

Cessna.

1969 thru 1974

MODEL 310 AND TURBO 310 SERIES

FOREWORD.

This Service Manual contains factory recommended procedures for ground handling, servicing and maintaining the Cessna 310 Series Aircraft. Where reference is made to the 310 Aircraft in this Service Manual, this reference applies to the 310P, 310Q and Turbo 310P and Turbo 310Q certified aircraft. This manual also describes the Cessna 310QII and Turbo 310QII which are the same as the Cessna 310Q and Turbo 310Q with some optional equipment installed as standard. Where there are specific differences, reference will be made to the individual aircraft. Besides serving as a reference for the experienced mechanic, this Service Manual also covers step-by-step procedures for the less experienced mechanic. This Service Manual should be kept in a handy place for ready reference. If properly used, it will better enable the mechanic to maintain the Cessna 310 Series aircraft and thereby, establish a reputation for reliable service.

The information in this Service Manual is based on data available at the time of publication, and is supplemented and kept current by Service Letters and Service News Letters published by Cessna Aircraft Company. These are sent to all Cessna Dealers so that they have the latest authoritative recommendations for servicing Cessna airplanes. Therefore, it is recommended that Cessna owners utilize the knowledge and experience of the factory-trained Dealer Service Organization.

In addition to the information in this Service Manual, a group of vendor publications are available from the Cessna Customer Services Department which describe complete disassembly, overhaul and parts breakdown of some of the various vendor equipment items. A listing of the available publications is issued periodically in Service Letters.

This Service Manual covers the 1969 through 1974 Model 310 and Turbo 310 Series aircraft which are certificated as follows:

1969	1970-1973	1974
310P T310P	310Q T310Q	310Q/310Q II T310Q/T310Q II

SERVICE MANUAL DECEMBER 1970

FAA APPROVAL HAS BEEN OBTAINED ON TECHNICAL DATA IN THIS PUBLICATION THAT AFFECTS AIRPLANE TYPE DESIGN.

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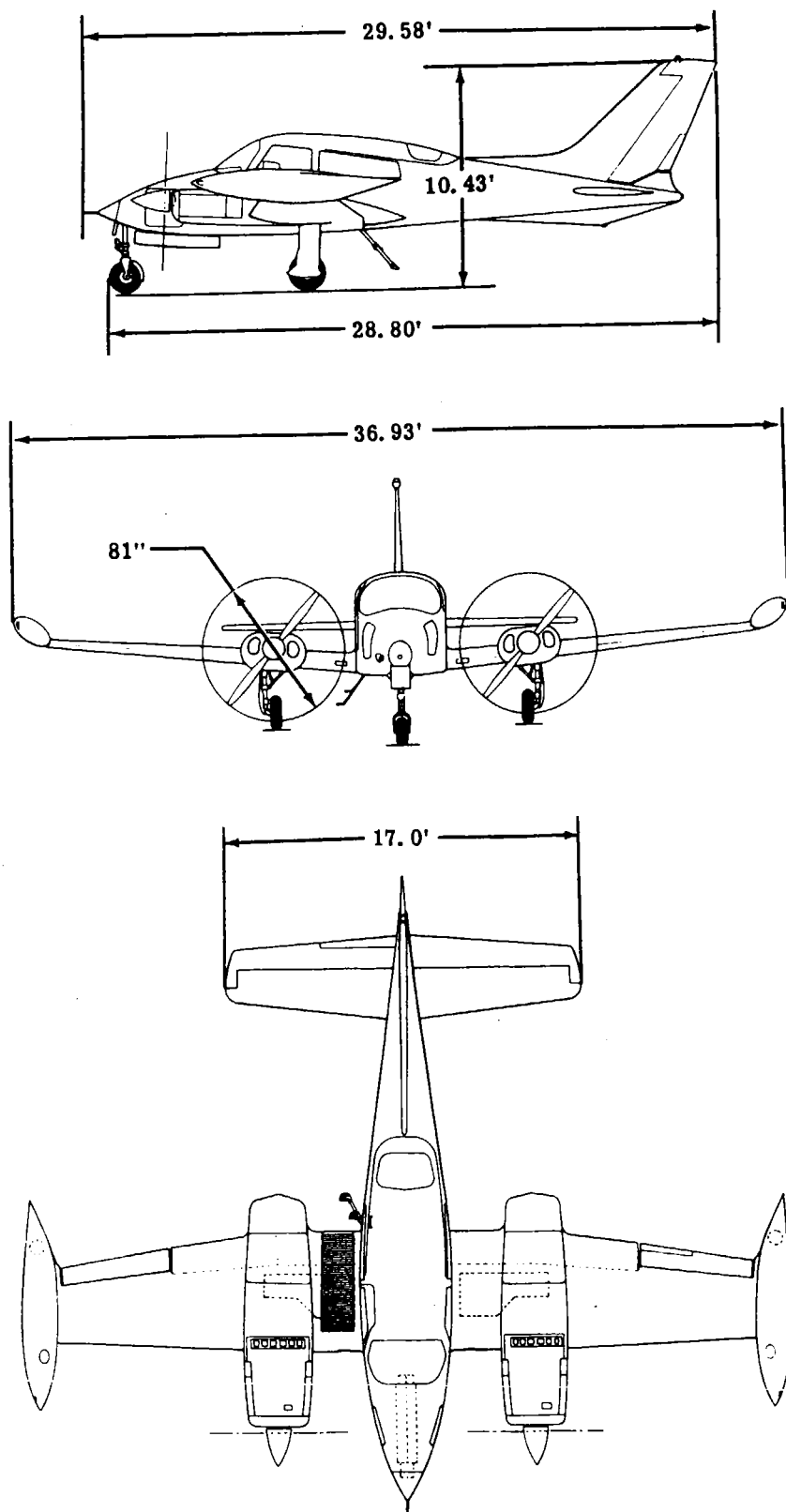
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TURBO 310Q0401 AND ON

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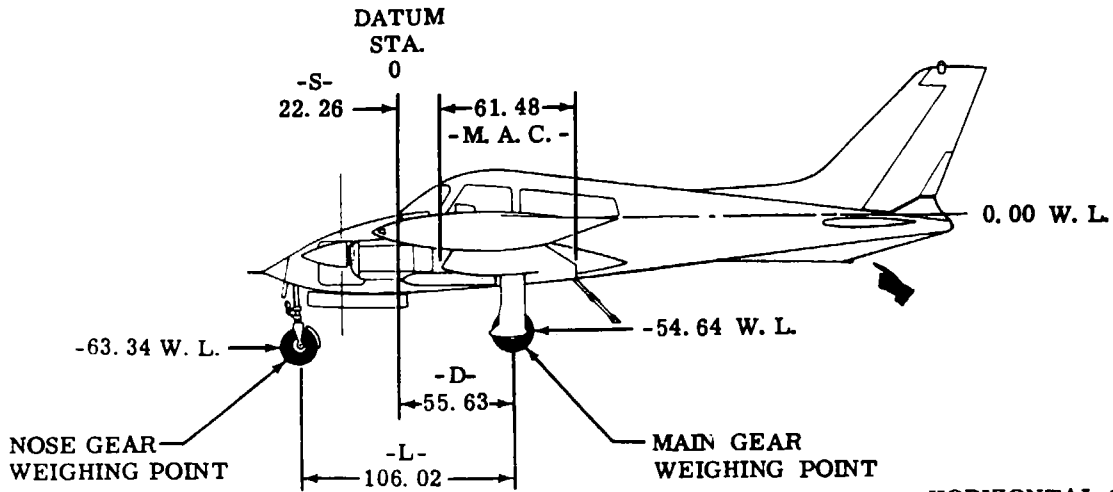
SECTION 2

GROUND HANDLING, SERVICING AND INSPECTION

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WEIGHING ON LANDING GEAR



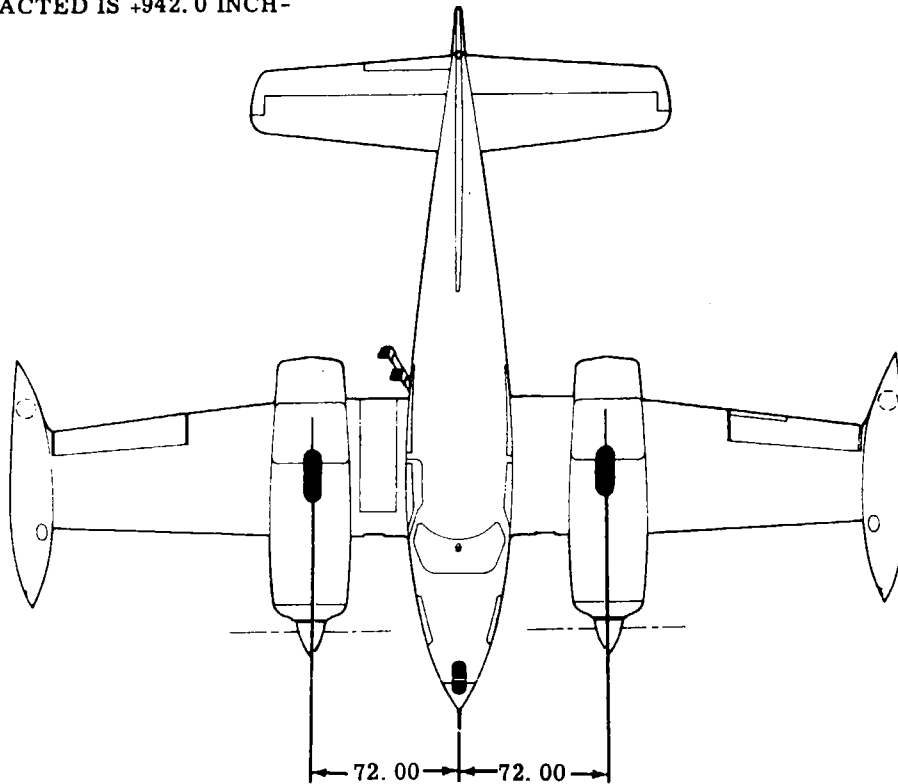
HORIZONTAL CG

$$CG = 55.63 - \frac{W_n (106.02)}{W}$$

$$\%M.A.C. = CG - \frac{22.26}{61.48} (100)$$

NOTE

AIRCRAFT IS WEIGHED WITH GEAR EXTENDED, MOMENT CHANGE WITH GEAR RETRACTED IS +942.0 INCH-POUNDS



310P0001 AND ON

Figure 2-5. Weighing and Measuring (Sheet 2)

Finish and Trim.

A finish and trim plate is installed in the nose wheel web. The plate contains finish and trim information for the airplane. The airplane and interior parts are painted various colors as coded on the finish trim plate. All paints used on this model airplane are listed by finish and trim code on the respective paint color chart, except heat resistant paint and landing gear paint. To read the plate, convert the number codes stamped on the plate to the detailed description given in the Paint Color Chart. To ensure matching colors when ordering paint, it is necessary to provide the proper information from the finish and trim plate. Paint must be ordered through the Cessna Dealers' Organization. Use Parts and Accessories Order Form Number P312-12 supplied by Cessna on request.

NOTE

- Since "CODE" numbering or lettering changes with aircraft model changes, it is important that the respective aircraft Model and Serial Number Chart be observed when ordering paint.
- When ordering paint specify CES1054 (3 Digit Dash No.) or CES2800 (4 Digit Dash No.), add letter "P" (for pint), "Q" (for quart), "G" (for gallon) or "S" (for spray can) to the Dash No. Example: CES1054-170G or CES2800-2113G = 1 Gallon of Vestal White.

Primer - Mixture and Application.

NOTE

Mix EX2016G primer only in quantities required for use within six hours and then only in stainless steel bucket provided.

- a. Mix equal parts of EX2016G primer and T6070 diluent and stir thoroughly.
- b. Apply EX2016G primer in a well broken up, wet, even coat. If primer has to be sanded, sand and re-prime. Sanding breaks film, resulting in poor adhesion.

NOTE

On all leading edge surfaces, apply cross coat, wet and even, of EX2016G primer.

- c. Clean equipment immediately after use and under no consideration use EX2016G primer that has been mixed longer than six hours.

Polycarbonate Primer - Mixture and Application.

- a. Surfaces to receive primer shall be solvent

washed with isopropyl alcohol.

b. Primer shall be Lacco 600 SL9953, white - Red Spot Paint and Varnish Company or RV3649, white, Duralac Chemical Corporation. This primer shall be reduced to spray viscosity by thinning with Red Spot SL8381 or Duralac T901 respectively. Use approximately one volume of thinner for one volume of primer.

c. The first coat of reduced primer shall be dry sprayed to an approximate cured film thickness of 0.0003 to 0.0004 inch.

d. The sprayed coating shall be allowed to dry a minimum of one hour prior to overcoating.

Epoxy Primer.

Fiberglass parts that have been stripped of their primer should be primed with P-900 Sky spar surfaces, consisting of the following:

P-900 Sky spar Surfaces	Base Component
C-918 Catalyst Concentrate	Component I
C-916 Catalyst Thinner	Component II
T-262 Thinner	Component III

a. Surfaces to receive Epoxy primer should be sanded lightly so the outer laminated layer is not exposed.

b. Remove residue by wiping with a cloth dampened with Isopropyl Alcohol.

NOTE

Do not use wood filler, lacquer, putty or aerodynamic smoothers, such as White Streak or Bondtite on fiberglass.

c. Allow all materials when first mixed with a catalyst, to stand in a closed container for approximately one hour before use.

NOTE

Mixed material has a usable pot life of 8 hours. When the material becomes thick and starts to gel, it must be discarded.

Materials, Description and Mixing Instructions.

P-900 Surfaces is an epoxy resin and constitutes the base component of the system. By mixing with the C-918 Catalyst Concentrate and/or the C-916 Catalyst Thinner in varying proportions and thinning with T-262 Thinner, any desired consistency can be obtained, from heavy putty to a spraying viscosity.

a. Mix 12 parts of the base component with one part of Component I (Catalyst Concentrate). Mix thoroughly then cover the container and allow to stand 1 hour.

b. The mixture should be a thick, smooth putty and may be applied with a spatula or heavy bristled brush.

c. The material may be overcoated immediately with P-900 either by brushing or spraying. The material will be dry for sanding when it does not gum up in the sandpaper and sands off in a dry powder.

PAINT COLOR CHART

1974 MODEL 310Q0901 AND ON

Finish & Trim Code	EXTERIOR PAINT COLOR	Vinyl	Polyurethane	Finish & Trim Code	INTERIOR PAINT COLOR	CES 1054	CES 2800
A	VESTAL WHITE	-170	-2113		EPOXY PAINT		
B	VIVID ORANGE	-2244	-2243	89	PALM GREEN		-2233
C	FESTIVAL YELLOW	-2270	-2269	90	CORAL RED		-2232
D	SHADOW BLUE	-2283	-2262	91	TOPAZ GOLD		-2234
E	LIME	-2250	-2249	92	ROYAL BLUE		-2231
F	GRAY	-2266	-2265	93	BEIGE		-2161
G	REBEL RED	-2241	-2240	94	ONYX BLACK	-308	
H	BEIGE	-2257	-2256	95	CLOUD GRAY	-534	
J	BOMBAY BRONZE	-925	-2191				
K	INCA GOLD	-2247	-2246				
L	AWARD BLUE	-2260	-2259		LACQUER PAINT		
M	HUNTER GREEN	-611	-2252	98	PALM GREEN		-2229
N	VELVET BLACK	-171	-2114	99	CORAL RED		-2228
P	EXECUTIVE BROWN	-2254	-2253	100	TOPAZ GOLD		-2230
				101	ROYAL BLUE		-2227
				102	BEIGE		-2156
	EXTERIOR PROTECTIVE PAINT GRAY	-142		103	VELVET BLACK	-151	
SP	SPECIAL COLORS						

INTERIOR TRIM PAINT USAGE

116	BLACK SEMI-GLOSS LACQUER - USED ON: BRAKE LINKS MASTER CYLINDER CONTROL COLUMN BRAKING BRAKE BRACKET - QUADRANT - VISABLE PARTS ON INSIDE RUDER PEDEALS	-156		SUNVISOR - EXPOSED PARTS CABIN AND BAGGAGE DOOR - EXPOSED PARTS			
	DULL BLACK - LACQUER USED ON: DEFROST DUCTS COMPASS COMPASS PEDESTAL STATIC PRESSURE PLATE - ALT SOURCE WINDSHIELD RETAINERS REAR VIEW MIRROR BRACKET	-193		DUSTY PEACH - LACQUER USED ON: BUTTONS - UPHOLSTERY SNAP - WING LOCKER	-535		
	ONYX BLACK - EPOXY USED ON: QUADRANT COVER TRIM WHEEL	-308		CLOUD GRAY - ACRYLIC LACQUER USED ON: NACELLE BAGGAGE DOOR FRAME - EXPOSED PARTS ONLY NACELLE BAGGAGE DOOR - INSIDE SURFACE	-857		
	CLOUD GRAY- EPOXY USED ON: END FITTING - CURTAIN TRACK DIVIDER	-534		BLACK SUEDE COATING USED ON: DECK SKIN AND PANEL	-882		
				CADET GRAY - LACQUER USED ON: INSTRUMENT PANEL CIRCUIT BREAKER PNL SILKSCREEN CIRCUIT BREAKER PNL AND PLUG BUTTONS			-2106

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SPECIAL INSPECTION
200 HOURS
100 HOURS
50 HOURS

VACUUM SYSTEM (Continued)

- 9. Vacuum System Central Air Filter - Clean and inspect for deterioration and contamination
- 10. Vacuum System Relief Valve - Inspect security and condition. Replace filter

DEICE SYSTEM

- 1. Deice System - Check for leaks, condition and operation of controls, lines and clamps for security
- 2. Deice Boots - Check for abrasions, cuts, nick and security of mounting
- 3. Deice Filter - Clean

PITOT STATIC SYSTEM

- 1. Sump - Check for cracks, dents, leaks and presence of water
- 2. System - Leak check
- 3. Altimeter - Inspect as required by CFR Part 91, paragraph 91.411 in accordance with FAR Part 43, Appendix E, by authorized repair station
- 4. Alternate Static Drain - Check

ALCOHOL WINDSHIELD ANTI-ICE SYSTEM

- 1. Check reservoir for proper service
- 2. Check nozzles for security and obstructions
- 3. Anti-ice System - Check for leaks, condition and operation of controls
- 4. Pump - Check for condition and security

ELECTRICAL SYSTEM

- 1. Airplane and systems Wiring - Check for chafing, broken or loose terminals and general condition
- 2. Junction Box - Check terminal for condition and security
- 3. Circuit Breaker Panel - Check terminals, wiring and mountings
- 4. Regulators - Check wiring, mounting, condition and wire routing
- 5. Switches - Check operation, terminals, wiring and mounting
- 6. Landing Gear Relay and Limit Switch - Check mounting and terminals
- 7. Wing and Fuselage - Check wiring, routing, security and terminals
- 8. Battery - Electrolyte specific gravity
- 9. Battery Cables - Check for corrosion and terminals for security
- 10. Instruments and Interior Lights - Check for operation and security
- 11. Radio and Navigation System - Check for operation and condition
- 12. Instrument Panel and Control Pedestal - Check mountings and terminals for security, check bonding between stationary panel and instrument panel for proper ground - resistance must be 0.010 ohms or less
- 13. Emergency Locator Transmitter - Check for condition, security and battery pack for proper charge
- 14. Flap Limit Switch and Motor - Check wiring and terminals for condition and security
- 15. Warning Lamps - Check condition

POST INSPECTION

- 1. Correct all discrepancies, replace all fairings, doors and access covers
- 2. Ground check engine, check ignition drop, alternator charging rate, oil pressure and general operation of components

SERVICE LETTERS

- 1. Check that all applicable Cessna Service Letters and Service Bulletins are complied with
- 2. Check that all applicable current airworthiness regulations are complied with

7

NOSE AND MAIN LANDING GEAR RIGGING INSPECTION.

The nose and main landing gear rigging inspection should be performed indoors with proper jacks, 28 volt power supply, 0 to 150 pound spring scale and an 0880001 actuator arm tension tool available.

The airplane should be placed on jacks, the necessary access plates, seats, cabin divider, carpets, floorboards removed, and the landing gears 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.

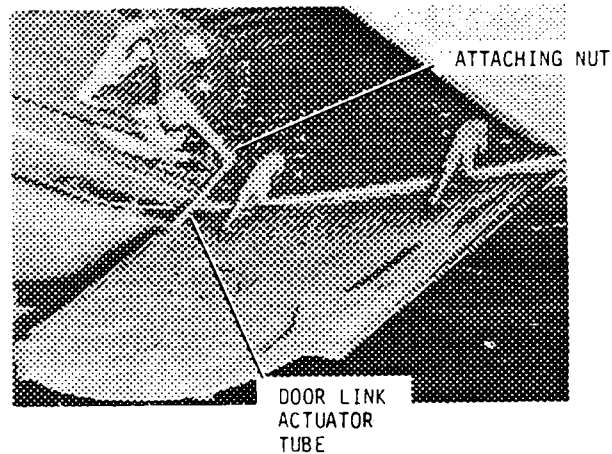
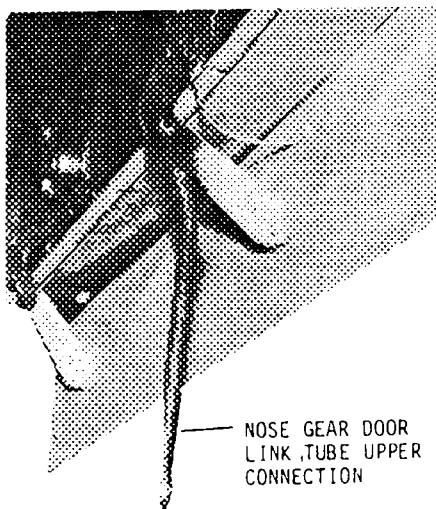
CAUTION: WHEN OPERATING THE LANDING GEAR ALWAYS BE PREPARED TO STOP TO PREVENT DAMAGE TO THE SYSTEM.

AFTER REMOVAL OF RETRACTION LINKAGE, ASSIST SPRINGS OR COMPONENT PARTS FOR CHECKING, THEY MUST BE REINSTALLED BEFORE PROCEEDING TO THE NEXT STEP.

**start
here**



DETAIL A DISCONNECTING LANDING GEAR DOORS

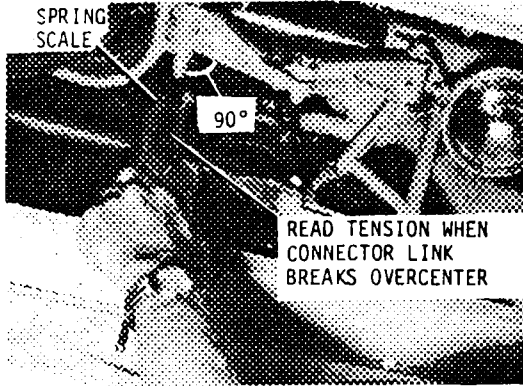


- i. Disconnect nose and main landing gear doors.

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.

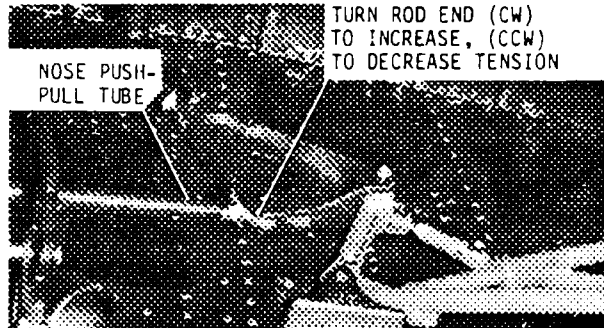
Nose and Main Landing Gear Rigging Inspection
Figure 2-8A (Sheet 2)

DETAIL L CHECKING NOSE GEAR UPLOCK TENSION



1. Inspect nose gear uplock tension
100 ± 20 pounds

▶ DETAIL L-1 ADJUSTING NOSE GEAR UPLOCK TENSION



1. If the nose gear uplock tension is not 100 ± 20 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.

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Landing Gear Actuator.

- a. Cleaning.
 1. Clean external parts of landing gear actuator assembly and reduction gear by wiping with a clean cloth.
 2. Dampen cloth with a suitable cleaning solvent to remove oil or grease accumulations.
- b. Inspection.
 1. Inspect assemblies externally for visible damage such as cracks, nicks, dents and scratches. Check upper and lower bell cranks and splines on the protruding portions of sector shaft for visible damage.
 2. Check landing gear actuator for proper operating times as follows:
 - (a) Flight check for excessive noise and for free, proper operation.

NOTE: Use maximum airspeeds placarded in airplane for extension and retraction tests.

- (b) Flight check time for full retraction "UP", amber light on 10 to 14 seconds. Time for full extension "DOWN", green lights on 5 to 9 seconds.
- (c) If during flight check, the landing gear will not retract and extend within the time limit described in step (b), remove the landing gear motor and perform the following no load test:
 - (1) Mount motor securely in a horizontal position.
 - (2) Connect motor as shown in Figure 2-8B to a variable 30 volt, DC power supply.
 - (3) Connect switch S3 for either direction.
 - (4) Open switch S2 to read ammeter.
 - (5) Close switch S1 to start motor.
 - (6) Gradually increase voltage from zero until the brake releases.

NOTE: The brake releasing may be indicated either by sound or the armature starting to turn.

- (7) Read voltmeter when brake releases. Brake must release at or less than 18 volts.
- (8) Stop motor, close switch S3 for opposite rotation and repeat steps (3) through (7).
- (9) Voltage must be within the same limits as previous rotation.
- (10) If the voltage is not within the limits as described in step (7), refer to Troubleshooting the Landing Gear Actuator Motor, Section 4.
- (11) Run motor in each direction as shown connected in Figure 2-8B with 24 volts DC applied.
- (12) Open switch S2 and read ammeter current. The ammeter should read approximately 7.5 amperes under no load when the RPM is approximately 4000 RPM.
- (13) Stop motor, close switch S3 for opposite rotation and repeat step (12).
- (14) Motor should operate within limits as described in step (12).
- (15) If the motor does not operate within the limits as described in step (2), refer to Troubleshooting the Landing Gear Actuator Motor, Section 4.
- (d) If the motor will not meet operating requirements after performing a no load check, replace motor and repeat step (b).
- (e) If the gear still will not meet flight check requirements, check all linkage and hinge points for binding or interference.
- (f) If no evidence of binding or interference is found, landing gear actuator must be replaced or overhauled in accordance with Cessna Landing Gear and Flap System Components Overhaul/Parts Manual.

- c. Servicing.
 1. Refer to Lubrication Diagram, Figure 2-12, and service components as shown.

SERVICING AND INSPECTION

- (e) Check that mounting clamp bolts or screws are torqued properly by evidence of torque putty.
- (f) If the torque putty is broken or cracked, remove putty, torque bolts 20-25 inch-pounds and apply white lacquer torque putty to bolts for future inspections.
- (g) Inspect chain guard for condition and attachment.
- (h) Visually inspect cable for deterioration and lubrication. Inspect travel stop blocks for security. Inspect cables for fraying, chafing, routing, cleanliness, cable tension and turnbuckle safetying. Inspect chains for proper safety at all points and chains for proper alignment on actuator sprockets.

3. Rudder and Rudder Trim Tab Travel and Deflection Check.

- (a) Check travel on rudder (310P0001 and on), left $29^{\circ} +1^{\circ}$, -0° (Turbo 310P0001 and on), left $34^{\circ} +1^{\circ}$, -0° and right $34^{\circ} +1^{\circ}$, -0° measured perpendicular to hinge line.
- (b) Check travel on rudder trim tab left $25^{\circ} +1^{\circ}$, -0° ; right $20^{\circ} +1^{\circ}$, -0° measured perpendicular to hinge line.
- (c) Check rudder trim tab deflection (free play) as follows (see Figure 2-8C):
 - (1) With rudder and rudder trim tab in neutral position, restrain the rudder control surface and manually deflect the tab at the trailing edge at a point where the actuator push-pull rod is located. Using approximately one pound of force, deflect the tab in one direction and measure the deflection from neutral using the control surface as a reference, then measure the deflection from neutral in the opposite direction. The sum of the two deflections must not exceed 0.070 inch at the upper end of tab. If the sum of the two deflections exceeds 0.070 inch, replace the bolts in the pushrod and recheck; if unacceptable, replace bearing in actuator screw end and recheck; if unacceptable, replace trim tab horn bearing and recheck; if still unacceptable, adjust actuator to remove end play from actuator. Actuator is adjusted by removing groov-pins, rotating bearing past existing groov-pin holes then applying pressure to force bearing inward, then

drilling new groov-pin holes in the bearing from existing holes in housing; install groov-pins. If trim tab deflection is still unacceptable, replace the trim tab actuator and insure areas are properly safetied.

4. Check rudder and rudder trim tab friction forces as follows:

- (a) The rudder and rudder trim cables shall be rigged to proper tension. Rudder cables 25 ± 5 pounds and rudder trim cables 10 ± 3 pounds.
- (b) Raise nosewheel clear of ground.
- (c) Hold gage against the lower portion of each left and right rudder pedal and apply pressure gradually.
- (d) Record the breakout force, the continuous movement force and the terminus force.

NOTE

Terminus force is the maximum force registered to move the control from 85% to 98% of the travel.

- (e) Measure the breakout force from neutral position of the rudder each way left and right. Breakout force must not exceed 20 pounds.
- (f) Determine the continuous movement force by displacing the rudder off center at least 50% of travel; then measuring the pedal force when the rudder passes through the neutral position. Continuous movement force must not exceed 18 pounds.
- (g) Determine the terminus force. Terminus force for the Model 310 must not exceed 50 pounds without autopilot, 53 pounds with autopilot. Terminus force for the Model T310 must not exceed 57 pounds without autopilot, 60 pounds with autopilot.
- (h) Rudder trim tab friction forces shall be measured tangent to the control wheel.
- (i) Throughout the travel, record maximum force. Maximum allowable friction force is 6 pounds.
- (j) If friction forces are greater than maximum allowable, check the following:
 - (1) Hinges, bearings, fairleads, cable routing, rudder pedals and rudder balance weight for security and proper mounting.
 - (2) Check for misaligned cables and pulleys, pulley bearings for seizing and hinges for binding or obstructions.
 - (3) Check fairleads for excessive wear.
 - (4) Check rudder pedals for freedom of movement, lubrication for evidence of damage or wear.

WARNING : ALL REPAIRED COMPONENTS MUST BE REPLACED WITH A NEW COMPONENT.

8. Perform a visual inspection of the removed engine exhaust system components.
9. Using artificial light and inspection mirrors, visually inspect the inside and outside surfaces of removed components for repairs, bulging, cracking, material deformation, warped mating surfaces, eroded flange surfaces, and integrity of welds.
10. Inspect "V" band clamp(s).

NOTE : Multi-segment "V" band clamp(s) are life-limited to 400 hour. After completing this Disassembly inspection and installation of new clamps, the clamps must be replaced on every 500 hours of operation.

- (a) (Refer to Figure 2-10A, Detail D and View B-B). Using artificial light and inspection mirrors, inspect the multi-segment "V" band clamp(s) surface(s) for signs of cracks or fractures. If cracks or fractures are visible, replace the clamp(s).
 - (b) (Refer to Figure 2-10A, Detail C). Using artificial light and inspection mirrors, inspect the one-piece "V" band clamp(s) surface(s) adjacent to the intersection of the "V" apex and bolt clips, and the entire length of the "V" apex of the clamp for signs of cracks or fractures. If cracks or fractures are visible, replace the clamp(s).
11. (Refer to Figure 2-10B). Perform a Digital Ultrasonic Thickness inspection of the engine exhaust system components except risers for wall thickness.

NOTE : The ultrasonic test system shall meet the minimum requirements as stated; the test equipment shall be a digital ultrasonic thickness gage capable of operating in a frequency range of 10-20 MHz. The minimum resolution of the instrument shall be 0.015 inch in steel. The transducer shall be a delay line type with a frequency between 10-20 MHz. The stand-off shall possess a maximum diameter of 0.19 inch.

WARNING : COMPONENTS WHICH DO NOT MEET THE REQUIREMENTS SHALL BE REPLACED. WALL THICKNESS OF EXHAUST TUBES SHALL BE NO LESS THAN 0.020 INCH. WALL THICKNESS OF SLIP JOINTS SHALL BE NO LESS THAN 0.025 INCH. (FIGURE 2-10B, DETAIL C).

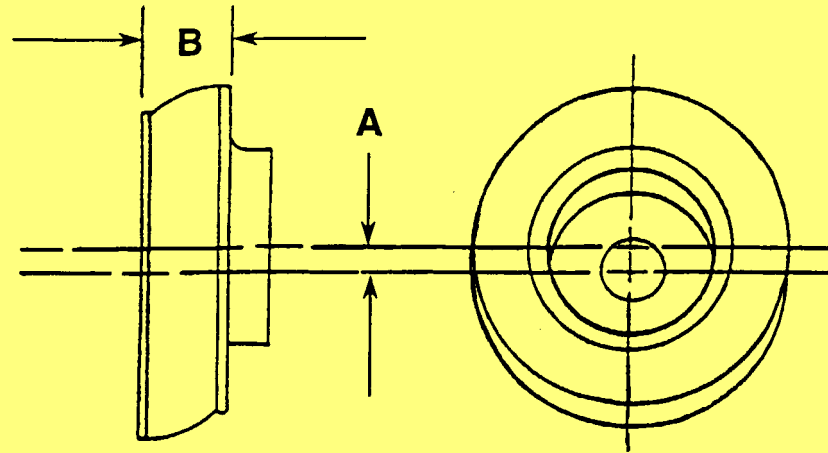
- (a) Ultrasonic thickness gage calibration.

NOTE : Instrument calibration shall be accomplished in accordance with the manufacturers recommendations.

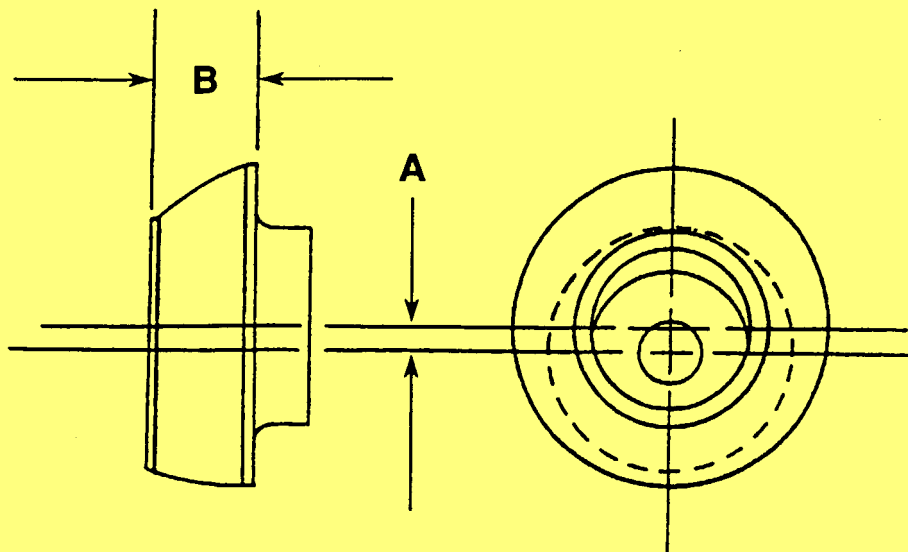
- 1 The instrument shall be calibrated using the 0880000-5 and 0880000-4 calibration standards.
- 2 The instrument shall be calibrated for a thickness range of 0.020 inch to 0.063 inch for 321 stainless steel.
- 3 The instrument shall be recalibrated at 30 minute intervals.

NOTE : Any change in accessories, or interruption of power supply also require recalibration.

- (b) (Refer to Figure 2-10B, Detail A). Inspect the exhaust system components for wall thickness.
 - 1 The exhaust components shall be inspected at the identified locations in Figure 2-10B.
 - 2 (Refer to Figure 2-10B, View A-A). Four measurements shall be taken at each location, and separated by 90°.
 - 3 Components which do not meet the requirements shall be replaced. Wall thickness of exhaust tubes shall be no less than 0.020 inch. (Figure 2-10B, Detail A). Wall thickness of slip joints shall be no less than 0.025 inch. (Figure 2-10B, Detail C).




FLAT (UPPER PAD)



CONICAL (LOWER PAD)

Model	Engine	Mount Assembly	Mount Component	Max. "A" Eccentricity	Min. "B" Thickness
310	IO470V	J-12390-1	J-12397-1	0.20 Inch	0.86 Inch
			J-12165-3	0.20 Inch	1.00 Inch
Turbo 310	TSIO520B	J-9613-31	J-9612-23	0.08 Inch	1.22 Inch
			J-9612-24	0.08 Inch	1.22 Inch
			J-9612-32	0.12 Inch	1.20 Inch
			J-9612-33	0.12 Inch	1.20 Inch

1051X1001
 1051X1002

 Engine Mount Inspection Limits
 Figure 2-11 (Sheet 1)

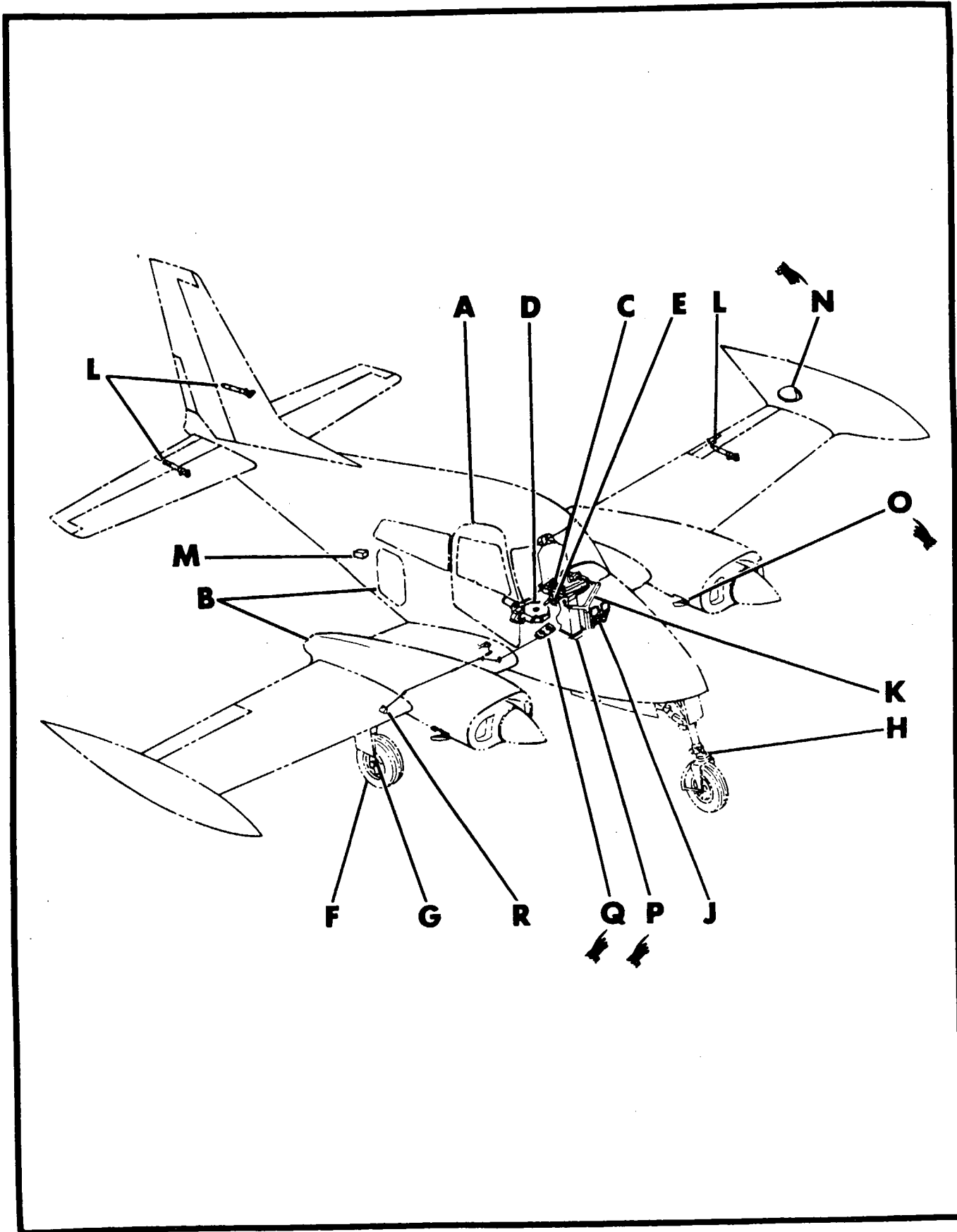
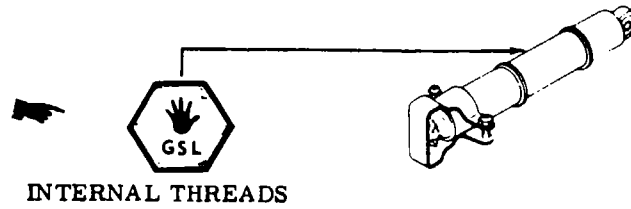


Figure 2-12. Lubrication Diagram (Sheet 2 of 15)

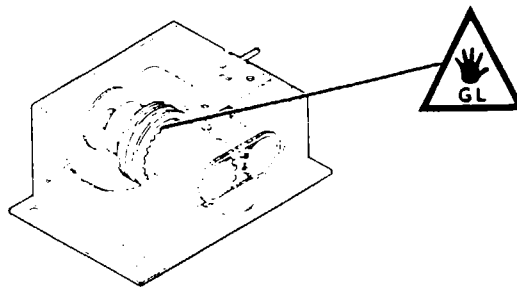
TRIM TAB ACTUATORS

INTERNAL THREADS

Detail **L**

NOTE

CLEAN AND REPACK AILERON,
ELEVATOR AND RUDDER ACTUATORS
WITH DOW CORNING #33 LIGHT
CONSISTENCY SILICONE GREASE.

