

Service Manual

**1977
Thru
1986**

MODEL 172 SERIES



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

THIS REPRINT

**CONSISTS OF THE BASIC MANUAL, DATED 20 MARCH 1985,
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SECTION	PAGE	AEROFICHE FICHE/FRAME	SECTION	PAGE	AEROFICHE FICHE/FRAME
18	6A	Added			
18	6B	Added			

REASON FOR TEMPORARY REVISION

To provide additional information for the stop drilling of cracks that originate at the trailing edge of control surfaces with corrugated skins.

FILING INSTRUCTIONS FOR THIS TEMPORARY REVISION

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CHAPTER/ SECTION/ SUBJECT	PAGE	AEROFICHE FICHE/FRAME	CHAPTER/ SECTION/ SUBJECT	PAGE	AEROFICHE FICHE/FRAME
11	11-11	2B19			
	11-15	2B23			

REASON FOR TEMPORARY REVISION

To change torque values for engine mount-to-fuselage bolts.

FILING INSTRUCTIONS FOR THIS TEMPORARY REVISION

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File this cover sheet behind the publication's title page to identify inclusion of the temporary revision in the manual. Insert the new pages in the publication at the appropriate locations and remove and discard the superseded pages.

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LIST OF EFFECTIVE PAGES

INSERT LATEST REVISED PAGES. DESTROY SUPERSEDED PAGES.

NOTE

The portion of the text affected by the revision is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands.

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TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 652.

*The asterisk indicates pages changed, added, or deleted by the current change

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WARNING

When performing any inspection or maintenance that requires turning on the master switch, installing a battery, or pulling the propeller through by hand, treat the propeller as if the ignition switch were ON. Do not stand, nor allow anyone else to stand, within the arc of the propeller, since a loose or broken wire, or a component malfunction, could cause the propeller to rotate.

MODEL 172 SERIES SERVICE MANUAL

CROSS REFERENCE LISTING OF POPULAR NAME VS. MODEL NUMBERS AND SERIALS

All aircraft, regardless of manufacturer, are certified under model number designations. However, popular names are often used for marketing purposes. To provide a consistent method of referring to these aircraft, the model number will be used in this publication unless the popular name is necessary to differentiate between versions of the same basic model. The following table provides a listing of popular name, model number and serial number.

POPULAR NAME	MODEL YEAR	MODEL	BEGINNING	SERIAL ENDING
SKYHAWK, SKYHAWK II	1977	172N	17261445, 17267585	17069309
	1978	172N	17261578, 17269310 (except 17270050)	17271034
	1979	172N	17271035	17272884
	1980	172N	17270050, 17272885	17274009
	1981	172P	17274010	17275034
	1982	172P	17275035	17275759
	1983	172P	17275760	17276079
	1984	172P	17276080	17276259
	1985	172P	17276260	17276516
	1986	172P	17276517	17276654
REIMS /CESSNA F172 SKYHAWK, SKYHAWK II	1977	F172N	F17201515	F17201639
	1978	F172N	F17201640	F17201749
	1979	F172N	F17201750	F17201909
	1980	F172N	F17201910	F17202039
	1981	F172P	F17202040	F17202134
	1982	F172P	F17202135	F17202194
	1983	F172P	F17202195	F17202216
	1984	F172P	F17202217	F17202233
	1985	F172P	F17202234	F17202238
	1986	F172P	F17202239	F17202254
CUTLASS, CUTLASS II	1983	172Q	17275869	17276054
	1984	172Q	17276101	17276211
	1985	172Q	NONE	

MODEL 172 SERIES SERVICE MANUAL

INTRODUCTION

This manual contains factory-recommended procedures and instructions for ground handling, servicing, and maintaining Cessna 172 Series airplanes. Besides serving as a reference for the experienced mechanic, this manual also covers step-by-step procedures for the less experienced. If properly used, it will better enable the mechanic to maintain Cessna 172 Series airplanes and thereby establish a reputation for reliable service.

This service manual is designed for aerofiche presentation. To facilitate the use of the aerofiche, refer to the aerofiche header for basic information.

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All supplemental service information concerning this manual is supplied to all appropriate Cessna Dealers so that they have the latest authoritative recommendations for servicing these Cessna aircraft. Therefore, it is recommended that Cessna owners utilize the knowledge and experience of the factory-trained Dealer Service Organization.

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SUPPLEMENTAL TYPE CERTIFICATE INSTALLATIONS

Inspection, maintenance and parts requirements for supplemental type certificate (STC) installations are not included in this manual. When an STC installation is incorporated on the airplane, those portions of the airplane affected by the installation must be inspected in accordance with the inspection program published by the owner of the STC. Since STC installations may change systems interface, operating characteristics and component loads or stresses on adjacent structures, Cessna provided inspection criteria may not be valid for airplanes with STC installations.

CUSTOMER COMMENTS ON MANUAL

Cessna Aircraft Company has endeavored to furnish you with an accurate, useful, up-to-date manual. This manual can be improved with your help. Please use the return card, provided with your manual, to report any errors, discrepancies, and omissions in this manual as well as any comments you wish to make.

MODEL 172 SERIES SERVICE MANUAL

SECTION 1 GENERAL DESCRIPTION

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1-1. GENERAL DESCRIPTION.

1-2. MODEL 172 SERIES.

1-3. **DESCRIPTION.** Cessna Model 172 aircraft, described in this manual, are high-wing monoplanes of all-metal, semimonocoque construction. These aircraft are equipped with a fixed tricycle landing gear with tubular spring-steel main gear struts. The steerable nose gear is equipped with an air/hydraulic fluid shock strut. Four-place seating is standard, and a double-width, fold-up auxiliary rear seat may be installed as optional equipment. All are powered by four-cylinder, horizontally-opposed, air-cooled Lycoming "Blue Streak" engines. The engines drive an all-metal, fixed-pitch propeller. Model 172 Series aircraft feature rear side windows, a "wrap-around" rear window and a swept-back fin and rudder.

1-4. **AIRCRAFT SPECIFICATIONS.** Leading particulars of these aircraft, with dimensions based on gross weight, are given in figure 1-1. If these dimensions are used for constructing a hangar or computing clearances, remember that such factors as nose gear strut inflation, tire pressure, tire sizes and load distribution may result in some dimensions that are considerably different from those listed.

1-5. **STATIONS.** Station diagrams are shown in figure 1-2 to assist in locating equipment when a written description is inadequate or impractical.

MODEL 172 SERIES SERVICE MANUAL

NOTE

These specifications are applicable to Model 172 and F172 Series airplanes and Model 172Q airplanes, except as indicated.

GROSS WEIGHT (Takeoff and Landing)	
172 and F172 Landplane (1977 thru 1980)	2300 Lbs.
172 and F172 Landplane (1981 & On)	2400 Lbs.
172 and F172 Floatplane	2200 Lbs.
172Q Model Only	2550 Lbs.
FUEL CAPACITY	
Standard Wing (Total)	43 Gal.
Standard Wing (Usable)	40 Gal.
Long-Range Wing (Total)	54 Gal.
Long-Range Wing (Usable)	50 Gal.
Wet Wing (Total) BEGINNING 1981 MODEL YEAR	68 Gal.
Wet Wing (Usable) BEGINNING 1981 MODEL YEAR	62 Gal.
OIL CAPACITY	
(Without External Filter) THRU 1980 MODEL YEAR	6 Quarts
(With External Filter) THRU 1980 MODEL YEAR	7 Quarts
(Without External Filter) BEGINNING 1981 MODEL YEAR	7 Quarts
(With External Filter) BEGINNING 1981 MODEL YEAR	8 Quarts
ENGINE MODEL	
172 and F172 Series (Refer to Section 11 for Engine Data)	LYCOMING O-320 Series
172Q Model Only (Refer to Section 11A for Engine Data)	LYCOMING O-360 Series
PROPELLER (Fixed Pitch) (172 and F172 Series)	75" McCAULEY
PROPELLER (Fixed Pitch) (Model 172Q Only)	76" McCAULEY
MAIN WHEEL TIRES (172 and F172 Series)	6.00 x 6, 4-Ply
Pressure THRU 1980 MODEL YEAR	29 Psi
Pressure BEGINNING 1981 MODEL YEAR	28 Psi
MAIN WHEEL TIRES (Model 172Q Only)	6.00 x 6, 6-Ply
Pressure	38 Psi
NOSE WHEEL TIRE (172 and F172 Series)	
TIRE THRU 1980 MODEL YEAR	5.00 x 5, 4-Ply
Pressure	31 Psi
BEGINNING 1981 MODEL YEAR	5.00 x 5, 6-Ply
Pressure	34 Psi
NOSE WHEEL TIRE (Model 172Q Only)	5.00 x 5, 6-Ply
Pressure	45 Psi
NOSE GEAR STRUT PRESSURE (Strut Extended)	45 Psi
WHEEL ALIGNMENT (Tubular Spring Struts)	
Camber	2° to 4°
Toe-in	0" to .18"
• (Tubular Gear is non-adjustable)	
AILERON TRAVEL	
Up	20° ± 1°
Down	15° ± 1°
• No provisions are made for aligning wheels on tubular gear aircraft. The tolerances provided are to be used only for checking existing wheel alignment.	

Figure 1-1. Aircraft Specifications (Sheet 1 of 2)

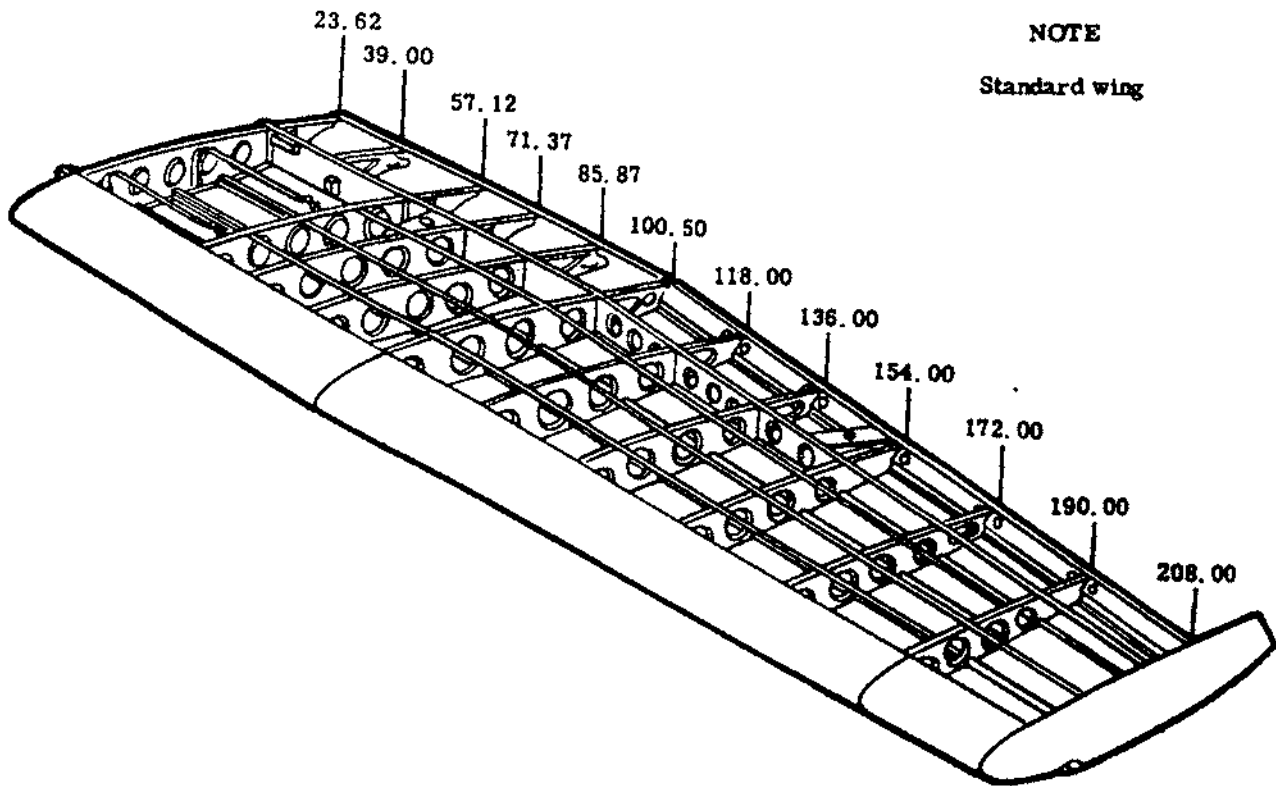
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WING FLAP TRAVEL (172 and F172 Series)	
Landplane THRU 1980 MODEL YEAR	0° to 40°, +0°- 2°
BEGINNING 1981 MODEL YEAR	0° to 30°, +0°- 2°
WING FLAP TRAVEL (Model 172Q Only)	
	0° to 30°, +0°- 2°
RUDDER TRAVEL (Measured Parallel to Water Line)	
Right	16° 10' ± 1°
Left	16° 10' ± 1°
RUDDER TRAVEL (Measured Perpendicular to Hinge Line)	
Right	17° 44' ± 1°
Left	17° 44' ± 1°
★ ELEVATOR TRAVEL	
Up	28° + 1°- 0°
Down	23° + 1°- 0°
ELEVATOR TRIM TAB TRAVEL	
Up THRU 1980 MODEL YEAR	28° + 1°- 0°
Down THRU 1980 MODEL YEAR	13° + 1°- 0°
Up BEGINNING 1981 MODEL YEAR (Landplane)	22° + 1°- 0°
Down BEGINNING 1981 MODEL YEAR (Landplane)	19° + 1°- 0°
Up BEGINNING 1981 MODEL YEAR (Floatplane)	28° + 1°- 0°
Down BEGINNING 1981 MODEL YEAR (Floatplane)	13° + 1°- 0°
PRINCIPAL DIMENSIONS	
Wing Span (Conical-Camber With Strobe Lights)	
(172 and F172 Series)	433.00"
Wing Span (With Strobe Lights) (Model 172Q Only)	432.00"
Tail Span (172 and F172 Series)	135.14"
Length THRU 1980 MODEL YEAR	323.00"
Length BEGINNING 1981 MODEL YEAR	323.04"
Tail Span (Model 172Q Only)	136.00"
Fin Height (Maximum With Nose Gear Depressed and	
Flashing Beacon Installed on Fin) (172 and F172 Series)	104.00"
Fin Height (Maximum With Nose Gear Depressed and	
Flashing Beacon Installed on Fin) (Model 172Q Only)	107.00"
Track Width (172 and F172 Series)	100.36"
Track Width (Model 172Q Only)	100.50"
BATTERY LOCATION	Firewall

★ Neutral position measured with the bottom of the balance area flush with the bottom of the stabilizer.

Figure 1-1. Aircraft Specifications (Sheet 2 of 2)

MODEL 172 SERIES SERVICE MANUAL



NOTE
Standard wing

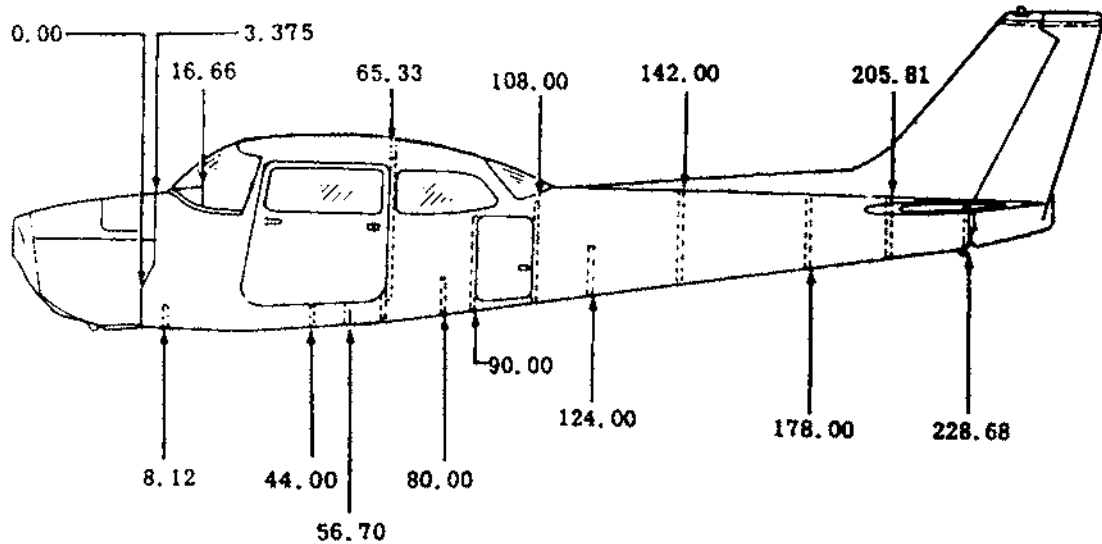


Figure 1-2. Reference Stations (Sheet 1 of 2)

MODEL 172 SERIES SERVICE MANUAL

NOTE

Wet wing option beginning
with 1981 model year

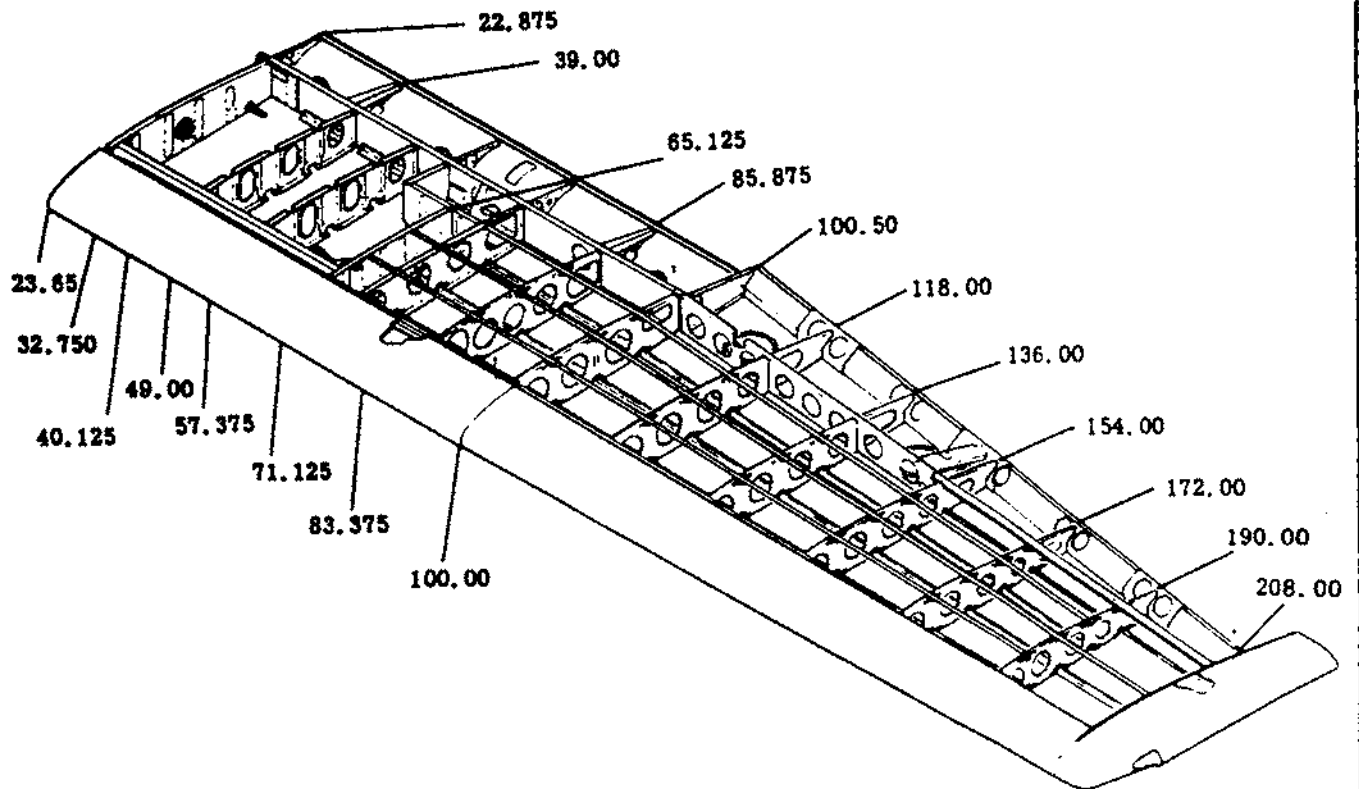


Figure 1-2. Reference Stations (Sheet 2 of 2)

MODEL 172 SERIES SERVICE MANUAL

1-6. **GENERAL AIRFRAME PRACTICES.** the following paragraphs deal with general torque and safetying practices used to ensure security of installation and prevent overstressing of components. Special torque values, when required, are specified with the specific component maintenance and installation instructions.

1-7. **TORQUEING PROCEDURES.** The importance of correct application cannot be overemphasized. Undertorque can result in unnecessary wear of nuts and bolts as well as parts they are holding together. When insufficient pressures are applied, uneven loads will be transmitted throughout assembly, which may result in excessive wear or premature failure due to fatigue. Overtorque can be equally damaging because of failure of a bolt or nut from overstressing threaded areas.

a. **Calculating Torque.** There are a few simple, but very important, procedures that should be followed to assure that correct torque is applied:

1. Calibrate torque wrench periodically to assure accuracy; and recheck frequently.
2. When using a torque wrench adapter which changes distance from torque wrench drive to adapter drive, the indicated reading must be adjusted for desired torque reading. (See Figure 20-1.)
3. Be sure that bolt and nut threads are clean and dry unless otherwise specified.
4. Determine friction drag torque and add to specified dry torque value to ensure proper bolt utilization.
 - (a) Hand-turn nut onto bolt until it stops.
 - (b) Using a torque wrench, measure running torque (torque required to turn nut on bolt).
 - (c) This running torque must be added to specified dry torque value to ensure proper bolt utilization.

EXAMPLE

Average running torque for a nut	= 15 in.-lbs.
<u>Dry torque required</u>	<u>= 125 ± 5 in.-lbs.</u>
Final torque wrench reading	= 140 ± 5 in.-lbs.

- (d) Since running torque will become less due to nut/bolt re-use (in accepted applications), this procedure must be repeated each time.
- (e) When necessary to tighten from bolt head, increase torque value by an amount equal to shank torque (torque required to turn bolt when installed). Measure with a torque wrench.

EXAMPLE

Average running torque for a nut	= 15 in.-lbs.
Average running shank torque for installed bolt	= 10 in.-lbs.
<u>Dry torque required</u>	<u>= 125 ± 5 in.-lbs.</u>
Final torque wrench reading	= 150 ± 5 in.-lbs.

b. **Torque Values - Bolts and Nuts.** (See Table 1-1.)

1. Tables included in this section do not apply to the following exceptions:
 - (a) Sheet metal screws should be tightened firmly, but with no specific torque value.
 - (b) Screws attached to nutplates should be tightened firmly, but with no specific torque value.
 - (c) Bolts, nuts, and screws used in control systems and installations where required torque would cause binding or interfere with proper operation of parts.
 - (d) Screws used with dimpled washers should not be drawn tight enough to eliminate washer crown.
 - (e) Fasteners that have a specified torque in a specific installation.

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NOTE

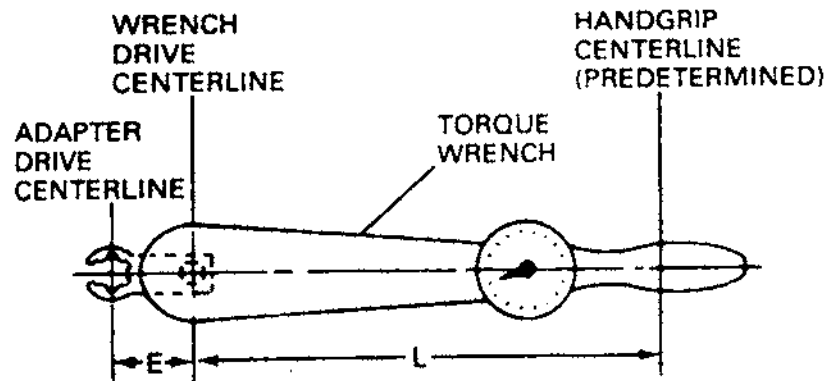
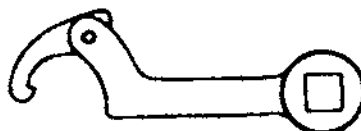
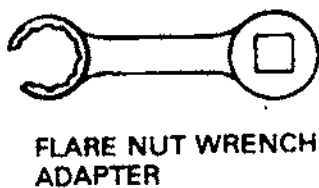
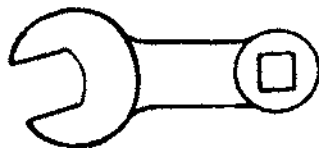
When using a torque wrench adapter which changes the distance from torque wrench drive to adapter drive, apply following formula to obtain corrected torque reading.

FORMULA

$$\frac{T \times L}{L + E} = Y$$

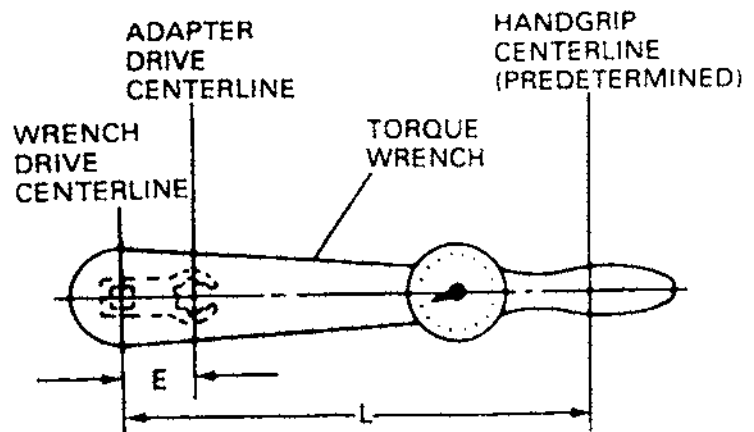
LEGEND

T = Desired Torque
Y = Indicated Torque
L = Effective Length Lever
E = Effective Length of Extension



EXAMPLE

$$\begin{aligned} T &= 135 \text{ In.-Lbs} \\ Y &= \text{Unknown} \\ L &= 10.0 \text{ In.-Lbs} \\ E &= 1.5 \text{ In.} \end{aligned} \quad \begin{aligned} Y &= \frac{135 \times 10}{10 + 1.5} = \frac{1350}{11.5} = 117.39 \\ Y &= 117 \text{ In.-Lbs} \end{aligned}$$



EXAMPLE

$$\begin{aligned} T &= 135 \text{ In.-Lbs} \\ Y &= \text{Unknown} \\ L &= 10.0 \text{ In.-Lbs} \\ E &= -1.5 \text{ In.} \end{aligned} \quad \begin{aligned} Y &= \frac{135 \times 10}{10 - 1.5} = \frac{1350}{8.5} = 158.82 \\ Y &= 159 \text{ In.-Lbs} \end{aligned}$$

Figure 1-3. Torque Wrench Adapter Adjustment

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BOLT TORQUE VALUES

	Tension		Shear	
	BOLTS			
	AN3 thru AN20 AN42 thru AN49 AN73 thru AN81 AN173 thru AN186 AN509NK9 AN525NK525 MS20033 thru MS20046 MS20073 MS20074 MS24694 MS27039		NOTE: Bolts in tension column may be used with shear nuts. Bolts in shear column should not be used unless a minimum of two threads extend beyond nut after installation.	
	NUTS			
	AN310 AN315 AN363 AN365 MS20365 MS20500 MS21045 NAS679 NAS1021		AN320 AN364 MS20364 NAS1022	

	Tension		Shear	
	BOLTS			
	MS20004 thru MS20024 NAS144 thru NAS148 NAS172 NAS174 NAS333 thru NAS340 NAS585 thru NAS590 NAS624 thru NAS644 NAS1303 thru NAS1320 NAS517		NAS464	
	NUTS			
	AN310 AN315 NA363 AN365 MS20365 MS21045 NAS679 NAS1021 NAS1291		AN320 AN364 NAS1022 MS20364	

Nut-bolt size	FINE THREAD SERIES			
	Torque Limits in.-lbs.		Torque Limits in.-lbs.	
	MIN.	MAX.	MIN.	MAX.
8-36	12	15	7	9
10-32	20	25	12	15
1-4-28	50	70	30	40
5-16-24	100	140	50	85
3-8-24	160	190	95	110
7-16-20	450	500	270	300
1-2-20	480	690	290	410
9-16-18	800	1000	480	600
5-8-18	1100	1300	660	780
3-4-16	2300	2500	1300	1500
7-8-14	2500	3000	1500	1800
1-14	3700	4500	2200	3300
1-1-8-12	5000	7000	3000	4200
1-1-4-12	9000	11000	5400	6600

Nut-bolt size	COURSE THREAD SERIES			
	Torque Limits in.-lbs.		Torque Limits in.-lbs.	
	MIN.	MAX.	MIN.	MAX.
8-32	12	15	7	9
10-24	20	25	12	15
1-4-20	40	50	25	30
5-16-18	80	90	48	55
3-8-16	160	185	95	110
7-16-14	235	255	140	155
1-2-13	400	480	240	290
9-16-12	500	700	300	420
5-8-11	700	900	420	540
3-4-10	1150	1600	700	950
7-8-9	2200	3000	1300	1800
1-8	3700	5000	2200	3000
1-1-8-8	5500	6500	3300	4000
1-1-4-8	6500	8000	4000	5000

Nut-bolt size	MS17825 MS17826			
	Torque Limits in.-lbs.		Torque Limits in.-lbs.	
	MIN.	MAX.	MIN.	MAX.
10-32	28	35	16	20
1-4-28	65	80	35	45
5-16-24	180	225	70	90
3-8-24	260	325	100	125
7-16-20	460	575	180	225
1-2-20	720	900	240	300
9-16-18	880	1100	320	400
5-8-18	1300	1600	480	600
3-4-16	2200	2800	880	1100
7-8-14	3700	4600	1500	1900
1-14	5400	6800	2400	3000
1-1-8-12	8000	10000	4000	5000
1-1-4-12	11000	14000	5600	7000

Table 1-1. Torque Values - Bolts and Nuts

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2. The values shown in Table 1-1 are based on parts being clean and dry with no lubricants added.
3. Castellated nuts requiring cotter pins should be tightened to low torque value. Torque can be increased to install cotter pin, but should never exceed maximum torque value.

NOTE

Self-locking castellated nuts, MS17825 and MS17826, require a separate torque range. These values are shown separately in torque value tables.

c. Torque Value - Threaded Straight Fittings.

NOTE

Tables in this section are for general applications. Refer to specific installations for special torque values and procedures.

1. Connectors installed in bosses with no required orientation should be installed using torque values given in Table 1-2.
2. Connectors installed in bosses requiring a specific orientation do not use a torque value, but use the following steps:
 - (a) Place jam-nut on fitting along with retainer and packing.
 - (b) Turn nut down until packing is firmly against lower threaded section of fitting.
 - (c) Install fitting into boss and tighten until there is a sudden increase in torque.
 - (d) Tighten fitting 1-1/2 turns.
 - (e) Orientation is accomplished by tightening fitting, but not exceeding one turn.
 - (f) Tighten jam-nut to torque values in Table 1-2.

THREADED CONNECTOR						TORQUE VALUE - HOSE ASSEMBLIES				
TUBE OUTSIDE DIAMETER (Inches)	THREAD	JAM-NUT		CONNECTOR w/ PACKING w/o JAM-NUT		HOSE INSIDE DIAMETER	Nipple or Nut			
		Torque-Limits (in.-lbs.)		Torque-Limits (in.-lbs.)			ALUMINUM Torque-Limits in.-lbs.		STEEL Torque-Limits in.-lbs.	
		MIN.	MAX.	MIN.	MAX.		MIN.	MAX.	MIN.	MAX.
1-8	5-16-24	35	50	50	55	1-8	20	30	75	85
3-16	3-8-24	65	80	65	75	3-16	25	35	95	105
1-4	7-16-20	85	105	95	105	1-4	50	65	135	150
5-16	1-2-20	105	125	125	135	5-16	70	90	170	200
3-8	9-16-18	120	150	155	165	3-8	110	130	270	300
1-2	3-4-16	240	280	280	305	1-2	230	260	450	500
5-8	7-7-14	320	380	380	405	5-8	330	360	650	700
3-4	1-16-12	500	600	550	600	3-4	460	500	900	1000
1	1-5-16-12	720	880	800	900	1	500	700	1200	1400
1-1-4	1-5-8-12	960	1200	900	1000	1-1-4	800	900	1520	1680
1-1-2	1-7-8-12	1200	1440	900	1000	1-1-2	800	900	1900	2100
2	2-1-2-12	1400	1500	900	1000	1-3-4	—	—	—	—
						2	1800	2000	2660	2940

Table 1-2. Torque Values
Jam-Nuts and Threaded Connector

Table 1-3. Torque Values
Hose Assemblies

MODEL 172 SERIES SERVICE MANUAL

THREADED STRAIGHT FITTING TORQUE VALUE (RIGID TUBE)												
TUBE OUTSIDE DIAMETER	FLARED END						STRAIGHT END					
	ALUMINUM		ALUMINUM		STEEL		6061-0 ALUMINUM		STEEL		6061-T(X) ALUMINUM	
	Torque-Limits in-lbs.		On Oxygen Lines Torque-Limits in-lbs.		Torque-Limits in-lbs.		5052-0 ALUMINUM Torque-Limits in-lbs.		Torque-Limits in-lbs.		w/ steel sleeve Torque-Limits in-lbs.	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	TUBE WALL	MIN. MAX.
1/8							20	30	45	55		
3/16					90	100	30	40	90	100	0.028	45 55
1/4	40	65			135	150	40	65	135	150	0.022	80 105
											0.028	80 105
											0.035	80 105
											0.049	90 115
5/16	60	80	100	125	180	200	60	80	180	200	0.028	80 105
											0.035	80 105
											0.042	125 175
3/8	75	125			270	300	75	125	270	300	0.028	125 175
											0.035	125 175
											0.049	125 175
1/2	150	250			450	500	150	250	450	500	0.028	135 180
											0.035	200 300
											0.049	400 500
											0.058	400 500
											0.065	400 500
5/8	200	350			700	800	200	350	700	800	All	500 600
3/4	300	500			1100	1150	300	500	1100	1150	All	600 700
1	500	700			1200	1400	500	700	1200	1400	All	1000 1300
1-1/4	600	900			1300	1450	600	900	1300	1450	All	1300 1500
1-1/2	600	900			1350	1500	600	900	1350	1500	All	1400 1700
2							600	900	1500	1700		

Table 1-4. Torque Values - Straight Threaded Fittings (Line)

- Bulkhead fittings are installed with jam-nuts and should be torqued to values in Table 1-2.
- Torque values for hose end fittings (nipple or nut) are given in Table 1-3.
- Torque values for straight threaded fittings used with rigid lines are given in Table 1-4.

1-8. **SAFETYING PROCEDURES.** The use of safety wire, cotter pins, lockwashers, and self-locking nuts is to prevent relative movement of critical components subject to vibration, torque, tension, etc., which could cause attaching parts to be broken, loosened, and/or detached.

MODEL 172 SERIES SERVICE MANUAL

1-9. SAFETY WIRE PROCEDURES.

- a. Identification. Lockwire comes in three types which are identified by size and color. The three types are classified by use.
 1. Inconel and Monel wire is used for general lockwiring and is identified by a natural wire color.
 - (a) Inconel can withstand temperatures up to 1500°F.
 - (b) Monel can withstand temperatures up to 800°F.
 2. Copper that is cadmium-plated and dyed yellow is used for shear and seal wiring applications.
 - (a) Shear applications are those where it is necessary to break or shear wire to permit operation or actuation of emergency devices.
 - (b) Seal applications are where wire is used with a lead seal to prevent tampering or use of a device without indication.
 3. Aluminum Alloy (Alclad 5056) is dyed blue and is used exclusively for safety-wiring magnesium parts.
 4. Size of wire is dependent on material and purpose of installation.
 - (a) 0.020-inch diameter copper wire should be used for shear and seal application.
 - (b) 0.020-inch diameter wire may be used to lockwire parts with tie holes smaller than 0.045 inches; or, on parts with tie hole diameters between 0.045 and 0.062 when spacing between parts is less than two inches; or, when bolts and screws of 0.25-inch diameter or less are closely spaced.
 - (c) 0.032-inch minimum diameter wire is used for general purpose lockwiring.

NOTE

When using single-wire method of locking, the largest wire that will fit tie holes should be used.

- b. Lockwire Installation. There are two basic forms of lockwiring. The single-wire method has limited application; the double-twist method is the common method of lockwiring.
 1. Use new wire for each application; do not try to re-use old wire.
 2. Single-wire method is accomplished by passing a single wire through tie holes and back with ends then twisted together. (See Figure 1-4.)
 - (a) Single-wire method is used for shear and seal wiring applications.
 - (b) Single-wire method can be used in closely spaced, closed geometric patterns. Closely spaced is defined as spacing two inches or less between centers of parts.

CAUTION

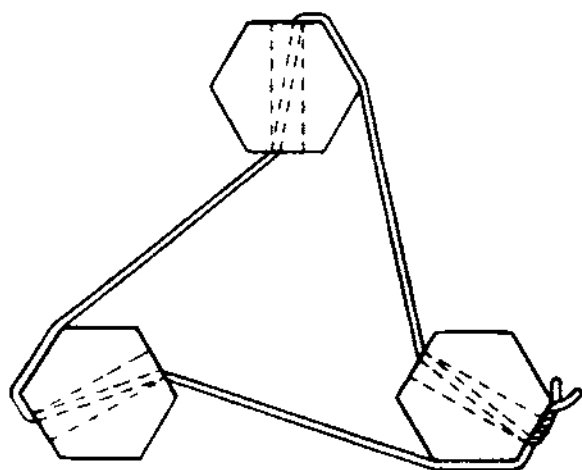
Screws in closely spaced geometric patterns which secure hydraulic or air seals, hold hydraulic pressure, or are used in critical areas should use double-twist method of lockwiring.

3. Lockwiring by the double-twist method is really one wire twisted on itself several times and is accomplished by the following steps (see Figure 1-4).
 - (a) Insert one end of wire through tie holes of bolt head and firmly loop around bolt head.

NOTE

This does not necessarily apply to castellated nuts when slot is close to top of nut. The wire will be more secure if it is made to pass along side of stud.

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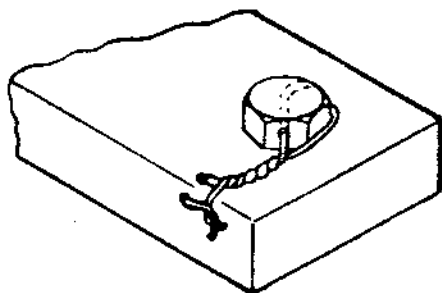
BOLTS IN CLOSELY SPACED, CLOSED
GEOMETRICAL PATTERN. SINGLE- WIRE METHOD.



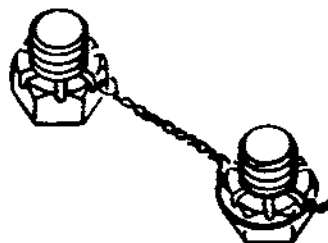
EXTERNAL SNAP RING
SINGLE-WIRE METHOD

NOTE

RIGHT-HAND THREADED PARTS
SHOWN. REVERSE DIRECTION
FOR LEFT-HAND THREADS.



SINGLE FASTENER APPLICATION
DOUBLE-TWIST METHOD



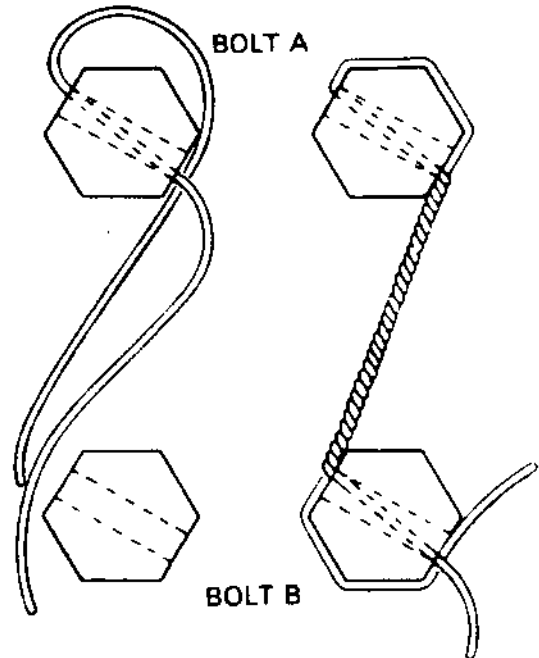
CASTELLATED NUTS ON DRILLED STUDS
DOUBLE-TWIST METHOD

Figure 1-4. Lockwire Safetying (Sheet 1 of 2)

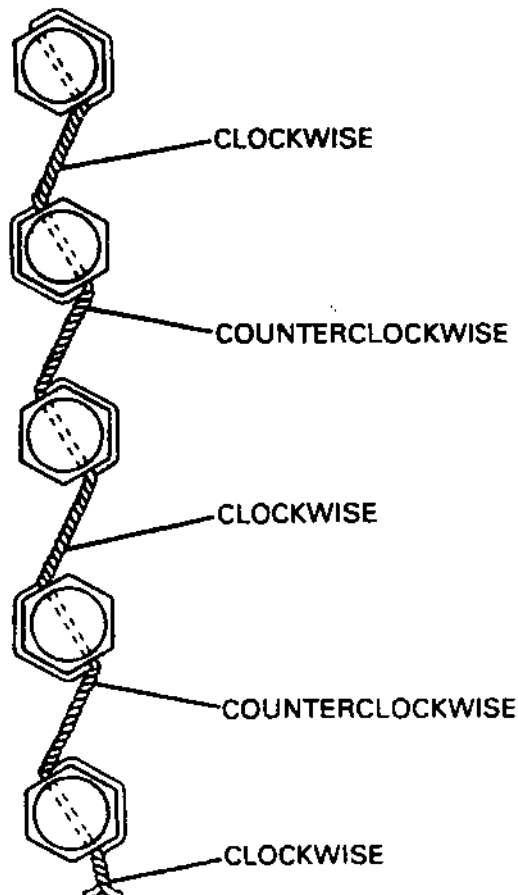
MODEL 172 SERIES SERVICE MANUAL

DOUBLE-TWIST METHOD

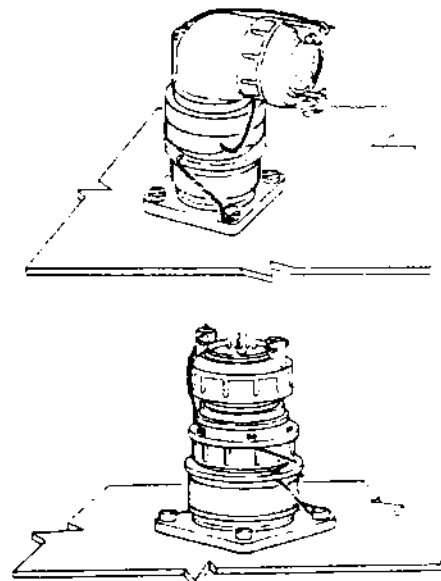
- STEP 1. Insert wire through bolt A and bend around bolt (if necessary, bend wire across bolt head). Twist wires clockwise until they reach bolt B.
- STEP 2. Insert one end of wire through bolt B. Bend other end around bolt (if necessary, bend wire across head of bolt). Twist wires counterclockwise 1/2 inch or six twists. Clip ends. Bend pigtail back against part.



DOUBLE-TWIST METHOD



MULTIPLE FASTENER APPLICATION
DOUBLE-TWIST METHOD



ELECTRICAL CONNECTION

Figure 1-4. Lockwire Safetying (Sheet 2 of 2)

MODEL 172 SERIES SERVICE MANUAL

- (b) While taut, twist strands to within 1/8 inch of next part. The twisting keeps wire taut without overstressing and prevents wire from becoming nicked, kinked, or mutilated.
- (c) Lockwiring multiple groups by double-twist method is accomplished in a similar manner except twists between parts are alternated between clockwise and counterclockwise.
- (d) After last tie hole, wire is twisted three to five times to form a pigtail.
- (e) Cut off any excess wire and bend pigtail towards part.
- 4. When lockwiring widely spaced multiple groups by double-twist method, three units shall be the maximum number in a series.

NOTE

Widely spaced multiple groups shall mean those in which fasteners are from four to six inches apart. Lockwiring shall not be used to secure fasteners or fittings which are spaced more than six inches apart, unless tie points are provided on adjacent parts to shorten span of lockwire to less than six inches.

- 5. When lockwiring closely spaced multiple groups, the number of units that can be lockwired by a 24-inch length of wire shall be the maximum number in a series.
- 6. Parts should be lockwired so that wire is placed in tension (pulled on) if a part attempts to loosen.
- c. Required Lockwire Installation Applications.
 - 1. Bolts and other fasteners securing critical parts that affect airplane safety and operation.
 - (a) In blind-tapped hole applications or bolts or castellated nuts on studs, lockwiring is installed in same manner as described for bolt heads.
 - (b) Hollow head bolts are safetied in manner prescribed for regular bolts.
 - (c) Drain plugs and cocks may be safetied to a bolt, nut, or other part having a free tie hole in accordance with instructions described.
 - (d) External snap rings may be locked if necessary using general locking principles as described and illustrated. Internal snap rings should not be lockwired.
 - (e) When locking is required on electrical connectors which use threaded coupling rings, or on plugs which employ screws or rings to fasten individual parts of plug together, they shall be lockwired with 0.020-inch diameter wire in accordance with locking principles as described and illustrated. It is preferable to lockwire all electrical connectors individually. Do not lockwire one connector to another unless it is necessary to do so.
 - (f) Drilled head bolts and screws need not be lockwired if installed into self-locking nuts or installed with lockwashers. Castellated nuts with cotter pins or lockwire are preferred on bolts or studs with drilled shanks, but self-locking nuts are permissible within limitations described in Paragraph 1-13.
 - 2. For new design, lockwire shall not be used to secure nor shall lockwire be dependent upon fracture as basis for operation of emergency devices such as handles, switches, and guard-covering handles that operate emergency mechanisms such as emergency exits, fire extinguishers, emergency cabin pressure release, emergency landing gear release, and the like. However, where existing structural equipment or safety of flight emergency devices requires shear wire to secure equipment while not in use, but which are dependent upon shearing or breaking of lockwire for successful emergency operation of equipment, particular care exercised to assure that wiring under these circumstances shall not prevent emergency operations of these devices.

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1-10. USE OF COTTER PINS.

a. **Cotter Pin Installation.** Castellated nuts and pins may be safetied with cotter pins or lockwire. The preferred method is to use cotter pins.

1. Select cotter pin material in accordance with temperature, atmosphere, and service limitations (see Table 1-5).
2. Cotter pins shall be new upon each application.
3. When nuts are to be secured to fastener with cotter pins, tighten nut to low side (minimum) of applicable specified or selected torque range, unless otherwise specified, and if necessary, continue tightening until slot aligns with hole. In no case shall you exceed high side (maximum) torque range.
4. If more than 50 percent of cotter pin diameter is above nut castellation, a washer should be used under nut or a shorter fastener should be used. A maximum of two washers may be permitted under a nut.
5. The largest diameter cotter pin which hole and slots will accommodate should be used, but in no application to a nut, bolt, or screw shall pin size be less than sizes described in Table 1-6.
6. Install cotter pin with head firmly in slot of nut with axis of eye at right angles to bolt shank. Bend prongs so that head and upper prong are firmly seated against bolt (see figure 1-5).
7. In pin applications, install cotter pin with axis of eye parallel to shank of clevis pin or rod end. Bend prongs around shank of pin or rod end (see Figure 1-5).

CAUTION

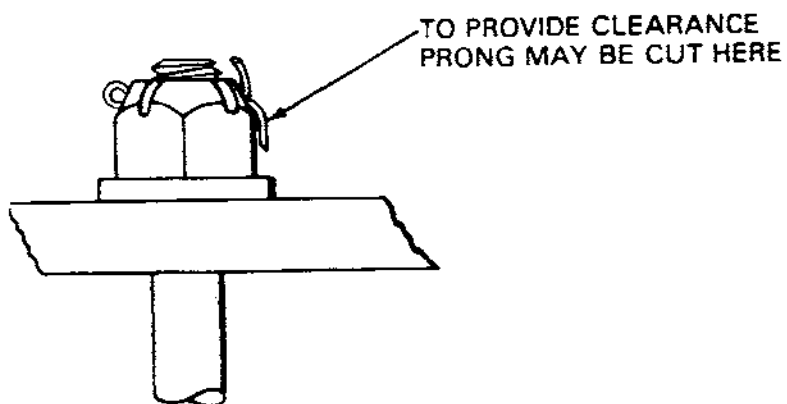
Cadmium-plated cotter pins should not be used in applications bringing them in contact with fuel, hydraulic fluid, or synthetic lubricants.

COTTER PINS (MS24665)		
MATERIAL	TEMPERATURE	USE
Carbon Steel	Up to 450°F	Pins that contact cadmium-plated surfaces.
		General Applications
		Normal Atmospheres
Corrosion-Resistant	Up to 800°F	Pins that contact corrosion-resistant steel.
		Corrosive atmospheres

Table 1-5. Cotter Pin Temperature and Use

COTTER PIN - MINIMUM SIZE	
THREAD SIZE	MINIMUM PIN SIZE
6	0.028
8	0.044
10	0.044
14	0.044
5 16	0.044
3 8	0.072
7 16	0.072
1 2	0.072
9 16	0.086
5 8	0.086
3 4	0.086
7 8	0.086
1	0.086
1-1 8	0.116
1-1 4	0.116
1-3 8	0.116
1-1 2	0.116

Table 1-6. Cotter Pin Minimum Size

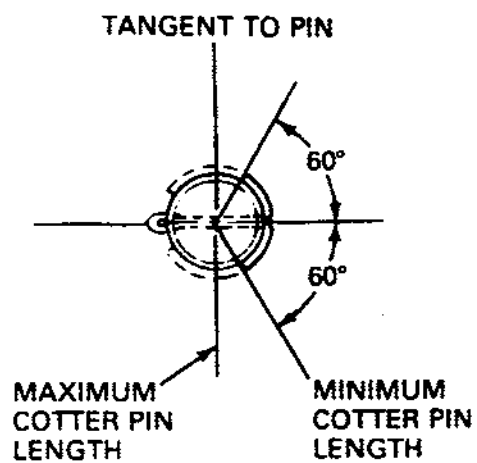
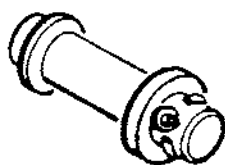


PREFERRED METHOD



ALTERNATE METHOD

CASTELLATED NUT ON BOLT



PIN APPLICATION

Figure 1-5. Installation of Cotter Pins

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1-11. USE OF LOCKING CLIPS.

a. Safetying Turnbuckles. (See Figure 1-6.)

1. Prior to safetying, both threaded terminals shall be screwed an equal distance into turnbuckle body and shall be screwed in at least so far that not more than three threads of any terminal are exposed outside body.
2. After turnbuckle has been adjusted to its locking position, with slot indicator groove on terminals and slot indicator notch on body aligned, insert end of locking clip into terminal and body (refer to Figure 1-6) until U-curved end of locking clip is over hole in center of body.
 - (a) Press locking clip into hold to its full extent.
 - (b) Curved end of locking clip will expand and latch in body slot.
 - (c) To check proper seating of locking clip, attempt to remove pressed "U" end from body hole with fingers only.

NOTE

Do not use tool as locking clip could be distorted.

3. Locking clips are for one time use only and shall not be re-used.
4. Both locking clips may be inserted in same hole of turnbuckle body or in opposite holes of turnbuckle body.

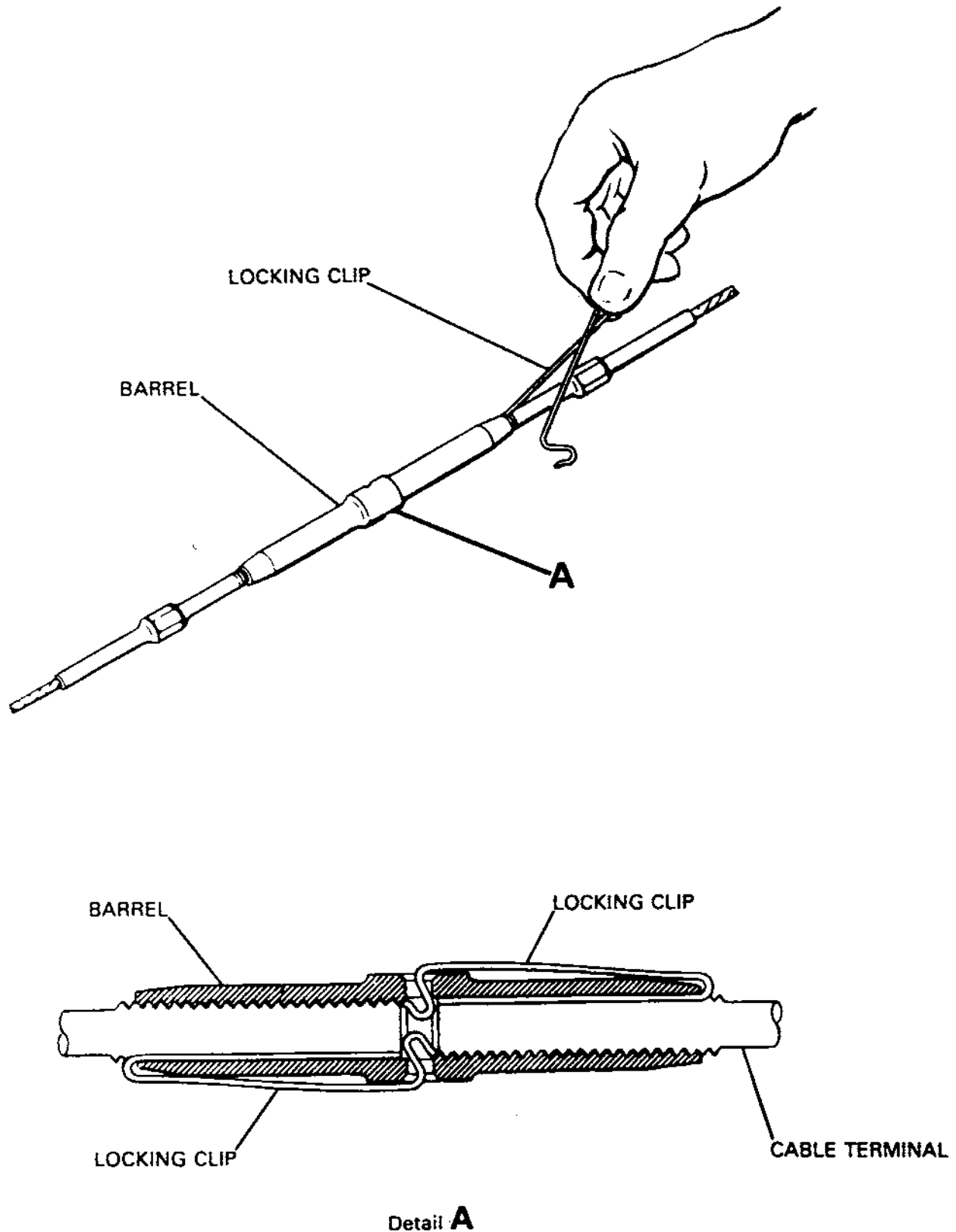


Figure 1-6. Safetying Turnbuckle Assemblies

1-12. USE OF LOCKWASHERS.

a. Lockwashers can be used only under the following conditions.

1. When self-locking feature cannot be provided in externally or internally threaded part.
2. When a cotter pin cannot be used to prevent rotation of internal threads with respect to external threads.
3. When lockwire cannot be used to prevent loosening of threaded parts.
4. When fastening is not used for fabrication of primary structure.
5. When loosening of threaded parts would not endanger safety of airplane or people.
6. When corrosion encouraged by gouging aluminum or magnesium alloys by edges of teeth on tooth-locked washers would not cause malfunctioning of parts being fastened together.

1-13. USE OF SELF-LOCKING NUTS.

a. Restrictions.

1. Self-locking nuts cannot be used under certain conditions.

- (a) Used, reworked, or reprocessed nuts should not be installed for any application.
- (b) Do not use if at joints in control systems for singular attach points.
- (c) Do not use on externally threaded parts that serve as an axle of rotation for another part where tensional (torque) loads can cause nut to loosen and/or become separated. Examples are pulleys, levers, linkages, and cam followers.

NOTE

Self-locking nuts can be used when threaded parts are held by a positive locking device that requires shearing or rupture before torsional loads can act on threaded parts.

- (d) Do not use where a loose nut, bolt, or screw could fall or be drawn into an area that would impede or damage or otherwise distort operation.
 - (e) Do not use to attach access panels and doors or to assemble components that are routinely disassembled or removed for access and servicing.
 - (f) In general, do not use self-locking nuts where loss of bolt affects safety of flight.
2. Bolts, studs, or screws, excluding Hi-Locks, must extend through self-locking nut for a length equivalent of two threaded pitches. This length includes chamfer.
 3. Self-locking nuts which are attached to structure shall be attached in a positive manner to eliminate possibility of their rotation or misalignment when tightening is to be accomplished by rotating bolts to structure, and permit replacement of nuts.

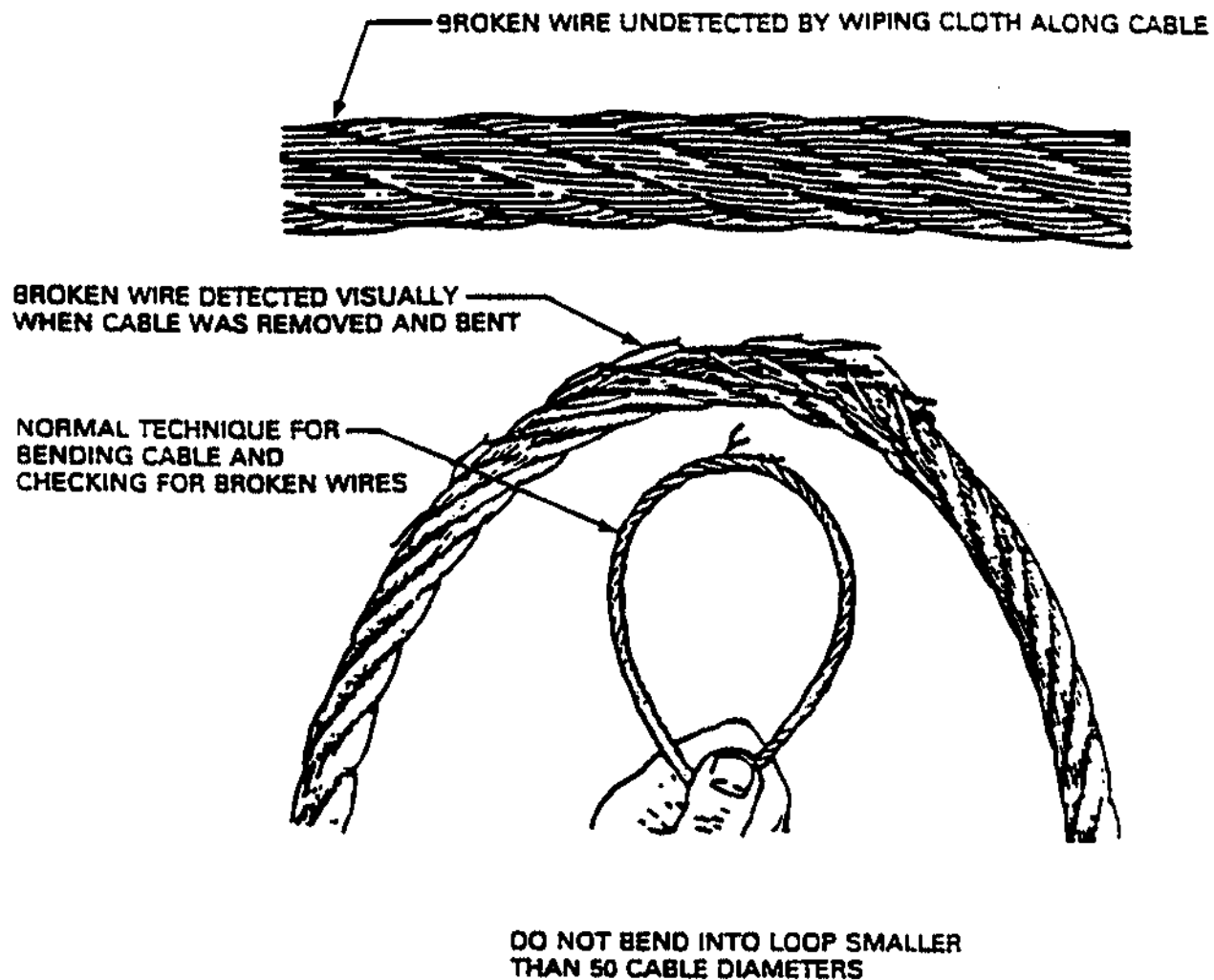
MODEL 172 SERIES SERVICE MANUAL

1-14. CONTROL CABLE WIRE BREAKAGE AND CORROSION LIMITATIONS.

a. Inspection of Control Cables.

1. Control cable assemblies are subject to a variety of environmental conditions and forms of deterioration that ultimately may be easy to recognize such as wire/strand breakage, or the not so readily visible types of deterioration including corrosion and/or distortion. The following information will aid in detecting these cable conditions.
2. Broken Wire.
 - (a) Examine cables for broken wires by passing a cloth along length of cable. This will detect broken wires, if cloth snags on cable. Critical areas for wire breakage are those sections of cable which pass through fairleads, across rod blocks, and around pulleys. If no snags are found, then no further inspection is required. If snags are found or broken wires are suspected, then a more detailed inspection is necessary which requires that the cables be bent in a loop to confirm broken wires (refer to figure 1-7). Loosen or remove cable to allow it to be bent in a loop as shown. While rotating cable, inspect bent area for broken wires.
 - (b) Wire breakage criteria for cables in flap, aileron, rudder, and elevator systems are as follows:
 - (1) Individual broken wires are acceptable in primary and secondary control cables at random locations when there are no more than six broken wires in any given ten-inch cable length.
3. Corrosion.
 - (a) Carefully examine any cable for corrosion that has a broken wire in a section not in contact with wear-producing airframe components such as pulleys, fairleads, rod blocks, etc. It may be necessary to remove and bend cable to properly inspect it for internal strand corrosion as this condition is usually not evident on outer surface of cable. Replace cable if internal corrosion is found. If a cable has been wiped clean of its corrosion-preventive lubricant and metal-brightened, the cable shall be examined closely for corrosion. For description of control cable corrosion, refer to Chapter 18, Corrosion and Corrosion Control.

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Figure 1-7. Cable Broken Wire Inspection

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1-15. ADHESIVES, CEMENTS AND SEALANTS - SHELF LIFE AND STORAGE.

a. General.

1. This section provides information which defines the proper storage and usable life (shelf life) of adhesives, cements and sealants which are used for maintenance and/or repair of the airplane. Also included in this section is the criteria used for testing these materials after the normal shelf life has expired, to determine if an extension to the shelf life is possible.
2. Shelf life refers to a specified period of time usually from the date of manufacture (normally stamped or printed on the product container) to the expiration date (which should be determined using limits specified in Table 1-7 or if applicable, the manufacturer's expiration date printed or stamped on the product container). The specified shelf life is dependent on proper storage in accordance with the limits specified in this section and/or the manufacturer's instructions.

b. Storage Criteria.

1. **Storage of Adhesives and Cements.** All adhesives and cements shall be stored under controlled temperature conditions. If open shop storage becomes necessary, these products shall in no case be stored in an area which will subject them to temperatures in excess of 95°F. Containers shall be tightly closed prior to being placing them into the proper storage environment. For proper storage environment, refer to Table 1-7 and the following paragraphs.
 - (a) Class I - These adhesives are epoxy base materials and have one year storage at room temperature. 0°F storage will extend the storage life. Refer to the product container instructions for storage temperature and life.
 - (b) Class II, III and IV - These adhesives are rubber and resin base and are good for six months at room temperature storage. 40°F storage will extend the storage life. Refer to the product container instructions for limits of each adhesive.
 - (c) Class V - These are silicone rubber adhesives. If stored in their original containers at a temperature below 80°F, have a shelf life of one year or as indicated on the storage container.
 - (d) Class VI - These are solvent bonding solvents. They should be stored in their original containers and tightly closed, and stored at 40°F temperature.
 - (e) Class VII - Cyanoacrylate base materials must be stored in the original containers at 40°F or as specified on the container instructions.
 - (f) Class VIII - These are pressure sensitive materials. The shelf life is two years when stored at 75°F and 50 percent relative humidity.
 - (g) Class IX - These are polyurethane products. Store in original container, between 70 and 100°F. Urethanes are moisture sensitive and precautions should be taken to ensure complete protection from moisture contamination. Container must be tightly closed at all times.
 - (h) Class X - These are acrylic base materials. They require storage at 40°F or per instructions on product container.

c. Storage of Sealants.

1. All sealants shall be stored under controlled temperature conditions. If open shop storage becomes necessary, these products shall in no case be stored in an area which will subject them to temperatures in excess of 95°F or below 40°F. Containers shall be tightly closed prior to placing them in the proper storage environment. For proper storage environment, refer to Table 1-7 and the following paragraphs.
 - (a) Premixed and frozen sealants shall be stored at -40°F or colder and shall not be used more than six weeks after the date of mixing even if all storage is at -40°F or colder. If storage temperatures rise above 40°F, but not warmer than -30°F, the material may be stored for a maximum of two weeks warmer than -40°F plus time at -40°F or colder for a combined total not to exceed five weeks beyond the date of mixing. If storage temperatures rise above -40°F but are not warmer than -20°F, the materials may be stored for a maximum of one week above -30°F plus time at -40°F or colder for a combined total not to exceed four weeks beyond the date of mixing.
 - (b) Unmixed sealants shall be stored at a controlled temperature of between 40 and 80°F and have a shelf life of approximately six months when stored within this temperature range. Unmixed sealants stored at temperatures exceeding 80°F shall be used within five weeks.
2. All materials should be used on a "first in-first out" basis. The adhesives, cements and sealants should be rotated so this requirement can be accomplished. All material containers should be clearly marked with a "use by" date, consisting of the year and month. All materials not used by this date must be tested prior to use. Refer to Testing criteria and Table 1-7.

d. Testing Criteria.

1. Any material (adhesive, cement or sealant) not used within its shelf life will be tested and the results reviewed to determine if the material is usable. If there is doubt about the material being usable, it must be properly disposed of. Material that has exceeded its original shelf life may be retested to determine if the material meets its requirements. Materials meeting their requirements will have their shelf life extended as specified in Table 1-7. Materials with shelf life extensions must be retested after a specified period of time. Refer to Table 1-7.

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2. Testing of Overaged Adhesives and Cements.

NOTE

Overaged adhesives and cements are those that have exceeded their original shelf life and must be tested prior to use and/or given extended shelf life.

- (a) Class I Epoxy Adhesive - Examine both components to ensure that they are still workable. Check for gelling and/or contamination. Stir components and mix a small amount of adhesive. Verify that adhesive sets up and hardens.
 - (b) Class II, III and IV Rubber and Resin Base Adhesives - Open containers and check for gelling and/or contamination. Check for spreading and drying.
 - (c) Class V Silicone Rubber Adhesives - Examine adhesive for hardness. If adhesive is still soft and can be spread, it is acceptable. Verify that adhesive will harden.
 - (d) Class VI Solvent Bonding Solvents - Check for signs of apparent contamination. Solvents should be clean and clear with no signs of cloudiness.
 - (e) Class VII Cyanoacrylic Base Adhesives - Verify that product is still liquid with no visible signs of contamination.
 - (f) Class VIII Pressure Sensitive Materials - Open containers and inspect for hardening, gelling and contamination. Stir components and mix a small amount of adhesive. Verify that adhesive sets up properly.
 - (g) Class X Acrylic Adhesives - Inspect base material to ensure that it is still liquid. Mix a small amount of the components and verify that it sets up properly.
3. In general, if these materials exhibit normal physical properties, with no signs of hardening, gelling or contamination and set up and/or harden properly as applicable, the shelf life may be extended as specified in Table 1-7.
- e. Testing of Overaged Sealants.

NOTE

Overaged sealants are those that have exceeded their original shelf life and must be tested prior to use and/or given extended shelf life.

1. For identification of sealants Classification, refer to Fuel, Weather, Pressure and High-Temperature Sealing - Maintenance Practices.
2. Overaged sealants to be tested for possible shelf life extension shall be properly mixed using the correct materials, procedures and equipment.
3. Overaged premixed frozen sealants, along with unmixed sealants should be visually inspected. Sealants which show conclusive evidence of separation, discoloration and/or gelling prior to the addition of a thinner or curing agent shall be discarded. When in doubt of the sealant quality, the overaged sealant should be compared with the same type of sealant, under six months old, which is known to be satisfactory.
4. The mixed sealants may be tested by placing a small amount of sealant (sample buttons) on a sheet of paper. After the sample buttons have cured, they should be cut in half and examined. The sealant should show no signs of spots or streaks of unmixed base compound or curing agent. However, sample buttons containing spots, streaks, discoloration and/or variations in uniformity of color are acceptable if these spots, streaks, etc., are tack free upon inspection. All mixed sealant should be as void free as possible.
5. Contaminated sealant, premixed sealant that have been thawed and refrozen shall be discarded.
6. Type I, Class A sealants should be checked for appearance, application time, tack-free time, cure time and adhesion.
7. Type I, Class B sealants should be checked for appearance, application time, cure time, tack-free time and adhesion. In addition, Class B-2 and B-4 sealants should be checked for initial flow.
8. Type I, Class C sealants should be checked for appearance, application time, cure time and adhesion. In addition, Class C sealants should be tested to determine that they ARE NOT at a tackfree condition at the end of their rated work life (squeeze out life).
9. Type II sealants should be checked for appearance, application time, tack-free time and cure time.
10. Type III sealants should be easily thinned with MEK, when difficulty is encountered in thinning the sealant, it should be discarded.

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11. Type IV sealants should be checked for appearance, application time, tack-free time and cure time.
12. Type V and VI sealants should be checked for appearance, tack-free time and cure time.
13. Type VII sealants should be checked for appearance, application time, tack-free time and cure time.
14. Type VIII sealants should be checked for appearance, application time, tack-free time, cure time and adhesion. Adhesion to aluminum should be (peel) less than two-pounds per inch of width.

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PRODUCT	STORAGE CONDITION (TEMPERATURE IN DEGREES FAHRENHEIT)	SHELF LIFE IN MONTHS	EXTEND SHELF LIFE IN MONTHS	RETEST IN MONTHS
ADHESIVES AND CEMENTS				
EA9309.3NA	40 TO 80°F	12 Months	6 Months	6 Months
EA9339	40 TO 80°F	12 Months	6 Months	6 Months
EA9314	40 TO 80°F	12 Months	6 Months	6 Months
EA9330	40 TO 80°F	12 Months	6 Months	6 Months
EA907	40 TO 80°F	12 Months	6 Months	6 Months
Devcon F	40 TO 80°F	12 Months	6 Months	6 Months
EA934NA	40 TO 80°F	12 Months	6 Months	6 Months
380/6	40 TO 80°F	12 Months	6 Months	6 Months
A1186B	40 TO 80°F	12 Months	6 Months	6 Months
EC2216	40 TO 80°F	12 Months	6 Months	6 Months
#10 Fastset	40 TO 80°F	12 Months	6 Months	6 Months
608 Quickset	40 TO 80°F	12 Months	6 Months	6 Months
EC880	40 TO 80°F	8 Months	3 Months	3 Months
EC847	40 TO 80°F	8 Months	3 Months	3 Months
EC1300L	40 TO 80°F	*6 Months	*3 Months	*3 Months
5452	40 TO 80°F	12 Months	6 Months	6 Months
56431	40 TO 80°F	12 Months	6 Months	6 Months
1636	40 TO 80°F	12 Months	6 Months	6 Months
RTV - 157	40 TO 80°F	12 Months	6 Months	6 Months
RTV - 158	40 TO 80°F	12 Months	6 Months	6 Months
RTV - 159	40 TO 80°F	12 Months	6 Months	6 Months
RTV732	40 TO 80°F	12 Months	6 Months	6 Months
RTV102	40 TO 80°F	12 Months	6 Months	6 Months
RTV103	40 TO 80°F	12 Months	6 Months	6 Months
RTV106	40 TO 80°F	12 Months	6 Months	6 Months
RTV108	40 TO 80°F	12 Months	6 Months	6 Months
RTV109	40 TO 80°F	12 Months	6 Months	6 Months
RTV94034	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 222	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 242	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 271	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 277	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 290	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 416	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 495	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 515	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 569	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 592	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 595	40 TO 80°F	12 Months	6 Months	6 Months

* Do not use after three months of storage in the 81°F to 90°F range
Do not use after five days of storage above 90°F.

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PRODUCT	STORAGE CONDITION (TEMPERATURE IN DEGREES FAHRENHEIT)	SHELF LIFE IN MONTHS	EXTEND SHELF LIFE IN MONTHS	RETEST IN MONTHS
ADHESIVES AND CEMENTS (CONTINUED)				
Loctite 601	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 620	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 680	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 1282	40 TO 80°F	12 Months	6 Months	6 Months
Loctite 1283	40 TO 80°F	12 Months	6 Months	6 Months
DA-5521	40 TO 80°F	12 Months	6 Months	6 Months
PS-18	40 TO 80°F	12 Months	6 Months	6 Months
PS-30	40 TO 80°F	12 Months	6 Months	6 Months
XA-3678	40 TO 80°F	12 Months	6 Months	6 Months
XF-3585	40 TO 80°F	12 Months	6 Months	6 Months
LR-100-226	40 TO 80°F	12 Months	6 Months	6 Months
EC776	40 TO 80°F	* 8 Months	* 3 Months	*3 Months
SB and P2	40 TO 80°F	12 Months	6 Months	6 Months
SEALANTS				
Pro-Seal 890	40 TO 80°F	6 Months	2 Months	2 Months
GC-408	40 TO 80°F	6 Months	2 Months	2 Months
PR1422	40 TO 80°F	6 Months	2 Months	2 Months
PR1440	40 TO 80°F	6 Months	2 Months	2 Months
GC435	40 TO 80°F	6 Months	2 Months	2 Months
Pro-Seal 567	40 TO 80°F	6 Months	2 Months	2 Months
PR810	40 TO 80°F	6 Months	2 Months	2 Months
Pro-Seal 700	40 TO 80°F	6 Months	2 Months	2 Months
GC1900	40 TO 80°F	6 Months	2 Months	2 Months
PR366	40 TO 80°F	6 Months	2 Months	2 Months
Pro-Seal 735	40 TO 80°F	6 Months	2 Months	2 Months
Pro-Seal 895	40 TO 80°F	6 Months	2 Months	2 Months
Pro-Seal 706B	40 TO 80°F	6 Months	2 Months	2 Months
PR1321	40 TO 80°F	6 Months	2 Months	2 Months
GC200	40 TO 80°F	6 Months	2 Months	2 Months
RTV-730	40 TO 80°F	6 Months	2 Months	2 Months
Pro-Seal 815	40 TO 80°F	6 Months	2 Months	2 Months
GC402	40 TO 80°F	6 Months	2 Months	2 Months
PR-1005L	40 TO 80°F	*8 Months	*3 Months	*3 Months
GC-3001	40 TO 80°F	*8 Months	*3 Months	*3 Months
444R	40 TO 80°F	*8 Months	*3Months	*3 Months

* Do not use after three months of storage in the 81°F to 90°F range
Do not use after five days of storage above 90°F.

Table 1-7. (Sheet 2 of 2)

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SECTION 2

GROUND HANDLING, SERVICING, CLEANING, LUBRICATION AND INSPECTION

WARNING

When performing any inspection or maintenance that requires turning on the master switch, installing a battery, or pulling the propeller through by hand, treat the propeller as if the ignition switch were ON. Do not stand, nor allow anyone else to stand, within the arc of the propeller, since a loose or broken wire, or a component malfunction, could cause the propeller to rotate.

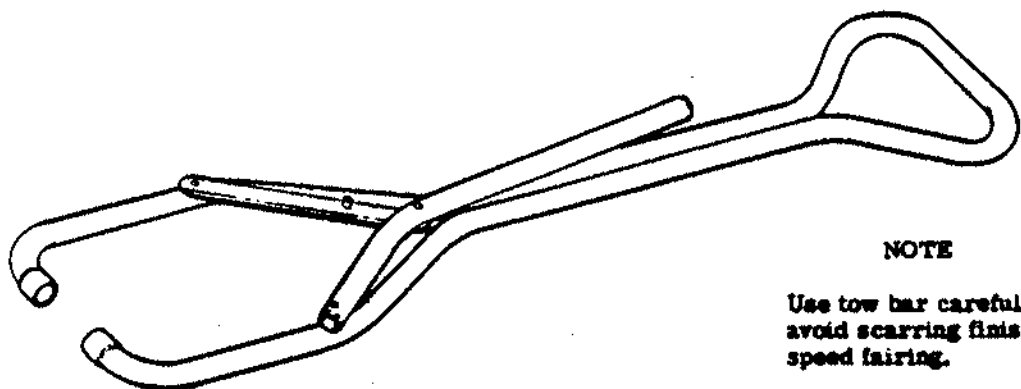
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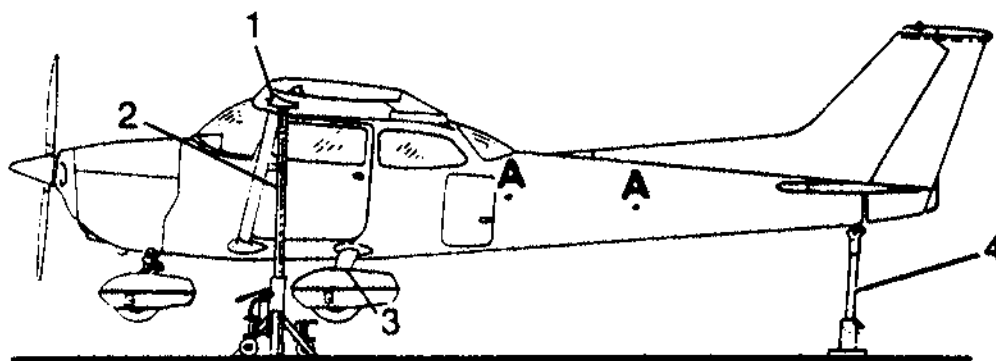


NOTE

Use tow bar carefully to avoid scarring finish on speed fairing.

Figure 2-1. Tow Bar

REFER TO SHEET 2
FOR JACKING
INFORMATION



NOTE

Corresponding points on both upper door sills may be used to level the aircraft laterally.

Reference points for longitudinal leveling of aircraft are two screws on left side of tailcone at zero waterline. These are indicated in illustration by A.

(Also refer to paragraph 2-5)

Figure 2-2. Jacking and Leveling (Sheet 1 of 2)

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JACKING INFORMATION

ITEM NUMBER	TYPE AND NUMBER	REMARKS
1	Block	1x4x4 padded with 1/4" rubber
2	#2-170 Basic jack (includes #2-71 Slide tube: Liftstroke 22-1/2") #2-70 Slide tube: Liftstroke 22-1/2" #2-64 Extension cap #2-109 Leg extension	Min. closed height: 34" Max. extension height: 56-1/2" Min. closed height: 57-1/2" Max. extension height: 80" Adds 4" Adds 12"
3	Built-in jack pad	Part of step bracket (SEE CAUTION)
4	Cessna #SE2-168	Tail tie-down stand

1. Wing jacks are placed under front spar of wing just outboard of wing strut, and must extend far enough to raise wheels off ground, and must be adequate strength.
2. Attach a Cessna #SE2-168 stand to the tie-down ring. Be sure tail stand weighs enough to keep tail down and under all conditions that it is strong enough to support any weight that might be placed on it (place shot bags or sand bags on tail stand). In addition, the base of adjustable tail stand is to be filled with concrete for additional weight as a safety factor.
3. Operate jacks evenly until desired height is reached.

CAUTION

When using built-in jack pad, flexibility of the gear strut will cause the main wheel to slide inboard as the wheel is raised, tilting the jack. The jack must be lowered for a second operation. jacking both wheels simultaneously at built-in jack pads is not recommended. jack pad may be used to raise only one main wheel. Do not USE brake casting as a jack point.

4. Items 2 and 4 are available from the Cessna Supply Division.

Figure 2-2. Jacking and Leveling (Sheet 2 of 2)

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- 2-1. GROUND HANDLING.
- 2-2. TOWING. Moving the aircraft by hand is accomplished by using the wing struts and landing gear struts as push points. A tow bar attached to the nose gear should be used for steering and maneuvering the aircraft on the ground. When no tow bar is available, press down at the horizontal stabilizer front spar adjacent to the fuselage to raise the nose wheel off the ground. With the nose wheel clear of the ground, the aircraft can be turned by pivoting it about the main wheels. Beginning with serials 17275035 and F1722135 tow bar stowage provisions are provided. In the baggage area a strap located at FS 110.75 and a bracket located at FS 140.10 are used to secure and store the tow bar assembly when not in use.

CAUTION

When towing the aircraft, never turn the nose wheel more than 30 degrees either side of center or the nose gear will be damaged. Do not push on control surfaces or outboard empennage surfaces. When pushing on the tailcone, always apply pressure at a bulkhead to avoid buckling the skin.

- 2-3. HOISTING. The aircraft may be lifted with a hoist of two-ton capacity by using hoisting rings, which are optional equipment, or by means of suitable slings. The front sling should be hooked to each upper engine mount at the firewall, and the aft sling should be positioned around the fuselage at the first bulkhead forward of the leading edge of the stabilizer. If the optional hoisting rings are used, a minimum cable length of 60 inches for each cable is required to prevent bending of the eyebolt-type hoisting rings. If desired, a spreader jig may be fabricated to apply vertical force to the eyebolts.
- 2-4. JACKING. See figure 2-2 for jacking procedures.
- 2-5. LEVELING. Corresponding points on both upper door sills may be used to level the aircraft laterally. The reference points for longitudinally leveling the aircraft are the two screws located on the left side of the tailcone. See figure 2-2 for screw locations.
- 2-5A. WEIGHING AIRCRAFT. Refer to Pilot's Operating Handbook.
- 2-6. PARKING. Parking precautions depend principally on local conditions. As a general precaution, set parking brake or chock the wheels and install the controls lock. In severe weather and high wind conditions, tie down the aircraft as outlined in paragraph 2-7 if a hangar is not available.
- 2-7. TIE-DOWN. When mooring the aircraft in the open, head into the wind if possible. Secure control surfaces with the internal control lock and set brakes.

CAUTION

Do not set parking brakes when they are overheated or during cold weather when accumulated moisture may freeze them.

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After completing the preceding, proceed to moor the aircraft as follows:

- a. Tie ropes, cables, or chains to the wing tie-down fittings located at the upper end of each wing strut. Secure the opposite ends of ropes, cables, or chains to ground anchors.
- b. Secure rope (no chains or cables) to forward mooring ring and secure opposite end to ground anchor.
- c. Secure the middle of a rope to the tail tie-down ring. Pull each end of rope away at a 45 degree angle and secure to ground anchors at each side of tail.
- d. Secure control lock on pilot control column. If control lock is not available, tie pilot control wheel back with front seat belt.
- e. These aircraft are equipped with a spring-loaded steering system which affords protection against normal wind gusts. However, if extremely high wind gusts are anticipated, additional external locks may be installed.

- 2-8. **FLYABLE STORAGE.** Flyable storage is defined as a maximum of 30 days nonoperational storage and/or the first 25 hours of intermittent engine operation.

NOTE

O-320-H2AD ENGINES

Thru aircraft serial 17274009, these engines are delivered from the factory with SAE 20W-50 Ashless Dispersant Oil conforming to MIL-L-22851. This oil must be used in these engines for all operations. (See figure 2-4, sheet 2 of 6.)

MODEL 172Q ONLY - O-360-A4N ENGINES

172 AND F172 SERIES -320-D2J ENGINES

Beginning with aircraft serial 17274010, these engines are delivered from the factory with MIL-L-6082 Aviation Grade Mineral Oil. This oil is to be used to replenish the oil supply during the first 25 hours of operation, at the first 25-hour oil change, and until a total of 50 hours have accumulated or oil consumption has stabilized. Then use MIL-L22851 Ashless Dispersant Oil conforming to AVCO Lycoming Service Instruction No. 1014 and all revisions and supplements thereto. (See figure 2-4, sheet 3 of 6).

During the 30 day nonoperational storage or the first 25 hours of intermittent engine operation, every seventh day the propeller shall be rotated through five revolutions, without running the engine. If the aircraft is stored outside, tie-down in accordance with paragraph 2-7. In addition, the pitot tube, static air vents, air vents, openings in the engine cowlings, and other similar openings shall have protective covers installed to prevent entry of foreign material. After 30 days, aircraft should be flown for 30 minutes or ground run-up until oil has reached operating temperature (lower green arc range).

CAUTION

Excessive ground operation shall be avoided.

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- 2-9. **RETURNING AIRCRAFT TO SERVICE.** After flyable storage, returning the aircraft to service is accomplished by performing a thorough preflight inspection. At the end of the first 25 hours of engine operation, drain engine oil and clean oil screens (or change external oil filter). Service engine with correct grade and quantity of engine oil. See figure 2-4 and paragraph 2-21 for correct grade of engine oil.
- 2-10. **TEMPORARY STORAGE.** Temporary storage is defined as aircraft in a nonoperational status for a maximum of 90 days. The aircraft is constructed of corrosion resistant alclad aluminum, which will last indefinitely under normal conditions if kept clean, however, these alloys are subject to oxidation. The first indication of corrosion on unpainted surfaces is in the form of white deposits or spots. On painted surfaces, the paint is discolored or blistered. Storage in a dry hangar is essential to good preservation and should be procured, if possible. Varying conditions will alter the measures of preservation, but under normal conditions in a dry hangar, and for storage periods not to exceed 90 days, the following methods of treatment are suggested:
- Fill fuel tanks or bays with the correct grade of gasoline.

WARNING

DURING ALL FUELING PROCEDURES, FIRE FIGHTING EQUIPMENT MUST BE AVAILABLE. TWO GROUND WIRES FROM DIFFERENT POINTS ON THE AIRPLANE TO SEPARATE APPROVED GROUND STAKES SHALL BE USED TO PREVENT ACCIDENTAL DISCONNECTION OF ONE GROUND WIRE. ENSURE THAT FUELING NOZZLE IS GROUNDED TO THE AIRPLANE.

NOTE

Tie-down rings should be used as grounding points for all grounding wires during refueling procedures.

- Clean and wax aircraft thoroughly.
- Clean any oil or grease from tires and coat tires with a tire preservative. Cover tires to protect against grease and oil.
- Either block up fuselage to relieve pressure on tires or rotate wheels every 30 days to change supporting points and prevent flat spotting the tires.
- Lubricate all airframe items and seal or cover all openings which could allow moisture and/or dust to enter.

NOTE

The aircraft battery serial number is recorded in the aircraft equipment list. To assure accurate warranty records, the battery should be reinstalled in the same aircraft from which it was removed. If the battery is returned to service in a different aircraft, appropriate record changes must be made and notification sent to the Cessna Claims Department.

- Remove battery and store in a cool, dry place; service battery periodically and charge as required.

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NOTE

An engine treated in accordance with the following may be considered being protected against normal atmospheric corrosion for a period not to exceed 90 days.

- g. Disconnect spark plug leads and remove upper and lower spark plugs from each cylinder.

NOTE

The preservative oil must be Lubricating Oil-Contact and Volatile, Corrosion Inhibited, MIL-C-6529, Type I heated to 200°F-220°F spray nozzle temperature.

- h. Using a portable pressure sprayer, atomize spray preservative oil through the upper spark plug hole of each cylinder with the piston in a down position. Rotate crankshaft as each pair of cylinders is sprayed.
- i. After completing step "h," rotate crankshaft so that no piston is at a top position. If the aircraft is to be stored outside, stop two-bladed propeller so that blades are as near horizontal as possible to provide maximum clearance for passing aircraft.
- j. Again, spray each cylinder without moving the crankshaft to thoroughly cover all interior surfaces of the cylinder above the piston.
- k. Install spark plugs and connect spark plug leads.
- l. Apply preservative oil to the engine interior by spraying approximately two ounces of the preservative oil through the oil filler tube.
- m. Seal all engine openings exposed to the atmosphere, using suitable plugs or non-hygroscopic tape. Attach a red streamer at each point that a plug or tape is installed.
- n. If the aircraft is to be stored outside, perform the procedures in paragraph 2-7. In addition, the pitot tube, static source vents, air vents, openings in the engine cowlings, and other similar openings should have protective covers installed to prevent entry of foreign material.
- o. Attach a warning placard to the propeller to the effect that the propeller shall not be moved while the engine is in storage.

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2-11. INSPECTION DURING STORAGE.

- a. Inspect airframe for corrosion at least once a month and remove dust collections as frequently as possible. Clean and wax aircraft as required.
- b. Inspect the interior of at least one cylinder through the spark plug hole for corrosion at least once a month.

NOTE

Do not move crankshaft when inspecting interior of cylinder for corrosion.

- c. If at the end of the 90 day period, the aircraft is to be continued in nonoperational storage, repeat the procedural steps "g" thru "o" of paragraph 2-10.

2-12. RETURNING AIRCRAFT TO SERVICE. After temporary storage, use the following procedures to return the aircraft to service.

- a. Remove aircraft from blocks and check tires for proper inflation. Check for proper nose gear strut inflation. (See figure 1-1.)
- b. Check battery and install.
- c. Check that oil sump has proper grade and quantity of engine oil.
- d. Service induction air filter and remove warning placard from propeller.
- e. Remove materials used to cover openings.
- f. Remove spark plugs from engine.
- g. While spark plugs are removed, rotate propeller several revolutions to clear excess rust preventive oil from cylinders.
- h. Clean, gap and install spark plugs. Torque plugs to the value specified in Section 11 or 11A and connect spark plug leads.
- i. Check fuel strainer. Remove and clean filter screen if necessary. Check fuel tanks or bays and fuel lines for moisture and sediment, drain enough fuel to eliminate moisture and sediment.
- j. Perform a thorough pre-flight inspection, then start and warm-up engine.

2-13. INDEFINITE STORAGE. Indefinite storage is defined as aircraft in a nonoperational status for an indefinite period of time. Engines treated in accordance with the following may be considered protected against normal atmosphere corrosion, provided the procedures outlined in paragraph 2-14 are performed at the intervals specified.

- a. Operate engine until oil temperature reaches normal operating range. Drain engine oil sump and reinstall drain plug and safety.
- b. Fill oil sump to normal operating capacity with corrosion preventive mixture which has been thoroughly mixed.

NOTE

Corrosion-preventive mixture consists of one part compound MIL-C-6529, Type I, mixed with three parts by volume of MIL-L-6082 mineral aircraft engine oil.

- c. Immediately after filling the oil sump with corrosion-preventive mixture, fly the aircraft for a period of time not to exceed a maximum of 30 minutes.

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- d. With engine operating at 1200 to 1500 rpm and induction air filter removed, spray corrosion-preventive mixture into induction airbox, at the rate of one-half gallon per minute, until heavy smoke comes from exhaust stack, then increase the spray until the engine is stopped.

CAUTION

Injecting corrosion-preventive mixture too fast can cause a hydrostatic lock.

- e. Do not rotate propeller after completing step "d".
- f. Remove all spark plugs and spray corrosion-preventive mixture, which has been preheated to 200°F to 220°F, into all spark plug holes to thoroughly cover interior surfaces of cylinders.
- g. Install lower spark plugs or install solid plugs, and install dehydrator plugs in upper spark plug holes. Be sure that dehydrator plugs are blue in color when installed.
- h. Cover spark plug lead terminals with shipping plugs (AN4060-1) or other suitable covers.
- i. With throttle in full open position, place a bag of desiccant in the carburetor intake and seal opening with moisture resistant paper and tape.
- j. Place a bag of desiccant in the exhaust tailpipe(s) and seal openings with moisture resistant tape.
- k. Seal cold air inlet to the heater muff with moisture resistant tape.
- l. Seal engine breather by inserting a protex plug in the breather hose and clamping in place.
- m. Seal all other engine openings exposed to atmosphere using suitable plugs or non-hygroscopic tape.

NOTE

Attach a red streamer to each place plugs or tape is installed. Either attach red streamers outside of the sealed area with tape or to the inside of the sealed area with safety wire to prevent wicking of moisture into the sealed area.

- n. Drain corrosion-preventive mixture from engine sump and reinstall drain plug.

NOTE

The corrosion-preventive mixture is harmful to paint and should be wiped from painted surfaces immediately.

- o. Attach a warning placard on the throttle control knob, to the effect that the engine contains no lubricating oil. Placard the propeller to the effect that it should not be moved while the engine is in storage.
- p. Prepare airframe for storage as outlined in paragraph 2-10 thru step "f".

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NOTE

As an alternate method of indefinite storage, the aircraft may be serviced in accordance with paragraph 2-10 providing the aircraft is run up at maximum intervals of 90 days and then reserviced per paragraph 2-10.

- 2-14. **INSPECTION DURING STORAGE.** Aircraft in indefinite storage shall be inspected as follows:
- Inspect cylinder protex plugs each 7 days.
 - Change protex plugs if their color indicates an unsafe condition.
 - If the dehydrator plugs have changed color in one half of the cylinders, all desiccant material in the engine shall be replaced with new material.
 - Every 6 months respray the cylinder interiors with corrosion-preventive mixture.

NOTE

Before spraying, inspect the interior of one cylinder for corrosion through the spark plug hole and remove at least one rocker box cover and inspect the valve mechanism.

- 2-15. **RETURNING AIRCRAFT TO SERVICE.** After indefinite storage, use the following procedure to return the aircraft to service.
- Remove aircraft from blocks and check tires for correct inflation. Check for correct nose gear strut inflation.
 - Check battery and install.
 - Remove all materials used to seal and cover openings.
 - Remove warning placards posted at throttle and propeller.
 - Remove and clean engine oil screen, then reinstall and safety. On aircraft that are equipped with an oil filter, install new filter.
 - Remove oil sump drain plug (or open quick-drain valve) and drain sump. Install and safety drain plug (or close quick-drain valve) and service engine with correct quantity and grade of engine oil in accordance with figure 2-4.

NOTE

The corrosion-preventive mixture will mix with the engine lubricating oil, so flushing the oil system is not necessary. Draining the oil sump will remove enough of the corrosion-preventive mixture.

- Service and install the induction air filter.
- Remove dehydrator plugs and spark plugs or plugs installed in spark plug holes and rotate propeller by hand several revolutions to clear corrosion-preventive mixture from cylinders.
- Clean, gap, and install spark plugs. Torque plugs to the value listed in Section 11 or 11A.
- Check fuel strainer. Remove and clean filter screen. Check fuel tanks or bays and fuel lines for moisture and sediment, and drain enough fuel to eliminate.
- Perform a thorough preflight inspection, then start and warm-up engine.
- Thoroughly clean aircraft and flight test aircraft.

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2-16. SERVICING.

2-17. Servicing requirements are shown in figure 2-4. The following paragraphs supplement this figure by adding details not included in the figure.

2-18. **FUEL.** Fuel tanks or bays should be filled immediately after flight to lessen moisture condensation. Tank or bay capacities are listed in Section 1. The recommended fuel grade to be used is given in figure 2-4.

WARNING

DURING ALL FUELING PROCEDURES, FIRE FIGHTING EQUIPMENT MUST BE AVAILABLE. TWO GROUND WIRES FROM DIFFERENT POINTS ON THE AIRPLANE TO SEPARATE APPROVED GROUND STAKES SHALL BE USED TO PREVENT ACCIDENTAL DISCONNECTION OF ONE GROUND WIRE. ENSURE THAT FUELING NOZZLE IS GROUNDED TO THE AIRPLANE.

NOTE

Tie-down rings should be used as grounding points for all grounding wires during refueling procedures.

2-18A. **USE OF FUEL ADDITIVES FOR COLD WEATHER OPERATION.** Strict adherence to recommended preflight draining instructions will eliminate any free water accumulations from the tank sumps. While small amounts of water may still remain in solution in the gasoline, it will normally be consumed and go unnoticed in the operation of the engine.

One exception to this can be encountered when operating under the combined effect of: (1) use of certain fuels, with (2) high humidity conditions on the ground (3) followed by flight at high altitude and low temperature. Under these unusual conditions small amounts of water in solution can precipitate from the fuel stream and freeze in sufficient quantities to induce partial icing of the engine fuel system.

While these conditions are quite rare and will not normally pose a problem to owners and operators, they do exist in certain areas of the world and consequently must be dealt with when encountered.

Therefore, to alleviate the possibility of fuel icing occurring under these unusual conditions it is permissible to add isopropyl alcohol or ethylene glycol monomethyl ether (EGME) compound to the fuel supply. See Figure 2-2A for fuel additive mixing ratio.

The introduction of alcohol or EGME compound into the fuel provides two distinct effects: (1) it absorbs the dissolved water from the gasoline and (2) alcohol has a freezing temperature depressant effect.

Alcohol, if used, is to be blended with the fuel in a concentration of 1% by volume. Concentrations greater than 1% are not recommended since they can be detrimental to fuel tank materials.

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The manner in which the alcohol is added to the fuel is significant because alcohol is most effective when it is completely dissolved in the fuel. To insure proper mixing the following is recommended:

1. For best results the alcohol should be added during the fueling operation by pouring the alcohol directly on the fuel stream issuing from the fueling nozzle.
2. An alternate method that may be used is to premix the complete alcohol dosage with some fuel in a separate clean container (approximately 2-3 gallon capacity) and then transfer this mixture to the tank or bay prior to the fuel operation.

Any high quality isopropyl alcohol may be used, such as:

Anti-icing fluid (MIL-F-5586) or
Isopropyl alcohol (Federal Specification TT-I-735a).

Ethylene glycol monomethyl ether (EGME) compound in compliance with MIL-I-27686 or Phillips PFA-55MB, if used, must be carefully mixed with the fuel in concentrations not to exceed 0.15% by volume.

CAUTION

Mixing of the EGME compound with the fuel is extremely important because concentration in excess of that recommended (0.15 percent by volume maximum) will result in detrimental affects to the fuel tanks, such as deterioration of protective primer and sealants and damage to O-rings and seals in the fuel system and engine components. Use only blending equipment that is recommended by the manufacturer to obtain proper proportioning.

Do not allow the concentrated EGME compound to come in contact with the airplane finish or fuel cell as damage can result.

Prolonged storage of the airplane will result in a water build-up in the fuel which "leeches out" the additive. An indication of this is when an excessive amount of water accumulates in the fuel tank sumps. The concentration can be checked using a differential refractometer. It is imperative that the technical manual for the differential refractometer be followed explicitly when checking the additive concentration.

- 2-19. **FUEL DRAINS.** On aircraft serials 17267585 thru 17275034 and F17201515 thru F17202134, the fuel drains are located in the fuel tanks or bays, fuel strainer, and carburetor. Drain plugs are installed in the fuel selector valve and carburetor; drain valves are located in the fuel tanks or bays and fuel strainer. Beginning with 17275035 and F17202135, a drain valve is located in the bottom of the fuel selector valve for sampling and draining of fuel. To activate the drain valves for fuel sampling, place cup up to valve and depress valve with rod protruding from cup. Refer to Section 12 for illustration of fuel tank and bay drain valve. The strainer valve is an integral part of the fuel strainer assembly. The strainer drain is equipped with a control which is located adjacent to the oil dipstick. Access to the control is through the oil dipstick access door. Open drains and remove drain plugs at intervals specified in figure 2-4. Also, during daily inspection of the fuel strainer, fuel selector, and tanks or bays, if water is found in the system, all fuel drain plugs should be opened and all water drained from the system.

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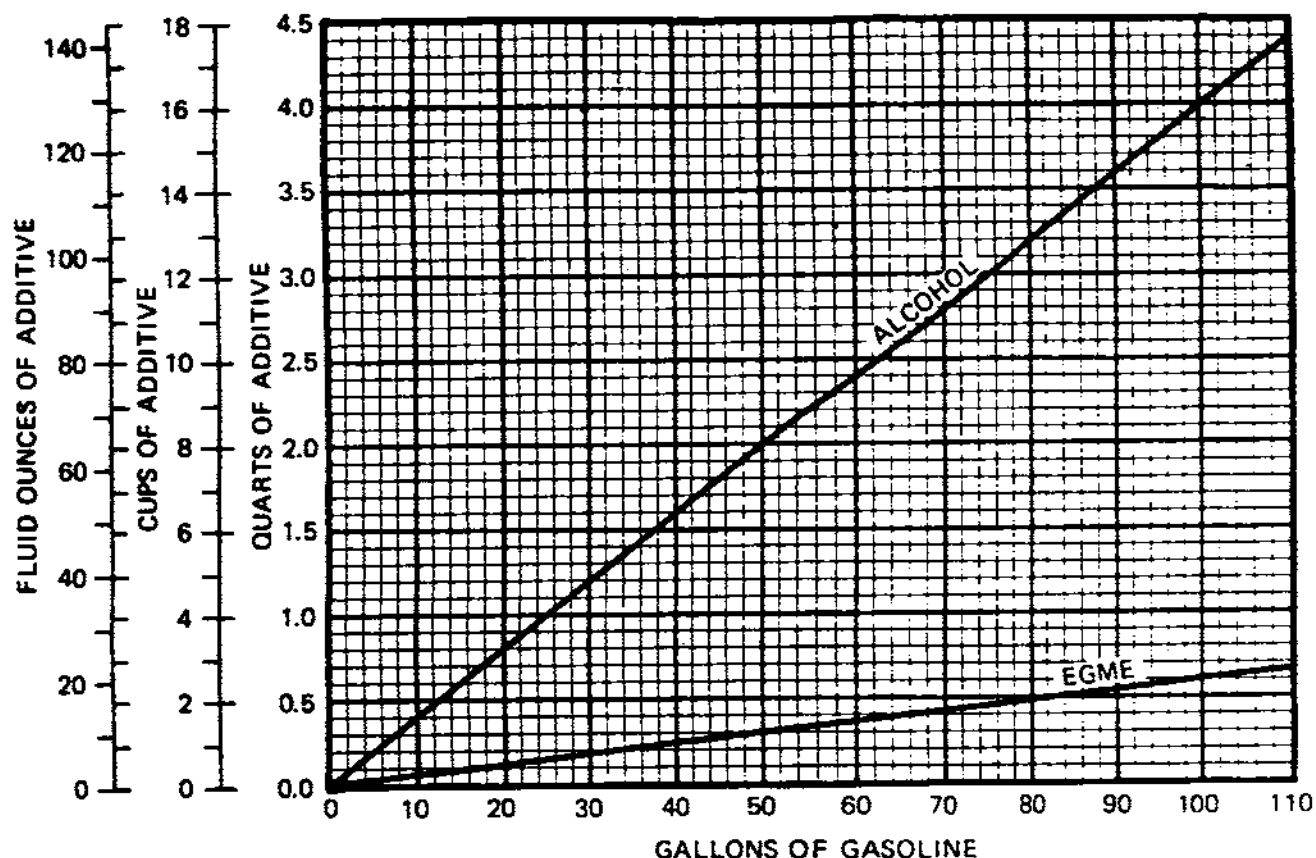


Figure 2-2A. Fuel Additive Mixing Ratio Chart.

- 2-20. **CARBURETOR DRAIN PLUG INSPECTION.** In order to prevent the possibility of thread sealant contamination in the carburetor float chamber, cleaning and inspection of the carburetor should be accomplished at each 100-hour inspection and anytime water in the fuel is suspected.
- With the fuel selector valve OFF, remove carburetor drain plug and clean off any sealant present on the end of the plug or in the threads on the plug.
 - Inspect drain plug hole in the carburetor and remove any sealant remaining in the hole.
 - Turn fuel selector valve to BOTH to flush float chamber and drain plug chamber while probing drain plug hole to ascertain that all residue of sealant material is dislodged and washed out of the chamber. Flushing operation should last 15 to 30 seconds.
 - A second flushing should then be accomplished and the drained fuel retained for inspection to ensure that no sealant particles are present.
 - Install drain plug as follows:
 - Install drain plug in carburetor 1-1/2 to 2 turns.
 - Apply sealant to drain plug threads (use NS-40 [RAS-4] or equivalent).
 - Tighten and safety drain plug.
 - Turn fuel selector valve to BOTH and inspect for evidence of fuel leakage.
- 2-21. **ENGINE OIL.** Check engine lubricating oil with the dipstick five to ten minutes after the engine has been stopped. The aircraft should be in as near a level position as possible when checking the engine oil, so that a true reading is obtained. Engine oil should be drained while the engine is still hot, and the nose of the aircraft should be raised slightly for more

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positive draining of any sludge which may have collected in the engine oil sump. Engine oil should be changed as specified in servicing intervals figure 2-4. Reduce these intervals for prolonged operations in dusty areas, in cold climates where sludging conditions exist, or where short flights and long idle periods are encountered, which cause sludging conditions. Always change oil and oil filter whenever oil on the dipstick appears dirty. Aviation grade oil conforming to AVCO Lycoming Service Instruction No. 1392 for the O-320-H2AD engine, and AVCO Lycoming Service Instruction No. 1014 for the O-320-D2J engine (Model 172 and F172 Series) and O-360-A4N engine (Model 171Q only) and any revisions or supplements thereto, shall be used.

NOTE

O-320-H2AD ENGINES

Service with 20W-50 Ashless Dispersant Oil conforming to MIL-L-22851. (See figure 2-4, sheet 2 of 6.)

O-320-D2J AND O-360-A4N ENGINES

Service with SAE 20W-50 (MIL-L-8082) Aviation Grade Mineral Oil when new or newly overhauled, during the first 25 hours of operation, at the first 25 hour oil change, and until 50 hours have accumulated or oil consumption has stabilized. (See figure 2-4, sheet 3 of 6.)

WARNING

The U.S. Environmental Protection Agency advises that mechanics and other workers who handle engine oil are advised to minimize skin contact with used oil and promptly remove used oil from the skin. In a laboratory study, mice developed skin cancer after skin was exposed to used engine oil twice a week without being washed off, for most of their life span. Substances found to cause cancer in laboratory animals may also cause cancer in humans.

Valve shown open. To close, twist screwdriver until valve unlocks and snaps down to closed position.

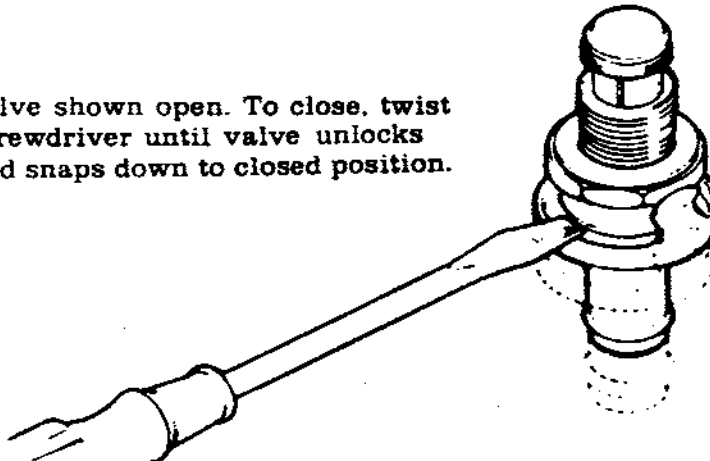


Figure 2-3. Quick-Drain Valve

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An oil quick-drain valve may be installed. This valve provides a quicker and cleaner method of draining the engine oil. This valve is installed in the oil drain port of the oil sump and allows oil to be drained by attaching a hose over the fitting end and pushing up, causing the oil to drain through the hose into a container. To drain the engine oil, proceed as follows:

- a. Operate engine until oil temperature is at normal operating temperature.
- b. (With Quick-Drain Valve.) Attach a hose to the quick-drain valve in the oil sump. Push up on quick-drain valve until it locks open, and allow oil to drain through the hose into the container, and remove oil filter (if installed).
- c. (Without Quick-Drain Valve.) Remove oil drain plug from engine sump and allow oil to drain into a container, and remove oil filter (if installed).
- d. After engine oil has drained, close quick-drain valve as shown in figure 2-3 and remove hose. Install and safety drain plug and oil filter. Torque oil filter to 18-20 lb-ft.
- e. Service engine with correct quantity and grade of engine oil in accordance with figure 2-4.

2-21A. ENGINE OIL ADDITIVE. Refer to AVCO Lycoming Service Bulletin No. 446.

2-22. ENGINE INDUCTION AIR FILTER (MODEL 172 AND F172 SERIES ONLY). The induction air filter keeps dust and dirt from entering the induction system. The value of maintaining the air filter in a good clean condition can never be overstressed. More engine wear is caused through the use of a dirty or damaged air filter than is generally believed. The frequency with which the filter should be removed, inspected, and cleaned will be determined primarily by aircraft operating conditions. A good general rule, however, is to remove, inspect and clean the filter at least every 100 hours of engine operating time and more frequently if warranted by operating conditions. Some operators prefer to hold spare induction air filters at their home base of operation so that a clean filter is always readily available for use. Under extremely dusty conditions, daily servicing of the filter is recommended. To service the filter, proceed as follows:

- a. Remove filter from aircraft.

NOTE

Use care to prevent damage to filter element when cleaning filter with compressed air.

- b. Clean filter by blowing with compressed air (not over 100 psi) from direction opposite of normal air flow. Arrows on filter case indicate direction of normal air flow.

CAUTION

Do not use solvent or cleaning fluids to wash filter. Use only water and a household detergent solution when washing the filter.

- c. After cleaning as outlined in step "b", the filter may be washed, if necessary, in a solution of warm water and a mild household detergent. A cold water solution may be used.

NOTE

The filter assembly may be cleaned with compressed air a maximum of 30 times or it may be washed a maximum of 20 times. A new filter should be installed after using 500 hours of engine operating time or one year, whichever

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should occur first. However, a new filter should be installed at anytime the existing filter is damaged. A damaged filter may have sharp or broken edges in the filtering panels which would allow unfiltered air to enter the induction system. Any filter that appears doubtful, shall have a new filter installed in its place.

- d. After washing, rinse filter with clear water until rinse water draining from filter is clear. Allow water to drain from filter and dry with compressed air (not over 100 psi).

NOTE

The filtering panels of the filter may become distorted when wet, but they will return to their original shape when dry.

- e. Be sure air box is clean, inspect filter. If filter is damaged, install a new filter.
- f. Install filter at entrance to air box with gasket on aft face of filter frame and with air flow arrows on filter frame pointed in the correct direction.

- 2-22A. **ENGINE INDUCTION AIR FILTER (MODEL 172Q ONLY).** The induction air filter keeps dust and dirt from entering the induction system. More engine wear is caused through the use of a dirty or damaged air filter than is generally believed. The polyurethane foam filter element should be changed every 200 hours. Under extremely dusty conditions, the filter should be replaced on condition.

CAUTION

This filter cannot be washed or cleaned by compressed air; it is a remove and replace item.

Prior to installation of a new filter, squeeze out excess wetting. It is possible that the runoff of excess wetting could damage the paint.

- 2-23. **VACUUM SYSTEM CENTRAL AIR FILTER.** The vacuum system central air filter keeps dirt and dust from entering the vacuum operated instruments. Inspect vacuum system central air filter every 200 hours of operating time for damage. Change central air filter element every 500 hours of operating time and whenever it becomes sufficiently clogged to cause suction gage readings to drop below 4.5 inches of mercury. Also, do not operate the vacuum system without a filter, or with the filter removed, or a vacuum line disconnected as particles of dust or other foreign matter may enter the system and damage the vacuum operated instruments.

CAUTION

Smoking will cause premature filter clogging.

- 2-24. **BATTERY.** Battery servicing involves adding distilled water to maintain the electrolyte 1/8" below the horizontal baffle plate at the bottom of the filler holes, checking the battery cable connections, and neutralizing and cleaning spilled electrolyte or corrosion. Use bicarbonate of soda (baking soda) and water to neutralize electrolyte or corrosion. Follow with a thorough flushing with water. Brighten cables and terminals with a wire brush, then coat with petroleum jelly before connecting. The battery box also should be checked and cleaned if any corrosion is noted. Distilled water, not acid or "rejuvenators", should be used to maintain electrolyte level. Check the battery every 100 hours (or at least every 90 days), more often in hot weather. Refer to Section 16 for detailed battery removal, installation and testing.

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- 2-25. **TIRES.** Maintain tire pressure at the pressure specified in figure 1-1. When checking tire pressure, examine tires for wear, cuts, bruises, and slippage. Remove oil, grease, and mud from tires with soap and water.

NOTE

Recommended tire pressures should be maintained. Especially in cold weather, remember that any drop in temperature of the air inside a tire causes a corresponding drop in air pressure.

- 2-26. **NOSE GEAR SHOCK STRUT.** The nose gear shock strut requires periodic checking to ensure that the strut is filled with hydraulic fluid and is inflated to the correct air pressure. To service the nose gear shock strut, proceed as follows:
- Remove valve cap and release all air.
 - Remove valve housing assembly.
 - Compress strut completely (stops in contact with outer barrel hub).
 - Oil Level.
 - Fluid used should comply with specification MIL-H-5606
 - Fill strut to bottom of valve installation hole.
 - Maintain oil level at bottom of valve installation hole.
 - Fully extend strut.
 - Replace valve housing assembly.
 - With strut fully extended and nose wheel clear of ground, inflate strut to 45 psi.

NOTE

The nose landing gear shock strut will normally require only a minimum amount of service. Maintain the strut extension air pressure, as shown in figure 1-1. Lubricate landing gear as shown in figure 2-5. Check the landing gear daily for general cleanliness, security of mounting, and for hydraulic fluid leakage. Keep machined surfaces wiped free of dirt and dust, using a clean, lint-free cloth saturated with MIL-H-5606 hydraulic fluid or kerosene. All surfaces should be wiped free of excessive hydraulic fluid.

- 2-27. **NOSE GEAR SHIMMY DAMPER.** The nose gear shimmy damper should be serviced at least every 100 hours. The shimmy damper must be filled completely with fluid, free of entrapped air, to serve its purpose. To service the shimmy damper, proceed as follows:
- Remove shimmy damper from aircraft.
 - While holding the damper in a vertical position with fitting end pointed downward, pull fitting end of the damper shaft to its limit of travel.
 - While holding damper in this position, fill damper through open end of cylinder with hydraulic fluid.
 - Push the shaft upward slowly to seal off the filler hole.
 - Clean dampener with solvent. Be sure to keep the shaft protruding through the filler hole until damper is installed on the aircraft.
 - Install dampener on aircraft.

NOTE

Keep the shimmy damper, especially the exposed portions of the damper piston shaft, clean to prevent collec-

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tion of dust and grit which could cut the seals in the damper barrel. Keep machined surfaces wiped free of dirt and dust, using a clean lint-free cloth saturated with MIL-H-5606 hydraulic fluid or kerosene. All surfaces should be wiped free of excessive hydraulic fluid.

- 2-28. **HYDRAULIC BRAKE SYSTEMS.** Check brake master cylinders and refill with hydraulic fluid as specified in the inspection charts. Bleed the brake system of entrapped air whenever there is a spongy response to the brake pedals. Refer to Section 5 for filling and bleeding of the brakes.
- 2-29. **CLEANING.**
- 2-30. Keeping the aircraft clean is important. Besides maintaining the trim appearance of the aircraft, cleaning lessens the possibility of corrosion and makes inspection and maintenance easier.
- 2-31. **CLEANING AND CARE OF THE WINDSHIELD AND WINDOW.**
- a. **General Maintenance Procedures.** The following procedures provide information regarding cleaning and servicing windshields and windows. Improper cleaning, or use of unapproved cleaning agents can cause damage to windshield and windows.
 - b. **Materials Required:**

NAME	MANUFACTURER	USE
Mild soap or detergent (hand dishwashing type)	Commercially available	Cleaning windshields and windows.
Aliphatic Naphtha Type II conforming to Federal Specification TT-N-95	Commercially available	Removing deposits which cannot be removed with mild soap solution.
Polishing wax: (Refer to Note 1)	S.C. Johnson and Son, Inc.	Waxing acrylic wind- shields and windows.
Turtle Wax (paste)	Turtle Wax, Inc. Chicago, IL 60638	
Great Reflections Paste Wax	E.I. duPont deNemours and Co. (Inc) Wilmington, DE 19898	
Slip-stream Wax (paste)	Classic Chemical Grand Prairie, TX 75050	
Acrylic polish conforming to Federal Specification P-P-560 such as: Permatex plastic cleaner Number 403D	Permatex Company, Inc. Kansas City, KS 66115	Cleaning and polishing acrylic windshields and windows.
Soft cloth, such as: Cotton flannel or old tee shirt material	Commercially available	Applying and removing wax and polish.

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c. Cleaning Instructions.

CAUTION

Windshields and windows (Acrylic Faced) are easily damaged by improper handling and cleaning techniques.

1. Place airplane inside hangar or in shaded area and allow to cool from heat of sun's direct rays.
2. Using clean (preferably running) water, flood the surface. Use bare hands with no jewelry to feel and dislodge any dirt or abrasive materials.
3. Using a mild soap or detergent (such as a dishwashing liquid) in water, wash the surface. Again use only the bare hand to provide rubbing force. (A clean cloth may be used to transfer the soap solution to the surface, but extreme care must be exercised to prevent scratching the surface.)
4. On acrylic windshields and windows only, if soils which cannot be removed by a mild detergent remain, Type II aliphatic naphtha applied with a soft clean cloth may be used as a cleaning solvent. Be sure to frequently refold cloth to avoid re-depositing soil and/or scratching windshield with any abrasive particles.
5. Rinse surface thoroughly with clean fresh water and dry with a clean cloth.

CAUTION

Do not use any of the following on or for cleaning windshields and windows: methanol, denatured alcohol, gasoline, benzene, xylene, MEK, acetone, carbon tetrachloride, lacquer thinners, commercial or household window cleaning sprays.

6. Hard polishing wax should be applied to acrylic surfaces. (The wax has an index of refraction nearly the same as transparent acrylic and will tend to mask any shallow scratches on the windshield surface).
7. Acrylic surfaces may be polished using a polish meeting Federal Specification P-P-560 applied per the manufacturer's instructions.

NOTE

When applying and removing wax and polish, use a clean soft cloth such as well worn tee shirt material or cotton flannel.

8. DO NOT USE rain repellent on acrylic surfaces.

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d. Windshield and Window Preventive Maintenance.

NOTE

Utilization of the following techniques will help minimize windshield and window crazing.

1. Keep all surfaces of windshields and windows clean.
2. If desired, wax acrylic surfaces.
3. Carefully cover all surfaces during any painting, powerplant cleaning or other procedure that calls for use of any type of solvents or chemicals. The following coatings are approved for use in protecting surfaces from solvent attack.
 - (a) White Spary Lab, MIL-C-6799, Type I, Class II.
 - (b) WPL-3 Masking Paper - St. Regis, Newton, MA.
 - (c) 5 X N - Poly-Spotstick - St. Regis, Newton, MA.
 - (d) Protex 40 - Mask Off Company, Monrovia, CA, and Southwest Paper Co., Wichita, KS.
 - (e) Protex 10VS - Mask Off Company, Monrovia, CA, and Southwest Paper Co., Wichita, KS.
 - (f) Scotch 344 Black Tape - 3M Company.
4. Do not park or store airplane where it might be subjected to direct contact with or vapors from: methanol, denatured alcohol, gasoline, benzene, xylene, MEK, acetone, carbon tetrachloride, lacquer thinners, commercial or household window cleaning sprays, paint strippers, or other types of solvents.
5. Do not use solar screens or shields installed on inside of airplane or leave sun visors up against windshield. The reflected heat from these items causes elevated temperatures which accelerate crazing and may cause formation of bubbles in the inner ply of multiple ply windshields.
6. Do not use a power drill motor or other powered device to clean, polish, or wax surfaces.

2-32. **PLASTIC TRIM.** The instrument panel, plastic trim, and control knobs need only be wiped with a damp cloth. Oil and grease on the control wheel and control knobs can be removed with a cloth moistened with Stoddard solvent. Volatile solvents, such as mentioned in paragraph 2-31, must never be used since they soften and craze the plastic.

2-33. **PAINTED SURFACES.** The painted exterior surfaces of your new Cessna have a durable, long lasting finish. Approximately 10 days are required for the paint to cure completely; in most cases, the curing period will have been completed prior to delivery of the airplane. In the event that polishing or buffing is required within the curing period, it is recommended that the work be done by someone experienced in handling uncured paint. Any Cessna Dealer can accomplish this work.

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Generally, the painted surfaces can be kept bright by washing with water and mild soap, followed by a rinse with water and drying with cloths or chamois. Harsh or abrasive soaps or detergents which could cause corrosion or scratches should never be used. Remove stubborn oil and grease with a cloth moistened with Stoddard solvent.

To seal any minor surface chips or scratches and protect against corrosion, the airplane should be waxed regularly with a good automotive wax applied in accordance with the manufacturer's instructions. If the airplane is operated in a seacoast or other salt water environment, it must be washed and waxed more frequently to assure adequate protection. Special care should be taken to seal around rivet heads and skin laps, which are the areas most susceptible to corrosion. A heavier coating of wax on the leading edges of the wings and tail and on the cowl nose cap and propeller spinner will help reduce the abrasion encountered in these areas. Reapplication of wax will generally be necessary after cleaning with soap solutions or after chemical de-icing operations.

- 2-34. **ALUMINUM SURFACES.** The aluminum surfaces require a minimum of care, but should never be neglected. The aircraft may be washed with clean water to remove dirt and may be washed with nonalkaline grease solvents to remove oil and/or grease. Household type detergent soap powders are effective cleaners, but should be used cautiously since some of them are strongly alkaline. Many good aluminum cleaners, polishes and waxes are available from commercial suppliers of aircraft products.

- 2-35. **ENGINE AND ENGINE COMPARTMENT.** An engine and accessories wash-down should be accomplished during each 100-hour inspection to remove oil, grease, salt corrosion or other residue that might conceal component defects during inspection. Also, periodic cleaning can be very effective preventive maintenance.

Precautions should be taken when working with cleaning agents such as wearing of rubber gloves, an apron or coveralls and a face shield or goggles. Use the least toxic of available cleaning agents that will satisfactorily accomplish the work. These cleaning agents include: (1) Stoddard Solvent (Specification P-D-680 type II), (2) A water alkaline detergent cleaner (MIL-C-25769J) mixed, 1 part cleaner, 2 to 3 parts water and 8 to 12 parts Stoddard solvent or (3) A solvent base emulsion cleaner (MIL-C-4361B) mixed 1 part cleaner and 3 parts Stoddard solvent.

CAUTION

Do not use gasoline or other highly flammable substances for wash down.

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Perform all cleaning operations in well ventilated work areas and ensure that adequate fire-fighting and safety equipment is available. Do not smoke or expose a flame, with 100 feet of the cleaning area. Compressed air, used for cleaning agent, application or drying, should be regulated to the lower practical pressure. Use of a stiff bristle brush rather than a steel brush is recommended if cleaning agents do not remove excess grease and grime during spraying.

A recommended procedure for cleaning an engine and accessories is as follows:

CAUTION

Do not attempt to wash an engine which is still hot or running. Allow the engine to cool down before cleaning.

- a. Remove engine cowlings.
- b. Carefully cover the coupling area between the vacuum pump and the engine drive shaft so that no cleaning solvent can reach the coupling or seal.
- c. Cover the open end of the vacuum discharge tube.
- d. Cover the vacuum relief valve filter, if installed in the engine compartment.
- e. Use fresh water for wash-down when the engine is contaminated with salt or corrosive chemicals. A cleaning agent such as described previously may then be used to remove oil and grime.

CAUTION

Care should be exercised to not direct cleaning agents or water streams at openings on the starter, magnetos, alternator or vacuum pump.

- f. Thoroughly rinse with clean warm water to remove all traces of cleaning agents.

CAUTION

Cleaning agents should never be left on engine components for an extended period of time. Failure to remove them may cause damage to components such as neoprene seals and silicone fire sleeves, and could cause additional corrosion.

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- g. Completely dry engine and accessories using clean, dry compressed air.
- h. Remove the cover over the coupling area.
- i. Remove the cover from the vacuum discharge tube.
- j. Remove the cover from the vacuum relief valve filter, if installed.
- k. If desired, engine cowling may be washed with the same cleaning agents, then rinsed thoroughly and wiped dry. After cleaning engine, relubricate all control arms and moving parts as required.

WARNING

For maximum safety, check that the magneto switches are off, the throttle is closed, the mixture control is in the idle cut-off position, and the airplane is secured before rotating the propeller by hand. Do not stand within the arc of the propeller blades while turning the propeller.

- m. Before starting engine, rotate the propeller by hand no less than four complete revolutions.

2-36. UPHOLSTERY AND INTERIOR. Keeping the upholstery and interior trim clean prolongs upholstery fabric and interior trim life. To clean the interior, proceed as follows:

- a. Empty all ash trays and refuse containers.
- b. Brush or vacuum clean the upholstery and carpet to remove dust and dirt.
- c. Wipe leather and plastic trim with a damp cloth.
- d. Soiled upholstery fabrics and carpet may be cleaned with a foam-type detergent used according to manufacturer's instructions.
- e. Oil spots and stains may be cleaned with household spot removers, used sparingly. Before using any solvent, read the instructions on the container and test it on an obscure place in the fabric to be cleaned. Never saturate the fabric with volatile solvent; it may damage the padding and backing material.
- f. Scrape sticky material from fabric with a dull knife, then spot clean the area.

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- 2-37. **PROPELLER.** Wash hub and blade with a soft cloth and Stoddard cleaning solvent or equivalent, then dry thoroughly with compressed air. The propeller should be wiped occasionally with an oily cloth, then wiped with a dry cloth. In salt water areas this will assist in corrosion proofing the propeller.
- 2-38. **WHEELS.** The wheels should be washed periodically and examined for corrosion, chipped paint, and cracks or dents in the wheel halves or in the flanges or hubs. If defects are found, remove and repair in accordance with Section 5. Discard cracked wheel halves, flanges or hubs and install new parts.
- 2-39. **LUBRICATION.**
- 2-40. Lubrication requirements are shown in figure 2-5. Before adding grease to grease fittings, wipe dirt from fitting. Lubricate until grease appears around parts being lubricated, and wipe excess grease from parts. The following paragraphs supplement figure 2-5 by adding details.
- 2-41. **WHEEL BEARINGS.** Clean and repack the wheel bearings at first 100-hour inspection and at each 500-hour inspection thereafter. If more than the usual number of takeoffs and landings are made, extensive taxiing is required, or the aircraft is operated in dusty areas or under seacoast conditions, cleaning and lubrication of the wheel bearings shall be accomplished at each 100-hour inspection.
- 2-42. **NOSE GEAR TORQUE LINKS.** Lubricate nose gear torque links every 50 hours. When operating in dusty conditions, more frequent lubrication is required.
- 2-43. **WING FLAP ACTUATOR.** Clean and lubricate wing flap actuator jack screw each 100 hours as follows:
- Expose jack screw by operating flaps to full down position.
 - Clean jack screw threads with solvent rag and dry with compressed air.

NOTE

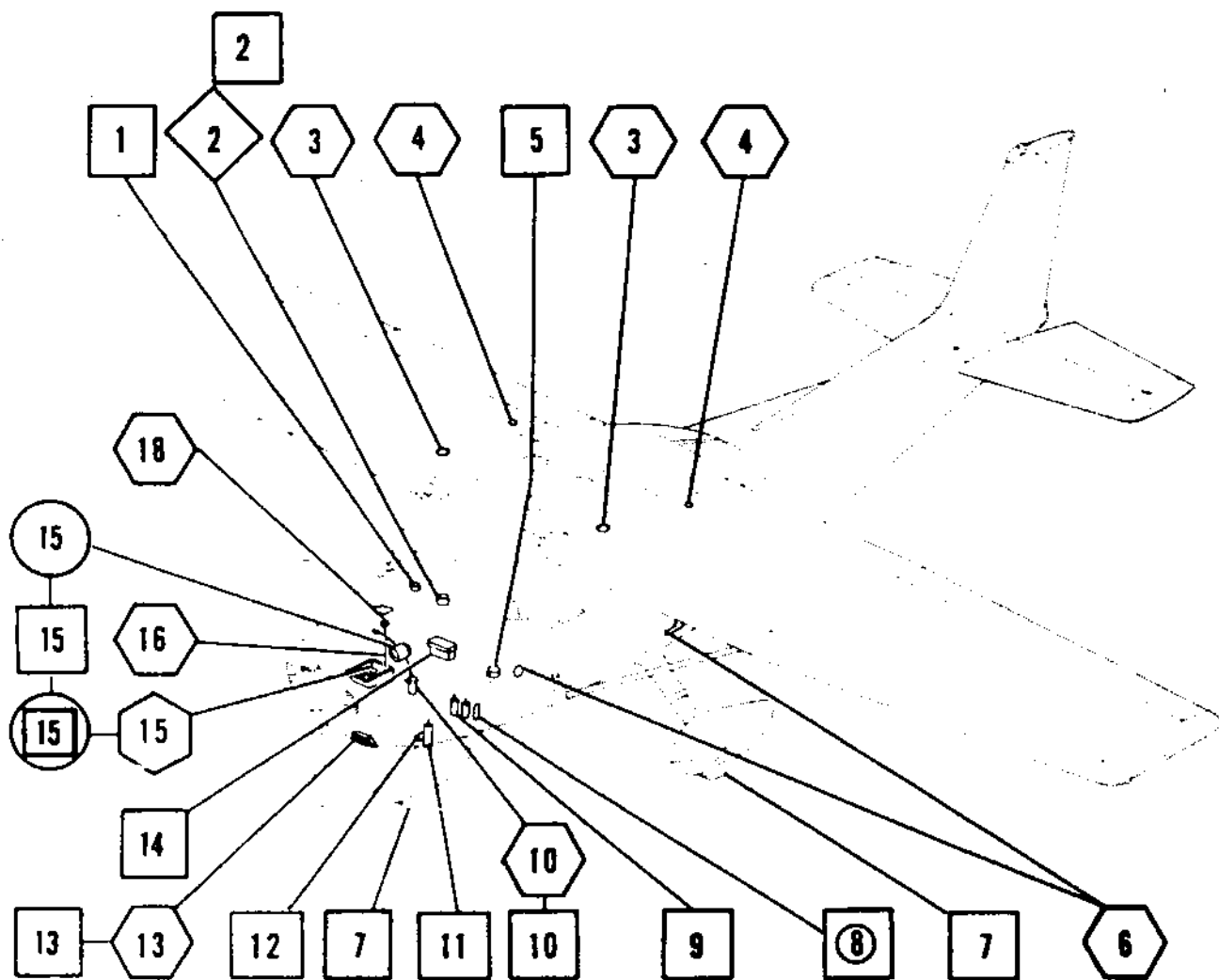
It is not necessary to remove actuator from aircraft to clean or lubricate threads.

- With oil can, apply light coat of No. 10 weight, non-detergent oil to threads of jack screw.

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- 2-44. **FUEL SELECTOR VALVE.** At each 100 hour inspection, check the fuel selector valve and drive shaft for the following:
- Valve control detent plate for cleanliness and excessive wear. Dirt accumulation on this plate can cause binding, poor detent feel and rapid wear of the plate.
 - All drive shaft attach points for security, binding, excessive wear and lubrication, if required.
 - Operate valve handle through all positions and check for proper operation, detent feel and freedom of movement.
- 2-45. **ROD END BEARINGS.** Periodic inspection and lubrication is required to prevent corrosion of the bearing in the rod end. At each 100-hour inspection, disconnect the control rods at the aileron, flap and nose gear steering rods, and inspect each rod end for corrosion. If no corrosion is found, wipe the surface of the rod end balls with general purpose oil and rotate ball freely to distribute the oil over its entire surface and connect the control rods to their respective units. If corrosion is detected during the inspection, install new rod ends.

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Refer to Sheets 2 & 3 for Fuel and Oil Specifications.

Figure 2-4. Servicing (Sheet 1 of 6)

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SPECIFIED AVIATION GRADE FUELS:

WARNING

ONLY AVIATION GRADE FUELS ARE APPROVED FOR USE.

ENGINE MODEL	APPROVED FUEL GRADES	NOTE
LYCOMING O-320-H2AD	100LL (blue)	1
	100 (green) (formerly 100/130)	1

NOTE

1. Compliance with Avco Lycoming Service Instruction No. 1070, and all revisions thereto, must be accomplished.

SPECIFIED AVIATION GRADE OIL:

AVERAGE AMBIENT TEMPERATURE (°F)/OIL GRADE											MAXIMUM OIL TEMPERATURE °F
0°	10°	20°	30°	40°	50°	60°	70°	80°	90°		
								SAE 60			245°
							SAE 40 or SAE 50				245°
				SAE 40							245°
		SAE 30, SAE 40 or SAE 20W-40									245°
SAE 30 or SAE 20W-30											210°
		SAE 15W-50 or SAE 20W-50									245°

The overlap of oil grades is based on a mid-range of ambient ground temperature vs maximum oil inlet temperature. Aviation grade ashless dispersant oil conforming to Avco Lycoming Service Instruction No. 1392, and all revisions and supplements thereto **MUST BE USED**.

Oil capacities for the aircraft are given in the following chart. For extended flight, fill to **FULL** mark on dipstick. Do not operate with less than **MINIMUM FOR FLIGHT** quantities listed. If an external oil filter is installed, one additional quart of oil is required when filter is changed.

CAPACITY (TOTAL)	CAPACITY (TOTAL WITH FILTER)	NORMAL OPERATION	MINIMUM FOR FLIGHT
6	7	5	4

Figure 2-4. Servicing (Sheet 2 of 6)

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SPECIFIED AVIATION GRADE FUELS:

WARNING

ONLY AVIATION GRADE FUELS ARE APPROVED FOR USE.

ENGINE MODEL	APPROVED FUEL GRADES	NOTE
LYCOMING O-320-D2J & O-360-A4N	100LL (blue)	1
	100 (green) (formerly 100/130)	1

NOTE

1. Compliance with Avco Lycoming Service Instruction No. 1070, and all revisions thereto, must be accomplished.

SPECIFIED AVIATION GRADE OIL:

AVERAGE AMBIENT TEMPERATURE (°F)/OIL GRADE											MAXIMUM OIL TEMPERATURE °F
0°	10°	20°	30°	40°	50°	60°	70°	80°	90°		
									SAE 60		245°
								SAE 40 or SAE 50			245°
				SAE 40							245°
		SAE 30, SAE 40 or SAE 20W-40									245°
SAE 30 or SAE 20W-30											210°
		SAE 15W-50 or SAE 20W-50									245°

Aviation grade oils conforming to Avco Lycoming Service Instruction No. 1014, and all revisions and supplements thereto, **MUST BE USED**, except as noted in paragraph 2-21.

Oil capacities for the aircraft are given in the following chart. For extended flight, fill to FULL mark on dipstick. Do not operate with less than MINIMUM FOR FLIGHT quantities listed. If an external oil filter is installed, one additional quart of oil is required when filter is changed.

CAPACITY (TOTAL)	CAPACITY (TOTAL WITH FILTER)	NORMAL OPERATION	MINIMUM FOR FLIGHT
7	8	6	5

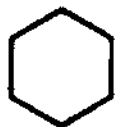
Figure 2-4. Servicing (Sheet 3 of 6)

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DAILY

- 3 **FUEL TANK OR BAY FILLER**
Service after each flight. Keep full to retard condensation. Refer to paragraph 2-18 for details.
- 4 **FUEL TANK OR BAY SUMP DRAINS:**
Drain off any water and sediment before first flight of the day.
- 10 **FUEL STRAINER**
Drain off any water and sediment before first flight of the day. Refer to paragraph 2-19 for details.
- 6 **PITOT AND STATIC PORTS**
Check for obstructions before first flight of the day.
- 13 **INDUCTION AIR FILTER**
Inspect and service under dusty conditions. Refer to paragraphs 2-22 and 2-22A for details.
- 16 **OIL DIPSTICK**
Check oil on preflight. Add oil as necessary. Refer to paragraph 2-21 for details. Gouges or deep marks on the lower end of the dipstick would be evidence of prior interference with the crankshaft and is cause for further investigation of the engine.
- 18 **OIL FILLER CAP**
Whenever oil is checked or added, check that filler cap is tight and oil filler door is secure.



FIRST 25 HOURS

- 15 **ENGINE OIL SYSTEM**
On O-320-H2AD engines, drain oil sump and clean pressure screen or replace oil filter, if installed. Refill with MIL-L-22851 Ashless Dispersant Oil. (See figure 2-4.) On O-320-D2J engines, drain oil sump, replace oil filter and refill with MIL-L-6082 Aviation Grade Mineral Oil.

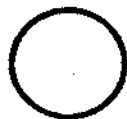


FIRST 50 HOURS

- 15 **ENGINE OIL SYSTEM**
On O-320-H2AD engines, drain oil sump and clean pressure screen or replace oil filter, if installed. Refill with MIL-L-22851 Ashless Dispersant Oil. (See figure 2-4.) On O-320-D2J Engines, drain oil sump, replace oil filter and service with MIL-L-22851 Ashless Dispersant Oil in accordance with oil chart in figure 2-4.

Figure 2-4. Servicing (Sheet 4 of 6)

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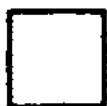


50 HOURS

- 15 ENGINE OIL SYSTEM (WHEN NOT EQUIPPED WITH EXTERNAL OIL FILTER)
Drain engine oil sump, clean oil pressure screen, and refill with ashless dispersant oil.

NOTE

Refer to 100 hour servicing interval when equipped with long external oil filter.



100 HOURS

- 12 NOSE GEAR SHIMMY DAMPER
Check fluid level and refill as required with hydraulic fluid. Refer to paragraph 2-27 for details.
- 11 NOSE GEAR SHOCK STRUT
Keep strut filled and inflate to correct pressure. Refer to paragraph 2-28 for details.
- 13 INDUCTION AIR FILTER
Clean filter per paragraph 2-22 (172 & F172 Series) and paragraph 2-22A (Model 172Q Only). Replace as required.
- 14 BATTERY
Check electrolyte level each 100 hours or each 90 days, which ever comes first.
- 7 TIRES
Maintain correct tire inflation as listed in figure 1-1. Also refer to paragraph 2-25 for details.
- 5 FUEL SELECTOR VALVE DRAIN
Drain off any water or sediment. Refer to paragraph 2-19.
- 10 FUEL STRAINER
Disassemble and clean strainer bowl and screen.
- 15 ENGINE OIL SYSTEM
On O-320-H2AD engines, drain oil sump and clean pressure screen or replace oil filter, if installed. Refill with MIL-L-22851 Ashless Dispersant Oil. (See figure 2-4.) On O-320-D2J and O-360-A4N engines, drain oil sump, replace oil filter, and service with MIL-L-22851 Ashless Dispersant oil in accordance with oil chart in figure 2-4.

NOTE

Refer to 50 hour servicing interval when not equipped with long external oil filter.

Change engine oil at least every 6 months, even though the recommended hours have not accumulated.

Figure 2-4. Servicing (Sheet 5 of 6)

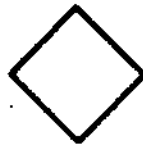
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- 1 **VACUUM RELIEF VALVE URETHANE FILTER**
Replace filter.
- 2 **VACUUM SYSTEM CENTRAL AIR FILTER**
Inspect for damage. See paragraph 2-23 for details.
- 9 **BRAKE MASTER CYLINDERS**
Check fluid level and refill as required with hydraulic fluid. Refer to paragraph 2-28 for details.



200 HOURS

- 8 **GROUND SERVICE RECEPTACLE**
Connect to 24-volt DC, negative-ground power unit. Refer to Section 11 for details.



500 HOURS

- 2 **VACUUM SYSTEM CENTRAL AIR FILTER**
Replace every 500 hours.

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FREQUENCY (HOURS)

50

100

500

1000

METHOD OF APPLICATION

HAND

GREASE
GUN

OIL
CAN

SYRINGE
(FOR POWDERED
GRAPHITE)

WHERE NO INTERVAL IS SPECIFIED,
LUBRICATE AS REQUIRED AND
WHEN ASSEMBLED OR INSTALLED.

NOTE

The military specifications listed are not mandatory, but are intended as guides in choosing satisfactory materials. Products of most reputable manufacturers meet or exceed these specifications.

LUBRICANTS

PG — SS-G-659	POWDERED GRAPHITE
GR — MIL-G-81322A	GENERAL PURPOSE GREASE
GM — MIL-G-23827A	AIRCRAFT AND INSTRUMENT GREASE
GL — MIL-G-21164C	MOLYBDENUM DISULFIDE GREASE
OG — MIL-L-7870A	GENERAL PURPOSE OIL
PL — VV-P-236	PETROLATUM
GP —	NO. 10-WEIGHT, NON-DETERGENT OIL
OL — VV-L-800A	LIGHT OIL

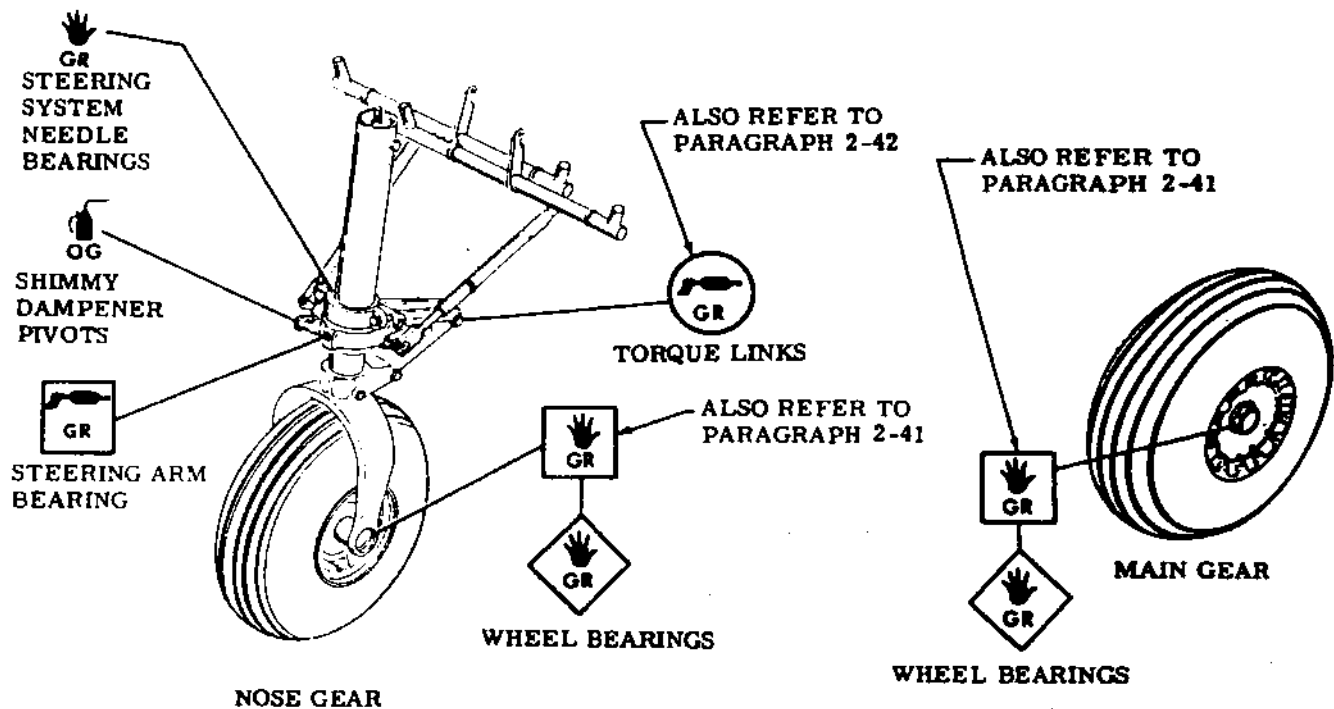


Figure 2-5. Lubrication (Sheet 1 of 3)

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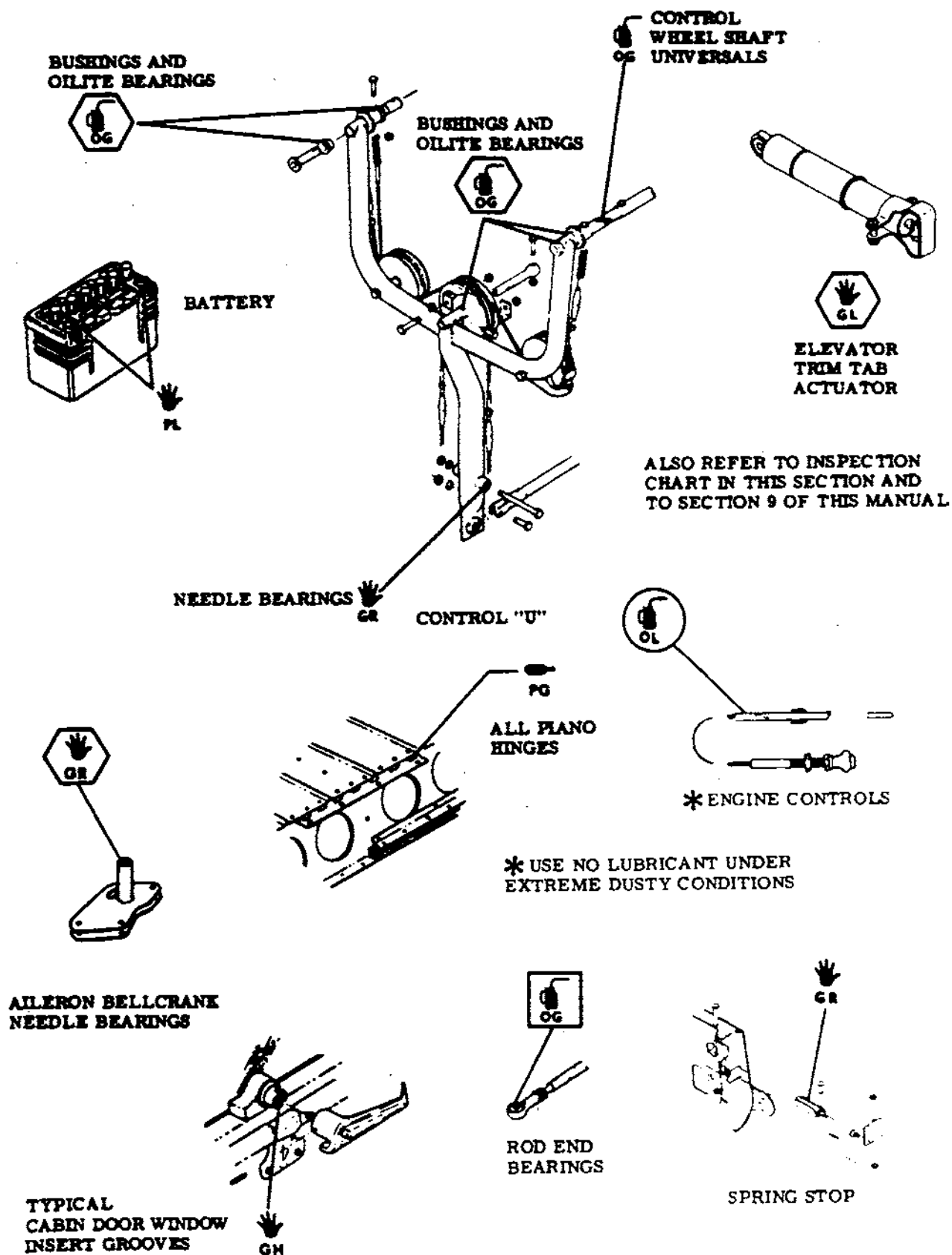
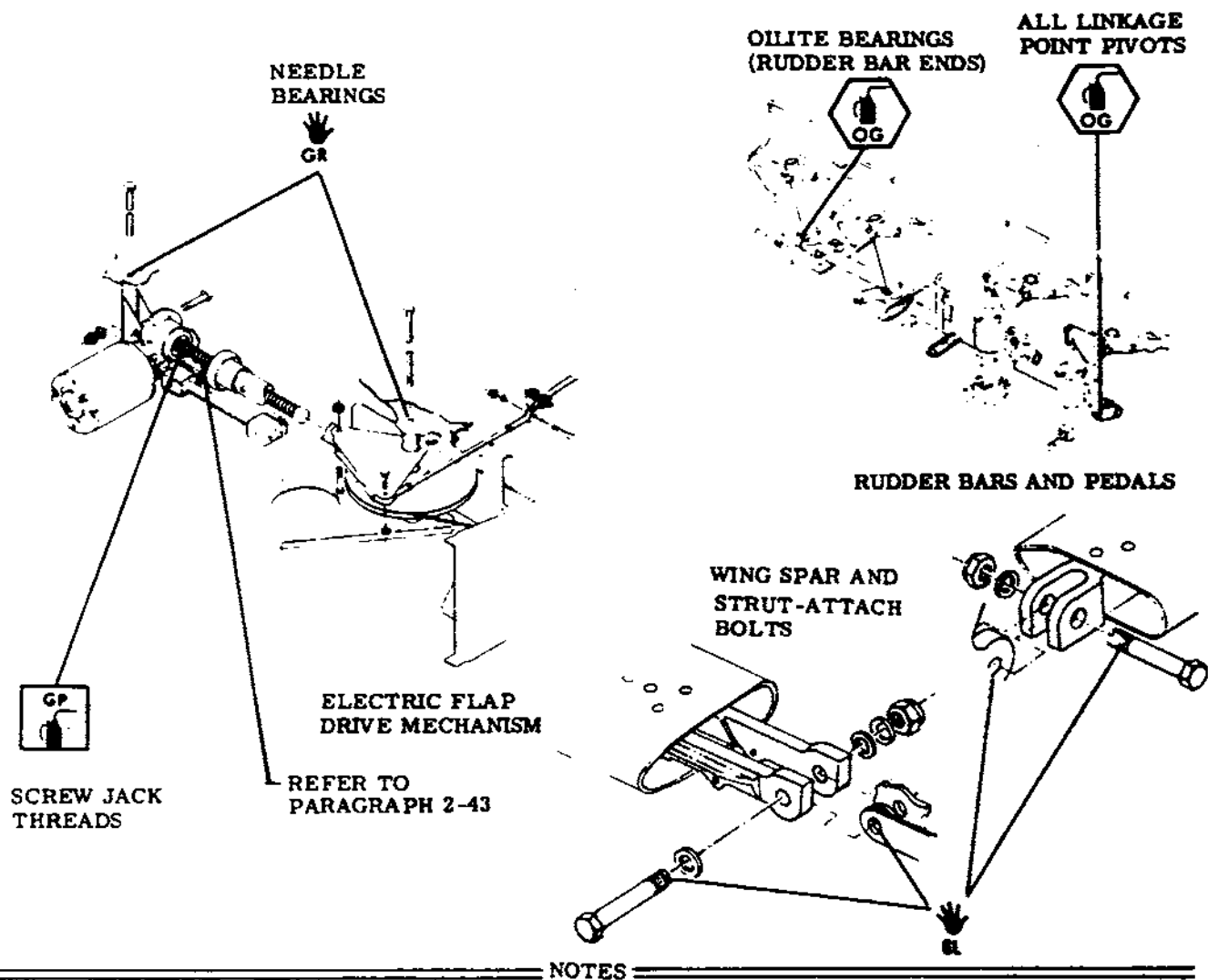


Figure 2-5. Lubrication. (Sheet 2 of 3)

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NOTES

Sealed bearings require no lubrication.

Do not lubricate roller chains or cables except under seacoast conditions. Wipe with a clean, dry cloth.

Lubricate unsealed pulley bearings, rod ends, Oilite bearings, pivot and hinge points, and any other friction point obviously needing lubrication, with general purpose oil every 1000 hours or oftener if required.

Paraffin wax rubbed on seat rails will ease sliding the seats fore and aft.

Lubricate door latching mechanism with MIL-G-81322A general purpose grease, applied sparingly to friction points, every 1000 hours or oftener, if binding occurs. No lubrication is recommended on the rotary clutch.

Figure 2-5. Lubrication (Sheet 3 of 3)

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2-46. GENERAL INSPECTION (MODEL 172 AIRPLANES).

NOTE

Cessna Aircraft Company recommends PROGRESSIVE CARE for airplanes flown 200 hours or more per year, and 100-HOUR INSPECTION for airplanes flown less than 200 hours per year.

A. Inspection Requirements.

(1) Two basic types of inspections are available as defined below:

- (a) As required by Federal Aviation Regulation Part 91.409(a), all civil airplanes of U.S. registry must undergo an annual inspection each 12 calendar months. In addition airplanes operated commercially (for hire) must also have an annual 100 hour inspection each 100 hours of operation as required by Federal Aviation Regulation Part 91.409(b).
- (b) In lieu of the above requirements, an airplane may be inspected in accordance with a progressive inspection program in accordance with Federal Aviation Regulation Part 91.409(d), which allows the work load to be divided into smaller operations that can be accomplished in a shorter time period. The CESSNA PROGRESSIVE CARE PROGRAM has been developed to satisfy the requirements of Part 91.409 (d).

B. Inspection Program Selection.

(1) As a guide for selecting the inspection program that best suits the operation of the airplane, the following is provided:

- (a) If the airplane is flown less than 200 hours annually, the following conditions apply:
 1. If flown for hire.
 - a. An airplane operating in this category must be inspected each 100 hours of operation (100-HOUR) and each 12 calendar months of operation (ANNUAL).
 2. If not flown for hire.
 - a. An airplane operating in this category must be inspected each 12 calendar months of operation (ANNUAL). It is recommended that between annual inspections, all items be inspected at the intervals specified in the Inspection Time Limits Charts and Component Time Limits Charts.
- (b) If the airplane is flown more than 200 hours annually, the following condition applies:
 1. Whether flown for hire or not, it is recommended that airplanes operating in this category be placed on the CESSNA PROGRESSIVE CARE PROGRAM. However, if not placed on the CESSNA PROGRESSIVE CARE PROGRAM, the inspection requirements for airplanes in this category are the same as those defined under Paragraph B. (1)(a)1.a. or 2.a. CESSNA PROGRESSIVE CARE PROGRAM may be utilized as a total concept program which ensures that the inspection intervals in the inspection charts are not exceeded. Manuals and forms which are required for conducting the CESSNA PROGRESSIVE CARE PROGRAM inspections are available from the Cessna Supply Division.

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C. Inspection Charts.

NOTE

Cessna has prepared these Inspection Charts to assist the owner or operator in meeting the foregoing responsibilities and to meet the intent of Federal Aviation Regulation Part 91.409(d). The Inspection Charts are not intended to be all-inclusive, for no such charts can replace the good judgment of a certified airframe and powerplant mechanic in performance of his duties. As the one primarily responsible for this airworthiness of the airplane, the owner or operator should select only qualified personnel to maintain the airplane.

- (1) The following Inspection Charts (Inspection Time Limits, Component Time Limits, Progressive Care Inspection, and Expanded Inspection) show the recommended intervals at which items are to be inspected based on normal usage under average environmental conditions. Airplanes operated in extremely humid tropics, or in exceptionally cold, damp climates, etc., may need more frequent inspections for wear, corrosion, and lubrication. Under these adverse conditions, perform periodic inspections in compliance with this chart at more frequent intervals until the operator can set his own inspection periods based on field experience. The operator's inspection intervals shall not deviate from the inspection time limits shown in this manual except as provided below:
 - (a) Each inspection interval can be exceeded by 10 hours or can be performed early at any time prior to the regular interval as provided below:
 1. In the event of late compliance of any operation scheduled, the next operation in sequence retains a due point from the time the late operation was originally scheduled.
 2. In the event of early compliance of any operation scheduled, that occurs 10 hours or less ahead of schedule, the next phase due point may remain where originally set.
 3. In the event of early compliance of any operation scheduled, that occurs more than 10 hours ahead of schedule, the next phase due point must be rescheduled to establish a new due point from the time of early accomplishment.
- (2) As shown in the charts, there are items to be checked at 50 hours, 100 hours, 200 hours, or at Special or Yearly inspection. Special or Yearly inspection items require servicing or inspection at intervals other than 50, 100, or 200 hours. If two inspection time requirements are listed for one inspection item, one hourly and the yearly, both apply and whichever requirement occurs first determines the time limit.
 - (a) When conducting a 50-hour inspection, check all items listed under EACH 50 HOURS. A 100-hour inspection includes all items listed under EACH 50 HOURS and EACH 100 HOURS. The 200-hour inspection includes all items listed under EACH 50 HOURS, EACH 100 HOURS, and EACH 200 HOURS. All of the items listed would be inspected, serviced, or otherwise performed as necessary to ensure compliance with the inspection requirements.
 - (b) A COMPLETE AIRPLANE INSPECTION includes all 50-, 100-, and 200-hour items plus those Special and Yearly Inspection Items which are due at the specified time.
 - (c) Component Time Limits Charts should be checked at each inspection interval to ensure proper overhaul and replacement requirements are accomplished at the specified times.

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D. Inspection Guidelines.

- (1) The Inspection Charts are to be used as a recommended inspection outline. Detailed information of systems and components in the airplane will be found in various chapters of this Maintenance Manual and the pertinent vendor publications. It is recommended that reference be made to the applicable portion of this manual for service instructions, installation instructions, and to the vendor's data or publications specifications for torque values, clearances, settings, tolerances, and other requirements.
- (2) For the purpose of this inspection, the term on condition is defined as follows: The necessary inspections and/or checks to determine that a malfunction or failure will not occur prior to the next scheduled inspection.
- (3) **MOVABLE PARTS:** Inspect for lubrication, servicing, security of attachment, binding, excessive wear, safetying, proper operation, proper adjustment, correct travel, cracked fittings, security of hinges, defective bearings, cleanliness, corrosion, deformation, sealing, and tension.
- (4) **FLUID LINES AND HOSES:** Inspect for leaks, cracks, bulging, collapsed, twisted, dents, kinks, chafing, proper radius, security, discoloration, bleaching, deterioration, and proper routing; rubber hoses for stiffness and metal lines for corrosion.
- (5) **METAL PARTS:** Inspect for security of attachment, cracks, metal distortion, broken spotwelds, condition of paint (especially chips at seams and around fasteners for onset of corrosion) and any other apparent damage.
- (6) **WIRING:** Inspect for security, chafing, burning, arcing, defective insulation, loose or broken terminals, heat deterioration, and corroded terminals.
- (7) **STRUCTURAL FASTENERS:** Inspect for correct torque in accordance with applicable torque values. Refer to Bolt Torque Data during installation or when visual inspection indicates the need for a torque check.

NOTE

Torque values listed are not to be used for checking tightness of installed parts during service.

- (8) **FILTERS, SCREENS, AND FLUIDS:** Inspect for cleanliness and the need for replacement at specified intervals.
- (9) **System check** (operation or function) requiring electrical power must be performed using 28.5 $\pm$ 0.25 volts bus voltage. This will ensure all components are operating at their designed requirements.
 - (a) **Airplane file.**
 1. Miscellaneous data, information, and licenses are a part of the airplane file. Check that the following documents are up-to-date and in accordance with current Federal Aviation Regulations. Most of the items listed are required by the Federal Aviation Regulations. Since the regulations of other nations may require other documents and data, owners of exported airplanes should check with their own aviation officials to determine their individual requirements.
 - a. To be displayed in the airplane at all times:
 - 1) Standard Airworthiness Certificate (FAA Form 8100-2).
 - 2) Aircraft Registration Certificate (FAA Form 8050-3).
 - 3) Aircraft Radio Station License (Federal Communication Commission Form 556 if transmitter is installed).
 - 4) Radio Telephone Station License (Federal Communication Commission Form 409 if Flitephone Radio Telephone is installed).
 - b. To be carried in the airplane at all times:
 - 1) Weight and Balance Data Sheets and associated papers (all copies of the Repair and Alteration Form, FAA Form 337, are applicable).
 - 2) Equipment List.
 - 3) Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual.
 - c. To be made available upon request:
 - 1) Airframe, Engine, Propeller, and Avionics Maintenance Records.

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2-47. PRE-INSPECTION CHECKS. (MODEL 172 AIRPLANES.)

A. Pre-Inspection Operational Checks.

- (1) Before beginning the step-by-step inspection, start and run up the engine and upon completion, shut down the engine in accordance with instructions in the Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual. During the run-up, observe the following, making note of any discrepancies or abnormalities:
 - (a) Engine temperatures and pressures.
 - (b) Static RPM. (Also refer to Section 11 and 11A of this manual.)
 - (c) Magneto drop. (Also refer to Section 11 and 11A of this manual.)
 - (d) Engine response to changes in power.
 - (e) Any unusual engine noises.
 - (f) Fuel selector and/or shutoff valve; operate engine on each tank (or cell) position and OFF position long enough to ensure shutoff and/or selector valve functions properly.
 - (g) Idling speed and mixture; proper idle cut-off.
 - (h) Alternator and ammeter.
 - (i) Suction gage.
 - (j) Fuel flow indicator.
- (2) After the inspection has been completed, an engine run-up should again be performed to determine that any discrepancies or abnormalities have been corrected.
- (3) Some of the items in the Inspection Time Limits paragraph are optional, therefore not applicable to all airplanes.

Mechanic's Pre-Inspection Discrepancies or Abnormalities to be Checked:

Mechanic's Post-Inspection Corrective Action Taken:

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2-48 INSPECTION TIME LIMITS. (MODEL 172 AIRPLANES.)

EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTIONS HOURS	YEARS

A	Placards (Refer to Pilot's Operating Handbook).									
A	1 Placards and Decals - Inspect presence, legibility, and security. Consult Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual for required placards.			•						
B	Fuselage (Section 3).									
B	1 Fuselage Surface - Inspect for skin damage, loose rivets, condition of paint, and check pitot-static ports and drain holes for obstruction. Inspect covers and fairings for security.		•							
B	2 Internal Fuselage Structure - Inspect bulkheads, doorposts, stringers, doublers, and skins for corrosion, cracks, buckles, and loose rivets, bolts and nuts.			•						
B	3 Control Wheel Lock - Check general condition and operation.			•						
B	4 Fuselage Mounted Equipment - Check for general condition and security of attachment.			•						
B	5 Antennas and Cables - Inspect for security of attachment, connection, and condition.			•						
B	6 Emergency Locator Transmitter - Inspect for security of attachment and check operation by verifying transmitter output. Check cumulative time and useful life of batteries in accordance with FAR Part 91.207. Refer to Section 16 - Emergency Locator Transmitter - Checkout Interval.		•							
B	7 Instrument Panel Shock Mounts, Ground Straps, and Covers - Inspect for deterioration, cracks, and security of attachment.			•						
B	8 Pilot's and Copilot's Inertia Reels - Inspect for security of installation, proper operation, and evidence of damage.		•							
B	9 Seats, Seat Belts, and Shoulder Harnesses - Check general condition and security. Check operation of seat stops and adjustment mechanism. Inspect belts for condition and security of fasteners.		•							
B	10 Windows, Windshield, Doors, and Seals - Inspect general condition. Check latches, hinges, and seals for condition, operation, and security of attachment.		•							
B	11 Upholstery, Headliner, Trim, and Carpeting - Check condition and clean as required.							EACH 400	EACH 1	
B	12 Flight Controls - Check freedom of movement and proper operation through full travel with and without flaps extended. Check electric trim controls for operation (as applicable).		•							
B	13 Aileron, Elevator, and Rudder Stops - Check for damage and security.		•							
B	14 Portable Hand Fire Extinguisher - Inspect for proper operating pressure, condition, security of installation, and servicing date.		•							
B	15 Seat Tracks and Stops - Inspect seat tracks for condition and security of installation. Check seat track stops for damage and correct location. Ensure inspection of seat rails for cracks EACH 50 HOURS. Refer to Section 3.	•								

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		EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTIONS	
2-48	INSPECTION TIME LIMITS. (MODEL 172 AIRPLANES.)				HOURS	YEARS
B	16 Control Column - Inspect pulleys, cables, sprockets, bearings, chains, bungees, and turnbuckles for condition and security.			•		
B	17 Fuel Line and Selector Valve Drain(s) - Remove plug and drain.		•			
C	Wings and Empennage (Section 4).					
C	1 Wing Surfaces and Tips - Inspect for skin damage, loose rivets, and condition of paint.		•			
C	2 Wing Struts and Strut Fairings - Check for dents, cracks, loose screws and rivets, and condition of paint.		•			
C	3 Wing Spar and Wing Strut Fittings - Check for evidence of wear. Check attach bolts for indications of looseness and retorque as required.			•		
C	4 Wing Structure - Inspect spars, ribs, skins, and stringers for cracks, wrinkles, loose rivets, corrosion, or other damage.			•		
C	5 Metal Lines, Hoses, Clamps, and Fittings - Check for leaks, condition, and security. Check for proper routing and support.			•		
C	6 Wing Access Plates - Check for damage and security of installation.			•		
C	7 Vertical and Horizontal Stabilizers, Tips and Tailcone - Inspect externally for skin damage and condition of paint.		•			
C	8 Vertical and Horizontal Stabilizers and Tailcone Structure - Inspect bulkheads, spars, ribs, and skins for cracks, wrinkles, loose rivets, corrosion, or other damage. Inspect vertical and horizontal stabilizer attach bolts for looseness. Retorque as necessary. Check security of inspection covers, fairings, and tips.		•			
D	Landing Gear and Brakes (Section 5).					
D	1 Brakes, Master Cylinders, and Parking Brake - Check master cylinders and parking brake mechanism for condition and security. Check fluid level and test operation of toe and parking brake.		•			
D	2 Main Gear Tubular Struts - Inspect for cracks, dents, corrosion, condition of paint or other damage. Check axles for condition and security.		•			
D	3 Brake Lines, Wheel Cylinders, Hoses, Clamps, and Fittings - Check for leaks, condition, and security and hoses for bulges and deterioration. Check brake lines and hoses for proper routing and support.				EACH 400	EACH 1
D	4 Wheels, Brake Discs, and Linings - Inspect for wear, cracks, warps, dents, or other damage. Check wheel through-bolts and nuts for looseness.		•			
D	5 Tires - Check tread wear and general condition. Check for proper inflation.		•			
D	6 Wheel Fairings, Strut Fairings, and Cuffs - Check for cracks, dents, and condition of paint.		•		A	
D	7 Main Landing Gear Attachment Structure - Check for damage, cracks, loose rivets, bolts and nuts and security of attachment.		•			

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2-48 INSPECTION TIME LIMITS. (MODEL 172 AIRPLANES.)		EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTIONS HOURS YEARS	
D	8 Nose Gear Steering Mechanism - Check for wear, security, and proper rigging.			•		
D	9 Nose Gear - Inspect torque links, steering rods, and boots for condition and security of attachment. Check strut for evidence of leakage and proper extension. Check strut barrel for corrosion, pitting, and cleanliness. Check shimmy damper and/or bungees for operation, leakage, and attach points for wear and security.		•			
D	10 Nose Gear Fork - Inspect for cracks, general condition, and security of attachment.			•		
D	11 Wheel Bearings - Clean, inspect and lube.				B	
D	12 Nose Gear Attachment Structure - Inspect for cracks, corrosion, or other damage and security of attachment.		•			
E	Alleron Control System (Section 6).					
E	1 Ailerons and Hinges - Check condition, security and operation.		•			
E	2 Aileron Structure, Control Rods, Hinges, Balance Weights, Bellcranks, Linkage, Bolts, Pulleys, and Pulley Brackets - Check condition, operation, and security of attachment.		•			
E	3 Ailerons and Cables - Check operation and security of stops. Check cables for tension, routing, fraying, corrosion, and turnbuckle safety. Check travel if cable tension requires adjustment or if stops are damaged. Check fairleads and rub strips for condition.			•		
E	4 Autopilot Rigging - Check per Avionics Installation Manual.				C	
E	5 Aileron Controls - Check freedom of movement and proper operation through full travel with and without flaps extended.		•			
F	Wing Flap Control System (Section 7).					
F	1 Flaps - Check tracks, rollers, and control rods for security of attachment. Check operation.		•			
F	2 Flap Actuator Threads - Clean and lubricate. Refer to paragraph 2-43 for detailed instructions.		•			
F	3 Flap Structure, Linkage, Bellcranks, Pulleys, and Pulley Brackets - Check for condition, operation and security.			•		
F	4 Wing Flap Control - Check operation through full travel and observe Flap Position indicator for proper indication.			•		
F	5 Flaps and Cables - Check cables for proper tension, routing, fraying, corrosion, and turnbuckle safety. Check travel if cable tension requires adjustment.			•		
F	6 Flap Motor, Actuator, and Limit Switches (electric flaps) - Check wiring and terminals for condition and security. Check actuator for condition and security.			•		
G	Elevator Control System (Section 8).					
G	1 Elevator Control - Check freedom of movement and proper operation through full travel with and without flaps extended.		•			
G	2 Elevator, Hinges, and Cable Attachment - Check condition, security, and operation.		•			

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2-48 INSPECTION TIME LIMITS. (MODEL 172 AIRPLANES.)		EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTIONS HOURS YEARS	
G	3 Elevator Control System - Inspect pulleys, cables, sprockets, bearings, chains, and turnbuckles for condition, security, and operation.			•		
H	Elevator Trim Tab Control System (Section 9).					
H	1 Elevator Trim Tab and Hinges - Check condition, security, and operation.		•			
H	2 Elevator Trim System - Check cables, push-pull rods, bellcranks, pulleys, turnbuckles, fairleads, rub strips, etc. for proper routing, condition, and security.		•			
H	3 Trim Controls and Indicators - Check freedom of movement and proper operation through full travel. Check pulleys, cables, sprockets, bearings, chains, bungees, and turnbuckles for condition and security. Check electric trim controls for operation as applicable.			•		
H	4 Elevator Trim Tab Stop Blocks - Inspect for damage and security.			•		
H	5 Elevator Trim Tab Actuator - Clean, lubricate, and check free-play.				D	
H	6 Elevator Trim Tab Actuator - Free-Play limits inspection. Refer to Section 9 for cleaning, inspection, and repair procedures.			•		
I	Rudder Control System (Section 10).					
I	1 Rudder - Inspect the rudder skins for cracks and loose rivets, rudder hinges for condition, cracks and security; hinge bolts, hinge bearings, hinge attach fittings, and bonding jumper for evidence of damage and wear, failed fasteners, and security. Inspect the rudder hinge bolts for proper safetying of nuts with cotter pins. Inspect balance weight for looseness and the supporting structure for damage.		•			
I	2 Rudder Pedals and Linkage - Check for general condition, proper rigging, and operation. Check for security of attachment.			•		
I	3 Rudder, Tips, Hinges, and Cable Attachment - Check condition, security, and operation.		•			
I	4 Rudder - Check internal surfaces for corrosion, condition of fasteners, and balance weight attachment.			•		
J	Engines (Sections 11 and 11A).					
J	1 Cowling - Inspect for cracks, dents, and other damage, security of cowl fasteners, and cowl mounted landing lights for attachment.	•				
J	2 Engine - Inspect for evidence of oil and fuel leaks. Wash engine and check for security of accessories.	•				
J	3 Engine Controls and Linkage - Check general condition, freedom of movement through full range. Check for proper travel, security of attachment, and for evidence of wear. Check friction locks for proper operation.	•				E
J	4 Ignition Switch and Electrical Harness - Inspect for damage, condition, and security.		•			

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2-48 INSPECTION TIME LIMITS. (MODEL 172 AIRPLANES.)

		EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTIONS HOURS	YEARS
J	5 Firewall Structure - Inspect for wrinkles, damage, cracks, sheared rivets, etc. Check cowl shock mounts for condition and security.			•		
J	6 Engine Shock Mounts, Engine Mount Structure, and Ground Straps - Check condition, security, and alignment.			•		
J	7 Induction System - Check security of clamps, tubes, and ducting. Inspect for evidence of leakage.	•				
J	8 Induction Airbox, Valves, Doors, and Controls - Remove air filter and inspect hinges, doors, seals, and attaching parts for wear and security. Check operation. Clean and inspect.		•			
J	9 Induction Air Filter - Remove and clean. Inspect for damage, and service per Paragraph 2-22 and 2-22A.		•		F	
J	10 Alternate Induction Air System - Check for obstructions, operation, and security.	•				
J	11 Alternator, Mounting Bracket and Electrical Connections - Check condition and security. Check alternator belts for condition and proper adjustment. Check belt tension per Section 16, Paragraph 16-38.	•				
J	12 Alternator - Check brushes, leads, commutator or slip ring for wear.					G
J	13 Starter, Starter Solenoid, and Electrical Connections - Check for condition of starter brushes, brush leads, and commutator.		•			H
J	14 Oil Cooler - Check for obstructions, leaks, and security of attachment.	•				
J	15 Exhaust System - Inspect for cracks and security. Special check in area of heat exchanger. Refer to Section 11, Paragraph 11-73 for inspection procedures.	•				
J	16 Auxiliary (Electric) Fuel Pump (172Q) - Check pump and fittings for condition, operation, security. Remove and clean filter (as applicable).		•			
J	17 Engine-Driven Fuel Pump - Check for evidence of leakage, security of attachment, and general condition.		•			
J	18 Magnetos - Check external condition, security, and electrical leads for condition. Check timing to engine and internal timing if engine timing requires adjustment.		•		I	
J	19 Magnetos - Check impulse coupling and stop pins for condition, replace as required.				J	
J	20 Magnetos - Inspection, lubrication, and overhaul procedures.				K	
J	21 Ignition Harness and Insulators - Check for proper routing, deterioration, and condition of terminals.		•			
J	22 Spark Plugs - Remove, clean, analyze, test, gap, and rotate top plugs-to-bottom and bottom plugs-to-top.		•			
J	23 Cylinder Compression - Perform differential compression test.			•		
J	24 Carburetor - Drain and flush carburetor bowl, clean inlet strainer, and drain plug. Check general condition and security.		•			
J	25 Engine Primer - Check for leakage, operation, and security.		•			

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2-48 INSPECTION TIME LIMITS. (MODEL 172 AIRPLANES.)		EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTIONS HOURS YEARS	
J	26 Hoses, Metal Lines, and Fittings - Inspect for signs of oil and fuel leaks. Check for abrasions, chafing, security, proper routing and support and for evidence of deterioration.	•				
J	27 Cold and Hot Air Hoses - Check condition, routing, and security.		•			
J	28 Engine Cylinders, Rocker Box Covers, and Pushrod Housings - Check for fin damage, cracks, oil leakage, security of attachment, and general condition.		•			
J	29 Engine Baffles and Seals - Check condition and security of attachment.	•				
J	30 Crankcase, Oil Sump, and Accessory Section - Inspect for cracks and evidence of oil leakage. Check bolts and nuts for looseness and retorque as necessary. Check crankcase breather lines for obstructions, security, and general condition.		•			
J	31 Engine Oil With Oil Filter - Drain oil sump and oil cooler, replace filter and refill with recommended grade aviation oil.		•		L	
J	32 Engine Oil Without Oil Filter - Drain oil sump and oil cooler, clean and inspect screens, and refill with recommended grade aviation oil.	•			L	
K	Fuel System (Section 12).					
K	1 Fuel Tanks or Integral Fuel Bays - Check for evidence of leakage and condition of fuel caps, adapters, and placards.		•			
K	2 Fuel Tanks or Integral Fuel Bays - Drain fuel and check tank interior and outlet screens.				M	
K	3 Fuel System - Inspect plumbing and components for mounting and security.		•			
K	4 Fuel Tank or Bay Drains - Drain water and sediment.	•				
K	5 Fuel Tank Vent Lines and Vent Valves - Check vents for obstruction and proper positioning.		•			
K	6 Fuel Selector Valve - Check controls for detent in each position, security of attachment, and for proper placarding.		•			
K	7 Fuel Strainer, Drain Valve, and Controls - Check freedom of movement, security, and proper operation. Disassemble, flush, and clean screen and bowl.		•			
K	8 Fuel Quantity Indicators - Check for damage, security of installation, and perform accuracy test.					EACH 1
L	Propeller and Propeller Governor (Section 13).					
L	1 Propeller Mounting - Check for security of installation.	•				
L	2 Propeller Blades - Inspect for cracks, dents, nicks, scratches, erosion, corrosion, or other damage.	•				
L	3 Spinner - Check general condition and attachment.	•				
L	4 Spinner and Spinner Bulkhead - Remove spinner, wash, and inspect for cracks and fractures.		•			
L	5 Propeller Mounting Bolts - Inspect mounting bolts and safety-wire for signs of looseness. Retorque mounting bolts as required.			•		
L	6 Propeller Hub - Check general condition.			•		

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2-48 INSPECTION TIME LIMITS. (MODEL 172 AIRPLANES.)

		EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTIONS HOURS YEARS	
M	Utility Systems (Section 14).					
M	1 Ventilation System - Inspect clamps, hoses, and valves for condition and security.				400	EACH 1
M	2 Heater Components, Inlets, and Outlets - Inspect all lines, connections, ducts, clamps, seals, and gaskets for condition, restriction, and security.		•			
M	3 Cabin Heat and Ventilation Controls - Check freedom of movement through full travel. Check friction locks for proper operation.			•		
M	4 Pitot Tube and Stall Warning Vane - Check for condition and obstructions.	•				
N	Instruments and Instrument Systems (Section 15).					
N	1 Vacuum System - Inspect for condition and security.		•			
N	2 Vacuum System Hoses - Inspect for hardness, deterioration, looseness, or collapsed hoses.		•			
N	3 Vacuum Pump - Check for condition and security. Check vacuum system breather line for obstructions, condition, and security.		•			
N	4 Vacuum System Air Filter - Inspect for damage, deterioration and contamination. Clean or replace, if required. NOTE: Smoking will cause premature filter clogging.		•		N	
N	5 Vacuum System Relief Valve - Inspect for condition and security.		•		O	
N	6 Instruments - Check general condition and markings for legibility.		•			
N	7 Instrument Lines, Fittings, Ducting, and Instrument Panel Wiring - Check for proper routing, support, and security of attachment.			•		
N	8 Static System - Inspect for security of installation, cleanliness, and evidence of damage.			•		
N	9 Navigation Indicators, Controls, and Components - Inspect for condition and security.			•		
N	10 Airspeed Indicator, Vertical Speed Indicator, and Magnetic Compass - Calibrate.					EACH 2
N	11 Altimeter and Static System - Inspect in accordance with FAR Part 91.411.					EACH 2
N	12 Instrument Panel Mounted Avionics Units (Including Audio Panel, VHF Nav.Com(s), ADF, Transponder, DME, and Compass System) - Inspect for deterioration, cracks, and security of instrument panel mounts. Inspect for security of electrical connections, condition, and security of wire routing.			•		
N	13 Avionics Operating Controls - Inspect for security and proper operation of controls and switches and ensure that all digital segments will illuminate properly.			•		
N	14 Remote Mounted Avionics - Inspect for security of units and electrical connectors, condition and security of wire routing. Also, check for evidence of damage and cleanliness.			•		

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2-48 INSPECTION TIME LIMITS. (MODEL 172 AIRPLANES.)		EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTIONS HOURS YEARS	
N	15 Microphones, Headsets, and Jacks - Inspect for cleanliness, security, and evidence of damage.			•		
N	16 Magnetic Compass - Inspect for security of installation, cleanliness, and evidence of damage.			•		
O	Electrical Systems (Section 16).					
O	1 General Airplane and System Wiring - Inspect for proper routing, chafing, broken or loose terminals, general condition, broken or inadequate clamps, and sharp bends in wiring.			•		
O	2 Instrument, Cabin, Navigation, Beacon, Strobe, and Landing Lights - Check operation, condition of lens, and security of attachment.		•			
O	3 Circuit Breakers and Fuses - Check operation and condition. Check for required number of spare fuses.		•			
O	4 Battery - Check general condition and security. Check level of electrolyte.		•		P	
O	5 Battery Box and Cables - Clean and remove any corrosion. Check cables for routing, support, and security of connections.		•			
O	6 Switch and Circuit Breaker Panel, Terminal Blocks, and Junction Boxes - Inspect wiring and terminals for condition and security.			•		
O	7 Alternator Control Unit - Inspect wiring, mounting, condition, and wire routing.			•		
O	8 Switches - Check operation, terminals, wiring, and mounting for conditions, security, and interference.			•		
O	9 Instrument Panel and Control Pedestal - Inspect wiring, mounting, and terminals for condition and security. Check resistance between stationary panel and instrument panel for proper ground.			•		
O	10 External Power Receptacle and Power Cables - Inspect for condition and security.			•		
P	Post Inspection.					
P	1 Replace all fairings, doors, and access hole covers. Ground check engine, alternator charging rate, oil pressure, tachometer, oil temperature and pressure gages, and general operation of components.					
Q	Perform the Following Operational Checks:					
Q	1 Brakes - Test toe brakes and parking brake for proper operation.		•			
R	Service Bulletins/Airworthiness Directives.					
R	1 Check that all applicable Cessna Service Bulletins and Supplier Service Bulletins are complied with.	•	•	•		
R	2 Check that all applicable Airworthiness Directives and Federal Aviation Regulations are complied with.	•	•	•		

MODEL 172 SERIES SERVICE MANUAL

2-48 INSPECTION TIME LIMITS. (MODEL 172 AIRPLANES.)

