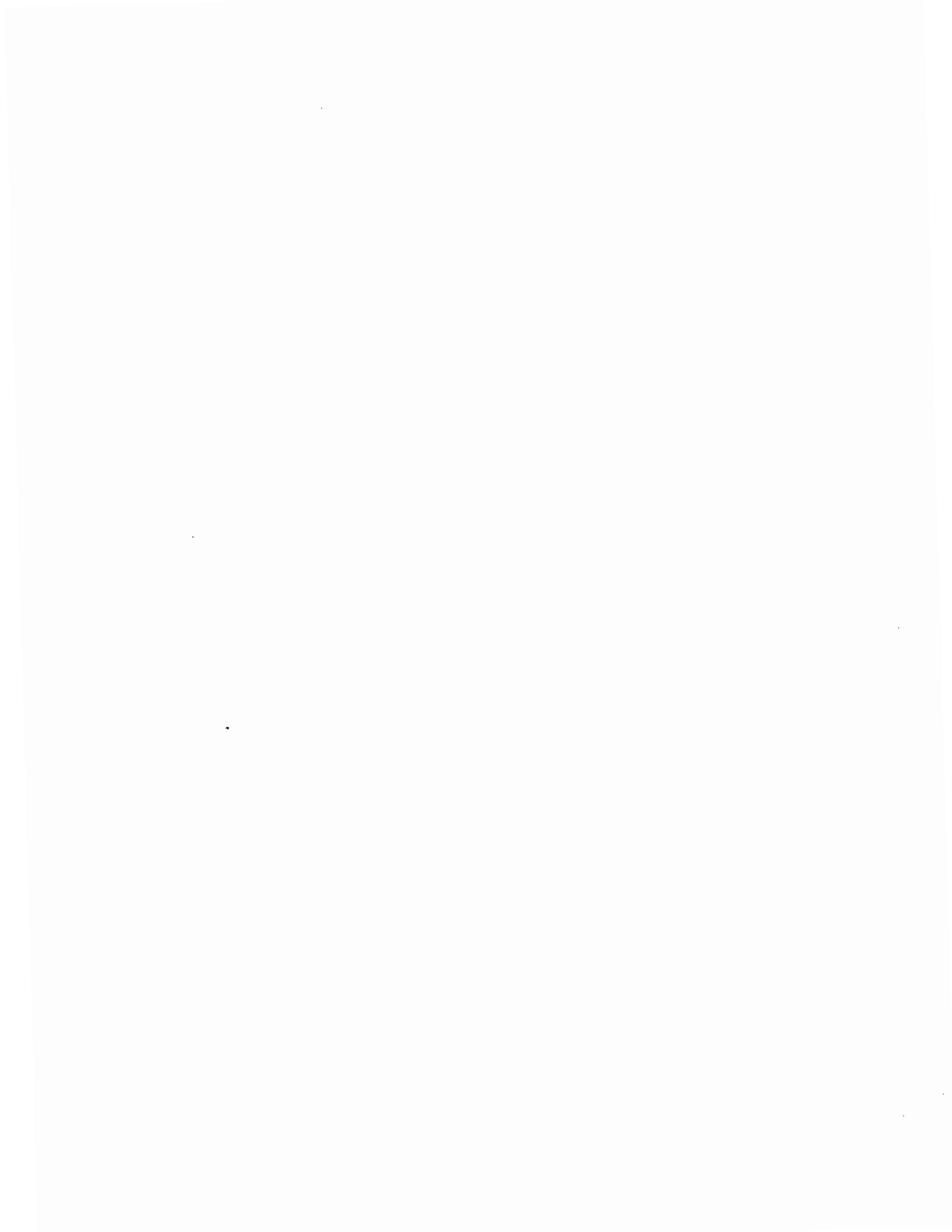




Removal and Installation of Safety Valve Plumbing. (See figure 13-5A.)

- a. Remove right-hand upholstery panel in accordance with Section 3.
- b. Remove vacuum hose (19) from "tee" (21) and from adapter located at right side of cabin, forward of instrument panel.
- c. Remove clamps securing vacuum lines to bulkheads along the right side of cabin.
- d. Disconnect line at unions and safety valve, then remove in five sections.
- e. Remove static pressure lines (13) from safety valve to aft pressure bulkhead.
- f. Installation is a reversal of removal procedures.

Variable Cabin Pressure System. (Optional)

The variable cabin pressure system provides the maximum for passenger comfort by allowing selection of any cabin pressure altitude above sea level. This selected cabin altitude is automatically maintained by the control system until the aircraft reaches an altitude creating ± 10 PSI differential pressure. The pressure rate-of-change for this system can be selected by the pilot providing maximum passenger comfort regardless of aircraft rate of ascent or descent.

The variable cabin pressure system utilizes the components of the standard system with the following additions: a variable rate cabin pressure outflow valve, a controller mounted on the pedestal which governs the outflow valve and plumbing interconnecting the valve and controller.

Outflow Valve.

The outflow valve governs cabin pressure and is actuated by a reference chamber in the variable controller. It is located in the aft cabin pressure bulkhead.

Removal of Outflow Valve. (See Figure 13-6.)

- a. Remove tailcone access door.
- b. Remove safety valve and outflow valve shroud.
- c. Disconnect static and vacuum lines from valve.
- d. Remove nuts, stat-o-seals and screws securing flow rings (23) to valve (25) and valve to doubler (26).

NOTE

On aircraft 421-0801 and On, discard removed gaskets and seal valves to bulkhead with approximately 1/8" diameter bead of RTV-106 sealant. Torque attaching screws to 4-6 inch-pound in a diametrically opposed sequence. Safetywire screws in accordance with standard procedures.

NOTE

To preclude possible leaks on assembly, discard all stat-o-seals and gaskets removed and install new ones.

Installation of Outflow Valve. (See Figure 13-6.)

- a. Assemble flow rings (23), stat-o-seals (24) and gaskets (12) to valve (25) with the stat-o-seals between flow rings and valve, held in position with the attaching screws (22).
- b. Place assembly in position on aft cabin bulkhead and secure with nuts (11).
- c. Adjust flow rings (23) to a minimum clearance of .05 inch between flow rings and valve (25).
- d. Connect static and vacuum lines.
- e. Install safety valve and outflow valve shroud.
- f. Install tailcone access door.

Variable Pressure Controller.

The variable pressure controller incorporates a reference chamber which controls the outflow valve which in turn governs the cabin pressure. The controller is referenced to a static air system, independent of the aircraft's static air system. The control is shock mounted and located on the control pedestal.

Removal of Pressure Controller. (See figure 13-6.)

- a. Remove screws (22) securing panel (28) to lower side of pedestal.
- b. Disconnect filter hose (14), outflow hose (15), static hose (16) and vacuum hose (17).
- c. Remove cap nuts (1) and pull control out far enough to disconnect post light wire.
- d. Remove four screws securing face plate (2) to control (4).

CAUTION

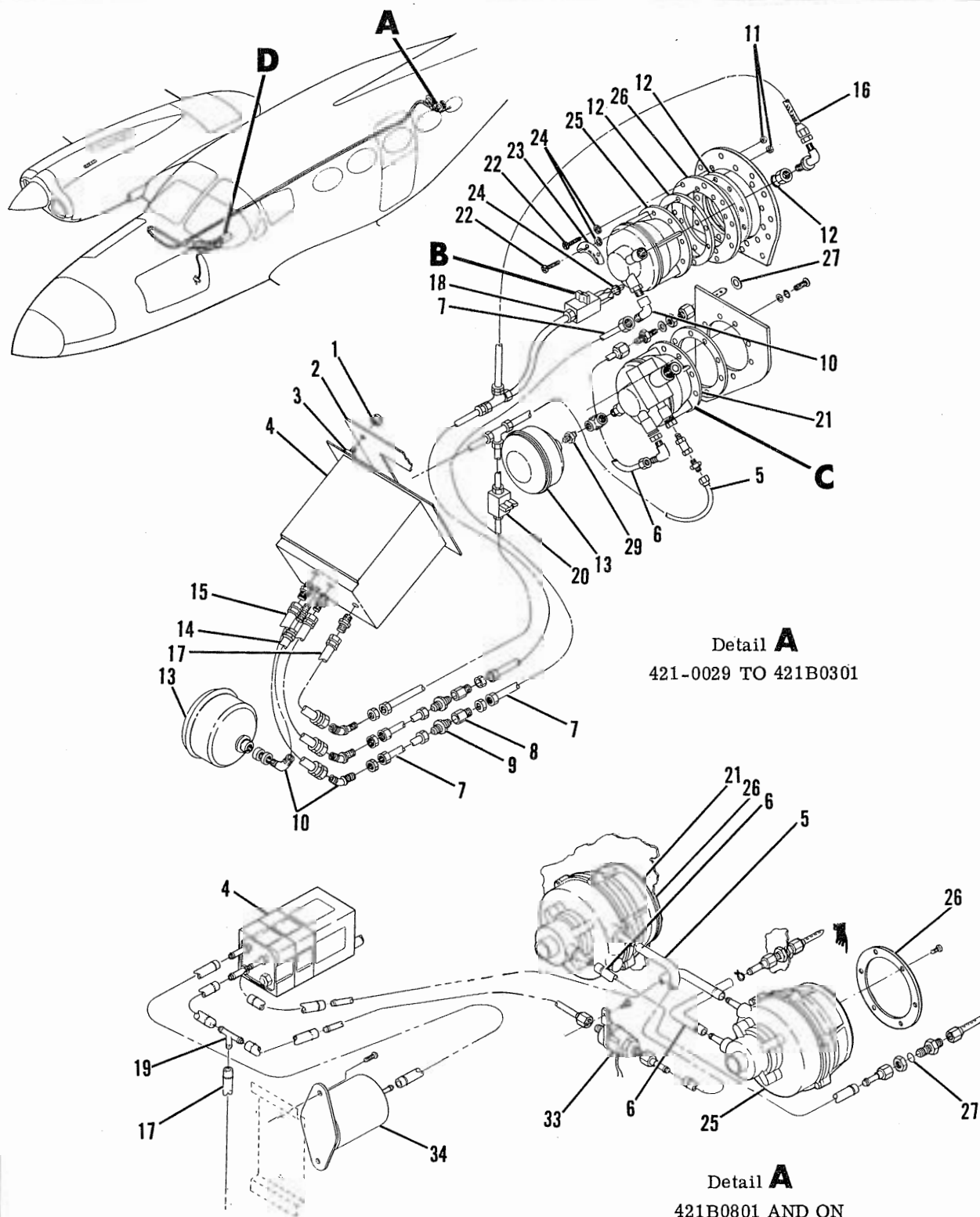
No adjustments should be attempted on controller or outflow valve. Repair is limited to replacement of parts.

Installation of Pressure Controller. (See Figure 13-6.)

Installation of pressure controller is the reversal of removal procedures.

Removal and Installation of Pressure Controller Plumbing. (See figure 13-6.)

- a. Remove safety valve and outflow valve shroud.
- b. Remove right side seats, pilot's seat, copilot's seat, kick plates and carpet as required in accordance with Section 3.
- c. Remove right lower side panels in accordance with Section 3.
- d. Remove floor access cover (73) and access cover (15) from lower side of fuselage. (See Figure 1-2.)
- e. Lower panel (28) and disconnect hoses (14, 15, 16 and 17) from pressure controller (4).
- f. Disconnect hoses (14, 15, 16 and 17) from elbow fittings and remove through access in bottom of the fuselage.
- g. Remove clamps securing static line (6) and outflow hose (15) seven places, disconnect at forward end and at aft fittings; then remove.
- h. Disconnect vacuum line (5) at fittings and remove in sections.
- i. Installation is a reversal of removal procedures.

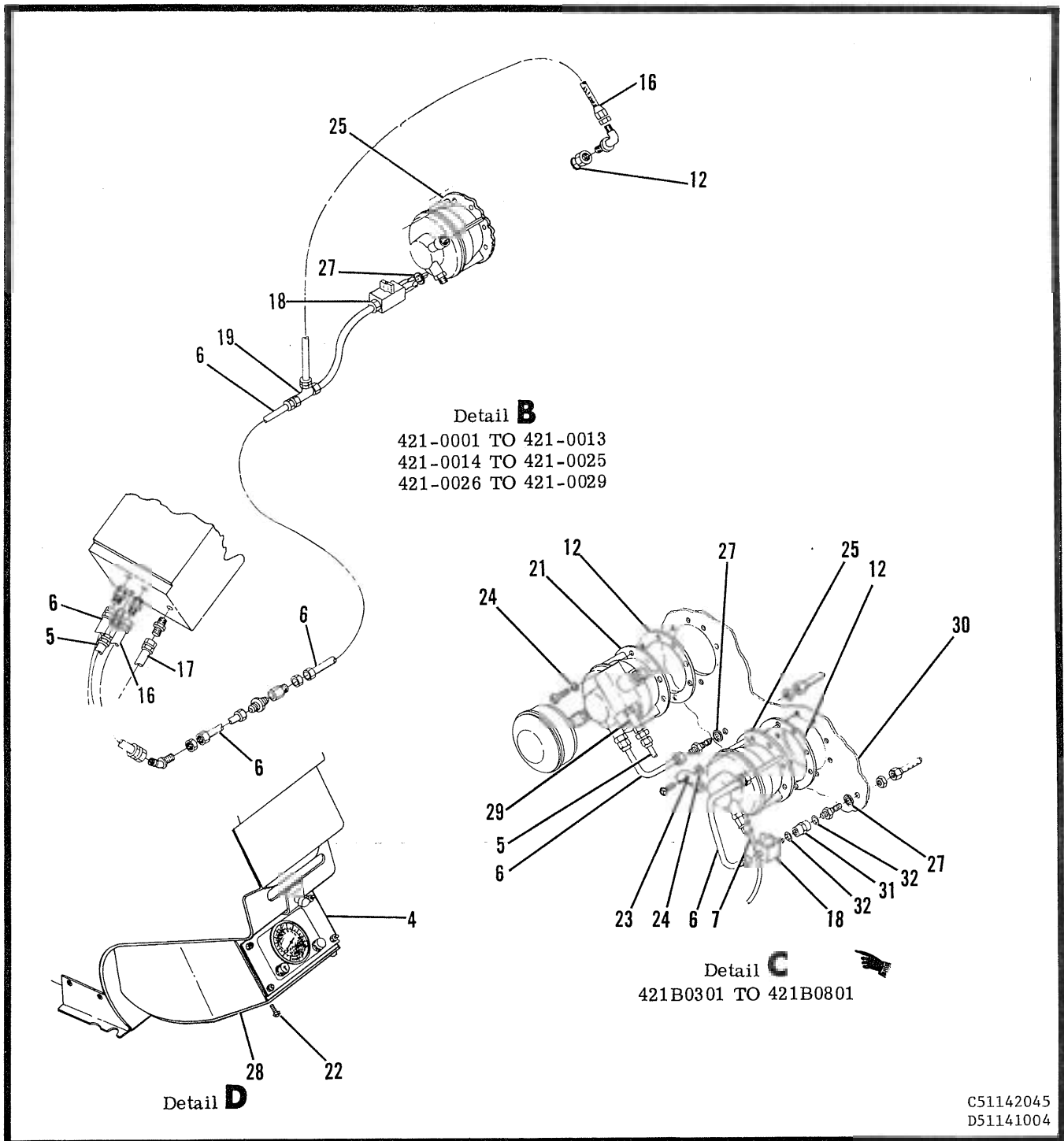


Detail **A**
421-0029 TO 421B0301

Detail **A**
421B0801 AND ON

51143063
A51143011
A51143071R

Figure 13-6. Variable Pressure Installation (Sheet 1 of 2)

C51142045
D51141004

1. Cap Nut	10. Elbow	18. Shutoff Valve	26. Doubler
2. Face Plate	11. Nut	19. Tee	27. Lock-O-Seal
3. Shock Mount	12. Gasket	20. Shutoff Valve	28. Panel
4. Outflow Valve Control	13. Filter	21. Safety Valve	29. Restrictor
5. Vacuum Line	14. Filter Hose	22. Screw	30. Aft Pressure Bulkhead
6. Static Line	15. Outflow Hose	23. Flow Ring	31. Coupling
7. Outflow Line	16. Static Hose	24. Stat-O-Seal	32. Packing
8. Coupling	17. Vacuum Hose	25. Outflow Valve	33. Solenoid Valve
9. Union			34. Volume Tank

Figure 13-6. Variable Pressure Installation (Sheet 2)

Preflight Ground Checkout Procedure. (421-0001 to 421B0801.) (Optional System.)

- a. Place aircraft in pressurized mode: doors and windows closed, cabin pressurize switch in PRESURIZE position, ram air valve control and dump valve control pushed full in.
- b. Disconnect electrical plug from cabin pressurization dump valve.
- c. Start and run engines at 20 inches of manifold pressure.
- d. On cabin altitude control, place cabin altitude needle on -1 (1000 feet below sea level).
- e. Set rate control arrow at midpoint (500 feet per minute) immediately after setting cabin altitude.
- f. Observe cabin rate of change gage. It should reflect a minus 500 ft. per minute reading for approximately four and one-half minutes after setting the rate control knob. After this time, it should drop back to zero.
- g. Observe cabin differential gage. It should increase to and then stabilize at approximately 1.2 psi. If erratic readings are observed check all associated lines for loose fittings. Also check for clogged air filter and obstructed static sensing port.

Leak Check of Pressurization Components. (See figure 13-6.) (421B0801 and On.)

- a. Remove the orifice fitting from the rear of the controller. In its place screw an AN814-5D plug.
- b. Disconnect the vacuum line from tee (19) to controller (4) at tee. Plug open end of line.
- c. Disconnect the line connecting the outflow valve (25) to controller (4) at the outflow valve.
- d. Connect an alternate source of vacuum to the disconnected line.
- e. Set controller altitude and rate selection knobs to maximum values.
- f. Pull a vacuum on the line. With 1 in. hg. vacuum (1000 ft. on altimeter), there should be no leakage observed for three minutes.

CAUTION

Controller unit will be damaged if more than 1 in. hg. vacuum is applied to line.

- g. At completion of leak check reconnect line to outflow valve and remove AN814-5D plug from controller and install orifice fitting.
- h. Remove plug from vacuum line and reconnect line to tee (19).

Preflight Ground Checkout Procedure. (421B0801 and On.) (Optional System.)

- a. Place aircraft in pressurized mode: doors and windows closed, pressurized air switches in PRESURIZE position, ram air valve control and dump valve control pushed full in.
- b. Pull CABIN PRESS circuit breaker.
- c. Start and run engines at 22 inches of manifold pressure. Confirm that aircraft vacuum is in the green range.
- d. On cabin altitude control, place cabin altitude pointer at a minimum of 1000 feet below field elevation.
- e. Set rate control arrow straight up (12 o'clock position) immediately after setting cabin altitude.
- f. Observe cabin rate-of-change gage. It should reflect approximately 500 feet per minute reading until cabin altitude approaches the selected altitude setting.
- g. Observe cabin differential pressure gage. It should increase and then stabilize at approximately .00 psi at sea level. The cabin differential pressure will increase approximately .50 psi per 1000 feet increase above sea level. See figure 13-6A.

ALTITUDE X 1000 FT	DIFFERENTIAL PRESSURE PSI	ALTITUDE X 1000 FT	DIFFERENTIAL PRESSURE PSI
1	.52	9	4.19
2	1.03	10	4.58
3	1.52	11	4.97
4	2.00	12	5.35
5	2.47	13	5.71
6	2.92	14	6.06
7	3.35	15	6.40
8	3.78	16	6.72

(STANDARD DAY)

Figure 13-6A. Pressure/Altitude Chart

CABIN PRESSURIZATION CHECK.

NOTE

Pressure and altitude readings given in parentheses apply to aircraft 421B0201 to 421B0301. Readings underlined apply to aircraft 421B0301 and On.

The cabin pressurization check should be conducted anytime 4.2 (4.4) 5.0 PSIG $\pm$.3 cabin differential cannot be maintained and/or during every 500 hour inspection. Outlined below are two cabin pressurization checks that may be utilized to recognize cabin pressurization leakage or equipment malfunction. The cabin pressurization flight check procedure is the preferred method and requires no test equipment. An alternate ground check procedure using SK421-1 may be conducted in lieu of the flight check to obtain the same basic results.

If the system is not functioning properly, obtain all information available as to the nature of the malfunction such as; when it occurs, altitude, maximum differential obtained, engine power settings, cabin pressurization control settings, any recent repairs or major equipment installation affecting the pressurized cabin section.

There are two principal areas to be considered in troubleshooting the cabin pressurization system.

- a. Engine and turbochargers.
- b. Pressurized cabin section and its regulating controls.

To isolate the source of the trouble, a flight check is recommended, this will accomplish the following:

- a. Check the performance of the engines and turbochargers (refer to Section 9 for Turbocharger Operation Flight Check Procedures).
- b. Check the cabin pressurization system in accordance with the Cabin Pressurization System Flight Check Preferred Method of this section.

Standard Cabin Pressurization System Flight Check (Preferred Method).

- a. Conduct a Turbocharger System Operational Flight Check, refer to Section 9 for Turbocharger Operation Flight Check Procedure.
- b. During climb, pressurize the cabin and observe operation of the system, noting the differential and comparing cabin altitude with the cabin pressurization operational flight check chart, figure 13-8A.

Maximum differential of 4.2 (4.4) 5.0 PSIG $\pm$.3 should be reached at 20,180 (20,860) 23,120 feet.

c. If the engines and turbochargers are functioning normally, according to the Turbocharger Operation Flight Check Procedure, Section 9, any malfunction of the cabin pressurization system should be isolated to the cabin area, its ducting seals and/or regulating equipment.

NOTE

If engines are not performing properly at altitude, the engine trouble should be corrected before proceeding further with this check.

d. While at cruise power and maximum differential pressure, check the following for air leaks: around the main cabin door, emergency exit window, cockpit storm windows, etc. Refer to Pressurization Troubleshooting Checklist in this section for additional areas to check.

e. Check cabin pressure regulator and safety valve for escaping air pressure; both valves should be closed if 4.2 (4.4) 5.0 PSIG $\pm$.3 differential is not being maintained at 20,180 (20,860) 23,120 feet or above.

f. Check the operation of each engine system and the pressurization air dump valves by dumping one valve at a time. A normal system will show a momentary rise in cabin altitude followed by a return to a stable condition on the cabin rate-of-climb indicator. Close the valve returning the system to pressurization from both engines. Dump the opposite valve and observe the cabin rate-of-climb indicator for change. The rate should become stable after a momentary rise in cabin altitude.

CAUTION

Severe personnel discomfort will be encountered if both dump valves are opened at the same time.

A continuing rate-of-change indication and a loss of differential pressure at a constant power setting, while pressurizing with one engine, could indicate leaking in the dump valves or ducting in that system.

g. If 4.2 (4.4) 5.0 PSIG $\pm$.3 differential pressure was not maintained during the check flight, refer to the Pressurization Troubleshooting Checklist and perform the Cabin Pressurization System Inspection found in Section 2.

Optional Cabin Pressurization System Flight Check (Preferred Method).

- a. Conduct a Turbocharger System Operational Flight Check, refer to Section 9 for Turbocharger Operation Flight Check Procedures.
- b. During the climb to altitude, set cabin altitude control for a sea level cabin. A properly functioning system should maintain a sea level cabin to 9000 feet altitude. A 4.2 (4.4) 5.0 PSIG $\pm$.3 differential pressure should be maintained throughout the remainder of the climb. Monitor cabin altitude during the climb and compare cabin pressurization with the cabin pressurization schedule in the 421 Owner's Manual.
- c. If the engines and turbochargers are functioning normally, according to the Turbocharger Operation Flight Check Procedures Section 9, any malfunction of the cabin pressurization system should be isolated to the cabin area, its ducting seals and/or regulating equipment.

NOTE

If engines are not performing properly at altitude, the trouble should be corrected before proceeding further with this check.

- d. While at cruise power and maximum differential pressure, check the following for air leaks: around the main cabin door, emergency exit window, cockpit storm windows, and etc., refer to Pressurization Troubleshooting Checklist in this Section for additional areas to check.
- e. Check cabin pressure regulator and safety valve for escaping air pressure, both valves should be closed if 4.2 (4.4) 5.0 PSIG $\pm$.3 differential pressure is not being maintained.
- f. Check operation of each engine and the pressurization air dump valves by dumping one valve at a time. A normal system will show a momentary rise in cabin altitude followed by a return to a stable condition on the cabin rate-of-change indicator. Close the valve, returning the system to pressurization from both engines. Dump the opposite valve and observe the cabin rate-of-change indicator for change. The rate should become stable after a momentary rise in cabin altitude.

CAUTION

Severe personnel discomfort will be encountered if both dump valves are opened at the same time.

A continuing rate-of-change indication and a loss of differential pressure at a constant power setting, while pressurizing with one engine, could indicate leaking in the dump valves or ducting in that system.

g. If 4.2 (4.4) 5.0 PSIG $\pm$.3 differential pressure was not maintained during the check flight, refer to the Pressurization Troubleshooting Checklist and perform the Cabin Pressurization System Inspection found in Section 2.

Cabin Pressurization System Ground Check (Alternate Method) (Standard and Optional Systems) (421-0001 to 421B0801).

Change 12

The following cabin pressurization ground check procedures, which is the alternate method, can be performed in lieu of the Cabin Pressurization Flight Check Procedures, using Cabin Pressurization System Test Kit, SK421-1.

CAUTION

To prevent damage to the engine due to overheating, this check should not be conducted when ambient temperature is above 85° F.

- a. Park the aircraft heading into the wind.

CAUTION

Conduct engine runup during this check with the cowl flap installed to prevent overheating. This check can be run using either engine.

- b. Remove plugs (421-0001 to 421-0014), cover plates (421-0014 to 421A0001) and manifold pressure relief valve (421A0001 and On) and connect gages as shown in figure 13-7.
- c. Route instrument hoses out of nacelle through the cowl flap opening. Place instruments close to tip tank and tape lines to wing.
- d. Remove sump from thermos console to gain access to the cabin outflow valve and turn lever (2, figure 13-5A) to TEST (Standard System) or close vacuum shutoff valve (20, figure 13-6) and static shutoff valve (18, figure 13-6) in the optional system. Access to the vacuum shutoff valve is gained by unsnapping the right-hand front upholstery panel next to the static drain valve. The static shutoff valve is in the aft cabin below the thermos console.
- e. (See figure 13-6.) Turn shutoff valve (20) to closed position to deactivate system.
- f. Position master switch to ON and pressurization dump valve switches to NORMAL.
- g. Place ram air valve control to PRESSURIZED.
- h. Close cabin doors and windows.
- i. Set aircraft altimeter to 29.92 in. Hg. and record field pressure altitude.
- j. Start instrumented engine in accordance with Starting Procedures in aircraft Owner's Manual.

CAUTION

Do not allow engine manifold pressure to exceed 28.0 in. Hg. when starting, to prevent damage to the differential pressure test gage. After the engines are started, the manifold pressure can be increased; however, the differential pressure test gage must be monitored to prevent rapid acceleration. To provide for personnel comfort, throttle movements (increase or decrease) should be monitored to maintain a cabin pressure rate-of-change of not more than 1000 feet per minute.

- k. (See figure 13-8.) The following step by step procedures are given to determine if the cabin is

pressurizing properly.

1. Starting at field pressure altitude, recorded in step i., on chart A, project a line from field pressure altitude to the diagonal guide line then to absolute pressure reading.

2. Increase engine RPM until absolute pressure gage reading, as determined in step 1., is reached, and hold this reading for one minute. Record the differential pressure gage reading. This is measured cabin differential pressure.

3. Record the aircraft outside air temperature, then starting from this point on chart B, project a line to the guide line then to differential pressure gage reading.

4. If the differential pressure gage reading obtained from chart B is equal to or more than the actual differential pressure gage reading obtained in step 2., the cabin differential pressure rate is acceptable.

1. If the differential pressure is greater than that obtained from Chart B, the cabin pressurization system is not maintaining a proper differential pressure and the Cabin Pressurization System Inspection found in Section 2 should be performed.

m. After test is completed, remove all test equipment and restore to original configuration.

NOTE

Check gasket, if damaged replace with a new gasket.

CAUTION

Be sure that "O" ring remains in groove on relief valve when installing to adapter plate.

n. (See figure 13-5A.) On the standard cabin pressurization system, set cabin outflow valve (3) to FLIGHT position and safety.

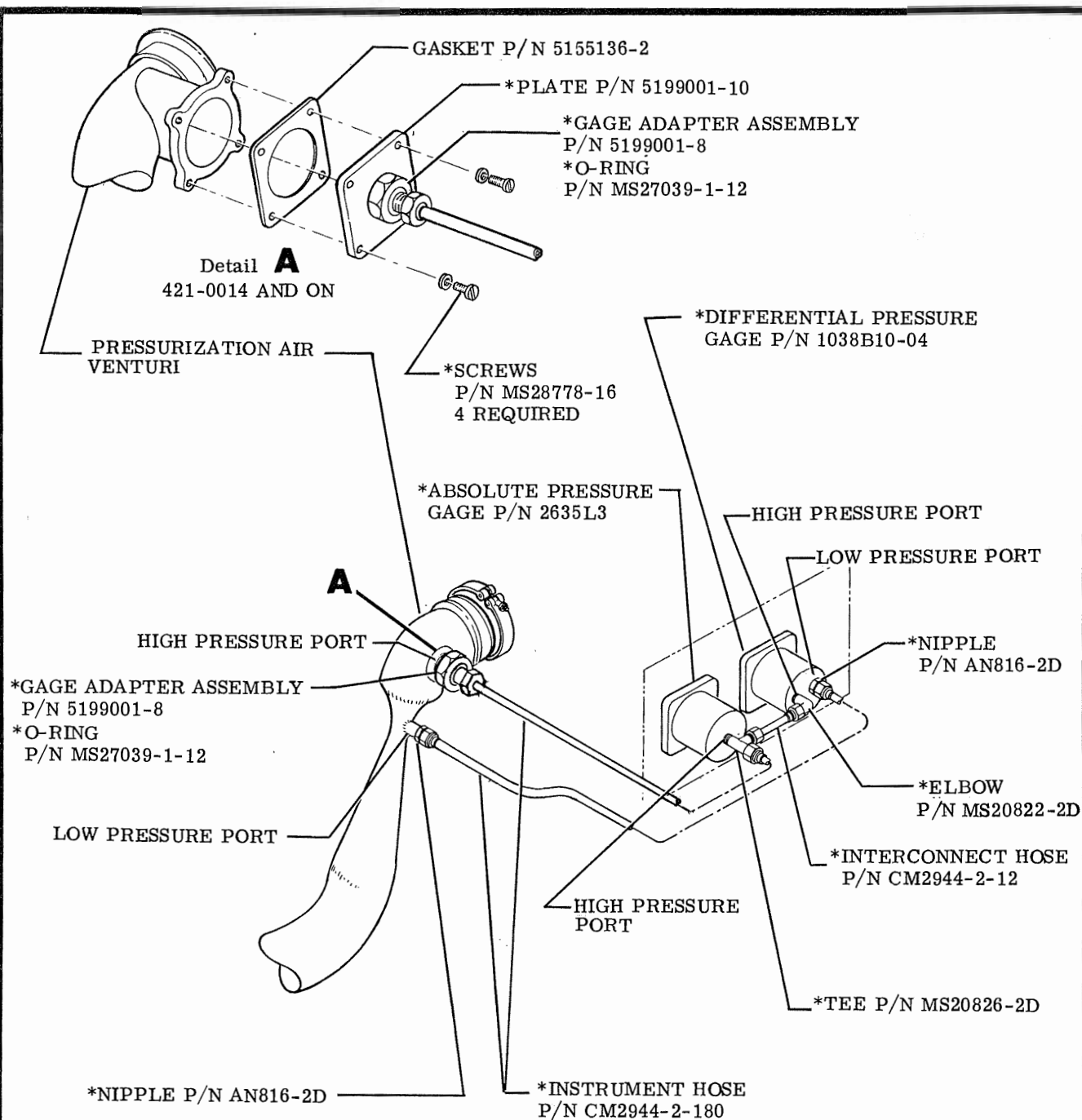
o. (See figure 13-6.) On the optional cabin pressurization system, return vacuum shutoff valve (20) and static shutoff valve (18) to the open position. Safety static shutoff valve (18) in the open position.

NOTE

On the optional pressurization system the vacuum and static shutoff valves must be open for the cabin pressurization system to function properly. The vacuum shutoff valve must be safetied open.

PRESSURIZATION TROUBLE SHOOTING CHECKLIST.

LOCATION	PROBABLE CAUSE	CORRECTION
Entrance Door*	Faulty seals and/or Lock-O-Seals	Repair or replace seal Refer to SK421-2
Emergency Exit*	Faulty seal	Replace seal
Foul Weather Windows	Faulty seals	Replace seals
Wire Bundles at Sta. 100.00 Bulkhead	Sealant broken	Reseal bundle
Access Doors	Faulty seals	Replace seals
Windows	Sealant broken	Replace sealant
Nose Gear Push-pull Tube	Boot loose or torn	Replace boot
Main Gear Push-pull Tube	Boot loose or torn	Replace boot
Control Column Bearing Cover	Gasket	Reseal gasket
Controls at Sta. 100.00 Bulkhead	Sealant broken	Reseal controls
Controls at Stub Wing	Sealant broken	Reseal controls
Safety Valve and Outflow Valve	Faulty gaskets and/or Lock-O-Seals	Replace gaskets
*A small amount of leakage around these areas is normal.		



*PARTS SUPPLIED IN SK421-1

Figure 13-7. Cabin Pressurization Test Equipment

SAMPLE PROBLEM: (for Chart A)

1. Field Pressure Altitude - 3400 Ft.
2. Guide Line
3. Absolute Pressure Gage Reading - 31.4 in. Hg.

SAMPLE PROBLEM: (for Chart B)

1. Outside Air Temperature - 88°F
2. Guide Line
3. Differential Pressure Gage Allowance - 83 in. H₂O.

CHART A

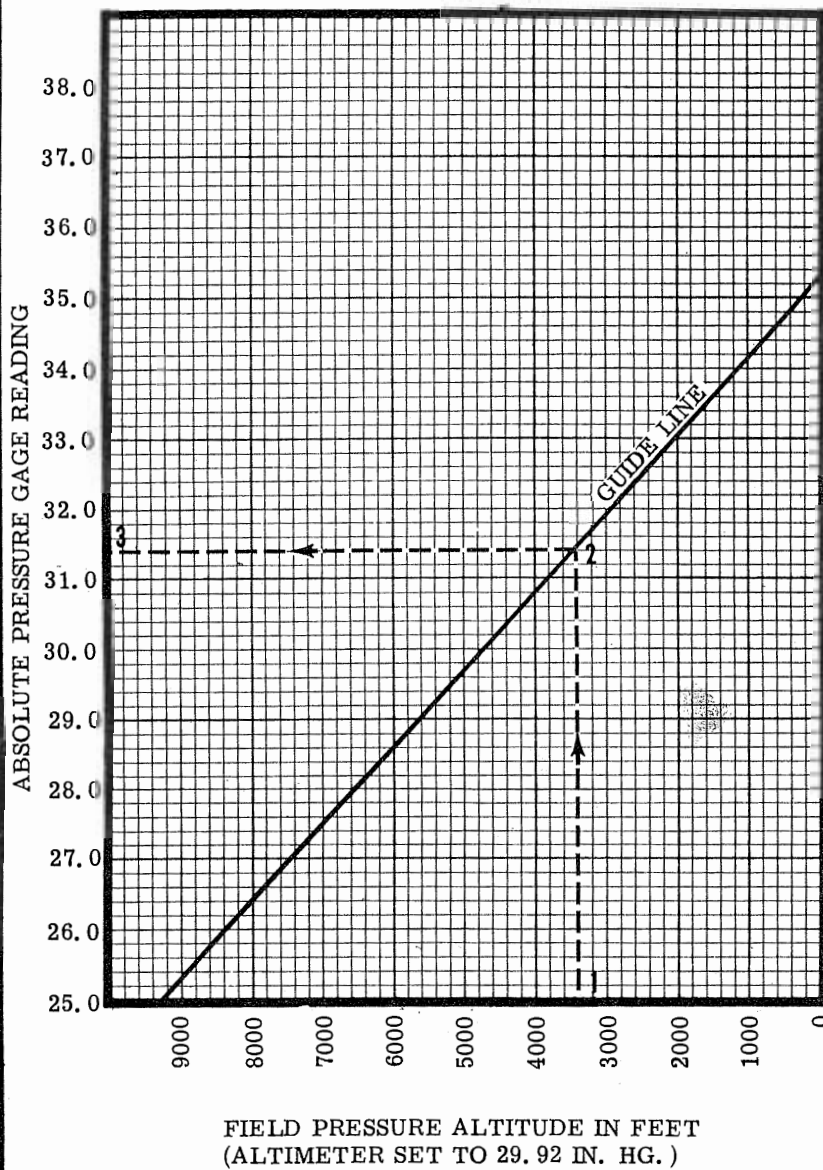


CHART B

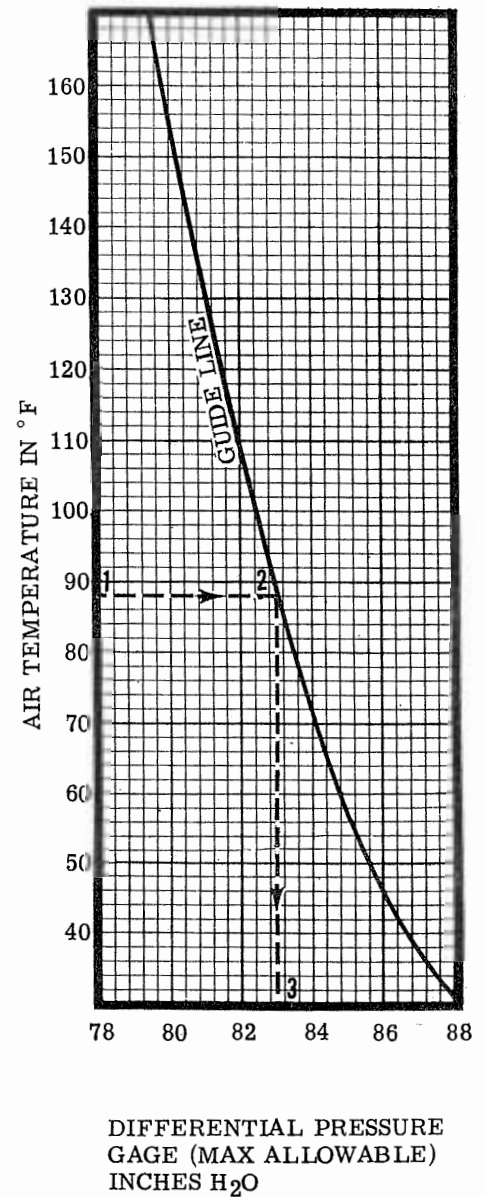
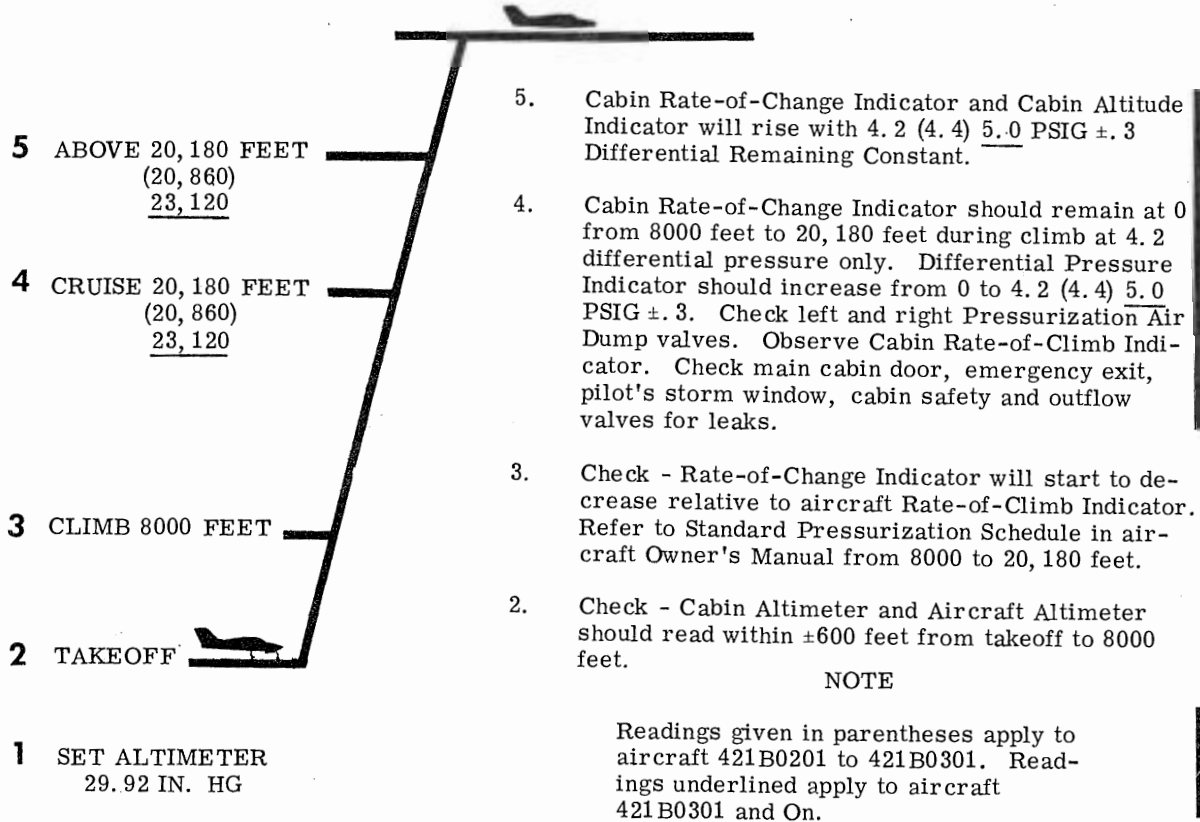
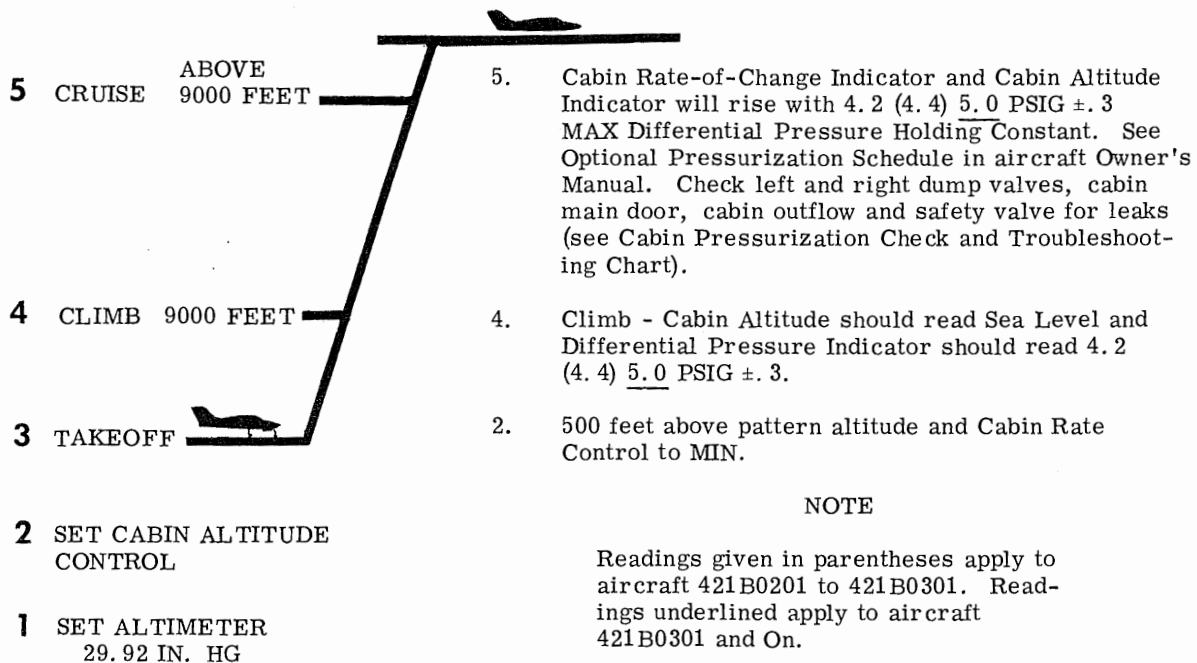


Figure 13-8. Leak Rate Chart



CABIN PRESSURIZATION SYSTEM STANDARD



CABIN PRESSURIZATION SYSTEM OPTIONAL

Figure 13-8A. Cabin Pressurization Operation Flight Check Chart

OXYGEN SYSTEM.

The optional oxygen system is designed to supply oxygen for a pilot and five passengers. The optional system consists of an oxygen cylinder, filler valve (inside left nose baggage door), plumbing, oxygen pressure gage, six outlet couplings, two permanent oxygen masks and four disposable type oxygen masks. Two optional bottle sizes are provided, an 11.0 cubic foot capacity bottle and a 114.9 cubic foot capacity bottle which meets the air carrier oxygen requirements. On aircraft 421B0301 and ON the 48.3 and 76.6 cubic foot oxygen installations incorporate an oxygen altitude compensator in the line from the regulator to the cabin outlets. This compensator reduces oxygen expenditures at lower altitudes and increases the oxygen duration.

All aircraft are equipped with standard plumbing from the forward cabin bulkhead to the six standard oxygen outlet couplings. Oxygen is routed from the high pressure cylinder through a regulator-shutoff valve. The regulator-shutoff valve reduces high cylinder pressure to a low usable pressure, and is controlled by a knob located just left of the pedestal. The low oxygen pressure is routed to six, outlet couplings which supply a continuous flow of oxygen to the oxygen mask whenever the mask hoses are plugged into the couplings. Each coupling contains a spring-loaded valve which prevents the flow of oxygen until the mask hose is plugged into the coupling. Each mask hose contains a flow indicator for visual proof of oxygen flow. The filler valve is located inside of the nose baggage door and eliminates the removal of the oxygen cylinder for refilling. The filler valve is a self-sealing automatic

valve which requires no manual opening or closing. A protective cap screws over the filler valve to prevent entry of foreign particles. The oxygen pressure gage is connected to the regulator-shutoff valve by a tube and indicates the amount of oxygen pressure in the oxygen cylinder.

WARNING

Oil, grease or other lubricants in contact with oxygen create a serious fire hazard, and such contact must be avoided. Do not permit smoking or open flame in or near aircraft while work is performed on oxygen system, or when the system is in operation. Guard against inadvertently turning the master switch on.

WARNING

USE NO OIL. Also keep equipment free of organic material (dust, lint, etc.). Be sure hands and clothing are free of oil, grease, soap, lipstick, lip balm and other fatty materials.

CAUTION

Prior to initial use, the oxygen system shall be purged with oxygen for a period of ten (10) minutes by inserting mask fitting at each of the outlets and allowing the oxygen to flow through slowly. If the system has not been used for a period of two (2) years, the regulator shall be inspected and rubber materials replaced.

Trouble Shooting the Oxygen System.

TROUBLE	PROBABLE CAUSE	CORRECTION
NO PRESSURE INDICATION ON PRESSURE GAGE	Leak in system has exhausted pressure.	Visually check pressure gage. Charge system and use detector fluids, type CG-1, MIL-25567A, or its equivalent, to check lines and fittings. Tighten or replace fittings as necessary.
	Defective pressure gage.	Pull knob out, insert mask hose into outlet and note flow indicator. Replace gage.
PRESSURE INDICATION NORMAL BUT OXYGEN FAILS TO FLOW	Defective oxygen cylinder-regulator assembly.	Replace oxygen cylinder-regulator assembly.
OXYGEN DURATION TOO SHORT	Leak in system.	Draw a line on gage cover glass directly over pointer with a grease pencil. Loss of oxygen should not exceed one percent of total supply for a 24-hour period. Charge system and use detector fluids. Type CG-1, MIL-25567A, or its equivalent, to check lines and fittings. Tighten or replace fittings as necessary.

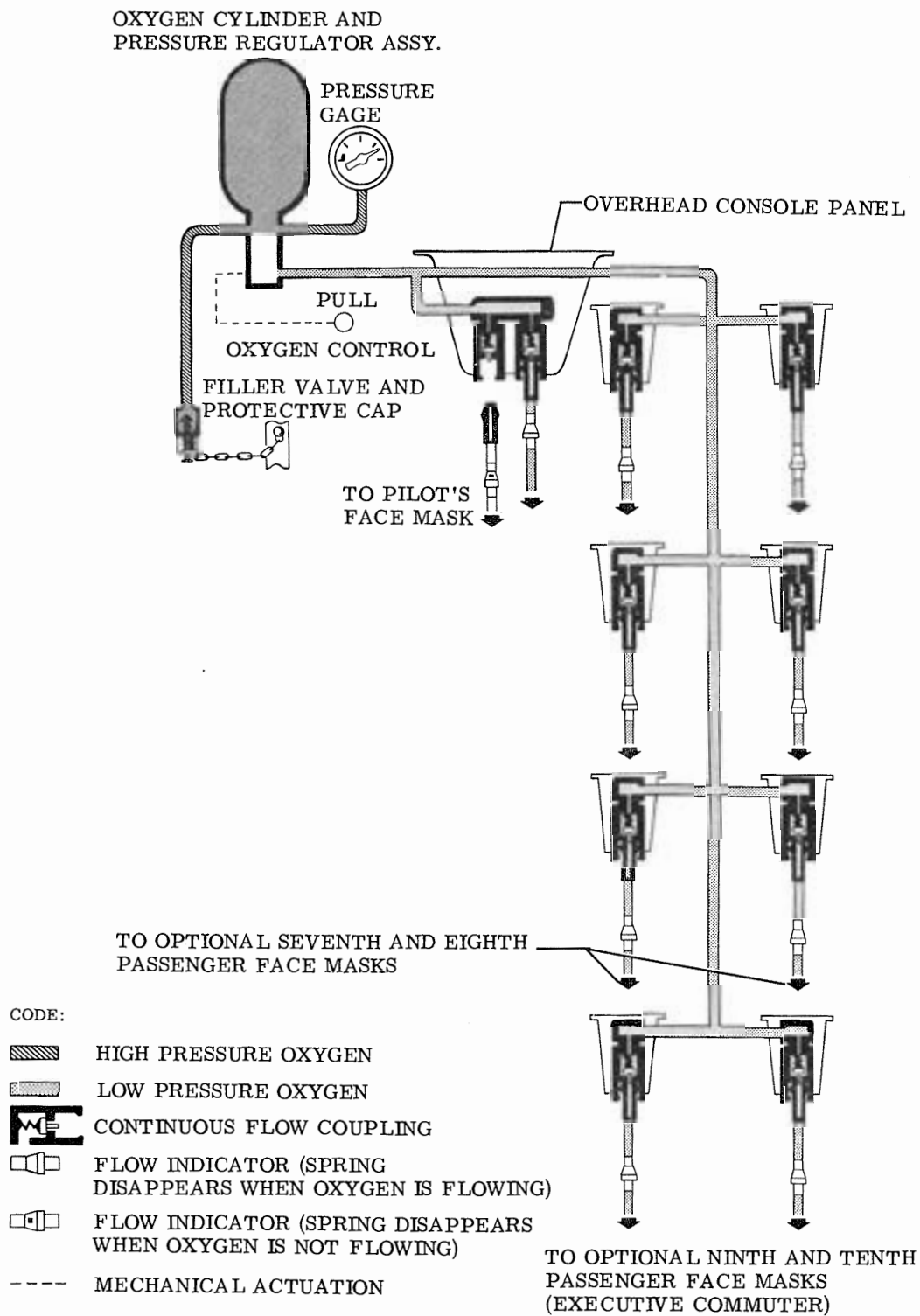
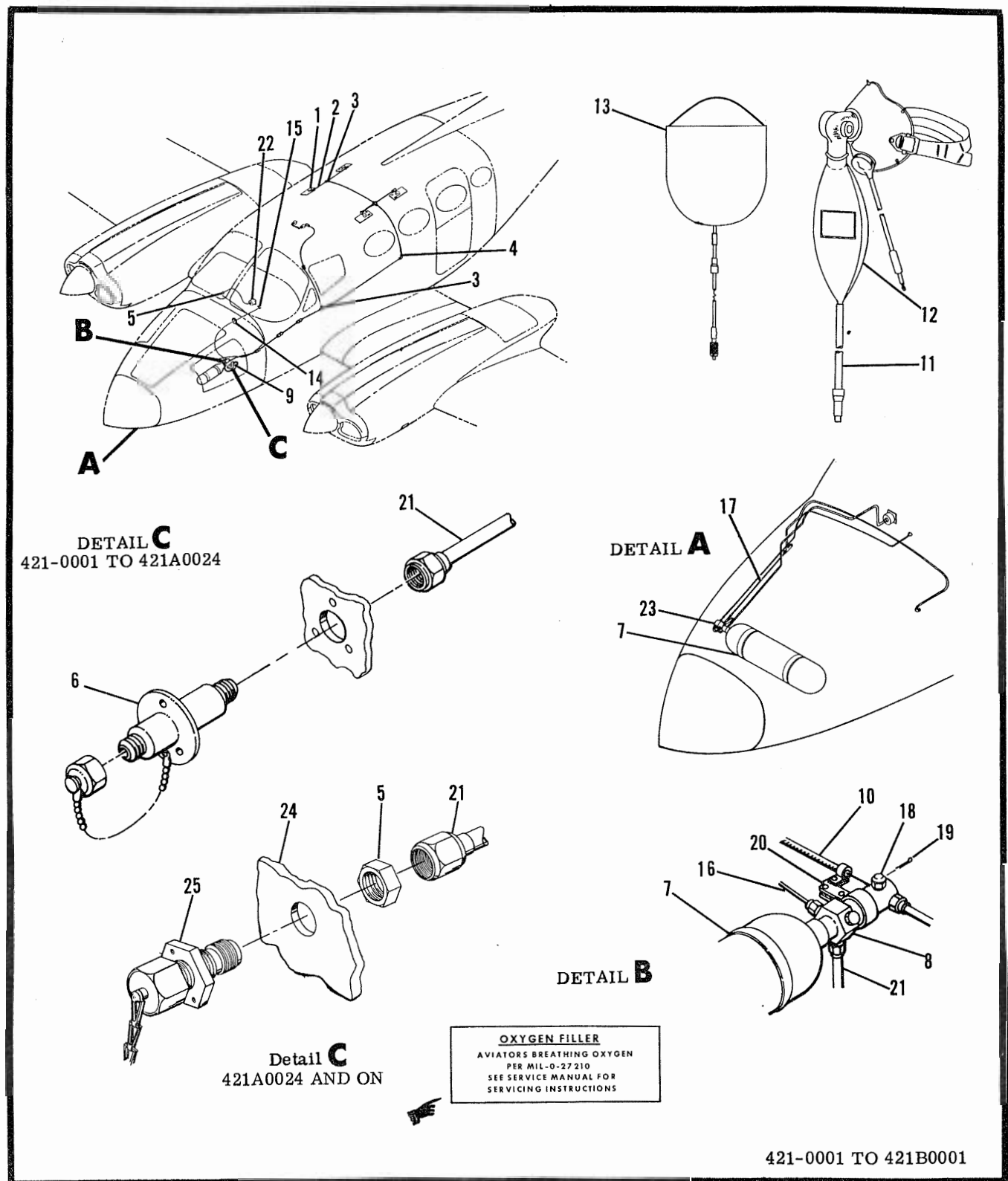


Figure 13-9. Oxygen System Schematic

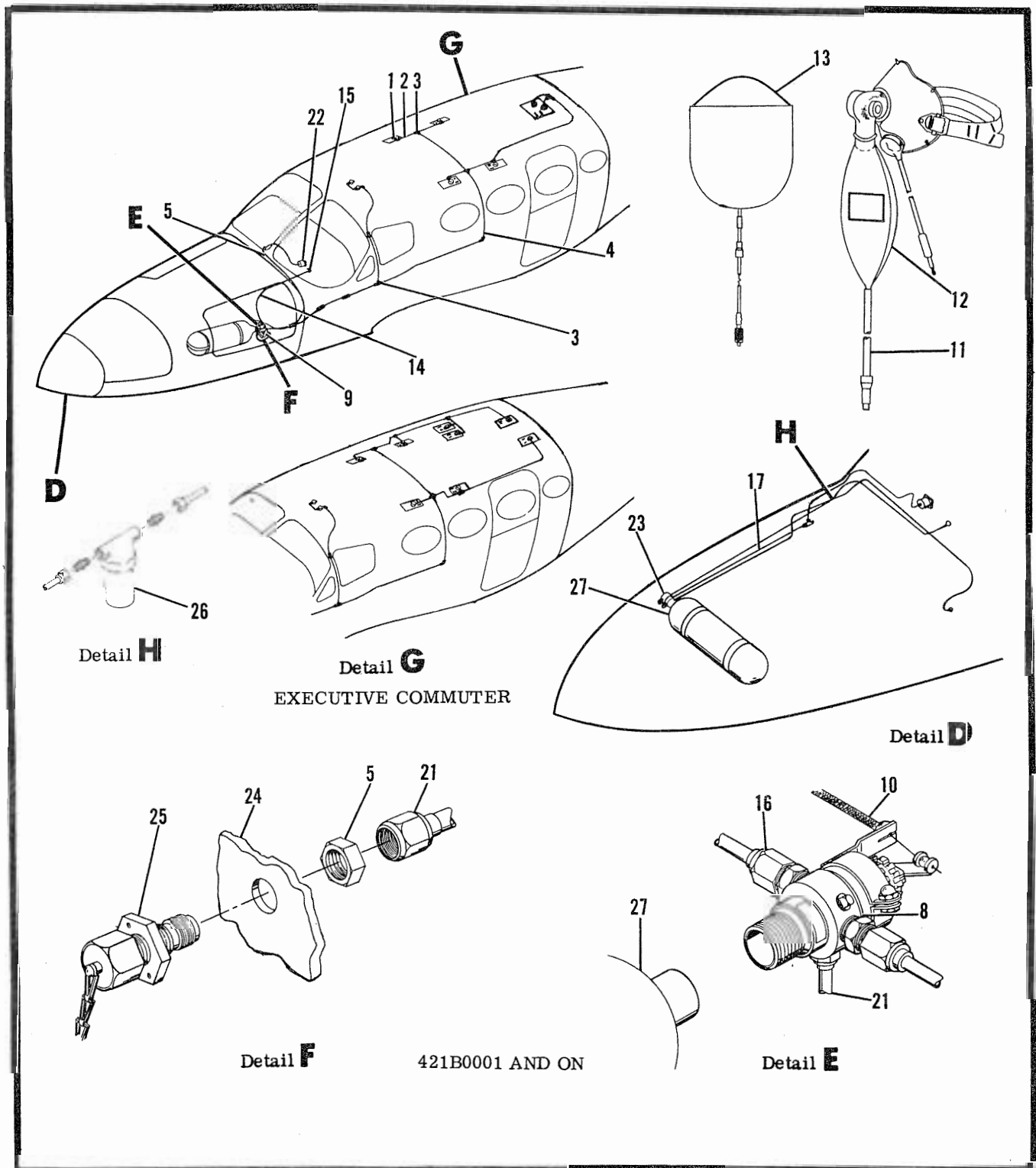


1. Oxygen Outlet
2. Line
3. Tee
4. Elbow

5. Union
6. Filler Valve
7. Mounting Clamp

8. Oxygen Cylinder Regulator Assembly (11.0 cu. ft.)
9. Shutoff Valve
10. Control Cable

Figure 13-10. Oxygen System Installation (Sheet 1 of 2)



11. Mask Hose
12. Oxygen Mask
13. Disposable Oxygen Mask
14. Seal Assembly
15. Oxygen Control Knob
16. Capillary Line

17. Low Pressure Line
18. Pressure Relief Valve
19. Cotter Pin
20. Control Mounting Clamp
21. Filler Valve Line
22. Pressure Gage

23. Oxygen Cylinder Regulator Assembly (114.9 cu. ft.)
24. Bulkhead Sta. 94.75
25. Bulkhead Fitting
26. Altitude Compensating Oxygen Regulator
27. Oxygen Cylinder

Figure 13-10. Oxygen System Installation (Sheet 2 of 2)

Maintenance of Oxygen System.

Before and during maintenance on oxygen systems, the following general rules must be followed:

- a. Clean hands, tools, and working area.
- b. Keep grease, oil, water and all foreign matter from system.
- c. Keep all lines dry and capped until installed.
- d. All compounds used on fittings must conform to MIL-T-5542. No compound shall be used on aluminum alloy flared fittings. Compounds are used only on the first three threads of male fittings. No compound is used on coupling sleeves, or outside of tube flares.

CAUTION

Whenever a component of the oxygen system (lines, gages, cylinders or regulators, etc.) has been removed, reinstalled, replaced, or system has been disassembled in any way, the oxygen system must be leak checked and purged as per procedures outlined in this section.

- e. Inspection of the cylinder is required before charging. Do not attempt to charge the cylinder if any of the following conditions exist:

1. Contamination or corroded fitting on cascade cylinder of filler valve.
2. Cylinder out of hydrostatic test date.
3. Cylinder bears no I. C. C. designation.
4. Cylinder completely empty after shutoff valve has been turned off for a length of time. Must be completely disassembled and inspected in an FAA approved facility before charging.
- f. Fabrication of pressure lines is not recommended. Lines should be replaced from factory by part number.
- g. Lines and fittings shall be clean and dry. One of the following methods may be used to clean lines:
 1. A vapor degreasing solution of stabilized trichlorethylene conforming to Specification MIL-T-7003 followed by blowing tubing clean and dry with a stream of clean, nitrogen gas (BB-N-411) Type 1, Class 1, Grade A or technical Argon (MIL-A-18455).

CAUTION

Most air compressors are oil lubricated, and a minute amount of oil may be carried by the air stream. A water lubricated compressor should be used to blow tubing clean.

2. Flush with naphtha conforming to Specification TT-N-95, then blow clean and dry with clean, dry, nitrogen gas (BB-N-411) Type 1, Class 1, Grade A or technical Argon (MIL-A-18455). Flush with anti-icing fluid conforming to MIL-F-5566 or anhydrous ethyl alcohol. Rinse thoroughly with fresh water and dry with clean, nitrogen gas (BB-N-411) Type 1, Class 1, Grade A or technical Argon (MIL-A-18455).
3. Flush with hot inhibited alkaline cleaner until free from oil and grease. Rinse with fresh water and dry with clean, nitrogen gas (BB-N-411) Type 1, Class 1, Grade A or technical Argon (MIL-A-18455).

NOTE

Cap lines at both ends immediately after drying to prevent moisture from entering.

Bleeding the Oxygen System. (See figure 13-10.)

- a. Pull oxygen control knob (15) to ON position.
- b. Remove tubing from mask end of one of the passenger's oxygen masks and insert into oxygen outlet and route the hose outside the cabin area through the pilot's foul weather window.

WARNING

The bleeding procedure should be accomplished outdoors. If the bleeding is done indoors extreme care must be exercised to prevent oxygen flow from oils, grease, contaminants and electrical sparks. The area should be roped off and no smoking or open flame in or near the area.

- c. Bleeding the oxygen system into the cabin area is not recommended.

Removal of Oxygen Cylinder-Regulator Assembly. (See figure 13-10.)

The following procedures are for the 11.0 cu. ft. capacity cylinder. The 114.9 cu. ft. cylinder is located in nose baggage compartment, mounted on the compartment floor. Access to the filler valve is through the right baggage compartment access door. Removal and installation of the 114.9 cu. ft. capacity cylinder is the same as for the 11.0 cu. ft. cylinder.

- a. Remove nose baggage compartment floor to gain access to oxygen cylinder and regulator.
- b. Push oxygen control knob (15) to OFF position and disconnect lines (16, 17 and 21) from oxygen cylinder-regulator assembly (8).
- c. Disconnect control cable (10) from oxygen cylinder-regulator assembly (8).
- d. Remove control mounting clamp (20) from oxygen cylinder-regulator assembly (8).
- e. Loosen mounting straps (7) and lift oxygen cylinder from aircraft.

CAUTION

Do not rotate control lever to the ON position with outlet ports (low pressure) open to atmosphere. Damage to regulator metering poppet will occur.

Installation of Oxygen Cylinder-Regulator Assembly. (See figure 13-10.)

WARNING

Extreme care must be taken when installing or working near the cylinder-regulator to prevent damaging the cylinder. The slightest scratch, nick or dent is cause for immediate condemnation of the cylinder.

- a. Install oxygen cylinder-regulator assembly (8) in the nose compartment position in mounting clamps (7). Do not tighten at this time.
- b. Align oxygen cylinder-regulator assembly (8) with control cable (10) and three line assemblies (16, 17 and 21). Tighten nuts on mounting straps (7).
- c. Install three line assemblies (16, 17 and 21) on the oxygen cylinder-regulator assembly (8).

CAUTION

On aircraft 421B0058 and On, an overboard vent line is incorporated. Make sure vent line is connected.

- d. Install control mounting clamp (20) on the oxygen cylinder-regulator assembly (8) and connect control cable (10) to the control actuator with cotter pin (19).
- e. Install nose baggage compartment floor.

Removal of Altitude Compensating Oxygen Regulator. (See figure 13-10.) (421B0301 and On)

- a. Move oxygen control knob to the OFF position.

NOTE

Repair or maintenance of this unit is not recommended. If malfunction should occur, remove and replace.

- b. Disconnect inlet and outlet lines from compensating regulator (26).
- c. Remove compensating regulator from aircraft.
- d. Install clean dry caps in inlet and outlet ports of compensating regulator and install clean dry plugs in disconnected oxygen lines.

Installation of Altitude Compensating Oxygen Regulator. (See figure 13-10.) (421B0301 and On)

- a. Remove protective caps and plugs from compensating regulator and supply lines.
- b. Position compensating regulator in place and connect supply lines to compensating regulator.
- c. Move oxygen control knob to the ON position and check for leaks.

Removal of Oxygen Pressure Gage. (See figure 13-10.)

The oxygen pressure gage may be removed without bleeding the oxygen pressure. A check valve is installed in the gage pressure outlet of the regulator

Each interconnected series of oxygen cylinders is equipped with a single gage. The trailer type cascade may also be equipped with a nitrogen cylinder (shown reversed) for filling landing gear struts, accumulators, etc. Cylinders are not available for direct purchase, but are usually leased and refilled by a local compressed gas supplier.

Service Kit SK310-32 (available from the Cessna Dealers' Organization) contains an adapter, a pressure gage, hose, lines, and fittings for equipping two oxygen cylinders to service oxygen systems. As noted in the Service Kit, a tee (Part No. 11844) and a pigtail (Part No. 1243-2) should be ordered for each additional cylinder to be used in the cascade of cylinders. Be sure to ground the aircraft and ground servicing equipment before use.

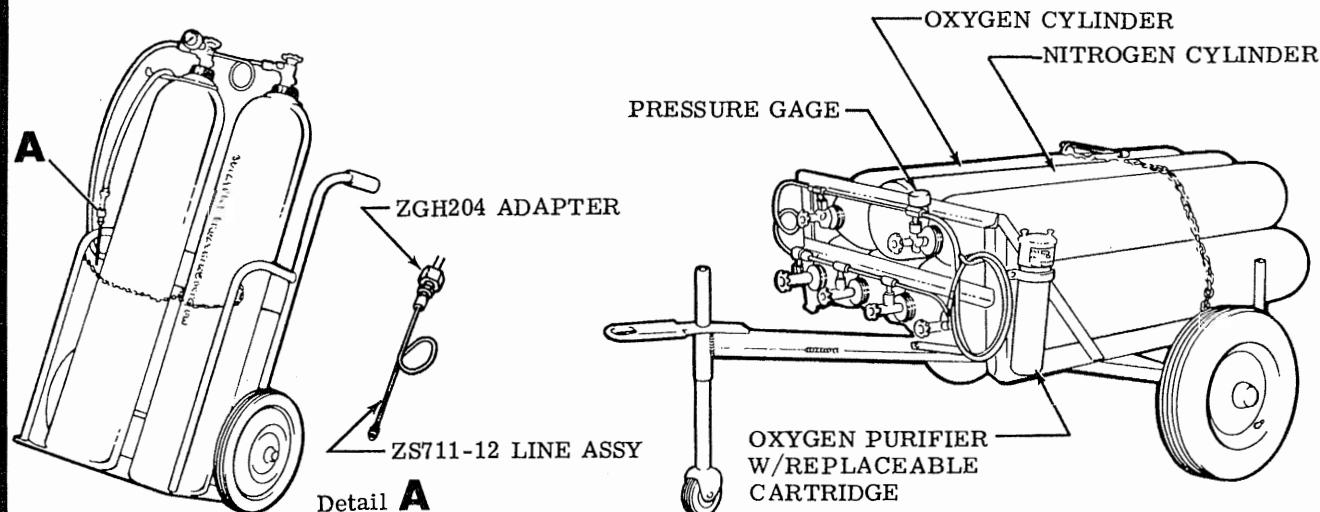


Figure 13-11. Typical Portable Oxygen Cascades

to shutoff the flow of oxygen from the cylinder when the capillary line is disconnected at the oxygen cylinder-regulator.

WARNING

Use non-sparking tools, make sure tools, and hands are free from oils, grease and other contaminants when working with oxygen.

- a. Disconnect capillary line (16) at regulator. The check valve should close as the line is loosened.

CAUTION

If oxygen continues to flow, reconnect line and bleed off pressure in accordance with bleeding procedures.

- b. Disconnect capillary line (16) at gage from nipple in back of pressure gage (22).
c. Cap all lines immediately after disconnecting.
d. Remove pressure gage by removing the mounting screws.

Installation of Oxygen Pressure Gage. (See figure 13-10.)

- a. Installation of oxygen pressure gage is the reversal of removal procedures.

Removal of Oxygen Filler Valve. (See figure 13-5.)

The oxygen filler valve may be removed without bleeding the oxygen pressure system. A check valve is incorporated in the high pressure side of the oxygen

INSPECTION CRITERIA FOR ACCEPTANCE OF OXYGEN CYLINDERS

The following data may be used to determine that oxygen cylinders are acceptable for service. This criteria should be used prior to charging cylinders.

Discrepancies	Cylinder Classification	
	ICC-3AA 1800	ICC-8HT 1800
Isolated pitting or corrosion (Depth)	.020 2 3	.010 2 3
Local pitting or corrosion or line corrosion (Depth)	.010 3 4	.005 3 4
General corrosion	Not allowed 5	Not allowed 5
Cuts, Digs, gouges (Depth)	.010 6	.005 6
Dents (Depth)	.062 7	.031 7
Fire Damage	Not allowed 8	Not allowed 8
Bulges	Not allowed 9	Not allowed 9

2	Isolated pits of small cross section involving loss of wall thickness by corrosive media. Small isolated pits with a maximum depth as shown are acceptable.
3	If depth exceeds figure shown, cylinder must be returned to the manufacturer for disposition.
4	Local pitting or corrosion or line corrosion involving loss of wall thickness by corrosive media with a pattern of pits which are connected to others in a band or line. A small area with a minimum depth as shown is acceptable. Areas extending beyond 3 inches in diameter or 4 inches long shall be considered general corrosion.
5	General corrosion (sometimes accompanied by pitting) involving loss of wall thickness by corrosive media covering a considerable area. Cylinder must be returned to the manufacturer for hydrostatic testing.
6	Deformations caused by contact with a sharp object cutting or upsetting the material of the cylinder, decreasing the wall thickness. Maximum defect permissible without corrective action. If this depth is exceeded, the cylinder must be returned to the manufacturer for removal of defects and verification of cylinder strength by hydrostatic testing.
7	Deformations caused by contact with blunt objects in such manner that the thickness of the metal is not materially impaired. The major diameter of the dent must be equal to or greater than 32 times the depth of the dent. Sharper dents (or deeper dents) than this are considered too abrupt and must be returned to the cylinder manufacturer for disposition.
8	Fire damage is indicated by charring or burning or sintering of the metal, charring or burning of the paint, distortion of the cylinder, functioned safety relief devices, melting of valve parts, etc. Cylinders must be returned to the cylinder manufacturer for disposition.
9	Bulged cylinders are not acceptable. Cylinders must be returned to the cylinder manufacturer for disposition.

regulator to shutoff the flow of oxygen from the cylinder when the high pressure line is disconnected from the oxygen cylinder.

- a. Disconnect filler valve line (21) at oxygen regulator.

CAUTION

If oxygen continues to flow when line is removed reconnect the line and bleed off oxygen pressure in accordance with bleeding procedures.

- b. Disconnect the filler line (21) from filler valve (6).
- c. Cap all lines immediately after disconnecting.
- d. Remove filler valve protective cap.
- e. Remove filler valve by removing three nuts and bolts.

Installation of Oxygen Filler Valve. (See figure 13-10.)

- a. Position filler valve in mounting bracket and secure with three attaching bolts and nuts.
- b. Remove filler valve protective cap.
- c. Connect filler valve line (21) to filler valve.

- d. Connect filler valve line (21) to oxygen regulator.
- e. Replace filler valve protective cap.

Removal of Oxygen Control Cable. (See figure 13-10.)

- a. Remove cotter pin securing control cable to oxygen regulator valve. On aircraft 421B0001 and On loosen set screws in collars and set screw in clamp, to remove clamp assembly.
- b. Remove nut and washer securing control to support bracket.
- c. Remove clamps securing control cable to structure.
- d. Remove nut on forward side of oxygen control bracket.
- e. Pull control aft through forward cabin bulkhead seal and remove cable.

Installation of Oxygen Control Cable. (See figure 13-10.)

- a. Install oxygen control cable by reversing the removal procedures.
- b. Seal cable at forward cabin bulkhead; seal fitting in accordance with Section 16.

Oxygen Cylinder Identification.

a. Cylinder specification followed by service pressure such as "ICC-3AA1800" or "ICC-3HT1800" will be stamped on the shoulder, or neck of each cylinder.

NOTE

Effective January 1, 1970, all newly manufactured cylinders will be stamped "DOT" (Department of Transportation) in lieu of "ICC" (Interstate Commerce Commission). An example for the new designation would be: "DOT-3HT1800."

- b. Cylinder serial number will be stamped below or directly following the cylinder specification.
- c. Hydrostatic test date will be stamped directly below the original manufacturer date and shall include the month and year of the hydrostatic test date.

Servicing and Inspection of Oxygen System.

Servicing and inspection of oxygen shall be accomplished as follows:

- a. Hydrostatic Test requirement:
 - 1. Standard weight (ICC or DOT-3AA1800) cylinders must be hydrostatically tested to 5/3 their working pressure every five years starting with the date of the last hydrostatic test.
 - 2. Lightweight (ICC or DOT-3HT1800) cylinders must be hydrostatically tested to 5/3 their working pressure every three years starting with the date of the last hydrostatic test.

NOTE

These test requirements are established by the Interstate Commerce Commission code of Federal Regulations, title 49, chapter 1, paragraph 73.34.

- b. Service Life requirements:
 - 1. Standard weight (ICC or DOT-3AA1800) cylinders have no life limitations, and may continue to be used until they fail hydrostatic testing.
 - 2. Lightweight (ICC or DOT-3HT1800) cylinders must be retired from service after 15 years or 4380 filling cycles after date of manufacture, whichever occurs first.
- c. Servicing requirements:

Oxygen system regulators/reducers, mask mounted regulators, valves, outlets, hoses, lines and cylinders must be serviced every year or 1000 flight hours, whichever occurs first.

 - 1. Service shall include for the above items, check of system line pressure, functional check of all moving components for operation and excessive wear, visual check for damage to components, visual check for the presence of contaminants (oil, grease, dirt, etc.); visual examination of both low and high pressure regulator relief mechanisms for damage and to insure freedom from obstruction.

2. At any time upon notification of decaying cylinder pressure when oxygen is not in use, immediately check the system until leak is found (use only leak detector conforming to MIL-L-25567B).

d. Oxygen Inspection requirements:

1. A careful visual inspection of the cylinders should be performed during routine maintenance and periodic inspections. If any bad dents, scratches or areas of corrosion are found, the cylinder must be carefully checked per the criteria Table I.

NOTE

If the acceptability of the cylinder is questionable after using criteria Table I, do not hesitate to return cylinder to manufacturer.

- e. Regulator shall be removed and overhauled by manufacturer or an FAA approved facility during hydrostatic testing.
- f. Pressure Gage. The pressure gage shall be checked for accuracy and cleaned by the manufacturer every 3 years or 3000 flight hours, whichever occurs first.
- g. Individual outlets shall be disassembled and inspected, and the sealing core, and/or all rubber parts replaced, regardless of condition every 3 years or 3000 flight hours, whichever occurs first.
- h. On 421-0001 to 421A0141, the filler valve should be disassembled, inspected and the o-rings replaced, regardless of condition every 3 years or 3000 flight hours, whichever occurs first.
- i. High pressure lines should be inspected for scratches, dents, cracks, deep gouges if a leak is indicated. Lines should be tested to not less than 3000 PSIG if trouble is indicated.

WARNING

Whenever components have been removed and replaced or oxygen system has been allowed to deplete to below 50 PSIG, the system must be purged in accordance with purging procedures before charging the system.

- j. Mask and Hose.
 - 1. Cleaning - Clean mask and hose with a mild solution of soap and water. Rinse thoroughly with clean water and allow to dry. Make sure all soap is removed after rinsing. Masks may be disinfected with a hospital type antiseptic spray or Zep Aero SBT-12.

NOTE

Remove mike from pilots mask when cleaning.

- 2. Inspection. Inspect mask and hoses for breaks, cracks, deterioration. Check mask storage compartment for cleanliness and general condition. Check flow indicators for free movement, and inspect couplings for proper insertion.

WARNING

Whenever components have been removed or replaced or oxygen system has been allowed to deplete to below 50 psi, the system must be purged before charging.

WARNING

When purging the oxygen system, the aircraft should be outdoors. If purging is done indoors extreme caution must be taken to prevent oxygen flow from contacting oils, grease, contaminants and electrical sparks. The area should be roped off, with no smoking or open flames allowed in or near the area. Make sure there is adequate ventilation in the area.

Purging the Oxygen System.

- a. Charge the oxygen system in accordance with charging procedures.
- b. Plug all masks into all outlets and purge system by allowing the oxygen to flow for at least 10 minutes. Smell the oxygen flowing from the outlets and continue to purge until the oxygen is odorless. Refill cylinder as required during and after purging.

Charging the Oxygen System.

The following procedures may be used in conjunction with the table of pressure/temperature values for charging the cylinder.

- a. Connect the cascade connection to filler valve.
- b. Slowly open valve of cylinder to be charged and observe pressure on cascade system.

NOTE

The oxygen bottle service line utilizes an AN805-3 nut and AN800-3 cone union. If nut or cone union is damaged replace defective parts.

- c. Slowly open valve on cascade cylinders having lowest pressure and allow pressure to equalize.
- d. Close cylinder valve on cascade cylinders, and slowly open valve on cylinder with next highest pressure until cylinder has been charged in accordance with chart.

Leak Testing the Oxygen System.

Test the oxygen system for leakage by applying detector fluids, which have been compounded for use with oxygen systems, to each fitting and observe for formation of bubbles. No visible leakage should occur. Remove all traces of solution and repair or replace leaky fittings and repeat preceding procedure. Further test the oxygen system for leakage by pressurizing it to service pressure. The leak rate should not exceed one percent of total supply per 24-hour period. After the test has been completed, wash away all traces of the leak detector.

TABLE OF FILLING PRESSURES

Initial temperature refers to ambient temperature in filling room. A rise of approximately 25°F may be expected as a result of compression. The cylinder should be filled as quickly as possible and allowed to cool by ambient air only.

Initial Temp. °F	Filling Pressure Psig	Initial Temp. °F	Filling Pressure Psig
0	1,600	70	1,925
10	1,650	80	1,950
20	1,675	90	2,000
30	1,725	100	2,050
40	1,775	110	2,100
50	1,825	120	2,150
60	1,875	130	2,200

Functional Testing the Oxygen System.

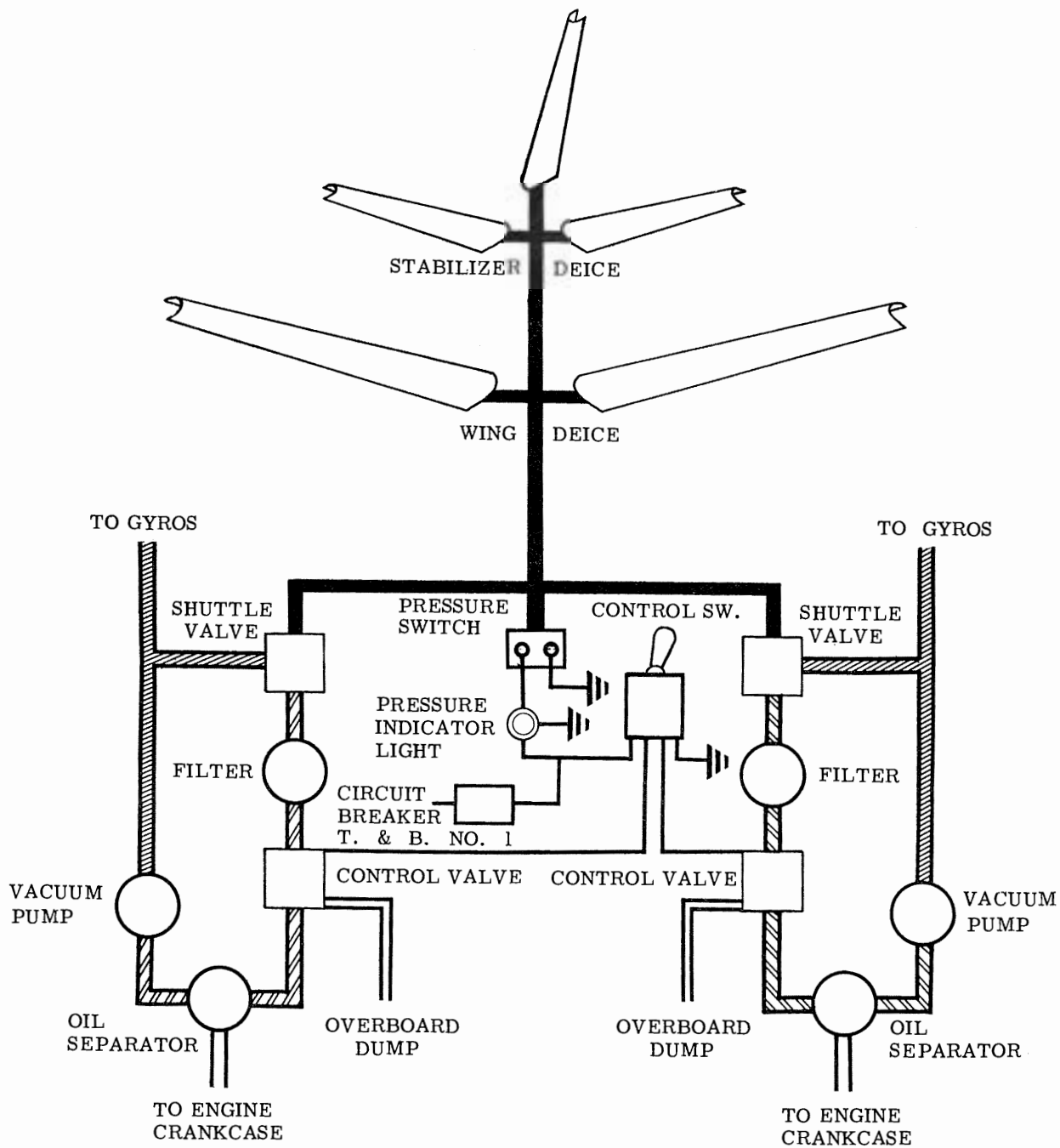
Whenever the oxygen system regulator (or regulator-cylinder assembly) has been replaced or overhauled, perform the following flow and internal leakage tests to check that the system functions properly.

- a. Fully charge the oxygen system per charging instructions.
- b. Install an oxygen outlet adapter (Cessna Part Number C166005-0506) into a pressure gage (gage should be calibrated in one-pound increments from 0 to 100 PSIG), and insert adapter into pilots' oxygen outlet. Place control knob in the "ON" position. The gage pressure should be 70 ±10 PSI.
- c. Insert adapters (or mask and line assemblies if they are operating properly) into all remaining outlets. With oxygen flowing from all outlets, the pressure should still be 70 ±10 PSI. Flow check shall be accomplished with a ground check flow meter model 40400, or equivalent.
- d. Place oxygen control knob in the "OFF" position and allow pressure to fall to 0 PSI. Remove all adapter assemblies except the one with the pressure gage. The pressure must not rise above 0 PSI when observed for one minute. Remove pressure gage and adapter from oxygen outlet.

NOTE

If pressures specified in the foregoing procedures are not obtained, the oxygen regulator is not operating properly. Remove and replace cylinder-regulator assembly with another unit and repeat test procedure.

- e. Connect oxygen masks to each outlet and check each mask for proper operation.
- f. Check proper function of pilot's mask microphone and control wheel switch. After checking, return all masks to mask case.
- g. Recharge oxygen system as required.



421-0001 TO 421B0120

Figure 13-12. Surface Deice System Schematic

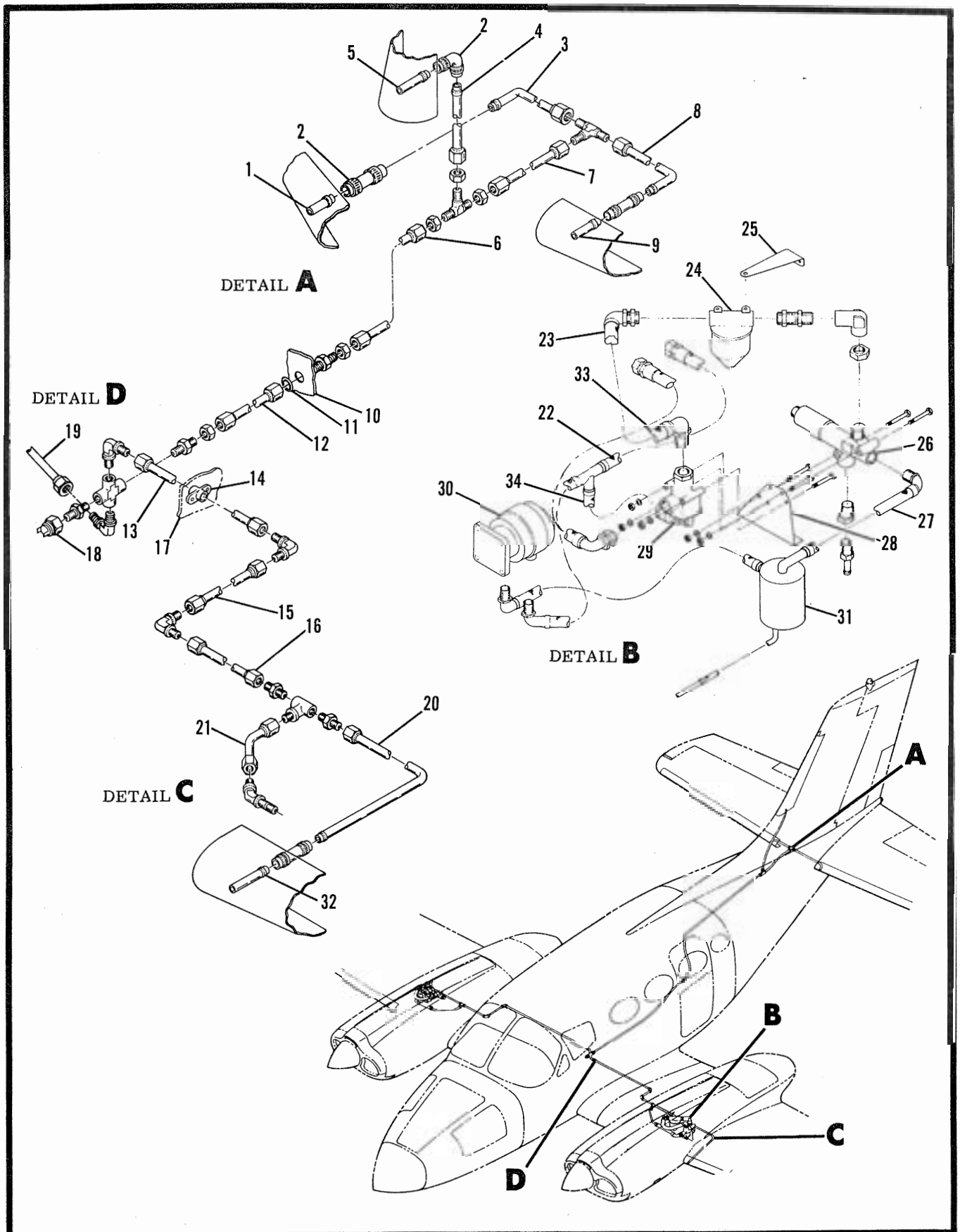


Figure 13-13. Surface Deice System

Figure 13-13. Surface Deice System Callouts

1. Right Stabilizer Boot
2. Hose and Clamps
3. Line To Right Stabilizer
4. Line To Vertical Stabilizer
5. Vertical Stabilizer Boot
6. Line Tee To Union
7. Line Tee To Tee
8. Line To Left Stabilizer
9. Left Stabilizer Boot
10. Aft Cabin Pressure Bulkhead
11. Lock-O-Seal
12. Line Union To Cross
13. Line Cross To LH Wing Gap
14. Seal Fitting
15. Line Elbow To Elbow
16. Line Wing Gap To Tee
17. Cabin Skin
18. Pressure Switch
19. Line Cross To RH Wing Gap
20. Line Tee To Left Wing Boot
21. Line Elbow To Tee
22. Existing Vacuum Line
23. Line Filter To Shuttle Valve
24. Filter
25. Support
26. Control Valve
27. Line Control Valve To Oil Separator
28. Support
29. Shuttle Valve
30. Pneumatic Pump
31. Oil Separator
32. Left Wing Boot
33. Line Shuttle Valve To Elbow
34. Line Shuttle Valve To Tee

SURFACE DEICE SYSTEM. (421-0001 TO 421B0120.)

NOTE

The optional surface deice system consists of gear driven wet vacuum pumps, inflatable rubber deice boots cemented to the leading edges of the horizontal and vertical stabilizer and outer wing leading edge panels. Air for inflation of the boots is supplied by the pressure side of the vacuum pump. Operation of the deicing system is through a six-second delay action control, labeled "Surface Deice" located on the left hand switch and circuit breaker console. When the control is positioned to ON, the control valve closes its overboard air valve and redirects the air from the pressure side of the vacuum pump through a filter, shuttle valve, and into the deice boots for the inflation cycle. After the six-second inflation cycle is complete, the system returns to its off position. Everytime an inflation cycle is desired, the control must be momentarily positioned to ON. After six-second inflation is completed, the deflation cycle begins. Air pressure returns through the system and overboard through the control valve. When the shuttle valve has less than 1 PSI against it, it closes and the vacuum side of the vacuum pump holds the boots in a deflated position. The pressure indicator should light when the system reaches 10 PSI. An optional left wing ice light is incorporated on the outboard side of the left engine nacelle to provide an aid in observing ice formation during night operation.

To remove line (20) from tee to wing boot, it is necessary to remove the turbine to gain access to the line clamps through the firewall access. Remove turbine in accordance with Section 9.

- f. Remove nylon insert and nut from line (13), break seal at seal fitting (14) and withdraw tube into cabin area.
- g. The right side removal procedures are the same.
- h. Remove clamps securing lines to structure in cabin section, disconnect lines at cross and aft cabin pressure bulkhead, remove inserts and nuts, then remove lines.
- i. Remove tailcone access door.
- j. Remove clamps securing line to tailcone structure, disconnect lines and remove.
- k. To remove lines (3 and 8) from stabilizer boots, remove stabilizer in accordance with Section 3, then remove lines.
- l. Remove line (4) through vertical stabilizer access (5). (See figure 1-2.)
- m. Installation of deice lines is the reversal of removal procedures.
- o. Seal line at seal fitting (14) in accordance with sealing procedures outlined in Section 16.

Removal of Deice Lines. (See figure 13-13.)

Remove deice lines as follows:

- a. (See figure 1-2) Remove aft passenger seats, carpet and floorboards (78, 79, 80, 82, 84, 85 and 86) in accordance with Section 3.
- b. Remove wing access covers (35, 48, 54, 55, 56 and 36) Typical right and left wings.
- c. (See figure 1-2.) Remove engine cowl (29).
- d. Remove hoses in engine compartment by removing hose clamps and hoses from pneumatic pump (30), oil separator (31), filter (24), control valve (26), shuttle valve (29) and firewall fittings.
- e. Remove clamps securing lines in wing leading edge, disconnect from fittings and remove lines.

Removal of Deice Filter, Control Valve, and Shuttle Valves. (See figure 13-13.)

- a. Remove engine cowling.
- b. Remove the clamps and hoses from the control and shuttle valves.
- c. Remove nuts, washers and bolts from control and shuttle valves.
- d. Remove filter (24), control valve (26) and shuttle valve (29).

Installation of Deice Filter, Control Valve, and Shuttle Valves. (See figure 13-13.)

Reverse the deice filter, control valve and shuttle

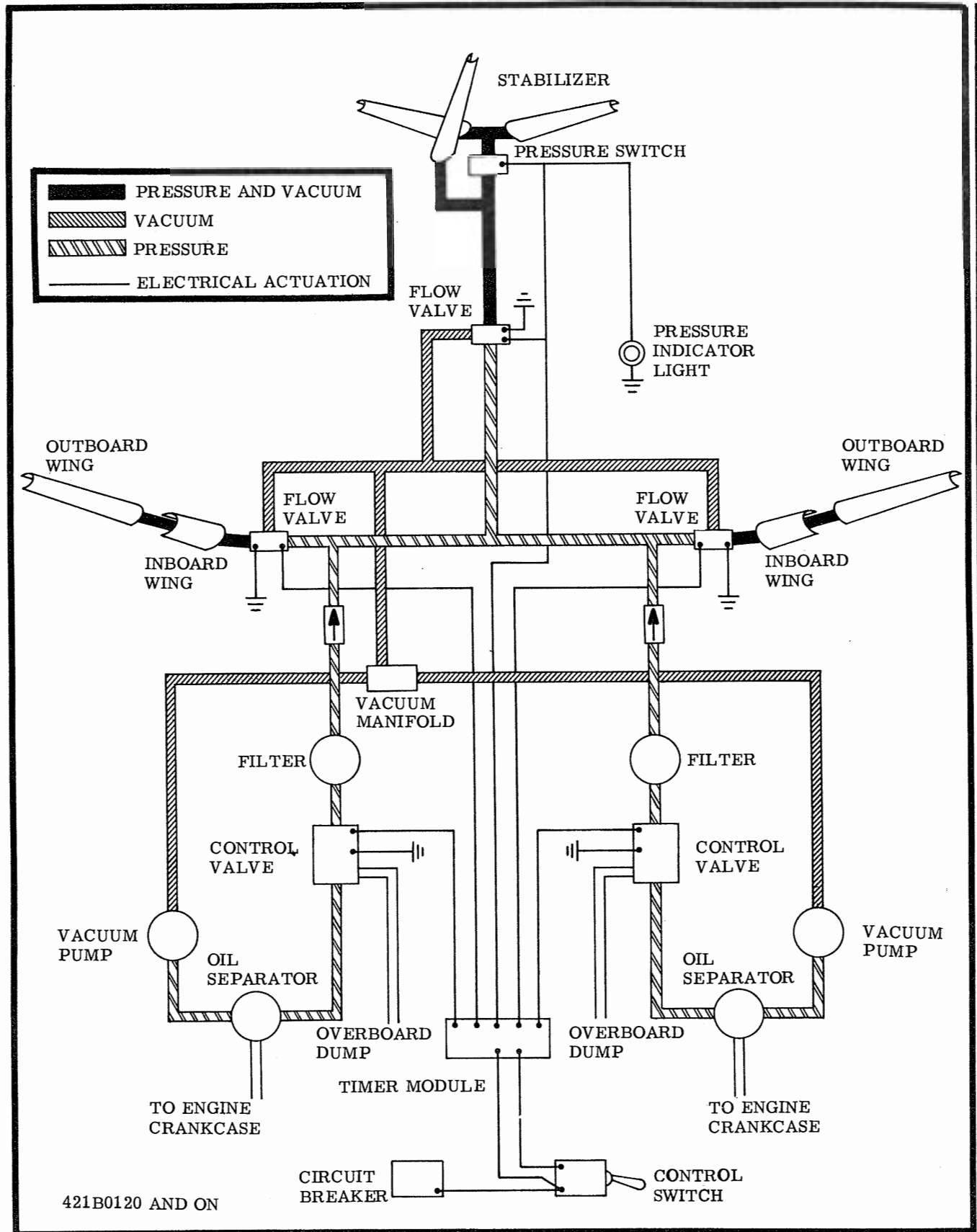


Figure 13-13A. Surface Deice System Schematic

valves removal procedures.

NOTE

Apply a small amount of suitable thread lubricant to male threads of all metal fittings before installation.

Surface Deice System Check.

a. Electrical Test:

1. Reconnect battery cables.
2. Position deice control to OFF position.
3. Position aircraft battery switch to ON position.
4. Close the T & B No. 1 (CB-9) circuit breaker.
5. Press pressure indicator light to check light circuit and bulb.
6. Position deice control to ON position and repeat step 5.
7. If indicator light does not function in steps 5 and 6, the circuit breaker may have opened. Check for short in system. Reset circuit breaker and recheck step 4.

b. Air Leakage Test:

1. This test can be performed in either the left or right nacelles. The following steps refer to the left nacelle.
2. Disconnect pressure hose from the control valve inlet fitting.
3. Disconnect tube from overboard port and plug the port with an AN933-4 plug.
4. Connect a source of clean air to the control valve inlet port. It is necessary that the inlet pressure be a minimum of 18 - 20 PSIG to perform this test. Include a pressure gage in the air line to observe the system pressures.
5. Apply 18 PSIG pressure to the system and by means of a hand-operated valve, trap the pressure in the deicer system. Observe the system for leakage. The leakage rate should not exceed a pressure drop of 4.0 PSIG per minute.
6. To check the pressure switch, apply 18 PSIG pressure to the system, turn on the aircraft battery switch with the T & B No. 1 (CB-9) closed. The indicator light should glow. Release the pressure and the indicator light should extinguish between 8 and 12 PSIG.
7. Remove test equipment, lubricate all threads and replace all system components.
8. Disassembly or rework of the operating equipment in this system should not be attempted, replace any unit which does not function correctly.

SURFACE DEICE SYSTEM. (421B0120 and on.)

The optional surface deice system consists of inflatable rubber deice boots cemented to the leading edges of the horizontal and vertical stabilizers, the outboard wing leading edge and inboard wing leading edge. Air for inflation is supplied by the pressure side of gear driven vacuum pumps. A check valve is

installed in the pressure line of each engine driven system to prevent loss of pressure if either pressure source fails. Operation of the deicing system is through a six second timer module and a "Surface Deice" switch located on the left switch and circuit breaker console. When the switch is momentarily positioned ON, the control valve closes its overboard air valve and directs the air from the pressure side of the vacuum pump through a filter and a check valve to the three flow valves. The timer module electrically opens the stabilizer flow valve allowing the stabilizer boots to inflate. After the six-second inflation cycle is completed, the timer module electrically closes the stabilizer flow valve, then opens the wing flow valves. After a six-second inflation cycle, the wing flow valve closes, completing the cycle. After each inflation cycle, air pressure from the boots is vented from the flow valve through a relief. When vent air pressure drops to approximately 1 PSI, the relief closes and the vacuum pump then holds the boots in a deflated position. The pressure indicator light will illuminate when the stabilizer boot pressure reaches 10 PSI. Optional wing ice lights are incorporated on the outboard side of the engine nacelles to provide an aid in observing ice formation during night operation.

Removal of Deice Lines. (See Figure 13-13B.) (421B0120 and on.)

Remove deice lines as follows:

- a. (See Figure 1-2.) Remove seats, carpets, floorboards, aft cabin access panel and upholstery as necessary to facilitate removal of deice system.
- b. Remove left and right engine cowlings, wing gap covers, wing and fuselage access covers as necessary to facilitate removal of deice system.
- c. Remove hoses in engine compartment by removing hose clamps and hoses from pneumatic pump (44), oil separator (42), filter (37), control valve (39) and firewall fittings.
- d. Remove clamps securing lines in wing leading edges, disconnect from fittings and remove lines.
- e. Remove nylon insert and nut from lines (19) and (21), break seal at seal fitting (23) and withdraw tubes into cabin area.
- f. The right side removal procedures are the same.
- g. Remove clamps securing lines to structure in the cabin section, disconnect lines at tee assemblies and at aft cabin pressure bulkhead, remove inserts and nuts, then remove lines.
- h. Remove clamps securing lines to tailcone structure, disconnect lines at aft cabin pressure bulkhead, flow valve and pressure switch and remove lines.
- i. To remove lines (3 and 9) from stabilizer boots, remove stabilizer in accordance with Section 3, then remove lines.
- j. Remove line (4) through vertical stabilizer access panel.
- k. Installation of deice lines is the reversal of removal procedures.
- l. Seal lines at seal fitting (23) in accordance with sealing procedures outlined in Section 16.

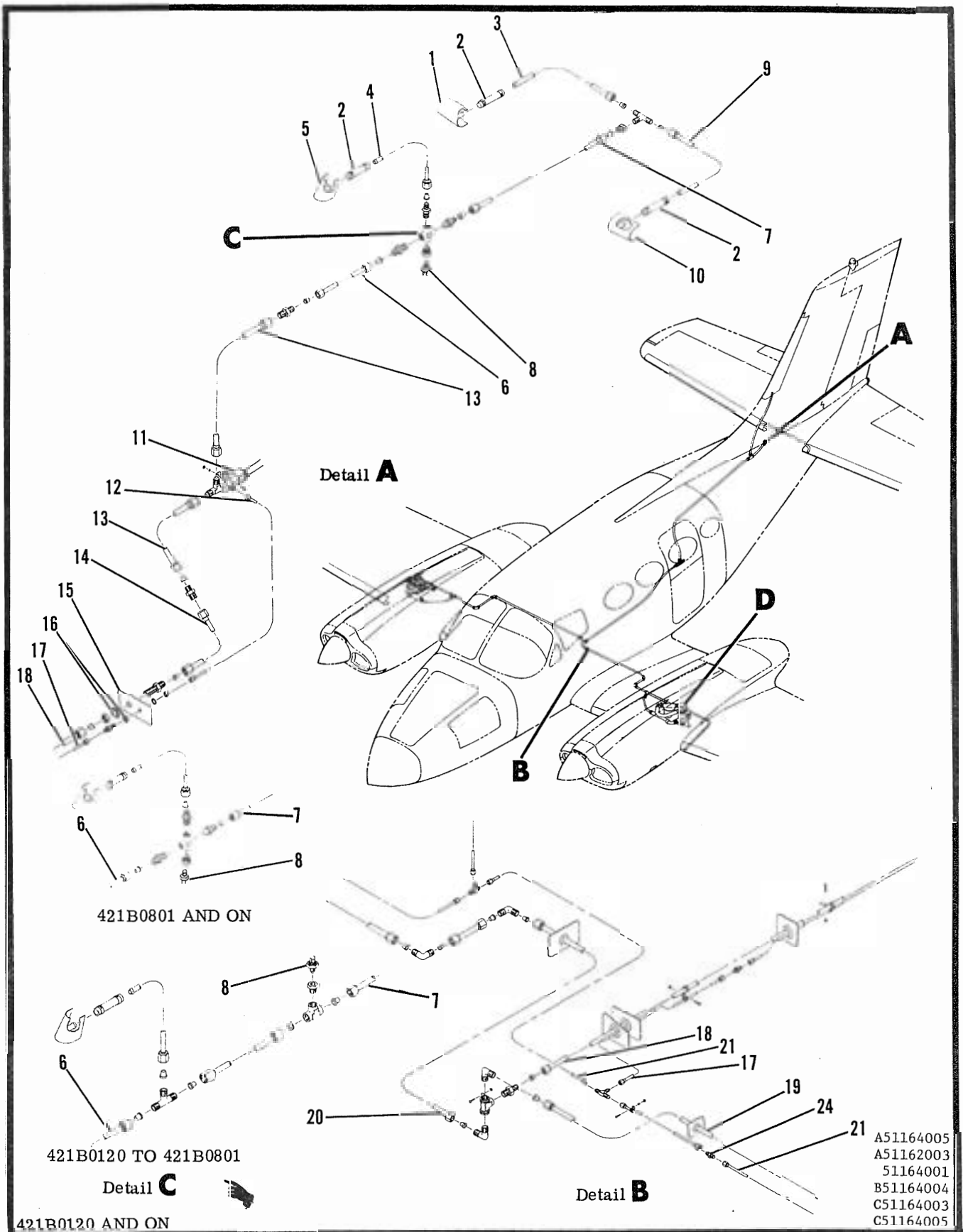
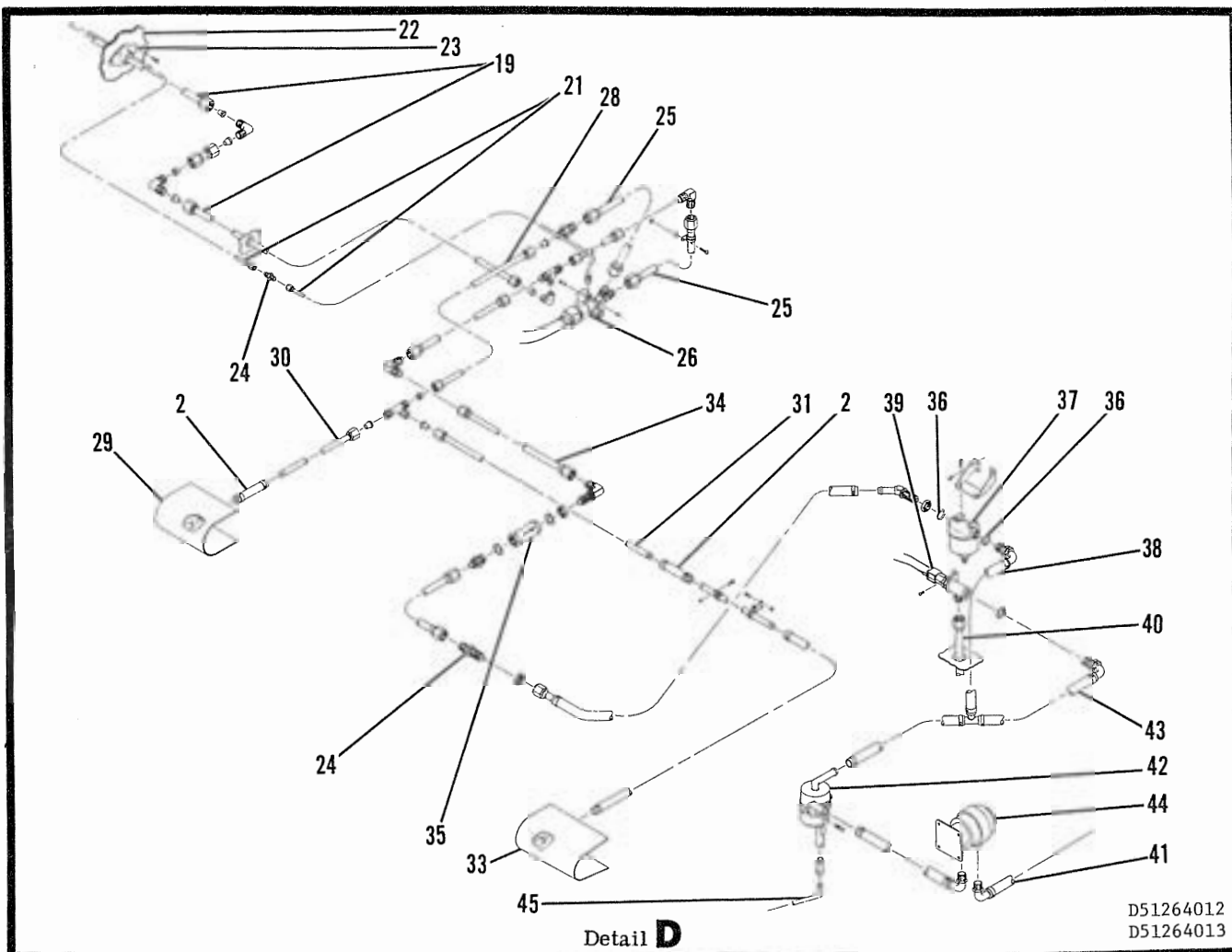


Figure 13-13B. Surface Deice System (Sheet 1)



1. Right Stabilizer Boot	16. Lock-O-Seal	31. Line Tee to Hose
2. Hose and Clamps	17. Vacuum Line	32. Line Hose to Hose
3. Line to Right Stabilizer	18. Line Union to Tee	33. Left Wing Outboard Boot
4. Line to Vertical Stabilizer	19. Line Tee to LH Wing Gap	34. Line Elbow to Check Valve
5. Vertical Stabilizer Boot	20. Line Tee to RH Wing Gap	35. Check Valve
6. Line Tee to Flow Valve	21. Vacuum Line	36. Packing
7. Line Tee to Pressure Switch	22. Cabin Skin	37. Filter
8. Pressure Switch	23. Seal Fitting	38. Line Filter to Tee
9. Line to Left Stabilizer	24. Union	39. Control Valve
10. Left Stabilizer Boot	25. Tube	40. Overboard Valve
11. Flow Valve	26. Flow Valve	41. Existing Vacuum Line
12. Vacuum Line	27. Line Tee to Elbow	42. Oil Separator
13. Tube Flow Valve	28. Line Tee to Union	43. Line Oil Separator to Tee
14. Line Tube to Union	29. Left Wing Inboard Boot	44. Pneumatic Pump
15. Aft Pressure Bulkhead	30. Line Tee to Boot	45. Line to Engine Crankcase

Figure 13-13B. Surface Deice System (Sheet 2)

Surface Deice System Check. (421B0120 and on.)

a. Operational Test.

1. Close surface deice circuit breaker.
2. Position deice control switch to OFF position.
3. Position aircraft battery switch to ON position.
4. Press annunciator panel test switch to check light circuit and bulb.

5. With engines running, momentarily position deice switch to ON position.

6. Check that timer cycles the stabilizer boots first for a period of approximately six seconds and then cycles the wing boots for a period of approximately six seconds and then deactivates itself.

7. The surface deice light in the annunciator panel will illuminate during the first (stabilizer) cycle to indicate the system is operating.

8. Position wing deice light switch to ON position and check that deice light illuminates.

9. Position all switches to OFF position.

b. Air Leakage Test.

1. This test can be performed in either the left or right nacelles. The following steps refer to the left nacelle.

2. Disconnect the pressure hose from the pneumatic pump (hose routed to oil separator).

3. Connect a source of 18-20 PSI clean air with an inline hand operated valve and an 18-20 PSI pressure gauge, to the disconnected deice hose.

4. Disconnect tube from overboard port of the control valve and plug the port with an AN933-4 plug.

5. Disconnect the electrical power lead to each of the three flow valves.

CAUTION

Do not attempt air leakage test with deice timer module connected in circuit.

6. Connect a 28VDC electrical source to each flow valve to energize the valves.

NOTE

For test or troubleshooting, one valve may be actuated at a time to test and isolate each system.

7. Apply 18 PSI pressure to the deice system and by means of the inline hand operated valve, trap the pressure in the deice system.

(a). Observe the deice system for leaks. The leakage rate should not exceed a pressure drop of 4.0 PSI per minute.

8. Insure that all deice boots inflate and that there are no leaks, remove test equipment and reconnect hose to pneumatic pump, remove plug from control valve and connect tube.

9. Remove 28VDC electrical source and reconnect electrical leads to aircraft system.

Cold Patch Repair of Deice Boots.

There are four types or areas of damage that are most common to the deice boots. An outline of the cold patch repair procedure for each follows:

NOTE

When repairing the deice boots and replacement layers are being installed, exercise care to prevent trapping air beneath the replacement layers. If air blisters appear after material is applied, remove them with a hypodermic needle. Should air blisters appear after boots have been installed for a length of time, it is permissible to cut a slit in the deice boot, apply adhesive and repair in accordance with the following cold patch repair pro-

cedures. An alternate method of repair is to peel the deice boot back using Keystone solvent, and reapply using normal adhesives.

a. Scuff or Surface Damage. This type of damage is the most commonly encountered and is usually caused by scuffing the outer surface of the deice boots while using scaffolds, refueling hoses, ladders, etc. Repair is generally not necessary because the thick outer veneer provides protection to the natural rubber underneath. If the scuff is severe and has caused removal of the entire thickness of veneer (exposing the brown natural rubber underneath) the damage should be repaired as outlined below:

1. Select a patch (Part Number 3306-1, 3306-2 or 3306-3) of ample size to cover the damaged area.

2. Clean the area to be repaired with a cloth dampened slightly with solvent.

3. Buff the area around the damage with steel wool so that the area is moderately but completely roughened.

4. Wipe the buffed area clean with a cloth slightly dampened in solvent to remove all loose particles.

5. Apply one even thorough coat of cement (Part Number 3306-16) to the patch and to the corresponding damaged area of the deice boot. Allow cement to set a couple of minutes until it becomes tacky.

6. Apply patch to the deice boot with an edge or the center adhering first, and work the remainder of the patch down being careful to avoid trapping air pockets.

7. Roll the patch thoroughly with a stitcher-roller (Part Number 3306-10) and allow to set for ten to fifteen minutes.

8. Wipe the patch and surrounding area from the center of the patch outward, with a cloth slightly dampened with solvent.

9. Apply one light coat of A-56-B conductive cement (Part Number 3306-13) to the patched area.

NOTE

Satisfactory adhesion should be obtained in four hours, however, if the patch is allowed to cure for a minimum of 20 minutes, the deice boots may be inflated to check the repair.

b. Damage to Tube Area. This type of damage consists of cuts, tears, or ruptures to the inflatable tube area and a fabric reinforced patch must be used for this repair. Damage to the tube area should be repaired as outlined below:

1. Select a patch (Part Number 3306-4, 3306-5, or 3306-6) of ample size to extend at least 5/8" beyond the damaged area.

NOTE

If none of these patches are of the proper size, one may be cut to the size desired from one of the larger patches. If this is done, the edge should be beveled by cutting with the shears at an angle. These patches are manufactured so they will stretch in one direction only. Be sure to cut the patch selected so

that the stretch is in the widthwise direction of the inflatable tubes.

2. Clean the area to be repaired with a cloth dampened slightly with solvent.

3. Buff the area around the damage with steel wool so that the area is moderately but completely roughened.

4. Wipe the buffed area clean with a cloth slightly dampened in solvent to remove all loose particles.

5. Apply one even thorough coat of cement (Part Number 3306-16) to the patch and the corresponding damaged area of the deice boot. Allow the cement to set for a couple of minutes until it becomes tacky.

6. Apply the patch to the deice boot with the stretch in the widthwise direction of the inflatable tubes, sticking edge of patch in place first and working remainder down with a very slight pulling action so the injury is closed. Use care not to trap air between patch and deicer surface.

7. Roll the patch thoroughly with a stitcher-roller (Part Number 3306-10) and allow to set for ten to fifteen minutes.

8. Wipe the patch and surrounding area, from the center outward, with a cloth slightly dampened with solvent.

9. Apply one light coat of S-56-B conductive cement (Part Number 3306-13) to restore conductivity.

NOTE

Satisfactory adhesion of patch to deice boot should be reached in four hours, however, if the patch is allowed to cure for a minimum of 20 minutes the deice boots may be inflated to check the repair.

c. Damage to Fillet Area. This includes any tears or cuts to the tapered area aft of the inflatable tubes. Damage to the fillet area should be repaired as outlined below:

1. Trim damaged area square and remove excess material. Cut must be sharp and clean to permit good butt joint of inlay.

2. Cut inlay from tapered fillet (Part Number 3306-7) to match cutout area.

3. Using solvent, loosen edges of deice boot around area approximately 1-1/2" from all edges.

4. Clean the area to be repaired with a cloth dampened slightly with solvent.

5. Lift back edges of cutout and apply one coat of EC-1300 cement to the underneath side of the loosened portion of the boot.

6. Apply one coat of EC-1300 cement to the wing skin underneath the loosened edges of deice boot and extending 1-1/2" beyond edges of deice boot into the cutout area.

7. Apply second coat of cement to underneath side of deice as outlined in step 5.

8. Apply one coat of EC-1300 to one side of a 2" wide neoprene coated fabric tape (Part Number 3306-8) and allow to dry and trim to size.

9. Reactivate cemented surfaces with solvent and apply reinforcing tape to wing skin, using care to

center tape under all edges of cutout.

10. Roll down tape on wing skin with stitcher-roller (Part Number 3306-10) to assure good adhesion being careful to avoid air pockets.

11. Apply one coat of EC-1300 cement to top surface of tape and allow to dry approximately 5 to 10 minutes.

12. Reactivate cemented surfaces with solvent. Working toward the cutout, roll down the edges of the loosened deice boot being careful to avoid trapping air pockets. The edges should overlap on the tape approximately 1 inch.

13. Roughen back surface of inlay repair material (Part Number 3306-7, previously cut to size) with steel wool. Clean with solvent and apply one coat of EC-1300 cement.

14. Apply one coat of EC-1300 cement to wing skin inside of the cutout area and allow to dry.

15. Apply the second coat of EC-1300 cement to back side of inlay material and allow to dry.

16. Reactivate cemented surfaces with solvent and carefully insert inlay material with feathered edge aft. Working from the leading edge of wing aft, roll down the inlay material carefully to avoid trapping air.

17. Roughen area on outer surface of deice boot and inlay with steel wool 1-1/4" on each side of splice. Clean with solvent and apply one coat of EC-1300 cement to this area.

18. Apply one coat of EC-1300 cement to one side of 2" wide neoprene coated fabric tape (Part Number 3306-8) trim to size and center tape over splice on all three sides.

19. Roll down tape on deice boot with stitcher-roller (Part Number 3306-10) to assure good adhesion, being careful to avoid air pockets.

20. Apply one light coat of A-56-B conductive cement (Part Number 3306-13) to restore conductivity.

d. Damaged Veneer - Loose from Deice Boot. If the veneer should become loosened from the deice boot, repairs should be made as outlined below:

1. Peel and trim the loose veneer to the point where the adhesion of veneer to the deice is good.

2. Roughen the area in which veneer is removed with steel wool, rubbing parallel to cut-edge of veneer ply to prevent loosening it.

3. Taper edges of veneer down to the tan rubber ply by rubbing parallel to the edges with steel wool and solvent.

4. Cut a piece of veneer material (Part Number 3306-9) to cover the damaged area and extend at least 1" beyond in all directions.

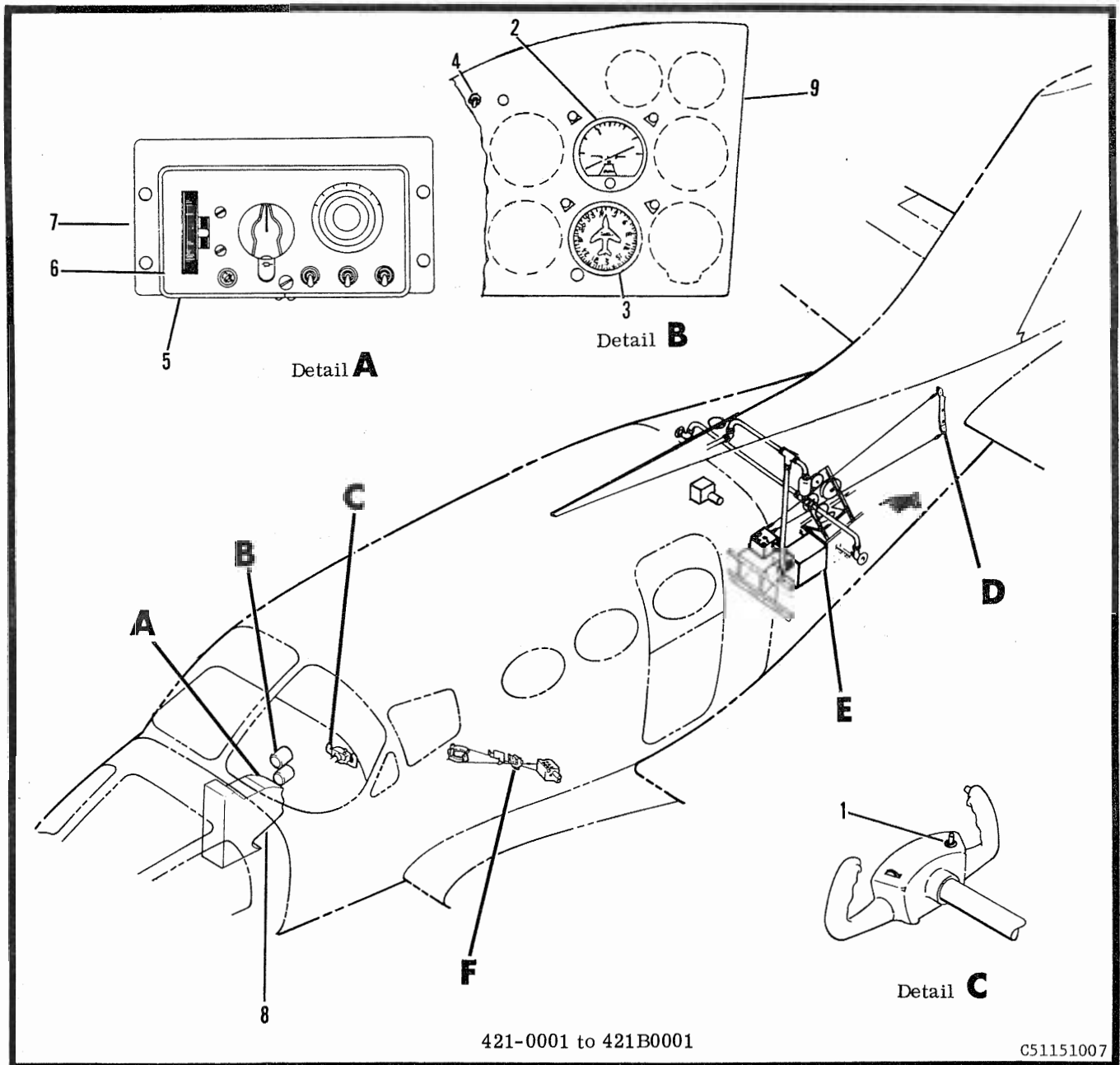
5. Mask off an area 1/2" larger in length and width than the size of veneer patch.

6. Apply one coat of EC-1300 cement to the damaged area and one coat to the veneer ply. Allow cement to set a couple of minutes until it becomes tacky.

7. Roll the veneer ply to the deicer with a 2" rubber roller, applying a slight tension on the veneer ply when applying to prevent trapping air.

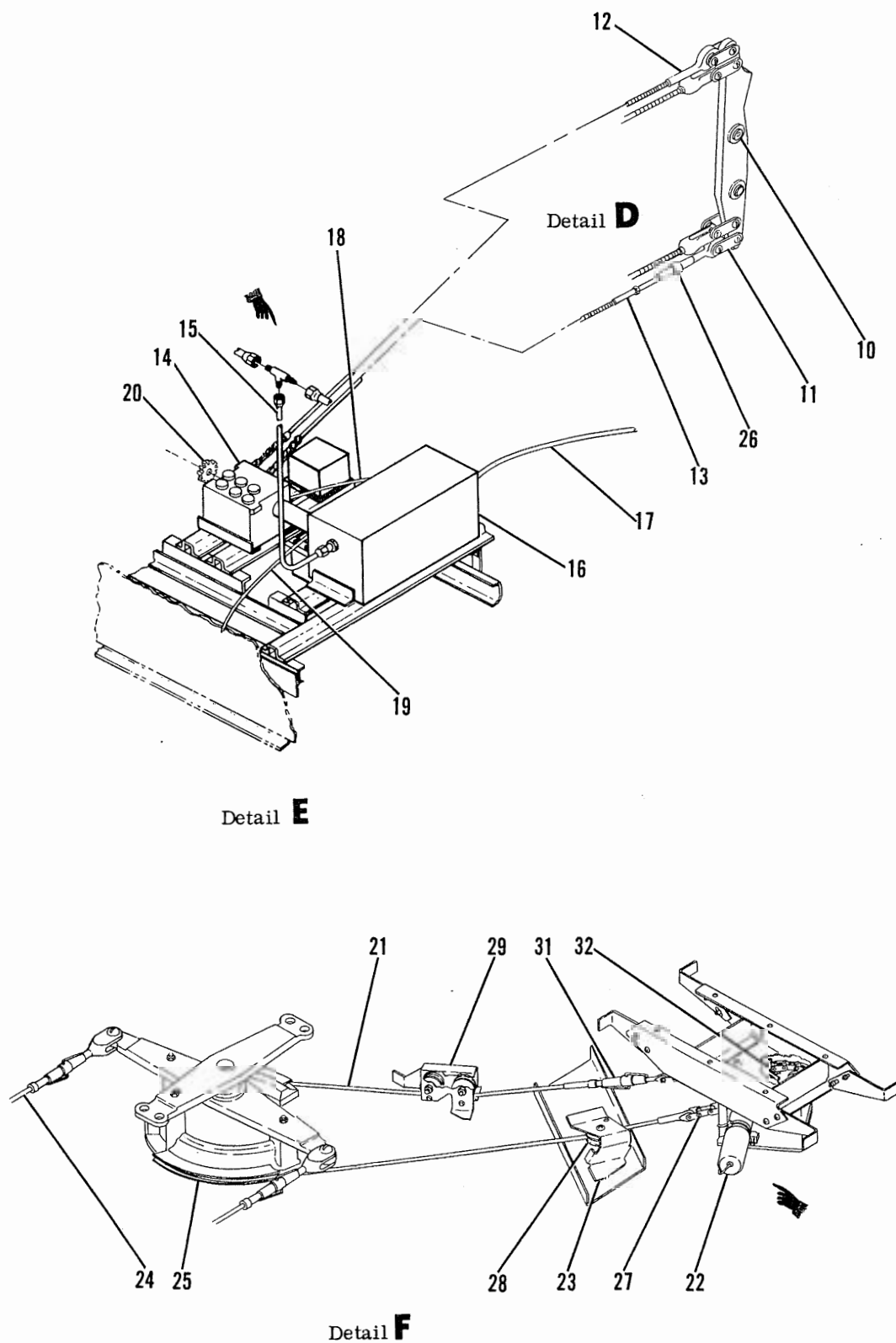
8. Wipe the patch and surrounding area, from the center of the patch outward, with a cloth slightly dampened with solvent.

9. Apply one light coat of A-56-B conductive cement (Part Number 3306-13) to restore conductivity.



1. Disengage Switch	17. Cable Assembly (Computer to Controller)
2. Attitude Gyro	18. Cable Assembly (Computer to Elevator Servo)
3. Directional Gyro	19. Cable Assembly (Computer to Aileron Servo)
4. Omni Selector Switch	20. Sprocket
5. Bezel	21. Aileron Cable (Servo to Bellcrank)
6. Flight Controller	22. Aileron Servo
7. Retainer	23. Bracket
8. Control Quadrant	24. Aileron Cable
9. Shock Mounted Instrument Panel	25. Aileron Quadrant
10. Elevator Bellcrank	26. Turnbuckle
11. Connector Link	27. Chain Assembly
12. Elevator Cable Upper (Servo to Bellcrank)	28. Aileron Cable Pulley
13. Elevator Cable Lower (Servo to Bellcrank)	29. Aileron Cable Pulley
14. Elevator Servo	30. Chain Assembly (Elevator Cable)
15. Static Line	31. Turnbuckle
16. Computer	32. Sprocket

Figure 13-14. Nav-O-Matic 400 Autopilot Installation (Sheet 1 of 2)



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421-0001 to 421B0001

Figure 13-14. Nav-O-Matic 400 Autopilot Installation (Sheet 2)

Replacement of Surface Deice Boots.

- a. Remove wing tip tank front fairings.
- b. (LH wing only) Remove four screws securing the stall warning transmitter.
- c. Refer to Removal and Installation of Propeller Deice Boots procedures and remove and install deice boots.
- d. Install stall warning transmitter screws on left wing.
- e. Replace tip tank front fairings.

NAV-O-MATIC 400 AUTOPILOT SYSTEM. (See figure 13-14.) (421-0001 to 421B0001)

CAUTION

Primary and secondary flight control cables, push pull tubes, bellcranks and mountings on late model aircraft use dual locking fasteners. The lock nuts for these fasteners incorporate a fiber lock, and are castellated for safety-ing with a cotter pin. When any of these areas are disconnected on any aircraft, new dual locking fasteners should be installed. See the Aircraft Parts Catalog for part numbers and location of these fasteners.

The Cessna Nav-O-Matic 400 Autopilot is a two-axis automatic flight control system that controls the position of the ailerons and elevators. In addition to holding the wing level and compensating for rotation about the pitch axis, the system incorporates an automatic intercept and hold of any magnetic heading or VOR radial. Also included are a command turn, a command pitch and altitude hold feature. For description of Cessna Nav-O-Matic 400 Autopilot components and trouble shooting procedures, refer to Cessna Nav-O-Matic 400 Autopilot Service/Parts Manual.

Removal and Installation of Autopilot Elevator Control Cables. (See figure 13-14.)

- a. Refer to Section 3 and remove tailcone access door and necessary access covers.
- b. Remove safety and disconnect turnbuckle (26) and remove cable (12) from elevator bellcrank (10) by removing cotter pin, nuts, washers and bolts.
- c. Route cable (12) from sprocket (20) and remove cable.
- d. Install control cables by reversing the removal procedure.

NOTE

When installing chain over sprocket (20), the elevators must be neutral and the actuator in the center of travel.

- e. Rig autopilot elevator cables in accordance with rigging procedures.

NOTE

After rigging is complete, turn on autopilot and verify that the elevator responds in the correct direction. Assist the movement of the elevator by pulling back on the control wheel, this will aid in overcoming the counterbalance of the elevator bob weight.

Removal and Installation of Autopilot Aileron Control Cables. (See figure 13-14.)

- a. Refer to Section 3 and remove aft cabin seats, rear carpet and necessary access panels.
- b. Remove safety and disconnect turnbuckle (31) connecting cable (21) to chain assembly (27). Tie guide wire to cable end.
- c. Remove pulleys (28 and 29) from brackets (23).
- d. Remove cable by routing cable aft from around aileron quadrant (25).
- e. Install the control cables by reversing the removal procedure.

NOTE

Note when installing chain over sprocket (32) the ailerons must be neutral and the actuator in the center of travel.

- f. Rig autopilot aileron control cables in accordance with rigging procedures.

NOTE

After rigging is complete; turn on autopilot and verify that the ailerons respond in the correct direction.

Removal and Installation of Aileron Servo. (See figure 13-14.)

- a. Refer to Section 3 and remove aft cabin seats, rear carpet and necessary access panels.
- b. Remove safety and loosen turnbuckle (31).
- c. Disengage chain assembly (27) from sprocket (32).
- d. Remove aileron servo attaching nuts, washers, and bolts. Disconnect electrical plug and remove servo from aircraft.
- e. Install aileron servo by reversing the removal procedures.

NOTE

When installing aileron servo make sure chain is centered over sprocket (32) and ailerons are in neutral.

- f. Rig autopilot aileron control cables in accordance with rigging procedures.
- g. Turn autopilot on and make sure ailerons operate in the correct direction.

Removal and Installation of Elevator Servo and Computer. (See figure 13-14.)

- a. Place suitable support under tailcone.
- b. Remove tailcone access panel and elevator bellcrank access covers.
- c. Remove safety and loosen turnbuckle (26).
- d. Disengage chain assembly (30) from sprocket (20).
- e. Remove elevator servo attaching nuts, washers and bolts.
- f. Disconnect electrical plug and remove servo.
- g. Disconnect static line (15) from autopilot computer (16).
- h. Remove attaching nuts, washers, and bolts and remove computer from aircraft.
- i. Install the elevator servo and computer by reversing the removal procedures.

NOTE

When installing elevator servo make sure chain is centered over sprocket (20) and elevator is in the neutral position.

- j. Rig autopilot elevator cables in accordance with rigging procedures.

NOTE

After rigging is complete turn on autopilot and verify that the elevator responds in the correct direction. Assist the movement of the elevator by pulling back on the control wheel, this will aid in overcoming the counterbalance of the elevator bob weight.

Removal and Installation of Autopilot Gyros. (See figure 13-14.)

- a. Refer to Section 12 and remove gyros in accordance with typical instrument removal and installation.

NOTE

Disconnect electrical connection before removal.

Removal and Installation of Autopilot Switches. (See figure 13-14.)

- a. Refer to Section 14 for typical removal and installation of electrical switches.

Removal and Installation of Controller. (See figure 13-14.)

- a. Remove screws attaching controller to pedestal.
- b. Pull controller out from center pedestal and disconnect electrical plug.
- c. Install controller by connecting electrical plug and inserting controller in center pedestal and installing screws.
- d. Check operation of controller and verify autopilot is operating the control surfaces in correct direction.

Rigging Autopilot Control System. (See figure 13-14.)

- a. Rig autopilot aileron control system as follows:
 1. Refer to Section 6 and verify that aileron control system is properly rigged.
 2. Place aileron control surfaces to the neutral position and secure with a clamping device.
 3. Insure that cable (21) is properly routed on pulleys (28 and 29) and check the installation of cable guard pins.
 4. Center chain assembly (27) on sprocket (32) and route cable over aileron control quadrant.
 5. Rig autopilot aileron cable (21) to 12 ± 3 pounds by tightening turnbuckle (31).

NOTE

Cable tension should be adjusted when ambient temperature is 60°F to 90°F. Allow aircraft temperature to stabilize for a period of 4 hours.

6. Safety turnbuckle.
- b. Rig autopilot elevator control system as follows:
 1. Refer to Section 6 and verify that the elevator control system is properly rigged.
 2. Place elevator control surfaces in neutral position and secure using a clamping device.
 3. With elevator control surface in neutral position, center chain assembly (30) on elevator servo sprocket (20), and attach cables (12 and 13) to links (11) on bellcrank (10).
 4. Rig elevator actuator cables (12 and 13) to 12 ± 3 pounds tension by tightening turnbuckle (26).
 5. Safety turnbuckle.
- c. Remove locking devices from control surfaces and move through entire travel. Observe chain assemblies (27 and 30) on servo sprockets for sufficient remaining links at extreme travel limits.

400A NAV-O-MATIC AUTOPILOT SYSTEM. (See figure 13-14A.) 421B0001 AND ON

The Cessna 400A Nav-O-Matic Autopilot is a two-axis flight control system featuring vacuum gyros, altitude hold, synchronous pitch trim, heading pre-select, omni intercept and track, turn command.

The following offerings are options to the basic autopilot: Automatic pitch trim ILS approach coupler, and slaved directional gyro. The automatic pitch trim operates in conjunction with the aircrafts elevator trim tab. A sensor installed in the elevator servo cables actuates the elevator trim servo motor and in turn operates the elevator trim tab to provide a follow up system. The ILS approach coupler enables the pilot to fly inbound on ILS front course on back course, this option is installed in the computer and connects to the indicator at the nose junction box. The slaved directional gyro replaces the standard directional gyro and provides heading information for the 400A Nav-O-Matic.

For additional description of the 400A Nav-O-Matic Autopilot and components refer to Cessna 400A Nav-O-Matic Autopilot Service/Parts manual.

Removal and Installation of Autopilot Elevator Control Cables. (See figure 13-14A.)

- a. Refer to Section 3 and remove tailcone access door and necessary access covers.
- b. Remove safety and disconnect turnbuckle (26) and remove cable (12) from elevator bellcrank (10) by removing cotter pin, nuts, washers and bolts.
- c. Remove cable guard posts (34) from sensor unit (33) to free cables (12 and 13).
- d. Route cable (12) from sprocket (20) and remove cable.
- e. Install control cables by reversing the removal procedure.

NOTE

When installing chain over sprocket (20), the elevators must be neutral and the actuator in the center of travel.

- f. Rig autopilot elevator cables in accordance with rigging procedures.

NOTE

After rigging is complete, turn on autopilot and verify that the elevator responds in the correct direction. Assist the movement of the elevator by pulling back on the control wheel, this will aid in overcoming the counterbalance of the elevator bob weight.

Removal and Installation of Autopilot Aileron Control Cables. (See figure 13-14A.)

- a. Refer to Section 3 and remove aft cabin seats, rear carpet and necessary access panels.
- b. Remove safety and disconnect turnbuckle (31) connecting cable (21) to chain assembly (27). Tie guide wire to cable end.
- c. Remove pulleys (28 and 29) from brackets (23).
- d. Remove cable by routing cable aft from around aileron quadrant (25).
- e. Install the aileron control cables by reversing the removal procedure.

NOTE

When installing chain over sprocket (32) the ailerons must be neutral and the actuator in the center of travel.

- f. Rig autopilot aileron control cables in accordance with rigging procedures.

NOTE

After rigging is complete, turn on autopilot and verify that the ailerons respond in the correct direction.

Removal and Installation of Aileron Servo. (See figure 13-14A.)

- a. Refer to Section 3 and remove aft cabin seats, rear carpet and necessary access panels.
- b. Remove safety and loosen turnbuckle (31).
- c. Disengage chain assembly (27) from sprocket (32).
- d. Remove aileron servo attaching nuts, washers, and bolts. Disconnect electrical plug and remove servo from aircraft.
- e. Install aileron servo by reversing the removal procedures.

NOTE

When installing aileron servo make sure chain is centered over sprocket (32) and ailerons are in neutral.

- f. Rig autopilot aileron control cables in accordance with rigging procedures.

NOTE

After rigging is completed, turn autopilot on and make sure ailerons operate in the correct direction.

Removal and Installation of Autopilot Flap Actuator.

For removal and installation of autopilot flap actuator refer to Section 8.

Removal and Installation of Elevator Servo and Computer. (See figure 13-14A.)

- a. Place a suitable support under tailcone.
- b. Remove tailcone access panel and elevator bell-crank access covers.
- c. Remove safety and loosen turnbuckle (26).
- d. Disengage chain assembly (30) from sprocket (20).
- e. Remove elevator servo attaching nuts, washers and bolts.
- f. Disconnect electrical plug and remove servo.
- g. Disconnect static line (15) from autopilot computer (16).
- h. Remove attaching nuts, washers, and bolts and remove computer from aircraft.
- i. Install the elevator servo and computer by reversing the removal procedures.

NOTE

When installing elevator servo make sure chain is centered over sprocket (20) and elevator is in the neutral position.

- j. Rig elevator cables in accordance with rigging procedures.

NOTE

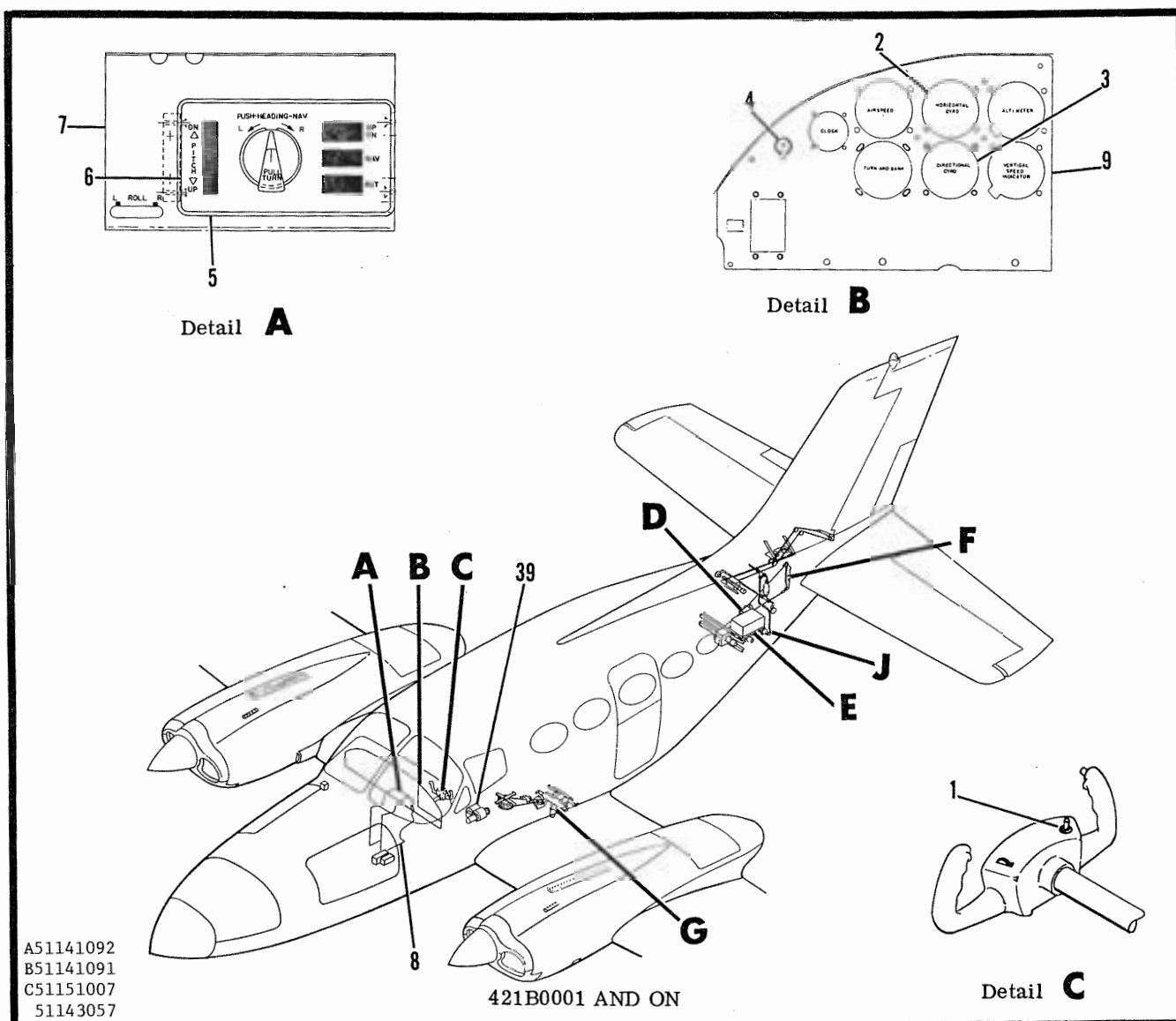
After rigging is complete turn on autopilot, and verify that the elevator responds in the correct direction. Assist the movement of the elevator by pulling back on the control wheel, this will aid in overcoming the counterbalance of the elevator bob weight.

Removal and Installation of Autopilot Elevator Trim Follow-Up Sensor. (See figure 13-14A.)

- a. Place a suitable support under tailcone.
- b. Remove tailcone access panel and elevator bell-crank access covers.
- c. Remove cable guard posts (34) from sensor unit (33) to free cables (12 and 13).
- d. Disconnect electrical plug from sensor unit.
- e. Remove sensor unit (33) from bracket by removing attaching screws and nuts.

NOTE

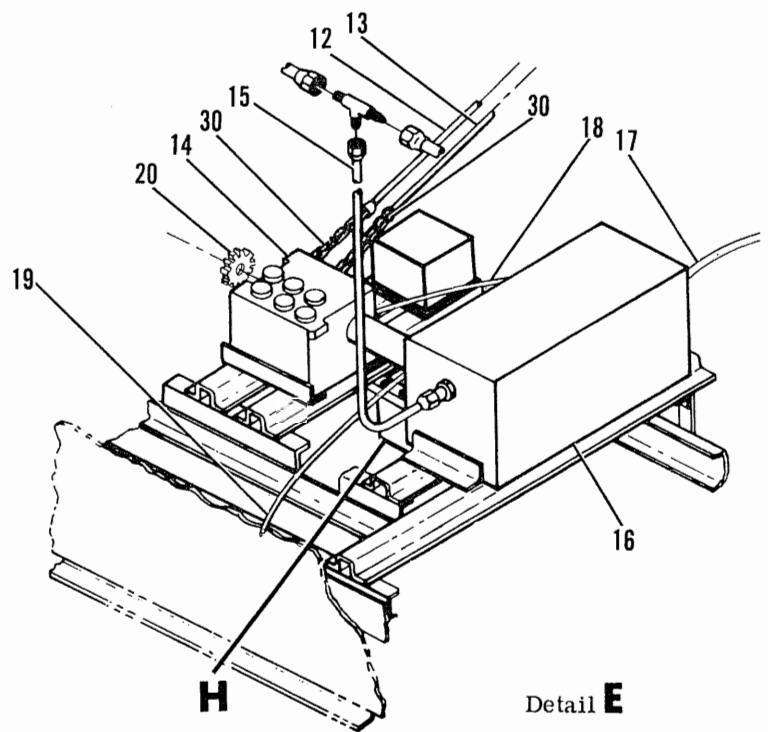
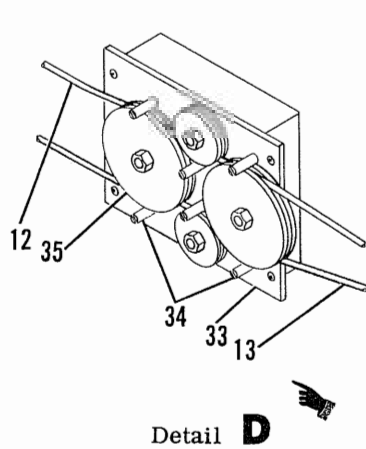
Make sure sensor unit (33) is installed with over-hanging pulley (35) forward.



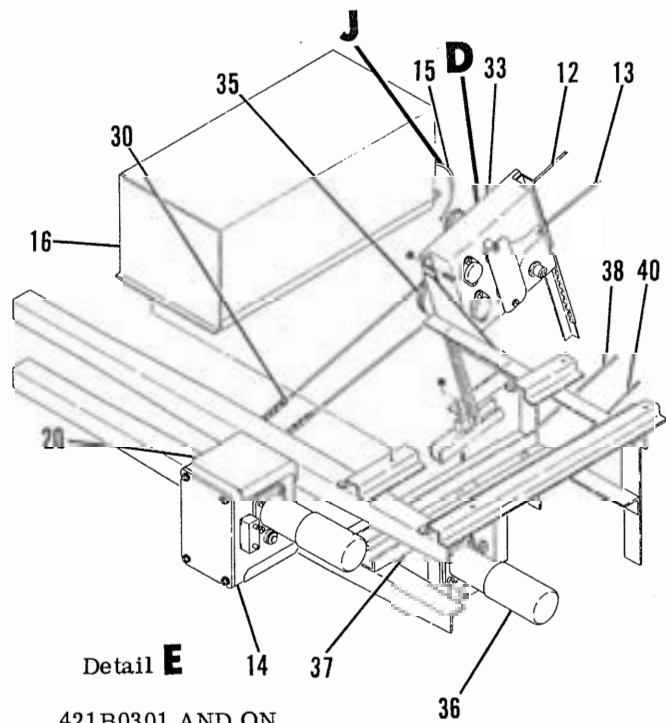
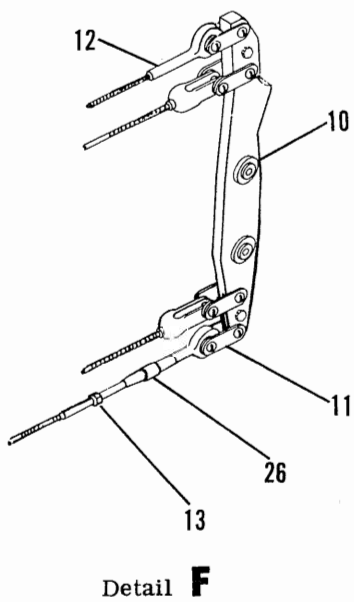
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1. Disengage Switch	21. Aileron Cable (Servo to Bellcrank)
2. Horizontal Gyro	22. Aileron Servo
3. Directional Gyro	23. Bracket
4. Omni Selector Switch	24. Aileron Cable
5. Bezel	25. Aileron Quadrant
6. Flight Controller	26. Turnbuckle
7. Retainer	27. Chain Assembly
8. Control Quadrant	28. Aileron Cable Pulley
9. Flight Instrument Panel	29. Aileron Cable Pulley
10. Elevator Bellcrank	30. Chain Assembly (Elevator Cable)
11. Connector Link	31. Turnbuckle
12. Elevator Cable Upper (Servo to Bellcrank)	32. Sprocket
13. Elevator Cable Lower (Servo to Bellcrank)	33. Sensor Unit
14. Elevator Servo	34. Bracket
15. Static Line	35. Pulley
16. Computer	36. Elevator Trim Servo
17. Cable Assembly (Computer to Controller)	37. Bracket
18. Cable Assembly (Computer to Elevator Servo)	38. Elevator Trim Follow-Up Cable
19. Cable Assembly (Computer to Aileron Servo)	39. Autopilot Flap Actuator
20. Sprocket	40. Elevator Trim Tab Cable

Figure 13-14A. 400A Nav-O-Matic Autopilot Installation (Sheet 1 of 3)



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Figure 13-14A. 400A Nav-O-Matic Autopilot Installation (Sheet 2)

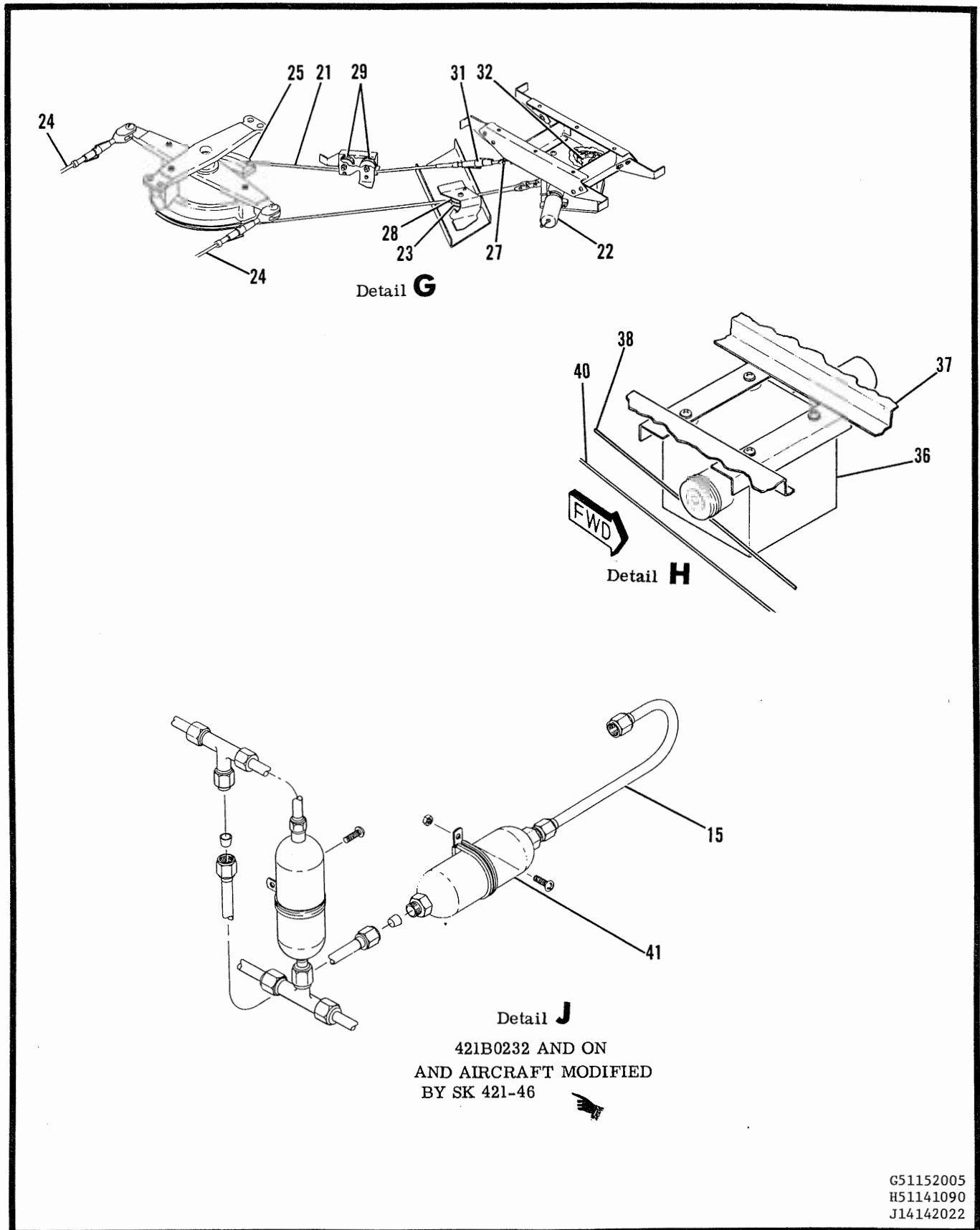


Figure 13-14A. 400A Nav-O-Matic Autopilot Installation (Sheet 3)

- f. Install sensor unit by reversing the removal procedures.

NOTE

After installation is completed, check tension on elevator control cables in accordance with the Rigging of Autopilot Elevator Control System procedures.

Removal and Installation of Autopilot Elevator Trim Follow-Up Servo. (See figure 13-14A.)

- a. Place a suitable support under tailcone.
- b. Remove tailcone access panel and elevator bellcrank access covers.
- c. Disconnect electrical plug from servo (36).
- d. Loosen screws attaching servo to bracket (37).
- e. Remove servo from cable (38).
- f. Install servo by reversing the removal procedures.

NOTE

Elevator trim control cable must make 2 full loops around the cable drum.

NOTE

After installation is completed, check tension on elevator trim control cables in accordance with the Rigging of Elevator Trim Control System procedures found in Section 6.

Removal and Installation of Controller. (See figure 13-14A.)

- a. Remove screws attaching controller to pedestal.
- b. Pull controller out from center pedestal and disconnect electrical plug.
- c. Install controller by connecting electrical plug and inserting controller in center pedestal and installing screws.
- d. Check operation of controller and verify autopilot is operating the control surfaces in correct direction.

Removal and Installation of Autopilot Gyros. (See figure 13-14A.)

- a. Refer to Section 12 and remove gyros in accordance with typical instrument removal and installation.

NOTE

Disconnect electrical connection before removal.

Removal and Installation of Autopilot Switches. (See figure 13-14A.)

- a. Refer to Section 14 for typical removal and installation of electrical switches.

Rigging Autopilot Control System. (See figure 13-14A.)

- a. Rig autopilot aileron control system as follows:
 1. Refer to Section 6 and verify that aileron control system is properly rigged.
 2. Place aileron control surfaces to the neutral position and secure with a clamping device.
 3. Insure that cable (21) is properly routed on pulleys (28 and 29) and check the installation of cable guard pins.
 4. Center chain assembly (27) on sprocket (32) and route cable over aileron control quadrant.
 5. Rig aileron autopilot cable (21) to 12 $\pm$ 3 pounds by tightening turnbuckle (31).

NOTE

Cable tension should be adjusted when ambient temperature is 60° F to 90° F. Allow aircraft temperature to stabilize for a period of 4 hours.

6. Safety turnbuckle.
- b. Rig autopilot elevator control system as follows:
 1. Refer to Section 6 and verify that the elevator control system is properly rigged.
 2. Place elevator control surfaces in neutral position and secure using a clamping device.
 3. With elevator control surface in neutral position, center chain assembly (30) on elevator servo sprocket (20), and attach cables (12 and 13) to links (11) on bellcrank (10).
 4. Rig elevator actuator cables (12 and 13) to 22 $\pm$ 2 pounds tension by tightening turnbuckle (26).
 5. Safety turnbuckle.
- c. Rig autopilot elevator trim control system as follows:
 1. Refer to Section 6 and verify that the elevator trim control is properly rigged.
 2. Place elevator trim control surfaces in neutral position and secure using a clamping device.
 3. With elevator trim control surface in neutral position, check to see that cable (38) is looped twice around cable drum.
 4. Rig cable (38) to 19 $\pm$ 3 pounds of tension.

NOTE

If optional electric elevator trim control motor is installed, rig cable (38) to 22 $\pm$ 2 pounds of tension.

- d. Remove locking devices from control surfaces and move through entire travel. Observe chain assemblies (27 and 30) on servo sprockets for sufficient remaining links at extreme travel limits.

YAW DAMPER SYSTEM. (See figure 13-14B.)

The yaw damper system is an independent system consisting of a gyro computer (turn and bank indicator), control switch, yaw actuator, and the disengage switch.

The gyro computer picks up the signal, routes it through a built-in computer in the gyro, amplifies the signal and sends the amplified signal to the yaw actuator.

The yaw damper control switch is mounted separately from the flight controller on all installations except the 800 integrated flight control system. On aircraft incorporating the 800 integrated flight control system the yaw damper control switch is part of the autopilot flight controller. The yaw damper disengage switch in the control wheel is connected to the autopilot disengage switch; disengaging the autopilot will also disengage the yaw damper.

Troubleshooting.

For troubleshooting the yaw damper system, refer to the Yaw Damper System Service/Parts manual.

Removal and Installation of Yaw Damper Actuator.
(See figure 13-14C.)

- a. Place a suitable support under tailcone.
- b. Remove tailcone access panel and rudder bell-crank access covers.
- c. Remove chain guard (17), loosen turnbuckle (14) and remove chain assembly from sprocket.
- d. Disassemble actuator from structure in accordance with applicable detail in figure.
- e. Disconnect electrical connector and remove actuator from aircraft.

- f. Install the rudder yaw actuator by reversing the removal procedures.
- g. Rig cables in accordance with rigging procedures.

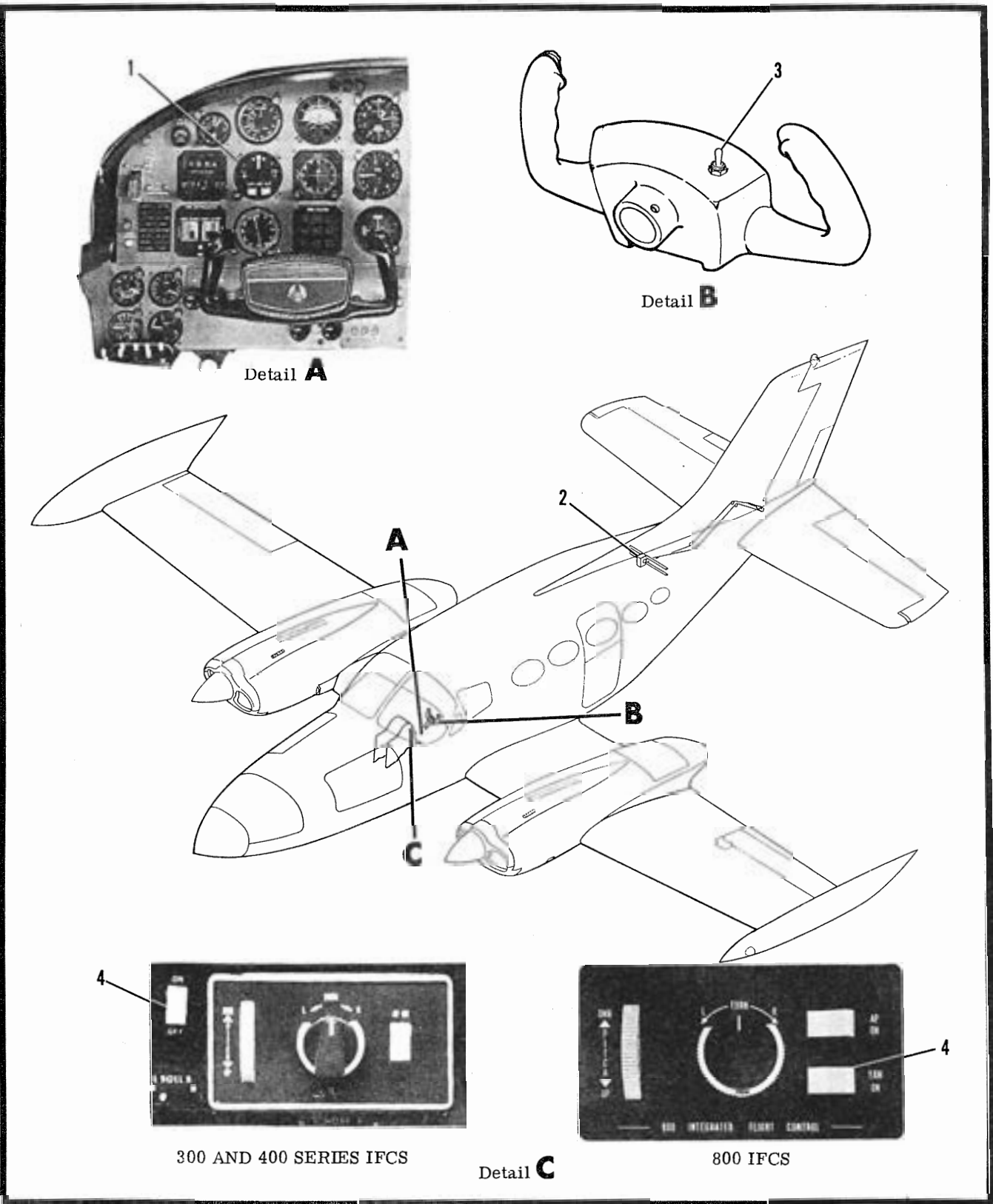
Rigging Yaw Damper System. (Refer to Figure 13-14C.)

- a. Refer to Section 7 and verify that rudder control system is properly rigged.
- b. Rig yaw actuator cables (5) and (13) to 16 $\pm$ 2 pounds tension by tightening turnbuckle (14).
- c. Safety turnbuckle.
- d. Adjust actuator in accordance with Actuator Centering Adjustment procedures.

Actuator Centering Adjustment. (421B0301 to 421B0801.)

Before making actuator centering adjustments, assure that rudder system and yaw damper system is rigged in accordance with rigging procedures.

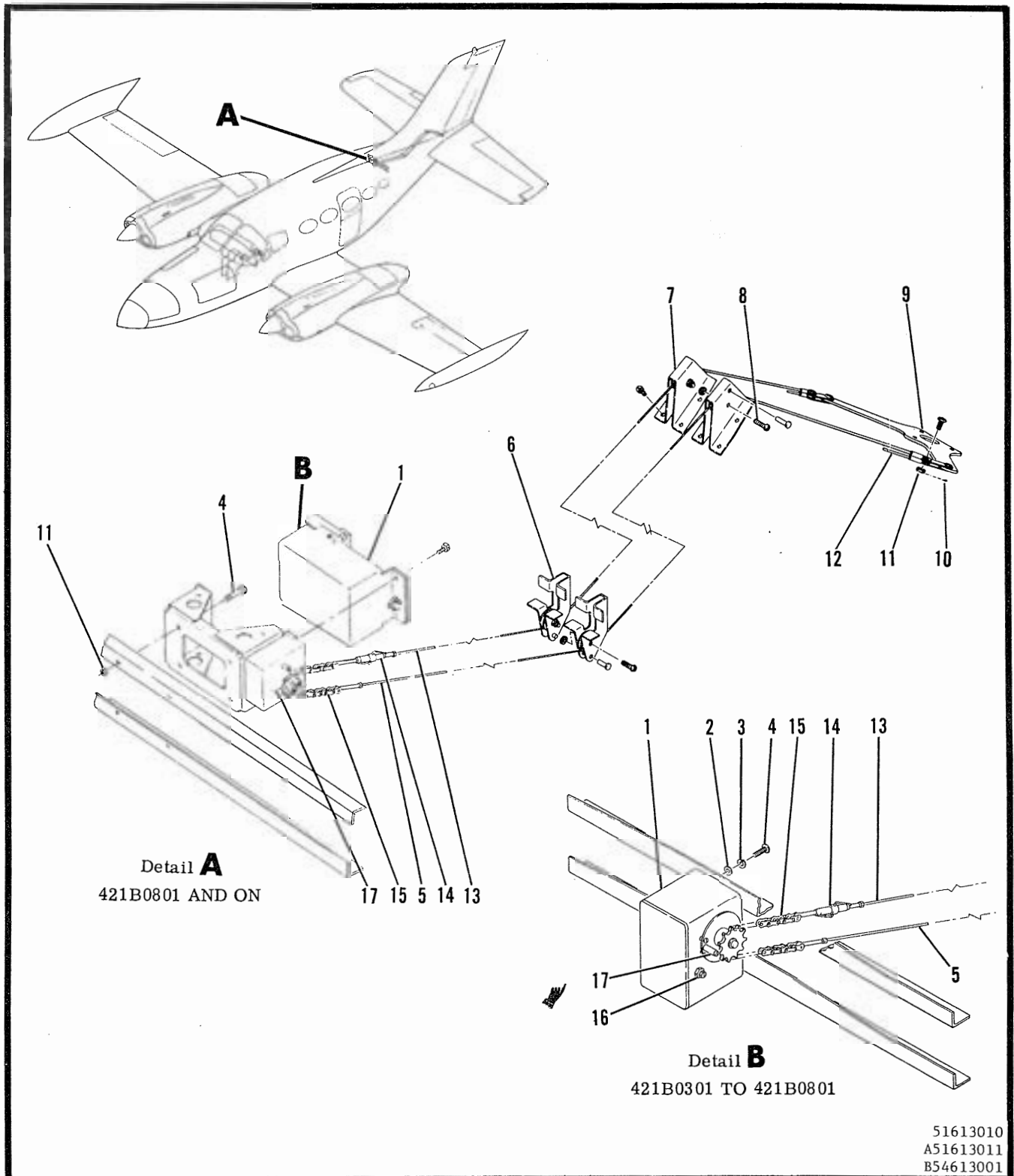
- a. Turn yaw damper system "ON."
- b. Check position of rudder. If rudder deflects from neutral position, manually hold rudder in the assumed position and disengage yaw damper switch. Refer to figure 13-14C, turn and hold centering screw (16) in a full (CW) position while returning rudder to neutral position. Release adjusting screw on actua-



- 1. Turn and Bank Indicator
- 2. Actuator

- 3. Autopilot Disengage Switch
- 4. Yaw Actuator Switch

Figure 13-14B. Yaw Damper Control System



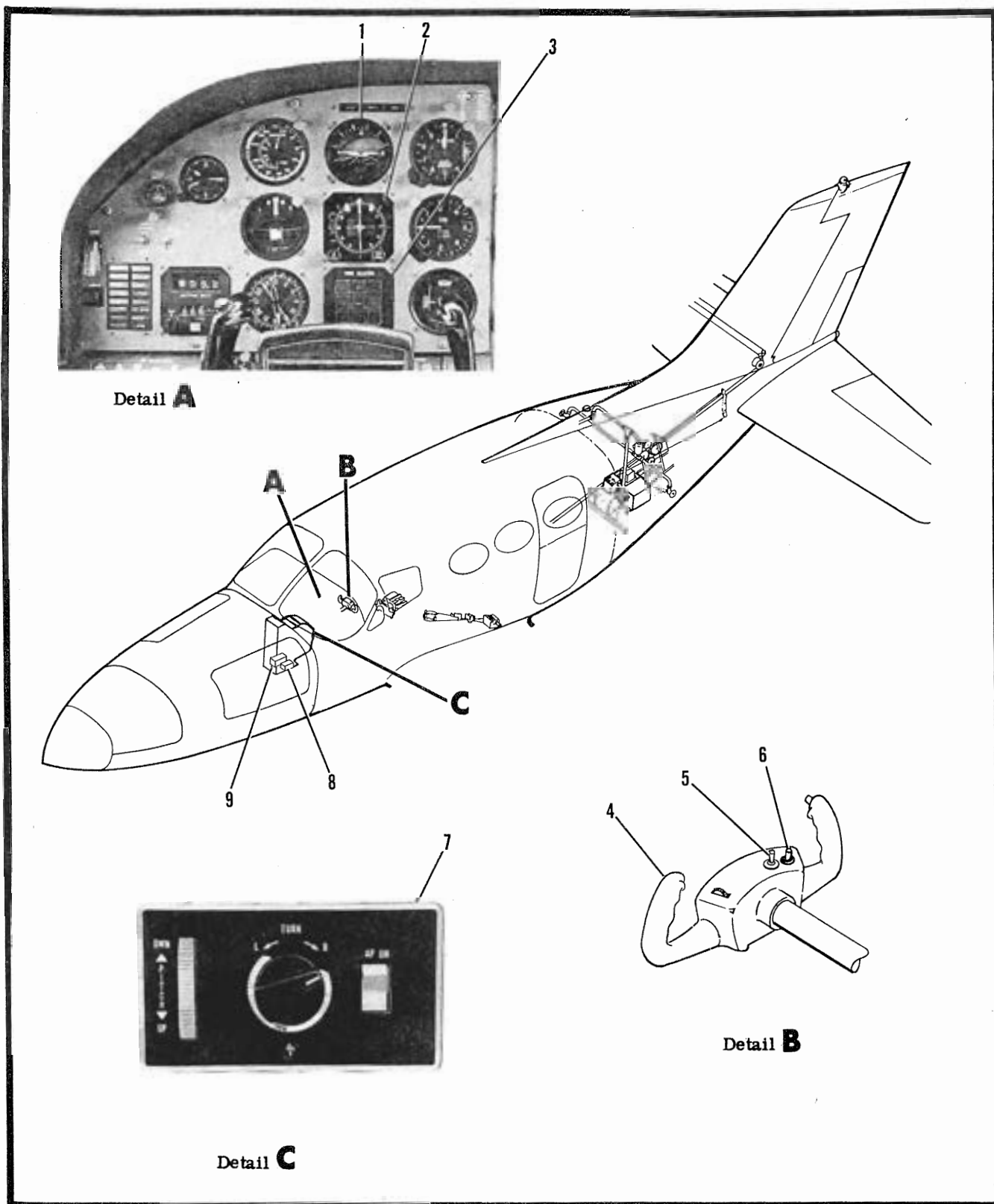
1. Actuator
2. Washer
3. Lockwasher
4. Screw

5. Cable
6. Bracket
7. Bracket
8. Bolt

9. Bellcrank
10. Cotter Pin
11. Nut
12. Cable, Rudder

13. Cable
14. Turnbuckle
15. Chain
16. Centering Screw
17. Chain Guard

Figure 13-14C. Yaw Damper Installation



1. ADI Indicator
2. HSI Indicator
3. Mode Selector

4. Pitch Synchronization Switch
5. Autopilot Disengage Switch
6. Go-Around Switch

7. Autopilot Controller
8. Inverter
9. Gyro

Figure 13-14D. Integrated Flight Control System

tor.

c. Turn yaw damper system "ON" and recheck for zero rudder deflection.

INTEGRATED FLIGHT CONTROL SYSTEM. (421B0201 AND ON). (See figure 13-14D.)

The Integrated Flight Control System is a two-axis (aileron and elevator) automatic flight control system consisting of the autopilot and flight director. Either the flight director or the autopilot may be used separately or as a combination. As an autopilot, in addition to holding the wings level and compensating for rotation about the pitch axis, the autopilot provides an automatic intercept and track of any magnetic heading or VOR radial. Also included is an automatic pitch trim, turn command, pitch command, altitude hold and an ILS approach feature. As a flight director the Integrated Flight Control System provides steering information, visually presented on the altitude director indicator (ADI), for climb, cruise, descent and altitude hold. Heading, VOR navigation, glide slope and ILS approaches are visually presented on the horizontal situation indicator (HSI).

For additional description, installation adjustments, troubleshooting, schematics and parts listing, refer to Cessna Integrated Flight Control System Service/Parts Manual.

300 And 400 Series Integrated Flight Control Systems.

The 300 and 400 Integrated Flight Control Systems consist of the 400A Nav-O-Matic autopilot and flight director, ILS coupler, slaved directional gyro, pitch synchronization and associated avionics. The 300 Integrated Flight Control System uses 300 avionics, while the 400 Integrated Flight Control System uses 400 avionics. Simultaneous or independent operation of the autopilot and flight director are provided. Go-around commands selectable by the pilot are provided in addition to the pitch synchronization.

800 Series Integrated Flight Control System.

The 800 Integrated Flight Control System consists of the 400A Nav-O-Matic autopilot and flight director, with yaw damper, altitude hold, automatic pitch trim, pitch synchronization, heading preselect, omni/ILS

couplers and turn and pitch command. Simultaneous or independent operation of the autopilot and flight director is provided and in addition to the autopilot features, the flight director includes pitch synchronization and go-around commands as selected by the pilot. The 800 Integrated Flight Control System includes a vacuum, slaved directional gyro with ADF presentation and an horizontal situation indicator (HSI). Nav 1 is connected to the HSI and Nav 2 is connected to an individual course indicator. 400 or 800 avionics system may be used with the 800 Integrated Flight Control System.

Removal, Installation and Rigging the Integrated Flight Control System Components. (See figure 13-14D.)

Refer to Removal, Installation and Rigging Procedures for the Nav-O-Matic 400A Autopilot Section 13 and Typical Instrument Removal and Installation Procedures Section 12 for removal, installation and rigging the Integrated Flight Control System Components.

Removal, Installation and Rigging the Integrated Flight Control System Components. (See figure 12-2 and figure 13-14.)

Refer to Removal, Installation and Rigging procedures for the Nav-O-Matic 400A Autopilot, Section 13 and Typical Instrument Removal and Installation procedures, Section 12 for removal, installation and rigging the Integrated Flight Control System components.

NAV-O-MATIC 800 SYSTEM.

The Nav-O-Matic 800 Autopilot consists of the following components: three gyroscopic sensors, a flight controller, a transistorized electronic computer, three electrically-controlled pneumatic powered servos which actuate the rudder, elevator, and aileron, one elevator trim pneumatic actuator, and a pump and pressure system to operate servos. Optional components to the basic autopilot installation are a heading selector and altitude controller. For adjustment, trouble shooting, and maintenance, refer to the Cessna Nav-O-Matic 800 Service/Parts Manual.

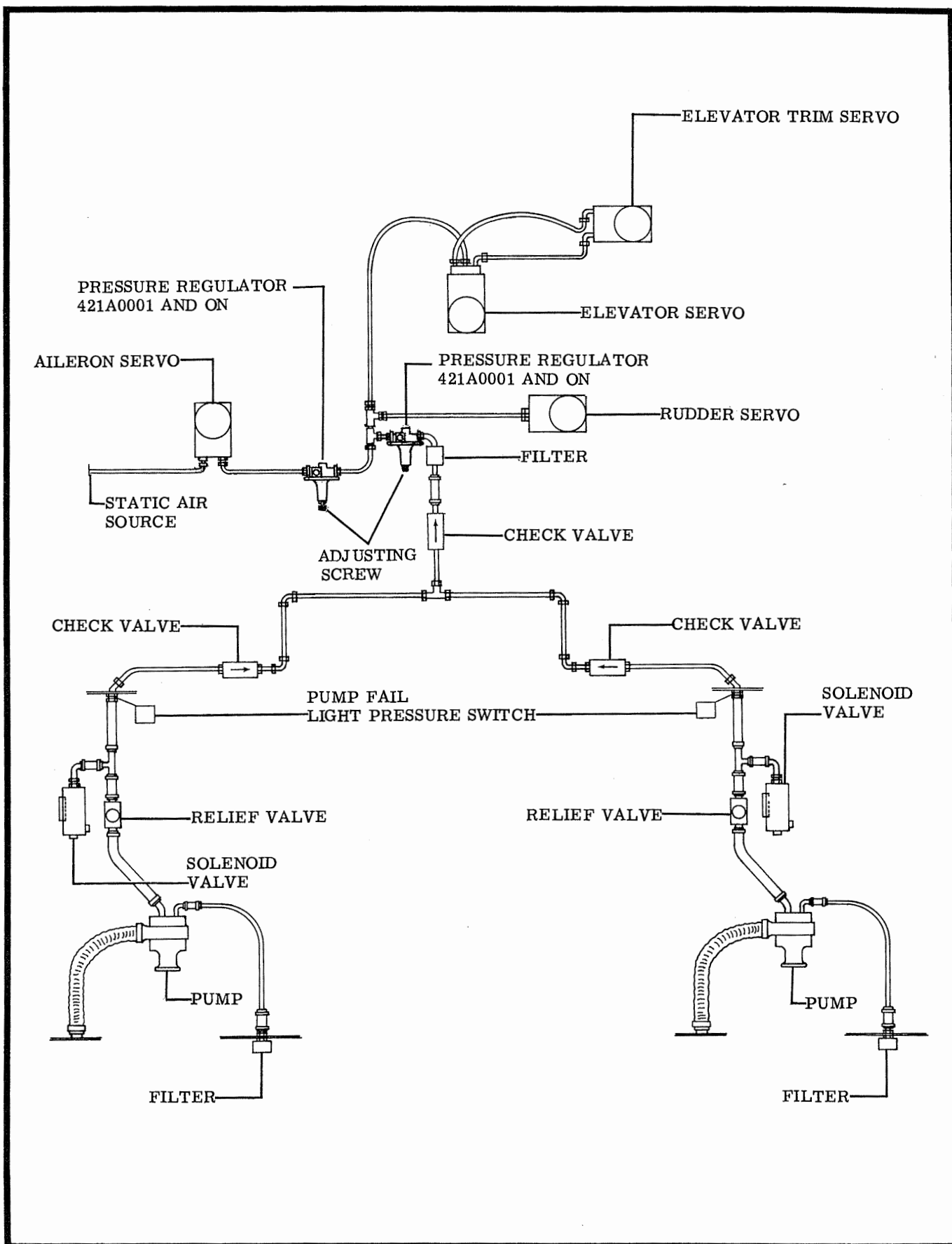
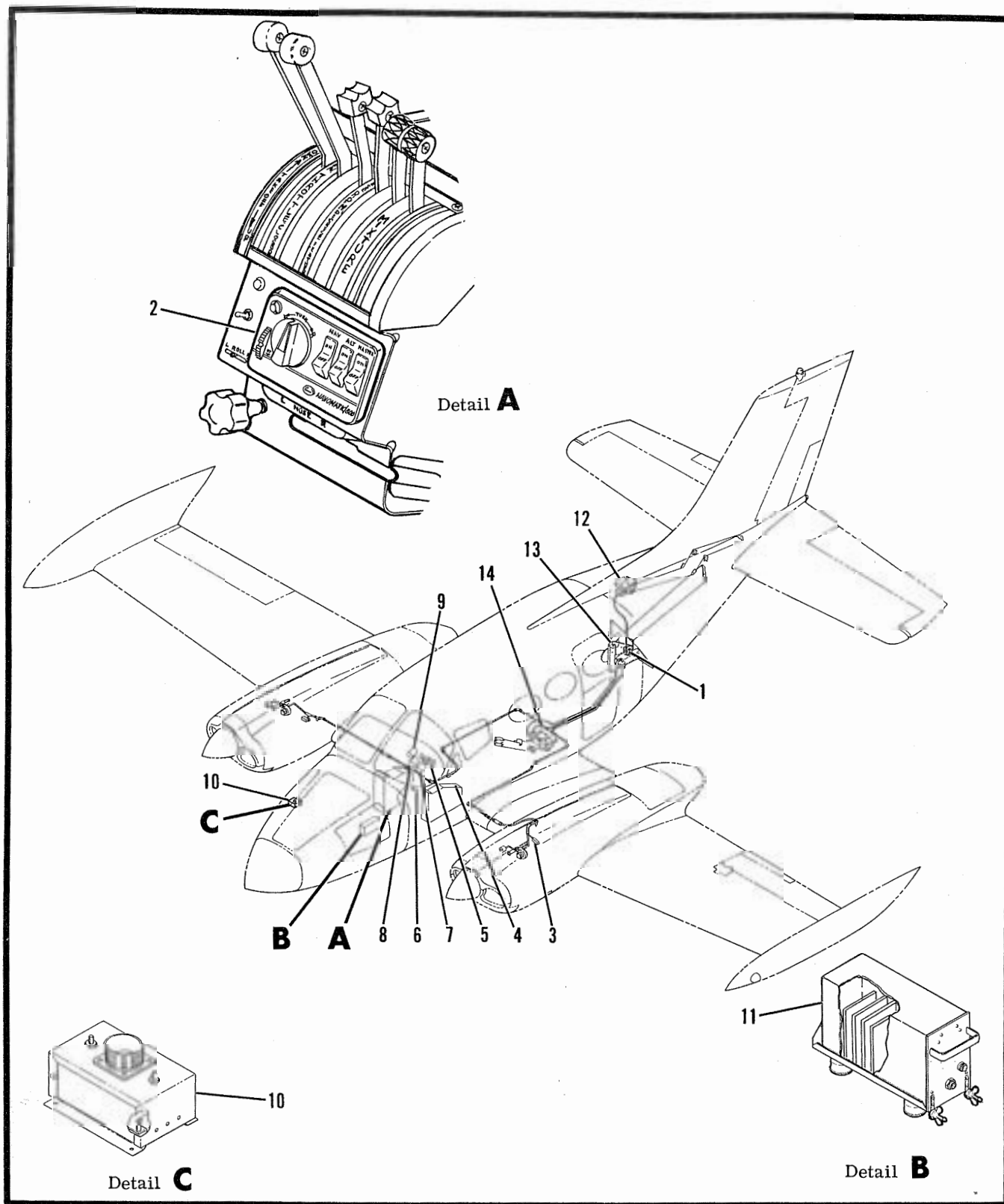


Figure 13-15. Cessna Nav-O-Matic 800 Autopilot Pneumatic Schematic



1. Elevator Trim Servo
2. Flight Controller
3. Solenoid
4. Circuit Breaker
5. Pilot's Disengage Switch

6. Autopilot Warning Lights
7. Directional Gyro
8. Attitude Gyro
9. Turn and Bank

10. Ground Adapter
11. Computer
12. Rudder Servo
13. Elevator Servo
14. Aileron Servo

Figure 13-16. Cessna Nav-O-Matic 800 Autopilot Components Location

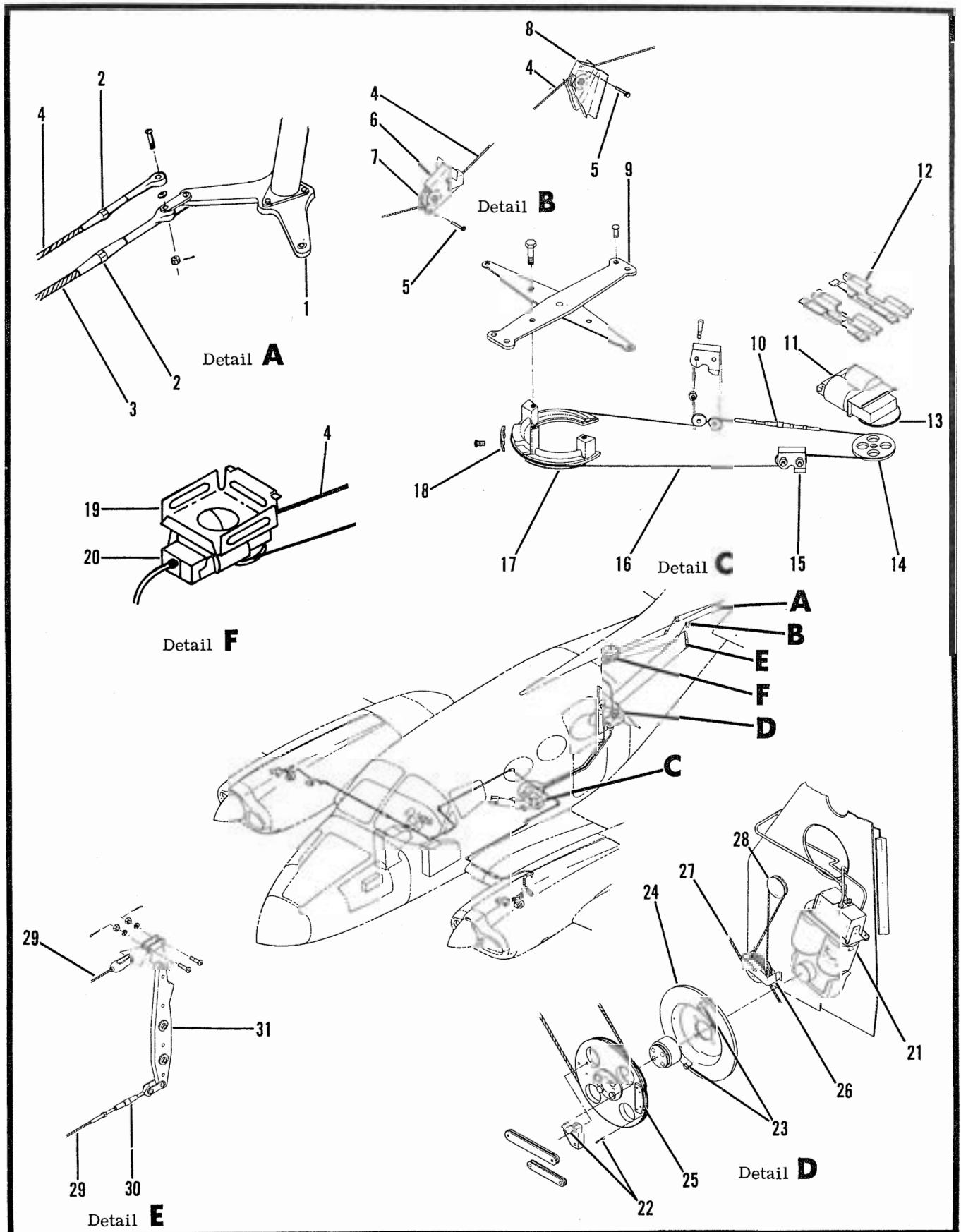


Figure 13-17. Cessna Nav-O-Matic 800 Autopilot Servos and Cables Installation

Figure 13-17. Cessna Nav-O-Matic Autopilot Servos and Cables Installation Callouts

1. Rudder Bellcrank	11. Aileron Servo	22. Cotter Pin
2. Turnbuckle	12. Support	23. Spacer
3. Rudder Cable	13. Cable Guard Assembly	24. Cable Guard Assembly
4. Autopilot Rudder Cable	14. Cable Drum	25. Clamp
5. Guard Pin	15. Pulley Bracket	26. Elevator Trim Pulley Bracket
6. Pulley Bracket	16. Autopilot Aileron Cable	27. Elevator Trim Cable
7. Pulley	17. Aileron Quadrant Assembly	28. Elevator Trim Servo
8. Pulley Bracket	18. Clamp	29. Autopilot Elevator Cable
9. Aileron Bellcrank	19. Support	30. Turnbuckle
10. Turnbuckle	20. Rudder Servo	31. Elevator Bellcrank
	21. Elevator Servo	

Removal and Installation of Autopilot Aileron Cables. (See figure 13-17.)

Remove autopilot aileron cable as follows:

- a. Remove front seats, middle seats and aft seats in accordance with Section 3.
- b. Remove rear carpet as necessary to gain access to cables.
- c. (See figure 1-2.) Remove floorboards (80 and 86) and access cover (17) on fuselage bottom.
- d. Remove safety and disconnect turnbuckle (10).
- e. Remove pulleys from pulley brackets (15).
- f. Loosen clamp (18) securing cable to quadrant (17).
- g. Through fuselage bottom access, remove screws and spacers (23) from cable guard assembly (13).
- h. Remove two outer screws from cable drum clamp (25), then loosen the remaining two screws allowing cable to become free.
- i. Remove cable through lower access.
- j. If autopilot aileron quadrant (17) is to be removed, the quadrant may be removed by removing the three attaching nuts and bolts.
- k. Install autopilot aileron cables by reversing the removal procedures.
- l. Rig aileron and check cable tension in accordance with rigging procedures of the section.

NOTE

The turnbuckle must be located midway between aileron servo drum and the adjacent pulley when in a neutral position.

Removal and Installation of Autopilot Rudder Cables. (See figure 13-17.)

Remove autopilot rudder cables as follows:

- a. Place a suitable support under tailcone.
- b. Remove tailcone access door.
- c. Remove stabilizer fairings (9 and 11) and access cover (5). (See figure 1-2.)
- d. Remove safety and disconnect turnbuckles (2) from left and right autopilot rudder cables (4).
- e. Remove guard pins (5) from pulley brackets (6 and 8).
- f. Remove screws and spacers (23) from cable guard assembly of rudder servo (20).
- g. Remove two outer screws from cable drum clamp, then loosen the two remaining screws allowing cable to become free.
- h. The installation procedure of the autopilot rudder cables is the reversal of the removal proce-

dures.

- i. Rig autopilot rudder cables in accordance with rigging procedures of this section.

Removal and Installation of Autopilot Elevator Cables. (See figure 13-17.)

- a. Place a suitable support under tailcone.
- b. Remove tailcone access door.
- c. Remove safety and disconnect turnbuckle (30).
- d. Remove cotter pin, nut and washer securing autopilot elevator cable to bellcrank links.
- e. Remove screws and spacers (23) from cable guard assembly (24).
- f. Remove the two outer screws from cable drum clamp (25), then loosen the two remaining screws allowing the cable to become free.
- g. Install autopilot elevator cables by reversing the removal procedures.
- h. Rig cables in accordance with rigging procedures of this section.

Removal and Installation of Autopilot Elevator Trim Control Cables. (See figure 13-17.)

- a. Place a suitable support under tailcone.
- b. Remove tailcone access door.
- c. Remove safety and disconnect turnbuckle on cable.
- d. Remove pulleys from bracket (26) and disengage cable from elevator trim servo (28).
- e. Remove cable in accordance with Section 6.

NOTE

The removal procedures for the autopilot elevator trim cable is the same as removal procedures for the elevator trim cables.

- f. Installation of the elevator trim control cables is the reversal of removal procedures.
- g. Rig elevator trim control cables in accordance with rigging procedures of this section.

Removal and Installation of Autopilot Pneumatic System. (See figure 13-18.)

Remove autopilot pneumatic system as follows:

- a. (See figure 1-2.) Remove engine cowls (29),

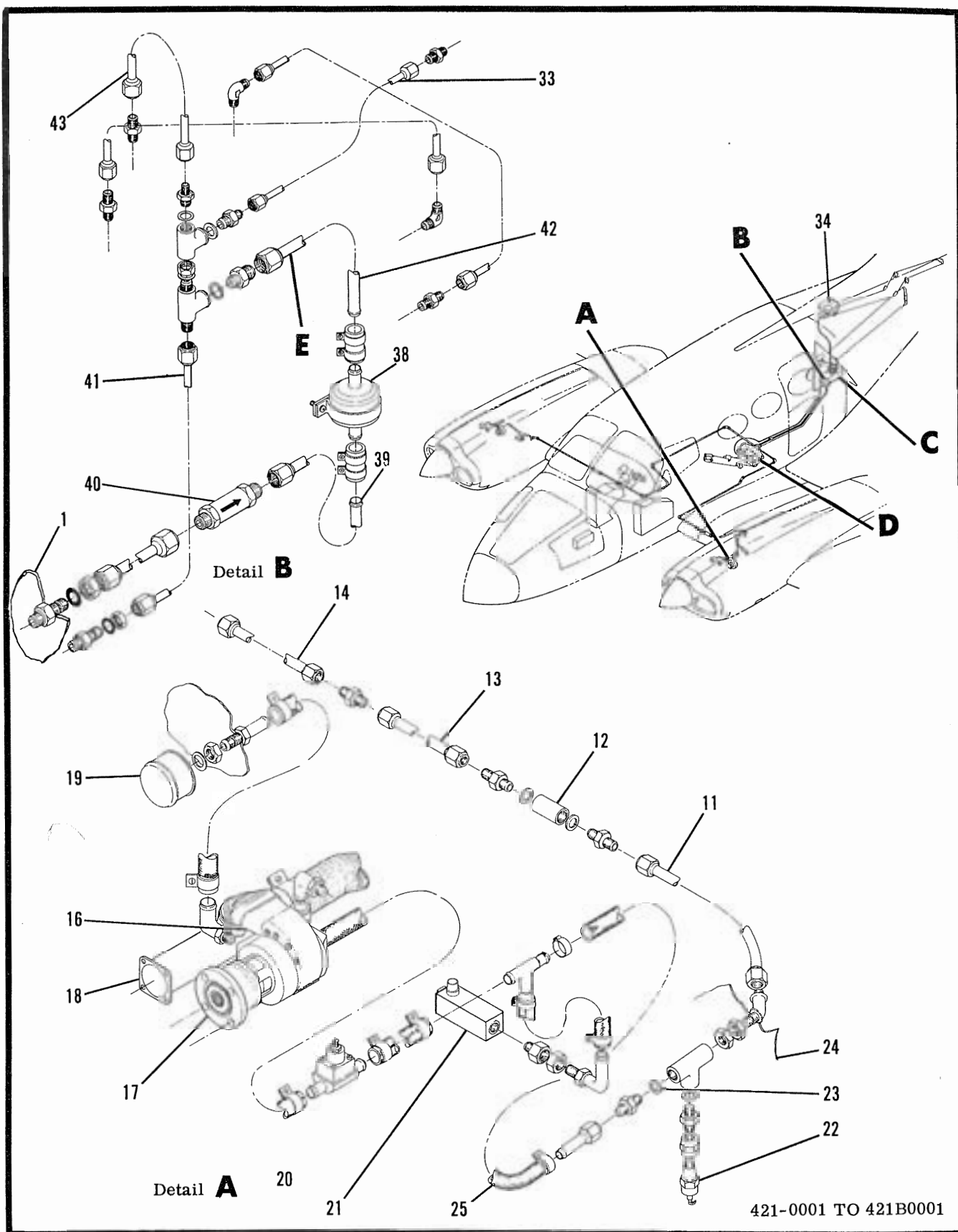
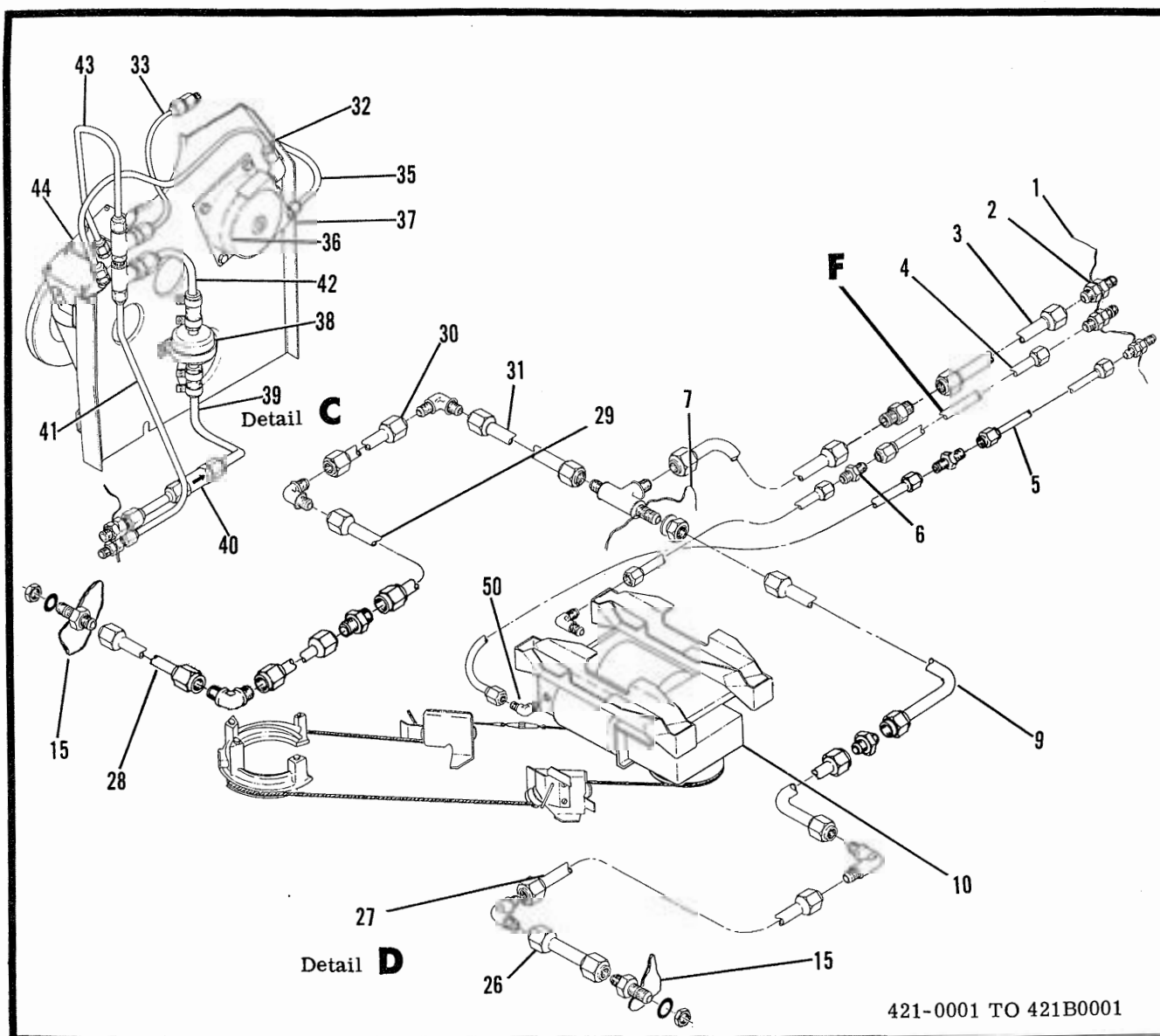


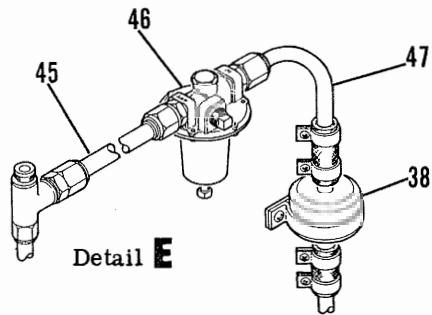
Figure 13-18. Cessna Nav-O-Matic 800 Autopilot Pneumatic System Installation (Sheet 1 of 5)



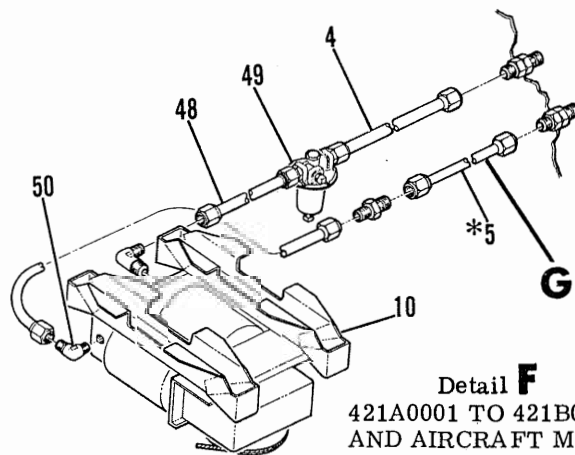
421-0001 TO 421B0001

1. Aft Pressure Bulkhead	17. Pneumatic Pump	35. Line Elevator Trim Servo to Elevator Servo
2. Lock-O-Seal	18. Cooling Air Adapter	36. Elevator Trim Servo
3. Pressure Line Assembly	19. Inlet Air Filter	37. Elevator Servo Support
4. Aileron Servo Pressure Line	20. Pressure Relief Valve	38. Filter
5. Servo Bleed Line	21. Dump Valve	39. Line Filter to Check Valve
6. Line Union to Aileron Servo	22. Pressure Switch	40. Check Valve
7. Beam Web	23. "O" Ring Gasket	41. Line Tee to Union
8. Line Tee to Elbow	24. Firewall	42. Line Filter to Tee
9. Line Elbow to Elbow	25. Hose Tee to Tee	43. Line Tee to Elevator Servo
10. Aileron Servo	26. Line Union to Elbow	44. Elevator Servo
11. Line Check Valve to Firewall	27. Line Elbow to Elbow	45. Line Tee to Pressure Regulator
12. Check Valve	28. Line Union to Elbow	46. Pressure Regulator
13. Line Check Valve to Union	29. Line Elbow to Elbow	47. Pressure Regulator to Filter
14. Line Union to Union	30. Line Elbow to Elbow	48. Line Union to Pressure Regulator
15. Cabin Skin	31. Line Elbow to Tee	49. Pressure Regulator
16. Shroud	32. Line Elevator Servo to Elevator Trim Servo	50. Elbow
	33. Line Rudder Servo to Tee	
	34. Rudder Servo	

Figure 13-18. Cessna Nav-O-Matic 800 Autopilot Pneumatic System Installation (Sheet 2 of 5)



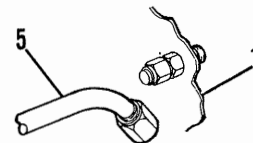
421A0001 TO 421B0001
AND AIRCRAFT MODIFIED
BY SK421-20.



Detail **F**
421A0001 TO 421B0001
AND AIRCRAFT MODIFIED
BY SK421-20.

NOTE

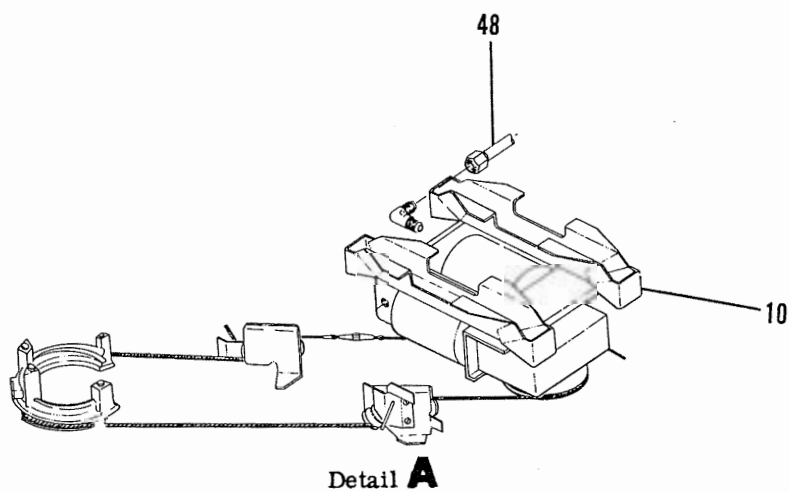
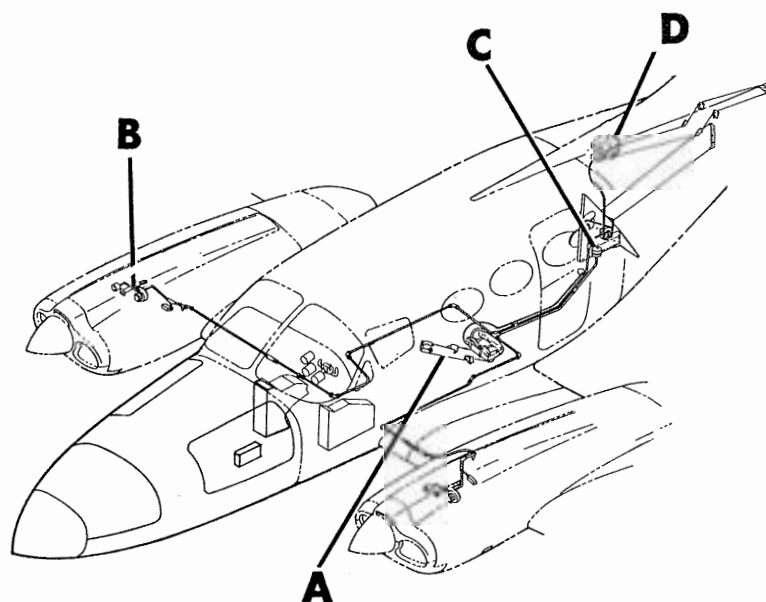
*ON AIRCRAFT 421A0046 TO 421B0001
SERVO BLEED LINE (5) HAS BEEN
DELETED BACK TO AILERON
SERVO (10) INCLUDING ELBOW (50).



Detail **G**
ON AIRCRAFT MODIFIED PER
SK421-21 AND ON AIRCRAFT
421A0030 TO 421A0046

421-0001 TO 421B0001

Figure 13-18. Cessna Nav-O-Matic 800 Autopilot Pneumatic System Installation (Sheet 3 of 5)



421B0001 AND ON

Figure 13-18. Cessna Nav-O-Matic 800 Autopilot Pneumatic System Installation (Sheet 4 of 5)

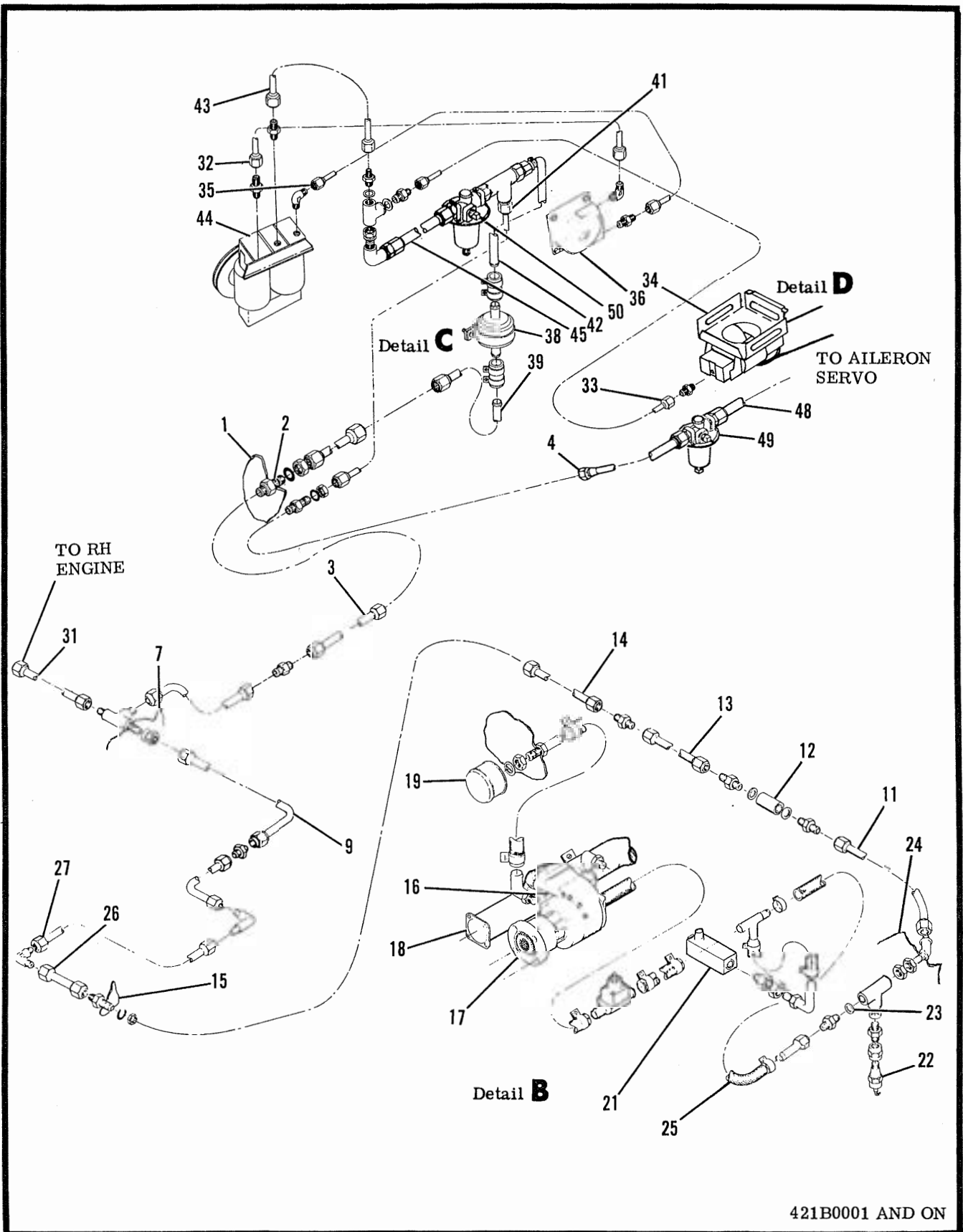


Figure 13-18. Cessna Nav-O-Matic 800 Autopilot Pneumatic System Installation (Sheet 5 of 5)

lower wing access doors (53, 54, 55, 56 and 57) and wing gap skin (35).

b. Remove pilot, copilot and aft seats in accordance with Section 3.

c. Remove carpet and floorboards (77, 78, 79, 80, 81, 82, 83, 84, 85 and 86 in accordance with Section 3. (See figure 1-2.)

d. Remove tailcone access door.

NOTE

All lines and fittings must be kept clean and suitably protected by caps, plugs or bags until installed in the system.

e. (See figure 13-18.) Remove plumbing from pneumatic pump (17) to firewall (24) by disconnecting hoses from pump (17), pressure relief valve (20), dump valve and pressure switch tee.

f. Disconnect and remove line (11) from firewall (24) to check valve (12).

g. Disconnect and remove line (13) from check valve (12) to union located in wing gap area.

h. It will be necessary to remove the heat exchanger to gain access to stub wing line (14). Remove heat exchanger in accordance with Section 13.

i. Disconnect line (14) from cabin skin fitting and remove.

NOTE

The removal procedures are the same for right and left wings.

j. Remove clamps securing lines to structure.

k. Disconnect lines (26 and 28) from cabin skin fitting. Hold fitting through skin to prevent it from turning, thus breaking the seal.

l. On aircraft 421-0001 to 421A0001, disconnect aileron servo pressure line (4) and aileron servo bleed line (5) from aft pressure bulkhead fittings. On aircraft 421A0001 and ON, remove pressure regulator (49) by disconnecting line union to pressure regulator (48) and aileron servo pressure line (4). Hold fittings at bulkhead to prevent turning and breaking cabin pressurization seal.

NOTE

On aircraft 421A0046 and ON, servo bleed line (5) has been deleted.

m. Disconnect lines in the cabin area in accordance with figure 13-18.

n. In the tailcone area, remove pressure line (33) from tee to rudder servo (34) and pressure line (43) from tee to elevator servo (44).

o. Disconnect and remove lines (32 and 35) from elevator trim servo (36) to elevator servo (44).

p. Disconnect and remove line (41) from tee to pressure bulkhead fitting.

q. On aircraft 421-0001 to 421A0001 remove filter lines (39 and 42). On aircraft 421A0001 and ON remove filter lines (45 and 47) from pressure regulator (46).

r. Installation is the reversal of the removal procedures.

Removal and Installation of Autopilot Servos. (See figure 13-17.)

a. Remove autopilot aileron servo (11) as follows:

1. Remove seats, carpet, floorboard access panels necessary to gain access to aileron servo.

2. Remove safety and disconnect turnbuckle (10).

3. Remove cable from aileron servo drum by loosening clamp securing cable to drum.

4. Remove aileron servo attaching nuts, washers, bolts and electrical plug and remove servo from aircraft.

5. Install aileron servo by reversing the removal procedure.

6. Rig autopilot aileron cables in accordance with rigging procedures.

b. Remove autopilot rudder servo as follows:

1. Place a suitable support under tailcone.

2. Remove tailcone access door.

3. Remove safety and disconnect turnbuckle (2).

4. Remove cable from rudder servo by loosening clamp securing cable to the servo drum.

5. Remove rudder servo attaching nuts, washers, bolts and electrical plug and remove servo from aircraft.

6. Installation of autopilot rudder servo is the reversal of removal procedures.

7. Rig autopilot rudder cables in accordance with rigging procedures.

c. Remove autopilot elevator servo as follows:

1. Place a suitable support under tailcone.

2. Remove tailcone access door.

3. Remove safety and disconnect turnbuckle (30).

4. Remove clamp from elevator servo drum and remove cable from drum.

5. Remove elevator servo attaching nuts, washers, bolts and electrical plug and remove servo from aircraft.

6. Installation of elevator servo is the reversal of the removal procedures.

7. Rig autopilot elevator cables in accordance with rigging procedures.

d. Remove autopilot elevator trim servo as follows:

1. Place a suitable support under tailcone.

2. Remove tailcone access door.

3. Remove safety from elevator trim cable and disconnect elevator trim cable from elevator trim servo.

4. Remove elevator trim servo attaching nuts, washers and bolts and remove servo from aircraft.

5. Installation of elevator trim servo is the reversal of removal procedures.

6. Rig elevator trim servo system in accordance with rigging procedures.

Removal and Installation of Autopilot Flight Controller

a. Remove the four screws attaching the flight controller to pedestal.

b. Pull flight controller aft and disconnect electrical plug and remove flight controller from pedestal.

c. Install by reversing the above procedure.

Removal and Installation of Autopilot Computer.

a. Open left nose access door and remove rear baggage shelf.

b. Loosen wing nuts securing computer and pull computer straight out of rack.

- c. Reverse the removal procedure for installation.

Rigging Autopilot Control System. (See figure 13-17.)

- a. Rig autopilot aileron control system as follows:
1. Refer to Section 6 and verify that the aileron control system is rigged properly.
 2. Place aileron control surfaces to the NEUTRAL position and secure with a clamping device.
 3. With drum (14) and servo (11) in NEUTRAL position, clamp cable to drum (14) in such a manner that the turnbuckle is midway between drum and the adjacent pulley.
 4. Rig tension on cable (16) to 12 ± 3 pounds.

NOTE

Cable tension should be adjusted when ambient temperature is 60°F to 90°F . Allow aircraft temperature to stabilize for a period of 4 hours.

5. If ailerons and servo are both still in neutral, install clamp (18), insure that cable guard pins (5) and guard spacers (23) are in place and safety turnbuckle (10).
6. Remove aileron clamping device.
- b. Rig the rudder control system as follows:
1. Refer to Section 7 and verify that the rudder control system is properly rigged.
 2. Place rudder control surface in NEUTRAL position and clamp and secure with clamping device.
 3. Insure that cable is properly clamped to servo drum and properly routed over pulleys.
 4. Rig control cable to 15 ± 5 pounds tension, keeping rudder and rudder servo in NEUTRAL position.
 5. Remove clamping device and check rudder for full travel and centering.
 6. Safety turnbuckle and verify that all cable guards are in place.
- c. Rig the autopilot elevator control cables as follows:
1. Refer to Section 6 and verify that the elevator control system is properly rigged.
 2. Place elevator control surface to the NEUTRAL position and clamp with suitable clamping device.
 3. Check the autopilot elevator control cables for proper routing and mounting on the elevator servo.
 4. Make sure elevator servo drum is in the NEUTRAL position.
 5. Rig elevator control cables (29) to 15 ± 5 pounds tension.
 6. Remove clamping device and clamps and operate elevator up and down.
 7. Verify that elevator control surfaces and cable drum are neutral.
 8. Refer to Section 7 and check travel of elevator control surface.
- d. Rig autopilot elevator trim control as follows:
1. Refer to Section 6 and rig elevator trim control system in accordance with rigging procedures.
 2. Check routing of elevator trim control cables, make sure cables are routed over pulleys and around the elevator trim servo drum.
 3. Rig the elevator cables to 16 ± 3 pounds tension.

4. Rotate the elevator trim control wheel so elevator trim tab is $26^{\circ} +1^{\circ}$, -0° down and set stop on the elevator trim tab cable.

5. Rotate the elevator trim control wheel so elevator trim tab is $10^{\circ} +1^{\circ}$, -0° up and set stop on the elevator trim tab cables.

NOTE

The elevator trim tab stop block must be located where they will not come in contact with the elevator trim servo pulley.

6. Check neutral position of elevator trim servo and trim tab.
7. Check operation in accordance with Nav-O-Matic 800 Service and Parts Manual.

NOTE

For installation of checkout patch cable, remove the LH forward cabin vent located just forward of the pilot's rudder pedals.

Autopilot Pressure Check and Adjustment. (See figure 13-18). (421-0001 to 421A0001)

- a. Disconnect line (33) from tee.
- b. Connect a pressure gage to the tee fitting.
- c. Start one engine and run at cruise RPM.
- d. Pressure at the filter outlet should read $10 + .75 - 0$ PSI.
- e. If pressure reading is below prescribed tolerance, adjust pressure relief valve (20) in the engine compartment to obtain correct pressure.
- f. Shut down engine and start opposite engine and perform the same check. Adjust if necessary.

Autopilot Pressure Check and Adjustment. (See figure 13-18.) (421A0001 and ON)

- a. Disconnect line (42) from tee.
- b. Connect a 0 to 20 PSI pressure gauge to line (42).
- c. Start one engine and run at cruise RPM.
- d. Pressure at the filter outlet should read $11.0 + .75, -0$ PSI.
- e. If pressure reading is above or below the prescribed tolerance, adjust pressure regulator (20) in the engine compartment to obtain correct pressure.
- f. Shutdown engine and start opposite engine and perform the same check. Adjust if necessary.
- g. With engine running at cruise RPM, remove pressure gauge and connect line (42) to pressure regulator (46).
- h. Connect the pressure gauge to the test port of pressure regulator (46).
- i. Pressure should be $10.0 + .75, -0$ PSI.
- j. If pressure reading is not within prescribed tolerance adjust pressure regulator by turning pressure regulator adjusting screw full in, with engine operating at cruise RPM turn pressure regulator adjusting screw out until correct pressure setting is reached.
- k. Remove pressure gauge and install plug in test port.

l. Connect pressure gage to the test port of pressure regulator (49) at access plate (93, figure 1-2).
m. Pressure reading should be 6.0 $\pm$.50, -0 on 421-0001 to 421B0001 aircraft and 7.0 $\pm$.50, -0 on 421B0001 and ON aircraft.

n. If pressure reading is not within the prescribed tolerance adjust pressure regulator by turning pressure regulator adjusting screw full in, with engine operating at cruise RPM turn pressure regulator adjusting screw out until correct pressure setting is reached.

o. Remove pressure gauge and install plug in test port.

p. Shutdown engine.