ELECTRIC TRIM TAB ACTUATOR

NOTE

ELECTRIC TRIM TAB ACTUATOR
DRUM AND CABLE MUST BE FREE
OF GREASE AND OIL.

Detail **M**

COMPONENT	LOCATION
Heater	
Filter and Solenoid	Right wing
Igniter Plug	Located in heater combustion chamber
Warning Relay	Right side of nose wheel well next to heater
Shutoff Valve	Right wing gap area
Thermostat	Inside ducting in right nose
Fuel Pump	On fuel pump motor
Inverter	Mounted forward of instrument panel \mathcal{Q}_L of aircraft
Junction Box	
Left	Left side of cabin, floor level, F. S. 100.00 back of upholstery panel
Right	Right side of cabin, floor level, F. S. 100.00 back of upholstery panel
Landing Gear	
Actuator and Motor	Between front and rear spar under floorboard (LH side)
Limit Switch (Down)	Top of landing gear actuator
Limit Switch (Up)	Top of landing gear actuator
Actuator Relays	Aft of actuator under floorboards
Safety Switch	Left landing gear strut
Nose Indicator Switch (Up)	Mounted on up lock torque tube
Nose Indicator Switch (Down)	Mounted on nose gear retracting linkage
Left Indicator Switch (Down)	Mounted on left side brace lock link
Right Indicator Switch (Down)	Mounted on right side brace lock link
Lighting	
Landing	Tip tank tail cap
Strobe Light	Forward tip tank nose and tail cone
Strobe Light - Power Units	In tailcone area
Wing Walkway Light	Right side of fuselage under cabin door
Courtesy Light Switch	Below baggage door stop
Wing Locker Baggage Light	Baggage nacelle wall
MAA Plate	Aft side of forward cabin door post
Propeller	
Synchronizer Actuator	Mounted in aft portion of RH nacelle
Control Box	Mounted on glove box RH side
Unfeathering Accumulator	Mounted on outboard side engine mount
Starter	
Solenoid	LH engine nacelle
Vibrator	LH panel brace forward of instrument panel
Terminal Blocks	
TB5 (Optional)	Mounted on aft side of stereo
TB14 (Engine Instr. Lts.)	Forward of instrument panel at \mathcal{Q}_L of aircraft
TB15 (Flight & Radio)	Forward of instrument panel left of \mathcal{Q}_L of aircraft
TB16 (Electroluminescent)	Forward of instrument panel at \mathcal{Q}_L of aircraft

Figure 2-14. Components and Location Chart (Sheet 2 of 3)

b. Remove emergency exit window by removing cover (20) and actuating release ring (21) thus releasing cable ends (15) from latch assemblies (16).

c. Supporting emergency exit window, push outward until pivot pins (8) and clips (10) clear fuselage structure.

Installation of Emergency Exit Window.
(See figure 3-5.)

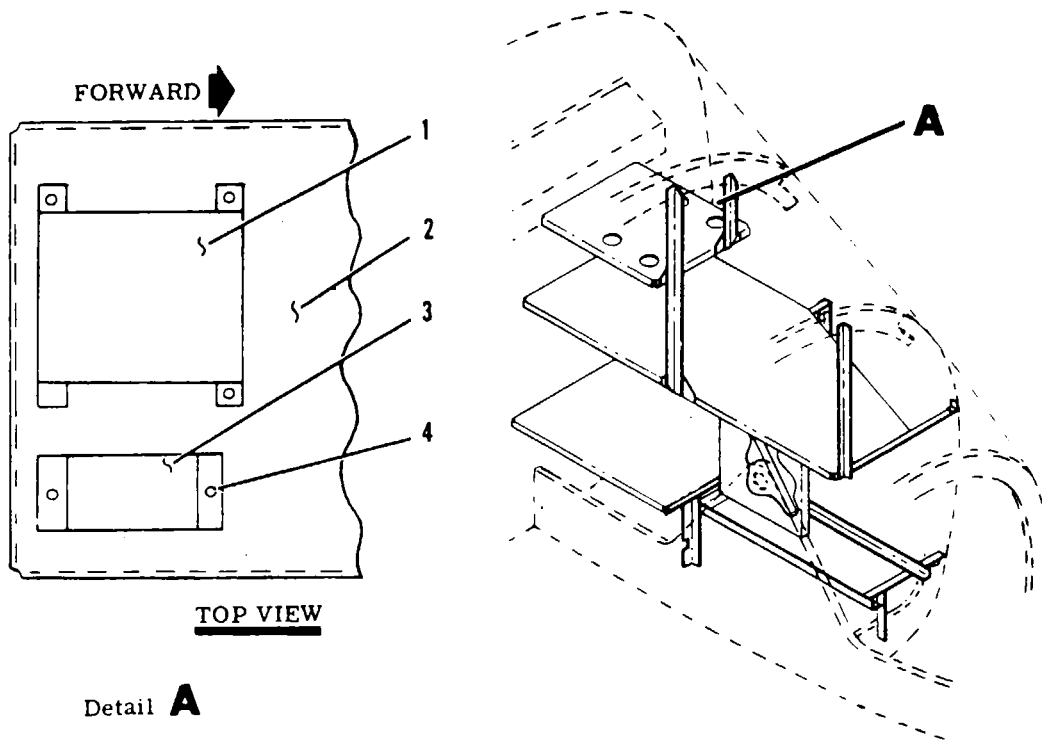
NOTE

Prior to installation, check each clip to ensure it is structurally sound. If it has been previously bent or shows signs of fatigue it shall be replaced. Clip may be fabricated in accordance with detail in figure 3-5.

a. Hold emergency window assembly at a slight angle, engage pivot pins (8) into fuselage structure and position window in fuselage frame.

NOTE

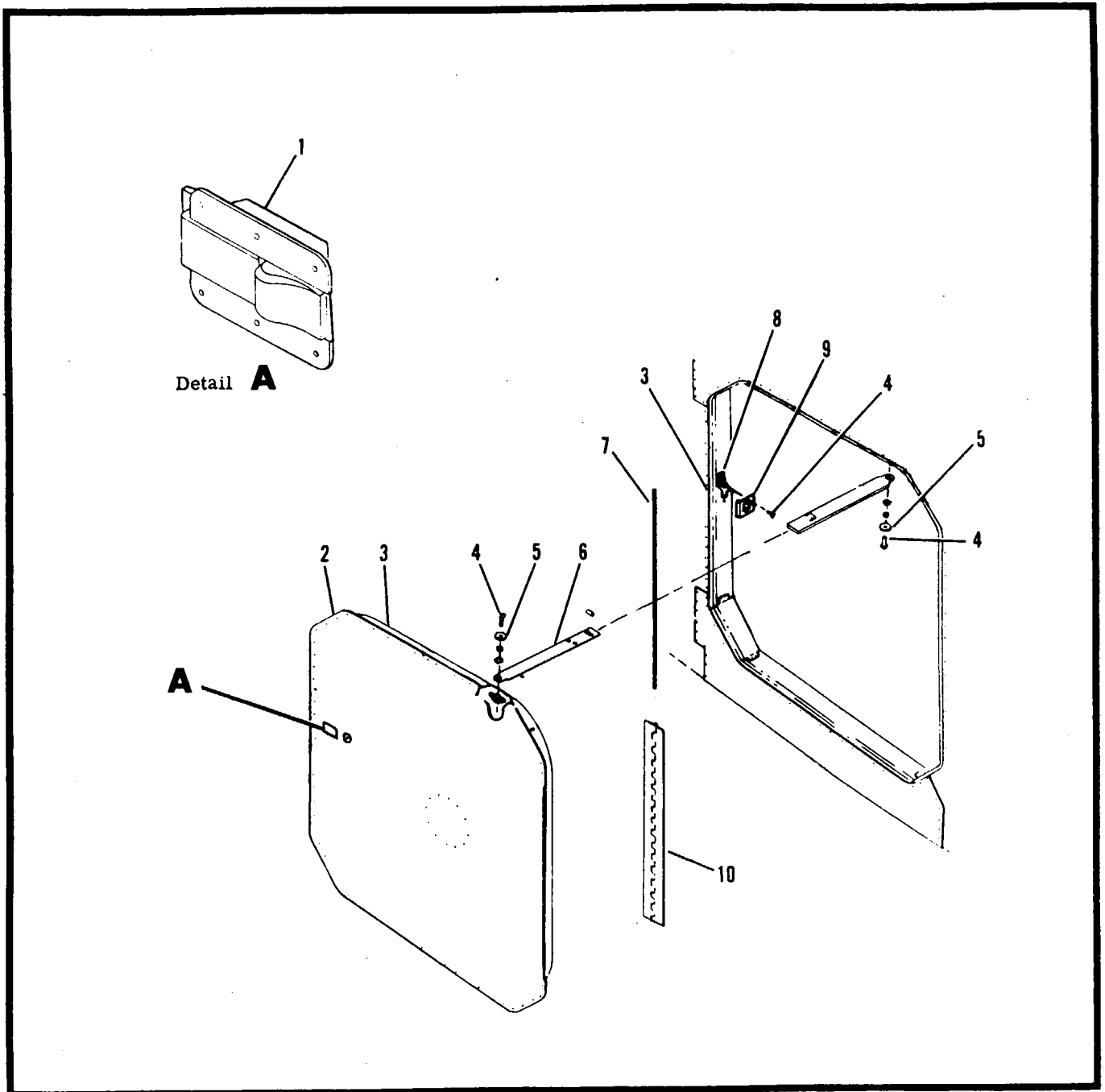
Pivot rings (8) are provided with adjustable mountings. Normally the pivot pins settings are not disturbed during emergency window removal. If pivot pins settings were disturbed, it will become necessary to realign them on installation. This is accomplished by loosening the four screws in the mounting plate.



1. Temperature Controller
2. Timer Shelf

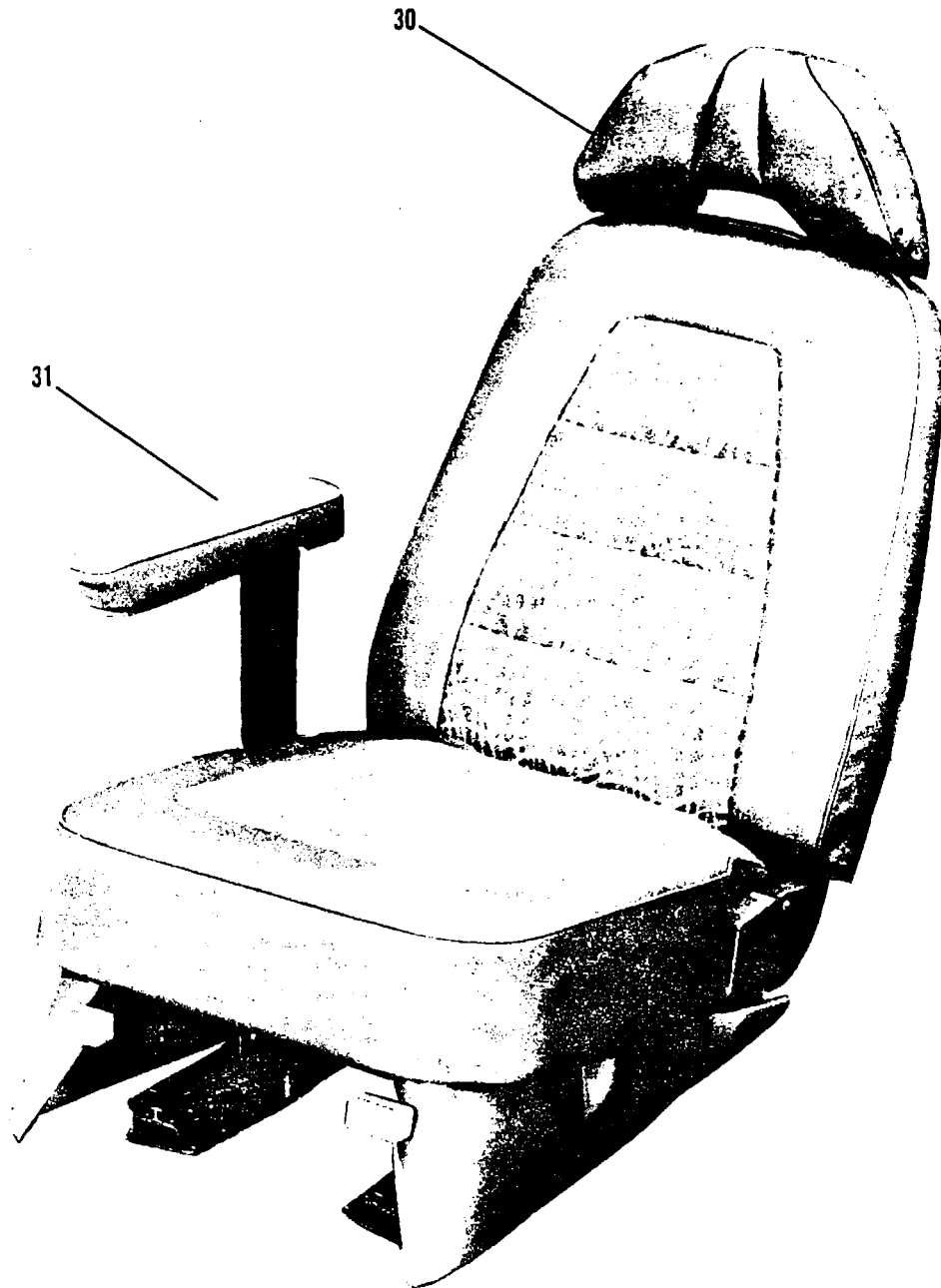
3. Relay
4. Screw and Nut

Figure 3-3. Heated Windshield Components Installation



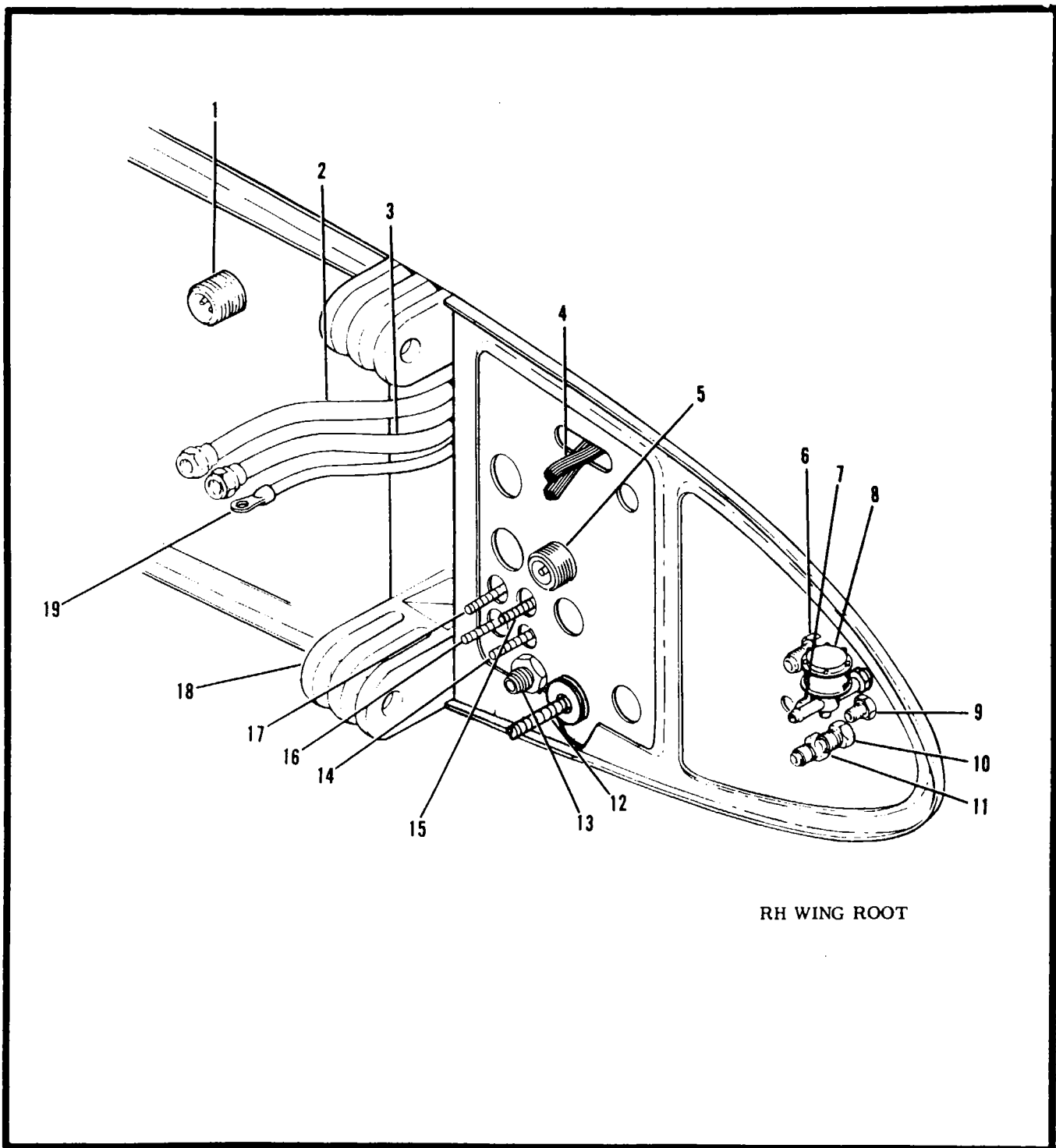
- | | | |
|-----------------------|--------------------|-------------------|
| 1. Baggage Door Latch | 10. Hinge Assembly | 19. Latch Pin |
| 2. Upholstery Panel | 11. Clevis | 20. Guide |
| 3. Seal | 12. Spring Washer | 21. Plate |
| 4. Screw | 13. Bellcrank | 22. Nut |
| 5. Washer | 14. Push Rod | 23. Spacer |
| 6. Door Stop | 15. Handle | 24. Bellcrank |
| 7. Hinge Pin | 16. Spring | 25. Lock Assembly |
| 8. Esna Nut | 17. Pin Assembly | 26. Arm |
| 9. Striker Plate | 18. Roll Pin | 27. Cover |

Figure 3-9. Baggage Door and Latch Assembly Installation (Sheet 1 of 2)



310Q0201 AND ON

Figure 3-13. Individual Adjusting Center Seat (Sheet 3 of 3)



RH WING ROOT

- | | |
|--|--|
| 1. Electrical Connector (Auxiliary Fuel) | 11. Fitting (Brake Line) |
| 2. Fuel Line (Crossover) | 12. Flex Cable (Fuel Selector Valve) |
| 3. Fuel Line (Crossover) | 13. Fitting (Deice Line) |
| 4. Wire Bundle | 14. Flex Cable (Mixture Control) |
| 5. Electrical Connector (Magnetos) | 15. Flex Cable (Alternate Air Control) |
| 6. Fitting (Heater Fuel Line) | 16. Flex Cable (Throttle Control) |
| 7. Fitting (Manifold Pressure Line) | 17. Flex Cable (Propeller Control) |
| 8. Pressure Relief Valve | 18. Fuselage Front Spar Fitting |
| 9. Fitting (Fuel Pressure Line) | 19. Starter Cable |
| 10. Fitting (Oil Pressure Line) | |

Figure 3-19. Wing Connections

LANDING GEAR AND BRAKE SYSTEM

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LANDING GEAR SYSTEM

WARNING: Anytime a landing gear retraction or extension system component has been removed, replaced or the tension on the downlocks adjusted, the entire landing gear system must be re-rigged.

The fully-retractable tricycle landing gear consists of a main gear located aft of each engine nacelle, and a nose gear located near the forward end of the fuselage. Each landing gear is mechanically connected to a single gearbox, which is normally driven by an electric motor. In the event of landing gear electrical system failure, the landing gear can be extended by operating a hand crank, located at the right side of the pilot's seat. Landing gear overtravel during operation is prevented by limit switches, which open the electrical circuit to the motor when the correct amount of travel has been attained. A safety switch prevents accidental retraction on the ground by opening the landing gear electrical circuit while the weight of the airplane is on the landing gear.

tube (35) and intermediate drive tube (40) to idler bellcranks (7) with bolts, spacers and nuts.

s. Connect forward push-pull tube (42) to lower bellcrank (50) with bolt, washer, nut and cotter pin.

t. (See figure 4-6.) Connect main gear doors (6) to links (3) with bolt, spacer, washer and nut.

u. Connect battery terminals.

v. Perform an operational check of landing gear, checking especially that limit switches are correctly adjusted and landing gear is correctly rigged. Refer to landing gear rigging procedures.

w. Install access hole covers on cabin floor and underside of fuselage, beneath landing gear actuator.

x. Install the carpet in accordance with Section 3.

y. Insure that landing gear is DOWN, then remove jacks.

CABIN STEP SYSTEM.

During retraction of the landing gear, a cable connected to the landing gear actuator retracts the cabin step into a well provided for it in the bottom right side of the fuselage. During extension of the landing gear, spring tension forces the step to extend. Extension and retraction are simultaneous with landing gear operation.

Removal of Cabin Step System. (See figure 4-2.)

a. Remove the rear seats and center and rear carpet in accordance with Section 3.

b. Remove the two access covers between the front and rear spars, also the three access covers aft of the rear spar, in accordance with Section 1.

c. Remove skin access cover from below landing gear actuator.

d. Disconnect cable at turnbuckle (36).

e. Disconnect cable from spring bail (35) by removing spring bail.

f. Remove cable (13) from pulley by removing cotter pin, washer, pin and clamp.

g. Remove cable (13) from aircraft.

h. Disconnect cable (31) from arm (22) by removing cotter pin and pin.

i. Remove cable (31) from aircraft.

j. Remove cabin step assembly from aircraft, being careful to disengage spring (23) from step support (32) when bolt, washer and nut are removed.

k. Location and parts necessary for disassembly or assembly of the cabin step assembly and pulley are clearly shown in figure 4-2.

l. For removal of pulley track (12) from landing gear actuator, refer to "Removal of Landing Gear Actuator."

Installation of Cabin Step System. (See figure 4-2.)

a. Place bail at end of cable (13) just outside of the pulley track (12) and with the cable (13) in the pulley, install clip and secure with pin, washer and cotter pin.

b. Route cable (13) aft through pulley (3) and attach spring bail (35).

c. Make certain that cotter pins are installed in

pulley bracket (4) to prevent the cable from leaving the pulley track.

d. Attach the short cable between the turnbuckle (36) and the spring bail (35).

e. Attach the cable (31) to arm (22) by installing pin and cotter pin.

f. Before installing step assembly, make certain that spacer (24) is installed.

g. Install spring (23) on step assembly. Preload spring 160°.

h. Place step assembly, with spring (23) installed into step support (32) and install bolt, washer and nut.

i. Route cable (31) through pulley (16).

j. Make certain that cotter pins are installed in pulley bracket (17) to prevent the cable from leaving the pulley track.

k. Raise the cabin step by hand and note that the spring (23) returns the cabin step to the extended position.

l. Raise the cabin step by hand to provide slack in cable (31) and install turnbuckle (36).

m. After turnbuckle (36) is installed, then return step to its extended position.

n. Adjust the turnbuckle (36) to place tension on the cable until just a small amount of light may be seen between the step assembly and step stop.

o. Check the cabin step installation as follows:

1. Jack aircraft in accordance with Section 2.
2. Raise the cabin step into the fuselage well by hand to make certain there are no obstructions.
3. Retract landing gear using normal retraction system

NOTE

Use of an external power source is advisable to prevent draining battery power.

4. Note that the cabin step retracts fully into the step well.

5. Using a spring scale, it should require approximately 4 to 6 pounds pressure to move the cabin step downward a short distance.

6. Safety turnbuckle.

7. Insure that landing gear is DOWN and remove jacks.

p. Install the floorboard access covers and skin access cover in accordance with Section 1.

q. Install the center and rear carpets and the rear seats in accordance with Section 3.

MANUAL EXTENSION SYSTEM.

The manual extension system consists of a hand crank, which is connected to the landing gear actuator by an arrangement of chain and sprockets, bellcrank, miter gears, and push-pull rods. The hand crank located at the right of the pilot's seat is normally in a stowed position. When unfolded into its operation position the hand crank disengages the normal landing gear operating system, and allows the gear to be operated manually. A spring loaded release button is provided to unlock the hand crank so that it may be unfolded and stowed.

- b. Position gear in place; then install washers between supports and trunnion and align holes.
- c. Install attaching shafts into gear trunnion and align gear trunnion, washer, and bearing in the landing gear supports, then work the shafts into position, using care to align holes in shaft and trunnion for the installation of roll pin.

NOTE

The attaching shafts are a slip fit and should be lubricated with light oil to aid in the installation of the shafts.

- d. Remove AN6 bolt used in removal and installation of attaching shafts and install roll pin.
- e. Connect side brace and push-pull tubes and gear door using bolts, washers and nuts.
- f. Install safety switch and down indicator switch with screws and nuts and adjust in accordance with Rigging of Main Landing Gear.

NOTE

Make sure landing gear limit switches have all holes in switch housing plugged and packed with DC-4 Silicone Compound to prevent moisture entering limit switches.

- g. Remove plug and caps and connect brake hose to union at bulkhead at forward wheel well. Use suitable lubricant on threads.
- h. Install clamps securing switch wire bundle and brake hose.
- i. Service and bleed brake system in accordance with Servicing Instructions, Section 2.
- j. Perform operational check on landing gear.
- k. Remove jacks and inflate strut in accordance with Section 2.
- l. Check landing gear alignment in accordance with Main Wheel Alignment and figure 4-29.

Removal of Main Gear Torque Links. (See figure 4-5.)

The removal procedures are the same for either left or right main landing gear torque links.

- a. Check alignment of main landing gear wheels in accordance with alignment procedures.
- b. With main landing gear wheels aligned and jacks removed, mark the relative position of each main landing gear piston and axle assembly, and trunnion assembly to facilitate aligning of parts for installation.

NOTE

Use a grease pencil for marking.

- c. Mark extension of landing gear strut.
- d. Jack the aircraft in accordance with Section 2.

NOTE

Make sure jack is positioned to allow removal of wheel and brake assembly.

- e. Remove brake, wheel and tire assembly in accordance with Section 4.
- f. Deflate strut in accordance with Section 2.
- g. Disconnect landing gear door and tie out of way.
- h. Disconnect torque link braces by removing cotter pins (23), nut (20), bolt (15), washers (21) and spacer (18).

NOTE

Washers located between torque link braces control toe-out, and must be retained and replaced in removal order, for proper wheel and torque link brace alignment.

- i. Remove roll pin (13) using a suitable drift punch.
- j. Remove shaft (12) using a suitable drift punch.
- k. Remove torque links (14).

Disassembly of Main Gear Torque Links. (See figure 4-5.)

Bushings (19 and 26) are press-fit and should be removed only for replacement. When replacement becomes necessary, proceed as follows:

- a. Remove grease fittings.
- b. Using a bench vise, wood blocks and proper size shaft or punch, press out bushings (19 and 26).

CAUTION

Take precaution when removing bushings to prevent damage to torque link.

Assembly of Main Gear Torque Links. (See figure 4-5.)

- a. Press in bushings (19 and 26) using bench vise, with necessary wood block and proper size punch.

NOTE

Bushings (19 and 26) must be pressed in wet using MIL-P-8585 zinc chromate primer or equivalent, and lube fitting holes of bushings aligned with torque brace lube fitting holes.

- b. Mill and finish installed bushings (19 and 26) flush with outside edge of torque link brace (14), break sharp edges 0.005 radius minimum. Bushings must not extend past edge of torque link brace.
- c. Insure lube fitting holes are clean and install lube fittings.

NOTE

Mill an equal amount on each bushing (26) using a flat mill file to provide a slip fit between the lugs on the torque link and the lugs on the trunnion and/or the lugs on the axle.

CAUTION

Anytime the floorboards are removed a temporary protective cover should always be used to prevent damage and improper settings of the landing gear actuator limit switches.

- c. Release compression on retracting linkage by engaging manual extension crank and operating a sufficient number of turns toward the up position to open the inboard main gear door 20° - 30°.

NOTE

Prior to any operation of the landing gear by the manual extension crank, assure the landing gear switch is in the neutral position and circuit breaker is pulled.

- d. (See figure 4-6.) Disconnect main wheel well door link tube (3) by removing nut and washer from the door actuators. (See figure 4-15.) Disconnect door link tubes (20) by removing nuts and bolts.

NOTE

Always disconnect nose gear door link tubes from the upper connection to prevent the possibility of connecting the lower connection to the wrong side of the hinge.

- e. (See figure 4-10.) Disconnect nose gear retracting linkage in the nose gear wheel well by removing nuts and bolts attaching nose push-pull tube (6) to fork bolt (7) and connector link (3) and removing push-pull tube (6).

- f. Disconnect the inboard end of both outboard drive tubes (15) by removing nut, spacers and bolt.

- g. Disconnect LH inboard drive tube (21) and RH inboard drive tube (17) at door actuator bellcranks (16).

CAUTION

During operation of landing gear actuator be prepared to stop to prevent any possible damage.

CAUTION

It is recommended that the inboard drive tubes be held during actuation to prevent damage to the structure. It may be necessary to install a length of safety wire in the drive tube ends to help hold tubes in position during operation.

- h. (See figure 4-1.) Adjust the UP and DOWN limit switches (17 and 34) on the landing gear actuator as follows:

1. Adjust both limit switches to the end of their adjusting slots in a direction which will permit maximum bellcrank travel.

NOTE

When adjusting either limit switch, align switch so that roller is contacted squarely by the bellcrank or drive tube.

2. Engage manual extension crank and operate toward the up position until the internal stop in the actuator is reached. To prevent possible damage to the actuator, do not force against the internal stop.

3. (See figure 4-1.) Note the angular position of the crank when internal stop is reached, back crank off toward the down position 2 turns of the hand crank, then advance crank 1/2 turn toward the up position. Adjust the up limit switch (17) so that it is just actuated at this point.

4. Engage manual extension crank and operate toward the down position until the internal stop in the actuator is reached. Do not force against the internal stop.

5. (See figure 4-1.) Note the angular position of the crank when internal stop is reached, back crank off toward the up position 2 turns of the hand crank, adjust the down limit switch (34) so that it is just actuated at this point.

6. After these preliminary adjustments to the limit switches have been made, stow the manual extension crank and operate the actuator electrically to the up position until the up limit switch is actuated.

CAUTION

Caution must be observed during actuation to insure that no damage is incurred by the disconnected ends of the main drive tubes.

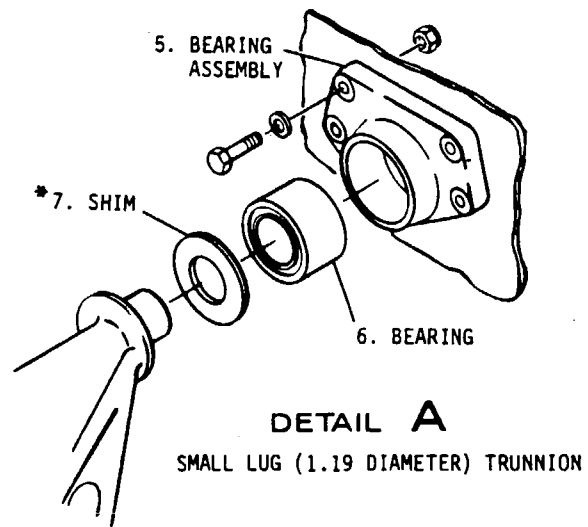
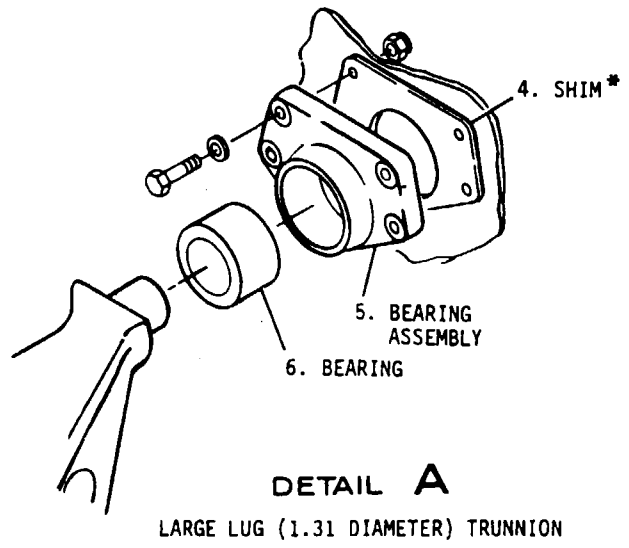
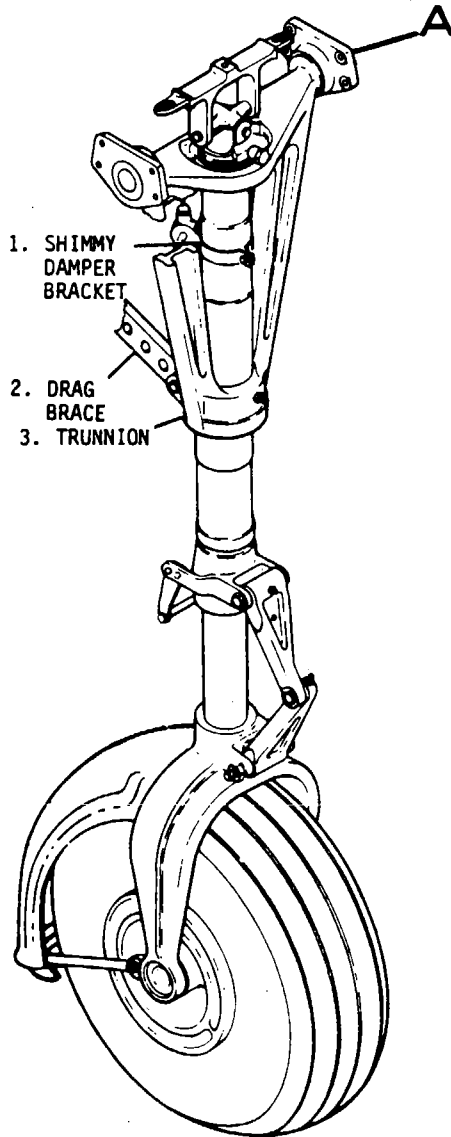
NOTE

To facilitate rigging of the landing gear, a two-position momentary ON switch with suitable lengths of electrical wires can be connected to the landing gear electrical circuit in such a manner that the landing gear can be observed while being operated during rigging. The use of an external power source is also recommended.

7. Engage the manual extension crank and note the angular position of the crank. Operate crank toward the up position noting the number of turns required to reach the internal stop in the actuator. The minimum number of turns required in the up position is three-fourths of one turn. The desired is 1-1/2 turns. If necessary, adjust the up limit switch to obtain this requirement.

8. Stow the manual extension crank and operate the actuator electrically to the down position until the down limit switch is actuated.

9. Engage the manual extension crank and note the position of the crank. Operate crank toward the down position and note the number of turns required to reach the internal stop in the actuator. The minimum number of turns required in the down position is one and the maximum (and desired) number of turns is two turns. If necessary, adjust the down limit switch to meet this requirement.



*NOTE: SHIM AS REQUIRED TO CENTER NOSE GEAR AND LIMIT SIDE PLAY TO NOT EXCEED 0.020.

Figure 4-14. Nose Gear Installation (Sheet 1)

14423004
A10421005
A10421005

1. Remove nut, washer, spacers and bolt attaching push-pull tube (5) to idler bellcrank (7).
2. Remove nut and bolt attaching push-pull tube (5) to outboard bellcrank (14).
 - i. Remove idler bellcrank (7) by removing bolt and washers. Remove spacer from idler bellcrank.

NOTE

Access to bolt for removal at idler bellcrank (7) is provided by a hole in the cabin floor above the bolt head.

- j. Remove torque tube (12) as follows:
 1. Remove adjusting bellcrank (9) by removing cotter pin and pin. If desired, fork bolt (18) can be removed from adjusting bellcrank.
 2. Remove inboard support bearing (10) by removing four nuts and bolts. Remove washer (4).
 3. Pull torque tube (12) inboard until it clears outboard support bearing (15), then tilt the outboard end upward and remove from nose section. Remove washer (4).
 4. If desired, outboard support bearing (15) can be removed by removing attaching nuts and bolts.
 5. Remove stop collar (11) from torque tube by removing cotter pin and pin

NOTE

Removal of collar (13) and outboard bellcrank (14) from torque tube (12) is not recommended. These are matched parts and collar (13) is a press fit.