R 3 Ensure all Maintenance Record Entries required by Federal Aviation Regulations are completed before returning the airplane to service.

EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTIONS	
			HOURS	YEARS
•	•	•		

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Special Inspections Legends:

- A. If the airplane is flown from surfaces with mud, snow, or ice, the main gear speed fairings should be checked that there is no accumulation which could prevent normal wheel rotation.
- B. First 100 hours and each 500 hours thereafter. More often if operated under prevailing wet or dusty conditions.
- C. Each 600 hours or 1 year, whichever comes first.
- D. Lubrication of the actuator is required each 1000 hours or 3 years, whichever comes first. See figure 2-5 for grease specification.
- E. Lubricate each 50 hours (except in extreme dusty conditions). These controls are not repairable and should be replaced every 1500 hours or whenever maximum linear movement exceeds .050 inch.
- F. Model 172Q: Replace polyurethane foam filter every 200 hours or on condition. Model 172 Series: Filter may be washed 20 times maximum, cleaned by compressed air 30 times maximum. Replace filter each 500 hours or 1 year, whichever comes first.
- G. Inspect each 500 hours.
- H. Check solenoid and electrical connections each 100 hours, inspect the commutator and brushes each 500 hours.
- I. If timing to engine is within tolerance - plus zero degrees, minus two degrees, internal timing will not require checking. Model 172 with O-320-H2AD engine (1977 thru 1980): Check magnetos at first 25 hours, first 50 hours, first 100 hours, and each 100 hours thereafter. Model 172 with O-320-D2J engine (1981 and ON), Model 172Q with O-360-A4N engine (1983 and ON): Check magnetos at first 100 hours, and every 100 hours thereafter or each one year, whichever occurs first.
- J. Compliance with Lycoming Service Bulletin 425B or latest revision is required. Model 172 with O-320-H2AD engine (1977 thru 1980): Each 500 hours.
- K.
 - 1. Inspect contact points for condition and adjust or replace as required.
 - 2. Inspect carbon brush, high-tension lead, and distributor block for condition and clean or replace as required.
 - 3. Inspect impulse coupling and pawls for condition and replace as required. Use light pressure only, do not force pin (or drill bit) when checking pawls.
 - 4. Inspect bearings and lubricate, replace bearings, if required.
 - 5. Lubricate contact point cam.
 - 6. Completely overhaul, or replace existing magneto with a new or rebuilt exchange magneto, at every engine overhaul. Refer to Overhaul and Maintenance Manual, Publication No. 1037C1-13, covering Model 4200/6200 series magnetos. Manual No. 1037C1-13 is available from Cessna Supply Division. Effectivity, Model 172 with O-320-O-2J engine (1981 and ON) and Model 172Q with O-360-A4N engine (1983 and ON); Each 500 hours and every engine overhaul.
- L. Model 172 with O-320-H2AD engine (1977 thru 1980): First 25 hours. Drain oil sump, clean pressure screen or replace oil filter, and refill with MIL-L-22851 ashless dispersant oil. If oil must be added during first 25 hours, use MIL-L-6082 aviation grade straight mineral oil. If engine is not equipped with an oil filter, change oil and clean pressure screen at 50 hours, and each 50 hours thereafter. If engine is equipped with an oil filter, change oil and filter at 50 hours, and each 100 hours thereafter. Model 172 with O-320-D2J engine (1981 and ON) and Model 172Q with O-360-A4N engine (1983 and ON): First 25 hours. Drain oil sump, clean pressure screen or replace oil filter, and refill with MIL-L-6080 aviation grade straight mineral oil. If engine is not equipped with an oil filter, change oil and clean pressure screen at 50 hours and each 50 hours thereafter. If engine is equipped with an oil filter, change oil and filter at 50 hours and each 100 hours thereafter. Beginning with the 50-hour oil change and thereafter, refill oil sump with MIL-L-22851 ashless dispersant oil.
- M. Each 1000 hours.
- N. Replace every 500 hours.
- O. Replace filter each 100 hours.
- P. Check electrolyte level and clean battery box each 100 hours or 90 days.

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2-49. COMPONENT TIME LIMITS. (MODEL 172 AIRPLANES.)

1. Component Time Limits.

- a. All components not listed herein should be inspected as detailed elsewhere in this chapter and repaired, overhauled or replaced as required. Items shown here should be overhauled or replaced during the regular maintenance periods.

2. Schedule.

a. POWERPLANTS (Sections 11 and 11A).

- (1) Engines (Avco Lycoming Engine Overhaul Manual) (See NOTE 2)
- (2) Magnetos (Sections 11 and 11A) (See NOTE 3)
- (3) Engine Compartment Flexible Fluid Carrying Rubber Hoses (Cessna Installed) Except Drain Hoses
- (4) Engine Compartment Drain Hoses
- (5) Engine Flexible Hoses (Avco Lycoming Installed) (See Lycoming Engine Maintenance Manual)

b. FUEL SYSTEM (Section 12).

- (1) Auxiliary Electric Fuel Pump (See NOTE 6)

c. PROPELLER (Section 13).

- (1) Propeller (See McCauley Maintenance and Overhaul Manual)
- (2) Governor (See Manufacturer's) (McCauley)

d. NAVIGATION (Section 15).

- (1) Locator Beacon Battery Pack

REPLACE *	OVERHAUL *
(NOTE 4)	REFER TO LATEST ISSUE OF MANUFACTURER'S MAINTENANCE MANUAL OR SERVICE BULLETIN
ON CONDITION (NOTE 5)	
(NOTE 1)	REFER TO LATEST ISSUE OF MANUFACTURER'S MAINTENANCE MANUAL OR SERVICE BULLETIN

* See Note 7.

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- NOTE 1: If battery has been in use for more than one collective hour and or at 50 percent of the useful life of the battery, date on the battery indicates 50 percent of the useful life.
- NOTE 2: It is recommended the items listed below be inspected at engine overhaul to establish condition for their replacement or overhaul. Although no overhaul or replacement interval has been established for these items, the inspection of these items at engine overhaul could eliminate overhaul or replacement of the items at a later time.
- Inspect hoses within the engine compartment in accordance with Engine Compartment Hoses (Refer to Inspection Time Limits). It is recommended the replacement interval not exceed engine overhaul interval.
 - Engine components, such as turbocharger, controller, manifold pressure relief valve and wastegate, magnetos, vacuum pumps, etc., should be inspected for condition, at the time of engine overhaul, as it may be cost effective to overhaul or replace marginal components at that time. A determination is to be made during engine overhaul such that if the components have less hours in service than the engine, or have not accumulated hours sufficiently close to the engine overhaul time to warrant overhaul as judged by inspection or the economic aspect, these components may not require overhaul or replacement concurrent with engine overhaul. It is recommended that the overhaul or replacement interval for these components not exceed the engine overhaul interval.
 - Inspect the engine compartment for structural damage when engine is removed for overhaul, and make the necessary repairs.
 - Inspect the engine exhaust as it may be cost effective to replace marginal components at engine overhaul.
 - Inspect electrical harnesses for damage which would be cost effective to replace at engine overhaul.
- NOTE 3: Overhaul Magneto(s) at engine overhaul or when engine is partially overhauled for severe environmental affects, engine overspeed, engine sudden stoppage or other unusual circumstances.
- NOTE 4: (This life limit is not intended to allow flexible fluid carrying rubber hoses in a deteriorated or damaged condition to remain in service.) Replace engine compartment flexible fluid carrying hoses (Cessna installed only) manufactured of rubber material every five years or at engine overhaul, whichever occurs first. This does not include drain hoses. Hoses which are beyond these limits and are in a serviceable condition, must be placed on order immediately and then be replaced within 120 days after receiving the new hose from Cessna.
- NOTE 5: Refer to latest Avco Lycoming Engine Service Bulletins.
- NOTE 6: Refer to latest Dukes Inc. Service Bulletins.
- NOTE 7: The terms overhaul and replacement as used within this section dictate action as defined below:
- Overhaul - Item may be overhauled as defined in Federal Aviation Regulation 43.2 or can be replaced as defined below:
 - Replacement - Item must be replaced with a new item or one that has been rebuilt as defined in Federal Aviation Regulation 43.2.

MODEL 172 SERIES SERVICE MANUAL

2-50. SCHEDULED MAINTENANCE CHECKS. (MODEL 172 AIRPLANES)

2-51. PROGRESSIVE CARE PROGRAM. (MODEL 172 AIRPLANES)

A. Progressive Inspection Program.

(1) Purpose and Use.

- (a) As detailed in Federal Aviation Regulation Part 91.409, paragraph (d), airplanes that desire to use a Progressive Inspection Program must be inspected in accordance with an authorized progressive inspection program. This chapter presents the current progressive inspection program for the Cessna Model 172, recommended by the Cessna Aircraft Company.

B. Introduction.

- (1) Following is the recommended Progressive Care Program for Model 172 airplanes.
- (2) This program is divided into four separate operations which are to be accomplished initially after 50 hours of operation and each 50 hours of operation thereafter. Additional special requirements indicated as Special Inspection, which are required at other intervals are specified separately.
- (3) Recommended progressive care inspection may be accomplished by one of the following.

NOTE

Some 100 HOUR items are covered in Operation 1 and 3, also some 200 HOUR items are covered in Operation 1, 2, 3 and 4. These items are placed here for convenience and expediency of the total inspection. After the first completion of all four Operations, these items will be at the proper intervals.

- (a) **NEW DELIVERED AIRCRAFT** - A new delivered aircraft must have less than 50 hours total time in service and enough calendar time remaining since the issuance date of the original Airworthiness Certificate to allow the owner/operator to complete a cycle of all four Operations before the first annual inspection becomes due. Operation 1 will be due at 50 hours time in service. Operation 2 will be due at 100 hours. Operation 3 will be due at 150 hours and Operation 4 will be due at 200 hours. There are additional inspection requirements for new aircraft at the FIRST 50 HOUR inspection point. In addition to performing Operation 1, the FIRST 50 HOUR ITEMS listed in the inspection Time Limits Charts in 2-59 must also be performed. After these FIRST 50 HOUR items have been accomplished, they have permanent inspection time limits which are covered in the Operations Schedules.
- (b) **ALL OTHER AIRCRAFT** - To qualify other aircraft which have more than 50 hours time in service for the Progressive Inspection Program, conduct a COMPLETE AIRPLANE INSPECTION. Operation 1 will become due 50 hours from the time the COMPLETE AIRPLANE INSPECTION was accomplished.
- (4) Performance of the inspections as listed herein at the specified points will assure compliance with the Inspection Time Limits detailed in 2-59. Special inspections shall be complied with at prescribed intervals and/or intervals coinciding with operations 1 through 4 as outlined in 2-62.
- (5) An operator may elect to perform the recommended inspections on a schedule other than that specified. Any inspection schedule requiring the various inspection items detailed in this chapter to be performed at a frequency equal to that specified herein or more frequently is acceptable. Any inspection item performed at a time period in excess of that specified herein must be approved by the appropriate regulating agency.
- (6) As defined in Federal Aviation Regulations Part 91.409(d) the frequency and detail of the Progressive Inspection Program shall provide for the complete inspection of the airplane within each 12-calendar months. If the airplane is approaching the end of a 12-calendar month period, but the complete cycle of 4 operations has not been accomplished, it will be necessary to complete the remaining operations, regardless of airplane hours before the end of the 12-calendar month period. If the Progressive Inspection Program is to be discontinued, an annual inspection becomes due at the time when any item reaches a maximum of 12 calendar months from the last time it was inspected under the Progressive Inspection Program. Refer to Federal Aviation Regulation Part 91.409(d) for detailed information.

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C. Inspection Time Limitations.

- (1) Each inspection interval may be exceeded by 10 hours or can be performed early at any time prior to the regular interval as provided below:
 - (a) In the event of late compliance of any operation scheduled, the next operation in sequence retains a due point from the time the late operation was originally scheduled.
 - (b) In the event of early compliance of any operation scheduled, that occurs 10 hours or less ahead of schedule, the next phase due point may remain where originally set.
 - (c) In the event of early compliance of any operation scheduled, that occurs more than 10 hours ahead of schedule, the next phase due point must be rescheduled to establish a new due point from the time of early accomplishment.

D. Procedures.

- (1) The following instructions are provided to aid in implementation of the Model 172 Series Progressive Care Program Schedule.
 - (a) Use the Progressive Care Program Inspection Chart, provided herein, for each airplane. The chart is to be placed in the airplane flight log book for use as a quick reference for pilots and maintenance personnel in determining when inspections are due and that they are performed within prescribed flight time intervals.
 - (b) Use the Progressive Care Program Component Overhaul and Replacement Log, provided herein, for each airplane. This log is to be kept with the airplane maintenance records and serves as a periodic reminder to maintenance personnel when various components are due for overhaul or replacement.
 - (c) To start the Progressive Care Program, begin conducting the inspections defined herein and refer to Federal Aviation Regulations Part 91.409(d) for procedures to notify the Federal Aviation Administration of the intent to begin a progressive inspection program.
 - (d) Accomplish each inspection and maintenance item per the checklists on the operation sheets of the Progressive Care and Maintenance Schedule. Spaces have been provided for the mechanic's and inspector's signatures as required, as well as any remarks. These are to become part of the maintenance records for each airplane. Each inspection is to be logged in the airplane and/or engine log books. Refer to Federal Aviation Regulation Part 43 for the recommended entry statement.

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PROGRESSIVE CARE PROGRAM (MODEL 172 AIRPLANES)

COMPONENT OVERHAUL AND REPLACEMENT RECORD

COMPONENT	DATE	REASON FOR REPLACEMENT	REPLACEMENT PART NUMBER SERIAL NUMBER	NEXT OVERHAUL AIRPLANE HOURS DATE
	X			
	X			
	X			
	X			
	X			
	X			
	X			
	X			
	X			
	X			

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PROGRESSIVE CARE PROGRAM INSPECTION CHART

AIRPLANE MODEL: 172

REGISTRATION NUMBER:

INSPECTION POINTS	TIME		TIME	
	INSPECTION DUE	INSPECTION ACCOMPLISHED	INSPECTION DUE	INSPECTION ACCOMPLISHED
OPERATION 1				
OPERATION 2				
OPERATION 3				
OPERATION 4				

EXAMPLE:

The airplane in this example was placed on the Progressive Care Program after flying a total of 110 hours. At that point, a complete initial inspection of the airplane was performed. The following steps indicate what will have taken place up through an hourmeter reading of 261 hours.

1. After the initial inspection at 110 hours, the first Inspection Due Column was filled out to show the total flying time at which each of the four (4) operation inspections would be due.
2. As each inspection was performed, the total flying time was recorded in the Inspection Accomplished column. The next Inspection Due space for that particular operation is also filled in at this time. These times will always be 200 hours from the last due point providing the operation was actually accomplished within the ten (10) hours limit.
3. The sample airplane now has a total flying time of 261 hours and the inspection chart shows that a Phase 4 will be due at 310 hours.

INSPECTION POINTS	TIME		TIME	
	INSPECTION DUE	INSPECTION ACCOMPLISHED	INSPECTION DUE	INSPECTION ACCOMPLISHED
OPERATION 1	160	162	360	
OPERATION 2	210	209	409	
OPERATION 3	260	261	460	
OPERATION 4	310			

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 1

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

- B 13 Aileron, Elevator, and Rudder Stops - Check for damage and security.
- B 15 Seat Tracks and Stops - Inspect seat tracks for condition and security of installation. Check seat track stops for damage and correct location. Ensure inspection of seat rails for cracks EACH 50 HOURS. Refer to Section 3.
- C 1 Wing Surfaces and Tips - Inspect for skin damage, loose rivets, and condition of paint.
- C 2 Wing Struts and Strut Fairings - Check for dents, cracks, loose screws and rivets, and condition of paint.
- C 7 Vertical and Horizontal Stabilizers, Tips and Tailcone - Inspect externally for skin damage and condition of paint.
- C 8 Vertical and Horizontal Stabilizers and Tailcone structure - Inspect bulkheads, spars, ribs, and skins for cracks, wrinkles, loose rivets, corrosion, or other damage. Inspect vertical and horizontal stabilizer attach bolts for looseness. Retorque as necessary. Check security of inspection covers, fairings, and tips.
- E 1 Ailerons and Hinges - Check condition, security and operation.
- E 2 Aileron Structure, Control Rods, Hinges, Balance Weights, Bellcranks, Linkage, Bolts, Pulleys, and Pulley Brackets - Check condition, operation, and security of attachment.
- E 5 Aileron Controls - Check freedom of movement and proper operation through full travel with and without flaps extended.
- F 1 Flaps - Check tracks, rollers, and control rods for security of attachment. Check operation.
- F 2 Flap Actuator Threads - Clean and lubricate. Refer to paragraph 2-43 for detailed instructions.
- G 1 Elevator Control - Check freedom of movement and proper operation through full travel with and without flaps extended.
- G 2 Elevator, Hinges, and Cable Attachment - Check condition, security, and operation.
- H 1 Elevator Trim Tab and Hinges - Check condition, security, and operation.
- I 1 Rudder - Inspect the rudder skins for cracks and loose rivets, rudder hinges for condition, cracks and security; hinge bolts, hinge bearings, hinge attach fittings, and bonding jumper for evidence of damage and wear, failed fasteners, and security. Inspect the rudder hinge bolts for proper safetying of nuts with cotter pins. Inspect balance weight for looseness and the supporting structure for damage.
- I 3 Rudder, Tips, Hinges, and Cable Attachment - Check condition, security, and operation.
- J 1 Cowling - Inspect for cracks, dents, and other damage, security of cowl fasteners, and cowl mounted landing lights for attachment.
- J 2 Engine - Inspect for evidence of oil and fuel leaks. Wash engine and check for security of accessories.

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 1

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

J	3	Engine Controls and Linkage - Check general condition, freedom of movement through full range. Check for proper travel, security of attachment, and for evidence of wear. Check friction locks for proper operation.
J	4	Ignition Switch and Electrical Harness - Inspect for damage, condition, and security.
J	5	Firewall Structure - Inspect for wrinkles, damage, cracks, sheared rivets, etc. Check cowl shock mounts for condition and security.
J	6	Engine Shock Mounts, Engine Mount Structure, and Ground Straps - Check condition, security, and alignment.
J	7	Induction System - Check security of clamps, tubes, and ducting. Inspect for evidence of leakage.
J	8	Induction Airbox, Valves, Doors, and Controls - Remove air filter and inspect hinges, doors, seals, and attaching parts for wear and security. Check operation. Clean and inspect air filter.
J	9	Induction Air Filter - Remove and clean. Inspect for damage, and service per Paragraph 2-22 and 2-22A.
J	10	Alternate Induction Air System - Check for obstructions, operation, and security.
J	11	Alternator, Mounting Bracket, and Electrical Connections - Check condition and security. Check alternator belts for condition and proper adjustment. Check belt tension per Section 16, Paragraph 16-38.
J	13	Starter, Starter Solenoid, and Electrical Connections - Check for condition of starter brushes, brush leads, and commutator.
J	14	Oil Cooler - Check for obstructions, leaks, and security of attachment.
J	15	Exhaust System - Inspect for cracks and security. Special check in area of heat exchanger. Refer to Section 11, Paragraph 11-73 for inspection procedures.
J	16	Auxiliary (Electric) Fuel Pump (172Q) - Check pump and fittings for condition, operation, security. Remove and clean filter (as applicable).
J	17	Engine-Driven Fuel Pump - Check for evidence of leakage, security of attachment, and general condition.
J	18	Magnetos - Check external condition, security, and electrical leads for condition. Check timing to engine and internal timing if engine timing requires adjustment.
J	21	Ignition Harness and Insulators - Check for proper routing, deterioration, and condition of terminals.
J	22	Spark Plugs - Remove, clean, analyze, test, gap, and rotate top plugs-to-bottom and bottom plugs-to-top.
J	23	Cylinder Compression - Perform differential compression test.
J	24	Carburetor - Drain and flush carburetor bowl, clean inlet strainer, and drain plug. Check general condition and security.
J	25	Engine Primer - Check for leakage, operation, and security.

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CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 1

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

J	26	Hoses, Metal Lines, and Fittings - Inspect for signs of oil and fuel leaks. Check for abrasions, chafing, security, proper routing and support and for evidence of deterioration.
J	27	Cold and Hot Air Hoses - Check condition, routing, and security.
J	28	Engine Cylinders, Rocker Box Covers, and Pushrod Housings - Check for fin damage, cracks, oil leakage, security of attachment, and general condition.
J	29	Engine Baffles and Seals - Check condition and security of attachment.
J	30	Crankcase, Oil Sump, and Accessory Section - Inspect for cracks and evidence of oil leakage. Check bolts and nuts for looseness and retorquing as necessary. Check crankcase breather lines for obstructions, security, and general condition.
J	31	Engine Oil With Oil Filter - Drain oil sump and oil cooler, replace filter, and refill with recommended grade aviation oil.
J	32	Engine Oil Without Oil Filter - Drain oil sump and oil cooler, clean and inspect screens, and refill with recommended grade aviation oil.
K	1	Fuel Tanks or Integral Fuel Bays - Check for evidence of leakage and condition of fuel caps, adapters, and placards.
K	3	Fuel System - Inspect plumbing and components for mounting and security.
K	4	Fuel Tank or Bay Drains - Drain water and sediment.
K	5	Fuel Tank Vent Lines and Vent Valves - Check vents for obstruction and proper positioning.
K	7	Fuel Strainer, Drain Valve, and Controls - Check freedom of movement, security, and proper operation. Disassemble, flush, and clean screen and bowl.
L	1	Propeller Mounting - Check for security of installation.
L	2	Propeller Blades - Inspect for cracks, dents, nicks, scratches, erosion, corrosion, or other damage.
L	3	Spinner - Check general condition and attachment.
L	4	Spinner and Spinner Bulkhead - Remove spinner, wash, and inspect for cracks and fractures.
L	5	Propeller Mounting Bolts - Inspect mounting bolts and safety-wire for signs of looseness. Retorque mounting bolts as required.
L	6	Propeller Hub - Check general condition.
M	2	Heater Components, Inlets, and Outlets - Inspect all lines, connections, ducts, clamps, seals, and gaskets for condition, restriction, and security.
M	4	Pitot Tube and Stall Warning Vane - Check for condition and obstructions.
N	3	Vacuum Pump - Check for condition and security. Check vacuum system breather line for obstructions, condition, and security.
O	4	Battery - Check general condition and security. Check level of electrolyte.

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CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 1

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

- ☐ 5 Battery Box and Cables - Clean and remove any corrosion. Check cables for routing, support, and security of connections.
- ☐ 7 Alternator Control Unit - Inspect wiring, mounting, condition, and wire routing.
- ☐ 10 External Power Receptacle and Power Cables - Inspect for condition and security.

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 1

SPECIAL INSPECTION AND YEARLY ITEMS

HOURS YEARS

INSPECTION
COMPLETED BY

Please review each of these items for required compliance

B	11	Upholstery, Headliner, Trim, and Carpeting - Check condition and clean as required.	EACH 400	EACH 1	
D	3	Brake Lines, Wheel Cylinders, Hoses, Clamps, and Fittings - Check for leaks, condition, and security and hoses for bulges and deterioration. Check brake lines and hoses for proper routing and support.	EACH 400	EACH 1	
D	6	Wheel Fairings, Strut Fairings, and Cuffs - Check for cracks, dents, and condition of paint.	A		
D	11	Wheel Bearings - Clean, inspect and lube.	B		
E	4	Autopilot Rigging - Check per Avionics Installation Manual.	C		
H	5	Elevator Trim Tab Actuator - Clean, lubricate, and check free-play.	D		
J	3	Engine Controls and Linkage - Check general condition, freedom of movement through full range. Check for proper travel, security of attachment, and for evidence of wear. Check friction locks for proper operation.		E	
J	9	Induction Air Filter - Remove and clean. Inspect for damage, and service per Paragraph 2-22 and 2-22A.	F		
J	12	Alternator - Check brushes, leads, commutator or slip ring for wear.		G	
J	13	Starter, Starter Solenoid, and Electrical Connections - Check for condition of starter brushes, brush leads, and commutator.		H	
J	18	Magnetos - Check external condition, security, and electrical leads for condition. Check timing to engine and internal timing if engine timing requires adjustment.	I		
J	19	Magnetos - Check impulse coupling and stop pins for condition, replace as required.	J		
J	20	Magnetos - Inspection, lubrication and overhaul procedures.	K		
J	31	Engine Oil With Oil Filter - Drain oil sump and oil cooler, replace filter, and refill with recommended grade aviation oil.	L		
J	32	Engine Oil Without Oil Filter - Drain oil sump and oil cooler, clean and inspect screens, and refill with recommended grade aviation oil.	L		
K	2	Fuel Tanks or Integral Fuel Bays - Drain fuel and check tank interior and outlet screens.	M		
K	8	Fuel Quantity Indicators - Check for damage, security of installation, and perform accuracy test.		EACH 1	
M	1	Ventilation System - Inspect clamps, hoses, and valves for condition and security.	400	EACH 1	
N	4	Vacuum System Air Filter - Inspect for damage, deterioration and contamination. Clean or replace, if required. NOTE: Smoking will cause premature filter clogging.	N		
N	5	Vacuum System relief Valve - Inspect for condition and security.	O		
N	10	Airspeed Indicator, Vertical Speed Indicator, and Magnetic Compass - Calibrate.		EACH 2	
N	11	Altimeter and Static System - Inspect in accordance with FAR Part 91.411.		EACH 2	
O	4	Battery - Check general condition and security. Check level of electrolyte.	P		

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CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 1

Special Inspections Legends:

- A. If the airplane is flown from surfaces with mud, snow, or ice, the main gear speed fairings should be checked that there is no accumulation which could prevent normal wheel rotation.
- B. First 100 hours and each 500 hours thereafter. More often if operated under prevailing wet or dusty conditions.
- C. Each 600 hours or 1 year, whichever comes first.
- D. Lubrication of the actuator is required each 1000 hours or 3 years, whichever comes first. See figure 2-5 for grease specification.
- E. Lubricate each 50 hours (except in extreme dusty conditions). These controls are not repairable and should be replaced every 1500 hours or whenever maximum linear movement exceeds .050 inch.
- F. Model 172Q: Replace polyurethane foam filter every 200 hours or on condition. Model 172 Series: Filter may be washed 20 times maximum, cleaned by compressed air 30 times maximum. Replace filter each 500 hours or 1 year, whichever comes first.
- G. Inspect each 500 hours.
- H. Check solenoid and electrical connections each 100 hours, inspect the commutator and brushes each 500 hours.
- I. If timing to engine is within tolerance - plus zero degrees, minus two degrees, internal timing will not require checking. Model 172 with 0-320-H2AD engine (1977 thru 1980): Check magnetos at first 25 hours, first 50 hours, first 100 hours, and each 100 hours thereafter. Model 172 with 0-320-D2J engine (1981 and ON), Model 172Q with 0-360-A4N engine (1983 and ON): Check magnetos at first 100 hours, and every 100 hours thereafter or each one year, whichever occurs first.
- J. Compliance with Bendix Service Bulletin 425B is required. Model 172 with 0-320-H2AD engine (1977 thru 1980): Each 500 hours.
- K.
 - 1. Inspect contact points for condition and adjust or replace as required.
 - 2. Inspect carbon brush, high-tension lead, and distributor block for condition and clean or replace as required.
 - 3. Inspect impulse coupling and pawls for condition and replace as required. Use light pressure only, do not force pin (or drill bit) when checking pawls.
 - 4. Inspect bearings and lubricate, replace bearings, if required.
 - 5. Lubricate contact point cam.
 - 6. Completely overhaul, or replace existing magneto with a new or rebuilt exchange magneto, at every engine overhaul. Refer to Overhaul and Maintenance Manual, Publication No. 1037C1-13, covering Model 4200/6200 series magnetos. Manual No. 1037C1-13 is available from Cessna Supply Division. Effectivity, Model 172 with 0-320-0-2J engine (1981 and ON) and Model 172Q with 0-360-A4N engine (1983 and ON); Each 500 hours and every engine overhaul.
- L. Model 172 with 0-320-H2AD engine (1977 thru 1980): First 25 hours. Drain oil sump, clean pressure screen or replace oil filter, and refill with MIL-L-22851 ashless dispersant oil. If oil must be added during first 25 hours, use MIL-L-6082 aviation grade straight mineral oil. If engine is not equipped with an oil filter, change oil and clean pressure screen at 50 hours, and each 50 hours thereafter. If engine is equipped with an oil filter, change oil and filter at 50 hours, and each 100 hours thereafter. Model 172 with 0-320-D2J engine (1981 and ON) and Model 172Q with 0-360-A4N engine (1983 and ON): First 25 hours. Drain oil sump, clean pressure screen or replace oil filter, and refill with MIL-L-6080 aviation grade straight mineral oil. If engine is not equipped with an oil filter, change oil and clean pressure screen at 50 hours and each 50 hours there after. If engine is equipped with an oil filter, change oil and filter at 50 hours and each 100 hours there after. Beginning with the 50-hour oil change and thereafter, refill oil sump with MIL-L-22851 ashless dispersant oil.
- M. Each 1000 hours.
- N. Replace every 500 hours.
- O. Replace filter each 100 hours.
- P. Check electrolyte level and clean battery box each 100 hours or 90 days.

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 2

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

- B 1 Fuselage Surface - Inspect for skin damage, loose rivets, condition of paint, and check pitot-static ports and drain holes for obstruction. Inspect covers and fairings for security.
- B 6 Emergency Locator Transmitter - Inspect for security of attachment and check operation by verifying transmitter output. Check cumulative time and useful life of batteries in accordance with FAR Part 91.207. Refer to Section 16 - Emergency Locator Transmitter - Checkout Interval.
- B 8 Pilot's and Copilot's Inertia Reels - Inspect for security of installation, proper operation, and evidence of damage.
- B 9 Seats, Seat Belts, and Shoulder Harnesses - Check general condition and security. Check operation of seat stops and adjustment mechanism. Inspect belts for condition and security of fasteners.
- B 10 Windows, Windshield, Doors, and Seals - Inspect general condition. Check latches, hinges, and seals for condition, operation, and security of attachment.
- B 12 Flight Controls - Check freedom of movement and proper operation through full travel with and without flaps extended. Check electric trim controls for operation (as applicable).
- B 14 Portable Hand Fire Extinguisher - Inspect for proper operating pressure, condition, security of installation, and servicing date.
- B 15 Seat Tracks and Stops - Inspect seat tracks for condition and security of installation. Check seat track stops for damage and correct location. Ensure inspection of seat rails for cracks EACH 50 HOURS. Refer to Section 3.
- B 17 Fuel Line and Selector Valve Drain(s) - Remove plug and drain.
- D 1 Brakes, Master Cylinders, and Parking Brake - Check master cylinders and parking brake mechanism for condition and security. Check fluid level and test operation of toe and parking brake.
- D 2 Main Gear Tubular Struts - Inspect for cracks, dents, corrosion, condition of paint or other damage. Check axles for condition and security.
- D 4 Wheels, Brake Discs, and Linings - Inspect for wear, cracks, warps, dents, or other damage. Check wheel through-bolts and nuts for looseness.
- D 5 Tires - Check tread wear and general condition. Check for proper inflation.
- D 6 Wheel Fairings, Strut Fairings, and Cuffs - Check for cracks, dents, and condition of paint.
- D 7 Main landing Gear Attachment Structure - Check for damage, cracks, loose rivets, bolts and nuts and security of attachment.
- D 8 Nose Gear Steering Mechanism - Check for wear, security, and proper rigging.

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CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 2

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

D	9	Nose Gear - Inspect torque links, steering rods, and boots for condition and security of attachment. Check strut for evidence of leakage and proper extension. Check strut barrel for corrosion, pitting, and cleanliness. Check shimmy damper and/or bungees for operation, leakage, and attach points for wear and security.
D	10	Nose Gear Fork - Inspect for cracks, general condition, and security of attachment.
D	12	Nose Gear Attachment Structure - Inspect for cracks, corrosion, or other damage and security of attachment.
H	2	Elevator Trim System - Check cables, push-pull rods, bellcranks, pulleys, turnbuckles, fairleads, rub strips, etc. for proper routing, condition, and security.
J	1	Cowling - Inspect for cracks, dents, and other damage, security of cowl fasteners, and cowl mounted landing lights for attachment.
J	2	Engine - Inspect for evidence of oil and fuel leaks. Wash engine and check for security of accessories.
J	3	Engine Controls and Linkage - Check general condition, freedom of movement through full range. Check for proper travel, security of attachment, and for evidence of wear. Check friction locks for proper operation.
J	7	Induction System - Check security of clamps, tubes, and ducting. Inspect for evidence of leakage.
J	10	Alternate Induction Air System - Check for obstructions, operation, and security.
J	11	Alternator, Mounting Bracket, and Electrical Connections - Check condition and security. Check alternator belts for condition and proper adjustment. Check belt tension per Section 16, Paragraph 16-38.
J	14	Oil Cooler - Check for obstructions, leaks, and security of attachment.
J	15	Exhaust System - Inspect for cracks and security. Special check in area of heat exchanger. Refer to Section 11, Paragraph 11-73 for inspection procedures.
J	26	Hoses, Metal Lines, and Fittings - Inspect for signs of oil and fuel leaks. Check for abrasions, chafing, security, proper routing and support and for evidence of deterioration.
J	29	Engine Baffles and Seals - Check condition and security of attachment.
J	32	Engine Oil Without Oil Filter - Drain oil sump and oil cooler, clean and inspect screens, and refill with recommended grade aviation oil.
K	4	Fuel Tank or Bay Drains - Drain water and sediment.
K	6	Fuel Selector Valve - Check controls for detent in each position, security of attachment, and for proper placarding.
L	1	Propeller Mounting - Check for security of installation.
L	2	Propeller Blades - Inspect for cracks, dents, nicks, scratches, erosion, corrosion, or other damage.
L	3	Spinner - Check general condition and attachment.
M	4	Pitot Tube and Stall Warning Vane - Check for condition and obstructions.

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CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 2

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

N	1	Vacuum System - Inspect for condition and security.
N	2	Vacuum System Hoses - Inspect for hardness, deterioration, looseness, or collapsed hoses.
N	4	Vacuum System Air Filter - Inspect for damage, deterioration and contamination. Clean or replace, if required. NOTE: Smoking will cause premature filter clogging.
N	5	Vacuum System relief Valve - Inspect for condition and security.
N	6	Instruments - Check general condition and markings for legibility.
O	2	Instrument, Cabin, Navigation, Beacon, Strobe, and Landing Lights - Check operation, condition of lens, and security of attachment.
O	3	Circuit Breakers and Fuses - Check operation and condition. Check for required number of spare fuses.
Q	1	Brakes - Test toe brakes and parking brake for proper operation.

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 2

SPECIAL INSPECTION AND YEARLY ITEMS

HOURS YEARS

INSPECTION
COMPLETED BY

Please review each of these items for required compliance.

B	11	Upholstery, Headliner, Trim, and Carpeting - Check condition and clean as required.	EACH 400	EACH 1	
D	3	Brake Lines, Wheel Cylinders, Hoses, Clamps, and Fittings - Check for leaks, condition, and security and hoses for bulges and deterioration. Check brake lines and hoses for proper routing and support.	EACH 400	EACH 1	
D	6	Wheel Fairings, Strut Fairings, and Cuffs - Check for cracks, dents, and condition of paint.	A		
D	11	Wheel Bearings - Clean, inspect and lube.	B		
E	4	Autopilot Rigging - Check per Avionics Installation Manual.	C		
H	5	Elevator Trim Tab Actuator - Clean, lubricate, and check free-play.	D		
J	3	Engine Controls and Linkage - Check general condition, freedom of movement through full range. Check for proper travel, security of attachment, and for evidence of wear. Check friction locks for proper operation.		E	
J	9	Induction Air Filter - Remove and clean. Inspect for damage, and service per Paragraph 2-22 and 2-22A.	F		
J	12	Alternator - Check brushes, leads, commutator or slip ring for wear.		G	
J	13	Starter, Starter Solenoid, and Electrical Connections - Check for condition of starter brushes, brush leads, and commutator.		H	
J	18	Magnetos - Check external condition, security, and electrical leads for condition. Check timing to engine and internal timing if engine timing requires adjustment.	I		
J	19	Magnetos - Check impulse coupling and stop pins for condition, replace as required.	J		
J	20	Magnetos - Inspection, lubrication and overhaul procedures.	K		
J	31	Engine Oil With Oil Filter - Drain oil sump and oil cooler, replace filter, and refill with recommended grade aviation oil.	L		
J	32	Engine Oil Without Oil Filter - Drain oil sump and oil cooler, clean and inspect screens, and refill with recommended grade aviation oil.	L		
K	2	Fuel Tanks or Integral Fuel Bays - Drain fuel and check tank interior and outlet screens.	M		
K	8	Fuel Quantity Indicators - Check for damage, security of installation, and perform accuracy test.		EACH 1	
M	1	Ventilation System - Inspect clamps, hoses, and valves for condition and security.	400	EACH 1	
N	4	Vacuum System Air Filter - Inspect for damage, deterioration and contamination. Clean or replace, if required. NOTE: Smoking will cause premature filter clogging.	N		
N	5	Vacuum System relief Valve - Inspect for condition and security.	O		
N	10	Airspeed Indicator, Vertical Speed Indicator, and Magnetic Compass - Calibrate.		EACH 2	
N	11	Altimeter and Static System - Inspect in accordance with FAR Part 91.411.		EACH 2	
O	4	Battery - Check general condition and security. Check level of electrolyte.	P		

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 2

Special Inspections Legends:

- A. If the airplane is flown from surfaces with mud, snow, or ice, the main gear speed fairings should be checked that there is no accumulation which could prevent normal wheel rotation.
- B. First 100 hours and each 500 hours thereafter. More often if operated under prevailing wet or dusty conditions.
- C. Each 600 hours or 1 year, whichever comes first.
- D. Lubrication of the actuator is required each 1000 hours or 3 years, whichever comes first. See figure 2-5 for grease specification.
- E. Lubricate each 50 hours (except in extreme dusty conditions). These controls are not repairable and should be replaced every 1500 hours or whenever maximum linear movement exceeds .050 inch.
- F. Model 172Q: Replace polyurethane foam filter every 200 hours or on condition. Model 172 Series: Filter may be washed 20 times maximum, cleaned by compressed air 30 times maximum. Replace filter each 500 hours or 1 year, whichever comes first.
- G. Inspect each 500 hours.
- H. Check solenoid and electrical connections each 100 hours, inspect the commutator and brushes each 500 hours.
- I. If timing to engine is within tolerance - plus zero degrees, minus two degrees, internal timing will not require checking. Model 172 with 0-320-H2AD engine (1977 thru 1980): Check magnetos at first 25 hours, first 50 hours, first 100 hours, and each 100 hours thereafter. Model 172 with 0-320-D2J engine (1981 and ON), Model 172Q with 0-360-A4N engine (1983 and ON): Check magnetos at first 100 hours, and every 100 hours thereafter or each one year, whichever occurs first.
- J. Compliance with Bendix Service Bulletin 425B is required. Model 172 with 0-320-H2AD engine (1977 thru 1980): Each 500 hours.
- K.
 - 1. Inspect contact points for condition and adjust or replace as required.
 - 2. Inspect carbon brush, high-tension lead, and distributor block for condition and clean or replace as required.
 - 3. Inspect impulse coupling and pawls for condition and replace as required. Use light pressure only, do not force pin (or drill bit) when checking pawls.
 - 4. Inspect bearings and lubricate, replace bearings, if required.
 - 5. Lubricate contact point cam.
 - 6. Completely overhaul, or replace existing magneto with a new or rebuilt exchange magneto, at every engine overhaul. Refer to Overhaul and Maintenance Manual, Publication No. 1037C1-13, covering Model 4200/6200 series magnetos. Manual No. 1037C1-13 is available from Cessna Supply Division. Effectivity, Model 172 with 0-320-0-2J engine (1981 and ON) and Model 172Q with 0-360-A4N engine (1983 and ON); Each 500 hours and every engine overhaul.
- L. Model 172 with 0-320-H2AD engine (1977 thru 1980): First 25 hours. Drain oil sump, clean pressure screen or replace oil filter, and refill with MIL-L-22851 ashless dispersant oil. If oil must be added during first 25 hours, use MIL-L-6082 aviation grade straight mineral oil. If engine is not equipped with an oil filter, change oil and clean pressure screen at 50 hours, and each 50 hours thereafter. If engine is equipped with an oil filter, change oil and filter at 50 hours, and each 100 hours thereafter. Model 172 with 0-320-D2J engine (1981 and ON) and Model 172Q with 0-360-A4N engine (1983 and ON): First 25 hours. Drain oil sump, clean pressure screen or replace oil filter, and refill with MIL-L-6080 aviation grade straight mineral oil. If engine is not equipped with an oil filter, change oil and clean pressure screen at 50 hours and each 50 hours thereafter. If engine is equipped with an oil filter, change oil and filter at 50 hours and each 100 hours thereafter. Beginning with the 50-hour oil change and thereafter, refill oil sump with MIL-L-22851 ashless dispersant oil.
- M. Each 1000 hours.
- N. Replace every 500 hours.
- O. Replace filter each 100 hours.
- P. Check electrolyte level and clean battery box each 100 hours or 90 days.

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 3

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

B	13	Aileron, Elevator, and Rudder Stops - Check for damage and security.
B	15	Seat Tracks and Stops - Inspect seat tracks for condition and security of installation. Check seat track stops for damage and correct location. Ensure inspection of seat rails for cracks EACH 50 HOURS. Refer to Section 3.
C	1	Wing Surfaces and Tips - Inspect for skin damage, loose rivets, and condition of paint.
C	2	Wing Struts and Strut Fairings - Check for dents, cracks, loose screws and rivets, and condition of paint.
C	3	Wing Spar and Wing Strut Fittings - Check for evidence of wear. Check attach bolts for indications of looseness and retorque as required.
C	4	Wing Structure - Inspect spars, ribs, skins, and stringers for cracks, wrinkles, loose rivets, corrosion, or other damage.
C	5	Metal Lines, Hoses, Clamps, and Fittings - Check for leaks, condition, and security. Check for proper routing and support.
C	6	Wing Access Plates - Check for damage and security of installation.
C	7	Vertical and Horizontal Stabilizers, Tips and Tailcone - Inspect externally for skin damage and condition of paint.
C	8	Vertical and Horizontal Stabilizers and Tailcone structure - Inspect bulkheads, spars, ribs, and skins for cracks, wrinkles, loose rivets, corrosion, or other damage. Inspect vertical and horizontal stabilizer attach bolts for looseness. Retorque as necessary. Check security of inspection covers, fairings, and tips.
E	1	Ailerons and Hinges - Check condition, security and operation.
E	2	Aileron Structure, Control Rods, Hinges, Balance Weights, Bellcranks, Linkage, Bolts, Pulleys, and Pulley Brackets - Check condition, operation, and security of attachment.
E	3	Ailerons and Cables - Check operation and security of stops. Check cables for tension, routing, fraying, corrosion, and turnbuckle safety. Check travel if cable tension requires adjustment or if stops are damaged. Check fairleads and rub strips for condition.
E	5	Aileron Controls - Check freedom of movement and proper operation through full travel with and without flaps extended.
F	1	Flaps - Check tracks, rollers, and control rods for security of attachment. Check operation.
F	2	Flap Actuator Threads - Clean and lubricate. Refer to paragraph 2-43 for detailed instructions.
F	3	Flap Structure, Linkage, Bellcranks, Pulleys, and Pulley Brackets - Check for condition, operation and security.
F	4	Wing Flap Control - Check operation through full travel and observe Flap Position indicator for proper indication.
F	5	Flaps and Cables - Check cables for proper tension, routing, fraying, corrosion, and turnbuckle safety. Check travel if cable tension requires adjustment.

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CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 3

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

- F 7 Flap Motor, Actuator, and Limit Switches (electric flaps) - Check wiring and terminals for condition and security. Check actuator for condition and security.
- G 1 Elevator Control - Check freedom of movement and proper operation through full travel with and without flaps extended.
- G 2 Elevator, Hinges, and Cable Attachment - Check condition, security, and operation.
- H 1 Elevator Trim Tab and Hinges - Check condition, security, and operation.
- H 4 Elevator Trim Tab Stop Blocks - Inspect for damage and security.
- H 6 Elevator Trim Tab Actuator - Free-Play limits inspection. Refer to Section 9 for cleaning, inspection, and repair procedures.
- I 1 Rudder - Inspect the rudder skins for cracks and loose rivets, rudder hinges for condition, cracks and security; hinge bolts, hinge bearings, hinge attach fittings, and bonding jumper for evidence of damage and wear, failed fasteners, and security. Inspect the rudder hinge bolts for proper safetying of nuts with cotter pins. Inspect balance weight for looseness and the supporting structure for damage.
- I 3 Rudder, Tips, Hinges, and Cable Attachment - Check condition, security, and operation.
- I 4 Rudder - Check internal surfaces for corrosion, condition of fasteners, and balance weight attachment.
- J 1 Cowling - Inspect for cracks, dents, and other damage, security of cowl fasteners, and cowl mounted landing lights for attachment.
- J 2 Engine - Inspect for evidence of oil and fuel leaks. Wash engine and check for security of accessories.
- J 3 Engine Controls and Linkage - Check general condition, freedom of movement through full range. Check for proper travel, security of attachment, and for evidence of wear. Check friction locks for proper operation.
- J 4 Ignition Switch and Electrical Harness - Inspect for damage, condition, and security.
- J 7 Induction System - Check security of clamps, tubes, and ducting. Inspect for evidence of leakage.
- J 8 Induction Airbox, Valves, Doors, and Controls - Remove air filter and inspect hinges, doors, seals, and attaching parts for wear and security. Check operation. Clean and inspect air filter.
- J 9 Induction Air Filter - Remove and clean. Inspect for damage, and service per Paragraph 2-22 and 2-22A.
- J 10 Alternate Induction Air System - Check for obstructions, operation, and security.
- J 11 Alternator, Mounting Bracket, and Electrical Connections - Check condition and security. Check alternator belts for condition and proper adjustment. Check belt tension per Section 16, Paragraph 16-38.

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 3

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

J	13	Starter, Starter Solenoid, and Electrical Connections - Check for condition of starter brushes, brush leads, and commutator.
J	14	Oil Cooler - Check for obstructions, leaks, and security of attachment.
J	15	Exhaust System - Inspect for cracks and security. Special check in area of heat exchanger. Refer to Section 11, Paragraph 11-73 for inspection procedures.
J	16	Auxiliary (Electric) Fuel Pump (172Q) - Check pump and fittings for condition, operation, security. Remove and clean filter (as applicable).
J	17	Engine-Driven Fuel Pump - Check for evidence of leakage, security of attachment, and general condition.
J	18	Magnetos - Check external condition, security, and electrical leads for condition. Check timing to engine and internal timing if engine timing requires adjustment.
J	21	Ignition Harness and Insulators - Check for proper routing, deterioration, and condition of terminals.
J	22	Spark Plugs - Remove, clean, analyze, test, gap, and rotate top plugs-to-bottom and bottom plugs-to-top.
J	24	Carburetor - Drain and flush carburetor bowl, clean inlet strainer, and drain plug. Check general condition and security.
J	25	Engine Primer - Check for leakage, operation, and security.
J	26	Hoses, Metal Lines, and Fittings - Inspect for signs of oil and fuel leaks. Check for abrasions, chafing, security, proper routing and support and for evidence of deterioration.
J	27	Cold and Hot Air Hoses - Check condition, routing, and security.
J	28	Engine Cylinders, Rocker Box Covers, and Pushrod Housings - Check for fin damage, cracks, oil leakage, security of attachment, and general condition.
J	29	Engine Baffles and Seals - Check condition and security of attachment.
J	30	Crankcase, Oil Sump, and Accessory Section - Inspect for cracks and evidence of oil leakage. Check bolts and nuts for looseness and retorquing as necessary. Check crankcase breather lines for obstructions, security, and general condition.
J	31	Engine Oil With Oil Filter - Drain oil sump and oil cooler, replace filter, and refill with recommended grade aviation oil.
J	32	Engine Oil Without Oil Filter - Drain oil sump and oil cooler, clean and inspect screens, and refill with recommended grade aviation oil.
K	1	Fuel Tanks or Integral Fuel Bays - Check for evidence of leakage and condition of fuel caps, adapters, and placards.
K	3	Fuel System - Inspect plumbing and components for mounting and security.
K	4	Fuel Tank or Bay Drains - Drain water and sediment.
K	5	Fuel Tank Vent Lines and Vent Valves - Check vents for obstruction and proper positioning.

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CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 3

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

- K 7 Fuel Strainer, Drain Valve, and Controls - Check freedom of movement, security, and proper operation. Disassemble, flush, and clean screen and bowl.
- L 1 Propeller Mounting - Check for security of installation.
- L 2 Propeller Blades - Inspect for cracks, dents, nicks, scratches, erosion, corrosion, or other damage.
- L 3 Spinner - Check general condition and attachment.
- L 4 Spinner and Spinner Bulkhead - Remove spinner, wash, and inspect for cracks and fractures.
- M 2 Heater Components, Inlets, and Outlets - Inspect all lines, connections, ducts, clamps, seals, and gaskets for condition, restriction, and security.
- M 4 Pitot Tube and Stall Warning Vane - Check for condition and obstructions.
- N 3 Vacuum Pump - Check for condition and security. Check vacuum system breather line for obstructions, condition, and security.
- O 4 Battery - Check general condition and security. Check level of electrolyte.
- O 5 Battery Box and Cables - Clean and remove any corrosion. Check cables for routing, support, and security of connections.

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 3

SPECIAL INSPECTION AND YEARLY ITEMS

HOURS YEARS

INSPECTION
COMPLETED BY

Please review each of these items for required compliance -

B	11	Upholstery, Headliner, Trim, and Carpeting - Check condition and clean as required.	EACH 400	EACH 1	
D	3	Brake Lines, Wheel Cylinders, Hoses, Clamps, and Fittings - Check for leaks, condition, and security and hoses for bulges and deterioration. Check brake lines and hoses for proper routing and support.	EACH 400	EACH 1	
D	6	Wheel Fairings, Strut Fairings, and Cuffs - Check for cracks, dents, and condition of paint.	A		
D	11	Wheel Bearings - Clean, inspect and lube.	B		
E	4	Autopilot Rigging - Check per Avionics Installation Manual.	C		
H	5	Elevator Trim Tab Actuator - Clean, lubricate, and check free-play.	D		
J	3	Engine Controls and Linkage - Check general condition, freedom of movement through full range. Check for proper travel, security of attachment, and for evidence of wear. Check friction locks for proper operation.		E	
J	9	Induction Air Filter - Remove and clean. Inspect for damage, and service per Paragraph 2-22 and 2-22A.	F		
J	12	Alternator - Check brushes, leads, commutator or slip ring for wear.		G	
J	13	Starter, Starter Solenoid, and Electrical Connections - Check for condition of starter brushes, brush leads, and commutator.		H	
J	18	Magnetos - Check external condition, security, and electrical leads for condition. Check timing to engine and internal timing if engine timing requires adjustment.	I		
J	19	Magnetos - Check impulse coupling and stop pins for condition, replace as required.	J		
J	20	Magnetos - Inspection, lubrication and overhaul procedures.	K		
J	31	Engine Oil With Oil Filter - Drain oil sump and oil cooler, replace filter, and refill with recommended grade aviation oil.	L		
J	32	Engine Oil Without Oil Filter - Drain oil sump and oil cooler, clean and inspect screens, and refill with recommended grade aviation oil.	L		
K	2	Fuel Tanks or Integral Fuel Bays - Drain fuel and check tank interior and outlet screens.	M		
K	8	Fuel Quantity Indicators - Check for damage, security of installation, and perform accuracy test.		EACH 1	
M	1	Ventilation System - Inspect clamps, hoses, and valves for condition and security.	400	EACH 1	
N	4	Vacuum System Air Filter - Inspect for damage, deterioration and contamination. Clean or replace, if required. NOTE: Smoking will cause premature filter clogging.	N		
N	5	Vacuum System relief Valve - Inspect for condition and security.	O		
N	10	Airspeed Indicator, Vertical Speed Indicator, and Magnetic Compass - Calibrate.		EACH 2	
N	11	Altimeter and Static System - Inspect in accordance with FAR Part 91.411.		EACH 2	
O	4	Battery - Check general condition and security. Check level of electrolyte.	P		

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CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 3

Special Inspections Legends:

- A. If the airplane is flown from surfaces with mud, snow, or ice, the main gear speed fairings should be checked that there is no accumulation which could prevent normal wheel rotation.
- B. First 100 hours and each 500 hours thereafter. More often if operated under prevailing wet or dusty conditions.
- C. Each 600 hours or 1 year, whichever comes first.
- D. Lubrication of the actuator is required each 1000 hours or 3 years, whichever comes first. See figure 2-5 for grease specification.
- E. Lubricate each 50 hours (except in extreme dusty conditions). These controls are not repairable and should be replaced every 1500 hours or whenever maximum linear movement exceeds .050 inch.
- F. Model 172Q: Replace polyurethane foam filter every 200 hours or on condition. Model 172 Series: Filter may be washed 20 times maximum, cleaned by compressed air 30 times maximum. Replace filter each 500 hours or 1 year, whichever comes first.
- G. Inspect each 500 hours.
- H. Check solenoid and electrical connections each 100 hours, inspect the commutator and brushes each 500 hours.
- I. If timing to engine is within tolerance - plus zero degrees, minus two degrees, internal timing will not require checking. Model 172 with 0-320-H2AD engine (1977 thru 1980): Check magnetos at first 25 hours, first 50 hours, first 100 hours, and each 100 hours thereafter. Model 172 with 0-320-D2J engine (1981 and ON), Model 172Q with 0-360-A4N engine (1983 and ON): Check magnetos at first 100 hours, and every 100 hours thereafter or each one year, whichever occurs first.
- J. Compliance with Bendix Service Bulletin 425B is required. Model 172 with 0-320-H2AD engine (1977 thru 1980): Each 500 hours.
- K.
 - 1. Inspect contact points for condition and adjust or replace as required.
 - 2. Inspect carbon brush, high-tension lead, and distributor block for condition and clean or replace as required.
 - 3. Inspect impulse coupling and pawls for condition and replace as required. Use light pressure only, do not force pin (or drill bit) when checking pawls.
 - 4. Inspect bearings and lubricate, replace bearings, if required.
 - 5. Lubricate contact point cam.
 - 6. Completely overhaul, or replace existing magneto with a new or rebuilt exchange magneto, at every engine overhaul. Refer to Overhaul and Maintenance Manual, Publication No. 1037C1-13, covering Model 4200/6200 series magnetos. Manual No. 1037C1-13 is available from Cessna Supply Division. Effectivity, Model 172 with 0-320-0-2J engine (1981 and ON) and Model 172Q with 0-360-A4N engine (1983 and ON); Each 500 hours and every engine overhaul.
- L. Model 172 with 0-320-H2AD engine (1977 thru 1980): First 25 hours. Drain oil sump, clean pressure screen or replace oil filter, and refill with MIL-L-22851 ashless dispersant oil. If oil must be added during first 25 hours, use MIL-L-6082 aviation grade straight mineral oil. If engine is not equipped with an oil filter, change oil and clean pressure screen at 50 hours, and each 50 hours thereafter. If engine is equipped with an oil filter, change oil and filter at 50 hours, and each 100 hours thereafter. Model 172 with 0-320-D2J engine (1981 and ON) and Model 172Q with 0-360-A4N engine (1983 and ON): First 25 hours. Drain oil sump, clean pressure screen or replace oil filter, and refill with MIL-L-6080 aviation grade straight mineral oil. If engine is not equipped with an oil filter, change oil and clean pressure screen at 50 hours and each 50 hours there after. If engine is equipped with an oil filter, change oil and filter at 50 hours and each 100 hours there after. Beginning with the 50-hour oil change and thereafter, refill oil sump with MIL-L-22851 ashless dispersant oil.
- M. Each 1000 hours.
- N. Replace every 500 hours.
- O. Replace filter each 100 hours.
- P. Check electrolyte level and clean battery box each 100 hours or 90 days.

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 4

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

A	1	Placards and Decals - Inspect presence, legibility, and security. Consult Pilot's Operating Handbook and FAA-Approved Airplane Flight Manual for required placards.
B	1	Fuselage Surface - Inspect for skin damage, loose rivets, condition of paint, and check pitot-static ports and drain holes for obstruction. Inspect covers and fairings for security.
B	2	Internal Fuselage Structure - Inspect bulkheads, doorposts, stringers, doublers, and skins for corrosion, cracks, buckles, and loose rivets, bolts and nuts.
B	3	Control Wheel Lock - Check general condition and operation.
B	4	Fuselage Mounted Equipment - Check for general condition and security of attachment.
B	5	Antennas and Cables - Inspect for security of attachment, connection, and condition.
B	6	Emergency Locator Transmitter - Inspect for security of attachment and check operation by verifying transmitter output. Check cumulative time and useful life of batteries in accordance with FAR Part 91.207. Refer to Section 16 - Emergency Locator Transmitter - Checkout Interval.
B	7	Instrument Panel Shock Mounts, Ground Straps, and Covers - Inspect for deterioration, cracks, and security of attachment.
B	8	Pilot's and Copilot's Inertia Reels - Inspect for security of installation, proper operation, and evidence of damage.
B	9	Seats, Seat Belts, and Shoulder Harnesses - Check general condition and security. Check operation of seat stops and adjustment mechanism. Inspect belts for condition and security of fasteners.
B	10	Windows, Windshield, Doors, and Seals - Inspect general condition. Check latches, hinges, and seals for condition, operation, and security of attachment.
B	12	Flight Controls - Check freedom of movement and proper operation through full travel with and without flaps extended. Check electric trim controls for operation (as applicable).
B	14	Portable Hand Fire Extinguisher - Inspect for proper operating pressure, condition, security of installation, and servicing date.
B	15	Seat Tracks and Stops - Inspect seat tracks for condition and security of installation. Check seat track stops for damage and correct location. Ensure inspection of seat rails for cracks EACH 50 HOURS. Refer to Section 3.
B	16	Control Column - Inspect pulleys, cables, sprockets, bearings, chains, bungees, and turnbuckles for condition and security.
B	17	Fuel Line and Selector Valve Drain(s) - Remove plug and drain.
D	1	Brakes, Master Cylinders, and Parking Brake - Check master cylinders and parking brake mechanism for condition and security. Check fluid level and test operation of toe and parking brake.

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 4

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

- D 2 Main Gear Tubular Struts - Inspect for cracks, dents, corrosion, condition of paint or other damage. Check axles for condition and security.
- D 4 Wheels, Brake Discs, and Linings - Inspect for wear, cracks, warps, dents, or other damage. Check wheel through-bolts and nuts for looseness.
- D 5 Tires - Check tread wear and general condition. Check for proper inflation.
- D 6 Wheel Fairings, Strut Fairings, and Cuffs - Check for cracks, dents, and condition of paint.
- D 7 Main landing Gear Attachment Structure - Check for damage, cracks, loose rivets, bolts and nuts and security of attachment.
- D 9 Nose Gear - Inspect torque links, steering rods, and boots for condition and security of attachment. Check strut for evidence of leakage and proper extension. Check strut barrel for corrosion, pitting, and cleanliness. Check shimmy damper and/or bungees for operation, leakage, and attach points for wear and security.
- D 12 Nose Gear Attachment Structure - Inspect for cracks, corrosion, or other damage and security of attachment.
- G 3 Elevator Control System - Inspect pulleys, cables, sprockets, bearings, chains, and turnbuckles for condition, security, and operation.
- H 2 Elevator Trim System - Check cables, push-pull rods, bellcranks, pulleys, turnbuckles, fairleads, rub strips, etc. for proper routing, condition, and security.
- H 3 Trim Controls and Indicators - Check freedom of movement and proper operation through full travel. Check pulleys, cables, sprockets, bearings, chains, bungees, and turnbuckles for condition and security. Check electric trim controls for operation as applicable.
- I 2 Rudder Pedals and Linkage - Check for general condition, proper rigging, and operation. Check for security of attachment.
- J 1 Cowling - Inspect for cracks, dents, and other damage, security of cowl fasteners, and cowl mounted landing lights for attachment.
- J 2 Engine - Inspect for evidence of oil and fuel leaks. Wash engine and check for security of accessories.
- J 3 Engine Controls and Linkage - Check general condition, freedom of movement through full range. Check for proper travel, security of attachment, and for evidence of wear. Check friction locks for proper operation.
- J 7 Induction System - Check security of clamps, tubes, and ducting. Inspect for evidence of leakage.
- J 10 Alternate Induction Air System - Check for obstructions, operation, and security.
- J 11 Alternator, Mounting Bracket, and Electrical Connections - Check condition and security. Check alternator belts for condition and proper adjustment. Check belt tension per Section 16, Paragraph 16-38.
- J 14 Oil Cooler - Check for obstructions, leaks, and security of attachment.

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CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 4

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

J	15	Exhaust System - Inspect for cracks and security. Special check in area of heat exchanger. Refer to Section 11, Paragraph 11-73 for inspection procedures.
J	26	Hoses, Metal Lines, and Fittings - Inspect for signs of oil and fuel leaks. Check for abrasions, chafing, security, proper routing and support and for evidence of deterioration.
J	29	Engine Baffles and Seals - Check condition and security of attachment.
J	32	Engine Oil Without Oil Filter - Drain oil sump and oil cooler, clean and inspect screens, and refill with recommended grade aviation oil.
K	4	Fuel Tank or Bay Drains - Drain water and sediment.
K	6	Fuel Selector Valve - Check controls for detent in each position, security of attachment, and for proper placarding.
L	1	Propeller Mounting - Check for security of installation.
L	2	Propeller Blades - Inspect for cracks, dents, nicks, scratches, erosion, corrosion, or other damage.
L	3	Spinner - Check general condition and attachment.
M	3	Cabin Heat and Ventilation Controls - Check freedom of movement through full travel. Check friction locks for proper operation.
M	4	Pitot Tube and Stall Warning Vane - Check for condition and obstructions.
N	1	Vacuum System - Inspect for condition and security.
N	2	Vacuum System Hoses - Inspect for hardness, deterioration, looseness, or collapsed hoses.
N	4	Vacuum System Air Filter - Inspect for damage, deterioration and contamination. Clean or replace, if required. NOTE: Smoking will cause premature filter clogging.
N	5	Vacuum System relief Valve - Inspect for condition and security.
N	6	Instruments - Check general condition and markings for legibility.
N	7	Instrument Lines, Fittings, Ducting, and Instrument Panel Wiring - Check for proper routing, support, and security of attachment.
N	8	Static System - Inspect for security of installation, cleanliness, and evidence of damage.
N	9	Navigation Indicators, Controls, and Components - Inspect for condition and security.
N	12	Instrument Panel Mounted Avionics Units (Including Audio Panel, VHF Nav/Com(s), ADF, Transponder, DME, and Compass System) - Inspect for deterioration, cracks, and security of instrument panel mounts. Inspect for security of electrical connections, condition, and security of wire routing.
N	13	Avionics Operating Controls - Inspect for security and proper operation of controls and switches and ensure that all digital segments will illuminate properly.

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CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 4

Registration No. _____ Airplane Model and SN _____ Airplane Time _____
INSPECTION COMPLETED BY _____

N	14	Remote Mounted Avionics - Inspect for security of units and electrical connectors, condition and security of wire routing. Also, check for evidence of damage and cleanliness.
N	15	Microphones, Headsets, and Jacks - Inspect for cleanliness, security, and evidence of damage.
N	16	Magnetic Compass - Inspect for security of installation, cleanliness, and evidence of damage.
O	1	General Airplane and System Wiring - Inspect for proper routing, chafing, broken or loose terminals, general condition, broken or inadequate clamps, and sharp bends in wiring.
O	2	Instrument, Cabin, Navigation, Beacon, Strobe, and Landing Lights - Check operation, condition of lens, and security of attachment.
O	3	Circuit Breakers and Fuses - Check operation and condition. Check for required number of spare fuses.
O	6	Switch and Circuit Breaker Panel, Terminal Blocks, and Junction Boxes - Inspect wiring and terminals for condition and security.
O	8	Switches - Check operation, terminals, wiring, and mounting for conditions, security, and interference.
O	9	Instrument Panel and Control Pedestal - Inspect wiring, mounting, and terminals for condition and security. Check resistance between stationary panel and instrument panel for proper ground.
Q	1	Brakes - Test toe brakes and parking brake for proper operation.

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 4

SPECIAL INSPECTION AND YEARLY ITEMS

HOURS YEARS

INSPECTION
COMPLETED BY

Please review each of these items for required compliance.

B	11 Upholstery, Headliner, Trim, and Carpeting - Check condition and clean as required.	EACH 400	EACH 1	
D	3 Brake Lines, Wheel Cylinders, Hoses, Clamps, and Fittings - Check for leaks, condition, and security and hoses for bulges and deterioration. Check brake lines and hoses for proper routing and support.	EACH 400	EACH 1	
D	6 Wheel Fairings, Strut Fairings, and Cuffs - Check for cracks, dents, and condition of paint.	A		
D	11 Wheel Bearings - Clean, inspect and lube.	B		
E	4 Autopilot Rigging - Check per Avionics Installation Manual.	C		
H	5 Elevator Trim Tab Actuator - Clean, lubricate, and check free-play.	D		
J	3 Engine Controls and Linkage - Check general condition, freedom of movement through full range. Check for proper travel, security of attachment, and for evidence of wear. Check friction locks for proper operation.		E	
J	9 Induction Air Filter - Remove and clean. Inspect for damage, and service per Paragraph 2-22 and 2-22A.	F		
J	12 Alternator - Check brushes, leads, commutator or slip ring for wear.		G	
J	13 Starter, Starter Solenoid, and Electrical Connections - Check for condition of starter brushes, brush leads, and commutator.		H	
J	18 Magnetos - Check external condition, security, and electrical leads for condition. Check timing to engine and internal timing if engine timing requires adjustment.	I		
J	19 Magnetos - Check impulse coupling and stop pins for condition, replace as required.	J		
J	20 Magnetos - Inspection, lubrication and overhaul procedures.	K		
J	31 Engine Oil With Oil Filter - Drain oil sump and oil cooler, replace filter, and refill with recommended grade aviation oil.	L		
J	32 Engine Oil Without Oil Filter - Drain oil sump and oil cooler, clean and inspect screens, and refill with recommended grade aviation oil.	L		
K	2 Fuel Tanks or Integral Fuel Bays - Drain fuel and check tank interior and outlet screens.	M		
K	8 Fuel Quantity Indicators - Check for damage, security of installation, and perform accuracy test.		EACH 1	
M	1 Ventilation System - Inspect clamps, hoses, and valves for condition and security.	400	EACH 1	
N	4 Vacuum System Air Filter - Inspect for damage, deterioration and contamination. Clean or replace, if required. NOTE: Smoking will cause premature filter clogging.	N		
N	5 Vacuum System relief Valve - Inspect for condition and security.	O		
N	10 Airspeed Indicator, Vertical Speed Indicator, and Magnetic Compass - Calibrate.		EACH 2	
N	11 Altimeter and Static System - Inspect in accordance with FAR Part 91.411.		EACH 2	
O	4 Battery - Check general condition and security. Check level of electrolyte.	P		

MODEL 172 SERIES SERVICE MANUAL

CESSNA PROGRESSIVE CARE MODEL 172

OPERATION NO. 4

Special Inspections Legends:

- A. If the airplane is flown from surfaces with mud, snow, or ice, the main gear speed fairings should be checked that there is no accumulation which could prevent normal wheel rotation.
- B. First 100 hours and each 500 hours thereafter. More often if operated under prevailing wet or dusty conditions.
- C. Each 600 hours or 1 year, whichever comes first.
- D. Lubrication of the actuator is required each 1000 hours or 3 years, whichever comes first. See figure 2-5 for grease specification.
- E. Lubricate each 50 hours (except in extreme dusty conditions). These controls are not repairable and should be replaced every 1500 hours or whenever maximum linear movement exceeds .050 inch.
- F. Model 172Q: Replace polyurethane foam filter every 200 hours or on condition. Model 172 Series: Filter may be washed 20 times maximum, cleaned by compressed air 30 times maximum. Replace filter each 500 hours or 1 year, whichever comes first.
- G. Inspect each 500 hours.
- H. Check solenoid and electrical connections each 100 hours, inspect the commutator and brushes each 500 hours.
- I. If timing to engine is within tolerance - plus zero degrees, minus two degrees, internal timing will not require checking. Model 172 with 0-320-H2AD engine (1977 thru 1980): Check magnetos at first 25 hours, first 50 hours, first 100 hours, and each 100 hours thereafter. Model 172 with 0-320-D2J engine (1981 and ON), Model 172Q with 0-360-A4N engine (1983 and ON): Check magnetos at first 100 hours, and every 100 hours thereafter or each one year, whichever occurs first.
- J. Compliance with Bendix Service Bulletin 425B is required. Model 172 with 0-320-H2AD engine (1977 thru 1980): Each 500 hours.
- K.
 - 1. Inspect contact points for condition and adjust or replace as required.
 - 2. Inspect carbon brush, high-tension lead, and distributor block for condition and clean or replace as required.
 - 3. Inspect impulse coupling and pawls for condition and replace as required. Use light pressure only, do not force pin (or drill bit) when checking pawls.
 - 4. Inspect bearings and lubricate, replace bearings, if required.
 - 5. Lubricate contact point cam.
 - 6. Completely overhaul, or replace existing magneto with a new or rebuilt exchange magneto, at every engine overhaul. Refer to Overhaul and Maintenance Manual, Publication No. 1037C1-13, covering Model 4200/6200 series magnetos. Manual No. 1037C1-13 is available from Cessna Supply Division. Effectivity, Model 172 with 0-320-0-2J engine (1981 and ON) and Model 172Q with 0-360-A4N engine (1983 and ON); Each 500 hours and every engine overhaul.
- L. Model 172 with 0-320-H2AD engine (1977 thru 1980): First 25 hours. Drain oil sump, clean pressure screen or replace oil filter, and refill with MIL-L-22851 ashless dispersant oil. If oil must be added during first 25 hours, use MIL-L-6082 aviation grade straight mineral oil. If engine is not equipped with an oil filter, change oil and clean pressure screen at 50 hours, and each 50 hours thereafter. If engine is equipped with an oil filter, change oil and filter at 50 hours, and each 100 hours thereafter. Model 172 with 0-320-D2J engine (1981 and ON) and Model 172Q with 0-360-A4N engine (1983 and ON): First 25 hours. Drain oil sump, clean pressure screen or replace oil filter, and refill with MIL-L-6080 aviation grade straight mineral oil. If engine is not equipped with an oil filter, change oil and clean pressure screen at 50 hours and each 50 hours thereafter. If engine is equipped with an oil filter, change oil and filter at 50 hours and each 100 hours thereafter. Beginning with the 50-hour oil change and thereafter, refill oil sump with MIL-L-22851 ashless dispersant oil.
- M. Each 1000 hours.
- N. Replace every 500 hours.
- O. Replace filter each 100 hours.
- P. Check electrolyte level and clean battery box each 100 hours or 90 days.

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OPERATION NO. 4

MECHANIC INSPECTOR REMARKS

CABIN

1. Control Wheel Lock - Check security and operation.
2. Flight Controls - Check freedom of movement and proper operation through full travel with and without flaps extended. Check electric trim controls for operation.
3. Control Column - Inspect pulleys, cables, sprockets, bearings, chains, bungees and turnbuckles for condition and security.
4. Elevator Control - Check freedom of movement and proper operation through full travel with and without flaps extended.
5. Trim Control and Indicator - Check freedom of movement and proper operation through full travel. Check pulleys, cables, sprockets, bearings, chains, bungees, and turnbuckles for condition and security. Check electric trim controls for operation as applicable.
6. Wing Flap Control - Check operation through full travel and observe Flap Position Indicator for proper indication.
7. Rudder Pedals and Linkage - Check for general condition, proper rigging, and operation. Check for security of attachment.
8. Pilot's and Copilot's Inertia Reels - Inspect for security of installation, proper operation, and evidence of damage.
9. Seats, Seat Belts, and Shoulder Harnesses - Check general condition and security. Check operation of seat stops and adjustment mechanism. Inspect belts for condition and security of fasteners.
10. Seat Tracks and Stops - Inspect seat tracks for condition and security of installation. Check seat track stops for damage and correct location.
11. Portable Hand Fire Extinguisher - Inspect for proper operating pressure, condition, security of installation, and servicing date.

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MECHANIC INSPECTOR REMARKS

	MECHANIC	INSPECTOR	REMARKS
12. Fuel Selector Valve - Check controls for detent in each position, security of attachment, and for proper placarding.			
13. Switches - Check operation, terminals, wiring, and mounting for condition, security, and interference.			
14. Circuit Breakers and Fuses - check operation and condition. Check for required number of spare fuses.			
15. Switch and Circuit Breaker Panel, Terminal Blocks, and Junction Boxes - Inspect wiring and terminals for condition and security.			
16. Ignition Switch and Electrical Harness - Inspect for damage, condition, and security.			
17. Engine Controls, and Linkage - Check general condition, freedom of movement through full range. Check for proper travel, security of attachment, and for evidence of wear. Check friction locks for proper operation.			
18. Heater Components, Inlets, and Outlets - Inspect all lines, connections, ducts, clamps, seals, and gaskets for condition, restriction, and security.			
19. Cabin Heat and Ventilation Controls - Check freedom of movement through full travel. Check friction locks for proper operation.			
20. Instrument, Cabin, Navigation, Beacon, Strobe, and Landing Lights - Check operation, condition of lens, and security of attachment.			
21. Microphones, Headsets, and Jacks - Inspect for cleanliness, security, and evidence of damage.			
22. Instrument Lines, Fittings, Ducting, and Instrument Panel Wiring - Check for proper routing, support, and security of attachment.			
23. General Airplane and System Wiring - Inspect for proper routing, chafing, broken or loose terminals, general condition, broken or inadequate clamps, and sharp bends in wiring.			

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MECHANIC INSPECTOR REMARKS

24.	Instrument Panel and Control Pedestal - Inspect wiring, mounting, and terminals for condition and security. Check resistance between stationary panel and instrument panel for proper ground.	
25.	Navigation Indicators, Controls, and Components - Inspect for condition and security.	
26.	Instrument Panel Mounted Avionics Units (Including Audio Panel, VHF Nav/Com(s), ADF, Transponder, DME, and Compass System - Inspect for deterioration, cracks, and security of instrument panel mounts. Inspect for security of electrical connections, condition, and security of wire routing.	
27.	Avionics Operating Controls - Inspect for security and proper operation of control and switches and ensure that all digital segments will illuminate properly.	
28.	Vacuum System - Inspect for condition and security.	
29.	Vacuum System Hoses - Inspect for hardness, deterioration, looseness, or collapsed hoses.	
30.	Vacuum System Relief Valve - Inspect for condition and security.	
31.	Vacuum System Air Filter - Inspect for damage, deterioration, and contamination. Clean or replace, if required.	
32.	Instrument Panel Shock Mounts, Ground Straps, and Covers - Inspect for deterioration, cracks, and security of attachment.	
33.	Instruments - Check general condition and markings for legibility.	
34.	Windows, Windshield, Doors, and Seals - Inspect general condition. Check latches, hinges, and seals for condition, operation, and security of attachment.	
35.	Placards and Decals - Inspect presence, legibility, and security. Consult Pilot's Operating Handbook and FAA-approved Airplane Flight Manual for required placards.	
36.	Magnetic Compass - Inspect for security of installation, cleanliness, and evidence of damage.	

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		MECHANIC	INSPECTOR	REMARKS
ENGINE				
1.	Cowling - Inspect for cracks, dents, and other damage, security of cowl fasteners, and cowl mounted landing lights for attachment.			
2.	Engine - Inspect for evidence of oil and fuel leaks. Wash engine and check for security of accessories.			
3.	Induction System - Check security of clamps, tubes, and ducting. Inspect for evidence of leakage.			
4.	Induction Airbox, Valves, Doors, and Controls - Remove air filter and inspect hinges, doors, seals, and attaching parts for wear and security. Check operation. Clean and inspect air filter and re-oil if flock-coated.			
5.	Induction Air Filter - Remove and clean. Inspect for damage, and service per paragraphs 2-22 and 2-22A.			
6.	Alternate Induction Air System - Check for obstructions, operation, and security.			
7.	Oil Cooler - Check for obstructions, leaks, and security of attachment.			
8.	Hoses, Metal Lines, and Fittings - Inspect for signs of oil and fuel leaks. Check for abrasions, chafing, security, proper routing and support and for evidence of deterioration.			
9.	Firewall Structure - Inspect for wrinkles, damage, cracks, sheared rivets, etc. Check cowl shock mounts for condition and security.			
10.	Fuel Strainer, Drain Valve, and Control - Check freedom of movement, security, and proper operation. disassemble, flush, and clean screen and bowl.			
11.	Vacuum Pump - Check for condition and security. Check vacuum system breather line for obstructions, condition, and security.			
12.	Engine Shock Mounts, Engine Mount Structure, and Ground Straps - Check condition, security, and alignment.			

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		MECHANIC	INSPECTOR	REMARKS
13.	Alternator, Mounting Bracket, and Electrical Connections - Check condition and security. Check alternator belts for condition and proper adjustment. Check belt tension per paragraph 16-38.			
14.	Alternator Control Unit - Inspect wiring, mounting, condition, and wire routing.			
15.	Auxiliary (Electric) (172Q) Fuel Pump - Check pump and fittings for condition, operation, security. Remove and clean filter (as applicable).			
16.	Engine-Driven Fuel Pump - Check for evidence of leakage, security of attachment, and general condition.			
17.	Engine Baffles and Seals - Check condition and security of attachment.			
18.	Exhaust System - Inspect for cracks and security, special check in area of heat exchanger.			
19.	Heater Components - Inspect all components for condition and security.			
20.	Ignition Harness and Insulators - Check for proper routing, deterioration, and condition of terminals.			
21.	Spark Plugs - Remove, clean analyze, test, gap, and rotate top plugs-to-bottom and bottom plugs-to-top.			
22.	Carburetor - Drain and flush carburetor bowl and clean inlet strainer. Check general condition and security.			
23.	Engine Primer - Check for leakage, operation, and security.			
24.	Engine Cylinders, Rocker Box Covers, and Pushrod Housings - Check for fin damage, cracks, oil leakage, security of attachment, and general condition.			
25.	Crankcase, Oil Sump, and Accessory Section - Inspect for cracks and evidence of oil leakage. Check bolts and nuts for looseness and retorque as necessary. Check crankcase breather lines for obstructions, security, and general condition.			

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		MECHANIC	INSPECTOR	REMARKS
26.	Cold and Hot Air Hoses - Check condition, routing, and security.			
27.	Cylinder Compression - Perform differential compression test.			
PROPELLER				
1.	Propeller Blades - Inspect for cracks, dents, nicks, scratches, erosion, corrosion, or other damage.			
2.	Spinner - Check general condition and attachment.			
3.	Spinner and Spinner Bulkhead - Remove spinner, wash, and inspect for cracks and fractures.			
4.	Propeller Mounting - Check for security of installation.			
5.	Propeller Mounting Bolts - Inspect mounting bolts and safety-wire for signs of looseness. Retorque mounting bolts as required.			
6.	Propeller Hub - Check general condition.			
WINGS				
1.	Wing Surfaces and Tips - Inspect for skin damage, loose rivets, and condition of paint.			
2.	Wing Struts and Strut Fairings - Check for dents, cracks, loose screws and rivets, and condition of paint.			
3.	Wing Spar and Wing Strut Fittings - Check for evidence of wear. Check attach bolts for indications of looseness and retorque as required.			
4.	Wing Access Plates - Check for damage and security of installation.			
5.	Pitot Tube and Stall Warning Vane - Check for condition and obstructions.			
6.	General Airplane and System Wiring - Inspect for proper routing, chafing, broken or loose terminals, general condition, broken or inadequate clamps, and sharp bends in wiring.			

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MECHANIC INSPECTOR REMARKS

7.	Metal Lines, Hoses, Clamps, and Fittings - Check for leaks, condition, and security. Check for proper routing and support.		
8.	Fuel Tank Vent Lines - Check vent lines for obstruction and proper positioning.		
9.	Fuel System - Inspect plumbing and components for mounting and security.		
10.	Fuel Tank or Bay Drains - Drain water and sediment.		
11.	Fuel Tanks or Integral Fuel Bays - Check for leakage and condition of fuel caps, adapters, and placards.		
12.	Wing Structure - Inspect spars, ribs, skins, and stringers for cracks, wrinkles, loose rivets, corrosion, or other damage.		
13.	Placards and Decals - Inspect presence, legibility, and security. Consult Pilot's Operating Handbook and FAA-Approved Airplane Manual for required placards.		
14.	Aileron Structure, Control Rods, Hinges, Balance Weights, Bellcranks, Linkage, Bolts, Pulleys, and Pulley Brackets - Check condition, operation, and security of attachment.		
15.	Ailerons and Hinges - Check condition, security, and operation.		
16.	Aileron Controls - Check freedom of movement and proper operation through full travel with and without flaps extended.		
17.	Ailerons and Cables - Check operation and security of stops. Check cables for tension, routing, fraying, corrosion, and turnbuckle safety. Check travel if cable tension requires adjustment or if stops are damaged. Check fairleads and rub strips for condition.		
18.	Flap Structure, Linkage, Bellcranks, Pulleys, and Pulley Brackets - Check for condition, operation, and security.		
19.	Flaps - Check tracks, rollers, and control rods for security of attachment. Check operation.		

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	MECHANIC	INSPECTOR	REMARKS

20.	Flaps and Cables - Check cables for proper tension, routing, fraying, corrosion, and turnbuckle safety. Check travel if cable tension requires adjustment.		

21.	Flap Motor, Actuator, and Limit Switches (electric flaps) - Check wiring and terminals for condition and security. Check actuator for condition and security.		

22.	Flap Actuator Threads - Clean and lubricate.		

LANDING GEAR

1.	Nose Gear Attachment Structure - Inspect for cracks, corrosion, or other damage. Check for security of attachment.		

2.	Nose Gear - Inspect torque links, steering rods, and boots for condition and security of attachment. Check strut for evidence of leakage and proper extension. Check strut barrel for corrosion, pitting, and cleanliness. Check shimmy damper and/or bungees for operation, leakage, and attach points for wear and security.		

3.	Nose Gear Fork - Inspect for cracks, general condition, and security of attachment.		

4.	Nose Gear Steering Mechanism - Check for wear, security, and proper rigging.		

5.	Tires - Check tread wear and general condition. Check for proper inflation.		

6.	Wheels, Brake Discs, and Linings - Inspect for wear, cracks, warps, dents, or other damage. Check wheel through-bolts and nuts for evidence of looseness.		

7.	Brakes - Test toe brakes and parking brake for proper operation.		

8.	Brakes, Master Cylinders, and Parking Brake - Check master cylinders and parking brake mechanism for condition and security. Check fluid level and test operation.		

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MECHANIC INSPECTOR REMARKS

EMPENNAGE

1. Vertical and Horizontal Stabilizers, Tips and Tailcone - Inspect externally for skin damage and condition of paint.
2. Vertical and Horizontal Stabilizers and Tailcone Structure - Inspect bulkheads, spars, ribs, and skins for cracks, wrinkles, loose rivets, corrosion, or other damage. Inspect vertical and horizontal stabilizer attach bolts for looseness. Retorque as necessary. Check security of inspection covers, fairings, and tips.
3. Elevator, Hinges, and Cable Attachment - Check condition, security, and operation.
4. Elevator Trim Tab and Hinges - Check condition, security, and operation.
5. Elevator Trim Tab Actuator - Free-play limits inspection.
6. Elevator Trim System - Check cables, push-pull rods, bellcranks, pulleys, turnbuckles, fairleads, rub strips, etc. for proper routing, condition, and security.
7. Elevator Control System - Inspect pulleys, cables, sprockets, bearings, chains, and turnbuckles for condition, security, and operation.
8. Rudder - Inspect the rudder skins for cracks and loose rivets, rudder hinges for condition, cracks and security; hinge bolts, hinge bearings, hinge attach fittings, and bonding jumper for evidence of damage and wear, failed fasteners, and security. Inspect the rudder hinge bolts for proper safetying of nuts with cotter pins. Inspect balance weight for looseness and the supporting structure for damage.
9. Rudder, Tips, Hinges, and Cable Attachment - Check condition, security, and operation.
10. Rudder - Check internal surfaces for corrosion, condition of fasteners, and balance weight attachment.
11. General Airplane and System Wiring - Inspect for proper routing, chafing, broken or loose terminals, general condition, broken or inadequate clamps, and sharp bends in wiring.

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OPERATION NO. 4

MECHANIC INSPECTOR REMARKS

SPECIAL INSPECTION ITEMS

1. Check and accomplish all Special Inspection items due.

POST INSPECTION

1. Replace all fairings, doors, floorboard and wing access covers. Ground check engine, alternator charging rate (28 volts minimum), oil pressure/oil temperature, fuel quantity indicator, rpm indicator, flight instruments, and general operating components.

SERVICE BULLETINS/AIRWORTHINESS DIRECTIVES

1. Check that all applicable Cessna Service Bulletins, Service Newsletters, and Supplier Service Notices are complied with.
2. Check that all applicable Airworthiness Directives and Federal Aviation Regulations are complied with.
3. Ensure all Maintenance Record Entries required by Federal Aviation Regulations are completed before returning the airplane to service.

OPERATION NO. 4 COMPLETED

AIRPLANE MODEL/SERIAL _____ REGISTRATION NO. _____

AIRPLANE HOURS _____ DATE _____

I certify that this operation was performed on the above airplane and that this airplane is approved for return to service.

SUPERVISOR MECHANIC _____ AIRPLANE INSPECTOR _____

CERTIFICATE NO. _____ CERTIFICATE NO. _____

COMPANY NAME _____

ADDRESS _____ CITY _____ STATE _____

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SECTION 3

FUSELAGE

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3-1. FUSELAGE.

3-2. WINDSHIELD AND WINDOWS. (See figure 3-1.)

3-3. **DESCRIPTION.** The windshield and windows are single-piece, acrylic panels, set in sealing strips and held by formed retaining strips, secured to the fuselage with screws and rivets. FS-4291 sealer (TMK01 Kit, Supply Division Cessna Aircraft Company, P.O. Box 949, Wichita, KS 67201 316/685-9111, Telex 417-489) is applied to all edges of the windshield and windows, with exception of the wing root area. The wing root fairing has a heavy strip that completes the windshield sealing.

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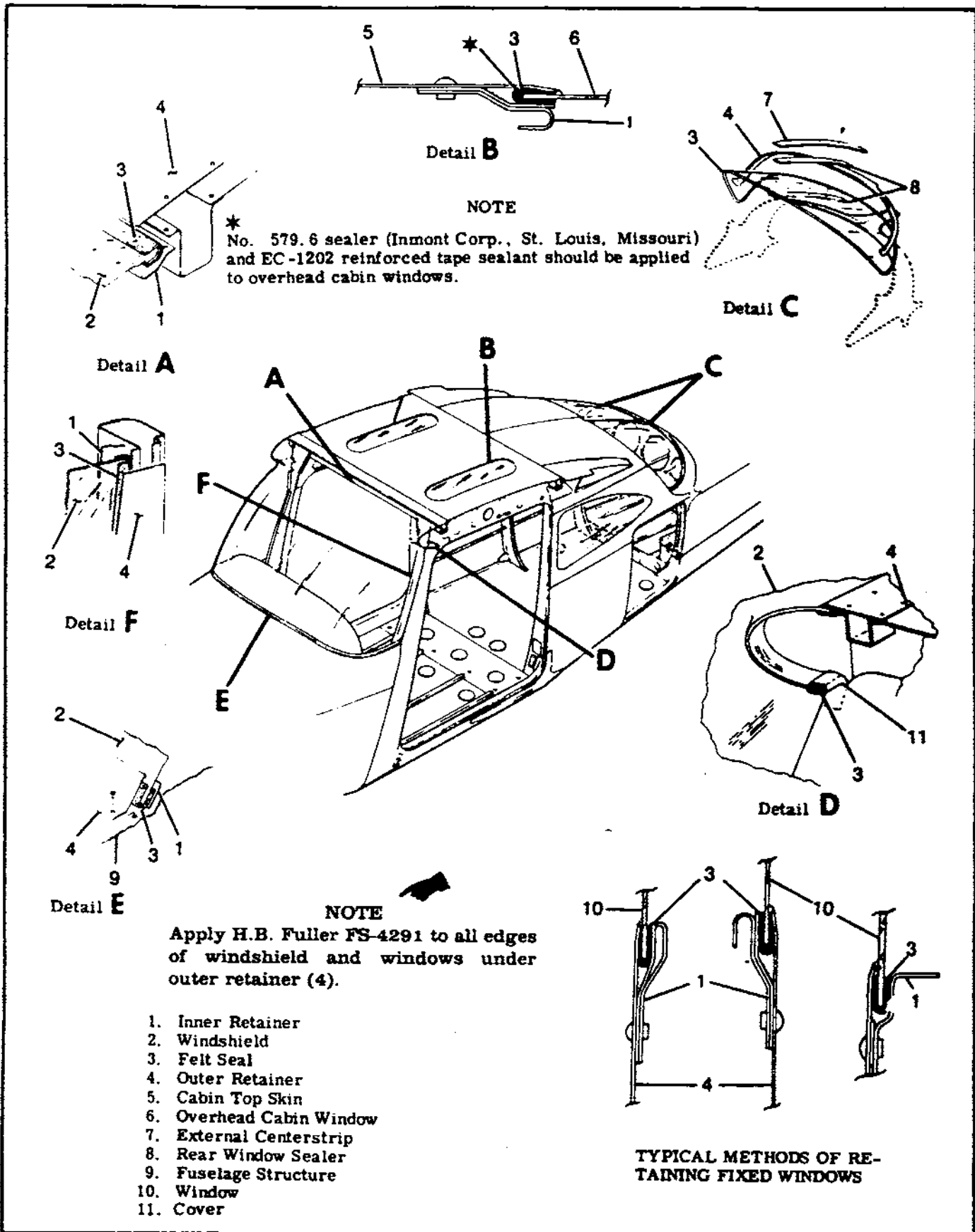


Figure 3-1. Windshield and Fixed Window Installation

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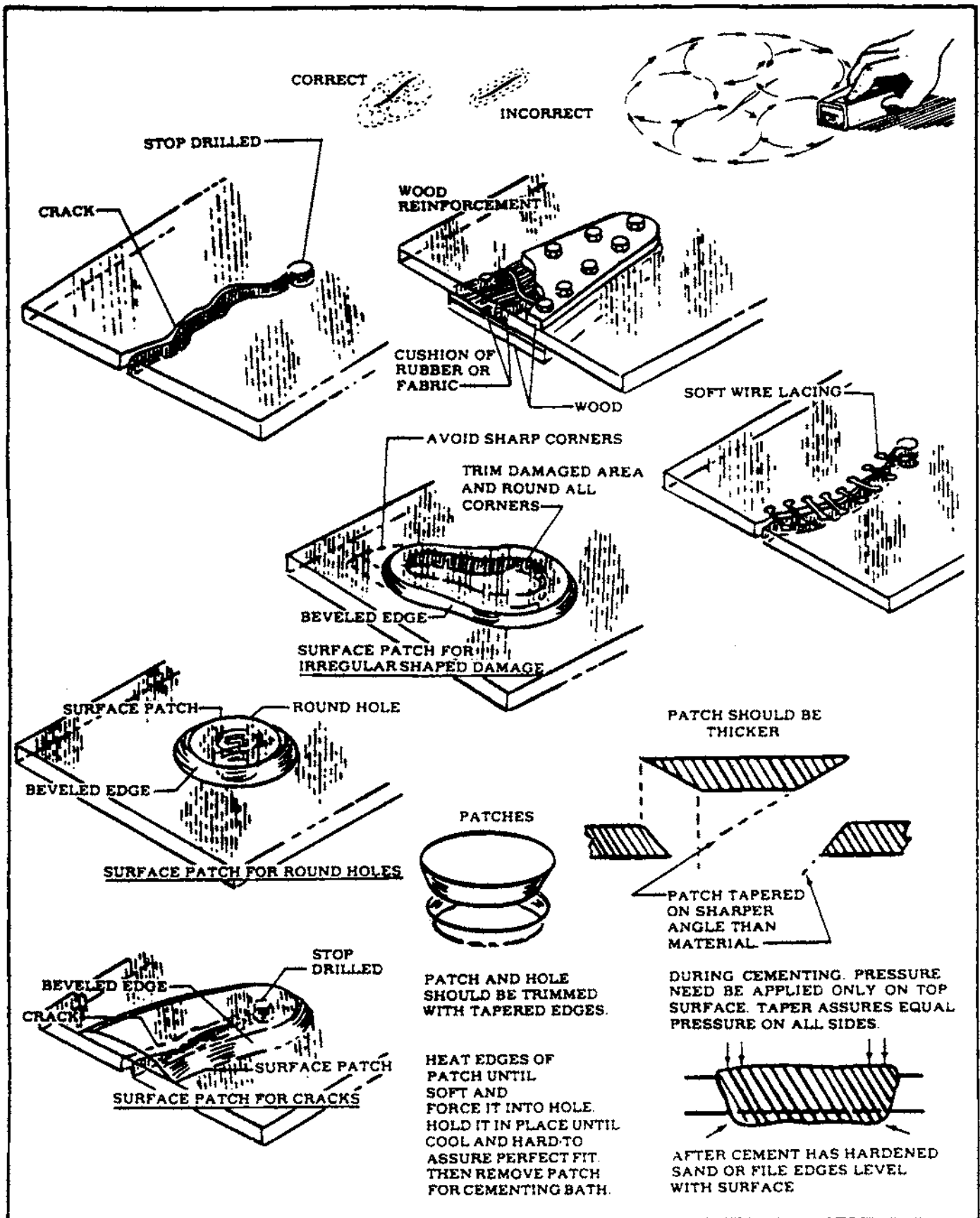


Figure 3-2. Repair of Windshield and Windows

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3-4. CLEANING and WAXING. (Refer to Section 2.)

3-5. WINDSHIELD AND WINDOW INSTALLATION TECHNIQUES:

Special drills must be used when drilling holes in acrylic. Standard drill will cause the hole to be oversized, distorted, or excessively chipped.

Whenever possible, a coolant such as a plastic drilling wax should be used to lubricate the drill bit. Cessna recommends "Reliance" drill wax or Johnson No. 140 Stick Wax.

Drilled holes should be smooth with a finish of 125 rhr.

The feed and speed of the drill is critical. The following chart indicates drill speed for various thicknesses of acrylic.

Material Thickness	Drill Speed
1/16" to 3/16"	1500 to 4500 rpm
1/4" to 3/8"	1500 to 2000 rpm
7/16"	1000 to 1500 rpm
1/2"	500 to 1000 rpm
3/4"	500 to 800 rpm
1"	500 rpm

Specifications for the twist drill used to drill acrylics is as follows:

NOTES

Shallow holes - when hole depth to hole diameter ratio is less than 1.5 to 1, the drill shall have an included tip angle of 55 degrees to 60 degrees and a lip clearance angle of 15 degrees to 20 degrees.

Medium deep holes - when hole depth to hole diameter ratio is from 1.5 to 1 up to 3 to 1, the drill shall have an included tip angle of 60 degrees to 140 degrees and a lip clearance angle of 15 degrees to 20 degrees.

Deep holes - when hole depth to hole diameter ratio is greater than 3.0 to 1, the drill shall have an included tip angle of 140 degrees and a lip clearance of 12 degrees to 15 degrees.

Parts which must have holes drilled shall be backed up with a drill fixture. Holes may be drilled through the part from one side. However, less chipping around holes will occur if holes are drilled by drilling the holes from both sides. This is accomplished by using a drill with an acrylic backup piece on the opposite side. Remove the drill from the hole and switch the backup plate and finish drilling from the opposite side.

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- 3-6. **REPAIR.** (See figure 3-2.) Replace extensively damaged transparent plastic rather than repair whenever possible, since even a carefully patched part is not the equal of a new section, either optically or structurally. At the first sign of crack development, drill a small hole at the extreme end of the crack as shown in figure 3-1. This serves to localize the cracks and to prevent further splitting by distributing the strain over a large area. If the cracks are small, stopping them with drilled holes will usually suffice until replacement or more permanent repair can be made. The following repairs are permissible; however, they are not to be located in the pilot's line of vision during landing or normal flight.

- a. **SURFACE PATCH.** If a surface patch is to be installed, trim away the damaged area and round all corners. Cut a piece of plastic of sufficient size to cover the damaged area and extend at least 3/4-inch on each side of the crack or hole. Bevel the edges as shown in figure 3-1. If the section to be repaired is curved, shape the patch to the same contour by heating it in an oil bath at a temperature of 248° to 302°F., or it may be heated on a hot plate until soft. Boiling water should not be used for heating. Coat the patch evenly with plastic solvent adhesive and place immediately over the hole. Maintain a uniform pressure of from 5 to 10 psi on the patch for a minimum of three hours. Allow the patch to dry 24 to 36 hours before sanding or polishing is attempted.
- b. **PLUG PATCH.** In using inserted patches to repair holes in plastic structures, trim the holes to a perfect circle or oval and bevel the edges slightly. Make the patch slightly thicker than the material being repaired, and similarly bevel the edges. Install patches in accordance with procedures illustrated in figure 3-1. Heat the plug until soft and press into the hole without cement and allow to cool to make a perfect fit. Remove the plug, coat the edges with adhesive, and then reinsert in the hole. Maintain a firm light pressure until the cement has set, then sand or file the edges level with the surface; buff and polish.

- 3-7. **SCRATCHES.** (See figure 3-2.) Scratches on clear plastic surfaces can be removed by hand-sanding operations, followed by buffing and polishing, if the steps below are followed carefully.

- a. Wrap a piece of No. 320 (or finer) sandpaper or abrasive cloth around a rubber pad or wood block. Rub surface around scratch with a circular motion, keeping abrasive constantly wet with clean water to prevent scratching surface further. Use minimum pressure and cover an area large enough to prevent formation of "bull's-eyes" or other optical distortions.

CAUTION

Do not use a coarse grade of abrasive. No. 320 is of maximum coarseness.

- b. Continue sanding operation, using progressively finer grade abrasives until scratches disappear.
- c. When scratches have been removed, wash area thoroughly with clean water to remove all gritty particles. The entire sanded area will be clouded with minute scratches which must be removed to restore transparency.
- d. Apply fresh tallow or buffing compound to a motor-driven buffing wheel. Hold wheel against plastic surface, moving it constantly over damaged area until cloudy appearance disappears. A 2000-foot-per-minute surface speed is recommended to

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prevent overheating and distortion. (Example: 750 rpm polishing machine with a 10-inch buffing bonnet.)

NOTE

Polishing can be accomplished by hand, but will require a considerably longer period of time to attain the same result as produced by a buffing wheel.

- e. When buffing is finished, wash area thoroughly and dry with a soft flannel cloth. Allow surface to cool and inspect area to determine if full transparency has been restored. Apply a thin coat of hard wax and polish surface lightly with a clean flannel cloth.

NOTE

Rubbing plastic surface with a dry cloth will build up an electrostatic charge which attracts dirt particles and may eventually cause scratching of surface. After wax has hardened, dissipate this charge by rubbing surface with a slightly damp chamois. This will also remove dust particles which have collected while wax is hardening.

- f. Minute hairline scratches can often be removed by rubbing with commercial automobile body cleaner or fine-grade rubbing compound. Apply with a soft, clean, dry cloth or imitation chamois.

3-8. CRACKS. (See figure 3-2.)

- a. When a crack appears, drill a hole at end of crack to prevent further spreading. Hole should be approximately 1/8-inch diameter, depending on length of crack and thickness of material.
- b. Temporary repairs to flat surfaces can be accomplished by placing a thin strip of wood over each side of the surface and inserting small bolts through the wood and plastic. A cushion of sheet rubber or aircraft fabric should be placed between wood and plastic on both sides.
- c. A temporary repair can be made by drilling small holes along both sides of crack. 1/4 to 1/8-inch apart and lacing edges together with soft wire. Small-stranded antenna wire makes a good temporary lacing material. This type of repair is used as a temporary measure ONLY, and as soon as facilities are available, panel should be replaced.

3-9. WINDSHIELD. (See figure 3-1.)

3-10. REMOVAL.

- a. Remove wing fairings.
- b. Remove air vent tubes.

CAUTION

If windshield is to be reinstalled, be sure to protect windshield during removal.

- c. With two people sitting in the airplane placing their feet against the windshield, just above the centerline, press upward on windshield forcing it out of lower retainers.
- d. Clean sealer from inner sidewalls and bottom of retainers.

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3-11. INSTALLATION.

- a. If windshield is to be reinstalled, clean off old sealer and felt, then install new felt around edges of windshield.
- b. If new windshield is to be installed, remove protective cover and clean, take care not to scratch windshield.
- c. Apply new felt to edges of windshield.
- d. Apply a strip of sealer (H.B. Fuller FS-4291) along the sides and bottom of felt.
- e. Position the bottom edge of windshield into lower retainer.
- f. Using a piece of bent sheet metal (8 in. wide x length of top edge of windshield) placed under top edge of upper retainer, bow windshield and guide top edge of windshield into upper retainer using bent sheet metal in a shoe horn effect.
- g. Install air vent tube.
- h. Install wing fairings.

3-12. WINDOWS. (See figures 3-1 and 3-3.)

3-13. **MOVABLE WINDOW.** (See figure 3-3.) A movable window, hinged at the top, is installed in the left cabin door, and optionally installed in the right cabin door.

3-14. REMOVAL AND INSTALLATION. (See figure 3-3.)

- a. Disconnect window stop (5).
- b. Remove pins from window hinges (6).
- c. Reverse preceding steps for installation. To remove frame from plastic panel, drill out blind rivets at frame splice. When replacing plastic panel in frame, ensure sealing strip and an adequate coating of Presstite No. 579.6 sealing compound is used around all edges of panel.

3-15. **WRAP-AROUND REAR WINDOW.** (See figure 3-1.) The rear window is a one-piece, acrylic plastic panel, set in sealing strips and held in place by retaining strips.

3-16. REMOVAL AND INSTALLATION. (See figure 3-1.)

- a. Removal external centerstrip (7).
- b. Remove upholstery as necessary to expose retainer strips inside cabin.
- c. Drill out rivets as necessary to remove outer retainer strip along aft edge of window.
- d. Remove window by lifting aft edge and pulling window aft. If difficulty is encountered, rivets securing retainer strips inside cabin may also be drilled out and retainer strips loosened or removed.
- e. Reverse preceding steps for installation. Apply felt strip and sealing compound to all edges of window to prevent leaks. Check fit and carefully file or grind away excess plastic. Use care not to crack plastic while installing.

3-17. **OVERHEAD WINDOW.** (See figure 3-1.) Overhead cabin windows, located in the cabin top, may be installed. These windows are one-piece, acrylic plastic panels, set in sealing strips and held in place by retaining strips.

3-18. REMOVAL AND INSTALLATION. (See figure 3-1.)

- a. Remove headliner and trim panels.
- b. Drill out rivets as necessary to remove retainer strips.
- c. Reverse preceding steps for installation. Apply felt strip and sealing compound to all edges of window to prevent leaks. Check fit and carefully file or grind away excess plastic. Use care not to crack plastic when installing.

3-19. **FIXED.** (See figure 3-1.) Fixed windows, mounted in sealing strips and sealing compound, are held in place by various retainer strips. To replace side windows, remove upholstery and trim panels as necessary, and drill out rivets securing retainers. Apply felt strip and sealing

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compound to all edges of window to prevent leaks. Check fit and file or grind away excess plastic. Use care not to crack plaster when installing.

3-20. CABIN DOORS. (See figure 3-3.)

3-21. **DESCRIPTION.** A cabin door is installed on each side of the aircraft consisting of a sheet outer skin chemically bonded to a formed inner pan assembly. To this rigid structure are attached the door latch assembly, a remote inside handle, a pair of external hinges, and an integral doorstop assembly. An openable window is installed on the LH door and may also be optionally installed on the RH door.

3-22. **REMOVAL AND INSTALLATION.** (See figure 3-3.) Removal of cabin doors is accomplished either by removing screws attaching the door hinges or by removing hinge pins.

NOTE

Ensure clevis pin (index 21, figure 3-3) is removed before removing door.

During reinstallation permanent-type hinge pins may be replaced with clevis pins secured with cotter pins.

3-23. **ADJUSTMENT.** Cabin doors should be adjusted so that door skin fairs smoothly with fuselage skin. Slots at door latch plate permit re-positioning of latch assembly and bolt engagement with rotary clutch on door post. If fitting a new door assembly, some trimming of door flange may be necessary, but gap between door skin and fuselage skin should be 0.09-inch or less.

CAUTION

Reforming of bonded door flange by striking with soft mallet, etc. is NOT permissible, due to possible damage to bonded areas.

3-24. **CABIN DOOR WEATHERSTRIP.** A hollow, fluted-type, rubber weatherstrip is cemented around all edges of the cabin door. When replacing weatherstrip, ensure that contact surfaces are clean and dry. Cut new weatherstrip to length, using old weatherstrip as a guide. Cut small notch in butt ends of new weatherstrip to allow for drainage. Position splice with notch at door low point and apply a thin, even coat of EC-1300L adhesive (3M Company) or equivalent to both surfaces. Allow to dry until tacky before pressing into place on door. Do not stretch weatherstrip around door corners.

3-25. **LATCHES** (Thru 17275034 and F17202134). (See figure 3-4.)

3-26. **DESCRIPTION.** The cabin door latch is a push-pull bolt type, utilizing a rotary clutch for positive bolt engagement. As door is closed, teeth on underside of bolt engage gear teeth on clutch. The clutch gear rotates in one direction only and holds door until handle is moved to LOCK position, driving bolt into slot.

3-27. **ADJUSTMENT.** Adjustment of latch or clutch cover is afforded by oversize and/or slotted holes. This adjustment ensures sufficient gear-to-bolt engagement and proper alignment.

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NOTE

Right-hand door installation is shown. Openable window is optional equipment on RH door and standard equipment on LH door.

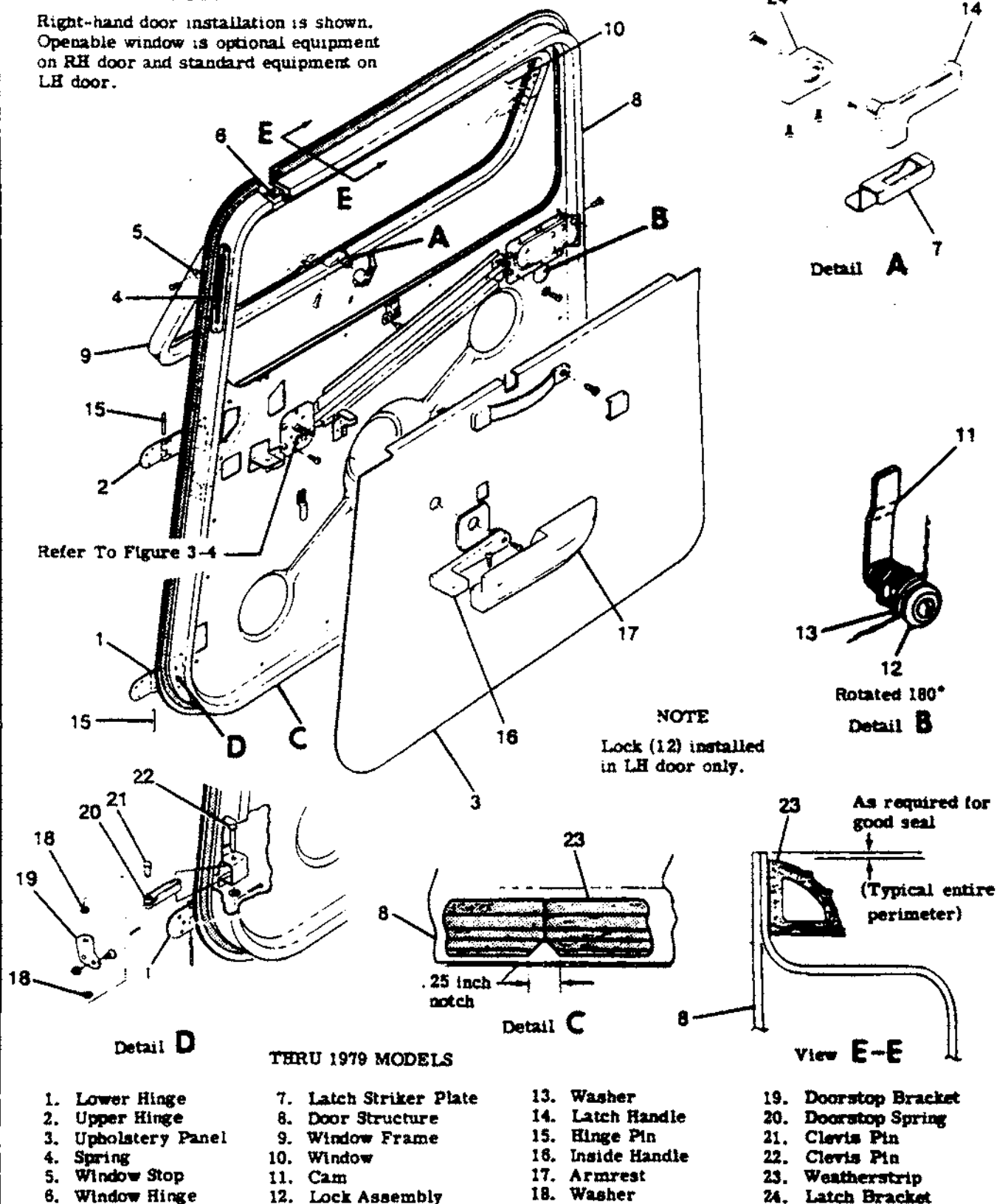
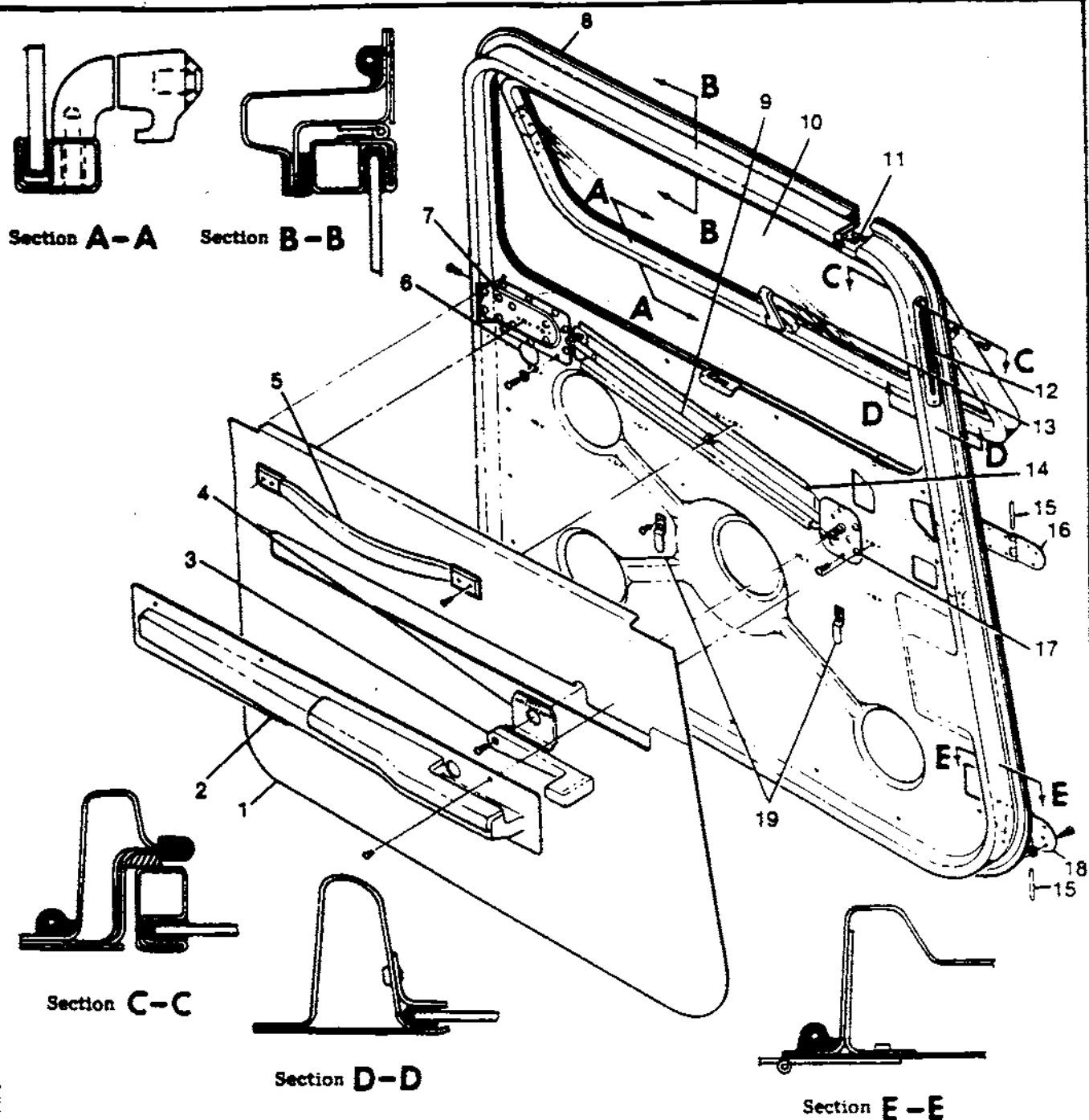


Figure 3-3. Cabin Door Installation (Sheet 1 of 2)

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BEGINNING WITH 1980 MODELS

1. Trim Panel
2. Arm Rest
3. Inside Handle
4. Escutcheon
5. Door Pull Assembly
6. Lock Assembly Mounting Hole

7. Latch Assembly
8. Weatherstrip
9. Push-Pull Rod
10. Window Assembly
11. Hinge Assembly
12. Spring

13. Latch Assembly
14. Channel
15. Hinge Pin
16. Upper Hinge
17. Base Plate
18. Lower Hinge
19. Upholstery Clip

Figure 3-3. Cabin Door Installation (Sheet 2 of 2)

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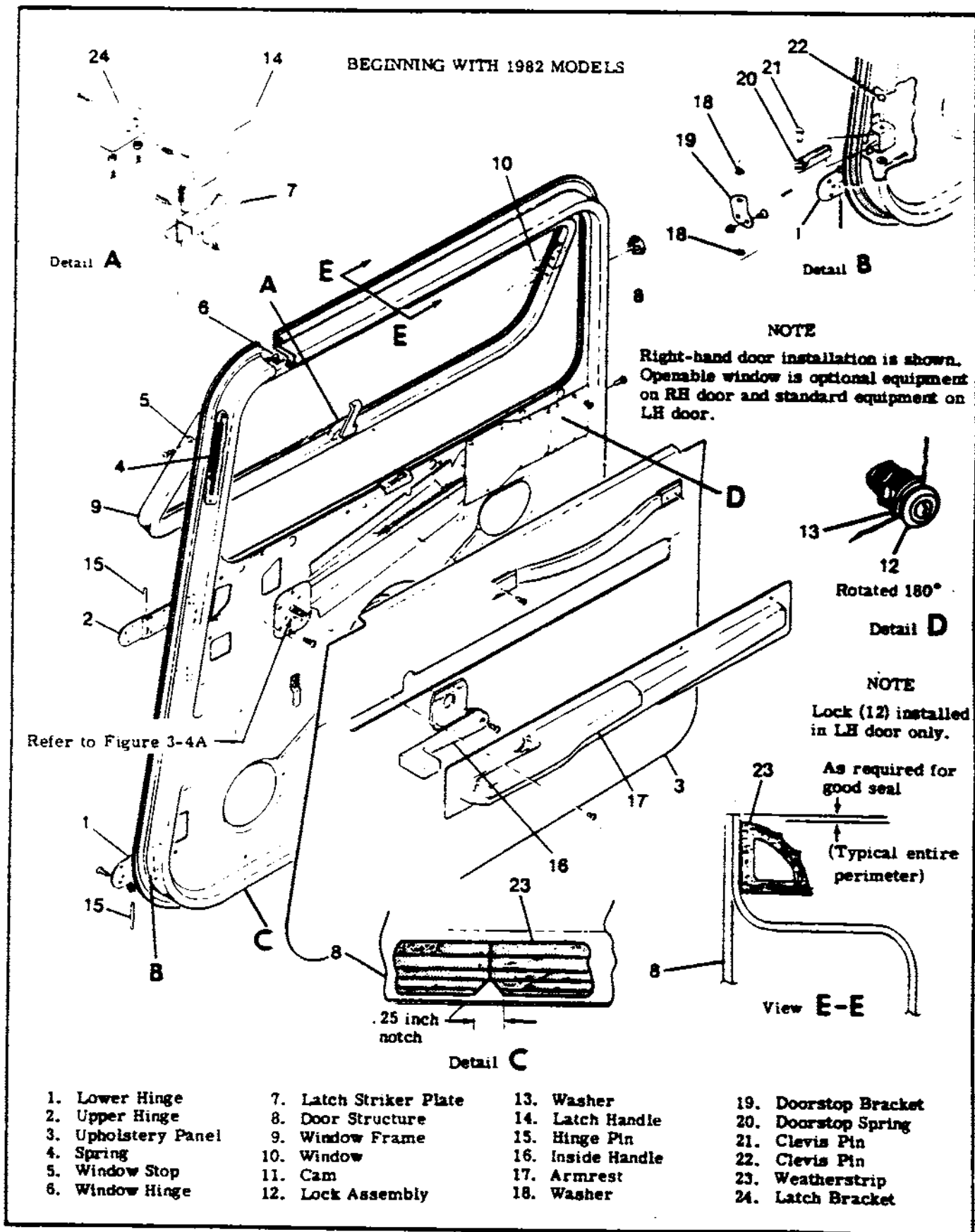


Figure 3-3. Cabin Door Installation (Sheet 3 of 3)

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NOTE

Lubricate door latch per Section 2. No lubrication is recommended for the rotary clutch.

- 3-28. **LOCK.** In addition to interior locks, a cylinder and key-type lock is installed on left door. If lock is to be replaced, the new lock may be modified to accept the original key. This is desirable, as the same key is used for ignition switch and cabin door lock. After removing old lock from door, proceed as follows:
- Remove lock cylinder from new housing.
 - Insert original key into new cylinder and file off any protruding tumblers flush with cylinder. Without removing key, check that cylinder rotates freely in housing.
 - Install lock assembly in door and check lock operation with door open.
 - Destroy new key and disregard code number on cylinder.
- 3-29. **INDEXING INSIDE DOOR HANDLE.** (See figure 3-4.) When inside door handle is removed, reinstall in relation to position of bolt (7), which is spring-loaded to the CLOSE position. The following procedure may be used.
- Temporarily install handle (17) on shaft assembly (12), approximately vertical.
 - Move handle (17) back and forth until handle centers in spring-loaded position.
 - Without rotating shaft assembly (12), remove handle (17) and install placard (18) with CLOSE index at top.
 - Install handle (17) to align with CLOSE index on placard (18), using screw (16).
 - Install arm rest (15) on upholstery panel (14).
- 3-29A. **LATCHES** (Beginning with 17275035 and F17202135). (See figure 3-4A).
- 3-29B. **DESCRIPTION.** The cabin door latch consists of a two-piece nylon latch base, exterior handle, spring-loaded latch bolt/pull-bar assembly, and a spring-loaded catch/trigger pin assembly. The interior handle base plate assembly is directly connected to the cabin door latch by means of an adjustable push rod assembly. This push rod assembly has one clamp on the main rod. This clamp is used to operate a cable assembly that drives a cable pin from the upper aft end of the cabin door into the aft upper door sill. When the cabin door is open, the door latch exterior handle should be extended (out), held in this position by means of the spring-loaded latch catch engaged with the latch bolt through the beveled hole in the bolt. The push rod assembly will be moved forward, and the attached cable assembly will be retracted from the upper door sill with the cable pin recessed in the pin guide, located in the upper aft corner of the door. The interior handle, being directly connected by means of the push rod, will be moved approximately 15° aft of the vertical position. Closing the cabin door drives the trigger pin over the nylon actuator attached to the cover plate, located on the rear doorpost. As the trigger pin is driven forward, it disengages the latch catch from the latch bolt. The extended extension springs, attached to the latch handle and bolt/pull bar assembly, compress, pulling the latch handle in, and driving the latch bolt over the latch striker, located on the rear doorpost. Pushing the exterior handle flush with the fuselage skin. The push rod assembly, attached to the latch bolt/pull bar assembly, moves aft, which also drives the cable pin from the pin guide in the door into the upper aft door sill receptacle. The interior door handle has now moved from approximately 15° aft of vertical to approximately 45° forward of vertical. Pushing the interior handle to the horizontal position, flush with the arm rest, will overcenter the door latch, securing the door for flight. The cabin door latch assembly also incorporates a locking arm and locking pin, used with a key lock to secure the aircraft after use. With the cabin door closed, and the exterior latch handle flush, actuating the key lock drives the locking pin into the exterior latch handle, locking the aircraft. It is important to note that since the cabin door latch assembly and the interior handle base plate assembly are directly connected by the push rod assembly, that any amount of force

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● 17267585 thru 17275034
F17201515 thru F17202134
Adjust door bolt by changing
length of push-rod.

1. Bearing Assembly
2. Nut
3. Spacer
4. Push-Pull Rod
5. Base Plate
6. Roll Pin
7. Bolt
8. Housing
9. Outside Handle
10. Spring
11. Support
12. Shaft Assembly
13. Screw
14. Upholstery Panel
15. Armrest
16. Screw
17. Inside Handle
18. Placard
19. Pivot Base Plate

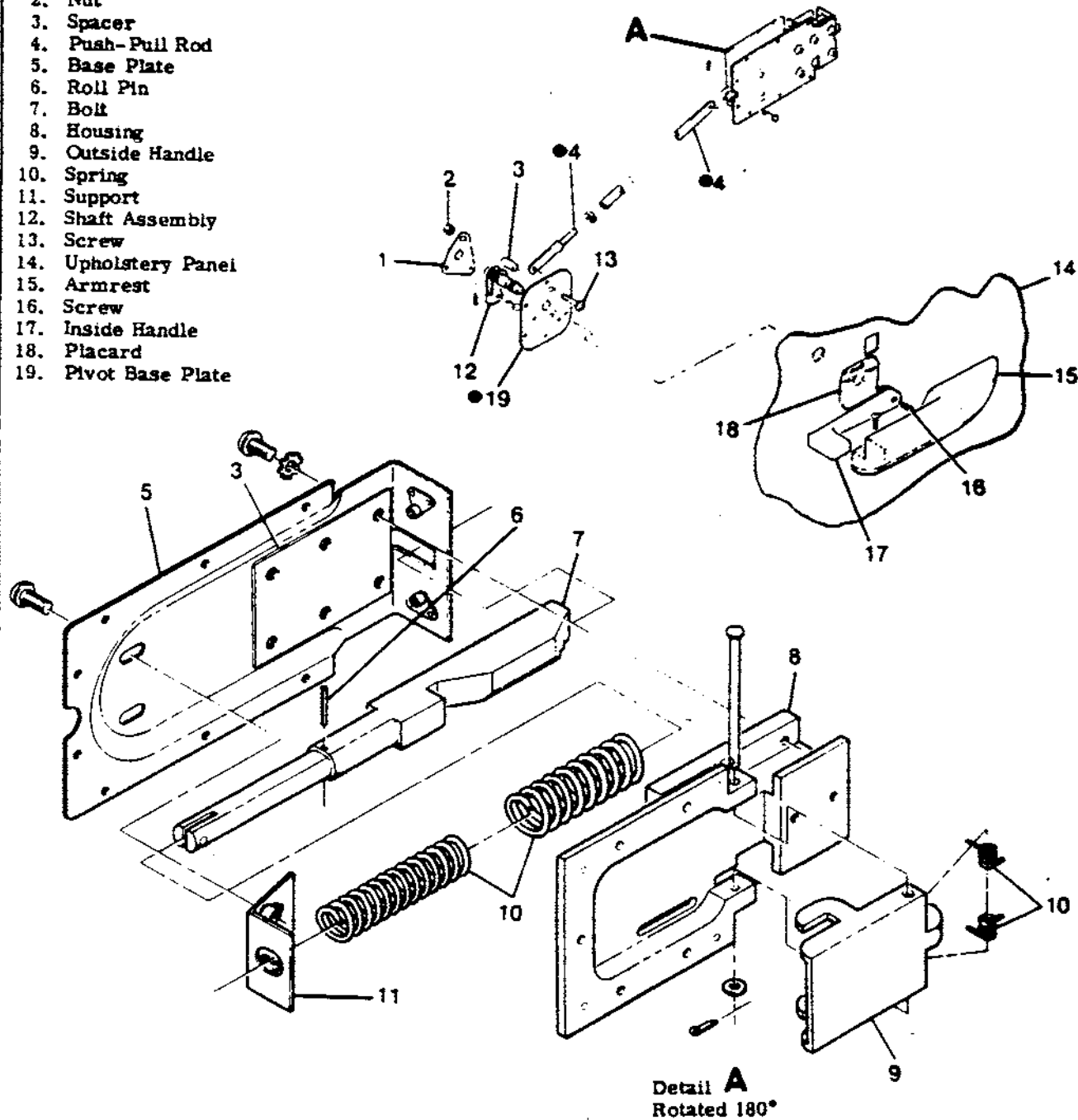


Figure 3-4. Door Latch Installation

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1. Bearing Assembly
2. Nut
3. Spacer
4. Push-Pull Rod
5. Pivot Base Plate
6. Bolt
7. Cable
8. Pin
9. Inside Handle
10. Screw
11. Armrest
12. Base Assembly
13. Screw
14. Outside Handle
15. Spring
16. Pin
17. Washer
18. Push Rod
19. Pin
20. Pull Bar
21. Catch
22. Pin
23. Cotter Pin
24. Locking Arm
25. Pin
26. Pin
27. Cam Assembly
28. Clamp
29. Clamp Bolt
30. Cover Assembly
31. Pin

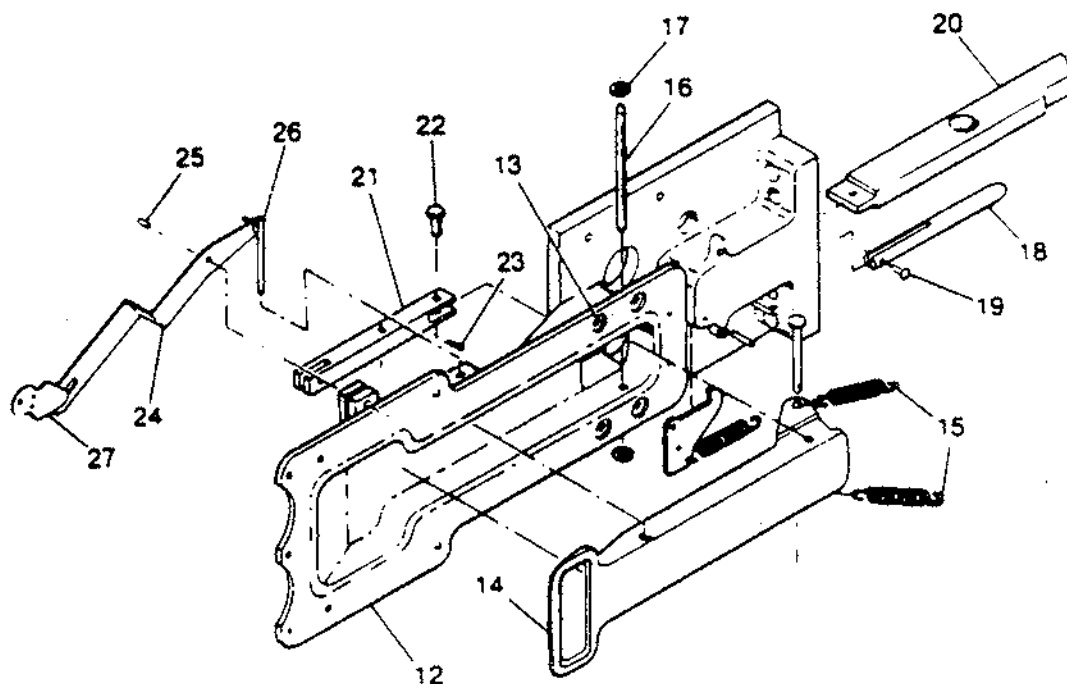
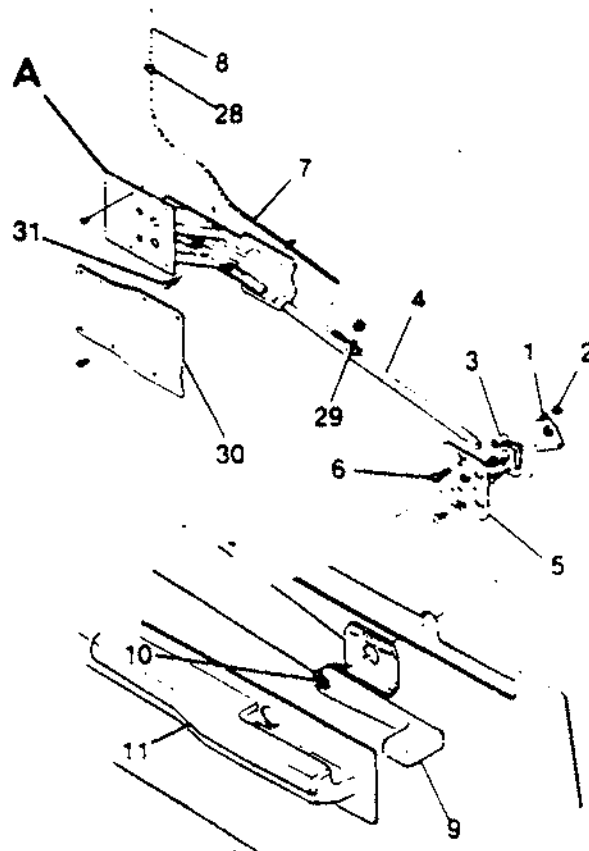


Figure 3-4A. Door Latch Installation

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applied to the outside handle is subsequently applied to the inside handle. If the push rod assembly is not properly adjusted, it is possible to lock one's self out of the aircraft by applying too much force to the exterior handle when closing the cabin door. Therefore, it is important to adhere to all of the rigging and adjustment specifications pertaining to the preload forces of the interior door handle. Refer to the rigging and adjusting procedures in the following paragraphs.

3-29C. INSTALLATION, RIGGING AND ADJUSTMENT PROCEDURES. (See figure 3-4A.)

3-29D. INSTALLATION OF LOCK ASSEMBLY ON LATCH ASSEMBLY. (See figure 3-4A.)

- a. Assemble locking arm (24) with pin assembly (25) by placing one washer on each side of locking arm (24). Swage pin (25) so that there is a minimal amount of looseness between parts. Cut excessive material from pin (25).
- b. Place pin (25) in 1/8-inch hole of base assembly (12).
- c. Align .099-inch hole of locking arm (24) with .094-inch hole in latch base (12), and install pin.
- d. Assemble cam assembly (27) to locking arm (24). Cam should be on latch side of locking arm. Use 3 washers between cam (27) and locking arm.

3-29E. INSTALLATION OF LOCK ASSEMBLY. (See figure 3-4A.)

NOTE

Install with latch in CLOSED position.

- a. Install latch assembly between door pan and door skin.
- b. Cable assembly (7) should be forward of latch base attach plate, and inboard of latch base cup.
- c. Extend latch handle through cutout in door skin. This will pull latch bolt back far enough to allow latch to fall into place.
- d. Push latch assembly aft so that bolt (20) and push rod (18) extend through their respective holes.
- e. Trip push rod (18) so that bolt (20) is fully extended and handle (14) is flush.
- f. Secure latch to door pan with four NAS220-5 screws (13) through base assembly (12) and two AN525-10R6 screws through aft flange of door pan.
- g. Ensure door skin fits properly around latch assembly, then drill eleven .128-inch holes to align with latch base.

NOTE

Do not oversize holes in the latch base and do not rivet base to skin at this time.

3-29F. INSTALLATION OF CABLE ASSEMBLY. (See figure 3-4A.)

- a. On pin end of cable assembly (7), attach clamp (28) and nut, one-inch from end of casing.
- b. Insert pin end of cable between door pan and door skin at aft end of door. Push pin end of cable to top of door.
- c. Remove plug button (30, figure 3-1 of this Supplement) and align pin on cable with pin guide, and insert pin through guide. Access is gained through .875-inch diameter hole after removal of plug button (30).
- d. Align clamp on cable casing with hole located one-inch below .875-inch hole and install screw.

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- e. Check operation of cable. If sluggish operation of cable is encountered, add S1450-2A4-062 washers as required to facilitate smoother cable operation.

3-29G. RIGGING CABLE ASSEMBLY. (See figure 3-4A.)

- a. Pull excess slack out of cable (7). Attach clamp (28) and nut to cable so that it aligns with .183-inch hole in door pan, and attach.

NOTE

Make sure door latch is in OPEN position before proceeding.

- b. Cut casing of cable assembly approximately two inches from clamp bolt (29) on push rod assembly (4).
- c. Insert core of cable through clamp (29).
- d. Pull core through clamp bolt so that pin (8) extends approximately 1/8-inch from door pan contour.
- e. Cut core approximately one inch forward of push rod clamp (29).
- f. Secure two nuts to push rod clamp bolt.
- g. Operate latch several times to ensure latch works freely. If latch binds up and will not work freely, remove cable core from clamp (29) and operate latch. If cable operates easily without cable attachment, check cable for possible adjustments to facilitate ease of operation.
- h. After cable operates freely, install cover assembly (30) and recheck cable for operation.

3-29H. RIGGING INSIDE DOOR HANDLE. (See figure 3-4A.)

- a. With latch secured to door pan, attach push pull rod assembly (4) to catch (21), and secure with pin (31).

NOTE

Do not install cotter pin (23).

- b. Ensure that latch is in CLOSED position.
- c. By removing pin (31) that connects push pull rod to latch base assembly, rotate rod in or out (180°) for adjustment. Adjust rod so that it takes a load of 6 pounds to 12 pounds at the end of the inner handle to move it from closed position to overcenter position.

NOTE

Rod must be attached to latch assembly before rigging can be accomplished.

- d. For fine adjustment for overcentering latch assembly, proceed as follows:
 - 1. Cabin door must be installed and completely fitted to fuselage.
 - 2. Cabin door latch must be in OPEN position. Latch must operate smoothly and freely.
 - 3. Adjust striker plate forward by installing shims as required, so that there is a minimal clearance between pull bar (20) and striker plate.

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NOTE

This adjustment will ensure that when the door is opened from the outside, the push rod will engage the latch catch, and the exterior handle will stay open until the door is closed again.

NOTE

If cabin door is located too far forward such that the door latch will not operate, this will not allow latch assembly push rod (18) to ride up on actuator and trigger the pull bar (20). Install shims as required beneath actuator, located on cover assembly.

4. Close the cabin door from inside the aircraft. When latch is overcentered, the exterior handle should pull flush. If it does not pull flush, the connecting push pull rod from the door latch to the inside handle assembly should be adjusted "out" (lengthened).

NOTE

When making this adjustment on the overcentering of the latch, it may be noticed that there is a sharp, loud clanging noise when the inside handle is pushed down. It is preferred that the outside door handle be flush, even if the clanging noise is noticeable.

5. When adjusting push pull rod (4), it may need only be adjusted 1/2 turn. To accomplish this, base plate should be removed.
 6. To make 1/2 turn adjustment, remove smaller end of push pull rod (4) and turn it over (180°). Then reinstall base plate assembly (5).
 7. When closing cabin door from the outside, by using a large, sharp force on the outside handle, it is possible to overcenter the inside handle, thus locking one's self out. To prevent this from occurring when adjusting the push pull rod in step "4", adjust the push pull rod so there is sufficient force (8 to 12 pounds) against the inside handle to prevent it from overcentering when closing the door from the outside.
 8. Do not file, grind or sand any portion of the pull bar (20).
 9. Recheck clamps that secure cable. There must not be any slippage between cable casing and clamp.
 10. After overcenter adjustment has been made, install cotter pin (23) in clevis pin (22).
- e. Rivet latch base (12) to door skin with MS20426A4-3 rivets.
 - f. Attach lock assembly casing (13, figure 3-3) to door skin with nut provided.
 - g. Install tumblers and attach cam to tumblers with screw and lockwasher provided.

NOTE

After installing cam, seal over head of screw and washer

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washer with RTV-102 (white) or RTV-103 (black) silicone rubber sealant (General Electric, Waterford, N. Y.).

- h. Operate lock several times to assure that all components function properly.

NOTE

Steps "f", "g" and "h" apply to LH door only.

3-29I. REPLACING LOCK ASSEMBLY.

- a. Remove lock cylinder from new housing.
- b. Insert original key into new cylinder and file off any protruding tumblers flush with cylinder. Without removing key, check that cylinder rotates freely in housing.
- c. Install lock assembly in door and check lock operation with door open.
- d. Destroy new key and disregard code number on cylinder.

3-29J. INDEXING INSIDE DOOR HANDLE. When inside door handle is removed, reinstall and index as noted in paragraph 3-27A.

3-30. BAGGAGE DOOR. (See figure 3-5).

3-31. REMOVAL AND INSTALLATION. (See figure 3-5.)

- a. Remove door-pull handle.
- b. Disconnect door-stop chain (8).
- c. Remove buttons securing upholstery panel and remove panel.
- d. Remove bolts (9) securing door to hinges.
- e. Reverse preceding steps for installation.

CAUTION

Reforming of bonded door flange by striking with soft mallet etc., is NOT permissible, due to possible damage to bonded areas.

3-32. BAGGAGE DOOR WEATHERSTRIP. A rubber weatherstrip is cemented around the edge of the baggage door and seals the door to the fuselage structure when the door is closed. A new seal can be installed after carefully cleaning door and weatherstrip contact surfaces. Apply a thin, even coat of EC-880 adhesive (3M Co.) or equivalent and allow to dry until tacky before pressing into place.

3-33. SEATS. (See figure 3-6.)

3-34. PILOT AND COPILOT.

- a. RECLINING BACK/FORE-AND-AFT ADJUST.
- b. ARTICULATING RECLINE/VERTICAL ADJUST.

3-35. DESCRIPTION. These seats are manually operated throughout their full range of operation. Seat stops are provided to limit fore-and-aft travel.

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● 17267585 thru 17273534
F17201515 thru F17202029

* 17273535 & On
F17202030 & On

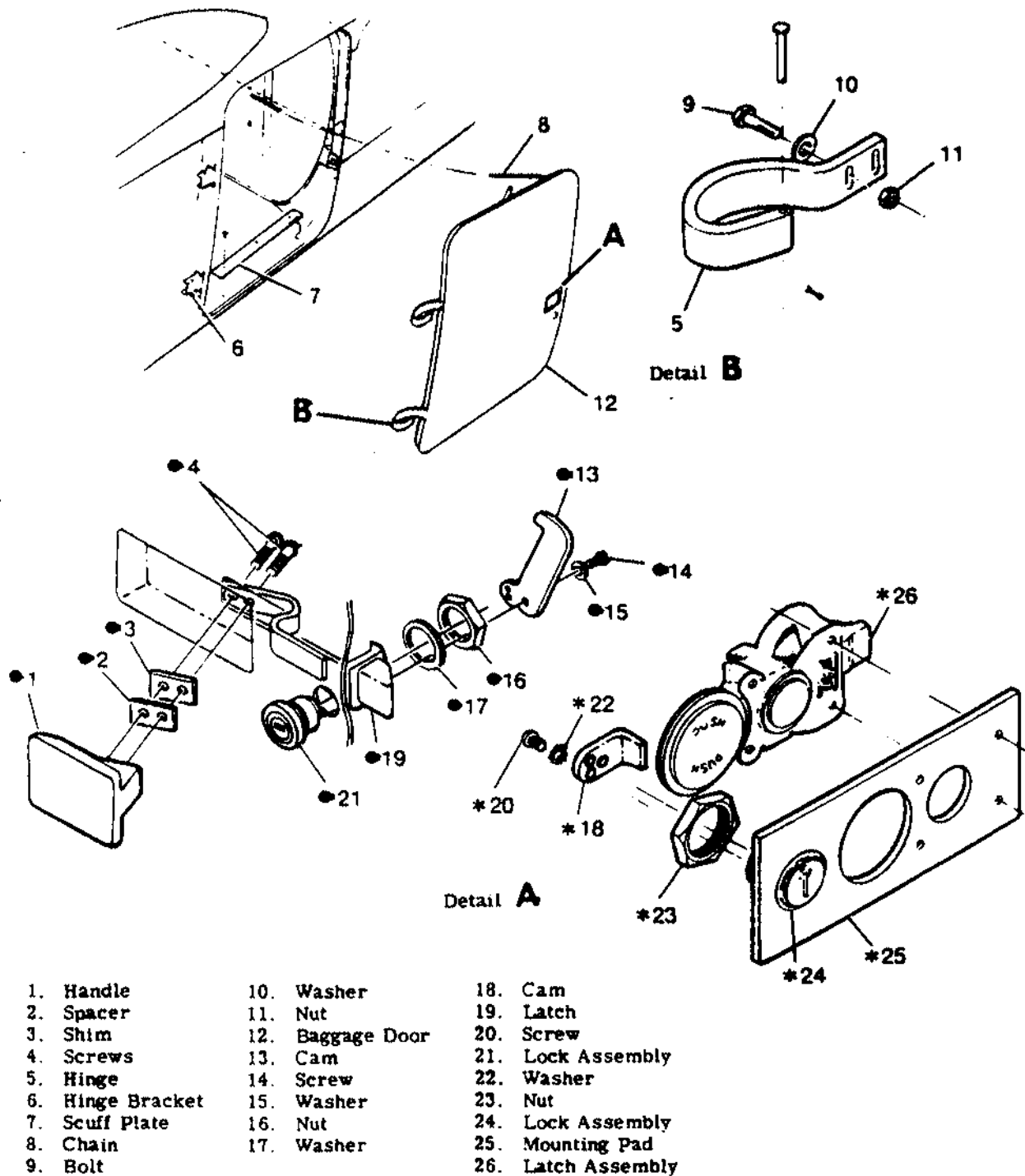


Figure 3-5. Baggage Door Installation

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- 3-36. **REMOVAL AND INSTALLATION.** (See figure 3-6.)
- Remove seat stops from rails.
 - Disengage seat belts by slipping buckle ends through seat belt retainer.
 - Crank vertical adjust seats to their maximum height.
 - Slide seat forward to disengage front rollers from seat rails.
 - Slide seat aft to disengage rear rollers from seat rails.
 - Lift seat out.
 - Reverse preceding steps to install seat. Ensure that all seat stops are installed.

WARNING

It is extremely important that pilot's seat stops are installed, since acceleration and deceleration could possibly permit seat to become disengaged from seat rails and create a hazardous situation, especially during takeoff and landing.

- 3-37. **CENTER.** (See figure 3-6.)
- DOUBLE-WIDTH BOTTOM AND BACK/SINGLE RECLINING BACK.
 - DOUBLE-WIDTH BOTTOM/INDIVIDUAL RECLINING BACKS.
- 3-38. **DESCRIPTION.** These seats are permanently bolted to the cabin structure and incorporate no adjustment provisions other than manually-adjustable three position backs.
- 3-39. **REMOVAL AND INSTALLATION.** (See figure 3-6.)
- Remove bolts securing seat to cabin structure.
 - Lift seat out.
 - Reverse preceding steps for installation.
- 3-40. **AUXILIARY/FOLD UP.** (See figure 3-6.)
- 3-41. **DESCRIPTION.** These seats are permanently bolted to the cabin structure and have no adjustment provisions. The seat structure is mounted on hinge brackets with pivot bolts, thus allowing seat to be pivoted upward to acquire more baggage area.
- 3-42. **REMOVAL AND INSTALLATION.** (See figure 3-6.)
- Remove bolts securing seat structure to hinge brackets.
 - Lift seat out.
 - Reverse preceding steps for installation.
- 3-43. **REPAIR.** Replacement of defective parts is recommended in repair of seats.
- 3-44. **CABIN UPHOLSTERY.** Due to the wide selection of fabrics, styles and colors, it is impossible to depict each particular type of upholstery. The following paragraphs describe general procedures which will serve as guides in removal and replacement of upholstery. Major work, if possible, should be done by an experienced mechanic. If the work must be done by a mechanic unfamiliar with upholstery practices, the mechanic should make careful notes during removal of each item to facilitate replacement later.

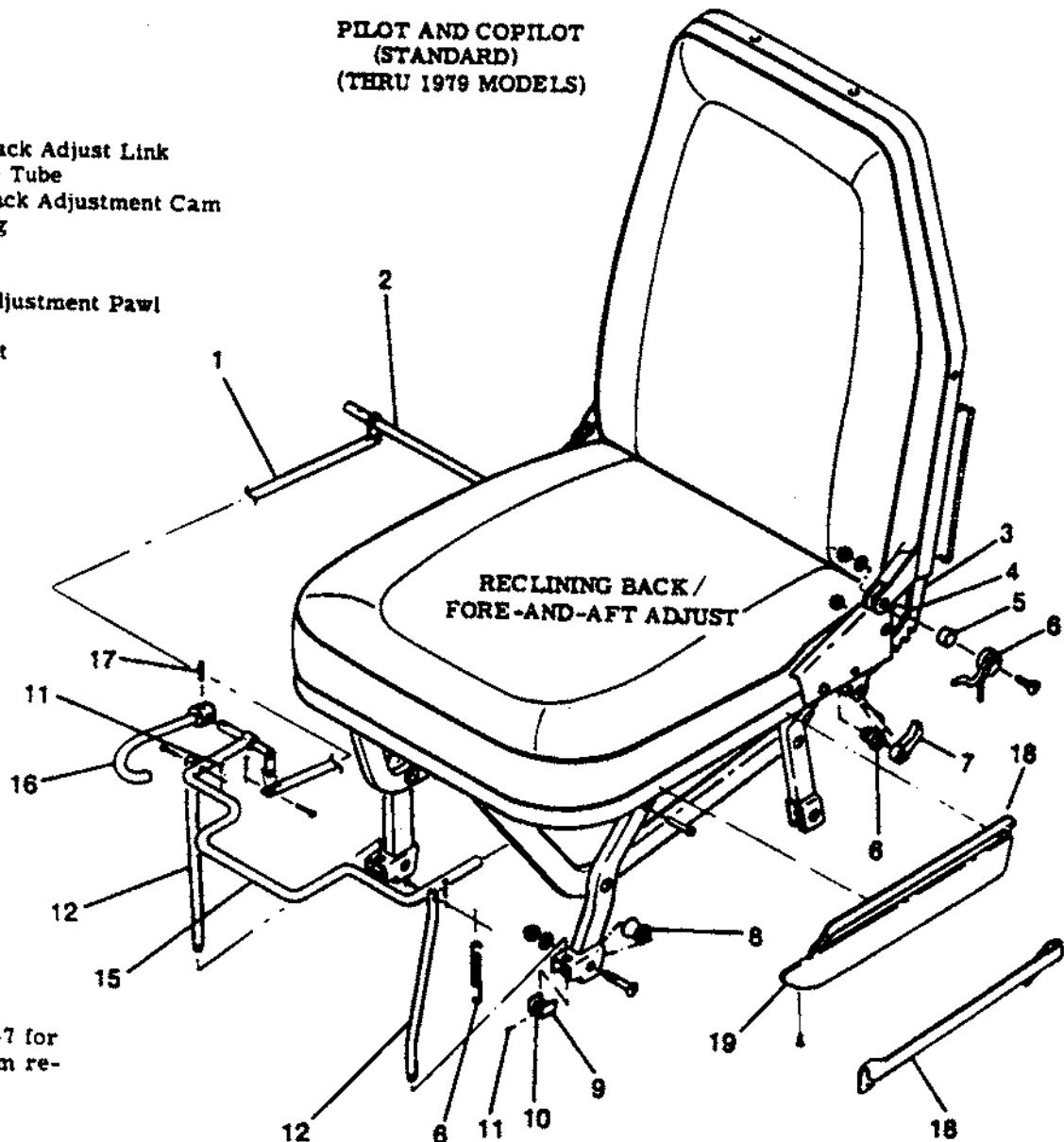
NOTE

Repair kits are available for the repair of cracks in ABS, PBC, PVCP, graphite and fiberglass material. (Cessna Supply Division, P.O. Box 949, Wichita, KS 67201, 316/685-9111, Telex 417-489.)

MODEL 172 SERIES SERVICE MANUAL

PILOT AND COPILOT (STANDARD) (THRU 1979 MODELS)

1. Seat Back Adjust Link
2. Torque Tube
3. Seat Back Adjustment Cam
4. Bushing
5. Spacer
6. Spring
7. Seat Adjustment Pawl
8. Roller
9. Bracket



10. Washer
11. Pin
12. Adjustment Pin
13. Seat Stop
14. Seat Rail
15. Fore/Aft Adjustment Handle
16. Recline Handle
17. Roll Pin
18. Seat Belt Retainer
19. Trim

WARNING

ASSURE THAT SEAT IS LOCKED IN POSITION
PRIOR TO TAKE OFF, AND LAUNCH. FAILURE
TO PROPERLY LATCH SEAT AND HEED ALL
SAFETY INSTRUCTIONS CAN RESULT IN SERIOUS
INJURY OR DEATH.

IN CLEAR VIEW OF THE PILOT

NOTE
Refer to sheets 9 and 10
for seat stop installa-
tion.

NOTE

Beginning with late 1977 models, seat belt
retainer (18) is separate from seat trim (19)
and is attached directly to seat frame with
four screws.

Figure 3-6. Seat Installation (Sheet 1 of 11)

MODEL 172 SERIES SERVICE MANUAL

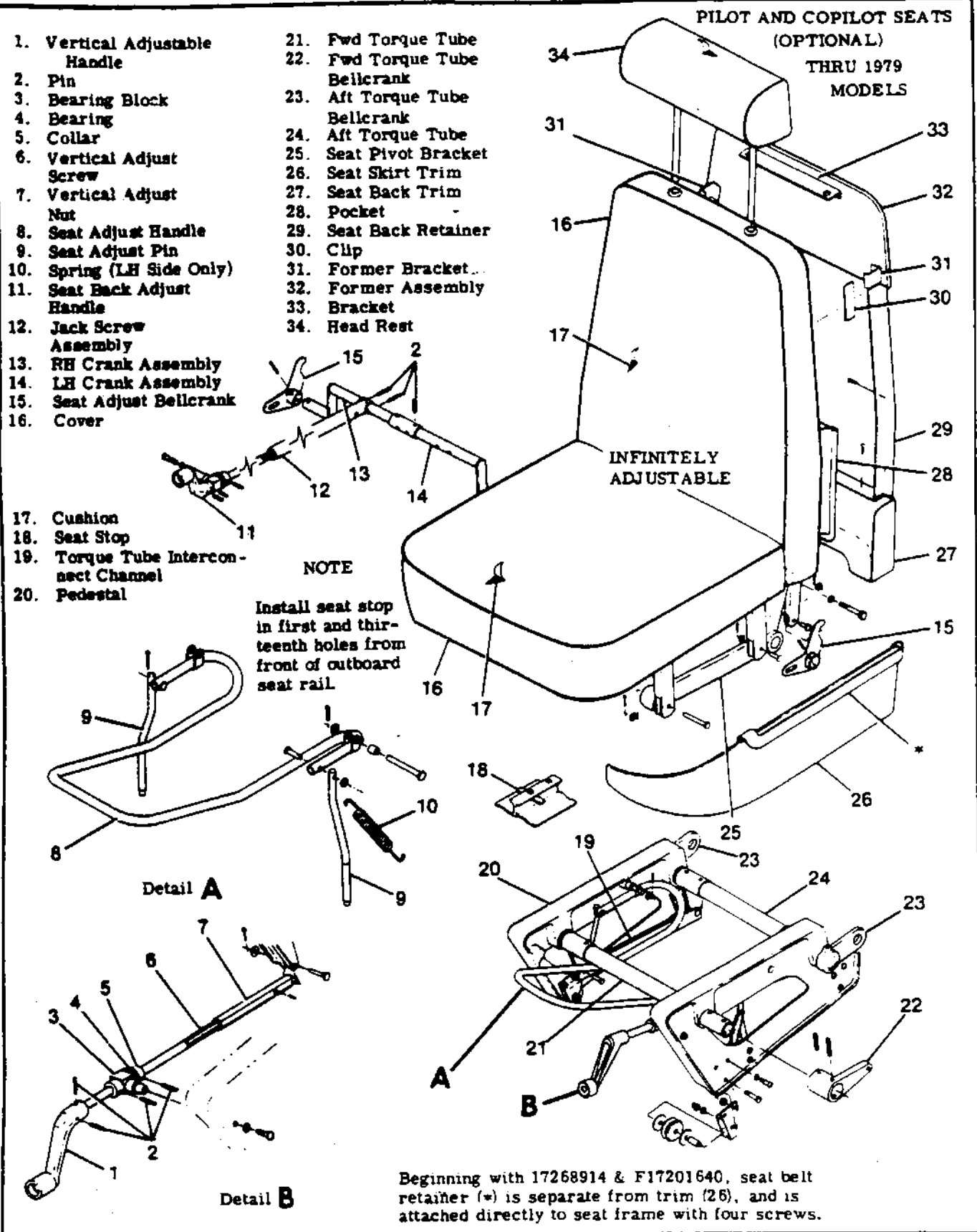


Figure 3-6. Seat Installation (Sheet 2 of 11)

MODEL 172 SERIES SERVICE MANUAL

CENTER SEAT (STANDARD)

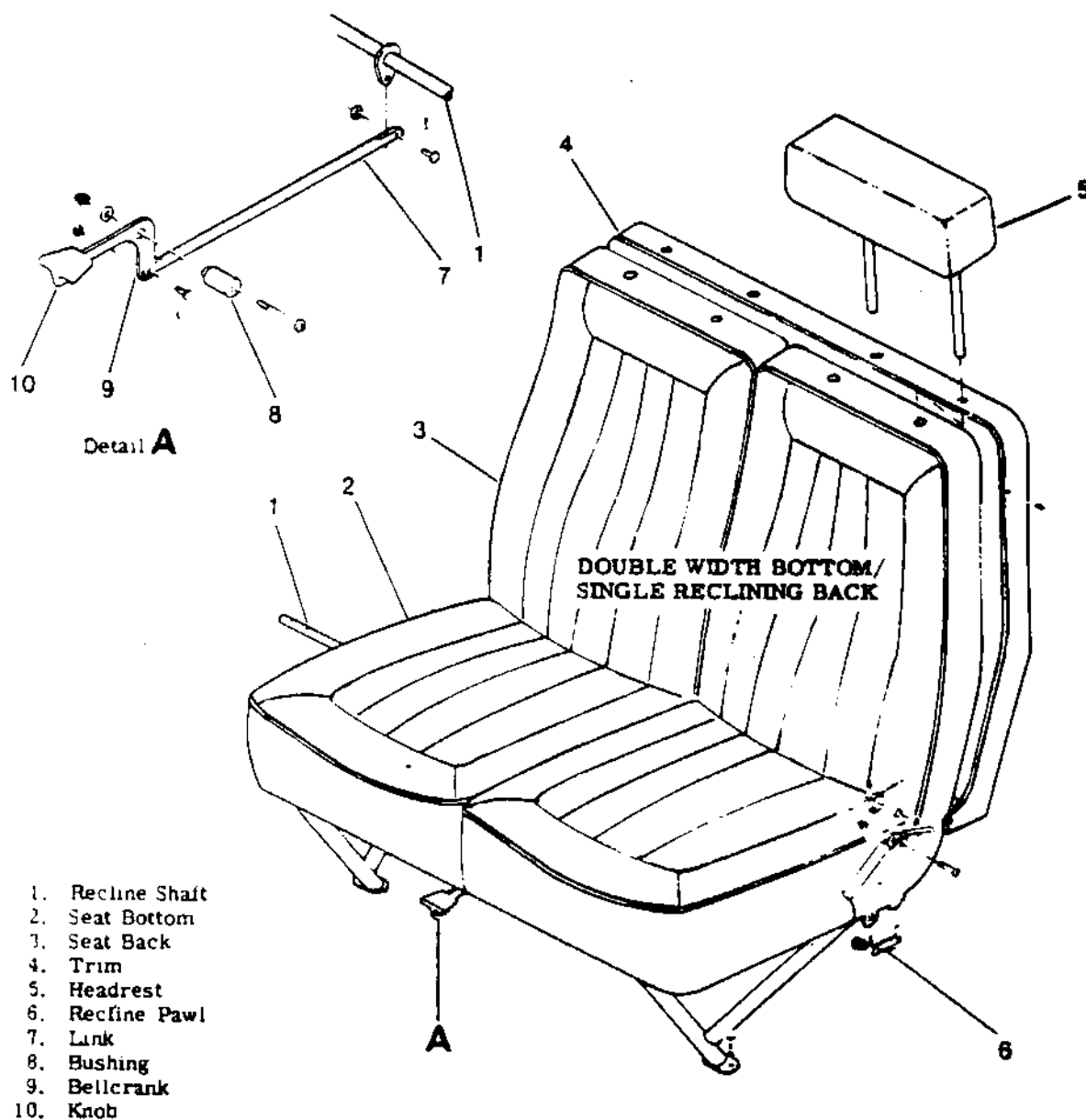


Figure 3-8. Seat Installation (Sheet 3 of 11)

MODEL 172 SERIES SERVICE MANUAL

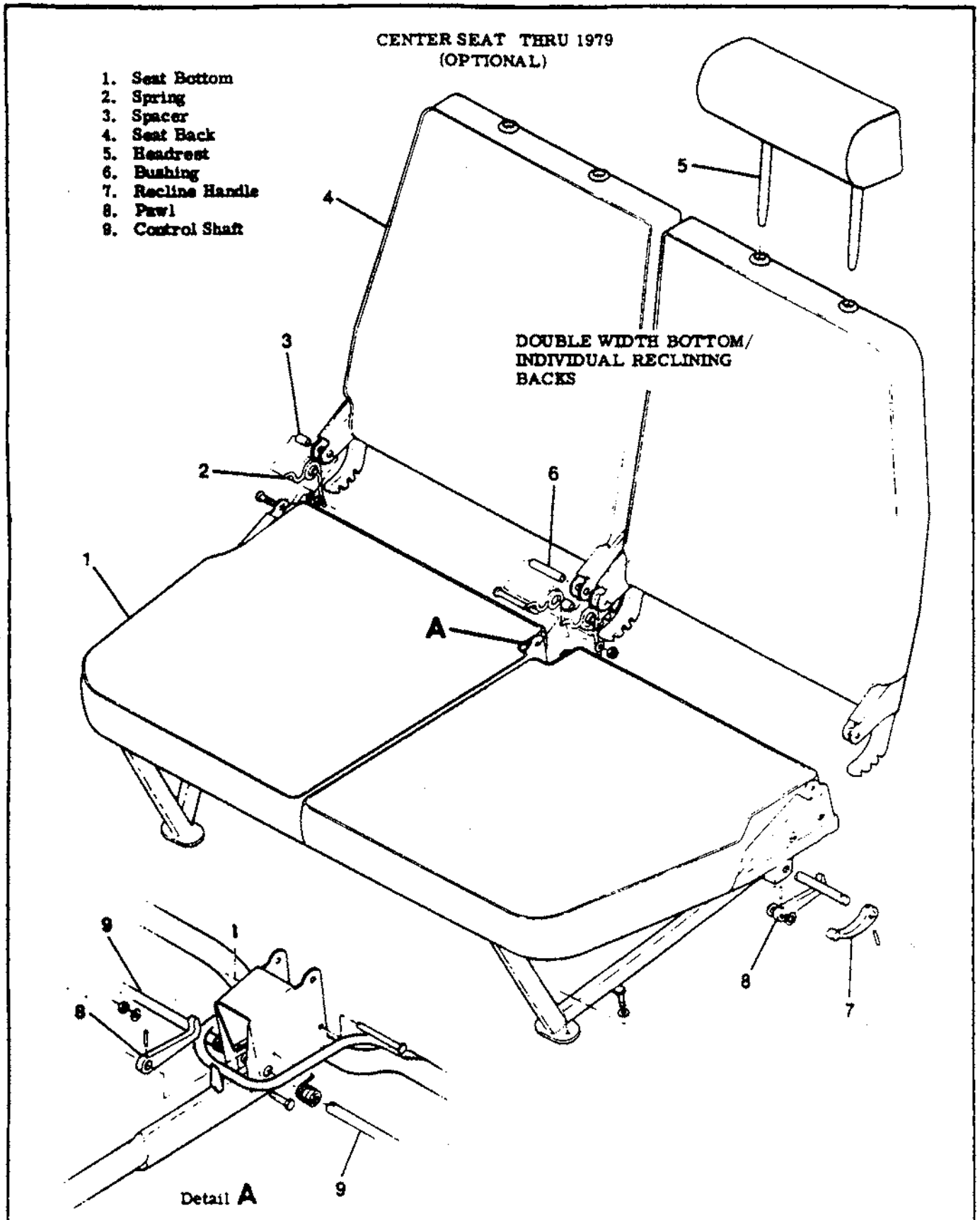


Figure 3-8. Seat Installation (Sheet 4 of 11)

MODEL 172 SERIES SERVICE MANUAL

1. Attach Bracket
2. Seat Bottom Structure
3. Seat Bottom
4. Seat Back
5. Floorboard
6. Mounting Bracket

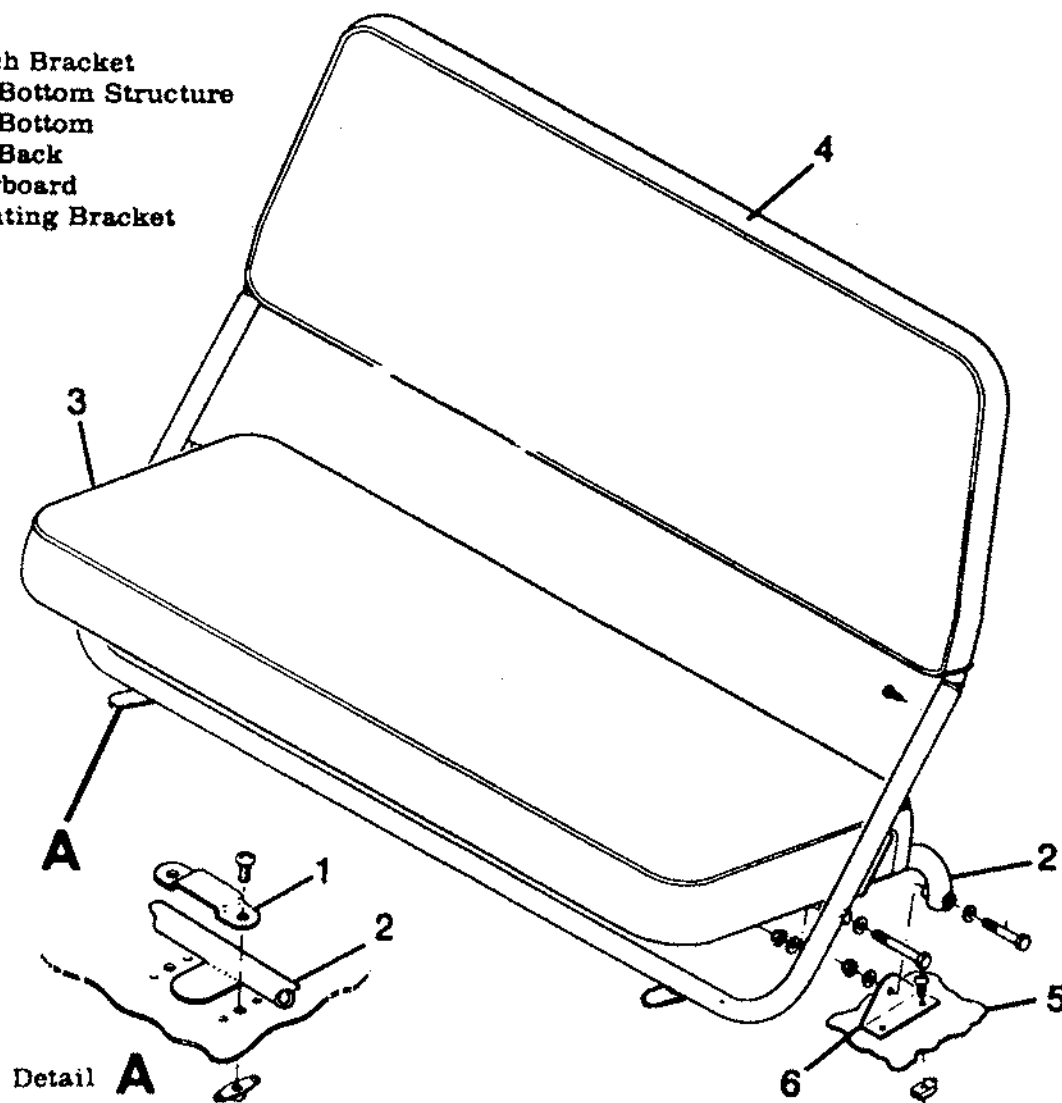


Figure 3-6. Seat Installation (Sheet 5 of 11)

MODEL 172 SERIES SERVICE MANUAL

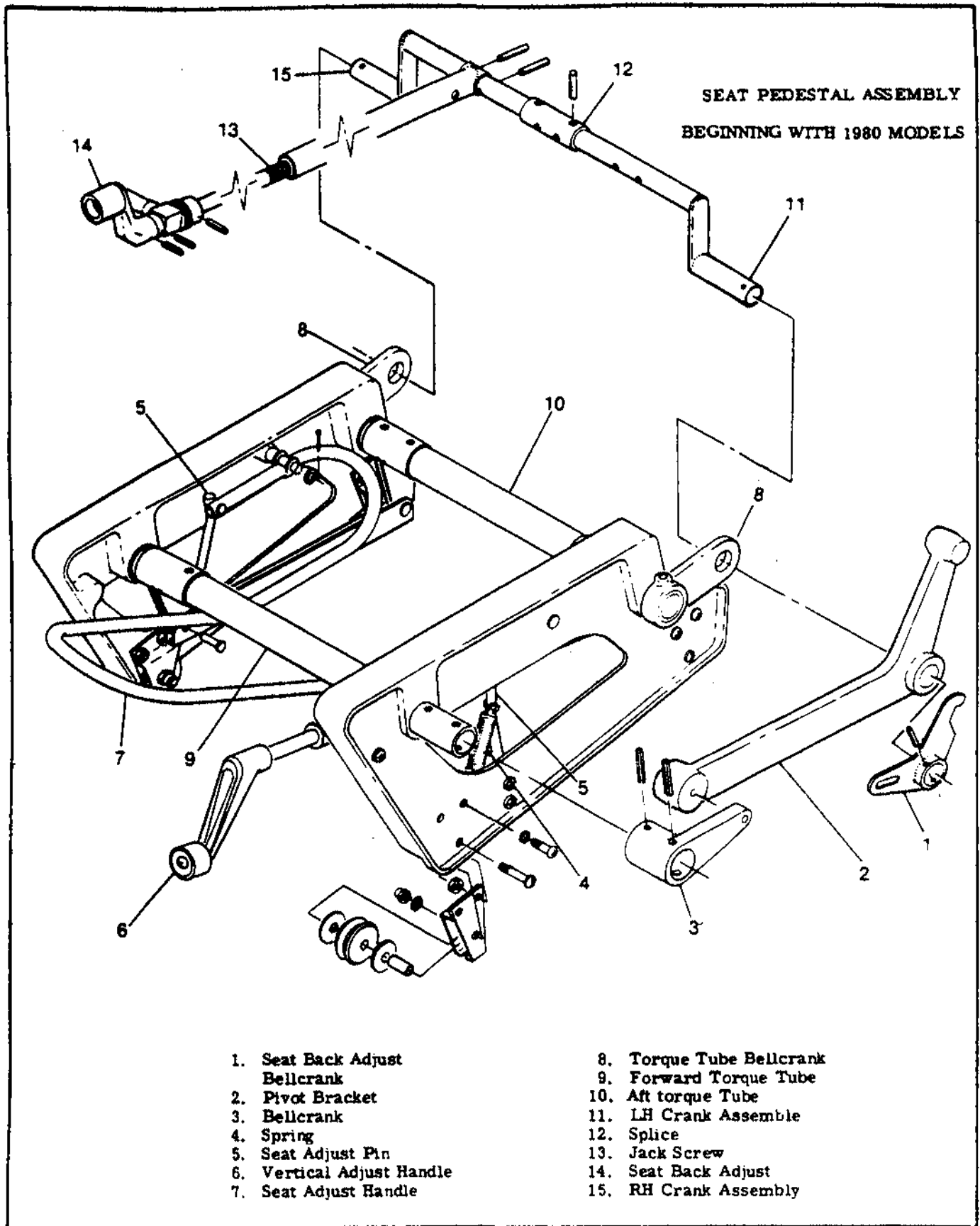


Figure 3-6. Seat Installation (Sheet 6 of 11)

MODEL 172 SERIES SERVICE MANUAL

PILOT AND COPILOT SEAT ASSEMBLY

BEGINNING WITH 1980 MODELS

1. Seat Handle Pin
2. Spring
3. Seat Adjust Handle
4. Cushion
5. Cover
6. Grommet
7. Head Rest
8. Former Bracket
9. Former Assembly
10. Bracket
11. Clip
12. Pocket
13. Bolt and Spacer
14. Lock Cylinder
15. Frame
16. Bracket
17. Pin
18. Roller
19. Spring
20. Link
21. Clevis Pin
22. Lock Cylinder Control

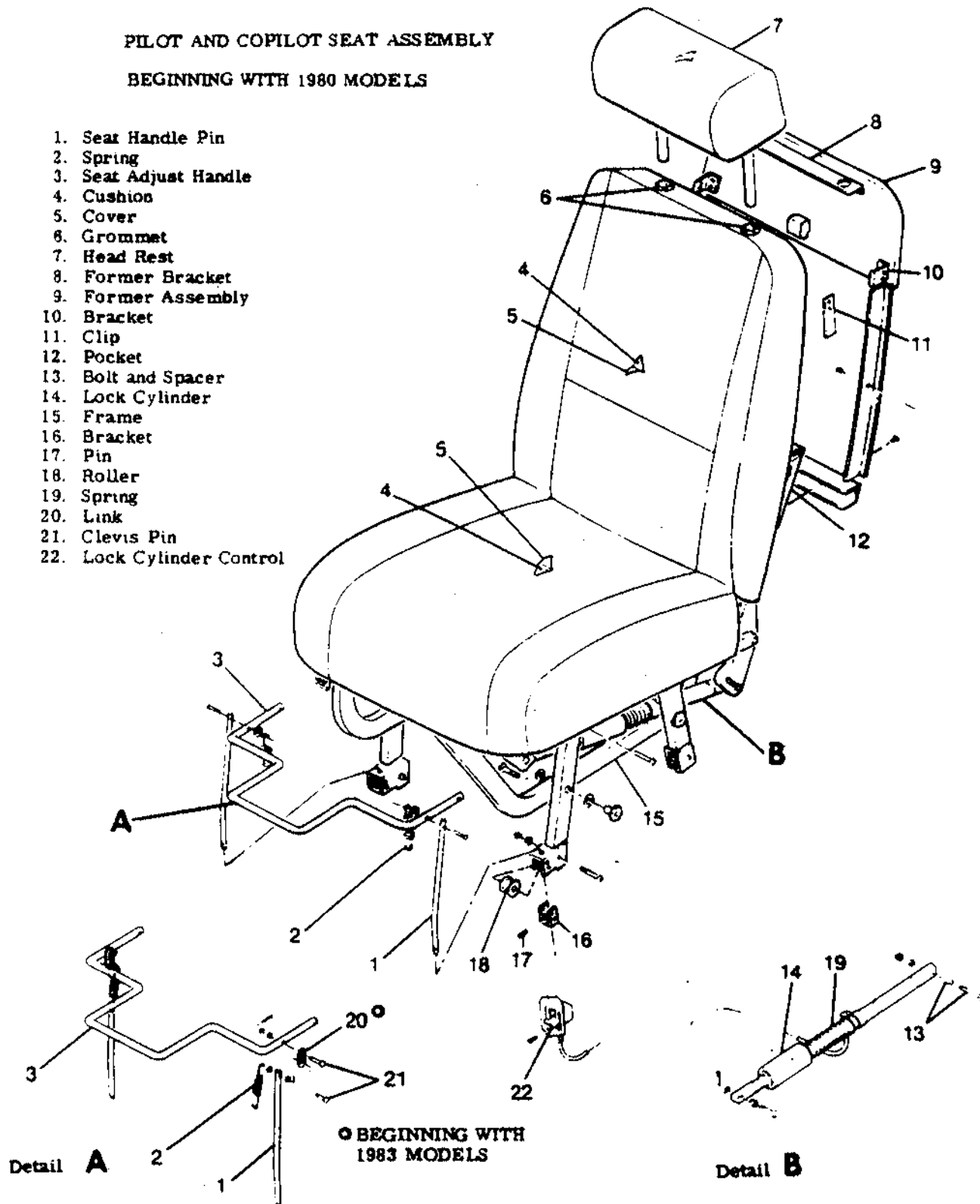


Figure 3-6. Seat Installation (Sheet 7 of 11)

MODEL 172 SERIES SERVICE MANUAL

INFINITELY-ADJUSTABLE SEAT ASSEMBLY BEGINNING WITH 1980 MODELS

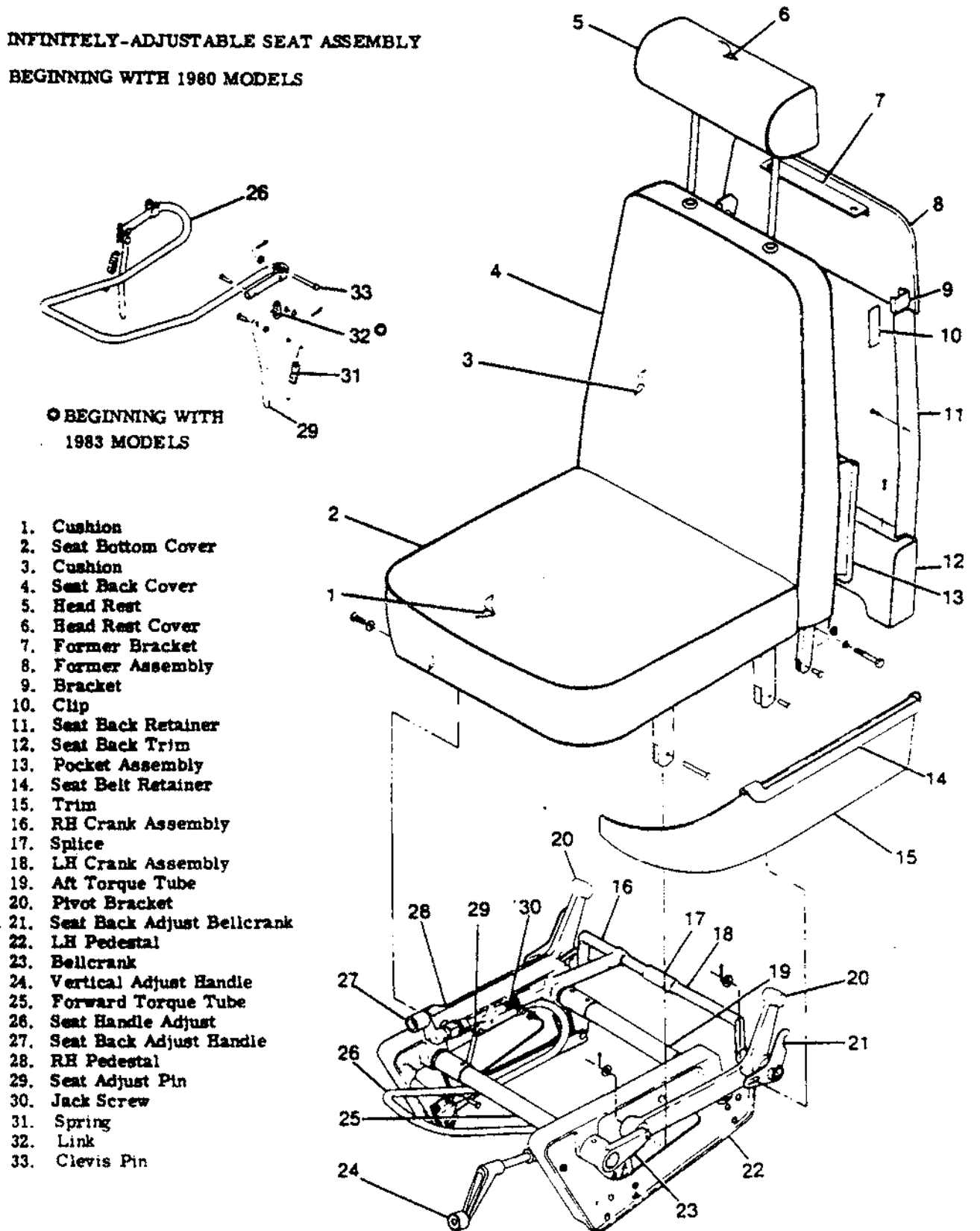


Figure 3-8. Seat Installation (Sheet 8 of 11)

MODEL 172 SERIES SERVICE MANUAL

SEAT STOP INSTALLATION - STANDARD SEAT

ELEVENTH SEAT STOP
HOLE FROM FWD EDGE
OF OUTBD PILOTS &
COPILOT'S SEAT RAILS

1. Screw
2. Seat Stop
3. Seat Rail-Outboard
4. Seat Stop
5. Pin
6. Cotter Pin

17267585 thru 17272884
F17201515 thru F17201909

FIRST SEAT STOP HOLE
PILOTS & COPILOT'S OUTBD
SEAT RAILS

17272885 thru 17276517
F17201910 thru F17202238

17276518 & ON
F17202239 & ON

EXTREME AFT OUTBD
PILOTS & COPILOT'S
SEAT RAILS.