AIR CONDITIONING SYSTEM. (See figure 13-19.) (421-0001 TO 421B0001)

The air conditioning system is composed of six major component installations; the compressor-condenser unit, the evaporator and blower cabin divider, the Wemac plenum check valve, the Wemac air shutoff valve, the condensate tank and drain, and the switch controls.

The compressor-condenser unit mounted in the right-hand forward wing locker area consists of the compressor, the condenser, the electric drive motor and the cooling fan. Inlet air is provided from the outboard side of the nacelle and outlet air is expelled on the inboard side of the nacelle. Plumbing and wiring is routed through the wing to the cabin area with a pressure seal installed at the fuselage skin.

The evaporator and blower cabin divider unit is a special designed unit mounted in the forward right-hand cabin divider. This unit consists of the evaporator, evaporator air blower, upper Wemac air blower, control switches, and the adjustable air outlets. This unit also serves as a plenum for cabin air distribution. Air is routed from the forward lower part of the cabin divider and pulled through the evaporator by the evaporator air blower. Refrigerated air is delivered to the passenger and crew overhead vents by the Wemac air blower located inside the divider plenum. Refrigerated air is also delivered from the upper portion of the cabin divider through the adjustable louvers located on the forward and aft side of the cabin divider.

The Wemac air plenum check valve is located inside the Wemac plenum to prevent back flow from the Wemac plenum air system when the air conditioner is not in use.

The Wemac air shutoff valve is a solenoid operated butterfly valve located in the lower portion of the Wemac plenum, and prevents mixing warm pressurized air or ambient air (depending on the mode of operation) with refrigerated air in the upper plenum. The pressurized air will continue to be directed through the lower heating and ventilating outlet system. The shutoff valve is closed when the compressor switch is turned on.

The condensate tank is installed below the evaporator unit to collect and store evaporator condensation. An electrically actuated dump valve is wired through the gear squat switch to provide stored fluid to drain overboard upon aircraft landing and depressurization.

The switch controls consisting of three toggle switches are located on the upper forward face of the cabin divider. The cooling switch turns on the compressor and the evaporator blower to high speed. The fan switch allows the evaporator blower to operate independent of the compressor unit and has two speeds, high and low. The Wemac air switch controls the Wemac air blower.

When the cooling switch is placed in the ON position, the compressor, driven by an electric motor, compresses the Freon gas to a high pressure and high temperature. This gas is routed to the condenser where cooling from the fan removes heat from gas, condensing it to a liquid. The liquid is then stored in the receiver-dryer, adjacent to the compressor, until it is used. The Freon is metered to the evaporator through the expansion valve at a rate to allow all the liquid to evaporate and return to the compressor at a reduced pressure. The heat required for the evaporation is absorbed from air passing over the evaporator cooling fins. Refrigerated air is then routed to the Wemac plenum and cabin outlets by the Wemac blower.

CAUTION

If for any reason the air conditioner is turned off, it is recommended that a minimum of three minutes elapse before it is turned on again; this allows the compressor head pressure to bleed off and bring the starting load to normal.

Troubleshooting.

For troubleshooting the air conditioning system, refer to the Air Conditioning System Service/Parts manual.

Removal of Compressor and Condenser Unit. (See figure 13-19.)

- a. Turn off all electrical power.
- b. (See figure 1-2.) Remove air conditioning access panel cover (91).
- c. Loosen screws and remove cover shield.
- d. Tag and disconnect electrical wiring.
- e. Discharge pressure in accordance with Discharge Procedures and disconnect lines.
- f. Remove bolts from mount and remove the compressor and condenser unit by lifting straight out of nacelle.
- g. If further disassembly is required, refer to Air Conditioning Systems Service/Parts Manual.

Installation of Compressor and Condenser Unit. (See figure 13-19.)

- a. Position compressor and condenser unit in nacelle and install shock mount bolts.
- b. Connect wiring and remove tags.
- c. Connect refrigerant lines.
- d. Evacuate and charge the refrigerant system in accordance with the Air Conditioning Systems Service/Parts Manual.
- e. Check operation.
- f. Install cover shield and air conditioning access cover.

Removal of Evaporator, Blower and Cabin Divider Unit. (See figure 13-19.)

- a. Remove screws from panel on cabin divider.
- b. Tag and disconnect wiring from evaporator blower and Wemac blower.
- c. Remove screws securing the cabin divider to floorboard, side bulkhead and top bulkhead. Remove cabin divider from the aircraft.
- d. Discharge pressure in accordance with Air Conditioning Systems Service/Parts Manual and disconnect lines.
- e. Remove screws securing Wemac blower and remove clamp on Wemac blower outlet.
- f. Remove screws securing evaporator to mounts, loosen clamp to condensate tank and lift evaporator from aircraft.

Installation of Evaporator, Blower and Cabin Divider Unit. (See figure 13-19.)

- a. The Installation Procedure for the evaporator, blower and cabin divider unit is the reversal of the Removal Procedure.
- b. Evacuate and charge the refrigerant system in accordance with Air Conditioning Systems Service/Parts Manual.

Removal of Condensate Tank and Valve. (See figure 13-19.)

- a. Remove copilot's seat in accordance with Removal Procedures.
- b. Remove carpet in front of cabin divider on right side.
- c. Remove cabin divider in accordance with Removal Procedures.
- d. Remove evaporator mounting screws and lift evaporator up enough to remove floorboard plates.
- e. Remove condensate tank and valve.

Installation of Condensate Tank and Valve. (See figure 13-19.)

- a. The Installation Procedure for the condensate tank and valve is the reversal of the Removal Procedures.

Removal and Installation of Wemac Plenum. (See figure 13-19.)

- a. Removal and installation of the Wemac plenum is not recommended.

Removal of Wemac Shutoff Valve. (See figure 13-19.)

- a. Remove pilot's seat in accordance with Removal Procedures in Section 3.
- b. Remove carpets and floorboards in accordance with Removal Procedures in Section 3.
- c. Tag and disconnect electrical wiring.
- d. Remove bolts (67) securing shutoff valve (69) to shutoff valve bracket assembly (70).
- e. Remove valve and both gaskets (68).

Installation of Wemac Shutoff Valve.

- a. Install new gaskets (68).

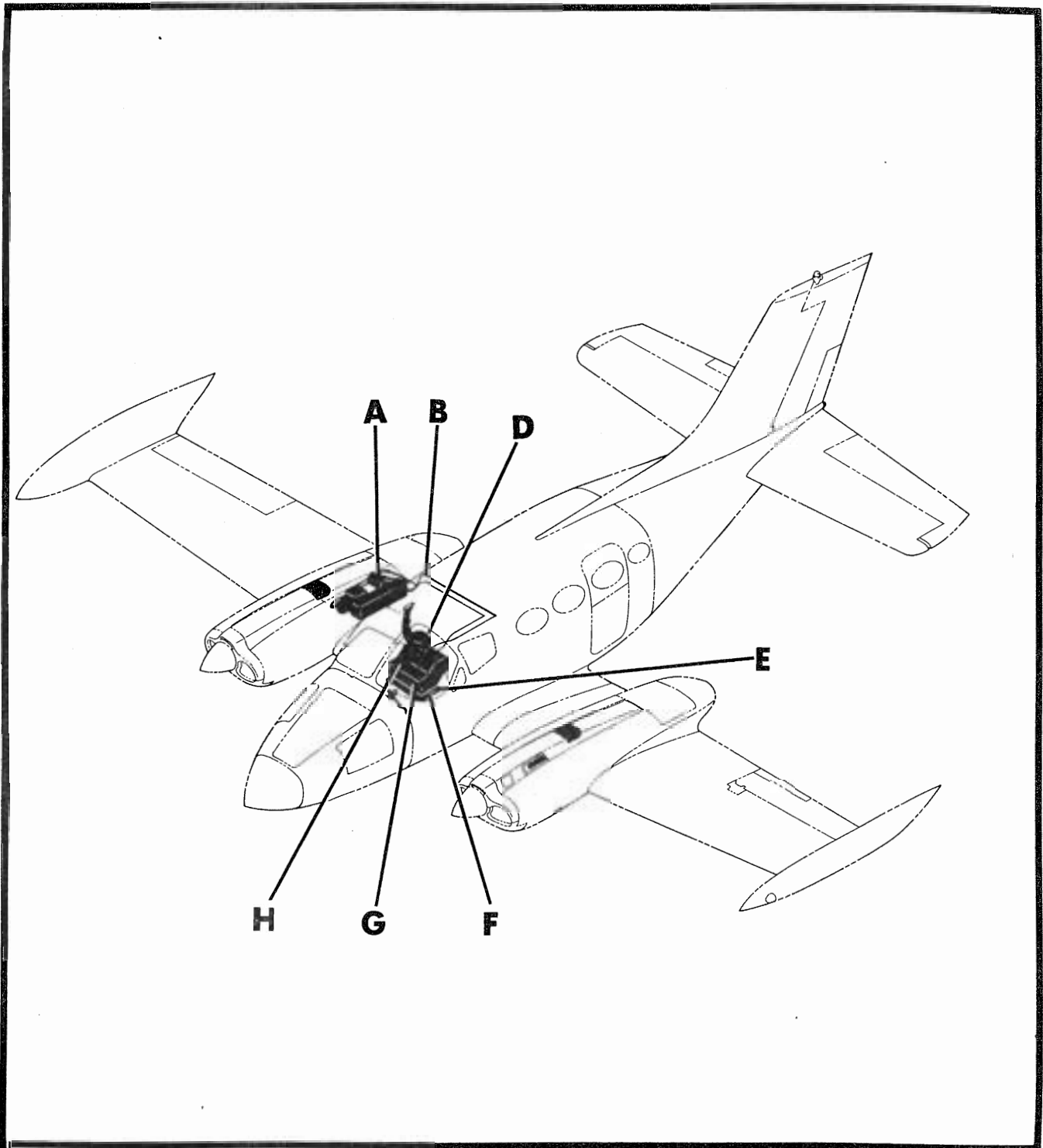
NOTE

When installing shutoff valve always use new gaskets (68).

- b. Install shutoff valve (69) in bracket assembly (70).
- c. Install bolts (67) and nuts (71).
- d. Connect electrical wiring.
- e. Install carpets and floorboards in accordance with Installation Procedures in Section 3.
- f. Install pilot's seat in accordance with Installation Procedures in Section 3.

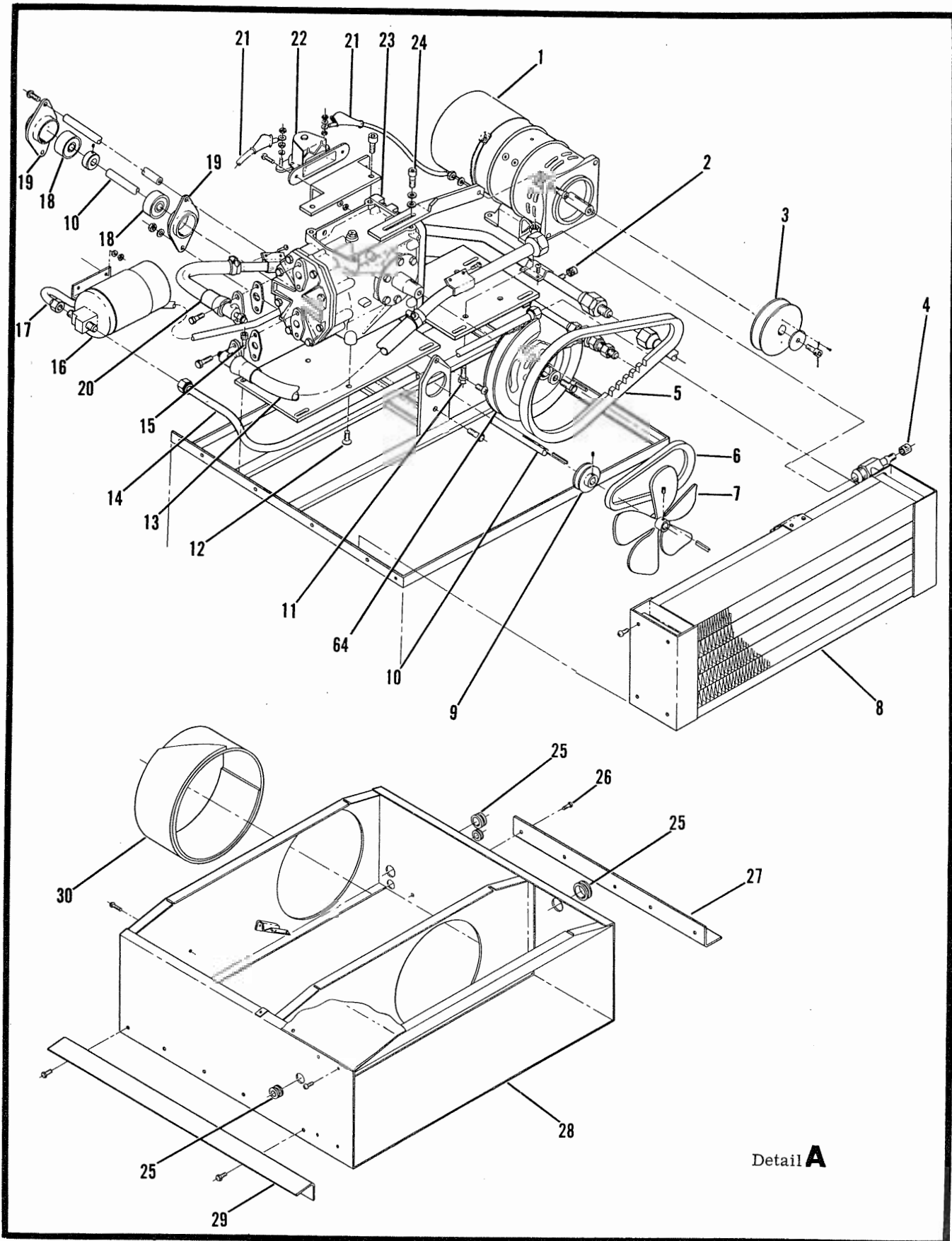
Removal of Air Conditioning Plumbing. (See figure 13-19.)

- a. (See figure 1-2.) Remove access covers (35), (58) and (91).
- b. Discharge pressure in accordance with Air



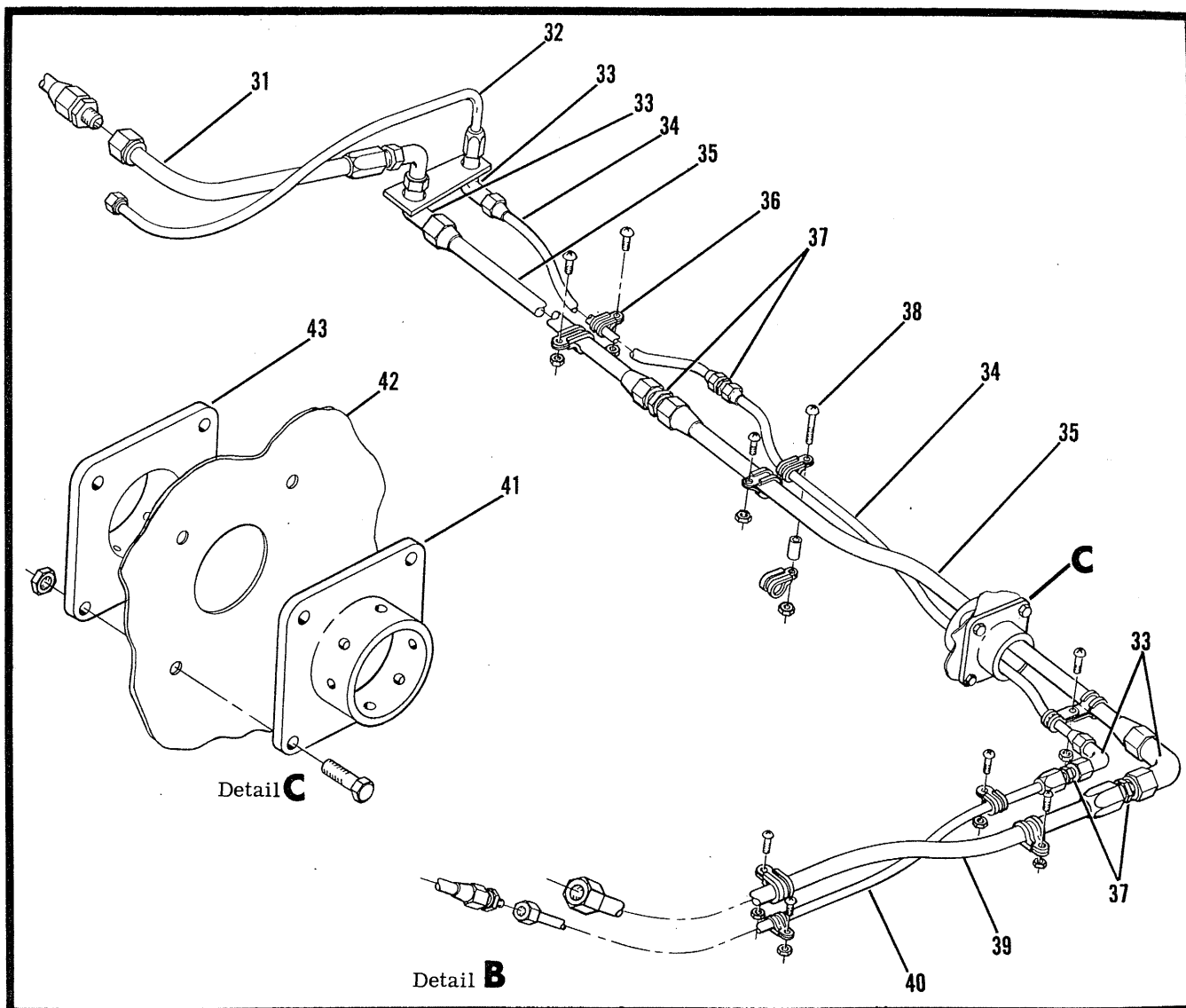
1. Motor	10. Shaft	17. Line (Receiver Dryer to Expansion Valve)
2. Charging Port (Low Pressure)	11. Bolt	18. Bearing
3. Pulley (Motor Drive)	12. Bolt	19. Bearing Retainer
4. Charging Port (High Pressure)	13. Line (Compressor Discharge)	20. Line (Evaporator to Compressor)
5. Belt (Motor to Compressor)	14. Line (Condenser to Receiver Dryer)	21. Electrical Cable
6. Belt (Motor to Fan)	15. Bolt	22. Relay
7. Fan	16. Receiver Dryer	23. Compressor
8. Condenser		24. Allen Bolt
9. Fan Pulley		

Figure 13-19. Air Conditioning System Installation (Sheet 1 of 4)



Detail **A**

Figure 13-19. Air Conditioning System Installation (Sheet 2 of 4)



25. Grommet	39. Hose Assembly (Elbow to Evaporator) (Low Pressure)	54. Evaporator Coil
26. Screw	40. Hose Assembly (Elbow to Evaporator) (High Pressure)	55. Cabinet Bottom
27. Aft Support		56. Mounting Clip
28. Cabinet Assembly		57. Brace
29. Forward Support		58. Cabinet Top
30. Duct		59. Blower Housing
31. Hose Assembly Condenser to Bulkhead (Low Pressure)	41. Seal Half	60. Blower Wheel
32. Hose Assembly (Rec. Dryer to Bulkhead) (High Pressure)	42. Fuselage Skin	61. Inlet Ring
33. Elbow	43. Seal Half	62. Motor Mount
34. Line Assembly Bulkhead to Wing Root (High Pressure)	44. Duct	63. Motor
35. Line Assembly Bulkhead to Wing Root (Low Pressure)	45. Clamp	64. Pulley (Compressor)
36. Clamp	46. Wemac Blower	65. Clamp
37. Union	47. Adapter	66. Duct
38. Screw	48. Adapter Ring	67. Bolt
	49. Condensate Tank	68. Gasket
	50. Floorboard	69. Valve (Shutoff)
	51. Drain Tube	70. Bracket Assy
	52. Solenoid Valve	71. Nut
	53. Expansion Valve	

Figure 13-19. Air Conditioning System Installation (Sheet 3 of 4)

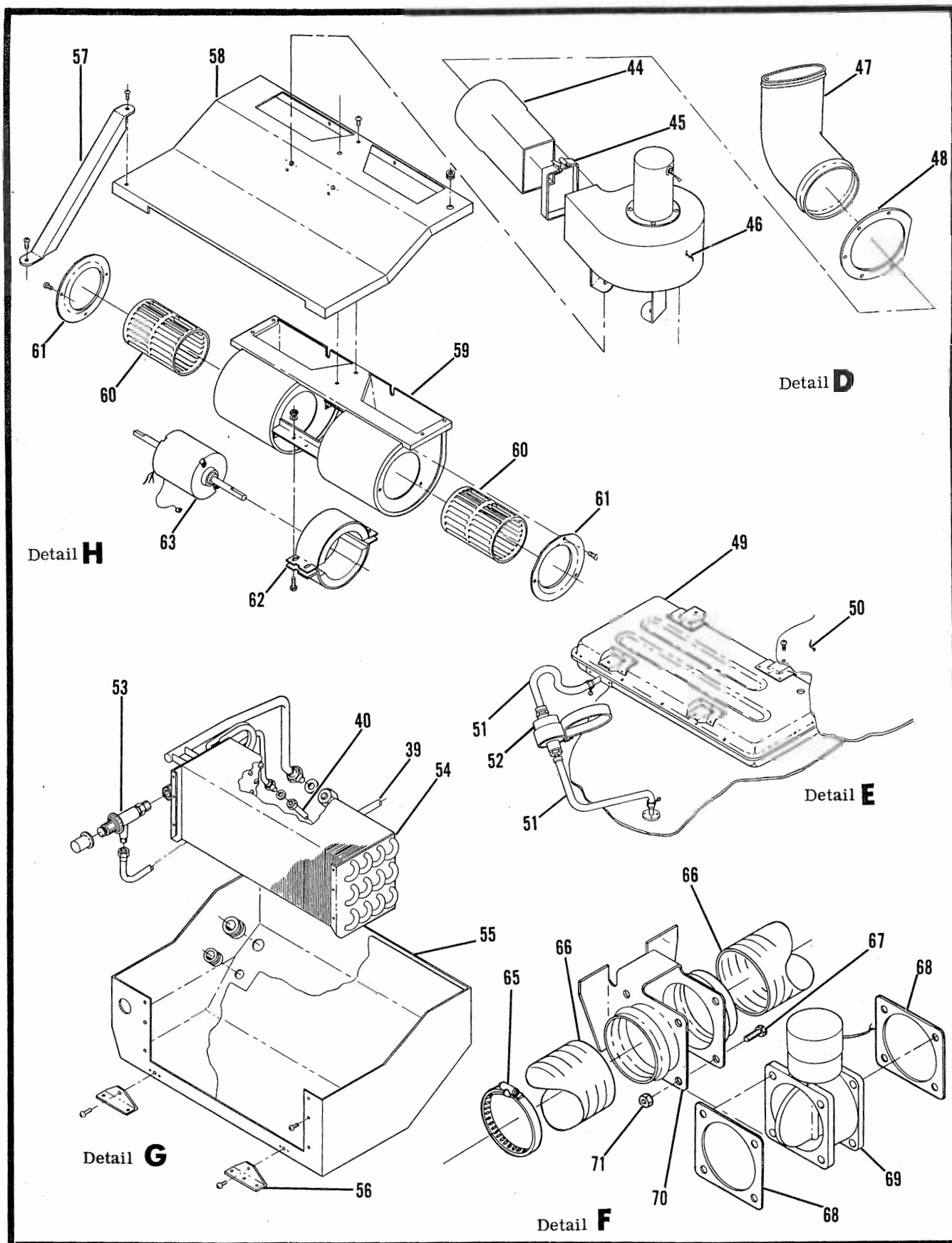


Figure 13-19. Air Conditioning System Installation (Sheet 4 of 4)

Conditioning System Service/Parts Manual.

c. Disconnect hoses (31) and (32) at nacelle, remove clamps (36), disconnect lines (34) and (35) at elbows (33) and unions (37) and carefully work lines from wing.

NOTE

Use care when removing lines to prevent scratches, nicks and bends.

d. Remove right front passenger seat and floorboard in accordance with Removal Procedures.

e. Disconnect lines (39) and (40) from hose elbows from under floorboard.

NOTE

Cap lines and hoses when not in use.

f. Disconnect clamps and remove the pressure seal at fuselage and route lines from stub wing.

Installation of Air Conditioning Plumbing. (See figure 13-19.)

a. The Installation Procedures for the air conditioning plumbing is the reversal of the Removal Procedures.

NOTE

When connecting aluminum fittings in the refrigerant system, lubricate all fittings with Capella "E"; torque all 5/8-inch fittings 18 to 21 foot-pounds and all 1/2-inch fittings 11 to 13 foot-pounds.

b. Reseal in accordance with resealing procedures in Section 16.

c. Evacuate and charge the refrigerant system in accordance with Air Conditioning System Service/Parts Manual.

d. Check system operation.

AIR CONDITIONING SYSTEM. (See figure 13-20.) (421B0001 to 421B0501.)

The air conditioning system is comprised of three major installations; right engine compartment, right wing locker and cockpit cabin area. The air conditioning system utilizing the vapor cycle concept and R-12 Freon as the refrigerant will deliver 14,500 BTU of cooling with an O. A. T. of 100° Fahrenheit.

The right-hand engine compartment installation consists of a piston type light-weight compressor mounted on the aft outboard side of the engine. The compressor is mounted to the nacelle structure and is belt driven from a pulley mounted on the aft side of the viscous damper. The compressor is engaged and

disengaged by an electromagnetic clutch when the air conditioning switch is placed in the air conditioning mode position. The compressor does not cycle on and off for cooling. A bypass valve has been incorporated to unload the compressor when less R-12 is needed by the system.

To protect the compressor from excessive liquid ingestion, a liquid trap is incorporated in the suction line located just aft of the firewall.

The right hand wing locker houses the two condenser modules, receiver-dryer, bypass valve, and condenser blower assembly. In flight cooling is provided by air drawn in through the inlet scoop on the outboard side of the engine nacelle being passed over the condenser and expelled through the nacelle outlet on the inboard side of the nacelle. The condenser blower is wired through the landing gear safety switch and operates during ground operation only except, during flight in the event the condenser temperature becomes excessively high causing the output pressure to increase, the fan will be turned on by the condenser fan control switch, and will remain on until the temperature of the condensers are reduced, lowering the output pressure. When the output pressure is reduced the condenser fan control switch will turn the fan off.

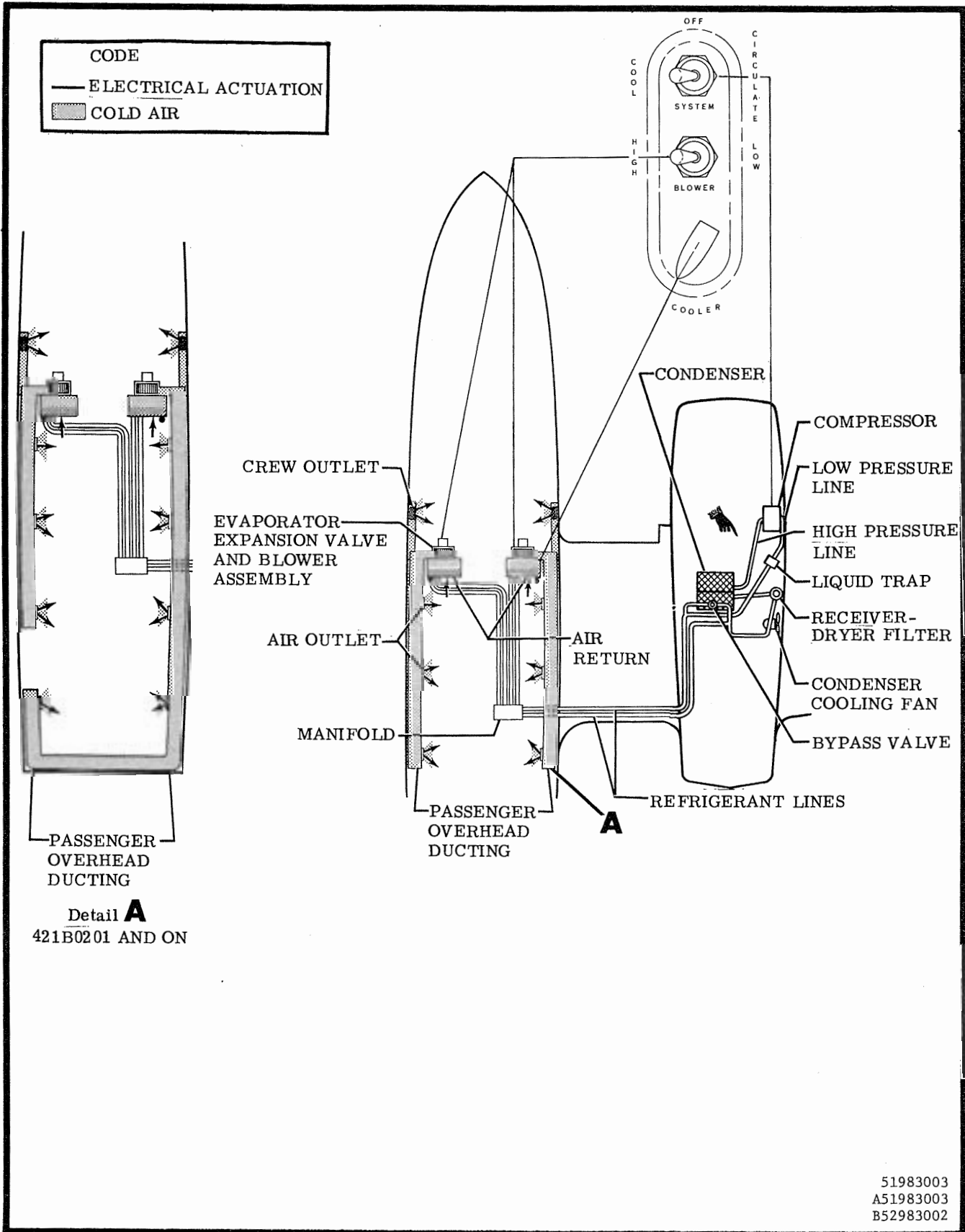
The receiver-dryer stores liquid refrigerant and draws the moisture out of the Freon during the cycle of operation. The bypass valve provides refrigerant flow to the compressor whenever the refrigerant solenoid valve is closed, and will maintain suction at a minimum pressure to prevent evaporator coil freezing. The bypass valve will unload the compressor when less R-12 is needed by the system.

The latching pressure switch is located in the high pressure line and provides protection for the refrigerant system. Should the thermostatic switch in the compressor fail or the temperature rise enough to cause the pressure to exceed 350 PSI the latching pressure switch will open and disable the magnetic clutch on the compressor. If the latching pressure switch is activated it will be necessary to remove the access plate on the inboard forward side of the right wing locker baggage compartment and manually reset the latching pressure switch.

A cover is provided for access to the right wing locker area for service and maintenance of components.

In the cabin cockpit area are mounted two evaporator modules, the control panel and temperature control assembly, the refrigerant manifold assembly, the condensate drain valve, the air distribution ducts and the sight glass and charging ports.

The evaporator modules each contain an evaporator coil, an expansion valve, a shroud, and a scroll and blower assembly. The evaporator modules are recessed behind the pilot and copilot seats. Cabin air



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Figure 13-20. Air Conditioning Distribution Schematic

is drawn through each evaporator coil and refrigerated air is routed into the distribution ducts into the cockpit cabin area. The blower motor is manually controlled and has dual speed which may be used to provide cockpit cabin ventilation or air recirculation when the air conditioner is turned off or when the cabin heater is operating.

The refrigerant manifold, located under the cabin floor, consists of a temperature relay, low pressure switch and distribution manifold. The manifold is the junction point for the gaseous and liquid freon distributed between the evaporator modules and the compressor.

A temperature control assembly mounted on the RH evaporator module (copilot's seat) senses evaporator inlet air. When surrounding air approaches the pre-selected value, the temperature control switch will close to provide voltage to the temperature relay.

The temperature control switch provides power to the compressor clutch through the temperature relay.

The low pressure switch provides system protection in the event of loss of freon or operation during extremely low outside ambient temperatures.

The condensate drain valve is located under the cabin floor and automatically drains the condensate from the evaporator modules during ground operation and in flight. The valve provides a two stage orifice which permits maximum drainage at ground operation and limited drainage during cabin pressurized flight. The second stage orifice assures no significant loss in cabin pressurization.

The control panel is located on the inboard side of the right-hand evaporator module and consists of a mode switch, evaporator blower speed selector switch and temperature selector rheostat. A special service fitting assembly is provided which permits system servicing and diagnosis. The fitting is located in the liquid line to the right-hand evaporator module expansion valve. The fitting contains a sight glass and service valve. Another service valve is located in the right-hand evaporator module suction line. This valve is used for charging freon to the system.

System operation in the air conditioning mode, requires that the right-hand engine be operating at a minimum tachometer reading of 950 RPM in order to drive the freon compressor at its design ground capacity. Whenever the system mode switch is selected to the air conditioning mode, with the right-hand engine operating, the magnetic clutch is energized and the compressor starts delivering a high pressure and temperature freon gas to the condensers. This gas is routed through the condensers where cool air from the fan assembly removes heat from the gas and condenses it into a high pressure liquid.

The liquid then enters the receiver-dryer where it is filtered, dried and gas is separated from the liquid.

From the receiver-dryer, the liquid flows to the freon distribution manifold which directs the liquid to each evaporator module expansion valve. The expansion valve throttles the liquid into a sub-cooled gas before it enters the evaporator coil. Air from the cabin is pulled across the evaporator coil and is cooled by the sub-cooled freon gas. The refrigerated air is then routed into the air distribution ducting and exhausted, through directional louvered outlets, into the cabin and cockpit.

Troubleshooting.

For troubleshooting the air conditioning system, refer to the Air Conditioning System Service/Parts Manual.

Removal of Compressor. (See figure 13-21.)

- a. Verify system power switch is in OFF position.
- b. Remove RH cowl.
- c. Discharge refrigerant system. Refer to Air Conditioning System Service/Parts Manual.

- d. Remove compressor drive belt in accordance with the Removal of Compressor Drive Belt Procedures.
- e. Remove suction hose and discharge hose. Cap open ports and hoses.
- f. Disconnect electrical wires at splices.
- g. Remove bolt and nut securing rod end (127) to bracket.
- h. Remove bolt, nut and washers securing support assembly (130) to support fitting.
- i. Remove compressor, torque link and support assembly as a unit.
- j. Disassemble compressor assembly components in accordance with figure 13-21.

Installation of Compressor (See figure 13-21.)

- a. Drain all oil from the compressor in accordance with Air Conditioning System Service/Parts Manual.
- b. Refill the compressor with 4 ounces of Suniso No. 5 or Texaco Capella E Grade, 500 viscosity oil or equivalent.

NOTE

Special care should be taken to assure that the system is not over-charged with oil, since an over-charge of oil in the system will decrease system performance.

NOTE

All openings in compressor shall be capped off to assure that oil in the compressor does not drain out during installation.

- c. Assemble torque link (129) and support assembly (130) to compressor. Refer to figure for proper placement of components.

NOTE

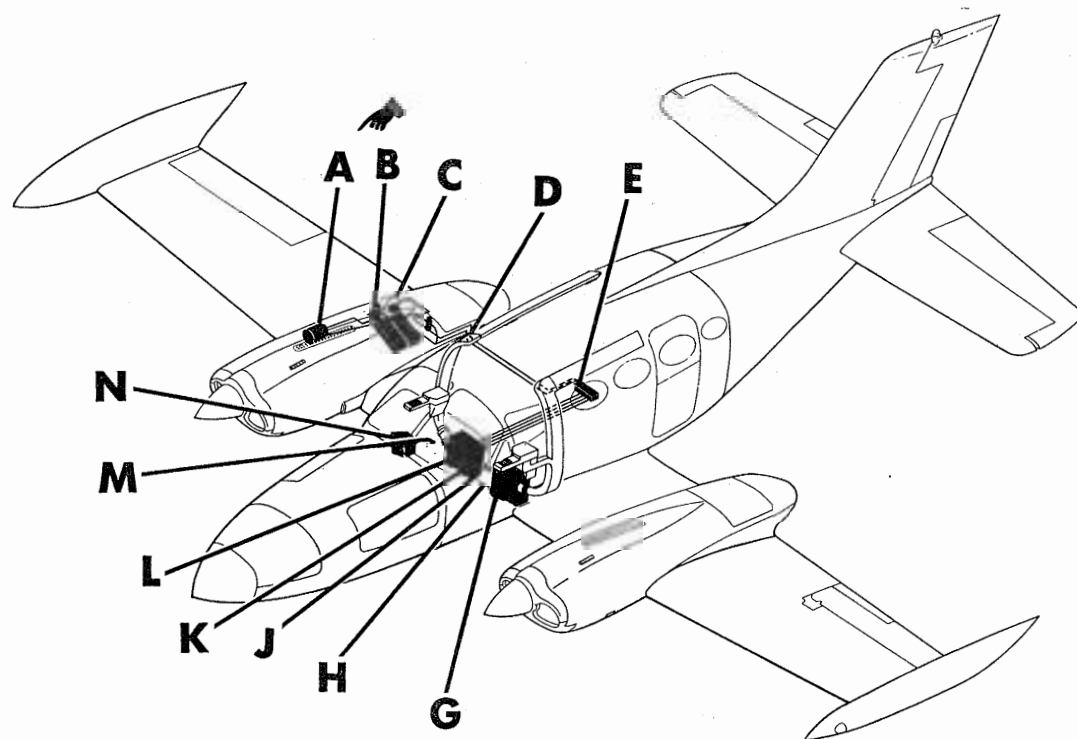
Bushings (131) may be lubricated with Dow-Corning DC4 (MIL-G-3278) silicone grease to facilitate installation. Bolts and nuts securing bushings must be snug but not so tight as to deform bushings. Secure nuts with cotter pins.

- d. Position compressor assembly in place and secure support assembly (130) to support fitting with bolt, nut and washers.

NOTE

Shift placement of washers as required to provide a static alignment of compressor pulley .15 inches forward of the engine drive pulley.

- e. Position compressor drive belt on pulleys and secure torque link rod end (127) to bracket. Washers may be added between rod end and bracket if required to align pulleys. Make certain a minimum of 1-1/2 threads protrude through the nut.



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Figure 13-21. Air Conditioning System (Sheet 1 of 5)

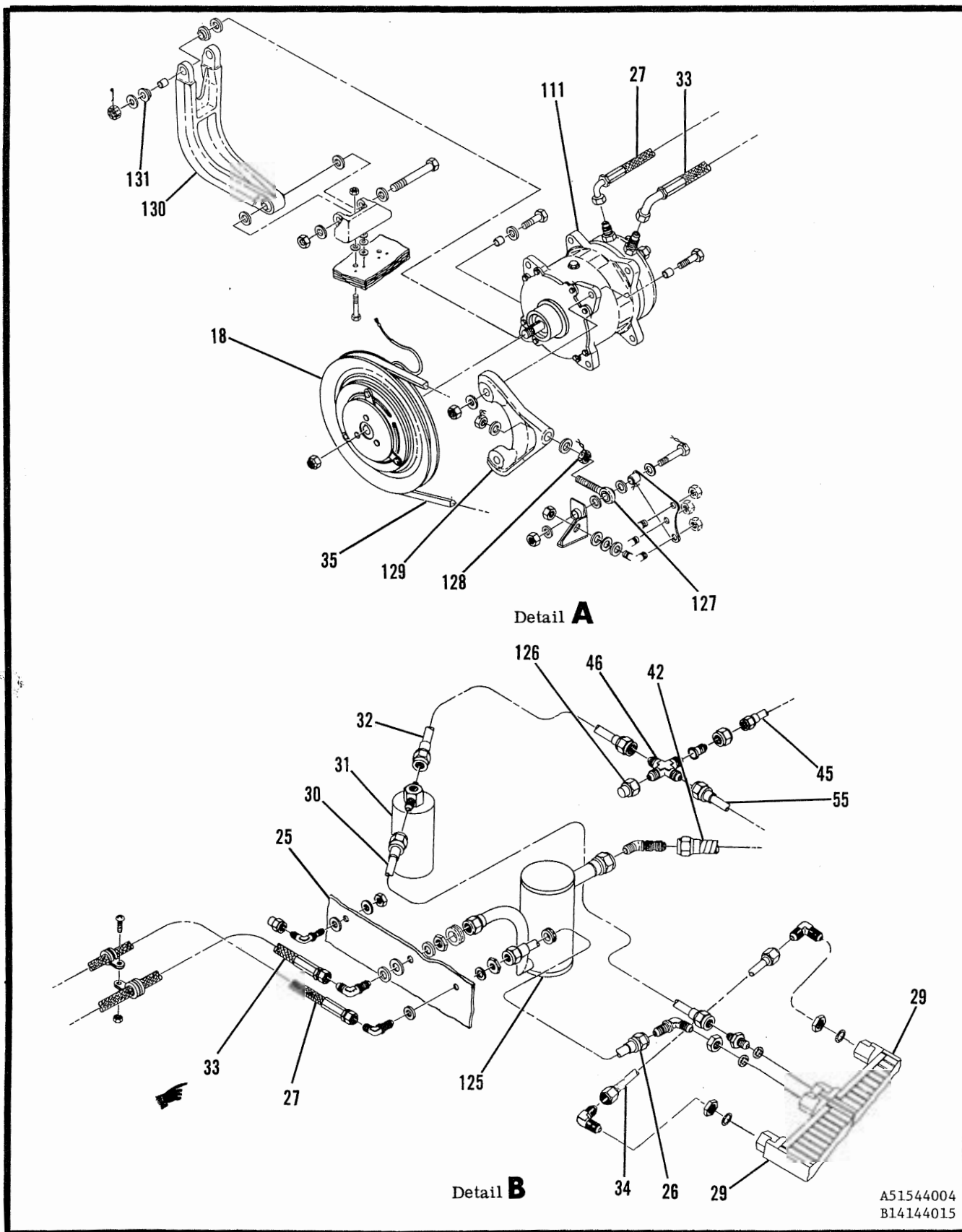


Figure 13-21. Air Conditioning System (Sheet 2)

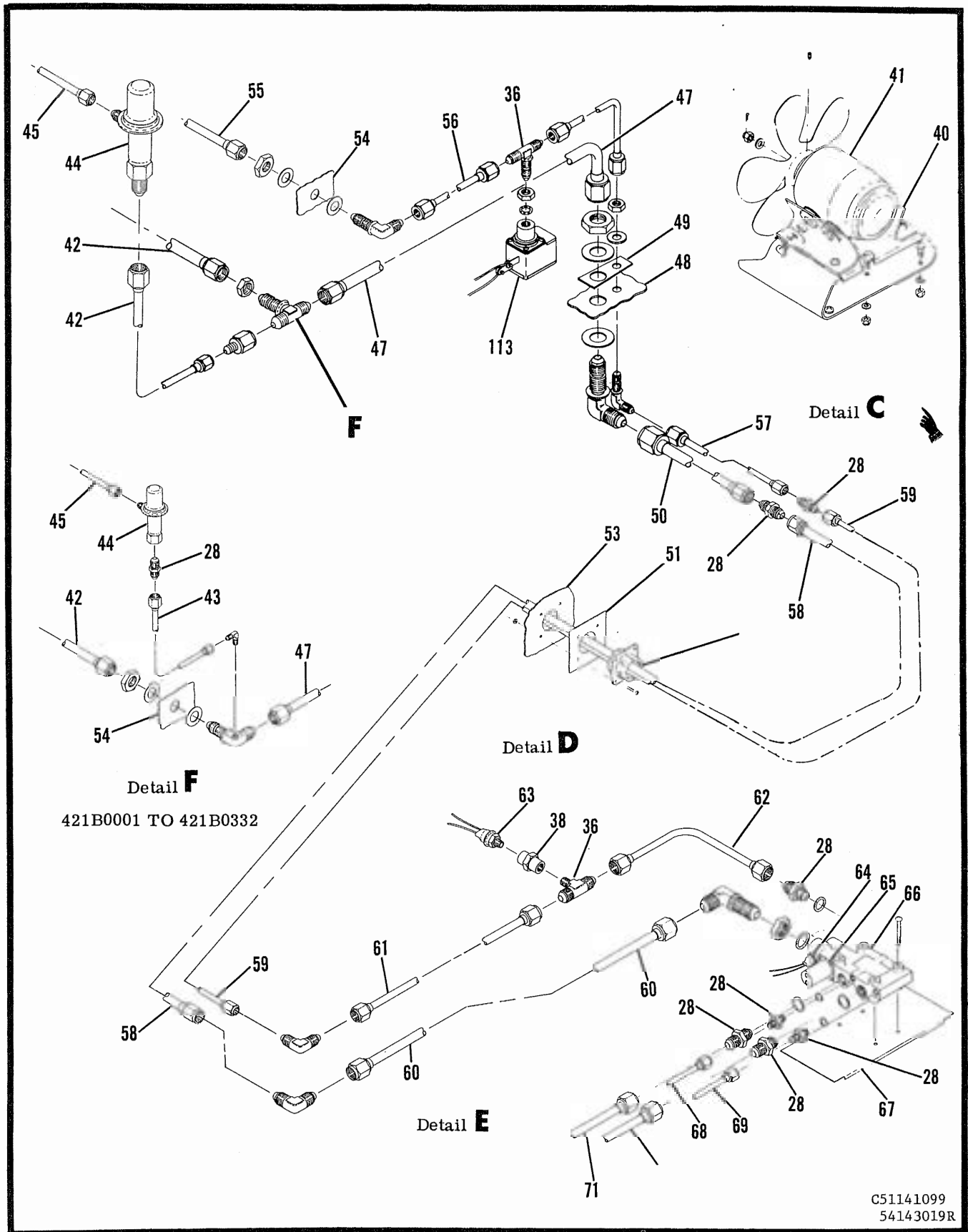
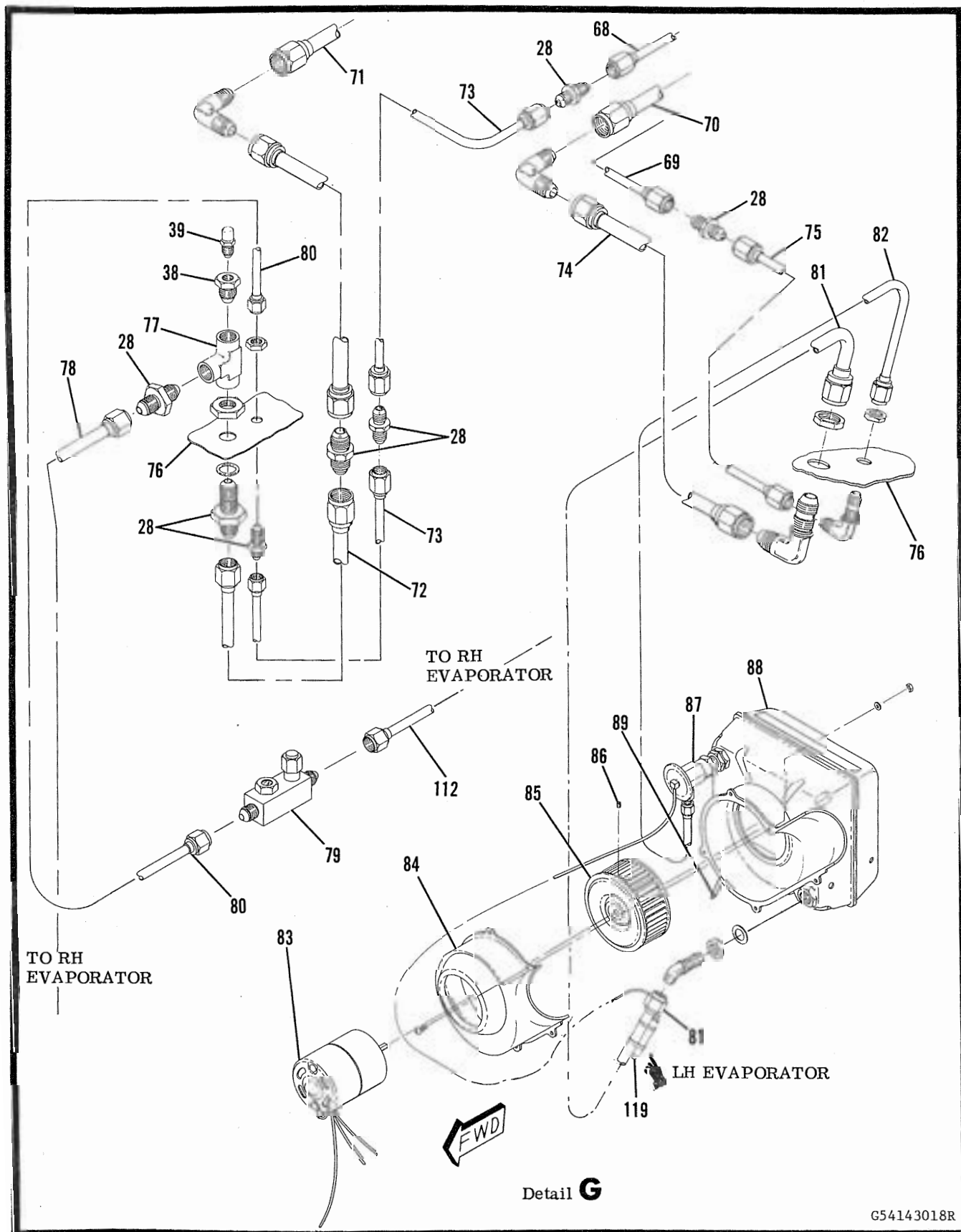
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Figure 13-21. Air Conditioning System (Sheet 3)



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Figure 13-21. Air Conditioning System (Sheet 4)

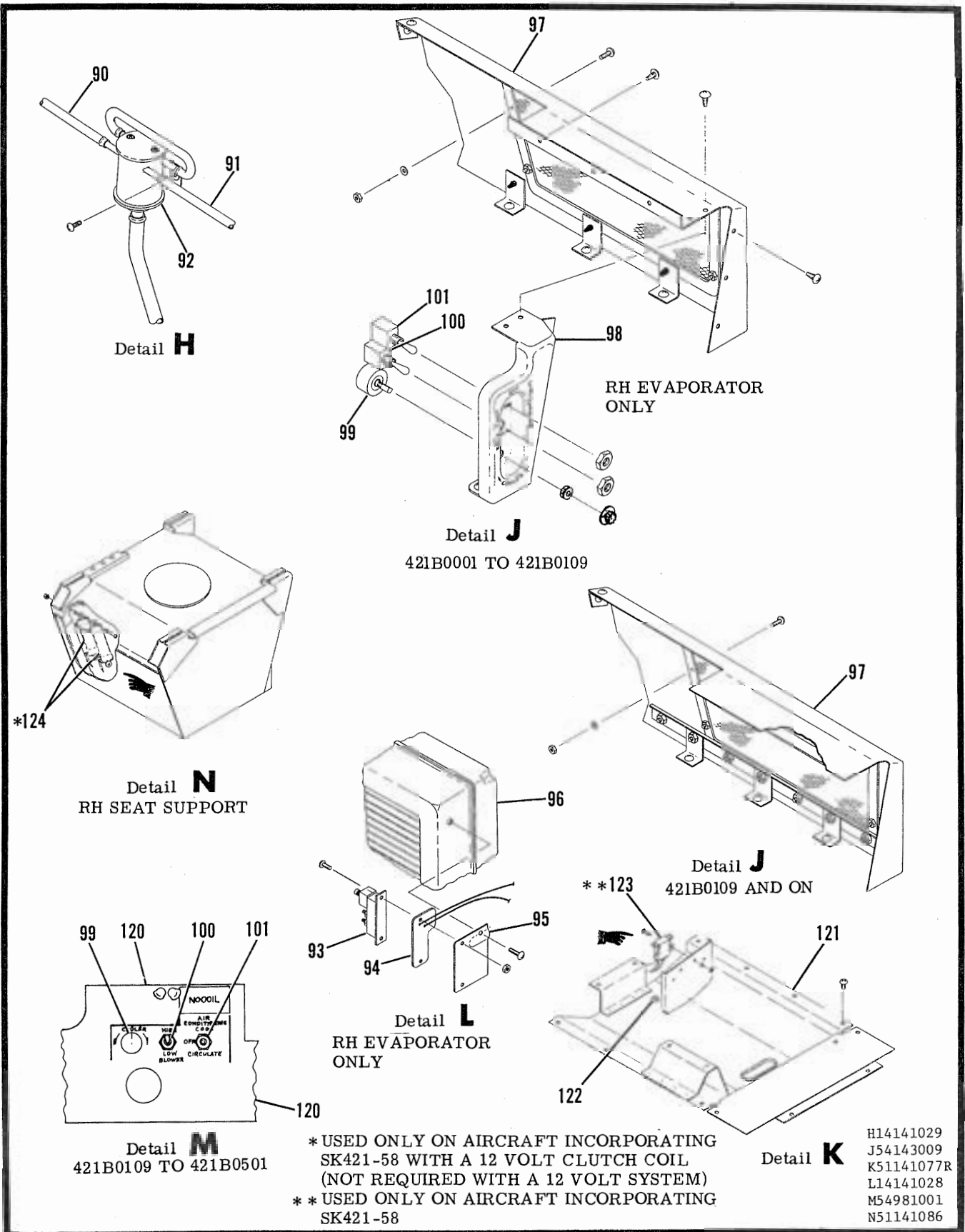


Figure 13-21. Air Conditioning System (Sheet 5)

Figure 13-21. Air Conditioning System Callouts

1. Thru 24. Deleted	61. Freon Liquid Injection Line (Union to High Pressure Switch Tee)	83. Motor
25. Firewall	62. Freon Liquid Injection Line (High Pressure Switch Tee to Manifold Union)	84. Blower Housing
26. Freon Discharge Line (Firewall Elbow to Condenser Union)	63. High Pressure Switch	85. Fan
27. Freon Discharge Hose (Firewall to Compressor)	64. Low Pressure Switch	86. Setscrew
28. Union	65. Manifold Shutoff Solenoid Valve	87. LH Evaporator Expansion Valve
29. Condenser	66. Manifold	88. LH Evaporator Module
30. Freon Discharge Line (Condenser Union to Receiver-Dryer)	67. Manifold Mounting Bracket	89. Condensate Drain
31. Receiver-Dryer	68. RH Evaporator Expansion Valve Line (Manifold to Union)	90. Drain Line From RH Evaporator
32. Freon Discharge Line (Receiver-Dryer to Cross)	69. LH Evaporator Expansion Valve Line (Manifold to Union)	91. Drain Line From LH Evaporator
33. Freon Suction Hose (Compressor Elbow to Firewall Elbow)	70. LH Evaporator Outlet Line (Manifold to Union)	92. Evaporator Condensate Drain
34. Crossover Line	71. RH Evaporator Outlet Line (Manifold to Union)	93. Temperature Control Switch
35. Compressor Drive Belt	72. RH Evaporator Outlet Line (Union to Service Valve)	94. Heat Temperature Control
36. Tee	73. RH Evaporator Expansion Valve Line (Union to Floorboard Union)	95. Bracket Temperature Control
37. Compressor Drive Sheave	74. LH Evaporator Outlet Line (Elbow to Floorboard Elbow)	96. RH Evaporator
38. Reducer	75. LH Evaporator Expansion Valve Line (Elbow to Floorboard Elbow)	97. RH Evaporator Back Cover
39. Plug	76. Floorboard	98. RH Evaporator Side Cover
40. Blower Motor Mount	77. Service Valve	99. Rheostat
41. Blower Motor	78. RH Evaporator Outlet Line (Service Valve to RH Evaporator)	100. Blower Switch
42. Gaseous Freon Suction Line (Firewall Elbow to Nacelle Skin Elbow)	79. Sight Glass - Service Port	101. Cool-Circulate System Switch
43. Line (Elbow to Bypass Valve)	80. RH Evaporator Expansion Valve Line (Floorboard Union to Sight Glass Service Port)	102. Thru 110. Deleted
44. Bypass Valve	81. LH Evaporator Outlet Line (Floorboard Elbow to LH Evaporator)	111. Compressor
45. Line (Bypass Valve to Cross)	82. LH Evaporator Expansion Valve Line (Floorboard Elbow to LH Evaporator Expansion Valve)	112. Line (Sight Glass - Service Port to RH Evaporator)
46. Cross		113. Latching Pressure Switch
47. Gaseous Freon Suction Line (Nacelle Skin Elbow to Elbow)		114. Thru 118. Deleted
48. Wing Skin		119. Temperature Sense Bulb
49. Spacer		120. Instrument Panel
50. Gaseous Freon Suction Line (Elbow to Union)		121. Pan
51. Doubler		122. Grommet
52. Seal		123. Temperature Control Relay
53. Fuselage Skin		124. Resistor
54. Nacelle Skin		125. Liquid Trap
55. Freon Liquid Injection Line (Cross to Nacelle Skin Elbow)		126. Cap
56. Freon Liquid Injection Line (Nacelle Skin Elbow to Elbow)		127. Rod End
57. Freon Liquid Injection Line (Elbow to Union)		128. Nut
58. Gaseous Freon Suction Line (Union to Union)		129. Torque Link
59. Freon Liquid Injection Line (Union to Union)		130. Support Assembly
60. Gaseous Freon Suction Line (Union to Manifold Elbow)		131. Bushing

- f. Adjust belt tension in accordance with Removal and Installation of Compressor Drive Belt Procedures.
- g. Connect electrical wires.

NOTE

When replacing a compressor having a 12 volt clutch assembly with a compressor having a 24 volt clutch, make sure resistors (119, figure 13-37) are removed from the circuit.

- h. Connect suction hose and discharge hose.
- i. Evacuate and charge system. Refer to Air Conditioning System Service/Parts Manual.
- j. Leak check fittings. No leakage is allowed.
- k. Install cowling.

Removal and Installation of Compressor Drive Belt. (See figure 13-21.)

- a. Remove and install drive belt as follows:
 - 1. Remove RH engine cowling.
 - 2. Cut safety wire from nuts (128) and screw nut onto rod end (127) until belt can be removed.
 - 3. Remove belt from compressor pulley and engine drive pulley.
 - 4. Install new belt and adjust nuts (128) on rod end (127) to obtain proper tension. Belt tension to be measured by loading center of belt with 25 pounds tension pulling up and measuring .5 inch deflection, with a straight edge across top belt between pulleys.
 - 5. Safety wire adjusting nuts (128) to each other.

NOTE

Recheck belt tension after a 10 minute ground run. After 2 to 5 flight hours, check belt for stretching.

- 6. Replace right hand engine cowling.

Removal of Manifold Assembly (See figure 13-21.)

- a. Remove cabin seats, carpeting and flooring in the area between F. S. 200 and 212.50 on right hand section of cabin.
- b. Discharge refrigerant system. Refer to Air Conditioning System Service/Parts Manual.
- c. Disconnect wiring to solenoid (65) and low pressure switch (64) and tag.
- d. Disconnect suction and discharge plumbing and cap off.
- e. Remove four mounting bolts and remove manifold.

Installation of Manifold Assembly. (See figure 13-21.)

- a. Installation of the refrigerant manifold assembly is the reversal of the removal procedure.
- b. Evacuate and charge system. Refer to Air Conditioning System Service/Parts Manual.
- c. Check for leaks with leak detector H-10 or equivalent.
- d. Replace flooring, carpeting and seats in cabin.

Removal of Low Pressure Switch. (See figure 13-21.)

- a. Remove cabin seats, carpeting and flooring in the area between F. S. 200.00 and F. S. 212.50 on right section of cabin.

- b. Discharge system in accordance with Air Conditioning System Service/Parts Manual.
- c. Disconnect switch (64), wires and tag.
- d. Turn pressure switch CCW to remove. Cap off hole.

Installation of Low Pressure Switch. (See figure 13-21.)

- a. Place small strip of teflon tape on pressure switch threads, remove hole cap and install pressure switch (64) in manifold.

CAUTION

Do not allow teflon tape to hang over threads and enter system when torqued.

- b. Screw switch CW until it is tight.
- c. Connect electrical wires on switch and charge the system as outlined in system charging procedures.
- d. Leak check at threads. If leak is observed, tighten pressure switch fitting until no leakage is observed.
- e. Replace flooring, carpeting and cabin seats.

Removal of Temperature Control Assembly. (See figure 13-21.)

- a. Verify system mode switch is in off position.
- b. Place copilot seat in full forward position with back down.
- c. Disconnect switch and heater wiring and tag.
- d. Remove two mounting screws and locknuts and left switch and heater assembly free.

NOTE

Temperature control assembly support bracket is bonded to the evaporator module shroud and normally does not require removal.

Installation of Temperature Control Assembly. (See figure 13-21.)

- a. Installation of the temperature control assembly is the reversal of the removal procedure.

Removal of Blower Motor. (See figure 13-21.)

- a. Verify system power switch OFF.
- b. Remove evaporator in accordance with the removal procedure.
- c. Disconnect motor wiring and tag.
- d. Remove five screws and locknuts from blower scroll (84).
- e. Pull motor and front portion of scroll assembly away from module (88).
- f. Remove blower wheel setscrew and slide wheel off motor shaft.

- g. Remove two motor support nuts and lock washers. Pull motor away from scroll and motor support ring.

Installation of Blower Motor. (See figure 13-21.)

- a. Place new motor in support ring, align mounting studs and press motor in place.
- b. Replace motor mount lock washers and nuts and tighten nuts.
- c. Slide blower wheel on motor shaft until it stops. Tighten set screw.

NOTE

Verify that the back side of the wheel does not strike the motor mount studs.

- d. Clean off both scroll mating surfaces and apply small bead of silicone rubber (RTV 102) on scroll mating surface.
- e. Install motor scroll assembly and align mounting screw holes and install screws.
- f. Place locknuts on mounting screws and tighten in random pattern.
- g. Connect motor electrical wiring and check motor operation at both speeds.

NOTE

During motor operation listen for any excessive noises or rubbing.

- h. Turn motor off, install evaporator in accordance with the installation procedures.

Removal of Expansion Valve. (See figure 13-21.)

- a. Verify system power switch OFF.
- b. Discharge system in accordance with the Air Conditioning System Service/Parts Manual.
- c. Remove expansion valve temperature sense bulb clamps (119) and remove bulb.

CAUTION

Do not damage bulb or sense line during disassembly.

- d. Disconnect blower motor (83), wiring and tag.
- e. Remove five screws and locknuts for blower scroll and remove motor-scroll assembly from module.
- f. Disconnect 1/4" line at valve inlet (87).
- g. Loosen 1/2" jam nut on valve outlet (87) and unscrew valve.
- h. Remove O-ring and jam nut. Discard O-ring.

Installation of Expansion Valve. (See figure 13-21.)

- a. Install jam nut and new O-ring (NAS-1595-8) on

valve outlet fitting.

- b. Screw valve assembly into coil inlet fitting until O-ring touches the inlet fitting.
- c. Position valve to mate with inlet line and screw on inlet line fitting until finger tight.
- d. Tighten jam nut while using back up wrench on valve body flat.

CAUTION

Do not wrench on valve outlet fitting. Wrench on valve body only.

- e. Tighten fitting on 1/4" inlet line.
- f. Replace valve temperature sensing bulb (119) on suction line using two straps.

NOTE

Locate bulb on bottom of horizontal section of suction line. Mounting straps must be tight, overtightening will crush bulb. Failure to assure the above may result in expansion valve hunting.

- g. Wrap suction line and sense bulb with refrigerant, moisture proof, tape. Thickness to be 1/4" minimum.
- h. Clean blower scroll mating surface and apply small bead of silicone rubber (RTV 102).
- i. Remove motor-scroll assembly on module scroll and align mounting holes.
- j. Install five mounting screws and locknuts and tighten at random.
- k. Connect motor electrical wiring and checkout motor operation at both speeds. Listen for excessive noise or rubbing.
- l. Reposition seat back and seat, if required.

Removal of High Pressure Switch. (See figure 13-21.)

- a. Remove cabin seats, carpeting and flooring in the area between F.S. 200.00 and F.S. 212.50 on right hand section of cabin.
- b. Discharge refrigerant system as outlined in system discharge procedures.
- c. Locate high pressure switch between lines (61 and 62).
- d. Disconnect switch (63), wires and tag.
- e. Turn pressure switch CCW to remove from reducer (38). Cap off hole.

Installation of High Pressure Switch. (See figure 13-21.)

- a. Place small strip of teflon tape on pressure switch threads, remove hole cap and install pressure switch in reducer (38).

CAUTION

Do not allow teflon tape to hang over threads and enter system when torqued.

- b. Screw switch CW until it is tight.
- c. Connect electrical wires on switch and charge the system as outlined in system charging procedures.
- d. Leak check at threads. If leak is observed, tighten pressure switch fitting until no leakage is observed.
- e. Replace flooring, carpeting and cabin seats.

Removal of Blower Fan Blade. (See figure 13-21.)

- a. Verify system mode switch is in off position.
- b. Remove access cover from top section of right hand nacelle.
- c. For complete protection during fan blade removal, it is suggested that condenser motor ground lead be disconnected.
- d. Remove cotter pin and retaining nut.
- e. Remove two Allen Head set screws and loosen fan blade on shaft.
- f. Loosen clamps securing electric motor and slide motor inboard.
- g. Remove fan blade from shroud.

Installation of Blower Fan Blade. (See figure 13-21.)

- a. Install new fan blade on motor shaft with fan hub 1/8 inch from motor front face.
- b. Tighten set screws retaining nut and install cotter pin.
- c. Move fan motor outboard until fan blade protrudes 2/3 of its blade width into the shroud.

NOTE

Clearance between fan blade and inside diameter of shroud should be 3/16 inch min.

- d. Tighten electric motor mounting straps.
- e. Connect motor ground lead.
- f. Install access cover.
- g. Place system mode switch to air conditioning and check blower assembly operation.

WARNING

Take special care to keep fingers and debris from fan inlet.

- h. Turn mode switch OFF.

Removal of Condenser Blower Motor. (See figure 13-21.)

- a. Verify system mode switch in off position.
- b. Remove access cover on top section of right

hand nacelle.

- c. Disconnect electrical wiring and tag.
- d. Remove mounting clamps and slide motor (41) inboard.
- e. Remove cotter pin, retaining nut and blade set screws.
- f. Slide fan blade off motor shaft.
- g. Remove motor.

Installation of Condenser Blower Motor. (See figure 13-21.)

- a. Installation of the electric motor is the reversal of the removal procedure.

NOTE

Fan blade alignment and spacing must be performed as outlined in fan blade removal and replacement procedure.

- b. Perform electrical checkout of motor operation.

Removal of Receiver-Dryer. (See figure 13-21.)

- a. Discharge refrigerant system. Refer to Air Conditioning System Service/Parts Manual and remove access cover in top section of right hand nacelle.
- b. Remove inlet and outlet refrigerant plumbing and cap.
- c. Loosen mounting straps and remove receiver-dryer (31).

Installation of Receiver-Dryer. (See figure 13-21.)

- a. Installation of the receiver-dryer (31) is the reversal of the removal procedure.

NOTE

The "IN" port of the receiver-dryer is connected to the plumbing from the last condenser outlet port.

- b. Evacuate and recharge system. Refer to Air Conditioning System Service/Parts Manual.
- c. Leak check with H-10 leak detector. No leakage allowed.
- d. Install access cover.

Removal of Liquid Trap. (See figure 13-21.)

- a. Discharge refrigerant system. Refer to Air Conditioning System Service/Parts Manual.
- b. Remove RH nacelle air conditioning access cover.
- c. Disconnect fittings and remove liquid trap from system.

Change 11

CAUTION

Care must be taken in removal and installation of the liquid trap to prevent twisting of the fittings which may cause cracks.

Installation of Liquid Trap. (See figure 13-21.)

- a. Position liquid trap in place with the outlet (curved tube) forward.
- b. Tighten tube fittings while holding the elbow fittings to prevent twisting the fittings.

NOTE

Install liquid trap so that the body is within 5 degrees of vertical. Insulate liquid trap and elbow using P-2 (2 in. wide x .19 thick) foam tape two layer wrap.

- c. Evacuate and charge system. Refer to Air Conditioning System Service/Parts Manual.
- d. Leak check with H-10 leak detector. No leakage is allowed.
- e. Install nacelle access cover.

Removal of Bypass Valve. (See figure 13-21.)

- a. Discharge refrigerant system. Refer to Air Conditioning System Service/Parts Manual.
- b. Remove access cover in top section of right hand nacelle.
- c. Disconnect valve inlet and outlet plumbing and cap off.
- d. Remove valve (44).

Installation and Adjustment of Bypass Valve. (See figure 13-21.)

- a. Installation of bypass valve (44) is the reversal of the removal procedure.

NOTE

The bypass valve is preset from the factory and should not be tampered with.

- b. Evacuate and charge the system. Refer to Air Conditioning System Service/Parts Manual.
- c. Leak check valve plumbing. No leakage allowed.
- d. Replace access cover.

Removal of Latching Pressure Switch. (See Figure 13-21.)

- a. Discharge the system. Refer to Air Conditioning System Service/Parts Manual.
- b. Remove air conditioner access cover in right nacelle.

- c. Tag and disconnect wires.
- d. Disconnect lines and remove latching pressure switch (113).
- e. Cap lines.

Installation of Latching Pressure Switch. (See figure 13-21.)

- a. Installation of latching pressure switch is the reversal of the removal procedures.
- b. Evacuate and charge system in accordance with Air Conditioning System Service/Parts Manual.
- c. Operational check in accordance with Operational procedures.

Removal of Evaporators. (See figure 13-21.)

The removal procedures given pertain to the left hand evaporator unit; however, the procedures are the same for the right hand evaporator. Where there is a specific difference, reference will be made to the individual evaporator unit.

- a. Remove pilot's seat in accordance with Section 3.
- b. Remove forward divider.

NOTE

On right hand evaporator remove control panel (98), back cover (97) and disconnect temperature control switch (93) in accordance with Details J and K.

- c. Discharge the refrigerant system in accordance with the Air Conditioning System Service/Parts Manual.
- d. Remove expansion valve temperature sense bulb clamps and remove bulb.
- e. Disconnect lines (81 and 82) from right hand evaporator.
- f. Tag and disconnect electrical wiring.
- g. Remove bolts securing evaporator to floorboard.
- h. Disconnect drain tube from bottom of evaporator unit.
- i. Remove air duct from evaporator.
- j. Remove evaporator from aircraft.

Installation of Evaporator. (See figure 13-21.)

The installation procedures given pertain to the left hand evaporator unit; however, the procedures are the same for the right hand evaporator unit. Where there is a specific difference, reference will be made to the individual evaporator unit.

- a. Place evaporator in mounting position.
- b. Connect air duct with clamp.
- c. Connect drain tube to bottom of evaporator unit.
- d. Secure evaporator to floorboard with bolts.
- e. Connect electrical wiring.
- f. Connect lines (81 and 82) to evaporator.

- g. Fasten expansion valve temperature sense bulb (99) to the bottom run of line (96) at approximate 5 to 7 o'clock position and as close to the evaporator as possible. Insulate temperature sense bulbs and lines by wrapping with P-2 foam tape.
- h. Evacuate and charge system in accordance with Air Conditioning System Service/Parts Manual.
- i. Perform operational check of system.
- j. Install forward divider.
- k. Install pilot's seat in accordance with Section 3.

Removal of Condensers. (See figure 13-21.)

- a. Remove access cover from top section of right hand nacelle.
- b. Discharge system in accordance with Air Conditioning System Service/Parts Manual.
- c. Disconnect lines (26, 30, and 34) from condenser units (29).
- d. Remove upper channel holding condensers in place and remove condensers.

Installation of Condensers. (See figure 13-21.)

- a. Install condensers by reversing the removal procedures.
- b. Evacuate and charge system in accordance with the Air Conditioning System Service/Parts Manual.

Removal and Installation of Evaporator Condensate Drain. (See figure 13-21.)

- a. (See figure 1-2.) Remove front spar access (77).
- b. Remove hose connections from evaporator condensate drain (92).
- c. Loosen screws attaching condensate drain to front spar and remove condensate drain from bottom of aircraft.
- d. Install condensate drain by reversing the removal procedures.

NOTE

After condensate drain has been installed in place, use Sealant CES2602, Class III, Type II to reseal drain hose in bottom of fuselage.

Removal of Air Conditioning Plumbing. (See figure 13-21.)

- a. Remove all RH passenger seats, pilot and co-pilot seats, and RH side of cabin carpeting.
- b. (See figure 1-2.) Remove all necessary access covers in RH floorboard area, RH engine cowl, access cover from top section of RH nacelle, and lower flaps to gain access to air conditioning plumbing.
- c. Discharge system in accordance with the Air Conditioning Systems Service/Parts Manual.

- d. Refer to figure and remove lines as required.

Installation of Air Conditioning Plumbing. (See figure 13-21.)

- a. Installation of the air conditioning plumbing is the reversal of the removal procedures.

NOTE

Lubricate all fitting threads with Capella "E" lubricant on installation.

- b. Reseal fuselage skin (53) in accordance with re-sealing procedures in Section 16 if lines (58 and 59) have been removed or replaced.
- c. Evacuate and charge the refrigerant system in accordance with Air Conditioning Systems Service/Parts Manual.
- d. Check for leaks with leak detector H-10 or equivalent.
- e. Perform operational check of air conditioning system.

AIR CONDITIONING SYSTEM. (See figure 13-22.) (421B0501 and On.)

The air conditioning system is comprised of three major installations; right-hand engine compartment, right-hand wing locker area, and the fuselage cabin area. The air conditioning system utilizes the vapor cycle concept and R-12 Freon as the refrigerant. The system will deliver 14,500 BTU of cooling with an OAT of 100° Fahrenheit.

The right engine compartment installation consists of a hydraulic pump mounted on the accessory pad of the engine with necessary lines and fittings routing to the wing locker.

The right wing locker houses the condensers, the compressor and its hydraulic drive motor, receiver-dryer, hydraulic manifold and valve assembly, condenser blower motor and fan, hydraulic fluid reservoir and drain valve, associated wing locker wiring and plumbing. In flight cooling is provided by air drawn through the inlet scoop on the outboard side of the engine nacelle being passed over the condensers and expelled through the nacelle outlet on the inboard side of the nacelle. The condenser blower is wired through the landing gear safety switch and normally operates during ground operation only; however, during flight in the event condenser temperature becomes excessively high, causing the output pressure temperature to increase, the fan will be turned on by the condenser high temperature switch, and remain on until temperature of the condensers are reduced, lowering the output pressure temperature. When the output pressure temperature is reduced the condenser high temperature switch will turn the fan off.

The purpose of the receiver-dryer is to store liquid refrigerant and filter out any moisture in the Freon during the system operation cycle.

The low pressure switch is utilized in the high pressure line and provides system protection in the event of loss of Freon or operation during extremely low outside ambient temperature. The switch senses Freon low pressure and opens the electrical circuit and disables the manifold and valve assembly which disengages the compressor.

The manifold and valve assembly is electrically operated and contains a solenoid by-pass valve, pressure relief valve and filter. The manifold and valve assembly is mounted in the hydraulic line from the engine driven pump to the hydraulic reservoir. The manifold and valve assembly is controlled by the temperature control on the air conditioning panel. When cooling is selected the manifold and valve assembly is energized and allows the hydraulic fluid under pressure to operate the motor on the compressor. After the temperature demand is reached, the manifold and valve assembly will de-energize and compressor rotation ceases. A pressure switch is installed in the hydraulic pressure line at the valve assembly. The switch will actuate and illuminate the A COND HYD light on the annunciator panel with the air conditioning system ON and right engine running. The switch will deactivate and the light will go out when hydraulic fluid pressure falls below 400 psi. A cover is provided for access to the right wing locker area, for servicing and maintenance of components.

In the cockpit area are mounted two evaporator modules, the control panel and temperature control assembly, the condensate drain valve, the air distribution ducts, the sight glass and charging ports.

The evaporator modules each contain an evaporator coil, an expansion valve, a shroud, and a scroll and blower assembly. The evaporator modules are located aft in the cabin under the baggage shelf. Cabin air is drawn through each evaporator coil and refrigerated air is routed into the distribution duct and cabin cockpit area.

The blower motor is manually controlled and has dual speed which may be used to provide cockpit cabin ventilation or air recirculation when the air conditioner is turned off or when the cabin heater is operating.

A temperature control assembly is mounted on the left-hand evaporator module. Whenever the surrounding air approaches the preselected valve, the control assembly will open the manifold and valve assembly, shutting off hydraulic fluid to the compressor motor.

The condensate drain valve is located under the cabin floor and automatically drains the condensate from the evaporator modules during ground operation and in flight. The valve provides a two stage orifice which permits maximum drainage at ground operation and limited drainage during cabin pressurized flight. The second stage orifice assures no significant loss of cabin pressurization.

The control panel, located on the right-hand side of the crew compartment, consists of a temperature selector rheostat, a mode switch and blower speed selector switch.

Special service fittings for diagnosis and charging the Freon system are installed in the liquid line to the right-hand evaporator module expansion valve and in the suction line in the sight gage. These fittings contain a valve to prevent loss of Freon during servicing. Service fittings are also located on the aft face of the compressor.

System operation in the air conditioning mode, requires the right engine to be operating at a minimum tachometer reading of 950 RPM to drive the Freon compressor at its designed ground capacity.

Whenever the system mode switch is selected to air conditioning mode, the manifold and valve assembly is closed and hydraulic fluid is supplied to the compressor motor which drives the compressor. The compressor starts delivering a high pressure and temperature Freon gas to the condensers. This gas is routed through the condensers where cool air from the fan assembly removes heat from the gas and condenses it into a high pressure liquid.

The liquid then enters the receiver-dryer where it is filtered, dried and gas is separated from the liquid. From the receiver-dryer, the liquid flows to each evaporator module expansion valve. The expansion valve throttles the liquid into a sub-cooled gas before it enters the evaporator coil. Air from the cabin is pulled across the evaporator coil and is cooled by the sub-cooled Freon gas. The refrigerated air is then routed into the air distribution ducts and exhausted into the cabin and cockpit.

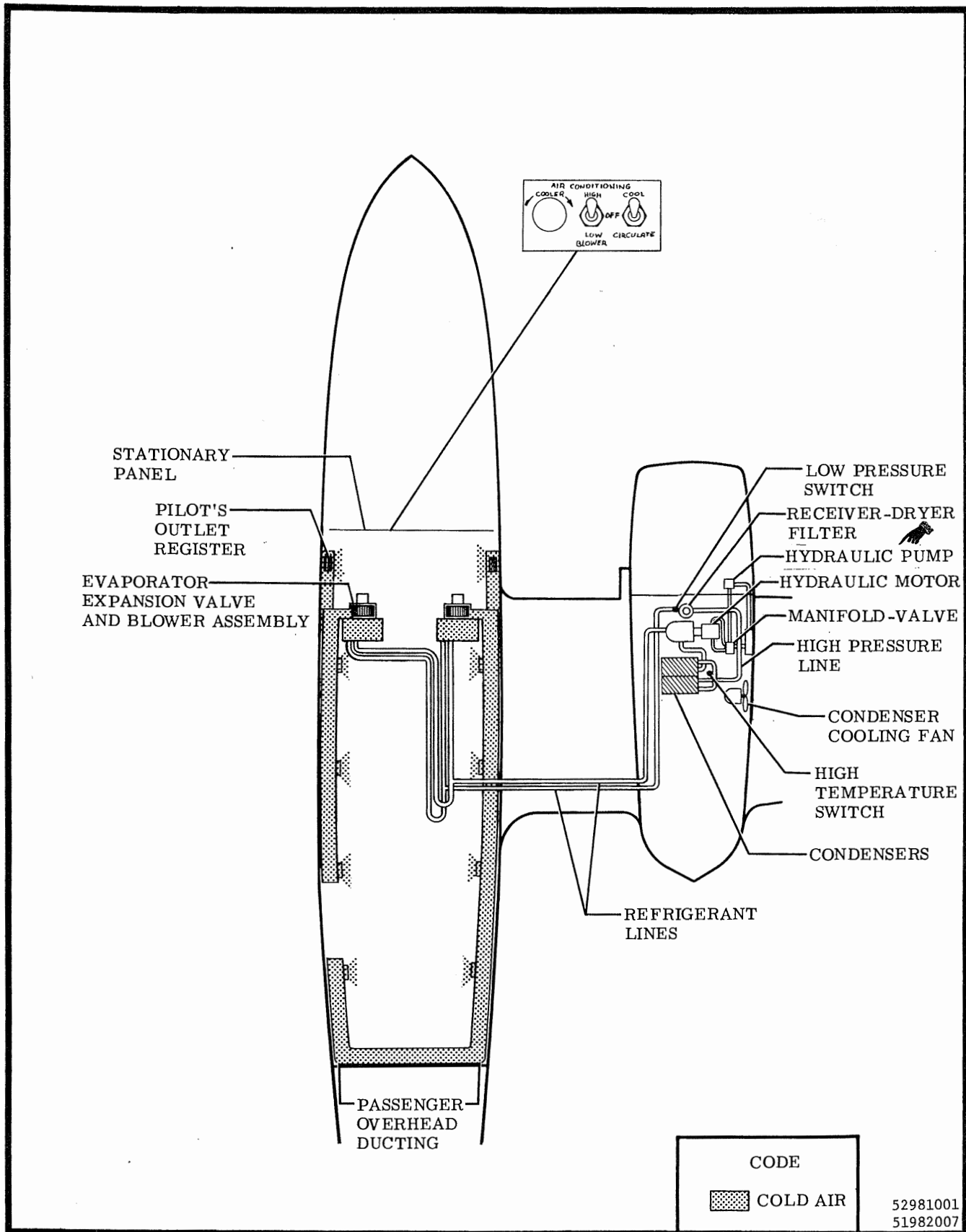
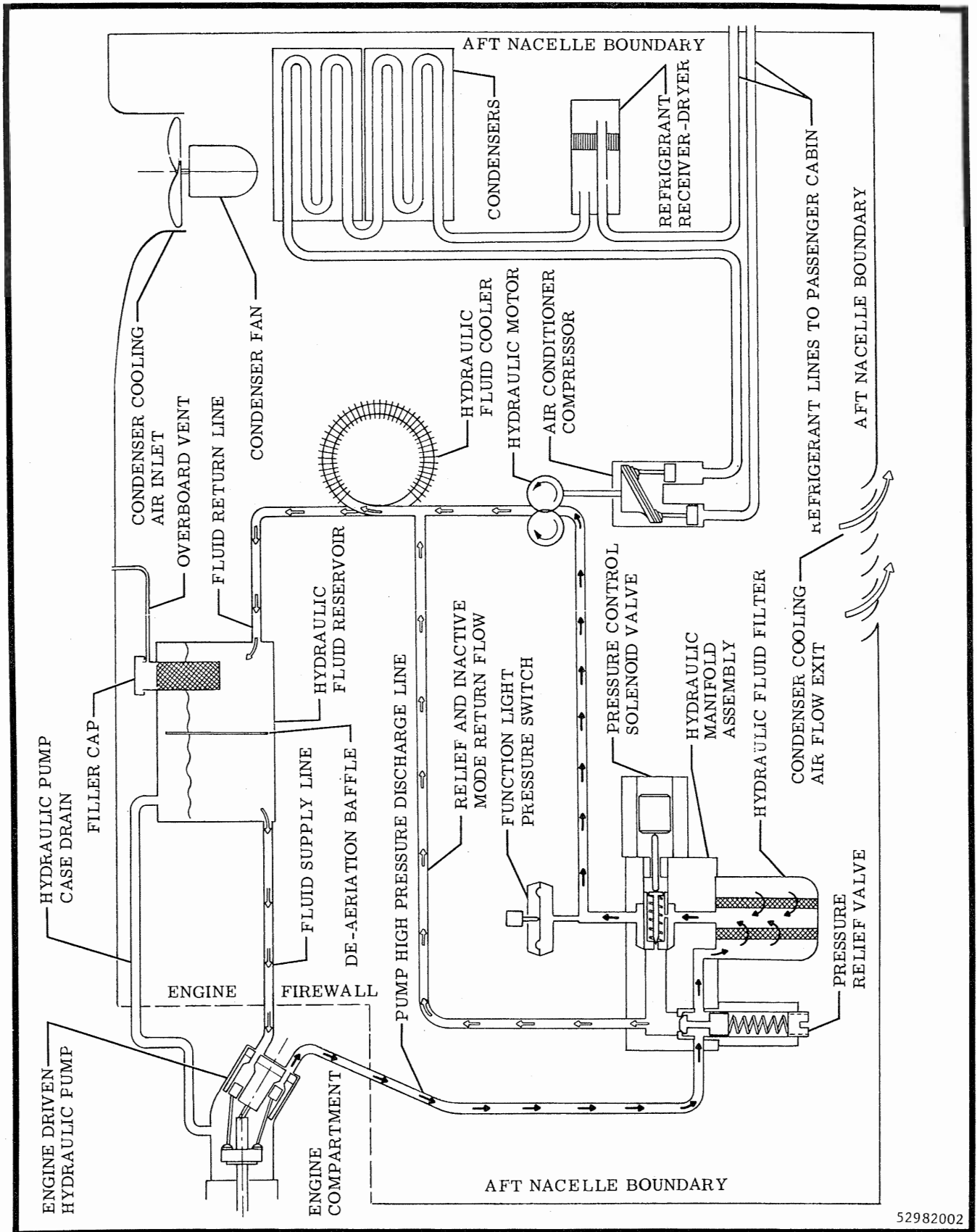


Figure 13-22. Air Conditioning Distribution Schematic



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Figure 13-22A. Air Conditioner Hydraulic System Schematic

Troubleshooting Air Conditioner Hydraulic System.

TROUBLE	PROBABLE CAUSE	CORRECTION
CABIN PRESSURE LIGHT OUT WITH SYSTEM IN OPERATION	Defective or misadjusted pressure switch.	Check pressure switch and associated components. Re- place or adjust as necessary. Refer to Air Conditioning System Service/Parts Manual.
HYDRAULIC MOTOR FAILS TO TURN WHEN AIR CONDITIONER IS ACTIVATED	Defective pressure light.	Replace light.
	Defective solenoid.	Check solenoid for 24 VDC. Replace if necessary.
	Defective pressure relief valve.	Test manifold valve and ad- just relief valve as necessary. Refer to Air Conditioning System Service/Parts Manual.
	Clogged filter.	Determine reason for con- tamination.
	Air conditioner compressor over-serviced.	Check compressor for proper freon charge. Refer to Air Conditioning System Service/ Parts Manual.
	Hydraulic pump inoperative.	Check drive spline for pos- sible shear and/or that spacer is installed in the internal splined bore of the engine accessory drive shaft. Defective pump. Replace if necessary. Incorrect hydraulic pump. Check Parts Catalog for cor- rect pump part number.
	Hydraulic motor defective. Defective manifold.	Replace hydraulic motor. Pressure test manifold. Re- place if necessary. Refer to Air Conditioning System Service/Parts Manual.

Hydraulic System Operational Test.

- a. Conduct operational test using a hydraulic test cart as follows:
 1. Ensure that all air conditioning system fittings, clamps and lines are tight.
 2. Service air conditioner hydraulic reservoir with 2.75 quarts of MIL-H-5606 hydraulic fluid (red).
 3. Ensure air conditioner compressor is serviced with proper amount of Freon. Refer to Air Conditioning System Service/Parts Manual.
 4. Connect hydraulic test cart to inlet and outlet lines at the engine driven hydraulic pump.

5. Connect 28 VDC power source to aircraft.
6. Adjust hydraulic test cart to 3 gpm.
7. Turn air conditioner to COOL mode.
8. Check hydraulic system for leaks.

NOTE

Use caution in the area of the condenser fan.

9. Increase hydraulic pressure to 1250 psi and observe that air conditioner panel light is ON and hydraulic motor is rotating.

10. Increase hydraulic flow to 6 gpm and maintaining 1250 psi turn air conditioner mode switch OFF, observe the air conditioner panel light OUT.
11. Turn air conditioner mode switch to COOL and observe panel light ON and hydraulic motor rotation.
12. Operate air conditioner in this configuration for a period of not less than ten minutes. Observe for leaks and proper air conditioning operation.
13. Remove hydraulic test cart, reconnect inlet and outlet lines to hydraulic pump and check hydraulic reservoir fluid level.
- b. Conduct operational test using engine operation as follows:
 1. Ensure that all air conditioning system fittings, clamps and lines are tight.
 2. Service air conditioner hydraulic reservoir with 2.75 quarts of MIL-H-5606 hydraulic fluid (red).

CAUTION

Hydraulic system must be complete and serviced before starting RH engine and pump inlet must be primed.

3. Ensure air conditioner compressor is serviced with the proper amount of Freon. Refer to Air Conditioning Service/Parts Manual.
4. Start RH engine and operate at approximately 1000 rpm and check for hydraulic fluid leaks.
5. Select COOL mode on the air conditioner switch and observe the air conditioner panel light is ON and hydraulic motor rotation.
6. Increase rpm to 1600 rpm.
7. Turn air conditioner mode switch to OFF position and observe that air conditioner panel light is OFF.
8. Turn air conditioner mode switch to COOL and observe the air conditioner panel light is ON and hydraulic motor rotating.
9. Operate engine at various rpm's while checking air conditioner hydraulic operation and air conditioner operation for a period of not less than 10 minutes.
10. Shut down engine and recheck reservoir fluid level.

Removal of Hydraulic Pump. (See figure 13-23.)

- a. Remove RH engine cowling.
- b. Remove clamps from shroud (30) and remove adapter (28).
- c. Disconnect hoses (2 and 26) and drain lines (27 and 101) from hydraulic pump (1) and cap all openings.
- d. Remove nuts and remove hydraulic pump (1) from engine.

Installation of Hydraulic Pump. (See figure 13-23.)

- a. Installation of the hydraulic pump (1) is the reversal of the removal procedures.
- b. Fill reservoir (4) with hydraulic fluid.

CAUTION

Hydraulic system must be serviced and system complete before engine operation or pump should be removed from pad and pad cover installed. Pump inlet must be primed before cranking engine.

- c. Check system operation and for hydraulic fluid leakage.
- d. Install engine cowling.

Removal of Hydraulic Motor. (See figure 13-23.)

- a. Remove RH wing nacelle air conditioning access cover.
- b. Place container under reservoir drain.
- c. Cut safety wire; open drain valve (8) and drain fluid from the reservoir.
- d. Disconnect line (25) from manifold and valve assembly (9) and firewall fitting. Cap all openings.
- e. Disconnect line (12) and hose (24) from hydraulic motor (22). Cap all openings.
- f. Remove nuts, washers and bolts, securing hydraulic motor (22) to adapter (89).
- g. Pull hydraulic motor (22) outboard and remove motor from compartment.

NOTE

Coupling half may be connected to motor spline, when motor is removed from the adapter. If coupling half is attached to spline, remove.

- h. If further disassembly of hydraulic motor (22) is required, refer to Air Conditioning System Service/Parts Manual.

Installation of Hydraulic Motor. (See figure 13-23.)

NOTE

Before installing hydraulic motor, lubricate spline of motor with Dow Corning No. 4 Compound.

For ease of installation, assemble coupling half on motor spline before installing motor in adapter.

- a. Insure spacer (90) is properly positioned in the opposite coupling half inside the adapter (89), before installing the hydraulic motor (22).
- b. Slide the hydraulic motor (22) with coupling half attached to spline into the adapter. Insure that the two coupling halves and spacer are engaged properly.
- c. Secure the hydraulic motor (22) to adapter (89) with bolts, washers and nuts.
- d. Connection of lines and hose is the reversal of

the removal procedures.

- e. Close drain valve (8) and safety wire.
- f. Fill reservoir (4) with hydraulic fluid.
- g. Check system for operation and leakage.
- h. Install RH nacelle air conditioning access cover.

Removal of Compressor. (See figure 13-23.)

- a. Discharge refrigerant system. Refer to Air Conditioning System Service/Parts Manual.
- b. Remove RH wing nacelle air conditioning access cover.
- c. Disconnect lines (41 and 50) from compressor (53). Cap all openings.
- d. Disconnect line (39) from receiver-dryer and low pressure switch (51) if necessary. Cap all openings.
- e. Loosen bolts, securing adapter (89) to compressor (53).
- f. Remove nuts, washers and mounting bolts, securing compressor (53) to brackets (52). Slide compressor (53) inboard and lift it out of the compartment.
- g. Remove screws, securing baffle to compressor (53).
- h. If further disassembly of compressor (53) is required refer to Air Conditioning System Service/Parts Manual.

Installation of Compressor. (See figure 13-23.)

- a. Drain all oil from the compressor (53) in accordance with Air Conditioning System Service/Parts Manual.
- b. Refill the compressor with 4 ounces of Suniso No. 5 or Texaco Capella E Grade, 500 viscosity oil or equivalent.

NOTE

Special care shall be taken to assure that the system is not over-charged with oil, since an over-charge of oil in the system will decrease system performance.

All openings in compressor shall be capped off to assure that oil in the compressor does not drain out during installation.

- c. Secure baffle to compressor (53) with screws, before installation.
- d. Position compressor (53) in the compartment. Slide the compressor (53) into the adapter (89). In-sure compressor engages properly in the adapter.
- e. Secure compressor (53) to brackets (52) with bolts, washer and nuts.
- f. Torque adapter bolts to 125 inch-pounds +0, -10.
- g. Connect lines (41 and 50) to the compressor (53).
- h. If line (39) between receiver-dryer (38) and low pressure switch was disconnected, reconnect line.
- i. Evacuate and charge system. Refer to Air Conditioning System Service/Parts Manual.
- j. Leak check system.
- k. Install RH nacelle air conditioning access cover.

Removal of Hydraulic Reservoir. (See figure 13-23.)

- a. Remove RH nacelle air conditioning access cover.
- b. Place container under reservoir drain.
- c. Cut safety wire; open drain valve (8) and drain hydraulic fluid from reservoir.
- d. Disconnect vent line (5), line (7), hose (6), line (3) and drain line (30) from reservoir (4). Remove fittings and cap all openings.
- e. Remove nuts, washers and bolts, securing manifold and valve assembly (9) to reservoir (4).
- f. Remove bolts and washers from reservoir (4); remove reservoir (4).

Installation of Hydraulic Reservoir. (See figure 13-23.)

- a. Installation of reservoir (4) is the reversal of the removal procedures.
- b. Close drain valve (8) and safety wire.
- c. Fill reservoir (4) with hydraulic fluid.
- d. Check system operation.

Removal of Manifold and Valve Assembly. (See figure 13-23.)

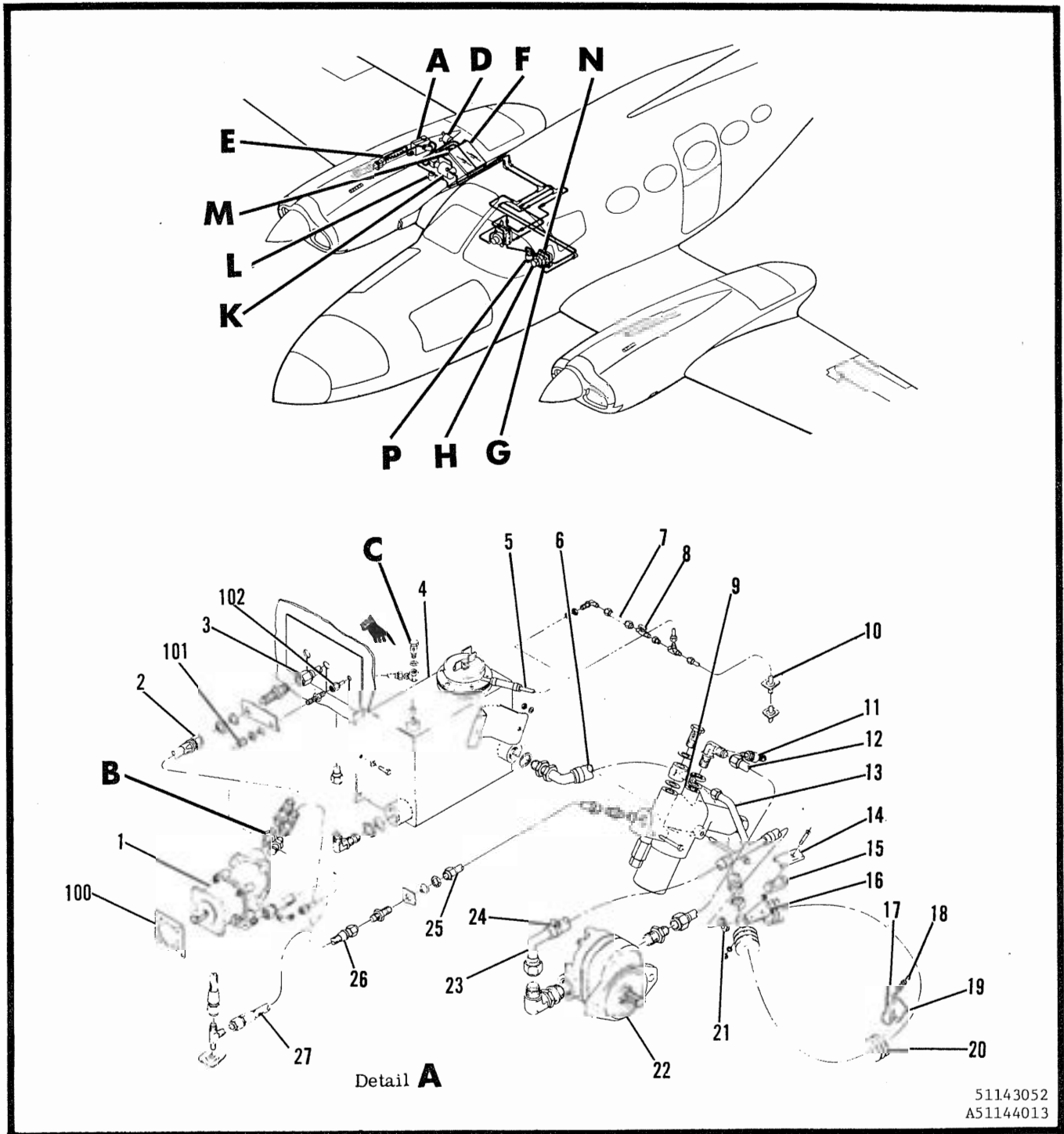
- a. Verify electrical power to air conditioning system is turned OFF.
- b. Remove RH nacelle air conditioning access cover.
- c. Place container under reservoir drain.
- d. Cut safety wire; open drain valve (8) and drain hydraulic fluid from reservoir (4).
- e. Identify electrical wiring and disconnect.
- f. Disconnect lines (12 and 25) and tee (13) from manifold and valve assembly (9). Cap all openings.
- g. Remove nuts, washers and bolts; remove manifold and valve assembly (9).

Installation of Manifold and Valve Assembly. (See figure 13-23.)

- a. Installation of manifold and valve assembly (9) is the reversal of the removal procedures.
- b. Close drain valve (8) and safety wire.
- c. Fill reservoir with hydraulic fluid.
- d. Check system operation.

Removal of Condenser Blower Motor. (See figure 13-23.)

- a. Verify electrical power to air conditioning system is turned OFF.
- b. Remove RH nacelle air conditioning access cover.
- c. Disconnect electrical wiring and tag.
- d. Remove mounting clamps (35) and slide blower motor (36) inboard and remove motor.
- e. If removal of fan blade is required, refer to Removal and Installation of Fan Blade procedures.

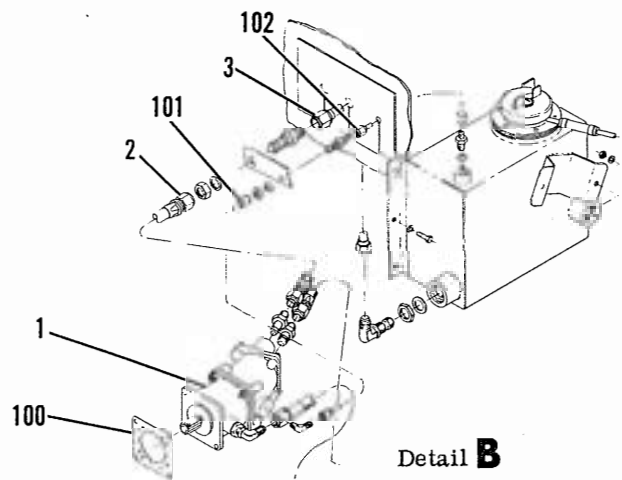


1. Pump (Hyd.)
2. Hose-Supply
3. Line-Supply
4. Reservoir (Hyd.)
5. Vent Line
6. Hose
7. Line
8. Drain Valve
9. Manifold and Valve Assembly

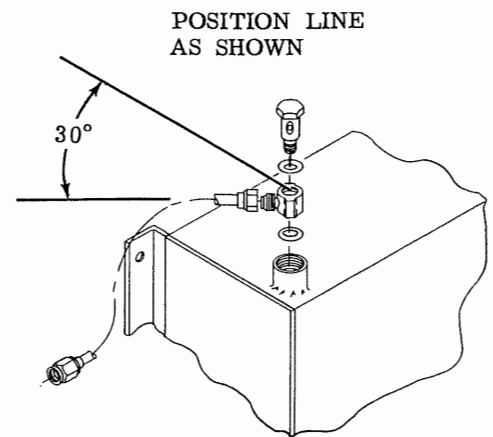
10. Line
11. Pressure Switch (Hyd.)
12. Line
13. Tee
14. Bracket (Lower)
15. Spacer
16. Bracket
17. Retainer
18. Spring

19. Clip
20. Cooling Coil
21. Grommet
22. Motor (Hyd.)
23. Elbow
24. Hose
25. Line
26. Hose
27. Drain Line

Figure 13-23. Air Conditioning System (Sheet 1 of 5)

**Detail B**

421B0501 TO 421B0823

**Detail C**

421B0823 AND ON

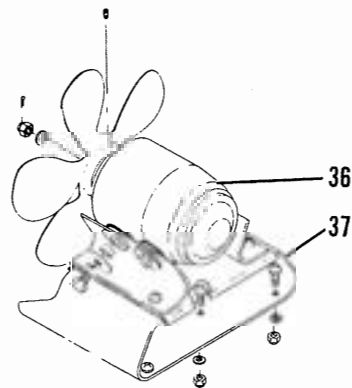
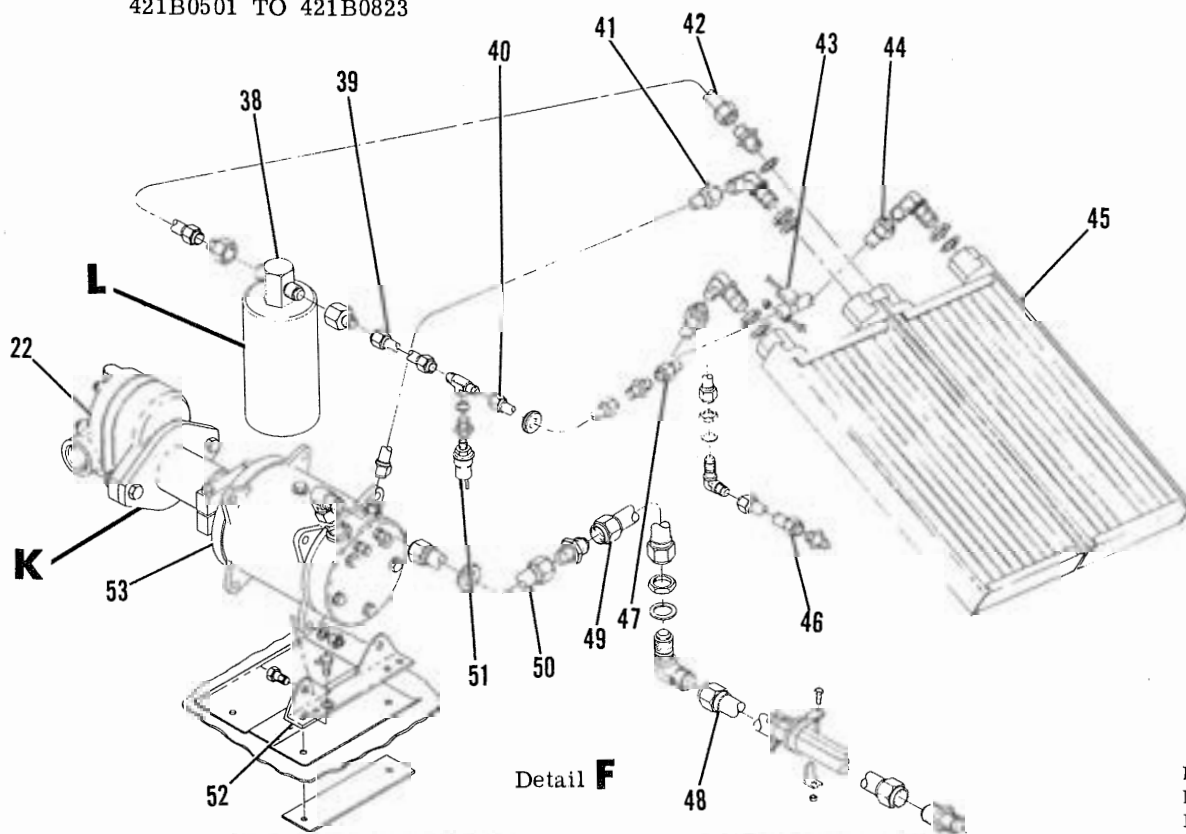
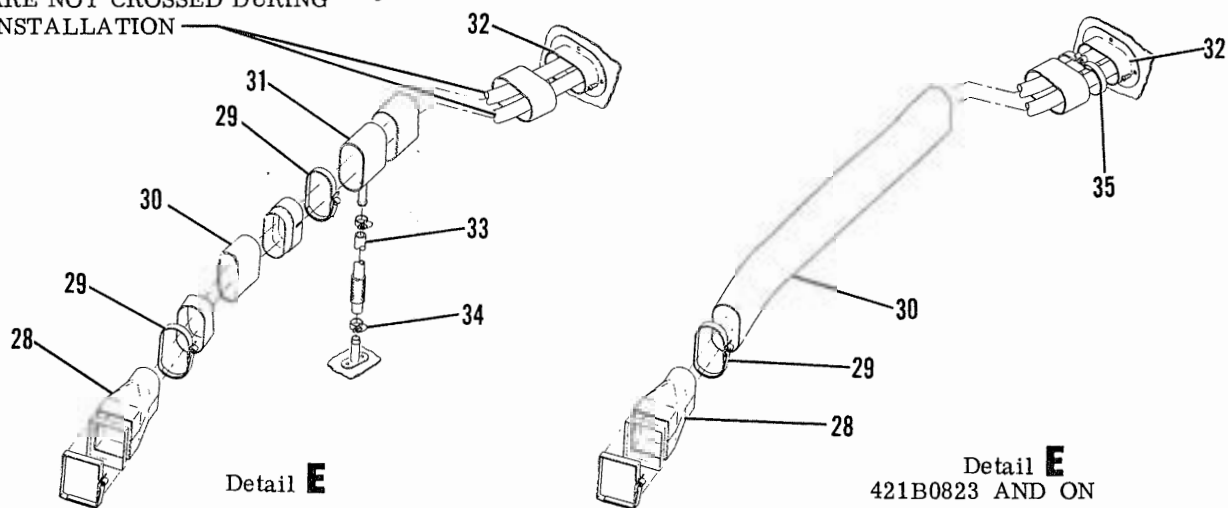
**Detail D**B51144014
C51141107
D51141099

Figure 13-23. Air Conditioning System (Sheet 2)

INSURE THAT THESE HOSES
ARE NOT CROSSED DURING
INSTALLATION



E14143045
E51143064
F14144012

28. Adapter	37. Mount	45. Condensers
29. Clamp	38. Receiver-Dryer	46. Line
30. Shroud	39. Line	47. Line
31. Adapter	40. Line	48. Line
32. Adapter	41. Line	49. Line
33. Hose	42. Line	50. Line
34. Clamp	43. High Temperature Switch	51. Low Pressure Switch
35. Clamp	44. Line	52. Bracket
36. Blower Motor		53. Compressor

Figure 13-23. Air Conditioning System (Sheet 3)

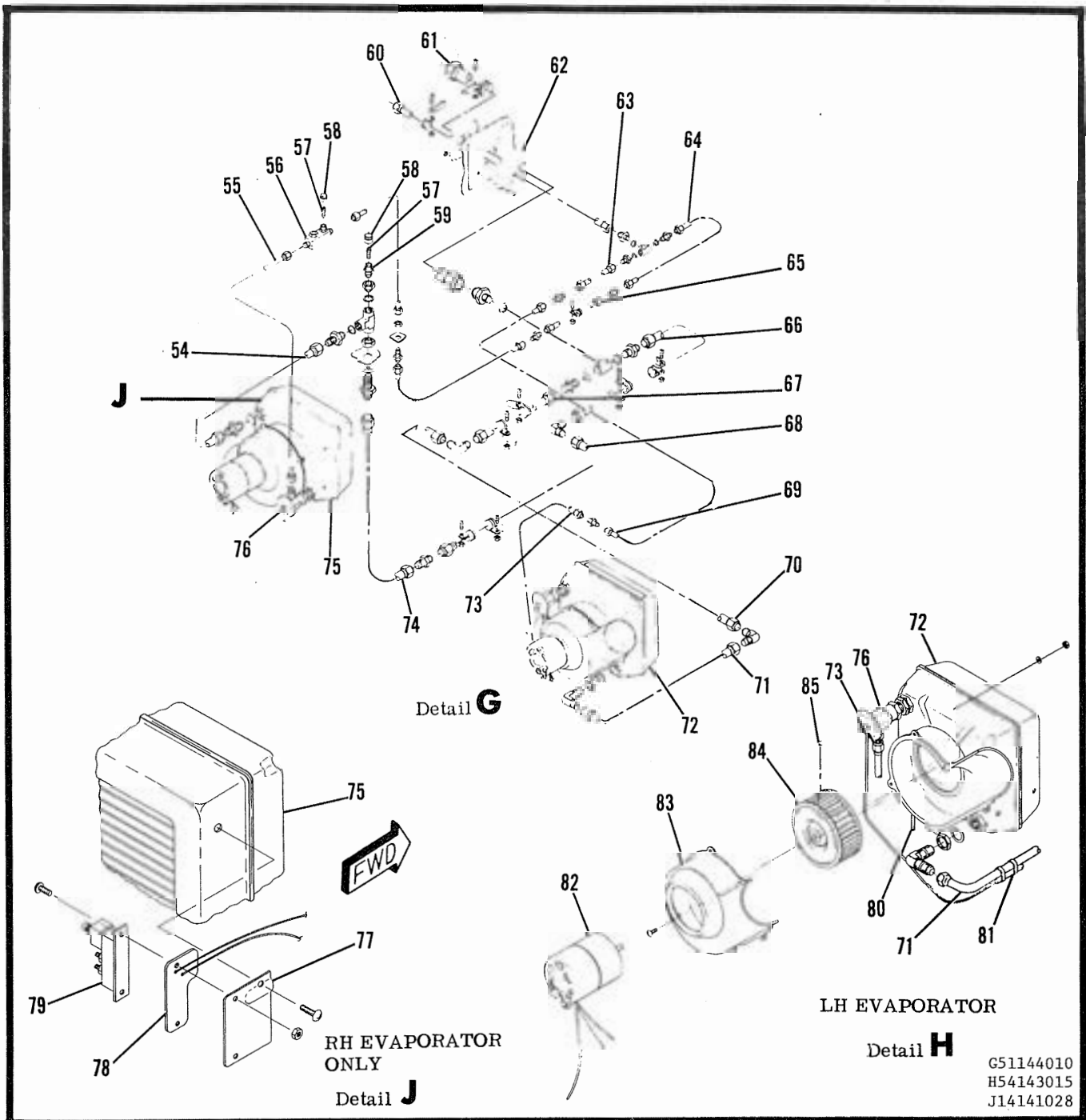
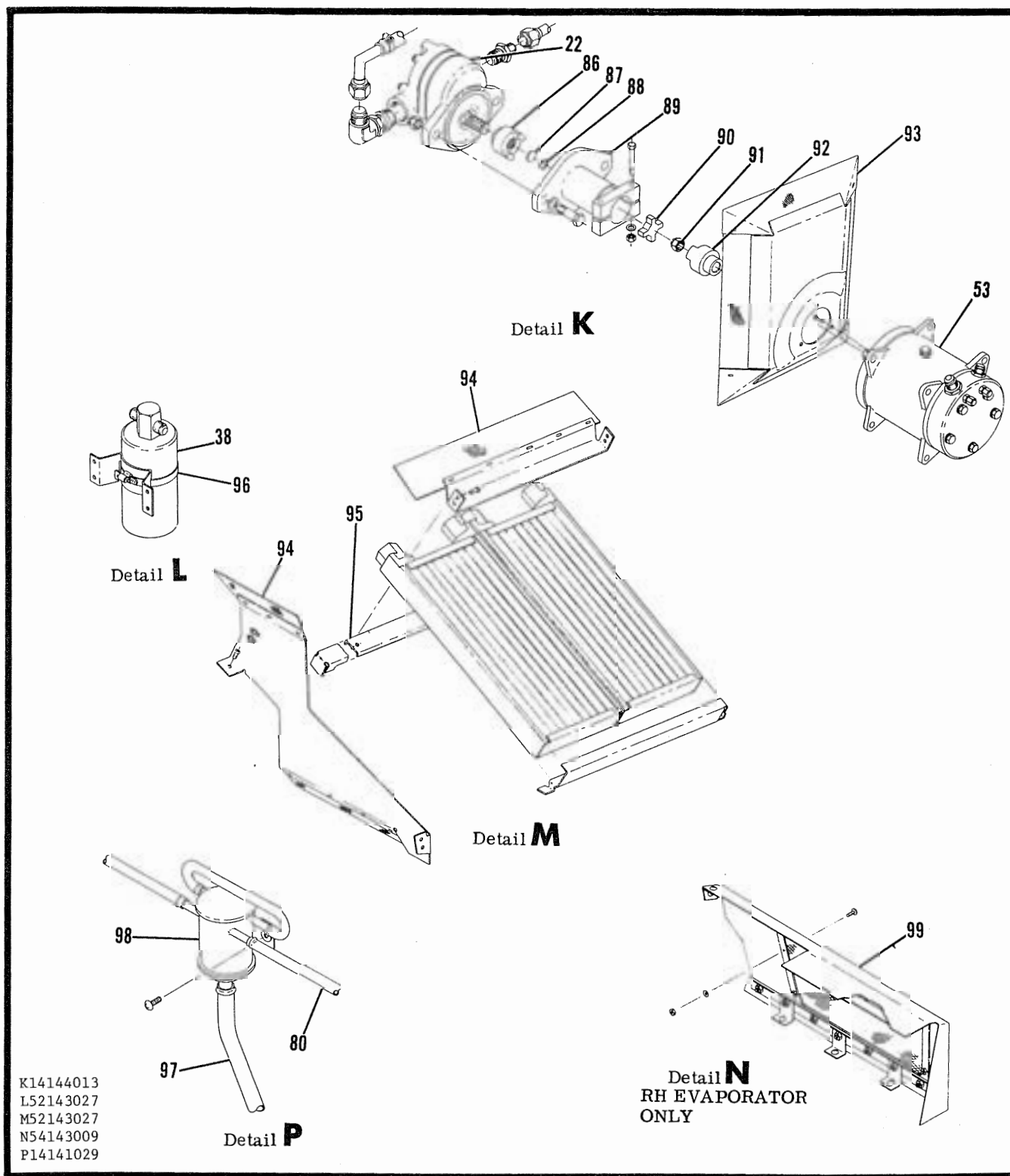


Figure 13-23. Air Conditioning System (Sheet 4)



86. Coupling Half	91. Nut	95. Support	99. Evaporator Cover
87. Washer	92. Coupling Half	96. Clamp	100. Gasket
88. Snap Ring	93. Baffle	97. Drain Tube	101. Drain Line
89. Adapter	94. Air Seal	98. Condensate Drain Valve	102. Drain Line
90. Spacer			

Figure 13-23. Air Conditioning System (Sheet 5)

Installation of Condenser Blower Motor. (See figure 13-23.)

- a. Installation of the blower motor (36) is the reversal of the removal procedures.

NOTE

Fan blade alignment and spacing must be performed as outlined in the fan blade removal and installation procedures.

Removal of Blower Fan Blade. (See figure 13-23.)

- a. Verify system mode switch is in the OFF position.
- b. Remove RH nacelle air conditioning access cover.
- c. For complete protection during fan blade removal, disconnect and isolate condenser blower motor ground lead.
- d. Loosen clamps, securing electric motor and slide motor inboard.
- e. Remove cotter pin and retaining nut.
- f. Remove two allen head set screws and loosen fan blade on shaft.
- g. Remove fan blade from shroud.

Installation of Blower Fan Blade. (See figure 13-23.)

- a. Install fan blade on the motor shaft with fan hub 1/8 inch from motor front face.
- b. Tighten set screws, retaining nut; install cotter pin.
- c. Move fan motor outboard until fan blade protrudes 2/3 of its blade width into the shroud.

CAUTION

Make sure there is sufficient clearance between the fan blade and inside diameter of shroud.

- d. Tighten blower motor mounting clamps (35).
- e. Connect motor ground lead; if disconnected.
- f. Apply electrical power to system; position air conditioning switch to COOL and check blower operation.

CAUTION

Take special care to keep fingers and debris from fan inlet.

- g. Turn switch OFF.
- h. Install access cover.

Removal of Condensers. (See figure 13-23.)

- a. Remove RH nacelle air conditioning access cover.
- b. Discharge system in accordance with Air Conditioning System Service/Parts Manual.

- c. Disconnect lines (41, 42 and 44) from condensers (45). Cap all lines and openings.
- d. Remove retainers (17), springs (18) and washers securing cooling coil (20) to condensers (45).
- e. Remove air seal securing condensers (45) and remove condensers.

Installation of Condensers. (See figure 13-23.)

- a. Installation of the condensers (45) is the reversal of the removal procedures.
- b. Evacuate and charge the refrigerant system. Refer to Air Conditioning Systems Service/Parts Manual.
- c. Leak check all fittings. No leakage is allowed.

Removal of Receiver-Dryer. (See figure 13-23.)

- a. Discharge refrigerant system. Refer to Air Conditioning System Service/Parts Manual.
- b. Remove RH wing nacelle air conditioning access cover.
- c. Disconnect lines (39 and 42) at receiver-dryer (38). Cap all lines and openings.
- d. Loosen mounting clamp and remove receiver-dryer (38).

Installation of Receiver-Dryer. (See figure 13-23.)

- a. Installation of receiver-dryer (38) is the reversal of the removal procedures.

NOTE

The IN port of the receiver-dryer is connected to the plumbing from the condenser.

- b. Evacuate and charge system. Refer to Air Conditioning System Service/Parts Manual.
- c. Leak check with H-10 leak detector. No leakage allowed.
- d. Install access panel.

Removal of Low Pressure Switch. (See figure 13-23.)

- a. Discharge refrigerant system. Refer to Air Conditioning System Service/Parts Manual.
- b. Remove RH wing nacelle air conditioning access cover.
- c. Locate low pressure switch (51) between lines (39 and 40).
- d. Disconnect and tag electrical wires to low pressure switch (51).
- e. Turn low pressure switch (51) CCW to remove from tee. Cap off hole.

Installation of Low Pressure Switch. (See figure 13-23.)

- a. Place small strip of Teflon tape on low pressure

switch threads, remove hole cap and install low pressure switch (51) in tee.

CAUTION

Do not allow Teflon tape to extend over threads and enter system when torqued.

- b. Screw low pressure switch (51) in tee until it is tight.
- c. Connect electrical wires, evacuate and charge the system. Refer to Air Conditioning System Service/Parts Manual.
- d. Leak check at threads. If leak is observed, tighten low pressure switch (51) fitting until no leakage is observed.
- e. Install access cover.

Removal of High Temperature Switch. (See figure 13-23.)

- a. Remove RH wing nacelle air conditioning access cover.
- b. Verify electrical power to system is turned OFF.
- c. Disconnect and tag electrical wires to switch.
- d. Remove nut and bolt and remove high temperature switch (43) from line (44).

Installation of High Temperature Switch. (See figure 13-23.)

- a. Installation of high temperature switch (43) is the reverse of the removal procedures.

Removal of Temperature Control Assembly. (See figure 13-23.)

- a. Verify electrical power to system is turned OFF.
- b. Remove baggage compartment floorboards.
- c. Disconnect electrical wiring and tag.
- d. Remove mounting screws and nuts and lift switch and heater assembly free.

Installation of Temperature Control Assembly. (See figure 13-23.)

- a. Installation of the temperature control assembly is the reversal of the removal procedures.

Removal of Evaporator Blower Motor. (See figure 13-23.)

- a. Verify electrical power to system is turned OFF.
- b. Remove evaporator in accordance with the Removal of Evaporator procedures.
- c. Disconnect motor (82) wiring and tag.
- d. Remove screws and locknuts from blower housing (83).
- e. Pull motor and front portion of scroll assembly away from evaporator module (72).
- f. Remove blower wheel set screw (85) and slide wheel (84) off motor shaft.
- g. Remove two motor support nuts and lock washers. Pull motor away from scroll and motor support ring.

Installation of Evaporator Blower Motor. (See figure 13-23.)

- a. Place motor in support ring, align mounting studs and press motor in place.
- b. Replace motor mount lock washers and nuts and tighten nuts.
- c. Slide wheel (84) on motor shaft until it stops. Tighten set screw (85).

NOTE

Verify that the back side of the wheel does not strike the motor mount studs.

- d. Clean off both scroll mating surfaces and apply small bead of silicone rubber (RTV102) on scroll mating surface.
- e. Install motor scroll assembly and align mounting screw holes and install screws.
- f. Place lock nuts on mounting screws and tighten in random pattern.
- g. Connect motor electrical wiring and check motor operation at both speeds.

NOTE

During motor operation listen for any excessive noise or rubbing.

- h. Turn motor off, install evaporator in accordance with the Installation of Evaporator procedures.

Removal of Expansion Valve. (See figure 13-23.)

The removal procedures are the same for the LH or RH evaporator expansion valve except for the valve being located in a different place on the evaporator.

- a. Verify system power switch is OFF.
- b. Remove evaporator in accordance with the Removal of Evaporator Procedures.
- c. Disconnect blower motor (82), wiring and tag.
- d. Remove screws and lock nuts from module housing and remove motor housing assembly from evaporator module.
- e. Disconnect 1/4 inch inlet line (73) from expansion valve.
- f. Loosen jamb nut on valve (76) and unscrew valve.

CAUTION

While loosening jamb nut on valve use back-up wrench on evaporator boss.

- g. Remove O-ring and jamb nut. Discard O-ring.

Installation of Expansion Valve. (See figure 13-23.)

The installation procedures are the same for the LH or RH evaporator expansion valve except for the valve being located in a different place on the evaporator.

- a. Install jamb nut and new O-ring (NAS-1595-8) on the valve outlet fitting.

- b. Screw valve assembly into coil inlet fitting until O-ring touches the inlet fitting.
- c. Position valve to mate with inlet line and screw on inlet line fitting until finger tight.
- d. Tighten jamb nut while using back-up wrench on evaporator boss.

CAUTION

Do not use wrench on valve outlet fitting.

- e. Tighten fitting on 1/4 inch inlet line (73).
- f. Clean motor housing and module housing mating surfaces and apply small bead of silicone rubber (RTV102).
- g. Install motor housing assembly to module housing and align mounting holes.
- h. Install mounting screws and lock nuts and tighten at random.
- i. Connect motor electrical wiring and checkout motor operation at both speeds. Listen for excessive noise or rubbing.
- j. Install evaporator in accordance with the Installation of Evaporator Procedures.

Removal of Evaporators. (See figure 13-23.)

The removal procedures given pertain to the LH evaporator unit; however, the procedures are the same for the RH evaporator. Where there is a specific difference, reference will be made to the individual evaporator unit.

- a. Remove seats and carpet.
- b. Remove aft baggage compartment cover.
- c. Discharge the refrigerant system. Refer to Air Conditioning Systems Service/Parts Manual.
- d. Remove expansion valve temperature sense bulb clamps and remove bulb.
- e. Disconnect lines from evaporator.
- f. Tag and disconnect electrical wiring.
- g. Remove bolts securing evaporator.
- h. Disconnect drain tube from bottom of evaporator unit.
- i. Remove air duct from evaporator.
- j. Remove evaporator from aircraft.

Installation of Evaporators. (See figure 13-23.)

The installation procedures given pertain to the LH evaporator unit; however, the procedures are the same for the RH evaporator unit. Where there is a specific difference, reference will be made to the individual evaporator unit.

- a. Place evaporator in mounting position.
- b. Connect air duct with clamp.
- c. Connect drain tube to bottom of evaporator unit.
- d. Secure evaporator with bolts.
- e. Connect electrical wiring.
- f. Connect lines to evaporator.
- g. Fasten expansion valve temperature sense bulb (75) to the bottom run of line at the approximate 5 to 7 o'clock position and as close to the evaporator as possible. Insulate temperature sense bulbs and lines by wrapping with P-2 foam tape.

- h. Evacuate and charge the refrigerant system. Refer to Air Conditioning Systems Service/Parts Manual.
- i. Perform operational check of system.
- j. Install baggage shelf.
- k. Install carpets and seats.

Removal and Installation of Evaporator Condensate Drain. (See figure 13-23.)

- a. (See figure 1-3.) Remove floorboards necessary to gain access.
- b. Remove hose connections from evaporator condensate tank (98).
- c. Loosen screws attaching condensate drain to front spar and remove condensate drain from bottom of aircraft.
- d. Install condensate drain by reversing the removal procedures.

NOTE

After condensate drain has been installed in place, use Sealant CES2602, Class III, Type II to reseal drain hose in bottom of fuselage.

Removal of Air Conditioning Plumbing. (See figure 13-23.)

- a. Remove all RH passenger seats, pilot and copilot seats, RH side of cabin carpeting.
- b. (See figure 1-3.) Remove all necessary access covers in RH floorboard area, RH engine cowling, RH nacelle air conditioning access cover and lower flaps to gain access to plumbing in the wing.
- c. Discharge system. Refer to Air Conditioning Systems Service/Parts Manual.
- d. Cut safety wire and open drain valve (8) and drain hydraulic fluid from reservoir.

NOTE

Step d. applies only if hydraulic fluid plumbing of the air conditioning system is disturbed.

- e. Refer to figure 13-23 for removal of air conditioning plumbing.

NOTE

All lines and openings shall be capped.

Installation of Air Conditioning Plumbing. (See figure 13-23.)

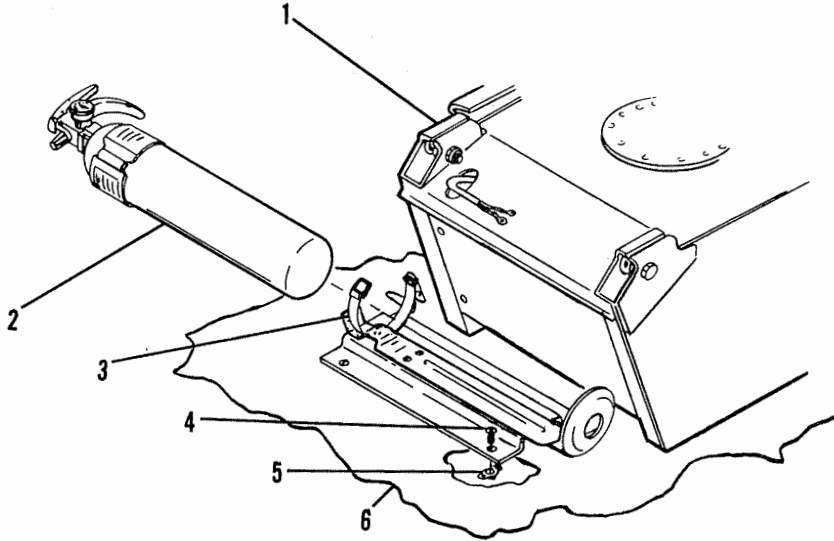
- a. Installation of the air conditioning plumbing is the reverse of the removal procedures.
- b. Install lock-o-seals (63 and 64) on pressure side of fuselage if lines (65 and 70) have been removed.
- c. Reseal seal fitting (62) in accordance with sealing procedures in Section 16. If lines (60 and 61) have been removed and replaced.
- d. Evacuate and charge the refrigerant system. Refer to Air Conditioning Systems Service/Parts Manual.
- e. Check for leaks with leak detector H-10 or equivalent.
- f. Perform an operational check of the air conditioning system.

FIRE EXTINGUISHER. (See figure 13-28.)

The Fire Extinguisher mounted on the floor, forward of the copilot's seat contains a pressurized Dry Chemical Charge. The fire extinguisher may be used on combustible, liquid, or electrical fires. The dry charge is non-toxic and non-corrosive. Residue left after use may be wiped off with a damp cloth or picked up with a vacuum source. The fire extinguisher may be recharged by most Fire Equipment Dealers.

RELIEF TUBE. (See figure 13-29.)

The relief tube is located behind the compartment door on the upper forward right-hand side of the toilet. On aircraft 421B0001 and On the relief tube may be installed behind the right-hand upholstery panel at F.S. 238.13. The relief tube should be cleaned on each post flight with a commercial disinfectant.

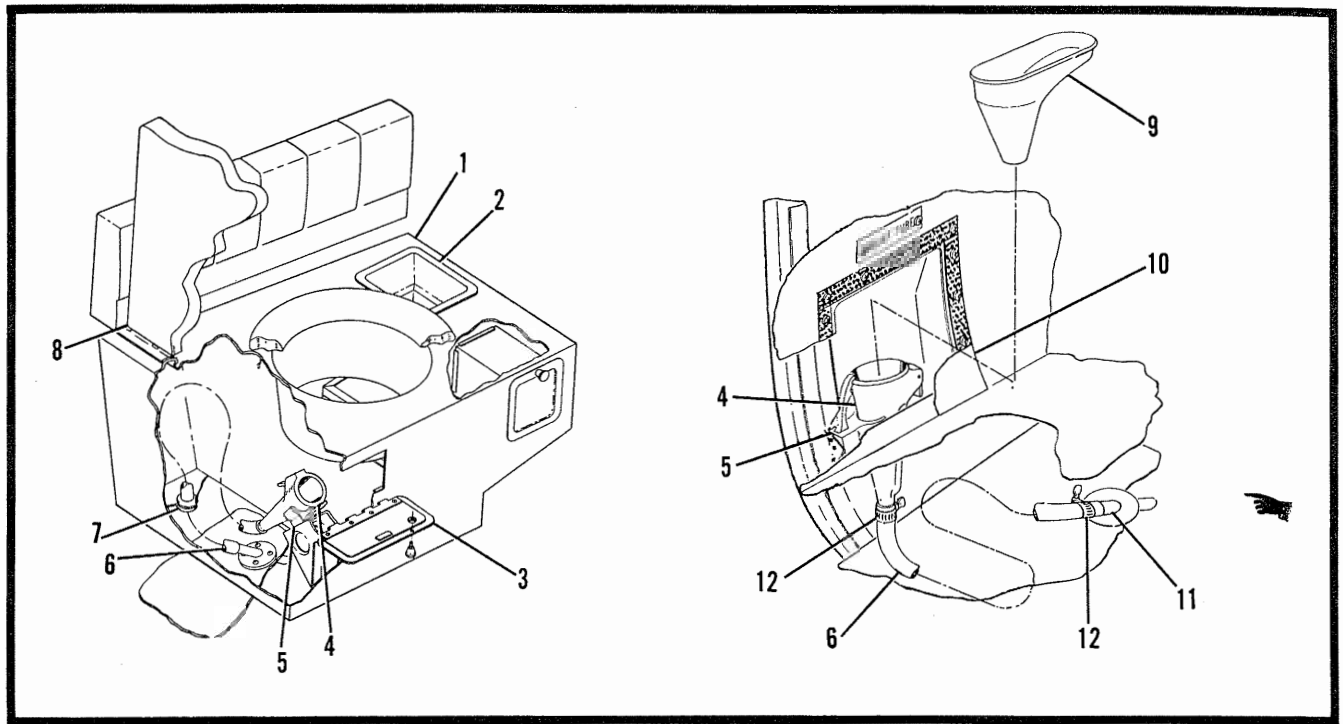


- 1. Seat Support
- 2. Fire Extinguisher

- 3. Bracket
- 4. Screw

- 5. Nut
- 6. Floorboard

Figure 13-28. Fire Extinguisher Installation



1. Toilet Assembly
2. Tissue Holder
3. Compartment Door
4. Horn

5. Bracket
6. Hose
7. Grommet
8. Toilet Lid

9. Adapter
10. Cover
11. Line
12. Clamp

Figure 13-29. Relief Tube Installation

PROPELLER DEICE SYSTEM.

The propeller deice system is the electrothermal type system. It consists of the following items: propeller blade deicers bonded to the propeller blades, slip ring assembly mounted to the engine crankshaft, brush holder assembly mounted to the engine crankcase, a repeat cycle timer, ammeter mounted in the instrument panel, a switch, and a circuit breaker. The deicing is accomplished by raising the temperature of the deice interface to a point, at which, centrifugal

force removes the ice. The cycle timer used on the deicing system heats the propeller deicer from 28 to 40 seconds. The deicer outer elements cycle on the right propeller element from 28 to 40 seconds, then on the inner elements. It then cycles to the left propeller outer elements from 28 to 40 seconds then to the left inner elements. It then returns to the right outer elements on the right propeller and continues cycling action. The cycling is done in order to maintain a balance between the left and right propellers and reduce power drain on the electrical system.

Troubleshooting the Propeller Deice System.

TROUBLE	PROBABLE CAUSE	CORRECTION
NO HEAT AT PROPELLER BLADE ELEMENTS	Circuit breaker out.	Reset circuit breaker.
	Timer inoperative.	Replace timer.
	Brushes improperly adjusted or broken.	Repair or adjust brushes.
	Wiring broken.	Repair or replace wiring.
DEICE SYSTEM INTER- MITTENT	Elements damaged.	Refer to inspection and testing procedures.
	Timer defective.	Repair/replace timer. Refer to inspection and testing procedures.
	Brushes broken or improperly adjusted.	Repair or replace brushes. Refer to adjustment procedures.

Removal of Slip Ring. (See figure 13-30.)

- a. Remove propeller in accordance with Propeller Removal Procedures found in Section 10, removing propeller, bulkhead and slip ring as one assembly.
- b. Identify and remove deice boot and slip ring electrical leads from spinner bulkhead.
- c. Remove nuts, washers and bolts securing slip ring to spacer and bulkhead.

Installation of Slip Ring. (See figure 13-30.)

- a. With the six attachment bolts in position in bulkhead (6), assemble in sequence; spacer (7), washer (11), star lockwasher (16), washer (11) and slip ring (8), guiding slip ring electrical leads through bulkhead as it is assembled. Secure with washers and nuts but do not torque at this time.
- b. Place assembly over propeller studs and install propeller in accordance with Propeller Installation Procedures found in Section 10.

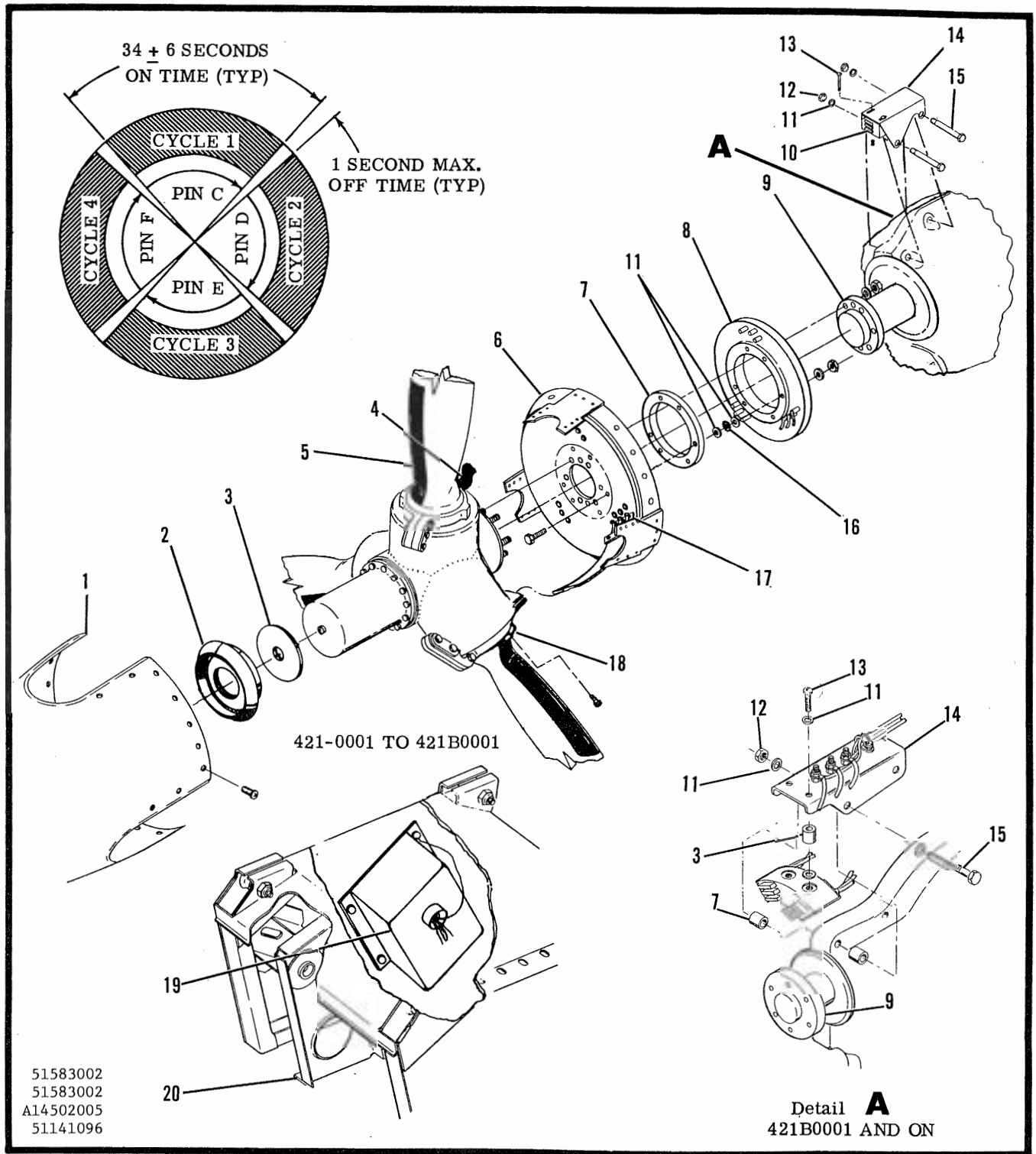
NOTE

Slip ring (8) should run in a true plane relative to brush block (10). Run out should not exceed .005 inch. Adjustment may be made by varying torque on attach bolts while maintaining as near 65 inch-pounds as possible.

- c. Torque slip ring attach bolts and connect electrical leads to proper terminals on terminal strip.

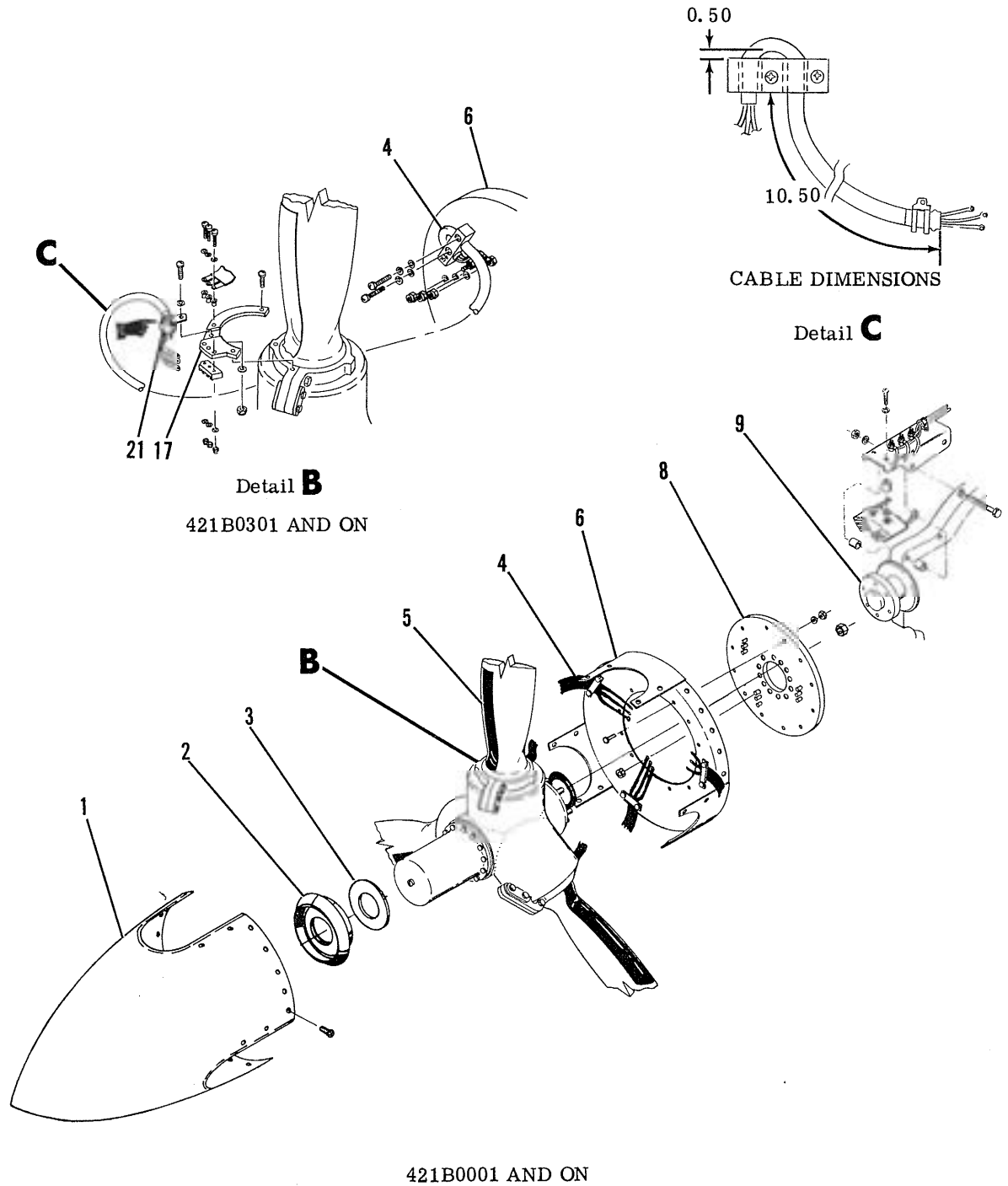
Removal of Brush Holder Assembly. (See figure 13-30.)

- a. (See figure 1-2.) Remove upper nacelle cowl (29).
- b. Disconnect electrical leads from brush holder (14).
- c. Remove nuts (12), washers (11), and bolts (15) from brush holder bracket and crankcase. Be careful not to apply any side loading on the brushes during the removal.



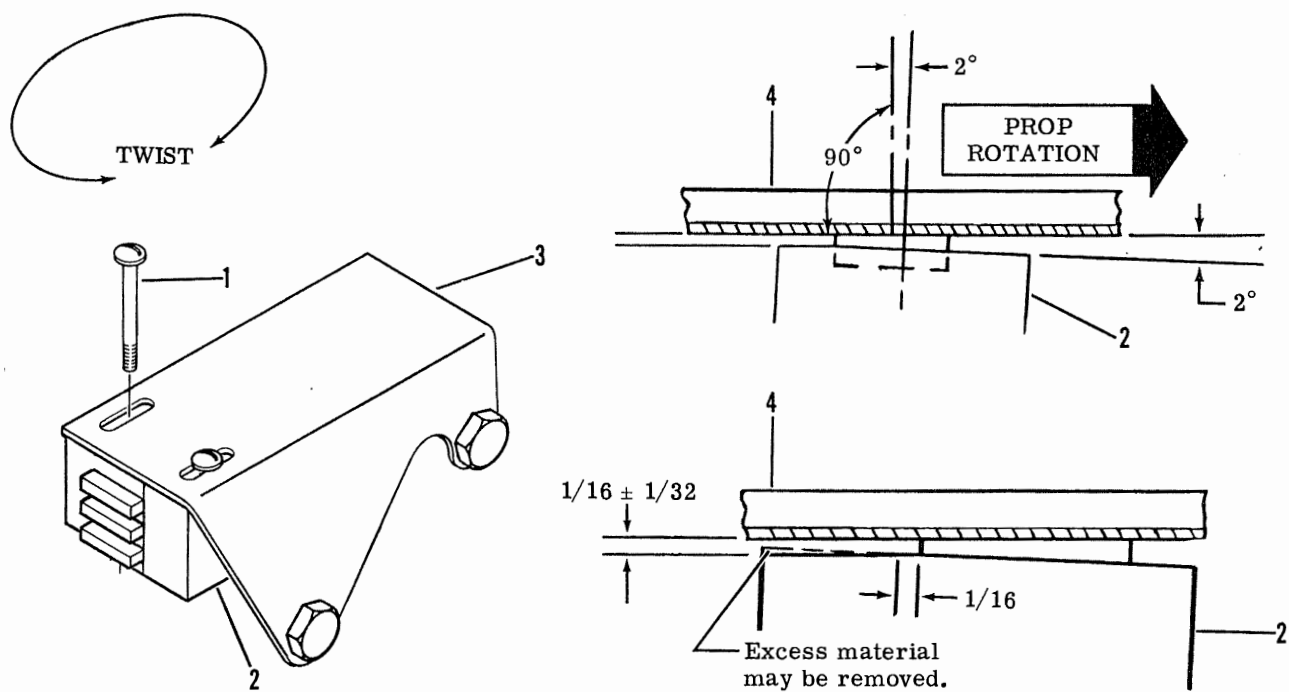
1. Spinner	8. Slip Ring	15. Bolt
2. Support	9. Crankshaft Flange	16. Star Lockwasher
3. Spacer	10. Brush Assembly	17. Terminal Strip
4. Electrical Lead	11. Washer	18. Clamp
5. Deice Boot	12. Nut	19. Timer
6. Spinner Bulkhead	13. Screw	20. Copilot Seat Support
7. Spacer	14. Brush Holder	21. Antislip Ring

Figure 13-30. Propeller De-ice Installation (Sheet 1 of 2)

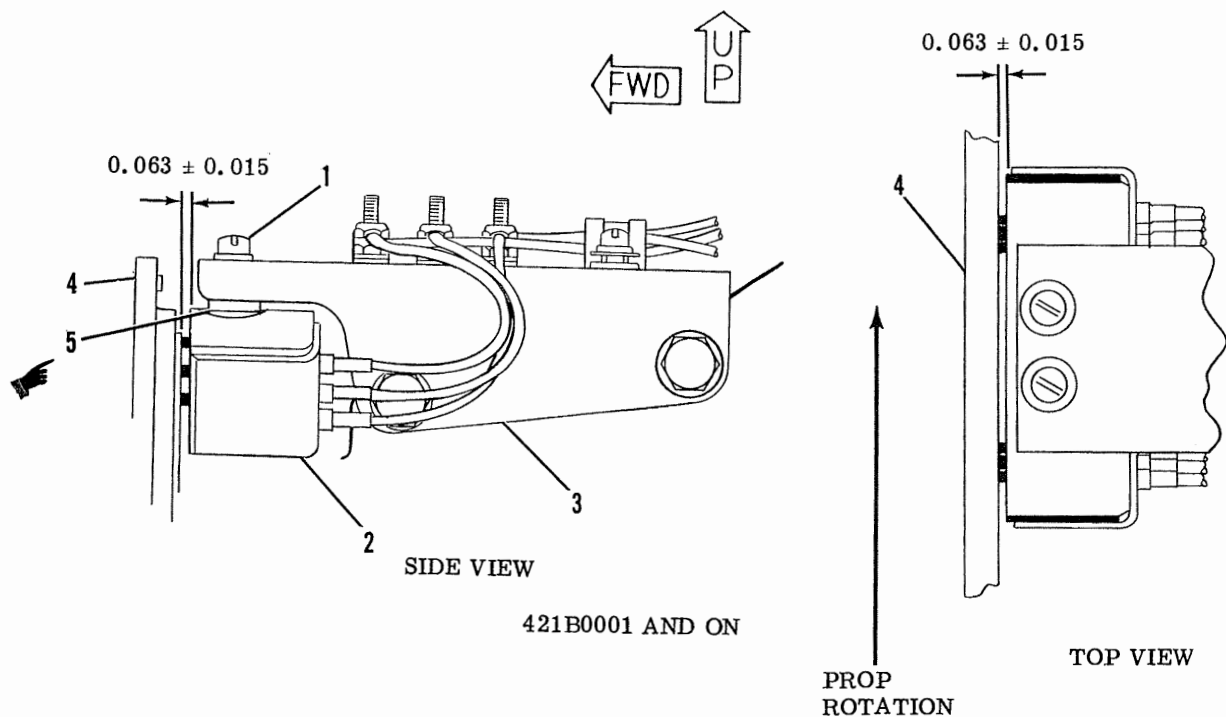


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Figure 13-30. Propeller De-ice Installation (Sheet 2)



421-0001 to 421B0001



1. Screw
2. Brush Holder

3. Bracket Assembly
4. Slip Ring

5. Washer

Figure 13-31. Deice Brush Holder Installation

- d. Remove screws (13), washers (11) and spacers (3) attaching brush holder to bracket.

Installation of Brush Holder Assembly. (See figure 13-30.)

NOTE

When installing brush holder, hold the brushes back in the holder until the mounting bolts have been inserted through the crankcase. Be careful not to apply any side loading on the brushes during installation.

Allow a minimum of 5 hours of engine running time before turning on the propeller deice system. Ground checkout of the system is allowed, with the engines not running.

Reverse the brush holder assembly removal procedure.

Adjustment of Brush Assembly. (See figure 13-31.)

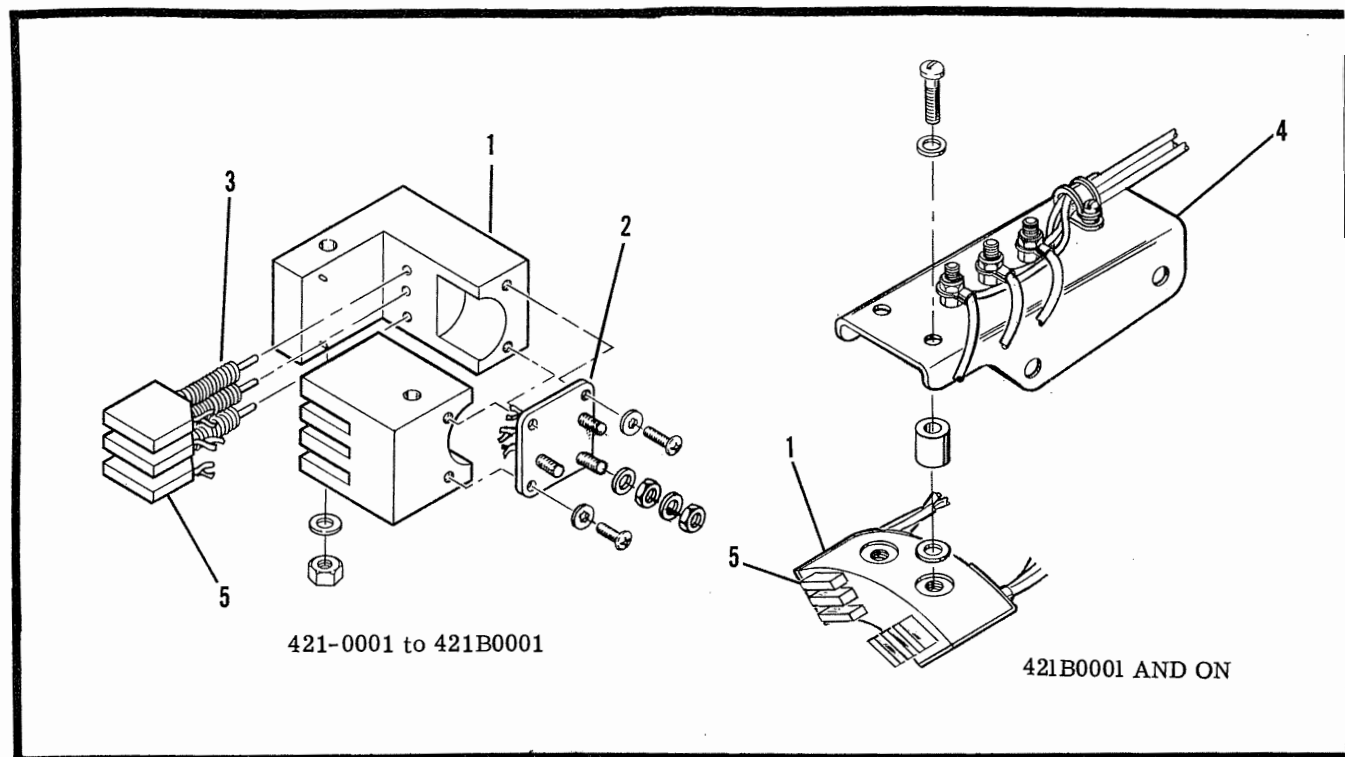
- a. When a chattering or screeching noise is emitted from the brush slip ring area, the probable cause is the improper alignment of the brushes and slip ring.

NOTE

If this chattering or screeching is noticed over idling engine noises, the trouble is severe and should be remedied immediately. A less severe chattering or screeching may be detected by pulling each propeller through slowly in the direction of rotation.

- b. The brush block assembly should be positioned as follows:

1. Loosen the screws through bracket assembly and brush holder (1, 2 and 3).
2. Adjust the brush block assembly, twist brush block assembly in brackets so that the brushes contact the slip rings in such a manner that the angle of the brushes to the slip rings is approximately 2° from a perpendicular to the slip ring surfaces. The angle is measured toward the direction of rotation of the slip rings.
3. Check each brush for correct alignment with slip ring surfaces through 360° rotation of slip rings. Add or remove washers (5) as required to obtain correct alignment.
4. Check the brush block assemblies for clearance from slip ring surfaces, on Aircraft 421A0001 to 421B0001 a distance of $1/16 \pm 1/32$ " should be maintained. On Aircraft 421B0001 and On maintain a distance of 0.063 ± 0.015 inches. If a portion of the brush block assembly is closer to the slip ring surface through 360° rotation, the excess material on the brush block should be removed.



1. Brush Block
2. Brush Assembly

3. Spring

4. Brush Bracket
5. Brush

Figure 13-32. Brush Holder Assembly

Replacement of Brush Assembly. (See figure 13-32.)

NOTE

The brushes are deemed replaceable when 1/4 inch of brush material remains. It is considered good practice, however, to replace the brushes when 3/8 inch of the brush material still remains. The brush block should be dismantled and the brush length measured periodically in order to determine usable remaining brush lengths.

- a. Remove the four screws and washers which hold the connector plate to the block. Note the orientation of the connector plate relative to the brush block so that it may be removed and then replaced in the exact same position.
- b. Disassemble the brush block (1) by pulling it apart in a direction perpendicular to brush travel, as shown in figure 13-32.
- c. Discard the old brush assembly (2) and the springs (3). Place new springs (3) into the counterbored holes.
- d. Take a new brush assembly (2) and insert the rods of the brushes through the spring (3) and into the holes of the brush block (1). This will partially compress the springs.
- e. Reassemble the other half of the brush block assembly (1) by placing the slots of the block over each brush, brush rod, and brush leads. Engage the block with pins.

NOTE

Care must be used so as not to damage the brush leads.

- f. Install the four screws and washers which hold the connector plate to the block.

Removal and Installation of Propeller Deice Ammeter.

To remove or install ammeter, see Section 12.

Removal of Propeller Deice Timer. (See figure 13-30.)

- a. Remove copilot's seat in accordance with Section 3.
- b. Remove access plate in top of seat support.
- c. Remove connector plug.
- d. Remove nuts, washers and screws securing timer to seat support web.

Installation of Propeller Deice Timer.

Reverse the propeller deice timer removal procedure.

Inspection and Testing of Propeller Deice System.

- a. Visually check the completed installation.
 1. Check propeller deicers for wrinkling or loose spots.
 2. Check wiring connections for correctness and tightness.
 3. Check continuity of wiring. Remove plug from timer. Using ohmmeter, check continuity from:
 - (a) Pin C of the plug to Terminal A of one prop shoe on the right engine.
 - (b) Pin D of the plug to Terminal B of one prop shoe on the right engine.
 - (c) Pin E of the plug to Terminal A of one prop shoe on the left engine.
 - (d) Pin F of the plug to Terminal B of one prop shoe on the left engine.
 - (e) Pin G of the plug to ground.
 - (f) Terminal C of one prop shoe on the right engine to ground.
 - (g) Terminal C of one prop shoe on the left engine to ground.
- b. System Tests.
 1. Propeller Deicer Resistance Check:
 - (a) Using an ohmmeter, check the resistance between terminals A-C, B-C of prop shoes in both engines. Resistance should be 2.23 to 2.58.

Removal of Propeller Deice Boots.

CAUTION

Do not use sharp tools or objects to remove boot as damage to the propeller may result.

- a. Remove deice boot from the propeller by softening the bond line of boot with Toluol until loosened.
- b. Pull deice boot slowly from propeller blade as bond line is loosened.

Installation of Propeller Deice Boots.

- a. Place deice boot on hub end of propeller blade, centered on blade leading edge and lead strap (terminal end) of boot aligned and against attach holes of installed terminal bracket.
- b. Mark off an area on propeller blade (using masking tape) 1/2 inch from each side and outer end of deice boot.
- c. Remove boot and clean the masked area of propeller blade using Methyl-Ethyl-Keytone (MEK) cleaning solvent. For final cleaning, wipe the solvent film off quickly with a clean dry cloth before it has time to dry.

CAUTION

Methyl-Ethyl-Ketone (MEK) must be used in a well ventilated area; avoid prolonged breathing of fumes. During all surface cleaning operations take precaution to guard against spark or open flame in work area.

- d. Mix thoroughly the EC1300LP cement and apply one brush coat evenly to the cleaned metal surface. Allow to air dry for a minimum of one hour and then apply a second coat of EC1300LP cement.
- e. Moisten a clean cloth with MEK and clean the unglazed back surface of the deice boot, changing cloth frequently to avoid contaminating of the area.
- f. Apply an even brush coat of EC1300LP cement to the unglazed back surface of the deice boot.
- g. Allow cement to dry; then using a silver (non-graphite, greaseless) pencil, mark a centerline along the leading edge of the propeller blade and a corresponding centerline on the cemented side of the deice boot.
- h. Reactivate the surfaces of the cement using a clean, lint-free cloth, heavily moistened with Toluol solvent. Avoid excessive rubbing of cement which would remove it from surfaces.
- i. Position the deice boot centerline on the propeller leading edge, with all marks and terminal leads aligned. Tack the deice boot centerline to the leading edge of the propeller blade.

NOTE

If the deice boot is allowed to get off centerlines, pull up with a quick motion and reposition properly. Roll firmly along centerline with a rubber roller.

- j. Roll outwardly from the centerline to the edge. If excessive material at the edges tend to form puckers, work them out smoothly and carefully with fingers.
- k. Roll the tapered edges of the deice boot with a metal hand-stitch roller and ensure there are no bubbles entrapped under the boot and that all edges firmly adhere to the propeller.

NOTE

In the event it becomes necessary to remove or loosen installed deice boots, Toluol shall be used to soften the "cement" line. A minimum amount of this solvent should be applied to the cement line as tension is applied to peel back the deice boot. The removal should be slow enough to allow the solvent to undercut the cement so that parts will not be damaged.

- l. Apply one brush coat of EC539P coating, mixed per manufacturer's instructions, evenly around the edges of the installed deice boot.
- m. Remove masking tape from the propeller blade and clean the surface of the blade with a clean cloth dampened with Toluol.

2. Timer Tests:

- (a) Connect a jumper wire from Pin B of the timer receptacle to Terminal B of the connector plug and from Pin G of the timer receptacle to ground.
- (b) Place the prop deicing system switch in the "ON" position.
- (c) Using a voltmeter check the DC volts to ground from Pin B of the timer. This should be approximately 24 volts DC.
- (d) Check DC volts to ground from Pins C, D, E, F; they are the points at which the system voltage is impressed in sequence to cycle power to the propeller deicers. The following cycling action of the timer should be:
 - (1) Timing sequence Pin C, 30 seconds, right engine propeller outboard halves.
 - (2) Timing sequence Pin D, 30 seconds, right engine propeller inboard halves.
 - (3) Timing sequence Pin E, 30 seconds, left engine propeller outboard halves.
 - (4) Timing sequence Pin F, 30 seconds, left engine propeller inboard halves.

NOTE

On time is approximately 30 seconds when operating on alternator voltage. When operating on battery voltage as in this checkout procedure, on time may be longer.

NOTE

The timer does not reposition itself to start at pin C when the system is turned off, but will begin its cycling at the same position in which it was last turned off. Cycling will then proceed in the order of C, D, E, F, as shown.

NOTE

Check pins C, D, E, F, until a voltage reading of approximately 24 volts DC is obtained. Hold the voltmeter probe on the pin until the voltage drops to 0. Move the probe to the next pin in the sequence C, D, E, F. Check volts DC at each pin in sequence, 24 volts DC should be measured at each pin in the sequence C, D, E, F. When correctness of the cycling sequence is established, turn prop deicing system switch off at the beginning of one of the on time periods and record the letter of the pin at which the voltage supply is present.

3. Propeller Deicer Heat Test:

- (a) Remove the jumper wire installed in paragraph b. 2. (a), and replace the connector plug in the timer receptacle.
- (b) Referring to the position in which the time was left in paragraph b. 2. (d), have an assistant place the prop deice system switch in the "ON" position. As the switch is turned

on, place a hand on each of the two deicer areas which should be heated per paragraph b. 2. (d).

- (c) The assistant in the cabin should note and record the prop deicer system ammeter reading. This should be 11 to 18 amps. Keep a close watch on the ammeter needle. The ammeter needle will deflect every 30 seconds because of the switching action of the timer. Each deflection will indicate a change in the heating areas of the prop deicers.

NOTE

The observer in the cabin should call out these 30 second interval deflections and the inspector at the propellers should change the position of his hands on the prop deicers accordingly, to check proper heating sequence of the prop deicer areas.

NOTE

If any irregularities are noted, recheck the wiring from the timer to the brush holder assembly and the prop deicer terminal connections. Make corrections as necessary and retest.

c. Slip Ring and Holder Assembly Check.

1. Check for out of flatness:

- (a) Allowable tolerance is .008. If .008 is exceeded, shim under mounting bolts to bring within tolerance.

2. On all new brush and/or slip ring installations, allow five hours engine running time before using deice system.

NOTE

Ground checkout of the system is allowed, with engines not running. Allow a minimum of 5 hours of engine running time before turning on the propeller deice system.

PROPELLER UNFEATHERING SYSTEM.

The optional unfeathering system consists of a nitrogen charged accumulator, a special governor, and a hose running from the governor to the accumulator. The governor contains a spring-loaded check valve which is unseated while the propeller control is in any position except FEATHER thus permitting governor pressurized oil to flow to and from the accumulator. When the propeller control is moved to the FEATHER position, the check valve is seated and oil under governor pressure is trapped in the accumulator and hose. As the propeller control is moved out of the FEATHER position, the trapped oil flows back through the governor to the propeller to unfeather it.

Troubleshooting the Propeller Unfeathering System.

TROUBLE	PROBABLE CAUSE	CORRECTION
PROPELLER FAILS TO UNFEATHER	Improper accumulator pressure.	Charge accumulator in accordance with Section 2.
	Defective governor.	Repair or replace/Rerig governor control.

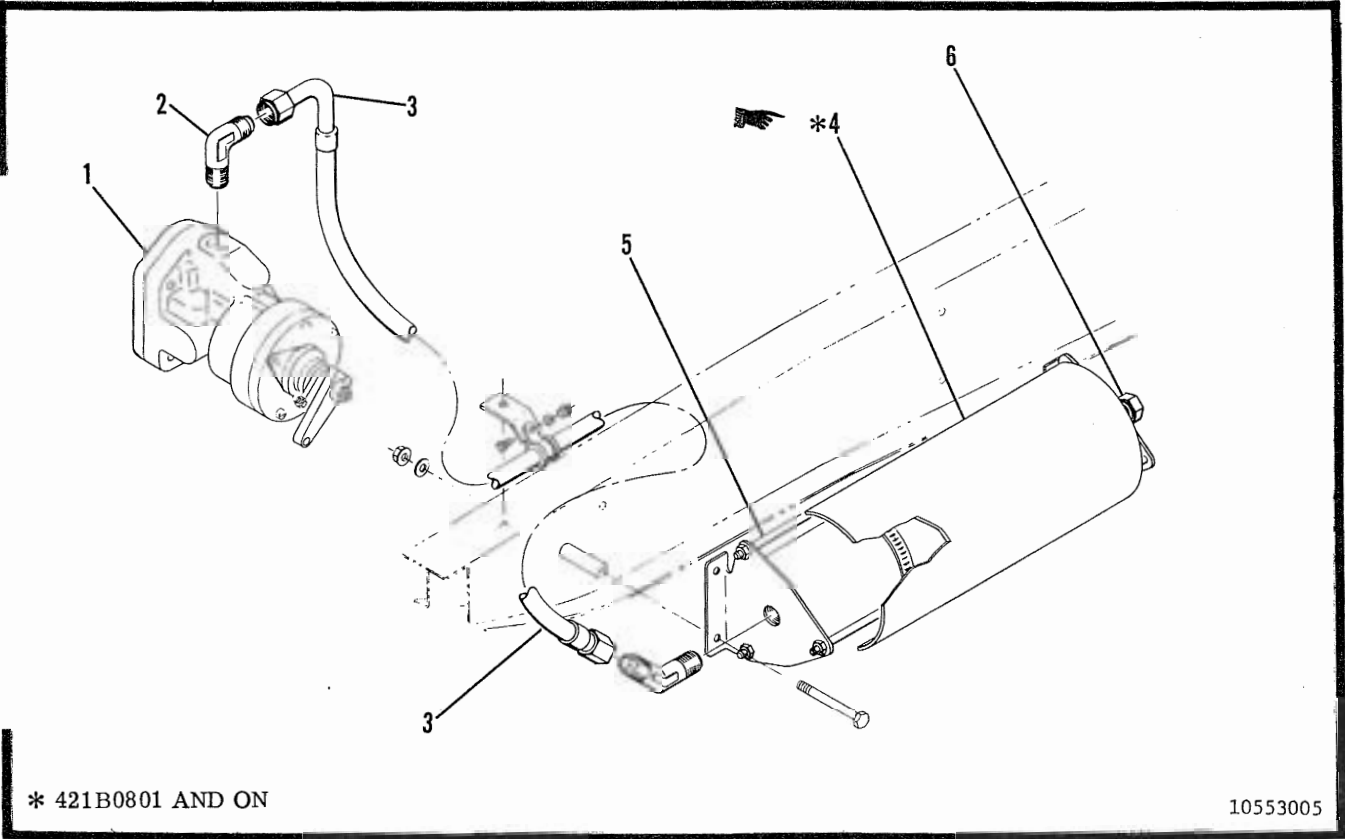
Removal, Service, Maintenance, and Installation of Propeller Governor.

For removal and installation of propeller governor refer to Removal and Installation of Propeller Governor Procedures found in Section 10.

CAUTION

Always release system pressure by placing the propeller control in UNFEATHER position, and release accumulator pressure through the filler valve, before disconnecting the hose between accumulator and governor or removing accumulator.

- a. Place propeller control in the UNFEATHER position before charging the accumulator to prevent the possibility of oil under pressure being trapped in the accumulator.
- b. Although the accumulator will function properly when charged with compressed air, dry nitrogen gas is recommended to minimize corrosion.
- c. Either too much pressure or not enough pressure in the accumulator will reduce efficiency of the unfeathering system. Refer to Section 2 for proper servicing.
- d. Always check that the filler valve does not leak after charging an accumulator.



1. Governor	3. Hose	5. Accumulator
2. Elbow	4. Heat Shield	6. Filler Valve

Figure 13-33. Propeller Unfeathering System

Removal and Installation of Propeller Unfeathering Accumulator.

- a. Remove engine cowling.
- b. Disconnect the pressure line.

CAUTION

Always make sure pressure is bled off the accumulator before disconnecting pressure line.

- c. Remove the four screws securing accumulator to the engine mount and remove the accumulator.

NOTE

The elbow in the accumulator is installed and leak tested by the manufacturer; therefore, removal of the elbow is not recommended.

The installation of the propeller unfeathering accumulator is a reversal of the removal procedure.

Operational Check of Propeller Unfeathering System.

- a. With engines operating at 2000 RPM, move propeller controls to the FEATHER position, then position mixture to IDLE-CUTOFF. The propellers should move to feathered position.
- b. Move propeller controls to an unfeathered position. Propellers should unfeather.
- c. If propellers do not unfeather, check system for leaks and proper pressure.

NOTE

When propellers do not unfeather sufficiently

to engage high pitch stop, bleed off accumulator pressure to 100 - 110 psi, then recheck operation.

PROPELLER SYNCHRONIZER SYSTEM.

The component parts of the propeller synchronizer system are two electrical pulse pickups, trimmer assembly, actuator motor assembly, switch, interconnecting electrical cable assemblies, and an indicator light. The control box assembly, located under the glove compartment box, contains an all transistorized circuitry. The actuator motor is a stepping type that operates on command from the control box and is located in the right engine nacelle. The flexible rotary shaft is connected to the actuator motor and trimmer assembly to trim the right engine speed setting. Magnetic pickups are mounted in each propeller governor to provide engine speed indications to the control box assembly. The function of the propeller synchronizer system is to automatically match the RPM between the two engines, therefore, the left engine is designated as the "master" engine while the right engine is termed the "slave" engine. The electrical pulses from both magnetic pickups are fed into the control box from the governors. Any difference in these pulse rates will cause the control box assembly to run the actuator motor and through the flexible shaft, trim the "slave" engine governor speed setting to exactly match the "master" engine RPM. Normal governor operations and functions are unchanged but the synchronizer system will continuously monitor engine RPM and reset the "slave" engine governor as required. The limited range feature prevents the "slave" engine losing more than a fixed amount of RPM in case the "master" engine is feathered with the synchronizer on.

Troubleshooting the Propeller Synchronizer System.

TROUBLE	PROBABLE CAUSE	CORRECTION
PROPELLER SYNCHRONIZER SYSTEM WILL NOT OPERATE	Circuit breaker out.	Reset circuit breaker.
	Actuator motor defective.	Repair or replace.
	Magnetic pickup out.	Replace. Refer to Testing Procedures.
	Defective governor.	Repair or replace governor.
	Wiring defective.	Perform Continuity Check in accordance with Synchronizer Wiring Test Procedures.

Operation of Propeller Synchronizer System.

Electrical pulses from the magnetic pickup in each governor are fed into the control box (Figure 13-34.) As any difference in the number of pulses is detected, a signal is sent from the control box to the actuator,

which trims the slave governor speed to match that of the master engine exactly. Normal governor operation is unaffected. The synchronizer will continuously monitor the engine speeds and reset the slave engine speed setting as required. Operating range of the actuator is approximately ± 50 RPM.

CAUTION

Disconnect the propeller synchronizer control box before doing any work on the governor pick-up leads. Turning the propeller synchronizer switch to the off position WILL NOT give this protection. Battery master switch must be OFF.

Removal of Propeller Synchronizer Components. (See figure 13-35.)

- a. Remove engine cowling.
- b. Disconnect electrical plug and flexible shaft (2) from actuator (1).
- c. Remove nuts and screws securing actuator to bracket and remove actuator from engine nacelle.
- d. Disconnect flex shaft (2) and control (15) from trimmer assembly (3).
- e. Loosen nuts securing control (15) from bracket (16) remove forward nut and route control aft thru the bracket (16).
- f. Remove nut (7), washers (4) and bolts (5) connecting rod (8) to trimmer assembly (3) and remove trimmer assembly (3).
- g. Remove nuts (7), washers (4) and screw (14) from rub block (13) and shield (6) and remove from support (12).
- h. Remove nuts (7), washers (4) and bolt (5) from governor (9), and loosen jamb nut and remove rod end (10).
- i. If the switch or light is to be removed, the panel (19) can be removed by removing autopilot controller, if installed, and removing the screws fastening the panel to the pedestal.

Installation of Propeller Synchronizer Components. (See figure 13-35.)

- a. Install components by reversing removal procedures.
- b. Adjust in accordance with adjusting procedures.

Adjustment of the Propeller Synchronizer System. (See figure 13-35.)

- a. Start rigging procedures by disconnecting flexible shaft (2) from actuator motor (1).
- b. Rotate free end of flexible shaft (2), counting total turns available on the "slave" governor trimmer assembly (3).
- c. Return trimmer assembly (3) to its center range.
- d. When trimmer assembly (3) is centered, rig governor (9) and control cable (15) in accordance with Rigging Propeller Controls.
- e. Manually rotate trimmer assembly (3) to either end of its travel.
- f. Move propeller pitch levers on the pedestal through its entire range, observing the governor speed adjusting lever to be certain it travels to the maximum and minimum RPM limits.
- g. Manually rotate the trimmer assembly (3) to opposite end of its travel.
- h. Perform step f. again.
- i. Recenter the trimmer assembly (3).
- j. Insert a squared shaft into drive of actuator motor (1) and count total turns available.
- k. Place actuator motor (1) in its center range.
- l. With both actuator motor (1) and trimmer assembly (3) centered, connect the flexible shaft (2) to actuator motor.
- m. Check flexible shaft (2) for binding and clearance in the full RPM position.
- n. Perform functional test.

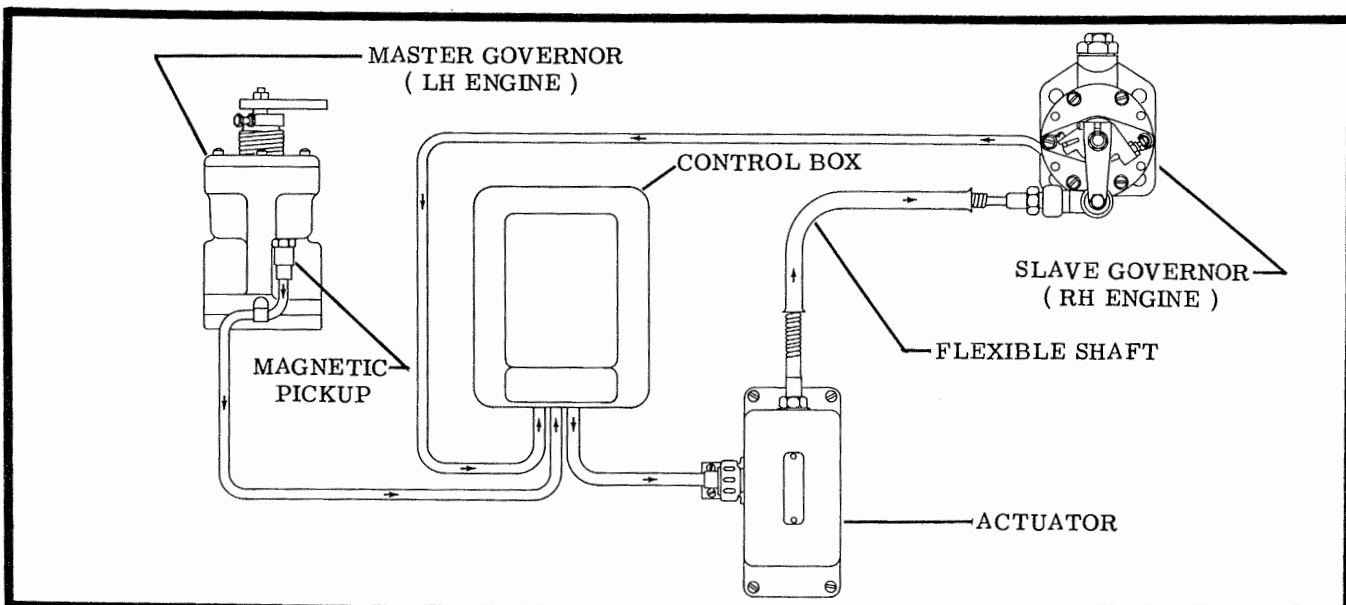
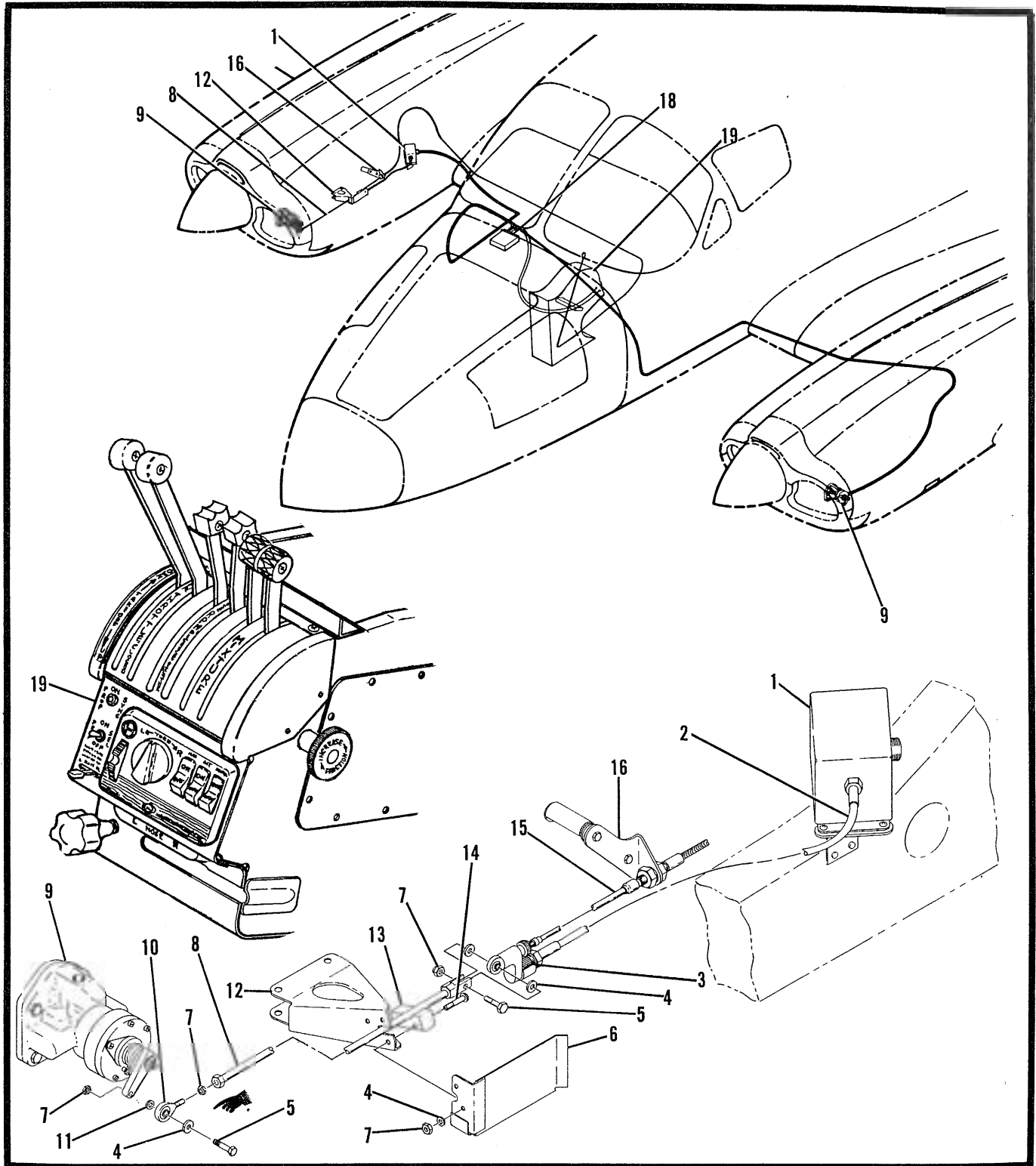


Figure 13-34. Schematic Diagram of Synchronizer Operation



1. Actuator
2. Flexible Shaft
3. Trimmer Assembly
4. Washer
5. Bolt
6. Shield

7. Nut
8. Rod Assembly
9. Governor
10. Rod End
11. Spacer
12. Support

13. Rub Block
14. Screw
15. Control
16. Bracket
17. Control Box
18. Prop Synchronizer
19. Switch and Light Panel

Figure 13-35. Propeller Synchronizer System Installation

Synchronizer Wiring Test

CAUTION

Do not plug in control box until this test has been satisfactorily completed. Even with switch "off" the box could be seriously damaged.

a. Before starting this test, be sure the control box is unplugged, the master switch is off, and the synchronizer circuit breaker is pulled. On a new installation, connect the actuator assembly and the magnetic pickups to the cables. Either pickup wire may be connected to pin receptacle No. 8 of the Jones cinch socket. Connect the other wire to pin receptacle No. 6 for slave engine, and No. 7 for the master engine. Before tying down pickup wires, complete continuity checks given in chart below between pins 8 and 6 and between pins 8 and 7.

NOTE

If another accessory uses the same circuit breaker, turn this accessory off before starting tests. The control box must be unplugged for these tests.

b. Make the following tests, using an ohmmeter to the pin receptacles in the Jones cinch socket number 233032: zero the ohmmeter and read on the X1 or X10 scale.

CAUTION

Do not use a probe that exceeds .045 inch in thickness. Insert and remove probe carefully. Failure to do so will result in loose pin connectors and faulty synchronizer operation.

PROPELLER SYNCHRONIZER WIRING CONTINUITY CHECK.

Test between receptacle numbers:	With Actuator Centered	OBTAIN		ACTION (If out of limits)
		With Actuator Uncentered 180°		
		Turn Clockwise (Facing Drive End) To Uncenter	Counterclockwise (Facing Drive End) To Uncenter	
5 & 1	open circuit (high resistance)	6.5 - 8.5 OHM	6.5 - 8.5 OHM	Bench check the actuator in accordance with Woodward Synchronizer Manual, Bulletin 33049.
5 & 3	open circuit (high resistance)	closed circuit (0 - 1.0 OHM)	13 - 17 OHM	
5 & 4	open circuit (high resistance)	13 - 17 OHM	closed circuit (0 - 1.0 OHM)	
4 & 1	6.5 - 8.5 OHM	6.5 - 8.5 OHM	6.5 - 8.5 OHM	
4 & 3	13 - 17 OHM	13 - 17 OHM	13 - 17 OHM	
3 & 1	6.5 - 8.5 OHM	6.5 - 8.5 OHM	6.5 - 8.5 OHM	
Test between receptacle numbers:		OBTAIN		ACTION (if out of limits)
8 & 7 (with 6 disconnected at pickup)		90 - 110 OHM 52 - 68 OHM**		Repair wiring if at fault; Replace governor if pickup is at fault; Replace pickup (Approved Governor Shop).
8 & 6 (with 7 disconnected at pickup)		90 - 110 OHM 52 - 68 OHM**		
8 & aircraft ground		open circuit (very high resistance)		
1 & aircraft ground		short circuit zero OHMS		Trace wiring to determine poor ground.
2 & aircraft ground*		open circuit (very high resistance)		Trace wiring to remove fault.
*2 & aircraft ground will read some low OHM value if you cannot open the circuit breaker. If the synchronizer shares a circuit breaker with another circuit, you may read an OHM value of the other circuit.				
**Solid steel pickup end with first length of sheathing out from the pickup colored white and carries P/N 723061WG21318 on its outer diameter immediately below the knurled diameter.				

c. When the system meets all of the preceding test values, turn the master switch on and reset the syn-

chronizer circuit breaker (CONTROL BOX must still be unplugged) and make the following voltage check:

PROPELLER SYNCHRONIZER VOLTAGE CHECK

TEST BETWEEN RECEPTACLE	METER READING	ACTION (If out of limits)
2 & 1	Same as supply voltage and polarity of pin No. 2 must be positive and pin No. 1 must be negative.	Trace wiring to determine fault or reversed polarity.

d. Check magnetic pickup output with the engine running at any cruise RPM. Check potential between pin receptacles 6 and 8. Also check potential between pin receptacles 7 and 8. Voltage must be a minimum of 1/2 volt at minimum cruise RPM, and a maximum of 3 volts at maximum cruise RPM. Voltages and RMS voltages as read on a 5000 OHM/volt AC voltmeter. If you do not obtain this voltage replace governor or have approved governor repair shop adjust or repair the pickup.

e. When the system complies with the specifications above, the control box may be connected.

f. If the synchronizer malfunctions now, the cause of the malfunction can probably be traced to the control box, or the mechanical function of the flexible shaft or governor speed trimming device. Check for a high friction level in the trimming mechanism. Be sure to center the actuator and trimming device before mating cable.

NOTE

To check magnetic pickup resistance at the governor, disconnect both connectors and measure resistance with an ohmmeter. Use X1 or X10 scale. Replace pickup if reading is other than 90-110 OHMS. On aircraft with first length of sheathing out from the pickup colored white and carries P/N 723061WG21318 on its outer diameter immediately below the knurled diameter, replace pickup if reading is other than 52-68 OHMS.

Removal and Installation of Magnetic Pickup in Propeller Governor.

- Remove propeller governor in accordance with Propeller Removal Procedures found in Section 10.
- Tag and disconnect wiring to pickup.
- Unscrew magnetic pickup from propeller governor.

d. Install magnetic pickup as follows:

- Set governor for maximum RPM, slowly rotating the governor drive shaft.
- Screw in pickup, tighten with fingers until pickup makes contact internally with the rotating fly-weight head.

CAUTION

Do not use wrench or pliers to tighten magnetic pickup.

NOTE

When installing new pickup always install new O-ring.

3. Tighten the pickup 1/8 turn counterclockwise and lightly tighten lock nut.

4. Connect a 5000 Ohm/Voltmeter across the pickup leads.

5. Drive the propeller governor at minimum cruise RPM and adjust pickup output to obtain $1.0 \pm .2$ volt. Screw pickup in to increase voltage, out to decrease voltage.

6. Tighten pickup lock nut and safety with lock wire.

CAUTION

Do not torque lock nut over 25 inch-pounds.

e. Install propeller governor in accordance with the Propeller Governor Installation Procedures found in Section 10.

f. Connect wires and remove tags.

Functional Test of Synchronizer System. (Optional)

To test the operation of the synchronizer in flight, first synchronize propellers manually and turn the

synchronizer switch ON. Then slowly adjust the master engine propeller governor control lever, in small increments, to increase or decrease RPM. The RPM range over which the slave engine will remain synchronized with the master engine is the limited range mentioned above. With the synchronizer ON, move the master engine propeller governor control lever to a point which is close to the end of this limited travel. Turn the synchronizer OFF. An unsynchronized condition will develop as the actuator moves to its mid-position. When the synchronizer is turned ON again, synchronization will result. If the units do not become synchronized, the actuator has reached the end of its travel and must be recentered in this manner.

- a. Turn the switch OFF.
- b. Synchronize the engines manually.
- c. Turn the switch ON.

HEATED STATIC PORTS

Static port heaters may be installed to prevent freezing the static ports due to moisture or ice formation. Care must be exercised in removing and installing the static ports to prevent damage to the heaters and electrical leads.

Removal and Installation of Heated Static Port.

- a. On aircraft 421-0001 to 421B0001, replace static port as follows:
 1. Disconnect static line and remove fitting from static port.
 2. Drill out rivets securing static port and plate to fuselage skin.
 3. Disconnect electrical wiring and remove static port.

CAUTION

Use extreme care in removing static port and plate from fuselage skin so as not to damage skin.

4. Clean sealant from skin with a cleaning solvent before installing new parts.
5. Fay seal with PR1422 (MIL-S-8802) an area .30 wide around edges of, and between plate, skin and static port. Apply sealant to attaching rivets upon installation. Fillet seal edges of static port after installation.
6. Trim rivet heads flush with spherical surface of plate.
7. Connect electrical wiring.
8. Install fitting and connect static line.
9. Perform static system test in accordance with Section 12.
- b. On aircraft 421B0001 and On, replace static port as follows:
 1. Disconnect static line and remove fitting from static port.
 2. Drill out rivets securing static port, spacer and retainer to fuselage skin.

3. Disconnect electrical wiring and remove static port.

4. Install static port by assembling static port and spacer to outside of fuselage skin and retainer on the inside and secure with countersunk rivets.

5. Connect electrical wiring.

6. Perform static system test in accordance with Section 12.

FLIGHT HOUR RECORDER.

The flight hour recorder instrument is mounted on the lower portion of the cabin outflow valve shroud. On aircraft 421B0056 and On, the recorder is mounted on the stationary instrument panel. On aircraft 421-0001 to 421B0001 the recorder is actuated by a vane switch located on the bottom of the aft fuselage. The vane switch is actuated by a 40 ± 5 MPH air flow over the vane. On aircraft 421B0001 and On the recorder is actuated by the landing gear safety switch. Whenever the landing gear strut is extended it will actuate the safety switch and allow the recorder to operate.

NOTE

On aircraft 421B0001 and On it is possible if the aircraft is on jacks and the battery switch is in the ON position, the flight hour recorder will record time.

Removal and Installation of Flight Hour Recorder.

- a. Remove aft tailcone access door.
- b. Disconnect wires from switch, remove screws attaching switch to fuselage skin. Retain the spacers for reinstallation.
- c. On aircraft 421-0001 to 421B0056, remove the outflow valve shroud.
- d. Remove two nuts securing flight hour meter to shroud.
- e. On aircraft 421B0056 and On, refer to typical instrument removal procedures for flight hour meter.
- f. Installation is the reversal of the removal procedure.

CESSNA ECONOMY MIXTURE INDICATOR.

The exhaust gas temperature (commonly referred to as EGT) sensing device is used to aid the pilot in selecting the most economical fuel-air mixture for cruising flight at a power setting of 75% or less. Exhaust gas temperature (EGT) varies with the ratio of fuel-to-air mixture entering the engine cylinders. Refer to the appropriate Owner's Manual for correct operation procedures of system.

Troubleshooting the Exhaust-Gas Temperature Gage.

TROUBLE	PROBABLE CAUSE	CORRECTION
GAGE INOPERATIVE	Defective gage, probe or wiring.	Isolate defective circuit, replace defective probe or gage.
INCORRECT READING	Indicator needs calibrating.	Calibrate in accordance with calibration procedure.
FLUCTUATING READING	Loose, frayed or broken electrical lead.	Tighten connections, and repair or replace defective leads.

Removal and Installation of EGT System. (See figure 13-36.)

- Disconnect wires at probe by removing two screws connecting wires together.
- Loosen clamp and remove from exhaust stack.
- Remove EGT indicator in accordance with Typical Instrument Removal Procedures found in Section 12.
- If wire is to be removed, pull wires from bundles routed to engine nacelle.

NOTE

The wiring is a thermocouple wire and is calibrated for a fixed resistance. Do not lengthen or shorten.

- Installation of EGT system is the reversal of the removal procedures.

Calibration of EGT System. (See figure 13-36.)

- To check calibration, obtain an average cruise condition of 65% power at 7500 feet and lean mixture to peak exhaust temperature on indicator.

NOTE

To obtain peak exhaust temperature, lean out mixture control slowly enough for pointer to follow. When the pointer stops going up and starts a downward movement, enrich mixture enough to regain peak reading.

- Record reading achieved after system has stabilized.
- Repeat step a. several times to insure a positive reading has been achieved.
- Lean mixture to a setting of not less than 25° F below peak exhaust gas temperature.
- Use adjust screw on face of indicator and position pointer to 4/5 scale.

NOTE

Adjustment should not exceed $\pm 75^{\circ}\text{F}$ or three divisions.

- If adjustment for more than $\pm 75^{\circ}\text{F}$ is required, perform the following steps:

- Gain access to rear of indicator.

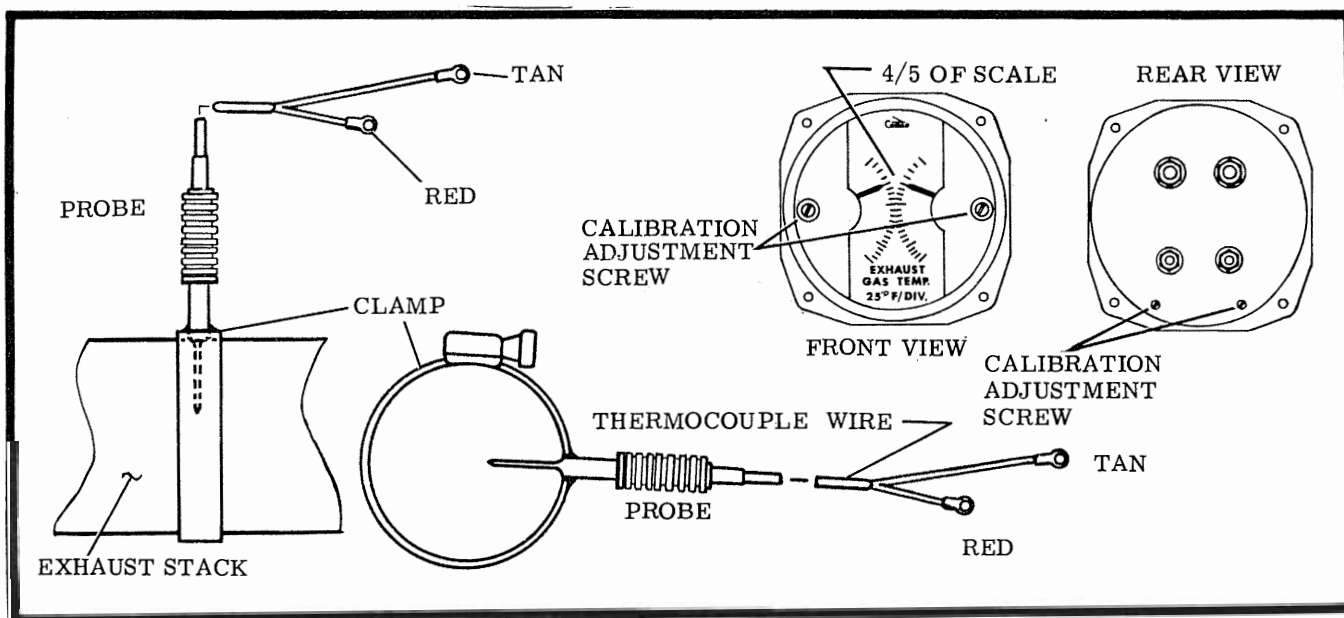


Figure 13-36. Exhaust Gas Temperature System Installation

2. Viewing meter from rear, turn calibration screws one turn clockwise for increase in indicator reading of 25° F (one division) or one turn counter-clockwise for decrease.

TRUE AIRSPEED INDICATOR

The True Airspeed Indicator is composed of three elements: airspeed, altitude and temperature. The altitude and temperature mechanisms are correlated to operate a rotating dial over which the indicated airspeed indicates the true airspeed. The true airspeed indicator senses changes in pressure and temperature. This combination of altitude and temperature change results in a sum total of airspeed corrections to indicate true airspeed.

Removal and Installation of True Airspeed Indicator.
(See figure 13-37.)

a. On aircraft 421A0001 to 421B0201, remove and install the true airspeed indicator in accordance with Typical Instrument Removal and Installation procedures.

b. On aircraft 421B0201 and On, remove and install the true airspeed indicator as follows:

1. Disconnect clamp securing temperature probe on bottom skin.
2. Loosen feed thru nut on temperature tube and work tube up and into the cockpit area.

CAUTION

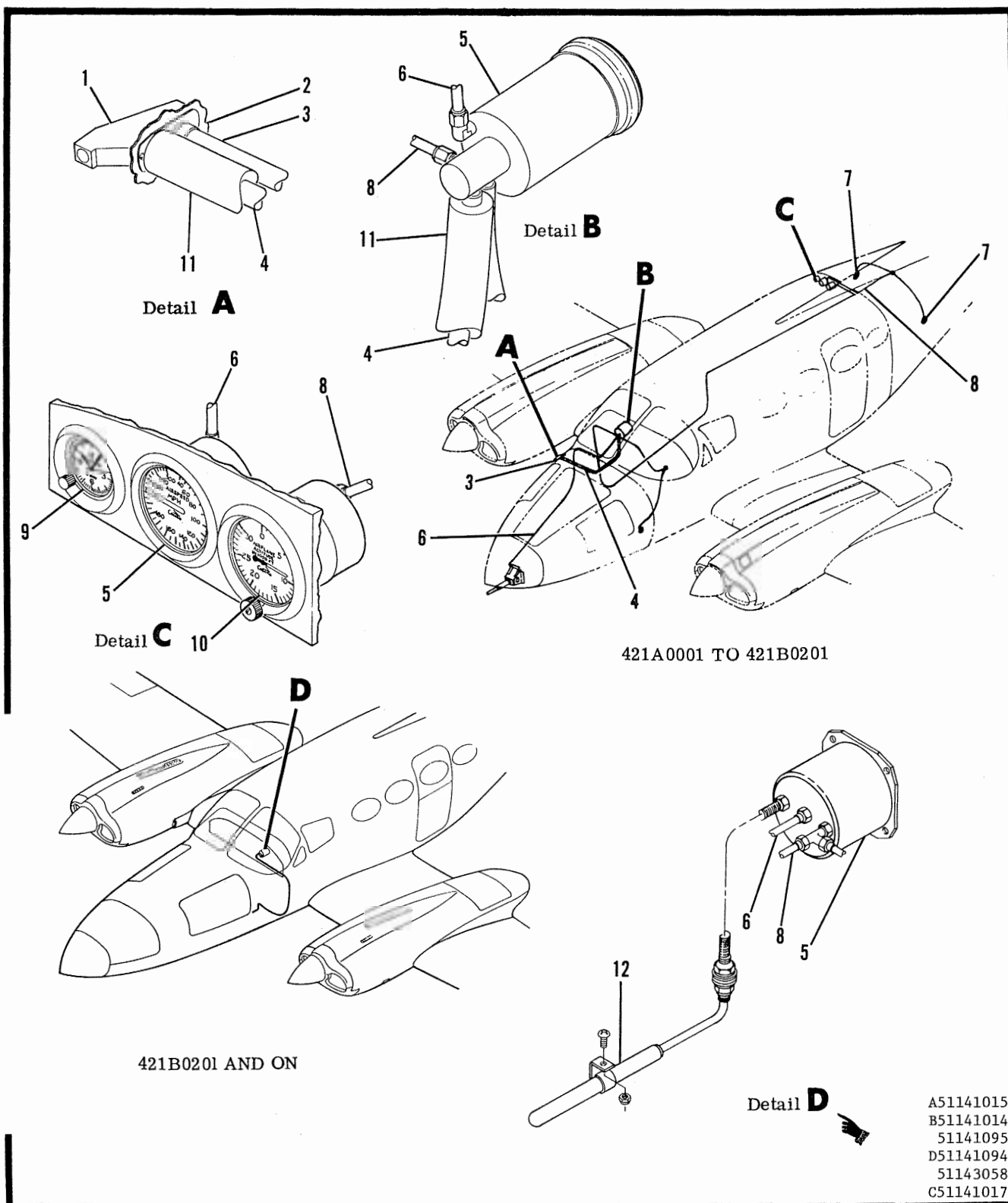
Avoid sharp bends, nicks or dents in temperature tube. Incorrect readings could result.

3. Remove indicator in accordance with Typical Instrument procedures Section 12.

4. Install true airspeed indicator by reversing removal procedures.

NOTE

Seal around feed thru fitting after installation in accordance with Fay Sealing procedures Section 16 with Class B type sealant material.

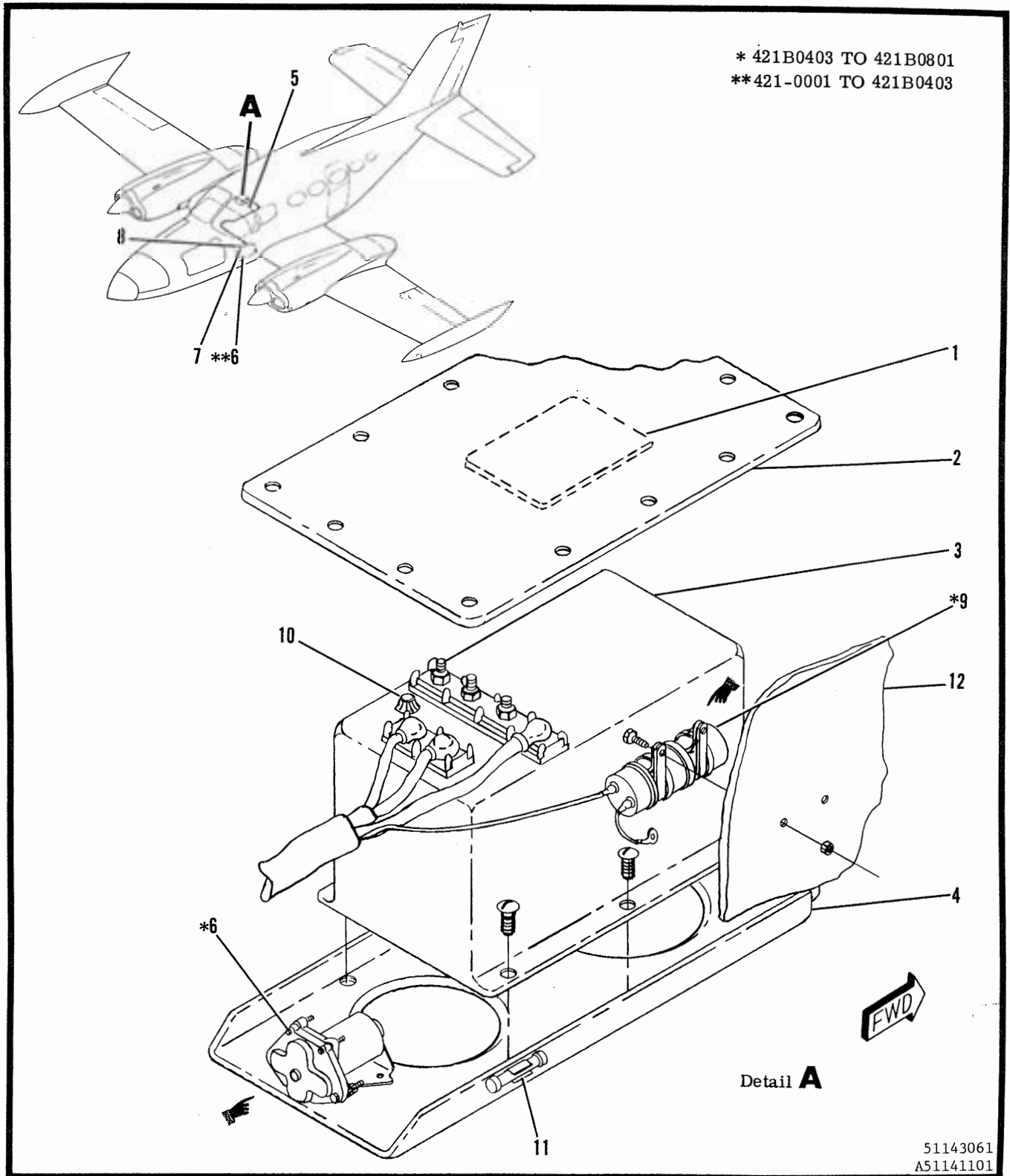


1. Air Scoop
2. Skin
3. Airscoop Static Line
4. Airscoop Pressure Line

5. True Airspeed Indicator
6. Pitot Pressure Line
7. Static Port
8. Static Line

9. Clock
10. Altimeter
11. Insulation
12. Temperature Probe

Figure 13-37. True Airspeed Installation

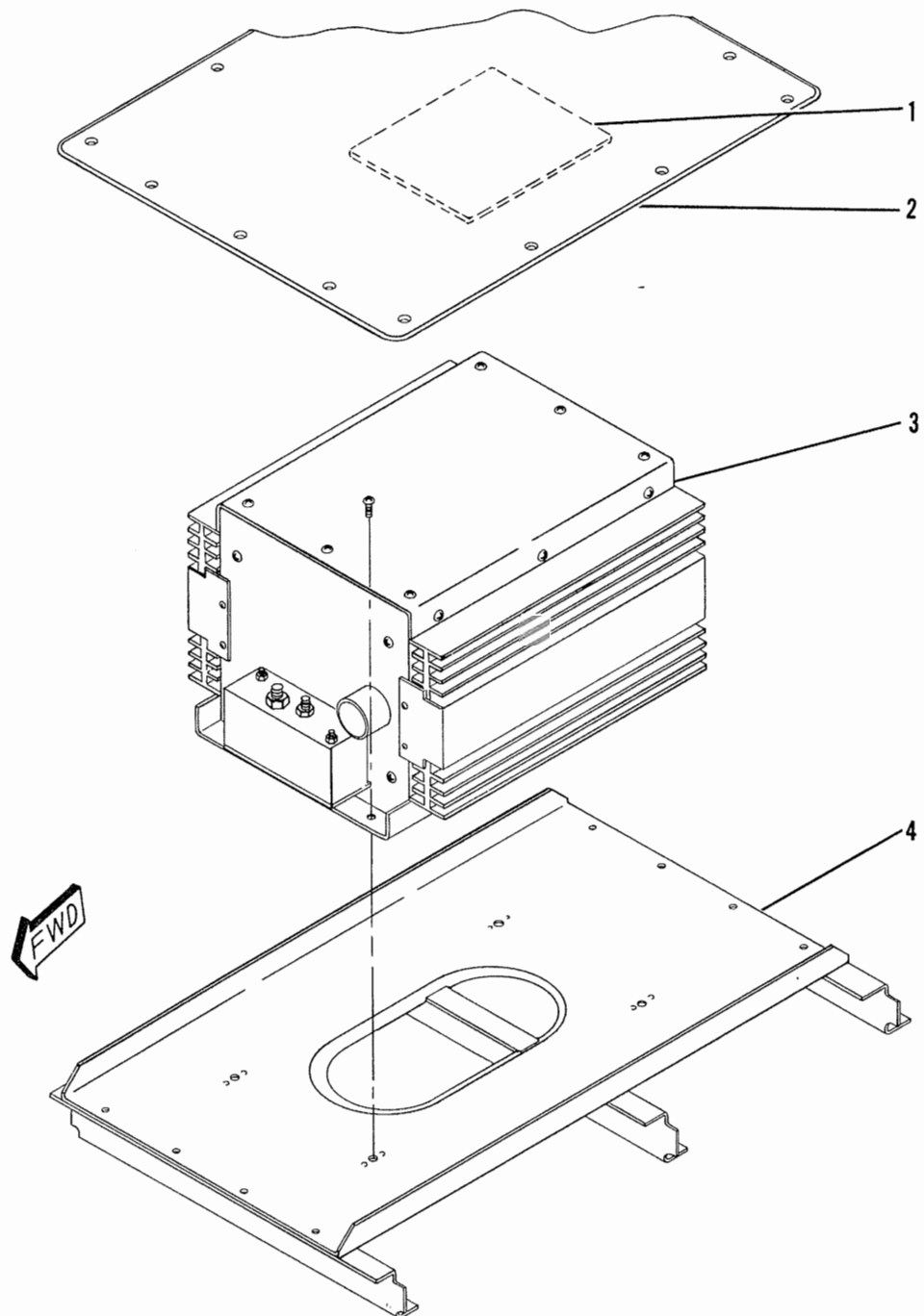


1. Decal
2. Access Cover
3. Inverter
4. Shelf

5. Heated Windshield
6. Relay
7. Controller
8. Circuit Breaker Panel

9. Capacitor
10. Fuse
11. Spare Fuse
12. Bulkhead

Figure 13-38. Heated Windshield Components Installation (Sheet 1 of 2)



Detail **A**
421B0801 AND ON

A51142044

Figure 13-38. Heated Windshield Components Installation (Sheet 2)

HEATED WINDSHIELD.

The heated windshield is electrically heated to prevent ice formation on the heated area while flying in icing conditions. The windshield is a laminated stretched acrylic construction utilizing a deposited metallic film for the heating element. On aircraft 421-0001 to 421A0118, electrical power is supplied from an auxiliary winding in the AC-DC 100 amp alternators and a alternate selector switch allows the pilot to use either alternator for the power source. On aircraft 421A0118 and On and aircraft incorporating SK421-47 and SK421-50, the electrical power is supplied from an inverter. Temperature control is accomplished by using an ON-OFF type controller

operating with a wire sensor imbedded in the windshield. Actuation of the windshield anti-ice switch activates the controller which senses windshield heat. If the windshield heat is not within the limits established by the sensor and controller, the controller closes the relay which controls AC power from the inverter to the windshield. When the windshield reaches the cutout temperature, the controller will open the relay, removing power from the windshield. On aircraft 421B0801 and On, the relay is not required.

Troubleshooting the Heated Windshield.

TROUBLE	PROBABLE CAUSE	CORRECTION
WINDSHIELD WILL NOT	Open circuit.	Reset circuit breaker.
	Defective relay.	Replace relay.
	Defective temperature controller.	Replace temperature controller.
	Loose or faulty wiring.	Check, tighten or replace wiring.
	Defective switch.	Replace switch.
	Defective windshield sensing element.	Replace windshield.
	Faulty inverter (421A0118 and On and aircraft incorporating SK421-47 and SK421-50).	Replace inverter.
WINDSHIELD HEATS CONTINUOUSLY WITHOUT CYCLING	Defective relay.	Replace relay.
	Defective temperature controller.	Replace temperature controller.
	Defective windshield sensing element.	Replace windshield.
INVERTER INOPERATIVE	Fuse blown	Replace fuse/or inverter.

Removal of Heated Windshield.

- Disconnect electrical wiring to magnetic compass, remove compass.
- Tag and disconnect windshield wiring.
- Remove windshield in accordance with the Windshield Removal Procedures found in Section 3.

Installation of Heated Windshield.

- Install windshield in accordance with Windshield Installation Procedures found in Section 3.
- Connect wiring and remove tags.

NOTE

If installing heated windshield other than one that was in aircraft, measure resistance across power terminals of heated windshield. Refer to decal on underside of inverter access cover for proper tap setting.

- Install magnetic compass and connect wiring.
- Check operation of heated windshield.

Removal and Installation of Heated Windshield Components. (See figure 13-38.)

- Remove access covers as required to gain ac-

cess to components.

- b. Tag and disconnect wiring.
- c. Remove screws securing temperature control and relay.
- d. Remove temperature control and relay from aircraft.
- e. Remove capacitor by removing clamps securing capacitor to side of bulkhead.

NOTE

The capacitor is not to be relocated because of transit voltage interference.

- f. Remove screws securing inverter to shelving.
- g. Remove inverter from aircraft.
- h. Install temperature control, relay, capacitor and inverter by reversing the removal procedures.

Operational Check of Heated Windshield. (421-0001 to 421A0118)

Because the heated windshield operates on AC voltage it will be necessary to operate either engine when performing an operational check.

- a. Park aircraft into wind.
- b. Start aircraft engine and allow to warm-up.
- c. After engine warm-up, adjust throttle to 1000 RPM.
- d. Turn heated windshield switch ON. Observe indicator light. If the indicator light is out, check press-to-test for defective bulb. If the bulb is defective replace bulb. If the bulb is not defective refer to troubleshooting chart and replace the temperature controller. The temperature controller is operating when the light is ON.
- e. Allow approximately one minute for windshield to warm-up after switch is turned ON.
- f. Check for heat in the heated area of the windshield. If the area is not warm make the following checks:
 1. Measure the voltage at the electrical terminal connections of the windshield. Voltage should be 100 to 300 volts AC.
 2. Shutdown engine and disconnect wiring from sensing element.
 3. Measure resistance of sensing element. Resistance should be from 300 to 500 ohms, depending on the ambient temperature of the windshield.
 4. Measure resistance of the heated area at terminals. Resistance should be from 30 to 50 ohms.

NOTE

When making the above resistance measurements always disconnect wiring at terminals and make sure battery is turned OFF.

- g. If, when checking the heated area, and the area is warm, the heated portion of the windshield should be operating satisfactorily. This should also be shown by the indicator light cycling on and off indicating the temperature controller is cycling.

Operational Check of Heated Windshield. (421A0118 and On and aircraft incorporating SK421-47 and SK421-50))

- a. Turn heated windshield switch ON. Observe indicator light on the annunciator panel. If the indicator light is out, check press-to-test for defective bulb. If the bulb is defective, replace bulb. If the bulb is not defective, refer to Troubleshooting Chart and replace the temperature controller. The temperature controller is operating when the light is ON.
- b. Allow approximately one minute for windshield to warm-up after switch is turned ON.
- c. Check for heat in the heated area of the windshield. If the area is not warm, make the following checks:
 1. Measure the voltage at the electrical terminal connections of the windshield. On 421-0001 to 421B0801 voltage should be 190 to 208 volts AC. On 421B0801 and On the voltage should be 198 to 211 volts.
 2. If AC voltage is present, measure the resistance of the heated windshield terminals. Resistance should be within limits given on decal (1).

CAUTION

When making the above resistance measurements, always disconnect wiring at terminals and make sure battery is turned off.

3. If resistance is within tolerance, measure resistance from ground terminal to primary structure. Resistance should be no greater than .005 ohms.
4. If AC voltage is not present at windshield connection terminals, disconnect AC wiring at terminals of inverter.
5. Measure AC voltage at inverter output terminals, if AC voltage is not present, disconnect DC voltage terminal wires and check for 28 volts DC.
6. If DC voltage is present, inverter is inoperative.
7. If AC voltage is present, at the inverter terminals, check for wiring continuity between inverter and the heated windshield.
8. If DC voltage is not present, check relay.
9. If relay is good, disconnect wiring from sensing unit at windshield terminals.
10. Measure resistance of sensing element. Resistance should be from 300 to 365 ohms, depending on the ambient temperature of the windshield.
11. If when checking the heated area, and the area is warm, the heated portion of the windshield should be operating satisfactorily. This should also be shown by the indicator light cycling on and off indicating the temperature controller is cycling.

STEREO TAPE PLAYER.

The optional stereo tape player is installed behind the left-hand forward divider in the stereo cabinet. The eight track stereo player has a tape speed of 3.75 in/sec., with a motor speed of 300 RPM. It has automatic switching of programs with continuous play and push button control for immediate program change.

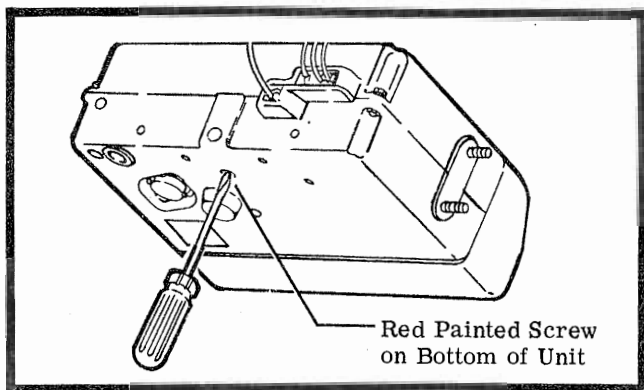


Figure 13-39. Crosstalk Adjustment

Removal and Installation of the Stereo Tape Player.

- Disconnect electrical plug connector from stereo player.
- Remove three screws fastening stereo cabinet to floorboard.
- Remove stereo cabinet with stereo player from floorboard.
- To further disassemble stereo player from cabinet, remove four nuts and washers holding stereo player to cabinet bracket, and remove stereo player.
- To install stereo player to cabinet, and stereo cabinet back in its original position, reverse the removal procedures.

NOTE

Do not use four track tape on this eight track stereo player.

Crosstalk or Misaligned Head Adjustment on Stereo Player. (See figure 13-39.)

Check several cartridges for the crosstalk condition. If only one cartridge produces crosstalk, the cartridge is defective. However, should the majority of the cartridges produce crosstalk, the unit requires adjustment. To make the adjustment to eliminate crosstalk or misadjusted playback head position, follow the step-by-step procedure below:

- Use a cartridge of known good performance.
- Note red painted screw on bottom of unit.
- Insert cartridge, noting if crosstalk is present.
- Using a screwdriver, adjust the red painted screw. Should the interference become louder, reverse the screw adjustment until the unit plays without interference.
- Secure the adjustment in position with plastic glue.

Speed Control Adjustment on Stereo Player. (See figure 13-40.)

Should speed variation be present, always check the

cartridge first (by substitution). Select a vocal tape of an artist whose singing voice you are familiar with. Turn unit on, and insert the cartridge, listening for the pitch of the artist's voice. Should the voice pitch be high, the unit is running fast; or if the voice pitch is low, the unit is running slow. To correct either the high or low pitch condition, follow the speed correction outline procedure below:

- Remove the two right-hand knobs from the control shaft on the tape only, noting an access hole to the right of the control shaft.
- Using a small screwdriver (inserted into access hole), make the speed control adjustment. Should the unit be running fast, a counterclockwise rotation of the screwdriver will slow the unit down; should the unit be running slow, a clockwise rotation of the screwdriver will speed it up. Set the speed control at that point where the artist's voice sounds correct to your ear.