- k. Remove connector link assembly (21) as follows:
 1. Remove bolt and nut attaching connector link assembly (21) to retracting arm (29).
 2. Remove nut, washer and bolt attaching connector link assembly (21) to adjusting rod end (22).

NOTE

Access to bolt for removal at adjusting rod end (22) is provided by a hole in the adjacent structure. Rotate connector link assembly to align hole.

1. Remove drag brace (26) as follows:
 1. Remove nut, washer, and bolt attaching drag brace (26) to truss assembly (24).
 2. Remove nut and bolt attaching drag brace to strut.
- m. Remove uplock torque tube (19) as follows:
 1. Remove nut and washer from each end of torque tube.

NOTE

Uplock torque tube (19) can be removed with left bearing assembly in place.

2. Remove bearing assemblies (20) by removing attaching nuts and bolts.

NOTE

Bearings are a press fit, and should be removed from supports only for replacement.

3. If desired, uplock hook (23) and adjusting rod end (22) can be removed from uplock torque tube.
- n. Remove truss assembly (24), retracting arm (29), and adjusting fork (27) as an assembly as follows:

1. Remove nut and bolt attaching switch bracket (25) to truss assembly (24).
2. Remove clamps attaching wires to retracting linkage and tie switch where it will not interfere with linkage removal.
3. Remove nuts, washers and bolts attaching truss assembly (24) to retainers (28).
4. Pull truss assembly (24) forward and remove from the aircraft.
5. If desired, retracting arm (29) and adjusting fork (27) can be removed from truss assembly by removing attaching nuts and bolts.
6. If desired, retainers (28) can be removed from aircraft by removing nuts, washers and bolts.

Installation of Nose Gear Retracting Linkage. (See figure 4-17.)

- a. Install truss assembly (24) as follows:
 1. If removed, install retracting arm (29) and adjusting fork (27) on truss assembly.

NOTE

Lower retracting arm (29) bolt is inaccessible after truss assembly is installed.

2. If removed, install retainers (28) with bolts, washers and nuts.
3. Place truss assembly (24) in position and attach to retainers with bolts, washers and nuts.
4. Install clamps attaching wires to retracting linkage and attach switch bracket (25) to truss assembly with bolt and nut.
- b. Install uplock torque tube assembly (19) as follows:
 1. If removed, attach uplock hook (23) and adjusting rod end (22) to uplock torque tube.
 2. Install left bearing assembly, then place uplock torque tube in position and install right bearing assembly. Install bearing assemblies (20) with bolts and nuts.
 3. Install washer and nut on each end of uplock torque tube assembly.
- c. Install drag brace (26) as follows:
 1. Attach drag brace (26) to truss assembly (24) with bolt, washer and nut.

NOTE

When installing bolt, insure that down indicator switch bracket (25) is properly in place.

2. Connect drag brace (26) to strut with attaching bolt and nuts.
- d. Install connector link assembly (21) as follows:
 1. Attach connector link assembly (21) to retracting arm (29) with bolt and nut.
 2. Attach connector link assembly (21) to adjusting

TROUBLE	PROBABLE CAUSE	CORRECTION
BRAKES FAIL TO HOLD	Brake linings worn out.	Replace lining in accordance with replacement of brake lining procedure.
	New linings just installed.	Taxi aircraft and apply brakes several times to condition linings.
	Air in system.	Bleed and fill system in accordance with bleeding procedure.
	Oil, grease or other foreign material on disc or brake linings.	Clean and flush with Trichloroethelene, then taxi the aircraft slowly, apply the brakes several times to condition the lining.
	Rudder pedals positioned so that brakes cannot be fully applied.	Reposition pedals.
	Brakes too hot from extensive use.	Allow time for brakes to cool.

Removal of Brake System. (See figure 4-23.)

- a. Remove pilot's and copilot's seats in accordance with Section 3.
- b. Remove front carpets and scuff plates in accordance with Section 3.
- c. Remove upholstery side panels in accordance with Section 3.
- d. Remove control column access cover from under- side of fuselage by removing attaching screws.
- e. Remove the rectangular access hole cover from right floorboard adjacent to the aft part of control pedestal.
- f. Drain system fluid by removing bleeder screw from both main wheel brake assemblies.
- g. Remove brake master cylinders.
- h. Disconnect left master cylinder hose (22) from elbow in web of pilot's left rudder pedal bracket, and remove through access hole.
- i. Remove left cabin brake line (20) as follows:

NOTE

As removal of this line requires its destruction, it is not recommended that it be removed except as required for replacement. Replacement of the factory installed line (20) will require two separate lines (1 and 3) joined with a union (2) just above the floorboard on the forward side of the bulkhead. These parts can be ordered as spares.

1. Cut line at riser portion forward of bulkhead and as close to the floorboard as practical.
2. Loosen coupling nuts from elbows and remove each section of line.
- j. To remove right master cylinder hose:
 1. Disconnect cabin crossover brake line (24) from elbow in web of pilot's right rudder pedal bracket.
 2. Remove attaching nut and washer from elbow to allow its removal from web or rudder pedal

3. Detach hose from elbow.
- k. Disconnect cabin crossover brake line (24) from elbow in right side of control column well and remove through access hole in left floorboard.
- l. Remove intermediate cabin brake line (26) as follows:

NOTE

Due to difficulty of access, it is recommended that this line be removed only as necessary for replacement.

1. Remove attaching nut and washers from elbow in right side of control column well to allow its withdrawal from position.
2. Disconnect line (26) from aft elbow.

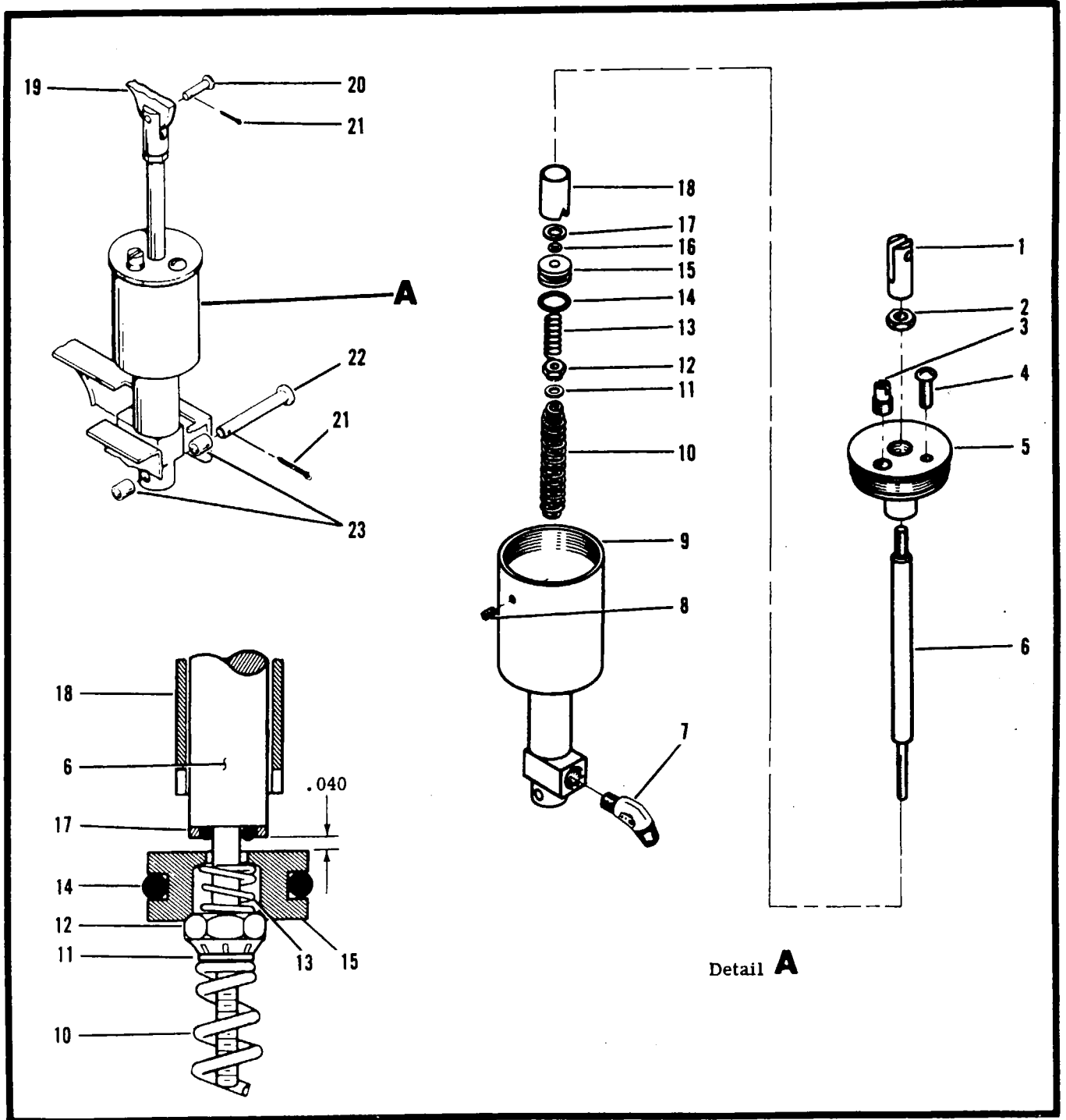
NOTE

Access to the aft coupling nut on this line is through the forward rectangular access hole in the right floorboard and through the lightening hole in the web of the copilot's left rudder pedal bracket. A 9/16 inch crowfoot wrench and extension can be manipulated through this opening to loosen the coupling nut.

3. Remove line through lightening hole, with elbow still attached, by manipulating forward end out-board and forward, to allow aft end to clear edge of lightening hole.
4. Detach line (26) from elbow.
- m. Disconnect right cabin brake line (29) from elbows. Carefully work line from its position beneath the floorboards, and remove through access hole.

CAUTION

It may be necessary to flex this line slightly



- 1. Clevis
- 2. Jamb Nut
- 3. Filler Plug
- 4. Screw
- 5. Cover
- 6. Piston Rod
- 7. Elbow
- 8. Setscrew

- 9. Body
- 10. Piston Return Spring
- 11. Washer
- 12. Nut
- 13. Piston Spring
- 14. O-Ring
- 15. Piston

- 16. O-Ring
- 17. Lock-O-Seal
- 18. Compensating Sleeve
- 19. Pilot's Rudder Pedals
- 20. Pin
- 21. Cotter Pin
- 22. Pin
- 23. Spacer

Figure 4-26. Brake Master Cylinder

- i. If an autopilot (optional equipment) is installed, disconnect autopilot cables from aileron direct cables (15) by removing attaching cable clamps.
- j. Remove aileron pulley (outboard of aileron quadrant) by removing cable guard pins, attaching bolt and washer.
- k. Disconnect aileron push-pull tube (8) from aileron quadrant (14) by removing cotter pin, nut, washer and bolt.
- l. Remove two sets of pulleys aft of the wheel well and one set in each wing root by removing cable guard cotter pins and attaching nuts and bolts.

NOTE

When removing control cables, tie safety wire to ends of cables before removal.

- m. Remove bolt and washer attaching aileron quadrant (14) to wing structure.
- n. With aileron return and direct cables (1 and 15) attached to aileron quadrant, remove quadrant and cables from wing using aileron quadrant access hole.
- o. Route fuselage direct cables (17) aft to bellcrank (16) and remove from aircraft.

NOTE

Leave guide wires in wing and fuselage to facilitate installation.

Installation of Aileron Control Cables. (See figure 5-3.)

- a. Secure aileron cables (17) to guide wires and route cable from bellcrank (16) to lower control column chain (18).
- b. Remove guide wires from cables.
- c. Secure aileron cables (17) to chain (18) with attaching clevis, cotter pin, and install pulleys.

NOTE

Insure that fuselage direct cables (17) are not crossed and routed on the underneath side of pulley.

- d. Secure aileron cable (17) to bellcrank (16) with attaching bolt, nut and cotter pin.
- e. Install cable guard cotter pin on fuselage pulleys.
- f. Secure aileron cables (1 and 15) to guide wires and route cables and quadrant into position.
- g. Remove guide wire from cables.
- h. Install quadrant (14) in wing and secure with washer and bolt.

CAUTION

Be sure bushing (11) is installed with quadrant or serious binding will occur during rigging.

- i. Install two sets of pulleys on pulley brackets aft of the wheel well and secure with attaching bolts and nuts.

- j. Install one set of pulleys on lower aft wing root pulley brackets and secure with attaching bolt and nuts.
- k. Position aileron direct cables (15) on lower pulleys and aileron return cables (1) on upper pulleys and install cable guard cotter pins.

NOTE

Aileron cables (1 and 15) must be routed on aft side wing pulleys.

- l. Secure aileron cables (1 and 15) to fuselage bellcrank with attaching bolts, nuts and cotter pins.

CAUTION

Insure that aileron cables are in place on aileron quadrants and pulleys in both wings before rigging tension on aileron system. Wing structure can be damaged by the aileron cables if tension is rigged on the cables while not properly in place on aileron quadrants or pulleys.

- m. If an autopilot (optional equipment) is installed, attach to the aileron cables and rig in accordance with rigging procedures.
- n. Install lower aft wing root fillets, fuselage floorboard access covers, aft underside wing access covers, and quadrant access cover.
- o. Install boot, retainer and cover on lower control column.
- p. Refer to Section 3 and install the following items:
 1. Rear upholstery panel, if autopilot (optional equipment) is installed.
 2. Front, center and rear carpets.
 3. Front seats and rear reclining seat, or middle individual and aft fifth and sixth seats (optional equipment).

Removal of Aileron Quadrant. (See figure 5-3.)

- a. Refer to Section 3 and remove the following items
 1. Rear reclining seat or middle, fifth and sixth seats (optional equipment).
 2. Rear carpet.
 3. Rear upholstery panel, if autopilot (optional equipment) is installed.
- b. Refer to Section 1 and remove aft floorboard access covers and wing access cover above quadrant.
- c. If autopilot (optional equipment) is installed, disconnect autopilot cables from aileron cables.
- d. Remove safety wire from turnbuckles (2) on cables (1 and 15) and disconnect cables at bellcrank.
- e. Remove aileron pulley outboard of aileron quadrant by removing cable guard pins, attaching bolt and washer.
- f. Attach safety wires to cables (1 and 15) to be used as guides on installation.
- g. Disconnect aileron push-pull tube (8) from aileron quadrant (14) by removing attaching cotter pin, nut, washer and bolt.
- h. Remove bolt and washer attaching aileron quadrant (14) to wing structure.

SECTION 6
ELEVATOR AND TRIM CONTROL SYSTEMS

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CAUTION

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

ELEVATORS.

The elevator control surfaces consist of two elevator assemblies connected by a torque tube and an elevator trim tab located at the trailing edge of the right elevator. Each elevator is attached to the rear spar of the horizontal stabilizer with two hinges. The elevators are operated by a pylon to which the elevator torque tubes are bolted.

Removal of Elevators. (See Figure 6-1.)

a. Refer to Section 3 and remove stinger in accordance with removal procedures.

b. Disconnect elevator trim tab push-pull tube (3) by removing cotter pin, nut, washer and bolt.

c. Disconnect elevator torque tubes from the elevator pylon (14) by removing nuts and bolts.

d. Disconnect bonding straps (8) by removing attaching screws.

e. Remove fiberglass tips (6) by removing attaching screws.

f. Remove each elevator by removing nuts (12), washers (11) and bolts (10).

g. When removing right elevator, guide elevator trim tab push-pull tube (3) out through elevator.

- b. Unsafety and loosen turnbuckle (10) to release tension on elevator trim control system.
- c. Remove elevator trim control wheel (14) by removing four screws and washers.
- d. Remove upper left side panel from control pedestal.

NOTE

To remove the elevator trim indicator assembly, the rivets around which the indicator pivots must be removed.

- e. Disengage chain (15) from sprocket (20), remove upper right side panel from control pedestal, and remove sprocket (20) by removing cotter pin, nut, washer, spacer (19) and bolt (18).

Installation of Elevator Trim Control Wheel, Sprocket, and Indicator Assembly. (See figure 6-3.)

- a. Install sprocket (20) with bolt (18), spacer (19), washer, nut and cotter pin.
- b. Install upper right side panel on control pedestal.
- c. Engage chain (15) with sprocket (20) and install upper left side panel on control pedestal.
- d. Rig the elevator trim control system in accordance with rigging procedure, and install the elevator trim control wheel (14) with four washers and screws.
- e. Install rear upholstery panel to tailcone.

Rigging of Elevator Trim Control System. (See figure 6-3.)

- a. Remove the rear curtain from the baggage compartment.
- b. Loosen stop blocks (12) by loosening nuts.
- c. Unsafety turnbuckle (10), adjust so that tension on the elevator trim control cables is 10 ± 3 pounds, and resafety turnbuckle.

NOTE

If an automatic pilot (optional equipment) is installed, adjust tension on elevator trim control cables to 19 ± 3 pounds.

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

- d. (See figure 6-1.) Disconnect elevator trim tab push-pull tube (3) from elevator trim tab horn (5) by removing attaching nut, washer and bolt.
- e. Rotate elevator trim control wheel (14) forward (nose down) until aft chain (5) and forward chain (15) have approximately two links clearing the sprockets.

NOTE

If the elevator trim indicator reaches its extreme travel during rigging, it can be relocated by removing elevator trim control wheel, moving the indicator, and re-

installing wheel.

- f. With the chains in the above position and the elevators in neutral (elevator horns aligned with stabilizer), adjust actuator screw (1) by rotating push-pull tube so that aft bolt hole in push-pull tube aligns with bolt hole in the trim tab horn when the elevator trim tab is approximately 10° up.

- g. (See figure 6-1.) Connect push-pull tube (3) to elevator trim tab horn (5) with attaching bolt, washer and nut.

NOTE

The threaded end of bolt attaching the elevator trim tab push-pull tube to actuator screw must be inboard; therefore, exact travel adjustment is not made by this means.

- h. Rotate elevator trim control wheel (14) so that elevator trim tab is $10^{\circ} +1^{\circ}$, -0° up, locate aft stop block (12) adjacent to cable terminal, and tighten. Slide the center stop block against aft stop block and tighten.

NOTE

If an automatic pilot (optional equipment) is installed, refer to Section 13 for rigging of stop blocks.

- i. Rotate elevator trim control wheel (14) so that the elevator trim tab is $26^{\circ} +1^{\circ}$, -0° down. Slide forward stop block against the center stop block and tighten.

- j. When the elevator trim control system is in either extreme position, the elevator trim indicator should be in the same relative position to the NOSE UP and NOSE DOWN positions on the decal. To adjust the indicator, use the following procedure:

- 1. Rotate elevator trim control wheel (14) so that elevator trim control system is in the extreme NOSE DOWN position.

- 2. Remove elevator trim control wheel (14) by removing four screws and washers, and place the elevator trim indicator at the NOSE DOWN position on the decal.

- 3. While the elevator trim indicator is in this position, install the elevator trim control wheel (14) with four washers and screws.

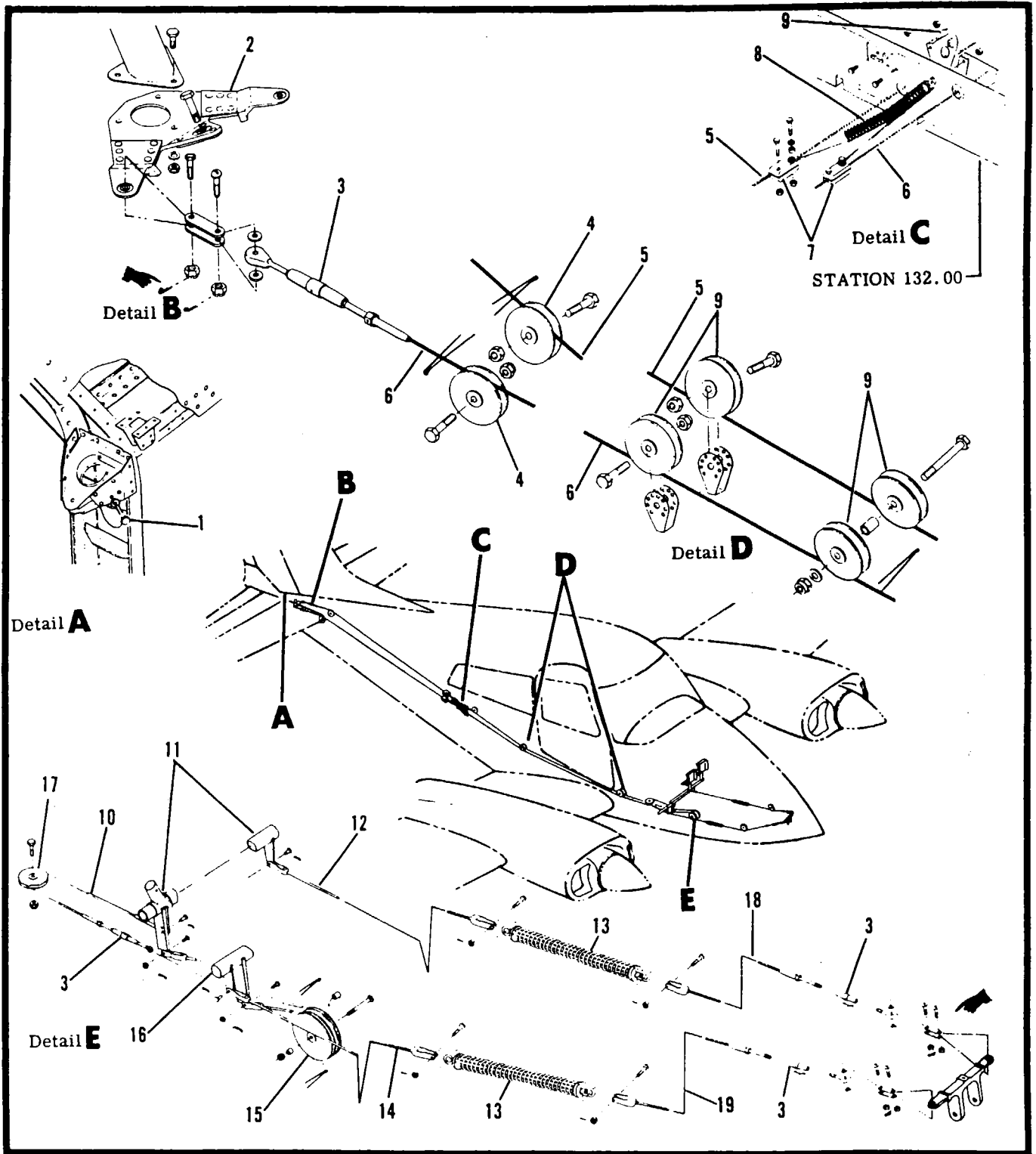
NOTE

The elevator trim control wheel (14) can be installed in any one of four positions. Select the position which causes the least indicator movement as it engages with the wheel track. If indicator and placard still do not give correct indication after rigging trim system, see 6-10A for procedure on installation of elevator trim tab placard.

WARNING

Insure that elevator trim tab moves in the proper direction when operated by the trim control wheel.

- k. Refer to Section 3, install rear upholstery panel to tailcone.



- | | | |
|------------------------|-------------------------------|----------------------------------|
| 1. Stop | 7. Cable Clamps | 14. Aft Right Steering Cable |
| 2. Rudder Bellcrank | 8. Rudder Centering Spring | 15. Forward Fuselage Pulley |
| 3. Turnbuckle | 9. Center Fuselage Pulley | 16. Torque Tube (RH, forward) |
| 4. Aft Fuselage Pulley | 10. Position Cable | 17. Position Cable Pulley |
| 5. Left Cable | 11. Torque Tube (LH, aft) | 18. Forward Left Steering Cable |
| 6. Right Cable | 12. Aft Left Steering Cable | 19. Forward Right Steering Cable |
| | 13. Nose Gear Steering Spring | |

Figure 7-2. Rudder Control System

TROUBLE	PROBABLE CAUSE	CORRECTION
FLAPS FAIL TO EXTEND OR RETRACT (CONT.)	<p>Defective flap motor.</p> <p>Defective electrical circuit.</p> <p>Stripped or broken drive gear or flap motor.</p> <p>Stripped or broken gears in reduction unit.</p> <p>Drive sprockets not secured to reduction unit output shaft.</p>	<p>Replace flap motor.</p> <p>Replace defective wires.</p> <p>Replace flap motor.</p> <p>Replace reduction unit.</p> <p>Replace rivets and/or sprockets.</p>
FLAPS FAIL TO RETRACT	<p>UP limit switch incorrectly adjusted.</p> <p>Incorrect rigging of flap cables, compensated for by incorrect adjustment of push-pull rods.</p>	<p>Adjust in accordance with rigging procedures.</p> <p>Rig in accordance with rigging procedures.</p>
FLAPS FAIL TO EXTEND COMPLETELY	<p>DOWN limit switch incorrectly adjusted.</p> <p>Incorrect rigging of flap cables, compensated for by incorrect adjustment of push-pull rods.</p>	<p>Adjust in accordance with rigging procedures.</p> <p>Rig in accordance with rigging procedures.</p>
FLAPS NOT SYNCHRONIZED OR FAIL TO FIT EVENLY WHEN RETRACTED	<p>Incorrect adjustment of push-pull rods.</p> <p>Bent push-pull rods.</p> <p>Incorrect adjustment of bellcrank interconnecting push-pull tubes.</p> <p>Incorrect rigging of cables and chains.</p> <p>Bent flap.</p>	<p>Adjust in accordance with rigging procedures.</p> <p>Straighten or replace.</p> <p>Adjust in accordance with rigging procedures.</p> <p>Rig in accordance with rigging procedures.</p> <p>Repair or replace flap.</p>
FLAPS ON ONE SIDE FAIL TO OPERATE	<p>Drive sprocket for inoperative side not secured to reduction unit output shaft.</p> <p>Broken chain, cable or attaching pin.</p>	<p>Replace rivets and/or sprocket.</p> <p>Replace broken parts.</p>

trailing edge. Should further adjustment of push-pull rods be necessary, this must be accomplished before final setting of cable tension.

NOTE

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

12. Remove tape and lower flaps a few degrees at a time, observing for any unusual tension build-up in the cables or binding of push-pull tubes and bell-cranks, until flaps reach 35° +1° -0°.

13. Rig both extend cables (18 and 30) with 85 pounds of tension. Final tension of extend cables, with flaps DOWN should be 85 ±10 pounds, differential tension between right and left should not exceed 25 pounds.

Rigging Flap Preselect System. (See figure 8-1.)

The following procedure is applicable to 310P0222 and On.

- a. Remove center seats and center carpets in accordance with Section 3.
- b. Remove floorboards.
- c. Connect 24 volt external power source to external power receptacle.

NOTE

To facilitate rigging of the flap preselect system, a two position momentary switch with suitable length of electrical wires can be connected to the flap actuator limit switches in such a manner that the flaps can be observed while being operated during rigging.

- d. Loosen nuts (48, 50, 51 and 53) to allow freedom of movement of cable (47).
- e. Adjust flap motor limit switches to provide 0° and 37° +1°, -0° flap travel. Adjust return cable tension to 280 lbs. ±20 lbs. with flaps retracted and extend cable tension to 85 lbs. ±10 lbs. with flaps extended.
- f. Center control cable (47) in brackets (49 and 52) and tighten nuts (48, 50, 51 and 53) with flaps retracted.
- g. At flap preselect assembly adjust limit switches rollers snug against cam ends.
- h. Tighten bolt (38) to obtain a 2 lb. ±.5 lb. friction load measured at end of preselect lever with lever between 0° and 15° settings.
- i. Adjust control cable (47) rod end and/or cable housing such that 15° flap selection results in 15° ±0° flap travel.
- j. Check for .10 minimum clearance between flap arm (44) and stationary panel.
- k. Adjust pointer (bend wire) on arm (44) to center on 15° mark.
- l. Adjust flap preselect lever upper stop to limit 0° flap setting with 225 lbs. ±25 lbs. return cable ten-

sion. Flap angular travel must be 0° retracted.

m. Position flap preselect lever to 35° (DOWN) adjust stop bolt (59) to limit flap travel to 35° +1°, -0°.

NOTE

When preselect lever assembly is placed in the 35° (DOWN) position, the angular travel must be 35° +1°, -0°.

n. Aircraft 310Q0401 and On, adjust flap/landing gear warning switch (61). Refer to Adjustment of Landing Gear Warning System, Section 4.

o. Check flap surface travel tolerances at the following locations: 15° ±0° DOWN; 35° +1°, -0° DOWN; 15° +0°, -2° from DOWN to UP.

p. Check the extension and retraction time. The flaps should extend in 6.5 to 9.5 seconds and retract in 6.5 to 9.5 seconds.

NOTE

If the flaps will not extend or retract in 6.5 to 9.5 seconds, the flap motor should be replaced.

q. Disconnect the 24 volt external power source from flap motor wiring.

r. Perform operational checkout of flap and preselect system, using the aircrafts power system, to ensure that proper operation of limit switches, preselect switches and flap angular movements are within specified tolerances.

s. Safety wire all turnbuckles and install floorboards.

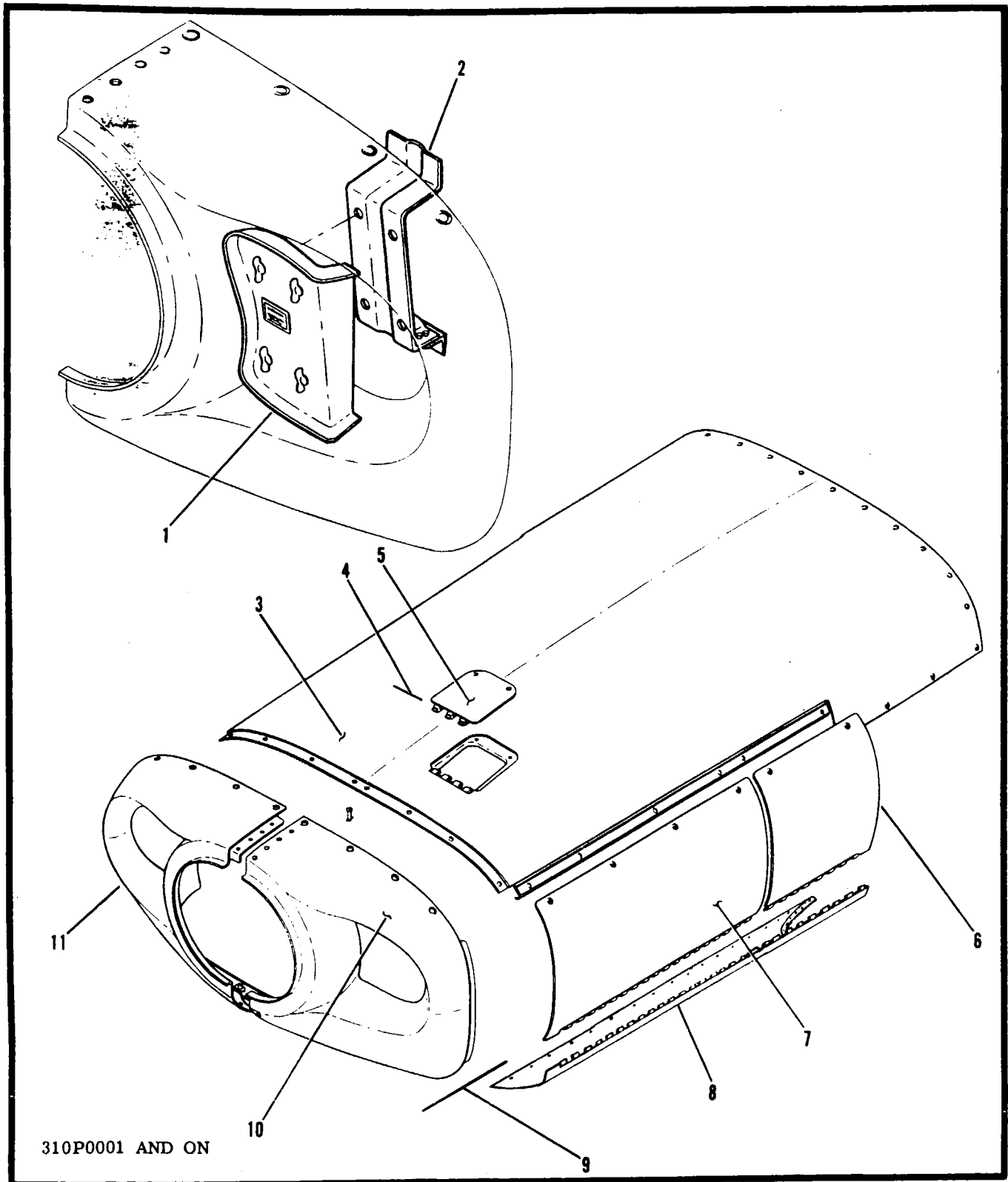
t. Install center carpets and center seats in accordance with Section 3.

Operational Flight Check.

The operational flight check of the flaps consists of flying the aircraft at 165 MPH CAS and operating the flaps down, noting the extension time. The flaps should extend in 10 to 14 seconds. Operate the flaps up and note the retraction time. The flaps should retract in 6 to 10 seconds.

NOTE

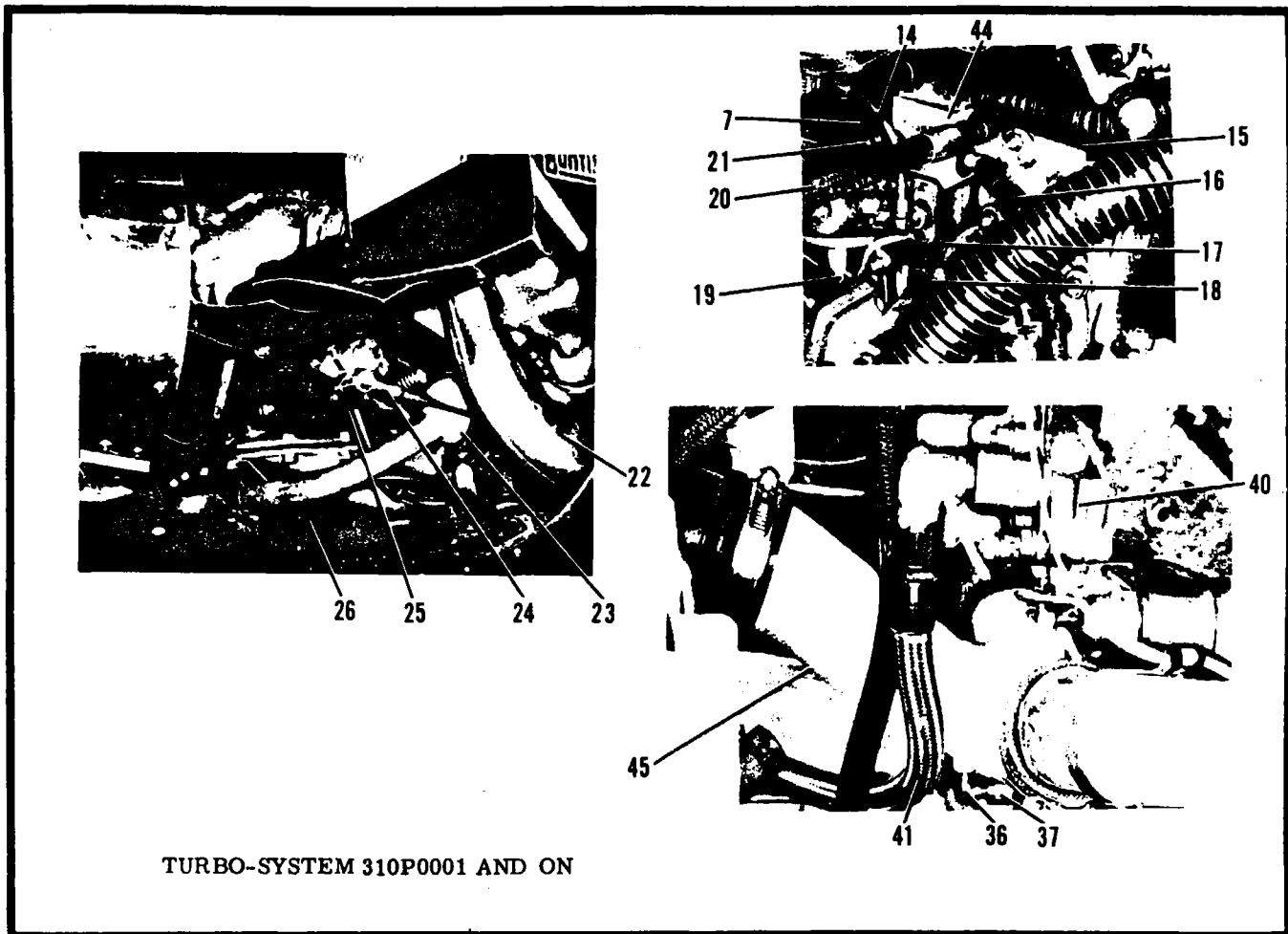
If the flaps will not extend or retract within the correct time, it will be necessary to replace the flap motor.