WARNING

It is extremely important that pilot's seat stops are installed, since acceleration and deceleration could possibly permit seat to become disengaged from seat rails and create a hazardous situation, especially during takeoff and landing.

Figure 3-6. Seat Installation (Sheet 9 of 11)

MODEL 172 SERIES SERVICE MANUAL

SEAT STOPS INSTALLATION - OPTIONAL INFINITE-ADJUST SEAT

SECOND SEAT STOP HOLE PILOTS & COPILOTS OUTBD SEAT RAILS

17267585 thru 17272384
F17201515 thru F17201909

5.75"

EXTREME AFT OUTBD
PILOTS & COPILOTS
SEAT RAILS.

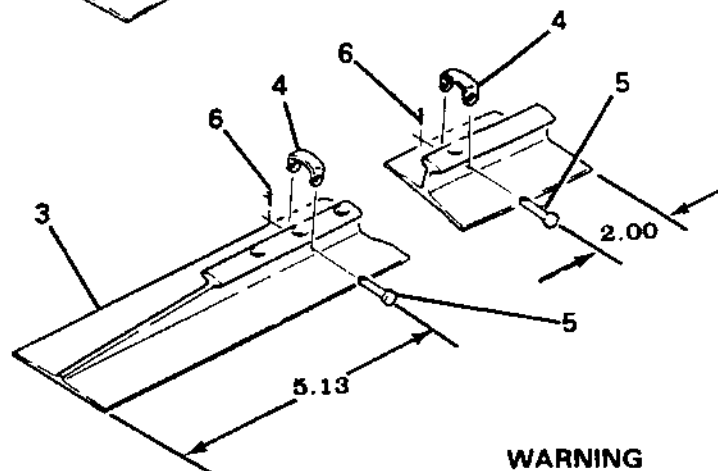
FIRST SEAT STOP HOLE PILOTS & COPILOTS OUTBD SEAT RAILS

17272885 thru 17276517
F17201910 thru F17202238

EXTREME AFT OUTBD
PILOTS & COPILOTS
SEAT RAILS.

1. Screw
2. Seat Stop
3. Seat Rail-Outboard
4. Seat Stop
5. Pin
6. Cotter Pin

17276518 & ON
F17202239 & ON



WARNING

It is extremely important that pilot's seat stops are installed, since acceleration and deceleration could possibly permit seat to become disengaged from seat rails and create a hazardous situation, especially during takeoff and landing.

Figure 3-6. Seat Installation (Sheet 10 of 11)

MODEL 172 SERIES SERVICE MANUAL

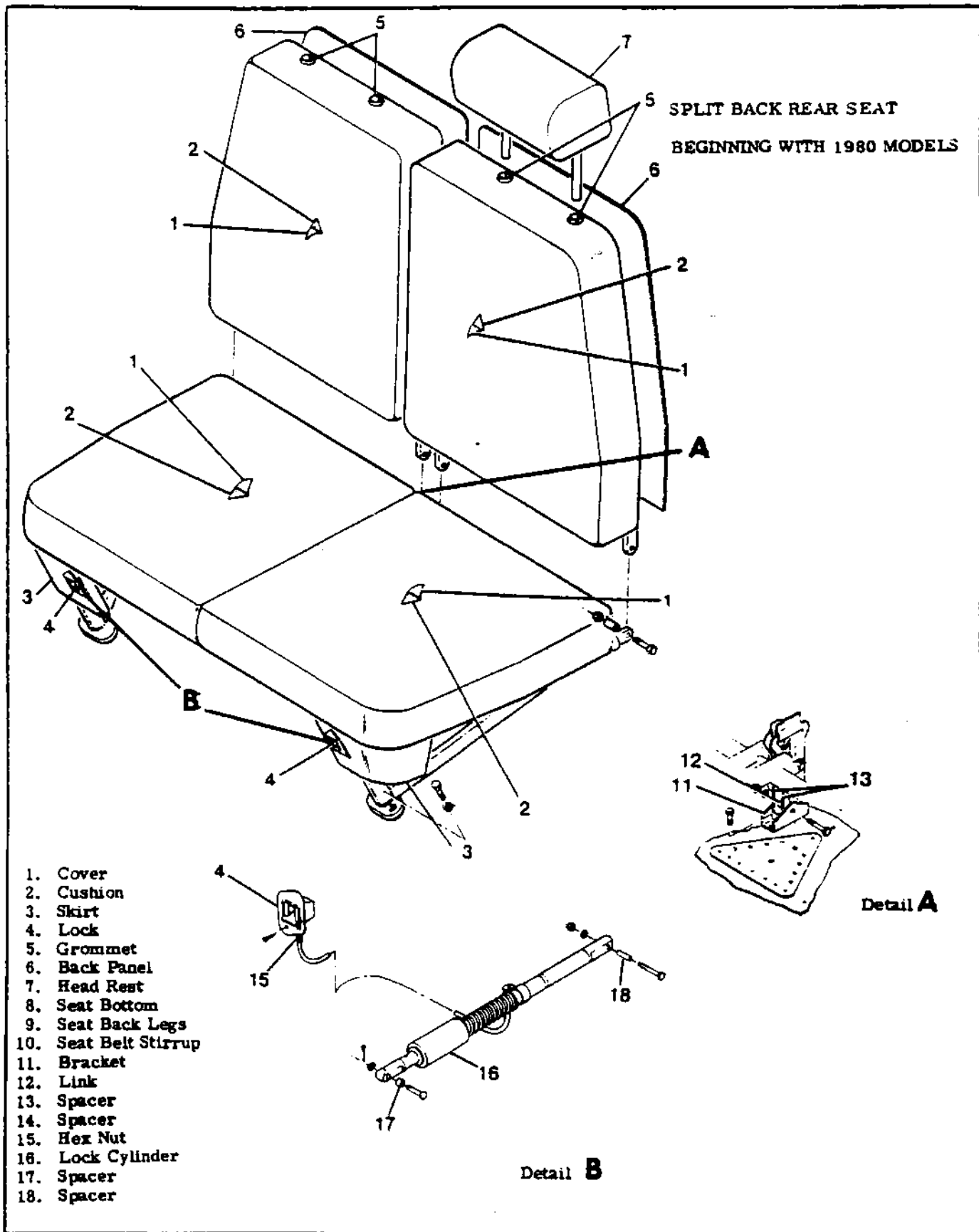
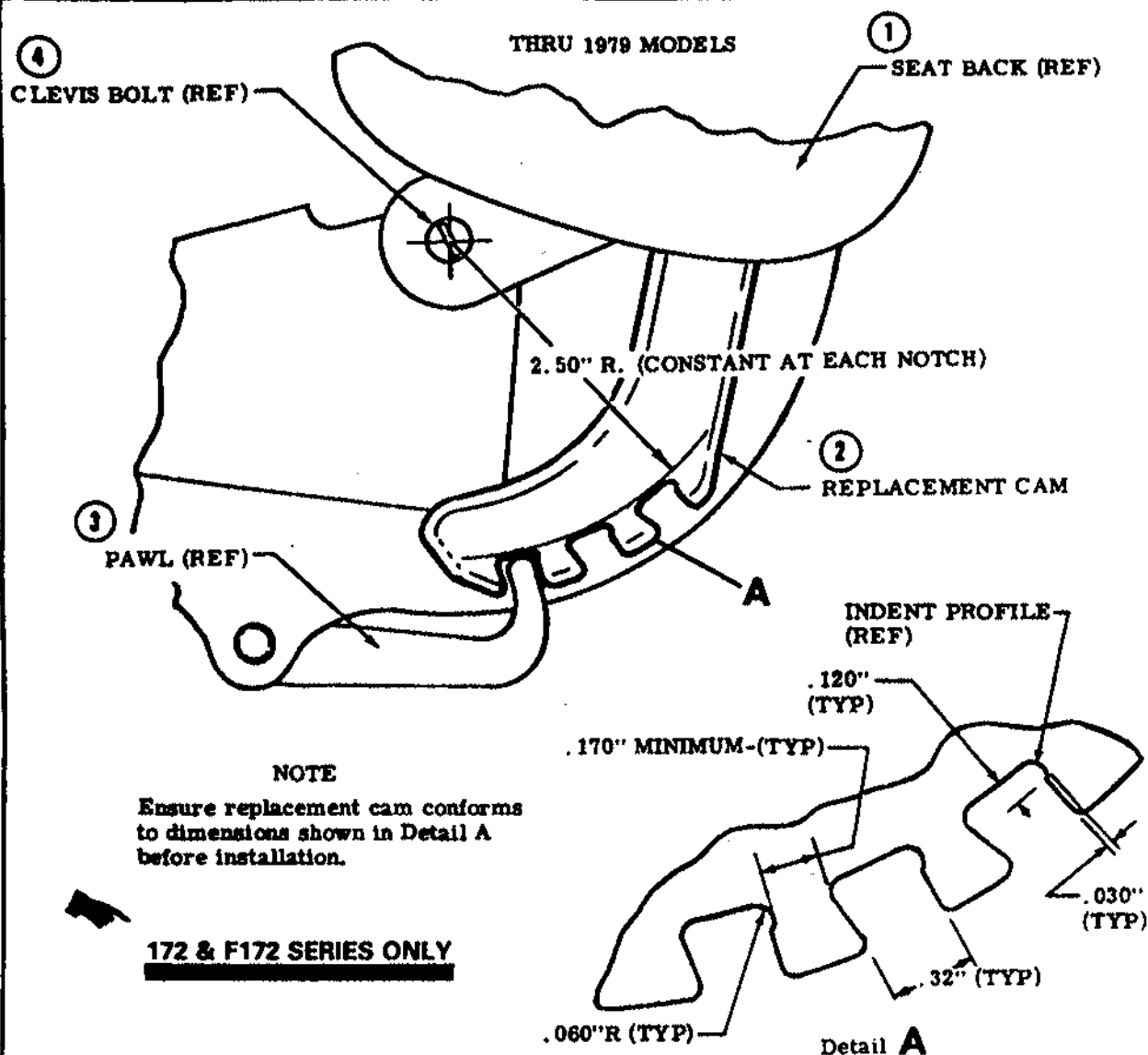


Figure 3-6. Seat Installation (Sheet 11 of 11)

MODEL 172 SERIES SERVICE MANUAL



REPLACEMENT PROCEDURE:

- Remove seat from aircraft.
- Remove plastic upholstery panels from aft side of seat back, then loosen upholstery retaining rings and upholstery material as required to expose rivets retaining old cam assembly.
- Drill out existing rivets and insert new cam assembly (2). Position seat back so pawl (3) engages first cam slot as illustrated.
- Position cam so each slot bottom aligns with the 2.50" radius as illustrated.
- Clamp securely in this position and check travel of cam. Pawl must contact bottom of each cam slot. Using existing holes in seat frame, drill through new cam and secure with MS20470AD6 rivets.
- Reinstall upholstery, upholstery panels and seat.

Figure 3-7. Seat Back Cam Replacement

MODEL 172 SERIES SERVICE MANUAL

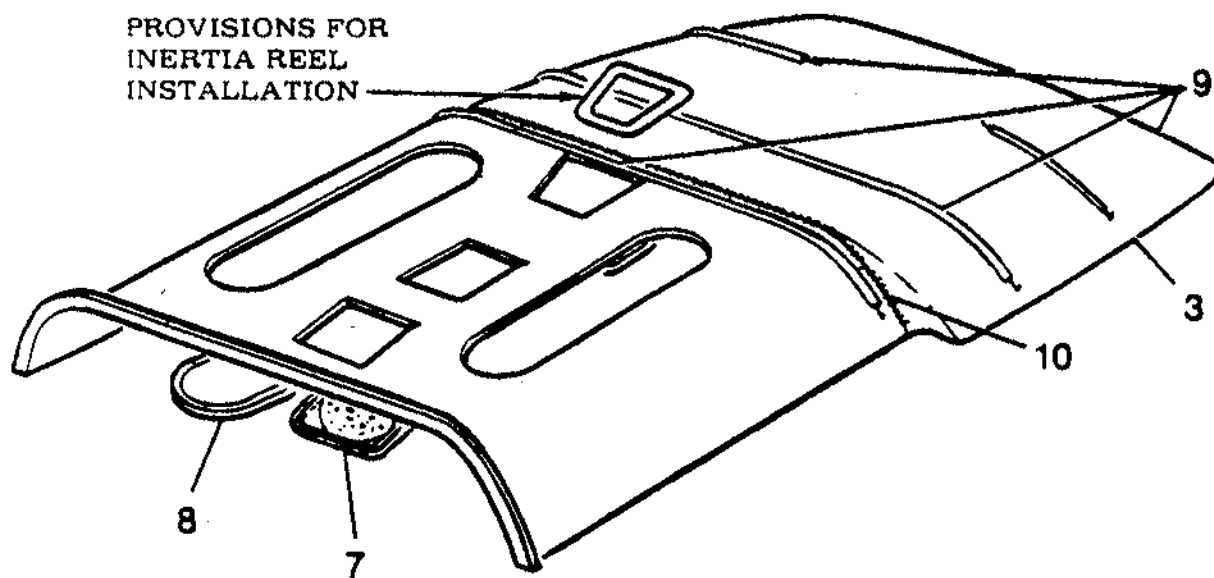
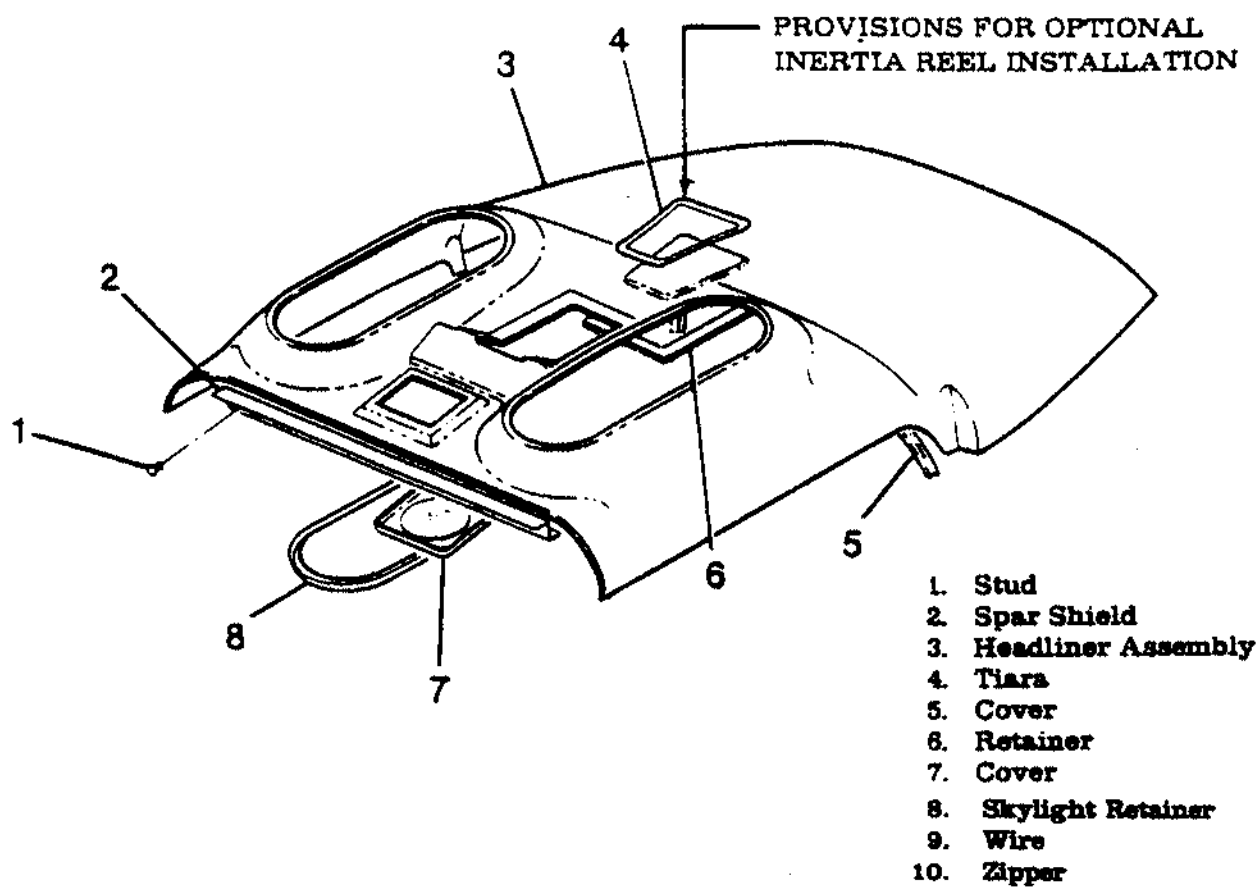


Figure 3-8. Cabin Headliner Installation

MODEL 172 SERIES SERVICE MANUAL

- 3-45. **MATERIALS AND TOOLS.** Materials and tools will vary with the job. Scissors for trimming upholstery to size, and a dull-bladed putty knife for wedging material beneath retainer strips are the only tools required for most trim work. Use industrial rubber cement to hold soundproofing mats and fabric edges in place. Refer to Section 18 for repair of glass-fiber constructed components.
- 3-46. **SOUNDPROOFING.** The aircraft is insulated with spun glass mat-type insulation and a sound-deadener compound applied to inner surfaces of skin in most areas of cabin and baggage compartment. All soundproofing material should be replaced in its original position anytime it is removed. A soundproofing panel is placed in gap between wing and fuselage and held in place by wing root fairings.
- 3-47. **CABIN HEADLINER.** (See figure 3-8.)
- 3-48. **REMOVAL AND INSTALLATION.** (See figure 3-8.)
- Remove sun visors, all inside finish strips and plates, overhead console, upper doorpost shields and any other visible retainers securing headliner.
 - Remove molding from fixed windows.
 - Remove screws securing headliner and carefully take down headliner.
 - Remove spun glass soundproofing panels above headliner.

NOTE

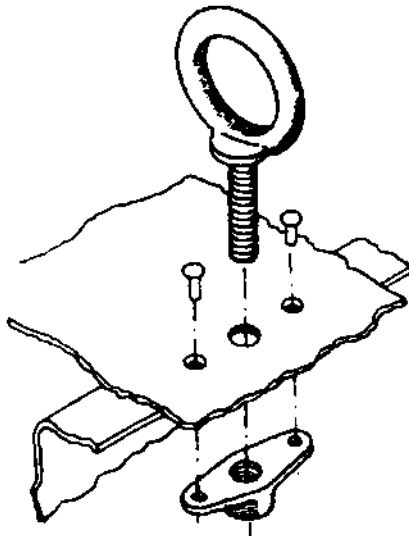
The lightweight soundproofing panels are held in place with industrial rubber cement.

- Reverse preceding steps for installation. Before installation, check all items concealed by headliner for security. Use wide cloth tape to secure loose wires to fuselage and to seal openings in wing roots.
- 3-49. **UPHOLSTERY SIDE PANELS.** Removal of upholstery side panels is accomplished by removing seats for access, then removing parts attaching panels. Remove screws, retaining strips, arm rests and ash trays as required to free panels. Automotive-type spring clips attach most door panels. A dull putty knife makes an excellent tool for prying clips loose. When installing side panels, do not over-tighten screws. Larger screws may be used in enlarged holes as long as the area behind the hole is checked for electrical wiring, fuel lines and other components which might be damaged by using a longer screw. Ensure that, after all seats are reinstalled, seat stops are properly and securely installed.
- 3-50. **CARPETING.** Cabin area and baggage compartment carpeting is held in place by rubber cement, small sheet metal screws and retaining strips. When fitting a new carpet, use old carpet as a pattern for trimming and for marking screw holes.
- 3-51. **SAFETY PROVISIONS.**
- 3-52. **CARGO TIE-DOWNS.** (See figure 3-9.) Cargo tie-downs are used to ensure baggage cannot enter seating area during flight. Methods of attaching tie-downs are illustrated in the figure. The eyebolt and nutplate can be located at various points. The sliding tie-down lugs also utilize eyebolts and attach to seat rails.
- 3-53. **SAFETY BELTS.** (See figure 3-11.) Safety belts should be replaced if frayed or cut, latches are defective or stitching is broken. Attaching parts should be replaced if excessively worn or defective. A seat belt shortening kit is available for aircraft serials 17266047 thru 17274009. Refer to SK172-76.

MODEL 172 SERIES SERVICE MANUAL

- 3-54. **SHOULDER HARNESS.** (See figure 3-11.) Individual shoulder harnesses may be installed for each seat. Each harness is connected to the upper fuselage structure and to the seat safety belt buckle. Component parts should be replaced as outlined in the preceding paragraph.
- 3-55. **GLIDER TOW-HOOK.** A glider tow-hook, which is mounted in place of the tail tie-down ring, is available for all models.
- 3-56. **REAR VIEW MIRROR.** (172 AND F172 SERIES ONLY.) (See figure 3-10.) A rear view mirror may be installed on the cowl deck above the instrument panel. The figure illustrates details for removal and installation of rear view mirror.
- 3-57. **SEAT RAIL INSPECTION.** A special inspection of seat rails should be conducted each 50 hours. See figure 3-12 for inspection procedures.

CARGO TIE-DOWN RING



CARGO TIE-DOWN LUG SLIDE ASSEMBLY

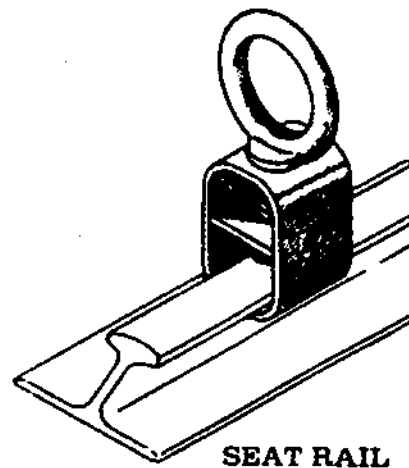


Figure 3-9. Cargo Tie-Down Rings

OPTIONAL (THRU
17271034 & F17201749)

1. Cover
2. Mirror
3. Grommet
4. Nut
5. Washer
6. Deck Skin

172 & F172 SERIES ONLY

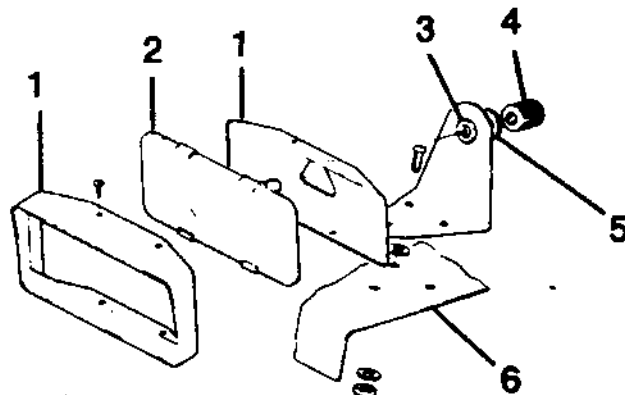


Figure 3-10. Rear View Mirror Installation

MODEL 172 SERIES SERVICE MANUAL

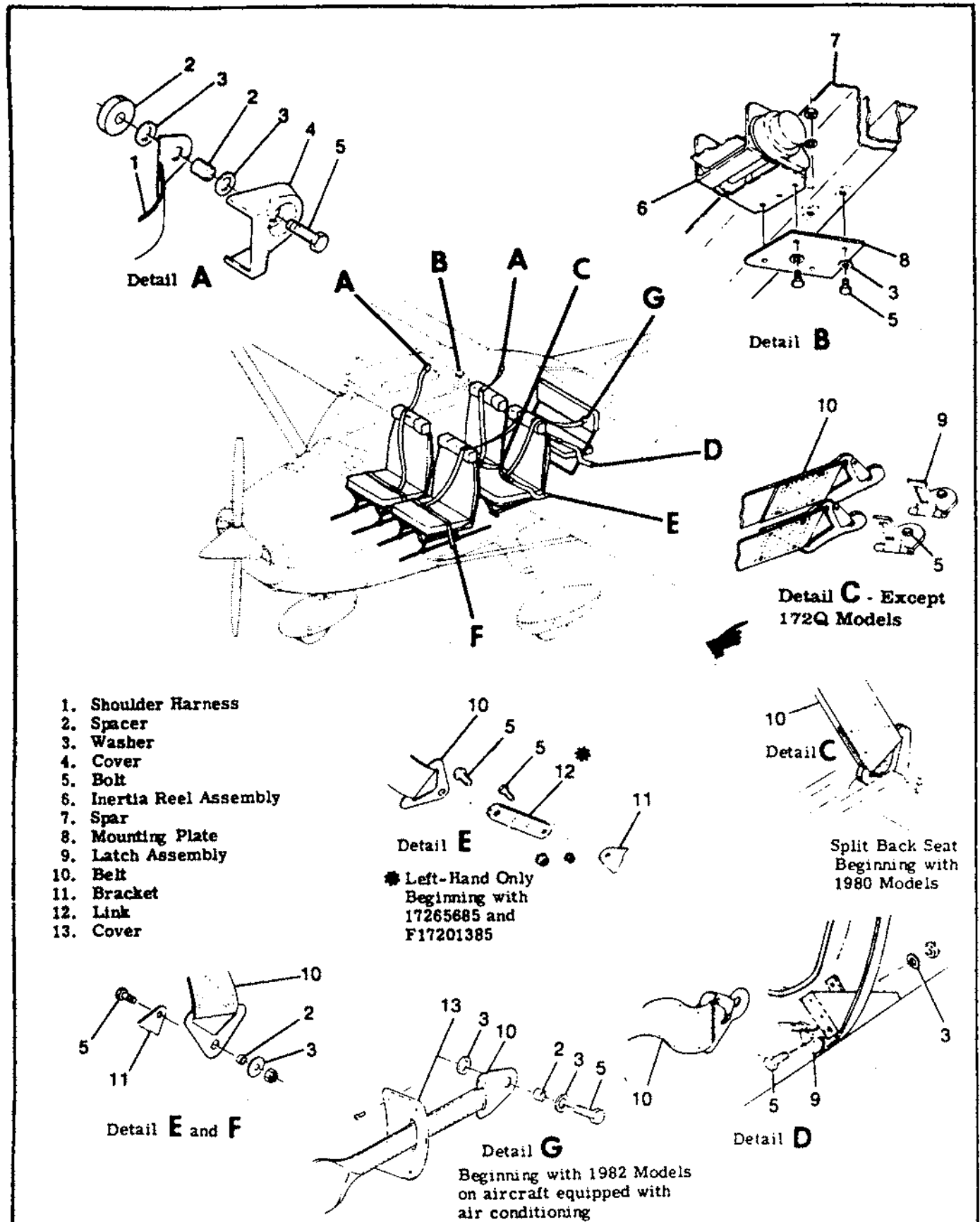
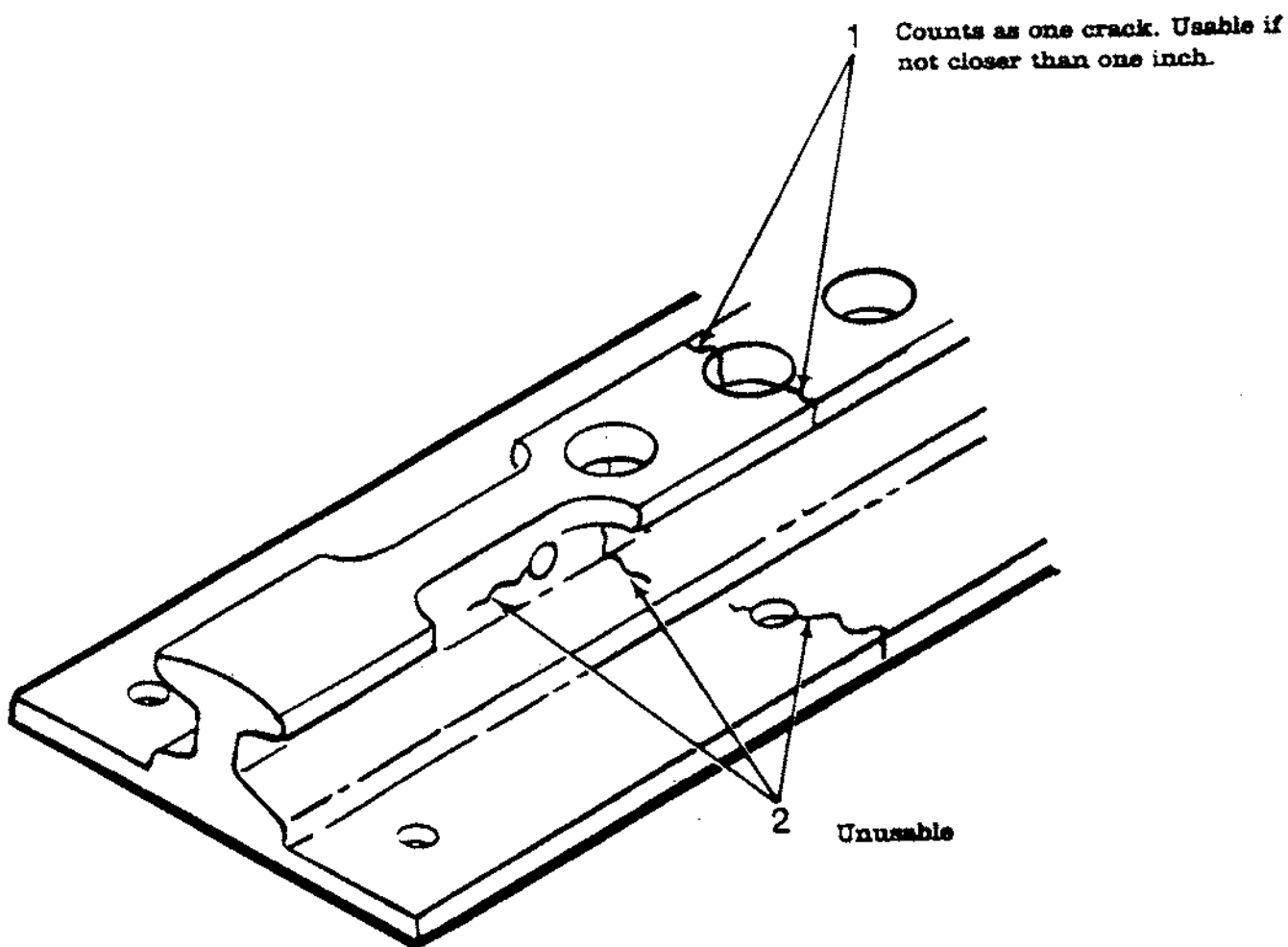


Figure 3-11. Seat Belt and Shoulder Harness Installation

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REPLACE SEAT RAIL WHEN:

- Any portion of web or lower flange is cracked (index 2).
- Any crack in crown of rail is in any direction other than right angle to length of rail.
- Number of cracks on any one rail exceeds four, or any two cracks (index 1) are closer than one inch.

NOTE

Use of seat rail cargo tie-downs is not permissible on seat rails with cracks.

Figure 3-12. Seat Rail Inspection

MODEL 172 SERIES SERVICE MANUAL

SECTION 4

WINGS AND EMPENNAGE

TABLE OF CONTENTS	Page No. Aerofiche/ Manual		
WINGS AND EMPENNAGE	1H5/4-1	Description	1H13 4-9
Wings	1H5/4-1	Removal	1H13 4-9
Description	1H5/4-1	Repair	1H14 4-10
Removal	1H5/4-1	Installation	1H14 4-10
Repair	1H8/4-4	Horizontal Stabilizer	1H14 4-10
Installation	1H8/4-4	Description	1H14 4-10
Adjustment	1H12/4-8	Removal/Installation	1H14 4-10
Wing Struts	1H13/4-9	Repair	1H17/4-11
Description	1H13/4-9	Stabilizer Abrasion Boots	1H17/4-11
Removal/Installation	1H13/4-9	Description	1H17 4-11
Repair	1H13/4-9	Removal	1H17 4-11
Fin	1H13/4-9	Installation	1H17 4-11

4-1. WINGS AND EMPENNAGE.

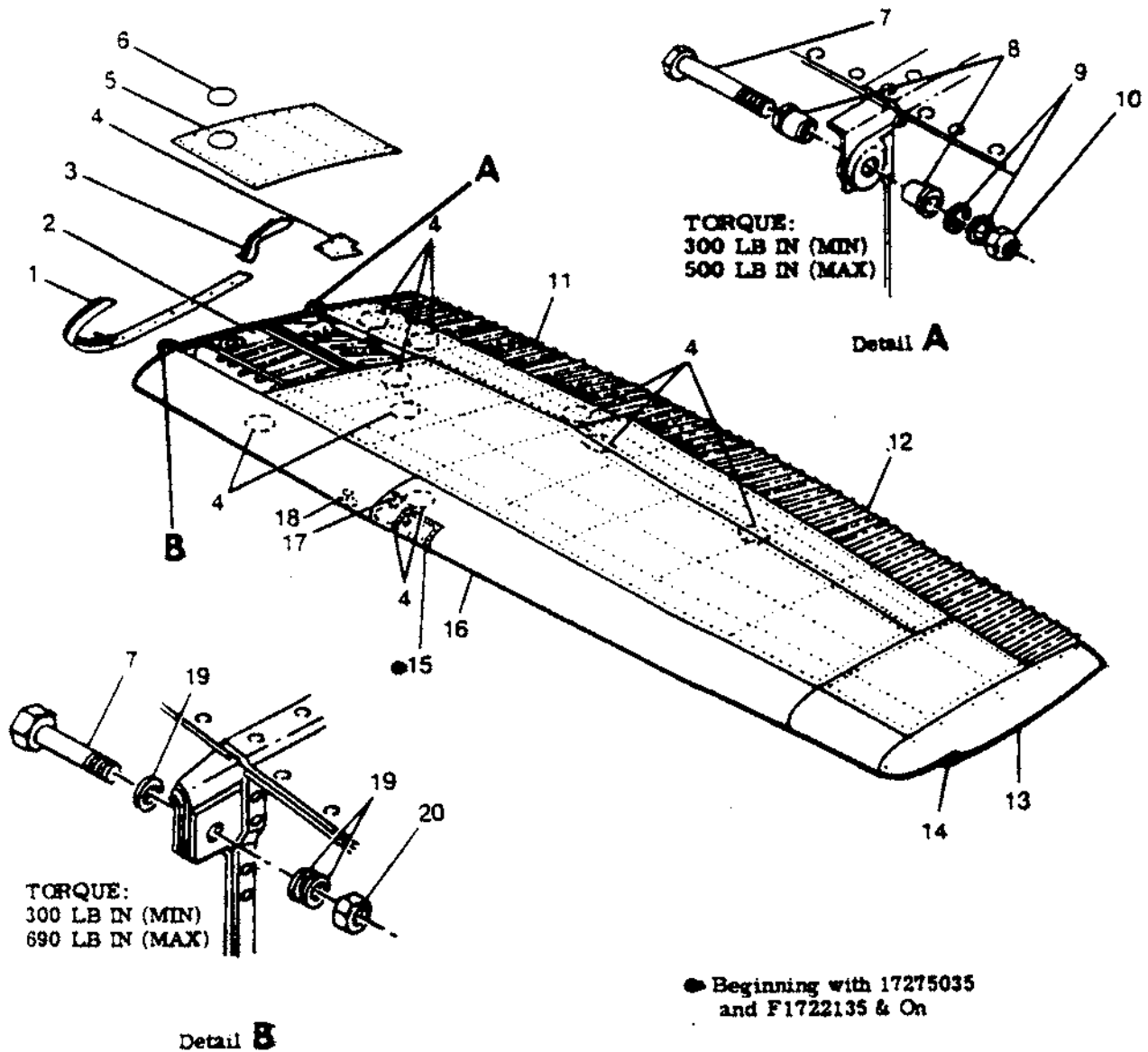
4-2. WINGS. (See figure 4-1.)

4-3. **DESCRIPTION.** Each all-metal wing is a semicantilever, semimonocoque type, with two main spars and suitable ribs for the attachment of the skin. Skin panels are riveted to ribs, spars and stringers to complete the structure. An all-metal, piano-hinged aileron, flap and a detachable wing tip are mounted on each wing assembly. A single metal fuel tank is mounted between the wing spars at the inboard end of each wing. Beginning with 1981 Models, an optional installation, consisting of an integral fuel bay, formed between the wing spars at the inboard end of each wing, is available. Colored navigation lights are mounted at each wing tip. Beginning with 1982 Models, the aircraft landing lights are located in the left hand wing leading edge.

4-4. **REMOVAL.** Wing panel removal is most easily accomplished if four men are available to handle the wing. Otherwise, the wing should be supported with a sling or maintenance stand when the fastenings are loosened.

- a. Remove wing root fairings and fairing plates.
- b. Remove all wing inspection plates.
- c. Drain fuel from tank or bay of wing being removed.
- d. Disconnect:
 1. Electrical wires at wing root disconnects.
 2. Fuel lines at wing root. (Refer to precautions outlined in Section 12.)
 3. Pitot line (left wing only) at wing root.
 4. Cabin ventilator hose at wing root.
- e. Reduce aileron cable tension by loosening turnbuckles and disconnect cables at aileron bellcranks. Disconnect flap cables at turnbuckles above headliner, and pull cables into wing root area.

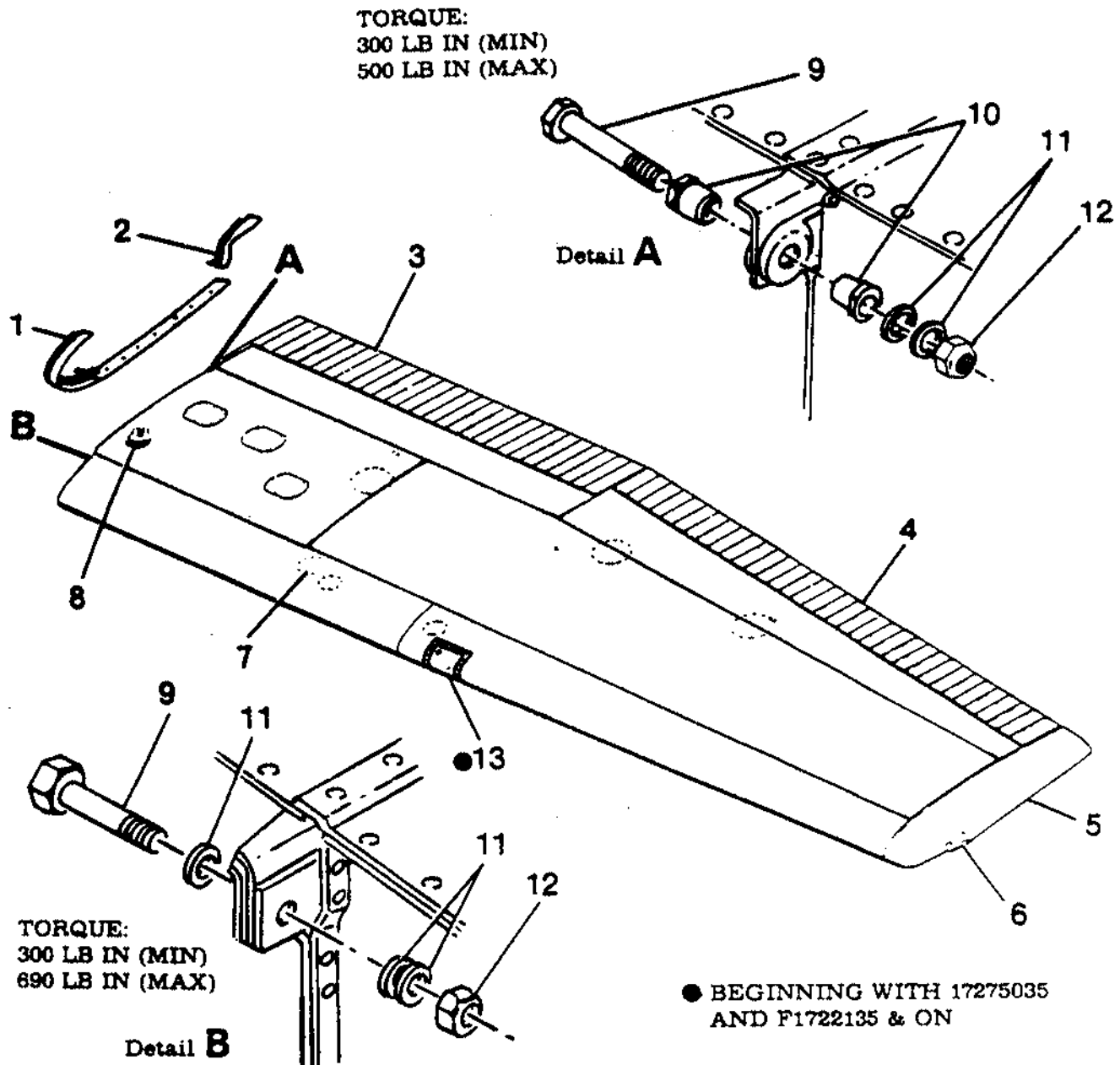
MODEL 172 SERIES SERVICE MANUAL



1. Fairing	8. Eccentric Bushings	15. Wing Mounted Landing Light
2. Fuel Tank	9. Washer	16. Wing Assembly
3. Lower Rear Fairing	10. Nut	17. Cover Plate
4. Inspection Plate	11. Wing Flap	18. Stall Warning Unit
5. Fuel Tank Cover	12. Aileron	19. Washers
6. Fuel Gage Access Cover	13. Wing Tip	20. Nut
7. Bolt	14. Navigation and Strobe Lights	

Figure 4-1. Wing Installation (Sheet 1 of 2)

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OPTIONAL, BEGINNING WITH 1981 MODELS

1. Fairing	5. Wing Tip	9. Bolt
2. Lower Rear Fairing	6. Navigation and Strobe Lights	10. Eccentric Bushings
3. Wing Flap	7. Courtesy Light	11. Washers
4. Aileron	8. Fuel Filler Cap	12. Nut
		13. Wing Mounted Landing Light

Figure 4-1. Wing Installation (Sheet 2 of 2)

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NOTE

To ease rerouting the cables, a guide wire may be attached to each cable before it is pulled free from the wing. Cable may then be disconnected from the wire. Leave the guide wire routed through the wing; it may be attached again to the cable during installation, and used to pull the cable into place.

- f. Remove screws from strut fairings and slide fairings toward center of strut.
- g. Support wing at outboard end and remove strut-to-wing attach bolt.
- h. Lower strut carefully to avoid damage to lower strut-to-fuselage fitting.

NOTE

Tape flaps in the streamlined position during wing removal. This will prevent flap damage due to the unsecured free-swinging action when handling the wing.

- i. Mark position of wing-attachment eccentric bushings (See figure 4-1.) These bushings are used to rig out "wing heaviness".
- j. Remove nuts, washers, bushings and bolts attaching wing spars to fuselage.

NOTE

It may be necessary to rock the wings slightly and/or to use a long drift punch to remove attaching bolts.

- k. Remove wing and lay on padded stand.

NOTE

Plans for fabrication of padded wing support stands are illustrated in Section 18 of this manual.

- 4-5. REPAIR. A damaged wing panel may be repaired in accordance with instructions outlined in Section 18, which supplements Federal Aviation Regulation, Part 43. Extensive repairs of wing skin and structure are best accomplished by using the wing alignment repair jig, which may be obtained from Cessna. The wing jig serves not only as a holding fixture, making work on the wing easier, but also assures absolute alignment of the repaired wing.
- 4-6. INSTALLATION. (See figure 4-1.)

NOTE

The forward wing spar fittings are attached to the fuselage fittings with AN8-23 bolts, and the aft wing spar fittings are attached to the fuselage fittings with AN7-24 bolts. Minimum torque on the AN8-23 bolts is 300 lb-in and the maximum torque is 690 lb-in. Minimum torque on the AN7-24 bolts is 300 lb-in, and the maximum torque is 500 lb-in.

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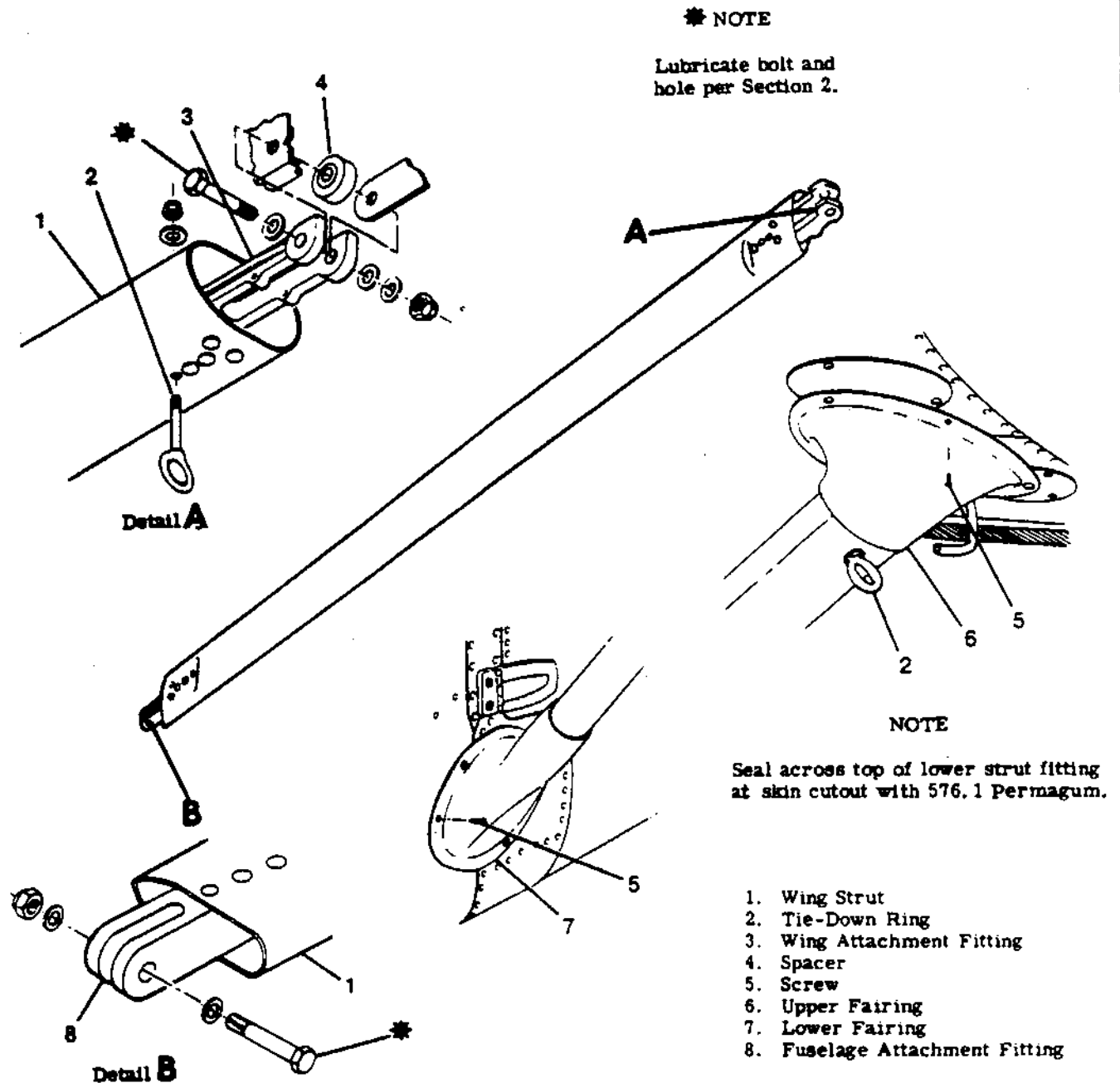


Figure 4-2. Wing Strut

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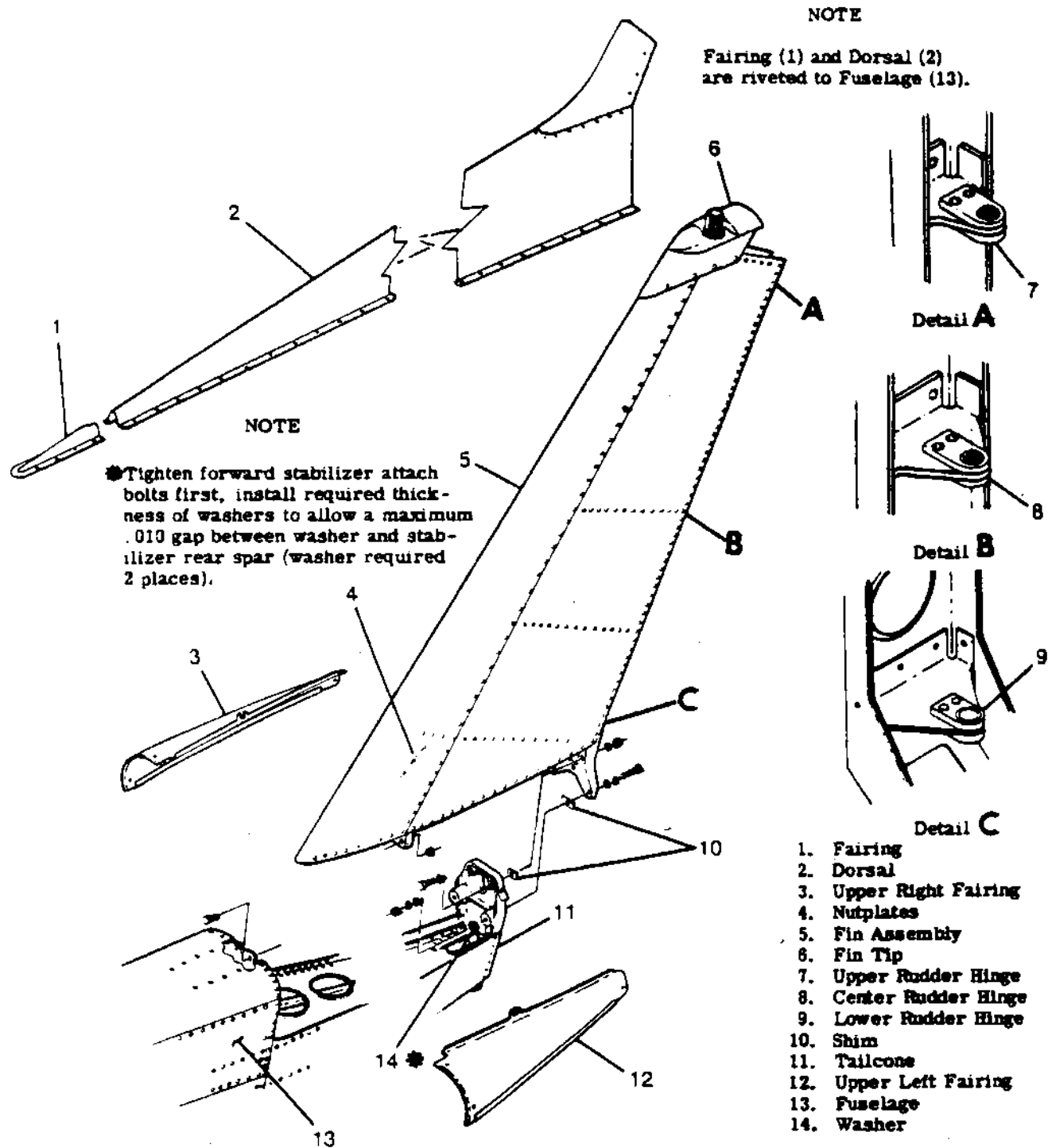
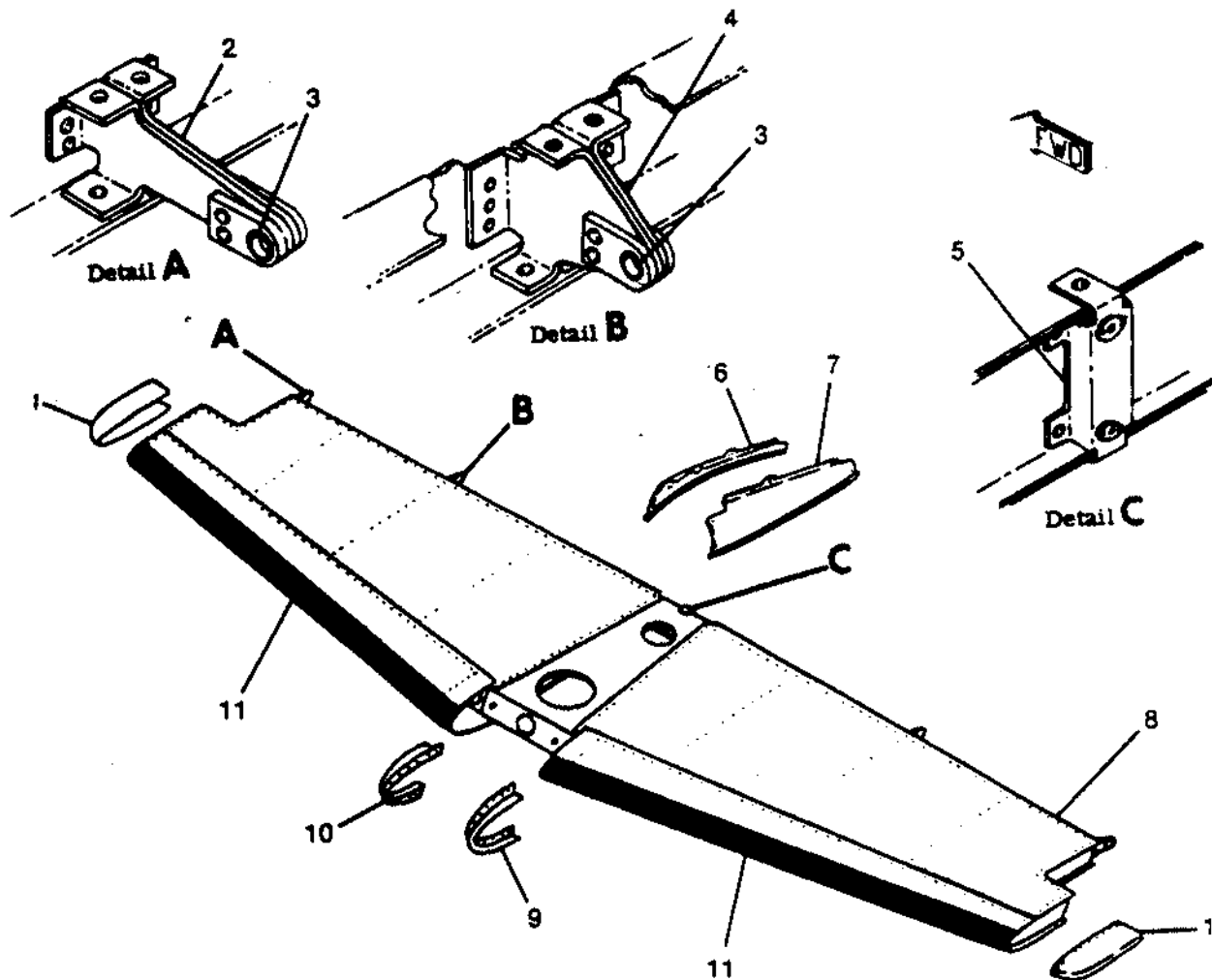


Figure 4-3. Vertical Fin

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NOTE

See figure 4-3 for stabilizer rear attach bolt installation.

NOTE

A kit is available from the Cessna Supply Division for installation of abrasion boots on aircraft not so equipped.

- 1. Stabilizer Tip
- 2. Outboard Elevator Hinge
- 3. Bushing

- 4. Inboard Elevator Hinge
- 5. Bracket
- 6. Upper Right Fairing
- 7. Upper Left Fairing

- 8. Horizontal Stabilizer
- 9. Forward Left Fairing
- 10. Forward Right Fairing
- 11. Abrasion Boot

Figure 4-4. Horizontal Stabilizer

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NOTE

Upon installation of bolts, coat holes and bolts lightly with Electro-Moly No. 11 (MIL-G-121164) grease.

- a. Hold wing in position and install bolts, bushings, washers and nuts attaching wing spars to fuselage fittings. Ensure eccentric bushings are positioned as marked. Torque nuts to values stipulated in note preceding this step.
- b. Install bolts, spacers, and nuts to secure upper and lower ends of wing strut to wing and fuselage fittings.

NOTE

Upon installation of bolts, coat holes and bolts lightly with Electro-Moly No. 11 (MIL-G-121164) grease.

NOTE

Seal opening in fuselage skin around lower wing strut fitting with 579.8 Sealer (Inmont Corp., St. Louis, Missouri) or equivalent.

- c. Route flap and aileron cables, using guide wires. (See note in paragraph 4-4.)
- d. Connect:
 1. Electrical wires at wing root disconnects.
 2. Fuel lines at wing root. (Refer to precautions outlined in Section 12.)
 3. Pitot line (if left wing is being installed.)
- e. Rig aileron system (Section 6).
- f. Rig flap system (Section 7).
- g. Refuel wing tank or bay and check for leaks. (Refer to precautions outlined in Section 12.)
- h. Check operation of wing tip lights.
- i. Check operation of fuel gage.
- j. Seal all openings common to fuselage root rib and adjacent to fuel cell with cloth-backed waterproof tape. Tapes recommended for usage are: Polyken 224, 230 or 231, Permacel P-69, P-670 or P-672, or Tuck 92T.
- k. Install wing root fairings.

NOTE

Be sure to insert soundproofing panel in wing gap, if such a panel was installed originally, before replacing wing root fairings.

- l. Install all wing inspection plates, interior panels and upholstery.

4-7. **ADJUSTMENT (Correcting "Wing-Heavy" Condition).** (See figure 4-1.) If considerable control wheel pressure is required to keep the wings level in normal flight, a "wing-heavy" condition exists.

- a. Remove wing fairing strip on the "wing-heavy" side of the aircraft.
- b. Loosen nut (10) and rotate bushings (8) simultaneously until the bushings are positioned with the thick side of the eccentrics up. This will lower the trailing edge of the wing, and decrease "wing-heaviness" by increasing angle-of-incidence of the wing.

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CAUTION

Be sure to rotate the eccentric bushings simultaneously. Rotating them separately will destroy the alignment between the off-center bolt holes in the bushings, thus exerting a shearing force on the bolt, with possible damage to the hole in the wing spar.

- c. Torque nut (10) and reinstall fairing strip.
- d. Test-fly the aircraft. If the "wing-heavy" condition still exists, remove fairing strip on the "lighter" wing, loosen nut, and rotate bushings simultaneously until the bushings are positioned with the thick side of the eccentrics down. This will raise the trailing edge of the wing, thus increasing "wing-heaviness" to balance heaviness in the opposite wing.
- e. Torque nut (10), install fairing strip, and repeat flight test.

4-8. WING STRUTS. (See figure 4-2.)

- 4-9. DESCRIPTION. Each wing has a single lift strut which transmits a part of the wing load to the lower portion of the fuselage. The strut consists of a streamlined tube riveted to two end fittings for attachment at the fuselage and wing.

4-10. REMOVAL AND INSTALLATION.

- a. Remove screws from strut fairings and slide fairings along strut.
- b. Remove fuselage and wing inspection plates at strut junction points.
- c. Support wing securely, then remove nut and bolt securing strut to fuselage.
- d. Remove nut, bolt and spacer used to attach strut to wing, then remove strut from aircraft.
- e. Reverse preceding steps to install strut.

NOTE

Seal opening in fuselage skin around lower wing strut fitting with 579.6 Sealant (Inmont Corp., St. Louis, Missouri) or equivalent.

4-11. REPAIR.

- a. For grooves in wing strut caused by strut fairings, the following applies.
 - 1. If groove exceeds .010 inch in depth and is less than .75 inch from a rivet center, the strut should be replaced.
 - 2. If groove is more than .75 inch from a rivet center and groove depth exceeds .030 inch, strut should be replaced.
 - 3. If groove depth is less than .030 inch and is more than .75 inch from a rivet center, strut should be repaired by tapering gradually to the original surface and burnishing out to a smooth finish. The local area should be checked with dye penetrant to insure that no crack has developed.

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- b. The following applies to wing struts with grooves worn in the lower trailing edge. This type damage can occur after extensive cabin door usage with a missing or improperly adjusted door stop which allows the door to bang against the aft edge of the strut at the lower end.

NOTE

Struts with a groove deeper than 50% of the original material thickness should be replaced. Lesser damage may be repaired as follows:

1. Without making the damage deeper, remove strut material on each side of groove to reduce notch effect of damage. Smooth and blend the surface to provide a gradual transition of strut tube material thickness in damaged area. The local area should be checked with dye penetrant to insure that no crack has developed.
2. Apply brush alodine or zinc chromate primer and repaint area.
3. Re-rig the door stop and/or re-form the lower portion of the door pan and skin in-board to prevent the door from rubbing the strut tube. If these actions prove to be ineffective, install some form of protective bumper, either on strut or lower portion of door, to prevent further damage. A short, hard rubber strip bonded to the trailing edge of the strut where the door comes close to strut is a possibility.

NOTE

It should be noted that the above disposition applies only to the damage caused by strikes from cabin door. The criteria set forth for strut fairing damage still applies as a general criteria for the remainder of the strut.

- c. Tie-downs and attaching parts may be replaced. If the strut is severely dented, cracked or deformed, it should be replaced.

4-12. FIN. (See figure 4-3.)

4-13. DESCRIPTION. The fin is primarily of metal construction, consisting of ribs and spars covered with skin. Fin tips are of ABS construction. Hinge brackets at the fin rear spar attach the rudder.

4-14. REMOVAL. The fin may be removed without first removing the rudder. However, for access and ease of handling, the rudder may be removed in accordance with procedures outlined in Section 10 of this manual. Remove fin as follows:

- a. Remove fairings on either side of fin.
- b. Disconnect flashing beacon lead, tail navigation light lead, antennas and antenna leads, and rudder cables, if rudder has not been removed.

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NOTE

The flashing beacon electric lead that routes into the fuselage may be cut, then spliced (or quick-disconnects used) at installation.

- c. Remove screws attaching dorsal to fin.
- d. Disconnect elevator cable from elevator bellcrank.
- e. Remove bolts attaching fin rear spar to fuselage fitting. Remove upper elevator stop bolts.
- f. Remove bolts attaching fin front spar to fuselage bulkhead, and remove fin.
- g. Retain any shims installed between the rear spar of the fin and the fuselage fitting.

4-15. **REPAIR.** Fin repair should be accomplished in accordance with applicable instructions outlined in Section 18.

4-16. **INSTALLATION.** Reverse the procedures outlined in paragraph 4-14 to install the vertical fin. Be sure to check and reset rudder and elevator travel.

- a. Reinstall any shims removed from between the fin rear spar and the fuselage fitting. If a new fin is being installed, measure any gap existing between the fin rear spar and the fuselage fitting and use shims as follows:

.000" to .030" gap	No Shim
.030" to .050" gap	0531115-1 Shim (.020")
.050" to .070" gap	0531115-2 Shim (.040")

A maximum of one shim per bolt is permissible.

4-17. **HORIZONTAL STABILIZER.** (See figure 4-4.)

4-18. **DESCRIPTION.** The horizontal stabilizer is primarily of all-metal construction, consisting of ribs and spars covered with skin. Stabilizer tips are of ABS construction. A formed metal leading edge is riveted to the assembly to complete the structure. The elevator trim tab actuator is contained within the horizontal stabilizer. The underside of the stabilizer contains a covered opening which provides access to the actuator. Hinges are located on the rear spar assembly to support the elevators.

4-19. **REMOVAL AND INSTALLATION.**

- a. Remove elevators and rudder in accordance with procedures outlined in Sections 8 and 10.
- b. Remove vertical fin in accordance with procedures outlined in paragraph 4-14.
- c. Disconnect elevator trim control cables at clevis and turnbuckle inside tailcone. remove pulleys which route the aft cables into horizontal stabilizer, and pull cables out of tailcone.
- d. Remove bolts securing horizontal stabilizer to fuselage.
- e. Remove horizontal stabilizer.
- f. Reverse preceding steps to install horizontal stabilizer.

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NOTE

Tighten forward stabilizer-attach bolts first. Install required thickness of washers to allow a maximum .010-inch gap between washer and stabilizer rear spar. Washers are required in 2 places. The following washers are available from the Cessna Supply Division.

S1450-5A20-100

S1450-5A20-080

S1450-5A20-063

- g. Check operation of tail navigation light and flashing beacon.
- h. Rig control systems as necessary.

4-20. **REPAIR.** Horizontal stabilizer repair should be accomplished in accordance with applicable instructions outlined in Section 18.

4-21. **STABILIZER ABRASION BOOTS.** (See figure 4-4.)

NOTE

An Accessory Kit (AK182-217) is available from the Cessna Supply Division for installation of abrasion boots on aircraft not so equipped.

4-22. **DESCRIPTION.** The aircraft may be equipped with two extruded rubber abrasion boots, one on the leading edge of each horizontal stabilizer. These boots are installed to protect the stabilizer leading edge from damage caused by rocks thrown back by the propeller.

4-23. **REMOVAL.** The abrasion boots can be removed by loosening one end of the boot and pulling it off the stabilizer with an even pressure. Excess adhesive or rubber can be removed with Methyl-Ethyl-Ketone.

4-24. **INSTALLATION.** Install abrasion boots as outlined in the following procedures.

- a. Trim boots to desired length.
- b. Mask off boot area on leading edge of stabilizer with 1-inch masking tape, allowing 1/4-inch margin.
- c. Clean metal surfaces of stabilizer, where boot is to be installed with Methyl-Ethyl-Ketone.
- d. Clean inside surface of abrasion boot with Methyl-Ethyl-Ketone and a Scotch brite pad to ensure complete removal of paraffin/talc. Then a normal wipe down with MEK on a cloth will leave surface suitable for bonding to the aluminum.

NOTE

Boots may be applied over epoxy primer, but if the surface has been painted, the paint shall be removed from the bond area. This shall be done by wiping the surfaces with a clean, lint-free rag, soaked with solvent, and then wiping the surfaces dry, before the solvent has time to evaporate, with a clean, dry lint-free rag.

- e. Stir cement (EC-1300 Minnesota Mining and Manufacturing Co.) thoroughly.
- f. Apply one even brush coat to the metal and the inner surface of the boot. Allow

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cement to air-dry for a minimum of 30 minutes, and then apply a second coat to each surface. Allow at least 30 minutes (preferably one-hour) for drying.

- g. After the cement has thoroughly dried, reactivate the surface of the cement on the stabilizer and boot, using a clean, lint-free cloth, heavily moistened with toluol. Avoid excess rubbing which would remove the cement from the surfaces.
- h. Position boot against leading edge, exercising care not to trap air between boot and stabilizer.

NOTE

Should boot be attached "off-course", pull it up immediately with a quick motion, and reposition properly.

- i. Press or roll entire surface of boot to assure positive contact between the two surfaces.
- j. Apply a coat of GACO N700A sealer, or equivalent, conforming to MIL-C-21067, along the trailing edges of the boots to the surface of the skin to form a neat, straight fillet.
- k. Remove masking tape and clean stabilizer of excess material.
- l. Mask to the edge of boot for painting stabilizer.

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SECTION 5

LANDING GEAR, WHEELS AND BRAKES

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5-1. LANDING GEAR.

- 5-2. **DESCRIPTION.** The aircraft is equipped with a fixed tricycle landing gear, consisting of tubular spring-steel main gear struts, and an air/oil steerable nose gear shock strut. Wheels with disc-type brakes and tube-type tires are installed on the main landing gear struts, and a two-piece, die-cast aluminum wheel is mounted on the nose gear strut. The nose wheel is steerable with the rudder pedals up to a maximum pedal deflection, after which it becomes free-swiveling, up to a maximum of 30 degrees, each side of center. Nose and main wheel speed fairings are available for installation.

5-3. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
AIRCRAFT LEANS TO ONE SIDE.	Incorrect tire inflation.	Inflate to pressure specified in figure 1-1.
	Landing gear attaching parts not tight.	Tighten loose parts; replace defective parts with new parts.
	Landing gear spring excessively sprung.	Remove and install new part(s).
	Bent axle(s).	Install new part(s).
TIRES WEAR EXCESSIVELY.	Incorrect tire inflation.	Inflate to pressure specified in figure 1-1.
	Main wheels out of alignment.	Remove and install new part(s).
	Landing gear spring excessively sprung.	Remove and install new part(s).
	Bent axle(s).	Install new part(s).
	Dragging brakes.	Refer to paragraph 5-67.
	Wheel bearings excessively tight.	Adjust properly.

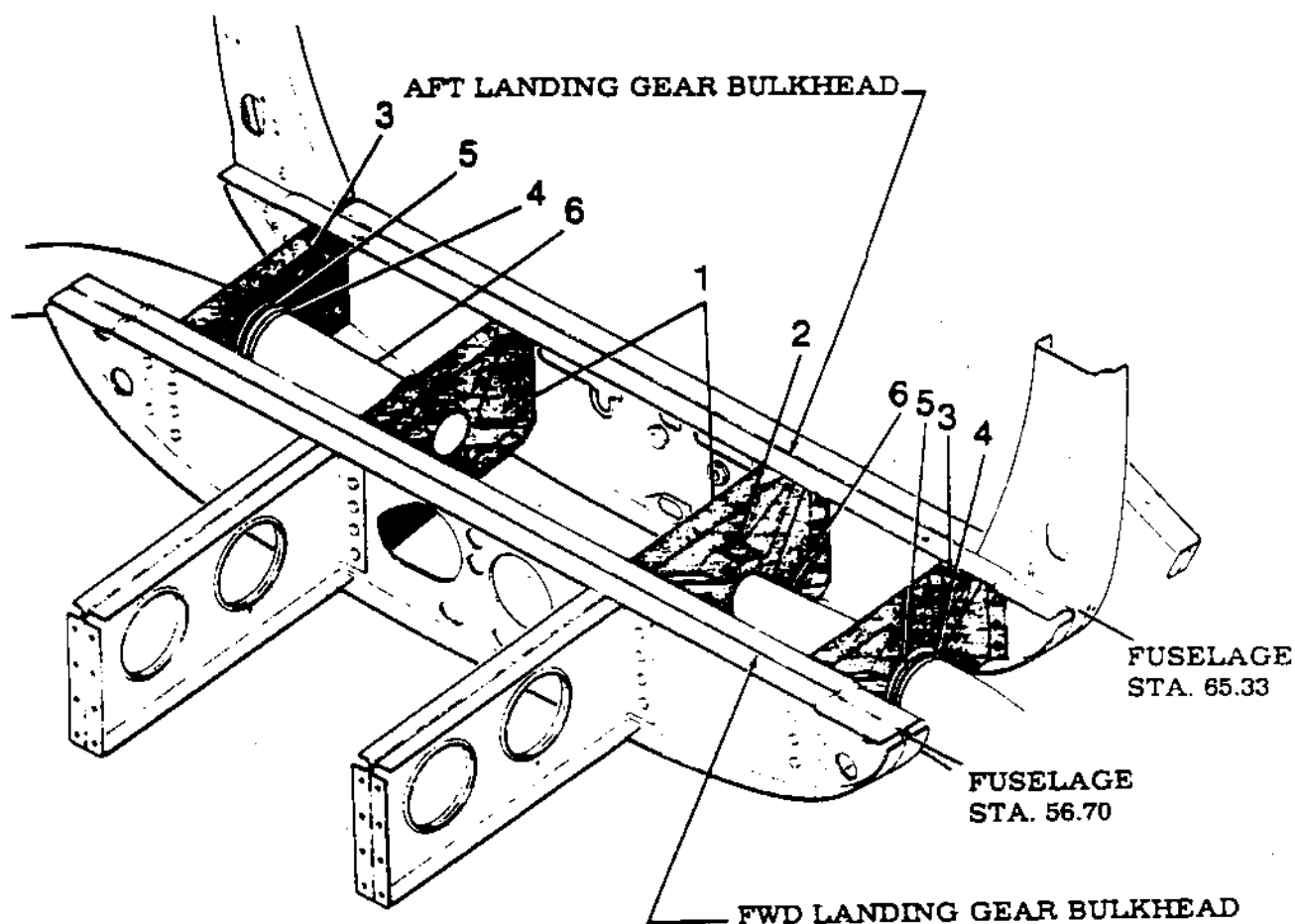
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5-3. TROUBLE SHOOTING. (Cont.)

TROUBLE	PROBABLE CAUSE	REMEDY
TIRES WEAR EXCESSIVELY (Cont.)	Loose torque links.	Add shims or install new parts as required.
WHEEL BOUNCE EVIDENT ON SMOOTH SURFACE.	Out of balance condition.	Refer to paragraph 5-30.

5-4. MAIN LANDING GEAR. (See figure 5-1.)

5-5. DESCRIPTION. The tubular, spring-steel main landing gear struts are attached to the



1. Inboard Forging
2. Bolt

3. Outboard Forging
4. Bushing

5. Bushing Retainer Ring
6. Tubular Strut

Figure 5-1. Main Landing Gear Installation (Sheet 1 of 2)

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Apply Y-8560 (3M Corporation) polyurethane tape (1" wide) to upper and lower surface of spring and above and below step bracket to prevent chafing of spring fairing.

1. Inboard Forging
2. Bolt
3. Outboard Forging
4. Bushing
5. Bushing Retainer Ring
6. Tubular Strut
7. Brake Line
8. Clamp
9. Step
10. Step Bracket
11. Axle
12. Brake Torque Plate
13. Nut
14. Hub Cap
15. Wheel Assembly
16. Wheel Brake Assembly
17. Fuselage Fairing
18. Tubular Strut Fairing
19. Cap Fairing
20. Brake Fairing
21. Elbow
22. Nut
23. O-Ring

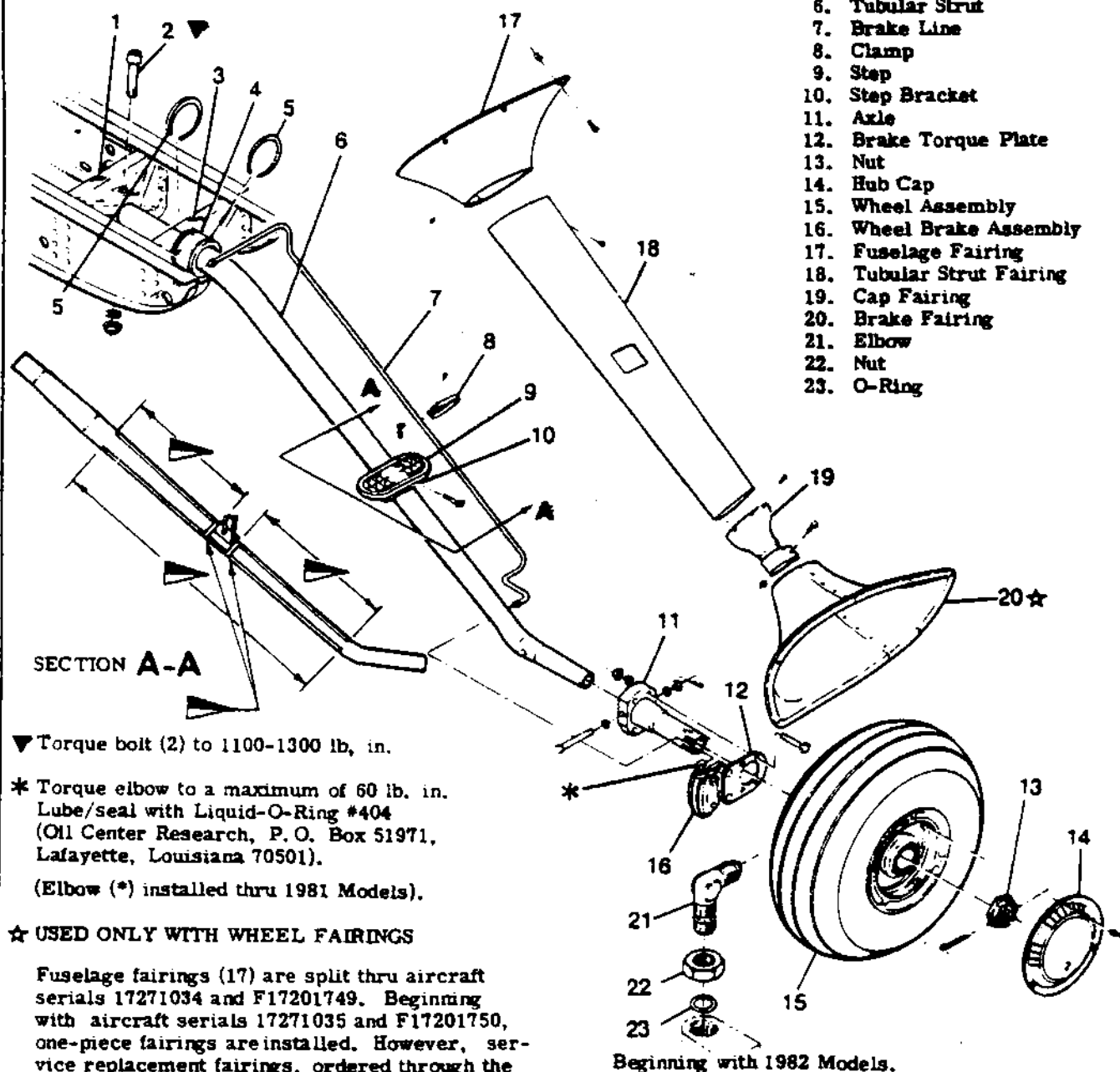


Figure 5-1. Main Landing Gear Installation (Sheet 2 of 2)

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aircraft at inboard and outboard forgings, located in the belly of the aircraft. A bracket is bonded to each strut for attachment of a step. Hydraulic brake lines are routed down and clamped to each main gear strut. The axles, main wheels and brake assemblies are installed at the lower end of each strut.

5-6. MAIN LANDING GEAR REMOVAL. (See figure 5-1.)

NOTE

The following procedure removes the landing gear as a complete assembly. Refer to applicable paragraph for removal of individual components.

- a. Remove floorboard access covers over inboard and outboard landing gear forgings (1) and (3).
- b. Hoist or jack aircraft in accordance with procedures outlined in Section 2.
- c. Remove screws attaching fairing (17) to fuselage. Remove screws at splice in fairing and work fairing off strut fairing.
- d. Drain hydraulic fluid from brake line (7) on strut being removed.
- e. Disconnect hydraulic brake line (7) at fitting where brake line emerges from fuselage skin. Cap or plug disconnected fittings.
- f. Remove nut, washer and bolt attaching inboard end of tubular strut to the inboard landing gear bulkhead fitting.
- g. Pull tubular strut from fitting and bushing. Use care when removing strut to prevent damage to hydraulic brake line.

NOTE

The tubular strut is a compression fit in the bushing in the outboard landing gear forging (3).

5-7. MAIN LANDING GEAR INSTALLATION. (See figure 5-1.)

NOTE

The following procedure installs the landing gear as a complete assembly. Refer to applicable paragraphs for installation of individual components.

- a. Install all parts removed from strut.
- b. Apply Dow Corning Compound DC-7 to approximately 11 inches on upper end of tubular strut.

NOTE

Avoid use of Dow Corning DC-7 on surfaces to be painted. DC-7 contains silicone which is harmful to painted areas.

- c. Slide tubular strut into place through bushing in outboard strut fitting and into inboard strut fitting.
- d. Align tubular strut in inboard fitting and install bolt through fitting and strut. Install washer and nut on bolt and tighten to torque value of 1100-1300 lb.in.
- e. Connect hydraulic brake line to fitting. Fill and bleed brake system in accordance with paragraph 5-79.

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- f. Install fuselage fairing.
- g. Lower aircraft and install floorboard access covers.

5-8. STEP BRACKET INSTALLATION. (See figure 5-1.)

NOTE

The step bracket is secured to the tubular gear strut with EA9309, EC2218, EC2214, EC3445, or a similar epoxy base adhesive.

- a. Mark position of the bracket so that the new step bracket will be installed in approximately the same position on the strut.
- b. Remove all traces of the original bracket and adhesive as well as any rust, paint or scale with a wire brush and coarse sandpaper.
- c. Leave surfaces slightly roughened or abraded, but deep scratches or nicks should be avoided.
- d. Clean surfaces to be bonded together thoroughly. If a solvent is used, remove all traces of the solvent with a clean, dry cloth. It is important that the bonding surfaces be clean and dry.
- e. Check fit of step bracket on the tubular strut. A small gap is permissible between bracket and tubular strut.
- f. Mix adhesive (any of those listed in note preceding step "a") in accordance with manufacturer's directions.
- g. Spread a coat of adhesive on bonding surfaces, and place step bracket in position on the tubular strut. Clamp bracket to strut to ensure a good, tight fit.
- h. Form a small fillet of the adhesive at all edges of the bonded surfaces. Remove excess adhesive with lacquer thinner.
- i. Allow adhesive to cure thoroughly according to manufacturer's recommendations before flexing the tubular gear strut or applying loads to the strut.
- j. Paint tubular strut and step bracket after curing is complete.

5-9. MAIN LANDING GEAR FAIRINGS. (See figures 5-1 and 5-2.)

- 5-10. DESCRIPTION. Some aircraft are equipped with fuselage fairings, attached to the fuselage and the tubular strut fairings with screws. The tubular strut fairings cover the tubular landing gear struts, and attach to the fuselage fairings at the upper end and to fairing caps at the lower end. The fairing caps attach to the tubular strut fairings at the upper end and are clamped to the tubular struts at the lower end. Brake fairings are installed at the lower end of the tubular strut fairings and are attached to the wheel speed fairings by screws around their outer perimeters. The speed fairings are installed over the wheels and are attached to mounting plates, attached to the axles. The wheel fairings are equipped with adjustable scrapers, installed in the lower aft part of the fairings, directly behind the wheels.

5-11. REMOVAL AND INSTALLATION. (See figure 5-1.)

- a. To remove brake fairings, proceed as follows:
 - 1. Remove screws from perimeter of fairing.
 - 2. Remove screws from nutplates holding two halves of fairing together; remove fairing halves.
 - 3. Reverse preceding steps for installation.
- b. To remove cap fairings, proceed as follows:
 - 1. Remove screws attaching fairing to tubular spring strut.
 - 2. Disconnect clamp from tubular strut and spring clamp over strut; remove cap fairing.

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•17263459 thru 17271569 *17271570 thru 17273369 *17273370 thru 17276574
 F17201235 thru F17201794 F17201795 thru F17202029 F17202030 And On
 17276575 & On

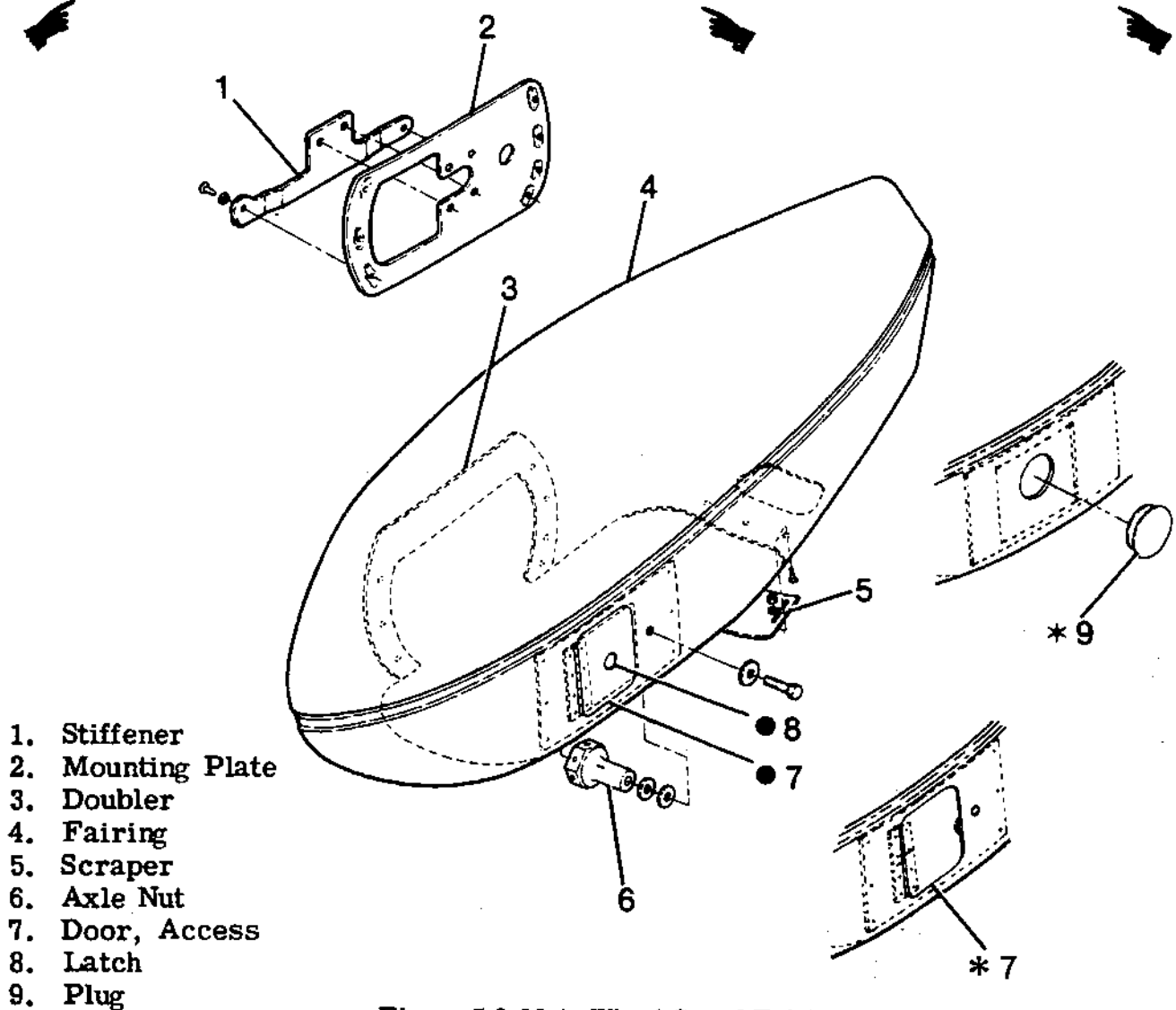


Figure 5-2. Main Wheel Speed Fairings

3. Reverse preceding steps for installation.
- c. To remove fuselage fairings, proceed as follows:
 1. Remove screws attaching fairings to fuselage.
 2. Slide fairings down tubular strut fairings and, thru aircraft serials 17271034 and F17201749, remove screws from nutplates holding fairings together; spring fairings over strut fairings. Beginning with aircraft serials 17271035 and F17201750, fairings are one-piece and cannot be sprung apart.
 3. Reverse preceding steps for installation.
- d. To remove tubular strut fairing, proceed as follows:
 1. Remove brake fairing per step "a".
 2. Remove cap fairing per step "b".
 3. Remove fuselage fairing per step "c".
 4. Remove screws from nutplates on strut fairing.
 5. Spring fairing over tubular gear strut.

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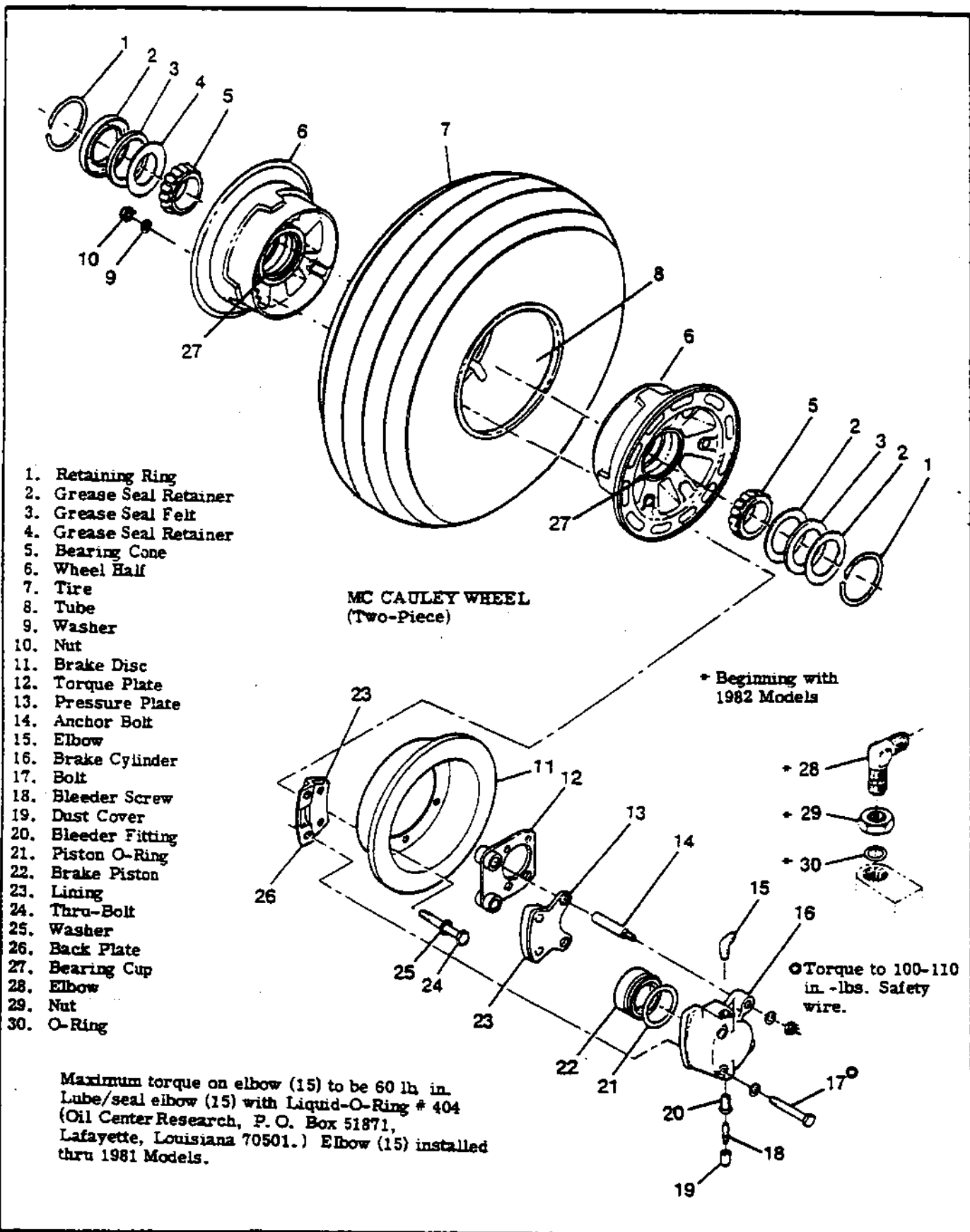


Figure 5-3. Main Wheel and Brake (Sheet 1 of 3)

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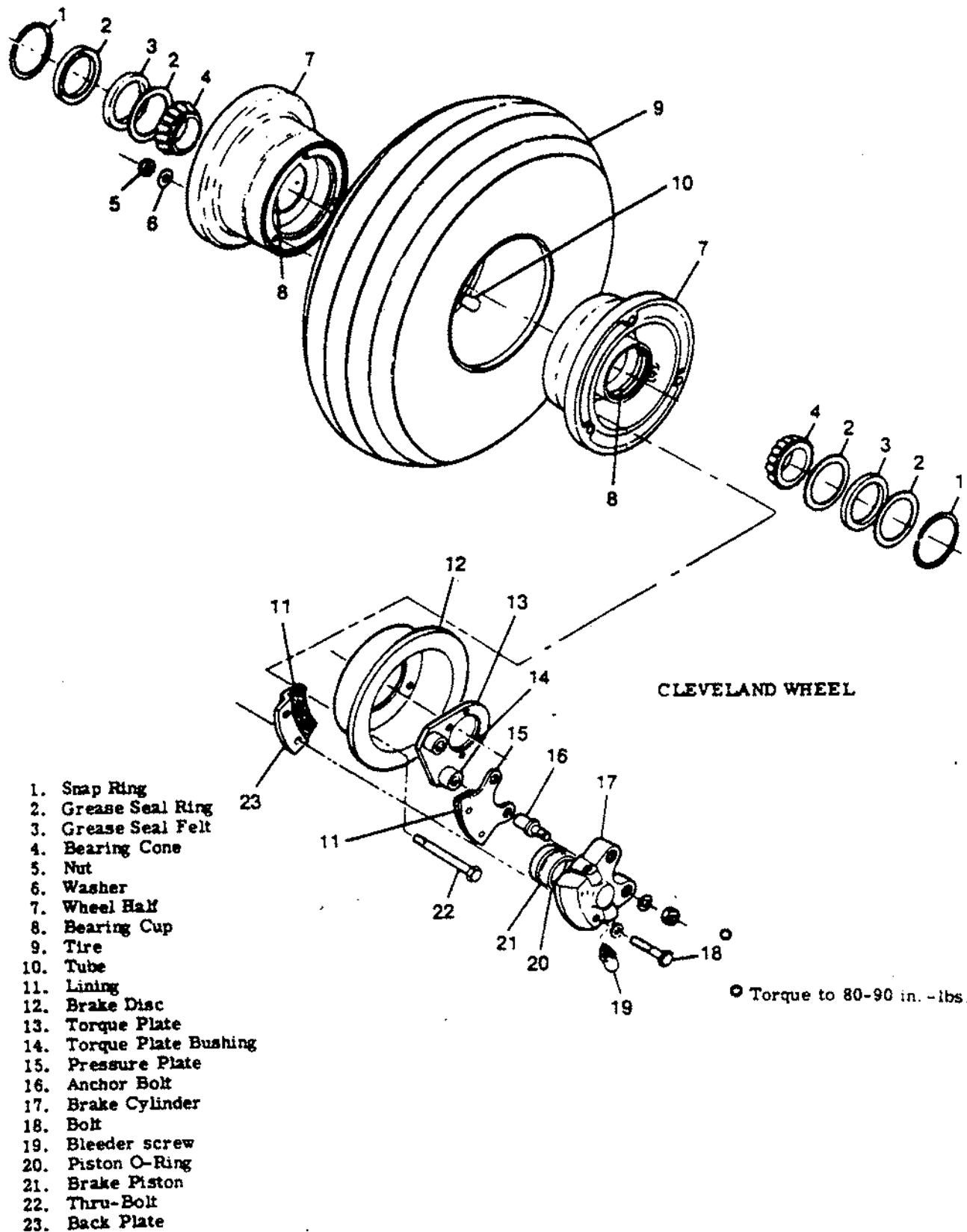


Figure 5-3. Main Wheel and Brake (Sheet 2 of 3)

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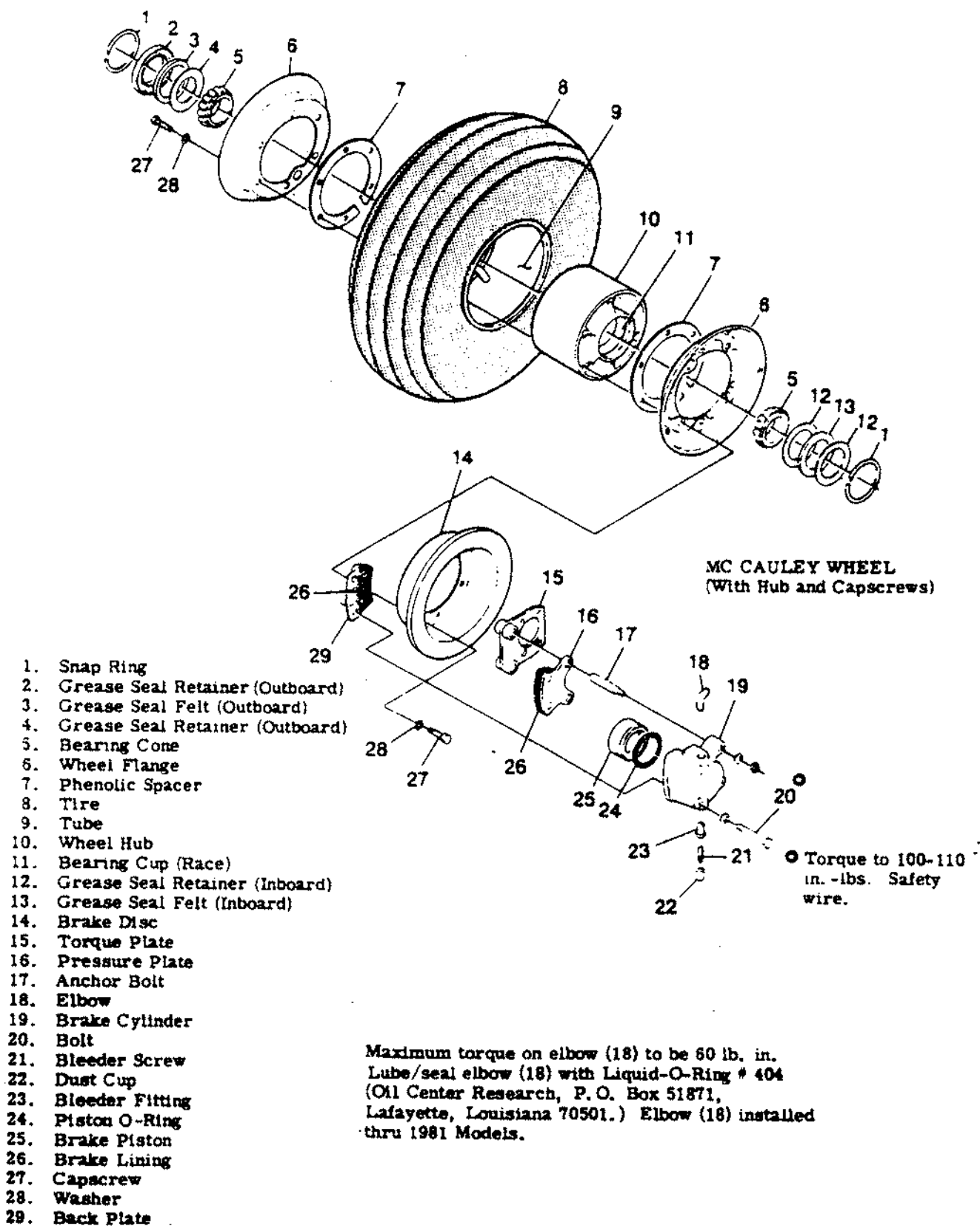


Figure 5-3. Main Wheel and Brakes (Sheet 3 of 3)

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6. Reverse preceding steps for installation.
- e. To remove step bracket cover, proceed as follows:
 1. Remove tubular strut fairing per step "d".
 2. Slide step bracket cover from step bracket on tubular gear strut.
 3. Reverse preceding steps for installation.

5-12. MAIN WHEEL SPEED FAIRING REMOVAL. (See figure 5-2.)

- a. Remove wheel brake fairing (item 20, figure 5-1) by removing screws around perimeter of fairing, then removing screws from nutplates holding two halves of brake fairing together.
- b. Remove screws attaching stiffener (1) and inboard side of wheel speed fairing (4) to attach plate (2), which is bolted to the axle.
- c. Remove bolt securing outboard side of fairing to axle nut.
- d. Loosen scraper, if necessary, and work speed fairing from wheel.

5-13. MAIN WHEEL SPEED FAIRING INSTALLATION. (See figure 5-2.)

- a. Work speed fairing down over wheel.
- b. Install bolt securing outboard side of fairing to axle nut.
- c. Install screws attaching stiffener (1) and inboard side of wheel speed fairing (4) to mounting plate (2), which is bolted to the axle.
- d. Install wheel brake fairing (item 20, figure 5-1) by installing screws in nutplates holding two halves of brake fairing together, then install screws around perimeter of fairing.
- e. After installation, check scraper-to-tire clearance for a minimum of 0.25-inch to a maximum of 0.50-inch. Elongated holes are provided in the scraper for clearance adjustments.

CAUTION

Always check scraper-to-tire clearance after installing speed fairings, whenever a tire has been changed, and whenever scraper adjustment has been disturbed. If the aircraft is flown from surfaces with mud, snow, or ice, the speed fairings should be checked to make sure there is no accumulation which could prevent normal wheel rotation. Wipe fuel and oil from speed fairings to prevent stains and deterioration.

5-14. MAIN WHEEL REMOVAL. (See figure 5-1.)

NOTE

It is not necessary to remove the main wheel to reline brakes or to remove brake parts, other than the brake disc on the torque plate.

- a. Hoist or jack aircraft in accordance with procedures outlined in Section 2.
- b. Remove speed fairing, if installed, as outlined in paragraph 5-12.
- c. Remove hub caps, if installed, cotter pin and axle nut.
- d. Remove bolts and washers attaching brake back plate to brake cylinder, and remove back plate.
- e. Pull wheel from axle.

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- 5-15. MAIN WHEEL DISASSEMBLY. (McCauley Two-Piece Wheel.) (See figure 5-3, Sheet 1 of 3.)
- Completely deflate tire and tube and break loose tire beads. Extreme care must be exercised to prevent tire tool damage when removing tire from wheel halves (6).

WARNING

Serious injury can result from attempting to separate wheel halves with tire and tube inflated.

- Remove nuts (10) and washers (9).
- Remove thru-bolts (24) and washers (25).
- Separate and remove wheel halves (6) from tire and tube.
- Remove retaining rings (1), grease seal retainers (2) grease seal felts (3), grease seal retainers (4) and bearing cones (5) from both wheel halves (6).

NOTE

Bearing cups (races) (27) are a press fit in wheel halves (6), and should not be removed unless a new part is to be installed. To remove bearing cups, heat wheel half in boiling water for 30 minutes, or in an oven, not to exceed 121°C (250°F). Using an arbor press, if available, press out bearing cup and press in a new bearing cup while wheel half is still hot.

- 5-16. MAIN WHEEL INSPECTION AND REPAIR. (McCauley Two-Piece Wheel.) (See figure 5-3, Sheet 1 of 3.)
- Clean all metal parts and grease seal felts in Stoddard solvent or equivalent, and dry thoroughly.

NOTE

A soft bristle brush may be used to remove hardened grease, dust or dirt.

- Inspect wheel halves (6) for cracks or damage.
- Inspect bearing cones (5), cups (27), retaining rings (1), grease seal retainers (2), grease seal felts (3) and grease seal retainers (4) for wear or damage.
- Inspect thru-bolts (24) and nuts (10) for cracks in threads or cracks in radius under bolt head.
- Replace cracked or damaged wheel half (6).
- Replace damaged retainer rings (1) and seals (2), (3) and (4).
- Replace worn or damaged bearing cups (27) and cones (5).
- Replace any worn or cracked thru-bolts (24) or nuts (10).
- Remove any corrosion or small nicks.
- Repair reworked areas of wheel by cleaning thoroughly, then applying one coat of clear lacquer paint.
- Pack bearings with grease specified in Section 2.
- Inspect brakes per paragraph 5-81.

- 5-17. MAIN WHEEL REASSEMBLY. (McCauley Two-Piece Wheel.) (See figure 5-3, Sheet 1 of 3.)
- Assemble bearing cone (5), grease seal retainer (4), grease seal felt (3), grease seal retainer (2) and retaining ring (1) into each wheel half (6).
 - Insert tube in tire, aligning index marks on tire and tube.

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- c. Place wheel half (6) into tire and tube (side opposite valve stem). With washer (25) under head of thru-bolt (24), insert bolt through wheel half (6).
- d. Place wheel half (6) into other side of tire and tube, aligning valve stem in valve slot.
- e. Insert washers (9) and nuts (10) on thru-bolts (24), and pre-torque to 10-15 lb. in.

CAUTION

Uneven or improper torque of the nuts can cause failure of the bolts with resultant wheel failure.

- f. Prior to torquing nuts (10), inflate tube with approximately 10-15 psi air pressure to seat tire.

CAUTION

Do not use impact wrenches on thru-bolts or nuts.

- g. Dry torque all nuts (10) evenly to a torque value of 140-150 lb. in.
- h. Inflate tire to correct pressure specified in figure 1-1.

5-18. DISASSEMBLY. (Cleveland Wheel.) (See figure 5-3, Sheet 2 of 3.)

- a. Remove valve core and deflate tire and tube. Break tire beads loose from wheel rims.

WARNING

Injury can result from attempting to separate wheel halves with tire inflated. Avoid damaging wheel flanges when breaking tire beads loose. A scratch, gouge or nick in the wheel may cause wheel failure.

- b. Remove thru-bolts and separate wheel halves, removing tire, tube and brake disc
- c. Remove grease seal rings, felts and bearing cones from wheel halves.

NOTE

Bearing cups (races) are press-fit in the wheel halves and should not be removed unless a new part is to be installed. To remove bearing cups, heat wheel halves in boiling water for 30 minutes or in an oven not to exceed 149°C (300°F). Using an arbor press, if available, press out bearing cup and press in new bearing cup while wheel half is still hot.

5-19. MAIN WHEEL INSPECTION AND REPAIR. (Cleveland Wheel.) (See figure 5-3, Sheet 2 of 3.)

- a. Clean all metal parts and grease seal felts in solvent and dry thoroughly.
- b. Inspect wheel halves for cracks. Cracked wheel halves should be discarded and new parts used. Sand out nicks, gouges and corroded areas. When protective coating has been removed, the area should be cleaned thoroughly, primed with zinc chromate and painted with aluminum lacquer.
- c. Inspect brakes per paragraph 5-81.
- d. Carefully inspect bearing cones and cups for damage and discoloration. After cleaning, pack bearing cones with clean aircraft wheel bearing grease, as outlined in Section 2, before installing in wheel half.

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- 5-20. **MAIN WHEEL REASSEMBLY.** (Cleveland Wheel.) (See figure 5-3, Sheet 2 of 3.)
- Insert thru-bolts through brake disc and position disc in the inner wheel half, using thru-bolts to guide the disc. Ascertain that the disc is bottomed in the wheel half.
 - Position tire and tube on outboard wheel half with tube inflation valve through hole in wheel half.
 - Place inner wheel half in position on outboard wheel half. Apply a light force to bring wheel halves together. While maintaining the light force, assemble a washer and nut on thru-bolt and tighten to maintain force. Assemble remaining washers and nuts to thru-bolts. Tighten nuts evenly to the torque value of 90 lb. in.

CAUTION

Uneven or improper torque of thru-bolt nuts can cause failure of bolts, with resultant wheel failure.

- Clean and pack bearing cones with clean aircraft wheel bearing grease, as outlined in Section 2.
 - Assemble bearing cones, grease seal felts and rings into wheel halves.
 - Inflate tire to seat tire beads, then adjust to correct tire pressure. Refer to chart in Section 1 for correct tire pressure.
- 5-21. **MAIN WHEEL DISASSEMBLY.** (McCauley Wheel with Hub and Capscrews.) (See figure 5-3, Sheet 3 of 3.)

WARNING

Injury can result from attempting to remove wheel flanges with tire and tube inflated. Avoid damaging wheel flanges when breaking tire beads loose. A scratch, gouge or nick in wheel flange could cause wheel failure.

- Remove valve core and deflate tire and tube. Break tire beads loose from wheel flanges.
- Remove capscrews and washers from outboard wheel flange.
- Remove capscrews and washers from inboard wheel flange.
- Remove brake disc.
- Remove wheel hub from tire.
- Remove retainer rings, grease seal retainers, grease seal felts and bearing cones.

NOTE

Bearing cups (races) are a press fit in the wheel hub and should not be removed unless a new part is to be installed. To remove the bearing cup, heat wheel hub in boiling water for 30 minutes, or in an oven not to exceed 121°C (250°F). Using arbor press, if available, press out the bearing cup and press in the new bearing cup while the wheel hub is still hot.

- 5-22. **MAIN WHEEL INSPECTION AND REPAIR.** (McCauley Wheel With Hub and Capscrews.) (See figure 5-3, Sheet 3 of 3.)
- Clean all metal parts, grease seal felts and phenolic spacers in cleaning solvent and dry thoroughly.

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- b. Inspect wheel flanges and wheel hub for cracks. Cracked wheel flanges or hub shall be discarded and new parts installed. Sand out smooth nicks, gouges and corroded areas. When the protective coating has been removed, the area should be cleaned thoroughly, primed with zinc chromate and painted with aluminum lacquer.
- c. Inspect brakes per paragraph 5-81.
- d. Carefully inspect bearing cones and cups for damage and discoloration. After cleaning, pack bearing cones with clean aircraft wheel bearing grease. Refer to Section 2 for grease type.

5-23. MAIN WHEEL REASSEMBLY. (McCauley Wheel With Hub and Capscrews.) (See figure 5-3, Sheet 3 of 3.)

- a. Place wheel hub in tire and tube with tube inflation stem in hole of wheel hub.
- b. Place spacer and wheel flange on inboard side of wheel hub (opposite of tube inflation stem).
- c. Place washer under head of each capscrew, insert capscrew through brake disc, wheel flange and spacer, and start capscrews into wheel hub threads.

CAUTION

Be sure that spacers, wheel flanges and brake disc are seated on flange of wheel hub. Uneven or improper torque of capscrews can cause failure of capscrews or hub threads with resultant wheel failure.

- d. Tighten capscrews evenly and torque to 190 to 200 lb. in.
- e. Place spacer and wheel flange on outboard side of wheel hub and align valve stem hole in wheel flange.
- f. Place washer under head of each capscrew, insert capscrew through wheel flange and spacer. Start capscrews into wheel hub threads.
- g. Tighten capscrews evenly and torque to 190 to 200 lb. in.
- h. Clean and pack bearing cones with clean aircraft wheel bearing grease. Refer to Section 2 for grease type.
- i. Assemble bearing cones, grease seal filts and retainer into wheel hub.
- j. Inflate tire to seat tire beads, then adjust to correct pressure. Refer to chart in Section 1 for correct tire pressure.

5-24. MAIN WHEEL INSTALLATION. (See figure 5-1.)

- a. Place wheel assembly on axle.
- b. Install axle nut and tighten axle nut until a slight bearing drag is obvious when the wheel is rotated. Back off nut to nearest castellation and install cotter pin.
- c. Place brake back plate in position and secure with bolts and washers.
- d. Install hub cap. Install speed fairing (if used) as outlined in paragraph 5-13.

CAUTION

Always check scraper-to-tire clearance after installing speed fairings, whenever a tire has been changed, and whenever scraper adjustment has been disturbed. If the aircraft is flown from surfaces with mud, snow, or ice, the fairing should be checked to make sure there is no accumulation which could prevent normal wheel rotation. Refer to paragraph 5-13 for correct scraper-to-tire clearance.

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5-25. MAIN WHEEL AXLE REMOVAL. (See figure 5-1.)

NOTE

This procedure should be used if the axle is not bonded to the tubular strut. If the axle is bonded to the strut, refer to paragraph 5-27.

- a. Remove speed fairing, if installed, in accordance with paragraph 5-12.
- b. Remove wheel in accordance with paragraph 5-14.
- c. Disconnect, drain and cap or plug hydraulic brake line at the wheel brake cylinder.
- d. Remove bolts attaching brake torque plate and speed fairing mounting plate to axle.
- e. Remove cotter pin, nut, washer and bolt attaching axle to tubular strut.
- f. Remove axle from spring-strut.

5-26. MAIN WHEEL AXLE INSTALLATION. (See figure 5-1.)

NOTE

This procedure should be used if the axle is not to be bonded to the tubular strut. If the axle is to be bonded to the strut, refer to paragraph 5-28.

- a. Install axle on spring-strut, using wet primer on faying surfaces of axle and spring-strut. Axle is installed with tapered edges to bottom.
- b. Install bolt, washer and nut attaching axle to spring-strut. After tightening nut, install cotter pin.
- c. Install brake components and speed fairing mounting plate to axle.
- d. Install wheel on axle in accordance with paragraph 5-24.
- e. Connect hydraulic brake line to wheel brake cylinder.
- f. Fill and bleed hydraulic brake system in accordance with paragraph 5-79.
- g. Install speed fairing, if used, in accordance with paragraph 5-13.

5-27. BONDED MAIN WHEEL AXLE REMOVAL. (See figure 5-4.)

NOTE

On some aircraft, due to axle looseness, axles have been bonded to the tubular landing gear strut. The following procedure should be used to remove a bonded axle.

- a. Remove speed fairings, if installed, according to procedures outlined in paragraph 5-12.
- b. Remove wheels in accordance with procedures outlined in paragraph 5-14.
- c. Disconnect, drain and cap or plug hydraulic brake line at the wheel brake cylinder.
- d. Remove cotter pin, nut and bolt attaching axle to spring strut.
- e. Remove brake components and speed fairing plate from axle.

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WARNING

Due to aging of aluminum axle, caused by the heating tape, a new axle will have to be installed.

CAUTION

Do not place tape in direct contact with tubular gear spring

1. Axle
2. Tubular Gear Strut
3. Electrical Heating Tape
4. Plug

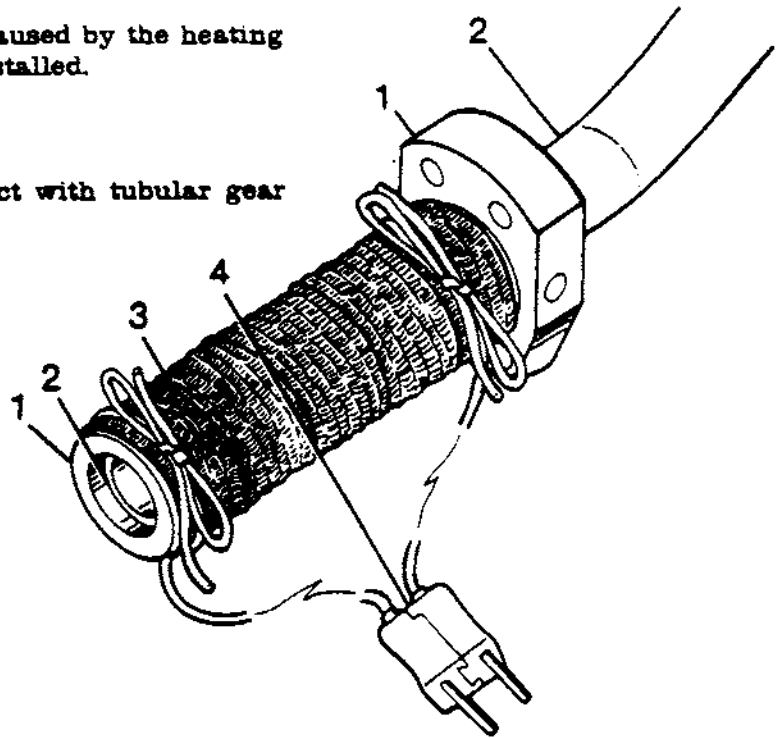


Figure 5-4. Bonded Main Wheel Axle Removal

NOTE

Axles are bonded to the struts of some tubular gear aircraft with EA9309-25GR adhesive, which is available from the Cessna Supply Division. The bond is too strong to allow the axle to be removed without first weakening the bond strength. The only methods of weakening the bond are with heat or cryogenic cold; heat being the most practical. A temperature of approximately 500°F is sufficient to weaken the bond so the axle can be removed. This is still a low enough temperature to prevent damage to the tubular strut.

f. Remove axles as follows:

NOTE

Axles should be removed from strut, using electric heating tape. Heating tape, P/N 135-459, can be obtained from the Cessna Supply Division.

- g. Wrap heating tape around axle from base head to outer end of axle and tie it on with string provided with the tape, as shown in figure 5-4.

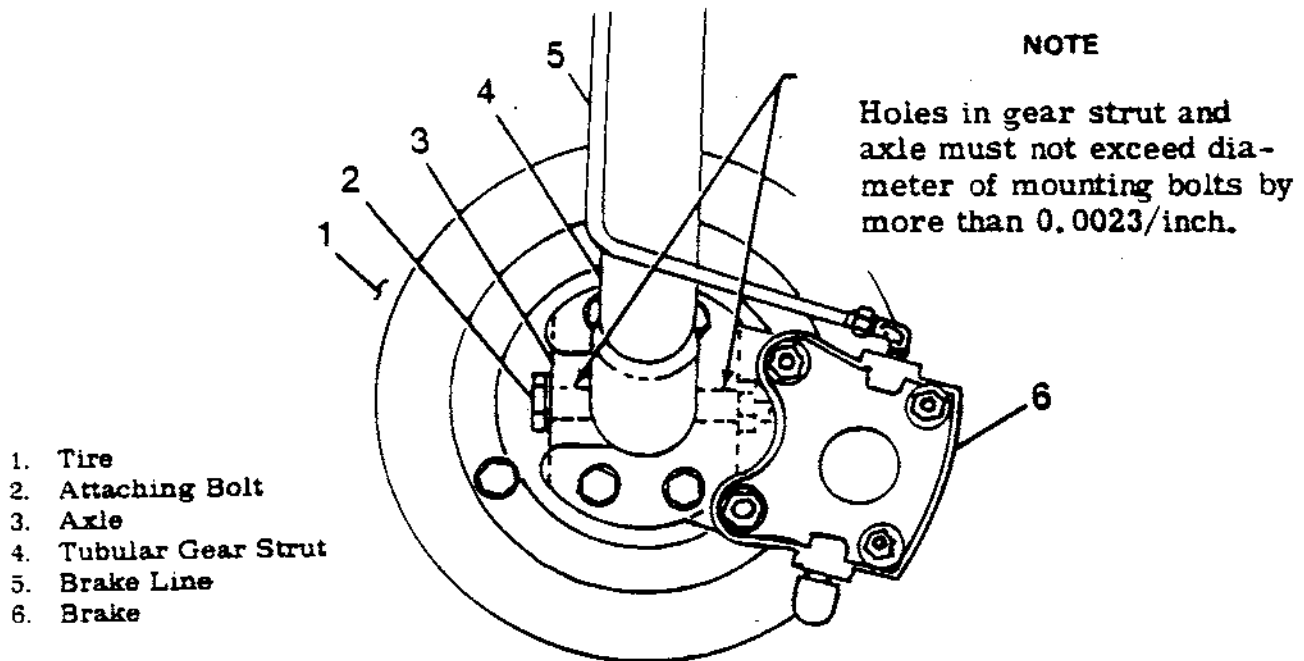


Figure 5-5. Installation of Main Wheel Strut to Axle Mounting Bolts.

CAUTION

Do not place tape in direct contact with tubular gear spring.

- h. Plug electric tape into 110 volt wall socket and heat for 20 to 30 minutes.
- i. Unplug tape and remove from axle. Remove axle by striking axle base head with a few sharp blows.
- j. Clean any old adhesive off landing gear spring with a wire brush. Brush strokes should run lengthwise along the spring. After old adhesive has been removed, wipe with clean rag saturated with acetone or alcohol. Immediately wipe dry with a clean, lint free cloth.

WARNING

Due to aging of the aluminum axle, caused by the heating tape, a new axle will have to be installed.

5-28. BONDED MAIN WHEEL AXLE INSTALLATION. (See figure 5-4.)

NOTE

If hole diameters in gear strut and axle exceed diameter of mounting bolts by more than 0.0023 /inch, it is permissible to bond the axle to the strut. Do not allow adhesive to enter the holes in gear strut or axle, or to contact bolt threads.

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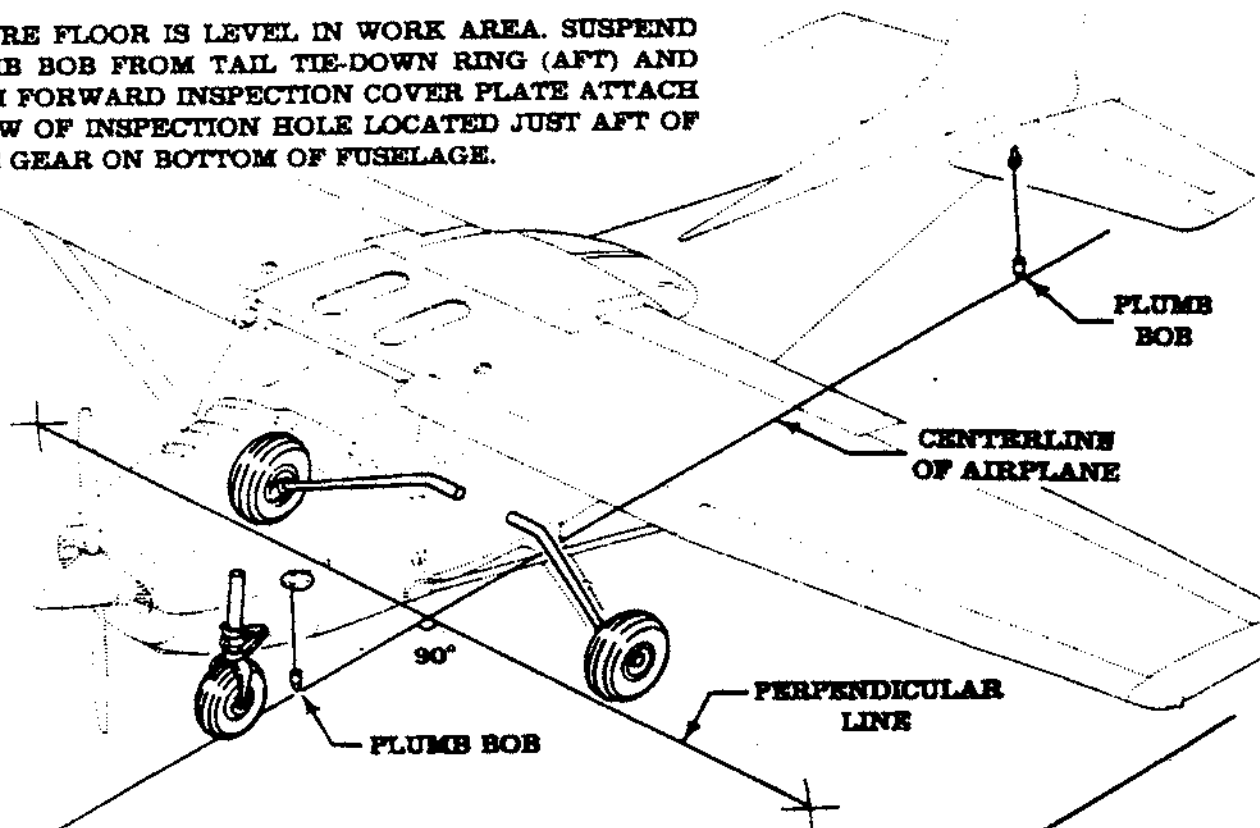
The following procedure outlines the correct method for bonding axle to strut.

- a. Prior to installing new axle, wipe outer surface of tubular gear and inside of axle with solvent, drying immediately with a clean, lint free cloth.
 - b. Mix EA9309-25GR adhesive, available from the Cessna Supply Division, in accordance with instructions in the package. Spread adhesive thinly and evenly on outer surface of landing gear spring in area that will be covered by axle.
 - c. Place axle on gear spring and rotate axle to assure even coverage between inner surface of axle and outer surface of spring.
 - d. Install retaining bolt, washers, nut and cotter pin. Tighten nut securely.
 - e. Allow 24 hours at 75°F for adhesive to cure, or 30 minutes at 250°F, if heating equipment is available.
 - f. Install brake components and speed fairing mounting plate to axle.
 - g. Install wheel on axle in accordance with procedures outlined in paragraph 5-24.
 - h. Connect hydraulic brake line to wheel brake cylinder.
 - i. Fill and bleed hydraulic brake system in accordance with paragraph 5-79.
 - j. Install speed fairings, if used, in accordance with paragraph 5-13.
- 5-29. **MAIN WHEEL ALIGNMENT CHECK.** (See figure 5-6.) No provisions are made for aligning the nose wheel. Figure 5-6 contains procedures for checking toe-in and camber. Toe-in limitations are .00" to +.18". Camber limitations are 2° to 4°. If wheel alignment is out of these limitations, a new tubular spring strut will have to be installed.
- 5-30. **WHEEL BALANCING.** Since uneven tire wear is usually the cause of wheel unbalance, replacing the tire will probably correct this condition. Tire and tube manufacturing tolerances permit a specified amount of static unbalance. The light-weight point of this tire is marked with a red dot on the tire sidewall and the heavy-weight point of the tube is marked with a contrasting color line (usually near the inflation valve stem). When installing a new tire, place these marks adjacent to each other. If a wheel shows evidence of unbalance during service, it may be statically balanced. Wheel balancing equipment is available from the Cessna Supply Division.
- 5-31. **NOSE GEAR.** (See figure 5-7.)
- 5-32. **DESCRIPTION.** A steerable nose wheel, mounted in a fork, attached to an air/oil (oleo) shock strut, make up the nose gear. The shock strut is attached to the firewall with upper and lower strut fittings. Nose wheel steering is accomplished by two steering tubes lining the nose gear steering collar to the rudder pedal bars. A hydraulic fluid-filled shimmy dampener is provided to minimize nose wheel shimmy. A nose wheel speed fairing may be installed on some aircraft.

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NOTE

ENSURE FLOOR IS LEVEL IN WORK AREA. SUSPEND PLUMB BOB FROM TAIL TIE-DOWN RING (AFT) AND FROM FORWARD INSPECTION COVER PLATE ATTACH SCREW OF INSPECTION HOLE LOCATED JUST AFT OF NOSE GEAR ON BOTTOM OF FUSELAGE.



REFER TO FIGURE 1-1 FOR TOE-IN AND CAMBER VALUES.

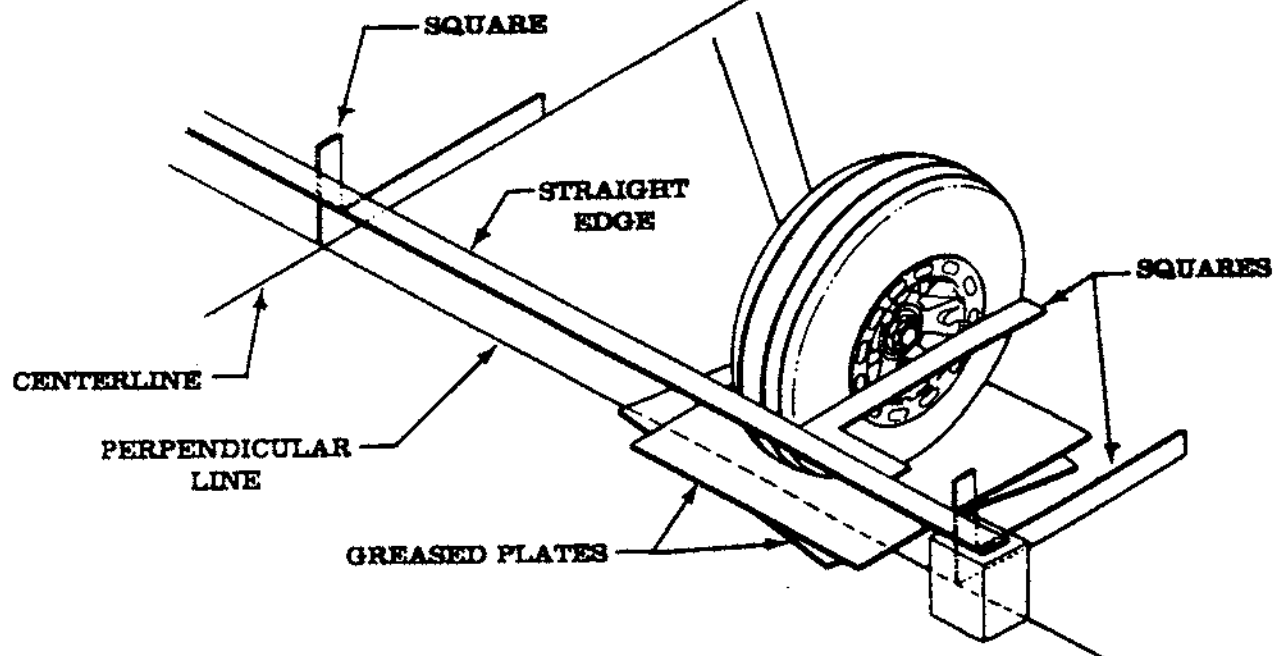
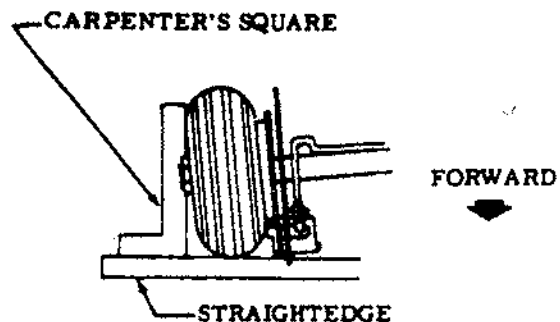


Figure 5-8. Main Wheel Alignment Check (Sheet 1 of 2)

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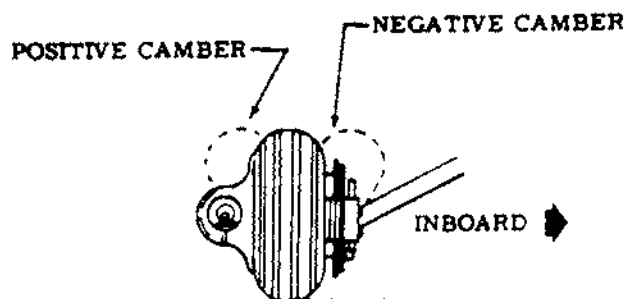
TOP VIEW OF TOE-IN CHECK

Measure toe-in at edges of wheel flange. Difference in measurements is toe-in for one wheel. (half of total toe-in.)



FRONT VIEW OF CAMBER CHECK

Measure camber by reading protractor level held vertically against outboard flanges of wheel.



NOTE

These procedures are specifically for checking main wheel alignment. No provisions are made for aligning the nose wheel. Refer to paragraph 5-29 or the chart in figure 1-1 of this manual for camber and toe-in limitations.

Figure 5-8. Main Wheel Alignment Check (Sheet 2 of 2)

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5-33. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
NOSE WHEEL SHIMMY. (Also refer to Service Letter SE84-21.)	Nose strut attaching bolts loose.	Tighten nose strut attaching bolts.
	Loose or worn nose wheel steering linkage.	Tighten. Replace defective parts with new parts.
	Nose wheel out of balance.	Refer to paragraph 5-46.
	Wheel bearings too loose.	Adjust properly.
	Defective shimmy damper.	Repair, or install new damper.
	Shimmy damper fluid low.	Service in accordance with Section 2.
	Loose torque links.	Add shims, or install new parts as required.
NOSE STRUT DOES NOT HOLD AIR PRESSURE.	Defective or loose air filler valve.	Check gasket and tighten loose valve. Install new valve if defective.
	Defective strut seals.	Install new seals.
HYDRAULIC FLUID LEAK- AGE FROM NOSE STRUT.	Defective strut seals.	Install new seals.

5-34. NOSE GEAR REMOVAL. (See figure 5-7.)

- Remove cowling for access.
- Weight or tie down tail of aircraft to raise nose wheel off the floor.
- Disconnect nose wheel steering tubes from nose gear steering collar.
- Remove strut clamp cap and shims at lower strut fitting.

WARNING

Be sure strut is deflated completely before removing bolt
or roll pin at top of strut.

- Deflate strut completely and telescope strut to its shortest length.
- Remove bolt at top of strut.
- Pull the strut assembly down out of upper attach forging.

5-35. NOSE GEAR INSTALLATION. (See figure 5-7.)

- Before inflating nose gear strut, insert top of strut in upper attach
forging and attach with bolt.
- Telescope strut to mate strut clamp cap with lower strut fitting on
firewall.

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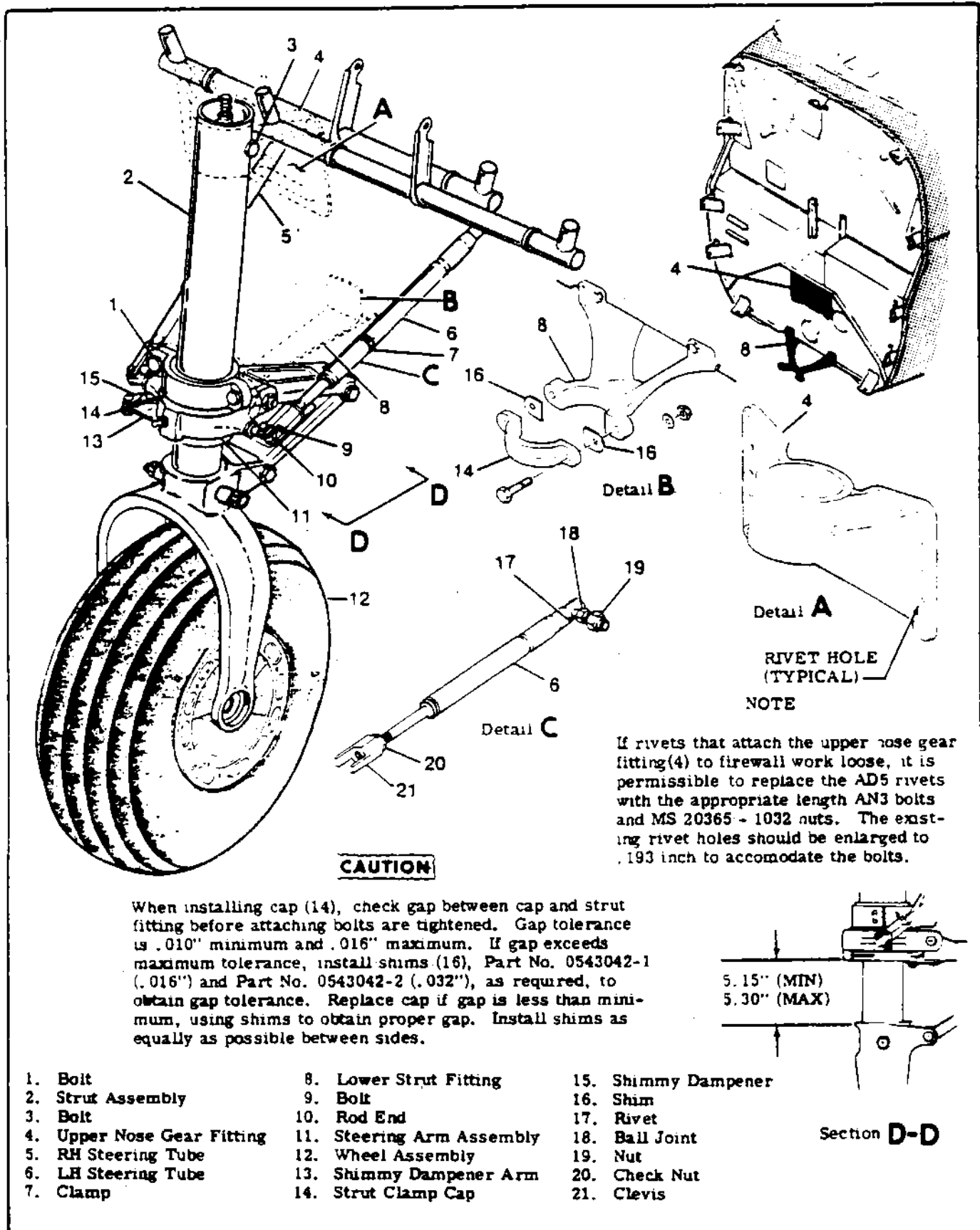


Figure 5-7. Nose Gear Installation

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- c. Install shims and strut clamp cap attaching strut to lower strut fitting, observing the CAUTION in figure 5-7.
- d. Inflate and service shock strut in accordance with procedures outlined in Section 2.
- e. Rig nose wheel steering tubes as outlined in applicable paragraph in Section 10.

5-36. NOSE WHEEL SPEED FAIRING REMOVAL. (See figure 5-8.)

WARNING

Nose wheel fairing cover plate (3) is secured by the lower torque link attaching bolt. Maintain weight of airplane on nose gear while removing this bolt and cover plate.

- a. Remove bolt securing cover plate (3) and fairing (1) to strut and remove cover plate. Reinstall torque link attach bolt.
- b. Weight or tie down tail of airplane to raise nose wheel off the floor.
- c. Remove nose wheel axle stud (6).

WARNING

Bolt (4) securing tow bar spacers (2) also holds strut cylinder base plug retaining spacer in place. Ensure spacer does not disengage from strut when removing bolt (4). See figure 5-10.

- d. Remove bolt (4) securing speed fairing (1) and tow bar spacers (2) to strut.
- e. Slide speed fairing up and remove nose wheel. Loosen scraper as necessary.
- f. Rotate speed fairing 90 degrees and work fairing down over the fork to remove.

5-37. NOSE WHEEL SPEED FAIRING INSTALLATION. (See figure 5-8.)

- a. Rotate speed fairing 90 degrees and work fairing up over nose gear fork to install.
- b. Slide fairing up and install nose wheel; install axle stud (6).
- c. Tighten axle stud nut until a slight bearing drag is obvious when the wheel is rotated. Back off nut to the nearest castellation, and install cotter pins.
- d. Install bolt (4), tow bar spacers (2), washers, and nut attaching fairing to strut.
- e. Adjust wheel scraper clearance in accordance with the following caution.

CAUTION

Always check scraper clearance after installing speed fairing, whenever a tire has been changed, and whenever scraper adjustment has been disturbed. Set clearance between tire and scraper for a minimum of 0.25-inch to a maximum of 0.50-inch. Elongated holes are provided in the scraper for adjustment. If the airplane is flown from surfaces with mud, snow, or ice, the speed fairing should be checked to make sure there is no accumulation which could prevent normal wheel rotation. Wipe fuel and oil from speed fairing to prevent stains and deterioration.

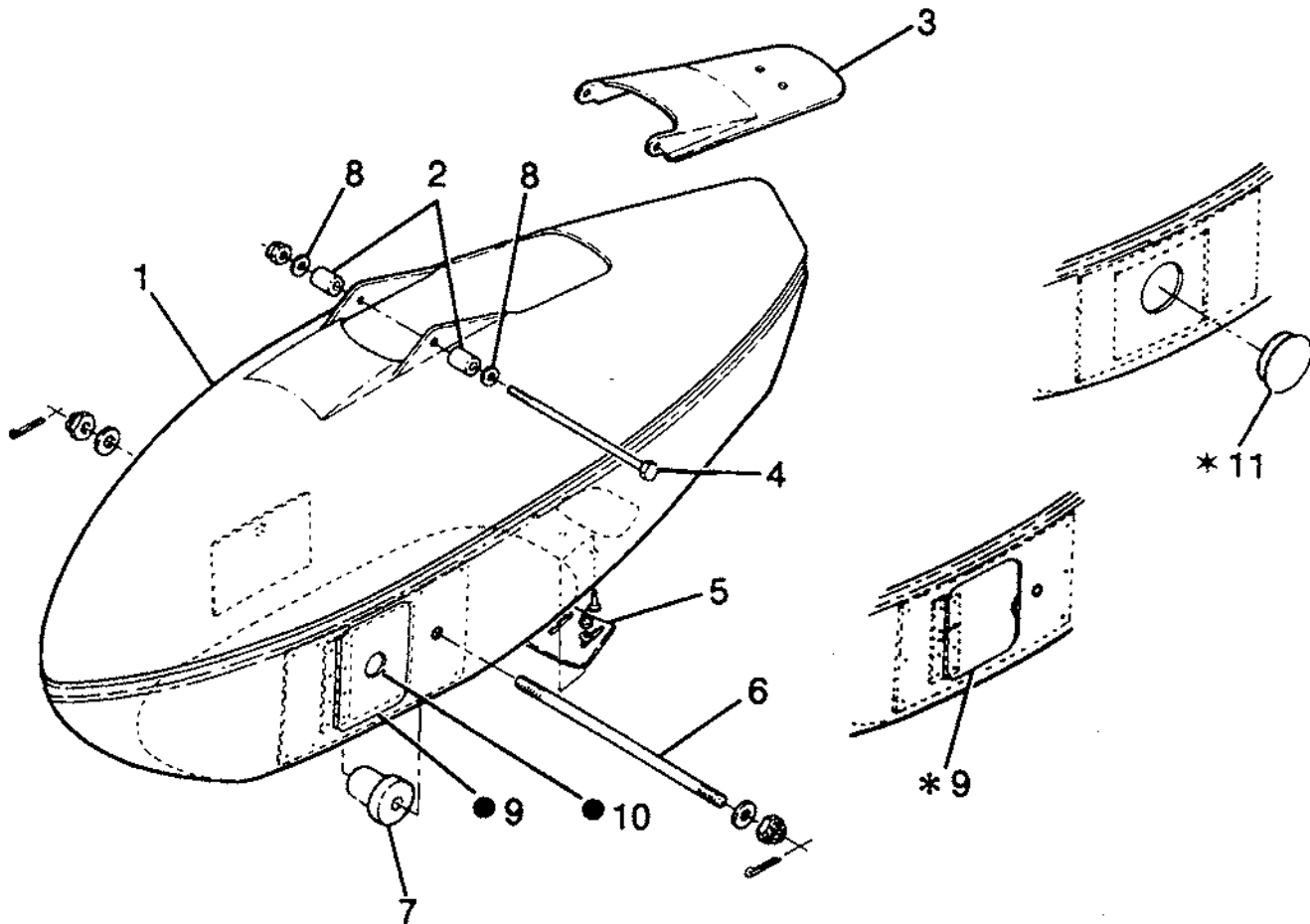
- f. Lower nose of airplane to floor.
- g. Install cover plate and bolt attaching cover plate to strut.

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● 17263459 thru 17271569
F17201235 thru F17201794

*17271570 thru 17273369
F17201795 thru F17202029
17276575 & On

*17273370 thru 17276574
F17202030 And On



1. Speed Fairing
2. Tow Bar Spacer
3. Cover Plate
4. Fork Bolt
5. Scraper
6. Axle Stud
7. Ferrule
8. S2111-1 Washer
9. Door, Access
10. Latch
11. Plug

Figure 5-8. Nose Wheel Speed Fairing

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- 5-38. **NOSE WHEEL REMOVAL.** (See figure 5-7.)
- Weight or tie down tail of aircraft to raise the nose wheel off the floor.
 - Remove nose wheel axle stud.
 - Pull nose wheel assembly from fork and remove axle tube from nose wheel. Loosen wheel scraper if necessary, if wheel is equipped with a speed fairing.
- 5-39. **DISASSEMBLY** (McCauley.) (See figure 5-9, sheet 1.)

WARNING

Serious injury can result from attempting to separate wheel halves with tire and tube inflated.

- Completely deflate tire and tube and break loose tire beads. Extreme care must be exercised to prevent tire tool damage when removing tire from wheel halves (6).
- Remove nuts (4) and washers (5).
- Remove thru-bolts (8) and washers (5).
- Separate and remove wheel halves (6) from tire and tube.
- Remove retaining rings (1), grease seal retainer (2), felt grease seal (3), grease retainer (2) and bearing cone (9) from each wheel half (6).

NOTE

Bearing cups (races) (7) are a press fit in wheel half (6) and should not be removed unless a new part is to be installed. To remove bearing cups, heat wheel half in boiling water for 30 minutes, or in an oven, not to exceed 121°C (250°F). Using an arbor press, if available, press out bearing cup and press in new bearing cup while wheel half is still hot.

- 5-40. **INSPECTION AND REPAIR.** (McCauley.) (See figure 5-9, sheet 1.)
- Clean all metal parts and felt grease seals in Stoddard solvent or equivalent, and dry thoroughly.

NOTE

A soft bristle brush may be used to remove hardened grease, dust or dirt.

- Inspect wheel halves (6) for cracks or damage.
- Inspect bearing cones (9), cups (7), retaining rings (1) and seals (2) and (3), for wear or damage.
- Inspect thru-bolts (8) and nuts (4) for cracks in threads or cracks in radius of bolt heads.
- Replace cracked or damaged wheel half (6).
- Replace damaged retaining rings (1) and seals (2) and (3).
- Replace any worn or cracked thru-bolts (8) or nuts (4).
- Replace worn or damaged bearing cups (7) or cones (9).
- Remove any corrosion or small nicks.
- Repair reworked areas of wheel by cleaning thoroughly, then applying one coat of clear lacquer paint.

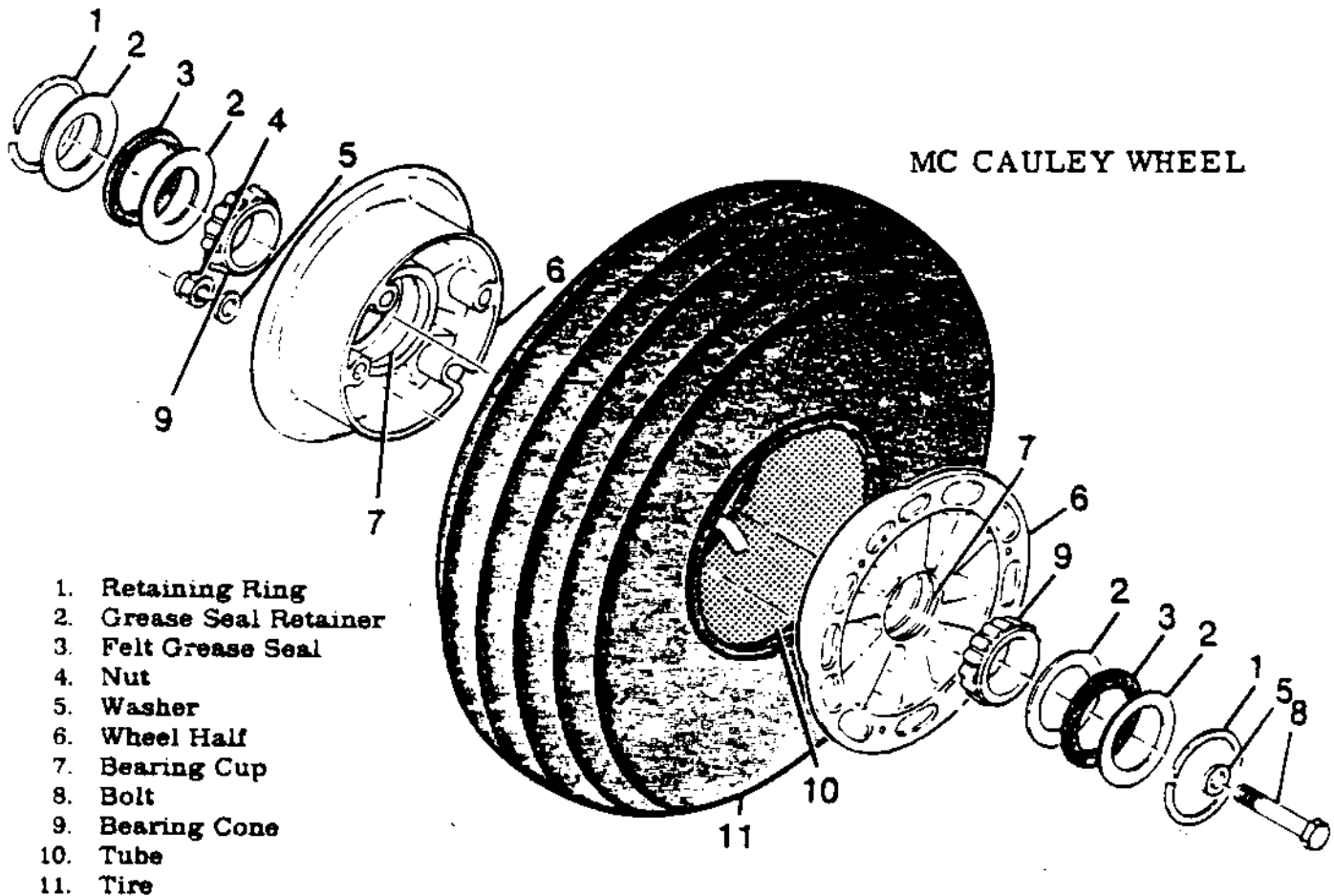


Figure 5-9. Nose Wheel and Tire (Sheet 1 of 2)

k. Pack bearings with grease specified in Section 2.

5-41. **REASSEMBLY.** (McCauley.) (See figure 5-9, sheet 1.)

- a. Assemble bearing cone (9), grease seal retainer (2), felt grease seal (3), grease seal retainer (2) and retaining ring (1) into both wheel halves (6).
- b. Insert tube in tire, aligning index marks on tire and tube.
- c. Place wheel half (6) into tire and tube (side opposite valve stem). With washer (5) under head of thru-bolt (8), insert bolt through wheel half (6).
- d. Place wheel half (6) into other side of tire and tube, aligning valve stem in valve slot.
- e. Install washers (5) and nuts (4) on thru-bolts (8) and pre-torque to 10-50 lb. in.

CAUTION

Uneven or improper torque of the nuts can cause failure of the bolts with resultant wheel failure.

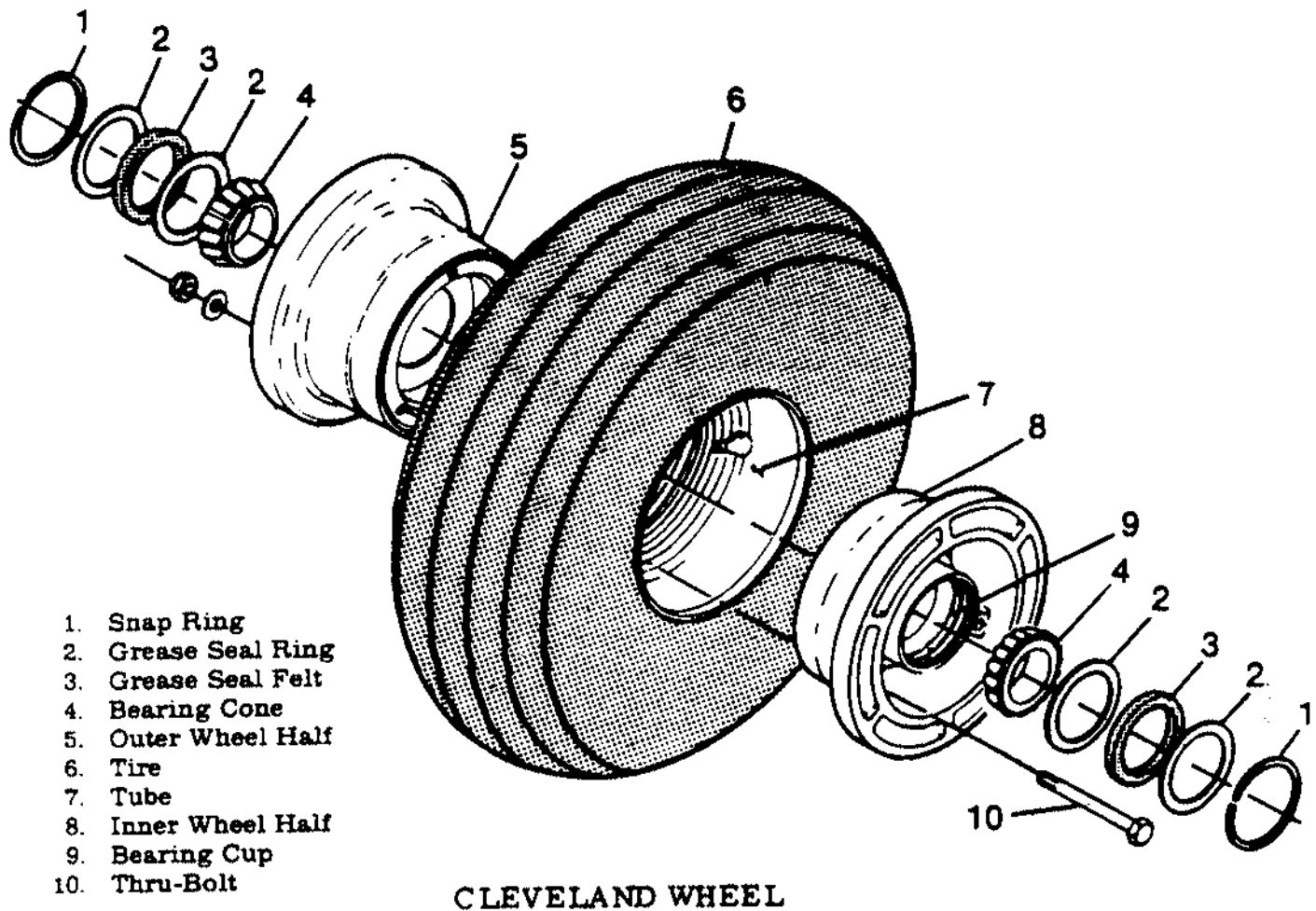


Figure 5-9. Nose Wheel and Tire (Sheet 2 of 2)

- f. Prior to torquing nuts (4), inflate tube with approximately 10-15 psi air pressure to seat tire.

CAUTION

Do not use impact wrenches on thru-bolts or nuts.

- g. Dry torque all nuts (4) evenly to a torque value of 140-150 lb. in.
h. Inflate tire to correct pressure specified in chart in Section 1.

5-42. DISASSEMBLY. (Cleveland.) (See figure 5-9, sheet 2.)

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WARNING

Injury can result from attempting to separate wheel halves with tire inflated. Avoid damaging wheel flanges when breaking tire beads loose.

- a. Deflate tire and break tire beads loose.
- b. Remove thru-bolts and separate wheel halves.
- c. Remove tire and tube.
- d. Remove snap ring, grease seal felt, grease seal rings and bearing cones from both wheel halves.

NOTE

Bearing are a press-fit in the wheel halves and should not be removed unless replacement is necessary. To remove bearing cups, heat wheel half in boiling water for 15 minutes. Using an arbor press, if available, press out bearing cup and press in new cup while wheel is still hot.

- 5-43. **INSPECT AND REPAIR.** (Cleveland.) (See to figure 5-9, sheet 2.)
- a. Clean all metal parts and grease seal felts in solvent and dry thoroughly.
 - b. Inspect wheel halves for cracks. Cracked wheel halves must be replaced. Sand out nicks, gouges and corroded areas. Where protective coating has been removed, area should be cleaned thoroughly, primed with zinc chromate primer and painted with aluminum lacquer.
 - c. Bearing cups and cones must be inspected carefully for damage and discoloration. After cleaning, repack cones with clean aircraft wheel bearing grease (Section 2) before installation in the wheel. To replace bearing cups, refer to note in paragraph 5-42.
- 5-44. **REASSEMBLY.** (Cleveland.) (See figure 5-9, sheet 2.)
- a. Insert tire in tube, aligning index marks on tire and tube.
 - b. Place tire and tube on wheel half and position valve stem through hole in wheel half.
 - c. Insert thru-bolts, position other wheel half, and secure with nuts and washers. Take care to avoid pinching tube between wheel halves. Torque bolts to 90 lb-in.

CAUTION

Uneven or improper torque on thru-bolt nuts may cause bolt failure with resultant wheel failure.

- d. Clean and repack bearing cones with clean aircraft wheel bearing grease. (Section 2.)
 - e. Assemble bearing cones, seals and retainers into wheel halves.
 - f. Inflate tire to seat tire beads, then adjust to correct pressure (Section 1).
 - g. Install wheel in accordance with paragraph 5-45.
- 5-45. **NOSE WHEEL INSTALLATION.** (See figure 5-7.)
- a. Install axle tube in nose wheel.
 - b. Install nose wheel assembly in fork and install nose wheel axle stud.
 - c. Tighten axle stud until a slight bearing drag is obvious when wheel is rotated. Back the nut off to the nearest castellation and insert cotter pins.

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CAUTION

On aircraft equipped with speed fairings, always check scraper-to-tire clearance after installing speed fairing, whenever a tire has been changed, or whenever scraper adjustment has been disturbed. Set scraper clearance in accordance with instructions outlined in paragraph 5-37.

- 5-46. **WHEEL BALANCING.** Since uneven tire wear is usually the cause of wheel unbalance, replacing the tire will probably correct this condition. Tire and tube manufacturing tolerances permit a specified amount of static unbalance. The light-weight point of the tire is marked with a red dot on the tire side-wall, and the heavy-weight point of the tube is marked with a contrasting color line (usually near the inflation valve stem). When installing a new tire, place these marks adjacent to each other. If a wheel shows evidence of unbalance during service, it may be statically balanced. Wheel balancing equipment is available from the Cessna Supply Division.

- 5-47. **NOSE GEAR SHOCK STRUT DISASSEMBLY.** (See figure 5-10.)

NOTE

The following procedures apply to the nose gear shock strut after it has been removed from the aircraft, and the speed fairing and nose wheel have been removed. In many cases, separation of the upper and lower strut will permit inspection and parts installation without removal or complete disassembly of the strut.

WARNING

Be sure shock strut is completely deflated before removing lock ring in lower end of upper strut, or disconnecting torque links.

- a. Remove shimmy dampener.
- b. Remove torque links. Note position of washers, shims and spacers.
- c. Remove lock ring from groove inside lower end of upper strut. A small hole is provided at the lock ring groove to facilitate removal of the lock ring.

NOTE

Hydraulic fluid will drain from strut halves as lower strut is pulled from upper strut.

- d. Using a straight, sharp pull, separate upper and lower struts. Invert lower strut and drain hydraulic fluid.
- e. Remove lock ring and bearing at upper end of lower strut assembly. Note top side of bearing.
- f. Slide packing support ring, scraper ring, retaining ring and lock ring from lower strut, noting relative position and top side of each ring; wire or tape together, if desired.
- g. Remove O-ring and back-up rings from packing support ring.
- h. Remove bolt securing tow bar spacers.

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NOTE

Use shims (2) as required between steering arm assembly (4) and washer (1) to provide a snug fit with retainer ring (5) installed. Also, adjust rod ends (3) to provide dimension shown in detail A-A.

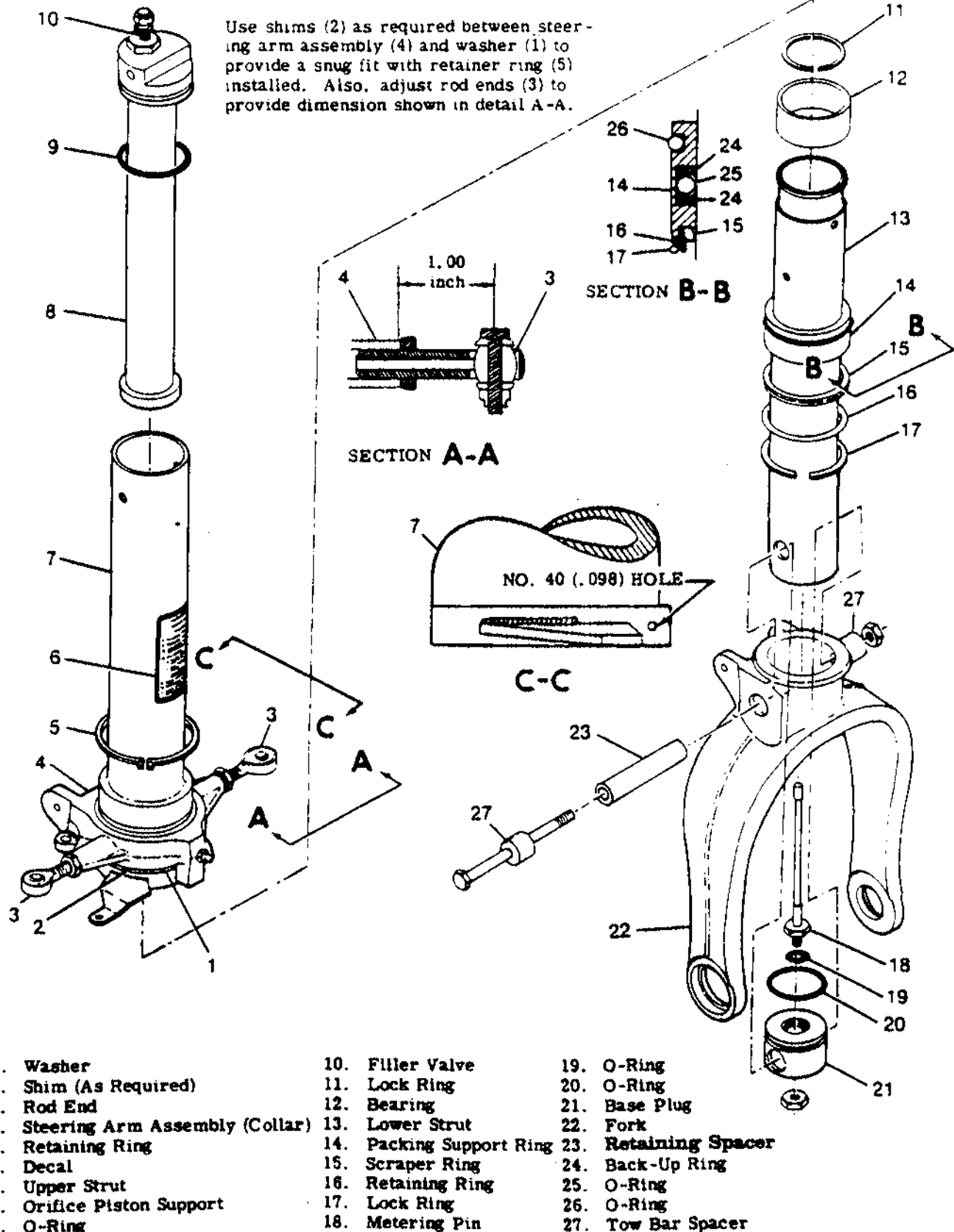


Figure 5-10. Nose Gear Shock Strut Assembly

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NOTE

Bolt attaching tow bar spacers also holds bushing and base plug in place.

- i. Remove bolt attaching fork to strut barrel, and remove base plug and metering pin from lower strut. Remove O-rings and metering pin from base plug.

NOTE

Lower strut barrel and fork are a press fit, drilled on assembly. Separation of these parts is not recommended, except for installation of a new part.

- j. Remove retaining ring securing steering arm assembly on upper strut, and remove steering arm assembly, shims (if installed) and washer. If shims are installed, note number and position of each shim.
- k. Push orifice support from upper strut and remove O-ring.
- l. Remove filler valve from orifice support.

5-48. NOSE GEAR SHOCK STRUT INSPECTION AND REPAIR. (See figure 5-10.)

- a. Thoroughly clean all parts in cleaning solvent and inspect them carefully.
- b. All worn or defective parts and all O-rings and back-up rings must be replaced with new parts.
- c. Sharp metal edges should be smoothed with No. 400 emery paper, then cleaned with solvent.

5-49. NOSE GEAR SHOCK STRUT REASSEMBLY. (See figure 5-10.)

Assemble these parts, lubricated with a film of Petrolatum VV-P-236, Hydraulic Fluid MIL-H-5606, or Dow-Corning DC-7. Do not use DC-7 on surfaces to be painted.

- a. Install washer (1) and shim(s), (2), if installed.
- b. Lubricate needle bearings in steering collar (4), as shown in Section 2, and install collar and retaining ring (5).
- c. Check steering collar for snug fit against washer. Shims of variable thicknesses are available from the Cessna Supply Division to provide a snug fit for collar against washer.

NOTE

If shims are required, remove retaining ring and steering collar and add shims as necessary to provide a snug fit with steering collar retaining ring installed. Shims are available in the following part numbers and thicknesses: 1243030-5 (.006 inch), 1243030-6 (.012 inch), and 1243030-7 (.020 inch).

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- d. Install rod ends (3) in steering collar (4) and adjust rod ends to dimension specified in Section A-A in figure 5-10.
- e. Install O-ring (9) and filler valve (10) in orifice piston support (8) and install orifice piston support in upper strut (7).
- f. Install O-ring (20) and metering pin (18) with O-ring (19) in base plug (21); secure with nut.

NOTE

If base plug (21) is to be replaced, new part will need to be line-drilled to accept NAS75-5 bushing.

- g. Install bushing (23) (if removed) in base plug (21), and install base plug assembly in lower strut (13).
- h. Align holes of bushing, hole in lower strut, and hole in fork. Install tow bar spacer under head of bolt, and install bolt through fork, lower strut and bushing which is installed in base plug. Install tow bar spacer on threaded end of bolt, install and tighten nut.
- i. Install lock ring (17), retaining ring (16) and scraper ring (15) on lower strut, making sure they are installed in same positions as they were removed.
- j. Install O-rings (25) and (26) and back-up rings in packing support ring (14); slide packing support ring over lower strut (13).
- k. Install bearing (12) and lock ring (11) at upper end of lower strut assembly. Note top side of bearing.
- l. Install upper strut assembly over lower strut assembly.
- m. Install lock ring (17) in groove in lower end of upper strut. Position lock ring so that one of its ends covers the small access hole in the lock ring groove (Section view C-C.)
- n. Install torque links, positioning washers, shims and spacers exactly in positions as removed.
- o. Install shimmy dampener.
- p. After shock strut assembly is complete, install strut on aircraft as outlined in paragraph 5-35.
- q. After strut is installed on aircraft, fill and inflate shock strut in accordance with procedures outlined in Section 2.

5-50. TORQUE LINKS. (See figure 5-11.)

5-51. DESCRIPTION. Torque links keep the lower strut aligned with the nose gear steering system, but permit shock strut action.

5-52. TORQUE LINK REMOVAL. (See figure 5-11.)

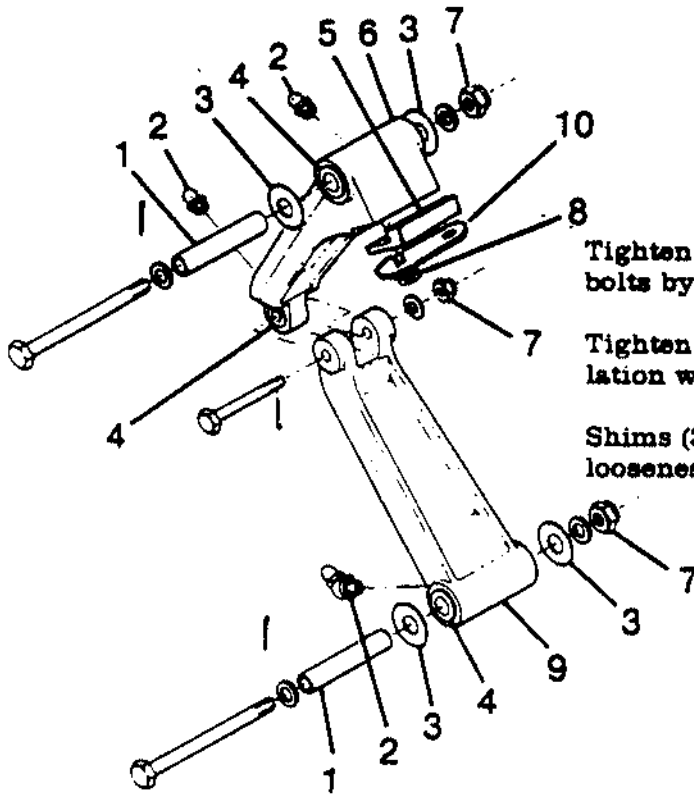
WARNING

Completely deflate strut before removing torque links.

- a. Completely deflate shock strut.
- b. Disconnect upper and lower attaching bolts, spacers, shims and nuts; remove torque links.

5-53. TORQUE LINK INSPECTION AND REPAIR. (See figure 5-11.) Torque link bushings should not be removed except for replacement of parts; replace if excessively worn.

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NOTE

Tighten bolts (8) to 20 to 25 pound inches, then safety the bolts by bending tips of safety lug (10).

Tighten nuts (7) snugly, then tighten to align next castellation with cotter pin hole.

Shims (3) are available to use as required to remove any looseness.

1. Spacer
2. Grease Fitting
3. Shim
4. Bushing
5. Stop Lug
6. Upper Torque Link
7. Nut
8. Bolt
9. Lower Torque Link
10. Safety Lug

Figure 5-11. Torque Links

5-54. TORQUE LINK INSTALLATION. (See figure 5-11.)

NOTE

If bolts (8), safety lug (10) and stop lug (5) were removed, upon installation, tighten bolts (8) to 20-25 pound-inches, then safety the bolts by bending tips of safety lug (10).

- a. With shock strut completely deflated, install upper and lower torque link assemblies.
- b. Install bolt attaching upper and lower assemblies.
- c. Tighten nuts (7) snugly, then tighten to align next castellation with cotter pin hole in bolt.
- d. Check upper torque link (6) and lower torque link (9) for looseness. If looseness is apparent, remove nuts (7) and bolts and install shims (3) as necessary to take up any looseness. This will assist in preventing nose wheel shimmy.
- e. Retighten nuts (7) snugly, then tighten to align next castellation with cotter pin hole in bolt; install cotter pin.
- f. Fill and inflate shock strut in accordance with procedures outlined in Section 2.

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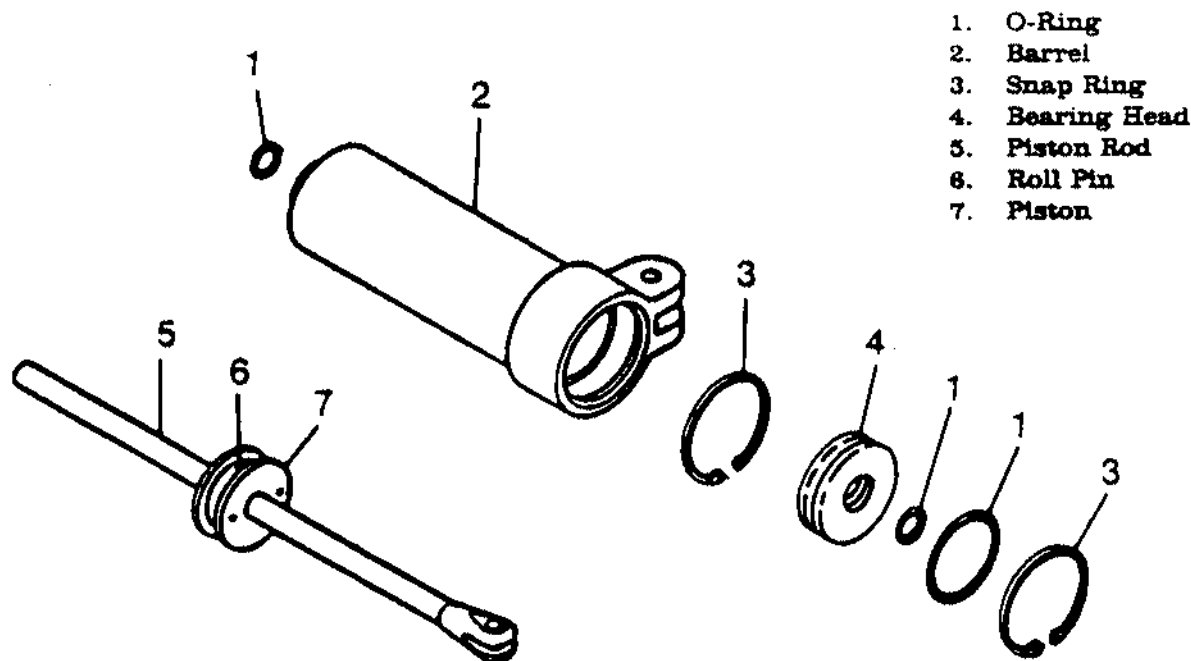


Figure 5-12. Shimmy Damper

5-55. **SHIMMY DAMPER.** (See figure 5-12.)

5-56. **DESCRIPTION.** The shimmy damper, provided for the nose gear, offers resistance to shimmy by forcing hydraulic fluid through small orifices in a piston. The damper piston shaft is secured to a bracket, welded on the bottom of the upper strut tube. The shimmy damper housing is secured to the steering arm assembly, which moves as the nose wheel is turned, causing relative motion between the damper shaft and housing.

5-57. **SHIMMY DAMPER REMOVAL.** (See figure 5-7.)

- a. Remove cotter pin, nut, washers and bolt attaching piston shaft clevis to bracket welded on bottom of upper strut tube.
- b. Remove cotter pin, nut, spacer and bolt attaching housing to steering arm assembly.
- c. Remove shimmy dampener.

5-58. **DISASSEMBLY AND REASSEMBLY.** (See figure 5-12.) Refer to figure for disassembling and reassembling the shimmy damper. When reassembling damper, install all new O-rings. Lubricate all parts with clean hydraulic fluid, Petrolatum VV-P-238, or Dow Corning DC-7. Keep DC-7 away from painted surfaces. When damper is completely assembled, service in accordance with procedures outlined in Section 2.

5-59. **SHIMMY DAMPER INSTALLATION.** (See figure 5-7.)

- a. Attach shimmy damper housing to steering arm assembly with bolt, spacer, nut and cotter pin.
- b. Attach shimmy damper piston rod clevis to bracket welded on bottom of upper strut tube with bolt, washers (as required) and nut.

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- 5-60. **NOSE WHEEL STEERING SYSTEM.** (See figure 5-7.)
- 5-61. **DESCRIPTION.** Nose wheel steering is accomplished through use of the rudder pedals. Spring-loaded steering rod assemblies connect the nose gear steering arm assembly to arms on the rudder bars. Steering is afforded up to approximately 10 degrees each side of neutral, after which brakes may be used to gain a maximum deflection of 30 degrees right or left of center. A flexible boot seals the fuselage entrance of the steering rod assembly.
- 5-62. **NOSE WHEEL STEERING ROD ASSEMBLIES.** (See figure 5-7.)
- 5-63. **DESCRIPTION.** The steering rods are connected by a clevis to the rod ends extending from the nose gear steering arm, and to an arm on the rudder pedal crossbars.
- 5-64. **NOSE WHEEL STEERING ADJUSTMENT.** Before attaching nose wheel steering rods to the rod ends protruding from the steering arm assembly, adjust rod ends to the dimension specified in section view A-A in figure 5-10. Since the nose wheel steering system and the rudder system are interconnected, adjustment to one system might affect the other system. Refer to Section 10 for instructions for rigging the nose wheel steering and the rudder system.
- 5-65. **BRAKE SYSTEM.** (See figure 5-3.)
- 5-66. **DESCRIPTION.** The hydraulic brake system is comprised of two master cylinders, located immediately forward of the pilot's rudder pedals, brake lines and hose connecting each master cylinder to its wheel brake cylinder, and the single-disc, floating cylinder-type brake assembly, located at each main landing gear wheel.
- 5-67. **TROUBLE SHOOTING.**

TROUBLE	PROBABLE CAUSE	REMEDY
DRAGGING BRAKES.	Brake pedal binding.	Check and adjust properly.
	Parking brake linkage holding brake pedal down.	Check and adjust properly.
	Worn or broken piston return spring (in master cylinder.)	Repair, or install new cylinder.
	Insufficient clearance at Lock-O-Seal or incorrect adjustment of cylinder overall length.	Adjust as outlined in paragraph 5-84. (Thru aircraft serials 17271034 and F17201749.)
	Restriction in hydraulic lines or restrictions in compensating port in brake master cylinder.	Drain brake line and clean the inside of the brake line with filtered compressed air. If cleaning the lines fails to give satisfactory results, the master cylinder may be faulty and should be repaired.

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5-67. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
DRAGGING BRAKES. (Cont).	Worn, scored or warped brake disc.	Install new disc and brake linings.
	Damaged or accumulated dirt restricting free movement of wheel brake parts.	Clean and repair or install new parts as necessary.
BRAKES FAIL TO OPERATE.	Leak in system.	If brake master cylinders or wheel cylinder assemblies are leaking, repair, or install new parts.
	Air in system.	Bleed system.
	Lack of fluid in master cylinders.	Fill and bleed system.
	Defective master cylinder.	Repair, or install new parts.

5-68. HYDRAULIC BRAKE LINES.

5-69. DESCRIPTION. The brake lines are rigid tubing, except for flexible hose used at the brake master cylinders. A separate line is used to connect each brake master cylinder to its corresponding wheel brake cylinder.

5-70. WHEEL BRAKE ASSEMBLIES. (See figure 5-3.)

5-71. DESCRIPTION. (See figure 5-3.) The wheel brake assemblies use a floating brake assembly and a disc which is attached to the main wheel.

5-72. WHEEL BRAKE REMOVAL. (See figure 5-3.) Wheel brake assemblies can be removed by disconnecting the brake line (drain hydraulic brake fluid when disconnecting line) and removing the brake back plate. The brake disc is removed after the wheel is removed and disassembled. To remove the torque plate, remove wheel and axle.

5-73. WHEEL BRAKE DISASSEMBLY. See figure 5-3 for a breakdown of wheel brake parts. This figure may be used as a guide for disassembling the wheel brakes.

5-74. WHEEL BRAKE INSPECTION AND REPAIR. (See figure 5-3.)

- Clean all parts except brake linings and O-rings in dry cleaning solvent and dry thoroughly.
- Install all new O-rings. If O-ring reuse is necessary, wipe with a clean cloth saturated in hydraulic fluid and inspect for damage.

NOTE

Thorough cleaning is important. Dirt and chips are the greatest single cause of malfunctions in the hydraulic brake system.