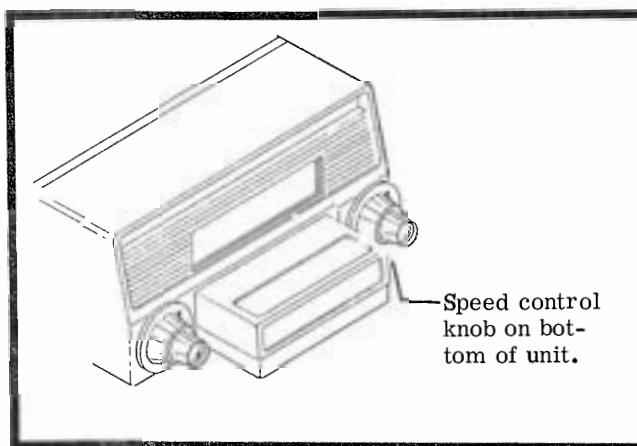


Figure 13-40. Speed Control Adjustment

ELECTRIC ELEVATOR TRIM CONTROL.

See Section 6 for removal, installation and rigging of electric elevator trim control system.

STROBE LIGHT SYSTEM.

See Section 14 for removal and installation of strobe lights system.

WING LOCKER FUEL SYSTEM.

See Section 11 for removal and installation of wing locker fuel system.

SEVENTH, EIGHTH, NINTH, AND TENTH SEATS.

See Section 3 for removal and installation of the seventh, eighth, ninth and tenth seats.

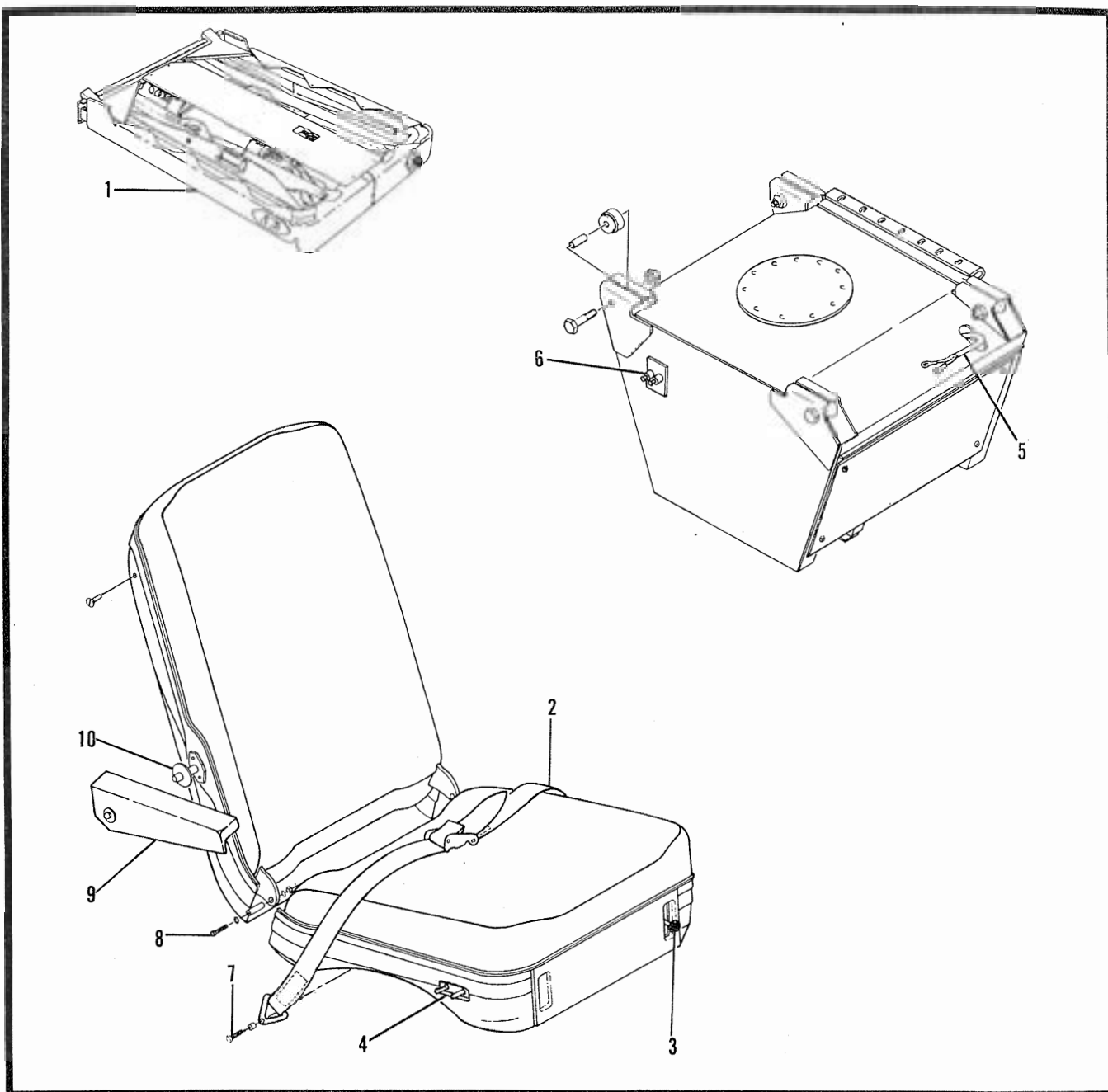
ELECTRIC SEAT. (See figure 13-41.)

moval of the seat.

Removal and installation of pilot's or copilot's electric seat is the same as the standard seats, except the wires must be removed and tagged before re-

CAUTION

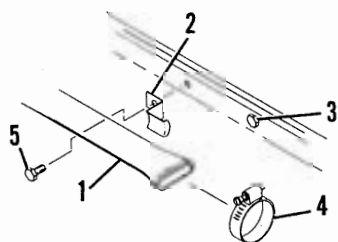
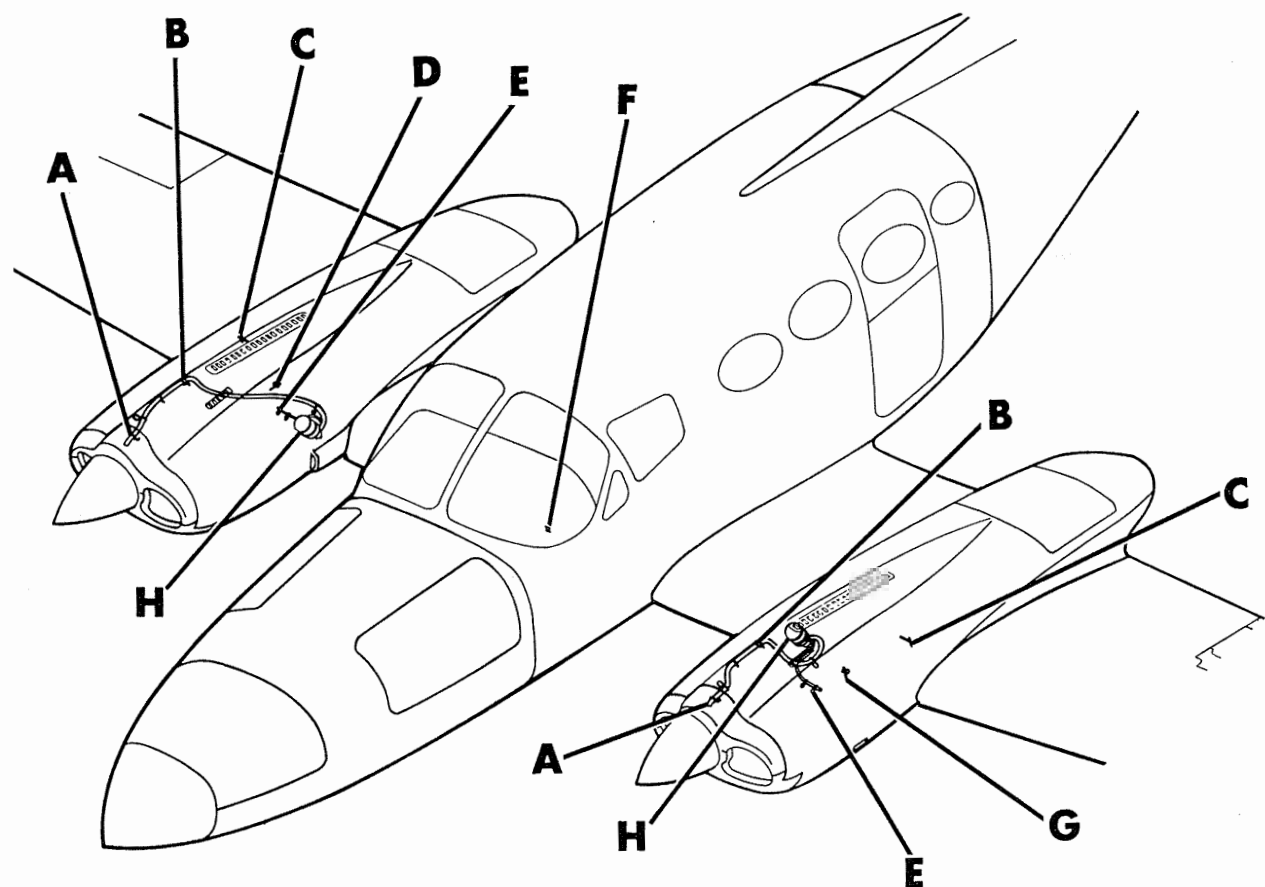
Make sure the master switch is in the OFF position before removing the electric seat.



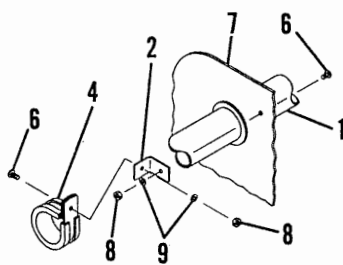
1. Bottom Assembly
2. Seat Belt
3. Seat Lock
4. Actuator Switches
5. Electrical Cable

6. Circuit Breaker
7. Bolt
8. Screw
9. Armrest
10. Armrest Stop

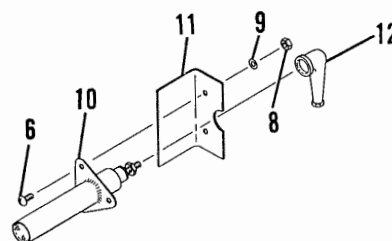
Figure 13-41. Electric Seat Installation



Detail **A**



Detail **B**



Detail **C**

51542005R
A14541004
B51541016
C51541015

1. Discharge Hose	8. Nut	16. Instrument Panel
2. Mounting Clip	9. Washer	17. Control Panel
3. Crankcase Thru Bolts	10. Thermo Detector	18. Test Switch
4. Clamp	11. Bracket	19. Post Light
5. Bolt	12. Rubber Nipple	20. Squib Terminal
6. Screw	13. Shield	21. Ground Terminal
7. Baffle	14. Engine Mount Beam	22. Discharge Sensor Lead
	15. Fire Extinguisher	

Figure 13-42. Engine Compartment Fire Extinguisher (Sheet 1 of 2)

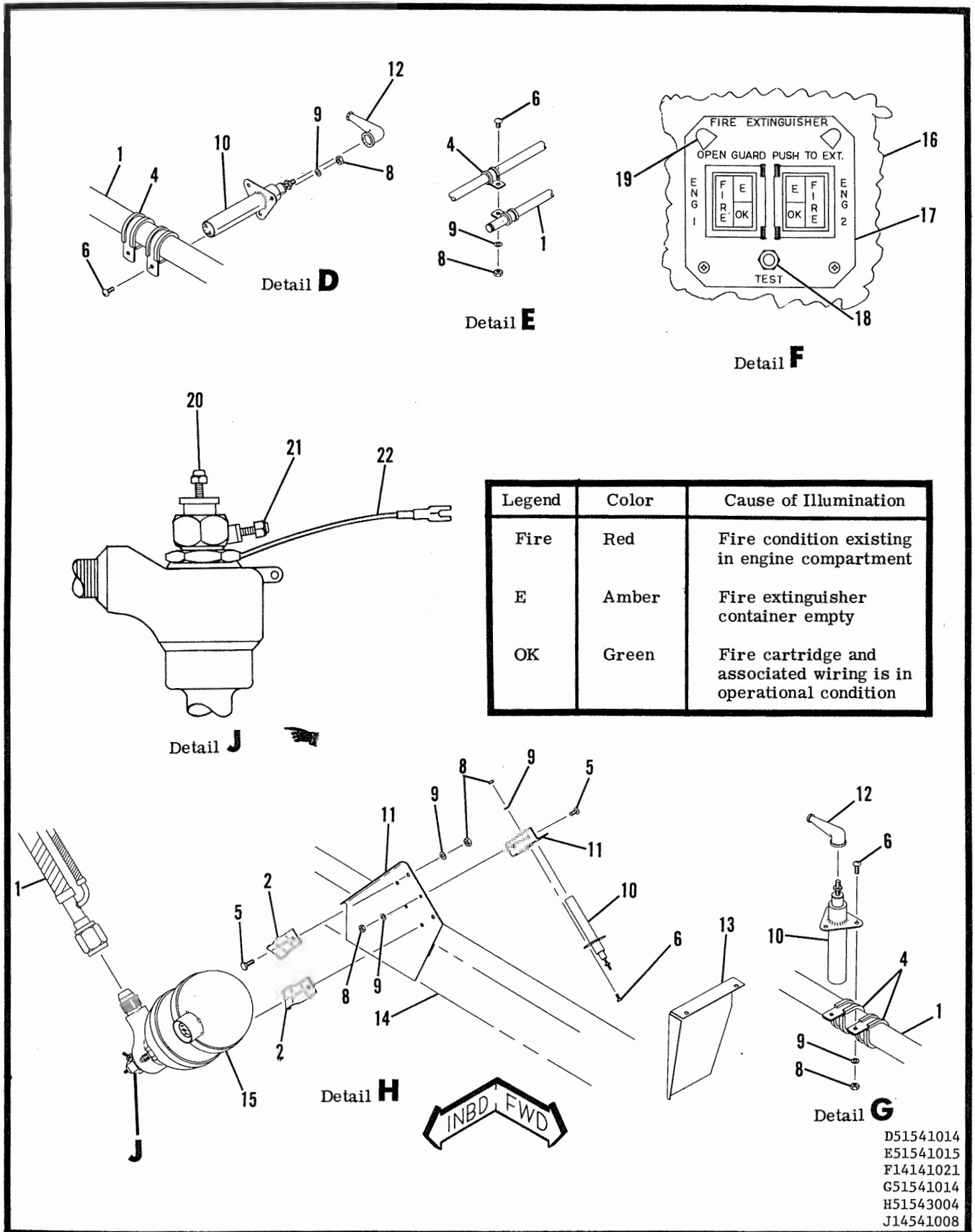


Figure 13-42. Engine Compartment Fire Extinguisher (Sheet 2 of 2)

ENGINE COMPARTMENT FIRE EXTINGUISHER.

The engine compartment fire extinguisher consists of three major components, control panel, thermal detectors, and the extinguisher unit. The annunciator panel may be mounted in any unused standard three-inch instrument hole, the three thermal detectors are mounted in the high heat areas of the engine nacelle and the fire extinguisher is mounted in the nacelle area. An exit line is routed from the fire extinguisher into the forward section of the engine where the freon gas is expelled. A smaller discharge hose which routes off of the large discharge hose expels freon gas from the center of the nacelle area towards the inboard side of the nacelle.

A test function is provided to test the system circuitry. When the test switch is pushed (shown in figure 13-42), all lights should illuminate.

NOTE

The test switch does not check detector system (refer to Servicing paragraph).

If an overheat condition is detected, the appropriate "Fire" light will annunciate the engine to be extinguished. To activate the extinguisher, open the guard for the appropriate engine and press the "Fire" light. Freon, under pressure, will be discharged to the engine and engine accessory compartments. The amber light E (figure 13-42) will illuminate after the extinguisher has been discharged and will continue to show empty until a new bottle is installed. The "Fire" light will remain illuminated until compartment temperatures cool.

NOTE

Only one discharge is available per engine.

Troubleshooting Engine Fire Extinguisher.

TROUBLE	PROBABLE CAUSE	CORRECTION
POWER ON TO INDICATOR PANEL TEST SWITCH DEPRESSED ALL LIGHTS FAIL TO ILLUMINATE	Open circuit breaker. Open circuit between pin A and B of connector at panel. (Pin A is ground.) Voltage present between Pin A and B at panel connector. Faulty panel.	Close circuit breaker. Repair wiring. Replace panel.
GREEN LIGHT(S) ILLUMINATED LIGHT(S) FAIL TO LIGHT	Defective light bulb(s). (Bulb(s) good.) Disconnect wire from bottom stud of cartridge. Ground wire, light(s) illuminate. Defective cartridge. (Light(s) fail to illuminate.) Open circuit between bottom stud wire of cartridge and panel connector. (Circuit exists between bottom wire of cartridge and connector.) Faulty panel.	Replace bulb(s). Replace cartridge. Repair wiring. Replace panel.
RED (FIRE) LIGHT(S) FAIL TO ILLUMINATE	Defective light bulb(s). (Bulb(s) good.) Defective panel.	Replace bulb(s). Replace panel.
AMBER LIGHT (E) LIGHT(S) FAIL TO LIGHT	Defective light bulb(s). (Bulb(s) good.) Defective panel.	Replace bulb(s). Replace panel.

Troubleshooting Engine Fire Extinguisher (Cont.)

TROUBLE	PROBABLE CAUSE	CORRECTION
POWER ON TO INDICATOR PANEL TEST SWITCH NOT DEPRESSED. RED (FIRE) LIGHT(S) LIGHTED	Shorted detectors or shorts in detector wiring. (Check for shorts in detector wiring be- tween pin C or D of harness connector and ground.)	Replace shorted detector or correct shorted wiring.
	(No short in wiring or detec- tor.) Indicator panel defective.	Replace detector.
GREEN LIGHTS OUT LIGHT(S) LIGHTED	(Depress test switch.) If light(s) stay on, indicator panel defective. Also, check affected cartridge for bridge-wire re- sistance.	Replace indicator panel.
AMBER (E) LIGHT(S) FLICKERING	Empty container.	Replace container.
	If container is full, unscrew cartridge, scratch some anodize off cartridge thread and reinstall. Torque 90 to 100 inch-pounds. If light is still intermittent, ground sen- sor wire to aircraft. Light goes out.	Replace container.
	If light does not go out. Probable open circuit between sensor wire and connector pin H or G.	Repair wiring.
	If circuit exists between sen- sor wire and connector pin H or G. Faulty panel.	Replace indicator panel.
AMBER (E) LIGHT(S) ON	Empty container.	Replace container.
	If container is full, unscrew cartridge, scratch some anodize of cartridge thread and reinstall. Torque 90 to 100 inch-pounds. If light is still on ground sensor wire to aircraft. Light goes out.	Replace container.
	If light does not go out. Probable open circuit between sensor wire and connector pin H or G.	Repair wiring.
	If circuit exists between sen- sor wire and connector pin H or G. Faulty panel.	Replace indicator panel.

Removal of Fire Extinguisher. (See figure 13-42.)

- a. Remove engine cowling.
- b. Make sure battery switch is OFF.
- c. Disconnect electrical wires from extinguisher.
- d. Disconnect discharge hose (1).
- e. Remove clamps (2) securing extinguisher unit to mounting clips.
- f. Remove extinguisher from nacelle.

Installation of Fire Extinguisher. (See figure 13-42.)

- a. Position fire extinguisher in place and connect hose (21).
- b. Clamp fire extinguisher in place with clamps (8).
- c. Connect electrical wires.

WARNING

Before connecting electrical connectors to cartridges, check connectors with multi-meter to ensure no voltage is present at connector.

- d. Continuity check detector circuitry in accordance with Servicing Fire Extinguisher.
- e. Turn on electrical power and check system for proper operation at the control panel. Press the test switch.
- f. Install engine cowling.

Removal and Installation of Fire Extinguisher Thermal Detectors. (See figure 13-42.)

- a. Make sure battery switch is OFF.
- b. Remove engine cowling.
- c. Loosen and remove bolts, washers and nuts attaching thermal detector to bracket or clamp.
- d. Disconnect electrical wire from detector.
- e. Remove detector from nacelle.
- f. The installation procedure for the fire extinguisher thermal detector is the reversal of the removal procedure.
- g. Continuity check detector circuitry in accordance with Servicing Fire Extinguisher.

Removal and Installation of Annunciator Panel. (See figure 13-42.)

- a. The removal and installation procedures for the annunciator panel is the same as any Typical Instrument Removal and Installation Procedures found in Section 12.

NOTE

When removing annunciator panel or installing annunciator panel light bulbs, always make sure the battery switch is in the OFF position.

Servicing Fire Extinguisher.

The following item should be checked at every 100 hour inspection. Check the pressure gage on each bottle to ensure the pressures indicated in the Pressure-Temperature Correction Table. If these pressures are not indicated, the bottle must be serviced.

PRESSURE-TEMPERATURE
CORRECTION TABLE

F° Temp	-60	-40	-20	0	+20
Ind	110	127	148	174	207
Pressure	134	155	180	212	251
F° Temp	+40	+60	+80	+100	+120
Ind	249	304	367	442	532
Pressure	299	354	417	492	582

Every six months, remove containers and weigh. (The scale used must be a 5 to 10 pound scale with an accuracy of $\pm 1\%$ full scale.) Weight of .25 pound below marked weight indicates a leaky container. After bottle has been replaced check the following:

a. Check the test function; if any light fails, replace bulb. If green light (OK) does not light after replacing bulb, replace firing cartridge *P/N 13083-5 in fire extinguisher. Any other light failure, after replacing bulbs and firing cartridge, indicates malfunction in the unit or associated wiring circuit.

NOTE

The test switch does not check the detector circuit.

- b. Conduct a continuity check of detector circuitry as follows:
 1. Apply power to the aircraft.
 2. Disconnect sensor wire from fire extinguisher bottle. The EMPTY light should come on.
 3. With sensor wire disconnected, press the Press-To-Test switch on the control panel. The OK light should come on indicating the squib is in operational condition.
 4. Reconnect sensor wire to bottle.

WARNING

Do not attempt to check the continuity of the sensor and/or the squib with a V.O.M. tester. Most V.O.M. testers have enough AMP capability to fire the cartridge. Continuity of the circuit shall be checked only when using a 100 MA current regulated source.

*P/N of HTL Industries, 1900 Walker Avenue,
Monrovia, California, 91016.

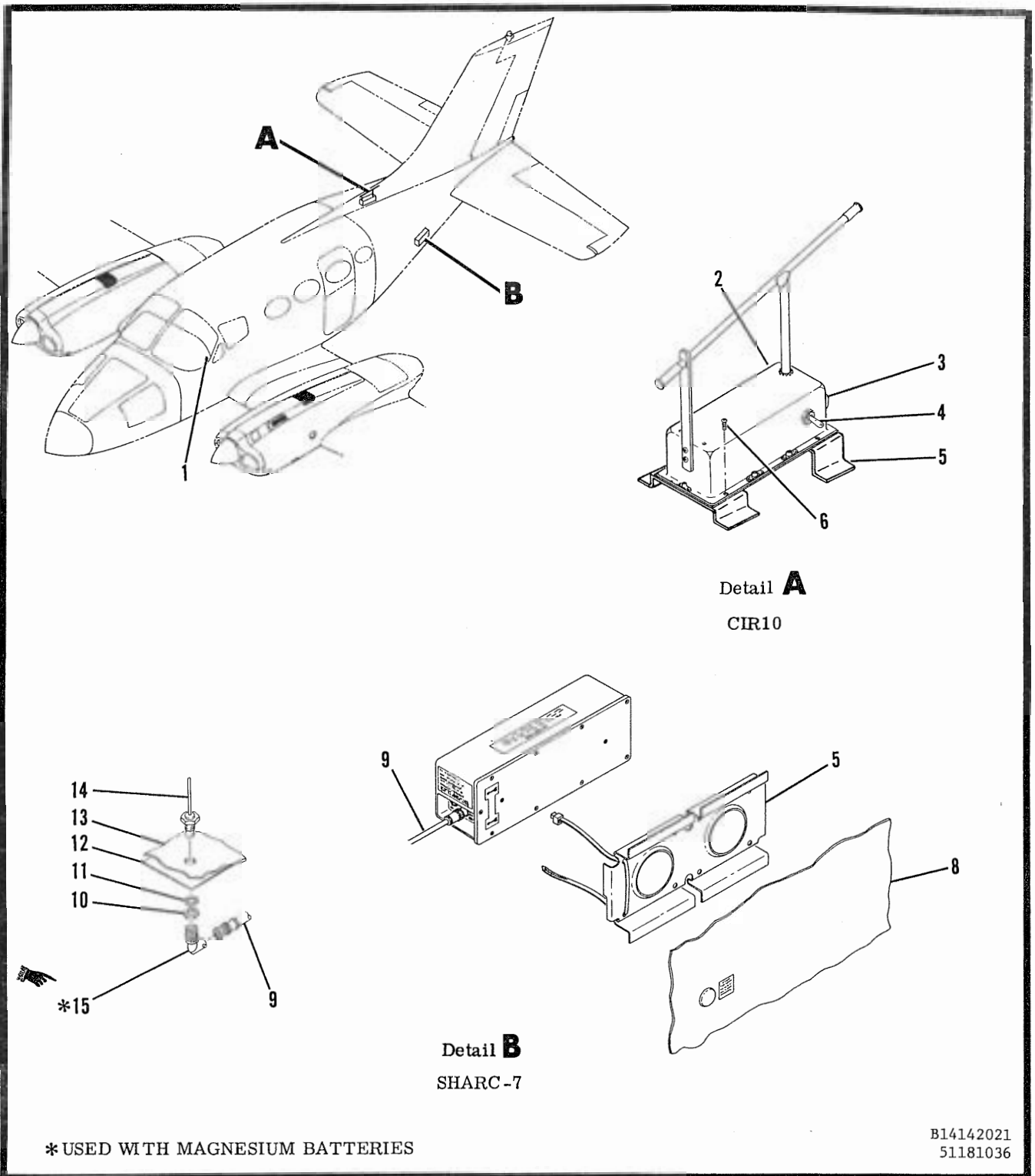
c. Conduct fire detect thermo detector check as follows:

1. Apply power to the aircraft.
2. Using an Alpha Heat gun, apply heat to each thermo detector body for approximately ten seconds and observe that fire light on panel comes on.

NOTE

Heat gun must have a capacity of 500° F or higher.

3. If light does not come on, remove thermo detector and check further in a temperature oven. Switch should actuate at 450° F.



1. Panel Switch	6. Screw	11. Lock Washer
2. Power Switch	7. Battery Access	12. Doubler
3. Terminal Block	8. Fuselage Side Skin	13. Upper Tailcone Skin
4. Function Switch	9. Antenna Coaxial	14. Antenna
5. Mount	10. Nut	15. Suppressor

Figure 13-43. Emergency Locator Transmitter

EMERGENCY LOCATOR TRANSMITTER

Description.

The emergency locator transmitter (ELT) is a self-contained, solid state unit, having its own power supply with an external mounted antenna. The transmitter is designed to transmit on dual emergency frequencies of 121.5 and 243.0 megahertz simultaneously. The CIR10 emergency locator transmitter is located in the leading edge of the dorsal fin at approximately fuselage station 309.56 and water line 125.00. The antenna is also enclosed in the dorsal. The SHARC-7 emergency locator transmitter is mounted in the tailcone on the side of the fuselage.

On the CIR10 transmitter, power is supplied from the aircraft system through a switch on the panel or the battery pack located inside the transmitter. The SHARC-7 transmitter is entirely portable operating on the power supplied by a battery pack. The battery pack service life is placarded on the batteries and also on the outside of the cover on the end of the transmitter.

The transmitter broadcast tone is audio modulated in a swept manner over the range of 1600 to 300 Hz and is a distinct, easily recognizable distress signal for reception by search and rescue personnel, and others monitoring the emergency frequencies.

The transmitter meets or exceeds the requirements of the following specifications:

- (1) R. S. S. 147 Issue 2, D. O. C.
- (2) TSO C612, F. A. A.
- (3) F. C. C. Part 87, F. C. C.
- (4) TSO C91, F. A. A.

Under favorable conditions, a distress signal from the ELT can be intercepted at a distance of 100 miles. It exhibits line of sight transmission characteristics which correspond approximately to 100 miles at a search altitude of 10,000 feet.

When battery inspection and replacement schedules are adhered to, the transmitter will broadcast an emergency signal at rated power, for a continuous period of at least 48 hours at temperatures from +55°C to -20°C after an emergency landing.

The military monitors 243.0 MHz. The 121.5 MHz frequency is monitored by the general aviation aircraft as well as C. A. P., D. O. T., F. A. A. and some commercial aircraft.

Operation.

A three position switch on the forward end of the unit controls operation. Placing the switch in the ON position will energize the unit to start transmitting

emergency signals. In the OFF position, the unit is inoperative. Placing the switch in the ARM position will set the unit to start transmitting emergency signals only after the unit has received a 5G (tolerances are +2G and -0G) impact force. On emergency locator transmitter P/N C1R10-4, a remote on-off switch on the instrument panel is provided in addition to the switch located on the front end of the transmitter.

CAUTION

Do not leave the emergency locator transmitter in the ON position longer than 10 seconds or you may activate downed aircraft procedures by C. A. P., D. O. T. or F. A. A. personnel.

Removal of Emergency Locator Transmitter. (See figure 13-43.)

The following steps "a" through "d" pertain to the CIR10 emergency locator transmitter.

- a. Refer to figure 1-2 and remove fin access cover.
- b. Assure aircraft electrical power is off and the on-off switch on the front of the transmitter is in the OFF position.
- c. Disconnect electrical leads from transmitter.
- d. Remove screws securing transmitter to mount and remove transmitter from dorsal fin.

Steps "e" through "g" pertain to the SHARC-7 emergency locator transmitter.

- e. Remove tailcone access door.
- f. Disconnect co-axial cable from end of transmitter.
- g. Cut sta-straps securing transmitter and remove transmitter from mounting bracket.

Installation of Emergency Locator Transmitter. (See figure 13-43.)

The following steps "a" through "c" pertain to the CIR10 emergency locator transmitter.

- a. Position transmitter in mount and install four mounting screws.

NOTE

Before installing the emergency locator transmitter to the mount, check condition of battery pack and make sure function switch is in the ARM position and the power switch is in the OFF position.

- b. Connect electrical leads to terminals.
- c. Install dorsal fin access cover.

Steps "d" through "h" pertain to the SHARC-7 emergency locator transmitter.

- d. Assure that the direction of flight arrows (placarded on the transmitter) are pointing towards the nose of the aircraft.
- e. Install transmitter in bracket and secure with new sta-straps.
- f. Connect co-axial cable to antenna.
- g. Position on-off switch to ARM position.
- h. Check operation of emergency locator transmitter in accordance with Section 2.

Removal and Installation of Emergency Locator Transmitter Antenna. (SHARC-7)

- a. Disconnect co-axial cable from base of antenna.
- b. Remove nut and lockwasher attaching the antenna base to the fuselage and the antenna will be free to remove.
- c. Install the antenna by reversing the removal procedures.

Removal and Replacement of Battery Pack

- a. Remove emergency locator transmitter in accordance with removal procedures.
- b. Remove screws attaching the cover to the case and remove cover. Remove rubber gasket to gain access to battery pack.
- c. When the battery pack is supplied with a plastic connector attached to the battery leads, merely disconnect the old battery pack and replace with a new battery pack, making sure the plastic connectors are completely mated.

CAUTION

Some early transmitters were delivered with transmitter leads soldered directly to the battery pack. Failure to observe proper polarity in connecting a new battery pack in the transmitter may result in immediate failure of transistorized components attached to the printed circuit board in the transmitter.

NOTE

Before installing the new battery pack, check to ensure that its voltage is 10.8 volts or greater.

NOTE

After relatively short periods of inactivation, the magnesium cell develops a coating over its anode which drastically reduces self-discharge and thereby gives the cell an extremely long storage life. This coating will exhibit a high resistance to the flow of electric current when the battery is first switched on. After a short while (less than 15 seconds), the battery current will completely dissolve this coating and enable the battery to operate normally. If this coating is present when your ELT is activated, there may be a few seconds delay before the transmitter reaches full power.

- d. Replace the transmitter cover by positioning the rubber gasket on the cover and pressing the cover and case together and attach with nine screws. Care should be taken to avoid trapping the gasket and overtightening screws.
- e. Remove the old battery placard from the end of transmitter and replace with new battery placard supplied with the new battery pack.

CAUTION

Be sure to enter the new battery pack expiration date in the aircraft records.

If the emergency locator transmitter is equipped with magnesium battery-pack, insure the static noise suppressor is installed between the antenna and transmitter - refer to Service Letter AV74-16.

- f. Check operation in accordance with Section 2.
- g. Refer to Section 2 and Inspection Chart for inspection intervals.

TROUBLESHOOTING.

Should your Emergency Locator Transmitter fail the Periodic or 100 Hours performance checks, it is possible to a limited degree, to isolate the fault to a particular area of the equipment.

CAUTION

In order to protect your warranty, troubleshooting should be conducted without removing the unit cover.

In performing the following troubleshooting procedure to test, peak effective radiated power, you will be able to determine if battery replacement is necessary or if your unit should be returned to your dealer for repair.

CAUTION

Do not leave the emergency locator transmitter in the ON position longer than 10 seconds. This could initiate downed aircraft search procedures by C. A. P., D. O. T. or F. A. A. personnel.

TROUBLE	PROBABLE CAUSE	CORRECTION
*POWER LOW SHARC-7	Low battery voltage. Faulty transmitter. Faulty coaxial antenna cable.	1. Set toggle switch to OFF. 2. Remove plastic plug from the remote jack and by means of a Switchcraft #750 jackplug, connect a Simpson 260 model voltmeter and measure voltage. If the voltage is 10-volts or less, the battery is below specification. 3. If the battery voltage is 10.8 volts or more, it is O. K. If the battery is O. K., check the transmitter as follows: a. Remove the voltmeter. b. By means of a Switchcraft #750 jackplug and 3 inch long maximum leads, connect a Simpson Model 1223 ammeter to the jack. c. Set the toggle switch to ON and observe the ammeter current drain. If it is in the range 0-50 MA, the transmitter or the coaxial cable is faulty. 4. Check coaxial antenna cable for high resistance joints. If this is found to be the case, the cable should be replaced.
*This test should be carried out with the coaxial cable provided with your unit.		
POWER LOW CIR10	Low battery voltage. Faulty transmitter.	1. Pull cabin lights circuit breaker. 2. Remove access cover to transmitter. 3. Remove transmitter from mount. 4. Remove battery access cover. 5. Measure voltage at battery contacts. NOTE Transmitter should be turned on when measuring battery voltage. 6. If the battery voltage is 10 volts or less, the battery pack should be replaced. If the battery voltage is greater than 10 volts, insert a 0-150 MA meter in series with power leads and check as follows: 1. Set power switch on transmitter to ON and observe current drain. 2. If current drain is 0-50 MS, the transmitter or the antenna is faulty and should be bench tested.

Installation of Pilot's and Copilot's Manual and Electrical Adjustable Seat. (See figure 13-44.)

- a. Insert seat on seat rails and slide forward.
- b. Pull up on seat stop handle and allow seat to move forward far enough to install seat stops.
- c. Connect wiring and remove tags.
- d. Install seat stops with screws and nuts.
- e. Turn on electrical power and check operation.
- f. If seat is not electrical, check operation using crank provided on the front of the seats.

PILOT AND COPILOT MANUAL AND ELECTRICAL ADJUSTABLE SEAT.

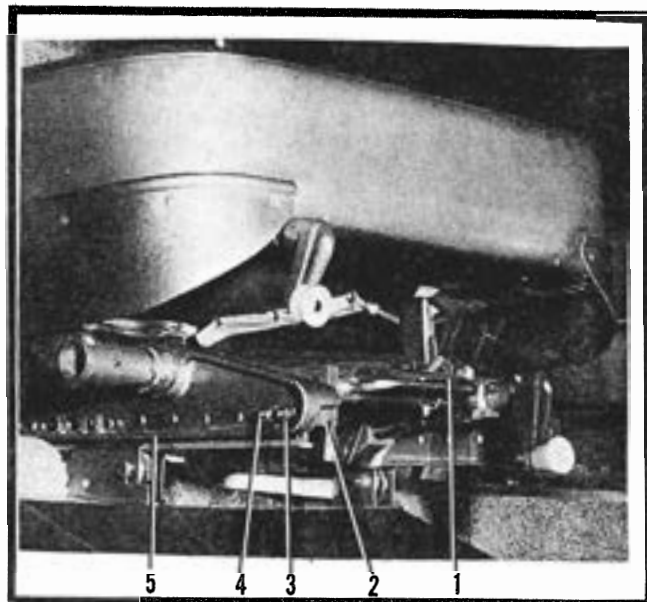
Removal of Pilot and Copilot Manual and Electrical Adjustable Seat. (See figure 13-44.)

The procedures given pertain to either the pilot's or copilot's manual or electrical adjustable seat. The difference between the manual and electrical is the electrical seat utilizes an electric motor in lieu of the manual crank for the up and down and tilting movements.

- a. Raise seat to the highest position.
- b. Remove seat stops on each side of the rail by removing nuts and screws.
- c. Tag and disconnect wiring.
- d. Pull up on seat stop handle and slide seat aft and remove seat from its mounting.

Disassembly of Pilot and Copilot Manual and Electrical Adjustable Seat.

- a. Disassemble pilot's and copilot's manual and electrical adjustable seat in accordance with Figure 13-45.



1. Adjust Handle	3. Nut	4. Screw
2. Seat Stop		5. Seat Rail

Figure 13-44. Pilot and Copilot Manual and Electrical Seat Installation

Figure 13-45. Pilot and Copilot's Manual and Electrical Adjustable Seat Callouts

1. Seat Back	9. Seat Bellcrank	18. Bearing Block
2. Screw	10. Seat Stop	19. Seat Bottom
3. Bolt	11. Nut	20. Arm Rest
4. Washer	12. Shaft	21. Arm Rest Stop
5. Spacer	13. Crank	22. Escutcheon
6. Seat Belt	14. Seat Stop Handle	23. Wire Bundle
7. Nut	15. Seat Base	24. Vertical Adjust Motor
8. Side Skirt	16. Shaft	25. Recline Motor
	17. Housing	

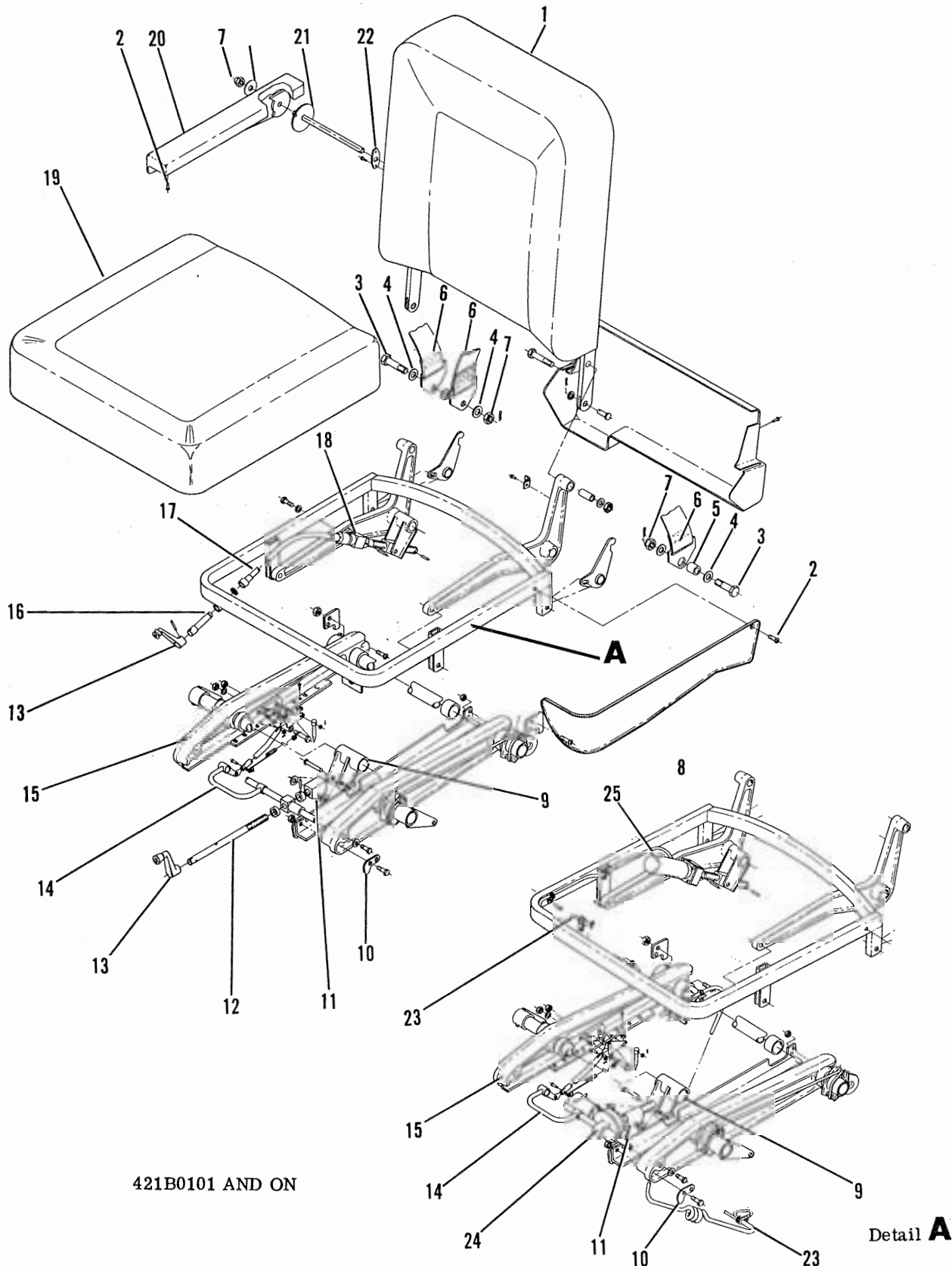


Figure 13-45. Pilot and Copilot's Manual and Electrical Adjustable Seat

ALCOHOL WINDSHIELD ANTI-ICE SYSTEM.

The alcohol windshield anti-ice system consists of a three gallon capacity tank which provides approximately one hour anti-icing capability, an electrically operated pump actuated by a switch breaker located on the LH console, and orificed tubes to disperse the anti-ice fluid over the windshield. A restrictor orifice is provided in the dispersal system to meter the alcohol for maximum efficiency. The system is serviced with isopropyl alcohol.

Removal of Alcohol Windshield Anti-Ice System.
(See figure 13-46.)

- a. Remove aft nacelle baggage compartment upholstery panel.
- b. Disconnect line (7) at elbow (12) and using a suitable tube attached to the line, pump remaining fluid from tank (3).
- c. Disconnect line (7) from tank and remove line (8).
- d. Disconnect electrical wire from pump (4) at splice.
- e. Remove pump (4) from tank by removing bolts (5).
- f. Remove screws (1) securing tank (3) to structure.
- g. Lift forward end of tank until vent tube clears bottom skin and carefully slide tank forward until clear of structure, then lift tank from aircraft.
- h. Extend flaps and remove RH wing gap fairings to gain access to lines.
- i. Remove clamps and remove lines (9) and (19).
- j. Remove RH forward side upholstery panel to gain access to line (18). Remove clamp and remove line.

NOTE

Hold union (17) with wrench when removing lines to prevent turning and subsequent breaking of seal at cabin skin.

- k. Working through RH nose baggage door, remove line (20), restrictor tee (21) and tubes (22) and (23).

Installation of Alcohol Windshield Anti-Ice System.
(See figure 13-46.)

- a. Position tank in place and secure in place with screws (1).

NOTE

Make certain vent extends below lower skin 0.40" and scarfed side is forward.

- b. Install pump (4) with two bolts (5) and washers.
- c. Install lines (7) and (8).
- d. Install lines (9) and (19) and clamp in place.

NOTE

Hold union (17) with wrench when installing lines to prevent turning and subsequent breaking of seal at cabin skin.

- e. Install line (18) and clamp in place.
- f. Install line (20) and restrictor tee (21).

NOTE

Restrictor tee must be installed with restrictor end upstream and arrow pointing downstream of flow.

- g. Install tubes (22) and (23) and clamp in place.

NOTE

Make certain tubes (22) and (23) maintain a minimum gap of 0.10" between tubes and windshield retainer.

- h. Install forward right cabin upholstery panel, wing gap fairings and access covers.
- i. Install aft nacelle baggage compartment upholstery panel.

Operational Check of Windshield Anti-Ice System.

- a. Fill reservoir with isopropyl alcohol (MIL-F-5566).
- b. Turn master switch ON.
- c. Switch windshield anti-ice switch ON.
- d. Assure alcohol flows evenly from all five holes on each side. Nominal flow rate is approximately 20 minutes per gallon.

NOTE

The left-hand spray pattern may be slightly greater than the right spray pattern. Spray should extend approximately 4 to 6 inches above nozzles during ground operation.

- e. Turn windshield anti-ice switch OFF. Alcohol flow should cease.
- f. If alcohol flow is irregular or fails to shut off properly, check pressure at pump. Pressure should be 4.0 to 4.75 PSIG.

Figure 13-46. Alcohol Windshield Anti-Ice System Callouts

1. Screw	9. Line (Elbow to Elbow)	17. Union
2. Filler	10. Nut	18. Line (Union to Union)
3. Tank	11. Washer	19. Line (Union to Elbow)
4. Pump	12. Elbow	20. Line (Union to Tee)
5. Bolt	13. Elbow	21. Restrictor Tee
6. Elbow	14. Line (Union to Union)	22. Tube RH
7. Line (Pump to Elbow)	15. Cabin Skin	23. Tube LH
8. Line (Tank to Pump)	16. Lock-O-Seal	24. Clamp

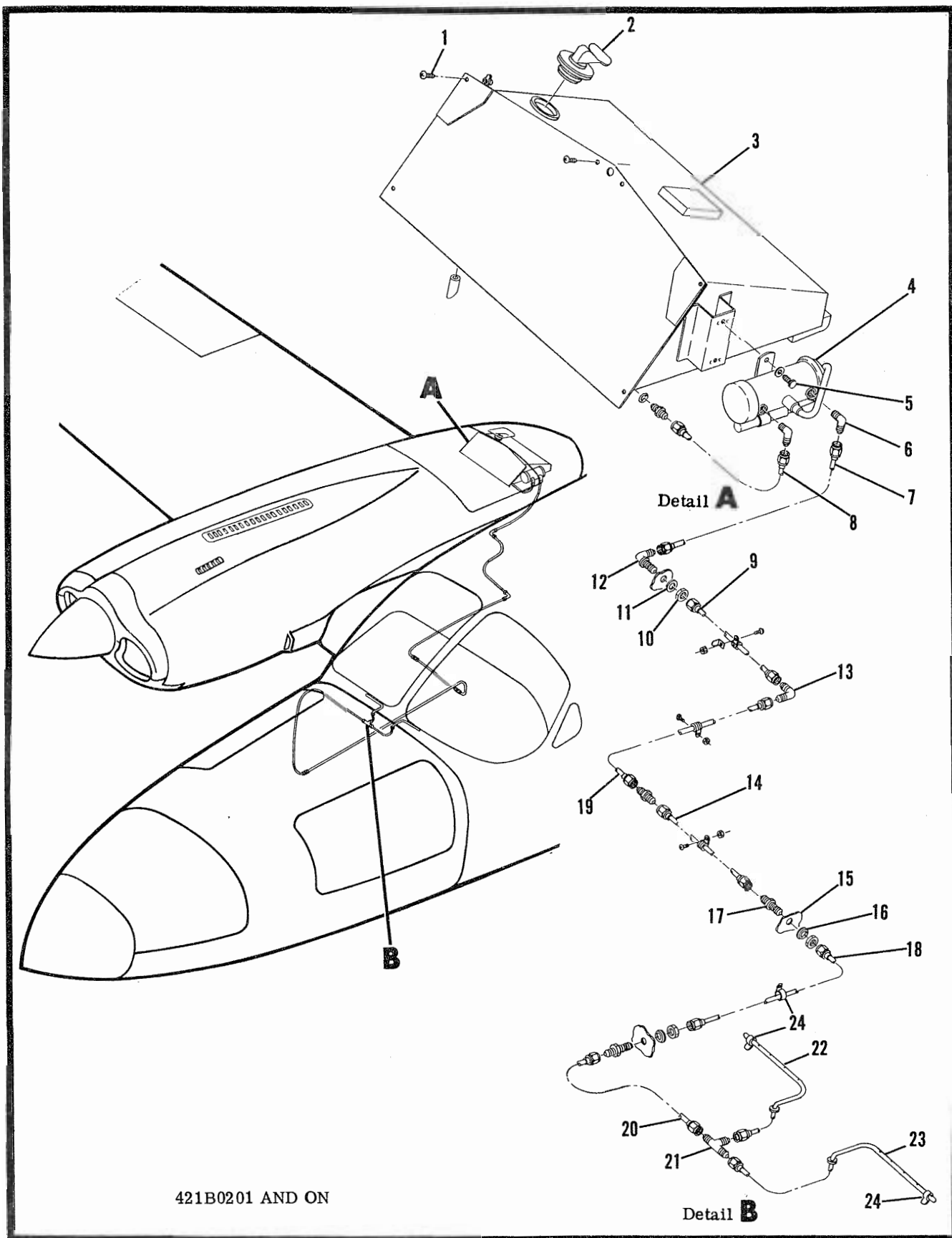


Figure 13-46. Alcohol Windshield Anti-Ice System

ANGLE OF ATTACK SYSTEM. (421B0501 and On.)

The angle of attack system consists of an indicator incorporating a press to test circuit (for ground test or flight test of the system) and a transducer. The indicator is mounted forward of the glareshield and visually displays the angle of attack of the aircraft. The transducer is located on the leading edge of the left wing and transmits electrical signals to the indicator for angle of attack display. The transducer incorporates a heater element operated by the pitot heater switch, to prevent ice from hampering the transducer operation. The system also incorporates a stall warning circuit, when energized causes the stall warning horn to sound.

Removal of Angle of Attack Indicator. (See figure 13-47.)

- a. Assure aircraft electrical power is off.
- b. Disconnect electrical connector to indicator.
- c. Remove screws securing indicator to mounting bracket.
- d. Remove grommet from deck cover; remove indicator.

Installation of Angle of Attack Indicator. (See figure 13-47.)

- a. Insert wire cable of indicator through hole in deck cover.
- b. Install grommet in deck cover.
- c. Position indicator on mounting bracket and secure with screws.
- d. Reconnect electrical plug.

Removal of Angle of Attack Transducer. (See figure 13-47.)

NOTE

Before removal of transducer, it is important that the exact fore-aft location of the vane be marked on the wing so that the replacement unit may be adjusted identically.

- a. Assure aircraft electrical power is off.
- b. Remove access cover.
- c. Disconnect electrical plug to transducer.
- d. Remove screws securing transducer to leading edge and remove transducer.

Installation of Angle of Attack Transducer. (See figure 13-47.)

- a. Insert wire cable of transducer through transducer mounting hole.
- b. Secure transducer to leading edge with screws.
- c. Reconnect transducer electrical plug.
- d. Replace access cover.

Operational Check of Angle of Attack System.

a. Ground Check.

1. Move battery switch to ON position.
2. Push the "PRESS TO TEST" button on the indicator and check that the indicator needle moves to the left (SLOW) end of scale and the stall warning horn sounds with the needle in the red zone. The needle should return to the SLOW diamond when the button is released.
3. Turn the pitot heat switch ON and check to see that the transducer mounting plate on the left wing leading edge heats up.
4. Turn pitot heat OFF.

NOTE

The pitot heat switch should not be left on any longer than necessary to determine that mounting plate is heating.

5. Push the transducer vane gently aft (down). Check that the needle moves to the right (FAST) end of scale. When released, the vane should return to the approximate center of its travel and the needle should return to the SLOW diamond.
6. Push the transducer vane gently forward (up). The indicator needle should move to the left (SLOW) end of scale and the stall warning horn should sound. When released, the vane should return to the approximate center of travel, the needle to the slow diamond, and the stall warning horn should stop.
7. Turn battery switch OFF.
- b. Ground Adjustment Check.
 1. Before applying electrical power to the system, check the SLOW/FAST needle position. It should be at a position midway between the SLOW (left) diamond and the SLOW legend.
 2. Turn on battery master switch. Check that the aircraft voltage is at least 24 volts.
 3. Press the test button on the front of the indicator. The needle shall move to the left end of the scale and the pre-stall warning horn shall sound. Release the test button. The SLOW/FAST needle shall return to a position near the SLOW diamond and the pre-stall warning horn shall stop.
 4. Remove cover, using a small screwdriver, turn the adjustment screw marked PSW (Pre-Stall Warning), located on the side of the indicator, clockwise until the pre-stall warning horn sounds. Then turn the PSW screw counterclockwise until the horn stops.
 5. Push the vane on the left transducer, located on the leading edge of the left wing forward (up). The pre-stall warning horn shall sound. Release the vane and the horn shall stop. If it does not stop within 3 to 4 seconds after the vane is released, turn the PSW adjustment screw counterclockwise one complete turn. Recheck by pushing the vane forward and releasing it to ensure that the horn will stop within 3 to 4 seconds after the vane is released. The system is now ready for flight check and adjustment.
- c. Flight Check and Adjustment.
 1. The flight check should be performed in smooth air at a safe altitude to perform stalls. Using the data recorded in the Flight Check portion of the Op-

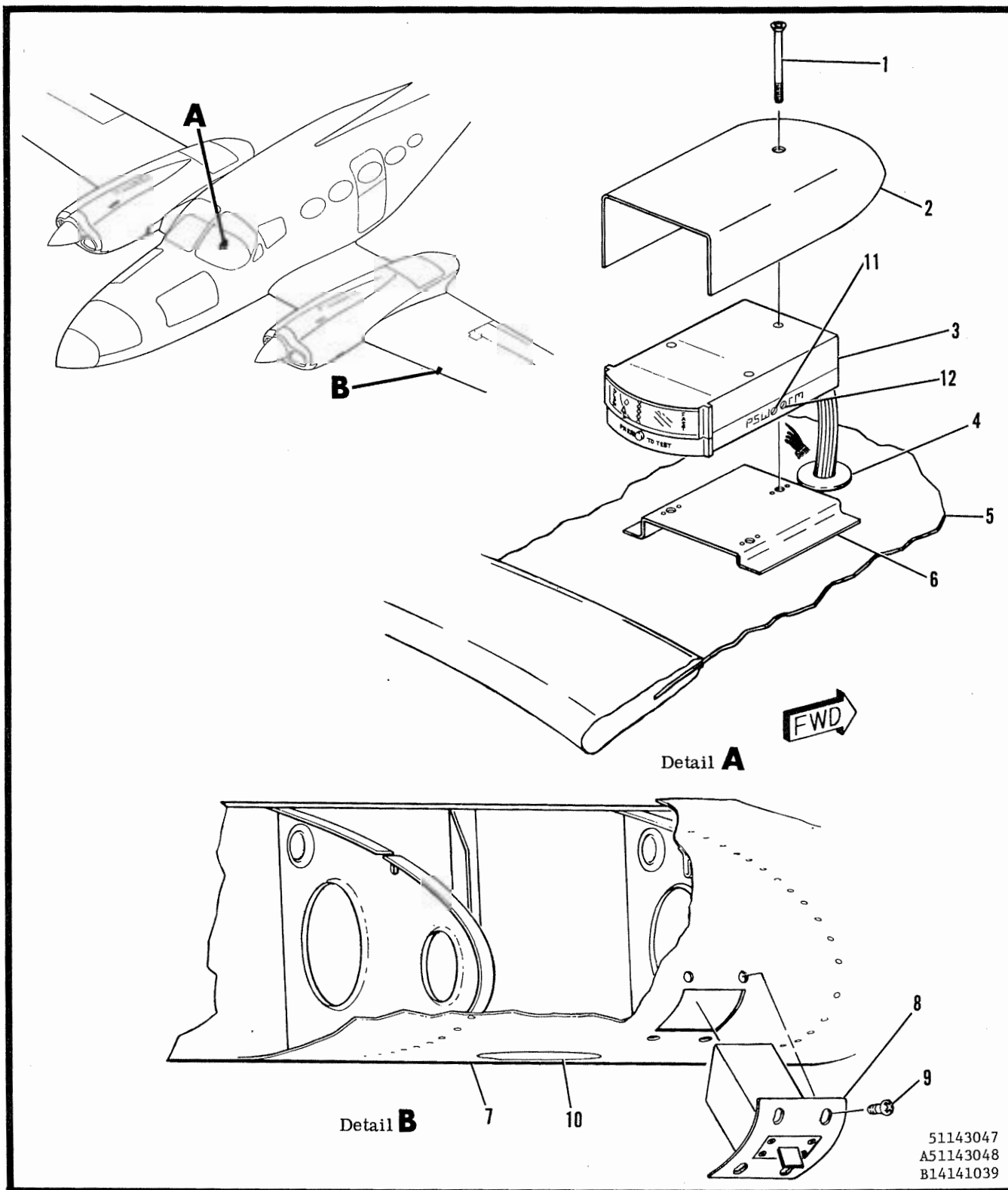


Figure 13-47. Angle of Attack System

erational Check of Stall Warning System (Section 14), adjust the angle of attack system to provide an "on speed" indication when the indicated airspeed is within ± 2 knots of the approach speed determined from the Approach and Stall Speed Chart, correct for weight at the time of the test for the following configurations:

- (a) Landing gear down.
- (b) Flaps full down.
- (c) Power as required to maintain a stable rate of descent at 500 FPM.

2. With power off (IDLE), flaps down, gear down, trim the aircraft for a speed approximately 20 knots above the stall speed determined from the Approach and Stall Speed Chart. Then slowly reduce speed at no more than 1 knot per second, and observe the speed at which the pre-stall warning horn sounds. Continue to reduce speed at no more than 1 knot per second until the aircraft stalls, and observe the stall speed. The pre-stall warning horn shall sound 3 to 5 knots before stall. If it does not, proceed as in steps 3 and 4.

3. If the speed at which the horn sounded was greater than 5 knots before stall, turn the PSW (Pre-Stall Warning) adjustment screw on the side of the indicator counterclockwise approximately $1/2$ turn for each knot the warning speed must be reduced. Then repeat step 2., until the warning horn sounds at 3 to 5 knots before stall speed. Do not allow the speed to decrease at greater than 1 knot per second during the checks.

4. If the speed at which the pre-stall warning sounded was less than 3 knots before stall, adjustment of the lift transducer location on the wing is required. Land and loosen the screws in the slotted

holes in the corners of the lift transducer mounting plate, and slide the transducer forward (up) on the wing. Retighten screws and repeat step 2., and step 3., if necessary. Do not attempt to increase the warning horn speed by turning the PSW adjustment screw clockwise, as the maximum clockwise setting was determined in the ground adjustment check steps 4. and 5. Any further clockwise adjustment will cause the horn to sound when the aircraft is at rest on the ground.

5. After the pre-stall warning horn is properly adjusted, determine the weight of the aircraft. Using the Approach and Speed Chart, find the approach speed.

6. With flaps and gear down, trim the aircraft for level flight at speed determined in step 5. Altitude hold may be used to facilitate this adjustment, if available. Maintaining this speed, observe the position of the SLOW/FAST needle. It should be at the center mark. If the needle is to the left of the center mark, turn the adjustment screw marked CM (Center Mark), located on the side of the indicator, clockwise. If it is to the right of the center mark, turn the adjusting screw counterclockwise. Make the adjustment in steps of 2 to 3 turns in the appropriate direction, then recheck the needle position and the airspeed to insure that the speed is being maintained at the proper value.

7. After completion of the flight check and alignment, replace the cover on the indicator and secure in place.

SECTION 14

ELECTRICAL SYSTEMS

Table of Contents

	Page		Page
POWER DISTRIBUTION	14-2	Removal and Installation of Starter	
Battery and Starter Circuit	14-2A	Switches	14-12B
Troubleshooting	14-2A	LIGHTING SYSTEM	14-12B
Removal of Battery	14-2A	Troubleshooting	14-12B
Maintenance of Battery	14-2A	Removal and Installation of Heat Sink	
Installation of Battery	14-4E	Assembly	14-14B
Removal of Battery Box	14-4E	Removal and Installation of Dimming	
Installation of Battery Box	14-4E	Control Assembly	14-14B
EXTERNAL POWER	14-4E	Removal of Landing Gear Switch and	
Removal of External Power Receptacle .	14-4E	Indicator Light (421-0001 to 421B0201).	14-14B
Installation of External Power Receptacle.	14-6	Installation of Landing Gear Switch and	
ALTERNATORS AND REGULATORS		Indicator Light	14-14B
(Delco-Remy) (421-0001 to 421A0001) .	14-7	Removal and Installation of Landing Gear	
Troubleshooting the 50 Amp Alternator		Indicator Lights (421B0201 and On) .	14-16
and Regulator System	14-7	Removal and Installation of Overhead	
ALTERNATORS AND REGULATORS		Console Light Rheostat	14-16
(Westinghouse) (421-0001 to 421A0001) .	14-8	Removal and Installation of Instrument	
ALTERNATORS AND REGULATORS		Lights	14-16
(421A0001 and On)	14-9	Removal and Replacement of Left Hand	
Troubleshooting 100 Amp Alternator		Console Lights	14-16
and Regulator System	14-9	Fuel Selector Valve Lights	14-16
Overvoltage Troubleshooting		Removal and Replacement of Fuel	
Information	14-10	Selector Valve Lights	14-16
Removal of Alternator	14-10D	Removal and Replacement of Rear	
Alternator Hub Replacement	14-10D	Dome Lights	14-16A
Installation of Alternator	14-10D	Removal and Replacement of Individual	
Removal and Installation of Voltage		Reading Lights	14-16A
Regulator	14-10D	Removal and Replacement of Cabin Door	
Operational Check and Adjustment		Entrance Light	14-16A
of Alternator and Regulator	14-10E	Removal and Replacement of Cabin	
Operational Check of Alternator		Courtesy Light	14-19
Failure Circuit	14-10E	Removal and Installation of Wing	
Operational Check of Alternator		Locker Baggage Light	14-19
Warning System	14-10E	Removal and Installation of Wing	
Operational Check and Adjustment		Locker Baggage Light Switch	14-19
of Alternators and Regulators	14-10E	Removal and Installation of Wing	
BATTERY MASTER AND ALTERNATOR		Navigation Lights	14-19
SWITCHES	14-11	Removal and Installation of Tail	
Removal	14-11	Navigation Lights	14-19
Installation	14-11	Removal and Installation of Rotating	
Removal and Installation of Side		Beacons	14-19
Console	14-12	Removal of Landing Light	14-19
Removal and Installation of Side		Installation of Landing Light	14-20
Console Circuit Breaker Panel	14-12	Adjustment of Landing Light	14-21
ANNUNCIATOR PANEL	14-12	Removal and Installation of Taxi Light	14-22
Removal	14-12	Adjustment of Taxi Light	14-22
Removal and Replacement of Diodes	14-12	Removal and Installation of Deice Light	14-22
Removal and Replacement of Light		Strobe Light System	14-22B
Assembly	14-12	Removal and Installation of the Strobe	
Installation	14-12	Light System Components	14-22C
Removal and Replacement of Light Bulbs .	14-12	STALL WARNING SYSTEM	14-22D
Removal and Replacement of Light Lens .	14-12B	Removal of Stall Warning Transmitter	14-22D
STATIONARY INSTRUMENT PANEL		Installation of Stall Warning	
SWITCHES	14-12B	Transmitter	14-22D
Typical Switch Removal	14-12B	Operational Check of Stall Warning	
Typical Switch Installation	14-12B	System	14-22D
		Adjustment of Stall Warning System . .	14-22D

Table of Contents (Continued)

	Page		Page
CIGAR LIGHTER CIRCUIT	14-22D	ELECTROLUMINESCENT PANEL LIGHTS .	14-22E
PITOT AND STALL WARNING HEAT		Removal	14-22E
SYSTEMS	14-22D	Installation	14-22E
		WIRING DIAGRAM INDEX	14-23
		WIRING DIAGRAM INDEX	14-103

POWER DISTRIBUTION.

Electrical energy for the aircraft is supplied by a 24 volt direct-current, single wire, negative ground electrical system. One 24 volt storage battery supplies power for starting and furnishes a reserve source of power for electrical components in the event of an alternator failure. A battery voltage monitor light in the annunciator panel provides a warning when illuminated that the electrical system is operating on low voltage. The monitor assembly will illuminate the warning light with decreasing voltage between 24.5 and 25.5 volts and remain ON with voltage lower than turn on voltage. The warning light will turn OFF with increasing voltage between 24.5 and 26.0 and remain off with voltage higher than turn off voltage. Two engine-driven 24 volt 50 ampere alternators supply the current needed to operate the electrical equipment and to charge the storage battery. The standard 50 AMP alternator system has two regulators, one is used for regulation of the system, and the second is used as a spare in event of regulator failure. The system is protected again against overvoltages by two circuit breaker type overvoltage devices. The alternator switches are mounted on the instrument panel, one on each side of the battery switch. All other switches with the exception of the landing gear, flap and cowl flap switch, are located on the left console. All electrical circuits in the aircraft are protected by circuit breakers and switch breakers, located in the left console panel. The 421 aircraft is equipped with standard navigation lights, a retractable landing light located in the main tank tail cap of the left wing, and two rotating beacon lights. One rotating beacon is mounted on the top of the rudder and one is mounted

on the underside of the fuselage. Lighting inside the cabin area includes a dome light, four reading lights, a map light, fuel selector lights, three overhead flood lights, three side console lights located in underside of pilot's armrest, and a cabin door light. The instrument panel lighting consists of two post lights over each instrument, a compass light, and a call number light. Optional equipment lights include a right hand landing light, taxi light, and wing deice light, outside the cabin area. Inside the cabin area, a lighted seat belt sign, oxygen sign and post lights for the optional instruments are the only optional lights.

Battery and Starter Circuit.

A 24 volt, 24 ampere-hour battery is installed in the left stub wing. Positive and negative terminals are clearly marked on the battery posts. The battery is held in place by the cover. The battery supplies power for the starter system and electrical system when the engines are not operating. A battery box drain is provided to drain and vent battery fluids and vapors.

CAUTION

The use of an external power source is recommended for ground operation and starting the aircraft engines.

cabin area includes a dome light, four reading lights, a map light located in each control wheel, fuel selector lights, three overhead flood lights, three side console lights located in underside of pilot's armrest, and a cabin door light. The instrument panel lighting consists of two post lights over each instrument, a compass light, and a call number light. Optional equipment lights include a right hand landing light, taxi light, and wing deice light, outside the cabin area. Inside the cabin area, a lighted seat belt sign, oxygen sign and post lights for the optional instruments are the only optional lights.

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CAUTION

The use of an external power source is recommended for ground operation and starting the aircraft engines.

Troubleshooting the Battery and Starter Circuit.

TROUBLE	PROBABLE CAUSE	CORRECTION
SLOW ENGINE CRANKING SPEED	Partially discharged battery. Low capacity battery.	Charge or change battery. Cycle battery to improve capacity or replace it.
	Faulty battery cell. Loose or corroded terminals. Burned starter solenoid switch contacts.	Replace battery. Clean and tighten terminals. Replace solenoid.
STARTER ENGAGES BUT WILL NOT CRANK ENGINE	Starter motor drags. Partially discharged battery. Faulty battery cells. Damaged or shorted starter motor. Faulty armature or field in starter motor.	Overhaul starter motor. Charge or change battery. Replace battery. Overhaul starter motor. Overhaul starter motor.
STARTER WILL NOT ENGAGE	Battery full discharged. Disconnected battery cable. Shorted or open starter solenoid	Replace or charge battery. Replace faulty cable. Replace solenoid.

Removal of Battery.

- Remove the battery access cover by loosening the air lock screws.
- Remove the NEGATIVE battery terminal by removing the nut and bolt securing ground strap to structure.

clean battery, use a mild solution of bicarbonate of soda (baking soda) and water to remove acid corrosion. Rinse with clear water and sponge off excess. Allow to air-dry or blow excess water off battery with dry air.

CAUTION

Always remove the ground cable first and install it last to prevent accidental short circuits.

- Disconnect the POSITIVE terminal and stow in a place not to interfere with removal of battery.
- Lift battery from box.

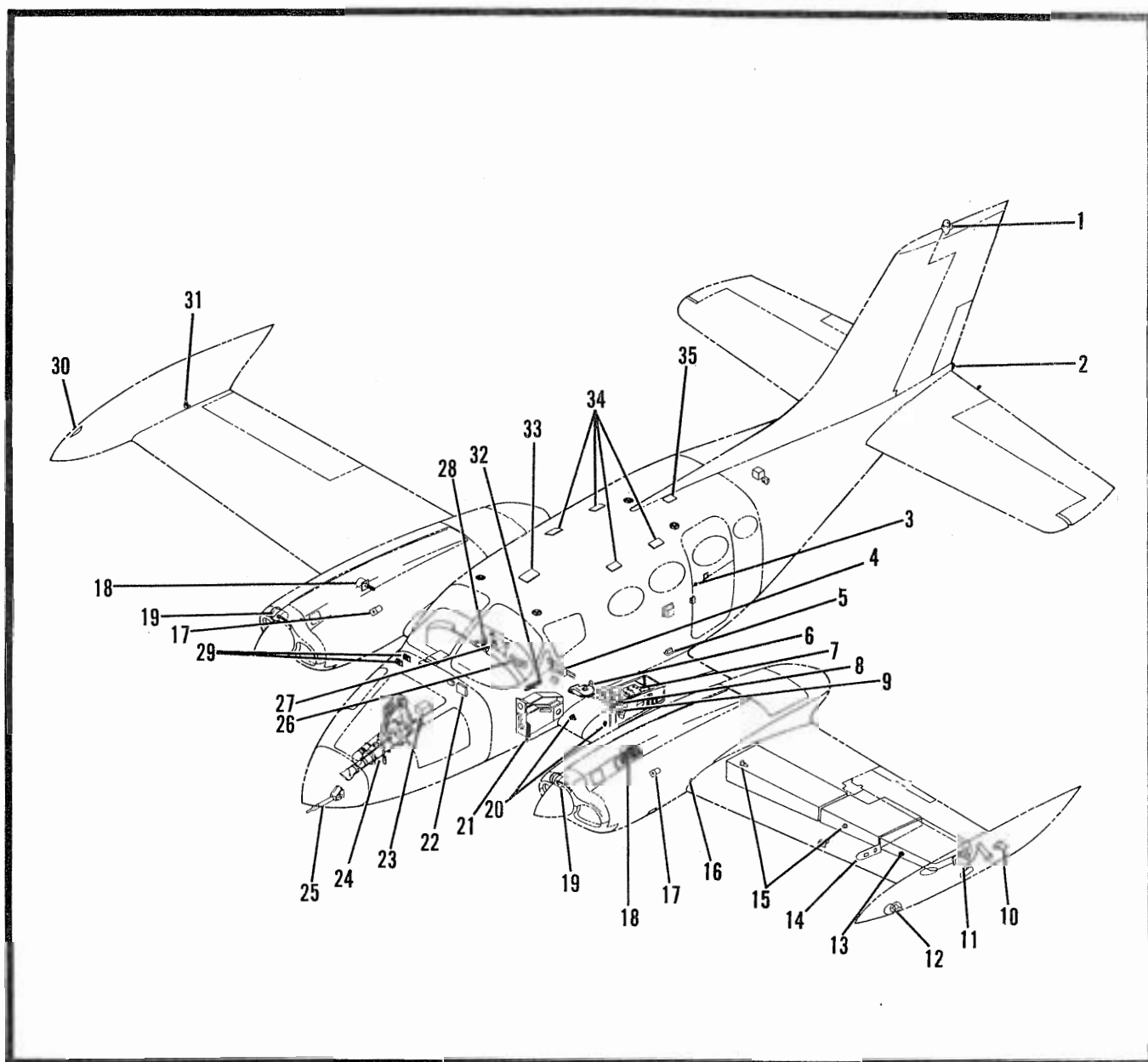
CAUTION

Take special precaution to insure that battery cell filler caps are tight before cleaning the battery. Entrance of soda water into a battery cell will neutralize the cell electrolyte.

Maintenance of Battery.

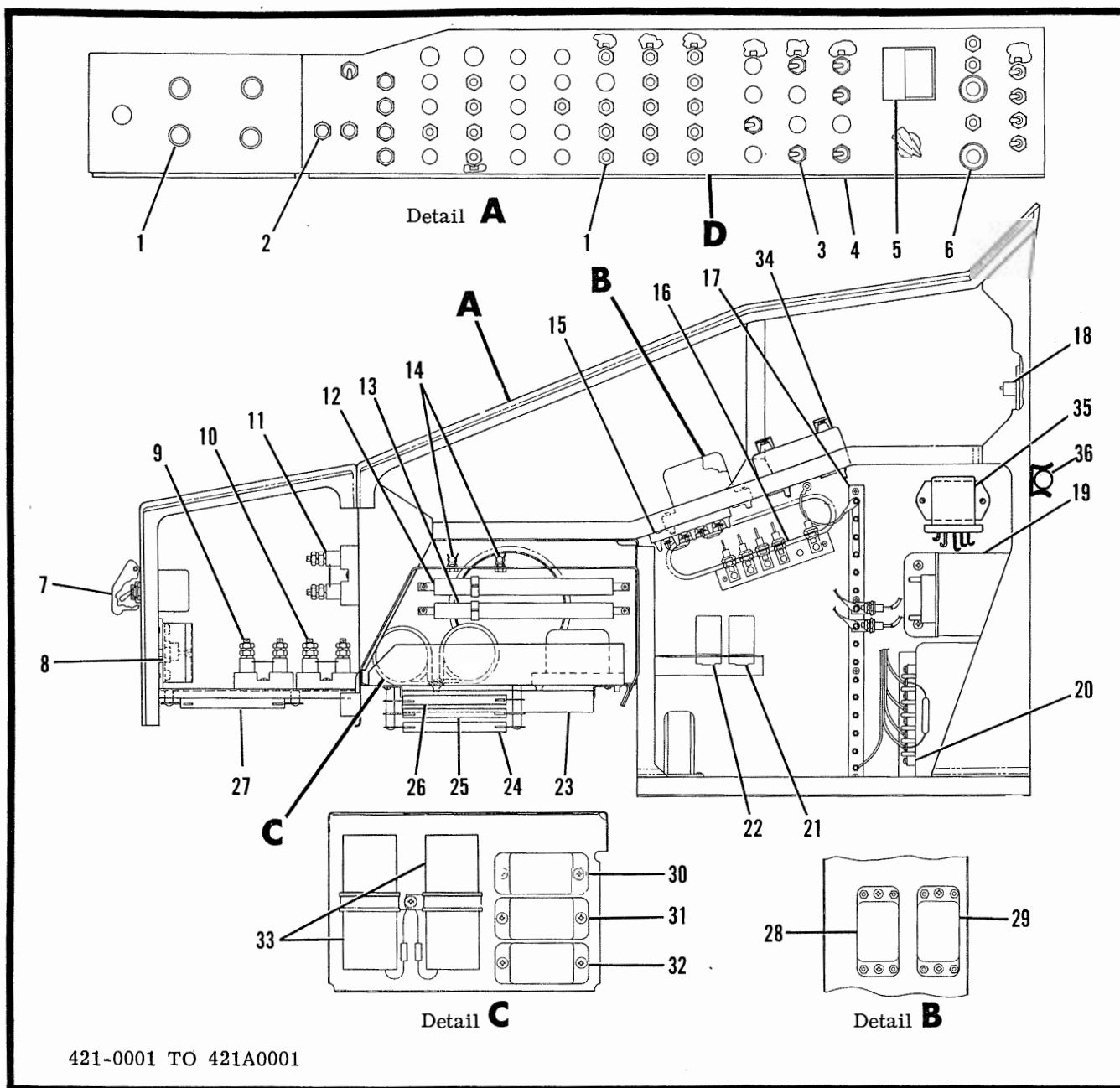
For maximum efficiency, the battery and the battery connections should be kept clean at all times. To

If additional cleaning of the battery terminals is needed, use a wire brush and brighten up the terminals to insure a good electrical connection. For best results the battery electrolyte should be kept level with the horizontal baffle plate (the plate with the hole in it), which is approximately two inches below the filler plug, by the addition of water as required. This water level should be maintained when the battery is in a level position.



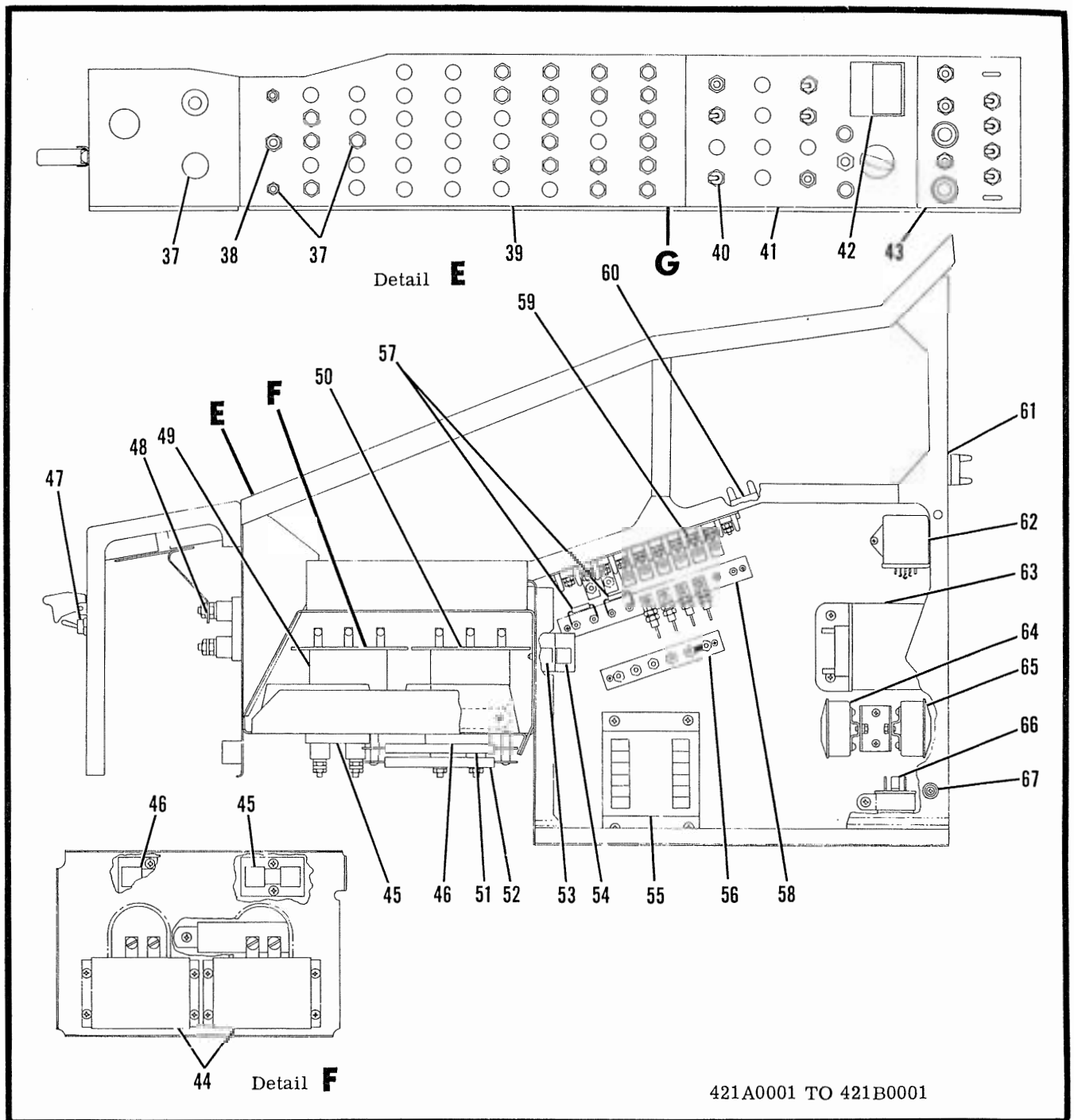
1. Rotating Beacon	19. Alternator
2. Tail Light	20. Wing Disconnect Plug
3. Courtesy Light	21. Dual Warning Unit
4. Flap Actuator	22. Prop Synchronizer - Located Under Glove Compartment
5. External Power Receptacle	23. Radio Junction Box RJBI - Located in Nose
6. Landing Gear Actuator	24. Heater
7. Battery	25. Pitot Heat
8. Battery Relay	26. Map Lights
9. Starter Relay	27. Stall Warning Horn - Located Under Copilot Seat
10. Landing Light	28. Prop Deice Timer - Located Under Copilot Seat
11. Left Auxiliary Fuel Pump	29. Voltage Regulators
12. Left Wing Position Light	30. Right Wing Position Lights
13. Auxiliary Fuel Tank Sending Unit (Opt.)	31. Right Wing Fuel Pump
14. Stroke Adjusting Panel	32. Console Panel Lights
15. Auxiliary Fuel Tank Sending Units	33. Overhead Console Lights
16. Deice Light	34. LH and RH Reading Lights
17. Tach Generator	35. Dome Light
18. Starter	

Figure 14-1. Equipment Location



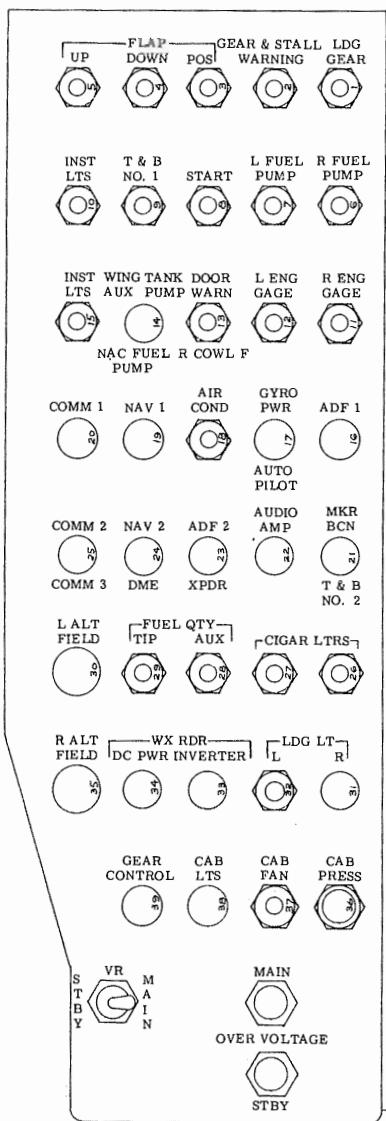
1. Circuit Breakers	13. RH Auxiliary Fuel Pump Resistor	26. Pilot's Cigar Lighter Resistor
2. Overtoltage Protectors	14. Spare Fuses	27. Ventilation Air Blower Resistor
3. Switch Breakers	15. Terminal Block TB-2	28. LH Fuel Boost Relay
4. Switch Panel	16. Terminal Block TB-7	29. RH Fuel Boost Relay
5. Voltammeter	17. Terminal Block TB-1	30. Landing Gear Relay
6. Engine Control Switch Panel	18. Barometric Switch	31. Gear Down Relay
7. Emergency Switch	19. Starter Vibrator	32. Gear Down Relay
8. Heat Sink Diode	20. Warning Unit	33. Capacitors (Optional 100 Amp Alternator)
9. LH Ammeter Shunt	21. Courtesy Light Relay	34. Heated Windshield Controller (Optional)
10. RH Ammeter Shunt	22. Gear Warning Relay	35. Heated Windshield Relay (Optional)
11. Voltage Shunt	23. Landing Gear Down Resistor	36. Spare Fuse
12. LH Auxiliary Fuel Pump Resistor	24. LH Rear Cigar Lighter Resistor	
	25. RH Rear Cigar Lighter Resistor	

Figure 14-2. Switch and Circuit Breaker Panel (Sheet 1 of 3)

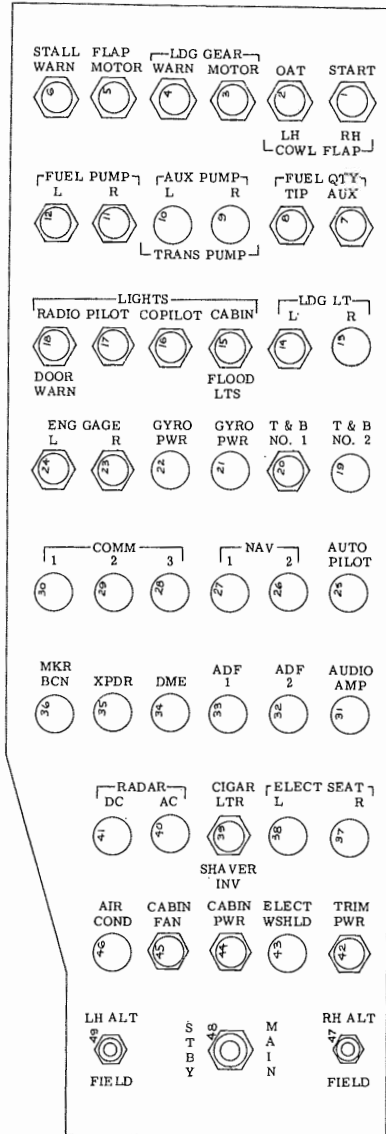


37. Circuit Breakers	48. Battery Shunt	58. Terminal Board TB-2
38. Overvoltage Protector	49. Main Overvoltage Relay	59. Terminal Board TB-1
39. Circuit Breaker Panel	50. Standby Overvoltage Relay	60. Terminal Board TB-4
40. Switch Breakers	51. Cabin Fan Resistor	61. Terminal Board TB-12
41. Switch Panel	52. Cigar Lighter Resistor	62. Electric Windshield Relay (Optional)
42. Voltammeter	53. LH Fuel Boost Relay	63. Starting Vibrator
43. Engine Control Switch Panel	54. RH Fuel Boost Relay	64. Landing Gear Horn Assembly
44. Voltage Regulator	55. Electric Windshield Controller	65. Stall Warning Horn Assembly
45. LH Alternator Shunt	56. Terminal Board TB-3	66. Flap Position Switch
46. RH Alternator Shunt	57. Cowl Flap Position Relays	67. Horn Assembly Resistor
47. Emergency Switch		

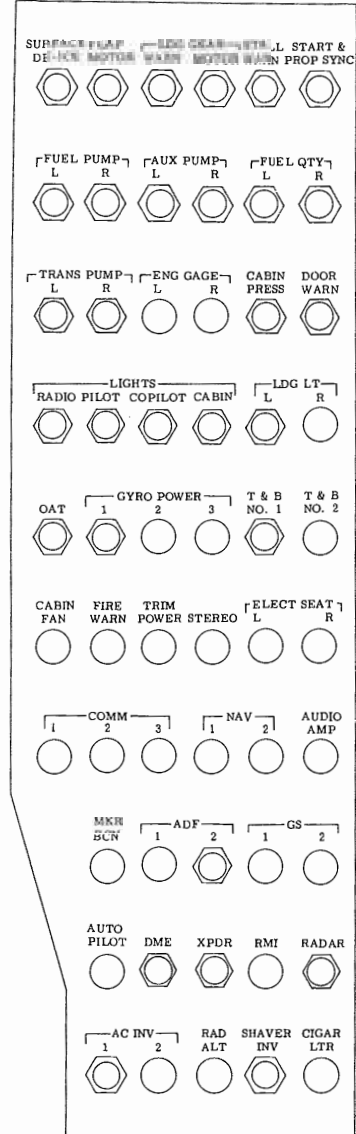
Figure 14-2. Switch and Circuit Breaker Panel (Sheet 2 of 3)

Detail **D**

TYPICAL 421

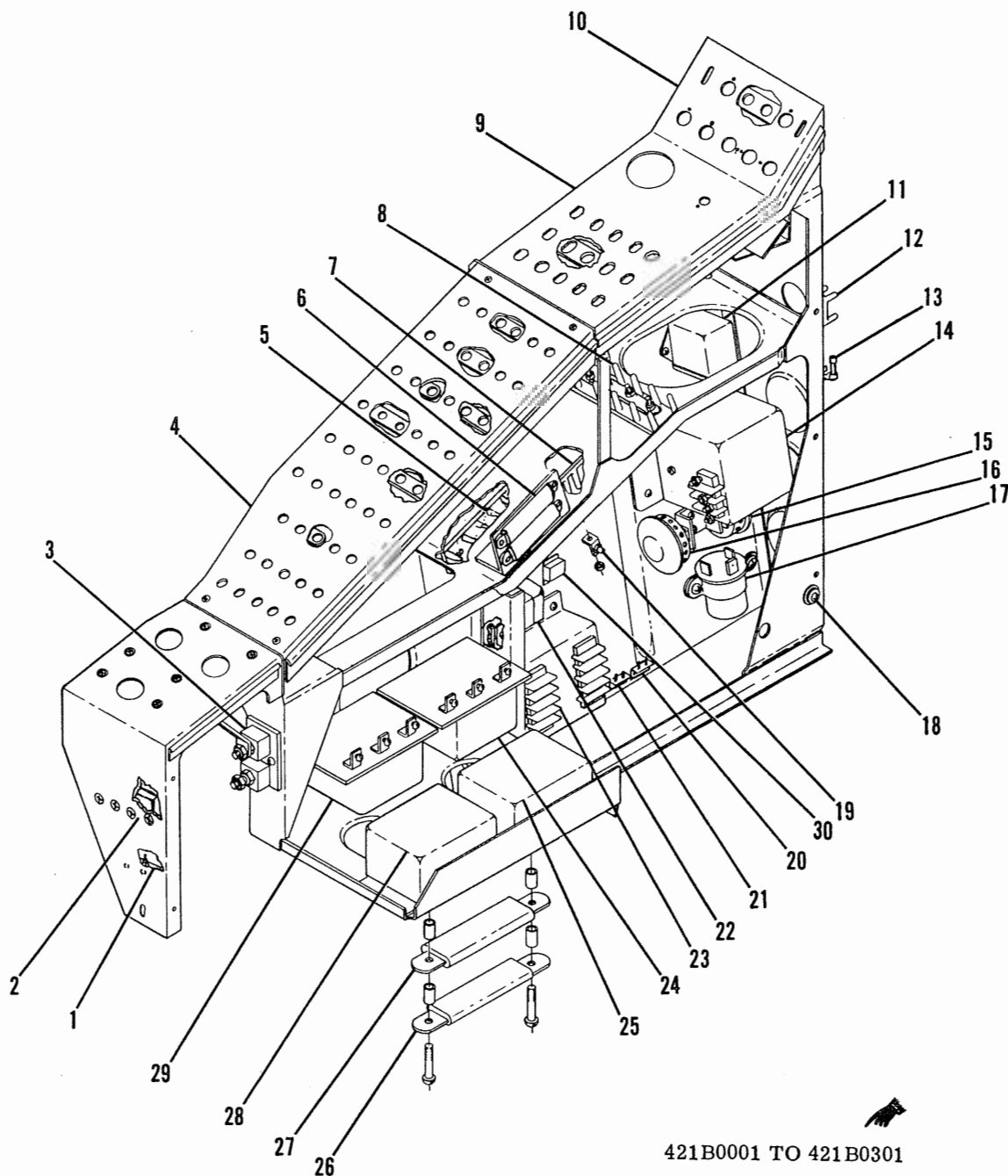
Detail **G**

421A0001 TO 421B0201

Detail **G**

421B0201 AND ON

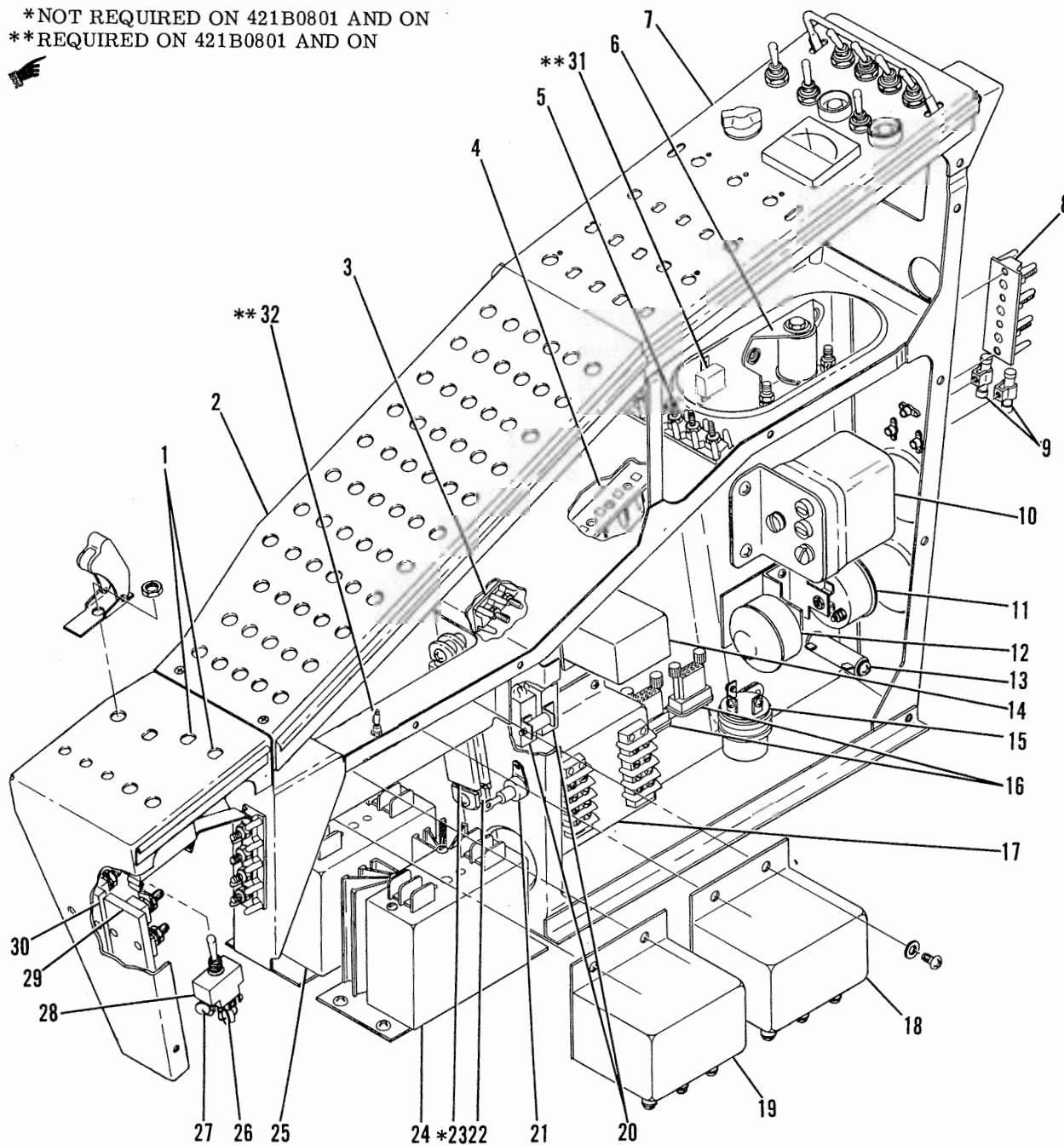
Figure 14-2. Switch and Circuit Breaker Panel (Sheet 3 of 3)



1. LH and RH Alternator Field Diodes	10. Engine Control Switch Panel	21. Ground Plug
2. LH and RH Alternator Shunts	11. Electric Windshield Relay	22. LH and RH Fuel Boost Relays
3. LH and RH Battery Shunts	12. Terminal Board TB-7	23. Electric Windshield Controller
4. Circuit Breaker Panel	13. LH and RH Alternator Fuses	24. Standby Overvoltage Relay
5. Terminal Board TB-8	14. Starting Vibrator	25. Regulator Filter
6. Alternator Fail Module	15. Stall Warning Horn Assembly	26. Cigar Lighter Resistor
7. Terminal Board TB-9	16. Landing Gear Horn Assembly	27. Cabin Fan Resistor
8. Terminal Board TB-4	17. Flasher	28. Regulator Filter
9. Switch Panel	18. Horn Assembly Resistor	29. Main Overvoltage Regulator
	19. Diode	30. Deice Timer Module (Opt.)
	20. Ground Plug	

Figure 14-2A. Side Console

*NOT REQUIRED ON 421B0801 AND ON
 **REQUIRED ON 421B0801 AND ON

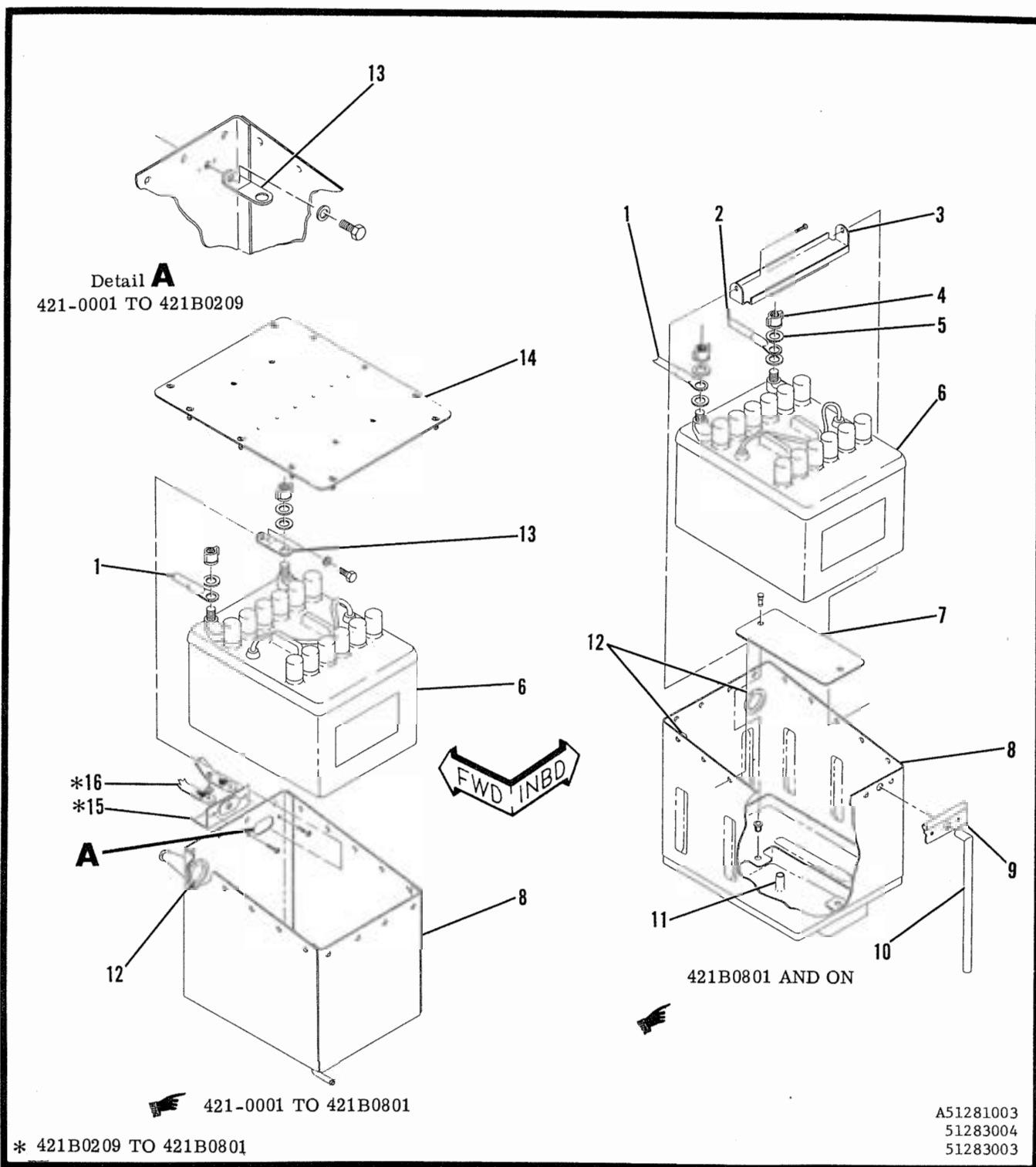


421B301 AND ON

51183010

1. Alternator Field Fuse	12. Landing Gear Warning Horn	23. Cigar Lighter Resistor
2. Circuit Breaker Panel	13. Landing Gear Horn Resistor	24. RH Voltage Regulator
3. Terminal Board TB-8	14. Surface Deice Timer Module	25. LH Voltage Regulator
4. Terminal Board TB-9	15. Flasher	26. Terminal Board TB-1
5. Terminal Board TB-4	16. Ground Plug	27. 1N4721 Diode
6. Air Conditioner Relay	17. Electric Windshield Controller	28. Alternator Field Switch
7. Switch Panel	18. RH Overvoltage Relay	29. RH Alternator Shunt
8. Terminal Board TB-7	19. LH Overvoltage Relay	30. LH Alternator Shunt
9. Spare Alternator Field Fuses	20. LH and RH Fuel Boost Relays	31. Low Voltage Monitor
10. Starter Vibrator	21. Cabin Heat Diode	32. Voltage Monitor Fuse
11. Stall Warning Horn	22. Cabin Fan Resistor	

Figure 14-2B. Side Console



1. Power Cable
2. Ground Cable
3. Tie Down Strap
4. Wing Nut
5. Lockwasher

6. Battery
7. Sump Cover
8. Battery Box
9. Seal
10. Vent Tube
11. Drain Tube

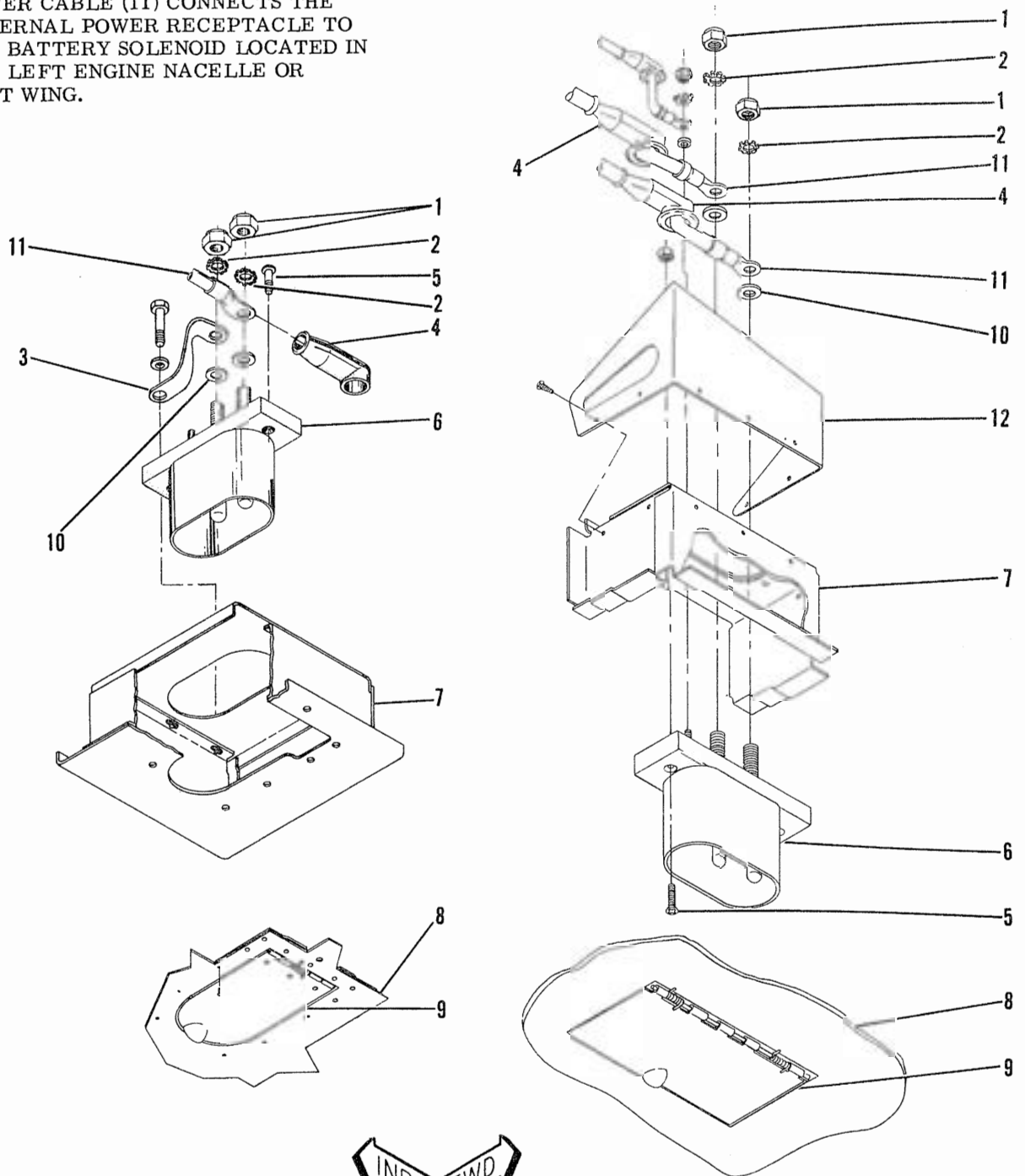
12. Grommet
13. Bus Bar
14. Battery Access Cover
15. Angle Assembly
16. Bonding Jumper

Figure 14-3. Battery and Battery Box Installation



NOTE:

POWER CABLE (11) CONNECTS THE EXTERNAL POWER RECEPTACLE TO THE BATTERY SOLENOID LOCATED IN THE LEFT ENGINE NACELLE OR LEFT WING.



421-001 TO 421B0501

421B0501 AND ON

51283002
51283001

1. Nut
2. Lockwasher
3. Ground Strap
4. Rubber Nipple

5. Screw
6. Receptacle
7. Bracket

8. Lower Skin
9. Access Door
10. Washer
11. Cable

Figure 14-3A. External Power Receptacle

Installation of Battery. (See figure 14-3.)

- a. Install and assemble components in accordance with figure. Make sure all connectors and components are secure.

NOTE

When attaching the battery cables to the battery, be sure cable grommets are properly placed over the edges of the battery box.

CAUTION

Make sure battery Master Switch is OFF. Use voltmeter to determine polarity. Reverse polarity will damage diodes in the alternators.

- b. Replace the battery access cover and secure with fasteners.

Removal of Battery Box. (See figure 14-3.)

- a. Remove battery in accordance with battery removal procedure.
- b. Remove battery box in accordance with figure.

Installation of Battery Box. (See figure 14-3.)

- a. Install and assemble battery box in accordance with figure.

CAUTION

Make sure battery box is properly vented overboard.

External Power.

On aircraft 421-0001 to 421B0801, an optional external power receptacle is installed on the underside of the fuselage just forward of the cabin door. On aircraft 421B0801 and On, the optional external power receptacle is installed under the aft end of the left nacelle. With an external power source connected to the external power receptacle, power is fed to the main bus when the master switch is OFF. To conserve the battery, external power should be used for engine starting in cold temperatures and when testing electrical equipment on the ground. The external power plug pins should be lubricated periodically with petroleum jelly.

Removal of External Power Receptacle. (See figure 14-3A.)

- a. Remove receptacle in accordance with figure.

CAUTION

The battery switch must remain in the OFF position while the external power receptacle is being removed or installed. If there is any possibility of the switch being turned ON during this procedure, it is advisable to disconnect the ground cable from the battery.

Installation of External Power Receptacle. (See figure 14-3A.)

- a. Install and assemble components in accordance with figure.

ALTERNATORS AND REGULATORS. (421-0001 TO 421A0001) (Delco-Remy)

The alternator is designed and constructed to give long periods of trouble-free service with a minimum amount of maintenance. The rotor is mounted on a ball bearing at the drive end, and each bearing has a grease reservoir. Only two brushes are required to carry through the two slip rings to the field coil which is mounted on the rotor. The brushes are extra long and under normal operating conditions will provide long periods of service. The stator windings are assembled on the inside of a laminated core that forms part of the alternator frame. Six rectifier diodes are mounted on the slip ring end frame and are connected to the stator windings. The six diodes replace the separately mounted rectifier as used in other types of applications, and they act to change the alternator AC voltages to DC voltage which appears at the battery terminals on the alternators. The transistor regulator is an assembly

composed principally of transistors, diodes, condensers, and resistors to form a completely static unit containing no moving parts. The transistor is an electrical device which limits the alternator voltage to a preset value by controlling the alternator field current. The diodes, condensers and resistors act together to aid the transistor in performing this function, which is the only function that the regulator performs in the charging circuit. The voltage at which the alternator operates is determined by the regulator adjustment. Once adjusted, the voltage remains almost constant, since the regulator is unaffected by either length of service, by change in temperature, or by changes in the alternator output and speed. Two regulators are installed on the standard aircraft; however, only one is used, the second is a spare. In event of a regulator failure, the regulator switch can be positioned in STANDBY. Should adjustments be required, an allen screw must be removed in the top of the regulator to gain access to adjustment screw. (See figure 14-4.)

Troubleshooting the 50 AMP Alternator and Regulator System. (421-0001 to 421A0001) (Delco-Remy)

TROUBLE	PROBABLE CAUSE	CORRECTION
BOTH ALTERNATORS FAIL TO OPERATE	Regulator power circuit breaker open.	Reset.
	Switch faulty.	Replace.
	Overvoltage protector tripped or faulty.	Reset or replace.
	Regulator faulty.	Replace.
ALTERNATOR OUTPUT CONTINUOUSLY HIGH	Faulty wiring.	Correct as required.
	Regulator set too high.	Adjust to 27.5 DC Volts.
	Regulator faulty.	Replace.
BATTERY CONSUMES WATER RAPIDLY	Faulty battery.	Replace.
	Regulator set too high.	Adjust to 27.5 DC Volts.
NO VOLTAGE AT BUS	Fuse blown.	Replace.
BATTERY DOES NOT COME UP TO FULL CHARGE - ALTERNATORS OPERATING	Faulty battery.	Replace.
	Faulty wiring.	Correct as required.
	Regulator set too low.	Adjust to 27.5 DC Volts.
AMMETER SHOWN HIGH DISCHARGE WHEN ALTERNATOR SWITCH & BATTERY SWITCH TURNED ON (ENGINE NOT RUNNING)	Shorted diode inside alternator.	Disconnect negative battery terminal. Connect a #313 light bulb in series with a 24 volt battery. Connect test leads from battery and bulb to output terminal of alternator and alternator case. Reverse leads - light should light on one polarity only if no diodes are shorted. Replace shorted diodes.

Troubleshooting the 50 AMP Alternator and Regulator System. (421-0001 to 421A0001) (Delco-Remy) (Cont.)

TROUBLE	PROBABLE CAUSE	CORRECTION
REGULATOR POWER CIRCUIT BREAKER OPENS	Short in regulator or overvoltage protector.	Switch to standby regulator. Reset regulator power breaker. If breaker does not reopen, determine and replace faulty regulator or overvoltage protector.
	Faulty wiring (opens in standby regulator also).	Locate and repair.
ALTERNATOR FIELD FUSE OPENS	Wiring shorted.	Locate and repair.
	Alternator field shorted.	Replace alternator.
OVERVOLTAGE PROTECTOR TRIPS	Regulator set too high.	Adjust to 27.5 DC Volts.
	Protector faulty.	Replace.
NO OUTPUT FROM ONE ALTERNATOR WITH BOTH ALTERNATOR SWITCHES ON	Alternator field fuse blown.	Replace.
	Alternator brushes worn.	Replace.
	Faulty wiring.	Repair.
	Faulty switch.	Replace.
ONE ALTERNATOR OUTPUT LOW	Faulty wiring.	Repair.
	Faulty alternator field.	Replace alternator.
	Faulty alternator diode.	Replace diode.
NOTE Any problem which seems to be in the voltage regulator or the overvoltage protector may be quickly isolated by simply switching the voltage regulator switch to STANDBY position. If the system then operates properly, the problem is with main voltage regulator, overvoltage protector, or their wiring. If the same problem still exists, the problem can then be assumed to be in some other portion of the system, probably in the alternators themselves.		

100 AMP Alternators and Regulator (Westinghouse) (Optional). (421-0001 TO 421A0001)

The optional 100 AMP alternator is a brushless alternator consisting of two alternators in the same housing. One of the alternators produces the DC power used to supply the load. The second machine supplies the excitation power required by the first alternator. This exciter receives its excitation from the voltage regulator. The voltage regulator senses the alternator output voltage and in turn delivers a DC signal to the exciter field. This signal will increase or decrease in magnitude depending upon whether the alternator output voltage must be raised or lowered. If the alternator output voltage is lower than the regulated level, the excitation signal will be of a greater magnitude than if the alternator output

voltage is higher than the regulated level. The exciter alternator consists of a stationary DC field and a rotating three-phase AC armature. The three-phase armature is connected to the main alternator DC field through a half wave rectifier assembly. These rectifiers are mounted on the alternator shaft between the exciter armature and the rotor field. When the alternator shaft is rotating and excitation is applied to the exciter field, an AC voltage is induced in the exciter armature. This voltage is rectified by the rectifier assembly and applied to the rotor field. As a result, an AC voltage is induced in the main alternator stationary winding. This three-phase voltage is applied to a full wave rectifier assembly and is converted to a DC voltage at the output terminals. A capacitor is connected across the output terminals to act as a voltage spike suppressor.

Experience has shown that a suppressor is required to reduce voltage spikes which could destroy the diodes. The alternator is engaged to the engine through a gear drive. A special cushion is used in the drive assembly to isolate torsional vibration and insure a longer life. Sealed precision bearings are used in the 100 Amp alternator and need replacing at approximately 1500 hours of operation. The 100 Amp alternator system uses a transistorized regulator having no moving parts and does not depend upon a mechanical action for its operation. Instead of mechanical action, the regulator utilizes transistors and diodes. Basically the regulator consists of three circuits; voltage reference, voltage error detector and power switch. The voltage reference circuit supplies a constant reference voltage which is used for comparison with the line voltage to determine voltage error. The error detector circuit makes the comparison between the reference voltage and the line voltage, then sends a signal to the transistor power switch. The power switch is the output stage of the regulator, it controls the alternator field voltage. Since the field resistance remains virtually constant, due to a temperature compensating winding, the field current is controlled also. The majority of the regulator components are mounted on a printed circuit board. This provides a more rugged unit, with a greater freedom from vibration, and simplifies repair. A potentiometer is provided, at the front of the regulator, to permit adjustment of the bus voltage to any desired level between 25.0 to 28.5 volts. This allows compensation to be made at time of installation for the differences in feeder drops between systems. After the adjustment has been made, a lock is provided to secure potentiometer.

ALTERNATORS AND REGULATORS. (421A0001 and ON) (Prestolite)

The principal components of the alternator are the

stator, the rotor, the slip ring end head, the drive end head and the rectifiers. The stator consists of a laminated iron core on which three phase windings are wound in slots around the inside circumference. The manner in which the three windings are connected together makes the stator a "WYE" type. Leads are connected to each of the three points of the phase windings and each lead is connected to a pair of diodes, one negative and one positive. The rotor consists of a single field coil encased between two four-poled, interleaved iron sections assembled on the shaft. The ends of the field coil are connected to a pair of slip rings which are insulated from each other and from the shaft. The slip ring end head supports the rectifier mounting plate and the negative rectifiers, a prelubricated bearing in which the rotor shaft rotates, the brush holders and brushes, the field and output terminals, and a ground screw or terminal. The drive end head supports a sealed, prelubricated ball bearing in which the drive end of the rotor shaft rotates. The negative rectifiers are pressed in the slip ring end head and the positive rectifiers are pressed into the heat sink (rectifier mounting plate) and are connected to the stator leads.

The principal components of the regulator are the transistors, the rectifier diode, the zener diode, and the resistors. The transistor is an electronic switch which can turn on and turn off the flow of current in an electric circuit. It has no mechanical or moving parts to wear out. The zener diode, in addition to passing current in the forward direction, will pass current in the reverse direction only when a particular value of voltage is applied in the reverse direction. It is this zener action which makes it adaptable for use as a voltage sensing device in the regulator. The resistors are used to limit the flow of current. The voltage at which the alternator operates is determined by the regulator adjustment.

Troubleshooting the 100 AMP Alternator and Regulator System.

TROUBLE	PROBABLE CAUSE	CORRECTION
BATTERY CONSUMES WATER RAPIDLY	Faulty battery. Regulator set too high.	Replace. Adjust to 27.5 DC Volts.
BATTERY DOES NOT COME UP TO FULL CHARGE - ALTERNATORS FUNCTIONING PROPERLY	Faulty battery. Faulty wiring. Regulators set too low.	Replace. Correct as required. Adjust to 27.5 DC Volts.
ONE ALTERNATOR FAILS TO OPERATE	Alternator field fuse open. Switch faulty. Wiring faulty. Overvoltage protector open.	Replace. Replace. Correct as required. Reset.

Troubleshooting the 100 AMP Alternator and Regulator System (Cont.)

TROUBLE	PROBABLE CAUSE	CORRECTION
ONE ALTERNATOR FAILS TO OPERATE (CONT.)	Regulator faulty.	Replace.
	Alternator faulty.	Replace.
BOTH ALTERNATORS FAIL TO OPERATE	Battery switch open or faulty.	Close switch or replace as required.
ONE ALTERNATOR OUTPUT CONTINUOUSLY LOW	Regulator set too low.	Adjust to 27.5 DC Volts.
	Regulator faulty.	Replace.
	Wiring faulty.	Correct as required.
	Faulty alternator field.	Replace alternator.
	Faulty alternator diode.	Replace diode.
ONE ALTERNATOR OUTPUT CONTINUOUSLY HIGH	Regulator set too high.	Adjust to 27.5 DC Volts.
	Regulator faulty.	Replace
	Wiring faulty.	Correct as required.
	Alternator faulty.	Replace.
AMMETER SHOWS HIGH DISCHARGE WHEN ALTERNATOR SWITCH AND BATTERY SWITCH ARE ON (ENGINES NOT RUNNING)	Shorted diode inside alternator.	Disconnect negative battery terminal. Connect a #313 light bulb in series with a 24 volt battery. Connect test leads from battery and bulb to output terminal of alternator and alternator case. Reverse leads - light should light on one polarity only if no diodes are shorted. Replace shorted diode.
ALTERNATOR FIELD FUSE OPENS	Wiring shorted.	Correct as required.
	Regulator faulty.	Replace.
	Alternator field shorted.	Replace alternator.
OVERVOLTAGE RELAY TRIPS	Transient voltage.	Turn off both alternator switches and battery switch to reset relay.
	Regulator set too high.	Adjust to 27.5 DC Volts.
	Relay faulty.	Replace relay.
NO VOLTAGE AT BUS	Blown fuse.	Replace.

Overvoltage Troubleshooting Information (100 Amp Westinghouse Alternator).

If an overvoltage has occurred the following checks should be performed.

a. Overvoltage relays.

1. (See figure 14-2.) Check overvoltage protectors (2 or 38) that trip voltage is between 32.0 and 36.0

volts DC. The following procedures are typical for right and left alternator systems.

NOTE

When testing trip voltage setting, the 500 uf capacitor and 51 ohm resistor must be a part of the test circuit.

CAUTION

Overvoltage protectors must be isolated from the aircraft wiring system when checking trip setting.

- (a) Insure that overvoltage protector part number is 9MC7-3-28 V.
- (b) Refer to applicable wiring diagram and isolate overvoltage protector, capacitor and resistor from aircraft wiring.
- (c) Using a variable voltage supply, apply voltage until protector breaks.
- (d) If voltage is within limits remove voltage supply, restore aircraft wiring and reset overvoltage protector.

On aircraft equipped with Prestolite Alternators, the overvoltage relay may be checked on the bench or in the aircraft. If the overvoltage relay is to be checked installed in the aircraft it will be necessary to disconnect wiring at the electrical terminals and proceed as follows:

- a. Connect a 28 VDC test lamp across the field and ground terminals.
- b. Connect a DC voltmeter across the battery and ground terminals.

NOTE

Voltmeter must have an accuracy of $\pm 2\%$.

- c. Connect a variable DC power supply 0-50 VDC. Connect positive lead to battery terminal on the overvoltage relay and the negative to the ground terminal on the overvoltage relay.
- d. Turn on power supply and adjust output voltage for 28 volts. Observe that the test lamp is illuminated. If lamp is not ON, the relay is defective and must be replaced.
- e. Allow the relay to operate at 28 volts for three hours and check that the test lamp remains on. If the lamp does not remain on, the relay must be replaced.
- f. Check the relay trip voltage by slowly increasing the output voltage. Increase the output voltage using a rate of approximately three volts per second until the test lamp goes out. Check that voltmeter indicates $33 \text{ V} \pm .5 \text{ volts}$. If the test lamp does not go out the relay is defective and must be replaced.

NOTE

Due to variations in operating conditions and the rate at which voltage is applied, the value of the voltage could vary $\pm 1.5 \text{ volts}$ and be acceptable.

b. Voltage regulators.

1. Insure that regulator voltage settings are correct.
2. Regulators must be adjusted to carry equal loads at 1200 prop RPM and a total of 40 to 50 amp load (20 to 25 amp load per alternator).
3. Insure that regulator adjustment locknut is properly tightened and setting is not changed during tightening process.

ening process.

c. Battery.

1. Insure that battery is properly serviced and that ground bus bar is making good ground with the battery box. Bus bar to battery box mating surface should be free of all paint, corrosion or other insulating material.

d. Wiring.

1. Check field sensing leads and alternator output power and ground wires for shorts and breaks.

NOTE

An intermittently shorted field wire between the regulator and the alternator can cause overvoltage conditions and a direct shorted field lead can cause damage to the voltage regulator that could result in overvoltage conditions or complete loss of output.

NOTE

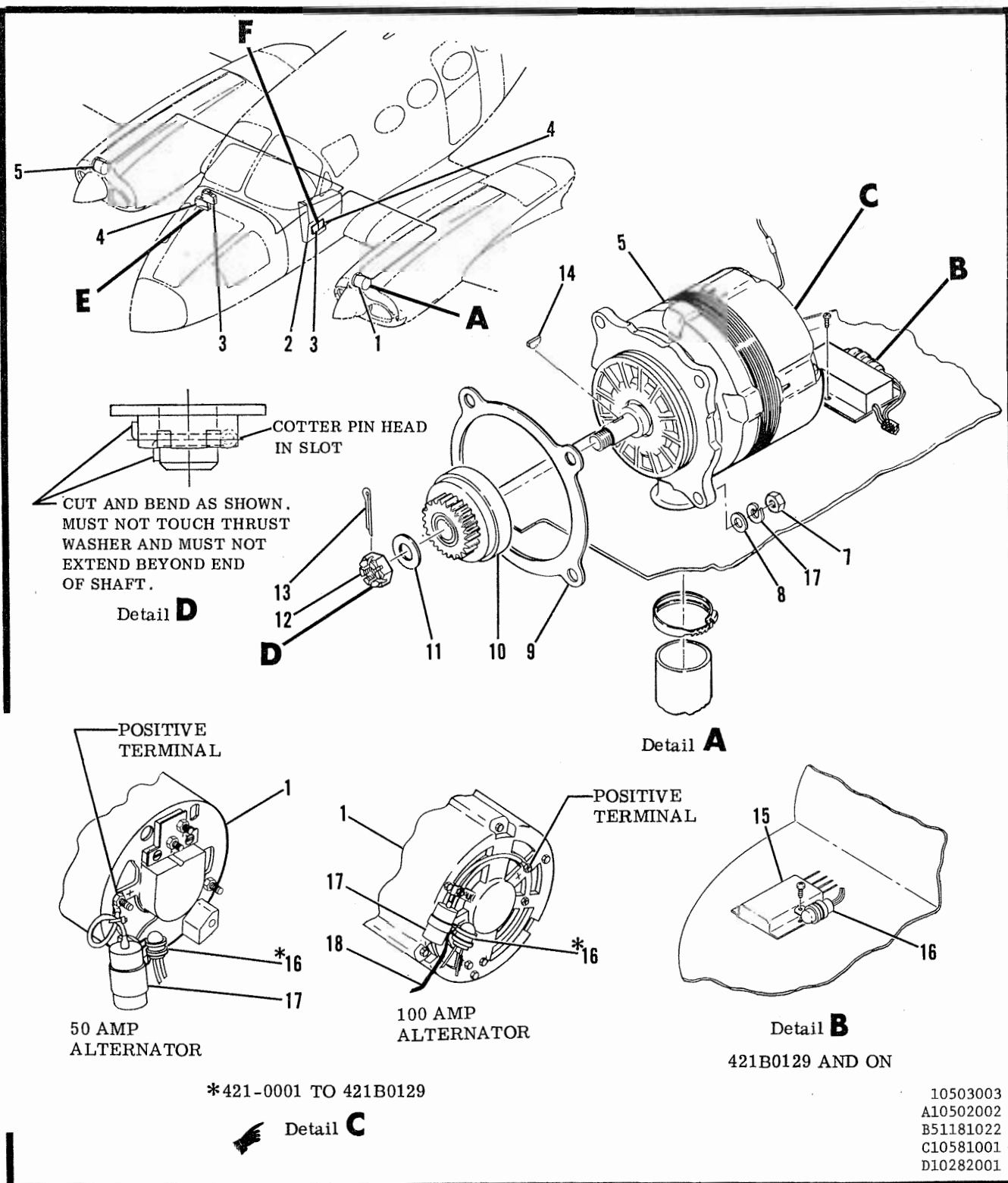
A directly shorted output wire can create an overshoot of the alternator voltage which may cause local damage where the short occurs.

2. Check ground return on alternator for good return to the engine case and then through the engine bonding strap to the airframe.

CAUTION

Copper terminals or splices should never be used to repair aluminum wiring.

3. Inspect all terminals in the power generating circuit for any loose or damaged connections. A loose connection can create unbalanced conditions in load, voltage and possible failure of the junction.
- e. Generating circuit components.
 1. Check alternator and battery shunts for loose conducting bars at solder joints.
 2. Inspect fuse holders for good solder joint connections and for cracked or broken housings. Insure that current carrying metal parts are free of corrosion, check field fuses for continuity.
 3. Check battery and alternator field switches for damage or excessive resistance through the contacts.
 4. Check alternator power circuit breakers for loose connections, damage or resistance through contacts.
 5. Check battery relay for proper operation and bus bars for corrosion.
 6. Check all external diodes on the field circuit for open or short circuits.
 7. Inspect the ammeter select switch for damage and shorts.
 8. Check alternator and regulator RFI filters for open or short circuits. Use only approved filters as follows:
 - Alternator Filter P/N 93874 Sprague Shunt or Capacitor P/N CA275X Mallory.
 - Regulator Filter P/N TC3501A Cornell-Dubilier.
9. Inspect defrost air duct adjacent to voltage reg-



1. Left Alternator
2. Console Panel
3. Main Regulator
4. Spare Regulator

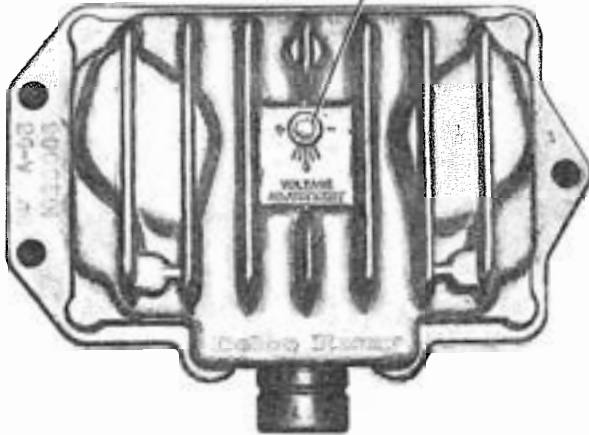
5. Right Alternator
6. Lockwasher
7. Nut
8. Washer

9. Gasket
10. Hub
11. Washer
12. Nut
13. Cotter Pin

14. Key
15. Alternator-Out Sensor
16. Diode
17. Capacitor
18. Ground Cable

Figure 14-4. Alternator and Regulator Installation (Sheet 1 of 2)

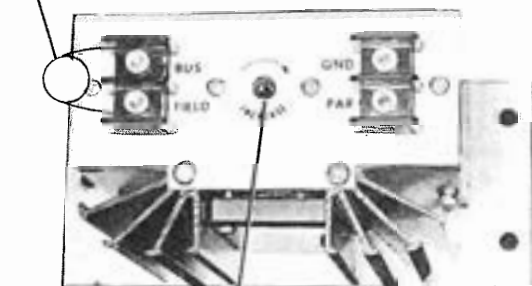
REGULATOR ADJUSTING SCREW
50 AMP REGULATOR
421-0001 TO 421A0001

Detail **E**

REGULATOR ADJUSTING SCREW
100 AMP REGULATOR
421-0001 TO 421A0001

Detail **E**

VARIRESISTOR
USED WITH 9910126-1
REGULATOR ONLY



421B0301 AND ON



421A0001 TO 421B0301

REGULATOR ADJUSTING SCREW
50 OR 100 AMP REGULATOR

Detail **F**

Figure 14-4. Alternator and Regulator Installation (Sheet 2)

ulators for damage or leaks. Excessive localized heating may cause intermittent failure of the regulator.

NOTE

On aircraft incorporating SK421-51 an interrupter is added on the alternator output line to prevent possibility of damage to equipment in the event of an uncontrolled alternator. The interrupter is controlled by the alternator field switch to insure that power is removed from the line when the alternator field switch is opened.

Removal of Alternator. (See figure 14-4.)

The removal of the alternators is the same for both engines and either 50 Amp or 100 Amp alternator.

- a. Remove the upper cowling.
- b. Remove the nose cap cowling.
- c. Disconnect and tag wires from alternator and stow out of the area.
- d. Remove nuts, lockwashers and plain washers securing alternator to engine.
- e. Carefully work the alternator from the engine pad.

CAUTION

Use care when removing alternator to prevent damage to splines on the alternator.

Alternator Hub Replacement. (See figure 14-4.)

- a. Remove alternator hub as follows:
 1. Remove cotter pin (13); then using special wrench, P/N 5090005-1, to hold shaft from turning, remove nut (12) and thrust washer (11).
 2. Pull alternator drive gear hub (10) from alternator shaft using care not to damage hub assembly.
- b. Install alternator hub as follows:
 1. Apply clean engine oil to shaft of alternator and install key (14).
 2. Slide alternator drive gear hub (10) onto shaft and onto key (14).
 3. Install thrust washer (11) on alternator shaft with bearing material (copper color) side toward the hub.
 4. Install nut (12); then using a special wrench P/N 5090005-1 to hold shaft from turning, torque nut to 450-500 inch-pounds.

NOTE

Ensure wrench 5090005-1 is aligned and seated in notch of alternator drive gear hub flange so that no damage will occur when torque is applied to nut.

5. Install cotter pin as shown in Detail D.

Installation of Alternator.

The installation of the alternators is the same for both engines and either 50 Amp or 100 Amp alternator.

- a. Make sure gasket has not been damaged or has been replaced.
- b. Position alternator on engine pad.

CAUTION

Before installing alternator always make sure the nut on the drive shaft of the alternator is safetied with the cotter pin installed as shown in Figure 14-4. If the nut is not safetied properly damage could result to the gears and alternator shaft.

- c. Work alternator in position and install washers, lockwashers, and install nuts securing alternator.
- d. Torque nuts to 155 to 175 inch-pounds.
- e. Connect electrical wiring.

CAUTION

Be sure alternator wiring is connected properly. Reverse polarity will destroy diodes in the electrical system.

NOTE

When replacing 50 amp alternator with a 100 amp alternator, add ground wire from alternator to engine case bolt.

- f. Install nose cap cowling.
- g. Install upper and lower cowl.

Removal and Installation of Voltage Regulator. (See figure 14-4.)

The removal and installation of the voltage regulator is the same for either 50 Amp or 100 Amp system.

- a. Remove voltage regulator covers (aft and forward) by removing screws attaching covers to side console.
- b. Tag and disconnect electrical wiring.
- c. Remove screws securing voltage regulator to shelving.
- d. Remove regulator.
- e. Install regulator by reversing the removal procedure.

NOTE

After voltage regulator has been mounted in position and wired, perform the Operational Check and Adjustment of Alternators and Regulators.

Operational Check of Alternator and Regulator.
421B0001 and On and Aircraft Modified by SK421-47
and SK421-50.

- a. With both engines operating at 1000 RPM, and the battery and alternator switches on, check the following:
 1. Select voltage position on voltmeter and assure bus voltage is 27.5 ± 1.0 volts.
 2. Select battery position on voltmeter and note battery is charging; charging amperage indication will vary as the battery builds up to normal charge.
 3. Load electrical system with all external lights, fuel pumps, pitot heat, etc., and check the alternator output; it should be positive and equal within 10 amps when loaded up to 100 amps total load.

NOTE

If total load is below 15 amps, one alternator may show little or no output. If so, turn producing alternator OFF; the other alternator should then pick up the load. Also, when one alternator is not carrying any load, the corresponding light may come on or flicker on and off. This is normal.

Operational Check of Alternator Failure Circuit.
421B0001 and On and Aircraft Modified by SK421-47
and SK421-50.

- a. With both engines operating at idle RPM, place battery switch and alternator switches to OFF, and observe that failure lights are out.
- b. Reduce electrical load to minimum to avoid discharging the battery.
- c. Turn on battery switch and observe both alternator failure lights illuminate full on.
- d. Increase engine RPM to 1800 and insure failure light remain ON.

NOTE

The reference voltage used for alternator out indication is approximately one half of whatever voltage the alternator is producing. When the alternator is turned OFF, it is capable of producing some voltage which will be a function of load and RPM of unit. At high RPM such as maximum power, the residual voltage at times can exceed the fail triggering level of the sensor, turning the failure lights OFF; this is acceptable.

- e. With both alternators and battery switches ON and light electrical load of 15 amps operate both engines at idle RPM and observe that lights remain off without any flickering. Increase RPM on both engines together, to 1800 RPM and again observe for any flickering.

NOTE

It is important that both engine RPM be as close to each other as possible because at

light loads, the alternator which is set at higher RPM will tend to take all of the load and the alternator running at lower RPM will be at a no load condition which will tend to give a false alternator out indication.

Operational Check of Alternator Warning System.
421B0001 and On and Aircraft Modified by SK421-47
and SK421-50.

- a. With both engines operating 1700 RPM and normal electrical load applied, push the press-to-test switch and hold in for at least 30 seconds, and insure both alternator out lights are on.
- b. Insure that pushing the press-to-test switch does not trip the landing gear motor breaker.

PRECAUTIONS TO BE OBSERVED WHEN TESTING OR SERVICING THE ELECTRICAL SYSTEM.

- a. Disconnect the battery, before connecting or disconnecting test instruments (except voltmeter) or before removing or replacing any unit or wiring. Accidental grounding or shorting at the regulator, alternator, ammeter, or accessories, will cause severe damage to the units and/or wiring.
- b. The alternator output lead must not be removed from the alternator with the field circuit energized and the alternator operating.
- c. Do not attempt to polarize the alternator. No polarization is required. Any attempt to do so may result in damage to the alternator, regulator or circuits.
- d. Grounding of the alternator output terminal may damage the alternator and/or circuit and components.
- e. Reversed battery connections may damage the rectifiers, vehicle wiring or other components of the charging system. Battery polarity should be checked with a voltmeter before connecting the battery. Most vehicles are negative ground.
- f. If a booster battery or fast charger is used, its polarity must be connected correctly to prevent damage to the electrical system components.
- g. When using an auxiliary power unit, make sure the voltage and polarity are set to correspond with the vehicle system voltage and polarity.

Operational Check and Adjustment of Alternators and Regulators. (421-0001 to 421A0118) (Westinghouse)

- a. Remove wire No. P39C12 (left regulator) and P40C12 (right regulator) from field terminals of voltage regulators and check their resistance to ground; their resistance should be approximately 15 ohms. Replace each wire after resistance measurement.
- b. Remove wire No. P81A14 (left regulator) and P82AA (right regulator) from Positive (+) terminal of voltage regulator and measure voltage with battery and applicable alternator field switch on. Voltage should be battery voltage, approximately 24 volts DC. Each wire voltage should be interrupted by either opening battery switch or its own alternator field switch. Replace each wire after measuring voltage.

c. Connect a precision voltmeter with minimum of 2% accuracy to the aircraft main bus and aircraft ground. (Note that the main bus referred to herein is all the wiring and bus bars connected between the two alternator power circuit breakers and all the distribution circuit breakers and not the plus terminal at the regulators or any other location.)

d. Start left engine per normal starting procedure. With the battery and left alternator switches on, increase RPM slowly and monitor alternator output voltage so as not to exceed 29 volts DC. If voltage exceeds 29 volts when 600 prop RPM is reached, adjust left-hand regulator setting to a level of 27 to 29 volts.

e. Start right engine per normal starting procedures and maintain at low idle. Turn left alternator switch off and right alternator switch on, increase RPM slowly and monitor alternator output voltage as outlined in step d.

f. Turn on left alternator switch and observe that the bus voltage does not exceed 29 volts.

g. Turn off right alternator switch and operate left engine at 1000 RPM. Load the system with approximately 20 to 30 amps by turning on equipment (Rotating Beacon, Landing Lights, Taxi Light, etc.). Allow system to warm-up a minimum of 10 minutes.

h. Turn off all equipment; a DC load of zero to 7 amp should now be on the aircraft's meter.

NOTE

On aircraft with AC-DC alternator, do not turn on the AC windshield while regulator setting is being made.

i. With left engine operating between 1000 and 1200 RPM, set the voltage regulator adjustment so that the voltage at the bus is at 27.5 ± 0.25 volts DC.

j. With right engine operating at the same RPM as that of the left, turn on the RH alternator switch and operate both alternators in parallel. Turn on 30 to 40 amp load and adjust right regulator to equally share the load.

Operational Check and Adjustment of Alternators and Regulators (421A0118 to 421B0301 and aircraft incorporating SK421-47 and SK421-50).

a. Remove wires from field terminal of the main voltage regulator and check resistance of alternator field; resistance should be approximately 15 ohms. Replace wire after resistance measurement.

b. Remove wire from positive (+) terminal of the voltage regulator and measure voltage with battery and applicable alternator field switch on. Voltage should be battery voltage, approximately 24 volts DC. Voltage should be interrupted by either opening battery switch or its own alternator field switch. Replace wire after measuring voltage.

c. Start left engine per normal starting procedure. With left alternator switch ON, increase RPM slowly and monitor alternator output voltage. Adjust voltage if required to prevent voltage exceeding 29 volts DC. Operate engine at 1500 RPM. Allow system to warm-up a minimum of 10 minutes with aircraft am-

meter reading 30 to 50 amps output, by loading the system with equipment when operating requires this amount of load. Adjust voltage regulator to 27.5 ± 0.25 volts DC. Record exact alternator output amperage. Shut down engine.

d. Start right engine and repeat above procedure; except after warm-up, adjust regulator to obtain the same ammeter reading as recorded on left engine.

e. Operate both engines and warm-up per above procedure. Check voltage setting for 27.5 volts on each alternator. Left and right alternator voltage should be within 0.50 volts of each other.

f. Repeat the above procedures for setting the standby voltage regulator.

Operational Check and Adjustment of Alternators and Regulators (421B0301 and On).

a. Install a 2% voltmeter connected to the aircraft power bus. (The power bus is considered to be between the alternator power circuit breakers and the individual circuit breakers for each system and not at the cigar lighter.)

b. Disconnect the paralleling wire (terminal marked "PAR") from either regulator and leave it disconnected thru step k.

NOTE

All adjustments are performed while operating only the LH engine. (RH engine shall not be running.)

c. With LH engine running at 1200 prop RPM, turn LH alternator field switch ON. (RH alternator switch must be OFF.) Add 10 to 15 amp load to LH alternator. Run this load for at least 2 minutes.

NOTE

To adjust voltage regulator, remove the snap plug from the upper face of the regulator and insert allen wrench.

d. Adjust LH regulator adjustment to read 27.5 volts on the voltmeter connected to the aircraft bus. Allow sufficient time for voltage to stabilize between adjustment.

NOTE

The aircraft voltammeter shall not be used for voltage setting.

e. Replace the snap plug in the LH regulator adjustment access hole and do not make any further adjustments on the LH regulator.

f. While continuing to operate the LH engine and alternator with the same electrical load as before, turn the RH alternator field switch ON. (RH engine is still not running.)

g. The remaining adjustments should be made using either a Simpson 260 or a Triplett 630 VOM.

CAUTION

Observe with caution that the field circuits of either system never touch ground or other electrical circuits, even for an instant, or the regulators may be damaged.

h. Select VOM to 0-50V scale and connect VOM between the field terminals of the left and right regulators (plus side meter to LH regulator).

i. Now very slowly rotate the RH regulator voltage adjustment while observing the voltmeter which has been connected to the two field terminals.

1. If a reverse (downscale) reading is obtained, turn the RH regulator adjustment counterclockwise, this should bring the meter upscale.

2. Then very slowly turn RH regulator adjustment clockwise to the point where the field voltmeter will read near zero.

NOTE

A stable reading should not be expected, voltage will fluctuate.

3. Then using the 0-10 volt and 0-2.5 volt scales on the VOM continue adjustment of the RH regulator to a lower voltage differential. (The 0-2.5 volt scale is recommended for making the final adjustment.) The correct adjustment has been achieved when the meter will remain briefly in the vicinity of zero, swinging both upscale and downscale.

j. Replace the snap plug in the RH regulator adjustment hole.

k. Shut down all power to the aircraft and disconnect VOM from field terminals.

l. Restore the paralleling wire removed by step b. above.

m. After aircraft has been restored to original configuration, the RH engine should be started, both alternators turned on and system should be operated at different loads to verify that paralleling is within 13% of load and bus voltage has remained within the 27.5 $\pm$.25 volt limit.

BATTERY MASTER AND ALTERNATOR SWITCHES.

A battery master switch is located between the left and right alternator switches on the left side of the stationary panel. A switch bar is installed across the top of the three switches to permit simultaneous shut off. When the battery is placed in the ON position it actuates a heavy duty relay which connects the battery to the bus bar. The alternator switches are connected electrically in the alternator field circuit.

Removal of Battery and Alternator Switches.

- a. Remove nut securing switch to stationary panel.
- b. Tag and remove wires from the switch.

CAUTION

During removal of any switch except the battery switch, the battery switch must remain OFF. When removing the battery switch, disconnect the ground cable from the battery to prevent an accidental short circuit.

Installation of Battery and Alternator Switches.
(See figure 14-5.)

- a. Connect the wires to proper switches and remove tags.
- b. Insert switch in proper position in the switch panel and secure with nut.

Removal and Installation of Side Console.

- a. Remove upholstery panel on side of console.
- b. Remove screws attaching console to structure.
- c. Lift console from floor to gain easier access to connectors and leads. Disconnect electrical connectors. Tag and disconnect cables and leads.
- d. Remove console from aircraft.
- e. Install console using reverse order.

Removal and Installation of Side Console Circuit Breaker Panel.

NOTE

When optional electroluminescent panels are installed, these panels must be removed first, in order to gain access to circuit breaker panel attaching screws.

- a. Remove the four attaching screws, one at each corner, and lift panel up and out.

NOTE

Panel is still attached to console by a wire bundle assembly. Components may be removed, replaced, or installed with panel in this position.

- b. Remove and replace components as may be required.
- c. If panel is to be removed, tag and disconnect electrical leads.
- d. Remove panel from aircraft.
- e. Install panel using reverse order.

ANNUNCIATOR PANEL (421B0001 and ON)

Sixteen annunciator lights stacked side by side, coupled by a printed circuit board on the rear and mounting brackets on the top and bottom make up the annunciator panel. These multi-colored lights will illuminate within a circuit to indicate various functions, operations and failures during flight. A press to test button located to the left of the annunciator panel will, when pressed, cause all lights on the annunciator panel, along with the propeller synchronizer if installed, and auxiliary fuel tank indicator to illuminate.

Removal of Annunciator Panel. (See figure 14-4A.)

- a. Turn off all power.
- b. Lower left hand instrument panel by removing

mounting screws.

- c. Tag and disconnect wiring.
- d. Disconnect electrical plug.
- e. Remove the four screws securing annunciator panel.
- f. Remove press to test switch.
- g. Carefully remove annunciator panel.

Removal and Replacement of Annunciator Panel Diodes. (See figure 14-4A.)

- a. Using a soldering iron and needle nose pliers, unsolder and remove old diode.
- b. Solder new diode in place.

NOTE

When soldering printed circuit boards and diodes always use some means of heat sink such as needle nose pliers. Heat could cause damage to diodes.

Removal and Replacement of Individual Light Assembly. (See figure 14-4A.)

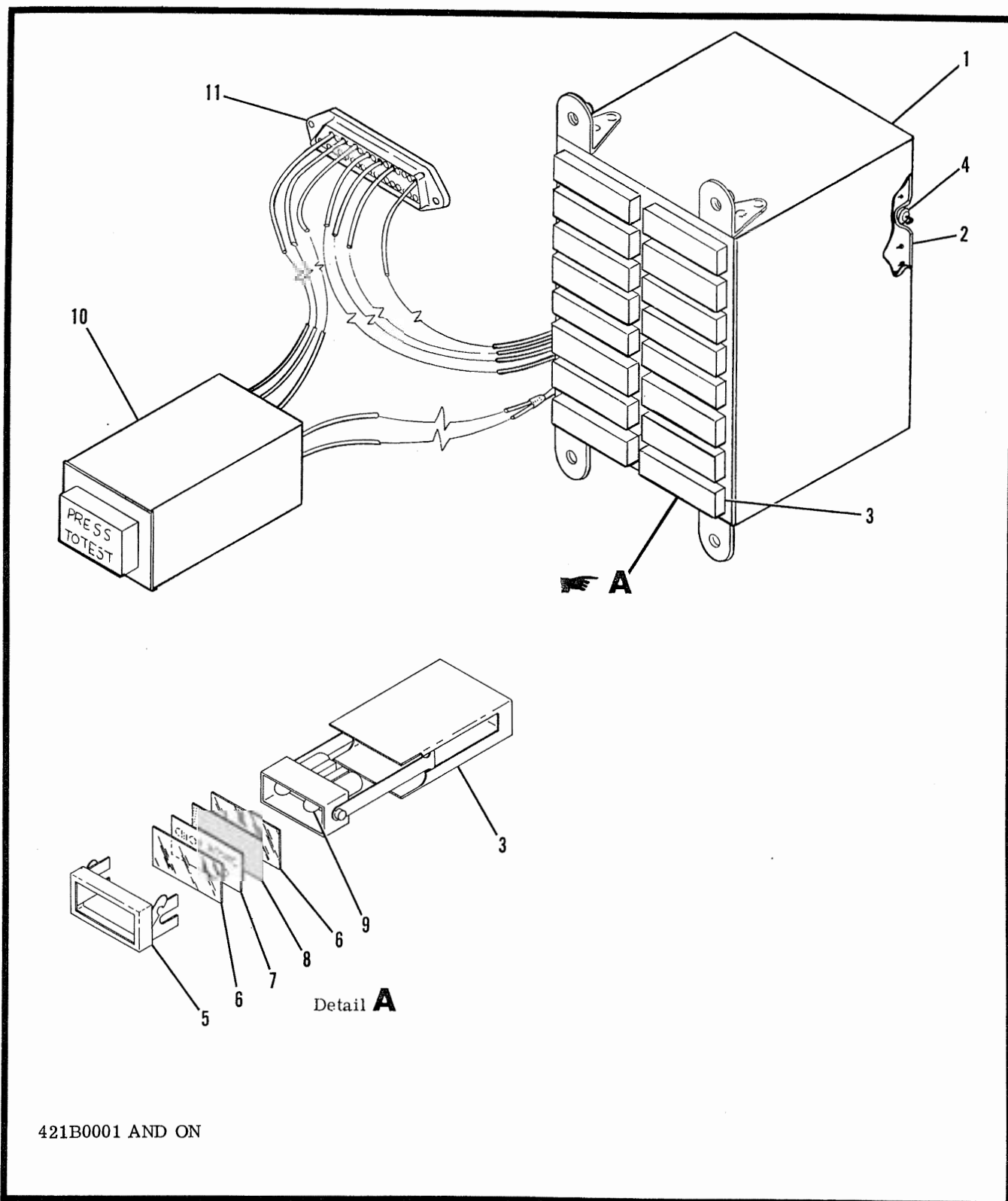
- a. With annunciator panel removed from shock panel remove mounting brackets, top or bottom, depending which is closest to light assembly to be removed.
- b. Unsolder light from printed circuit board and remove light assembly.
- c. Replace light assembly using caution to prevent damage to circuit board and diodes.
- d. Install mounting brackets.

Installation of Annunciator Panel. (See figure 14-4A.)

- a. Position annunciator panel in place and install four screws.
- b. Connect electrical plug.
- c. Install press to test switch.
- d. Connect wiring and remove tags.
- e. Install instrument panel in place.
- f. Turn on power and check operation of annunciator panel.
- g. Refer to figure 14-4A for proper color coding.

Removal and Replacement of Annunciator Light Bulbs. (See figure 14-4A.)

- a. On the light with the bulb to be replaced push in on the frame of the light assembly and allow light to pop out.
- b. Rotate the light capsule 90 degrees.
- c. Lift bulb out of light capsule and insert new bulb.
- d. Rotate light capsule in place and insert into position. Press firmly into proper place.



1. Bracket
2. Circuit Board
3. Basic Unit
4. Diode

5. Light Capsule
6. Clear Lens
7. Legend
8. Color Filter

9. Lamp
10. Press To Test Switch
11. Plug

Figure 14-4A. Annunciator Panel Installation

Removal and Replacement of Annunciator Light Lens. (See figure 14-4A.)

- a. Press light in and allow light capsule to pop out.
- b. Rotate clip on each side of the lens housing, one side up, the other side down.
- c. Carefully pull lens housing from light capsule.
- d. Press out clear lens, filter, legend disperser, and clear lens.

CAUTION

Do not attempt to pry lens housing apart from lens; the housing will break.

- e. Insert the clear lens, filter, legend disperser and clear lens in proper order.
- f. Insert lens housing and lock into place with clip, one up, the other down.
- g. Press light into panel.

STATIONARY INSTRUMENT PANEL.

Mounted on the stationary instrument panel are the cowl flap switches, landing gear switch and the flap switch. There are six rheostats mounted on the stationary instrument panel to control the dimming of the left hand console lights, flight instrument lights, switch panel lights, radio panel lights, compass light and engine instrument lights.

SWITCHES.

Typical Switch Removal. (See figure 14-5.)

- a. Loosen and remove the decorative nut securing switch to the switch panel and remove switch from the panel.
- b. Tag and remove the wires from the switch.

Typical Switch Installation. (See figure 14-5.)

- a. Connect wires to proper switches and remove tags.

Trouble Shooting the Lighting System.

- b. Install switch in panel and secure with decorative nut.

Removal and Installation of Starter Switches.

- a. Remove left console side cover.
- b. Loosen switch guard and remove nut securing guard and switch to panel.
- c. Tag and remove wires from the switch.

CAUTION

When removing starter switches, it is advisable to remove negative cable from the battery to prevent the starter circuit from being energized during removal of switch.

- d. To install switch, connect the wires to the switch and remove tags.
- e. Install switch in the panel, secure with guard and nut.
- f. Replace console panel cover.

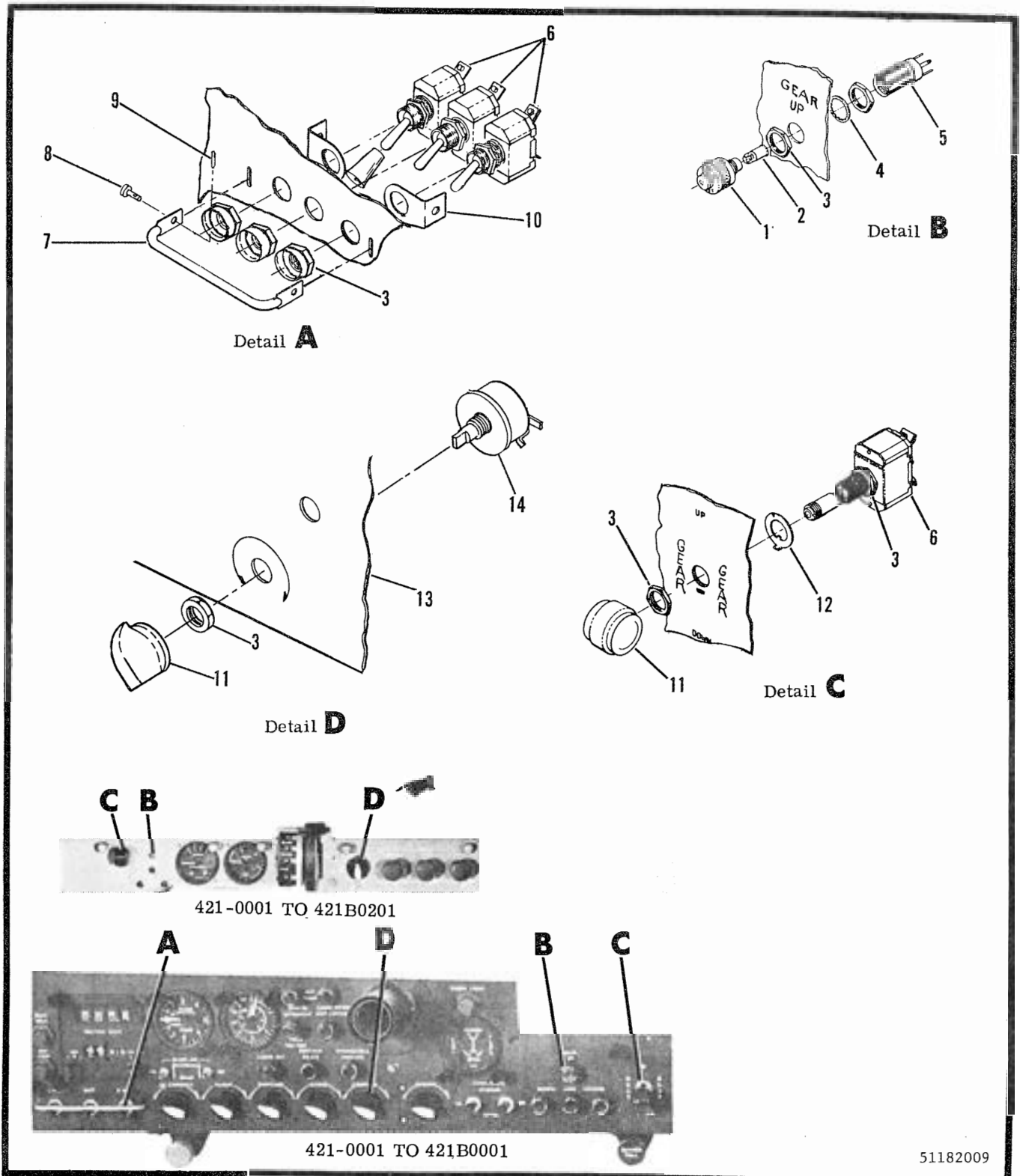
Removal and Installation Switches and Circuit Breakers. (Typical) (See figure 14-2A.)

- a. Turn off all power.
- b. Remove pilot's seat.
- c. Remove console side cover to gain access to applicable switch or circuit breaker.
- d. Remove electroluminescent light panel as required.
- e. Identify, tag and remove wires from switch or circuit breaker.
- f. Remove nut and washer securing switch or circuit breaker to panel. Remove switch.
- g. Install switch or circuit breakers by reversing the removal procedures.

LIGHTING SYSTEM

The standard exterior lighting system consists of the navigation lights, tail light, top and bottom rotating beacons and a left landing light. Optional exterior lights consist of the right landing light, deice light,

TROUBLE	PROBABLE CAUSE	CORRECTION
ONE NAVIGATION LIGHT IS OUT	Lamp burned out.	Replace lamp.
	Defective wiring.	Check/repair or replace wiring.
	Defective lamp socket.	Replace light assembly.

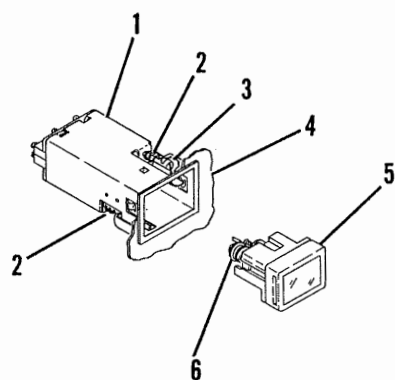


1. Lens Cap
2. Bulb
3. Nut
4. Lockwasher
5. Light Body

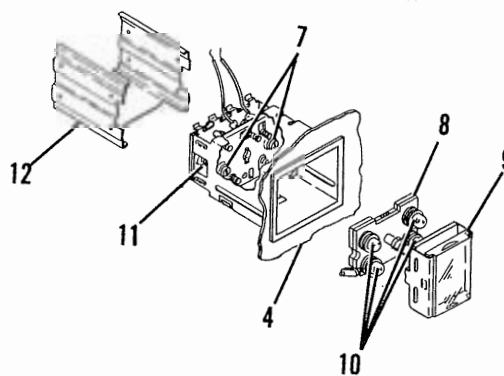
6. Switch
7. Switch Bar
8. Pin
9. Cotter Pin

10. Bracket
11. Knob
12. Keyed Washer
13. Instrument Panel
14. Rheostat

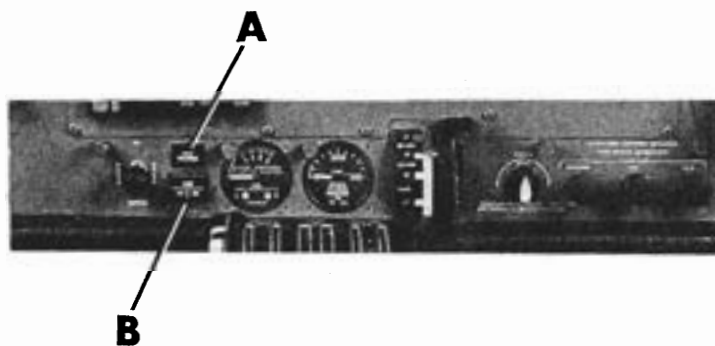
Figure 14-5. Stationary Panel Components Installation

Detail **A**

GEAR UNLOCKED
INDICATOR LIGHT

Detail **B**

GEAR DOWN AND LOCKED
INDICATOR LIGHT



421B0201 AND ON

1. Light Assembly	5. Lens Assembly	9. Lens Assembly
2. Locking Cam	6. Lamps	10. Lamps
3. Screw	7. Screw	11. Locking Cam
4. Instrument Panel	8. Lamp Socket Assembly	12. Backshell

Figure 14-5A. Landing Gear Indicator Lights

TROUBLE	PROBABLE CAUSE	CORRECTION
ALL NAVIGATION LIGHTS ARE OUT	Circuit breaker out. Defective wiring or navigation light switch.	Check/reset circuit breaker. Check/repair or replace wiring. Replace navigation light switch.
LANDING LIGHT EXTENDS BUT DOES NOT LIGHT	Circuit breaker out. Lamp burned out. Defective wiring.	Check/reset circuit breaker. Replace lamp. Check/repair or replace wiring.
LANDING LIGHT WILL NOT EXTEND OR WHEN EXTENDED WILL NOT RETRACT	Circuit breaker out. Defective wiring. Defective switch. Defective landing gear light.	Check/reset circuit breaker. Check/repair or replace wiring. Replace switch. Replace landing light.
ROTATING BEACON LIGHTS, BUT WILL NOT ROTATE	Defective motor. Defective wiring.	Replace light. Check jumper wire in connector.
ROTATING BEACON LIGHT WILL NOT LIGHT	Lamp burned out. Defective wiring.	Replace lamp. Check/repair wiring.
TAXI LIGHT DOES NOT OPERATE	Circuit breaker out. Lamp burned out.	Check/repair wiring and/or replace switch. Replace lamp.
COURTESY LIGHT OUT	Circuit breaker out. Defective switch or wiring. Lamp burned out.	Check/reset circuit breaker. Check/repair wiring and/or replace switch. Replace lamp.
DEICE LIGHT OUT	Circuit breaker out. Defective switch or wiring. Lamp burned out.	Check/reset circuit breaker. Check/repair wiring and/or replace switch. Replace lamp.
INSTRUMENT LIGHTS OUT	Lamp(s) burned out.	Replace lamps.
GROUP OF INSTRUMENT LIGHTS OUT	Defective transistor heat sink assembly. Defective dimmer control.	Replace transistor. Replace defective resistor and/or defective potentiometer.

taxi light, and a strobe light. The standard interior lights consist of a cabin door light, a dome light, four cabin reading lights, overhead console lights, a map light, three left hand console panel lights located in the pilot's armrest and fuel selector lights. The instrument panel lights consist of the warning lights, compass light, a call letter light, and the instrument lights. If desired, an optional lighted seat belt sign, oxygen sign and post lights for optional instruments may be installed. On aircraft 421B0001 and On a dimmer control and a transistor heat sink controls the lighting intensity. On aircraft 421B0001 to 421B0301, the transistor heat sink assembly is located on the right aft side of the forward pressure bulkhead. On aircraft 421B0301 and On, the transistor heat sink is located on the forward center side of the forward pressure bulkhead. On aircraft 421B0001 to 421B0301, the dimmer control is mounted on the stationary panel; on aircraft 421B0301 and On, the dimmer control is mounted on the center pedestal. On aircraft 421B0001 to 421B0301 a dimming control for auxiliary fuel quantity lights is mounted on the forward side of the stationary switch panel at the inboard side of the glove compartment; on aircraft 421B0301 and On it is mounted above the center pedestal.

Removal and Installation of Heat Sink Assembly.
(See figure 14-5B.)

- a. Disconnect connector from aircraft wire bundle.
- b. Remove four screws securing heat sink assembly (2) to forward pressure bulkhead (1) and remove heat sink.

c. Transistors (4) may be removed from the heat sink assembly by removing nut, screw, lockwasher and mica washer.

d. Identify electrical leads from transistor to side in reinstallation and disconnect leads.

e. Install transistors and heat sink assembly by reversing the removal procedures.

Removal and Installation of Dimming Control Assembly. (See figure 14-5B.)

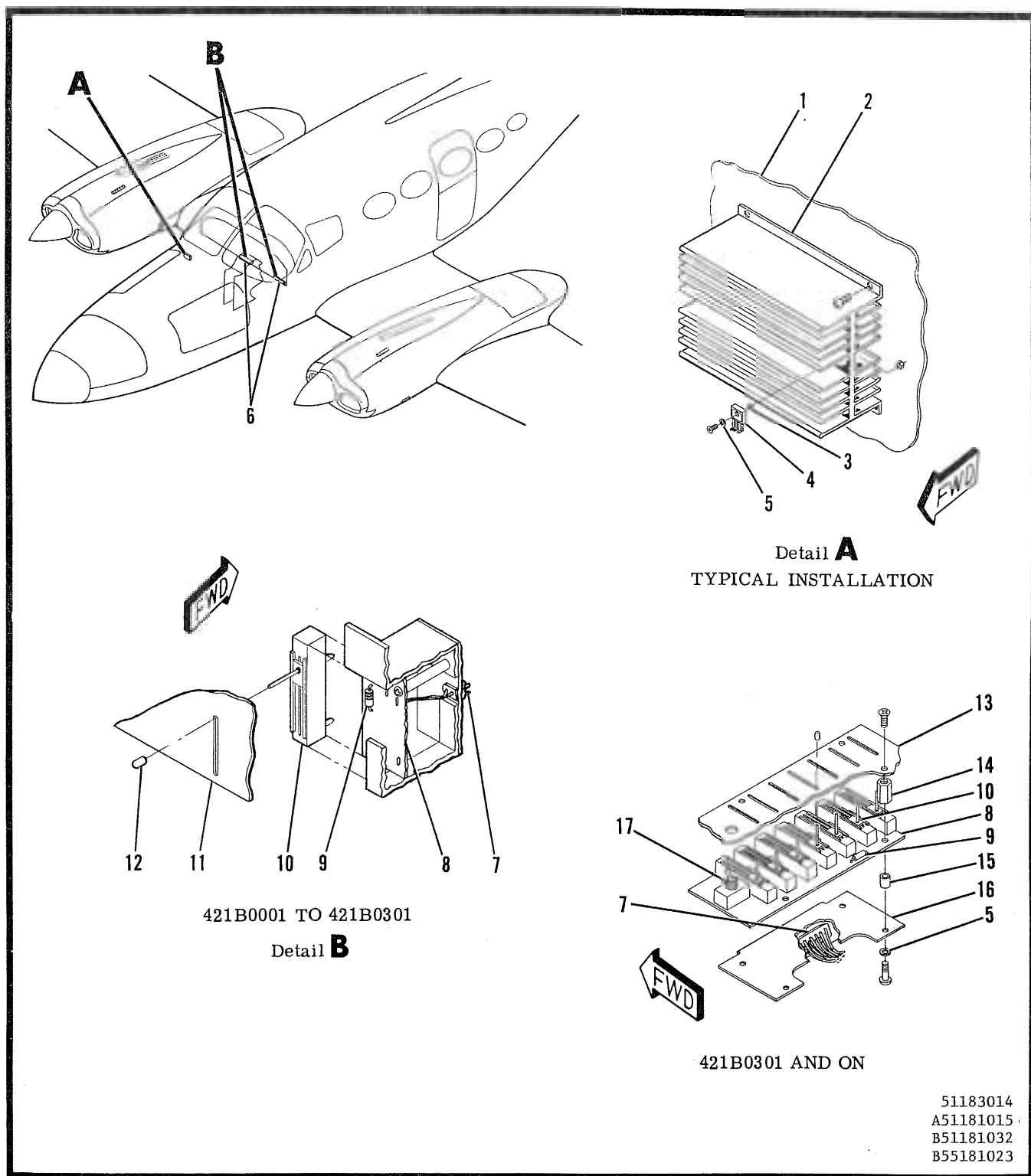
- a. Disconnect electrical wiring at electrical plug (7).
- b. Remove switch handles (12) from dimming control assembly (6).
- c. Remove four screws securing dimming control to stationary panel (11) and remove dimming control from behind panel.
- d. Remove screws, nuts and spacers securing circuit board (8) to dimming control assembly.
- e. Resistors (9) and potentiometers (10) may be replaced if required by unsoldering electrical connections.
- f. Install resistors, potentiometers, circuit board and dimming control assembly by reversing the removal procedures.

Removal of Landing Gear Switch and Indicator Light.
(See figure 14-5.) (421-0001 to 421B0201)

- a. Unscrew and remove wheel shaped knob from switch.
- b. Remove the nut securing switch to panel and remove the switch from the rear of the panel.
- c. Tag and disconnect wires from the switch.
- d. To remove the indicator lights, remove the lens and bulb.
- e. Loosen nut securing light to panel and pull light forward from panel.
- f. Unsolder and tag wires from light.

Installation of Landing Gear Switch and Indicator Light. (See figure 14-5.) (421-0201 to 421B0201)

- a. To install indicator light, solder wires to light and remove tags.

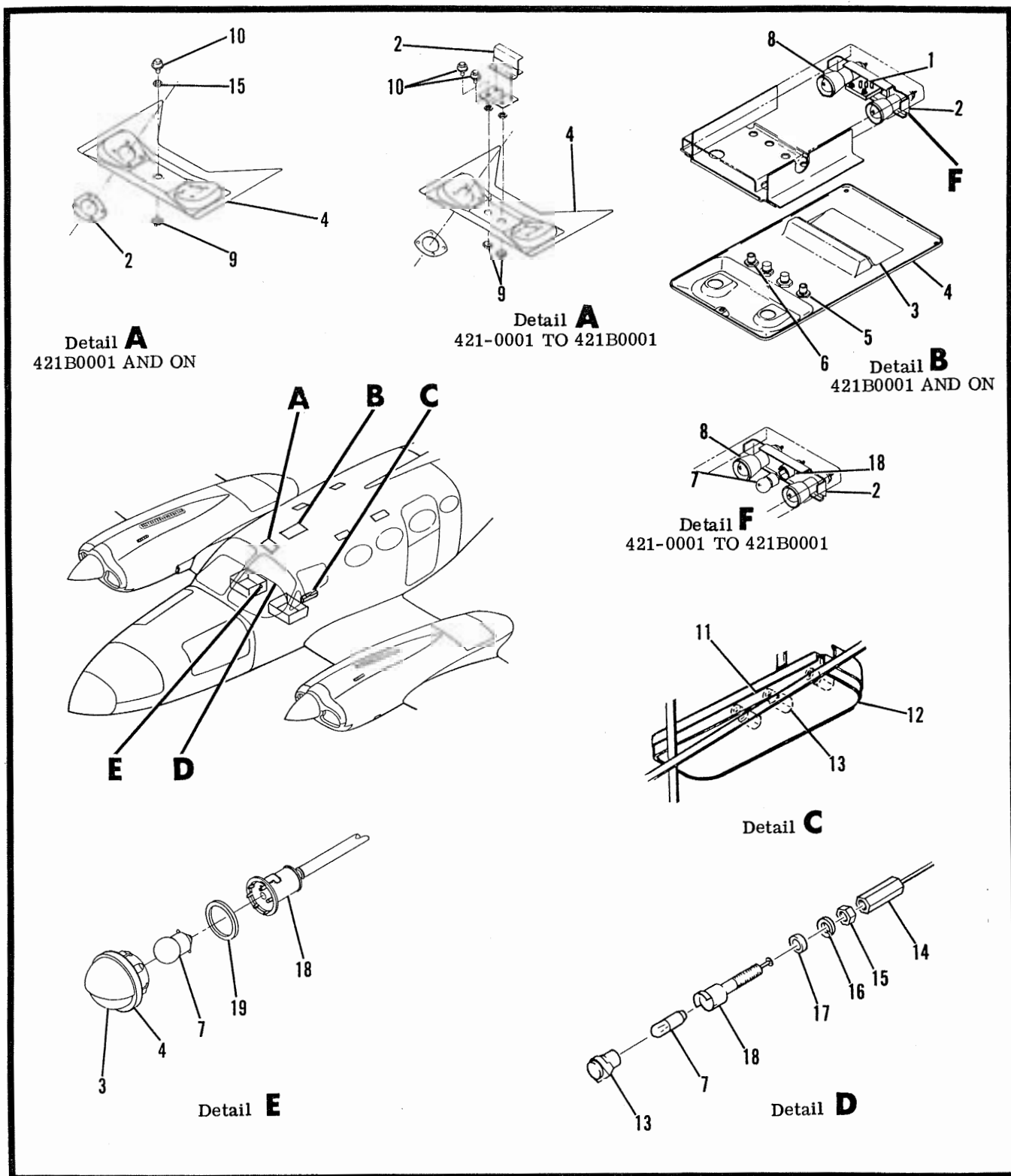


1. Forward Pressure Bulkhead
2. Heat Sink Assembly
3. Mica Washer
4. Transistor
5. Lockwasher
6. Dimming Control Assembly

7. Electrical Plug
8. Circuit Board
9. Resistor
10. Potentiometer
11. Stationary Panel

12. Switch Handle
13. Center Pedestal
14. Hex Spacer
15. Spacer
16. Bracket
17. Switch

Figure 14-5B. Instrument Lighting Controls



1. Transistor Unit
2. Escutcheon
3. Lens
4. Cover
5. Mike Jack

6. Headset Jack
7. Bulb
8. Reflector
9. Knob
10. Rheostat

11. Armrest
12. Shield
13. Light
14. Connector

16. Lockwasher
17. Washer
18. Socket
19. Gasket

Figure 14-6. Cockpit Lighting

- b. Install light in panel and secure with nut.
- c. Install bulb and lens.
- d. To install landing gear switch, connect wires to switch and remove tags from wires.
- e. Place two nuts on the switch shaft and run them down finger-tight against the switch body.
- f. Place another nut on the switch shaft from front of the instrument panel. Tighten only finger-tight.
- g. Tighten the nut on the front side of the panel.
- h. Tighten nuts on the back side of panel (counterclockwise) on switch shaft until the switch is secured against panel. Be sure the keyed washer mates the small hole in the panel below switch mounting hole.
- i. Screw the wheel shaped knob on the switch toggle.

Removal and Installation of Landing Gear Indicator Lights. (See figure 14-5A.) (421B0201 and On.)

- a. To remove gear unlocked light, identify, tag and disconnect electrical wires at connector.

NOTE

To replace lamps, it is only necessary to comply with steps (b) and (c).

- b. Press the lens assembly (5). The lens will snap back and extend approximately 1/2 inch.
- c. The lens assembly can then be pulled from light assembly (1) to expose lamps (6).
- d. Turn screws (3) counterclockwise until locking cams (2) are unlocked.
- e. Remove light assembly from instrument panel (4).
- f. Installation of the gear unlocked light is the reversal of the removal procedures.
- g. To remove the down-and-locked indicator light, identify, tag and disconnect electrical wires at connector.

NOTE

To replace lamps, it is only necessary to comply with steps (h) and (i).

- h. With finger tips, pull out on lens (9) until it reaches a stop (approximately 1/2 inch).
- i. Rotate lens assembly (9) 90 degrees counterclockwise. The lens and lamp socket assembly (8) will then extend further. The lens and lamp socket assembly (8) can then be pivoted down to expose lamps (10).
- j. With the lamp socket assembly (8) pivoted out of the way, turn screws (7) counterclockwise until the locking cams (11) are unlocked.
- k. Slide backshell (12) from the light assembly and remove light assembly from instrument panel (4).
- l. To install the down-and-locked indicator light, insert the light assembly through the instrument panel (4), then slide the backshell (12) onto the light assembly until it is against the backside of the instrument panel.

NOTE

An assembled fire warning light must be disassembled in accordance with the removal procedures prior to installation.

- m. Turn screws (7) clockwise until locking cams (11) are engaged against the backshell (12). Tighten screws.
- n. Swing light socket assembly (8) into position and push in until a stop is reached (approximately 1/2 inch from panel). Rotate lens (9) clockwise 90 degrees and push lens (9) until it snaps into position.
- o. Connect electrical wires and verify proper operation of switch.

Removal and Installation of Overhead Console Light Rheostats.

- a. Loosen setscrew securing rheostat knob using a 3/32-inch allen wrench, then remove rheostat knob.
- b. Remove screws securing cover panel and remove cover.
- c. Remove nut securing rheostat to bracket and remove rheostat from bracket.
- d. Tag and remove wires by unsoldering from rheostat connections.
- e. To install overhead console light rheostats reverse this procedure.

Removal and Installation of Instrument Lights. (See figure 14-6.)

- a. To remove post type instrument panel lights, remove wire from connector and remove nut, lock-washers and spacer (if used) securing light to instrument panel or stationary panel.
- b. To install post instrument lights, reverse the above procedure.

Removal and Replacement of Left Hand Console Lights.

- a. Remove the screws securing the metal shield on the arm rest console.
- b. Remove lights by removing lens, bulb and base of light.
- c. Installation of left hand console panel lights is the reversal of the above procedure.

Fuel Selector Valve Lights.

The fuel selector valve lights are located on the inboard side of pilot's and copilot's seats. These lights are controlled by the engine rheostat on the stationary panel.

Removal and Replacement of Fuel Selector Valve Light.

- a. To remove fuel selector valve light, pry light loose from seat base.

b. To install fuel selector valve light, make sure wire is connected and insert light into hole. Press in firmly to insure tight fit.

Removal and Replacement of Rear Dome Light. (See figure 14-7.)

- a. Remove rear dome light lens by removing retaining screws.
- b. Remove dome light switch by removing the two screws securing switch to bracket.

NOTE

Because the dome light is riveted to outside skin, no further disassembly should be attempted unless absolutely necessary.

- c. Replacement of rear dome light is the reversal of the above procedure.

Removal and Replacement of Individual Reading Lights. (See figure 14-7.)

- a. Remove light socket (3) by screwing counterclockwise out of retainer.
- b. Pull socket out, tag and disconnect wires.
- c. Remove air outlet by screwing counterclockwise out of retainer.
- d. Remove oxygen outlet cover (6) by removing outlet cover retainer nut (7).

- e. Pull escutcheon up and out of bracket.
- f. Remove four screws securing light retainer to plate.

CAUTION

Before disconnecting any wires from the individual reading lights or cabin courtesy light always disconnect the ground lead of the battery. These lights are not connected thru the master switch and damage may result to the circuit wiring.

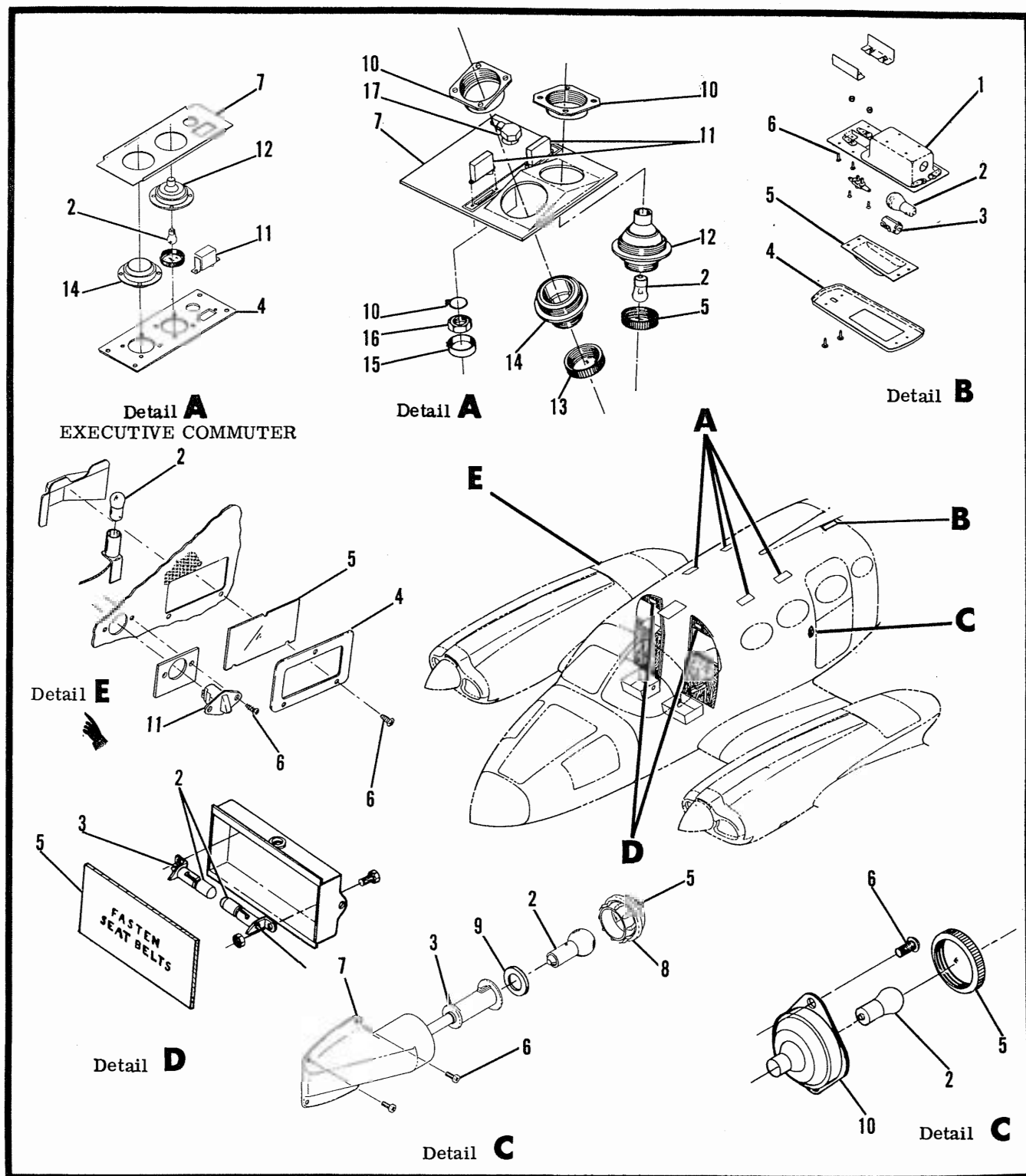
- g. Removal of the individual reading light switch is accomplished by removing the screws securing the switch to the escutcheon.

NOTE

For convenience of replacing bulbs, the lens is removable from the light by an expansion type lens and is removed by slipping lens off of light.

Removal and Replacement of Cabin Door Entrance Light. (Optional, 421B0001 and ON) (See figure 14-7.)

- a. Remove two screws securing light assembly to cabin door forward door post.
- b. Pull assembly out and disconnect wires.
- c. To install, connect electrical leads and install



1. Light (Dome)
2. Bulb
3. Socket
4. Escutcheon
5. Lens
6. Screw

7. Bracket
8. Light (Entrance)
9. Gasket
10. Retainer
11. Switch

12. Light (Reading)
13. Air Outlet Valve
14. Air Outlet
15. Outlet Cap
16. Nut
17. Oxygen Outlet

Figure 14-7. Cabin Lighting

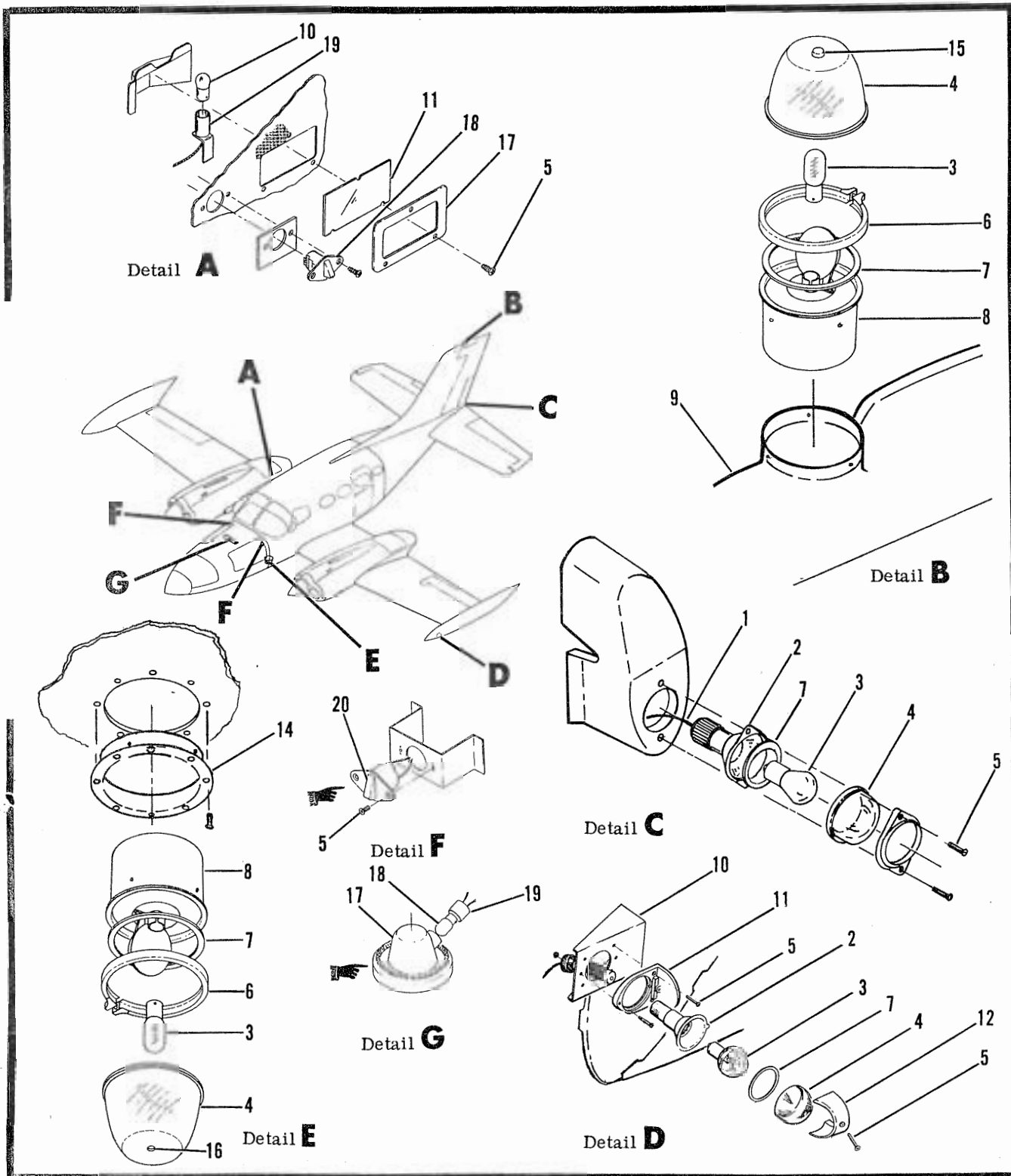


Figure 14-8. Exterior Lighting

two retaining screws.

NOTE

For convenience of replacing bulbs, the lens is removable from the light by an expansion type lens ring and is removed by slipping lens off of light.

Removal and Replacement of Cabin Courtesy Light. (See figure 14-7.)

- a. Remove two screws securing light assembly to side panel armrest.
- b. Pull assembly out and disconnect wires.
- c. To install, connect electrical leads and install two retaining screws.

NOTE

For convenience of replacing bulbs, the lens is removable from the light by an expansion type lens ring and is removed by slipping lens off of light

Removal and Installation of Wing Locker Courtesy Light. (See figure 14-7.)

- a. Pull wing locker light circuit breaker.
- b. Remove the three screws securing the light and remove light from nacelle.
- c. Installation of the wing locker courtesy light is the reversal of the removal procedures.
- d. Reset circuit breaker and check operation.

Removal and Installation of Wing Locker Courtesy Light Switch. (See figure 14-7.)

- a. Pull wing locker light circuit breaker.
- b. Remove two screws securing switch.
- c. Tag and disconnect wires to switch.
- d. Installation of the nacelle wing locker light switch is the reversal of the removal procedures.
- e. Reset circuit breaker and check operation.

REMOVAL AND INSTALLATION OF NOSE BAGGAGE COMPARTMENT LIGHT. (See Figure 14-8.) (421B0301 AND ON.)

- a. Open nose baggage door.
- b. Pull light assembly (17) down and lift out of mount bracket.

NOTE

Light assembly (17) is held in place by spring tabs.

- c. Disconnect socket assembly (19) and remove light assembly from aircraft.
- d. To replace light bulb (18) remove from socket assembly and install new bulb.

- e. To reinstall light assembly, reconnect to socket assembly, insert light assembly into mount bracket, push up with a firm even hand pressure until spring tabs latch light assembly in place.
- f. Close door, secure with locking fasteners.

REMOVAL AND INSTALLATION OF NOSE BAGGAGE COMPARTMENT LIGHT SWITCHES. (See figure 14-8.) (421B0301 AND ON.)

- a. Open nose baggage doors.
- b. Remove the two mount screws (5) securing switch (20) in place.

NOTE

The switches are mounted at aft end of door-frame, one on the left and one on the right.

- c. Tag and disconnect wires.
- d. Remove switch from aircraft.
- e. Install switch by reversing the foregoing procedure.
- f. Close and secure doors with locking fasteners.

Removal and Replacement of (Fasten Seat Belt) and (Oxygen) Sign Lights (Optional).

The optional "Fasten Seat Belt" and "Oxygen" sign lights are mounted on the cabin divider and are operated by switches mounted on the left side of the instrument panel.

- a. To remove either light, remove the top panel from the forward side of the cabin divider.
- b. Remove the two screws securing the light to the cabin divider.
- c. Disconnect and tag wires.
- d. Installation of the lights is the reversal of the above procedure.

Removal and Installation of Wing Navigation Lights. (See figure 14-8.)

- a. Remove the tip tank nose cap.
- b. (See figure 14-8.) Remove and install navigation light in sequence as shown.

Removal and Installation of Tail Navigation Lights. (See figure 14-8.)

- a. Two screws secure the tail light assembly to the stinger. Removing these two screws and disconnecting the electrical connector from the rear of the light assembly will allow the tail light to be removed.
- b. To replace the tail light, reverse the above procedure.

Removal and Installation of Rotating Beacons. (See figure 14-8.)

- a. To remove the rudder-mounted rotating beacon, remove the screws in the fiberglass tip and lift rotating beacon out.

- b. Disconnect electrical plug.
- c. To remove the belly mounted rotating beacon, remove the screws in the flange mounting and lower rotating beacon from fuselage.
- d. Disconnect the electrical plug.
- e. Installation of the rotating beacons may be accomplished by reversal of the above procedure.

NOTE

On the belly-mounted rotating beacon, make sure the gasket is installed between fuselage skin and rotating beacon. Seal around beacon from inside of fuselage in accordance with sealing procedures in Section 16.

CAUTION

When replacing the bulb in the rotating beacons do not allow the reflector to move. Always grasp the bulb base and unscrew bulb

from bayonet fittings. This will prevent motor drive spring damage.

Removal of Landing Light. (See figure 14-9.)

- a. Support the light assembly and remove screws which secure lamp housing to retainer band.
- b. Lower the light assembly out of the tip tank tail cap and place on a stand of suitable height.

NOTE

The wiring to the light contains sufficient slack to permit the light assembly to be brought down below the tip tank tail cap for removal of light wiring.

- c. Tag and remove the wires from the terminal block on the light.
- d. To remove the lamp from the landing light, extend the light approximately 60 degrees and remove the lamp retainer ring. Pull the lamp from the inner canopy and disconnect the wires from the lamp.

NOTE

When the light assembly is removed from the aircraft, the light may be extended by applying a 28 volt power source across the OPEN and ground terminals.

- e. Remove the two screws securing the power unit to the housing.

Installation of Landing Light. (See figure 14-9.)

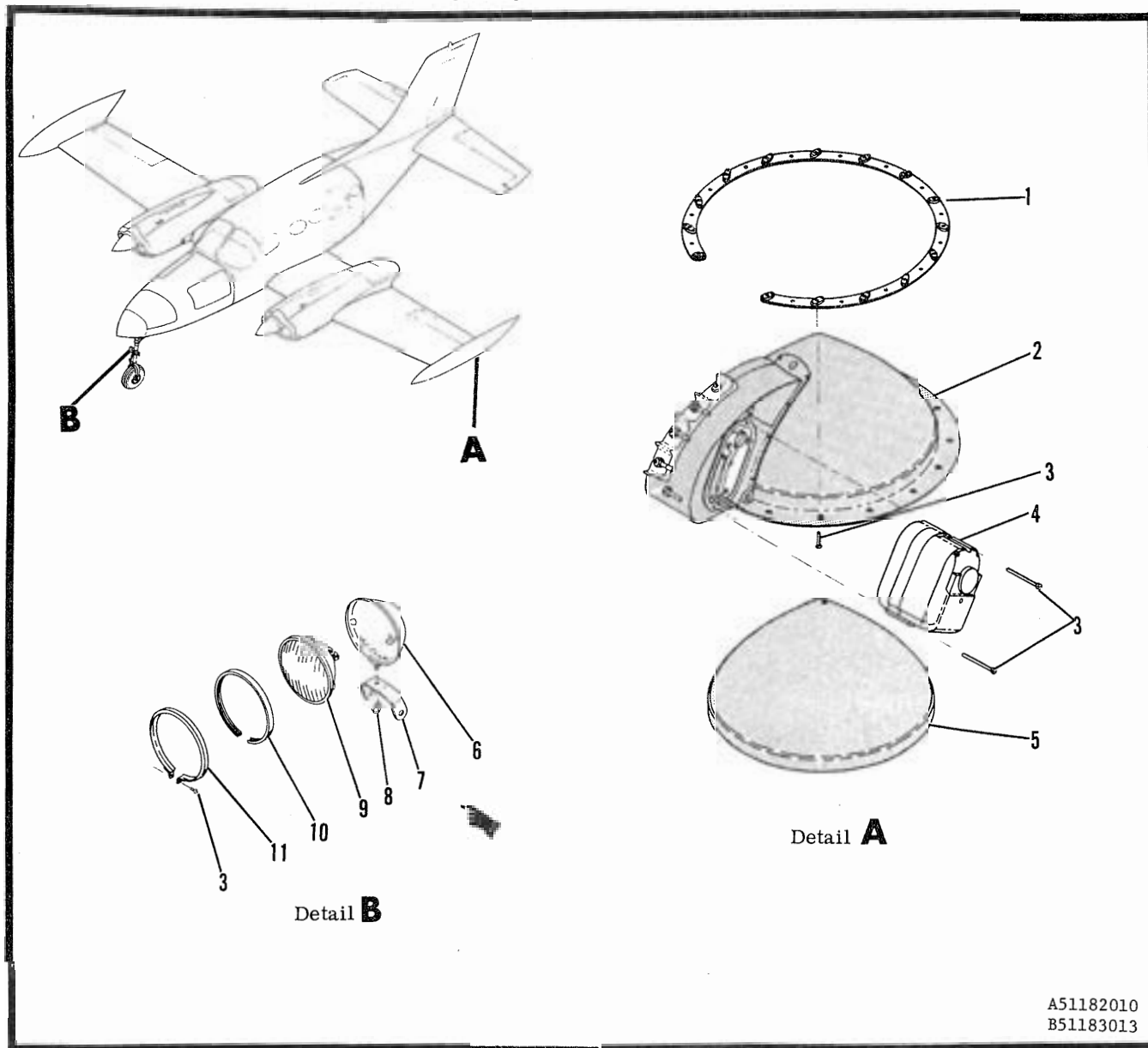
- a. Position power unit within drive housing of light

assembly and secure with two screws.

- b. To install a new lamp, connect the wires to the lamp and position the lamp within the canopy with the filament shield inboard. Position the lamp retainer band over the edges of the lamp and canopy with the flat side toward the apex of the canopy. Using needle nose pliers, pull the retainer band tight around the lamp and canopy and fasten the clip on the band.

NOTE

Before installing a new lamp, it will be neces-



1. Retainer Band
2. Lamp Housing
3. Screw
4. Power Unit

5. Lamp Assembly
6. Canopy Assembly
7. Bracket

8. Nut
9. Lamp
10. Gasket
11. Retainer Ring

Figure 14-9. Landing and Taxi Light Installation

sary to extend the light approximately 60 degrees to gain access to the retainer band.

c. Position the retainer ring inside the tip tank tail cap with the open side forward and tape it to the tip tank tail cap to hold it in position temporarily while the light assembly is installed.

d. Connect the wires to the light assembly and remove the identification tags.

e. Place the light assembly into the wing and secure with screws.

NOTE

Start all screws through the nutplates on the retainer band before attempting to tighten any of them to prevent distortion or misalignment of the band.

Adjustment of Landing Light. (See figure 14-10.)

Landing lights are adjusted in the factory to extend to an angle of 80 degrees from the fully retracted position. The angle of extension may be altered by means of an adjustment screw as illustrated in figure 14-10.

NOTE

Do not turn the adjusting screw counterclockwise more than three full turns without closing and opening the light before further adjustment. Excessive turns of the screw in a counterclockwise direction will distort an actuator contact within the assembly, thus changing the fixed setting which controls the light retract position.

The angle of extension of the landing light may be checked with a bubble protractor. Check the degree of opening according to the following steps:

a. Retract the landing light and place the flat surface of the protractor across the retainer band which secures the lamp within the inner canopy.

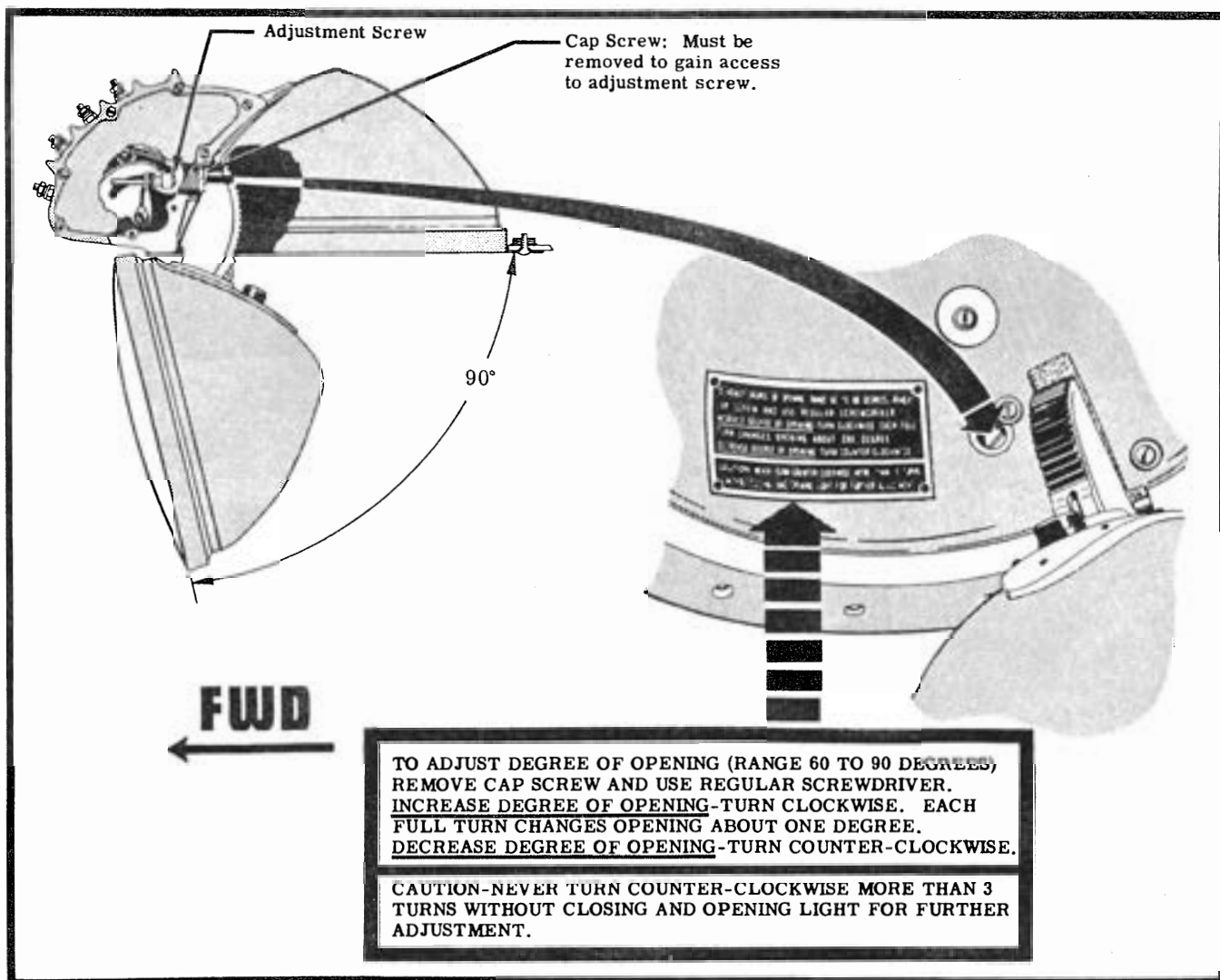


Figure 14-10. Adjustment of Landing Light

NOTE

Two blocks of equal thickness may be placed on the retainer band to raise the protractor so it will clear the surface of the lamp for a more positive location of the protractor.

b. Run the landing light full down and measure the angle of extension. If the light has not reached the desired degree of extension, turn the landing light adjustment screw in the direction necessary to achieve the desired angle of extension.

c. Retract the light to the full up position, fully extend the light, and check the angle of extension.

Removal and Installation of Taxi Light. (See figure 14-9.)

- a. Tag and disconnect electrical wires.
- b. Remove nut securing lamp and remove lamp.
- c. Remove cotter pin, nut and washer securing light to strut bracket.
- d. Installation of taxi light is a reversal of this procedure.

Adjustment of Taxi Light.

The taxi light should be adjusted to an angle of approx-

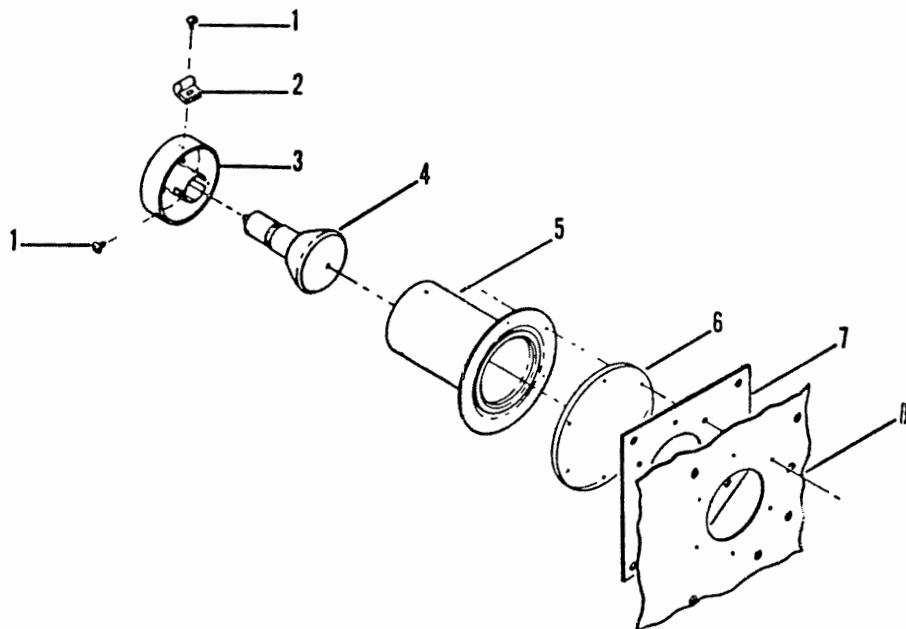
imately three degrees below horizontal. The light should also be adjusted to point in the direction of the nose wheel. The fore and aft positions of the light may be adjusted by removing the cotter pin and loosening the nut to free the mounting bracket. The light may be aligned with the nose wheel by loosening the mounting nut and pivoting the light on the mounting bracket.

CAUTION

After adjustment, make sure the nut securing light to the bracket is tight and the bolt securing the bracket is tight and cotter pin installed.

Removal and Installation of Deice Light. (See figure 14-11.)

- a. Remove upper cowling from left engine.
- b. Remove screws securing socket assembly and clamp holding wires.
- c. Pull socket assembly apart from lamp shield to remove bulb.
- d. If further disassembly is required, tag and remove wires. Drill out rivets securing shield assembly to nacelle skin.
- e. Installation of deice light is accomplished by reversing this procedure.



1. Screw
2. Plastic Clamp
3. Socket Assembly

4. Lamp
5. Shield

6. Lens
7. Doubler
8. Nacelle Skin

Figure 14-11. Wing Deice Light Installation

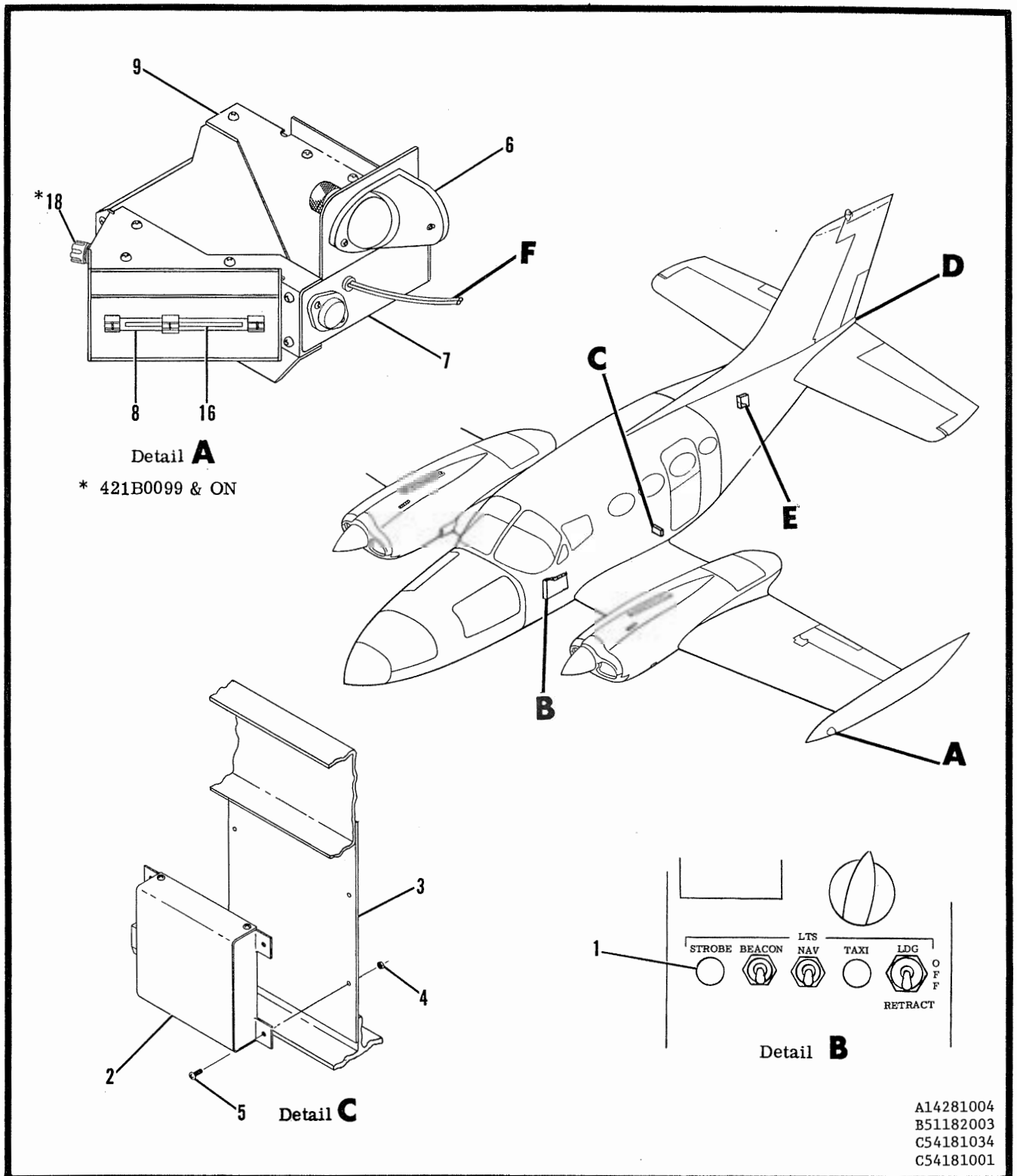


Figure 14-12. Strobe Light System Installation (Sheet 1 of 2)

Strobe Light System. (Optional)

The high intensity strobe light system consists of a strobe light located on each wing tip, a flasher unit located beneath the floorboard under the left-hand aft

forward facing passenger seat, a power supply unit located in the tail section of the aircraft, a switch circuit breaker located on the side console, and a tail light unit located in the stringer. The wiring is shielded to guard against radio noise interference.

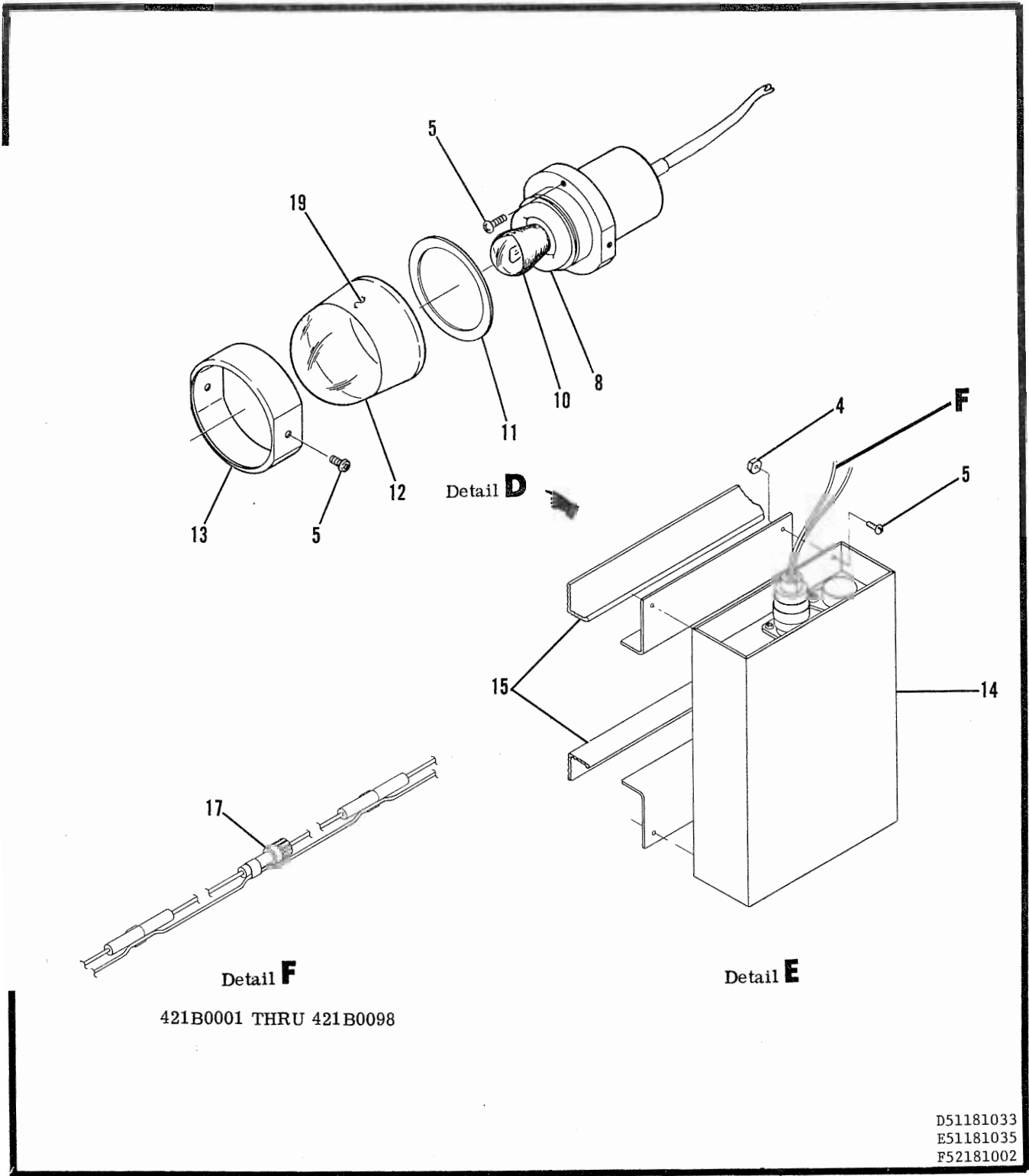


Figure 14-12. Strobe Light System Installation (Sheet 2 of 2)

Troubleshooting the Strobe Light System.

TROUBLE	PROBABLE CAUSE	CORRECTION
ONE STROBE LIGHT OUT	Flash tube burned out.	Replace flash tube.
	Power supply defective.	Replace power supply.
ALL STROBE LIGHTS OUT	Circuit breaker out.	Reset breaker.
	Defective switch.	Replace switch.
	Power supply defective	Replace power supply.
	Timer inoperative.	Replace timer.
STROBE LIGHT WILL NOT FLASH	Defective timer.	Replace timer.

Removal and Installation of the Strobe Light System Components. (See figure 14-12.)

- a. Remove nose cap on each wing tip.

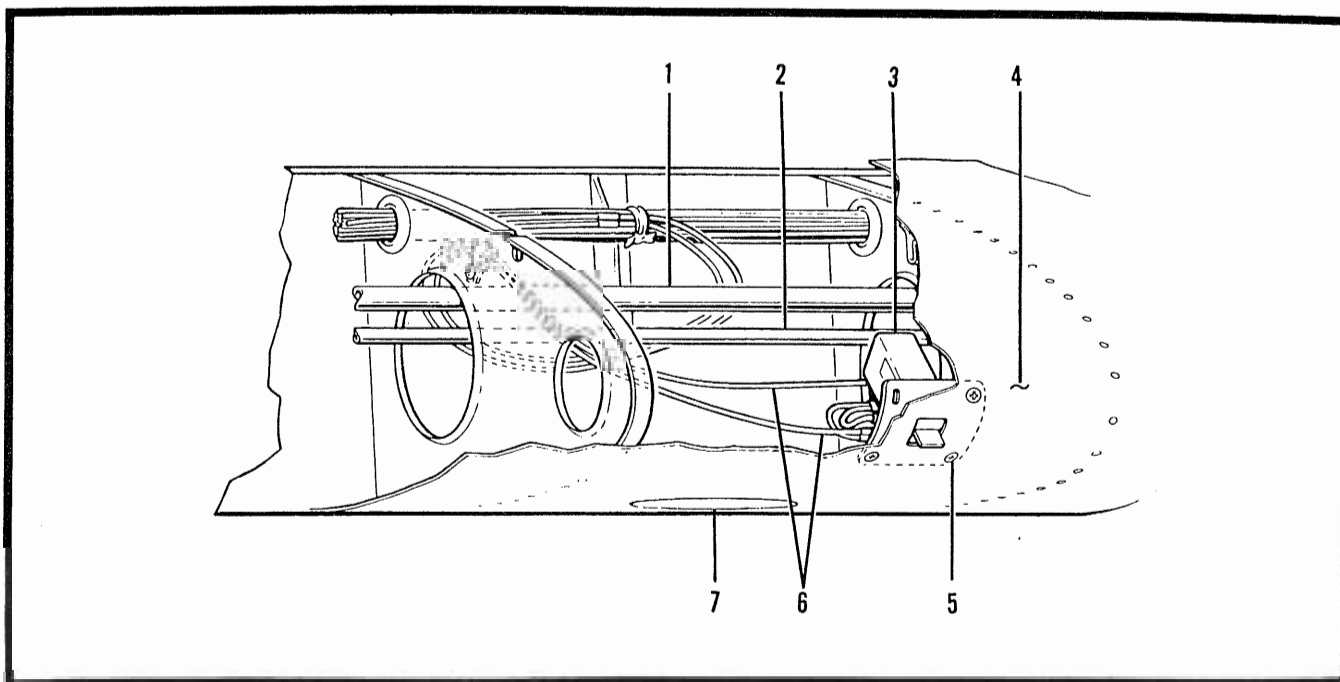
NOTE

If strobe light bulb is burned out, unsafety and remove from clips. Reinstall new bulb and safety.

CAUTION

Install bulb with trigger grid facing toward the lens and away from the reflector

- b. Disconnect electrical wiring to strobe light.
 c. Remove strobe light unit from supporting bracket.
 d. (See figure 1-2.) Remove access cover (82) to gain access to flasher.
 e. Disconnect electrical wiring from flasher.
 f. Remove flasher from supporting beam.
 g. (See figure 1-2.) Remove access cover (21) to gain access to power supply unit.
 h. Disconnect electrical plug.
 i. Remove power supply unit from supporting bracket
 j. Remove tail light in accordance with figure
 k. The installation of the strobe system components is the reversal of the removal procedure.



1. Left Fuel Supply Line
 2. Vapor Return Line

3. Stall Warning Transmitter
 4. Wing Skin
 5. Screw

6. Electrical Wires
 7. Access Hole Cover

Figure 14-13. Stall Warning Transmitter

STALL WARNING SYSTEM.

The stall warning system is comprised of a stall and landing gear warning horn mounted in the left console and the actuating switch mounted on the leading edge of the left wing. When the aircraft approaches a stall the switch energizes the electrical circuit and causes the warning horn to sound. A heater element is provided in the actuating switch, to prevent ice from hampering the operation, is energized when the pitot heat switch is turned on.

Removal of Stall Warning Transmitter. (See figure 14-13.)

NOTE

Before removal of stall warning transmitter, it is important that the exact location of the vane be marked on the wing so that the replacement unit may be adjusted identically.

- a. Remove access hole cover (7).
- b. Remove four screws (5) attaching stall warning transmitter (3) to wing skin (4).
- c. Tag and disconnect electrical wires (6) and remove stall warning transmitter (3).

Installation of Stall Warning Transmitter. (See figure 14-13.)

- a. Attach electrical wires (6) as tagged at removal.
- b. Secure stall warning transmitter (3) to wing skin (4) with four attaching screws (5).
- c. Replace access hole cover (7).

Operational Check of Stall Warning System.

- a. Ground Check.
 1. Turn electrical power on.
 2. Activate vane on stall warning transmitter and observe audible warning signal.
- b. Flight Check.
 1. Check the stall warning in two configurations: landing gear up, flaps up and gear down, flaps full down.
 2. Check each configuration in step a at 65% power using power computer furnished with aircraft and at idle power.
 3. Approach the stall by reducing airspeed at a rate as close as possible to 1 knot per second. In the stall the aircraft roll attitude should be controllable up to the time the aircraft nose pitches downward or full up elevator stop is reached. The fuel should be managed to minimize asymmetric fuel prior to conducting the stall.
 4. The indicating stall speed in the landing configuration at idle power shall fall within ± 4 knots of a line drawn from the light weight stalling speed to the heavy weight stalling speed as shown by the appropriate chart in Figure 14-13A. The weight at the time of takeoff minus the fuel used shall be used for the weight at stall.

Adjustment of Stall Warning System.

- a. Using the data recorded in the Flight Check portion of the Operational Check of Stall Warning System, adjust the stall warning vane to provide a stall warning horn at 4 to 9 knots IAS prior to the idle power landing configuration stall.
- b. Raising the stall warning vane position will increase the stall warning indication and lowering the stall warning vane will lower the stall warning indication.