310P0001 AND ON

- | | | |
|-------------------------|--------------------|------------------------------------|
| 1. Winterization Baffle | 5. Oil Filler Door | 8. Lower Cowl Assembly LH |
| 2. Attaching Bracket | 6. Aft Cowl Door | 9. Hinge Pin |
| 3. Upper Cowl Assembly | 7. Cowl Door | 10. Nose Cap Assembly - Left Half |
| 4. Hinge Pin | | 11. Nose Cap Assembly - Right Half |

Figure 9-1. Engine Cowling (Sheet 1 of 2)



TURBO-SYSTEM 310P0001 AND ON

1. Magnetos
2. Oil Cooler
3. Hose (Throttle body to manifold fitting)
4. Manifold Fitting
5. Vacuum Pump
6. Hose (Vacuum pump)
7. Hose Assembly (Controller to crankcase)
8. Hose Assembly (Cooler to waste-gate actuator)
9. Drain Line (Oil separator to overboard)
10. Oil Separator
11. Tachometer
12. Throttle Body
13. Hose (Throttle body to intake manifold)
14. Line Assembly (Turbocharger discharge)
15. Tube (Ram air to fuel pump)
16. Hose Assembly (Return, metering valve to fuel pump)
17. Fuel Pump
18. Hose Assembly (Supply, fuel pump to metering valve)
19. Line Assembly (Fuel pump drain)
20. Hose Assembly (Vapor return to fuel tank)
21. Hose Assembly (Supply, nacelle fitting to fuel pump)
22. Exhaust Stack
23. Manifold Crossover (Air intake)
24. Rod End (Propeller control)
25. Governor
26. Hose Assembly (Forward air intake drain)
27. Wire Bundle (Engine)
28. Hoisting Lug
29. Hose Assembly (Metering valve to fuel manifold valve)
30. Fuel Manifold Valve Assembly
31. Brush Holder Assembly (Propeller deice)
32. Alternator
33. Ground
34. Temperature Bulb (Cylinder head)
35. Rear Engine Baffle
36. Fitting (Drain line)
37. Hose Assembly (Aft air intake manifold)
38. Starter
39. Starter Cable
40. Scavenger Pump
41. Hose Assembly (Oil return, turbocharger to scavenger pump)
42. Shroud Hose (Metering valve hose)
43. Line Assembly (Fuel pressure)
44. Fuel Pump Shroud
45. Air Intake Manifold
46. Line Assembly (RH, nozzle pressurization)
47. Line Assembly (LH, nozzle pressurization)
48. Duct (Fuel supply from tee)
49. Duct (Fuel return line to pump)
50. Duct (Fuel supply from pump)
51. Shroud (Metering valve)
52. Hose Assembly (Coller to turbocharger)
53. Turbocharger
54. Manifold Pressure Relief Valve

Figure 9-4. Engine Installation (Sheet 2 of 2)

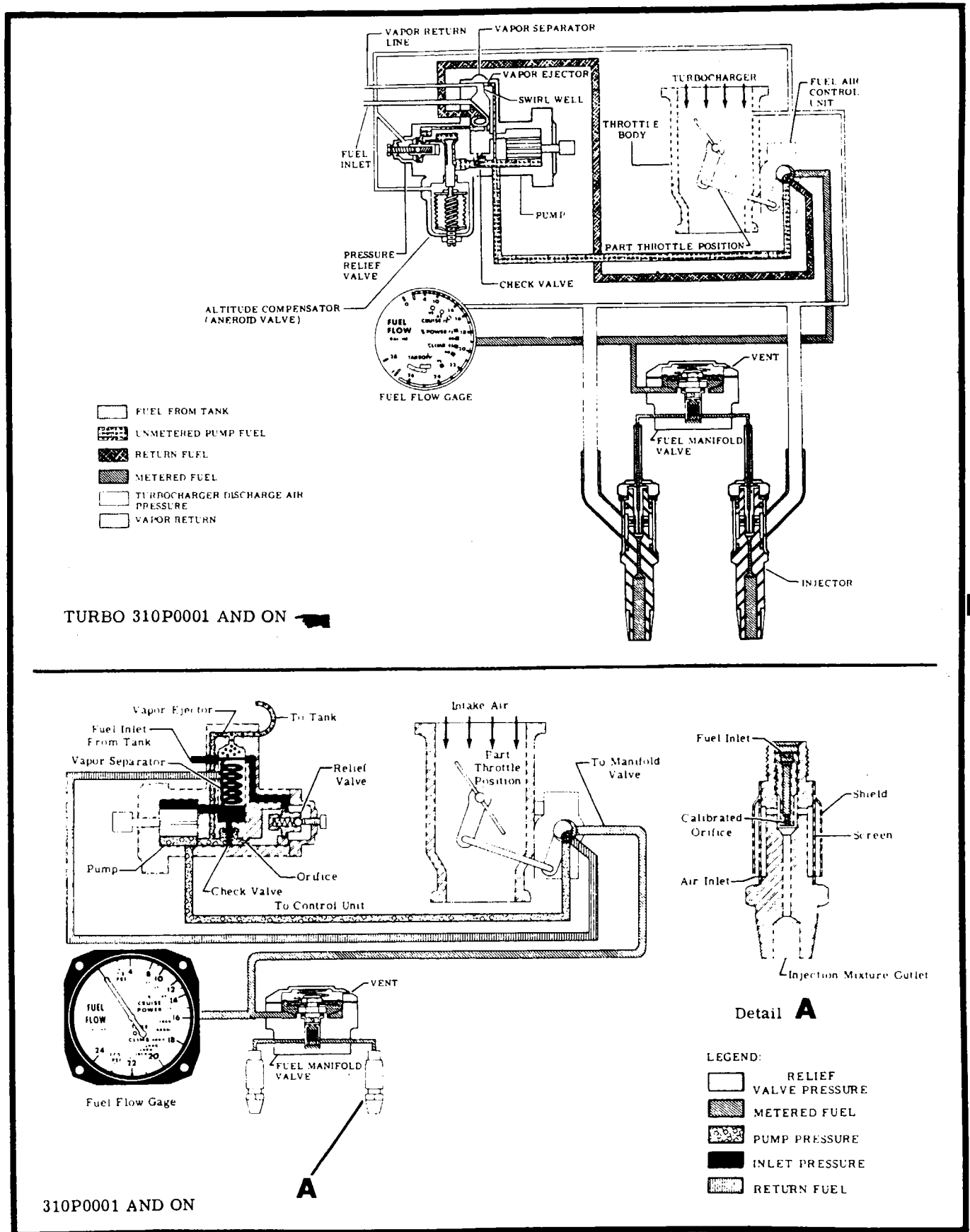


Figure 9-9. Fuel Injection Schematic

1. Low Unmetered Pressure Adjustment: Allow engine to warm-up, then idle engine at 600 RPM. Unmetered fuel pressure should indicate 7.0 PSI on test hookup pressure gage. If the indicated pressure does not indicate 7.0 PSI, turn adjusting screw on pressure relief valve (turn IN to increase fuel pressure or turn OUT to decrease fuel pressure) until proper fuel pressure is obtained. Position auxiliary pump to LOW, observe that unmetered fuel pressure does not exceed 7.2 PSI.

2. Maximum Fuel Flow Adjustment: Allow engine oil to reach a temperature indication in the upper 1/3 of green arc on oil temperature indicator. With the engine power setting at maximum RPM and 32 ± 0.5 Hg, reading from the aircraft's fuel flow indicator and the auxiliary fuel pumps OFF, set fuel flow to 29.2 GPH (175.2 PPH). Position auxiliary fuel pumps to ON, check that fuel flow does not exceed 31.0 PSI (186.0 PPH). If the GPH (PPH) is not within the prescribed tolerance, loosen lock nut and turn adjusting screw on altitude compensator (turn OUT to increase and turn IN to decrease) until 27.5 to 29.2 GPH (165 to 175 PPH) is obtained.

ENGINE OIL SYSTEM. (See figure 9-11.)

The Continental engines installed in the aircraft have wet sump, pressure lubrication systems. Oil tem-

perature in each engine is controlled by a thermally operated valve which either bypasses the oil around the externally mounted cooler or routes it through the cooler passages for cooling. Drilled and cored internal passages route the oil to all moving engine parts which require lubrication. Oil furnished to the propeller governor for propeller operation is also routed through internal passages. This complete internal oil system eliminates all difficulties associated with external oil lines. Engine oil is routed externally for use in actuating the turbocharger wastegate and turbocharger lubrication on the Turbo 310P0001 and On. Engine oil is filtered through an internally mounted screen filter or externally mounted oil filter. A bypass valve will rotate the oil around the filter if it should become clogged. Oil pressure is maintained by a spring-loaded pressure relief valve which is adjustable.

Oil temperature is sensed through a heat variable resistor type temperature bulb which is located in the main oil passage of the crankcase directly below the cooler. Changes in oil temperatures are transmitted from the oil temperature bulb to the oil temperature gage through a single electrical wire.

TROUBLE	PROBABLE CAUSE	CORRECTION
HIGH OIL TEMPERATURE INDICATION	Low oil supply.	Replenish.
	Cooler air passages clogged.	Clean thoroughly.
	Cooler core plugged.	Remove cooler and flush thoroughly.
	Thermostat damaged or held open by solid matter.	Remove, clean valve and seat. If still inoperative, replace.
	Oil viscosity too high.	Drain and refill with correct seasonal weight. (See Section 2.)
	Prolonged ground operation.	Limit ground operation to a minimum.
	Malfunctioning gage or bulb unit.	Check wiring. Check bulb unit. Check gage. Replace defective parts.
LOW OIL PRESSURE INDICATION	Low oil supply.	Replenish.
	Oil viscosity too low.	Drain and refill with correct seasonal weight. (See Section 2.)
	Foam in oil due to presence of alkaline solids in system.	Drain and refill with fresh oil. (It may be necessary to flush cooler core if presence of alkaline solids is due to a previous cleaning with alkaline materials.)
	Defective pressure pump.	Replace pump.
	Malfunctioning pressure gage.	Check gage. Clean plumbing. Replace if required.
	Weak or broken oil pressure relief valve spring.	Replace spring. Adjust pressure to 30-60 psi by adjusting screw.
	Clogged oil filter.	Replace oil filter.

Installation of Engine Baffles (310P0001 AND ON).
(See figure 9-15.)

a. Install engine baffles by reversing removal procedures.

Removal of Engine Baffles (Turbo 310P0001 AND ON).
(See figure 9-16.)

Removal of Engine Baffles. (See figure 9-16.)

a. Remove engine cowling in accordance with removal procedures.

b. Remove screws attaching baffle (2) to support (1), baffles (3 and 22). Remove baffle (2) from engine nacelle.

c. Disconnect and remove the following items from baffle (3):

1. Disconnect oil filler breather hose from oil separator by loosening attaching clamps.

2. (See figure 9-13.) Remove oil separator (11) from baffle by removing two clamps and attaching screws.

3. (See figure 9-4.) Disconnect LH nozzle pressurization line (47) from fuel injection nozzles and route line through baffle (3) by removing grommet.

4. Remove the remaining screws attaching baffle (3) to oil cooler and baffle (4).

5. Remove baffle (3) from engine nacelle.

d. On both LH and RH sides of engine, remove baffles (9, 10, and 11) by removing existing screws in rocker covers and screws attaching baffles (11) to baffles (17 and 19). Remove baffles from engine nacelle.

e. Remove baffle (5) by removing four screws attaching baffle (5) to baffle (6). Remove baffle (5) from engine nacelle.

f. Remove baffle (6) by removing screws attaching baffle (6) to rocker cover. Remove baffle from engine nacelle.

g. Remove supports (8 and 12) from between engine cylinders by removing bolts (7). Remove supports from engine nacelle.

h. Remove baffles (13, 14, 15, 16 and 20) from engine as follows:

1. (See figure 9-4.) Disconnect air intake manifold (45) from throttle body (12) by loosening hose (13).

2. Remove attaching nuts and washers and lower air intake manifold until it comes to rest upon the engine support mounts.

3. Route baffles (13, 14, 15, 16 and 20) from beneath engine cylinder heads.

4. Remove baffles from engine nacelle.

i. Remove baffle (17) from engine as follows:

1. (Refer to Section 10.) If propeller synchronizer is installed, disconnect electrical impulse pickup from governor and route through baffle.

2. Remove two screws attaching baffle (17) to baffle (18).

3. Remove baffle from engine nacelle.

j. Remove baffle (19) from the engine as follows:

1. Remove radio noise filter from baffle (19) by removing attaching screws.

2. Remove lower forward bolt which attaches alternator and baffle (19) to crankcase.

3. Remove two screws attaching baffle (19) to baffle (18).

4. Release spring and remove baffle (19) from engine nacelle.

k. Remove baffle (18) as follows:

1. (Refer to Section 10.) Remove propeller spinner in accordance with removal procedures.

2. Remove two nuts and four washers attaching baffle (18) to engine crankcase.

3. Remove baffle from engine nacelle.

l. Remove baffle (22) as follows:

1. (See figure 9-4.) Disconnect from baffle the following items:

(a) Ram air tube (15).

(b) Shroud tube (42) and metering fuel line (28).

(c) Disconnect and route wire bundle (27) through baffle.

(d) If autopilot is installed, disconnect ram air tube from baffle.

2. Disconnect spring (21) and remaining attaching screws and route baffle (22) from engine nacelle.

Installation of Engine Baffles (Turbo 310P0001 AND ON). (See figure 9-16.)

a. Install engine baffles by reversing removal procedures.

NOTE

If induction air intake manifold was lowered to remove baffles (13, 14, 15, 16 and 20), replace gaskets upon installation.

TURBOCHARGER INSULATION.

On aircraft Turbo 310P0001 to 310Q0401, the turbocharger insulation installation consists of three individual blankets which are wrapped around the turbocharger turbine and held in place with Monel wire. Each blanket is made from material which consists of high temperature insulation sandwiched between two thin jackets of quilted stainless steel. Small holes are provided on the inside of each blanket to provide the necessary breathing. These blankets, when installed, will contain the high temperatures which are emitted by the turbocharger turbine. On aircraft Turbo 310Q0401 and On, the turbocharger is insulated by a shield, the shield consists of two shield halves hinged together which are fitted around the turbocharger turbine and held in place with Monel wire.

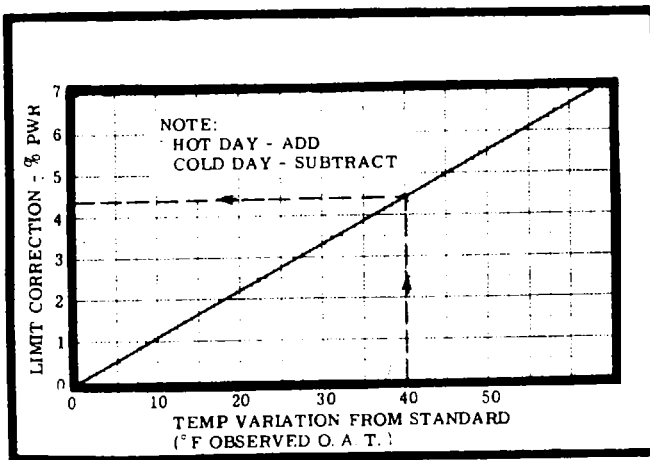
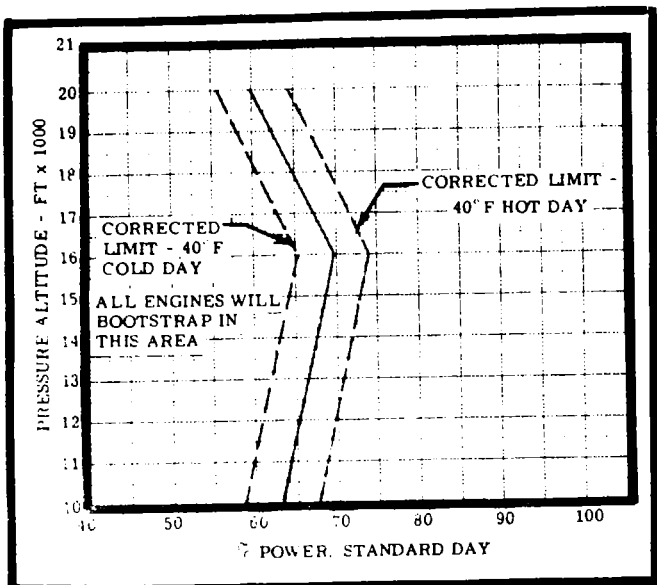
Removal and Installation of Turbocharger Insulation Blankets. (See figure 9-17.)

CAUTION

Extreme care should be taken when removing, installing, or working near the turbocharger blankets to prevent puncturing the stainless steel jackets.

a. Cut and unlace the Monel wire securing the turbocharger insulation blankets in place.

BOOTSTRAP LIMITS - TSIO 520B ENGINE, TE0659 1.58 A/R TURBINE



BOOTSTRAP LIMITS - TSIO 520B ENGINE WITH TE0659 1.83 A/R TURBINE

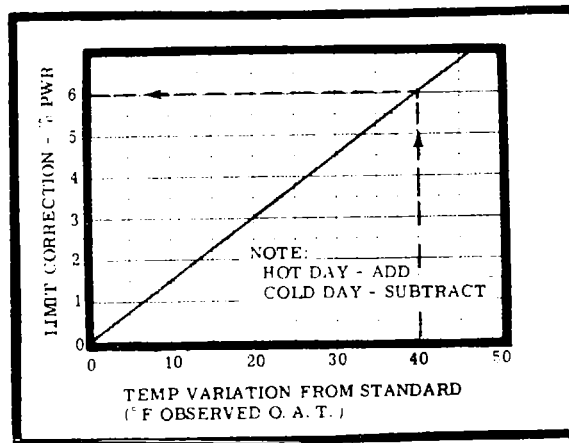
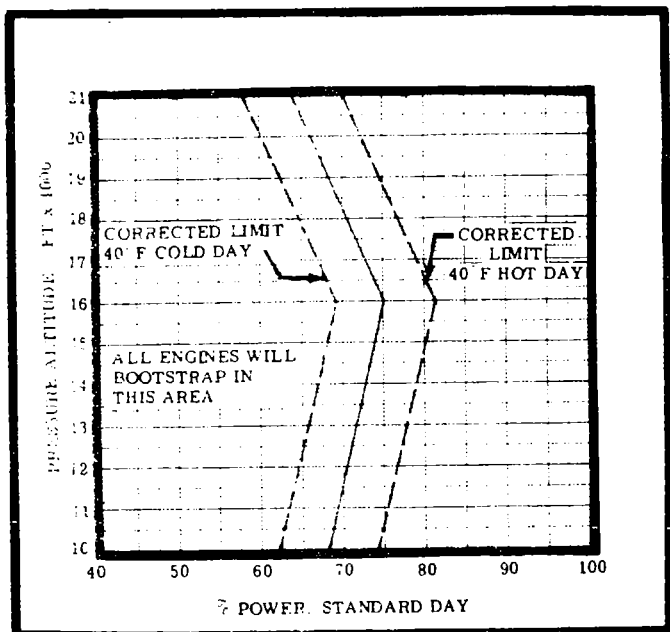


Figure 9-21. Bootstrapping Tolerance Chart

6. With the indented slot on cam aligned with the mark at top of breaker housing and painted chamfered tooth on large distributor gear visible in timing window, set pointer on center of "E" gap mark.

7. Connect the 11-851 timing light, or equivalent, across main breaker.

8. Adjust main breaker contacts to open at this point or over any portion of the "E" gap boss.

9. Turn rotor until cam follower is on the high point of cam lobe, measure contact clearance. It should be 0.018 ± 0.006 . Readjust breaker and recheck to be sure that contacts will open with "E" gap tolerance.

NOTE

Replace breaker assembly if "E" gap tolerance and contact clearance cannot be obtained.

d. On retard breaker magnetos, it is necessary to set the retard breaker to open a predetermined number of degrees after the main breaker opens within $+2^\circ$, -0° . The number of degrees retard for a particular magneto is stamped at the bottom of the breaker compartment. After main breaker has been set to open at "E" gap ($10^\circ \pm 4^\circ$) move pointer back until it is over the zero mark without moving rotor from its position where main breaker just opened. Turn rotor until pointer is over correct retard mark. Using a timing light, adjust retard breaker contacts to open at this point. A tolerance of $1/16$ inch past the point can be used to get proper contact clearance. Continue rotating rotor until cam follower is on the high point of the lobe. Measure contact clearance. It should be 0.018 ± 0.006 . If not, readjust breaker and recheck to be sure that contacts will open within retard degree tolerance. Replace breaker assembly if retard degree tolerance and contact clearance cannot be obtained.

NOTE

Extreme care must be taken not to move the rotor from the main breaker opening position when returning the pointer back to the zero mark.

Installation of Magnetos and Ignition Timing. (310P0001 AND ON.)(See figure 9-26.)

- Remove either the upper or lower spark plug from No. 1 cylinder.
- Rotate propeller to align engine timing points and marks located on alternator sheave.

NOTE

All starter adapters and alternator sheaves furnished on engines have timing marks stamped on the face. If it is necessary to replace these parts, they will not be furnished with the timing marks. Therefore, it will be necessary to use a top dead center indicator or an inclinometer on the propeller spinner to locate the 20° BTC position for timing magnetos to engines. When it is assured that the No. 1 cylinder is at 20° BTC, it is permissible to index the new starter adapter and sheave.

- With inspection hole plug and breaker cover removed, check magneto to see that it is internally timed for right-hand drive rotation.

NOTE

The magneto installation procedure is identical for installing either magneto on either engine.

- Place the magneto on the crankcase accessory mounting pad and temporarily secure in place with clamps, washers and nuts.
- Attach a timing light to the magneto in accordance with timing light manufacturer's instructions.
- If timing light indicator light is OFF, rotate magneto housing in direction of its magneto rotation a few degrees beyond point where indicator light comes ON. Slowly rotate magneto in opposite direction until indicator light goes OFF. At this point the magneto should be timed to the engine.
- Tighten magneto clamp nuts to prevent any further movement of the magneto.

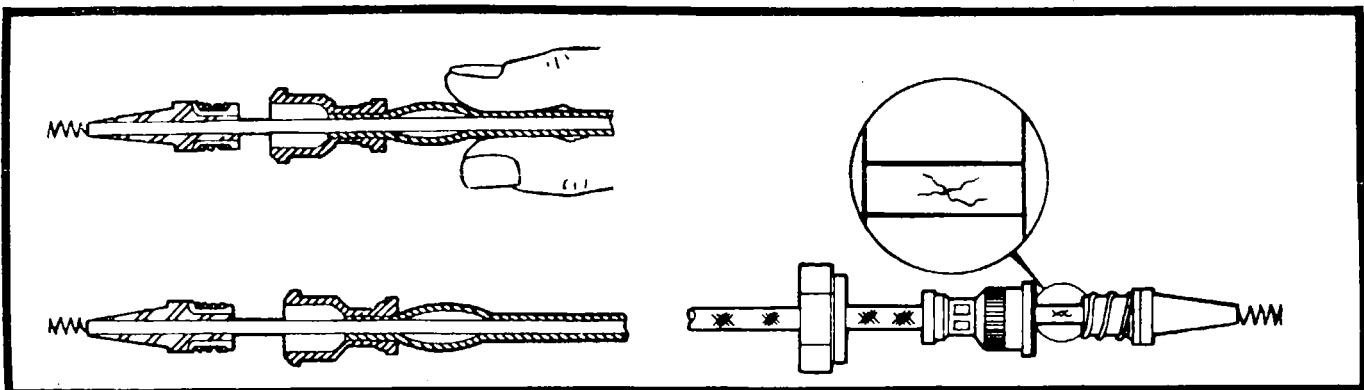


Figure 9-27. Ignition Harness

Periodic inspection during repair should be made to avoid removal of excessive amounts of metal. All raised edges should be carefully smoothed out to reduce the area of the defect and the amount of metal to be removed. Repair with suitable fine cut files and coarse grain emery cloth and smooth all edges and surfaces with fine grain emery cloth. Any blade repair on these surfaces which necessitates a depression that exceeds the manufacturer's tolerances or those listed in FAA Advisory Circular AC43.13-1 shall be cause for considering blade not air-worthy.

metal removal is within the tolerances specified. Damage which cannot be repaired by local removing of metal may be repaired by removing metal so as to shorten blades, although shortening blades is a propeller major repair. Any shortening of one blade requires an identical shortening of the other one, and any change in tip plan form or contour of one blade requires an identical change on the other one. Limitations concerning shortening of blades are specified in the manufacturer's publications or FAA Advisory Circular AC43.13-1.

c. Defects on Leading and Trailing Edge:

Repair defects as outlined in "b" above with suitable half-round file and emery cloth. Carefully smooth all edges of repaired defect. Any blade repair on leading and trailing edges which necessitates metal removal that exceeds the manufacturer's tolerances or those listed in FAA Advisory Circular AC43.13-1 shall be cause for considering blade not airworthy.

Blades that have leading or trailing edges pitted from normal wear may be reworked by removing sufficient metal to eliminate the pitting. Start well back from the edge and work over the edge in such a manner that the contour of the blade remains substantially the same. Avoid abrupt section changes and blunt edges. Permissible reductions in blade thickness and width, listed in the manufacturer's publications or FAA Advisory Circular AC43.13-1, must be observed.

d. Tip Damage:

Damage on blade tips may be removed in accordance with "b" and "c" listed above, as long as

e. Refinishing:

Prior to corrosion protection treatments, all repair areas should be smoothly polished out and blended in to finish repair and improve appearance. Whenever possible, all repaired blades should be anodized in a sulfuric acid anodize bath. The blades must be anodized with loose blade retention hardware on shank end; therefore, the blade must be supported vertically with steel hardware out of the solution and suitably protected to be unaffected by fumes. The same holds true for caustic baths.

When anodizing is not readily available, local repaired or inspected areas may be treated by other approved methods for corrosion protection; so-called chromodizing, alodine solution, painting, etc. It is doubtful that the finish of these treatments, other than sulfuric acid anodize, will blend in with regard to appearance. If desired, both camber and thrust face sides may be painted with zinc chromate primer and black lacquer to improve appearance. The thrust face side should always be painted.

Troubleshooting the Propellers.

TROUBLE	PROBABLE CAUSE	CORRECTION
PROPELLER DOES NOT RESPOND TO MOVEMENT OF PROPELLER PITCH LEVER OR FAILS TO CHANGE PITCH	Control linkage disconnected. Governor not correct for propeller. Governor speeder spring broken. Screen in governor mounting gasket clogged. Governor drive shaft sheared. Defective pitch changing mechanism, or excessive blade friction.	Check visually, connect or replace control linkage. Check that correct governor is installed. Overhaul or replace governor. Remove governor and replace gasket. Overhaul or replace governor. Check propeller manually, repair or replace parts as required.
FAILURE TO CHANGE PITCH FULLY	Improper rigging of governor control. Defective governor.	Check that arm on governor has full travel and rig correctly. Overhaul or replace governor.

- e. Refer to Section 9, install engine baffles and cowling in accordance with installation procedures.
- f. Perform an operational check of propellers.
- g. If optional propeller unfeathering system is installed, charge accumulator in accordance with Section 2.

- e. If propeller fails to unfeather when propeller control lever is advanced forward of the feather gate stop, turn adjustment screw clockwise.
- f. For minimum rpm adjustments, adjust controls in accordance with rigging procedures.

Rigging Propeller Governor Controls. (See figure 10-5.)

- a. Disconnect the propeller control rod end at the governor arm by removing nut, spacer and bolt.
- b. Move propeller control lever from maximum to minimum rpm position (against feather gate stop).
- c. Adjust control system cable rod ends, cable housing and support bracket as required to align rod end hole with rigging pin (No. 8 drill shank or equivalent) installed and positioned over the 2000 rpm index mark.
- d. Remove rigging pin and install bolt, spacer and nut on outboard arm hole. On Turbo 310 aircraft, install bolt in inboard hole of governor arm.
- e. Cycle propeller control lever to insure a minimum top end cushion of 0.20 inch. Make minor adjustments as required to attain minimum cushion at top end and minimum control rpm of 1800 to 2000 rpm at the lower end of lever travel.

Adjustment of Governor. (See figure 10-5.)

If maximum rpm, low minimum rpm or propeller feathering periods are incorrect adjust as required.

- a. If static rpm is too high, reduce by adjusting governor stop screw (6). Turn clockwise one revolution for each 17 rpm decrease. This reduction prevents possible overspeeding at takeoff.
- b. If static rpm is too low, it is possible that either the governor stop screw (6) or the propeller low pitch stop (4, figure 10-4) is the limiting factor. Move the propeller control lever toward decrease rpm and then to increase rpm position; if the maximum attainable rpm is reached at the same time as the governor stop, the governor is the limiting factor. Correct by adjusting the governor stop screw. Turn counterclockwise one revolution for each 25 rpm increase. If the maximum obtainable is reached before governor stop is reached, the propeller low pitch stop may be the limiting factor. This would require an adjustment of the propeller blades to decrease the low pitch angle. This adjustment should be made only by an authorized propeller overhaul station.
- c. If feathering time period is in excess of 9 seconds, adjust by loosening locking nut (12) and turn adjustment screw (3) counterclockwise. Hold screw position while securing locknut.
- d. If propeller feathers before control lever reaches a point 0.20 inch aft of the feather gate stop position, ascertain that propeller control is properly rigged and that minimum rpm is on the high end of the 1800-2000 rpm range. If control rigging is correct, turn feather adjustment screw (3) clockwise to lower the feather position.

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 on the underside of 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 indicators 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 pulse 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.

Operation of Propeller Synchronizer System.

Electrical pulses from the magnetic pickup in each governor are fed into the control box (figure 10-6). 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.

Removal of Synchronizer System Components. (See figure 10-7.)

- a. Remove flexible shaft (4) as follows:
 1. Disconnect flexible shaft (4) from actuator motor (9) and trimmer assembly (3).
 2. Remove the lock ring and hex nut from either end of flexible shaft.
 3. Remove flexible shaft from engine nacelle by routing through guide tube.

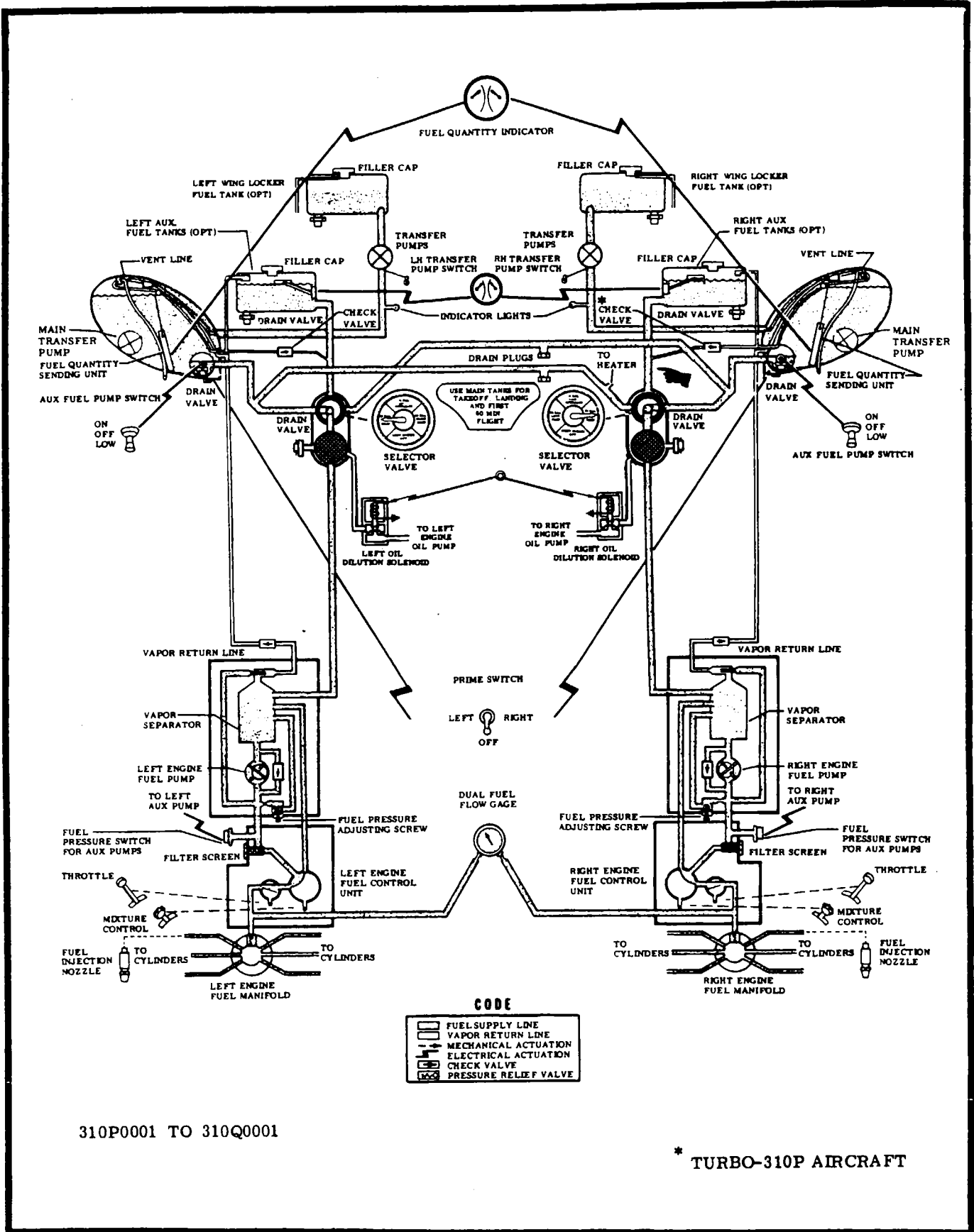
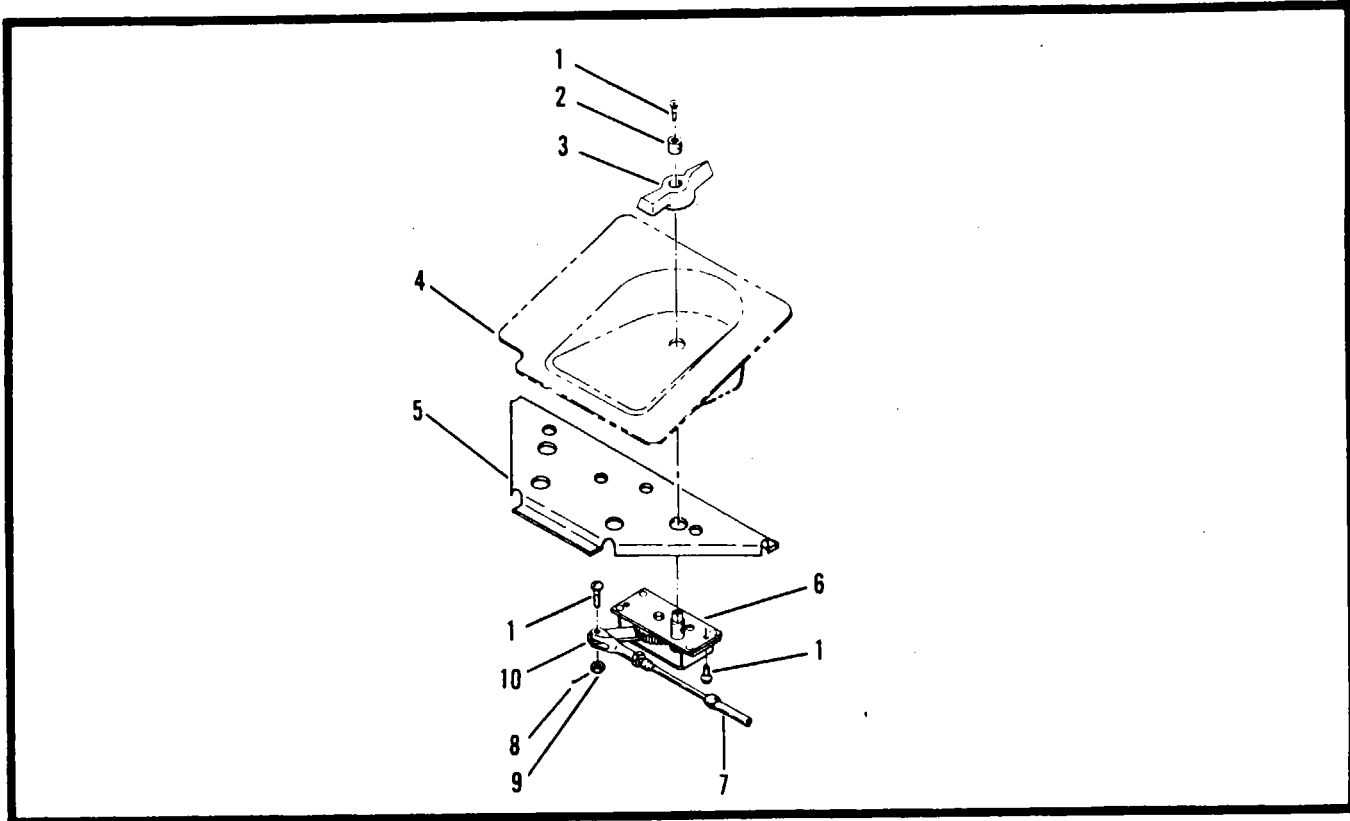


Figure 11-1. Fuel System Schematic (Sheet 1 of 2)



- 1. Screw
- 2. Spacer
- 3. Handle
- 4. Floorboard

- 5. Bracket
- 6. Gear Box
- 7. Cable
- 8. Cotter Pin

- 9. Nut
- 10. Terminal

Figure 11-5. Fuel Selector Control Handle and Gear Box

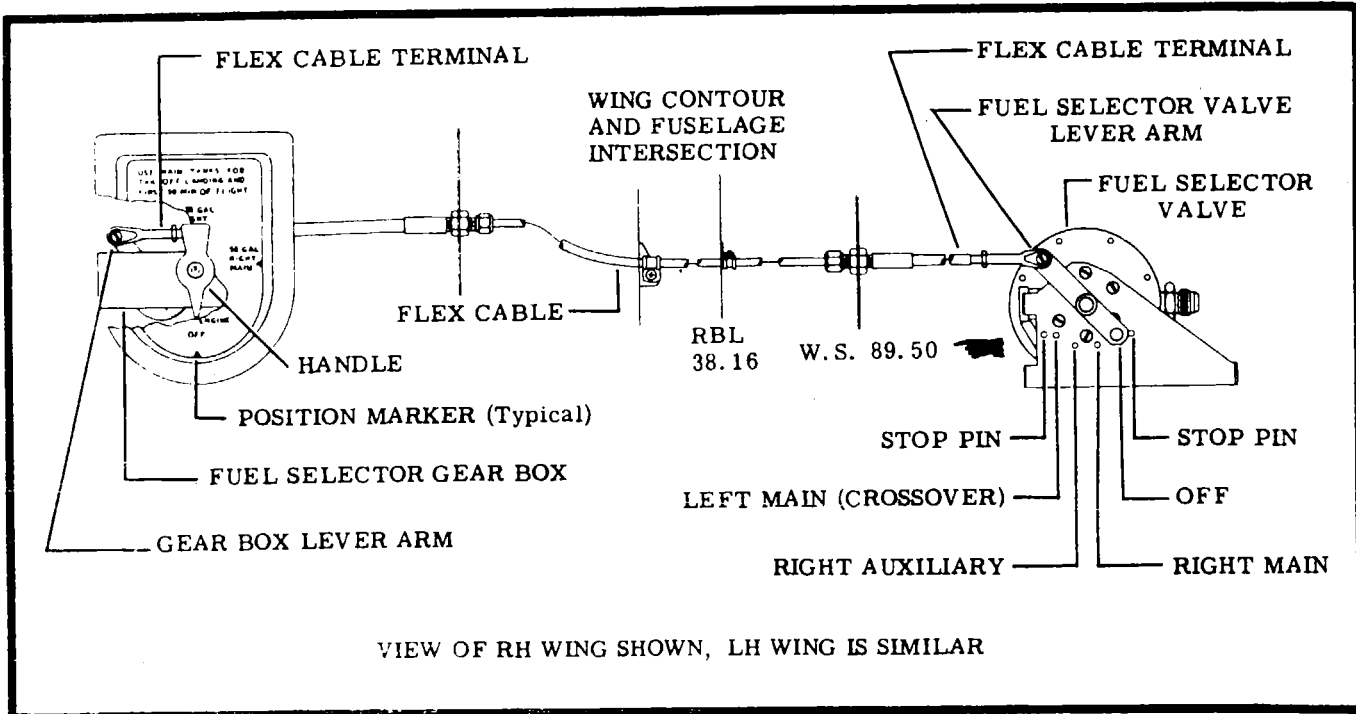


Figure 11-6. Fuel Selector Rigging Schematic

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- 6. Restore the circuits to original configuration.
- d. Calibration.
 - 1. Apply airplane power and assure battery is adequately charged; voltage should never be less than 22 volts when calibrating.
 - 2. Place fuel selector valve to "Main" position and adjust the signal conditioner "Main Empty" potentiometer to read exact "Zero" pounds on the indicator.
 - 3. Place the fuel selector valve to "Aux" position and adjust the signal conditioner "Aux Empty" potentiometer to read exact "Zero" pounds on the indicator.