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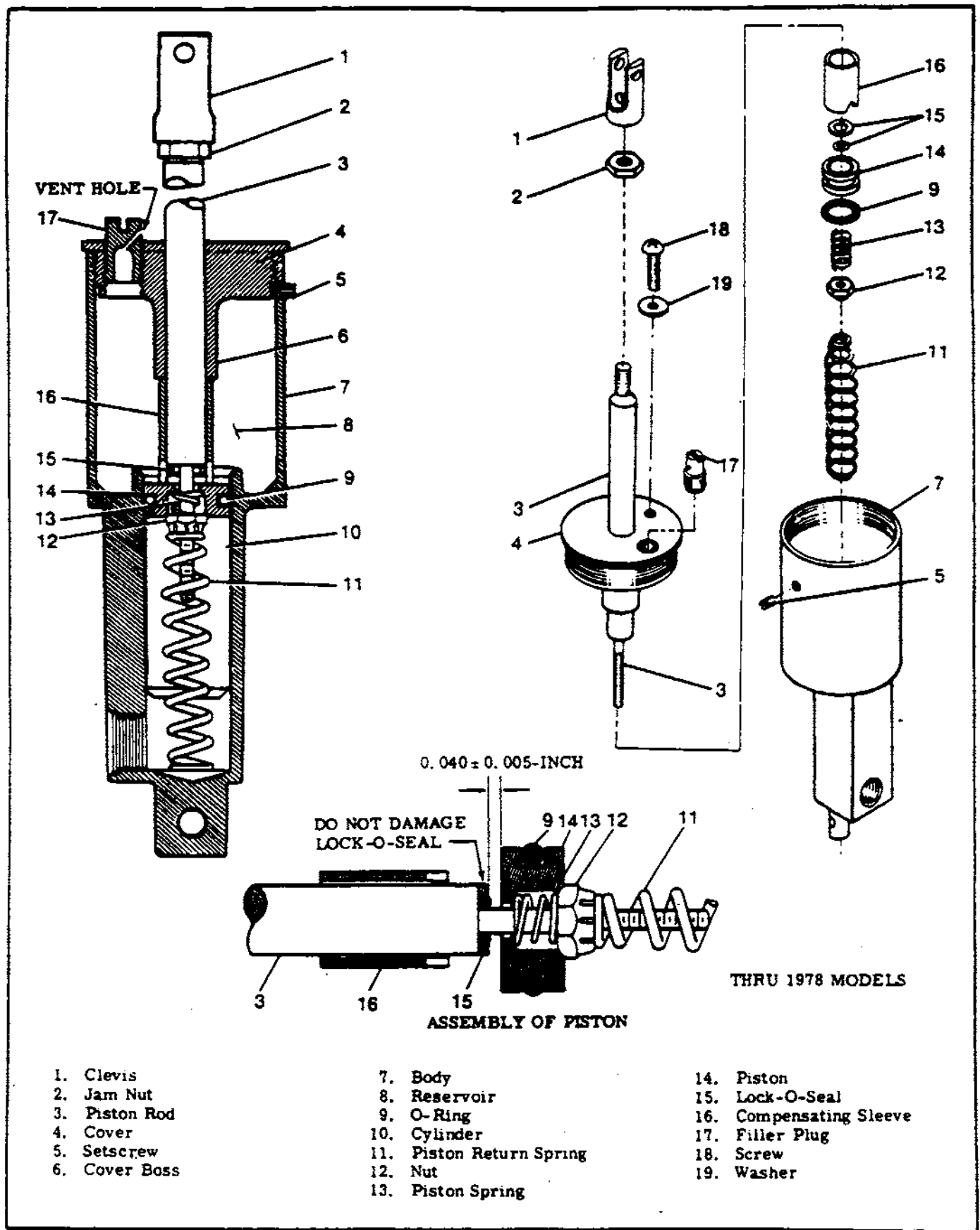


Figure 5-13. Brake Master Cylinder (Sheet 1 of 2)

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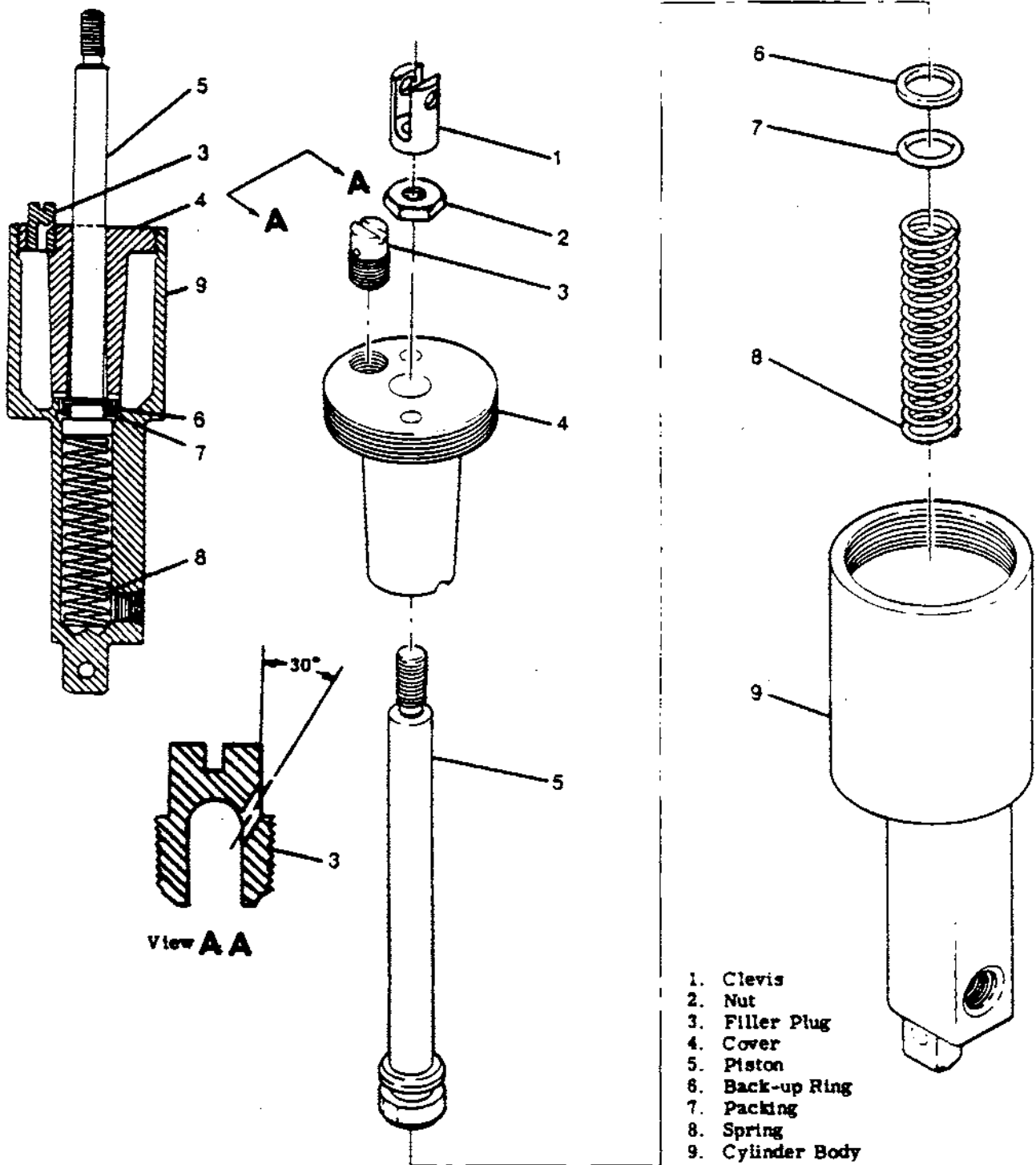


Figure 5-13. Brake Master Cylinder (Sheet 2 of 2)

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- c. Check brake lining for deterioration and maximum permissible wear. (Refer to applicable paragraph for maximum wear limit.)
- d. Inspect brake cylinder bore for scoring. A scored cylinder will leak or cause rapid O-ring wear. Install a new brake cylinder if the bore is scored.
- e. If the anchor bolts on the brake assembly are nicked or gouged, they shall be sanded smooth to prevent binding with the pressure plate or torque plate. When new anchor bolts are to be installed, press out old bolts and install new bolts with a soft mallet.
- f. Inspect wheel brakes disc for a minimum thickness of 0.190 (McCanley) or 0.205 (Cleveland). If brake disc is below minimum thickness, install a new part.

5-75. WHEEL BRAKE REASSEMBLY. (See figure 5-3.)

NOTE

Lubricate parts with clean hydraulic fluid during brake reassembly.

- a. See figure 5-3 for reassembling wheel brakes.
- b. Thru 1981 Models, torque elbow (18) to a maximum of 60 lb. in. Lube/seal with Liquid O-Ring No. 404 (Oil Research, P.O. Box 51971, Lafayette, La. 7050).
- c. Torque bolt (20) to 120-130 lb. in.
- d. Thru 1981 Models, torque bleeder screw (21) to 30-40 lb. in.

5-76. WHEEL BRAKE INSTALLATION.

- a. Place brake assembly in position with pressure plate in place.
- b. Install back plate.

NOTE

If torque plate was removed, install as the axle is installed, or install on axle. If the brake disc was removed, install as wheel is assembled.

- 5-77. CHECKING BRAKE LINING WEAR. New brake lining should be installed when the existing lining has worn to a minimum thickness of 3/32-inch. A 3/32-inch thick strip of material held adjacent to each lining can be used to determine amount of wear. The shank end of a drill bit of the correct size can also be used to determine wear of brake linings.

5-78. BRAKE LINING INSTALLATION. (See figure 5-3.)

- a. Remove bolts securing back plate, and remove back plate.
- b. Pull brake cylinder out of torque plate and slide pressure plate off anchor bolts.
- c. Place back plate on a table with lining side down flat. Center a 9/64-inch (or slightly smaller) punch in the rolled rivet, and hit the punch sharply with a hammer. Punch out all rivets securing the linings to the back plate and pressure plate in the same manner.

NOTE

A rivet setting kit, Part No. 199-00100, is available from the Cessna Supply Division. This kit consists of an anvil and punch.

- d. Clamp the flat side of the anvil in a vise.
- e. Align new lining on back plate and place brake rivet in hole with rivet head in the

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- lining. Place the head against the anvil.
- f. Center rivet setting punch on lips of rivet. While holding back plate down firmly against lining, hit punch with hammer to set rivet. Repeat blows on punch until lining is firmly against back plate.
- g. Realign the lining on the back plate and install and set rivets in the remaining holes.
- h. Install a new lining on pressure plate in the same manner.
- i. Position pressure plate on anchor bolts and place cylinder in position so that anchor bolts slide into the torque plate.
- j. Install back plate with bolts and washers.
- k. Refer to paragraph 5-90 for brake lining burn-in procedure.

5-79. BRAKE SYSTEM BLEEDING.

NOTE

Bleeding with a clean hydraulic pressure source connected to the wheel bleeder is recommended.

- a. Remove brake master cylinder filler plug and screw flexible hose with appropriate fitting into the filler hole at top of the master cylinder.
- b. Immerse opposite end of flexible hose in a container with enough hydraulic fluid to cover the end of the hose.
- c. Connect a clean hydraulic pressure source, such as a hydraulic hand pump or Hydro-Fill unit, to the bleeder valve in the wheel cylinder.
- d. As fluid is pumped into the system, observe the immersed end of the hose at the master brake cylinder for evidence of air bubbles being forced from the brake system. When bubbling has ceased, remove bleeder source from wheel cylinder and tighten the bleeder valve.

5-80. BRAKE MASTER CYLINDER.

- 5-81. **DESCRIPTION.** The brake master cylinders, located immediately forward of the pilot's rudder pedals, are actuated by applying pressure at the top of the rudder pedals. A small reservoir is incorporated into each master cylinder for the fluid supply. When dual brakes are installed, mechanical linkage permits the copilot pedals to operate the master cylinders.

5-82. BRAKE MASTER CYLINDER REMOVAL.

- a. Remove front seats and rudder bar shield for access to the brake master cylinders.
- b. Remove bleeder screw at wheel brake assembly and drain hydraulic fluid from brake cylinders.
- c. Disconnect parking brake and disconnect brake master cylinders from rudder pedals.
- d. Disconnect hydraulic hose from brake master cylinders and remove cylinders.
- e. Plug or cap hydraulic fittings, hose and lines, to prevent entry of foreign material.

5-83. DISASSEMBLY. (Thru aircraft serials 17271034 and F17201749.) (See figure 5-13, sheet 1 of 2.)

- a. Unscrew clevis (1) and jamnut (2).
- h. Remove screw (18) and washer (19).
- c. Remove filler plug (17) and setscrew (5).
- d. Unscrew cover (4) and remove up over piston rod (3).
- e. Remove piston rod (3) and compensating sleeve (16).
- f. Slide sleeve (16) up over rod (3).
- g. Unscrew nut (12) from threads of piston rod (3).
- h. Remove spring (13) and O-ring (9) from piston (14).

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- i. Remove Lock-O-Seal (15).

- 5-84. **INSPECTION AND REPAIR.** (Thru aircraft serials 17271034 and F17201749.) (See figure 5-13, sheet 1 of 2.) Repair is limited to installation of new parts, cleaning and adjusting. (Refer to reassembly paragraph for adjustment.) Use clean hydraulic fluid (MIL-H-5606) as a lubricant during reassembly of the cylinders. Inspect Lock-O-Seal (Parker Seal Co. P/N 800-001-6) and replace if damaged. Replace all O-rings. Filler plug (17) must be vented so pressure cannot build up in the reservoir during brake operation. Remove plug and drill 1/16-inch hole, 30° from vertical, if plug is not vented.
- 5-85. **REASSEMBLY.** (Thru aircraft serials 17271034 and F17201749.) (See figure 5-13, sheet 1 of 2.)
- a. Install Lock-O-Seal (15) at bottom of piston rod (3).
 - b. Install O-ring (9) in groove in piston (14); insert piston spring (13) into piston, and slide assembly up on bottom threaded portion of piston rod (3).
 - c. Run nut (12) up threads to spring (13). Tighten nut (12) enough to obtain 0.040 ± 0.005 -inch clearance between top of piston and bottom of Lock-O-Seal, as shown in the figure.
 - d. Install piston return spring (11) into cylinder (10) portion of body (7).
 - e. Install piston rod end (3) through spring (11).
 - f. Slide compensating sleeve (16) over rod (3).
 - g. Install cover (4), washer (19) and screw (18).
 - h. Install jamb nut (2) and clevis (1).
 - i. Install filler plug (17), making sure vent hole is open.
 - j. Install setscrew (5).
- 5-86. **DISASSEMBLY.** (Beginning with aircraft serials 17271035 and F17201750.) (See figure 5-13, sheet 2 of 2.)
- a. Unscrew clevis (1) and jamb nut (2).
 - b. Remove filler plug (3).

NOTE

A special tool, brake master cylinder wrench No. 34-101 is available from the Cessna Supply Division to accomplish the following step.

- c. Unscrew cover (4) and remove up over piston (5).
 - d. Remove piston (5) and spring (8).
 - e. Remove packing (7) and back-up ring (6) from piston (5).
- 5-87. **INSPECTION AND REPAIR.** (Beginning with aircraft serials 17271035 and F17201750.) (See figure 5-13, sheet 2 of 2.) Repair is limited to installation of new parts and cleaning. Use clean hydraulic fluid (MIL-H-5606) as a lubricant during reassembly of the cylinders. Replace packing and back-up ring. Filler plug (3) must be vented so pressure cannot build up during brake operation. Remove plug and drill 1/16-inch hole, 30° from vertical, if plug is not vented. Refer to view A-A for location of vent hole.
- 5-88. **REASSEMBLY.** (Beginning with aircraft serials 17271035 and F17201750.) (See figure 5-13, sheet 2 of 2.)
- a. Install spring (8) in cylinder body (9).
 - b. Install back-up ring (6) and packing (7) in groove of piston (5).
 - c. Install piston (5) in cylinder body (9).
 - d. Install cover (4) over piston (5) and screw cover into cylinder body (9).

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- e. Install nut (2) and clevis (1).
- f. Install filler plug (3), making sure vent hole is open.

5-89. BRAKE MASTER CYLINDER INSTALLATION.

- a. Connect hydraulic hoses to brake master cylinders and install cylinders.
- b. Connect brake master cylinders to rudder pedals and connect parking brake linkage.
- c. Install bleeder screw at wheel brake assembly and fill and bleed brake system in accordance with paragraph 5-79.
- d. Install rudder bar shield and install front seats.

NOTE

Ensure that seat stops are installed properly.

5-90. BRAKE LINING BURN-IN. The brake pads are equipped with either a non-asbestos organic lining or an iron based metallic lining. These materials must be properly conditioned (glazed) in order to provide maximum performance and service life. This is accomplished by a brake burn-in.

- a. Non-asbestos organic lining.
 - 1. Taxi airplane for 1500 feet with engine at 1700 RPM applying brake pedal force as needed to develop a 5 to 9 knots taxi speed.
 - 2. Allow brakes to cool for 10 to 15 minutes.
 - 3. Apply brakes and check to see if a high throttle static run up may be held with normal pedal force. If so, burn-in is completed.
 - 4. If static run up cannot be held, repeat steps 1 thru 3 as needed to successfully hold.
- b. Iron based metallic lining.
 - 1. Perform two consecutive full stop braking applications from 30 to 35 knots. Do not allow the brake discs to cool substantially between stops.

NOTE

Light brake usage can cause the glaze to wear off, resulting in reduced brake performance. In such cases, the lining may be conditioned again following the instructions set forth in this burn-in procedure.

5-91. PARKING BRAKE SYSTEM. (See figure 5-14.)

5-92. DESCRIPTION. The parking brake system employs a handle and a ratchet mechanism connected by a cable to linkage at the brake master cylinders. Pulling out on the handle depresses both master cylinder piston rods, and the handle ratchet locks the handle in this position until the handle is turned and released.

5-93. REMOVAL AND INSTALLATION OF COMPONENTS. See figure 5-14 for relative location of system components. The figure may be used for removal and installation of parts of the system.

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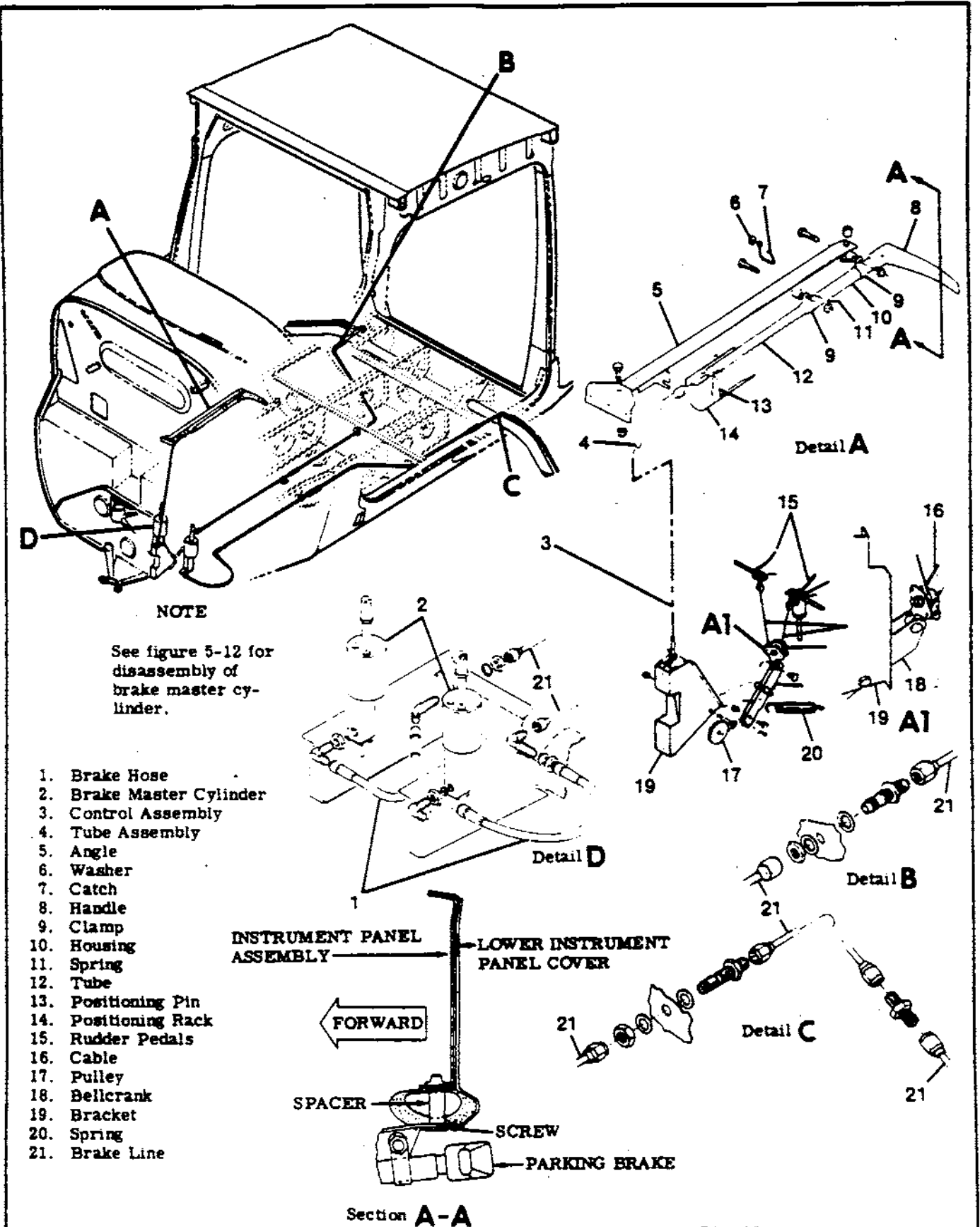


Figure 5-14. Brake Systems

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SECTION 6

AILERON CONTROL SYSTEM

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AILERON CONTROL SYSTEM	1K5/6-1	Repair	1K11/6-7
Description	1K5/6-1	Installation	1K11/6-7
Trouble Shooting	1K5/6-1	Cables and Pulleys	1K11/6-7
Control "U"	1K6/6-2	Removal/Installation	1K11/6-7
Description	1K6/6-2	Ailerons	1K12/6-8
Removal/Installation	1K7/6-3	Removal	1K12/6-8
Repair	1K7/6-3	Installation	1K12/6-8
Aileron Bellcrank	1K7/6-3	Repair	1K12/6-8
Removal	1K11/6-7	Rigging	1K12/6-8

- 6-1. AILERON CONTROL SYSTEM. (See figure 6-1.)
- 6-2. DESCRIPTION. The aileron control system consists of two control wheels, one for the pilot and one for the copilot, attached to columns and linked by universal joints to the control "U" located behind the instrument panel. Lateral rotation of either control wheel is transmitted to the ailerons, one per wing, via a series of sprockets, chains, pulleys, cables, bellcranks and push-pull tubes.
- 6-3. TROUBLE SHOOTING.

NOTE

Due to remedy procedures in the following trouble shooting chart it may be necessary to rereg system, refer to paragraph 8-18.

TROUBLE	PROBABLE CAUSE	REMEDY
LOST MOTION IN CONTROL WHEELS.	Loose control cables.	Adjust cables to proper tension.
	Broken pulley or bracket, cable off pulley or worn rod end bearings.	Replace worn or broken parts, install cables correctly.
	Sprung bellcrank.	Replace bellcrank.
	Loose chains.	Adjust chain tension.

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6-3. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
RESISTANCE TO CONTROL WHEEL MOVEMENT.	Cables too tight.	Adjust cables to proper tension.
	Pulleys binding or cable off.	Replace defective pulleys. Install cables correctly.
	Bellcrank distorted or damaged.	Replace bellcrank.
	Defective U-joints.	Replace defective U-joints.
	Clevis bolts in system too tight.	Loosen, then tighten properly and safety.
CONTROL WHEELS NOT LEVEL WITH AILERONS NEUTRAL.	Rusty chain or chain binding with sprocket.	Replace chain or defective parts.
	Improper adjustment of chains or cables. With control wheel centered, aileron bellcrank stop bushing should be centered in slot (both left and right bellcranks).	Adjust in accordance with paragraph 6-18.
	Improper adjustment of aileron push-pull rods. If chains and cables are properly rigged and bellcrank stop bushings are not centered in slots, push-pull rods are adjusted incorrectly.	Adjust in accordance with paragraph 6-18.
DUAL CONTROL WHEELS NOT COORDINATED.	Chains improperly adjusted.	Adjust in accordance with paragraph 6-18.
INCORRECT AILERON TRAVEL.	Push-pull rods not adjusted properly.	Adjust in accordance with paragraph 6-18.
	Worn bellcrank stop bushings or bellcrank slots.	Replace worn parts.

6-4. CONTROL "U". (See figure 6-2.)

6-5. **DESCRIPTION.** The control "U" transforms rotation of the control wheels into pulling motion on the aileron cables by means of sprockets and chains. The "U" is pivoted at the lower end to operate the elevator control system.

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6-6. REMOVAL AND INSTALLATION.

- a. Disconnect battery cables and insulate terminals as a safety precaution.
- b. Remove pedestal cover as outlined in paragraph 9-17.
- c. Remove rudder bar shields, carpeting and plates as necessary for access to lower end of control "U".
- d. Remove radios, radio cooling plenums, dust covers and associated hardware as necessary.
- e. Remove glove box.
- f. Remove cabin air cooling hose directly below right hand side of instrument panel.
- g. Remove engine controls and cabin air controls as necessary.
- h. Remove right hand forward side upholstery panel.
- i. Remove bolt from each end of parking brake assembly and swing assembly away from working area.
- j. Remove bolt attaching bearing (11) to RH side of control "U" and remove bolt attaching roller (32) (beginning with 17265685 and F17201385) to LH side of control "U". Remove bearing, roller and attaching hardware.
- k. Drill out rivets attaching instrument panel support (after completion of step "j") and remove support.
- l. Drill out rivets attaching right hand side panel to pedestal structure and remove panel.
- m. Remove safety wire and disconnect direct cable turnbuckles (17).
- n. Remove bolts (12) attaching control wheel tubes to universal joints (13.)
- o. Remove bolt (19) attaching push-pull tube (18) to control "U".
- p. Remove pivot bolt (20) and carefully work control "U" out from under right hand side of instrument panel.
- q. Reverse preceding steps for reinstallation.

NOTE

To prevent loss of strength and to ease reinstallation of right hand pedestal structure side panel, machine screws and nuts may be installed in the two upper rivet holes, provided at least No. 6 screws are installed.

- r. Rig aileron control system in accordance with paragraph 6-18 and safety turnbuckles (17).
- s. Check and/or rig elevator control system in accordance with paragraph 8-14.
- t. Check and/or rig all engine and cabin air controls.
- u. Check all radios and electrical components which may have been disconnected or become inoperative while performing the preceding steps.
- v. Reinstall all items removed for access.

6-7. REPAIR. Repair consists of replacing worn, damaged or defective shafts, bearings, bushings, sprockets, roller chains, universal joints or other components. Refer to Section 2 for lubrication requirements.

6-8. AILERON BELLCRANK. (See figure 6-3.)

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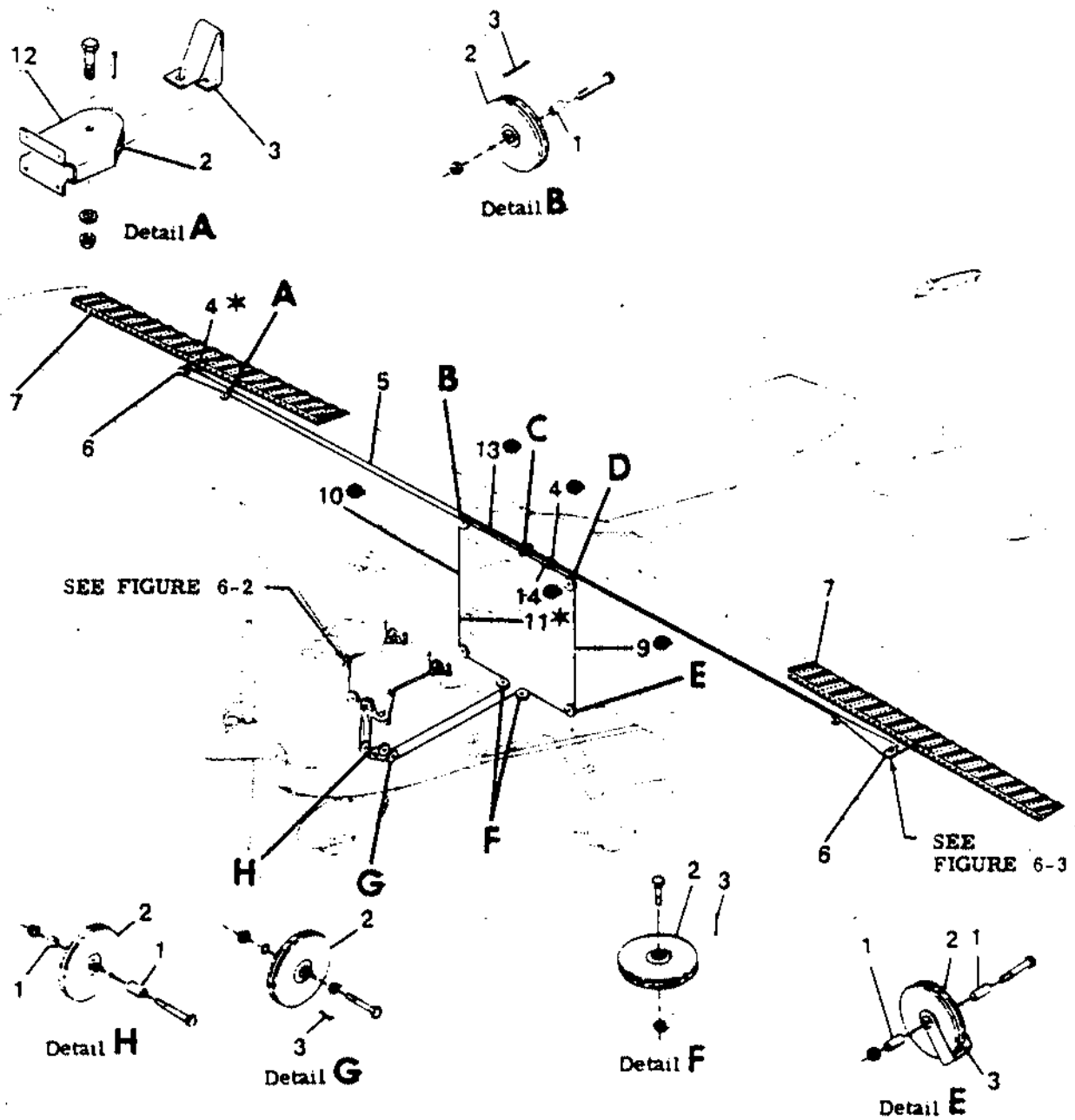
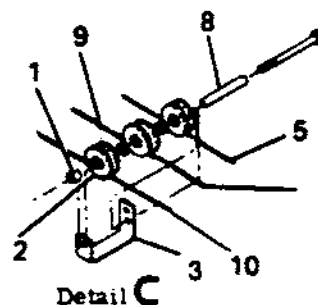


Figure 6-1. Aileron Control System (Sheet 1 of 2)

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1. Spacer
2. Pulley
3. Cable Guard
4. Carry-Thru Cable Turnbuckle
5. Carry-Thru Cable
6. Bellcrank
7. Aileron
8. Bushing
9. LH Direct Cable
10. RH Direct Cable
11. Direct Cable
12. Pulley Bracket
13. LH Direct Cable Turnbuckle
14. RH Direct Cable Turnbuckle



* THRU 17269874 & F17201829
● 17269875 & ON
F17201830 THRU F17202233



CAUTION

Maintain specified cable tension. Direct and follow-thru cables: 40 ± 10 lbs at average temperature for the area.

Figure 6-1. Aileron Control System (Sheet 2 of 2)

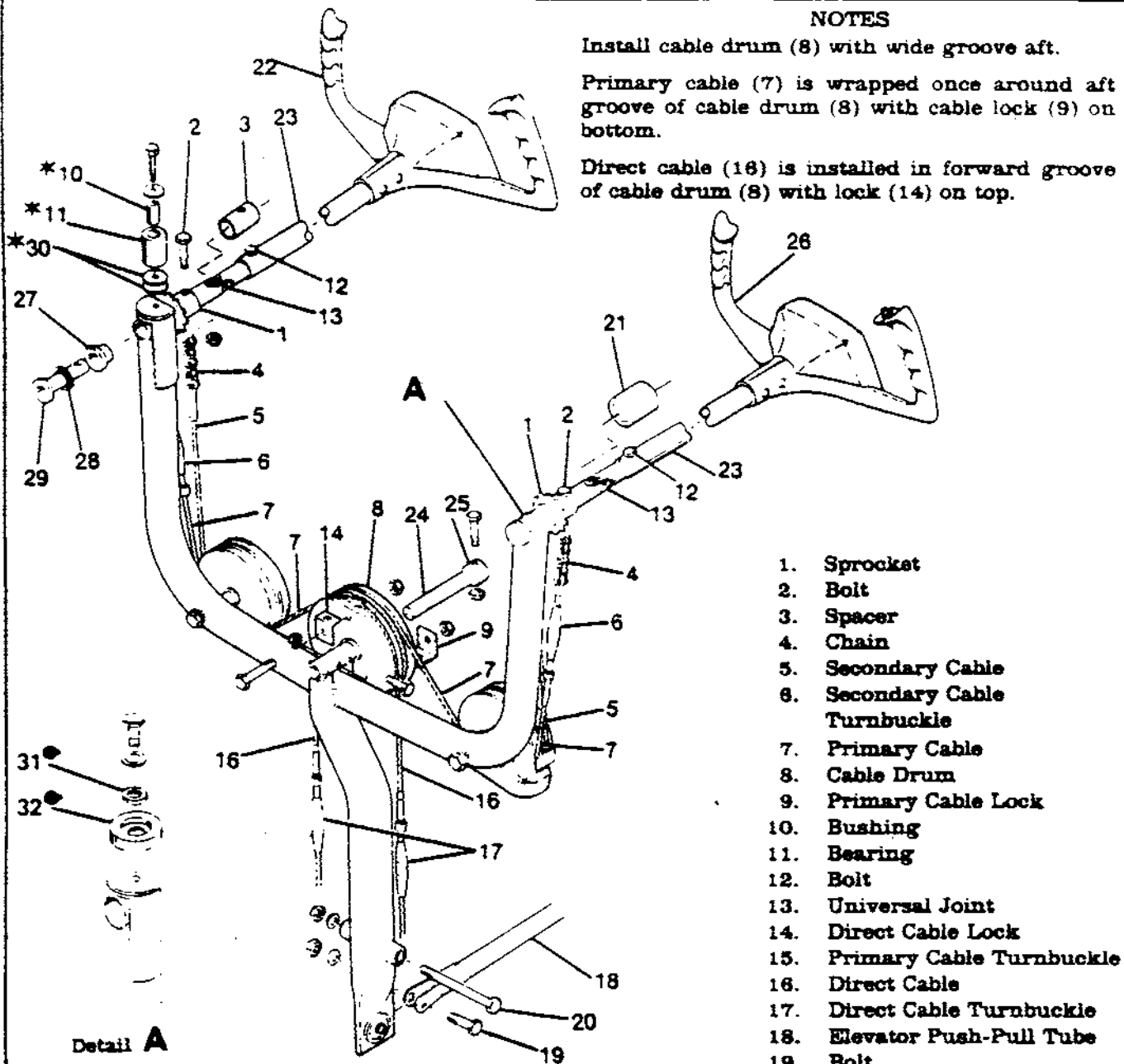
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NOTES

Install cable drum (8) with wide groove aft.

Primary cable (7) is wrapped once around aft groove of cable drum (8) with cable lock (9) on bottom.

Direct cable (16) is installed in forward groove of cable drum (8) with lock (14) on top.



LH AND RH CONTROLS

*Bushing (10), bearing (11), and washer (30) used thru: 17265684 and F17201384.

LH CONTROLS

●Spacer (31) and roller (32) beginning serials: 17265685 and ON. F17201385 thru F17202233.

NOTE

When dual controls are NOT installed, spacer (3) replaces copilot's control wheel (22), control tube (23), and universal joint (13).

1. Sprocket
2. Bolt
3. Spacer
4. Chain
5. Secondary Cable
6. Secondary Cable Turnbuckle
7. Primary Cable
8. Cable Drum
9. Primary Cable Lock
10. Bushing
11. Bearing
12. Bolt
13. Universal Joint
14. Direct Cable Lock
15. Primary Cable Turnbuckle
16. Direct Cable
17. Direct Cable Turnbuckle
18. Elevator Push-Pull Tube
19. Bolt
20. Pivot Bolt
21. Hose
22. Copilot's Control Wheel
23. Control Tube
24. Shaft
25. Retainer
26. Pilot's Control Wheel
27. Bearing
28. Countersunk Washer
29. Shaft
30. Washer
31. Spacer
32. Roller

Figure 6-2. Control "U" Installation

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6-9. REMOVAL

- a. Remove access plate inboard of each bellcrank on underside of wing.
- b. Relieve control cable tension by loosening turnbuckle barrel (17).
- c. Disconnect control cables from bellcrank. Retain all spacers (12).
- d. Disconnect aileron push-pull rod (8) at bellcrank.
- e. Remove nuts, washers and bolts securing bellcrank stop bushing (15) and bellcrank (7) to wing structure.
- f. Remove bellcrank through access opening, using care that bushing (5) is not dropped from bellcrank.

NOTE

Brass washers (11) may be used as shims between lower end of bellcrank and wing channel (9). Retain these shims. Tape open ends of bellcrank to prevent dust and dirt from entering bellcrank needle bearings (6).

- 6-10. REPAIR. Repair of bellcranks consists of replacement of defective parts. If needle bearings are dirty or in need of lubrication, clean thoroughly and lubricate as outlined in Section 2.

6-11. INSTALLATION.

- a. Place bushing (5) and stop-bushing (15) in bellcrank (7) and position bellcrank in wing.
- b. Install brass washers (11) between lower end of bellcrank and wing channel (9) to shim out excess clearance.
- c. Install bellcrank pivot bolt (4), washers and nut.
- d. Position bellcrank stop-bushing and install attaching bolt (16), washers and nut.
- e. Connect aileron cables and push-pull rod to bellcrank.
- f. Rig aileron system in accordance with applicable paragraph in this section, safety turnbuckle (17) and reinstall all items removed for access.

- 6-12. CABLES AND PULLEYS. (See figure 6-1.)

6-13. REMOVAL AND INSTALLATION.

- a. Remove access plates, wing root fairings and upholstery as required.
- b. Disconnect cables from aileron bellcranks and remove cable guards and pulleys as necessary to work cables free of aircraft.

NOTE

To ease routing of cables, a length of wire may be attached to end of cable before being withdrawn from aircraft. Leave wire in place, routed through structure; then attach cable being installed and use to pull cable into position.

- c. After cable is routed, install pulleys and cable guards. Ensure cable is positioned in pulley groove before installing guard.
- d. Rig aileron system in accordance with applicable paragraph in this section, safety turnbuckles and install access plates, fairings and upholstery removed in step "a."

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6-14. AILERONS. (See figure 6-3.)

6-15. REMOVAL.

- a. Disconnect push-pull rod (8) at aileron.
- b. Remove screws and nuts attaching aileron hinges (2) to trailing edge of wing.
- c. Using care, pull aileron out and down to slide hinges from under wing skin and auxiliary spar reinforcements.

6-16. INSTALLATION.

- a. Position aileron hinges between skin and auxiliary spar reinforcements and install screws and nuts attaching hinges to trailing edge of wing.
- b. Attach push-pull rod (8) to aileron.

NOTE

If rigging was correct and push-pull rod adjustment was not disturbed, it should not be necessary to rig system.

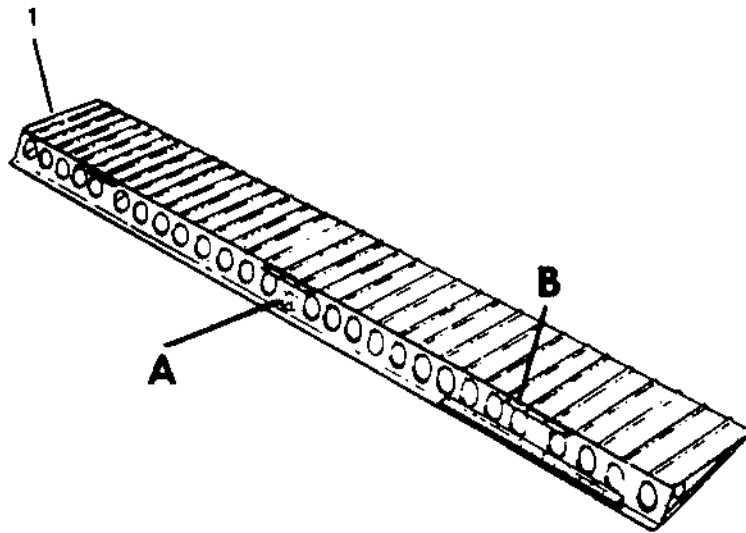
- c. Check aileron travel and alignment, rig if necessary, in accordance with applicable paragraph in this section.

6-17. REPAIR. Aileron repair may be accomplished in accordance with instructions outlined in Section 18. Before installation, ensure balance weights and hinges are securely attached.

6-18. RIGGING. (See figure 6-2.)

- a. Check primary cable (7) is in aft groove of cable drum (8) and wrapped once around drum. The primary cable lock (9) is installed at bottom of drum and direct cable lock (14) is installed at top.
- b. With control wheels neutral, check chain ends (4) are approximately equidistant from center of sprockets (1).
- c. Keeping control wheels neutral, tighten secondary cable turnbuckles (6) so control wheels are level in neutral position (synchronized), with enough tension on cables to remove slack from chains (4), without binding. Results of adjusting turnbuckles are as follows:
 1. Loosening secondary cable turnbuckles (6) and tightening direct cable turnbuckles (17) at center of control "U" will move inboard sides of both control wheels down.
 2. Tightening either primary control cable turnbuckle (15) and loosening secondary cable turnbuckles (6) at center of control "U" will move outboard side of applicable control wheel down.
- d. Tape a bar across both control wheels to hold them in neutral position.
- e. Adjust direct cable turnbuckles (17) below control "U" and single carry-thru turnbuckle (index 17, figure 6-3) at aileron bellcrank (index 7, figure 6-3) so bellcrank stop bushings (index 15, figure 6-3) are centered in both bellcrank slots with 40 ± 10 pounds tension on aileron carry-thru cable (index 18, figure 6-3). Disregard tension on direct cables, which will be different than tension on carry-thru cable.
- f. Adjust push-pull rods (index 8, figure 6-3) at each aileron until ailerons are neutral with reference to trailing edge of wing flaps. Be sure wing flaps are fully up when making this adjustment.
- g. Remove bar from control wheels.

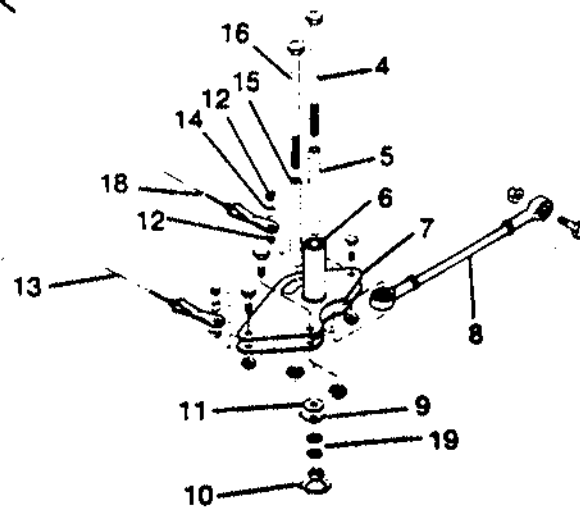
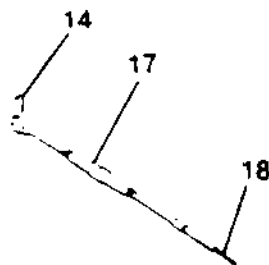
MODEL 172 SERIES SERVICE MANUAL



NOTE

Carry-thru cable turnbuckle (17) is located at RH aileron bellcrank thru 17269874 and F17201829.

Carry-thru cable turnbuckle (17) is located above headliner beginning 17269875 and F17201830.



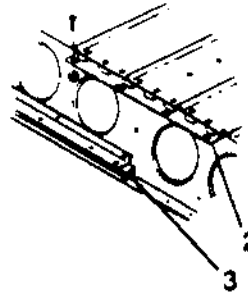
Detail A

1. Aileron
2. Hinge
3. Balance Weight
4. Pivot Bolt
5. Bushing
6. Needle Bearing
7. LH Bellcrank
8. Push-Pull Rod
9. Channel
10. Lower Wing Skin
11. Brass Washer
12. Spacer
13. Direct Cable
14. Bushing
15. Bushing
16. Bolt
17. Carry-Thru Cable Turnbuckle
18. Carry-Thru Cable
19. Washers

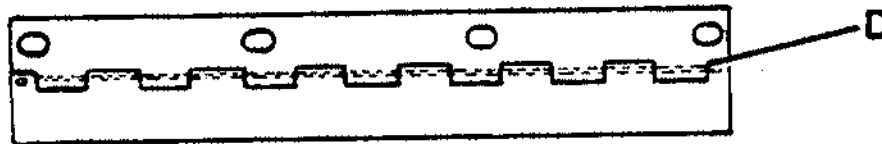
Figure 6-3. Aileron Installation (Sheet 1 of 3)

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- 2. Hinge
- 3. Balance Weight
- 20. Hinge Pin
- 21. Hinge
- 22. Cotter Pin
- 23. Hinge Pin

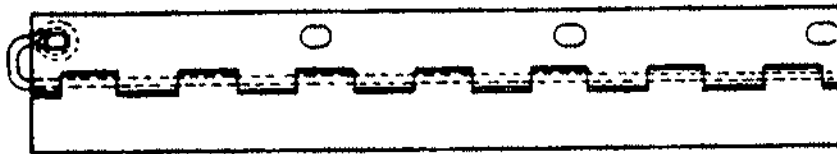


Detail B



AILERON HINGE (TYP)

Used through Serials: 17276254 and F17202233.



AILERON HINGE (TYP)

Beginning Serial: 17276255 and ON.

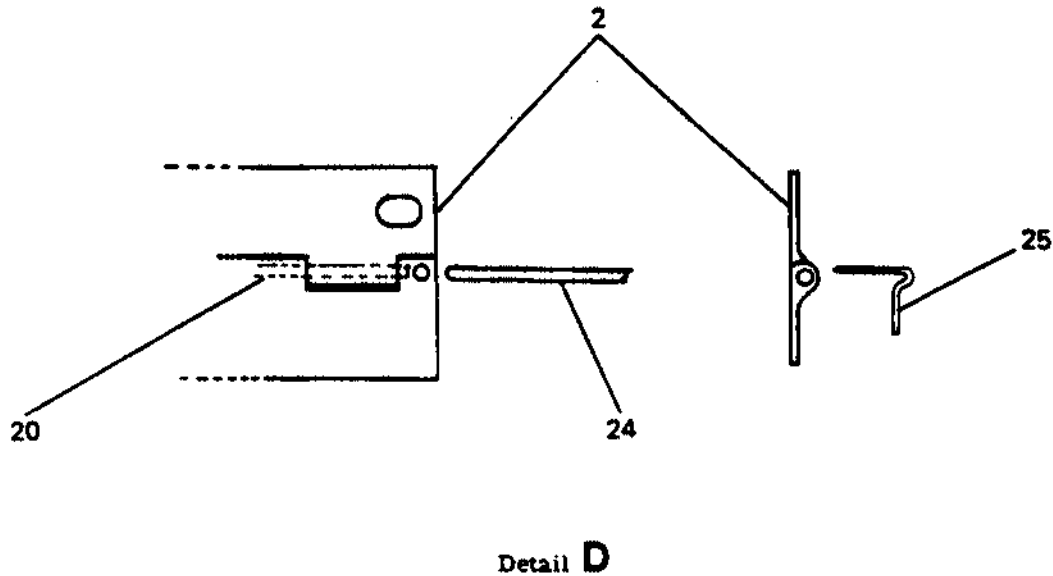
Detail C

NOTE

Install loop of hinge pin (23) on outboard end of hinge.

Figure 6-3. Aileron Installation (Sheet 2 of 3)

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- 2. Hinge
- 20. Hinge Pin
- 24. 0.89 Diameter Drill Rod
- 25. MS24685 Cotter Pin

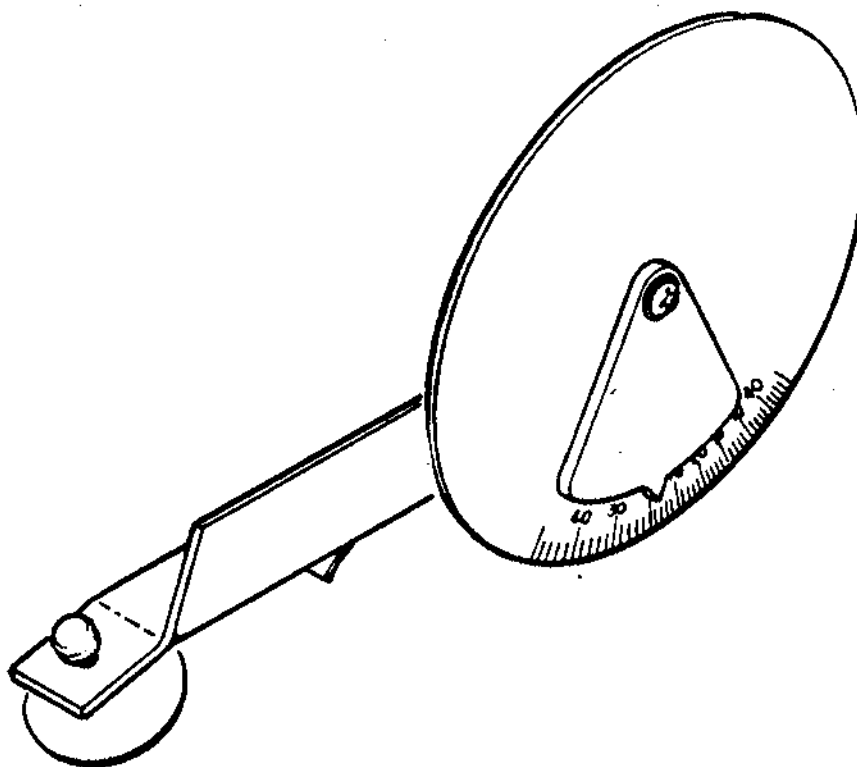
NOTE

The following method may be utilized to check wear on aileron hinges used prior to Serial 17278254 and F17202233. Refer to Service Letter SE83-18 for specific serials affected.

- (1) Remove cotter pins (22) from both ends of hinges.
- (2) Push drill rod (24) or number 43 drill bit into hole past holes from which cotter pins (25) were removed.
- (3) Bend one leg of cotter pin (25) back and attempt to install the other leg into the cotter pin hole past drill rod (24). If leg of cotter pin (25) GOES, replace hinge (2). If NO GO condition exists, hinges are not worn sufficiently to require replacement.
- (4) Remove drill rods (24) and replace new cotter pins (25) in hinges (2).

Figure 6-3. Aileron Installation (Sheet 3 of 3)

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AVAILABLE FROM CESSNA SUPPLY DIVISION (TOOL NO. SE716)

Figure 6-4. Inclinometer for Measuring Control Surface Travel

- h. Check ailerons for correct travel (figure 1-1) using an inclinometer (illustrated in figure 6-4). Make adjustments if necessary and check that the bushing travel stops are properly centered in the bellcranks.
- i. Safety all turnbuckles by the single-wrap method.
- j. Install all items removed for access.

NOTE

Be sure ailerons move in correct direction when operated by control wheel.

SECTION 7

WING FLAP CONTROL SYSTEM

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Drive Pulleys	1L1/7-5
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Removal/Installation	1L8/7-12
Rigging	1L8/7-12

7-1. WING FLAP CONTROL SYSTEM. (See figure 7-1.)

7-2. DESCRIPTION. The wing flap control system is comprised of an electric motor and transmission assembly, drive pulleys, push-pull rods, cables and a follow-up control. Power from the motor and transmission assembly is transmitted to the flaps by a system of drive pulleys, cables and push-pull rods. Electrical power to the motor is controlled by two microswitches mounted on a floating arm assembly, by a camming lever and a follow-up control. As the flap control lever is moved to the desired flap setting, the attached cam trips one of the microswitches, activating the flap motor. As the flaps move to the position selected, the floating arm is rotated by the follow-up control until the active microswitch clears the cam breaking the circuit and stopping the motor. To reverse flap direction, the control lever is moved in the opposite direction causing the cam to trip the second microswitch which reverses the flap motor. The follow-up control moves the cam until it is clear of the second switch, shutting off the flap motor. Limit switches at the flap actuator assembly control flap travel as the flaps reach the full UP or DOWN positions.

7-3. OPERATIONAL CHECK.

- Operate flaps through their full range of travel observing for uneven travel or jumpy motion, binding or lost motion. Ensure flaps are moving together through their full range of travel.
- Check for positive shut-off of motor at flap travel extremes to prevent damage to actuator assembly.
- With flaps full UP, mount an inclinometer on one flap and set to 0°. Lower flaps to full DOWN position and check flap angle as specified in figure 1-1. Check approximate mid-range percentage setting against degrees as indicated on inclinometer. Repeat the same procedure for the opposite flap.

NOTE

An inclinometer for measuring control surface travel is available from the Cessna Supply Division. See figure 6-4.

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- d. Remove access plates adjacent to flap drive pulleys and attempt to rock pulleys to check for bearing wear.
- e. Inspect flap rollers and tracks for evidence of binding or defective parts.

7-4. TROUBLE SHOOTING.

NOTE

Due to remedy procedures in the following trouble shooting chart it may be necessary to rerig system, refer to paragraphs 7-18 and 7-20.

TROUBLE	PROBABLE CAUSE	REMEDY
BOTH FLAPS FAIL TO MOVE.	Open circuit breaker.	Reset and check continuity. Replace breaker if defective.
	Defective switch.	Place jumper across switch. Replace if defective.
	Defective motor.	Remove and bench test motor. Replace if defective.
	Broken or disconnected wires.	Run a continuity check of wiring. Connect or repair wiring.
	Defective or disconnected transmission.	Connect transmission. Remove, bench test and replace transmission if defective.
	Defective limit switch.	Check continuity of switches. Replace switches found defective.
BINDING IN SYSTEM AS FLAPS ARE RAISED AND LOWERED.	Cables not riding on pulleys.	Check visually. Route cables correctly over pulleys.
	Bind in drive pulleys.	Check drive pulleys in motion. Replace drive pulleys found defective.
	Broken or binding pulleys.	Check pulleys for free rotation or breaks. Replace defective pulleys.
	Frayed cable.	Check visually. Replace defective cable.
	Flaps binding on tracks.	Observe flap tracks and rollers. Replace defective parts.

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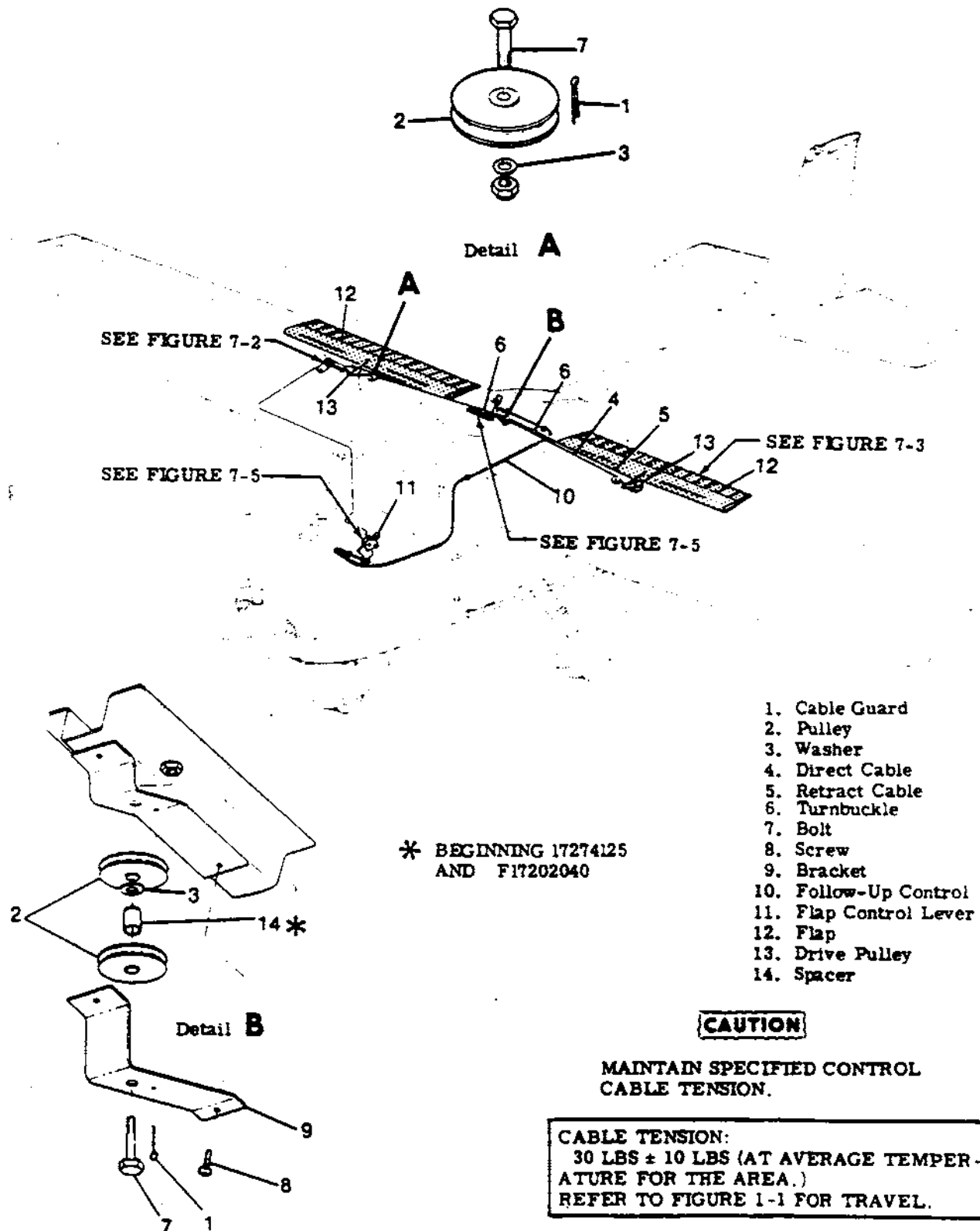


Figure 7-1. Wing Flap Control System

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LEFT FLAPS FAILS TO MOVE.	Disconnected or broken cable.	Check cable tension. Connect or replace cable.
	Disconnected push-pull rod.	Check visually. Attach push-pull rod.
INCORRECT FLAP TRAVEL.	Incorrect rigging.	Refer to paragraph 7-16.
	Defective operating switch.	Check continuity of switches. Replace switches found defective.
FLAPS FAIL TO RETRACT.	Defective or disconnected flaps UP operating switch.	Check continuity of switch. Connect or replace switch.
FLAPS FAIL TO EXTEND.	Defective or disconnected flaps DOWN operating switch.	Check continuity of switch. Connect or replace switch.

7-5. FLAP MOTOR AND TRANSMISSION ASSEMBLY.

7-6. REMOVAL AND INSTALLATION (See figure 7-2.)

- Run flaps to full DOWN position.
- Disconnect battery ground cable and insulate terminal as a safety precaution.
- Remove access plates beneath flap motor and transmission assembly in right wing.

NOTE

Flap motor (9), transmission (7), hinge assembly (10) and actuating tube (5) are removed from the aircraft as a unit. On aircraft equipped with long range fuel tank, it may be easier to detach motor and transmission assembly before removal from wing.

- Remove bolt (20) securing actuating tube (5) to drive pulley (13).
- Screw actuating tube (5) in toward transmission (7) as far as possible by hand.
- Remove bolt (1) securing flap motor hinge (10) to wing. Retain brass washer between hinge and wing structure for use on reinstallation.
- Disconnect motor electrical leads at quick-disconnects.
- Disconnect wiring at limit switches (23 and 26).
- Carefully work assembly from wing through access opening.
- Reverse preceding steps for reinstallation. If hinge assembly (10) was removed from the transmission (7) for any reason, ensure that short end of hinge is reinstalled toward the top.
- Use Loctite grade CV adhesive on threads of setscrew (6) and collar (24) whenever actuating tube (5) is removed. Torque setscrew to 60 pound-inches.
- Complete operational check as outlined in paragraph 7-3 and rerig system in accordance with paragraph 7-16.

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- 7-7. **REPAIR.** Repair consists of replacement of motor, transmission, actuating tube and associated hardware. Bearings in hinge assembly may also be replaced. Lubricate as outlined in Section 2.
- 7-8. **DRIVE PULLEYS.** (See figure 7-2.)
- 7-9. **REMOVAL AND INSTALLATION.**
- Remove access plate adjacent to drive pulley (13) in right wing.
 - Unzip or remove headliner as necessary for access to turnbuckles (index 4, figure 7-1), remove safety wire and loosen turnbuckles.
 - Remove bolt (19) securing flap push-pull rod (14) to drive pulley (13) and lower RIGHT flap gently.
 - Remove bolt (20) securing actuating tube (5) to drive pulley (13) and lower LEFT flap gently. Retain bushing.
 - Remove cable locks (12) securing control cables to drive pulley (13). Tag cables for reference on reinstallation.
 - Remove bolt (11) attaching drive pulley (13) to wing structure.
 - Using care, remove drive pulley through access opening, being careful not to drop bushing. Retain brass washer between drive pulley and wing structure for use on reinstallation. Tape open ends of drive pulley after removal to protect bearings.
 - To remove left wing drive pulley, use this same procedure omitting step "d."
 - Reverse the preceding steps for reinstallation. Rig system in accordance with paragraph 7-16, safety turnbuckles and reinstall all items removed for access.
- 7-10. **REPAIR.** Repair is limited to replacement of bearings. Cracked, bent or excessively worn drive pulleys must be replaced. Lubricate bearings as outlined in Section 2.
- 7-11. **FLAPS.** (See figure 7-3.)
- 7-12. **REMOVAL AND INSTALLATION.**
- Run flaps to full DOWN position.
 - Remove access plates (1) from top leading edge of flap.
 - Disconnect push-pull rod (6) at flap bracket (7).
 - Remove bolts (5) at each flap track. As flap is removed from wing, all washers, rollers and bushings will fall free. Retain these for reinstallation.
 - Reverse the preceding steps for reinstallation. If push-pull rod (6) adjustment is not disturbed, rerigging of system should not be necessary. Check flap travel and rig in accordance with paragraph 7-16, if necessary.
- 7-13. **REPAIR.** Flap repair may be accomplished in accordance with instructions outlined in Section 18.
- 7-14. **CABLES AND PULLEYS.** (See figure 7-1.)
- 7-15. **REMOVAL AND INSTALLATION.**
- Remove access plates, fairings, headliner and upholstery as necessary for access.
 - If direct cable (4) is to be removed, disconnect clamp (index 7, figure 7-5) from bellcrank (index 2, figure 7-5).
 - Remove safety wire, relieve cable tension, disconnect turnbuckles (6) and carefully lower LEFT flap.
 - Disconnect cables at drive pulleys, remove cable guards and pulleys as necessary to work cables free of aircraft.

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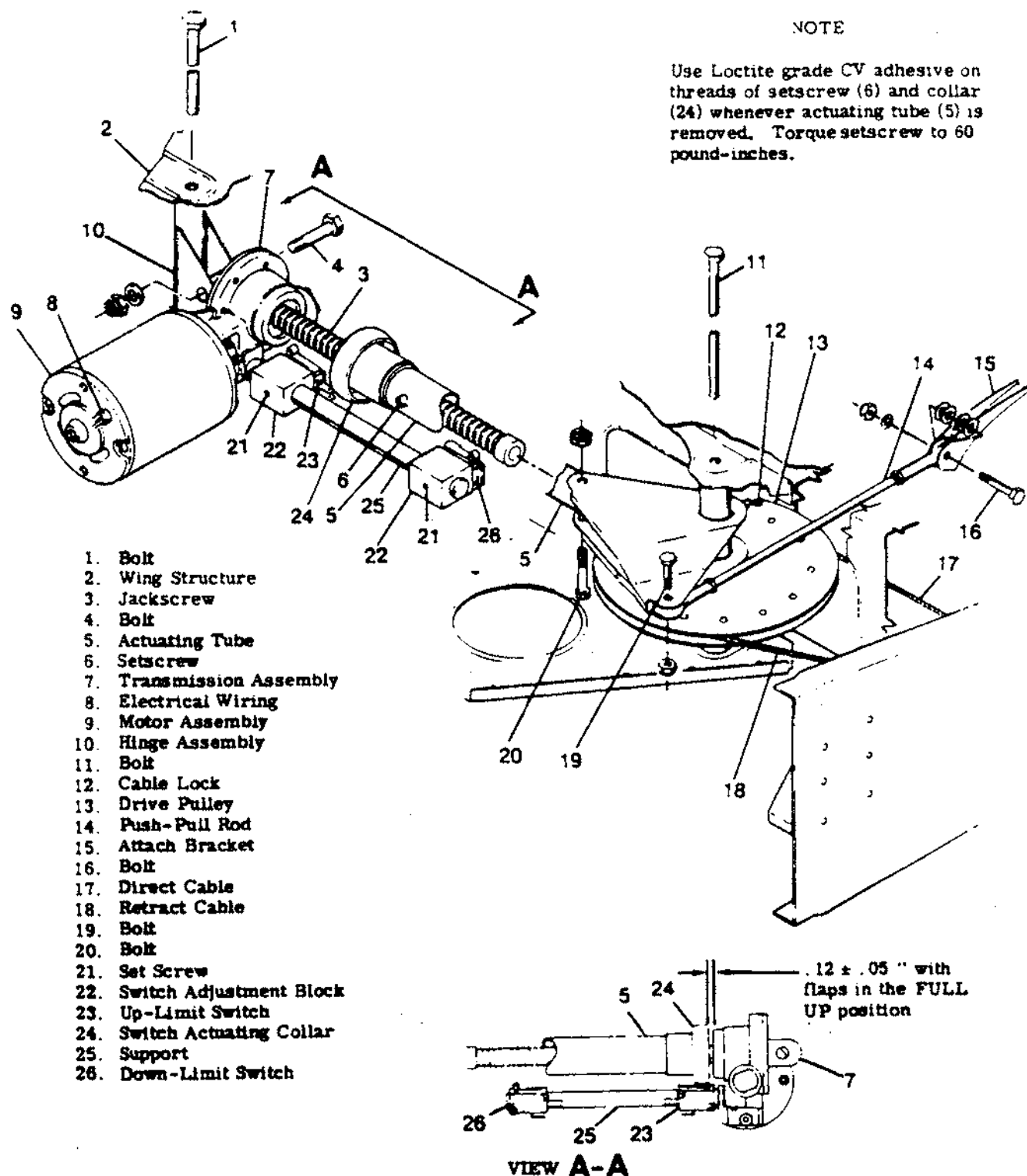


Figure 7-2. Flap Motor and Transmission Installation

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NOTE

To ease routing of cables, a length of wire may be attached to the end of cable being withdrawn from the aircraft. Leave wire in place, routed through structure; then attach the cable being installed and use wire to pull cable into position.

- e. Reverse the preceding steps for reinstallation.
- f. After cables are routed in position, install pulleys and cable guards. Ensure cables are positioned in pulley grooves before installing guards.
- g. Rerig flap system in accordance with paragraph 7-16 and safety turnbuckles.
- h. Rerig follow-up system in accordance with paragraph 7-20 and reinstall all items removed in step "a."

7-16. RIGGING.

- a. (See figure 7-1.) Unzip or remove headliner as necessary for access to turnbuckles (6).
- b. With flaps in the full UP position, disconnect follow-up cable (index 4, figure 7-5) by removing clevis attaching follow-up cable to bellcrank (index 2, figure 7-5).
- c. (See figure 7-1.) Remove safety wire, relieve cable tension, disconnect turnbuckles (6) and carefully lower left flap.
- d. (See figure 7-2.) Disconnect push-pull rods (14) at drive pulleys (13) in both wings and lower RIGHT flap gently.
- e. Disconnect actuating tube (5) from drive pulley (13).

NOTE

If control cables are not connected to left and right drive pulleys, actuating tube (5) and push-pull rods (14) must be disconnected before installing cables. If drive pulleys (13) are not installed, attach control cables before installing drive pulleys in the wings as illustrated in figure 7-4.

- f. Adjust both push-pull rods (14) to $8.83 \pm .12$ inches between centers of rod end bearings and tighten locknuts on both ends. Connect push-pull rods to flaps and drive pulleys.

NOTE

Temporarily connect cables at turnbuckles (index 6, figure 7-1) and test flaps by hand to ensure both flaps extend and retract together. If they will not, the cables are incorrectly attached to the drive pulleys. Ensure that the right drive pulley rotates clockwise when viewed from below, as the flaps are extended. Tag cables for reference and disconnect turnbuckles again.

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NOTE

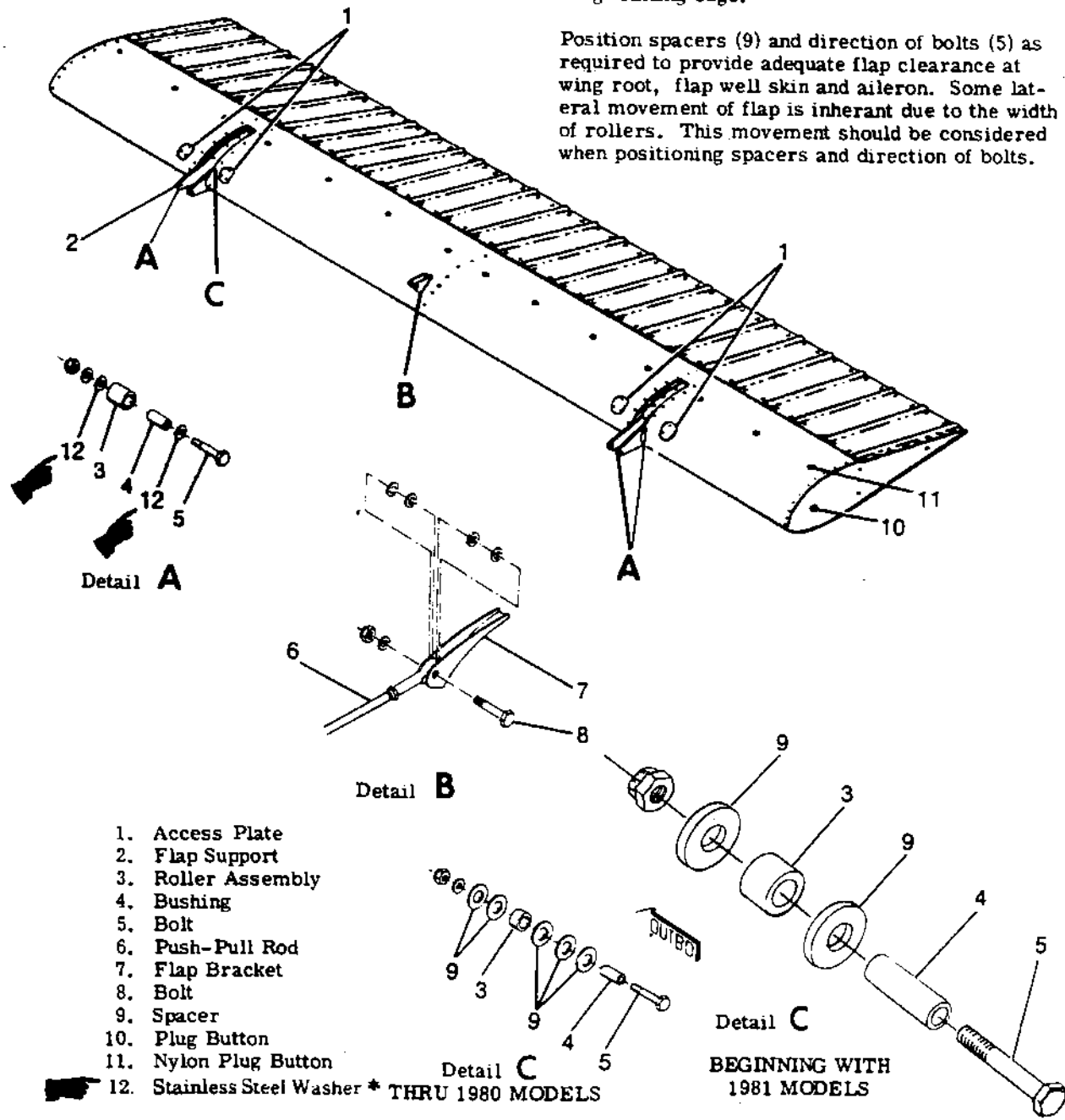
Beginning with Serial 17276296, the access plates (1) are attached with recessed head screws in place of truss head screws.

- * Airplanes 17261445, 17267585 and On and F17201515 and On incorporating SK180-44. When incorporating SK180-44 only stainless steel washers (12) are used.

NOTE

Bushings (4), rollers (3) and spacers (9) are first positioned through slots in flap tracks, then are secured to the flap roller supports (2) with attaching bolts, washers and nuts. Nylon plug buttons (11) prevent wing flap from chafing wing trailing edge.

Position spacers (9) and direction of bolts (5) as required to provide adequate flap clearance at wing root, flap well skin and aileron. Some lateral movement of flap is inherent due to the width of rollers. This movement should be considered when positioning spacers and direction of bolts.



OUTBOARD HINGE

Figure 7-3. Flap Installation

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- g. (See figure 7-2.) Screw actuating tube (5) IN toward transmission (7) by hand to $.12 \pm .05$ inches between switch actuating collar (24) and transmission as illustrated in View A-A.
- h. Loosen setscrew (6) securing actuating tube (5) to switch actuating collar (24) and hold collar to maintain $.12 \pm .05$ inch while holding RIGHT flap in the full UP position and adjust actuating tube (5) IN or OUT, as necessary to align with attachment hole in drive pulley (13).
- i. Apply Loctite grade CV sealant (or equivalent) to threads of setscrew (6) and torque to 60 inch-pounds.

NOTE

If actuating tube (5) is too long to allow attachment to drive pulley after completion of step "h", proceed to step "j".

- j. Disconnect push-pull rod (14) at drive pulley (13) to allow connecting actuating tube (5) to drive pulley.
- k. Manually hold RIGHT flap in full UP position and readjust push-pull rod (14) to align with attachment hole in drive pulley. Connect push-pull rod and tighten locknuts.

NOTE

The right flap and actuator must be correctly rigged, before cables and left flap can be rigged.

- l. With flaps in full UP position, loosen setscrew (21) and slide up limit switch adjustment block (22) on support (25) to just activate switch and shut off electrical power to motor at this position. Tighten setscrew.
- m. Manually hold LEFT flap, full UP and connect control cables at turnbuckles (index 6, figure 7-1). Remove reference tags previously installed.
- n. With flaps full UP, adjust turnbuckles to obtain 30 ± 10 pounds tension on cables. Adjust retract cable (18) first.

NOTE

Ensure cables are positioned in pulley grooves and cable ends are positioned correctly at drive pulleys before tightening turnbuckles.

- o. Disconnect push-pull rod at left drive pulley. Run motor to extend flaps approximately 20° and check tension on each flap cable. If necessary, readjust turnbuckles to maintain 30 ± 10 pounds tension on each cable and safety turnbuckles.
- p. Fully retract right flap. Manually hold left flap in full UP position and readjust push-pull rod to align with attaching hole in drive pulley. Connect push-pull rod and tighten locknuts.

NOTE

An inclinometer for measuring control surface travel is available from the Cessna Supply Division. See figure 6-4.

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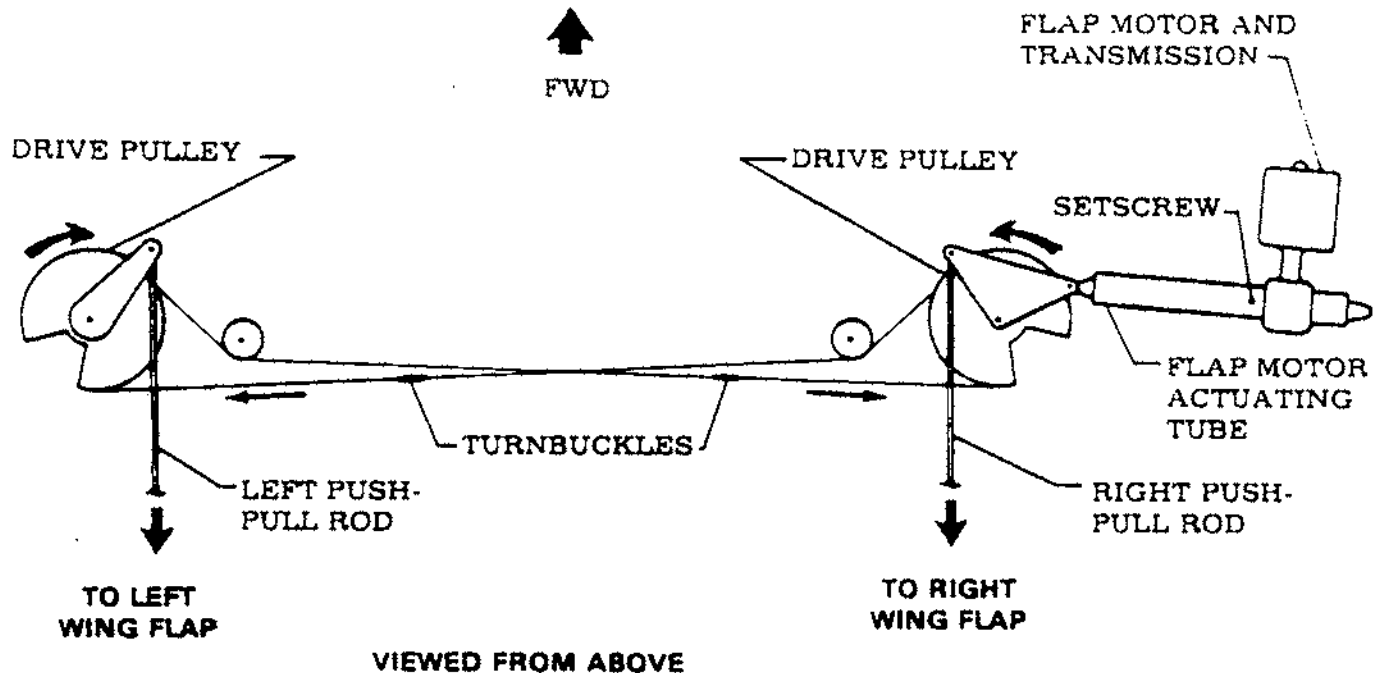


Figure 7-4. Flap System Schematic

- q. Mount an inclinometer on RIGHT flap and adjust to 0°.
- r. Run flaps to full DOWN position and adjust DOWN limit switch (32) to stop motor and flap at the degree of travel specified in figure 1-1. Repeat check on LEFT flap. Recheck limit switch through several flap cycles.

NOTE

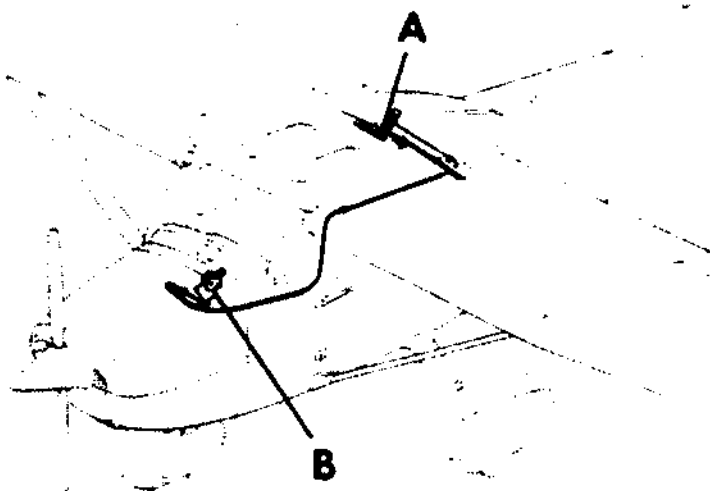
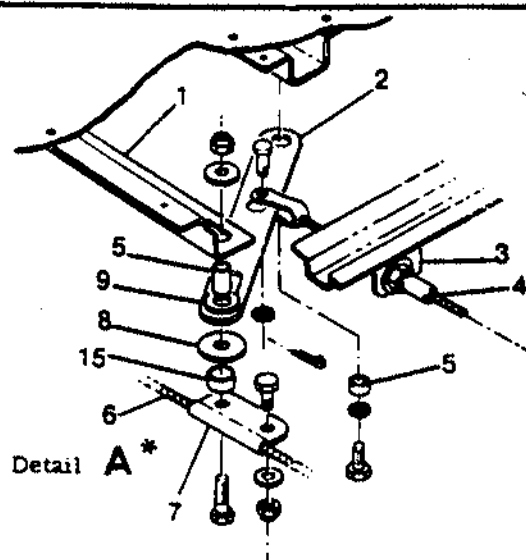
All flap rollers may not bottom in the flap tracks at the travel extremes.

- s. Reconnect and rerig the flap follow-up system in accordance with paragraph 7-20. Perform an operational check in accordance with paragraph 7-3. recheck all items for proper safetying and replace items removed for access.

7-17. FLAP FOLLOW-UP AND INDICATING SYSTEM. (See figure 7-5.)

7-18. DESCRIPTION. The flap follow-up and indicating system consists of a sheathed cable assembly, pointers and microswitches. One end of the cable is attached to the flap operating switch operating arm. The other end is clamped to the flap direct cable, above the headliner in the rear cabin area. Motion of the flap cable is transmitted through the follow-up control to the pointer, attached to the switch mounting arm. Pointer moves along a scale as the flaps are extended or retracted. When the motion of the switch mounting arm with the attached operating switches positions the "active" operating switch to clear the cam on flap lever, flap motor circuit is broken and flaps stop at selected position.

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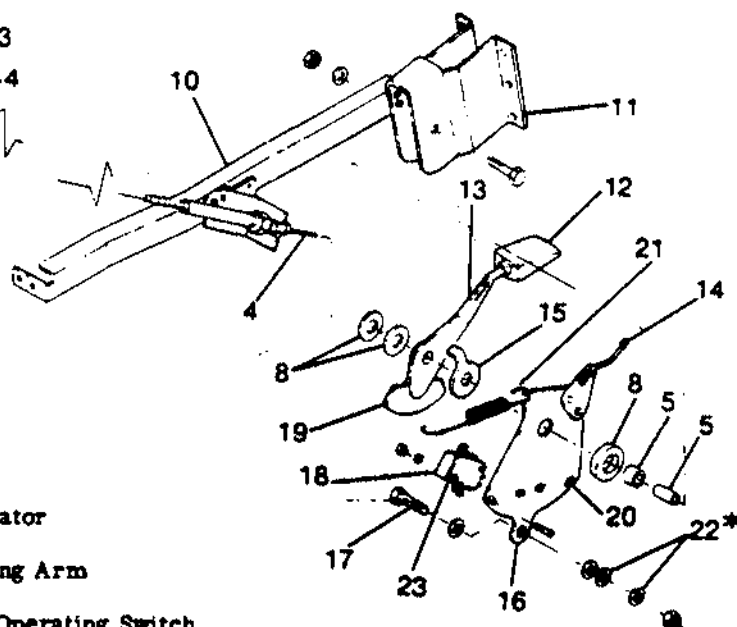
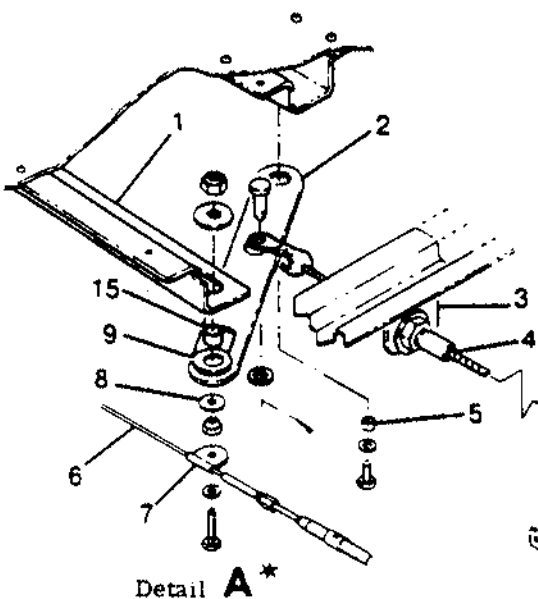


NOTE

Lubricate slots of guide (1) and bellcrank (2) with Lubri-Bond "A" or Lubri-Bond 220 (Electrofilm Inc.) North Hollywood, California or Perma-Silk (Everlube Corp.) North Hollywood, California.

* Thru 17272169 & F17201909

* Beginning 17272170 & F17201910



1. Guide	13. Flap Lever
2. Bellcrank	14. Position Indicator
3. Mounting Bracket	15. Spacer
4. Follow-Up Cable	16. Switch Mounting Arm
5. Bushing	17. Clamp Bolt
6. Flap Direct Cable	18. Flaps DOWN Operating Switch
7. Clamp	19. Cam
8. Washer	20. Flaps UP Operating Switch
9. Teflon Washer	21. Spring
10. Support	22. Clamp Bolt Washer
11. Bracket	23. Insulator
12. Knob	

Detail B

* NOTE

Position center cable of flap follow-up (4) between washers (22)

Figure 7-5. Flap Follow-Up Control and Position Indicator

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- 7-19. **REMOVAL AND INSTALLATION.** Figure 7-5 can be used as a guide to removal and installation of the flap follow-up and indicating system.

NOTE

If knob (12) works loose on flap lever (13), remove knob and clean threads on flap lever with MEK or equivalent. After threads have thoroughly dried, prime with grade T primer, and allow primer to flash off or dry from three to five minutes. Apply grade CU Loctite (MIL-S-22473), Loctite 271, STA-LOK Catalog No. 800, or equivalent to threads of flap lever (13). Install knob (12) and allow Loctite to cure from five to 20 minutes before service use.

- 7-20. **RIGGING.** (See figure 7-5.)

- a. Flap control system must be rigged in accordance with paragraph 7-16 before flap follow-up system can be rigged.
- b. Disconnect spring (21) from switch mounting arm (16).
- c. With flaps and flap lever (13) in full UP position and holding flap position indicator (14) to a clearance of .03 inch maximum with top of instrument panel opening, pull center cable of flap follow-up (index 4, detail b) to remove slack. Connect cable thru clamp bolt (17) observing note of figure 7-5.
- d. Connect spring (21) to switch mounting arm (16).
- e. Adjust switches (18) and (20) in slotted holes in mounting arm (16) until cam (19) is centered between switch rollers.
- f. Mount an inclinometer on one flap and set to 0° (flaps full UP). Turn master switch ON and move flap lever (13) to 10° position.

NOTE

An inclinometer for measuring control surface travel is available from Cessna Supply Division. See figure 8-4.

- g. Observe inclinometer reading when flaps stop. Adjust flaps DOWN operating switch (18) in slotted holes on mounting arm (16) as required to obtain flap travel of 10° -0° -2°.
- h. Adjust flaps UP operating switch (20) to obtain positive clearance with cam (19) when flaps DOWN operating switch has just opened in the 10° position.
- i. Repeat steps g. and h. for 20° flap position (travel 20° -0° -2°).
- j. Run flaps to full DOWN position at the degree of travel specified in figure 1-1. Check that flaps DOWN operating switch (18) remains closed as flap motor limit switch (index 26, figure 7-2) stops flaps in full DOWN position.
- k. Check flaps through several cycles, recheck all components for security and replace items removed for access.

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SECTION 8

ELEVATOR CONTROL SYSTEM

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Removal/Installation	1L16/8-4	Cables and Pulleys	1L18 8-6
Repair	1L16/8-4	Removal/Installation	1L18/8-6
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8-1. ELEVATOR CONTROL SYSTEM.

8-2. DESCRIPTION. The elevators are operated by power transmitted through forward and aft movement of the control "U". This power reaches the elevators through a system consisting of a push-pull tube, cables and bellcranks. The elevator control cables, at their aft ends, are attached directly to a bellcrank, installed between the elevators. This bellcrank serves as an interconnect between the elevators and as a bearing point for the travel stop bolts. A trim tab is installed on the right elevator and is described in Section 9.

8-3. TROUBLE SHOOTING

NOTE

Due to remedy procedures in the following trouble shooting chart it may be necessary to rerig system, refer to paragraph 8-14.

TROUBLE	PROBABLE CAUSE	REMEDY
NO RESPONSE TO CONTROL WHEEL FORE-AND-AFT MOVEMENT.	Forward or aft end of push-pull tube disconnected.	Attach push-pull tube correctly.
	Cables disconnected.	Attach cables and rig system in accordance with paragraph 8-14.

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8-3. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
BINDING OR JUMPY MOTION FELT IN MOVE- MENT OF ELEVATOR SYSTEM.	Defective forward or rear bellcrank pivot bearing.	Move to check for play or binding. Replace bellcrank.
	Cables slack.	Adjust to tension specified in figure 8-1.
	Cables not riding correctly on pulleys.	Open access plates and ob- serve pulleys. Route cables correctly over pulleys.
	Nylon bearing on instru- ment panel binding.	Disconnect universal joint and check for binding. Re- place bearing if binding is felt.
	Defective control "U" pivot bearing.	Disconnect elevator push- pull tube at lower end of "U" and check that control moves freely. Replace bearing if found defective.
	Defective elevator hinges.	Move elevators by hand check- ing hinges. Replace defective hinges.
	Clevis bolts too tight.	Readjust to eliminate bolt binding.
	Lubrication needed.	Lubricate in accordance with Section 2.
	Defective pulleys or cable guards.	Replace defective parts and install guards properly.
	Stops incorrectly set.	Check elevator travel with inclinometer. Rig system in accordance with paragraph 8-14.
ELEVATORS FAIL TO ATTAIN PRESCRIBED TRAVEL.	Cables tightened unevenly.	Rig system in accordance with paragraph 8-14.
	Interference at instru- ment panel.	Rig system in accordance with paragraph 8-14.

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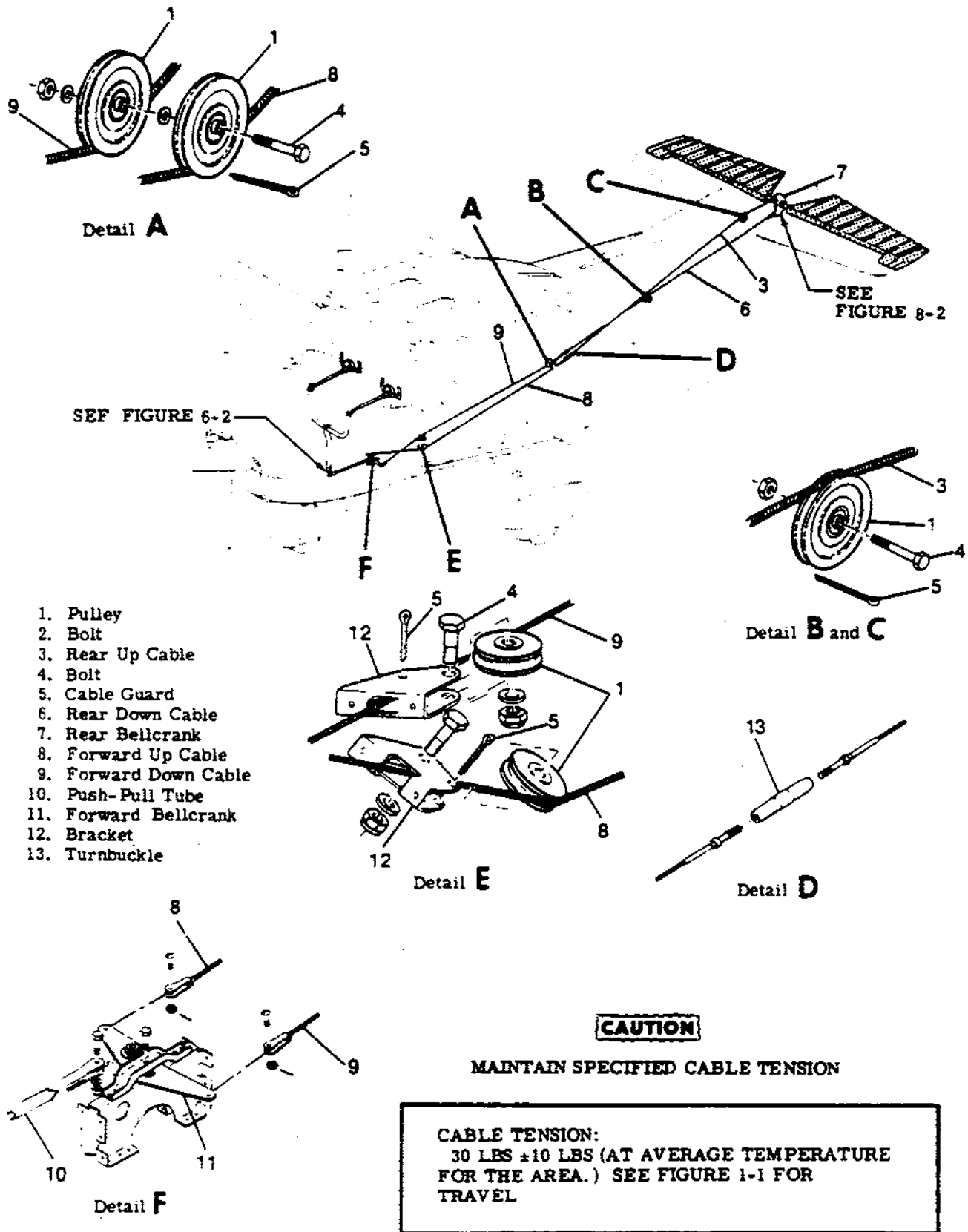


Figure 8-1. Elevator Control System

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3-4. ELEVATORS. (See figure 8-2.)

3-5. REMOVAL AND INSTALLATION.

NOTE

This procedure is written primarily for the right elevator since the trim tab is attached to this elevator.

- a. Disconnect trim tab push-pull channel (3) at tab actuator.
- b. Remove bolts (6) securing elevators to bellcrank (9).

NOTE

If trim system is not moved and actuator screw is not turned, rigging of trim system should not be necessary after installation of elevator.

- c. Remove bolts (16) from elevator hinges.
- d. Using care, remove elevator.
- e. To remove left elevator use same procedure, omitting step "a".
- f. Reverse preceding steps for installation. Rig system in accordance with paragraph 8-14 if necessary.

8-6. REPAIR. Repair may be accomplished as outlined in Section 18. If repair has affected static balance, check and rebalance as required.

8-7. BELLCRANKS.

8-8. FORWARD. (See figure 8-1.)

8-9. REMOVAL AND INSTALLATION.

- a. Remove seats, upholstery and access plates as necessary.
- b. Relieve cable tension at turnbuckles (13) and disconnect cables from bellcrank (11).
- c. Disconnect push-pull tube (10) from bellcrank (11).
- d. Remove pivot bolt and remove bellcrank.
- e. Reverse preceding steps for installation. Rig system in accordance with paragraph 8-14, safety turnbuckles and reinstall all items removed in step "a".

8-10. REAR. (See figure 8-2.)

8-11. REMOVAL AND INSTALLATION.

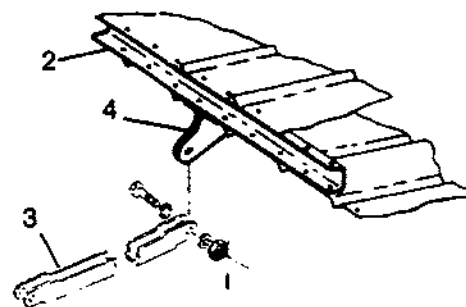
- a. Remove rudder. (Refer to Section 10.)
- b. Relieve cable tension at turnbuckles (index 13, figure 8-1) and disconnect cables from rear bellcrank (9).
- c. Remove bolts (6) securing elevators to bellcrank.
- d. Remove bellcrank pivot bolt (8) and slide bellcrank from between tube assemblies (7).

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- Do not paint cable terminals, bolts, or ends of elevator bellcrank (9).

NOTE

Install push-pull channel (3) with channel opening up on all floatplanes and landplanes through Serials 17274009 and F17202039. Beginning with landplanes Serials 17274010 and F17202040, install push-pull channel (3) with channel opening down.



Detail A

* NOTE

Install upper bolt with head to the right and lower bolt with head to the left. The cable end clevises must be free to swivel.

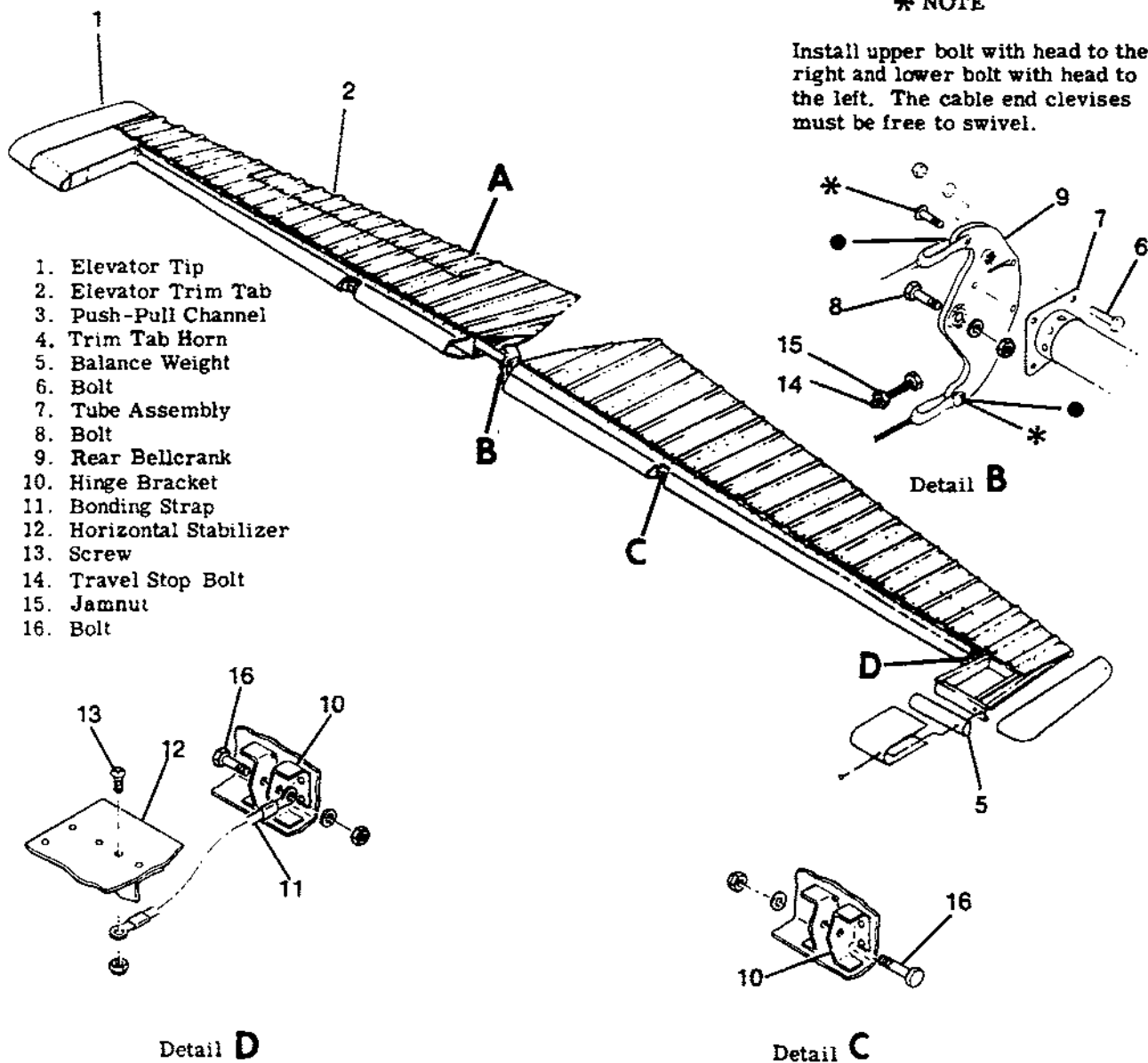


Figure 8-2. Elevator Installation

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NOTE

It may be necessary to remove one of the stabilizer attaching bolts for clearance when removing the bellcrank pivot bolt.

- e. Reverse preceding steps for installation. Rig system in accordance with paragraph 8-14, safety turnbuckles and reinstall all items removed for access.

8-12. CABLES AND PULLEYS. (See figure 8-1.)

8-13. REMOVAL AND INSTALLATION.

- a. Remove seats, upholstery and access plates as necessary.
- b. Relieve cable tension at turnbuckles (13).
- c. Disconnect cables at forward bellcrank (11).
- d. Disconnect cables at rear bellcrank (7).
- e. Remove cable guards and pulleys as necessary to work cables free of aircraft.

NOTE

To ease routing of cables, a length of wire may be attached to end of cable before being withdrawn from aircraft. Leave wire in place, routed through structure, attach cable being installed and pull cable into position.

- f. After cable is routed in position, install pulleys and cable guards. Ensure cable is positioned in pulley groove before installing guards.
- g. Rig system in accordance with paragraph 8-14, safety turnbuckles and reinstall all items removed in step "a".

8-14. RIGGING. (See figure 8-1.)

- a. Lock control column in neutral position by installing neutral rigging tool (index 2, figure 8-3).
- b. Streamline elevators to neutral with horizontal stabilizer.

NOTE

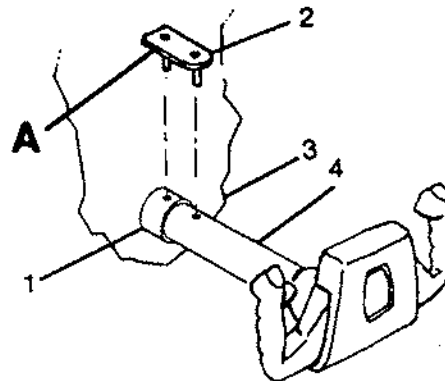
Neutral position measured with the bottom of the balance area flush with the bottom of the stabilizer.

- c. Holding elevators in neutral position, adjust turnbuckles (13) equally to obtain 30 ± 10 lbs. cable tension.
- d. Mount an inclinometer on elevator and, keeping elevator streamlined with stabilizer, set inclinometer to 0° .

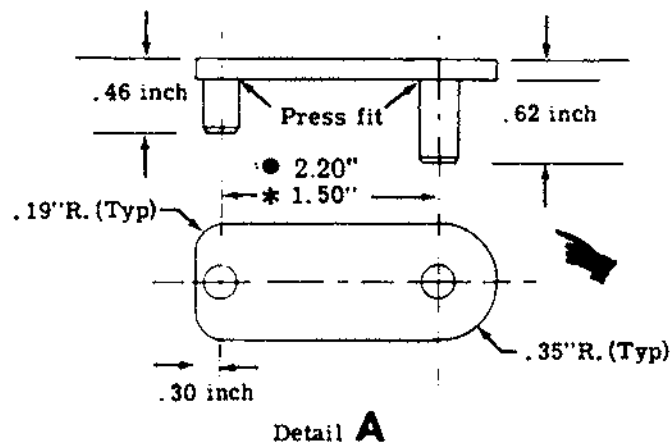
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● 17276080 & On
F17202217 & On

* 17267585, 17261445
17261578 thru 17276079
F17201515 thru F17202216



1. Support
2. Neutral Rigging Tool
3. Instrument Panel
4. Pilot's Control Column



Fabricate from .125 inch steel plate and
.209 inch dia. drill rod according to dim-
ensions shown.

Figure 8-3. Control Column Neutral Rigging Tool

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NOTE

An inclinometer for measuring control surface travel is available from Cessna Supply Division. See figure 6-4.

- e. Remove control column neutral rigging tool and adjust travel stop bolts (index 14, figure 8-2) to range of travel specified in figure 1-1.
- f. Check that control "U" does NOT contact instrument panel in full UP position or firewall in the full DOWN position.
- g. Safety turnbuckles (13) and travel stop bolts: check remainder of elevator control system for security and reinstall all items removed for access.

WARNING

Be sure elevators move in the correct direction when operated by controls.

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SECTION 9

ELEVATOR TRIM CONTROL SYSTEM

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- 9-1. ELEVATOR TRIM CONTROL SYSTEM. (See figure 9-1.)
- 9-2. DESCRIPTION. The elevator trim tab, located on the right elevator, is controlled by a trim wheel mounted in the pedestal. Power to operate the tab is transmitted from the trim control wheel by means of chains, cables and an actuator. A mechanical pointer, adjacent to the trim wheel indicates tab position. A "nose-up" setting results in a tab-down position.
- 9-3. TROUBLE SHOOTING.

NOTE

Due to remedy procedure in the following trouble shooting chart it may be necessary to rerig system, refer to paragraph 9-18.

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9-3. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
TRIM CONTROL WHEEL MOVES WITH EXCESSIVE RESISTANCE.	Cable tension too high.	Adjust tension as specified in figure 9-1.
	Pulleys binding or rubbing.	Repair or replace as necessary.
	Cables not in place on pulleys.	Install cables correctly.
	Trim tab hinge binding.	Disconnect actuator and move tab to check resistance. Lubricate or replace hinge as necessary.
	Defective trim tab actuator.	Remove chain from actuator sprocket and operate actuator manually. Replace actuator if defective.
	Rusty chain.	Replace rusty chain.
	Damaged sprocket.	Replace damaged sprocket.
LOST MOTION BETWEEN CONTROL WHEEL AND TRIM TAB.	Bent sprocket shaft.	Observe motion of sprockets. Replace bent sprocket shaft.
	Cable tension too low.	Adjust tension as specified in figure 9-1.
	Broken pulley.	Replace defective pulley.
	Cables not in place on pulleys.	Install cables correctly.
	Worn trim tab actuator.	Remove and replace worn actuator.
TRIM INDICATOR FAILS TO INDICATE CORRECT TRIM POSITION.	Actuator attachment loose.	Tighten.
	Indicator incorrectly engaged on wheel track.	Reset indicator.
INCORRECT TRIM TAB TRAVEL.	Stop blocks loose or incorrectly adjusted.	Adjust stop blocks on cables. See figure 9-2.

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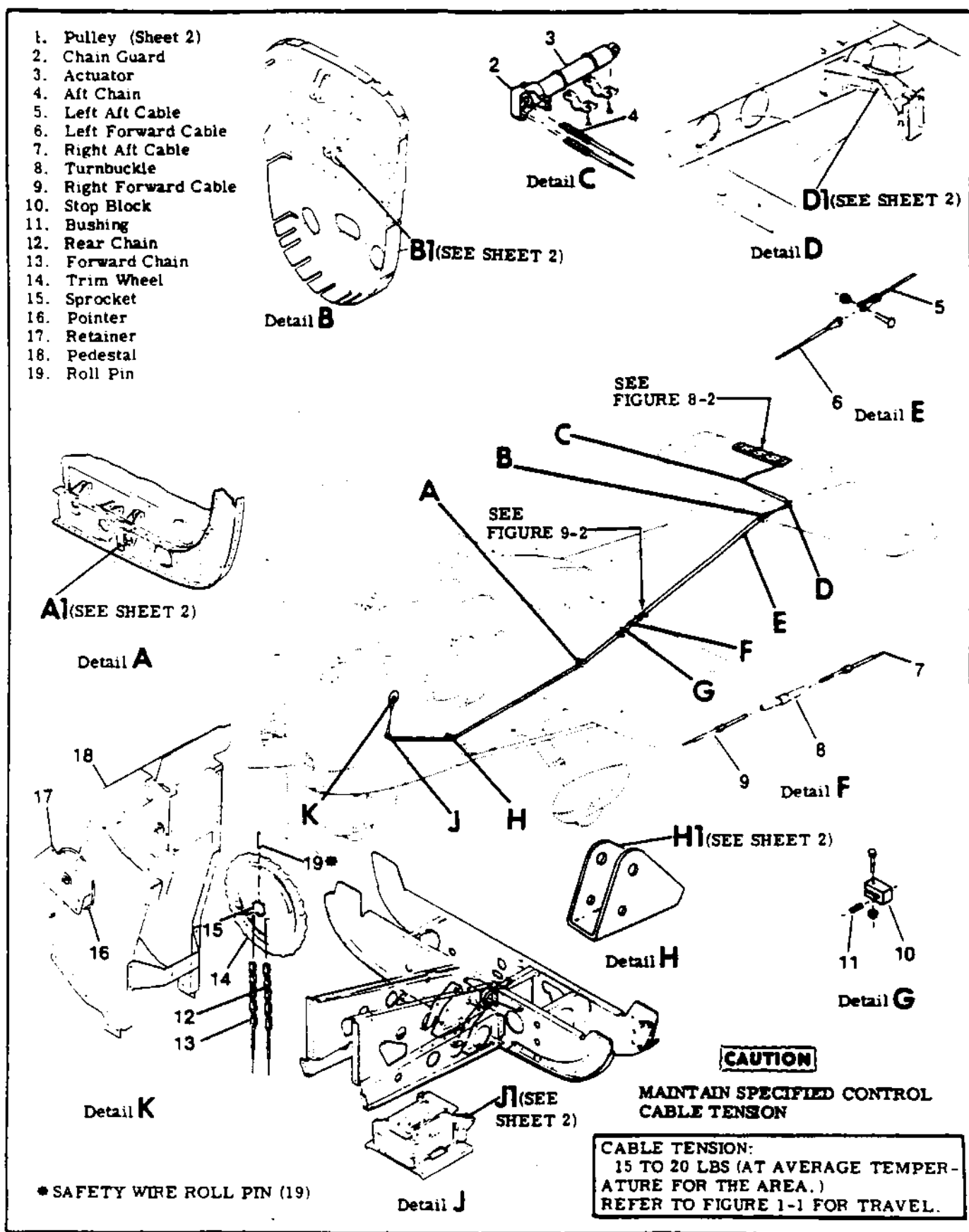


Figure 9-1. Elevator Trim Tab Control System (Sheet 1 of 2)

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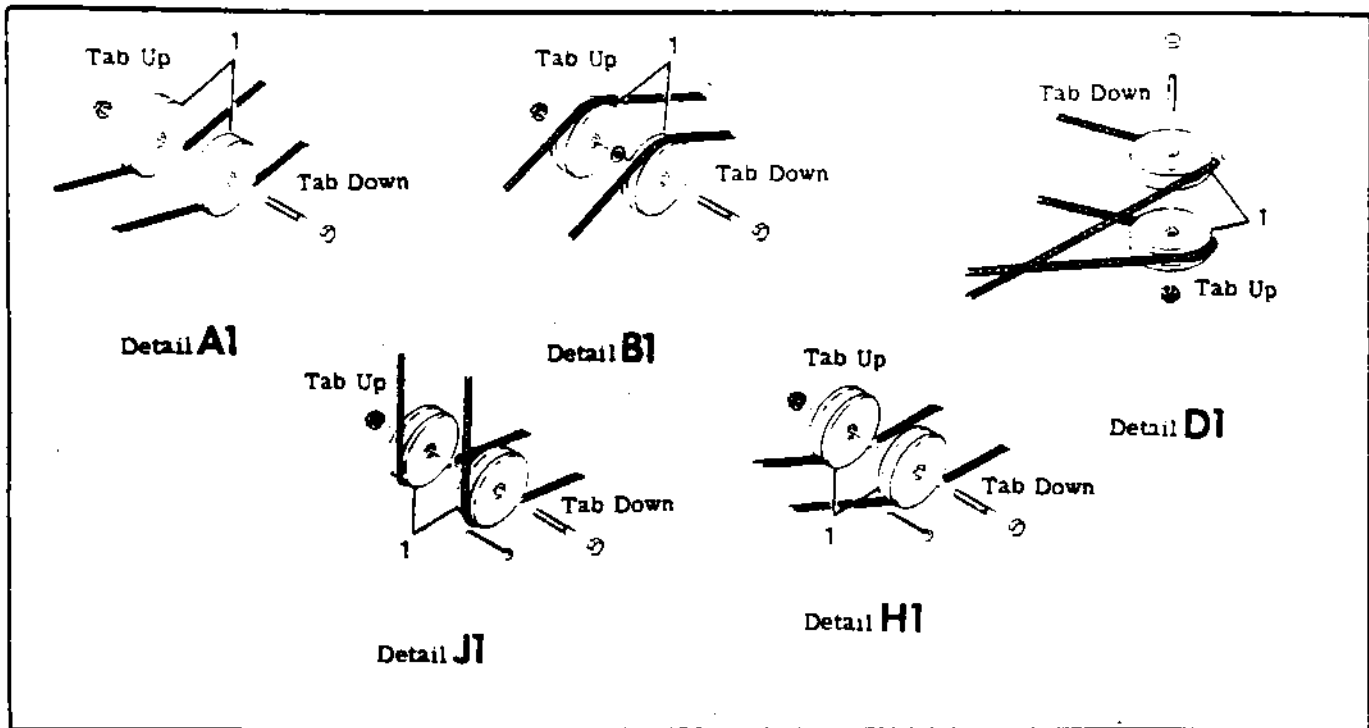


Figure 9-1. Elevator Trim Tab Control System (Sheet 2 of 2)

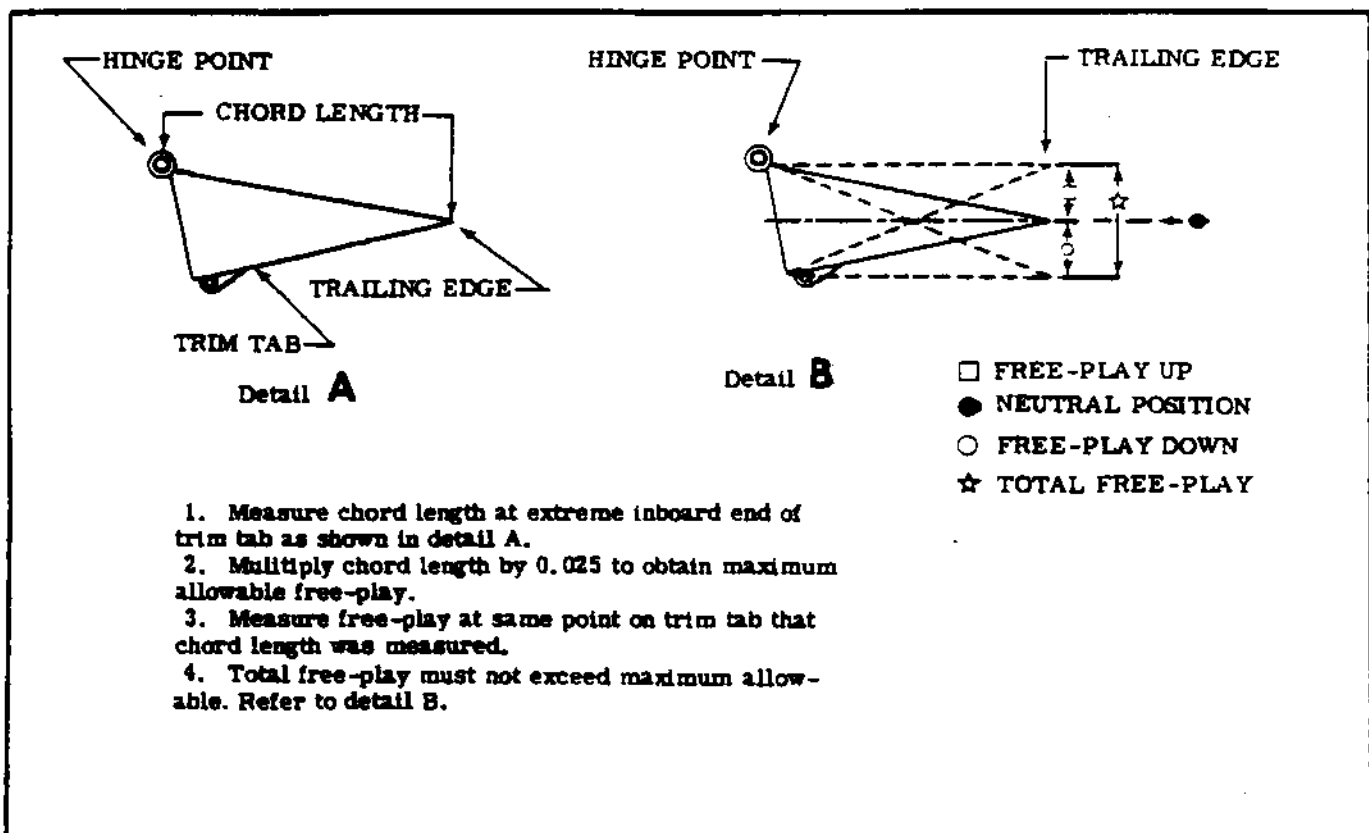


Figure 9-1A. Trim Tab Free-Play Inspection

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9-4. TRIM TAB. (See figure 8-2.)

9-5. REMOVAL AND INSTALLATION.

- a. Disconnect push-pull channel (3) from horn assembly (4).
- b. Drill out rivets attaching hinge to elevator.

NOTE

After tab has been removed and if hinge pin is to be removed, it is necessary to spread the crimped ends of the hinge before driving out pin. When a pin has been installed, crimp ends of hinge to prevent pin from working out.

- c. Reverse preceding steps for installation.

9-6. TRIM TAB ACTUATOR.

9-7. REMOVAL AND INSTALLATION. (See figure 9-1.)

CAUTION

Position a support stand under tail tie-down ring to prevent tailcone from dropping while working inside.

- a. Remove baggage compartment aft wall for access.
- b. Remove safety wire and relieve cable tension at turnbuckle (8).
- c. Disconnect push-pull tube from actuator (3).
- d. Remove access plate from underside of right-hand stabilizer beneath actuator.
- e. Remove chain guard (2) and disengage chain (4) from actuator sprocket.
- f. Remove screws attaching actuator clamps to bracket and carefully work actuator out through access opening.
- g. Reverse the preceding steps for reinstallation. Rig trim system in accordance with paragraph 9-18, safety turnbuckle (8) and reinstall all items removed for access.

9-8. DISASSEMBLY. (See figure 9-3.)

- a. Remove actuator in accordance with paragraph 9-7.
- b. Disassemble actuator assembly (1) as illustrated in Detail A as follows:
 1. Remove chain guard (3) if not previously removed in step "e" of paragraph 9-7.
 2. Using suitable punch and hammer, remove groov-pins (8) securing sprocket (5) to screw (9) and remove sprocket from screw.
 3. Unscrew threaded rod end (15) and remove rod end from actuator.
 4. Remove groov-pins (10) securing bearings (6 and 14) at the housing ends.
 5. Lightly tap screw (9) toward the sprocket end of housing, remove bearing (6) and collar (7).
 6. Lightly tap screw (9) in the opposite direction from sprocket end, remove bearing (14), O-ring (13) and collar (7).
 7. It is not necessary to remove retaining rings (11).

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9-9. CLEANING, INSPECTION AND REPAIR. (See figure 9-3.)

- a. DO NOT remove bearing (16) from threaded rod end (15) unless replacement of bearing is necessary.
- b. Clean all component parts, except bearing (16), by washing in Stoddard solvent or equivalent. Do not clean sealed bearing (16).
- c. Inspect all component parts for obvious indications of damage such as stripped threads, cracks, deep nicks and dents.
- d. Check bearings (6 and 14), screw (9) and threaded rod end (15) for excessive wear and scoring. Dimensions of the parts are as follows:

BEARING (6)

INSIDE DIAMETER 0.373" MIN.

INSIDE DIAMETER 0.374" MAX.

BEARING (14)

INSIDE DIAMETER

SMALL HOLE 0.248" MIN.

SMALL HOLE 0.249" MAX.

LARGE HOLE 0.373" MIN.

LARGE HOLE 0.374" MAX.

THREADED ROD END (15)

OUTSIDE DIAMETER

(SHANK)

0.245" MIN.

0.246" MAX.

SCREW (9)

OUTSIDE DIAMETER

0.369" MIN.

0.370" MAX.

NOTE

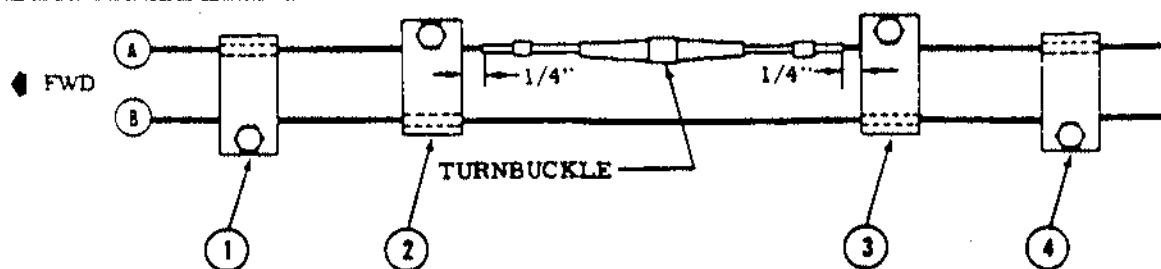
Relative linear movement between internal threaded screw (9) and bearing (14) should be 0.004 to 0.010 inch at room temperature.

- e. Examine threaded rod end (15) and screw (9) for damaged threads or dirt particles that may impair smooth operation.
- f. Check sprocket (5) for broken, chipped and/or worn teeth.
- g. Check bearing (16) for smoothness of operation.
- h. DO NOT attempt to repair damaged or worn parts of the actuator assembly. Discard all defective items and install new parts during reassembly.

9-10. REASSEMBLY. (See figure 9-3.)

- a. Always discard the following items and install new parts during reassembly:
 1. Groov-Pins (8 and 10).
 2. O-Ring (13).
 3. Nuts (2).
- b. During reassembly, lubricate collars (7), screw (9) and threaded rod end (15) in accordance with procedures outlined in Section 2.
- c. Install collar (7) and bearing (6) on screw (9).
- d. Press sprocket (5) into the end of screw (9), align groov-pin holes and install new groov-pins (8).

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1. With elevators in neutral, set trim tab to neutral (streamlined).
2. Position stop blocks (2) and (3) approximately 1/4" fore-and-aft of turnbuckle respectively, and secure to cable A.
3. Place inclinometer on trim tab and run tab to DOWN TRAVEL limit listed in Section 1.
4. Position stop block (4) against stop block (3) and secure to cable B.
5. Run trim tab to UP TRAVEL limit listed in Section 1, place stop block (1) against stop block (2) and secure to cable B.

Figure 9-2. Elevator Trim Tab Travel Adjustment

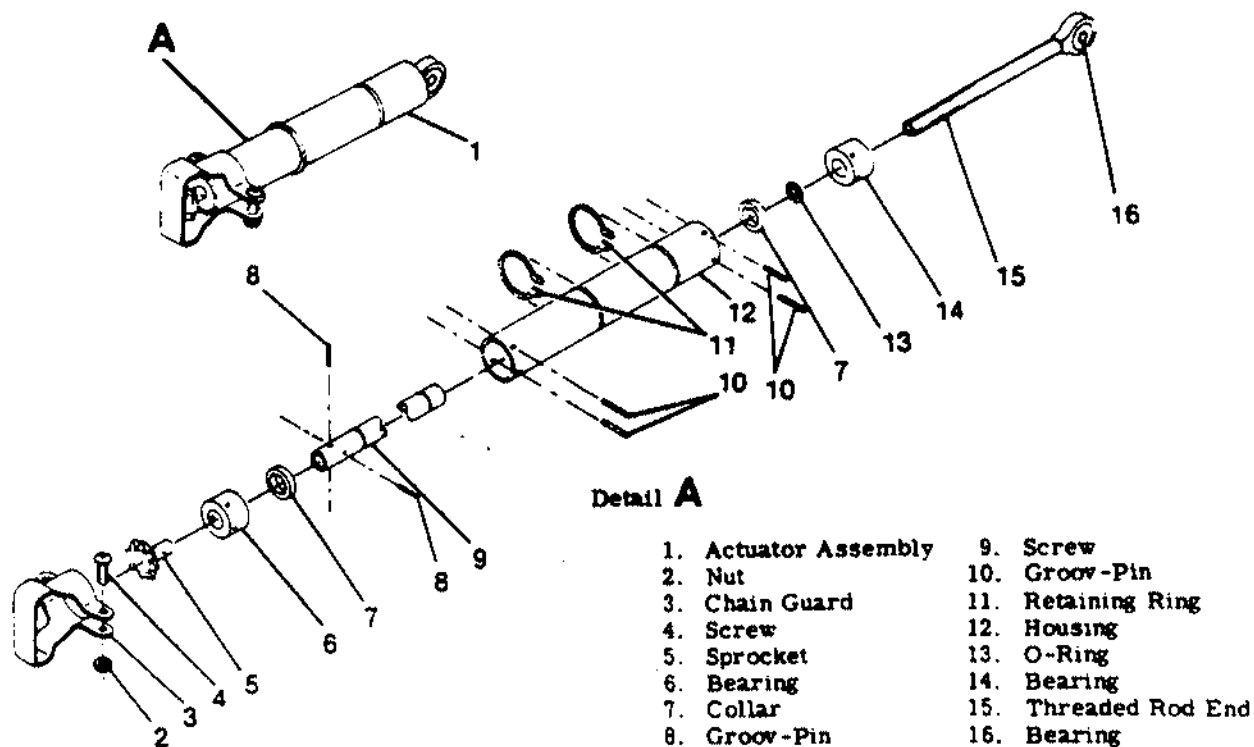


Figure 9-3. Elevator Trim Tab Actuator Assembly

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- e. Insert screw (9), with assembled parts, into housing (12) until bearing (6) is flush with end of housing.

NOTE

When inserting screw (9) into housing (12), locate the sprocket (5) at the end of housing which is farther away from the groove for retaining ring (11).

The bearings (6 and 14) are not pre-drilled and must be drilled on assembly. The groov-pins (10) are 3/32 inch in diameter, therefore, requiring a 3/32 (0.0937) inch drill.

- f. With bearing (6) flush with end of housing (12), carefully drill bearing so the drill will emerge from the hole on the opposite side of housing (12). DO NOT ENLARGE HOLES IN HOUSING.
- g. Press new groov-pins (10) into pin holes.
- h. Insert collar (7), new O-ring (13) and bearing (14) into opposite end of housing (12).
- i. Complete steps "f" and "g" for bearing (14).
- j. If a new bearing (16) is required, a new bearing may be pressed into the boss. Be sure force bears against the outer race of bearing.
- k. Screw the threaded rod end (15) into screw (9).
- l. Install retaining rings (11), if they were removed.
- m. Test actuator assembly by rotating sprocket (5) with fingers while holding threaded rod end (15). The threaded rod end should travel in and out smoothly, with no indication of binding.
- n. Reinstall actuator assembly in accordance with paragraph 9-7.

9-11. TRIM TAB FREE-PLAY INSPECTION.

- a. Place elevator and trim tab in neutral position and secure elevator from movement.
- b. Determine maximum amount of allowable free play using formula shown in figure 9-1A.
- c. Using moderate hand pressure (up and down), measure free-play at trailing edge of trim tab.
- d. If trim tab free-play is less than maximum allowable, the system is within prescribed limits.
- e. If trim tab free-play is more than maximum allowable, check the following items for looseness while moving trim tab up and down.
 - 1. Check push-pull channel to trim tab horn assembly attachment for looseness.
 - 2. Check push-pull channel to actuator assembly threaded rod end attachment for looseness.
 - 3. Check actuator assembly threaded rod end for looseness in the actuator assembly.
- f. If looseness is apparent while checking steps e-1 and e-2, repair by installing new parts.
- g. If looseness is apparent while checking step e-3, refer to paragraphs 9-6 through 9-10.

9-12. TRIM TAB CONTROL WHEEL. (See figure 9-1.)

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9-13. REMOVAL AND INSTALLATION.

- a. Relieve cable tension at turnbuckle (8).

CAUTION

Position a support stand under tail tie-down ring to prevent tailcone from dropping while working inside.

- b. Remove pedestal cover (12). (Refer to applicable paragraph in this section.)
- c. Remove screws attaching control wheel retainer (17).
- d. Remove retainer and pointer (16), using care not to drop control wheel (14).
- e. Disengage roller chain (13) from sprocket (15) and remove control wheel.
- f. Reverse preceding steps for installation. Rig system in accordance with applicable paragraph in this section, safety turnbuckle and reinstall all items removed for access.

9-14. CABLES AND PULLEYS. (See figure 9-1.)

9-15. REMOVAL AND INSTALLATION.

- a. Remove seats, upholstery and access plates as necessary.
- b. Disconnect cables at turnbuckle (8) and cable ends (5 and 6).
- c. Remove cable guards and pulleys as necessary to work cables free of aircraft.

NOTE

To ease routing of cables, a length of wire may be attached to end of cable before being withdrawn from aircraft. Leave wire in place, routed through structure, attach cable being installed and pull cable into position.

- d. After cable is routed in position, install pulleys and cable guards. Ensure cable is positioned in pulley groove before installing guards.
- e. Rig system in accordance with applicable paragraph in this section, safety turnbuckle and reinstall all items removed in step "a."

9-16. PEDESTAL COVER. (See figure 9-1.)

9-17. REMOVAL AND INSTALLATION.

- a. Remove fuel selector valve handle and placard.
- b. Remove mike and remove mike jack mounting nut.
- c. Remove screws attaching pedestal cover to structure and remove cover.

9-18. RIGGING. (See figure 9-1.)

CAUTION

Position a support stand under tail tie-down ring to prevent tailcone from dropping while working inside.

- a. Remove rear baggage compartment panel and access plates as necessary.
- b. Loosen travel stop blocks (10) on cables.
- c. Disconnect actuator (3) from trim tab push-pull channel.
- d. Check cable tension and readjust turnbuckle (8) if necessary.

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NOTE

If chains and/or cables are being installed, permit actuator screw to rotate freely as chains and cables are connected. Set cable tension.

- e. Rotate trim wheel (14) full forward (nose down). Ensure pointer (16) does not restrict wheel movement. If necessary, reposition pointer using a thin screwdriver to pry trailing leg of pointer out of groove.

NOTE

Full forward (nose down) position of trim wheel is where further movement is prevented by chain or cable ends contacting sprockets or pulleys.

- f. With elevator and trim tab both in neutral (streamlined), place inclinometer on tab and set to zero.

NOTE

An inclinometer for measuring control surface travel is available from Cessna Supply Division. See figure 6-4.

- g. Rotate actuator screw in or out as required to place tab up with a maximum of 2° overtravel, with actuator screw connected to push-pull channel.
- h. Rotate trim wheel to position tab up and down, readjusting actuator screw as required to obtain overtravel in both directions.
- i. Position stop blocks (10) and adjust as illustrated in figure 9-2 to limit travel as specified in Section 1.
- j. Check trim wheel pointer travels the same distance from ends of slot in cover. Reposition trailing leg of pointer if necessary (refer to step "d").
- k. Safety turnbuckle and reinstall all items removed in step "a".

WARNING

Be sure trim tab moves in correct direction when operated by trim wheel. Nose down trim corresponds to tab up position.

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SECTION 10

RUDDER AND RUDDER TRIM CONTROL SYSTEMS

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- 10-1. RUDDER CONTROL SYSTEM. (See figure 10-1.)
- 10-2. DESCRIPTION. Rudder control is maintained through use of conventional rudder pedals which also control nose wheel steering. The system is comprised of rudder pedals, cables and pulleys, all of which link the pedals to the rudder and nose wheel steering. Cable tension is automatically determined when the rudder pedals are rigged against return springs 6.50 inches from firewall.
- 10-3. TROUBLE SHOOTING.

NOTE

Due to remedy procedures in the following trouble shooting chart it may be necessary to rerig system, refer to paragraph 10-11.

TROUBLE	PROBABLE CAUSE	REMEDY
RUDDER DOES NOT RESPOND TO PEDAL MOVEMENT.	Broken or disconnected cables.	Connect or replace cables.

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10-3. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
BINDING OR JUMPY MOVEMENT OF RUDDER PEDALS.	Cables too tight.	See figure 10-2 for distance between firewall and pedals. Adjust cable tension in accordance with paragraph 10-11.
	Cables not riding properly on pulleys.	Route cables correctly over pulleys.
	Binding, broken or defective pulleys or cable guards.	Replace defective pulleys and install guards properly.
	Pedal bars need lubrication.	Refer to Section 2.
	Defective rudder bar bearings.	If lubrication fails to eliminate binding, replace bearing blocks.
	Defective rudder hinge bushings.	Replace defective bushings.
	Clevis bolts too tight.	Readjust to eliminate binding.
LOST MOTION BETWEEN RUDDER PEDALS AND RUDDER.	Steering rods not adjusted properly.	Rig system in accordance with paragraph 10-11.
	Insufficient cable tension.	See figure 10-2 for distance between firewall and pedals. Adjust cable tension in accordance with paragraph 10-11.
INCORRECT RUDDER TRAVEL.	Incorrect rigging.	Rig system in accordance with paragraph 10-11.

10-4. RUDDER PEDAL ASSEMBLY. (See figure 10-2.)

10-5. REMOVAL AND INSTALLATION.

- a. Remove carpeting, shields and soundproofing from pedal and tunnel areas as necessary.
- b. Disconnect master cylinders (12) at pilot rudder pedals.
- c. Disconnect parking brake cables at master cylinders.
- d. Remove rudder pedals (2) and brake links (5).
- e. Relieve cable tension at clevises (index 11, figure 10-1).
- f. Disconnect cables, return springs, trim bungee, and steering tubes from rudder bars.
- g. Remove bolts securing bearing blocks (8) and work rudder bars out of tunnel area.

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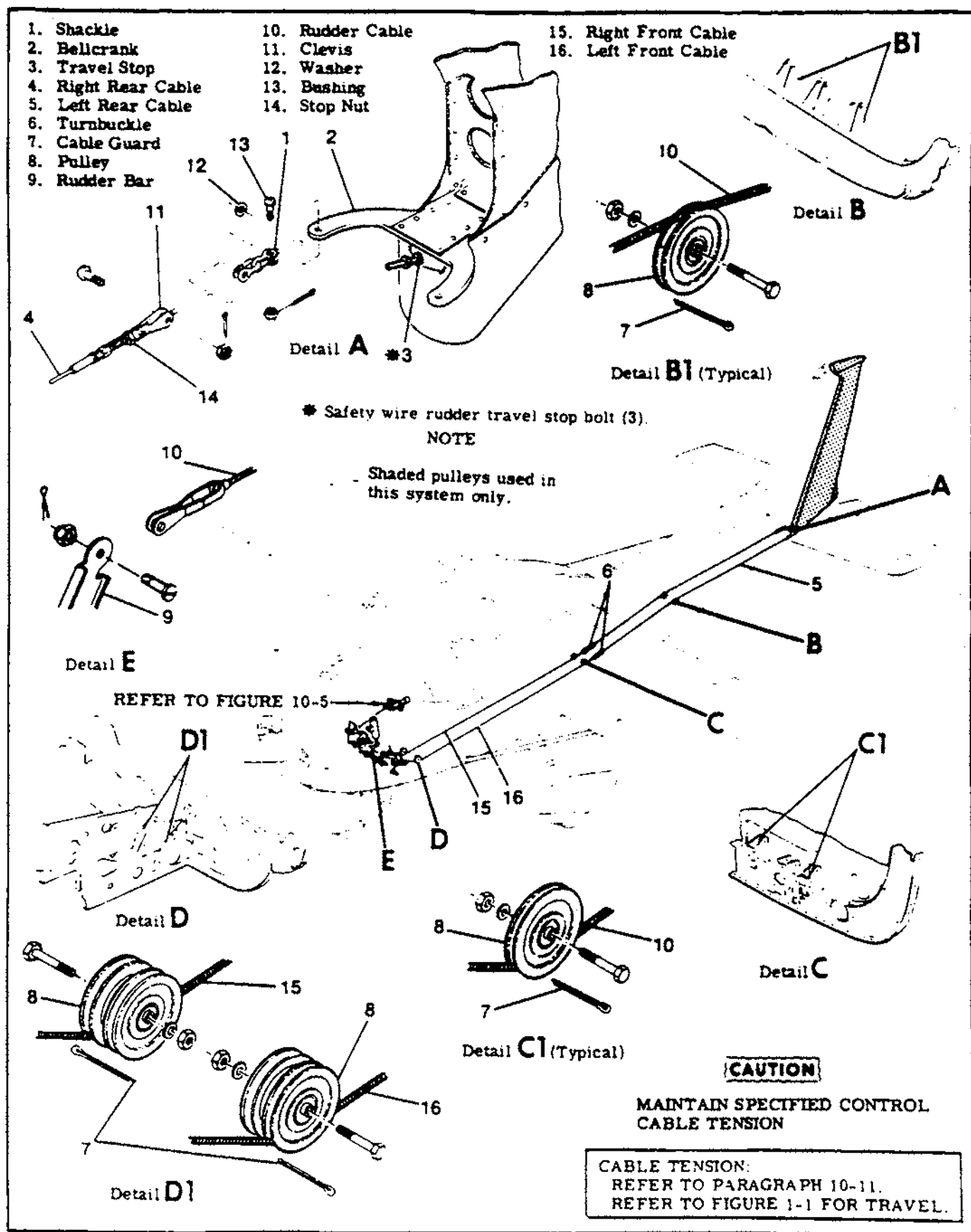


Figure 10-1. Rudder Control System

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NOTE

Rudder bar assemblies should be checked for excessive wear before installation. The bearing blocks are nylon and require no lubrication unless binding occurs. A few drops of general purpose oil should eliminate such binding.

- h. Reverse preceding steps for installation. Rig system in accordance with applicable paragraph in this section. Safety turnbuckles or clevises, as applicable, and reinstall all items removed in step "a".

10-6. RUDDER. (See figure 10-3.)

10-7. REMOVAL AND INSTALLATION.

- a. Disconnect tail navigation light quick-disconnect (13).
- b. Relieve cable tension at clevises (index 11, figure 10-1) and disconnect clevises from rudder bellcrank (12).
- c. With rudder supported, remove hinge bolts (1) and lift rudder free of vertical fin.
- d. Reverse preceding steps for installation. Rig system in accordance with appropriate paragraph in this section and safety turnbuckles or clevises, as applicable.

10-8. REPAIR. Repair may be accomplished as outlined in Section 18. Hinge bushings may be replaced as necessary.

10-9. CABLES AND PULLEYS. (See figure 10-1.)

10-10. REMOVAL AND INSTALLATION.

- a. Remove seats, upholstery and access plates as necessary.
- b. Disconnect cable at rudder bar (9) and bellcrank (2).
- c. Remove cable guards and pulleys as necessary to work cables free of aircraft.

NOTE

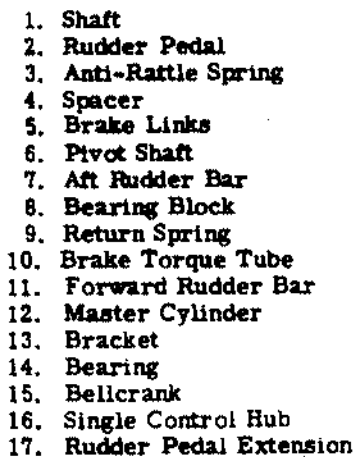
To ease routing of cables, a length of wire may be attached to end of cable before being withdrawn from aircraft. Leave wire in place, routed through structure, attach cable being installed and pull cable into position.

- d. After cable is routed in position, install pulleys and cable guards. Ensure cable is positioned in pulley groove before installing guard.
- e. Rig system in accordance with appropriate paragraph in this section. Safety turnbuckles or clevises, as applicable, and reinstall all items removed in step "a".

10-11. RIGGING. (See figure 10-1.)

- a. Adjust travel stops (3) to attain travel specified in Section 1. Figure 10-4 illustrates correct travel and one method of checking.

* THRU 17276019 AND F17202174
* BEGINNING WITH 17276020
AND F17202175



- Nylon washers may be installed between shaft (1) and brake link (5) as required to eliminate excessive clearance when dual controls ARE installed.

10-5

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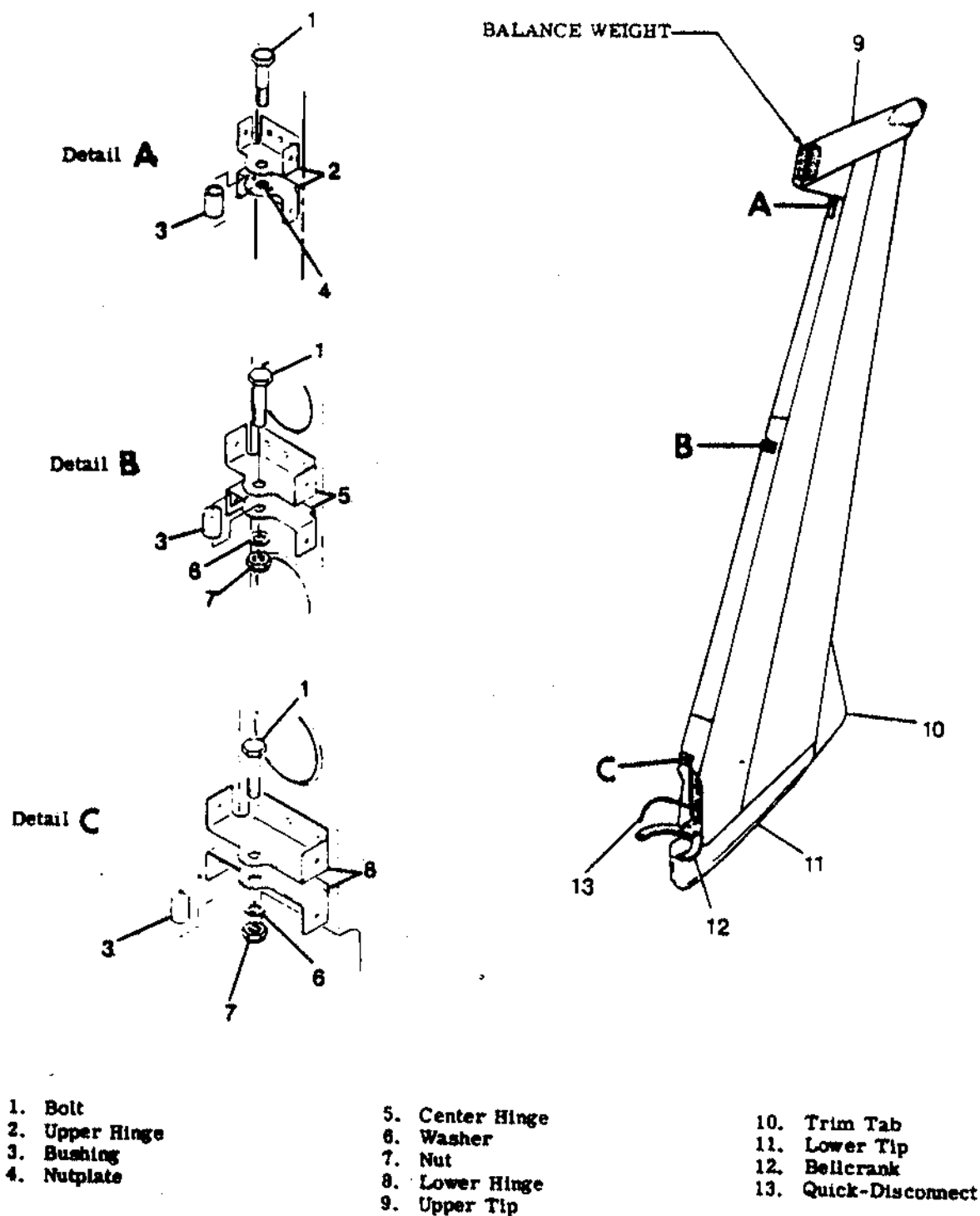
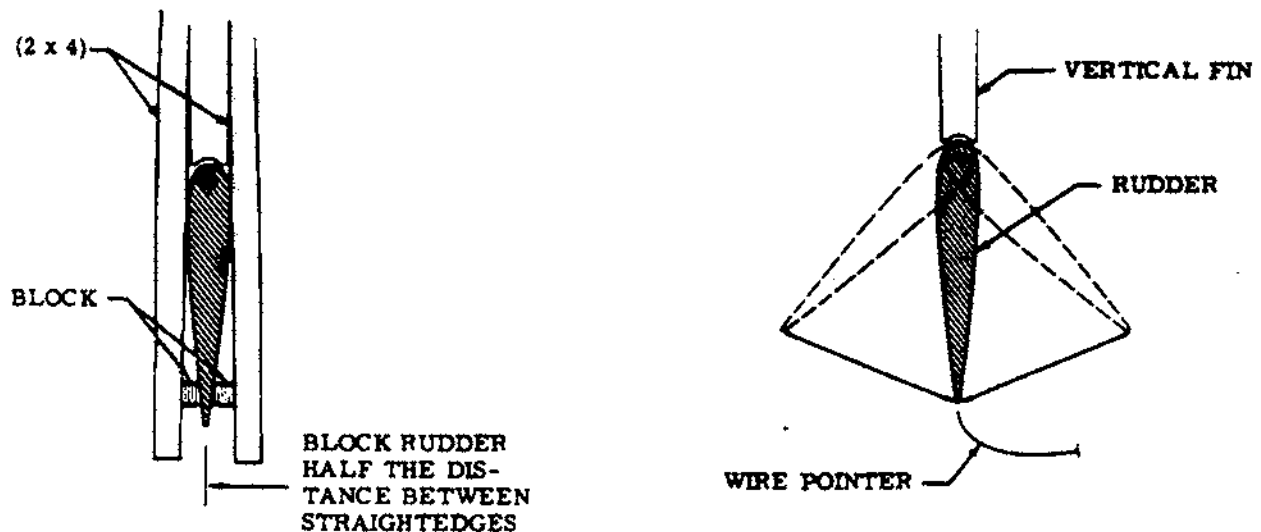


Figure 10-3. Rudder Assembly

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ESTABLISHING NEUTRAL POSITION OF RUDDER

MEASURING RUDDER TRAVEL

1. Establish neutral position of rudder by clamping straightedge (such as wooden 2 X 4) on each side of fin and rudder and blocking trailing edge of rudder half the distance between straightedges as shown.
2. Tape a length of soft wire to one elevator in such a manner that it can be bent to index with a point on rudder trailing edge just above the lower rudder tip (disregard fixed trim tab).
3. Using soft lead pencil, mark rudder at point corresponding to soft wire indexing point (neutral).
4. Remove straightedges.
5. Hold rudder against right, then left, rudder stop. Measure the distance from pointer to pencil mark on rudder in each direction of travel. Distance should be between 5.29" and 5.91".

Figure 10-4. Checking Rudder Travel

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- b. Disconnect nose wheel steering tubes (refer to section 3) from nose strut.
- c. Adjust cables at clevises (11) to align rudder and pedals in neutral position. 6.50 inches from firewall to pedal pivot shafts (index 6, figure 10-2). This step automatically determines cable tension because of the return springs (index 9, figure 10-2) attached to the rudder bar.

NOTE

Due to thickness of insulation on firewall, it is recommended that a piece of 1/16 inch welding rod be ground to a sharp point and notched at the 6.50 inch dimension. Pierce insulation on firewall and use notch to measure proper dimension.

- d. Tie down or weight tail to raise nose wheel free of ground.
- e. Center nose gear against external stop.
- f. Extend steering tubes until free play is removed. **DO NOT COMPRESS SPRINGS.**
- g. Adjust steering tube rod ends to 1.00 inch dimension between steering arm assembly and bolt hole as illustrated in section 5 and tighten jam nuts.
- h. Adjust steering tube clevises to align with rod end bearings.

NOTE

Extend steering tubes to seat rods against internal springs but do not attempt to preload these springs by shortening rod end clevises after alignment. Preload is built into steering tubes.

- i. Install clevises on rod ends.

NOTE

DO NOT adjust rudder trim with steering tubes. Degree of steering travel cannot be adjusted.

- j. Rig rudder trim control system in accordance with paragraph 10-14.
- k. Safety clevises (11) and install all items removed for access.

NOTE

Flight test aircraft to determine if ground adjustment of fixed trim tab is necessary. **DO NOT** rig rudder "off-center" unless trim tab does not provide adequate correction.

WARNING

Be sure rudder moves in correct direction when operated by pedals.

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- 10-12. **RUDDER TRIM CONTROL SYSTEM.** (See figure 10-5.)
- 10-13. **DESCRIPTION.** A lever assembly, actuated by the pilot, is linked via a bellcrank to a rudder trim bungee which is, in turn connected directly to the rudder bar assembly and hence to the rudder itself. The lever assembly is mounted on the center console structure and utilizes a pin to positively lock the trim system in any of 3 positions left or right of the center of "neutral" trim position. The lever also serves as the trim position indicator.
- 10-14. **RIGGING.** (See figure 10-5.)

NOTE

The rudder control system **MUST** be rigged according to paragraph 10-11 prior to rigging the rudder trim control system.

- a. Tie down or weight tail of the aircraft to raise nose wheel clear of ground.
- b. Ensure nose wheel, rudder and rudder pedals are all in "neutral" position.
- c. Ensure top nut on bungee assembly is adjusted to eliminate end play between shaft and housing.
- d. Install bungee (5) between rudder bar (8), and bellcrank (7) as shown in figure 10-5, detail A.
- e. Make sure lever assembly (3) is in neutral position or center hole of bracket (4).
- f. Adjust ball ends of push rod (8) so that ball end studs align with holes in bellcrank (7) and lever assembly (3) and install push rod.
- g. Check for security and safetying of all components and reinstall all items removed for access.

WARNING

Be sure rudder trim lever moves rudder in correct direction.

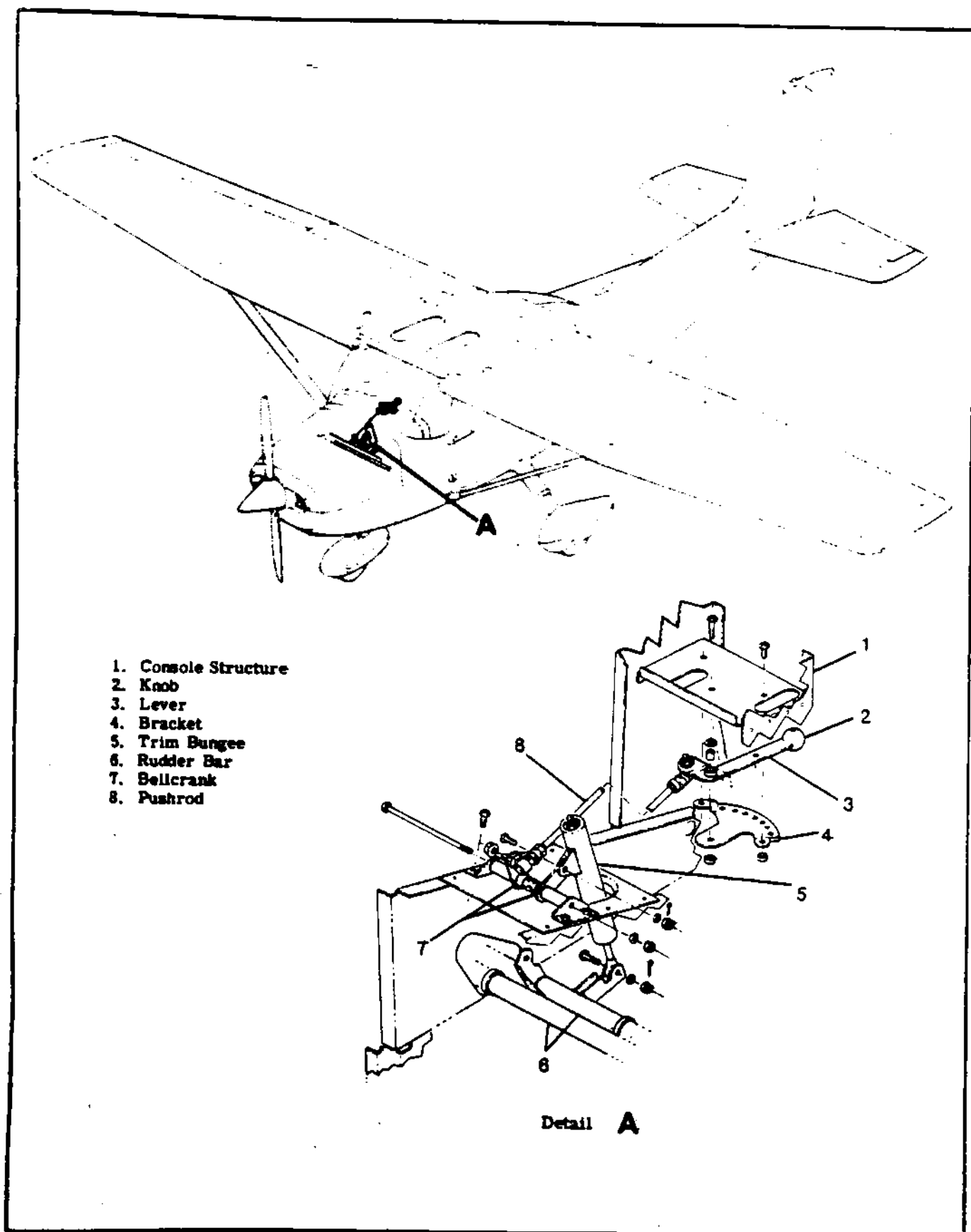


Figure 10-5. Rudder Trim Control System

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SECTION 11

ENGINE

(O-320-H2AD)

WARNING

When performing any inspection or maintenance that requires turning on the master switch, installing a battery, or pulling the propeller through by hand, treat the propeller as if the ignition switch were ON. Do not stand, nor allow any one else to stand, within the arc of the propeller, since a loose or broken wire, or a component malfunction, could cause the propeller to rotate.

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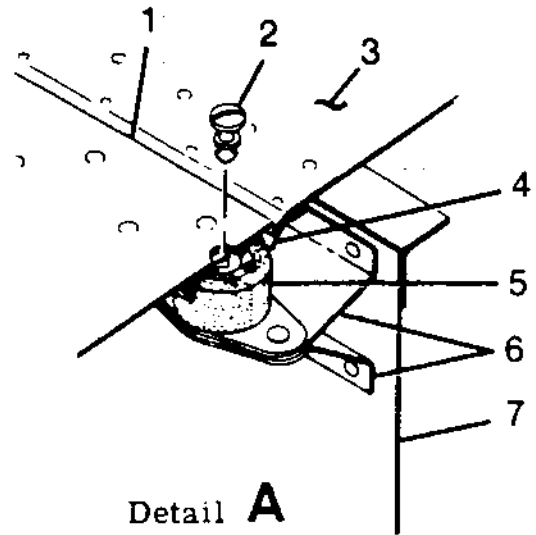
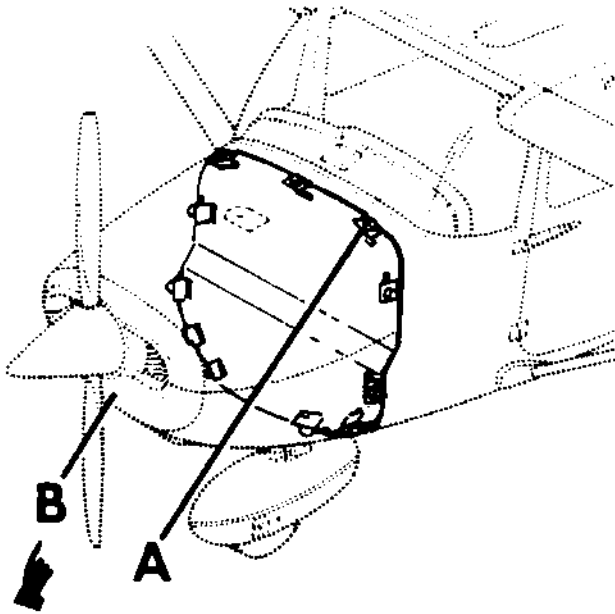
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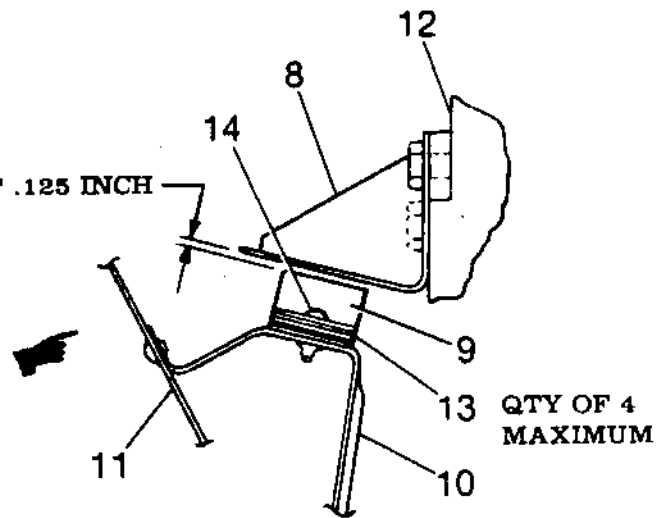
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MAXIMUM GAP .125 INCH



1. Engine Cowling
2. Quick-Release Fastener
3. Fuselage
4. Asbestos Seal
5. Shock Mount
6. Bracket
7. Firewall
8. Cowl Snubber Bracket
9. Snubber
10. Snubber Support
11. Nose Cap
12. Engine
13. Shim
14. Screw

QTY OF 4
MAXIMUM

Detail B

NOTE

Item (13) shim (P/N 0552227-1) can be installed as required (maximum 4) between snubber support (10) and snubber (9) to obtain a maximum gap of .125 inch between snubber (9) and cowl snubber bracket (8).

Figure 11-1. Engine Cowling Shock Mounts

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11-1. ENGINE COWLING.

11-2. **DESCRIPTION.** The engine cowling is comprised of an upper and lower cowling segment. Instead of attaching directly to the fuselage, the cowling attaches to shock mounts, which in turn, are fastened to the fuselage. A door in the top cowl provides access to the engine oil dipstick, oil filler neck and strainer drain control. Quick-disconnect fasteners are used at the cowling-to shock mounts and at the parting surfaces of the upper and lower cowl attach points. Machine screws secure the cowling segments together at the nose caps.

11-3. REMOVAL AND INSTALLATION.

- a. Release the quick-release fasteners attaching the cowling to the shock mounts and at the parting surfaces of the upper and lower cowling segments. (See figure 11-1.)
- b. Remove machine screws securing the cowling nose caps together.
- c. Disconnect electrical wiring at back of landing light.
- d. Remove air filter cover from lower cowl by removing 4 attaching screws (Thru Serials 17273579 and F17202029), or 4 quick-release fasteners (Serial 17273580 & On, and F17202030 & On).
- e. Release the 4 quick-release fasteners from the air filter and remove filter from cowl.
- f. Reverse the preceding steps for reinstallation. Be sure that the baffle seals are turned in the correct direction to confine and direct airflow around the engine. The vertical seals must fold forward and the side seals must fold upward.

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NOTE

When the new shock mounts or brackets are being installed, careful measurements should be made to position these parts correctly on the firewall. These service parts are not pre-drilled. Install shock mounts on brackets so that cowlings stud and shock mount are correctly aligned. Sheet aluminum may be used as shims between bracket halves to provide proper cowlings contour.

- 11-4. **CLEANING AND INSPECTION.** Wipe the inner surfaces of the cowlings segments with a clean cloth saturated with cleaning solvent (Stoddard or equivalent). If the inside surface of the cowlings is coated heavily with oil or dirt, allow solvent to soak until foreign material can be removed. Wash painted surfaces of the cowlings with a solution of mild soap and water and rinse thoroughly. After washing, a coat of wax may be applied to the painted surfaces to prolong paint life. After cleaning, inspect cowlings for dents, cracks, loose rivets and spot welds. Repair all defects to prevent spread of damage.
- 11-5. **REPAIR.** If cowlings skins are extensively damaged, new complete sections of the cowlings should be installed. Standard insert-type patches may be used for repair if repair parts are formed to fit contour of cowlings. Small cracks may be stop-drilled and small dents straightened if they are reinforced on the inner surface with a doubler of the same material as the cowlings skin. Damaged reinforcement angles should be replaced with new parts. Due to their small size, new reinforcement angles are easier to install than to repair the damaged part.
- 11-6. **ENGINE.**
- 11-7. **DESCRIPTION.** On 1977 thru 1980 Models, an air cooled, wet-sump four-cylinder, horizontally-opposed, direct-drive carbureted "Blue Streak" (Lycoming) O-320-H series engine is used to power the airplane. The cylinders, numbered from front to rear, are staggered to permit a separate throw on the crankshaft for each connecting rod. The right front cylinder is number 1 and cylinders on the right side are identified by odd numbers 1 and 3. The left front cylinder is number 2 and the cylinders on the left side are identified as numbers 2 and 4. Refer to paragraph 11-8 for engine data. For repair and overhaul of the engine, accessories and propeller, refer to the appropriate publications issued by their manufacturer's. These publications are available from the Cessna Supply Division.
- 11-8. **ENGINE DATA.**

MODEL (Lycoming)	O-320-H2AD
BHP at RPM	160 BHP at 2700 RPM
Number of Cylinders	4 Horizontally-Opposed
Displacement	319.8 Cubic Inches
Bore	5.125 Inches
Stroke	3.875 Inches
Compression Ratio	9.0:1

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11-8. ENGINE DATA (Cont).

Magnetos	Bendix D4RN-2021*
Right Magneto	Fires 25° BTC 1-3 Lower and 2-4 Upper
Left Magneto	Fires 25° BTC 1-3 Upper and 2-4 Lower
Firing Order	1-3-2-4
Spark Plugs	18mm (Refer to Avco Lycoming Service Instruction No. 1042 for factory approved spark plugs and required gap.)
Torque Value	390 ± 30 LB-IN.
Carburetor (Marvel-Schebler)	MA-4SPA
Oil Sump Capacity	6 U.S. Quarts
With Filter Change	7 U.S. Quarts
Tachometer	Mechanical
Approximate Dry Weight	283 Pounds (Weight is Approximate
With Standard Accessories	and will vary with optional equipment installed)
Oil Pressure	
Minimum Idling	25 PSI
Normal	60 to 90 PSI
Maximum	115 PSI
Oil Temperature	
Normal Operation	Within Green Arc
Maximum Permissible	Red Line (245°F)
Cylinder Head Temperature	500°F Maximum (Not Indicated)
	*Right rotating rotor as viewed from propeller end.

11-9. TIME BETWEEN OVERHAUL (TBO). Refer to the latest Revision of Lycoming Service Instruction No. 1009, and all applicable Service Letters or Service Bulletins, for recommendations applicable to O-320-H series engines. At the time of overhaul engine accessories should be overhauled.

11-9A. OVERSPEED LIMITATIONS. The engine must not be operated above specified maximum continuous RPM. However, should inadvertant overspeed occur refer to the latest issue of Avco Lycoming Service Bulletin No. 369 and all applicable Service Letters and Service Instructions for obligatory recommendations.

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11-10. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE WILL NOT START.	Improper use of starting procedure.	Refer to Pilot's Operating Handbook.
	Fuel tanks or bays empty.	Visually inspect tanks or bays. Fill with proper grade and quantity of gasoline.
	Mixture control in the IDLE CUT-OFF position.	Move control to the full RICH position.
	Fuel selector valve in OFF position.	Place selector valve in the ON position to a tank known to contain gasoline.
	Defective carburetor.	Repair or replace carburetor.
	Carburetor screen or fuel strainer plugged.	Remove carburetor and clean carburetor screen or fuel strainer thoroughly.
	Engine flooded.	Refer to Pilot's Operating Handbook.
	Water in fuel system.	Open fuel strainer drain and check for water. If water is present, drain fuel tank sumps, lines, strainer and carburetor.
	Defective magneto switch or grounded magneto leads.	Check continuity. Repair or replace switch or leads.
	Spark plugs fouled.	Remove, clean and regap plugs. Test harness cables to persistently fouled plugs. Replace if defective.

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11-10. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE STARTS BUT DIES, OR WILL NOT IDLE.	Idle stop screw or idle mixture incorrectly adjusted.	Refer to paragraph 11-43.
	Carburetor idling jet plugged.	Clean carburetor idling jet.
	Spark plugs fouled or improperly gapped.	Remove, clean and regap plugs. Replace if defective.
	Water in fuel system.	Open fuel strainer drain and check for water. If water is present, drain fuel tank sumps, lines, strainer and carburetor.
	Defective ignition system.	Refer to paragraph 11-55.
	Induction air leaks.	Check visually. Correct the cause of leaks.
	Manual primer leaking.	Disconnect primer outlet line. If fuel leaks through primer, repair or replace primer.
	Leaking float valve or float level set too high.	Perform an idle mixture check. Attempt to remove any rich indication with the idle mixture adjustment. If the rich indication cannot be removed, the float valve is leaking or the float level is set too high. Replace defective parts, reset float level.
	Defective carburetor.	If engine will start when primed but stops when priming is discontinued, with mixture control in full RICH position, the carburetor is defective. Repair or replace carburetor.

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11-10. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE STARTS BUT DIES, OR WILL NOT IDLE (Cont).	Defective engine.	Check compression. Listen for unusual engine noises. Engine repair is required.
ENGINE RUNS ROUGHLY OR WILL NOT ACCELERATE PROPERLY.	Restriction in aircraft fuel system.	Refer to Section 12.
	Worn or improperly rigged throttle or mixture control.	Check visually. Replace worn linkage. Rig properly.
	Spark plugs fouled or improperly gapped.	Remove, clean and regap plugs. Replace if defective.
	Defective ignition system.	Refer to paragraph 11-55.
	Defective or badly adjusted accelerator pump in carburetor.	Check setting of accelerator pump linkage and adjust as necessary.
	Float level set too low.	Check and reset float level.
	Defective carburetor.	Repair or replace carburetor.
	Defective engine.	Check compression. Listen for unusual engine noises. Engine repair is required.
	Restricted carburetor air filter.	Check visually. Clean in accordance with Section 2.
	Cracked engine mount.	Inspect and repair or replace mount as required.
	Defective mounting bushings.	Inspect and install new bushings as required.

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11-10. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
POOR IDLE CUT-OFF.	Worn or improperly rigged mixture control.	Check that idle cut-off stop on carburetor is contacted. Replace worn linkage. Rig properly.
	Manual primer leaking.	Disconnect primer outlet line. If fuel leaks through primer, it is defective. Repair or replace primer.
	Defective carburetor.	Repair or replace carburetor.
	Fuel contamination.	Check all screens in fuel system. Drain all fuel and flush out system. Clean all screens, lines, strainer and carburetor.

- 11-11. **REMOVAL.** If an engine is to be placed in storage or returned to the manufacturer for overhaul, proper preparatory steps should be taken for corrosion prevention prior to beginning the removal procedure. Refer to Section 2 for storage preparation. The following engine removal procedure is based upon the engine being removed from the aircraft with the engine mount attached to the firewall.

NOTE

Tag each item when disconnected to aid in identifying wires, hoses, lines and control linkages when engine is reinstalled. Likewise, shop notes made during removal will often clarify reinstallation. Protect openings, exposed as a result of removing or disconnecting units, against entry of foreign material by installing covers or sealing with tape.

- Place all cabin switches in the OFF position.
- Place fuel selector valve in the OFF position.
- Remove engine cowlings in accordance with paragraph 11-3.
- Disconnect battery cables and insulate terminals as a safety precaution.
- Drain fuel strainer and lines with strainer drain control.

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NOTE

During the following procedures, remove any clamps or lacings which secure controls, wires, hoses or lines to the engine, engine mount or attached brackets, so they will not interfere with engine removal. Some of the items listed can be disconnected at more than one place. It may be desirable to disconnect some of these items at other than the places indicated. The reason for engine removal should be the governing factor in deciding at which point to disconnect them. Omit any of the items which are not present on a particular engine installation.

- f. Drain the engine oil sump and oil cooler.
- g. Disconnect magneto primary lead wires at magnetos.

WARNING

The magnetos are in a SWITCH ON condition when the switch wires are disconnected. Ground the magneto points or remove the high tension wires from the magnetos or spark plugs to prevent accidental firing.

- h. Remove the spinner and propeller in accordance with Section 13.
- i. Disconnect throttle and mixture controls at carburetor. Remove clamps attaching controls to engine and pull controls aft clear of engine. Use care to avoid bending controls too sharply. Note EXACT position, size and number of attaching washers and spacers for reference on reinstallation.
- j. Loosen clamps and remove flexible duct from engine baffle and oil cooler.
- k. Loosen clamps and remove flexible duct from muffler shroud and heater valve.
- l. Disconnect carburetor heat control at airbox and remove clamp attaching control to bracket. Pull control aft to clear engine.
- m. Disconnect wires and cables as follows:
 - 1. Disconnect tachometer drive shaft at adapter.

CAUTION

When disconnecting starter cable do not permit starter terminal bolt to rotate. Rotation of the bolt could break the conductor between bolt and field coils causing the starter to be inoperative.

- 2. Disconnect starter electrical cable at starter.
- 3. Disconnect cylinder head temperature wire at probe.
- 4. Disconnect electrical wires and wire shielding ground at alternator.
- 5. Disconnect EGT probe (if installed).
- 6. Remove all clamps and lacings attaching wires or cables to engine and pull wires and cables aft to clear engine.
- n. Disconnect lines and hoses as follows:
 - 1. Disconnect vacuum hose at firewall fitting.
 - 2. Disconnect engine breather hose at top of accessory case.

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WARNING

Residual fuel and oil draining from disconnected lines and hoses constitutes a fire hazard. Use caution to prevent accumulation of such fuel and oil when lines or hoses are disconnected.

3. Disconnect oil temperature bulb at adapter.
 4. Disconnect primer line at firewall fitting.
 5. Disconnect fuel supply hose at carburetor.
 6. Disconnect oil pressure line at firewall fitting.
 7. Disconnect oil cooler hoses at cooler.
- o. Carefully check the engine again to ensure ALL hoses, lines, wires, cables, clamps and lacing are disconnected or removed which would interfere with the engine removal. Ensure all wires, cables and engine controls have been pulled aft to clear the engine.
 - p. Attach a hoist to the lifting eye at the top center of the engine crankcase. Lift engine just enough to relieve the weight from the engine mounts.

CAUTION

Place a suitable stand under the tail tie-down ring before removing engine. The loss of engine weight will cause the aircraft to be tail heavy.

- q. Remove bolts attaching engine to engine mount and slowly hoist engine and pull it forward, checking for any items which would interfere with the engine removal. Balance the engine by hand and carefully guide the disconnected parts out as the engine is removed.

11-12. **CLEANING.** Refer to Section 2 for cleaning of the engine.

11-13. **ACCESSORIES REMOVAL.** Removal of engine accessories for overhaul or for engine replacement involves stripping the engine of parts, accessories and components to reduce it to the bare engine. During the removal process, removed items should be examined carefully and defective parts should be tagged for repair or replacement with new components.

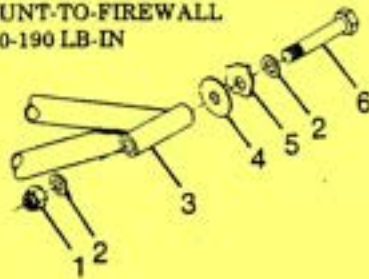
NOTE

Items easily confused with similar items should be tagged to provide a means of identification when being installed on a new engine. All openings exposed by the removal of an item should be closed by installing a suitable cover or cap over the opening. This will prevent entry of foreign material. If suitable covers are not available, tape may be used to cover the openings.

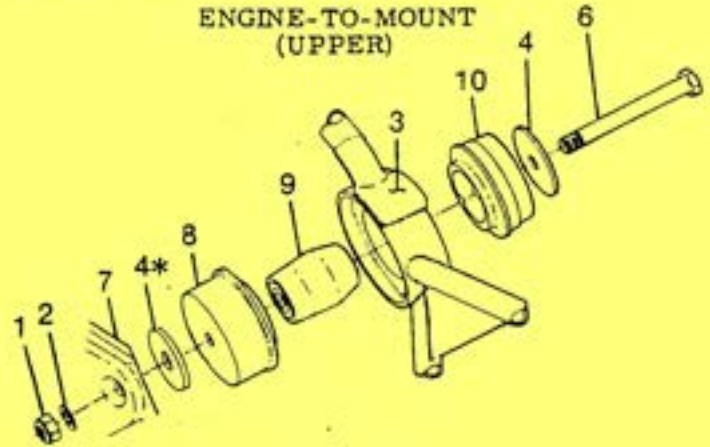
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MOUNT-TO-FIREWALL (UPPER)

 TORQUE MOUNT-TO-FIREWALL
BOLTS TO 160-190 LB-IN



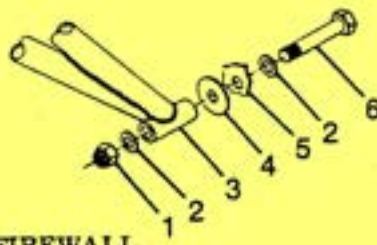
ENGINE-TO-MOUNT (UPPER)



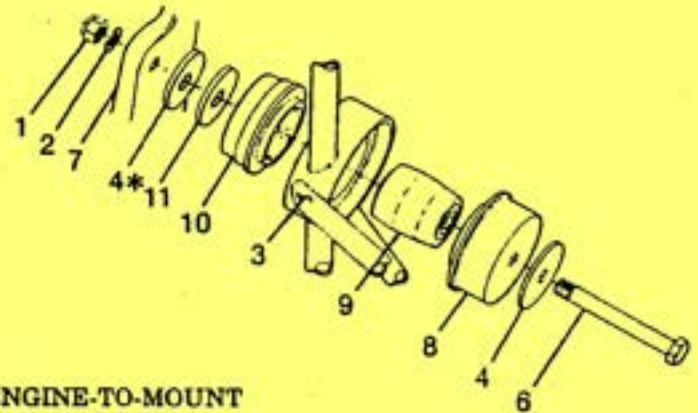
NOTE

When installing shock mounts, install shock mount pad (8) as shown for the upper and lower mounts.

MOUNT-TO-FIREWALL (LOWER)



TORQUE ENGINE-TO-MOUNT
BOLTS TO 450-500 LB-IN



ENGINE-TO-MOUNT (LOWER)

* BEGINNING WITH SERIAL 17267808
F17201518

- 1. Nut
- 2. Washer
- 3. Engine Mount

- 4. Washer
- 5. Firewall
- 6. Bolt
- 7. Engine Mount Foot

- 8. Shock Mount Pad
- 9. Shock Mount Dampener
- 10. Shock Mount Pad
- 11. Washer

Figure 11-2. Engine Mount Details

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- 11-14. **INSPECTION.** For specific items to be inspected, refer to the engine manufacturer's manual.

- a. Visually inspect the engine for loose nuts, bolts, cracks and fin damage.
- b. Inspect baffles, baffle seals and brackets for cracks, deterioration and breakage.
- c. Inspect all hoses for internal swelling, chafing through protective plys, cuts, breaks, stiffness damaged threads and loose connections. Excessive heat on hoses will cause them to become brittle and easily broken. Hoses and lines are most likely to crack or break near the end fittings and support points.
- d. Inspect for color bleaching of the end fittings or severe discoloration of the hoses.

NOTE

Avoid excessive flexing and sharp bends when examining hoses for stiffness.

- e. Refer to Section 2 for replacement intervals for flexible fluid carrying hoses.
- f. For major engine repairs, refer to the manufacturer's overhaul and repair manual.

- 11-15. **BUILD-UP.** Engine build-up consists of installation of parts, accessories and components to the basic engine to build up an engine unit ready for installation on the aircraft. All safety wire, lockwashers, nuts, gaskets and rubber connections should be new parts.

- 11-16. **INSTALLATION.** Before installing the engine on the aircraft, install any items which were removed from the engine or aircraft after the engine was removed.

NOTE

Remove all protective covers, plugs, caps and identification tags as each item is connected or installed. Omit any items not present on a particular engine installation.

- a. Hoist the engine to a point near the engine mount.
- b. Install engine shock-mount pads as illustrated in figure 11-2.
- c. Carefully lower engine slowly into place on the engine mount. Route controls, lines, hoses and wires in place as the engine is positioned on the engine mount.

NOTE

Be sure engine shock-mount pads, spacers and washers are in place as the engine is lowered into position.

- d. Install engine mount bolts, washers and nuts, then remove the hoist and tail support stand. Torque bolts to 450-500 lb-in.
- e. Route throttle, mixture and carburetor heat controls to the carburetor and airbox and connect. Secure controls in position with clamps.

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NOTE

Throughout the aircraft fuel system, from the tanks to the carburetor, use NS-40 (RAS-4) (Snap-On-Tools Corp., Kenosha, Wisconsin), MIL-T-5544 (Thread Compound Antiseize, Graphite Petrolatum), USP Petrolatum or engine oil as a thread lubricator or to seal a leaking connection. Apply sparingly to male threads, exercising extreme caution to avoid "stringing" sealer across the end of the fitting. Always ensure that a compound, the residue from a previously used compound, or any other foreign material cannot enter the system.

- f. Connect lines and hoses as follows:
 - 1. Connect oil cooler hoses at cooler.
 - 2. Connect oil pressure line at firewall fitting.
 - 3. Connect fuel supply hose at carburetor.
 - 4. Connect primer line at firewall fitting.
 - 5. Connect oil temperature bulb at adapter.
 - 6. Connect engine breather hose at top of accessory case.
 - 7. Connect vacuum hose at firewall fitting.
 - 8. Install clamps and lacings attaching lines and hoses to engine, engine mount and brackets.
- g. Connect wires and cables as follows:
 - 1. Connect electrical wires and wire shielding ground at alternator.
 - 2. Connect cylinder head temperature wire at probe. Do not exceed 4 lb-in. torque.

CAUTION

When connecting starter cable, do not permit starter terminal bolt to rotate. Rotation of the bolt could break the conductor between bolt and field coils causing the starter to be inoperative.

- 3. Connect starter electrical cable at starter.
- 4. Connect tachometer drive shaft at adapter. Be sure drive cable engages drive in adapter. Hand tighten, then torque 1/4 turn.
- 5. Connect EGT probe (if installed).
- 6. Install clamps and lacings securing wires and cables to engine, engine mount and brackets.
- h. Install flexible duct to heater valve and engine baffle and install clamps.
- i. Install flexible duct to engine baffle and oil cooler and install clamps.
- j. Install propeller and spinner in accordance with instructions outlined in Section 13.
- k. Complete a magneto switch ground-out and continuity check, then connect primary lead wires to the magnetos. Remove the temporary ground or connect spark plug leads, whichever procedure was used during removal.

WARNING

Be sure magneto switch is in OFF position when connecting switch wires to magnetos.

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- l. Clean and install induction air filter.
- m. Service engine with proper grade and quantity of engine oil. Refer to Section 2 if engine is new, newly overhauled or has been in storage.
- n. Check all switches are in the OFF position, and connect battery cables.
- o. Rig engine controls in accordance with paragraphs 11-61, 11-62 and 11-63.
- p. Inspect engine installation for security, correct routing of controls, lines, hoses and electrical wiring, proper safetying and tightness of all components.
- q. Install engine cowling in accordance with paragraph 11-3.
- r. Perform an engine run-up and make final adjustments on the engine controls.

11-17. FLEXIBLE FLUID HOSES.

11-18. LEAK TEST.

- a. After each 100 hours of engine operation, all flexible fluid hoses in the engine compartment should be checked for leaks as follows:
 1. Examine the exterior of hoses for evidence of leakage or wetness.
 2. Hoses found leaking should be replaced.
 3. Refer to paragraph 11-14 for detailed inspection procedures for flexible hoses.

11-19. REPLACEMENT.

- a. Hoses should not be twisted on installation. Pressure applied to a twisted hose may cause failure or loosening of the nut.
- b. Provide as large a bend radius as possible.
- c. Hoses should have a minimum of one-half inch clearance from other lines, ducts, hoses or surrounding objects, or be butterfly clamped to same, or tied together with S-1693-3 sta-strap as required to prevent chafing..
- d. Rubber hoses will take a permanent set during extended use in service. Straightening a hose with a bend having a permanent set will result in hose cracking. Care should be taken during removal so that hose is not bent excessively, and during reinstallation to assure hose is returned to its original position.
- e. Refer to AC 43.13-1, Chapter 10, for additional installation procedures for flexible fluid hose assemblies.

11-20. STATIC RUN-UP PROCEDURES. In a case of suspected low engine power, a static RPM run-up should be conducted as follows:

- a. Run-up engine, using takeoff power and mixture settings, with the aircraft facing 90° right and then left to the wind direction.
- b. Record the RPM obtained in each run-up position.

NOTE

Daily changes in atmospheric pressure, temperature and humidity will have a slight effect on static run-up.

- c. Average the RPM values obtained in step b. The resulting RPM figure should be within 60 RPM of 2340 RPM.
- d. If the resulting average RPM figure is lower than stated above, the following checks are recommended to determine a possible deficiency.
 1. Check carburetor heat control for proper rigging. If partially open it would cause a slight power loss.
 2. Check magneto timing, spark plugs and ignition harness for settings and conditions.
 3. Check condition of induction air filter. Clean if necessary.
 4. Perform an engine compression check. (Refer to engine manufacturer's manual.)