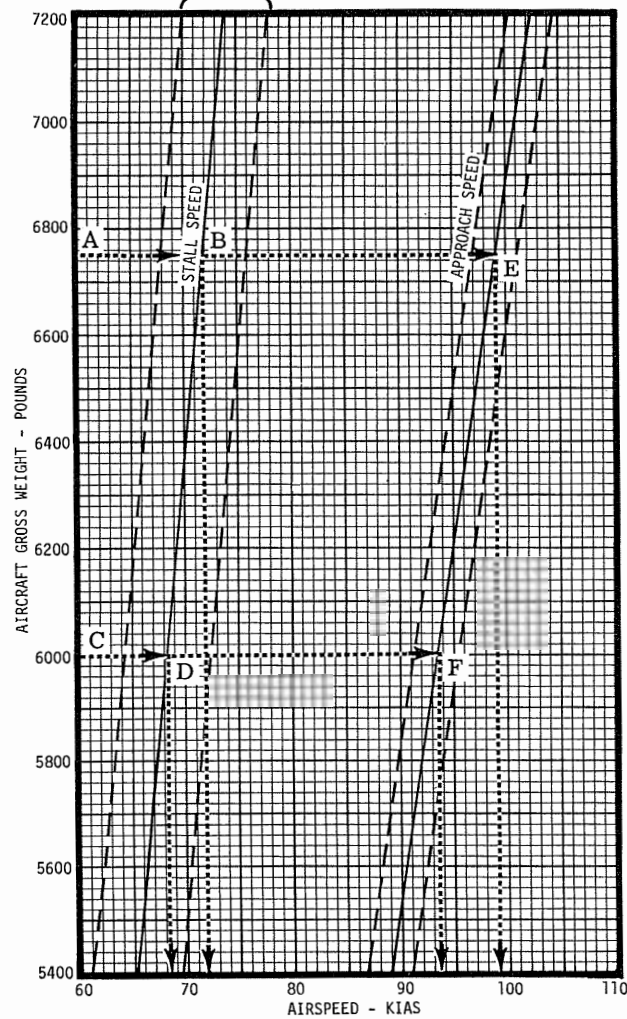
PITOT AND STALL WARNING HEAT SYSTEMS.

The pitot and stall warning heaters are resistance units mounted integrally in the pitot tube and stall warning transmitter. Both units are controlled by one switch.

TAKEOFF WEIGHT RANGE - LBS
6000 - 6750

TAKEOFF C.G. RANGE - %
18 - 20

TOLERANCE BAND ± 4 KNOTS
FROM STALL SPEED LINE



EXAMPLE

- "A" POINT "A" WEIGHT (HEAVY WEIGHT)
- "B" STALL SPEED AT POINT "A" WEIGHT (72.0 KIAS)
- "C" POINT "C" WEIGHT (LIGHT WEIGHT)
- "D" STALL SPEED AT POINT "C" WEIGHT (68.2 KIAS)
- "E" APPROACH SPEED AT POINT "A" WEIGHT (99.0 KIAS)
- "F" APPROACH SPEED AT POINT "C" WEIGHT (93.5 KIAS)

51986001

Figure 14-13A. Approach and Stall Speed Chart

ELECTROLUMINESCENT PANEL LIGHTS

NOTE

The electroluminescent panel emanates light from crystalline powders, or phosphors, sandwiched between two electrically conducted surfaces, of which one surface is translucent. When the panel lights are turned on, the powders absorb electrical AC energy and convert it to light without the use of starters, or ballasts and with minimal heat.

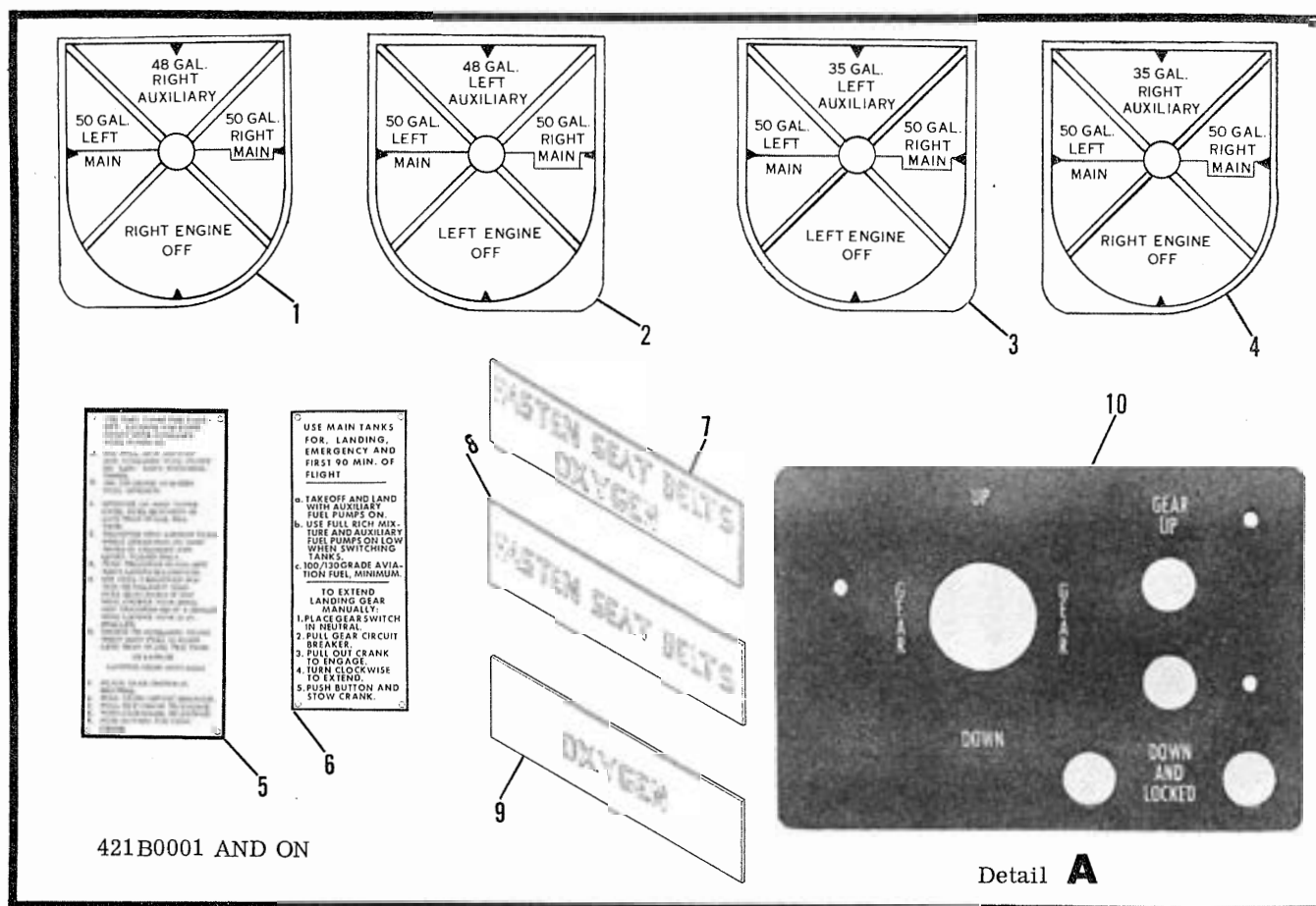
Operational checks on the electroluminescent panels should be performed using 120 volt 400 cycle AC. However, panel will operate without damage on 120 volt, 60 cycle AC.

Installation of Electroluminescent Panels. (See figure 14-14.)

Removal of Electroluminescent Panels. (See figure 14-14.)

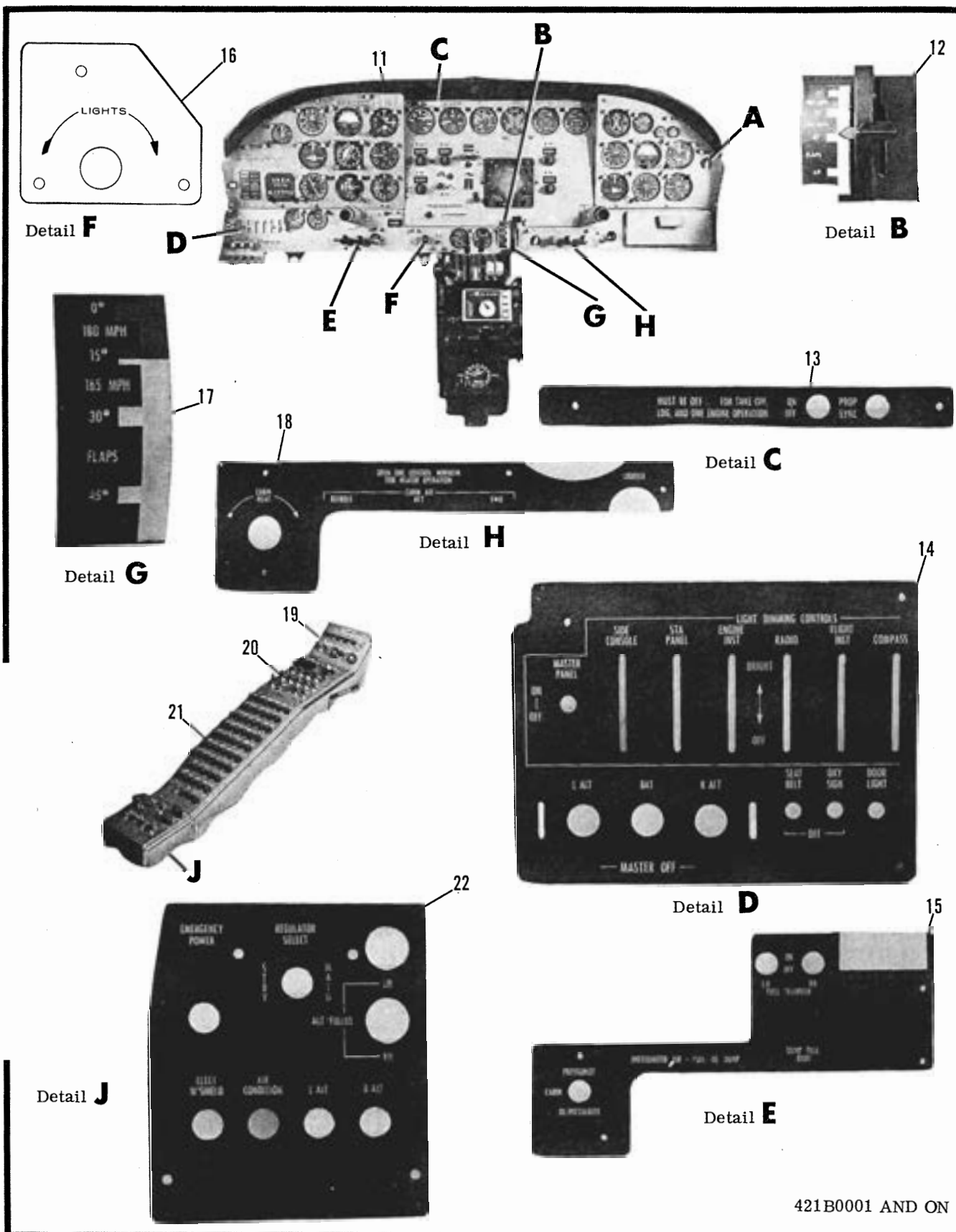
a. The installation procedure for the electroluminescent panels is the reversal of the removal procedures.

- a. Turn off power.
- b. Remove the necessary switch circuit breaker nuts.
- c. Lift panel off and tag and disconnect wiring.



1. RH Auxiliary Fuel Select (48 Gal)
2. LH Auxiliary Fuel Select (48 Gal)
3. LH Auxiliary Fuel Select (35 Gal)
4. RH Auxiliary Fuel Select (35 Gal)
5. Wing Locker Fuel Select
6. Manual Gear Extension and Fuel Select
7. Fasten Seat Belts and Oxygen
8. Fasten Seat Belts
9. Oxygen
10. Landing Gear Control
11. Manifold Pressure
12. Flap Indicator Guard
13. Propeller Synchronizer Control
14. Master Dimming Control
15. Cabin Pressure and Fuel Transfer
16. Flight Light Control
17. Flap Indicator Block
18. Cabin Heat Control
19. Forward Switch Console
20. Forward Circuit Breaker Console
21. Center Circuit Breaker Console
22. Aft Circuit Breaker and Switch Console

Figure 14-14. Electroluminescent Panels (Sheet 1 of 2)



421B0001 AND ON

Figure 14-14. Electroluminescent Panels (Sheet 2 of 2)

NOTE

This load chart is to be used for determining electrical load on the aircraft power distribution system. Amps given are approximate and based on the maximum allowable load in each installation. The loads are not to be used for troubleshooting.

CONTINUOUS ELECTRICAL LOAD CHART

Amp Required

Tip Tank Auxiliary Fuel Pump (2)	11.40
Inline Auxiliary Fuel Pump (2)	3.80
Fuel Transfer Pump (2)	2.20
Fuel Quantity System (2)	.20
Heater Combustion Air Blower	3.00
Heater Vent Blower	11.00
Fuel Pump (Cabin Heater)	1.00
Heater Fuel Valve	.20
Heater Ignition	.75
Stall Warning Heater	1.30
Pitot Tube Heater (Single)	4.30
Tip Tank Vent Heater (2)	.58
Flap Position Indicator (6)	.24
Engine Gauges (2)	.64
Air Temperature Indicator	.08
Turn and Bank Indicator	.15
Battery Relay	.60
Landing Gear Up Indicator Light (2)	.08
Navigation Lights (3)	2.88
Rotating Beacons (2)	3.60
Map Lights (2)	.52
Reading Lights (4)	1.20
Fuel Select Lights (2)	.40
Compass Light	.04
Post Lights (47)	1.48
Side Console Lights (3)	.34
Flood Lights (2)	1.04
Dome Light	.51
Voltage Regulator (2)	2.00
Pressurization Air Dump Valves	.30
Cowl Flaps (Each)	2.00
Cowl Flap Position Indicator	.06
Windshield Deice System (Electric)	50.00
Windshield Deice System (Alcohol)	.40
Stereo Tape Player System	1.50
Auxiliary Fuel Pump Wing Locker (2)	6.00
Propeller Synchronizer System	1.00
Propeller Synchronizer Indicator (1)	.04
Oxygen Sign Lights (2)	.20
Seat Belt Sign Lights (2)	.20
Strobe Lights	3.00
Propeller Deice Boots (3)	14.70
Static Source Heater (2)	.72
Wing Locker Vent Heater (2)	.58
Turn and Bank Indicator RH	.15
Flight Hour Recorder	.04
Air Conditioner System (Total Package)	50.00
Wemac Blower	1.90
Electroluminescent Lighting System	1.25
Electroluminescent Lighting - Avionics Personalized Panel	.30

NOTE

Total continuous load should not exceed 80% of the total rated alternator capacity.

NON-CONTINUOUS ELECTRICAL LOAD CHART

	Amp Required
Landing Gear Down Indicator (4)	.20
Landing Gear Motor	25.00
Flap Motor	13.00
Heater Overheat Light	.04
Cigar Lighter (Each)	6.80
Landing Gear Relay	.45
Fuel Boost Relay (2)	.18
Landing Gear Warning (Horn and Flasher)	.60
Stall Warning	.20
Door Warning Indicator	.04
Door Courtesy Light	.30
Landing Light LH (Lamp)	9.00
Landing Light Extension and Retraction Motor	1.25
Alternator Failure Indicator (2)	.08
Cabin Altitude Warning Light (2)	.04
Turn and Bank Test Light (2)	.15
Press-To-Test Light (2)	.08
Spare Light (2)	.08
Shaver Inverter	.60
Electric Seat (2)	20.00
Deice Light - Wing (2)	1.40
Intercom Call Light	.04
Surface Deice System	6.25
Surface Deice Indicator	.04
Electric Trim	.60
Taxi Light	3.64
Landing Light RH (Lamp)	9.00
Landing Light Motor RH	1.25

WIRING DIAGRAM INDEX

421-0001 TO 421A0001
STANDARD AND OPTIONAL

TITLE	PAGE
Plug Chart and Terminal Boards	14-26
Instruments, Flap and Fuel Control	14-27
Landing Gear	14-28
Lighting	14-29
Audio and Door Warning	14-30
Audio	14-31
Starter, Ignition, Alternator and Power Distribution	14-32
Cabin Pressure, Cabin Heat, Cowl Flap Actuators and Cigar Lighters	14-33
Optional Equipment (Prop Deice, Surface Deice, Flight Hour Recorder, Shaver Inverter, and Electric Seat)	14-34
Optional Equipment (Prop Synchronizer) Air Conditioner, Aux Wing Locker Fuel	14-35
Optional Equipment (100 AMP Alternator and Electric Heated Windshield)	14-36
Alternator (Westinghouse to Prestolite Modification)	14-37

421A0001 TO 421B0001
STANDARD AND OPTIONAL

Alternator Conversion (Westinghouse to Prestolite)	14-38
Connectors	14-39
Terminal Boards	14-40
Starter - Ignition	14-41
Alternator - 50 AMP Prestolite	14-42
Landing Gear, Flap Control, Vent Heater and Stall Warning	14-43
Instruments and Fuel Controls	14-44
Lighting - Interior	14-45
Lighting - Exterior	14-46
Audio and Door Warning	14-47
Cabin Press, Cabin Heat, Cowl Flap, Cigar Lighters	14-48
Optional Equipment (Stereo)	14-49
Optional Equipment (External Power, Air Conditioner, RH Control Wheel, and Reading, Oxygen and Seat Belt Lights)	14-50
Optional Equipment (Propeller Synchronizer, Surface Deice, Propeller Anti-Ice)	14-51
Optional Equipment (Static Heaters, Electric Seat, Flight Hour Recorder, Electric Elevator Trim, Auxiliary Fuel Transfer Pumps)	14-52
Alternator (Optional 100 AMP Westinghouse)	14-53
Intercomm, Boom Mike, Fwd and Aft P.A.	14-54

421B0001 TO 421B0301

STANDARD

Connectors	14-55
Terminal Boards	14-56
Starter Ignition	14-57
Prestolite Alternator (50 AMP, Std and 100 AMP, Opt)	14-58
Landing Gear, Flap Control, Vent Heater and Stall Warning	14-59
Tach. Generator, Engine Instruments, O.A.T., Turn and Bank, Fuel Pumps	14-60
Dimmable Interior Lighting, Door Courtesy Light, and Reading Lights	14-61
Lighting - Exterior, and Tip Tank Transfer Pumps	14-62
Map Lights, Audio and Door Warning	14-63
Cabin Pressure, Cabin Heat, and Cigar Lighters	14-64
Capacitance Fuel System	14-65

WIRING DIAGRAM INDEX

421B0001 AND ON EXCEPT AS NOTED

OPTIONAL

TITLE	PAGE
Propeller Deice	14-66
Surface Deice	14-67
Heated Windshield	14-68
Propeller Synchronizer	14-69
Strobe Light	14-70
Stereo	14-71
External Power Receptacle	14-73
Auxiliary Cabin Ventilating System	14-74
No. 2 Pitot Heat	14-75
Wing Locker Fuel Transfer Pump, and Vent Heaters RH and LH	14-76
Electric Seats	14-77
Static Source Heaters	14-78
Electric Elevator Trim	14-79
Flight Hour Recorder	14-80
Shaver Inverter	14-81
Taxi Light	14-82
Radio Noise Filter - Magneto	14-83
RH Turn and Bank, Left and Right Hand Turn Coordinator	14-84
Radio Noise Filter - Regulators	14-85
RH Landing Light, and Surface Deice	14-86
External P. A., Intercomm, Aft P. A., Boom Mike	14-87
Electroluminescent Panels	14-88
E. G. T. Lights, Optional Pilot Instrument Lights, Optional Copilot Instrument Lights	14-90
Oxygen and Seat Belt Lights	14-91
Power Bus and Wire Installation - Side Console	14-92
Air Conditioner 421B0001 to 421B0501	14-93
Reading Lights, Ten Places	14-94
Nacelle Courtesy Light	14-95
Fire Detect System	14-96
Crash Locator Beacon	14-97
Surface Deice	14-98
Alcohol Windshield Deice	14-99
Light, Dimmer Control	14-100
Transistor and Heat Sink	14-101
Annunciator	14-102
United Kingdom ARB Wiring Diagram	14-102B
Wiring Diagram Index	14-103

NOTE

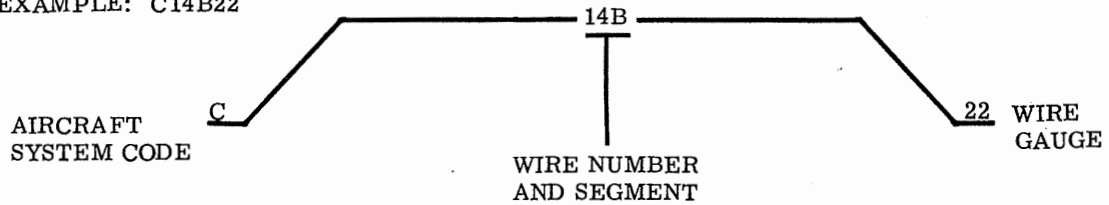
See page 14-103 for standard wiring diagrams index for 421B0301 and On and additional optional wiring diagrams for 421B0001 and On as noted.

NOTE

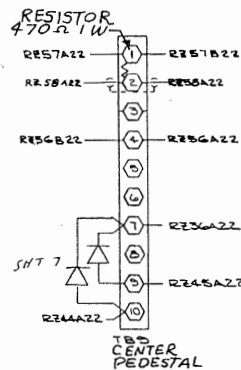
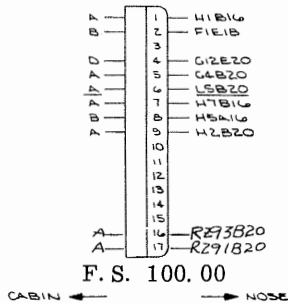
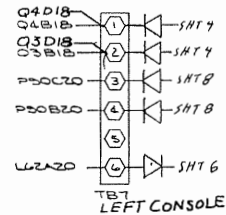
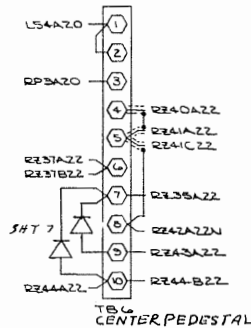
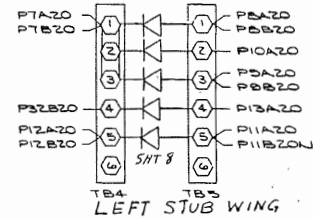
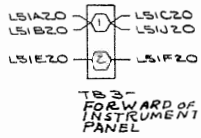
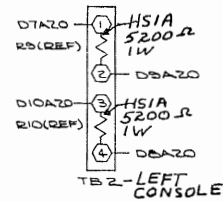
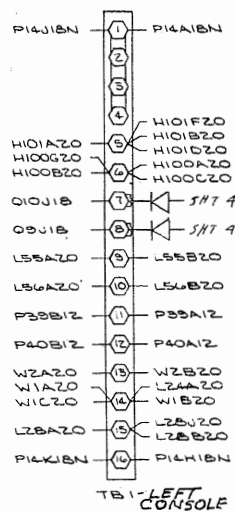
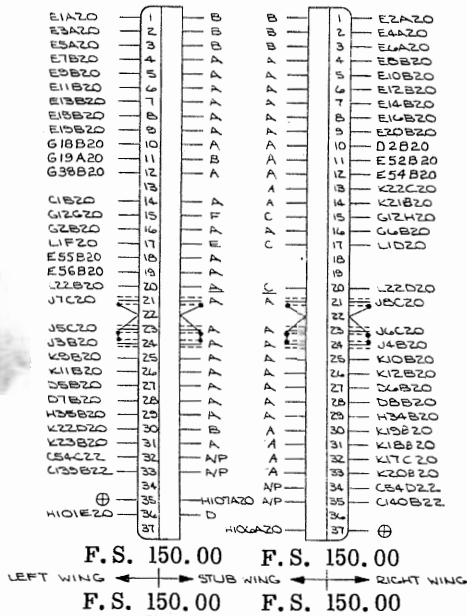
Part Numbers referred to on Wiring Diagrams are for reference only. When ordering spare or replacement parts, refer to applicable Parts Catalog.

The wiring diagrams contained in this section clearly show the complete wiring on each item of electrical component listed in the Wiring Diagram Index. The first portion of wire number indicates the Aircraft System, the center portion indicates Wire Number, and the last portion indicates Wire Gage Size. Each wiring diagram contains part number and nomenclature for each component.

EXAMPLE: C14B22

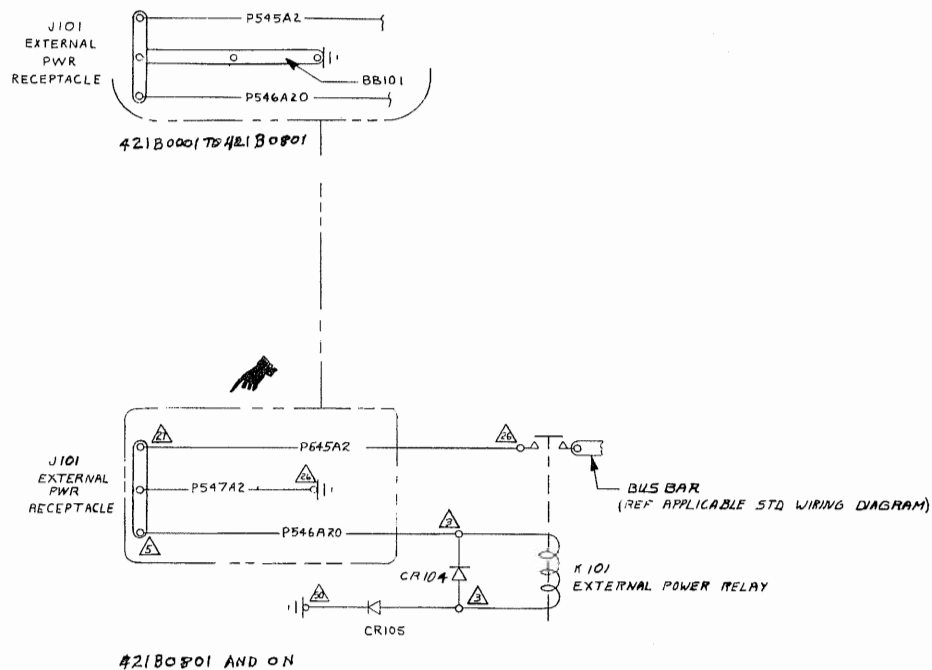


PLUG CHART



EFF: 421-0001 TO 421A-0001

NAME	DATE	Cessna. AIRCRAFT WALLACE-PROSPECT PLANT WICHITA, KANSAS
DRAWN R. DANSEY	12-22-65	
CHECK J. STAFFORD	1-8-66	TITLE WIRING DIAGRAM MODEL 421
PROJ. J. STAFFORD	2-8-66	
CODE IDENT. NO.	SIZE	DRAWING NO.
71379	D	51080000
SCALE NONE	REV	E
SHEET 100 OF 1200		



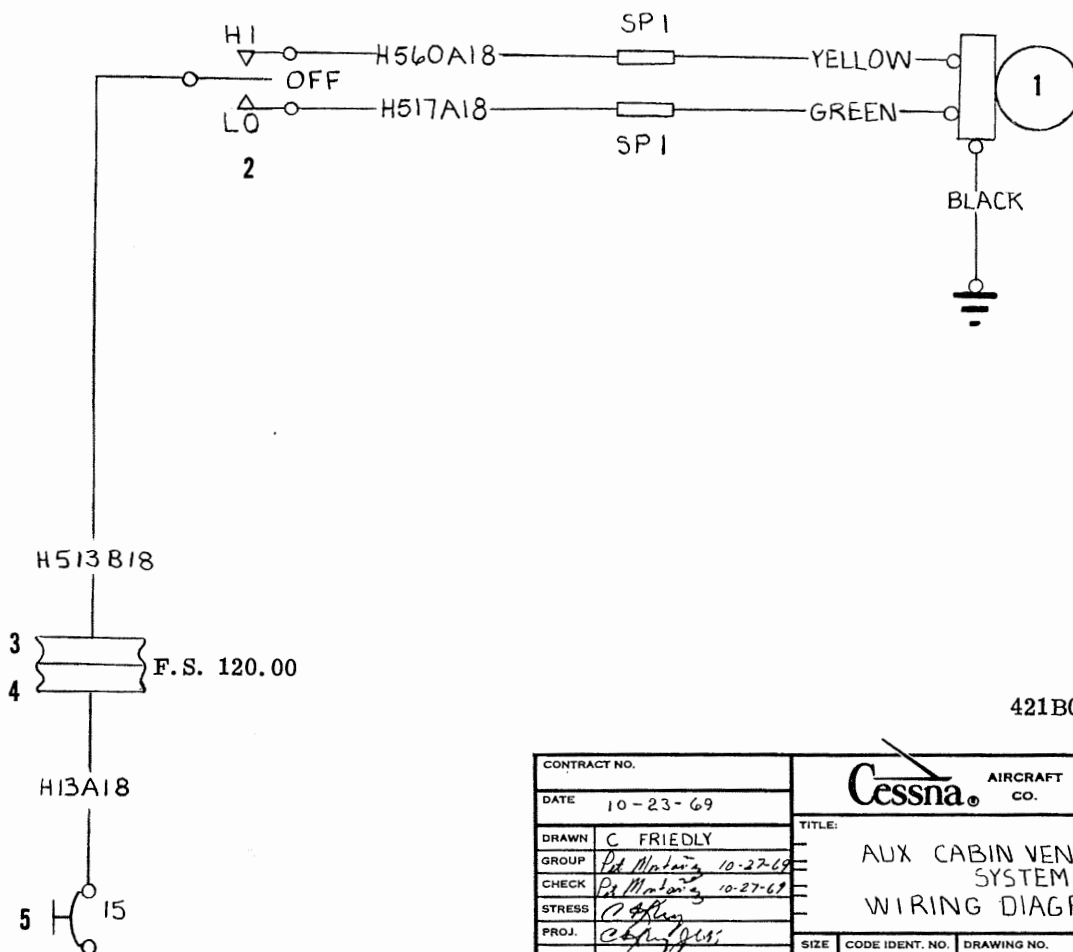
EQUIPMENT LIST

SYMBOL	PART NO.	PART NAME
BB101	5008011-6	BUS BAR-EXT PWR
J101	AN2552-3A	RECEPT-AUX POWER
K101	0850469-1	RELAY-AUX POWER
CR104	1N2482	DIODE-EXT PWR RELAY
CR105	1N2482	DIODE-EXT PWR RELAY
△	MS25036-126	TERMINAL LUG
△	MS25036-103	TERMINAL LUG
△	MS25036-102	TERMINAL LUG
△	MS25036-127	TERMINAL LUG
△	MS25036-150	TERMINAL LUG

421B0001 AND ON

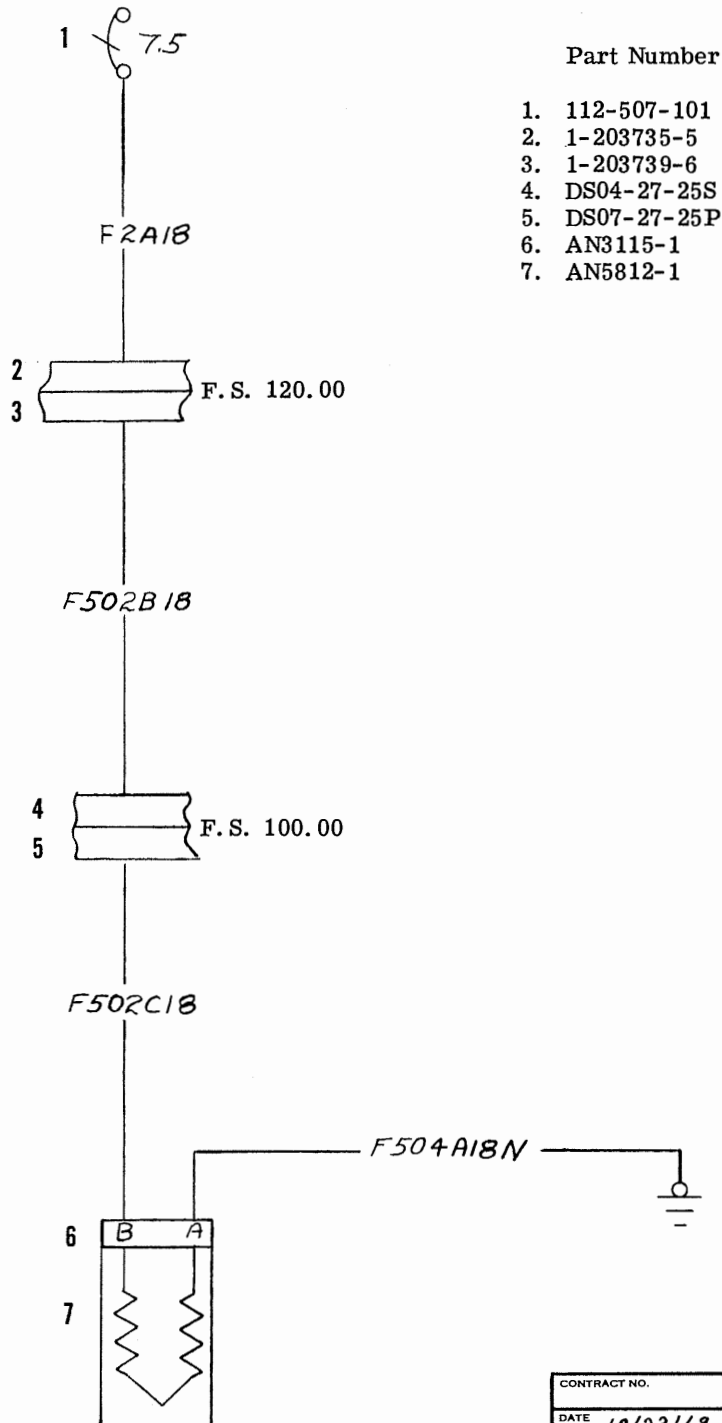
Cessna.		AIRCRAFT CO.	P. O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201
TITLE: EXTERNAL PWR RECEPTACLE WIRING ASSY. (OPT)			
SIZE: C	CODE IDENT. NO. 71379	DRAWING NO. 5118438	C
SCALE: NONE		REF	SHEET 1 OF 1

Part Number	Nomenclature
1. 66-01-5	Aux Cabin Blower
2. S-382-1	Sw - Evap Fan Control
3. 1-20-37-39-6	Recept - Fwd Side Cons
4. 1-20-37-35-5	Plug - Fwd Side Cons
5. 7277-2-15	Circuit Bkr



421B0001 AND ON

CONTRACT NO.		Cessna. AIRCRAFT CO. P. O. BOX 1977 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
DATE	10-23-69	TITLE: AUX CABIN VENTILATING SYSTEM WIRING DIAGRAM	
DRAWN	C. FRIEDLY	SIZE	CODE IDENT. NO. 71379
GROUP	Pd. M. L. 10-27-69	DRAWING NO.	5118439
CHECK	Pd. M. L. 10-27-69	SCALE	NONE
STRESS	C. F. L.	REF	
PROJ.	C. F. L.	SHEET	1 OF 1
OTHER	ECB. H. D.		



Part Number

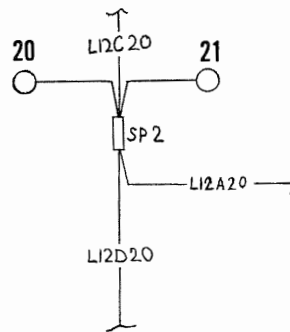
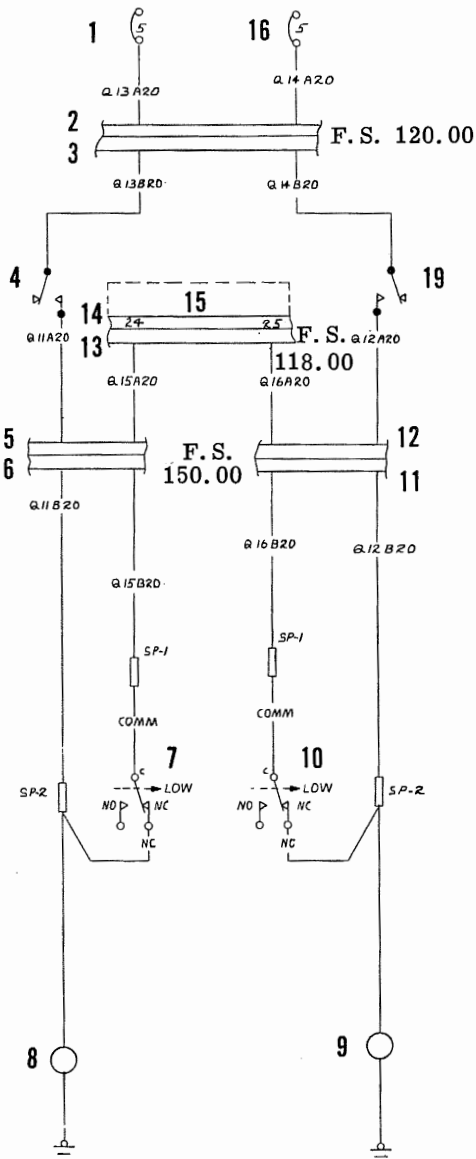
Nomenclature

1. 112-507-101	No. 2 Pitot Heat - Sw Ckt Bkr
2. 1-203735-5	Plug - Fwd Side Cons
3. 1-203739-6	Recept - Fwd Side Cons
4. DS04-27-25S	Recept - Nose Bhd
5. DS07-27-25P	Plug - Nose Bhd
6. AN3115-1	Plug - No. 2 Pitot Heat
7. AN5812-1	No. 2 Pitot Tube Assy

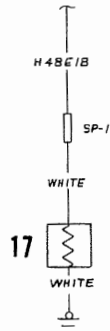
421B0001 AND ON

CONTRACT NO.				AIRCRAFT CO.		P. O. BOX 1977 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
DATE 10/23/69				TITLE:		NO. 2 PITOT HEAT WIRING DIAGRAM	
DRAWN	WALTMAN	GROUP		10/27/69		CHECK	
CHECK	10/27/69	STRESS		10/27/69		PROJ.	
OTHER	10/27/69	SIZE		CODE IDENT. NO.		DRAWING NO.	
		D		71379		5118440	
SCALE: NONE		REF		SHEET 1 OF 1			

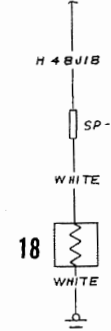
Part Number	Nomenclature	Part Number	Nomenclature
1. 7277-2-5	Transfer Pump LH - Ckt Bkr	12. DS04-37S	Recept - RH Wing
2. 1-203739-6	Recept - Fwd Side Cons	13. 17-1030	Recept - Annunciator
3. 1-203735-5	Plug - Fwd Side Cons	14. 17-20370	Plug - Annunciator
4. MST-205N	LH Nac Aux Fuel - Sw	15. 5618009-1	Annunciator Assy
5. DS04-37S	Recept - LH Wing	16. 7277-2-5	Transfer Pump RH - Ckt Bkr
6. DS07-37P	Plug - LH Wing	17. 105880	Vent Htr - LH Wing Locker
7. 9910058-1	Sw - LH Nac Fuel Press	18. 105880	Vent Htr - RH Wing Locker
8. 4140-00-153	Fuel Pump - LH Nac	19. MST-205N	RH Nac Aux Fuel - Sw
9. 4140-00-153	Fuel Pump - RH Nac	20. CM2990-2	Post Lt - Radio Call Placard Lt
10. 9910058-1	Sw - RH Nac Fuel Press	21. CM2990-2	Post Lt - Fuel Transfer Sw Lt
11. DS07-37P	Plug - RH Wing		



STALL & VENT HEAT
(REF APPLICABLE STANDARD)
WIRING DIAGRAM

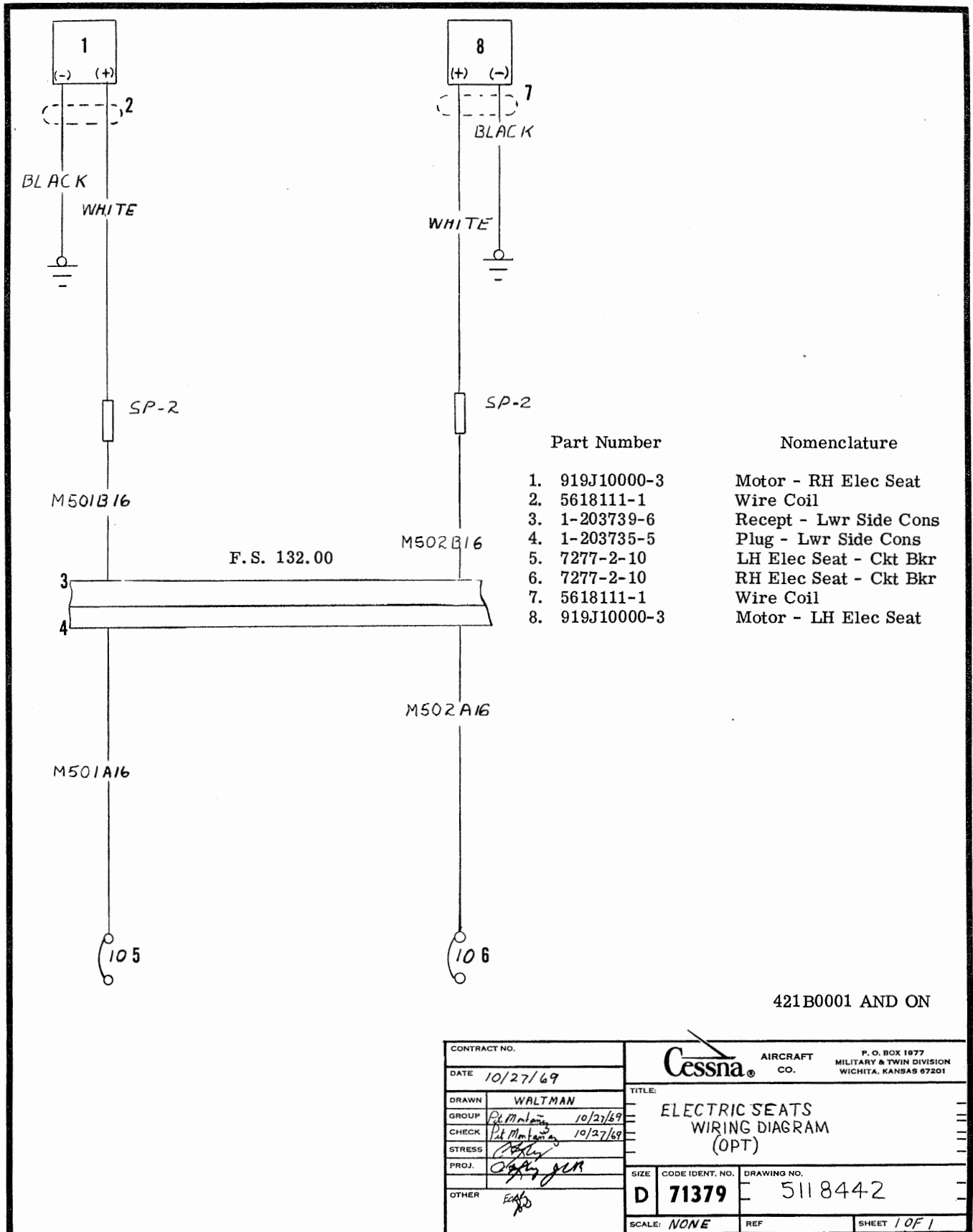


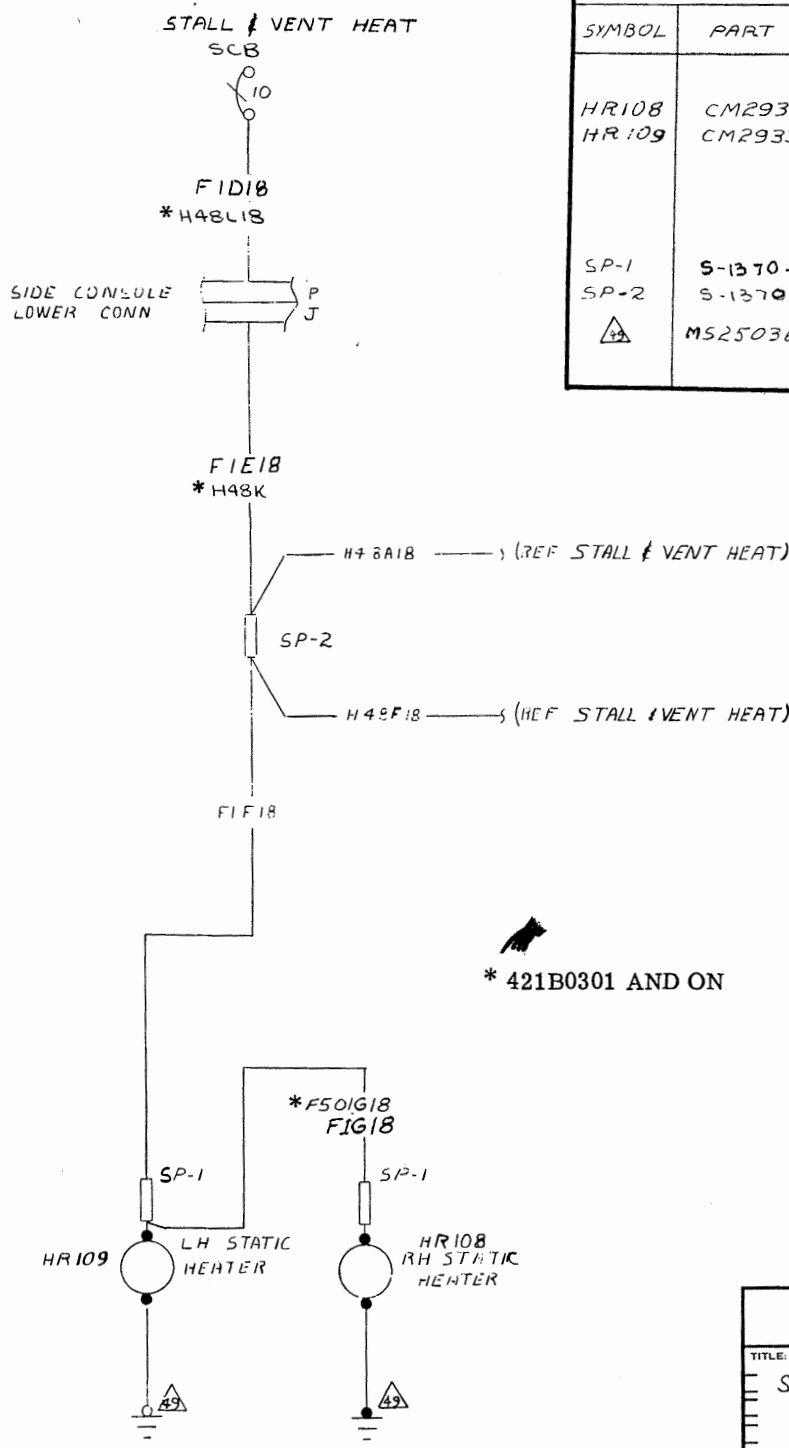
STALL & VENT HEAT
(REF APPLICABLE STANDARD)
WIRING DIAGRAM



421B0001 AND ON

CONTRACT NO.		Cessna. AIRCRAFT CO. P. O. BOX 1877 MILWAUKEE & TWIN DIVISION WICHITA, KANSAS 67201	
DATE	10-27-69	TITLE	WING LOCKER FUEL TRANSFER PUMP & VENT HTR RH & LH (OPT) WIRING DIAGRAM
DRAWN	WALTMAN	SIZE	D 71379
GROUP	10-27-69	CODE IDENT. NO.	5118441
CHECK	10-27-69	DRAWING NO.	
STRESS		SCALE	NONE
PROJ.		REP	
OTHER		SHEET	1 OF 1



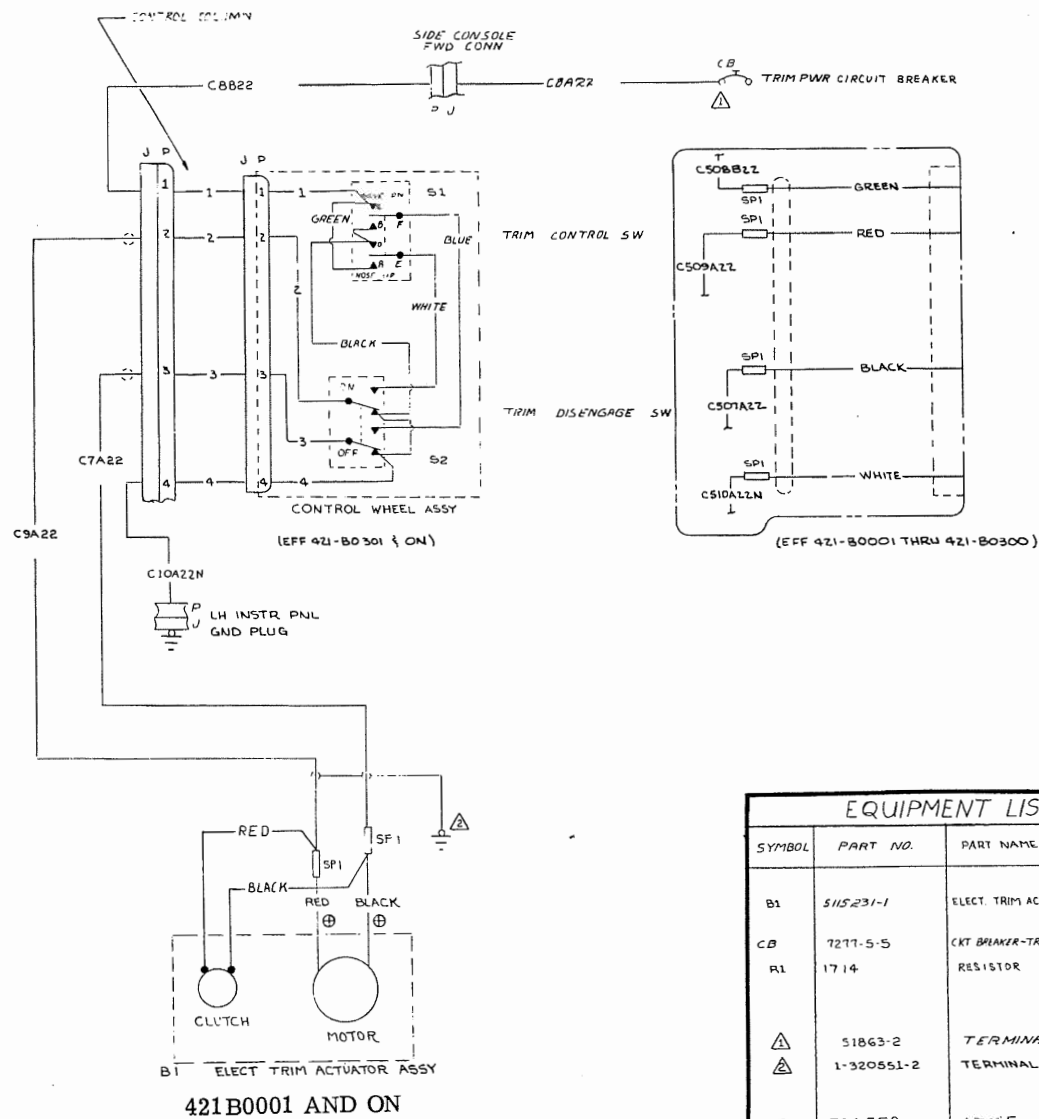


* 421B0301 AND ON

421B0001 AND ON

EQUIPMENT LIST		
SYMBOL	PART NO.	PART NAME
HR108	CM2933-5	STATIC SOURCE-HTR-RH
HR109	CM2933-5	STATIC SOURCE-HTR-LH
SP-1	S-1370-1	SPLICE
SP-2	S-1370-2	SPLICE
	MS25036-149	TERMINAL LUG

		AIRCRAFT CO.	P. O. BOX 1977 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201
TITLE: STATIC SOURCE HEATERS WIRING DIAGRAM (OPT)			
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5118443	
SCALE: NONE		REF REV A	SHEET 1 OF 1



EQUIPMENT LIST

SYMBOL	PART NO.	PART NAME
B1	5115231-1	ELECT. TRIM ACTR ASSY
CB	7277-5-5	CKT BREAKER-TRIM PWR
RL	1714	RESISTOR
△	51863-2	TERMINAL
△	1-320551-2	TERMINAL
SP-1	320559	WALICE
S1	305-4320A	SWITCH-TRIM CONTROL
S2	T20057	SWITCH-TRIM DISENGAGE

Cessna®

AIRCRAFT
CO.P. O. BOX 1977
MILITARY & TWIN DIVISION
WICHITA, KANSAS 67201

TITLE:

ELECTRIC ELEVATOR TRIM
WIRING DIAGRAM
(OPT)

SIZE

D

CODE IDENT. NO.

71379

DRAWING NO.

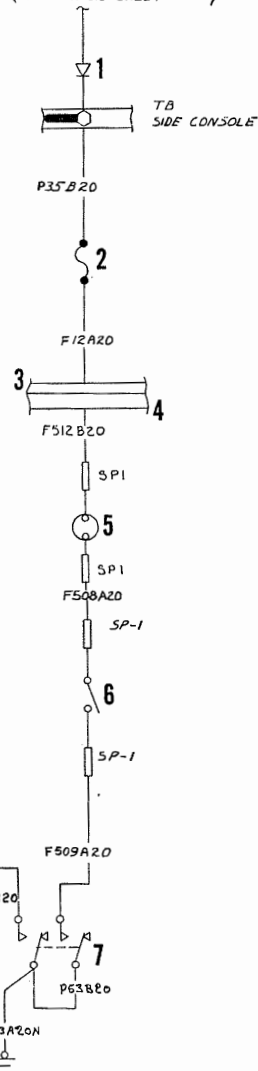
5118444

D

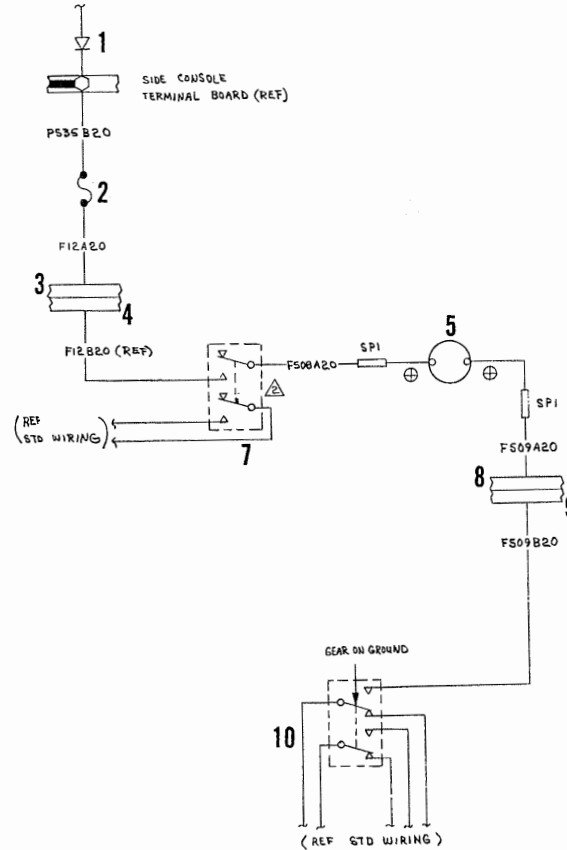
SCALE: NONE

REF

SHEET 1 OF 1

(REF STD WIRING DIAGRAM)
(ALTERNATOR SHEET)

421B0001 TO 421B0056

(REF STD WIRING DIAGRAM)
(ALTERNATOR SHEET)

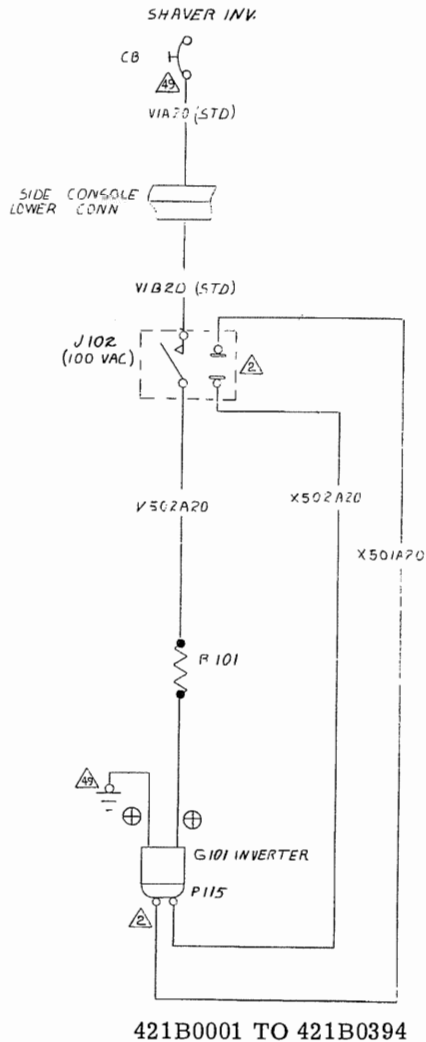
421B0056 AND ON

Part Number

Nomenclature

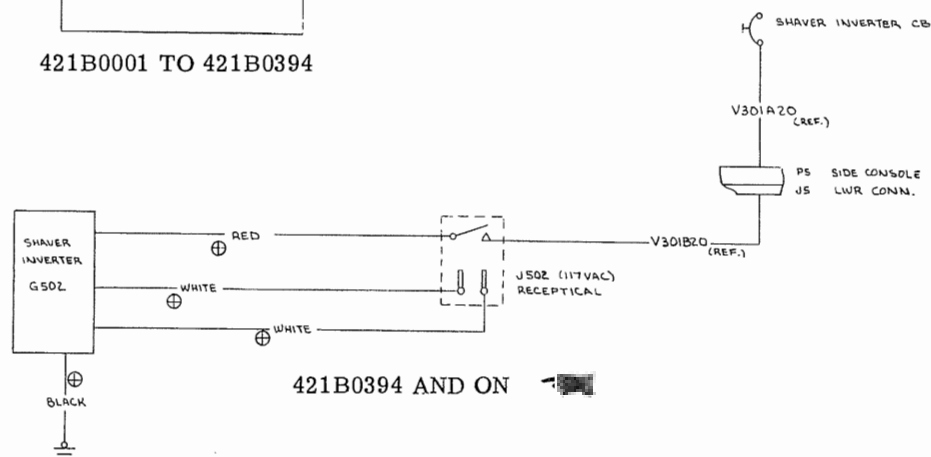
1. IN1201	Diode - Cabin Lt
2. AGC 3.0 Amp	Fuse - Flight Hour Recorder
3. 1-203739-6	Recept - Fwd Side Cons
4. 1-203735-5	Plug - Fwd Side Cons
5. CM2926-1	Recorder - Flight Hour
6. S-1498-2	Sw - Flight Hour
7. MS24525-22	Sw - Battery
8. DS04-37S	Recpt - LH Wing
9. DS07-37P	Plug - LH Wing
10. 2VA20	Sw - Gear Safety

CONTRACT NO.		Cessna. AIRCRAFT CO. P.O. BOX 1977 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
DATE 10/27/69			
DRAWN	WALTMAN	TITLE: FLIGHT HOUR RECORDER WIRING DIAGRAM (OPT)	
GROUP	Pt. McIntosh 10/27/69		
CHECK	Pt. McIntosh 10/27/69	SIZE CODE IDENT. NO. DRAWING NO.	
STRESS	Pt. McIntosh		
PROJ.	421B0056	D 71379 5118445	
OTHER	Eqd		
SCALE: NONE		SHEET 1 OF 1	



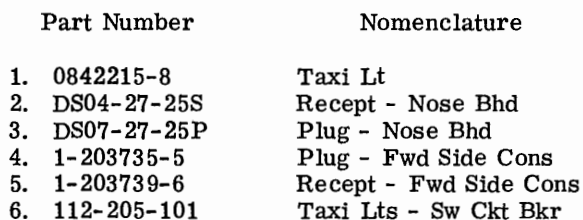
EQUIPMENT LIST

SYMBOL	PART NO.	PART NAME
G101	12SP2A	INVERTER
P115	865	PLUG
J102	7777K1	RECEPTACLE -100 VAC
R 101	OR-40-5	RESISTOR
CB	7277-5	CIRCUIT BREAKER
△	MS25036-102	TERMINAL
△	MS25036-149	TERMINAL
421B0001 TO 421B0394		
G502	EM 242	INVERTER
J502	7777K1	RECEPTACLE
421B0394 AND ON		



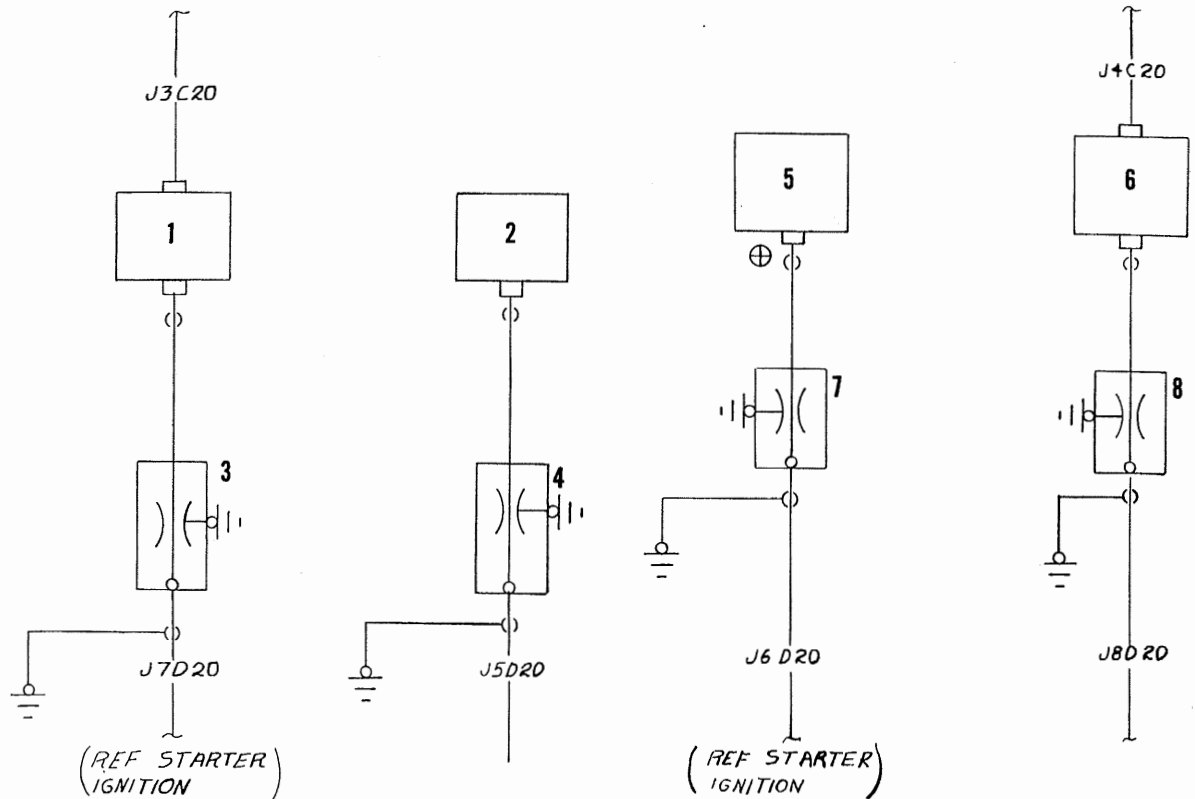
Cessna.		AIRCRAFT CO.	P. O. BOX 1977 MILITARY & TRAVEL DIVISION WICHITA, KANSAS 67201
TITLE: * SHAVR INVERTER (28V) WIRING ASSY.			
SIZE:	CODE IDENT. NO.	DRAWING NO.	
D	71379	5118109	

SUPERSEDES
5118446



421B0001 AND ON

CONTRACT NO.				AIRCRAFT		P. O. BOX 1977	
DATE 10-23-69				CO.		MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
DRAWN WALTMAN		TITLE:		TAXI LIGHT (OPT)			
GROUP <i>Ad Montano 10-28-69</i>		TAXI LIGHT (OPT)		WIRING DIAGRAM			
CHECK <i>Ad Montano 10-28-69</i>							
STRESS <i>Chap</i>		SIZE		CODE IDENT. NO.		DRAWING NO.	
PROJ. <i>Ad Montano 10-28-69</i>		C		71379		5118447	
OTHER <i>Ed 10-28-69</i>		SCALE: NONE		REF		SHEET 1 OF 1	



Part Number

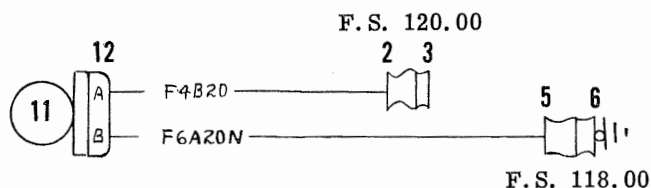
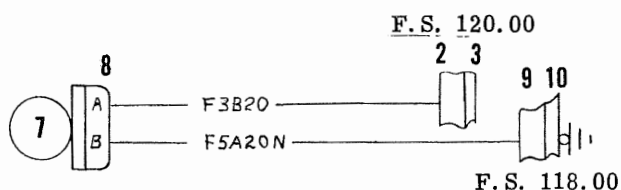
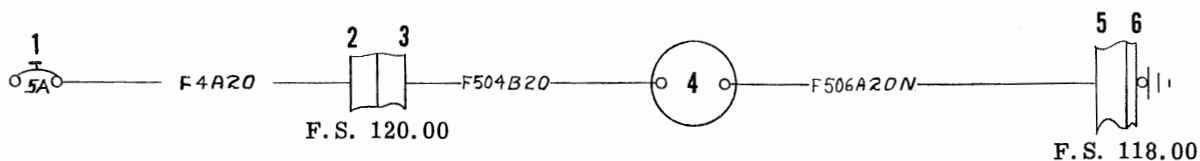
Nomenclature

1. S6LN-1201	LH Mag - LH Eng
2. S6LN-1205	RH Mag - RH Eng
3. MF-3A	Radio Noise Filter
4. MF-3A	Radio Noise Filter
5. S6LN-1205	RH Mag - RH Eng
6. S6LN-1201	LH Mag - LH Eng
7. MF-3A	Radio Noise Filter
8. MF-3A	Radio Noise Filter

421B0001 AND ON

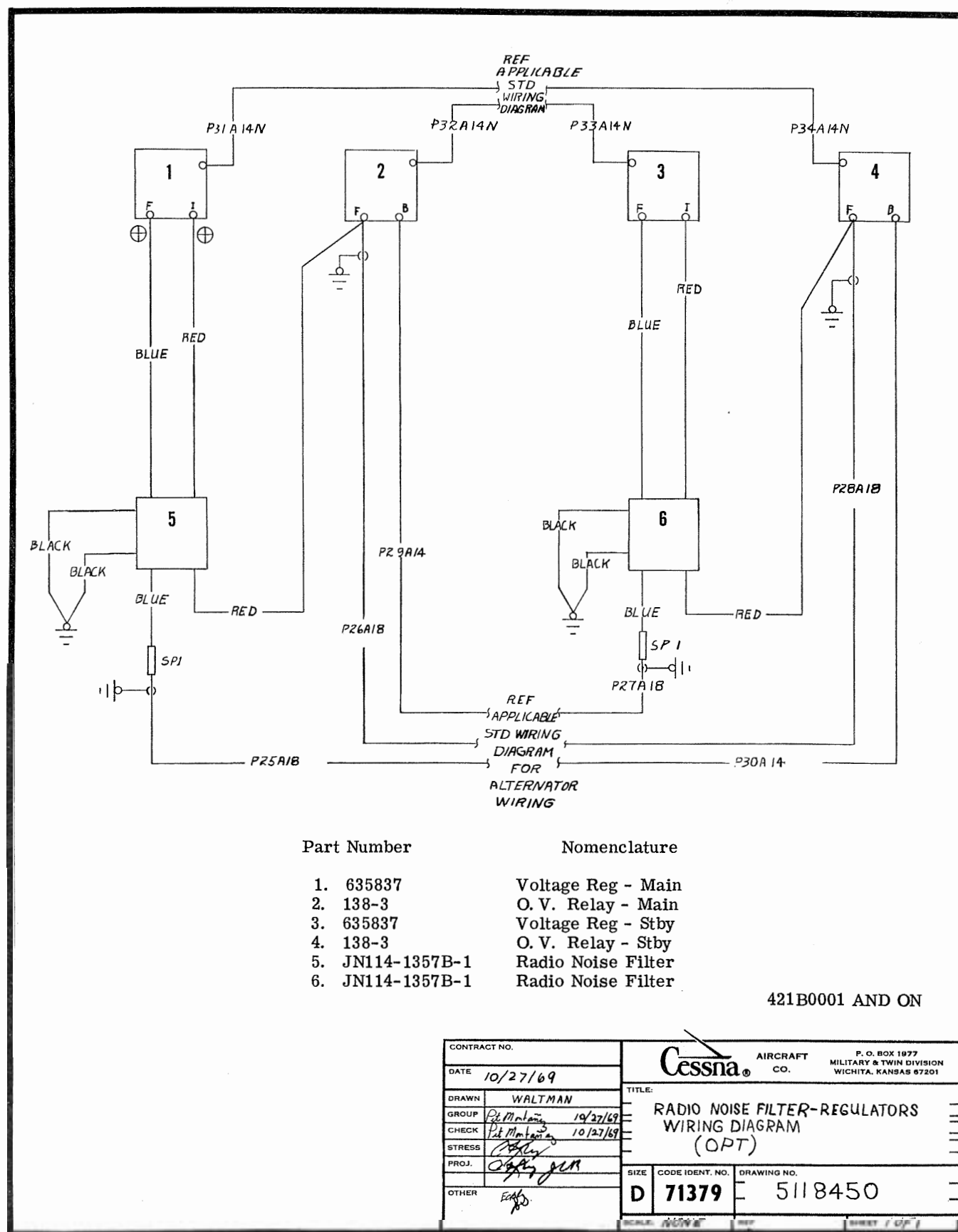
CONTRACT NO.		AIRCRAFT CO. P. O. BOX 1977 MILITARY & TWIN DIVISION WICHITA, KAN. 67201		
DATE 10/27/69				
DRAWN	WALTMAN	TITLE: RADIO NOISE FILTER - MAGNETO WIRING DIAGRAM		
GROUP	Pt. Montoya 10/27/69			
CHECK	Pt. Montoya 10/27/69			
STRESS	Pt. Montoya			
PROJ.	Edgley	SIZE	CODE IDENT. NO.	DRAWING NO.
OTHER	Edgley	D	71379	5118448
		SCALE: NONE	REF	SHEET 1 OF 1

Part Number	Nomenclature
1. 7277-2-5	Turn & Bank No. 2 - Ckt Bkr
2. 1-203739-6	Recept - Fwd Side Cons
3. 1-203735-5	Plug - Fwd Side Cons
4. CM2651-L1	Turn & Bank Ind No. 2
5. 201298-1	Recept - RH Grd Inst Pnl
6. 203540-1	Plug - RH Grd Inst Pnl
7. C661003-0202	Turn Coordinator - LH
8. MS3106A-10SL-3S	Plug - LH Turn Coordinator
9. 1-201298-6	Recept - LH Grd Inst Pnl
10. 1-203540-1	Plug - LH Grd Inst Pnl
11. C661003-0202	Turn Coordinator - RH
12. MS3106A-10SL-3S	Plug - RH Turn Coordinator



421B0001 AND ON

CONTRACT NO.		Cessna [®] AIRCRAFT CO.		P. O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
DATE 10/24/69		TITLE:			
DRAWN WALTMAN		RH T&B, LEFT & RIGHT HAND			
GROUP <i>P. J. Montano</i> 10/27/69		TURN COORDINATOR WIRING			
CHECK <i>P. J. Montano</i> 10/27/69		DIAGRAM (OPT)			
STRESS <i>Waltman</i>		SIZE CODE IDENT. NO. DRAWING NO.			
PROJ. <i>Waltman</i>		D 71379		5118449	
OTHER <i>Waltman</i>		SCALE: NONE		REF SHEET 1 OF 1	



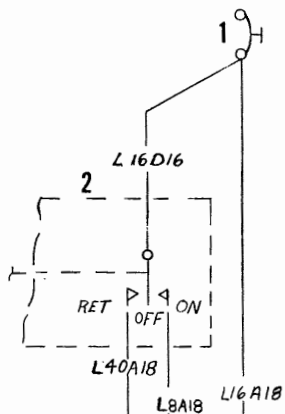
Part Number

Nomenclature

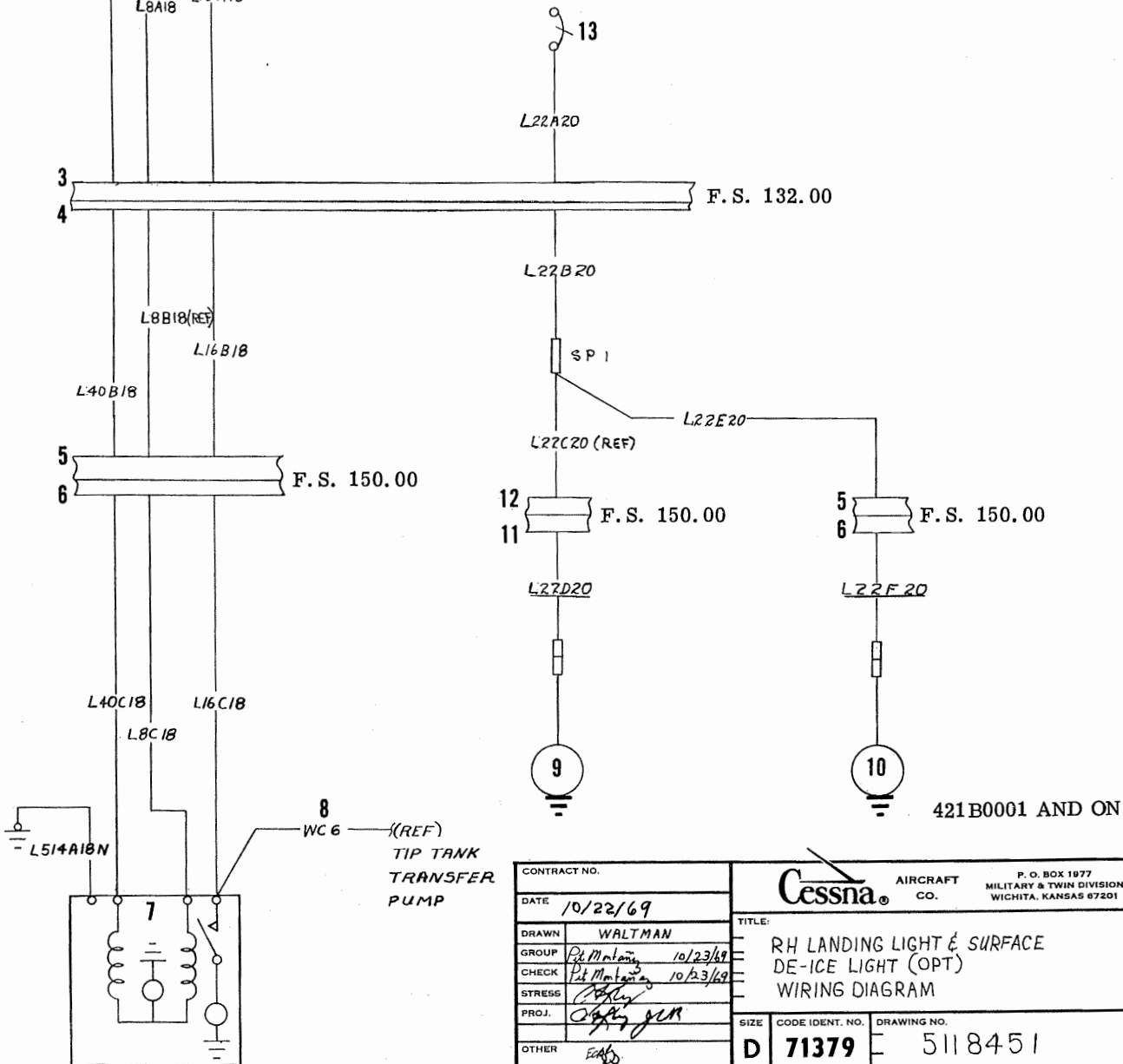
1. 635837	Voltage Reg - Main
2. 138-3	O. V. Relay - Main
3. 635837	Voltage Reg - Stby
4. 138-3	O. V. Relay - Stby
5. JN114-1357B-1	Radio Noise Filter
6. JN114-1357B-1	Radio Noise Filter

421B0001 AND ON

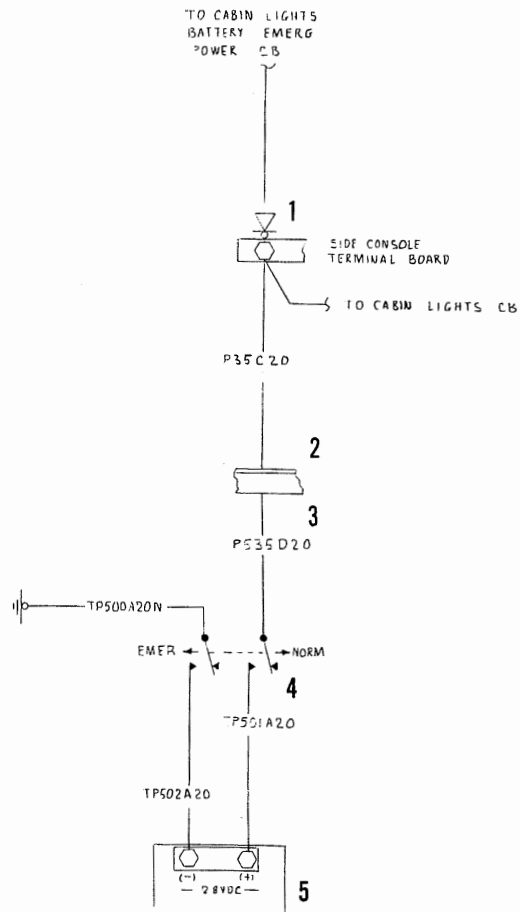
CONTRACT NO.				AIRCRAFT CO.		P. O. BOX 1977 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
DATE 10/27/69				TITLE:		RADIO NOISE FILTER-REGULATORS WIRING DIAGRAM (OPT)	
DRAWN	WALTMAN	GROUP		10/27/69		CHECK	
CHECK	Pt. Montoya	10/27/69		STRESS		PROJ.	
OTHER	Edg.	SIZE		CODE IDENT. NO.		DRAWING NO.	
		D		71379		5118450	
		SCALE: NONE		REF		SHEET 1 OF 1	



Part Number	Nomenclature
1. 7277-2-10	RH Ldg Lt - Ckt Bkr
2. MS24524-21	Plug - Ldg Lt
3. 1-203739-6	Recept - Lwr Side Cons
4. 1-203735-5	Plug - Lwr Side Cons
5. DS04-37S	Recept - RH Wing
6. DS07-37P	Plug - RH Wing
7. 0870132-1	Ldg Lt - RH
8. 877	Wire Assy
9. 0820501-1	Wing Ice Lt - LH
10. 0820501-1	Wing Ice Lt - RH
11. DS04-37S	Recept - LH Wing
12. DS07-37P	Plug - LH Wing
13. 112-205-101	Surface Deice Lt - Ckt Bkr



CONTRACT NO.		Cessna® AIRCRAFT CO. P. O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
DATE 10/22/69		TITLE: RH LANDING LIGHT & SURFACE DE-ICE LIGHT (OPT) WIRING DIAGRAM	
DRAWN WALTMAN		SIZE CODE IDENT. NO. DRAWING NO.	
GROUP Pt. McIntosh 10/23/69		D 71379 5118451	
CHECK Pt. McIntosh 10/23/69		SCALE: NONE REF SHEET 1 OF 1	
STRESS			
PROJ. 09/27/69			
OTHER			

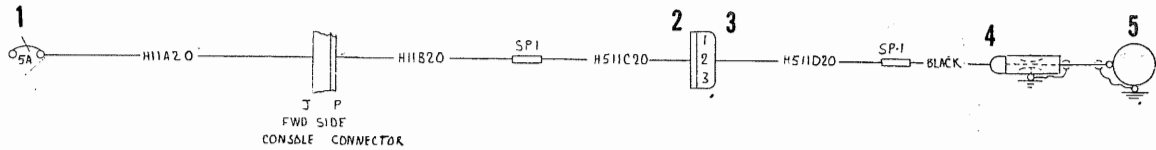


CRASH LOCATOR BEACON WIRING ASSY

Part Number	Nomenclature
1. IN2482	Diode-Overhead Flood Lts
2. 1-203739-5	Recept Side Console
3. 1-203739-6	Plug Side Console
4. S-1696-1	Switch
5. CIR-10	Transmitter

421B0101 AND ON

Cessna		AIRCRAFT CO.		P.O. BOX 1875 WICHITA, KANSAS 67201	
TITLE					
WIRING ASSY - CRASH					
LOCATOR BEACON					
REV	CODE IDENT NO	DRAWING NO			
D	71379	5118462			
SCALE	1/10 IN	REV	SHEET 1 OF 1		

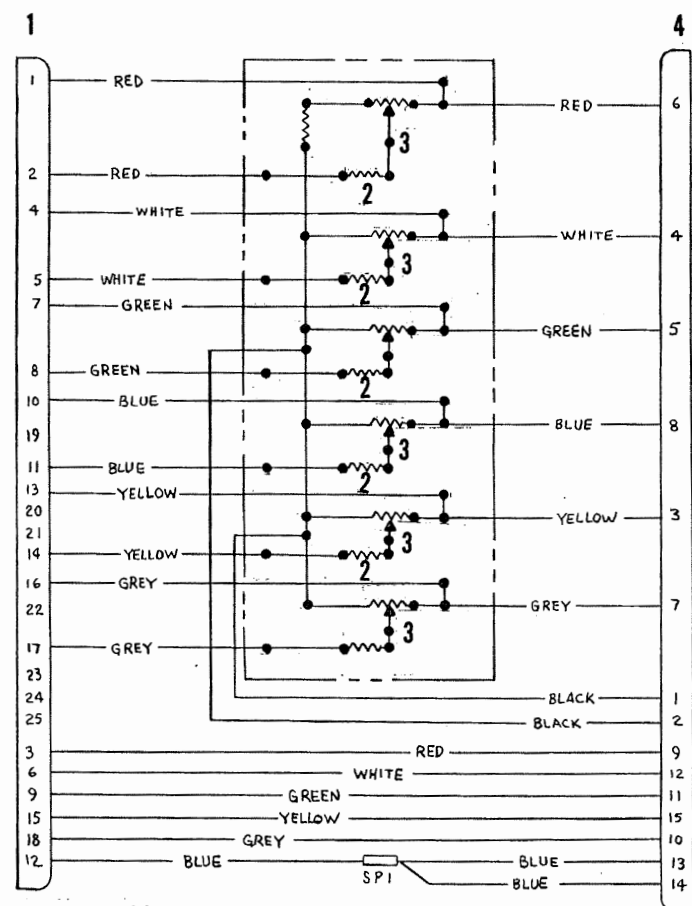


① WIRING ASSY - ALCOHOL WINDSHIELD DE-ICE

Part Number	Nomenclature
1. 112-205-101	Switch Circuit Breaker
2. DS07-3P	Plug
3. DS04-3S	Receptacle
4. WC106	Connector Assembly
5. 476411	Pump and Filter Assembly

421B0201 AND ON

		AIRCRAFT CO.		P. O. BOX 1877 WICHITA, KANSAS 67201	
		TITLE:		ALCOHOL WINDSHIELD DEICE WIRING	
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5118464			
SCALE: NONE		REF	SHEET 1 OF 1		



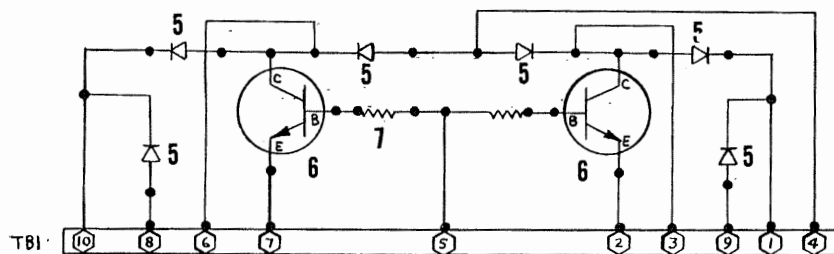
F. S. 118.00

LIGHT DIMMER CONTROL

F. S. 118.00

Part Number	Nomenclature
1. DB-25S	Receptacle
2. RC-20GF151K	Resistor
3. CM3535	Potentiometer
4. DA-15P	Plug
5. IN5061	Diode
6. 2N3053	Transistor
7. RC20GF682K	Resistor
8. RC20GF152K	Resistor

REFER TO SHEET 15
FOR SYSTEM WIRING



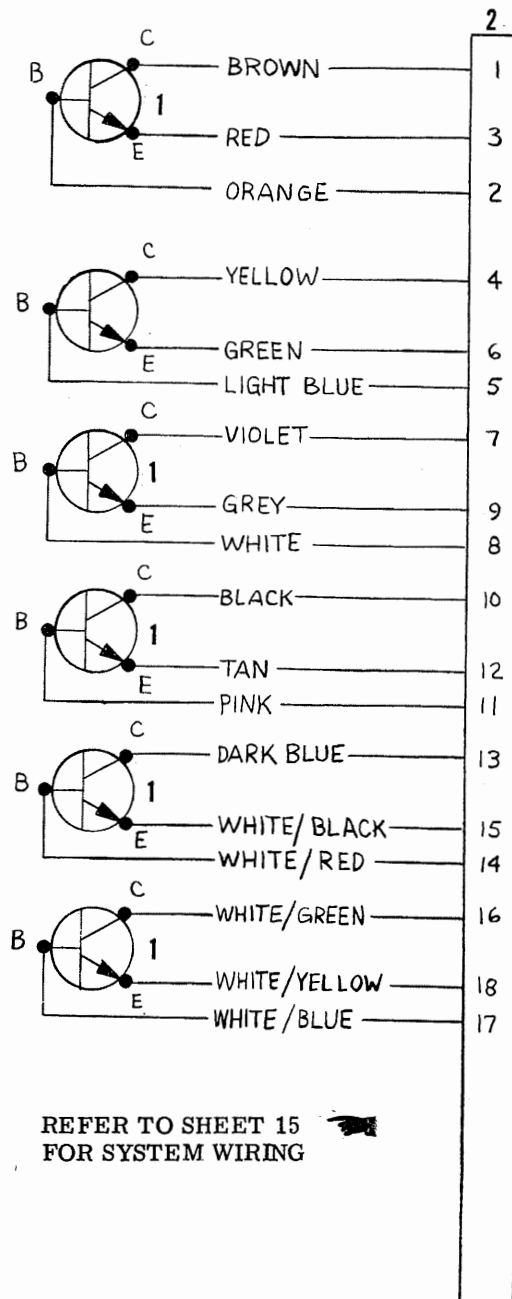
REFER TO SHEET 19
FOR WIRING SYSTEM

F. S. 118.00

DIMMER CONTROL
AUXILIARY FUEL QUANTITY LIGHT

421B0001 AND ON

Cessna		AIRCRAFT CO.	P. O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201
TITLE: LIGHT DIMMER CONTROL WIRING			
SIZE: D	CODE IDENT. NO.: 71379	DRAWING NO.: 5618007	
SCALE: NONE	REV:	SHEET 1 OF 1	



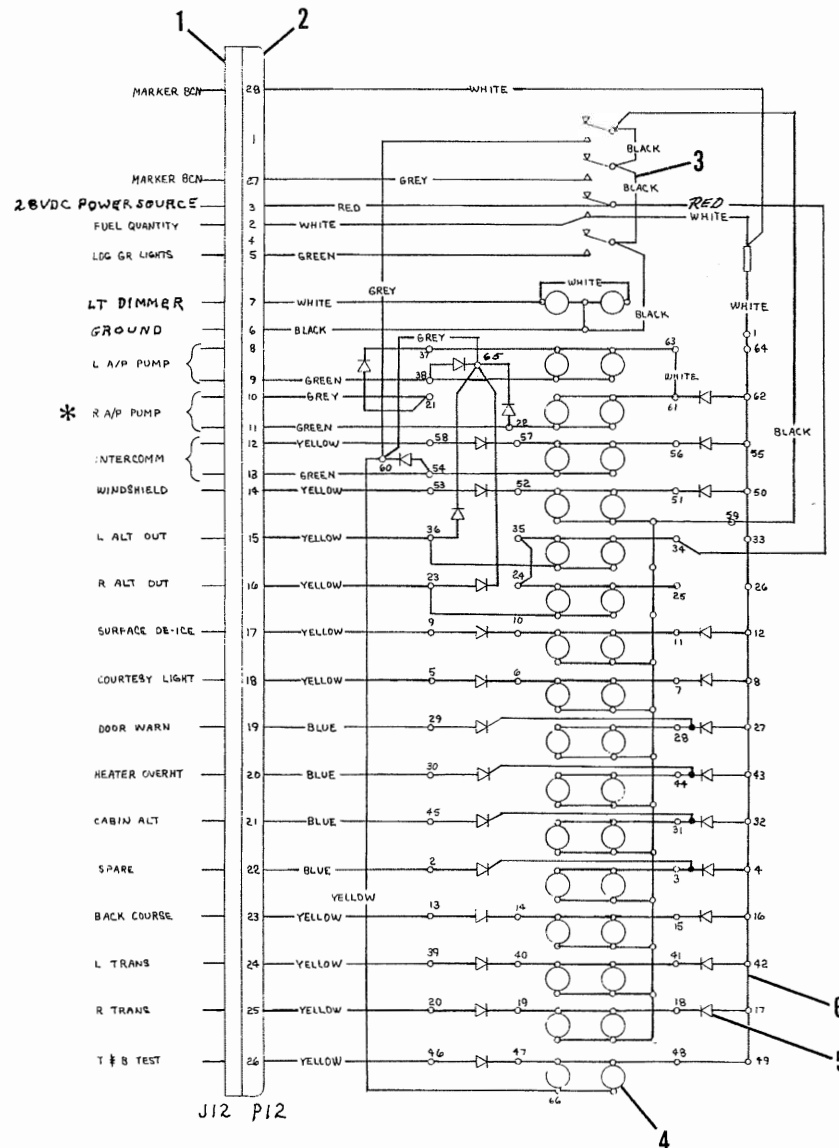
REFER TO SHEET 15
FOR SYSTEM WIRING

F. S. 100.00

421B0001AND ON

Part Number	Nomenclature
1. MJE3055	Transistor
2. DB-25S	Receptacle

Cessna		AIRCRAFT CO.	P. O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201
TITLE: TRANSISTOR & HEAT SINK ASSEMBLY			
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5618008	
SCALE: NONE	REF	SHEET	



* A COND HYD 421B0501 AND ON

PART NUMBER

1. 17-10370
2. 17-20370
3. SA24SDX11-1
4. GE327
5. 1N5061
6. 9910072-13

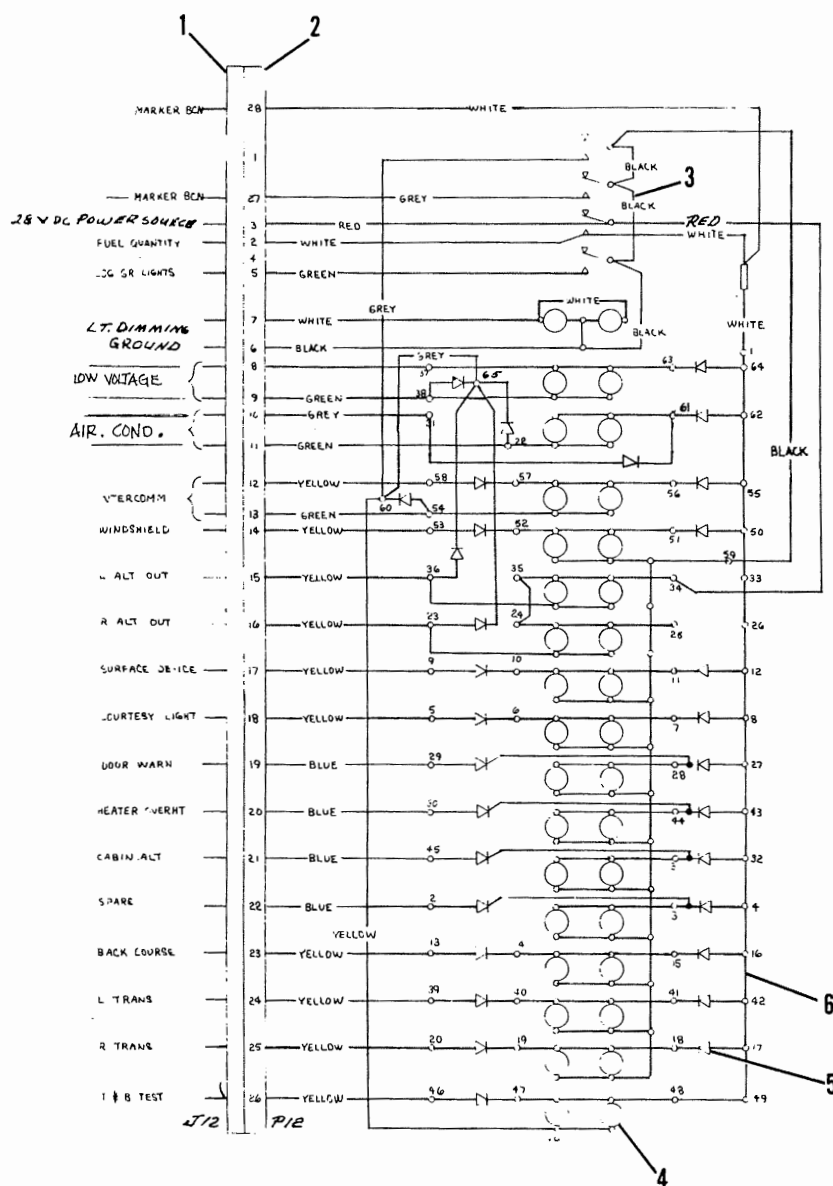
NOMENCLATURE

RECEPTACLE
PLUG
SWITCH - PRESS TO TEST
BULB
DIODE
CIRCUIT BOARD

ANNUNCIATOR INTERNAL
SCHEMATIC ONLY

421B0301 TO 421B0801

Cessna.		P. O. BOX 1977 WALLACE-PROSPECT PLANT WICHITA, KANSAS	
TITLE ANNUNCIATOR ASSY			
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5618009	
SCALE NONE		SHEET	



PART NUMBER

1. 17-10370
2. 17-20370
3. SA24SDX11-1
4. GE327
5. 1N5061
6. 9910072-13

NOMENCLATURE

1. RECEPTACLE
2. PLUG
3. SWITCH-PRESS TO TEST
4. BULB
5. DIODE
6. CIRCUIT BOARD

ANNUNCIATOR INTERNAL
SCHEMATIC ONLY

421B0801 AND ON

Cessna.		P. O. BOX 1977 WALLACE-PROSPECT PLANT WICHITA, KANSAS	
TITLE <i>ANNUNCIATOR ASSY</i>			
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5618009	
SCALE NONE			

WIRING DIAGRAM INDEX

421B0301 AND ON

TITLE	PAGE
Wiring Reference Designators	14-105
Connectors	14-107
Terminal Boards	14-108
Alternator System	14-109
Power Distribution Bus	14-110
Starter-Ignition	14-111
Landing Gear	14-112
Flap Control	14-112
Vent Heater and Stall Warning	14-112
Tach. Generator	14-113
Engine Instruments	14-113
Outside Air Temperature	14-113
Turn and Bank	14-113
Fuel Pumps	14-113
Fuel Quantity System (Capacitance)	14-114
Dimmable Panel Lights	14-115
Interior Overhead Lighting	14-116
Light - Exterior and Tip Tank	14-117
Transfer Pumps	14-117
Cabin Pressurization	14-118
Cabin Heat	14-118
Cigar Lighters and Door Warning	14-118
Map Lights and Audio	14-119
Electroluminescent Instrument Panel	14-120
Avionics Bus	14-120A
Flight Hour Recorder	14-121
Optional Pilot, Copilot Instrument Lights	14-122
Power Distribution - Side Console (Optional)	14-123
Oxygen, Seat Belt and Smoking Lights (Optional)	14-124
Auxiliary Cabin Ventilating System	14-125
Angle of Attack	14-126
Air Conditioner	14-127
Heated Windshield	14-128
Avionics Cooling Blower	14-129

WIRING DIAGRAMS

REFERENCE DESIGNATOR CODE:

Reference designators are used in these diagrams to more quickly identify and locate a part or assembly used in an electrical system. A part is identified by reference number on a diagram. The reference number is called out in page 14-105 and identified by part number, description, and diagram sheet location.

EXAMPLE -

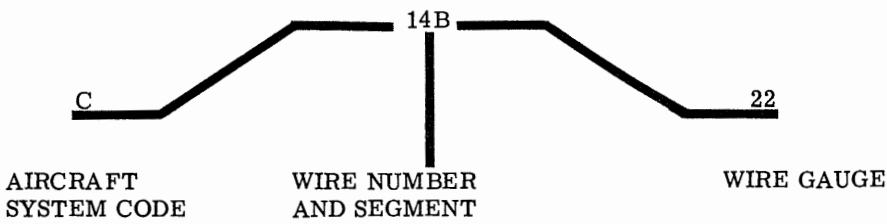
REF. DESIGNATOR	DIAGRAM SHT. NO.	PART NO.	DESCRIPTION
BB20	6	0820001-1	BATTERY BUS

NOTE

Part Numbers referred to on Wiring Diagrams are for reference only. When ordering spare or replacement parts, refer to applicable Parts Catalog.

The wiring diagrams contained in this section clearly show the complete wiring on each item of electrical component listed in the Wiring Diagram Index. The first portion of wire number indicated the Aircraft System, the center portion indicates Wire Number, and the last portion indicates Wire Gauge Size. Each wiring diagram contains part number and nomenclature for each component.

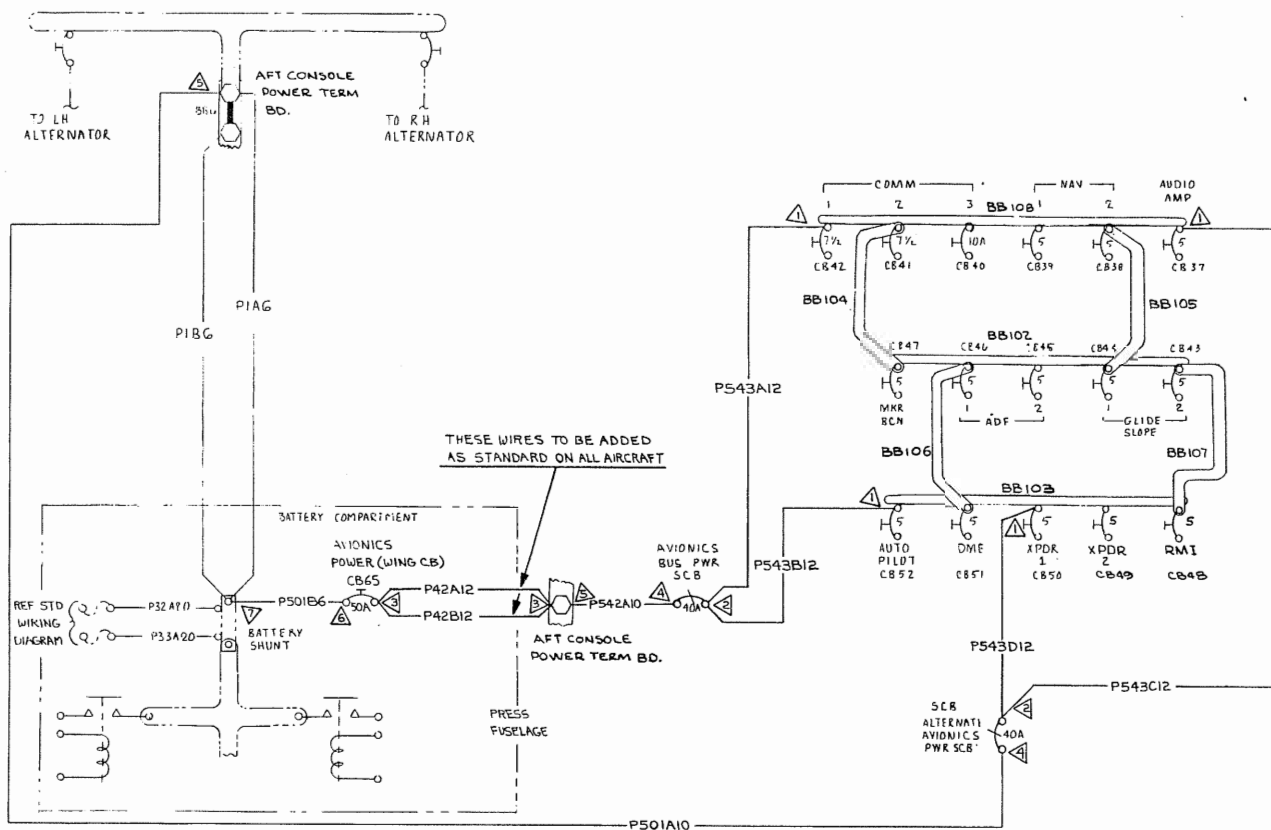
EXAMPLE: C14B22



Three types of wire numbers are shown for optional equipment. An example of the various wire numbers is as follows:

E27B18	E327B18	E527B18

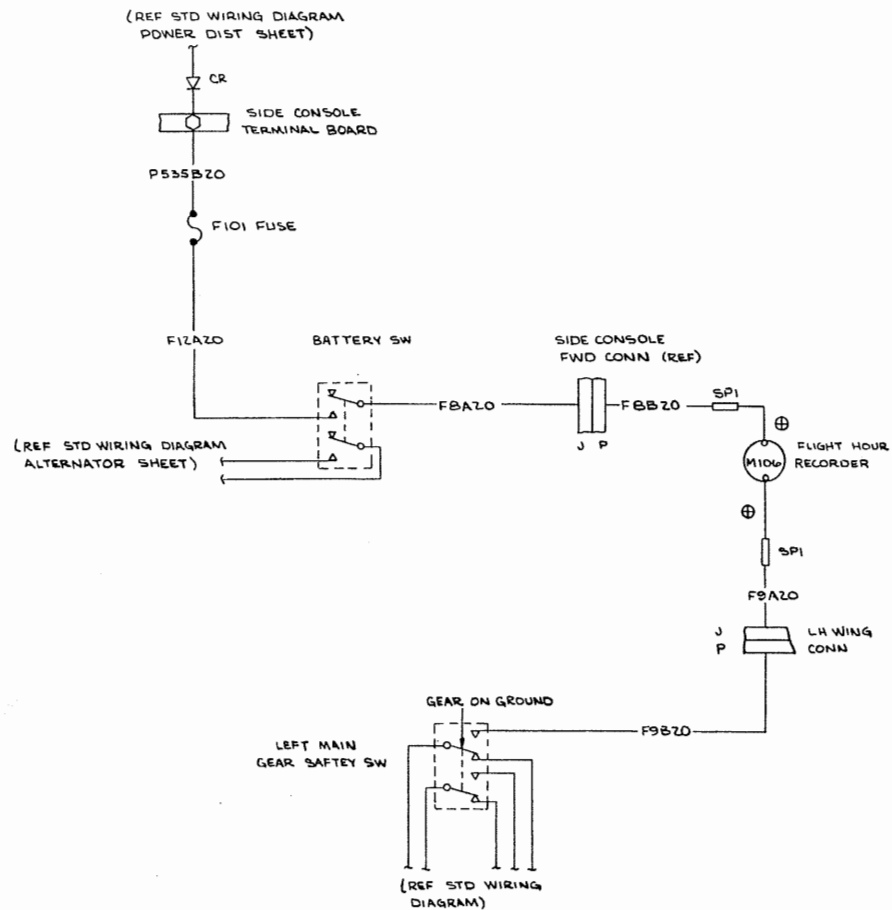
The only difference in the wire is in the installation schedule. The E27B wire numbering system was used on aircraft 421-0001 thru 421B0301. At 421B0301 and On, the same wire would be indicated as E327B18 or E527B18.



EQUIPMENT LIST (REF ONLY)		
SYMBOL	PART NO.	PART NAME
△	2-36161-5	TERMINAL
△	2-320568-2	TERMINAL
△	2-36161-3	TERMINAL
△	2-320568-3	TERMINAL
△	2-36161-4	TERMINAL
△	322005	TERMINAL
△	321670	TERMINAL
BB 101	5118410-1	BUS BAR
BB 102	5118410-1	BUS BAR
BB 103	5118410-1	BUS BAR
BB 104	5118403-1	BUS BAR
BB 105	5118403-1	BUS BAR
BB 106	5118403-1	BUS BAR
BB 107	5118403-1	BUS BAR
CB37	7277-5	CKT BKR, AUDIO AMP
CB38	7277-5	CKT BKR, NAV 2
CB39	7277-5	CKT BKR, NAV 1
CB40	7277-5	CKT BKR, COMM 3
CB41	7277-5	CKT BKR, COMM 2
CB42	7277-5	CKT BKR, COMM 1
CB43	7277-5	CKT BKR, GLIDESLOPE2
CB44	7277-5	CKT BKR, GLIDESLOPE1
CB45	7277-5	CKT BKR, ADF 1
CB46	7277-5	CKT BKR, AD2
CB47	7277-5	CKT BKR, MKR BCN
CB49	7277-5	CKT BKR, RMI
CB50	7277-5	CKT BKR, XPDR 1
CB51	7277-5	CKT BKR, DME
CB52	7277-5	CKT BKR, AUTOPILOT
CB55	7851-15-50	CKT BKR, AVIONICS (WING)
CB64	7277-5	CKT BKR, XPDR 2
SCB	CM-3589-40	SW CB, AVIONICS ALT
CB	7851-15-50	CB, AVIONICS PWR
SCB	CM-3589-40	SW CB, AVIONICS ALT

421B0301 AND ON

Cessna.		AIRCRAFT CO.	P. O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201
TITLE:			
WIRING ASSY ~ AVIONICS BUS			
SIZE	CODE/IDENT NO.	DRAWING NO.	
D	71379	5618200	

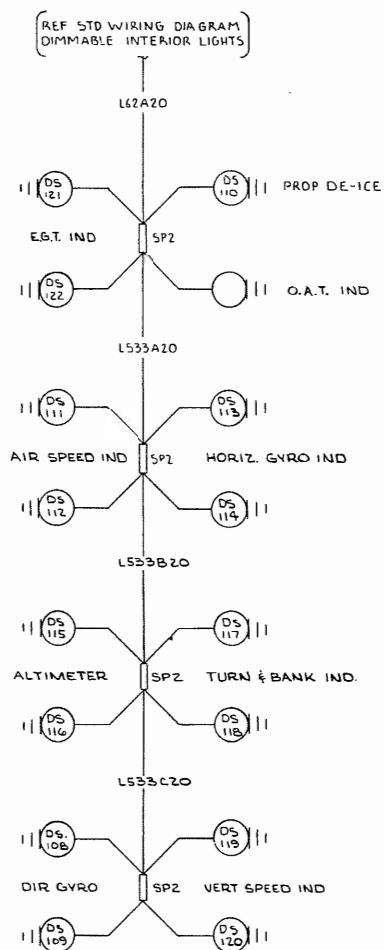


EQUIPMENT LIST

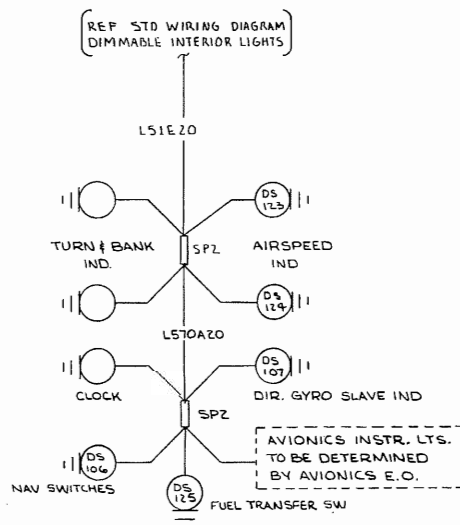
SYMBOL	PART NO.	PART NAME
M106	CM2926-1	RECORDER - FLT HR
F101	AGC 3.0	FUSE
SP1	S1370-1	SPLICE

421B0301 AND ON

		AIRCRAFT CO.		P.O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201
		TITLE: FLIGHT HOUR RECORDER WIRING ASSY (OPT.)		
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5618202		
SCALE: NONE		REF	SHEET 1 OF 1	



(2) OPTIONAL CO-PILOT INSTRUMENT LIGHTS

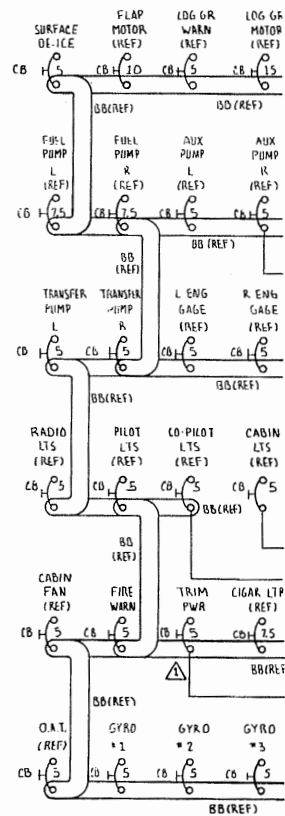
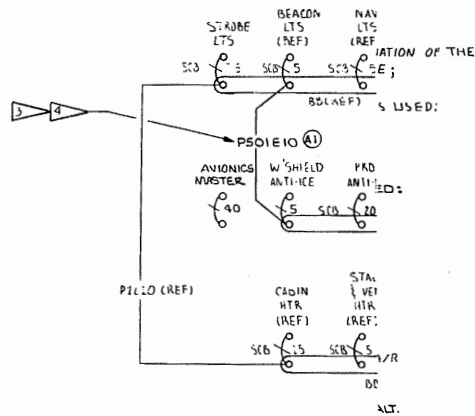


(1) OPTIONAL PILOT INSTRUMENT LIGHTS

EQUIPMENT LIST		
SYMBOL	PART NUMBER	PART NAME
DS 106	CM2990-G1	POST LIGHT - NAV SW
DS 107		D.G. SLAVE
DS 108		DIR. GYRO
DS 109		DIR. GYRO
DS 110		PROP DE-ICE
DS 111		AIR SPEED
DS 112		AIR SPEED
DS 113		HORIZ. GYRO
DS 114		HORIZ. GYRO
DS 115		ALTITUDE
DS 116		ALTITUDE
DS 117		T&B IND.
DS 118		T&B IND.
DS 119		V. S. I.
DS 120		V. S. I.
DS 121		EST. T.
DS 122		EST. T.
DS 123		AIR SPEED
DS 124		AIR SPEED
DS 125	CM2990-G1	POST LIGHT FUEL SW
SP2	320562	SPLICE

421B0301 AND ON

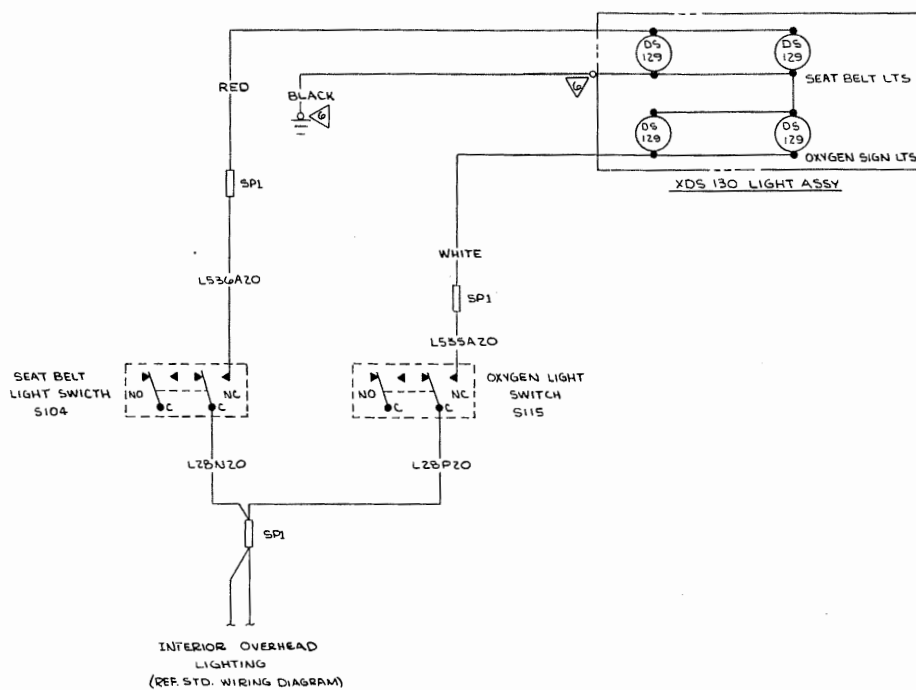
Cessna		AIRCRAFT CO.	P.O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201
TITLE: OPTIONAL PILOT INSTRUMENT LIGHTS OPTIONAL CO-PILOT INSTRUMENT LIGHTS WIRING ASSY			
SIZE: D	CODE IDENT. NO. 71379	DRAWING NO. 5618203	
SCALE: NONE OFF REV. A SHEET 1 OF 1			



EQUIPMENT LIST		
SYMBOL	PART NUMBER	DESCRIPTION
CB	7277-5-5	CKT BREAKER - SURFACE DE-ICE
CB		- L TRANSFER PUMP
CB		- R TRANSFER PUMP
CB		- FIRE WARN
CB	7277-5-5	- TRIM PWR
CB	7277-5-10	- L ELECT SEAT
CB	7277-5-10	- R ELECT SEAT
CB	7277-5-5	- GYRO #1
CB		- GYRO #2
CB		- GYRO #3
CB		- T & B #2
CB		- RADAR
CB		- STEREO
CB	7277-5-5	- RADIO ALT
CB	700-100-30	- AC INV #2
CB	700-100-30	- AC INV #1
SCB	112-507-101	CKT BREAKER - STROBE LTS
SCB	112-205-101	- TAXI LT
SCB	112-205-101	- W SHIELD ANTI-ICE
SCB	112-220-101	- PROP ANTI-ICE
SCB	112-205-101	- DE-ICE LT
SCB	112-205-101	- PITOT HEAT #2
SCB	CM 3589-00	SW CKT BREAKER - ANONICS MUST.
BB109	5118410-6	TERMINAL
BB110	5118410-7	BUS BAR
BB111	5118410-7	BUS BAR

421B0301 AND ON

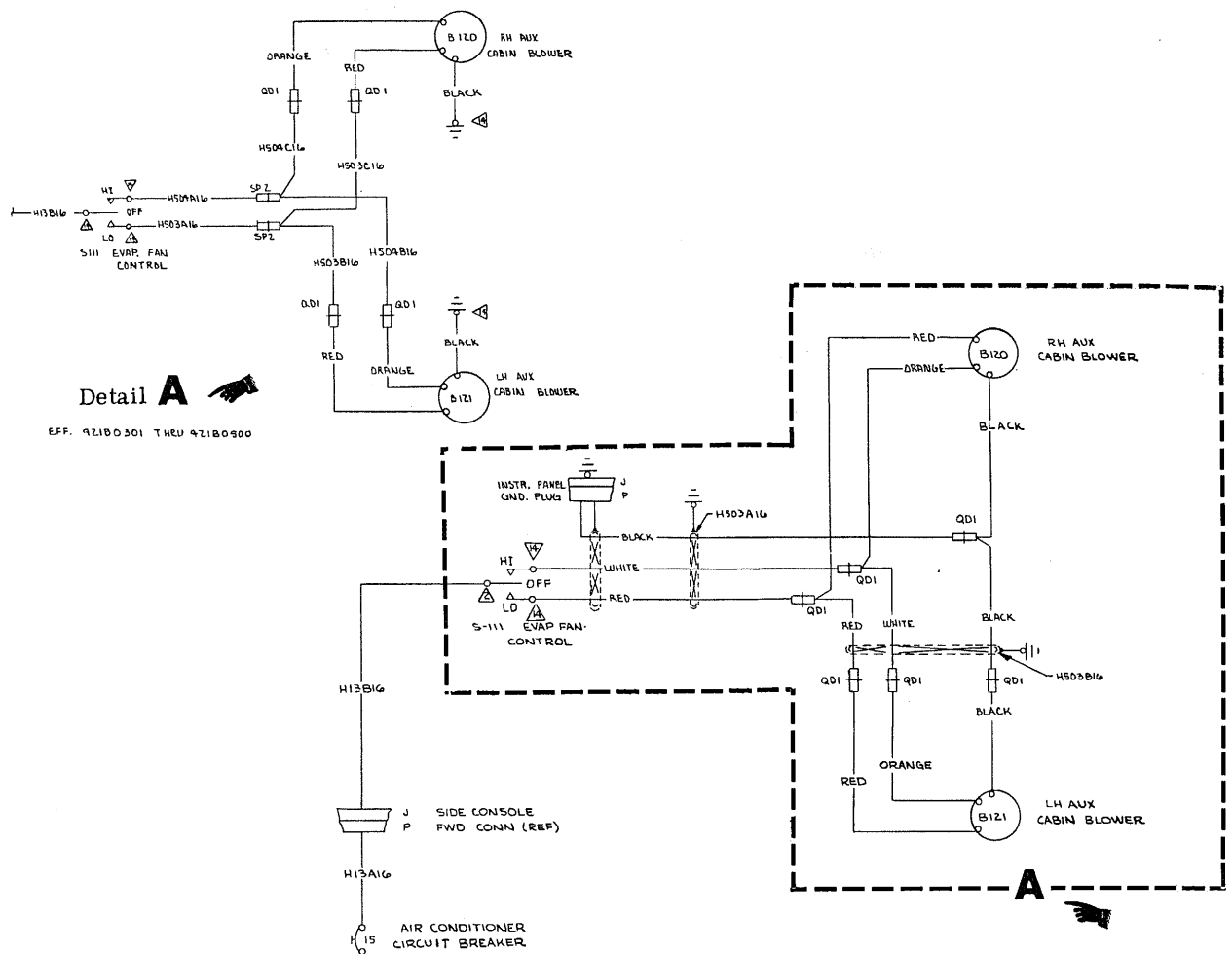
		AIRCRAFT CO.		P. O. BOX 1877 MILWAUKEE & TRIN DIVISION WICHITA, KANSAS 67201	
		TITLE: POWER DISTRIBUTION WIRING ASSY SIDE CONSOLE (OPT)			
SIZE: D	CODE IDENT. NO. 71379	DRAWING NO. 5618204			
SCALE: NONE		REF		SHEET 1 / 1	



EQUIPMENT LIST (FOR REF ONLY)			
SYMBOL	PART NO.	PART NAME	NOTE
DS 129	327	LAMP	
XDS 130	9000-01	LIGHT ASSY-CABIN	
XDS 131	10-0746-1	LIGHT ASSY-CABIN	
S-104	MST-205N	SWITCH, SEAT BELT	
S-115	MST-205N	SWITCH, OXYGEN	
S-133	MST-205N	SWITCH, SMOKING	
SP1	S-1310-1	SPLICE	
△	1-320551-3	TERMINAL	

421B0301 AND ON

Cessna		AIRCRAFT CO.	P. O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201
TITLE: OXYGEN, SEAT BELT & SMOKING LTS. WIRING ASSY. (OPT.)			
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5618206	
SCALE: NONE	REF	SHEET 1 of 1	

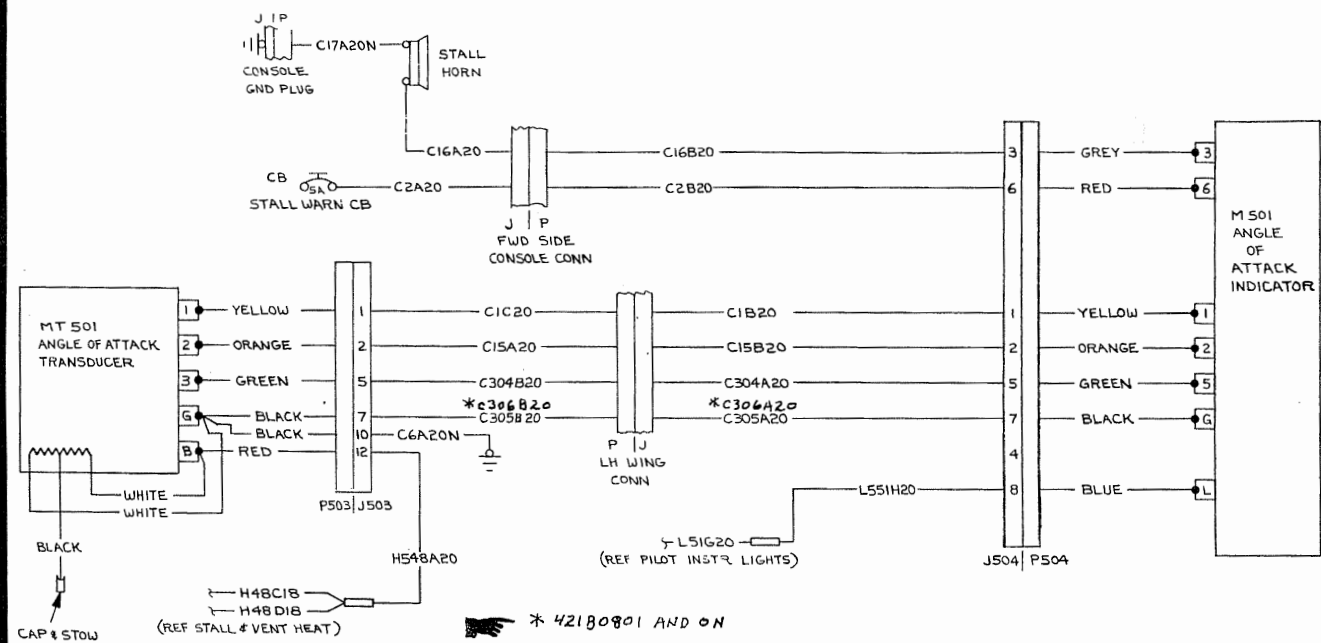


EQUIPMENT LIST

SYMBOL	PART NO.	PART NAME
B120	76061-1	RH AUX BLOWER
B121	76061-1	LH AUX BLOWER
S111	MS35053-21	SWITCH-EVAP FAN
QD1	1-51864-0	TERMINAL
SP1	S-341-1	SPLICE
SP2	S-1510-2	SPLICE

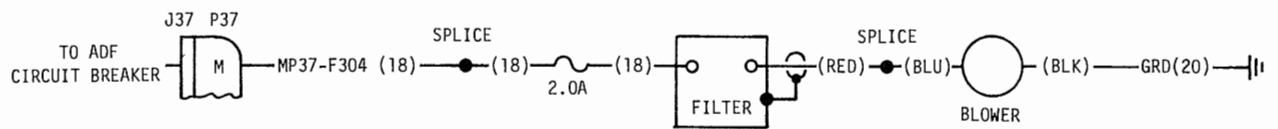
421B0301 AND ON

Cessna [®]		AIRCRAFT CO.	P.O. BOX 1877 MILITARY & TRAVEL DIVISION WICHITA, KANSAS 67201
TITLE: AUX CABIN VENTILATING SYSTEM WIRING ASSY			
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5618207	A



421B0501 AND ON

Cessna		AIRCRAFT CO.	P.O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201
TITLE: WIRING ASSY ~ ANGLE OF ATTACK			
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5618208	
SCALE:	REF	SHEET 1 OF 1	



10986005

Cessna.		P. O. BOX 1977 WALLACE-PROSPECT PLANT WICHITA, KANSAS	
TITLE			
AVIONICS COOLING BLOWER WIRING DIAGRAM			
SIZE	CODE IDENT. NO.	DRAWING NO.	
D	71379	55112009	
SCALE: NONE		SHEET	

SECTION 15

ELECTRONICS SYSTEMS

Table of Contents

	Page		Page
GENERAL DESCRIPTION	15-1	Cessna 800 RMI	15-16E
Wiring Code	15-1	Cessna 800 Nav	15-16F
AVIONICS MASTER SWITCH BREAKERS	15-2	Cessna 800 Com	15-16G
ELECTRONIC INTERFERENCE	15-2	Cessna 800 Glideslope	15-16H
Radio Noise	15-2	Cessna 800 Antenna Interconnects	15-16I
Alternator Noise	15-2	Cessna 800 Transponder	15-16J
Ignition Noise	15-2	Cessna Nav-O-Matic 800 Autopilot	15-17
Flap and Landing Gear Motor Noise	15-2A	12310-1144 Ground Adapter	15-20A
Auxiliary Fuel Pump Noise	15-2A	DG104B-1 Ground Adapter	15-20B
Lighting Circuit Noise	15-2A	Cessna Nav-O-Matic 400	15-20C
ELECTRONIC INTERFERENCE		Cessna Transceiver 500	15-20D
TROUBLESHOOTING GUIDE	15-2A	Cessna Nav/Com 500	15-21
Alternator Noise	15-2A	Cessna 500 Series Antenna	
Regulator Noise	15-2A	Interconnects	15-22
E. L. Inverter Noise	15-2A	Cessna ADF 500 (Rotatable Loop)	15-23
Electric Trim Motor Noise	15-2B	Cessna Dual ADF 500 (Rotatable Loop)	15-24
Fuel Boost and Auxiliary Transfer		Cessna ADF 500 (Fixed Loop)	15-25
Pump Noise	15-2B	Cessna Nav/Omni 500	15-26
Tip Tank Transfer Pump Noise	15-2B	Cessna Nav/Com 400	15-26A
Rotating Beacon Noise	15-2B	Cessna Transceiver 400	15-26B
Strobe Light Noise	15-2B	Cessna Nav/Omni 400	15-26C
AVIONICS COOLING BLOWER	15-2C	Cessna ADF 400	15-26D
Removal	15-2C	Cessna 400 ADF	15-26E
Installation	15-2C	Cessna Glideslope 400	15-26F
FLIGHT PHONE	15-2C	Cessna Transponder 400	15-26G
Removal and Installation	15-2C	Cessna 400 ADF (Fixed Loop)	15-26H
WIRING DIAGRAMS		Cessna Marker Beacon 300	15-27
Cessna Transceiver 800	15-2H	Weather Radar	15-28
Cessna Transmitter 800	15-3	AVQ-55 Weather Radar	15-29
Cessna Nav/Omni 800	15-4	T22RA HF Transceiver	15-30
Cessna Dual Nav/Omni 800	15-5	PN101 Pictorial Navigation System	15-31
Cessna Glide Slope 800	15-6	PN101 Pictorial Navigation System	
Cessna ADF 400	15-6A	Audio Amplifier and Audio Wiring	
Cessna Dual ADF 400	15-6B	Diagram	15-32A
Cessna ADF 800 (Fixed Loop)	15-7	Radio Junction Box Terminations	15-33
Cessna ADF 800 (Rotatable Loop)	15-8	Radio Cooling Blower	15-34A
Cessna Dual ADF 800 (Rotatable Loop)	15-9	Audio Code Filter	15-34B
Cessna Marker Beacon 800	15-10	Continuous Load Chart	15-35
Cessna DME 800	15-11	Table of Electronic Equipment	
Cessna Transponder 800	15-14	Loading	15-36
Cessna RMI 800	15-15		
AIM 400 Gyro	15-16		
Cessna 800 ADF	15-16A		
Cessna 800 Dual ADF	15-16B		
Cessna 800 Transponder	15-16C		
Cessna 800 Marker Beacon	15-16D		

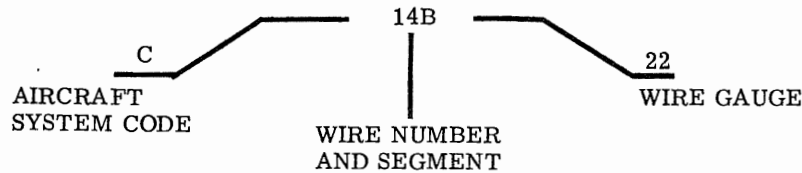
GENERAL DESCRIPTION.

This section contains wiring diagrams which clearly show the complete wiring on each item of electronic equipment listed in the wiring diagram index. The last portion of the section contains tables showing the electronic loading of various components on the shelves and rack in the aircraft.

Wiring Code.

Each wire used in the electronics system is identified by code. This coding provides a convenient way of identifying wires when installing new wiring or servicing existing wires. The wire code is shown on each diagram. Some cabling is supplied by vendors on the electronics equipment and do not carry

Example C14B22



NOTE

The wiring diagrams in this section pertain to Aircraft 421-0001 to 421B0001.

For wiring diagrams on Aircraft 421B0001 and On, refer to the applicable wiring diagram book furnished with your aircraft.

Cessna identification. The diagrams covering such wiring may refer to the instruction manuals of such equipment where a more complete wiring diagram may be found. The wiring code used by Cessna on the 421 is shown above.

AVIONICS MASTER SWITCH BREAKERS

Two Avionics Master Switches are provided with factory-installed avionics. Power is supplied from the battery through a circuit breaker located in the left-hand stub wing circuit breaker panel to the avionics switch breaker located on the left side console. The ALTERNATE AVIONICS power switch circuit breaker located next to the avionics switch circuit breaker on the left console provides, power in the event the avionics circuit breaker, switch breaker or their associated wiring and battery circuits become inoperative. Access to the avionics circuit breaker is gained by removing access cover (36), figure 1-2.

ELECTRONIC INTERFERENCE

Radio Noise.

Radio noise is a problem of great importance to the aircraft industry. A noisy radio system may actually imperil the safety of the aircraft occupants. The performance of radio navigation equipment can be completely erroneous if radio noise is excessive. For this reason, radio installations should be made only by persons who are qualified. Radio noise is not generated in a properly operating radio set, but is merely presented to the listener in an audible form exactly the same way that a radio station is received. Many forms of noise can exist in any particular aircraft and, ironically, sometimes certain aircraft can be amazingly quiet. This condition is unusual and even though the aircraft is quiet without noise suppression, it cannot be released without proper suppression. A quiet aircraft without suppression may degenerate into a noisy aircraft with changes in age, temperature, and humidity. Common radio noise is generated by ordinary electrical devices in the aircraft such as flap or gear motors, navigation light flashers and ignition or alternator systems. By

properly installing capacitive and inductive devices in these circuits, the noise can usually be reduced to a tolerable level. A more difficult type of noise to suppress, is that generated by friction between two components or by rectification. Another difficult problem is noise that is carried to sensitive areas by grounding loops. The following paragraphs contain solutions that have been effective for the factory. It is important to remember that each aircraft may present a slightly different problem and, therefore, a "fix" on one aircraft will not necessarily be effective in all cases.

Alternator Noise.

While the alternators are relatively free from radio noise, there is the possibility the alternators will produce an audible noise in the radio and electronic systems. Inside the alternator a three phase AC voltage is applied to a full wave rectifier assembly, thus converting the AC voltage to DC. During the rectification, an AC ripple appears on top of the DC voltage, thus the bus voltage is actually fluctuating. While the battery acts as a capacitance, it is also necessary to have additional filtering. This is accomplished by the use of a capacitor from the output terminal to ground at the alternator. The use of solid state regulators reduces the possibility of regulator noise to a minimum and will not require filtering.

Ignition Noise.

The sound of ignition noise is easily identified because of its timing. The 421 has a shielded magneto ignition system. Each secondary lead from the magneto to the plug is a shielded wire. Double shielded wiring is used in the primary circuit with a special suppressor in series with the switch lead. The suppressor is constructed coaxially with a shielded lead coming out of the end which is connected to the magneto cigarette cartridge. The double shielded wire is connected to the terminal end of the filter (the shield is grounded). The double shielded wire enters the cabin area through connectors in the wing root rib to prevent noise transfer to the junction box wiring.

The double shielding is continued to the inside of the cabin to the magneto switch. The magneto switches are enclosed in a shielded case to which the double shield of wire is grounded. If ignition noise is prevalent in the radio system, the entire magneto system should be checked for tight connections, especially in the root rib connectors and at the switch and suppressor. All ground connections in the circuit are critical and any oil or dirt accumulation should be cleaned from the connection and the metal should be brightened to provide the best possible ground. Ignition harness should be replaced if shielding becomes questionable.

Flap and Landing Gear Motor Noise.

During a landing approach, an unfiltered motor in the flap or gear circuits can produce a startling volume of noise which is very distracting. There is also the possibility of the noise blanketing a message from the tower during the approach. It is possible that sufficient noise could be created through these circuits to blanket an ILS signal, creating a hazardous situation. For these reasons, the circuits have a filter section built into the motor. The filter should be very effective if the unit is properly grounded. If noise becomes excessive with good grounding, a motor overhaul or replacement may be necessary.

Auxiliary Fuel Pump Noise.

Coaxial type capacitors produce effective results when installed on the base of the fuel boost pumps. Because of the location of the fuel pump and capacitors, the connections must be kept tight to avoid any possible arcing. When proper filtering and grounding do not produce the desired filtering results, a new pump should be tried.

Lighting Circuit Noise.

All lighting components on the 421 have internal filters and usually do not require external capacity. The light wiring, however, because of its route to the extremities of the aircraft can, in unusual cases, conduct noise to vital areas. The light wires and electrical wiring bundles should be routed away from the antenna and loop antenna cables to prevent picking up noise in the radio systems. Shielding should be properly grounded.

ELECTRONIC INTERFERENCE TROUBLESHOOTING GUIDE.

The following general troubleshooting information is presented as a guide to determine the system or systems producing the interference.

- a. Pinpoint the particular system causing the noise by the process of elimination.
- b. Once the system causing a particular noise is isolated, investigate the particular system or sys-

tems to determine which component or components are causing the noise, by observing which components are actually operating when the noise occurs.

- c. Check the component for proper operation or damage.
- d. Check wiring connections and wiring coming in contact with moving parts.
- e. Check wire routing for proper separation.
- f. Check wire shielding where applicable.
- g. Check all system grounds.

Alternator Noise.

If alternator noise is experienced and it is determined it is coming from the output of the alternator, the following troubleshooting should be accomplished before attempting additional filtering.

- a. Check attenuator output bypass filter for broken leads or inadequate ground.
- b. Check the lead attaching to alternator power (+) terminal is as short as possible or approximately 1 to 2 inches long.
- c. Check alternator ground wire for any damage or improper contact or corrosion between terminal and grounding point.
- d. Check alternator brushes for damage that could be arcing.
- e. Check alternator brush tension for proper seating.

Regulator Noise.

If regulator noise is present and traced to the regulator and its associated control leads, the following checks should be made before attempting to add additional filtering.

- a. Check regulator adjustment for proper setting (27.25 to 27.75 volts).
- b. Check regulator noise filter for damage, loose wires, broken leads, or improper connections.
- c. Check shield wire on regulator to alternator field wires for proper termination (single point ground), shield damage, check for adequate coverage at termination ends.
- d. Check alternator for brush arcing.

E. L. Inverter Noise.

In most cases noise produced by the E. L. inverters could be due to the light capacitive load on inverter. When this problem occurs, it can be eliminated by the addition of .01 to .05 udf 200 WV capacitor to the output terminals of the inverter. If the noise cannot be eliminated, it should be determined whether the noise is due to one of the following.

- a. Radiation from AC arcing requiring shielding.
- b. Noise conducted to the power bus by the DC input, requiring filtering.
- c. Radiation from DC power leads requiring shielding.

- d. Radiation from inverter, necessitating replacement of inverter.
- e. If the aircraft has an ADF installed, the following guidelines may be used to locate E. L. inverter noise:
 1. Tune ADF to a low frequency band.
 2. Place all panel light controls in the lowest position.
 3. Turn each panel control fully on, one at a time, and listen for a high-pitched buzzing sound similar to an electric drill motor.
 4. After isolation of the noisy control, check panels on that control for operation.
 5. If the inverter has a capacitor across its output terminals, check the capacitor for damage or substitute a capacitor known to be good.

Electric Trim Motor Noise.

In the event of noise difficulties caused by the trim system motors, the following should be checked to insure standard noise suppression equipment is properly installed.

- a. Check that motor frame and actuator assembly are properly grounded.
- b. Check capacitors inside of motor for broken leads or damage.
- c. Check to make sure shielded wires are properly grounded at the actuator assembly and that the shields are not shorted in other areas to structure which could create noise loops.
- d. If the filters are good and noise is not totally eliminated, the following procedures should be attempted to eliminate the noise:
 1. Change C_1 to .05 microfarad.
 2. Add a 1.0 microfarad feed-thru capacitor with shielded lead to (+) lead of the side producing the noise. Attach the housing or capacitance ground to the actuator housing assembly.
 3. Make sure shielding wire and motor frame are making good ground.
 4. If the motor is noisy in both directions of rotation, add a 1.0 microfarad feed-thru capacitor to both leads and insure that shield and housing or capacitor ground are attached to the actuator housing assembly.
 5. The addition of larger capacitors, inductors or RF chokes is not recommended; experience has proven no significant change in additional filtering.

Fuel Boost and Auxiliary Transfer Pump Noise.

If boost pump noise is experienced in the audio system, check the following.

- a. Insure that wiring is properly shielded.
- b. Insure shields are properly grounded.
- c. Check loose wiring connections for looseness and breaks.

NOTE

If the cause of the noise cannot be eliminated, a .47 microfarad 50 WV feed-thru capacitor should be installed in the power (AX) lead as close to the pump as possible and insure the case of the capacitor is properly grounded to the airframe.

Tip Tank Transfer Pump Noise.

If the tip tank transfer pump is causing noise in the audio system, check the following.

- a. Check capacitor case ground.
- b. Check capacitor for damage, open circuit, short circuit, loose wiring and damaged shielding.
- c. Substitute a capacitor of the same value known to be good in place of the original capacitor.

Rotating Beacon Noise.

If the rotating beacons are causing noise in the audio system, the following should be checked.

- a. Filter for proper ground.
- b. Lamp circuit for loose connections and wiring.
- c. Bulb for loose socket.
- d. Internal filter for damage.
- e. External light for proper ground to frame or structure of aircraft.

Strobe Light Noise.

If the strobe lights are causing noise in the audio system from radiation or in-line interference, the following should be checked.

- a. Make sure all power supply units are grounded properly to the airframe.
- b. Insure the shielded wires and twisted pairs from the tail light are grounded.

NOTE

Grounds must be terminated at the power supply.

- c. Insure tail Nav light is adequately grounded.

NOTE

If it is determined the noise is being radiated from the tail light, flash tube, the interference can be minimized by installing a strip of aluminum metalized tape on top of the existing white stripe painted on the glass and insuring the aluminum strip is grounded to the metal case of the light assembly.

AVIONICS COOLING BLOWER.

An optional avionics cooling blower, if installed, is located in the control pedestal. The blower system consists of a blower, filter, fuse holder, fuse and electrical wiring. The blower is utilized to cool the avionics equipment mounted on the radio panel of the instrument panel.

Removal of Avionics Cooling Blower. (See figure 15-1.)

- a. Ensure electrical power is OFF.
- b. Remove access panel (2) from control pedestal (1).
- c. Identify and disconnect blower ground wire (black) from structure; disconnect blower wire (blue) at splice.
- d. Remove blower (7) from bracket (4) by removing clamp (6).

Installation of Avionics Cooling Blower. (See figure 15-1.)

- a. Position clamp on blower and secure clamp to bracket with bolts, washers and nuts.

NOTE

Clamp is to be positioned against stop block (5). Install blower with flow arrow pointing up.

- b. Identify and connect electrical wires of blower.

NOTE

Ensure ground wire is properly grounded.

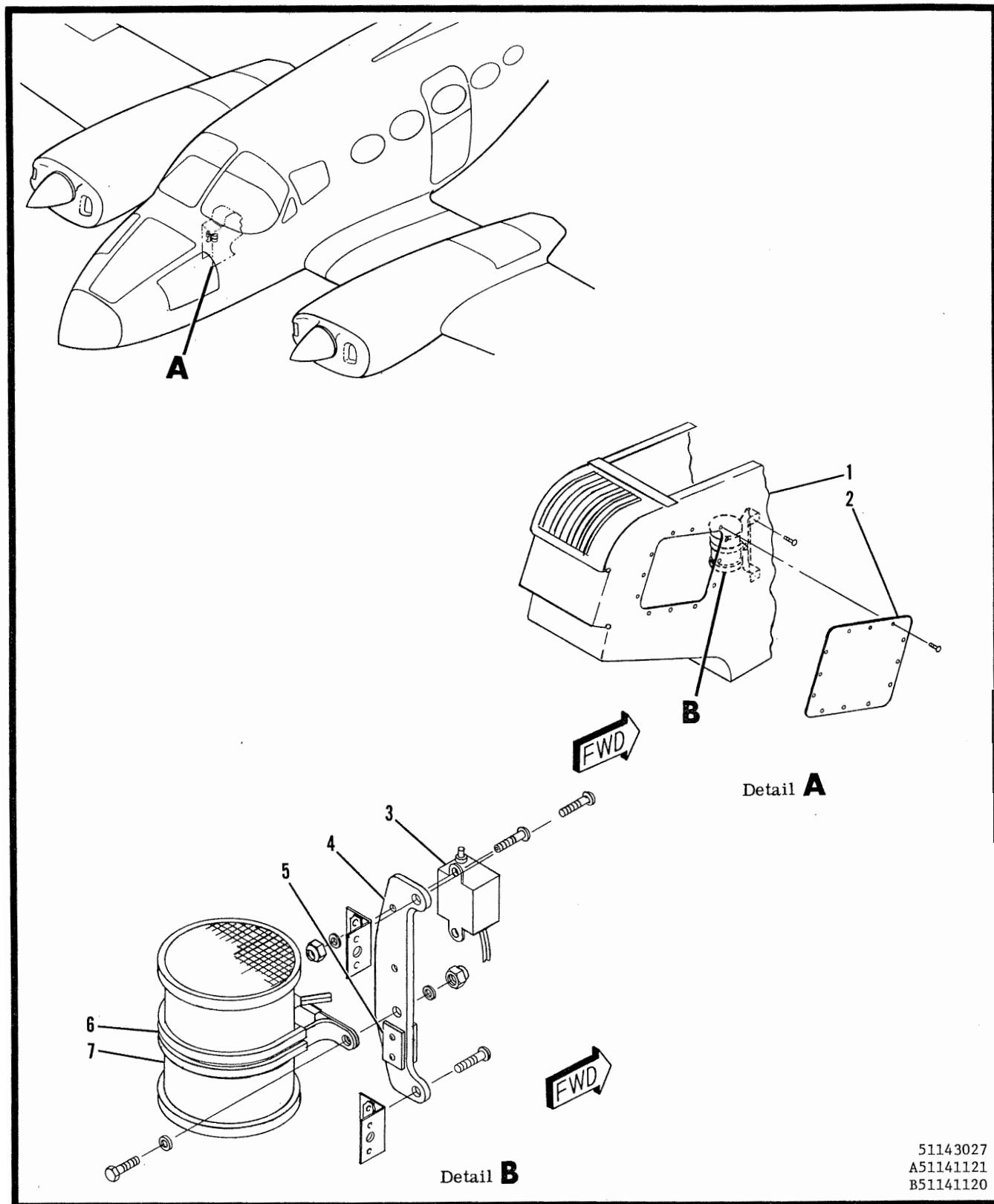
- c. Conduct operational check to ensure proper directional flow of air.
- d. Install access panel of control pedestal.

FLIGHT PHONE.

The flight phone system consists of an RT-18 transceiver, an AT-460 antenna, a phone handset and associated wiring and cables. The transceiver, and antenna is located below the aft fuselage baggage compartment. The phone handset is normally located under the aft RH passenger seat.

Removal and Installation of Flight Phone System. (See figure 15-1A.)

- a. Open drawer assembly; remove phone from its base, tag wires and disconnect wire bundle (2).
- b. Remove phone mounting plate (3) from drawer assembly by removing screws, washers and nuts.
- c. Remove nuts, washers and screws securing drawer assembly to slide assembly (9); remove drawer from seat base.
- d. Remove slides from seat base by removing cap nuts and bolts securing brackets (8) to seat base (7).
- e. Remove carpet and aft floorboard as required to gain access to flight phone transceiver and antenna.
- f. Disconnect wire bundle (2) and coax cable (12) from transceiver (14).
- g. Remove transceiver from its mounting plate and remove mounting plate from brackets (13) by removing attaching screws.
- h. Disconnect coax cable (12) from antenna (11) and remove antenna from aircraft by removing attaching screws.
- i. Install flight phone system by reversing removal procedures.



- 1. Control Pedestal
- 2. Access Panel

- 3. Filter
- 4. Bracket
- 5. Stop Block

- 6. Clamp
- 7. Blower

Figure 15-1. Avionics Cooling Blower

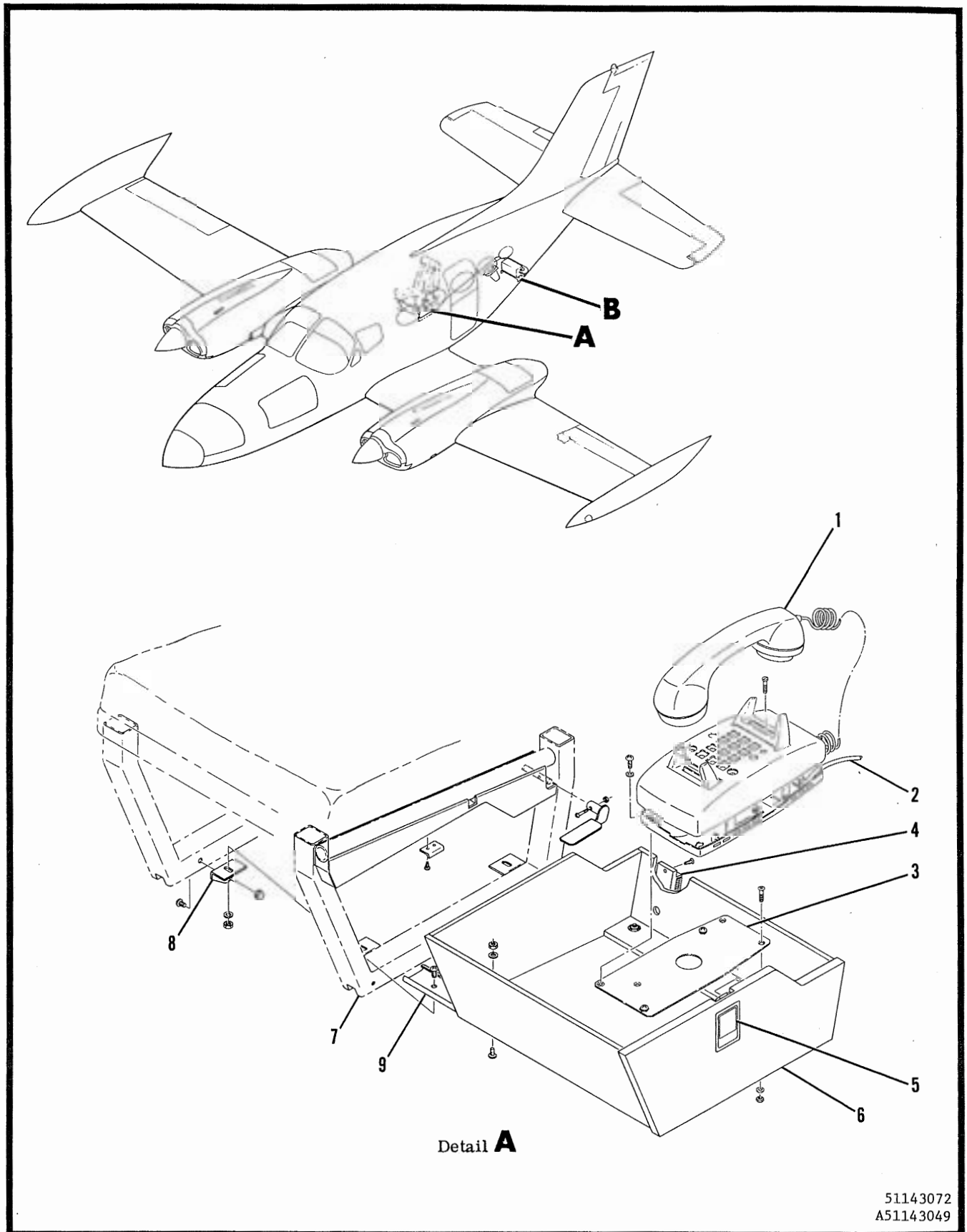
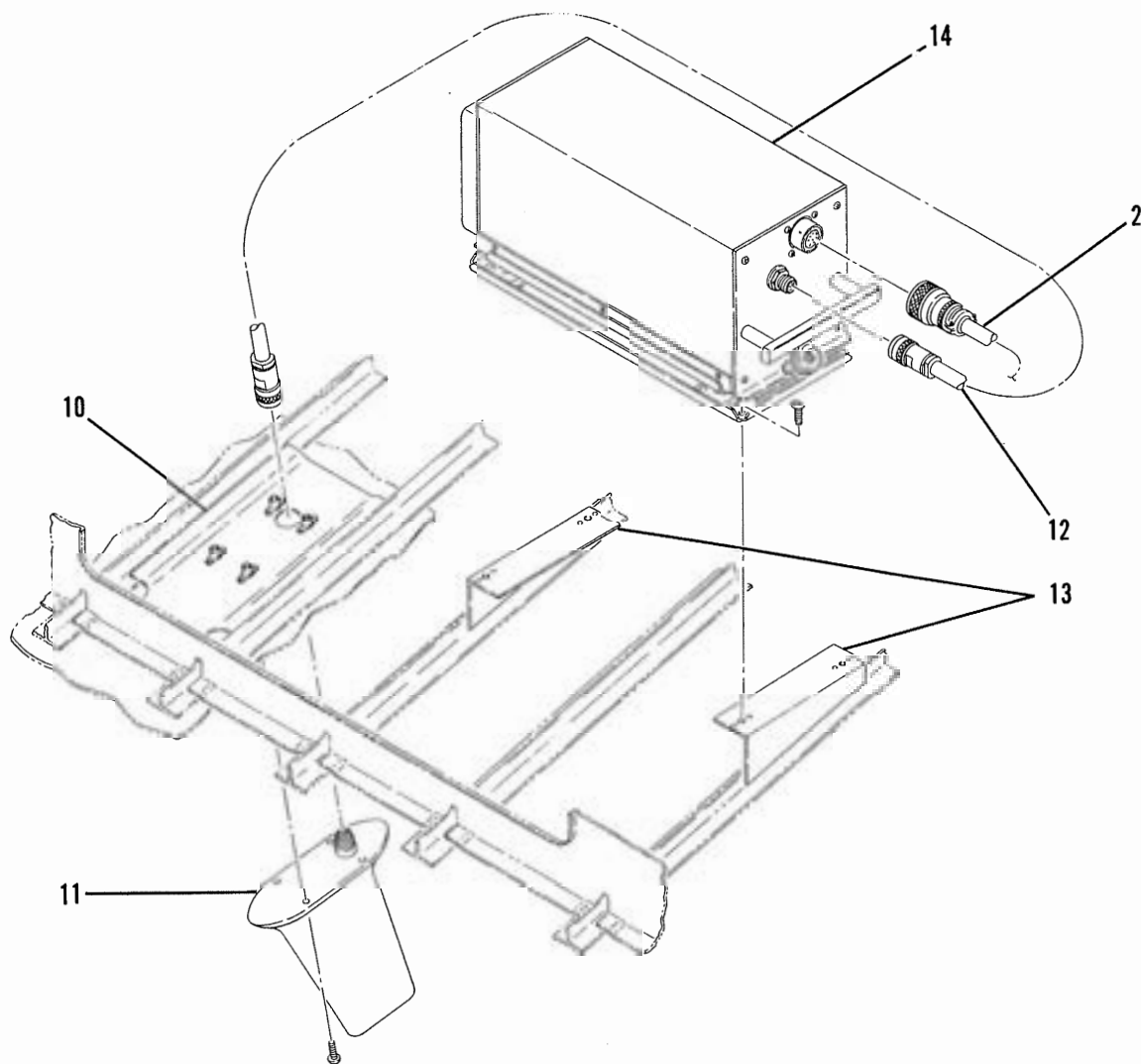


Figure 15-1A. Flight Phone Installation (Sheet 1 of 2)

51143072
A51143049

Detail **B**

B51143073

1. Handset
2. Wire Bundle
3. Mounting Plate
4. Magnetic Catch
5. Latch Assembly

6. Drawer Assembly
7. Seat Base
8. Bracket
9. Slide Assembly

10. Doubler
11. Antenna
12. Coax Cable
13. Support
14. Transceiver

Figure 15-1A. Flight Phone Installation (Sheet 2)

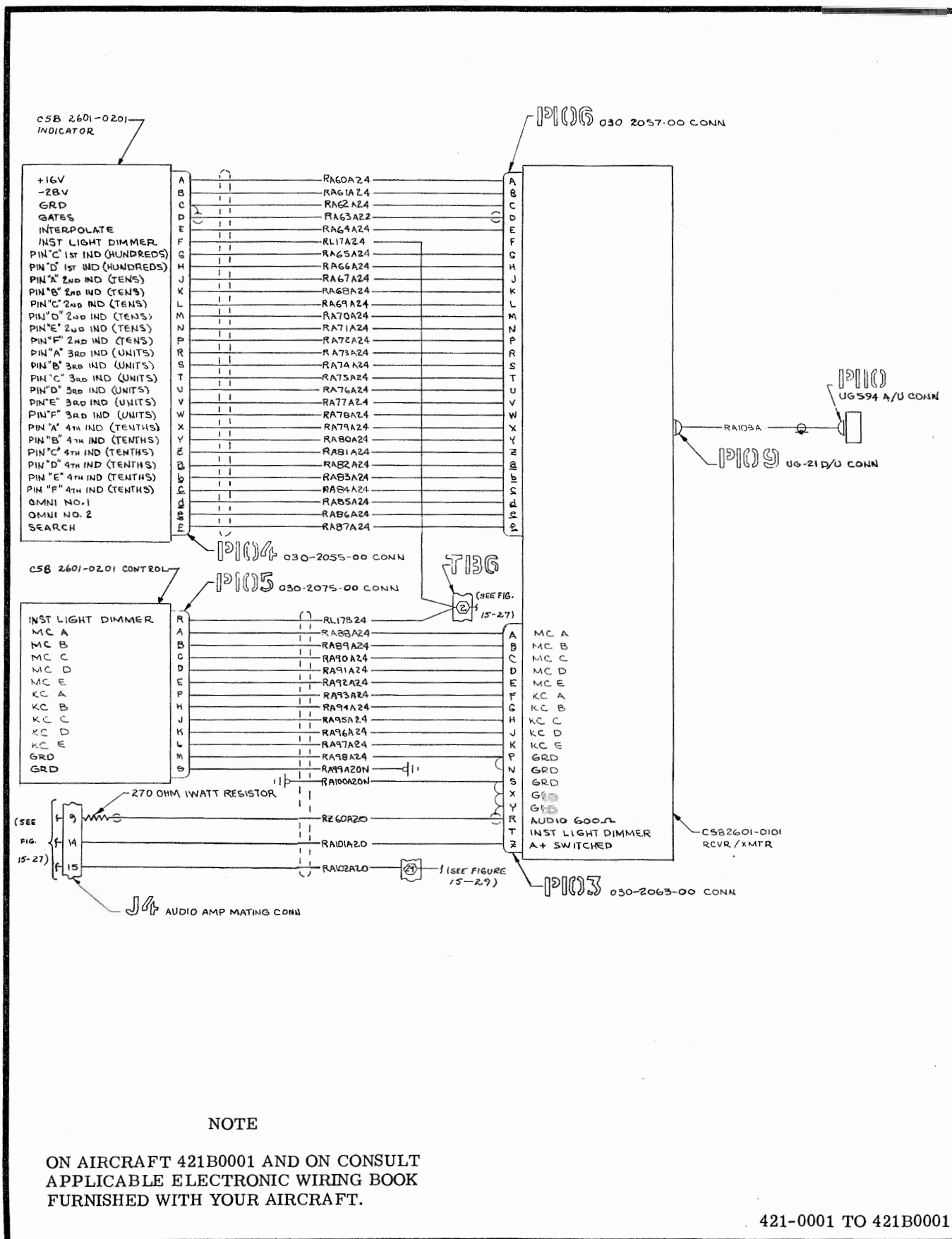
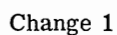
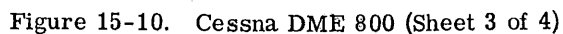


Figure 15-10. Cessna DME 800 (Sheet 1 of 4)





NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
FURNISHED WITH YOUR AIRCRAFT.

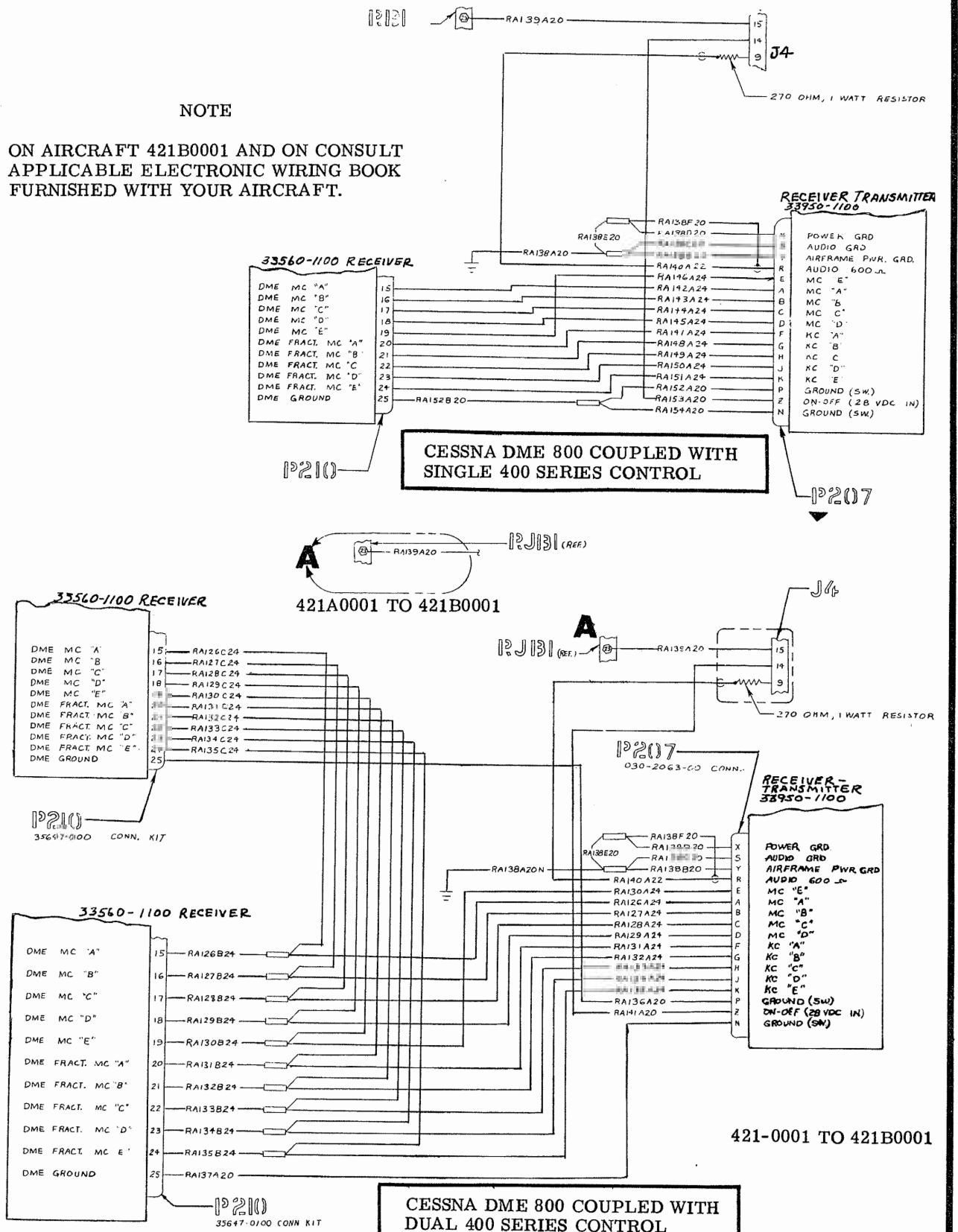


Figure 15-10. Cessna DME 800 (Sheet 4 of 4)

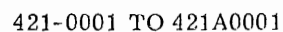
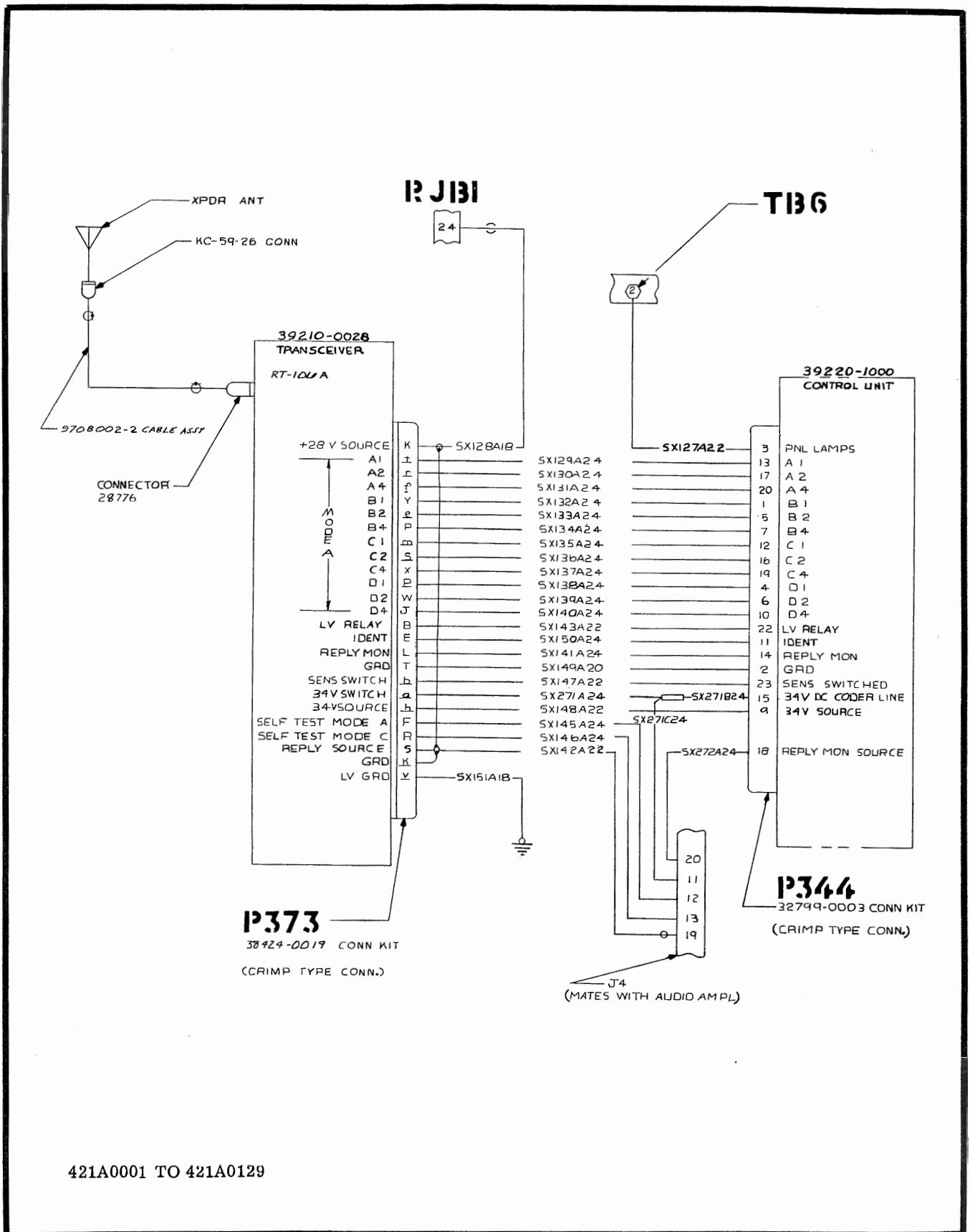
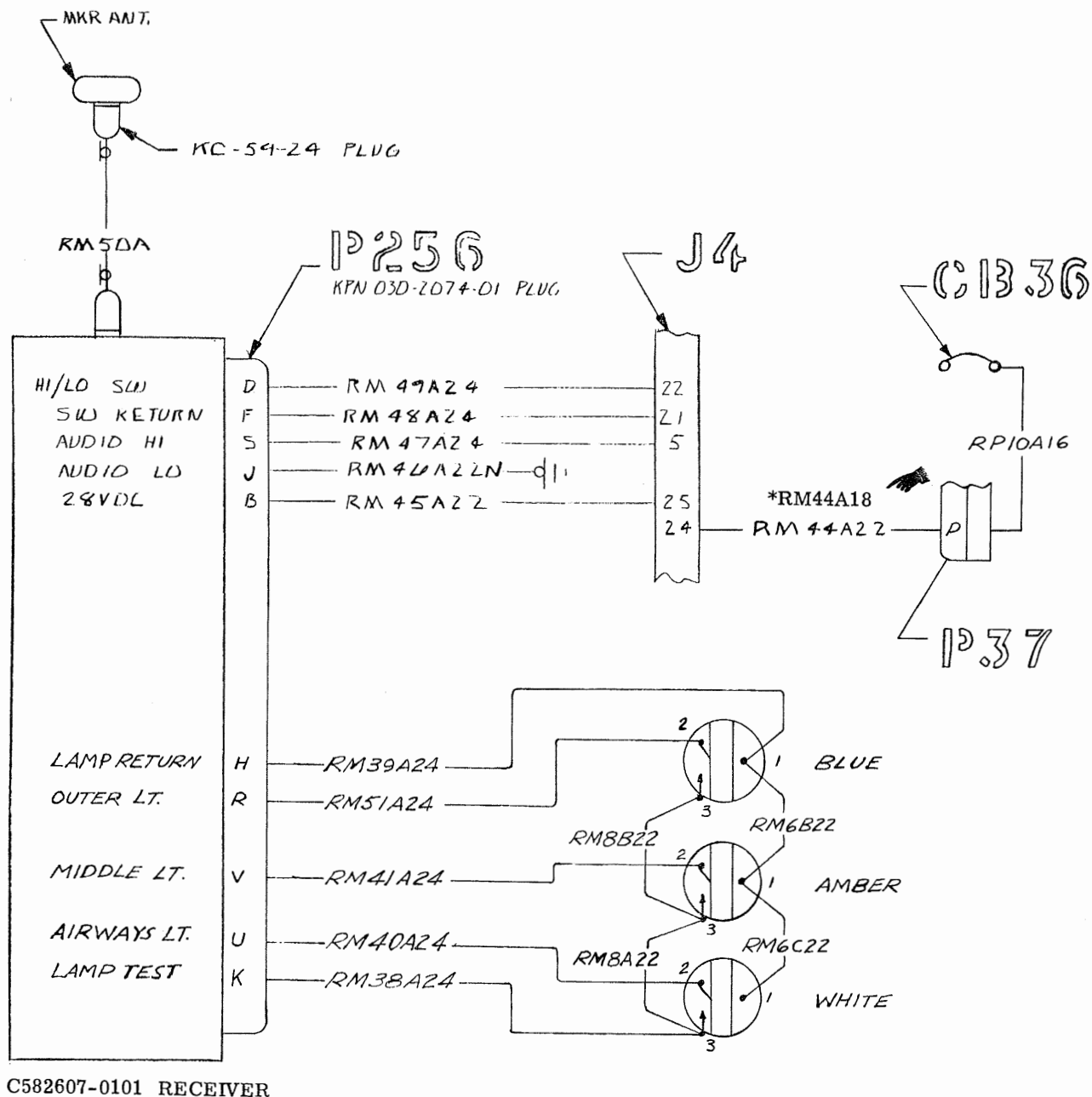


Figure 15-11. Cessna Transponder 800



421A0001 TO 421A0129

Figure 15-13C. Cessna 800 Transponder



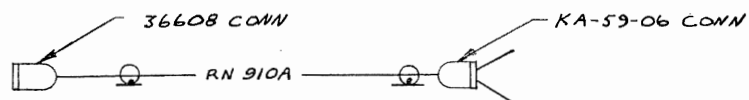
NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
FURNISHED WITH YOUR AIRCRAFT.

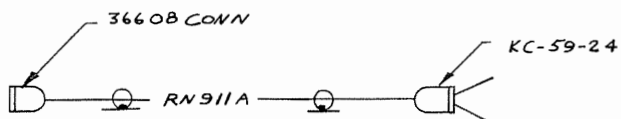
*421A0090 TO 421B0001

421A0001 TO 421B0001

Figure 15-13D. Cessna 800 Marker Beacon



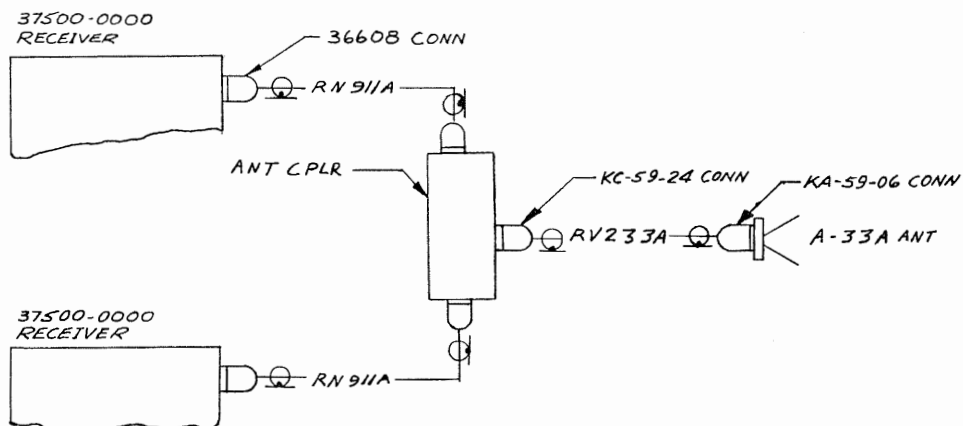
A-33A ANTENNA



OMNI-TENNA OR COUPLER

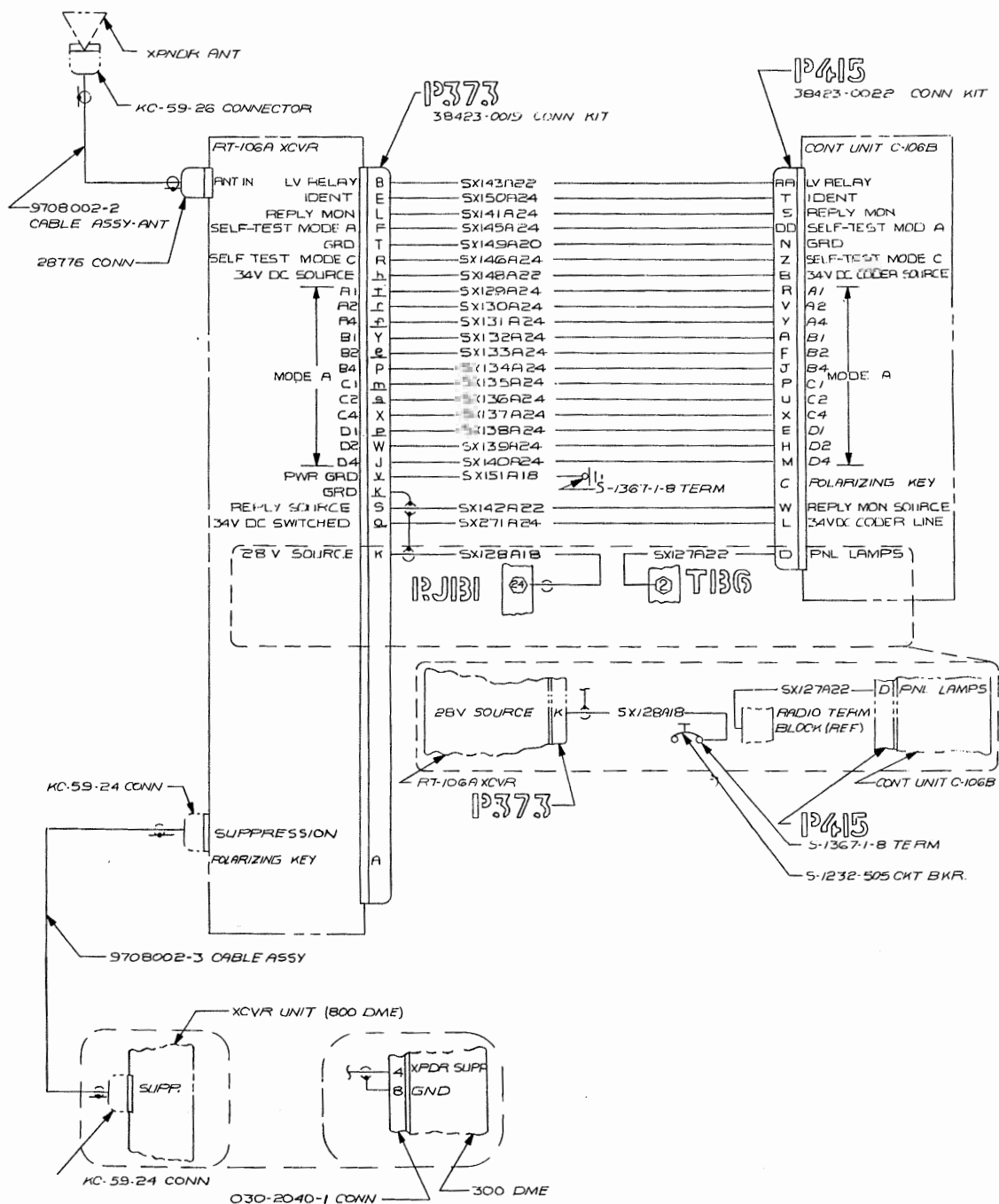
NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
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421A0001 TO 421B0001

Figure 15-13I. Cessna 800 Antenna Interconnects



NOTE

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421A0129 TO 421B0001

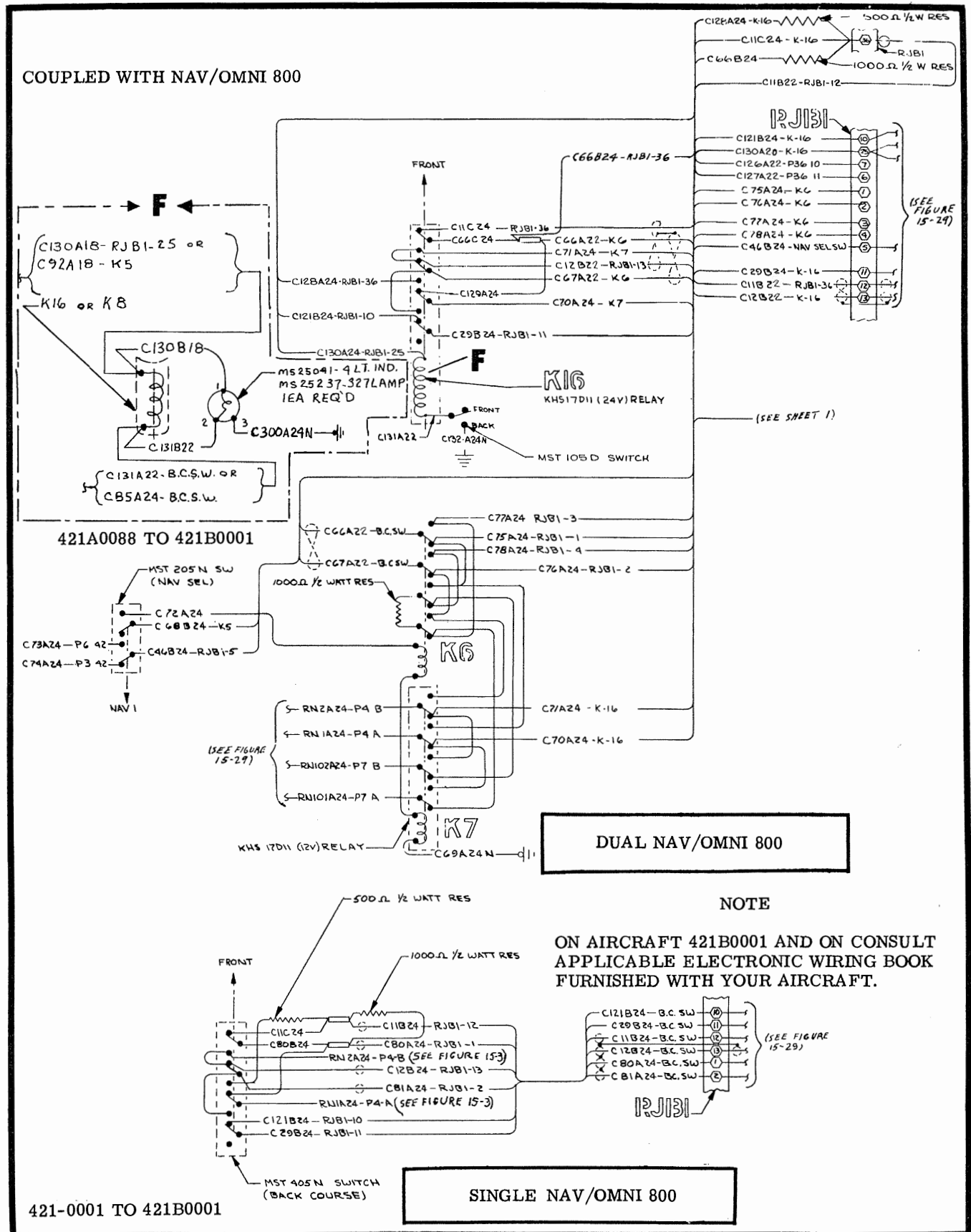
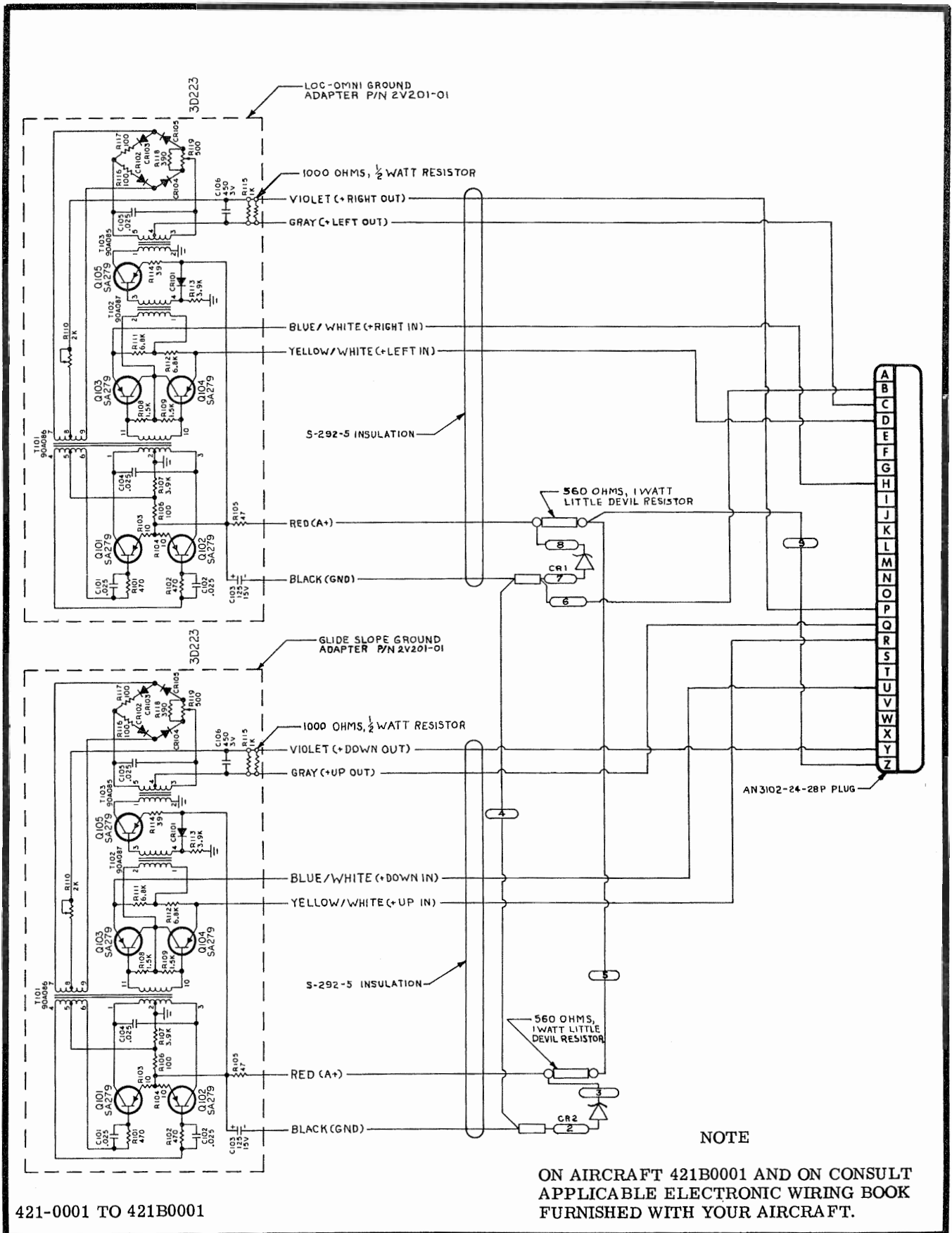
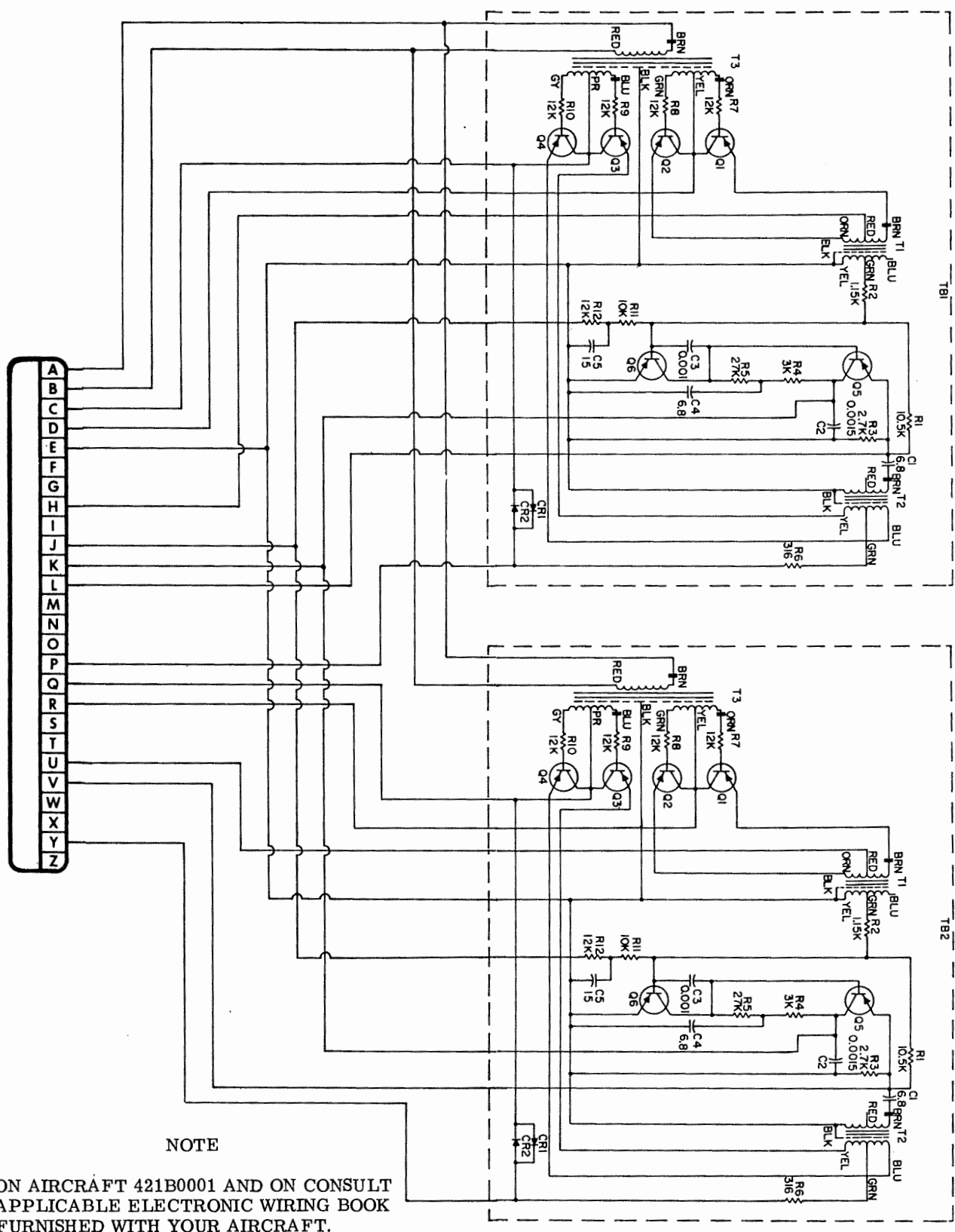


Figure 15-14. Cessna Nav-O-Matic 800 Autopilot (Sheet 3 of 5)



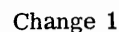
421-0001 TO 421B0001

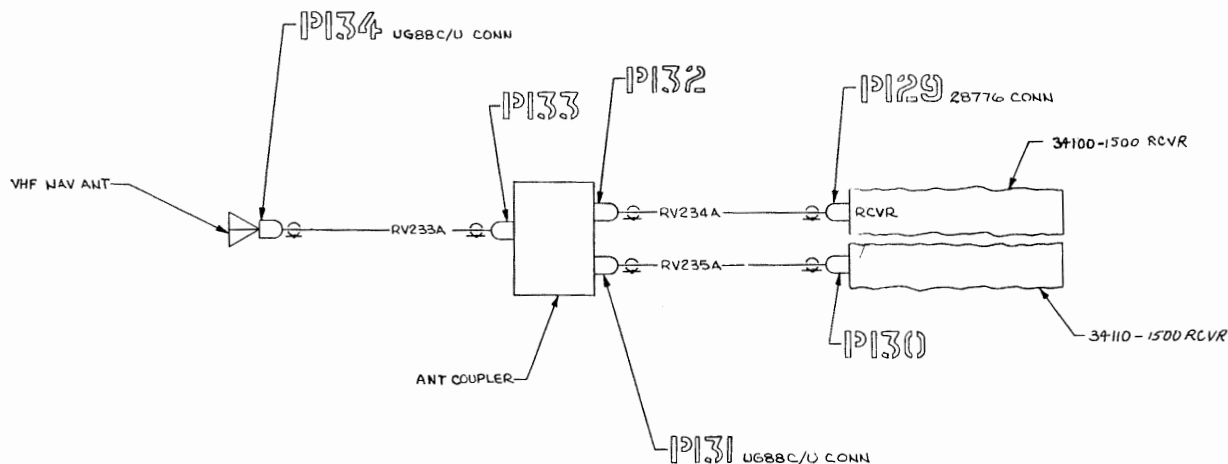
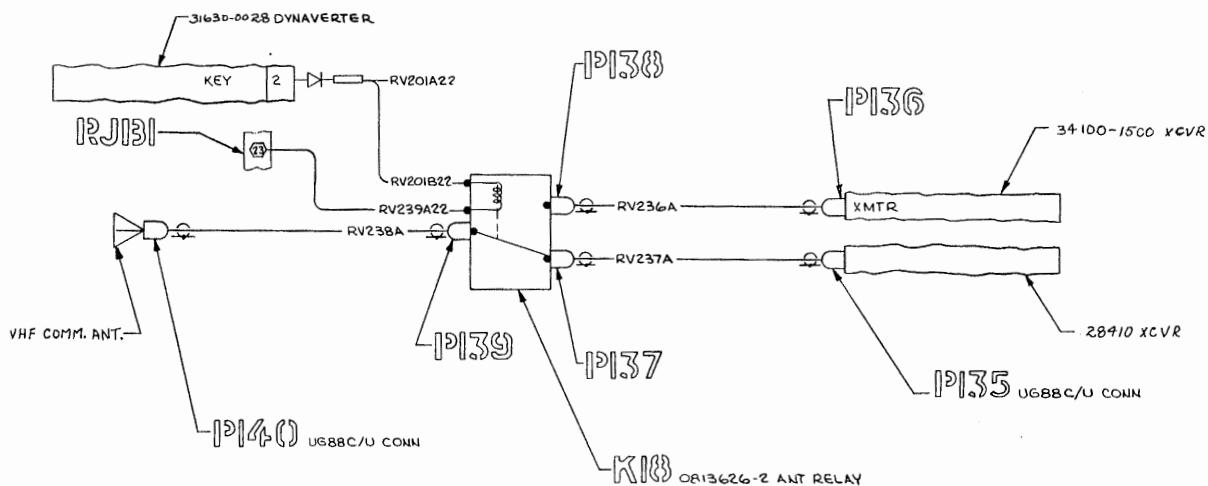
Figure 15-14A. 12310-1144 Ground Adapter



421-0001 TO 421B0001

Figure 15-14B. DG104B-1 Ground Adapter



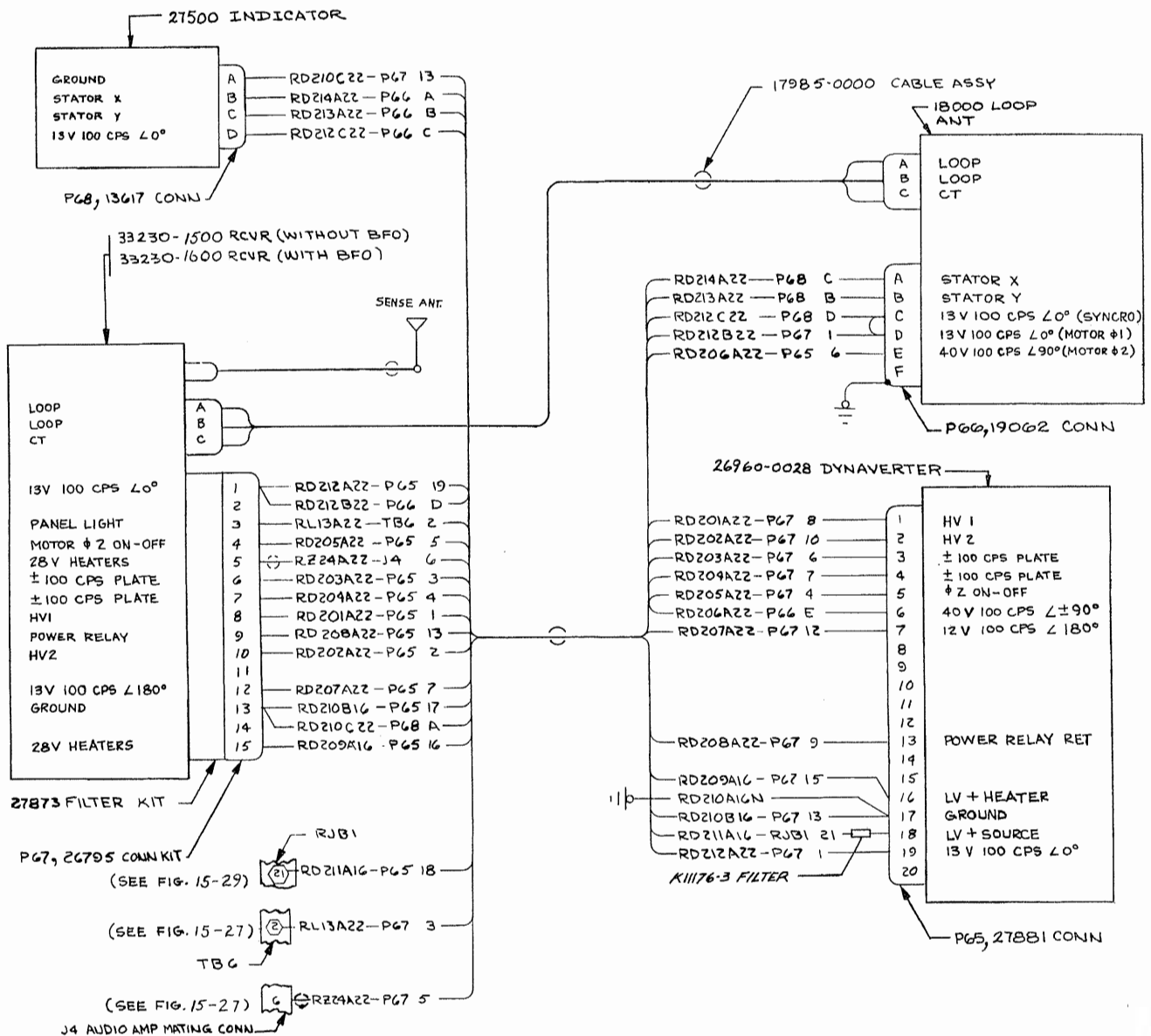


NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT
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421-0001 TO 421B0001

Figure 15-17. Cessna 500 Series Antenna Interconnects

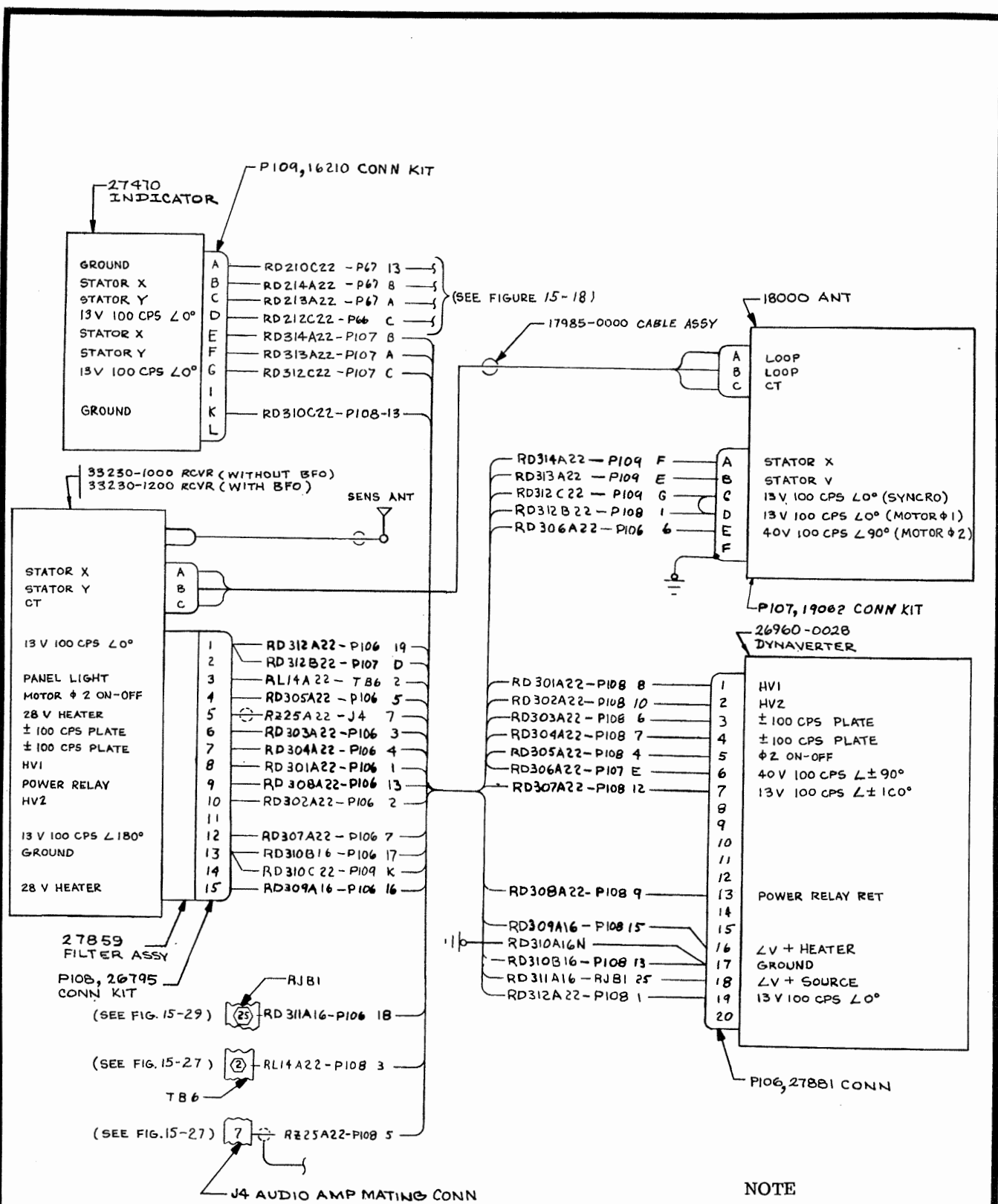


NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
FURNISHED WITH YOUR AIRCRAFT.

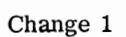
421-0001 TO 421B0001

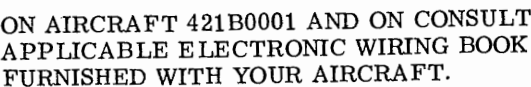
Figure 15-18. Cessna ADF 500 (Rotatable Loop)



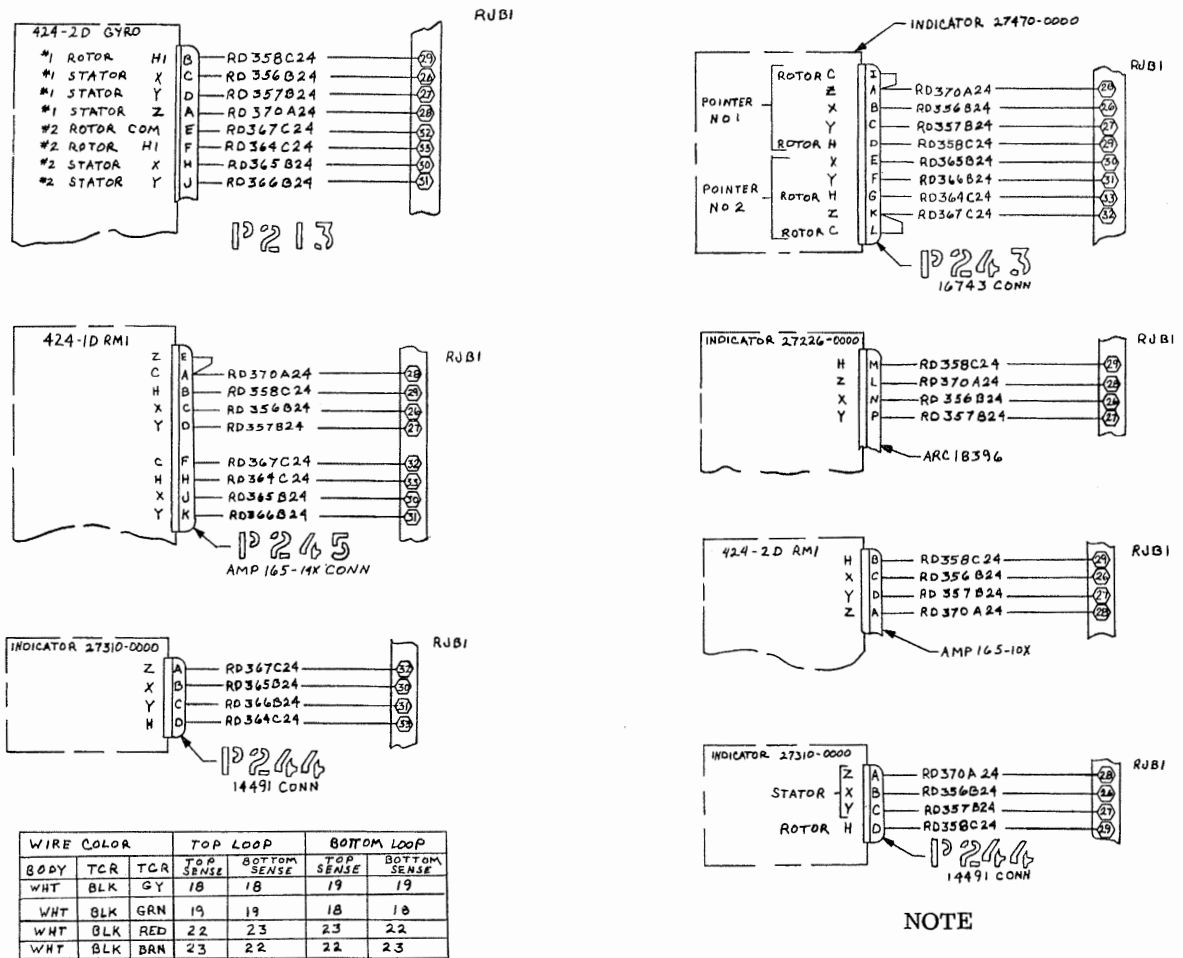
421-0001 TO 421B0001

Figure 15-19. Cessna Dual ADF 500 (Rotatable Loop)





Change 1



NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT APPLICABLE ELECTRONIC WIRING BOOK FURNISHED WITH YOUR AIRCRAFT.

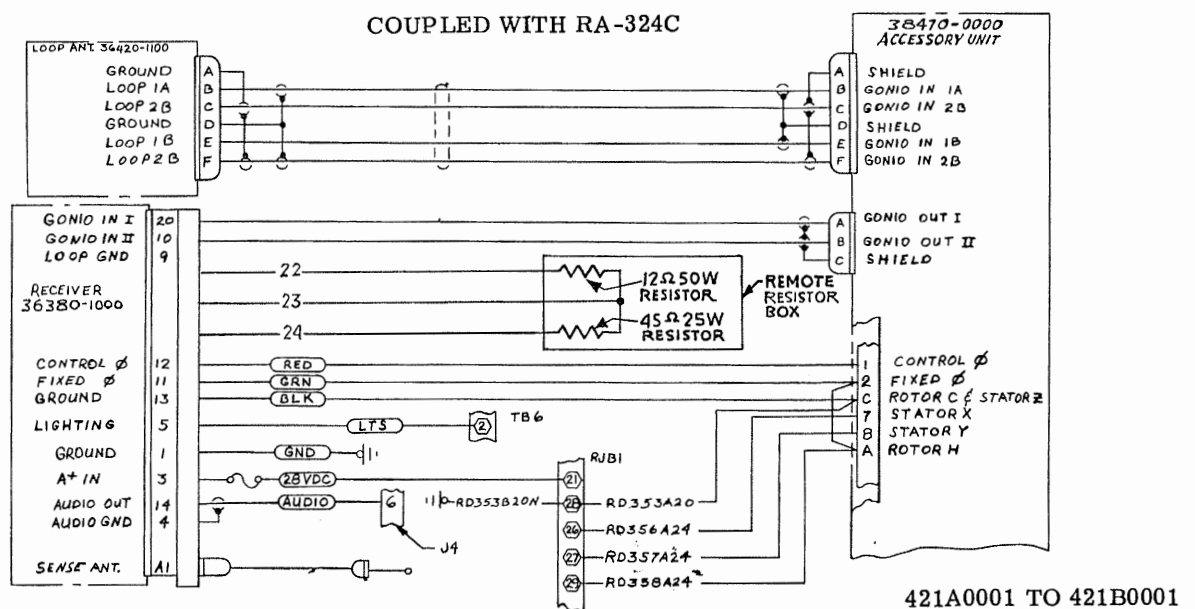
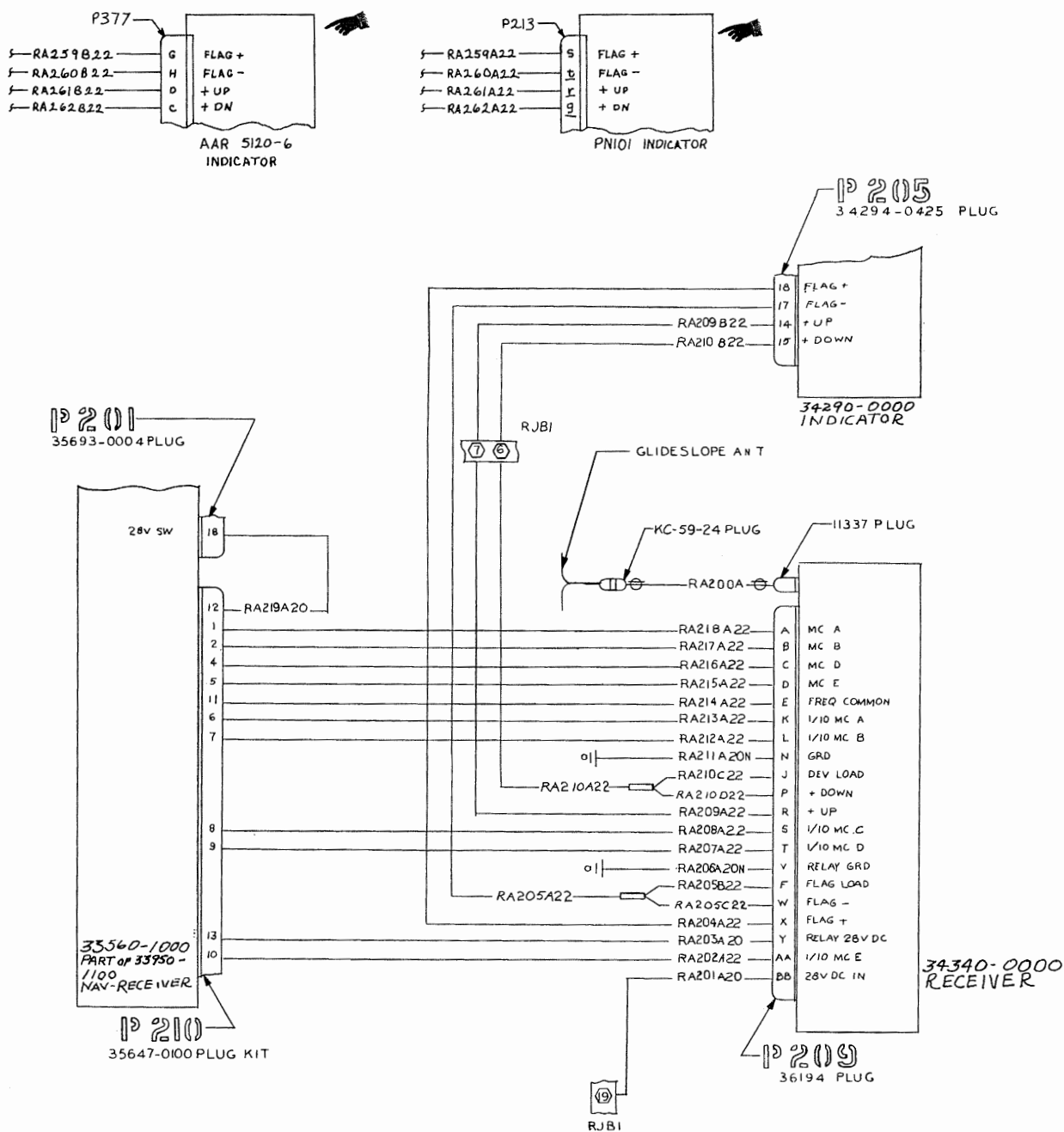


Figure 15-21E. Cessna 400 ADF

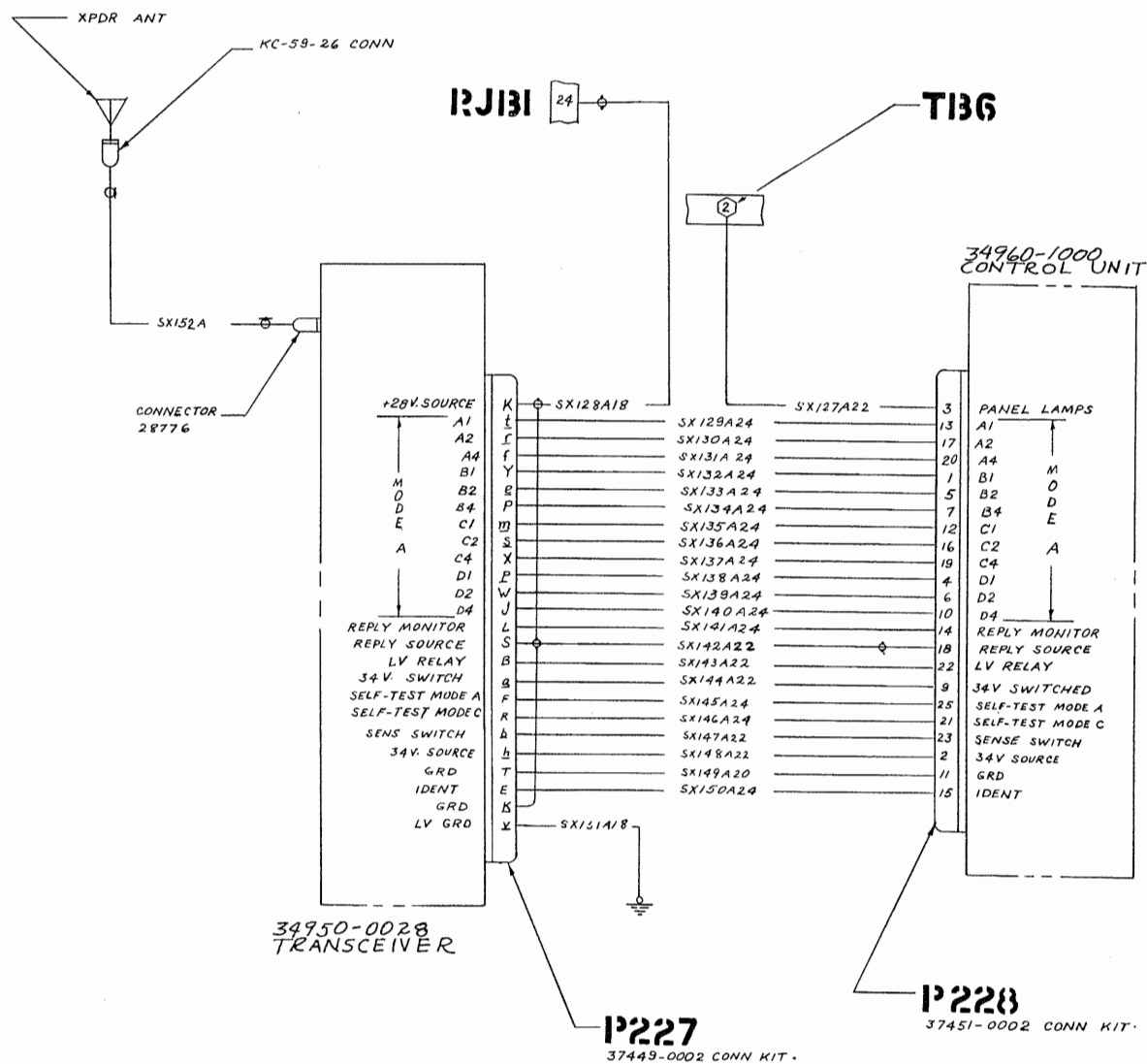


NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
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421-0001 TO 421B0001

Figure 15-21F. Cessna Glideslope 400



NOTE

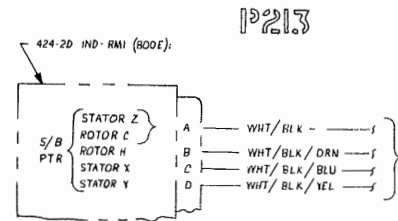
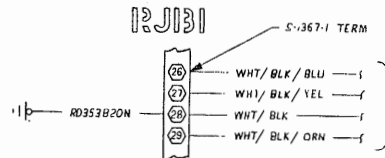
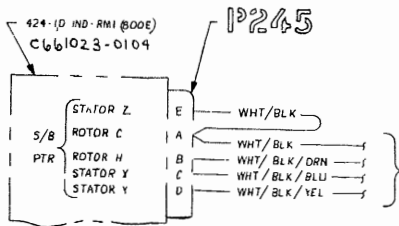
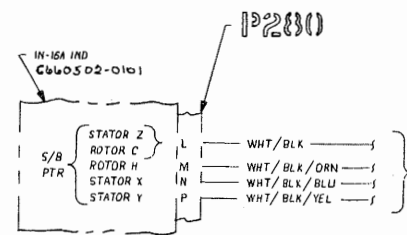
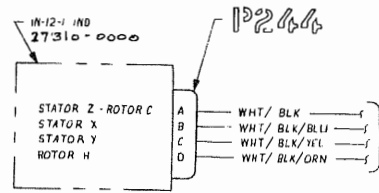
ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
FURNISHED WITH YOUR AIRCRAFT.

421-0001 TO 421B0001

Figure 15-21G. Cessna Transponder 400

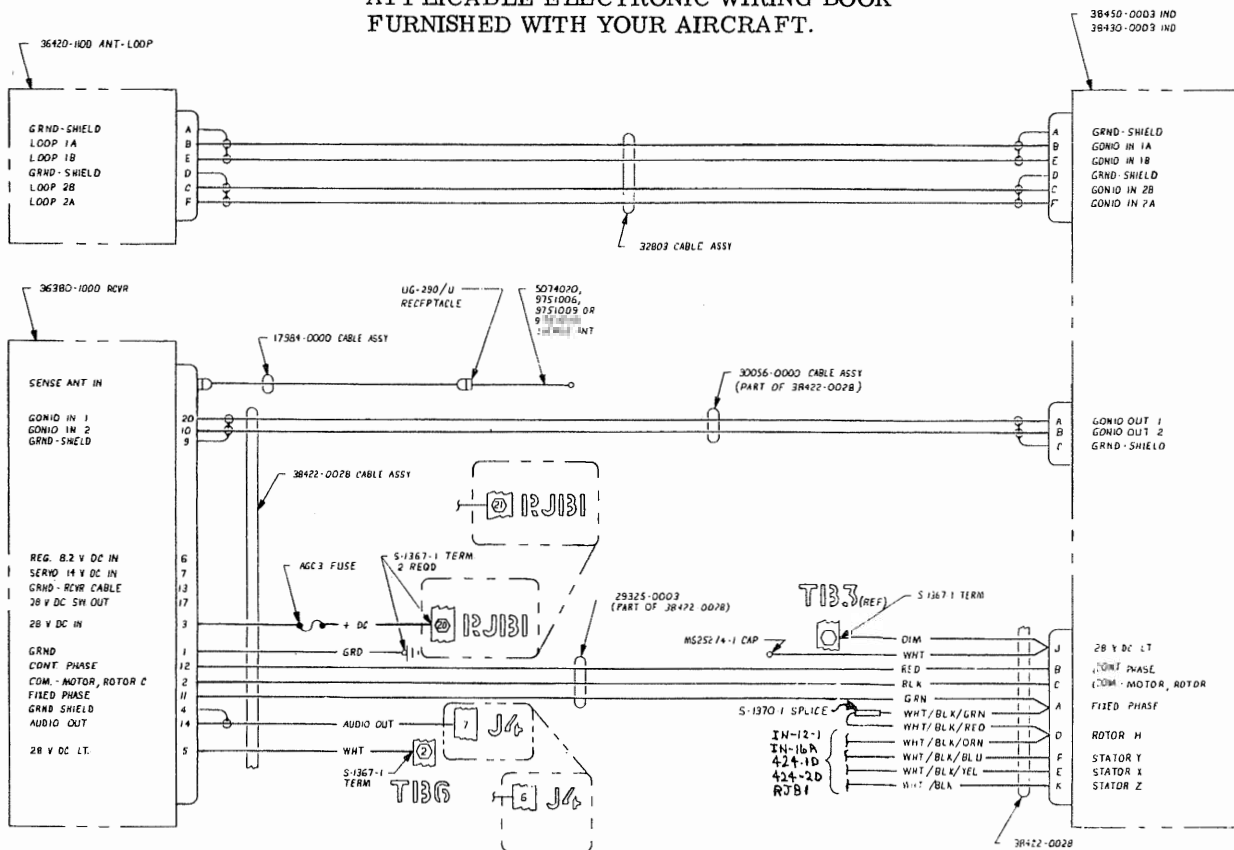
TABLE 1

WIRE COLOR	TERMINAL NO.			
	TOP LOOP	BOTTOM LOOP	TOP LOOP	BOTTOM LOOP
RED	5	5	5	5
BLK	5	6	6	5
GRN	1	1	2	2
WHT	2	2	1	1



NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
FURNISHED WITH YOUR AIRCRAFT.