NOTE

Slight tapping on the indicator may be required to overcome friction when meter is in static condition.

- 4. Place fuel selector valve to "Main" position. Interconnect test box and harness assembly. Adjust variable capacitance for added capacitance value. (See Table I.)

TABLE I

CAPACITANCE VALUES							
AIRPLANE SERIALIZATION	MAIN TANK UNIT	CAPACITANCE VALUES IN PICOFARADS				DRY CALIBRATION VALUES	
		Inboard	Auxiliary Middle	Tank Units Outboard	Empty Total	Added Capacitance	Full Indicator Setting
310Q0001 Thru 310Q0600	*37.04±0.5	15.18±0.5			15.18±0.5	32.65PF	300 Lbs.
310Q0601 AND ON	*35.00±0.5	13.68±0.5	2.62±0.5	7.55±0.5	23.85±1.5	32.64PF 35.25PF	50 Gal. 100/130 Octane 310 Lbs. 100 Octane Low Lead

*2.00 PF Allowance for Additional System Wiring Capacitance on Main and Auxiliary Systems.

- 5. Adjust signal conditioner "Main Full" potentiometer to read as specified by Tables for indicator setting. (Ref. Table I on the indicator. Tap indicator slightly to insure that pointer has stabilized in final position.
- 6. Disconnect test box and harness assembly and restore circuit to original configuration.
- 7. With airplane power on and fuel selector valve to "Main" position, check main empty for any shift. It may be necessary to readjust main and auxiliary potentiometers, by switching back and forth to "Main" and "Aux" positions respectively, until no deviation in zero reading is noticed.

- 8. Recheck "Main Full" per steps (4) and (5). If calibration has changed, readjust "Full Main" until a "full" indication without a change in both main and auxiliary zero indication is obtained.
- 9. Repeat steps (1) through (8) for opposite side.
- 10. After both LH and RH sides have been restored to original configuration, select Aux tanks by actuating the override switch located below the fuel quantity indicator on the instrument panel and verify that Aux zero corresponds to that of the main.

Troubleshooting the Fuel Quantity Indicator System. (The troubleshooting chart is the same for either system.)

TROUBLE	PROBABLE CAUSE	CORRECTION
INCORRECT QUANTITY INDICATION	Defective wiring.	Replace or repair defective wiring.
	Defective sending unit.	Remove wires at the sending unit and attach an ohmmeter to unit terminals. Operate float by hand. If the unit is good, the meter should read approximately 15 ohms when empty and 180 ohms when full.

and check for any rough spots, deposits or foreign material. If not smooth, wrap a piece of cloth around a wood dowel, dip the cloth in Stoddard Solvent (Federal Specification P-D-680), and swab the plunger tube until clean.

d. Rinse remaining parts in the solvent and dry with compressed air. Exercise care when drying the screen (3) to prevent damage.

e. Inspect all parts visually for damage.

f. Inspect the fuel pump electrical resistance by connecting an ohmmeter between the connector terminal and ground on the pump housing. Resistance should be between 19.0 and 19.5 ohms. If the resistance is not within limits, replace the pump assembly.

Assembly of Main Tank Fuel Transfer Pump.

a. Insert the plunger assembly (8) in the tube with the buffer-spring end first. Check for proper fit by slowly raising and lowering the plunger in the tube; it should move freely without any tendency of sticking. A click should be heard each time the plunger approaches the top of the tube. If this click cannot be heard, the interrupter assembly in the sealed portion of the pump is not functioning properly, and the pump assembly must be replaced.

b. Install the plunger spring (7).

c. Place the spring cup gasket (6) in position on the plunger spring cup (5) and carefully attach this assembly to the pump body (9), with the three screws (4). Tighten screws securely.

d. Carefully install the screen (3), place cover gasket (2) in position in cover (1) and attach the cover to the pump body (9).

e. Hold the pump body securely with one hand and tighten the cover (1) into place on the pump body bayonets with a 5/8 inch open-end wrench or box socket.

Installation of Main Tank Fuel Transfer Pump. (See figure 11-9A.)

The installation procedure is the same for either main tank fuel transfer pump.

- a. Install pump to bulkhead.
- b. Connect fuel lines to pump.

CAUTION

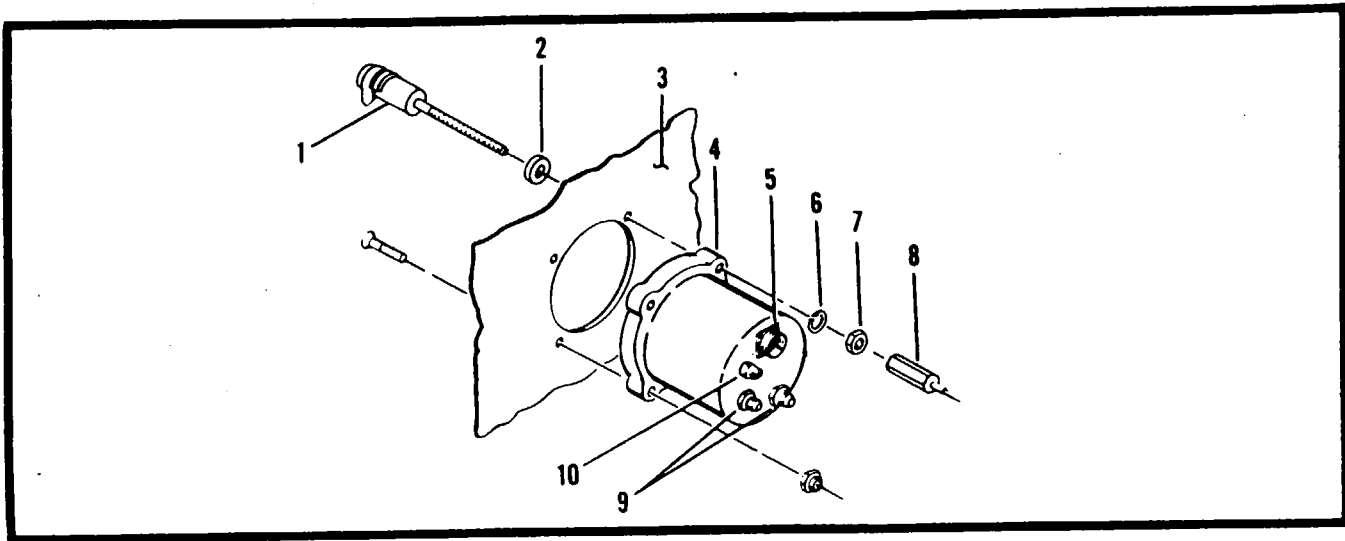
Observe "IN" and "OUT" markings on pump relative to lines being connected for correct installation.

- c. Connect electrical wiring.
- d. Perform following operational check of transfer pump:
 - (1) Pour approximately 5 gallons of fuel into main tank.
 - (2) Turn master switch ON.
 - (3) Observe that pump is functioning properly.

NOTE

Transfer pump must be pumping from forward section of main tank to center baffle area.

- e. Install tail cap assemblies to main fuel tank.
- f. Refuel aircraft.



- 1. Lighting Fixture
- 2. Rubber Washer
- 3. Instrument Panel

- 4. Instrument
- 5. Electrical Connector
- 6. Lockwasher
- 7. Nut

- 8. Connector
- 9. Hose Fittings
- 10. Vent Plug

Figure 12-2. Typical Instrument Installation

(b) Check the reading at hose (12) for 4.8-inches Hg. If it is 4.8, proceed to the next step. If it is not, then the relief valve (13) needs to be readjusted. If it cannot be readjusted, replace with new part.

(c) Check the manifold check valve (18) by checking the reading at hose (12) or (3 or 4) on the opposite side from test side for any reading. If there is no reading, proceed to next step. If there is a reading, the manifold check valve (18) is defective and is allowing ambient air to enter the system. Replace manifold check valve (18).

(d) Check the central air filter at hose (9 or 10) for any reading. If there is none, then the filter is good, but if there is more than 1 1/4-inch Hg. reading, the filter is partially plugged and has to be replaced.

d. High vacuum.

1. The system shows high vacuum using the 1G31-1 gage and probe. Proceed step-by-step as outlined.

(a) Check the reading at hose (12). If it is high and reads the same as suction gage (1), then the relief valve (13) filter is possibly dirty. Replace with a new part.

(b) Another possible problem is that the relief valve (13) is improperly adjusted. Readjust to 4.8-inches Hg. If it will not adjust, replace relief valve (13) with a new part.

e. Suction gage fluctuates.

1. Check for panel vibration or plumbing vibration and correct as required.

f. Erratic vacuum.

1. This is an indication that there might be some type of fluid in the pump; i.e., oil, varsol, water, etc. Check pump exterior for any signs of oil, varsol, etc. If it is apparent that there is fluid in the pump, remove and replace pump.

g. Gyro gage follows engine RPM.

1. To simulate a gage following engine RPM, vary the pressure on the 1H88-1 regulator with excessive pressure. If the gage fluctuates, this is an indication that the relief valve (13) might have something in the seat. Undo the adjustment screw on the relief valve (13) and with clean shop compressed air, blow the seat area off. Reinstall adjustment screw and readjust relief valve (13). If relief valve (13) still fluctuates, replace relief valve (13) with new part.

h. One gyro inoperative.

1. If one gyro functions fine while the other gyro will not erect or precesses and tumbles, use the 1G31-1 gage and probe to check at the back of the inoperative gyro at the hose (7 or 8) connected to the manifold (18) for a reading of 4.8-inches Hg. If you get a reading of 4.8-inches

Hg., this is an indication that that gyro is defective. Replace gyro. If there is no reading at the back of the gyro, there must be a clogged line from the manifold (18) to the gyro. With the 1G31-1 gage and probe, work your way toward the manifold (18) until you get a reading. Replace that plugged segment of hose.

NOTE

Make sure that the hose (9 or 10) from the central air filter to the gyro is also clean and unrestricted by checking with the 1G31-1 gage and probe to ensure that is no vacuum in that line. If there is a vacuum, replace filter or hose to correct the situation.

i. Gyros will not erect.

1. In a nondifferential gage vacuum system, when the suction gage (1) reads okay, but the gyros will not erect, using the 1G31-1 gage and probe, check for any reading at hose (9 or 10). If there is any reading, this is an indication that the central air filter is clogged or the hoses (9 or 10) could have a plugged section in them. Replace central air filter or section of bad hose (9 or 10):

j. Both fail source indicators retract with one side operational.

1. Using the 1G31-1 gage and probe, check for a reading in hose (3 or 4) on the opposite side from testing. If you get a reading, then the manifold (18) is defective. Replace manifold.

k. Gyro gage indicates frequent regulator adjustment.

1. In a differential gage system using the 1G31-1 gage and probe, check for any reading at hose (9 or 10). If there is a reading, then the central air filter is partially clogged. Replace filter. Also, check for a higher than normal reading in hoses (7 or 8) and (12) which might be an obstruction in the hoses or lines. Remove obstruction.

l. Frequent pump replacement.

1. If it is obvious that one side is having frequent pump replacement exhibiting shorter than normal pump life, then it is very important that that side be thoroughly inspected and tested using an Airborne 343 Test kit. Make sure that:

(a) This is proper pump for application.

(b) There are no restrictions in the discharge side of the pump.

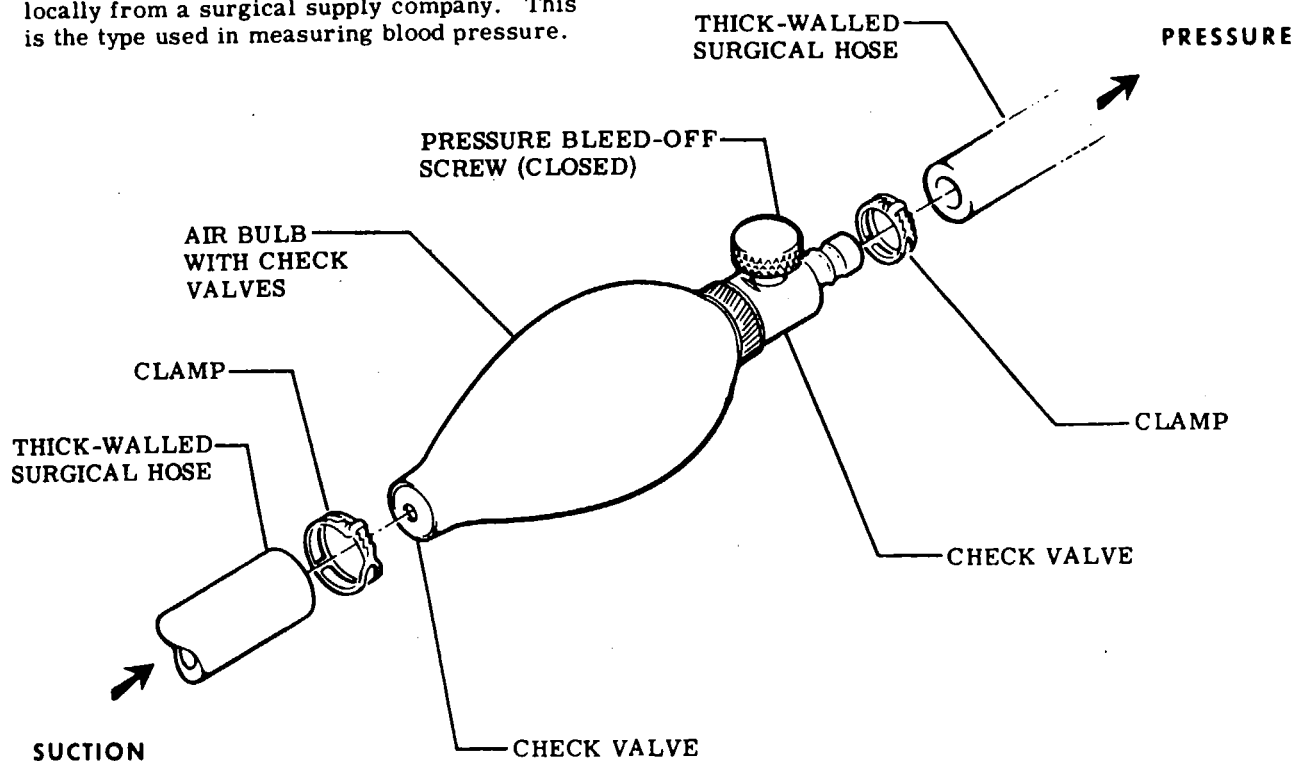
(c) There are no kinked or plugged lines.

(d) Filters are all in satisfactory condition.

(e) Vacuum pressure is set properly.

NOTE

Air bulb with check valves may be obtained locally from a surgical supply company. This is the type used in measuring blood pressure.



TO APPLY SUCTION:

1. Squeeze air bulb to expel as much air as possible.
2. Hold suction hose firmly against static pressure source opening.
3. Slowly release air bulb to obtain desired suction, then pinch hose shut tightly to trap suction in system.
4. After leak test, release suction slowly by intermittently allowing a small amount of air to enter static system. To do this, tilt end of suction hose away from opening, then immediately tilt it back against opening. Continue to admit this small amount of air intermittently until all suction is released, then remove test equipment.

TO APPLY PRESSURE:

1. Connect pressure hose to pitot tube.
2. Slowly squeeze air bulb to apply desired pressure to pitot system. Desired pressure may be maintained by repeatedly squeezing bulb to replace any air escaping through leaks.
3. Release pressure by slowly opening pressure bleed-off screw, then remove test equipment.

Figure 12-10. Static System Test Equipment

Troubleshooting the Heater (Continued).

TROUBLE	PROBABLE CAUSE	CORRECTION
<p>INSUFFICIENT HEATER OUTPUT AT HIGH AIR SPEEDS</p> <p>HEATER OPERATES ON GROUND, BUT NOT IN FLIGHT</p>	<p>Malfunction in heater fuel supply.</p> <p>Insufficient combustion air.</p> <p>Weak ignition.</p> <p>Lack of fuel.</p>	<p>Perform checks in accordance with functional check of heater fuel supply and heater fuel nozzle. Replace components as necessary.</p> <p>Check ducts for obstruction.</p> <p>Check blower motor for proper speed.</p> <p>Check fan blades for damage and freedom of rotation.</p> <p>Check spark plug. A good ignition system check may be performed by using a long reach automotive spark plug opened up to a 3/32 inch gap. If the ignition system is operating properly the spark in this gap will ignite a business card or a manila tag.</p> <p style="text-align: center;">NOTE</p> <p>Heater spark plug will not work for this check, due to the annular spark gap.</p> <p>Check ignition unit.</p> <p>Check power to heater solenoid terminal (#8). If no voltage is present, check thermostat calibration, air flow switch, and cycling switch.</p> <p>Check fuel pressure between fuel pump and heater. Refer to Cessna Heater Overhaul/Parts Manual.</p> <p>Check fuel supply to pump (remote solenoid, filter manual valves, etc.).</p> <p>Refer to Cessna Heater and Components Overhaul/Parts Manual and perform Fuel Nozzle and Solenoid test.</p>
<p>HEATER OPERATES IN FLIGHT, OUTPUT IS LOW</p>	<p>Poor thermostat operation</p> <p>Poor fuel atomization in burner.</p>	<p>Check thermostat calibration and freedom of movement.</p> <p>Check fuel pressure to heater.</p> <p>Refer to Cessna Heater and Components Overhaul/Parts Manual and perform Fuel Nozzle and Solenoid test.</p>

if the pitch 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 the deice boot around area approximately 1-1/2 inch 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 loosened portion of the boot.
6. Apply one coat of EC-1300 cement to the wing skin underneath the loosened edges of the deice boot and extending 1-1/2 inch beyond edges of deice boot into the cutout area.
7. Apply second coat of cement to underneath side of deice boot as outlined in step 5.
8. Apply one coat of EC-1300 cement to one side of a 2-inch 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 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 the second coat of EC-1300 cement to back side of inlay material and allow to dry.
15. 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.
16. Roughen area on outer surface of deice boot and inlay with steel wool 1-1/2 inch on each side of the splice. Clean with solvent and apply one coat of EC-1300 cement to this area.
17. Apply one coat of EC-1300 cement to one side of 2-inch wide neoprene coated fabric tape (Part Number 3306-8) trim to size and center tape over splice on all three sides.
18. Roll down tape on deice boot with stitcher-roller (Part Number 3306-10) to assure good adhesion, being careful to avoid air pockets.
19. Apply one light coat of A-56-B conductive ce-

ment (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 boot 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 inch beyond in all directions.
5. Mask off an area 1/2 inch 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 until it becomes tacky.
7. Roll the veneer ply to the deice boot with a 2-inch 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.

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.

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 safetying 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.

Removal of Control Cables. (See figure 13-6.)

- a. Refer to Section 3 and remove the following items:
 1. Rear upholstery panel for access to tailcone.
 2. Rear reclining, middle individual or fifth and sixth seats (optional equipment).
 3. Rear carpet.

2. Using a clamp or other locking device, lock elevator in the neutral position.
3. With elevator control surface in the neutral position, place chain (15) evenly over sprocket on actuator (17) and attach cables (7 and 19) to links (20) on bellcrank (21).
4. Rig the elevator actuator cables (7 and 19) to 22 ±2 inch-pounds tension by tightening the turnbuckles.

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. Remove locking device from elevator control surfaces and move elevator through entire travel. Observe chain (14) on actuator (5) for sufficient remaining links at the extreme travel limits.
6. Safety turnbuckles.

YAW DAMPER SYSTEM. (See figure 13-6B.)

The independent yaw damper system consists of a G830A (turn and slip indicator), rudder servo actuator and the disengage switch.

The turn and slip indicator provides standard turn and slip information. It also monitors yaw axis motion and supplies the servo actuator with a signal to minimize that motion. The indicator includes an electrically driven gyro, computer circuit, rate-of-turn indicator, turn-and-slip indicator and warning flags. The manually operated trim knob compensates for attitude or airspeed variations.

The rudder servo applies the signal from the gyro through a mechanical linkage to the rudder. An electric clutch in the drive linkage provides a positive disconnect between actuator and rudder when yaw damper is not in use.

The yaw damper switch is located on the left instrument panel and de-energizes the electric clutch and gyro computer. The autopilot yaw damper disengage switch, located on the pilot's control wheel, also disengages 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 13-6C.)

- a. Place a suitable support under tailcone.
- b. Remove tailcone access panel and rudder bellcrank access covers.
- c. Remove chain guard (11), loosen turnbuckle (7) and remove chain assembly from sprocket.
- d. Remove bolts (9) securing actuator (1) to structure.
- e. Disconnect electrical connector and remove actuator from aircraft.
- f. Install the rudder yaw actuator by reversing the removal procedures.

NOTE

Secure bolts (9) with safetywire after tightening to proper torque value.

- g. Rig cables in accordance with rigging procedures.

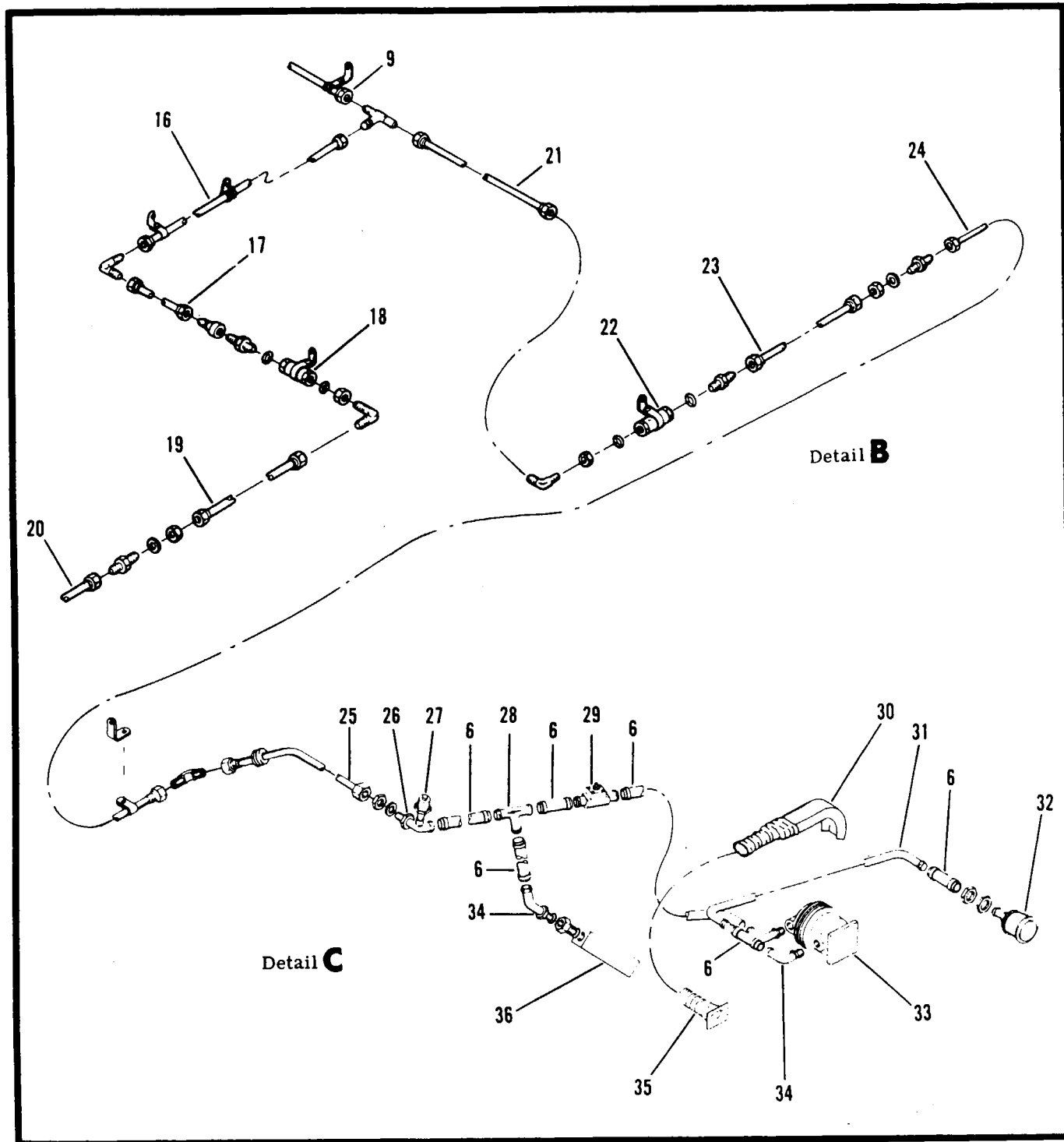
Rigging Yaw Damper System. (Refer to figure 13-6C.)

- a. Refer to Section 7 and verify that rudder control system is properly rigged.
- b. Rig yaw actuator cables (3) and (8) to 16, -2, -2, pounds tension by tightening turnbuckle (7).
- c. Safety turnbuckle.
- d. Adjust actuator in accordance with Actuator Centering Adjustment procedures.

Actuator Centering Adjustment

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 13-6B, turn and hold centering screw (10) in a full (CW) position while returning rudder to



- 19. Line (Check Valve to Fuselage Skin)
- 20. Line (RH Wing)
- 21. Line (Center Cabin to Check Valve)
- 22. Check Valve (LH Wing)
- 23. Line (Check Valve to Fuselage Skin)
- 24. Line (LH Wing)
- 25. Line (Aft Nacelle to Firewall)
- 26. Adapter (Pressure Switch)
- 27. Pressure Switch

- 28. Tee (Restrictor)
- 29. Pressure Relief Valve
- 30. Shroud
- 31. Line (Air Filter to Pump)
- 32. Air Filter
- 33. Pump
- 34. Elbow Adapter
- 35. Ram Air Hose
- 36. Solenoid Valve

Figure 13-9. Nav-O-Matic 800 Pneumatic System Installation (Sheet 2 of 2)

NOTE

Oxygen installation utilize a standard filler valve. To attach to this valve, the oxygen service cart must be equipped with an AN805-3 nut.

Servicing and Inspection of Oxygen System

Refer to Section 2 and Manual CGA-C6 (Visual Inspection of Cylinders) for inspection requirements.

- a. 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 psi, the system must be purged in accordance with purging procedures before charging the system.

- b. Mask and Hose.
 - 1. Cleaning - Clean mask and hose with 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.
 - 2. Inspection - Inspect mask and hoses for leaks, cracks, deterioration, and to ensure hose is fully engaged on both ends of flow indicator. If the hose has slipped at all, trim one half inch off the hose and reinstall. Check mask storage compartment for cleanliness and general condition, check flow indicators for free movement, and inspect couplings for proper insertion.

NOTE

Remove mike from pilots mask when cleaning.

Purging the Oxygen System.

- a. Charge the oxygen system in accordance with charging procedures.
- b. Move airplane outdoors if possible. If unable to move airplane outdoors, make sure area is roped off, no smoking or open flame permitted in the area, no grease or lubricant near cabin area, cabin door and pilots window open. Allow only qualified personnel to perform the purging operation.
- b. Plug all masks into 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.

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 lever in the "ON" position. The gage pressure should be 70 ± 10 PSIG.
- 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 PSIG. Flow check shall be accomplished with a ground check flow meter model 40400, or equivalent.
- d. Place oxygen control lever 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 pressure 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. After checking, return all masks to mask case.
- g. Recharge oxygen system as required.

OIL DILUTION SYSTEM (OPTIONAL EQUIPMENT) Airplanes 310P0001 To 310Q0601

The oil dilution system consists of two solenoid valves, one mounted on the firewall of each engine compartment. Each valve is connected to the main fuel supply line, and to each engine crankcase at an oil passage on the suction side of the engine oil pump. The valves are operated electrically by placing the oil dilution switch in either the left or right position. When the switch is depressed, oil in the selected engine will be diluted. When the switch is released, it automatically returns to the OFF position.

CAUTION

Support the propeller before removing the last nut to prevent the possibility of dropping propeller.

d. Carefully remove propeller assembly from engine crankshaft.

Installation of Propellers. (See figure 13-18.)

a. Clean the propeller hub (5) and engine crankshaft flange with crocus cloth.

b. Wipe dust and foreign particles from the propeller hub, crankshaft flange, and oil passages with a clean rag.

NOTE

Inspect O-ring seal (6) in propeller hub flange for damage and replace as necessary.

c. Secure propeller assembly to engine crankshaft by six self-locking nuts (9).

WARNING

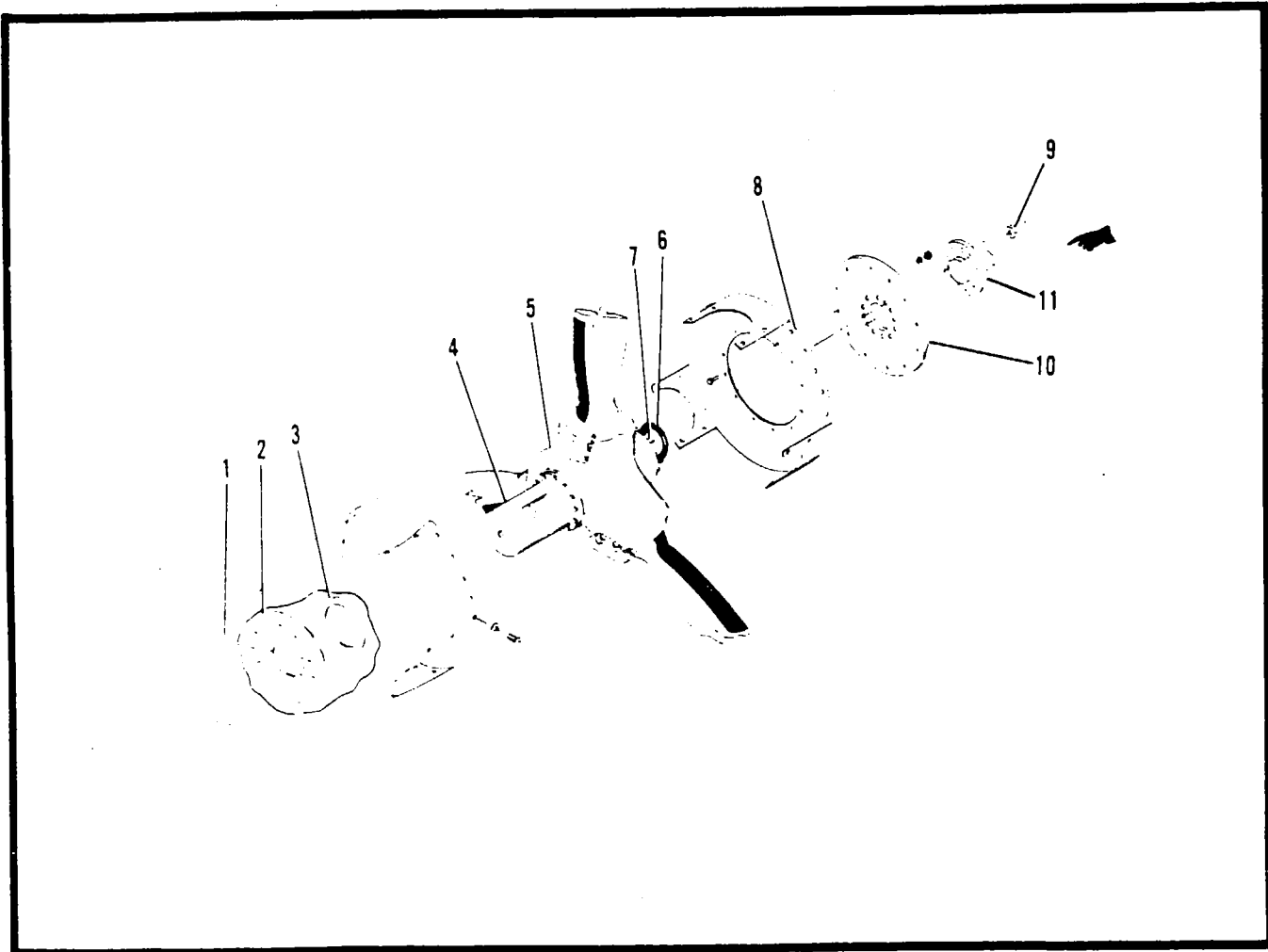
Do not use all steel locknuts. Use only new elastic element locknuts when installing propeller.

NOTE

Torque nuts (12) from 80 to 85 ft lbs.

d. Replace engine cowling in accordance with Section 9.

e. Perform an operational check in accordance with the Operational Check for Propellers.

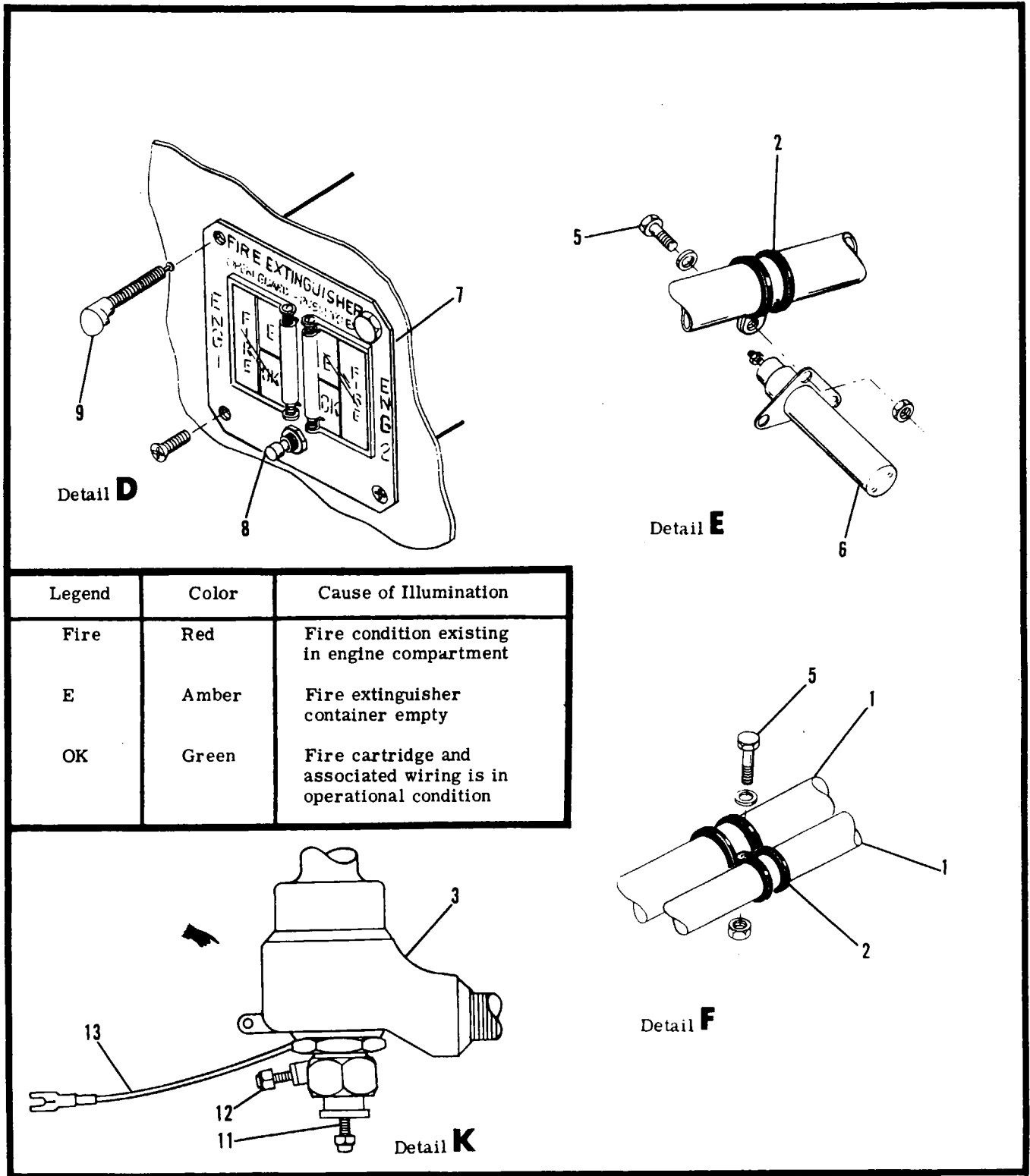


- 1. Spinner
- 2. Support
- 3. Spacer
- 4. Propeller Cylinder

- 5. Propeller Hub
- 6. O-Ring Seal
- 7. Stud
- 8. Spinner Bulkhead

- 9. Nut
- 10. Adapter
- 11. Crankshaft

Figure 13-18. Three Bladed Propeller Installation



- 1. Hose (Discharge)
- 2. Clamp
- 3. Fire Extinguisher
- 4. Mounting Clamp
- 5. Bolt
- 6. Thermal Detector
- 7. Annunciator Panel
- 8. Test Switch
- 9. Light
- 10. Firewall
- 11. Squib Terminal
- 12. Ground Terminal
- 13. Discharge Sensor Lead

Figure 13-24. Engine Compartment Fire Extinguisher (Sheet 2 of 3)

Figure 13-28. 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. Nut | 22. Tube RH |
| 7. Line (Pump to Elbow) | 15. Cabin Skin | 23. Tube LH |
| 8. Line (Tank to Pump) | 16. Elbow | 24. Clamp |

ALCOHOL WINDSHIELD ANTI-ICE SYSTEM.
(310Q0401 and ON).

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 13-28.)

- 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.
- 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 13-28.)

- a. Position tank in place and secure 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.

- 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.