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- 11-21. **ENGINE BAFFLES.**
- 11-22. **DESCRIPTION.** The sheet metal baffles installed on the engine direct the flow of air around the cylinders and other engine components to provide optimum cooling. These baffles incorporate rubber-asbestos composition seals at points of contact with the engine cowlings and other engine components to help confine and direct the flow to the desired area. It is very important to engine cooling that the baffles and seals are in good condition and installed correctly. The vertical seals must fold forward and the side seals must fold upward. Removal and installation of the various baffle segments is possible with the cowlings removed. Be sure that any new baffle seals properly. Beginning with Serials 17270188 and F17201730, two access holes have been added to the engine baffling to facilitate the accessibility of spark plugs on number 3 and 4 cylinders. Earlier 1977 and 1978 models (Serials 17267585 thru 17270187 and F17201515 thru F17201729) can be modified by the instructions contained in Service Letter SE78-22.
- 11-23. **CLEANING AND INSPECTION.** The engine baffles should be cleaned with a suitable solvent to remove oil and dirt.

NOTE

The rubber-asbestos seals are oil and grease resistant but should not be soaked in solvent for long periods.

Inspect baffles for cracks in the metal and for loose and/or torn seals. Repair or replace any defective parts.

- 11-24. **REMOVAL AND INSTALLATION.** Removal and installation of the various baffle segments is possible with the cowlings removed. Be sure that any replaced baffles and seals are installed correctly and that they seal to direct the airflow in the correct direction. Various lines, hoses, wires and controls are routed through some baffles. Make sure that these parts are reinstalled correctly after installation of baffles.
- 11-25. **REPAIR.** Repair of an individual segment of engine baffle is generally impractical since, due to the small size and formed shape of the part, replacement is usually more economical. However, small cracks may be stop-drilled and a reinforcing doubler installed. Other repairs may be made as long as strength and cooling requirements are met. Replace sealing strips if they do not seal properly.
- 11-26. **ENGINE MOUNT.** (See figure 11-2.)
- 11-27. **DESCRIPTION.** The engine mount is composed of sections of steel tubing welded together and reinforced with gussets. The mount is fastened to the fuselage at four points. The engine is attached to the engine mount with shock-mount assemblies which absorb engine vibrations.
- 11-28. **REMOVAL AND INSTALLATION.** Removal of the engine mount is accomplished by removing the engine as outlined in paragraph 11-11, then removing the engine mount from the firewall. On reinstallation, torque the mount-to-fuselage bolts to 160-190 lb-in. Torque the engine-to-mount bolts to 450-500 lb-in.

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- 11-29. **REPAIR.** Repair of the engine mount shall be performed carefully as outlined in Section 18. Refer to Section 19 for mount painting.
- 11-30. **ENGINE SHOCK MOUNT PADS.** (See figure 11-2.) The bonded rubber and metal shock mounts are designed to reduce transmission of engine vibrations to the airframe. The rubber pads should be wiped clean with a clean, dry cloth.

NOTE

Do not clean the rubber pads and dampener assembly with any type of cleaning solvent.

Inspect the metal parts for cracks and excessive wear due to aging and deterioration. Inspect the rubber pads for separation between the pad and metal backing, swelling, cracking or a pronounced set of the pad. Install new parts for all parts that show evidence of wear or damage.

- 11-31. **ENGINE OIL SYSTEM.**
- 11-32. **DESCRIPTION.** The lubricating system is of the full pressure, wet sump type. Refer to applicable engine manufacturers overhaul manual for specific details and descriptions.

WARNING

The U.S. Environmental Protection Agency advises that mechanics and other workers who handle engine oil are advised to minimize skin contact with used oil and promptly remove used oil from the skin. In a laboratory study, mice developed skin cancer after skin was exposed to used engine oil twice a week without being washed off, for most of their life span. Substances found to cause cancer in laboratory animals may also cause cancer in humans.

- 11-33. **TROUBLE SHOOTING.**

TROUBLE	PROBABLE CAUSE	REMEDY
NO OIL PRESSURE.	No oil in sump.	Check with dipstick. Fill sump with proper grade and quantity of oil. Refer to Section 2.
	Oil pressure line broken, disconnected or pinched.	Inspect pressure lines. Replace or connect lines as required.
	Oil pump defective.	Remove and inspect. Examine engine. Metal particles from damaged pump may have entered engine oil passage.
	Defective oil pressure gage.	Check with a known good gage. If second reading is normal, replace gage.

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11-33. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
NO OIL PRESSURE (Cont).	Oil congealed in gage line.	Disconnect line at engine and gage; flush with kerosene. Pre-fill with kerosene and install.
	Relief valve defective.	Remove and check for dirty or defective parts. Clean and install; replace valve if defective.
LOW OIL PRESSURE.	Low oil supply.	Check with dipstick. Fill sump with proper grade and quantity of oil. Refer to Section 2.
	Low viscosity oil.	Drain sump and refill with proper grade and quantity of oil.
	Oil pressure relief valve spring weak or broken.	Remove and inspect spring. Replace weak or broken spring.
	Defective oil pump.	Check oil temperature and oil level. If temperature is higher than normal and oil level is correct, internal failure is evident. Remove and inspect. Examine engine. Metal particles from damaged pump may have entered oil passages.
	Secondary result of high oil temperature.	Observe oil temperature gage for high indication. Determine and correct reason for high oil temperature.
	Leak in pressure or suction line.	Inspect gasket between accessory housing and crankcase. Repair engine as required.
	Dirty oil screens.	Remove and clean oil screens.
HIGH OIL PRESSURE.	High viscosity oil.	Drain sump and refill with proper grade and quantity of oil.
	Relief valve defective.	Remove and check for dirty or defective parts. Clean and install; replace valve if defective.

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11-33. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
HIGH OIL PRESSURE (Cont).	Defective oil pressure gage.	Check with a known good gage. If second reading is normal, replace gage.
LOW OIL TEMPERATURE.	Defective oil temperature gage or temperature bulb.	Check with a known good gage. If second reading is normal, replace gage. If reading is similar, the temperature bulb is defective. Replace bulb.
	Oil cooler thermostatic valve/bypass valve defective or stuck.	Remove valve and check for proper operation. Replace valve if defective.
HIGH OIL TEMPERATURE.	Oil cooler air passages clogged.	Inspect cooler core. Clean air passages.
	Oil cooler oil passages clogged.	Attempt to drain cooler. Inspect for sediment. Remove cooler and flush thoroughly.
	Thermostatic valve or bypass valve damaged or held open by solid matter.	Feel front of cooler core with hand. If core is cold, oil is bypassing cooler. Remove and clean valve and seat. If still inoperative, replace.
	Low oil supply.	Check with dipstick. Fill sump with proper grade and quantity of oil. Refer to Section 2.
	Oil viscosity too high.	Drain sump and refill with proper grade and quantity of oil.
	Prolonged high speed operation on the ground.	Hold ground running above 1500 RPM to a minimum.
	Defective oil temperature gage.	Check with a known good gage. If second reading is normal, replace gage.

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11-33. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
HIGH OIL TEMPERATURE (Cont.)	Defective oil temperature bulb.	Check for correct oil pressure, oil level and cylinder head temperature. If they are correct, check oil temperature gage for being defective; if similar reading is observed, bulb is defective. Replace bulb.
	Oil congealed in cooler.	This condition can occur only in extremely cold temperatures. If congealing is suspected, use an external heater or a heated hangar to warm the congealed oil.
OIL LEAK AT FRONT OF ENGINE.	Damaged crankshaft seal.	Replace.
OIL LEAK AT PUSH ROD HOUSING.	Damaged push rod housing oil seal.	Replace.

11-34. FULL-FLOW OIL FILTER.

11-35. DESCRIPTION. An external full-flow oil filter may be installed on the engine. If the filter should become clogged, a bypass valve allows engine oil to flow directly to the engine oil passages.

11-36. REMOVAL AND INSTALLATION.

NOTE

Replacement filters are available from the Cessna Supply Division.

- a. Remove engine cowling in accordance with paragraph 11-3.
- b. Remove safety wire from filter.
- c. Unscrew filter from adapter.
- d. Lightly lubricate gasket with engine oil, (or DC 4 DOW CORNING on CHAMPION spin-on filters) prior to installation.
- e. Install spin-on filter on the stud and torque to 18-20 lb-ft or 3/4 to 1 full turn after gasket makes contact.
- f. Safety wire filter to adapter.
- g. After first engine run check for oil leaks.

11-37. OIL COOLER.

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- 11-38. **DESCRIPTION.** Beginning with Serials 17271954 & on, and F17201910 & on, the external oil cooler is mounted on the aft side of the right aft vertical baffle. Flexible fire sleeved hoses carry the oil to and from the cooler. Cooling air for the cooler enters through a hole in the baffle assembly. Exhaust air from the cooler is discharged into the engine compartment. A bypass valve causes oil to bypass the cooler in the event of congealed oil or an obstruction in the cooler. At each engine oil change, drain the oil cooler.
- 11-39. **ENGINE FUEL SYSTEM.**
- 11-40. **DESCRIPTION.** A single barrel, float-type up-draft carburetor is installed on the engine. The carburetor is equipped with a manual mixture control and an idle cut-off. For repair and overhaul of the carburetor refer to the manufacturer's overhaul and repair manual.
- 11-41. **CARBURETOR.**
- 11-42. **REMOVAL AND INSTALLATION.**
- Place fuel selector valve in the OFF position.
 - Remove engine cowlings in accordance with paragraph 11-3.
 - Drain fuel from strainer and lines with strainer drain control.
 - Disconnect throttle and mixture controls at the carburetor. Note EXACT position, size and number of washers and spacers for reference on reinstallation.
 - Disconnect and cap or plug fuel lines at carburetor.
 - Remove induction airbox.
 - Remove nuts and washers attaching carburetor to intake manifold and remove carburetor.
 - Reverse the preceding steps for reinstallation. Use new gasket between carburetor and intake manifold. Check carburetor throttle arm to idle stop arm attachment for security, proper torque and cotter pin installation at each normal engine inspection in accordance with figure 11-4.
- 11-43. **IDLE SPEED AND MIXTURE ADJUSTMENTS.** Since idle RPM may be affected by idle mixture adjustment, it may be necessary to readjust idle RPM after setting the idle mixture.
- Start and run engine until the oil temperature and oil pressure are in the normal operating range.
 - Check the magnetos for proper operation in accordance with paragraph 11-56.
 - Clear the engine by advancing the RPM to approximately 1000, then retard the throttle to the idle position. The engine RPM should stabilize at 600 ± 25 . If not, adjust the idle speed screw IN to increase and OUT to decrease RPM.

NOTE

An engine should idle smoothly, without excessive vibrations. The idle speed should be high enough to maintain idling oil pressure and to preclude any possibility of engine stoppage in flight when the throttle is closed.

- After the idle speed has stabilized (600 ± 25 RPM), move the mixture control slowly toward the IDLE CUT-OFF position and observe the tachometer for any minute change during this manual leaning procedure.

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- e. Quickly return the mixture control to the FULL RICH position before the engine stops.
- f. A momentary increase of approximately 25 RPM while slowly, manually leaning the mixture is most desirable. An increase of more than 25 RPM indicates a rich idle mixture, and an immediate decrease in RPM (if not preceded by a momentary increase), indicates a lean idle mixture.
- g. If the idle mixture is too rich, turn the idle mixture adjustment center screw one or two notches in a clockwise direction as viewed from the aft end of the unit, then repeat steps "d" through "f".

NOTE

After each adjustment to the idle mixture, run engine up to approximately 1800 RPM to clear the engine of excess fuel and obtain a correct idle speed.

- h. If the idle mixture is too lean, turn the idle mixture adjustment center screw one or two notches in a counterclockwise direction as viewed from the aft end of the unit, then repeat steps "d" thru "f".
- i. This method of adjustment will give the desired idle RPM. If the adjustments do not remain stable, check the throttle and mixture linkage for evidence of wear and improper rigging. Any looseness of the throttle and mixture linkage will cause erratic idling. In all cases, allowance should be made for the effect of weather condition upon idling adjustment. The relation of the aircraft to the prevailing wind direction will have an effect on the propeller load and engine RPM. It is advisable to make idle adjustments with the aircraft crosswind.

11-44. INDUCTION AIR SYSTEM.

- 11-45. DESCRIPTION. Ram air to the engine enters the induction airbox through the induction filter located in the forward part of the lower engine cowling. From the induction airbox the air is directed to the inlet of the carburetor, mounted on the lower side of the engine oil sump through the carburetor to the center zone induction system, which is an integral part of the oil sump. From the center zone system, the fuel-air mixture is distributed to each cylinder by separate intake pipes. The intake pipes are attached to the center zone risers with hoses and clamps and to the cylinder with a two-bolt flange, which is sealed with a gasket. The induction airbox contains a valve, operated by the carburetor heat control in the cabin, which permits air from an exhaust heated source to be selected in the event carburetor icing or filter icing should be encountered.

11-46. REMOVAL AND INSTALLATION.

- a. Remove and install air filter as follows:
 1. Thru Serials 17273579 and F17202029, remove 4 machine screws from metal trim around air filter and remove trim. Beginning with Serials 17273580 & On, and F17202030 & On, 4 machine screws are replaced by 4 quick-release fasteners.
 2. Release 4 quick-release fasteners securing filter element to cowl and remove element for cleaning or replacement. Refer to Section 2 for servicing.
 3. Reverse the preceding steps for reinstallation.
- b. Remove and install induction airbox as follows:
 1. Remove cowling as required for access in accordance with paragraph 11-3.
 2. Mark the intake pipes as they are removed from the engine so they may be reassembled in the same location from which they were removed.
 3. Loosen hose clamps and slide hose connections from sump. Remove any clamps attaching wires or lines to the intake pipes.

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4. Remove the nuts, washers and lock washers at cylinder.
5. Remove intake pipe and clean gasket from cylinder mounting pad and intake pipe flange.
6. Reverse the preceding steps for reinstallation. Use new gaskets and install intake pipes in the same location from which they were removed.

11-47. IGNITION SYSTEM.

11-48. **DESCRIPTION.** The ignition system is comprised of dual magnetos, two spark plugs in each cylinder, an ignition wiring harness, an ignition switch mounted on the instrument panel and required wiring between the ignition switch and magnetos.

11-49. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE WILL NOT START.	Defective ignition switch.	Check switch continuity. Replace if defective.
	Spark plugs defective, improperly gapped or fouled by moisture or deposits.	Clean, regap and test plugs. Replace if defective.
	Defective ignition harness.	If no defects are found by a visual inspection, check with a harness tester. Replace defective parts.
	Magneto "P" lead grounded.	Check continuity. "P" lead should not be grounded in the ON position, but should be grounded in OFF position. Repair or replace "P" lead.
	Failure of impulse coupling.	Impulse coupling pawls should engage at cranking speeds. Listen for loud clicks as impulse couplings operate. Remove magnetos and determine cause. Replace defective magnetos.
	Defective magneto.	Refer to paragraph 11-55.
	Broken drive gear.	Remove magneto and check magneto and engine gears. Replace defective parts. Make sure no pieces of damaged parts remain in engine or engine disassembly will be required.

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11-49. TROUBLE SHOOTING. (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE WILL NOT IDLE OR RUN PROP- ERLY.	Spark plugs defective, improperly gapped or fouled by moisture or deposits.	Clean, regap and test plugs. Replace if defective.
	Defective ignition harness	If no defects are found by a visual inspection, check with a harness tester. Re- place defective parts.
	Defective magneto.	Refer to paragraph 11-55.
	Impulse coupling pawls remain engaged.	Listen for loud clicks as impulse coupling operates. Remove magneto and deter- mine cause. Replace defec- tive magneto.
	Spark plugs loose.	Check and install properly.

11-50. MAGNETOS.

11-51. DESCRIPTION. The Bendix D-2000 series magneto consists of two electrically independent ignition circuits in one housing. A single four pole rotor provides the magnetic energy for both circuits. The magneto uses an impulse coupling to provide reliable ignition at engine cranking speed. Suppression of breaker contact point arcing is accomplished by feed-thru type capacitors mounted in the magneto cover which forms a part of the magneto harness assembly.

11-52. REMOVAL AND INSTALLATION.

WARNING

The magneto is in a SWITCH ON condition when the switch wire is disconnected. Therefore, ground the breaker contact points or disconnect the high-tension wires from the magneto or the spark plugs.

- a. Remove engine cowling in accordance with paragraph 11-3.
- b. Remove the eight screws securing the high-tension outlet cover to the magneto. The "P" leads may be disconnected for additional clearance if necessary.

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NOTE

It is a good practice to position No. 1 cylinder at its approximate advance firing position before removing the magneto.

- c. Remove nuts, washers and clamps attaching the magneto to the engine accessory housing. Note the approximate angular position at which the magneto is installed, then remove the magneto.
- d. Reverse the preceding steps for reinstallation and time magneto-to-engine in accordance with paragraph 11-54.

11-53. INTERNAL TIMING. (MAGNETO REMOVED FROM ENGINE.)

NOTE

A magneto, correctly timed internally, will have the red painted tooth of the large distributor gears approximately centered in the timing windows, the R "E" gap mark on the rotor shaft in alignment with the pointer and both sets of breaker contacts opening, all at the same time.

- a. Remove breaker contact point assembly cover, if installed, by removing the cover screws, pulling cover directly aft away from housing and disconnecting both capacitor leads from breaker contact assemblies.
- b. Remove timing inspection hole plugs from magneto.
- c. Slowly turn the rotor shaft until the red painted tooth of the large distributor gear for each side is approximately centered in the inspection windows with the R ("E" gap) mark on the rotor aligned with the pointer. Lock the rotor in this EXACT position using Bendix Holding Tool, Part No. 11-8465 or equivalent.

NOTE

Position the 11-8465 Rotor Holding Tool on drive end of rotor shaft in the 4 o'clock position so that any shaft deflection caused by clamping action will be in a plane parallel to the breaker contacts.

- d. Connect the timing light (Bendix Part No. 11-9110 or equivalent) black lead to any unpainted surface of the magneto. Connect the red lead to the left breaker contact terminal and the green lead to the right breaker contact terminal.
- e. Carefully adjust the LEFT breaker contacts to just begin to open (light will go out) with the timing pointer within the width of the R ("E" gap) mark.
- f. Repeat step "e" for the RIGHT breaker contacts.
- g. Loosen the rotor holding tool and turn rotor shaft in normal direction of rotation until cam followers of contact assemblies are on the high point of cam lobes. Contact point clearance should be 0.016 ± 0.002 inch and 0.016 ± 0.004 inch on LEFT and RIGHT contacts respectively. If dimensions do not fall within limits, readjust contact points and recheck to be sure the points just begin to open when the timing pointer is within the width of the R ("E" gap) mark.

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NOTES

Wire feeler gages are recommended when checking contact point clearance.

No attempt should be made to stone or dress contact points.

If the above conditions are met and within tolerance, the magneto is timed internally and ready for installation. If the above conditions are not within tolerance, proceed to step "h".

- h. While holding the rotor shaft, loosen the screw securing breaker contact cam to rotor shaft and back screw out approximately half way. Place the end of a broad bladed screw driver between the bottom of the cam and housing. Strike the screw driver handle with a sharp downward blow to "pop" the cam loose from taper of shaft.
- i. Rotate cam until breaker contact cam followers are on the high point of cam lobes. Adjust breaker points to obtain a clearance of 0.016 ± 0.002 inch and 0.016 ± 0.004 inch on LEFT and RIGHT contacts respectively. Tighten breaker contact securing screws to 20-25 lb-in.
- j. Repeat step c.
- k. While holding rotor shaft in this EXACT position, rotate the breaker contact cam in the opposite direction of rotation a few degrees BEYOND where the breaker contacts close, then rotate cam in the normal direction of rotation until the breaker contacts just begin to open. Point opening should be determined by the use of a timing light. (Bendix Part No. 11-9110 or equivalent.)
- l. While holding cam in this EXACT position, push cam on rotor shaft as far as possible with the fingers. Tighten cam securing screw thereby drawing the cam down evenly and tightly. Torque cam securing screw to 16-20 lb-in.

NOTE

Extreme care must be exercised in this operation. If cam adjustment is changed in the slightest degree, the timing of the magneto will be thrown off. Do not drive cam on rotor shaft with a mallet or other instrument.

- m. Recheck timing to make sure both sets of breaker contact begin to open within the width of the R ("E" gap) mark and that the contact point clearance is in accordance with dimensions in step "g".

NOTE

When reinstalling the inspection hole plugs, make sure the ventilated plugs are installed in the ends of the magneto. Torque plugs to 12-15 lb-in.

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- 11-34. **MAGNETO-TO-ENGINE TIMING.** The magneto must be installed with its timing marks carefully aligned, with number one cylinder on its compression stroke and with the number one piston at its advanced firing position. Refer to paragraph 11-8 for the advanced firing position of number one piston. To locate the compression stroke of the number one cylinder, remove the lower spark plug from number 2, 3 and 4 cylinders. Remove the upper spark plug from number 1 cylinder. Place the thumb of one hand over the spark plug hole of number one cylinder and rotate crankshaft in the direction of normal rotation until the compression stroke is indicated by positive pressure inside the cylinder lifting the thumb off the spark plug hole. After the compression stroke is attained, locate the number one piston at its advanced firing position. Locating the advanced firing position of the number one piston may be obtained by rotating the crankshaft opposite to its normal direction of rotation until it is approximately 30 degrees before top dead center (BTC) on the compression stroke of number one cylinder. Rotate crankshaft in a normal direction to align the timing mark on the front face of the starter ring gear support with the drilled hole in the starter, making sure the final motion of the ring gear is in the direction of normal rotation.

NOTE

An accurate top center indicator which screws into a spark plug mounting hole, and a pendulum pointer mounted on a 360-degree timing disc may also be used to locate the advanced firing position. The timing disc should be adapted to fit over the end of the propeller spinner in such a manner that it may be rotated as necessary. In all cases, it must be definitely determined that the number one cylinder is at the correct firing position and on the compression stroke, when the engine is turned in its normal direction of rotation.

After the engine has been placed in the correct firing position, install the magneto to the engine in the following manner:

- a. Remove the timing window plug from the most convenient side of the magneto housing.
- b. Remove the rotor viewing location plug from the top center of the housing.
- c. Turn the rotating magnet drive shaft in the normal direction of magneto rotation until the red painted tooth of the large distributor gear is centered in the timing hole (hole at each side of magneto).
- d. Also observe at this time that the built in pointer just ahead of the rotor viewing window aligns with the R ("E" gap) mark on the rotor.
- e. Install the magneto-to-engine gasket on the magneto flange.

WARNING

Do not attach harness spark plug leads to the spark plugs until all magneto-to-engine timing procedures are completed and the switch leads ("P" leads) are connected.

- f. Remove the engine-to-magneto drive gear train backlash by turning magneto drive opposite to normal rotation as far as possible.
- g. With the No. 1 cylinder at its correct firing position as close to its No. 1 firing position as possible red tooth in center of window and pointer over R ("E" gap) mark on rotor and install magneto to the engine. Loosely tighten magneto in position.

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NOTE

To facilitate connection of a timing light to the switch lead ("P" lead) terminals, short adapter leads may be fabricated. These can be made by using two switch lead terminals and two short pieces of insulated wire. Install the fabricated adapter leads in the switch lead outlet terminals of the cover.

- h. Attach the red lead of the timing light (Bendix Part No. 11-9110 or equivalent) to the left switch lead adapter, the green lead of the timing light to the right switch lead adapter and the black lead of the timing light to the magneto housing (common ground).

NOTE

An internal timing tolerance is allowed when adjusting the two main breakers. Therefore, one of the main breakers may open slightly before the other. Magneto-to-engine timing should be accomplished using the first main breaker to open as the reference point when the engine is in the firing position for No. 1 cylinder. This will ensure that ignition created by either spark plug will not occur prior to the desired engine firing point.

- i. Turn the entire magneto in direction of rotor rotation until the timing lights are on.
- j. Turn magneto in direction of rotor rotation, right-hand rotation to right and left-hand rotation to left, until one of the timing lights just goes off. Then tighten the magneto mounting clamps evenly in this position.
- k. Back the engine up approximately 10° and then carefully "bump" the engine forward while observing the timing lights.
- l. At the No. 1 cylinder firing position, one of the timing lights should go off. Continue turning the engine in its normal direction of rotation until the other timing light goes off. This should be not more than 3 engine degrees later than the first light. If not, repeat steps "i" thru "k" until these conditions are obtained.
- m. Make sure the magneto clamps are tightened securely, recheck timing once more and remove timing equipment.
- n. Reinstall inspection plugs and torque plugs to 12-15 lb-in.

- 11-55. MAINTENANCE. At the first 25-hour inspection, first 50-hour inspection, first 200-hour inspection and thereafter at each 100-hour inspection, the contact breaker point compartment and magneto-to-engine timing should be inspected and checked. If magneto-to-engine timing is correct within plus zero and minus two degrees, internal timing need not be checked. If timing is out of tolerance, remove magneto and set internal timing (paragraph 11-53), then install and time to the engine.

NOTE

If engine operating troubles develop which appear to be caused by the ignition system, it is advisable to check the spark plugs and ignition harness first before working on the magnetos. If the trouble appears definitely associated with a magneto, the following may be used to help disclose the source of trouble without overhauling the magneto.

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a. Moisture check.

1. Remove contact breaker point assembly cover and inspect cover, cables and capacitor for moisture in the area.
2. Inspect distributor block high tension outlets for moisture.
3. If any moisture is evident, lightly wipe with a soft, dry, clean, lint-free cloth.

CAUTION

Do not use gasoline or any other solvent, as these will remove the wax coating on some parts and cause an electrical leak.

b. Breaker contact compartment check.

1. Check all parts of the contact breaker assembly for security. Check distributor block high-tension outlet springs for evidence of spark erosion and proper height. The end of spring should not be more than 0.422 inch from top of tower.
2. Check breaker contact assembly points for excessive wear, burning, deep pits and carbon deposits. Breaker points may be cleaned with a hard finish paper. If breaker points are found defective, install a new assembly. Make no attempts to stone or dress breaker points. Clean new breaker points with clean unleaded gasoline and hard finish paper before installing.
3. Check condition of the cam follower felt. Squeeze felt between thumb and finger. If fingers are not moistened with oil, re-oil using 2 or 3 drops of lubricant (Bendix Part No. 10-96527 or equivalent). Allow approximately 30 minutes for felt to absorb the lubricant. Blot off excess lubricant with a clean, lint-free cloth. Too much lubricant could foul breaker points and cause excessive burning.
4. Check capacitors for looseness in the magneto cover of the harness assembly and for any physical damage. If equipment is available, check the capacitors for leakage, series resistance and capacitance. The capacitance should be 0.34 to 0.41 microfarads.

NOTE

Spring in capacitor outlet may cause an indication of a short to ground if an adapter lead is not used.

- c. If the trouble has not been corrected after accomplishing the moisture and breaker contact compartment check, check magneto-to-engine timing in accordance with paragraph 11-54. If timing is incorrect, remove magneto and adjust internal timing in accordance with paragraph 11-53.
- d. Reinstall magneto and time to engine in accordance with paragraph 11-54.
- e. If the trouble has not been corrected, magneto overhaul or replacement is indicated.

11-56. MAGNETO CHECK.

- a. Start and run engine until the oil and cylinder head temperatures are in the normal operating ranges.
- b. Advance engine speed to 1700 RPM.
- c. Turn the ignition switch to the "R" position and note the RPM drop, then return the switch to the "BOTH" position to clear the opposite set of plugs.
- d. Turn the switch to the "L" position and note the RPM drop, then return the switch to the "BOTH" position.

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- e. The RPM drop should not exceed 150 RPM on either magneto setting or show greater than 50 RPM differential between magneto settings. A smooth RPM drop-off past normal is usually a sign of a too lean or too rich mixture. A sharp RPM drop-off past normal is usually a sign of a fouled plug, a defective harness lead or a magneto out of time. If there is doubt concerning operation of the ignition system, RPM checks at a leaner mixture setting or a higher engine speeds will usually confirm whether a deficiency exists.

NOTE

An absence of RPM drop may be an indication of faulty grounding of one side of the ignition system, a disconnected ground lead at magneto or possibly the magneto timing is set too far in advance.

- 11-57. **SPARK PLUGS.** Two 18-mm spark plugs are installed in each cylinder and screw into helicoil type thread inserts. The spark plugs are shielded to prevent spark plug noise in the radios and have an internal resistor to provide longer terminal life. Spark plug life will vary with operating conditions. A spark plug that is kept clean and properly gapped will give better and longer service than one that is allowed to collect lead deposits and is improperly gapped.

NOTE

Refer to Section 2 for inspection interval. Remove, clean, inspect and regap all spark plugs at each inspection. Install lower spark plugs in upper portion of cylinders and install upper spark plugs in lower portion of cylinders. Since deterioration of lower spark plugs is usually more rapid than that of the upper spark plugs, rotating helps prolong spark plug life.

- 11-58. **ENGINE CONTROLS.**

- 11-59. **DESCRIPTION.** The throttle, mixture, propeller, and carburetor heat controls are of the push-pull type. The mixture control is equipped to lock in any position desired. To move the control, the spring-loaded button, located in the end of the control knob, must be depressed. When the button is released, the control is locked. The mixture control also has a vernier adjustment. Turning the knob in either direction will change the control setting. The vernier is primarily for precision control setting. The throttle control has neither a locking button nor a vernier adjustment, but contains a knurled friction knob which is rotated for more or less friction as desired. The friction knob prevents vibration induced "creeping" of the control. The carburetor heat control has no locking device. Prior to 1979 Models the ball bearing-type rod ends on the throttle, mixture, and propeller control cable ends are secured to the engine with AN bolt, washers, and self-locking nut. Beginning with 1979 Models, the bolt is replaced with a pre-drilled AN bolt, and the self-locking nut is replaced with a castellated nut and cotter pin. (See figure 11-3.)

NOTE

Steel AN bolts with an undrilled shank are identified with an "A" suffix (AN3-6A). A steel bolt of the same size, with the shank drilled for castellated nut and cotter pin, is identified as AN3-6. Aluminum AN bolts are not to be used in this application.

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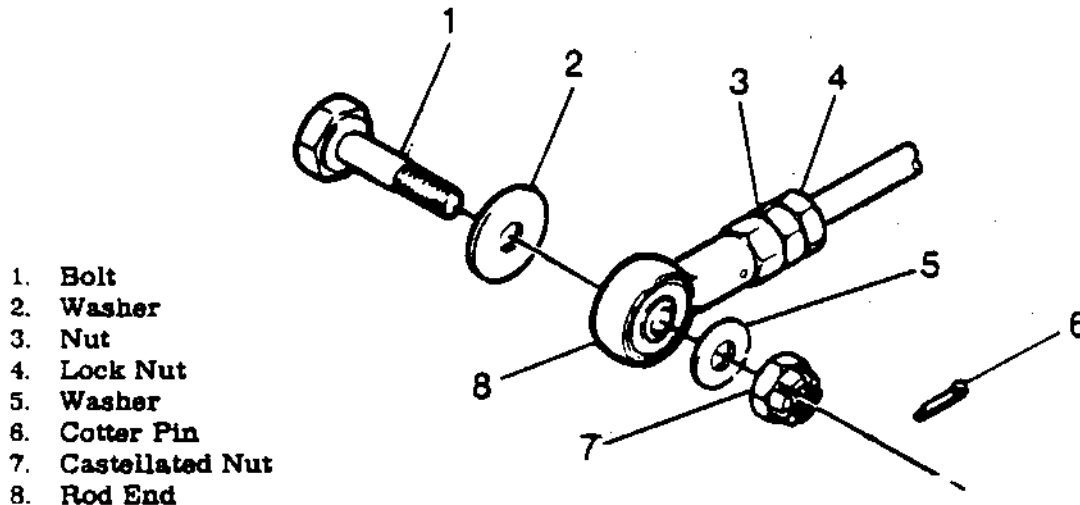


Figure 11-3. Control Cable End (Typical)

- 11-60. **RIGGING.** When adjusting any engine control, it is important to check that the control slides smoothly throughout its full range of travel, that it locks securely if equipped with a locking device and the arm or lever it operates moves through its full arc of travel.

CAUTION

Whenever engine controls are being disconnected, pay particular attention to the EXACT position, size and number of attaching washers and spacers. Be sure to install attaching parts as noted when connecting controls.

- 11-61. **THROTTLE CONTROL.** (See figure 11-4.)

NOTE

Before rigging throttle control, check that clamping sleeve (13) is secure. If any indication of looseness (total linear movement exceeds .050 in.) or breakage is apparent, replace throttle control.

- a. Screw friction lock nut (2) into threads of barrel (7).
- b. Ensure washer (5) is installed, and nut (6) on forward side of panel is secured against washer.
- c. Push knob assembly (1) full in against friction lock nut (2), then pull knob assembly out approximately 1/8-inch to obtain "cushion."

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- d. Tighten friction lock nut (2) against barrel (7).
- e. At the carburetor, position throttle lever to the full forward power stop position against throttle stop screw.

NOTE

Ensure palnut (17) is on threads of plunger (18) before installing rod end (16).

- f. See figure 11-3. Place larger washer (2) on bolt (1).
- g. Insert bolt (1) through hole in throttle lever from the INBOARD SIDE of throttle lever.
- h. Screw rod end (16) on threads of plunger (18), until hole in rod end bearing is aligned with end of bolt (1).

NOTE

Ensure that rod end (16) is threaded on to plunger (18) so that .020-inch safety wire cannot be installed through drilled hole in rod end.

- i. Connect rod end to bolt (1) in throttle lever.
- j. Place washer (5) on bolt and secure with castellated nut (7) and cotter pin (6).
- k. Check clamping sleeve (13) in bracket (12) and clamp (15).
- l. Loosen friction lock nut (2).
- m. Pull knob assembly full out and check that idle stop on carburetor is contacted.
- n. Push knob assembly full in and check that full power stop on carburetor is contacted.
- o. Check that throttle has maintained the approximate 1/8-inch "cushion" set in step "c".
- p. Work throttle control in and out several times to check for binding.

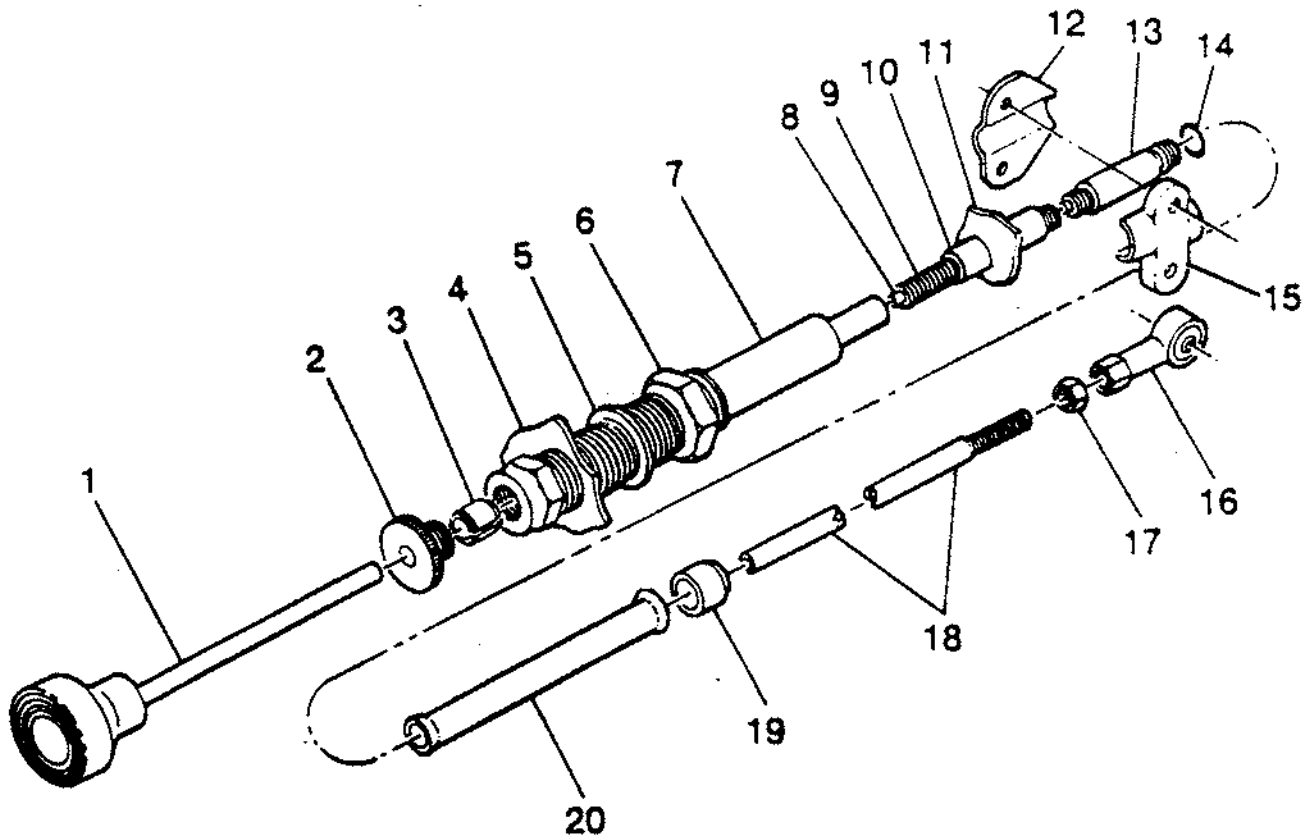
NOTE

Refer to the inspection chart in Section 2 for inspection, lubrication, and/or replacement interval for the throttle control.

11-62. MIXTURE CONTROL.

- a. Push mixture control full in, then pull it out approximately 1/8 inch for cushion.
- b. Loosen clamp securing the control to the engine.
- c. Shift control housing in the clamp so that the mixture arm on the carburetor is in the full open position (RICH). Tighten the clamp in this position.
- d. Unlock and pull mixture control full out. Check that idle mixture arm on carburetor is full closed (IDLE CUT-OFF).
- e. Check that the bolt and nut at the mixture arm on carburetor secures the control wire and that the bolt will swivel in the arm.
- f. Bend the wire tip 90 degrees to prevent it from being withdrawn if the attaching nut should become loose.
- g. When installing a new control, it may be necessary to shorten the wire and/or control housing.
- h. The mixture arm on the carburetor must contact the stops in each direction, and the control should have approximately 1/8 inch cushion when pushed in.

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1. Knob Assembly
2. Friction Lock Nut
3. Locking Collet
4. Instrument Panel
5. Washer
6. Nut
7. Barrel
8. Core
9. Casing
10. Clamping Sleeve
11. Firewall
12. Bracket
13. Clamping Sleeve
14. Packing
15. Clamp
16. Rod End
17. Pin Nut
18. Plunger
19. Plunger Seal
20. Plunger Guide

NOTE SERRATED FACES OF
THROTTLE ARM AND STOP

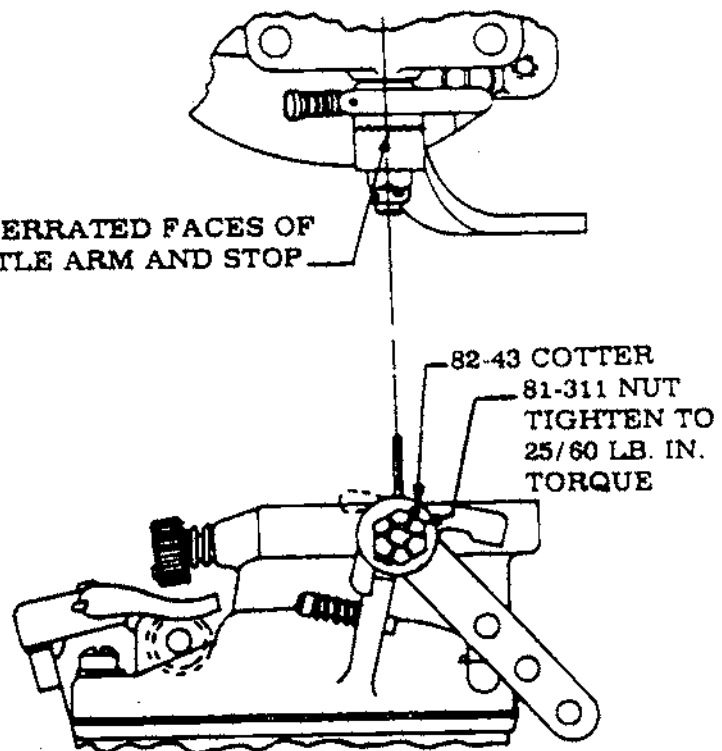


Figure 11-4. Throttle Control

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NOTE

Refer to the inspection chart in Section 2 for inspection and/or replacement interval for the mixture control.

11-63. CARBURETOR HEAT CONTROL

- a. Loosen clamp securing the control to the bracket on engine.
- b. Push control full in, then pull it out approximately 1/8 inch from panel for cushion.
- c. Shift control housing in its clamp so that the valve in the airbox is seated in the full open position. Tighten clamp in this position.
- d. Pull out on the control and check that the air valve inside the airbox seats in the opposite direction.
- e. Check that bolt and nut on the air valve lever secures the control wire and that the bolt will swivel in the lever.
- f. Bend the wire tip 90 degrees to prevent it from being withdrawn if the attaching nut should become loose.

NOTE

Refer to the inspection chart in Section 2 for inspection, lubrication, and/or replacement interval for the carburetor heat control.

11-64. STARTING SYSTEM.

- 11-65. DESCRIPTION. The starting system employs an electrical starter motor mounted at the front (propeller end) lower left side of the engine. A starter solenoid is activated by the ignition key on the instrument panel. When the solenoid is activated, its contacts close and electrical current energizes the starter motor. Initial rotation of the starter armature shaft, engaged with the reduction gear, drives the Bendix shaft and pinion. When the armature turns the reduction gear, the Bendix drive pinion meshes with the crankshaft ring gear assembly by inertia and action of the screw threads within the Bendix sleeve. A detent pin engages in a notch in the screw threads which prevents demeshing if the engine fails to start when the starting circuit is de-energized. When the engine reaches a predetermined speed, centrifugal action forces the detent pin out of the notch in the screw shaft and allows the pinion to demesh from the ring gear.

CAUTION

Never operate the starter motor more than 12 seconds at a time. Allow starter motor to cool between cranking periods to avoid overheating. Longer cranking periods without cooling time will shorten the life of the starter motor.

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11-66. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
STARTER WILL NOT OPERATE.	Defective master switch or circuit.	Check continuity of master switch and circuit. Install new switch or wires.
	Defective starter switch or switch circuit.	Check continuity of switch and circuit. Install new switch or wires.
	Defective starter motor.	Check voltage to starter. If voltage is present. Remove, repair or install new starter motor.
STARTER MOTOR RUNS, BUT DOES NOT TURN CRANKSHAFT.	Defective Bendix drive.	Remove starter and inspect Bendix drive. Replace defective parts.
	Damaged starter pinion gear or ring gear.	Inspect starter pinion gear and ring gear. Replace defective parts.
STARTER MOTOR DRAGS.	Low battery.	Check battery. Charge or install new battery.
	Starter switch or relay contacts burned or dirty.	Install servicable unit.
	Defective starter motor power cable.	Inspect cable. Install new cable.
	Loose or dirty connections.	Inspect connections. Remove clean and tighten all terminal connections.
	Defective starter motor.	Check starter motor brushes, brush spring tension, thrown solder on brush cover. Repair or install new starter motor.
	Dirty or worn commutator.	Inspect commutator. Clean and turn commutator.
STARTER EXCESSIVELY NOISY.	Worn starter pinion gear or broken teeth on ring gear.	Inspect starter pinion gear and ring gear. Replace defective parts.

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- 11-67. **PRIMARY MAINTENANCE.** The starting circuit should be inspected at regular intervals, the frequency of which should be determined by the service and conditions under which the equipment is operated. Inspect the battery and wiring. Check battery for fully charged condition, proper electrolyte level with approved water and terminals for cleanliness. Inspect wiring to be sure that all connections are clean and tight and that the wiring insulation is sound. Check that the brushes slide freely in their holders and make full contact on the commutator. When brushes are worn to one-half of their original length, install new brushes (compare brushes with new ones). Check the commutator for uneven wear, excessive glazing or evidence of excessive arcing. If the commutator is only slightly dirty, glazed or discolored, it may be cleaned with a strip of No. 00 or No. 000 sandpaper. If the commutator is rough or worn, it should be turned in a lathe and the mica undercut. Inspect the armature shaft for rough bearing surfaces. New brushes should be properly seated when installing by wrapping a strip of No. 00 sandpaper around the commutator (with sanding side out) 1-1/4 to 1-1/2 times maximum. Drop brushes on sandpaper covered commutator and turn armature slowly in the direction of normal rotation. Clean sanding dust from motor after sanding.

- 11-68. **STARTER MOTOR.**

- 11-69. **REMOVAL AND INSTALLATION.**

- a. Remove engine cowling in accordance with paragraph 11-3.

CAUTION

When disconnecting or connecting the starter cable, do not permit starter terminal bolt to rotate. Rotation of the bolt could break the conductor between terminal and field coils causing the starter to be inoperative.

- b. Disconnect electrical cable at starter motor. Insulate the disconnected cable terminal as a safety precaution.
- c. Remove three nuts and washers and one bolt securing starter to crankcase. Work starter from engine.
- d. To install starter, position starter on mounting pad, aligning dowel pins in starter mounting pad with holes in mounting pad on engine.
- e. Secure starter with washer, lockwasher and nut in three places and install bolt and washers.
- f. Tighten nuts and bolt evenly to a torque value of 150 lb-in.
- g. Connect electrical cable to starter terminal and install engine cowling.

- 11-70. **EXHAUST SYSTEM.** (See figure 11-5.)

- 11-71. **DESCRIPTION.** The exhaust system consists of an exhaust pipe from each cylinder to the muffler located beneath the engine. The muffler assembly is enclosed in a shroud which captures exhaust heat that is used to heat the aircraft cabin. A shroud on number three exhaust pipe is used to capture carburetor heat for the engine intake system. The tailpipe welded to the muffler routes the exhaust gasses overboard.

- 11-72. **REMOVAL AND INSTALLATION.**

- a. Remove engine cowling in accordance with paragraph 11-3.
- b. Disconnect flexible ducts from shrouds on muffler assembly and exhaust pipe.
- c. Remove EGT probe (optional) if installed.
- d. Remove nuts, bolts, washers and clamps attaching exhaust pipes to muffler assembly.

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- e. Loosen nuts attaching exhaust pipes to the cylinders and remove muffler assembly
- f. Remove nuts and washers attaching exhaust pipes to the cylinders and remove pipes and gaskets.
- g. Reverse the preceding steps for reinstallation. Install a new copper-asbestos gasket between each exhaust pipe and its mounting pad. When installing the attaching nuts, install a plain washer, an internal tooth washer and nut. Make sure all clamps attaching muffler to exhaust pipes are tight and all air ducts are installed.

11-73. INSPECTION.

WARNING

Any time exhaust fumes are detected in the cabin, an immediate inspection must be performed.

The exhaust system must be thoroughly inspected, especially the heat exchange section of the muffler. An inspection of the exhaust system must be performed every 50 hours of operating time. All components that show cracks and general deterioration must be replaced with new parts. Using a flashlight and mirror inspect diffuser tubes through the tailpipe. Replace muffler if defective.

- a. Remove engine cowling in accordance with paragraph 11-3.
- b. Loosen or remove shrouds so that ALL surfaces of the exhaust system are visible.
- c. Check for holes, cracks and burned spots. Especially check the areas adjacent to welds. Look for exhaust gas deposits in surrounding areas which indicate an exhaust leak.
- d. Where a surface is not accessible for visual inspection or for a positive test, proceed as follows:
 - 1. Remove exhaust pipes and muffler.
 - 2. Remove shrouds.
 - 3. Seal openings with expansion rubber plugs.
 - 4. Using a manometer or gage, apply approximately $3 \pm 1/2$ psi (6 inches of mercury) air pressure while the unit is submerged in water. Any leaks will appear as bubbles and can be readily detected.
 - 5. It is recommended that any components found defective be replaced with new parts before the next flight.
 - 6. If no defects are found, remove plugs and dry components with compressed air.
- e. Install the exhaust system and engine cowling.

11-74. EXTREME WEATHER MAINTENANCE.

- 11-75. **COLD WEATHER.** Cold weather starting is made easier by the installation of the manually-operated engine primer system. Fuel is supplied by a line from the fuel strainer to the plunger type primer. Operating the primer forces fuel to the intake valve port of the cylinder. Primer lines should be replaced when crushed or broken and should be properly clamped to prevent vibration and chafing. The following may also be used to assist engine starting in extreme cold weather. After the last flight of the day, drain the engine oil into a clean container so the oil can be preheated. Cover the engine to prevent ice or snow from collecting inside the cowling. When preparing the aircraft for flight or engine run-up after these conditions have been followed, preheat the drained oil.

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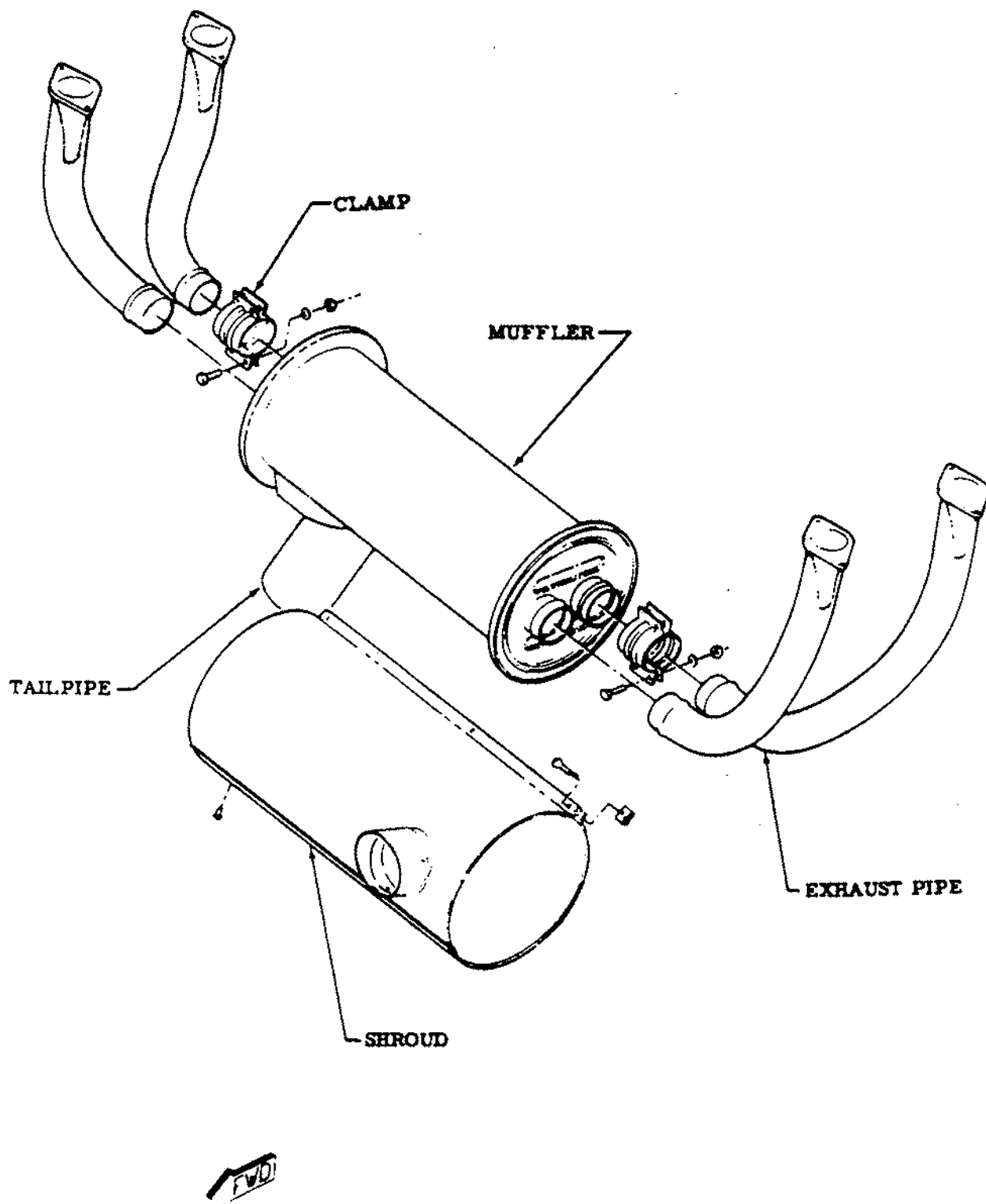


Figure 11-5. Exhaust System

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WARNING

Do not heat the oil above 121°C (250°F). A flash fire may result. Before pulling the propeller through, ascertain that the magneto switch is in the OFF position to prevent accidental firing of the engine.

After preheating the oil, fuel may be mixed with the heated oil in a ratio of 1 part fuel to 12 parts oil before pouring into the engine oil sump. If the free air temperature is below -29°C (-20°F), the engine compartment should be preheated by a ground heater. Pre-heating the engine compartment is accomplished by inducing heated air up through opening in lower cowl assembly; thus heating up both the cylinders and oil. After the engine compartment has been preheated, inspect all engine drain and vent lines for presence of ice. After this procedure has been complied with, pull the propeller through several revolutions by hand before starting engine.

CAUTION

Due to the desludging effect of the diluted oil, engine operation should be observed closely during the initial warm-up of the engine. Engines that have considerable amount of operational hours accumulated since their last dilution period may be seriously affected by the dilution process. This will be caused by the diluted oil dislodging sludge and carbon deposits within the engine. This residue will collect in the oil sump and possibly clog the screened inlet to the oil pump. Small deposits may actually enter the oil pump and be trapped by the main oil filter screen. Partial or complete loss of engine lubrication may result from either condition. If these conditions are anticipated after oil dilution, the engine should be run for several minutes at normal operating temperatures and then stopped and inspected for evidence of sludge and carbon deposits in the oil sump and oil filter screen. Future occurrence of this condition can be prevented by diluting the oil prior to each oil change. This will prevent the accumulation of the sludge and carbon deposits.

- 11-76. **DUSTY CONDITIONS.** Dust inducted into the intake system of the engine is probably the greatest single cause of early engine wear. When operating under high dust conditions, service the induction air filter daily as outlined in Section 2. Also, change engine oil and lubricate the airframe more often than specified.
- 11-77. **SEACOAST AND HUMID AREAS.** In salt water areas, special care should be taken to keep the engine and accessories clean to prevent oxidation. In humid areas, fuel and oil should be checked frequently and drained of condensed moisture.

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SECTION 11A

ENGINE (MODEL O-320-D2J AND MODEL O-360-A4N)

WARNING

When performing any inspection or maintenance that requires turning on the master switch, installing a battery, or pulling the propeller through by hand, treat the propeller as if the ignition switch were ON. Do not stand, nor allow anyone else to stand, within the arc of the propeller, since a loose or broken wire, or a component malfunction, could cause the propeller to rotate.

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11A-1. ENGINE COWLING. Refer to paragraph 11-1.

11A-2. DESCRIPTION. Refer to paragraph 11-2.

11A-3. REMOVAL AND INSTALLATION. Refer to paragraph 11-3.

11A-4. CLEANING AND INSPECTION. Refer to paragraph 11-4.

11A-5. REPAIR. Refer to paragraph 11-5.

11A-6. ENGINE.

11A-7. DESCRIPTION. Beginning with 1981 Models an air-cooled, wet-sump, four-cylinder, horizontally-opposed, direct-drive, carbureted Lycoming Model O-320-D2J engine is used to power the airplane. The cylinders, numbered from front to rear, are staggered to permit a separate throw on the crankshaft for each connecting rod. The right front cylinder is number one, and cylinders on right side are identified by odd numbers one and three. The left front cylinder is number two and the cylinders on the left side are identified as numbers two and four. Refer to Paragraph 11A-8 for engine data. For repair and overhaul of the engine, accessories and propeller, refer to the appropriate publications issued by their manufacturers. These publications are available from the Cessna Supply Division.

11A-8. ENGINE DATA. (O-320-D2J.)

MODEL (Lycoming)	O-320-D2J
BHP at RPM	160 at 2700 RPM
Number of Cylinders	4 Horizontally-Opposed
Displacement	319.8 Cubic Inches
Bore	5.125 Inches
Stroke	3.875 Inches
Compression Ratio	8.50:1
Magnetos (Dual)	Slick 4251 (Impulse coupling)*
Right Magneto	Fires 25° BTC
Left Magneto	1-3 Lower and 2-4 Upper
	Fires 25° BTC
	1-3 Upper and 2-4 Lower
Firing Order	1-3-2-4
Spark Plugs	18mm (Refer to Avco Lycoming Service Instruction No. 1042 for factory approved spark plugs and required gap.)
Torque Value	390±30 LB-IN.

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11A-8. ENGINE DATA (Cont).

Carburetor (Marvel-Schebler)	MA-4SPA	
Oil Sump Capacity	7 U.S. Quarts	
With Filter Change	8 U.S. Quarts	
Tachometer	Mechanical	
Approximate Dry Weight	275 Lbs. (Weight is Approximate and will	
With Standard Accessories	vary with optional equipment installed.)	
Oil Pressure		
Minimum Idling	25 PSI	**20 PSI
Normal	60-90 PSI	50-90 PSI
Maximum	115 PSI	115 PSI
Oil Temperature		
Normal Operation	Within Green Arc	
Maximum Permissible	Red Line (245°F)	
Cylinder Head Temperature	500°F Maximum (Not Indicated)	

*The direction of rotation of the magneto shafts, viewed from anti-propeller end of the engine is clockwise.

**1984 and On, and all aircraft equipped with 0509087 modification kit.

11A-8A. ENGINE. (172Q Models Only.)

11A-8B. DESCRIPTION. The Model 172Q airplane is powered by a four-cylinder, horizontally-opposed, air-cooled, direct-drive, wet-sump, carbureted Lycoming Model O-360-A4N engine. The cylinders, numbered from front to rear, are staggered to provide each cylinder connecting rod its own crankthrow. Cylinders are numbered one through four with number one cylinder on the right front and number three cylinder on the right rear. Cylinders two and four are on the left front and left rear, respectively. Refer to Paragraph 11A-8C for engine data. For repair and overhaul of the engine accessories and propeller, refer to the appropriate publications issued by their manufacturers. These publications are available from the Cessna Supply Division.

11A-8C. ENGINE DATA. (O-360-A4N.)

MODEL (Lycoming)	O-360-A4N
BHP at RPM	180 BHP at 2700 RPM
Number of Cylinders	4 Horizontally-Opposed
Displacement	361.0 Cubic Inches
Bore	5.125 Inches
Stroke	4.375 Inches
Compression Ratio	9.0:1

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11A-8C. ENGINE DATA (Cont).

Magnetos (Dual)	Slick 4251	
Right Magneto	Fires 25° BTC 1-3 Lower and 2-4 Upper	
Left Magneto	Fires 25° BTC 1-3 Upper and 2-4 Lower	
Firing Order 1-3-2-4		
Spark Plugs	18mm (Refer to Avco Lycoming Service Instruction No. 1042 for factory approved spark plugs and required gap.)	
Torque Value	390 ± 30 LB-IN.	
Carburetor	Marvel-Schebler MA4-5	
Oil Sump Capacity	7 U.S. Quarts	
With Filter Change	8 U.S. Quarts	
Tachometer	Mechanical	
Approximate Dry Weight	291 Lbs. (Weight is Approximate and will vary with optional equipment installed.)	
With Standard Accessories		
Oil Pressure		
Minimum Idling	25 PSI	*20 PSI
Normal	60-90 PSI	50-90 PSI
Maximum	115 PSI	115 PSI
Oil Temperature		
Normal Operation	Within Green Arc	
Maximum Permissible	Red Line (245°F)	
Fuel Pressure		
Red Line	0.5 PSI	
Normal	0.5-8.0 PSI	
Red Line	8.0 PSI	

*1984 and On, and all aircraft equipped with 0509087 modification kit.

- 11A-9. TIME BETWEEN OVERHAUL (TBO). Refer to the latest Revision of Avco Lycoming Service Instruction No. 1009, and all applicable Service Letters or Service Bulletins, for recommendations applicable to O-320-D and O-360-A4N Series engines. At the time of overhaul, engine accessories should be overhauled.

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11A-9A. OVERSPEED LIMITATIONS. The engine must not be operated above specified maximum continuous RPM. However, should inadvertent overspeed occur, refer to the latest issue of Avco Lycoming Service Bulletin 389, and all applicable Service Letters and Service Instructions for obligatory recommendations.

11A-10. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE WILL NOT START.	Improper use of starting procedure.	Review starting procedure.
	Fuel tanks or bays empty.	Visually inspect tanks or bays. Fill with proper grade and quantity of gasoline.
	Mixture control in the IDLE CUT-OFF position.	Move control to the full RICH position.
	Fuel selector valve in OFF position.	Place selector valve in the ON position to a tank known to contain gasoline.
	Defective carburetor.	Repair or replace carburetor.
	Carburetor screen or fuel strainer plugged.	Remove carburetor and clean carburetor screen or fuel strainer thoroughly.
	Vaporized fuel. (Most likely to occur in hot weather with a hot engine.)	Refer to Pilot's Operating Handbook.
	Engine flooded.	Refer to Pilot's Operating Handbook.
	Water in fuel system.	Open fuel strainer drain and check for water. If water is present, drain fuel tank sumps, lines, strainer and carburetor.
	Defective magneto switch or grounded magneto leads.	Check continuity. Repair or replace switch or leads.
ENGINE STARTS BUT DIES, OR WILL NOT IDLE.	Spark plugs fouled.	Remove, clean and regap plugs. Test harness cables to persistently fouled plugs. Replace if defective.
	Idle stop screw or idle mixture incorrectly adjusted.	Refer to paragraph 11-43.
	Carburetor idling jet plugged.	Clean carburetor idling jet.
	Spark plugs fouled or improperly gapped.	Remove, clean and regap plugs. Replace if defective.
	Water in fuel system.	Open fuel strainer drain and check for water. If water is present, drain fuel tank sumps, lines, strainer and carburetor.

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11A-10. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE STARTS BUT DIES, OR WILL NOT IDLE (Cont).	Defective ignition system.	Refer to paragraph 11A-55.
	Vaporized fuel. (Most likely to occur in hot weather with a hot engine.)	Refer to Pilot's Operating Handbook.
	Induction air leaks.	Check visually. Correct the cause of leaks.
	Manual primer leaking.	Disconnect primer outlet line. If fuel leaks through primer, repair or replace primer.
	Leaking float valve or float level set too high.	Perform an idle mixture check. Attempt to remove any rich indication with the idle mixture adjustment. If the rich indication cannot be removed, the float valve is leaking or the float level is set too high. Replace defective parts, reset float level.
	Defective carburetor.	If engine will start when primed but stops when priming is discontinued, with mixture control in full RICH position, the carburetor is defective. Repair or replace carburetor.
	Defective engine.	Check compression. Listen for unusual engine noises. Engine repair is required.
ENGINE RUNS ROUGHLY OR WILL NOT ACCEL- ERATE PROPERLY.	Restriction in aircraft fuel system.	Refer to Section 12.
	Worn or improperly rigged throttle or mixture control.	Check visually. Replace worn linkage. Rig properly.
	Spark plugs fouled or improperly gapped.	Remove, clean and regap plugs. Replace if defective.
	Defective ignition system.	Refer to paragraph 11A-55.

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11A-10. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE RUNS ROUGHLY OR WILL NOT ACCEL- ERATE PROPERLY. (Cont).	Defective or badly adjusted accelerator pump in carburetor.	Check setting of accelerator pump linkage and adjust as necessary.
	Float level set too low.	Check and reset float level.
	Defective carburetor.	If engine will start when primed but stops when priming is discontinued, with mixture control in full RICH position, the carburetor is defective. Repair or replace carburetor.
	Defective engine.	Check compression. Listen for unusual engine noises. Engine repair is required.
	Restricted carburetor air filter.	Check visually. Clean in accordance with Section 2.
	Cracked engine mount.	Inspect and repair or replace mount as required.
POOR IDLE CUT-OFF.	Defective mounting bushings.	Inspect and install new bushings as required.
	Worn or improperly rigged mixture control.	Check that idle cut-off stop on carburetor is contacted. Replace worn linkage. Rig properly.
	Manual primer leaking.	Disconnect primer outlet line. If fuel leaks through primer, it is defective. Repair or replace primer.
	Defective carburetor.	Repair or replace carburetor.
	Fuel contamination.	Check all screens in fuel system. Drain all fuel and flush out system. Clean all screens, lines, strainer and carburetor.

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- 11A-11. REMOVAL. Refer to paragraph 11-11.
- 11A-12. CLEANING. Refer to Section 2.
- 11A-13. ACCESSORIES REMOVAL. Refer to paragraph 11-13.
- 11A-14. INSPECTION. Refer to paragraph 11-14.
- 11A-15. BUILD-UP. Refer to paragraph 11-15.
- 11A-16. INSTALLATION. Refer to paragraph 11-16.
- 11A-17. FLEXIBLE FLUID HOSES. Refer to paragraph 11-17.
- 11A-18. LEAK TEST. Refer to paragraph 11-18.
- 11A-19. REPLACEMENT. Refer to paragraph 11-19.
- 11A-20. STATIC RUN-UP PROCEDURES. In a case of suspected low engine power, a static RPM run-up should be conducted as follows:
 - a. Run-up engine, using takeoff power and mixture settings, with the aircraft facing 90° right and then left to the wind direction.
 - b. Record the RPM obtained in each run-up position.

NOTE

Daily changes in atmospheric pressure, temperature and humidity will have a slight effect on static run-up.

- c. Average the RPM values obtained in step b. The resulting RPM figure should be 2300 to 2420 for O-320-D2J engine or 2350 to 2450 RPM for O-360-A4N engine.
- d. If the resulting average RPM figure is lower than stated above, the following checks are recommended to determine a possible deficiency.
 - 1. Check carburetor heat control for proper rigging. If partially open it would cause a slight power loss.
 - 2. Check magneto timing, spark plugs and ignition harness for settings and conditions.
 - 3. Check condition of induction air filter. Clean if necessary.
 - 4. Perform an engine compression check. (Refer to engine manufacturer's manual.)
- 11A-21. ENGINE BAFFLES. Refer to paragraph 11-21.
- 11A-22. DESCRIPTION. Refer to paragraph 11-22.
- 11A-23. CLEANING AND INSPECTION. Refer to paragraph 11-23.
- 11A-24. REMOVAL AND INSTALLATION. Refer to paragraph 11-24.
- 11A-25. REPAIR. Refer to paragraph 11-25.
- 11A-26. ENGINE MOUNT. Refer to paragraph 11-26.
- 11A-27. DESCRIPTION. Refer to paragraph 11-27.

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11A-28. REMOVAL AND INSTALLATION. Refer to paragraph 11-28.

11A-29. REPAIR. Refer to paragraph 11-29.

11A-30. ENGINE SHOCK MOUNT PADS. Refer to paragraph 11-30. See Figure 11A-1.

11A-31. ENGINE OIL SYSTEM. Refer to paragraph 11-31.

11A-32. DESCRIPTION. Refer to paragraph 11-32.

11A-33. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
NO OIL PRESSURE.	No oil in sump.	Check with dipstick. Fill sump with proper grade and quantity of oil. Refer to Section 2.
	Oil pressure line broken, disconnected or pinched.	Inspect pressure lines. Replace or connect lines as required.
	Oil pump defective.	Remove and inspect. Exam- ine engine. Metal particles from damaged pump may have entered engine oil passages.
	Defective oil pressure gage.	Check with a known good gage. If second reading is normal, replace gage.
	Oil congealed in gage line.	Disconnect line at engine and gage; flush with kero- sene. Pre-fill with kerosene and install.
	Relief valve defective.	Remove and check for dirty or defective parts. Clean and install; replace valve if defective.
LOW OIL PRESSURE.	Low oil supply.	Check with dipstick. Fill sump with proper grade and quantity of oil. Refer to Section 2.
	Low viscosity oil.	Drain sump and refill with proper grade and quantity of oil.

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11A-33. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
LOW OIL PRESSURE (Cont).	Oil pressure relief valve spring weak or broken.	Remove and inspect spring. Replace weak or broken spring.
	Defective oil pump.	Check oil temperature and oil level. If temperature is higher than normal and oil level is correct, internal failure is evident. Remove and inspect. Examine engine. Metal particles from damaged pump may have entered oil passages.
	Secondary result of high oil temperature.	Observe oil temperature gage for high indication. Determine and correct reason for high oil temperature.
	Leak in pressure or suction line.	Inspect gasket between accessory housing and crankcase. Repair engine as required.
HIGH OIL PRESSURE.	Dirty oil filter.	Remove and install new filter.
	High viscosity oil.	Drain sump and refill with proper grade and quantity of oil.
	Relief valve defective.	Remove and check for dirty or defective parts. Clean and install; replace valve if defective.
LOW OIL TEMPERATURE.	Defective oil pressure gage.	Check with a known good gage. If second reading is normal, replace gage.
	Defective oil temperature gage or temperature bulb.	Check with a known good gage. If second reading is normal, replace gage. If reading is similar, the temperature bulb is defective. Replace bulb.
	Oil cooler thermostatic valve/bypass valve defective or stuck.	Remove valve and check for proper operation. Replace valve if defective.

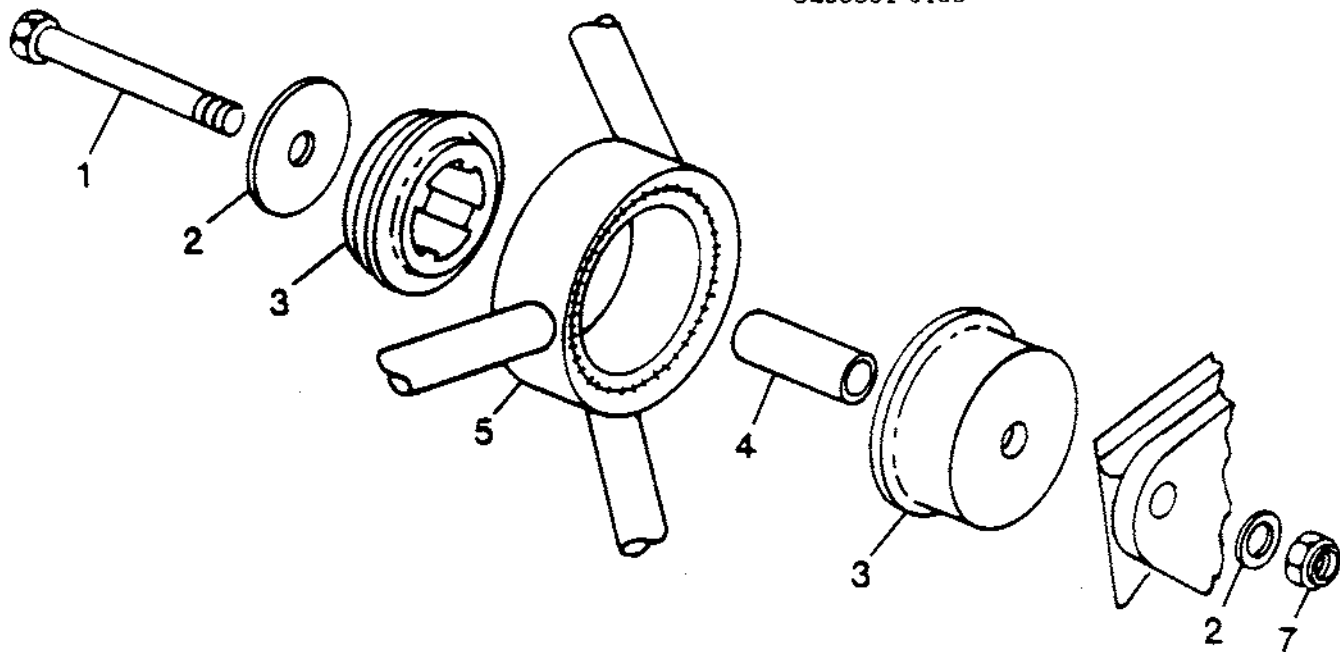
MODEL 172 SERIES SERVICE MANUAL

11A-33. TROUBLE SHOOTING (Cont).

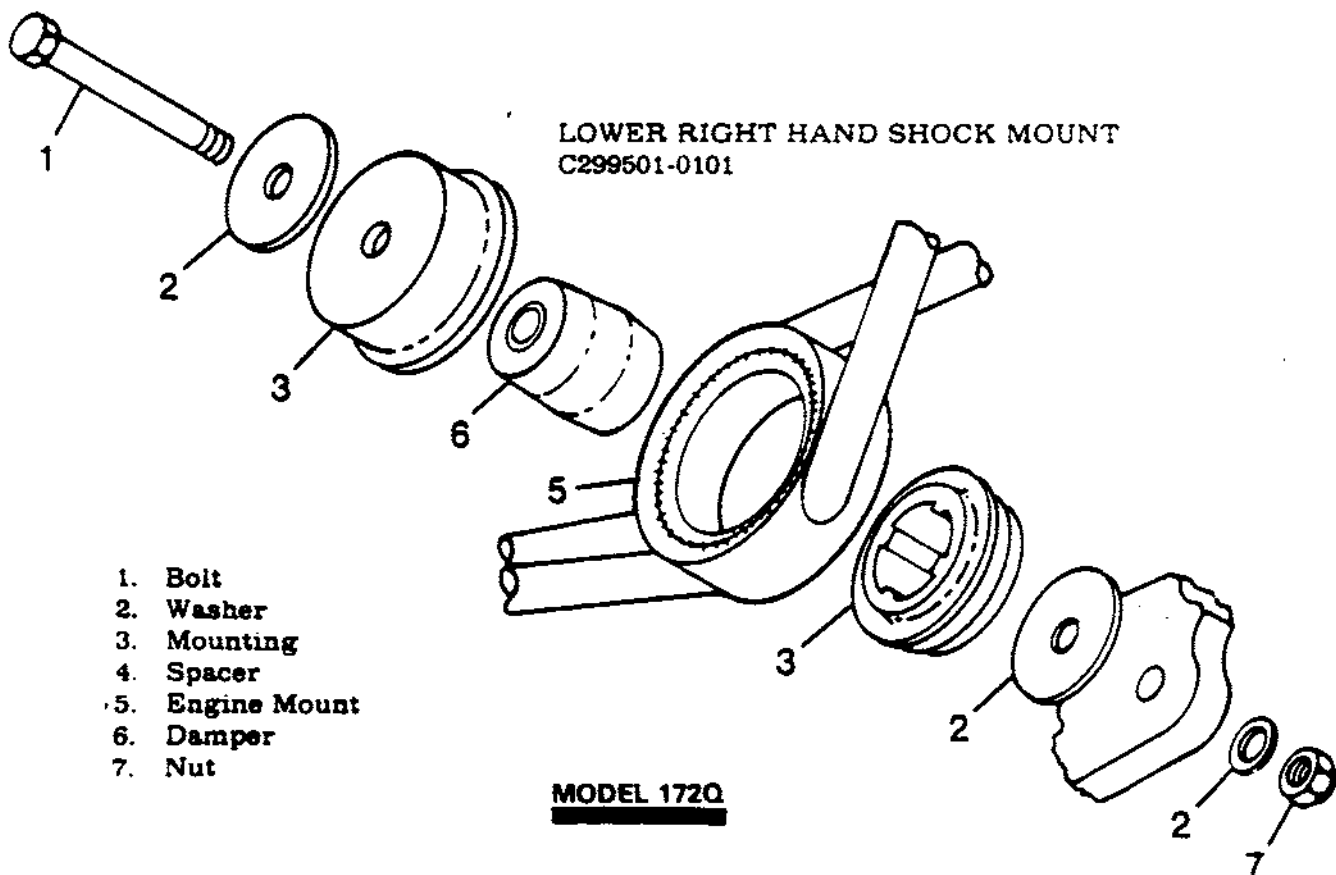
TROUBLE	PROBABLE CAUSE	REMEDY
HIGH OIL TEMPERATURE.	Oil cooler air passages clogged.	Inspect cooler core. Clean air passages.
	Oil cooler oil passages clogged.	Attempt to drain cooler. Inspect for sediment. Remove cooler and flush thoroughly.
	Thermostatic valve or bypass valve damaged or held open by solid matter.	Feel front of cooler core with hand. If core is cold, oil is bypassing cooler. Remove and clean valve and seat. If still inoperative, replace.
	Low oil supply.	Check with dipstick. Fill sump with proper grade and quantity of oil. Refer to Section 2.
	Oil viscosity too high.	Drain sump and refill with proper grade and quantity of oil.
	Prolonged high speed operation on the ground.	Hold ground running above 1500 RPM to a minimum.
	Defective oil temperature gage.	Check with a known good gage. If second reading is normal, replace gage.
	Defective oil temperature bulb.	Check for correct oil pressure, oil level and cylinder head temperature. If they are correct, check oil temperature gage for being defective; if similar reading is observed, bulb is defective. Replace bulb.
	Oil congealed in cooler.	This condition can occur only in extremely cold temperatures. If congealing is suspected, use an external heater or a heated hangar to warm the congealed oil.
OIL LEAK AT FRONT OF ENGINE.	Damaged crankshaft seal.	Replace. Also refer to Service News Letter, SNL85-8, Feb. 15, 1985.
OIL LEAK AT PUSH ROD HOUSING.	Damaged push rod housing oil seal.	Replace.

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UPPER RIGHT HAND SHOCK MOUNT C299501-0106



LOWER RIGHT HAND SHOCK MOUNT C299501-0101



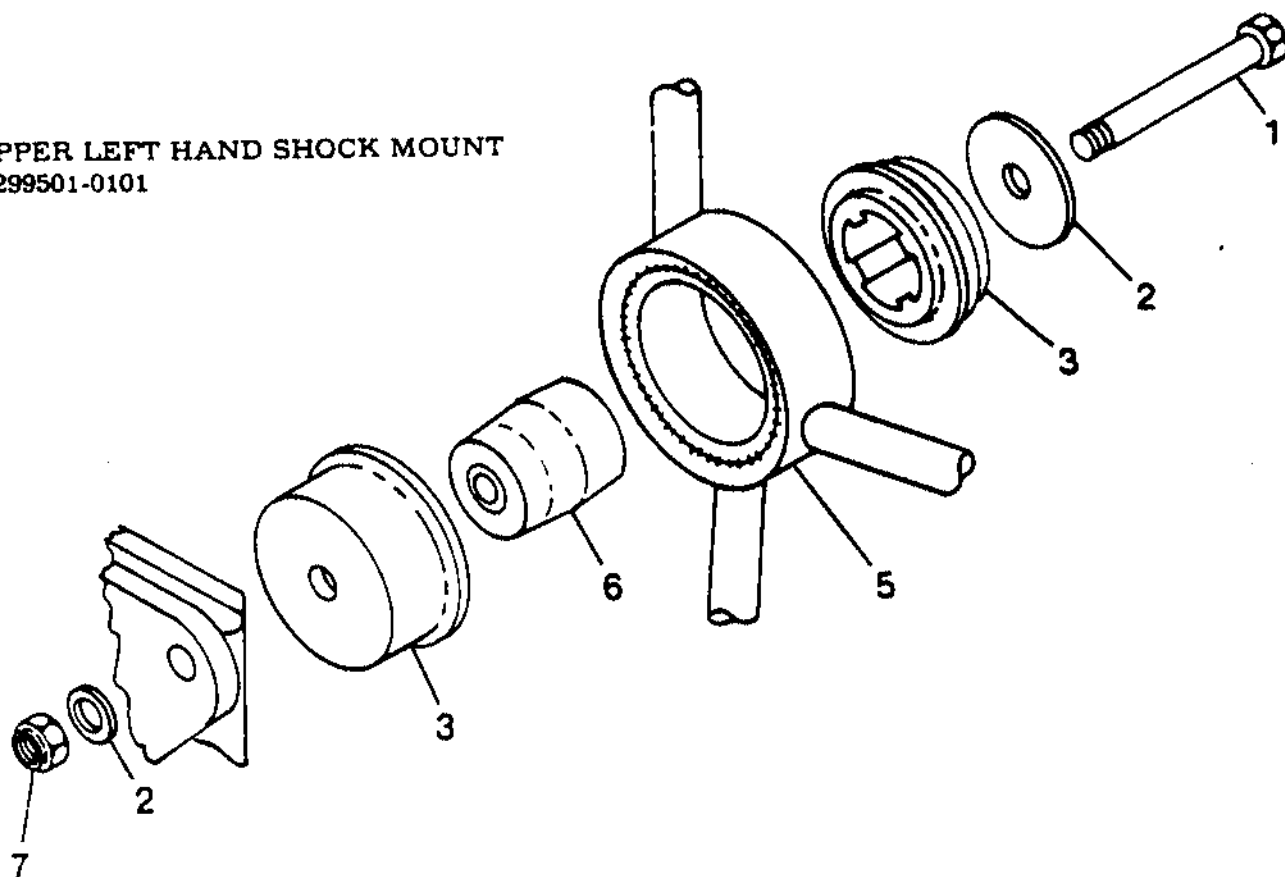
1. Bolt
2. Washer
3. Mounting
4. Spacer
5. Engine Mount
6. Damper
7. Nut

MODEL 172Q

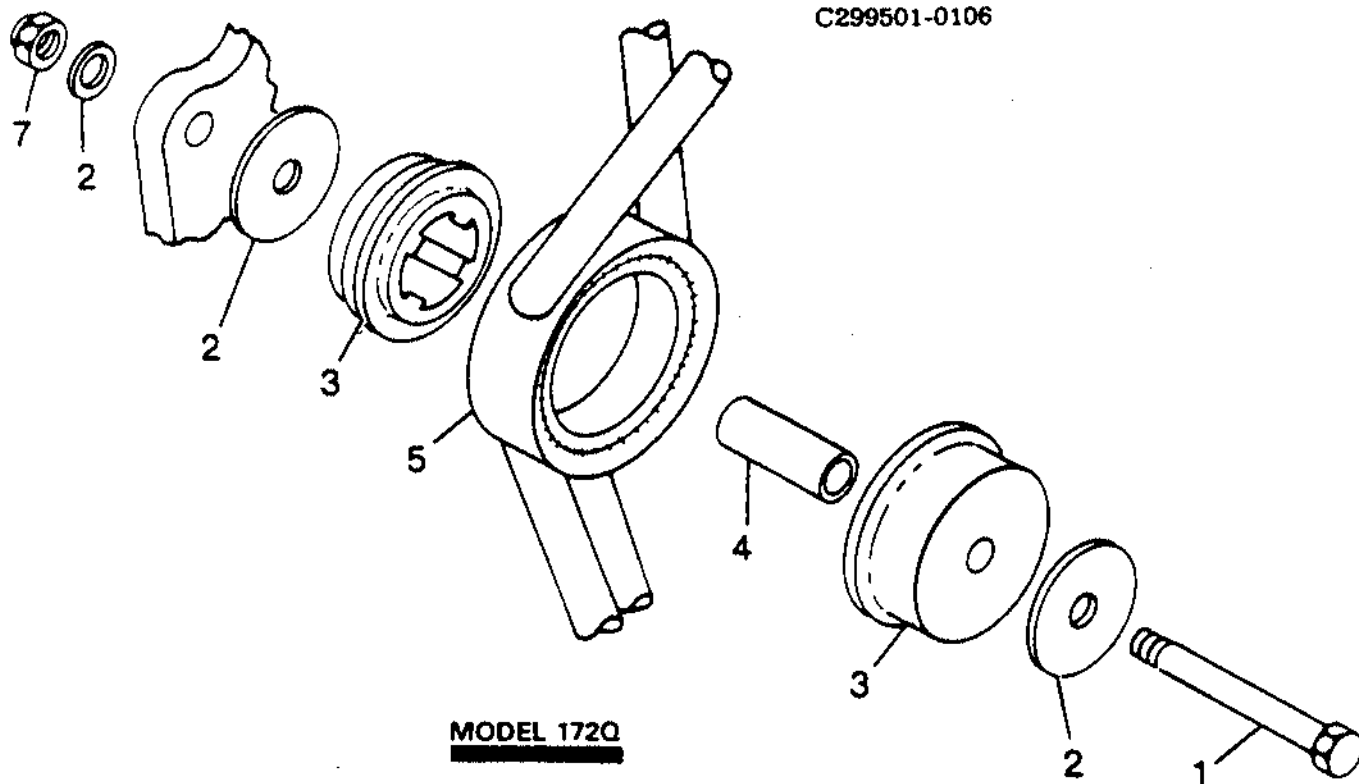
Figure 11A-1. Shock Mount Details (Sheet 1 of 2)

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UPPER LEFT HAND SHOCK MOUNT C299501-0101



LOWER LEFT HAND SHOCK MOUNT C299501-0106



MODEL 172Q

Figure 11A-1. Shock Mount Details (Sheet 2 of 2)

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11A-34. FULL-FLOW OIL FILTER.

11A-35. DESCRIPTION. An external full-flow, spin-on oil filter is installed on the engine. If the filter should become clogged, a bypass valve allows engine oil to flow directly to the engine oil passages.

11A-36. REMOVAL AND INSTALLATION. Refer to paragraph 11-36.

11A-37. OIL COOLER. Refer to paragraph 11-37.

11A-38. DESCRIPTION. Refer to paragraph 11-38.

11A-39. ENGINE FUEL SYSTEM. Refer to paragraph 11-39.

11A-40. DESCRIPTION. Refer to paragraph 11-40.

11A-41. CARBURETOR. Refer to paragraph 11-41.

11A-42. REMOVAL AND INSTALLATION. Refer to paragraph 11-42.

11A-43. IDLE SPEED AND MIXTURE ADJUSTMENTS. Refer to paragraph 11-43.

11A-44. INDUCTION AIR SYSTEM. Refer to paragraph 11-44. The Model 172Q airplanes incorporate an induction air filter assembly featuring a replacement filter element.

11A-45. DESCRIPTION. Refer to paragraph 11-45.

11A-46. REMOVAL AND INSTALLATION. Refer to paragraph 11A-46.

11A-47. IGNITION SYSTEM.

11A-48. DESCRIPTION. The ignition system is comprised of dual Slick 4251 magnetos, two spark plugs in each cylinder, an ignition wiring harness, an ignition switch mounted on the instrument panel, and required wiring between the ignition switch and the magnetos.

11A-49. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE WILL NOT START.	Defective ignition switch.	Check switch continuity. Replace if defective.
	Spark plugs defective, improperly gapped or fouled by moisture or deposits.	Clean, regap and test plugs. Replace if defective.
	Defective ignition harness.	If no defects are found by a visual inspection, check with a harness tester. Replace defective parts.

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11A-49. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE WILL NOT START (Cont).	Magneto "P" lead grounded.	Check continuity. "P" lead should not be grounded in the ON position, but should be grounded in OFF position. Repair or replace "P" lead.
	Failure of impulse coupling.	Impulse coupling pawls should engage at cranking speeds. Listen for loud clicks as impulse couplings operate. Remove magnetos and determine cause. Replace defective magnetos.
	Defective magneto.	Refer to paragraph 11A-55.
	Broken drive gear.	Remove magneto and check magneto and engine gears. Replace defective parts. Make sure no pieces of damaged parts remain in engine or engine disassembly will be required.
ENGINE WILL NOT IDLE OR RUN PROP- ERLY.	Spark plugs defective, improperly gapped or fouled by moisture or deposits.	Clean, regap and test plugs. Replace if defective.
	Defective ignition harness	If no defects are found by a visual inspection, check with a harness tester. Replace defective parts.
	Defective magneto.	Refer to paragraph 11A-55.
	Impulse coupling pawls remain engaged.	Listen for loud clicks as impulse coupling operates. Remove magneto and determine cause. Replace defective magneto.
	Spark plugs loose.	Check and install properly.

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11A-50. MAGNETOS.

- 11A-51. DESCRIPTION. The engine is equipped with dual Slick 4251 (impulse coupling) magnetos. The magnetos incorporate an integral feed-thru capacitor and require no external noise filter in the ground lead. The direction of rotation of the magneto shafts, viewed from the anti-propeller end of the engine, is clockwise. Refer to Slick 4200/6200 Series Aircraft Magnetos Maintenance and Overhaul Instructions Bulletin, and all revisions and supplements thereto, for a detailed description, disassembly and reassembly of the magneto.

11A-52. REMOVAL AND INSTALLATION.

WARNING

The magneto is in a SWITCH ON condition when the switch wire is disconnected. Therefore, ground the breaker contact points or disconnect the high-tension wires from the magneto or the spark plugs.

- a. Remove engine cowling in accordance with paragraph 11-3.
- b. Remove screws securing the high-tension outlet cover to the magneto. The "P" leads may be disconnected for additional clearance if necessary.

NOTE

It is a good practice to position No. 1 cylinder at its approximate advance firing position before removing the magneto.

- c. Remove nuts, washers and clamps attaching the magneto to the engine accessory housing. Note the approximate angular position at which the magneto is installed, then remove the magneto.
- d. Reverse the preceding steps for reinstallation and time magneto-to-engine in accordance with paragraph 11A-54.

NOTE

Magneto (primary) lead nut torque range is 11-13 in.-lbs.
Exceeding this torque range could result in possible condenser damage.

- 11A-53. INTERNAL TIMING. (MAGNETO REMOVED FROM ENGINE.) Refer to Slick 4200/6200 Series Aircraft Magnetos Maintenance and Overhaul Instructions Bulletin, and all revisions and supplements thereto, for internal timing instructions.

- 11A-54. MAGNETO-TO-ENGINE TIMING. After 100 hours of operation and every 100 hours thereafter, or at annual inspection, whichever comes first, the magneto-to-engine timing should be checked. This is accomplished in the following manner:

WARNING

Be sure switch is in "OFF" position and the "P" lead is grounded.

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- a. Turn the engine crankshaft in the normal direction of rotation until the No. 1 cylinder is in the full-advance firing position, following the engine manufacturer's procedure for timing of magnetos.
- b. Loosen the magneto mounting bolts, and connect a standard timing light between engine ground and the magneto condenser terminal.

NOTE

Switch must be "ON".

- c. Rotate the complete magneto opposite normal rotation of the mageto on the engine mounting, until the timing light indicates the contact breaker points are just opening. Secure the magneto in this position.

WARNING

During all magneto maintenance, always take proper precautions to make sure the engine can not fire or start when the propeller is moved. TURN SWITCH "OFF".

11A-55. MAINTENANCE. Refer to Slick 4200/6200 Series Aircraft Magnetos Maintenance and Overhaul Instructions Bulletin, and all revisions and supplements thereto, for disassembly, cleaning, inspection, and reassembly instructions. At 500-hour intervals, the contact assemblies should be checked for burning or wear. If the points are not discolored and have a white frosty surface around the edges, the points are functioning properly and should not be touched. Apply M-1827 cam grease sparingly to each lobe of the cam before reassembly. If the points are blue (indicating excessive arcing) or pitted, they should be discarded. Replace both condenser and damaged points. At 500-hour inspections, it is necessary to check the carbon brush in the distributor gear for wear, cracks and chipping. Measure carbon brush length from distributor gear shaft to end of brush. Minimum acceptable length is 1/32 inch. If worn, cracked or chipped, the distributor gear must be replaced. Put a drop of SAE #20 non-detergent machine oil in each oilite bearing in the distributor block and bearing bar. Inspect the high tension lead from the coil to make sure it makes contact with the carbon brush on the distributor gear shaft. At 500-hour inspection, visually inspect the impulse coupling shell and hub for cracks, loose rivets or rounded pawls that may slip when latching up on the pin. If any of these conditions are evident, the coupling should be replaced.

NOTE

If the engine operating troubles develop which appear to be caused by the ignition system, it is advisable to check the spark plugs and ignition harness first before working on the magnetos. If the trouble appears definitely associated with a magneto, perform moisture check and breaker contact compartment check in accordance with procedures outlined in paragraph 11-55, steps "a" thru "b". If trouble has not been corrected after accomplishing the moisture and breaker contact compartment checks, check magneto-to-engine timing in accordance with paragraph 11A-54. If timing is incorrect, remove magneto and adjust internal timing in accordance with paragraph 11A-53. Reinstall magneto and time to engine in accordance with paragraph 11A-54. If the trouble has not been corrected, magneto overhaul or replacement is indicated.

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- 11A-56. MAGNETO CHECK. Refer to paragraph 11-56.
- 11A-57. SPARK PLUGS. Refer to paragraph 11-57.
- 11A-58. ENGINE CONTROLS. Refer to paragraph 11-58.
- 11A-59. DESCRIPTION. Refer to paragraph 11-59.
- 11A-60. RIGGING. Refer to paragraph 11-60.
- 11A-61. THROTTLE CONTROL. Refer to paragraph 11-61.
- 11A-62. MIXTURE CONTROL. Refer to paragraph 11-62.
- 11A-63. CARBURETOR HEAT CONTROL. Refer to paragraph 11-63.
- 11A-64. STARTING SYSTEM. Refer to paragraph 11-64.
- 11A-65. DESCRIPTION. Refer to paragraph 11-65.
- 11A-66. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
STARTER WILL NOT OPERATE.	Defective master switch or circuit.	Check continuity of master switch and circuit. Install new switch or wires.
	Defective starter switch or switch circuit.	Check continuity of switch and circuit. Install new switch or wires.
	Defective starter motor.	Check voltage to starter. If voltage is present. Remove, repair or install new starter motor.
STARTER MOTOR RUNS, BUT DOES NOT TURN CRANKSHAFT.	Defective Bendix drive.	Remove starter and inspect Bendix drive. Replace defective parts.
	Damaged starter pinion gear or ring gear.	Inspect starter pinion gear and ring gear. Replace defective parts.
STARTER MOTOR DRAGS.	Low battery.	Check battery. Charge or install new battery.
	Starter switch or relay contacts burned or dirty.	Install servicable unit.
	Defective starter motor power cable.	Inspect cable. Install new cable.

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11A-66. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
STARTER MOTOR DRAGS. (Cont.)	Loose or dirty connections.	Inspect connections. Remove clean and tighten all terminal connections.
	Defective starter motor.	Check starter motor brushes, brush spring tension, thrown solder on brush cover. Repair or install new starter motor.
	Dirty or worn commutator.	Inspect commutator. Clean and turn commutator.
STARTER EXCESSIVELY NOISY.	Worn starter pinion gear or broken teeth on ring gear.	Inspect starter pinion gear and ring gear. Replace defective parts.

11A-67. PRIMARY MAINTENANCE. Refer to paragraph 11-67.

11A-68. STARTER MOTOR. Refer to paragraph 11-68.

11A-69. REMOVAL AND INSTALLATION. Refer to paragraph 11-69.

11A-70. EXHAUST SYSTEM. Refer to paragraph 11-70.

11A-71. DESCRIPTION. Refer to paragraph 11-71.

11A-72. REMOVAL AND INSTALLATION. Refer to paragraph 11-72.

11A-73. INSPECTION. Refer to paragraph 11-73.

11A-74. EXTREME WEATHER MAINTENANCE. Refer to paragraph 11-74.

11A-75. COLD WEATHER. Refer to paragraph 11-75.

11A-76. DUSTY CONDITIONS. Refer to paragraph 11-76.

11A-77. SEACOAST AND HUMID AREAS. Refer to paragraph 11-77.

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SECTION 12

FUEL SYSTEM

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12-1. FUEL SYSTEM.

- 12-2. **DESCRIPTION.** The 172 and 172Q Series airplanes are equipped with either a standard fuel system, an optional long-range fuel system, or beginning with Serials 17274010, F17202070, and 17275869 (172Q), an optional extended range "wet wing" system. The standard and long-range systems are essentially the same, differing mainly in fuel tank capacity. The extended range system consists of an integral fuel bay in the inboard end of each wing. Fuel flows by gravity from two aluminum tanks (one per wing) in the standard and long-range systems, and from an integral fuel bay area in each wing in the extended range system, to a four-position selector valve, through an electric auxiliary fuel pump (172Q) through a firewall-mounted fuel strainer to the carburetor and engine primer. Depending upon selector valve handle position, fuel is directed from either or both tanks or bays to the engine, or flow can be shut off completely. An important aspect of the gravity type fuel system is positive venting of all tanks or bays. Venting is accomplished in all three systems by an overboard vent line equipped with a vent check valve, incorporated in the left fuel tank or bay. The vent line protrudes through the bottom of the left wing into the airstream. In addition, a vent crossover line connects the airspace in the left tank to the airspace in the right tank where a vented fuel tank cap is installed. An electric fuel quantity indicating system consisting of two float type transmitters (one per tank or bay) and two indicators mounted on the instrument panel display approximate fuel quantity to the pilot. The pilot primes the engine for starting using a manual primer which takes fuel from the fuel strainer and directs it to number four cylinder (172), or three cylinders (172Q).

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- 12-3. **PRECAUTIONS.** Observe the following general precautions and rules during fueling, defueling, tank or integral fuel bay purging, repairing, assembly or disassembly of system components, and electrical system checks and repairs on the airplane fuel system:

WARNING

During all fueling procedures, fire fighting equipment must be available. Attach a ground wire from approved ground stakes to the mooring eyebolt on LH and RH wing struts or mooring ring on LH and RH wings. Ground fuel nozzle to airplane during fueling operations.

- a. Plugs or caps should be placed on all disconnected hoses, lines and fittings to prevent residual fuel drainage, thread damage, or entry of dirt or foreign material into fuel system.

12-4. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
NO FUEL TO CARBURETOR.	Fuel selector valve not turned on.	Turn valve on.
	Fuel tanks or bays empty.	Service with proper grade and amount of fuel.
	Plugged fuel strainer.	Remove and clean strainer and screen.
	Fuel line plugged.	Clean out or replace fuel line.
	Fuel tank or bay outlet strainers plugged.	Remove and clean strainers and flush out fuel tanks or bays.
	Inlet elbow or inlet screen in carburetor plugged.	Clean and/or replace.
	Fuel line disconnected or broken.	Connect or repair fuel lines.
FUEL STARVATION AFTER STARTING.	Defective fuel selector valve.	Repair or replace selector valve.
	Partial fuel flow from the preceding causes.	Use the preceding remedies.
	Plugged fuel vent.	See paragraph 12-11.

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12-4. TROUBLE SHOOTING (CONT).

TROUBLE	PROBABLE CAUSE	REMEDY
FUEL STARVATION AFTER STARTING (CONT).	Water in fuel.	Drain fuel tank or bay sumps, fuel lines and fuel strainer.
NO FUEL QUANTITY INDICATION.	Fuel tanks or fuel bays empty.	Service with proper grade and amount of fuel.
	Open circuit breaker.	Reset circuit breaker. Refer to Section 15.
	Loose connections or open circuit.	Tighten connections; repair or replace wiring. Refer to Section 20.
	Defective fuel quantity indicator or transmitter.	Refer to Section 15.
PRESSURIZED FUEL TANK OR BAY.	Plugged bleed hole in fuel vent.	Check per paragraph 12-11.

12-5. FUEL TANKS.

12-6. DESCRIPTION. A rigid metal tank is installed in the inboard panel of each wing. Sump drain valves, one in each tank, are provided for draining trapped water and sediment. Airplanes 17261445, 17267585 and On and F17201515 and On incorporating SK172-116 have one additional quick drain valve installed in the lower outboard corner of the tank for draining trapped water and sediments. Airplanes incorporating SK172-135 have four additional quick drain valves in each tank for draining trapped water and sediment.

12-7. REMOVAL AND INSTALLATION.

- Remove sump drain valve and drain fuel from applicable tank. (Observe precautions in paragraph 12-3.)
- Remove fuel tank cover by removing attaching screws.
- Remove wing root fairings.
- Disconnect and plug or cap all fuel and vent lines from tank. Remove fittings as necessary for clearance when removing tank.
- Disconnect electrical lead and ground strap from fuel quantity transmitter.
- Disconnect straps securing fuel tank and remove tank. Use care to avoid damage to protruding fittings and hose connections when removing the tank.
- To install tank, reverse the preceding steps. Be sure grounding is secure in accordance with figure 12-3.

12-8. FUEL QUANTITY TRANSMITTERS. Fuel quantity transmitters are installed in the top of fuel tanks. A complete description, along with procedures for removal, installation and adjustment are contained in Section 15.

12-9. FUEL VENTS.

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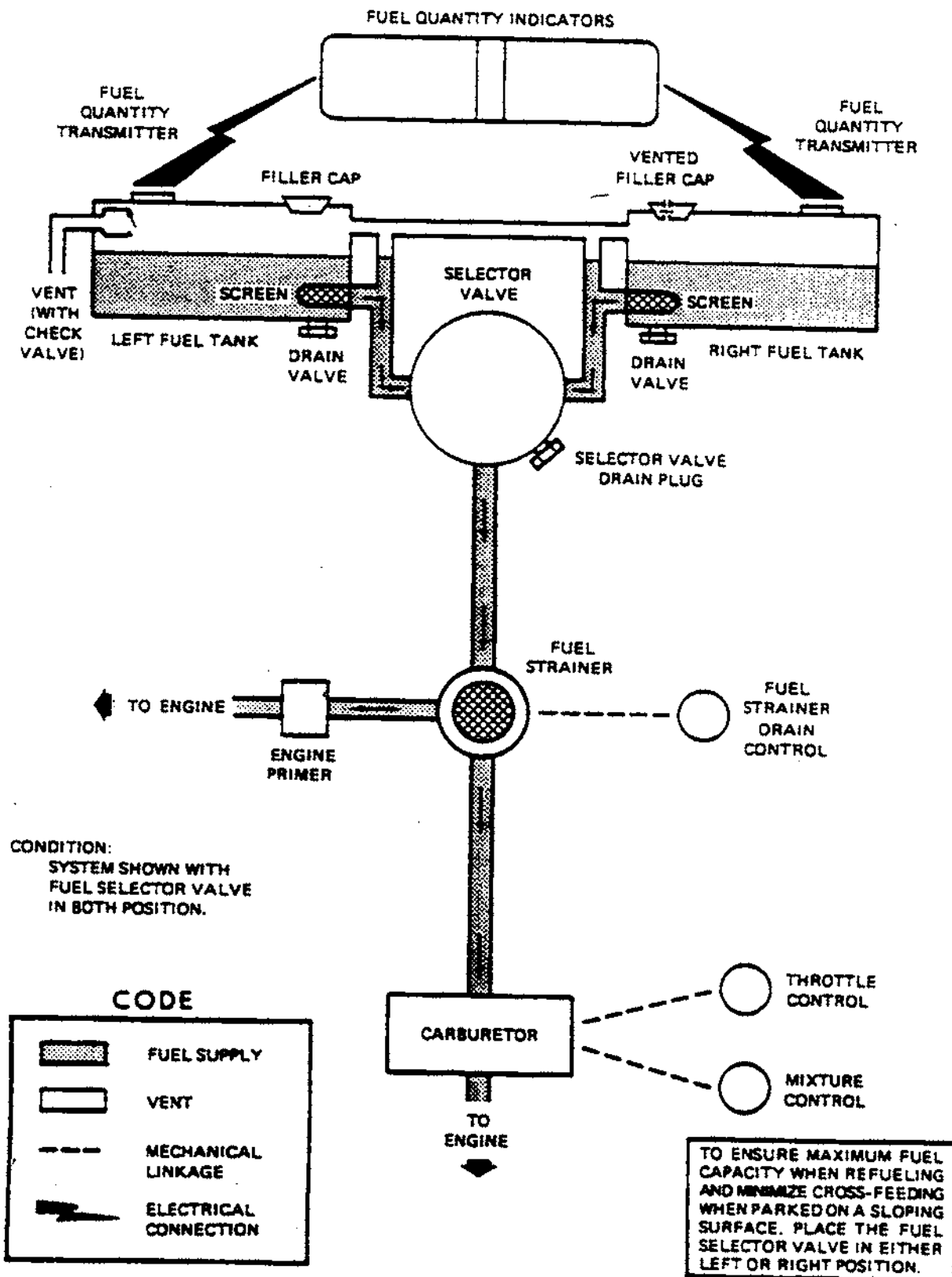
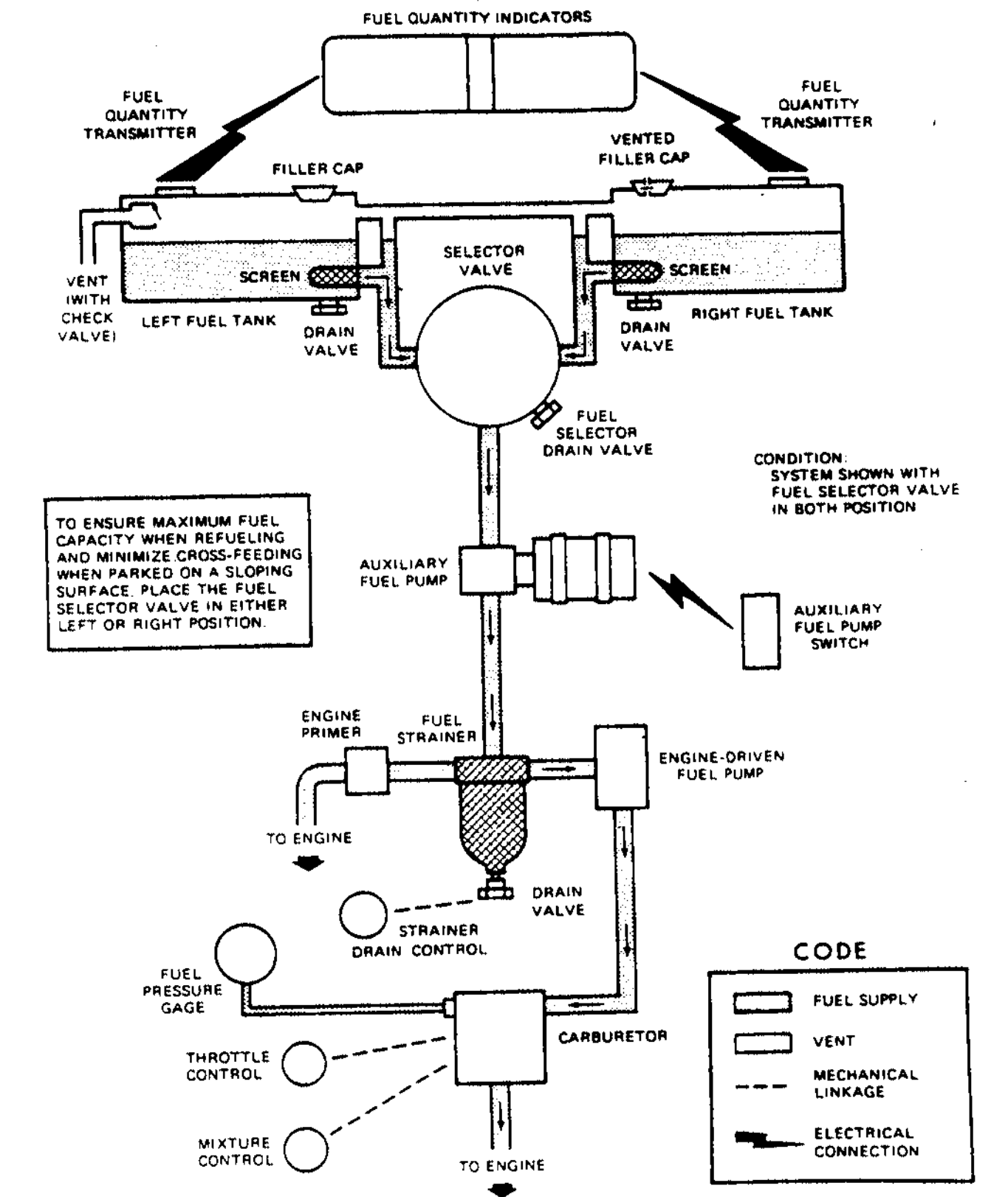


Figure 12-1. 172 Fuel System Schematic (Sheet 1 of 2)

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MODEL 172Q SERIES AIRPLANES

Figure 12-1. 172 Fuel System Schematic (Sheet 2 of 2)

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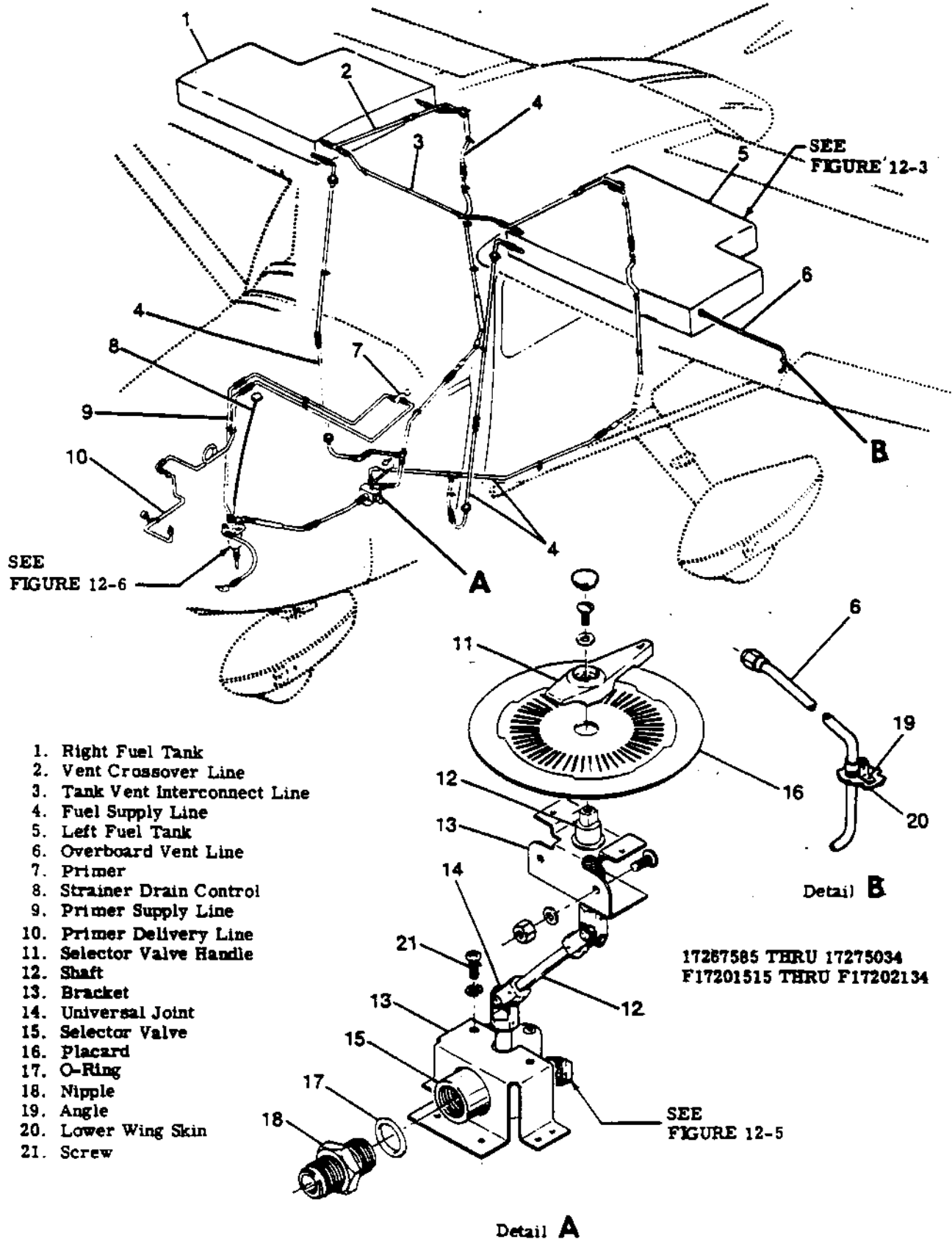
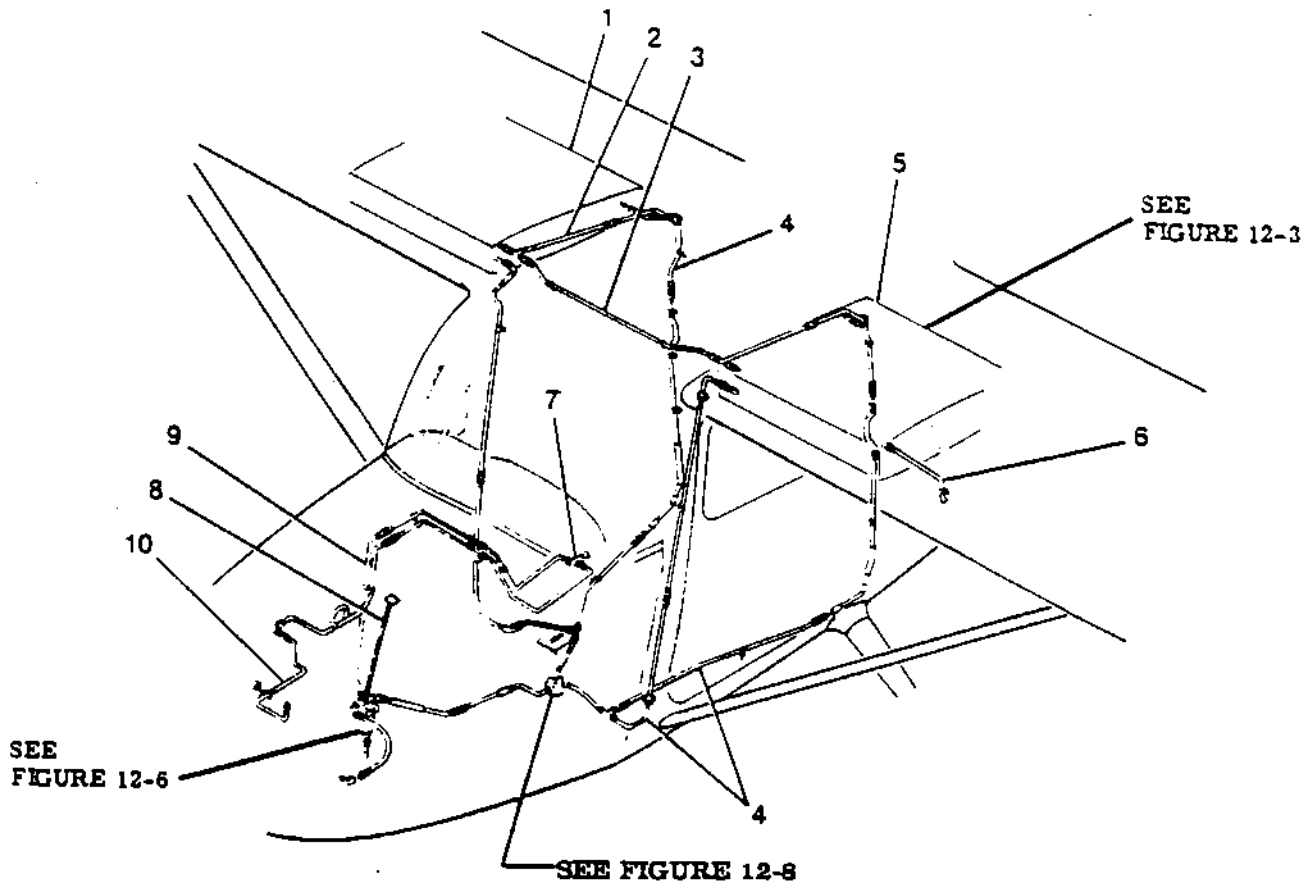


Figure 12-2. Fuel System (Sheet 1 of 2)

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1. Right Fuel Tank
2. Vent Crossover Line
3. Vent Tank Interconnect Line
4. Fuel Supply Line
5. Left Fuel Tank
6. Overboard Vent Line
7. Primer
8. Strainer Drain Control
9. Primer Supply Line
10. Primer Delivery Line

BEGINNING WITH 17275035
AND F17202135

WARNING

ASSURE THAT ALL CONTAMINATE, INCLUDING WATER, ARE REMOVED FROM FUEL AND FUEL SYSTEM BEFORE FLIGHT. FAILURE TO ASSURE CONTAMINANTS FREE FUEL, AND HEED ALL SAFETY INSTRUCTIONS AND OTHER ADVERTISING PRIOR TO FLIGHT CAN RESULT IN SERIOUS INJURY OR DEATH.

0700000-11

IN CLEAR VIEW OF THE PILOT

Figure 12-2. Fuel System (Sheet 2 of 2)

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- 12-10. **DESCRIPTION.** A vent line is installed in the outboard end of the left fuel tank and extends overboard down through the lower wing skin. The inboard end of the vent line extends into the fuel tank, then forward and slightly upward. A vent valve is installed on the inboard end of the vent line inside of the fuel tank. A crossover line connects the two tanks together. A tee is installed on each end of the crossover line. A separate vent line is attached to the tees, connecting the crossover line to each of the aft fuel supply lines from each fuel tank. See figure 12-2. In addition, the right-hand fuel tank cap includes a small vent safety valve to ensure positive fuel tank venting.
- 12-11. **CHECKING.** If stoppage of either the fuel vent or vent bleed hole occurs, with the engine running, it can lose power, and eventually stop due to fuel starvation, which can lead to collapsing of fuel tank. If the above stoppage occurs during a non-run period, fuel expansion can pressurize the fuel tanks causing fuel spillage, or can even rupture the tank.
- Attach a rubber tube to the end of vent line beneath the wing.
 - Blow into tube to slightly pressurize tank. If air can be blown into tank, vent line is open.
 - After tank is slightly pressurized, insert end of rubber tube into a container of water and watch for a continuous stream of bubbles, which indicates the bleed hole in valve assembly is open and relieving pressure.
 - After completion of step "c", blow into tube again to slightly pressurize the tank, and loosen, but do not remove filler cap on opposite wing to check tank crossover line. If pressure escapes from filler cap, crossover line is open.

NOTE

Remember that a plugged vent line or bleed hole can cause either fuel starvation and collapsing of fuel tanks or the pressurization of tanks by fuel expansion.

- Any fuel vent found plugged or restricted must be corrected prior to returning aircraft to service.

WARNING

The fuel vent line protruding beneath the wing near the wing strut must be correctly aligned to avoid possible icing of the vent tube. Dimensions are shown in figure 12-4.

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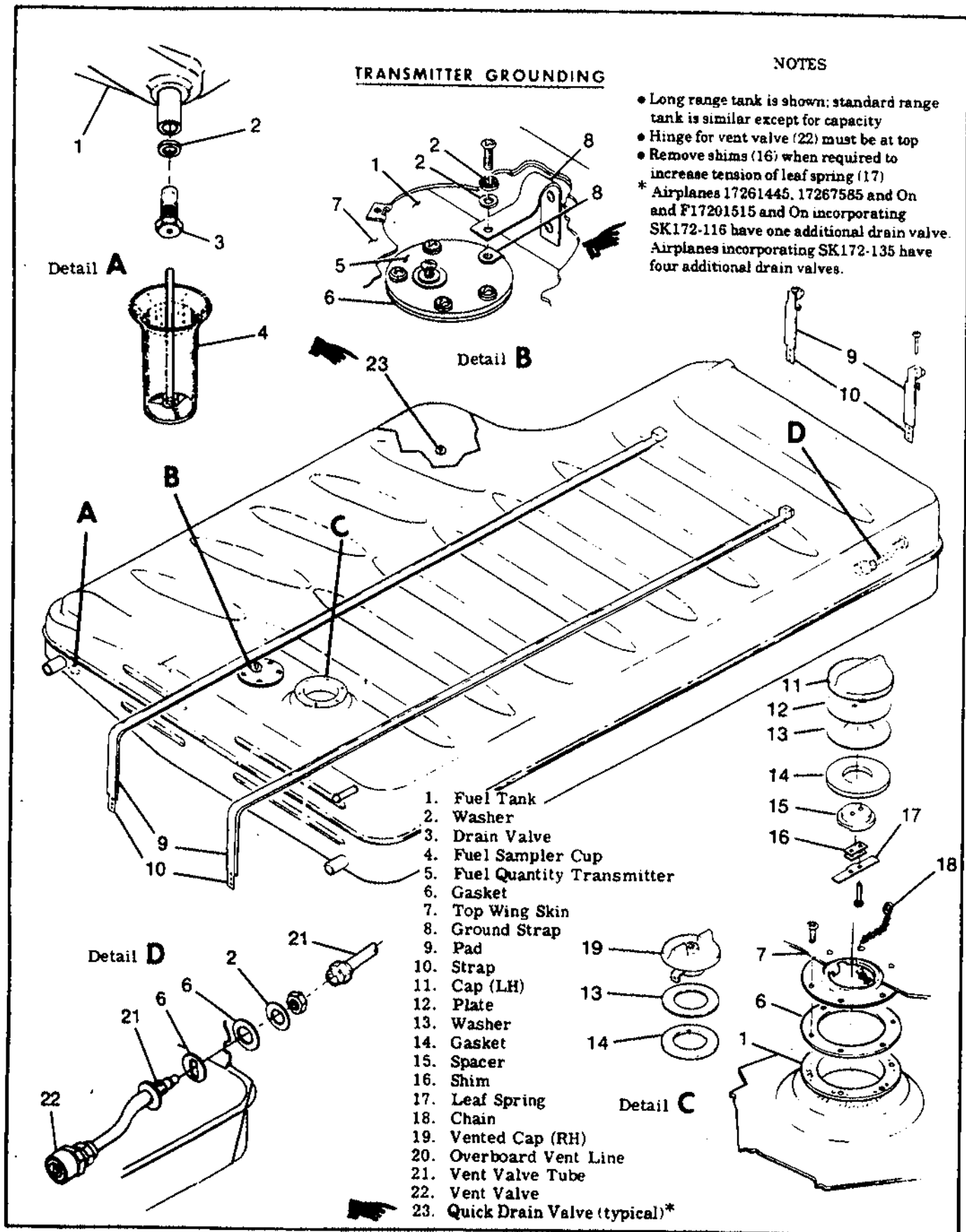
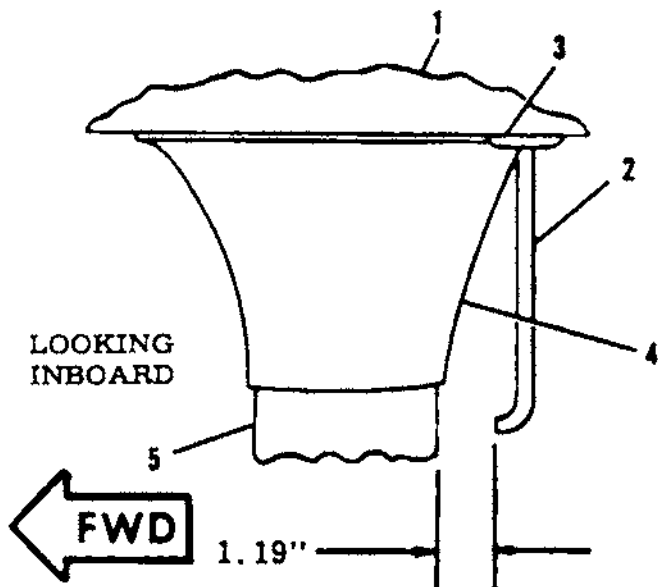
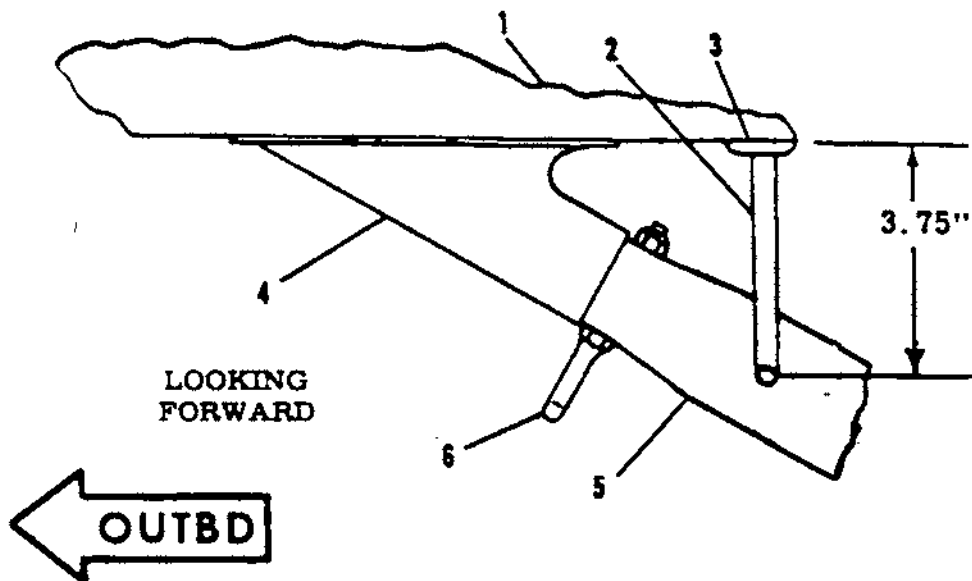


Figure 12-3. Fuel Tank

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1. Wing	4. Fairing
2. Vent	5. Wing Strut
3. Grommet	6. Tie-Down Ring

Figure 12-4. Fuel Vent Location

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- 12-12. FUEL SELECTOR VALVE. (See figure 12-5.)
- 12-13. DESCRIPTION. A four position fuel selector valve is located beneath the floorboard just aft and slightly to the left of the pedestal structure. A shaft links the valve to a handle mounted on the pedestal structure. The positions of the handle are labelled "OFF, LEFT, BOTH ON and RIGHT". Beginning with 17275035 and F17202135, a drain valve assembly is located in the bottom of the selector valve body for sampling and draining of fuel. Valve repair is limited to replacement of component parts only.
- 12-14. REMOVAL AND INSTALLATION. (See figure 12-2.)
- Drain all fuel from wing tanks, fuel strainer, lines and selector valve, observing precautions outlined in paragraph 12-3.
 - Remove selector valve handle (11) and pedestal cover.
 - Peel back carpet as required to gain access to inspection plates aft of pedestal structure.
 - Disconnect lower universal joint (14) at valve shaft.
 - Disconnect and cap inlet and outlet fuel lines to valve.
 - Remove screws (21) attaching valve to mounting bracket (13) and withdraw valve.
 - Reverse preceding steps for installation. Service aircraft in accordance with Section 2, turn fuel selector valve to ON position and check for leaks.
 - Replace items removed for access.
- 12-15. DISASSEMBLY. (See figure 12-5.)
- Remove fuel selector valve in accordance with paragraph 12-14.
 - Remove screws (1) securing cover (2) to valve body (7) and carefully remove cover. Discard O-rings (15) and (8), but retain ball (3) and spring (4) for reinstallation.
 - Slowly withdraw rotor (5) from valve body.

NOTE

Removal of rotor (5) will allow seal (8), O-ring (9), washer (10) and spring (11) (one each installed in both inlet ports) to pop free.

- Remove washer (16), plug (13) and O-ring (12).

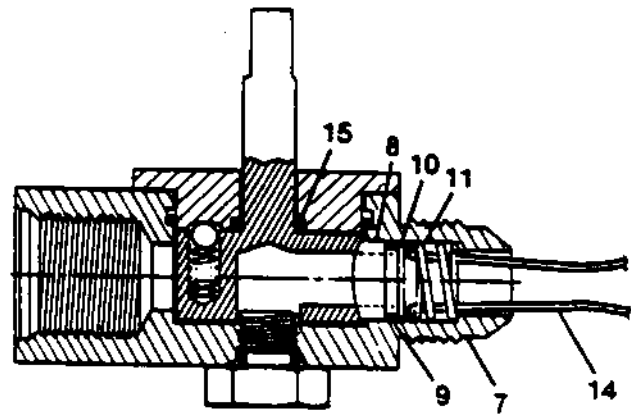
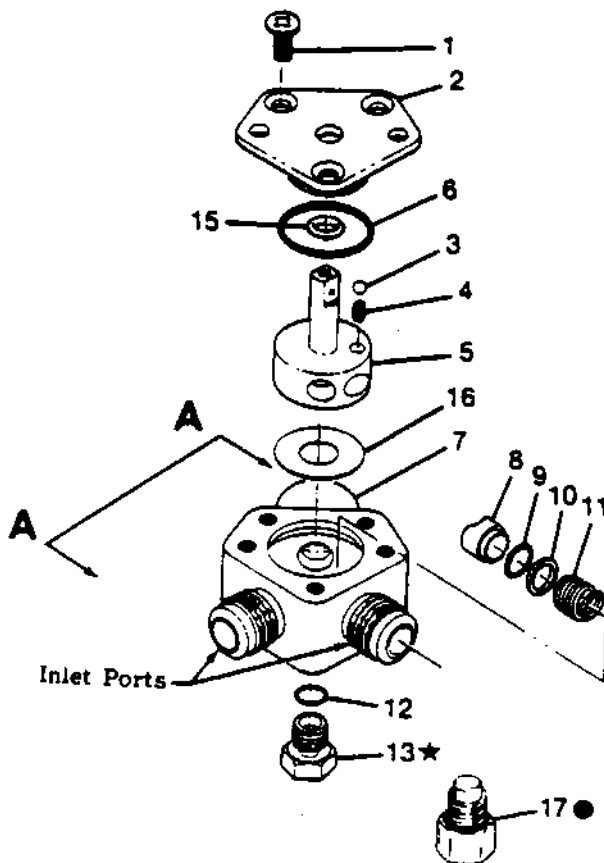
- 12-16. CLEANING, INSPECTION AND REPAIR. (See figure 12-5.)

NOTE

Repair of damaged or worn parts of the selector valve assembly is NOT authorized and therefore, is limited to replacement of component parts only.

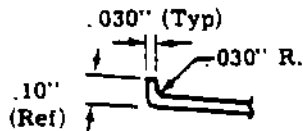
- Clean disassembled parts by washing in Stoddard solvent or equivalent. Blow parts dry using clean compressed air.

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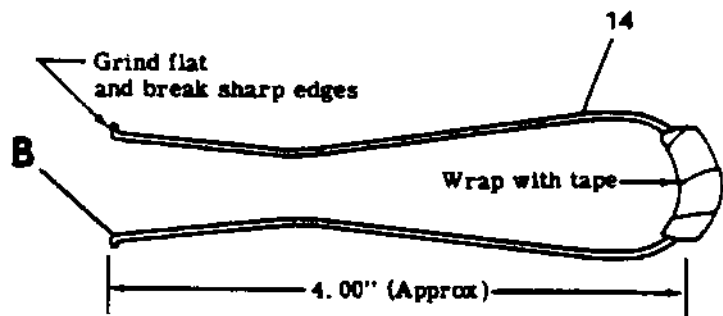


★ 17267585 THRU 17275034
F17201515 THRU F17202134

● Beginning with 17275035
and F17202135



Detail B



NOTES

Fabricate two spring compressors (14) from 1/16 inch diameter #1 OX-WELD AC welding rod (or equivalent) according to dimensions shown.

All dimensions in inches.

1. Screw	9. O-Ring
2. Cover	10. Washer
3. Ball	11. Spring
4. Spring	12. O-Ring
5. Rotor	13. Plug
6. O-Ring	14. Spring Compressor
7. Body	15. O-Ring
8. Seal	16. Washer
	17. Drain Valve Assembly

Figure 12-5. Fuel Selector Valve and Spring Compressor

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- b. Inspect all parts for obvious wear or damage as follows:
 - 1. Check detent holes in cover (2) for excessive wear and examine bearing surfaces with rotor (5).
 - 2. Inspect shaft and bearing surfaces of rotor (5) for removal of black anodized finish indicating wear. Check for internal corrosion of drilled passages.
 - 3. Examine valve body (7) for wear, cracks, distortion and internal corrosion. Any damage to thread surfaces at inlet and outlet ports or cover attach screw holes is cause for rejection.

12-17. REASSEMBLY. (See figure 12-5.)

NOTE

Reassembly of selector valve is facilitated by mounting in a bench vise or equivalent bench support, making sure valve body (7) is protected from damage. Fabrication of spring compressors (14) (two required) is recommended before reassembly. Replace O-rings (6, 9 and 15) whenever rotor is removed from valve body.

- a. Insure all component parts are clean, then coat sparingly with lightweight engine oil.
- b. Insert washer (16) and springs (11) into body (7).
- c. With spring compressors (14) in place as shown in Section A-A, compress springs (11) and install washers (10), new O-rings (9) and seals (8) into inlet ports.
- d. Holding springs compressed, carefully insert rotor (5) into valve body (7). Release spring compressors and check for proper seating of seals to rotor.
- e. Insert new O-ring (6) into recess at top of valve body (7).
- f. Place new O-ring (15) over shaft of rotor.
- g. Lubricate spring (4) and ball (3) with lubricant conforming to Military Specification VV-P-236 (USP Petrolatum or equivalent), insert spring into hole in top of rotor.
- h. Place ball on spring and turn rotor as required to index one of the detent holes in cover (2).
- i. Attach cover (2) and test rotation of rotor shaft for ease of operation and positive detent engagement.
- j. Replace plug (13) using new O-ring (12).
- k. Reinstall selector valve in accordance with paragraph 12-14.

12-18. FUEL STRAINER. (See figure 12-6.)

- 12-19. DESCRIPTION. The fuel strainer is mounted at the firewall in the lower engine compartment. The strainer is equipped with a quick-drain valve which provides a means of draining trapped water and sediment from the fuel system. The quick-drain control is located adjacent to the oil dipstick and is accessible through the oil dipstick door in the upper engine cowl.

NOTE

The fuel strainer can be disassembled, cleaned and reassembled without removing the assembly from the aircraft. (Refer to paragraph 12-21.)

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- 12-20. REMOVAL AND INSTALLATION. (See figure 12-6.)
- Remove cowling as necessary to gain access to strainer.
 - With selector valve in "OFF" position, drain fuel from strainer and lines with strainer quick-drain control.
 - Disconnect and cap or plug all fuel lines and controls from strainer. (Observe precautions in paragraph 12-3.)
 - Remove bolts attaching assembly to firewall and remove strainer.
 - Reverse the preceding steps for installation. With selector valve in "ON" position check for leaks and proper operation of quick-drain valve.
- 12-21. DISASSEMBLY AND ASSEMBLY. (See figure 12-6.)
- With selector valve in "OFF" position, drain fuel from bowl and lines with quick-drain control.
 - Remove drain tube, safety wire, nut and washer at bottom of filter bowl and remove bowl.
 - Carefully unscrew standpipe and remove.
 - Remove filter screen and gasket. Wash filter screen and bowl with solvent (Federal Specification P-S-681, or equivalent) and dry with compressed air.
 - Using a new gasket between filter screen and top assembly, install screen and standpipe. Tighten standpipe only finger tight.
 - Using all new O-rings, install bowl. Note that step-washer at bottom of bowl is installed so that step seats against O-ring. Connect drain tube.
 - With selector valve in "ON" position, check for leaks and proper operation of quick-drain valve.
 - Safety wire bottom nut to top assembly. Wire must have right-hand wrap, at least 45 degrees.
- 12-22. PRIMING SYSTEM.
- 12-23. DESCRIPTION. The Model 172-Series airplanes employ a standard manually-operated priming system which primes one cylinder. Fuel is supplied by a line from the strainer to the plunger-type primer. Operating the primer delivers fuel to the intake port of the cylinder. A three-cylinder priming system is available as optional equipment. Operating the primer on this optional system delivers fuel to the intake port of each individual cylinder except No. 3.
- 12-24. REMOVAL. (See figure 12-7.)

NOTE

Removal of primer from instrument panel requires disassembly of primer.

- Place fuel shutoff valve in the OFF position.
- Spread drip cloth under left-hand instrument panel.
- Disconnect and cap or plug primer lines at primer.
- Unlock primer knob and pull aft to clear packing nut (5).
- Unscrew packing nut (5).
- Withdraw primer knob and piston rod from instrument panel.
- The primer barrel assembly can now be worked free from the instrument panel on the firewall side of the panel.

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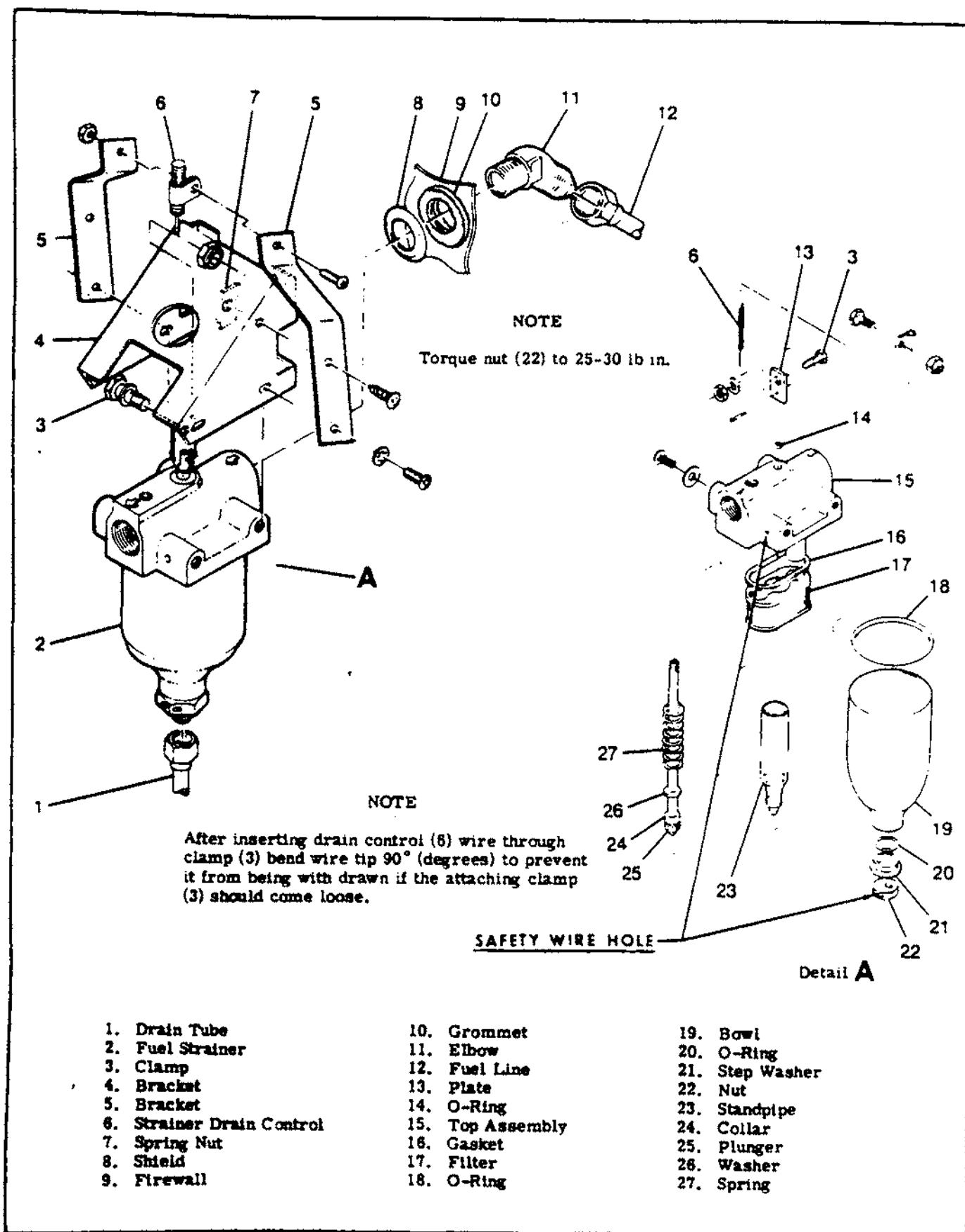
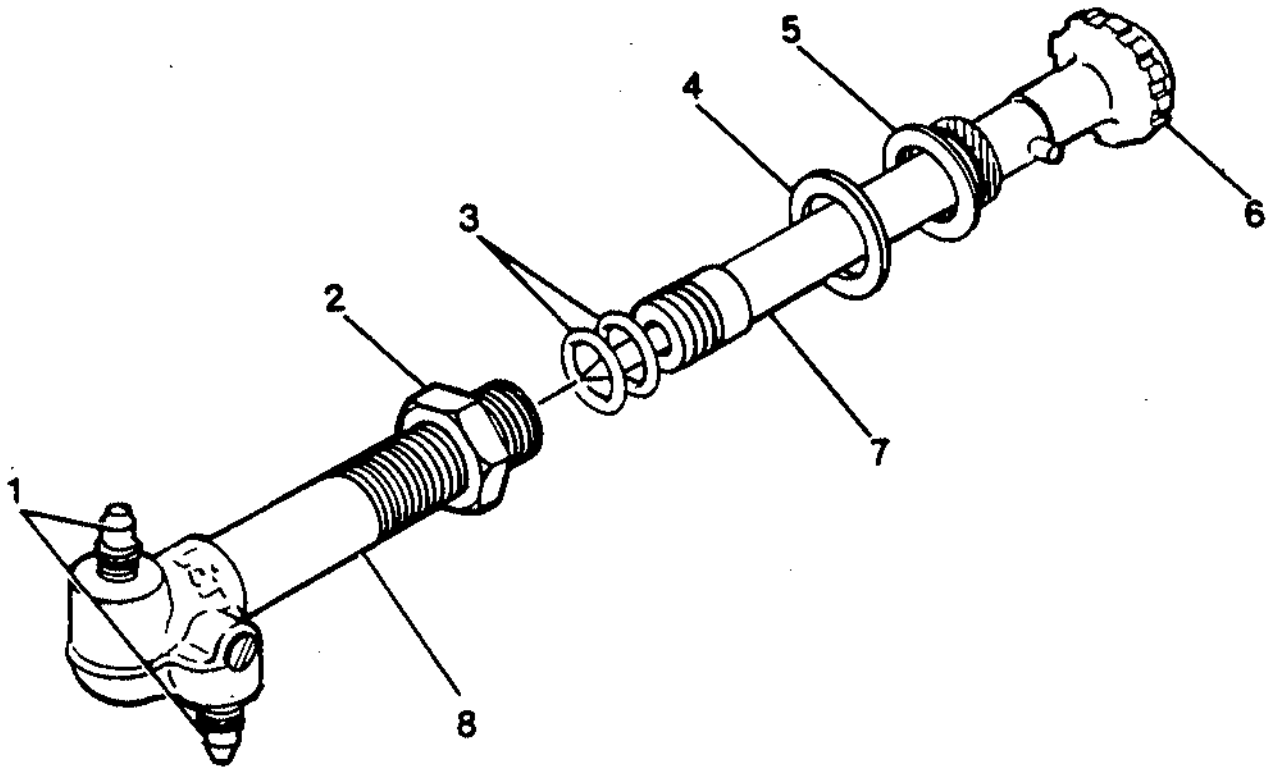


Figure 12-6. Fuel Strainer

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1. Fitting	4. Washer	7. Piston Rod
2. Locknut	5. Packing Nut	8. Barrel
3. O-Ring	6. Knob	

Figure 12-7. Primer Assembly

- 12-25. **INSPECTION.** (See figure 12-7.) Visually inspect the primer lines for crushed, kinked, or broken condition. Ensure proper clamping to prevent fatigue due to vibration or chafing. Ensure barrel assembly (8) cylinder wall is free of signs of pitting, corrosion, or scoring and that O-rings (3) are in good condition.

NOTE

To remove O-rings (3) from piston rod (7), squeeze O-rings in grooves of piston rod with thumb and index finger. Work O-rings over end of piston rod. O-rings can be refitted to their grooves on piston rod (8) in a similar manner.

CAUTION

Do not damage O-rings (3).

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12-26. INSTALLATION. (See figure 12-7.)

- a. From the firewall side of the instrument panel, insert barrel assembly (8) through hole in panel. Ensure that washer (4) is installed on barrel between locknut (2) and firewall side of panel.

CAUTION

Do not damage O-rings (3) during step "b".

- b. While holding barrel assembly (8) firmly in place, insert piston rod assembly (7) into barrel.
- c. The distance the barrel protrudes through hole in panel can be adjusted by turning locknut (2).
- d. Tighten packing nut (5) against panel.
- e. Unplug or uncap fittings on primer lines and attach to primer fittings (1).
- f. Turn fuel shutoff valve to the ON position.
- g. Check primer for proper pumping action and positive fuel shutoff in the locked position.

12-26A. AUXILIARY ELECTRIC FUEL PUMP. (MODEL 172Q).

12-26B. DESCRIPTION. The electric fuel pump is located under the floorboards on the RH side of the cabin. It is plumbed into the fuel system parallel with the engine-driven fuel pump. The auxiliary electric fuel pump may be used as a standby in case of engine-driven fuel pump failure. The pump is controlled by a rocker-switch located on the switch and control panel adjacent to the master switch.

12-26C. REMOVAL AND INSTALLATION. (See figure 12-8.)

- a. Place fuel selector valve in OFF position.
- b. Turn the master switches and auxiliary fuel pump switch OFF.
- c. Disconnect fuel lines (16) and drain line (14) from pump (11). OBSERVE precautions outlined in paragraph 12-3.
- d. Disconnect electrical wires from pump (11).
- e. Loosen clamp (13) and remove fuel pump (11) from bracket (12).
- f. Reverse preceding steps for installation of pump.
- g. Check for proper operation and fuel leaks after installing pump.

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12-27. INTEGRAL FUEL BAYS.

12-28. **DESCRIPTION.** Beginning with Serials 17274010 and F17202070, an extended range fuel system is available. The extended range system is a wet wing configuration that consists of integral fuel bays in the inboard end of each wing, vented fuel cap for right wing fuel bay, non-vented fuel cap for left wing fuel bay, fuel quantity transmitters, mounted on the side of the left and right wing root rib assemblies, fuel vent valve assembly mounted on the inboard side of the left outboard fuel bay rib, fuel sump drain valves in the bottom inboard end of each fuel bay, fuel screens over the end of each fuel supply line, and baffles mounted on the bottom inboard surface of each fuel bay. In addition, airplanes incorporating SK182-100 have four quick drain fuel sump valves installed in each fuel bay.

12-29. **CLASSIFICATION OF FUEL LEAKS.** Fuel leaks which do not constitute a flight hazard are stains, seeps and heavy seeps NOT in an enclosed area. However, they should be repaired when the aircraft is grounded for other maintenance. Fuel leaks which constitute a flight hazard are running leaks in any area, seeps, heavy seeps, or stains in an enclosed area, such as the wing leading edge, the sections of wing inboard and outboard of the fuel bay and the area between the rear fuel spar and the main spar. These leaks must be repaired before that bay is used for another flight. The wet or stained spot on the wing in the area of the bay is an indication of the intensity of the leak. Fuel leak classifications are shown in figure 12-9.

NOTE

Stains and seeps that are not considered a flight hazard must be inspected after each flight to ensure that they have not grown in intensity to the point of causing a flight hazard.

If a leak causing a flight hazard should occur at a place where there are no facilities available to make an acceptable repair, it is recommended that the leaking bay be drained and some suitable material placed over the leak, if it is within an enclosed area of the wing, to eliminate escaping fumes. By switching the fuel selector valve to the other bay, the aircraft can then be flown to a base where the fuel leak can be repaired.

12-30. FUEL BAY PURGING.

WARNING

Purge fuel bays with an inert gas prior to repairing fuel leaks, to preclude the possibility of explosions.

The following procedure may be used to purge the bay with argon or carbon dioxide.

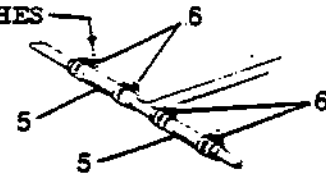
- a. Ground the aircraft to a suitable ground stake.
- b. Remove safety wire from shutoff valve control knob and pull control to "OFF" position. (Resafety control knob after completion of repair.)
- c. Drain all fuel from bay being repaired. (Observe the precautions in paragraph 12-3.)
- d. Remove access door and insert hose into bay.
- e. Allow inert gas to flow into bay for several minutes (time dependent upon hose size, rate of flow, etc.) to remove all fuel vapors.

Since argon and carbon dioxide are heavier than air, these gases will remain in the bay during the repair. The repair shall be made using non-sparking tools (air motors, plastic scrapers, etc.).

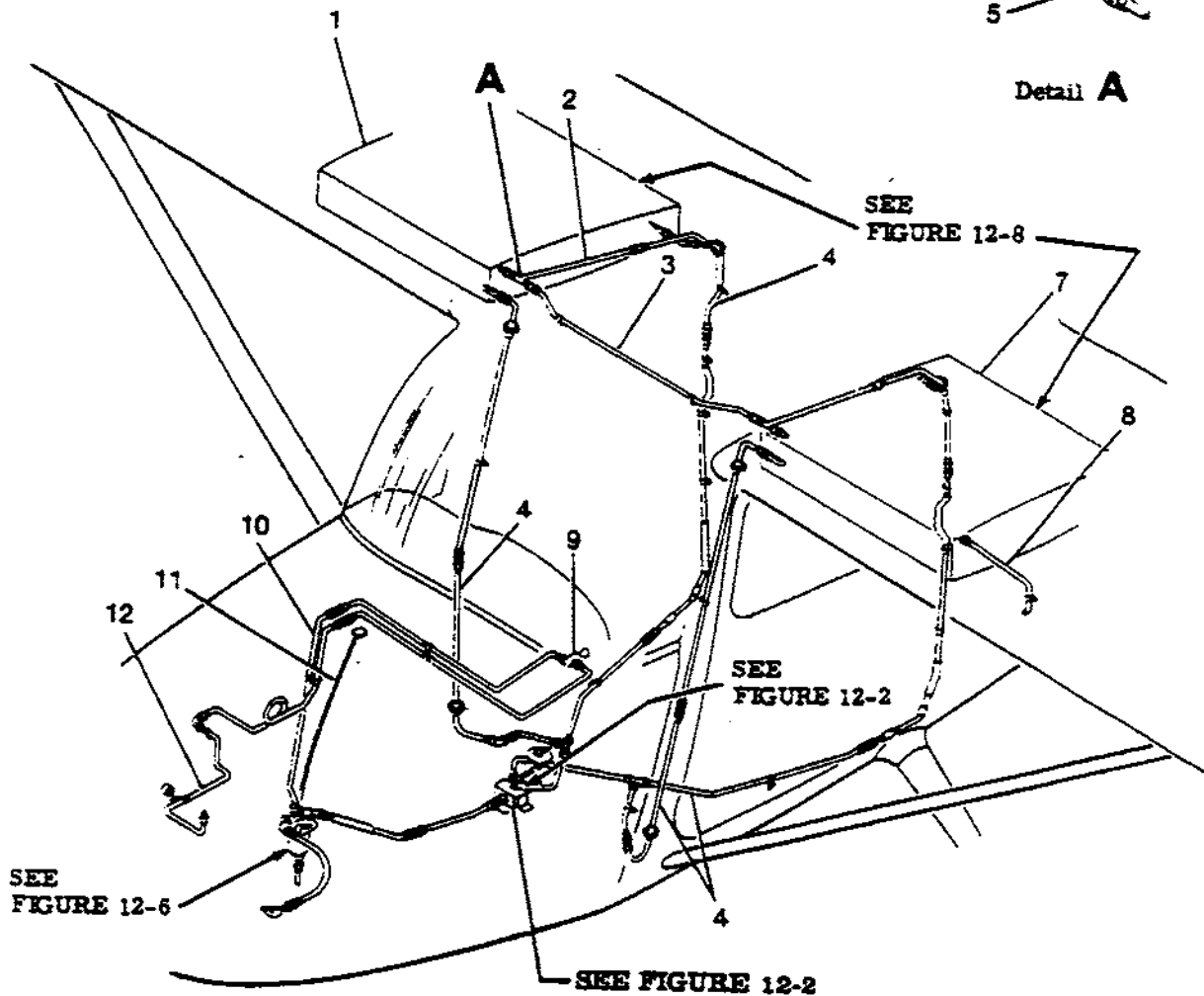
MODEL 172 SERIES SERVICE MANUAL

17274010 & ON
F17202070 & ON

MAXIMUM TORQUE
8 - 10 LB-INCHES
(4 - Places)



Detail A



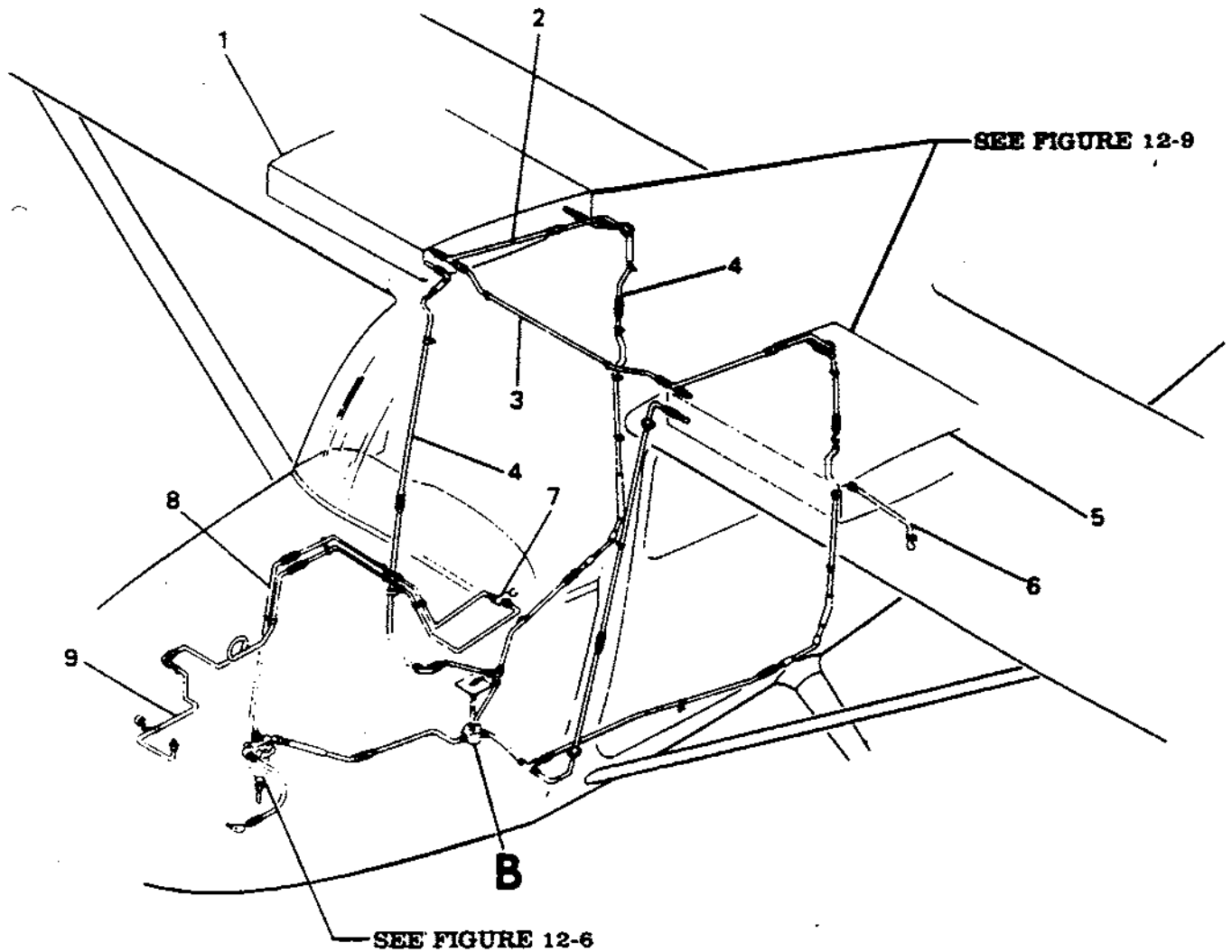
17274010 thru 17275034
F17202040 thru F17202134

172 SERIES AIRPLANES

1. Right Integral Fuel Bay	7. Left Integral Fuel Bay
2. Vent Crossover Line	8. Overboard Vent Line
3. Tank Vent Interconnect Line	9. Primer
4. Fuel Supply Line	10. Primer Supply Line
5. Hose	11. Strainer Drain Control
6. Clamp	12. Primer Delivery Line

Figure 13-8. Integral Bay Fuel System (Sheet 1 of 5)

MODEL 172 SERIES SERVICE MANUAL



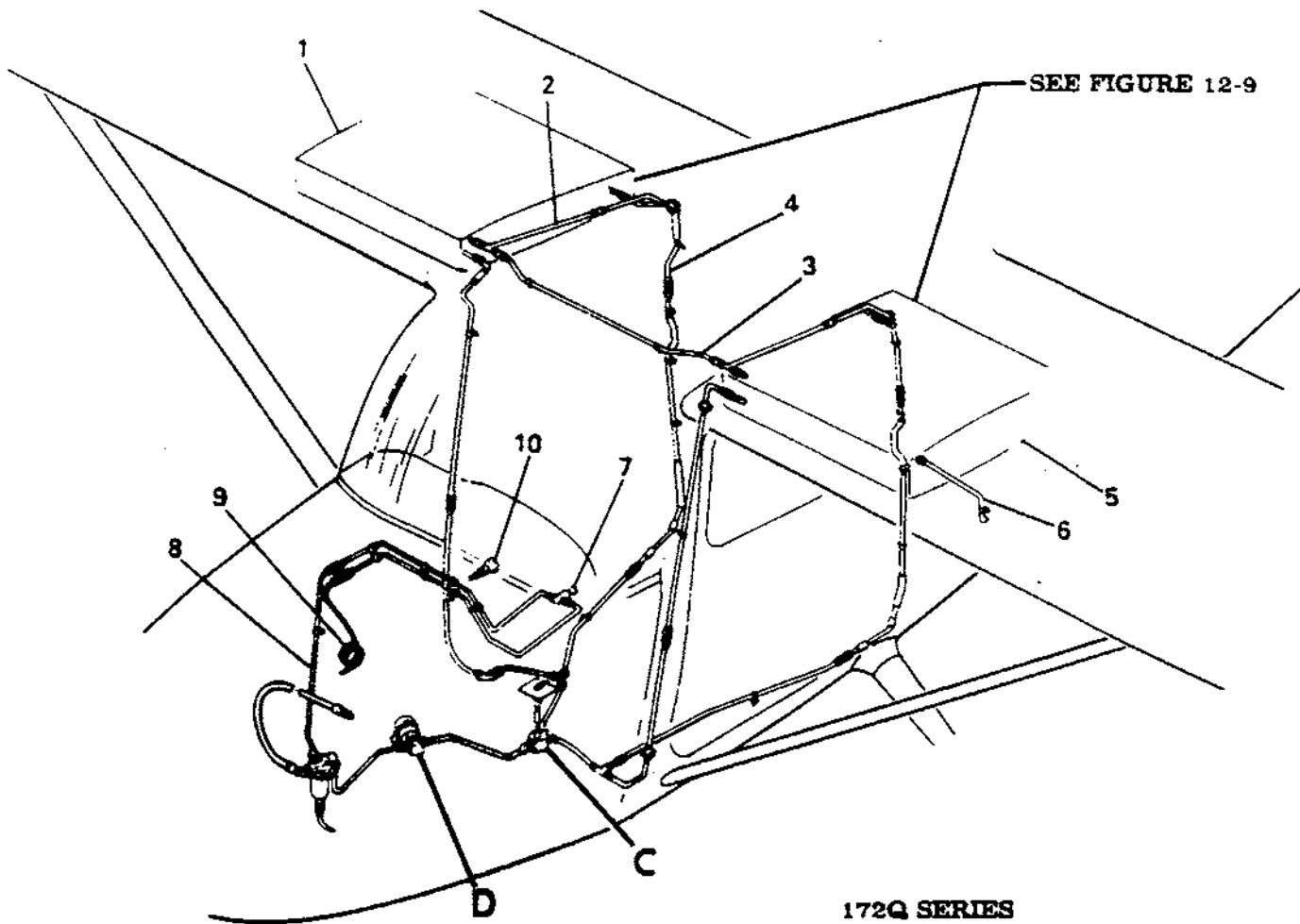
17275035 AND ON
F17202040 THRU F17202233

172 SERIES AIRPLANES

1. Right Integral Fuel Bay	6. Overboard Vent Line
2. Vent Crossover Line	7. Primer
3. Vent Interconnect Line	8. Primer Supply Line
4. Fuel Supply Line	9. Primer Delivery Line
5. Left Integral Fuel Bay	

Figure 12-8. Integral Bay Fuel System (Sheet 2 of 5)

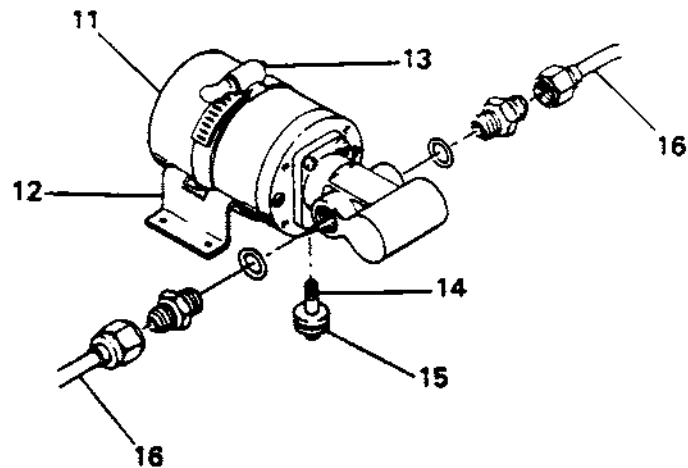
MODEL 172 SERIES SERVICE MANUAL



172Q SERIES

17275869 AND ON

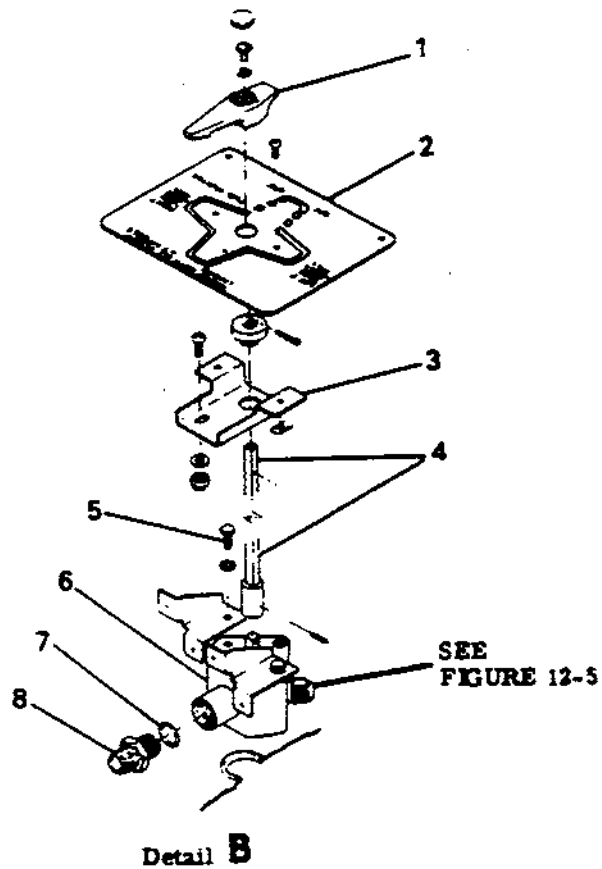
1. Right Integral Fuel Bay
2. Vent Crossover Line
3. Vent Interconnect Line
4. Fuel Supply Line
5. Left Integral Fuel Bay
6. Overboard Vent Line
7. Primer
8. Primer Supply Line
9. Primer Delivery Line
10. Fuel Pressure Gage
11. Fuel Pump
12. Fuel Pump Bracket
13. Clamp
14. Drain Line
15. Grommet
16. Fuel Lines



Detail D

Figure 12-8. Integral Bay Fuel System (Sheet 3 of 5)

MODEL 172 SERIES SERVICE MANUAL



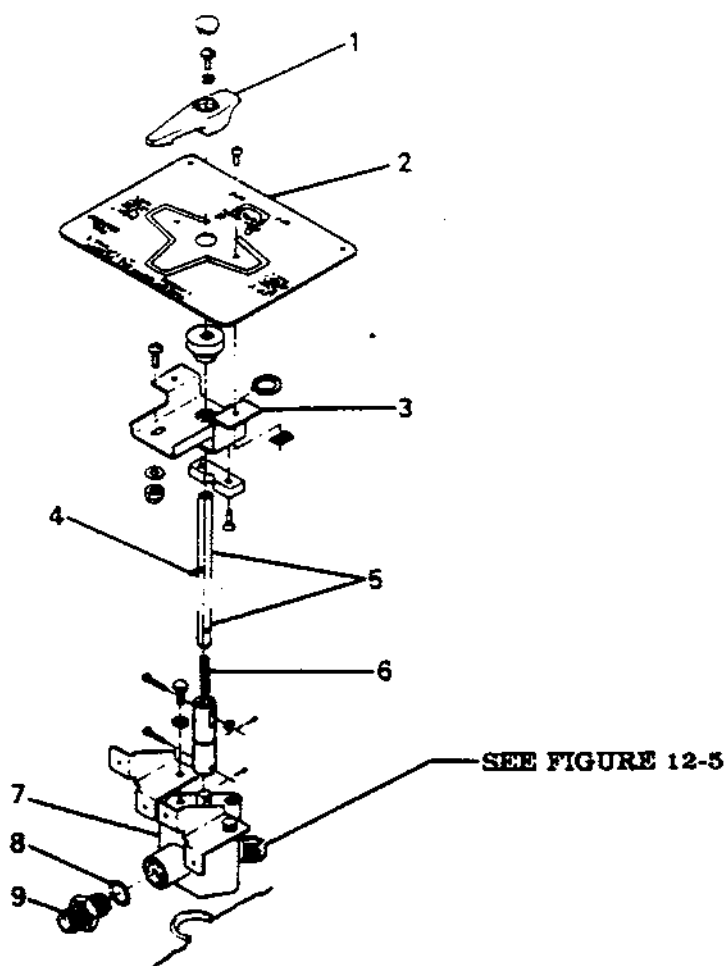
17275035 THRU 17276259
F17202135 THRU F17202233

1. Fuel Selector Valve Handle
2. Placard
3. Bracket
4. Shaft
5. Bolt
6. Selector Valve
7. O-Ring
8. Nipple

Figure 12-8. Integral Bay Fuel System (Sheet 4 of 5)

MODEL 172 SERIES SERVICE MANUAL

1. Fuel Selector Valve Handle
2. Placard
3. Bracket
4. Roll Pin
5. Shaft
6. Spring
7. Selector Valve
8. O-Ring
9. Nipple



Detail C

17276260 AND ON

NOTE

Roll pin (4) must be bonded to shaft (5) with EA9316, EA9309 or EA9314. The products may be purchased from Hystol Div. Dexter Corp., Willow Pass Rd; Pittsburg, CA 94565. Equivalent product, EC2216, may be purchased from 3M Co., St. Paul MN. 55119. Clean roll pin (4) and shaft (5) with MEK, and thoroughly dry parts before applying bonding agent. At 75°F, bond cures to 80% ultimate tensile strength within 24 hours. Accelerated cure times are as follows:

- (a) Five minutes at 250°F.
- (b) Ten minutes at 200°F.

Figure 12-8. Integral Bay Fuel System (Sheet 5 of 5)

MODEL 172 SERIES SERVICE MANUAL

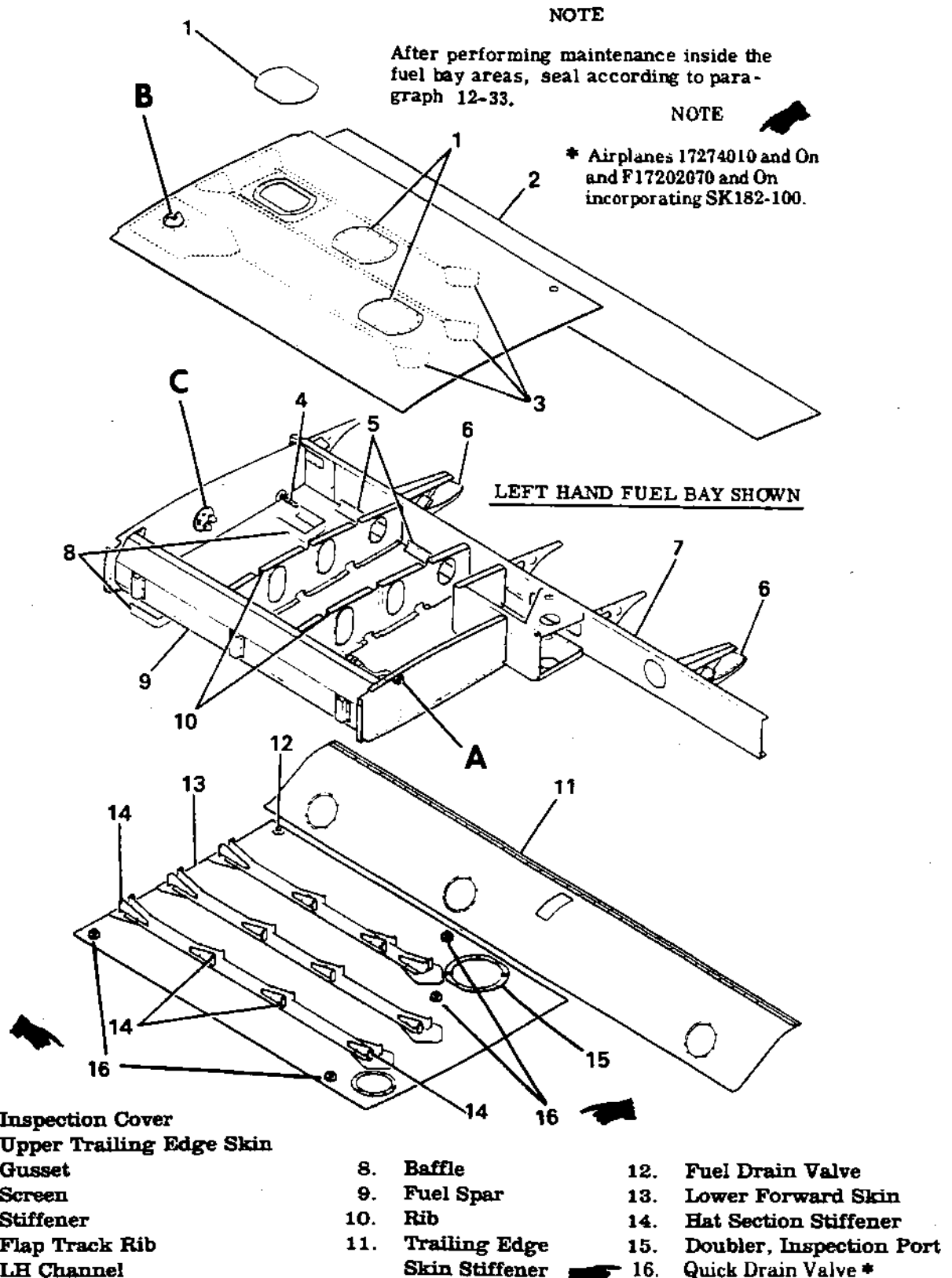
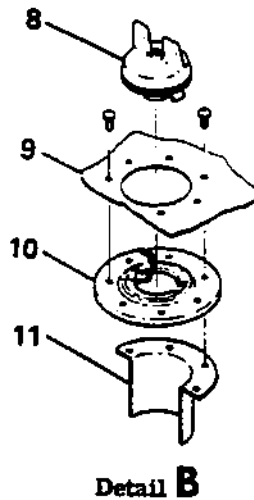
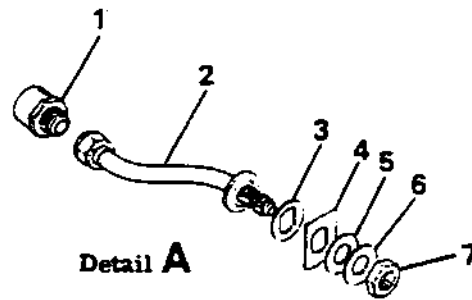


Figure 12-9. Integral Fuel Bay Installation (Sheet 1 of 4)

MODEL 172 SERIES SERVICE MANUAL



1. Fuel Vent Valve
2. Tube
3. Inner Gasket
4. Rib
5. Outer Gasket
6. Washer
7. Nut
8. Fuel Cap
9. Upper Wing Skin
10. Fuel Filler Neck
11. Filler Collar

NOTES

Hinge for vent valve (1) must be at top.

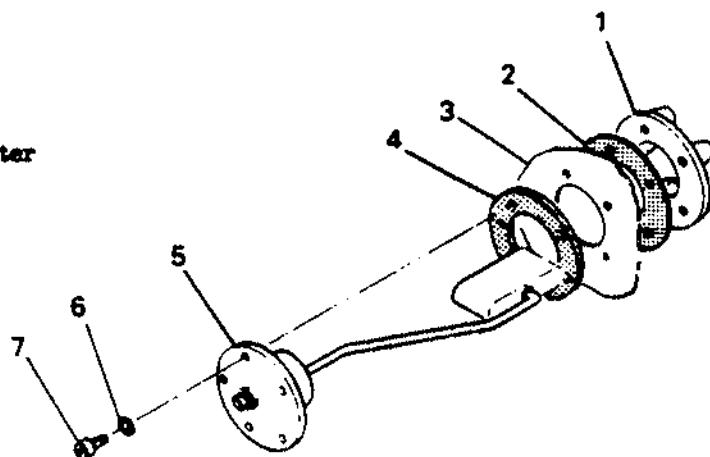
Install tube (2) with bend down.

LH fuel cap is non-vented, RH fuel cap is vented type (See figure 12-2).

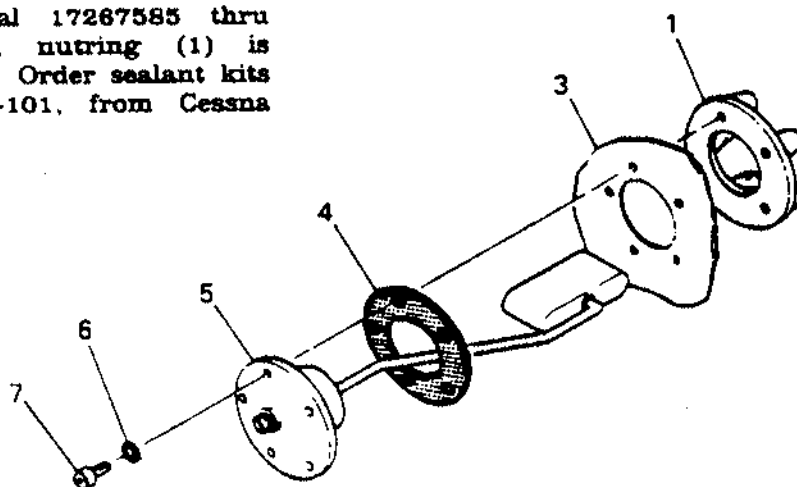
Figure 12-9. Integral Fuel Bay Installation (Sheet 2 of 4)

MODEL 172 SERIES SERVICE MANUAL

1. Nutring
2. Root Rib Gasket
3. Root Rib
4. Transmitter Gasket
5. Fuel Quantity Transmitter
6. Washer
7. Screw



Beginning with Serial 17267585 thru 17276330, 17276331, nutring (1) is bonded to root rib (2). Order sealant kits SK210-56, or SK210-101, from Cessna Supply Division.



17276331 AND ON

Detail C

NOTE

After installing washers (6) and screws (7) torque screws to 20 in/lbs (once only), using a cross-pattern sequence.

Figure 12-9. Integral Fuel Bay Installation (Sheet 3 of 4)

MODEL 172 SERIES SERVICE MANUAL

FUEL
100LL/100 MIN. GRADE AVIATION GASOLINE
CAP. 21.5 U.S. GAL.

Fuel Quantity Placard - Standard Tanks

FUEL
100LL/100 MIN. GRADE AVIATION GASOLINE
CAP. 27 U.S. GAL.

Fuel Quantity Placard - Long Range Tanks

FUEL
100LL/100 MIN. GRADE AVIATION GASOLINE
CAP. 34 U.S. GAL.
CAP. 24.0 U.S. GAL. TO BOTTOM OF FILLER COLLAR

Fuel Quantity Placard - Integral Tanks



Fuel Grade Placard

1. Fuel Cap (See figure 12-12)
2. Fuel Filler Collar

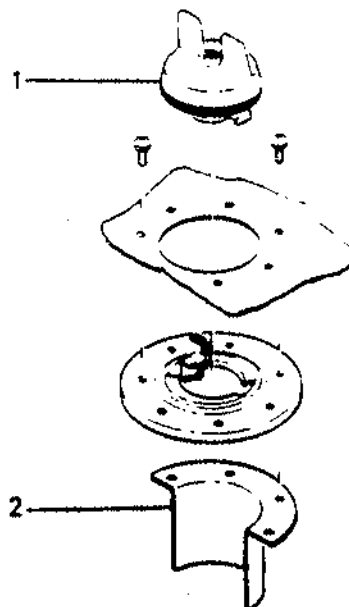
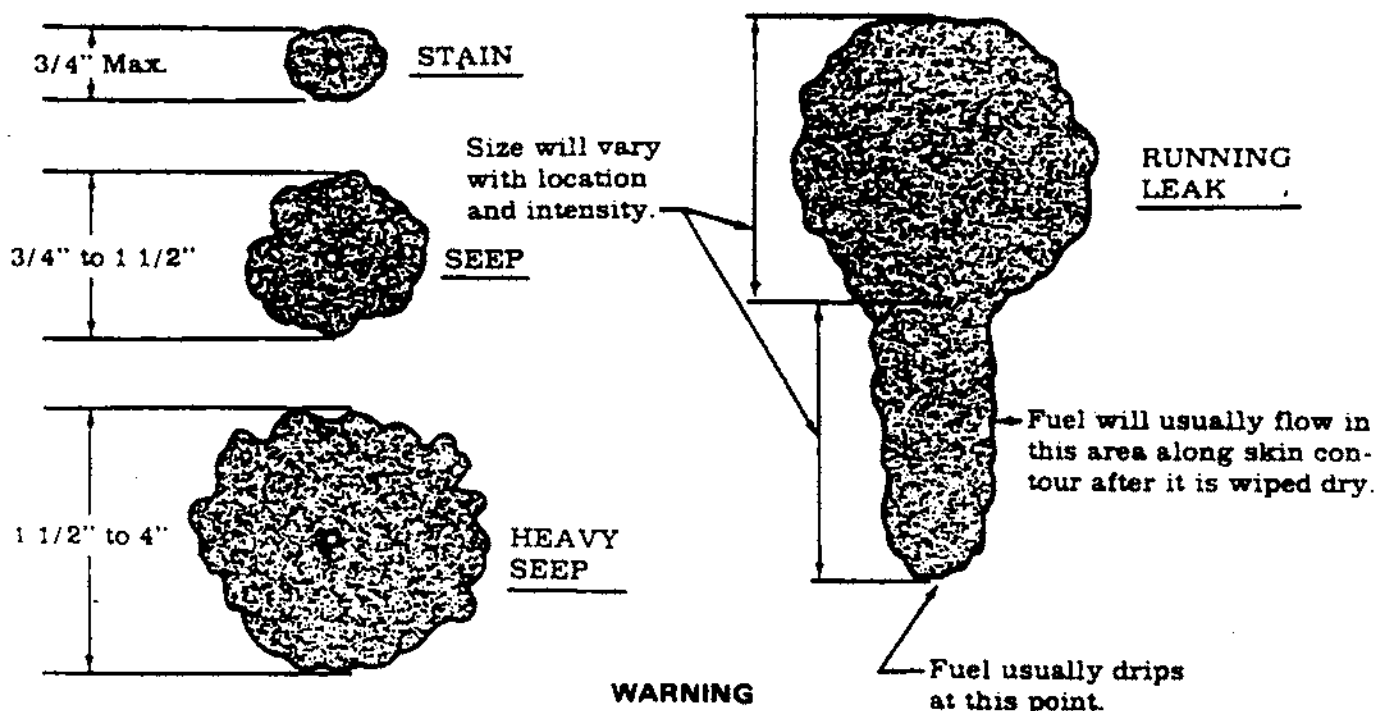


Figure 12-9. Integral Fuel Bay Installation (Sheet 4 of 4)

MODEL 172 SERIES SERVICE MANUAL



REFER TO PARAGRAPH 12-13 FOR FUEL BAY PURGING WHICH SHOULD BE ACCOMPLISHED BEFORE REPAIRING FUEL BAYS.