421-0001 TO 421B0001

Figure 15-21H. Cessna 400 ADF (Fixed Loop)

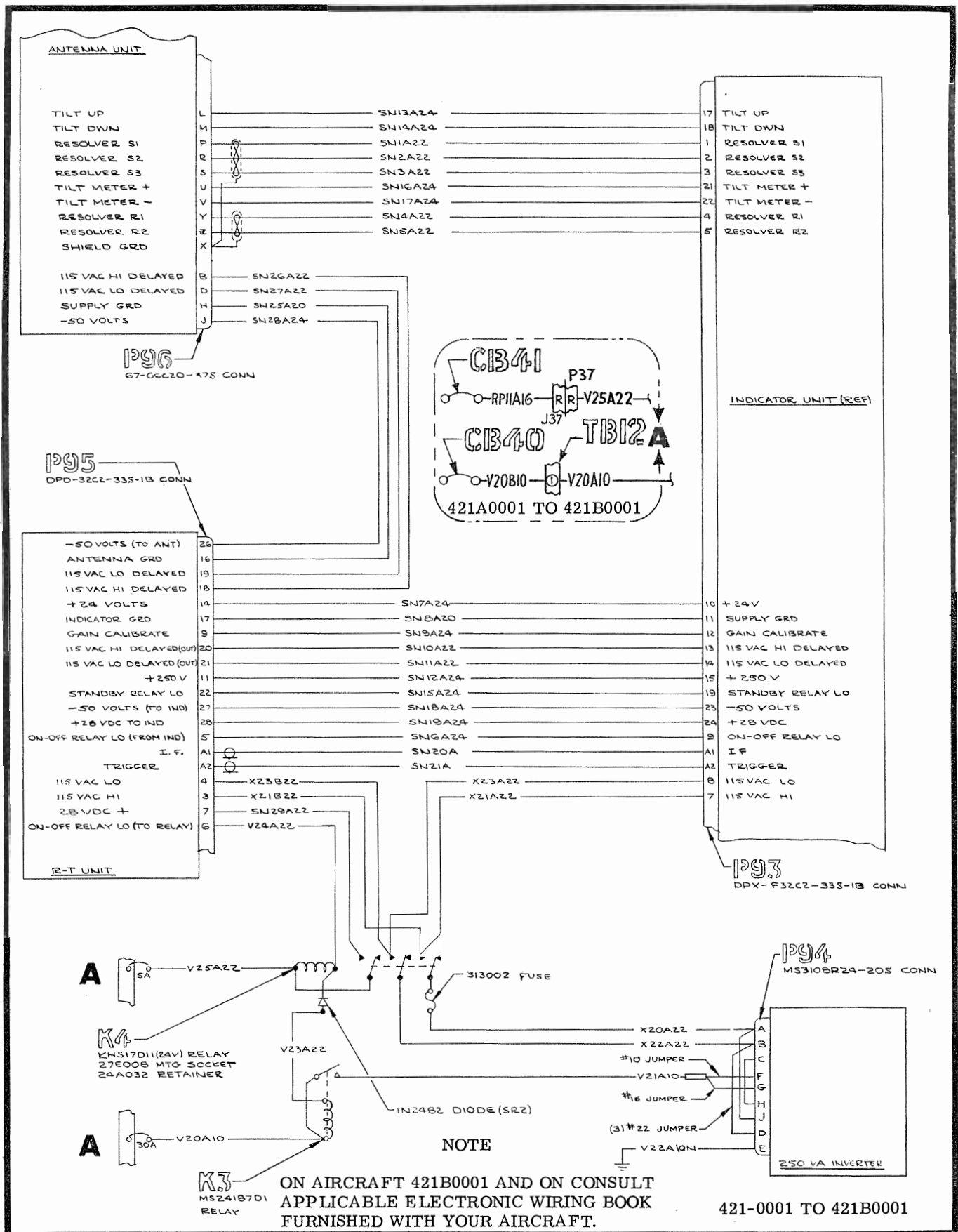
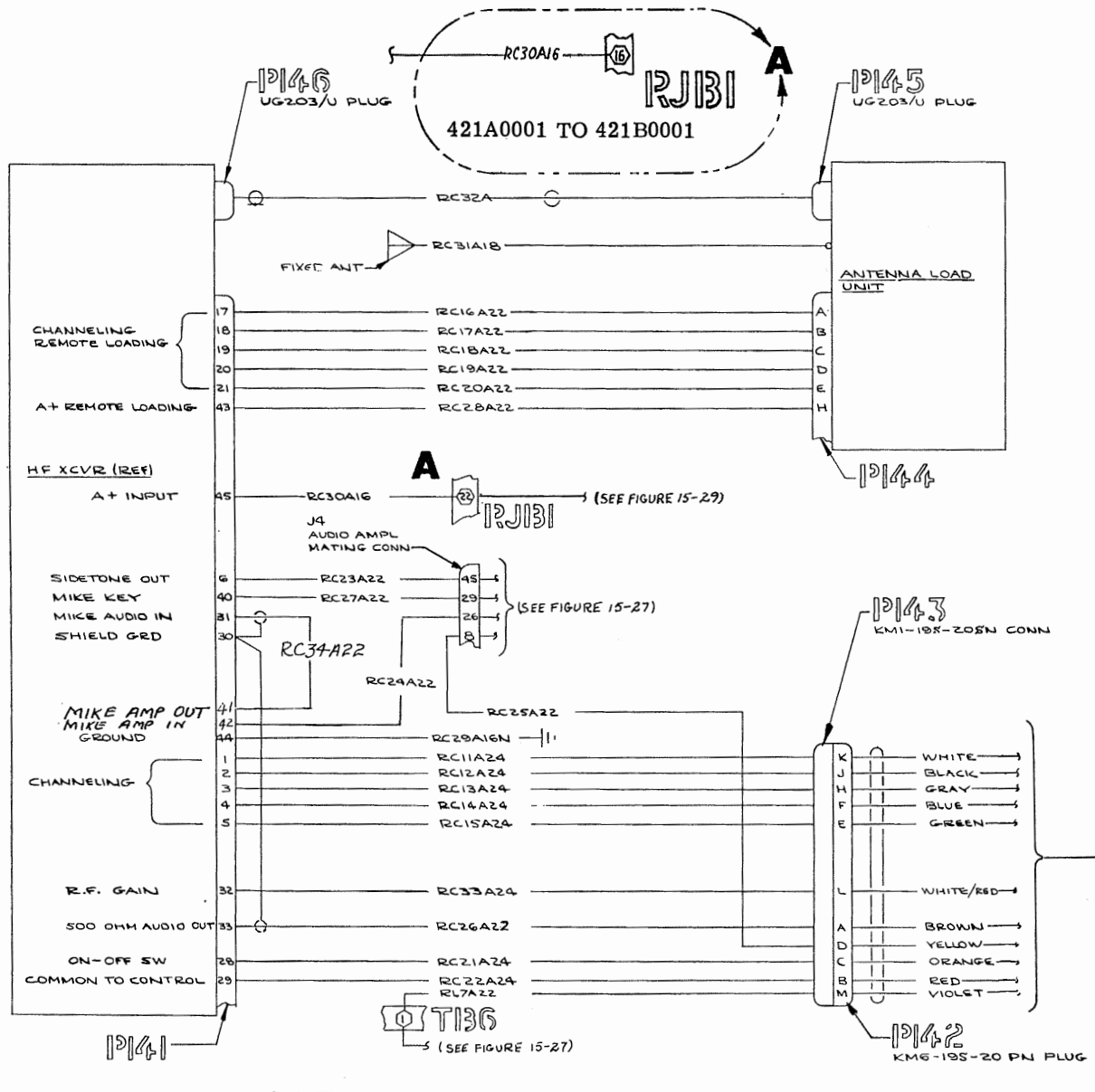


Figure 15-24. AVQ-55 Weather Radar



421-0001 TO 421B0001

NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
FURNISHED WITH YOUR AIRCRAFT.

Figure 15-25. T22RA HF Transceiver

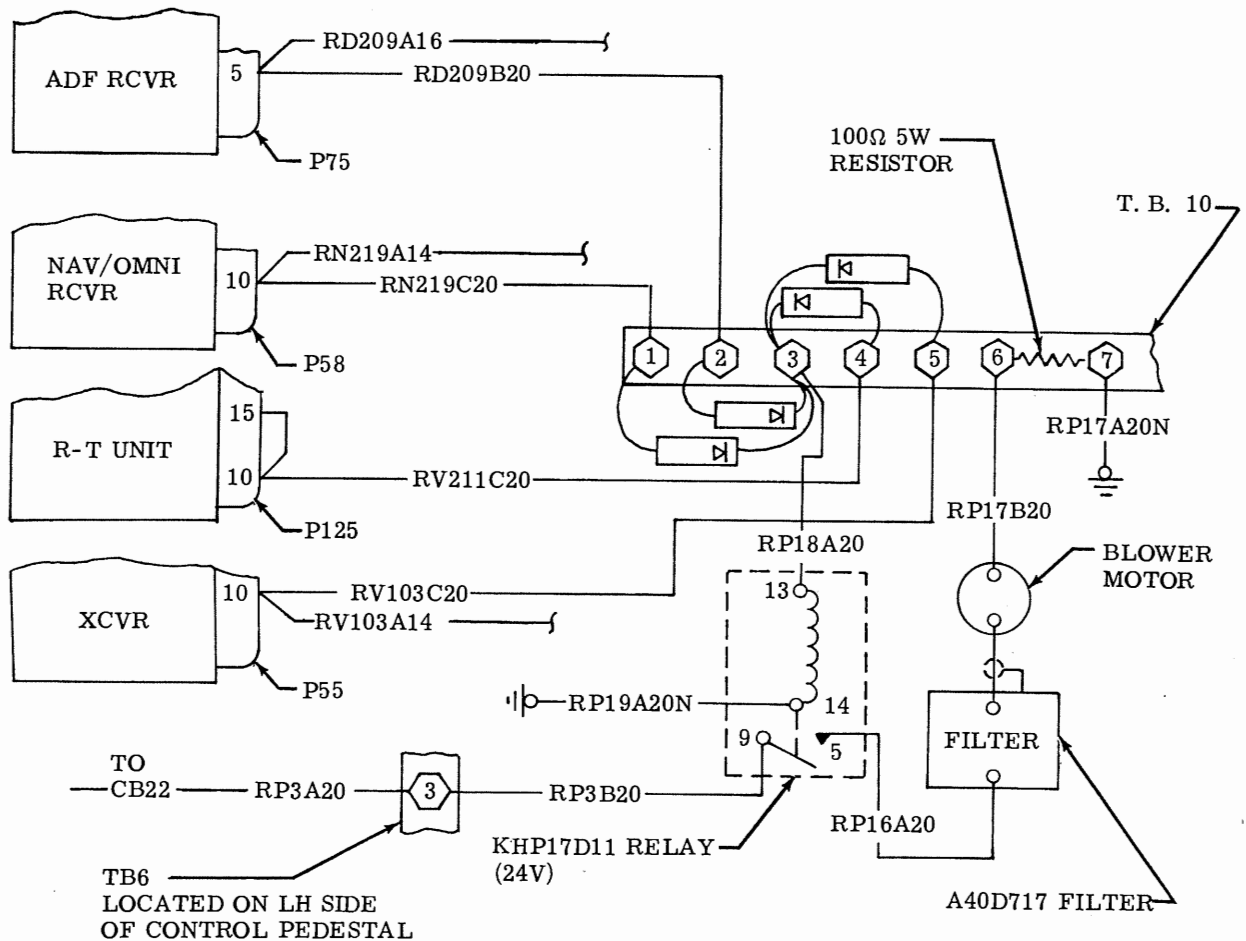


Figure 15-30. Radio Cooling Blower

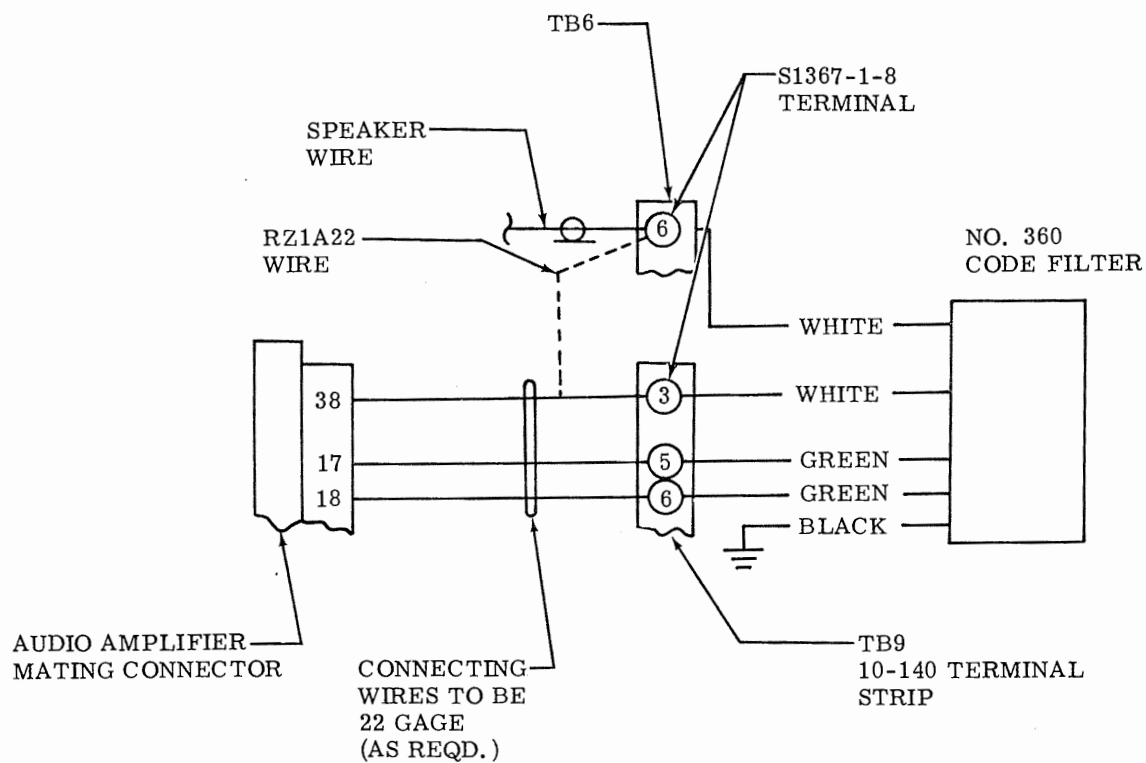
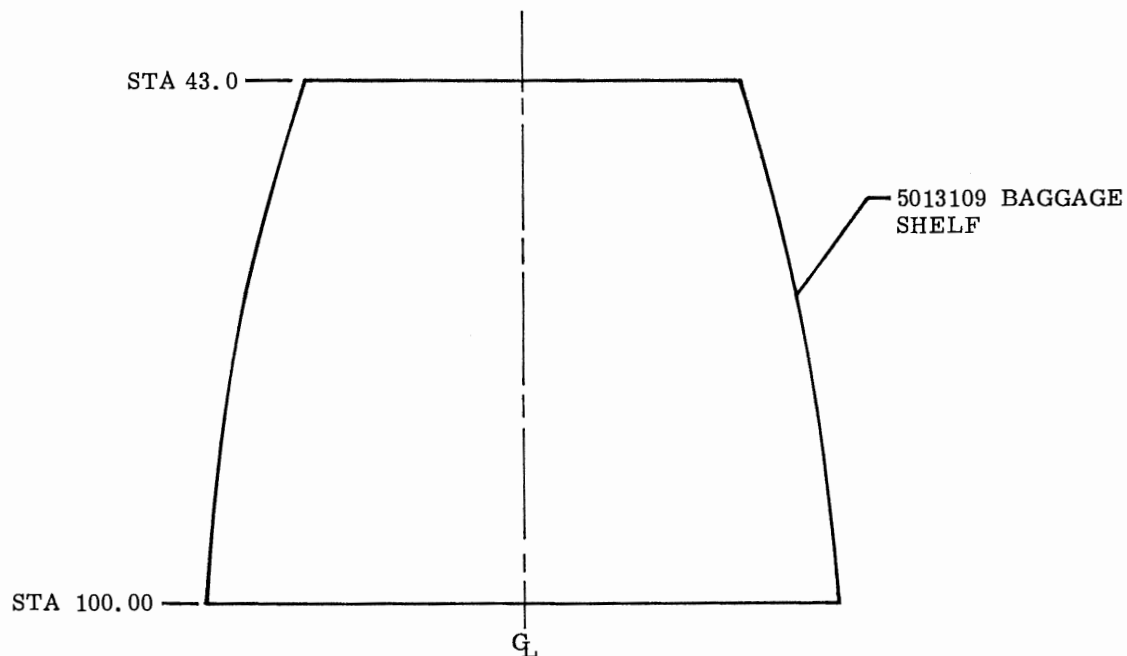


Figure 15-31. Audio Code Filter

	Amp Req'd.
Cessna Marker Beacon 300	0.02
Cessna Nav/Com 400	1.5
Cessna Glide Slope 400	0.45
Cessna Transponder 400	1.5
Cessna Transceiver 400	1.0
Cessna Nav/Omni 400	0.5
Cessna Nav/Omni 500	6.7
Cessna ADF 500	2.1
Cessna Nav/Com 500	2.6
Cessna Transceiver 500	3.25
Cessna Nav/Omni 800 (560 Channel)	2.0
Cessna Transceiver 800	3.4
Cessna Transmitter 800	0.9
Cessna ADF 800	2.1
Cessna Nav-O-Matic 800 Autopilot	4.0
Cessna Nav-O-Matic 400 Autopilot	1.2
Cessna RMI 800	3.1
Cessna DME 800	2.75
Cessna 800 Audio Amp	0.5
Cessna Transponder 800	2.0
Cessna Glide Slope 800	0.7
Cessna Marker Beacon 800	0.38
T-22RA H. F. Transceiver	2.0
AIM Slaved Directional Gyro	0.08
AVQ 55 Weather Radar	22.0
AVQ 45 Weather Radar	5.0
AVQ 46 Weather Radar	5.0
Radio Cooling Blower	0.74
PN 101 System	8.0
Cessna Glidescope/Marker Beacon 800 (Type KGM690)	.15
Cessna RMI 800 (Type SC-12 or SC-12A)	2.50
Cessna ADF 800 (Type R21B)	2.80
Cessna Nav/Omni 800 (41A)	.075
Cessna Nav/Com 800 (Type 131B)	1.50
Cessna Transponder 800 (Type 106)	1.50

Figure 15-32. Electronic Continuous Load Chart

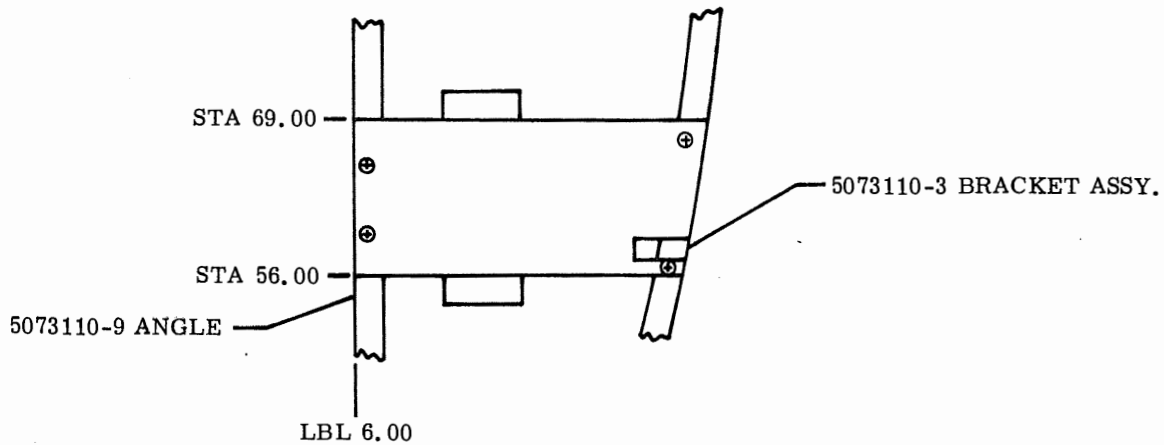


EQUIPMENT	COMPONENT WEIGHT	REMARKS
Cessna 800 Transmitter		
26460-0028 Transmitter	7.1	
23400-0028 Dynaverter	3.5	
30190-0028 Transmitter (Export)	7.1	
Cessna 800 Transceiver		
19300-1028 Transceiver	13.8	Includes Mount
20660 Mounting		
27610-0028 Transceiver (Export)	13.8	
Dynaverter (Transceiver 800)		
22560-0028 Dynaverter	13.8	Includes Mount
21455 Mounting		
Cessna 800 Glide Slope		
21420-0028 Glide Slope Receiver	4.6	
22510 Mounting	2.1	
21790 Mounting	1.4	
Cessna 800 DME		
C582601-0101 Remote Unit	8.4	
071-4002-00 Rack Assembly	.9	
Cessna 800 Marker Beacon		
21430-0028 Receiver	3.7	
22510 Mounting	2.1	
21790 Mounting	1.4	
22700 Mounting	3.0	

TABLE OF ELECTRONIC EQUIPMENT LOADING

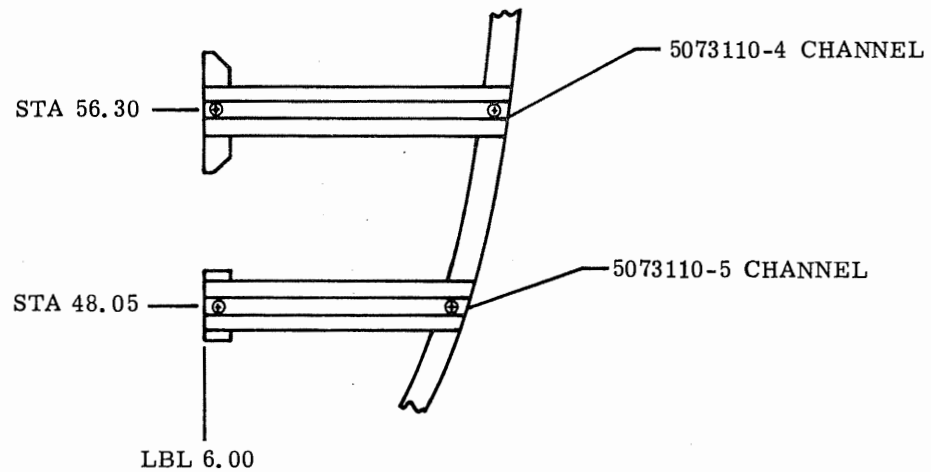
EQUIPMENT	COMPONENT WEIGHT	REMARKS
Cessna RMI 800 28240 Converter	3.6	
PN-101 28240 Converter 6781 Transformer	3.6	
Cessna Nav/Omni 800 26410 Receiver 27900 Converter 22510 Mounting	7.0 4.5 2.1	
AVQ-55 Weather Radar MI-591003-2 Transceiver MI-591021 Shock Mount MGH 229-100 Inverter	27.0 2.5 13.5	
AVQ-45 Weather Radar MI-592021 Transceiver MI-592032 Shock Mount	14.0	

TABLE OF ELECTRONIC EQUIPMENT LOADING



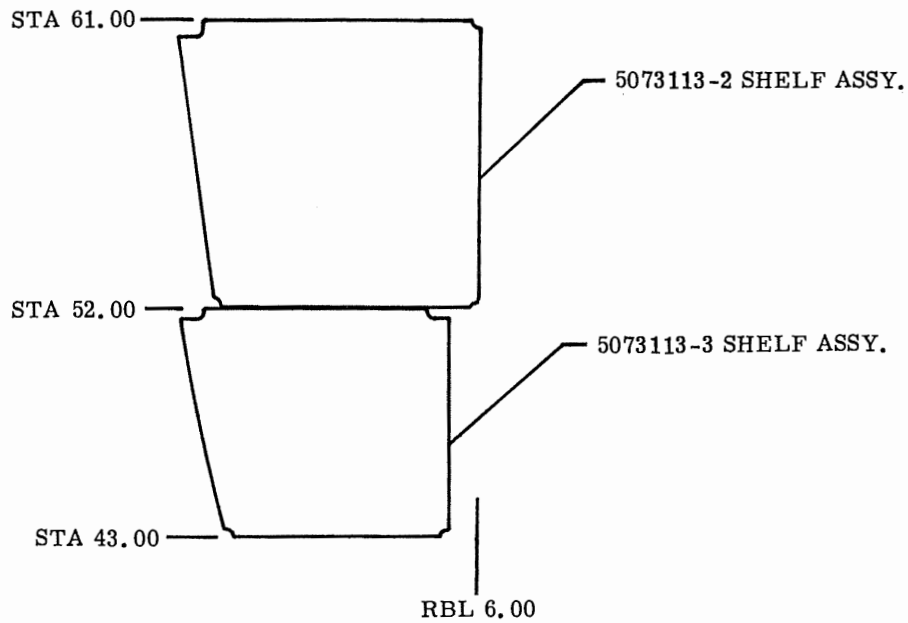
EQUIPMENT	COMPONENT WEIGHT	REMARKS
Cessna 500 ADF 34660-0028 Dynaverter 21650 Mounting	2.9	
Cessna 300 Marker Beacon 31240-0028 Receiver	3.7	
Cessna 800 Marker Beacon 21430-0028 Receiver	3.7	
Cessna 800 RMI 29100 Dynaverter	3.5	
Cessna 800 ADF 24630-0028 Dynaverter 21650 Mounting	3.5	
PN-101 29100 Dynaverter	3.5	

TABLE OF ELECTRONIC EQUIPMENT LOADING



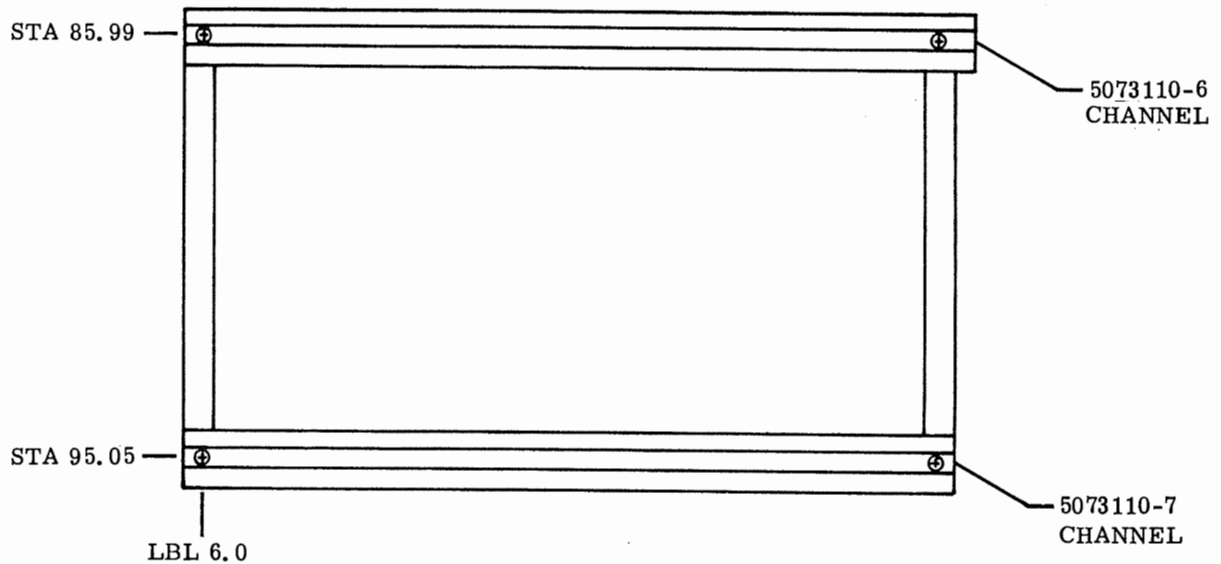
EQUIPMENT	COMPONENT WEIGHT	REMARKS
Cessna 800 Transmitter		
26460-0028 Transmitter	7.7	
23400-0028 Dynaverter	1.4	
Cessna 800 Marker Beacon		
21430-0028 Receiver	3.7	
21790 Mount	1.4	
Cessna 800 Transponder		
34900-0028 Transceiver		
29300-0000 Coder	3.5	
22510 Mounting	2.1	
Cessna 800 Marker Beacon		
21430-0028 Receiver	3.7	
Cessna Glide Slope 800		
21420-0028 Receiver	4.6	

TABLE OF ELECTRONIC EQUIPMENT LOADING



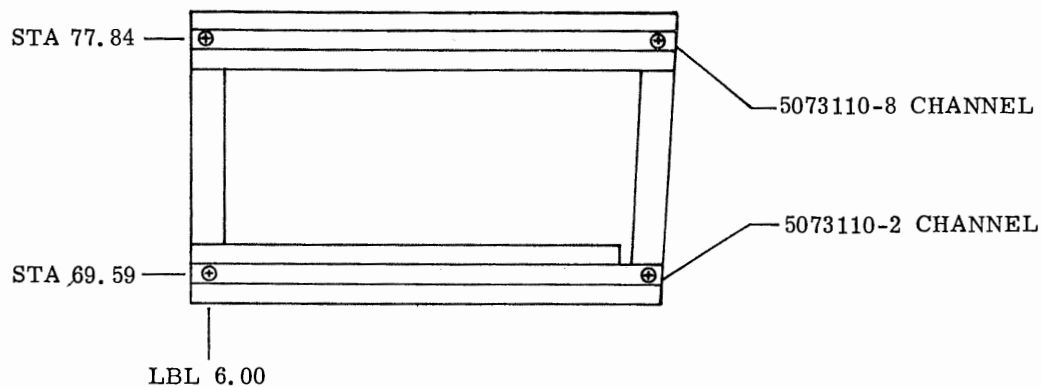
EQUIPMENT	COMPONENT WEIGHT	REMARKS
Dynaverter (Transceiver 800) 22560-0028 Dynaverter 21455 Mounting	13.8	(When using 114.5 cu. ft. oxygen cylinder)
Cessna 500 Transceiver 32380-0028 Dynaverter 24900 Mounting	4.3	
Cessna 500 ADF (Fixed Loop) 34660-0028 Dynaverter 21650 Mounting	2.9	
Cessna 800 ADF (Rotatable Loop) 24630-0028 Dynaverter 21650 Mounting	1.0	
34850-0028 Receiver 21660 Mounting	7.4	
PN-101 101A115S-7 Inverter		

TABLE OF ELECTRONIC EQUIPMENT LOADING

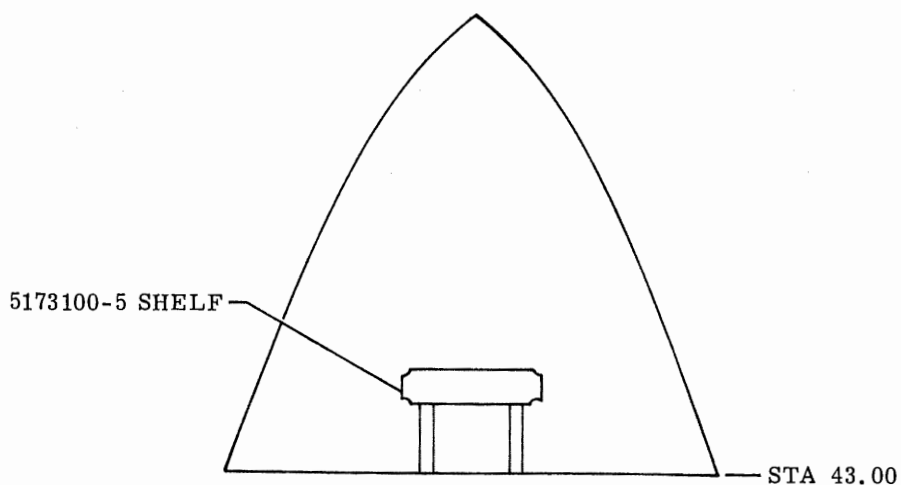


EQUIPMENT	COMPONENT WEIGHT	REMARKS
Cessna 500 Transceiver 32380-0028 Dynaverter 24900 Mounting	4.3	
Cessna Glide Slope 800 21420-0028 Glide Slope Receiver 22700 Mounting	4.6	
Cessna 800 RMI 32210 Converter	3.6	
High Frequency Transceiver T-22-RA Transceiver		
Nav-O-Matic 800 Autopilot 0870069-1 Computer	9.90	
Cessna DME 800 C582601-0101 Remote Unit	11.4	

TABLE OF ELECTRONIC EQUIPMENT LOADING

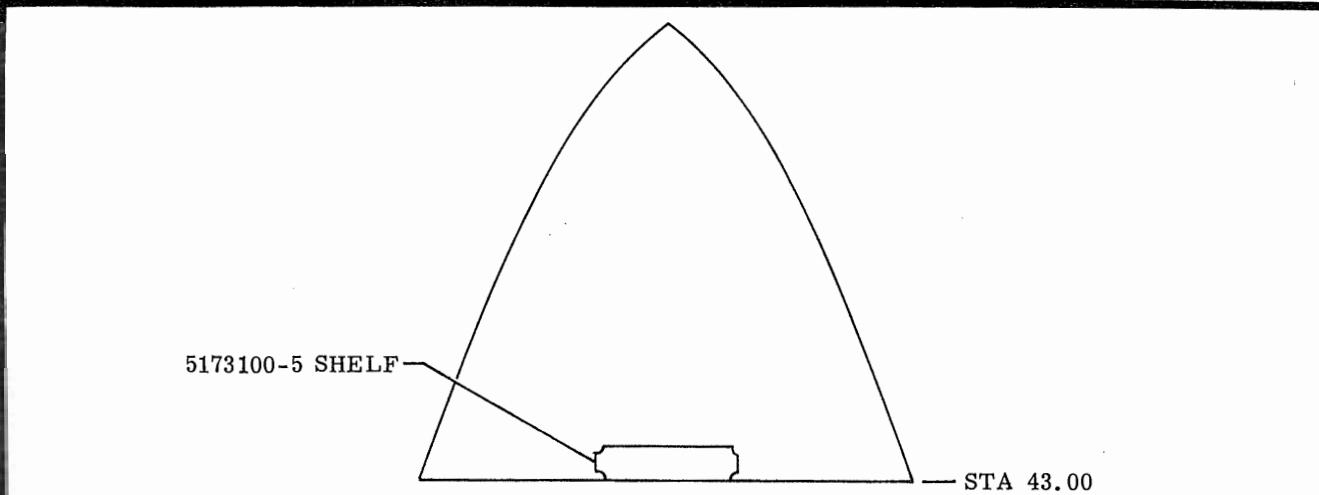


EQUIPMENT	COMPONENT WEIGHT	REMARKS
Cessna 500 Nav/Omni		
24660 Converter	3.7	
31360-0028 Dynaverter		
24900 Mounting	4.3	
Cessna 800 Nav/Omni (Single)		
26410 Receiver	7.0	
27900 Converter	4.5	
22510 Mounting (Triple)	2.1	
23180 Mounting (Quad)	3.9	



EQUIPMENT	COMPONENT WEIGHT	REMARKS
Cessna Glide Slope 800		
21420-0028 Receiver	4.6	
21790 Mounting	1.4	

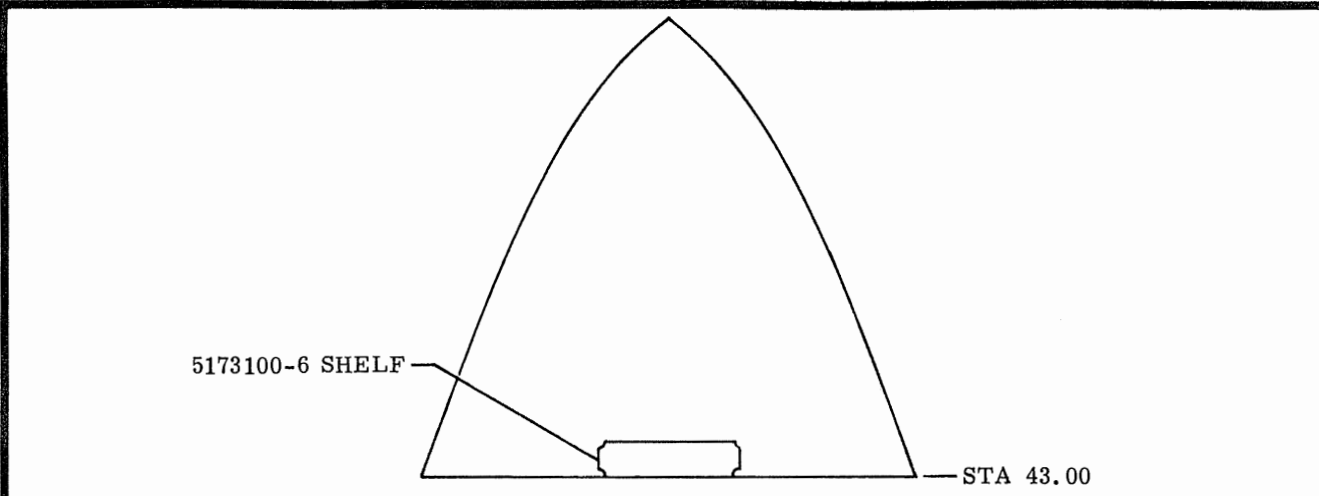
TABLE OF ELECTRONIC EQUIPMENT LOADING



5173100-5 SHELF

STA 43.00

EQUIPMENT	COMPONENT WEIGHT	REMARKS
Cessna 800 Transceiver 19300-1028 Transceiver 20770 Mounting	13.8	
Cessna 500 Nav/Omni Receiver 31360-0028 Dynaverter 24900 Mounting	3.7	
Cessna 500 Nav/Com 31630-0028 Dynaverter 24900 Mounting	4.3	

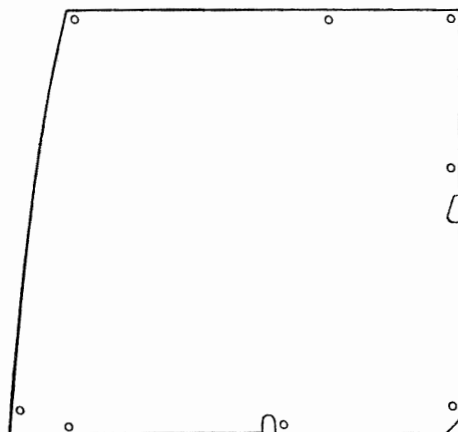


5173100-6 SHELF

STA 43.00

EQUIPMENT	COMPONENT WEIGHT	REMARKS
Cessna 800 Transceiver 22560-0028 Dynaverter 21455 Mounting	13.8	
Cessna 500 Nav/Com 24660 Converter 24900 Mounting	3.7	

TABLE OF ELECTRONIC EQUIPMENT LOADING

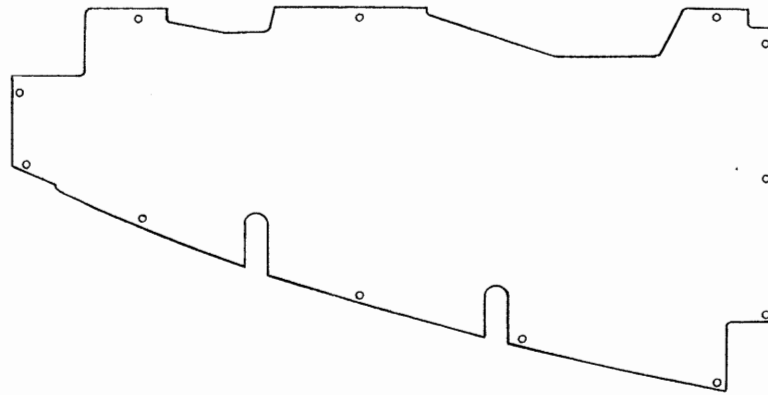


5013110-8 SHELF

EQUIPMENT	COMPONENT WEIGHT	REMARKS
Cessna 400 Nav/Com 3660-0000 Accessory Unit 35540-0000 Mounting	2.2	Includes Mount
Cessna 400 Transponder 34960-1000 Rec/Trans	4.4	
Cessna 400 Glide Slope 36440-0000 Receiv 34650-0000 Mount	2.6 0.3	
Cessna ADF 400 34660-0028 Dynaverter 21650 Mount	2.9	Includes Mount
35380-0000 Receiver Accessory 35390-0000 Mounting	5.7	Includes Mount
Cessna 800 Transponder 39210-0028 Transceiver 34980-0000 Mounting	6.5	Includes Mount
Cessna 800 RMI C582606-0101 Converter C582606-0102 Converter C582606-0103 Mounting	5.8 4.6	Includes Mount Includes Mount
Cessna Marker Beacon 300 31243-0028 Receiver	3.7	

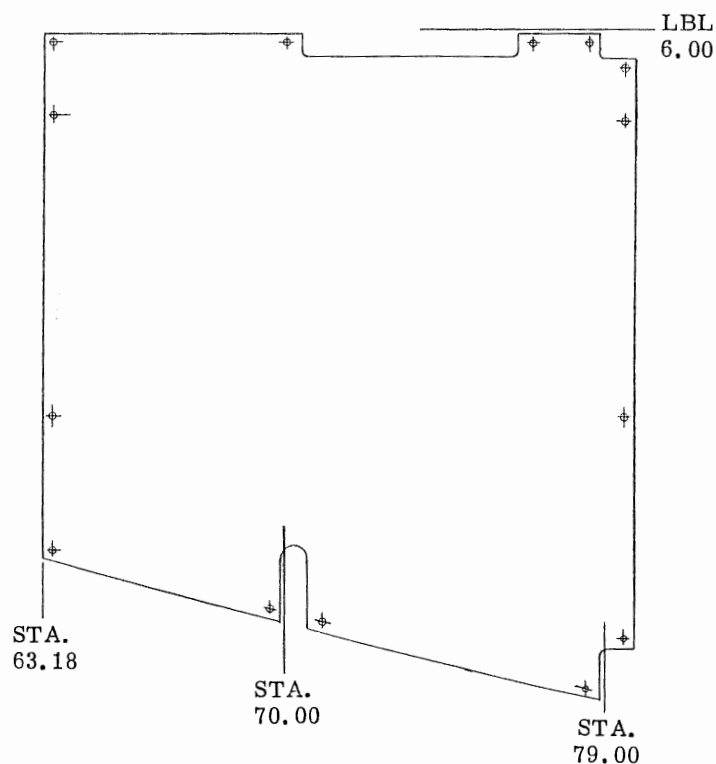
TABLE OF ELECTRONIC EQUIPMENT LOADING

5013110-9 SHELF



EQUIPMENT	COMPONENT WEIGHT	REMARKS
Cessna 400 Nav/Com 3660-0000 Accessory Unit 35540-0000 Mounting	2.2	Includes Mount
Cessna 400 Transponder 34960-1000 Rec/Trans	4.4	
Cessna 400 Glide Slope 36440-0000 Receiver 34650-0000 Mount	2.6	
Cessna ADF 400 34660-0028 Dynaverter 21650 Mount	2.9	Includes Mount
Cessna Marker Beacon 300 31243-0028 Receiver	3.7	
Cessna 800 Marker Beacon/Glide Slope C582607-0101 Receiver C582607-0103 Mounting	4.2	Includes Mount

TABLE OF ELECTRONIC EQUIPMENT LOADING



EQUIPMENT	COMPONENT WEIGHT	REMARKS
Cessna 800 RMI		
C582606-0101 Converter	5.8	Includes Mount
C582606-0102 Converter	4.6	Includes Mount
C582606-0103 Mounting		
Cessna 800 Nav		
37500-0000 Receiver	2.7	Includes Mount
35950-0000 Converter	1.9	Includes Mount
36450-0000 Mounting		
Cessna 800 Com		
38500-0000 Accessory Unit	5.6	Includes Mount
37260-0000 Transceiver	4.1	Includes Mount
36280-0000 Mounting (Transceiver)		
34980-0000 Mounting (Accessory Unit)		

TABLE OF ELECTRONIC EQUIPMENT LOADING

SECTION 16

STRUCTURAL REPAIR

Table of Contents

	Page		Page
GENERAL	16-1	REPAIR OF PLASTIC WINDOWS	16-13
Type of Construction	16-1	CONTROL SURFACE BALANCING	
Ground Handling	16-1	PROCEDURES	16-17
Investigation of Damage	16-2	CHECKING WING TWIST AND LOCATION	
Definition of Damage	16-2	OF THRUST LINE	16-20
Preparing Damaged Area for Repairs	16-2	SEALING PROCEDURES	16-21
Control Surface Rebalancing Data	16-2	Application of Sealing Procedures	16-22
WING	16-2	Faying Surface Sealing	16-22
Access Openings	16-2	Hole Fitting	16-22
Wing Skin	16-2	Injection Sealing	16-22
Wing Ribs	16-3	Fillet Sealing	16-23
Wing Spars	16-3	Fastener Sealing	16-23
Flaps and Ailerons	16-3	Window Sealing	16-23
TAIL GROUP	16-3	Electrical Sealing	16-24
Vertical Stabilizer and Dorsal	16-3	ALIGNMENT AND SYMMETRY CHECK	16-51
Rudder	16-4	FUEL CELL REPAIR	16-53
Horizontal Stabilizer	16-4	CABIN DOOR SEAL REPAIR	16-58
Elevators	16-4	REPAIR OF ICE PROTECTION PANELS	16-58
FUSELAGE	16-5	RIVETS	16-59
BULKHEADS	16-5	General	16-59
LANDING GEARS	16-6	Types	16-59
ENGINE NACELLE	16-6	Substitution of Rivets	16-59
Engine Firewall	16-6A	Diameters	16-60
Engine Firewall Sealing	16-6A	Lengths	16-60
Engine Mount	16-6A	Removal of Solid Rivets	16-60
Engine Cowling	16-6A	Riveting Installation	16-60
FIBERGLASS PARTS	16-6A	Loose or Working Rivets in Wing	16-62
REPAIR PROCEDURES FOR BONDED		Loose or Working Rivets	16-62
HONEYCOMB	16-6A	NOSE COMPARTMENT WATER SEALING	16-64
RADOME REPAIR PROCEDURES	16-8	SEALANT MATERIALS	16-65
RAIN EROSION COATING APPLICATION		PRESSURE DRAIN SEALS	16-66
(RADOME)	16-12		

GENERAL.

Type of Construction.

The Model 421 is an all-metal aircraft of semimonocoque type construction with the skin carrying a portion of all structural loads. The fuselage is comprised of a nose section, cabin section and a tailcone. It is constructed of formed bulkhead rings, stringers, and stiffeners all of which are riveted to the external skin. The cabin section is sealed to form a pressure cell. The wing, horizontal stabilizer,

and vertical stabilizer are built up around two main spars, with ribs, formers, and riveted skin forming the basic structure. Torsional stiffness of this structure is afforded by the skin closure of areas between the spars forming enclosed "boxes." Each movable surface consists of a hinge support spar with ribs, formers, and riveted outer covering skin.

Ground Handling.

Leveling, jacking, and other ground handling details are covered in Section 2.

Investigation of Damage.

After a thorough cleaning of the damaged area, all structural parts should be carefully examined to determine the extent of damage. Frequently the force causing the damage is transmitted from one member to the next, causing strains and distortion. Abnormal stresses incurred by shock or impact forces on a rib, bulkhead, or similar structure may be transmitted to the extremity of the structural member, resulting in secondary damage such as sheared or stretched rivets, elongated bolt holes, canned skin plate or bulkheads. Points of attachment should be examined particularly for distortion and security of fastenings in the primary and secondary damaged areas.

Definition of Damage.

Structural damage to the aircraft is divided into the following classifications:

a. Negligible damage shall be considered damage that will not affect the airworthiness of the aircraft and can be permitted to exist as is or can be corrected with a simple repair such as removing dents, burnishing scratches, and stop drilling cracks in non-structural parts.

NOTE

The cabin section from fuselage station 100.00 to 273.94 is a pressurized cell and all skins between bulkheads must be considered as structural members including inspection openings. (See Fuselage Repairs.)

b. Damage repairable by patching will be considered damage that may be repaired by covering or reinforcing a portion of the aircraft.

c. Damage repairable by insertion will be considered damage requiring replacement of a section with the correct repair material.

d. Damage necessitating replacement of parts will be considered as damage not repairable by patching or insertion, but that may be repaired by installing a new or reconditioned part. If a part or area of an assembly is damaged to the extent that it requires replacement and a replacement cannot be made because of tooling or jig requirements the entire assembly must be replaced.

Preparing Damaged Area for Repairs.

To prepare an area for repair, examine and classify the damage. Make a thorough check before beginning repairs. In some cases a damaged part may be classified as needing replacement when after removal, closer inspection indicates the part may be repaired. Take more time for the damage estimate and save man-hours on repairs. To prepare a damaged area for patch or inserting repairs:

a. Remove all ragged edges, dents, tears, cracks, punctures, and similar damages.

b. Leave edges, after removal of damaged area, parallel to any square or rectangular edges of the unit.

c. Round all square corners.

d. Smooth out abrasions and dents.

e. Brush iridite all rough edges and scratches with an iridite solution diluted 1 ounce to 1 gallon of water and rinse thoroughly.

f. Apply two coats of zinc chromate primer to all internal surfaces and edges lapping one another.

NOTE

Damage adjacent to a previous repair requires removal of the old repair and inclusion of the entire area in the new repair. For repairs in the cabin section that would affect the pressure seal, see sealing procedures in this section.

Control Surface Rebalancing Data.

The control surfaces of the aircraft have been 100% statically balanced. After each repair or painting of the control surfaces, they must be rebalanced. Correct balance is restored by the addition or removal of lead ballast weights in the counterbalance sections of the surfaces. (See figure 16-8 and 16-9.)

WING

The wings are all-metal, full cantilever, semimonocoque type construction, utilizing two main spars. Each wing consists of a wing panel, aileron, flaps, engine nacelle, wing tanks, wing tip fuel tank and main landing gear. The landing gear is attached to and retracts into the wing.

Access Openings.

Access openings with removable cover plates are located in the underside of the wing between the root rib and the tip section. These openings afford access to the aileron bellcranks, flap bellcranks, electrical wiring, pulleys, cables, and inspection of internal structure. When work is done on the trailing edge wing structure in the flap area, partial access can be provided by lowering the flaps. Outboard of this area, the trailing edge wing structure can be made available for repair by removing the aileron.

Wing Skin.

All wing, aileron, and flap skin thickness and temper are listed in figure 16-19.

a. Negligible Damage:

Any smooth dents in the wing skin that are free from cracks, abrasions, and sharp corners, which are not stress wrinkles and do not interfere with any internal structure or mechanism, may be considered as negligible damage. In areas of low stress intensity, cracks, deep scratches, or deep sharp dents, after trimming or stop drilling can be enclosed by a two-inch circle, can be considered negligible if the damaged area is at least one diameter of the enclosing circle away from all existing rivet lines. Stop drilling is considered a temporary repair.

b. Repairable Damage:

Skin damage ahead of the front spar and also where the optimum in appearance is desired, should be repaired by the insertion method. Typical insertion repairs are illustrated in figure 16-29. Skin damage aft of the front spar which exceeds the negligible damage limit but it is not extensive enough to necessitate replacement of a skin panel can be repaired by patching. Typical wing repairs are illustrated in the back of the section.

c. Damage Necessitating Replacement of Parts:

In case the skin is extensively damaged, repairs should be made by replacing an entire sheet panel from one structural member to the next. The repair seams should be made to lie along stiffening members, or bulkheads, and each seam should be made exactly the same in regard to rivet size, spacing, and rivet pattern as the manufactured seam at the edges of the original sheet. If the two manufactured seams are different, the stronger one should be copied.

Wing Ribs.

All ribs except those exposed to the wheel well contain flanged lightening holes. Flanged upper and lower edges of all ribs serve as cap-strips in addition to providing rigidity to the rib. The skin riveted directly to each rib flange provides the cellular strength for each successive rib bay. The nose, center, and trailing edge rib segments are riveted together through the front and rear spars to form the basic airfoil sections. Spanwise extruded stringers stiffen the skin between ribs.

a. Negligible Damage:

Any smooth dents in the wing rib that are free from cracks, abrasions, and sharp corners, which are not stress wrinkles and do not interfere with any internal structure or mechanism, may be considered as negligible damage. In areas of low stress intensity, cracks, deep scratches, or deep sharp dents, which after trimming or stop drilling can be enclosed by a two-inch circle, can be considered negligible if the damaged area is at least one diameter of the enclosing circle away from all existing rivet lines. Stop drilling is considered a temporary repair.

b. Repairable Damage:

Repairs for wing rib webs and flanges are shown in figures 16-36 and 16-37. Before repairing is attempted, all cracks or deep scratches must be stop-drilled with a 3/32 inch drill, and all sharp corners and ragged edges must be trimmed and deburred.

c. Damage Necessitating Replacement of Parts.

Parts such as stiffeners, small ribs, clips, and brackets should be replaced if their damage exceeds that specified as negligible. These parts due to their size, are usually impractical to repair. In many instances, the time required to replace the damaged part may be considerable less than the time required

to repair it. This should be considered carefully prior to making any repair whether it be only a small part or a complete component.

Wing Spars.

Repair of spar damage affecting the alignment of the wing spar should not be attempted in the field. Permissible spar repairs are illustrated in the back of the section.

Flaps and Ailerons.

a. Negligible Damage.

Minor skin dents and nicks are considered negligible and can be worked out by burnishing.

b. Repairable Damage.

Skin damage exceeding that considered negligible damage can be repaired by patching. Typical skin repairs are illustrated in the back of the section.

c. Damage Necessitating Replacement of Parts.

Warped and cracked skin, ribs, hinge brackets and torque tubes are replaceable items. Any damage that covers more than half of the unit will require replacement of the entire unit.

NOTE

Flight control surfaces must be balanced in accordance with balancing procedures after repair or painting.

TAIL GROUP

The all-metal tail group is a full cantilever design, consisting of the conventional arrangement of vertical fin and rudder, horizontal stabilizer and elevators. The right elevator and rudder both contain flight adjustable trim tabs, actuated by a system of cables and pulleys controlled from the pilot's tab control wheels.

Vertical Stabilizer and Dorsal Group.

The vertical stabilizer and dorsal area are constructed jointly to form a single unit. Basically the unit consists of formed sheet metal spars and ribs to which the outer skin is attached. The front spar is reinforced at its root end and drilled to facilitate the installation of two attachment bolts. Stiffness to the entire stabilizer and dorsal assembly is provided by the attachment of the skins and the forward leading edge skin.

a. Negligible Damage.

Any smooth dents in the vertical stabilizer and dorsal group skin that are free from cracks, abrasions, and sharp corners, which are not stress wrinkles and do

not interfere with any internal structure or mechanism, may be considered as negligible damage. In areas of low stress intensity, cracks, deep scratches, or deep sharp dents, which after trimming or stop drilling can be enclosed by a two-inch circle, can be considered negligible if the damaged area is at least one diameter of the enclosing circle away from all existing rivet lines. Stop drilling is considered a temporary repair.

b. Repairable Damage.

Repair of the skins, ribs, and spars can be accomplished as illustrated in the back of the section. Access to the internal stabilizer structure is best gained by removing the skin attaching rivets on one side of the rear spar and springing back the skin.

c. Damage Necessitating Replacement of Parts.

Extrusion, hinge brackets, and small ribs should be replaced rather than repaired. In general, where parts are available, the easiest and most satisfactory repairs can be accomplished by replacing the damaged parts.

Rudder.

a. Negligible Damage.

Minor skin dents and nicks are considered negligible and will be worked out by burnishing.

b. Repairable Damage.

Skin damage, exceeding that considered negligible damage, can be repaired by patching. Typical skin repairs are illustrated in the back of the section.

c. Damage Necessitating Replacement of Parts.

Warped and cracked skin, ribs, hinge brackets, and torque tubes are replaceable items. Any damage that covers more than half of the rudder will require replacement of the rudder.

NOTE

Flight control surfaces must be balanced in accordance with balancing procedures after repair or painting.

Horizontal Stabilizer.

a. Negligible Damage.

Any smooth dents in the horizontal stabilizer skin that are free from cracks, abrasions, and sharp corners, which are not stress wrinkles and do not interfere with any internal structure or mechanism, may be considered as negligible damage. In areas of low stress intensity, cracks, deep scratches, or deep sharp dents, which after trimming or stop drilling can be enclosed by a two-inch circle, can be considered negligible if the damaged area is at least one diameter of the enclosing circle away from all exist-

ing rivet lines. Stop drilling is considered a temporary repair.

b. Repairable Damage.

Skin damage, exceeding that considered negligible damage, can be repaired by patching. Typical skin repairs are illustrated in the back of the section. Repairing or splicing of horizontal stabilizer spar caps is not recommended. Access to the internal stabilizer structure may be gained by removing a portion of the rivets along the rear spar and ribs and springing back the skin. By using the proper bucking bars through holes in spar web, the skins may be closed with a minimum of blind rivets.

c. Damage Necessitating Replacement of Parts.

Extrusions, hinge brackets, stabilizer tab, spar, and ribs should be replaced rather than repaired. In general, where parts are available, the easiest and most satisfactory repairs can be accomplished by replacing the damaged parts.

Elevators.

a. Negligible Damage

Any smooth dents in the elevator skin that are free from cracks, abrasions, and sharp corners, which are not stress wrinkles and do not interfere with any internal structure or mechanism, may be considered as negligible damage. In areas of low stress intensity, cracks, deep scratches, or deep sharp dents, which after trimming or stop drilling can be enclosed by a two-inch circle, can be considered negligible if the damaged area is at least one diameter of the enclosing circle away from all existing rivet lines. Stop drilling is considered a temporary repair. The exception to negligible damage on the elevator surfaces is the front spar, a crack appearing in the web at the hinge fittings or in the tip rib which supports the overhanging balance weight is not considered negligible. Cracks in the overhanging tip rib, in the area at the front spar intersection with the web of the rib, also cannot be considered negligible.

b. Repairable Damage.

Skin damage, exceeding that considered negligible damage, can be repaired by patching. Typical skin repairs are illustrated in the back of the section.

c. Damage Necessitating Replacement of Parts.

Warped and cracked skin, ribs, hinge brackets, and torque tubes are replaceable items. Any damage that covers more than half of the elevator will require replacement of the elevators.

NOTE

Flight control surfaces must be balanced in accordance with balancing procedures after repair or painting.

FUSELAGE

The fuselage is of semimonocoque construction consisting of formed bulkheads, longitudinal stringers, reinforcing channels, and skin platings. The fuselage nose section consists of the fuselage structure from the nose to fuselage station 100.00. The cabin section consists of the fuselage structure from fuselage station 100.00 to fuselage station 273.94, (421-0001 to 421B0301) Fuselage Station 289-94 (421B0301 and On). The tail section consists of the structure from fuselage station 273.94 to fuselage station 373.56, (421-0001 to 421B0301) Fuselage Station 289.94 to 373.56 (421B0301 and On). Formed bulkheads, channels, and extrusions constitute frame members of the cabin area. The cabin section is pressurized to the skin from fuselage station 100.00 to 273.94, (421-0001 to 421B0301) Fuselage Station 100.00 to 289.94 (421-0301 and On). Drilling or any type of repairs of the pressurized cabin should be accomplished in a manner that will not change structural integrity or pressurization capabilities of the aircraft. The following instructions should be followed in repairing the cabin section:

1. Skin patches should be of same gage as the original skin. Back up doublers should be of the next heavier gage material.
2. All lap joints and skin patches should have two rows of rivets staggered. Spacing not to exceed .75".
3. Fay seal doublers and patches in accordance with sealing procedures of section to preserve pressurization requirements.
4. All repair parts must be free of metal chips, burrs or scratches.
5. Rivets used should be of the same type and size as used in the original structure.
6. Do not countersink deeper than 75% of the material thickness.
7. (421-0001 to 421B0301) The forward cabin pressure bulkhead at Fuselage Station 100.00 and aft cabin pressure bulkhead at fuselage station 273.94 are fabricated of honeycomb material. Standard repairs may be made using honeycomb material of the same gage as the original part for insert patches and .050 2024-T3 backup doublers.
8. (421B0301 and On) The forward cabin pressure bulkhead at Fuselage Station 100.00 and the aft cabin pressure bulkhead at Fuselage Station 289.94 are fabricated of .040 2024-T3 material. Standard repairs may be made using material of same gage heat treat and alloy. Backup doublers should be of next heavier gage material.

a. Negligible Damage.

Any smooth dents in the fuselage skin that are free from cracks, abrasions, and sharp corners, which are not stress wrinkles and do not interfere with any internal structure or mechanism, may be considered as negligible damage.

b. Repairable Damage.

Mild wrinkles occurring in the upper or lower skin panels in the bay forward of the horizontal stabilizers and which extend through the corners (shoulder areas) may be repaired by the addition of a stringer. A

wrinkle, which is hand removable, should be reinforced by a 1/2 x 1/2 x .050 inch 2024-T42 extruded angle. The angle should be inserted fore and aft across the center of the wrinkle and should extend to within 1/16 to 1/8 inch of the fuselage bulkheads comprising the ends of the bay. If the wrinkles cannot be removed by hand, the damaged area should be repaired. Typical methods of repair of skins, bulkheads, stringers and channels are given in the back of this section. Before repairing is attempted, all cracks or deep scratches must be stop drilled with a #30 drill and all sharp corners and ragged edges must be trimmed and deburred.

c. Damage Necessitating Replacement of Parts.

All forgings and castings of any material and structural parts made of steel must be replaced if damaged. Structural members of a complicated nature that have been distorted or wrenched should be replaced. Major skin damage should be repaired by replacing the entire damaged sheet.

NOTE

When replacing entire skin panels, duplication of the forward edge on the original sheet is required. In effect, this flange is a structural member, carrying specific loads across the open areas.

BULKHEADS.

Bulkheads are composed of formed "U" channel sections. The principle material of construction is 2024-O alclad aluminum alloy, which after forming is heat treated to a 2024-T42 condition. All bulkheads in the fuselage are of the formed sheet metal or the reinforced formed sheet metal type.

a. Cracked Bulkhead Web or Flanges.

Acceptable methods of repairing various types of cracks occurring in service are shown in the back of the section. Small holes (3/32-inch) should be drilled at the extreme ends of the cracks to prevent further spreading. Reinforcement should be added to carry the stresses across the damaged portion and stiffen the joints. The condition causing such cracks to develop at a particular point may be a stress concentration at that point, in conjunction with a repetition of stress (such as produced by vibration of the structure).

NOTE

An increase in sheet thickness alone is usually beneficial but does not necessarily remedy the conditions leading to cracking. Patch type repairs are generally employed and are usually satisfactory in restoring the original material strength characteristics.

d. Severely Bent, Kinked, or Torn Channels.

If practical, severely bent, kinked, or torn portions of bulkhead should be removed and a replacement section installed and joined at the original splice joint. If this is not justified, cutting away the damaged portion and inserting a trimmed portion of the original section, adequately reinforced by splice plates or doublers, will prove satisfactory. This is known as an insertion type repair.

LANDING GEAR

The main gears are carried by the wings and are housed within the wing wheel wells when retracted. The nose gear retracts into the fuselage nose wheel well. Doors covering the wells are regarded as parts of the landing gear assemblies but the wells are structural features of the wings and fuselage.

a. Repairs of Landing Gear.

The landing gear assemblies are composed of parts that are not regarded as repairable. Minor repairs are permissible on the doors but when they are re-installed there must be no distortion that will prevent perfect operation.

ENGINE NACELLE.

The engine nacelle group, located in each wing, is composed of the semicantilever bed-type mount, the

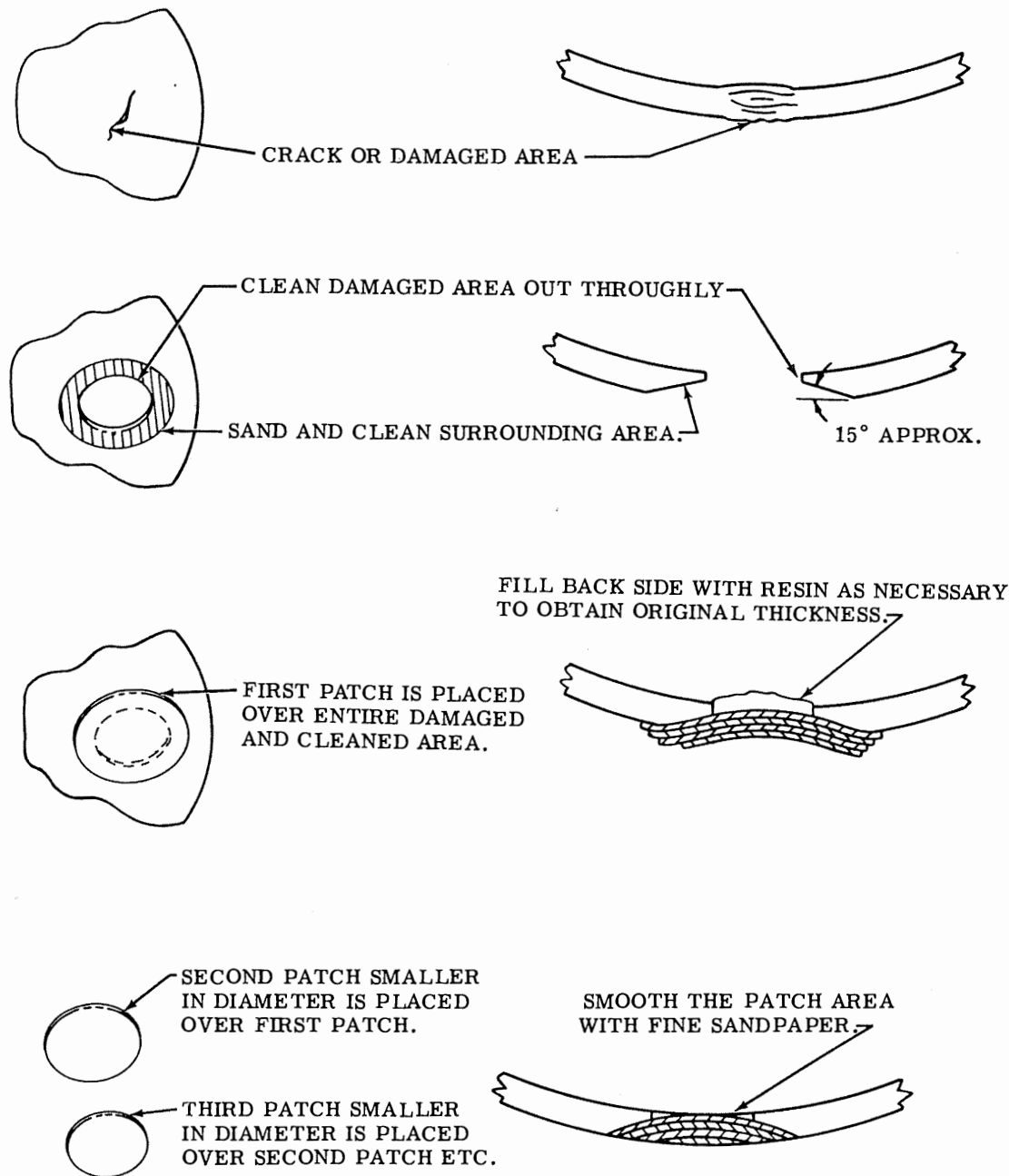


Figure 16-1. Typical Fiberglass Repair

stainless steel firewall, and the cowling group. The engine mount structure is made of .063 inch 2024-T4 aluminum and 4130 cad-plated steel. The cowling is made up of three sections; the upper, the lower which includes the left and right access doors, and the two piece nose section which fastens in the center of the cowling. All sections fasten in place with Camloc quick fasteners. The nacelle firewall is made up of stainless steel sheet with a clad aluminum angle riveted around its contour.

a. Negligible Damage.

Minor dents in the firewall and cowling, if straightened, may be classified as negligible damage. Scratches and dents should be burnished out.

Engine Firewall.

a. Repair of Stainless Steel Firewall.

The firewall may be repaired by using the clear structure-type patch, as shown in figure 16-53 of this section, providing the patch is of the same thickness as the firewall and monel rivets are used. Maximum diameter on holes that can be patched is 2 inches. The holes should be routed and repaired in accordance with figure 16-53. Cracks should be stop drilled and repaired in accordance with figure 16-53. Parts having cracks extending to the edge of the part must be replaced. Maximum allowable length of cracks to be repaired is 3 inches.

Engine Firewall Sealing

The engine firewall should be sealed with pro-seal #700 (Coast Pro-Seal Company) using the following procedures:

- a. Clean area on surface to be sealed with solvent.
- b. Mix 1 part of Pro-seal #700 curing agent with 100 parts of Pro-seal #700 sealant.

NOTE

Sealant should be mixed by weight. It is important that accelerator be completely and uniformly dispersed throughout the base compound.

- c. Using a spatula, caulking gun, or flow gun, apply a fillet of sealer along cracks, seams, joints and rows of rivets.

NOTE

If the sealing is done before the parts are mated, use enough sealing compound to completely fill the joint and wipe away the excess after parts are mated.

NOTE

If the sealant is applied with a brush or a brush flow gun, more than one coat of sealant

will be necessary on very porous material. The sealant should be allowed to air dry 10 minutes between coats.

- d. Pro-seal #700 is the only sealant authorized for the stainless steel firewall. If sealant other than pro-seal #700 has been used, it should be removed from the firewall and resealed using only the recommended sealant.

Engine Mount.

a. Engine Mount Repair.

Replacement of mount is the only recommended repair.

Engine Cowling.

a. Repair of Skins.

Skins, if damaged extensively, should be replaced with a section of original manufacture. Small damaged areas should be reinforced with a doubler installed on the inner side. Material selected should be of the same thickness and characteristics as the original part.

b. Repair of Cowling Reinforcement.

Cowl reinforcements, if damaged, should be replaced. Due to their small size and complex angles they are easier to replace than to repair.

FIBERGLASS PARTS.

The nose cone, empennage tips, fairings, heat ducts, and other parts of the aircraft are made of fiberglass.

a. Repairable Damage.

Damaged fiberglass parts may be repaired by the methods shown in figure 16-1. Cut and trim the area just beyond the noticeable damage. If the parts are painted, remove paint and sand clear an area at least two inches beyond the edge of the cutout. Prepare the necessary size and number of patches of glass cloth. Mix a sufficient amount of resin in accordance with the manufacturer's instructions.

WARNING

Always follow the manufacturer's mixing instructions carefully as the mixing of peroxide and cobalt together will result in a spontaneous fire.

Be sure that your hands are free from oil, grease and dirt. Apply an even coat of resin on the sanded area. Impregnate all the glass cloth patches by laying them on a clear paper and working the resin through the fabric with a small brush. Place the larger patch over the cutout area, working out all air

bubbles and wrinkles. If the cutout is large enough to cause the patch to sag, place a suitable support behind the repair area. Coat the support with automobile wax or wax paper to prevent the resin from adhering to the support. Apply the second patch over the first patch etc., working out all wrinkles and air bubbles. After all the patches have been applied, brush the area with an even coat of resin and allow to cure. Smooth the patch area with fine sandpaper until the desired finish is obtained. Repaint the finished area with matching paint.

b. Damage Necessitating Replacement of Parts.

When the fiberglass parts are torn or cracked over a large area or show signs of rigidity through the use of too much pressure on the surface, then the parts should be removed and replaced.

REPAIR PROCEDURES FOR BONDED HONEYCOMB. (See figure 16-1A.)

a. The Model 421 engine cowling is fabricated using a sandwich type honeycomb construction. Sometime during the life of the aircraft, damage may occur to the skin and/or honeycomb which will require repairs. In the event damage occurs to the bonded honeycomb the following repair procedures have been developed with the objective of equaling, as nearly as possible the strength of the original part with minimum loss of aerodynamic characteristics, electrical properties and minimize increase in overall weight.

b. Damages to sandwich honeycomb construction are divided into classes according to severity and possible effect upon the airframe structure. Damage classifications are as follows:

Class 1. Dents, scars, scratches, cracks, etc., in the facings not accomplished by a puncture or a fracture.

Class 2. Punctures or fractures on one facing only, possibly accompanied by damage to the honeycomb core but without damage to the opposite facing.

Class 3. Holes or damage extending completely through the sandwich, affecting both facings and the core.

Class 4. Adhesive voids between skin and honeycomb core.

WARNING

Solvents used must be stored in, transported in, and used from safety containers. Adequate ventilation must be provided in storage and usage areas. The solvents specified are flammable and caution to prevent fires must be taken. No smoking, sparks or open flames shall be permitted in the immediate area where the solvents are being used. Storage and usage areas shall be free from excessive heat, sparks, and open flames when possible and

practical, rubber gloves shall be worn when performing solvent operations.

c. Repair of Class 1 damage shall be as follows:

1. Class 1 damage resulting in a hole not exceeding 1-1/2 inches diameter, dents, scratches or scars of .030 inch deep shall be repaired as follows:

- (a) Remove paint to bare metal using either 400 or 600 grit wet sandpaper.
- (b) Mask area adjacent to sanded area.
- (c) Mix thoroughly equal portions, by volume, of Epon 828 and Versamid 125. Add aluminum powder until a thick non-flowing paste is obtained.

NOTE

Prepare only that quantity of material that will be used in 30 minutes.

- (d) Fill damaged area with mix and smooth with a putty knife or spatula.
 - (e) Allow the mix to cure at room temperature until hard (approximately 4 hours).
 - (f) Wet sand the repaired area with 400 grit wet sandpaper until smooth.
 - (g) Clean the repaired area with a clean cloth moistened with Isopropyl Alcohol, Naphtha or Toluene. Allow to air dry.
 - (h) Brush a minimum of two coats of Zinc Chromate primer over the repaired area, allowing each coat to dry.
 - (i) Refer to Section 2, and paint in accordance with applicable finish specifications.
2. Class 1 damage resulting in cracks shall be repaired as follows:
- (a) Stop drill crack at both ends with 3/16 inch diameter holes.
 - (b) Prepare a circular external patch, which will extend one inch beyond damage area, from .012 or .015 aluminum.
 - (c) Remove all paint and primer around damage area by sanding with 400 or 600 grit wet sandpaper.

NOTE

Sanded area must be approximately 1/2 inch wider than aluminum patch.

- (d) Lightly sand entire damage area with 400 grit sandpaper until a satin finish is obtained. Mask off around damage area.
- (e) Wipe damage area with a clean cloth moistened with Isopropyl Alcohol, Naphtha or Toluene. Wipe dry with a clean cloth.
- (f) Mix thoroughly 100 parts (by weight) Epon VIII Adhesive with 6 parts (by weight) of curing agent "A".

NOTE

Prepare only that quantity of material that will be used in two hours.

- (g) Work some of the prepared adhesive in the

crack and drilled holes. Apply a thin film over sanded surface.

- (h) Prepare a one-ply No. 191 glass cloth or similar scrim cloth 1/8 inch wider than aluminum patch.
 - (i) Apply a thin film of the adhesive on the aluminum patch and assembly cloth between patch and damaged assembly and apply sufficient pressure to assure intimate contact.
 - (j) Using mylar or cellophane over aluminum patch, place a clamping device on patch to insure complete contact of all bonding surfaces.
 - (k) Remove excess adhesive with a clean cloth dampened with Naphtha or Toluene.
 - (l) Cure at 150° to 200° F using heat lamps or oven.
 - (m) Remove clamps, pressure pads, etc., and sand away remaining excessive adhesive.
 - (n) Brush a minimum of two coats of Zinc Chromate primer over the repaired area, allowing each coat to dry.
 - (o) Refer to Section 2, and paint in accordance with applicable finish specifications.
- d. Repair of Class 2 damage shall be as follows:
1. Class 2 damage to upper cowl resulting in damages that extend completely through the aluminum outer skin and into the aluminum honeycomb core but without damage to the inner skin:
 - (a) Carefully trim out skin to a circular or oval shape with a hole saw or fly cutter removing honeycomb core completely to the opposite skin.

CAUTION

Extreme care should be taken not to damage the inner skin.

- (b) Remove completely all the damaged honeycomb core.
- (c) Prepare either an aluminum honeycomb core or balsa wood replacement plug as follows:
 - (1) If balsa wood is used, fabricate plug so that the grain will be perpendicular to the skins.
 - (2) Lightly sand balsa plug with 400 grit sandpaper and wipe off dust with a clean cloth.

NOTE

Do not touch the bare surface with bare hands after sanding. If the balsa wood is cut too short, the distance between shall be shimmed up until intimate contact is made with all surfaces.

- (3) Wrap balsa plug in clean waxed paper until ready for use.
- (4) When aluminum honeycomb plug is used, the core shall be the approximate density of the original core.
- (5) Cut aluminum honeycomb plug so that the top edge will be even with the ad-

jacent skins and completely fills the damaged area.

- (d) Remove all paint and primer (approximately 1-1/2 inches larger in diameter than cut-out) from around damage area with either 400 or 600 grit wet sandpaper.
- (e) Mask around sanded area and cut-out area.
- (f) Mix thoroughly 100 parts (by weight) Epon VIII adhesive with 6 parts (by weight) of curing agent "A".

NOTE

Prepare only that quantity of material that will be used in two hours.

- (g) If balsa plug is being used, spread the adhesive lightly over all surfaces. If aluminum plug is being used, brush or trowel adhesive on the internal side of the existing skin and where the plug will make contact with core.
- (h) Position balsa wood or aluminum plug into place.
- (i) Prepare a circular external patch, which will be one inch larger than plug hole, from .012 or .015 aluminum.
- (j) Prepare a one-ply circular No. 191 glass cloth or similar scrim cloth 1/8 inch larger than plug hole.
- (k) Apply a thin film of adhesive over sanded surface and place the No. 191 glass cloth or similar cloth over the plug.
- (l) Clean the bond surface of aluminum patch and coat with adhesive.
- (m) Assemble patch over glass cloth and plug and apply sufficient pressure to assure intimate contact.

NOTE

Care should be taken to insure that plug and glass cloth remain in place.

- (n) Using mylar or cellophane over aluminum patch, place a clamping device on patch to insure complete contact of all bonding surfaces.
 - (o) Remove excessive adhesive with a clean cloth moistened with Naphtha or Toluene.
 - (p) Cure at 150° to 200° F using heat lamps or oven.
 - (q) Remove clamps, pressure pads, etc., and sand away remaining excessive adhesive.
 - (r) Brush a minimum of two coats of Zinc Chromate primer over the repaired area, allowing each coat to dry.
 - (s) Refer to Section 2, and paint in accordance with applicable finish specifications.
2. Class 2 damage to upper cowl resulting in damage which extends completely through the fiberglass inner skin and into aluminum honeycomb core but without damage to the outer aluminum skin.
 - (a) Carefully trim out skin to a circular or oval shape with a hole saw or fly cutter removing

aluminum honeycomb core completely to opposite skin.

- (b) Prepare a balsa wood or aluminum honeycomb plug as stated in step 1(c) above.
- (c) Sand undamaged fiberglass skin lightly approximately 2 inches out from around the hole.

CAUTION

Do not sand through fiberglass skin.

- (d) Prepare two No. 181 glass fabric patches, 1/8 inch larger than hole diameter.
- (e) Mix thoroughly 100 parts (by weight) Epon 828 and 10 parts (by weight) Diethlenetriamine (DTA).
- (f) Coat plugs with Epon 828 and DTA mix as described in step 1. (g).
- (g) Impregnate the two No. 181 glass patches with mixture to the content of approximately 50% and assemble patches over plug.

NOTE

Smooth out all wrinkles.

- (h) Prepare one No. 181 glass fabric patch large enough to cover sanded area and impregnate with mixture.
 - (i) Assemble third patch over the two previous layers and remove all wrinkles as before.
 - (j) Using mylar or cellophane, cover patches and apply a clamping device.
 - (k) Cure assembly at 150° to 200° F for approximately 90 minutes.
 - (l) Remove clamps, pressure pads, etc., and sand smooth to original contour.
3. Class 2 damage to side cowl which extends completely through aluminum skin and the aluminum honeycomb core shall be repaired as follows:
- (a) Repair damage as described under step 1. (d) except use Bloomingdale's HT-424 or Narmco's Metlbond 302 adhesives.
 - (b) The cure time for adhesives described in step (a) above, will be a minimum of 5 hours.
4. Class 2 damage to side cowl which extends completely through fiberglass skin and aluminum honeycomb core shall be repaired as follows:
- (a) Repair damage as described under step 2. (d), except use either Bloomingdale's HT-424 or Narmco's Metlbond 302 adhesives.

- (b) The skins shall be fabricated from either Cordo's Pyropreg AC, U.S. Polymeric's Poly Preg 502, or Narmco's 506 (color black).
- (c) The reinforcement shall be 181-150 Valan.
- (d) Cure time for adhesives described in step (a) above, will be a minimum of 5 hours.

e. Repair of class 3 damage is as follows:

1. Class 3 damage to upper and side cowls resulting in damage to both aluminum and fiberglass skins having a minimum damage size of 1.0 inch or maximum damage size of 4 inches.

- (a) Prepare surfaces, plugs and patches as described in step d.
 - (b) Fabricate a temporary mold or block to hold the plug in place while aluminum outer skin is being repaired.
 - (c) Repair outer aluminum skin in accordance with step d.
 - (d) Remove temporary mold or block and repair fiberglass skin in accordance with step d., and flare in patch with existing skin contour.
- f. Repair of class 4 damage is as follows:
1. Class 4 repairs are those repairs needed to fill voids between aluminum core and skin surfaces.
- (a) Drill sufficient 1/8 inch holes in the fiberglass inner skin adjacent to voids.
 - (b) Remove all burrs around drilled holes.
 - (c) Mix thoroughly 100 parts (by weight) Epon 828 with 10 parts (by weight) curing agent "D".

NOTE

Prepare only that quantity that can be used in one hour.

- (d) Using a syringe or pressure gun, inject resin mix into the aluminum honeycomb cells until they become filled.
- (e) Wipe off excess resin with a cloth that has been dampened with MIBK or MEK and cover the holes with masking tape.
- (f) Position the structure so that both skins will be in intimate contact with resin.
- (g) Cure adhesive for 2 hours at 150° to 200° F.
- (h) Remove masking tape and sand away excess resin.

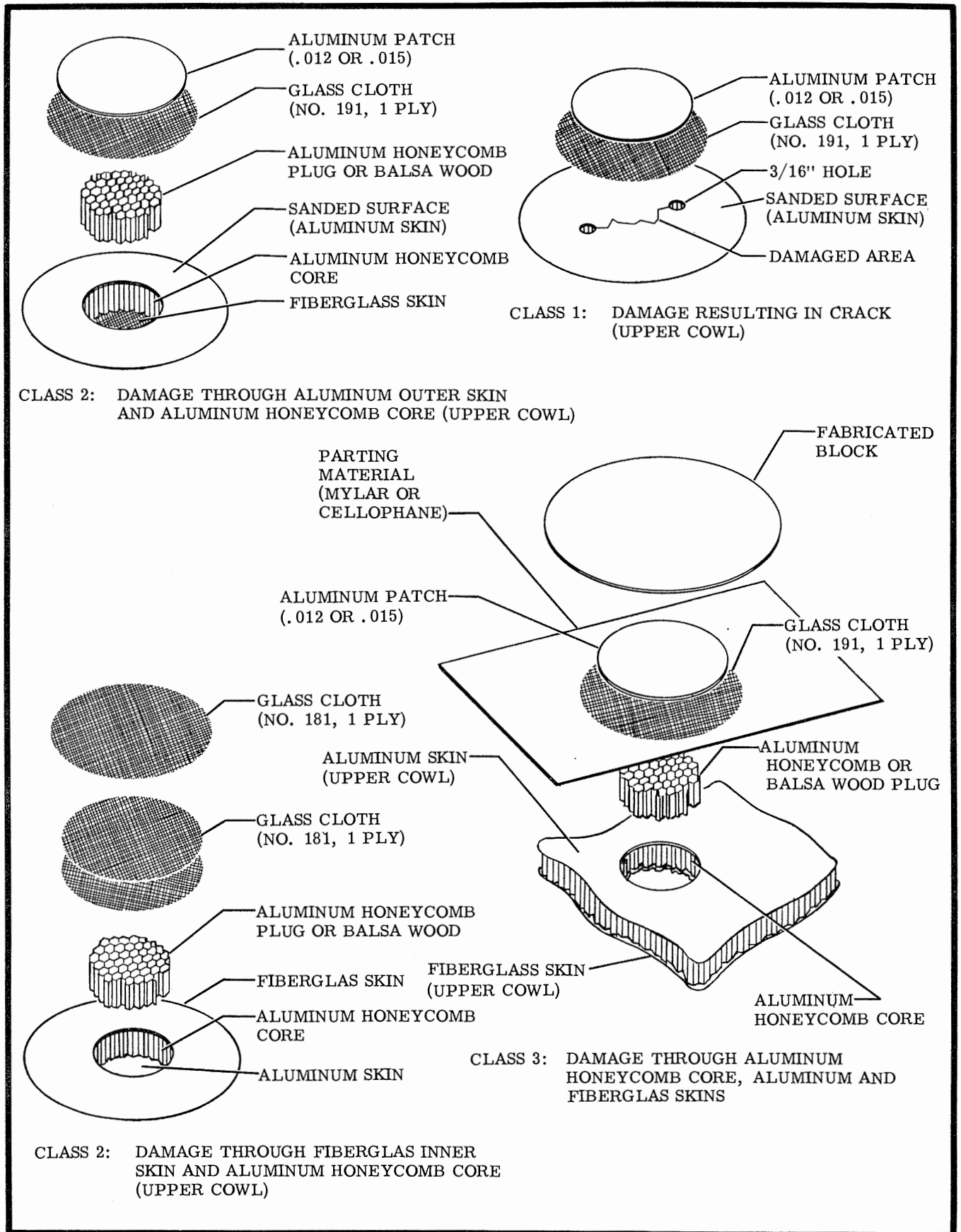


Figure 16-1A. Bonded Honeycomb Repair

RADOME REPAIR PROCEDURES.

a. Remove radome in accordance with Section 3. Repair procedures are developed with the objective of equaling as nearly as possible the electrical and strength properties of the original part with a minimum increase in weight. This can only be accomplished by repairing damaged parts with approved materials and working techniques. For convenience in presentation and for clarity in designating repair procedures to be used, damages to solid laminate radomes in this procedure shall be divided into classes according to severity, as follows:

1. Class I Repair. Surface scratches, scars or erosion not penetrating through the first ply of fabric.
2. Class II Repair. Punctures, delaminations, contaminates or fractures extending through the first ply down into the laminate but without damage to the opposite facing.
3. Class III Repair. Damage extending completely through the laminate affecting both facings.
4. Class IV Repair. Defect which does not exceed an area .5 inch square and surface has not been broken and does not occur more than twice in any 1 foot square area.
5. Class V Repair. Delamination in edge bond extending up to 1/8 inch out from drilled holes; delaminations not extending more than 1/2 inch from trimmed edges and approximately 1 inch in size.

b. Repair Techniques.

1. Class I Repair. Surface scratches, scars or erosion not penetrating through the first ply shall be repaired as follows:

- (a) Clean injured area thoroughly and carefully using a clean cloth saturated with methyl-ethyl-ketone or another approved cleaning agent.
- (b) Lightly sand the damaged area, using No. 280 grit sandpaper, clean the sanded surface thoroughly, using methyl-ethyl-ketone, Specification TT-M-261. Moisture and solvents should be completely removed to prevent their inhibiting the cure of the resin.
- (c) Apply one or two coats (depending on severity of the abrasion) of the following resin mix to the abraded surface.

Composition

Resin Selectron 5003 (Alternate: Hetron 92)	100 parts by weight
Lupersol DDM	0.5 to 1.5 parts by weight
Luperco ATC Paste	.95 to 1.05 parts by weight
Nuodex Cobalt	4 to 8 drops/lb. resin

Refer to the end of this section for Vendor information.

Mixing Procedure

Dissolve ATC Paste in the resin and thoroughly mix. Add Nuodex Cobalt and mix. Add DDM and thoroughly mix.

Bench Life

Approximately 30 minutes at room temperature.

(d) Over this coated surface, apply a sheet of colored cellophane or polyvinyl alcohol film extending two or three inches beyond the surface. The cellophane or PVA prevents exposure to the air and will provide a smooth surface against which the resin may cure.

(e) Tape cellophane or PVA in place and work out air bubbles and excessive resin with the hand or a rubber squeegee. Cure the resin as follows:

- (1) Gel resin at any surface temperature from 80° F up to a maximum of 150° F.
- (2) After gelation the repaired area is cured at a surface temperature of 120 to 150° F for 30 minutes. The surface temperature is then raised to 200-230° F and maintained for 30 minutes. Heat may be obtained by heat lamps, glow rods, etc.

(f) After the resin has cured or set, remove the cellophane or PVA from the cured resin and remove any excessive resin by sanding lightly.

2. Class II Repair. Punctures, delaminations, contaminates or fractures extending through the first ply down into the laminate but without damage to the opposite facing.

Method I (Stepped Joint Method).

(a) The preferred method of removing damaged plies in accomplishing a Class II Repair is by the stepped joint method. For small damages the scarf method of repair may be used.

(b) Ascertain the extent of the damaged area by visual inspection, using a strong light source, prior to beginning repair. With aid of a straight edge or compass, outline the damaged area by scribing a rectangle with rounded corners or circle that will necessitate removal of a minimum of sound material. Extend the sides of the circle a distance in inches equal to the number of plies to be removed less one inch. (Five inches if six plies are to be removed, four inches if five plies are to be removed, etc.) Overlap should be at least one inch per ply of glass cloth.

(c) With the aid of a straight edge, use a sharp knife or other specially prepared cutter and cut along the lines scribed in the outermost ply. Use extreme care not to cut or score the underlying ply. A suggested method is to cut through the overlaying ply in a series of cuts rather than attempt to cut through the ply in one cut.

(d) Remove the cut outermost ply by inserting the knife blade under the corner and prying loose carefully. When this outermost ply is removed, scribe on the next exposed ply a similar outline except reducing the dimensions one inch in all directions. (Overlaps shall be one inch each ply.) Repeat this procedure until all the damaged plies have been removed. (See Figure 16-2.)

(e) Lightly sand exposed plies and clean surfaces using methyl-ethyl-ketone, Specification TT-M-261, and allow to dry thoroughly preparatory to completing repair buildup.

WARNING

The sanding operation on glass cloth reinforced laminates gives off a fine dust that may cause

skin irritation. Breathing of an excessive amount of this dust may be injurious, therefore, precaution as to skin and respiratory protection will be observed.

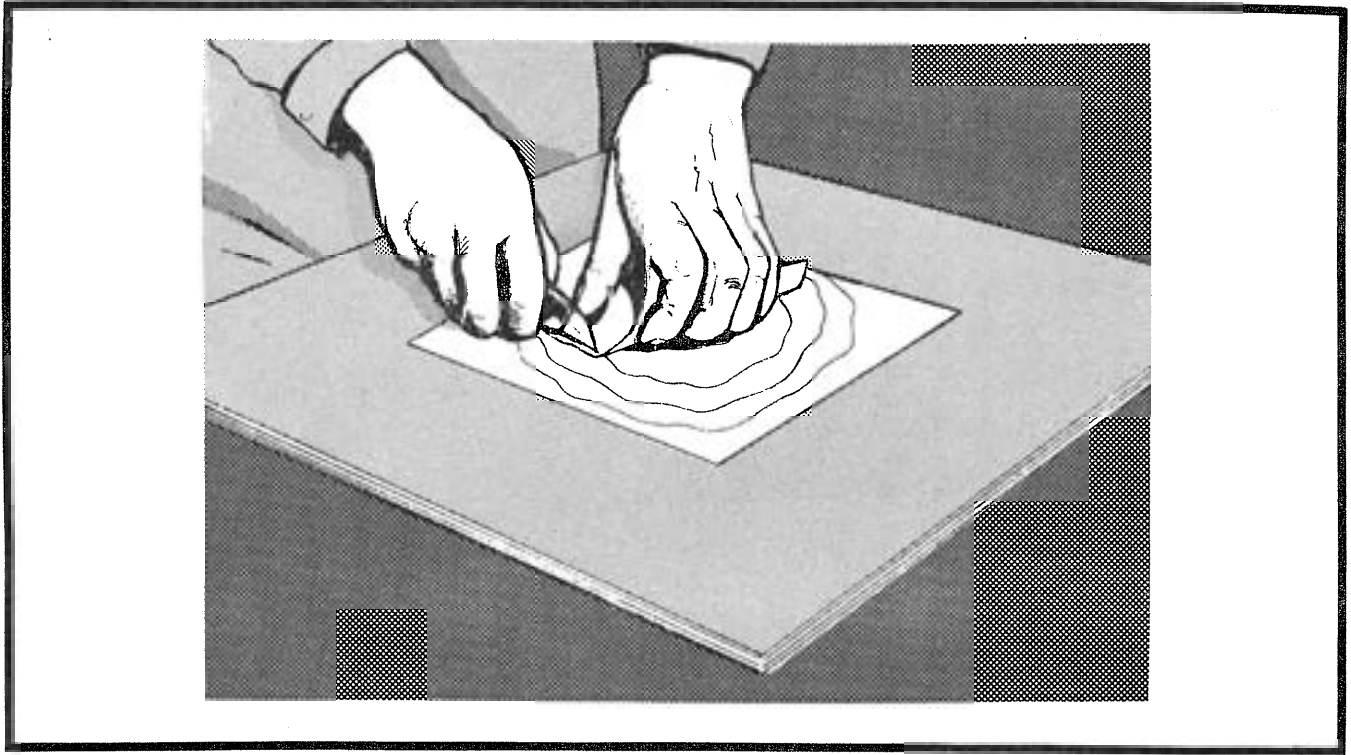


Figure 16-2. Removing Damaged Face Plies - Step Joint Method

(f) Cut patches from the same type of fabric as was used in the original part. Cut the fabric patches to the size of each hole. Impregnate the cloth patches with the resin mix specified under Repair Method I, paragraph (c). Sandwich each patch ply between two sheets of PVA or cellophane larger than the patch by at least two inches on all sides. (See Figure 16-3 and 16-4.) The impregnated glass cloth shall contain 45-50 percent of catalyzed resin after cellophane has been removed. (Weight of resin equal to weight of dry glass cloth comprises 50 percent resin content.) Brush a coat of resin on the surface of the scarfed plies.

(g) Fit the smallest patch in place taking care to avoid entrapping air under the patch. Smooth out all wrinkles and trim to fit. Add successive plies in a like manner the warp direction of each patch ply approximately the same as that of the original ply.

(h) Surround the patch with a bleeder and cover the entire area with polyvinyl alcohol film and secure in an air tight seal with either double-backed tape or extruded sealing tape or both. Evacuate the area under the PVA film. Sweep out entrapped air and excess resin with the air of a rubber squeegee or a similar device. The motion of the squeegee shall be slow enough so that the air bubbles will be swept clear of the laminate by the wave, or motion of the excess resin. The air bubbles may be observed through the transparent PVA sheeting and the wiping process will continue

until all air bubbles are swept past the edge of the laminate. The working or wiping of the laminate will be stopped when the plies of fabric are firmly packed together. Further wiping will create air or vapor voids observable as a whitening and a loss of transparency. Should the PVA sheet be punctured during the void-free working or wiping process, the hole may be repaired with transparent tape and the air which has penetrated the bag shall be worked from the laminate. Vacuum pressure shall be maintained during the complete curing process.

(i) Cure repaired area as described under Repair Method I, paragraph (c). After the resin has cured, remove the PVA from the cured resin and remove any excessive resin by sanding lightly.

Method II (Scarf Joint Method).

(a) The scarf joint method may be used when the repair of a damaged area will require removal of an area less than three inches in diameter.

(b) The scarf method consists of sanding out the damaged plies to a circular or oval disc shape. (See Figure 16-5.) The damaged plies will be scarfed back carefully to a distance of at least 50 times the total face ply thickness by using polisher-sander Stock No. 5130-537-3394, or by hand sanding using No. 180 grit sandpaper. The scarfing operation will be performed very accurately to provide a uniform taper and usually requires some practice before acceptable scarfs are obtained.

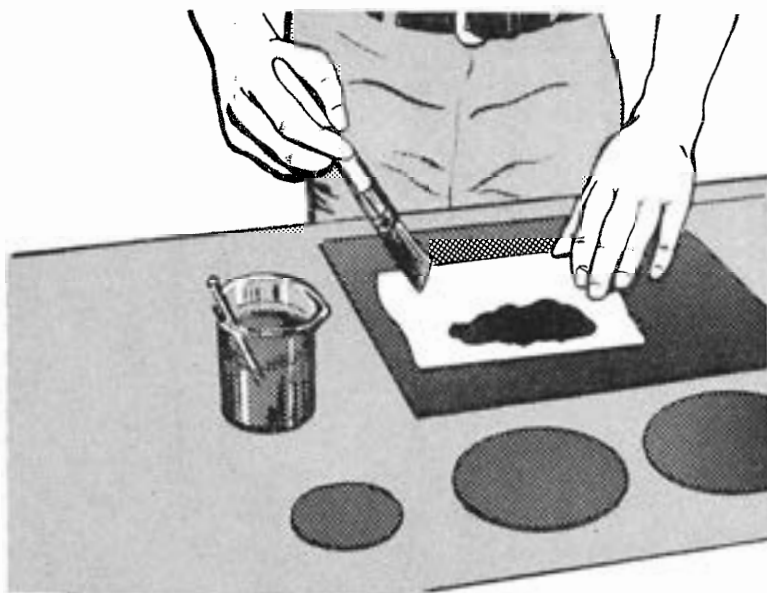


Figure 16-3. Suggested Method of Resin Impregnating Replacement Plies

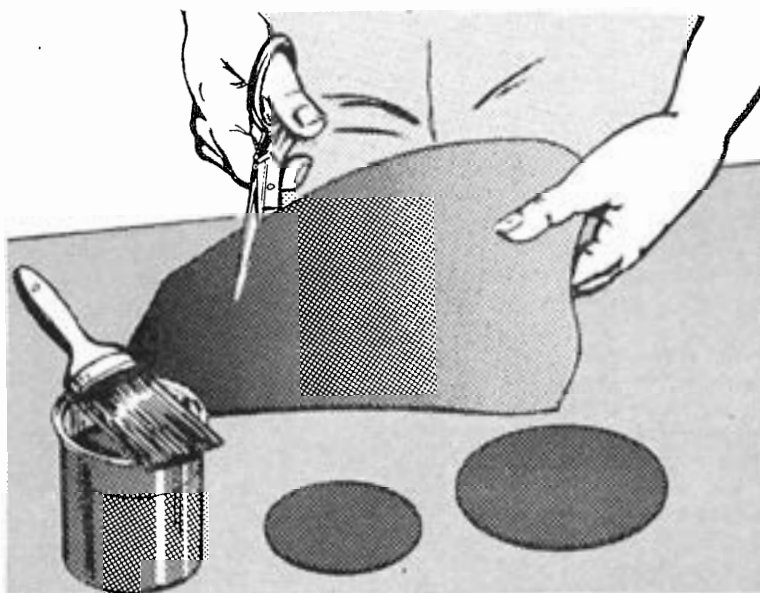


Figure 16-4. Cutting Replacement Plies from Impregnated Glass Cloth Sandwiched Between Sheet of Cellophane

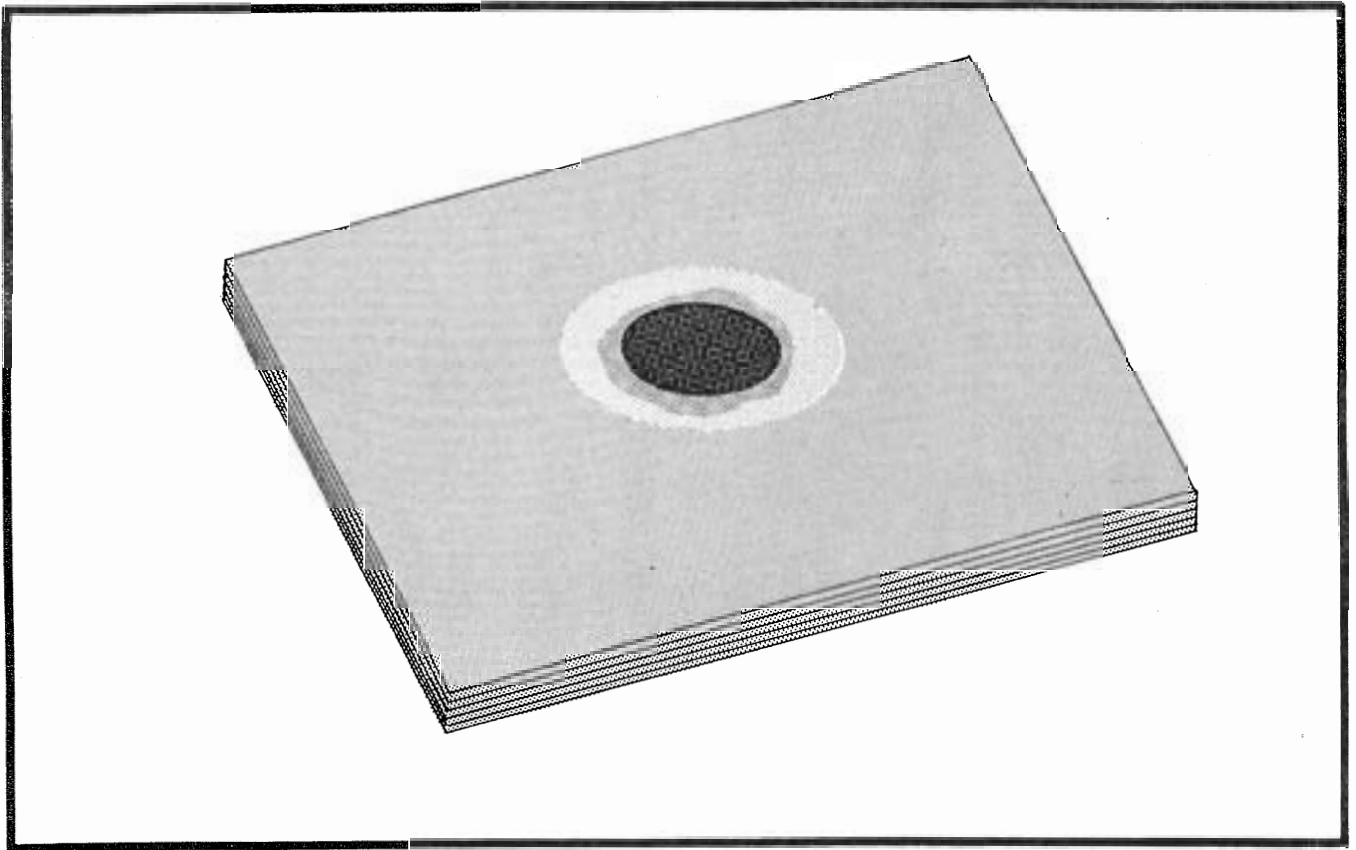


Figure 16-5. Damaged Face Plies Removed - Scarf Method

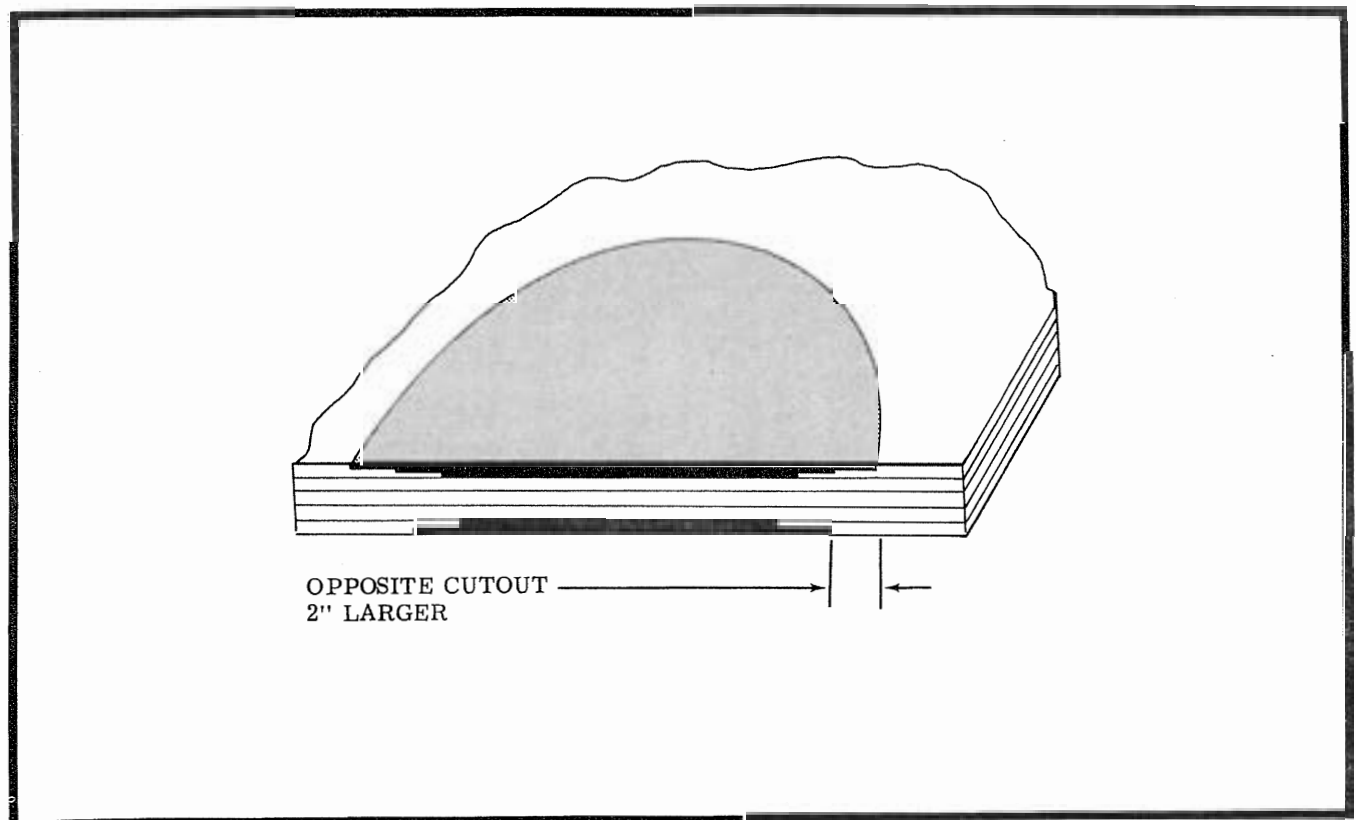


Figure 16-6. Completed Double Face Patch Repair

(c) The glass cloth laminations for the facing repairs are prepared with the largest piece being cut to the exact shape of the outside of the scarfed area. The smallest piece is cut so that it overlaps the scarfed area by its proportionate amount, depending on the number of plies in the repair and the intermediate pieces are cut so as to have equal taper.

(d) Process the prepared area in accordance with paragraphs (f), (g), (h) and (i) under Class II Repairs, Method I.

3. Class III Repair. Damage extending completely through the laminate affecting both facings.

(a) Damages completely through the laminate shall be repaired by removing and replacing the damaged material as previously outlined under Class II Repair. Never remove inner and outer radome face ply at the same time. One facing will be completed before repair is made on the opposite facing. On solid laminate radomes 1/2 of the damaged face plies will be removed from one side and the buildup repair completed, then repeat removal and new ply buildup procedures on opposite side.

(b) To accomplish Class III Repairs it is necessary that the opposite side of the laminate be provided with a temporary mold or block to hold the laminate in place during the first face ply buildup.

(c) The damaged facings shall be removed and replaced as previously outlined for removing and replacing damaged plies for Class II Repair. Repeat repair procedures on the opposite facing except the cut out ply area will be larger by approximately two inches than the first ply cut out area on the opposite face repair. This will prevent the joints of the inner and outer repair area from being in the same position. (See Figure 16-6.)

4. Class IV Repair. Defects which do not exceed an area .5 inch square and the surface has not been broken and does not occur more than twice in any 1 foot square area.

(a) If surface is broken, sand smooth.

(b) Drill 2 to 3 No. 50 holes into the damaged skin spaced throughout the damaged area. Inject resin mix under Class I Repair, paragraph (c), with a hypodermic syringe and needle to insure contact with all surfaces and to obtain a maximum possible "wetting up" of the fractured skin.

(c) Cure as described under Class I Repair, paragraph (e).

5. Class V Repair. Delamination in edge band extending up to 1/8 inch out from drilled holes; delaminations not extending more than 1/2 inch inward from trimmed edges and approximately 1 inch in size.

(a) Work as much as possible resin mix under Class I Repair, paragraph (c), into the discrepant area. Resin may be injected into the delaminated area along the panel edges with a hypodermic syringe and needle through holes drilled with a No. 50 drill bit. Extruded Sealing Tape placed around the needle and against the panel will force the resin throughout the delaminated area.

(b) Apply pressure, if necessary, with C-clamps or vacuum blanket. Cure per paragraph (3), under Class I Repairs.

Radome Repair Procedures (421B0501 and On)

a. Remove radome in accordance with Chapter 3. Repair procedures are developed with the objective of equaling as nearly as possible the electrical and strength properties of the original part with a minimum increase in weight. This can only be accomplished by repairing damaged parts with approved materials and working techniques. For convenience in presentation and for clarity in designating repair procedures to be used, damages to radomes in this procedure shall be divided into classes according to severity, as follows:

1. Class I Repair. Surface scratches, scars or erosion not penetrating through the first ply of fabric.

2. Class II Repair. Punctures, delaminations, contaminants or fractures extending through the first ply.

3. Class III Repair. Damage extending completely through both face sheets.

b. Repair Techniques.

1. Class I Repair. Surface scratches, scars or erosion not penetrating through the first ply shall be repaired as follows:

(a) Clean damaged area thoroughly and carefully using a clean cloth saturated with methyl-ethyl-ketone or another approved cleaning agent.

(b) Lightly sand the damaged area, using No. 280 grit sandpaper, clean the sanded surface thoroughly, using methyl-ethyl-ketone, Specification TT-M-261.

(c) Apply one or two coats (depending on severity of the abrasion) of the following material to the abraded surface:

Composition: Bostik 464-3-1 Surfacer, CA-142 Catalyst, TL-52 Thinner.

Vendor: Bostik-Finch, Boston Street, Middleton, Mass.

Mixing Procedure: Mix in a ratio of 3 parts by volume 464-3-1 base to one part CA-142 catalyst. Surfacer may be thinned with TL-52 to approximately 25 seconds #2 Zahn cup.

(d) Material may be applied by spray gun. The coating will dry to sand in 3 hours at normal temperatures. Sand with 320 grit paper and reapply paint.

2. Class II Repair. Punctures, delaminations extending through the outside face sheet.

(a) Punctures outside the radar window, not exceeding one inch in diameter.

(1) Mix EA960F and apply to core area of damage. Allow to harden, sand smooth and paint.

(b) Punctures inside the radar window, not exceeding 1/2 inch in diameter.

(1) If face sheet and core are damaged beyond use, fill core area with EA960F, allow to harden, sand smooth and paint.

(2) If face sheet and core are not damaged beyond use, bond back together with the following adhesive mix:

Composition: EA9309 Adhesive Mix.

Vendor: Hysol Division - The Dexter Corporation, Olean, New York 14760.

Mixing Procedure: Combine 100 parts "A" with 23 parts "B" by weight and mix thoroughly.

Bench Life: Approximately 40 minutes for one pound mass at 75° Fahrenheit.

- (3) Sand, paint and gloss surface at least 1/2 inch around damaged area. Apply sufficient adhesive to face sheet to rebond to core. Impregnate a patch of 181 or 1581 dry glass cloth with the 9309 adhesive mix. The patch should be 1/2 inch larger than the damaged area. Apply this patch to damaged area. Over this tape a sheet of polyethylene until adhesive hardens. Remove, sand lightly and paint.

(c) Delaminations in the edge bond. Delamination in the attachment edge bond may be bonded back together with EA9309 adhesive. If several plies of glass cloth are damaged, remove and replace with equal number of 181 or 1581 glass. Impregnate the glass cloth with EA9309, apply and allow to harden. Sand to shape or fit and repaint.

3. Class III Repair. Damage through both face sheets. This damage covers 1/2 inch diameter in the radar window area and one inch outside the window area. Damage beyond these limits should require replacement of the radome.

(a) Remove damaged face sheet. Apply polyethylene sheet to core and backup with a thin sheet of metal. Tape in place. Apply EA960F to fill core flush. Allow to harden and remove sheet metal backup. Apply EA9309 impregnated patches over damaged area overlapping by 1/2 inch all around. Tape a polyethylene sheet over impregnated patches and rub polyethylene sheet to smooth the adhesive and remove air from patch. Allow to harden, remove polyethylene sheet and sand lightly.

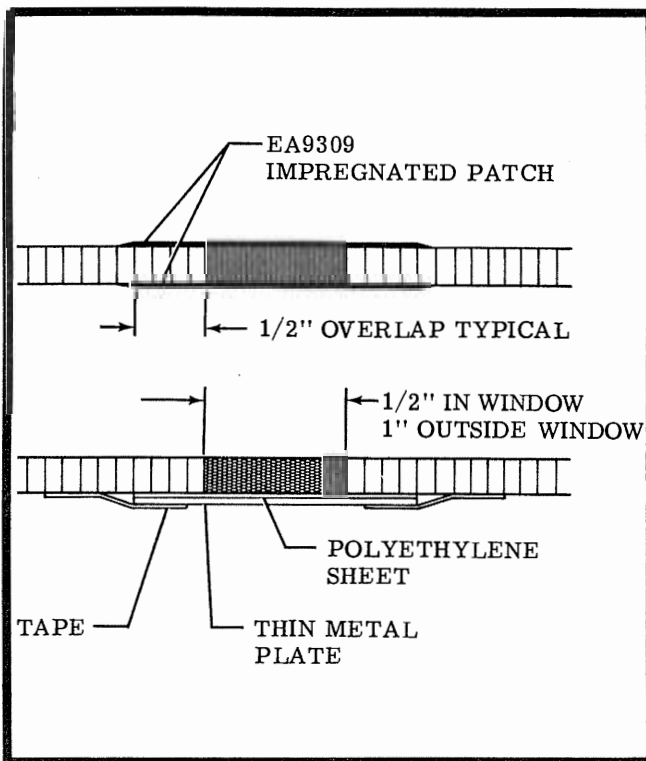


Figure 16-6A. Typical Class III Radome Repair

RAIN EROSION COATING APPLICATION (RADOME)

Rain erosion resistant coatings shall be repaired if worn away, blistered, peeled or otherwise defective. If the area is exposed to spilled or leaked oil, use only the epoxy enamel finish described later in this paragraph. Normal rain erosion coating specifications are:

MIL-C-7439, Coating Systems, Elastomeric, Rain Erosion Resistant and Rain Erosion Resistant with Anti-Static Treatment for Exterior Aircraft and Missile Plastic Parts.

The repair materials are listed below, in order of their application

Primer: Bostik No. 1007, made by B. B. Chemical Co., Cambridge, Mass. Methylene-ethyl-Ketone is a suitable thinner.

Rain Erosion Resistant Coating: consists of No. 1801C Top Coat Cement and No. 983C Accelerator. Both made by Goodyear Tire and Rubber Co., Akron, Ohio.

The above items (Primer, Top Coat Cement and Accelerator) are included in Goodyear Kit No. 23-56 for brush application. For spraying, use Kit No. 23-56S which includes also:

No. 1803C Diluting Solvent.

Use Goodyear Kit No. 23-57 (brushing) or No. 23-57S (spraying, and including No. 1803 Diluting Solvent). Both kits differ from Nos. 23-56 and 23-56S in that they include:

Anti-Static Surfacer Cement No. 1804C. No. 983C Accelerator is used with this material. Made by Goodyear Tire and Rubber Co., Akron, Ohio.

GACO N-79 Rain Erosion Coating Kit may be used as an alternate.

Components

N-700-9 Top Coat Cement
 N-300-9 Accelerator
 N-450-9 Thinner (MEK or Toluene may be used as alternates)
 N-81 Anti-Static, Gates Engineering, P. O. Box 1711, Wilmington, Delaware.

REPAIR OF PLASTIC WINDOWS.

NOTE

No repairs of any kind are recommended on highly stressed or compounded curves where the repair would be likely to affect the pilot's or copilot's field of vision.

a. When a crack appears in a panel, drill a hole at each end of the crack to prevent further spreading. The hole should be approximately 1/8 inch in diameter depending on the length of the crack and the thickness of the material.

b. A temporary repair can be made on a curved surface by placing fabric patches over the affected areas. Secure the patches with airplane dope, Specification No. MIL-D-5549; or Lacquer, Specification No. MIL-L-7178. Lacquer Thinner, Specification No. MIL-T-6094 can also be used to secure the patch temporarily.

c. A temporary repair can be made by drilling small holes along sides of the crack 1/4 to 1/8 inch apart and lacing the edges together with soft wire. Small stranded antenna wire makes a good temporary measure only, and as soon as facilities are available, the panel should be replaced.

CAUTION

If temporary repairs are made, aircraft must be operated in unpressurized mode until replacement of window can be made.

d. Scratches on transparent plastic surfaces can be removed by hand-sanding operations followed by buffing and polishing, provided subsequent instructions are followed carefully. Wrap a piece of No. 320 (or finer) sandpaper or abrasive cloth around a rubber pad or wood block. Rub the surface around the scratch

with a circular motion, keeping the abrasive constantly wet with clean water to prevent scratching the surface further. Use minimum pressure and cover an area large enough to prevent the formation of a "bull's eye" or other optical distortions.

CAUTION

Do not use a coarse grade of abrasive; No. 320 is the maximum coarseness permitted.

e. Continue the sanding operating, using progressively finer grade abrasives.

f. When the scratches have been removed, wash the area thoroughly with clean water to remove all the gritty particles. The entire sanded area will be clouded with minute scratches which must be removed to restore transparency.

g. Apply fresh tallow and buffing compound to a motor-driven buffing wheel. Hold the wheel against the plastic surface, moving it constantly over the damaged area until the cloudy appearance disappears. A 2000-foot-per-minute surface speed is recommended to prevent heating, distortion or burns.

NOTE

Polishing can be accomplished by hand but it will require a considerably longer period of time to attain the same result as produced by buffing wheel.

h. When buffing is finished, wash the area thoroughly and dry it with a soft flannel cloth. Allow the surface to cool and inspect the area to determine if full transparency has been restored. Then apply a thin coat of hard wax and polish the surface lightly with a clean flannel cloth.

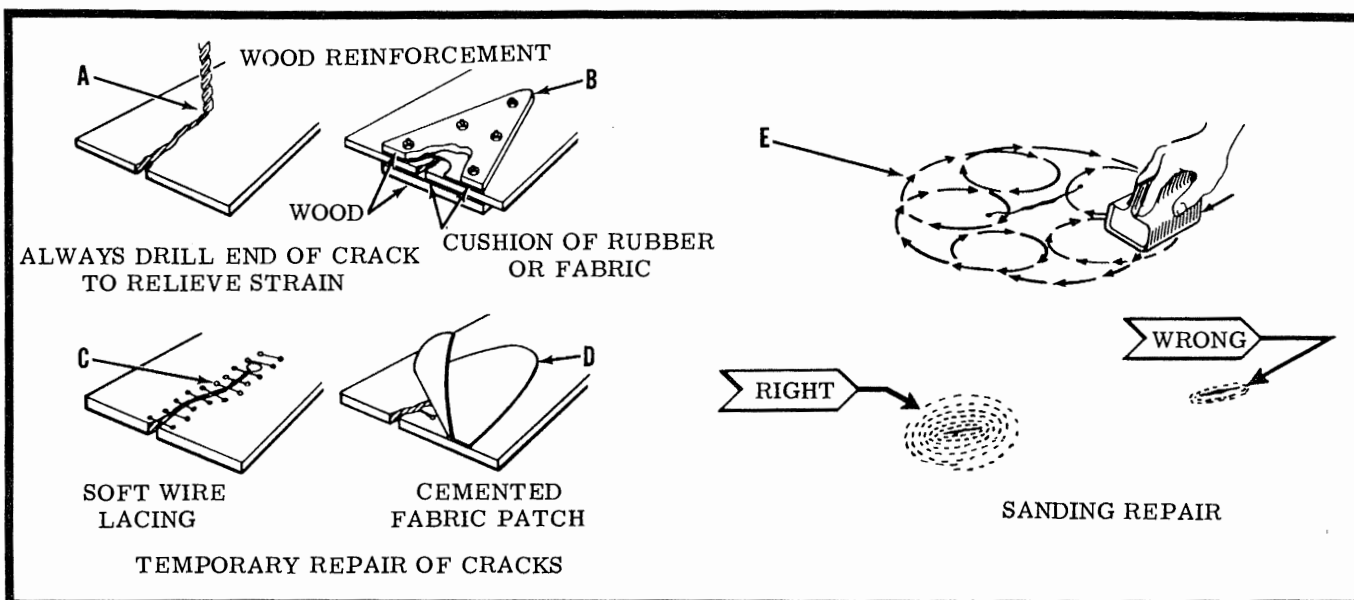
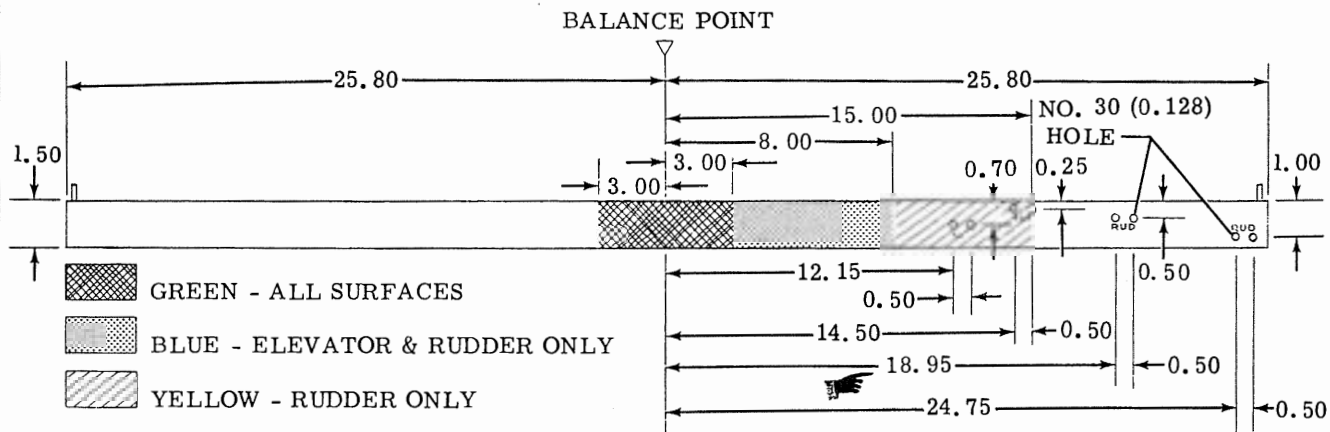
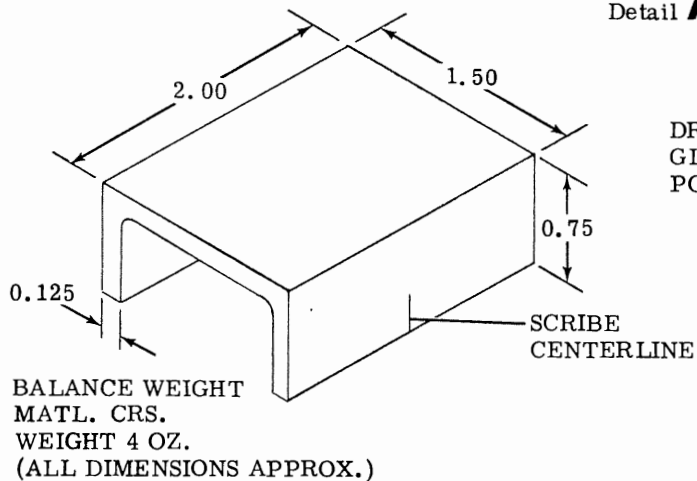


Figure 16-7. Plastic Window Repairs

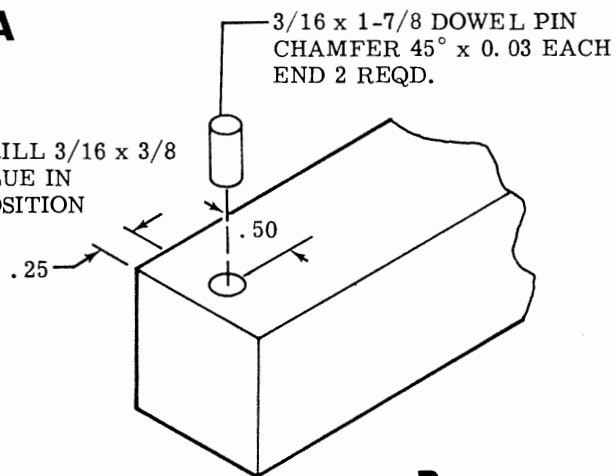


BEAM 1.0 x 1.50 x 51.60
WOOD

Detail A

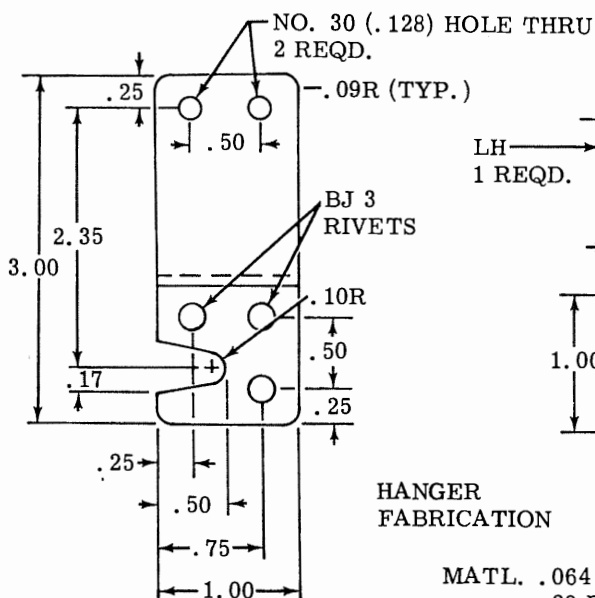


DRILL 3/16 x 3/8
GLUE IN
POSITION



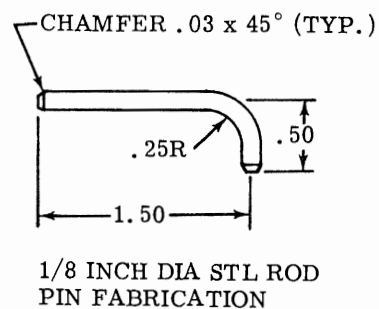
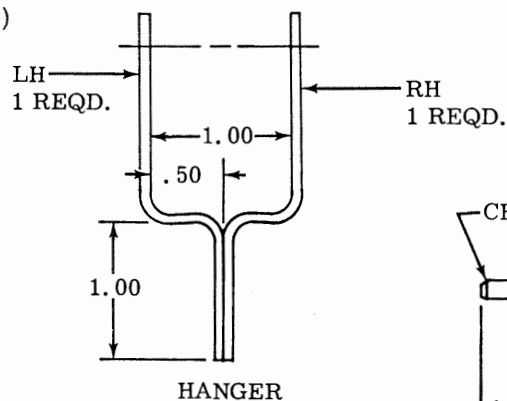
Detail B

TYPICAL DOWEL INSTALLATION



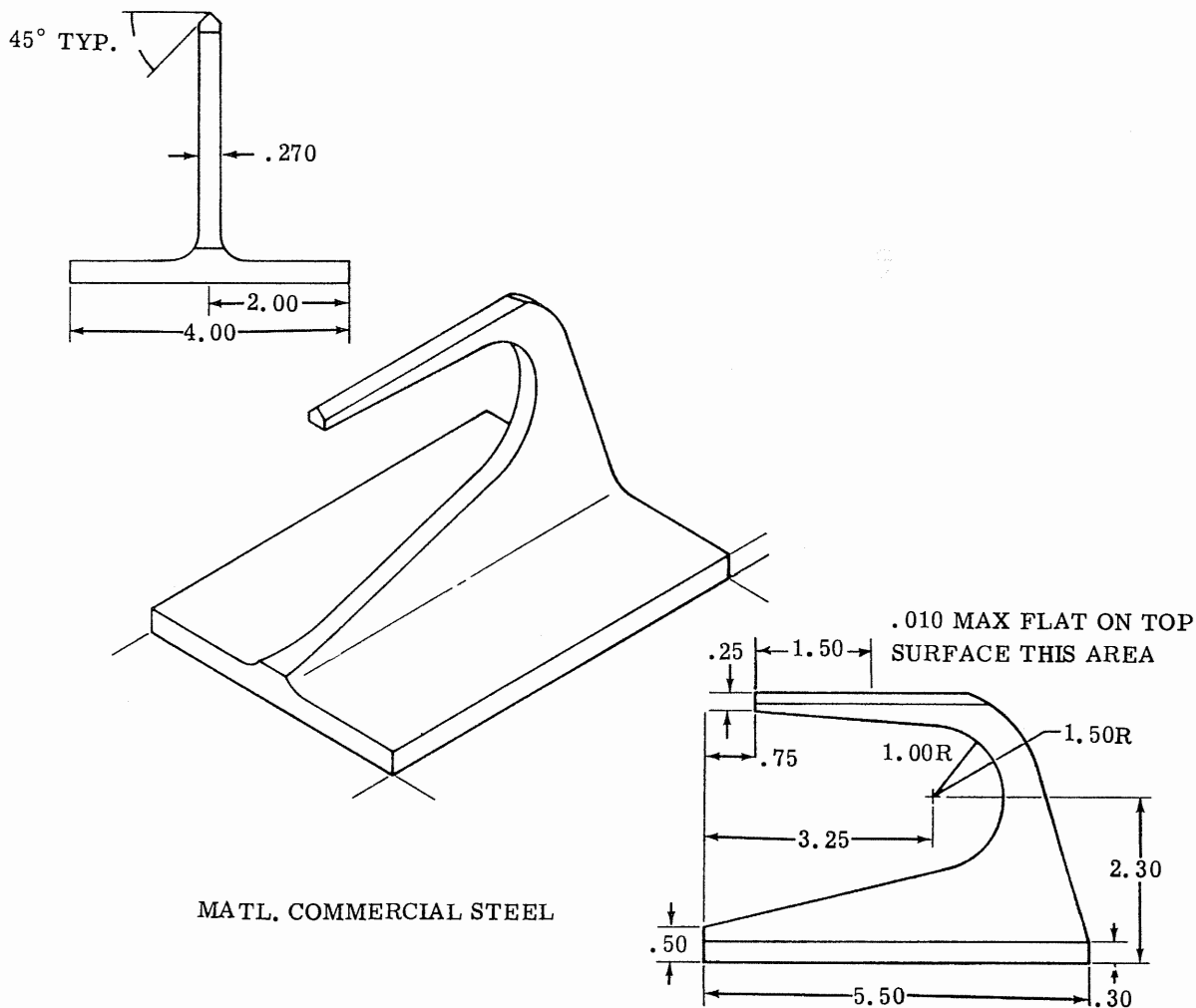
Detail C

MATL. .064 2024-T42 CLAD
.20 BEND RADIUS



Detail D

Figure 16-8. Balancing Fixture Fabrication. (Sheet 1 of 2)



FABRICATION OF BALANCE FIXTURE.

Beam.

- Fabricate beam from wood (yellow pine) or equivalent, one by one and one-half inch stock.
- Locate center of beam. (Should be 25.80 inches from end.)
- Locate and drill 3/16 (.1875) x 3/8 (.375) holes .25 in from each end of beam.
- (See Detail B.) Fabricate dowel and install in beam using glue for security.
- Measuring from the center point of beam or 25.80 inch Station, locate and drill No. 30 (.128) diameter holes for aileron, elevator and rudder hanger locations.
- Mark off and paint the beam as indicated for aileron, rudder and elevator positions.

Hanger.

- Fabricate right and left hanger halves per Detail C.

- Assemble the hanger using three MS20470AD3-5 rivets.

Pin.

- Fabricate pin from 1/8 stl. rod per Detail D.

Balance Weight.

- Fabricate balance weight per Detail A.

NOTE

If necessary, grind or file balance weight to obtain four (4) ounce weight. Scribe center-line after fabrication.

Mandrel.

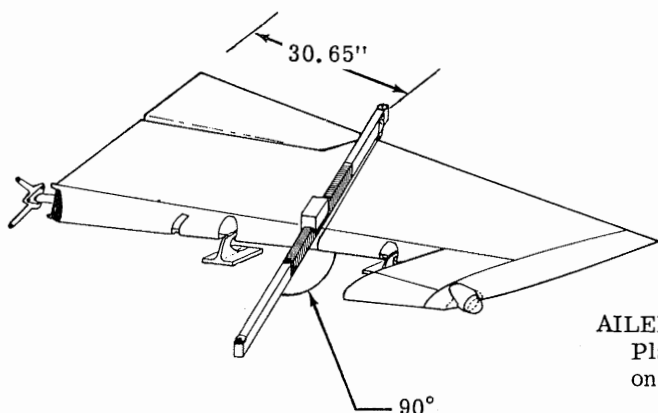
- Fabricate mandrel in accordance with Detail E.

NOTE

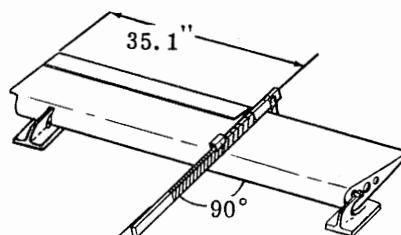
Mandrel may be fabricated from any suitable material.

Figure 16-8. Balancing Fixture Fabrication. (Sheet 2 of 2)

LEFT HAND SIDE SURFACE DOWN



LOWER SURFACE DOWN

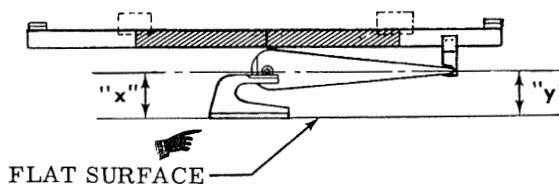
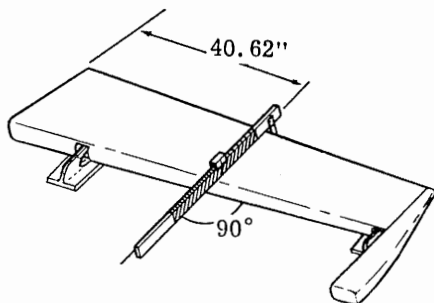


AILERON:

Place balanced fixture (refer to balancing procedure) on first rib line outboard of trim tab on the aileron

RUDDER:

Place balanced fixture (refer to balancing procedures) on first rib line above the trim tab on the rudder



TYPICAL BALANCED CONTROL

NOTE

In a 100% static balanced condition dimensions x and y will be the same.

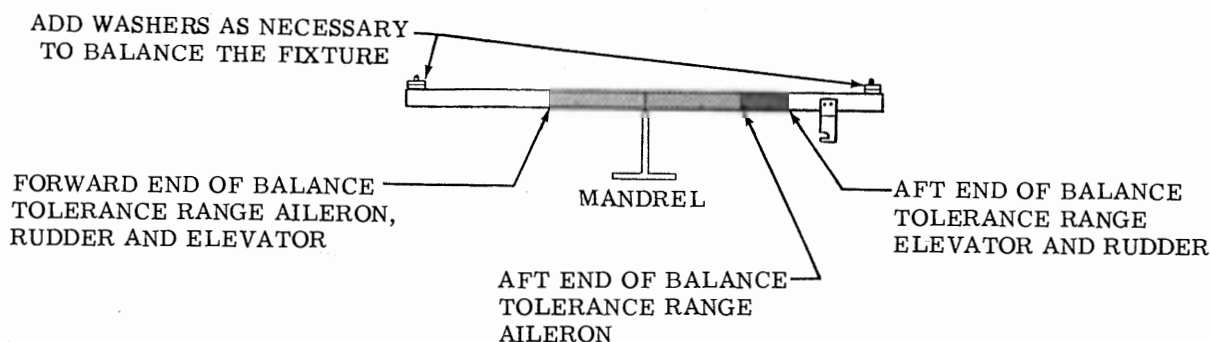
LOWER SURFACE DOWN

ELEVATOR:

Place balanced fixture (refer to balancing procedures) on first rib line outboard of trim tab on the elevator

SURFACE	BALANCE TOLERANCE
AILERON	+.75 TO -.75 in. lb.
ELEVATOR	+.75 TO -2.00 in. lb.
RUDDER	+.75 TO -3.75 in. lb.

Figure 16-9. Static Balancing Aileron, Rudder and Elevator (Sheet 1 of 4)

**BALANCING PROCEDURES.**

It is recommended that control surface balancing be accomplished in a draft-free room/area using the balancing equipment fabricated from instructions contained in figure 16-8.

NOTE

Be certain control surface weights are installed, surfaces are clean, all foreign matter inside control surfaces removed, painted and hinge bolts installed. Surfaces which have trim tabs incorporated must have the tab secured in a streamlined position and push-pull rods, with attaching hardware on the trim tab, and installed before starting balancing procedures.

BALANCING FIXTURE.

- Install hanger assembly in the appropriate position for the surface being balanced.
- Place mandrel on a table or other suitable flat surface and center balancing beam on mandrel at the centerline of bar.
- Add washers to dowel pins until a balanced condition is obtained.

NOTE

When balancing fixture is in balance, it must assume a position parallel to the work surface.

RUDDER BALANCING PROCEDURE.

- Remove rudder from aircraft in accordance with Section 7.
- Tape rotating beacon wire along the leading edge of the rudder.
- Insert hinge bolts in place and position rudder on mandrels with bolts resting on the knife edge.

NOTE

Make sure rudder control surface has freedom of movement and does not drag on mandrels and bonding wires do not interfere with movement of control.

- Secure the rudder trim tab in a streamlined position and install associated hardware.
- Locate the position for balancing fixture on the rudder and place balancing beam in position.

NOTE

If balancing beam position falls on a rivet line, it will be necessary to move the beam to one side to provide a flat surface for the balancing beam. The balancing beam must be perpendicular to the hinge centerline and the trailing edge of the rudder control surface must be firmly seated in the cutout of the hanger.

- If the rudder assumes position parallel with base of mandrel and the balance weight is within the Green, Blue and Yellow range, the rudder is statically balanced.
- If rudder assumes a position of trailing edge up, when balance weight is on aft end of range, rudder is overbalanced and needs weight removed.

NOTE

Remove overbalance by using a 1/2 inch drill to remove some of the weight.

- If rudder control surface assumes position of trailing edge down, when balance weight is on forward end of range, rudder surface is underbalanced and needs more balance weight added.
- The approximate amount of weight needed for underbalance may be determined by placing small amounts of loose weight in the balance weight area.
- Additional balance weight may be added by pound-

Figure 16-9. Static Balancing Aileron, Rudder and Elevator (Sheet 2 of 4)

ing lead into existing holes of weight and staking. If holes are not available to insert added weight, it will be necessary to add 2 nutplates on each side of lightening hole and add a lead bar weight secured by two bolts.

NOTE

The rudder tip and mounting screws must be installed each time the rudder is checked for balance.

- k. Install rudder in accordance with Section 7.

AILERON BALANCING PROCEDURE.

- a. Remove aileron from aircraft in accordance with Section 5. (The outboard hinge is a pin.)
- b. Balance the fixture for aileron control surface.
- c. Insert hinge bolt in place and position aileron on the mandrels with bolt and pin resting on the knife edge.

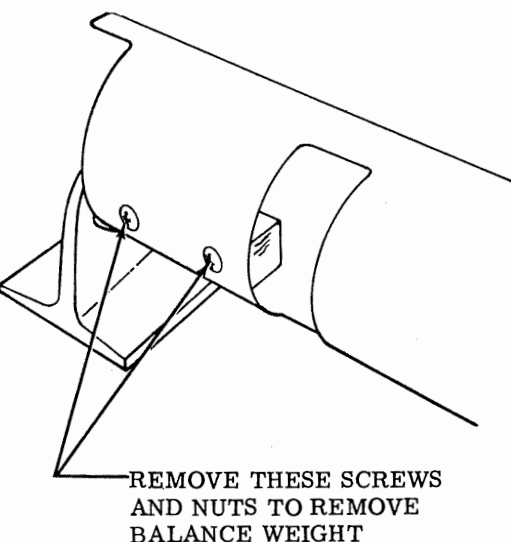
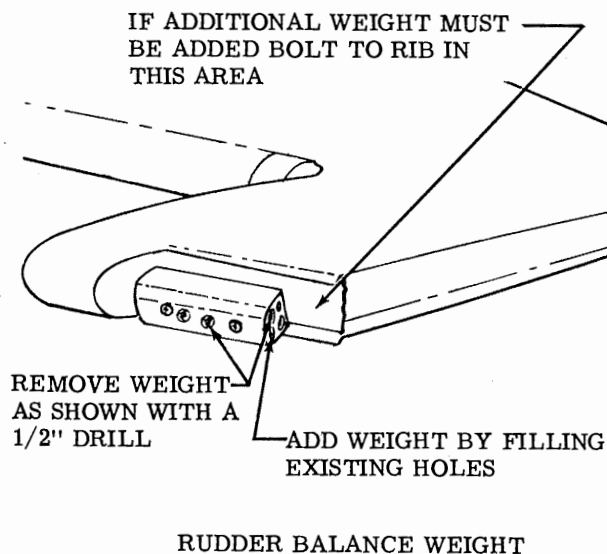
CAUTION

Be sure bolt is inserted in correct hinge location (upper hole).

NOTE

Make sure aileron control surface has freedom of movement, does not drag on mandrels and the bonding straps are free.

- d. Secure the trim tab on the left hand aileron in a streamlined position and install associated hardware.
- e. Locate the position for balancing fixture on the aileron and place balancing beam into position.



NOTE

If balancing beam position falls on a rivet line, it will be necessary to move the beam to one side to provide a flat surface for the balancing beam. The balancing beam must be perpendicular to the hinge centerline and trailing edge of the aileron control surface must be firmly seated in the cutout of the hanger.

- f. If the aileron assumes a position parallel with base of mandrel and the balance weight is within Green range, the aileron is statically balanced.
- g. If aileron assumes a position of trailing edge up, when balance weight is on aft end of range, the aileron is overbalanced and needs weight removed.

NOTE

Remove overbalance by removing weight as necessary.

- h. If the aileron assumes position of trailing edge down, when balance weight is on forward end of range, aileron is underbalanced and needs more balance weight added.
- i. The approximate amount of weight needed for underbalance may be determined by placing small amounts of loose weight in the balance weight area.
- j. Addition of balance weight may be added by inserting lead into existing holes of the weight. If holes are not available additional weight may be added by removing existing screws and installing longer screws to attach added weight.

NOTE

The aileron balance weight must be removed from the aileron in order to remove excess weight.

Figure 16-9. Static Balancing Aileron, Rudder and Elevator (Sheet 3 of 4)

CAUTION

Make certain bolts securing weight in place are tight before installing aileron on aircraft.

- k. Install aileron in accordance with Section 5.

ELEVATOR BALANCING PROCEDURE.

- a. Remove elevator in accordance with Section 6.
- b. Balance the fixture for elevator control surface.
- c. Insert hinge bolts in place and position elevator on the mandrels with bolts resting on the knife edge.

NOTE

Make sure elevator control surface has freedom of movement, does not drag on mandrels and bonding straps are free.

- d. Secure the elevator trim tab on right-hand elevator in a streamlined position and install associated hardware.
- e. Locate the position for balancing fixture on the elevator and place balancing beam into position.

NOTE

If balancing beam position falls on a rivet line it will be necessary to move the beam to one side to provide a flat surface for the balancing beam. The balancing beam must be perpendicular to the hinge centerline and trailing edge of the aileron control surface must be firmly seated in the cutout of the hanger.

- f. If the elevator assumes a position parallel with base of mandrel, and the balance weight is within the Green and Blue range, the elevator is statically balanced.

- g. If the elevator assumes a position of trailing edge up, when balance weight is on aft end of range, elevator is overbalanced and needs weight removed.

NOTE

Remove overbalance by using a 1/2 inch drill to remove some of the weight.

- h. If the elevator assumes position of trailing edge down, when balance weight is on forward end of range, elevator is underbalanced and needs more balance weight added.

- i. The approximate amount of weight needed for underbalance may be determined by placing small amounts of loose weight in the balance weight area.

- j. Additional balance weight may be added by inserting lead in existing holes of the weight. If holes are not available, additional weight may be added by bolting a lead bar in the center of existing weight.

NOTE

Each time the elevator is checked for weight and balance, the elevator tip must be installed and elevator tip screws must be in the proper location (short screws toward aft end of elevator).

- k. Install elevator in accordance with Section 6.

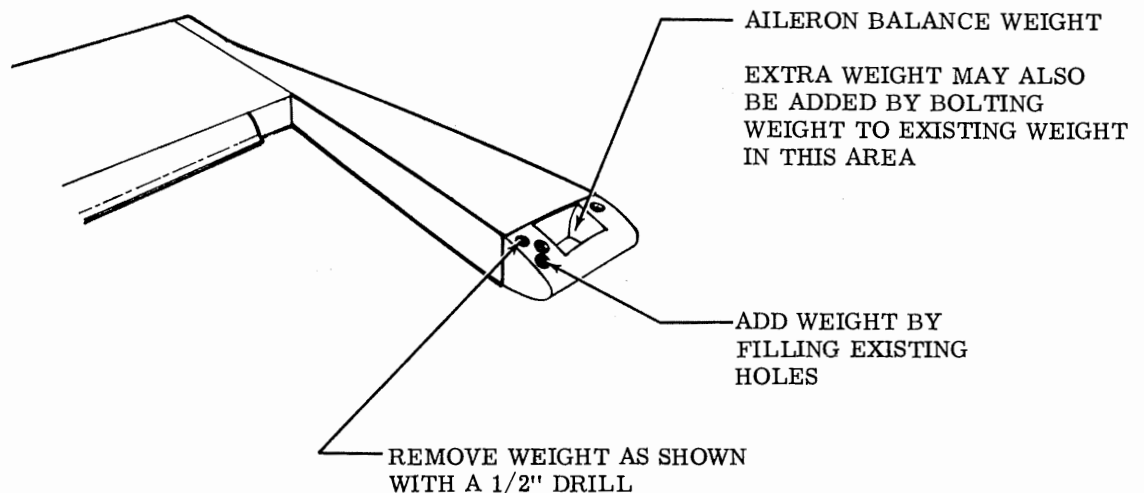
ELEVATOR BALANCE WEIGHT

Figure 16-9. Static Balancing Aileron, Rudder and Elevator (Sheet 4 of 4)

CHECKING WING TWIST AND LOCATION OF THRUST LINE. (See figure 16-10.)

a. Remove wing in accordance with wing removal procedures and place wing on suitable supports beneath the root and tip ribs.

NOTE

The wing tip tank must be removed during check.

b. Locate wing datum plane as follows:

1. Locate a line at the root rib (wing station 46.89) which is 4.515 inches up from the lower surface of the front spar, and 3.99 inches up from the lower surface of the rear spar.

2. Locate a line at the tip rib (wing station 217.66) which is 1.44 inches up from the lower surface of the front spar, and .81 inch up from the lower surface of the rear spar.

3. These two lines locate the wing datum plane, and the three degrees of twist will be present if the lines are parallel.

c. Locate the engine thrust line as follows:

1. Locate a plane which is 13.50 inches above and parallel to the wing datum plane.

2. The thrust line, which lies in this plane, is perpendicular to the front spar, and 40.135 inches outboard from the centerline of the bolt holes in the front spar fittings.

d. Install wing tip tank on wing.

e. Install wing in accordance with wing installation procedures.

SEALING PROCEDURES

The cabin area of the fuselage extending from F.S. 100.00 to F.S. 273.94 has been carefully sealed in process of manufacture. During maintenance and repair, it is necessary to maintain a good cabin seal. The following information is given to assist in the maintenance and repair of the pressurized cabin where sealing is required.

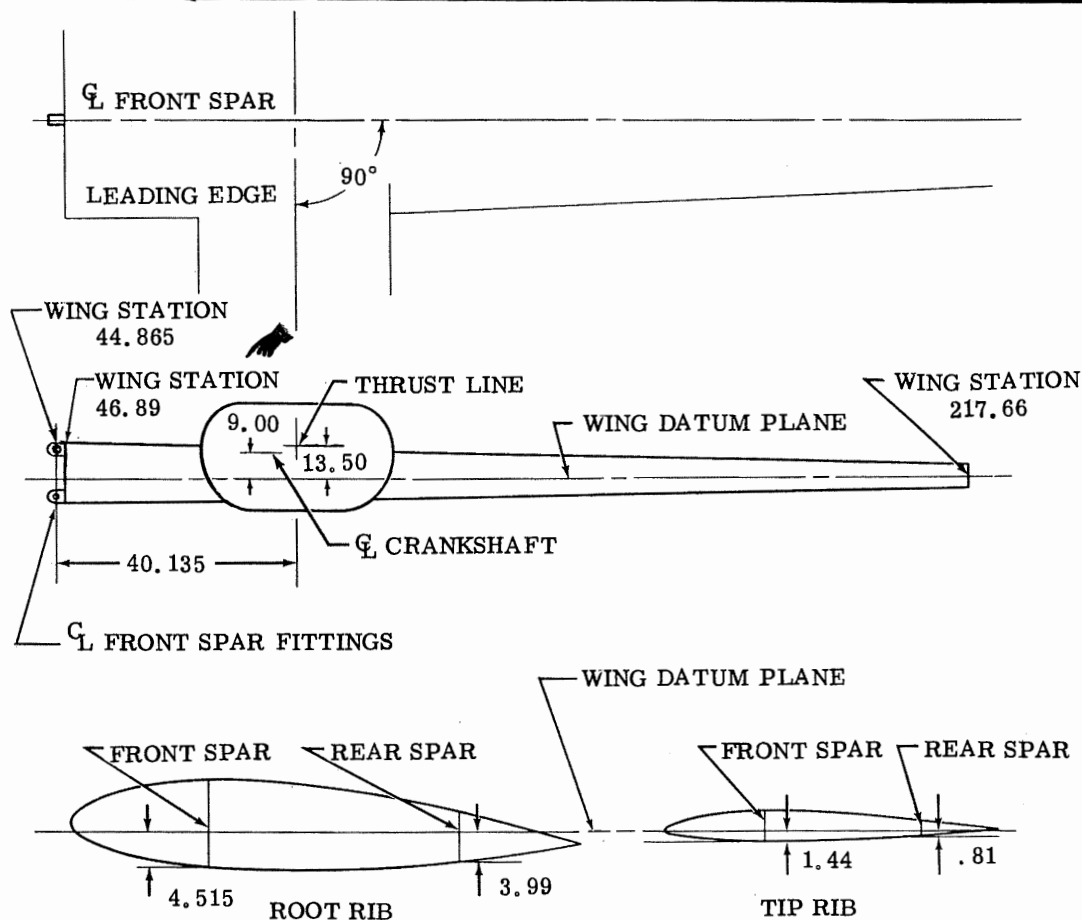


Figure 16-10. Wing Twist and Thrust Line Data

NOTES

1. In rework or repair of faulty seal, the sealant must be completely removed or notched completely in the affected area to produce a solid residual material.

2. Cutting tools should be made from material not harder than 2024T-3 aluminum. Acrylic plastic is preferred. Steel cutting tools should never be used.

3. Sealant material should not be applied when the temperature of the structure is below 60°F.

WARNING

Sealing compounds are highly inflammable. Exercise precautions to prevent fire or explosion. These materials are toxic and should be applied in a well ventilated area.

Sealant Materials

The following sealants are recommended:

- a. Faying sealants.
 - 1. EC1675 Class A Minnesota Mining and Manufacturing Co.
 - 2. Pro-Seal 890 Class A Coast Pro-Seal Manufacturing Co.
 - 3. PR1422 Class A Products Research and Chemical Corp.
- b. Fillet sealant.
 - 1. EC1675 Class B Minnesota Mining and Manufacturing Co.
 - 2. Pro-Seal 890 Class B Coast Pro-Seal Manufacturing Co.
 - 3. PR1422 Class B Products Research and Chemical Corp.
- c. Hole filling compound.
 - 1. Pro-Seal 567 Coast Pro-Seal Manufacturing Co.
- d. Electrical connector and wire bundle sealing.
 - 1. Pro-Seal 727 Coast Pro-Seal Manufacturing Co.

NOTE

Class A - Indicates brushable material.
Class B - Indicates filleting or injection material.

Cleaning Materials.

The following cleaners are recommended:

- a. Electrical.
 - 1. Aliphatic Naptha (TT-N-95) Type II.
 - 2. Mozels Cleaning Solvent #18 Mozell Chemical Co.
- b. Structural.
 - 1. Methyl Ethyl Ketone (MEK) Cleaning Solvent.

Equipment.

- a. Clean rags.
- b. Stiff bristle brushes (not nylon).
- c. Sealant gun (Pyle #950 or equivalent). Pyle Industries Inc., Southfield, Michigan.

- d. Polyethylene nozzles for sealant gun.
- e. Polyethylene cartridges for sealant gun.
- f. Rubber gloves.

Cleaning.

- a. Clean the surface immediately prior to the application of the sealing compound to insure the surface is free of dirt, grease and chips.
- b. Metal cleaning should be done with a clean, soft, lintless rag moistened with Methyl Ethyl Ketone (MEK). The solvent should always be poured on the cloth to refrain from contamination of the solvent. The solvent should never be poured or sprayed on the structure due to possibility of running between layers of structure and creeping out again after cleaning, bringing contamination to surface to which the sealant is to be applied.
- c. Immediately dry the area thus cleaned with a dry, clean, lintless rag before the solvent has evaporated from the surface.
- d. If primer is removed during cleaning, it should be touched up after all sealing operations are complete.
- e. Always clean an area wider than the width of the finally applied sealant.
- f. Cleaned areas should be handled with care to prevent surface contamination.

Application Sequence.

In order to accomplish an adequate seal in an efficient manner, the following sealant operations shall be accomplished in the following order:

- a. Faying surface sealing as required on assembly.
- b. Fill holes and slots as required.
- c. Fill joggles and confined holes by injection as required.
- d. Fillet seal seams and joints as required.
- e. Seal fasteners as required.
- f. Faying surface sealing of close-out panels as required.

Mixing Two Part Sealants.

- a. The base compound should be matched with the appropriate batch numbered accelerator.
- b. The two components must be weighed in proportions as marked on the container within a tolerance of $\pm 2\%$.
- c. If the entire preweighed kit is to be used, it is not necessary to weigh out the accelerator and base compound. Simply mix entire amounts of the preweighed compounds in accordance with instructions outlined.
- d. The two components should be mixed thoroughly so that the complete mixture is of uniform color.

NOTE

Care should be exercised to preclude the trapping of air in the sealing compound during the mixing procedure.

e. Mixed compound has a limited work life, so only enough should be mixed to satisfy the immediate requirement.

Application of Sealing Procedures.

Faying surface sealing.

a. Using sealant EC1675, Class A, apply to one surface with a brush, spatula or roller. Spread evenly to approximately 1/32 inch thick over the entire faying surface. The application should be accomplished with the sealing compound flowed on with a minimum of stroking so as to prevent formation of bubbles.

b. Avoid using excess amounts of sealing compound.

c. When the surfaces are fastened together, any extruded sealant should be faired out with a fairing tool, leaving a smooth fillet along the joint.

d. All permanent fasteners must be installed within the work life of the sealant. Sealant extruded through hole by rivet must be wiped from end of rivet before bucking. If permanent fasteners cannot be installed, use temporary fasteners and clamps as necessary to hold the parts firmly together until the sealant has cured. Remove individual temporary fasteners and replace immediately with permanent fasteners. Fresh sealant must be applied to the fastener.

NOTE

Any pressure testing required should not be done before the sealing compound has completely cured.

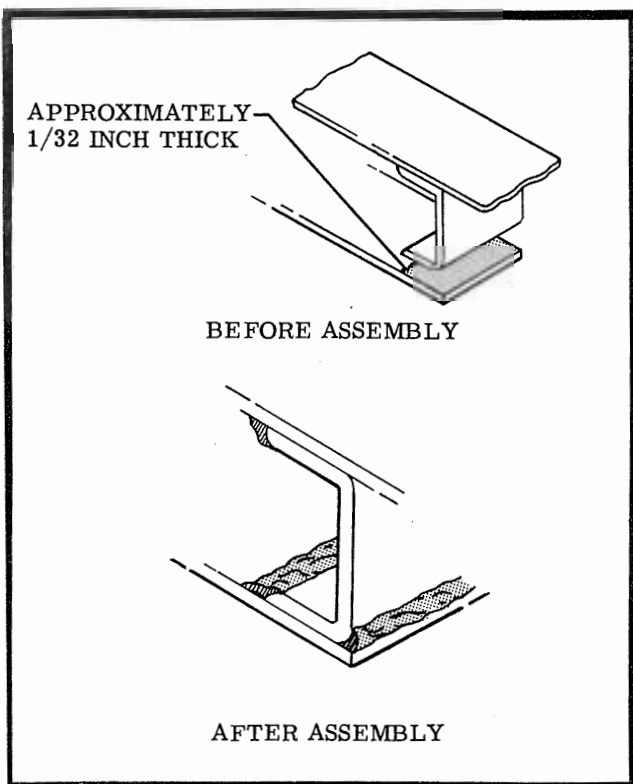


Figure 16-11. Fay Surface Sealing

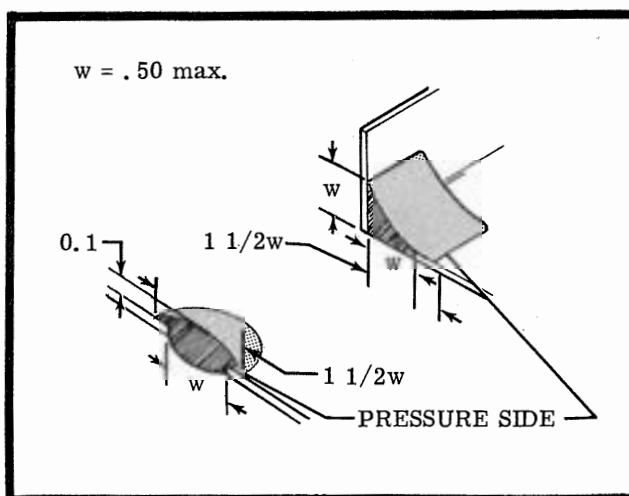


Figure 16-12. Hole Filling

Hole Filling.

a. All tool and coordination holes through a pressure seal area should be plugged with soft rivets and overcoated with EC1675, Class A sealant.

b. Holes, gaps and other cavities that cannot be filled with one application of sealant should be filled with a void filling compound. Pro-Seal 567 is preferred. The compound should then be overcoated with sealant.

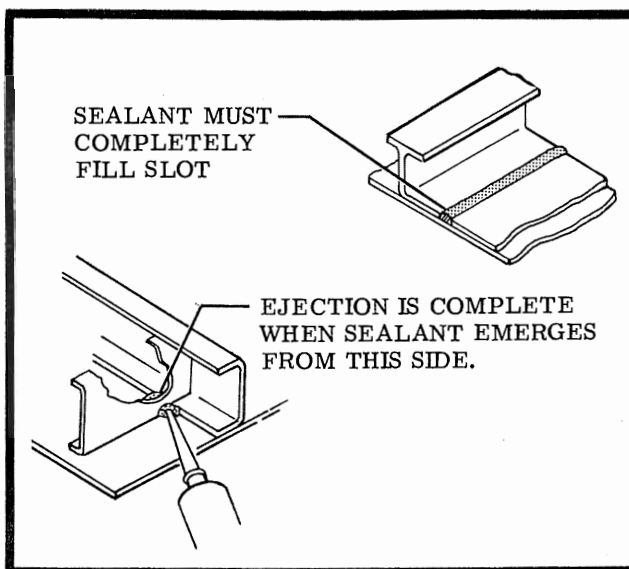


Figure 16-13. Injection Sealing

Injection Sealing.

a. Injection seal may be applied to provide continuity of seals where fillet seals are interrupted by holes, joggles or structure. Force EC1675, Class B sealant into one end of the cavity or injection hole, if provided, with a sealing gun until the sealant emerges from a prescribed opening for continuity of seal.

b. When a seal is made at the bottom of a slot, the sealant should be applied so as to fill and have a continuous contact with the bottom and sides of the slot.

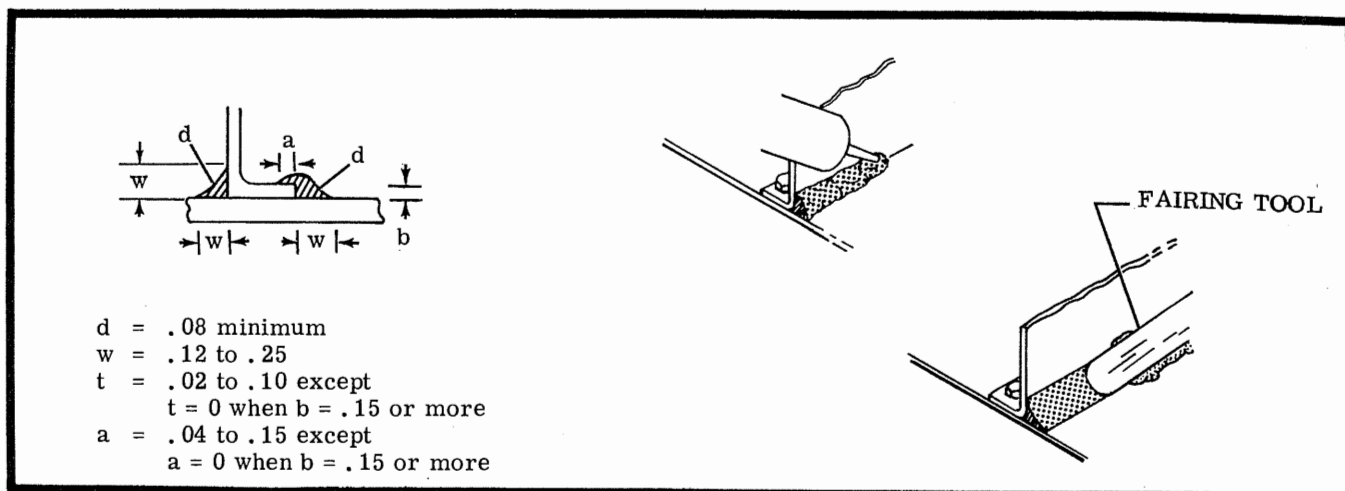


Figure 16-14. Fillet Sealing

Fillet Sealing.

a. Fillet sealing should be done with EC1675, Class B sealant, using a sealing gun for application. The nozzle tip should be pointed into the seam and maintained nearly perpendicular to the line of travel. A bead of sealant will be forced ahead of the nozzle tip.

b. Fillets may be worked into the surface with fairing tools or gun tip.

c. Fillet shapes and dimensions should conform to dimensions given in figure 16-14 as near as possible.

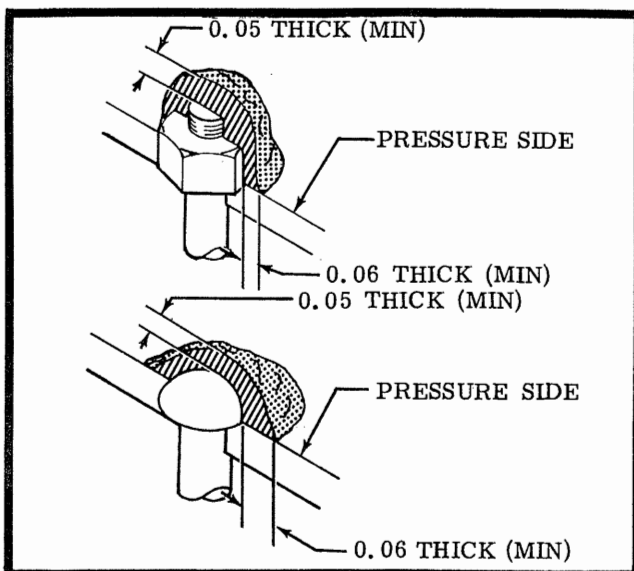


Figure 16-15. Fastener Sealing

Fastener Sealing.

a. Fasteners installed through a faying surface within the work life of the sealant need no further sealing.

b. Fasteners installed through a faying plane where no faying surface sealant is used should be sealed by one of the following methods:

1. Apply EC1675, Class A sealant to the fastener or hole on installation.
2. Brush the fastener with sealant after installation.

Window Sealing.

a. Apply masking tape to window and outside mating skin or fairing. If window is already masked, or otherwise protected, peel off the protective coating in areas to be in contact with the sealant.

b. Clean both surfaces thoroughly. Acrylic materials should be cleaned with Aliphatic Naptha (TT-N-95, Type II) and a clean lint-free cloth.

NOTE

Do not use ketone or any cleaner that may cause crazing of the acrylic type glass.

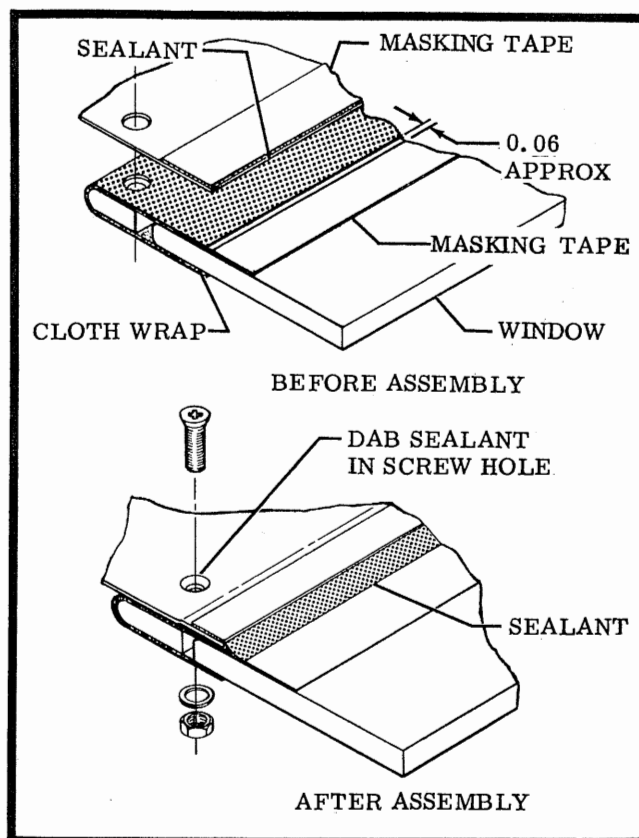


Figure 16-16. Window Sealing

CAUTION

Windows are of acrylic materials and must be sealed only with EC1675, Class B sealant with NONCRAZING accelerator.

- c. Apply sealant to surfaces as required, consistent with the type of sealing.
- d. Assemble mating surfaces allowing the sealant to extrude out the edge of the skin or fairing. Complete assembly using the appropriate fasteners and dabbing sealant into the dimpled or countersunk hole.
- e. Fair extruded sealant over cloth wrap and over edge of masking tape.
- f. After sealant is cured, remove masking tape.

Electrical Sealing.

When the wire bundles are continuous and pass through a pressurized bulkhead, they should be sealed in accordance with one of the following alternate methods using the S45 nylon seal fitting.

Injection Method.

- a. Clean the metal area where the seal fitting will seat. Clean the wires and seal fittings with Mozel solvent #18.
- b. Pass the wire bundle through the bulkhead cutout and secure, leaving approximately two inches of slack.
- c. Bundle ties must not be placed within six inches of the seal assembly to facilitate penetration of sealant around individual wires.
- d. Place the seal halves around the wire bundle on the pressure side and position in bulkhead cutout.
- e. Wrap several turns of masking tape around the seal assembly ends and the wire bundle to center the bundle and retain the sealant when applied.
- f. Secure the seal assembly to the bulkhead with the required fasteners.
- g. Puncture the tape over the injection hole in the fitting.
- h. Injection sealant should be Pro-seal 727 and should be used toward the beginning of its work

life (freshly mixed) to obtain a good flow throughout the fitting and between the wires leaving no voids.

- i. Inject sealant using a sealant gun at a pressure of approximately 100 psi until the sealant, without visible evidence of entrapped air, emerges from both notches in the outer periphery of the seal assembly mounting flanges.
- j. Remove excess sealant which extrudes from the seal assembly mounting flanges.
- k. Remove the masking tape after the sealant has cured.

Pre-Pack Method.

- a. Accomplish steps a through d of injection method.
- b. Place seal fitting halves around the wire bundle on the pressure side of the bulkhead.
- c. Wrap several turns of masking tape around the seal assembly on the far end only to center the bundle and retain the sealant when applied.
- d. Hold the seal assembly in a vertical position with the open end up and inject sealant in around the wires. Remove and reinject the nozzle at several locations within and around the bundle to fill all the voids between the wires and around the wires and the seal assembly.
- e. Wrap the open end of the seal assembly with masking tape to center the bundle and retain the sealant.
- f. Lay a heavy bead of sealant within the flange of the fitting so that when placed against the bulkhead, some would be extruded between the fitting and bulkhead.
- g. Position fitting in the cutout and secure with the required fasteners.
- h. Remove any excessive sealant which extrudes from the seal assembly mounting flanges.

Adding Additional Wires to Continuous Bundle.

When additional wires need to be added to a bundle which has been installed and sealed, one of the following procedures may be used:

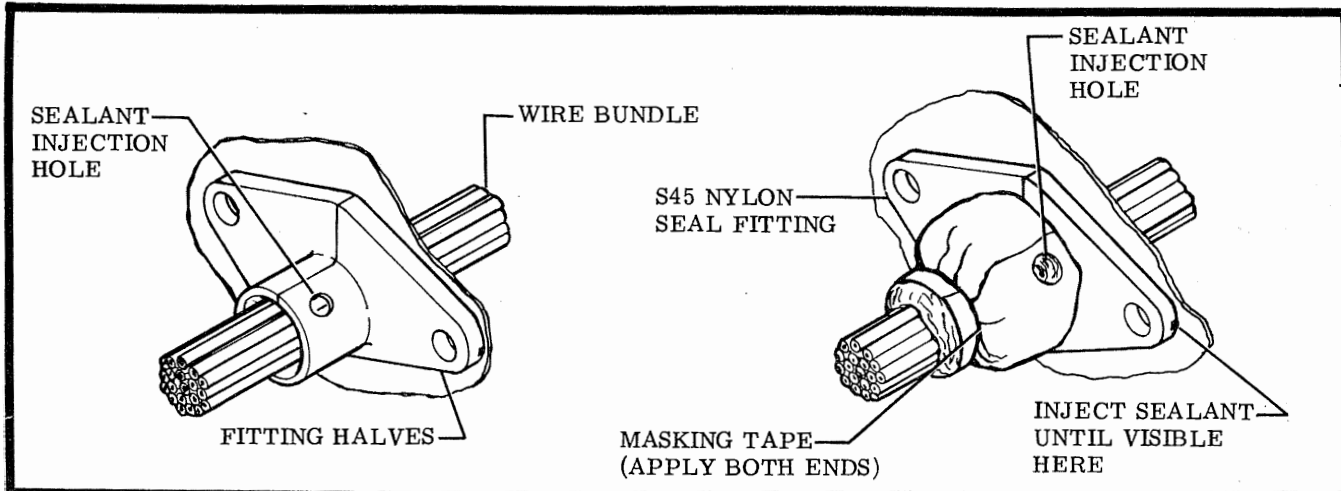
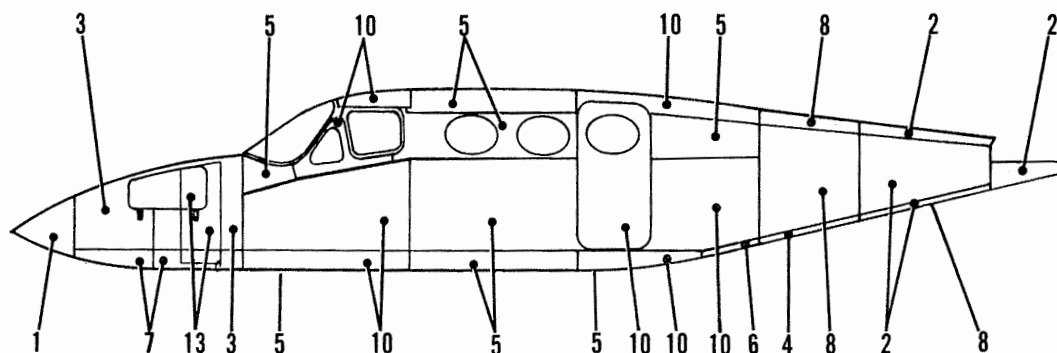
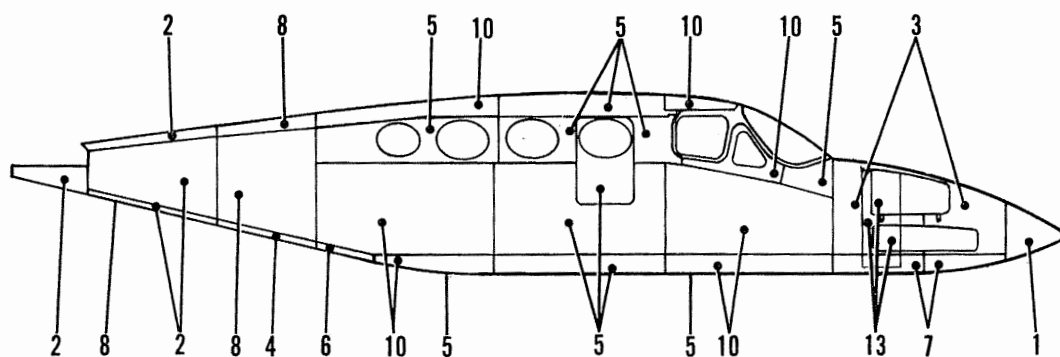


Figure 16-17. Electrical Sealing

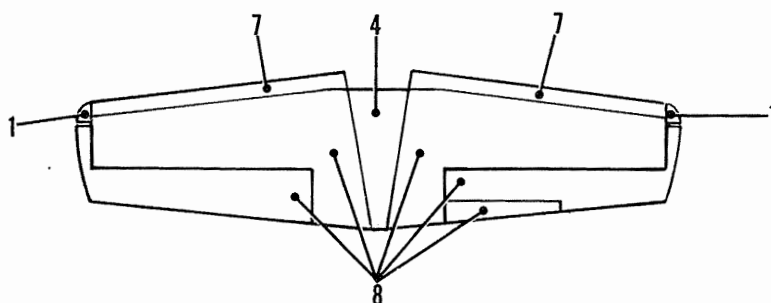
- a. Filler rods may have been added during manufacture to accommodate future wire installations. If so, remove as many filler rods as necessary to install the required wires. Several wires can be added through the same hole, but room must be retained to inject sealant around the wires. Remove the filler rods by pulling straight from the hole with pliers.
- b. Route and connect the wires prior to sealing.
- c. Seal each cavity by injecting Pro-seal 727 sealing compound completely around the wires in the cavity.
- d. Retie any remaining filler rods to the wire bundle on each side of the seal fitting approximately 1 inch from the end of the rods.
- e. When there are no filler rods, it is necessary to remove the seal assembly from the structure by prying loose at the seal assembly mounting flanges.
- f. Remove and discard the old seal fitting and remove all the original sealing material from the wires and structure. Care must be taken to avoid damage to the wire insulation.
- g. Assemble and reseal the assembly in accordance with the appropriate methods.



FUSELAGE LEFT SIDE

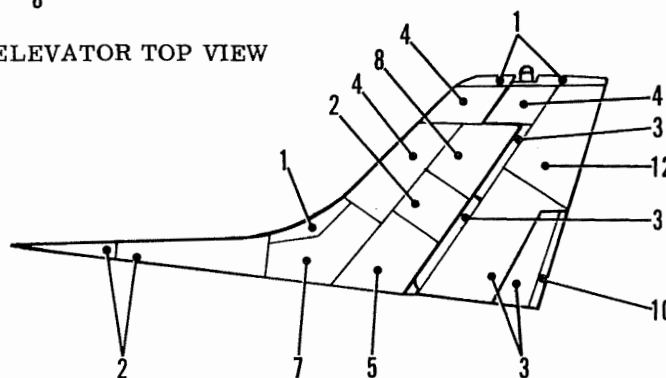


FUSELAGE RIGHT SIDE



STABILIZER & ELEVATOR TOP VIEW

1. FIBERGLASS
2. .020 T2024 T3 ALCLAD
3. .020 T2024 T42 ALCLAD
4. .025 T2024 T3 ALCLAD
5. .032 T2024 T3 ALCLAD
6. .040 T2024 T42 ALCLAD
7. .025 T2024 T42 ALCLAD
8. .016 T2024 T3 ALCLAD
9. .040 T2024 T3 ALCLAD
10. .032 T2024 T42 ALCLAD
11. .040 T2024 T42 ALCLAD
12. .016 T2024 T42 ALCLAD
13. Polycarbonate
(421A0001 AND ON)



FIN & RUDDER LEFT SIDE

Figure 16-18. Fuselage and Empennage Skin

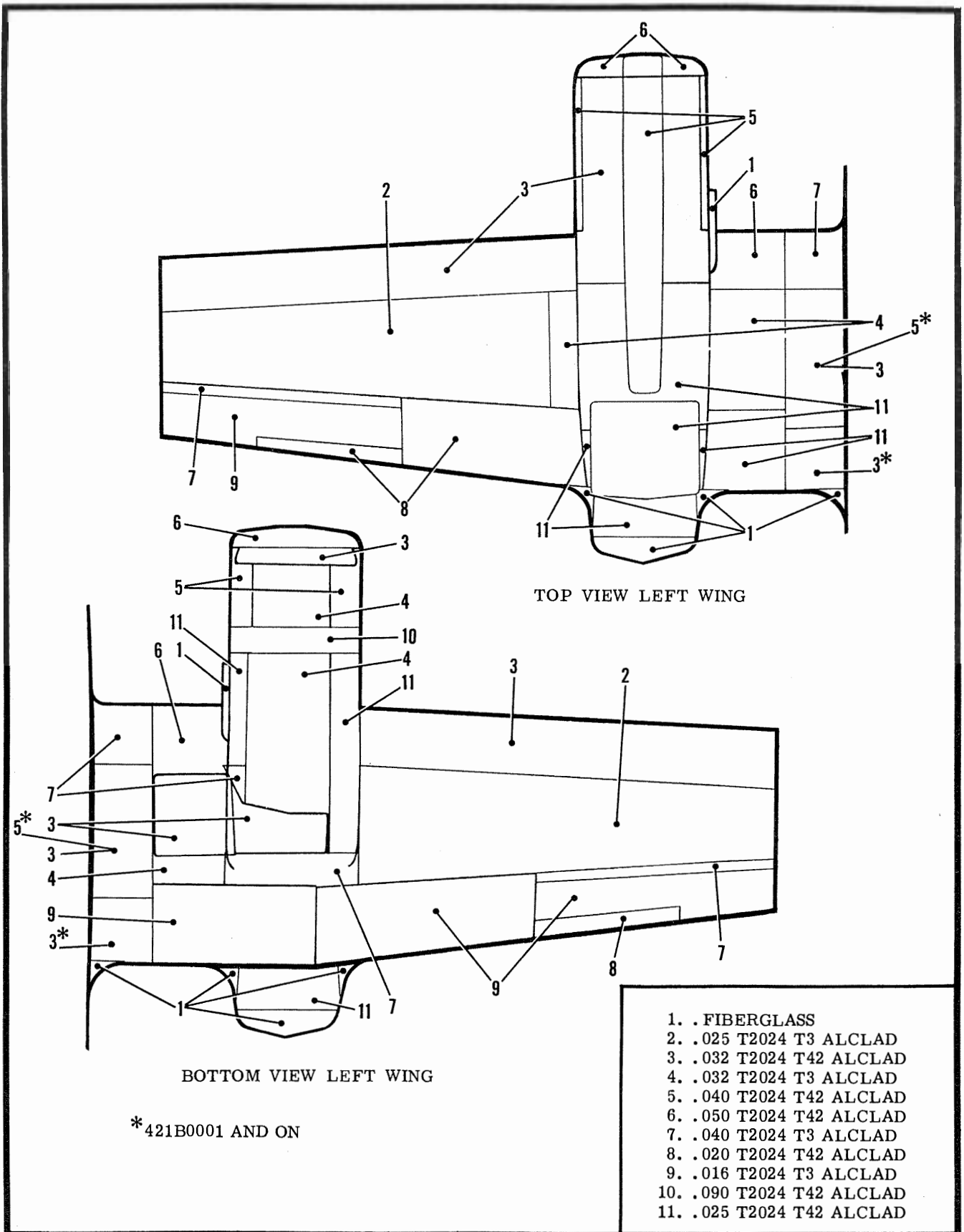
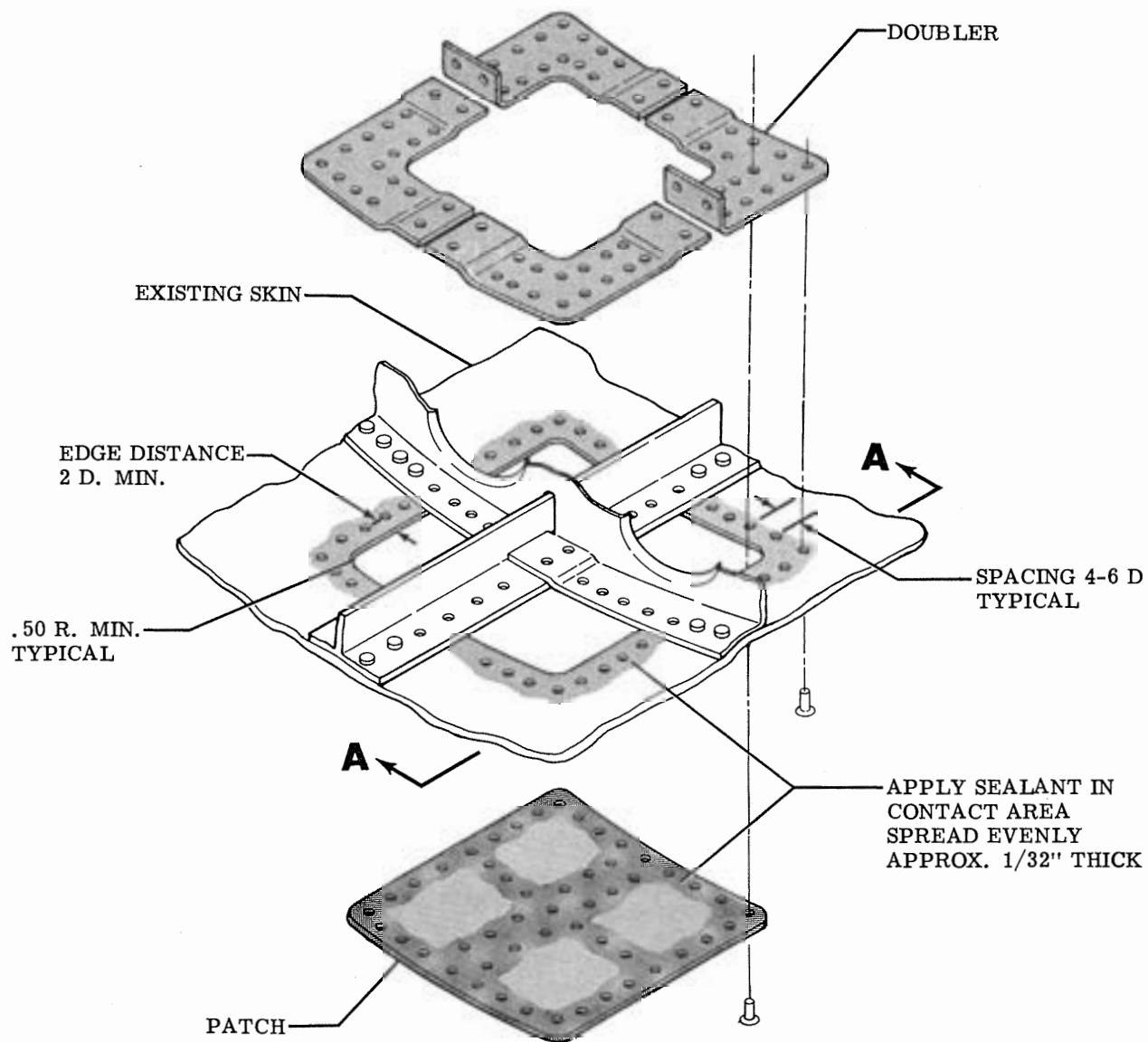


Figure 16-19. Wing Skin



-  ORIGINAL PARTS
-  REPAIR PARTS
-  REPAIR PARTS IN CROSS SECTION

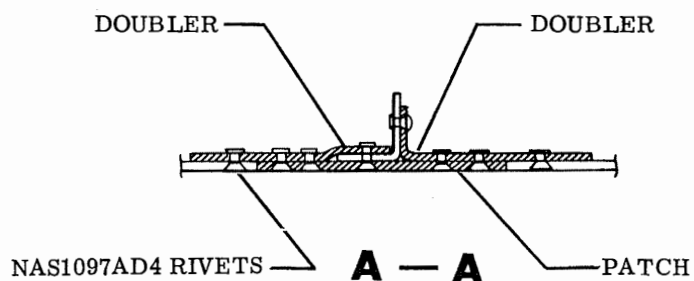


Figure 16-20. Over Structure Repair of Pressure Cabin

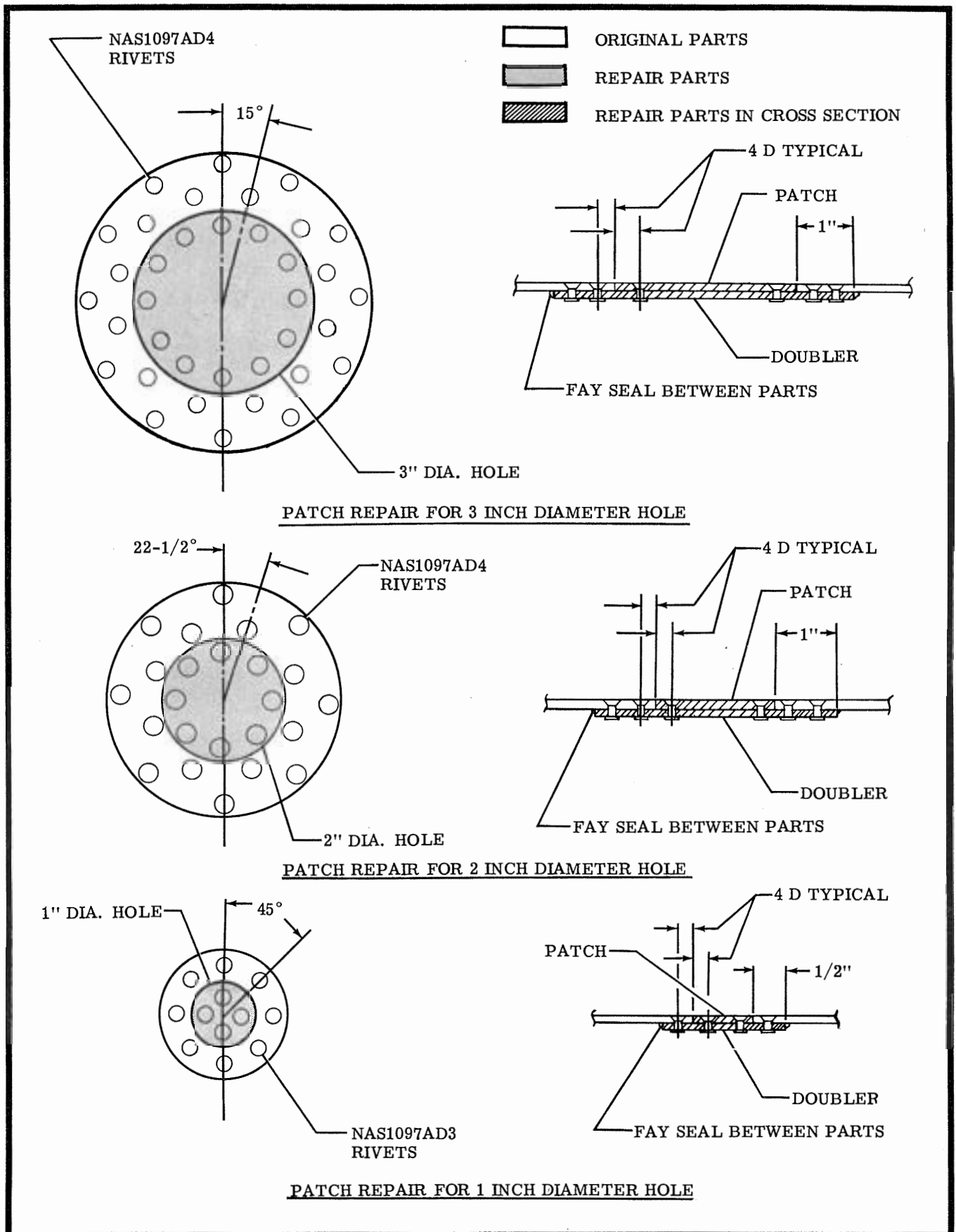


Figure 16-21. Typical Circular Hole Skin Repair in Pressure Cabin

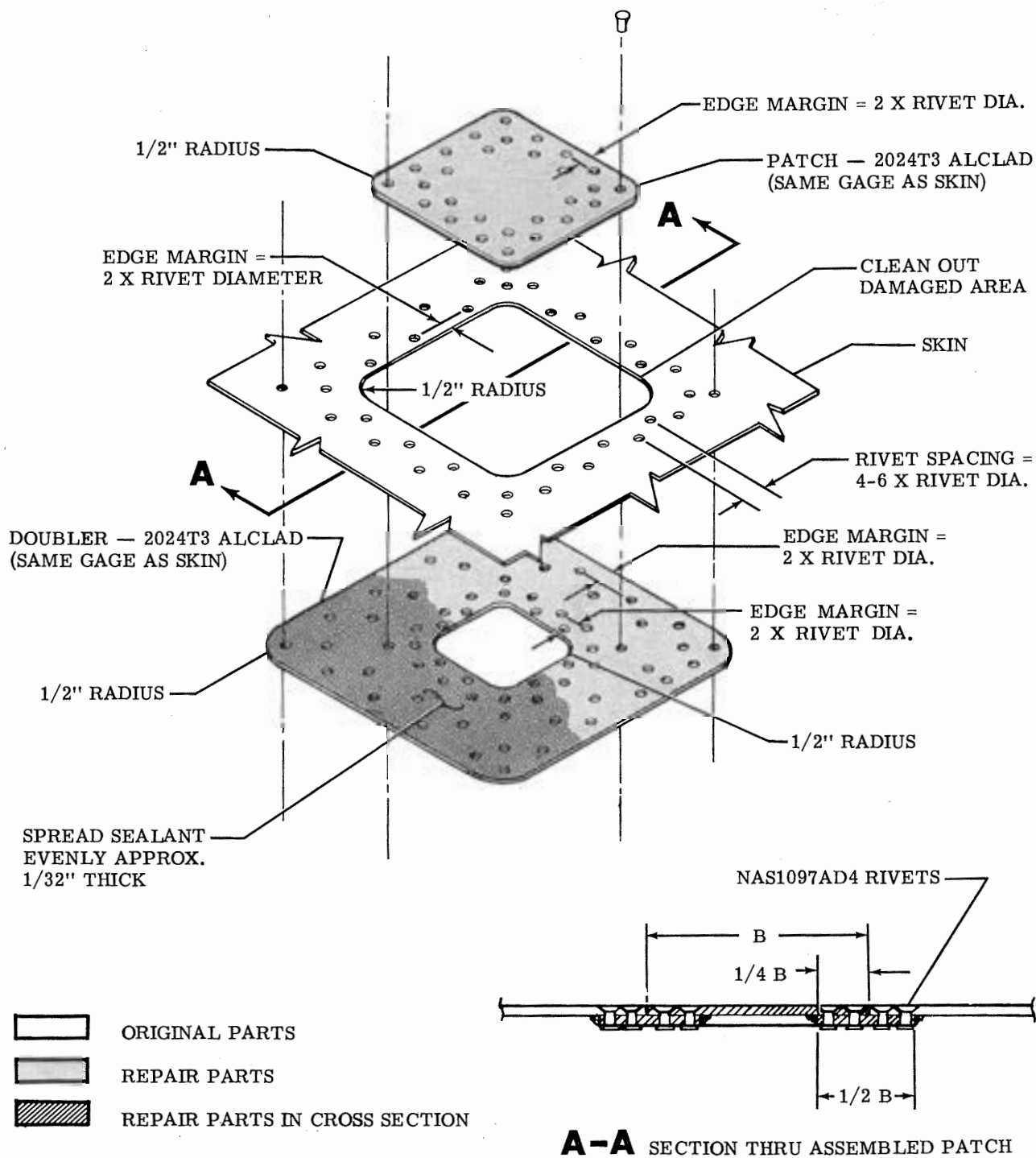


Figure 16-22. Typical Insert Patch in Pressure Cabin

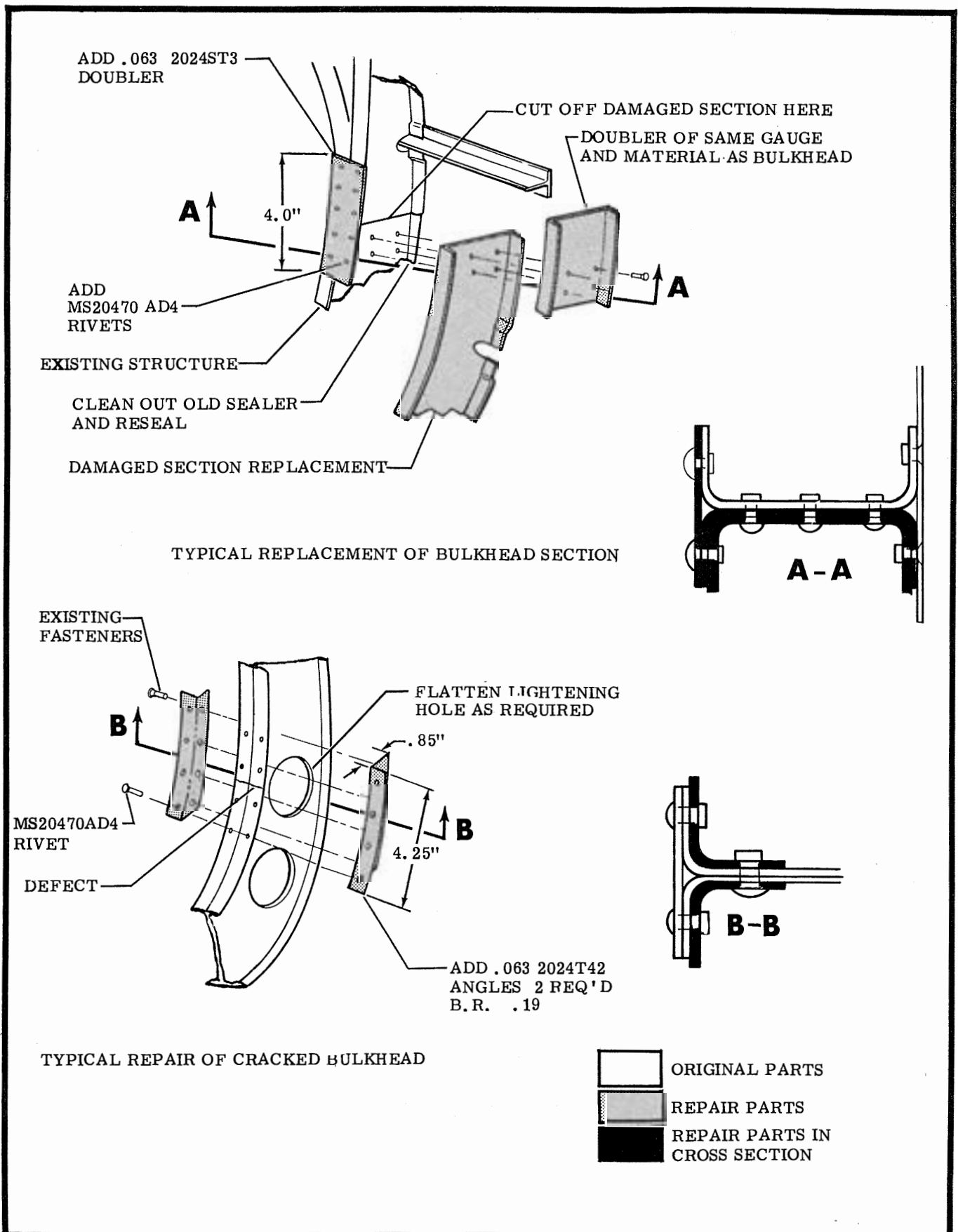
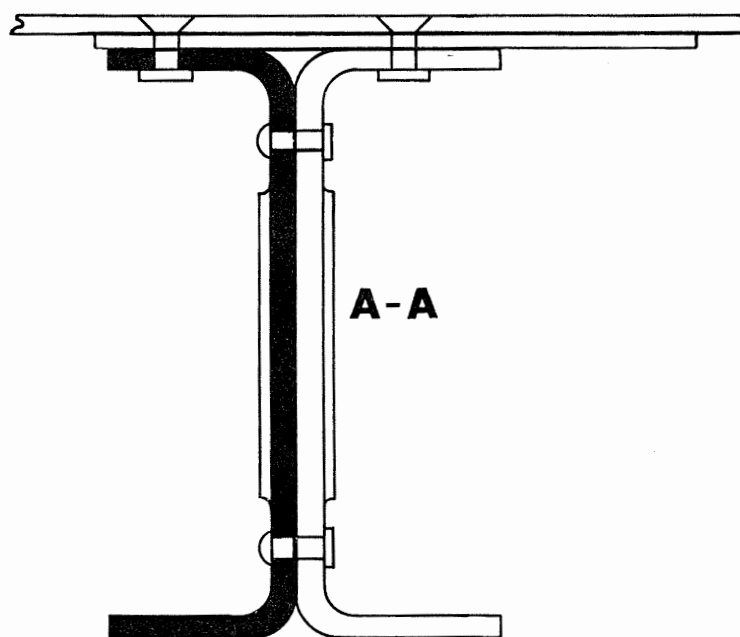
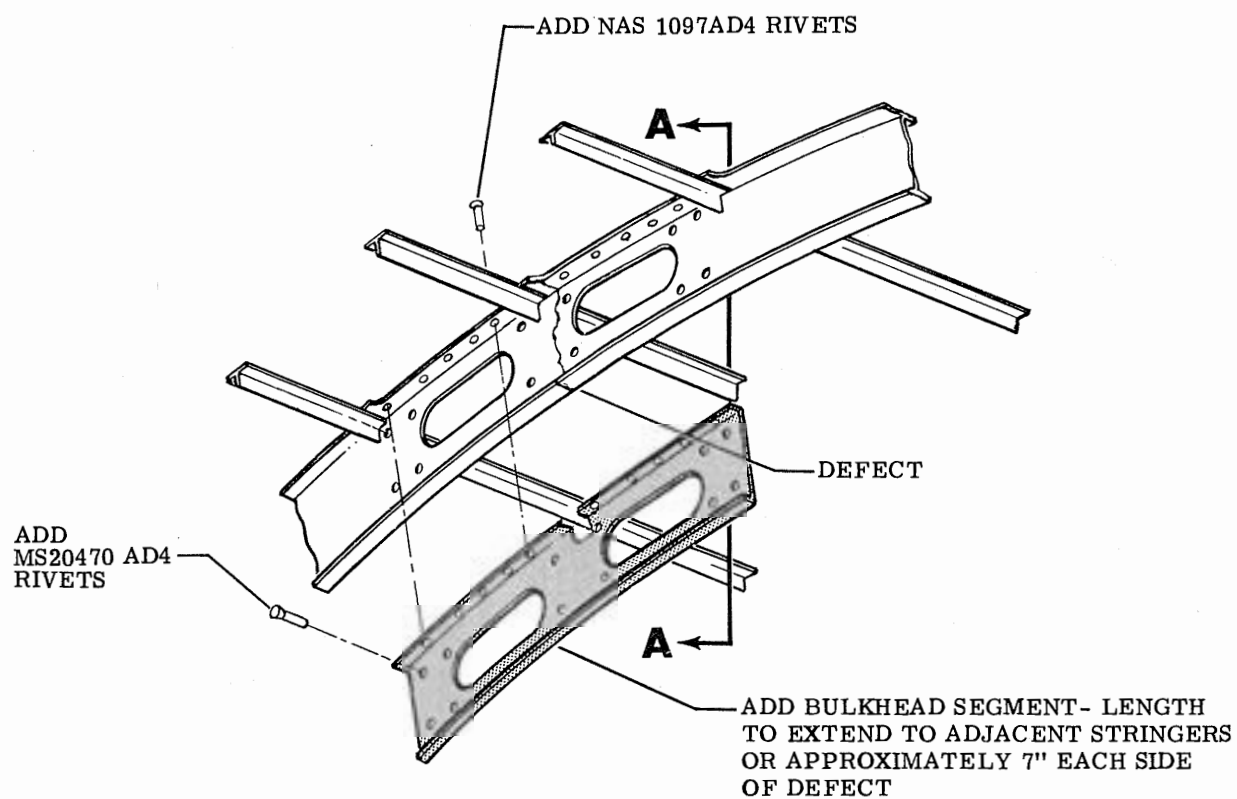


Figure 16-23. Typical Cabin Bulkhead Repair (Sheet 1 of 2)



TYPICAL CABIN BULKHEAD REPAIR

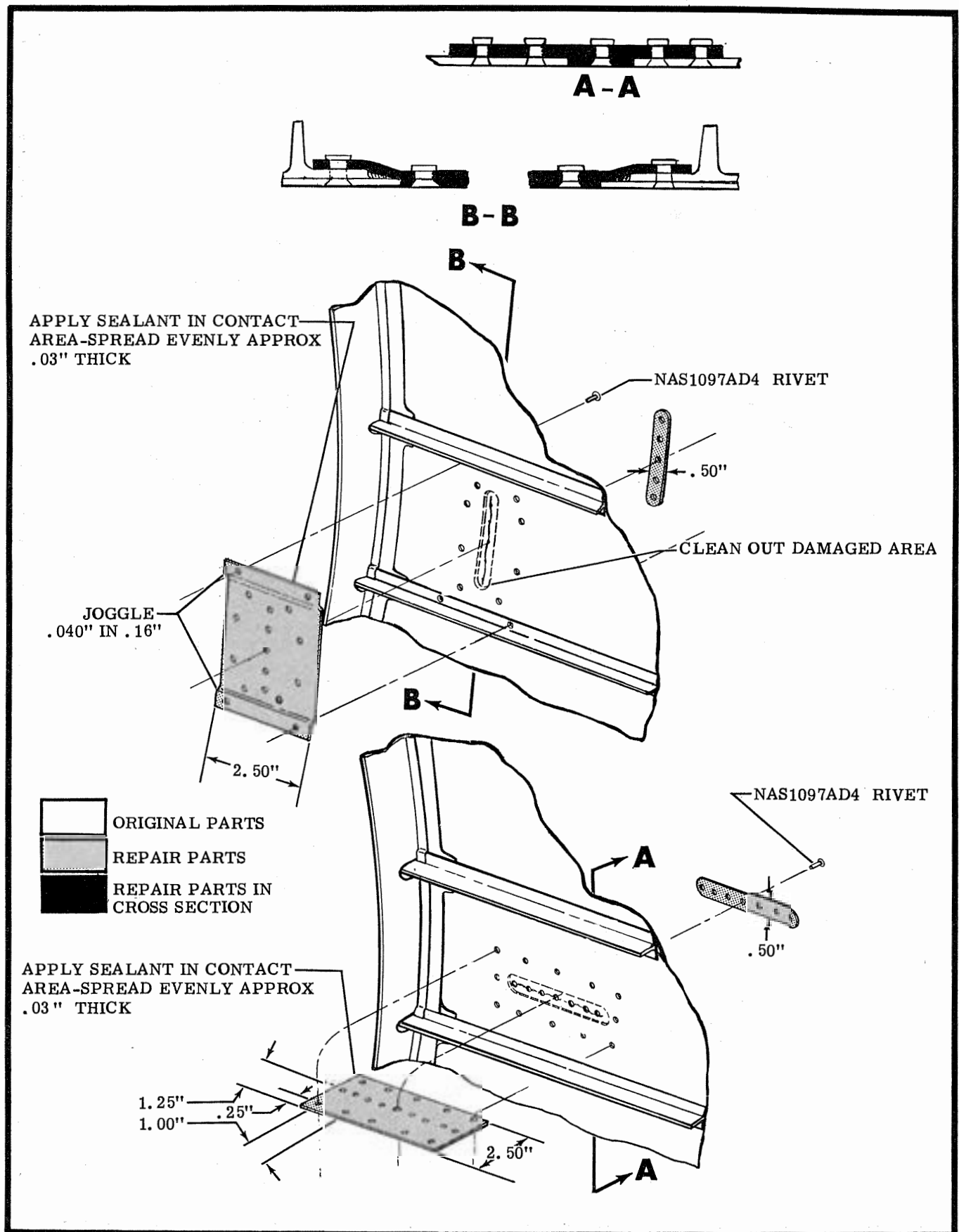


Figure 16-24. Typical Cabin Skin Crack Repair

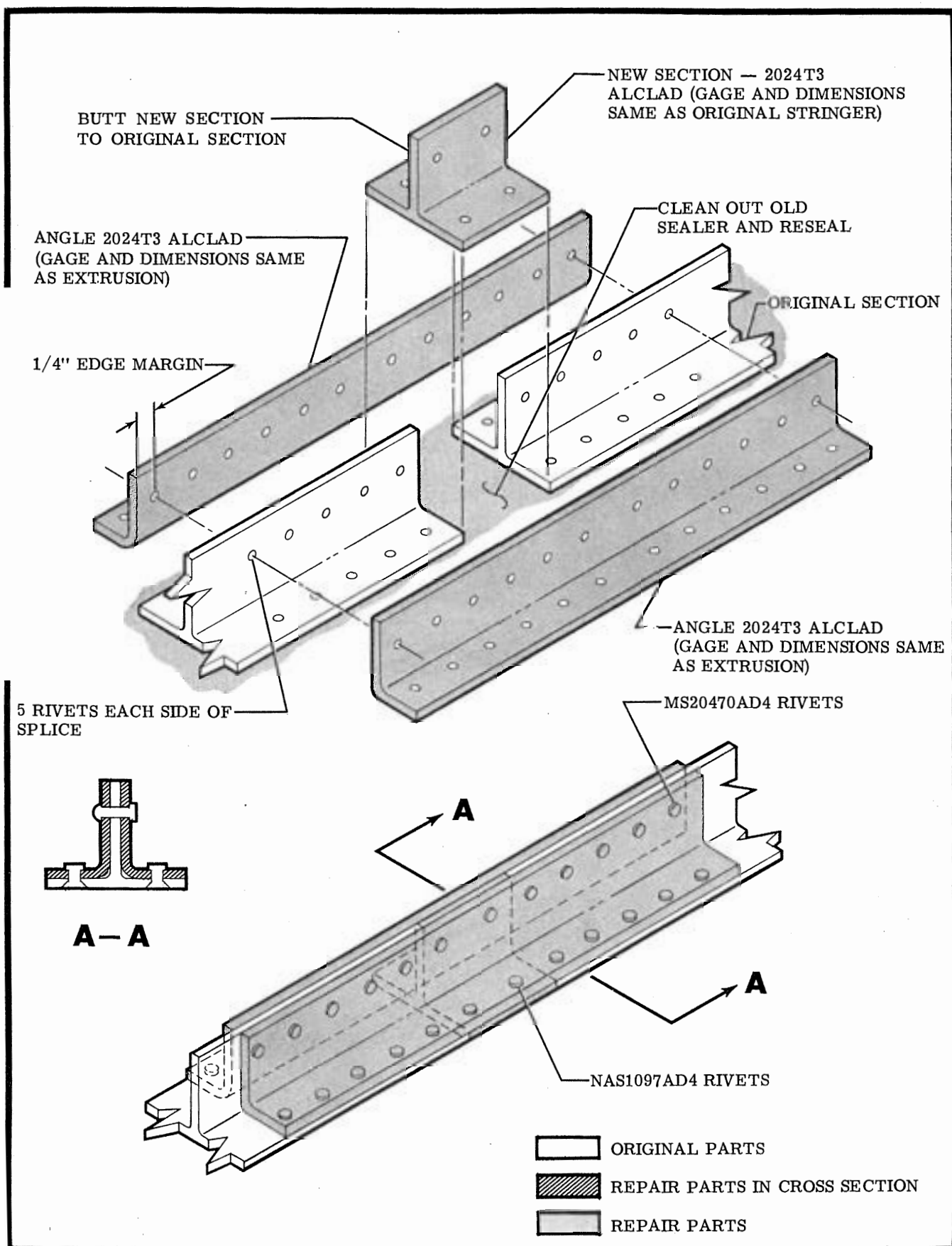
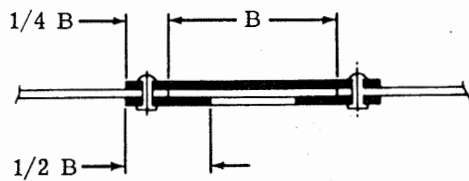
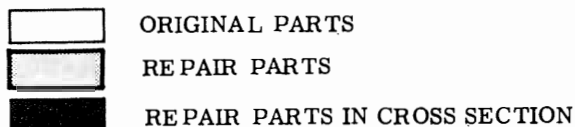
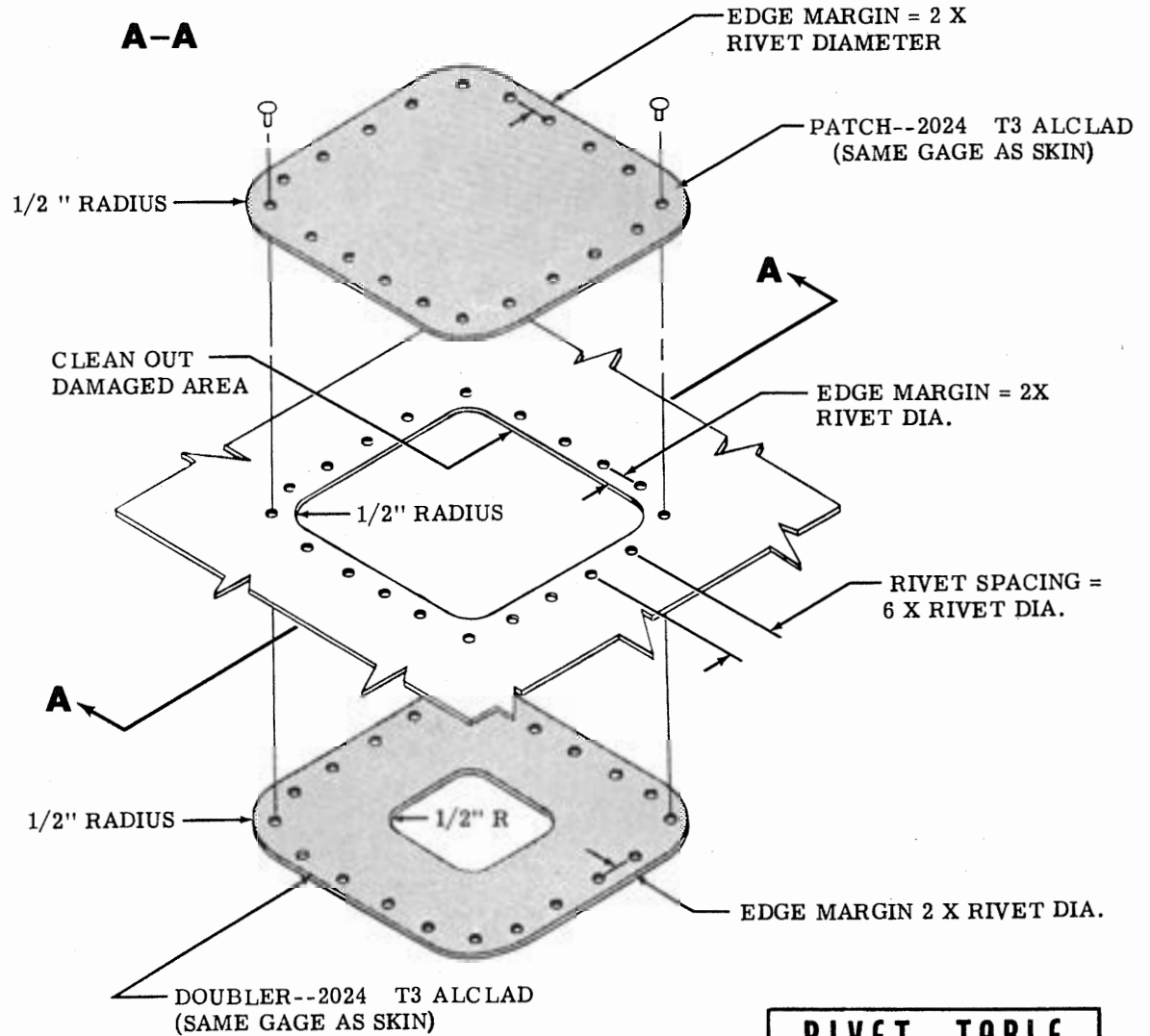


Figure 16-25. Typical Cabin Section Stringer Splice



SECTION THRU ASSEMBLED PATCH



RIVET TABLE	
SKIN GAGE	RIVET DIA.
.020	3/32
.025	1/8
.032	1/8
.040	1/8
.051	5/32

Figure 16-26. Typical Clear of Structure Skin Repair

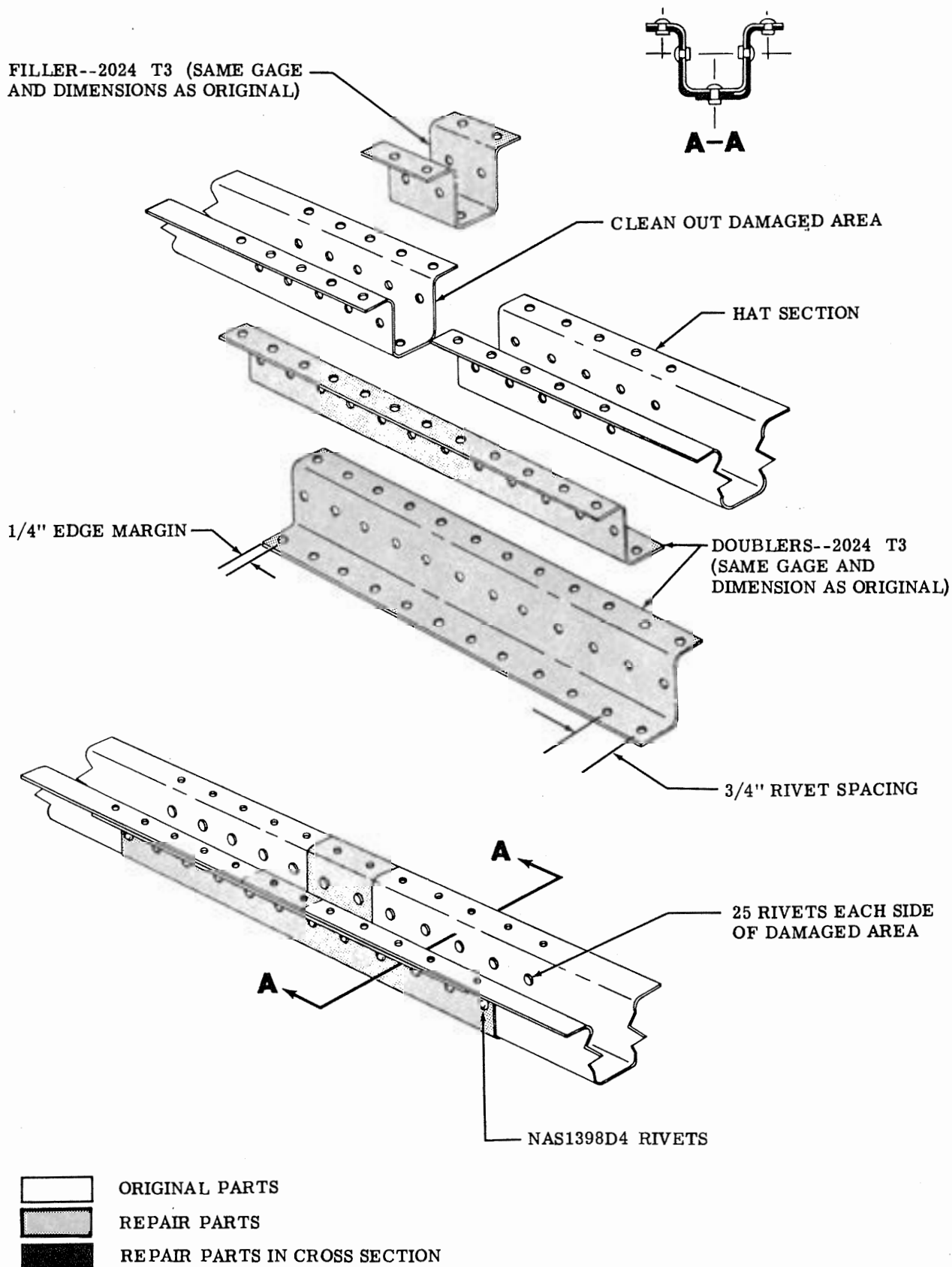


Figure 16-27. Typical Pressure Bulkhead Hat Section Repair

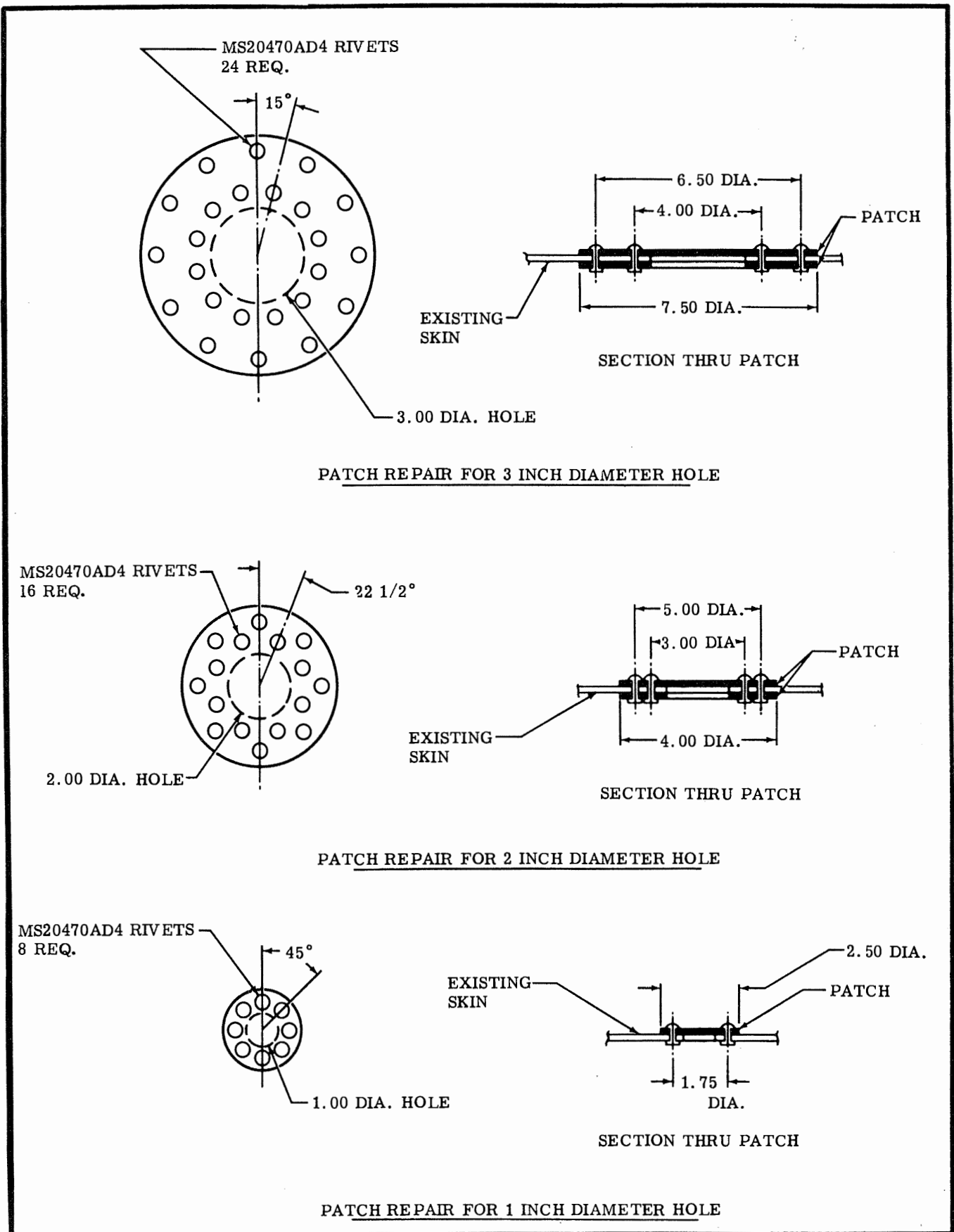
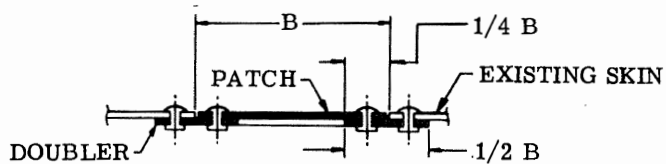


Figure 16-28. Typical Patch Repair of Circular Holes



SECTION THRU ASSEMBLED PATCH

A-A

RIVET TABLE	
SKIN GAGE	RIVET DIA.
.020	3/32
.025	1/8
.032	1/8
.040	1/8
.051	5/32

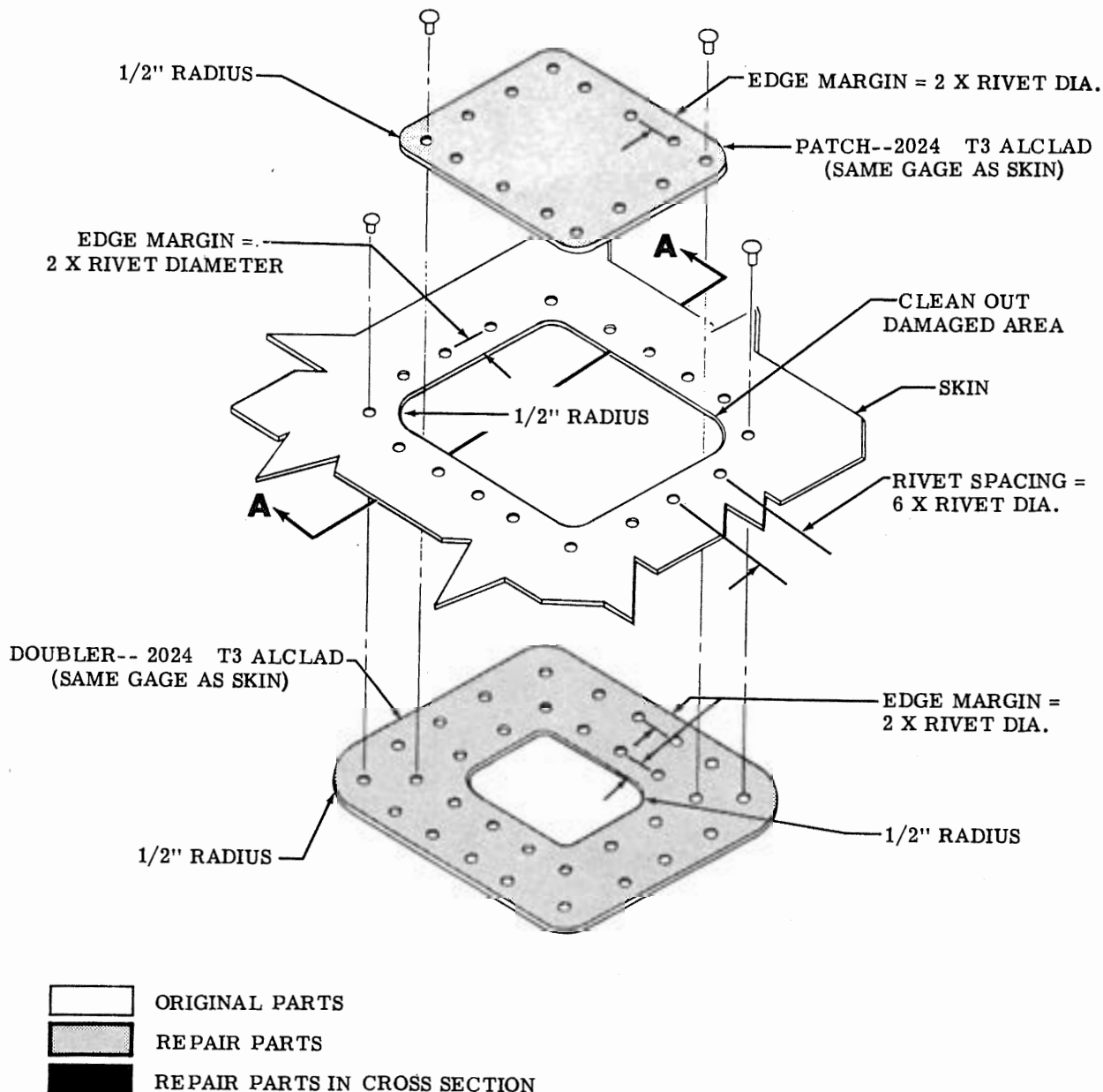


Figure 16-29. Typical Insert Patch

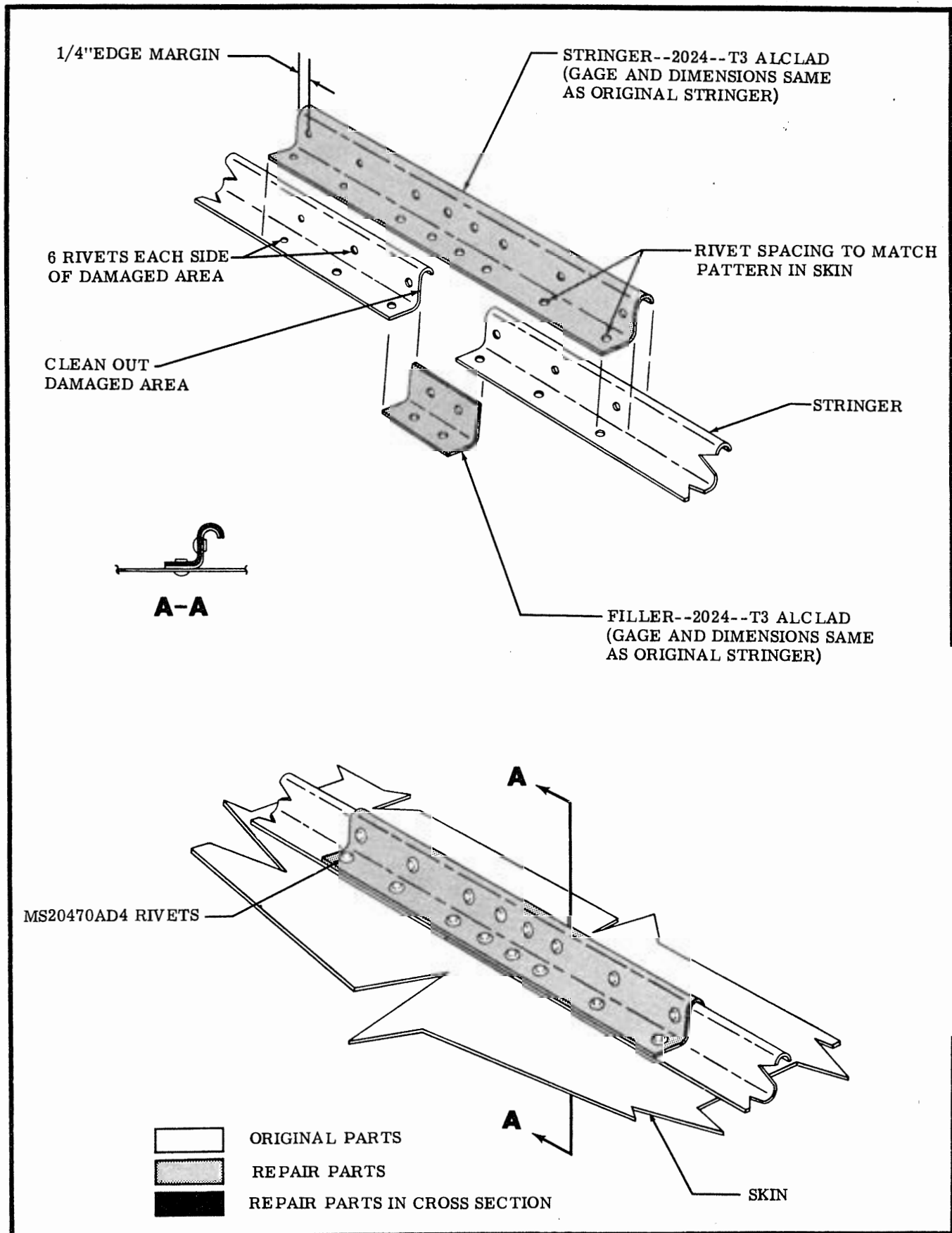


Figure 16-30. Typical Wing L.E. Stringer Repair

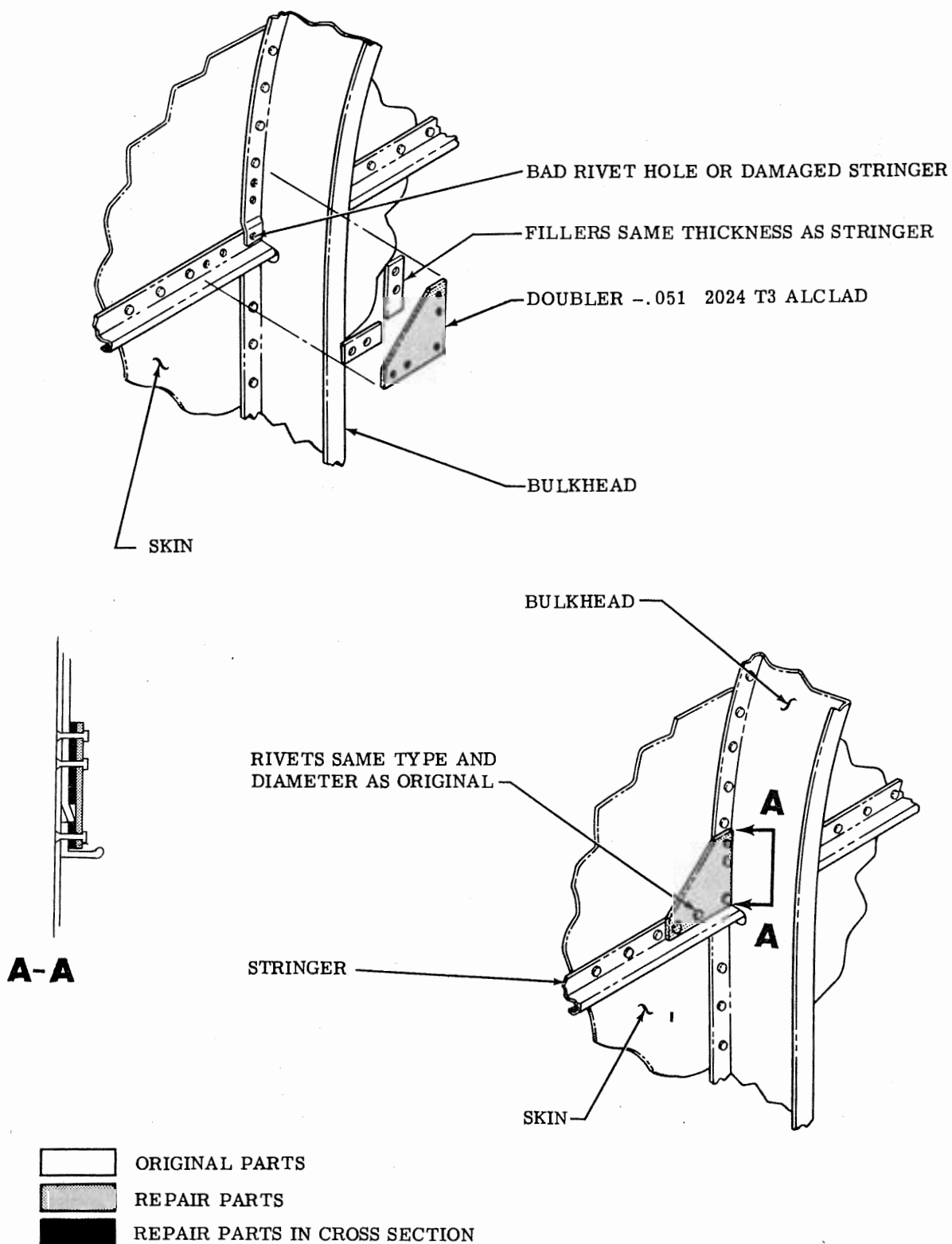


Figure 16-31. Typical Stringer to Bulkhead Repair

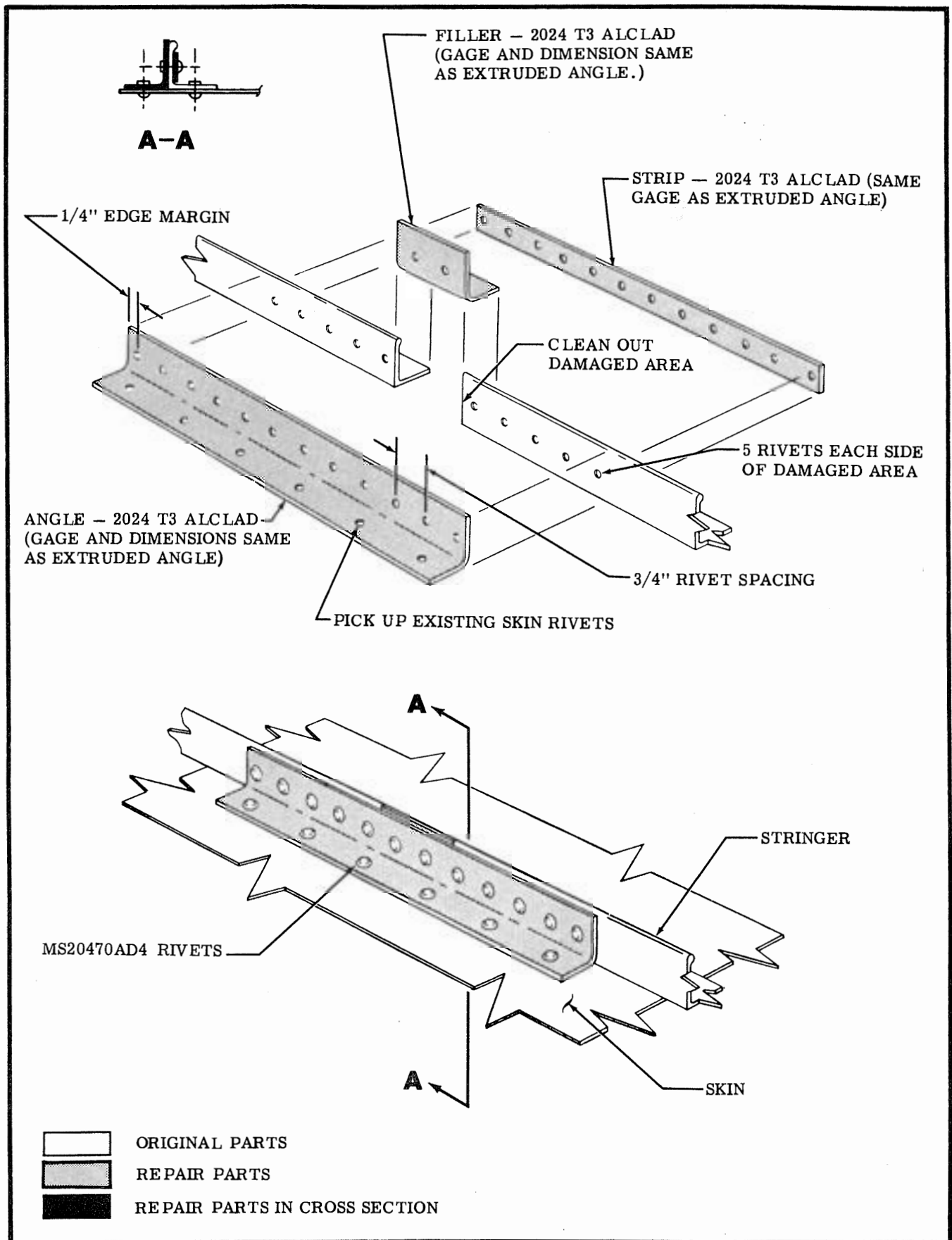


Figure 16-32. Typical Stringer Repair

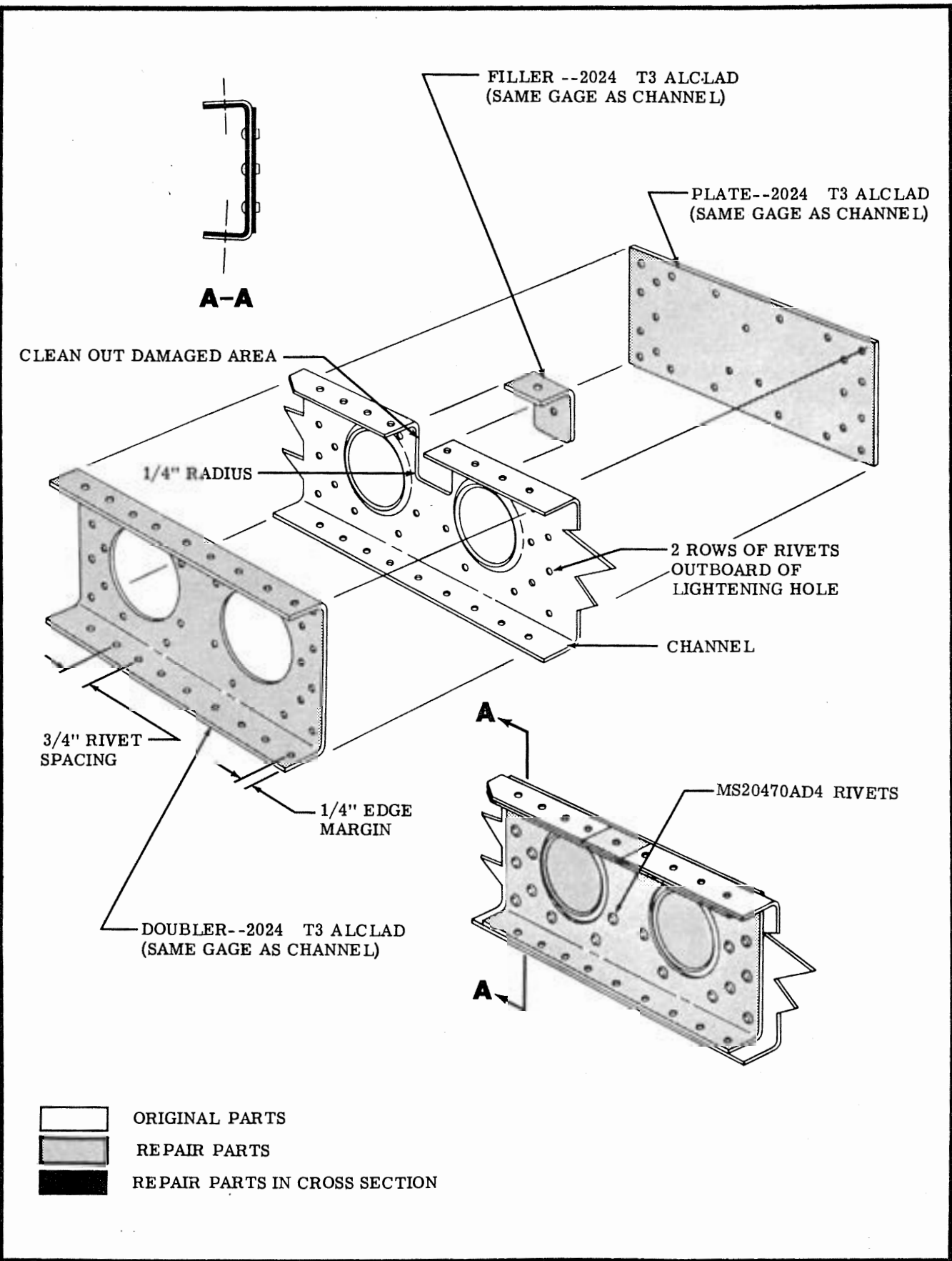


Figure 16-33. Typical Channel Flange Repair

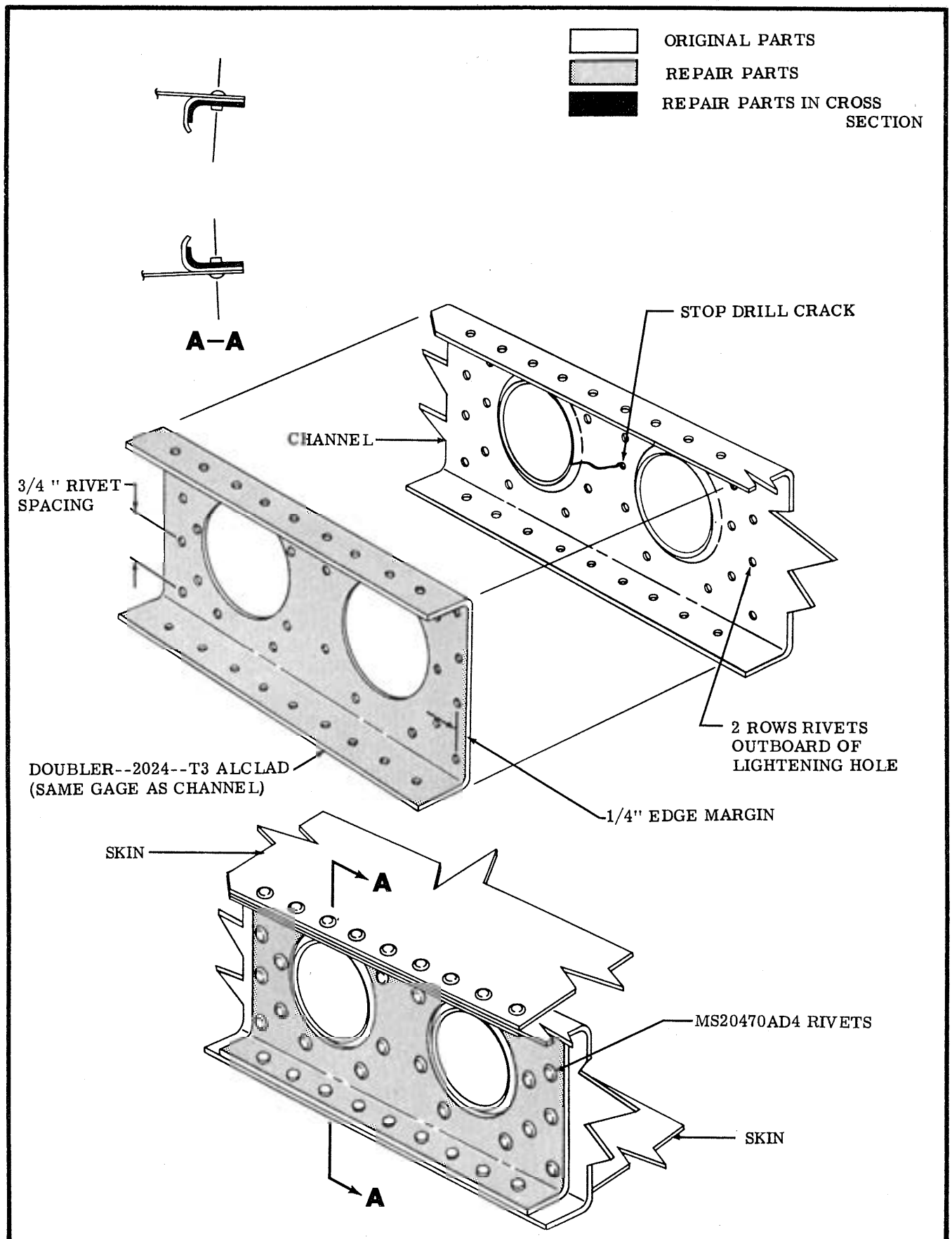
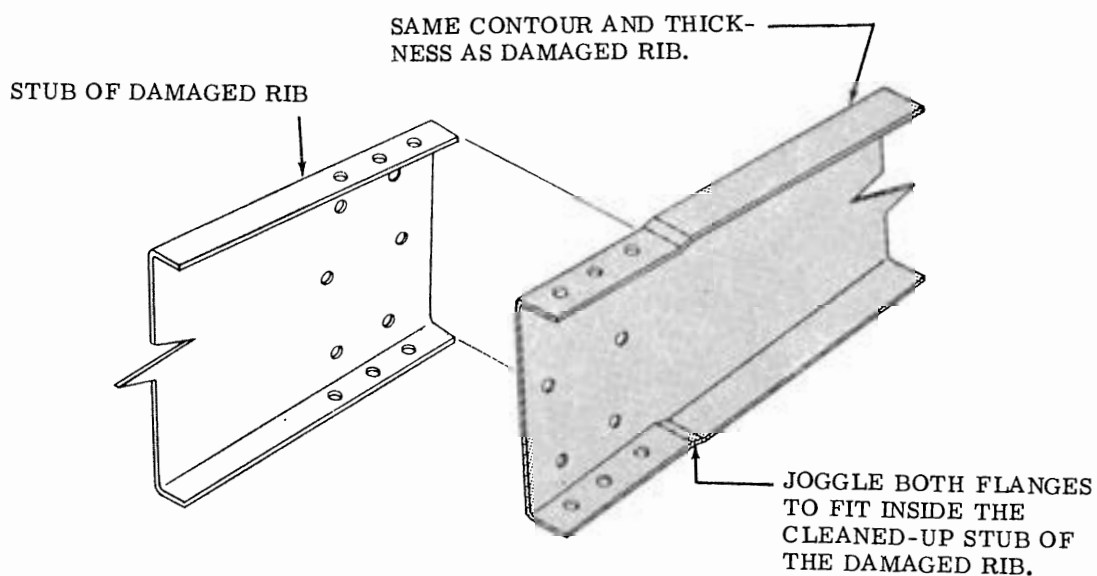
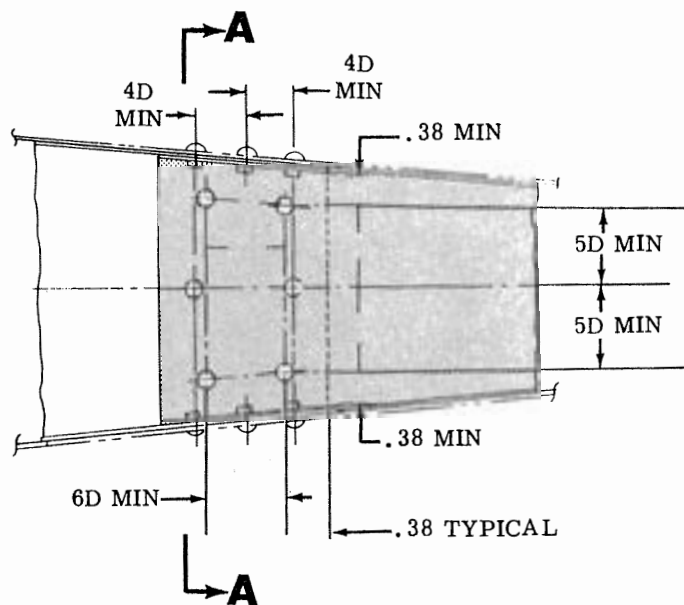


Figure 16-34. Typical Channel Repair

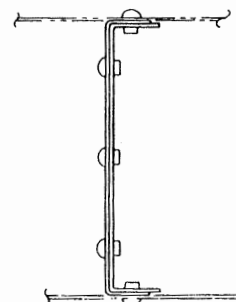


NUMBER OF ROWS OF RIVETS IN WEB DEPENDS ON AREA AVAILABLE. SEE MINIMUM SPACING. MAXIMUM SPACING IS ONE INCH. RIVETS IN FLANGES MUST BE AS SHOWN.