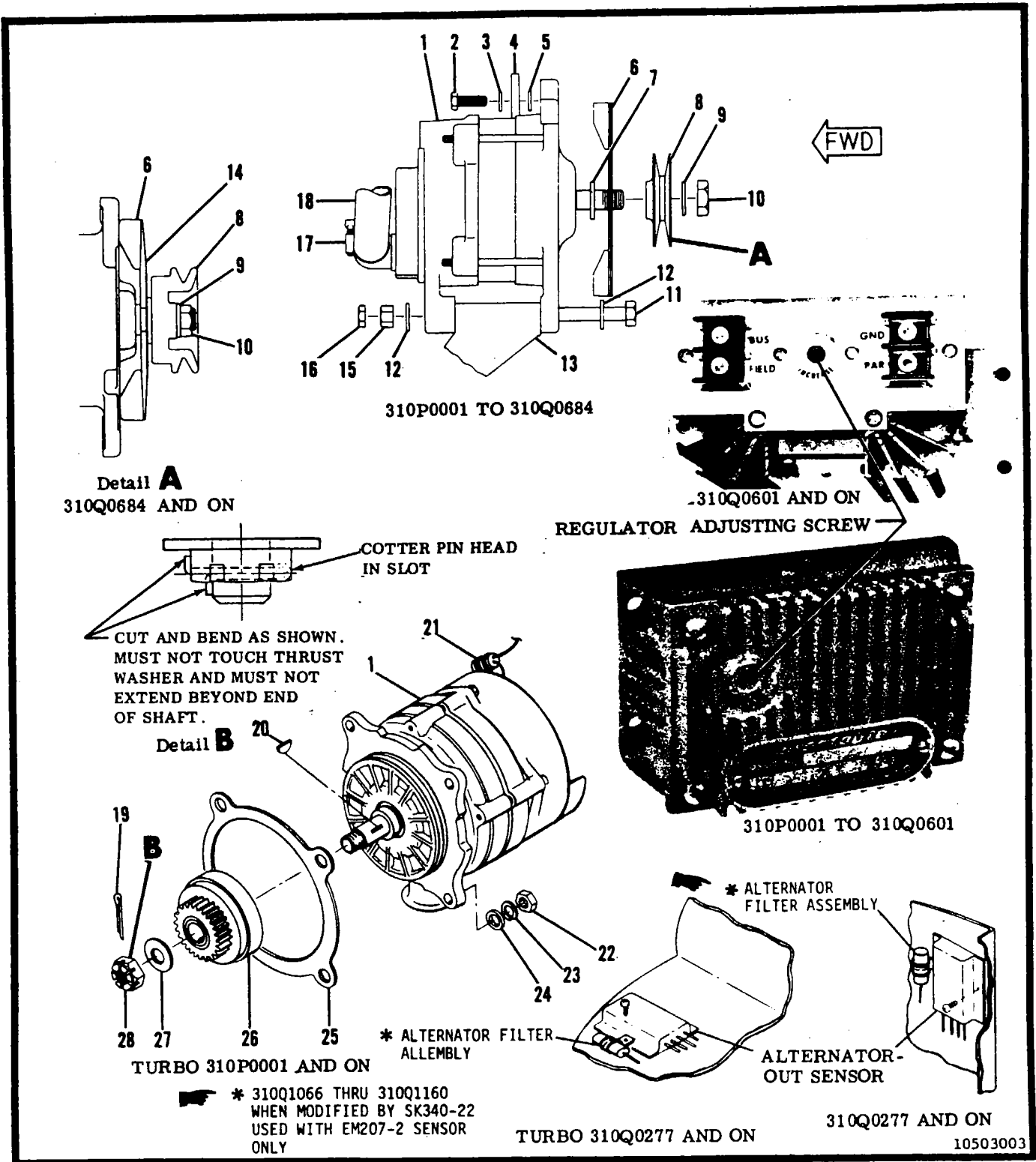
NOTE

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.

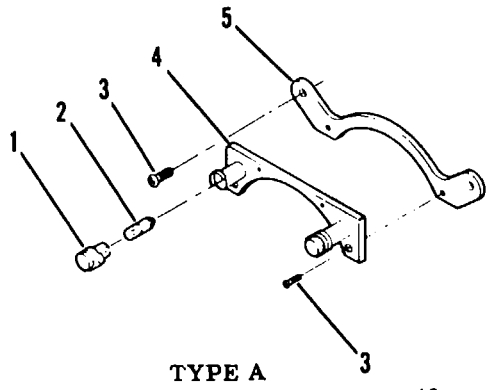
ANGLE OF ATTACK SYSTEM. (310Q0901 and On.)

The angle of attack system consists of an indicator incorporating a press-to-test circuit (for ground test or in 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.



- | | | | |
|----------------|----------------|------------------|----------------|
| 1. Alternator | 8. Sheave | 15. Nut | 22. Nut |
| 2. Bolt | 9. Lock Washer | 16. Locknut | 23. Lockwasher |
| 3. Washer | 10. Nut | 17. Clamp | 24. Washer |
| 4. Upper Brace | 11. Bolt | 18. Ram Air Tube | 25. Gasket |
| 5. Washer | 12. Washer | 19. Cotter Pin | 26. Hub |
| 6. Fan | 13. Mount | 20. Key | 27. Washer |
| 7. Spacer | 14. Backplate | 21. Diode | 28. Nut |

Figure 14-3. Alternator and Regulator Installation



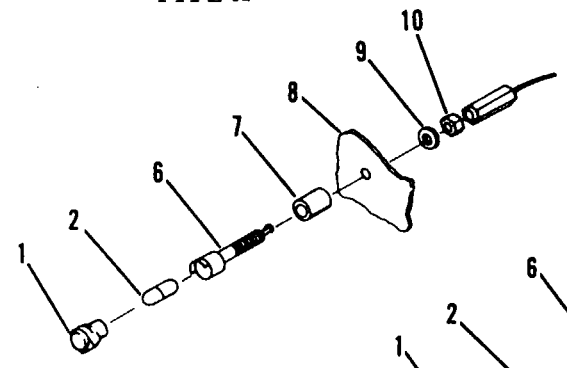
TYPE A

DETACHABLE (TYPE A & D)

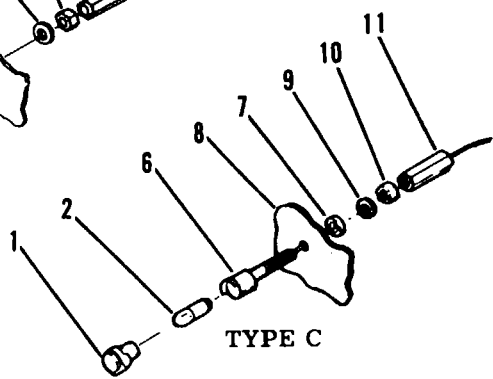
Unscrew nylon attach and remove as shown.

NON-DETACHABLE (TYPE B & C)

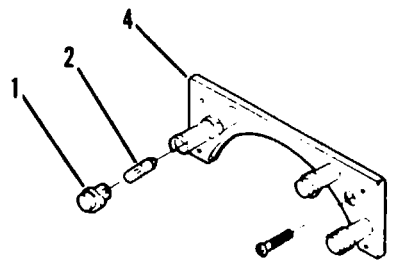
The lead must be severed before removal. Upon re-installation, a line splice is required (quick-disconnect, permanent splice, etc.). Use adequate insulation on the splice. Protect the end of the lead during removal to prevent accidental shorting.



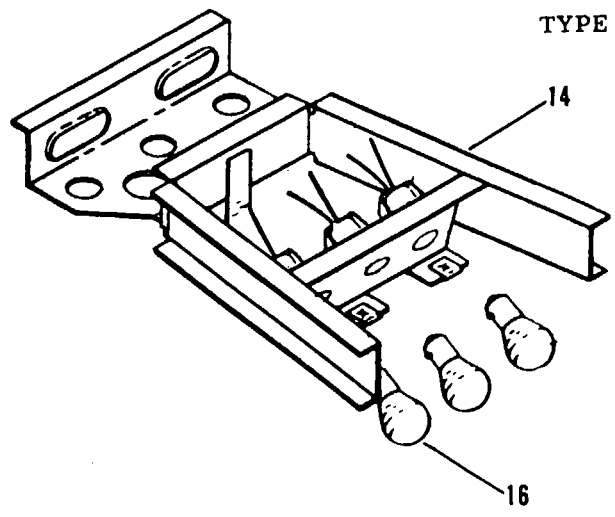
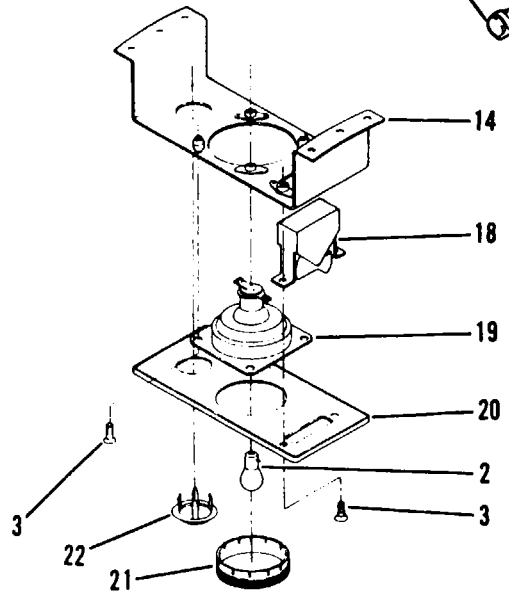
TYPE B



TYPE C

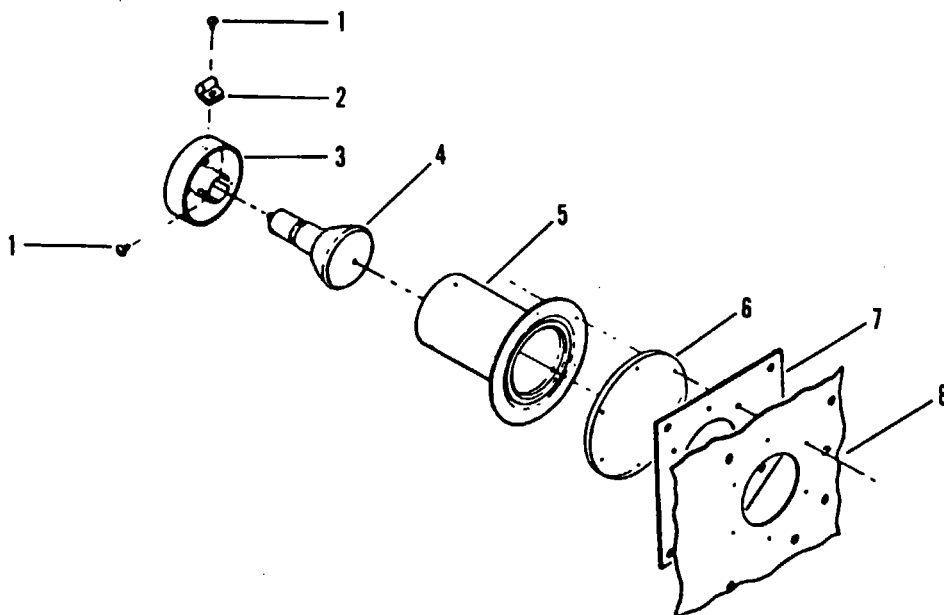


TYPE D



- | | | |
|-------------------|---------------------|-------------------|
| 1. Hood | 7. Spacer | 13. Rheostat |
| 2. Bulb | 8. Instrument Panel | 14. Bracket |
| 3. Screw | 9. Washer | 15. Console Cover |
| 4. Cover Plate | 10. Nut | 16. Flood Light |
| 5. Mounting Plate | 11. Connector | 17. Knob |
| 6. Socket | 12. Washer | 18. Switch |

Figure 14-8. Instrument Panel, Front Dome and Individual Reading Light (Sheet 1 of 2)



- | | | | |
|------------------|--------------------|-----------|-----------------|
| 1. Screw | 3. Socket Assembly | 5. Shield | 7. Doubler |
| 2. Plastic Clamp | 4. Lamp | 6. Lens | 8. Nacelle Skin |

Figure 14-12. Wing Deice Light Installation

Removal and Installation of the Strobe Light System Components. (See figure 14-9A.)

- 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 outward towards the lens and away from the reflector.

- b. Disconnect electrical wiring to strobe light.
- c. Remove strobe light unit from supporting bracket.
- d. Remove access cover to gain access to flasher.
- e. Disconnect electrical wiring from flasher.
- f. Remove flasher from supporting beam.

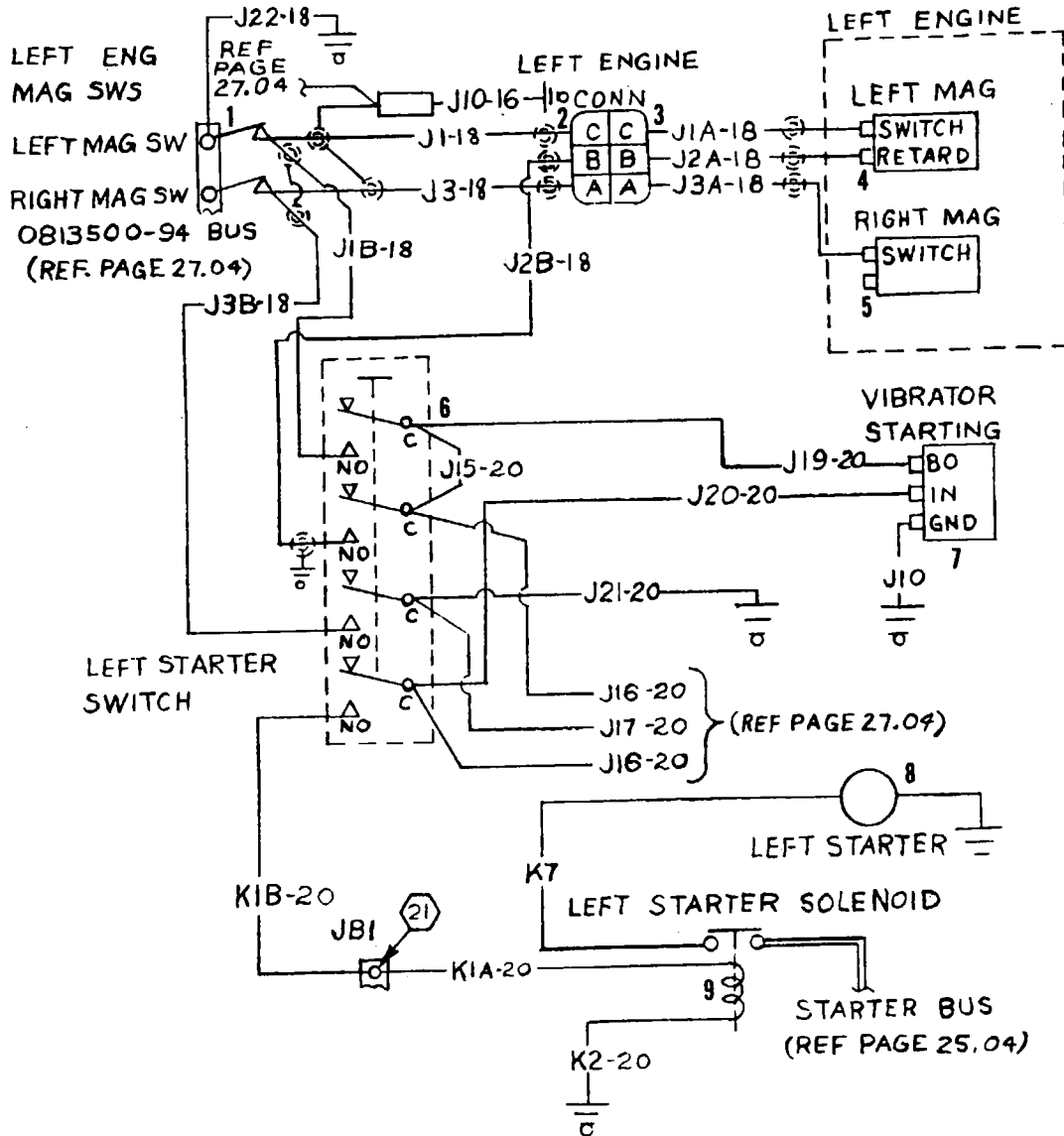
- g. Remove access cover to gain access to power supply unit.
- h. Disconnect electrical plug.
- i. Remove power supply unit from supporting bracket.
- j. Remove tail light in accordance with figure 14-9.
- k. The installation of the strobe system components is the reversal of the removal procedure.

Removal and Installation of Cabin Step Light and Wing Walkway Light. (See figure 14-13.)

- a. Remove screws (1) holding lens assembly.
- b. Remove lens assembly (2) from housing assembly.
- c. Remove bulb (4) from socket.
- d. If further disassembly is required, lift out housing assembly (3) remove wires from socket and tag.
- e. Installation of cabin step light is accomplished by reversing this procedure.

START & IGNITION - LEFT ENGINE

EFF. SERIALS

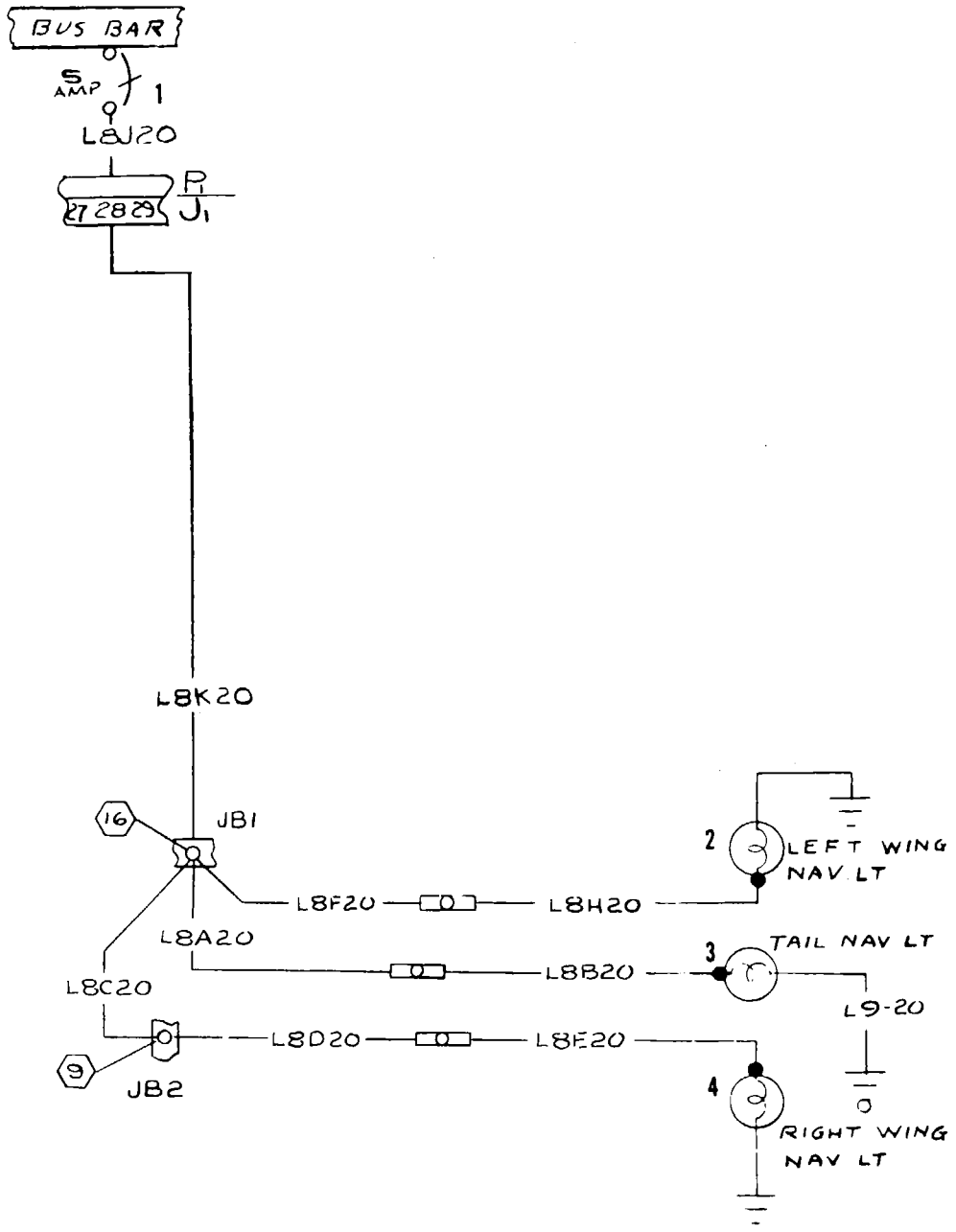


ITEM	PART NUMBER	NOMENCLATURE
1	S382-2	Left Mag Switch
2	MS3106B-10SL-3S	Connector
3	MS3106B-10SL-3P	Connector
4	628472	Left Mag (Left Engine)
5	628473	Right Mag (Left Engine)
6	4PB12T2	Left Start Switch
7	0812689-1	Starting Vibrator
8	0850461-1	Left Starter
9	*627841 0850469-1	Left Starter Left Starting Relay

*Turbo-System 310P0001 AND ON

NAVIGATION LIGHTS

EFF. SERIALS



ITEM

PART NUMBER

NOMENCLATURE

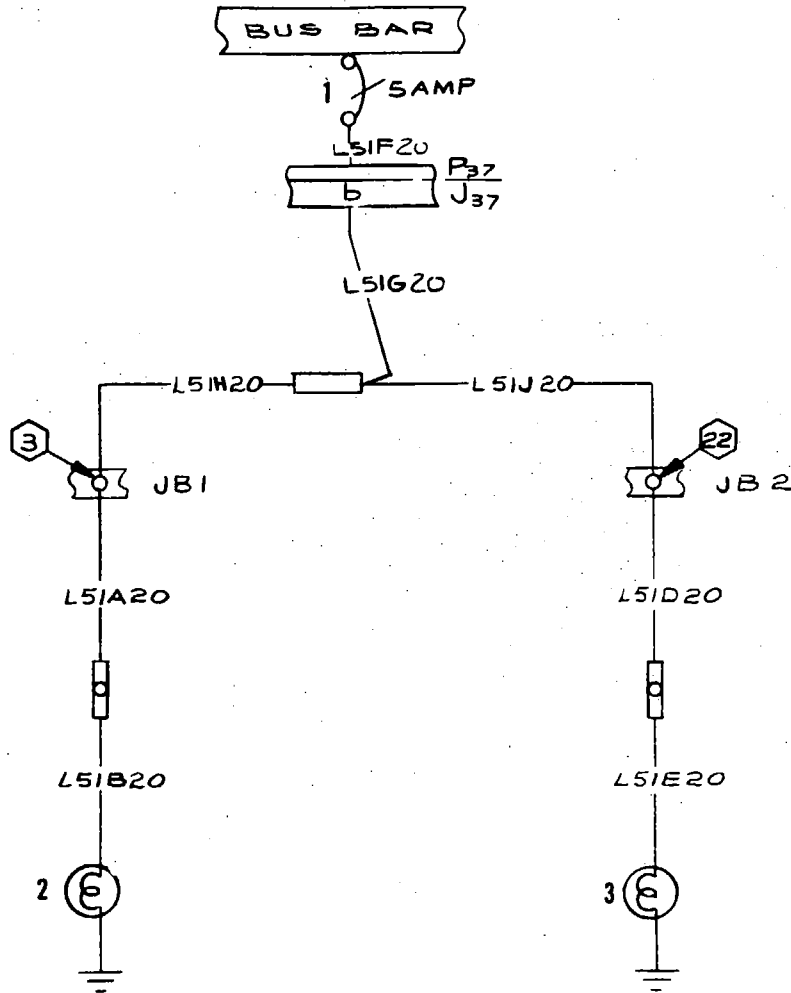
- 1
- 2
- 3
- 4

- 112-205-101
- 0823200-1
- C622001-0103
- 0823200-2

- Circuit Breaker
- Left Wing (Nav Lite)
- Tail (Nav Lite)
- Right Wing (Nav Lite)

WING DE-ICE LIGHT (OPT)

EFF. SERIALS



ITEM	PART NUMBER	NOMENCLATURE
1	112-205-101	Circuit Breaker
2	0820501-5	LH Deice Light
3	0820501-5	RH Deice Light

CESSNA AIRCRAFT CO.
WICHITA, KANSAS

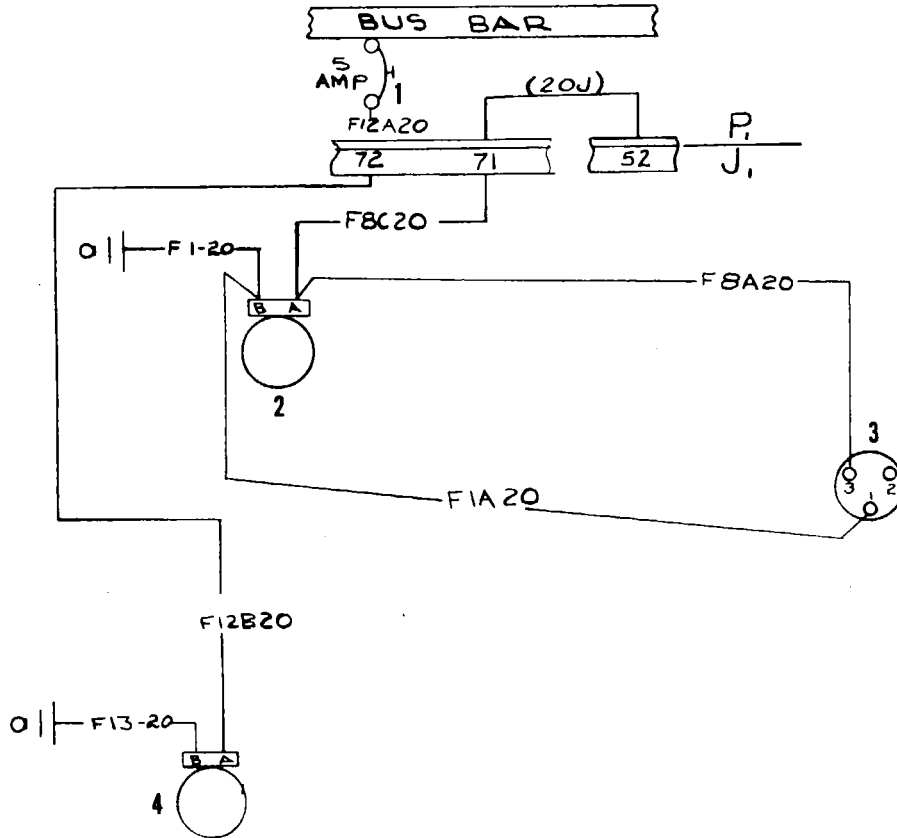
310Q MODEL
AE REV.

0870090 DRAWING NO.

40.03 PAGE

TURN & BANK INDICATOR & TEST LIGHT

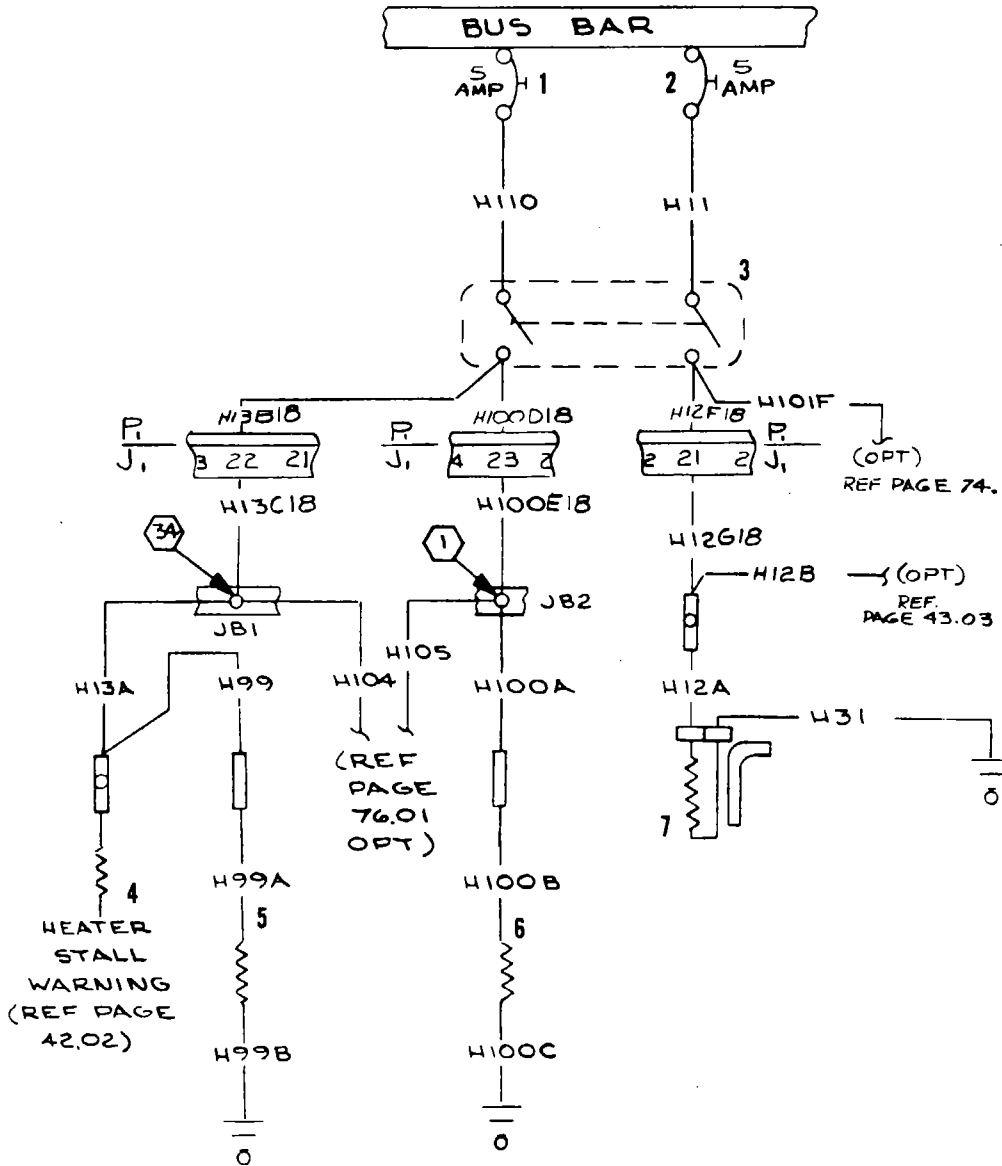
EFF. SERIALS



ITEM	PART NUMBER	NOMENCLATURE
1	S1232-505	Circuit Breaker
2	C661031-0101	Turn and Bank Indicator - LH
3	L3100AM	Turn and Bank Test Light
4	C661031-0101	Turn and Bank Indicator - RH

PITOT HEAT SYSTEM

EFF. SERIALS



ITEM

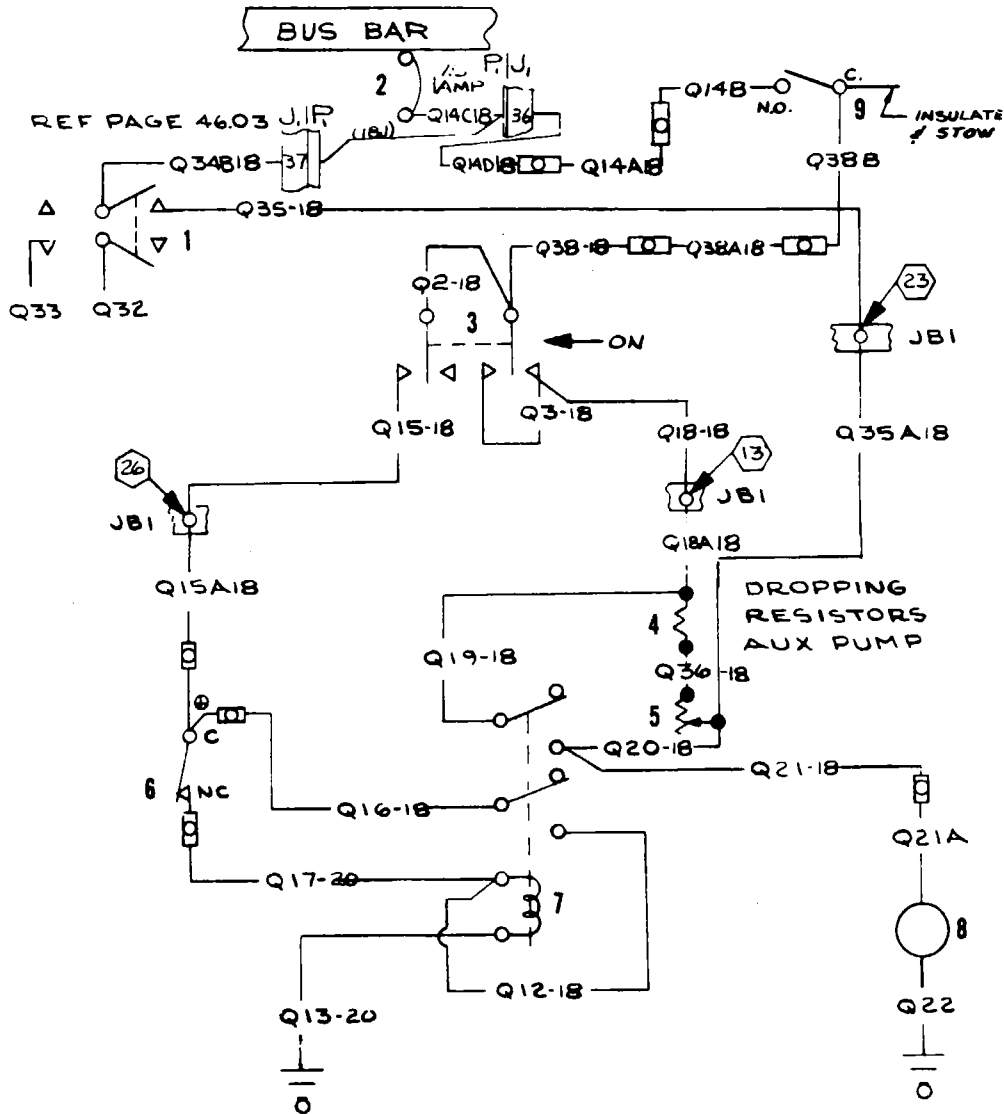
PART NUMBER

NOMENCLATURE

1	S1232-505	Circuit Breaker
2	S1232-505	Circuit Breaker
3	MS35059-22	Switch - Pitot Heat
4	0511062-1	Heater - Stall Warning
5	104738	Heater - Fuel Vent LH
6	104738	Heater - Fuel Vent RH
7	AN5813-1	Heater - Pitot Tube

LEFT AUX PUMP SYSTEM

EFF. SERIALS



• DISCONNECTS IN LEFT JUNCTION BOX. WHEN OPTIONAL ENGINE (LESS "OIL PRESSURE SW") IS INSTALLED, SPLICE WIRE Q14 TO Q38 IN L. JCT. BOX.

ITEM	PART NUMBER	NOMENCLATURE
1	MS35059-27	Switch - Prime
2	S1232-507	Circuit Breaker
3	S392-1	Switch - Aux Pump LH
4	0771	Resistor
5	0771	Resistor
6	0850452-6	Switch - Pressure
7	0850404-1	Relay - Aux Pump LH
8	0850420-1	Pump - Aux Pump LH
9	0850452-8	Oil Pressure Switch

CESSNA AIRCRAFT CO.
WICHITA, KANSAS

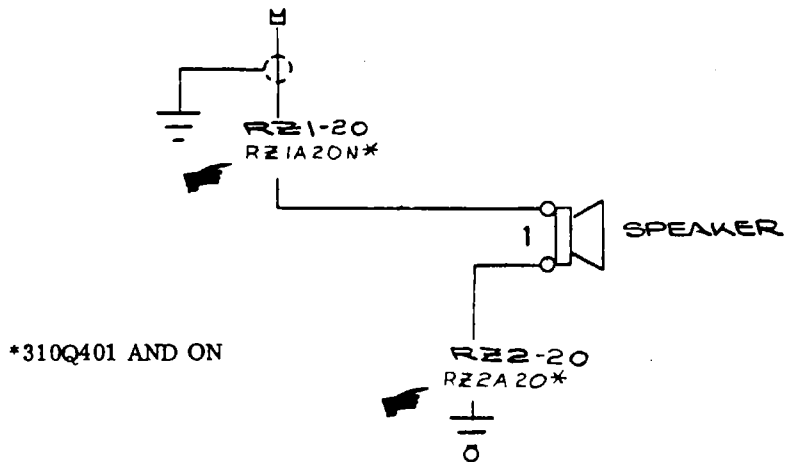
310
MODEL REV.