Figure 12-10. Classification of Fuel Leaks

NOTE

Portable vapor detectors are available to determine presence of explosive mixtures and are calibrated for leaded fuel. These detectors can be used to determine when it is safe to make repairs.

- 12-31. **INTEGRAL FUEL BAY SEALANT.** Two kinds of sealants are used, one to seal the fuel bay and the other to seal the access doors and fuel quantity transmitter adapter. The access door sealant is more pliable and will not adhere to metal as firmly as the bay sealant does. This permits the access doors and fuel quantity transmitter adapter to be removed without damage to them. Service Kits SK210-56 (6 ounce tube) and SK210-101 (2.5 ounce tube), available from the Cessna Supply Division, contain these sealants with the proper quantity of accelerator for each sealant. The sealants can be identified by color. The bay sealant is white and its accelerator is a black paste. The access door sealant is gray and its accelerator is a clear liquid.

WARNING

The accelerator, EC-1608B contains cumene hydroperoxide. Keep away from heat and flame. Use only in a well ventilated area. Avoid skin and eye contact. **WEAR EYE SHIELDS.** In case of eye contact, flush with water and get prompt medical attention.

MODEL 172 SERIES SERVICE MANUAL

- 12-32 **MIXING SEALANT.** Use all the accelerator and sealant in the container when mixing, to ensure the proper ratio of accelerator to sealant. Stir the accelerator to absorb all floating liquid before it is mixed with the sealant. The accelerator can then be poured into the container of sealant for mixing; otherwise, a wax-free container must be used. Stir accelerator and sealant until it becomes a uniform mixture. Do not allow air bubbles to mix in. If this occurs, work air bubbles out.
- 12-33. **SEALING DURING AND AFTER STRUCTURAL REPAIR.**

CAUTION

Protect drain holes and fuel outlet screens when applying sealants. **DO NOT** plug drain channels between stiffeners (4) at inboard end of stringers (5) on lower skin (6). See figure 12-12 (typical lower skin section).

Any repair that breaks the fuel bay seal will necessitate resealing of that area of the bay. Repair parts that need sealing must be installed and riveted during the sealing operation. All joints within the boundary of the bay, but which do not provide a direct fuel path out of the bay, such as stringers and rib flanges within the bay, must be fay surface sealed only. Joints which provide a direct fuel path out of the bay area, such as fuel spar flanges and inboard and outboard rib flanges, must be fay surface sealed and fillet sealed on the fuel side. Fay surface sealing is applying sealant to one mating part before assembly. Enough sealant must be applied so it will squeeze out completely around the joint when the parts are riveted or fastened together. The fillet seal is applied after the joint is fay surface sealed and riveted or fastened together. Fillet sealing is applying sealant to the edge of all riveted joints, joggles, bend reliefs, voids, rivets or fasteners through the boundary of the bay and any place that could produce a fuel leak. The fay sealant need not be cured before the fillet seal is applied, but the squeezed out sealant, to which the fillet sealant is applied, must be free of dirt and contamination. Fillets laid on intersecting joints shall be joined together to produce a continuous fillet. Filler sealant must be pressed into the joint, working out all entrapped air. The best method of applying sealant is with an extrusion gun. Then work the sealant into the joint with a small paddle, being careful to eliminate all air bubbles.

NOTE

During structural repair, parts must be predrilled, countersunk or dimpled and cleaned before being sealed and positioned for final installation.

- a. Remove all existing sealant from area to be sealed, leaving a taper on the remaining sealant. The taper will allow a scarf bond and a continuous seal when the new sealant is applied.

NOTE

The best method of removing sealant is with a chisel-type tool made of hard fiber. Remaining sealant may then be removed with aluminum wool. Steel wool or sandpaper must not be used.

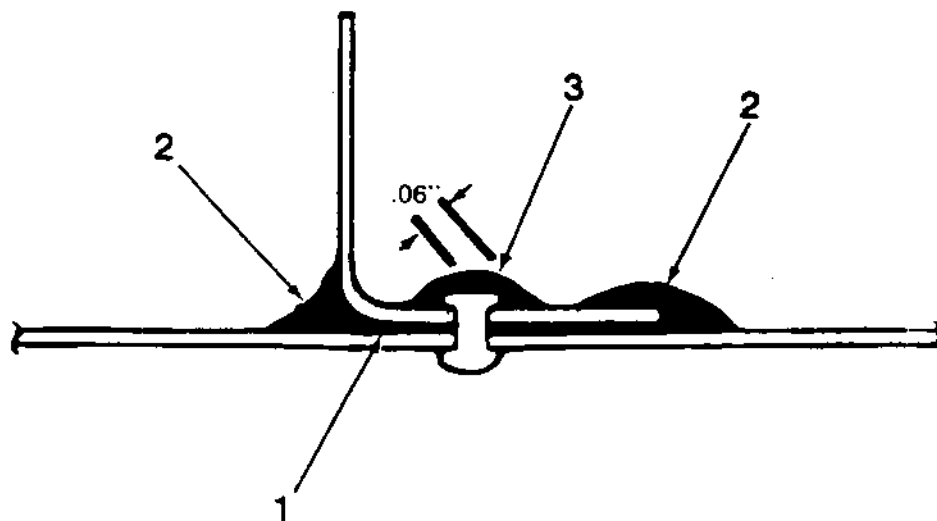
- b. Vacuum thoroughly to remove all chips, filings, dirt, etc., from the bay area.

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NOTE

Refer to paragraph 12-33.

TYPICAL INSPECTION PLATE

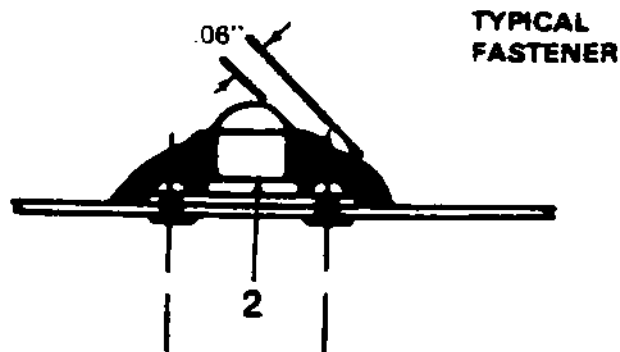


TYPICAL RIB SECTION

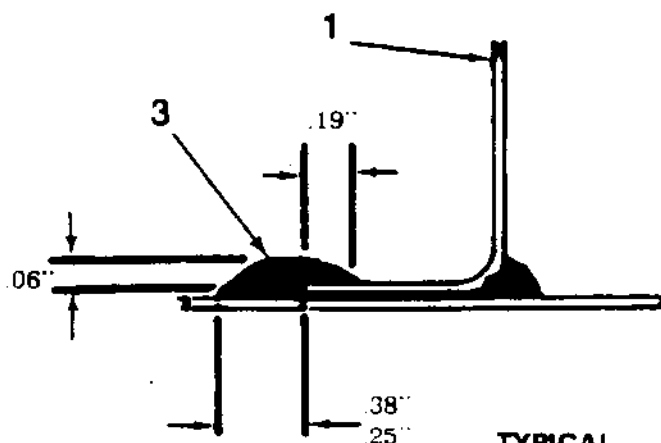
1. Faying
2. Fillet Seal
3. Rivet and Fastener Seal

Figure 12-11. Typical Fuel Bay Sealing (Sheet 1 of 2)

MODEL 172 SERIES SERVICE MANUAL

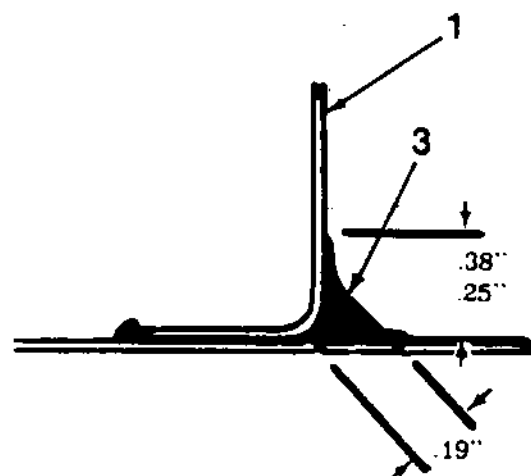


Fastener

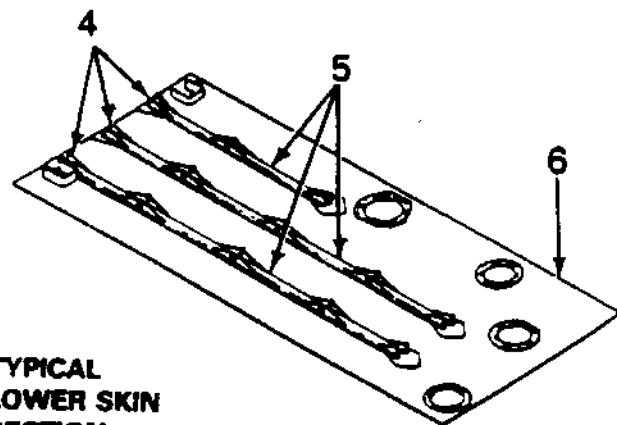


TYPICAL FUEL BAY SPAR

Fillet



TYPICAL END SECTION



TYPICAL LOWER SKIN SECTION

1. Fuel Side
2. Nutplate
3. Fillet Seal
4. Stiffener
5. Stringer
6. Lower Skin

Figure 12-11. Typical Fuel Bay Sealing (Sheet 2 of 2)

MODEL 172 SERIES SERVICE MANUAL

- c. All surfaces and areas to be sealed shall be thoroughly cleaned by wiping with a clean cloth dampened with Methyl Ethyl Ketone (MEK), acetone or similar solvent and dried with a clean cloth before the solvent evaporates. Always pour the solvent on the cloth. Never use contaminated solvent. The cloth shall not be so saturated that dripping occurs.

NOTE

Allowable work life of EC-1675B/ A sealant is four hours from the starting time of mixing. Allowable work life of EC-1608B/ A sealant is one hour. These apply to standard conditions of 77° Fahrenheit and 50% relative humidity. An increase in temperature or a decrease in humidity will shorten the work life of the sealant.

- d. Apply fay surface sealant to one mating part and install rivets or fasteners while sealant is still within its allowable work life.

NOTE

During the sealing operation, sealant must be checked at various times to determine that it has not exceeded its allowable work life. Use a small wood paddle, such as a tongue depressor, to gather some sealant. Touch the sealant to a piece of clean sheet metal. If the sealant adheres to the sheet metal, it is still within its allowable work life. If the sealant does not adhere to the sheet metal, it is beyond its allowable work life and must not be used.

- e. Apply a fillet seal to the repaired area on the inside of the bay.
- f. Apply fay surface door sealant to access doors and fuel quantity transmitter adapter, if removed, and install the doors and adapter.
- g. Allow the sealant to cure. Refer to paragraph 12-34 for curing time.
- h. Clean stains from outside of bay area.
- i. Test fuel bay for leaks as described in paragraph 12-35.

12-34 SEALING FUEL LEAKS. First determine the source of the fuel leaks. Fuel can flow along a seam or the structure of the wing for several inches, making the leak source difficult to find. A stained area is an indication of the leak source. Fuel leaks can be found by testing the complete bay as described in paragraph 12-35. Another method of detecting the source of a fuel leak is to remove access doors and blow with an air nozzle from the inside of the bay in the area of the leak while a soap bubble solution is applied to the outside of the bay. After the leak source has been found, proceed as follows:

- a. Remove existing sealant in the area of the leak as described in paragraph 12-32, step "a".
- b. Clean the area and apply a fillet seal. Press sealant into leaking area with a small paddle, being sure to work out all entrapped air.
- c. If a leak occurs around a rivet or bolt, restrike the rivet or torque the bolt to the maximum allowable torque, and repair any damaged sealant.
- d. Apply fay surface door sealant to access doors or fuel quantity transmitter adapter, if removed, and install the doors and adapter.
- e. Test fuel bay for leaks as described in paragraph 12-35.

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- 12-35. **CURING TIME.** Service Kits SK210-56 and SK210-101 contain SP654890B2 Fuel Tank Area Sealant Kit and SP654706B2 Access Door Sealant Kit. Normal curing time for SP264706B2 Sealant Kit is 24 hours. These values are based on a Standard condition of 77° Fahrenheit and 50% humidity. Curing time may be accelerated as shown in the following chart.

Temperature of Sealant °F	Time in Hours
160	3
140	4
120	7

NOTE

Temperature shall not exceed 160°F. Bay must be vented to relieve pressure during accelerated curing.

WARNING

Access door sealant must not be heated above 90° until sealant is cured for 24 hours based on a standard condition of 77° Fahrenheit and 50% relative humidity. Harmful vapors are released if sealant is heated above 90°F.

12-36 TESTING INTEGRAL FUEL BAY.

- Remove vent line from vent fitting and cap the fitting.
- Remove forward and aft fuel lines from bay.
- To one of the bay fittings, attach a water manometer capable of measuring 20 inches of water.
- To the other bay fitting, connect a well-regulated supply of air (1/2 PSI MAXIMUM or 13.8 INCHES OF WATER). Nitrogen may be used where the bay might be exposed to temperature changes while testing.
- Make sure filler cap is installed and sealed.

CAUTION

Do not attempt to apply pressure to the bay without a good regulator and a positive shutoff in the supply line. Do not inflate the fuel bay to more than 1/2 psi or damage may occur.

- Apply pressure slowly until 1/2 psi is obtained.
- Apply soap solution as required.
- Allow 15 to 30 minutes for pressure to stabilize.
- If bay holds for 15 minutes, without pressure loss, bay is acceptable.
- Reseal and retest if any leaks are found.

- 12-37. **FUEL QUANTITY TRANSMITTERS.** One float-actuated, variable-resistive transmitter is located in each fuel bay. They are connected electrically to separate galvanometric gages, one for each bay, thereby indicating fuel level in each bay. A complete description of the transmitters, operation, and maintenance procedures is contained in Section 15.

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- 12-38. VENTED FUEL FILLER CAP. (See figure 12-11.)
- 12-39. DESCRIPTION. The RIGHT-HAND fuel filler cap incorporates a vent and safety valve that provides both vacuum and positive pressure relief.
- 12-40. INSPECTION, CLEANING AND REPAIR.
- Remove RIGHT-HAND fuel filler cap from the adapter assembly.
 - Disconnect the safety chain from the cap and cover or plug the tank opening to keep out foreign matter.
 - Check condition of gasket and frictionless washer, replace as required.
 - Using cotton swabs and Stoddard solvent or equivalent, gently lift edges of rubber umbrella and clean seat and umbrella removing all contaminants. Using a second swab wipe seat and umbrella thoroughly, removing all cotton fibers. Repeat until swabs show no discoloration.
 - If the umbrella continues to leak or is deteriorated, remove and replace. To remove the umbrella, lubricate the umbrella stem with (MIL-H-5606) hydraulic fluid to prevent tearing the stem. When installing the new umbrella, lubricate the stem with (MIL-H-5606) hydraulic fluid and use a small blunt tool to insert the retaining knob on the umbrella, into the check valve body.
 - Connect fuel cap to safety chain and reinstall cap in the adapter assembly.

NOTE

Check valve (2) shall open at or before 4.0 inches of water vacuum pressure, and be able to withstand .5 PSI positive pressure without leakage.

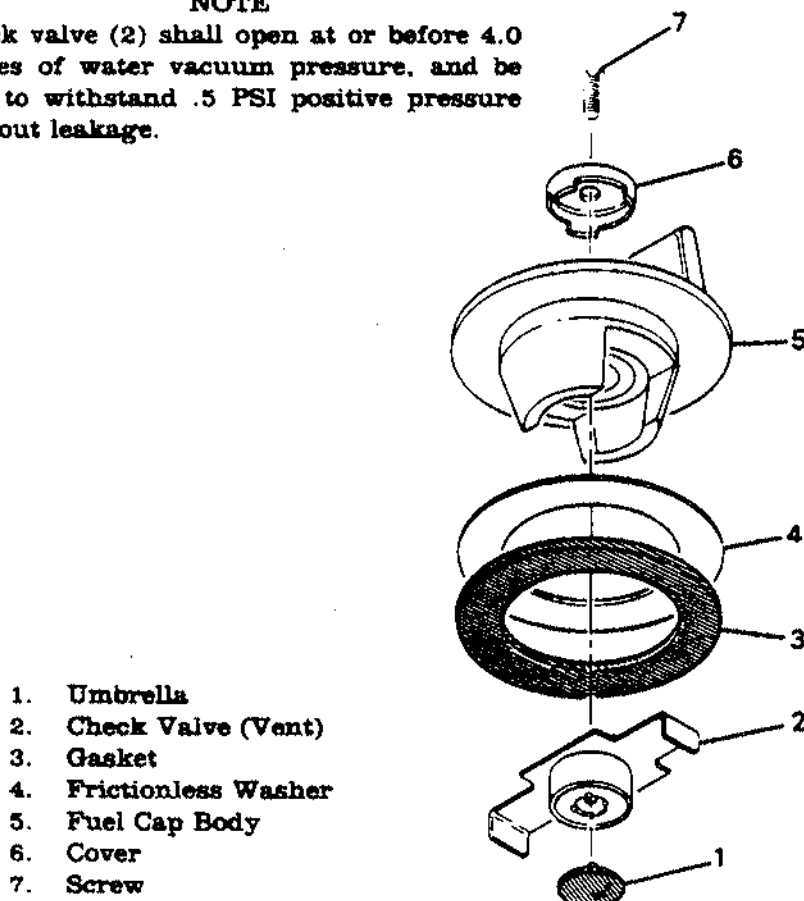


Figure 12-12. Vented Fuel Filler Cap

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SECTION 13

PROPELLER

WARNING

When performing any inspection or maintenance that requires turning on the master switch, installing a battery, or pulling the propeller through by hand, treat the propeller as if the ignition switch were ON. Do not stand, nor allow anyone else to stand, within the arc of the propeller, since a loose or broken wire, or a component malfunction, could cause the propeller to rotate.

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Repair	2F19/13-1
Removal	2F19/13-1
Installation	2F21/13-3
Time Between Overhaul (TBO) ..	2F21/13-3

- 13-1. PROPELLER. (See figure 13-1.)
- 13-2. DESCRIPTION. An all-metal, fixed-pitch propeller, equipped with a spinner, is used on the aircraft.
- 13-3. REPAIR. Repair of a metal propeller first involves evaluating the damage and determining whether the repair is to be a major or minor one. Federal Aviation Regulations, Part 43 (FAR 43), and Federal Aviation Agency Advisory Circular No. 43.13 (FAA AC No. 43.13), define major and minor repairs, alterations and who may accomplish them. When making alterations or repairs to a propeller, FAR 43, FAA AC No. 43.13 and the propeller manufacturer's instructions must be observed. The propeller manufacturer's Service Manual may be obtained from the Cessna Service Parts Center.

NOTE

For information not covered in this section, refer to the applicable McCauley Service Manual and supplements thereto.

- 13-4. REMOVAL. (See figure 13-1.)

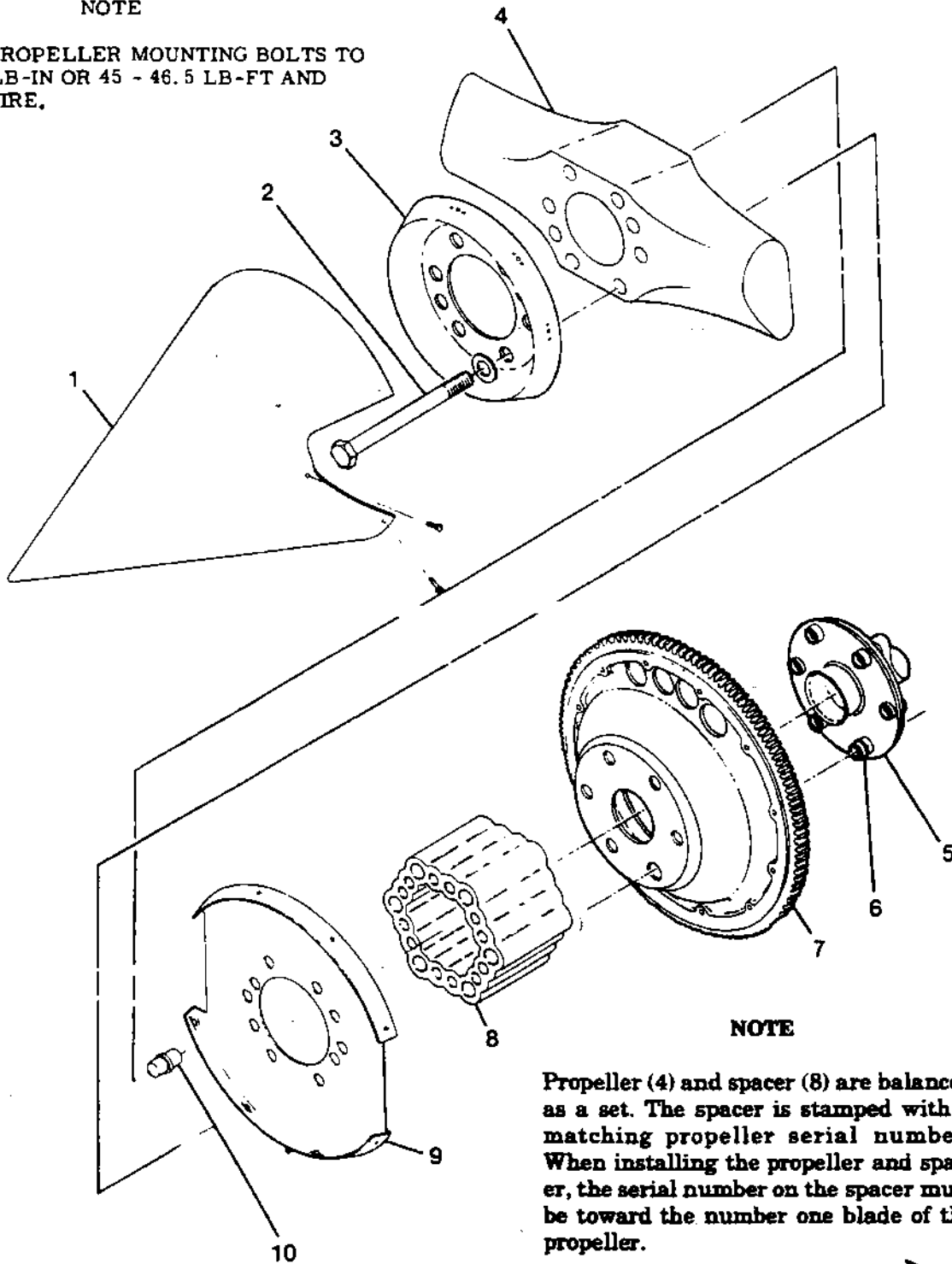
WARNING

Be sure magneto switch is in OFF position before turning propeller.

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NOTE

TORQUE PROPELLER MOUNTING BOLTS TO 540 - 560 LB-IN OR 45 - 46.5 LB-FT AND SAFETY WIRE.



NOTE

Propeller (4) and spacer (8) are balanced as a set. The spacer is stamped with a matching propeller serial number. When installing the propeller and spacer, the serial number on the spacer must be toward the number one blade of the propeller.

1. Spinner	6. Crankshaft Bushing
2. Mounting Bolt	7. Ring Gear Support Assembly
3. Forward Bulkhead	8. Spacer
4. Propeller	9. Aft Bulkhead
5. Engine Crankshaft	10. Dowel Pin

13-1. Propeller Installation

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- a. Remove spinner (1).
- b. Remove safety wire from mounting bolts.
- c. Remove mounting bolts (2) and remove forward spinner bulkhead (3), propeller (4), rear spinner bulkhead (9) and spacer (8).

NOTE

Propeller mounting bolts should be magnafluxed whenever propeller is removed from the engine for reconditioning or repair.

- d. If removal of the ring gear support assembly (7) is necessary, loosen the alternator adjusting arm and disengage the drive pulley belt from pulley on the aft face of the starter ring gear support assembly.

13-5. INSTALLATION. (See figure 13-1.)

WARNING

Be sure magneto switch is in OFF position before turning propeller.

- a. If the starter ring gear support assembly (7) was removed, clean the mating surface of support assembly and engine crankshaft.
- b. Place alternator drive belt in the pulley groove of the starter ring gear support. Fit support assembly over propeller flange bushing of the crankshaft.

NOTE

Make sure the bushing hole in the ring gear support that bears the identification "O", is assembled at the "O" identified crankshaft flange bushing. This bushing is marked "O" by an etching on the crankshaft flange next to the bushing. The starter ring gear must be located correctly to assure proper alignment of the timing marks on the ring gear.

- c. Clean mating surfaces of the propeller, bulkheads and spacer and assemble as illustrated in figure 13-1.
- d. Find the top center (TC) mark on the aft face of the starter ring gear support. Locate one of the propeller blades over the TC mark, rotate the propeller clockwise (as viewed from front of engine) to the first bushing and install propeller.
- e. Tighten propeller mounting bolts evenly, torque bolts to 45 lb-ft. and safety wire.

NOTE

The propeller mounting bolt torque should be checked at least once per year.

- f. Install spinner.
- g. Adjust alternator drive belt tension as outlined in Section 16.

13-6. TIME BETWEEN OVERHAUL (TBO). There is no recommended overhaul period for fixed-pitch propellers. These shall be reconditioned or repaired as required for blade surface conditions.

SECTION 14

UTILITY SYSTEMS

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Ventilating System	2G6 14-4
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14-1. UTILITY SYSTEMS.

14-2. HEATING SYSTEM. (See figure 14-1.)

14-3. DESCRIPTION. The heating system is comprised of the heat exchange section of the exhaust muffler, a shut-off valve, mounted on the right forward side of the firewall, a push-pull control on the instrument panel, outlets and flexible ducting connecting the system.

14-4. SYSTEM OPERATION. Ram air is ducted through an engine baffle inlet and heat exchange section of the exhaust muffler, to the shut-off valve at the firewall. The heated air flows from the shut-off valve into a duct across the aft side of the firewall, where it is distributed into the cabin. The shut-off valve, operated by a push-pull control marked "CABIN HT." located on the instrument panel, regulates the volume of heated air entering the system. Pulling the control full out supplies maximum flow, and pushing control in gradually decreases flow, shutting off flow completely when the control is pushed full-in.

14-5. TROUBLE SHOOTING. Most of the operational troubles in the heating, defrosting and ventilating systems are caused by sticking or binding air valves and their controls, damaged air ducting or defects in the exhaust muffler. In most cases, valves or controls can be freed by proper lubrication. (Refer to Section 2 of this manual for lubrication information.) Damaged or broken parts must be repaired or replaced. When checking controls, ensure that valves respond freely to control movement, that they move in the correct direction, and that they move through their full range of travel and seal properly. Check that hoses are properly secured, and replace hoses that are burned, frayed or crushed. If fumes are detected in the cabin, a thorough inspection of the exhaust system should be accomplished. Refer to applicable paragraph in Section 11 of this manual for this inspection. Since any holes or cracks may permit exhaust fumes to enter the cabin, replacement of defective parts is imperative, because fumes constitute an extreme danger. Seal any gaps in shut-off valves at the firewall with Pro-Seal #700 (Coast Pro-Seal Co., Los Angeles, California) compound, or equivalent compound.

14-6. REMOVAL, REPAIR AND INSTALLATION. The heating and defrosting systems are illustrated in figure 14-1. The figure may be used as a guide for removal, repair or

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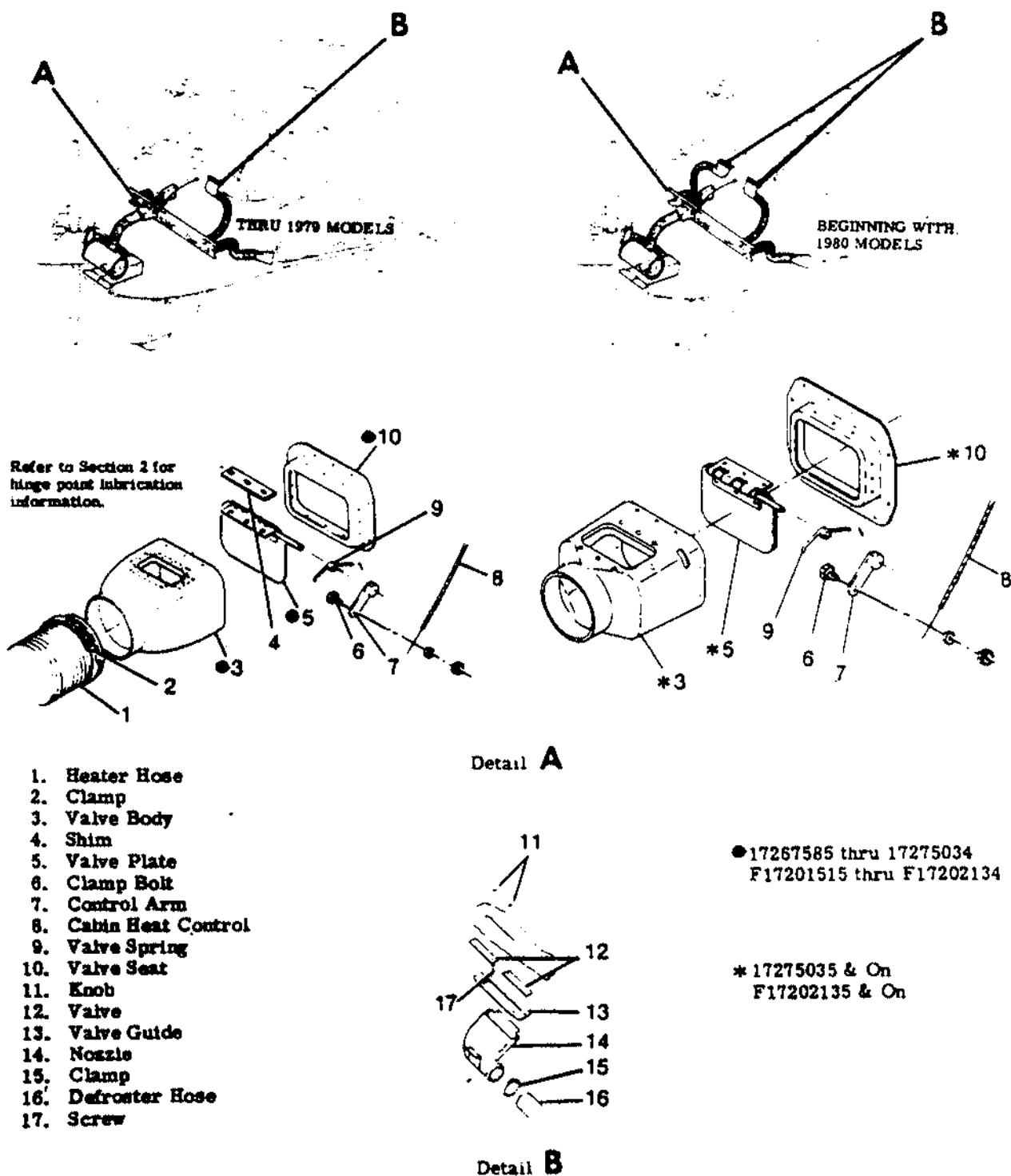


Figure 14-1. Heating and Defrosting Systems

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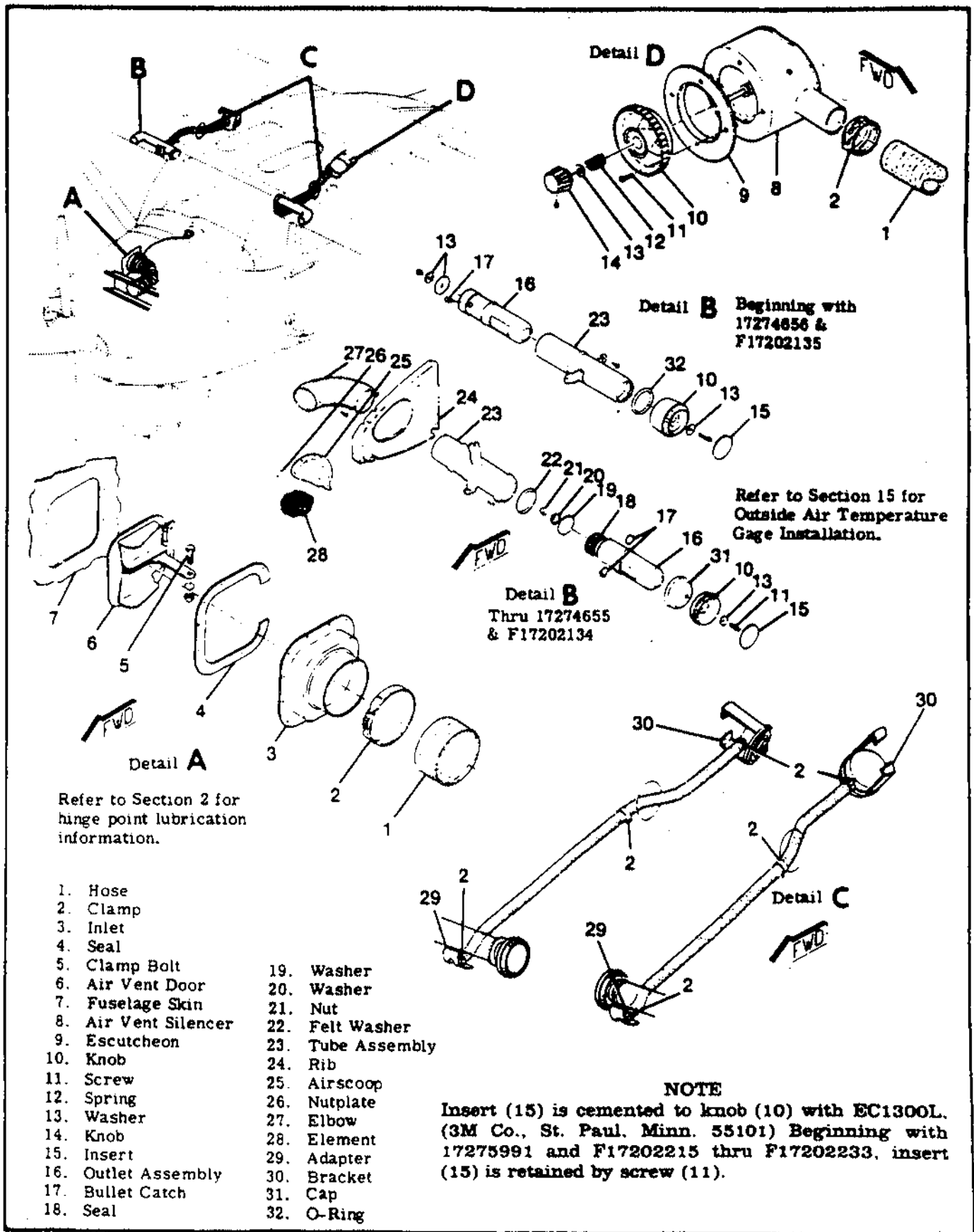


Figure 14-2. Ventilating Systems

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installation of system components. Burned, frayed or crushed hose may be replaced with new hose, cut to correct length and installed in the original routing. Trim hose windings shorter than complete hose length to allow clamps to be installed. Defective air valves should be repaired or replaced. Check for correct operation of valves and their controls after repair and/or installation.

- 14-7 DEFROSTER SYSTEM. (See figure 14-1.)
- 14-8. DESCRIPTION. The defrosting system is comprised of a duct across the aft side of the firewall, defroster outlets, mounted on the cowl deck, immediately aft of the windshield, and flexible ducting connecting the system.
- 14-9. SYSTEM OPERATION. Air from the duct across the aft side of the firewall flows through the flexible ducting to the defroster outlet. Temperature and volume of this air is controlled by settings of the heater system control.
- 14-10. TROUBLE SHOOTING. Since the defrosting system depends on proper operation of the heating system, trouble shooting procedures outlined in paragraph 14-5 should be followed for checking the defroster system.
- 14-11. REMOVAL, REPAIR AND INSTALLATION. The defroster system is illustrated in figure 14-1 in conjunction with the heating system. The figure may be used as a guide for removal, repair or installation of system components. Burned, frayed or crushed hose must be replaced with new hose, cut to correct length and installed in the original routing. Trim hose windings shorter than complete hose length to allow clamps to be installed. A defective defroster outlet should be repaired or replaced. Check for correct operation of control after repair and/or installation.
- 14-12. VENTILATING SYSTEMS. (See figure 14-2.)
- 14-13. DESCRIPTION. Three separate systems are installed for cabin ventilation. One system is comprised of an air scoop, located in each wing root fillet, with flexible ducting connecting each air scoop to an adjustable air vent silencer unit, located on each side of the rear cabin area. Another system is comprised of an air scoop, located in the leading edge of each wing, just outboard of the air scoop in the wing root fillets. These air scoops are connected to cabin outlets, installed on each side of the cabin, near the upper corners of the windshield. These outlets are manually-adjustable with knobs on the outlet assemblies. A third system is comprised of a fresh air scoop door on the right side of the fuselage, just forward of the copilot seat. Flexible ducting connects this air scoop to the duct across the aft side of the firewall. This system is controlled by a push-pull control on the instrument panel.
- 14-14. SYSTEMS OPERATION. Heating, defrosting and ventilating systems work together to provide the conditions desired by the pilot. When the heating system, defrosting system and one ventilating control is pushed in, no heated air can enter the firewall duct; therefore, if the "CABIN AIR" control (to the scoop door on the right forward fuselage) is pulled out, only fresh air from the scoop will flow through the duct into the cabin. As the "CABIN HT" control is gradually pulled out, more and more heated air will blend with the fresh air from the scoop, and be distributed into the cabin. Either one, or both of the controls may be set at any position from full open to full closed. Rear seat ventilation is provided by air vent silencer assemblies, mounted in the left and right rear cabin wing root areas. These units receive ram air from the air scoops in the wing root fillets. Each silencer assembly is equipped with a valve which meters incoming cabin ventilating air, which greatly reduces inlet air noise. The outlet assemblies, installed near the upper corners of the windshield are manually operated, increasing or decreasing flow of ram air into the cabin.

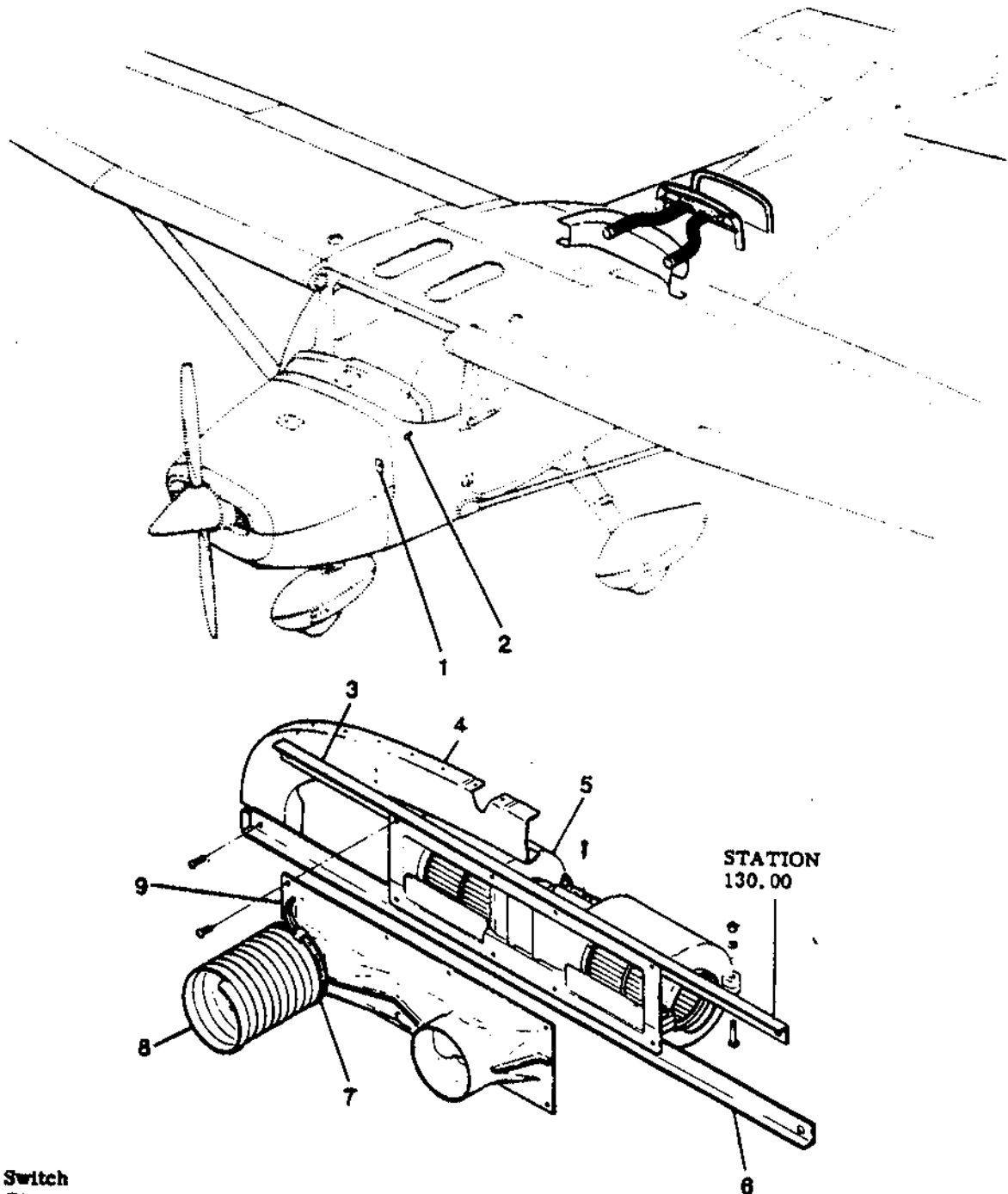
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NOTE

Beginning with 17276260 CABIN HT and CABIN AIR controls are replaced with locking type controls. To operate a locking type control, push in and hold the center button before moving knob in either direction.

- 14-15. **TROUBLE SHOOTING.** Most of the operational troubles in the ventilating systems are caused by sticking or binding of the inlet scoop door or its control. Check airscoop filter elements in the wing leading edges for obstructions. The elements may be removed and cleaned or replaced. Since air passing through the filters is emitted into the cabin, do not use a cleaning solution which would contaminate the air. The filters may be removed to increase air flow. However, their removal will cause a slight increase in noise level.
- 14-16. **REMOVAL, REPAIR AND INSTALLATION.** The ventilating system is illustrated in figure 14-2. The figure may be used as a guide for removal, repair or installation of system components. A defective ventilator or scoop must be repaired or replaced. Check for proper operation of controls after repair and/or installation.
- 14-17. **AIR CIRCULATION FAN SYSTEM.** (See figure 14-3.)
- 14-18. **DESCRIPTION.** An optional cabin ventilating fan may be located above the extended baggage compartment. The system consists of a high-speed blower and overhead ductwork, similar to that offered with the air conditioning option. This fan only circulates air and no cooling components are attached. The blower is controlled by a four-position switch, located on the pilot's console. The four switch positions are labeled HI, MED, LOW and OFF.
- 14-19. **REMOVAL.** (See figure 14-3.) Access to the blower assembly and ducting is gained through the baggage door.
- Remove baggage compartment panel.
 - Disconnect forward and aft ends of hoses (8) by removing hose clamps.
 - Remove 8 screws attaching blower assembly (5) and duct assembly (9) to supports (3) and (6).
 - Remove lower support (6).
 - Disconnect electrical connections.
 - Remove blower assembly.
- 14-20. **INSPECTION AND REPAIR.** Hoses should be checked for security, and replaced if frayed or crushed. Check that hose clamps are properly tightened; check electrical connections, and check that blower rotates freely.
- 14-21. **INSTALLATION.** (See figure 14-3.)
- Install blower unit (5) and duct assembly (9) to upper support (3).
 - Connect electrical connections.
 - Install lower support (6), and attach blower assembly and duct (9).
 - Install hoses and hose clamps.
 - Install baggage compartment panel.

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1. Switch
2. Circuit Breaker
3. Support
4. Bulkhead
5. Blower Assembly
6. Support
7. Clamp
8. Duct
9. Duct Assembly

Figure 14-3. Circulating Fan Installation

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SECTION 15 INSTRUMENTS AND INSTRUMENT SYSTEMS

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15-1. INSTRUMENTS AND INSTRUMENT SYSTEMS.

15-2. **GENERAL.** This section describes typical instrument installations and their respective operating systems. Emphasis is placed on trouble shooting and corrective measures only. It does NOT deal with specific instrument repairs since this usually requires special equipment and data and should be handled by instrument specialists. Federal Aviation Regulations require malfunctioning instruments to be sent to an approved instrument overhaul and repair station or returned to manufacturer for servicing. Our concern here is with preventive maintenance and correction of system faults which result in instrument malfunctions. The descriptive material, maintenance and trouble shooting information in this section is intended to help the mechanic determine malfunctions and correct them, up to the defective instrument itself at which point an instrument technician should be called in. Some instruments, such as fuel quantity and oil pressure gages, are so simple and inexpensive, repairs usually will be more costly than a new instrument. On the other hand, aneroid and gyro instruments usually are well worth repairing. The words "replace instrument" in the text, therefore, should be taken only in the sense of physical replacement in the aircraft. Whether replacement is to be with a new instrument, an exchange one, or original instrument is to be repaired must be decided on basis of individual circumstances.

15-3. INSTRUMENT PANEL.

15-4. **DESCRIPTION.** The instrument panel assembly consists of a stationary (right side) and shock-mounted (left side) panel. Beginning with 1983 models, the left side also contains a stationary panel. The stationary panel contains engine, radio and flight hour recording instruments. The shock-mounted panel contains major flight instruments such as horizontal and directional gyros. Most of the instruments are screw-mounted on the panel backs.

15-5. **REMOVAL AND INSTALLATION.** (See figure 15-1.) The stationary panel is secured to engine mount stringers and a forward fuselage bulkhead and ordinarily is not considered removable. The shock-mounted panel is secured to the stationary panel with rubber shock-mounted assemblies. To remove shock-mounted panel proceed as follows:

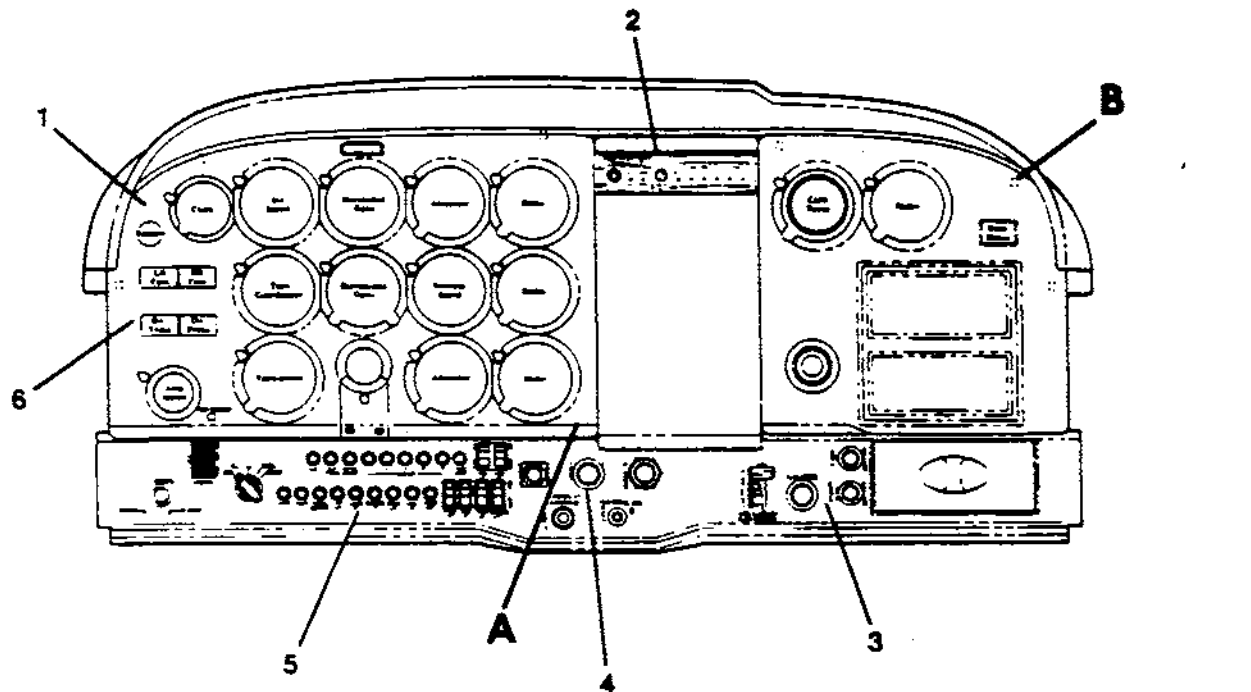
- a. Unscrew threaded buttons securing decorative cover and remove cover.
- b. Remove nuts and washers from shock-mounts.
- c. Tag and disconnect instrument wiring.
- d. Disconnect plumbing and cap all open fittings and lines.
- e. Pull panel straight back to remove.
- f. For installation reverse the preceding procedure. Ensure ground strap is properly installed.

15-6. **SHOCK MOUNTS.** Service life of instruments is directly related to adequate shock-mounting of panel. If removal of panel is necessary, check mounts for deterioration.

15-7. INSTRUMENTS.

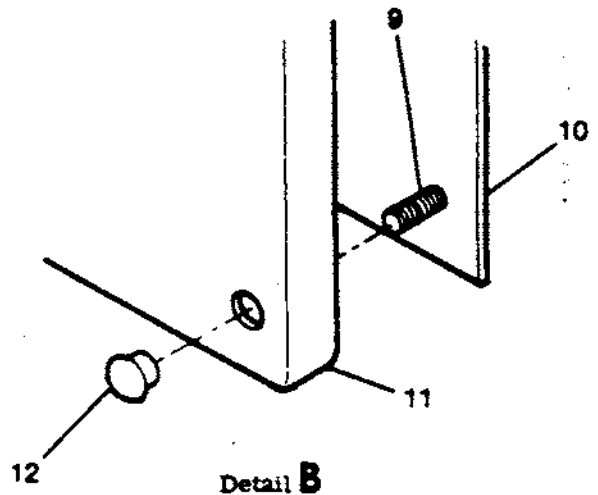
15-8. **REMOVAL.** (See figure 15-1.) Most instruments are secured to panel with screws inserted through panel face. To remove an instrument, remove decorative cover, disconnect wiring or plumbing to the instrument, remove mounting screws and take instrument out from behind, or in some cases, from front of panel. Instrument clusters are installed as units and are secured by a screw at each end. A cluster must be removed from panel to replace an individual gage. In all cases when an instrument is removed, disconnected lines or wires should be protected. Cap open lines and cover pressure connections on instrument to prevent thread damage and entrance of foreign matter. Wire terminals should be insulated or tied up to prevent accidental grounding or short-circuiting.

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NOTE POSITION OF GROUND STRAP AND SEQUENCE OF ATTACHING PARTS WHEN REMOVING OR INSTALLING SHOCK PANEL.

Detail A



Detail B

1. Shock-Mounted Panel	5. Switch and Circuit Breaker Panel	9. Stud
2. Radio Panel	6. Engine Instruments	10. Instrument Panel
3. Heating and Ventilating Controls	7. Shock-Mount	11. Decorative Cover
4. Engine Controls	8. Ground Strap	12. Threaded Button

Figure 15-1. Typical Instrument Panel

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- 15-9. **INSTALLATION.** Generally, installation procedure is the reverse of removal procedure. Ensure mounting screw nuts are tightened firmly, but do not over-tighten, particularly on instruments having plastic cases. The same rule applies to connecting plumbing and wiring.

NOTE

All instruments (gages and indicators), requiring a thread seal or lubricant, shall be installed using teflon tape on male fittings only. This tape is available through Cassara Supply Division.

When replacing an electrical gage in an instrument cluster assembly, avoid bending pointer or dial plate. Distortion of dial or back plate could change calibration of gages.

- 15-10. **PITOT AND STATIC SYSTEMS.** (See figure 15-2.)

- 15-11. **DESCRIPTION.** The pitot system conveys ram air pressure to the airspeed indicator. The static system vents vertical speed indicator, altimeter and airspeed indicator to atmospheric pressure through plastic tubing connected to a static port. A static line sump is installed at source button to collect condensation in static system. A pitot tube heater may be installed. The heating element is controlled by a switch at instrument panel and powered by the electrical system. An alternate static source valve may be installed in the static system for use when the external static source is malfunctioning. Refer to the Pilot's Operating Handbook for flight operation using the alternate static source.

- 15-12. **MAINTENANCE.** Proper maintenance of pitot and static system is essential for proper operation of altimeter, vertical speed and airspeed indicators. Leaks, moisture and obstructions in pitot system will result in false airspeed indications, while static system malfunctions will affect readings of all three instruments. Under instrument flight conditions, these instrument errors could be hazardous. Cleanliness and security are the principal rules for system maintenance. The pitot tube and static ports **MUST** be kept clean and unobstructed.

- 15-13. **STATIC PRESSURE SYSTEM INSPECTION AND LEAKAGE TEST.** The following procedure outlines inspection and testing of static pressure system, assuming altimeter has been tested and inspected in accordance with current Federal Aviation Regulations.

- a. Ensure static system is free from entrapped moisture and restrictions.
- b. Ensure no alterations or deformations of airframe surface have been made which would affect the relationship between air pressure in static pressure system and true ambient static air pressure for any flight configuration.
- c. Close static pressure alternate source control, if installed.
- d. Attach a source of suction to static pressure source opening. Figure 15-3 shows method of obtaining suction.
- e. Slowly apply suction until altimeter indicates a 1000-foot increase in altitude.

CAUTION

When applying or releasing suction, do not exceed range of vertical speed indicator or airspeed indicator.

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- f. Cut off suction source to maintain a "closed" system for one minute. Leakage shall not exceed 100 feet of altitude loss as indicated on altimeter.
- g. If leakage rate is within tolerance, slowly release suction source.

NOTE

If leakage rate exceeds maximum allowable, first tighten all connections, then repeat leakage test. If leakage rate still exceeds maximum allowable, use following procedure.

- h. Disconnect static pressure lines from airspeed indicator and vertical speed indicator. Use suitable fittings to connect lines together so altimeter is the only instrument still connected into static pressure system.
- i. Repeat leakage test to check whether static pressure system or the bypassed instruments are cause of leakage. If instruments are at fault, they must be repaired by an "appropriately rated repair station" or replaced. If static pressure system is at fault, use following procedure to locate leakage.
- j. Attach a source of positive pressure to static source opening. Figure 15-3 shows one method of obtaining positive pressure.

CAUTION

Do not apply positive pressure with airspeed indicator or vertical speed indicator connected to static pressure system.

- k. Slowly apply positive pressure until altimeter indicates a 500-foot decrease in altitude and maintain this altimeter indication while checking for leaks. Coat line connections and static source flange with solution of mild soap and water, watching for bubbles to locate leaks.
 - l. Tighten leaking connections. Repair or replace parts found defective.
 - m. Reconnect airspeed and vertical speed indicators into static pressure system and repeat leakage test per steps "c" thru "g".
- 15-14. **PITOT SYSTEM INSPECTION AND LEAKAGE TEST.** To check pitot system for leaks, place a piece of tape over small hole in lower aft end of pitot tube, fasten a piece of rubber or plastic tubing over pitot tube, close opposite end of tubing and slowly roll up tube until airspeed indicator registers in cruise range. Secure tube and after a few minutes recheck airspeed indicator. Any leakage will have reduced the pressure in system, resulting in a lower airspeed indication. Slowly unroll tubing before removing it, so pressure is reduced gradually. Otherwise instrument may be damaged. If test reveals leak in system, check all connections for tightness.
- 15-15. **BLOWING OUT LINES.** Although pitot system is designed to drain down to pitot tube opening, condensation may collect at other points in system and produce a partial obstruction. To clear line, disconnect at airspeed indicator. Using low pressure air, blow from indicator end of line toward pitot tube.

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CAUTION

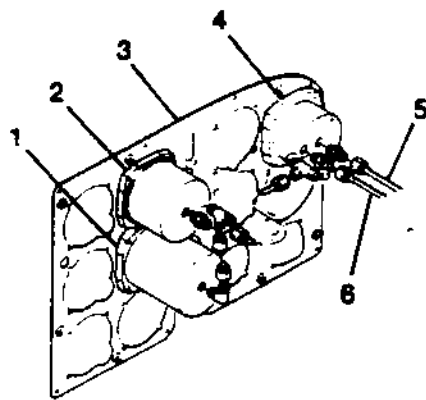
Never blow through pitot or static lines toward instruments.

Like pitot lines, static pressure lines must be kept clear and connections tight. All models have a static source sump which collects moisture and keeps system clear. However, when necessary, disconnect static line at first instrument to which it is connected, then blow line clear with low-pressure air. Check all static pressure line connections for tightness. If hose or hose connections are used, check for general condition and clamps for security. Replace hose which cracked, hardened or show other signs of deterioration.

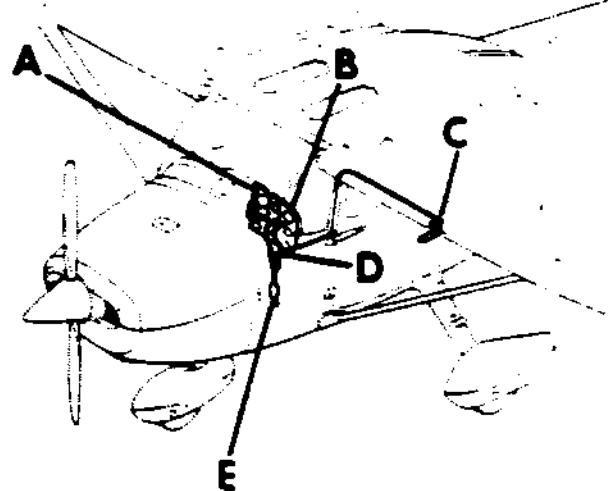
- 15-16. **REMOVAL AND INSTALLATION OF COMPONENTS.** (See figure 15-2.) To remove pitot mast remove four mounting screws on side of connector (13) and pull mast out of connector far enough to disconnect pitot line (5). Electrical connections to heater assembly (if installed) may be disconnected through wing access opening just inboard of mast. Pitot and static lines are removed in the usual manner, after removing wing access plates, lower wing fairing strip and upholstery as required. Installation of tubing will be simpler if a guide wire is drawn in as tubing is removed from wing. The tubing may be removed from wing. The tubing may be removed intact by drawing it out through cabin and right door. Tighten connections firmly but avoid overtightening and distorting fittings. If twisting of plastic tubing is encountered when tightening fittings, VV-P-236 (USP Petrolatum), may be applied sparingly between tubing and fittings.
- 15-17. **ENCODING ALTIMETER.**
- 15-18. **DESCRIPTION.** An encoding altimeter may be installed which is also connected to static system pressure. The encoding altimeter supplies coded altitude signals to the aircraft's transponder for transmission to ground based interrogating radar. The encoding altimeter installation requires the use of a fully operational secondary altimeter as backup.
- 15-19. **REMOVAL AND INSTALLATION.** Figure 15-2, sheet 2 may be used as a guide for removal and installation of the encoding altimeter.
- 15-20. **TROUBLE SHOOTING -- PITOT STATIC SYSTEM.**

TROUBLE	PROBABLE CAUSE	REMEDY
LOW OR SLUGGISH AIR-SPEED INDICATION. (Normal altimeter and vertical speed.)	Pitot tube obstructed, leak or obstruction in pitot line.	Test pitot tube and line for leaks or obstructions. Blow out tube and line, repair or replace damaged line.
INCORRECT OR SLUGGISH RESPONSE. (All three instruments.)	Leaks or obstruction in static line.	Test line for leaks and obstructions. Repair or replace line, blow out obstructed line.

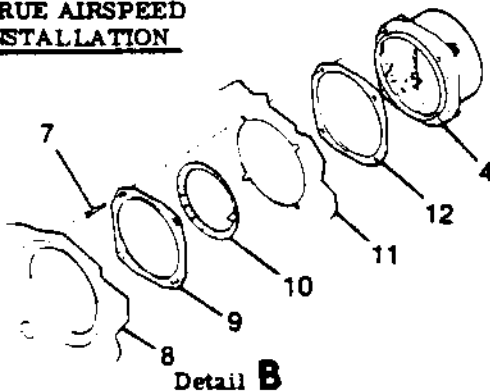
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Detail A

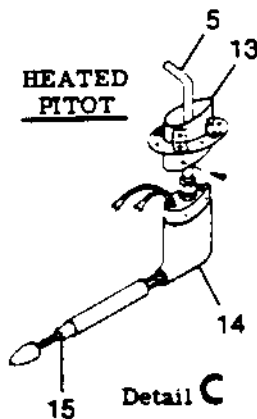


TRUE AIRSPEED INSTALLATION



Detail B

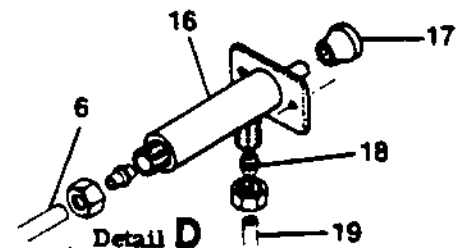
HEATED PITOT



Detail C

1. Vertical Speed Indicator
2. Altimeter
3. Shock-Mounted Panel
4. Airspeed Indicator
5. Pitot Line
6. Static Line
7. Mounting Screw
8. Cover
9. Retainer
10. True Airspeed Ring

11. Instrument Panel
12. Spacer
13. Connector
14. Mast Body
15. Heater Element
16. Valve
17. Knob
18. Insert
19. Line (to Sump)
20. Static Sump (Plastic)
21. Flange
22. Static Port
31. Static Sump (Metal)



Detail D

Detail E
WITH ALTERNATE
STATIC SOURCE

Detail E
WITHOUT ALTERNATE
STATIC SOURCE

NOTE

Do not overtighten screws (7)
and do not lubricate any parts.

Use spacers (12) as required
for adequate friction on ring
assembly (10).

★ THRU 17276468 AND
F17202233

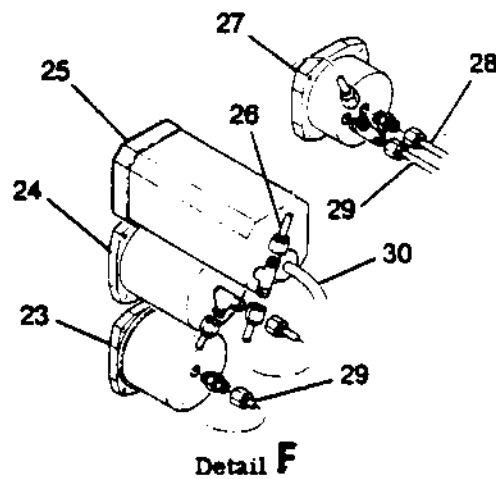
* BEGINNING WITH 17276469
AND F17202234

Figure 15-2. Pitot Static Systems (Sheet 1 of 2)

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ENCODING ALTIMETER INSTALLATION



Detail F

- 23. Backup Altimeter
- 24. Vertical Speed Indicator
- 25. Encoding Altimeter
- 26. Static Line
- 27. Airspeed Indicator
- 28. Pitot Line
- 29. Static Line
- 30. Cable (to Transponder)

Figure 15-2. Pitot Static Systems (Sheet 2 of 2)

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15-21. TRUE AIRSPEED INDICATOR.

15-22. **DESCRIPTION.** The true airspeed indicator is equipped with a conversion ring, which may be rotated until pressure altitude is aligned with outside air temperature, then airspeed indicated on the instrument is read as true airspeed on the adjustable ring.

15-23. **REMOVAL AND INSTALLATION.** (See figure 15-2.) Upon installation, before tightening mounting screws (7), calibrate instrument as follows: Rotate ring (10) until 105 knots on the adjustment ring aligns with 105 knots on the indicator. Holding this setting, move retainer (9) until 60°F aligns with zero pressure altitude, then tighten mounting screws (7) and replace decorative cover (8).

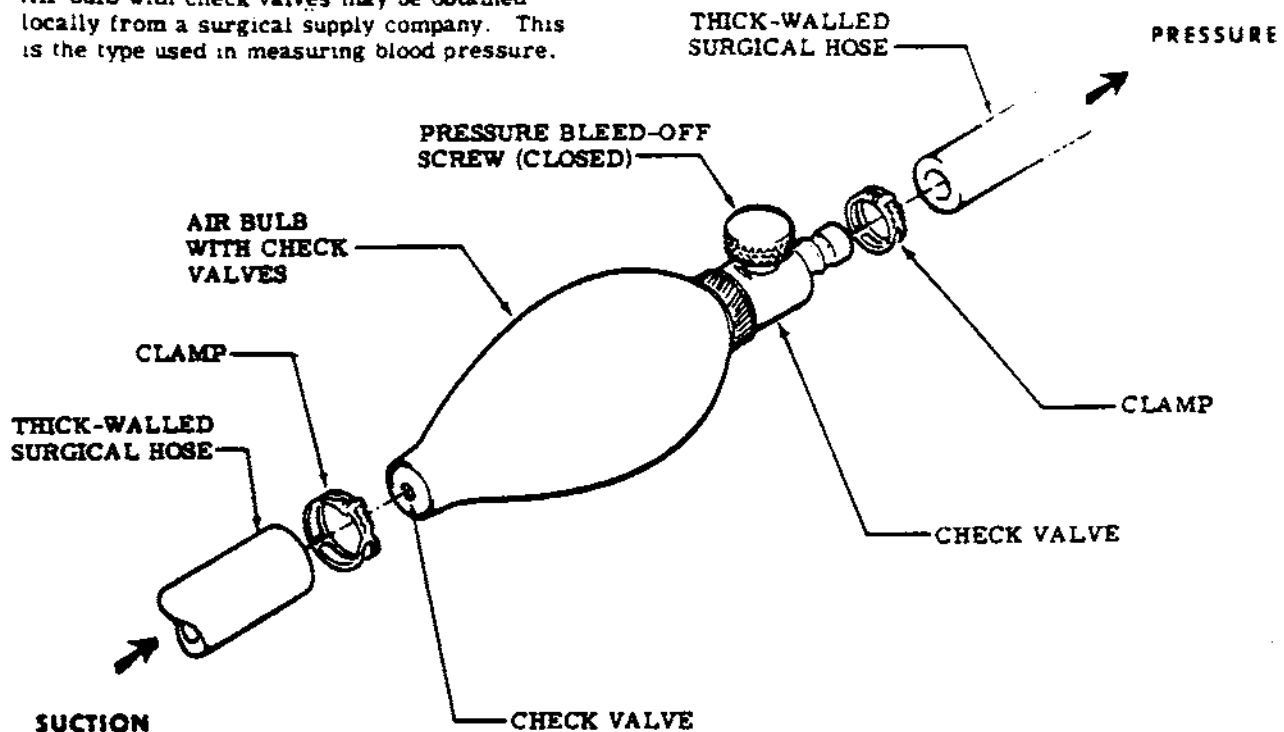
15-24. TROUBLE SHOOTING -- AIRSPEED INDICATOR.

TROUBLE	PROBABLE CAUSE	REMEDY
HAND FAILS TO RESPOND.	Pitot pressure connection not properly connected to pressure line from pitot tube.	Test line and connection for leaks. Repair or replace damaged line, tighten connections.
	Pitot or static lines clogged.	Check line for obstructions. Blow out lines.
INCORRECT INDICATION OR HAND OSCILLATES.	Leak in pitot or static lines.	Test lines and connections for leaks. Repair or replace damaged lines, tighten connections.
	Defective mechanism or leaking diaphragm.	Substitute known good indicator and check reading. Replace instrument.
HAND VIBRATES.	Excessive vibration.	Check panel shock mounts. Replace defective shock mounts.
	Excessive tubing vibration.	Check clamps and line connections for security. Tighten clamps and connections. replace tubing with flexible hose.

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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. Wait until vertical speed indicator approaches zero, then repeat. Continue to admit this small amount of air intermittently until all suction is released, then remove test equipment.

TO APPLY PRESSURE:

CAUTION

Do not apply positive pressure with airspeed indicator or vertical speed indicator connected into static system.

1. Hold pressure hose firmly against static pressure source opening.
2. Slowly squeeze air bulb to apply desired pressure to static 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 15-3. Static Test Equipment

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15-25. TROUBLE SHOOTING -- ALTIMETER.

TROUBLE	PROBABLE CAUSE	REMEDY
INSTRUMENT FAILS TO OPERATE.	Static line plugged.	Check line for obstructions. Blow out lines.
	Defective mechanism.	Substitute known-good altimeter and check reading. Replace instrument.
INCORRECT INDICATION.	Hands not carefully set.	Reset hands with knob.
	Leaking diaphragm.	Substitute known-good altimeter and check reading. Replace instrument.
	Pointers out of calibration.	Compare reading with known-good altimeter. Replace instrument.
HAND OSCILLATES.	Static pressure irregular.	Check lines for obstruction or leaks. Blow out lines, tighten connections.
	Leak in airspeed or vertical speed indicator installations.	Check other instruments and system plumbing for leaks. Blow out lines, tighten connections.

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15-26. TROUBLE SHOOTING -- VERTICAL SPEED INDICATOR.

TROUBLE	PROBABLE CAUSE	REMEDY
INSTRUMENT FAILS TO OPERATE.	Static line plugged.	Check line for obstructions. Blow out lines.
	Static line broken.	Check line for damage, connections for security. Repair or replace damaged line. Tighten connections.
INCORRECT INDICATION.	Partially plugged static line.	Check line for obstructions. Blow out lines.
	Ruptured diaphragm.	Substitute known-good indicator and check reading. Replace instrument.
	Pointer off zero.	Reset pointer to zero.
POINTER OSCILLATES.	Partially plugged static line.	Check line for obstructions. Blow out lines.
	Leak in static line.	Test lines and connections for leaks. Repair or replace damaged lines. Tighten connections.
	Leak in instrument case.	Substitute known-good indicator and check reading. Replace instrument.
HAND VIBRATES.	Excessive vibration.	Check shock mounts. Replace defective shock mounts.
	Defective diaphragm.	Substitute known-good indicator and check for vibration. Replace instrument.

15-27. Deleted.

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15-28. VACUUM SYSTEM.

- 15-29. DESCRIPTION. Suction to operate the gyros is provided by a dry-type engine-driven vacuum pump, gear-driven through a spline-type coupling. A suction relief valve, to control system pressure, is connected between the pump inlet and instruments. In the cabin, the vacuum line is routed from gyro instruments to the relief valve at the firewall. A throw away type central air filtering unit is installed. The reading of the suction gage indicates net difference in suction before and after air passes through a gyro. This differential pressure will gradually decrease as the central air filter becomes dirty, causing a lower reading on the suction gage.

NOTE

Excessive smoking will cause premature filter clogging.

15-30. TROUBLE SHOOTING -- VACUUM SYSTEM.

TROUBLE	PROBABLE CAUSE	REMEDY
HIGH SUCTION GAGE READINGS.	Gyros function normally-relief valve screen clogged, relief valve malfunction.	Check screen, then valve. Compare gage readings with new gage. Clean screen, reset valve. Replace gage.
NORMAL SUCTION GAGE READING, SLUGGISH OR ERRATIC GYRO RESPONSE.	Instrument air filters clogged.	Check filter. Replace if required.
LOW SUCTION GAGE READINGS.	Leaks or restriction between instruments and relief valve, relief valve out of adjustment, defective pump.	Check lines for leaks, disconnect and test pump. Repair or replace lines, adjust or replace relief valve, repair or replace pump.
	Central air filter dirty.	Check filter. Replace if required.
SUCTION GAGE FLUCTUATES.	Defective gage or sticking relief valve.	Check suction with test gage. Replace gage. Clean sticking valve with Stoddard solvent. Blow dry and test. If valve sticks after cleaning, replace valve.

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15-31. TROUBLE SHOOTING -- GYROS.

TROUBLE	PROBABLE CAUSE	REMEDY
HORIZON BAR OSCILLATES OR VIBRATES EXCESSIVELY.	Central filter dirty.	Check filter. Replace if required.
	Suction relief valve improperly adjusted.	Adjust or replace relief valve.
	Faulty suction gage.	Substitute known-good suction gage and check gyro indication. Replace suction gage.
	Defective mechanism.	Substitute known-good gyro and check indication. Replace instrument.
	Excessive vibration.	Check panel shock-mounts. Replace defective shock-mounts.
EXCESSIVE DRIFT IN EITHER DIRECTION.	Central air filter dirty.	Check filter. Replace if required.
	Low vacuum, relief valve improperly adjusted.	Adjust or replace relief valve.
	Faulty suction gage.	Substitute known-good suction gage and check gyro indication. Replace suction gage.
	Vacuum pump failure.	Check pump. Replace pump.
	Vacuum line kinked or leaking.	Check lines for damage and leaks. Repair or replace damaged lines, tighten connections.
DIAL SPINS IN ONE DIRECTION CONTINUOUSLY.	Operating limits have been exceeded.	Replace instrument.
	Defective mechanism.	Substitute known-good gyro and check indication. Replace instrument.

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15-31. TROUBLE SHOOTING -- GYROS. (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
HORIZON BAR FAILS TO RESPOND.	Central filter dirty.	Check filter. Replace if required.
	Suction relief valve improperly adjusted.	Adjust or replace relief valve.
	Faulty suction gage.	Substitute known-good suction gage and check gyro response. Replace suction gage.
	Vacuum pump failure.	Check pump. Replace pump.
	Vacuum line kinked or leaking.	Check lines for damage and leaks. Repair or replace damaged lines, tighten connections.
HORIZON BAR DOES NOT SETTLE.	Defective mechanism.	Substitute known-good gyro and check indication. Replace instrument.
	Insufficient vacuum.	Adjust or replace relief valve.
	Excessive vibration.	Check panel shock-mounts. Replace defective shock-mounts.

15-32. TROUBLE SHOOTING -- VACUUM PUMP.

TROUBLE	PROBABLE CAUSE	REMEDY
OIL IN DISCHARGE.	Damaged engine drive seal.	Replace gasket.
HIGH SUCTION.	Suction relief valve filter clogged.	Check filter for obstructions. Clean or replace filter.
LOW SUCTION.	Relief valve leaking.	Replace relief valve.
	Vacuum pump failure.	Substitute known-good pump and check pump suction. Replace vacuum pump.
LOW PRESSURE.	Safety valve leaking.	Replace safety valve.
	Vacuum pump failure.	Substitute known-good pump and check pump pressure. Replace vacuum pump.

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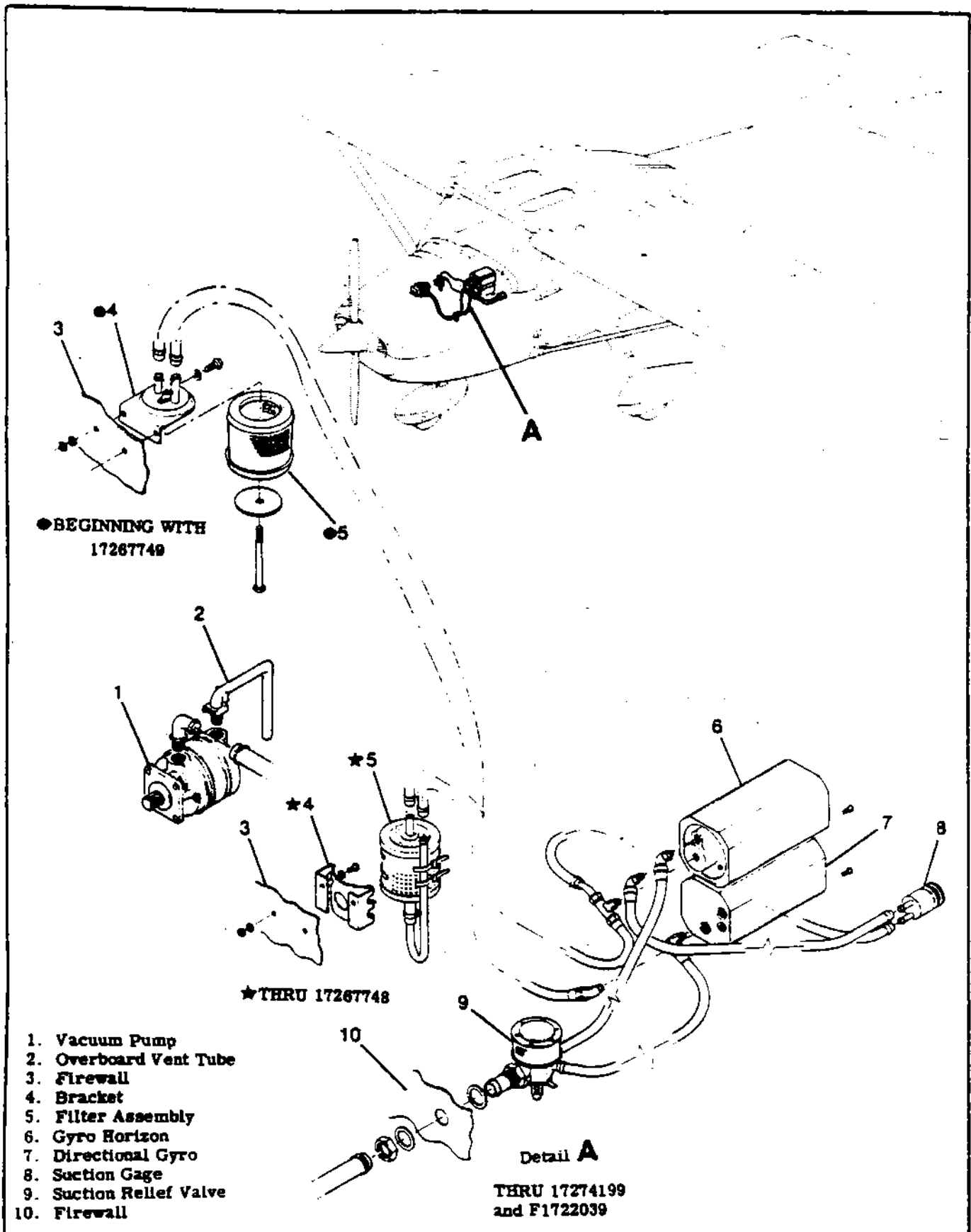


Figure 15-4. Vacuum System (Sheet 1 of 2)

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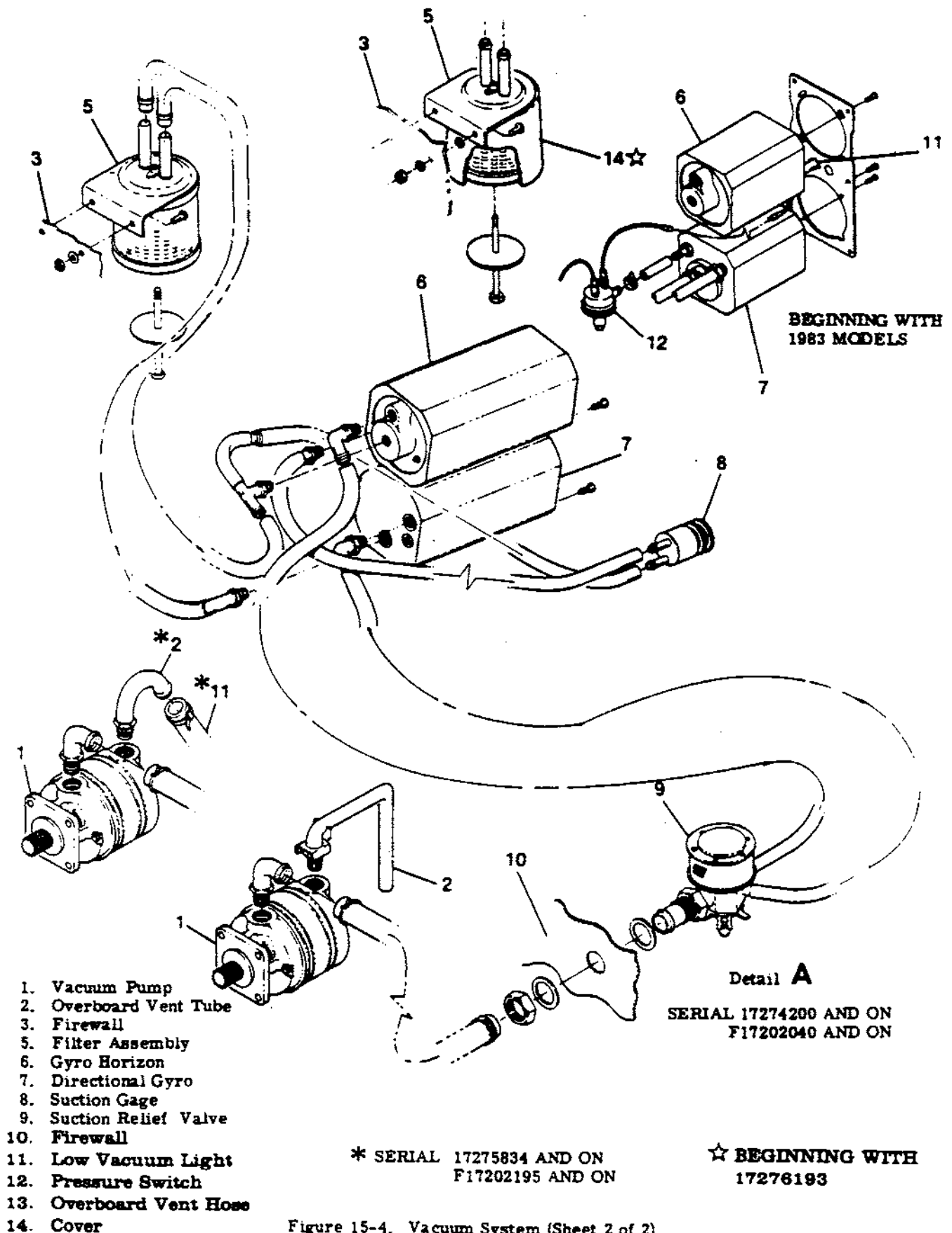


Figure 15-4. Vacuum System (Sheet 2 of 2).

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15-33. MAINTENANCE PRACTICES.

CAUTION

When replacing a vacuum system component, ensure all connections are made correctly to avoid damage to gyro system. When a component is removed, cap off and identify all open lines, hoses, and fittings to prevent dirt from entering system, and to ensure proper reinstallation. Upon component replacement, check all hoses carefully to be sure they are clean and free of debris, oil, solvent, collapsed inner liners, and external damage. Replace old, hard cracked, or brittle hoses, particularly on pump inlet, to avoid possible pump damage. On vacuum pump, where hose clearance is tight, making it difficult to reinstall hoses, apply a light film of petrolatum to the fitting. Install hoses by pushing them straight on, and do not wiggle hoses from side to side as this could cause particles to be cut from inside of hose, allowing particles to enter system.

CAUTION

Do not use teflon tape, pipe dope, or thread lubricants of any type on fitting threads, and avoid over-tightening of connections. All filters in vacuum system must be changed when installing a new pump. Failure to do so will void pump warranty. **DO NOT CONNECT A PUMP BACKWARDS.** Since the manifold check valves provide no pressure relief, the pump will be destroyed within a matter of seconds after starting the engine.

15-33A. REMOVAL OF VACUUM PUMP.

- a. Remove upper engine cowling in accordance with procedures in Section 11.
- b. Disconnect, cap off and identify hose on inlet side of vacuum pump.
- c. Identify and disconnect hose on outlet side of vacuum pump.
- d. Remove nuts, lockwashers, and flat washers securing vacuum pump to engine.
- e. Remove vacuum pump from mounting studs on engine.
- f. Remove elbow from pump and retain if it is reusable.

NOTE

Discard any twisted fittings or nuts with rounded corners.

15-33B. MOUNTING PAD INSPECTION.

- a. Check condition of the AND 20000 pad seal. If the seal shows any signs of oil leakage, replace the seal.

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15-33C. INSTALLATION OF VACUUM PUMP.

- a. Before installing a new vacuum pump, purge all lines in system to remove carbon particles or other pump components that may have been deposited in lines by previous pump.

NOTE

Before installing vacuum pump on engine, ensure that mating surfaces are clean and free of any old gasket material.

- b. Consult the applicable Parts Catalog, the pump vendor's application list, or the PMA label on pump box to verify that the pump is the correct model for the engine and/or system.
- c. Position vacuum pump in a jaw-protected vise, with drive coupling downward.

CAUTION

The pump housing should never be placed directly in a vise, since clamping across center housing will cause an internal failure of carbon rotor. Protect pump mounting flange with soft metal or wood. NEVER install a vacuum pump that has been dropped.

- d. Install elbow in pump; hand-tighten only.

NOTE

Do not use teflon tape, pipe dope, or thread lubricants of any type, and avoid over-tightening of connections.

NOTE

Use only a box wrench to tighten fittings to desired position. Do not make more than one and one half (1 1/2) turns beyond hand-tighten position.

- e. Position new mounting pad gasket on mounting studs on engine.
- f. Position vacuum pump on mounting studs.
- g. Secure pump to engine with flat washers, new lockwashers, and nuts.

CAUTION

Always replace all lockwashers with new ones when installing a new vacuum pump. Tighten all four mounting nuts (4) to 50 to 70 pound-inches.

- h. Connect hose to inlet side of vacuum pump.
- i. Install upper engine cowl in accordance with procedures in Section 11.

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- 15-34. **CLEANING.** In general, low-pressure, dry compressed air should be used in cleaning vacuum system components. Suction relief valve, exposed to engine oil and dirt, should be replaced. Check hose for collapsed inner liners as well as external damage.

CAUTION

Never apply compressed air to lines or components installed in aircraft. The excessive pressures will damage gyros. If an obstructed line is to be blown out, disconnect at both ends and blow from instrument panel out.

- 15-34A. **LOW-VACUUM WARNING LIGHT.** A red low-vacuum light is installed on the instrument panel. The light is controlled by a vacuum switch mounted on the back of the gyro horizon. The switch contacts are normally closed. The light may be checked by turning ON the master switch. With the engine running, the light should illuminate when the vacuum drops below $3 \pm .5$ inches Hg.
- 15-35. **VACUUM RELIEF VALVE ADJUSTMENT.** A suction gage reading of 5.3 inches of mercury is desirable for gyro instruments. However, a range of 4.5 to 5.4 inches of mercury is acceptable. To adjust the relief valve, remove central air filter, run engine to 2200 rpm on the ground and adjust relief valve to $5.3 \pm .1$ inches of mercury.

CAUTION

Do not exceed maximum engine temperature.

Be sure filter element is clean before installing. If reading drops noticeably, install new filter element.

15-35A. STANDBY VACUUM SYSTEM.

- 15-35B. **DESCRIPTION.** A standby vacuum system may be installed in the airplane. The system consists of an electric motor driven vacuum pump and associated hoses mounted on the aft side of the firewall. One hose is the vacuum pump vent hose and the other connects to a manifold with the engine-driven vacuum pump, just prior to the system relief valve. A two-position circuit breaker switch, mounted adjacent to the master switch on the instrument panel, controls and protects the system.

A technical line drawing of a biplane from a top-down perspective. The aircraft features a high-wing configuration with a single engine and propeller at the front. Two fuel tanks are mounted on the fuselage, one on each side of the engine. The fuel tank on the right side is labeled with the letter 'A'. A network of fuel lines, labeled with the letter 'B', runs from the tank towards the engine. The drawing is a black and white line art illustration.

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15-20A

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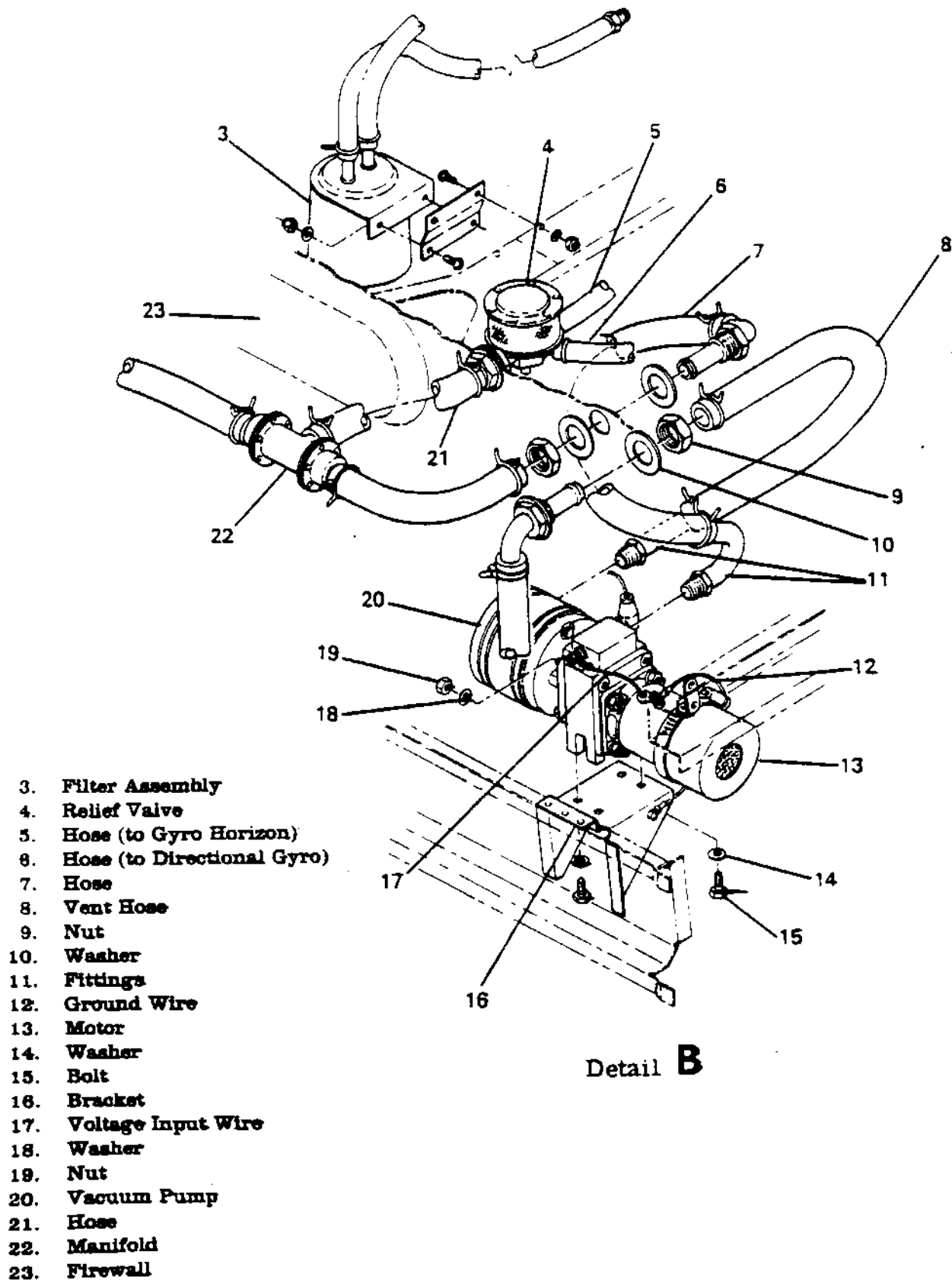


Figure 15-4A. Standby Vacuum System (Sheet 2 of 2)

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15-35C. TROUBLE SHOOTING - STANDBY VACUUM SYSTEM.

TROUBLE	PROBABLE CAUSE	REMEDY
NO SUCTION GAGE READING.	Circuit breaker switch has opened.	Reset circuit breaker switch. If switch reopens, check wire from switch to bus bar for short. Repair or replace wire.
	Defective motor.	Check voltage input wire and ground wire. Repair or re- place wires.
	Defective pump.	Check pump operation. Replace pump.
LOW SUCTION GAGE READING.	Leak or restriction between pump and suction gage.	Check hoses and connections for leaks and obstructions. In- stall new clamps at connection, clear or replace hoses.
	Relief valve not properly adjusted.	Adjust relief valve.
	Defective pump.	Check pump. Replace pump.
	Central air filter dirty.	Replace central air filter.

15-35D. REMOVAL. (See figure 15-4A.)

- a. Release clamps securing hoses (7) and (8) to pump (20).
- b. Cap hoses (7), (8) and pump fittings (11) so dirt cannot enter system.
- c. Make sure circuit breaker switch (1) and battery switch are off.
- d. Disconnect motor voltage input wire (17) and ground wire (12).
- e. Remove safety from bolts (15).
- f. Support pump and motor assembly and remove bolts (15) and washers (14).
- g. If pump is to be removed from motor, remove nuts (19) and washers (18).

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15-35E. INSTALLATION. (See figure 15-4A.)

- a. If removed, install pump (20) on motor (13) drive studs and install washers (18) and nuts (19).
- b. Position pump and motor assembly up against bracket (16) and install washers (14) and bolts (15).
- c. Safety-wire bolts (15).
- d. Connect motor voltage input wire (17) and ground wire (12).
- e. Remove caps from hoses (7), (8), and fittings (11) then install hoses and clamps.
- f. Turn on battery switch and circuit breaker switch (1) then check suction gage to see that system is operating properly. Then turn off switches.

CAUTION

Check that voltage input wire (17) is not pushed down into motor as it could become entangled with the armature, locking it.

15-36. ENGINE INDICATORS.

15-37. TACHOMETER.

- 15-38. DESCRIPTION. The tachometer used on Cessna single-engine aircraft is a mechanical indicator driven at half crankshaft speed by a flexible shaft. Most tachometer difficulties will be found in the drive-shaft. To function properly, shaft housing must be free of kinks, dents and sharp bends. There should be no bend on a radius shorter than six inches and no bend within three inches of either terminal. If a tachometer is noisy or pointer oscillates, check cable housing for kinks, sharp bends and damage. Disconnect cable at tachometer and pull it out of housing. Check cable for worn spots, breaks and kinks.

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NOTE

Before replacing a tachometer cable in housing, coat lower two thirds with AC Type ST-640 speedometer cable grease or Lubriplate No. 110. Insert cable in housing as far as possible, then slowly rotate to make sure it is seated in engine fitting. Insert cable in tachometer, making sure it is seated in drive shaft, then reconnect housing and hand tighten, then torque 1/4 turn.

15-39. OIL PRESSURE GAGE.

15-40. **DESCRIPTION.** The Bourdon tube-type oil pressure gage is a direct-reading instrument, operated by a pressure pickup line connected to the engine main oil gallery at the rear of the engine below the engine mount. The oil pressure line on 1984 and On, and all aircraft equipped with a 0509087 Modification Kit, is located at the front of the engine near the upper right corner. The oil pressure line from the instrument to the engine should be filled with kerosene, especially during cold weather operation, to attain an immediate oil indication.

15-41. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
GAGE DOES NOT REGISTER.	Pressure line clogged.	Check line for obstructions. Clean line.
	Pressure line broken.	Check line for leaks and damage. Repair or replace damaged line.
	Fractured Bourdon tube.	Replace instrument.
	Gage pointer loose on staff.	Replace instrument.
	Damaged gage movement.	Replace instrument.
GAGE POINTER FAILS TO RETURN TO ZERO.	Foreign matter in line.	Check line for obstructions. Clean line.
	Foreign matter in Bourdon tube.	Replace instrument.
	Bourdon tube stretched.	Replace instrument.
GAGE DOES NOT REGISTER PROPERLY.	Faulty mechanism.	Replace instrument.

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15-41. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
GAGE HAS ERRATIC OPERATION.	Worn or bent movement.	Replace instrument.
	Foreign matter in Bourdon tube.	Replace instrument.
	Dirty or corroded movement	Replace instrument.
	Pointer bent and rubbing on dial, dial screw or glass.	Replace instrument.
	Leak in pressure line.	Check line for leaks and damage. Repair or replace damaged line.

15-42. OIL TEMPERATURE GAGE.

15-43. DESCRIPTION. The oil temperature gage is an electrically operated indicator mounted in the instrument cluster with the oil pressure gage. One electrical lead is routed from the indicator to the sending unit installed in the engine. The other lead supplies power from the bus bar to the indicator. Refer to Table 1 on page 15-26A when trouble shooting the oil temperature gage.

15-43A. CYLINDER HEAD TEMPERATURE GAGE.

15-43B. DESCRIPTION. The temperature sending unit regulates electrical power through the cylinder head temperature gage. The gage and sending unit require little or no maintenance other than cleaning, making sure lead is properly supported and all connections are clean, tight and properly insulated. Rochester gages are connected the same as the Stewart Warner gages, but the Rochester gages do not have the calibration pot and are not adjustable. Refer to Table 2 on page 15-26B when trouble shooting the cylinder head temperature gage.

15-44. CARBURETOR AIR TEMPERATURE GAGE.

15-45. DESCRIPTION. The carburetor air temperature gage is a resistance bridge type. Changes in electrical resistance of the element are indicated by the gage, calibrated for temperature. The system requires power from the airplane electrical system and operates only when the master switch is on. Although both instrument and sending unit are grounded, two leads are used to avoid possibility of instrument error induced by poor electrical bonds in the air frame

15-46. TROUBLE SHOOTING - CARBURETOR AIR TEMPERATURE GAGE.

TROUBLE	PROBABLE CAUSE	REMEDY
GAGE POINTER STAYS OFF LOW END OF SCALE.	Open circuit breaker.	Reset breaker..
	Master switch "OFF" or switch defective.	Check switch "ON". Replace defective switch.
	Broken or grounded leads between gage and sending unit.	Repair or replace defective wiring.

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15-46. TROUBLE SHOOTING -- CARBURETOR AIR TEMPERATURE GAGE (Cont).

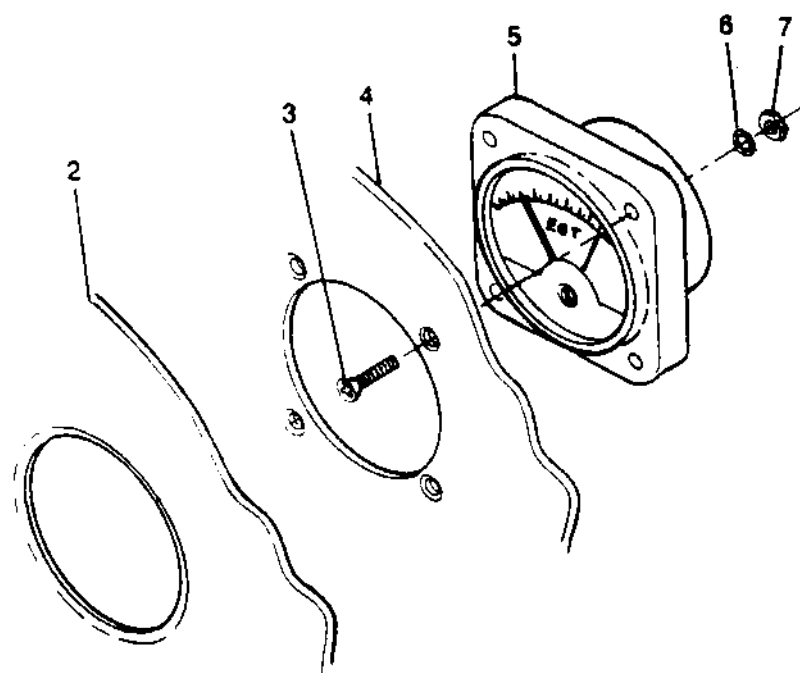
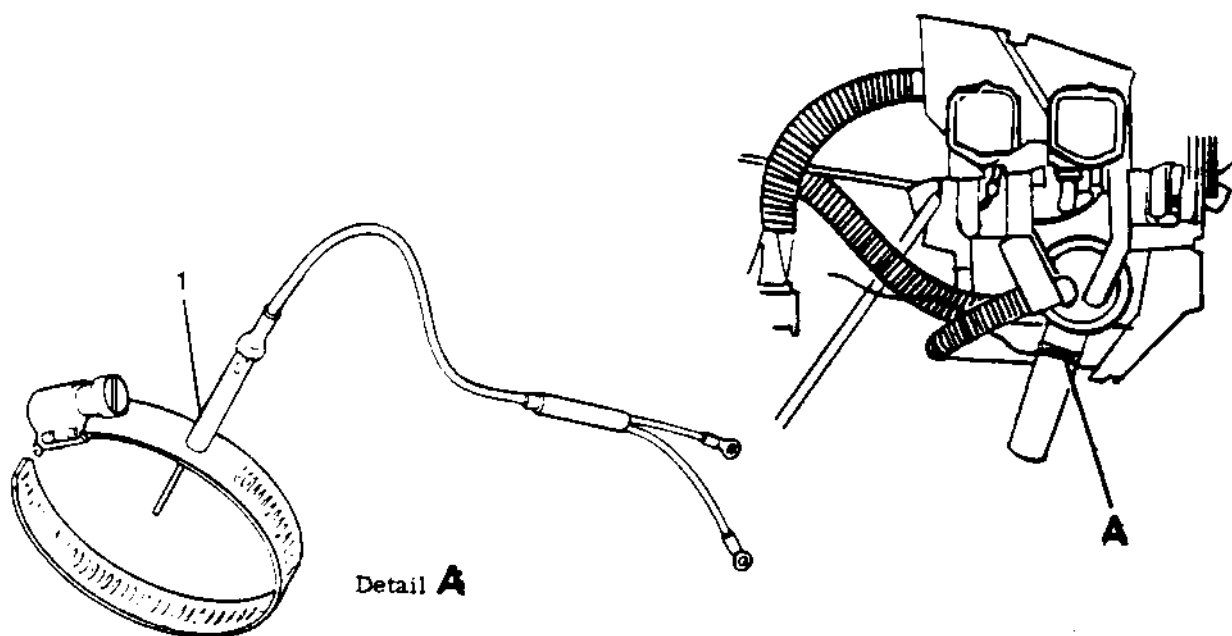
TROUBLE	PROBABLE CAUSE	REMEDY
GAGE POINTER GOES OFF HIGH END OF SCALE.	Broken or grounded lead.	Repair or replace defective wiring.
	Defective gage or sensing unit.	Replace gage or sensing unit.
GAGE OPERATES INTERMITTENTLY.	Defective master switch, broken or grounded lead.	Replace switch, repair or replace defective wiring.
	Defective gage or sensing unit.	Replace gage or sensing unit.
EXCESSIVE POINTER OSCILLATION.	Loose or broken lead.	Repair or replace defective wiring.
	Defective gage or sensing unit.	Replace gage or sensing unit.
	Excessive panel vibration.	Tighten panel mounting screws.
OBVIOUSLY INCORRECT TEMPERATURE READING.	Defective gage or sensing unit.	Replace gage or sensing unit.
POINTER FAILS TO GO OFF SCALE WITH CURRENT OFF.	Defective master switch.	Replace switch.
	Defective gage.	Replace gage.

15-46A. ECONOMY MIXTURE INDICATOR (EGT) (BEGINNING WITH 1979 MODELS.)

15-46B. DESCRIPTION. The economy mixture indicator is an exhaust gas temperature (EGT) sensing device which is used to aid the pilot in selecting the most desirable fuel-air mixture for cruising flight at less than 75% power. Exhaust gas temperature (EGT) varies with ratio of fuel-to-air mixture entering the engine cylinders. Refer to the Pilot's Operating Handbook for operating procedure of the system.

15-46C. CALIBRATION. A potentiometer adjustment screw is provided behind the plastic cap at the back of the instrument for calibration. This adjustment screw is used to position the pointer over the reference increment line (4/5 of scale) at peak EGT. Establish 75% power in level flight, then carefully lean the mixture to peak EGT. After the pointer has peaked, using the adjustment screw, position pointer over reference increment line (4/5 scale).

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1. Probe
2. Panel Cover
3. Screw
4. Instrument Panel
5. Indicator
6. Lockwasher
7. Nut

15-4A. Economy Mixture Indicating System E.G.T.

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NOTE

This setting will provide selective temperature indications for normal cruise power settings within range of the instrument.

Turning the screw clockwise increases the meter reading and counterclockwise decreases the meter reading. There is a stop in each direction and damage can occur if too much torque is applied against stops. Approximately 600°F total adjustment is provided. The adjustable yellow pointer on the face of the instrument is a reference pointer only.

15-46D. REMOVAL AND INSTALLATION. (See figure 15-4A.)

- a. Indicator.
 1. Remove instrument panel decorative cover.
 2. Disconnect EGT indicator leads.
 3. Remove screws, nuts and washers securing indicator and remove indicator.
 4. To install reverse the preceding steps.
- b. Probe.
 1. Disconnect probe leads.
 2. Remove clamp and probe assembly.
 3. When installing probe, tighten clamp to 30-35 lb-in.
 4. Coil or fold excess lead and tie in a convenient out of the way location.

15-46E. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
GAGE INOPERATIVE	Defective gage, probe or circuit.	Repair or replace defective part.
INCORRECT READING	Indicator needs calibrating.	Calibrate indicator in accordance with paragraph 15-46C.
FLUCTUATING READING	Loose, frayed or broken lead, permitting alternate make and break of circuit.	Tighten connection and repair or replace defective leads.

15-47. FUEL QUANTITY INDICATING SYSTEM.

15-48. DESCRIPTION. The magnetic type fuel quantity indicators are used in conjunction with a float-operated variable-resistance transmitter in each fuel tank. The full position of float produces a minimum resistance through transmitter, permitting maximum current flow through the fuel quantity indicator and maximum pointer deflection. As fuel level is lowered, resistance in the transmitter is increased, producing a decreased current flow through fuel quantity indicator and a smaller pointer deflection.

15-49. REMOVAL AND INSTALLATION OF FUEL QUANTITY TRANSMITTER.

- a. Drain fuel from tank. (Observe precautions in Section 12.)
- b. Remove access plate above fuel tank for access to transmitter.
- c. Disconnect electrical lead and ground strap from transmitter.
- d. Remove screws attaching transmitter and carefully work transmitter from tank. DO NOT BEND FLOAT ARM.

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- e. Install transmitter by reversing preceding steps, using new gaskets around opening in fuel tank and under screw heads. Be sure to tighten screws evenly.
- f. Service fuel tanks. Check for leaks and correct quantity indication.

NOTE

Ensure transmitter is properly grounded in accordance with Section 12.

15-50. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
FAILURE TO INDICATE.	No power to indicator or transmitter. (Pointer stays below E.)	Check fuse and inspect for open circuit. Replace fuse. repair or replace defective wire.
	Grounded wire. (Pointer stays above F.)	Check for partial ground between transmitter and gage. Repair or replace defective wire.
	Low voltage.	Check voltage at indicator. Correct voltage.
OFF CALIBRATION.	Defective indicator.	Substitute known-good indicator. Replace indicator.
	Defective transmitter.	Substitute known-good indicator. Replace indicator. Substitute known-good transmitter. Recalibrate or replace.
	Low or high voltage.	Check voltage at indicator. Correct voltage.
STICKY OR SLUGGISH INDICATOR OPERATION.	Defective indicator.	Substitute known-good indicator. Replace indicator.
	Low voltage.	Check voltage at indicator. Correct voltage.
ERRATIC READINGS.	Loose or broken wiring on indicator or transmitter.	Inspect circuit wiring. Repair or replace defective wire.
	Defective indicator or transmitter.	Substitute known-good component. Replace indicator or transmitter.
	Defective master switch.	Replace switch.

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15-51. TRANSMITTER ADJUSTMENT.

WARNING

Using the following fuel transmitter calibration procedure on components other than the originally installed (Stewart Warner) components will result in a faulty fuel quantity reading.

- 15-51A. STEWART WARNER GAGE TRANSMITTER CALIBRATION. Chances of transmitter calibration changing in normal service is remote; however, it is possible that float arm or float arm stops may become bent if transmitter is removed from cell. Transmitter calibration is obtained by adjusting float travel. Float travel is limited by float arm stops.

WARNING

Use extreme caution while working with electrical components of the fuel system. The possibility of electrical sparks around an "empty" fuel cell creates a hazardous situation.

Before installing transmitter, attach electrical wires and place master switch in "ON" position. Allow float arm to rest against lower float arm stop and read indicator. The pointer should be on E (empty) position. Adjust the float arm against lower stop so pointer indicator is on E. Raise float until arm is against upper stop and adjust upper stop to permit indicator pointer to be on F (full). Install transmitter in accordance with paragraph 15-49.

- 15-51B. ROCHESTER GAGE TRANSMITTER. Do not attempt to adjust float arm or stop. No adjustment is allowed.

Table 1

NOTE

Select the oil temperature sending unit part number from the left column and the temperature from the column headings. Read the ohms value under the appropriate temperature column.

Part Number	Type	72°F	120°F	165°F	220°F	250°F
S1630-1	Oil Temp				46.4	
S1630-3	Oil Temp		620.0			52.4
S1630-4	Oil Temp		620.0			52.4
S1630-5	Oil Temp			192.0		
S2335-1	Oil Temp	990.0				34.0

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Table 2

NOTE

Select the cylinder head temperature sending unit part number that is used in your aircraft from the left column and the temperature from the column headings. Read the ohms value under the appropriate temperature column.

Part Number	Type	200°F	220°F	450°F	475°F
S1372-1	CHT		310.0	34.8	
S1372-2	CHT		310.0	34.8	
S1372-3	CHT			113.0	
S1372-4	CHT			113.0	
S2334-3	CHT	745.0			38.0
S2334-4	CHT	745.0			38.0

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- 15-51. TRANSMITTER ADJUSTMENT.
(Refer to page 15-26A.)

- 15-52. HOURMETER. (See figure 15-5.)

- 15-53. DESCRIPTION. The hourmeter is electrically operated and is actuated by a pressure switch in the oil pressure system. Electrical power is supplied through a one-amp fuse from the electrical clock circuit, and therefore, will operate independent of the master switch. If no clock is installed, a line direct from the battery contactor provides power independent of the master switch through a one-amp fuse located adjacent to the battery box. An indicator on the dial face rotates when the meter is actuated. If the meter is inoperative and the clock is operating, the meter or its wiring is faulty and must be replaced.

NOTE

When installing the hourmeter, the positive (red) wire must be connected to the white (+) terminal. Connecting wires incorrectly will damage the meter.

- 15-54. MAGNETIC COMPASS.

- 15-55. DESCRIPTION. The magnetic compass is liquid-filled, with expansion provisions to compensate for temperature changes. It is equipped with compensating magnets adjustable from the front of the case. The compass is internally lighted, controlled by the panel lights rheostat. No maintenance is required on the compass except for a check on a compass rose each 200 hours for adjustment.

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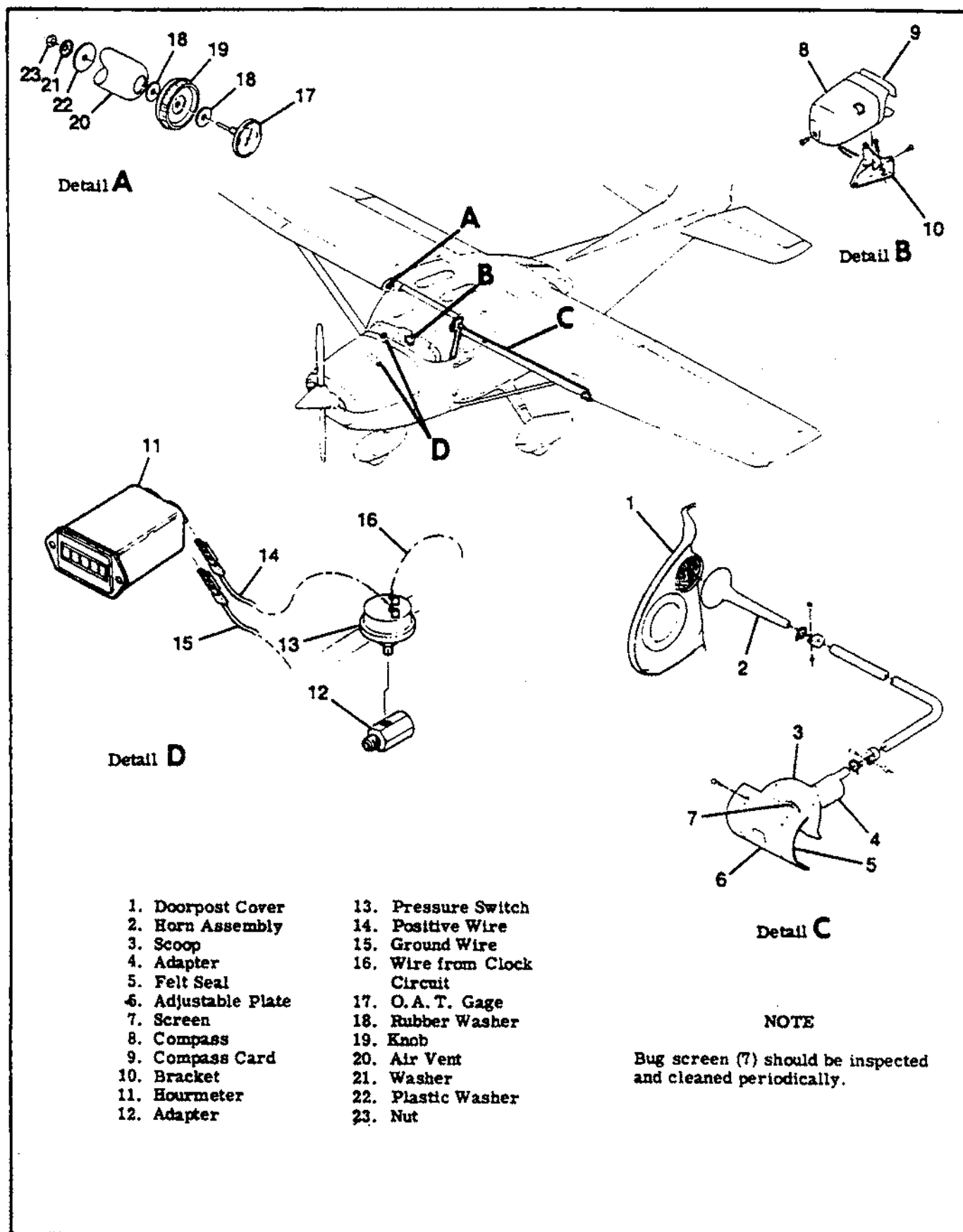


Figure 15-5. Miscellaneous Instruments and Stall Warning System

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15-56. REMOVAL AND INSTALLATION. See figure 15-5 for removal and installation.

15-57. STALL WARNING SYSTEM.

15-58. DESCRIPTION. The system is composed of an adjustable plate on left wing leading edge, connected to a reed type horn by means of plastic tubing. The horn is actuated approximately 5 to 10 knots above stalling speed as a negative air pressure area at wing leading edge causes a reverse flow of air through horn. By moving adjustable plate (6) up, actuation of horn will occur at a higher speed and moving plate down causes actuation to occur at a slower speed. Center adjustable plate opening in wing leading edge upon installation, then flight test aircraft, observing horn actuation during stall. Readjust plate to obtain desired results if necessary. Approximately $\frac{3}{32}$ inch adjustment of plate will change speed at which horn actuation occurs by 5 knots. To test horn operation, cover opening in plate (6) with a clean cloth, such as a handkerchief and apply a slight suction by mouth to draw air through horn.

15-59. REMOVAL AND INSTALLATION. Refer to figure 15-5 for removal and installation.

15-60. TURN COORDINATOR.

15-61. DESCRIPTION. The turn coordinator is an electrically operated, gyroscopic, roll-rate turn indicator. Its gyro simultaneously senses rate of motion roll and yaw axes which is projected on a single indicator. The gyro is a non-tumble type requiring no caging mechanism and incorporates an a. c. brushless spin motor with a solid state inverter.

15-62. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
INDICATOR DOES NOT RETURN TO CENTER.	Friction cause by contamination in the indicator dampening.	Replace instrument.
	Friction in gimbal assembly.	Replace instrument.
DOES NOT INDICATE A STANDARD RATE TURN (TOO SLOW).	Low voltage.	Correct voltage.
	Inverter frequency changed.	Replace instrument.
NOISY MOTOR.	Faulty bearings.	Replace instrument.
ROTOR DOES NOT START.	Faulty electrical connection.	Correct voltage or replace faulty wire.
	Inverter malfunctioning.	Replace instrument.
	Motor shorted.	Replace instrument.
	Bearings frozen.	Replace instrument.

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15-62. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
IN COLD TEMPERATURES. HAND FAILS TO RESPOND OR IS SLUGGISH.	Oil in indicator becomes too thick.	Replace instrument.
	Insufficient bearing end play.	Replace instrument.
	Low voltage.	Check voltage at instrument. Correct voltage.
NOISY GYRO.	High voltage.	Check voltage to instrument. Correct voltage.
	Loose or defective rotor bearings.	Replace instrument.

15-63. TURN-AND-SLIP INDICATOR.

15-64. DESCRIPTION. The turn-and-slip indicator is an electrically operated instrument powered by the aircraft electrical system, therefore, operating only when the master switch is ON.

15-65. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
INDICATOR POINTER FAILS TO RESPOND.	Internal fuse blown.	Check wiring for continuity, check voltage at indicator. Replace fuse, if fuse still blows, replace instrument.
	Master switch "OFF" or switch defective.	Check switch "ON." Re- place defective switch.
	Broken or grounded lead to indicator.	Check circuit wiring. Repair or replace defective wiring.
	Indicator not grounded.	Check ground wire. Repair or replace defective wire.
HAND SLUGGISH IN IN RETURNING TO ZERO.	Defective mechanism.	Replace instrument.
	Defective mechanism.	Replace instrument.
	Low voltage.	Check voltage at indicator. Correct voltage.
POINTER DOES NOT INDI- CATE PROPER TURN.	Defective mechanism.	Replace instrument.

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15-85. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
HAND DOES NOT SIT ON ZERO.	Gimbal and rotor out of balance.	Replace instrument.
	Hand incorrectly sits on rod. Sensitivity spring adjustment pulls hand off zero.	Replace instrument. Replace instrument.
IN COLD TEMPERATURES, HAND FAILS TO RESPOND OR IS SLUGGISH.	Oil in indicator becomes too thick.	Replace instrument.
	Insufficient bearing end play.	Replace instrument.
	Low voltage.	Check voltage at indicator. Correct voltage.
NOISY GYRO.	High voltage.	Check voltage at indicator. Correct voltage.
	Loose or defective rotor bearings.	Replace instrument.

15-66. OUTSIDE AIR TEMPERATURE GAGE (See figure 15-5).

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SECTION 16

ELECTRICAL SYSTEMS

WARNING

When performing any inspection or maintenance that requires turning on the master switch, installing a battery, or pulling the propeller through by hand, treat the propeller as if the ignition switch were ON. Do not stand, nor allow anyone else to stand, within the arc of the propeller, since a loose or broken wire, or a component malfunction, could cause the propeller to rotate.

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16-1. ELECTRICAL SYSTEMS.

- 16-2. GENERAL. This section contains service information necessary to maintain the Aircraft Electrical Power Supply System, Aircraft Lighting System, Pitot Heater, Cigar Lighter and Electrical Load Analysis Chart.

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16-3. ELECTRICAL POWER SUPPLY SYSTEM.

16-4. **DESCRIPTION.** Electrical energy for the aircraft is supplied by a 14-volt, direct-current, single wire, negative ground electrical system. A single 12-volt battery supplies power for starting and furnishes a reserve source of power in the event of alternator failure thru 1977 models. Beginning with 1978 models the electrical system is 28-volt and a 24-volt battery is utilized. An engine-driven alternator is the normal source of power during flight and maintains a battery charge controlled by a voltage regulator. An external power receptacle is offered as optional equipment to supplement the battery system for starting and ground operation.

16-5. SPLIT BUS BAR.

16-6. **DESCRIPTION.** Electrical power is supplied through a split bus bar. One side of the bus bar supplies power to the electrical equipment while the other side supplies the electronic installations. When the master switch is closed, the battery contactor engages and the battery power is supplied to the electrical side of the split bus bar. The electrical bus feeds battery power thru a relay, thru 1977 models and an avionics master switch beginning with 1978 models, to the electronics bus.

16-7. MASTER SWITCH.

16-8. **DESCRIPTION.** The operation of the battery and alternator systems is controlled by a master switch. The switch is an interlocking split rocker with battery mode on the right-hand side and alternator mode on the left-hand side. This arrangement allows the battery to be on the line without the alternator, however, operation of the alternator without the battery on the line is not possible.

16-9. AMMETER.

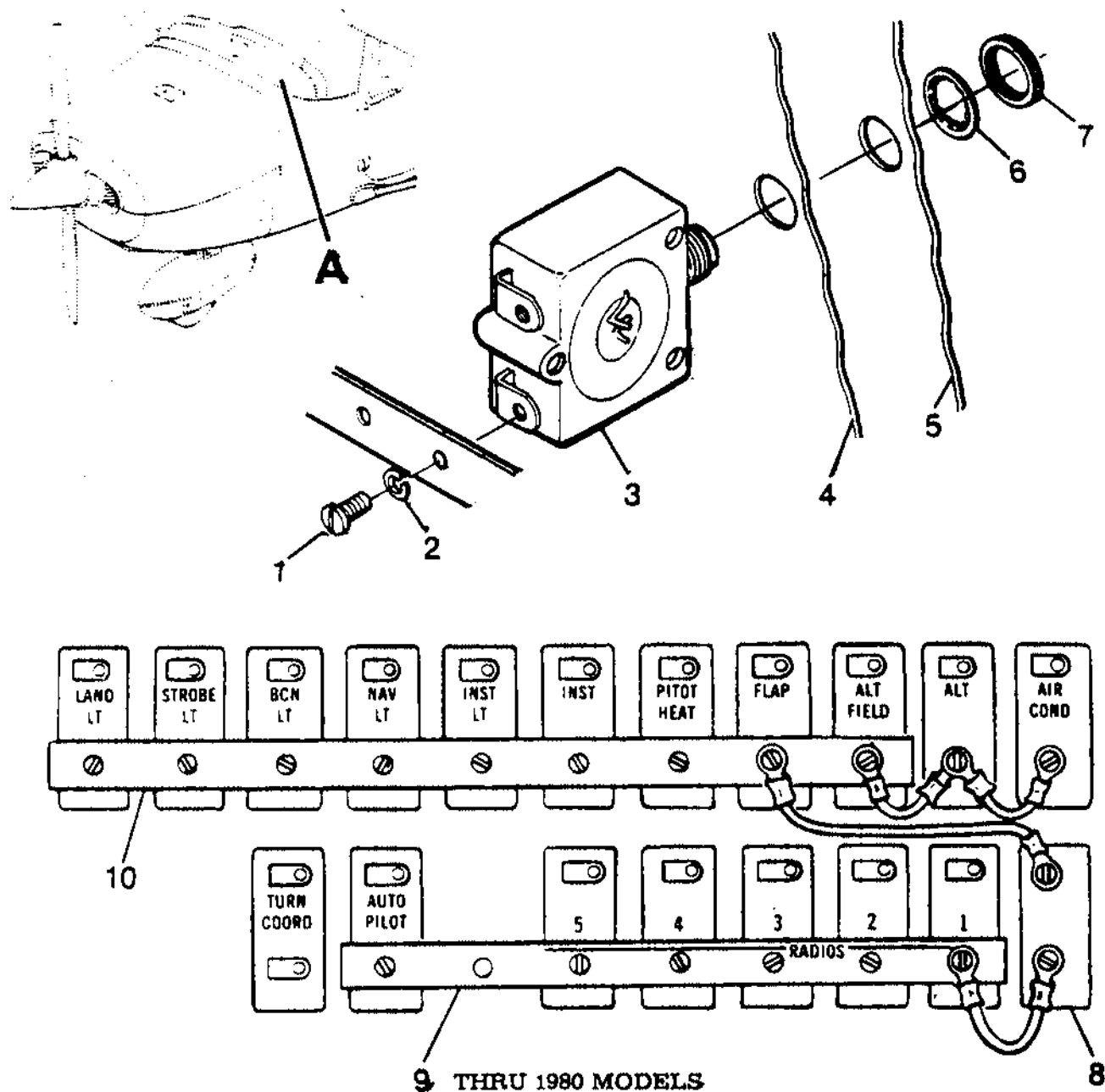
16-10. **DESCRIPTION.** The ammeter is connected between the battery and the aircraft bus. The meter indicates the amount of current flowing either to or from the battery. With a low battery and the engine operating at cruise, the ammeter will show the full alternator output. When the battery is fully charged and cruise is maintained with all electrical equipment off, the ammeter will show a minimum charging rate.

16-11. BATTERY POWER SYSTEM.

16-12. BATTERY.

16-13. **DESCRIPTION.** Thru 17269309 and F17201639 a 12-volt battery with an approximate 25 ampere-hour capacity is installed. On aircraft serials 17269310 thru 17269605 and F17201640 thru F17201729 the battery is 24-volt and approximately 17 ampere-hour capacity. Beginning with 17269742 and F17201730 the battery is also 24-volts with an approximate 12.75 ampere-hour capacity as standard and an optional battery with an approximate 15.5 ampere-hour rating. The battery is mounted on the forward left hand side of the firewall.

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1. Screw	6. Lockwasher
2. Lockwasher	7. Nut
3. Circuit Breaker	8. Avionics Switch
4. Instrument Panel	9. Avionics Bar
5. Decorative Cover	10. Primary Bus

Figure 16-1. Circuit Breaker and Bus Bar Installation (Sheet 1 of 3)

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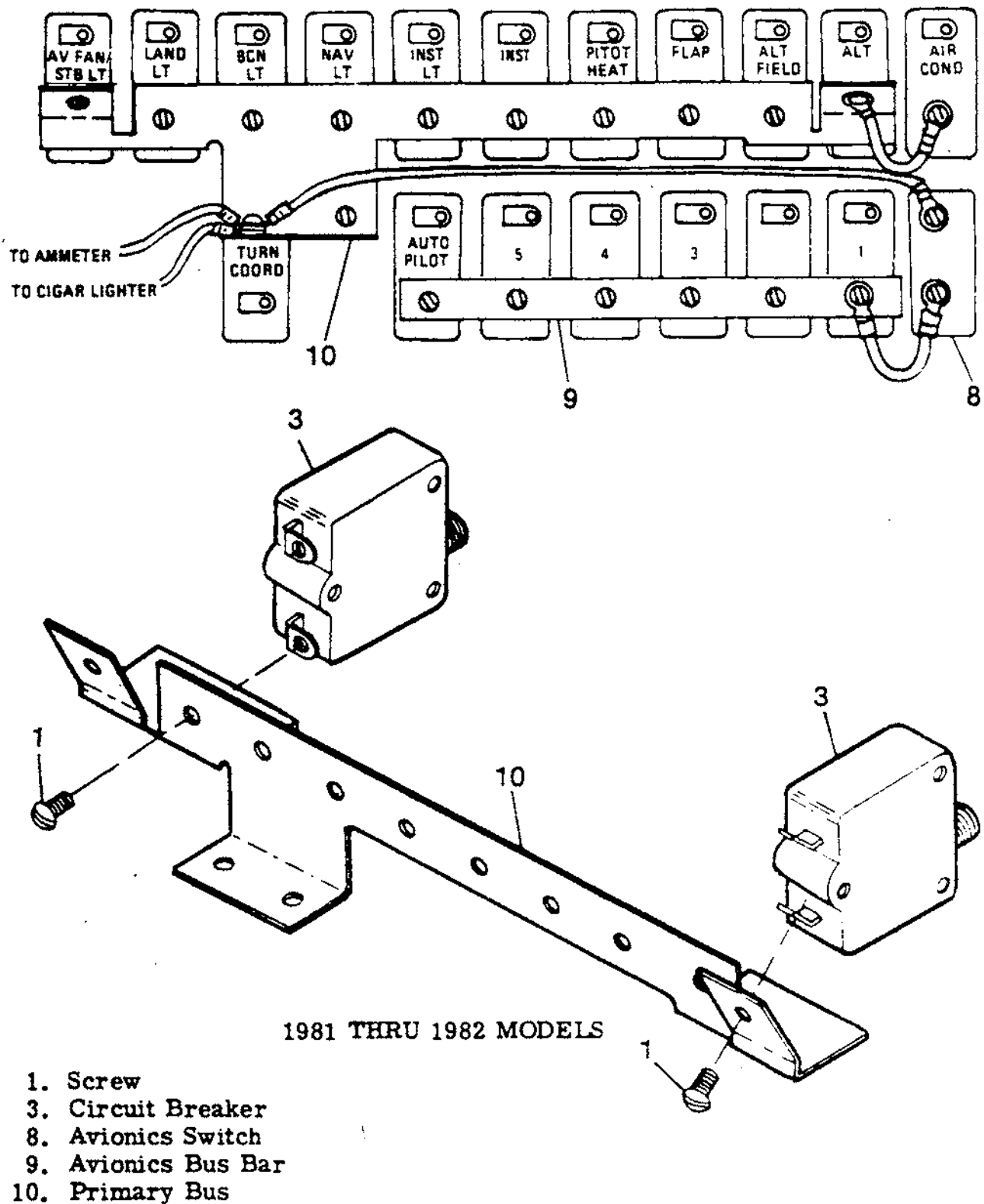


Figure 16-1. Circuit Breaker and Bus Bar Installation (Sheet 2 of 3)

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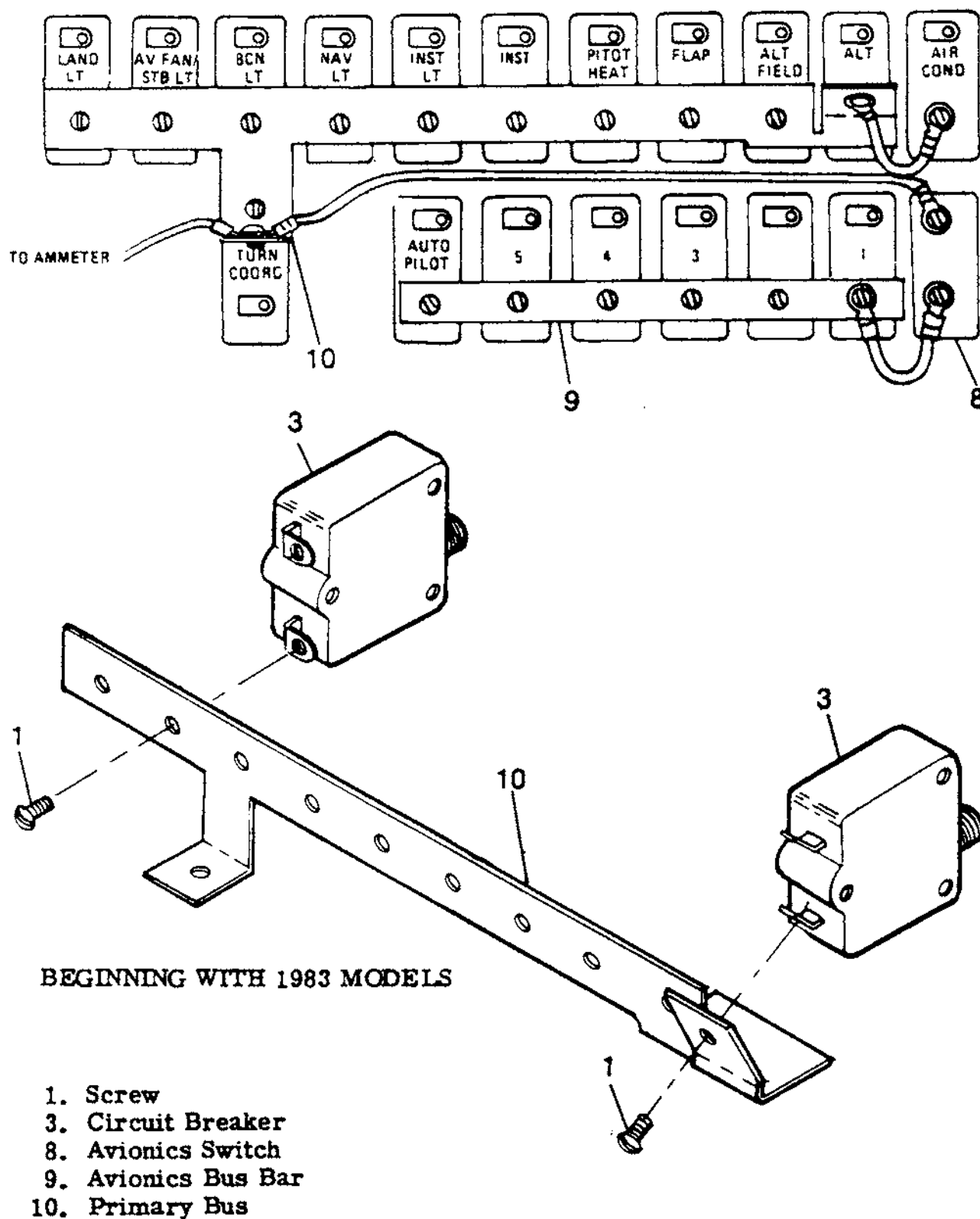


Figure 16-1. Circuit Breaker and Bus Bar Installation (Sheet 3 of 3)

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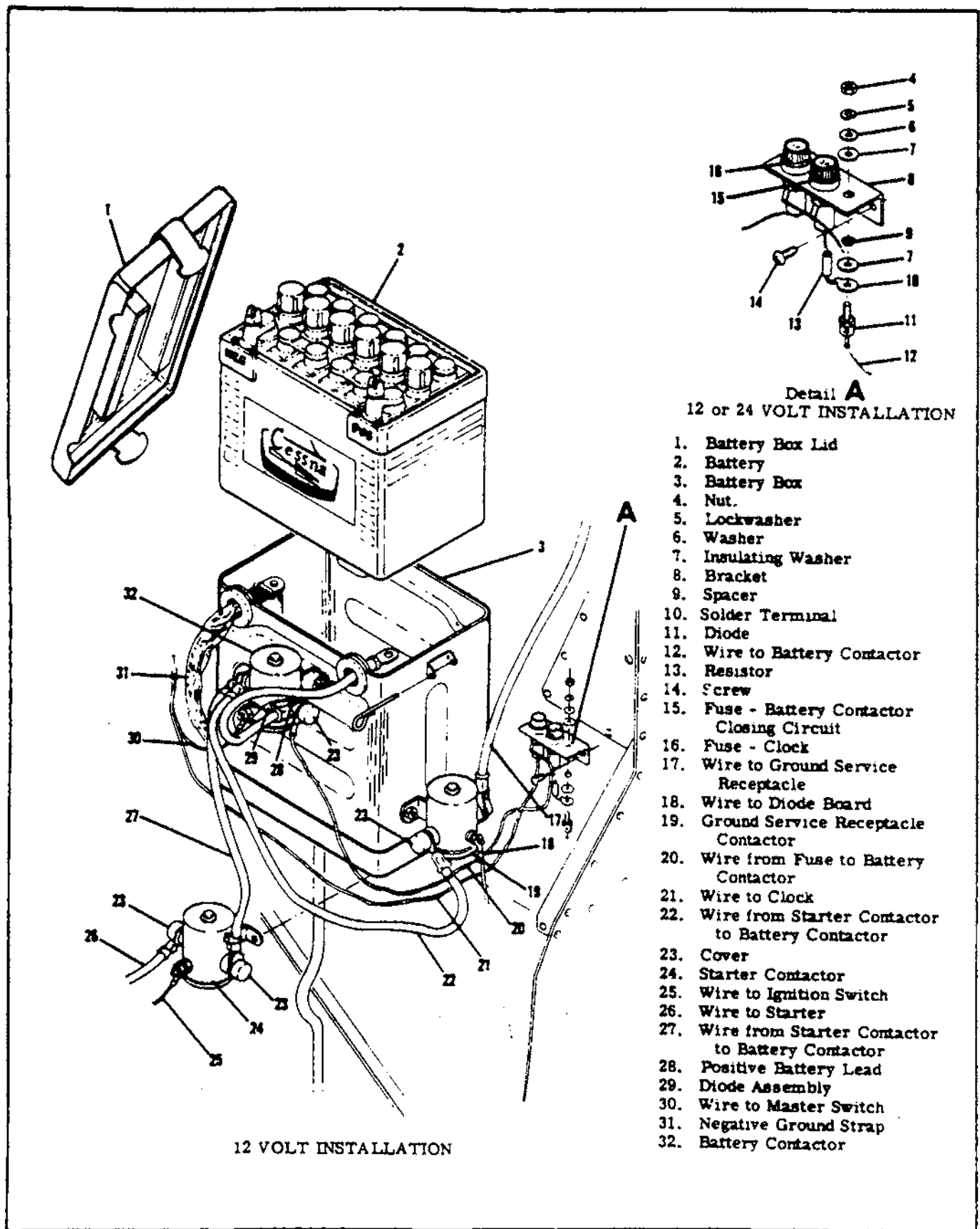


Figure 16-2. Battery and Electrical Equipment Installation (Sheet 1 of 7)

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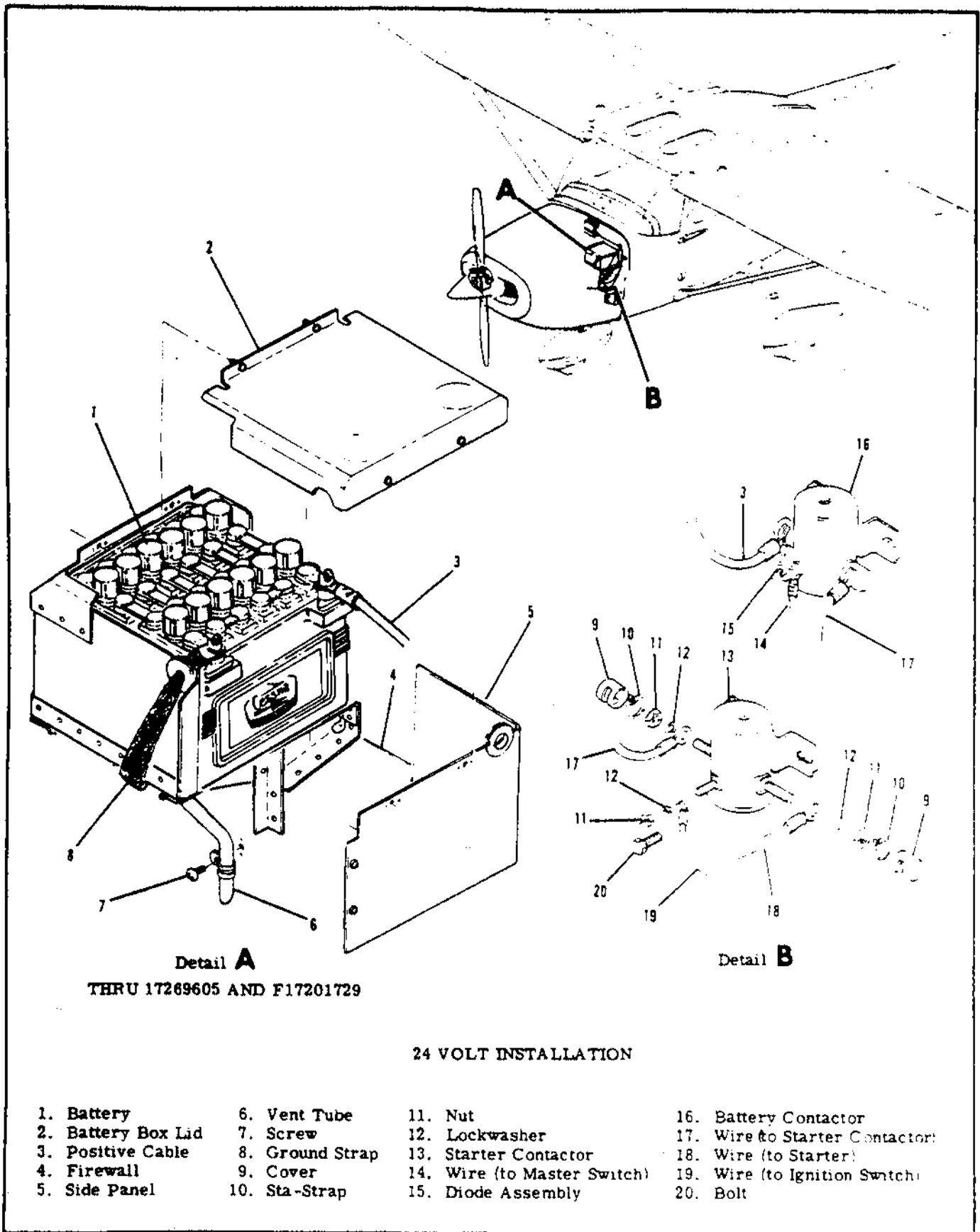
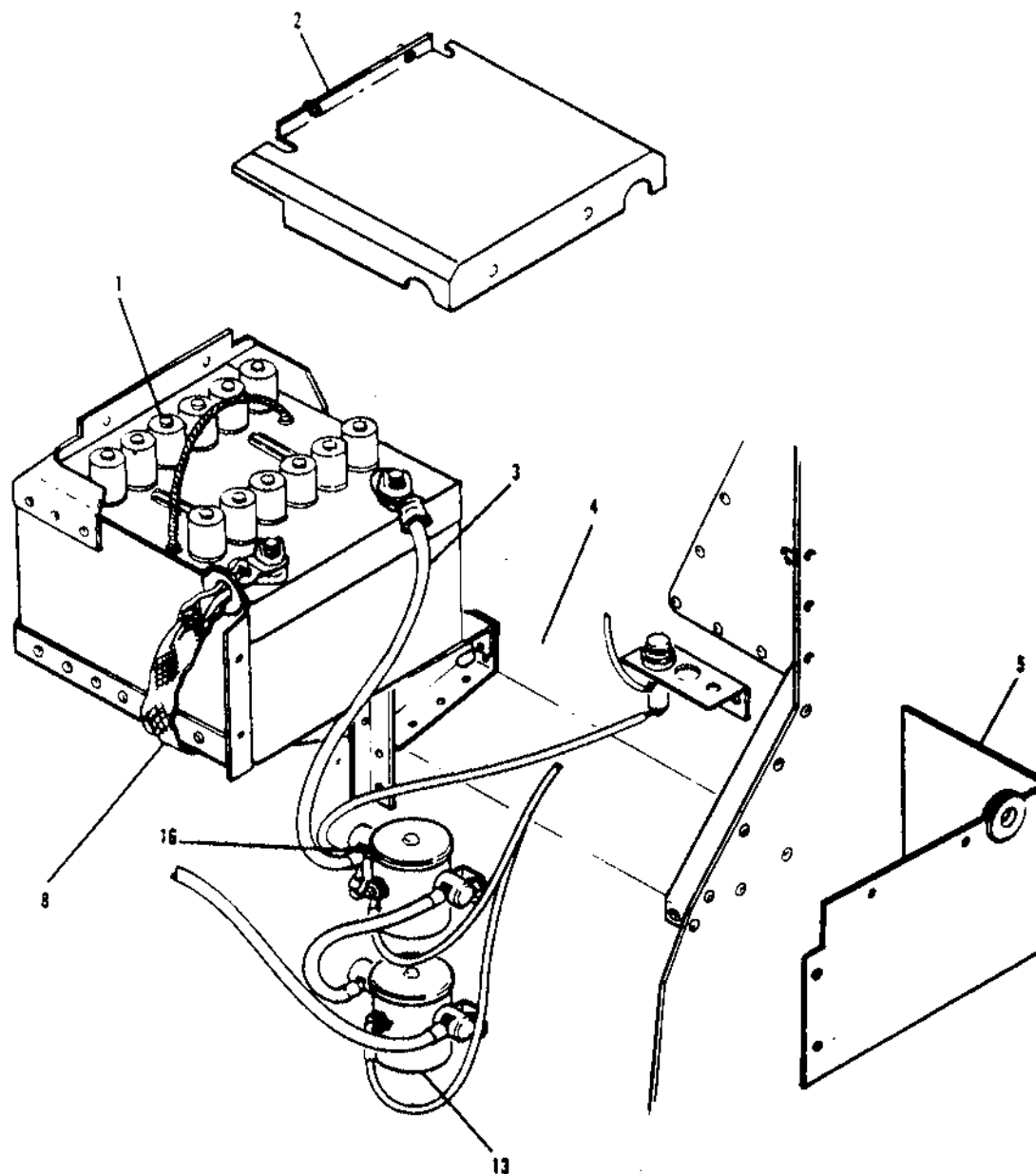


Figure 16-2. Battery and Electrical Equipment Installation (Sheet 2 of 7)

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Detail **A**

17269606 THRU 17272884 AND
F17201730 THRU F17201909

Figure 16-2. Battery and Electrical Equipment Installation (Sheet 3 of 7)

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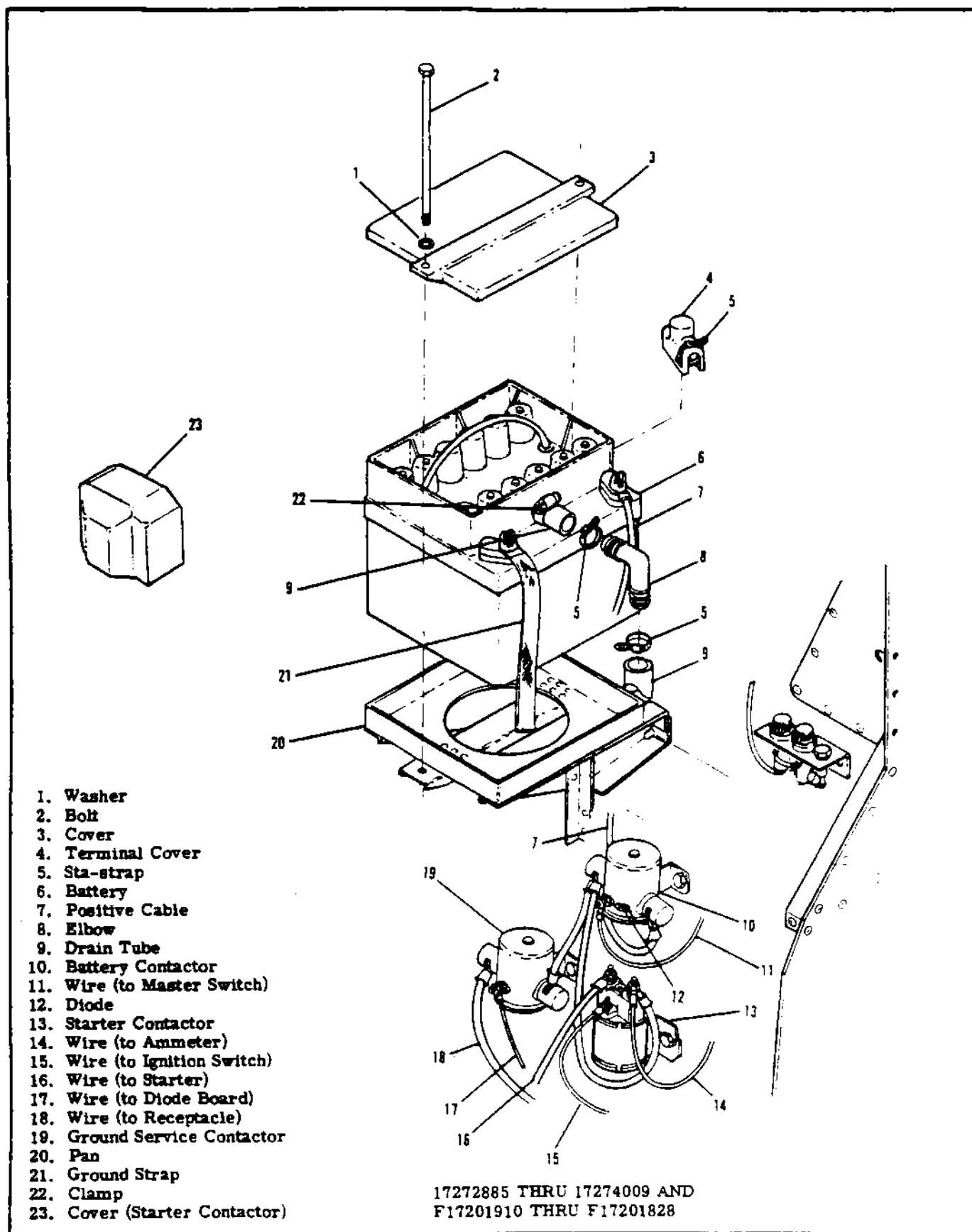


Figure 16-2. Battery and Electrical Equipment Installation (Sheet 4 of 7)

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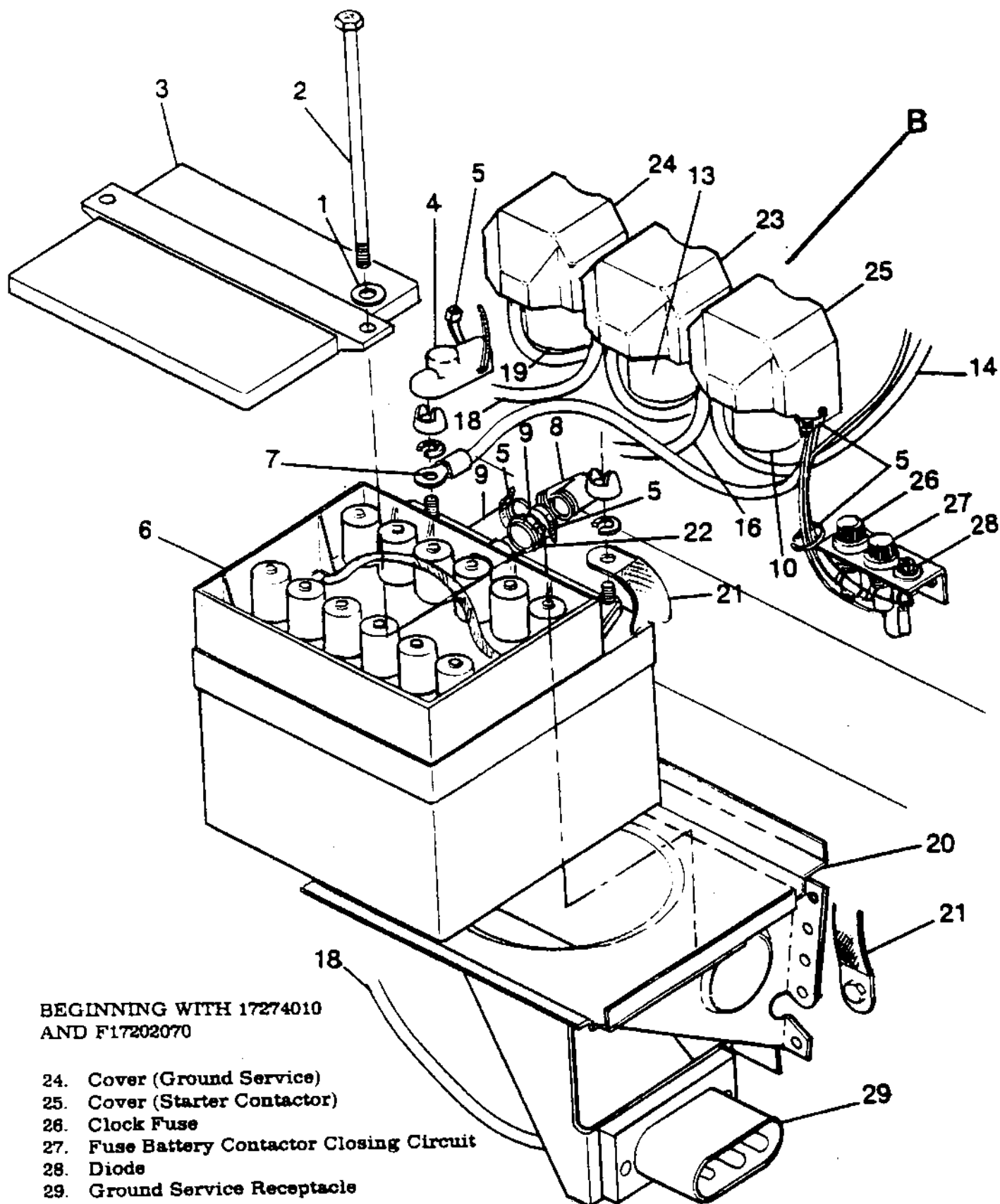


Figure 16-2. Battery and Electrical Equipment Installation (Sheet 5 of 7)



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* Used on All Three Contactors

* BEGINNING WITH 17275340
AND F17202170

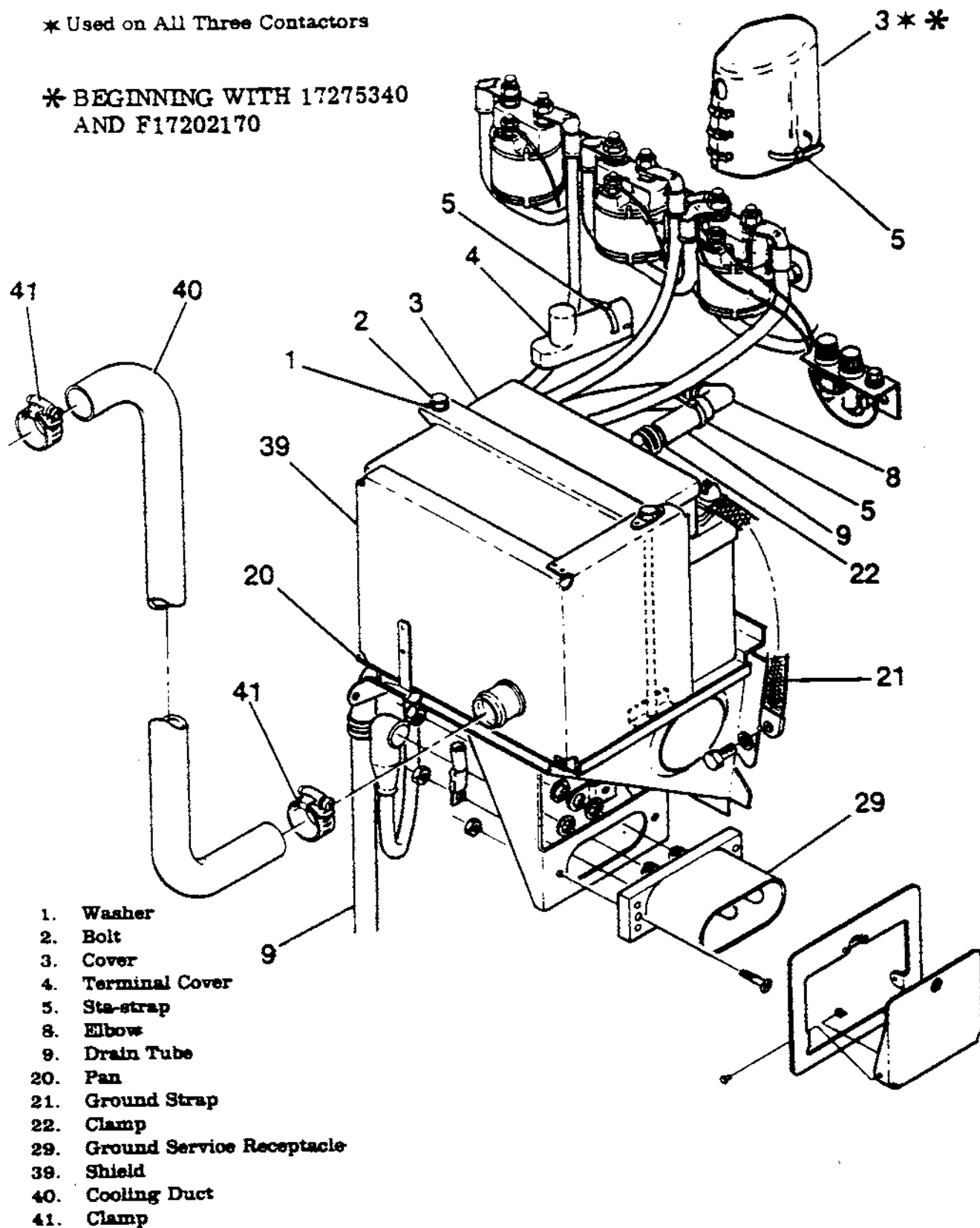


Figure 16-2. Battery and Electrical Equipment Installation (Sheet 7 of 7)

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16-14. TROUBLE SHOOTING THE BATTERY POWER SYSTEM.

TROUBLE	PROBABLE CAUSE	REMEDY
BATTERY WILL NOT SUPPLY POWER TO BUS OR IS INCAPABLE OF CRANKING ENGINE.	Battery discharged.	1. Measure voltage at "BAT" terminal of battery contactor with master switch and a suitable load such as a taxi light turned on. Normal battery will indicate 11.5 volts or more on a 14 volt system or 23 volts or more on a 28 volt system. If voltage is low, proceed to Step 2. If voltage is normal, proceed to Step 3.
	Battery faulty.	2. Check fluid level in cells and charge 12-volt battery at 14 volts or 24-volt battery at 28 volts for approximately 30 minutes or until the battery voltage rises to 14 volts on 12-volt battery or 28 volts on 24-volt battery. If tester indicates a good battery, the malfunction may be assumed to be a discharged battery. If the tester indicates a faulty battery replace the battery.
	Faulty contactor or wiring between contactor or master switch.	3. Measure voltage at master switch terminal (smallest) on contactor with master switch closed. Normal indication is zero volts. If voltage reads zero, proceed to step 4. If a voltage reading is obtained check wiring between contactor and master switch. Also check master switch.
	Open coil on contactor.	4. Check continuity between "BAT" terminal and master switch terminal of contactor. Normal indication on 14 volt aircraft is 16-24 ohms. Normal indication on 28 volt aircraft is 50-70 ohms. If ohmmeter indicates an open coil, replace contactor. If ohmmeter indicates a good coil, proceed to step 5.

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16-14. TROUBLE SHOOTING THE BATTERY POWER SYSTEM (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
BATTERY WILL NOT SUPPLY POWER TO BUS OR IS INCAPABLE OF CRANKING ENGINE. (Cont).	Faulty contactor contacts.	5. Check voltage on "BUS" side of contactor with master switch closed. Meter normally indicates battery voltage. If voltage is zero or intermittent, replace contactor. If voltage is normal, proceed to Step 6.
	Faulty wiring between contactor and bus.	6. Inspect wiring between contactor and bus. Repair or replace wiring.

16-15. REMOVAL AND INSTALLATION. (See figure 16-2.)

CAUTION

When installing or removing battery always observe the proper polarity with the aircraft electrical system (negative to ground). reverse the polarity, even momentarily, may result in failure of semiconductor devices (alternator diodes, radio protection diodes and radio transistors).

Always remove the battery ground cable first and replace it last to prevent accidental short circuits.

a. THRU 1979 MODELS.

1. Remove upper half of cowl.
2. Remove battery box cover and beginning with 1978 models also remove side panel.
3. Disconnect the ground cable from the negative battery terminal.
4. Disconnect the cable from the positive terminal of the battery.
5. Lift the battery out of the battery box.
6. To replace the battery, reverse this procedure.

b. BEGINNING WITH 1980 MODELS.

1. Remove upper half of engine cowl.
2. Disconnect ground strap from negative battery terminal.
3. Cut sta-strap and remove cover from positive battery terminal.
4. Disconnect the cable from the positive battery terminal.
5. Remove clamp and battery drain tube.
6. Remove bolts and washers securing battery and cover, then remove cover and lift battery out of pan.

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- 16-16. **CLEANING THE BATTERY.** For maximum efficiency, the battery and connections should be kept clean at all times.
- Remove the battery in accordance with the preceding paragraph.
 - Tighten battery cell filler caps to prevent the cleaning solution from entering the cells.
 - Wipe the battery cable ends, battery terminals and entire surface of the battery with a clean cloth moistened with a solution of bicarbonate of soda (baking soda) and water.
 - Rinse with clear water, wipe off excess water and allow battery to dry.
 - Brighten up cable ends and battery terminals with emery cloth or a wire brush.
 - Install the battery according with the preceding paragraph.
 - Coat the battery terminals with petroleum jelly or an ignition spray product to reduce corrosion.
- 16-17. **ADDING ELECTROLYTE OR WATER TO THE BATTERY.** A battery being charged and discharged with use will decompose the water from the electrolyte by electrolysis. When the water is decomposed, hydrogen and oxygen gases are formed which escape into the atmosphere through the battery vent system. The acid in the solution chemically combines with the plates of the battery during discharge or is suspended in the electrolyte solution during charge. Unless the electrolyte has been spilled from a battery, acid should not be added to the solution. The water, however, will decompose into gases and should be replaced regularly. Add distilled water as necessary to maintain the electrolyte level with the horizontal baffle plate or the split ring on the filler neck inside the battery. When "dry charged" batteries are put into service, fill as directed with electrolyte. When the electrolyte level falls below normal with use, add only distilled water to maintain the proper level. On Aircraft Serials 17269310 thru 17269605 and F1721640 thru F1721729 refer to Cessna Single-Engine Service Letter, SE78-6 Dated February 13, 1978 when filling the battery. The battery electrolyte contains approximately 25% sulphuric acid by volume. Any change in this volume will hamper the proper operation of the battery.

CAUTION

Do not add any type of "battery rejuvenator" to the electrolyte. When acid has been spilled from a battery, the acid balance may be adjusted by following instructions published by the Association of American Battery Manufacturers.

- 16-18. **TESTING THE BATTERY.** The specific gravity of the battery may be measured with a hydrometer to determine the state of battery charge. If the hydrometer reading is low, slow-charge the battery and retest. Hydrometer readings of the electrolyte must be compensated for the temperature of the electrolyte. Some hydrometers have a built-in thermometer and conversion chart. The following chart shows the battery condition for various hydrometer readings with an electrolyte temperature of 80° Fahrenheit.

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BATTERY HYDROMETER READINGS

READINGS

1.280 Specific Gravity
1.250 Specific Gravity
1.220 Specific Gravity
1.190 Specific Gravity
1.160 Specific Gravity

BATTERY CONDITION

100% Charged
75% Charged
50% Charged
25% Charged
Practically Dead

NOTE

All readings shown are for an electrolyte temperature of 80° Fahrenheit. For higher temperatures the readings will be slightly lower. For cooler temperatures the readings will be slightly higher. Some hydrometers have a built-in temperature compensation chart and a thermometer. If this type tester is used, disregard this chart.

- 16-19. **CHARGING THE BATTERY.** When the battery is to be charged, the level of electrolyte should be checked and adjusted by adding distilled water to cover the tops of the internal battery plates. Remove the battery from the aircraft and place in a well ventilated area for charging.

WARNING

When a battery is being charged, hydrogen and oxygen gases are generated. Accumulation of these gases can create a hazardous explosive condition. Always keep sparks and open flame away from the battery.

Allow unrestricted ventilation of the battery area during charging.

The main points of consideration during a battery charge are excessive battery temperature and violent gassing. Test the battery with a hydrometer to determine the amount of charge. Decrease the charging rate or stop charging temporarily if the battery temperature exceeds 125° F.

- 16-20. **BATTERY BOX (THRU 17272884 AND F17201909).**
- 16-21. **DESCRIPTION.** The battery is completely enclosed in a box which is painted with acid proof paint. The box has a vent tube which protrudes through the bottom of the aircraft allowing battery gases and spilled electrolyte to escape. The battery box is riveted to the forward side of the firewall.

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- 16-22. **REMOVAL AND INSTALLATION.** (See figure 16-1A.) The battery box is riveted to mounting brackets on the firewall. The rivets must be drilled out to remove the box. When a battery box is installed and riveted into place, all rivets and scratches inside the box should be painted with acid proof lacquer Part No. CES1054-381, available from the Cessna Service Parts Center.
- 16-23. **MAINTENANCE OF BATTERY BOX.** The battery box should be inspected and cleaned periodically. The box and cover should be cleaned with a strong solution of bicarbonate of soda (baking soda) and water. Hard deposits may be removed with a wire brush. When all corrosive deposits have been removed from the box, flush it thoroughly with clean water.

WARNING

Do not allow acid deposits to come in contact with skin or clothing. Serious acid burns may result unless the affected area is washed immediately with soap and water. Clothing will be ruined upon contact with battery acid.

Inspect the cleaned box and cover for physical damage and for areas lacking proper acid proofing. A badly damaged or corroded box should be replaced. If the box or lid require acid proofing, paint the area with acid proof lacquer Part No. CES1054-381, available from the Cessna Service Parts Center.

- 16-24. **BATTERY CONTACTOR.**
- 16-25. **DESCRIPTION.** The battery contactor is bolted to the side of the battery box thru 1977 models and on the firewall beginning with 1978 models. The contactor is a plunger type which is actuated by turning the master switch on. When the master switch is off, the battery is disconnected from the electrical system. A silicon diode is used to eliminate spiking of transistorized radio equipment. The large terminal of the diode connects to the battery terminal of the battery contactor. The small terminal of the diode and the master switch wire connect to the minus terminal of the contactor coil. A nylon cover is installed over the contactor terminals to prevent accidental short circuits.
- 16-26. **REMOVAL AND INSTALLATION.** (See figure 16-2.)
- a. **THRU 1980 MODELS.**
1. Remove engine cowl per Section 11.
 2. Thru 1979 models, remove battery box cover and disconnect ground strap from negative battery terminal.
 3. Beginning with 1980 models, disconnect ground strap from negative battery terminal.
 4. Cut sta-straps and remove nylon covers from contactor terminals.
 5. Remove nuts and washers securing each side of the battery contactor and remove contactor.
 6. Remove bolt and washer securing each side of the battery contactor and remove contactor.
 7. To install contactor, reverse the preceding steps; be sure to install diode assembly if removed. Use new sta-straps on nylon covers.

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b. BEGINNING WITH 1981 MODELS.

1. Remove engine cowl per Section 11.
2. Disconnect ground strap from negative battery terminal.
3. Cut sta-straps and remove contactor cover.
4. Remove nuts and washers, then remove and tag wires for reinstallation.
5. Remove bolt and washer securing each side of the battery contactor and remove contactor.
6. To install contactor, reverse the preceding steps; be sure to install diode assembly if removed. Use new sta-straps on cover.

16-27. BATTERY CONTACTOR CLOSING CIRCUIT.

- 16-28. DESCRIPTION. This circuit consists of a 5 amp fuse, a resistor and a diode located on the firewall fuse bracket adjacent to the battery. This serves to shunt a small charge around the battery contactor so that ground power may be used to close the contactor when the battery is too dead to energize the contactor by itself.

16-29. GROUND SERVICE RECEPTACLE.

- 16-30. DESCRIPTION. A ground service receptacle is offered as optional equipment to permit use of external power for cold weather starting or when performing lengthy electrical maintenance. A reverse polarity protection system is utilized whereby ground power must pass through an external power contactor to be connected to the bus. A silicon junction diode is connected in series with the coil on the external power contactor so that if the ground power source is inadvertently connected with a reversed polarity, the external power contactor will not close. This feature protects the diodes in the alternator, and other semi-conductor devices used in the aircraft from possible reverse polarity damage.

NOTE

On Aircraft Serials 17257585 thru 17289971 refer to Cessna Single-Engine Service Letter SE78-19, dated March 27, 1978.

NOTE

Thru 1977 models application of external power opened the relay supplying voltage to the electronics bus. Beginning with 1978 models this relay is replaced by an avionics master switch. The avionics master switch must be OFF when external power is applied.

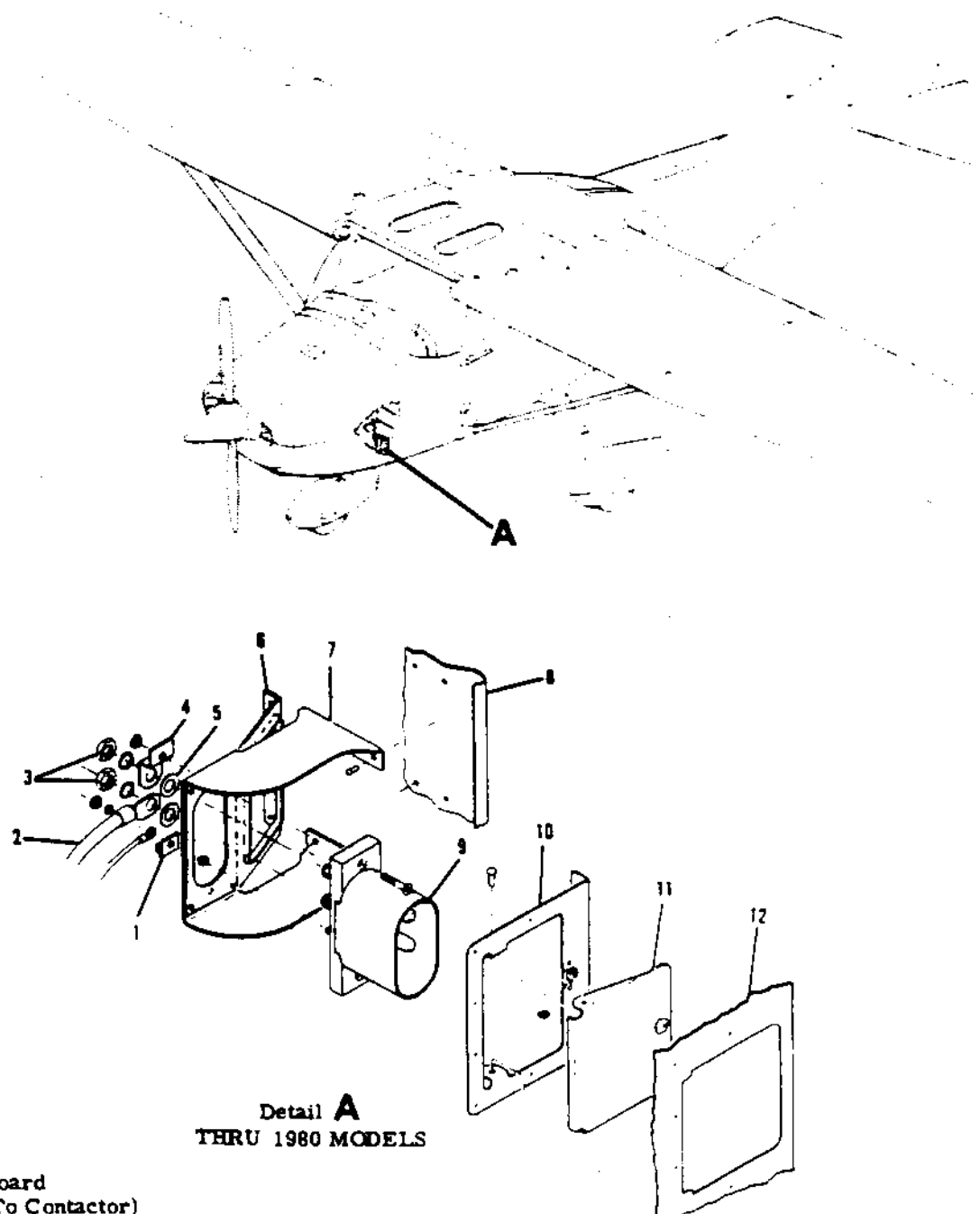
NOTE

When using ground power to start the aircraft, close the master switch before removing the ground power plug.

CAUTION

Failure to observe polarity when connecting an external power source directly to the battery or directly to the battery side of the battery contactor, will damage the diodes in the alternator and other semiconductor devices in the aircraft.

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1. Diode Board
2. Cable (To Contactor)
3. Nut
4. Ground Strap
5. Washer
6. Brace
7. Bracket Assembly
8. Firewall
9. Receptacle
10. Doubler
11. Door
12. Cowl Skin
13. Rubber Nipple

Figure 16-3. Ground Service Receptacle Installation (Sheet 1 of 2)

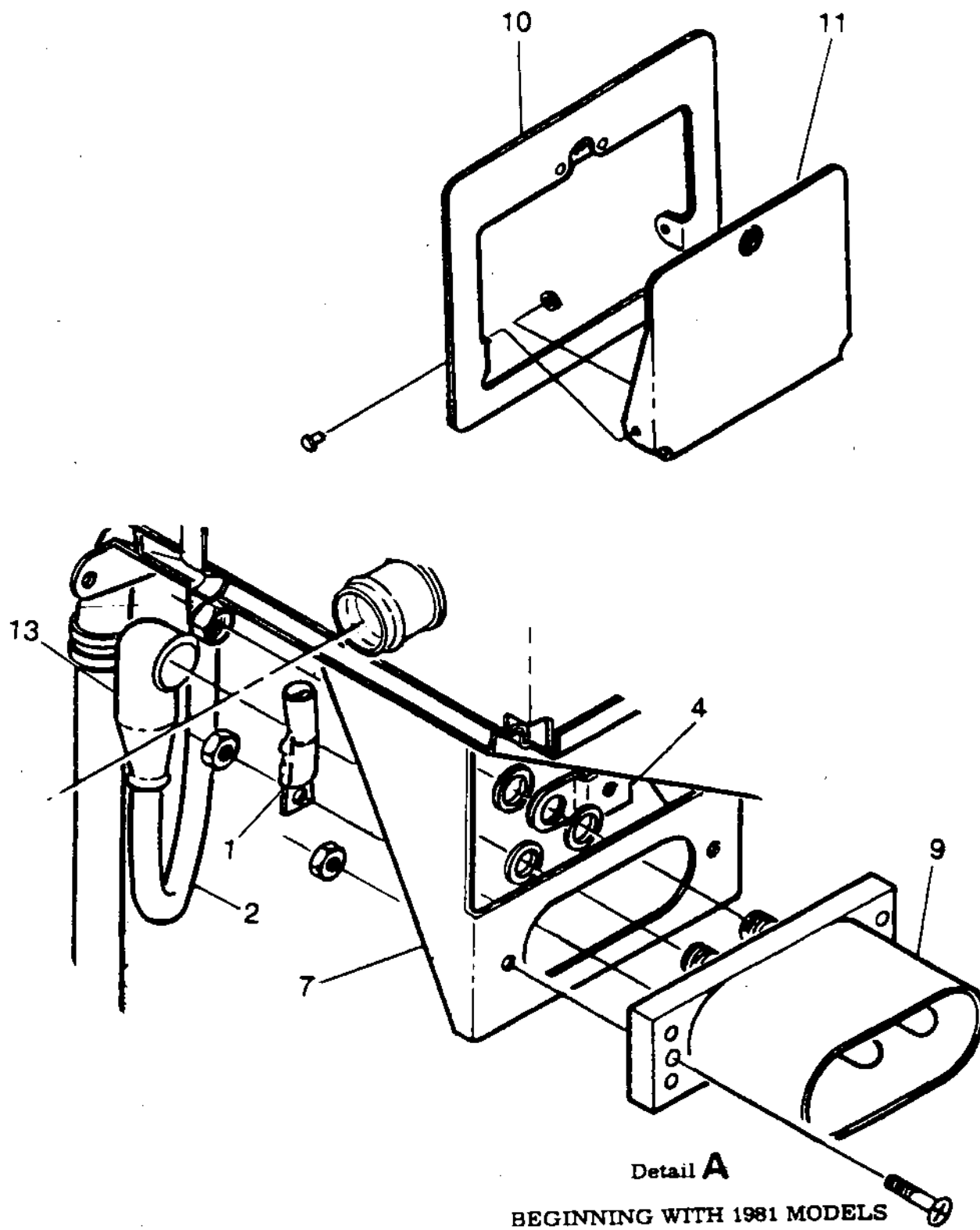


Figure 16-3. Ground Service Receptacle Installation (Sheet 2 of 2)

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16-31. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
STARTER ENGAGES WHEN GROUND POWER IS CONNECTED. (THRU 1977 MODELS)	Shorted or reversed diode in split bus-bar system.	Check wiring to, and condition of diode mounted on the split bus relay bracket adjacent to the magneto switch. Correct wiring. Replace diode board assembly.
GROUND POWER WILL NOT CRANK ENGINE.	Ground service connector wired incorrectly.	1. Check for voltage at all three terminals of external power contactor with ground power connected and master switch off. If voltage is present on input and coil terminals but not on the output terminal, proceed to step 4. If voltage is present on the input terminal but not on the coil terminal, proceed to step 2. If voltage is present on all three terminals, check wiring between contactor and bus.
	Open or mis-wired diode on ground service diode board assembly.	2. Check for voltage at small terminal of ground service receptacle. If voltage is not present, check ground service plug wiring. If voltage is present, proceed to step 3. 3. Check polarity and continuity of diode board at rear of ground service receptacle. If diode is open or improperly wired, replace diode board assembly.
	Faulty external power contactor.	4. Check resistance from small (coil) terminal of external power contactor to ground (master switch off and ground power unplugged. Normal indication is 16-24 ohms on the 12 volt and 50-70 on the 24 volt. If resistance indicates an open coil, replace contactor. If resistance is normal, proceed to step 5.

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16-31. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
GROUND POWER WILL NOT CRANK ENGINE (Cont.)	Faulty contacts in external power contactor.	5. With master switch off and ground power applied, check for voltage drop between two large terminals of external power (turn on taxi light for a load). Normal indication is zero volts. If voltage is intermittently present or present all the time, replace contactor.

16-32. REMOVAL AND INSTALLATION. (See figure 16-2.)

- Open battery box and disconnect the ground cable from the negative terminal of the battery and pull the cable from the battery box.
- Remove the nuts, washers, ground strap and diode board from the studs of the receptacle and remove the battery cable.
- Remove the screws and nuts holding the receptacle. The receptacle will then be free from the bracket.
- To install a ground service receptacle, reverse this procedure. Be sure to place the ground strap on the negative stud of the receptacle.

16-33. ALTERNATOR POWER SYSTEM.

- 16-34. DESCRIPTION. The alternator system consists of a belt-driven alternator, a voltage regulator/alternator control unit, mounted on the left hand side of the firewall and a circuit breaker located on the instrument panel. The system is controlled by the left hand portion of the split rocker, master switch labeled "ALT". Thru 1978 models an over-voltage sensor switch and red warning light labeled "HIGH VOLTAGE" are incorporated to protect the system. Beginning with 1979 models, over-voltage and under-voltage switches are contained within the alternator control unit. A red warning light labeled "LOW VOLTAGE" is installed on the instrument panel. The aircraft battery supplies the source of power for excitation of the alternator.

16-35. ALTERNATOR.

- 16-36. DESCRIPTION. The 60-ampere alternator is three phase, delta connected with integral silicon diode rectifiers. The alternator is belt driven and is rated at 14 volts at 60 amperes continuous output thru 1977 models and 28 volts at 60 amperes beginning with 1978 models.