FOR RIB THICKNESS OF .032 OR LESS USE AD-3 RIVETS AND FOR THICKER MATERIAL USE AD-4.



-  ORIGINAL PARTS
-  REPAIR PARTS
-  REPAIR PARTS IN CROSS SECTION



A-A

Figure 16-35. Typical Repair of Control Surface Rib

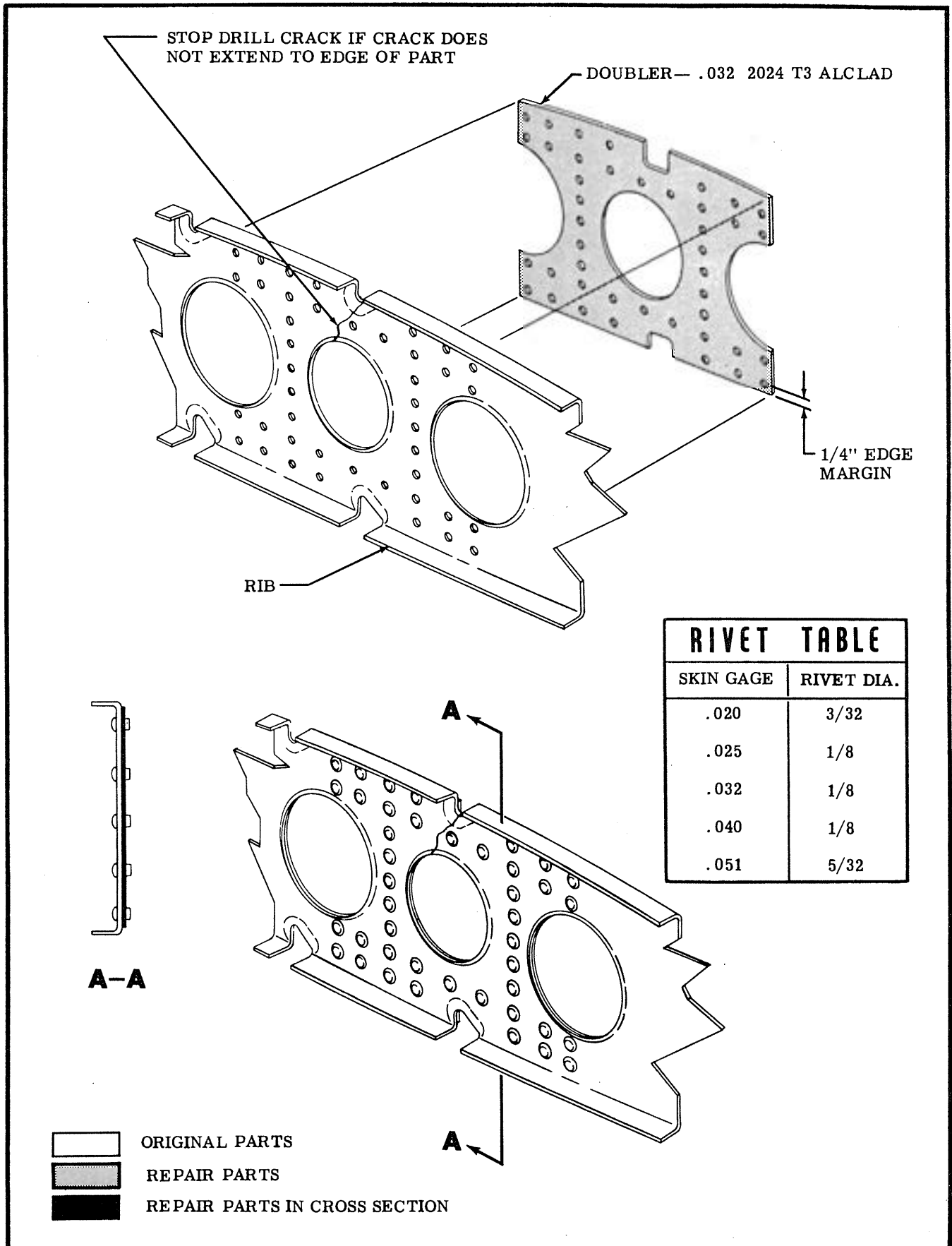
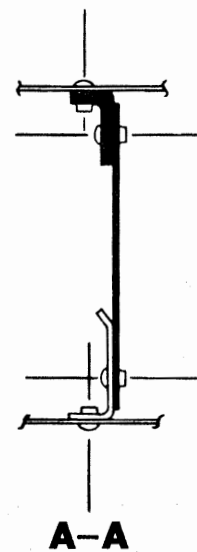
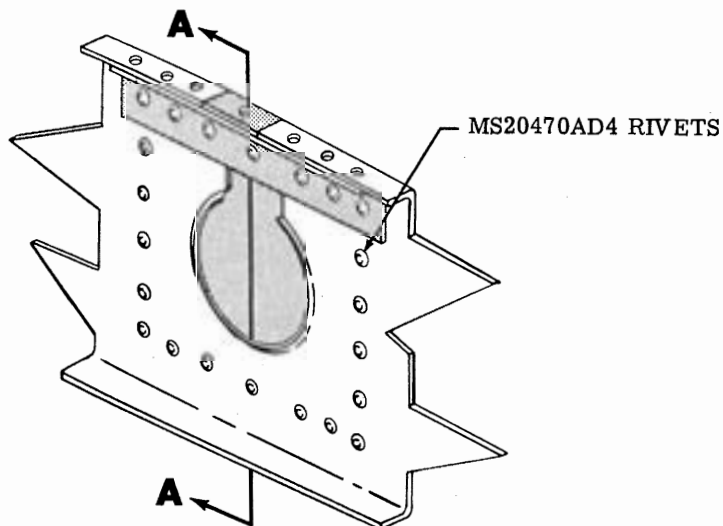
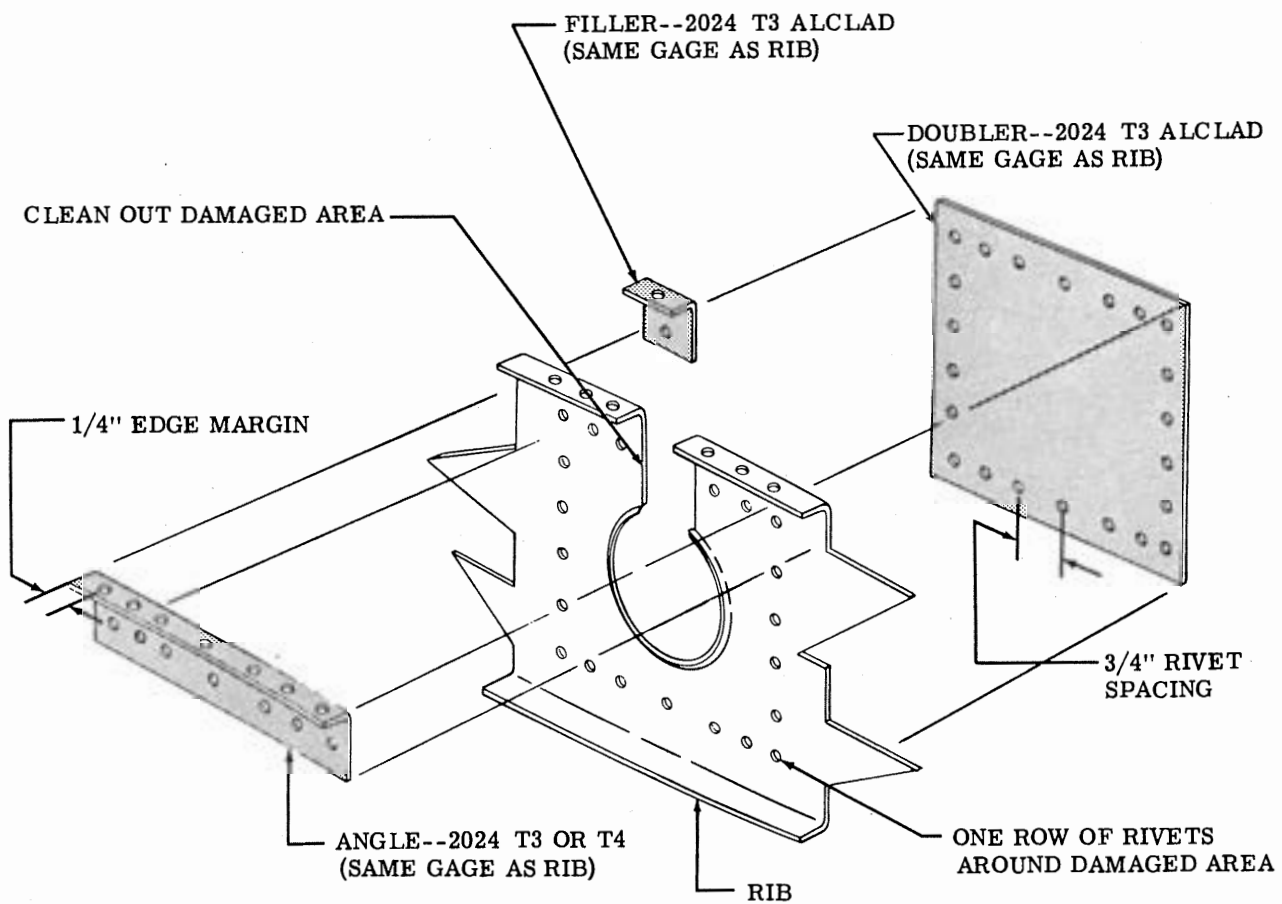


Figure 16-36. Typical Rib Web Repair



	ORIGINAL PARTS
	REPAIR PARTS
	REPAIR PARTS IN CROSS SECTION

Figure 16-37. Typical Rib Flange Repair

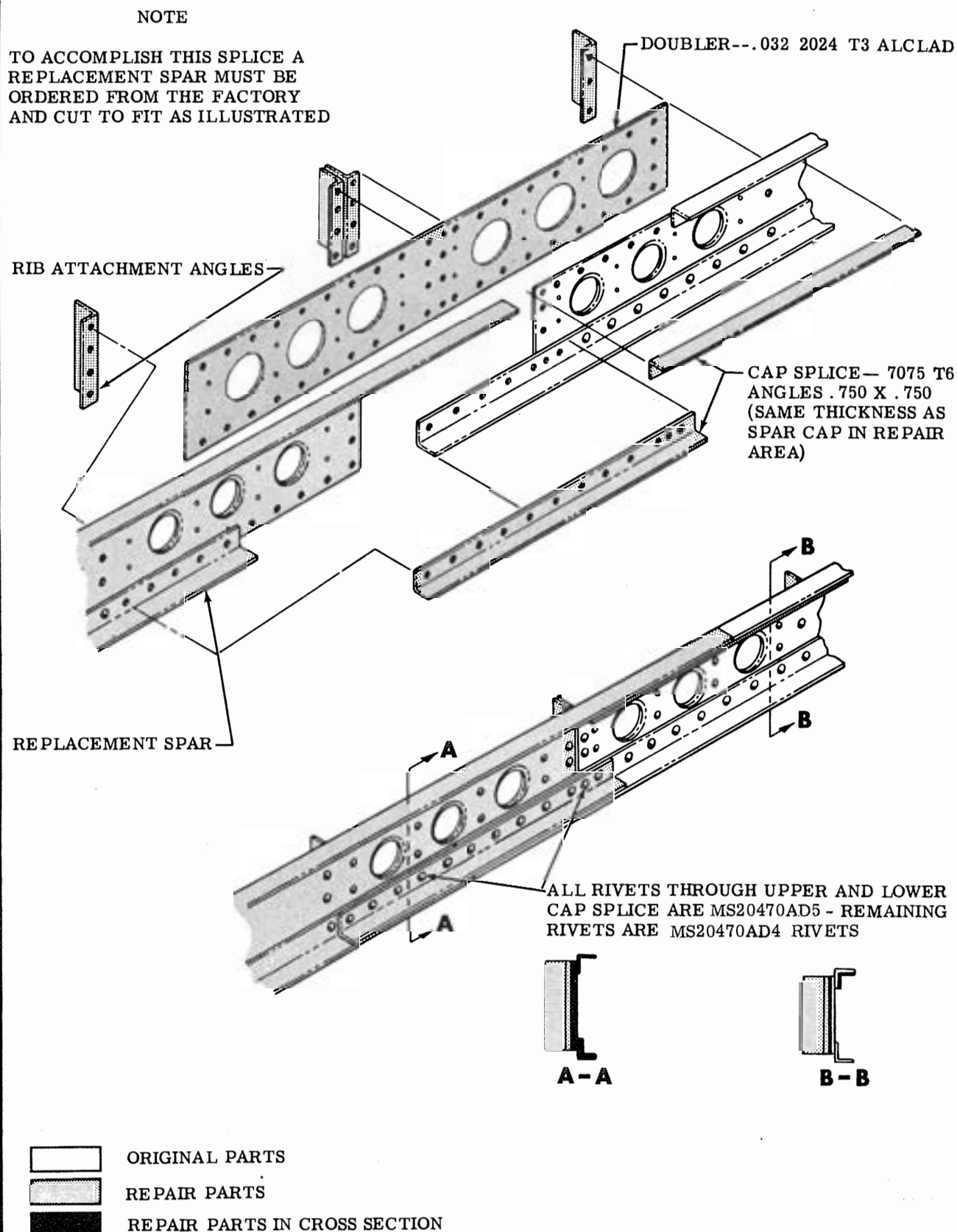
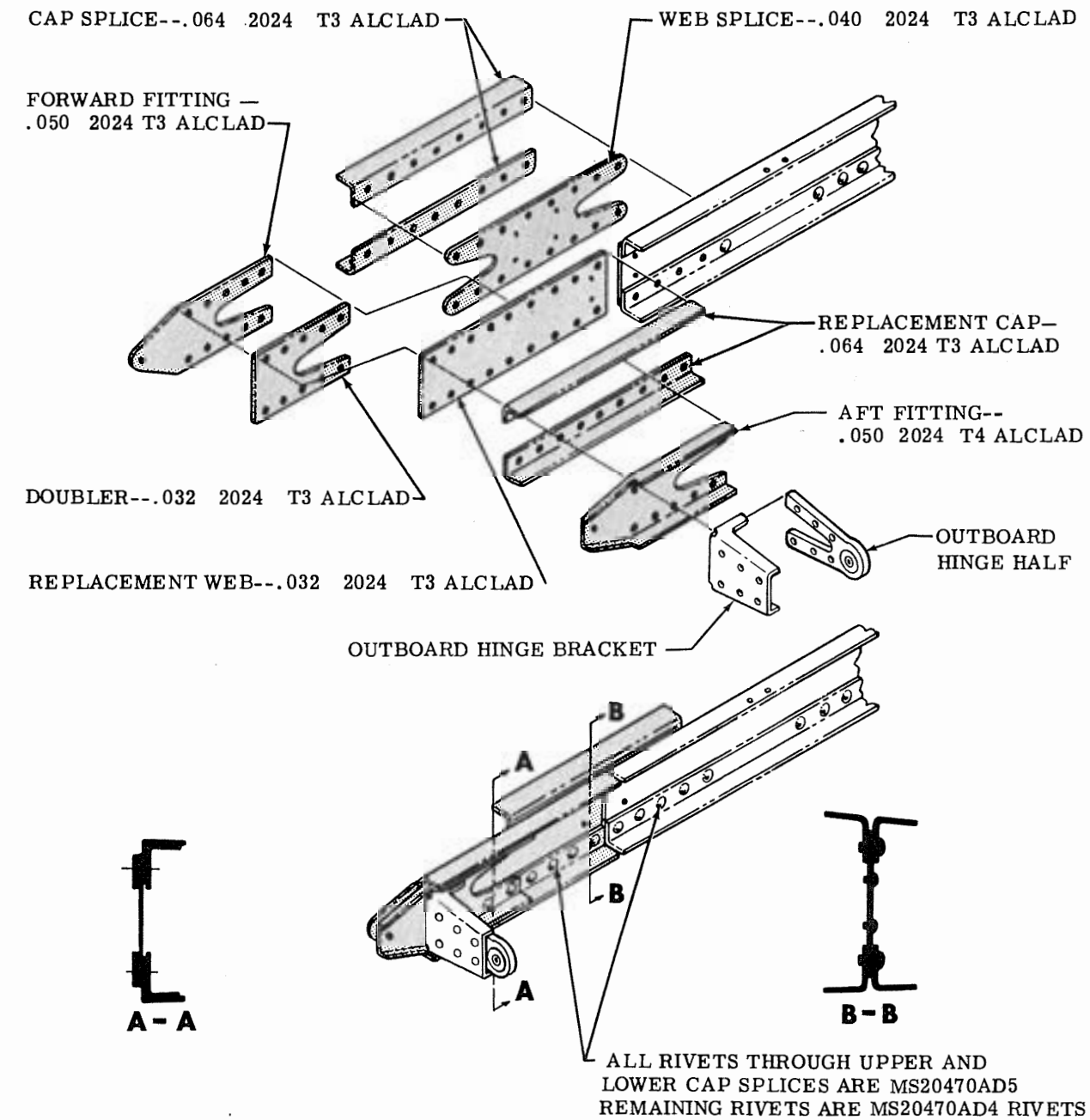


Figure 16-38. Typical Rear Spar Repair (Section 128.86 and Outboard)



	ORIGINAL PARTS
	REPAIR PARTS
	REPAIR PARTS IN CROSS SECTION

Figure 16-39. Typical Rear Spar Repair (Station 206.94 and Outboard)

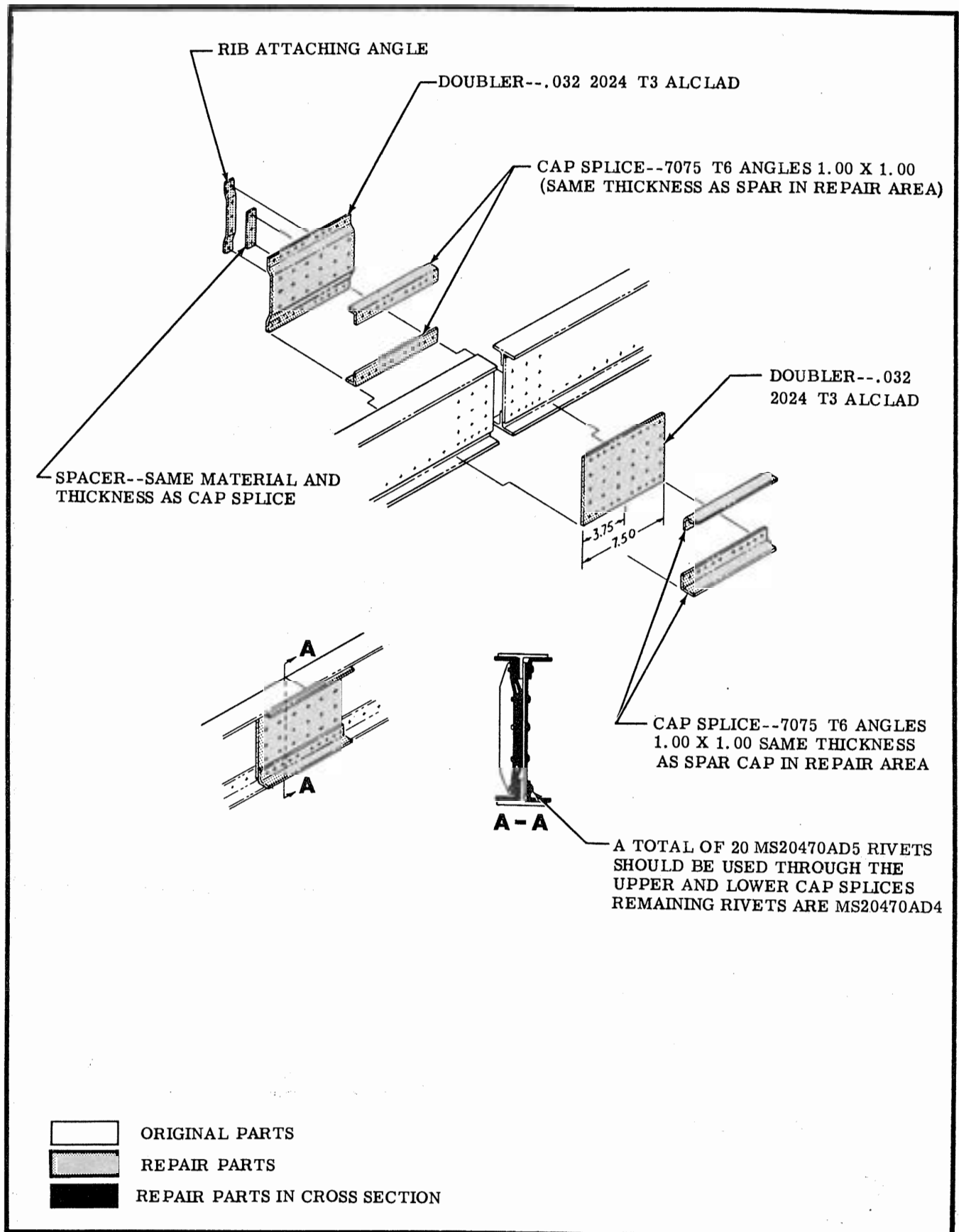


Figure 16-40. Typical Front Spar Repair (Station 186.49 and Outboard)

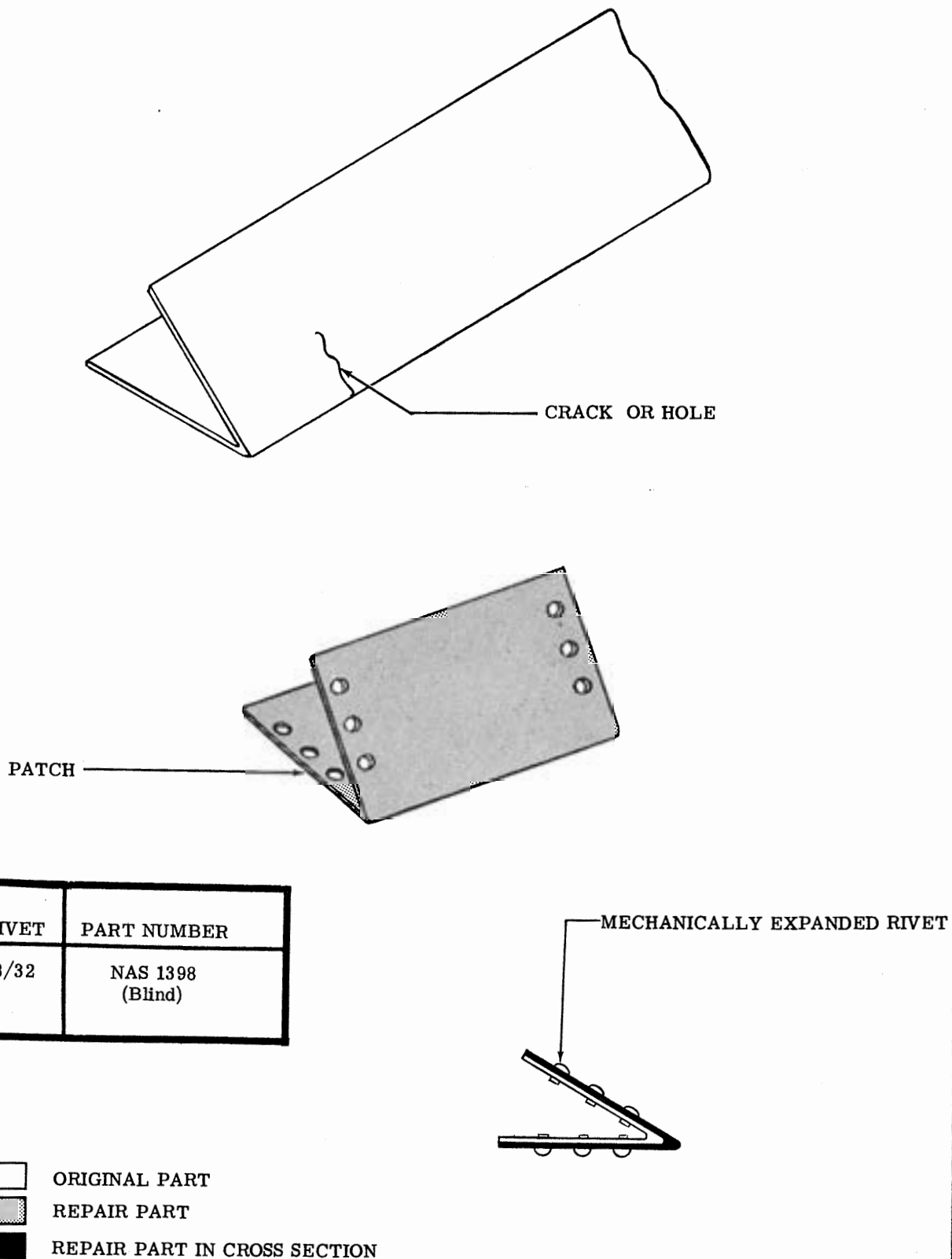


Figure 16-41. Typical Repair of Trailing Edge of a Control Surface

ALIGNMENT AND SYMMETRY CHECK. (See figure 16-42.)

Before making an alignment and symmetry check, the aircraft should be defueled and leveled in accordance

with Section 2. Figure 16-42 provides the measurements and shows the relative elevation points to be measured during the alignment symmetry check. Measurements are made with a steel tape projected between alignment points.

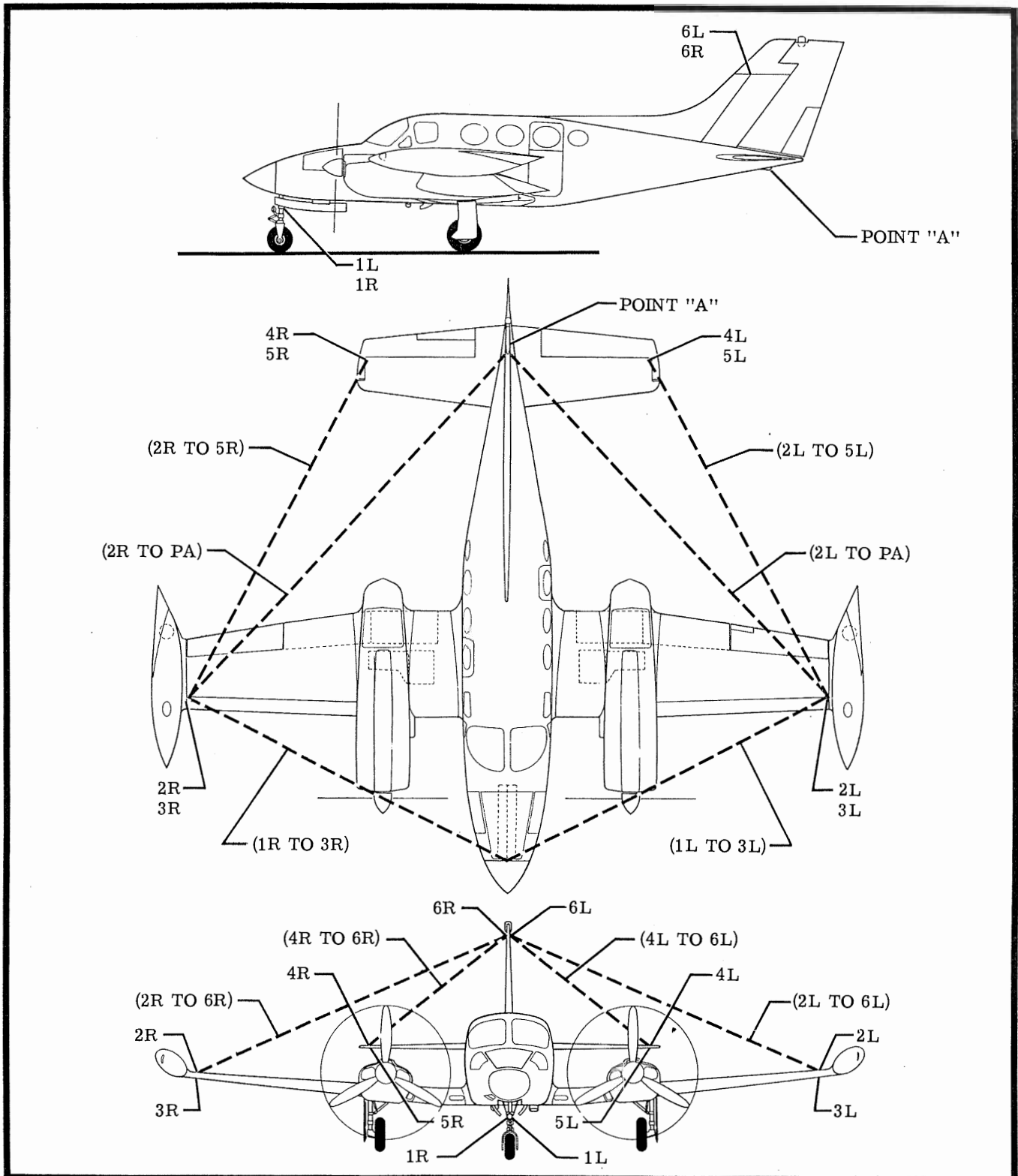
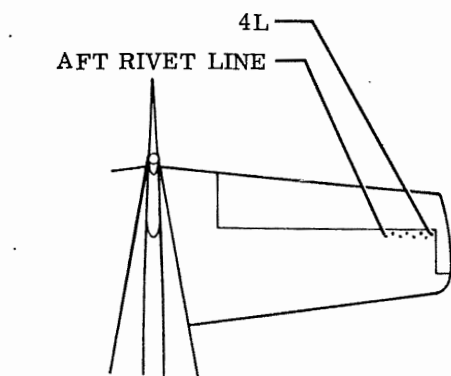
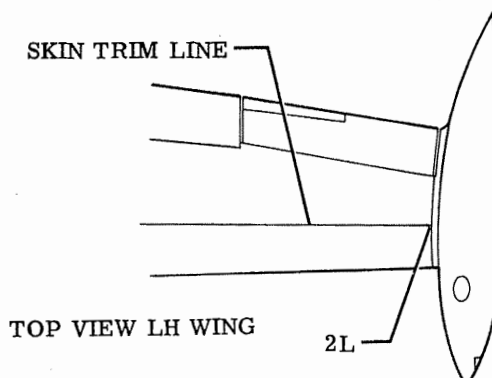
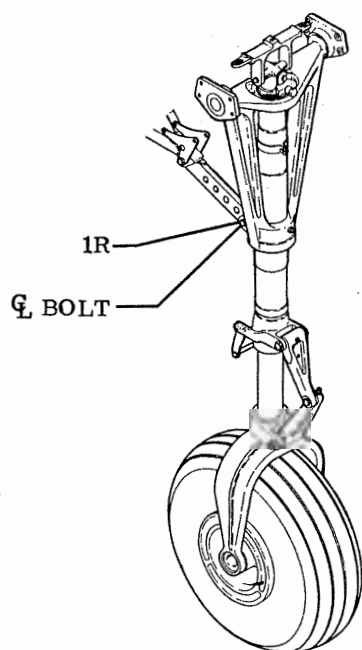
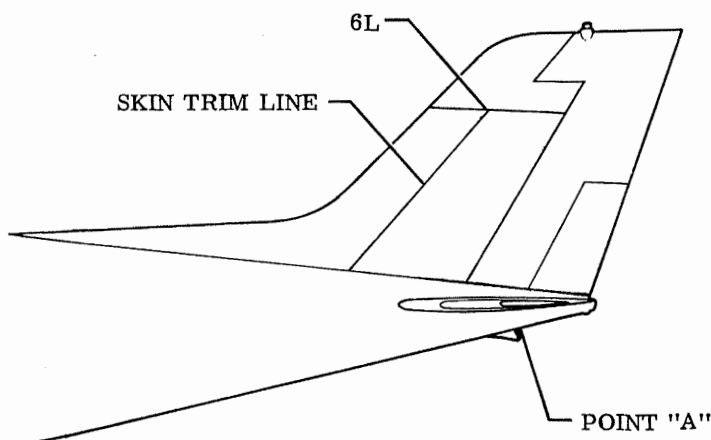


Figure 16-42. Alignment and Symmetry Check (Sheet 1 of 2)



TOP VIEW STABILIZER



Details of Check Points:

A. Center line aft tail skid bolt.

1. Center line of bolt at gear strut and drag brace attachment. Center line head of bolt RH side and shank of bolt LH side.
2. Skin trim line and inboard edge of tip fairing at front spar.
3. Same as 2 except bottom of wing.
4. Center line aft rivet line of rear stabilizer at outboard edge of stabilizer.
5. Same as 4 except bottom of stabilizer.
6. Skin trim line at forward fin spar and lower edge of tip cap.

ALIGNMENT AND SYMMETRY CHECK

	421-0001 TO 421B0001	421B0001 AND ON
POINTS	DISTANCE	DISTANCE
1L TO 3L 1R TO 3R	20'1.00" ±1.25"	21'1.00" ±1.25"
2L TO 5L 2R TO 5R	20'11.00" ±2.00"	21'6.00" ±2.00"
2L TO PA 2R TO PA	25'8.00" ±1.50"	26'5.00" ±1.50"
4L TO 6L 4R TO 6R	9'4.00" ±1.00"	9'5.50" ±1.00"
2L TO 6L 2R TO 6R	26'2.00" ±2.00"	26'11.00" ±2.00"

Figure 16-42. Alignment and Symmetry Check (Sheet 2 of 2)

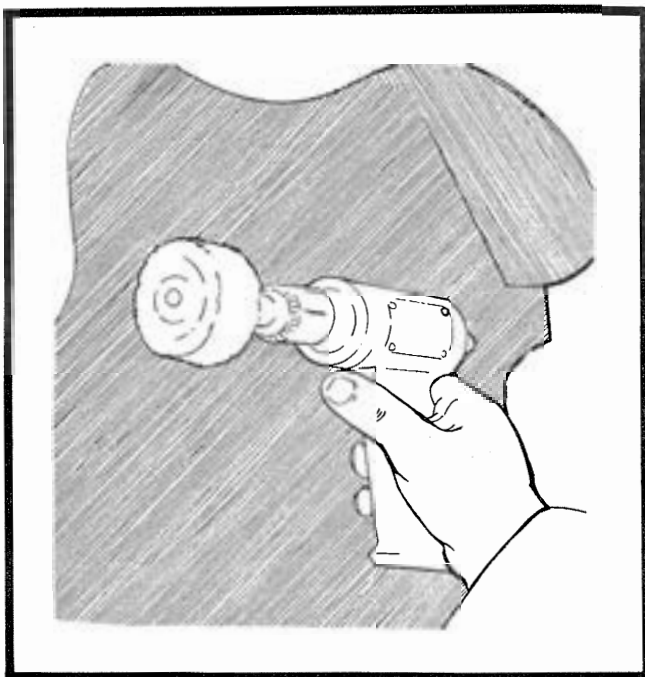


Figure 16-43. Buffing with Air Drill

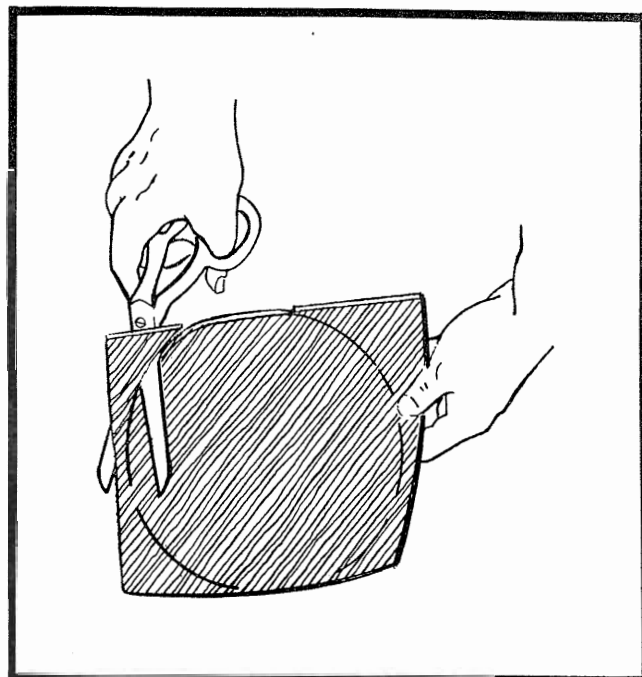


Figure 16-44. Fabrication of Patch

FUEL CELL REPAIR.

The fuel cells installed in the wings are a bladder-type, known as Construction BTC-39, manufactured by Goodyear Tire and Rubber Company. The following cold patch repair procedures are approved repair practices of Vithane BTC-39 fuel cells. These procedures apply only to BTC-39 fuel cells and deviations from these procedures should not be permitted.

CAUTION

Repair of the BTC-39 Vithane fuel cells is restricted to authorized personnel, and/or those certified or approved by factory trained schools.

a. The following equipment will be needed to make the cold patch repair.

1. Repair Kit, Dwg #2F1-3-35342, available from the Cessna Service Parts Center, consisting of the following:

- (a) 2331 Repair Cement (1/2 pint cans, 173 cc in each can).
- (b) 2328C Cross-linker (1 Oz. bottle, 28 cc in each bottle).
- (c) Methyl Ethyl Ketone (1 pint cans).
- (d) FT-160 Repair Fabric (sheet 12" x 12").
- (e) Cellophane (sheet 12" x 24").
- (f) Foam rubber, cloth back (sheet 12" x 12").

2. Paintbrush, 1-inch.

3. Roller, 1-inch diameter x 3/4" flat, or equivalent.

NOTE

The repair should be made on a well lighted

table and natural contours maintained if possible. Prevent cell from contact with sharp edges, corners, dirty floors or other surfaces.

WARNING

Repair area must be well ventilated and no open flame or smoking in area of cell repair.

b. Repair Limitations.

- 1. FT-160 repair fabric is for repair of simple

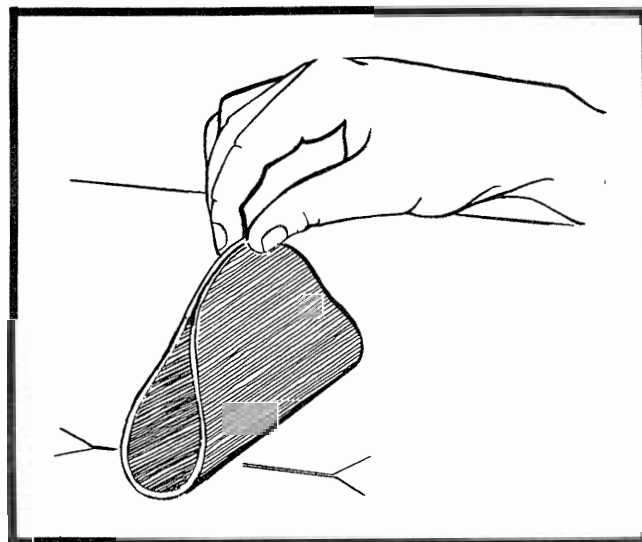


Figure 16-45. Centering Patch Over Injury

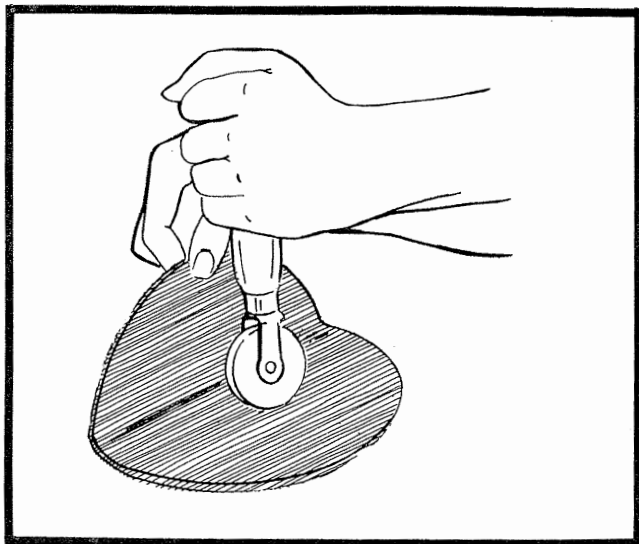


Figure 16-46. Use of Roller Stitcher

contours only. Patches referred to in these procedures are of this material.

2. Inside patches are to lap defect edges two-inches (2") in each direction.

3. Outside patches are to lap two and one-quarter inches (2-1/4") in each direction.

4. Outside patches are to be applied and cured prior to applying an inside patch.

5. Blisters between interliner and fabric larger than 1/4" in diameter, require an outside and an inside patch.

6. Separations between outer plies larger than one-inch (1") in diameter require an outside and inside patch. Holes and punctures require an outside and inside patch.

7. Slits and tears, up to three-inches (3") maximum length, require an outside and inside patch.

8. External abraided or scuffed areas, without fabric damage, require an outside patch only.

9. A loose lap may be trimmed, provided that a one-inch (1") effective bond remains.

10. Air cure repair patches are to remain clamped and undisturbed for 72 hours at room temperature of approximately 75° F.

c. Repair Patch.

1. Prepare exterior cell wall and exterior patch first. Cut repair patch from FT-160 material to size required (see figure 16-44) to insure proper lap over injury in all directions in accordance with Repair Limitations. Hole shears at an angle to produce a beveled edge (feather) on patch when cutting patch. Round corners of patch. Dull side or gum contact face of repair patch should be the largest surface after beveling.

2. Wash one square foot of cell wall surrounding injury, and repair patch contact side with a clean cloth soaked with Methyl Ethyl Ketone solvent.

3. Abraid cell wall surface about injury and contact side of patch with fine emery cloth or emery buffer wheel (see figure 16-43) to remove shine.

4. Repeat Methyl Ethyl Ketone washings two more times. A total of three washings each surface.

5. Tape a piece of cellophane inside cell over injury.

6. When all the above preparatory work has been completed, and all has been positioned for patch application on repair table, mix the 2331C cement (173 cc) with the cross-linker 2328C (28 cc), and stir mixture thoroughly.

7. Brush one even coat of mixed repair cement on the cell wall around injury and on the contact side of repair patch. Allow to dry for twenty minutes.

8. Repeat a second mixing of repair cement and brush on a second coat.

CAUTION

DO NOT USE FIRST CAN OF MIXED CEMENT FOR THIS COAT.

9. Allow cement to dry approximately ten minutes and then center patch over injury as shown in figure 16-45.

10. (See figure 16-46.) Lay repair patch by rolling down on surface from center of edge without trapping air. Hold the unrolled portion of repair patch off the cemented surface until roller contact insures an air-free union. At this time repair patch may be moved by hand on wet surface to improve lap. Do not lift repair patch, slide it.

CAUTION

Make sure cellophane inside cell over injury remains in place, because any cement will

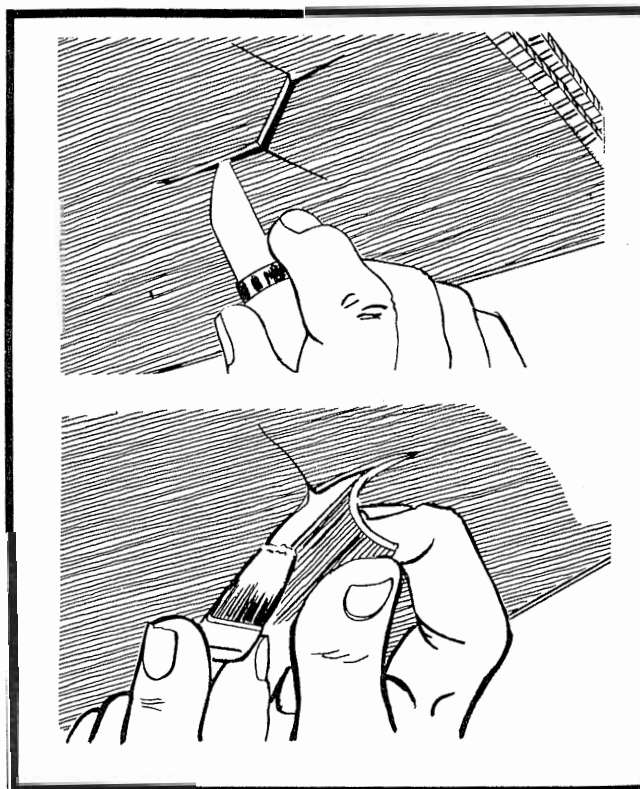


Figure 16-47. Repair of Blisters

stick cell walls together without it as a separator.

11. Cover one smooth surface each of two aluminum plates (plates must be larger than patch, with 1/4" fabric-backed airfoam, fabric side out. Tape airfoam in place. Foam must cover edges of plate for protection.

12. Fold cell adjacent to patch and place prepared plates, one over repair patch, and one on opposite side.

13. Secure the assembly with a "C" clamp, tighten by hand. Check cement flow to determine pressure.

CAUTION

Make sure that cell fold is not clamped between plates. This would cause a hard permanent crease. Also, be sure patch does not move when clamp is tightened.

14. Inside patch is applied in the same manner as the outside patch. See Repair Limitations paragraph for size of inside patch, after outside patch has been cured.

CAUTION

Success of applying both an outside and inside repair simultaneously is doubtful and not recommended.

d. Metal Fitting - Sealing Surfaces.

1. Rub off roughness of affected area with a fine file, emery cloth or emery wheel as shown in figure 16-43.

2. Clean metal surfaces using a clean cloth dipped in Methyl Ethyl Ketone. Moisten cleaned surface with clean cloth dipped in water. Apply Alodine 1200 solution, undiluted, to the affected area with a small nylon brush. Allow solution to dry until a light golden color appears. When coating has been formed, remove excess solution by wiping with a clean water-moistened cloth. Wipe dry.

WARNING

Do not allow solution to come in contact with hands, eyes or clothing.

e. Accessory Replacement.

1. Obtain cured repair accessory from manufacturer.

2. Mark location of old accessory and preserve marking for guide lines to locate new part.

3. Remove old accessory by gradually loosening an edge with a blunt probe-like instrument.

4. When an edge is loose, grasp accessory by loose edge with pliers and gently pull accessory off

fuel cell wall. Be careful not to pull cell lap open while peeling accessory off. Pull from blind side of cell lap toward the exposed edge.

5. Buff the cell surface under accessory with emery cloth or emery buffer wheel (see figure 16-43) to smooth roughness and prepare for cement.

NOTE

Removal of accessory may leave an uneven cavity and surface. The surface under accessory should be buffed even and smooth.

6. Prepare replacement accessory by buffing and washing contact surface. Also wash cell surface (see Repair Patch paragraph).

7. Apply mixed 2331C repair cement to both surfaces.

8. Roll new accessory into place as with a repair patch and place suitable padded plates in position to insure adequate pressure when clamped. Use cellophane separator to prevent cement sticking in wrong places.

9. Cure as with repair patch procedure cure method.

f. Defects Repair.

1. Blisters (see figure 16-47).

(a) Remove loose material by buffing or trimming. Apply an outside and inside patch.

2. Holes, punctures, cuts, tears and deep abraided areas.

(a) Trim away any ragged material and apply an outside and inside repair patch.

3. Loose seams.

(a) Buff loose edge and contact surface. Wash three times with MEK. Apply 2331C mixed cement, two coats, as with repair patch. Clamp and cure. Loose seams may be trimmed if minimum lap remains.

4. Loose fitting flange - Inside.

(a) Buff edge of flange and contact surface under flange.

(b) Apply 2331C mixed repair cement, cellophane padded plates and clamp.

(c) Follow procedure as outlined for repair patch except patch itself.

5. Missing coat.

(a) Buff surface.

(b) Wash three times with MEK.

(c) Apply 2331C mixed cement two coats as with repair patch.

(d) Clamp and cure.

6. Looseness against metal.

(a) Prepare metal as per metal fitting-sealing surface.

(b) Apply 2331C mixed cement and cure.

g. Testing.

1. Attach test plates to all fittings.

2. Inflate the cell with air to a pressure of 1/4 PSI maximum.

3. Apply soap suds to patched area and check for leaks.

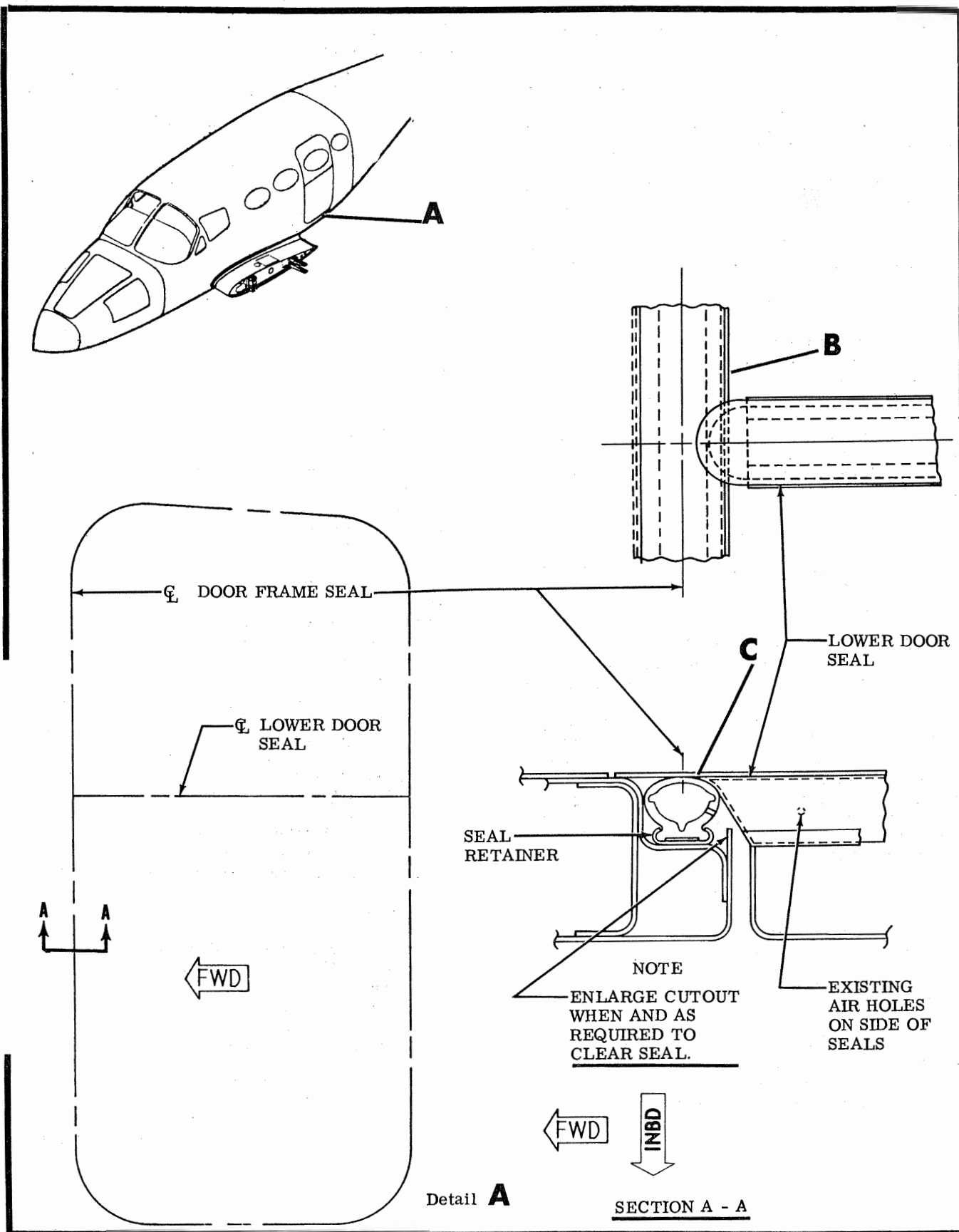


Figure 16-48. Cabin Door Seal Repair (Sheet 1 of 2)

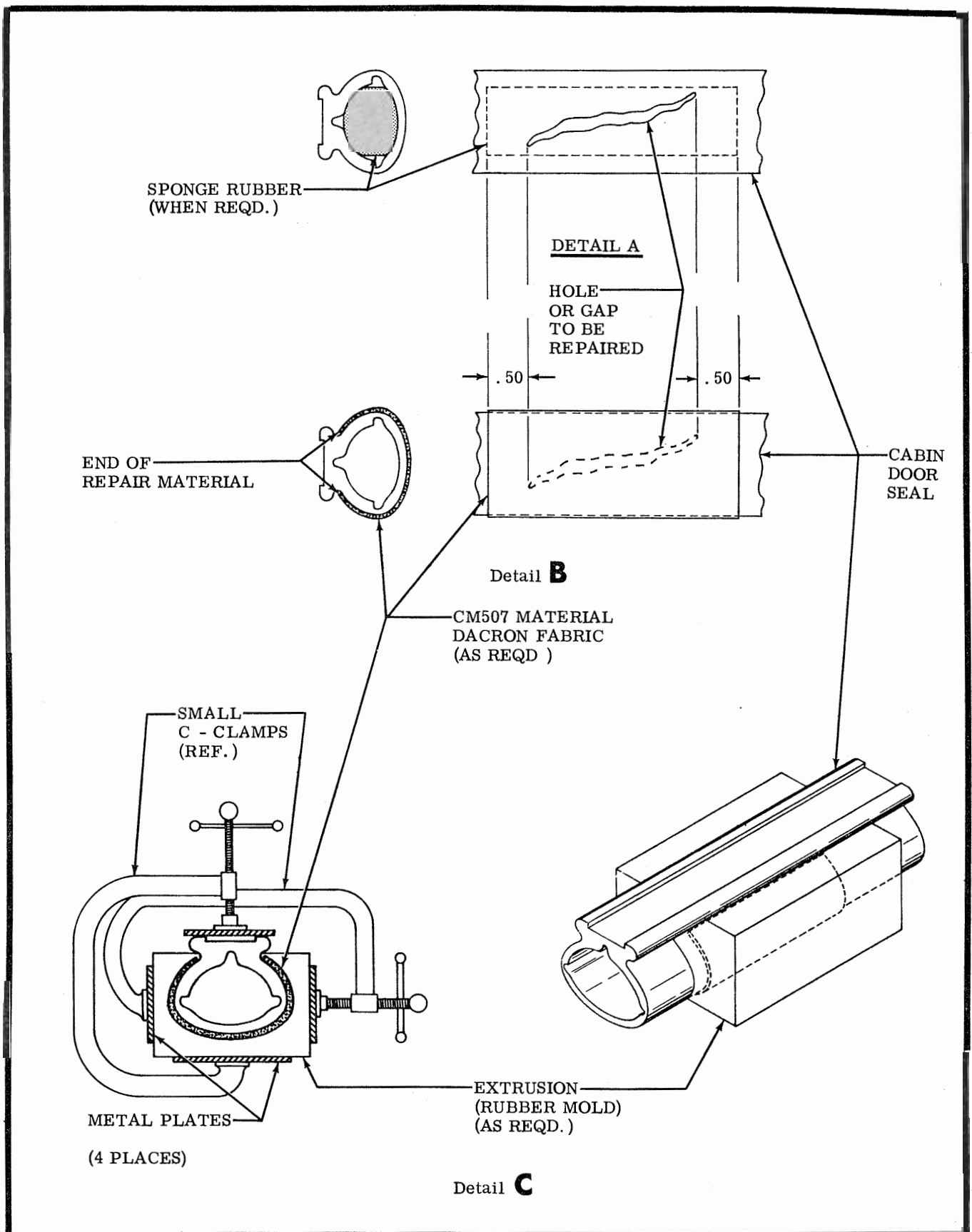


Figure 16-48. Cabin Door Seal Repair (Sheet 2 of 2)

CABIN DOOR SEAL REPAIR.

When repairing the cabin door seal the work area must be clean and dirt free. The cabin door seal need not be removed from the cabin door, only remove enough seal in the damaged area to allow installation of rubber mold.

NOTE

Seals with damaged area of holes or gaps in excess of six inches in length should not be repaired. The seal should be replaced.

a. The following equipment will be necessary before attempting to repair the cabin door seal.

1. SK421-2A available from Cessna Service Parts Center.
2. 3 each small "C" clamps.
3. Blunt plaster tool (for removing and installing seal in cabin door retainer).
4. Spatula.
- b. (Refer to Figure 16-48) Mark seal and seal retainer to insure proper reinstallation of seal in seal retainer.
- c. Remove damaged seal from retainer.

CAUTION

Use extreme care in removing seal from seal retainer, use only plastic tools with blunt ends to prevent additional damage to seal.

d. (See figure 16-43) Using buffing wheel or other suitable means, buff seal area to be repaired slightly and as required to obtain a smooth repairable surface.

e. If a large hole or gap exists in the seal, fill the void with a piece of foam rubber as shown in Detail B to help support the repair material.

NOTE

Make sure the sponge rubber extends at least 0.50 inch beyond ends of hole or gap and trimmed to mate inside surface of damaged area of seal.

NOTE

Insure only enough sponge rubber (R411N closed cell rubber) is used to support the seal material, for each applicable repair. Excess sponge rubber results in cabin door being difficult to close.

f. Cut a piece of CM507 material - Dacron Fabric (included in SK421-2A) the width to extend 0.50 inch beyond ends of hole or gap in seal and long enough to wrap around seal as shown in Figure 16-48, Detail B.

g. Cut a piece of extrusion rubber mold (included in SK421-2A) long enough to cover and overlap ends of CM507 material - Dacron Fabric Patch as shown in Figure 16-48, Detail C.

NOTE

Fabricate (4) four metal plates 0.06 thickness same length and width as rubber mold.

- h. Clean the entire surface area to be repaired with alcohol and let dry.
- i. Remove cellophane lines from cut piece of CM507 material - Dacron Fabric.
- j. Apply a coat of Silastic Silicone Rubber 140 Adhesive approximately 0.005 thick to cleaned surface of seal and to cut piece of fabric spatula.
- k. Allow applied Silastic Silicone Rubber 140 Adhesive to dry until tacky, but no longer, transfer to the knuckles when touched, (usually between 5 and 30 minutes).

NOTE

Use the back of the knuckle to touch the adhesive surface instead of finger tips to minimize contamination.

- l. Install CM507 material - Dacron Fabric Patch on seal with the adhesive surface mating and positioned over hole or gap per dimensions as shown in Figure 16-48, Detail B.
- m. Insure that seal retains its symmetrical size and shape and that no wrinkles exist in patch or seal.
- n. Apply a thin coat of parting agent (soap stone or talcum powder) to extrusion rubber mold to prevent seal sticking to rubber mold.
- o. Place extrusion rubber mold over installed fabric patch as shown in Figure 16-48, Detail C.
- p. Apply light pressure to fabric patch during curing of adhesive, using fabricated metal plates and small "C" clamps as shown in Figure 16-48 Detail C.

NOTE

When seal is only partially removed from retainer to make repair, support the seal and clamped rubber mold to prevent distortion of cabin door seal.

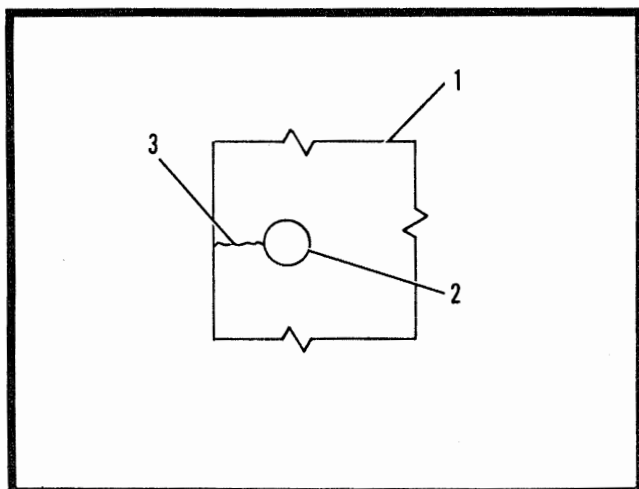
- q. Allow adhesive to cure a minimum of 24 hours under pressure clamp before removing from rubber mold.
- r. Remove seal from rubber mold.
- s. Position seal on seal retainer with marks aligned and reinstall seal, using a blunt tool and talcum powder or water as required to facilitate installation.

NOTE

Insure that door frame seal is installed with existing air holes in seal toward door opening and lower door seal with holes toward the top of door. Pressurized air from inside cabin enters the holes, inflating the seal to form a pressurized seal.

REPAIR OF ICE PROTECTION PANELS.

The following repair procedures should be used for repairing the polycarbonate type ice protection panels. See figure 16-49 and 16-50 for types of



1. Ice Protection Panel 2. Rivet 3. Crack

Figure 16-49. Repairing Crack in Ice Protection Panel

cracks and method of repair. Figure 16-49 is an example of the cracks starting at a rivet hole propagating to the outer edge of the panel.

- a. See figure 16-49, rout the crack using router bit. Rout material approximately 1/32 wide and 1/2 the depth of the panel thickness.
- b. Clean routed crack with isopropyl or ethyl alcohol.
- c. Fill crack with epibond 1331 in accordance with manufacturer's instructions.

NOTE

Epibond 1331 may be procured from Furane Plastics 4514 Brazil Street, Los Angeles, California 90039.

- d. Figure 16-50 illustrates a combination of cracks which may occur. Cracks which do not extend to the outer edge of the ice protection panel, shall be drilled through the ice protection panel with a #40 drill.
- e. Fill the stop drilled hole with Epibond 1331 as per manufacturer's instructions.

NOTE

Bondite or Ditzler DX-666 may be used as an alternate for Epibond 1333.

- f. Normal finishing, priming and painting shall be accomplished following the repair.

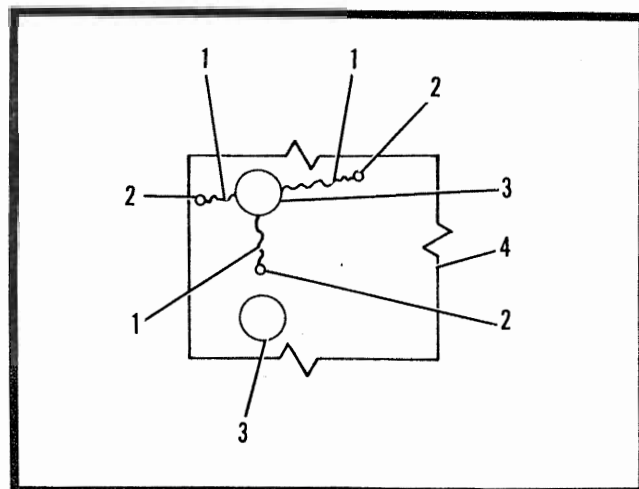
NOTE

Refer to section 2 for painting Polycarbonate.

RIVETS

General.

The following rivets are commonly used in aircraft structures: standard solid shank, hi-shear, and blind. Rivets used in aircraft construction are most gener-



1. Crack 2. Stop Drill 3. Rivet 4. Ice Protection Panel

Figure 16-50. Repairing Combination of Cracks in Ice Protection Panel

ally fabricated from aluminum alloys. In special cases, monel, corrosion-resistant steel, mild steel, copper and iron rivets are used.

Types.

- a. Standard solid shank rivets are those generally used in aircraft construction. They are fabricated in the following head types: roundhead, flathead, countersunk-head, and brazier-head. Roundhead rivets are generally used in the interior of aircraft except where clearance is required for adjacent members. Flathead rivets are generally used in the interior of the aircraft where head clearance is required. Countersunk-head rivets are used on the exterior surfaces of the aircraft to minimize turbulent airflow. Brazier-head rivets are used on the exterior surfaces of the aircraft where strength requirements necessitate a stronger rivet head than that of the countersunk-head rivet. Both the brazier-head and the countersunk-head rivets are used on the exterior of the aircraft where head clearance is required.

- b. Hi-shear rivets are special patented rivets having a high shear strength equivalent to that of the standard AN bolts. They are used in special cases in locations where high shear loads are present, such as spars, wings and heavy bulkhead ribs. The rivet consists of a cadmium plated pin of alloy steel and a collar of aluminum alloy. The installed rivet can be readily identified by the presence of the attached collar in place of the formed head on standard rivets.

- c. Blind rivets are used where strength requirements permit when one side of the structure is inaccessible making it impossible or impractical to drive standard solid shank rivets.

Substitution of Rivets.

- a. Standard solid shank rivets.
 1. In the replacement of rivets in installations

which require the raised head rivets, it is desirable to use whichever of the rivets that correspond to the type of rivet removed.

2. Countersunk head rivets are to be replaced by rivets of the same type and degree of countersink.

3. When rivet holes become enlarged, deformed, or otherwise damaged use the next larger size as replacement.

4. Replacements shall not be made with rivets of lower strength material unless they are larger than those removed.

5. In the absence of aluminum rivets, stainless, monel, or iron rivets may be used with generous application of zinc chromate primer only to permit necessary flights of aircraft. The proper replacement shall be made as soon as facilities are available.

b. Hi-shear rivets. When hi-shear rivets are not available, replacement of sized 3/16 or greater shall be made with bolts of equal or greater strength than the rivet being replaced and with self-locking nuts of the same diameter. The flush-type hi-shear rivet may be temporarily replaced by like diameter flush-type steel screws of equal or greater strength and self-locking nuts provided the threaded part of screw does not extend into material being fastened together. This latter procedure is temporary only and replacement with the hi-shear flush-type rivet must be accomplished as soon as they become available.

c. Blind rivets. Blind rivets have higher deflection rates in shear than standard solid rivets. For this reason, it is not advisable to replace any considerable number of solid rivets in a given joint by blind rivets in as much as this may result in over-stressing the remaining solid rivets. The following specific instructions apply.

1. The hollow blind rivet shall not be used.

2. The blind rivet used shall be of the same or greater strength and one size larger than the rivet it replaces, except that blind rivets may be replaced size for size.

3. In cases of dimpled assembly, the rivet holes shall be drilled after the sheets are dimpled.

4. When possible, the exposed end of each clipped plug shall be coated with a 10 percent chromic acid solution or with zinc chromate primer.

5. Blind rivets shall not be used in hulls, floats, or tanks except in cases of absolute necessity.

6. If blind fasteners other than blind rivets are encountered, it is recommended that replacements be made by either of these fasteners or by standard rivets.

Diameters.

a. Rivet diameters range from 3/32 inch to 3/8 inch. The 1/8, 5/32 and 3/32 inch sizes are the most frequently used.

b. Since smaller rivets lack the proper structural qualities and larger rivets may dangerously reduce the splice or patch area, care must be exercised before substituting other than the specified sizes of rivet diameter.

Lengths.

a. The proper length of rivet is an important part

of the repair. Should too long a rivet be used, the formed head will be too large, or the rivet may bend or be forced between the sheets being riveted.

Should too short a rivet be used the formed head will be too small or the riveted material will be damaged.

b. If proper length rivets are not available, longer rivets may be cut off to equal the proper length (not grip).

c. The rivet length is based on the grip.

Removal of Solid Rivets. (See figure 16-51.)

a. When it becomes necessary to replace rivets, great care should be taken in their removal so that the rivet hole will retain its original size and not acquire replacement with a larger size rivet.

b. To remove a rivet, file a flat surface on the manufactured head. It is always preferable to work on the original head rather than on the one that is bucking over, since the former will always be more symmetrical about the shank. Indent the flat surface with a counter-punch so the drill may be correctly centered. A drill slightly less in diameter than the rivet shank should be used to drill and weaken the head. Take care that rivet shank does not turn with the drill and cause a tear. If the other end of the rivet is supported, the head may be sheared off with a sharp chisel. This cutting should always be done along the direction of the plate edge. If shank is unduly tight after removal of the head, the rivet should be drilled out completely. It may be forced out with a counter-punch of a smaller diameter than the rivet, provided the sheet is properly supported from the opposite side; however, there is greater danger of damaging the sheet and enlarging the hole when using this method. This procedure will also apply to flush rivets.

Riveting Installation.

a. Riveting procedure. A large percentage of the riveting of aircraft structures is done on thin gage aluminum alloy and the work must be so accomplished that the material is not distorted by hammer blows or injured with riveting tools. All aircraft power riveting is done by upsetting or heading rivets against a bucking bar instead of striking the shank with a hammer.

1. To prevent deforming of its head a rivet set must be selected to fit each type. The depth of this set must be such that it does not touch the material being riveted.

2. Parts which are to be heat-treated should be heat-treated before riveting since heat treating after this process causes warping. This is also necessary when assemblies are heated in a salt bath as the salt cannot be entirely washed out of the cracks.

3. Rivets of a diameter smaller than three thirty-seconds inch must not be used for any structural parts, control parts, wing covering, cowling, or similar sections of aircraft except where there are actual replacements.

4. Rivets through hollow tubes, which are loaded only in shear, should be hammered just enough to form a small head. No attempt should be made to form the standard round head as the amount of ham-

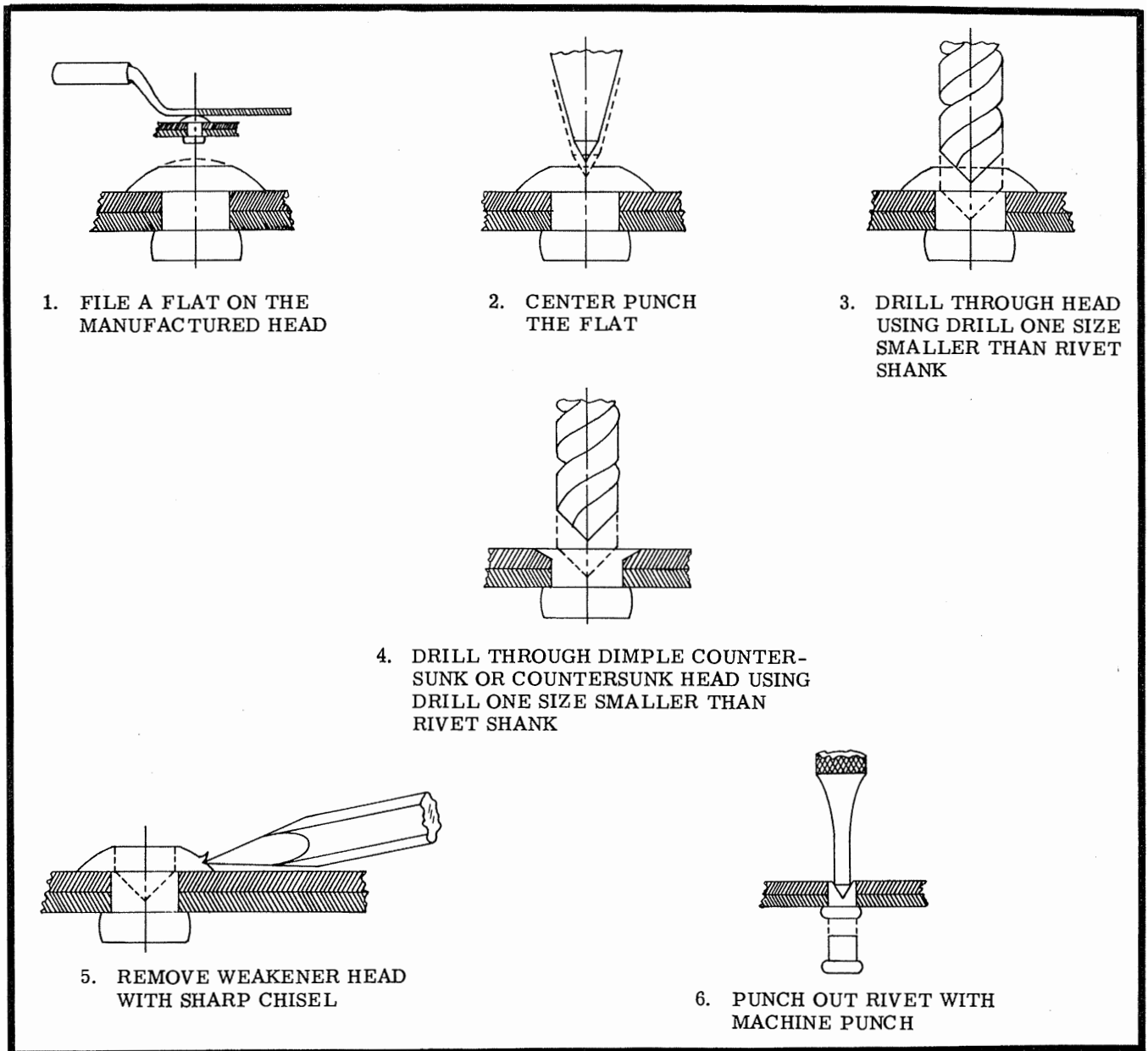


Figure 16-51. Removal of Rivets

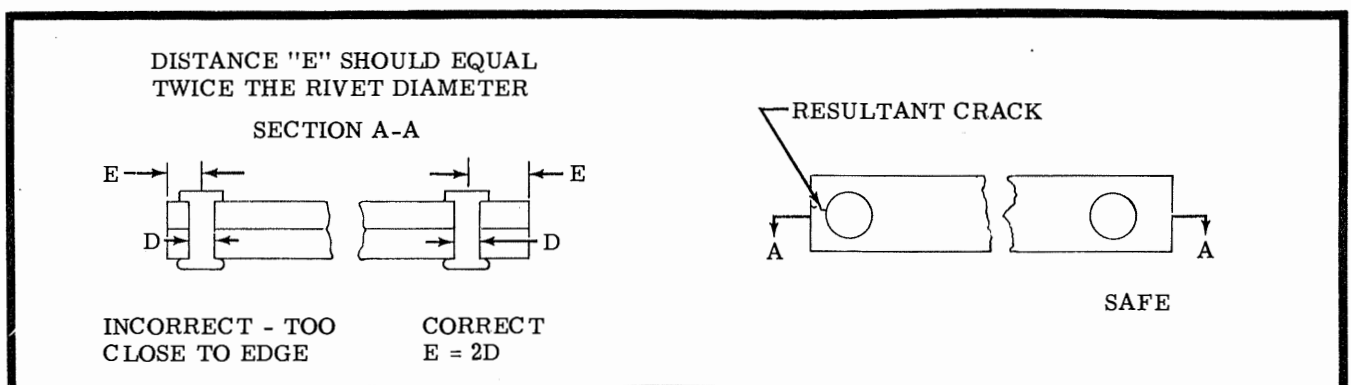


Figure 16-52. Rivet Edge Distance

mering required often causes the rivet to buckle inside the tube, with resultant injury to the member.

5. Aluminum alloy rivets must never be used in tension for structural, control, or other critical parts of aircraft. Whenever such an installation is required, bolts should be used.

6. The use of hollow rivets in joining highly stressed parts is not permitted. When rivets cannot be driven because of the inaccessibility of the end for bucking or driving, the next size self-plugging cherry rivet may be used.

7. The selection of the proper rivet and proper number of rivets is very important.

8. The rivets must be of the proper length for the total thickness of the pieces being riveted. Ordinarily, from 1-1/2 to 2 times the diameter of the rivet is about the right amount for the rivet shank to protrude through the material to form the head. For heavy material such as plates or fittings, from 2 to 2-1/2 diameters may be used.

9. The rivet should not be too loose in the hole as this condition will cause it to bend over while being headed, and the shank will not be sufficiently expanded to completely fill the hole. A drill from 0.002 to 0.004 inch larger than the rivet should be used for sheet and plate riveting.

10. Pieces should be held firmly together by clamps, screws or bolts while they are being drilled and riveted.

11. Where rivets are headed on the inside of the structure, the bucking bar is held against the end of the rivet shank. Care must be exercised doing this operation to prevent unseating the rivet by the application of too much pressure. For the first few blows the bucking bar should be held lightly against the rivet shank so that it will receive the impact of the blow through the rivet. The bucking bar must be held square with rivet to avoid turning it over.

12. Only a sufficient number of blows should be struck to properly upset a rivet. The blows must be as uniform as possible.

b. Sparing and diameter of rivets. There are no specific rules which are applicable to every case or type of riveting. There are, however, certain general rules which should be understood and followed.

1. The edge distance of rivets should not be less than two diameters of the rivet measured from the edge of the sheet or plate to the center of the rivet hole. (See figure 16-52.)

2. The spacing between rivets, when in rows, depends upon several factors, principally the thickness of the sheet, the diameter of the rivets and the manner in which the sheet will be stressed. This spacing is seldom less than four diameters of the rivet, measured between the centers of the rivet holes. Rivets spaced four diameters apart are found in certain seams of monocoque and semimonocoque fuselages, webs of built-up spars, various plates or fittings, and floats or hulls.

3. Where there are two rows of rivets, they are usually staggered. The transverse pitch or distance between rows should be slightly less than the pitch of the rivets, 75% of rivet pitch being the usual practice.

4. An average spacing or pitch of rivets in the cover or skin of most structures, except at highly stressed joints, will be from 6 to 12 diameters of the rivet.

5. The best practice in repair jobs is to make the pitch of the rivets equal to those in the original structure.

Loose or Working Rivets in Outboard Section of Wing.

Loose or working rivets attaching skin to upper and lower front spar cap may be repaired by adding MS20470AD4 or equivalent rivets midway between and in line with existing working rivets and four rivets beyond the last loose rivet, starting repair at wing tip and working inboard. This repair is limited to the area between the nacelle and tip tank fitting.

NOTE

Care must be taken to avoid damage to fuel tanks and wiring.

Loose or Working Rivets.

a. Rivets which appear to be loose shall be checked by the use of a 0.002 feeler gage by inserting the gage around the head of the rivet in question. If the feeler gage can be inserted to the shank of the rivet, it shall be classified as a loose rivet and must be replaced.

b. If the feeler gage can be inserted approximately half-way to the shank for 30% of the circumference of the rivet head, it shall not be classified as a loose rivet.

c. The feeler gage shall be used to check the shear section between the riveted members, such as skin to spar or different sections of skin in a similar manner to that used around the rivet head.

d. If the skin around the brazier head or counter-sunk rivet can be moved by depressing the skin with finger pressure around the rivet, the rivet shall be replaced.

e. If rivets are found to turn by applying a rotating load to the head of the rivet, they should be replaced.

f. In areas where exterior paint has been applied to rivet heads, the paint may harden due to aging processes and show hairline cracks around the edge of the rivet heads. This should not be used as a basis for determining whether the rivet is loose or not. The hardened paint may crack at times and collect dirt or exhaust fumes which will appear as discoloration. It is not possible to detect loose rivets visually.

g. When replacing rivets, it is desirable to replace them with like size and type. In some instances, it will be necessary to go to the next size larger diameter. For general repair practices, the spacing between the centerlines of adjacent rivet holes shall be four diameters or greater. In areas where the spacing between rivets prohibits the use of the next size larger rivets, special repair instructions and procedures shall be utilized.

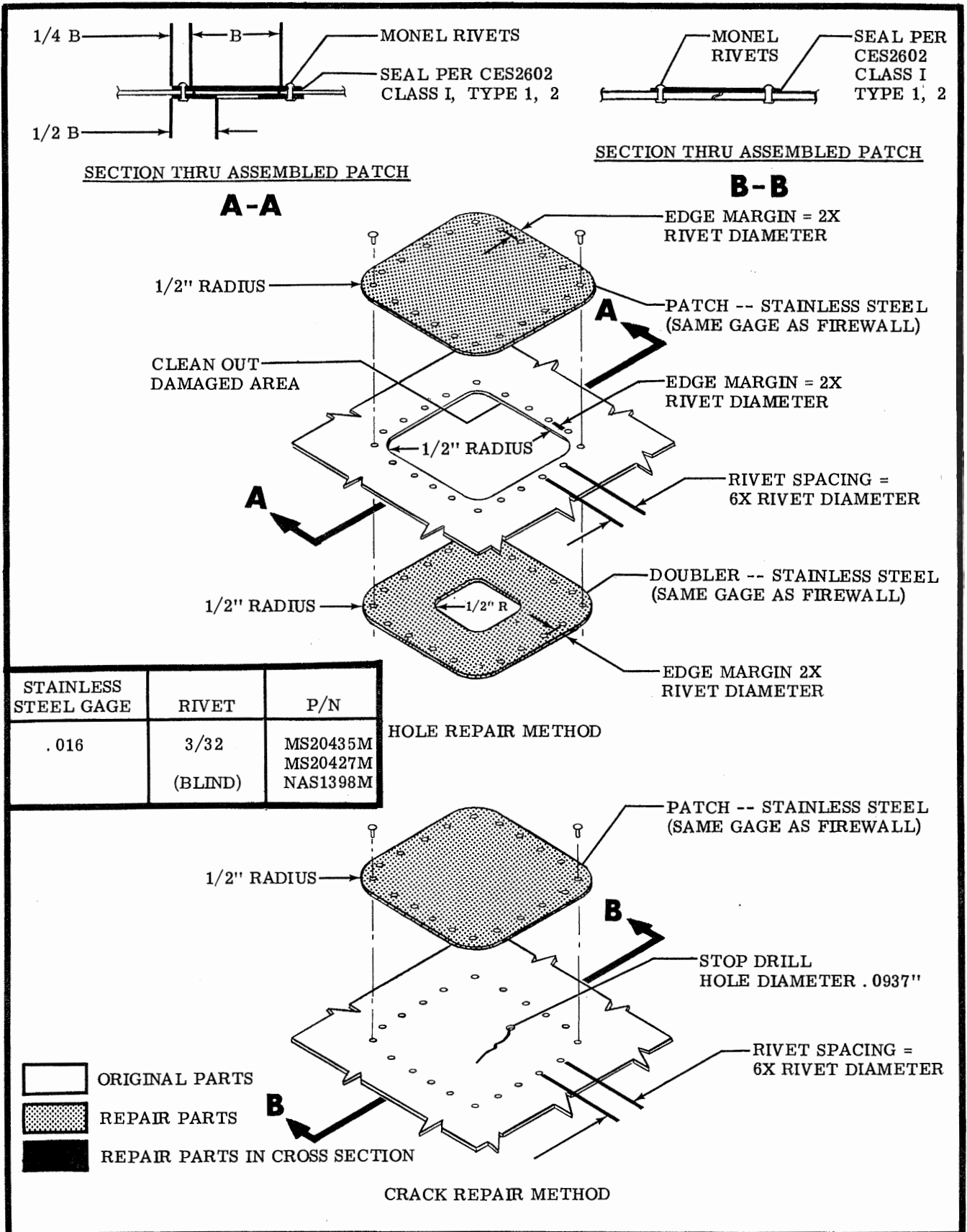


Figure 16-53. Repair of Firewall

NOSE COMPARTMENT WATER SEALING. (See figure 16-54.)

When access panels have been removed or when repairs have been made in the nose section or water has entered the nose compartment, it will be necessary to seal the nose section in accordance with the following instructions.

- a. Seal all skin joints, rivets and stringers in nose baggage and radio compartment by brushing the joints with PR1422, Class A2 sealant, using a small paint brush.
- b. Remove nose access panel and seal with No. 5550 sealer.
- c. Detach nose cone or radome and seal all voids between nose cone or radome assembly, aircraft skin and nose bulkhead using 576-1 sealer (Prestite-Permagum).
- d. Seal around pitot tube using No. 5120C sealant.
- e. Seal around rivets and voids of cabin heater inlet and nose section skin using PR810 sealant.
- f. Seal any opening, all voids in nose wheel well, which might have water leakage possibilities using PR1422 or PR810 sealant.
- g. Seal entire perimeter of all access panels using No. 5550 sealer.
- h. Seal voids around baggage doors, lower latch assemblies, between lower doorframe channel and aircraft skin with 576-1 sealer (Prestite-Permagum) or PR810 sealant.
- i. If baggage doorframe seal is replaced, use EC880 cement for sealant.

Preparations, Application and Procedures for Sealants, Cements and Surfaces.

- a. All surfaces shall be free of dirt, grease, moisture or chips at the time of application of sealants or cements.
- b. Metal surfaces shall be thoroughly cleaned with solvents such as Trichlorethylene, Stoddard Super Solvent or Methyl Ethyl Ketone (MEK). This is very important for sealant and cement adhesion.

NOTE

Do not use any of the above solvents on transparent plastic surfaces.

- c. Use a lint-free cloth for application of solvent and another for wiping surfaces dry. Do not allow the solvent to evaporate; the area must be wiped dry. Blow faying surfaces free of solvent using filtered air.
- d. Transparent plastic surfaces (windshield, windows) shall be cleaned by wiping lightly with a cloth or small paint brush saturated with Aliphatic Naphtha (TT-N-95, Type II) or equivalent, and dry with a clean cotton-flannel cloth.

CAUTION

All surface cleaning and all sealing must be done in a clean, well ventilated area. Take precautions to guard against sparks or open flame in the vicinity of the aircraft at all times. Observe all safety precautions and regulations.

WARNING

Avoid excessive skin contact and prolonged breathing of vapors of any solvent or sealant. Wash hands thoroughly after using sealants or solvents before smoking or eating.

- e. EC612 fillet sealant is applied along cracks, seams and joints, where sealant is applicable, using a spatula or pressure extruder.
- f. Allow EC612 sealant to air dry until quite tacky to the back of the knuckles (15 to 30 minutes) and then apply a coat of PR810 sealant over the entire fillet of EC612 sealant, using a spatula or extrusion gun.
- g. Apply PR810 sealant using a spatula, calking gun, flow gun or brush along cracks, seams, joints and rows of screws or rivets as specified.
1. When sealing is done before parts are mated, use enough PR810 sealant to completely fill the joint and wipe away the excess after the parts are joined.
2. Joints shall not be flexed until sealant has cured to tack-free condition. Fillet seals shall overlap the edges of all materials thinner than .20 and may or may not overlap materials over .20 inch.

NOTE

PR810 sealant cures by solvent release. Length of cure period depends on air circulation and temperature. Parts may be handled or installed after sealant has become tack-free. The tack-free condition can be determined by placing the knuckles firmly against the sealant. When the sealant doesn't adhere to the knuckles, the sealant is tack-free (approximately 2 hours).

- h. PR1422, Class 2A sealing compound shall be mixed per manufacturer's instructions on container.

NOTE

Mix PR1422 sealing compound in a wax-free container and insure the two components are mixed thoroughly so that the mixture is uniform in color. Care should be taken in mixing to avoid incorporation of air by too rapid stirring or folding action.

NOTE

Mixed compound has a limited work life, mix only quantity of PR1422 sealing compound required to accomplish each sealing operation.

1. Mixing temperatures for PR1422, Class A2 sealant is 75° to 40° F.
2. Sealant shall not be applied at temperatures below 60° F or to structure that is below 60° F.

NOTE

PR1422, Class A2 tack-free condition can be determined by placing the knuckles firmly against the sealant. When sealant no longer adheres to the knuckles, (approximately 30 hours), the sealant is tack-free. Final curing time of sealant is approximately two and one-half times the tack-free curing time. All clean up must be done before sealant cures.

- i. No. 5120C sealer is furnished in extruded beads or ribbons and can be cut to size and placed by hand in area indicated.
- j. No. 5550 sealer is furnished in cartridges, use cartridge to apply sealer.

NOTE

If No. 5120C or No. 5550 sealers flow out after joints are mated, wipe off the excess material.

- k. EC880 cement shall be applied in a thin even coat to each surface to be bonded and allowed to dry

until quite tacky, but no longer transfers to the knuckles when touched, (usually between 5 and 30 minutes). Porous surfaces may require two coats.

NOTE

Use the back of the knuckle to touch the adhesive surface instead of fingertips to minimize contamination.

1. Place the two surfaces in contact and press firmly together to insure intimate contact. If less strength is required, only one surface need be coated (the less porous), in which case, the drying period will be from 5 to 8 minutes.
2. One hour should be allowed before the part is handled. Very good bond strength is obtained if parts are allowed to set for at least 24 hours.

NOTE

Rubber seal materials shall be prepared by abrading or roughening the surface to be bonded to remove the surface gloss, then solvent cleaned.

Sealant Materials.

- a. PR1422, Class A2 sealant, PR810 sealant, Products Research Company.
- b. No. 5550 sealer, No. 5120C sealer, Schnee-Moorhead Chemicals, Inc.
- c. 576-1 sealer, Prestite Engineering Company.
- d. EC880 cement, 3M Company.

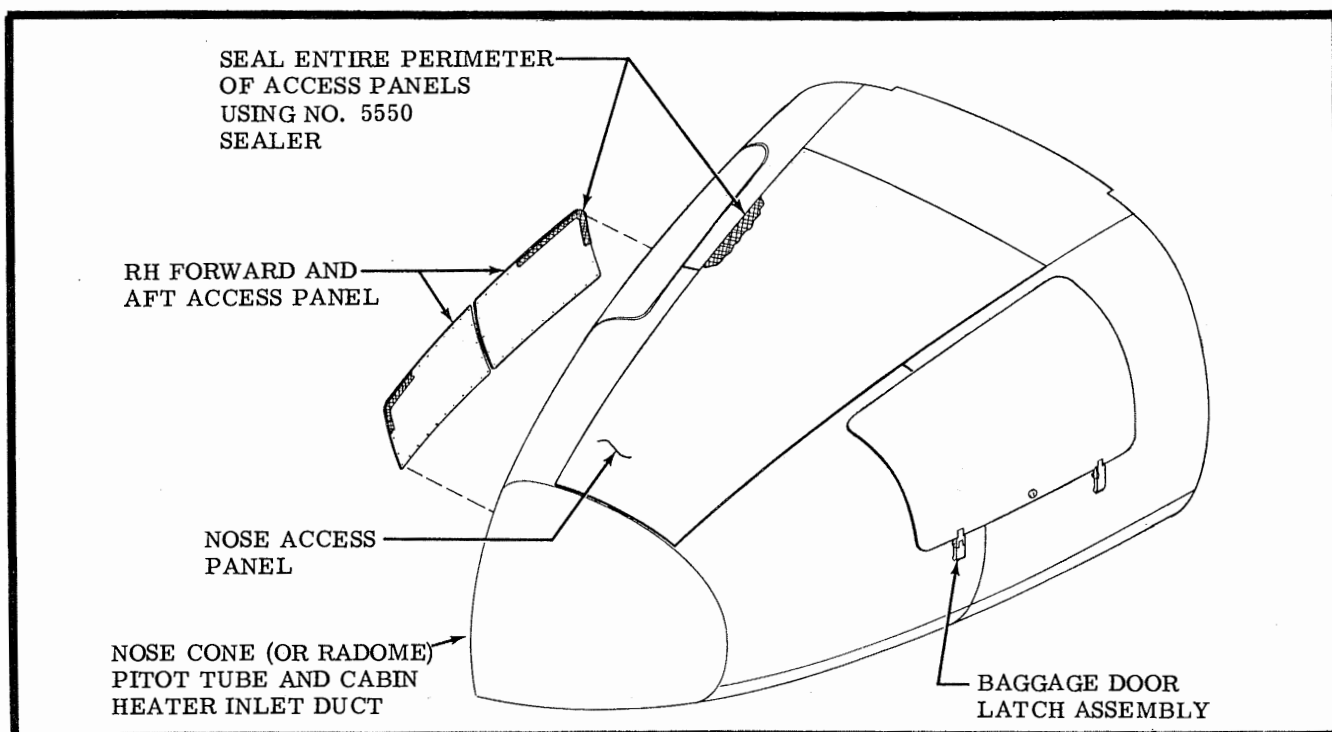


Figure 16-54. Nose Compartment Water Sealing

Pressure Drain Seals.

The pressure drain seals, located on the lower skin of the fuselage, provide a drain should moisture accumulate between the lower skin and floorboards. When the pressure cabin is in the unpressurized mode, the seals will allow moisture to drain.

Removal of Pressure Seals. (See figure 16-55.)

Removal of the pressure seals is not recommended unless the seal has been punctured or the seal has been damaged rendering it inoperative.

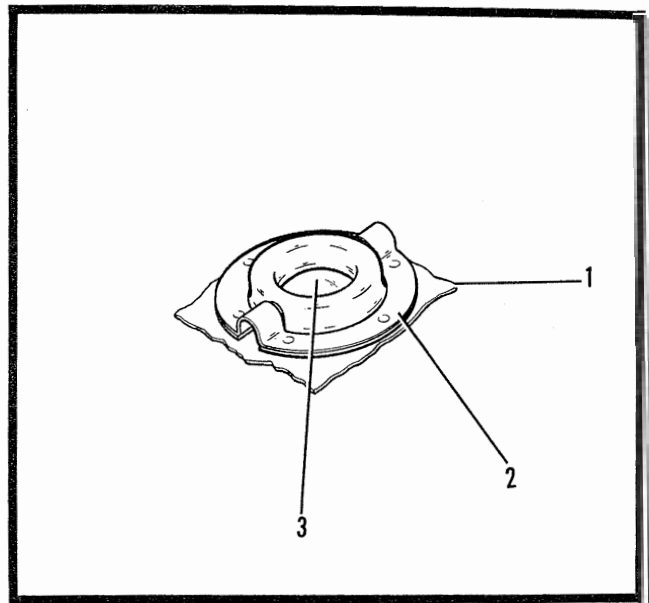
- a. Using the proper size drill, remove rivets.
- b. Remove seal and discard.

Installation of Pressure Seals. (See figure 16-55.)

- a. Position seal in place.
- b. Secure with proper rivets using good shop practice.

CAUTION

Never insert a sharp object in drain hole, this will puncture the seal.



1. Belly Skin 2. Retainer 3. Pressure Seal

Figure 16-55. Pressure Drain Seals

Resin Selectron 5003 - Comparable to MIL-R-7575 -
Vendor: PPG Industries, Inc., One Gateway Center,
Pittsburg, Penn., Attention: International Dept.

- a. Alternate: Hetron 92 - Comparable to MIL-R-7575 - Vendor: Hooker Electrochemical Co.,
Niagra Falls, N. Y.

Luperson DDM - No MIL specification - Vendor:
Lucidol Division, Wallace and Tiernan, Inc.,
Buffalo, N. Y.

Luperco ATC Paste - No MIL specification -
Vendor: Lucidol Division, Wallace and Tiernan,
Inc., Buffalo, N. Y.

Nuodex Cobalt - Federal Standard TT-D-643 -
Manufacturer: Nuodex Canada Lmt., 34 Industrial
St., Toronto 352, Ontario, Canada.

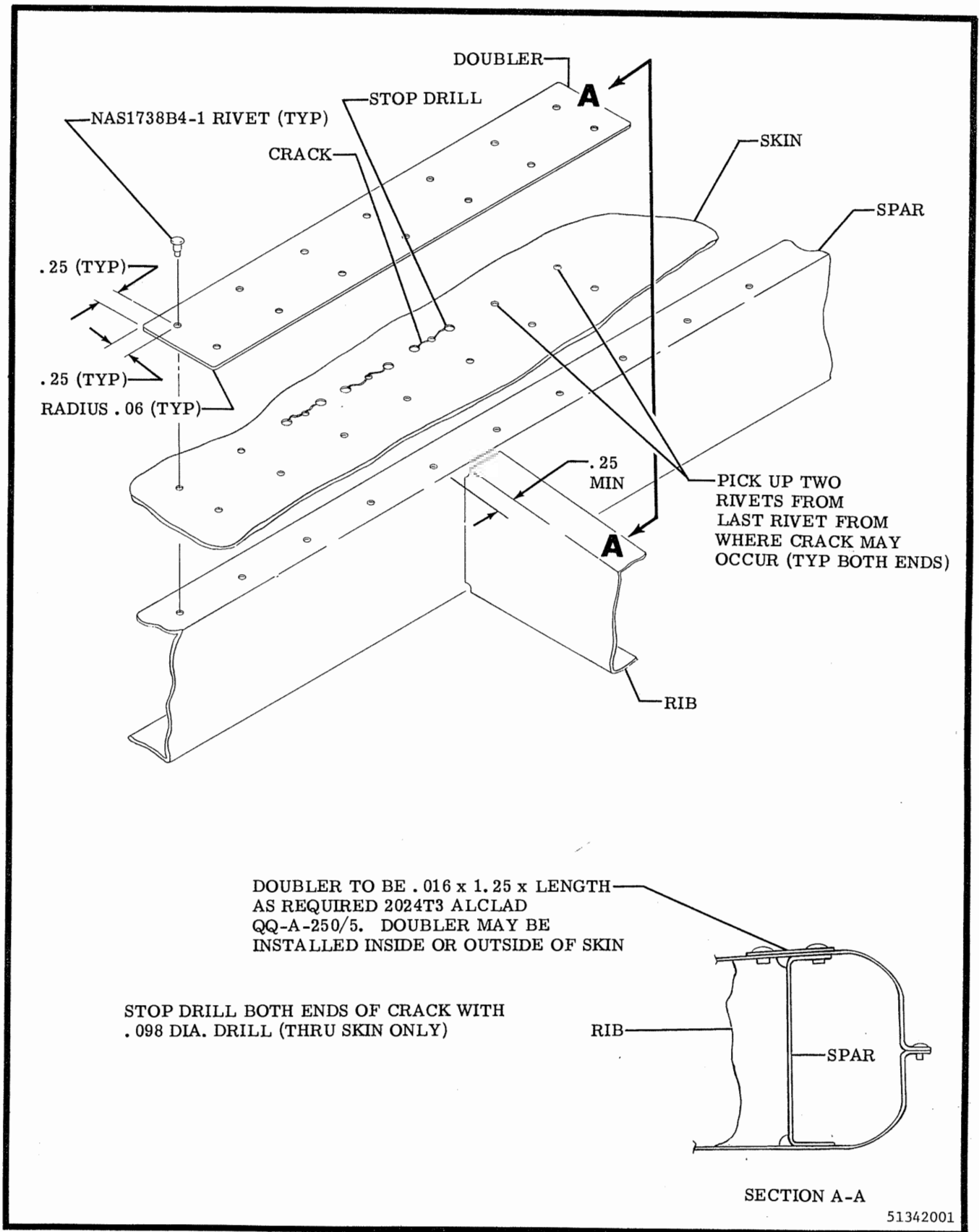
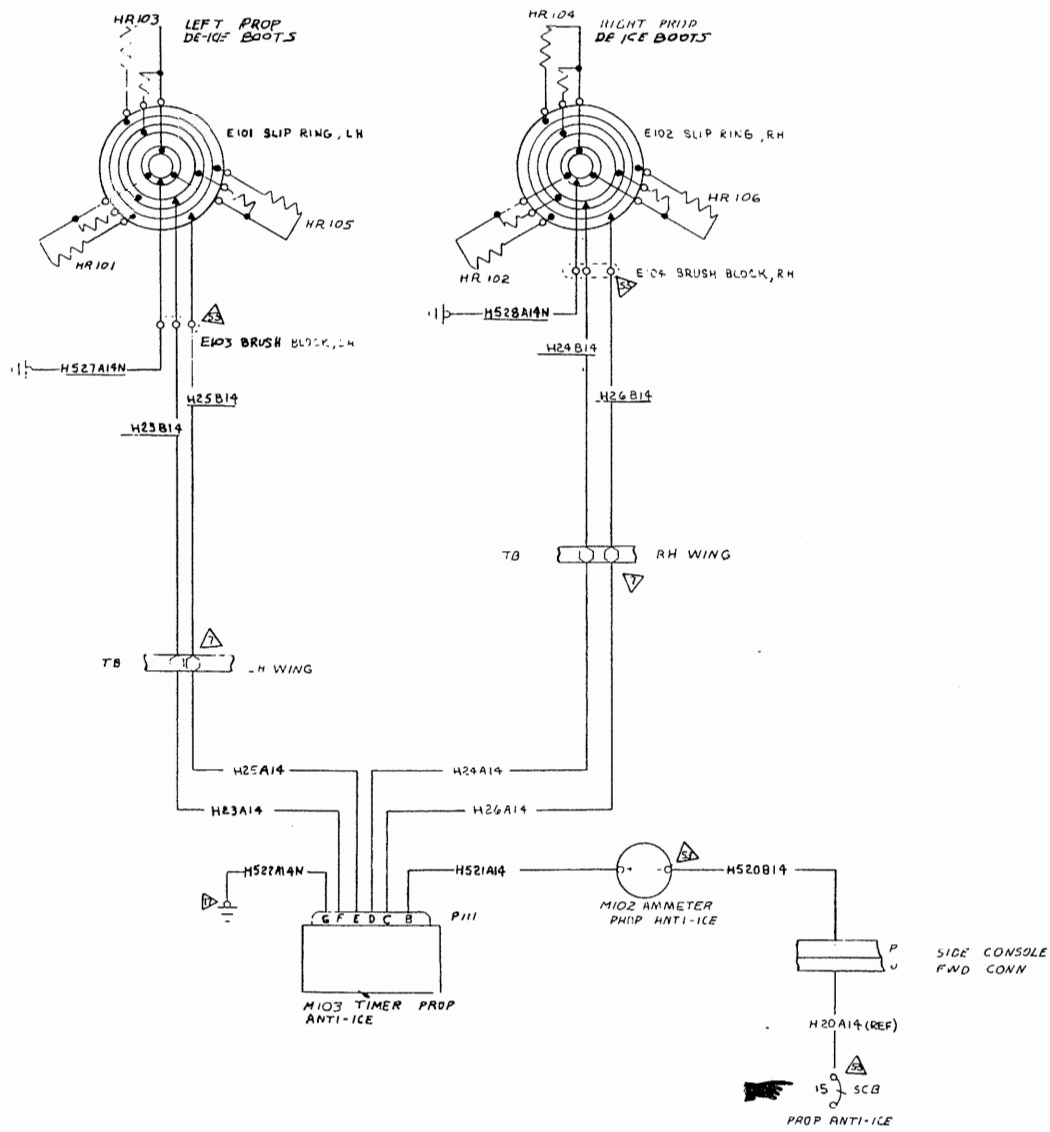


Figure 16-56. Typical Elevator Skin Repair



EQUIPMENT LIST (FOR REF ONLY)		
SYMBOL	PART NO	PART NAME
E101	4E1489	SLIP-RING, LH
E102	4E1489	SLIP-RING, RH
E103	4E1387	BRUSH BLOCK, LH
E104	4E1387	BRUSH BLOCK, RH
HR101	C165013-0201	PROP BOOT
HR102	C165013-0201	PROP BOOT
HR103		
HR104		
HR105		
HR106	C165013-0201	PROP BOOT
M102	C662503-0101	AMMETER-PROP ANTI-ICE
M103	3E150-3	TIMER-PROP ANTI-ICE
P III	MS3108B-20-153 66099-1	PLUG-TIME PROP ANTI-ICE PIN
SCB	112-215-101 56101-1	PROP ANTI-ICE SOCKET
	MS25036-153	TERMINAL
	MS25036-107	TERMINAL

421B0001 AND ON

		AIRCRAFT CO.		P. O. BOX 1977 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
TITLE: PROPELLER DE-ICE WIRING DIAGRAM (OPT)					
SIZE D	CODE IDENT. NO. 11379	DRAWING NO. 5118431			
SCALE: NONE		REF	SHEET 1 OF 1		

SUPERSEDES 5118301

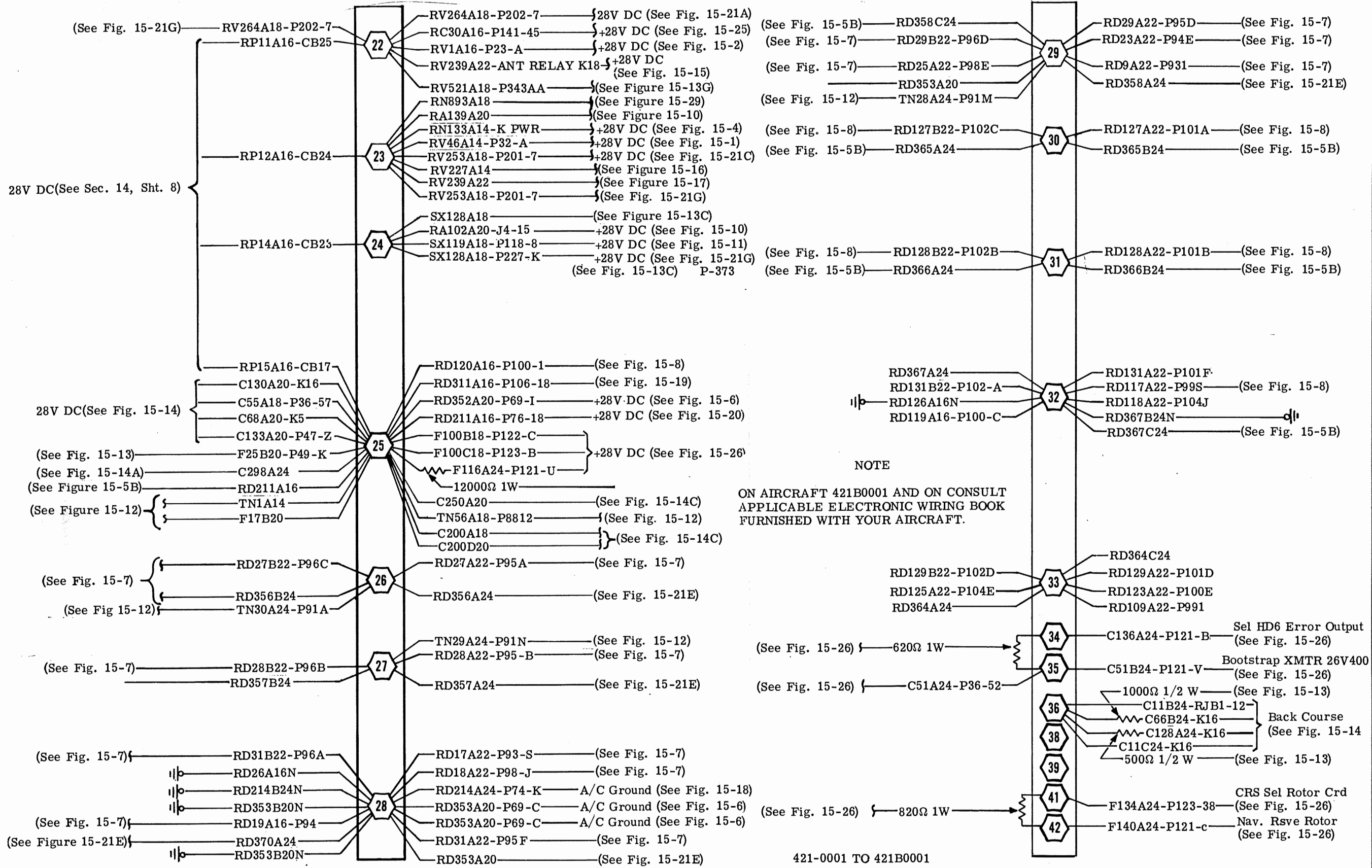


Figure 15-29. Radio Junction Box Terminations (Sheet 2 of 2)

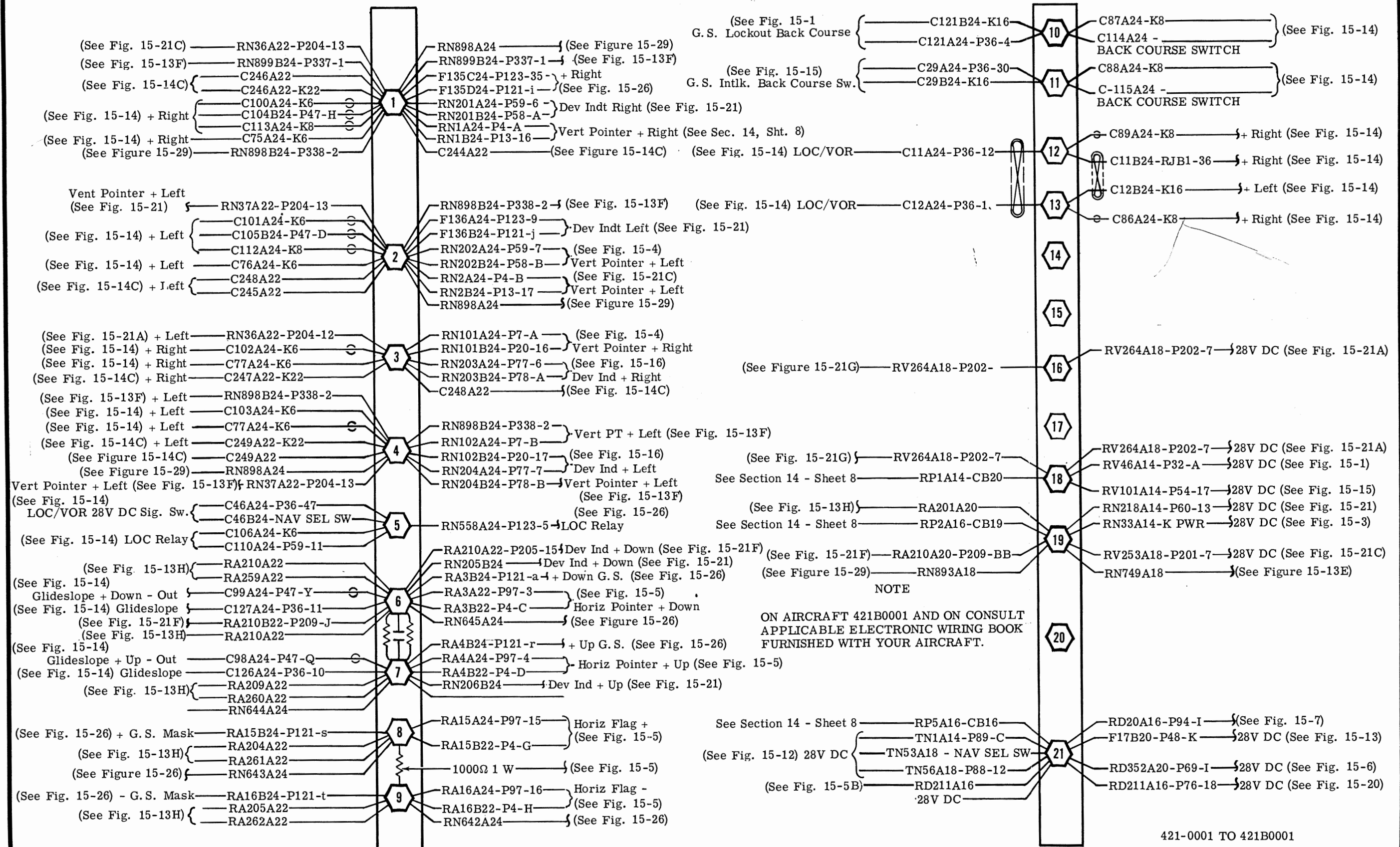
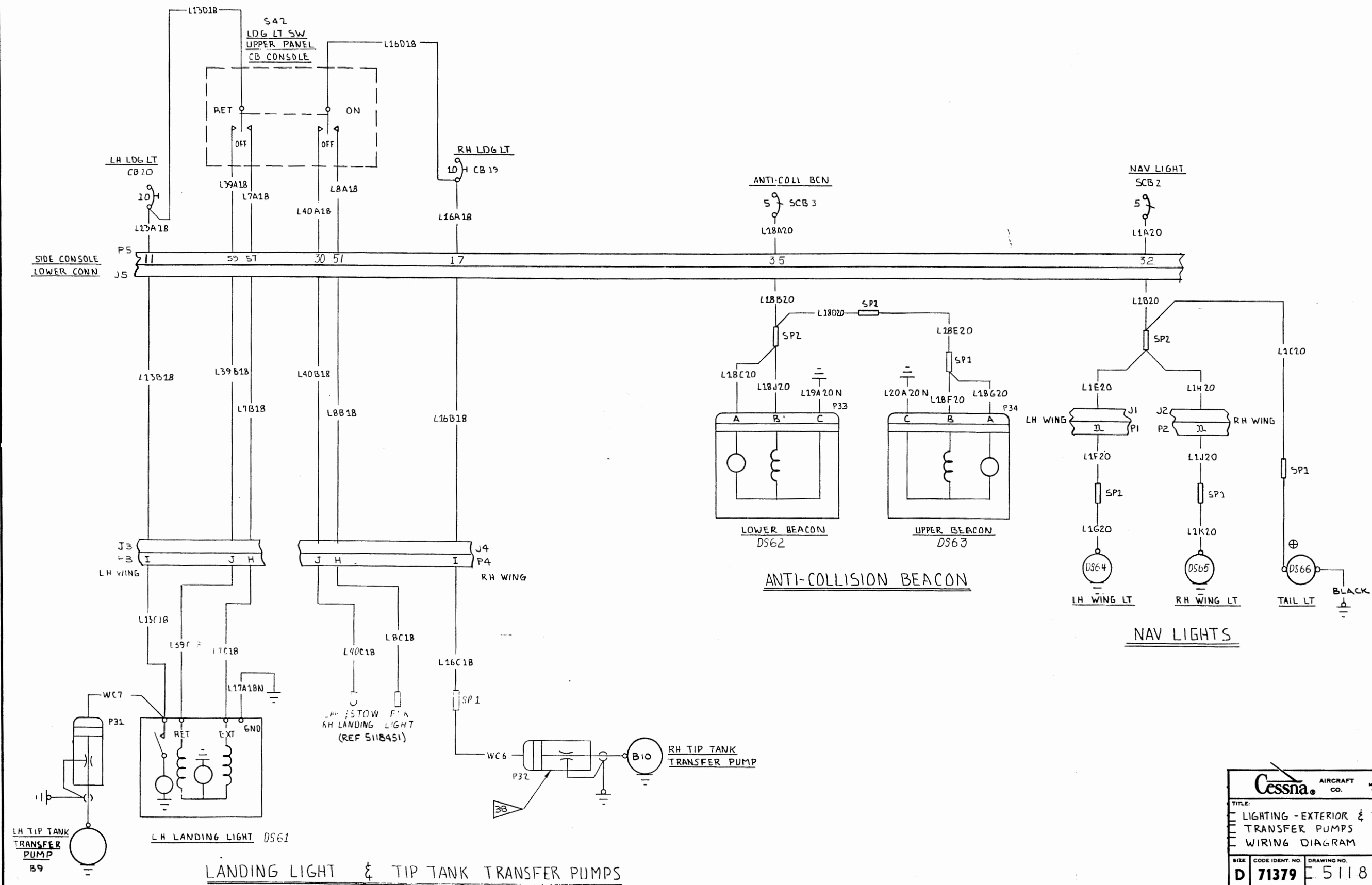
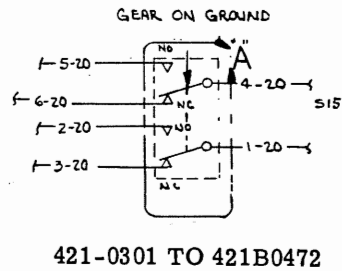
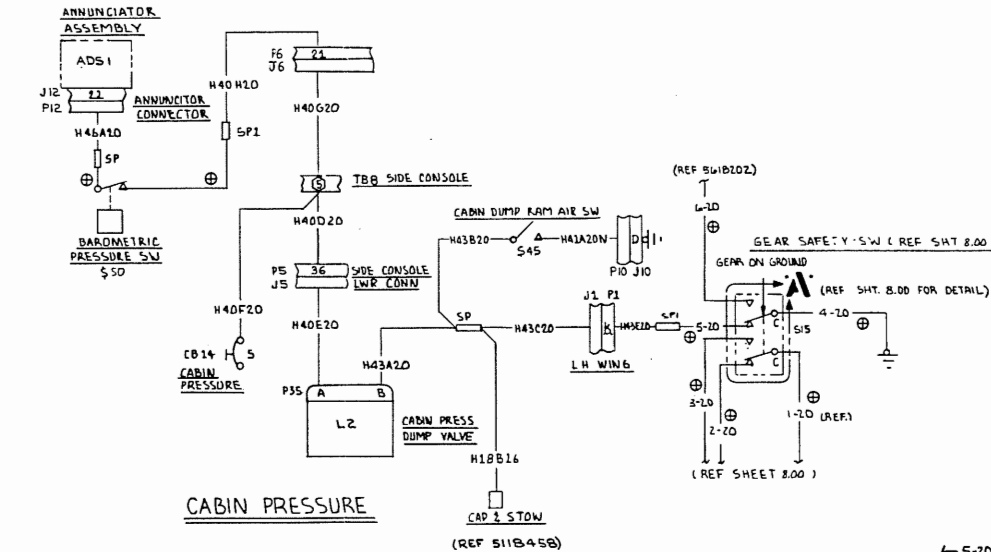
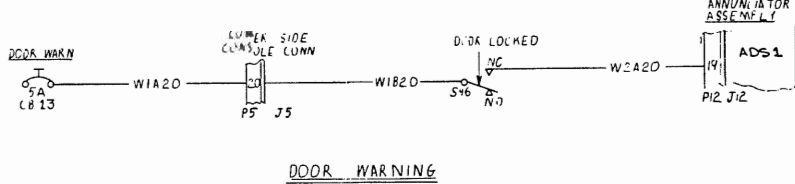
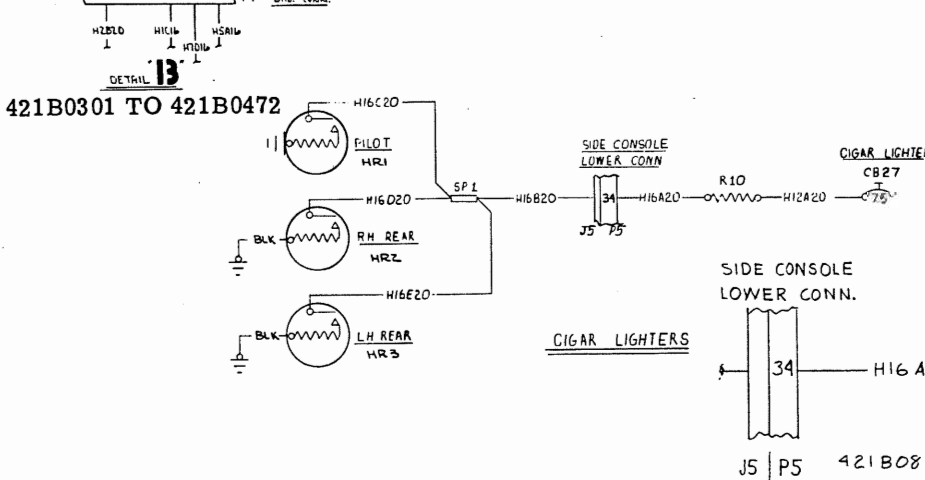
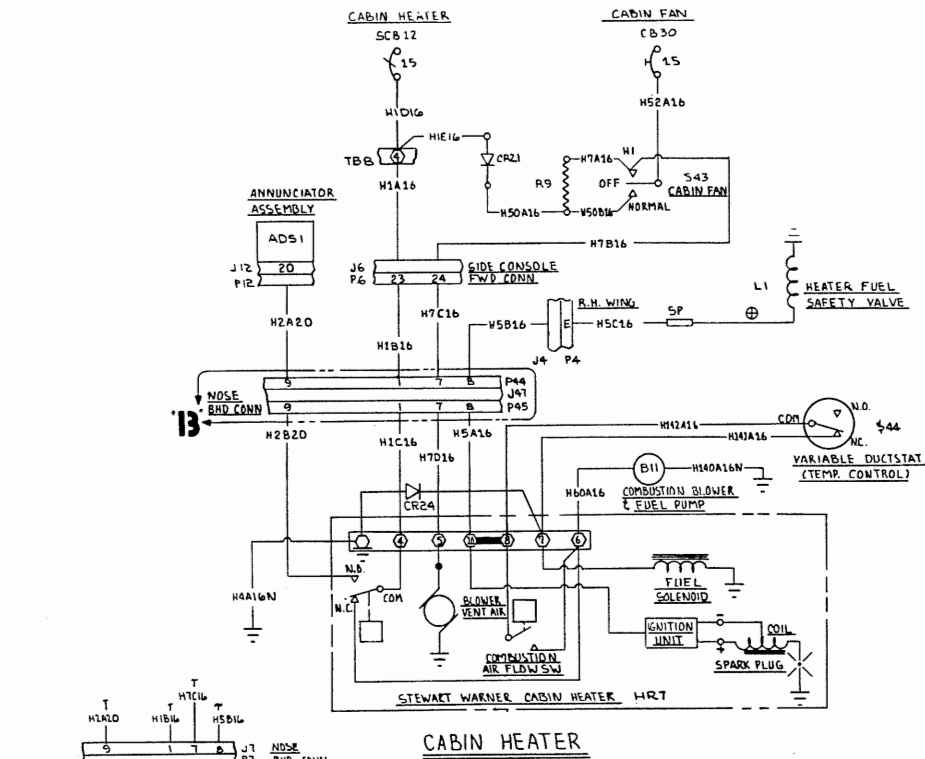


Figure 15-29. Radio Junction Box Terminations (Sheet 1 of 2)

REVISIONS				
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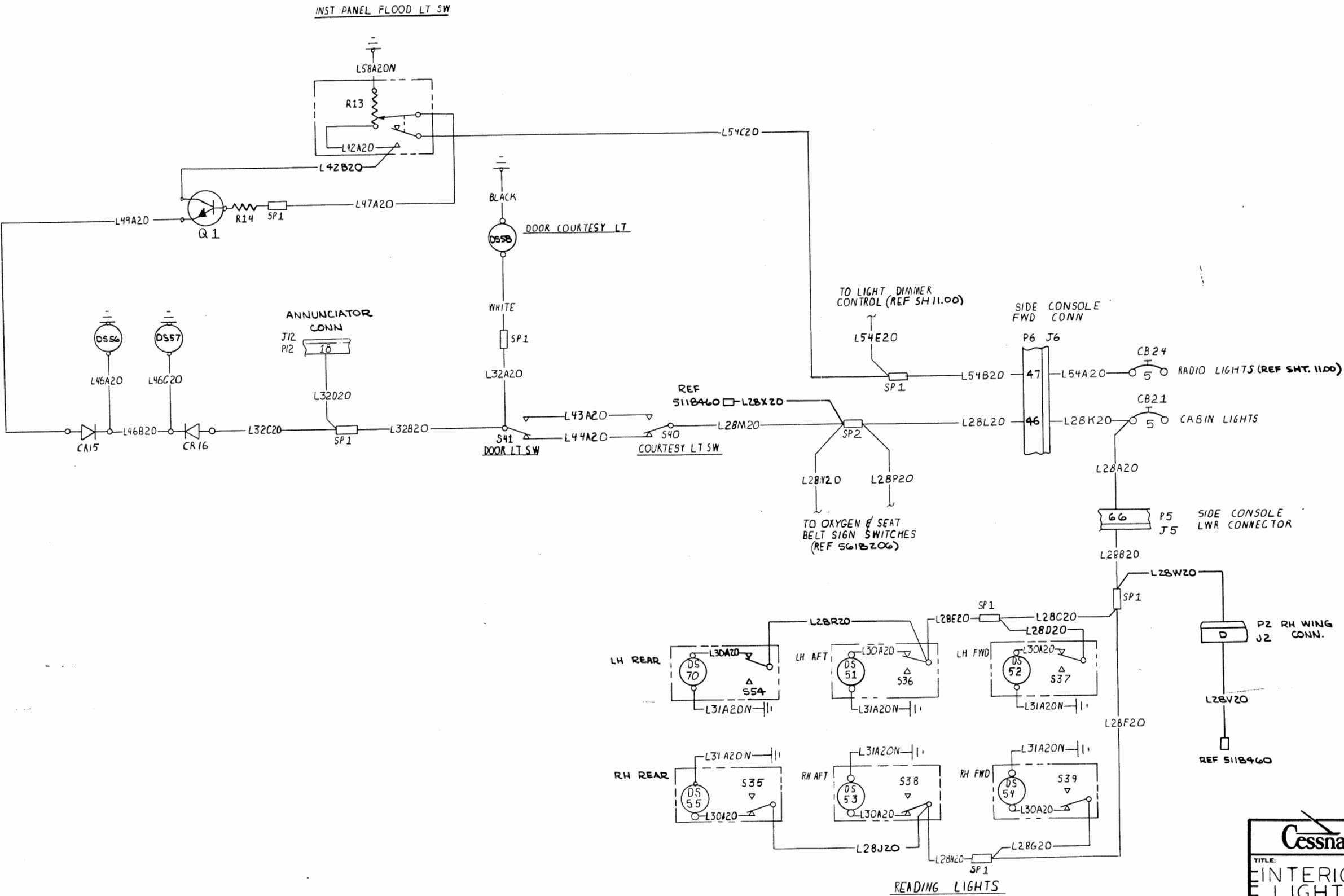


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TITLE: LIGHTING - EXTERIOR & TIP TANK TRANSFER PUMPS WIRING DIAGRAM				
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5118420		
SCALE: NONE		REF	SHEET 13.00 OF 15.00	



Cessna		AIRCRAFT CO.	P. O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201
TITLE CABIN PRESSURE, CABIN HEAT, CIGAR LIGHTERS & DOOR WARNING WIRING DIAGRAM			
SIZE	CODE IDENT. NO.	DRAWING NO.	
D	71379	5118 420	
SCALE: NONE		REF E	SHEET 14.00 OF 15.00

REVISIONS			
ZONE	LTR	DESCRIPTION	DATE





AIRCRAFT
CO.

P.O. BOX 1877
MILITARY & TWIN DIVISION
WICHITA, KANSAS 67201

TITLE:
INTERIOR OVERHEAD
LIGHTING

SIZE: **D**

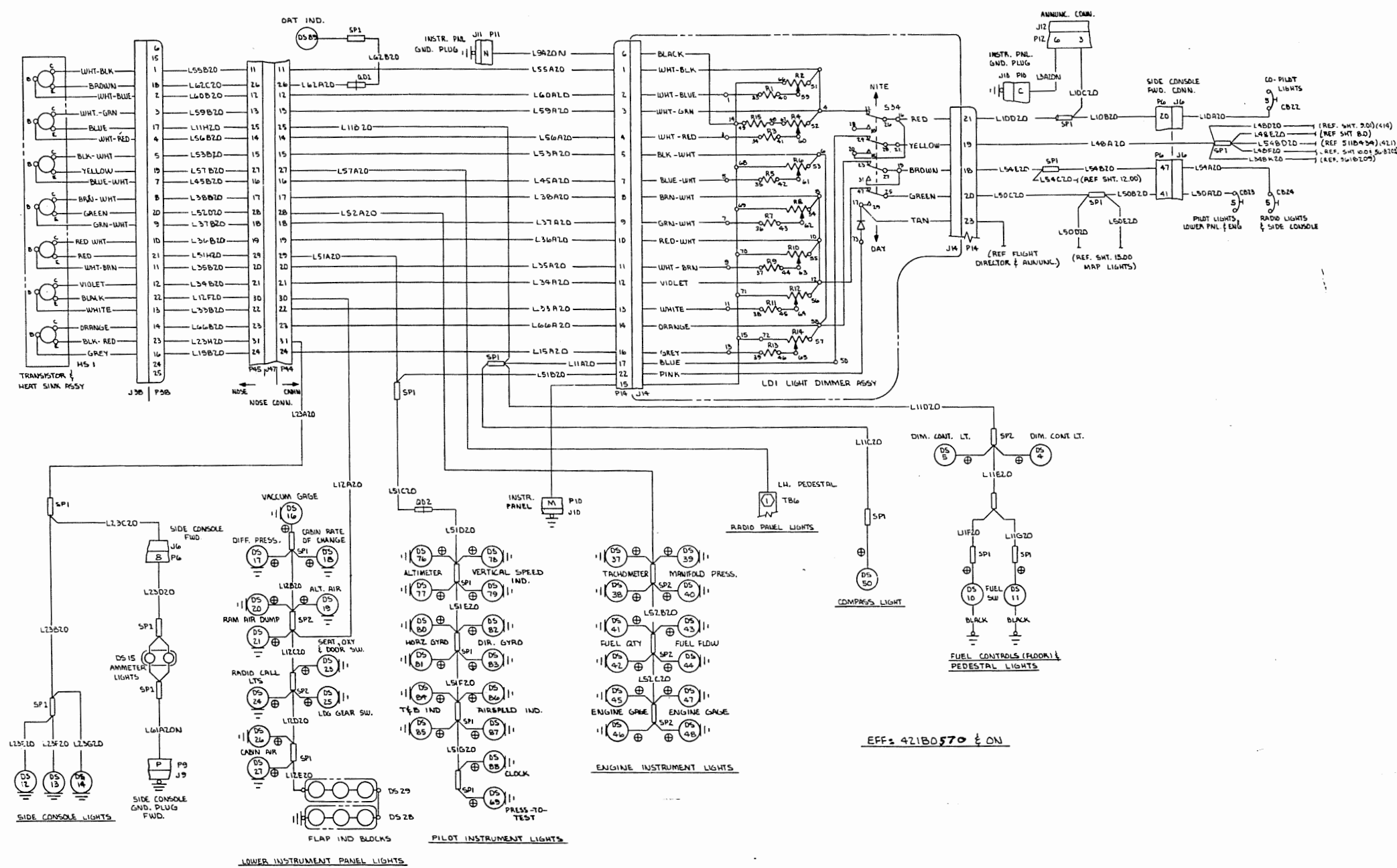
CODE IDENT. NO.: **71379**

DRAWING NO.: **5118420**

SCALE: **N / A**

REF:

SHEET **12.00** OF **15.00**



Cessna

AIRCRAFT CO. P.O. BOX 1977 WICHITA, KANSAS 67201

TITLE

DIMMABLE PANEL LIGHTS (MODIFIED)

SERIAL CODE IDENT. NO.

D 71379

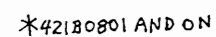
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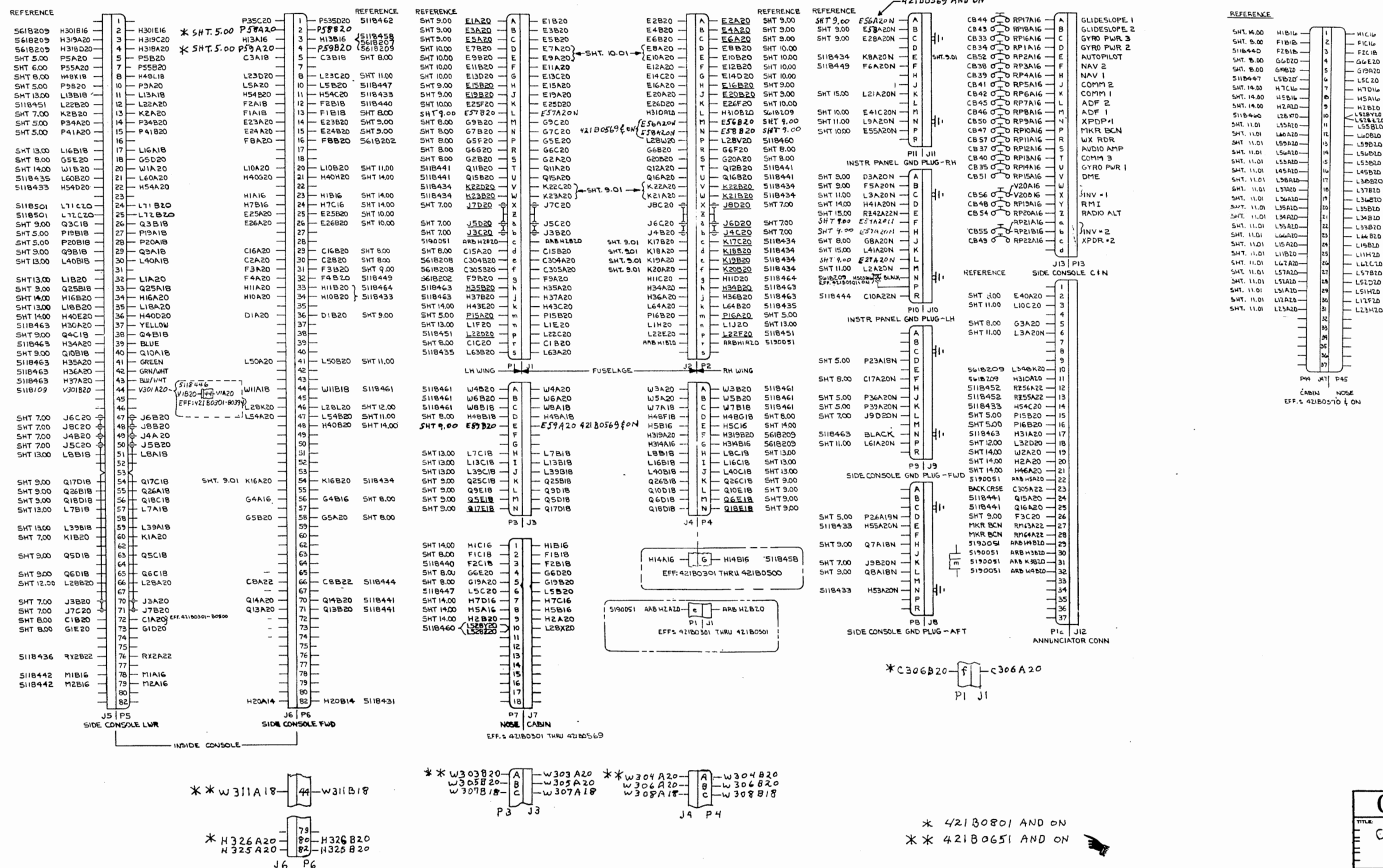
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REF: E

SHEET 11.01 OF 15.00



		AIRCRAFT CO.		P.O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
TITLE:					
TERMINAL BOARDS					
SIZE	CODE IDENT NO	DRAWING NO			
D	71379	518420			
SCALE	NONE	REF	E	SHEET 4.00 OF 1500	



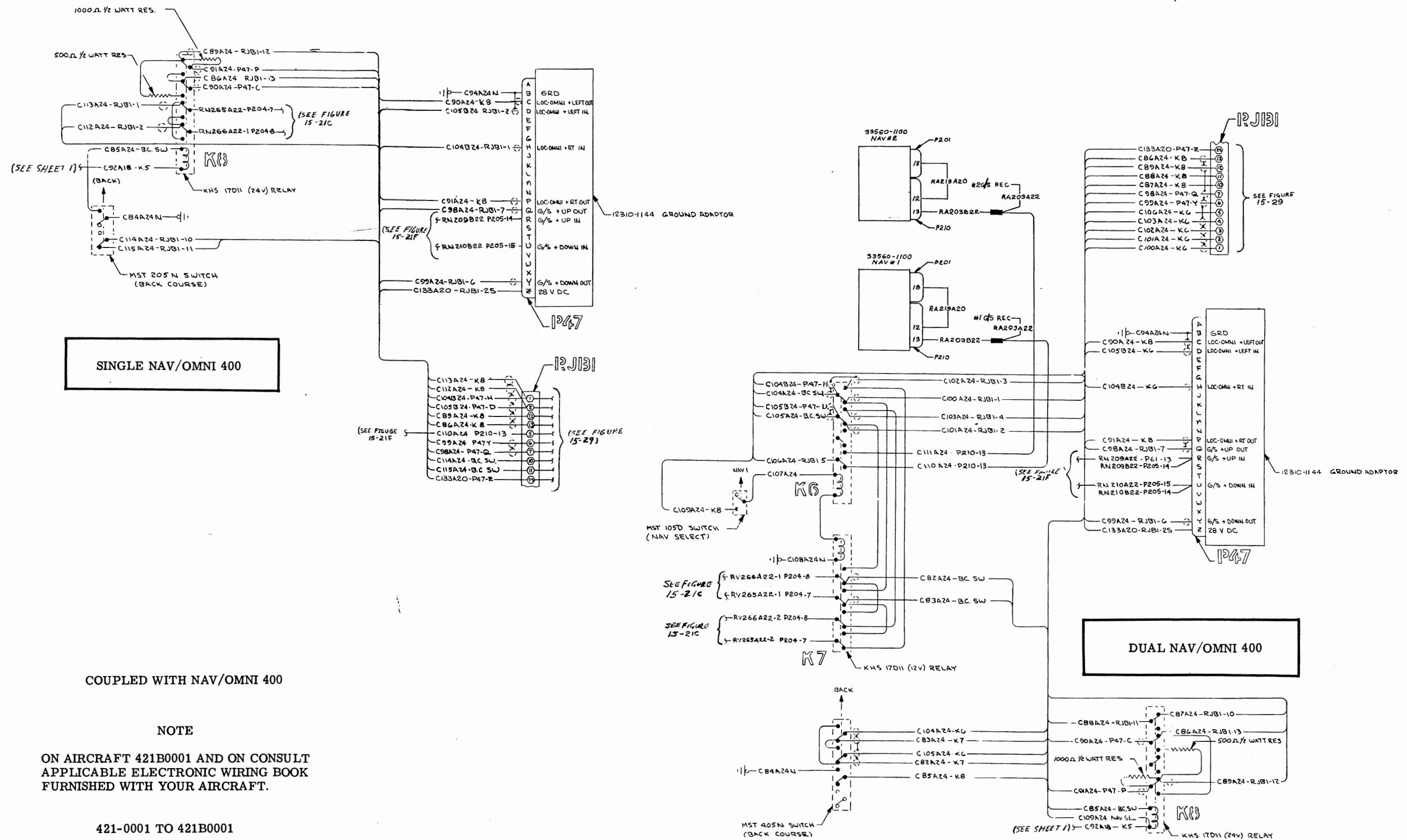


Figure 15-14. Cessna Nav-O-Matic 800 Autopilot (Sheet 5 of 5)

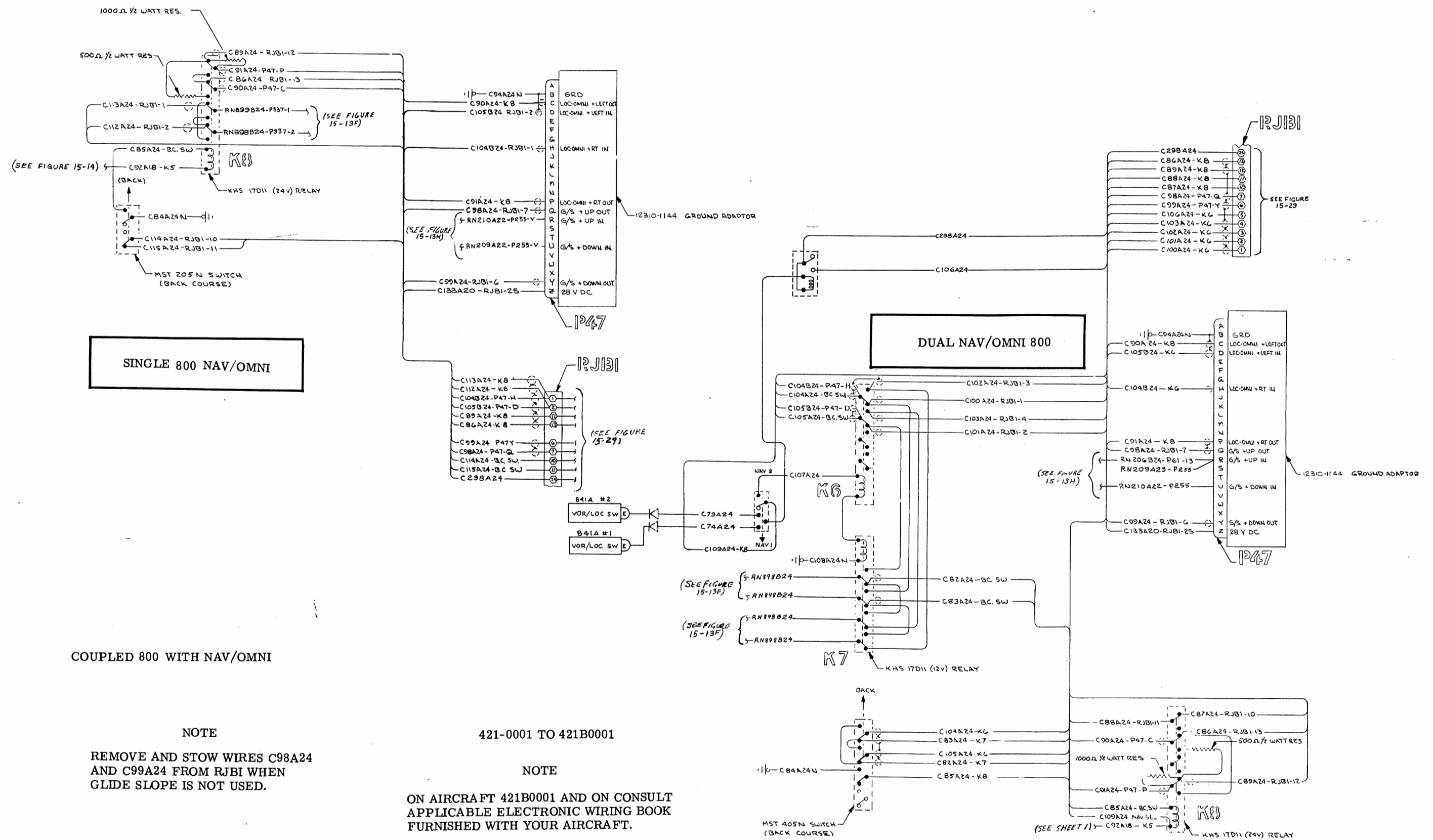
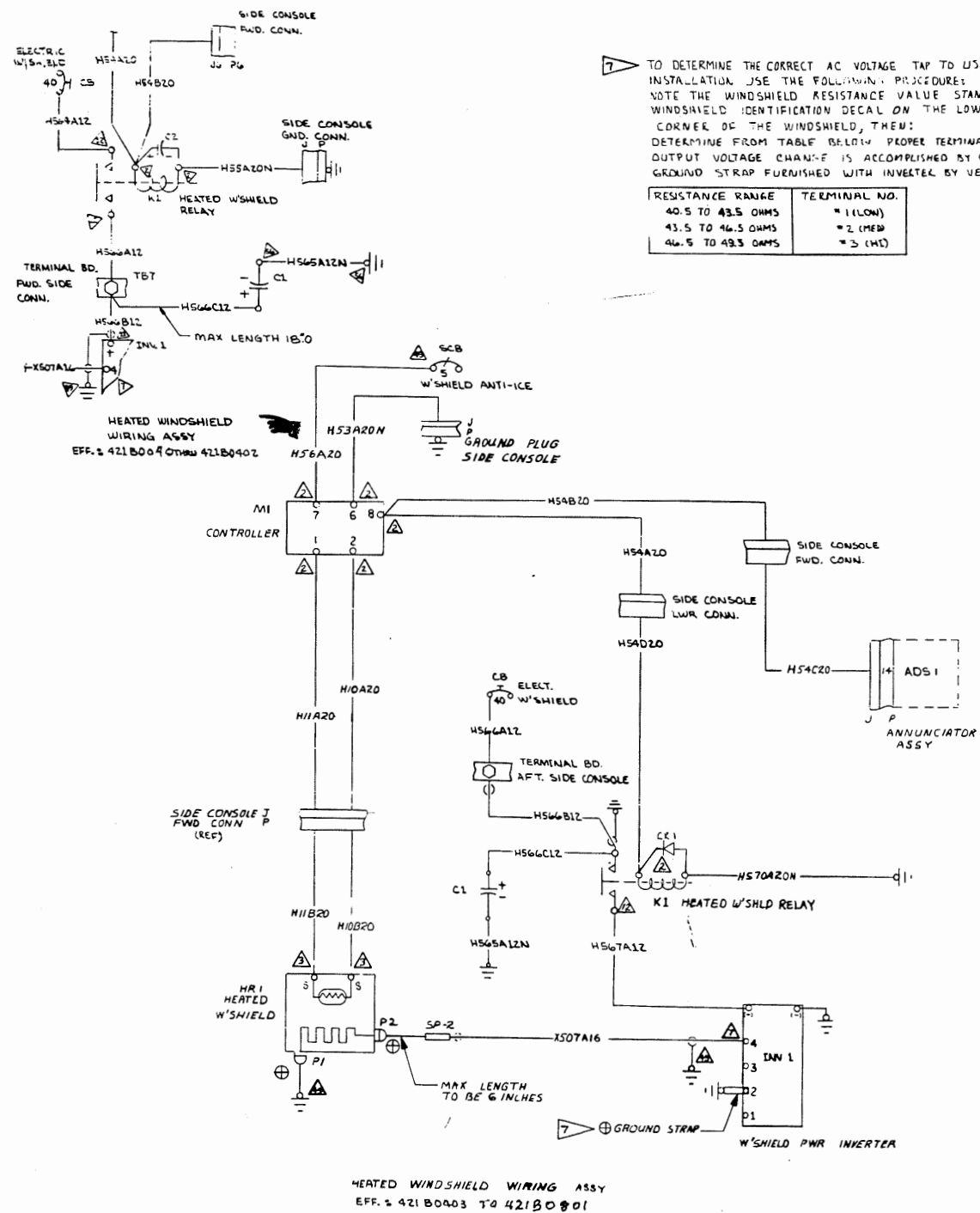
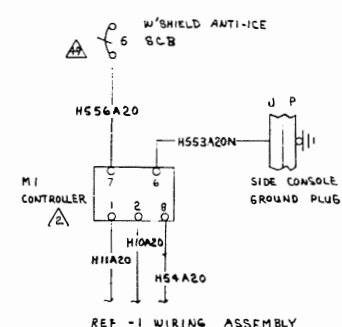


Figure 15-14. Cessna Nav-O-Matic 800 Autopilot (Sheet 4 of 5)

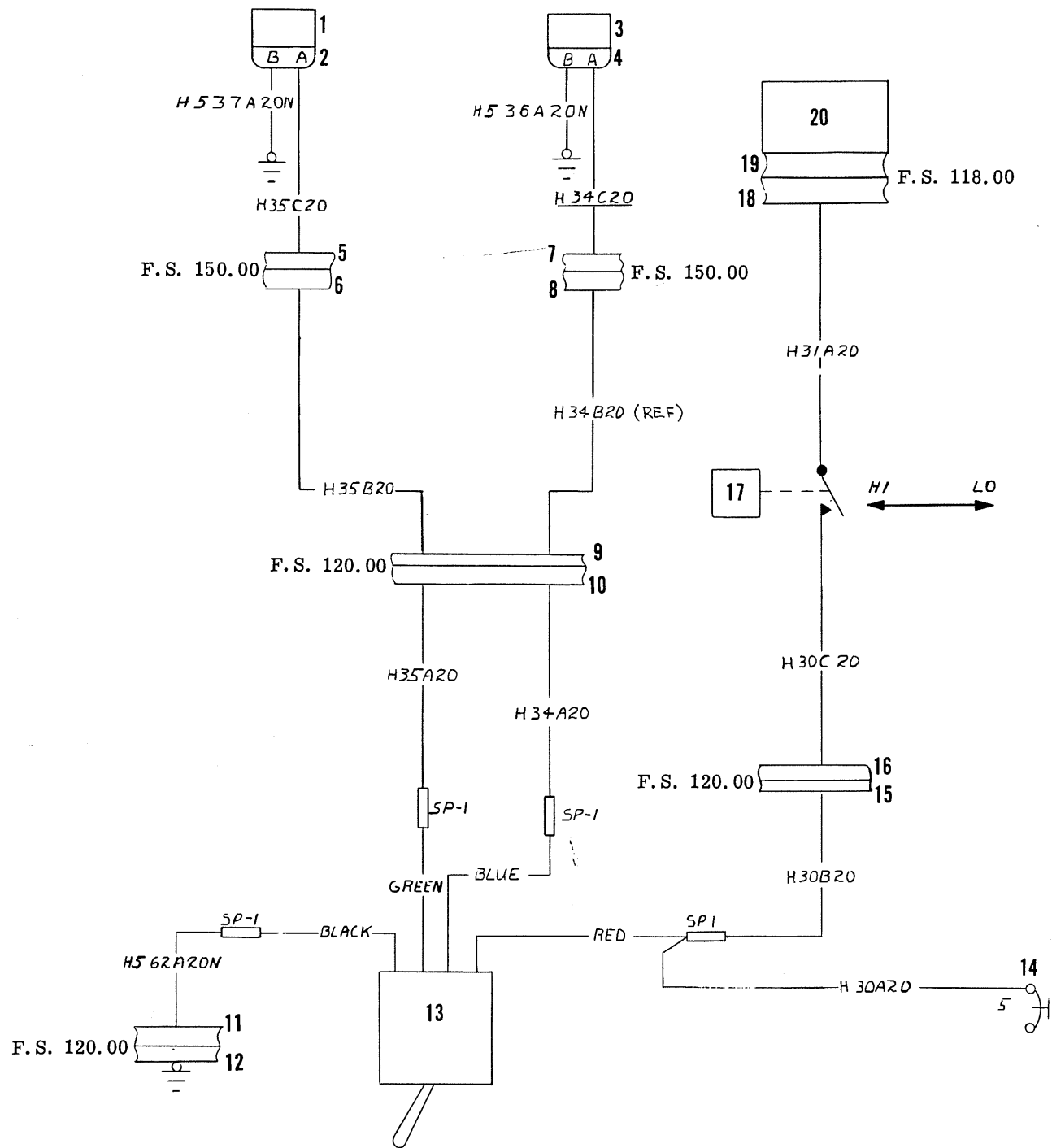


EQUIPMENT LIST		
SYMBOL	PART NO.	PART NAME
C1	FAH 103-50	CAPACITOR INVERTER
C2	109-240-101	HEATED WINDSHIELD C.B.
HR 1	9910071-1	HEATED WINDSHIELD
INV 1	9910067-1	INVERTER HEATED WSHLD
K1	609LH201A	RELAY HEATED WINDSHIELD
▲	MS25036-102	TERMINAL
▲	MS25036-107	TERMINAL
▲	MS25036-111	TERMINAL
▲	MS25036-112	TERMINAL
▲	MS25036-113	TERMINAL
▲	MS25036-156	TERMINAL
▲	MS25036-103	TERMINAL
M1	9910013-2	CONTROLLER WINDSHIELD
P1	WB0450	PLUG HEATED WSHIELD
P2	WB0450	PLUG HEATED WSHIELD
SCB	12-205-101	SWITCH CIRCUIT BREAKER
SP1	320559	SPLICE
SP2	320562	SPLICE
C2	TE-1305	CAPACITOR
CR-1	1N2982	DIODE



HEATED WINDSHIELD WIRING ASSY
EFF. 42180001 TO 42180040

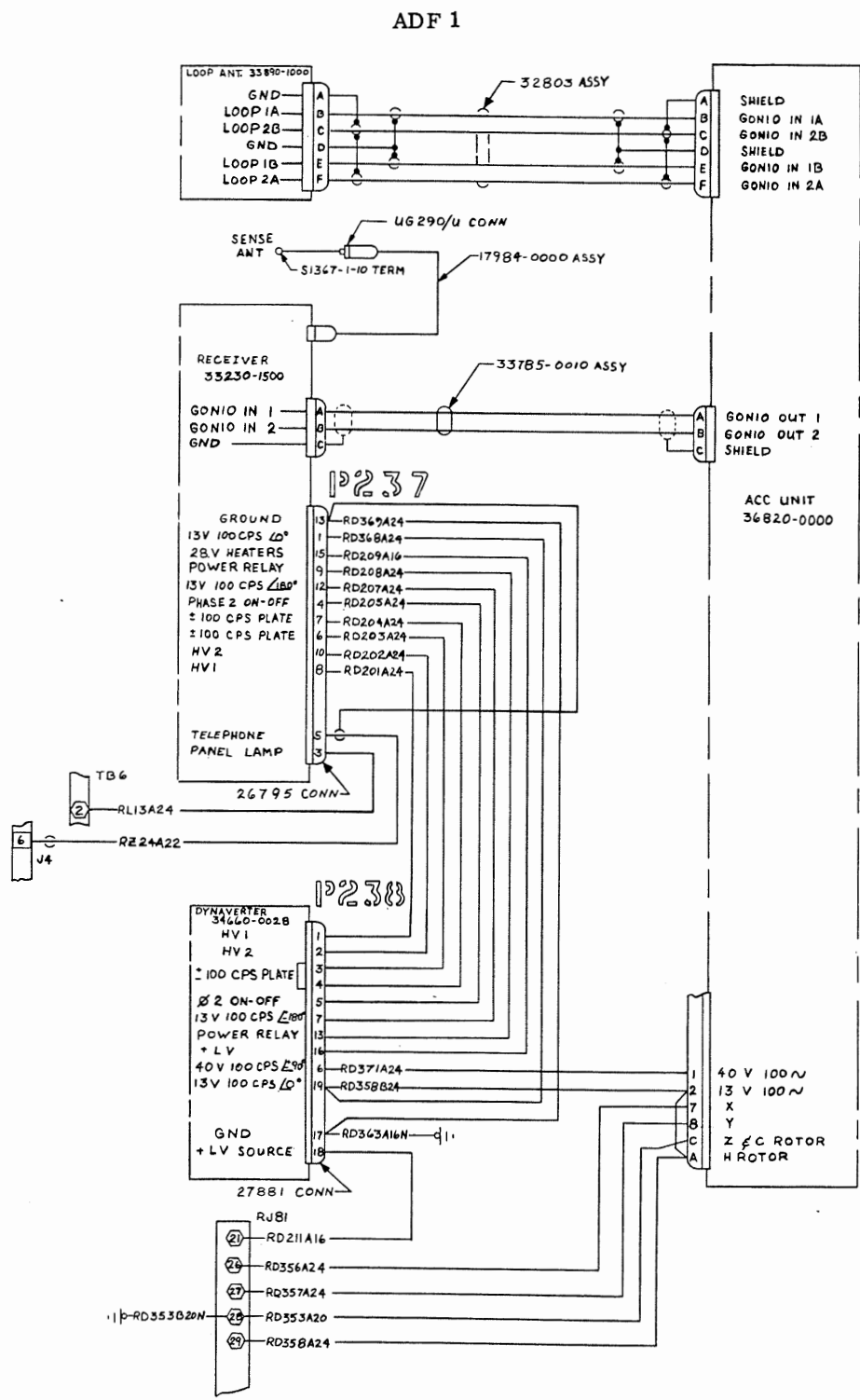
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TITLE: HEATED WINDSHIELD WIRING DIAGRAM (OPT)					
SIZE	CODE IDENT. NO.	DRAWING NO.			
D	71379	5118433		F	
SCALE: NONE		REF		SHEET 1 OF 1	



Part Number	Nomenclature
1. 3D1542-03	Valve - Surf Deice LH
2. MS3108E-12S-3S	Plug - Surf Deice Valve LH
3. 3D1543-03	Valve - Surf Deice Valve RH
4. MS3108E-12S-3S	Plug - Surf Deice Valve RH
5. DS07-37P	Plug - LH Wing
6. DS04-37S	Recept - LH Wing
7. DS07-37P	Plug - RH Wing
8. DS04-37S	Recept - RH Wing
9. 1-203739-6	Recept - Fwd Side Cons
10. 1-203735-5	Plug - Fwd Side Cons
11. 201298-1	Recept - Side Cons Grd
12. 203540-1	Plug - Side Cons Grd
13. 3D1748-2	Delay Sw - Surf Deice
14. 7277-2-5	Turn & Bank No. 1 - Ckt Bkr
15. 1-203739-6	Recept - Fwd Side Cons
16. 1-203735-5	Plug - Fwd Side Cons
17. 1D1194	Sw - Deice Press
18. 17-1030	Recept - Annunciator
19. 17-20370	Plug - Annunciator
20. 5618009-1	Annunciator Assy

421B0001 TO 421B0120

Cessna AIRCRAFT CO.		P. O. BOX 1977 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201
TITLE: SURFACE DE-ICE WIRING DIAGRAM (OPT)		
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5118432
SCALE: NONE		SHEET 1 OF 1



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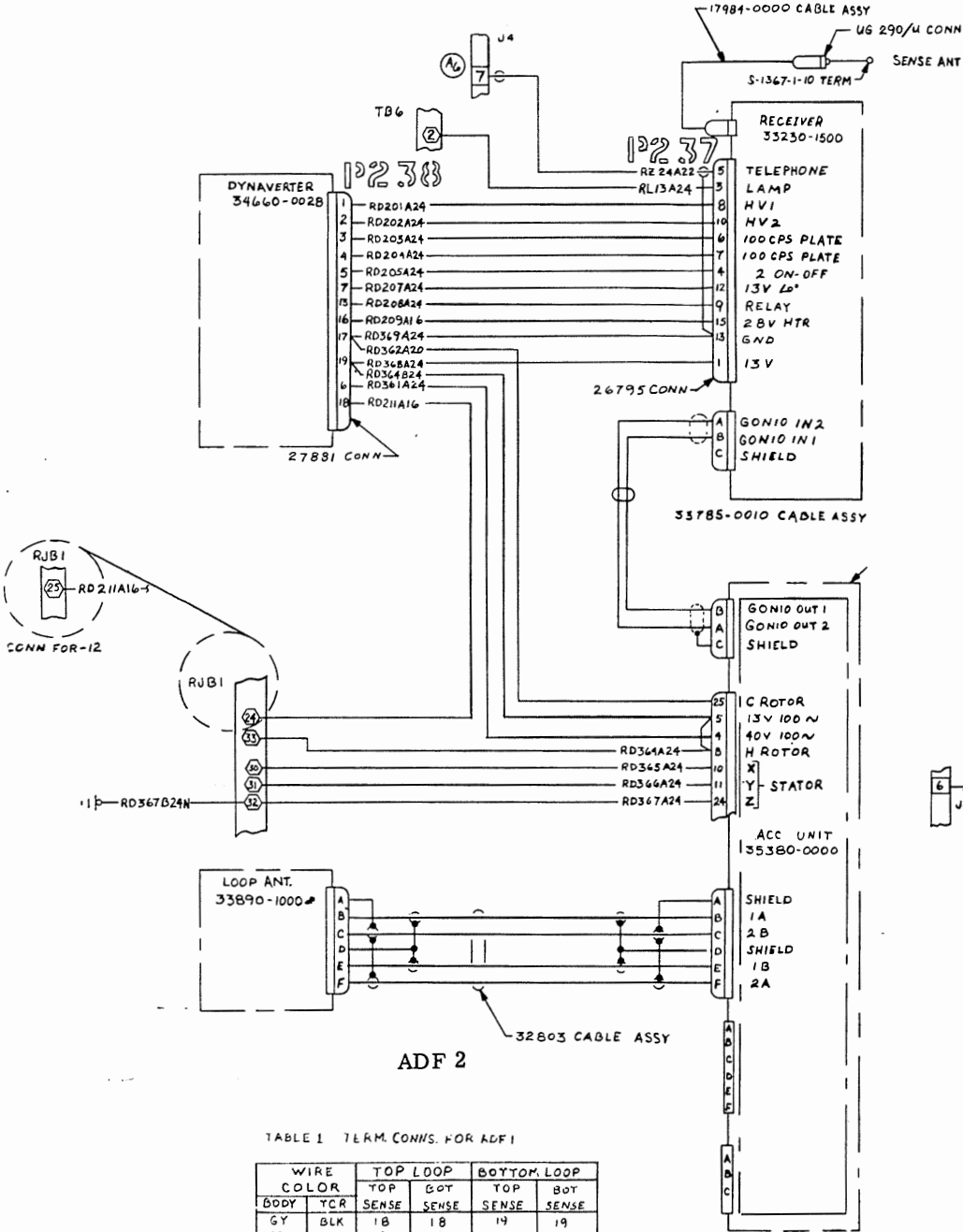


TABLE I TERM. CONNS. FOR ADF 1

WIRE COLOR	TOP LOOP	BOTTOM LOOP
BODY	TCR	SENSE
GRN	BLK 18	18 19
GRN	BLK 19	19 18
RED	BLK 22	23 22
BRN	BLK 23	22 23

TABLE II TERM. CONNS. FOR ADF 2

WIRE COLOR	TOP LOOP	BOTTOM LOOP
BODY	TCR	SENSE
GRN	BLK 16	16 17
GRN	BLK 17	17 16
RED	BLK 12	13 12
BRN	BLK 13	12 13

COUPLED WITH RA-21C.

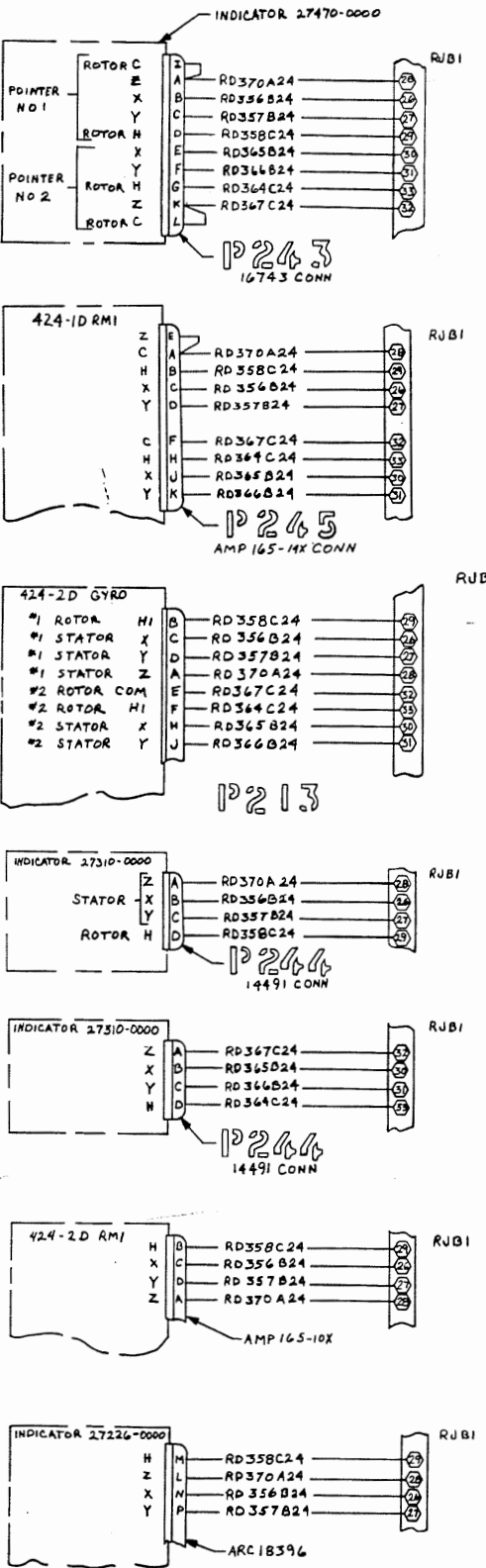
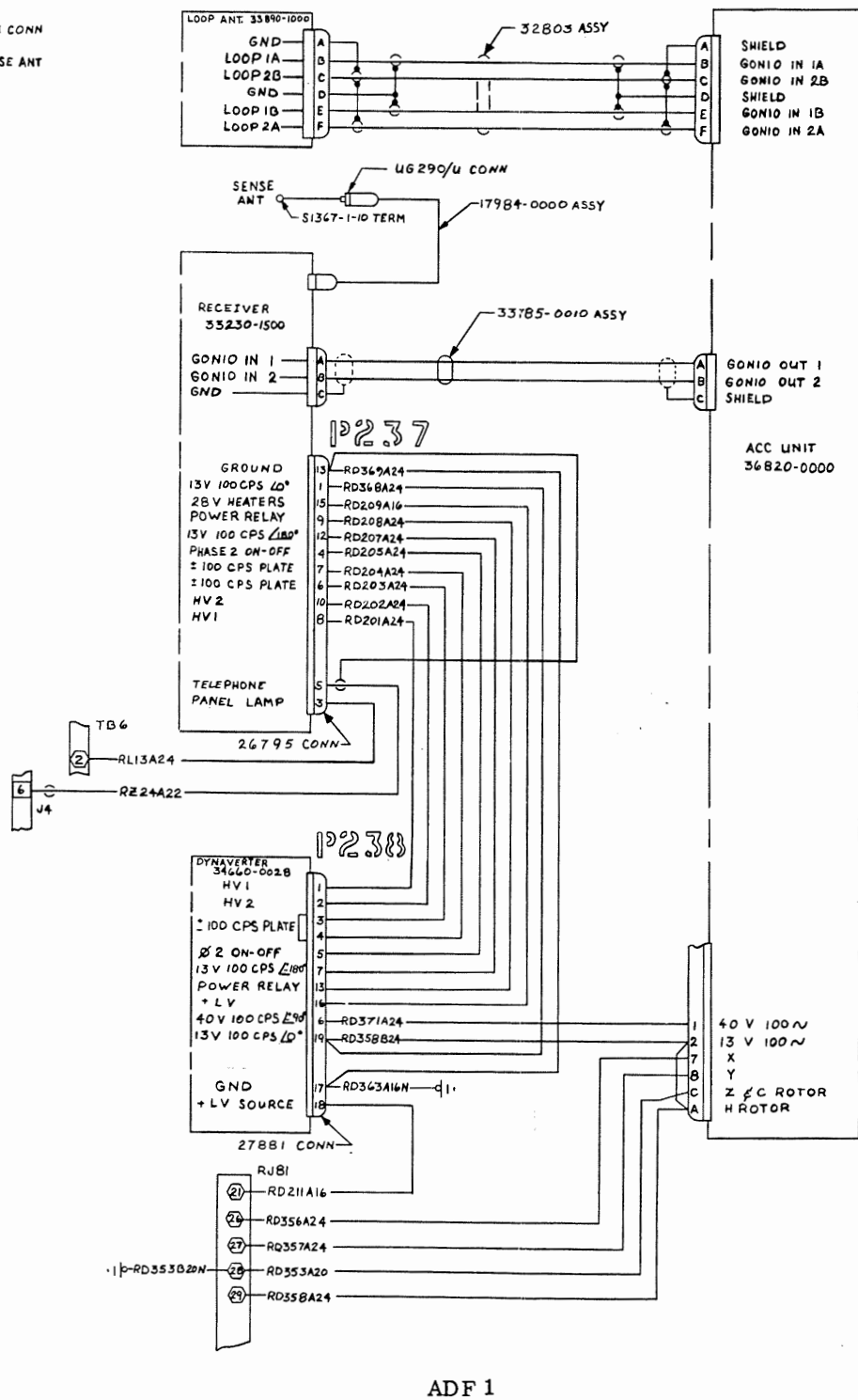
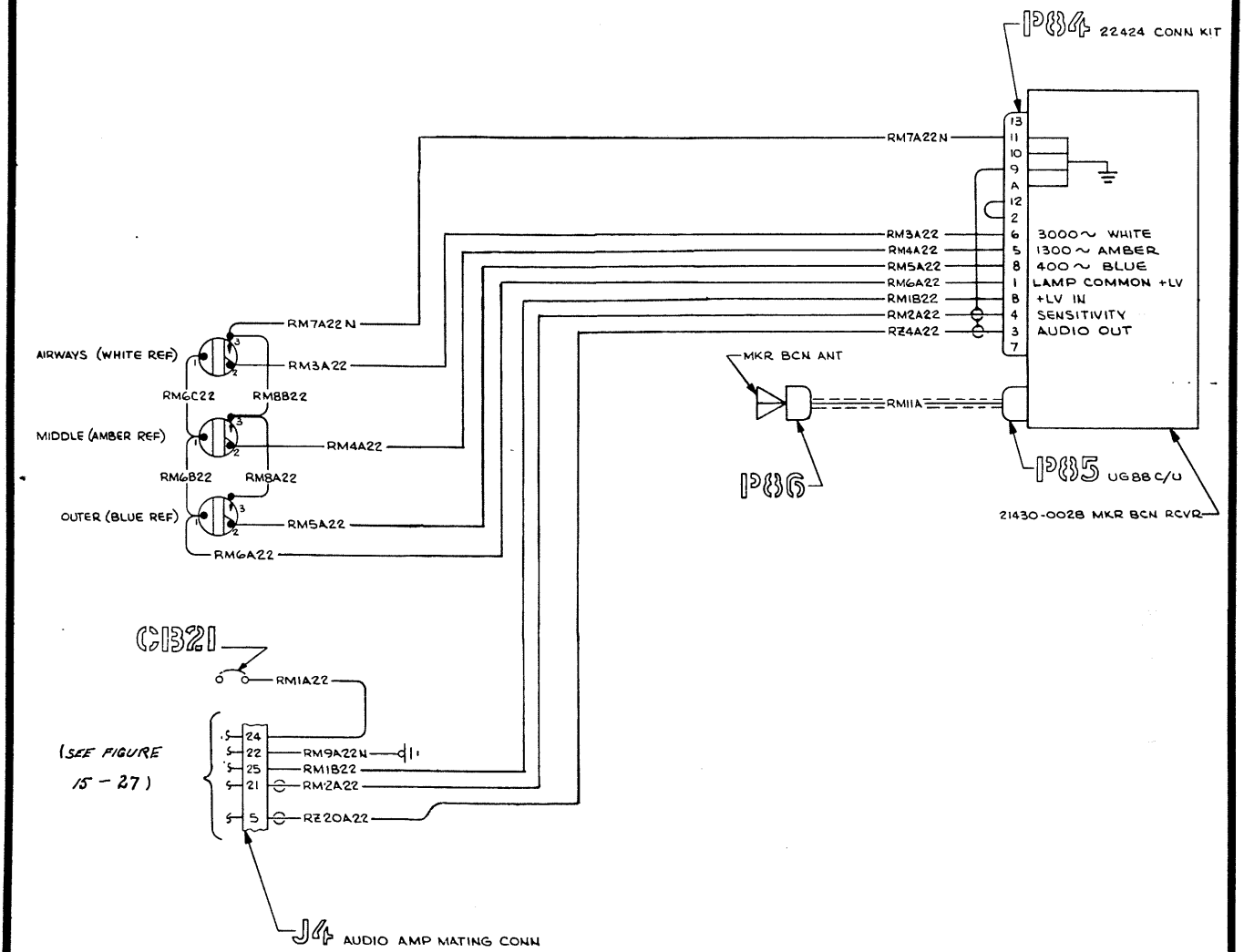


Figure 15-5B. Cessna Dual ADF 400



421-0001 TO 421A0001

Figure 15-9. Cessna Marker Beacon 800

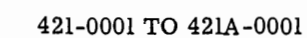


Figure 15-12. Cessna RMI 800

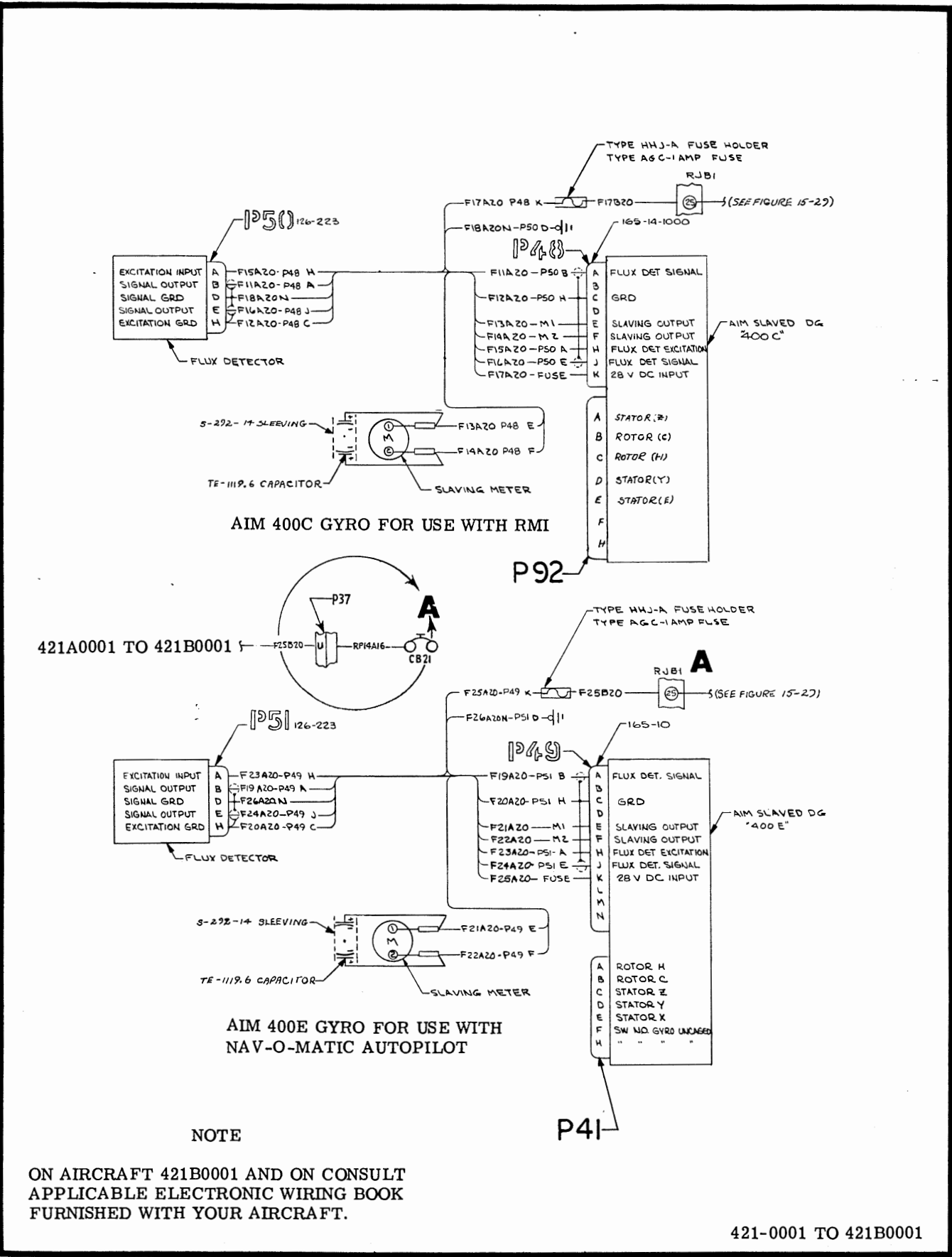
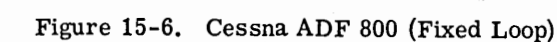
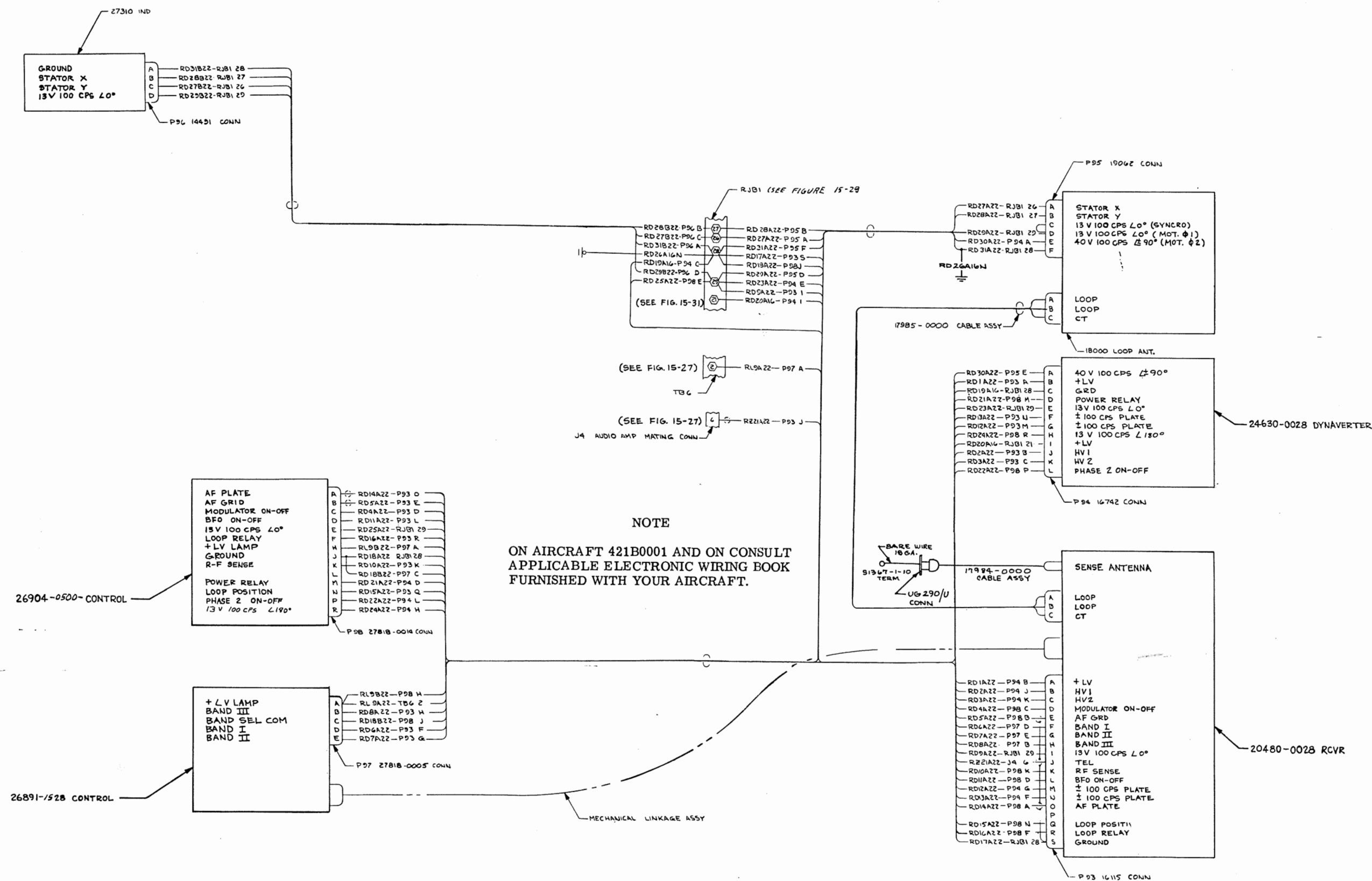


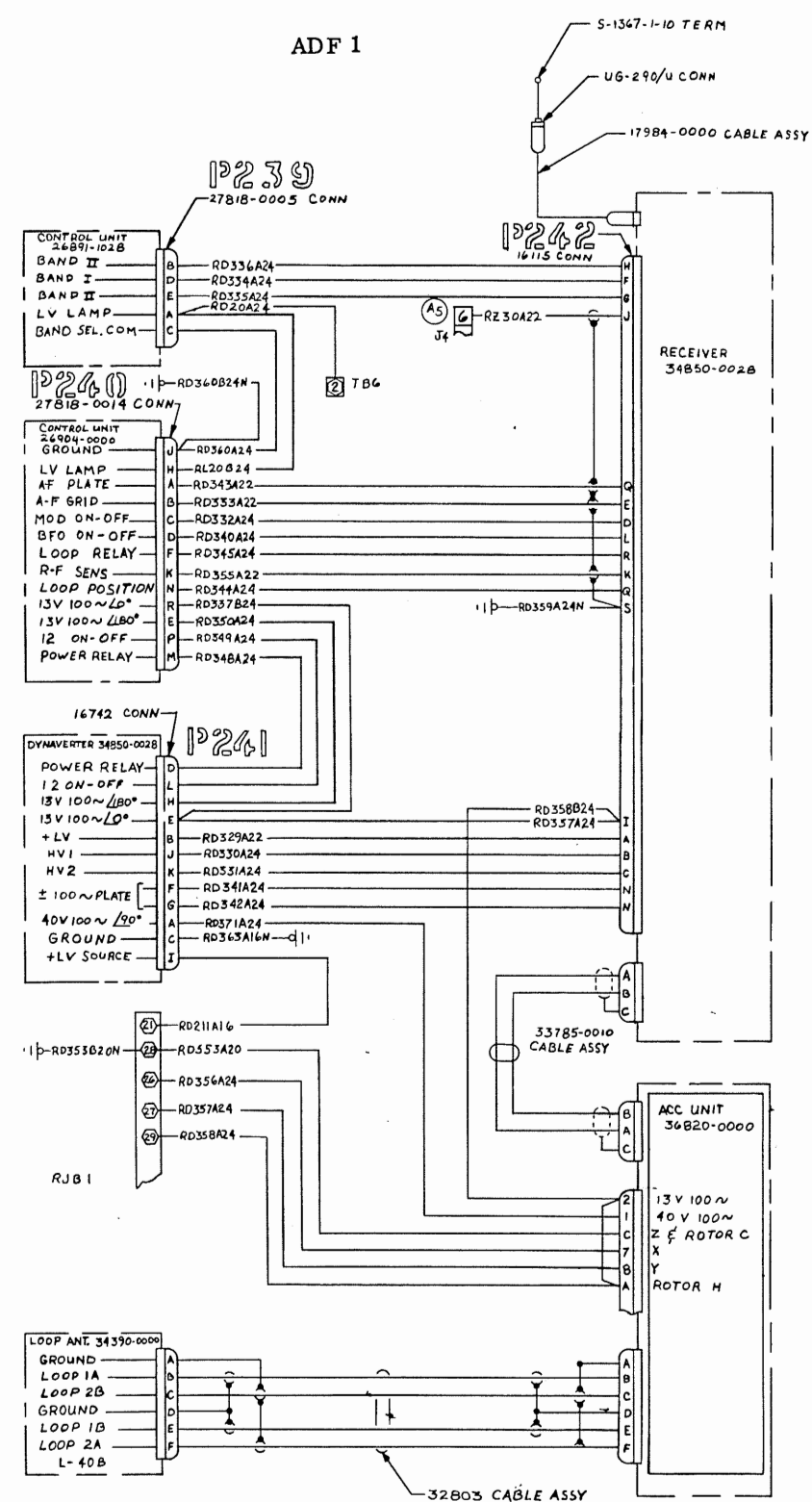
Figure 15-13. AIM 400 Gyro



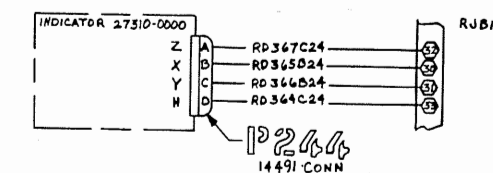
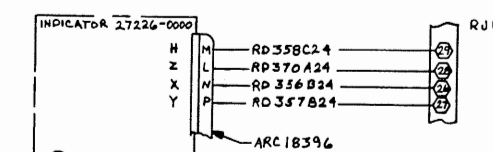
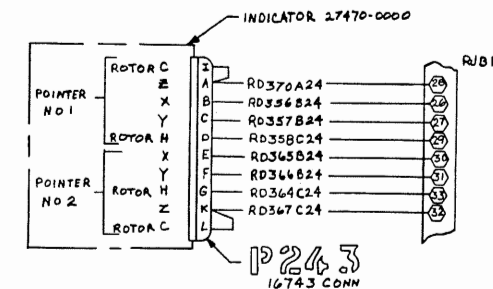
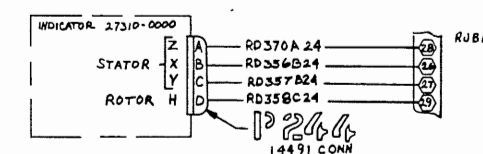
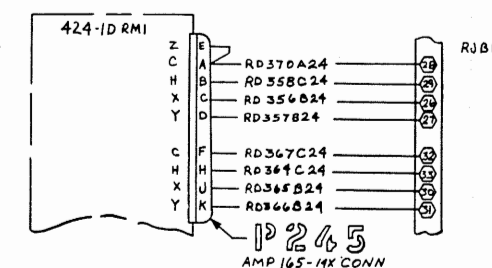
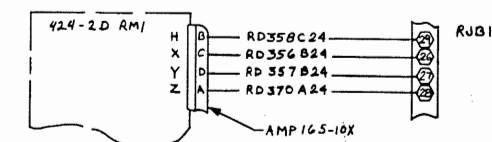
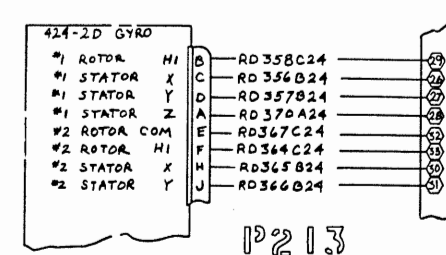


421-0001 TO 421B0001

Figure 15-7. Cessna ADF 800 (Rotatable Loop)



COUPLED WITH RA-21C.

TABLE I TERM. CONNS. FOR ADFI

WIRE COLOR		TOP LOOP		BOTTOM LOOP	
BODY	TCR	TOP SENSE	BOT SENSE	TOP SENSE	BOT SENSE
GY	BLK	18	18	19	19
GRN	BLK	19	19	18	18
RED	BLK	22	23	23	22
BRN	BLK	23	22	22	23

NOTE

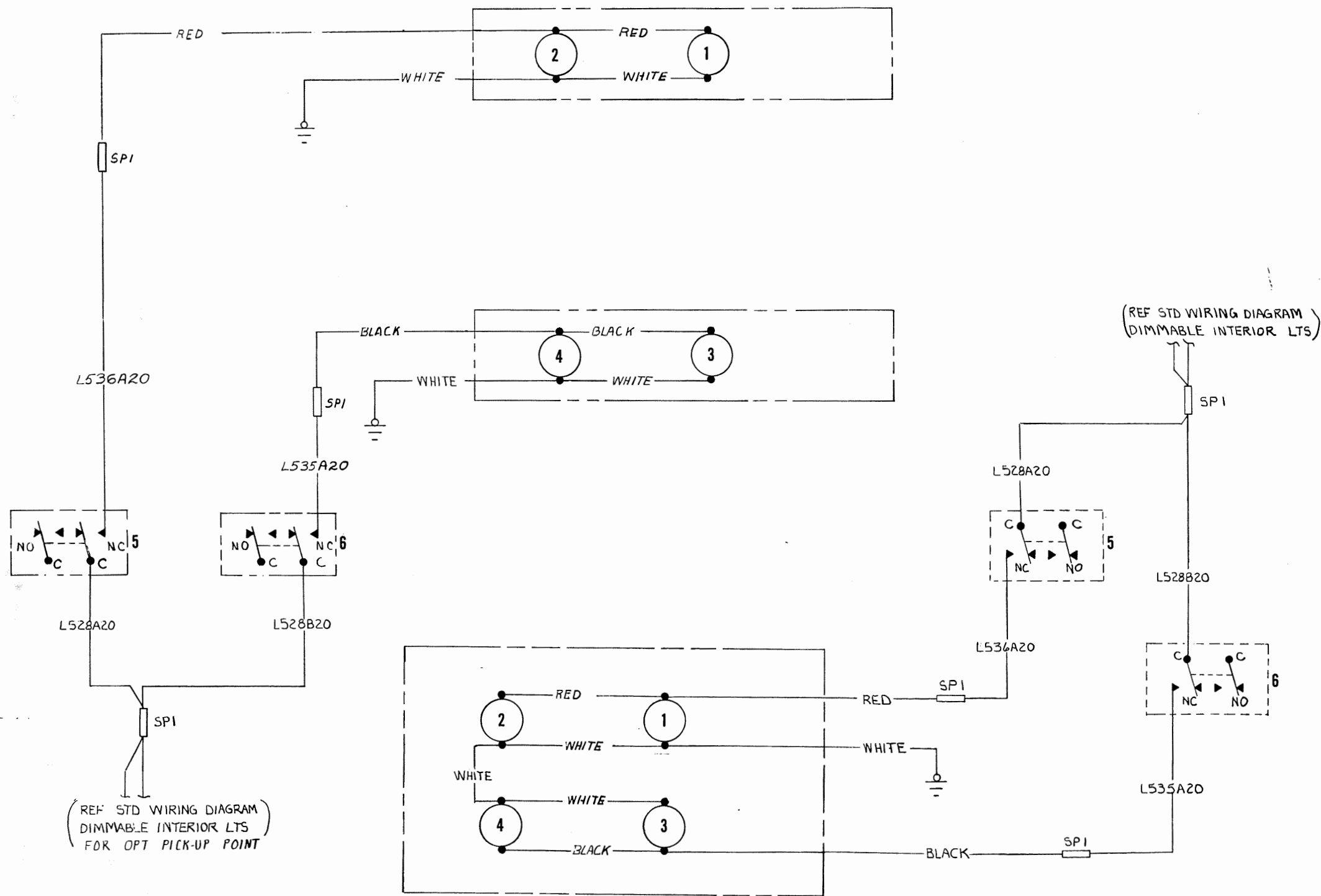
421A0001 TO 421B0001

ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
FURNISHED WITH YOUR AIRCRAFT.