0870090
DRAWING NO.

55.00
PAGE

SPEAKER CIRCUIT

EFF. SERIALS



ITEM

1

PART NUMBER

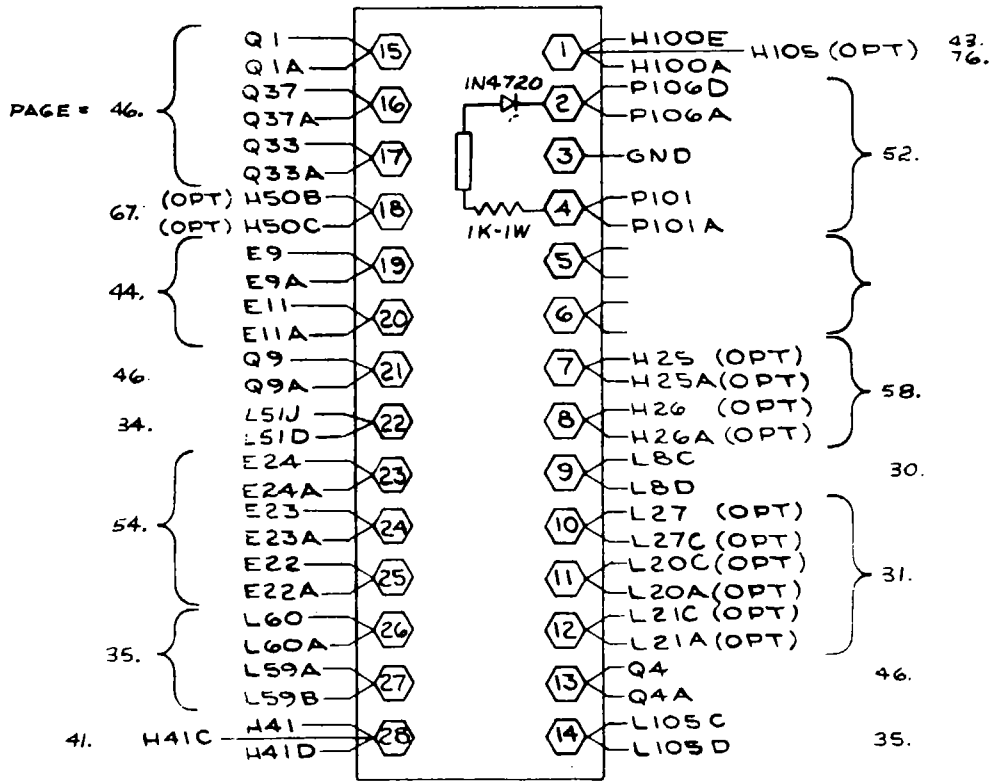
525-10C4HT

NOMENCLATURE

Speaker - Cabin

RIGHT JUNCTION BOX CONNECTIONS

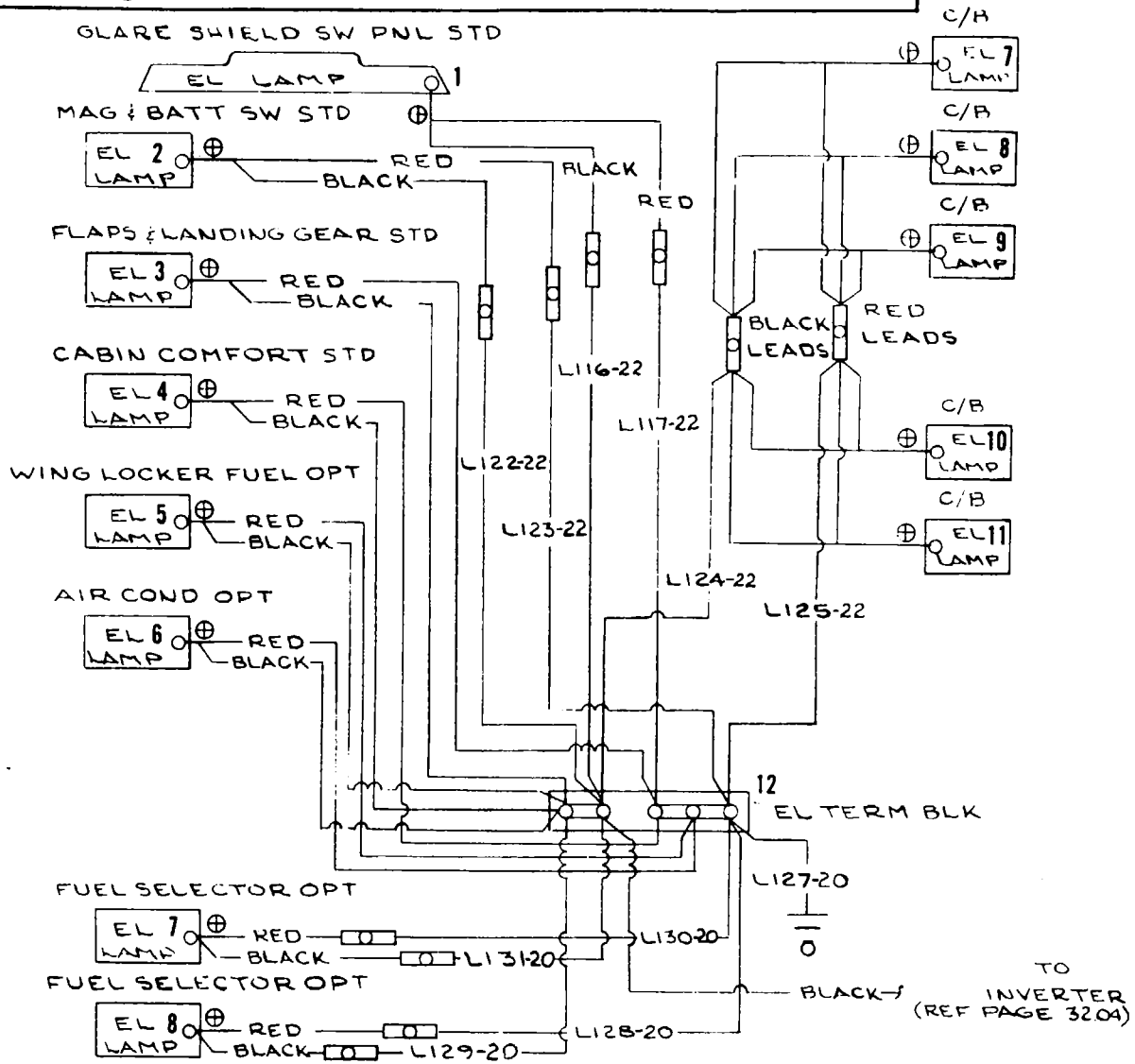
EFF. SERIALS



RIGHT JUNCTION
BOX
JB2

ELECTRLUMINESCENT LAMP CKT (OPT) C/B PNL EL

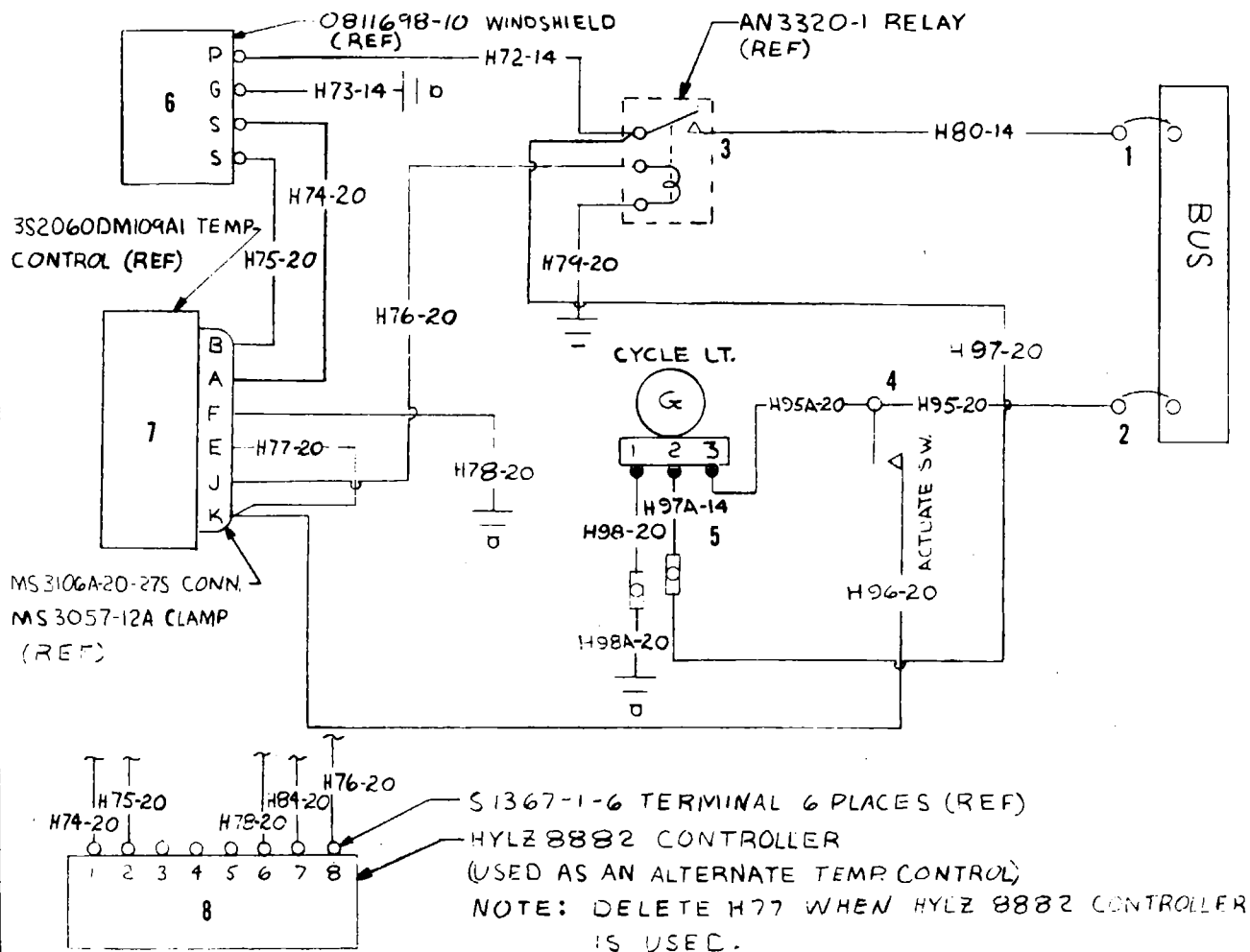
EFF. SERIALS



ITEM	PART NUMBER	NOMENCLATURE
1	9910034-2	El Lamp - Glare Shield Switch Panel
2	9910031-3	El Lamp - Mag and Battery Switch
3	9910051-1	El Lamp - Flaps and Landing Gear
4	9910033-3	El Lamp - Cabin Comfort
5	9910030-1	El Lamp - Wing Locker Fuel
6	9910030-	El Lamp - Air Cond
7	9910052-3	El Lamp - Fuel Selector
8	9910052-4	El Lamp - Fuel Selector
9	9910032-10	El Lamp - Circuit Breaker
10	9910032-11	El Lamp - Circuit Breaker
11	9910032-3	El Lamp - Circuit Breaker
12	MS25123-1-5	El Terminal Block

AIRCON WINDSHIELD (OPT)

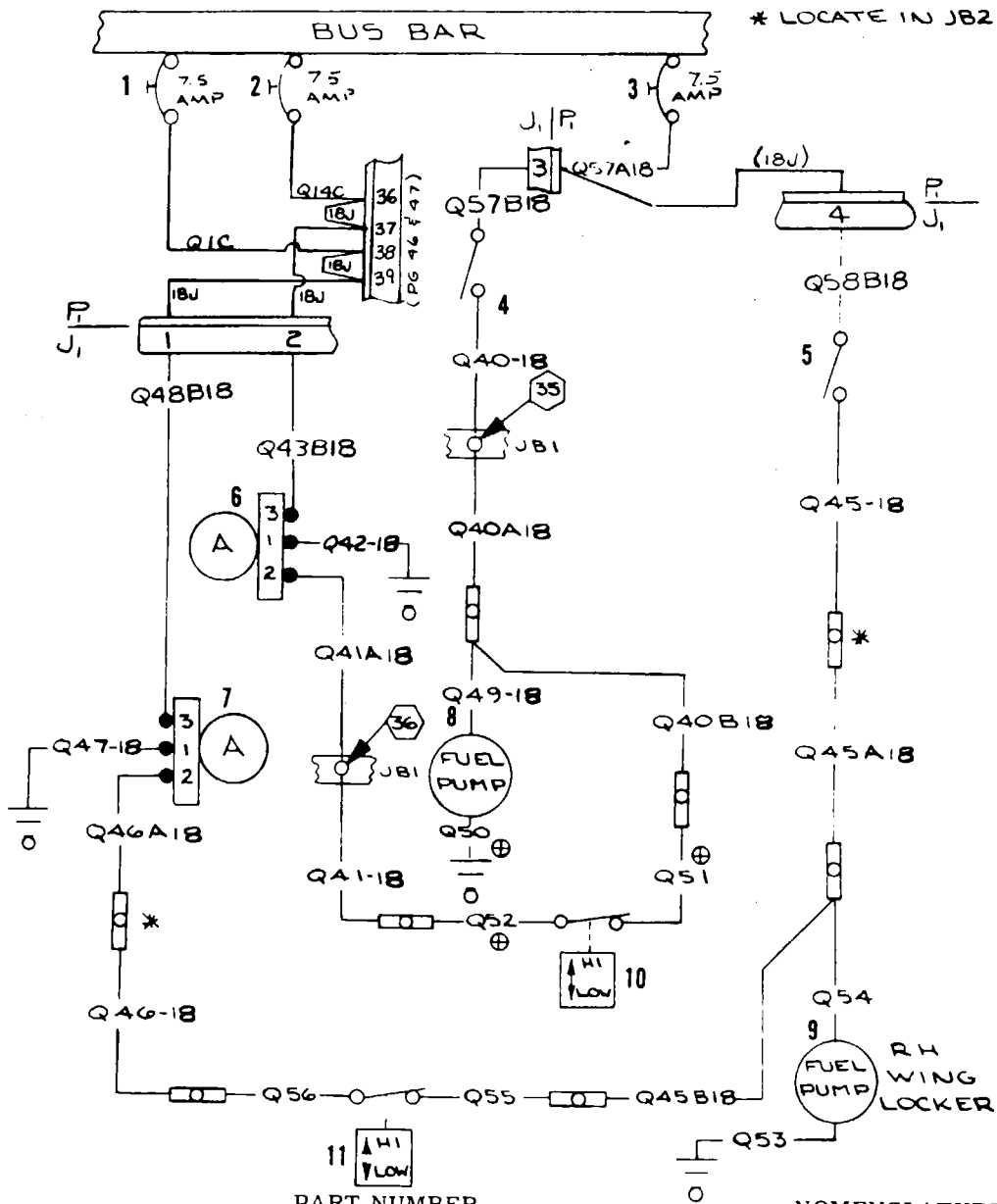
EFF. SERIALS



ITEM	PART NUMBER	NOMENCLATURE
1	S1232-505	Circuit Breaker
2	S1232-505	Circuit Breaker
3	AN3320-1	Relay
4	S382-2	Actuator Switch
5	VM911M4	Cycle Light
6	0811698-10	Windshield
7	3S2060DM109A1	Temperature Control
8	HYLZ8882	Controller

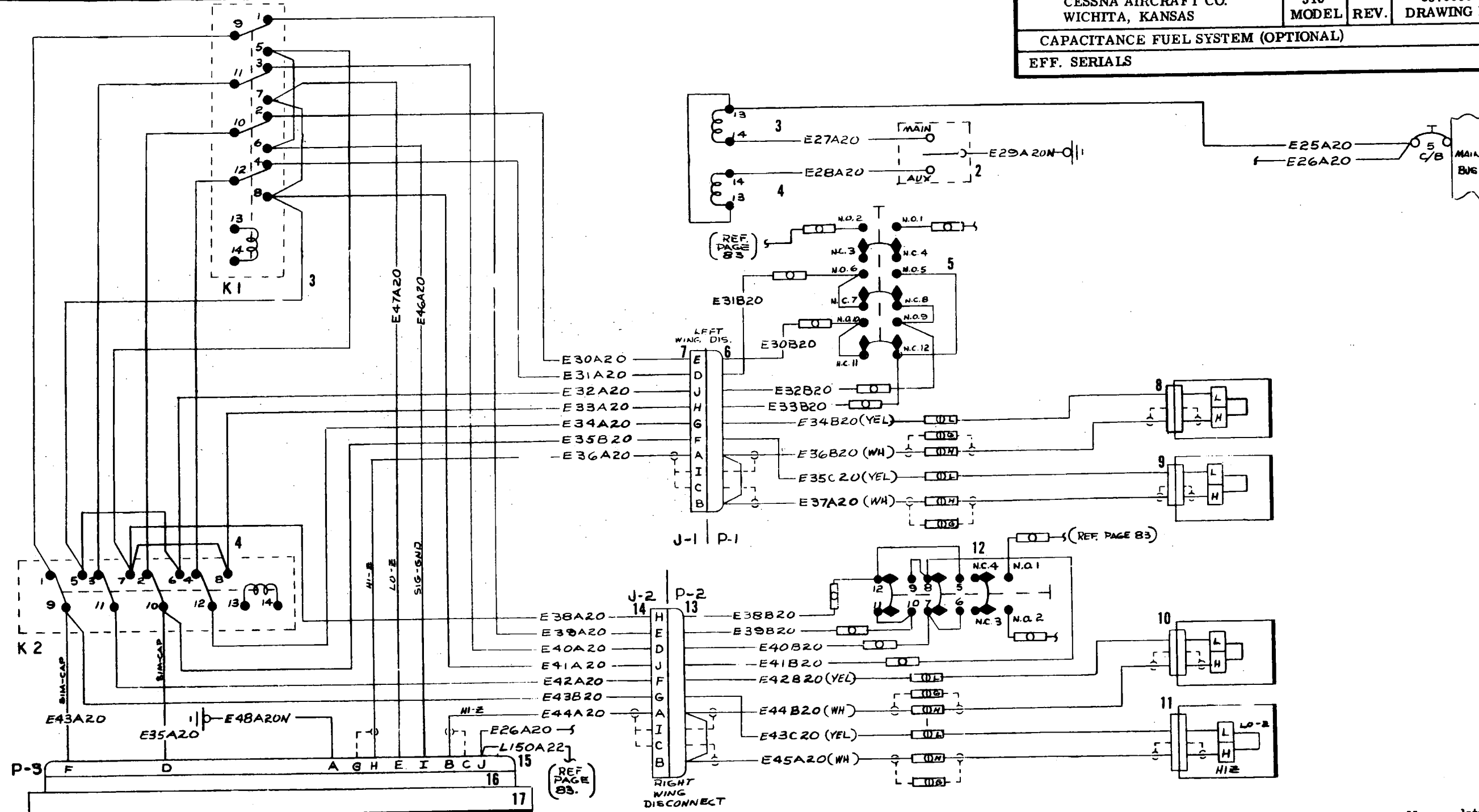
AUX FUEL TRANSFER PUMP (OPT) WING LOCKER

EFF. SERIALS



ITEM	PART NUMBER	NOMENCLATURE
1	S1232-505	Circuit Breaker
2	S1232-505	Circuit Breaker
3	S1232-507	Circuit Breaker
4	S382-2	Left Fuel Pump Switch
5	S382-2	Right Fuel Pump Switch
6	VM911M4	LH Light Fuel Pressure Ind
7	VM911M4	RH Light Fuel Pressure Ind
8	4140-00-153	Fuel Pump LH Wing Locker
9	4140-00-153	Fuel Pump RH Wing Locker
10	0850452-3	Pressure Switch - RH
11	0850452-3	Pressure Switch - LH

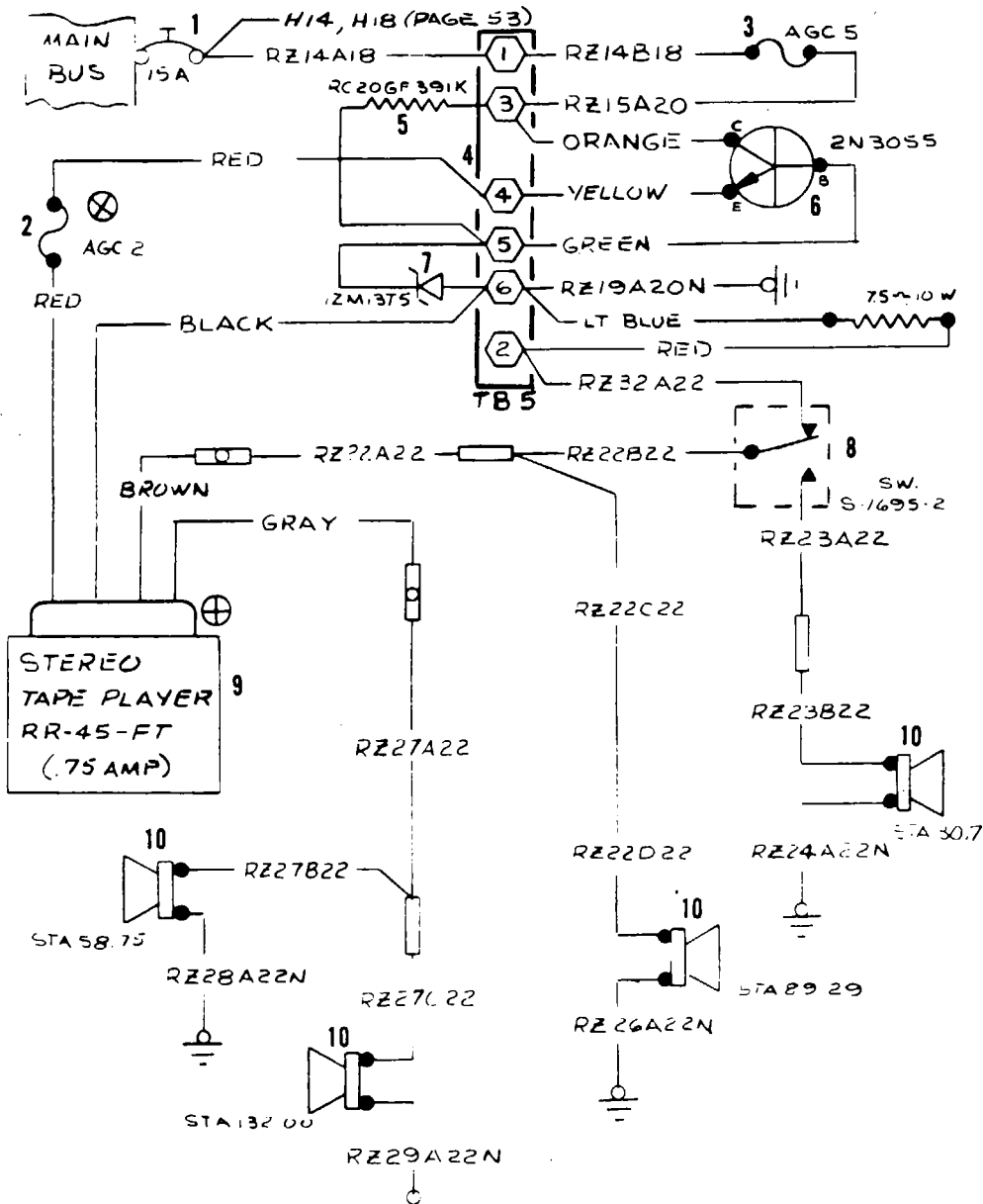
CAPACITANCE FUEL SYSTEM (OPTIONAL)
EFF. SERIALS



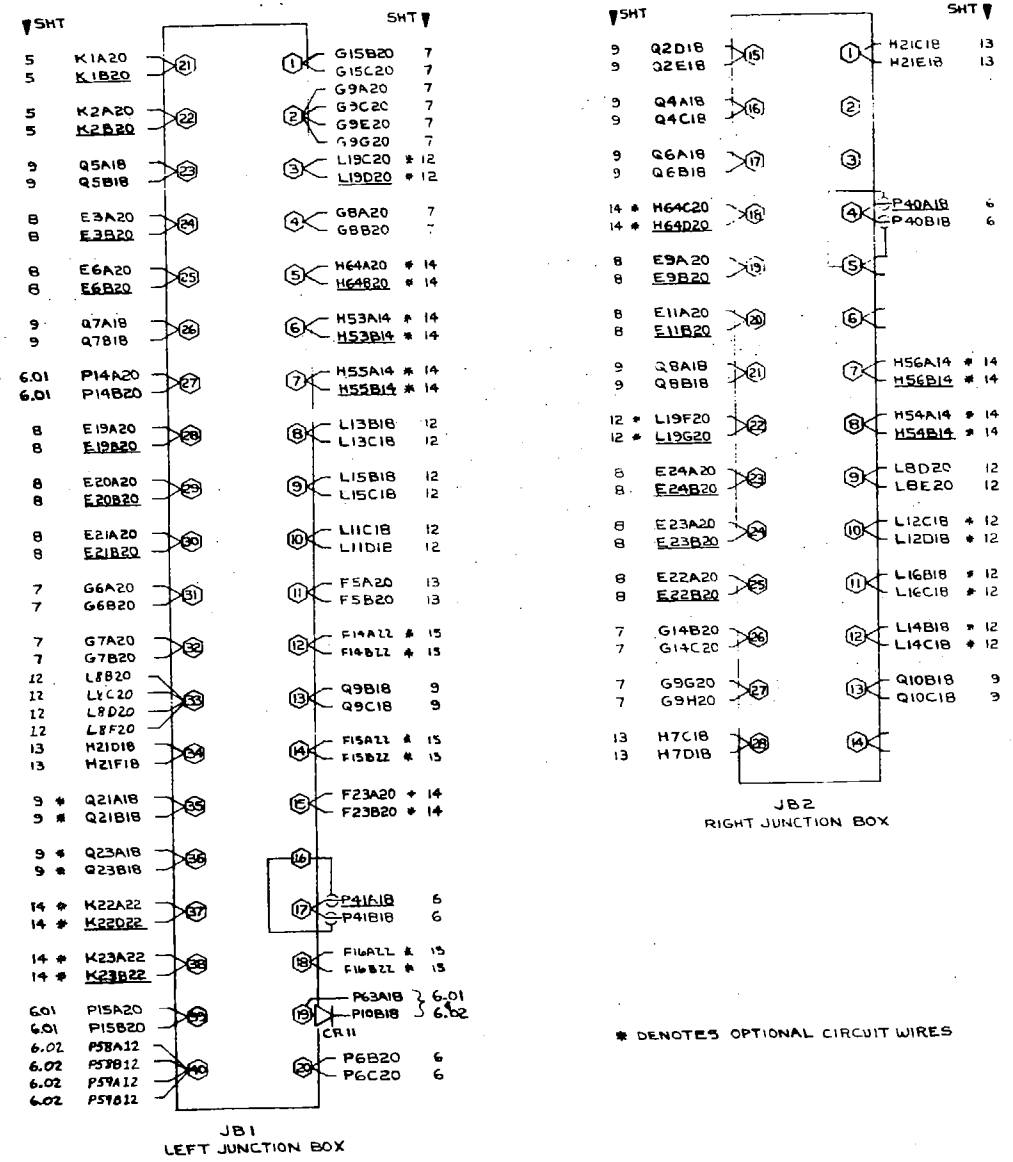
Unit	Part Number	Nomenclature	Unit	Part Number	Nomenclature
1	S1232-505	Circuit Breaker	10	PAA700-3	(RH) Main Tank Unit
2	S1695-4	Selector Switch	11	PAA700-2	(RH) Aux Tank Unit
3	281XDX-24VDC	Relay	12	36-604	(RH) Selector Valve Switch
4	281XDX-24VDC	Relay	13	MS3106R-18-1P	Plug
5	36-604	(LH) Selector Valve Switch	14	MS3100R-18-1S	Receptacle
6	MS3106R-18-1P	Plug	15	MS3106E-18-1S	Receptacle
7	MS3100R-18-1S	Receptacle	16	MS3106E-18-1P	Plug
8	PAA700-3	(LH) Main Tank Unit	17	C662013-0101	Indicator
9	PAA700-2	(LH) Aux Tank Unit			

STEREO TAPE SYS (STD-OPT)

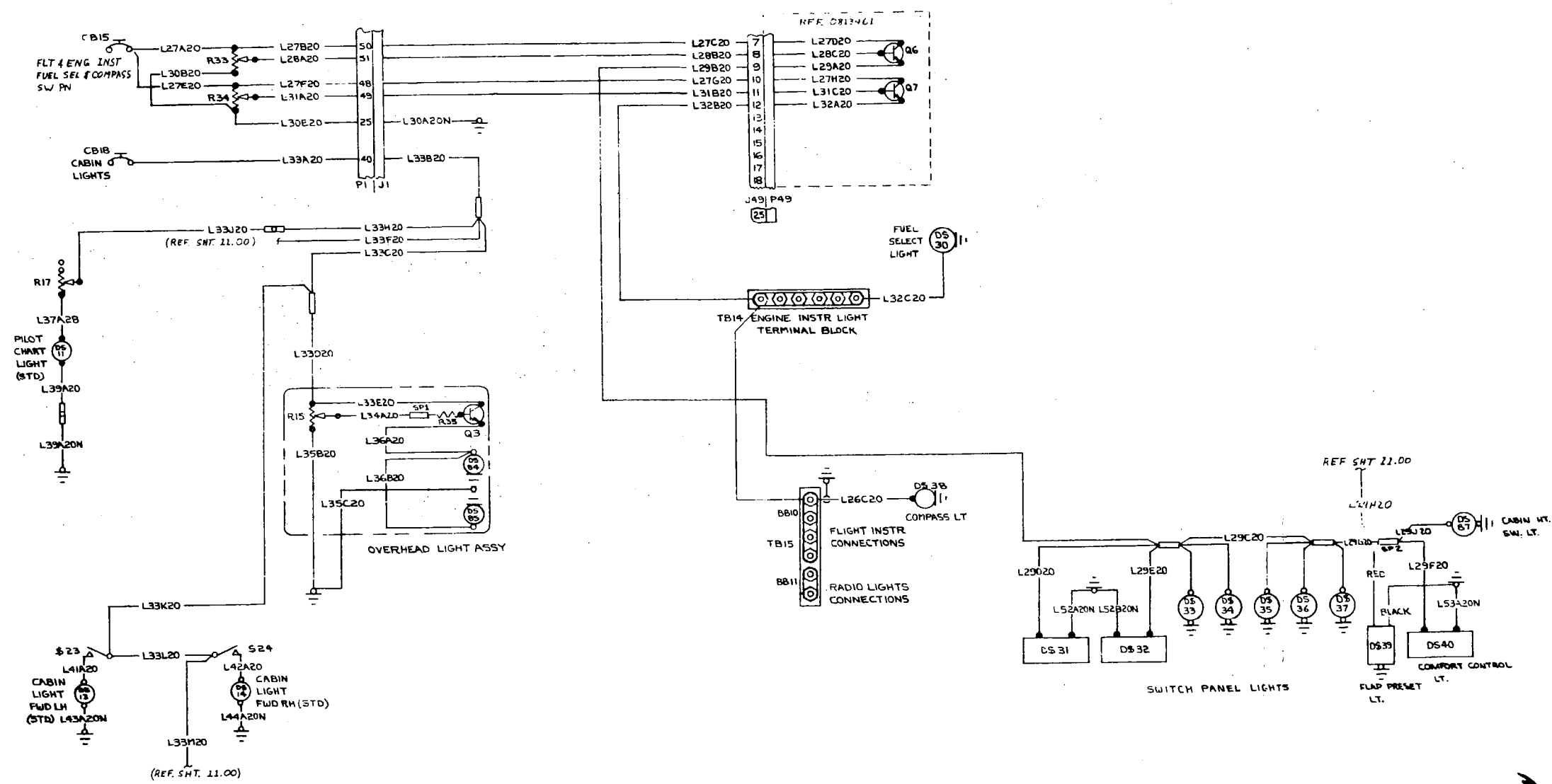
EFF. SERIALS



ITEM	PART NUMBER	NOMENCLATURE
1	S1232-515	Circuit Breaker
2	AGC2	Fuse
3	AGC5	Fuse
4	MS27212-1-6	Terminal Block
5	RC20GF391K	Resistor
6	2N3055	Transistor
7	12M13T5	Diode
8	S-1695-2	Switch
9	PR-45-FT	Stereo Tape Player
10	C596506-0101	Speaker



		AIRCRAFT CO.		P. O. BOX 1877 WICHITA, KANSAS 67201	
TITLE TERMINAL BOARDS (JUNCTION BOX CONNECTIONS)					
SIZE D	CODE IDENT NO 71379	DRAWING NO 0808080			
SCALE NONE	REF F	SHEET 4 OF 16			



		AIRCRAFT CO.	P. O. BOX 1877 MILWAUKEE & TWIN DIVISION WICHITA, KANSAS 67217
TITLE INTERIOR LIGHTING - STD			
SIZE D	CODE IDENT NO 71379	DRAWING NO 0808080	
SCALE NONE	REF F	SHEET NO. OF 16.30	

- 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.

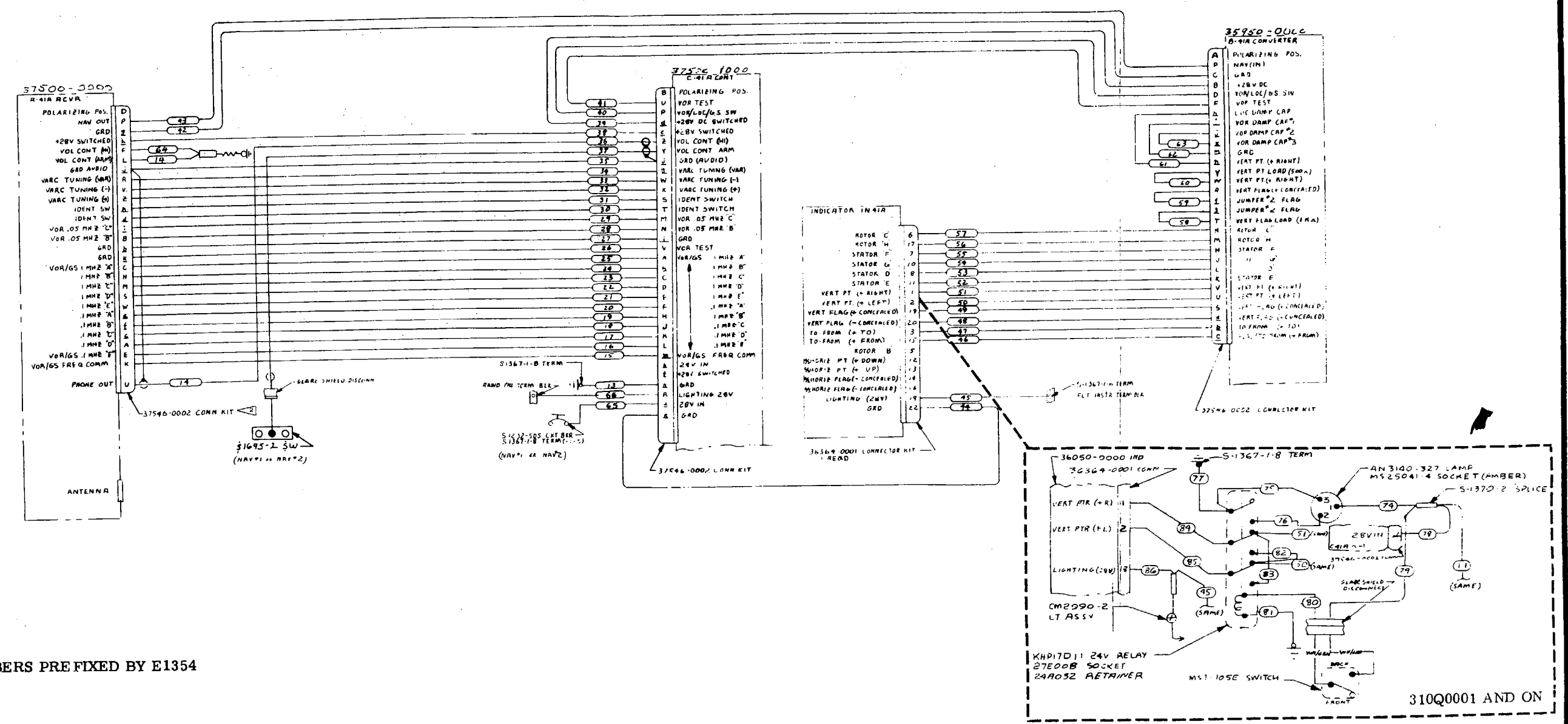
NOTE

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 MASTER SWITCHES AND CIRCUIT BREAKER. (310Q0901 and On.)

Two avionics master switches are provided with factory-installed avionics. Power is supplied from the battery, through a circuit breaker, located in the left wing outboard of the engine nacelle, to the AVIONICS MASTER switch breaker, located on the upper forward section of the side panel and on to avionics bus. The ALTERNATE AVIONICS power switch breaker, located on the lower section of the side panel, provides backup power in the event the circuit breaker, switch breaker or their associated wiring and battery circuits become inoperative.

Access to the avionics circuit breaker is gained by removing access plate (66), figure 1-3.



NOTE: WIRE NUMBERS PREFIXED BY E1354

310P0015 AND ON
TURBO-SYSTEM 310P0015 AND ON

310Q0001 AND ON

Figure 15-7. Cessna Nav 800

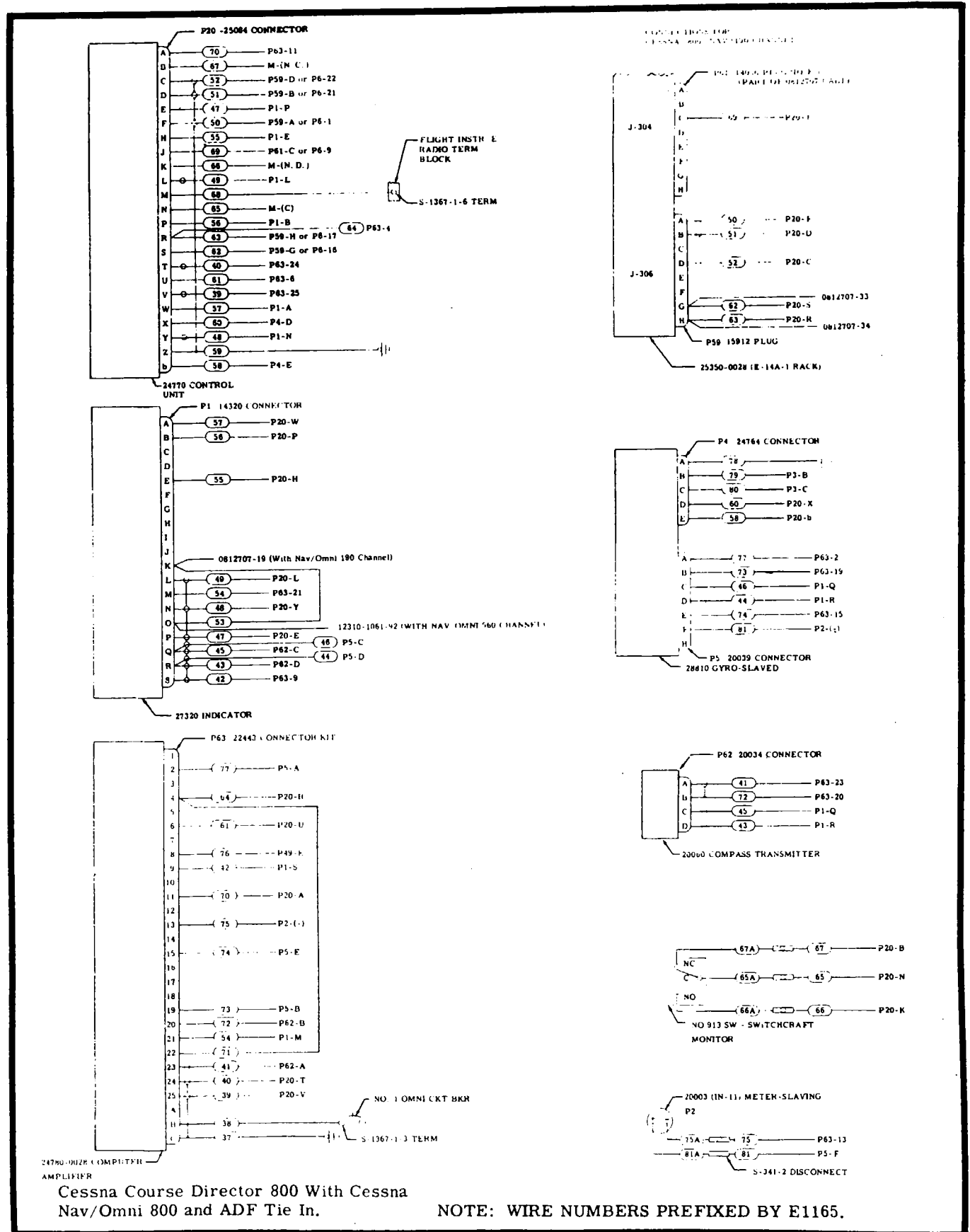
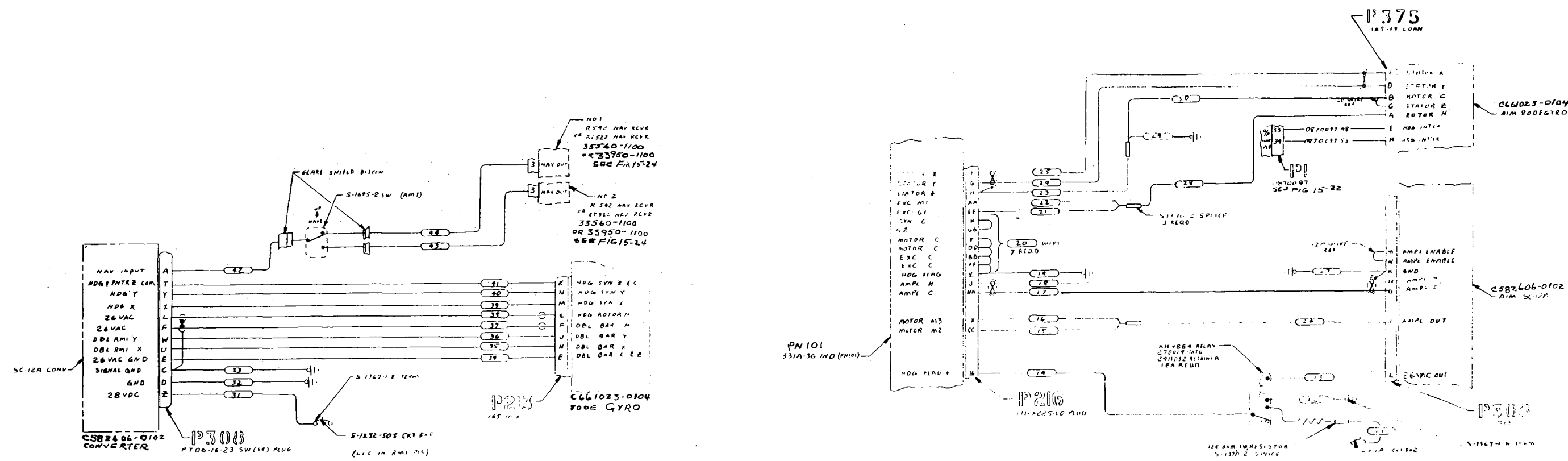