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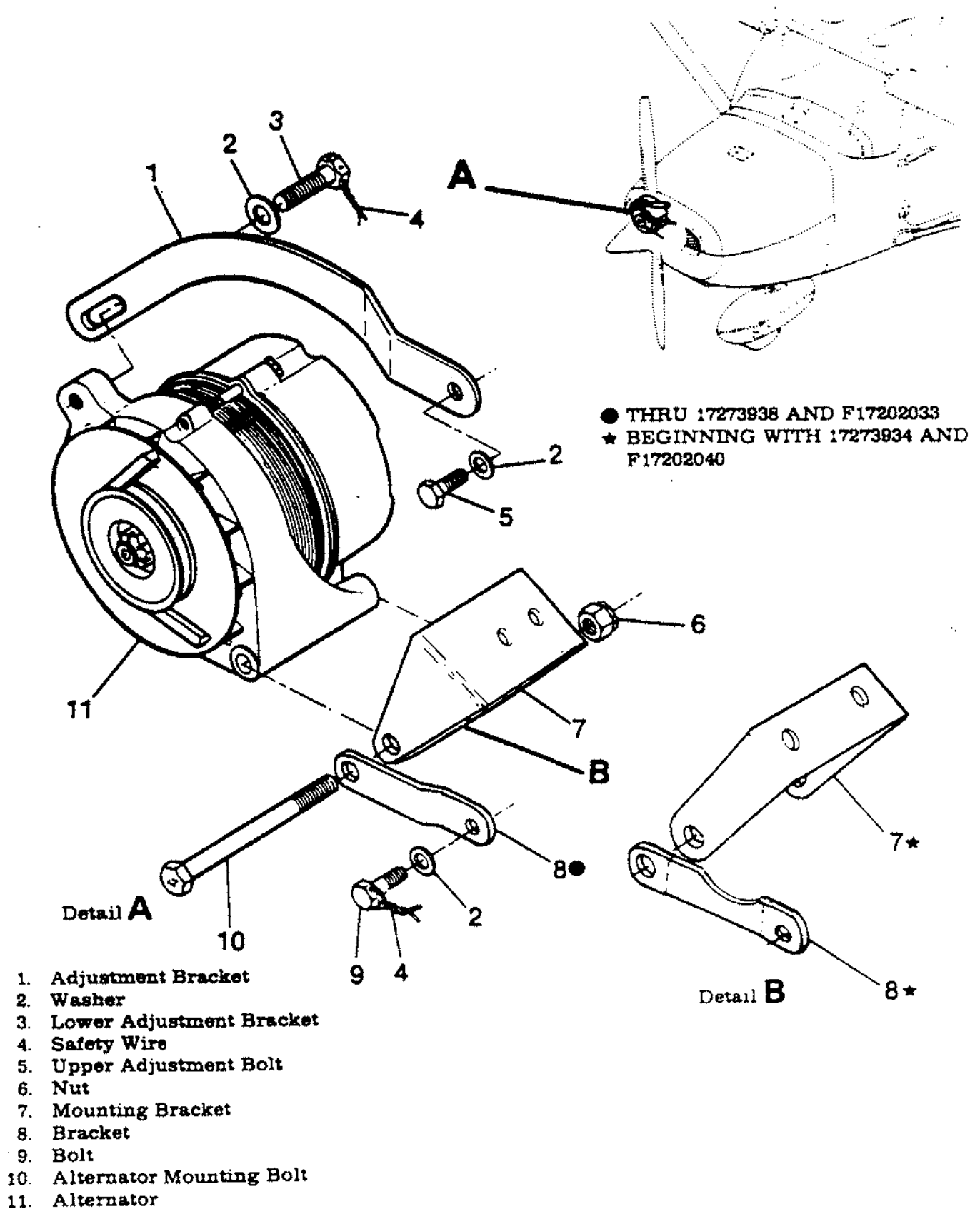


Figure 16-4. Belt-Driven Alternator Installation

MODEL 172 SERIES SERVICE MANUAL

16-37. TROUBLE SHOOTING THE ALTERNATOR SYSTEM (THRU 1977 MODELS)

TROUBLE	PROBABLE CAUSE	REMEDY
AMMETER INDICATES HEAVY DISCHARGE WITH ENGINE NOT RUNNING OR ALTERNATOR CIRCUIT BREAKER OPENS WHEN MASTER SWITCH IS TURNED ON.	Shorted radio noise filter or shorted wire.	1. Remove cable from output terminal of alternator. Check resistance from end of cable to ground (MASTER SWITCH MUST BE OFF). If resistance does not indicate a direct short, proceed to step 4. If resistance indicates a direct short, proceed to step 2. 2. Remove cable connections from radio noise filter. Check resistance from the filter input terminal to ground. Normal indication is infinite resistance. If reading indicates a direct short, replace filter. If no short is evident, proceed to step 3. 3. Check resistance from ground to the free ends of the wires which were connected to the radio noise filter (or alternator if no noise filter is installed). Normal indication does not show a direct short. If a short exists in wires, repair or replace wiring.
	Shorted diodes in alternator.	4. Check resistance from output terminal of alternator to alternator case. Reverse leads and check again. Resistance reading may show continuity in one direction but should show an infinite reading in the other direction. If an infinite reading is not obtained in at least one direction, repair or replace alternator.

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16-37. TROUBLE SHOOTING THE ALTERNATOR SYSTEM (THRU 1977 MODEL) (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ALTERNATOR SYSTEM WILL NOT KEEP BAT- TERY CHARGED.	Regulator faulty or improp- erly adjusted.	1. Start engine and adjust for 1500 RPM. Ammeter should indicate a heavy charge rate with all electrical equipment turned off. Rate should taper off in 1-3 minutes. A voltage check at the bus should indicate a reading consistent with the voltage vs temperature chart in the Cessna Alternator Charging System Service/Parts Manual. If charge rate tapers off very quickly and voltage is normal, check battery for malfunction. If ammeter shows a low charge rate or any discharge rate, and voltage is low, proceed to step 2. 2. Stop engine, remove cowl, and remove cover from voltage regulator. Turn master switch ON/OFF several times and observe field relay in regulator. Relay should open and close with master switch and small arc should be seen as contacts open. If relay is inoperative, proceed to step 3. If relay operates, proceed to step 4. 3. Check voltage at "S" terminal of regulator with master switch closed. Meter should indicate bus voltage. If voltage is present, replace regulator. If voltage is not present, check wiring between regulator and bus.

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16-37. TROUBLE SHOOTING THE ALTERNATOR SYSTEM (THRU 1977 MODEL) (Cont.)

TROUBLE	PROBABLE CAUSE	REMEDY

CAUTION

Before performing step 4, remove radios from the panel.

ALTERNATOR SYSTEM
WILL NOT KEEP BAT-
TERY CHARGED. (Cont.)

Regulator faulty or improp-
erly adjusted. (Cont.)

4. Remove plug from regu-
lator and start engine. Mo-
mentarily jumper the "A+"
and "F" terminals together
on the plug. Ship's ammeter
should show heavy rate of
charge. If heavy charge rate
is observed, replace regula-
tor. If heavy charge rate is
not observed, proceed to
step 5.

5. Check resistance from
"F" terminal of regulator to
"F" terminal of alternator.
Normal indication is a very
low resistance. If reading
indicates no or poor conti-
nuity, repair or replace wir-
ing from regulator to alter-
nator.

6. Check resistance from
"F" terminal of alternator to
alternator case. Normal in-
dication is 6-7 ohms. If re-
sistance is high or low, re-
pair or replace alternator.

7. Check resistance from
case of alternator to air-
frame ground. Normal indica-
tion is very low resistance.
If reading indicates no, or
poor continuity, repair or re-
place alternator ground wiring.

ALTERNATOR OVERCHAR-
GES BATTERY - BATTERY
USES EXCESSIVE WATER.

Regulator faulty or improp-
erly adjusted.

Check bus voltage with en-
gine running. Normal indica-
tion agrees with the Cessna
Alternator Charging System
Service/Parts Manual. Ob-
serve ship's ammeter, am-
meter should indicate near
zero after a few minutes of
engine operation. Replace
regulator.

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16-37. TROUBLE SHOOTING THE ALTERNATOR SYSTEM (THRU 1977 MODEL) (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
OVER-VOLTAGE WARNING LIGHT ON.	Regulator faulty or improperly adjusted. Faulty sensor switch.	1. With engine running turn off and on battery portion of the master switch. If the light stays on shut down engine then turn on the "BAT" and "ALT" portion the master switch. Check for voltage at the "S" terminal of the voltage regulator. If voltage is present adjust or replace regulator. If voltage is not present check master switch and wiring for short or open condition. If wiring and switch are normal replace sensor.

16-37A. TROUBLE SHOOTING THE ALTERNATOR SYSTEM. (1978 MODELS) a. ENGINE NOT RUNNING.

TROUBLE	PROBABLE CAUSE	REMEDY
AMMETER INDICATES HEAVY DISCHARGE OR ALTERNATOR CIRCUIT BREAKER OPENS. (Battery Switch ON, Alternator Switch OFF, all other electrical switches OFF.)	Shorted diode in alternator.	Turn off Battery Switch and remove "B" Lead from alternator. Check resistance from "B" Terminal to alternator case. Reverse leads and check again. Resistance reading may show continuity in one direction but should show an infinite reading in the other direction. If an infinite reading is not obtained in at least one direction, repair or replace alternator.
ALTERNATOR REGULATOR CIRCUIT BREAKER OPENS WHEN BATTERY AND ALTERNATOR SWITCHES ARE TURNED ON.	Short in Over-Voltage sensor.	Disconnect Over-Voltage Sensor plug and recheck. If circuit breaker stays in replace Over-Voltage Sensor.
	Short in alternator voltage regulator.	Disconnect regulator plug and recheck. If circuit breaker stays in, replace regulator.
	Short in alternator field.	Disconnect "F" terminal wire and recheck. If circuit breaker stays in, replace alternator.

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16-37A. TROUBLE SHOOTING THE ALTERNATOR SYSTEM. (Cont.) b. ENGINE RUNNING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ALTERNATOR CIRCUIT BREAKER OPENS WHEN BATTERY AND ALTERNATOR SWITCHES ARE TURNED ON, OVER-VOLTAGE LIGHT DOES NOT COME ON.	Defective circuit breaker.	Replace circuit breaker.
ALTERNATOR REGULATOR CIRCUIT BREAKER OPENS WHEN BATTERY AND ALTERNATOR SWITCHES ARE TURNED ON, OVER-VOLTAGE LIGHT DOES NOT COME ON.	Shorted field in alternator.	Check resistance from "F" terminal of alternator to alternator case. if resistance is less than 5 ohms repair/replace.

CAUTION

This malfunction frequently causes a shorted regulator which will result in an over-voltage condition when system is again operated.

ALTERNATOR MAKES ABNORMAL WHINING NOISE.	Shorted diode in alternator.	Turn off Battery Switch and remove "B" Lead from alternator. Check resistance from "B" Terminal of alternator to alternator case. Reverse leads and check again. Resistance reading may show continuity in one direction but should show an infinite reading in the other direction. If an infinite reading is not obtained in at least one direction, repair or replace alternator.
OVER-VOLTAGE LIGHT DOES NOT GO OUT WHEN ALTERNATOR AND BATTERY SWITCHES ARE TURNED ON.	Shorted regulator.	Replace regulator.
	Defective over-voltage sensor.	Replace sensor.

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16-37A. TROUBLE SHOOTING THE ALTERNATOR (Cont).

b. ENGINE RUNNING.

TROUBLE	PROBABLE CAUSE	REMEDY
AFTER ENGINE START WITH ALL ELECTRICAL EQUIPMENT TURNED OFF CHARGE RATE DOES NOT TAPER OFF IN 1-3 MINUTES.	Regulator faulty or high resistance in field circuit.	With engine not running turn off all electrical loads and turn on battery and alternator switches. Measure bus voltage to ground, then measure voltage from terminal of alternator to ground. If there is more than 2 volts difference check field circuit wiring shown on alternator system wiring diagram in Section 20. Clean all contacts. Replace components until there is less than 2 volts difference between bus voltage and field voltage.

NOTE

Also refer to battery power system trouble shooting chart.

ALTERNATOR SYSTEM
WILL NOT KEEP BATTERY
CHARGED.

Alternator output voltage
insufficient.

1. Connect voltmeter between D.C. Bus and ground. Turn off all electrical loads. Turn on Battery Switch, start engine and adjust for 1500 RPM, voltage should read approximately 24 volts. Turn on alternator switch, voltage should read between 27.4 and 28.0 volts. Ammeter should indicate a heavy charge rate which should taper off in 1-3 minutes. If charge rate tapers off very quickly and voltage is normal, check battery for malfunction. If ammeter shows a low charge rate or any discharge rate, and voltage does not rise when alternator switch is turned on proceed to Step 2.

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16-37A. TROUBLE SHOOTING THE ALTERNATOR SYSTEM (Cont).
b. ENGINE RUNNING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ALTERNATOR SYSTEM WILL NOT KEEP BAT- TERY CHARGED. (Cont.)	Alternator output voltage insufficient (Cont.)	2. Stop engine, turn off all switches. Connect voltmeter between "F" terminal of alternator and ground. Do NOT start engine. Turn on battery switch and alternator switch. Battery voltage should be present at "F" terminal, less 1 volt drop thru regulator. if not refer to Step 3. 3. Starting at "F" terminal of alternator trace circuit to voltage regulator, at "B" terminal of regulator trace circuit to over-voltage sensor, to master switch, to Bus Bar. Replace component which does not have voltage present at output. Refer to alternator system wiring diagram in Section 20.
	Alternator field winding open.	1. If voltage is present turn off alternator and battery switches. Check resistance from "F" terminal of alternator to alternator case, turning alternator shaft during measurement. Normal indication is 12-20 ohms. If resistance is high or low, repair or replace alternator. If ok refer to step 2. 2. Check resistance from case of alternator to airframe ground. Normal indication is very low resistance. If reading indicates no, or poor continuity, repair or replace alternator ground wiring.

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16-37B. TROUBLE SHOOTING -- ALTERNATOR SYSTEM (BEGINNING 1979 MODELS).

a. ENGINE NOT RUNNING.

TROUBLE	PROBABLE CAUSE	REMEDY
AMMETER INDICATES HEAVY DISCHARGE OR ALTERNATOR CIRCUIT BREAKER OPENS. (Battery Switch ON, Alternator Switch OFF, all other electrical switches OFF.)	Shorted diode in alternator.	Turn off Battery Switch and remove "B" Lead from alternator. Check resistance from "B" Terminal of alternator to alternator case. Reverse leads and check again. Resistance reading may show continuity in one direction but should show an infinite reading in the other direction. If an infinite reading is not obtained in at least one direction, repair or replace alternator.
ALTERNATOR REGULATOR CIRCUIT BREAKER OPENS WHEN BATTERY AND ALTERNATOR SWITCHES ARE TURNED ON.	Short in alternator control unit.	Disconnect Over-Voltage Sensor plug and recheck. If circuit breaker stays in replace Over-Voltage Sensor. Disconnect control unit plug and recheck. If circuit breaker stays in, replace alternator control unit.
	Short in alternator field.	Disconnect "F" terminal wire and recheck. If circuit breaker stays in, replace alternator.

b. ENGINE RUNNING.

ALTERNATOR CIRCUIT BREAKER OPENS WHEN BATTERY AND ALTERNATOR SWITCHES ARE TURNED ON, LOW-VOLTAGE LIGHT DOES NOT COME ON.	Defective circuit breaker.	Replace circuit breaker.

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16-37B. TROUBLE SHOOTING -- ALTERNATOR SYSTEM (Cont).

b. ENGINE RUNNING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ALTERNATOR REGULATOR CIRCUIT BREAKER OPENS WHEN BATTERY AND ALTERNATOR SWITCHES ARE TURNED ON. LOW-VOLTAGE LIGHT MAY OR MAY NOT COME ON.	Shorted field in alternator.	Check resistance from "F" terminal of alternator to alternator case. if resistance is less than 5 ohms repair/replace.

CAUTION

This malfunction may cause a shorted alternator control unit which will result in an over-voltage condition when system is again operated.

ALTERNATOR MAKES ABNORMAL WHINING NOISE.	Shorted diode in alternator.	Turn off Battery Switch and remove "B" Lead from alternator. Check resistance from "B" Terminal of alternator to alternator case. Reverse leads and check again. Resistance reading may show continuity in one direction but should show an infinite reading in the other direction. If an infinite reading is not obtained in one direction, repair or replace alternator.
LOW-VOLTAGE LIGHT DOES NOT GO OUT WHEN ALTERNATOR AND BATTERY SWITCHES ARE TURNED ON.	Shorted alternator control unit. Defective low-voltage sensor.	Replace alternator control unit. Replace alternator control unit.

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16-37B. TROUBLE SHOOTING -- ALTERNATOR SYSTEM (Cont).

b. ENGINE RUNNING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
AFTER ENGINE START WITH ALL ELECTRICAL EQUIPMENT TURNED OFF CHARGE RATE DOES NOT TAPER OFF IN 1-3 MINUTES.	Alternator control unit faulty or high resistance in field circuit.	With engine not running turn off all electrical loads and turn on battery and alternator switches. Measure bus voltage to ground, then measure voltage from terminal of alternator to ground. If there is more than 2 volts difference check field circuit wiring shown on alternator system wiring diagram in Section 20. Clean all contacts. Replace components until there is less than 2 volts difference between bus voltage and field voltage.

NOTE

Also refer to battery power system trouble shooting chart.

ALTERNATOR SYSTEM WILL NOT KEEP BATTERY CHARGED.

Alternator output voltage insufficient.

1. Connect voltmeter between D.C. Bus and ground. Turn off all electrical loads. Turn on Battery Switch, start engine and adjust for 1500 RPM. voltage should read approximately 24 volts. Turn on alternator switch, voltage should read between 28.4 and 28.9 volts. Ammeter should indicate a heavy charge rate which should taper off in 1-3 minutes. If charge rate tapers off very quickly and voltage is normal, check battery for malfunction. If ammeter shows a low charge rate or any discharge rate, and voltage does not rise when alternator switch is turned on proceed to Step 2.

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16-37B. TROUBLE SHOOTING -- ALTERNATOR SYSTEM (Cont).

b. ENGINE RUNNING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ALTERNATOR SYSTEM WILL NOT KEEP BAT- TERY CHARGED. (Cont.)	Alternator output voltage insufficient (Cont.)	2. Stop engine, turn off all switches. Connect voltmeter between "F" terminal of alternator and ground. Do NOT start engine. Turn on battery switch and alternator switch. Battery voltage should be present at "F" terminal, less 1 volt drop thru regulator, if not refer to Step 3. 3. Starting at "F" terminal of alternator, trace circuit to alternator control unit at Pin 1 (Blue Wire). Trace circuit from Pin 3 (Red Wire) to master switch, to Bus Bar. Trace circuit from alternator control unit Pin 2 (Orange Wire) to alternator "BAT" terminal. Check connections and replace component which does not have voltage present at output. Refer to alternator system wiring diagram in Section 20.
	Alternator field winding open.	1. If voltage is present turn off alternator and battery switches. Check resistance from "F" terminal of alternator to alternator case, turning alternator shaft during measurement. Normal indication is 12-20 ohms. If resistance is high or low, repair or replace alternator. If ok refer to Step 2. 2. Check resistance from case of alternator to air-frame ground. Normal indication is very low resistance. If reading indicates no, or poor continuity, repair or replace alternator ground wiring.

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16-38. REMOVAL AND INSTALLATION. (See figure 16-4.)

- a. Ensure that the master switch is off and the negative lead is disconnected from the battery.
- b. Remove wiring from the alternator and label.
- c. Remove safety wire from the upper adjusting bolt and loosen bolt.
- d. Remove safety wire from lower adjusting bolt and remove bolt.
- e. Remove the locknut from the alternator mounting bolt.
- f. Remove the alternator drive belt and the alternator mounting bolt, the alternator will then be free for removal.
- g. To replace the alternator, reverse this procedure.
- h. Apply a torque wrench to the nut on alternator pulley and adjust the belt tension so the belt slips when the following torque value is applied.

TORQUE VALVES FOR CHECKING ALTERNATOR BELT TENSION

Used Belt	New Belt
Slips At 7 to 9 Ft. Lbs.	Slips At 11 to 13 Ft. Lbs.

NOTE

On new aircraft or whenever a new belt is installed, belt tension should be checked within 10 to 25 hours of operation.

- i. Tighten and safety wire upper and lower adjusting bolts.
- j. Tighten alternator mounting bolt.

16-39. OVER-VOLTAGE WARNING SYSTEM.

- 16-40. DESCRIPTION. Thru 1978 Models the over-voltage system consists of an over-voltage sensor switch and a red warning light labeled "HIGH VOLTAGE". The over-voltage sensor is attached to the wire bundle behind the instrument panel thru 1977 models and on a mounting bracket just forward of the instrument panel on the left hand side beginning with 1978 models. When an over-voltage tripoff occurs the over-voltage sensor turns off the alternator system and the red warning light comes on. The ammeter will show a discharge. Turn off bolt sections of the master switch to recycle the over-voltage sensor. If the over-voltage condition was transient, the normal alternator charging will resume and no further action is necessary. If the over-voltage tripoff recurs, then a generating system malfunction has occurred such that the electrical accessories must be operated from the aircraft battery only. Conservation of electrical energy must be practiced until the flight can be terminated. The over-voltage light filament may be tested at any time by turning off the "Alternator" portion of the master switch and leaving the battery portion on. This test does not induce an over-voltage condition on the electrical system.

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NOTE

The over-voltage sensor switch contains solid state devices. Observe proper polarity before supplying power. Grounding the orange lead or interconnecting orange and black leads will destroy the device. When removal is required for replacement, identify (tag) wiring and follow the wiring diagram in Section 20 for rewiring.

Beginning with 1979 Models the over-voltage sensor is contained within the alternator control unit. The unit also contains a low-voltage sensor. A red warning light labeled "LOW VOLTAGE" is installed on the instrument panel. When an over-voltage condition occurs the over-voltage sensor turns off the alternator and the voltage in the system drops. When system voltage drops below 24.5 volts the low-voltage sensor turns on the low-voltage light indicating a drain on the battery and the ammeter will show a discharge. Turn off both sections of the master switch to recycle the over-voltage sensor. If the over-voltage condition was transient, the normal alternator charging will resume and no further action is necessary. If the over-voltage tripoff recurs, then a generating system malfunction has occurred such that the electrical accessories must be operated from the aircraft battery only. Conservation of electrical energy must be practiced until the flight can be terminated. The over-voltage light filament may be tested at any time by turning off the "Alternator" portion of the master switch and leaving the battery portion on. This test does not induce an over-voltage condition on the electrical system.

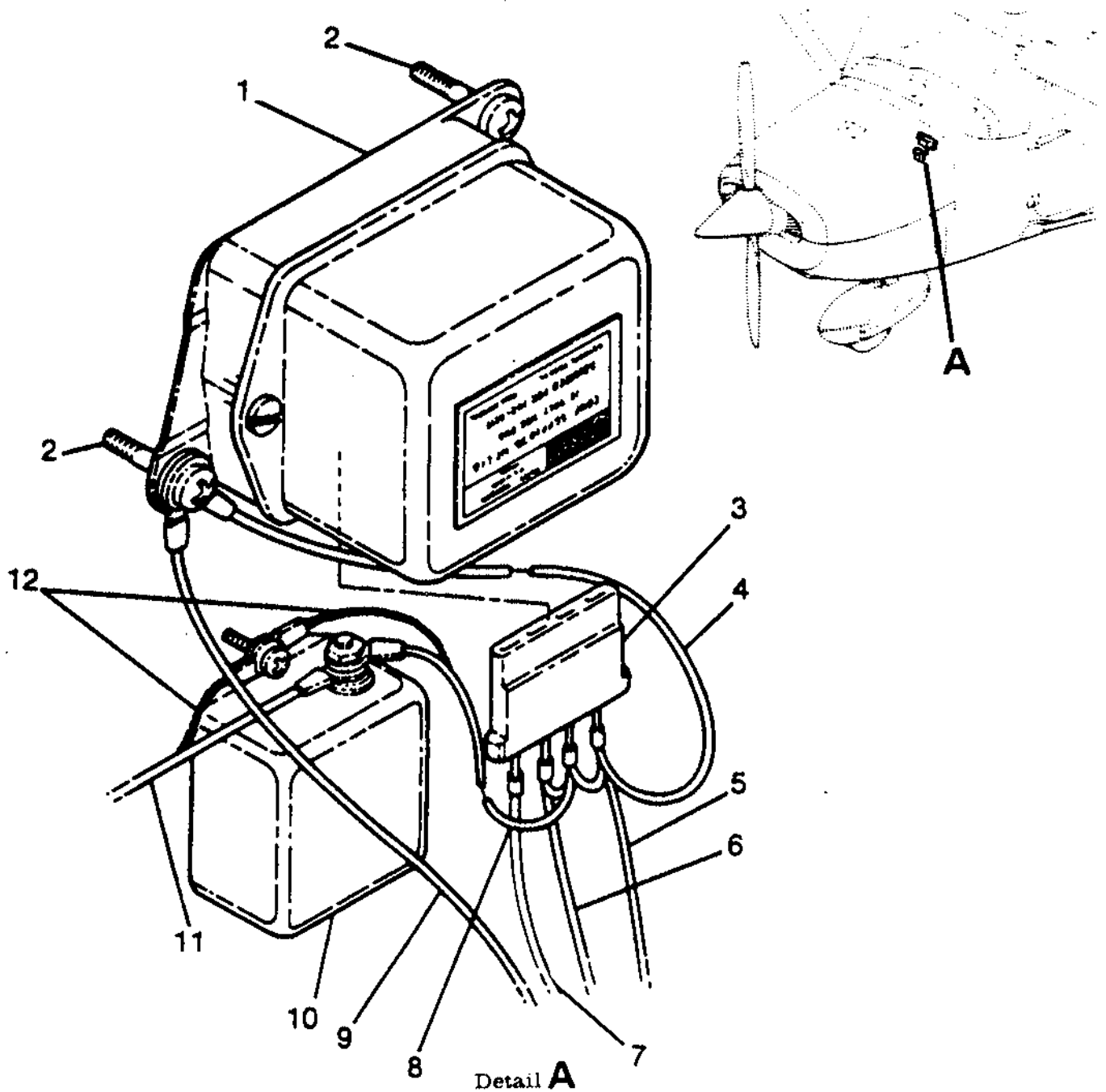
16-41. ALTERNATOR VOLTAGE REGULATOR.

16-42. DESCRIPTION. Thru 1977 Models the voltage regulator is semi-solid state. The mechanical relay in the regulator is actuated by the aircraft master switch and connects the regulator to the battery. The solid state portion is voltage sensitive and controls the current applied to the field windings of the alternator. The regulator is a remove and replace item and not repairable. The regulator is adjustable, but adjustment on the aircraft is not recommended. A bench adjustment procedure is outlined in the Cessna Alternator Charging Systems Service/Parts Manual. Thru 1978 Models the voltage regulator is solid-state. The regulator is a remove and replace item and not repairable. The regulator is adjustable, but adjustment on the aircraft is not recommended. A bench adjustment procedure is outlined in the Cessna Alternator Charging Systems Service/Parts Manual. A Cessna Alternator Charging System Test Box Assembly (PN-9870000-1) is available through the Cessna Service/Parts Center for use in isolating failures in the 28-volt regulator and the 28-volt alternator. Refer to paragraph 16-43 for removal and installation.

16-42A. ALTERNATOR CONTROL UNIT.

16-42B. DESCRIPTION. The alternator control unit is a solid state voltage regulator with an over-voltage sensor and low-voltage sensor incorporated in the unit. The control unit is not adjustable and is a remove and replace item. A Cessna Alternator Charging System Test Box Assembly (PN9870005) is available through the Cessna Service/Parts Center for use in isolating failures in the 28-volt alternator control units (C811005-0101 and C811005-0102) and the 28-volt alternator.

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THRU 1977 MODELS

1. Voltage Regulator	7. Wire to Overvoltage Light
2. Screw	8. Wire to Filter
3. Housing	9. Wire to Alternator Ground
4. Wire Shields to Ground	10. Filter - Radio Noise
5. Wire to Alternator "F"	11. Wire to Master Switch
6. Wire to Alternator "A+"	12. Shield - Ground

Figure 16-5. Voltage Regulator Installation (Sheet 1 of 5)

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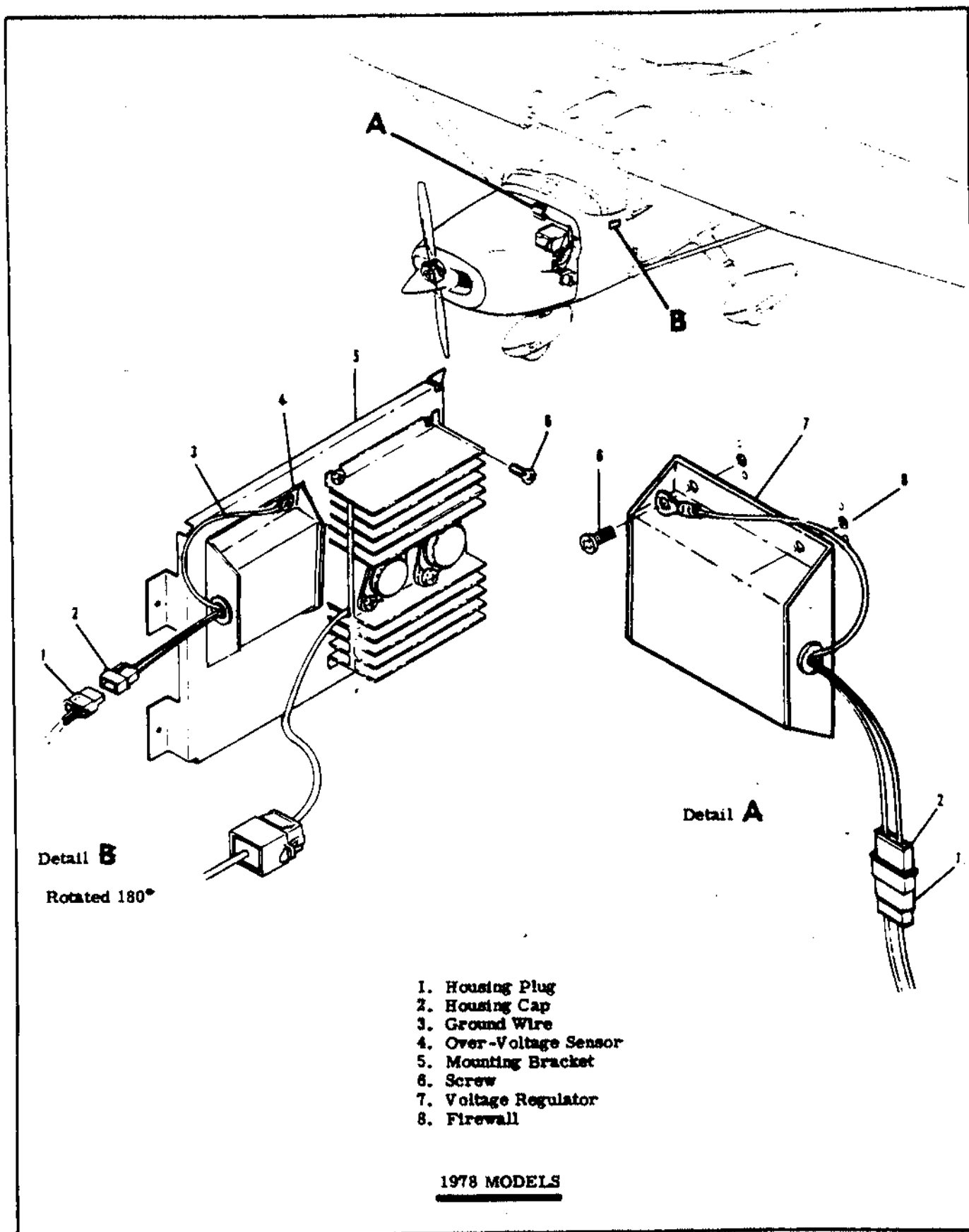
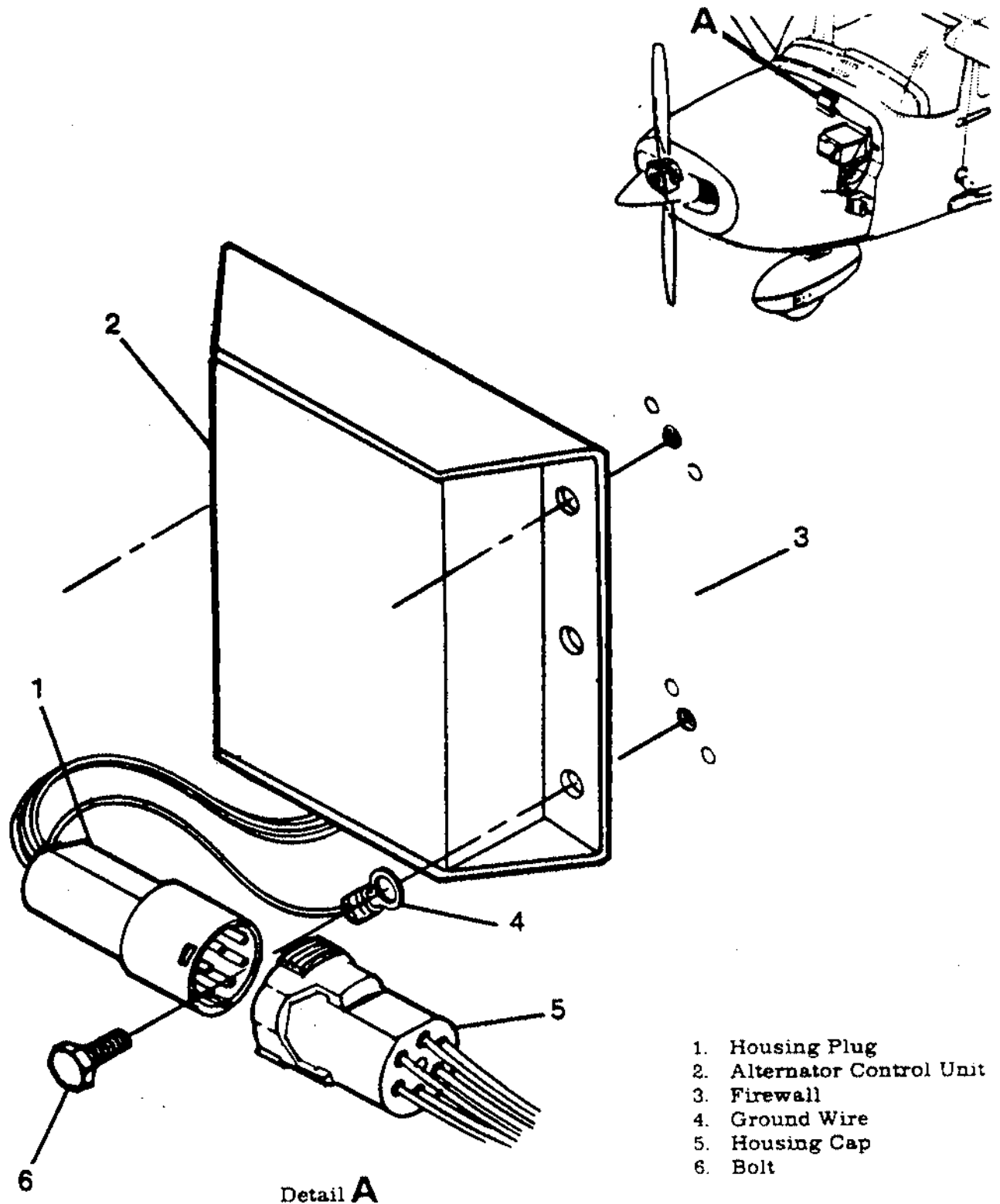


Figure 16-5. Voltage Regulator Installation (Sheet 2 of 5)

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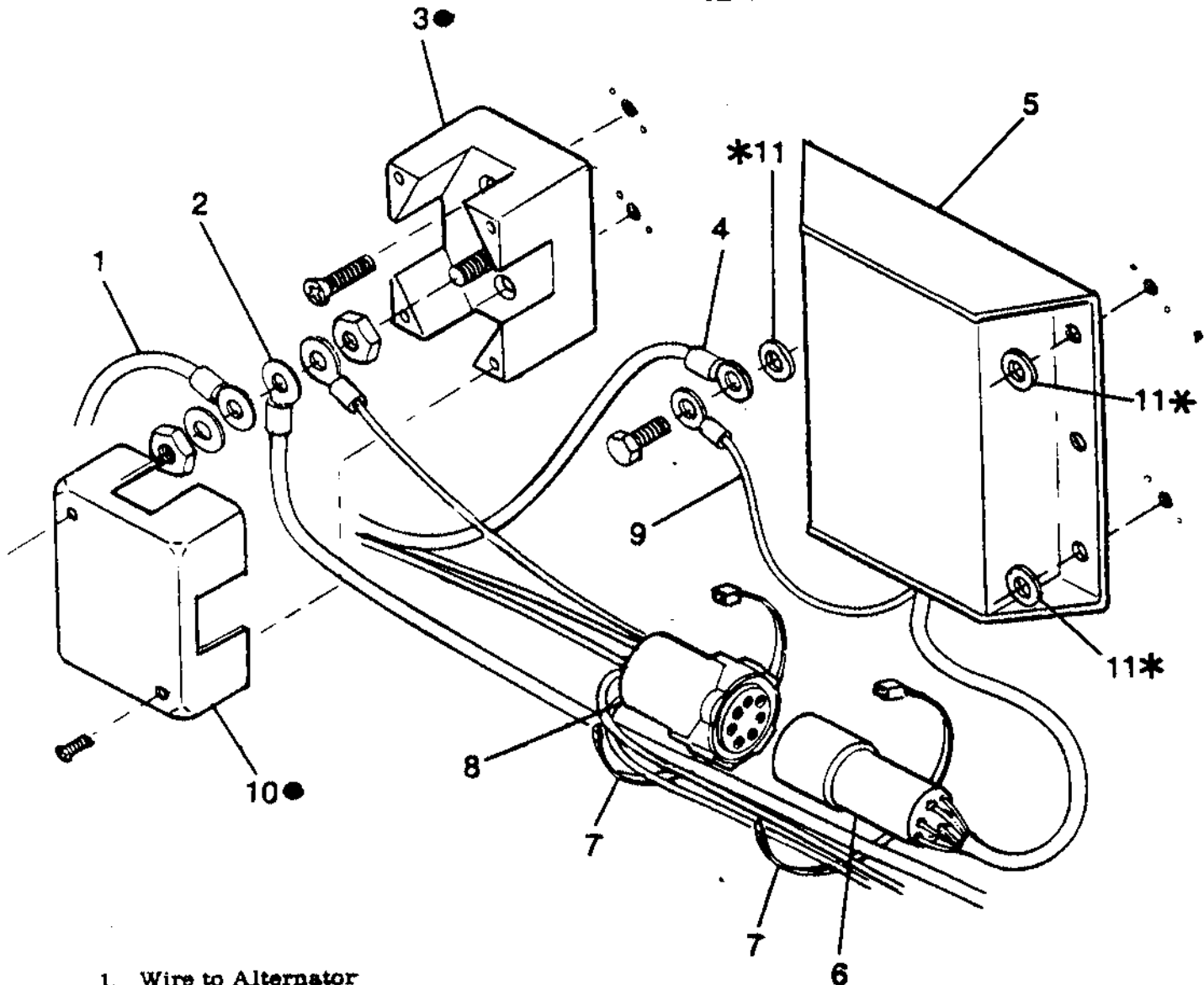


1979 MODELS

Figure 16-5. Voltage Regulator Installation (Sheet 3 of 5)

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● BEGINNING WITH 17271453
AND F17201795



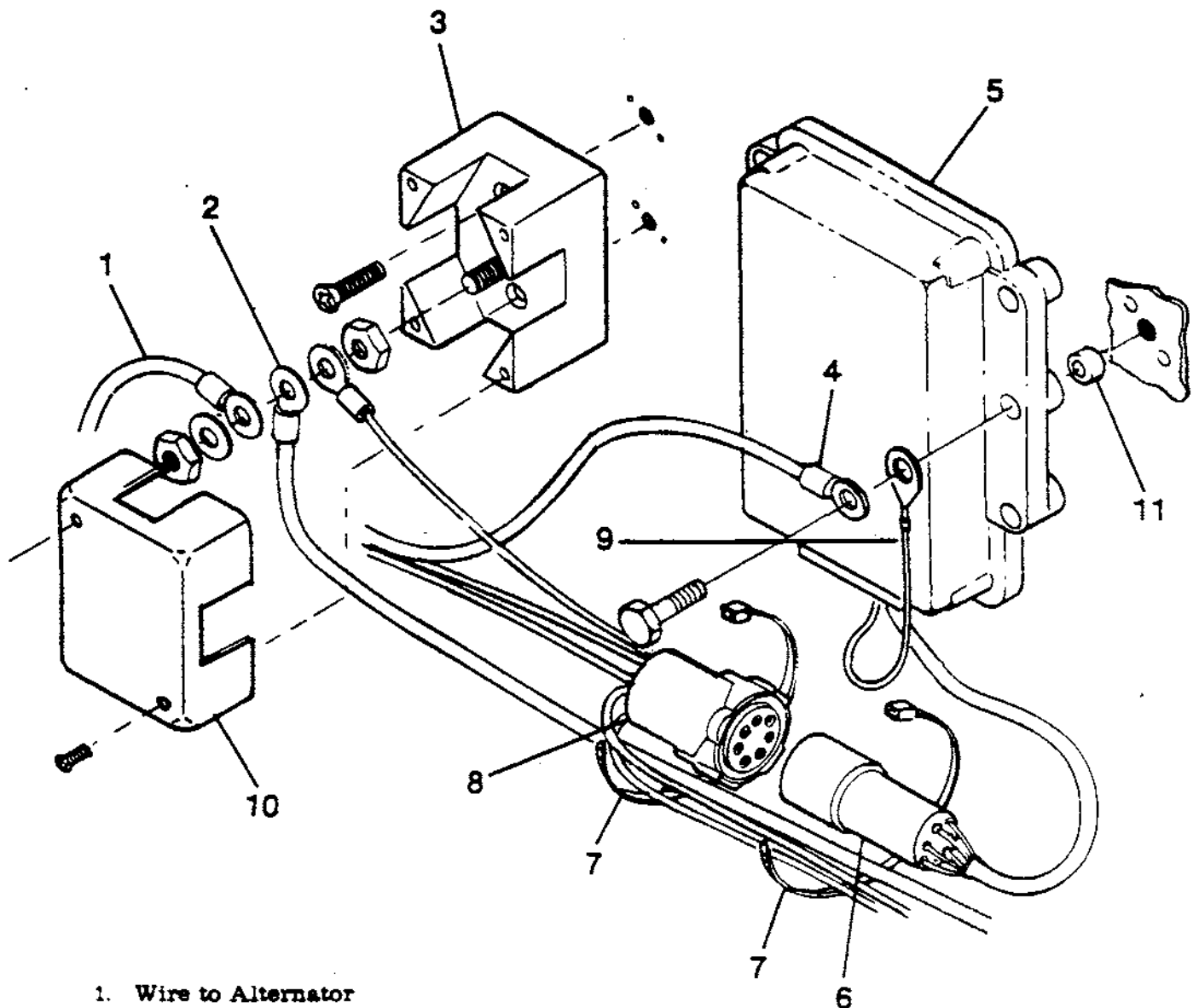
1. Wire to Alternator
2. Wire to Alternator Circuit Breaker
3. Terminal Block
4. Alternator Ground
5. Alternator Control Unit
6. Housing-Plug
7. Sta-Strap
8. Housing Cap
9. Ground Wire
10. Cover
11. Washer

* BEGINNING WITH 1981 MODELS

17276885 THRU 17276199 AND
F17201910 THRU F17202233

Figure 16-5. Voltage Regulator Installation (Sheet 4 of 5)

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1. Wire to Alternator
2. Wire to Alternator Circuit Breaker
3. Terminal Block
4. Alternator Ground
5. Alternator Control Unit
6. Housing-Plug
7. Sta-Strap
8. Housing Cap
9. Ground Wire
10. Cover
11. Spacer

BEGINNING WITH 17276200
AND F17202234

Figure 16-5. Voltage Regulator Installation (Sheet 3 of 5)

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16-43. REMOVAL AND INSTALLATION. (See figure 16-5.)

- a. Remove upper half of engine cowl.
- b. Place master switch in the "OFF" position.
- c. Disconnect negative lead from the battery and pull lead free of the battery box.
- d. Disconnect housing plug from the regulator/alternator control unit.
- e. Remove screws securing the regulator/alternator control unit to the firewall.
- f. To install regulator/alternator control unit, reverse the preceding steps. Be sure the connections for grounding are clean and bright before assembly. Otherwise faulty voltage regulation and/or excessive radio noise may result.

16-44. AIRCRAFT LIGHTING SYSTEM.

16-45. **DESCRIPTION.** The aircraft lighting system consists of landing and taxi lights, navigation lights, anti-collision strobe lights, flashing beacon light, dome, instrument flood lights and courtesy light, control wheel map light, compass and radio dial lights.

16-46. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
LANDING AND TAXI LIGHT(S) OUT.	Short circuit in wiring.	1. Inspect circuit breaker. If open, proceed to Step 2. If ok, proceed to Step 3.
	Defective wiring.	2. Test each circuit separately until short is located. Repair or replace wiring.
	Defective switch.	3. Check voltage at lights with master and landing and taxi light switches ON. Should read battery voltage. Replace switch.
LANDING AND/OR TAXI LIGHT OUT.	Lamp burned out.	1. Test lamp with ohmmeter or new lamp. Replace lamp.
	Open circuit in wiring.	2. Test wiring for continuity. Repair or replace wiring.
FLASHING BEACON DOES NOT LIGHT.	Short circuit in wiring.	1. Inspect circuit breaker. If open, proceed to Step 2. If ok, proceed to Step 3.
	Defective wiring.	2. Test circuit until short is located. Repair or replace wiring.
	Lamp burned out.	3. Test lamp with ohmmeter. Replace lamp. If lamp is good, proceed to Step 4.

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16-46. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
FLASHING BEACON DOES NOT LIGHT (Cont).	Open circuit in wiring.	4. Test circuit from lamp to flasher for continuity. If no continuity is present, repair or replace wiring. If continuity is present, proceed to Step 5.
	Defective switch.	5. Check voltage at flasher with master and beacon switch on. Should read battery voltage. Replace switch. If voltage is present, proceed to Step 6.
	Defective flasher.	6. Install new flasher.
FLASHING BEACON CONSTANTLY LIT.	Defective flasher.	1. Install new flasher.
ALL NAV LIGHTS OUT.	Short circuit in wiring.	1. Inspect circuit breaker. If open, proceed to Step 2. If ok, proceed to Step 3.
	Defective wiring.	2. Isolate and test each nav light circuit until short is located. Repair or replace wiring.
	Defective switch.	3. Check voltage at nav light with master and nav light switches on. Should read battery voltage. Replace switch.
ONE NAV LIGHT OUT.	Lamp burned out.	1. Inspect lamp. Replace lamp.
	Open circuit in wiring.	2. Test wiring for continuity. Repair or replace wiring.

WARNING

The anti-collision system is a high voltage device. Do not remove or touch tube assembly while in operation. Wait at least 5 minutes after turning off power before starting work.

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16-46. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
BOTH ANTI-COLLISION STROBE LIGHTS WILL NOT LIGHT.	Open circuit breaker.	1. Check, if open reset. If circuit breaker continues to open proceed to Step 2. 2. Disconnect red wire between aircraft power supply (battery/external power) and strobe power supplies, one at a time. If circuit breaker opens on one strobe power supply, replace strobe power. If circuit breaker opens on both strobe power supplies proceed to Step 3. If circuit breaker does not open proceed to Step 4. 3. Check aircraft wiring. Repair or replace as necessary. 4. Inspect strobe power supply ground wire for contact with wing structure.

CAUTION

Extreme care should be taken when exchanging flash tube. The tube is fragile and can easily be cracked in a place where it will not be obvious visually. Make sure the tube is seated properly on the base of the nav light assembly and is centered in the dome.

NOTE

When checking defective power supply and flash tube, units from opposite wing may be used. Be sure power leads are protected properly when unit is removed to prevent short circuit.

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16-46. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ONE ANTI-COLLISION STROBE LIGHT WILL NOT LIGHT.	Defective Strobe Power Supply, or flash tube.	1. Connect voltmeter to red lead between aircraft power supply (battery/external power) and strobe power supply, connecting negative lead to wing structure. Check for 12 volts, thru 1977 models and 24 volts beginning with 1978 models. If ok proceed to Step 2. If not, check aircraft power supply (battery/external power). 2. Replace flash tube with known good flash tube. If system still does not work, replace strobe power supply.
DOME LIGHT TROUBLE.	Short circuit in wiring.	1. Inspect circuit breaker. If circuit breaker is open, proceed to Step 2. If circuit breaker is ok, proceed to Step 3.
	Defective wiring.	2. Test circuit until short is located. Repair or replace wiring. 3. Test for open circuit. Repair or replace wiring. If no short or open circuit is found, proceed to Step 4.
	Lamp burned out.	4. Test lamp with ohmmeter if defective. Replace lamp.
	Defective switch.	5. Check for voltage at dome light with master and dome light switch on. Should read battery voltage. Replace switch.
INSTRUMENT LIGHTS WILL NOT LIGHT.	Short circuit in wiring.	1. Inspect circuit breaker. If open, proceed to Step 2. If ok, proceed to Step 3.
	Defective wiring.	2. Test circuit until short is located. Repair or replace wiring.

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16-46. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
INSTRUMENT LIGHTS WILL NOT LIGHT (Cont).	Defective wiring.	3. Test for open circuit. Repair or replace wiring. If no short or open circuit is found, proceed to Step 4.
	Faulty section in dim- ming potentiometer.	4. Lights will work when control is placed in brighter position. Replace potentiometer.
	Faulty light dimming transistor.	5. Test both transistors with new transistor. Replace faulty transistor.
	Faulty selector switch.	6. Inspect. Replace switch.
INSTRUMENT LIGHTS WILL NOT DIM.	Open resistor or wiring in minimum intensity end of potentiometer.	1. Test for continuity. Re- place resistor or repair wiring.
	Shorted transistor.	2. Test transistor by substitu- tion. Replace defective trans- istor.
CONTROL WHEEL MAP LIGHT WILL NOT LIGHT.	Nav light switch turned off.	1. Nav light switch has to be ON before map light will light.
	Short circuit in wiring.	2. Check lamp fuse on ter- minal board located on back of stationary panel with ohm- meter. If fuse is open, proceed to Step 3. If fuse is ok, pro- ceed to Step 4.
	Defective wiring.	3. Test circuit until short is located. Repair or replace wiring.
	Defective map light assembly.	4. Test for open circuit. Repair or replace wiring. If a short or open circuit is not found, proceed to Step 5. 5. Check voltage at map light assembly with master and nav switches on. If bat- tery voltage is present, re- place map light assembly

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- 16-47. LANDING AND TAXI LIGHT. (THRU 17275034 AND F17202135.)
- 16-48. DESCRIPTION. The landing and taxi light is mounted in the nose cap of the lower cowl. The lamp is controlled by a rocker type switch on the instrument panel. A circuit breaker on the panel protects the system.
- 16-49. REMOVAL AND INSTALLATION. (See figure 16-6.)
- Remove upper half of engine cowl.
 - Disconnect lamp wires then remove lower half of cowl.
 - Remove screws (7) and remove lamp assembly.

NOTE

Note position and number of washers between support (2) and bracket (3).

- Remove screws (9) then remove gaskets (5) and lamp.
 - To install reverse the preceding steps.
- 16-50. ADJUSTMENT OF LANDING AND TAXI LIGHT. (THRU 17275034 AND F17202134.) (See figure 16-8.) Adjustment of the landing and taxi light is pre-set at the factory, however changes to this adjustment may be made as desired by adding or subtracting from the number of washers (8). A maximum of two washers may be used.
- 16-51. LANDING AND TAXI LIGHTS (DUAL).
- 16-52. DESCRIPTION. Thru 17275034 and F17202134 the landing and taxi lights are cowl mounted. Beginning with 17275035 and F17202135, the landing and taxi lights are wing-mounted. The left hand light is used for taxi and the right hand for landing. Two rocker type switches on the pilots switch panel control the lights. A 20 amp circuit breaker is installed to protect the system. See figure 16-8 for adjustment.

NOTE

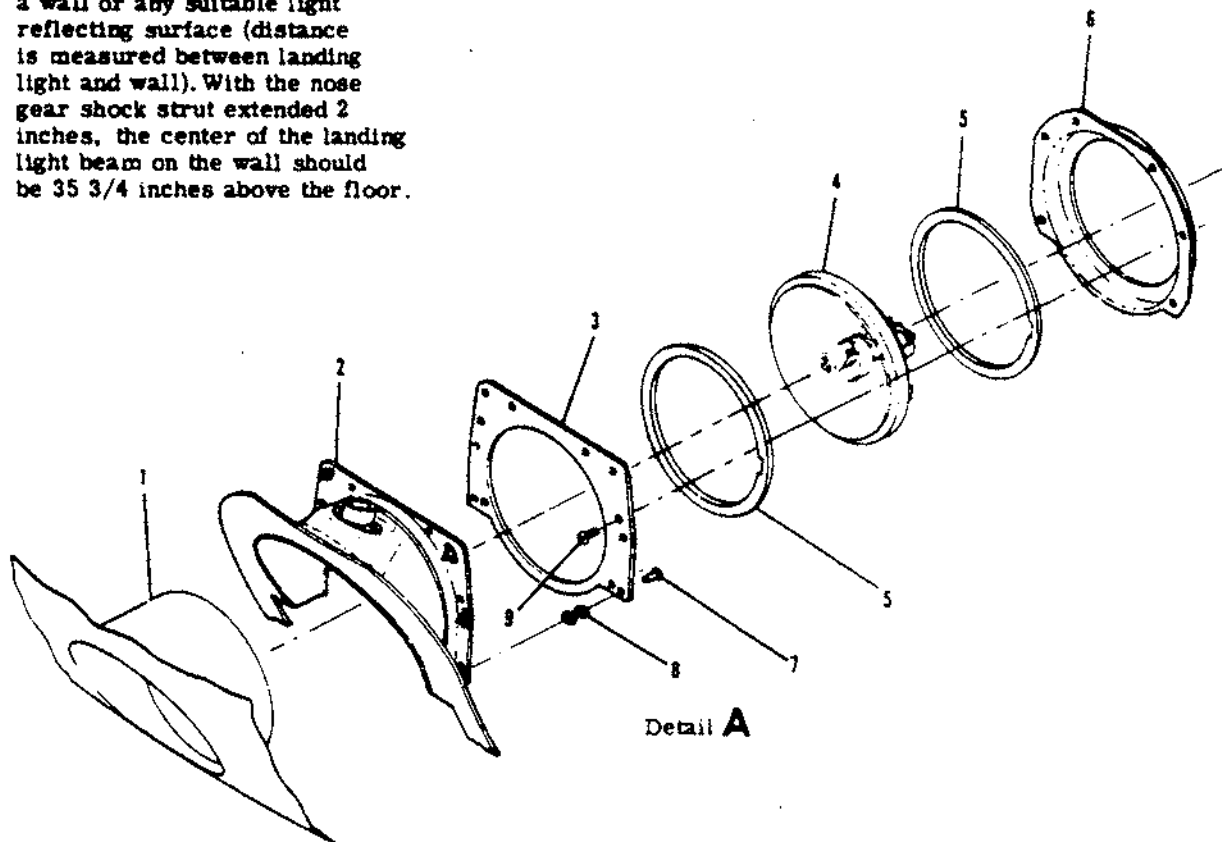
On Aircraft Serials 17261899 thru 17270181 and F17201035 thru F17201675, refer to Cessna Single-Engine Service Letter SE78-15 dated March 20, 1978.

- 16-53. REMOVAL AND INSTALLATION. (See figure 16-8.)
- THRU 17275034 AND F17202134.
 - Remove screws (1) and pull bracket assembly (2) from nose cap to gain access to electrical leads.
 - Disconnect electrical leads from lamps making sure switches are off and leads do not short out.
 - Remove screws (9) from plate (7) and remove lamp assembly from bracket (2). If left hand (taxi) light is being removed, note position of spacers (3) and (11) for reinstallation.
 - Remove screws (10) from bracket (4) and remove gaskets and lamp.
 - Install new lamp reassemble.
 - BEGINNING WITH 17275035 AND F17202135.
 - Remove screws (2) and remove lens assembly (1).
 - Remove screws (3) and remove brackets (4) and (5).
 - Pull lamp (6) forward and disconnect electrical leads.
 - If plates (8) are to be removed, remove screws (7), plates (8), and spacers (9), (10), (11), (12), (13), and (14). Note position of spacers for reinstallation.
 - To install, reverse the preceding procedure.

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Park the aircraft 3 feet from a wall or any suitable light reflecting surface (distance is measured between landing light and wall). With the nose gear shock strut extended 2 inches, the center of the landing light beam on the wall should be 35 3/4 inches above the floor.



1. Landing Light Support
2. Bracket Assembly
3. Plate
4. Lamp
5. Gasket
6. Bracket
7. Adjustment Screw
8. Washer
9. Screw

Figure 16-6. Landing and Taxi Light Installation (Sheet 1 of 3)

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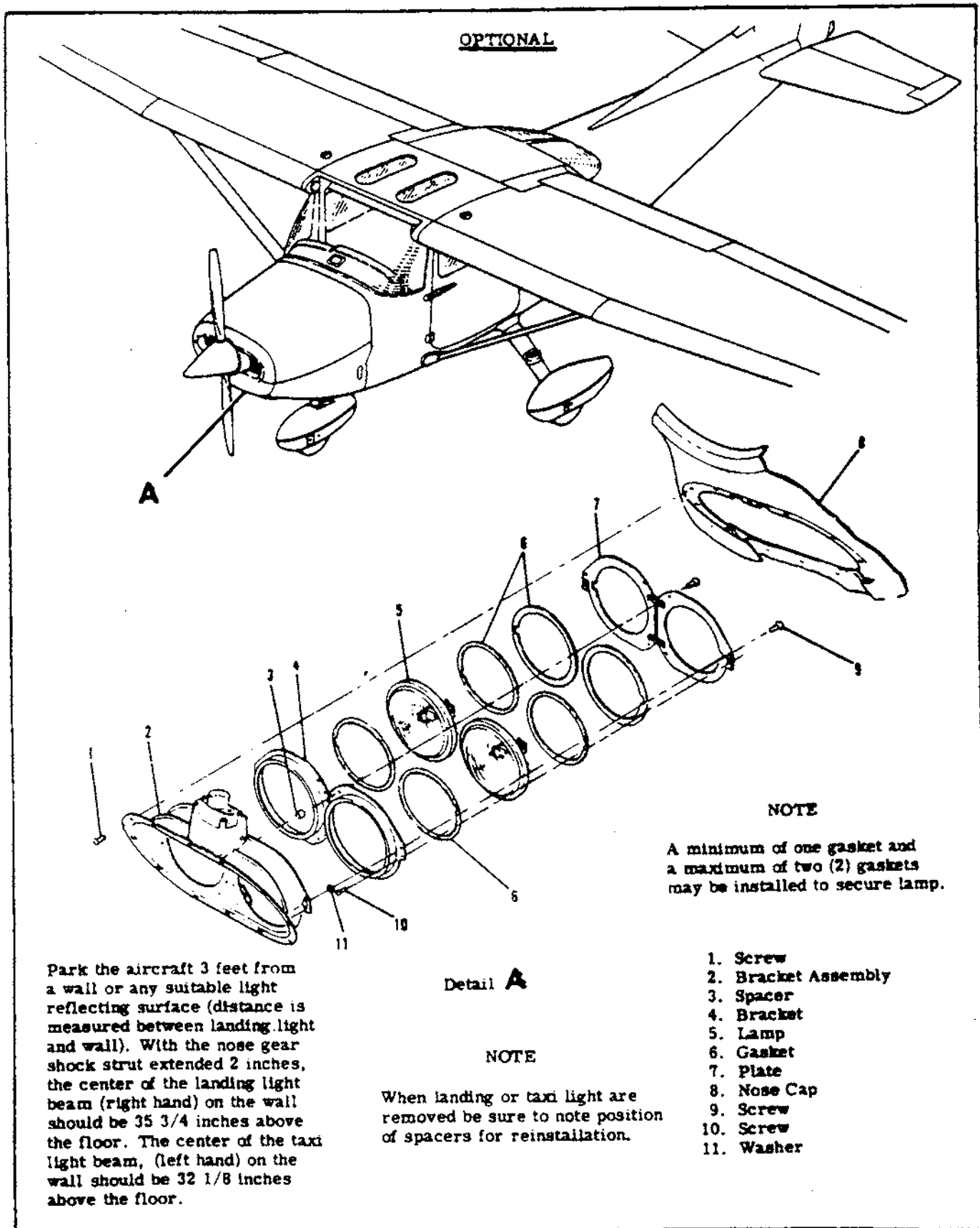
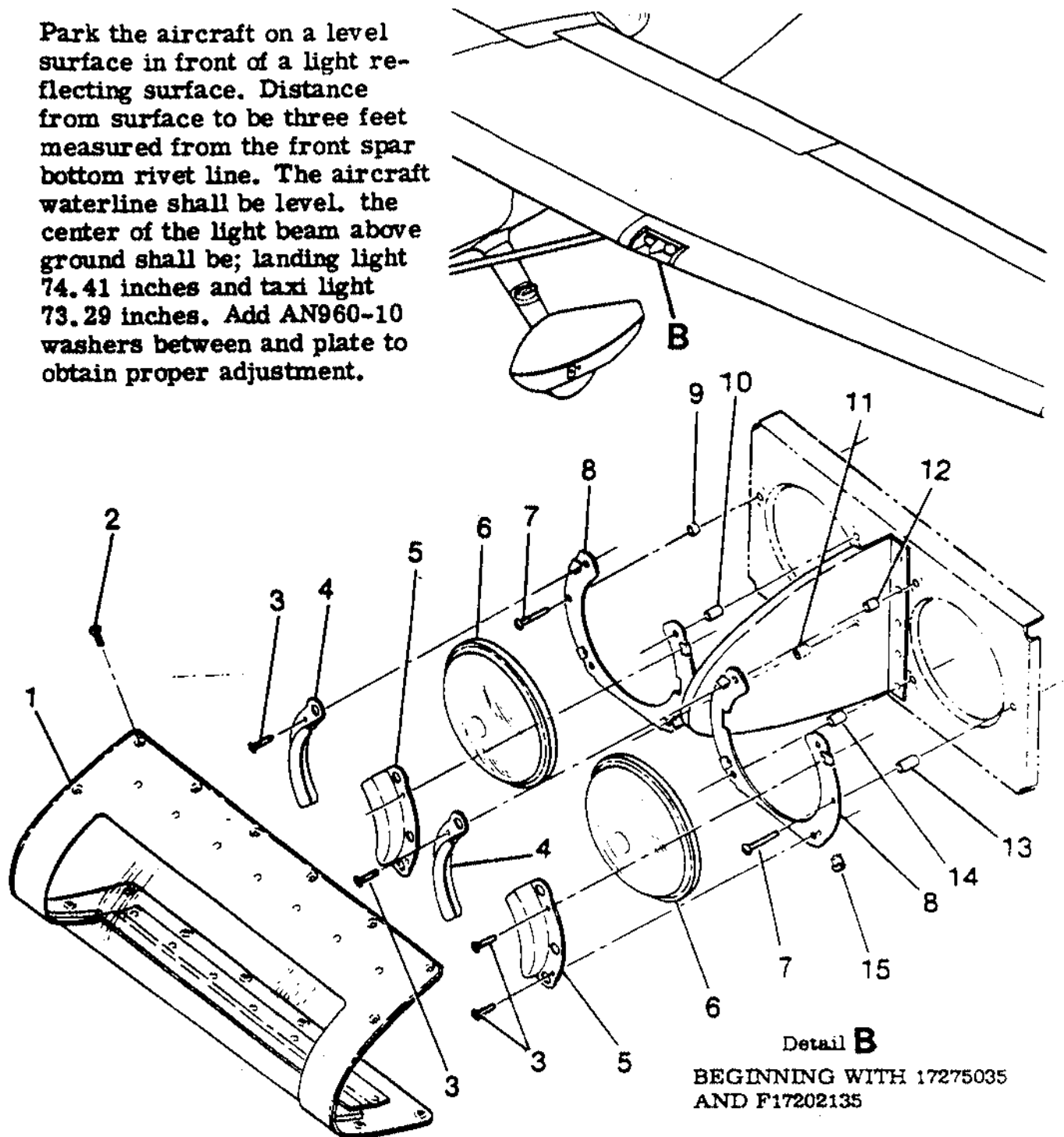


Figure 18-6. Landing and Taxi Light Installation (Sheet 2 of 3)

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Park the aircraft on a level surface in front of a light reflecting surface. Distance from surface to be three feet measured from the front spar bottom rivet line. The aircraft waterline shall be level. the center of the light beam above ground shall be; landing light 74.41 inches and taxi light 73.29 inches. Add AN960-10 washers between and plate to obtain proper adjustment.



1. Lens Assembly	9. Spacer
2. Screw	10. Spacer
3. Screw	11. Spacer
4. Bracket	12. Spacer
5. Bracket	13. Spacer
6. Lamp	14. Spacer
7. Screw	15. Nutplate
8. Plate	

Detail B
BEGINNING WITH 17275035
AND F17202135

Figure 16-6. Landing and Taxi Light Installation (Sheet 3 of 3)

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16-54. NAVIGATION LIGHTS.

16-55. DESCRIPTION. The navigation lights are mounted on each wing tip and the aft end of the vertical fin tip. The lights are controlled by a rocker type switch located on the instrument panel. A circuit breaker is installed on the panel to protect the system.

16-56. REMOVAL AND INSTALLATION. For removal and installation of the navigation lights, see figure 16-7.

16-57. ANTI-COLLISION STROBE LIGHTS.

16-58. DESCRIPTION. A white strobe light may be installed on each wing tip with the navigation lights. Strobe lights are vibration resistant and operate on the principle of a capacitor discharge into a xenon tube, producing an extremely high intensity flash. Energy is supplied to the lights from individual power supplies mounted on each wing tip rib.

16-59. REMOVAL AND INSTALLATION. For removal and installation of strobe light and power supply, see to figure 16-7.

WARNING

This anti-collision system is a high voltage device. Do not remove or touch tube assembly while in operation. Wait at least 5 minutes after turning off power before starting work.

16-60. OPERATIONAL REQUIREMENTS (THRU 1977 MODELS).

CAUTION

The capacitors in the strobe light power supplies must be reformed if not used for a period of (6) months. The following procedure must be used.

Connect the power supply, red wire to plus, black to ground to 6 volt DC source. Do not connect strobe tube. Turn on 6 volt supply. Note current draw after one minute. If less than 1 ampere, continue operation for 24 hours. Turn off DC power source. Then connect to proper voltage, 12 volt. Connect tube to output of strobe power supply and allow to operate, flashing, for 15 minutes. Remove strobe tube. Operating power supply at 12 volts, note the current drain after one minute. If less than 0.5 amperes, operate for 6 hours. If current draw is greater than 0.5 amperes, reject the unit.

16-61. FLASHING BEACON.

16-62. DESCRIPTION. The flashing beacon light is attached to the vertical fin tip. The lamp is iodine-vapor, electrically switched by a solid-state flasher assembly. The flasher assembly is mounted in the aft section of the tailcone. The switching frequency of the flasher assembly operates the beacon at approximately 45 flashes per minute. A 1.5 ohm resistor is installed thru 1977 models and a 6 ohm resistor is installed to eliminate a pulsing effect on the cabin lighting and ammeter.

16-63. REMOVAL AND INSTALLATION. For removal and installation of flashing beacon, see figure 16-8.

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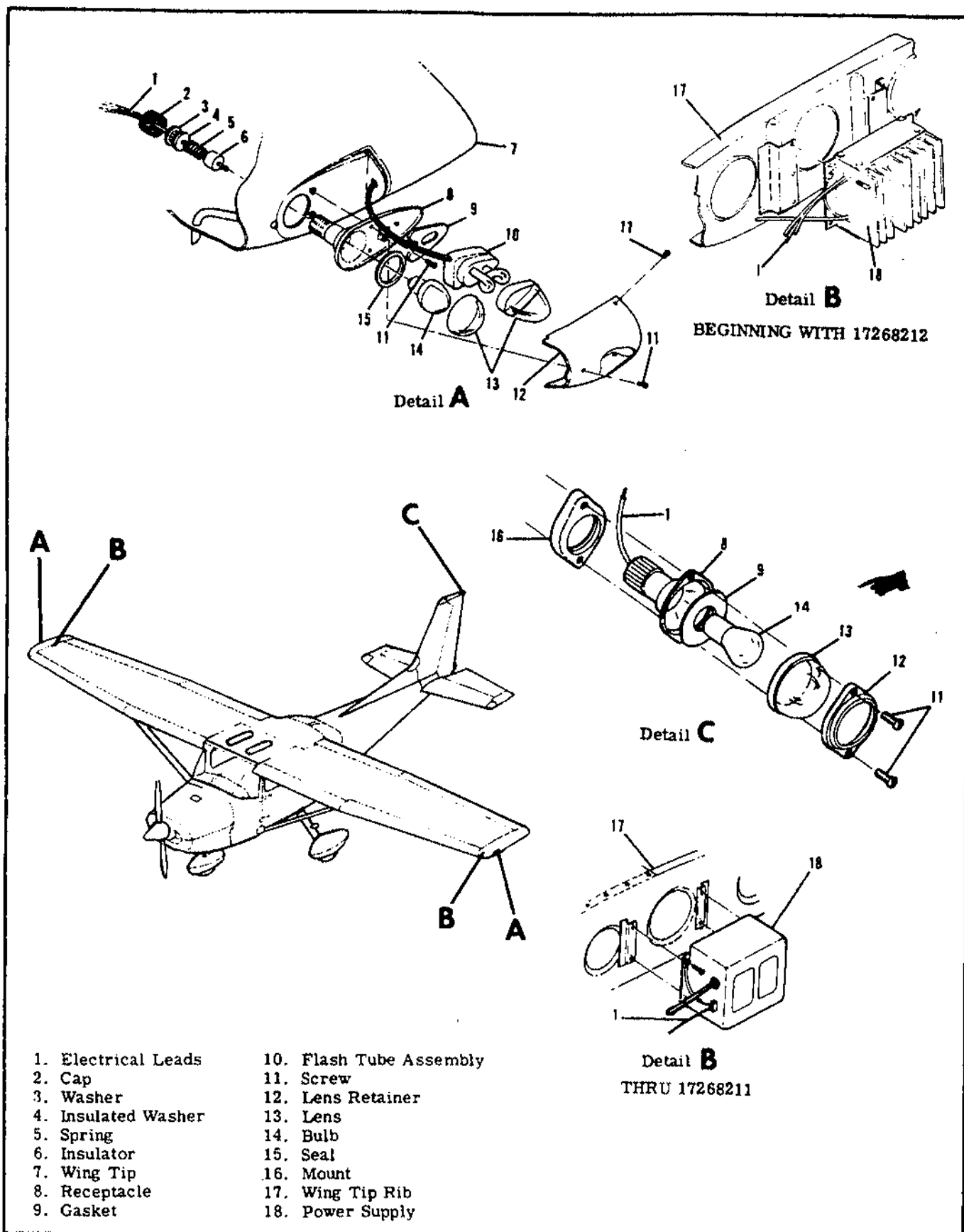


Figure 16-7. Navigation and Anti-Collision Strobe Light Installation

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*THRU 17272894

*BEGINNING WITH 17272895

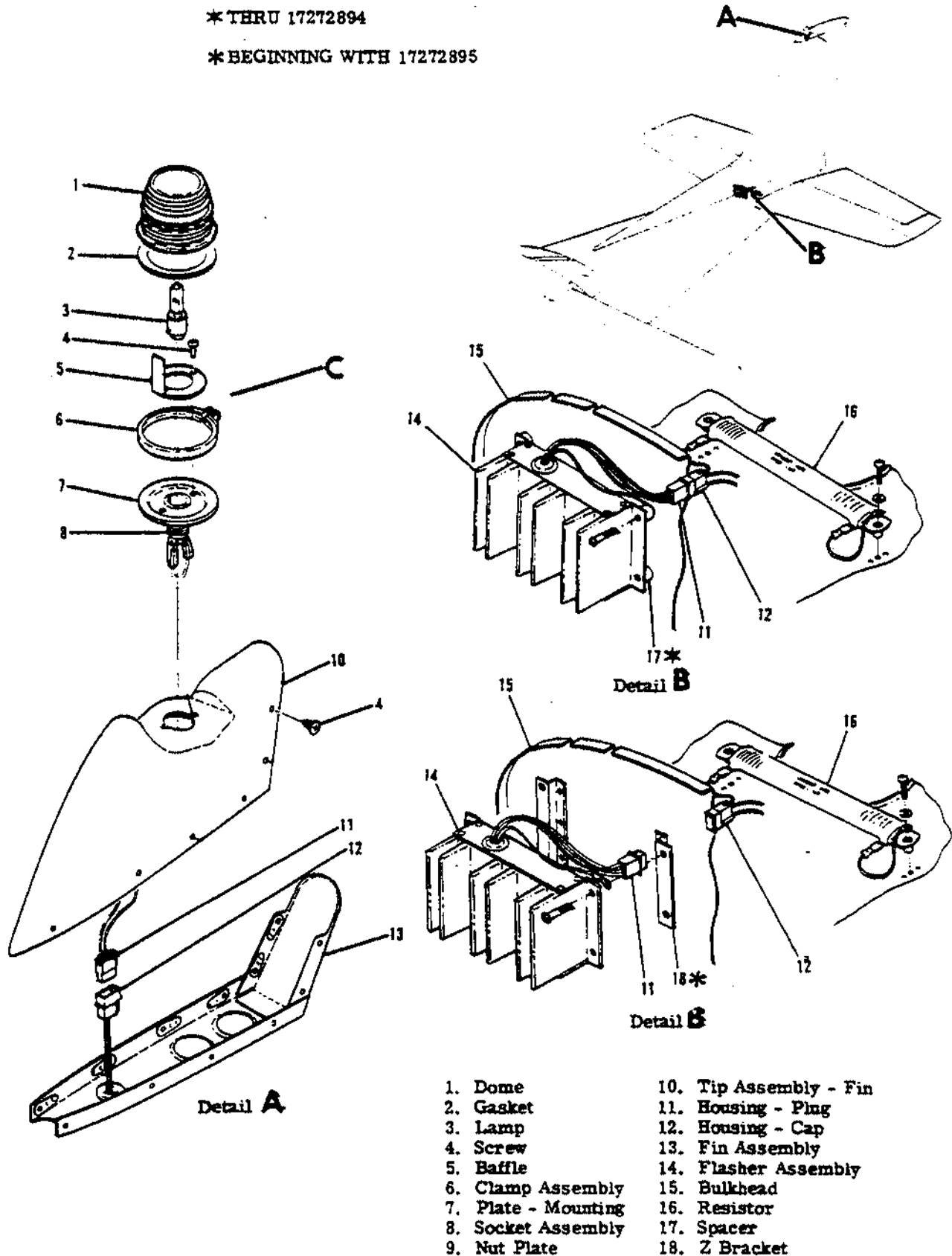
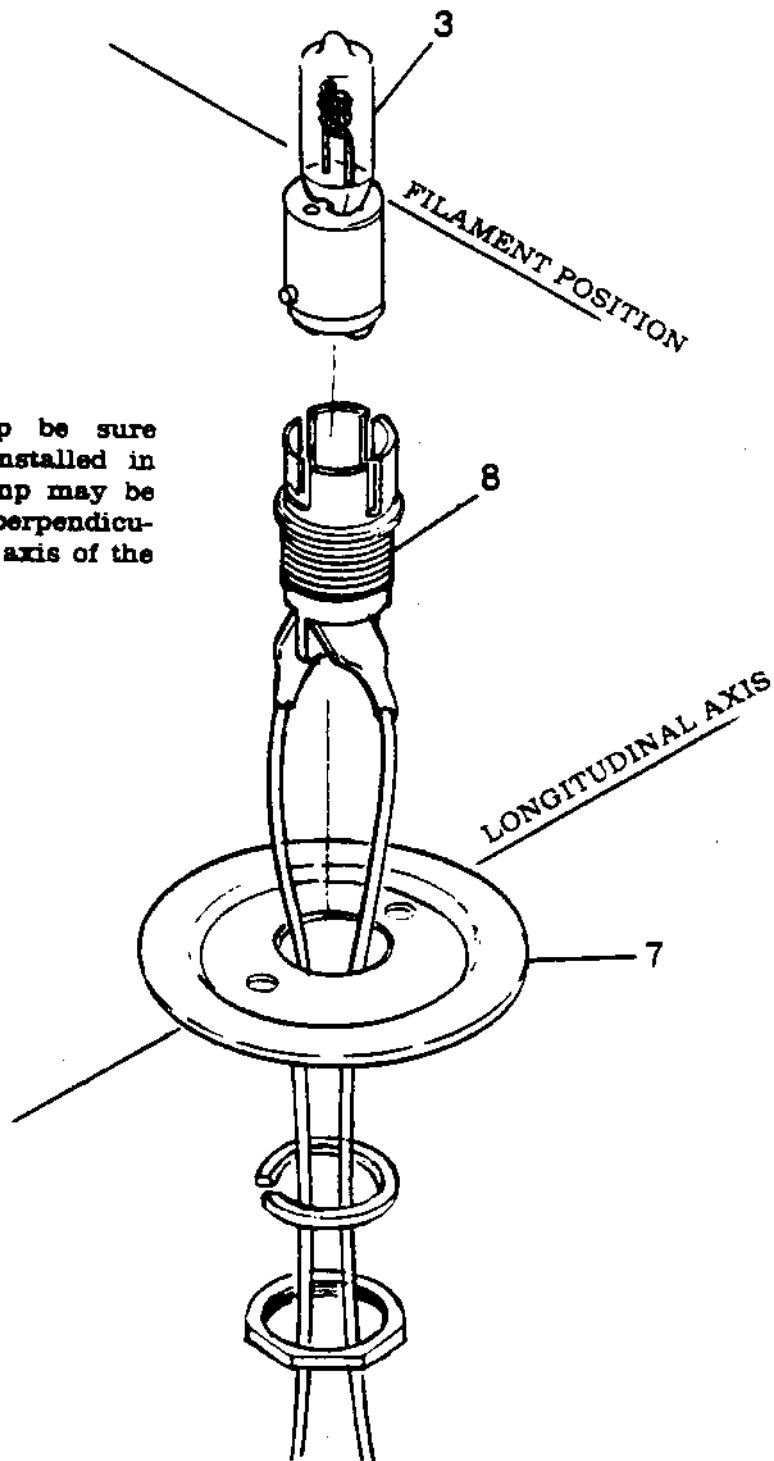


Figure 16-8. Flashing Beacon Light Installation (Sheet 1 of 2)

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NOTE

When installing lamp be sure socket assembly is installed in mounting plate so lamp may be installed with filament perpendicular to the longitudinal axis of the aircraft.



Detail **C**

BEGINNING WITH 17273742
AND F17202000

Figure 16-8. Flashing Beacon Light Installation (Sheet 2 of 2)

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- 16-64. INSTRUMENT AND DOME LIGHTS.
- 16-65. DESCRIPTION. The instrument flood light and dome light are installed in the overhead console. The dome light consists of a frosted lens and a single bulb controlled by a switch mounted forward of the light. The instrument flood light consists of a red lens and a single bulb controlled by an off/on switch mounted aft of the light. Intensity of the lamp is controlled by a rheostat switch located on the instrument panel.
- 16-66. REMOVAL AND INSTALLATION. For removal and installation of instrument and dome light, see figure 16-9.
- 16-67. COURTESY LIGHTS.
- 16-68. DESCRIPTION. The courtesy lights are mounted in the underside of each wing, inboard of the upper wing strut attach. The light consists of a lens socket and a single bulb. The lights are controlled by the dome light switch.
- 16-69. REMOVAL AND INSTALLATION. For removal and installation of the courtesy lights, see figure 16-9.
- 16-70. COMPASS AND RADIO DIAL LIGHTING.
- 16-71. DESCRIPTION. The compass and radio dial lights are contained within the individual units. The lights are controlled by the instrument flood light switch on the overhead console. Intensity is controlled by a rheostat located on the instrument panel.
- 16-72. INSTRUMENT POST LIGHTING.
- 16-73. DESCRIPTION. Individual post lighting may be installed to provide non-glare instrument lighting. The post light consists of a cap and a clean lamp assembly with a tinted lens bonded to the decorative covers. The intensity of the post lights is controlled by the radio light dimming rheostat located on the instrument panel.
- 16-74. REMOVAL AND INSTALLATION. For removal and installation of post lamp, slide the cap and lens assembly from the base. Slide the lamp from the socket and replace.

NOTE

When installing postlight assemblies, assemblies shall be coated with RTV-102, General Electric, Waterford, New York, on forward side of panel where postlight could come in contact with sheet metal subpanel. This coating shall insulate postlight assembly from contact with airplane structure. Maximum coating thickness to be .03.

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16-74A. TROUBLE SHOOTING - POSTLIGHTING.

TROUBLE	PROBABLE CAUSE	REMEDY
LAMP WILL NOT LIGHT.	Defective lamp.	1. Test lamp with ohmmeter or replace with a new lamp. If lamp is OK, proceed to step 2.
	Defective socket or open circuit.	2. With switch on, test socket. If defective, replace socket or wiring.
ONE SECTION OF LAMPS WILL NOT LIGHT.	Defective connector.	1. Test for voltage on lamp side of connector. If voltage is not present, check opposite side of connector. If voltage is present, replace pins and sockets as necessary. If voltage is not present, check connections at terminal block.
	Defective circuit in dimming assembly.	2. Refer to paragraph 16-74B.
	Defective rheostat.	3. Check voltage at output side of rheostat with battery switch on. Should read battery voltage with rheostat turned full clockwise. Voltage should decrease as rheostat is turned counterclockwise. If no voltage is present or voltage has a sudden drop before rheostat has been turned full counterclockwise replace rheostat.
ALL LAMPS OUT.	Open circuit breaker.	1. With battery switch on, check circuit breaker. Reset if open. If circuit breaker is set, check voltage at output side of breaker. If no voltage is present, replace circuit breaker.
LAMPS WILL NOT DIM.	Defective resistor or rheostat.	1. Check resistor and rheostat for continuity and resistance value. Also, check transistors for partial short. Refer to paragraph 16-74B. Replace rheostat and transistor.

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- 16-74B. **TROUBLE SHOOTING - TRANSISTOR HEAT SINK.** Remove heat sink from airplane. Check transistors for opens and shorts, check transistor sockets for evidence of shorting out against heat sink, especially on the bottom side. Check that legs of transistor socket have not been bent up against heat sink. If this has happened, you may see burned spot on the socket leg. If the transistor sockets and wiring appear to be in good condition, install transistor back in heat sink and make a continuity check. Attach one lead of an ohmmeter to the heat sink then check every pin of the pigtail plug with the other lead for continuity. (These should not be continuity). If continuity is found, this will burn out transistors immediately.
- 16-75. **TRANSISTORIZED LIGHT DIMMING.**
- 16-78. **DESCRIPTION.** A remotely located, two-circuit transistorized dimming assembly is installed to control instrument lighting. One circuit controls the compass light, map light and instrument flood lights. The other circuit controls radio lighting. A concentric knob arrangement on a dual rheostat assembly mounted on the instrument panel.
- 16-77. **REMOVAL AND INSTALLATION.** For removal and installation of transistorized dimming assembly, see figure 16-10.
- 16-77A. **TROUBLE SHOOTING - HEAT SINK.** Refer to paragraph 16-74B.

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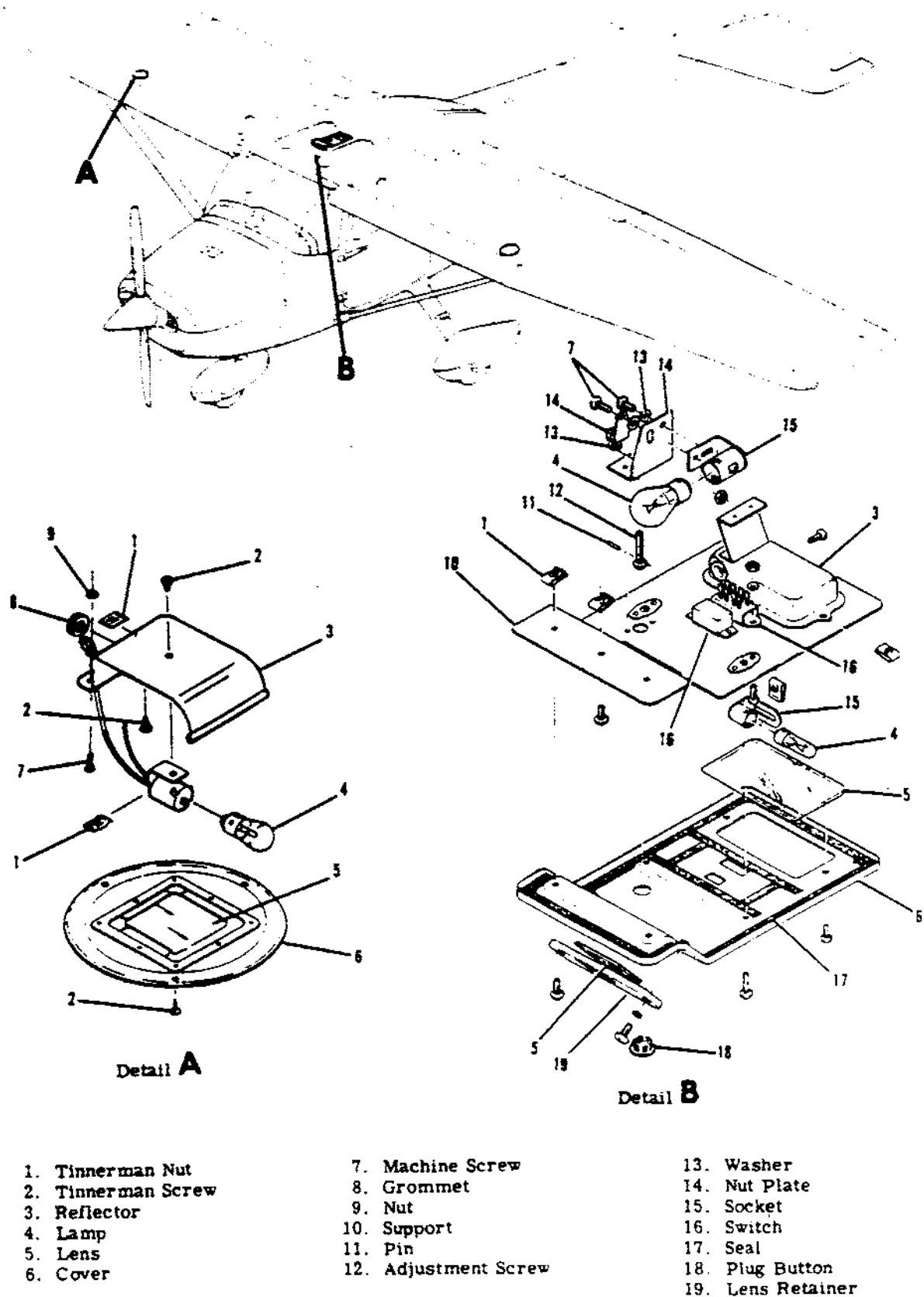


Figure 16-9. Instrument, Dome and Courtesy Light Installation

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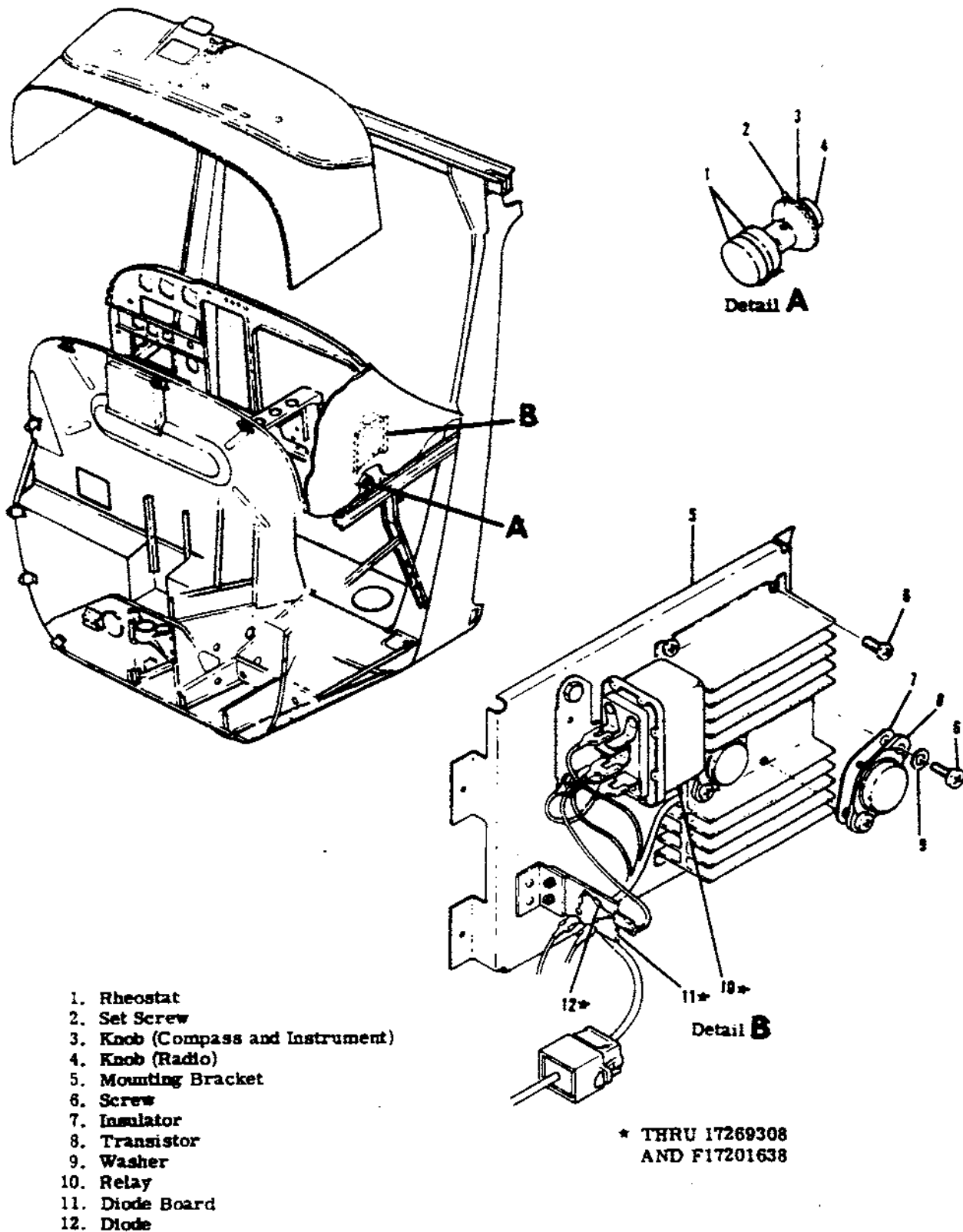


Figure 16-10. Transistorized Dimming

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16-78. MAP LIGHTING.

16-79. DESCRIPTION. White map lighting and red non-glare instrument lighting are provided by an adjustable light mounted on the upper forward part of the left door post. The switch is a three position type with red, white and off positions. The map light contains a white bulb for general purpose lighting and a red bulb for adjustable instrument lighting. The intensity of the red bulb is controlled by the center portion of a concentric knob arrangement thru a dual rheostat assembly located on the pilot's switch panel.

16-80. REMOVAL AND INSTALLATION. (See figure 16-11.)

- a. For replacement of defective lamp slide the hood and lens from the map light assembly and remove the bayonet type bulb.
- b. For removal of the map light assembly, remove the screws from the front door post shield. Remove the washer and nut attaching the map light. Remove the ground wire from the map light screw. Detach the wires at the quick disconnect fasteners and remove the map light assembly.

16-81. CONTROL WHEEL MAP LIGHT.

16-82. DESCRIPTION. The control wheel map light is mounted on the lower side of the control wheel. Light intensity is controlled by a rheostat. For dimming the rheostat should be turned clockwise.

16-83. REMOVAL AND INSTALLATION. (See figure 16-12, sheet 1 of 2) (THRU 17275674)

- a. For easy access to map light assembly rotate control wheel 90°.
- b. Label the wires connected to the map light assembly (terminal block) and remove screws securing wires to the terminal block.
- c. The assembly is now free for removal, Remove the two screws securing the map light to the control wheel and remove map light assembly.
- d. For reassembly reverse this procedure.

16-83A. REMOVAL AND INSTALLATION. (See figure 16-12, sheet 2 of 2) BEGINNING WITH 17275675)

- a. For easy access to map light assembly rotate control wheel 90°.
- b. To remove lamp press in and rotate counterclockwise.
- c. To remove rheostat remove screws securing bracket (10).
- d. Disconnect electrical leads from rheostat (8).
- e. For reassembly reverse this procedure.

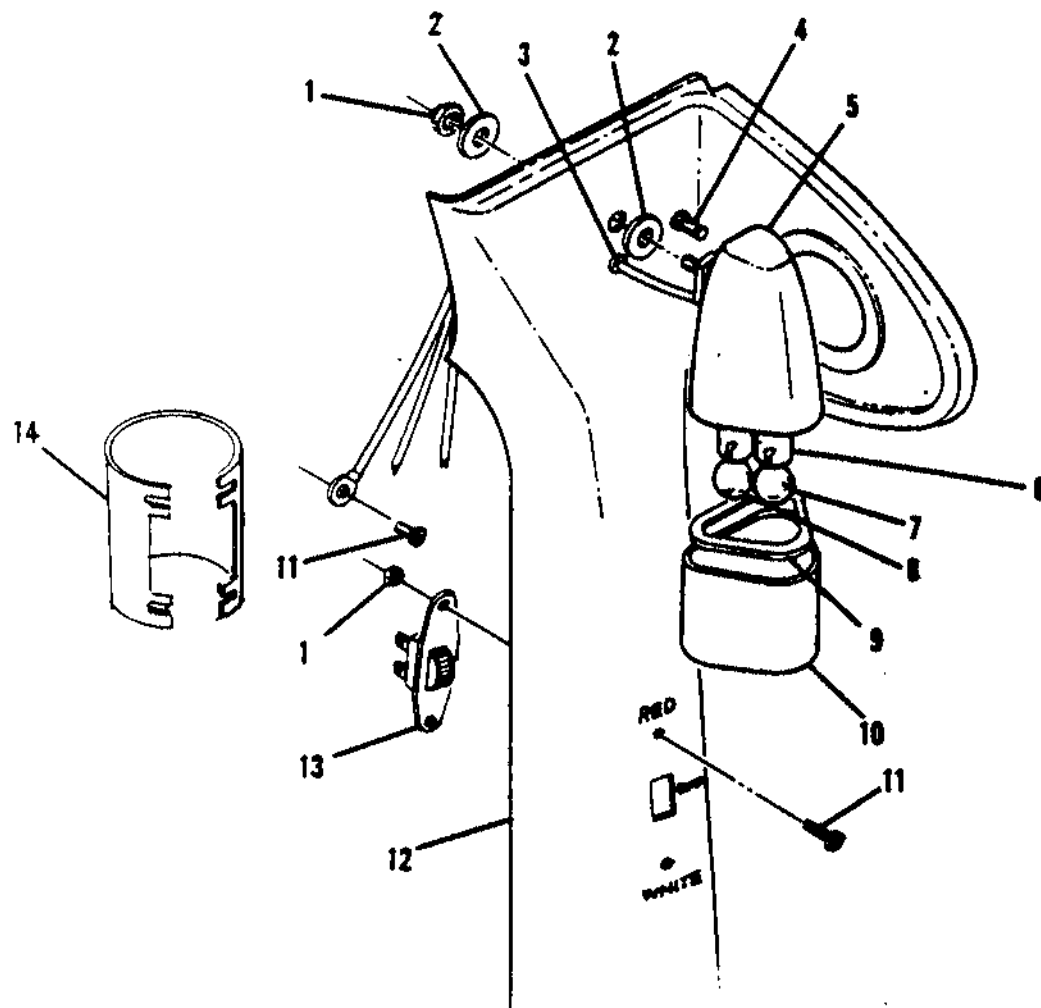
16-84. PITOT HEATER.

16-85. DESCRIPTION. An electrical heater unit is installed in some pitot tubes. The heater offsets the possibility of ice formations on the pitot tube. The heater is integrally mounted in the pitot tube and is operated by a switch on the instrument panel. (See figure 16-13.)

16-86. CIGAR LIGHTER.

16-87. DESCRIPTION. Thru 17275035 and F17202135 the cigar lighter (located on the instrument panel) is equipped with a thermal-actuated circuit breaker

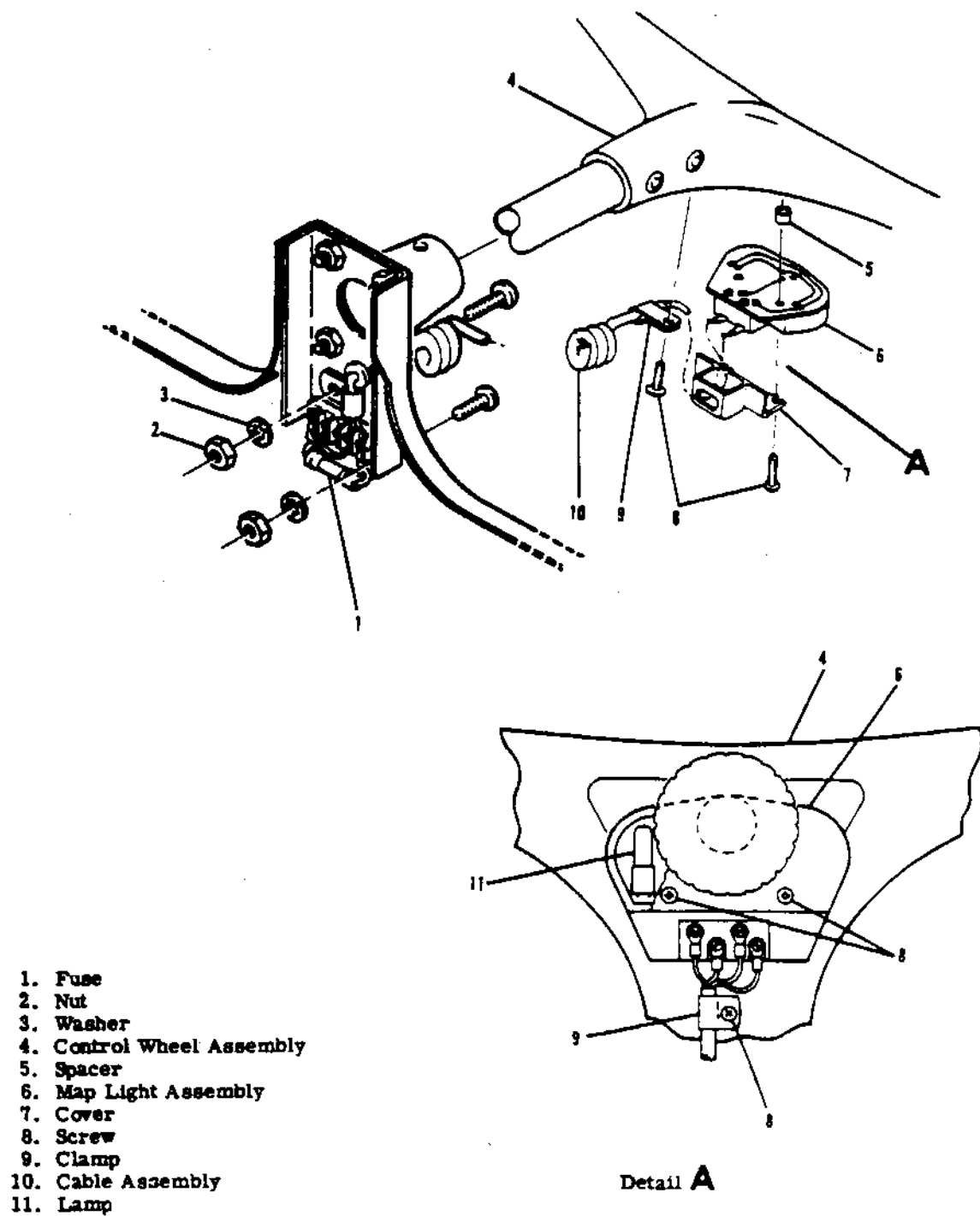
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1. Nut
2. Washer
3. Grommet
4. Adjustment Screw
5. Maplight Assembly
6. Socket Assembly
7. Lamp
8. Red Lamp
9. Lens
10. Hood
11. Screw
12. Front Doorpost Shield
13. Maplight Switch
14. Insulator

Figure 16-11. Map Light Installation

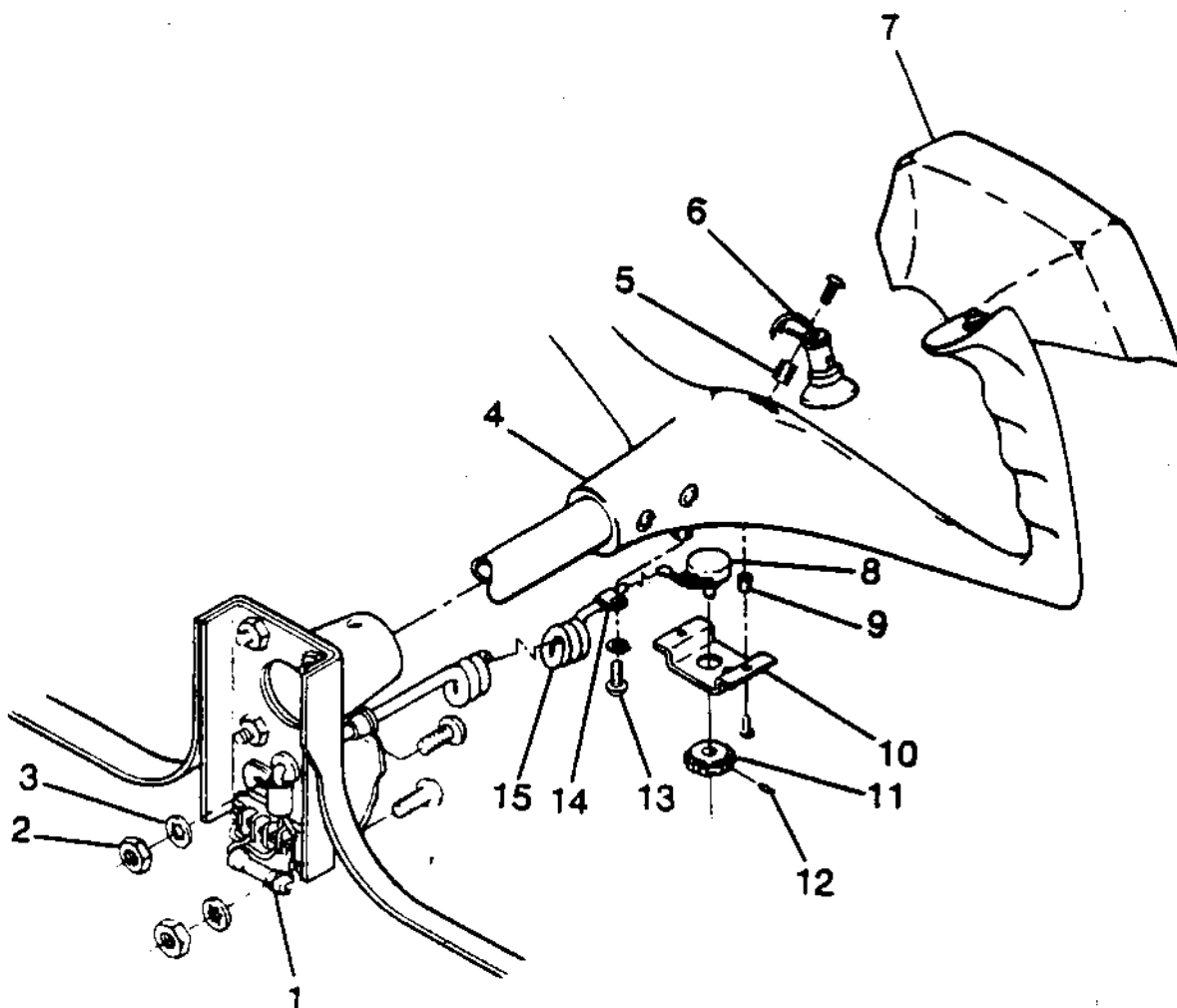
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THRU 17275674

Figure 16-12. Control Wheel Map Light Installation (Sheet 1 of 2)

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1. Fuse
2. Nut
3. Washer
4. Control Wheel Assembly
5. Insert
6. Map Light Assembly
7. Pad
8. Rheostat
9. Insert
10. Bracket
11. Knob
12. Setscrew
13. Screw
14. Clamp
15. Cable

BEGINNING WITH 17275675

Figure 16-12. Control Wheel Map Light Installation (Sheet 2 of 2)

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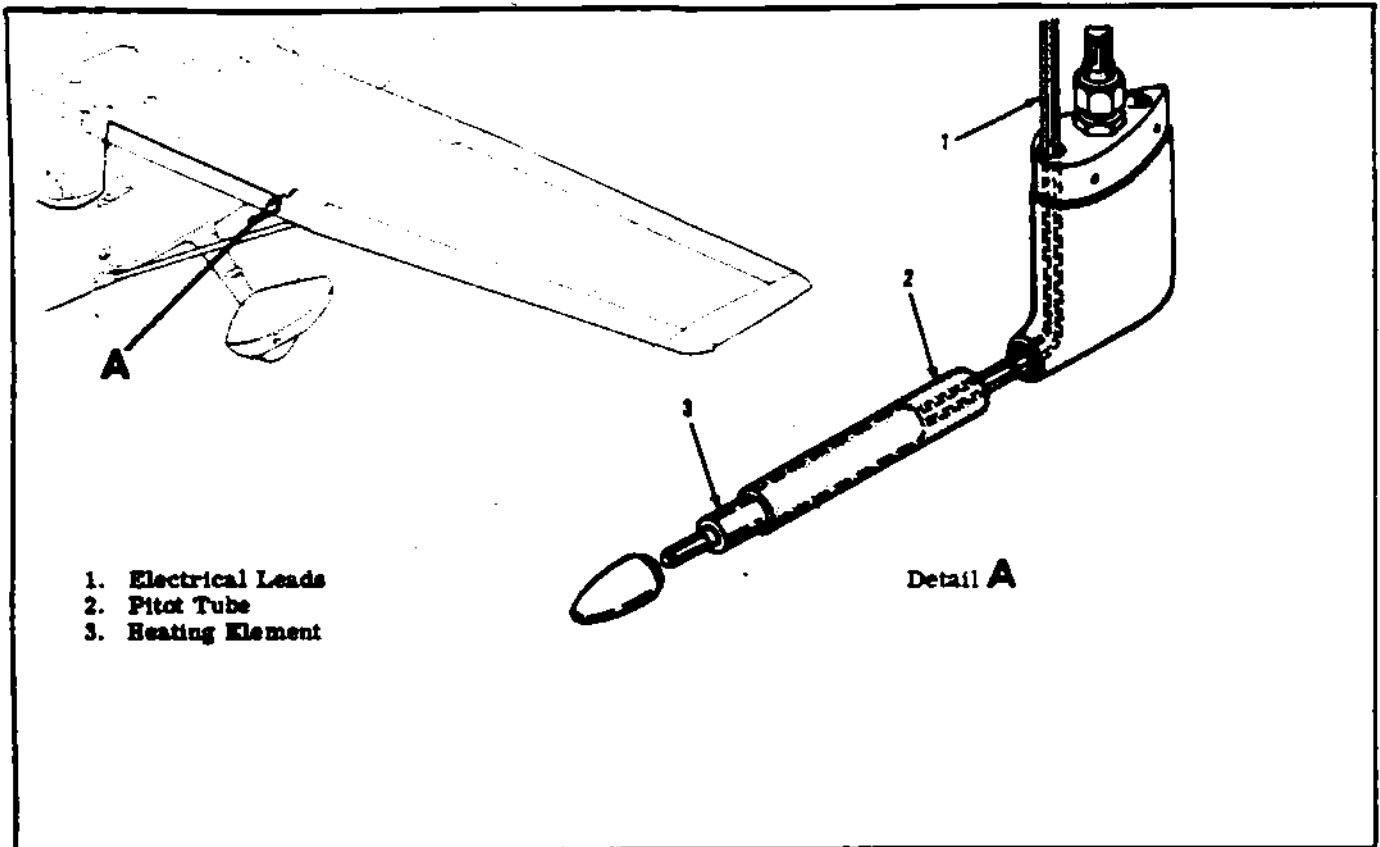


Figure 16-13. Heated Pitot Installation

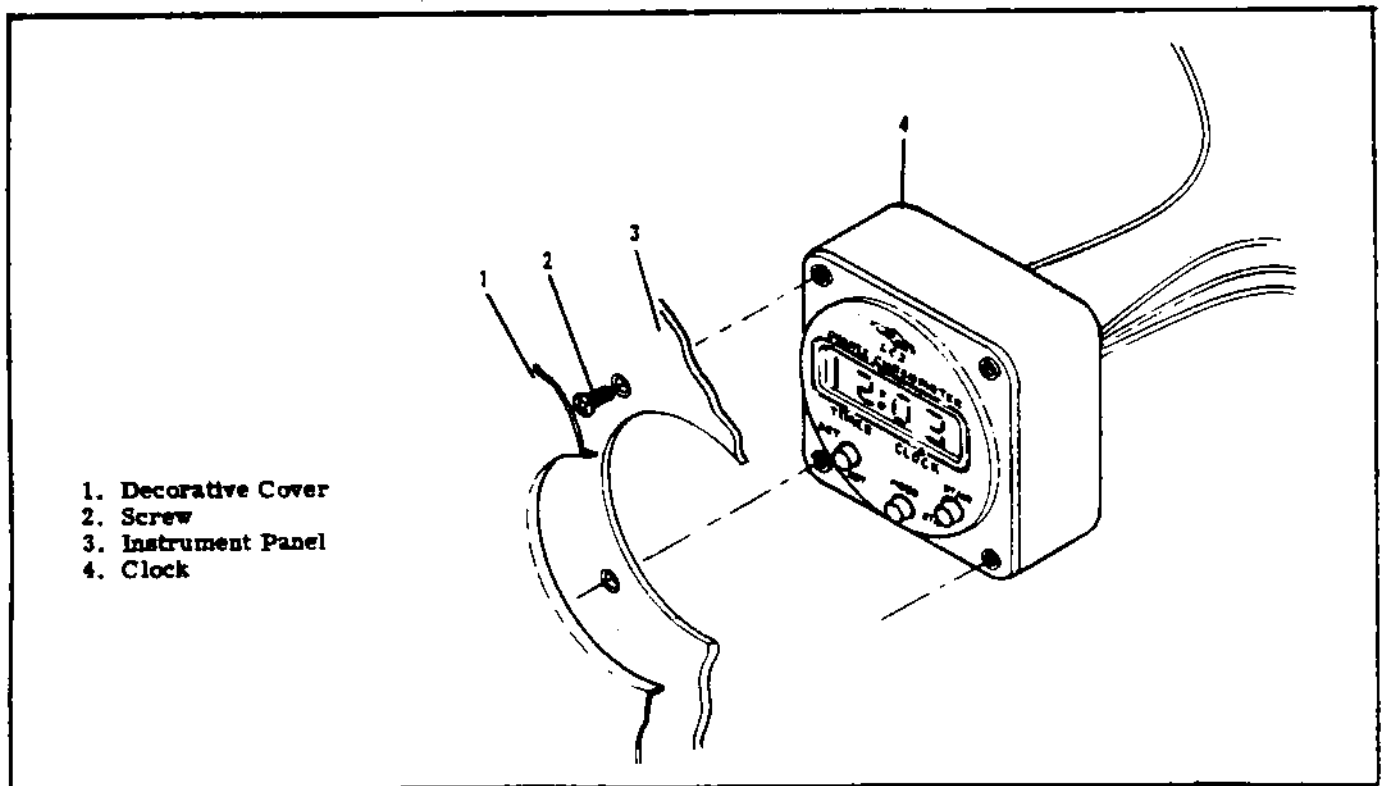


Figure 16-14. Digital Clock Installation

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which is attached to the rear of the cigar lighter. The circuit breaker will open if the lighter becomes jammed in the socket or held in position too long. The circuit breaker may be reset by inserting a small probe into the .078 diameter hole in the back of the circuit breaker and pushing lightly until a click is heard.

CAUTION

Make sure master switch is "OFF" before inserting probe into circuit breaker on cigar lighter to reset.

16-87A. CLOCK.

16-87B. DESCRIPTION. Thru 1978 Models an electric clock may be installed in the aircraft. During the 1979 Models a digital clock may be installed. The digital clock has the capability of date and second read out as well as time. Both clocks are installed in the instrument panel in the same manner, see figure 16-14.

16-88. EMERGENCY LOCATOR TRANSMITTER. (THRU 17268576)

16-89. DESCRIPTION. The ELT is a self-contained, solid state unit, having its own power supply, with an externally mounted antenna. The C589511-0209 transmitter is designed to transmit simultaneously on dual emergency frequencies of 121.5 and 243.0 Megahertz. The C589510-0211 transmitter thru 17265192 and the C589510-0212 beginning with 17265193 used for Canadian registry, operates on 121.5 only. The unit is mounted in the tailcon, aft of the baggage curtain on the right hand side. The transmitters are designed to provide a broadcast tone that is audio modulated in a swept manner over the range of 1800 to 300 Hz in a distinct, easily recognizable distress signal for reception by search and rescue personnel and others monitoring the emergency frequencies. Power is supplied to the transmitter by a battery-pack which has the service life of the batteries placarded on the batteries and also on the outside end of the transmitter. ELTs are equipped with a battery-pack containing alkaline "D" size batteries (See figure 16-13). The ELT exhibits line of sight transmission characteristics which correspond approximately to 100 miles at a search altitude of 10,000 feet. When battery inspection and replacement schedules are adhered to, the transmitter will broadcast an emergency signal at rated power (75 MW-minimum), for a continuous period of time as listed in the following table.

TRANSMITTER LIFE TO 75 MILLIWATTS OUTPUT

Temperature	4 Cell Lithium Battery Pack
+130°F	115 hrs
+ 70°F	115 hrs
- 4°F	95 hrs
- 40°F	23 hrs

Battery-packs have a normal shelf life of five to ten (5-10) years and must be replaced at 1/2 of normal shelf life in accordance with TSO-C91. Cessna specifies 5 years replacement of lithium (4-cell) battery packs.

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- 16-90. **OPERATION.** A three position switch on the forward end of the unit controls operation. Placing the switch in the ON position will energize the unit to start transmitting emergency signals. In the OFF position, the unit is inoperative. Placing the switch in the ARM position will set the unit to start transmitting emergency signals only after the unit has received a 5g (tolerances are +2g and -0g) impact force, for a duration of 11-16 milliseconds.

NOTE

Transmitter is also attached to the mounting bracket by velcro strips; pull transmitter to free from mounting bracket and velcro.

CAUTION

Do not leave the emergency locator transmitter in the ON position longer than 1 second (3 sweeps of the warble tone) or you may activate downed aircraft procedures by C.A.P., D.O.T. or F.A.A. personnel.

- 16-91. **CHECKOUT INTERVAL:**

100 HOURS OR THREE MONTHS, WHICHEVER COMES FIRST.

- a. Turn aircraft master switch ON.
- b. Turn aircraft transceiver ON and set frequency on receiver to 121.5 MHz.
- c. Remove the ELT's antenna cable from the ELT unit.
- d. Place the ELT's function selector switch in the ON position for 1 second or less. Immediately replace the ELT function selector switch in the ARM position after testing ELT.
- e. Test should be conducted only within the time period made up of the first five minutes after any hour.

CAUTION

Tests with the antenna connected should be approved and confirmed by the nearest control tower. The FAA/DOT allows free space transmission tests from the airplane anytime within five minutes after each hour. The test time allowed is generally three sweeps of the warble tone, or approximately one second. The control tower should be notified that a test is about to be performed.

NOTE

After accumulated test or operation time equals 1 hour, battery-pack replacement is required. Do Not use substitute battery-pack.

- f. Check calendar date for replacement of battery-pack. This date is supplied on a sticker attached to the outside of the ELT case and to each battery.

- 16-92. **REMOVAL AND INSTALLATION OF TRANSMITTER.** (See figure 16-15.)

- a. Remove baggage curtain to gain access to the transmitter and antenna.
- b. Disconnect co-axial cable from end of transmitter.
- c. Cut sta-strap securing antenna cable and unlatch metal strap to remove transmitter.

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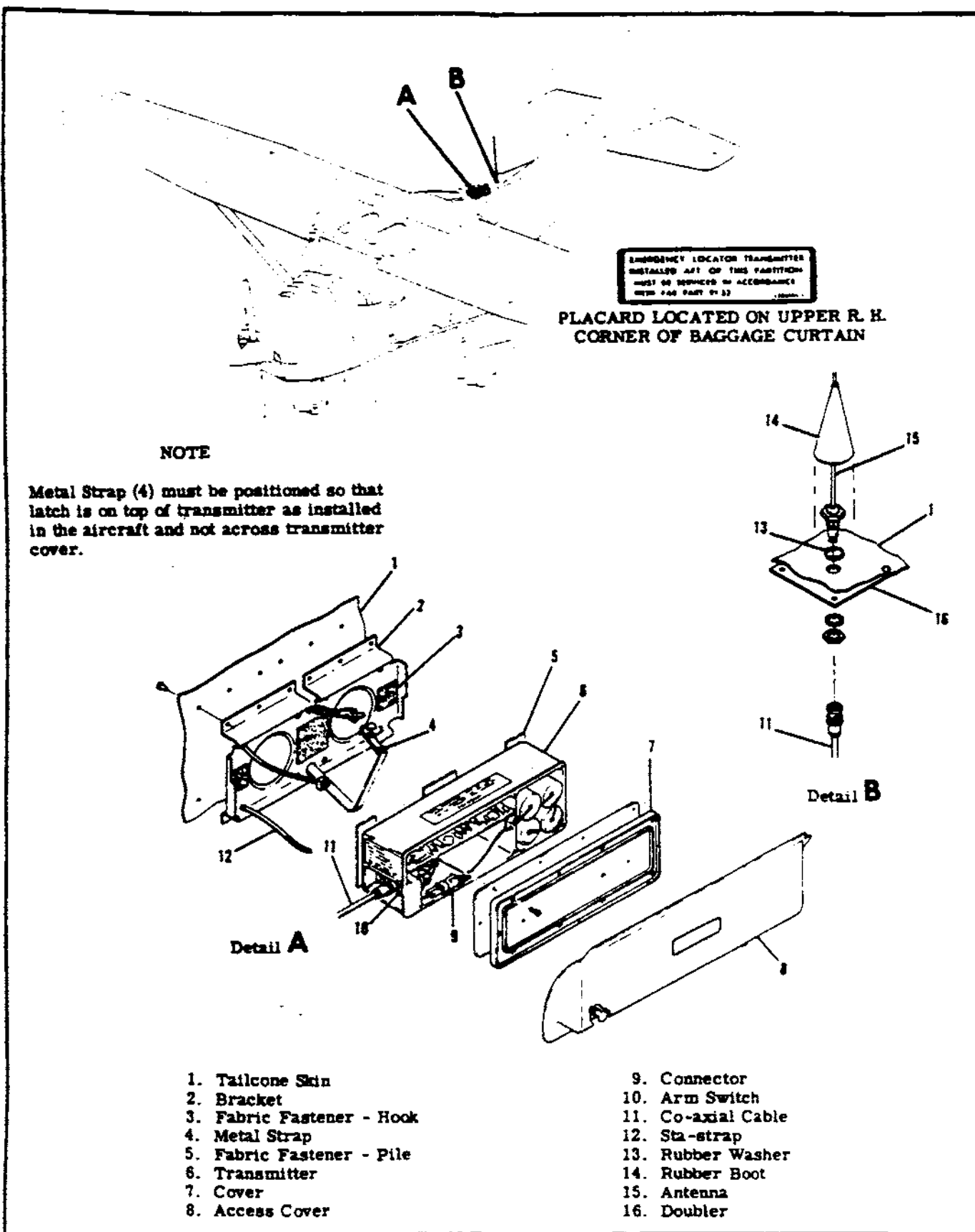


Figure 16-15. Emergency Locator Transmitter Installation

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NOTE

To replace velcro strips, clean surface thoroughly with clean cloth saturated in one of the following solvents: Trichloric thylene, Aliphatic Napthas, Methyl Ethyl Ketone or Enmar 6094 Lacquer Thinner. Cloth should be folded each time the surface is wiped to present a clean area and avoid redepositing of grease. Wipe surface immediately with clean dry cloth, do not allow solvent to dry on surface. Apply Velcro® adhesive to each surface in a thin even coat and allow to dry until quite tacky, but no longer transfers to the finger when touched (usually between 5 and 30 minutes). Porous surfaces may require two coats. Place the two surfaces in contact and press firmly together to ensure intimate contact. Allow 24 hours to complete cure.

- d. To reinstall transmitter, reverse preceding steps.

NOTE

An installation tool is required to properly secure strap. This tool may be purchased locally or ordered from the Panduit Corporation, Tinley Park, Ill., part number GS-2B (Conforms to MS90387-1).

CAUTION

Ensure that the direction of flight arrows (placarded on the transmitter) are pointing towards the nose of the aircraft.

16-93. REMOVAL AND INSTALLATION OF ANTENNA. (See figure 16-15.)

- a. Disconnect co-axial cable from base of antenna.
- b. Remove the nut and lockwasher attaching the antenna base to the fuselage and the antenna will be free for removal.
- c. To reinstall the antenna, reverse the preceding steps.

NOTE

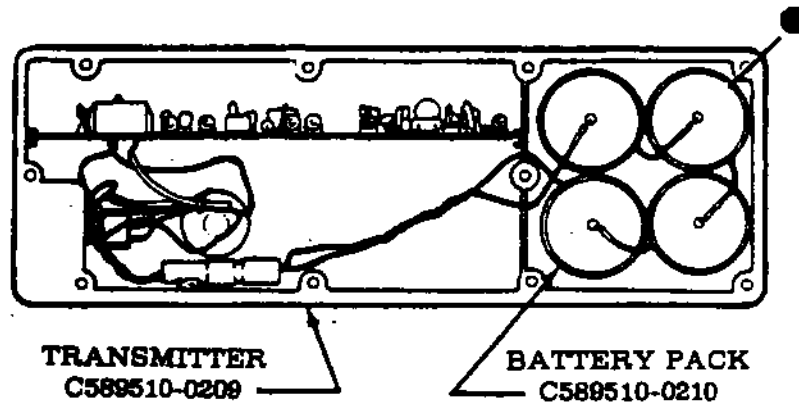
Upon reinstallation of antenna, cement rubber boot (14) using RTV102, General Electric Co. or equivalent, to antenna whip only; do not apply adhesive to fuselage skin or damage to paint may result.

16-94. REMOVAL AND INSTALLATION OF LITHIUM FOUR (4) CELL BATTERY-PACK. (See figure 16-16.)

NOTE

When existing battery fails or exceeds normal expiration date, convert ELT System to new D/M alkaline powered ELT per Avionics Service Letter AV78-31, dated November 10, 1978.

MODEL 172 SERIES SERVICE MANUAL



NOTE

A PVC spacer is installed in this position on the C589510-0213 battery pack used in the C589510-0212 transmitter used on Canadian aircraft

Figure 16-16. Lithium 4 Cell Battery Pack Installations

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NOTE

Transmitters equipped with the 4 cell battery-pack can only be replaced with another 4 cell battery-pack.

- a. After the transmitter has been removed from aircraft in accordance with para. 16-92, place the transmitter switch in the OFF position.
- b. Remove the four screws attaching the cover to the case and then remove the cover to gain access to the battery-pack.

NOTE

Retain the rubber gasket and screws for reinstallation.

- c. Disconnect the battery-pack electrical connector and remove battery-pack.
- d. Place new battery-pack in the transmitter with four batteries as shown in the case in figure 16-16.
- e. Connect the electrical connector as shown in figure 16-16.

NOTE

Before installing the new 4 cell battery-pack, check to ensure that its voltage is 11.2 volts or greater.

CAUTION

It is desirable to replace adhesive material on the 4 cell battery-pack, use only 3M Jet Melt Adhesive #3738. Do not use other adhesive materials since other materials may corrode the printed circuit board assembly.

- f. Replace the transmitter cover and gasket.
- g. Remove the old battery-pack placard from the end of transmitter and replace with new battery-pack placard supplied with the new battery-pack.

CAUTION

Be sure to enter the new battery-pack expiration date in the aircraft records. It is also recommended this date be placed in your ELT Owner's Manual for quick reference.

- 16-95. **TROUBLE SHOOTING.** Should your Emergency Locating Transmitter fail the 100 Hours performance checks, it is possible to a limited degree to isolate the fault to a particular area of the equipment. In performing the following trouble shooting procedures to test peak effective radiated power, you will be able to determine if battery replacement is necessary or if your unit should be returned to your dealer for repair.

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16-95. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
*POWER LOW	Low battery voltage.	1. Set toggle switch to off. 2. Remove plastic plug from the remote jack and by means of a Switchcraft #750 jack-plug, connect a Simpson 260 model voltmeter and measure voltage. If the battery-pack transmitters is 11.2 volts or less, the battery-pack is below specification.
	Faulty transmitter.	3. If the battery-pack voltage meets the specifications in Step 2, the battery-pack is ok. If the battery is ok, check the transmitter as follows: a. Remove voltmeter. b. By means of Switchcraft #750 jackplug and 3 inch maximum long leads, connect a Simpson Model 1223 ammeter to the jack. c. Set the toggle switch to ON and observe the ammeter current drain. If the current drain is in the 85-100 ma range, the transmitter or the co-axial cable is faulty.
	Faulty co-axial antenna cable.	4. Check co-axial antenna cable for high resistance joints. If this is found to be the case, the cable should be replaced.

*This test should be carried out with the co-axial cable provided with your unit.

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16-96. EMERGENCY LOCATOR TRANSMITTER. (BEGINNING WITH 17268577)

- 16-97. DESCRIPTION. The ELT is a self-contained, solid state unit, having its own power supply with an externally mounted antenna. The unit is mounted in the tailcone, aft of the baggage curtain on the right hand side. The transmitters are designed to provide a broadcast tone that is audio modulated in a swept manner over the range of 1600 to 300 Hz in a distinct, easily recognizable distress signal for reception by search and rescue personnel and others monitoring the emergency frequencies. The ELT exhibits line of sight transmission characteristics which correspond approximately to 100 miles at a search altitude of 10,000 feet. The C589511-0103 transmitter on domestic aircraft, and the C589511-0104 transmitter on aircraft with Canadian registry, are used thru 17271034 and F17201749. The C589511-0117 transmitter on domestic aircraft, and the C589511-0113 transmitter on aircraft with Canadian registry, are used 17271035 thru 17275871 and F17201750 thru F17202194. Beginning with 17275815 and F17202195 the C589512-0103 transmitter is used on all aircraft.

The C589511-0104 transmits on 121.5 MHz at 25 mw rated power output for 100 continuous hours in the temperature range of -40°F (-40°C to + 55°C). The C589511-0113 transmits on 121.5 MHz at 25 mw rated power output for 100 continuous hours in the temperature range of -4°F to + 131°F (-20°C to + 55°C). The C589511-0103 transmits on 121.5 and 243.0 MHz simultaneously at 75 mw rated power output for 48 continuous hours in the temperature range of -40°F to + 131°F (-40°C to + 55°C). The C589511-0117 and C589512-0103 transmits on 121.5 and 343.0 MHz at 75 mw rated power output for 48 continuous hours in the temperature range of -4°F to + 131°F (-20°C to 55°C).

Power is supplied to the transmitter by a battery-pack. The C589511-0104 and C589511-0103 ELTs equipped with a lithium battery-pack must be modified by SK185-20 as outlined in Avionics Service Letter AV78-31, dated 20 November, to incorporate alkaline battery-packs. The C589511-0114 alkaline battery-packs have the service life of the battery-pack stamped on the battery-pack, on the end of the transmitter below the switch and on top of the transmitter. The C589512-0107 alkaline battery-packs have the replacement date and date of installation on the battery-pack and the replacement date on the top of the transmitter.

- 16-98. OPERATION. A three position switch on the forward end of the unit controls operation. Placing the switch in the ON position will energize the unit to start transmitting emergency signals. In the OFF position, the unit is inoperative. Placing the switch in the ARM position will set the unit to start transmitting emergency signals only after the unit has received a 5g (tolerances are -2g and -0g) impact force, for a duration of 11-16 milliseconds.

CAUTION

Do not leave the emergency locator transmitter in the ON position longer than 1 second (3 sweeps of the warble tone) or you may activate downed aircraft procedures by C.A.P., D.O.T. or F.A.A. personnel.

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16-99. CHECKOUT INTERVAL:

100 HOURS, OR THREE MONTHS, WHICHEVER COMES FIRST.

- a. Turn aircraft master switch ON.
- b. Turn aircraft transceiver ON and set frequency on receiver to 121.5 MHz.
- c. Remove the ELT's antenna cable from the ELT unit.
- d. Place the ELT's function selector switch in the ON position for 1 second or less. Immediately replace the ELT function selector switch in the ARM position after testing ELT.
- e. Test should be conducted only within the time period made up of the first five minutes after any hour.

CAUTION

Tests with the antenna connected should be approved and confirmed by the nearest control tower. The FAA/DOT allows free space transmission tests from the airplane anytime within five minutes after each hour. The test time allowed is generally three sweeps of the warble tone, or approximately one second. The control tower should be notified that a test is about to be performed.

NOTE

After accumulated test or operation time equals 1 hour, battery-pack replacement is required. Do Not use substitute battery pack.

- f. Check calendar date for replacement of battery-pack. This date is supplied on a sticker attached to the outside of the ELT case and to each battery.

16-100. REMOVAL AND INSTALLATION OF TRANSMITTER. (See figure 16-17.)

- a. Remove baggage curtain to gain access to the transmitter and antenna.
- b. Disconnect co-axial cable from end of transmitter.
- c. Remove the two #10 screws from the baseplate of the ELT and remove ELT.
- d. To reinstall transmitter, reverse preceding steps.

CAUTION

Ensure that the direction of flight arrows (placarded on the transmitter) are pointing towards the nose of the aircraft.

16-101. REMOVAL AND INSTALLATION OF ANTENNA. (See figure 16-17.)

- a. Disconnect co-axial cable from base of antenna.
- b. Remove the nut and lockwasher attaching the antenna base to the fuselage and the antenna will be free for removal.
- d. To reinstall the antenna, reverse the preceding steps.

CAUTION

The C589511-0111 and C589511-0119 co-axial cable must be installed as indicated on the cable sleeve. Cable end marked "TO ANT" must be connected to the ELT antenna, and the end marked "TO ELT" must be connected to the C589511-0113/-0117 and C589511-0103/-0104 transmitters.

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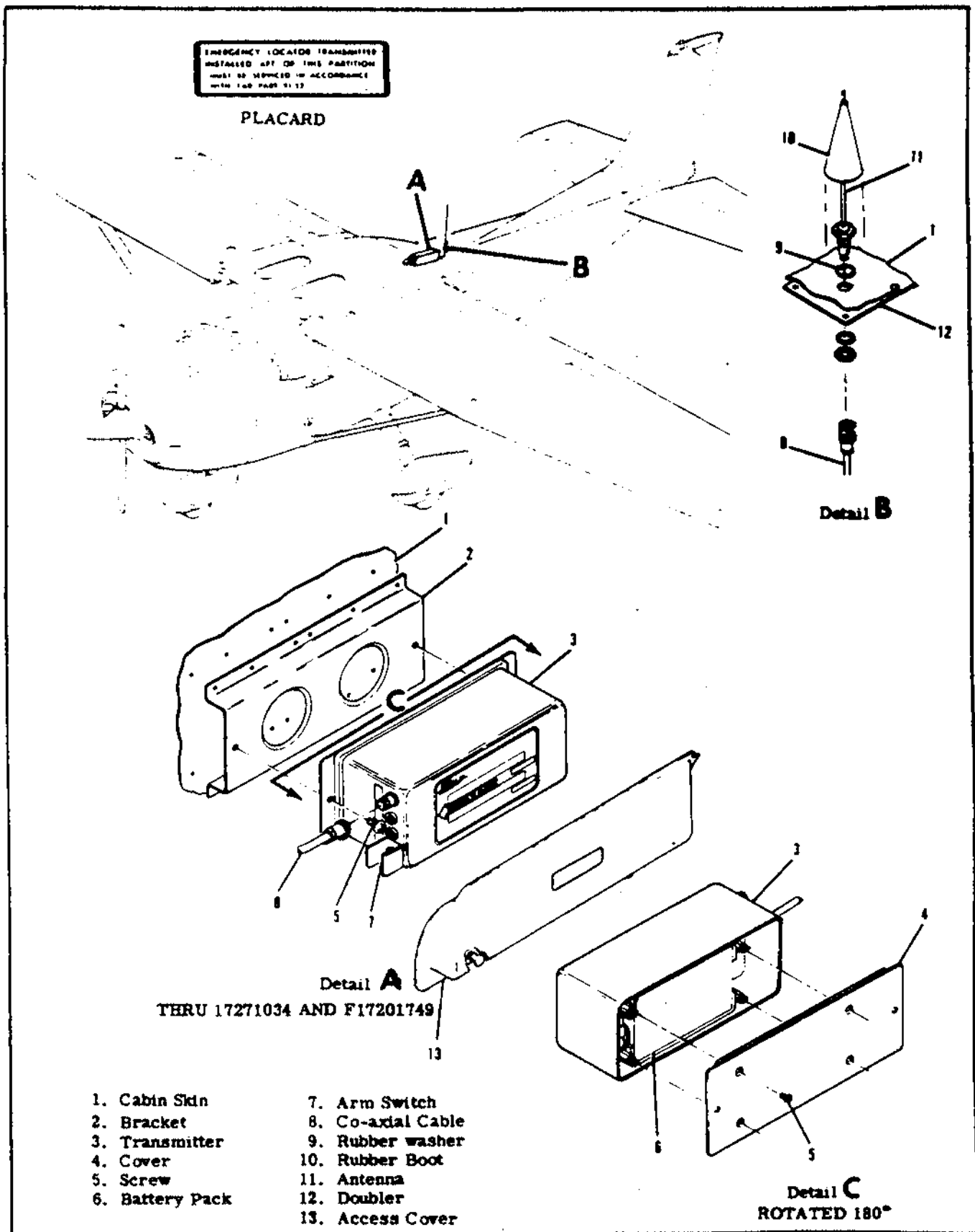


Figure 16-17. Emergency Locator Transmitter Installation (Sheet 1 of 3)

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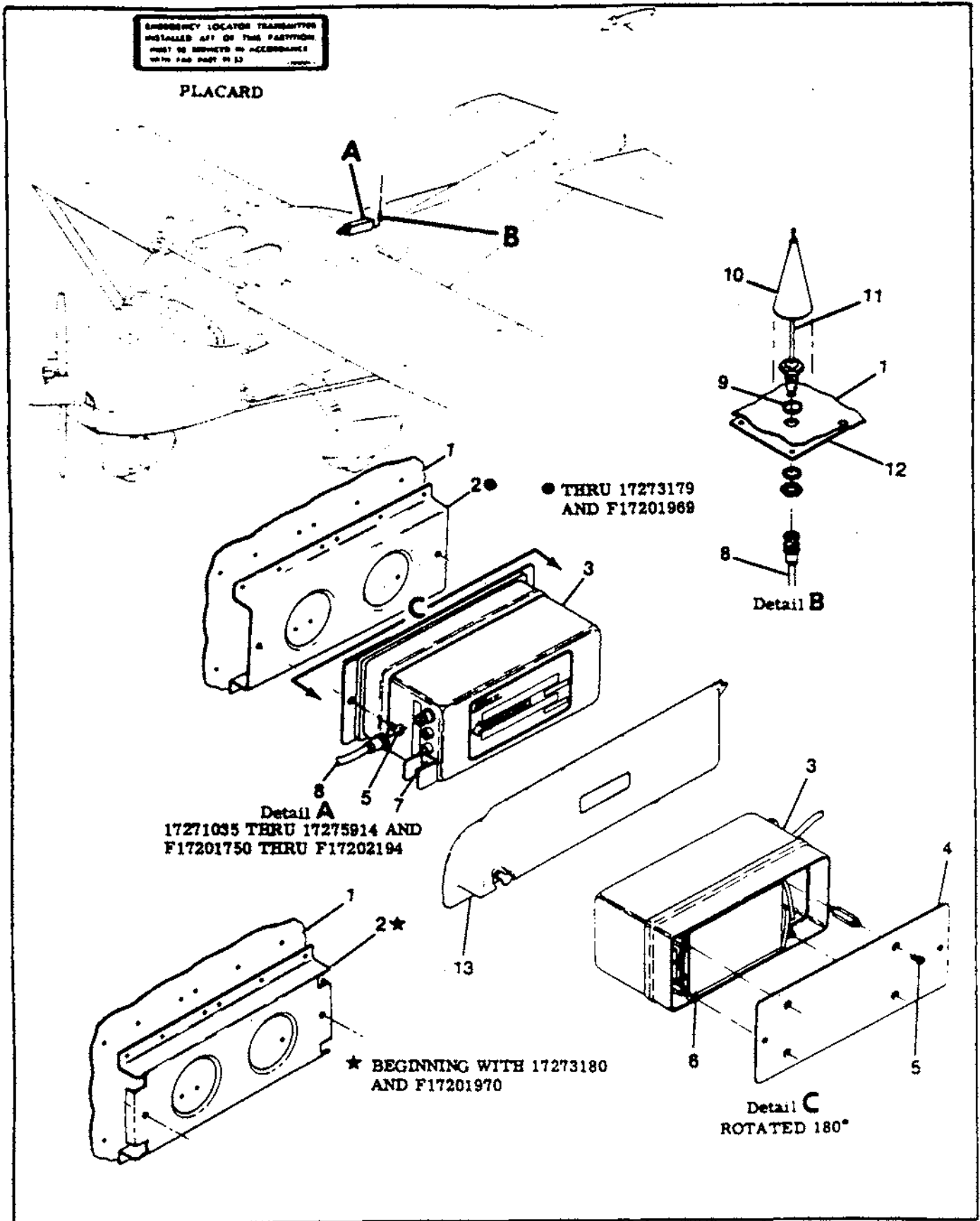
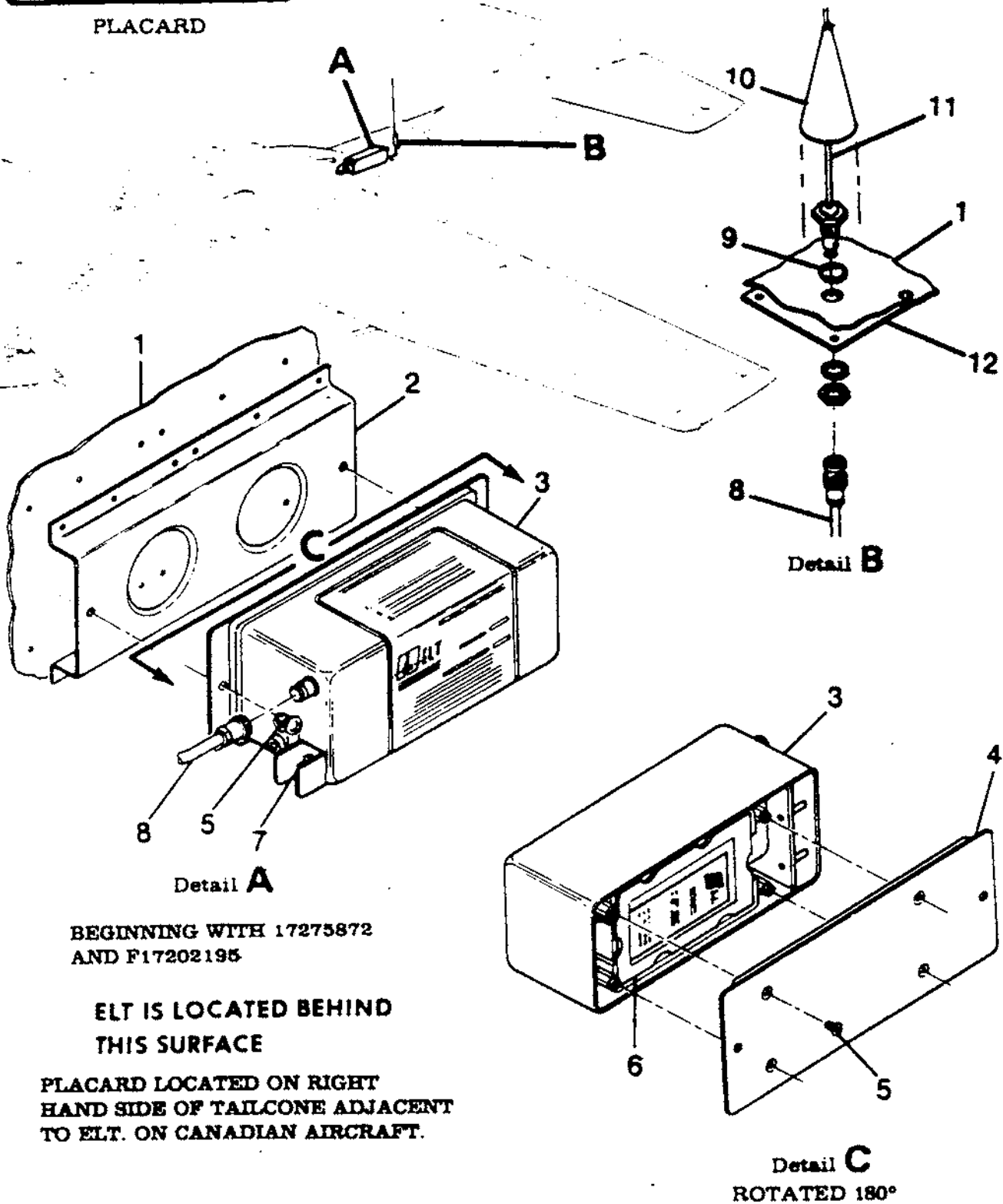


Figure 16-17. Emergency Locator Transmitter Installation (Sheet 2 of 3)

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EMERGENCY LOCATOR TRANSMITTER
INSTALLED AFT OF THIS PARTITION
MUST BE SERVICED IN ACCORDANCE
WITH FAR PART 91.33

PLACARD



BEGINNING WITH 17275872
AND F17202195

ELT IS LOCATED BEHIND
THIS SURFACE

PLACARD LOCATED ON RIGHT
HAND SIDE OF TAILCONE ADJACENT
TO ELT. ON CANADIAN AIRCRAFT.

Detail C
ROTATED 180°

Figure 16-17. Emergency Locator Transmitter Installation (Sheet 3 of 3)

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NOTE

Upon reinstallation of antenna, cement rubber boot (14) using RTV102, General Electric Co. or equivalent, to antenna whip only; do not apply adhesive to fuselage skin or damage to paint may result.

16-102. REMOVAL AND INSTALLATION OF BATTERY PACK. (See figure 16-18.)

NOTE

Transmitters equipped with the C589511-0105 or C589511-0106 battery-packs can only be replaced with a C589511-0114 after modification by SK185-20 has been completed.

CAUTION

Lithium battery-pack must be replaced with alkaline battery-packs per SK185-20.

CAUTION

Replacement battery-packs other than Dorne and Margolin (C589511-0114 or C589512-0107) battery-packs may seriously degrade operating life, signal strength and, in some cases, the mechanical configuration of the ELT.

- a. After the transmitter has been removed from aircraft in accordance with para. 16-100, place the transmitter switch in the OFF position.
- b. Remove the four screws attaching the cover to the case and then remove the cover to gain access to the battery-pack.
- c. Disconnect the battery-pack electrical connector and remove battery-pack.
- d. Place new battery-pack in the transmitter with four batteries as shown in the case in figure 16-18.
- e. Connect the electrical connector as shown in figure 16-18.

NOTE

Before installing the battery-pack, check to ensure that its voltage is 7.5 volts or greater.

- f. Replace the transmitter baseplate on the unit and pressing the baseplate and unit together attach baseplate with four nylok patch screws.
- g. Stamp the new replacement date on the outside of the ELT. The date should be noted on the switching nameplate on the side of the unit as well as on the instruction nameplate on top of the unit.

WARNING

The battery-pack has pressurized contents. Do not recharge, short circuit or dispose of in fire.

CAUTION

Be sure to enter the new battery-pack expiration date in the aircraft records. It is also recommended this date be placed in your ELT Owner's Manual for quick reference.

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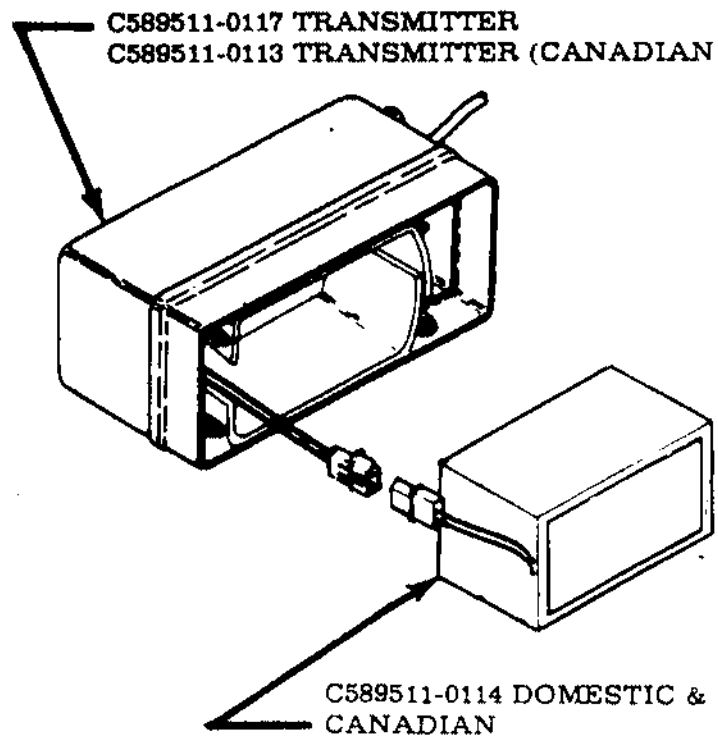
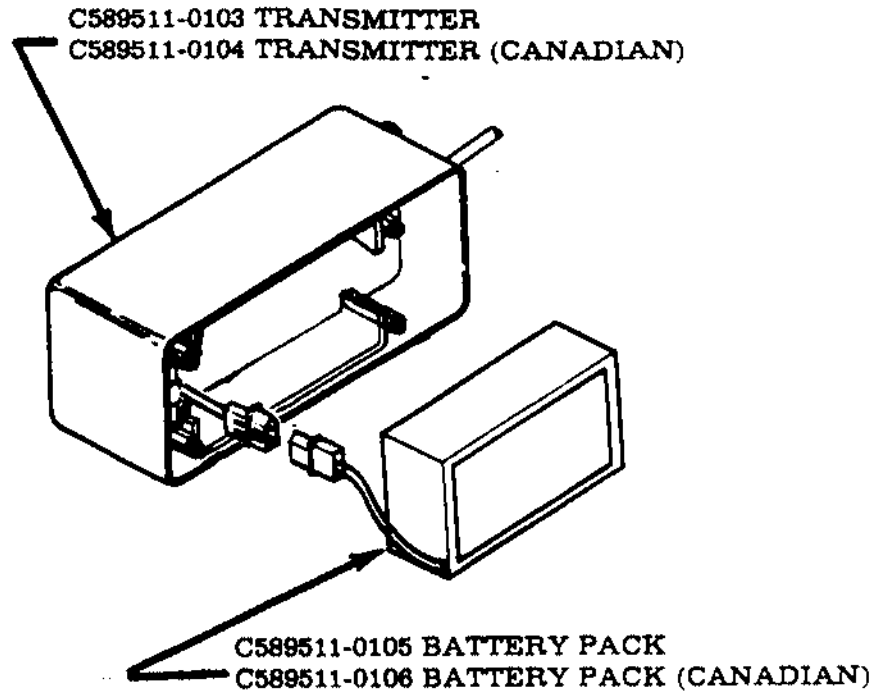


Figure 16-18. Battery Pack Installation

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- 16-103. TROUBLE SHOOTING. Should your Emergency Locating Transmitter fail the 100 Hours performance checks, it is possible to a limited degree to isolate the fault to a particular area of the equipment. In performing the following trouble shooting procedures to test peak effective radiated power, you will be able to determine if battery replacement is necessary or if your unit should be returned to your dealer for repair.

TROUBLE	PROBABLE CAUSE	REMEDY
*POWER LOW	Low battery voltage.	1. Set toggle switch to off. 2. Disconnect the battery-pack from the transmitter and connect a Simpson 260 model voltmeter and measure voltage. If the battery-pack transmitter is 7.5 volts or less, the battery-pack is below specification.
	Faulty transmitter.	3. If the battery-pack voltage meets the specifications in Step 2, the battery-pack is ok. If the battery is ok, check the transmitter as follows: a. Reconnect battery pack to the transmitter. b. By means of E. F. Johnson 105-0303-001 jackplugs and 3 inch maximum long leads, connect a Simpson Model 1223 ammeter to the jack. c. Set the toggle switch to AUTO and observe the ammeter current drain. If the current drain is in the 15-25 ma range, the transmitter or the co-axial cable is faulty.
	Faulty co-axial antenna cable.	4. Check co-axial antenna cable for high resistance joints. If this is found to be the case, the cable should be replaced.

*This test should be carried out with the co-axial cable provided with your unit.

ELECTRICAL LOAD ANALYSIS CHART

STANDARD EQUIPMENT (Running Load)		AMPS REQD				
	1977	1978	1979	1980	1981	1982
Battery Contactor	0.6	0.45	0.5	0.5	0.5	0.5
Fuel Indicators	0.4	0.11	0.1	0.1	0.1	0.1
Flashing Beacon Light	7.0	6.0	6.0	6.0	6.0	6.0
Instrument Lights	1.3	0.87	0.7	0.7	0.7	0.7
Position Lights	5.6	2.5	2.5	2.5	2.5	2.5
Turn Coordinator	0.8	0.28	0.3	0.3	0.3	0.3
OPTIONAL EQUIPMENT (Running Load)						
Altitude Blind Encoder		0.1	0.1	0.1	0.1	0.1
Strobe Lights		3.0	3.0	3.0	3.0	3.0
Cessna 300 ADF (Type R-546E)	1.0	1.0	1.0	1.0	1.0	1.0
Cessna 300 Nav/Com (100 Channel) (Type RT-308C)	1.5					
Cessna 300 Nav/Com (Type RT-385A)		1.0**	1.0**	1.0**	1.0**	1.0**
		2.25*	2.25*	2.25*	2.25*	2.25*
Cessna 300 HF Transceiver (PT10-A)	1.5	1.0**	1.0**	1.0**		
		9.0***	9.0***	9.0***	9.0***	
Cessna 300 Transceiver (Type RT-524A)	3.2					
Cessna 300 Transponder (Type RT-359A)	1.0	2.0	2.0	2.0	2.0	2.0
Cessna 400 Glide Slope (Type R-443B) (40 Channel)	0.4	0.5	0.5	0.5	0.5	
Cessna 400 Glide Slope (Type R-446B)						0.5
Cessna 400 Marker Beacon (Type R-402A/B)	0.3	0.1	0.1			0.1
Sunair SS Bank HF Transceiver (Type ASB-125)	5.0	2.5**	2.5**	2.5**	2.5**	2.5**
		7.5**	7.5**	7.5**	7.5**	7.5**
Cessna 300 A Navomatic (Type AF-395A)	2.0	2.5	2.5	2.5	2.5	2.5
Cessna 200 Navomatic (Type AF-295B)	2.0	2.5	2.5	2.5	2.5	2.5
Cessna EA-401A Encoding Altimeter	0.1	0.1	0.1	0.1	0.1	0.1
Cessna 400 Transponder (RT-459A)		2.0	2.0	2.0		2.0
Cessna 300 Nav/Com (720 Channel RT-328T)	1.5*	1.5*				
Narco 190 DME	2.9	2.9	2.9	2.9	2.9	
DME-451						1.2
Cessna 400 XPDR (ARC Type RT-459A)	2.0★	2.0	2.0	2.0	2.0	
Bendix GM-247A Marker Beacon	0.1★	1.0				
Pitot Heat		2.9	2.9	2.9	2.9	2.9
Post Lights		0.6	0.6	0.6	0.6	0.6
RNAV 511			1.0	1.0	1.0	
RNAV AN5-351						0.65
Interphone System				†	†	†
Avionics Fan					1.0	1.0
ITEMS NOT CONSIDERED AS PART OF RUNNING LOAD						
Cigarette Lighter	10.0	7.0	7.0	7.0	7.0	
Clock	†	†	†	†	†	†
Control Wheel Map Light	0.33	0.1	0.1	0.1	0.1	0.1
Courtesy & Dome Lights	2.5	1.2	1.2	1.2	1.2	1.2
Flap Motor	15.0	8.5	8.5	8.5	8.5	8.5
Landing and Taxi Lights (Single)	20.0	8.9	8.9	8.9	8.9	
Landing and Taxi Lights (Dual)	15.6	3.6 ea	3.6 ea	3.6 ea	3.6 ea	
Landing and Taxi Lights						9.0 ea
Map Light (Door Post)	0.33	0.2	0.2	0.2	0.2	0.2
Air Conditioner (High Blower)			6.7	6.7	6.7	6.7
Ventilation System Blower (High Speed)			5.0	5.0	5.0	5.0
† Negligible * 2.25 Transmitting *** 9.00 Transmitting ** Receiving						
★ Export Only ** 7.50 Transmitting * 6.00 Transmitting						

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ELECTRICAL LOAD ANALYSIS CHART

ALL MODELS

STANDARD EQUIPMENT (Running Load)	AMPS REQD			
	1983	1984	1985	1986
Battery Contactor	0.5	0.5	0.5	0.5
Fuel Indicators	0.1	0.1	0.1	0.1
Flashing Beacon Light	6.0	6.0	7.0	7.0
Instrument Lights	0.7	0.7	0.7	0.7
Position Lights	2.5	2.5	2.5	2.5
Turn Coordinator	0.3	0.3	0.3	0.3
OPTIONAL EQUIPMENT (Running Load)				
Altitude Blind Encoder	0.1	0.1	0.1	0.1
Strobe Lights	3.0	3.0	2.0	2.0
Cessna 300 ADF (Type R-546E)	1.0	1.0	1.0	1.0
Cessna 300 Nav/Com (RT-385A)	1.0**	1.0**	1.0**	1.0**
	2.25*	2.25*	2.25*	2.25*
Cessna 300 Transponder (Type RT-359A)	2.0	2.0	2.0	2.0
Cessna 400 Glide Slope (Type R-443B) (40-Channel)	0.5	0.5	0.5	0.5
Cessna 400 Marker Beacon (Type R-402A or R-402B) ...	0.1	0.1	0.1	0.1
Sunair SS Bank HF Transceiver				
(Type ASB-125)	2.5**	2.5**	2.5**	2.5**
	7.5*	7.5*	7.5*	7.5*
Cessna 300A Navomatic (Type AF-395A)	2.5	2.5	2.5	2.5
Cessna 200 Navomatic (Type AF-295B)	2.5	2.5	2.5	2.5
Cessna EA-401A Encoding Altimeter	0.1	0.1	0.1	0.1
Cessna 400 Transponder (Type RT-459A)	2.0	2.0	2.0	2.0
DME-451	1.2	1.2		
Pitot Heat	2.9	2.9	2.9	2.9
Post Lights	0.6	0.6	0.6	0.6
RNAV AN5-351	0.65	0.65		
Interphone System	†	†	†	†
Avionics Fan	0.6	0.6	1.0	1.0
ITEMS NOT CONSIDERED PART OF RUNNING LOAD				
Clock	†	†	†	†
Control Wheel Map Light	0.1	0.1	0.1	0.1
Courtesy & Dome Lights	1.2	1.2	1.2	1.2
Flap Motor	8.5	8.5	1.8	1.8
Landing and Taxi Lights	9.0 ea	9.0 ea	9.0 ea	9.0 ea
Map Light (Door Post)	0.2	0.2	0.2	0.2
Air Conditioner (High Blower)	6.7	6.7	6.7	6.7
Ventilation System Blower (High Speed)	5.0	5.0	5.0	5.0
Standby Vacuum System			13.0	13.0
Sperry RT-377A DME			0.3	0.3

† Negligible

** Receiving

* Transmitting

SECTION 18

STRUCTURAL REPAIR

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18-1. STRUCTURAL REPAIR.

18-2. **REPAIR CRITERIA.** Although this section outlines repair permissible on structure of the aircraft, the decision of whether to repair or replace a major unit of structure will be influenced by such factors as time and labor available, and by a comparison of labor costs with the price of replacement assemblies. Past experience indicates that replacement, in many cases, is less costly than major repair. Certainly, when the aircraft must be restored to its airworthy condition in a limited length of time, replacement is preferable. Restoration of a damaged aircraft to its original design strength, shape, and alignment involves careful evaluation of the damage, followed by exacting workmanship in performing the repairs. This section suggests the extent of structural repair practicable on the aircraft, and supplements Federal Aviation Regulation, Part 43. Consult the factory when in doubt about a repair not specifically mentioned here.

18-3. EQUIPMENT AND TOOLS.

18-4. **SUPPORT STANDS.** Padded, reinforced sawhorse or tripod type support stands, sturdy enough to support any assembly placed upon them, must be used to store a removed wing or tailcone. Plans for local fabrication of support stands are contained in figure 18-1. The fuselage assembly, from the tailcone to the firewall, must NOT be supported from the underside, since the skin bulkheads are not designed for this purpose. Adapt support stands to fasten to the wing attach points or landing gear attach points when supporting a fuselage.

18-5. **FUSELAGE REPAIR JIGS.** Whenever a repair is to be made which could affect structural alignment, suitable jigs must be used to assure correct alignment of major attach points, such as fuselage, firewall, wing and landing gear. These fuselage repair jigs are obtainable from the factory.

18-6. **WING JIGS.** These jigs serve as a holding fixture during extensive repair of a damaged wing, and locates the root rib, leading edge and tip rib of the wing. These jigs are also obtainable from the factory.

18-7. WING TWIST AND STABILIZER ANGLE-OF-INCIDENCE.

18-8. Wing twist (washout) and horizontal stabilizer angle of incidence are shown below. Stabilizers do not have twist. Wings have no twist from the root to the lift strut station. All twist in the wing panel occurs between this station and the tip rib. See figure 18-2 for wing twist measurement.

WING

Twist (Washout) 3° 00'

STABILIZER

Angle of Incidence -3° 30'

18-9. **REPAIR MATERIALS.** Thickness of a material on which a repair is to be made can easily be

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determined by measuring with a micrometer. In general, material used in Cessna aircraft covered in this manual is made from 2024 aluminum alloy, heat treated to a -T3, -T4, or -T42 condition. If the type of material cannot readily be determined, 2024-T3 may be used in making repairs, since the strength of -T3 is greater than -T4 or -T42 (-T4 and -T42 may be used interchangeably, but they may not be substituted for -T3). When necessary to form a part with a smaller bend radius than the standard cold bending radius for 2024-T4, use 2024-O and heat treat to 2024-T42 after forming. The repair material used in making a repair must equal the gauge of the material being replaced unless otherwise noted. It is often practical to cut repair pieces from service parts listed in the Parts Catalog. A few components (empennage tips, for example) are fabricated from thermo-formed plastic or glass-fiber constructed material.

18-10. WING.

- 18-11. **DESCRIPTION.** The standard wing assemblies are a semicantilever type, employing semimonocoque type of structure. Basically, the internal structure consists of built-up front and rear spar assemblies, a formed auxiliary spar assembly and formed sheet metal nose, intermediate, and trailing edge ribs. Stressed skin, riveted to the rib and spar structures, completes the rigid structure. Access openings (hand holes with removable cover plates) are located in the underside of the wing between the wing root and tip section. These openings afford access to aileron bellcranks, flap bellcranks, electrical wiring, strut attach fittings, control cables and pulleys, and control disconnect points. Beginning with 1981 Models, an optional fuel system installation employs a different wing assembly. These wings are sheet metal constructed, with a single main spar, two fuel spars, formed ribs and stringers.

The front fuel spar also serves as an auxiliary spar and is the forward wing attaching point. An inboard section forward of the main spar is sealed to form an integral fuel bay area. The main spar consists of milled spar caps attaching fittings joined by a web section. The aft fuel spar is a formed channel. The front fuel spar is a built-up assembly consisting of a formed channel, doubler, attach strap and support angle. Stressed skin, riveted to the ribs, spars and stringers, completes the wing structure. Access openings (hand holes with removable cover plates) are located in the underside of the wing between the wing root and tip section. These openings afford access to the flap and aileron bellcranks, flap drive pulleys, flap actuator in left wing, flap and aileron control cable disconnect points, fuel adapter plate, air scoop connectors and electrical wiring.

18-12. WING SKIN.

- 18-13. **NEGLIGIBLE DAMAGE.** Any smooth dents in the wing skin that are free from cracks, abrasions and sharp corners, which are not stress wrinkles and do not interfere with any internal structure or mechanism, may be considered as negligible damage in any area of the wing. On the optional fuel bay wing, outboard of wing station 65.125 in areas of low stress intensity, cracks, deep scratches or sharp dents, which after trimming or stop-drilling can be enclosed by a two-inch circle, can be considered negligible if the damaged area is at least one diameter of the enclosing circle away from all existing rivet lines and material edges. The area on the lower surface of the wing between the two stringers adjacent to the main spar is not considered low stress intensity. Stop-drilling is considered a temporary repair and a permanent repair must be made as soon as practicable.
- 18-14. **REPAIRABLE DAMAGE.** On a standard wing, Figure 18-4 outlines typical repair to be employed in patching skin. Before installing a patch, trim the damaged area to form a rectangular pattern, leaving at least one-half inch radius at each corner, and de-burr. The sides of the hole should lie span-wise or chord-wise. A circular patch may also be used. If the

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patch is in an area where flush rivets are used, make a flush patch type of repair; if in an area where flush rivets are not used, make an overlapping type of repair. Where optimum appearance and airflow are desired, the flush patch may be used. Careful workmanship will eliminate gaps at butt-joints; however, an epoxy type filler may be used at such joints. On the optional fuel bay wing, repairs must not be made to the upper or lower wing skin inboard of station 65.125 without factory approval. However, an entire skin may be replaced without factory approval. Refer to Section 1 for wing station locations. Figure 18-4 outlines typical repairs to be employed in patching skin. Before installing a patch, trim the damaged area to form a rectangular pattern, leaving at least one-half inch radius at each corner and de-burr. The sides of the hole should lie span-wise or chord-wise. A circular patch may also be used. If the patch is in a area where flush rivets are used, make a flush patch type of repair; if in an area where flush rivets are not used, make an overlapping type of repair. Where optimum appearance and airflow are desired, the flush patch may be used. Careful workmanship will eliminate gaps at butt-joints; however, an epoxy type filler may be used at such joints.

- 18-15. **DAMAGE NECESSITATING REPLACEMENT OF PARTS.** If a skin is badly damaged, repair must be made by replacing an entire skin panel, from one structural member to the next. Repair seams must be made to lie along structural members and each seam must be made exactly the same in regard to rivet size, spacing, and pattern as the manufactured seams at the edges of the original sheet. If the manufactured seams are different, the stronger must be copied. If the repair ends at a structural member where no seam is used, enough repair panel must be used to allow an extra row of staggered rivets, with sufficient edge margin, to be installed.
- 18-16. **WING STRINGERS.**
- 18-17. **NEGLIGIBLE DAMAGE.** Refer to paragraph 18-13.
- 18-18. **REPAIRABLE DAMAGE.** Figure 18-5 outlines a typical wing stringer repair. Two such repairs may be used to splice a new section of stringer material in position, without the filler material.
- 18-19. **DAMAGE NECESSITATING REPLACEMENT OF PARTS.** If a stringer is so badly damaged that more than one section must be spliced, replacement is recommended.
- 18-20. **WING AUXILIARY SPARS.**
- 18-21. **NEGLIGIBLE DAMAGE.** Refer to paragraph 18-13.
- 18-22. **REPAIRABLE DAMAGE.** Figure 18-8 illustrates a typical auxiliary spar repair.
- 18-23. **DAMAGE NECESSITATING REPLACEMENT OF PARTS.** If damage to an auxiliary spar would require a repair which could not be made between adjacent ribs, the auxiliary spar must be replaced.
- 18-24. **WING RIBS.**
- 18-25. **NEGLIGIBLE DAMAGE.** Refer to paragraph 18-13.
- 18-26. **REPAIRABLE DAMAGE.** Figure 18-6 illustrates a typical wing rib repair.
- 18-27. **DAMAGE NECESSITATING REPLACEMENT OF PARTS.** Leading and trailing edge ribs that are extensively damaged can be replaced. However, due to the necessity of unfastening an excessive amount of skin in order to replace the rib, they should be repaired if practicable.

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Center ribs, between the front and rear spar should always be repaired if practicable.

- 18-28. **WING SPARS.**
- 18-29. **NEGLIGIBLE DAMAGE.** Due to the stress which wing spars encounter, very little damage can be considered negligible. All cracks, stress wrinkles, deep scratches, and sharp dents must be repaired. Smooth dents, light scratches and abrasions may be considered negligible.
- 18-30. **REPAIRABLE DAMAGE.** Figure 18-7 illustrates typical spar repairs. It is often practical to cut repair pieces from service parts listed in the Parts Catalog. Service Kits are available for certain types of spar repairs.
- 18-31. **DAMAGE NECESSITATING REPLACEMENT OF PARTS.** Damage so extensive that repair is not practicable require replacement of a complete wing spar. Also refer to paragraph 18-2.
- 18-32. **AILERONS.**
- 18-33. **NEGLIGIBLE DAMAGE.** Refer to paragraph 18-13.
- 18-34. **REPAIRABLE DAMAGE.** The repair shown in figure 18-9 may be used to repair damage to aileron leading edge skins. Figure 18-4 may be used to repair damage to flat surfaces between corrugations; when damage area includes corrugations, see figure 18-3A. It is recommended that material used for repair be cut from spare parts of the same gauge and corrugation spacing. Following repair the aileron must be balanced. Refer to paragraph 18-36 and figure 18-3 for balancing the aileron. If damage would require a repair which could not be made between adjacent ribs, see the following paragraph.
- 18-35. **DAMAGE NECESSITATING REPLACEMENT OF PARTS.** If the damage would require a repair which could not be made between adjacent ribs, complete skin panels must be replaced. Ribs and spars may be repaired, but replacement is generally preferable. Where extensive damage has occurred, replacement of the aileron assembly is recommended. After repair and/or replacement, balance aileron in accordance with paragraph 18-36 and figure 18-3.
- 18-36. **AILERON BALANCING.** Following repair, replacement or painting, the aileron must be balanced. A flight control surface balancing fixture kit is available (P/N 5180002-1). See figure 18-3 for procedures pertaining to the use of this kit.
- 18-37. **WING FLAPS.**
- 18-38. **NEGLIGIBLE DAMAGE.** Refer to paragraph 18-13.
- 18-39. **REPAIRABLE DAMAGE.** Flap repairs should be similar to aileron repairs discussed in paragraph 18-34. A flap leading edge repair is shown in figure 18-10. If an overlapping patch is to be used, be sure it will not interfere with the wing during flap operation.
- 18-40. **DAMAGE NECESSITATING REPLACEMENT OF PARTS.** Flap repairs which require replacement of parts should be similar to aileron repairs discussed in paragraph 18-35. Since the flap is not considered a moveable control surface, no balancing is required.
- 18-41. **WING LEADING EDGE.**
- 18-42. **NEGLIGIBLE DAMAGE.** Refer to paragraph 18-13.

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- 18-43. **REPAIRABLE DAMAGE.** A typical leading edge skin repair is shown in figure 18-9. An epoxy-type filler may be used to fill gaps at butt-joints. To facilitate repair, extra access holes may be installed in the locations noted in figure 18-11. If the damage would require a repair which could not be made between adjacent ribs, refer to the following paragraph.
- 18-44. **DAMAGE NECESSITATING REPLACEMENT OF PARTS.** For extensive damage, complete leading edge skin panels must be replaced. To facilitate replacement, extra access holes may be installed in the locations noted in figure 18-11.
- 18-45. **ELEVATORS AND RUDDER.**
- 18-46. **NEGLIGIBLE DAMAGE.** Refer to paragraph 18-13. The exception to negligible damage on the elevator surfaces is the front spar, where a crack appearing in the web at the hinge fittings or in the structure which supports the overhanging balance weight is not considered negligible. Cracks in the overhanging tip rib, in the area at the front spar intersection with the web of the rib, also cannot be considered negligible.
- 18-47. **REPAIRABLE DAMAGE.** Skin patches illustrated in figure 18-4 may be used to repair skin damage between corrugations. For skin damage which includes corrugations, see figure 18-3A. Following repair, the elevator/rudder must be balanced. See figure 18-3 for balancing. If damage would require a repair which could not be made between adjacent ribs, see the following paragraph.
- 18-48. **DAMAGE NECESSITATING REPLACEMENT OF PARTS.** If the damaged area would require a repair which could not be made between adjacent ribs, complete skin panels must be replaced. Ribs and spars may be repaired, but replacement is generally preferable. Where extensive damage has occurred, replacement of the entire assembly is recommended. After repair and/or replacement, balance elevators and rudder in accordance with paragraph 18-49 and figure 18-3.
- 18-49. **ELEVATOR AND RUDDER BALANCING.** Following repair, replacement or painting, the elevators and rudder must be balanced. A flight control surface balancing fixture kit is available (P/N 5180002-1). See figure 18-3 for procedures pertaining to the use of this kit.
- 18-50. **FIN AND STABILIZER.**
- 18-51. **NEGLIGIBLE DAMAGE.** Refer to paragraph 18-13.
- 18-52. **REPAIRABLE DAMAGE.** Skin patches illustrated in figure 18-4 may be used to repair skin damage. Access to the dorsal area of the fin may be gained by removing the horizontal closing rib at the bottom of the fin. Access to the internal fin structure is best gained by removing skin attaching rivets on one side of the rear spar and ribs, and springing back the skin. Access to the stabilizer structure may be gained by removing skin attaching rivets on one side of the rear spar and ribs, and springing back the skin. If the damaged area would require a repair which could not be made between adjacent ribs, or a repair would be located in an area with compound curves, see the following paragraph.
- 18-53. **DAMAGE NECESSITATING REPLACEMENT OF PARTS.** If the damaged area would require a repair which could not be made between adjacent ribs, or the repair would be located in an area with compound curves, complete skin panels must be replaced. Ribs and spars may be repaired, but replacement is generally preferable. Where damage is extensive, replacement of the entire assembly is recommended.
- 18-54. **FUSELAGE.**

18-33A. CRACKS IN CORRUGATED AILERON SKINS (Continued from page 18-5)

1. It is permissible to stop drill crack(s) that originate at the trailing edge of the control surface provided the crack is not more than 2 inches in length.
2. Stop drill crack using a #30 (.128 inch) drill.
3. A crack may only be stop drilled once.

NOTE: A crack that passes through a trailing edge rivet and does not extend to the trailing edge of the skin may be stop drilled at both ends of the crack.

4. Any control surface that has a crack that progresses past a stop drilled hole shall be repaired. Refer to paragraphs 18-33, -34, and -35 as applicable for repair information.
5. A control surface that has any of the following conditions shall have a repair made as soon as practicable:
 - A. A crack that is longer than 2 inches.
 - B. A crack that does not originate from the trailing edge or a trailing edge rivet.
 - C. Cracks in more than six trailing edge rivet locations per skin.

Refer to paragraphs 18-33, -34, and -35 as applicable for repair information.

6. Affected control surfaces with corrugated skins and having a stop drilled crack that does not extend past the stop drilled hole, may remain in service without additional repair.

18-38A. CRACKS IN CORRUGATED FLAP SKINS (Continued from page 18-5)

1. It is permissible to stop drill crack(s) that originate at the trailing edge of the control surface provided the crack is not more than 2 inches in length.
2. Stop drill crack using a #30 (.128 inch) drill.
3. A crack may only be stop drilled once.

NOTE: A crack that passes through a trailing edge rivet and does not extend to the trailing edge of the skin may be stop drilled at both ends of the crack.

4. Any control surface that has a crack that progresses past a stop drilled hole shall be repaired. Refer to paragraphs 18-38, -39, and -40 as applicable for repair information.
5. A control surface that has any of the following conditions shall have a repair made as soon as practicable:
 - A. A crack that is longer than 2 inches.
 - B. A crack that does not originate from the trailing edge or a trailing edge rivet.
 - C. Cracks in more than six trailing edge rivet locations per skin.

Refer to paragraphs 18-38, -39, and -40 as applicable for repair information.

6. Affected control surfaces with corrugated skins and having a stop drilled crack that does not extend past the stop drilled hole, may remain in service without additional repair.

18-46A. CRACKS IN CORRUGATED ELEVATOR SKINS (Continued from page 18-6)

1. It is permissible to stop drill crack(s) that originate at the trailing edge of the control surface provided the crack is not more than 2 inches in length.
2. Stop drill crack using a #30 (.128 inch) drill.
3. A crack may only be stop drilled once.

NOTE: A crack that passes through a trailing edge rivet and does not extend to the trailing edge of the skin may be stop drilled at both ends of the crack.

4. Any control surface that has a crack that progresses past a stop drilled hole shall be repaired. Refer to paragraphs 18-46, -47, and -48 as applicable for repair information.
5. A control surface that has any of the following conditions shall have a repair made as soon as practicable:
 - A. A crack that is longer than 2 inches.
 - B. A crack that does not originate from the trailing edge or a trailing edge rivet.
 - C. Cracks in more than six trailing edge rivet locations per skin.

Refer to paragraphs 18-46, -47, and -48 as applicable for repair information.

6. Affected control surfaces with corrugated skins and having a stop drilled crack that does not extend past the stop drilled hole, may remain in service without additional repair.

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- 18-55. **DESCRIPTION.** The fuselage is of semimonocoque construction, consisting of formed bulkheads, longitudinal stringers, reinforcing channels, and skin panels.
- 18-56. **NEGLIGIBLE DAMAGE.** Refer to paragraph 18-13. Mild corrosion appearing upon alclad surfaces does not necessarily indicate incipient failure of the base metal. However, corrosion of all types must be carefully considered, and approved remedial action taken. Small cans appear in the skin structure of all metal aircraft. It is strongly recommended, however, that wrinkles which appear to have originated from other sources, or which do not follow the general appearance of the remainder of the skin panels, be thoroughly investigated. Except in the landing gear bulkhead areas, wrinkles occurring over stringers which disappear when the rivet pattern is removed, may be considered negligible. However, the stringer rivet holes may not align perfectly with the skin holes because of a permanent "set" in the stringer. If this is apparent, replacement of the stringer will usually restore the original strength characteristics of the area.

NOTE

Wrinkles occurring in the skin of the main landing gear bulkhead areas must not be considered negligible. The skin panel must be opened sufficiently to permit a thorough examination of the lower portion of the landing gear bulkhead and its tie-in structure.

Wrinkles occurring in open areas which disappear when the rivets at the edge of the sheet are removed or a wrinkle which is hand removable, may often be repaired by the addition of a 1/2 x 1/2 x .060 inch 2024-T4 extruded angle, riveted over the wrinkle and extended to within 1/16 to 1/8 inch of the nearest structural members. Rivet pattern should be identical to existing manufactured seam at edge of sheet. Negligible damage to stringers, formed skin flanges, bulkhead channels, and like parts is similar to that for the wing skin, given in paragraph 18-13.

- 18-57. **REPAIRABLE DAMAGE.** Fuselage skin repairs may be accomplished in the same manner as wing skin repairs outlined in paragraph 18-14. Stringers, formed skin flanges, bulkhead channels and similar parts may be repaired as shown in figure 18-5.
- 18-58. **DAMAGE NECESSITATING REPLACEMENT OF PARTS.** Fuselage skin major repairs may be accomplished in the same manner as the wing repairs outlined in paragraph 18-15. Damaged fittings must be replaced. Seat rails serve as structural parts of the fuselage and must be replaced if damaged. Refer to Section 3.
- 18-58A. **BONDED DOORS.**
- 18-58B. **REPAIRABLE DAMAGE.** Bonded doors may be repaired by the same methods used for riveted structure. Rivets are a satisfactory substitute for bonded seams on these assemblies. The strength of the bonded seams in doors may be replaced by a single 3/32, 2117-AD rivet per running inch of bond seam. The standard repair procedures outlined in AC43.13-1 are also applicable to bonded doors.
- 18-59. **BULKHEADS.**
- 18-60. **LANDING GEAR BULKHEADS.** Since these bulkheads are highly stressed members, irregularly formed to provide clearance for control cables, fuel lines, etc., the patch-type repairs will be, for the most part, impractical. Minor damage, consisting of small nicks or scratches, may be repaired by dressing out the damaged area, or by replacement of rivets.

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Any other damage must be repaired by replacing the landing gear support assembly as an aligned unit.

- 18-61. **REPAIR AFTER HARD LANDING.** Buckled skin or floorboards, and loose or sheared rivets in the area of the main gear support will give evidence of damage to the structure from an extremely hard landing. When such evidence is present, the entire support structure must be examined, and all support forgings must be checked for cracks, using a dye penetrant and proper magnification. Bulkheads in the damaged area must be checked for alignment, and deformation of the bulkhead webs must be determined with the aid of a straightedge. Damaged support structure, buckled floorboards and skins, and damaged or questionable forgings must be replaced.
- 18-62. **FIREWALL DAMAGE.** Firewall sheets may be repaired by removing the damaged material (MIL-S-5059) corrosion-resistant (18-8) steel, and splicing in a new section. The new portion must be lapped over the old material, sealed with Pro-Seal #700 (Coast Pro-Seal Co., Chemical Division, 2235 Beverly Blvd., Los Angeles, California), compound or equivalent, and secured with steel (MS20450) rivets. Patches, splices and joints should be repaired with steel rivets. Angles around the periphery of the firewall are secured with steel rivets, except where engine shock mount brackets are attached with aluminum (MS20470) rivets. The diagonal support angles on the upper firewall are secured with steel rivets. Nutplates are attached with aluminum rivets. The diagonal support angles on the lower firewall are secured with aluminum rivets.
- 18-63. **FASTENERS.** Fasteners used in the aircraft are generally solid aluminum rivets, blind rivets, and steel-threaded fasteners. Usage of each is primarily a function of the loads to be carried, accessibility, and frequency of removal. Rivets used in aircraft construction are usually fabricated from aluminum alloys. In special cases, monel, corrosion-resistant steel and mild steel, copper, and iron rivets are used.
- 18-63A. **RIVETS.** Standard solid-shank MS rivets are those generally used in aircraft construction. They are fabricated in the following head types: roundhead, flathead, countersunk head, and brazier head. Flathead rivets are generally used in the aircraft interior where head clearance is required. MS20426 countersunk head rivets are used on the exterior surfaces of the aircraft to minimize turbulent airflow. MS20470 brazier head rivets are used on the exterior surfaces of the aircraft where strength requirements necessitate a stronger rivet head than that of the countersunk head rivet. Both the brazier head and the countersunk head rivets are used on the exterior of the aircraft where head clearance is required. Hi-shear rivets are special, patented rivets having a hi-shear strength equivalent to that of standard AN bolts. They are used in special cases in locations where hi-shear loads are present, such as in spars, wings, and in heavy bulkhead ribs. This rivet consists of a cadmium-plated pin of alloy steel. Some have a collar of aluminum alloy. Some of these rivets can be readily identified by the presence of the attached collar in place of the formed head on standard rivets. Blind rivets are used, where strength requirements permit, where one side of the structure is inaccessible, making it impossible or impractical to drive standard solid-shank rivets.
- 18-63B. **REPLACEMENT OF HI-SHEAR RIVETS.** Replacement of hi-shear rivets with close-tolerance bolts or other commercial fasteners of equivalent strength properties is permissible. Holes must not be elongated, and the hi-shear substitute must be a smooth, push-fit. Field replacement of main landing gear forgings on bulkheads may be accomplished by using the following fasteners.
- NAS464P-* bolt, MS21042-* nut and AN960-* washer in place of Hi-shear rivets for forgings with machined flat surfaces around attachment holes.