Figure 15-13A. Cessna 800 ADF



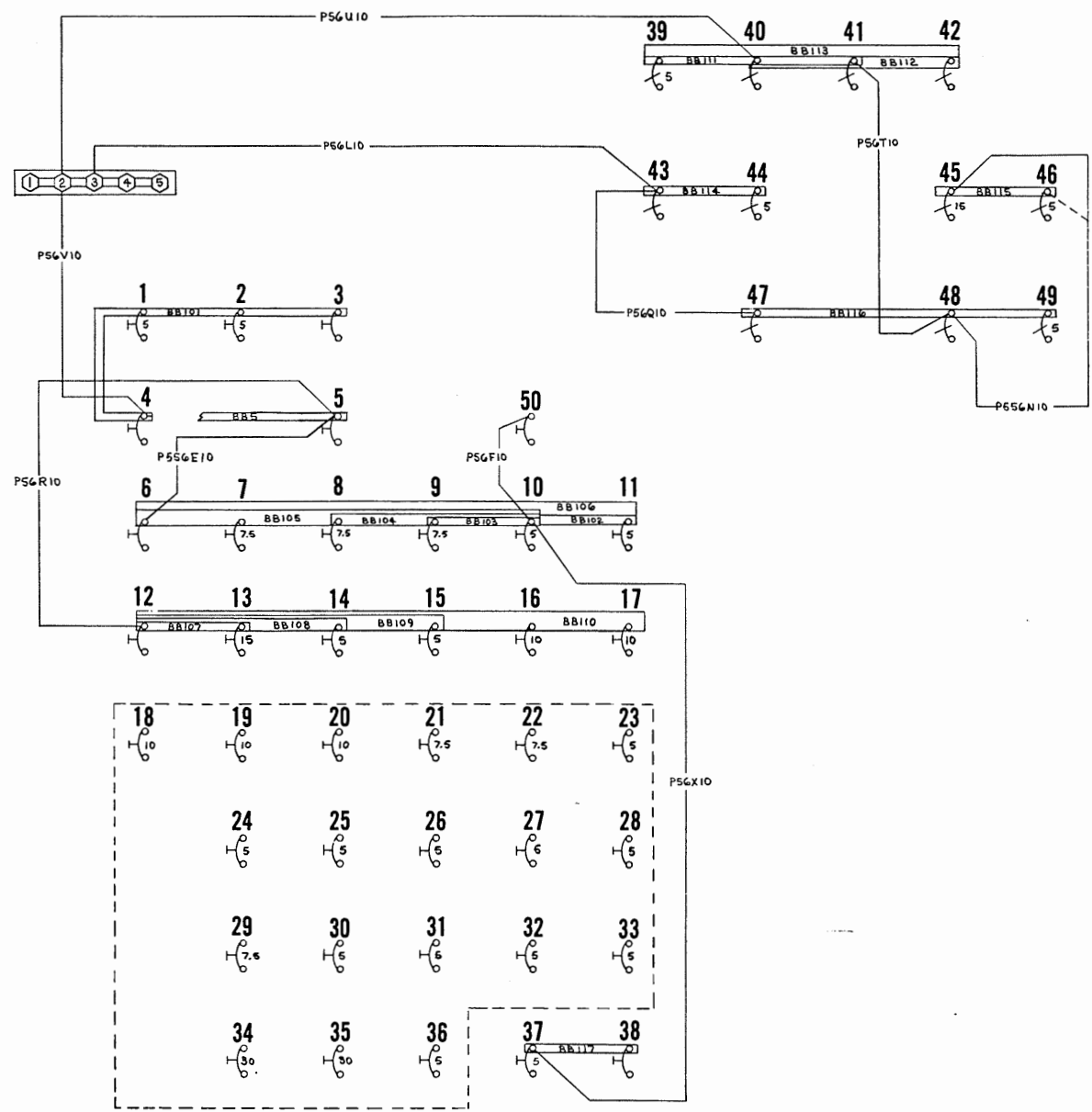
Change 2



Part Number	Nomenclature
1. 1820	Lt - Seat Belt Sign
2. 1820	Lt - Seat Belt Sign
3. 1820	Lt - Oxygen Sign
4. 1820	Lt - Oxygen Sign
5. MST-205N	Sw - Seat Belt Sign
6. MST-205N	Sw - Oxygen Sign

421B0001 AND ON

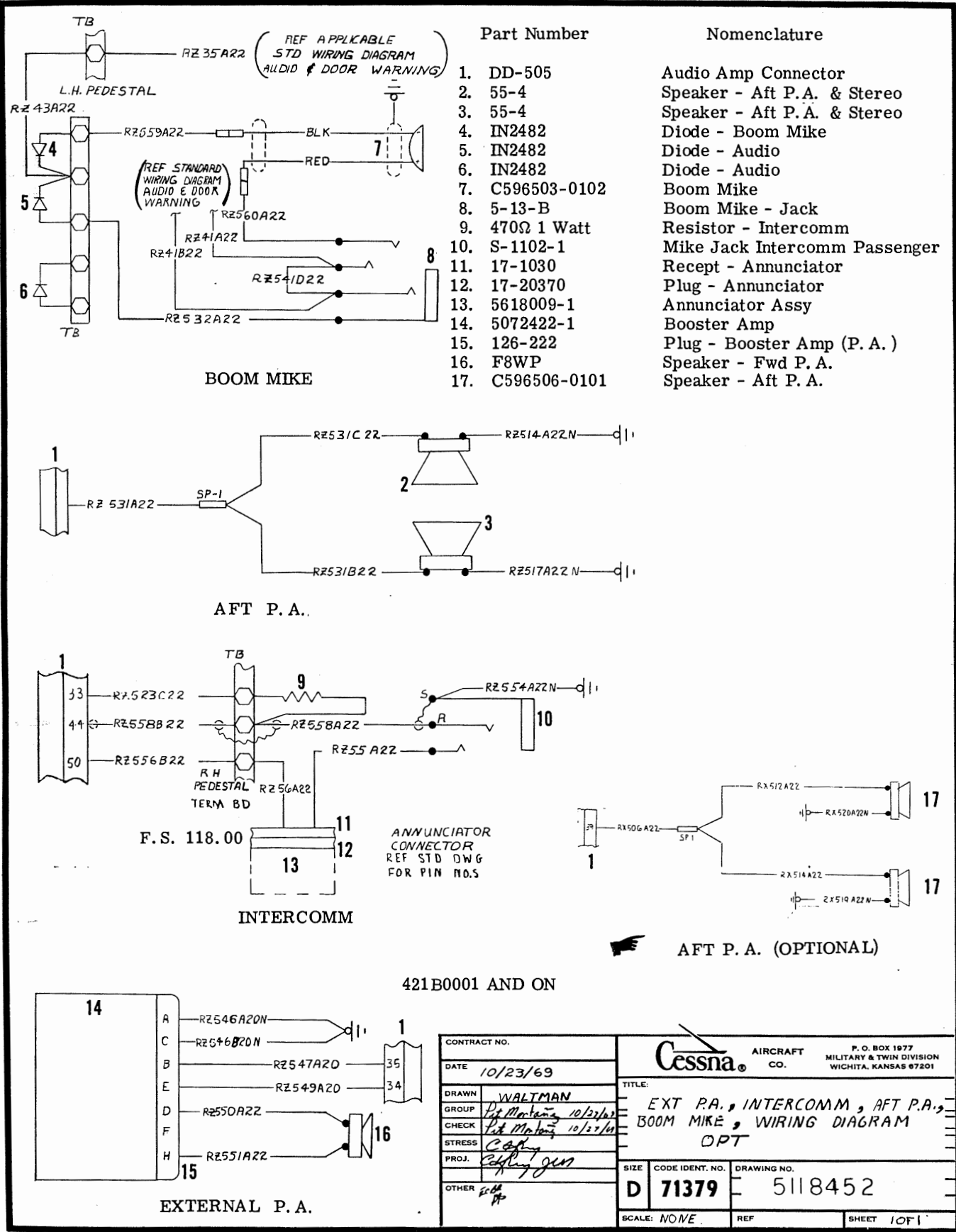
CONTRACT NO.		Cessna. AIRCRAFT CO. P. O. BOX 1977 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
DATE	10/27/69	TITLE: OXYGEN & SEATS BELT LTS WIRING DIAGRAM (OPT) SEATS	
DRAWN	WALTMAN	SIZE CODE IDENT. NO. DRAWING NO.	
GROUP	Pt. McIntire 10/28/69	D 71379 5118455	
CHECK	Pt. McIntire 10/28/69	SCALE: NONE REF SHEET 1 OF 1	
STRESS	Edg. 10/28/69		
PROJ.	Edg. 10/28/69		
OTHER	Edg. 10/28/69		

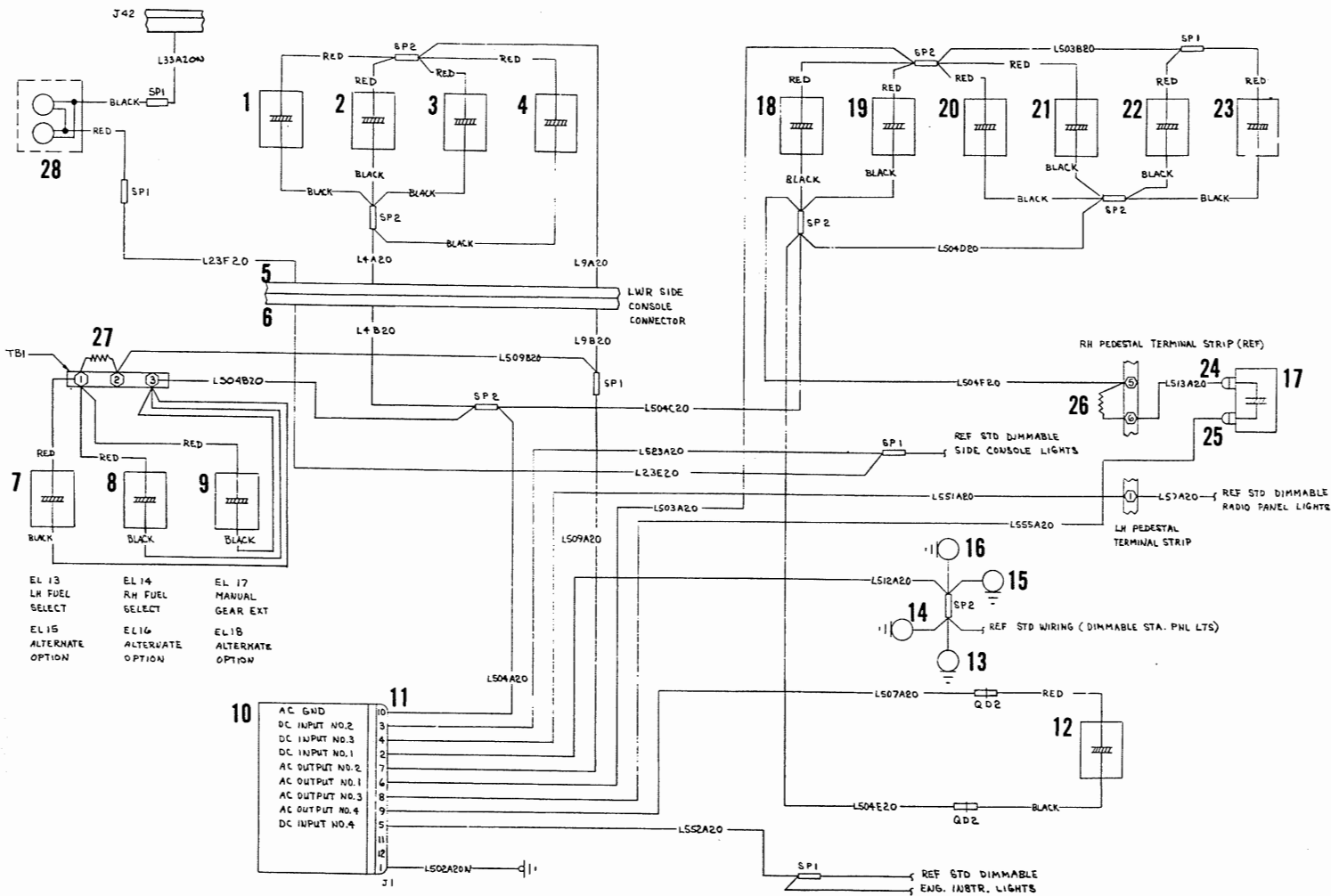


Part Number	Nomenclature
1. 7277-2-5	Transfer Pump LH - Ckt Bkr
2. 7277-2-5	Transfer Pump - RH - Ckt Bkr
3. 7277-2-5	Eng Gage LH - Ckt Bkr
4. 7277-2-7.5	Radio Lts - Ckt Bkr
5. 7277-2-5	Copilots Lts - Ckt Bkr
6. 7277-2-5	Prop Synchro - Ckt Bkr
7. 7277-2-7.5	Gyro Pwr 1 - Ckt Bkr
8. 7277-2-7.5	Gyro Pwr 2 - Ckt Bkr
9. 7277-2-7.5	Gyro Pwr 3 - Ckt Bkr
10. 7277-2-5	Turn & Bank 1 - Ckt Bkr
11. 7277-2-5	Turn & Bank 2 - Ckt Bkr
12. 7277-2-15	Cabin Fan - Ckt Bkr
13. 7277-2-15	Air Cond - Ckt Bkr
14. 7277-2-5	Trim Pwr - Ckt Bkr
15. 7277-2-5	Stereo - Ckt Bkr
16. 7277-2-15	Elec Seat LH - Ckt Bkr
17. 7277-2-15	Elec Seat RH - Ckt Bkr
18. 7277-2-10	Comm 1 - Ckt Bkr
19. 7277-2-10	Comm 2 - Ckt Bkr
20. 7277-2-10	Comm 3 - Ckt Bkr
21. 7277-2-7.5	Nav 1 - Ckt Bkr
22. 7277-2-7.5	Nav 2 - Ckt Bkr
23. 7277-2-5	Audio Amp - Ckt Bkr
24. 7277-2-5	Mkr Bcn - Ckt Bkr
25. 7277-2-5	ADF 1 - Ckt Bkr
26. 7277-2-5	ADF 2 - Ckt Bkr
27. 7277-2-5	Glideslope 1 - Ckt Bkr
28. 7277-2-5	Glideslope 2 - Ckt Bkr
29. 7277-2-7.5	Autopilot - Ckt Bkr
30. 7277-2-5	DME - Ckt Bkr
31. 7277-2-5	Transponder - Ckt Bkr
32. 7277-2-5	RMI 1 - Ckt Bkr
33. 7277-2-5	Radar - Ckt Bkr
34. 109-230-101	AC Inv 1 - Ckt Bkr
35. 109-230-101	AC Inv 2 - Ckt Bkr
36. 7277-2-5	Radio Alt - Ckt Bkr
37. 7277-2-5	Shaver Inv - Ckt Bkr
38. 7277-2-7.5	Cigar Lighter - Ckt Bkr
39. 112-205-101	Strobe Lt - Ckt Bkr
40. 112-205-101	Anti-Coll Bcn - Ckt Bkr
41. 112-205-101	Nav Lts - Ckt Bkr
42. 112-205-101	Taxi Lts - Ckt Bkr
43. 112-205-101	Stall & Vent Heat - Ckt Bkr
44. 112-205-101	Deice Lt - Ckt Bkr
45. 112-215-101	Prop Anti-Ice - Ckt Bkr
46. 112-205-101	Windshield Anti-Ice - Ckt Bkr
47. 112-215-101	Cabin Heat - Ckt Bkr
48. 112-507-101	Pitot Heat 1 - Ckt Bkr
49. 112-507-101	Pitot Heat 2 - Ckt Bkr
50. 7277-2-10	Ldg Lt LH - Ckt Bkr

421B0001 AND ON

CONTRACT NO.		P. O. BOX 1877	
DATE 10-30-69		Cessna. AIRCRAFT CO. WICHITA, KANSAS 67201	
DRAWN K. WILKIN		TITLE: POWER BUS & WIRE INSTL, SIDE CONSOLE (OPT)	
GROUP H. M. M. 10-31-69		CHECK H. M. M. 10-31-69	
ESTIM. C. H. H.		PROJ. C. H. H.	
OTHER		SIZE CODE IDENT. NO. DRAWING NO.	
		D 71379 5118456	
SCALE: NONE		SHEET 1 OF 1	



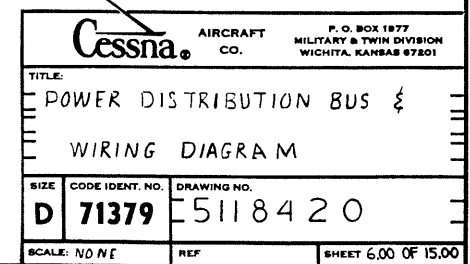


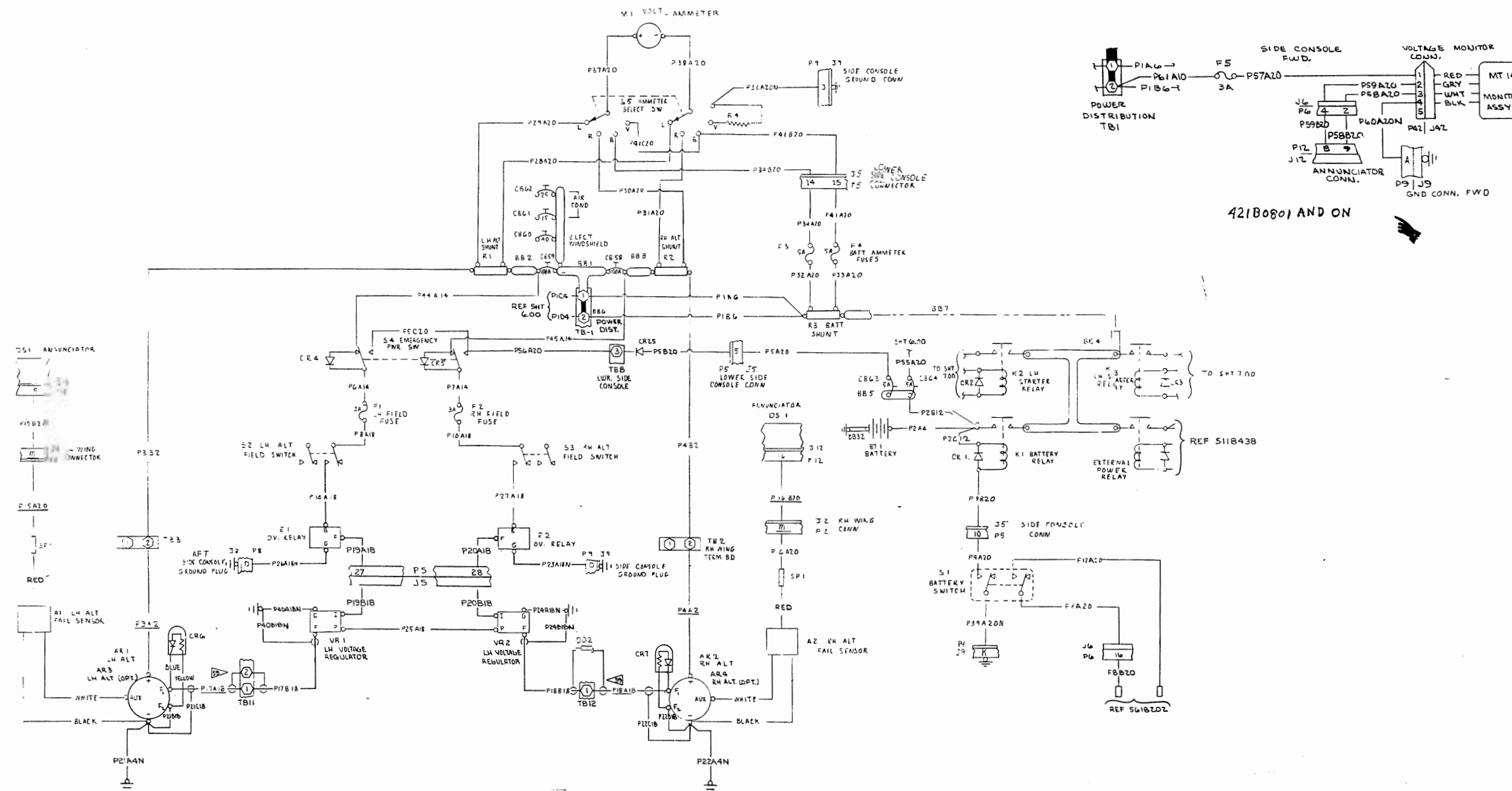
1 ELECTRO-ILLUMINESCENT PANEL WIRING DIAGRAM

Part Number	Nomenclature
1. 9910077-9	El Pnl - Aft CB Cons
2. 9910077-11	El Pnl - CB Cons
3. 9910077-12	El Pnl - Sw CB Pnl
4. 9910077-10	El Pnl - Upper Sw Pnl
5. 1-203739-6	Recept - Fwd Side Cons
6. 1-203735-5	Plug - Fwd Side Cons
7. 9910077-13	El Pnl - LH Fuel Select
or	
9910077-15	El Pnl - LH Aux Fuel Select
8. 9910077-14	El Pnl - RH Fuel Select
or	
9910077-16	El Pnl - RH Aux Fuel Select
9. 9910066-17	El Pnl - Manual Gear Ext
or	
9910077-18	El Pnl - Wing Locker Fuel
10. 9910081-3	Inverter
11. 1625R12	Recpt
12. 9910077-19	El Pnl - Manifold Prews Chart
13. CM2990-2	Post Lt - Press Rate Control
14. CM2990-2	Post Lt - Vacuum Gage
15. CM2990-2	Post Lt - Cabin Rate of Change
16. CM2990-2	Post Lt - Differential Press
17. CM2990-2	El Pnl - Radio
18. 9910077-5	El Pnl - Master Sw Pnl
19. 9910077-4	El Pnl - Cabin Press
20. 9910077-1	El Pnl - Ldg Gear Sw
21. 9910077-7	El Pnl - Flap Indicator
22. 9910077-8	El Pnl - Indicator Guard
23. 9910077-3	El Pnl - Cabin Heat
24. 20416	Recpt
25. 20416	Recpt
26. RC42GF182K	Resistor
27. RC42GF272K	Resistor
28. 5118486-1	Lt Assy - Voltmeter

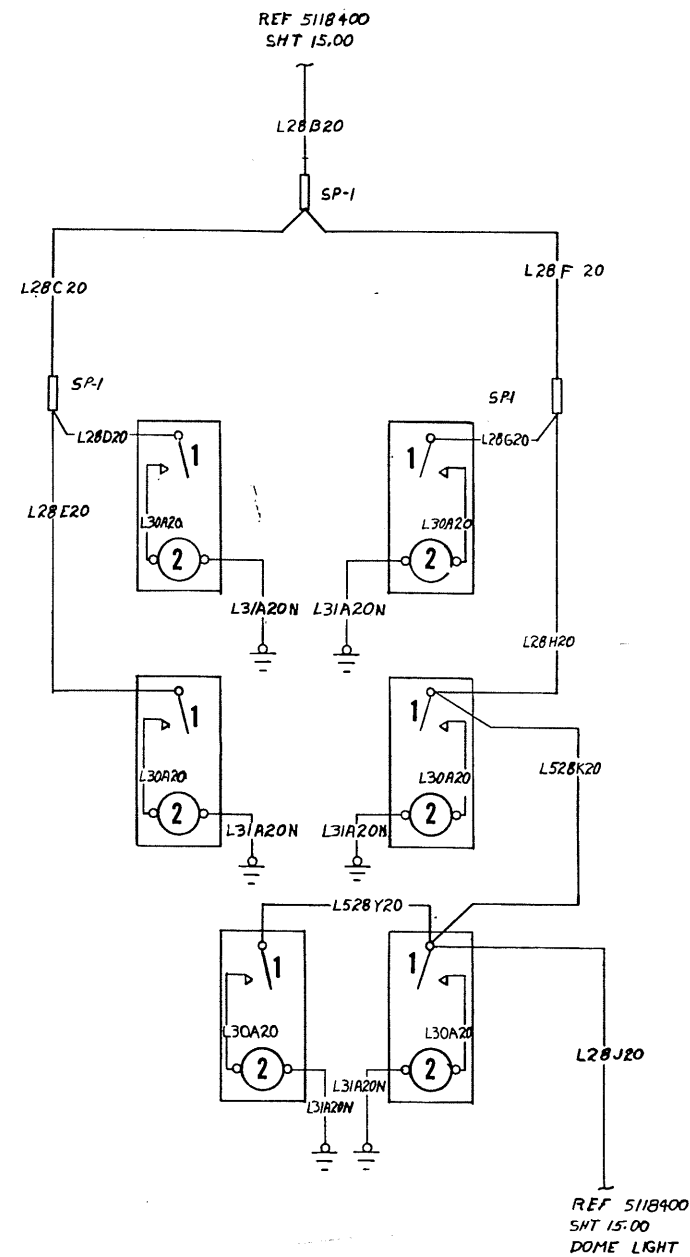
421B0001 AND ON

CONTRACT NO.		Cessna		AIRCRAFT CO.		P. O. BOX 1977 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
DATE		12-23-69		TITLE:		ELECTROLUMINESCENT INSTR. PANEL WIRING ASSY (OPT)	
DRAWN		K. WILKIN		CHECK		P. M. MONTGOMERY 12-22-69	
GROUP		P. M. MONTGOMERY 12-22-69		STRESS		P. M. MONTGOMERY 12-22-69	
PROJ.		P. M. MONTGOMERY 12-22-69		OTHER		P. M. MONTGOMERY 12-22-69	
SIZE		D 71379		DRAWING NO.		5118453	
SCALE		NONE		REF		SHEET 1 OF 2	





Cessna		AIRCRAFT CO.		P.O. BOX 1977 WICHITA, KANSAS 67201	
TITLE ALTERNATOR SYSTEM ~ 50 & 100 AMP PRESTOLITE WIRING DIAGRAM					
SIZE D	CODE IDENT NO 71379	DRAWING NO 5118420		SHEET 5.00 OF 15.00	
SCALE: NONE		REF: E		SHEET 5.00 OF 15.00	



Part Number

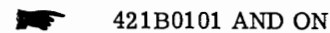
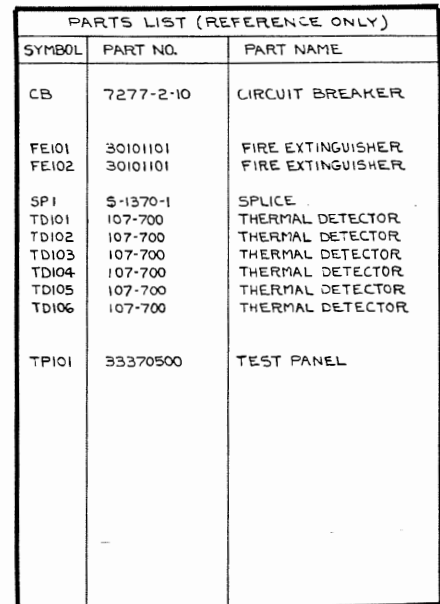
- 1. S-1158-2-1
- 2. 1849

Nomenclature

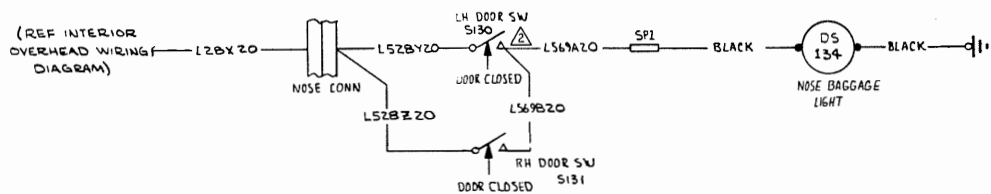
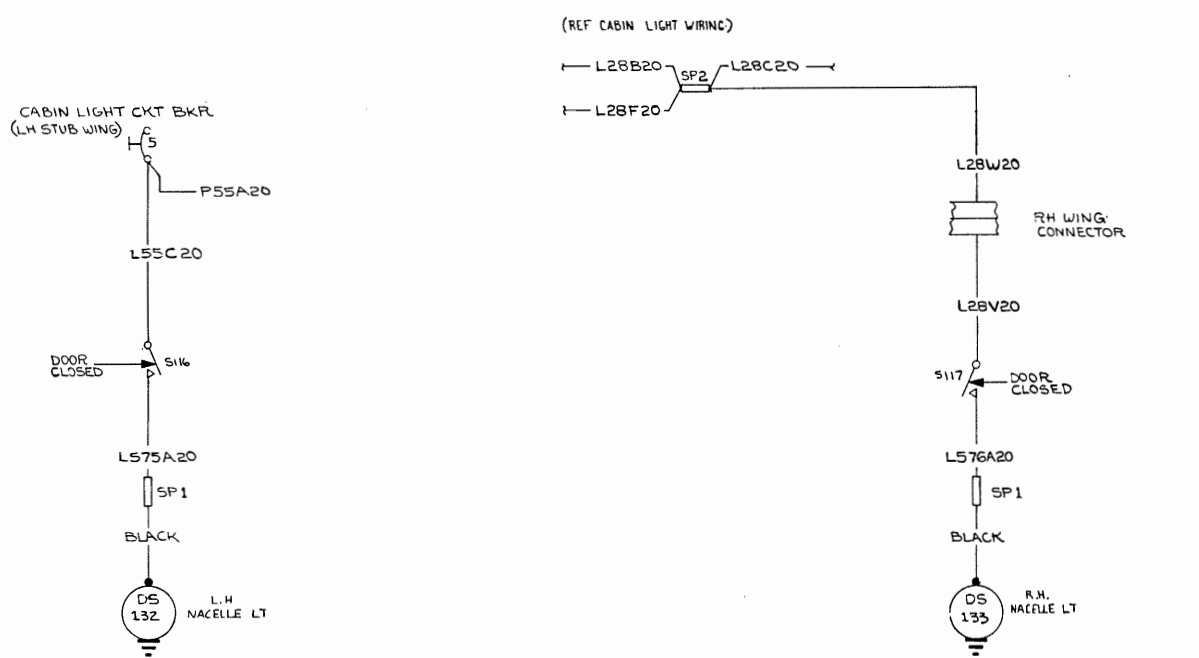
Switch
Reading Light

421B0001 AND ON

CONTRACT NO.		Cessna. AIRCRAFT CO. P. O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
DATE 3-25-70		TITLE	
DRAWN WALTMAN		READING LIGHTS WIRING	
GROUP		DIAGRAM 10 PLACE OPT	
CHECK			
STRESS			
PROJ.			
OTHER			
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5118459	
SCALE: NONE		SHEET 1 OF 1	



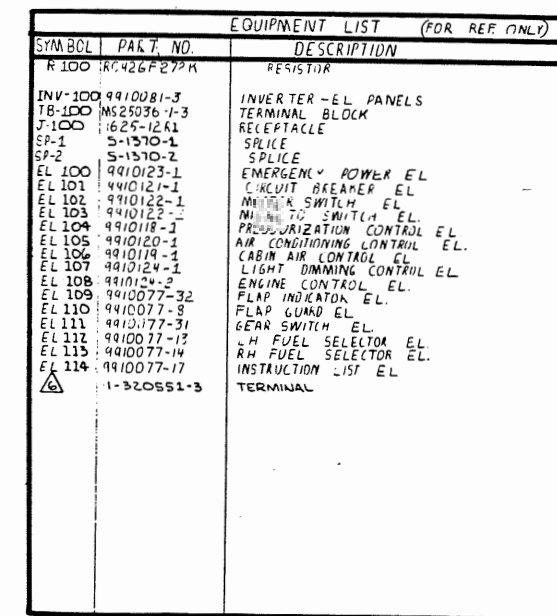
Cessna.	AIRCRAFT	P. O. BOX 1977
	CO.	MILITARY & TRUCK DIVISION WICHITA, KANSAS 67201
TITLE:		
FIRE DETECT SYSTEM		
WIRING ASSY		
SIZE	CODE IDENT. NO.	DRAWING NO.
D	71379	5118461 C
SCALE: NONE		



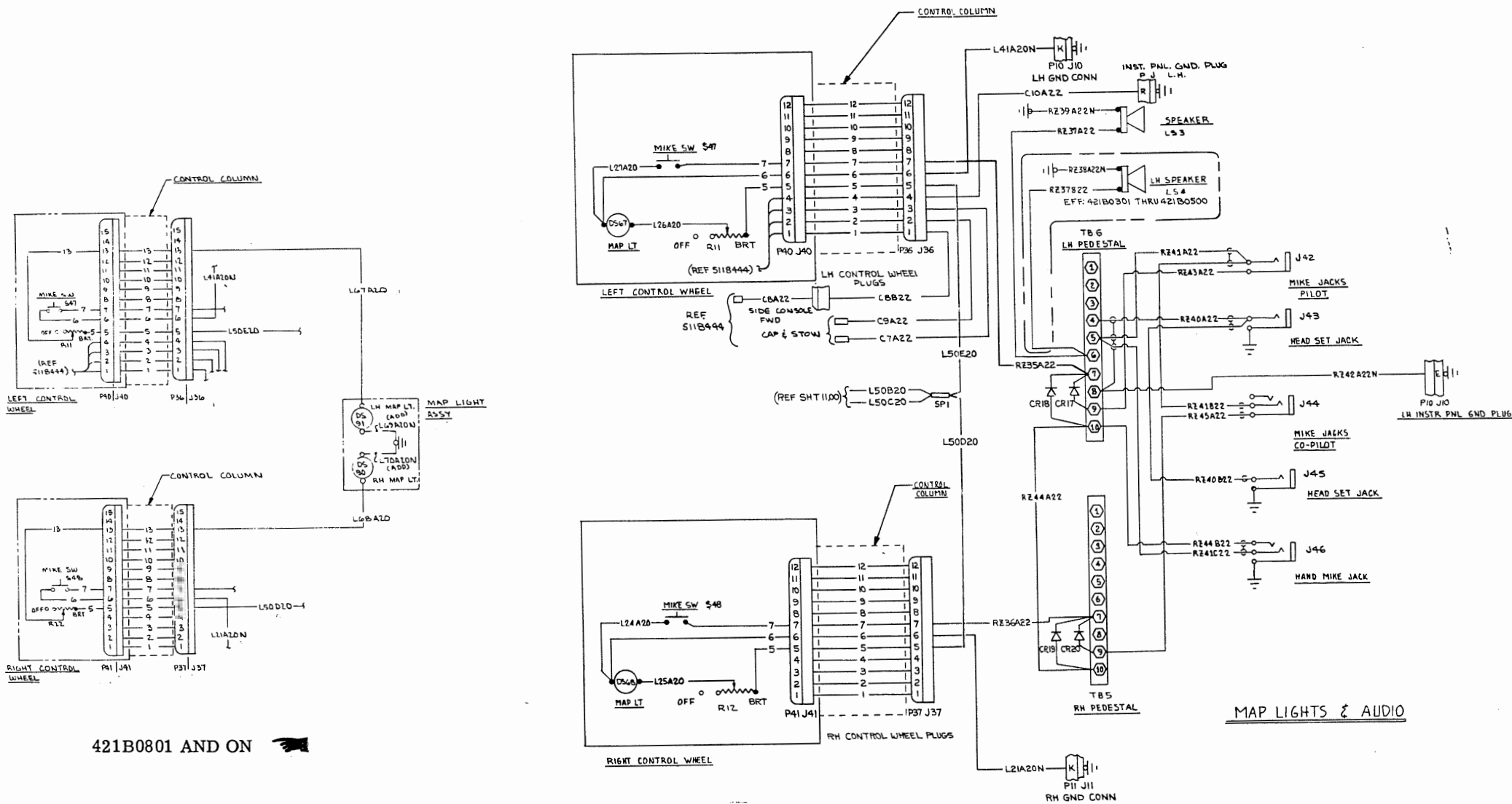
EQUIPMENT LIST (FOR REF ONLY)		
SYMBOL	PART NO.	PART NAME
DS 132	GE1309	LAMP
DS 133	GE1309	LAMP
DS 134	C622002-0102	LAMP
S116	8406K1	SWITCH - NACELLE LIGHT
S117	8406K1	SWITCH - NACELLE LIGHT
S130	8406K1	SWITCH - NOSE LT
S131	8406K1	SWITCH - NOSE LT
△	51863-2	TERMINAL
△	2-36153-3	TERMINAL
SP1	S-1370-1	SPLICE
SP2	S-1370-2	SPLICE

421B0301 AND ON

Cessna.		AIRCRAFT CO.	P.O. BOX 1877 MILITARY & TRUCK DIVISION WICHITA, KANSAS 67201
TITLE: NACELLE-NOSE COURTESY LIGHT WIRING DIAGRAM			
SIZE	CODE IDENT. NO.	DRAWING NO.	
D	71379	5118460	
SCALE	NONE	REF	REV B
		SHEET	1 OF 1



SYMBOL		PART NO.	DESCRIPTION
R 100		RC426F279K	RESISTOR
INV-100	9410081-3		INVERTER -EL PANELS
TB-100	MS25036-1-3		TERMINAL BLOCK
J-100	1625-12K1		RECEPTACLE
SP-1	5-1510-1		SPLICE
SP-2	5-1510-2		SPLICE
EL 100	9410123-1		EMERGENCY POWER EL
EL 101	941012-1		CIRCUIT BREAKER EL
EL 102	9410122-1		MILK SWITCH EL
EL 103	9410123-1		MILK TO SWITCH EL
EL 104	9410118-1		PREOXYGENIZATION CONTROL EL
EL 105	9410120-1		AIR CONDITIONING CONTRL EL.
EL 106	9410119-1		CABIN AIR CONTRL EL
EL 107	9410124-1		LIGHT DIMMING CONTROL EL
EL 108	9410124-2		ENGINE CONTROL EL
EL 109	9410077-32		FLAP INDICATOR EL.
EL 110	9410077-8		FLAP GUARD EL
EL 111	9410177-31		GEAR SWITCH EL
EL 112	9410077-113		LH FUEL SELECTOR EL.
EL 113	9410077-14		RH FUEL SELECTOR EL.
EL 114	9410077-17		INSTRUCTION LIST EL
△	1-320551-3		TERMINAL



421B0801 AND ON

Cessna		AIRCRAFT CO.		P.O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
TITLE: MAP LIGHTS & AUDIO					
WIRING DIAGRAM					
SIZE	CODE IDENT NO.	DRAWING NO.			
D	71379	5118420			
SCALE: NONE	REF	SHEET 15.00 OF 15.00			

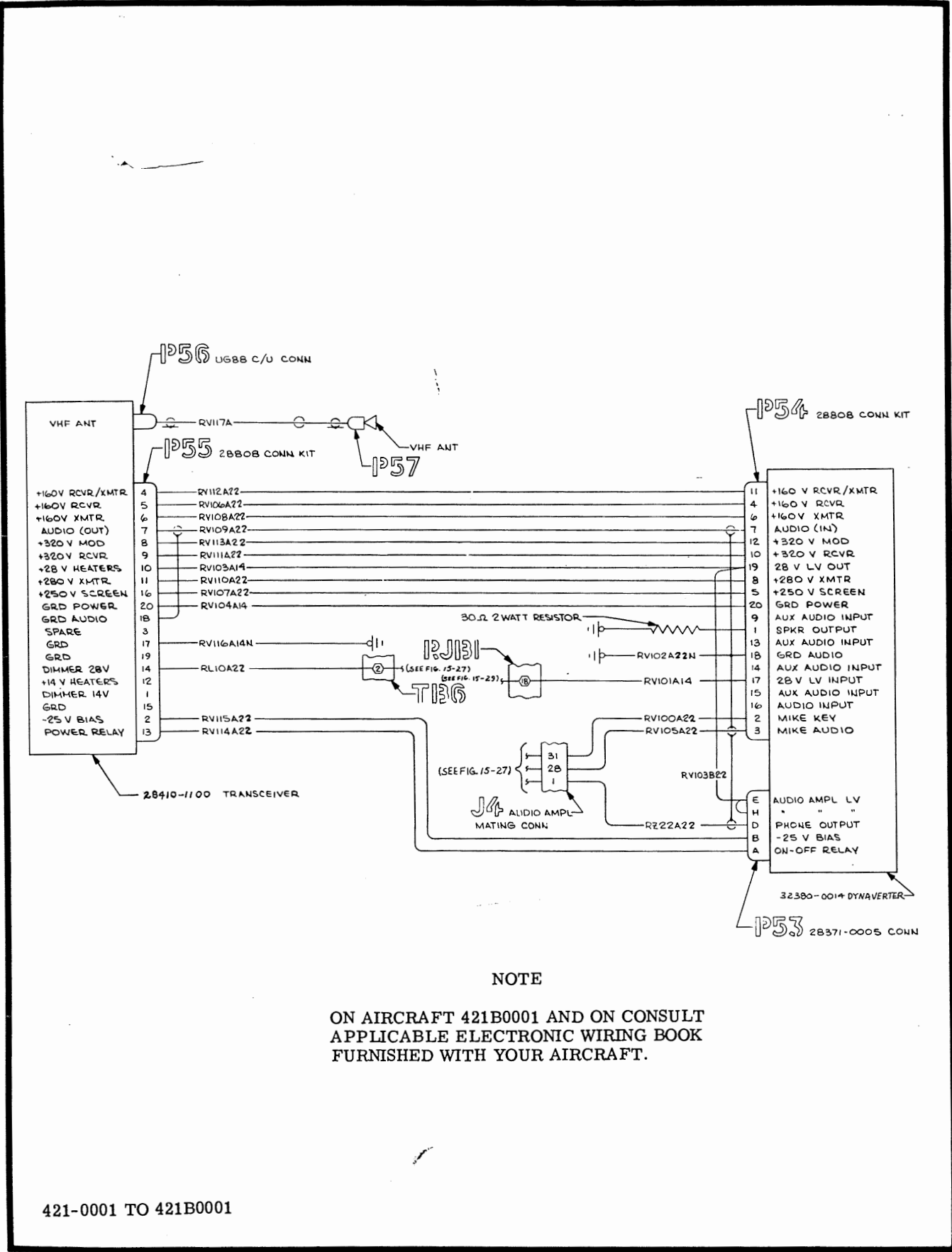


Figure 15-15. Cessna Transceiver 500

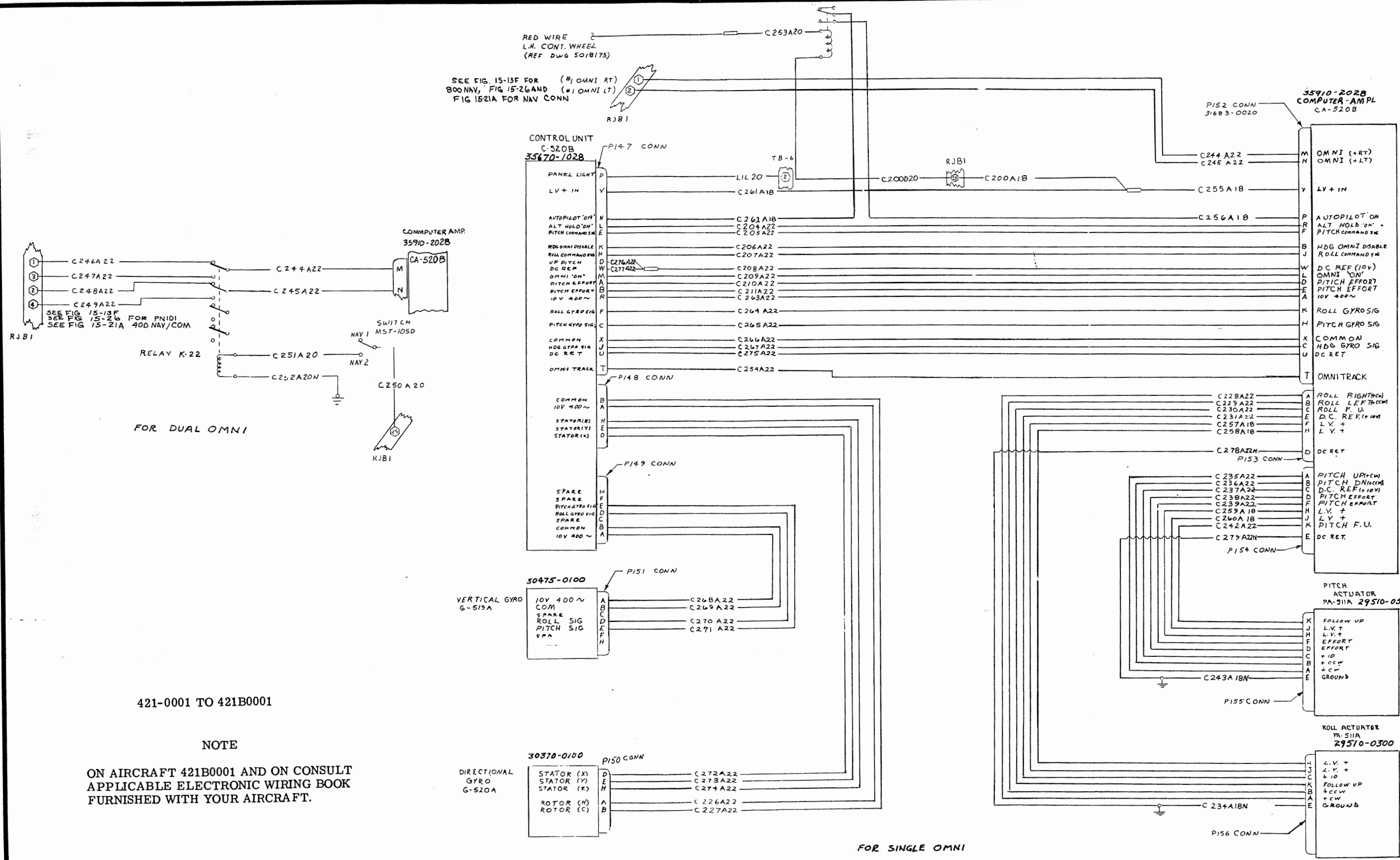


Figure 15-14C. Cessna Nav-O-Matic 400

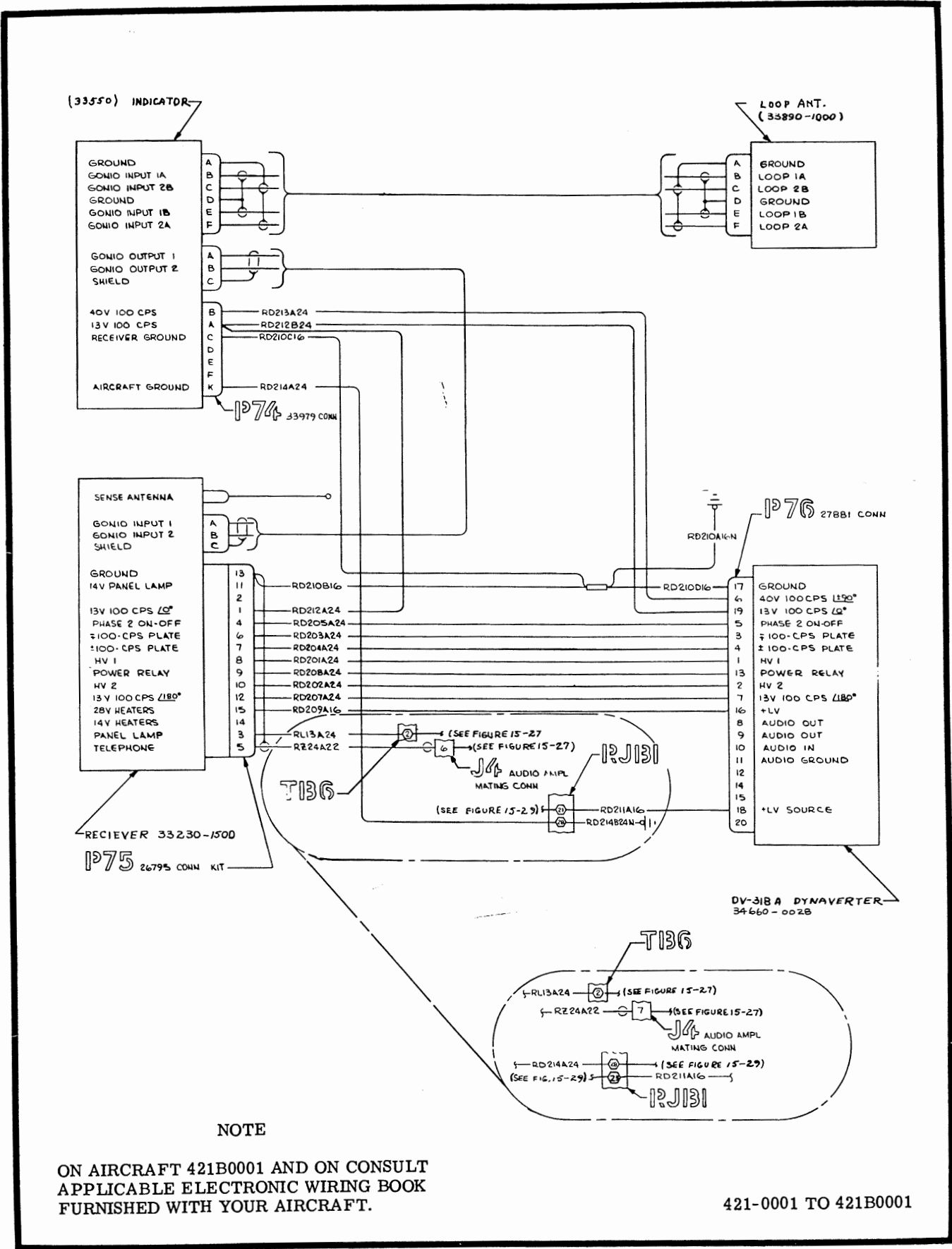
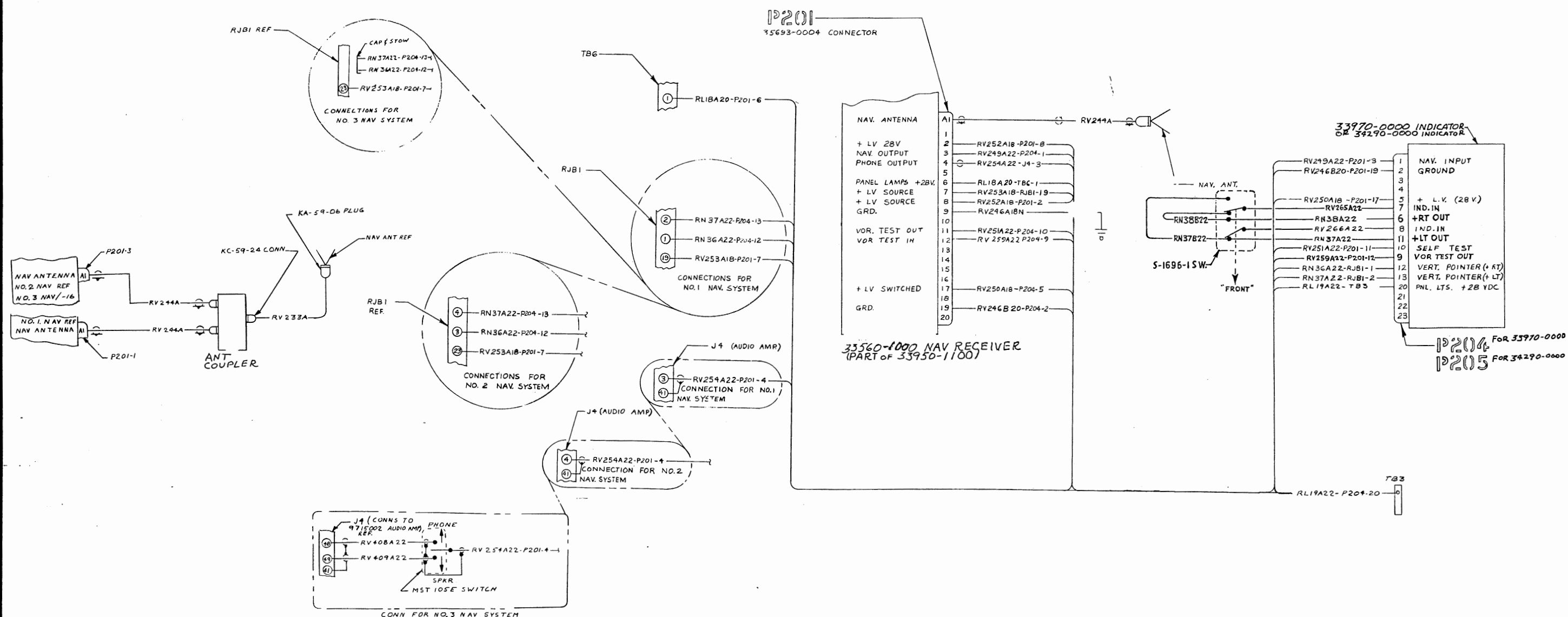


Figure 15-21D. Cessna ADF 400

NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
FURNISHED WITH YOUR AIRCRAFT.



421-0001 TO 421B0001

Figure 15-21C. Cessna Nav/Omni 400

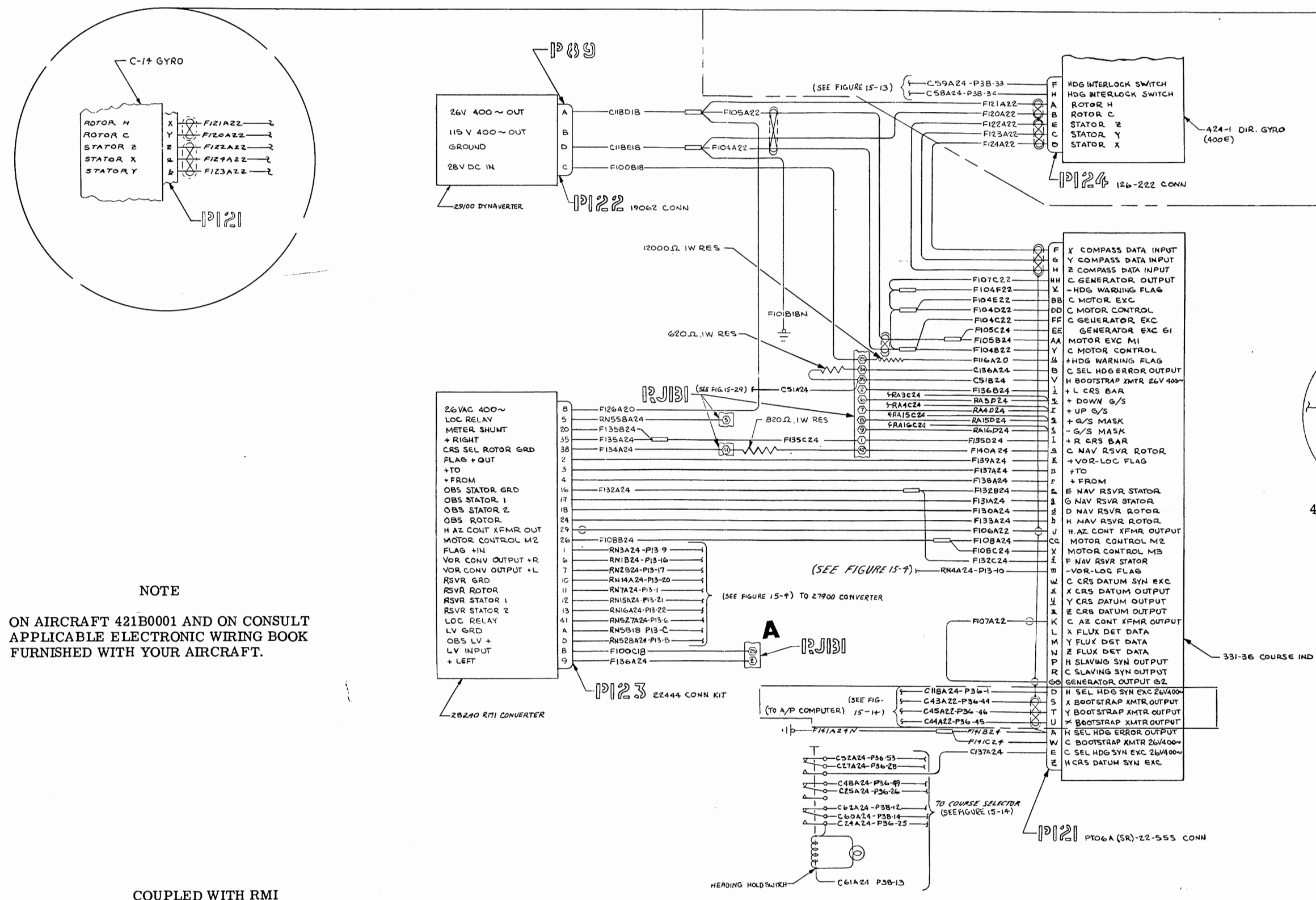


Figure 15-26. PN 101 Pictorial Navigation System (Sheet 1 of 2)

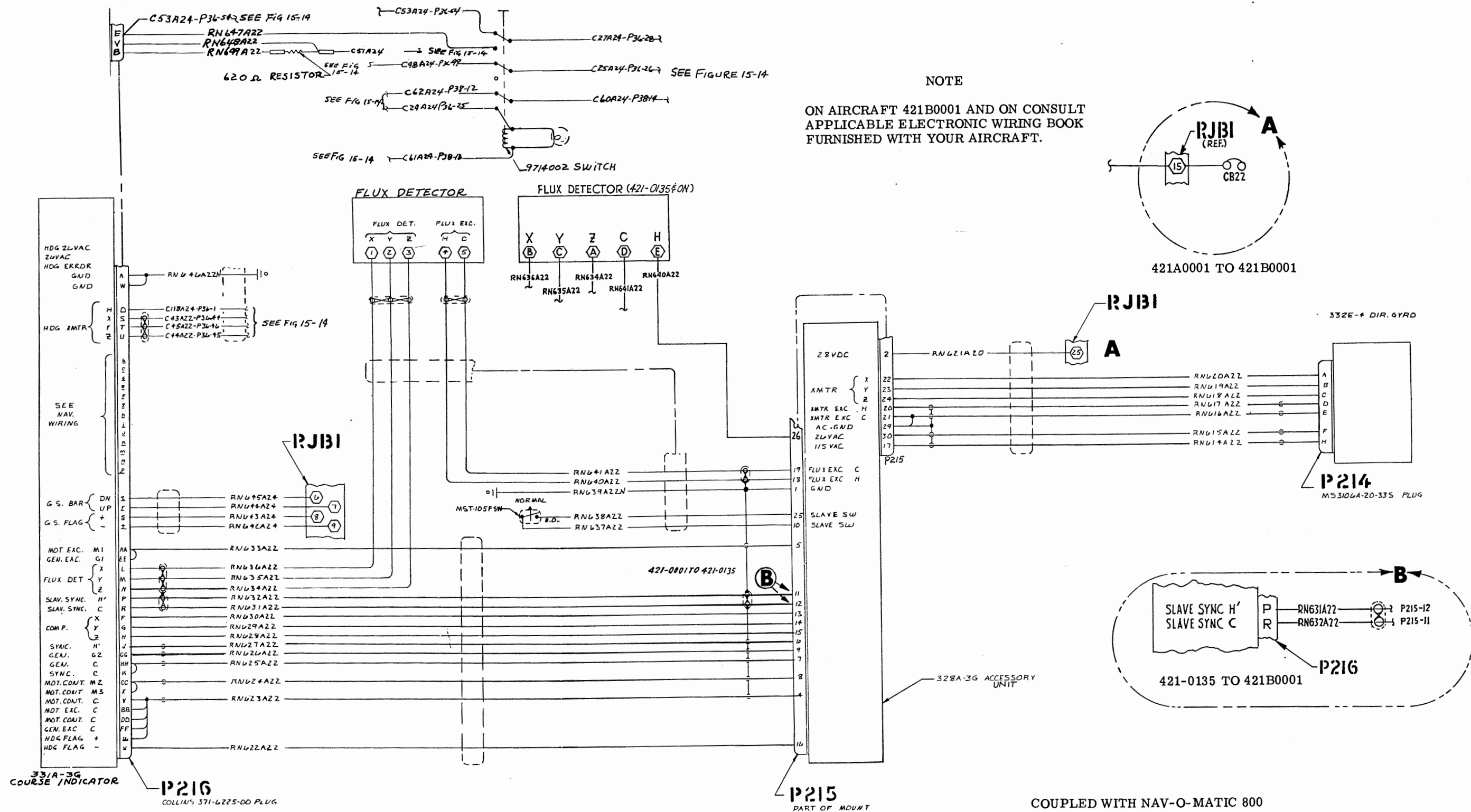


Figure 15-26. PN 101 Pictorial Navigation System (Sheet 2 of 2)

AVQ-45 Weather Radar

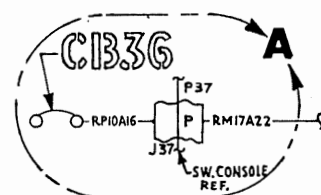
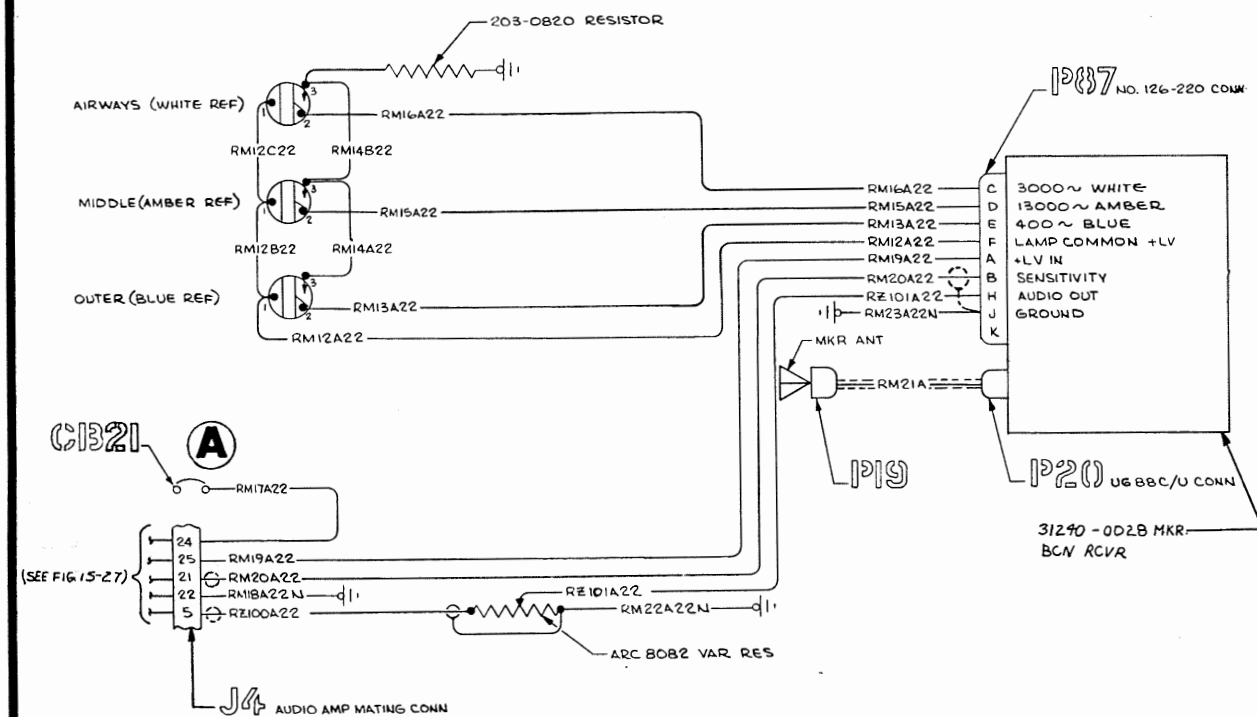
NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
FURNISHED WITH YOUR AIRCRAFT.

AVQ 46 Weather Radar
421-0042 TO 421B0001

421-0001 TO 421B0001

Figure 15-23. Weather Radar



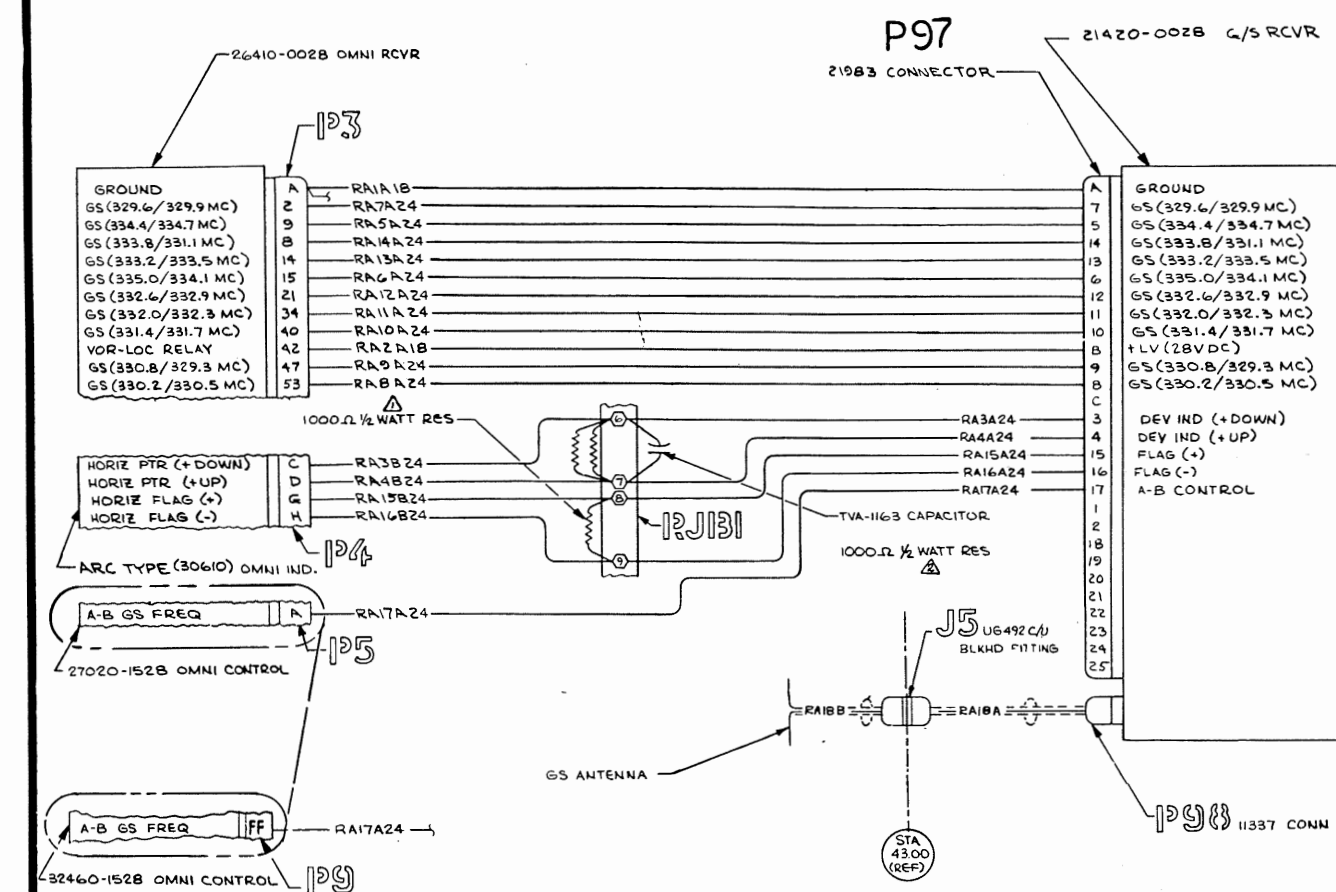
421A0001 TO 421B0001

NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
FURNISHED WITH YOUR AIRCRAFT.

421-0001 TO 421B0001

Figure 15-22. Cessna Marker Beacon 300

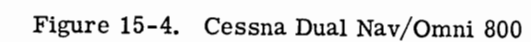


△ CIRCUIT SHOWN IS FOR ONE INDICATOR LOAD:
FOR TWO INDICATOR LOADS DELETE RESISTOR

△ CIRCUIT SHOWN IS FOR ONE INDICATOR LOAD: FOR
TWO INDICATOR LOADS DELETE ONE RESISTOR,
FOR THREE INDICATOR LOADS DELETE BOTH RESISTORS.

421-0001 TO 421A0001

Figure 15-5. Cessna Glide Slope 800



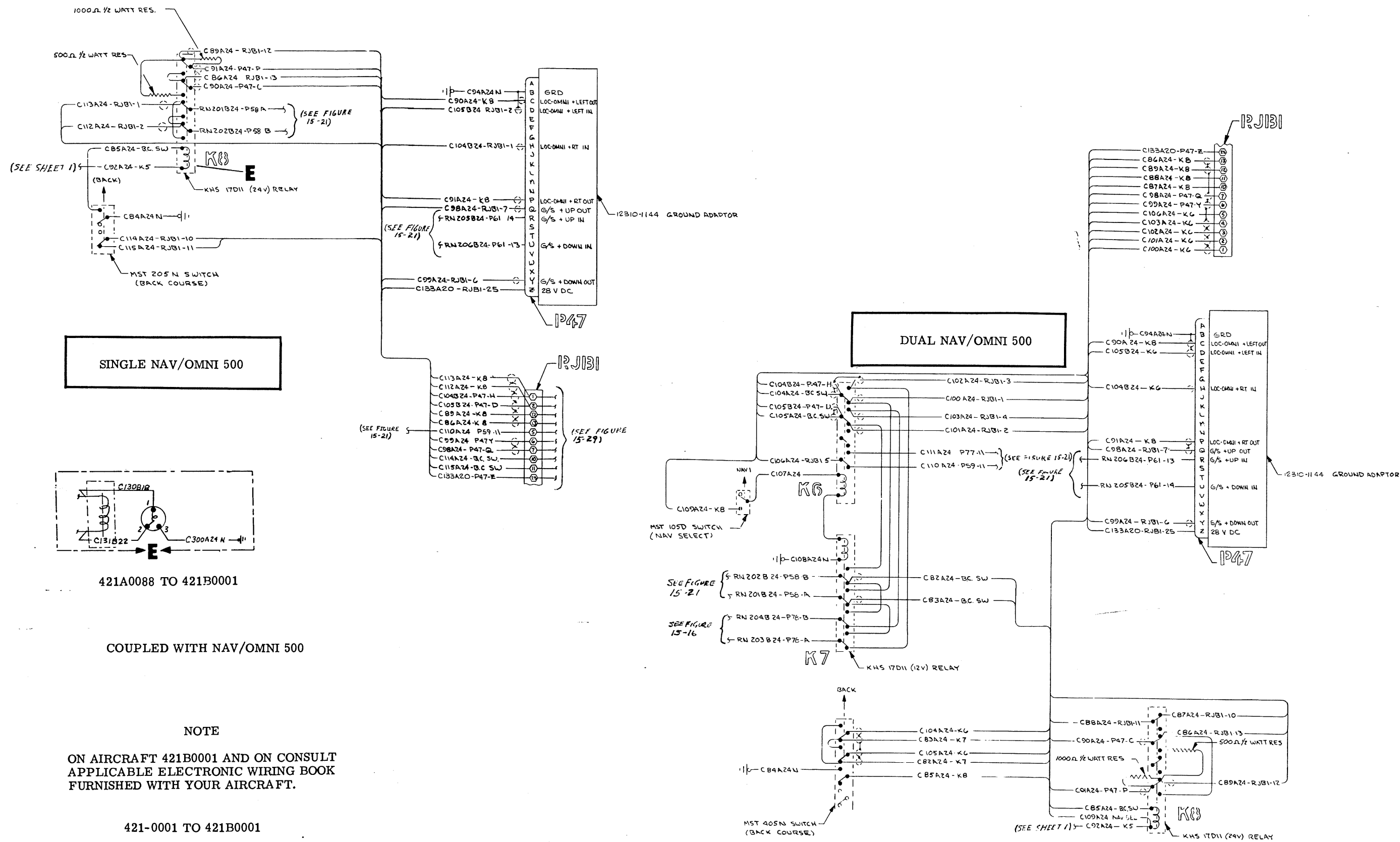


Figure 15-14. Cessna Nav-O-Matic 800 Autopilot (Sheet 2 of 5)

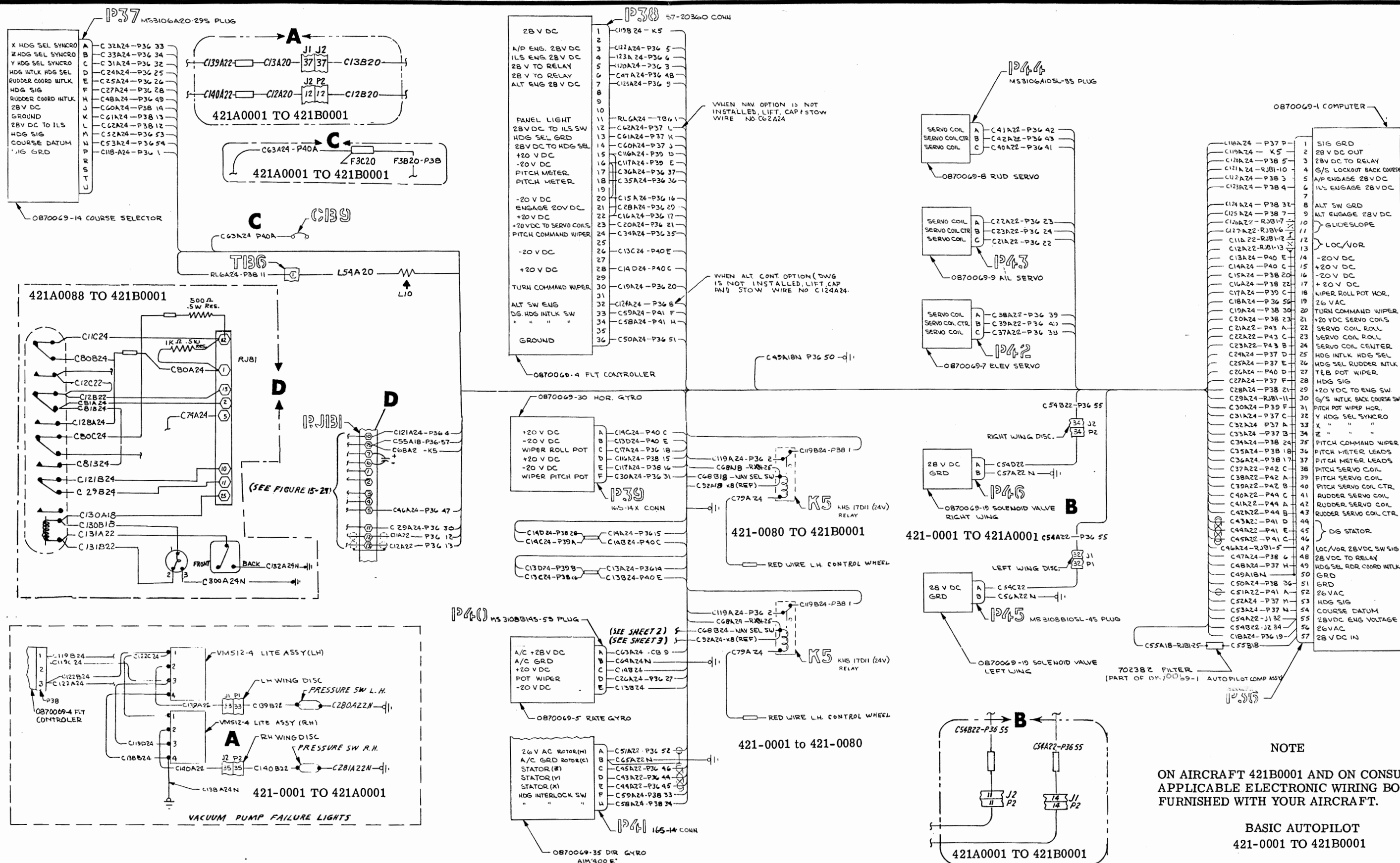
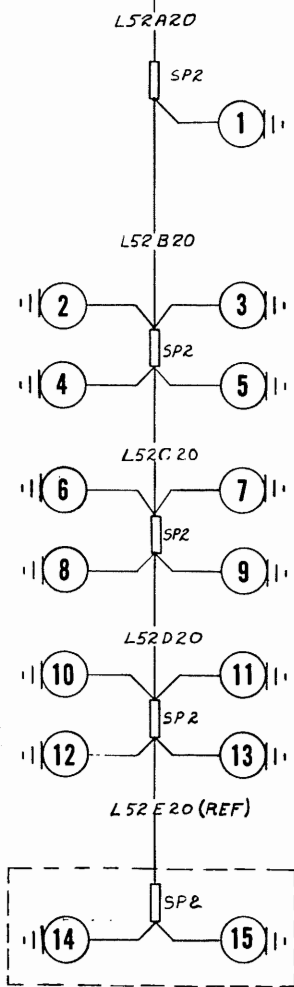


Figure 15-14. Cessna Nav-O-Matic 800 Autopilot (Sheet 1 of 5)

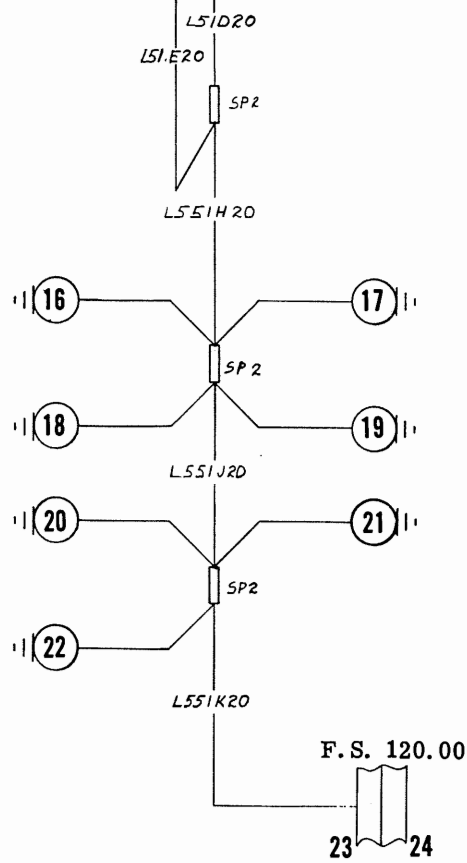


(REF STD WIRING DIAGRAM)
DIMMABLE INTERIOR LIGHTS



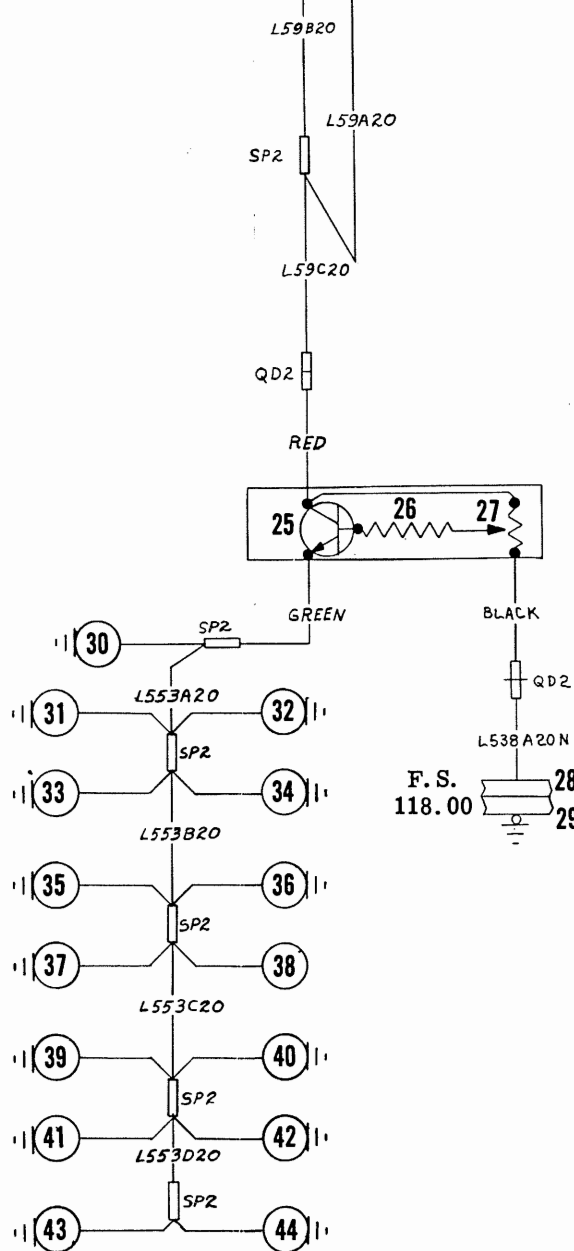
E. G. T. LIGHTS

(REF STD WIRING DIAGRAM)
DIMMABLE INTERIOR LIGHTS



PILOT INSTRUMENT LIGHTS

(REF STD WIRING DIAGRAM)
DIMMABLE INTERIOR LIGHTS



COPILOT INSTRUMENT LIGHTS

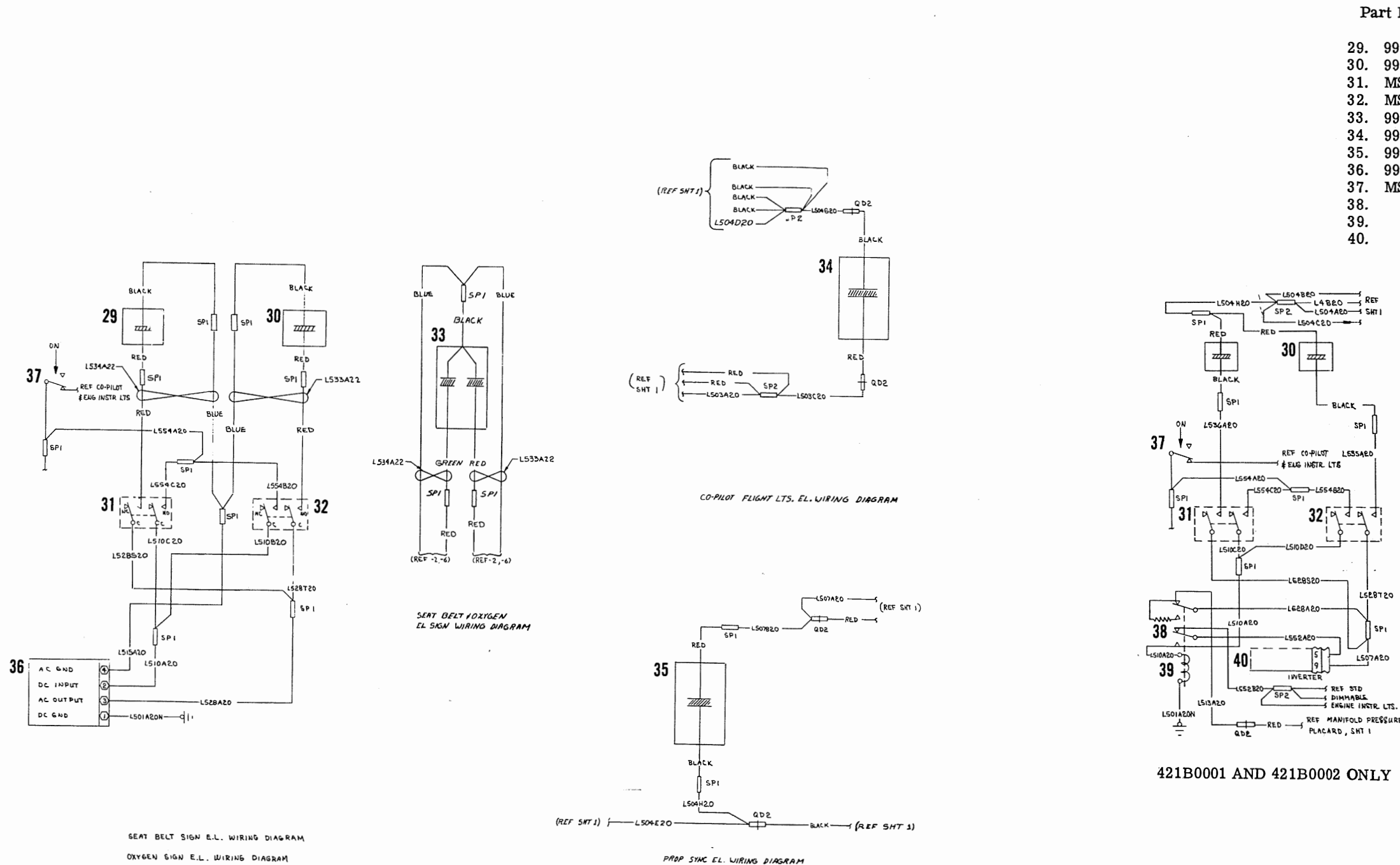
Part Number

Nomenclature

1. CM2990-2	Post Lt - Manifold Press Placard
2. CM2990-2	Post Lt - Tach
3. CM2990-2	Post Lt - Manifold Press
4. CM2990-2	Post Lt - Tach
5. CM2990-2	Post Lt - Manifold Press
6. CM2990-2	Post Lt - Fuel Qty
7. CM2990-2	Post Lt - Fuel Flow
8. CM2990-2	Post Lt - Fuel Qty
9. CM2990-2	Post Lt - Fuel Flow
10. CM2990-2	Post Lt - Eng Gage
11. CM2990-2	Post Lt - Eng Gage
12. CM2990-2	Post Lt - Eng Gage
13. CM2990-2	Post Lt - Eng Gage
14. CM2990-2	Post Lt - E. G. T.
15. CM2990-2	Post Lt - E. G. T.
16. CM2990-2	Post Lt - ADF
17. CM2990-2	Post Lt - IN-41
18. CM2990-2	Post Lt - ADF
19. CM2990-2	Post Lt - IN-41
20. CM2990-2	Post Lt - RMI
21. CM2990-2	Post Lt - Radio Sw
22. CM2990-2	Post Lt - RMI
23. 203735-1	Recept - Comm & Nav
24. 203735-6	Plug - Comm & Nav
25. MJE3055	Transistor - Copilot Lts
26. RC20GF151K	Copilot Instr Lts
27. 0870142-1	Rheostat - Copilot Instr Lts
28. 203540-1	Plug - RH Grd
29. 201298-1	Recept - RH Grd
30. CM2990-2	Post Lt - OAT
31. CM2990-2	Post Lt - Airspeed Ind
32. CM2990-2	Post Lt - Turn & Bank
33. CM2990-2	Post Lt - Airspeed Ind
34. CM2990-2	Post Lt - Turn & Bank
35. CM2990-2	Post Lt - Directional Gyro
36. CM2990-2	Post Lt - Horizontal Gyro
37. CM2990-2	Post Lt - Directional Gyro
38. CM2990-2	Post Lt - Horizontal Gyro
39. CM2990-2	Post Lt - Rate of Climb
40. CM2990-2	Post Lt - Altimeter
41. CM2990-2	Post Lt - Rate of Climb
42. CM2990-2	Post Lt - Altimeter
43. CM2990-2	Post Lt - Prop Deice
44. CM2990-2	Post Lt - Dimmer Control

421B0001 AND ON

CONTRACT NO.		Cessna. AIRCRAFT CO. P. O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
DATE 10-27-69		TITLE: E. G. T. LIGHTS, OPT PILOT INSTR. LIGHTS, OPT CO-PILOT INSTR. LIGHTS WIRING DIAGRAM	
DRAWN WALTMAN		GROUP F. S. 10/27/69	
CHECK F. S. 10/27/69		STRESS	
PROJ. F. S. 10/27/69		OTHER	
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5118454	
SCALE: NONE		SHEET	



Part Number	Nomenclature
29. 9910077-21	El Pnl - Seat Belt Sign
30. 9910077-22	El Pnl - Oxygen Sign
31. MST-205N	Sw - Seat Belt Sign
32. MST-205N	Sw - Oxygen Sign
33. 9910077-20	El Pnl - Seat Belt & Oxygen Sign
34. 9910077-2	El Pnl - Flight Instr
35. 9910077-6	El Pnl - Prop Synchro
36. 9910081-1	Inverter
37. MST-405N	Sw - Master Lt Control
38.	Resistor
39.	Relay
40.	Inverter

421B0001 AND ON

CONTRACT NO.		AIRCRAFT CO.		P. O. BOX 1977 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
DATE 12-23-69		Cessna			
DRAWN WALTMAN		TITLE: ELECTROLUMINESCENT INSTR. PANEL WIRING ASSY (OPT)			
GROUP P. M. M. 12-23-69					
CHECK P. M. M. 12-23-69					
STRESS C. R. L.					
PROJ. C. R. L.					
OTHER					
SIZE D	CODE IDENT. NO. 71379	DRAWING NO. 5118453			
SCALE: NONE		REF		SHEET 2 OF 2	

REFERENCE SHEET	PART NUMBER	DESCRIPTION	NOTES	REFERENCE SHEET	PART NUMBER	DESCRIPTION	REFERENCE SHEET	PART NUMBER	DESCRIPTION	REFERENCE SHEET	PART NUMBER	DESCRIPTION	REFERENCE SHEET	PART NUMBER	DESCRIPTION	REFERENCE SHEET	PART NUMBER	DESCRIPTION	
A1	5.00	9910094-2	L ALT FAIL SENS	CR4	5.00	5118335-10	LH-ALT FLD DIO	DS78	11.00	CM2990G1	VVI PL	M2	9.00	CA68017-0101	TACH IND	R4	5.00	HS-1A-11-7200	VOLT METER RES 58
A2	5.00	9910094-2	R ALT FAIL SENS	CR7	5.00	5118335-10	RH ALT FLD DIO	DS79	11.00	CM2990G1	VVI PL	M3	9.00	CA68017-0101	LH ENGINE GAGE	R5	9.00	FR-100-5	LOG GR DN RES 16
AOS1	14.00	5618039-9	ANNUNC ASSY	CR8	6.00	5618035-1	EMER LT. PWR DI	DS80	11.00	CM2990G1	GYRO HOR PL	M4	9.00	CA68019-0101	RH ENGINE GAGE	R6	8.00	1 3/4-0-48-F-40	LOG-GR HORN RES 9
AR1	5.00	634445	LH ALTN-50 AMP 7	CR9	6.00	5618035-1	REG. LT. PWR DI	DS81	11.00	CM2990G1	GYRO HOR PL	M5	9.00	CA68020-0101	AIR TEMP IND	R7	9.00	AR-75-25	L FUEL PUMP RES16
AR2	5.00	634445	RH ALTN-50 AMP 7	CP1	8.00	145061	LOG GR RLY DIO	DS82	11.00	CM2990G1	DIR GYRO PL	M6	9.00	CA61031-0101	LH TEG IND	R8	9.00	AR-75-25	R FUEL PUMP RES16
AR3	5.00	639229	LH ALT-100 AMP	CR11	9.00	5618035-1	R FUEL PRIM DIO	DS83	11.00	CM2990G1	DIR GYRO PL	M7	10.00	9910082-1	FUEL QTY IND	R9	14.00	OR-55-1	CARIN FAN RES 16
AR4	5.00	639229	RH ALT-100 AMP	CR12	9.00	5618035-1	R FUEL PRIM DIO	DS84	11.00	CM2990G1	TEB IND PL	MT1	9.00	MS28034-3	L OIL TEMP BULB	R10	14.00	OR-55-2	CIGAR LTR RES 16
R1	7.00	627841	LH STARTER 7.8	CR13	9.00	5618035-1	LH L BOOST DIO	DS85	11.00	CM2990G1	TEB IND PL	MT2	9.00	MS28034-3	R OIL TEMP BULB	R11	15.00	E-50-R-1-352A	LH MAP LT POT 9
R2	7.00	627841	RH STARTER 7.8	CR14	9.00	5618035-1	LH L BOOST DIO	DS86	11.00	CM2990G1	ASI PL	MT3	9.00	MS28034-3	R OIL TEMP BULB	R12	15.00	E-50-R-1-352A	RH MAP LT POT 9
R3	9.00	9910092-3	LDG GR MOTOR	CR15	12.00	141201	DIM FLD LT DIO	DS87	11.00	CM2990G1	CLOCK PL	MT4	9.00	MS28034-3	R OIL TEMP BULB	R13	12.00	CM34852	FLOOD LTS POT 41
R4	8.00	9910095-1	FLAP MOTOR	CR16	12.00	141201	9RT FLD LT DIO	DS88	11.00	CM2990G1	CLOCK PL	MT5	9.00	MS28034-3	R OIL TEMP BULB	R14	12.00	RC20GF151K	FLOOD LTS RFS.
R5	9.00	81500-8	LH AUX PUMP 5	CR17	15.00	142482	LH AUDIO DIODE	DS89	11.00	CM2990G1	DAT IND PL	MT6	9.00	MS28034-3	R OIL TEMP BULB	R15	12.00	RC20GF151K	FLOOD LTS RFS.
R6	9.00	81500-8	RH AUX PUMP 5	CR18	15.00	142482	LH AUDIO DIODE	E1	5.00	9910068-2	LH O.V. RELAY	MT7	9.00	MS28034-3	R OIL TEMP BULB	R16	12.00	RC20GF151K	FLOOD LTS RFS.
R7	9.00	106-1	LH BOOST PUMP 5	CR19	15.00	142482	LH AUDIO DIODE	E2	5.00	9910068-2	RH O.V. RELAY	MT8	9.00	MS28034-3	R OIL TEMP BULB	R17	12.00	RC20GF151K	FLOOD LTS RFS.
R8	9.00	106-1	RH BOOST PUMP 5	CR20	15.00	142482	LH AUDIO DIODE	F1	5.00	MDX-3.0-AMP	L ALT FLD FUSE 37	MT9	9.00	MS28034-3	R OIL TEMP BULB	R18	12.00	RC20GF151K	FLOOD LTS RFS.
R9	13.00	476411	LH TRANS PUMP 19	CR21	14.00	141201	CABIN HEAT DIO	F2	5.00	MDX-3.0-AMP	R ALT FLD FUSE 37	MT10	9.00	MS28034-3	R OIL TEMP BULB	R19	12.00	RC20GF151K	FLOOD LTS RFS.
R10	13.00	476411	RH TRANS PUMP 19	CR22	14.00	141201	CABIN HEAT DIO	F3	5.00	AGCS	BATT AMTR FUSE 37	MT11	9.00	MS28034-3	R OIL TEMP BULB	R20	12.00	RC20GF151K	FLOOD LTS RFS.
R11	14.00	9910094-6	HEATER, BLOWER	CR23	14.00	141201	CABIN HEAT DIO	F4	5.00	AGCS	BATT AMTR FUSE 37	MT12	9.00	MS28034-3	R OIL TEMP BULB	R21	12.00	RC20GF151K	FLOOD LTS RFS.
R12	5.00	5118410-20	PWR CB BUS BAR	CR24	8.00	5118412-2	LGR DIODE ASSY	F5	5.00	AGCS	BATT AMTR FUSE 37	MT13	9.00	MS28034-3	R OIL TEMP BULB	R22	12.00	RC20GF151K	FLOOD LTS RFS.
R13	5.00	5118410-20	LH CB PWR BUS	CR25	8.00	5118412-2	LGR UNLOCK LT	F6	5.00	AGCS	BATT AMTR FUSE 37	MT14	9.00	MS28034-3	R OIL TEMP BULB	R23	12.00	RC20GF151K	FLOOD LTS RFS.
R14	5.00	5118410-18	RH CB PWR BUS	CR26	8.00	5118412-2	LGR UNLOCK LT	F7	5.00	AGCS	BATT AMTR FUSE 37	MT15	9.00	MS28034-3	R OIL TEMP BULB	R24	12.00	RC20GF151K	FLOOD LTS RFS.
R15	5.00	5118410-18	MAIN RELAY BUS	CR27	8.00	5118412-2	LGR UNLOCK LT	F8	5.00	AGCS	BATT AMTR FUSE 37	MT16	9.00	MS28034-3	R OIL TEMP BULB	R25	12.00	RC20GF151K	FLOOD LTS RFS.
R16	5.00	5118410-18	EMER PWR BUS	CR28	8.00	5118412-2	LGR UNLOCK LT	F9	5.00	AGCS	BATT AMTR FUSE 37	MT17	9.00	MS28034-3	R OIL TEMP BULB	R26	12.00	RC20GF151K	FLOOD LTS RFS.
R17	5.00	MS25225-4-2	ALD BUS DISTR B	CR29	8.00	5118412-2	LGR UNLOCK LT	F10	5.00	AGCS	BATT AMTR FUSE 37	MT18	9.00	MS28034-3	R OIL TEMP BULB	R27	12.00	RC20GF151K	FLOOD LTS RFS.
R18	5.00	5118410-17	BATT SHUNT BUS	CR30	8.00	5118412-2	LGR UNLOCK LT	F11	5.00	AGCS	BATT AMTR FUSE 37	MT19	9.00	MS28034-3	R OIL TEMP BULB	R28	12.00	RC20GF151K	FLOOD LTS RFS.
R19	5.00	5118410-17	1 R SCB BUS	CR31	8.00	5118412-2	LGR UNLOCK LT	F12	5.00	AGCS	BATT AMTR FUSE 37	MT20	9.00	MS28034-3	R OIL TEMP BULB	R29	12.00	RC20GF151K	FLOOD LTS RFS.
R20	5.00	5118410-17	3R SCB BUS	CR32	8.00	5118412-2	LGR UNLOCK LT	F13	5.00	AGCS	BATT AMTR FUSE 37	MT21	9.00	MS28034-3	R OIL TEMP BULB	R30	12.00	RC20GF151K	FLOOD LTS RFS.
R21	5.00	5118410-17	1R CB BUS	CR33	8.00	5118412-2	LGR UNLOCK LT	F14	5.00	AGCS	BATT AMTR FUSE 37	MT22	9.00	MS28034-3	R OIL TEMP BULB	R31	12.00	RC20GF151K	FLOOD LTS RFS.
R22	5.00	5118410-17	1-2 R JUMP BUS	CR34	8.00	5118412-2	LGR UNLOCK LT	F15	5.00	AGCS	BATT AMTR FUSE 37	MT23	9.00	MS28034-3	R OIL TEMP BULB	R32	12.00	RC20GF151K	FLOOD LTS RFS.
R23	5.00	5118410-17	1-2 R JUMP BUS	CR35	8.00	5118412-2	LGR UNLOCK LT	F16	5.00	AGCS	BATT AMTR FUSE 37	MT24	9.00	MS28034-3	R OIL TEMP BULB	R33	12.00	RC20GF151K	FLOOD LTS RFS.
R24	5.00	5118410-17	2R CB BUS	CR36	8.00	5118412-2	LGR UNLOCK LT	F17	5.00	AGCS	BATT AMTR FUSE 37	MT25	9.00	MS28034-3	R OIL TEMP BULB	R34	12.00	RC20GF151K	FLOOD LTS RFS.
R25	5.00	5118410-17	2-3 R JUMP BUS	CR37	8.00	5118412-2	LGR UNLOCK LT	F18	5.00	AGCS	BATT AMTR FUSE 37	MT26	9.00	MS28034-3	R OIL TEMP BULB	R35	12.00	RC20GF151K	FLOOD LTS RFS.
R26	5.00	5118410-17	2-3 R JUMP BUS	CR38	8.00	5118412-2	LGR UNLOCK LT	F19	5.00	AGCS	BATT AMTR FUSE 37	MT27	9.00	MS28034-3	R OIL TEMP BULB	R36	12.00	RC20GF151K	FLOOD LTS RFS.
R27	5.00	5118410-17	3R CB BUS	CR39	8.00	5118412-2	LGR UNLOCK LT	F20	5.00	AGCS	BATT AMTR FUSE 37	MT28	9.00	MS28034-3	R OIL TEMP BULB	R37	12.00	RC20GF151K	FLOOD LTS RFS.
R28	5.00	5118410-17	3-4 R JUMP BUS	CR40	8.00	5118412-2	LGR UNLOCK LT	F21	5.00	AGCS	BATT AMTR FUSE 37	MT29	9.00	MS28034-3	R OIL TEMP BULB	R38	12.00	RC20GF151K	FLOOD LTS RFS.
R29	5.00	5118410-17	3-4 R JUMP BUS	CR41	8.00	5118412-2	LGR UNLOCK LT	F22	5.00	AGCS	BATT AMTR FUSE 37	MT30	9.00	MS28034-3	R OIL TEMP BULB	R39	12.00	RC20GF151K	FLOOD LTS RFS.
R30	5.00	5118410-17	3-4 R JUMP BUS	CR42	8.00	5118412-2	LGR UNLOCK LT	F23	5.00	AGCS	BATT AMTR FUSE 37	MT31	9.00	MS28034-3	R OIL TEMP BULB	R40	12.00	RC20GF151K	FLOOD LTS RFS.
R31	5.00	5118410-17	3-4 R JUMP BUS	CR43	8.00	5118412-2	LGR UNLOCK LT	F24	5.00	AGCS	BATT AMTR FUSE 37	MT32	9.00	MS28034-3	R OIL TEMP BULB	R41	12.00	RC20GF151K	FLOOD LTS RFS.
R32	5.00	5118410-17	3-4 R JUMP BUS	CR44	8.00	5118412-2	LGR UNLOCK LT	F25	5.00	AGCS	BATT AMTR FUSE 37	MT33	9.00	MS28034-3	R OIL TEMP BULB	R42	12.00	RC20GF151K	FLOOD LTS RFS.
R33	5.00	5118410-17	3-4 R JUMP BUS	CR45	8.00	5118412-2	LGR UNLOCK LT	F26	5.00	AGCS	BATT AMTR FUSE 37	MT34	9.00	MS28034-3	R OIL TEMP BULB	R43	12.00	RC20GF151K	FLOOD LTS RFS.
R34	5.00	5118410-17	3-4 R JUMP BUS	CR46	8.00	5118412-2	LGR UNLOCK LT	F27	5.00	AGCS	BATT AMTR FUSE 37	MT35	9.00	MS28034-3	R OIL TEMP BULB	R44	12.00	RC20GF151K	FLOOD LTS RFS.
R35	5.00	5118410-17	3-4 R JUMP BUS	CR47	8.00	5118412-2	LGR UNLOCK LT	F28	5.00	AGCS	BATT AMTR FUSE 37	MT36	9.00	MS28034-3	R OIL TEMP BULB	R45	12.00	RC20GF151K	FLOOD LTS RFS.
R36	5.00	5118410-17	3-4 R JUMP BUS	CR48	8.00	5118412-2	LGR UNLOCK LT	F29	5.00	AGCS	BATT AMTR FUSE 37	MT37	9.00	MS28034-3	R OIL TEMP BULB	R46	12.00	RC20GF151K	FLOOD LTS RFS.
R37	5.00	5118410-17	3-4 R JUMP BUS	CR49	8.00	5118412-2	LGR UNLOCK LT	F30	5.00	AGCS	BATT AMTR FUSE 37	MT38	9.00	MS28034-3	R OIL TEMP BULB	R47	12.00	RC20GF151K	FLOOD LTS RFS.
R38	5.00	5118410-17	3-4 R JUMP BUS	CR50	8.00	5118412-2	LGR UNLOCK LT	F31	5.00	AGCS	BATT AMTR FUSE 37	MT39	9.00	MS28034-3	R OIL TEMP BULB	R48	12.00	RC20GF151K	FLOOD LTS RFS.
R39	5.00	5118410-17	3-4 R JUMP BUS	CR51	8.00	5118412-2	LGR UNLOCK LT	F32	5.00	AGCS	BATT AMTR FUSE 37	MT40	9.00	MS28034-3	R OIL TEMP BULB	R49	12.00	RC20GF151K	FLOOD LTS RFS.
R40	5.00	5118410-17	3-4 R JUMP BUS	CR52	8.00	5118412-2	LGR UNLOCK LT	F33	5.00	AGCS	BATT AMTR FUSE 37	MT41	9.00	MS28034-3	R OIL TEMP BULB	R50	12.00	RC20GF151K	FLOOD LTS RFS.
R41	5.00	5118410-17	3-4 R JUMP BUS	CR53	8.00	5118412-2	LGR UNLOCK LT	F34	5.00	AGCS	BATT AMTR FUSE 37	MT42	9.00	MS28034-3	R OIL TEMP BULB	R51	12.00	RC20GF151K	FLOOD LTS RFS.
R42	5.00	5118410-17	3-4 R JUMP BUS	CR54	8.00	5118412-2	LGR UNLOCK LT	F35	5.00	AGCS	BATT AMTR FUSE 37	MT43	9.00	MS28034-3	R OIL TEMP BULB	R52	12.00	RC20GF151K	FLOOD LTS RFS.
R43	5.00	5118410-17	3-4 R JUMP BUS	CR55	8.00	5118412-2	LGR UNLOCK LT	F36	5.00	AGCS	BATT AMTR FUSE 37	MT44	9.00	MS28034-3	R OIL TEMP BULB	R53	12.00	RC20GF151K	FLOOD LTS RFS.
R44	5.00	5118410-17	3-4 R JUMP BUS	CR56	8.00	5118412-2	LGR UNLOCK LT	F37	5.00	AGCS	BATT AMTR FUSE 37	MT45	9.00	MS28034-3	R OIL TEMP BULB	R54	12.00	RC20GF151K	FLOOD LTS RFS.
R45	5.00	5118410-17	3-4 R JUMP BUS	CR57	8.00	5118412-2	LGR UNLOCK LT	F38	5.00	AGCS	BATT AMTR FUSE 37	MT46	9.00	MS28034-3	R OIL TEMP BULB	R55	12.00	RC20GF151K	FLOOD LTS RFS.
R46	5.00	5118410-17	3-4 R JUMP BUS	CR58	8.00	5118412-2	LGR UNLOCK LT	F39	5.00	AGCS	BATT AMTR FUSE 37	MT47	9.00	MS28034-3	R OIL TEMP BULB	R56	12.00	RC20GF151K	FLOOD LTS RFS.
R47	5.00	5118410-17	3-4 R JUMP BUS	CR59	8.00	5118412-2	LGR UNLOCK LT	F40	5.00	AGCS	BATT AMTR FUSE 37	MT48	9.00	MS28034-3	R OIL TEMP BULB	R57	12.00	RC20GF151K	FLOOD LTS RFS.
R48	5.00	5118410-17	3-4 R JUMP BUS	CR60	8.00	5118412-2	LGR UNLOCK LT	F41	5.00	AGCS	BATT AMTR FUSE 37	MT49	9.00	MS28034-3	R OIL TEMP BULB	R58	12.00	RC20GF151K	FLOOD LTS RFS.
R49	5.00	5118410-17	3-4 R JUMP BUS	CR61	8.00	5118412-2	LGR UNLOCK LT	F42	5.00	AGCS	BATT AMTR FUSE 37	MT50	9.00	MS28034-3	R OIL TEMP BULB	R59	12.00	RC20GF151K	FLOOD LTS RFS.
R50	5.00	5118410-17	3-4 R JUMP BUS	CR62	8.00	5118412-2	LGR UNLOCK LT	F43	5.00	AGCS	BATT AMTR FUSE 37	MT51	9.00	MS28034-3	R OIL TEMP BULB	R60	12.00	RC20GF151K	FLOOD LTS RFS.
R51	5.00	5118410-17	3-4 R JUMP BUS	CR63	8.00	5118412-2	LGR UNLOCK LT	F44	5.00	AGCS	BATT AMTR FUSE 37	MT52	9.00	MS28034-3	R OIL TEMP BULB	R61	12.00	RC20GF151K	FLOOD LTS RFS.
R52	5.00	5118410-17	3-4 R JUMP BUS	CR64	8.00	5118412-2	LGR UNLOCK LT	F45	5.00	AGCS	BATT AMTR FUSE 37	MT53	9.00	MS28034-3	R OIL TEMP BULB	R62	12.00	RC20GF151K	FLOOD LTS RFS.
R53	5.00	5118410-17	3-4 R JUMP BUS	CR65	8.00	5118412-2	LGR UNLOCK LT	F46											

NOTE

ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
FURNISHED WITH YOUR AIRCRAFT.

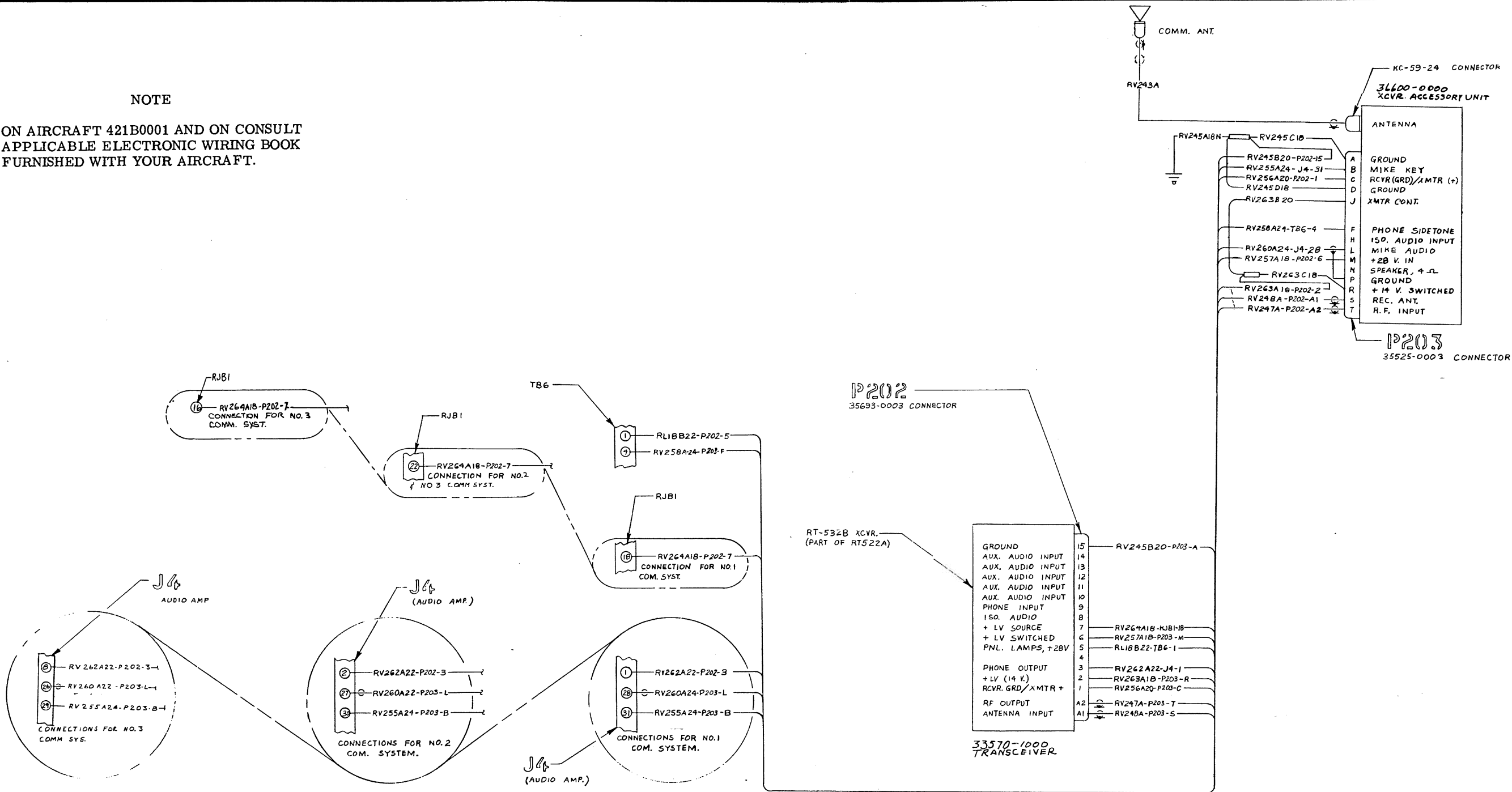
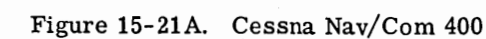
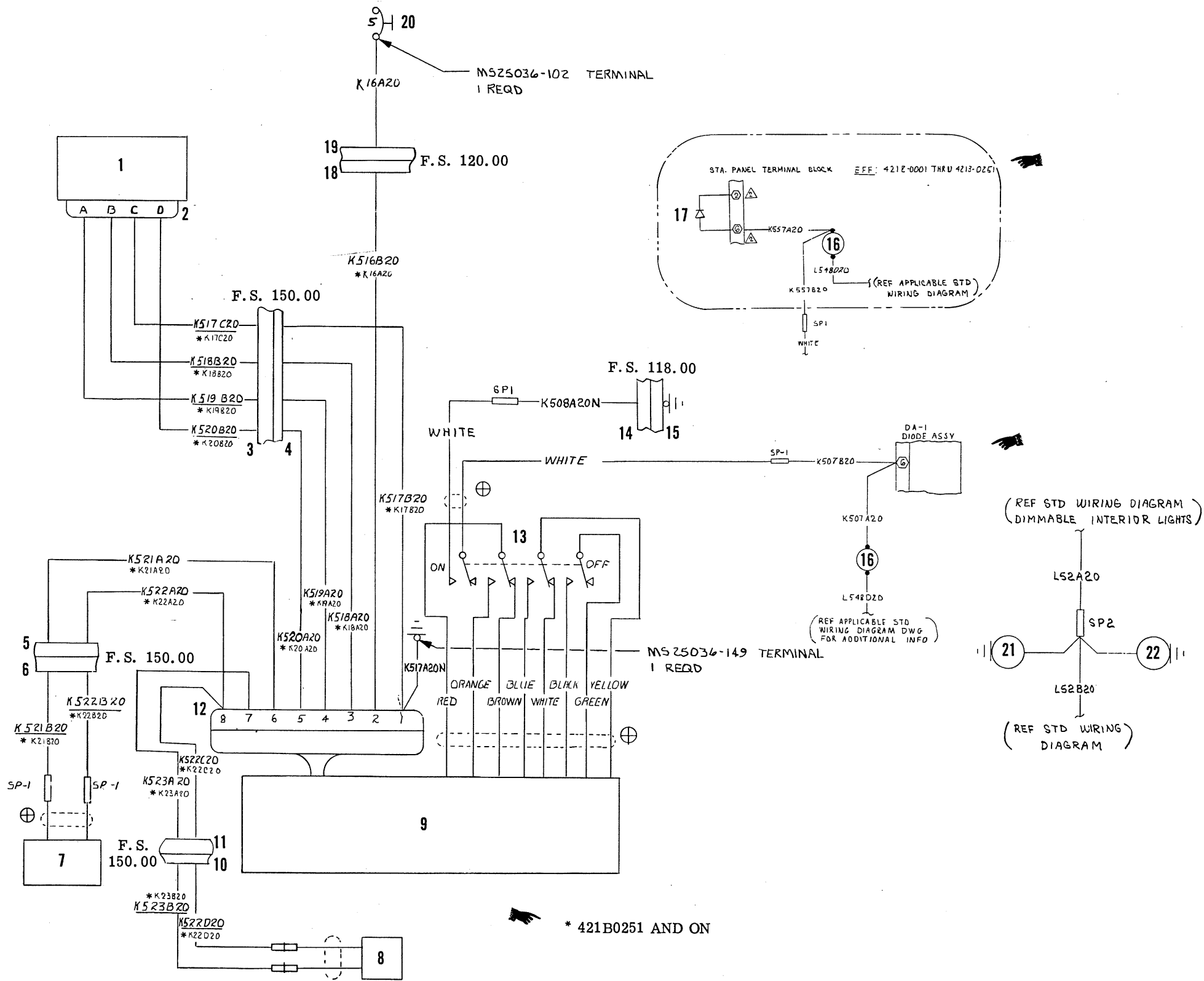


Figure 15-21B. Cessna Transceiver 400

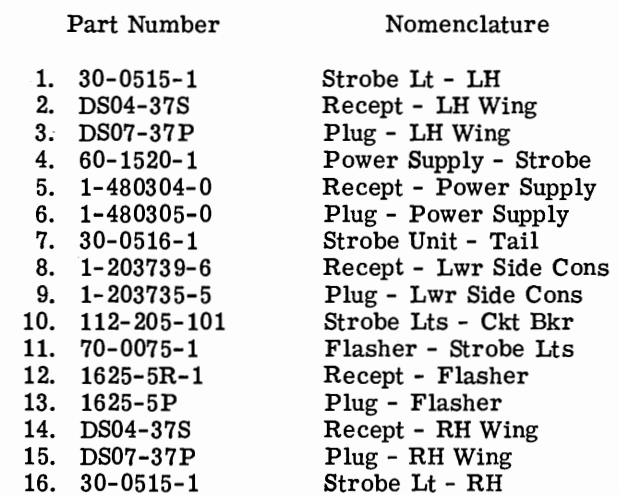




Part Number	Nomenclature
1. 213100	Actuator - Prop Synchro
2. 233062	Plug - Prop Synchro Act Assy
3. DS04-37S	Recept - RH Wing
4. DS07-37P	Plug - RH Wing
5. DS04-37S	Recept - RH Wing
6. DS07-37P	Plug - RH Wing
7. B210446	Slave Pick-up
8. B210446	Master Pick-up
9. 213433	Control Box Assy - Prop Synchro
10. DS07-37P	Plug - LH Wing
11. DS04-37S	Recept - LH Wing
12. 233032	Plug - Prop Synchro Cont Box
13. MST205N	Sw - Prop Synchro
14. 201298-1	Recept - RH Grd
15. 203540-1	Plug - RH Grd
16. 50160T10T3AL	Prop Synchro Ind Lt
17. IN5061	Diode - Prop Synchro
18. 1-203739-6	Recept - Fwd Side Cons
19. 1-203735-5	Plug - Fwd Side Cons
20. 7277-2-5	Prop Synchro - Ckt Brk
21. CM2990-2	Post Lt - Prop Synchro Placard
22. CM2990-2	Post Lt - Manifold Press Placard

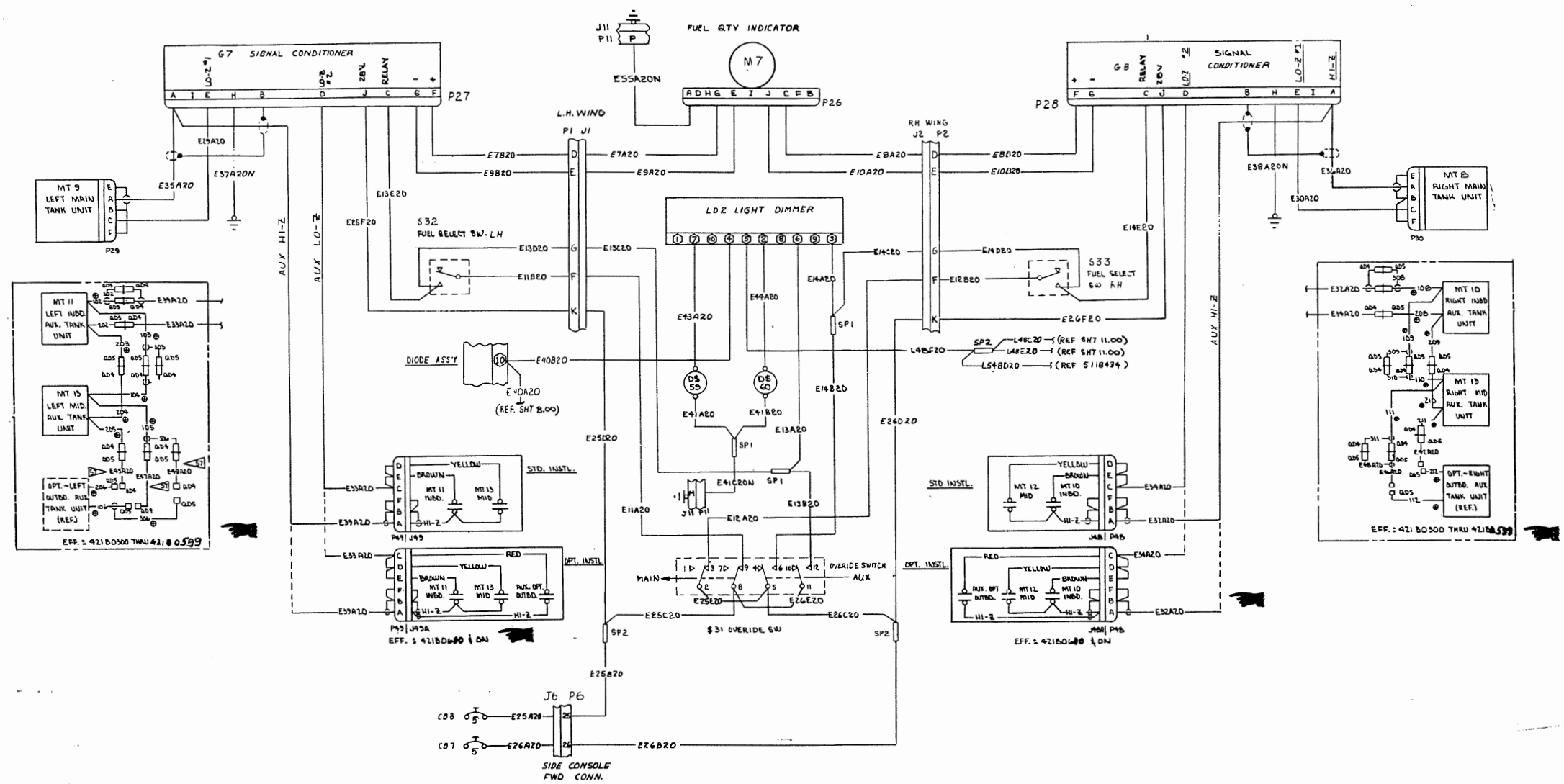
421B0001 AND ON

CONTRACT NO.		Cessna. AIRCRAFT CO. P. O. BOX 1677 MILITARY DIVISION WICHITA, KANSAS 67201	
DATE	10/22/69	TITLE: PROPELLER SYNCHRONIZER WIRING DIAGRAM (OPT)	
DRAWN	WALTMAN	SIZE: D	
GROUP	Pt Mtn	CODE IDENT. NO.	71379
CHECK	Pt Mtn	DRAWING NO.	5118434
STRESS	Pt Mtn	SCALE: NONE	
PROJ.	Pt Mtn	REF	
OTHER	END	SHEET 1 OF 1	

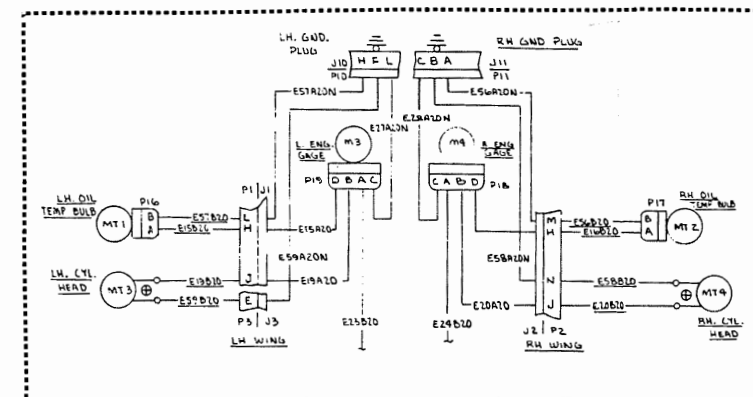
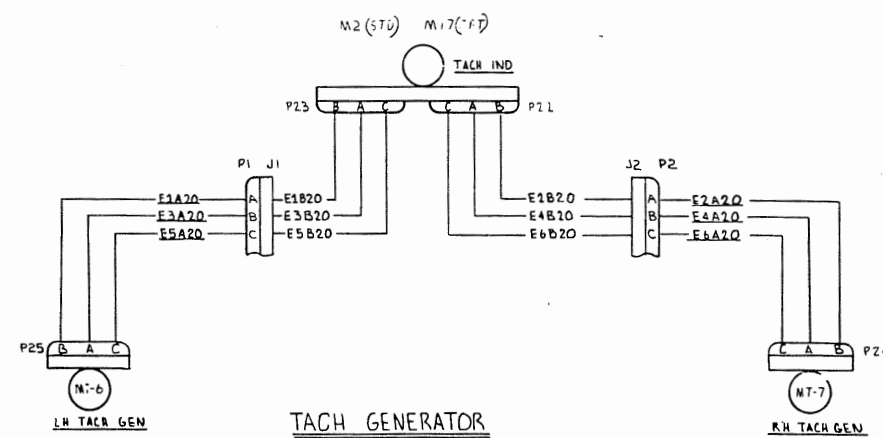
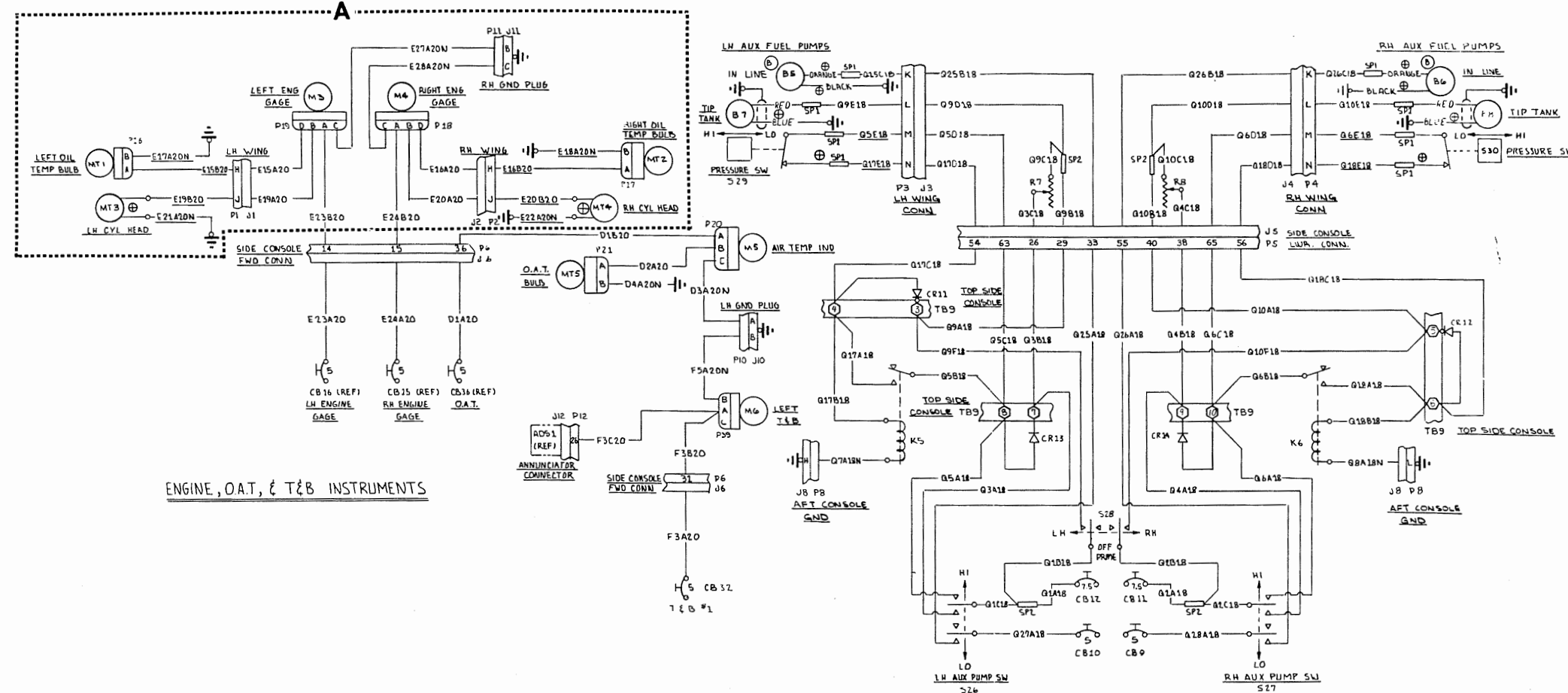


421B0001 AND ON

CONTRACT NO.		 AIRCRAFT CO.		P. O. BOX 1977	
DATE 10-23-69				MILITARY & TWIN DIVISION	
DRAWN WALTMAN		TITLE: STROBE LIGHT WIRING		WICHITA, KANSAS 67201	
GROUP Pit Maning 10-27-69					
CHECK Pit Maning 10-27-69		(OPT)			
STRESS [Signature]					
PROJ. [Signature]		SIZE CODE IDENT. NO.		DRAWING NO.	
OTHER ECRH		D 71379		5118435	
		SCALE: NONE		REF	
				SHEET 1 OF 1	



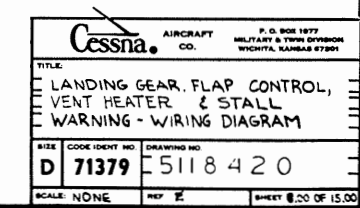
Cessna AIRCRAFT CO. P. O. BOX 1977 WICHITA, KANSAS 67201	
TITLE: FUEL QUANTITY SYSTEM (CAPACITANCE) 421	
SIZE: D	CODE IDENT. NO. 71379
SCALE: NONE	DRAWING NO. 5118420
REF: E	SHEET 1000 OF 1500



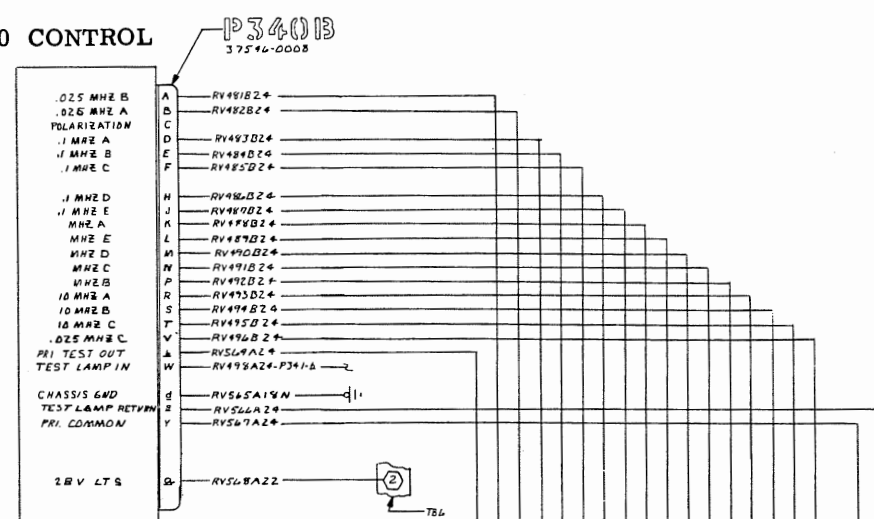
421B0569 AND ON

 **DETAIL A**

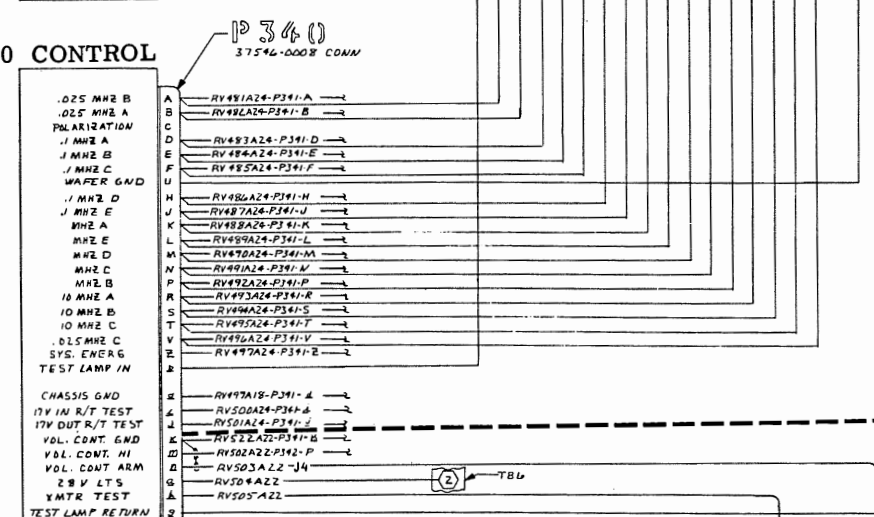
		AIRCRAFT CO.		P. O. BOX 1977 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201	
TITLE:					
TACH GEN, ENGINE INSTRUMENTS O.A.T, T & B, & FUEL PUMPS WIRING DIAGRAM					
SIZE:	CODE IDENT NO.	DRAWING NO.			
D	71379	5118 420			
SCALE:	NONE	REF	E	SHEET 9.00 OF 15.00	



39410-1000 CONTROL



37250-1000 CONTROL



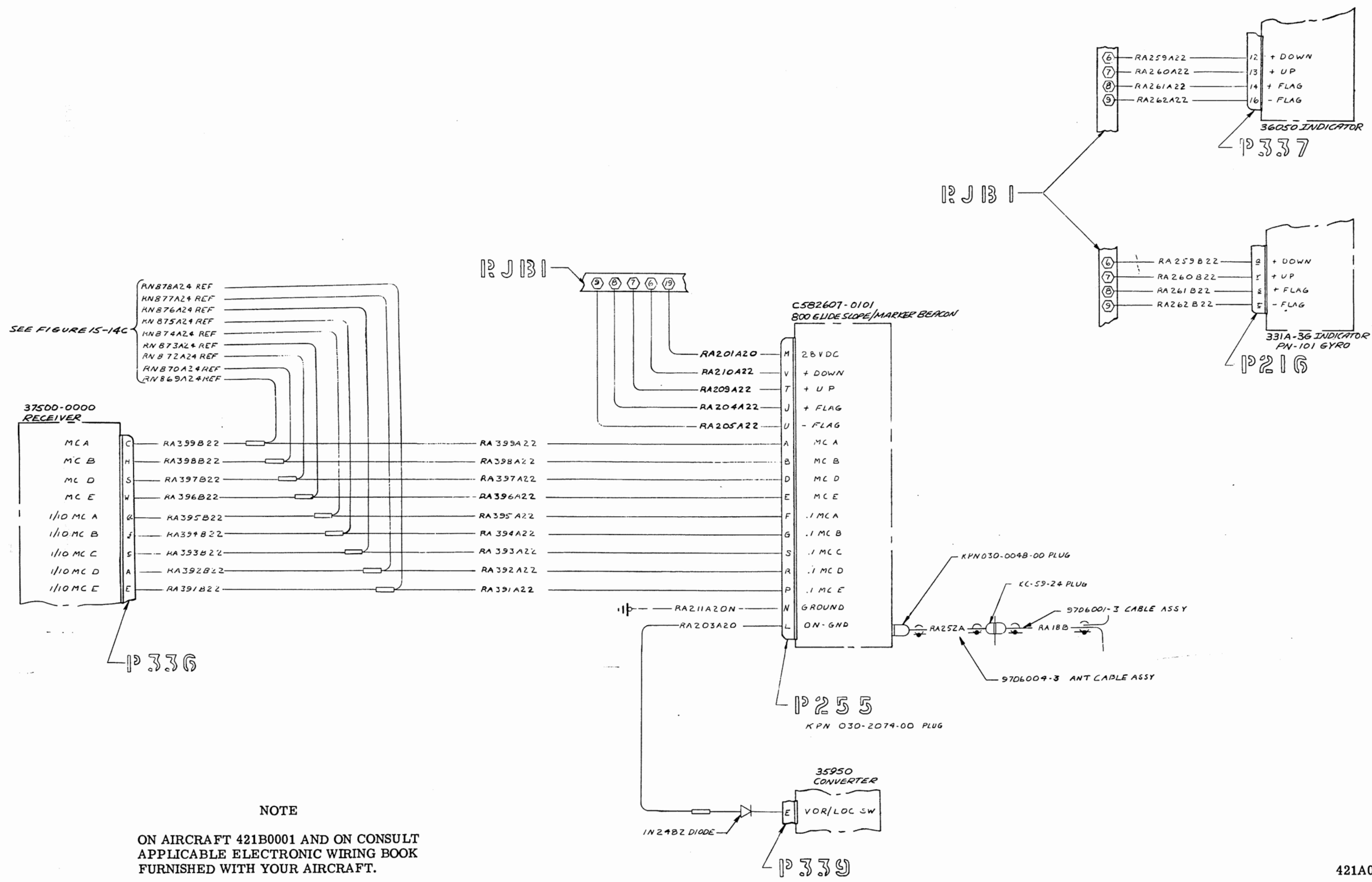
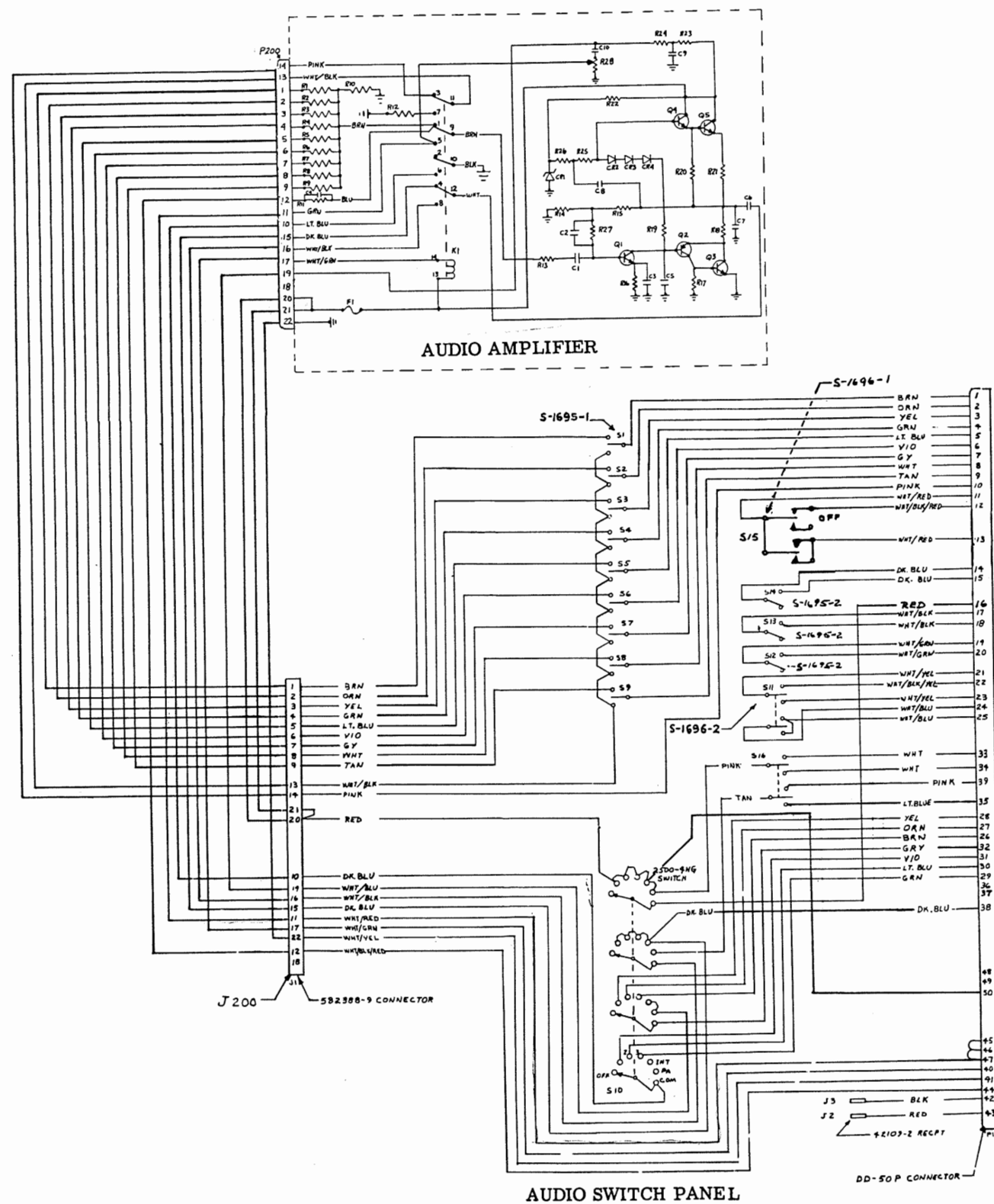


Figure 15-13H. Cessna 800 Glideslope

421A0001 TO 421B0001



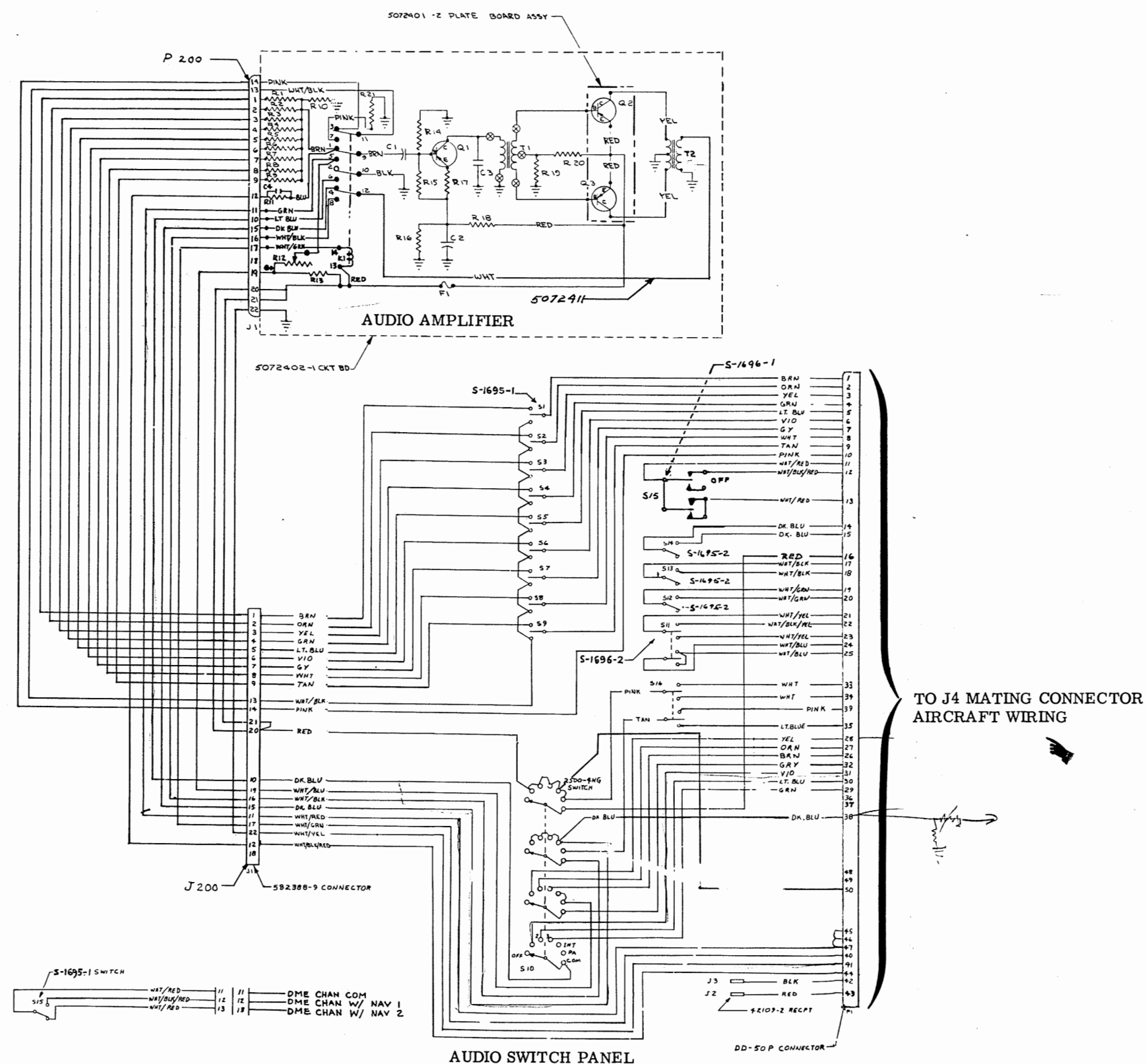
- F1 - 315001 FUSE (LITTLE FUSE)
- K1 - KHS17D11 RELAY
- Q1 - 2N3565 TRANSISTOR
- Q2 - 40319 TRANSISTOR
- Q3 - 2N5293 TRANSISTOR
- Q4 - 40408 TRANSISTOR
- Q5 - 2N5293 TRANSISTOR
- CR1 - VR18 ZENER DIODE
- CR2 - IN3754 DIODE
- CR3 - IN3754 DIODE
- CR4 - IN3754 DIODE
- C1 - NLW5-50 CAPACITOR
- C2 - DPMS4S15 CAPACITOR
- C3 - NLW50-6 CAPACITOR
- C4 - NLW3-35 CAPACITOR
- C5 - DPMS6D1 CAPACITOR
- C6 - NLW250-6 CAPACITOR
- C7 - DPMS4S1 CAPACITOR
- C8 - NLW10-50 CAPACITOR
- C9 - NLW50-50 CAPACITOR
- C10 - NLW5-50 CAPACITOR
- R1 - 470Ω 1/2 W RESISTOR
- R2 - 470Ω 1/2 W RESISTOR
- R3 - 470Ω 1/2 W RESISTOR
- R4 - 470Ω 1/2 W RESISTOR
- R5 - 470Ω 1/2 W RESISTOR
- R6 - 470Ω 1/2 W RESISTOR
- R7 - 470Ω 1/2 W RESISTOR
- R8 - 470Ω 1/2 W RESISTOR
- R9 - 470Ω 1/2 W RESISTOR
- R10 - 47Ω 1/2 W RESISTOR
- R11 - 220kΩ 1/2 W RESISTOR
- R12 - 20 kΩ 1/4 W RESISTOR
- *R13 - 1.2kΩ 1/2 W RESISTOR
- R14 - 6.2kΩ 1/2 W RESISTOR
- R15 - 43kΩ 1/2 W RESISTOR
- R16 - 220Ω 1/2 W RESISTOR
- R17 - 100Ω 1/2 W RESISTOR
- R18 - 1Ω 1/2 W RESISTOR
- R19 - 75Ω 1/2 W RESISTOR
- R20 - 100Ω 1/2 W RESISTOR
- R21 - 1Ω 1/2 W RESISTOR
- R22 - 680Ω 1/2 W RESISTOR
- R23 - 100Ω 1/2 W RESISTOR
- R24 - 390Ω 2 W RESISTOR
- R25 - 1.8kΩ 1/2 W RESISTOR
- R26 - 1.5kΩ 1/2 W RESISTOR
- R27 - 12kΩ 1/2 W RESISTOR
- R28 - 271-1-502 5k TRIM POT

*R13-8.2 K Ω 1/2 W Resistor
421B0301 TO 421B0501

TO J4 MATING CONNECTOR
AIRCRAFT WIRING

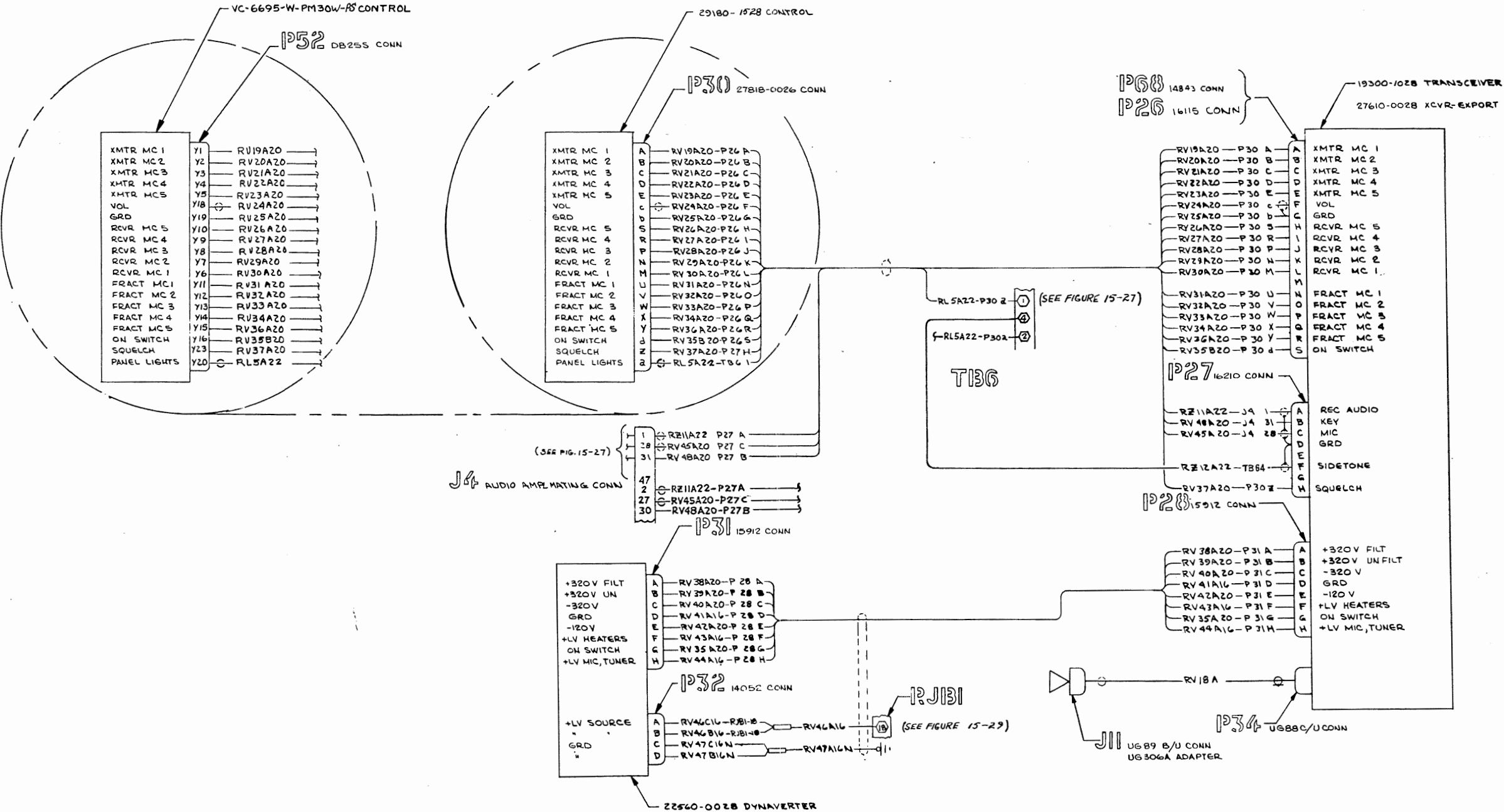
421B0001 TO 421B501

Figure 15-27. Audio Amplifier and Audio Wiring (Sheet 2)



F-1-315001 Fuse (Little Fuse)	R-6-470 Ω 1/2 Watt Resistor
K1-KHS-17D11 Relay	R-7-470 Ω 1/2 Watt Resistor
Q-1-ZN1379 Transistor	R-8-470 Ω 1/2 Watt Resistor
Q-2-ZN297A Transistor	R-9-470 Ω 1/2 Watt Resistor
Q-2-ZN2869 Transistor	R-10-47 Ω 1/2 Watt Resistor
Q-3-ZN297A Transistor	R-11-220000 Ω 1/2 Watt Resistor
Q-3-ZN2869 Transistor	R-12-20,000 Ω 1/4 Watt Resistor
T-1T-Y-30X Transformer	R-13-470 Ω 2 Watt Resistor
T-2T-Y-35 Transformer	R-14-68,000 Ω 1/2 Watt Resistor
C-1 TE1203 Capacitor	R-15-4,7000 Ω 1/2 Watt Resistor
C-2 25075 Capacitor	R-16-1000 Ω 1 Watt Resistor
C-3 91P47301S2 Capacitor	R-17-27 Ω 1/2 Watt Resistor
C-4 NLW3-35 Capacitor	R-18-1000 Ω 1 Watt Resistor
R-1-470 Ω 1/2 Watt Resistor	R-19-22,000 Ω 1 Watt Resistor
R-2-470 Ω 1/2 Watt Resistor	R-20-10 Ω 1/2 Watt Resistor
R-3-470 Ω 1/2 Watt Resistor	R-21-470 Ω 1 Watt Resistor
R-4-470 Ω 1/2 Watt Resistor	R-23-2.7 Ω 1 Watt Resistor
R-5-470 Ω 1/2 Watt Resistor	R-24-2.7 Ω 1 Watt Resistor

Figure 15-27. Audio Amplifier and Audio Wiring Diagram (Sheet 1 of 4)



421-0001 TO 421A0001

Figure 15-1C. Cessna Transceiver 800

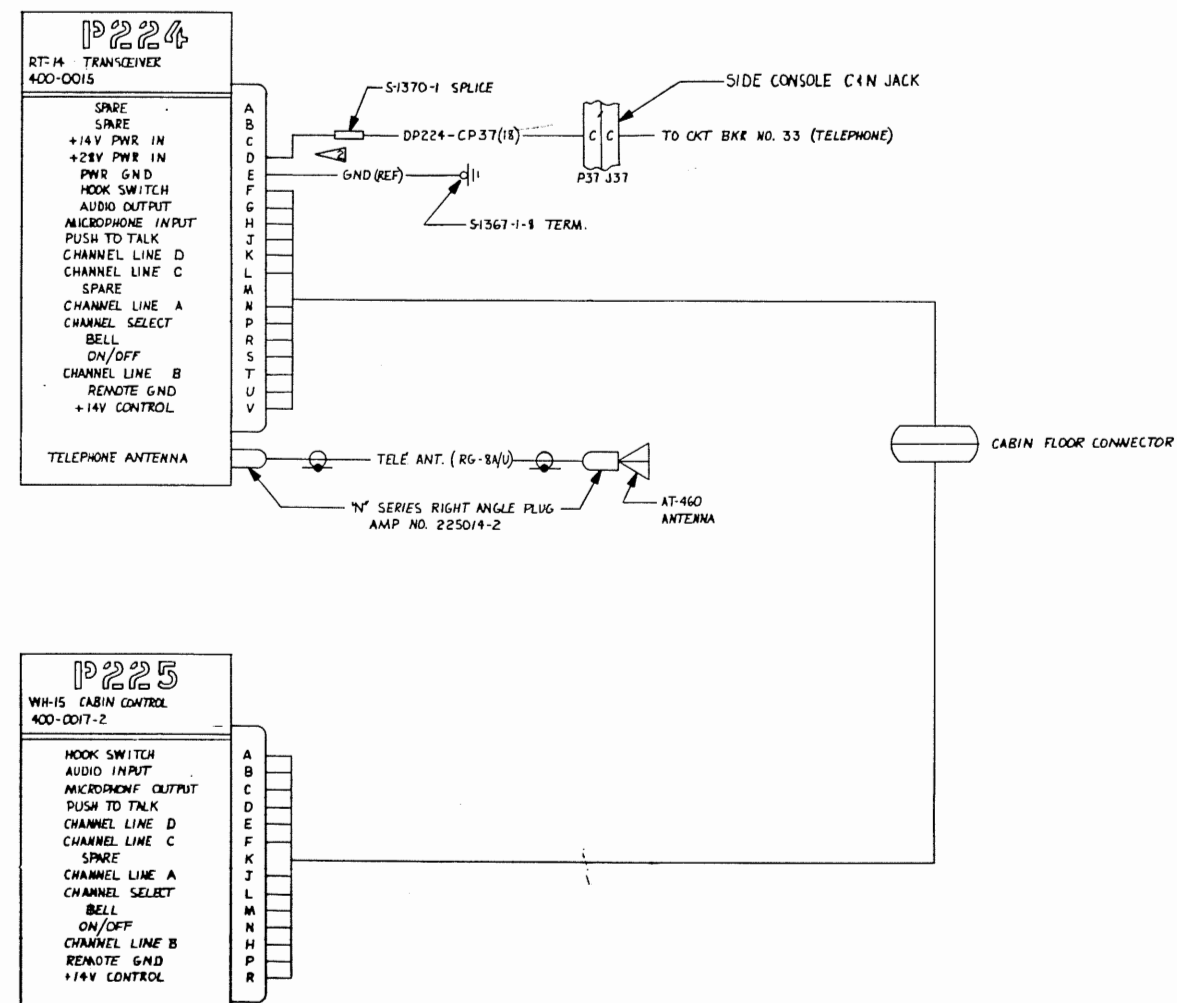
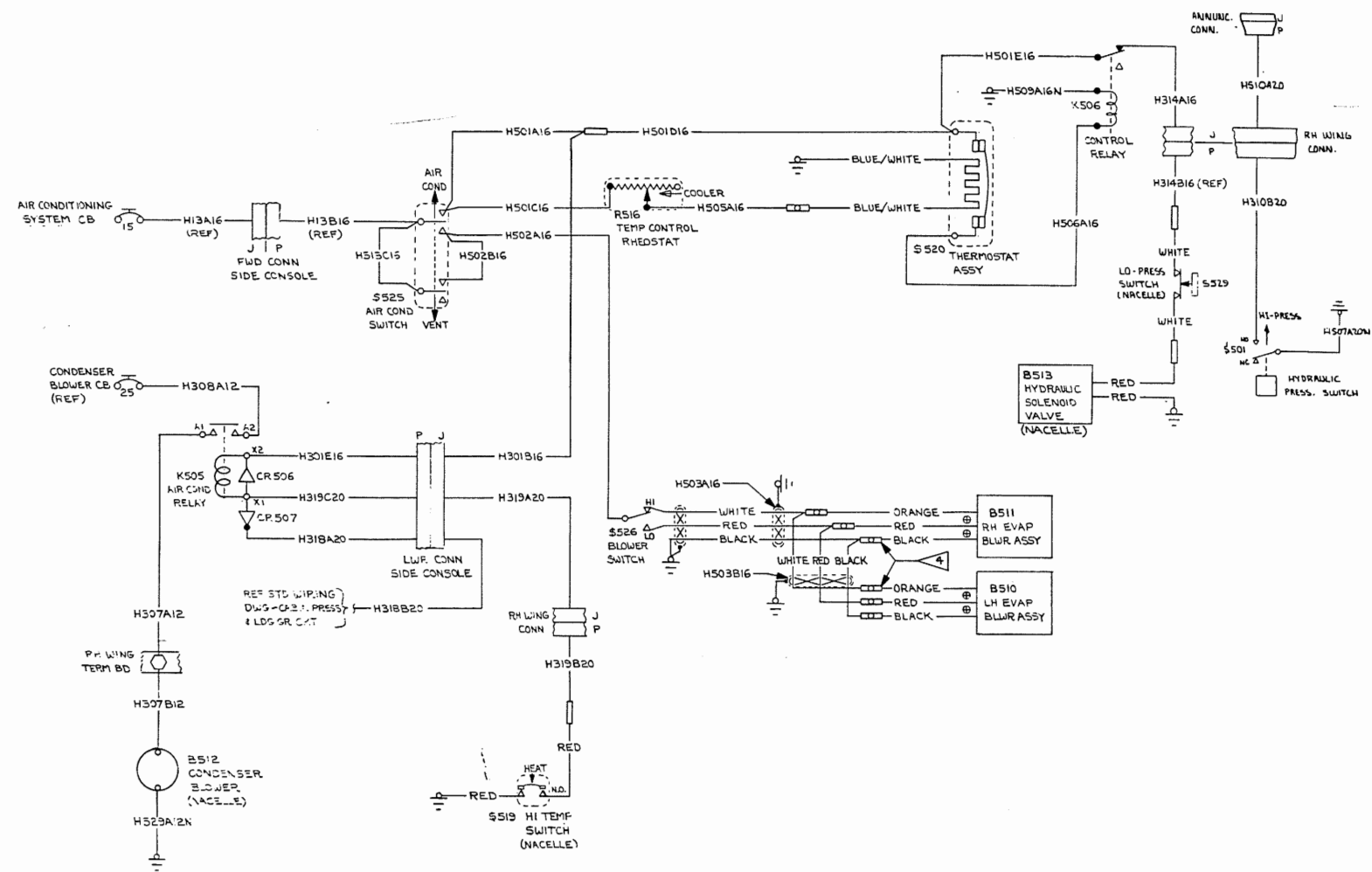
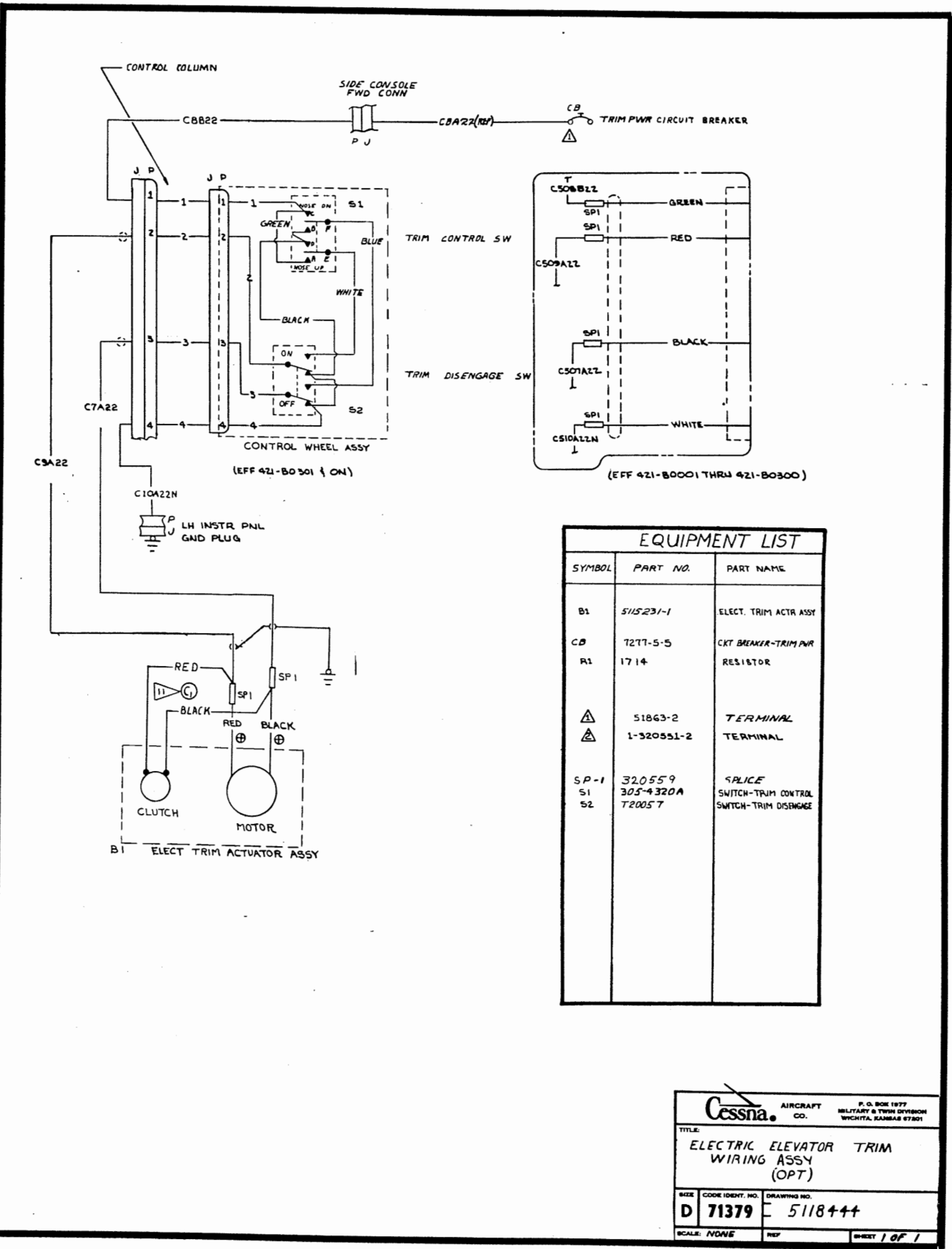


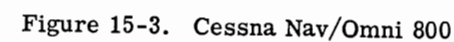
Figure 15-1B. Flight Phone Wiring Diagram

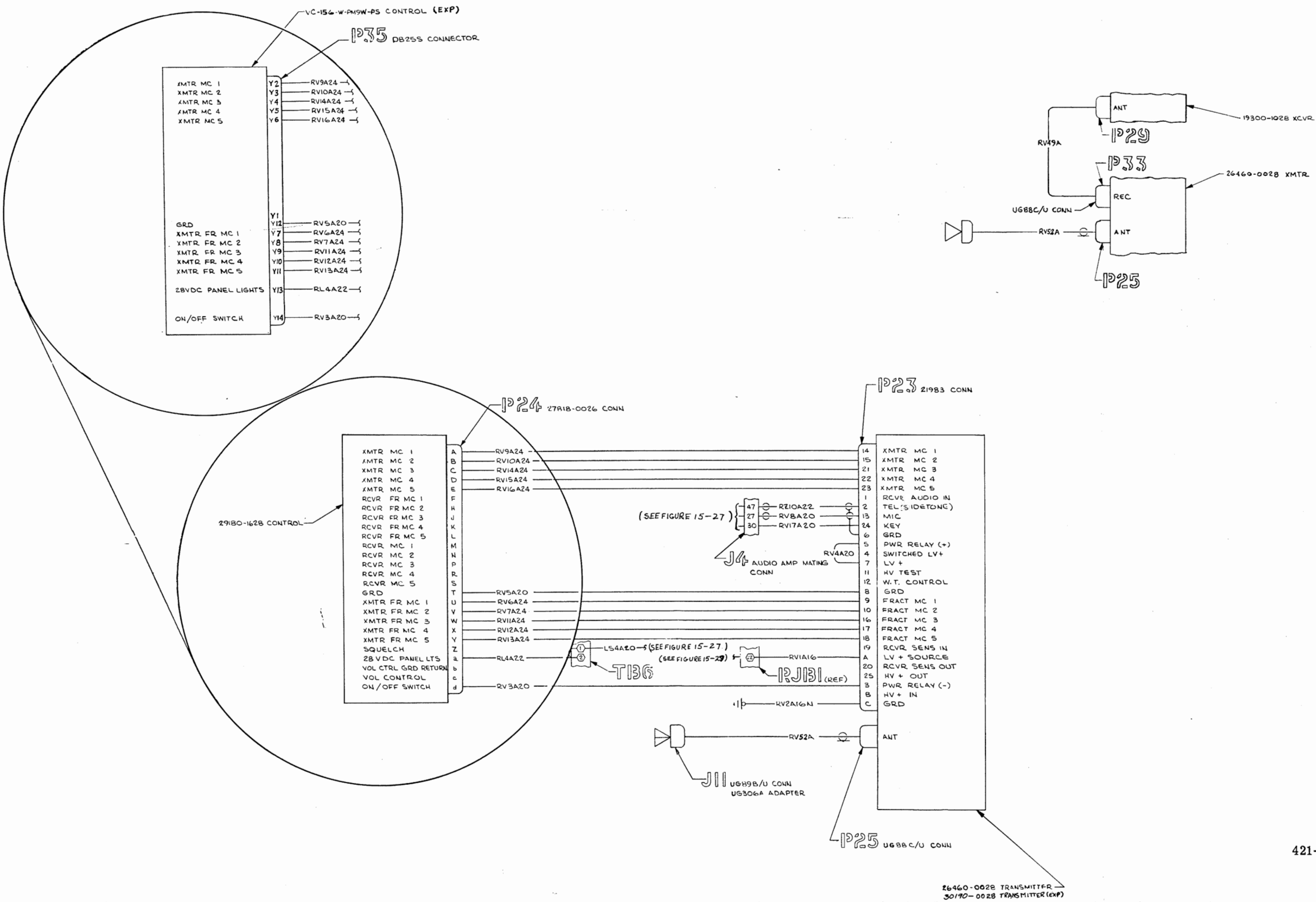


421B0501 AND ON

Cessna		AIRCRAFT CO.	P.O. BOX 1877 MILITARY & TWIN DIVISION WICHITA, KANSAS 67201
TITLE AIR CONDITIONER WIRING ASSY (OPT)			
REV	CODE IDENT. NO.	DRAWING NO.	
D	71379	5618209	
			SHT 1 OF 1







421-0001 TO 421A0001

Figure 15-2. Cessna Transmitter 800

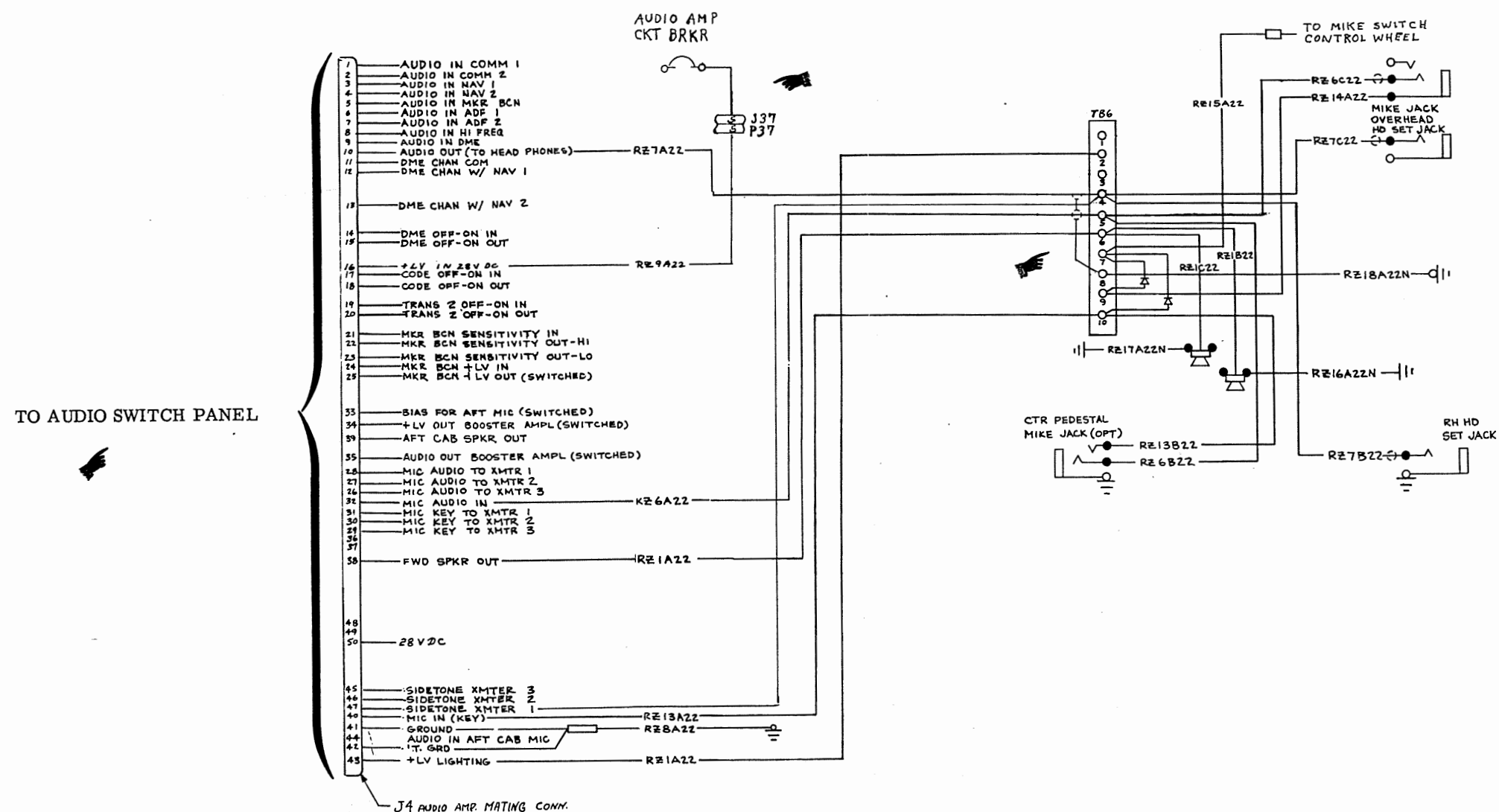
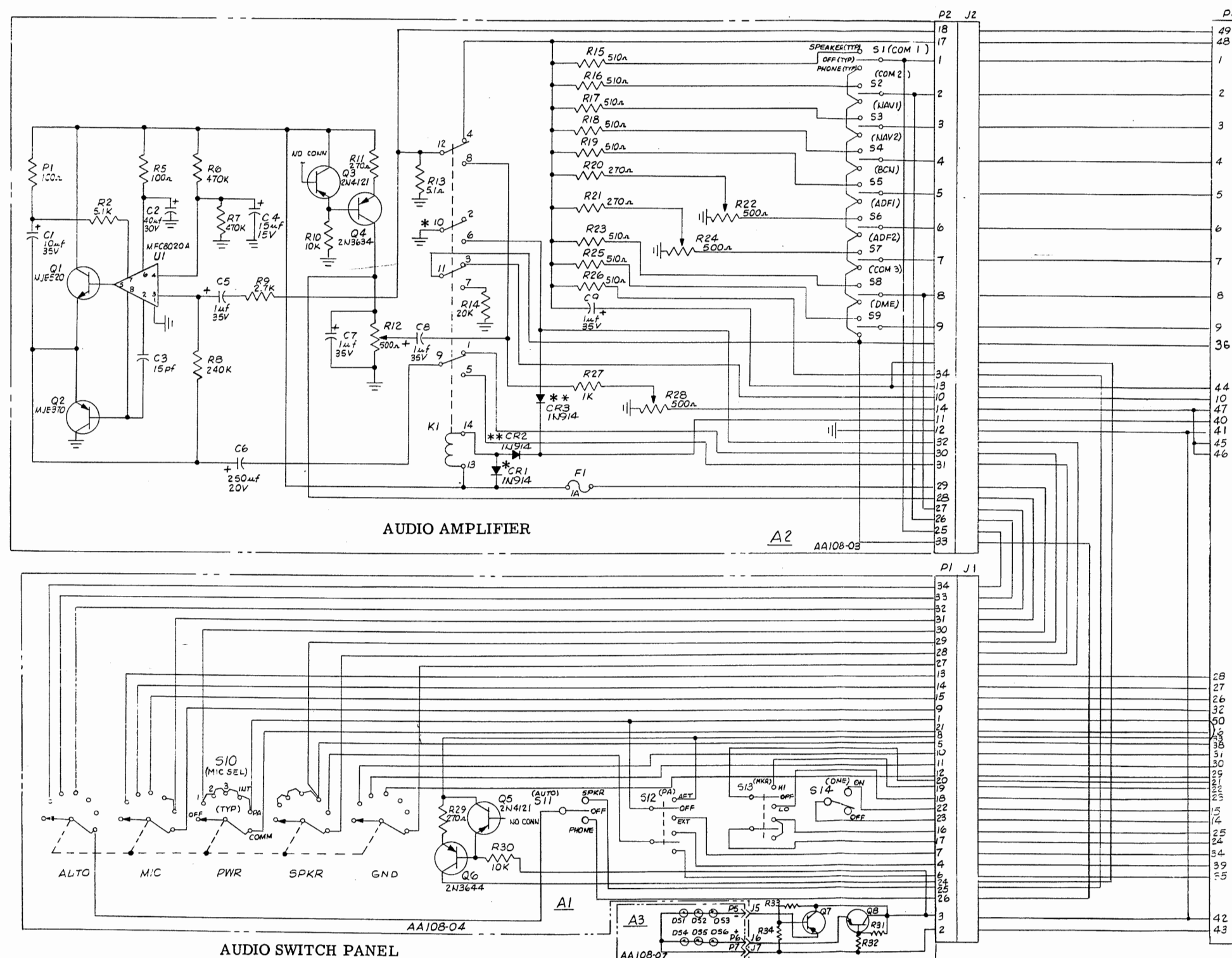


Figure 15-27. Audio Amplifier and Audio Wiring Diagram (Sheet 4)

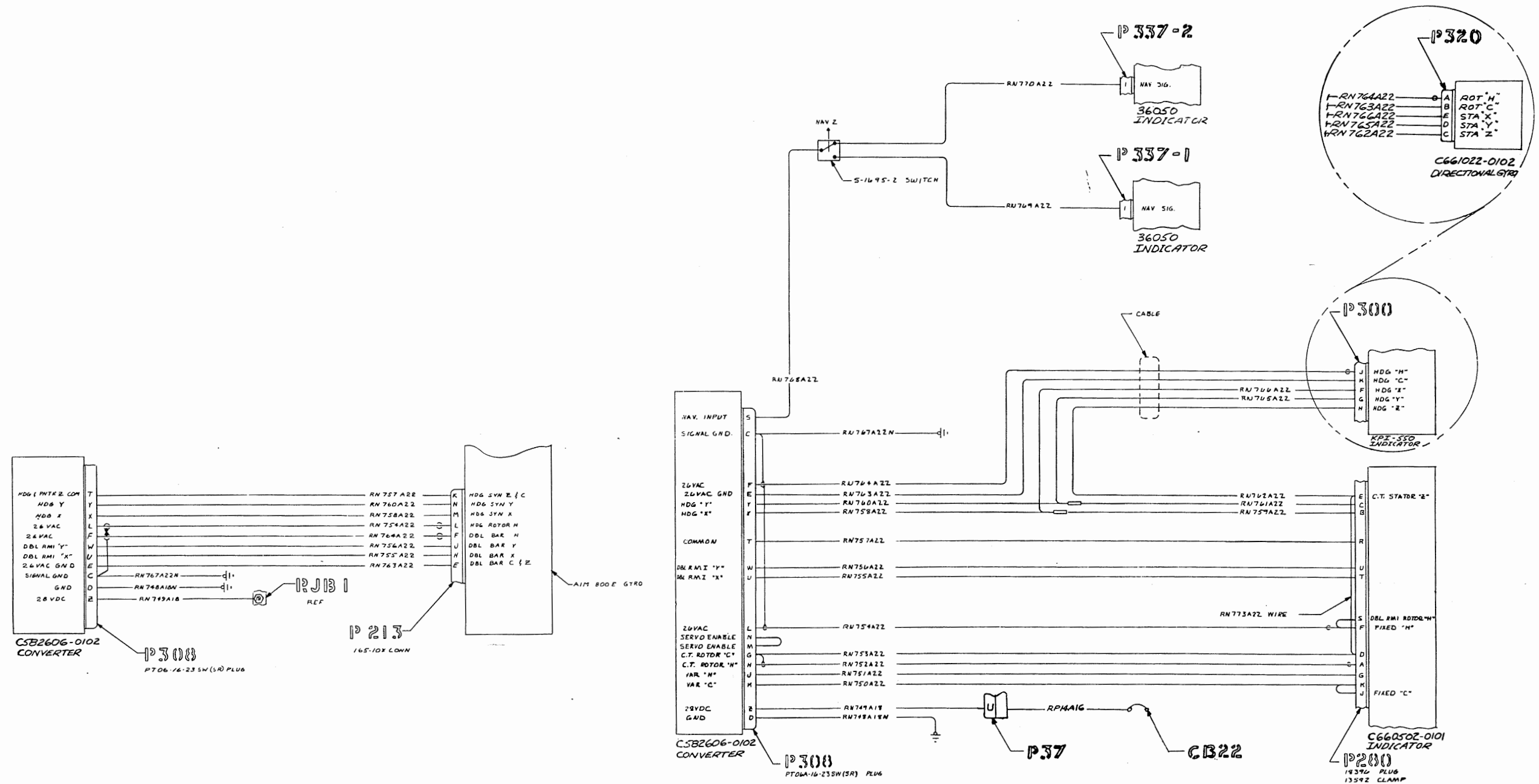


*DELETED
 **CHANGED TO 1N4005 OR 1N4007 (ALT)
 EFF: 421B0501 AND ON
 AND AUDIO AMPLIFIER S/N 0253 AND ON

TO J4 MATING CONNECTOR
 AIRCRAFT WIRING

421B501 AND ON

Figure 15-27. Audio Amplifier and Audio Wiring Diagram (Sheet 3)



NOTE
ON AIRCRAFT 421B0001 AND ON CONSULT
APPLICABLE ELECTRONIC WIRING BOOK
FURNISHED WITH YOUR AIRCRAFT.

421A0001 TO 421B0001

Figure 15-13E. Cessna 800 RMI

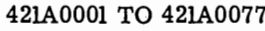
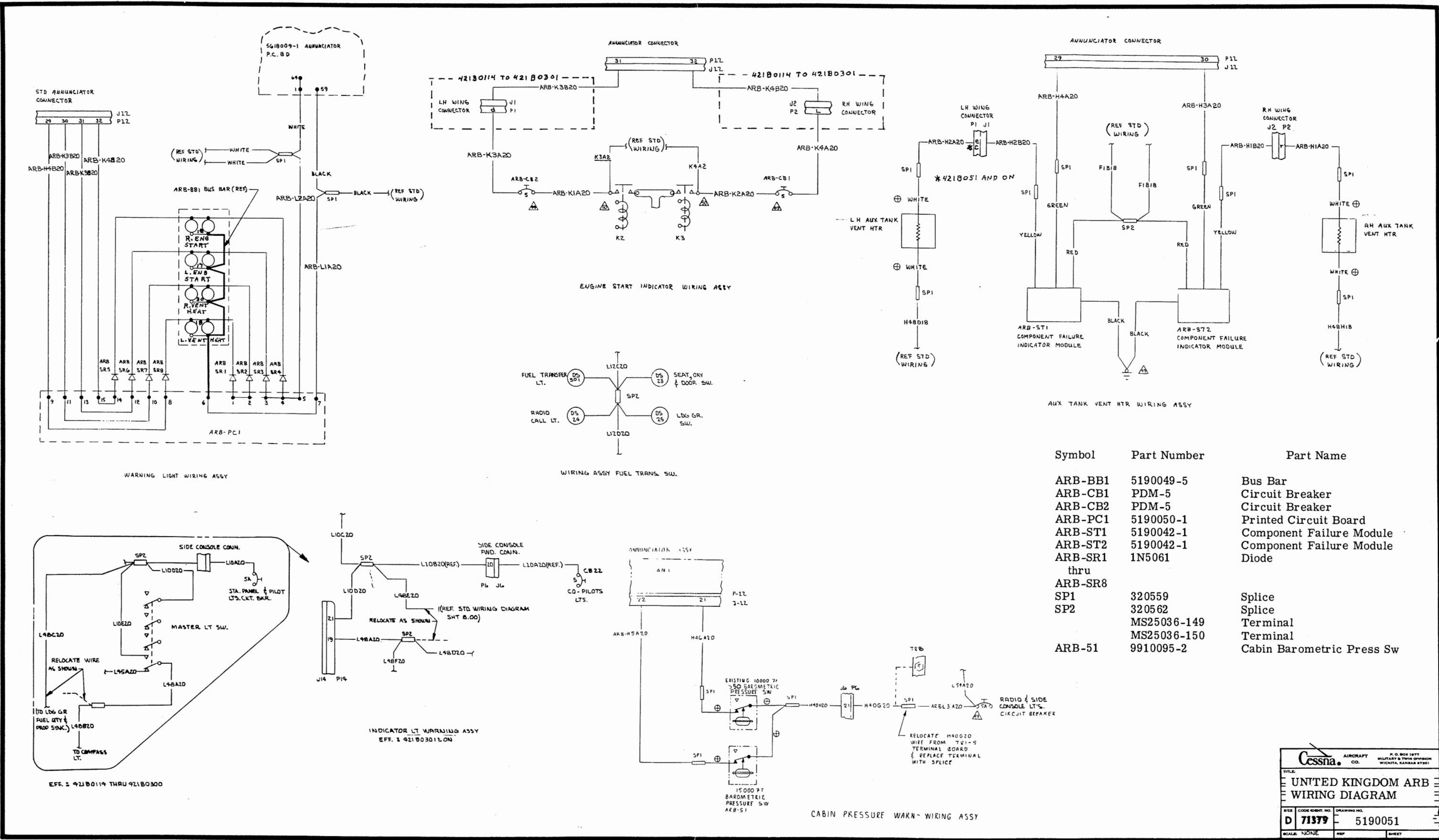


Figure 15-13 F. Cessna 800 Nav



Detail A DISCONNECTING Landing Gear Doors

1. Disconnect nose and main landing gear doors.

CAUTION

When disconnecting the landing gear doors, always run the landing gear up approximately 20 to 30 degrees and disconnect main gear door by removing attaching nut from actuator arm. On the nose gear doors always disconnect the door link tube from the upper connection to prevent the possibility of connecting lower connector to the wrong side of the bellcrank.

--- READ THIS --- BEFORE STARTING INSPECTION

NOSE AND MAIN LANDING GEAR RIGGING INSPECTION

The nose and main landing gear rigging inspection should be performed indoors with proper jacks, 25 volt power supply, 0 to 150 pound spring scale and an 0890001 actuator arm tension tool available.

The aircraft should be placed on jacks, the necessary access plates, seats, cabin divider, carpets, floorboards removed, and the landing gear cleaned with a suitable solvent prior to inspection. Step by step procedures are presented and each step must be completed before performing the next step.

NOTE

The operational checks and tension measurements requirements of this inspection will require the services of two people.

CAUTION

- When operating the landing gear always be prepared to step to prevent damage to the system.
- After removal of retraction linkage, assist springs or component parts for checking, they must be reinstalled before proceeding to the next step.

Check	Adjustment If Required
Detail A	---
Detail B	---
Detail C	---
Detail D	D-1
Detail E	E-1
Detail F	---
Detail G	G-1
Detail H	H-1
Detail J	J-1
Detail K	K-1
Detail L	L-1
Detail M	---
Detail N	N-1 - N-2
Detail P	---
Detail Q	Q-1

Detail B CHECKING Up and Down Limit Switches

1. Operate landing gear to the up and locked position and turn switch OFF.

2. Engage manual extension crank and note the angular position of the crank handle.

3. Turn handle (CCW) AFT until the internal stop in the actuator is reached.

NOTE

The internal stop should be reached in approximately 3/4 to 1-1/2 turns.

4. If the internal stop is not reached in 3/4 to 1-1/2 turns, run landing gear down and disconnect inboard main drive tube (D-1). Adjust up limit switch until the correct number of turns are obtained.

NOTE

Each time the actuator switches are adjusted the landing gear must be operated approximately half way down then back up before noting the number of turns required to reach the internal stop.

5. Operate the landing gear to the down and locked position.

6. Engage manual extension crank and note the angular position of the crank handle.

7. Turn handle (CW) FWD until the internal down stop in the actuator is reached.

NOTE

The internal stop should be reached in approximately 1 to 2 turns.

8. If the internal stop is not reached in 1 to 2 turns the landing gear actuator down limit switch must be adjusted until the proper number of turns are obtained.

CAUTION

During manual extension of the landing gear, never release the manual extension crank, damage could result to personnel and the shift of the pilot's seat.

Detail C Drive Tubes, Trunnions, Retracting Linkage, and Wheel Well Area

1. Check the operation of the landing gear. Visually inspect drive tubes, idlers, trunnions, and wheel well area for ricks, cracks, dents, bends, looseness, wear and/or visual damage.

NOTE

If any part of the landing gear system is questionable, do not hesitate to reject it.

2. Inspect the landing gear retraction linkage for excessive wear, looseness, dents, cracks, bends, and deep scratches.

3. Check main gear trunnion roll pin in pivot shaft for looseness.

Detail D CHECKING Main Gear Door Arm Tension

1. Check main gear doors for tension as shown 25 ± 10 pounds.

2. If the main gear door tension is not 25 ± 10 pounds, adjust inboard drive tube rod end in half turn increments to obtain proper tension.

3. Shortening rod end will increase door tension (CCW).

4. After checking door tension with the gear down, run the landing gear up and check the door tension.

5. The tension should be 25 ± 10 pounds in the up position and a maximum of 10 pounds difference from the down position. Adjust up limit switch (see Detail B) to obtain proper tension.

NOTE

Check hand crank for number of turns to internal stop after obtaining tension, 3/4 to 1-1/2 turns.

Detail D-1 ADJUSTING Main Gear Door Tension

1. Check main gear free fall by breaking main lock links as shown, raise gear approximately six (6) inches by hand, then release.

2. If the gear does free fall down and locked, disconnect and fitting and lengthen 1/2 turn, reconnect and check free fall.

NOTE

Lengthen and fitting in 1/2 turn increments until the gear will not free fall down and locked.

3. If the gear does not free fall to a down and lock position, visually check the following:

- Drive tubes for bends, breaks, binding and damage.
- Trunnion bolts for seating, binding, alignment and lubrication.
- Lock link brace for alignment, overcenter travel, bending and breaks.
- Side brace for proper overcenter engagement, bolts for proper torque, (refer to Torque Chart, Section 1).
- Bolts in wheel well area for binding and interference.

Detail E CHECKING Main Landing Gear Free Fall

1. Check main gear free fall by breaking main lock links as shown, raise gear approximately six (6) inches by hand, then release.

2. If the gear does free fall down and locked, disconnect and fitting and lengthen 1/2 turn, reconnect and check free fall.

NOTE

Lengthen and fitting in 1/2 turn increments until the gear will not free fall down and locked.

3. If the gear does not free fall to a down and lock position, visually check the following:

- Drive tubes for bends, breaks, binding and damage.
- Trunnion bolts for seating, binding, alignment and lubrication.
- Lock link brace for alignment, overcenter travel, bending and breaks.
- Side brace for proper overcenter engagement, bolts for proper torque, (refer to Torque Chart, Section 1).
- Bolts in wheel well area for binding and interference.

Detail E-1 ADJUSTING Main Landing Gear for Free Fall

1. Check main gear free fall by breaking main lock links as shown, raise gear approximately six (6) inches by hand, then release.

2. If the gear does free fall down and locked, disconnect and fitting and lengthen 1/2 turn, reconnect and check free fall.

NOTE

Lengthen and fitting in 1/2 turn increments until the gear will not free fall down and locked.

3. If the gear does not free fall to a down and lock position, visually check the following:

- Drive tubes for bends, breaks, binding and damage.
- Trunnion bolts for seating, binding, alignment and lubrication.
- Lock link brace for alignment, overcenter travel, bending and breaks.
- Side brace for proper overcenter engagement, bolts for proper torque, (refer to Torque Chart, Section 1).
- Bolts in wheel well area for binding and interference.

Detail F Landing Gear Drop Off

1. (See Detail G-1.) Disconnect uplock push pull tube.

2. Operate landing gear up and measure drop off as shown.

3. If drop off is not 1/8 to 1/4 inches refer to Detail D-1 and adjust outboard drive tube.

4. After adjustment the uplock hooks must engage and disengage freely with no binding.

NOTE

Lengthen the outboard drive tube to decrease the amount of drop off. Shorten the outboard drive tube to increase drop off.

Detail G CHECKING Uplock Hooks for Engagement

1. Inspect main gear uplock hooks for proper engagement, when gear is retracted.

Detail G-1 ADJUSTING Uplock Hook for Engagement

1. If the main gear uplock hooks do not engage properly adjust the uplock hooks until the hooks make full contact with the surface of the spacers.

2. Lengthening the uplock push pull tube (CCW) will move the uplock hooks away from the spacers.

3. Shortening the uplock push pull tube will pull the uplock hooks in closer to the spacers.

4. After adjustment the uplock hooks must engage and disengage freely with no binding.

Detail H CHECKING Checking Down Lock Tension

1. Inspect main landing gear down lock for proper engagement and tension (40 to 60 pounds).

NOTE

When checking down lock tension always place finger on the down lock switch, pull scales at a right angle to the lock link and read scale at the point when a definite switch actuation is felt.

Detail H-1 ADJUSTING Down Lock Tension

1. If the down lock tension is not 40 to 60 pounds, adjust push pull tube in one half turn increments until proper tension is obtained. If the down lock tension is in excess of 60 pounds the down lock tension should be rigged 40 to 50 pounds. Lengthening the push pull tube (CCW) decreases and shortening the push pull tube (CW) increases tension.

NOTE

When shortening or lengthening the outboard push-pull tube the fork bolt must be lengthened or shortened a corresponding amount of turns so that the combined lengths of the two parts does not change.

Detail Q-1 CHECKING Safety Switch Inspection

1. Refer to Section 4 for checking and adjustment of Landing Gear Safety Switch.

NOTE

After completing the inspection make sure the gear is down and locked, lubricated and power turned OFF.

Detail Q CHECKING Safety Switch Inspection

1. Turn battery master switch ON.

2. Close throttles and actuate landing gear safety switch by hand as shown.

3. Place landing gear switch handle in the UP position. The landing gear should remain down and locked and the horn should sound.

NOTE

If the horn does not sound, refer to Section 4, Troubleshooting. If the landing gear does not remain down and locked, the safety switch is defective and must be replaced.

4. If the landing gear remains down and locked return landing gear switch handle to DOWN position. Release the safety switch.

Detail P CHECKING Nose and Main Landing Gear Doors for Proper Fit

1. Operate the landing gear through one complete cycle and visually inspect nose and main landing gear doors for operation, proper fit and other damage.

2. Operate the landing gear through one complete cycle and check the gear indicator lights and warning horn. Check for operation with gear extended and retracted.

Detail N-2 ADJUSTING Main Landing Gear Down Indicator Light Switch

1. If the indicator lights do not illuminate within the required number of turns or the overcenter linkage is not overcenter when the lights illuminate make the following adjustments.

2. Adjust the nose gear down and locked indicator light switch by adjusting the switch actuating bolt. Turn bolt CCW to actuate switch farther from the internal stop in the actuator. Turn bolt CW to actuate switch closer to the internal stop in the actuator.

3. Adjust the main landing gear switches by repositioning. Loosen mounting screws and move switch toward the bellcrank to actuate it closer to the internal stop in the actuator.

4. Resume cranking toward the down position noting the number of turns required to reach the internal stop in the actuator.

5. The number of turns required to reach the internal stop should not be less than 8 or more than 14 for the nose gear. Not less than 4 or more than 8 on the main gear.

NOTE

After adjusting indicator switches check to see that gear indicator lights do not illuminate before gear is down and locked by overcenter linkage.

Detail N CHECKING Gear Down Indicator Light Switches for Proper Adjustment

1. Retract landing gear approximately halfway.

2. Engage manual extension handle (see Detail B). Crank toward the down position and stop when green light comes on. Note the angular position of the manual extension handle.

3. Check applicable gear of illuminate light for being down and locked with the overcenter linkage overcenter.

4. Resume cranking toward the down position noting the number of turns required to reach the internal stop in the actuator.

5. The number of turns required to reach the internal stop should not be less than 8 or more than 14 for the nose gear. Not less than 4 or more than 8 on the main gear.

Detail M CHECKING Nose Gear Uplock Engagement

1. Inspect nose gear uplock for proper engagement.

2. Uplock hook must be fully engaged with hook against the nose strut bolt and spacer; engages and disengages freely with no binding.

3. Uplock hook must be engaged with .003 to .001 inches clearance between the spacer on the nose strut and surface of the hook.

Detail L-1 ADJUSTING Nose Gear Uplock Tension

1. If the nose gear uplock tension is not 75 ± 10 pounds, adjust nose push-pull tube in half turn increments.

2. Lengthen the nose push-pull tube (CCW) to decrease the uplock tension.

3. Shorten nose push-pull tube to increase (CW) uplock tension.

Detail L CHECKING Nose Gear Uplock Tension

1. Inspect nose gear uplock tension (75 ± 10 pounds).

2. Adjust fork bolt in half turn increments. Lengthen (CCW) fork bolt to increase down lock tension. Shorten (CW) to decrease tension.

Detail K-1 ADJUSTING Nose Gear Down Lock Tension

1. Inspect nose gear down lock tension (75 ± 10 pounds).

2. Adjust fork bolt in half turn increments. Lengthen (CCW) fork bolt to increase down lock tension. Shorten (CW) to decrease tension.

Detail K CHECKING Nose Gear Down Lock Tension

1. Disconnect spring.

2. Connect drive tube. (See Detail L-1.)

3. Inspect nose gear down lock tension (25 ± 10 pounds). Make sure the overcenter spring is disconnected when checking tensions and adjustments.

4. If the nose gear down lock tension is not 25 ± 10 pounds, make sure the nose gear fork bolt is properly adjusted (K-1).

Detail J-1 ADJUSTING Nose Gear Connector Link for Overcenter Travel

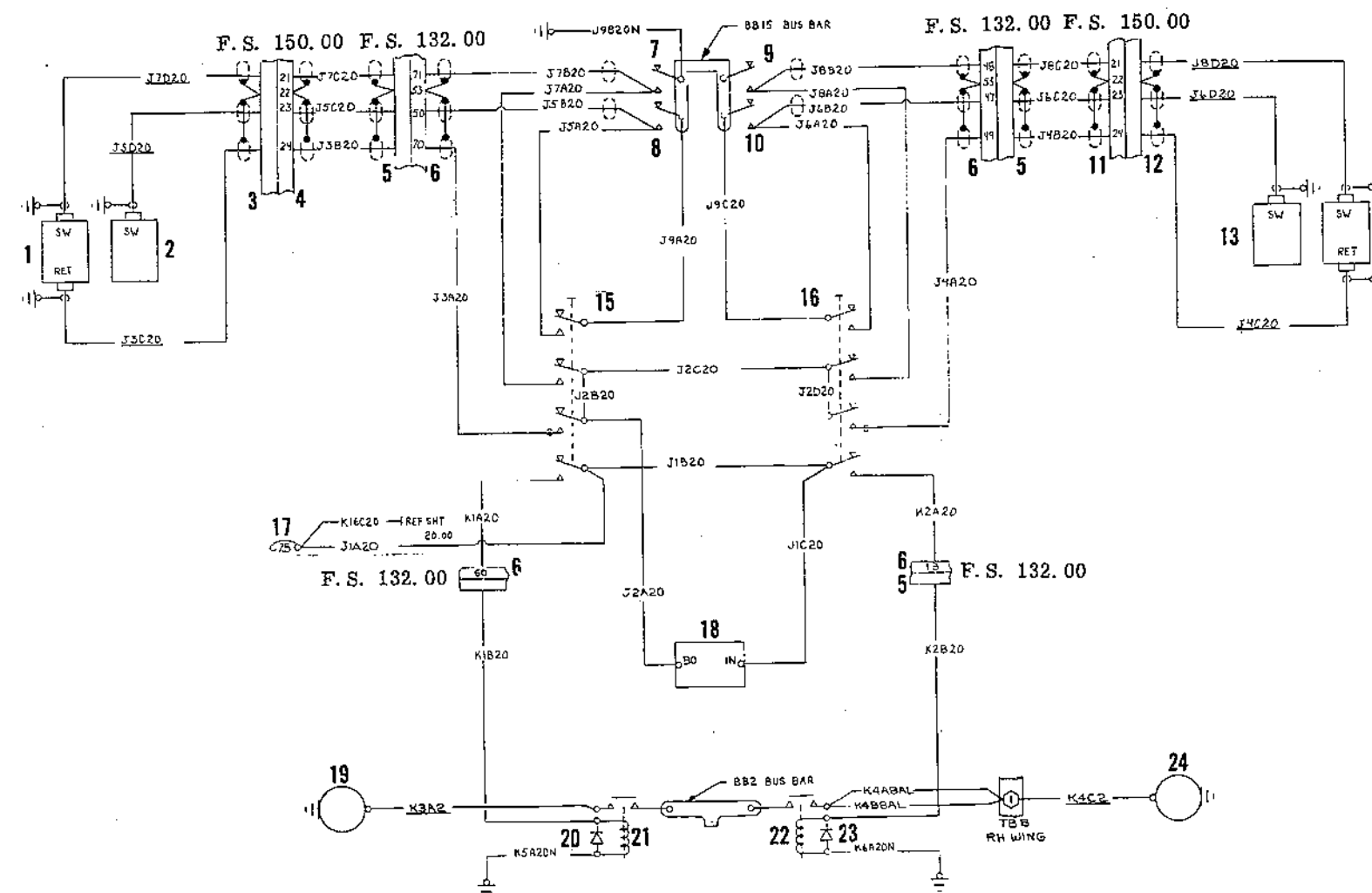
1. If the nose gear connector link is not snapping overcenter properly adjust rod end and as shown.

Detail J CHECKING Nose Gear Connector Link For Proper Overcenter Travel

1. See Detail L-1 and disconnect drive tube.

2. Inspect nose gear connector link for proper overcenter adjustment.

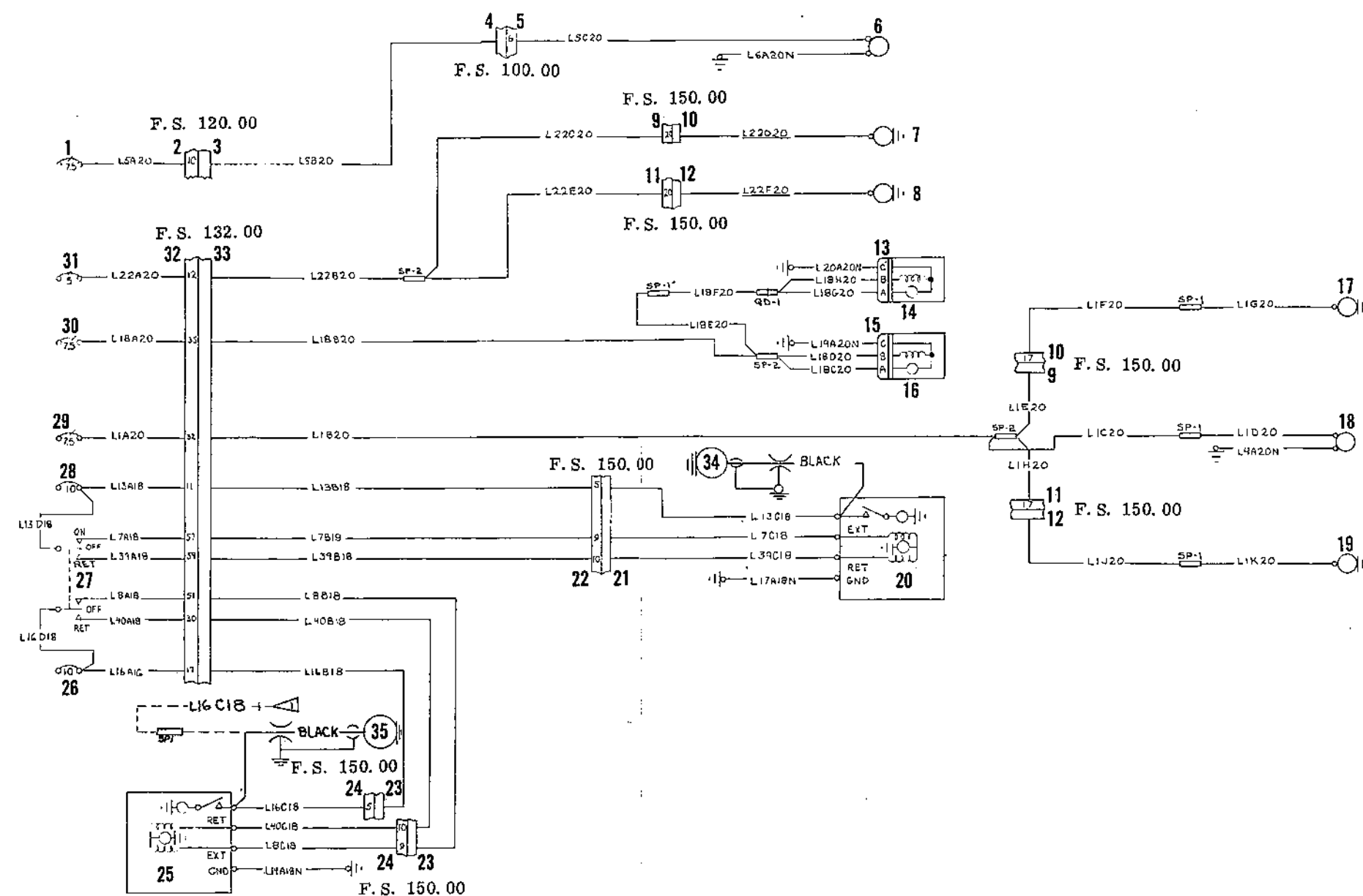
Figure 2-32. Nose and Main Landing Gear Rigging Inspection



Part Number	Nomenclature
1. S6LN-1201	L Mag - L Eng
2. S6LN-1205	R Mag - L Eng
3. DS07-37P	Plug - L Wing
4. DS04-37S	Recp - L Wing
5. 201310-3	Recp - Side Cons Lwr Conn
6. 201311-3	Plug - Side Console Lwr Conn
7. S-382-2	Sw - Mag LH (LH Wing)
8. S-382-2	Sw - Mag LH (RH Wing)
9. S-382-2	Sw - Mag RH (LH Wing)
10. S-382-2	Sw - Mag RH (RH Wing)
11. DS04-37S	Recp - R Wing
12. DS07-37P	Plug - R Wing
13. S6LN-1205	R Mag - R Eng
14. S6LN-1201	L Mag - R Eng
15. 14-104R	Sw - LH Start
16. 14-104R	Sw - RH Start
17. S-1232-507	Start - Ckt Bkr
18. 10-176487-242	Starting Vibrator
19. 627841	Starter - RH
20. IN2482	Diode - LH Start Relay
21. 0850469-1	Relay - Starter
22. 0850469-1	Relay - Starter
23. IN2482	Diode - RH Start Relay
24. 627841	Starter - LH

421A0001 TO 421B0001

CONTRACT NO.		Cessna.	
DATE 17 MAY 1968		P. O. BOX 1977 WALLACE, KANSAS	
DRAWN C. E. DUGAN		TITLE STARTER-IGNITION	
GROUP 10-176487-242		WIRING DIAGRAM	
CHECK 10-176487-242			
STRESS 10-176487-242			
PROJ. 10-176487-242			
OTHER 10-176487-242			
SIZE CODE IDENT. NO. DRAWING NO.		D 71379 5118301	
SCALE NONE		REV B	
		SHEET 10.00 of 23.00	



▷ IF RH LDG LT IS NOT ABOARD A/C,
SPlice PUMP WIRING AS SHOWN.