Figure 15-15. Cessna Course Director 800 (Sheet 1 of 3)



NOTE: WIRE NUMBERS PREFIXED BY E1360

Figure 15-20. Cessna 800 RMI

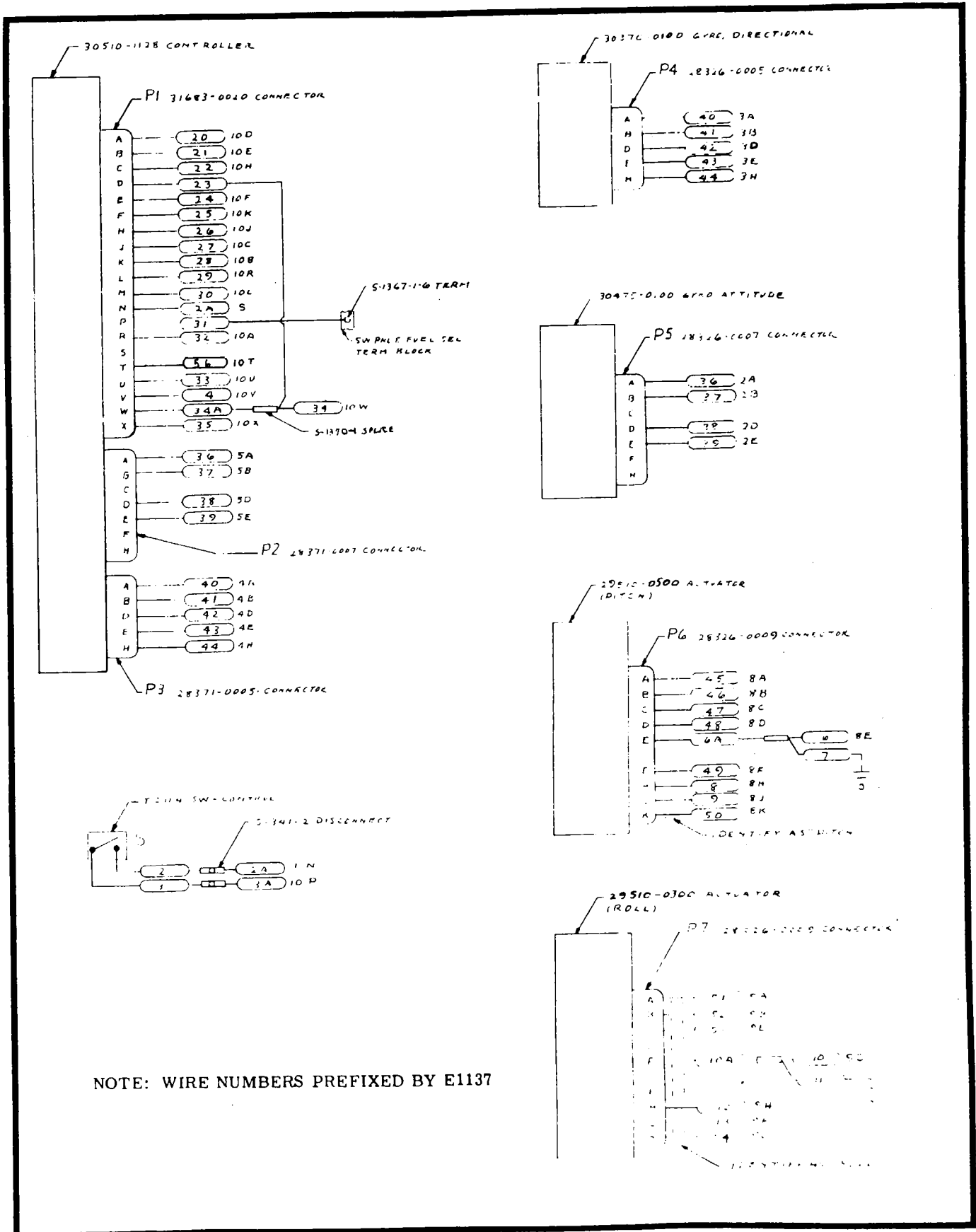


Figure 15-23. Cessna Nav-O-Matic 400 Autopilot (Sheet 1 of 3)

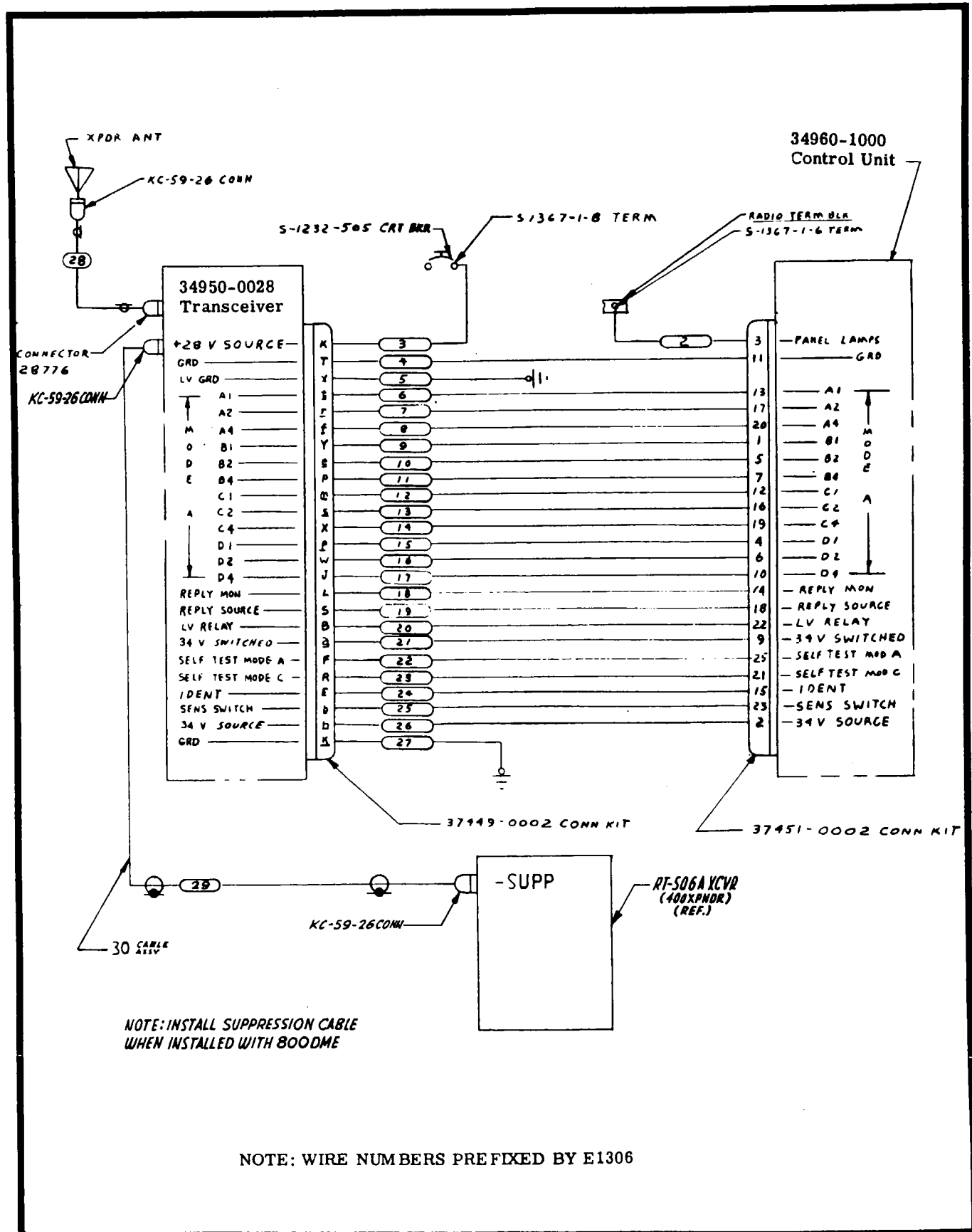
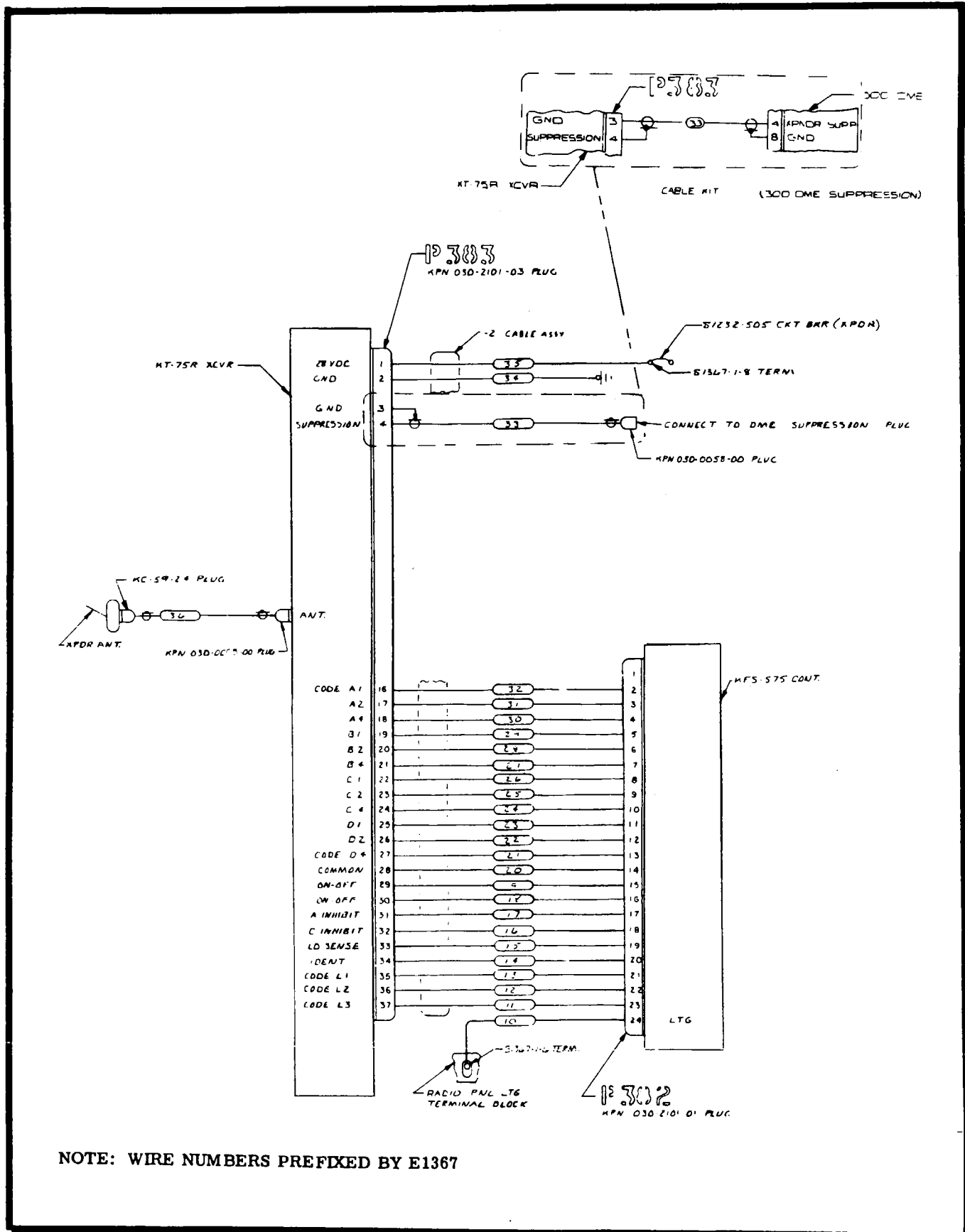


Figure 15-30. Cessna Transponder 400



NOTE: WIRE NUMBERS PREFIXED BY E1367

Figure 15-36B. Cessna 300 Transponder

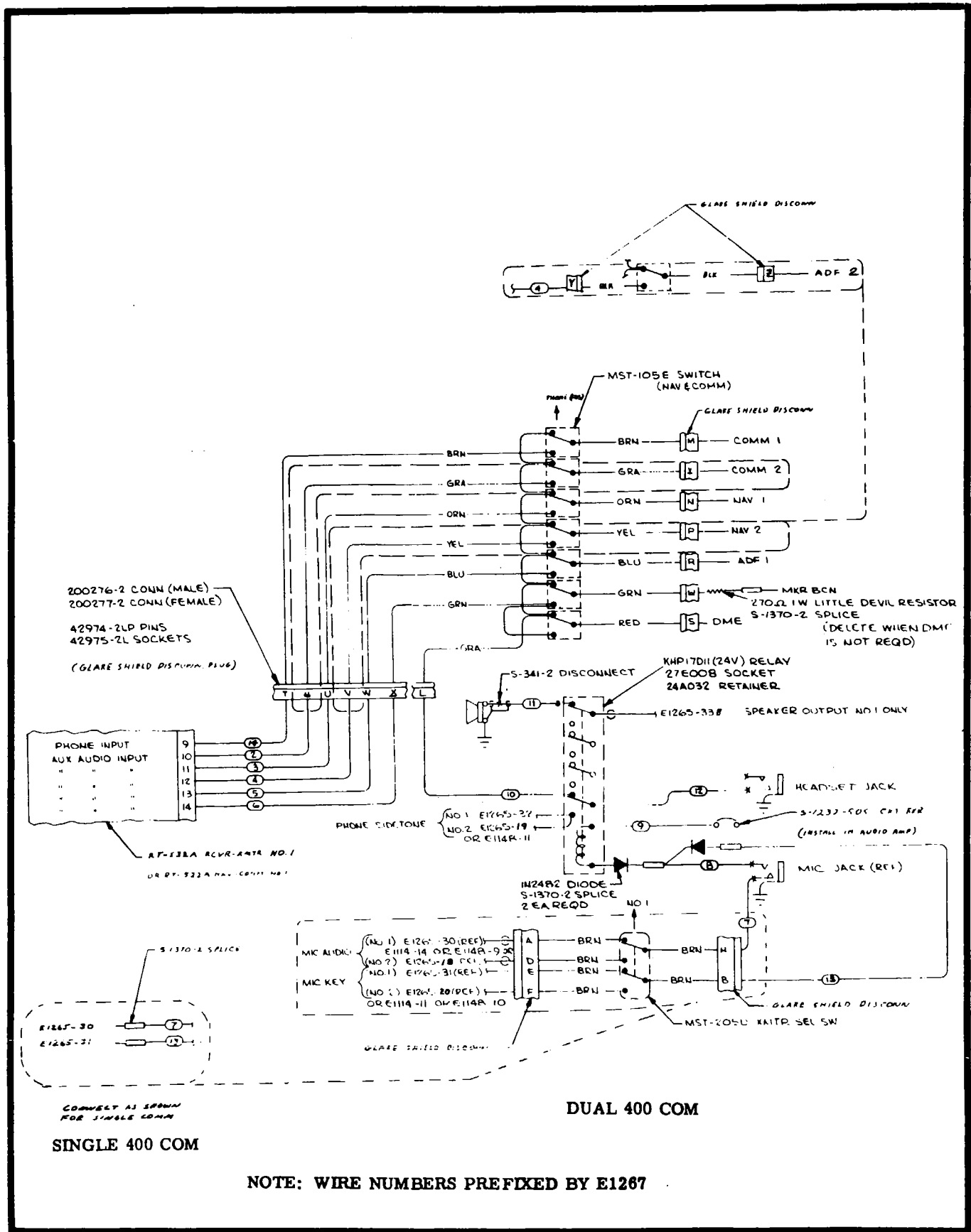
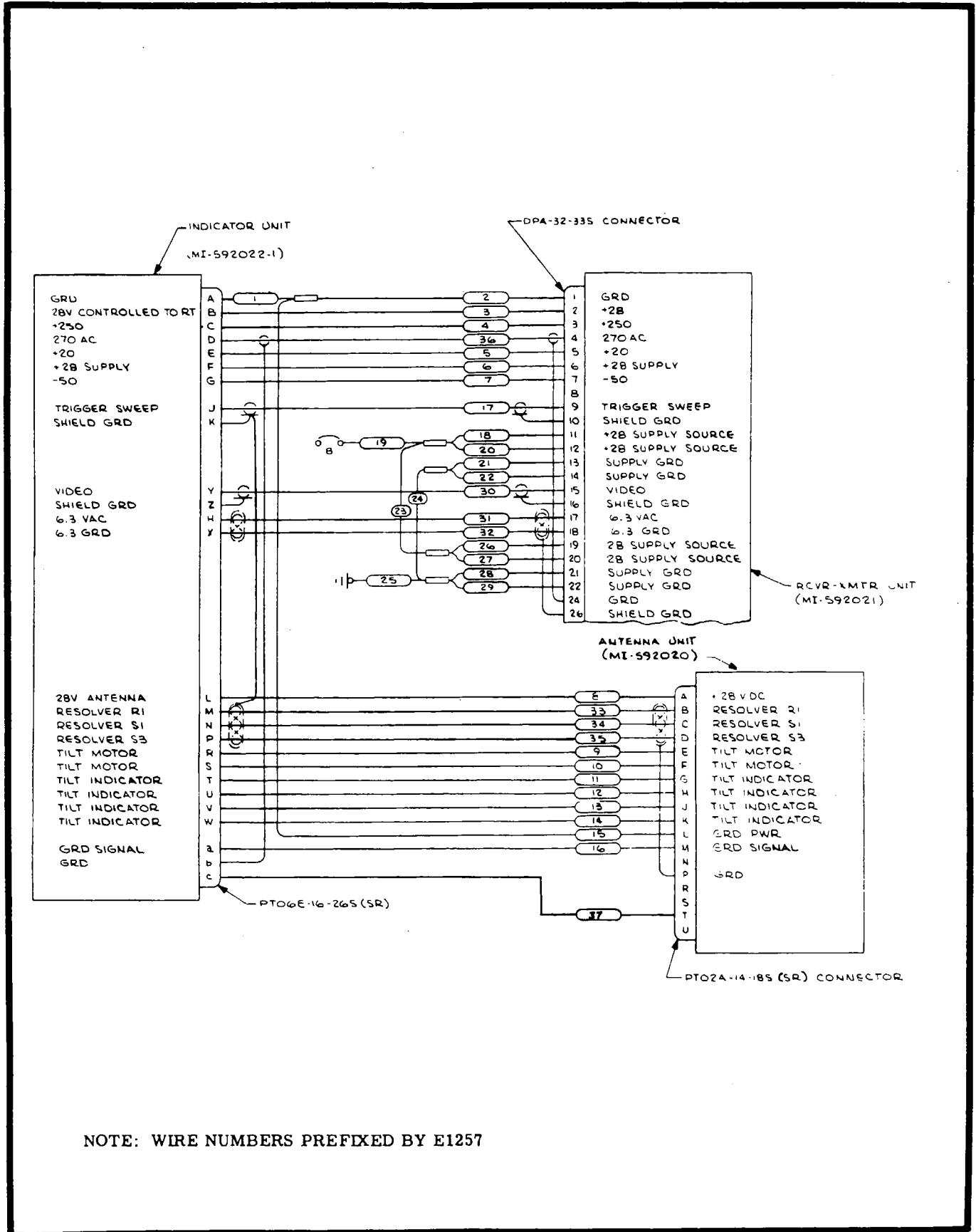


Figure 15-40A. Audio System (Sheet 4 of 5)



NOTE: WIRE NUMBERS PREFIXED BY E1257

Figure 15-47. AVQ-45 Weather Radar

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 initial damage is transmitted from one member to the next, causing strains and distortions. 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.
- 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 a solution of Iridite mixed in a ratio of 1 ounce of Iridite to 1 gallon of water and rinse thoroughly.

f. Apply two coats of zinc-chromate primer to all internal surfaces and edges lapping over another.

NOTE

Damage adjacent to a previous repair requires removal of the old repair and inclusion of the entire area in the new repair.

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.

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 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 and Horizontal Stabilizer Angle of Incidence.

Angle of incidence is defined as the angle between the wing or stabilizer chord line and aircraft waterline (aircraft level longitudinally). Stabilizers do not have twist. Wings have a constant rate of twist from the wing root rib to the tip rib. All twist is between these two ribs. The amount of twist between these points is the difference between the angle of incidence at the root rib and the angle of incidence at the tip. Refer to Section 3 to check wing twist.

Wing Skin.

All wing, aileron, and flap skin thickness and temper are listed in figure 16-10.

Negligible Damage.

Any smooth dents in the wing skin that are free from cracks, abrasions and sharp corners, which are not

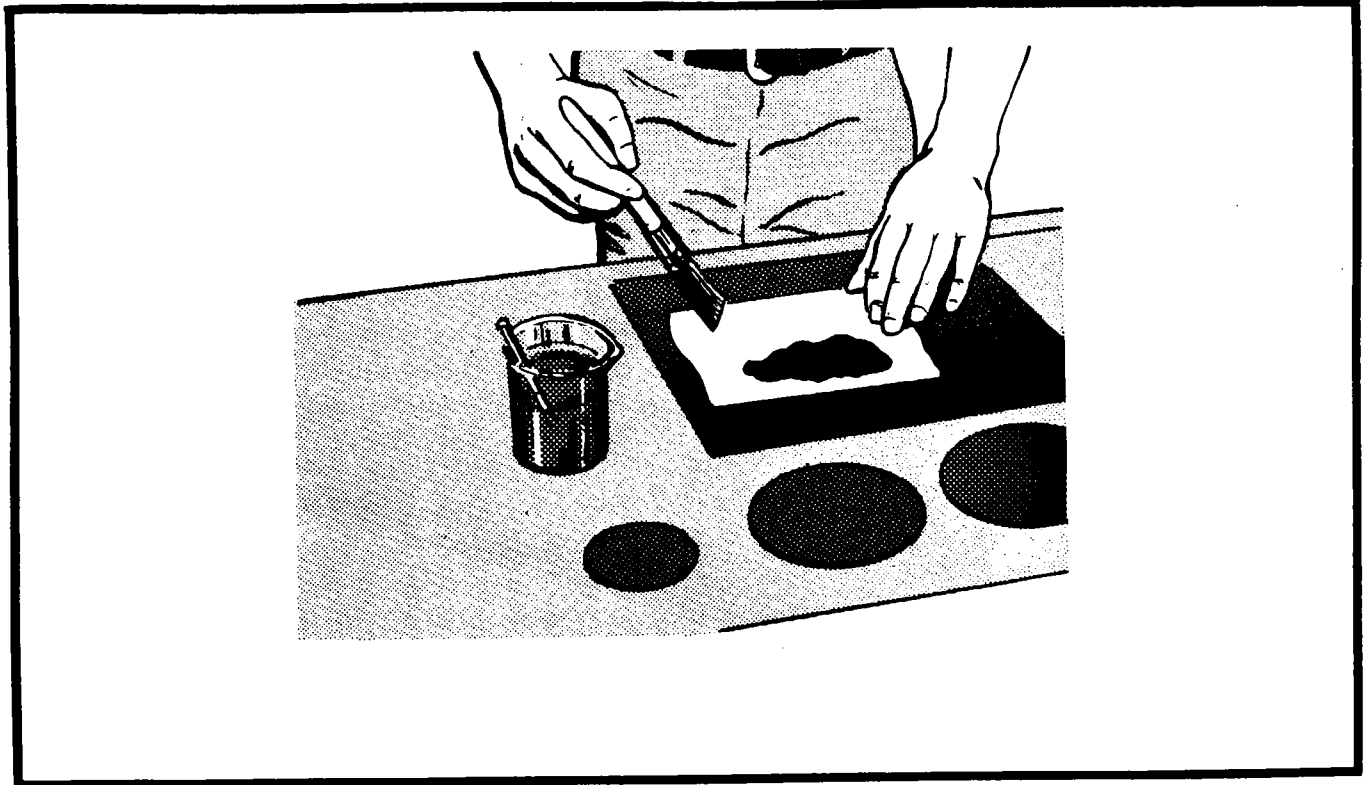


Figure 16-3. Suggested Method of Resin Impregnating Replacement Plies

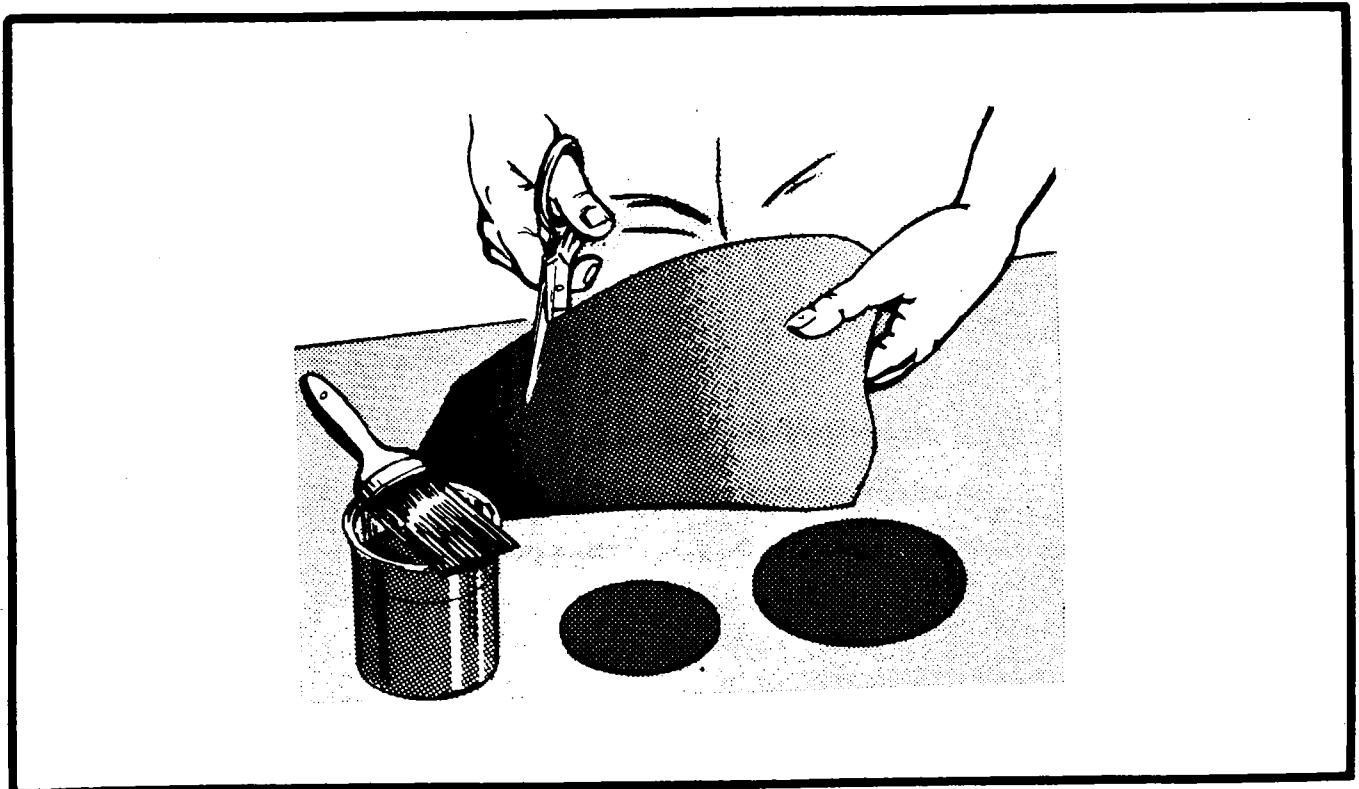


Figure 16-4. Cutting Replacement Plies from Impregnated Glass Cloth Sandwiched Between Sheet of Cellophane

FABRICATION OF BALANCE FIXTURE.

CAUTION

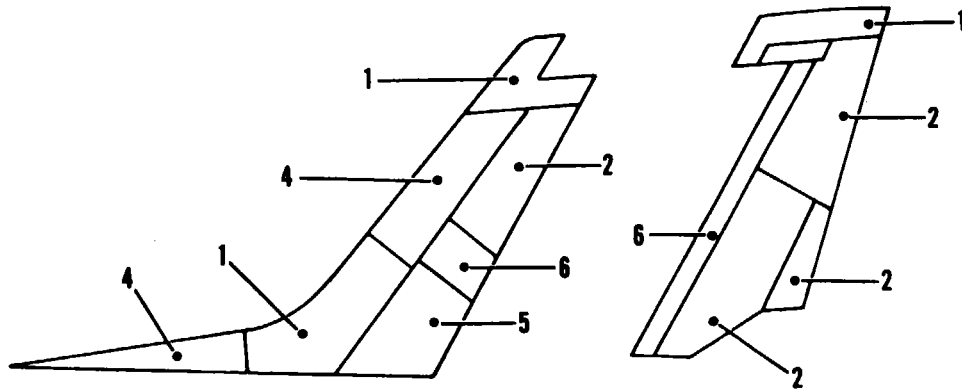
Refer to the applicable manual for balancing instruction.

a. The balance fixture is used for balancing control surfaces for the following airplanes:

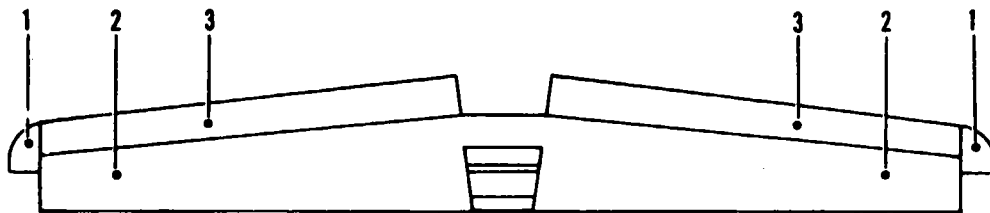
310P0001 AND ON
320D0001 AND ON
335-0001 AND ON
340-0001 AND ON
401-0001 AND ON
402-0001 TO 402C0001
414-0001 TO 414A0001
421-0001 TO 421C0001

b. Fabricate balance fixture to dimensions and instructions given in figure 16-8.

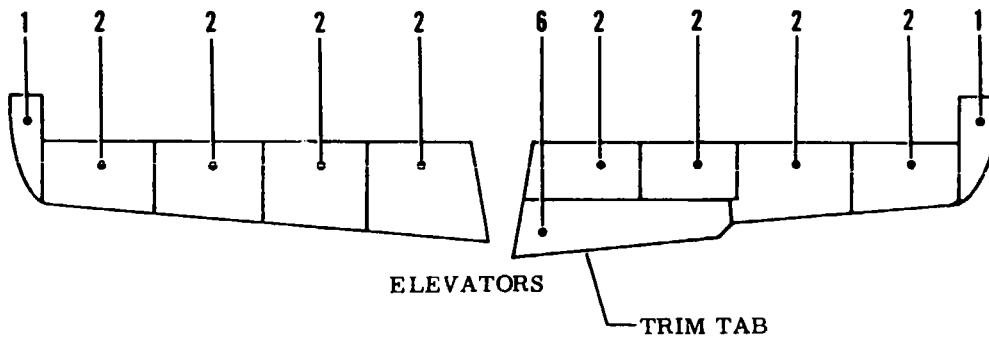
1. FIBERGLASS
2. .016 INCH 2024 T3 ALCLAD
3. .025 INCH 2024 T3 ALCLAD
4. .025 INCH 2024 T42 ALCLAD
5. .032 INCH 2024 T3 ALCLAD
6. .020 INCH 2024 T3 ALCLAD



VERTICAL FIN AND RUDDER



HORIZONTAL STABILIZER



ELEVATORS

TRIM TAB

Figure 16-12. Empennage Skin

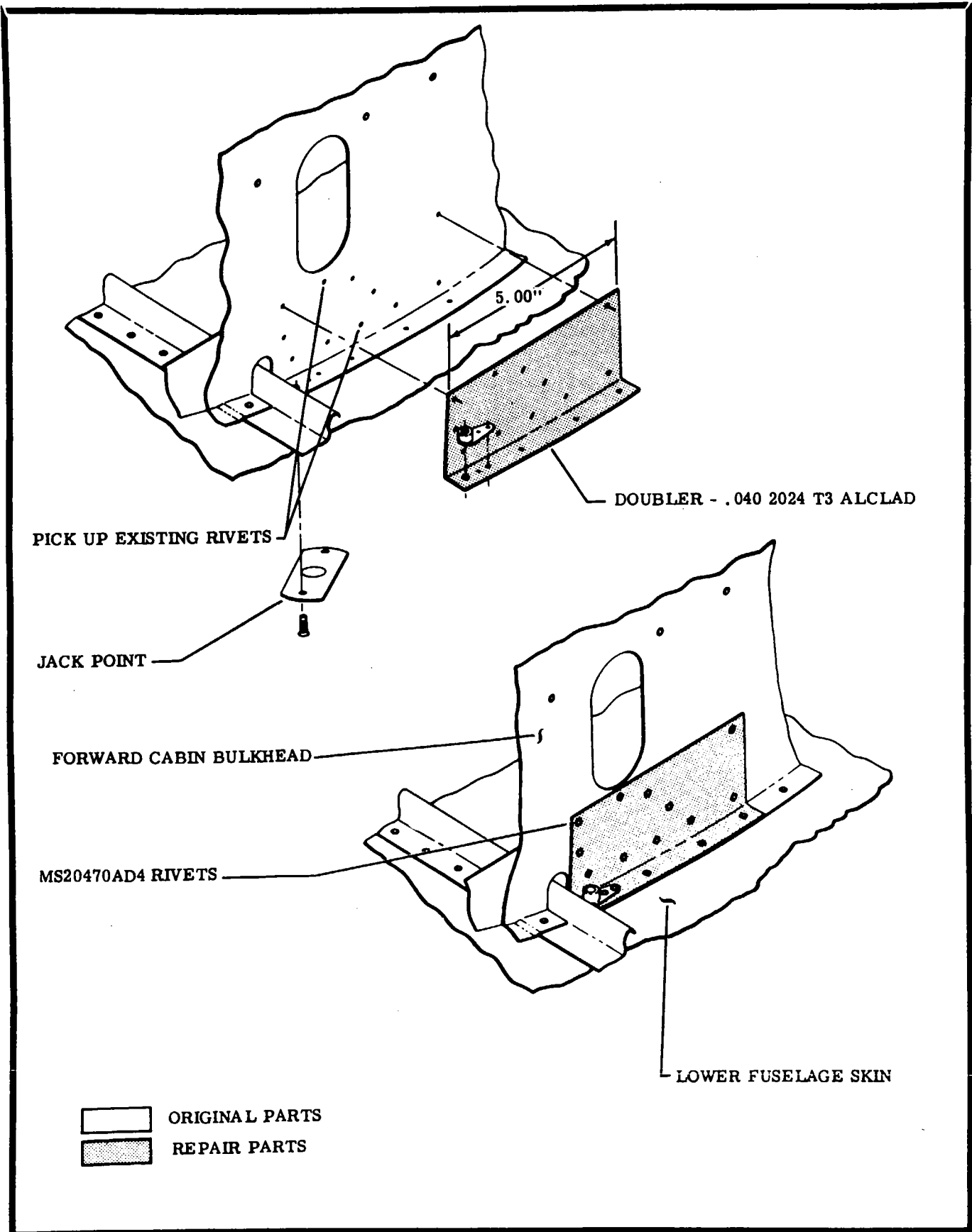


Figure 16-19. Typical Jacking Point Reinforcement (Sheet 2 of 2)

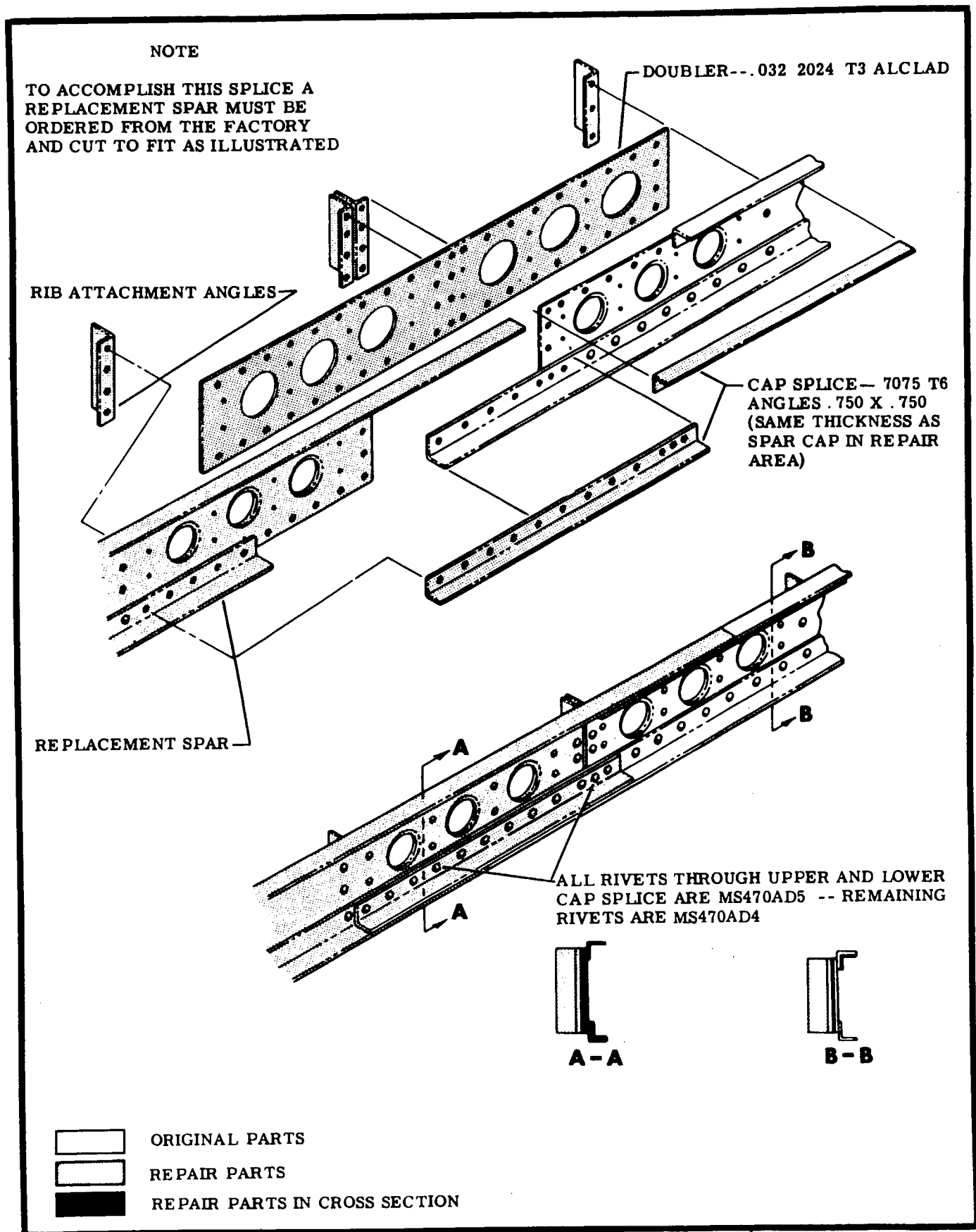


Figure 16-28. Typical Rear Spar Repair (Station 111, 12 and outboard)

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