Part Number

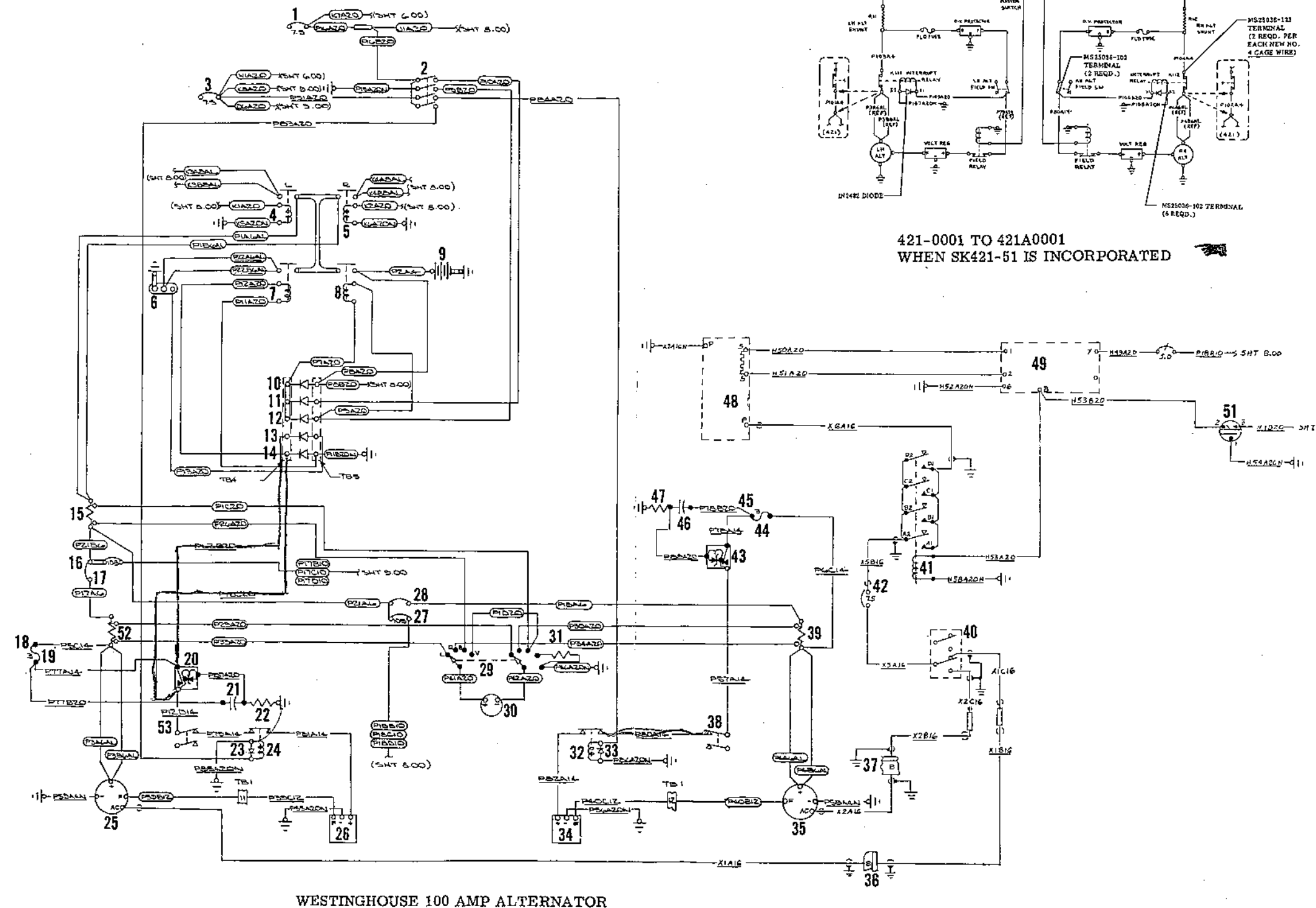
Nomenclature

1. 112-507-101	Taxi Lts - Sw Ckt Bkr
2. 201310-3	Recpt - Side Cons Fwd Conn
3. 201311-3	Plug Side Cons Fwd Conn
4. DS04-27-25S	Recpt - Nose Bhd
5. DS07-27-25P	Plug - Nose Bhd
6. 0842215-8	Taxi Light
7. 0820501-5	Deice Light
8. 0820501-5	Wing Diece Lt - RH
9. DS04-37S	Recpt - L Wing
10. DS07-37P	Plug - L Wing
11. DS04-37S	Recpt - R Wing
12. DS07-37P	Plug - R Wing
13. MS3106A-10SL-3S	Plug - Upper Anti-Coll Bcn
14. C621002-0106	Rotary Bcn - Upper
15. MS3106A-10SL-3S	Plug - Tower Anti-Coll Bcn
16. C621002-0107	Rotary Bcn - Lwr
17. 0823200-1	Nav Lt - LH
18. C622001-0103	Tail Lt
19. 0823200-2	Nav Lt - RH
20. 0870132-1	Ldg Lt - RH
21. DS07-27-8P	Plug - LH Wing
22. DS04-27-2S	Recpt - LH Wing
23. DS04-27-2S	Recpt - RH Wing
24. DS07-27-8P	Plug - RH Wing
25. 0870132-1	Ldg Lt - RH
26. S-1232-10	R Ldg Lt - Ckt Bkr
27. MS24524-21	Sw - Ldg Lt
28. S-1232-510	L Ldg Lt - Ckt Bkr
29. 112-507-101	Nav Lt - Sw Ckt Bkr
30. 112-507-101	Anti-Coll Bcn - Sw Ckt Bkr
31. 112-205-101	Deice Lt - Sw Ckt Bkr
32. 201311-3	Plug - Side Cons Lwr Conn
33. 201310-3	Recpt - Side Cons Lwr Conn
34. 9910004-3	Transfer Fuel Pump - LH
35. 9910004-3	Transfer Fuel Pump - RH

421A0001 TO 421B0001

CONTRACT NO.		Cessna	
DATE	17 MAY 1968	P. O. BOX 1977 WALLACE PROSPECT PLANT WICHITA, KANSAS	
DRAWN	C.E. DUGAN	TITLE	
GROUP	Electrical Systems	LIGHTING, EXTERIOR	
CHECK	W. H. H. H.	WIRING DIAGRAM	
STRESS	None		
PROJ.	None		
OTHER	DCN 21A	SIZE	CODE IDENT. NO. DRAWING NO.
		D	71379 5118301
		SCALE	REV B
			SHEET 15 OF 42,300

NOTES:
 1. WIRES ENCLOSED IN A CARTRIDGE, EXAMPLE (CUM), ARE THE SAME AS THE STANDARD 30 AMP ALTERNATOR SYSTEM.
 2. WIRES WHICH ATTACH TO 15 & 37 WILL REQUIRE TERMINAL CHG (STD WIRE LENGTH TO BE SUFFICIENT TO ALLOW THIS INSTL)



WESTINGHOUSE 100 AMP ALTERNATOR

Part Number

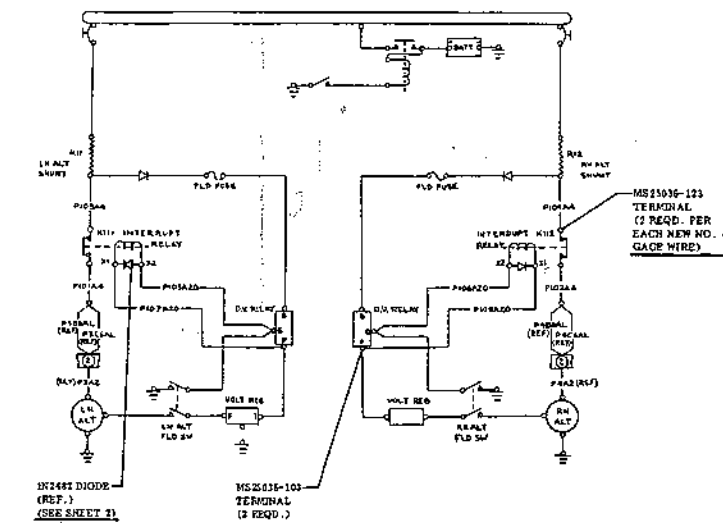
Nomenclature

1. S-1232-7 Ckt Bkr - Start
2. MS24525-22 Sw - Battery
3. S-1232-7 Ckt Bkr - Door Warn
4. 0850469-1 Relay - Starter L
5. 0850469-1 Relay - Starter R
6. AN2552-3A Recp - Aux Pwr
7. 0850469-1 Relay - Aux Pwr L
8. 0850469-1 Relay - Battery
9. 12-CS-24 Battery
10. IN1201 Diode - Battery
11. IN2482 Diode - Batt Relay
12. IN2482 Diode - Batt Sw
13. IN1201 Diode - Overvoltage Prot - LH
14. IN2482 Diode - Aux Pwr Relay
15. 22370-125 Shunt
16. PDLM-105 Ckt Bkr - L Bus
17. PDLM-105 or PDLM-95 (Opt) Ckt Bkr - L Alt - 105 or Ckt Bkr - L Alt - 95
18. 341001 Fuse Holder
19. MDX (3.0 Amp) Fuse (Slow-Blow)
20. 9MC7-3-28 Overvoltage Protector - LH
21. 539-2559-01 Capacitor - LH
22. 51r 1 Watt 5% Resistor - LH
23. IN2482 Diode - LH Fld Relay
24. AN3320-1 Relay - LH Alt Fld
25. 976J417-2 or 976J553-2 LH Alternator (-J417 Std 100 Amp) (-J553 for Elec W.S.)
26. 914F585-1 Voltage Regulator - LH

Part Number

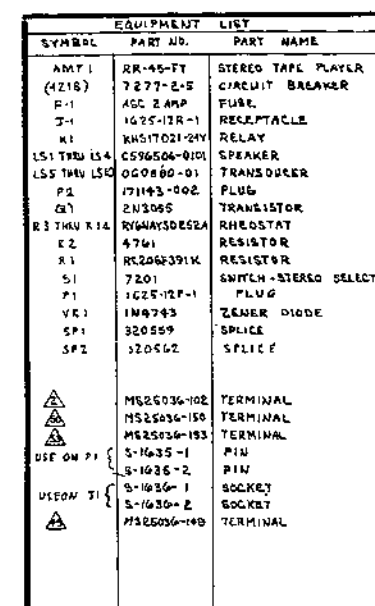
Nomenclature

27. PDLM-105 Ckt Bkr - R Bus
28. PDLM-105 or PDLM-95 (Opt) Ckt Bkr - R Alt - 105 or Ckt Bkr - R Alt - 95
29. PA-2003 Sw - Voltammeter
30. CM2664-1 Voltammeter
31. HS-1A-1%-7200 Resistor - Voltammeter
32. AN3320-1 Relay - RH Alt Fld
33. IN2482 Diode - RH Fld Relay
34. 914F585-1 Voltage Regulator - RH
35. 976J417-2 or 976J553-2 RH - Alt (J417 Std 100 Amp) (J553 for Elec W.S.)
36. DS07-27-8P Plug
37. DS07-27-8P Plug
38. MS24524-22 Sw - RH Alt Fld
39. 22370-125 Shunt - RH Alternator
40. MS25059-23 Sw - Anti-Ice Windshield
41. FC400-25 Relay - Anti-Ice W.S.
42. S-1232-7 Ckt Bkr - Ht Windshield
43. 9MD7-3-28 Overvoltage Protector - RH
44. MDX (3.0 Amp) Fuse (Slow-Blow)
45. 341001 Fuse Holder
46. 539-2559-01 Capacitor - RH
47. 51r 1 Watt 5% Resistor - RH
48. 9910013-1 Anti-Ice Windshield
49. 2832-1A Controller - Windshield
50. 112-205-101 Sw Bkr - Anti-Ice Windshield
51. VM911M-4 Windshield Htr Lt
52. 22370-125 Shunt
53. MS24524-22 Sw - LH Alt Fld

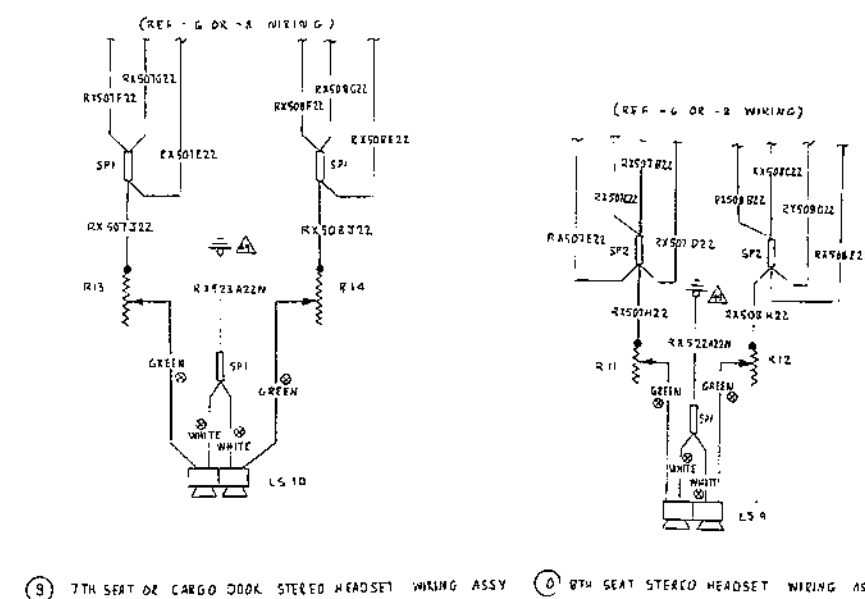


421-0001 TO 421A0118

NAME	DATE	ISSUED	REVISION
W. J. BARNES	2-2-56	1	1
CHIEF	1-1-56	2	2
ST. J. BARNES	1-1-56	3	3
PROJ. ENGINEER	1-1-56	4	4
Cessna		P. O. BOX 1977 WICHITA, KANSAS	
100 AMP ALTERNATOR (OPTIONAL) & ELECTRIC HEATED WINDSHIELD			
CODE ENT. NO.	REV	ISSUED	NO.
71379	D	51080000	
SCALE	NO.	REV	A



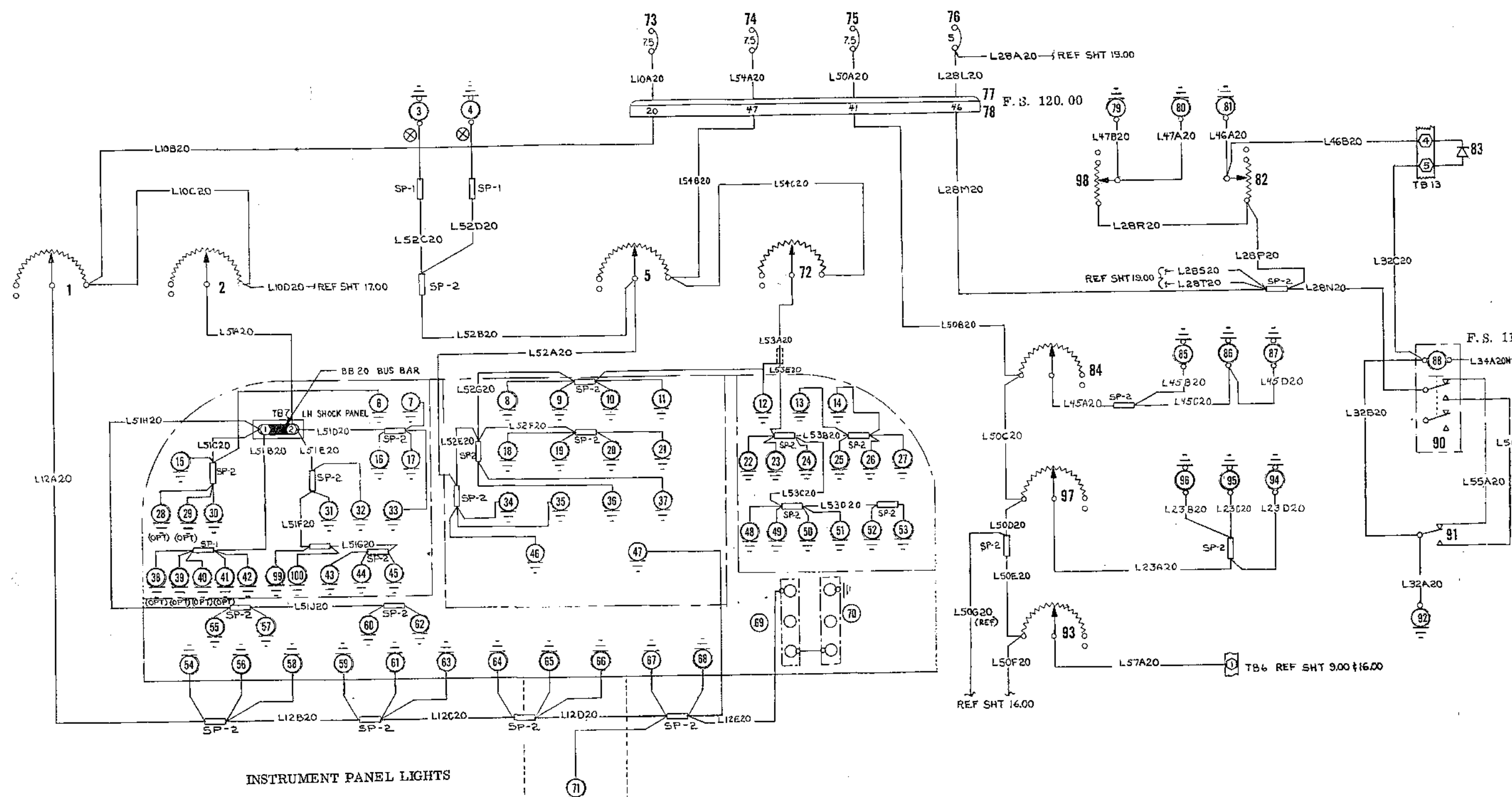
⑥ STEREO WITH AFT PA $\frac{1}{2}$ /OR INTERCOMM ~ SPEAKER WIRING ASSY



⑥ STEREO SPEAKER & HEADSET WIRING ASBY

⑨ 7TH SEAT OR CARGO DOOR STEREO HEADSET WIRING ASSY ⑩ 8TH SEAT STEREO HEADSET WIRING ASSY

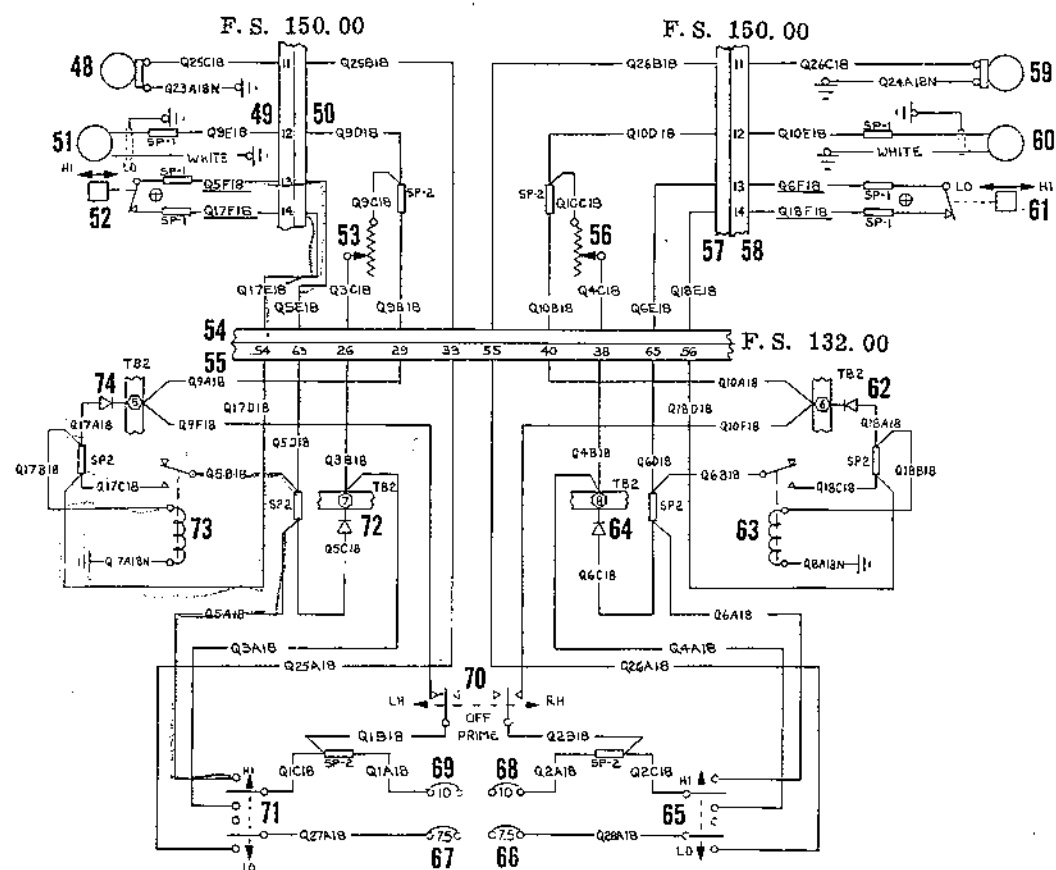
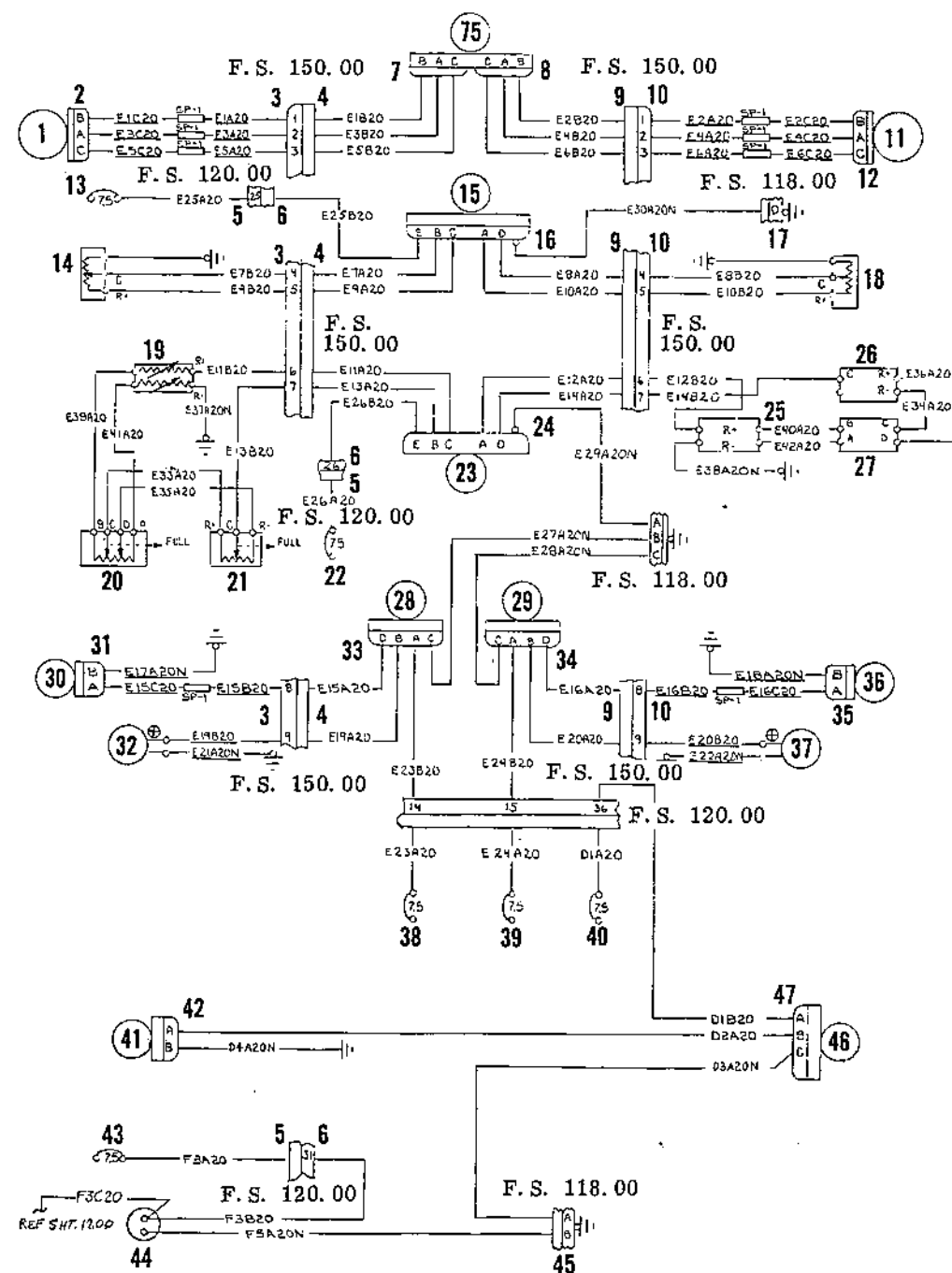
Cessna.		AIRCRAFT CO.	P. O. BOX 1877 MILWAUKEE & TWENTY EIGHTH MILWAUKEE, WISCONSIN 53201
TITLE			
WIRING ASSY ~ STEREO CABINET & UNDER SEAT WITH AFT PA 1/2" OR HEADSETS, MINI-8 (OPT)			
SIZE	CODE IDENT. NO.	DRAWING NO.	
D	71379	E	5118436
SCALE	NAME	REP	SHEET



Part Number	Nomenclature	Part Number	Nomenclature
1. XR5239	Rheo - Stationary Pnl	52. 20-0121-1B24	Lt - Pnl - RH
2. XR5238	Rheo - Pilot Inst Lts	53. 20-0121-1B24	Lt - Pnl - RH
3. 161619	Fuel Select Lt	54. 20-0121-1B24	Post Lt Instl
4. 161619	Fuel Select Lt	55. 20-0121-1B24	Post Lt Instl
5. XR5238	Rheo - Eng & Fuel Select Lts	56. 20-0121-1B24	Post Lt Instl
6. 20-0121-1B24	Post Lt Inst	57. 20-0121-1B24	Post Lt Instl
7. 20-0121-1B24	Post Lt Inst	58. 20-0121-1B24	Post Lt Instl
8. 20-0121-1B24	Post Lt Inst	59. 20-0121-1B24	Post Lt Instl
9. 20-0121-1B24	Post Lt Inst	60. 20-0121-1B24	Post Lt Instl
10. 20-0121-1B24	Post Lt Inst	61. 20-0121-1B24	Post Lt Instl
11. 20-0121-1B24	Post Lt Inst	62. 20-0121-1B24	Post Lt Instl
12. 20-0121-1B24	Post Lt - Placard	63. 20-0121-1B24	Post Lt Instl
13. 20-0121-1B24	Post Lt - Placard	64. 20-0121-1B24	Post Lt Instl
14. 20-0121-1B24	Post Lt Instl	65. 20-0121-1B24	Post Lt Instl
15. 20-0121-1B24	Post Lt Instl	66. 20-0121-1B24	Post Lt Instl
16. 20-0121-1B24	Post Lt Instl	67. 20-0121-1B24	Post Lt Instl
17. 20-0121-1B24	Post Lt Instl	68. 20-0121-1B24	Post Lt Instl
18. 20-0121-1B24	Post Lt Instl	69. 5115230-1	Flap Preselect - Ind Block Assy
19. 20-0121-1B24	Post Lt Instl	70. 5115233-1	Flap Preselect - Guard Assy
20. 20-0121-1B24	Post Lt Instl	71. 20-0121-1B24	Post Lt - Var Press Contr
21. 20-0121-1B24	Post Lt Instl	72. XR5239	Rheo - Copilot Instl Lts
22. 20-0121-1B24	Lt - Pnl - RH	73. S-1232-507	Pilot Lt - Ckt Bkr
23. 20-0121-1B24	Lt - Pnl - RH	74. S-1232-507	Copilot Lt - Ckt Bkr
24. 20-0121-1B24	Lt - Pnl - RH	75. S-1232-507	Radio Lt - Ckt Bkr
25. 20-0121-1B24	Lt - Pnl - RH	76. S-1232-505	Cabin Lt - Ckt Bkr
26. 20-0121-1B24	Lt - Pnl - RH	77. 201310-3	Recp - Side Cons Fwd Conn
27. 20-0121-1B24	Lt - Pnl - RH	78. 201311-3	Recp - Side Cons Fwd Conn
28. 20-0121-1B24	Post Lt Instl	79. 3366	Flood Lt
29. 20-0121-1B24	Post Lt Instl	80. 3366	Flood Lt
30. 20-0121-1B24	Post Lt Instl	81. 2109	Flood Lt - White
31. 20-0121-1B24	Post Lt Instl	82. XR5239	Rheo - Ovhd Lt - White
32. 20-0121-1B24	Post Lt Instl	83. IN2482	Diode - Ovhd Flood Lt
33. 20-0121-1B24	Post Lt Instl	84. R25-350-RS30	Rheo - Compass
34. 20-0121-1B24	Post Lt Instl	85. CM2639-5	Compass Lt
35. 20-0121-1B24	Post Lt Instl	86. A-1765-4-327	Coll No. Lt
36. 20-0121-1B24	Post Lt Instl	87. A-1765-4-327	Coll No. Lt
37. 20-0121-1B24	Post Lt Instl	88. 20-0121-1B24	Post Lt - Sw
38. 20-0121-1B24	Post Lt Instl	89. 201298-1	Plug
39. 20-0121-1B24	Post Lt Instl	90. 52PB64-T2	Sw - Door Lt
40. 20-0121-1B24	Post Lt Instl	91. S-1238-2-1	Sw - Door Lt
41. 20-0121-1B24	Post Lt Instl	92. 5119019-1	Door Courtesy Lt
42. 20-0121-1B24	Post Lt Instl	93. XR5238	Radio Pnl Lt - Rheo
43. 20-0121-1B24	Post Lt Instl	94. A5395-1B	Lt Assy (Side Cons)
44. 20-0121-1B24	Post Lt Instl	95. A5395-1B	Lt Assy (Side Cons)
45. 20-0121-1B24	Post Lt Instl	96. A5395-1B	Lt Assy (Side Cons)
46. 20-0121-1B24	Post Lt Instl	97. XR5239	Rheo - Side Console
47. 20-0121-1B24	Lt - Pnl - RH	98. XR5238	Rheo - Ovhd Lt Red
48. 20-0121-1B24	Lt - Pnl - RH	99. 20-0121-1B24	Post Lt Instl
49. 20-0121-1B24	Lt - Pnl - RH	100. 20-0121-1B24	Post Lt Instl
50. 20-0121-1B24	Lt - Pnl - RH		
51. 20-0121-1B24	Lt - Pnl - RH		

421A0001 TO 421B0001

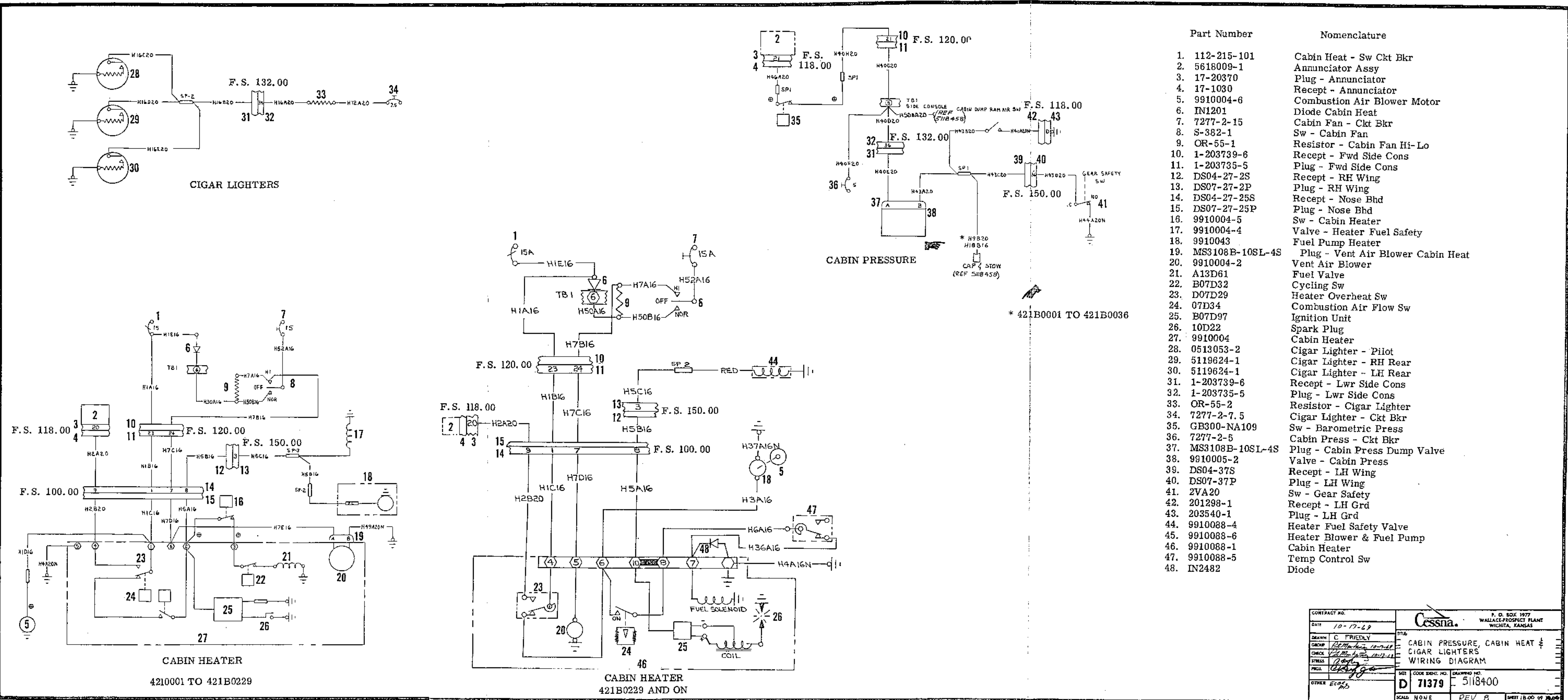
CONTRACT NO.		P. O. BOX 1977 WALLACE PROSPECT PLANT WICHITA, KANSAS	
DATE	5-17-68	Cessna.	
DRAWN	C. E. DUGAN	TITLE	
CHECK	W. H. DUGAN	LIGHTING, INTERIOR WIRING DIAGRAM	
STRESS	W. H. DUGAN	SIZE	
PROJ.	W. H. DUGAN	CODE IDENT. NO.	
OTHER	DCN 8A	DRAWING NO.	
		D 71379 5118301	
		SCALE NONE REV B SHEET 14 OF 43300	

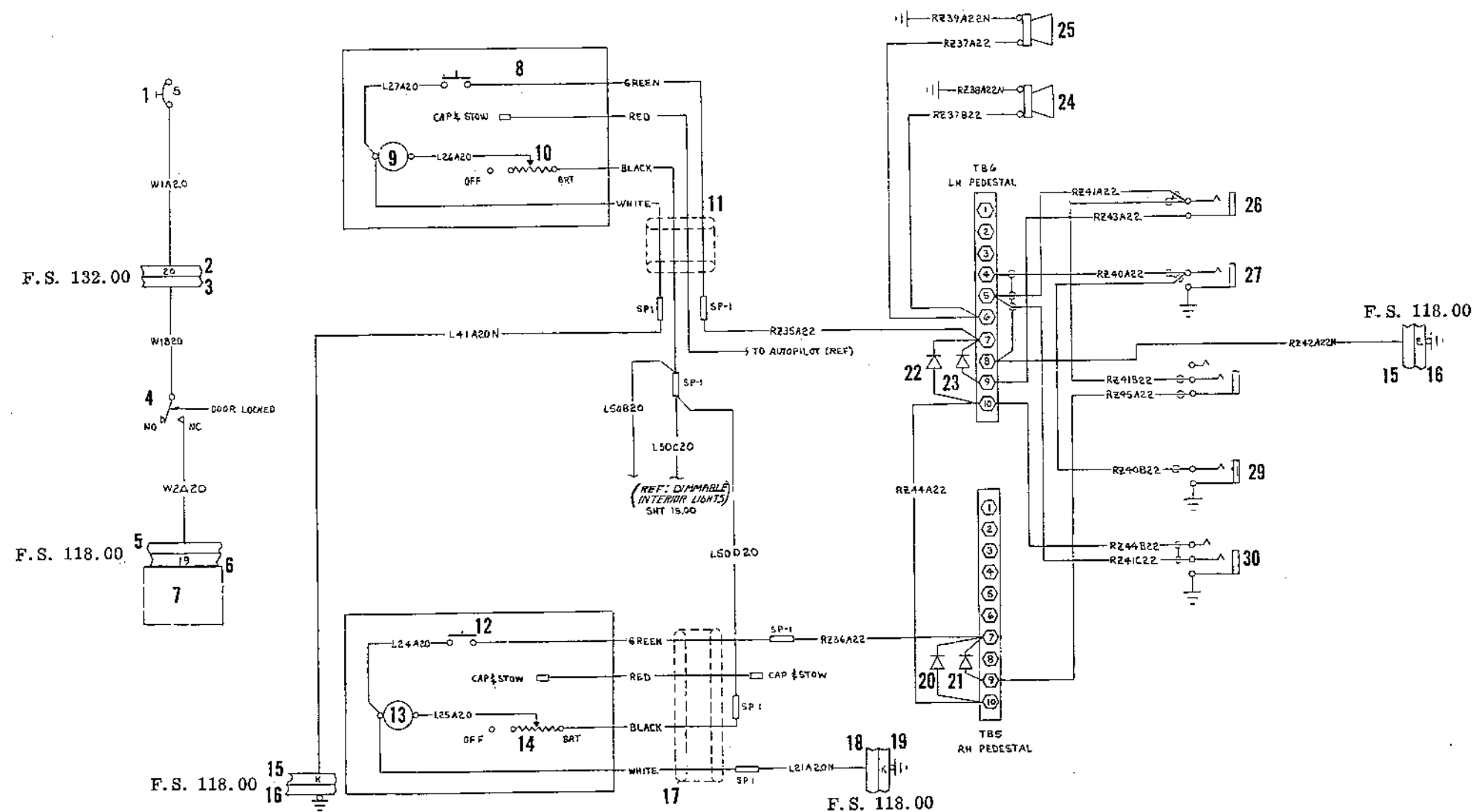


Part Number	Nomenclature	Part Number	Nomenclature
1. 0850350-1	Tach Gen - LH	42. MS3108B-12S-3S	Plug - OAT Bulb
2. S-1232-507	Fuel Qty Tip - Ckt Bkr	43. S-1232-507	T & B No. 1 - Ckt Bkr
3. DS07-37P	Plug - L Wing	44. CM2651-L1	Turn & Bank Ind - RH
4. DS04-37S	Recp - L Wing	45. 201298-1	Plug - Grd LH
5. 201310-3	Recp - Side Console Fwd	46. CM2628-L1	Air Temp Ind
6. 201311-3	Plug - Side Console Fwd	47. MS3106A-14S-2S	Plug - Air Temp Ind
7. MS3106A-14S-1S	Plug - L Wing (LH Tach Gen)	48. 1B5-7	Aux Fuel Pump - LH (In-line)
8. MS3106A-14S-1S	Plug - R Wing (RH Tach Gen)	49. DS07-27-8P	Plug - LH Wing
9. DS04-37S	Recp - R Wing	50. DS04-27-2S	Recp - LH Wing
10. DS07-37P	Plug - R Wing	51. 085420	Aux Fuel Pump - LH (Tip Tank)
11. 0850350-1	Tach Gen - RH	52. 0850452-7	Sw - Fuel Press - LH
12. MS3106A-10SL-3S	Plug - RH Tach Gen	53. AR-75-25	Resistor - Fuel (LH Wing)
13. MS3106A-10SL-3S	Plug - LH Tach Gen	54. 201310-3	Recp - Side Console - Lwr Conn
14. 0850350-1	Tach Gen - LH	55. 201311-3	Plug - Side Console - Lwr Conn
15. CM2696-L1	Fuel Qty - Tip	56. AR-75-25	Resistor - Fuel (RH Wing)
16. MS3106A-14S-5S	Tip Tank Fuel Qty - Plug	57. DS04-27-2S	Recp - RH Wing
17. 201298-1	Plug - Grd RH	58. DS07-27-8P	Plug - RH Wing
18. 0850435	Tank Unit - Tip - RH	59. 1B5-7	Aux Fuel Pump - RH (In-Line)
19. 5028213-1	Stroke Adj - LH Resistor	60. 085420	Aux Fuel Pump - RH (Tip Tank)
20. EA470A-2959	Tank Unit - Ctr - LH	61. 0850452-7	Sw - Fuel Press - RH
21. EA470A-2956	Tank Unit - Ind - LH	62. IN1201	Diode - Fuel Prime - RH
22. S-1232-507	Fuel Qty Aux - Ckt Bkr	63. FC215-136	Relay - R Fuel Boost
23. CM2646-L2	Fuel Qty - Aux	64. IN1201	Diode - Aux Pump Low - RH
24. MS3106A-14S-5S	Plug - Wing Tank Fuel Qty	65. S-392-1	Sw - Fuel Boost RH Ckt Bkr
25. 5028213-1	Stroke Adj - RH	66. S-1232-507	R Aux Pump (Trans Pump) - Ckt Bkr
26. EA470A-2956	Tank Unit - Inbd - RH	67. S-1232-507	L Aux Pump (Trans Pump) - Ckt Bkr
27. EA470A-2959	Fork Unit - Ctr - RH	68. S-1232-507	R Fuel Pump - (Trans Pump) - Ckt Bkr
28. CM2634-N3	Engine Gage - LH	69. S-1232-507	L Fuel Pump - (Trans Pump) - Ckt Bkr
29. CM2634-N3	Engine Gage - RH	70. 1568-1	Sw - Prime
30. MS28034-3	Oil Temp Bulb - LH	71. S-392-1	Sw - Fuel Boost - LH
31. MS3106-12S-3S	Plug - L Oil Temp Bulb	72. IN1201	Diode - Aux Pump Lwr - LH
32. 0813601-6	Cyl Temp Bulb - LH	73. FC215-136	Relay - L Fuel Boost
33. MS3106-14S-2S	Plug - L Eng Gage	74. IN1201	Diode - Fuel Prim - LH
34. MS3106-14S-2S	Plug - R Eng Gage	75. CM2682-L1	Tach Ind
35. MS3106-12S-3S	Plug - R Oil Temp Bulb		
36. MS28034-3	Oil Temp Bulb - RH		
37. 0813601-6	Cyl Temp Bulb - RH		
38. S-1232-507	L Eng Gage - Ckt Bkr		
39. S-1232-507	R Eng Gage - Ckt Bkr		
40. S-1232-510	Flap Motor - Ckt Bkr		
41. 0813601-8	Temp Bulb - Outside Air		

421A0001 TO 421B0001

CONTRACT NO.		Cessna.	
DATE 6-1-68		P. O. BOX 1977 WICHITA, KANSAS	
DRAWN C.E. DUGAN		INSTRUMENTS & FUEL CONTROLS	
GROUP			
CHECK			
STRESS			
FROM			
OTHER C.D.			
DCN 17A		D 71379 518301	
SCALE NONE		REV B	

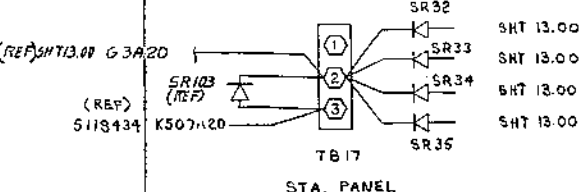
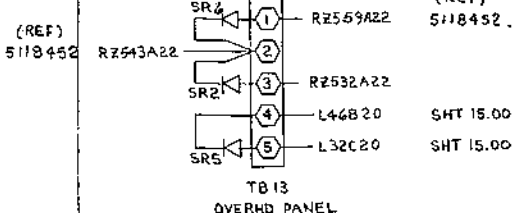
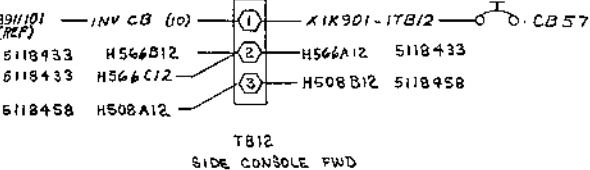
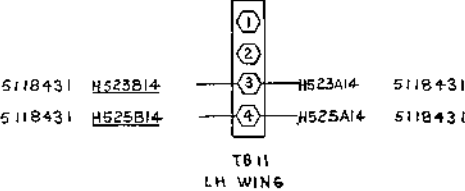
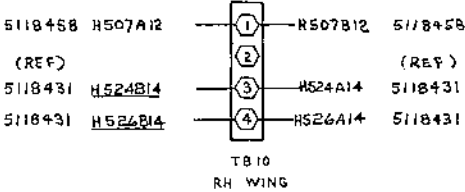
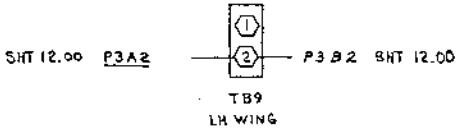
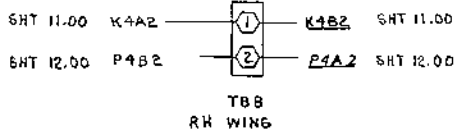
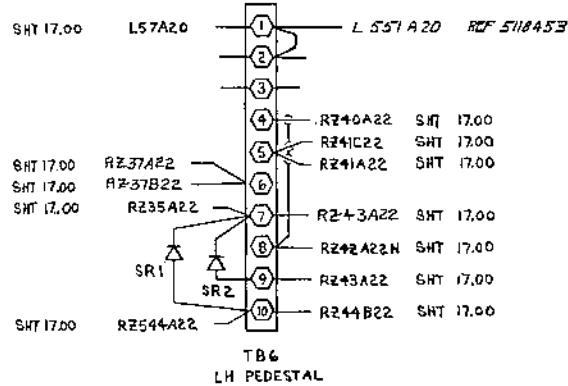
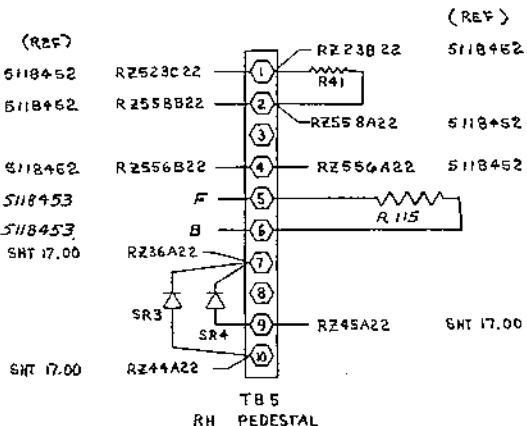
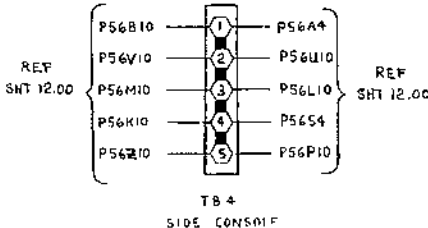
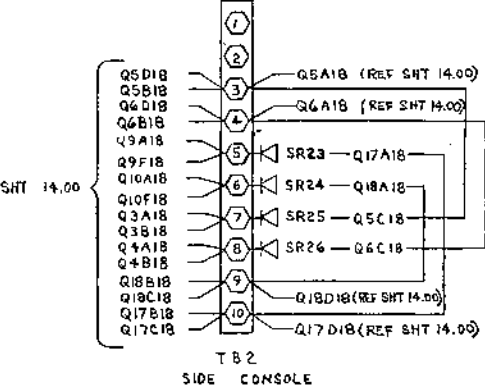
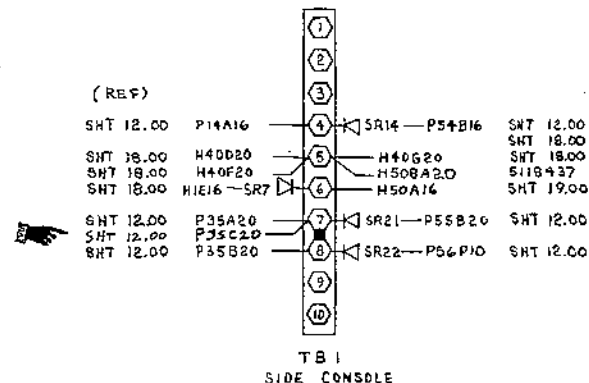




Part Number	Nomenclature
1. 7277-2-5	Door Warn - Ckt Bkr
2. 1-203735-5	Plug - Lwr Side Cons
3. 1-203739-6	Recept - Lwr Side Cons
4. MS25253-1	Sw - Door Warn
5. 17-1030	Recept - Annunciator
6. 17-20370	Plug - Annunciator
7. 5618009-1	Annunciator Assy
8. 913	Sw - Mike LH
9. 1309	Map Lt - LH
10. E-50-R-1-352A	Rheostat - LH Control Wheel
11. 877	Wire Coil Cord
12. 913	Sw - Mike RH
13. 1309	Map Lt - RH
14. E-50-R-1-352A	Rheostat - RH Control Wheel
15. 201298-1	Recept - LH Grd
16. 203540-1	Plug - LH Grd
17. 877	Wire Coil Cord
18. 201298-1	Recept - RH Grd
19. 203540-1	Plug - RH Grd
20. IN2482	Diode - Audio
21. IN2482	Diode - Audio
22. IN2482	Diode - Audio
23. IN2482	Diode - Audio
24. C596506-0101	Speaker - Audio LH
25. C596506-0101	Speaker - Audio RH
26. 1514209-1	Mike Jack - Pilot
27. S-1103-1	Hdset Jack - Ovhd Pilot
28. S-1102-1	Mike Jack - Copilot
29. S-1103-1	Hdset Jack - Ovhd Copilot
30. S-1102-1	Hand Mike - Pilot

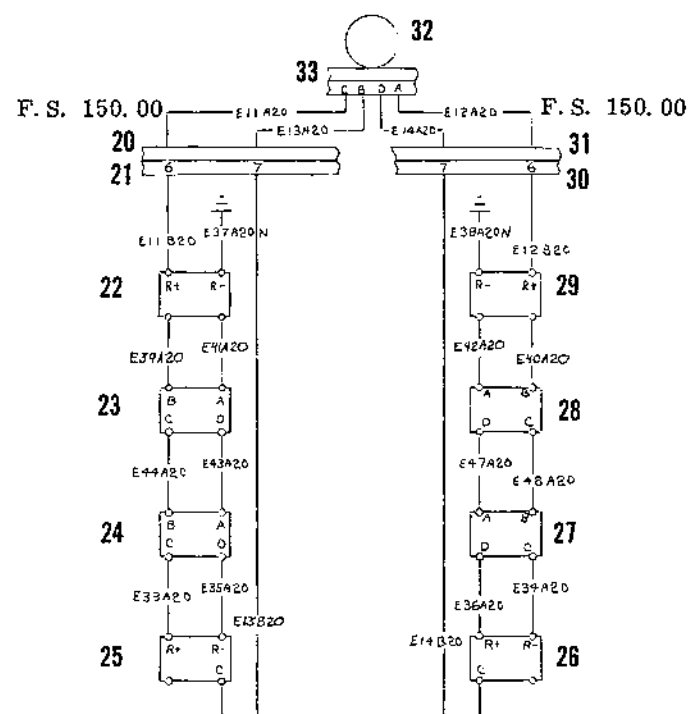
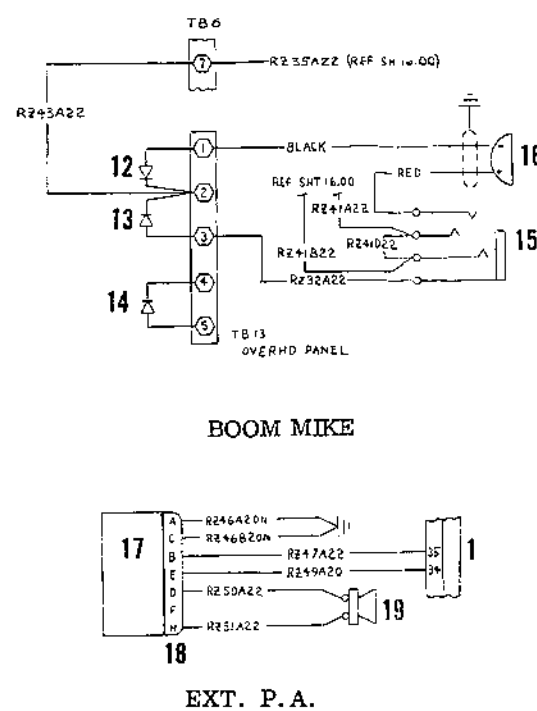
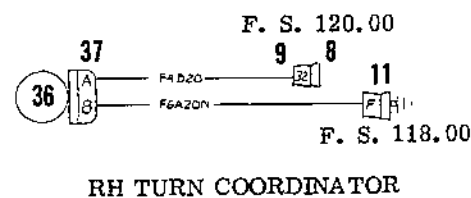
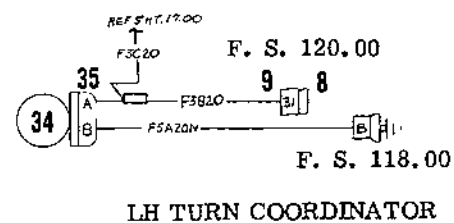
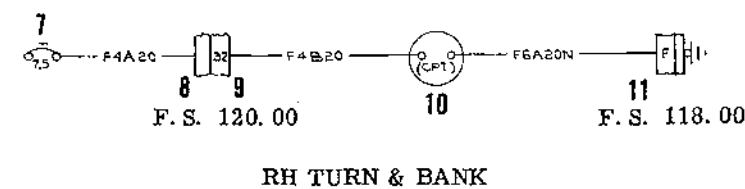
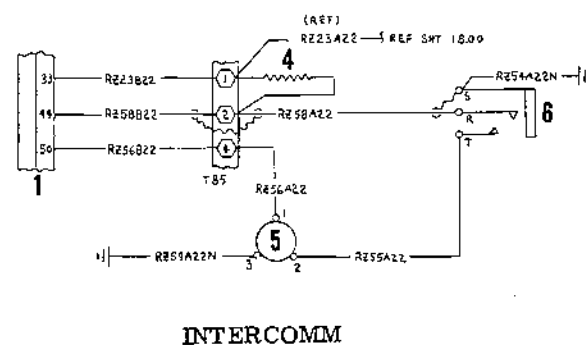
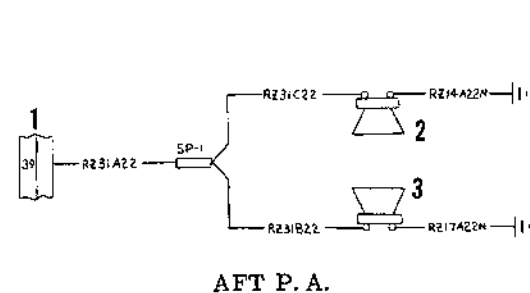
421B0001 AND ON

CONTRACT NO.		Cessna.		P. O. BOX 1977 WALLACE-PROSPECT PLANT WICHITA, KANSAS	
DATE	10-17-69	TITLE			
DRAWN	KC - WILKIN	MAP LIGHTS, AUDIO & DOOR			
GROUP	10-17-69	WARNING			
CHECK	10-17-69	WIRING DIAGRAM			
STRESS	10-17-69				
PROJ.	10-17-69				
OTHER	10-17-69				
SIZE	D	CODE IDENT. NO.	71379	DRAWING NO.	5118400
SCALE	NONE	REV.	B	SHEET 17.00 OF 19.00	



421B0001 AND ON

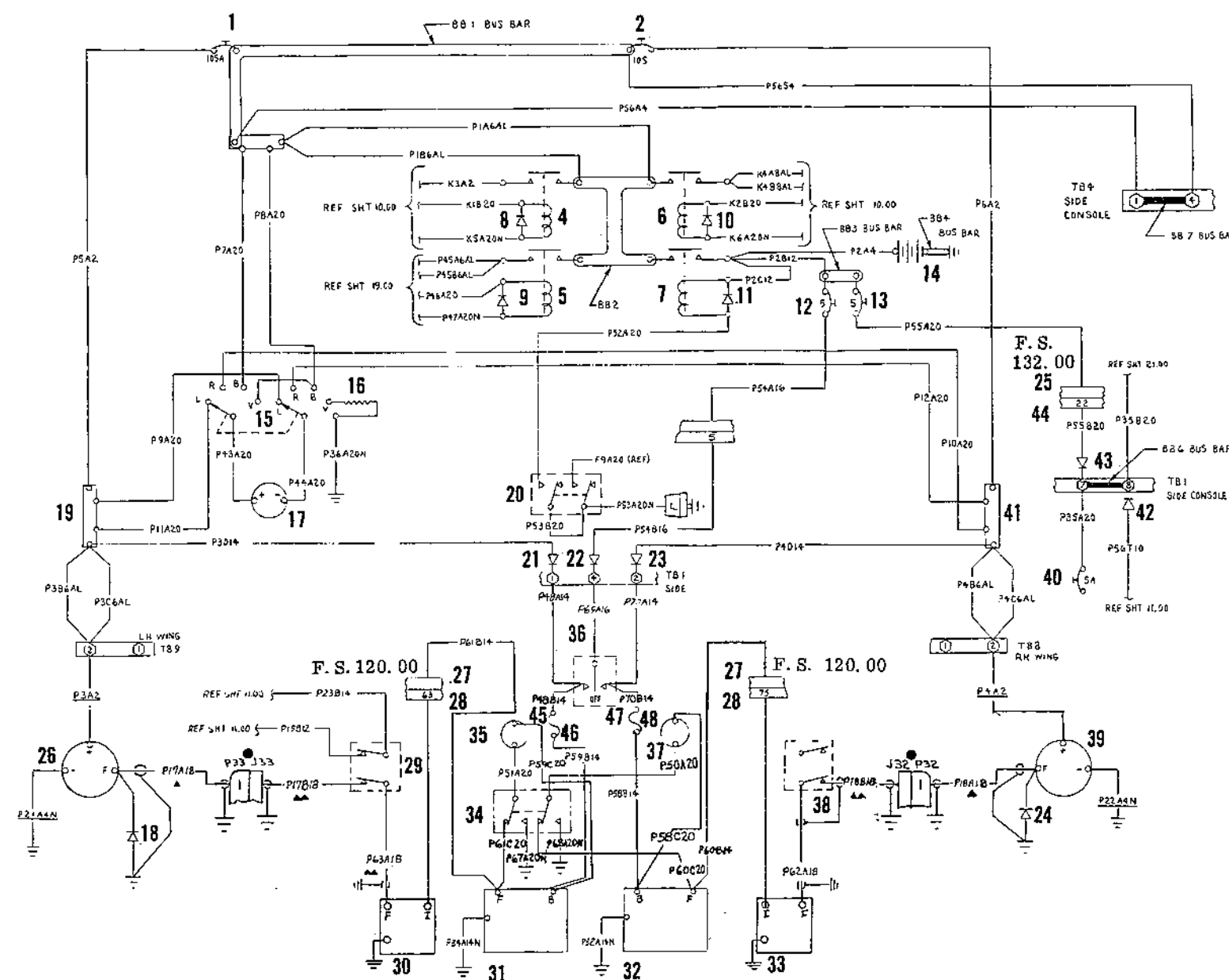
CONTRACT NO.		Cessna.		P. O. BOX 1977 WALLACE-PROSPECT PLANT WICHITA, KANSAS	
DATE	10-17-89	TITLE			
DRAWN	K. WILKIN	TERMINAL BOARDS			
GROUP	Electrical Systems				
CHECK	W. M. Jones				
STRESS	Chapman				
PROJ.	Chapman				
OTHER	Ends				
SIZE	D	CODE IDENT. NO.	71379	DRAWING NO.	5118400
SCALE	NONE	REV.	B	SHEET 10.00 OF 19.00	



Part Number	Nomenclature
1. 7777K1	Recp - 100V AC
2. T696	Spkr Aft P.A. & Stereo
3. T696	Spkr Aft P.A. & Stereo
4. 470r 1 watt	Res - Intercomm
5. VM911M-3	Lt - Intercomm Coll
6. S-1102-1	Mike Jack - Intercomm
7. S-1232-505	T & B No. 2 - Ckt Bkr
8. 201310-3	Recp - Side Cons Fwd Conn
9. 201311-3	Plug - Side Cons Fwd Conn
10. CM2651-L1	T & B Ind - RH
11. 201298-1	Plug - RH Grd
12. IN2482	Diode - Audio
13. IN2482	Diode - Audio
14. IN2482	Diode - Ovhd Flood Lt
15. 203540-1	Recp - RH Grd
16. C596503-0101	Boom Mike
17. 5072422-1	Booster Amplifier
18. 126-222	Plug - Booster Amplifier
19. F8WP	Spkr - Fwd P.A.
20. DS04-37S	Recp - L Wing
21. DS07-37P	Recp - L Wing
22. 5028213-1	Strk Adj - LH Res
23. EA470A-2957	Tank Unit - Outbd - LH
24. EA470A-2959	Tank Unit - Ctr - LH
25. EA470A-2956	Tank Unit - Inbd - LH
26. EA470A-2956	Tank Unit - Inbd - RH
27. EA470A-2959	Tank Unit - Ctr - RH
28. EA470A-2957	Tank Unit - Outbd - RH
29. 5028213-1	Strk Adj - RH Res
30. DS07-37P	Plug - R Wing
31. DS07-37S	Recp - R Wing
32. CM2646-L3	Fuel Quan - Aux
33. MS3106A-14S-5S	Plug - Wing Fuel Qty
34. C661003-0202	Turn Coordinator LH (Opt)
35. MS3106A-10SL-3S	Plug - LH Turn Coordinator
36. C661003-0202	Turn Coordinator RH (Opt)
37. MS3106A-10SL-3S	Plug - RH Turn Coordinator

421A0001 TO 421B0001

CONTRACT NO.		DATE		5-23-68	
DRAWN		K. WILKIN		TITL	
GROUP		Electrical		OPTIONAL EQUIPMENT	
CHECK		J. M. M. 5-22-68		INTERCOMM, BOOM MIKE,	
STRESS		J. M. M. 5-22-68		FWD & AFT P.A. - WIRING DIAGRAM	
PROJ.		421A		SIZE	
OTHER		BCN 48		CODE IDENT NO.	
		BCN 17A		DRAWING NO.	
				D 71379	
				5118301	
				SCALE NONE	
				REV B	
				SHEET 23.00 OF 23.00	



WESTINGHOUSE 100 AMP ALTERNATOR

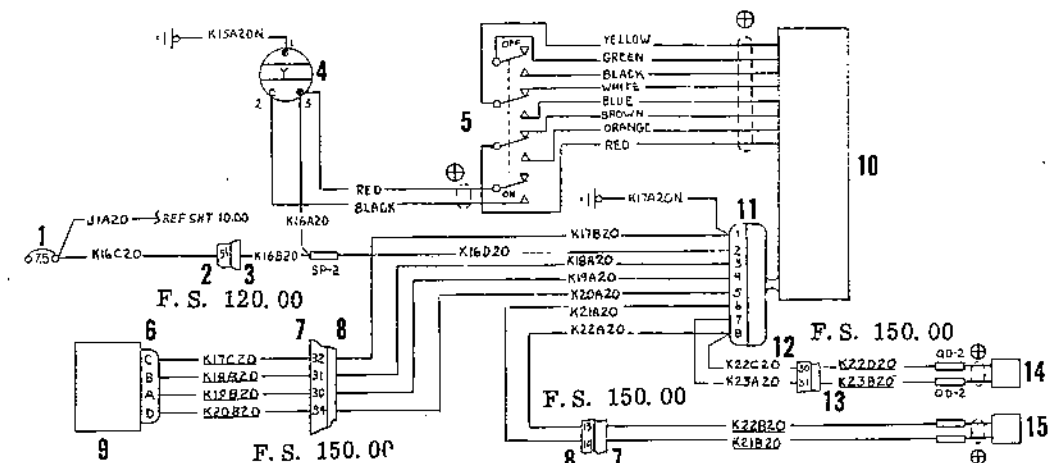
Part Number

Nomenclature

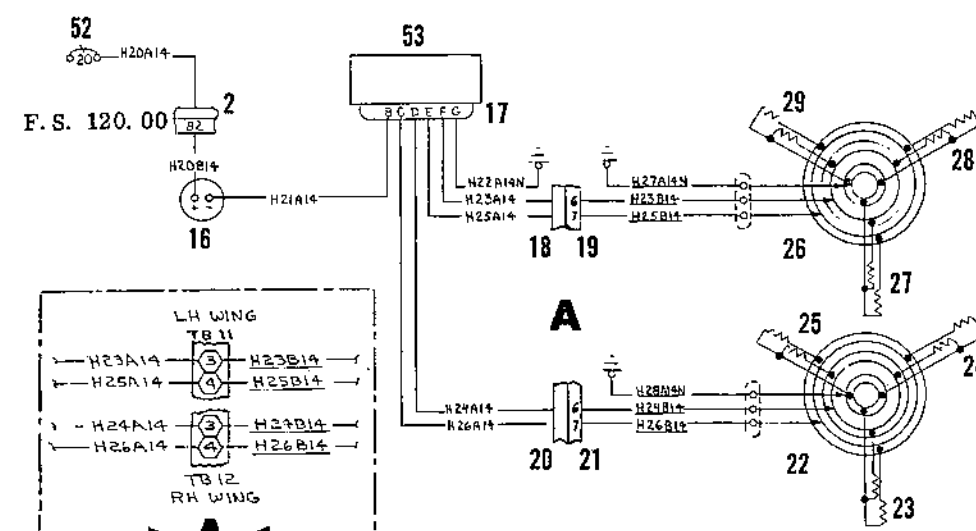
1. PDLM-105	L Alt - Ckt Bkr
2. PDLM-105	R Alt - Ckt Bkr
3. 22370-125	Shunt - Btry
4. 0850469-1	Relay - Starter - LH
5. 0850469-1	Relay - Aux Pwr
6. 0850469-1	Relay - Starter - RH
7. 0850469-1	Relay - Btry
8. IN2482	Diode - LH Start Relay
9. IN2482	Diode - Ext Pwr Relay
10. IN2482	Diode - RH Start Relay
11. IN2482	Diode - Btry Relay
12. S-1232-505	Cab Lt, Btry - Ckt Bkr
13. S-1232-505	Emer Pwr - Ckt Bkr
14. 12CS24	Battery
15. PA2003	Sw - VAM
16. HS-1A-1%-7200	Resistor - AV Meter
17. CM2664-1	Volt Ammeter
18. 7277-2-3	Diode - LH Fld to Grd
19. 22370-125	Shunt - LH Alt
20. MS24525-22	Sw - Btry
21. IN1201	Diode - LH Fld
22. IN1201	Diode - Emer Fld
23. IN1201	Diode - RH Fld
24. IN5059	Diode - RH Fld to Grd
25. 201311-3	Recpt - Lwr CB Pnl
26. 976J417-2	Alternator - LH
27. 201310-3	Recpt - Side Cons Fwd Conn
28. 201311-3	Plug - Side Cons Fwd Conn
29. MS24524-22	Sw - LH Alt Fld
30. 914F585-1	Voltage Reg - LH
31. 138-2	Overvoltage Relay - LH
32. 138-2	Overvoltage Relay - RH
33. 914F585-1	Voltage Reg - RH
34. 14-102B	Sw - Alt Fail Test
35. L9000	Lt - Alt Fail Ind - LH
36. S-382-3	Sw - Emergency
37. L9000	Lt - Alt Fail Ind - RH
38. MS24524-22	Sw - RH Alt Fld
39. 976J417-2	Alternator - RH
40. S-1232-505	Cabin Lt - Ckt Bkr
41. 22370-125	Shunt - RH Alt
42. MS25253-1	Sw - Door Warn
43. 0850452-7	Sw - Fuel Press
44. 201311-3	Side Cons Lwr Conn
45. MDX 3.0 AMP	Fuse - Alternator LH
46. HCM	Fuse Holder
47. MDX 3.0 AMP	Fuse - Alternator RH
48. HCM	Fuse Holder

421A0001 TO 421A0118

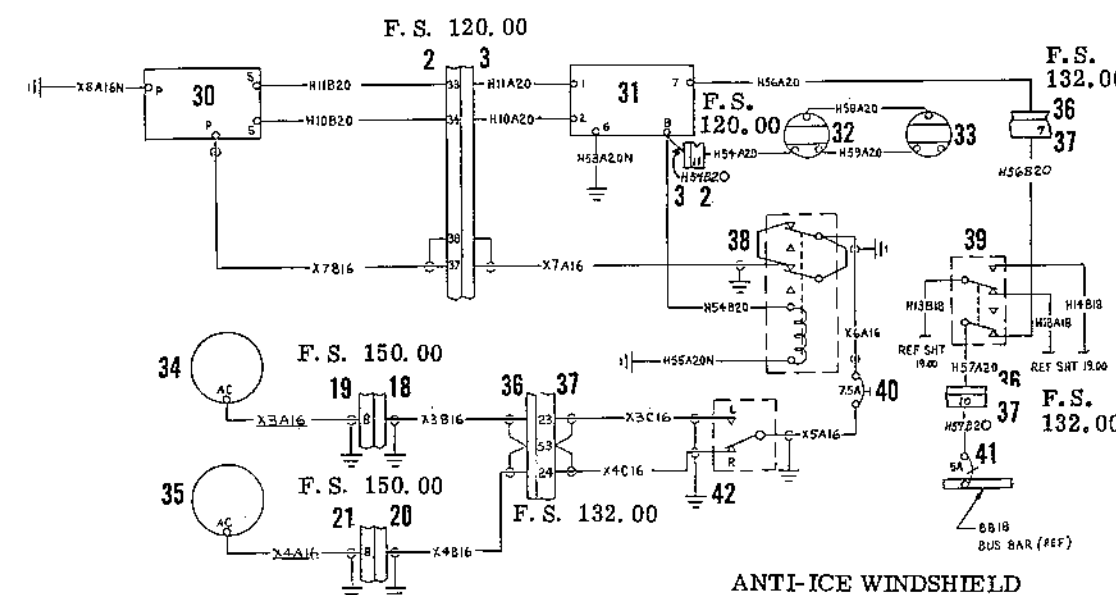
CONTRACT NO.		P. O. BOX 1977 WALLACE-PROSPECT PLANT WICHITA, KANSAS	
DATE	5-22-68	Cessna.	
DRAWN	K. WILKIN	ALTERNATOR - OPTIONAL	
CHECK	J. H. HARRIS	100 AMP WESTINGHOUSE	
STAMP		WIRING DIAGRAM	
PROJ.	100 AMP	REV	71379
OTHER	DCNS 5A, 14A 158, 14A	DRAWING NO.	5118301
SCALE: NONE		REV B	DATE: 22.00 OF 23.00



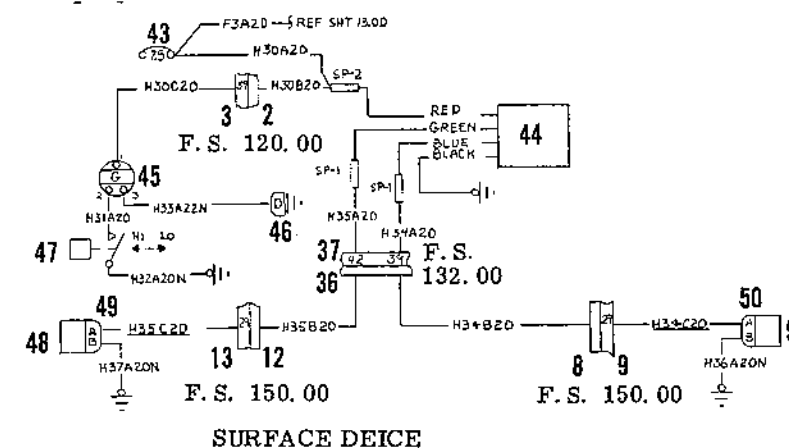
PROPELLER SYNCHRONIZER



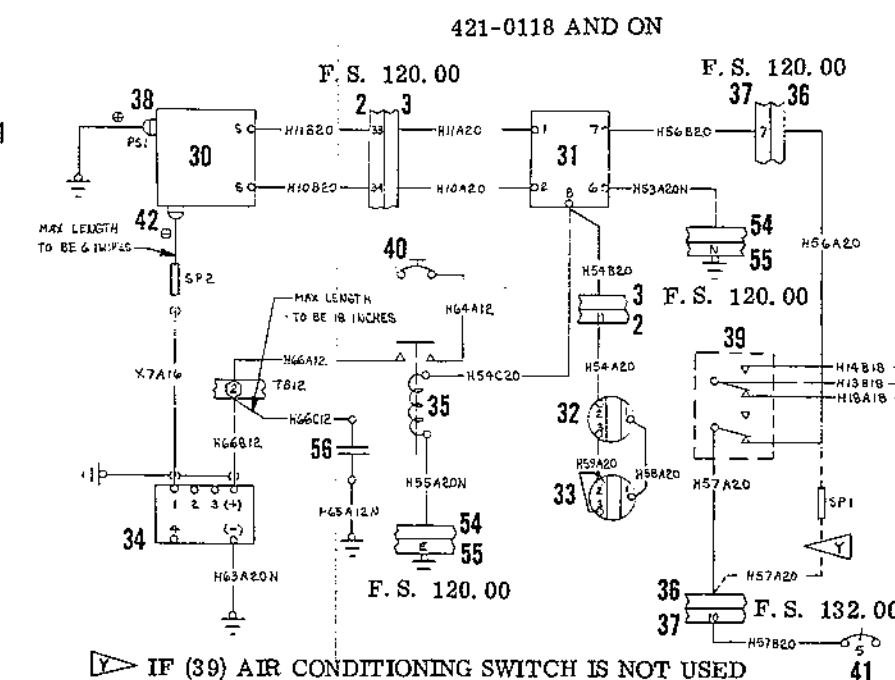
421A0050 AND ON PROPELLER ANTI-ICE



ANTI-ICE WINDSHIELD



SURFACE DEICE

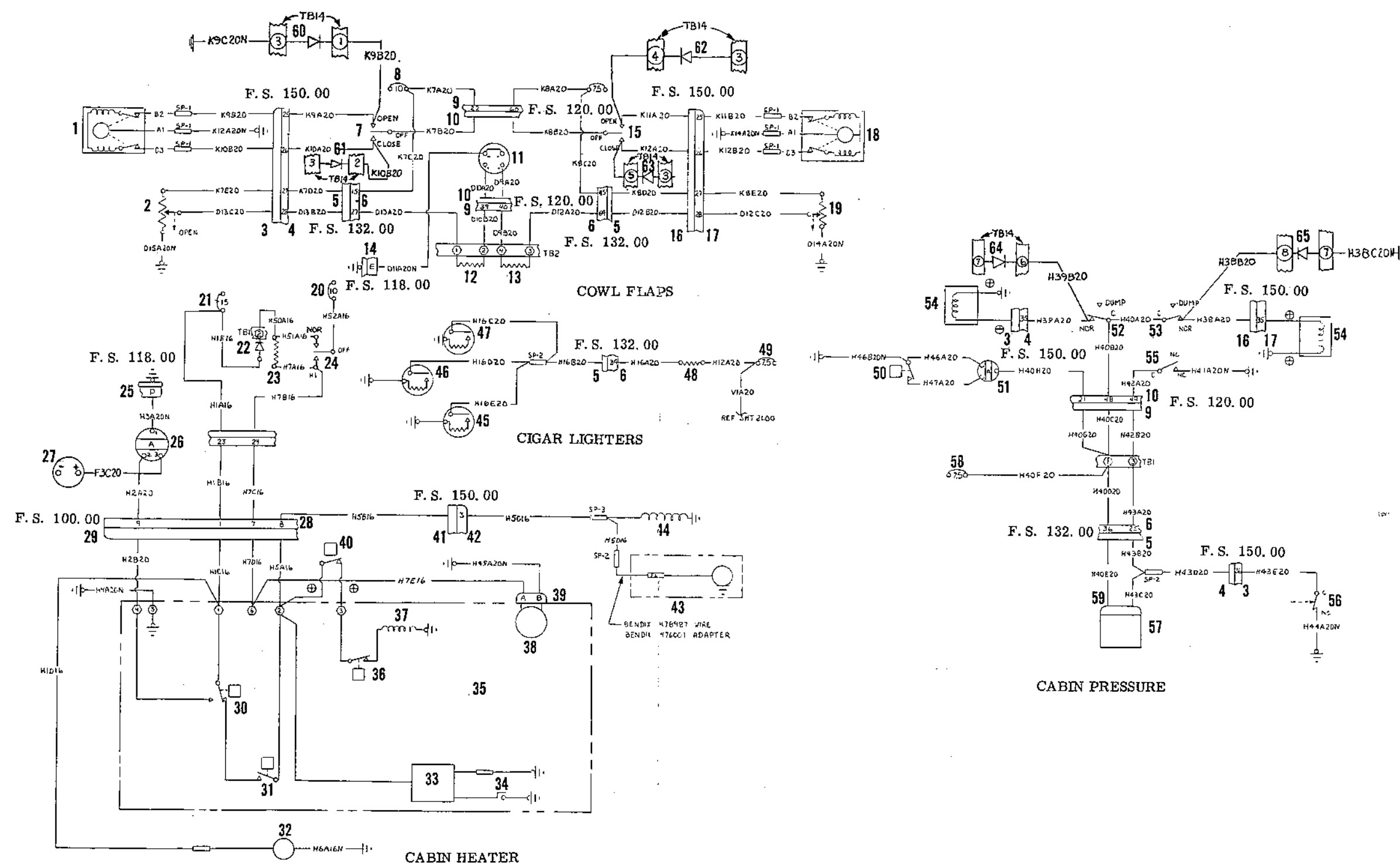


IF (39) AIR CONDITIONING SWITCH IS NOT USED
SPlice WIRES H56A20 & H57A20 TOGETHER.

Part Number	Nomenclature	Part Number	Nomenclature
1. S-1232-507	Start - Ckt Bkr	27. 4E1188-3	Prop Boot - LH Prop
2. 201310-3	Recp - Side Cons Fwd Conn	28. 4E1188-3	Prop Boot - LH Prop
3. 201311-3	Plug - Side Cons Fwd Conn	29. 4E1188-3	Prop Boot - LH Prop
4. VM911M-4	Lt - Prop Syncho Ind	30. 9910013-1	Anti-Ice Windshield
5. MST405N	Sw - Prop Syncho	31. 2832-1A	Controller - Windshield
6. 233062	Plug - Actuator Assy	32. VM911M-4	Lt - Windshield Htr
7. DS07-37P	Plug - R Wing	33. VM911M-4	Door Warn Ind Lt
8. DS04-37S	Recp - R Wing	34. 9910067-2	Inverter - Windshield
9. 0850458-7	Actuator - Prop Syncho	35. M524187-01	Relay - Windshield
10. 213434	Control Box Assy - Prop Syncho	36. 201310-3	Recp - Side Cons Lwr Conn
		37. 201311-3	Plug - Side Cons Lwr Conn
11. 233032	Plug - RH Wing	38. WB0450	Plug - Windshield
12. DS04-37S	Recp - L Wing	39. S-392-3	Sw - Air Cond Control
13. DS07-37P	Plug - L Wing	40. S-1232-507	Elec Windshield - Ckt Bkr
14. C210446 or B210529	Master Pickup	41. 112-205-101	Windshield Anti-Ice
15. C210446 or B210529	Slave Pickup	42. WB0450	Plug - Windshield
16. CM2806-1	Ammeter - Prop Anti-Ice	43. S-1232-507	T & B No. 1 - Ckt Bkr
17. MS3106B-20-15S	Plug - Timer Prop Anti-Ice	44. 3D1748	Timer - Surf Deice
		45. VM911M-3	Lt - Surf Deice
18. DS04-27-2S	Recp - LH Wing	46. 201298-1	Plug - Surf Deice Lt
19. DS07-27-8P	Plug - LH Wing	47. ID1194	Sw - Deice Press
20. DS07-27-2S	Recp - RH Wing	48. 3D1542-02	Valve - Surf Deice - LH
21. DS07-27-8P	Plug - RH Wing	49. MS3108E-12S-3S	Plug - Surf Deice - LH
22. 4E1387 & 4E1489	Brush & Slip Ring Assy RH	50. MS3108E-12S-3S	Plug - Surf Deice - RH
23. 4E1188-3	Prop Boot - RH Prop	51. 3D1542-02	Valve - Surf Deice - RH
24. 4E1188-3	Prop Boot - LH Prop	52. 112-520-101	Prop Anti-Ice - Sw Ckt Bkr
25. 4E1188-3	Prop Boot - RH Prop	53. 3E1150-3	Timer - Prop Anti-Ice
26. 4E1387 & 4E1489	Brush & Slip Ring Assy - LH	54. 201298-1	Recp - CB Pnl Grd
		55. 203540-1	Plug - CB Pnl Grd
		56. FAH103-50	Capacitor - Windshield

421A0001 TO 421B0001

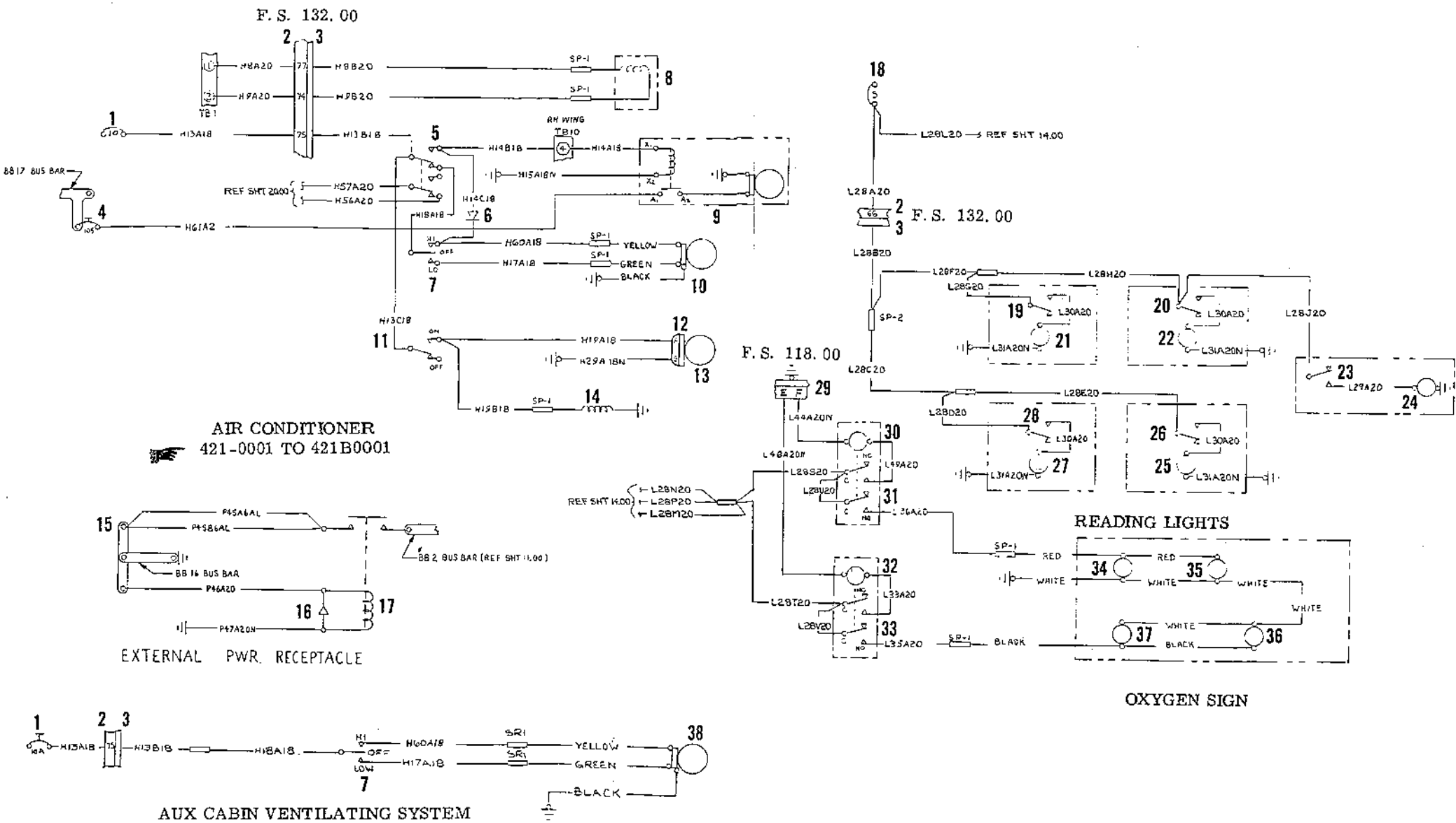
CONTRACT NO.		Cessna.	
DATE 6-3-68		P. O. BOX 1977 WICHITA, KANSAS	
DRAWN T.D.WERT	CHECKED J. J. WERT	OPTIONAL SYSTEMS-PROPELLER SYNCHRONIZER, SURFACE DE-ICE, PROPELLER ANTI-ICE WIRING DIAG.	
MOD. J. J. WERT	DATE 6-3-68	D 71379 5118301	
OTHER DCN 18C DCN 17A		SCALE NONE REV B UNIT 2803, 4, 2304	



Part Number	Nomenclature	Part Number	Nomenclature
1. 4194-00	Cowl Flap Motor - LH	33. B07D97	Ignition Unit
2. XR5459	Cowl Flap XMTR - LH	34. 10D22	Spark Plug
3. DS07-37P	Plug - L Wing	35. 9910004-1	Htr - Cabin
4. DS04-37S	Recp - L Wing	36. B07D32	Cycling Sw
5. 201310-3	Recp - Side Cons Lwr Conn	37. A13D61	Fuel Valve
6. 201311-3	Plug - Side Cons Lwr Conn	38. 9910004-2	Vent Air Blower Motor
7. S-382-1	Sw - Cowl Flap LH	39. MS3108B-10SL-4S	Plug - Vent Air Blower
8. S-1232-510	Flap Motor - Ckt Bkr	40. 9910004-5	Thermo - Cabin Htr
9. 201310-3	Recp - Side Cons Fwd Conn	41. DS04-27-2S	Rec - RH Wing
10. 201311-3	Plug - Side Cons Fwd Conn	42. DS07-27-8P	Plug - RH Wing
11. CM2676-1	Cowl Flap Position	43. 05D92	Fuel Pump - Htr
12. HS-1A-5200-1%	Res - Cowl Flap Pos Ind - LH	44. 0850451-1	Valve - Surf Deice - RH
13. HS-1A-5200-1%	Res - Cowl Flap Pos Ind - RH	45. 0513052-6	Cigar Ltr - LH Rear
14. 201298-1	Plug - Grd - RH	46. 0513052-6	Cigar Ltr - RH Rear
15. S-382-1	Sw - Cowl Flap RH	47. 0513052-11	Cigar Ltr - Pilot
16. DS04-37S	Recp - R Wing	48. OR-55-2	Resistor - Cigar Ltr
17. DS07-37P	Plug - R Wing	49. S-1232-507	Cigar Ltr Shaver Invt
18. 4194-00	Cowl Flap Motor - RH	50. GB300-NA109	Sw - Barom Press
19. XR5459	Cowl Flap XMTR - RH	51. 20-0121-1824	Post Lt - Var Press Con
20. S-1232-510	Cabin Fan - Ckt Bkr	52. 7055	Sw - Bleed Air Dump - LH
21. 112-215-101	Cabin Heat - Sw Ckt Bkr	53. 7055	Sw - Bleed Air Dump - RH
22. IN1201	Diode - Cabin Heat	54. 9910012-3	Bleed Air Dump Valve
23. OR-55-1	Res - Cab Fan - Hi - Lo	55. MS25085-1	Sw - Cab Dump Ram Air
24. S-382-1	Sw - Cab Fan	56. 2VA20	Sw - Gr Safety
25. 201298-1	Plug - Grd - LH	57. 9910009	Valve - Cabin Press Dump
26. VM911M-4	Htr Overheat Ind Lt	58. S-1232-507	Cabin Press - Ckt Bkr
27. CM2651-L1	Turn & Bank Ind RH (Opt)	59. MS3108B-10SL-4S	Plug - Cab, Press Dump Valve
28. DS04-27-25S	Rec - Nose Bhd	60. IN5061	Diode - Cowl Flap Sw LH
29. DS07-27-25P	Plug - Nose Bhd	61. IN5061	Diode - Cowl Flap Sw LH
30. D07D29	Htr Overheat Sw	62. IN5061	Diode - Cowl Flap Sw RH
31. 07D34	Combustion Air Flow Sw	63. IN5061	Diode - Cowl Flap Sw RH
32. 9910004-6	Combustion Air Blower Motor	64. IN5061	Diode - Bleed Air Dump Sw LH
		65. IN5061	Diode - Bleed Air Dump Sw RH

421A0001 TO 421B0001

CONTRACT NO.		Cessna.	
DATE 5-21-68		P. O. BOX 1977 WICHITA, KANSAS	
DRAWN T.D. WERT		CABIN PRESS, CABIN HEAT,	
CHECKED R. D. M. 6-5-68		COWL FLAP, CIGAR LIGHTERS	
STRESS		WIRING DIAGRAM	
FUEL		SIZE CODE	
OTHER DCN 17A		D 71379	
DCN 11B		5118301	
SCALE NONE		REVS	
		SHEET 17 OF 23,000	



Part Number	Nomenclature
1. S-1232-510	Ckt Bkr-Air Cond
2. 201311-3	Plug - Side Cons Lwr Conn
3. 201310-3	Recp - Side Cons Lwr Conn
4. PDLM-105	Air Cond Compass - Ckt Bkr
5. S-392-3	Sw - Air Cond Control
6. IN1201	Diode - Air Cond
7. S-382-1	Sw - Evap Fan Control
8. 3303-00-9	Valve - Condensate A/C
9. 0529801	Compressor Assy
10. AA326-215-1	Evaporator Fan
11. S-382-1	Sw - Wemac Blower
12. MS2108B-10SL-4S	Plug - Wemac Blower
13. 166A100-9	Wemac Blower
14. 9910012-2	Valve Wemac Air Shutoff
15. AN2552-3A	Recp - Aux Pwr
16. IN2482	Diode - Ext Pwr Relay
17. 0850469-1	Relay - Aux Pwr
18. S-1232-505	Cabin Lt - Ckt Bkr
19. 2390	Sw - Reading Lt RH Fwd
20. 2390	Sw - Reading Lt RH Aft
21. 2390	Reading Lt - RH Fwd
22. 2390	Reading Lt - RH Aft
23. 0713029	Sw - Dome Lt
24. 2109	Dome Lt
25. 2390	Reading Lt - LH Aft
26. 2390	Sw - Reading Lt - LH Aft
27. 2390	Reading Lt - LH Fwd
28. 2390	Sw - Reading Lt - LH Fwd
29. 201298-1	Plug - LH Grd
30. 327	Seat Belt Sign Lt
31. 52PB64-T2	Sw - Seat Belt Sign
32. 327	Oxygen Sign Lt
33. 52PB64-T2	Sw - Oxygen Sign
34. 1820	Lt - Seat Belt
35. 1820	Lt - Seat Belt
36. 1820	Lt - Oxygen Sign
37. 1820	Lt - Oxygen Sign
38. 66-01-5	Aux Cabin Blower

421A0001 TO 421B0001

CONTRACT NO.		P. O. BOX 1977 WICHITA, KANSAS	
DATE 5-31-68		Cessna.	
DRAWN T.D. WERT	CHKD J. D. WERT	OFFICIAL SYSTEM - EXT PWR, AIR CONDITIONER, RH CONTR, WHEEL, READING, OXYGEN, SEAT BELT LTS. WIRING DIAGRAM	
PROJ. 101	REV. 1	REV. 1	REV. 1
OTHER DCN/34	REV. 1	REV. 1	REV. 1
D 71379		5118 301	
REV. 1		REV. 1	

SHT 11.00	P54A16	5	P54B16
SHT 20.00	H54A20	7	H54B20
SHT 12.00	F1E18	8	F1D18
SHT 20.00	H57A20	10	H57B20
SHT 15.00	L3B16	11	L3A16
SHT 15.00	L22A20	12	L22B20
SHT 10.00	K2B20	13	K2A20
SHT 17.00	K7D20	15	K7C20
SHT 15.00	L13B18	17	L13A18
SHT 12.00	G5D20	18	G5E20
SHT 14.00	W1B20	20	W1A20
SHT 11.00	P55A20	22	P55B20
SHT 20.00	X3B16	23	X3C16
SHT 20.00	X4B16	24	X4C16
SHT 17.00	H43B20	25	H43A20
SHT 13.00	D3C16	26	D3B16
SHT 17.00	D13B20	27	D13A20
SHT 13.00	Q5B16	29	Q5A16
SHT 15.00	L4C16	30	L4B16
SHT 15.00	L1B20	32	L1A20
SHT 13.00	Q25B16	33	Q25A16
SHT 17.00	H1B20	34	H1A20
SHT 15.00	L6B20	35	L6A20
SHT 17.00	H4C20	36	H4B20
SHT 13.00	C4C16	38	C4B16
SHT 20.00	H34B20	39	H34A20
SHT 13.00	C10B16	40	C10A16
SHT 20.00	H35B20	42	H35A20
SHT 21.00	V1B20	44	V1A20
SHT 17.00	K5B20	45	K5A20
SHT 10.00	J6C20	47	J6B20
SHT 10.00	J8C20	48	J8B20
SHT 10.00	J4B20	49	J4A20
SHT 10.00	J5C20	50	J5B20
SHT 15.00	L8B16	51	L8A16
SHT 13.00	Q17B18	54	Q17A18
SHT 13.00	Q26B18	55	Q26A18
SHT 13.00	Q18B18	56	Q18A18
SHT 15.00	L7B16	57	L7A16
SHT 15.00	L35B18	59	L35A18
SHT 10.00	K1B20	60	K1A20
SHT 13.00	C5B16	62	C5A16
SHT 17.00	D12B20	64	D12A20
SHT 13.00	C6E18	65	C6D18
SHT 19.00	L25B20	66	L25A20
SHT 10.00	J3B20	70	J3A20
SHT 10.00	J7C20	71	J7B20
SHT 12.00	C1B20	72	C1A20
SHT 12.00	G1E20	73	G1D20
SHT 19.00	H9B20	74	H9A20
SHT 19.00	H13B18	75	H13A18
SHT 23.00	R1B16	76	R1A16
SHT 19.00	H8B20	77	H8A20
SHT 21.00	M1B16	78	M1A16
SHT 21.00	M2B16	79	M2A16
SHT 11.00	P15B20	80	P15A20
SHT 11.00	P16B20	82	P16A20

F. S. 132.00

SIDE CONSOLE LWR

SHT 12.00	C3A18	5	C3B18
SHT 15.00	L5A20	10	L5B20
SHT 20.00	H54B20	11	H54A20
SHT 12.00	F1A18	13	F1B18
SHT 15.00	E23A20	14	E23B20
SHT 13.00	E24A20	15	E24B20
SHT 21.00	F12A20	16	F12B20
SHT 14.00	L10A20	20	L10B20
SHT 17.00	H40B20	21	H40A20
SHT 17.00	K7A20	22	K7B20
SHT 17.00	H1A16	23	H1B16
SHT 17.00	H7B16	24	H7A16
SHT 13.00	E25A20	25	E25B20
SHT 13.00	E26A20	26	E26B20
SHT 13.00	F3A20	31	F3B20
SHT 23.00	F4A20	32	F4B20
SHT 20.00	H1A20	33	H1B20
SHT 20.00	H10A20	34	H10B20
SHT 13.00	D1A20	36	D1B20
SHT 20.00	X7A16	37	X7B16
SHT 17.00	D10B20	39	D10A20
SHT 17.00	D5B20	40	D5A20
SHT 14.00	L50A20	41	L50B20
SHT 14.00	L28L20	46	L28M20
SHT 14.00	L54A20	47	L54B20
SHT 17.00	H40C20	48	H40B20
SHT 17.00	H42B20	49	H42A20
SHT 12.00	G1B20	50	G1F20
SHT 20.00	K16C20	54	K16B20
SHT 12.00	G4A16	56	G4B16
SHT 12.00	G5B20	58	G5A20
SHT 20.00	H30B20	59	H30A20
SHT 17.00	K8A20	60	K8B20
SHT 22.00	P61B14	63	P61A14
SHT 11.00	P49B14	65	P49C14
SHT 21.00	C9A22	66	C9B22
SHT 11.00	P49D14	67	P49E14
SHT 21.00	Q14A20	70	Q14B20
SHT 21.00	Q13A20	71	Q13B20
SHT 11.00	P23A14	72	P23B14
SHT 11.00	P24A14	73	P24B14
SHT 22.00	P60B14	75	P60A14
SHT 20.00	H20A14	82	H20B14

F. S. 120.00

SIDE CONSOLE FWD

SHT 13.00	F1A20	1	F1B20
SHT 13.00	E3A20	2	E3B20
SHT 13.00	C5A20	3	C5B20
SHT 13.00	E7A20	4	E7B20
SHT 13.00	E5B20	5	E5A20
SHT 13.00	E1B20	6	E1A20
SHT 13.00	E13B20	7	E13A20
SHT 13.00	E15B20	8	E15A20
SHT 13.00	E18B20	9	E18A20
SHT 12.00	G9B20	10	G9C20
SHT 12.00	G7B20	11	G7C20
SHT 12.00	G5B20	12	G5C20
SHT 12.00	C1C20	13	C1B20
SHT 12.00	C10B20	14	C11A20 - 12.00 IN CAP STOW
SHT 12.00	G6B20	15	G6C20
SHT 12.00	G2B20	16	G2A20
SHT 12.00	L1F20	17	L1E20
SHT 21.00	Q15B20	18	Q15A20
SHT 21.00	Q11B20	19	Q11A20
SHT 15.00	L22B20	20	L22C20
SHT 15.00	J7C20	21	J7B20
SHT 10.00	J5B20	22	J5C20
SHT 10.00	L3C20	24	L3B20
SHT 17.00	K9B20	25	K9A20
SHT 17.00	K10B20	26	K10A20
SHT 17.00	K7B20	27	K7B20
SHT 17.00	D13B20	28	D13B20
SHT 20.00	H13C20	29	H13B20
SHT 20.00	K22C20	30	K22C20
SHT 20.00	K23B20	31	K23A20
SHT 11.00	P15A20	35	P15B20
SHT 17.00	H39A20	36	H39A20
SHT 17.00	H43B20	38	H43D20
SHT 17.00	C15B20 - 12.00 IN CAP STOW	37	C15A20

LN WING FUSELAGE

SHT 12.00	H48B18	1	H48A18
SHT 15.00	L13C18	5	L13B18
SHT 20.00	H23B14	6	H23A14
SHT 20.00	H25B14	7	H25A14
SHT 20.00	L3A16	8	X3B16
SHT 15.00	L7C18	9	L7B18
SHT 15.00	L39C18	10	L39B18
SHT 13.00	Q25C18	11	Q25B18
SHT 13.00	Q9A18	12	Q9F18
SHT 13.00	Q6F18	13	Q6E18
SHT 13.00	Q17F18	14	Q17E18

F. S. 150.00

LN WING DISCONNECT PLUGS

SHT 13.00	F2B20	1	E2A20
SHT 13.00	E4B20	2	E4A20
SHT 13.00	E6B20	3	E6A20
SHT 13.00	E8A20	4	E8B20
SHT 13.00	E10A20	5	E10B20
SHT 13.00	E12A20	6	E12B20
SHT 13.00	E14A20	7	E14B20
SHT 13.00	E16A20	8	E16B20
SHT 13.00	E20A20	9	E20B20
SHT 12.00	G10A20	10	G9C20
SHT 12.00	G12A20	11	G12B20
SHT 20.00	K22A20	13	K22B20
SHT 20.00	K21A20	14	K21B20
SHT 12.00	G6B20	15	G6F20
SHT 12.00	G20B20	16	G20A20
SHT 15.00	L1J20	17	L1H20
SHT 21.00	Q16A20	18	Q16B20
SHT 21.00	Q12A20	19	Q12B20
SHT 15.00	L22E20	20	L22F20
SHT 10.00	J6C20	21	J6D20
SHT 10.00	J4C20	24	J4D20
SHT 17.00	K11A20	25	K11B20
SHT 17.00	K12A20	26	K12B20
SHT 17.00	K10B20	27	K10E20
SHT 17.00	D12B20	28	D12C20
SHT 20.00	H43C20	29	H43B20
SHT 20.00	K15A20	30	K15B20
SHT 20.00	K18A20	31	K18B20
SHT 20.00	P16B20	32	P16A20
SHT 20.00	K20A20	34	K20B20
SHT 17.00	H38A20	36	H38A20

FUSELAGE RH WING

SHT 17.00	H5B16	1	H5C16
SHT 15.00	H9B18	4	H9C18
SHT 15.00	L16B16	5	L16C16
SHT 20.00	H24A14	6	H24B14
SHT 20.00	H26A14	7	H26B14
SHT 20.00	X4B16	8	X4A16
SHT 15.00	L8B18	9	L8C18
SHT 15.00	L40B18	10	L40C18
SHT 13.00	H26B18	11	H26C18
SHT 13.00	Q10B18	12	Q10E18
SHT 13.00	Q6E18	13	Q6F18
SHT 13.00	Q18E18	14	Q18F18

F. S. 150.00

RH WING DISCONNECT PLUGS

SHT 13.00	D3A20N	A	E29A20N	SHT 13.00
SHT 13.00	F5A20N	B	E27A20N	SHT 13.00
SHT 12.00	G3A20N	C	E28A20N	SHT 13.00
SHT 20.00	H33A22N	D	E30A20N	SHT 13.00
SHT 19.00	L48A20N	E	F1A20N	SHT 17.00
SHT 15.00	W3A20N	F	F12A20N	SHT 17.00
SHT 12.00	G8A20N	G	F14A20N	SHT 17.00
SHT 16.00	WHITE	H	WHITE	SHT 17.00
SHT 22.00	P53A20N	K	WHITE	SHT 17.00
SHT 14.00	L34A20N	L	WHITE	SHT 17.00
SHT 17.00	H3A20N	M	WHITE	SHT 17.00
SHT 21.00	WHITE	N	WHITE	SHT 17.00
SHT 21.00	WHITE	P	WHITE	SHT 17.00
SHT 21.00	WHITE	R	WHITE	SHT 17.00

F. S. 100.00

H1B16	1	H1C16	SHT 17.00
F1B20	2	F1C20	SHT 12.00
G6D20	3	G6E20	SHT 12.00
G17B20	4	G17A20	SHT 12.00
L5B20	5	L5C20	SHT 15.00
H7C16	6	H7D16	SHT 17.00
H5B16	7	H5A16	SHT 17.00
H2A20	8	H2B20	SHT 17.00
H2A20	9	H2B20	SHT 17.00
H2A20	10	H2B20	SHT 17.00
H2A20	11	H2B20	SHT 17.00
H2A20	12	H2B20	SHT 17.00
H2A20	13	H2B20	SHT 17.00
H2A20	14	H2B20	SHT 17.00
H2A20	15	H2B20	SHT 17.00
H2A20	16	H2B20	SHT 17.00
H2A20	17	H2B20	SHT 17.00
H2A20	18	H2B20	SHT 17.00

CABIN NOSE

SHT 13.00	D3A20N	A	E29A20N	SHT 13.00
SHT 13.00	F5A20N	B	E27A20N	SHT 13.00
SHT 12.00	G3A20N	C	E28A20N	SHT 13.00
SHT 20.00	H33A22N	D	E30A20N	SHT 13.00
SHT 19.00	L48A20N	E	F1A20N	SHT 17.00
SHT 15.00	W3A20N	F	F12A20N	SHT 17.00
SHT 12.00	G8A20N	G	F14A20N	SHT 17.00
SHT 16.00	WHITE	H	WHITE	SHT 17.00
SHT 22.00	P53A20N	K	WHITE	SHT 17.00
SHT 14.00	L34A20N	L	WHITE	SHT 17.00
SHT 17.00	H3A20N	M	WHITE	SHT 17.00
SHT 21.00	WHITE	N	WHITE	SHT 17.00
SHT 21.00	WHITE	P	WHITE	SHT 17.00
SHT 21.00	WHITE	R	WHITE	SHT 17.00

F. S. 118.00

GRD PLUG, LH

GYRO PWR	→ CB21	→ RP1A16	A
AUTOPILOT	→ CB25	→ RP2A16	B
NAV 2	→ CB26	→ RP3A16	C
NAV 1	→ CB27	→ RP4A16	D
COMM 2	→ CB29	→ RP5A16	E
COMM 1	→ CB30	→ RP6A16	F
ADF 2	→ CB32	→ RP7A16	G
ADF 1	→ CB33	→ RP8A16	H
XPDR	→ CB35	→ RP9A16	I
MKR BGN	→ CB36	→ RP10A16	J
WX RDR	→ CB41	→ RP11A16	K
AUDIO AMP	→ CB51	→ RP12A16	L
COMM 3	→ CB28	→ RP13A16	M
GYRO PWR	→ CB22	→ RP14A16	N
DME	→ CB34	→ RP15A16	O

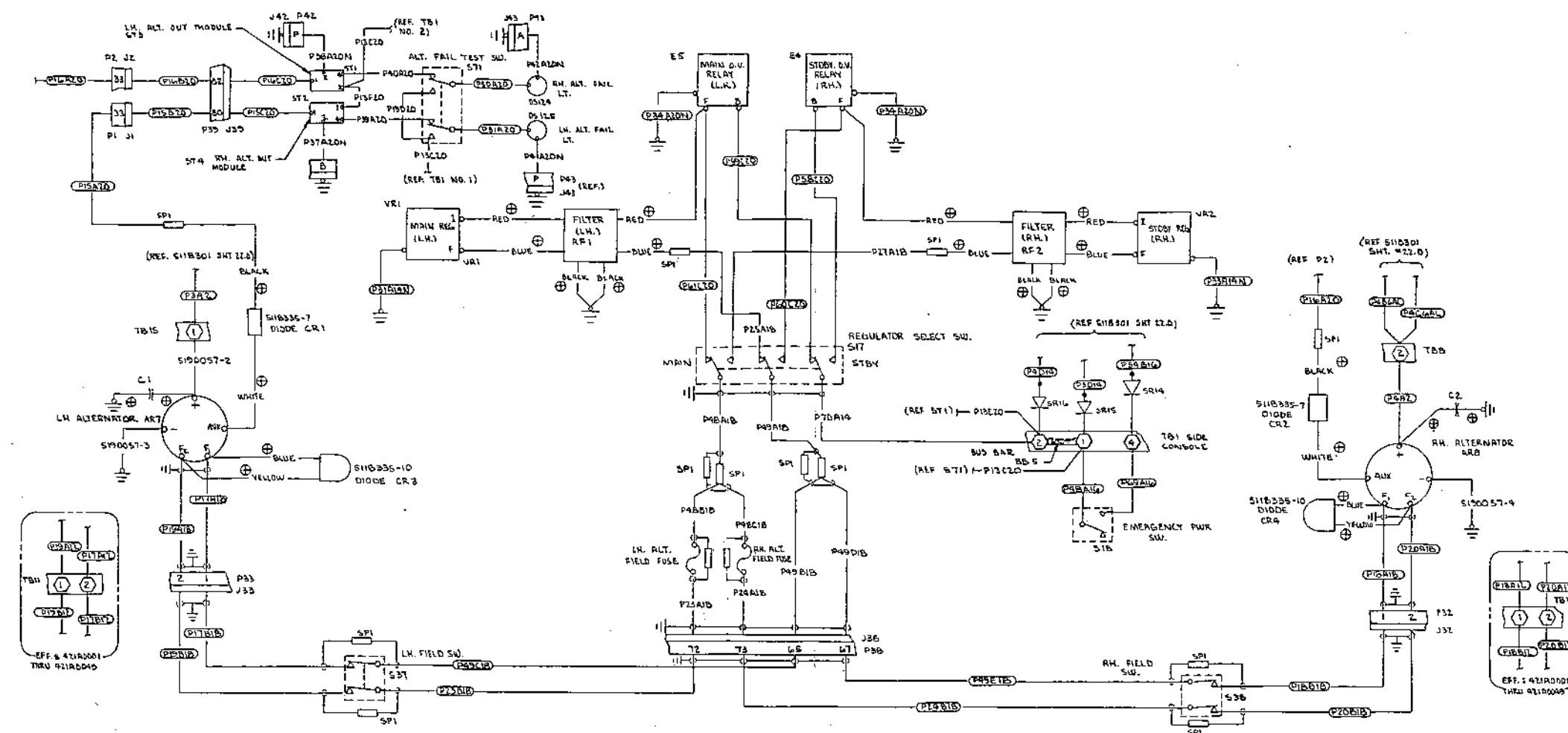
F. S. 118.00

GRD PLUG, RH

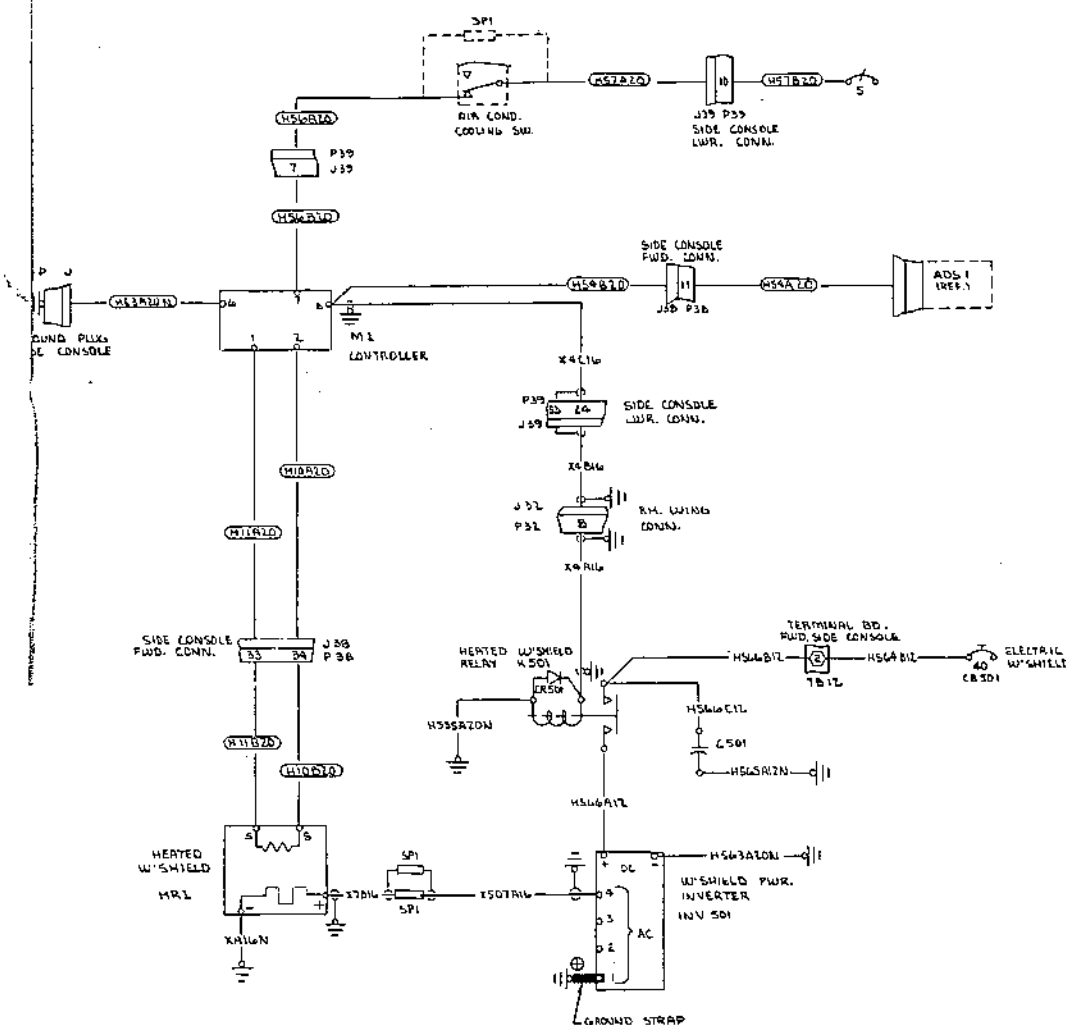
C/LN PLUG SIDE CONSOLE

F. S. 120.00

		J43	P43	
SHEET 11	P42A42N			A
SHEET 11	P37A20N			B
				C
				D
SHEET 20	H55A20N			E
SHEET 20	X9A16N			F
SHEET 13	Q7A18N			G
				H
				I
SHEET 10	J9B20N			J
SHEET 13	Q8A18N			K
				L
				M
SHEET 20	H53A20N			N
SHEET 11	P41A20N			O
SHEET 11	P33A14N			P

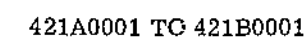
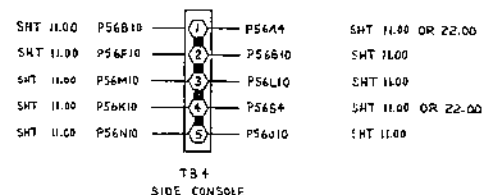
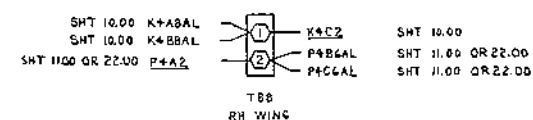
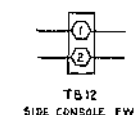
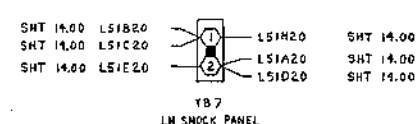
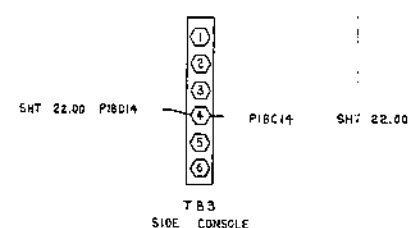
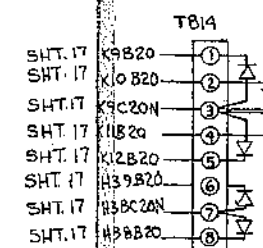
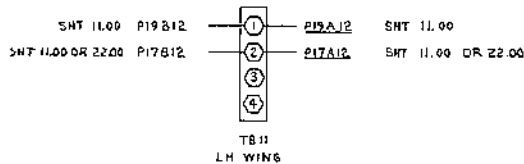
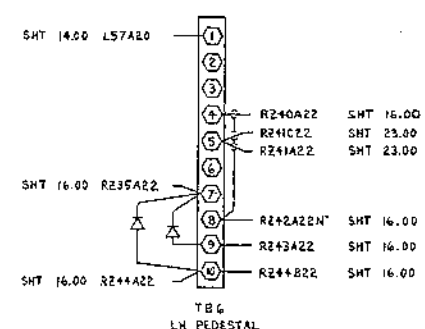
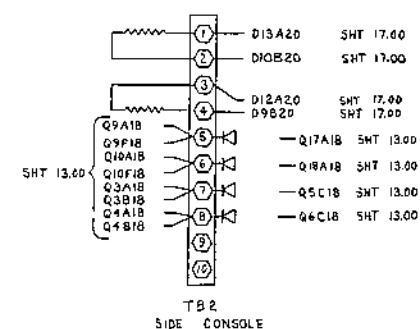
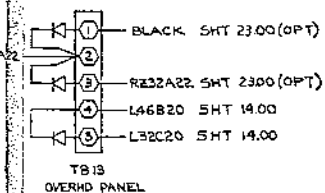
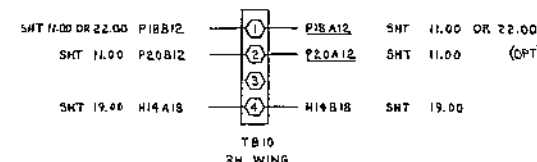
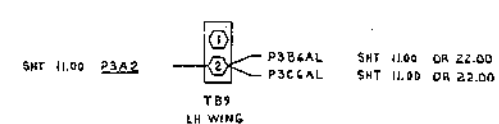
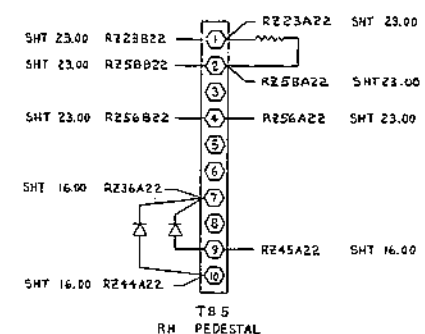
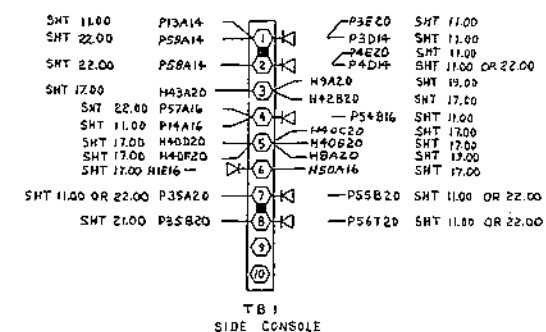


EQUIPMENT INSTALLATION LIST		
SYMBOL	PART NO.	PART NAME
ALT (A0)	CA003	ALTERNATOR
BBS	MS 1000-02	BUS BAR
C1 & C2	511034-1	FILTER ASSY.
CR1 & CR2	511035-1	CIRCUIT BREAKER (MUR.)
CR3 & CR4	511036-1	DIODE
CR5 & CR6	511037-1	DIODE
CR7 & CR8	511038-1	DIODE
CR9 & CR10	511039-1	DIODE
CR11 & CR12	511040-1	DIODE
CR13 & CR14	511041-1	DIODE
CR15 & CR16	511042-1	DIODE
CR17 & CR18	511043-1	DIODE
CR19 & CR20	511044-1	DIODE
CR21 & CR22	511045-1	DIODE
CR23 & CR24	511046-1	DIODE
CR25 & CR26	511047-1	DIODE
CR27 & CR28	511048-1	DIODE
CR29 & CR30	511049-1	DIODE
CR31 & CR32	511050-1	DIODE
CR33 & CR34	511051-1	DIODE
CR35 & CR36	511052-1	DIODE
CR37 & CR38	511053-1	DIODE
CR39 & CR40	511054-1	DIODE
CR41 & CR42	511055-1	DIODE
CR43 & CR44	511056-1	DIODE
CR45 & CR46	511057-1	DIODE
CR47 & CR48	511058-1	DIODE
CR49 & CR50	511059-1	DIODE
CR51 & CR52	511060-1	DIODE
CR53 & CR54	511061-1	DIODE
CR55 & CR56	511062-1	DIODE
CR57 & CR58	511063-1	DIODE
CR59 & CR60	511064-1	DIODE
CR61 & CR62	511065-1	DIODE
CR63 & CR64	511066-1	DIODE
CR65 & CR66	511067-1	DIODE
CR67 & CR68	511068-1	DIODE
CR69 & CR70	511069-1	DIODE
CR71 & CR72	511070-1	DIODE
CR73 & CR74	511071-1	DIODE
CR75 & CR76	511072-1	DIODE
CR77 & CR78	511073-1	DIODE
CR79 & CR80	511074-1	DIODE
CR81 & CR82	511075-1	DIODE
CR83 & CR84	511076-1	DIODE
CR85 & CR86	511077-1	DIODE
CR87 & CR88	511078-1	DIODE
CR89 & CR90	511079-1	DIODE
CR91 & CR92	511080-1	DIODE
CR93 & CR94	511081-1	DIODE
CR95 & CR96	511082-1	DIODE
CR97 & CR98	511083-1	DIODE
CR99 & CR100	511084-1	DIODE

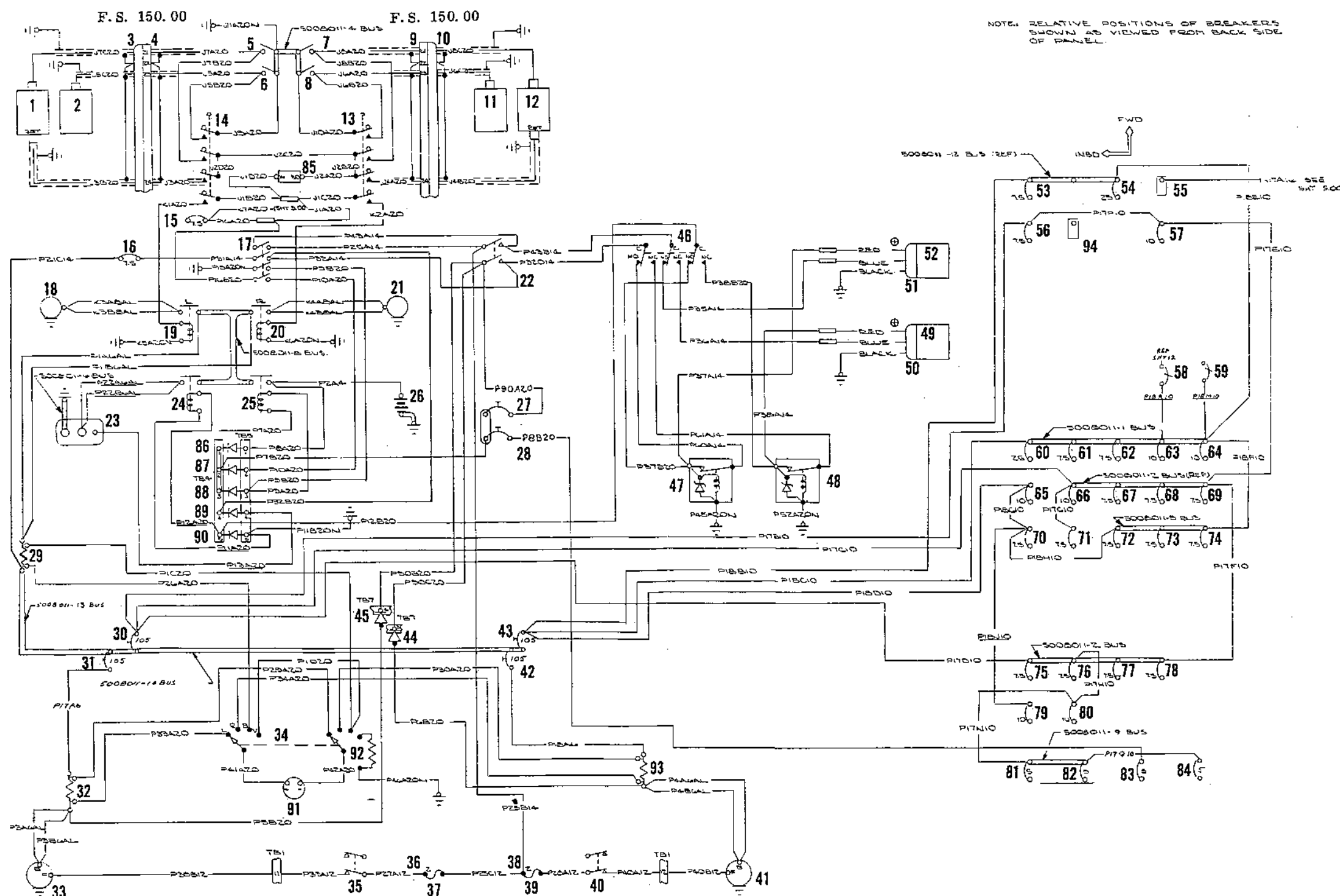


EQUIPMENT LIST (REF. ONLY)		
SYMBOL	PART NO.	PART NAME
CR501	511055-1	DIODE
CR502	511056-1	DIODE
CR503	511057-1	DIODE
CR504	511058-1	DIODE
CR505	511059-1	DIODE
CR506	511060-1	DIODE
CR507	511061-1	DIODE
CR508	511062-1	DIODE
CR509	511063-1	DIODE
CR510	511064-1	DIODE
CR511	511065-1	DIODE
CR512	511066-1	DIODE
CR513	511067-1	DIODE
CR514	511068-1	DIODE
CR515	511069-1	DIODE
CR516	511070-1	DIODE
CR517	511071-1	DIODE
CR518	511072-1	DIODE
CR519	511073-1	DIODE
CR520	511074-1	DIODE
CR521	511075-1	DIODE
CR522	511076-1	DIODE
CR523	511077-1	DIODE
CR524	511078-1	DIODE
CR525	511079-1	DIODE
CR526	511080-1	DIODE
CR527	511081-1	DIODE
CR528	511082-1	DIODE
CR529	511083-1	DIODE
CR530	511084-1	DIODE

Cessna		P.O. BOX 1077 MILWAUKEE, WISCONSIN 53201	
TITLE: ALTERNATOR CONVERSION KIT-421A (WESTINGHOUSE TO PRESTOLITE)			
SIZE: D	DATE: 7/13/79	DRAWING NO.: 5190087	
SCALE: NONE	REV:	SHEET 1 OF 2	



CONTRACT NO.		P. O. BOX 1977 WALLACE/FROST/PLANT WICHITA, KANSAS	
DATE	5-22-68	TERMINAL BOARDS	
DESIGN	M. WILKIN		TITLE
GROUP	Ad. Marketing 65-1-2		
CHECK	Ad. Marketing 65-2		
THROW	Ad. Marketing 65-2		
ENCL.	Ad. Bismark		
OTHER	DCN 118	SIZE	DRAWING NO.
		CODE IDENT. NO.	5118301
		NAME	REV B
		DATE	SHEET 9.00 OF 23.00



Part Number

Nomenclature

Part Number

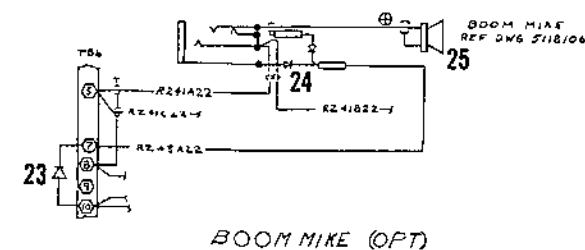
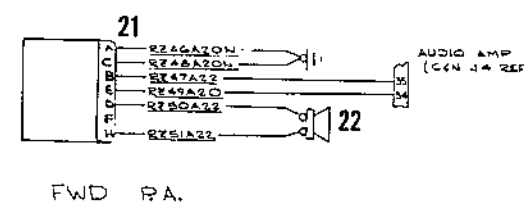
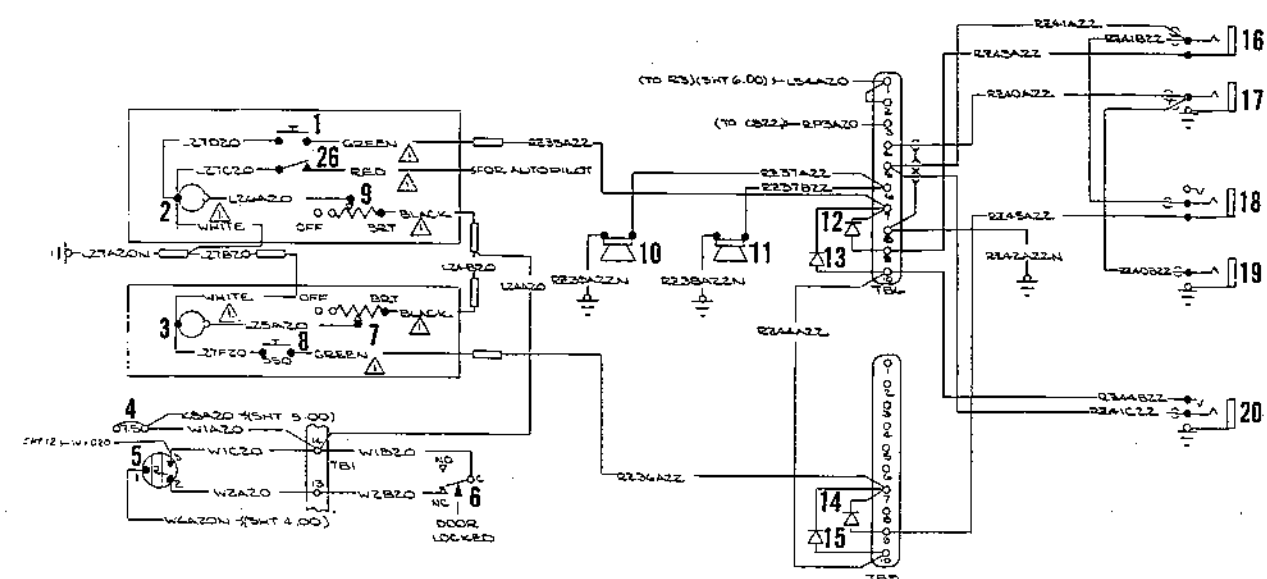
Nomenclature

1.	S6LN-1201	L Mag - L Eng	53.	112-507-101	Sw Bkr - Nav Lt
2.	S6LN-1205	R Mag - L Eng	54.	112-215-101	Sw Bkr - Cabin Heat
3.	DS07-37P	Plug	55.	S-282-1	Sw - Cabin Fan
4.	DS04-37S	Recp - L Wing	56.	112-507-101	Sw Bkr - Anti-Coll Bcn
5.	S-382-2	Sw - Magneto	57.	112-210-101	Sw Bkr - Pitot Heat
6.	S-282-2	Sw - Magneto	58.	112-205-101	Sw Bkr - Wshld Anti-Ice
7.	S-382-2	Sw - Magneto	59.	112-220-101	Sw Bkr - Prop Anti-Ice
8.	S-382-2	Sw - Magneto	60.	S-1232-25	Ckt Bkr - Ldg Gr
9.	DS04-37S	Recp - R Wing	61.	S-1232-7	Ckt Bkr - Gr & Stall Warn
10.	DS07-37P	Plug	62.	S-1232-7	Ckt Bkr - Flap Pos
11.	S6LN-1205	R Mag - R Eng	63.	S-1232-10	Ckt Bkr - Flap Dwn
12.	S6LN-1201	L Mag - R Eng	64.	S-1232-10	Ckt Bkr - Flap Up
13.	4PB12-T2	Sw - R Start	65.	S-1232-10	Ckt Bkr - R Fuel Pump
14.	4PB12-T2	Sw - L Start	66.	S-1232-10	Ckt Bkr - L Fuel Pump
15.	S-1232-7	Ckt Bkr - Start	67.	S-1232-7	Ckt Bkr - Start
16.	S-1232-7	Ckt Bkr - Start	68.	S-1232-7	Ckt Bkr - T & B No. 2
17.	MS24525-22	Sw - Battery	69.	S-1232-7	Ckt Bkr - Inst Lts
18.	627841	Starter	70.	S-1232-7	Ckt Bkr - R Eng Gage
19.	0850469-1	Relay - Starter	71.	S-1232-7	Ckt Bkr - L Eng Gage
20.	0850469-1	Relay - Starter	72.	S-1232-7	Ckt Bkr - Door Warn
21.	627841	Motor - Combustion	73.	S-1232-7	Ckt Bkr - Wing Tank Aux Pump
22.	S-292-3	Sw - Emergency	74.	S-1232-7	Ckt Bkr - Inst Lts
23.	AN2552-3A	Recp - Aux Power	75.	S-1232-7	Ckt Bkr - Cigar Lts
24.	0850469-1	Relay - Aux Power	76.	S-1232-7	Ckt Bkr - Shaver Intv
25.	0850469-1	Relay - Battery	77.	S-1232-7	Ckt Bkr - Fuel Qty Aux
26.	12-CS-24	Battery	78.	S-1232-7	Ckt Bkr - Fuel Qty Tip
27.	PDM-5	Ckt Bkr - Cab Lts	79.	S-1232-10	Ckt Bkr - Ldg Lt R
28.	PDM-5	Ckt Bkr - Alt Emer Pwr	80.	S-1232-10	Ckt Bkr - Ldg Lt L
29.	22370-125	Shunt - VAM	81.	S-1232-5	Ckt Bkr - Cab Press
30.	PDLN-105	Ckt Bkr - L Bus	82.	S-1232-10	Ckt Bkr - Cab Fan
31.	PDLN-105	Ckt Bkr - L Alt	83.	S-1232-5	Ckt Bkr - Cab Lts
32.	22370-125	Shunt - LH Alternator	84.	S-1232-5	Ckt Bkr - Gr Control
33.	632590	Alternator - L	85.	10-176487-242	Starting Vibrator
34.	PA-2003	Sw - Voltammeter	86.	IN1201	Diode - Bat Relay Sw
35.	MS24524-22	Sw - L Alt Field	87.	IN2482	Diode - Emer Pwr Sw
36.	313002	Fuse	88.	IN2482	Diode - Bat Relay
37.	341001	Fuse Holder	89.	IN1201	Diode - Ext Pwr Recp
38.	313002	Fuse	90.	IN2482	Diode - Aux Pwr Relay
39.	341001	Fuse Holder	91.	0813601-6	Cyl Temp Bulb - Lt
40.	MS24524-22	Sw - R Alt Field	92.	HS-1A-1%-7200	Resistor - Voltammeter
41.	632590	Alternator - R			Sw
42.	PDLN-105	Ckt Bkr - R Bus	93.	22370-12S	Shunt - RH Alternator
43.	PDLN-105	Ckt Bkr - L Alt	94.	3D1748	Timer - Surface Deice
44.	BZ-3YT	Sw - Gr Up Limit			
45.	0813535-3	Sw - Gr Control			
46.	23AT2	Sw - Regulator Sel			
47.	9MC7-3-28	Overvoltage Protect (Main)			
48.	9MC7-3-28	Overvoltage Protect (Spare)			
49.	631656	Voltage Regulator (Spare)			
50.	2985054	Plug			
51.	2985054	Plug			
52.	631656	Voltage Regulator (Main)			

421-0001 TO 421A0001

NAME	DATE	REVISION	DATE
DRYAN, D. GUNDEY	12-17-68	1	12-17-68
CHECK	12-17-68	1	12-17-68
INSTR	12-17-68	1	12-17-68
PROJ	12-17-68	1	12-17-68
Cessna AIRCRAFT WALLACE PROSPECT PLANT WICHITA, KANSAS STARTER, IGNITION, ALTERNATOR & POWER DISTRIBUTION 71379 D 51080000 REV C			

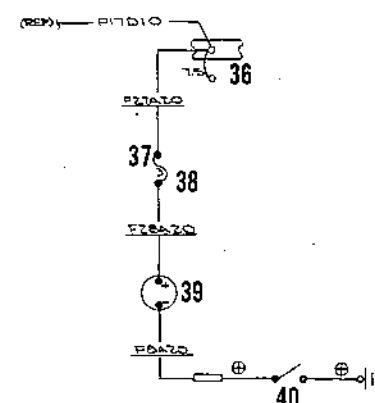
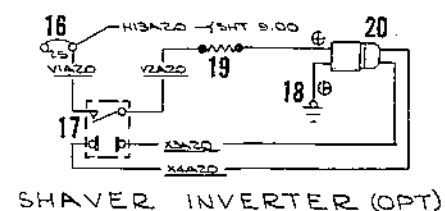
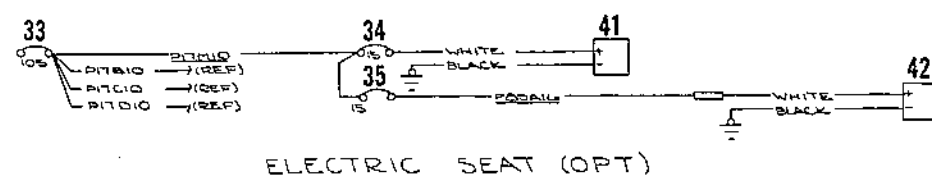
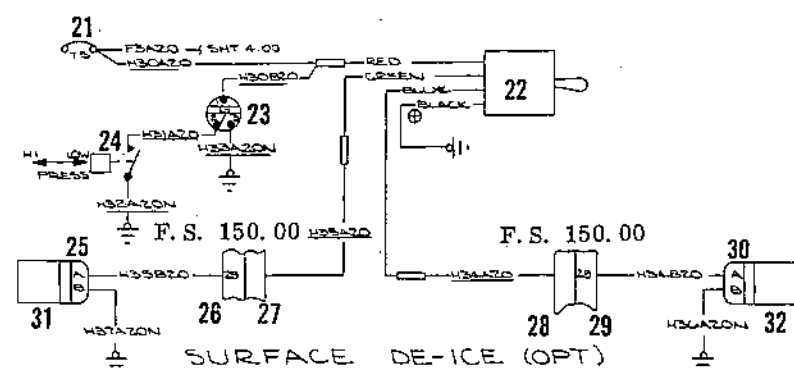
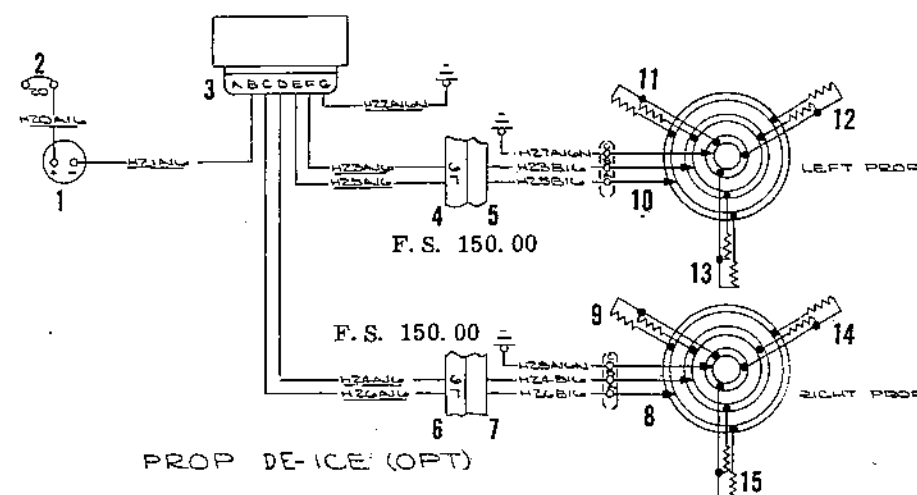
NOTE:
WIRES MARKED Δ ARE CONTAINED IN A 4-WIRE
COILED CORD BETWEEN CONTROL WHEEL AND
INSTRUMENT PANEL



Part Number	Nomenclature
1. 913	Sw - Mike LH
2. 2109	Map Lt - LH
3. 2109	Map Lt - RH
4. S-1232-7	Ckt Brk - Door Warn
5. VM911M-2	Door Warn Ind
6. MS25253-1	Sw - Door Warn
7. E50-R-1-352A	Rheostat - R Cont Wheel
8. 913	Sw - Mike - RH
9. E50-R-1-352A	Rheostat - L Cont Wheel
10. ID1756	Speaker - LH
11. ID1756	Speaker - RH
12. IN2482	Diode - Pilots Mike Jack
13. IN2482	Diode - Hand Mike Jack
14. IN2482	Diode - Copilots Mike Jack
15. IN2482	Diode
16. S-1103-1	Mike Jack - Pilots
17. S-1103-1	Hd Set Jack
18. S-1102-1	Mike Jack - Copilots
19. S-1103-1	Hd Set Jack
20. S-1102-1	Hand Mike Jack
21. 126-222	Plug
22. F8WP	Speaker
23. IN2482	Diode
24. IN2482	Diode - Boom Mike Jack
25. S-13B	Boom Mike Jack
26. T20057	Sw - Autopilot

421-0001 TO 421A0001

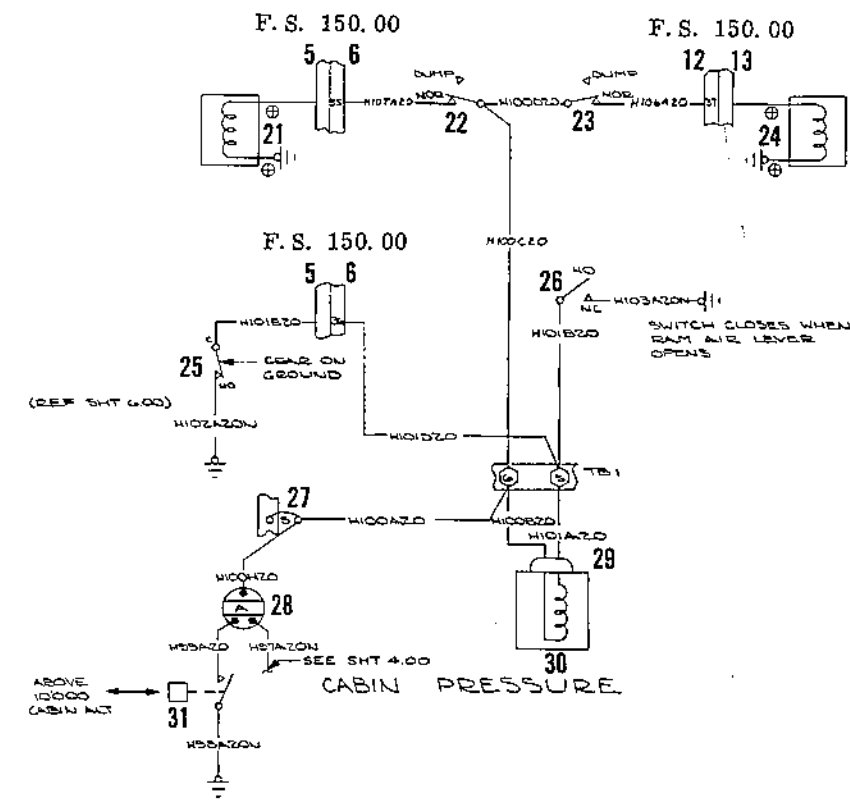
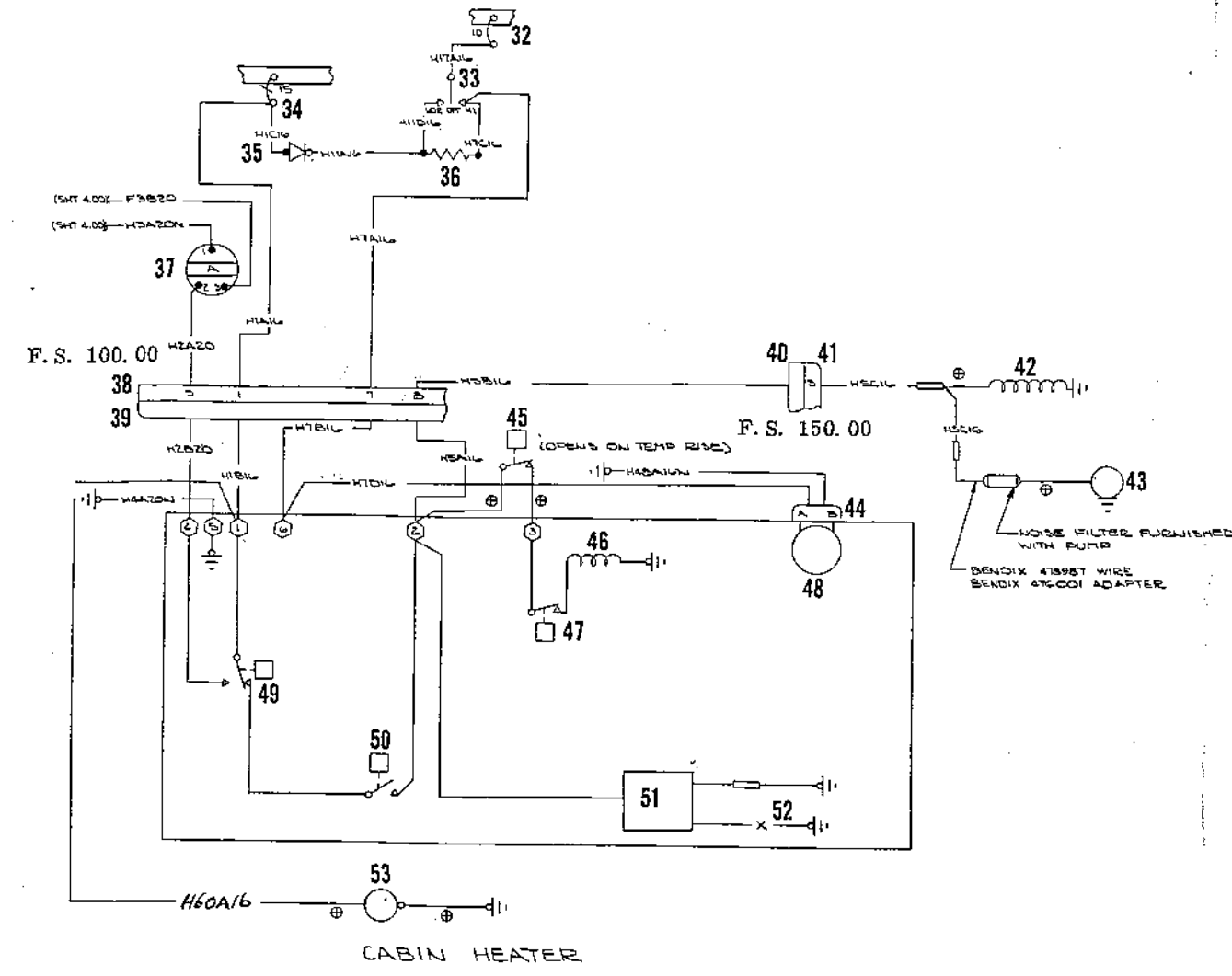
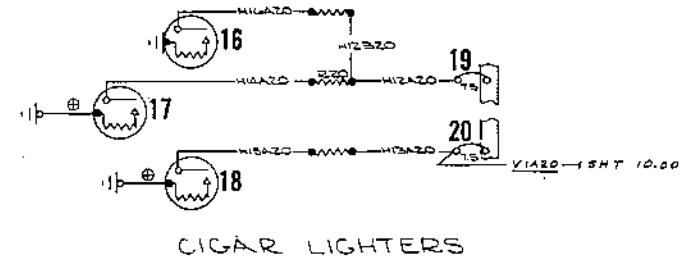
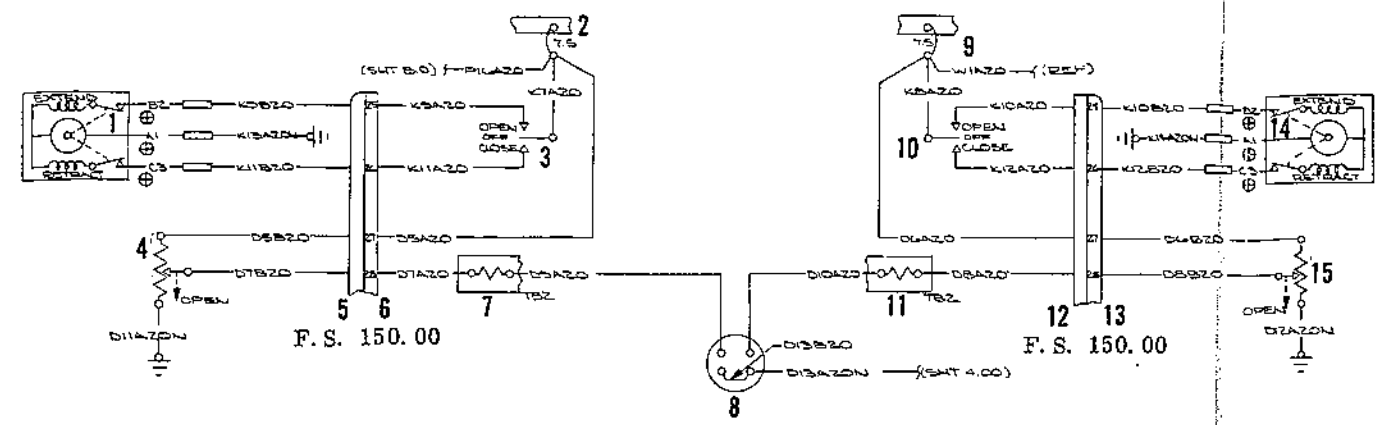
NAME	DATE	FIG. NO.	REV. NO.
DESIGNED BY	2-10-68	71379	1
CHECKED BY	2-10-68	71379	1
APPROVED BY	2-10-68	71379	1
REVISIONS	2-10-68	71379	1
Cessna		AIRCRAFT WALLACE PROSPECT PLANT WICHITA, KANSAS	
TITLE		AUDIO & DOOR WARNING	
CODE		71379	
SIZE		D 51000000	
SCALE		1:1	
SHEET		100 OF 1200	



Part Number	Nomenclature
1. CM2906-1	Ammeter - Prop Anti-Ice
2. 112-220-101	Sw Bkr - Prop Anti-Ice
3. MS3108B-20-15S	Plug
4. DS04-27-2S	Recp - R Wing
5. DS07-27-8P	Plug
6. DS04-27-2S	Recp - L Wing
7. DS07-27-8P	Plug
8. 4E1387 & 4E1489	Brush & Slip Ring Assy - R Prop
9. 4E1188-3	Prop Boot - L
10. 4E1387 & 4E1489	Brush & Slip Ring Assy - L Prop
11. 4E1188-3	Prop Boot - L
12. 4E1188-3	Prop Boot - L
13. 4E1188-3	Prop Boot - R
14. 4E1188-3	Prop Boot - R
15. 4E1188-3	Prop Boot - R
16. S-1232-7	Ckt Bkr - Shaver Invt
17. 7777K1	Recp - 100 V AC
18. 12SP2	Inverter - Shaver
19. OR-40-5	Resistor - Shaver Invt
20. 865	Plug
21. S-1232-7	Ckt Bkr - Turn & Bank No. 1
22. 3D1748	Timer - Surface Deice
23. VM911M-3	Surface Deice Ind
24. ID1194	Sw - Deice Press
25. MS3108E-12S-3S	Plug
26. DS07-37P	Plug
27. DS04-37S	Recp - L Wing
28. DS04-37S	Recp - R Wing
29. DS07-37P	Plug
30. MS3108E-12S-3S	Plug
31. 3D1542-02	Valve - LH
32. 3D1542-02	Valve - RH
33. PDLM-105	Ckt Bkr - L Bus
34. S-1232-15	Ckt Bkr - LH Seat
35. S-1232-15	Ckt Bkr - RH Seat
36. S-1232-7	Ckt Bkr - Cigar Ltr
37. AGC (3.0 Amp)	Fuse
38. HHJ-A	Fuse Holder
39. CM2683-L1	Recorder - Flt Hr
40. S-1498-2	Sw - Flt Hr
41. 5119231-21	LH Seat
42. 5119231-22	RH Seat

421-0001 TO 421A0001

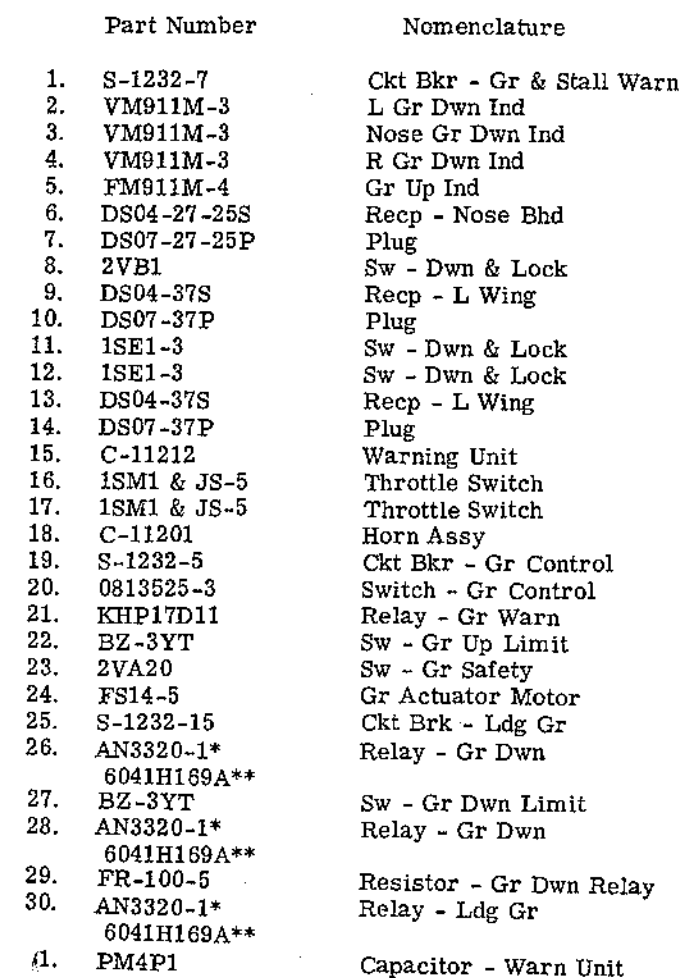
NAME		DATE	P. O. BOX 1977 Cessna AIRCRAFT WALLACE PROSPECT PLANT WICHITA, KANSAS	
DESIGNED BY	7-22-66	7-22-66	PROP DE-ICE, SURFACE DE-ICE, FLT HOUR REC., SHAVER INV., ELECTRIC SEAT	
CHECKED BY	7-22-66	7-22-66		
STAMPED BY	7-22-66	7-22-66		
PROJ. NO.	7-22-66	7-22-66		
71379		51080000	REV B	



Part Number	Nomenclature	Part Number	Nomenclature
1. 4194-00	Cowl Flap Motor - LH	28. VM911M-4	Cabin Altitude Lt
2. S-1232-7	Ckt Bkr - Start	29. MS2108B-10SL-4S	Plug
3. S-382-1	Sw - L Cowl Flap	30. 991005-2	Valve - Cabin Dump
4. XR5459	Cowl Flap XMTR - LH	31. GB300-NA109	Sw - Baro Press
5. DS07-37P	Plug	32. S-1232-10	Ckt Bkr - Cab Fan
6. DS04-37S	Recp - L Wing	33. S-382-1	Sw - Cabin Fan
7. HSIA-5200-1%	Resistor - Pos Ind L	34. 112-215-101	Sw Bkr - Cabin Heat
8. MS28034-3	Oil Temp Bulb - RH	35. IN1186	Diode
9. S-1232-7	Ckt Bkr - Door Warn	36. OR-55-1	Resistor - Cab Fan
10. S-382-1	Sw - R Cowl Flap	37. VM911M-4	Htr Overheat Ind
11. HSIA-5200-1%	Resistor - Pos Ind R	38. DS04-27-25S	Recp - Nose Bhd
12. DS04-37S	Recp - R Wing	39. DS07-27-25P	Plug
13. DS07-37P	Plug	40. DS04-27-2S	Recp - L Wing
14. 4194-00	Cowl Flap Motor - LH	41. DS07-27-8P	Plug
15. XR5459	Cowl Flap XMTR - RH	42. 0850451-1	Valve - Htr Fuel Safety
16. 0513052-11	Cigar Lighter - Pilot	43. 05D92	Fuel Pump
17. 0513052-6	Cigar Lighter - RH	44. MS3108B-10SL-4S	Plug
18. 0513052-6	Cigar Lighter - LH	45. 9910004-5	Cabin Air Thermo
19. S-1232-7	Ckt Bkr - Cigar Ltr	46. A13D61	Fuel Valve
20. S-1232-7	Ckt Bkr - Shaver Invtr	47. B07D32	Cycling Sw
21. 991009	Valve - Bleed Air Dump - LH	48. 9910004-2	Vent Air Blower
22. 7055	Sw - Bleed Air Dump - LH	49. D07D29	Htr Overheat Sw
23. 7055	Sw - Bleed Air Dump - RH	50. 07D34	Combustion Air Flow Sw
24. 991003	Valve - Bleed Air Dump - RH	51. B07D97	Ignition Unit
25. 2VA20	Sw - Gr Safety - LH	52. 10D22	Spark Plug
26. MS25085-1	Sw - Cabin Dump Ram Air	53. 991004-6	Combustion Air Blower Motor
27. S-1232-7	Ckt Bkr - Cab Press		

421-0001 TO 421A0001

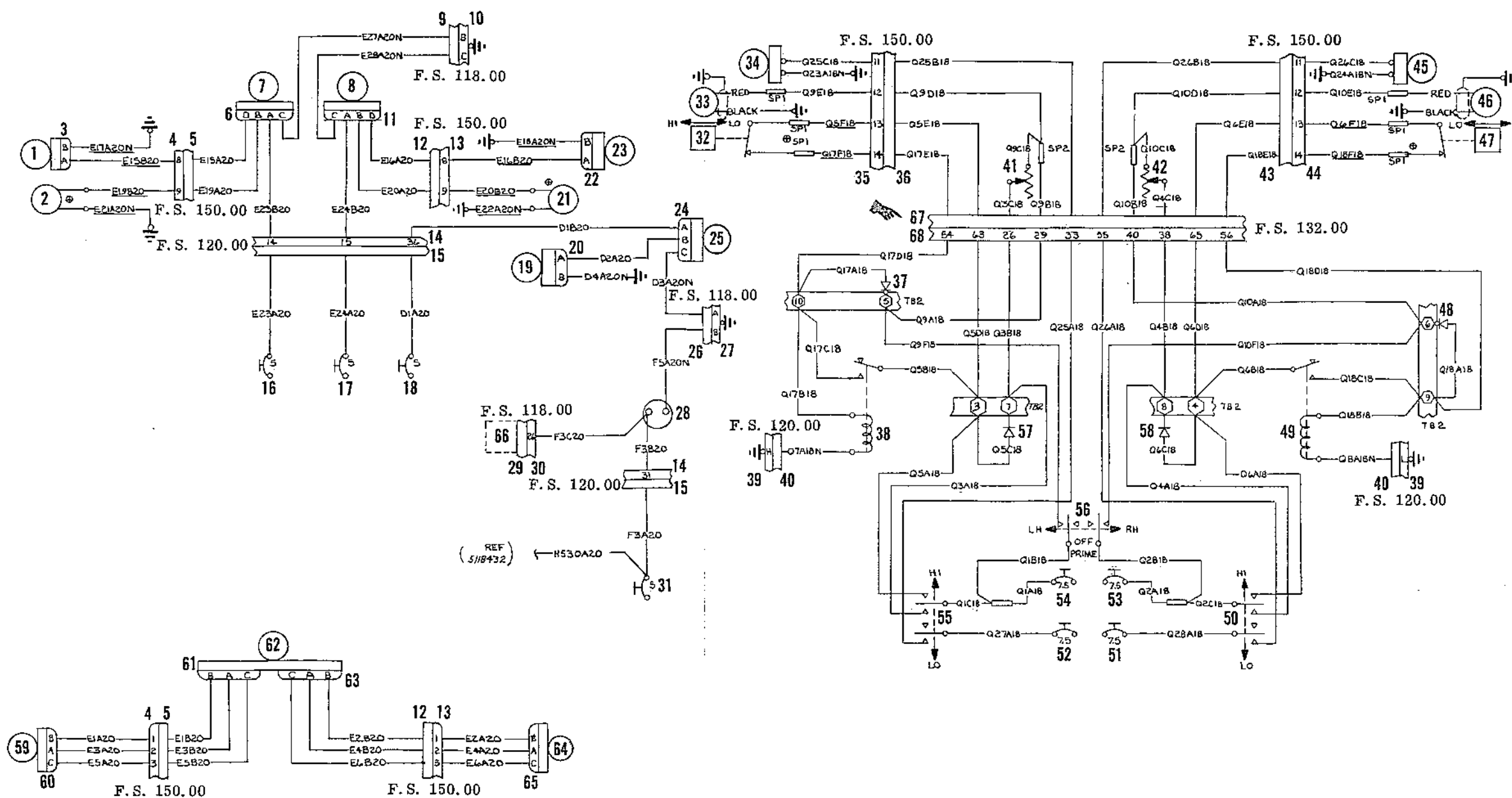
NAME	DATE	REV	71379
DESIGN	BY	DATE	5108000
CHECK	BY	DATE	
APPROV	BY	DATE	
CABIN PRESS, CABIN HEAT, COWL FLAP ACTUATOR, CIGAR LIGHTERS			
REV B			



*421-0001 TO 421-0180
**421-0180 TO 421A0001

421-0001 TO 421A0001

		P. O. BOX 1977 AIRCRAFT CO. WALLACE-PROSPECT PLANT WICHITA, KANSAS	
TITLE: LANDING GEAR			
CODE IDENT. NO. 71379	SIZE D	DRAWING NO. 51000000	
SCALE NONE	REV B	QUANTITY 5.00 OF P.L.C.	



Part Number

Nomenclature

1. MS28034-3 Oil Temp Bulb - LH
2. 0813601-6 Cyl Temp Bulb - LH
3. MS3106A-12S-3S Plug - Oil Temp Bulb LH
4. DS07-37P Plug - LH Wing
5. DS04-37S Recept - LH Wing
6. MS3106A-14S-2S Plug - LH Eng Gage
7. CM2920-L1 Eng Gage - LH
8. CM2920-L1 Eng Gage - RH
9. 201298-1 Recept - RH Grd
10. 203540-1 Plug - RH Grd
11. MS3106A-14S-2S Plug - RH Eng Gage
12. DS04-37S Recept - RH Wing
13. DS07-37P Plug - RH Wing
14. 1-203735-5 Plug - Side Cons Fwd
15. 1-203739-6 Recept - Side Cons Fwd
16. 7277-2-5 Eng Gage LH - Ckt Bkr
17. 7277-2-5 Eng Gage RH - Ckt Bkr
18. 7277-2-5 OAT - Ckt Bkr
19. 0813601-8 Temp Bulb - Outside Air
20. MS3106A-12S-3S Plug - OAT Bulb
21. 0813601-6 Cyl Temp Bulb RH - Ckt Bkr
22. MS3106A-12S-3S Plug - Oil Temp Bulb RH
23. MS28034-3 Plug - Oil Temp Bulb - RH
24. MS3106A-14S-2S Plug - Air Temp Ind
25. CM2628-L1 Air Temp Ind
26. 201298-1 Plug - LH Grd
27. 203540-1 Plug - LH Grd
28. CM2651-L1 Turn & Bank Ind - LH
29. 17-1030 Recept - Annunciator
30. 17-20370 Plug - Annunciator
31. 7277-2-5 Turn & Bank No. 2 - Ckt Bkr
32. 0850452-7 Sw - Fuel Pressure
33. 0850420-1 Tip Tank Pump - LH
34. 1B5-7 Aux In-Line Pump - LH

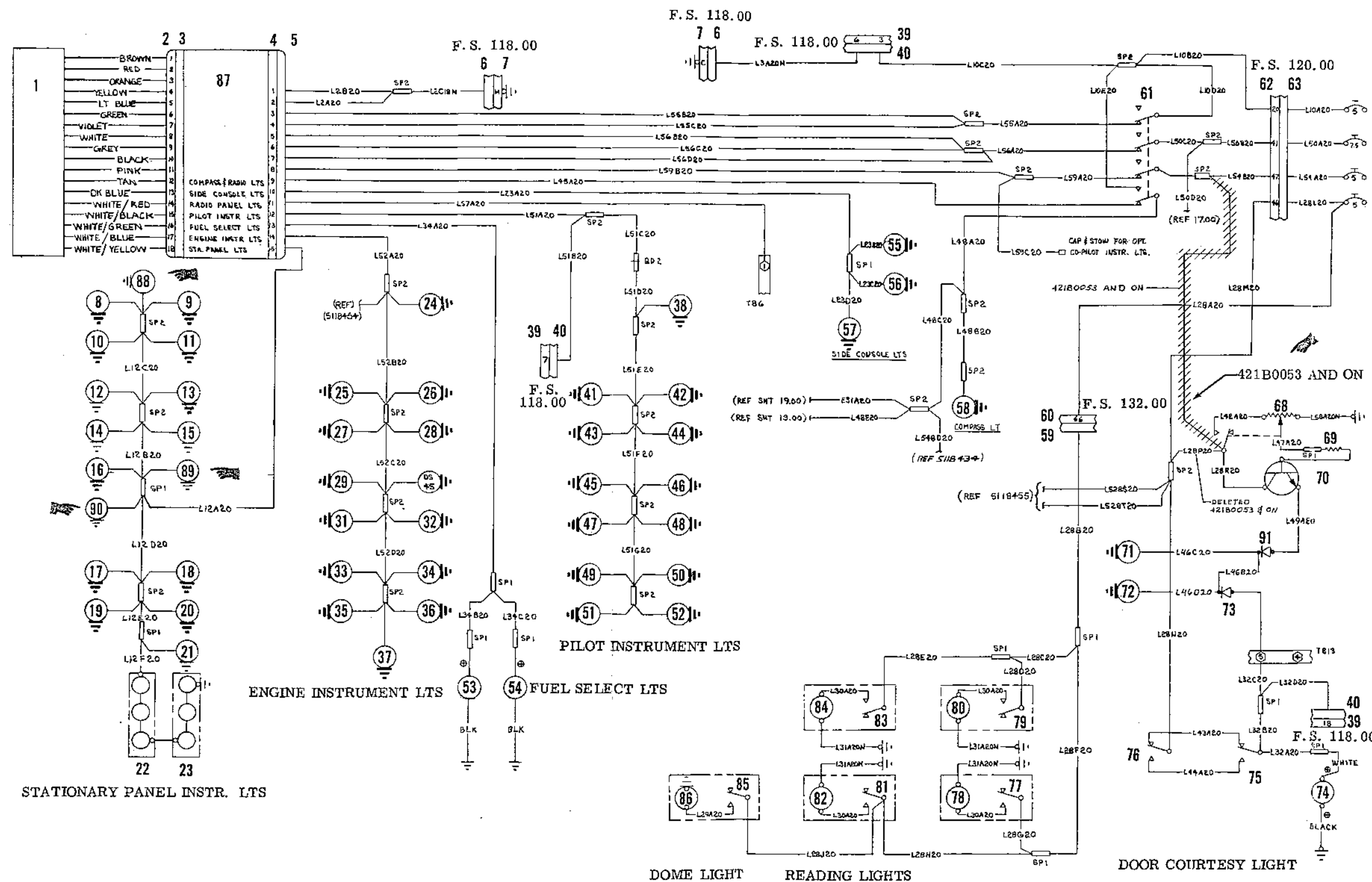
Part Number

Nomenclature

35. DS07-27-2P Plug - LH Wing
36. DS04-27-2S Recept - LH Wing
37. IN1201 Diode - Primer Fuel
38. FC215-136 Relay - LH Fuel Boost
39. 203540-1 Plug - CB Pnl Grd
40. 201298-1 Recept - CB Pnl Grd
41. AR-75-25 Resistor - Fuel Pump LH
42. AR-75-25 Resistor - Fuel Pump RH
43. DS04-27-2S Recept - RH Wing
44. DS07-27-2P Plug - RH Wing
45. 1B5-7 Aux - In-Line Pump - RH
46. 0850420-1 Tip Tank Pump - RH
47. 0850452-7 Sw - Fuel Press
48. IN1201 Diode - Prime Fuel
49. FC215-136 Relay - RH Fuel Boost
50. S-392-1 Sw - RH Fuel Boost
51. 7277-2-7.5 Aux Pump RH - Ckt Bkr
52. 7277-2-7.5 Aux Pump LH - Ckt Bkr
53. 7277-2-7.5 Fuel Pump RH - Ckt Bkr
54. 7277-2-7.5 Fuel Pump LH - Ckt Bkr
55. S-392-1 Sw - LH Fuel Boost
56. 1568-1 Sw - Prime
57. IN1201 Diode - Aux Pump Low LH
58. IN1201 Diode - Aux Pump Low RH
59. 0850350-4 Tach Gen - LH
60. MS3106A-10SL-3S Plug - LH Tach
61. MS3106A-14S-1S Plug - LH Tach Ind
62. CM3304-1 Tach Ind
63. MS3106A-14S-1S Plug - RH Tach Ind
64. 0850350-4 Tach Gen - RH
65. MS3102A-10SL-3S Plug - RH Tach
66. 5618009-1 Annunciator Assy
67. 1-203739-6 Jack
68. 1-203739-6 Plug

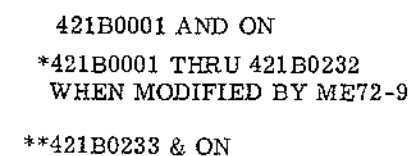
421B0001 AND ON

CONTRACT NO.		Cessna.		P.O. BOX 1877 MILWAUKEE, WISCONSIN 53218	
DATE 10-17-67		TITLE		TACH GEN, ENGINE INSTRUMENTS OAT, T&B & FUEL PUMPS WIRING DIAGRAM	
DESIGNER	C. FRIEDY	SIZE	D	CODE (IDENT. NO.)	71379
CHECKER	W. J. BROWN	DRAWING NO.	5118400		
STRESS	W. J. BROWN	SCALE	NONE		
PROJ.	W. J. BROWN	REV.	B		
OTHER	W. J. BROWN	SHEET 14.00 OF 14.00			

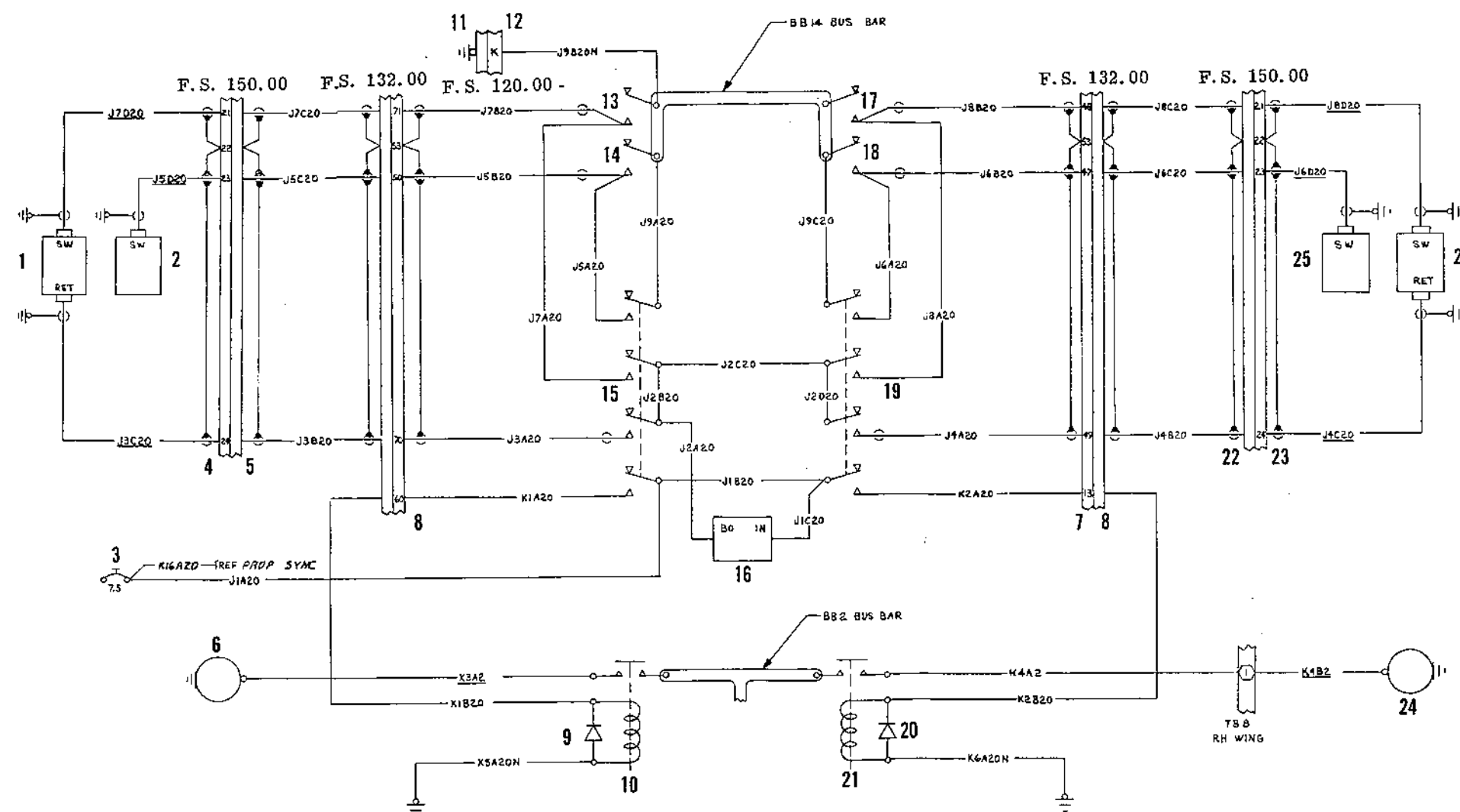


421B0001 AND ON

CONTRACT NO.		DATE 10-17-69	
DRAWN C. FRIEDLY		CHECKED [Signature]	
GROUP [Signature]		STATION [Signature]	
FUEL [Signature]		OFFICE [Signature]	
TITLE DIMMABLE INTERIOR LIGHTING, DOOR COURTESY LT & READING LIGHTS WIRING DIAGRAM		CODE ENT. NO. 5118400	
SCALE NONE		REV 5	



CONTRACT NO.		Cessna.		P. O. BOX 1977 WALLACE PROSPECT PLANT WICHITA, KANSAS
DATE	10-17-69	FILE		
DRAWN	C. FRIEDLY			
CHECK	10-22-69			
CHCK	10-22-69			
STATUS	10-22-69			
REEL	10-22-69			
OTHER	10-22-69			
		PRESTALITE ALTERNATOR ~ 150 AMP (STD) # 100 AMP (OPT) WIRING DIAGRAM		
		SZ	CODE ECHT. NO.	DRAWING NO.
		A	71379	518400
		SCALE	NONE	REV B

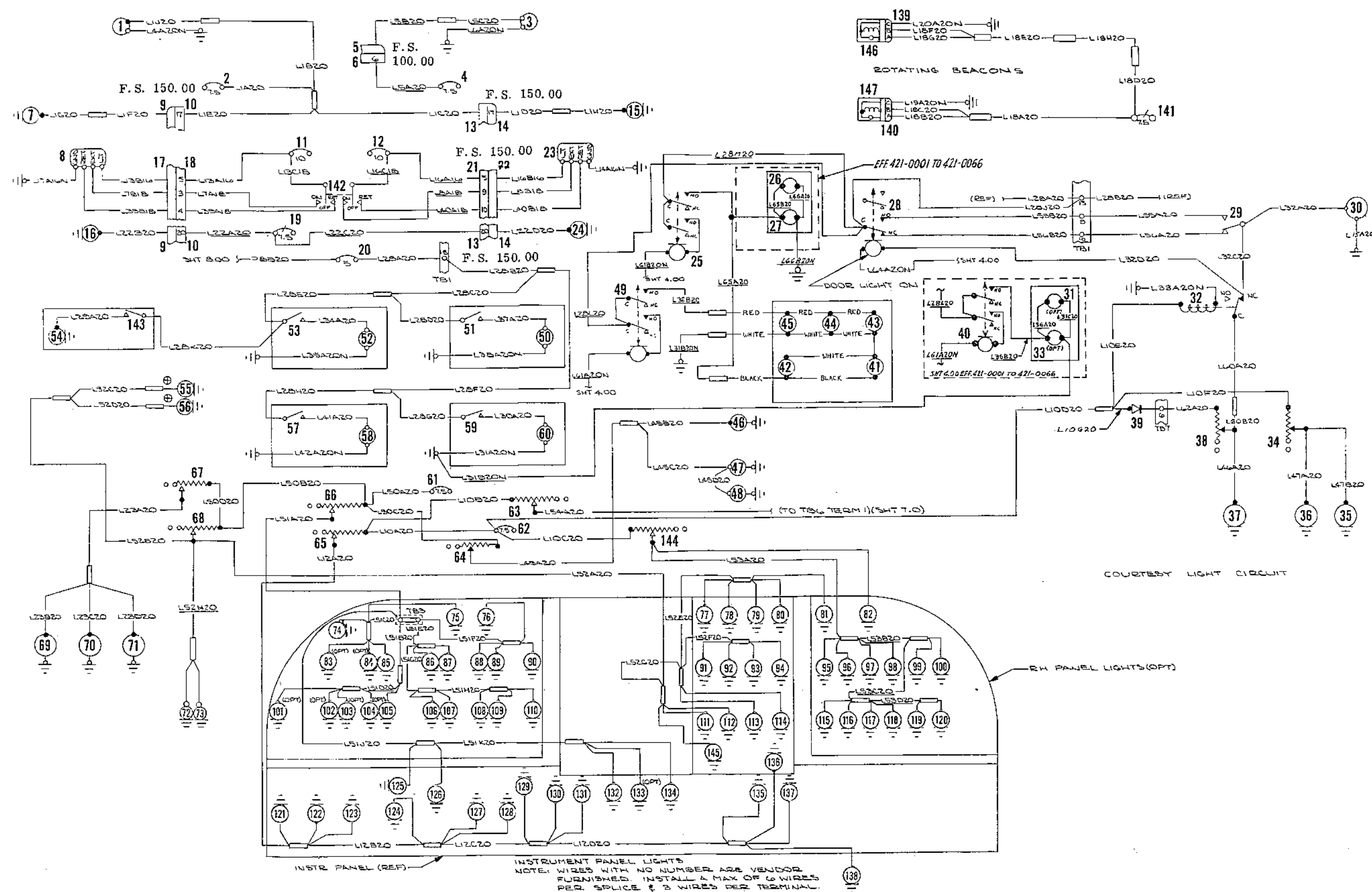


Part Number	Nomenclature

1. S6LN-1201	LH Mag - LH Eng
2. S6LN-1205	RH Mag - LH Eng
3. 7277-2-7.5	Starter - Ckt Bkr
4. DS07-37P	Plug - LH Wing
5. DS04-37S	Recept - LH Wing
6. 627841	Starter - LH
7. 1-203739-6	Recept - Lwr Side Cons
8. 1-203739-5	Plug - Lwr Side Cons
9. IN2482	Diode - LH Start Relay
10. 0850469-1	Relay - Starter LH
11. 203540-1	Plug - CB Pnl Grd
12. 201298-1	Recept - CB Pnl Grd
13. S-382-2	SW. L. H. mag.
14. S-382-2	SW. L. H. mag.
15. 14-104R	Sw - LH Start
16. 10-176487-242	Starting Vibrator
17. S-382-2	SW. R. H. mag.
18. S-382-2	SW. R. H. mag.
19. 14-104R	Sw - RH Start
20. IN2482	Diode - RH Start Relay
21. 0850469-1	Relay - Starter RH
22. DS04-37S	Recept - RH Wing
23. DS07-37P	Plug - RH Wing
24. 627841	R. H. Starter
25. S6LN-1205	RH Mag - RH Eng
26. S6LN-1201	LH Mag - RH Eng

421B0001 AND ON

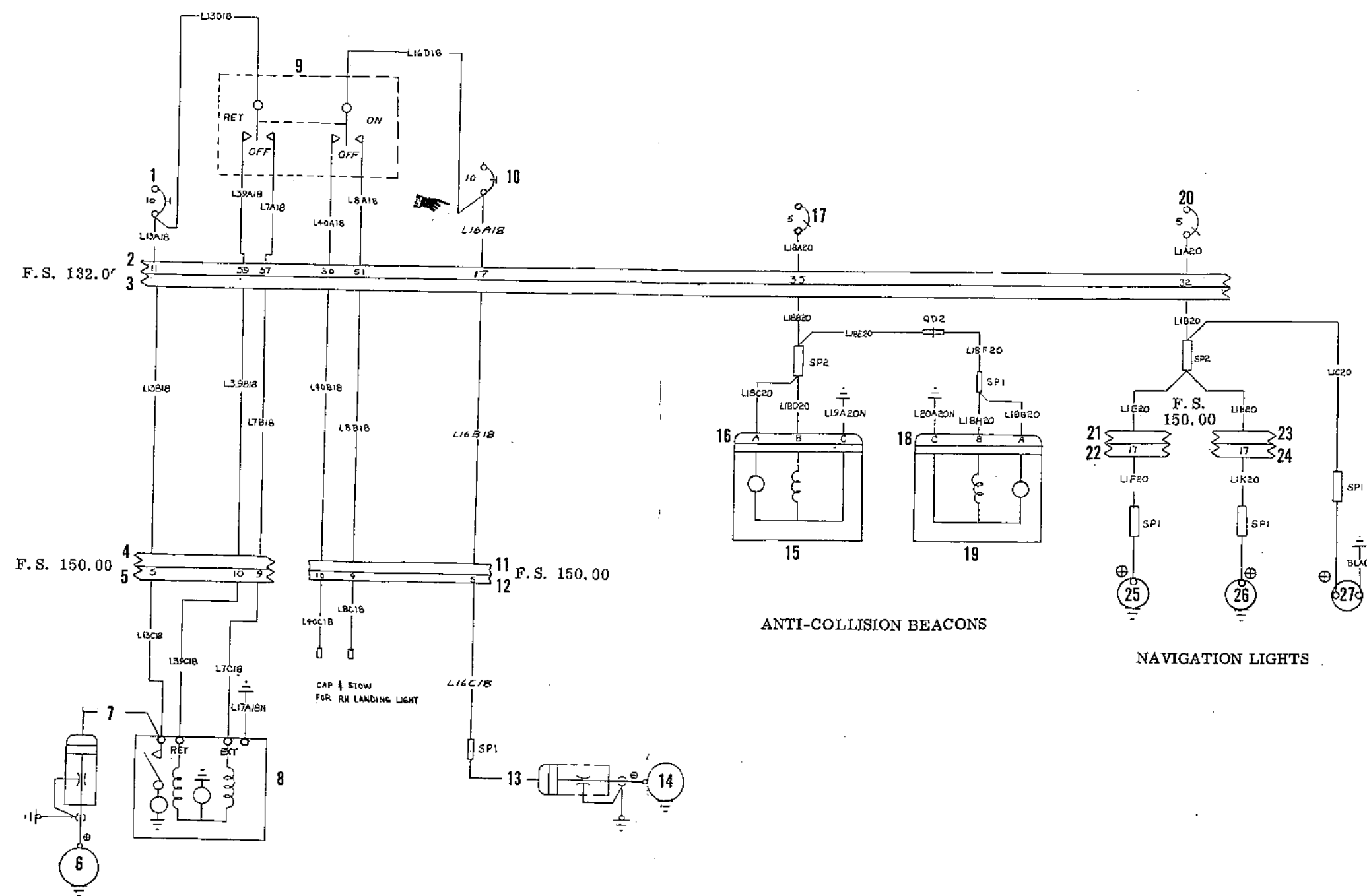
CONTRACT NO.		P. O. BOX 1977 WALLACE PROSPECT PLANT WICHITA, KANSAS	
DATE	10-17-69	Cessna.	
DRAWN	C. FRIEDLY	TITLE	
CHECK	W. B. B. 10-21-69	STARTER-IGNITION	
INSTR.	W. B. B. 10-21-69	WIRING DIAGRAM	
SCALE	AS SHOWN	REV.	REV. B
OTHER	AS SHOWN	REV.	REV. B
CODE	71379	DRAWING NO.	5118400
SCALE	NONE	REV.	B



Part Number	Nomenclature	Part Number	Nomenclature
1. 0433006-4	Tail Light	73. 20-0121-1B24	Var Pr Cont Lt
2. 112-507-101	Sw Bkr - Nav Lt	74. 20-0121-1B24	Post Lt - Instl
3. 0842215-8	Taxi Light	75. 20-0121-1B24	Post Lt - Instl
4. 112-507-101	Sw Bkr - Taxi Lt	76. 20-0121-1B24	Post Lt - Instl
5. DS07-27-25P	Plug	77. 20-0121-1B24	Post Lt - Instl
6. DS04-27-25S	Recp - Nose Bhd	78. 20-0121-1B24	Post Lt - Instl
7. 0823200-1	L Position Lt	79. 20-0121-1B24	Post Lt - Instl
8. 0870132-1	Ldg Lt - L	80. 20-0121-1B24	Post Lt - Instl
9. DS07-37P	Plug	81. 20-0121-1B24	Post Lt - Placard
10. DS04-37S	Recp - L Wing	82. 20-0121-1B24	Post Lt - Prop Anti-Ice
11. S-1232-10	Ckt Bkr - Ldg Lt L	83. 20-0121-1B24	Post Lt - Instl
12. S-1232-10	Ckt Bkr - Ldg Lt R	84. 20-0121-1B24	Post Lt - Instl
13. DS04-37S	Recp - R Wing	85. 20-0121-1B24	Post Lt - Instl
14. DS07-37P	Plug	86. 20-0121-1B24	Post Lt - Instl
15. 0823200-2	R Position Lt	87. 20-0121-1B24	Post Lt - Instl
16. 0820501-5	Deice Lt	88. 20-0121-1B24	Post Lt - Instl
17. DS07-27-8P	Recp - R Wing	89. 20-0121-1B24	Post Lt - Instl
18. DS04-27-2S	Sw Bkr - Deice Lt	90. 20-0121-1B24	Post Lt - Instl
19. 112-507-101	Ckt Bkr - Fuel Qty Aux	91. 20-0121-1B24	Post Lt - Instl
20. S-1232-7	Recp - L Wing	92. 20-0121-1B24	Post Lt - Instl
21. DS04-27-2S	Plug	93. 20-0121-1B24	Post Lt - Instl
22. DS07-27-8P	Ldg Lt - L	94. 20-0121-1B24	Post Lt - Instl
23. 0820132-1	Deice Lt	95. 20-0121-1B24	Post Lt - RH Pnl
24. 0820501-5	Sw - Oxy Sign	96. 20-0121-1B24	Post Lt - RH Pnl
25. 52PB64-2T	Oxygen Sign Lt	97. 20-0121-1B24	Post Lt - RH Pnl
26. MS90282-1	Oxygen Sign Lt	98. 20-0121-1B24	Post Lt - RH Pnl
27. MS90282-1	Sw - Door Lt	99. 20-0121-1B24	Post Lt - RH Pnl
28. 52PB64-T2	Sw - Door Lt	100. 20-0121-1B24	Post Lt - RH Pnl
29. S-1238-2-1	Door Courtesy Lt	101. 20-0121-1B24	Post Lt - Instl
30. 5119019-1	Seat Belt Sign Lt	102. 20-0121-1B24	Post Lt - Instl
31. MS90282-1	Relay - Courtesy Lt	103. 20-0121-1B24	Post Lt - Instl
32. KHP17D11	Seat Belt Sign Lt	104. 20-0121-1B24	Post Lt - Instl
33. MS90882-1	Rheostat - Overhead Lts (Red)	105. 20-0121-1B24	Post Lt - Instl
34. XR5238	Flood Lt - Red	106. 20-0121-1B24	Post Lt - Instl
35. 3366	Flood Lt - Red	107. 20-0121-1B24	Post Lt - Instl
36. 3366	Flood Lt - Red	108. 20-0121-1B24	Post Lt - Instl
37. 2109	Flood Lt - White	109. 20-0121-1B24	Post Lt - Instl
38. XR5239	Rheostat - Overhead Lts (White)	110. 20-0121-1B24	Post Lt - Instl
39. IN1201	Diode - Overhead Lts, Rheostat	111. 20-0121-1B24	Post Lt - Instl
40. 52PB64-T2	Sw - Seat Belt Sign	112. 20-0121-1B24	Post Lt - Instl
41. 1820	Seat Belt & Oxygen Sign	113. 20-0121-1B24	Post Lt - Instl
42. 1820	Seat Belt & Oxygen Sign	114. 20-0121-1B24	Post Lt - Instl
43. 1820	Seat Belt & Oxygen Sign	115. 20-0121-1B24	Post Lt - Instl
44. 1820	Seat Belt & Oxygen Sign	116. 20-0121-1B24	Post Lt - Instl
45. 1820	Seat Belt & Oxygen Sign	117. 20-0121-1B24	Post Lt - Instl
46. CM2639-5	Compass Lt	118. 20-0121-1B24	Post Lt - Instl
47. A-7165-4-327	Call No. Lt	119. 20-0121-1B24	Post Lt - Instl
48. A-7165-4-327	Call No. Lt	120. 20-0121-1B24	Post Lt - Instl
49. 52PB64-T2	Sw - Seat Belt Sign	121. 20-0121-1B24	Post Lt - Instl
50. 2390	Reading Lt	122. 20-0121-1B24	Post Lt - Instl
51. S-1158-2-1	Sw - Reading Lt	123. 20-0121-1B24	Post Lt - Instl
52. 2390	Reading Lt	124. 20-0121-1B24	Post Lt - Instl
53. S-1158-2-1	Sw - Reading Lt	125. 20-0121-1B24	Post Lt - Instl
54. 2109	Dome Lt	126. 20-0121-1B24	Post Lt - Instl
55. 161619	Fuel Select Lt	127. 20-0121-1B24	Post Lt - Instl
56. 161619	Fuel Select Lt	128. 20-0121-1B24	Post Lt - Instl
57. S-1158-2-1	Sw - Reading Lt	129. 20-0121-1B24	Post Lt - Instl
58. 2390	Reading Lt	130. 20-0121-1B24	Post Lt - Instl
59. S-1158-2-1	Sw - Reading Lt	131. 20-0121-1B24	Post Lt - Instl
60. 2390	Reading Lt	132. 20-0121-1B24	Post Lt - Instl
61. S-1232-7	Ckt Bkr - Inst Lts	133. 20-0121-1B24	Post Lt - Instl
62. S-1232-7	Ckt Bkr - Inst Lts	134. 20-0121-1B24	Post Lt - Instl
63. XR5238	Rheostat - Radio Pnl Lts	135. 20-0121-1B24	Post Lt - Instl
64. R25-350-RS30	Rheostat - Compass & Radio Call	136. 20-0121-1B24	Post Lt - Instl
65. XR5239	Rheostat - Sw Panel Lts	137. 20-0121-1B24	Post Lt - Instl
66. XR5238	Rheostat - RH Inst Pnl	138. 20-0121-1B24	Post Lt - Instl
67. XR5239	Rheostat - Side Console Lts	139. 0870132-1	Ldg Lt - R
68. XR5238	Rheostat - Fuel Lts	140. 0870132-1	Ldg Lt - L
69. A5385-1B	Lt Assy	141. 112-507-101	Sw Bkr - Anti-Coll Ben
70. A5385-1B	Lt Assy	142. MS24524-21	Sw - Ldg Lt
71. A5385-1B	Lt Assy	143. 0713089	Sw - Dome Lt
72. 20-0121-1B24	Var Pr Cont Lt	144. XR5239	Rheostat - LH Pnl Lts
		145. 20-0121-1B24	Post Lt - Instl
		146. C621002-0107	Rotating Bcn - Lwr
		147. C621002-0104	Rotating Bcn - Upper

421-0001 TO 421A0001

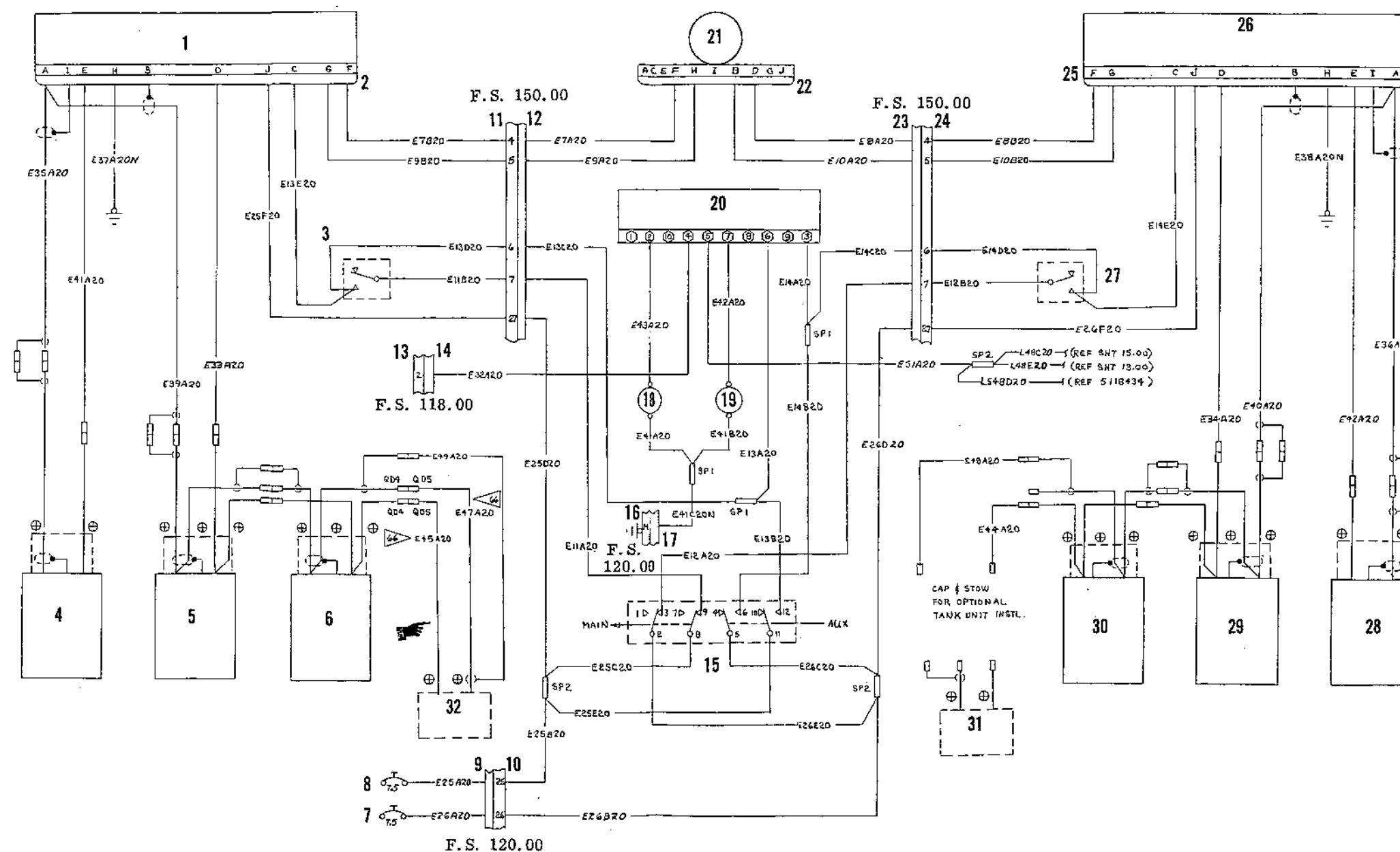
NAME		DATE		Cessna		P. O. BOX 1977	
DRAWN		CHECK		AIRCRAFT WALLACE PROSPECT PLANT		WICHITA, KANSAS	
GROUP		DATE		LIGHTING			
CHECK		DATE					
APPROVED		DATE					
SCALE		REV		71379		5108000	
SCALE		REV					



Part Number	Nomenclature
1. 7277-2-10	Ldg Lt LH - Ckt Bkr
2. 1-203735-5	Plug - Lwr Side Cons
3. 1-203739-6	Recept - Lwr Side Cons
4. DS04-27-2S	Recept - LH Wing
5. DS07-27-2P	Plug - LH Wing
6. 476284	Tip Tank Transfer Pump - LH
7. 877	Wire Assy
8. 0870132-1	Ldg Lt - LH
9. MS24524-21	Sw - Ldg Lt
10. 7277-2-10	Ldg Lt RH - Ckt Bkr
11. DS04-27-2S	Recept - RH Wing
12. DS07-27-2P	Plug - RH Wing
13. 877	Wire Assy
14. 476284	Tip Tank Transfer Pump - RH
15. C621002-0107	Anti-Coll Bcn - Lwr
16. MS3106A-10SL-3S	Plug - Lwr Rotor Bcn
17. 112-205-101	Anti-Coll Bcn - Sw Ckt Bkr
18. MS3106A-10SL-3S	Plug - Upper Rotor Bcn
19. C621002-0106	Anti-Coll Bcn - Upper
20. 112-205-101	Nav Lts - Sw Ckt Bkr
21. DS04-37S	Recept - LH Wing
22. DS07-37P	Plug - LH Wing
23. DS04-37S	Recept - RH Wing
24. DS07-37P	Plug - RH Wing
25. 0823200-1	LH Wing Nav Lt
26. 0823200-2	RH Wing Nav Lt
27. C622001-0103	Fail Nav Lt

421B0001 AND ON

CONTRACT NO.		Cessna. P.O. BOX 1977 WALLACE, KANSAS	
DATE	10-17-69	TITLE	LIGHTING-EXTERIOR & TIP TANK TRANSFER PUMPS WIRING DIAGRAM
DRAWN	C. FRIEDLY	SIZE	D 71379 51184-00
CHECK	By [Signature]	CODE IDENT. NO.	51184-00
SYMBOL	By [Signature]	REV.	8
PROJ.	By [Signature]	REV. 8	51184-00
OTHER	By [Signature]	REV. 8	51184-00



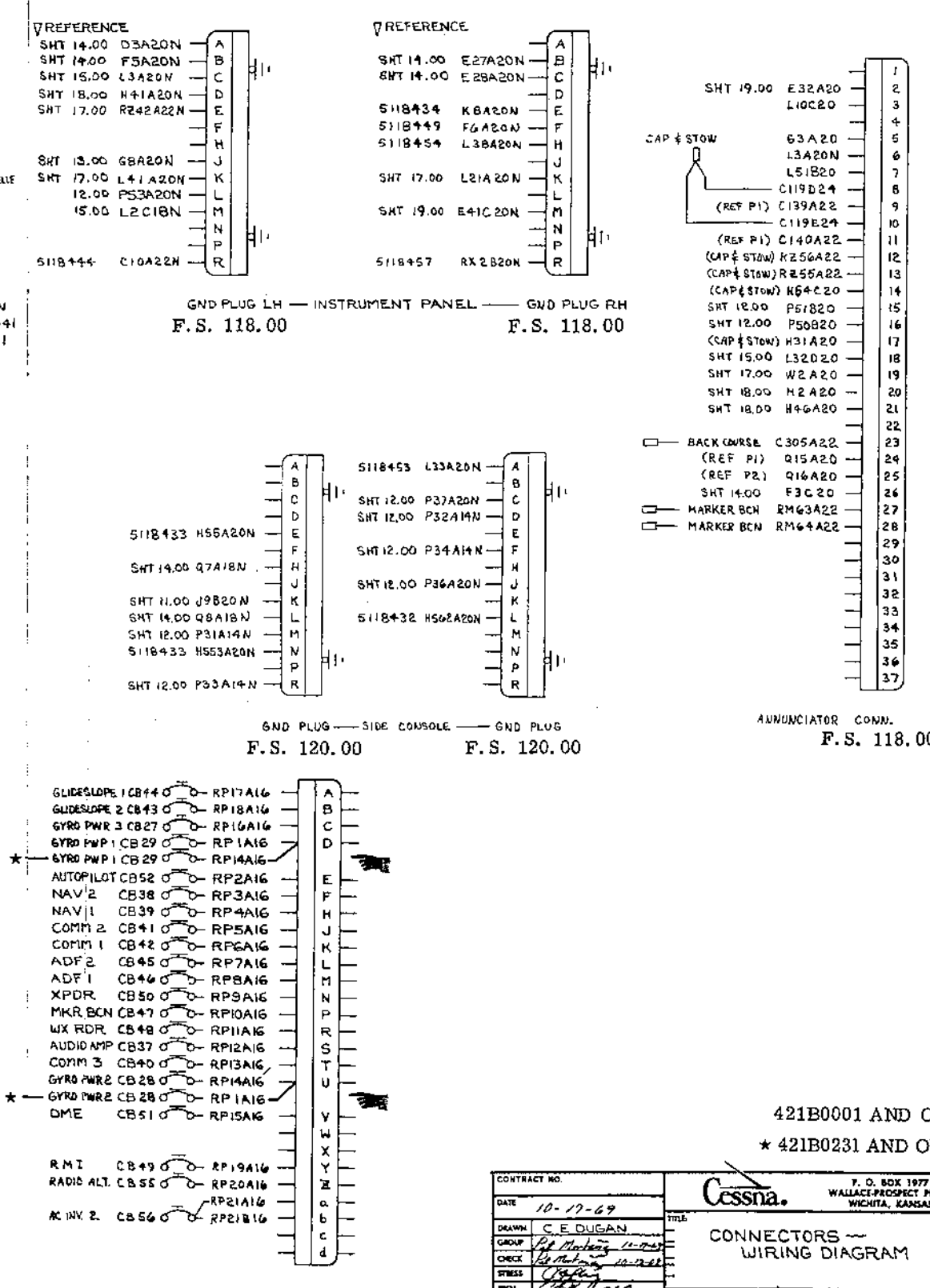
Part Number

Nomenclature

1. CMF-860-2	Signal Conditioner
2. MS3106E-18-1S	Plug - LH Signal Conditioner
3. MS25253-1	Sw - LH Crossfeed
4. PAA700-2	Tank Unit - LH Main
5. PAA700-8	Tank Unit - Aux LH Inbd
6. PAA700-4	Tank Unit - Aux LH MID
7. 7277-2-5	Fuel Qty - RH
8. 7277-2-5	Fuel Qty - LH
9. 1-203739-6	Recept - Fwd Side Cons
10. 1-203735-5	Plug - Fwd Side Cons
11. DS07-37P	Plug - LH Wing
12. DS04-37S	Recept - LH Wing
13. 17-20370	Plug - Annunciator
14. 17-1030	Recept - Annunciator
15. 7415	Sw - Override
16. 203540-1	Plug - CB Pnl Gnd
17. 203540-1	Recept - CB Pnl Gnd
18. WI-28T1PB15F	LH Aux Fuel Qty Lt
19. WI-28T1PB15F	RH Aux Fuel Qty Lt
20. 5618007-14	Lt Dimmer
21. DSF859	Fuel Qty Ind
22. MS3106E-18-1S	Plug - Fuel Qty Ind
23. DS04-37S	Recept - RH Wing
24. DS07-37P	Plug - RH Wing
25. MS3106E-18-1S	Plug - RH Signal Conditioner
26. CMF-860-2	Signal Conditioner
27. MS25253-1	Sw - RH Crossfeed
28. PAA700-1	Tank Unit - RH Main
29. PAA700-7	Tank Unit - Aux RH Inbd
30. PAA700-3	Tank Unit - Aux RH Mid
31. PAA700-5	Tank Unit - Opt RH Outbd Aux
32. PAA700-6	Tank Unit - Opt LH Outbd Aux

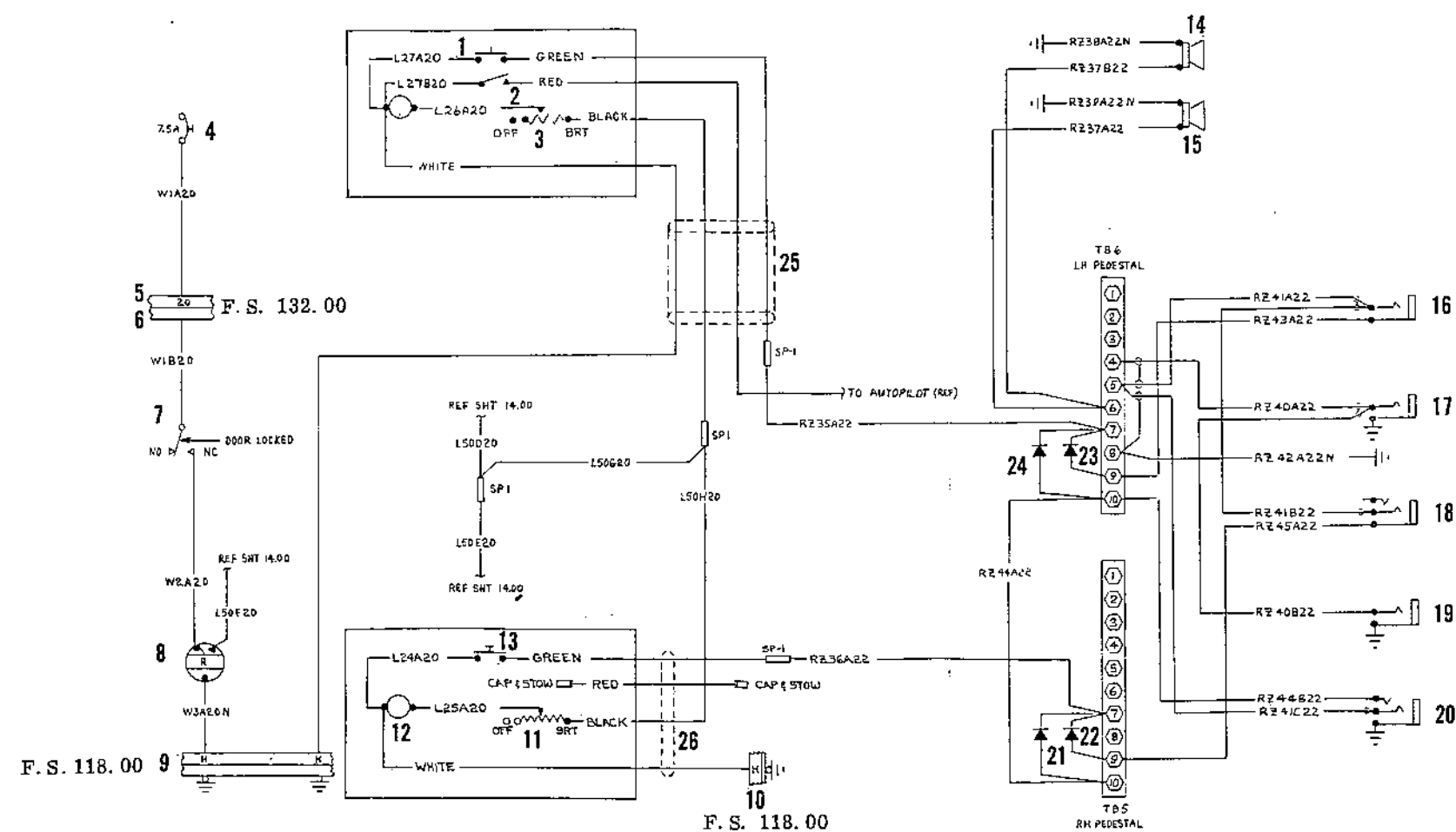
421B0001 AND ON

CONTRACT NO.		Cessna		AIRCRAFT CO.		P.O. BOX 1877 MILITARY AIRWING DIVISION WICHITA, KS 67201	
DATE	10-17-68	TITLE					
DRAWN	WALTMAN	CAPACITANCE FUEL SYSTEM					
CHECK	WALTMAN	WIRING DIAGRAM					
STRESS	WALTMAN						
PROJ.	WALTMAN						
OTHER	WALTMAN						
SIZE	D	CODE IDENT. NO.	71379	DRAWING NO.	5118400		
SCALE	NONE	REV.	REV. A	SHEET 1 OF 1			



421B0001 AND ON
★ 421B0231 AND ON

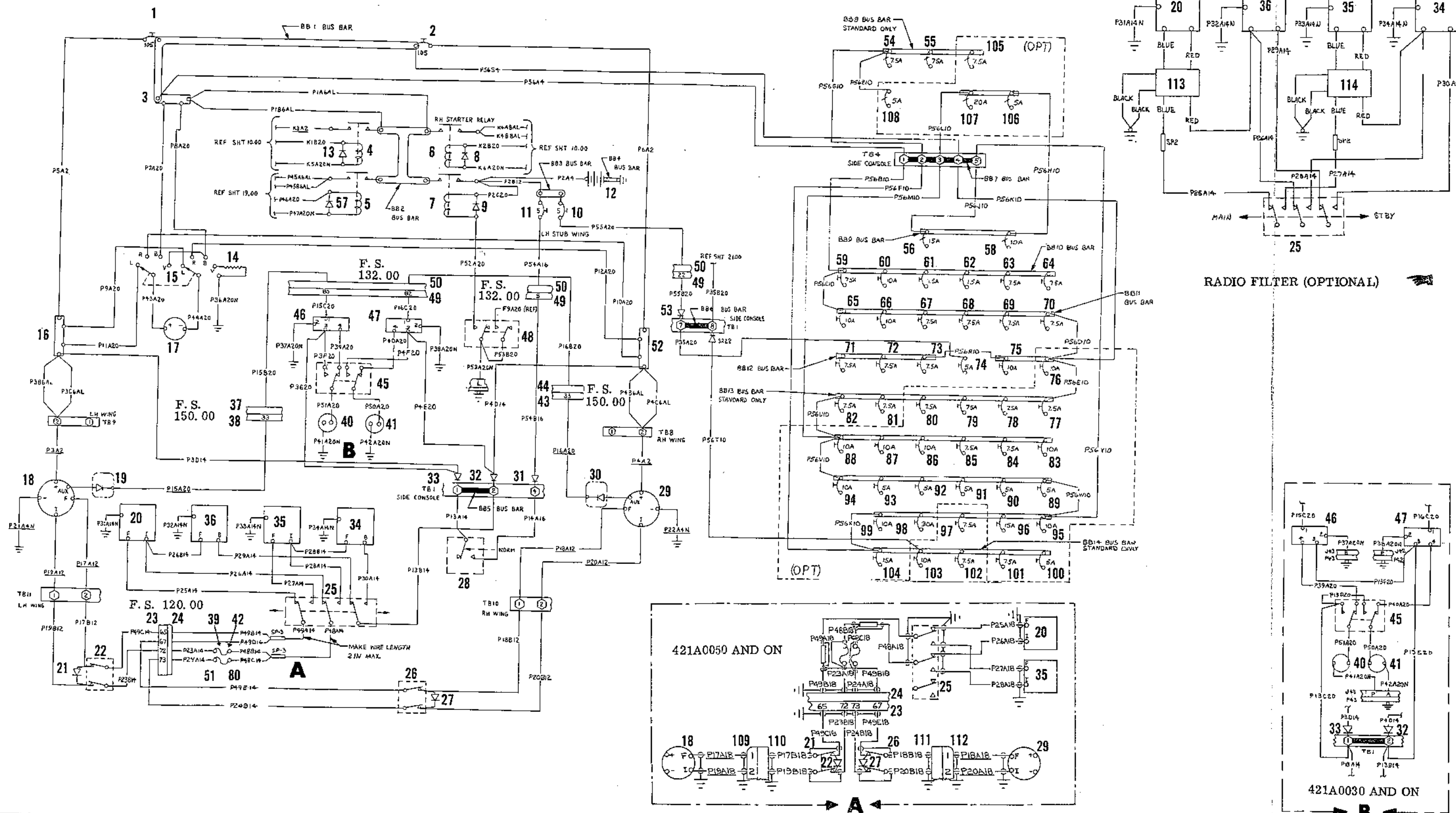
CONTRACT NO.		Cessna.		P. O. BOX 1977	
DATE 10-17-69				WALLACE PROSPECT PLANT WICHITA, KANSAS	
DRAWN C. E. DUGAN		TITLE CONNECTORS ~ WIRING DIAGRAM			
GROUP 14-10000-10-1000					
CHECK 14-10000-10-1000		SIZE CODE IDENT. NO. DRAWING NO.		D 71379 5118400	
PRICE \$14.00					
OTHER DATA		SCALE NONE		REV. B	
				SHEET 9.00 OF 19.00	



Part Number	Nomenclature
1. 913	Sw - Mike - LH
2. T20057	Sw - Autopilot
3. E-50-R-1-352A	Rheo - L Control Wheel
4. S-1232-507	Radio Lt
5. 201311-3	Plug - Side Cons Lwr Conn
6. 201310-3	Recp - Side Cons Lwr Conn
7. MS25253-1	Sw - Door Warn
8. VM911M-2	Door Warn Ind Lt
9. 201298-1	Plug - LH Grd Conn
10. 201298-1	Plug - RH Grd Conn
11. E-50-R-1-352A	Rheo - R Control Wheel
12. 1306	Map Lt - RH
13. 913	Sw - Mike - RH
14. ID1756	Spkr - Audio - RH
15. ID1756	Spkr - Audio - LH
16. S-13-B	Mike Jack - Pilot
17. S-1103-1	Hdset Jack - Ovhd - Pilot
18. S-1102-1	Mike Jack - Copilot
19. S-1103-1	Hdset Jack - Ovhd - Copilot
20. S-1102-1	Mike Jack - Hand Mike
21. IN2482	Diode - Audio
22. IN2482	Diode - Audio
23. IN2482	Diode - Audio
24. IN2482	Diode - Audio
25. 877	Wire Coil Cord
26. 877	Wire Coil Cord (Opt.)

421A0001 TO 421B0001

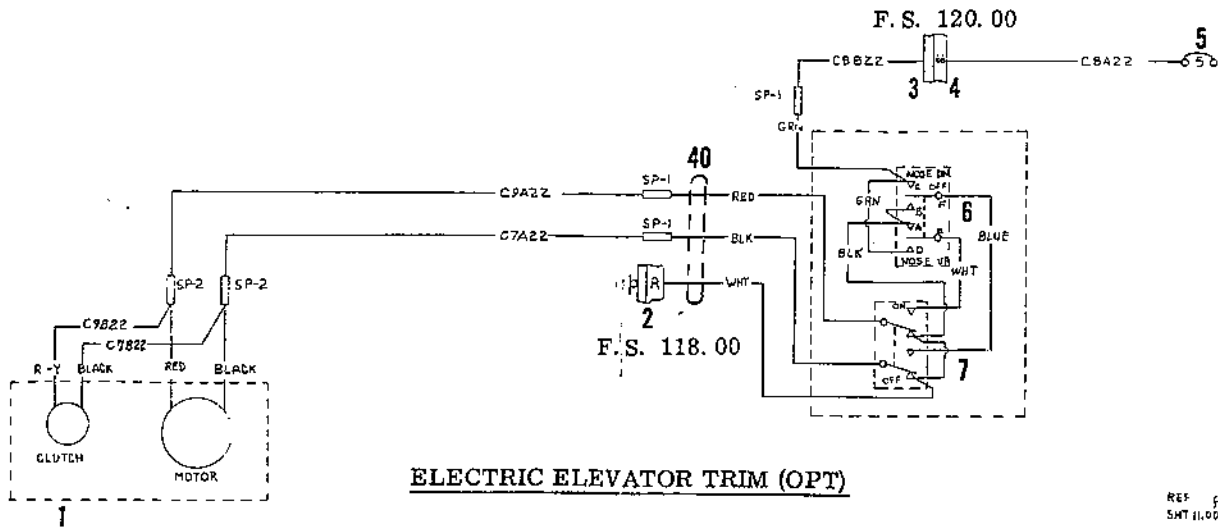
CONTRACT NO.		Cessna.		P. O. BOX 1977 WICHITA, KANSAS	
DATE	5-31-60	TITLE			
DRAWN	T.D. WERT	AUDIO AND DOOR WARNING			
CHECK	R. D. WERT	WIRING DIAGRAM			
SYMBOL	W. A. WERT	SIZE			
SCALE	NONE	CODE IDENT. NO.	71379	DRAWING NO.	5118301
OTHER		SCALE	NONE	REV	B
				SHEET 16.00 OF 23.00	



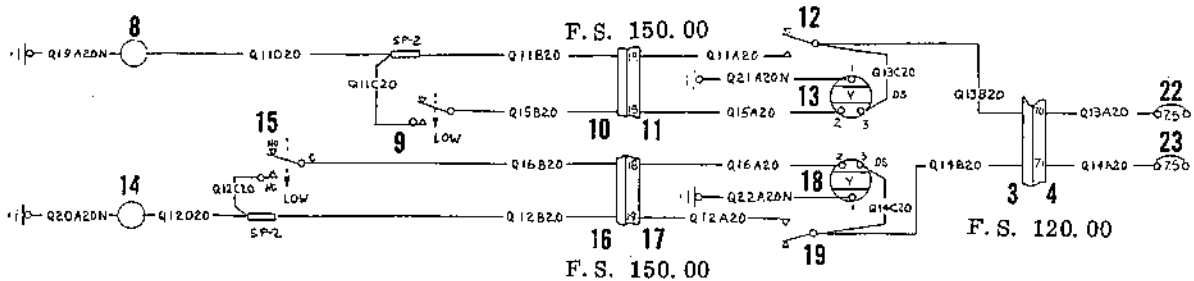
Part Number	Nomenclature	Part Number	Nomenclature
1. PDLM-105	L Alt - Ckt Bkr	68. S-1232-507	R Aux Pump (Trans Pump) - Ckt Bkr
2. PDLM-105	R Alt - Ckt Bkr	69. S-1232-507	Fuel Qty Tip - Ckt Bkr
3. 22370-125	Shunt - Btry	70. S-1232-507	Fuel Qty Aux - Ckt Bkr
4. 0850469-1	Relay - Str - LH	71. S-1232-507	Radio Lt - Ckt Bkr
5. 0850469-1	Relay - Aux Pwr - LH	72. S-1232-507	Pilot Lt - Ckt Bkr
6. 0850469-1	Relay - Str - RH	73. S-1232-507	Copilot Lt - Ckt Bkr
7. 0850469-1	Relay - Aux Pwr - RH	74. S-1232-505	Cabin Lt - Ckt Bkr
8. IN2482	Diode - RH Str Relay	75. S-1232-510	L Ldg Lt - Ckt Bkr
9. IN2482	Diode - Btry Relay	76. S-1232-507	R Ldg Lt - Ckt Bkr (Opt)
10. S-1232-505	Cab Lt - Btry (Ckt Bkr)	77. S-1232-7	T & B No. 2 - Ckt Bkr (Opt)
11. S-1232-505	Emer Pwr - Ckt Bkr	78. S-1232-507	T & B No. 1 - Ckt Bkr (Opt)
12. 12C524	Btry	79. S-1232-507	Gyro Pwr - Ckt Bkr (Opt)
13. IN2482	Diode - LH Str Relay	80. S-1232-507	Gyro Pwr - Ckt Bkr (Opt)
14. HS-1A-1%-7200	Resistor - AV Meter	81. S-1232-507	R Eng Gage - Ckt Bkr
15. PA2003	Sw - VAM	82. S-1232-507	L Eng Gage - Ckt Bkr
16. 22370-12S	Shunt - LH Alt	83. S-1232-507	Autopilot - Ckt Bkr (Opt)
17. CM2664-1	Volt Ammeter	84. S-1232-507	Nav 2 - Ckt Bkr (Opt)
18. 632590	Alternator - LH	85. S-1232-507	Nav 1 - Ckt Bkr (Opt)
19. IN1201	LH Alt Aux	86. S-1232-510	Comm 3 - Ckt Bkr (Opt)
20. VSF7401	Volt Reg - Prestolite (Main)	87. S-1232-510	Comm 2 - Ckt Bkr (Opt)
21. IN1201	Diode - LH Fld Sw (Std)	88. S-1232-510	Comm 1 - Ckt Bkr (Opt)
22. MS24524-22	Sw - LH Alt Fld	89. S-1232-505	Audio Amp - Ckt Bkr (Opt)
23. 201311-3	Plug - Side Cons Fwd Conn	90. S-1232-505	ADF 2 - Ckt Bkr (Opt)
24. 201310-3	Recp - Side Cons Fwd Conn	91. S-1232-505	ADF 1 - Ckt Bkr (Opt)
25. 23AT2-T2	Sw - Reg Select	92. S-1232-505	DME - Ckt Bkr (Opt)
26. MS24524-22	Sw - RH Alt Fld	93. S-1232-505	XPDR - Ckt Bkr (Opt)
27. IN5061	Diode - RH Fld Sw	94. S-1232-510	Mkr Bcr - Ckt Bkr (Opt)
28. S-382-3	Sw - Emer	95. S-1232-510	R Elec Seat - Ckt Bkr (Opt)
29. 632590	Alternator - RH	96. S-1232-510	L Elec Seat - Ckt Bkr (Opt)
30. IN5059	RH Alt Aux	97. S-1232-507	Cigar Ltr Shaver Inv - Ckt Bkr (Opt)
31. IN1201	Diode - Emer Fld Ctr	98. S-1232-530	AC Inv Radar - Ckt Bkr (Opt)
32. IN1201	Diode - LH Fld	99. S-1232-510	DC Radar - Ckt Bkr (Opt)
33. 138-2	OV Relay (RBM cont) Stby	100. S-1232-505	Trim Pwr - Ckt Bkr (Opt)
34. VSF7401	Volt Reg - Prestolite (Stby)	101. S-1232-507	Elec Wshld - Ckt Bkr (Opt)
35. 138-2	OV Relay (RBM cont) Main	102. S-1232-507	Cabin Press - Ckt Bkr
36. DS04-37S	Recp - L Wing	103. S-1232-510	Cabin Fan - Ckt Bkr
37. DS07-37P	Plug - L Wing	104. PDLM-105	Air Conditioner - Ckt Bkr (Opt)
38. MDX 3.0 AMP	Fuse - Alternator LH	105. 112-507-101	Taxi Lts - Sw Ckt Bkr (Opt)
39. L9000	Lt - Alt Fail Ind - LH	106. 112-205-101	Wshld Anti-Ice - Sw Ckt Bkr (Opt)
40. L9000	Lt - Alt Fail Ind - RH	107. 112-220-101	Prop Anti-Ice - Sw Ckt Bkr (Opt)
41. L9000	Fuse Holder	108. 112-205-101	Deice Lt - Sw Ckt Bkr (Opt)
42. HCM	Plug - R Wing	109. DS07-27-2P	Plug - LH Wing
43. DS07-37P	Recp - R Wing	110. DS04-27-2S	Recpt - LH Wing
44. 14-102B	Sw - Alt Fail Test	111. DS07-27-2P	Plug - RH Wing
45. 5118333-1	LH Alt Fail Sw	112. DS04-27-2S	Recpt - RH Wing
46. 5118333-1	RH Alt Fail Sw	113. JN14-13578-1	Radio Noise Filter
47. S-382-5	Sw - Battery	114. JN14-13578-1	Radio Noise Filter
48. 201311-3	Plug - Side Cons Lwr Conn		
49. 201310-3	Recp - Side Cons Lwr Conn		
50. MDX 3.0 AMP	Fuse - Alternator RH		
51. 22370-12S	Shunt - RH Alt		
52. IN1201	Diode - Cab Lt		
53. 112-507-101	Anti-Coll Bcr - Sw Ckt Bkr		
54. 112-507-101	Nav Lts - Sw Ckt Bkr		
55. 112-215-101	Cabin Ht - Sw Ckt Bkr		
56. IN2482	Diode - Ext Pwr Relay		
57. 112-210-101	Pitot Heat		
58. S-1232-507	Stall Warn - Ckt Bkr		
59. S-1232-510	Flap Motor - Ckt Bkr		
60. S-1232-507	Ldg Gr Warn - Ckt Bkr		
61. S-1232-515	Ldg Gr Motor - Ckt Bkr		
62. S-1232-507	Oat - Ckt Bkr		
63. S-1232-507	Str - Ckt Bkr		
64. S-1232-507	L Fuel Pump - Ckt Bkr		
65. S-1232-507	R Fuel Pump - Ckt Bkr		
66. S-1232-507	L Aux Pump (Trans Pump) - Ckt Bkr		
67. S-1232-507			

421A0001 TO 421B0001

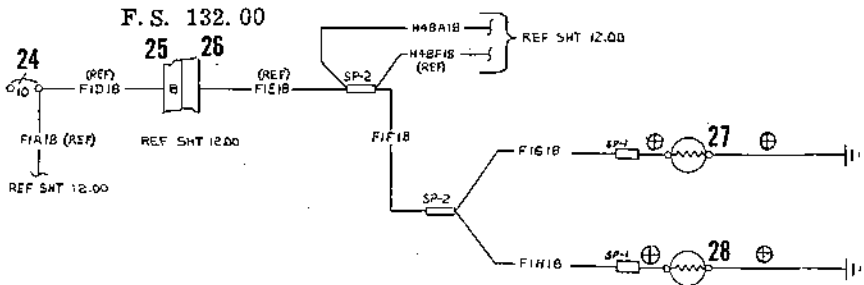
CONTRACT NO.		P. O. BOX 1977 WICHITA, KANSAS	
DATE		Cessna.	
DRAWN		ALTERNATOR - 50 AMP PRESTOLITE WIRING DIAGRAM	
CHECKED		D 71379	
APPROVED		5118301	
OTHER CHG		SCALE: NONE	
DCNS 16A		SHEET 11.00 OF 23.00	



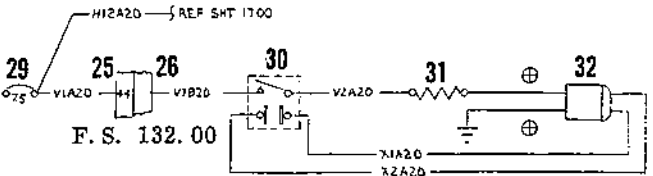
ELECTRIC ELEVATOR TRIM (OPT)



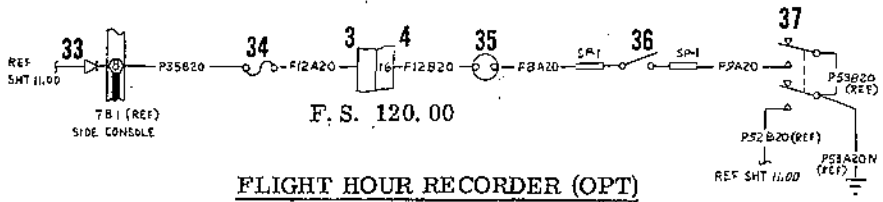
WING LOCKER FUEL TRANSFER PUMPS (OPT)



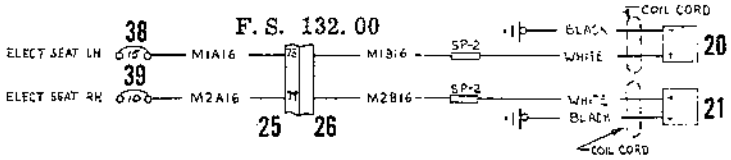
STATIC SOURCE HEATERS (OPT)



SHAVER INVERTER (OPT)



FLIGHT HOUR RECORDER (OPT)



LH ELECTRIC SEAT (OPT)
RH ELECTRIC SEAT (OPT)

Part Number	Nomenclature
1. 5115231	Elec Trim Actr Assy
2. 201298-1	Plug - LH Grd
3. 201311-3	Plug - Side Cons Fwd Conn
4. 201310-3	Recp - Side Cons Fwd Conn
5. S1232-505	Trim Pwr - Ckt Bkr
6. T2153	Sw - Trim Disengage
7. 305-4320	Sw - Trim Control
8. 4140-00-153	Pump - Wing Lkr Fuel - LH
9. 9910058-1	Sw - Wing Lkr Fuel Press - LH
10. DS07-37P	Plug - L Wing
11. DS04-37S	Recp - L Wing
12. S-382-2	Sw - Wing Lkr Fuel - LH
13. VM911M-4	Lt - Wing Lkr Fuel - LH
14. 4140-00-153	Pump - Wing Lkr Fuel - RH
15. 9910058-1	Sw - Wing Lkr Fuel Press - RH
16. DS07-37P	Plug - R Wing
17. DS04-37S	Recp - R Wing
18. VM911M-4	Lt - Wing Lkr Fuel - RH
19. S-382-2	Sw - Wing Lkr Fuel - RH
20. 919J10000-3	Motor Elec Seat - LH
21. 919J0000-3	Motor Elec Seat - RH
22. S-1232-507	Ckt Bkr - Wing Lkr Fuel Pump - LH
23. S-1232-507	Ckt Bkr - Wing Lkr Fuel Pump - RH
24. 112-210-101	Pitot Heat - Sw Ckt Bkr
25. 201311-3	Plug - Side Cons Lwr Conn
26. 201310-3	Recp - Side Cons Lwr Conn
27. CM2933-5	Static Source Htr - R
28. CM2933-5	Static Source Htr - L
29. S1232-507	Ckt Bkr - Cigar Ltr Shaver Invtr
30. 7777K1	Recp - 100V AC
31. OR-40-5	Res - Shaver Inv.
32. 12SP2A	Inverter - Shaver
33. IN1201	Diode - Cab Light
34. AGC 3.0 Amp	Flight Hr Rec
35. S-1498-1	Recorder - Flt Hr
36. S-1498-2	Sw - Flt Hr
37. S-382-2	Sw - Battery
38. S-1232-510	L Elec Seat - Ckt Bkr
39. S-1232-510	R Elec Seat - Ckt Bkr
40. 877	Wire Coil Cord (Opt.)

421A0001 TO 421B0001

CONTRACT NO.		Cessna.		P. O. BOX 1977 WICHITA, KANSAS	
DATE 5-28-68		TITLE		OPTIONAL EQUIPMENT - STATIC HTRS, ELECT SEAT, FLT HR REC, SHAVER INV, ELECT ELEV TRIM, WING FUEL TRANS PUMPS WIRING DIAGRAM	
DRAWN E.D. WERT		GROUP		5-28-68	
CHECKED		DATE		5-28-68	
STRESS		DATE		5-28-68	
PROJ.		DATE		5-28-68	
OTHER		DATE		5-28-68	
DCN 5A		D 71379		5118301	
SCALE NONE		REV 8		WRT 2100 A 2300	