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- b. NAS464P-* bolt, ESNA2935-* mating base washer and ESNA RM52LH2935-* self-aligning nut for forgings (with draft angle of up to a maximum of 8°) without machined flat surfaces around attachment holes.

*Dash numbers to be determined according to the size of the holes and the grip lengths required. Bolt grip length should be chosen so that no threads remain in the bearing area.

18-63C. SUBSTITUTION OF RIVETS.

- a. Solid-shank rivets (MS20426AD and MS20470AD). When placing rivets in installations which require raised head rivets, it is desirable to use rivets identical to the type of rivet removed. Countersunk-head rivets (MS20426) are to be replaced by rivets of the same type and degree of countersink. When rivet holes become enlarged, deformed, or otherwise damaged, use the next larger size rivet as a replacement. Replacement shall not be made with rivets of lower strength material.
- b. Hi-shear Rivets. When hi-shear rivets are not available, replacement of sizes 3/16-inch or greater rivets shall be made with bolts of equal or greater strength than the rivet being replaced, and with self-locking nuts of the same diameter.
- c. The following pages contain approved solid-shank and hi-shear rivet substitutions.

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Replace	In thickness (or thicker)	With
MS20470AD3	.025 .020	NAS1398B4, NAS1398D4 NAS1738B4, NAS1738D4, NAS1768D4, CR3213-4, CR3243-4
MS20470AD4	.050 .040 .032 .025	NAS1398B4, NAS1398D4 NAS1398B5, NAS1398D5, NAS1738B4, NAS1738E4, NAS1768D4, CR3213-4 NAS1738B5, NAS1738E5, NAS1768D5, CR3213-5, CR3243-4 CR3243-5
MS20470AD5	.063 .050 .040 .032	NAS1398B5, NAS1398D5 NAS1398B6, NAS1398D6, NAS1398B5, NAS1738E5, CR3213-5 NAS1738B6, NAS1738E6, NAS1768D5, CR3213-6, CR3243-5 CR3243-6
MS20470AD6	.080 .071 .063 .050	NAS1398B6 NAS1398D6 NAS1738B6, NAS1738D6, NAS1768D6, CR3213-6 CR3243-6
MS20426AD3 (Countersunk) (See Note 1)	.063 .040 .025	NAS1399B4, NAS1399D4 NAS1769D4, CR3212-4 NAS1769B4, NAS1739E4, CR3242-4
MS20426AD4 (Countersunk)	.080 .063 .050 .040	NAS1399B4, NAS1399D4 NAS1739B4, NAS1739D4, CR3212-4 NAS1769D4 CR3242-4
(See Note 1)	.050 .040 .032	CR3212-5 NAS1739B5, NAS1739D5, NAS1769D4 CR3242-5
MS20426AD4 (Dimpled)	.063	NAS1739B4, NAS1739D4

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Replace	In thickness (or thicker)	With
MS20426AD5 (Countersunk)	.090	NAS1399B5, NAS1399D5
	.080	CR3212-5
	.071	NAS1739B5, NAS1739E5
	.063	NAS1769D5
	.050	CR3242-5
(See Note 1)	.063	NAS1739B6, NAS1739D6, NAS1769D6, CR3212-6
	.040	CR3242-6
	.032	AN509-10 Screw with MS20365 Nut
MS20426AD5 (Dimpled)	.071	NAS1739B5, NAS1739D5
MS20426AD6 (Countersunk)	.090	NAS1739B6, NAS1739D6, CR3212-6
	.071	NAS1769D6
	.063	CR3242-6
	.032	AN509-10 Screw with MS20365 Nut
MS20426AD6 (Dimpled)	.090	NAS1739B6, NAS1739D6
	.032	AN509-10 Screw with MS20365 Nut

NOTE 1: Rework required. Countersink oversize to accommodate oversize rivet.

NOTE 2: Do not use blind rivets in high vibration areas or to pull heavy sheets or extrusions together. High vibration areas include the nacelle or engine compartment including the fire-wall. Heavy sheets or extrusions include spar caps.

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REPLACE		DIAMETER	WITH	
Fastener	Collar		Fastener	Collar
• NAS178	NAS179	(See Note 1) (See Note 1) (See Note 1) (See Notes 1 and 2) (See Note 1) (See Note 1)	• NAS1054 • NAS14XX • NAS529 ★ NAS1446 ★ NAS7034 □ NAS464 □ NAS1103 □ NAS1303 □ NAS6203 □ AN173	NAS179, NAS528 NAS1080C, NAS1080E, NAS1080G NAS524A NAS1080C, NAS1080A6 NAS1080K AN364, MS20364, MS21042 AN305, MS20305, MS21044, MS21045
• NAS1054	NAS179, NAS528	(See Note 2)	• NAS14XX • NAS529 ★ NAS1446 ★ NAS7034 □ NAS464 □ NAS1103 □ NAS1305 □ NAS6203	NAS1080C, NAS1080E NAS524A NAS1080C, NAS1080A6 NAS1080K AN364, MS20304, MS21042
• NAS14XX	NAS1080C NAS1080E NAS1080G		• NAS529 ★ NAS1446 ★ NAS7034 □ NAS464 □ NAS1103 □ NAS1303 □ NAS6203	NAS524A NAS1080C, NAS1080A6 NAS1080K AN364, MS20364, MS21042
• NAS529	NAS524A	(See Note 3)	□ NAS1446	NAS1080C, NAS1080A6

NOTE 1: See appropriate tables for nominal diameters available.

NOTE 2: Available in oversize for repair of elongated holes. Ream holes to provide a .001 inch interference fit.

NOTE 3: NAS1446 oversize only permitted as a replacement for NAS529.

• Steel shank fastener designed for drive-on collars.

★ Steel shank fastener designed for squeeze-on collars. Installation requires sufficient space for the tool and extended shank of the fastener.

□ Threaded fastener.

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18-64. ENGINE MOUNT.

18-65. **DESCRIPTION.** The "dynafocal" type engine mount is constructed of 4130 chrome-molybdenum steel tubing. A truss structure, fastened to the firewall at four points, provides a mount for the nose landing gear as well as the engine. The engine is attached radially to the four mounting lugs by Lord type, bonded sandwich mounts.

18-66. **GENERAL CONSIDERATIONS.** All welding on the engine mount must be of the highest quality since the tendency of vibration is to accentuate any minor defect present and cause fatigue cracks. Engine mount members are preferably repaired by using a larger diameter replacement tube, telescoped over the stub of the original member using fishmouth and rosette type welds. However, reinforced 30-degree scarf welds in place of the fishmouth welds are considered satisfactory for engine mount repair work. Refer to Section 19 for engine mount painting.

18-67. **ENGINE MOUNT RADIAL SUPPORT DAMAGE.** Minor damage such as a crack adjacent to an engine attaching lug may be repaired by rewelding the support tube and extending a gusset past the damaged area. Extensively damaged parts must be replaced.

18-68. **DAMAGE INVOLVING ENGINE MOUNTING LUGS AND ENGINE MOUNT TO FUSELAGE ATTACHING FITTINGS.** Engine mounting lugs and engine mount-to-fuselage attaching fittings should not be repaired but must be replaced.

18-69. **BAFFLES.** Baffles ordinarily require replacement if damaged or cracked. However, small plate reinforcements riveted to the baffle will often prove satisfactory both to the strength and cooling requirements of the unit.

18-70. ENGINE COWLING.

18-71. **REPAIR OF COWLING SKINS.** If extensively damaged, complete sections of cowlings must be replaced. Standard insert-type skin patches, however, may be used if repair parts are formed to fit. Small cracks may be stop-drilled and dents straightened if they are reinforced on the inner side with a doubler of the same material. Bonded cowlings may be repaired by the same methods used for riveted structure. Rivets are a satisfactory substitute for bonded seams on these assemblies. The strength of the bonded seams in cowlings may be replaced by a single 3/32, 2117-AD rivet per running inch of bond seam. The standard repair procedures outlined in AC43.13-1 are also applicable to cowlings.

18-72. **REPAIR OF REINFORCEMENT ANGLES.** Cowl reinforcement angles, if damaged, must be replaced. Due to their small size, they are easier to replace than to repair.

18-73. **REPAIR OF GLASS-FIBER CONSTRUCTED COMPONENTS.** Glass-fiber constructed components on the aircraft may be repaired as stipulated in instructions furnished in Service Kit SK182-12. Observe the resin manufacturer's recommendations concerning mixing and application of the resin. Epoxy resins are preferable for making repairs, since epoxy compounds are usually more stable and predictable than polyester and, in addition, give better adhesion. In addition, repair kits are also available for the repair of cracks in ABS, PBC, PVPC, graphite, and fiberglass material. These kits, Part No. 51543 thru 51548, are available from the Cessna Supply Division.

18-74. CORROSION AND CORROSION CONTROL.

NOTE

For information on corrosion and corrosion control for aircraft, refer to FAA Advisory Circular AC43-4.

MODEL 172 SERIES SERVICE MANUAL

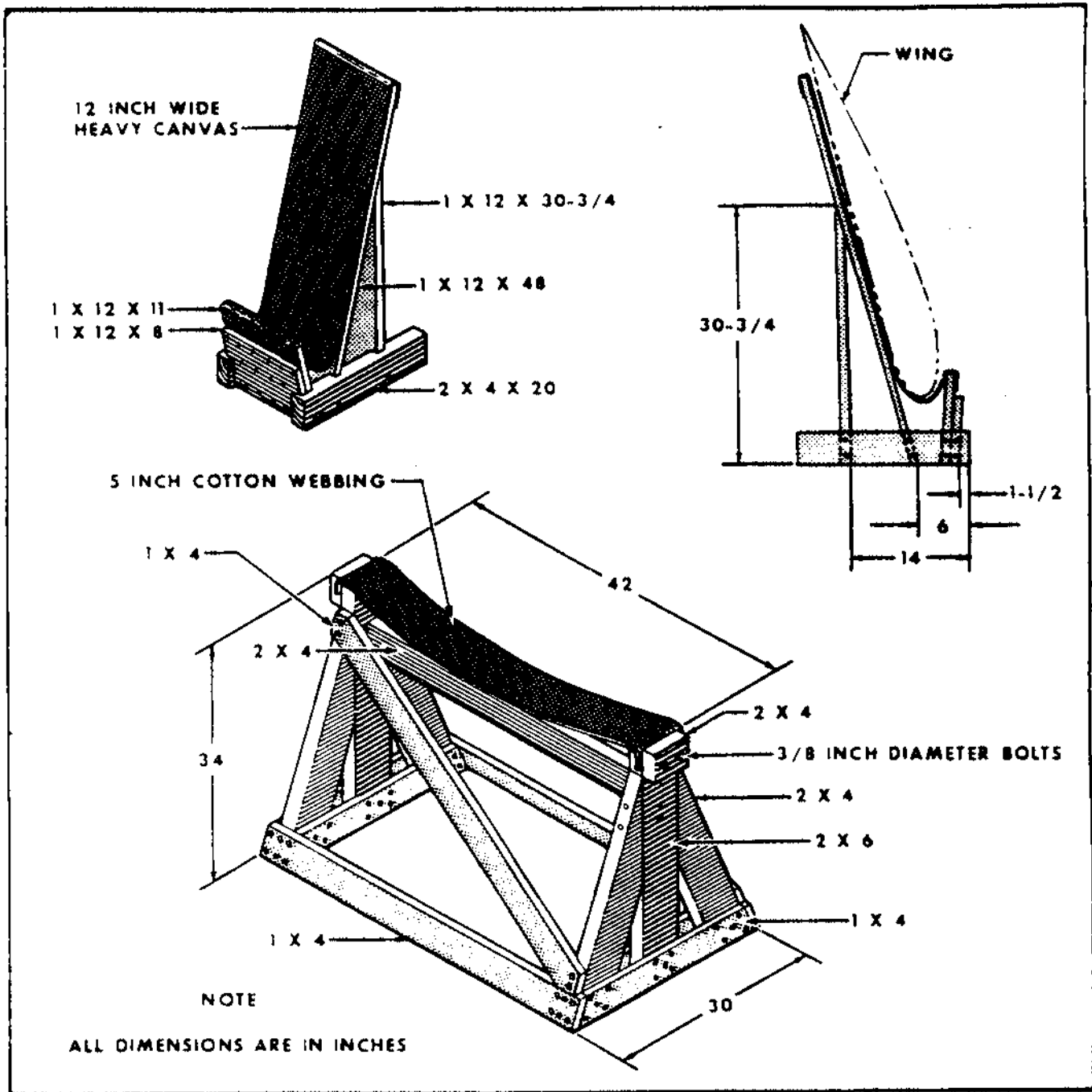
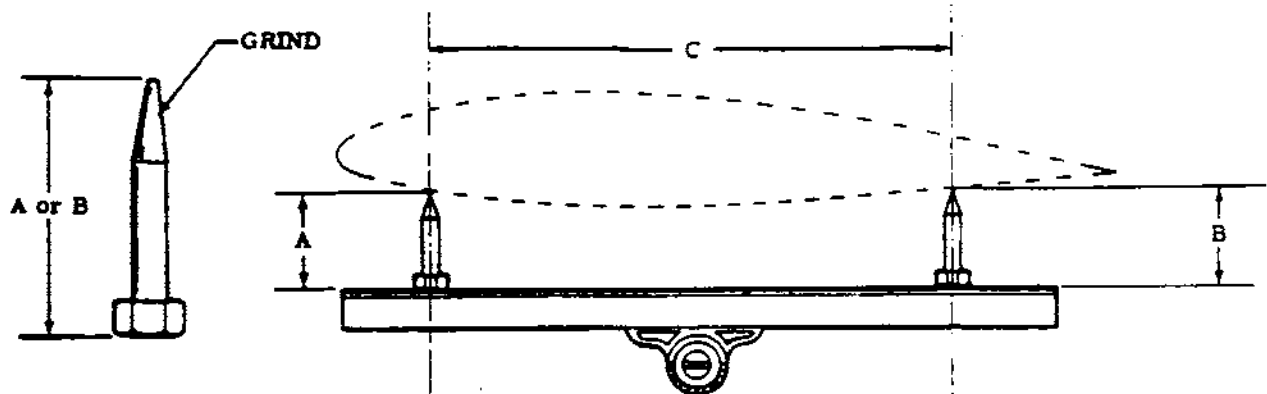


Figure 18-1. Wing and Fuselage Support Stands

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A	B	C	WING STATION
2.00	1.00	29.50	39.00
2.00	1.00	29.50	100.50
.45	1.00	24.00	208.00

ALL WING TWIST OCCURS BETWEEN STA. 100.50
AND STA. 208.00.
(Refer to paragraph 18-7 for angle of incidence).

MEASURING WING TWIST

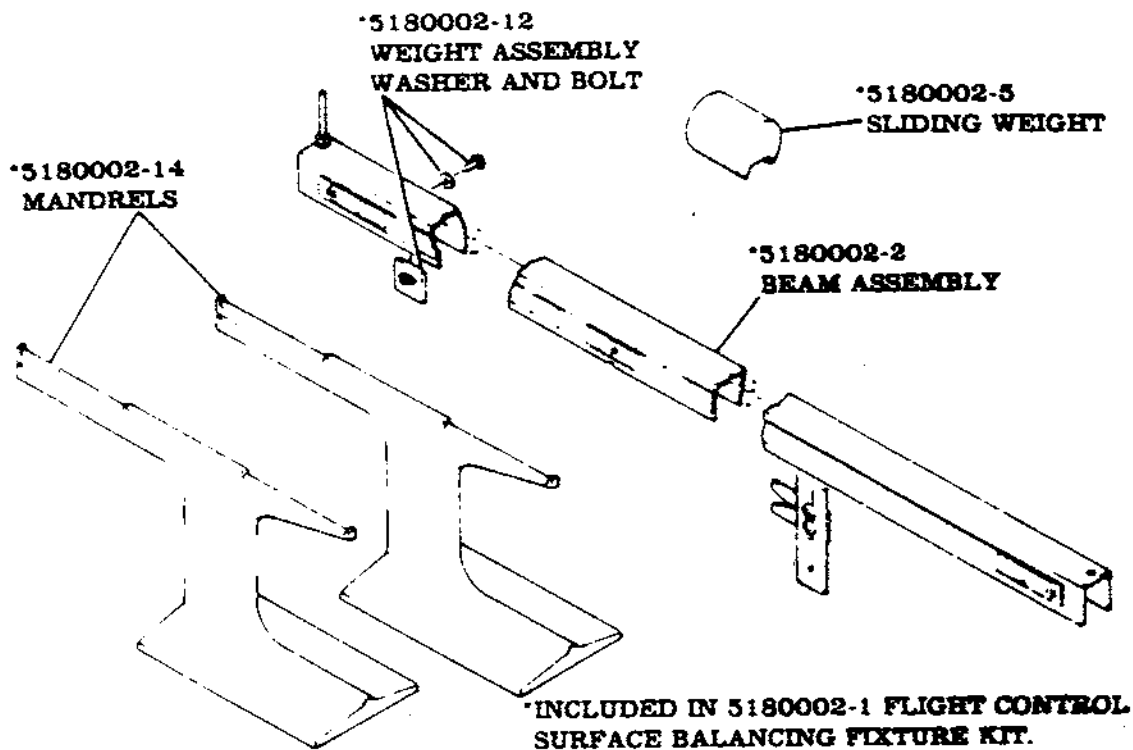
If damage has occurred to a wing, it is advisable to check the twist. The following method can be used with a minimum of equipment, which includes a straightedge (32" minimum length of angle, or equivalent), three modified bolts for a specific wing, and a protractor head with level.

1. Check chart for applicable dimension for bolt length (A or B).
2. Grind bolt shanks to a rounded point as illustrated, checking length periodically.
3. Tape two bolts to straightedge according to dimension C.
4. Locate inboard wing station to be checked and make a pencil mark approximately one-half inch aft of the lateral row of rivets in the wing leading edge spar flange.
5. Holding straightedge parallel to wing station (staying as clear as possible from "beans", place longer bolt on pencil mark and set protractor head against lower edge of straightedge
6. Set bubble in level to center and lock protractor to hold this reading.
7. Omitting step 6, repeat procedure for each wing station, using dimensions specified in chart. Check to see that protractor bubble is still centered.
8. Proper twist is present in wing if protractor readings are the same (parallel). Forward or aft bolt may be lowered from wing .10 inch maximum to attain parallelism.

Figure 18-2. Checking Wing Twist

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FLIGHT CONTROL SURFACE BALANCING FIXTURE KIT (PART NUMBER 5180002-1)



GENERAL NOTES

1. Balance control surfaces in a draft-free area.
2. Place hinge bolts through control surface hinges and position on knife edge balancing mandrels. Be sure hinge bolt shank rests on knife edge.
3. Make sure all control surfaces are in their approved flight configurations: painted (if applicable), trim tabs installed, all foreign matter removed from inside of control surface, elevator trim tab push-pull rod installed and all tips installed.
4. Place balancing mandrels on a table or other suitable flat surface.
5. Adjust trailing edge support to fit control surface being balanced while center of balancing beam is directly over hinge line. Remove balancing beam and balance the beam itself by moving the adjustable weight (fastened by bolt and washer). Fine balance may be accomplished by use of washers at long screw on end of beam.
6. When positioning balancing beam on control surface, avoid rivets to provide a smooth surface for the beam and keep the beam 90° to the hinge line of the control surface.

Figure 18-3. Control Surface Balancing (Sheet 1 of 5)

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7. Paint is a considerable weight factor. In order to keep balance weight to a minimum, it is recommended that existing paint be removed before adding paint to a control surface. Increase in balance weight will also be limited by the amount of space available and clearance with adjacent parts. Good workmanship and standard repair practices should not result in unreasonable balance weight.
8. The approximate amount of weight needed may be determined by taping loose weight at the balance weight area.
9. Lighten balance weight by drilling off part of weight.
10. Make balance weight heavier by fusing bar stock solder to weight after removal from control surface. The ailerons should have balance weight increased by ordering additional weight, listed in applicable Parts Catalog and installing next to existing inboard weight the minimum length necessary for correct balance.

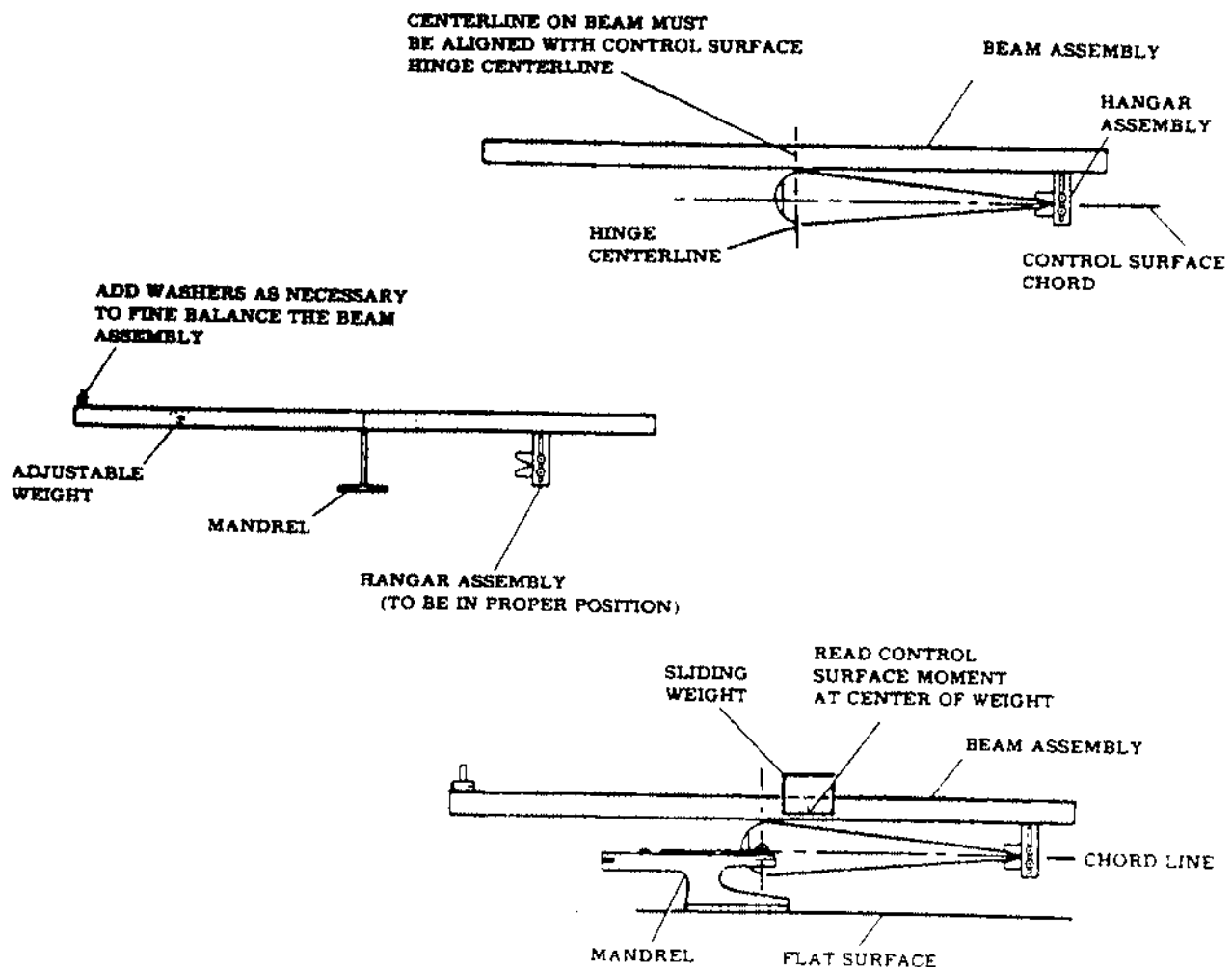


Figure 18-3. Control Surface Balancing (Sheet 2 of 5)

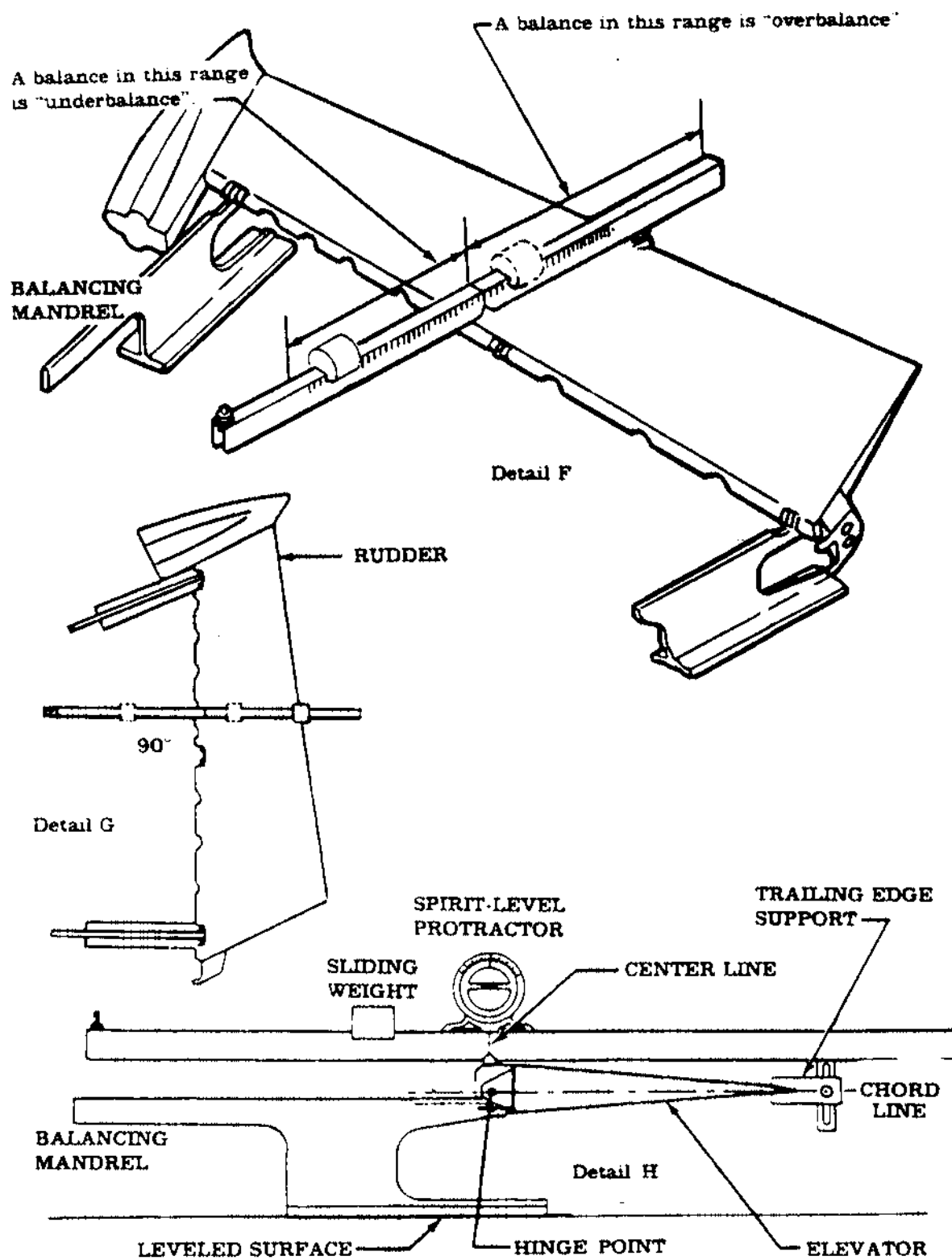


Figure 18-3. Control Surface Balancing (Sheet 3 of 5)

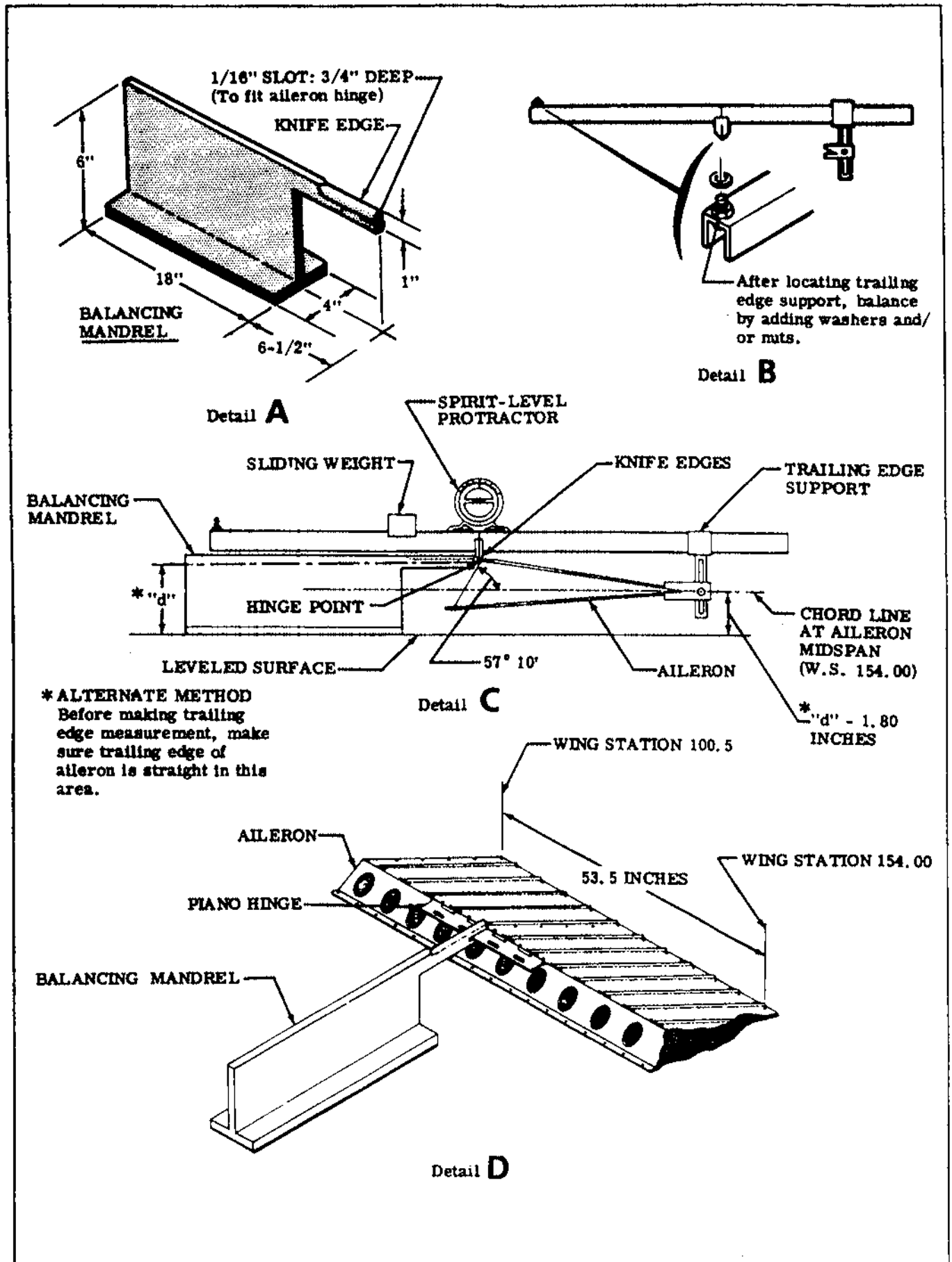


Figure 18-3. Control Surface Balancing (Sheet 4 of 5)

MODEL 172 SERIES SERVICE MANUAL

CONTROL SURFACE BALANCE REQUIREMENTS

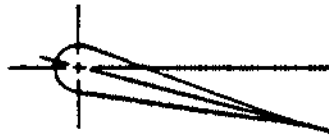
NOTE

Balance limits for control surfaces are expressed for "Approved Flight" configuration. "Approved Flight" configuration is that condition of the control surface as prepared for flight of the airplane whether it be painted or unpainted.

"Approved Flight" limits must never be exceeded when the surface is in its final configuration for flight.

DEFINITIONS:

UNDERBALANCE is defined as the condition that exists when surface is trailing edge heavy and is defined by a symbol (+). If the balance beam sliding weight must be on the leading edge side of the hinge line (to balance the control surface), the control surface is considered to be underbalanced.



OVERBALANCE is defined as the condition that exists when surface is leading edge heavy and is defined by a symbol (-). If the balance beam sliding weight must be on the trailing edge side of the hinge line (to balance the control surface), the control surface is considered to be overbalanced.



CONTROL SURFACE	APPROVED FLIGHT CONFIGURATION BALANCE LIMITS (Inch-Pounds)
AILERON	0.0 to + 11.31
RUDDER	0.0 to + 9.0
RIGHT ELEVATOR	0.0 to + 24.5
LEFT ELEVATOR	0.0 to + 18.5

Figure 18-3. Control Surface Balancing (Sheet 5 of 5)

MODEL 172 SERIES SERVICE MANUAL

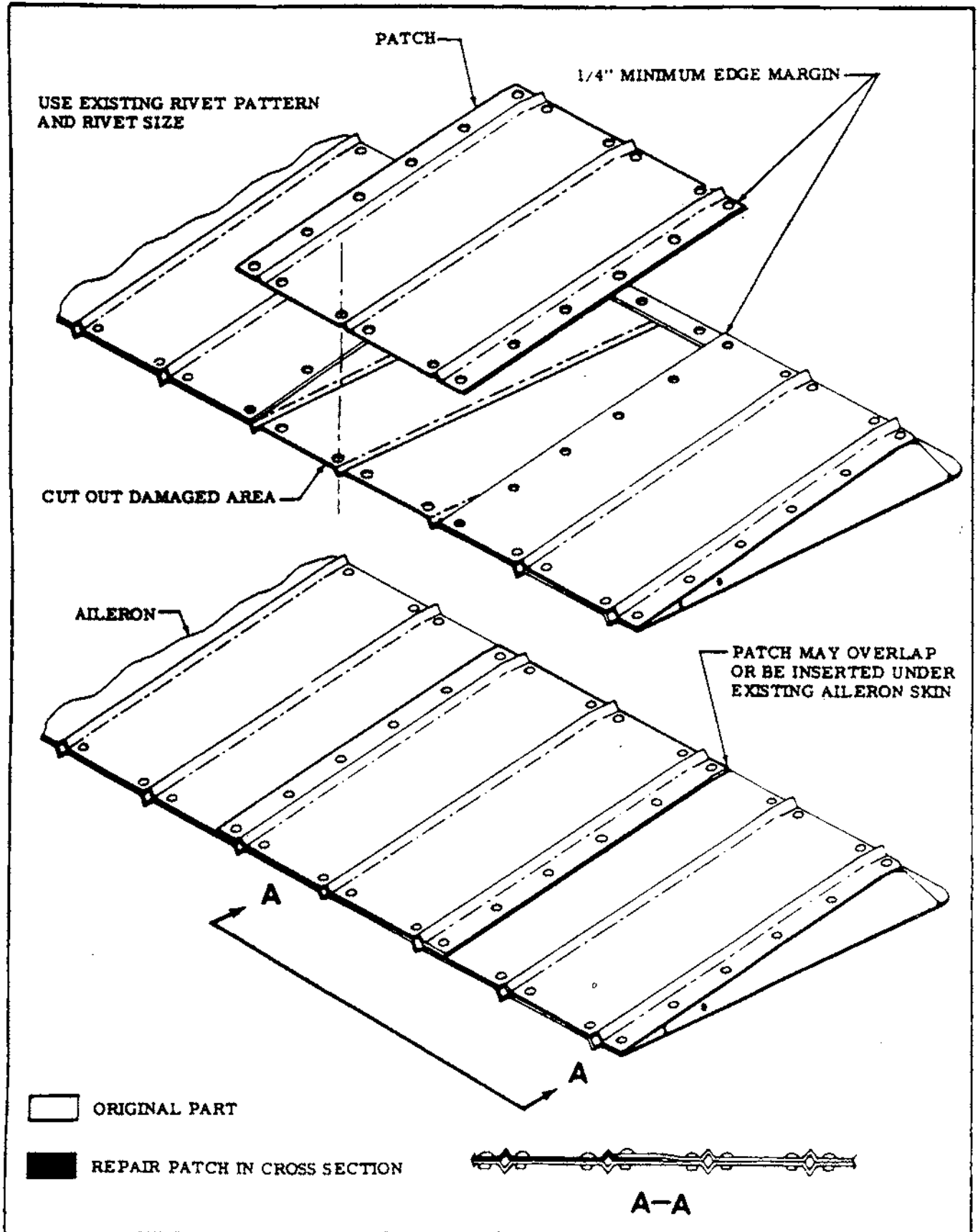


Figure 18-3A. Corrugated Skin Repair

MODEL 172 SERIES SERVICE MANUAL

PATCHES AND DOUBLERS — 2024-T3 ALCLAD

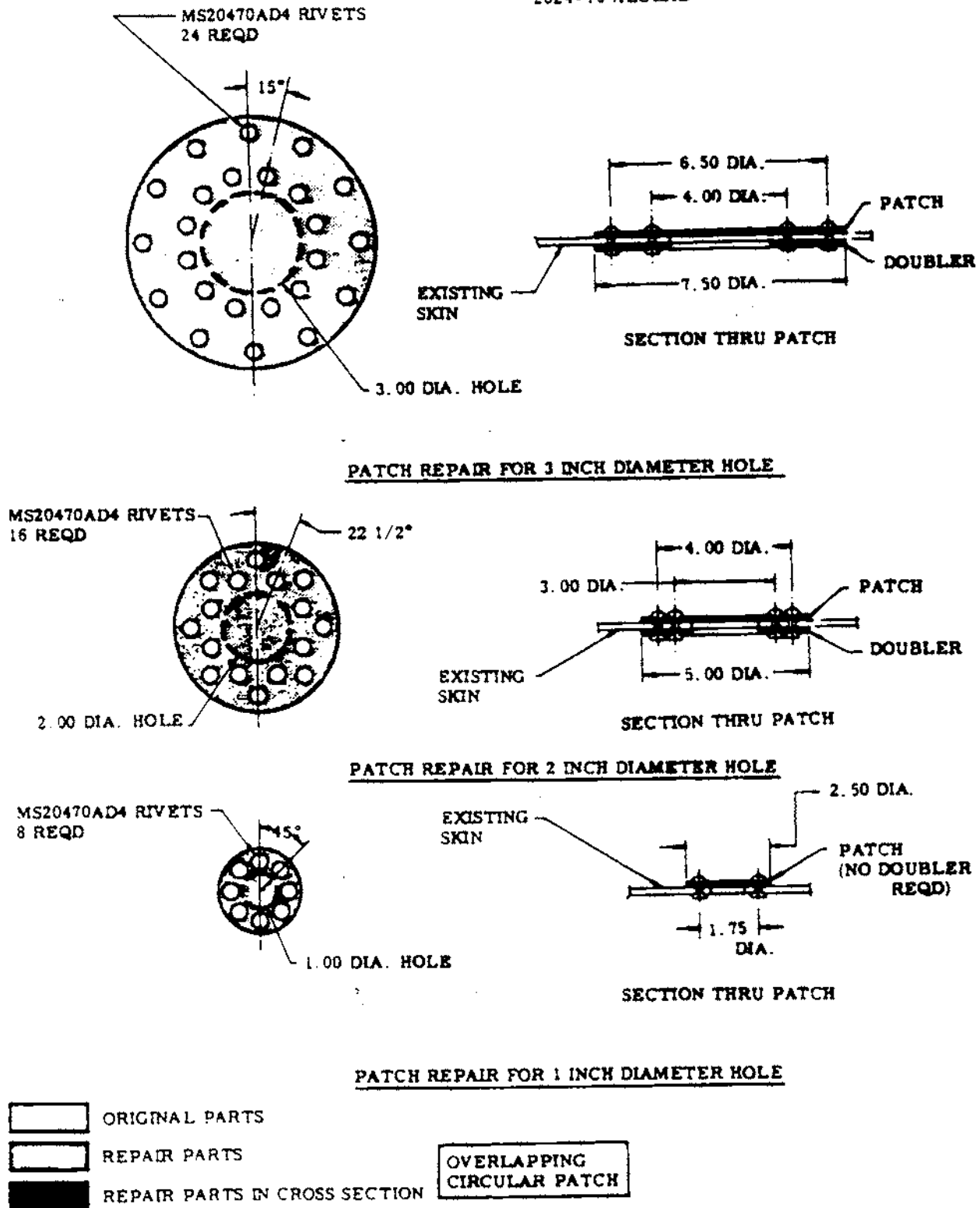
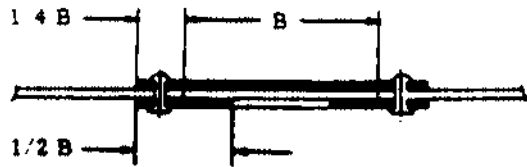


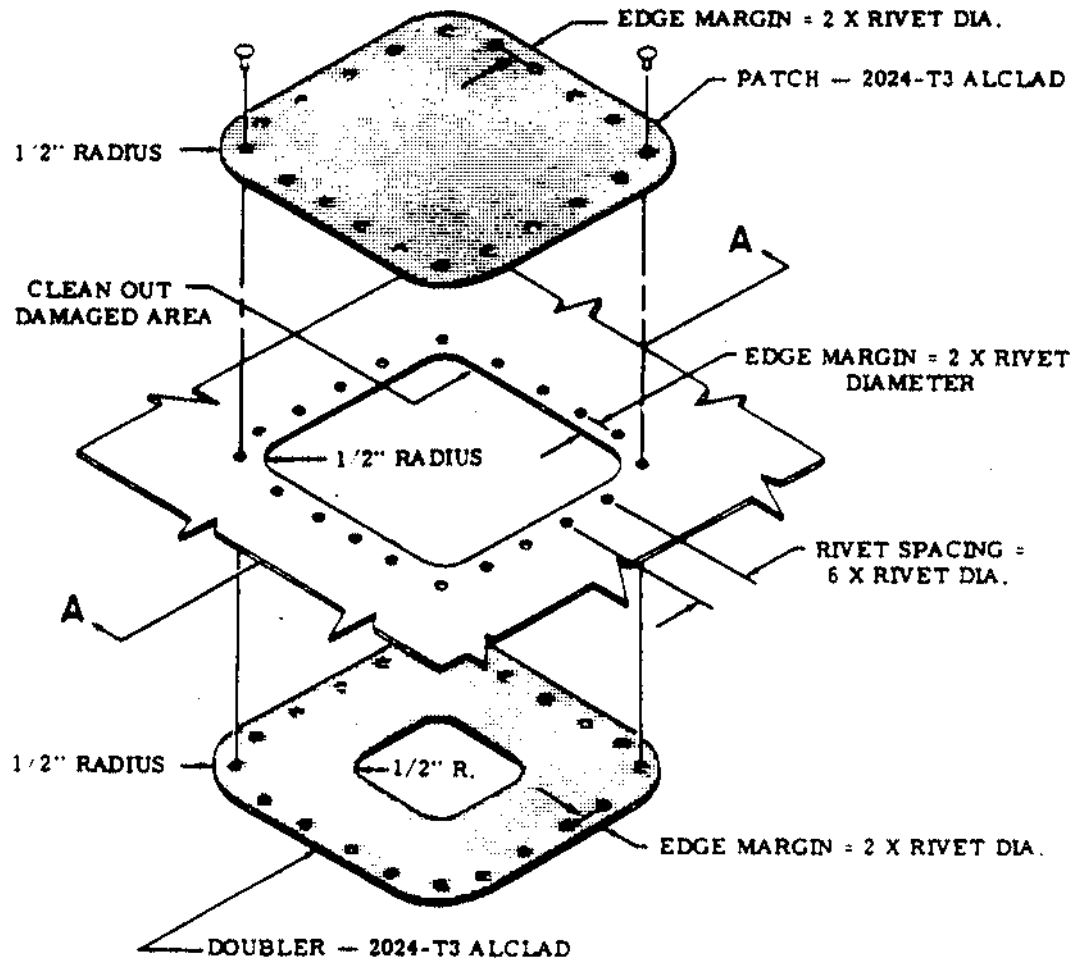
Figure 18-4. Skin Repair (Sheet 1 of 6)

MODEL 172 SERIES SERVICE MANUAL

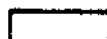
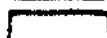


SECTION THRU ASSEMBLED PATCH

A-A



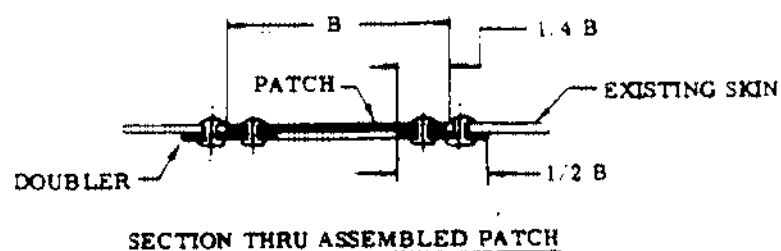
OVERLAPPING REC-
TANGULAR PATCH

-  ORIGINAL PARTS
-  REPAIR PARTS
-  REPAIR PARTS IN CROSS SECTION

RIVET TABLE	
SKIN GAGE	RIVET DIA.
.020	1/8
.025	1/8
.032	1/8
.040	1/8
.051	5/32

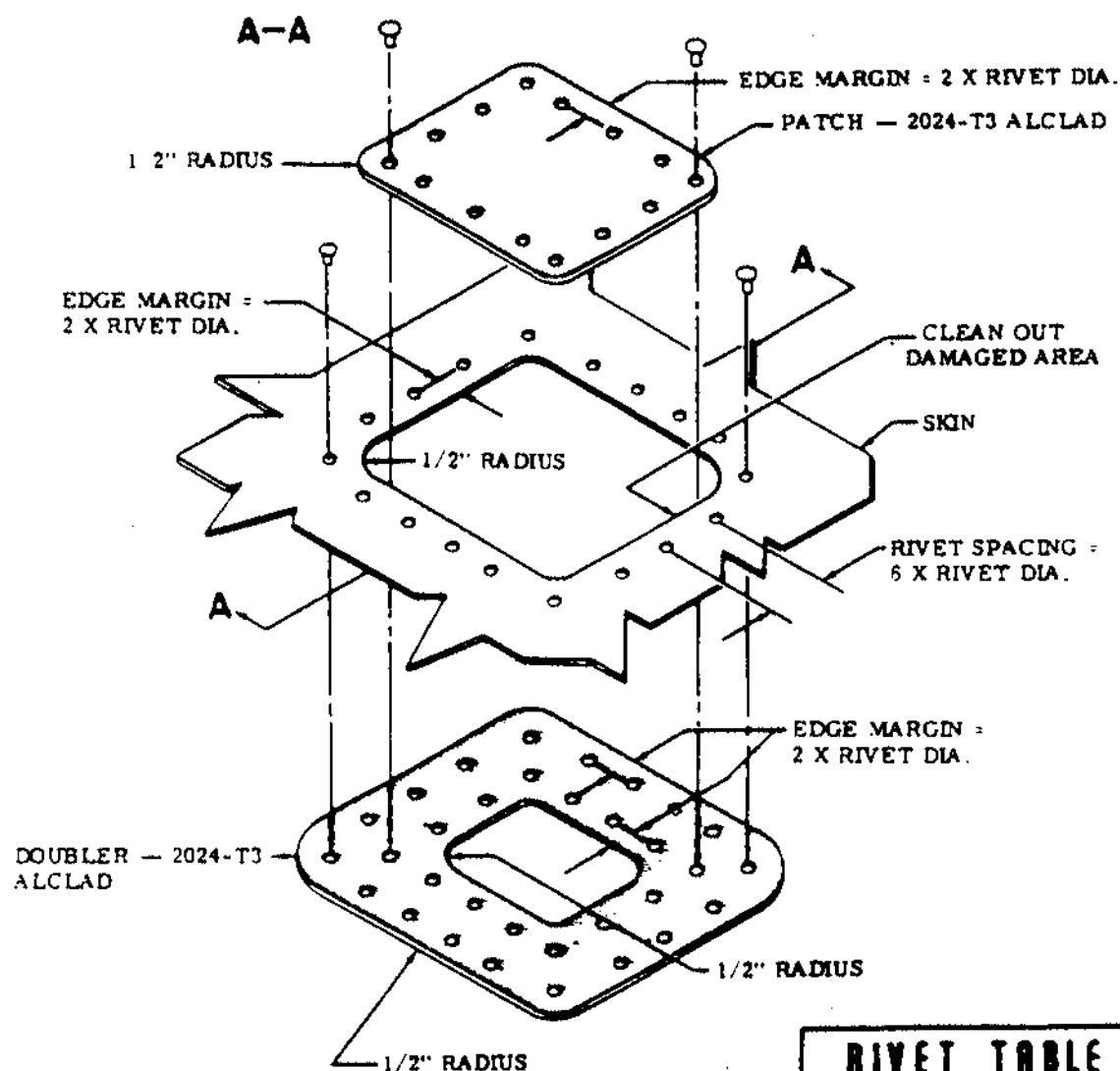
Figure 18-4. Skin Repair (Sheet 2 of 6)

MODEL 172 SERIES SERVICE MANUAL



NOTE

For optimum appearance and airflow, use flush rivets, dimpled skin and patch, and counter-sunk doubler.



-  ORIGINAL PARTS
-  REPAIR PARTS
-  REPAIR PARTS IN CROSS SECTION

FLUSH RECTANGULAR PATCH
(CIRCULAR FLUSH PATCH IS
SIMILAR)

RIVET TABLE	
SKIN GAGE	RIVET DIA.
.020	1/8
.025	1/8
.032	1/8
.040	1/8
.051	5/32

Figure 18-4. Skin Repair (Sheet 3 of 6)

MODEL 172 SERIES SERVICE MANUAL

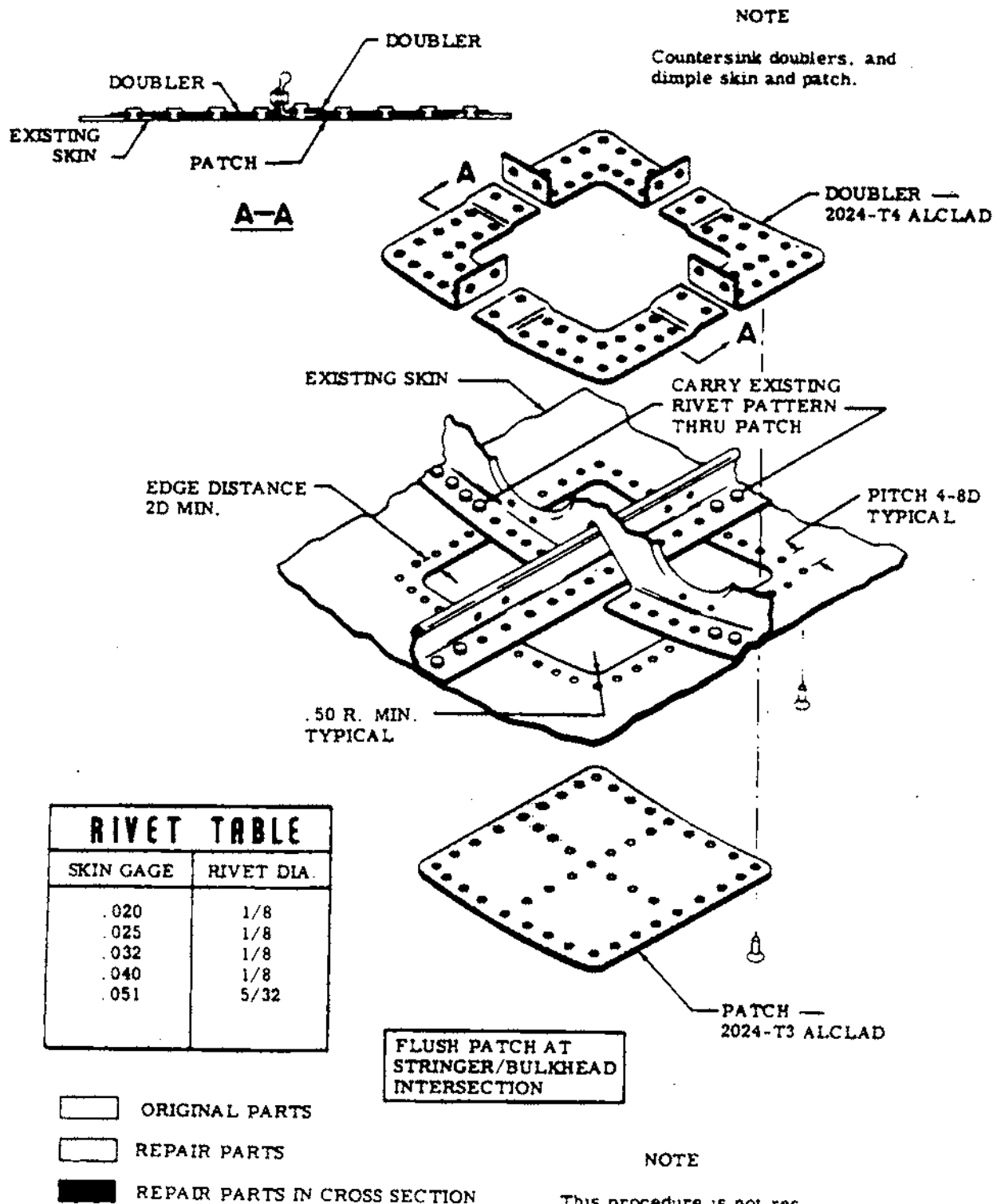


Figure 18-4. Skin Repair (Sheet 4 of 6)

MODEL 172 SERIES SERVICE MANUAL

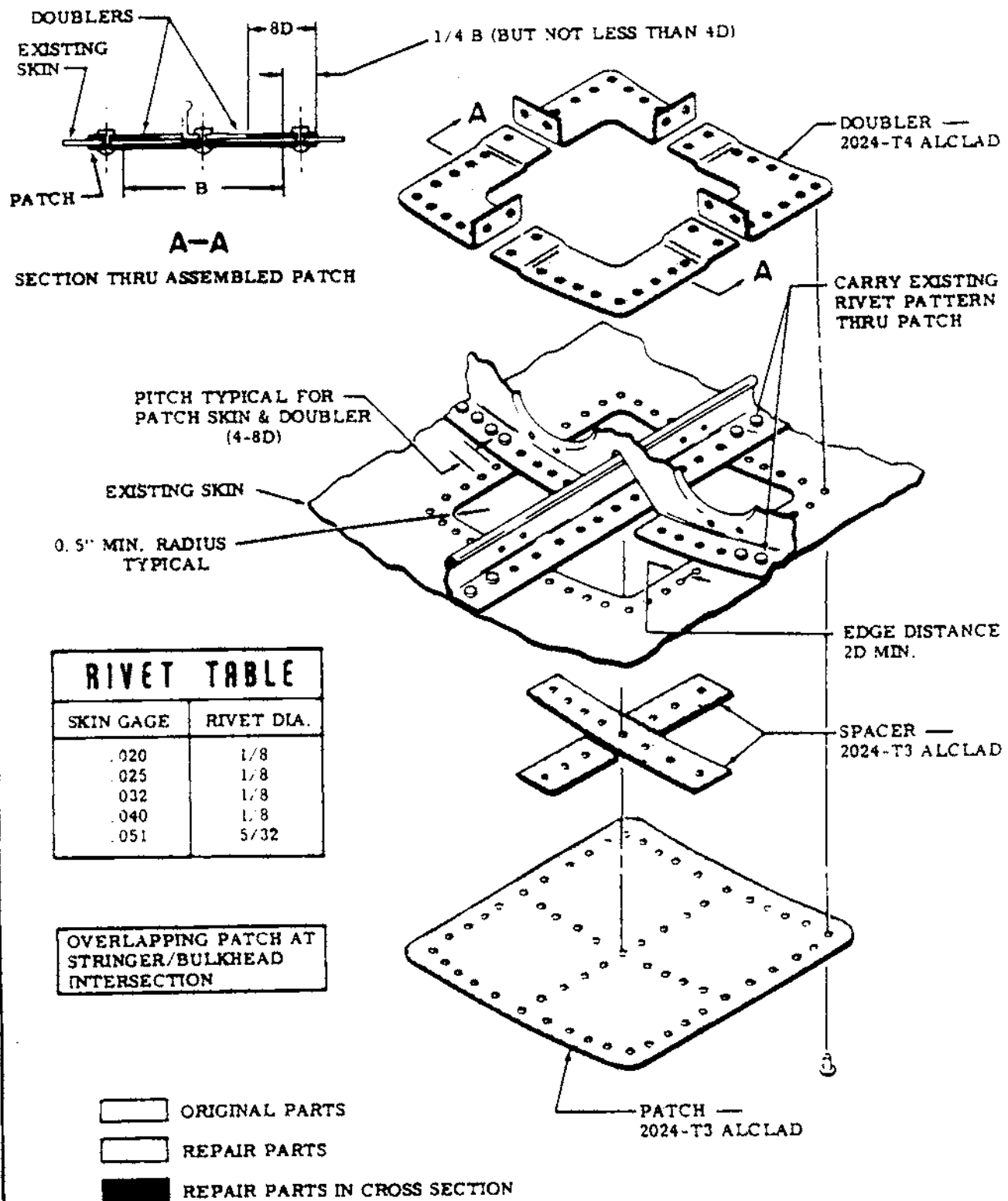


Figure 18-4. Skin Repair (Sheet 5 of 6)

MODEL 172 SERIES SERVICE MANUAL

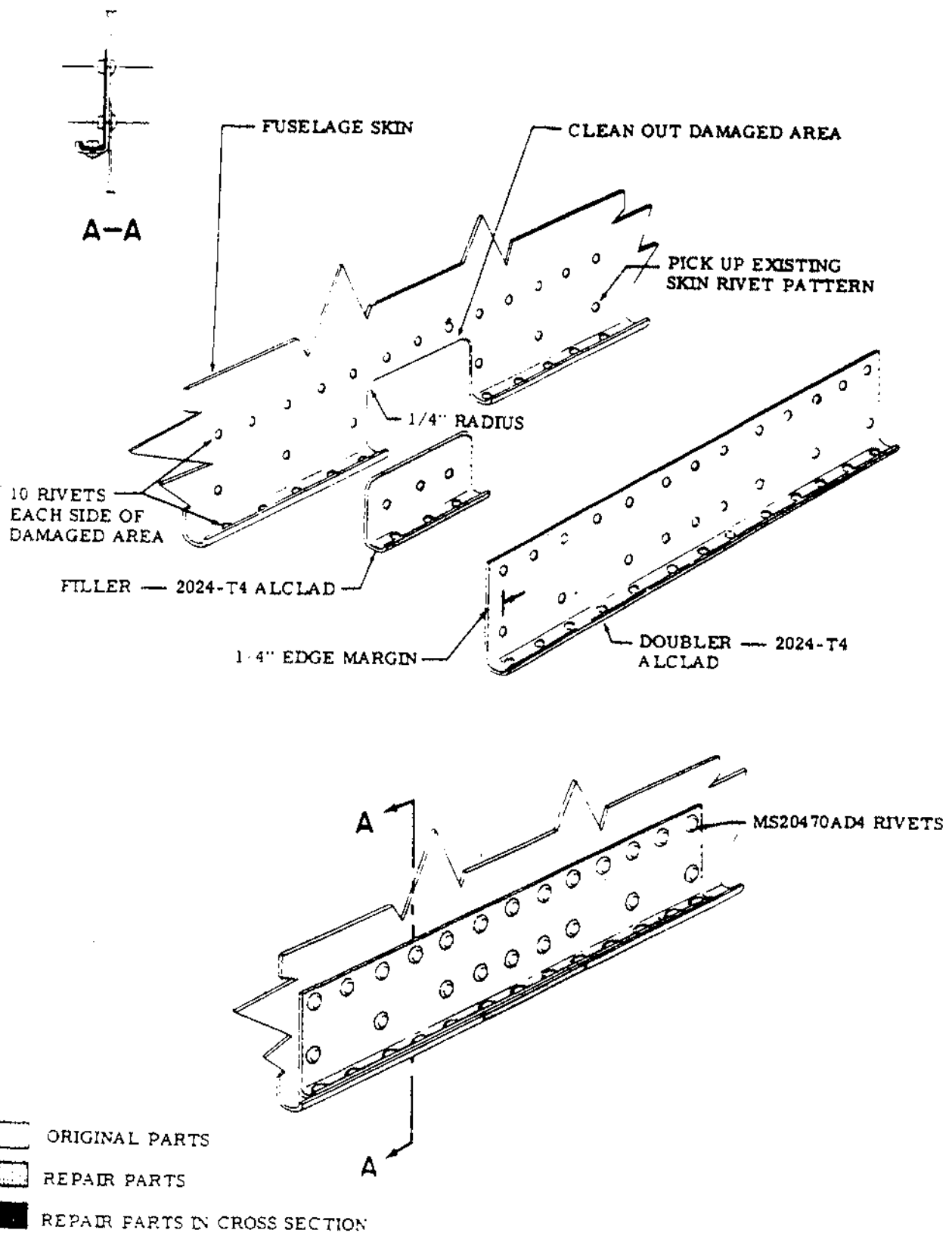
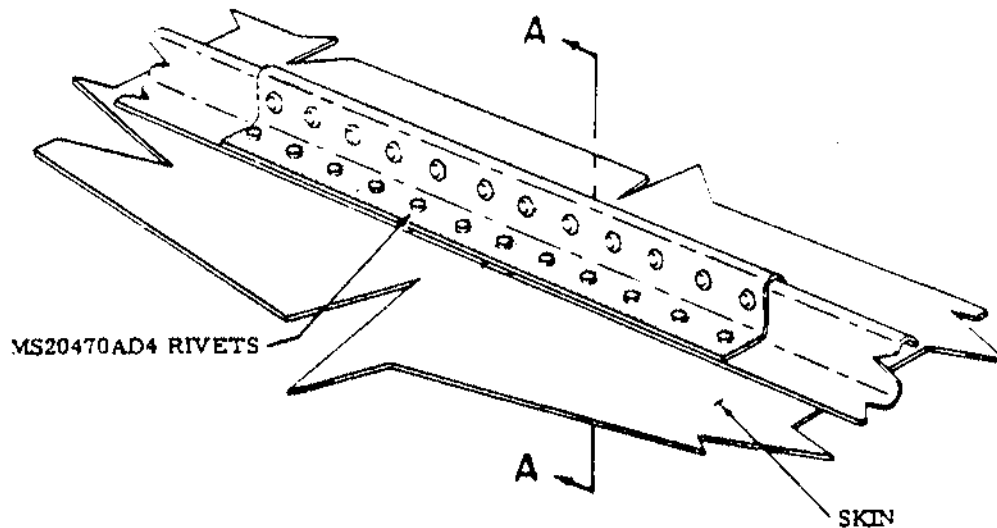
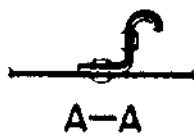
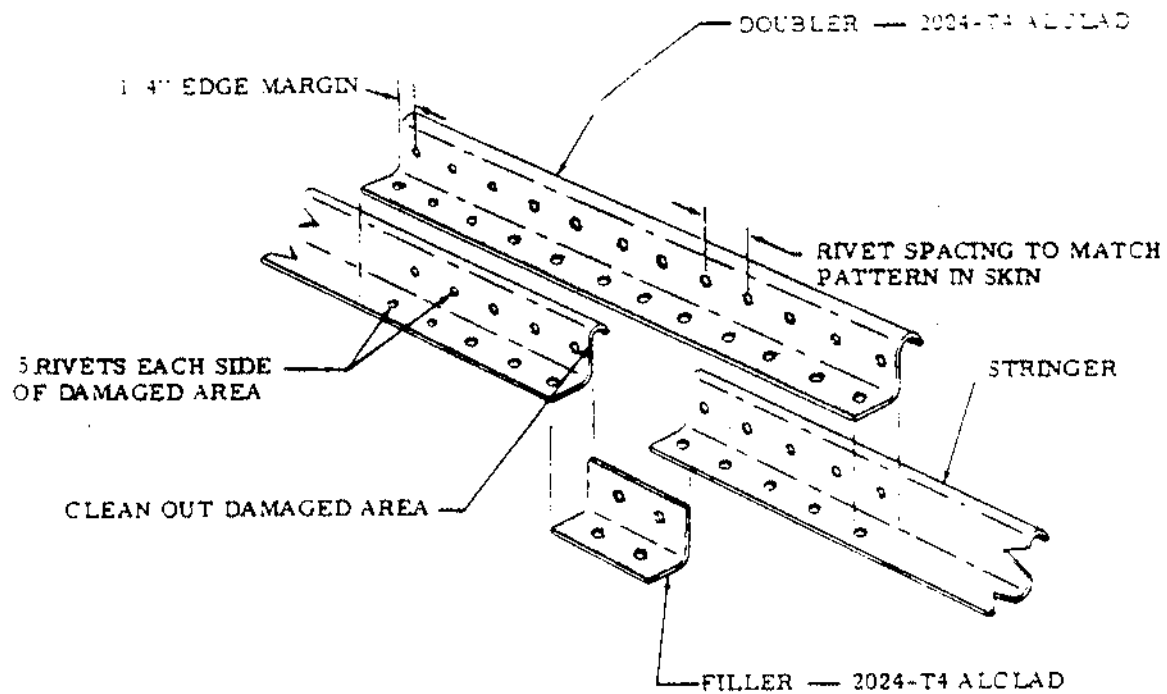


Figure 18-4. Skin Repair (Sheet 6 of 6)

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- ORIGINAL PARTS
- REPAIR PARTS
- REPAIR PARTS IN CROSS SECTION

Figure 18-5. Stringer and Channel Repair (Sheet 1 of 4)

MODEL 172 SERIES SERVICE MANUAL

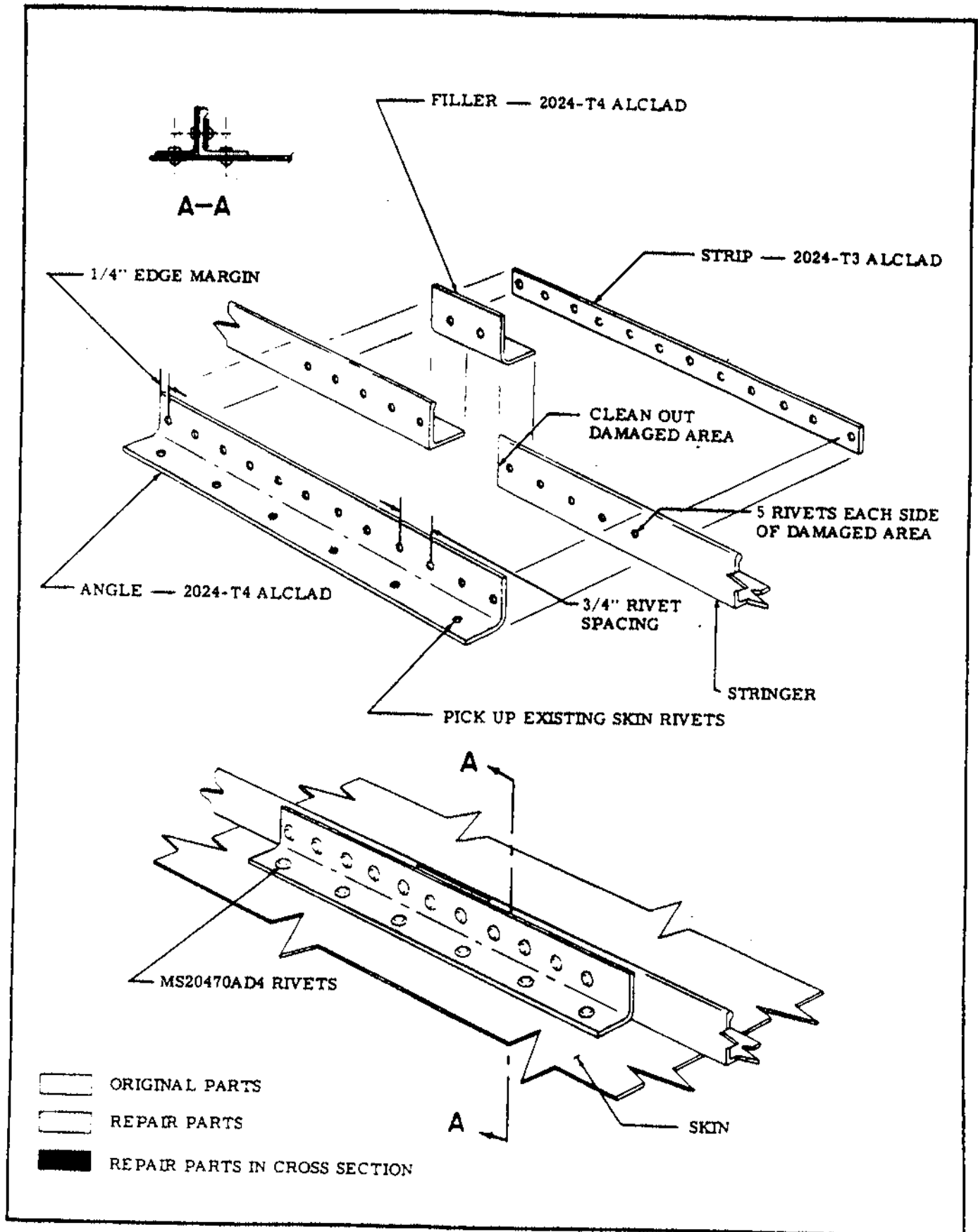


Figure 18-5. Stringer and Channel Repair (Sheet 2 of 4)

MODEL 172 SERIES SERVICE MANUAL

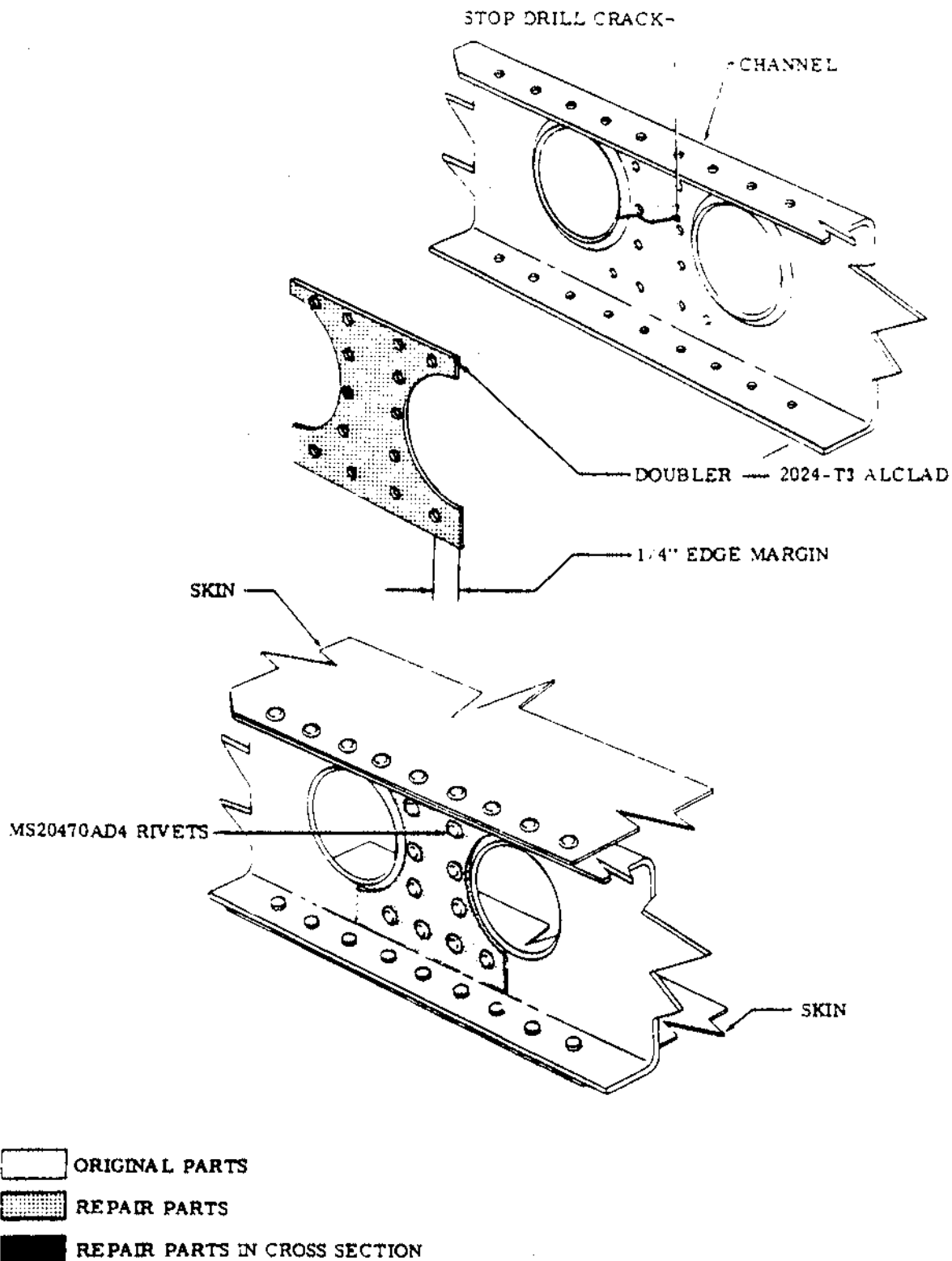
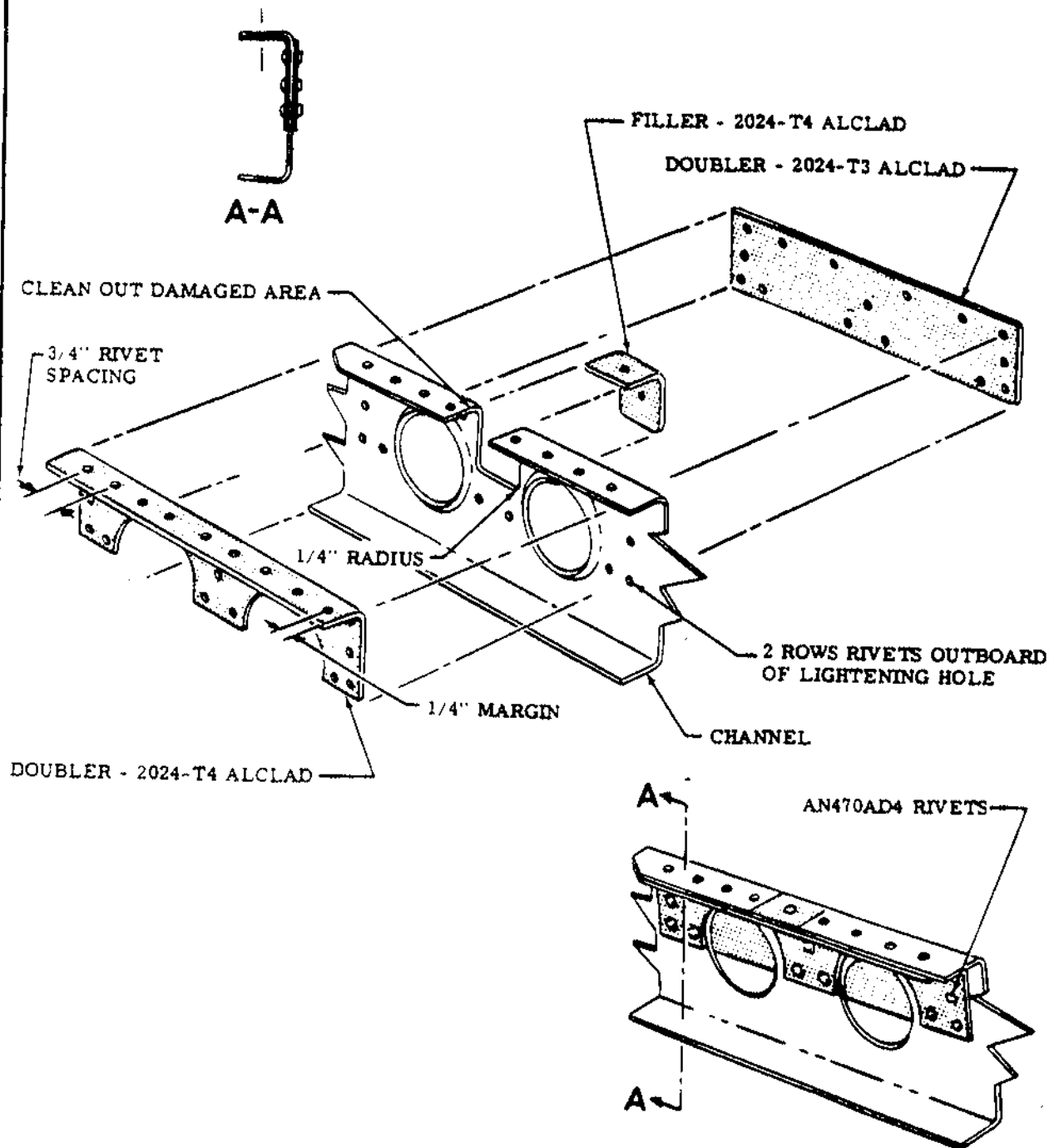


Figure 18-5. Stringer and Channel Repair (Sheet 3 of 4)

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-  ORIGINAL PARTS
-  REPAIR PARTS
-  REPAIR IN CROSS SECTION

Figure 18-5. Stringer and Channel Repair (Sheet 4 of 4)

MODEL 172 SERIES SERVICE MANUAL

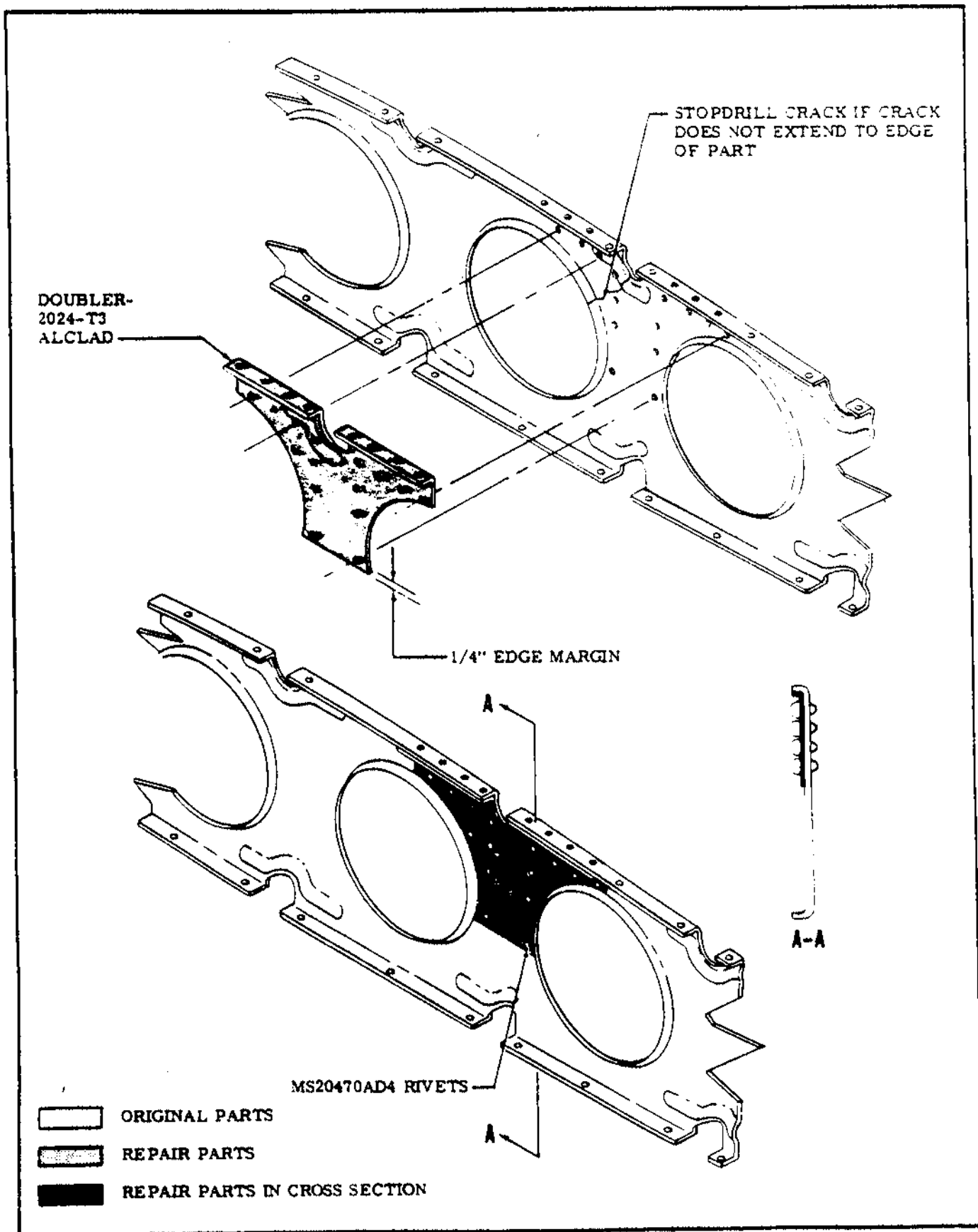


Figure 18-6. Rib Repair (Sheet 1 of 2)

MODEL 172 SERIES SERVICE MANUAL

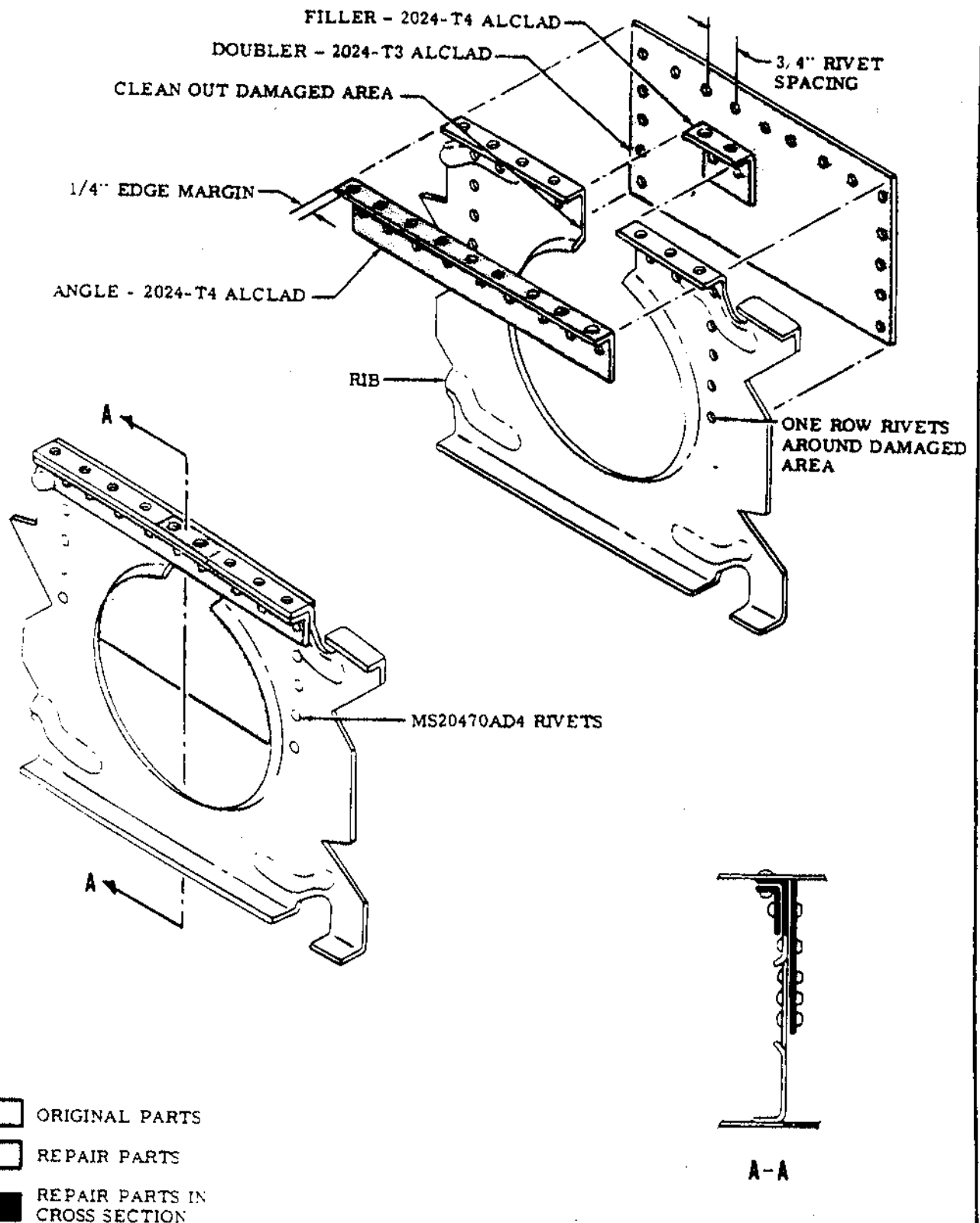


Figure 18-6. Rib Repair (Sheet 2 of 2)

MODEL 172 SERIES SERVICE MANUAL

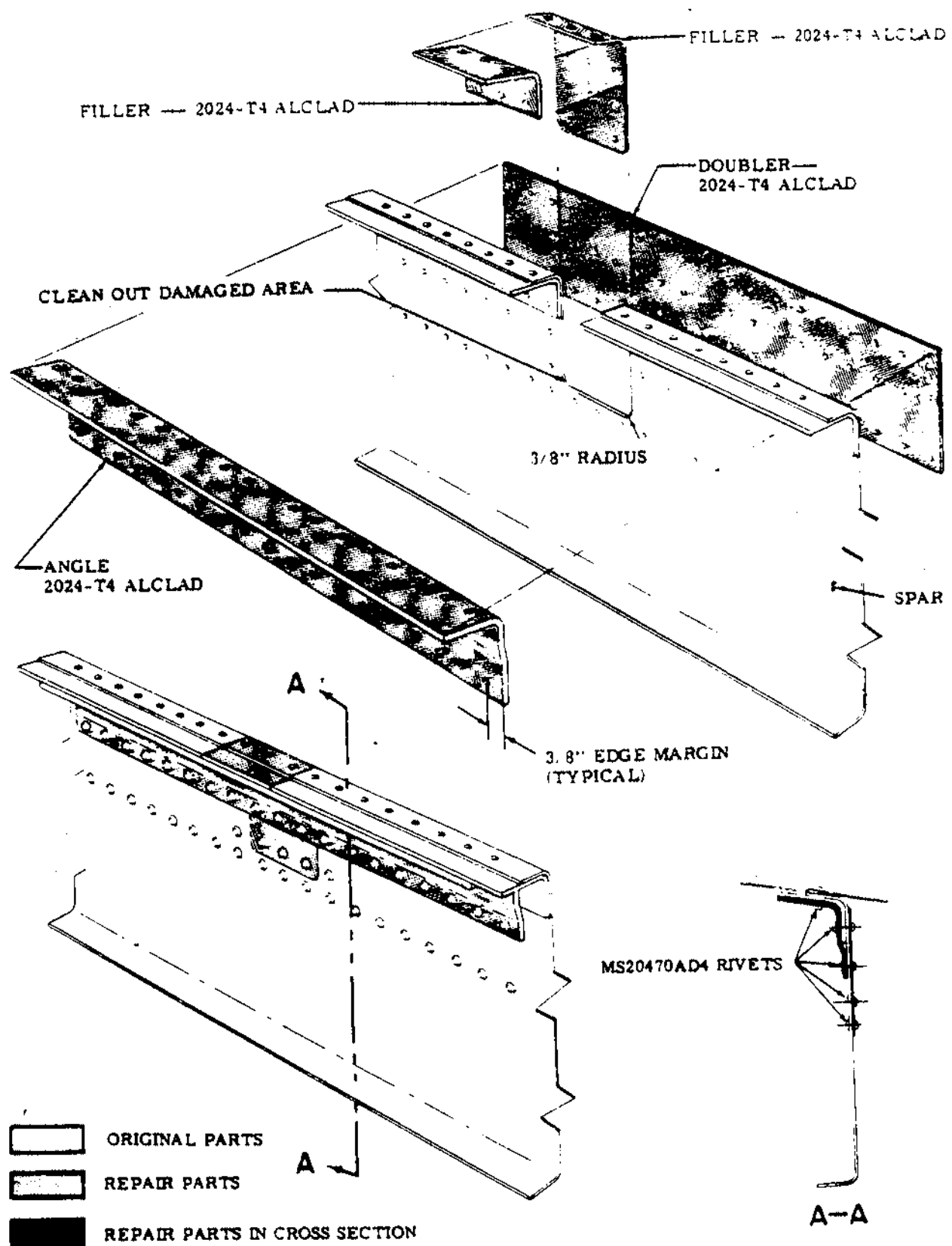


Figure 18-7. Wing Spar Repair (Sheet 1 of 3)

MODEL 172 SERIES SERVICE MANUAL

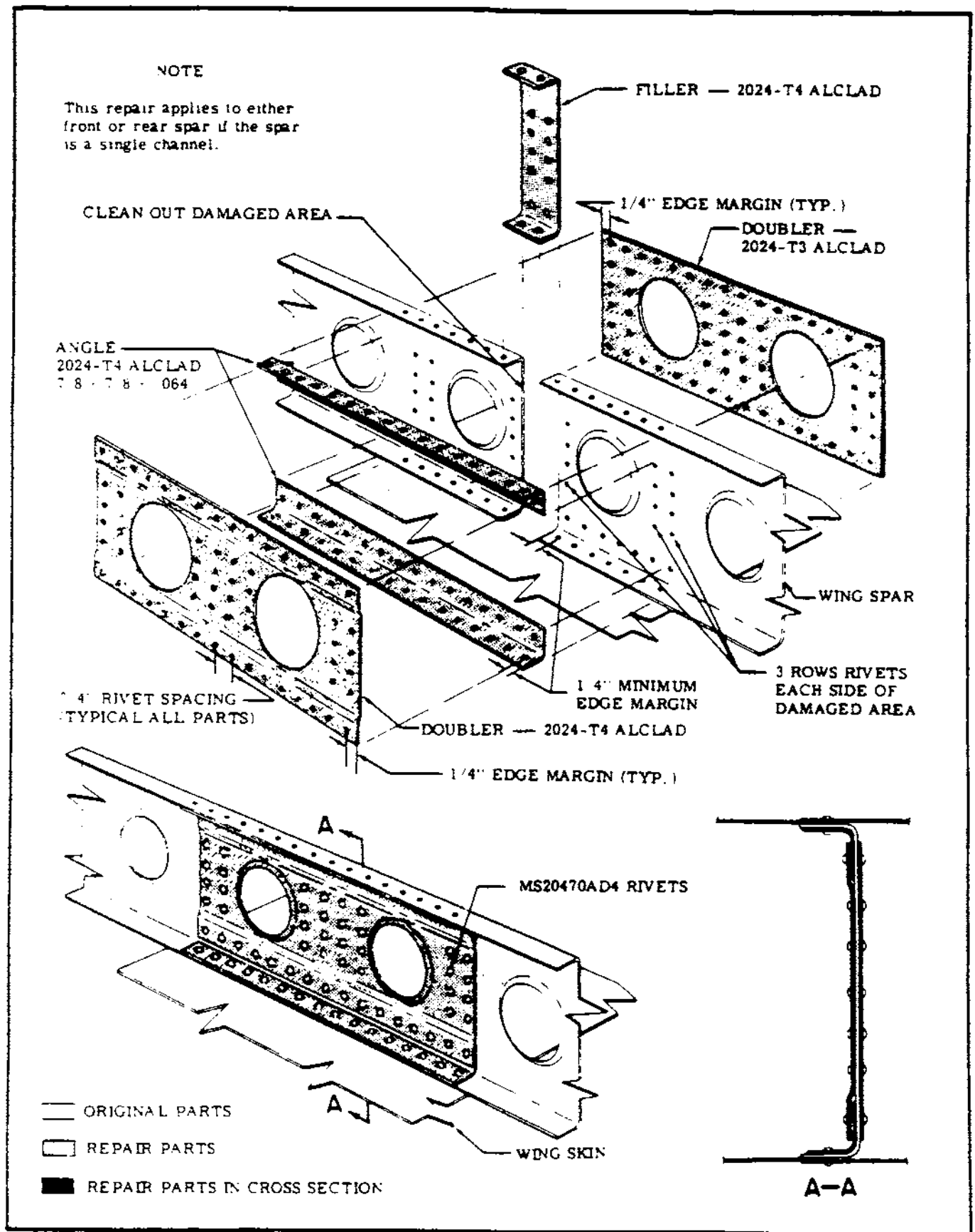


Figure 18-7. Wing Spar Repair (Sheet 2 of 3)

MODEL 172 SERIES SERVICE MANUAL

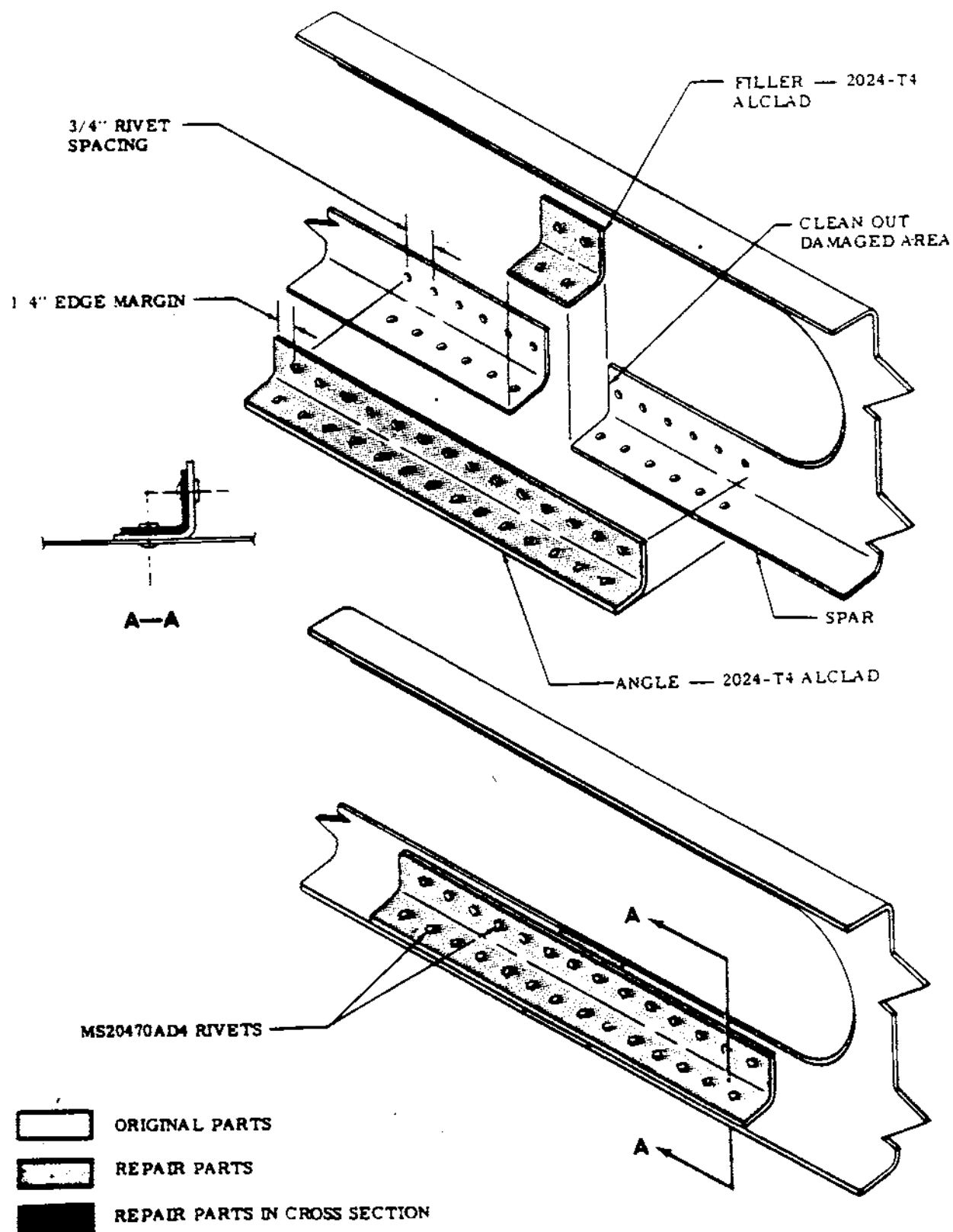


Figure 18-7. Wing Spar Repair (Sheet 3 of 3)

MODEL 172 SERIES SERVICE MANUAL

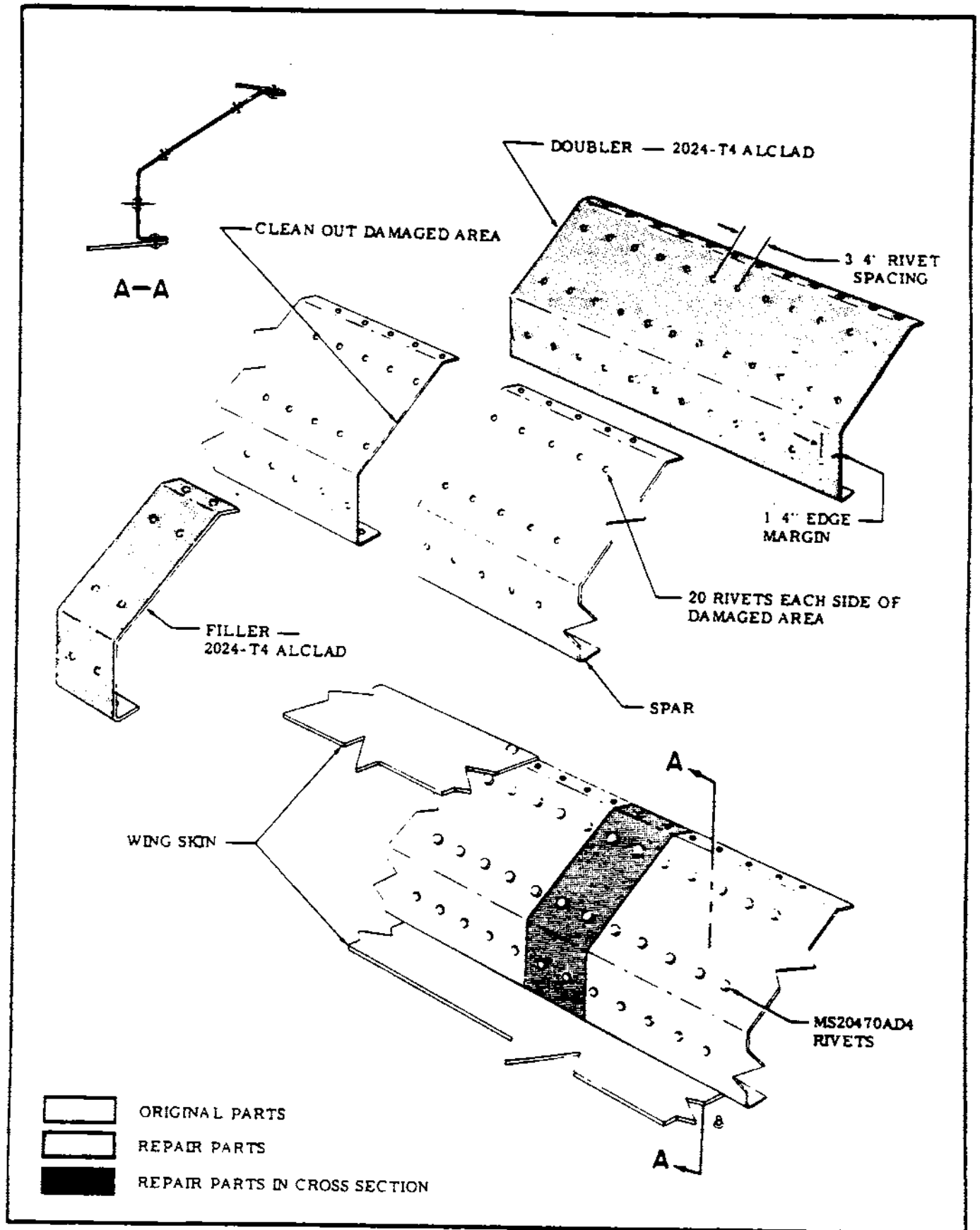


Figure 18-8. Auxiliary Spar Repair

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NOTES:

1. Dimple leading edge skin and filler material, countersink the doubler.
2. Use MS20426AD4 rivets to install doubler.
3. Use MS20426AD4 rivets to install filler, except where bucking is impossible. Use CR162-4 Cherry (blind) rivets where regular rivets cannot be bucked.
4. Contour must be maintained; after repair has been completed, use epoxy filler as necessary and sand smooth before painting.
5. Vertical size is limited by ability to install doubler clear of front spar.
6. Lateral size is limited to seven inches across trimmed out area.
7. Number of repairs is limited to one in each bay.

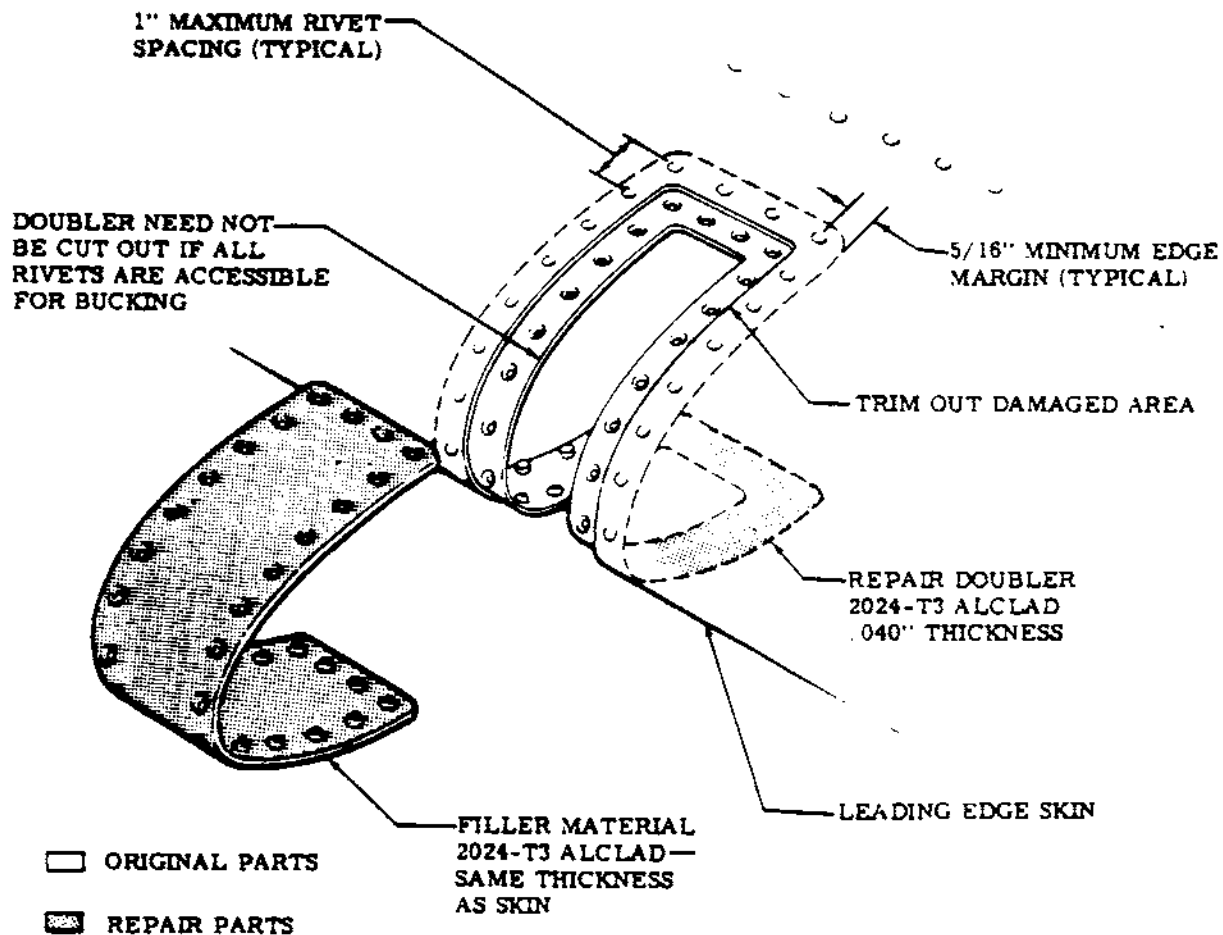


Figure 18-9. Leading Edge Repair

MODEL 172 SERIES SERVICE MANUAL

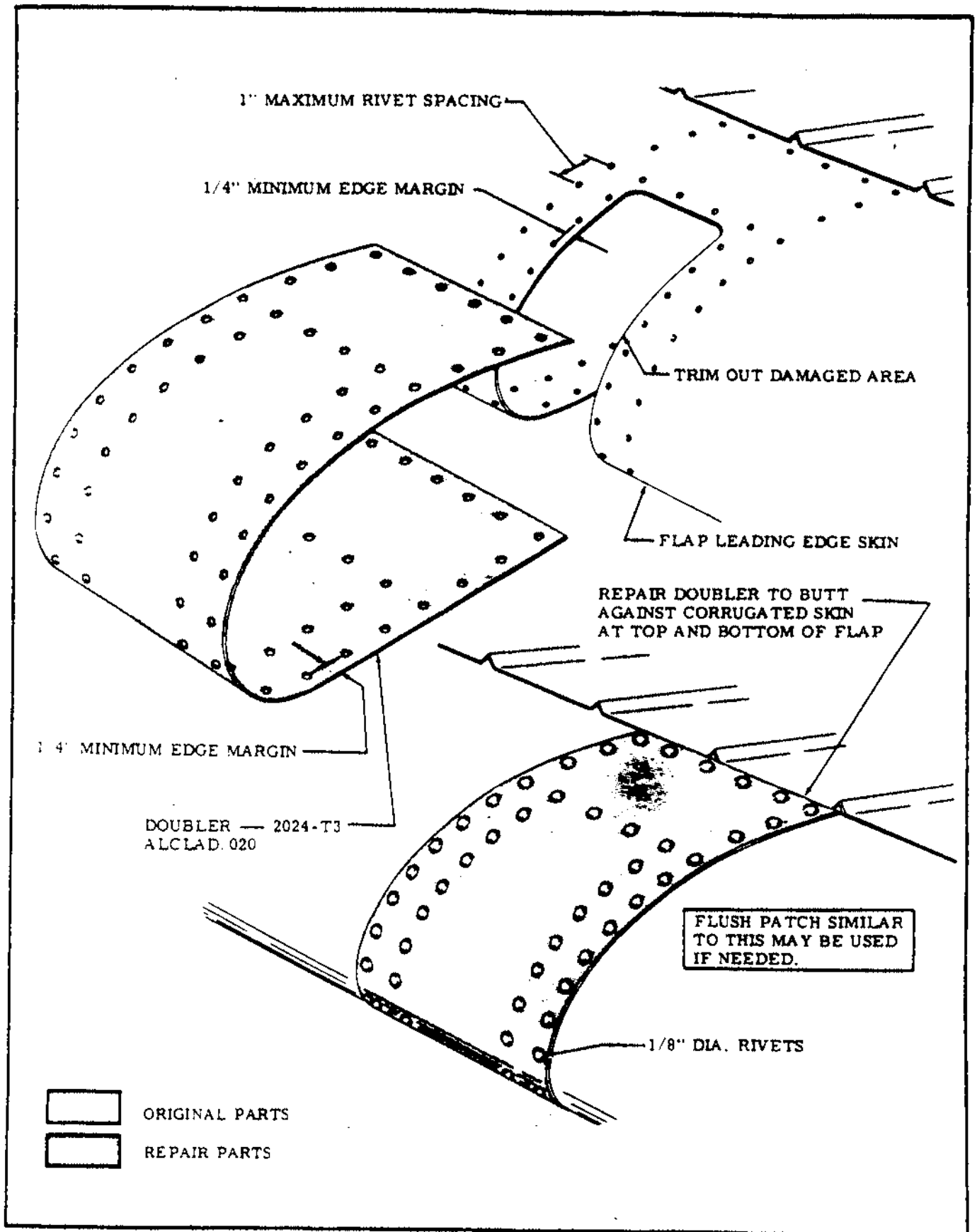
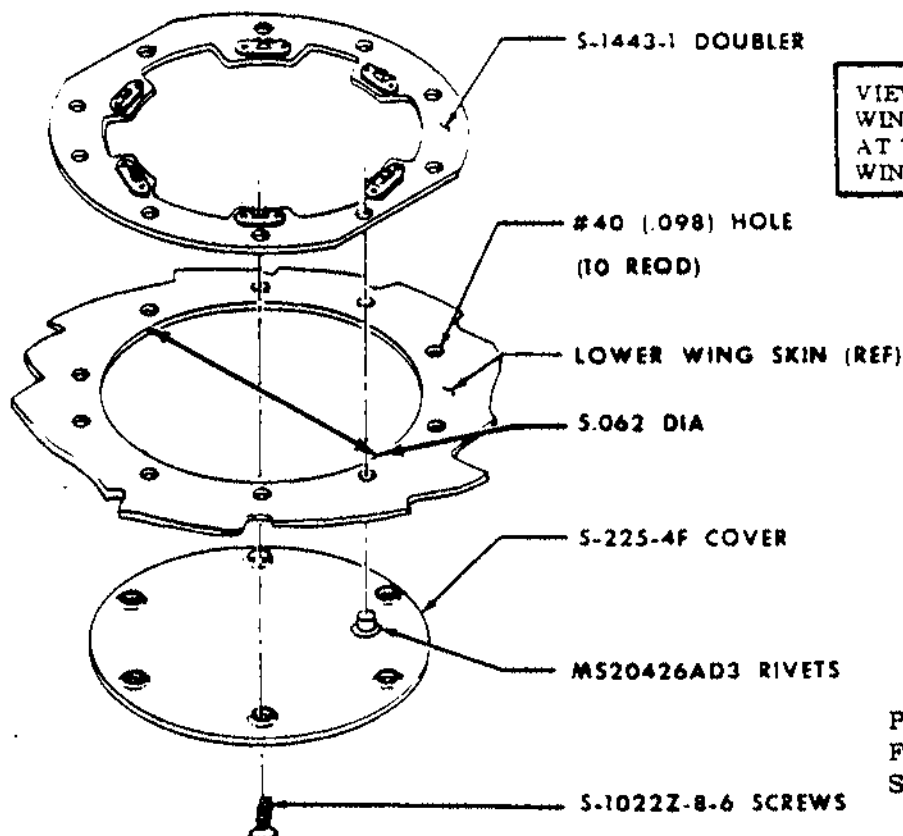


Figure 18-10. Flap Leading Edge Repair

MODEL 172 SERIES SERVICE MANUAL



VIEWS FROM INSIDE WING LOOKING DOWN AT TOP OF LOWER WING SKIN.

NOTE

PARTS ARE AVAILABLE FROM THE CESSNA SUPPLY DIVISION

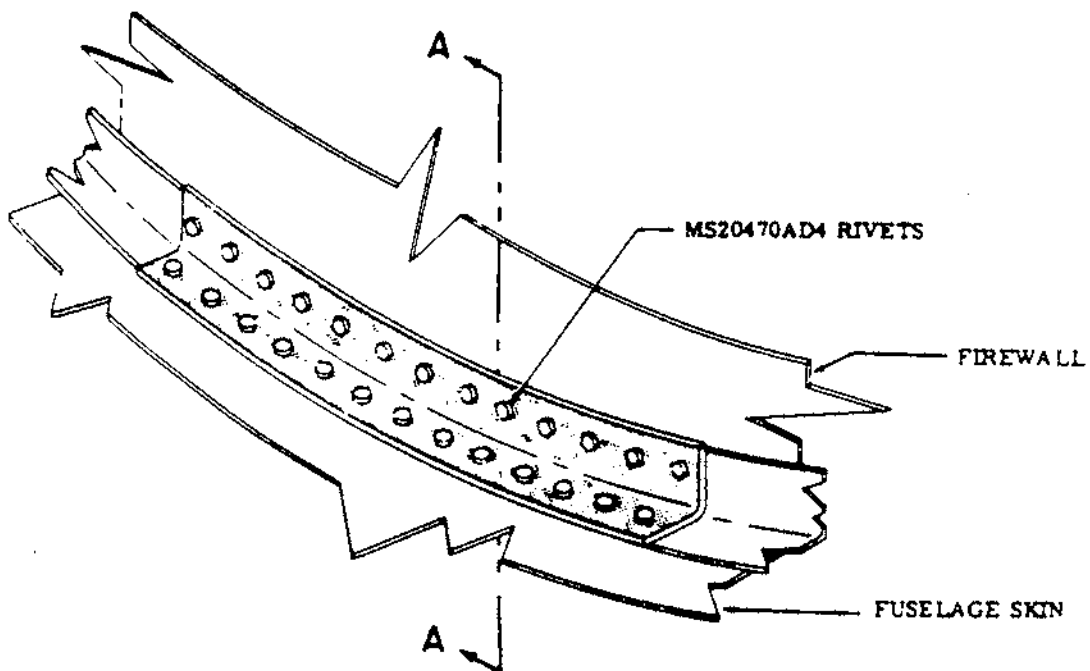
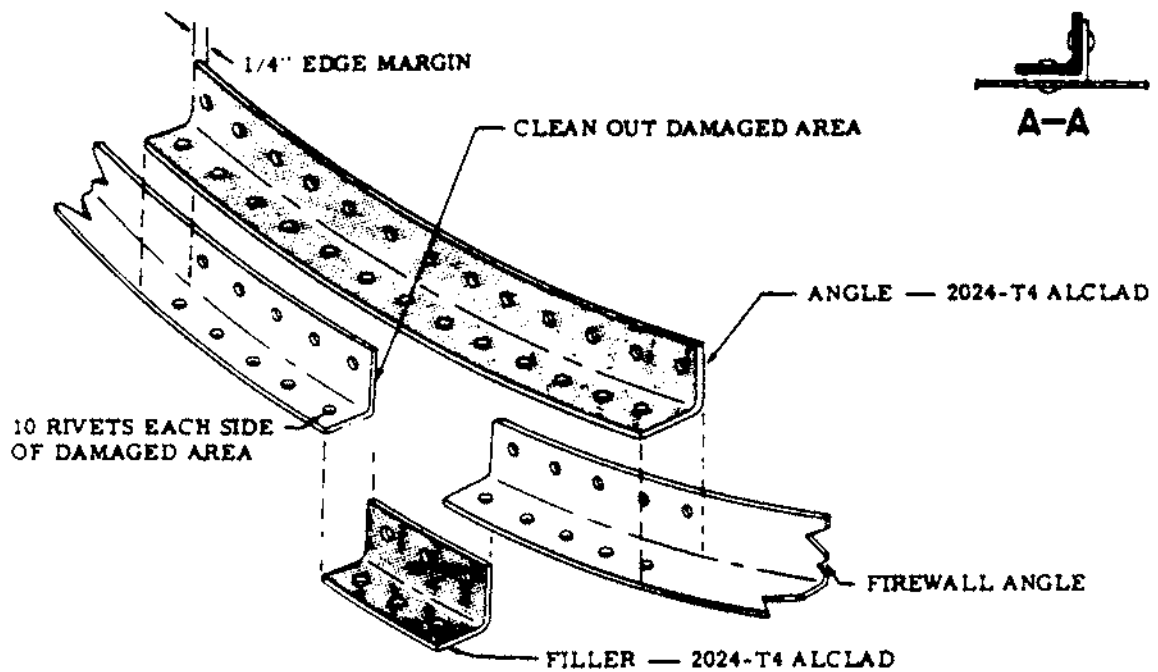
PRECAUTIONS

1. Add the minimum number of access holes necessary.
2. Any circular or rectangular access hole which is used with approved optional equipment installations may be added in lieu of the access hole illustrated.
3. Do not add access holes at outboard end of wing; remove wing tip instead.
4. Do not add an access hole in the same bay where one is already located.
5. Locate new access holes near the center of a bay (spanwise).
6. Locate new access holes forward of the front spars as close to the front spar as practicable.
7. Locate new access holes aft of the front spar between the first and second stringers aft of the spar. When installing the doubler, rotate it so the two straight edges are closest to the stringers.
8. Alternate bays, with new access holes staggered forward and aft of the front spar, are preferable.
9. A maximum of five new access holes in each wing is permissible; if more are required, contact the Cessna Service Department.
10. When a complete leading edge skin is being replaced, the wing should be supported in such a manner so that wing alignment is maintained.

- a. Establish exact location for inspection cover and inscribe centerlines.
- b. Determine position of doubler on wing skin and center over centerlines. Mark the ten rivet hole locations and drill to size shown.
- c. Cutout access hole, using dimension shown.
- d. Flex doubler and insert through access hole, and rivet in place.
- e. Position cover and secure, using screws as shown.

Figure 18-11. Access Hole Installation

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- ORIGINAL PARTS
- REPAIR PARTS
- REPAIR PARTS IN CROSS SECTION

Figure 18-12. Firewall Angle Repair

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- ① Use rivet pattern at wing station 23.65 for repair from wing station 23.65 to wing station 85.87. Use rivet pattern at wing station 100.50 for lap splice patterns from wing station 100.50 to wing station 190.00. See figure 1-2 for wing stations.

- ② Use rivet spacing similar to the pattern at wing station 100.50 at leading edge ribs between lap splices.

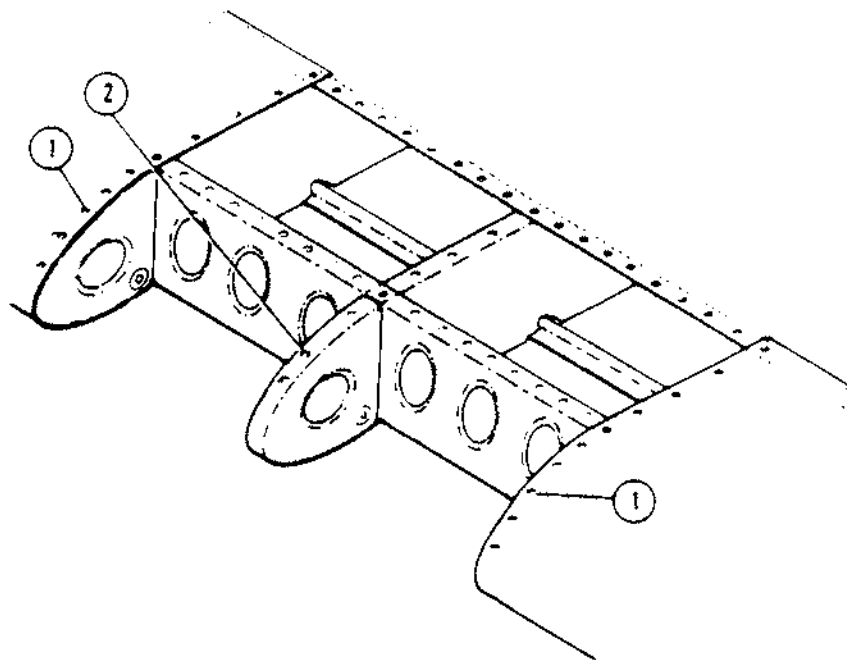
Select number of flush rivets to be used at each wing station leading edge rib from table.

RIBS AND STRINGERS:

Blind rivets may be substituted for solid rivets in proportionally increased numbers in accordance with the table.

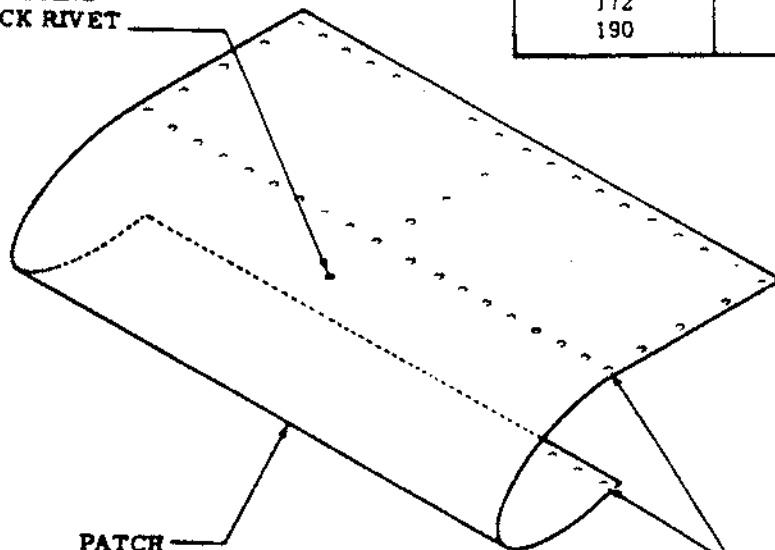
SPARS:

Blind rivets may be installed in wing spars only in those locations where blind rivets were used during original manufacture, ie fuel bay area of front spars on aircraft with integral fuel bays.



NUMBER OF FLUSH RIVETS IN DIMPLED SKIN REQUIRED IN REPLACEMENT LEADING EDGE SKIN		
WING STATION RIB	SOLID MS20426-4	BLIND CR2248-4
118	18	22
136	15	18
154	11	13
172	10	12
190	10	12

EXISTING TACK RIVET



PATCH

EXISTING RIVET PATTERN

TYPICAL LEADING EDGE SECTION

Figure 18-13. Bonded Leading Edge Repair

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SECTION 19

PAINTING

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Manual

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Interior Parts	3C5/19-3	Priming	3C8 19-6
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		Touch-Up	3C10 19-8
		Repair of Dents	3C10 19-8

NOTE

This section contains standard factory materials listing and area of application. For paint number and color, refer to Aircraft Trim Plate and Parts Catalog. In all cases determine the type of paint on the aircraft as some types of paint are not compatible. Materials may be obtained from Cessna Supply Division.

NOTE

Control surfaces, except for wing flaps, must be balanced after painting. Refer to Section 18, figure 18-3 for balancing procedures.

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MATERIAL	NO/TYPE	DOMESTIC	FRENCH	AREA OF APPLICATION
PAINT	ACRYLIC LACQUER *	X		NOTE 1
	LACQUER		X	
	CES 1054-215 Heat Resistant Enamel	X	X	NOTE 8
PRIMER	P60G2 With R7K44 Reducer	X	X	NOTE 2
	Ex-Er-7 With T-Er-4 Reducer	X	X	
THINNER	T-8402A	X		NOTE 4
	T8094A	X	X	NOTE 3
SOLVENT	Methyl Ethyl Ketone (MEK)	X	X	NOTE 5

NOTE

1. Used on aircraft exterior.
2. Used with lacquer or acrylic lacquer on aircraft exterior.
3. Used to thin lacquer and for burndown.
4. Used to thin acrylic lacquer and for burndown.
5. Used to clean aircraft exterior prior to priming.
6. Used on aircraft engine mount.

* THROUGH SERIALS 17289309, 17289311 THRU 17289549.
17289551 THRU 17289556, 17289561 THRU 17289566,
17289567, 17289583, 17289584.

- 19-1. **PAINTING OF FORMED ABS PLASTIC PARTS.** The following procedures outline some basic steps which are useful during touch up or painting of formed ABS plastic parts.

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19-2. INTERIOR PARTS (Finish Coat of Lacquer).

a. Painting of Spare Parts.

1. Ensure a clean surface by wiping with Naphtha to remove surface contamination.

CAUTION

Do not use strong solvents such as Xylol, Toluol or Lacquer Thinner since prolonged exposure can soften or embrittle ABS.

2. After the part is thoroughly dry it is ready for the lacquer topcoat. Paint must be thinned with lacquer thinner and applied as a wet coat to ensure adhesion.
- b. Touch Up of Previously Painted Parts.
 1. Light sanding is acceptable to remove scratches and repair the surface but care must be exercised to maintain the surface texture or grain.
 2. Ensure a clean surface by wiping with Naphtha to remove surface contamination.

CAUTION

Do not use strong solvents such as Xylol, Toluol or Lacquer Thinner since prolonged exposure can soften or embrittle ABS.

3. After the part is thoroughly dry it is ready for the lacquer topcoat. Paint must be thinned with lacquer thinner and applied as a wet coat to ensure adhesion.

NOTE

Lacquer paints can be successfully spotted in.

19-3. EXTERIOR PARTS (Acrylic Topcoat).

a. Painting of Spare Parts.

1. Light scuff sand to remove scratches and improve adhesion.
2. Ensure a clean surface by wiping with Naphtha to remove surface contamination.

CAUTION

Do not use strong solvents such as Xylol, Toluol or Lacquer Thinner since prolonged exposure can soften or embrittle ABS.

3. After the part is thoroughly dry it is ready for the topcoat. Paint must be thinned with appropriate acrylic thinner and applied as a wet coat to ensure adhesion.
- b. Touch Up of Previously Painted Parts.
 1. Lightly scuff sand to remove scratches and improve adhesion.
 2. Ensure a clean surface by wiping with Naphtha to remove surface contamination.

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CAUTION

Do not use strong solvents such as Xylol, Toluol or lacquer Thinner since prolonged exposure can soften or embrittle ABS.

3. Apply a compatible primer - surfacer and sealer.
4. After the part is thoroughly dry it is ready for the topcoat. Paint must be thinned and applied as a wet coat to ensure adhesion.

NOTE

Acrylic topcoats can be successfully spotted in.

- 19-4. **REFINISHING ENGINE MOUNTS.** After completing a repair as directed in Section 18, refinish with Part Number EX2219 (Ameron-Enmar Finished, 16116 E. 13th, Andover, Kansas 67230) (316) 733-1361 heat-resistant black enamel. Degrease and scuff sand or grit blast entire area to bare metal. Spray enamel to a dry film thickness of 0.001" to 0.0013", and cure at 250°F for 15 minutes. Part can be handled as soon as cool to touch.

NOTE

BEGINNING SERIAL 17269310, 17269550, 17269557, 17269562 THRU 17269565, 17269568 THRU 17269582, and 17269585.

IMRON MODIFIED URETHANE

MATERIAL	NO/TYPE	AREA OF APPLICATION
PAINT	IMRON ENAMEL	Used as corrosion proof topcoat
	IMRON 192S Activator	Catalyst for Imron Enamel
PRIMER	WASH PRIMER P60G2	Used to prime aircraft for Imron Enamel
REDUCER/ THINNER	IMRON Y8485S Reducer	Used to thin Imron Enamel
	Catalyst Reducer R7K44	Used to reduce P60G2

NOTE

Do not paint pitot tube, gas caps, or aileron gap seals. Also do not paint antenna covers which were not painted at the factory.

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REQUIRED MATERIALS

MATERIAL	NO/TYPE	AREA OF APPLICATION
STRIPPER	Strypeeze Stripper	Used to strip primer overspray
CLEANER	DX440 Wax and Grease Remover	Used to clean aircraft exterior
	Imperial Cleaner	Used to remove grease, bug stains, etc.
	Klad Polish	Used to clean aluminum finish
	808 Polishing Compound	Used to rub out overspray
SOLVENT	Naphtha	Used to clean plexiglass and ABS
	Methly Ethyl Ketone (MEK)	Used to tack aircraft prior to topcoat
CLOTH	HEX Wiping Cloth	Used with solvent to clean aircraft exterior
FILLER	White Streak	Used to fill small dents
MASKING	Class A Solvent Proof Paper	Used to mask areas not to be painted
	Tape Y218	Used for masking small areas
	Tape Y231	Used for masking small areas

- 19-5. **FACILITY.** Painting facilities must include the ability to maintain environmental control to a minimum temperature of 65°F., and a positive pressure inside to preclude the possibility of foreign material damage. All paint equipment must be clean, and accurate measuring containers available for mixing protective coatings. Modified Urethane has a pot life of four to eight hours, depending on ambient temperature and relative humidity. Use of approved respirators while painting is a must, for personal safety. All solvent containers should be grounded to prevent static build-up. Catalyst materials are toxic, therefore, breathing fumes or allowing contact with skin can cause serious irritation. Material stock should be rotated to allow use of older materials first, because its useful life is limited. All supplies should be stored in an area where temperature is higher than 50°F., but lower than 90°F. Storage at 90°F. is allowable for no more than sixty days providing it is returned to room temperature for mixing and use.

Modified urethane paint requires a minimum of seven days to cure under normal conditions, if humidity and temperature is lower, curing time will be extended to a maximum of 14 days. During the curing period, indiscriminate use of masking tape, abrasive polishes, or cleaners can cause damage to finish. Desirable curing temperature for modified urethane is 60°F. for a resulting satisfactory finish.

- 19-6. **CLEAN UP.**
- Inspect airplane for any surface defects, such as dents or unsatisfactory previous repairs, and correct according to paragraph 19-13.

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- b. Wipe excess sealer from around windows and skin laps with naphtha. Mask windows, ABS parts, and any other areas not to be primed, with 3M tape and Class A Solvent Proof Paper. Care must be exercised to avoid cuts, scratches or gouges by metal objects to all plexiglass surfaces, because cuts and scratches may contribute to crazing and failure of plexiglass windows.

NOTE

Do not use strong solvents such as xytol, toluol, MEK, or lacquer thinner on plexiglass as crazing will occur.

- c. Methyl Ethyl Ketone (MEK) solvent should be used for final cleaning of airplanes prior to painting. The wiping cloths shall be contaminant and lint free HEX. Saturate cloth in the solvent and wring out so it does not drip. Wipe the airplane surface with the solvent saturated cloth in one hand, and immediately dry with a clean cloth in the other hand. It is important to wipe dry solvent before it evaporates.

When an airplane has paint or zinc chromate overspray on the exterior, stripper may be used to remove the overspray. The stripper may be applied by brush and will require a few minutes to soften the overspray. Heavy coatings may require more than one application of the stripper. Use extreme care to prevent stripper from running into faying surfaces on corrosion proofed airplanes. After removal of the overspray, clean the airplane with Methyl Ethyl Ketone (MEK) solvent in the prescribed manner.

NOTE

It is imperative that clean solvent be used in cleaning airplanes. Dispose of contaminated solvent immediately. Fresh solvent should be used on each airplane.

WARNING

Use explosion proof containers for storing wash solvents and other flammable materials.

19-7. PRE-PRIMING.

- a. For all standard aircraft, P60G2 primer shall be mixed one part primer to one and one half parts R7K44 catalyst by volume. Mix only in stainless steel or lined containers. After mixing, allow primer to set for thirty minutes before spraying. Pot life of the mixed primer is six hours. All mixed material should be discarded if not used within this time. Pot pressure during spray operation should be approximately 10 ± 1 psi. Air pressure should be 40 to 50 psi at the gun. Blow loose contaminant off the airplane with a jet of clean, dry air. Cover the flap tracks, nose gear strut tube, wheels, and shimmy dampener rod ends. ABS parts and other pre-primed parts do not receive wash primer.

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WARNING

AIRCRAFT SHOULD BE GROUNDED PRIOR TO PAINTING TO PREVENT STATIC ELECTRICITY BUILD-UP AND DISCHARGE.

19-8. PRIMING.

- a. Apply primer in one wet even coat. Dry film thickness to be .0003 to .0005 inches. Do not topcoat until sufficiently cured. When scratching with firm pressure of the fingernail does not penetrate the coating, the primer is cured. Primer should be topcoated within four hours after application.

19-9. PREPAINTING.

- a. On standard aircraft mix the required amount of Imron with Imron 192S Activator in a 3 to 1 ratio. Mix thoroughly (no induction time required before spraying). Imron shall be thinned with Y8485S Imron Reducer to obtain a spraying viscosity of 18 to 20 seconds on a No. 2 Zahn Cup. Viscosity should be checked after 4 hours and adjusted if necessary.
- b. When applying modified urethane finishes, the painter should wear an approved respirator, which has a dust filter and organic vapor cartridge, or an air supplied respirator. All modified urethane finishes contain some isocyanate, which may cause irritation to the respiratory tract or an allergic reaction. Individuals may become sensitized to isocyanates.
- c. The pot life of the mixture is approximately 6-8 hours at 75°F. Pot pressure should be approximately 12 psi during application. Air pressure at the gun should be 40 to 50 psi.
- d. Scuff sand the primer only where runs or dirt particles are evident. Minor roughness or grit may be removed by rubbing the surface with brown Kraft paper which has been thoroughly wrinkled. Unmask ABS and other preprimed parts and check tapes. Clean surface with a jet of low pressure, dry air.

19-10. PAINTING ALL-OVER WHITE OR COLOR.

- a. Complete painting of the plane should be done with 2 or 3 wet, even coats. Dry coats will not reflow, and will leave a grainy appearance.
- b. Allow 5 minute period for the finish to flash off before moving aircraft to the oven.
- c. Move to the force dry oven and dry for approximately 1 1/2 hours at 120°F to 140°F.
- d. Dry film thickness of the overall color should be between approximately 2.0 mils. Films in excess of 3.0 mils are not desirable.

19-11. MASKING FOR STRIPES.

- a. Remove airplane from the oven. Allow airplane to cool to room temperature before masking.
- b. Mask stripe area using 3M Tape Y231 or 3M Tape Y218 and Class A solvent proof paper. Double tape all skin laps to prevent blow by.
- c. Airplanes which will have a stripe only configuration shall be masked, cleaned, and primed, in stripe area only.
- d. If the base coat is not over 72 hours old, the stripe area does not require sanding. If sanding is necessary because of age or to remove surface defects, use #400 or #600 sandpaper. Course paper will leave sand marks which will decrease gloss and depth of gloss of the finish. The use of power sanders should be held to a minimum, if used, exercise care to preclude sanding through the white base coat. Wipe surface to be striped with a tack cloth and check all tapes.

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- e. Stripe colors on Imron base coat will be Imron Enamel. Mix as outlined in paragraph 19-9.
- f. Painting of the stripe should be done with 2 or 3 wet-even coats. Dry coats will not reflow, and will leave a grainy appearance. Stripes may be force dried or air dried. Film thickness of a stripe is approximately 1.5 mil to 2.0 mils.
- g. Do not remove masking tape and paper until the paint has dried to a "dry to touch" condition. Care should be exercised in removal of the masking to prevent damage to the finish.
- h. Modified urethane finishes are sensitive to moisture, therefore, should be stored out of rain until cured.

19-12. TOUCH UP.

When necessary to touch up or refinish an area, the defect should be sanded with #400 and followed by #600 sandpaper. Avoid, if possible, sanding through the primer. If the primer is penetrated over an area 1/2 inch square or larger, repriming is necessary. Avoid spraying primer on the adjacent paint as much as possible. Since urethane finishes cannot be "spotted in" repairs should be in sections extending to skin laps or stripe lines.

- a. Dry overspray and rough areas may be compounded out with DuPont #808 rubbing compound.
- b. Grease, bug stains, etc., may be removed from painted surfaces with DX440 Wax and Grease Remover or Imperial Cleaner. Klad Polish may be used on bare aluminum to remove stains, oxides, etc.
- c. Rework areas, where paint or primer removal is required, may be stripped with Strypeeze Paint Remover. All traces of stripper must be removed before refinishing.

19-13. REPAIR OF DENTS.

NOTE

Refer to Section 18 for repair of damaged area(s). Dent repair as described in this Section is applicable only to smooth dents in the skin that are free from cracks, sharp corners, are not stress wrinkles and do not interfere with any internal mechanism.

- a. To repair dents use White Streak Filler or equivalent. Mix White Streak in the correct proportion as recommended by the manufacturer.
- b. Do not apply White Streak Filler over paint. All paint shall be removed in the repair area and the aluminum surface sanded lightly to increase adhesion. Apply the White Streak to a level slightly above the surrounding skin. After drying for 10-15 minutes, sand the filler flush with the skin surface, using care to feather the edges.

NOTE

Application of a top coat thickness in excess of 5.0 mils, requires a control surface balance check.

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CIRCUIT FUNCTION AND SPECIFIC CIRCUIT CODE LETTERS

A - Armament
B - Photographic
C - Control Surface
CA - Automatic Pilot
CC - Wing Flaps
CD - Elevator Trim
D - Instrument (Other Than Flight or Engine Instrument)
DA - Ammeter
DB - Flap Position Indicator
DC - Clock
DD - Voltmeter
DE - Outside Air Temperature
DF - Flight Hour Meter
E - Engine Instrument
EA - Carburetor Air Temperature
EB - Fuel Quantity Gage and Transmitter
EC - Cylinder Head Temperature
ED - Oil Pressure
EE - Oil Temperature
EF - Fuel Pressure
EG - Tachometer
EH - Torque Indicator
EJ - Instrument Cluster
EK - Turbine Inlet Temperature
EL - Fuel Flow
F - Flight Instrument
FA - Bank and Turn
FB - Pitot Static Tube Heater and Stall Warning Heater
FC - Stall Warning
FD - Speed Control System
FE - Indicator Lights
G - Landing Gear
GA - Actuator
GB - Retraction
GC - Warning Device (Horn)
GD - Limit Switches
GE - Indicator Lights
H - Heating, Air Conditioning, Ventilating and De-Icing
HA - Anti-Icing
HB - Cabin Heater
HC - Cigar Lighter

DH - De-Ice
HE - Air Conditioners
HF - Cabin Ventilation
J - Ignition
JA - Magneto
K - Engine Control
KA - Starter Control
KB - Propeller Synchronizer
L - Lighting
LA - Cabin
LB - Instrument
LC - Landing
LD - Navigation
LE - Taxi
LF - Rotating Beacon
LG - Radio
LH - De-ice
LJ - Fuel Selector
LK - Tail Flood Light
LL - Recognition Lighting
M - Miscellaneous
MA - Cowl Flaps
MB - Electrically Operated Seats
MC - Smoke Generator
MD - Spray Equipment
ME - Cabin Pressurization Equipment
MF - Chem O ₂ - Indicator Light
P - D. C. Power
PA - Battery Circuit
PB - Generator Circuits
PC - External Power Source
PH - Anti-Ice Power Source
Q - Fuel and Oil
QA - Auxiliary Fuel Pump
QB - Oil Dilution
QC - Engine Primer
QD - Main Fuel Pumps
QE - Fuel Valves
R - Radio (Navigation and Communication)
RA - Instrument Landing
RB - Command
RC - Radio Direction Finding
RD - VHF
RE - Homing

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RF - Marker Beacon
RG - Navigation
RH - High Frequency
RJ - Interphone
RK - UHF
RL - Low Frequency
RM - Frequency Modulation
RP - Audio System and Audio Amplifier
RR - Distance Measuring Equipment (DME)
RS - Airborne Public Address System

S - Radar
U - Miscellaneous Electronic
US - Identification - Friend or Foe
W - Warning and Emergency
WA - Flare Release
WB - Chip Detector
WC - Fire Detection System
WD - Low Level Fuel
WE - Vacuum Warning System
X - A. C. Power

CIRCUITS FUNCTION	GAUGE	BASE COLOR (or solid)	STRIPE COLOR
A - Power	16	Red	None
	18	Red	Black
	20	Red	White
		Red	Green
	22	Red	Yellow
Ground	16	Black	None
	18	Black	White
Mike Ground	22	Black	None
Radio Lights Dim	18	Yellow	None
Mike Audio	22	Tan	None
		Tan (Shielded)	None
Mike Key	22	White	Black
Radio Speaker	20	Green	None
Headphones	22	Blue	None
Dev - ●	22	Gray	Red
Dev - ●	22	Gray	Green

● "Dev" and "Dev-" circuits are for use in Nav-o-matic 300 autopilots and any associated omni indicator circuit to which it connects.

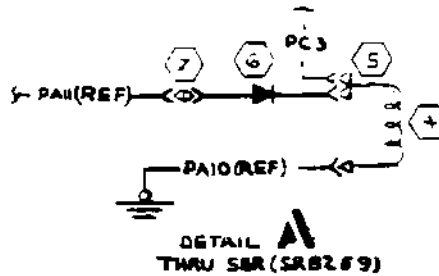
NOTE

All other color-coded wires are for general use in multiconductor radio and autopilot harness assemblies.

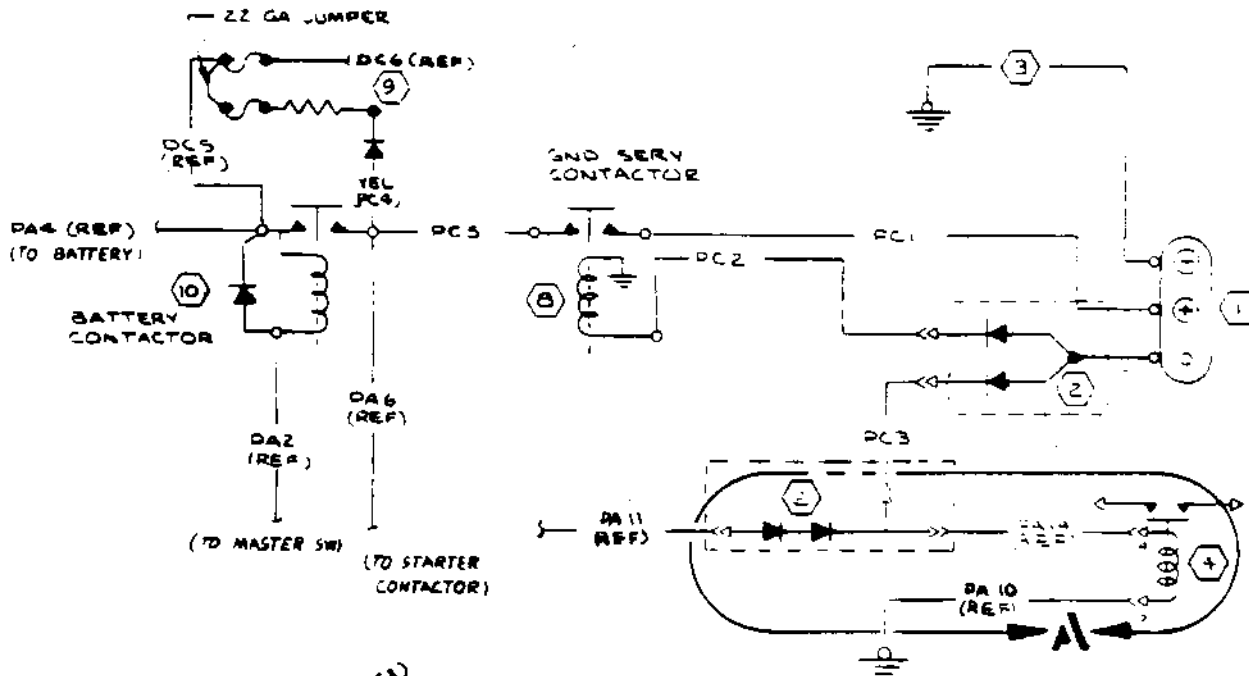
CROSS REFERENCE LISTING OF SERIAL REQUEST NUMBERS LISTED ON DIAGRAMS VS. AIRCRAFT SERIAL NUMBERS.

SR NO.	AIRCRAFT SERIAL NO.	SR NO.	AIRCRAFT SERIAL NO.	SR NO.	AIRCRAFT SERIAL NO.
SR7692	17263459	SR8773	17271035 & F17201750	SR9624	17274010
SR7903	17265685 & F17201385	SR8774	R1722910 & FR17200631	SR9625	R17203400
SR7904	FR17200562	SR9014	17270900 & F17201750	SR9742	17274183 & F17202040
SR8133	17265685 & F17201515	SR9104	17272885	SR10034	17275035 & F17202135
SR8134	FR17200591	SR9105	R1723200	SR10056	17275035 & F17202135
SR8146	R1722000	SR9145	17270790	SR10092	17275800 & F17202195
SR8259	17265782 & F17201445	SR9187	17271576	SR10185	17275675
SR8453	17269310 & F17201640	SR9270	17272885, F17201910 & R1723200	SR10248	17275361 & F17202136
SR8454	R1722725 & FR17200621	SR9429	R17272383	SR10412	17276260 & F17202234
SR8490	17267585, F17201515	SR9435	17271744 & F17201830	SR10523	17276080 & F17202216
	R1722000 & FR17200591	SR9583	17273154	SR10581	17275869
SR8552	17268213 & R1722141	SR9608	17269310 thru 17272884	SR11072	17276517
SR8596	17269310, R1722825		F17201640 thru F17201909		

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REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: ADD PAH(REF): DELETE S-2064-1 1570043 WAS 0770719-2 (SR8259)	5-23-15	ST 077 1570043
B	BY REV: ADD DETAIL SR82591	5-23-15	ST 077 1570043
C	BY REV: 0553010 WAS 0312551, 0535061 WAS AN 255-3A (NON SHOP PRACTICE)	5-28-16	ST 077 1570043



INACTIVE
EFF THRU SER (SR 8453)
RS
27
27

QTY	PART NO.	DESCRIPTION	QTY	PART NO.	DESCRIPTION
2	PCS	CONTACTOR	1	S-367-113	S-367-113
18	SE	FUSE & DIODE ASSY	18	S-367-113	SOLDER
18	PC3	CONTACTOR	6	S-1493-1	S-1493-1
18	PC2	CONTACTOR	2	S-1493-1	S-367-110
2	PC1	CONTACTOR	12	S-367-114	S-367-113
QTY	PART NO.	DESCRIPTION	QTY	PART NO.	DESCRIPTION
1	DA11	RECEPTACLE	1	DA10	RECEPTACLE

WIRE TABLE			
WIRE CODE NO.	GA	MATERIAL	LG
1	18	18-4	18
2	18	18-4	18
3	18	18-4	18
4	18	18-4	18
5	18	18-4	18
6	18	18-4	18
7	18	18-4	18
8	18	18-4	18
9	18	18-4	18
10	18	18-4	18
11	18	18-4	18
12	18	18-4	18
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91	18	18-4	18
92	18	18-4	18
93	18	18-4	18
94	18	18-4	18
95	18	18-4	18
96	18	18-4	18
97	18	18-4	18
98	18	18-4	18
99	18	18-4	18
100	18	18-4	18

PART NO.	DESCRIPTION
0	S-1519-2 CONTACTOR
9	0712031 FUSE & DIODE ASSY
8	S-1660-1 CONTACTOR
7	S-2064-1 CONTACTOR
6	0770719-2 DIODE ASSY
5	S-2023-1 ADAPTER
4	S-1817-1 RELAY
3	053010 GROUND STRAP
2	1570043 DIODE ASSY
1	W531201 RECEPTACLE

EQUIPMENT TABLE			
PART NO.	DESCRIPTION	QTY	REMARKS
1	W531201	1	RECEPTACLE
2	1570043	1	DIODE ASSY
3	053010	1	GROUND STRAP
4	S-1817-1	1	RELAY
5	S-2023-1	1	ADAPTER
6	0770719-2	1	DIODE ASSY
7	S-2064-1	1	CONTACTOR
8	S-1660-1	1	CONTACTOR
9	0712031	1	FUSE & DIODE ASSY
0	S-1519-2	1	CONTACTOR

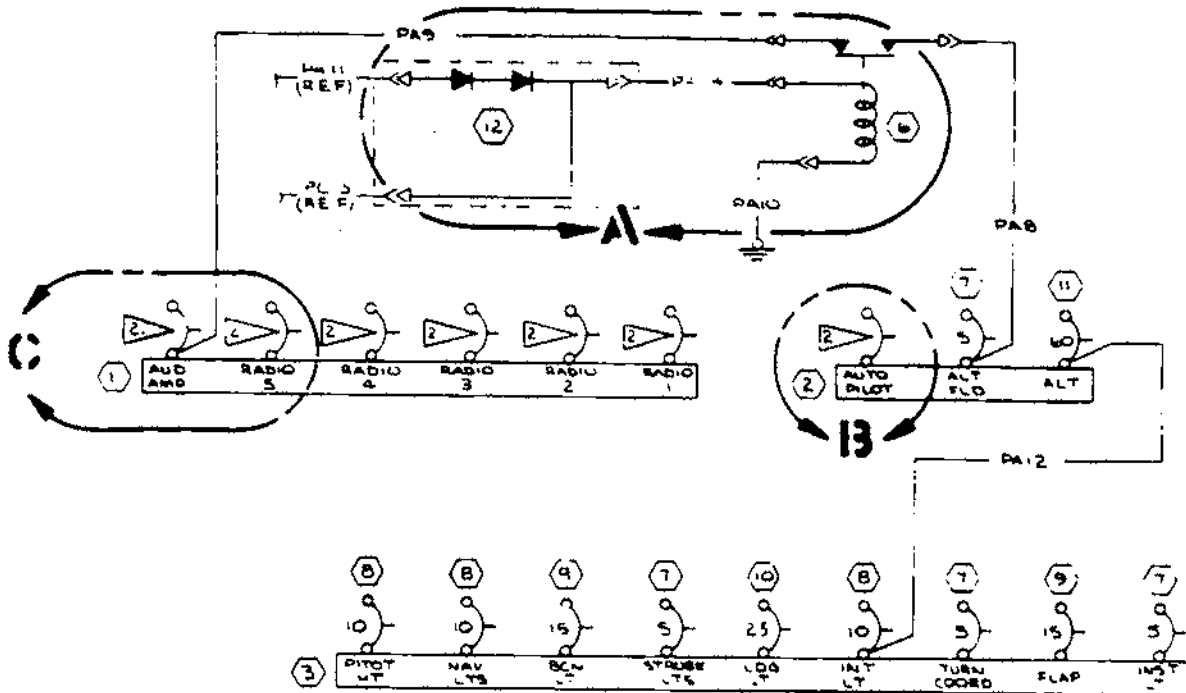
WIRING DIAGRAM -			
GROUND SERVICE RECEPTACLE (OPT)			
DESIGN	G. STAMM	DATE	1-1-14
GROUP	BILLY DEN	DATE	1-1-14
DRAWN	MERRICK	DATE	1-1-14
CHECK	J. YOUNG	DATE	1-1-14
STRESS			
PROJ			
APPRO			
OTHER			
SIZE	C	CODE IDENT.	71379
DWG NO			0570101
SCALE	NONE	DATE	5-19-13
PAGE	4	TOTAL	20

MODEL 172 SERIES SERVICE MANUAL

NOTES:

1. THIS LOCATION FOR FUEL PUMP CIRCUIT BREAKER ON PR172 ONLY
2. VALUE OF THESE CIRCUIT BREAKERS VARY WITH OPTIONAL EQUIPMENT INSTALLED

REV	DESCRIPTION	DATE	APPD
A	BY REV: 5-1360-15L WAS 5-1360-10L AT BGN LT CKT BKR (SR7004746)	BAH 5-13-75	SR7004746
B	BY REV: ADD PWR: 50043 WAS 010719 2; DELETE 5-2064-1 (SR8259)	MS 5-23-75	SR8259
C	BY REV: ADD DETAIL A 5-2023-1; 5-2064-1 & 017019 (SR8259)	RS 6-16-75	SR8259
D	BY REV: DELETE NOTE 1 & PART NOS. FROM CMT BKR REFERRED TO BY NOTE 2; ADD NOTE 2 & DETAILS "B" & "C" (SR7504)	TMS 7-23-75	SR7504
E	BY REV: 5-1360-25L WAS 5-1360-20L ADD R172 (SR8335SR8336SR8337)	700 7-23-75	SR8335SR8336SR8337



INACTIVE
REF THRU SER (SR8453) (SR8454)
RS 2-1-76
700-444 ZF

3	071019	DIODE ASSY
2	510043	DIODE BOARD ASSY
1	5-596-60L	CIRCUIT BREAKER
10	5-1360-25L	CIRCUIT BREAKER
9	5-1360-15L	CIRCUIT BREAKER
8	5-1360-10L	CIRCUIT BREAKER
7	5-1360-5L	CIRCUIT BREAKER
6	5-1911	RELAY
5	5-2023-1	ADAPTER
4	5-2064-1	CONNECTOR
3	0510419-1	BUS BAR
2	0570419-2	BUS BAR
1	0570419-3	BUS BAR

PART NO.	DESCRIPTION
3	0510419-1
2	0570419-2
1	0570419-3

EQUIPMENT TABLE

CES-400 IS APPLICABLE
VENOOR CODES PER S-400
CES-XXXX-CESNA SPEC. NO.
S-XXX OR CNXXXX-CESNA
STD. NO.

SUPERSEDES:
0500062 P 48.1
SUPERSEDED BY:
0570311 P 40.0

PA14	3	5-1493-1	5-1493-1	SER(SR8459) 4 ON
PA12	6	5-1367-40	5-1367-40	
PA10	18	2	5-1493-1	5-1367-1-40
PA9	12	22	5-1493-3	5-1367-3-40
PA8	12	10	5-1493-3	5-1367-3-40

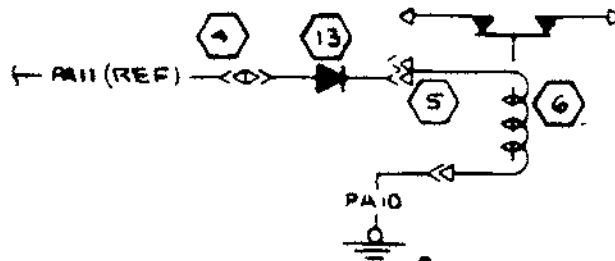
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS	SERIALS

WIRE TABLE

CONTRACT NO.	NAME	DATE	TITLE
DESIGN	G. STANNA	1-1-74	WIRING DIAGRAM -
GROUP	R. H. STANNA	1-1-74	BUS BAR, PRIMARY,
DRAWN	MERICK	10-9-74	ALTERNATOR & ELECTRONIC
CHECK	J. YOUNG	12-9-74	
STRESS			

SIZE	CODE IDENT	OWG NO
C	71379	0570101
SCALE	NONE	(SR7504) (SR7504) PAGE: 43

MODEL 172 SERIES SERVICE MANUAL

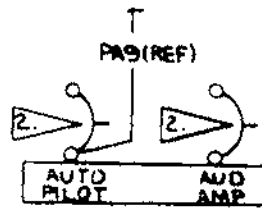


DETAIL A
THRU SER (SRB259) (172G5782 FI1214931
FR1720581)

TO FUEL
PUMP SW



DETAIL B
(APPLIES TO FR172 (R172 ONLY))



DETAIL C
(APPLIES TO FR172 (R172 ONLY))

CONTRACT NO.			Cessna AIRCRAFT CO.			COMMERCIAL AIRCRAFT DIV 3800 E. PARKWAY WICHITA, KANSAS		
DESIGN	NAME	DATE	TITLE					
GROUP	NAME	DATE	WIRING DIAGRAM —					
DRAWN	NAME	DATE	BUS BAR, PRIMARY,					
CHECK	NAME	DATE	ALTERNATOR & ELECTRONIC					
BY	NAME	DATE	SIZE					
APPRO	NAME	DATE	CODE IDENT					
OTHER	NAME	DATE	DWG NO					
			C			71379		
			SCALE			NONE		
			1/8" = 1"			PAGE 43		

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: ADD DETAIL A (SR7904)	TMS 3-10-78	RF
B	BY REV: F WAS A + A WAS F (NOW SHOP PRACTICE)	RJP 10-8-78	RF
C	BY REV: DELETE NOTE 1 0110119-2 ADD R172 (NOW SHOP PRACTICE) (SR8446)	RJA 2-25-76	RF

NOTES:

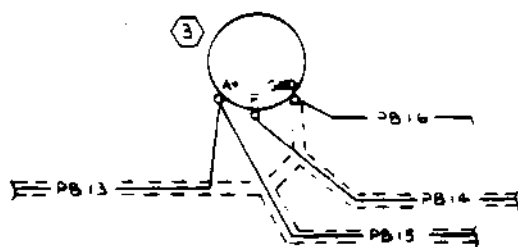
1. OBSERVE POLARITY SYMBOL ON DIODE WHEN INSTALLING ON SWITCH TO AVOID DIODE FAILURE
2. AMP TERM 422B1-2 ON CONDUCTOR, AMP TERM 2-323931-2 ON SHIELD & GND WIRE

INACTIVE
EFF THRU SEP (SR8455) (SR8454)
RF

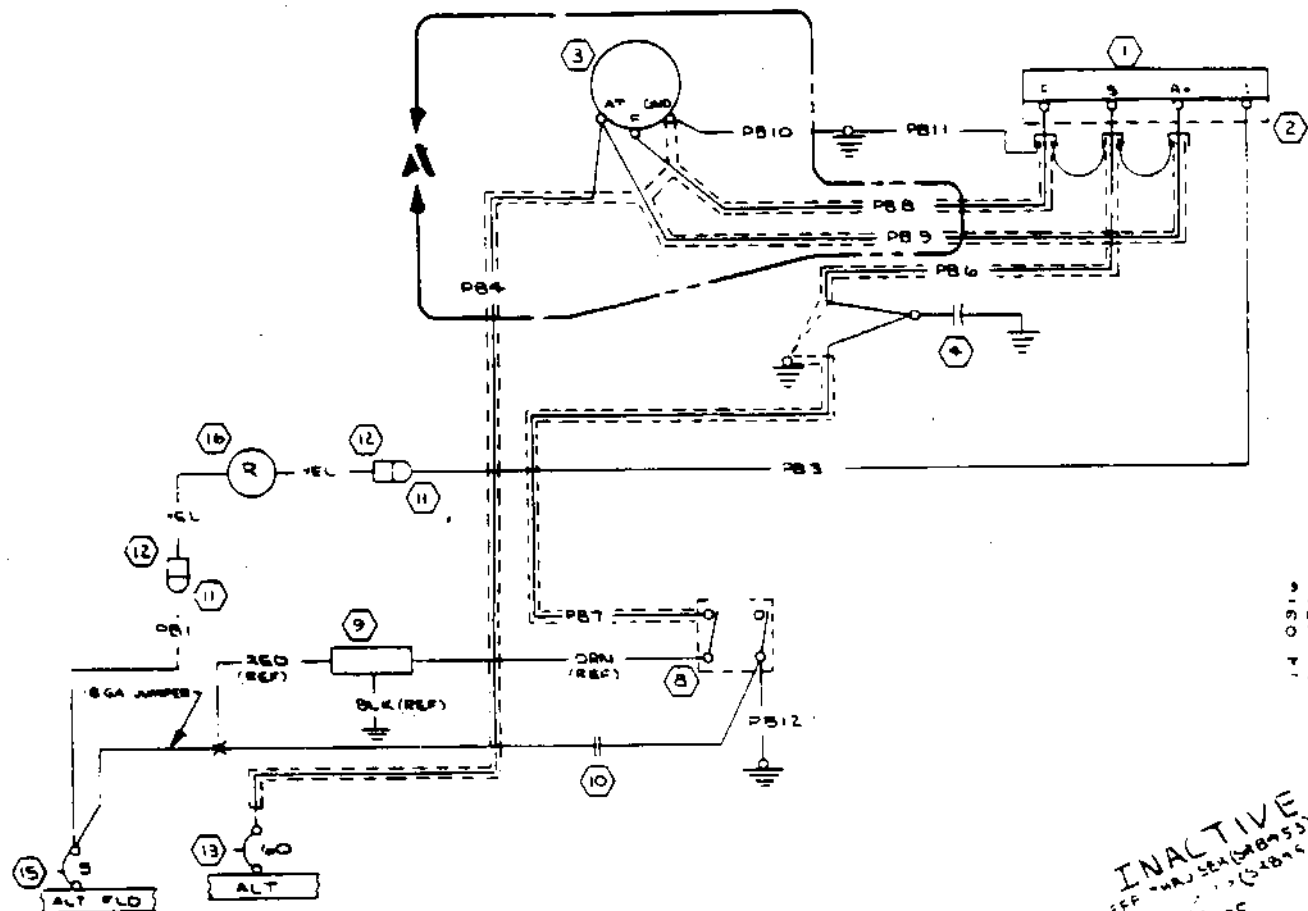
53 0916
53 0916

10 S-2-35-1 LIGHT ASSY 5 S-1360-5-1 CIRCUIT BREAKER 3 S-1590-604 CIRCUIT BREAKER 12 S-11637-2 HOUSING 17 S-11637-1 HOUSING 10 TVA-1315 CAPACITOR 9 CS93001-0101 OVERVOLTAGE SENSOR 8 S-1994-1-1 SWITCH		PB16 B S-1562-8-9 PB15 185 PB14 185 PB13 BS S-1534-8-9 PB12 18 PB11 16 PB10 E S-1562-8-9 PB9 185 PB8 185 PB7 185 PB6 185 PB4 BS S-1534-8-9 PB3 22 PB1 22 WIRE CODE NO GA MATERIAL LG TERMINALS SERIALS	
4 0710038-2 FILTER 3 C611501-0102 ALTERNATOR ASSY 2 C611501-0102 ALTERNATOR ASSY 1 C611001-0201 REGULATOR		EQUIPMENT TABLE CES-1000 IS APPLICABLE VENDOR CODES PER S-400 CES-XXXX-CESNA SPEC. NO. S-XXX OR CESNA-CESNA STD NO.	
SUPERSEDES S-411.1 050006 L P 4-14-1 SUPERSEDED BY 051011 P-5.0		WIRE TABLE CONTRACT NO: NAME DATE DESIGN G STAMMI 12-7-76 GROUP E HANDEL 12-7-76 DRAWN MERRICK 10-3-76 CHECK J YQUEL 12-16-76 STRESS PROJ APPD OTHER	
COMMERCIAL AIRCRAFT DIV 5800 E PAWNEE WICHITA KANSAS		TITLE WIRING DIAGRAM - ALTERNATOR SYSTEM, 60 AMP	
SIZE CODE IDENT DWG NO C 71379 0570101		SCALE NONE 15- 241900 PAGE 4-4-0	

MODEL 172 SERIES SERVICE MANUAL



DETAIL A
(APPLIES TO FR172 (A172 ONLY))



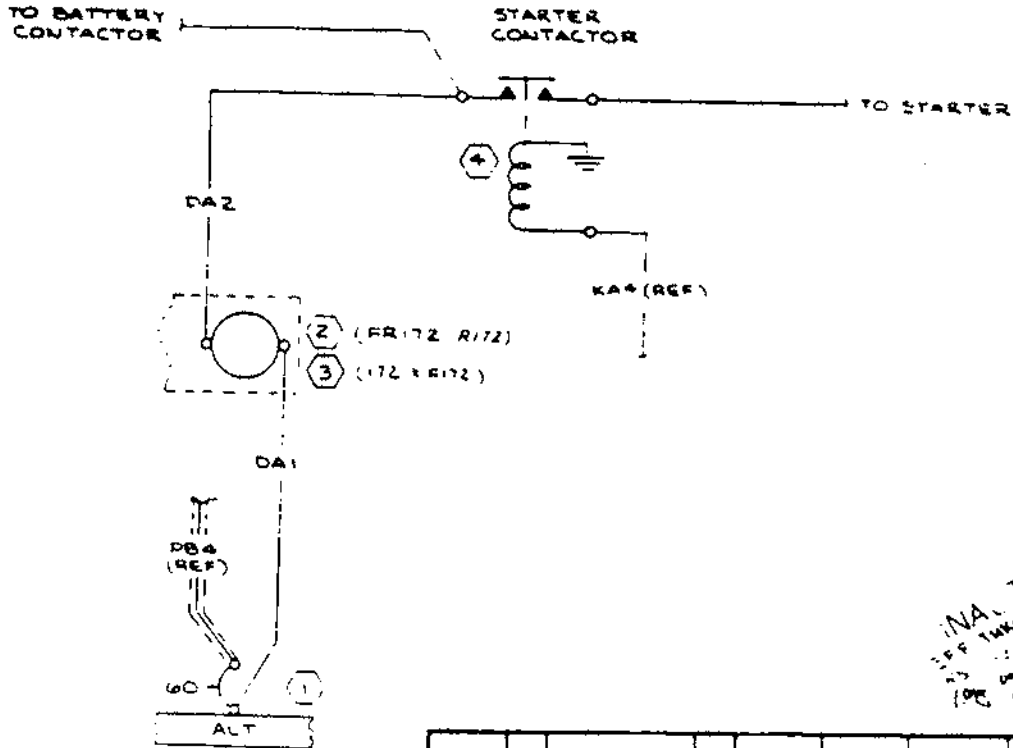
14 0319
53 0319

INACTIVE
REF. WIRING (48453)
43 10 25

CONTRACT NO.		Cessna AIRCRAFT CO.		PAWNEE DIVISION 3800 E PAWNEE WICHITA, KANSAS	
DESIGN	NAME	DATE	TITLE		
GROUP	NAME	DATE	WIRING DIAGRAM -		
DRAWN	NAME	DATE	ALTERNATOR SYSTEM,		
CHECK	NAME	DATE	60 AMP		
SYNOPSIS					
PROJ.					
APPD.					
OTHER					
SIZE	COORD. TENT.	DWG. NO.			
C	71379	0570101			
SCALE NONE		SERIAL (INDICATED) PAGE 4 OF 1			

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADG 9112 (SR 846)	28 5 2-25 76	YH-406 28 770



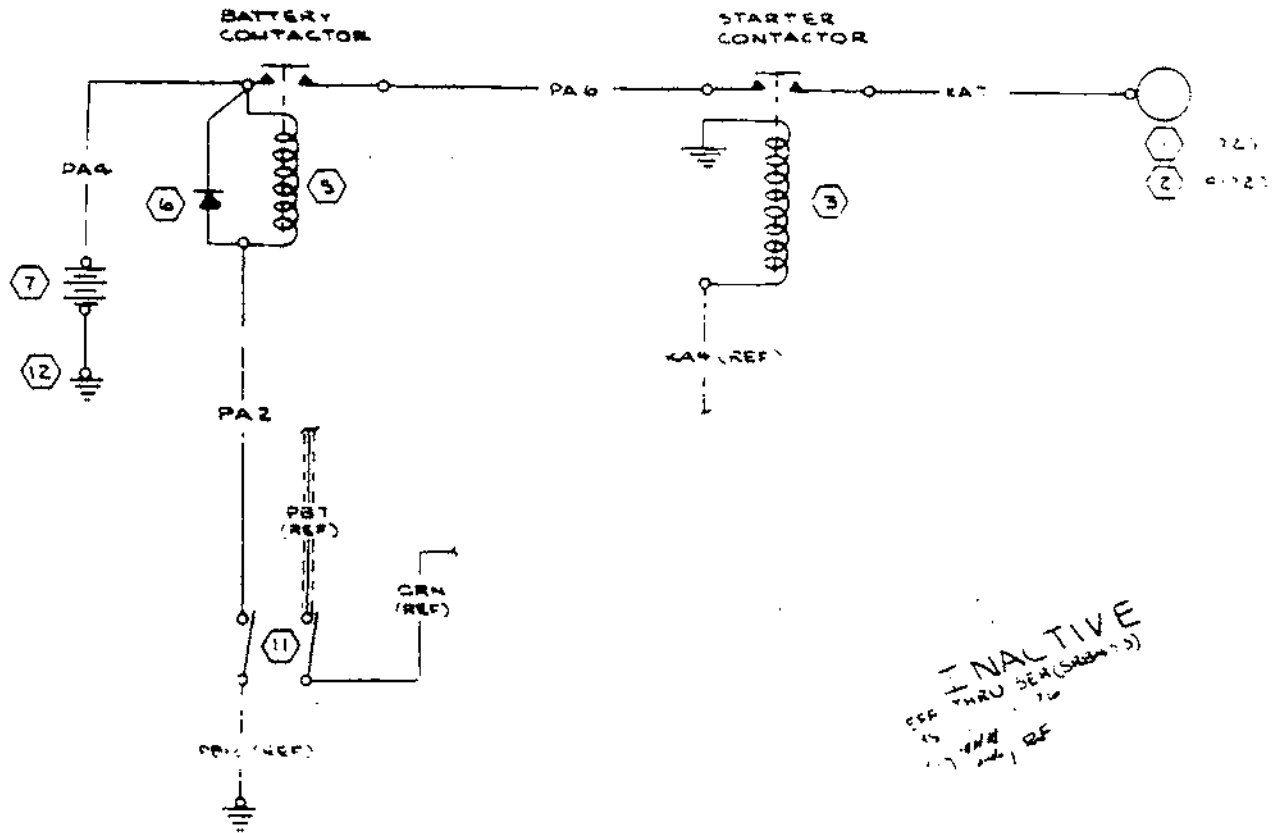
INACTIVE

[illegible]

			WIRE TABLE			COMMERCIAL AIRCRAFT DIV 5800 E. PAWNEE WICHITA, KANSAS		
CONTRACT NO.			CASA AIRCRAFT CO.			TITLE		
DESIGN			NAME			DATE		
GROUP			G. STAMPA			11-1-76		
DRAWN			MERRICK			10-31-76		
CHECK			J. YOUNG			12-4-76		
STRESS								
PART NO.			DESCRIPTION			EQUIPMENT TABLE		
CES-1000 IS APPLICABLE			SUPERSEDES:			SIZE		
VENDOR CODES PER S-400			030362			CODE IDENT		
CES-1111-CASA SPEC. NO.			0 4 15			DWG NO		
S-1111 OR CHUQUIN-CASA			0 4 16			C 71379		
STD. NO.			SUPERSEDED BY:			0570101		
			2410511			SCALE - 1:1		
			OTHER			PAGE 4 OF 4		

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	31 REV. DELETE 3770719-2 (NOW SHOP PRACTICE)	7-27-65	SEE WIRING 25 6-15-76



INACTIVE
SEE THRU SER (S222-1-5)
15
1-1-76
1-1-76

5-1-0916

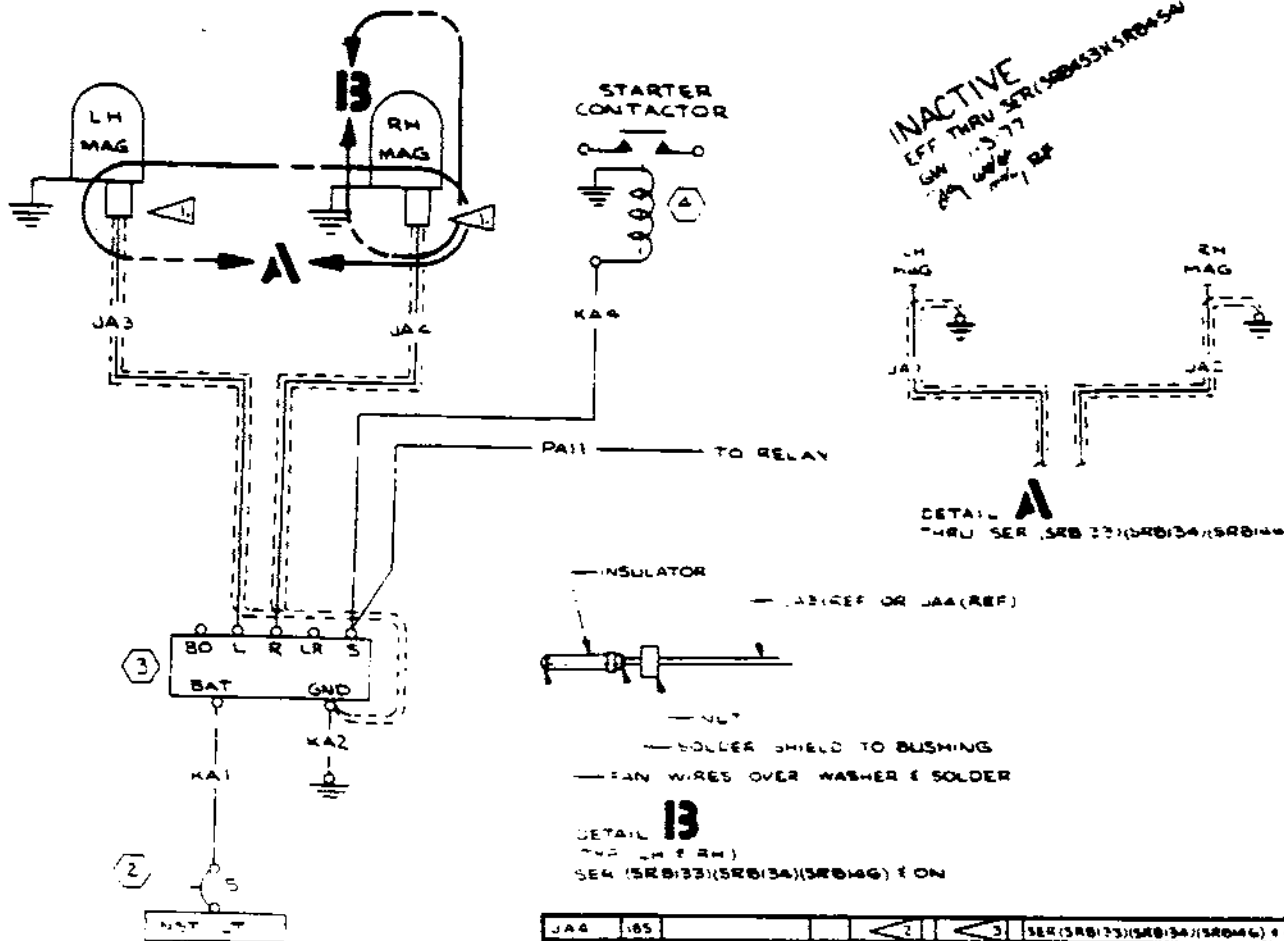
EQUIPMENT TABLE				WIRE TABLE			
PART NO.	DESCRIPTION	QUANTITY	REMARKS	WIRE NO.	GA.	MATERIAL	TERMINALS
12	0412007-1	BATTERY GND		KA 7	4	30	5-1367-615 5-1367-615
11	5-1994-1-1	SWITCH		PA 6	4	16	5-1367-615 5-1367-615
				PA 4	4	6	5-1367-615 5-1367-615
8				PA 2	22	57	5-1367-615 5-1367-615
7	0311315-1	BATTERY ASSY					
6	0770728-1	DIODE ASSY					
5	5-1579-2	CONTACTOR					
4							
3	5-1951-1	CONTACTOR					
2	631261	STARTER					
1	76211	STARTER					
CONTRACT NO:				Cessna AIRCRAFT CO.			
DESIGN				WIRING DIAGRAM -			
GROUP				BATTERY CIRCUIT			
DRAWN				C			
CHECK				71379			
SYNOPSIS				0570101			
SUPERSEDED:				SCALE: NONE			
SUPERSEDED BY:				PAGE: 4.7.C			

MODEL 172 SERIES SERVICE MANUAL

NOTES:

1. ADD 5-1488-1 NIPPLES TO MAG END OF WIRES
2. 5-1376-1-6 FOR CENTER CONDUCTOR
5-1376-2-6 FOR SHIELDING
3. TERMINALS SUPPLIED WITH ENGINE

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	34 REV. ACC JAZ JAZ DETAIL A 8 B 6 2ER SER OUT JAZ JAZ ACC NOTE 243 (SRB:33)(REF)SRB:34(REF)SRB:46(REF)	SEP 30 76	JS [Signature]



JA4	BS		2	3	SER(SRB:23)(SRB:34)(SRB:46) & ON
JA3	BS		2	3	SER(SRB:33)(SRB:34)(SRB:46) & ON
DA1	BS	8	5-1367-1	5-1493-1	
LA2	BS	50	5-1367-1-4	5-1367-1-2	THRU SER (SRB:23)(SRB:34)(SRB:46)
JA1	BS	45	5-1367-1-4	5-1367-1-2	THRU SER (SRB:33)(SRB:34)(SRB:46)
KA4	BS	52	5-1367-1-4	5-1367-1-0	
LA2	BS	8	5-1367-1-4	5-1367-1-8	
LA1	ZZ	16	5-1367-1-4	5-1367-1-8	
WIRE NO	QA	MATERIAL	LG	TERMINALS	SERIALS

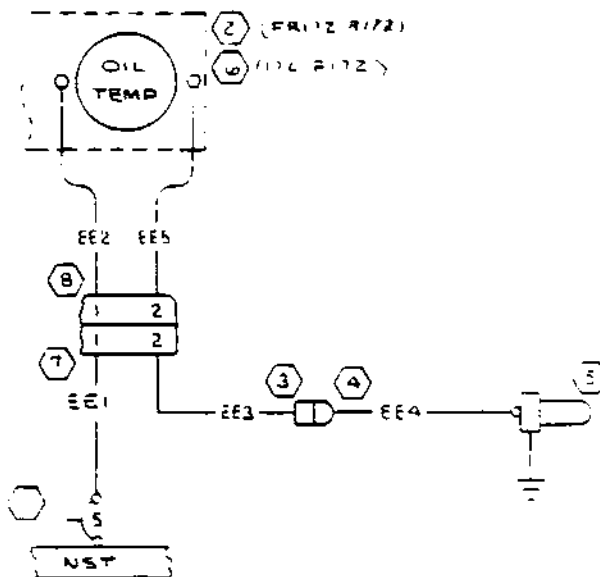
4	S-1991-1	CONTACTOR
5	6392501-0105	IGNITION SWITCH
6	S-1360-2L	CIRCUIT BREAKER
PART NO.		DESCRIPTION
EQUIPMENT TABLE		

CES-1000 IS APPLICABLE VENDOR CODES PER S-400 CES-XXX-CESNA SPEC. NO. S-XXX ON CMXXX-CESNA STD NO.	SUPERSEDES 2500062 P 511 SUPERSEDED BY 0570311 PG 51

CONTRACT NO.			WIRE TABLE		
			COMMERCIAL AIRCRAFT DIV 3800 E. PAWNEE WICHITA, KANSAS		
NAME DATE			Cessna AIRCRAFT CO.		
DESIGN 5 STAVAN 12-4-76			TITLE		
GROUP E HAKU 12-4-76			WIRING DIAGRAM —		
DRAWN MERRICK 10-4-76			MAGNETO SYSTEM		
CHECK 5 TOMEI 12-6-76					
STRESS					
PROJ 5 12-4-76			SIZE		
APPD JPE			CODE IDENT NO		
OTHER			DWG NO		
			C 71379		
			0570101		

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV C669512-0102 WAS C669511-0102 (SRT904)	9LA 22-75	57-18 F
B	3Y REV: DELETE EE2 (SRT903) (REFYSA7904) (REF)	RIP 4-10-75	57-18 25
C	3Y REV: ADD EE2, EE5, 5-1430-100 5-1641-30 5-1636-1 WAS SOLDER. EE1 & EE3, 5-1360-50 WAS 5-160-10L, 5-1367-1-C WAS SOLDER/EE5N EE1, C669512-0103 WAS C669512-0101 (NOW SMOOR PRACTICE)	RIP 10-8-75	57-18 25
D	3Y REV: ADD R172 (SAB146)	RIP 2-25-76	57-18 25



8	S-1640-9	CONNECTOR
7	S-1641-9	CONNECTOR
6	CW4512-0103	INST CLUSTER
5	S-1630-1	SENDING UNIT
4	S-1637-1	HOUSING
3	S-1637-2	HOUSING
2	CW4512-0103	INST CLUSTER
1	S-1640-5L	CIRCUIT BREAKER

	PART NO.	DESCRIPTION
EQUIPMENT TABLE		

CES-000 IS APPLICABLE
VENDOR CODES PER S-000
CES-ELITE-CESMA SPEC. NO.
S-XXX OR CHANGING-CESMA
STD. NO.

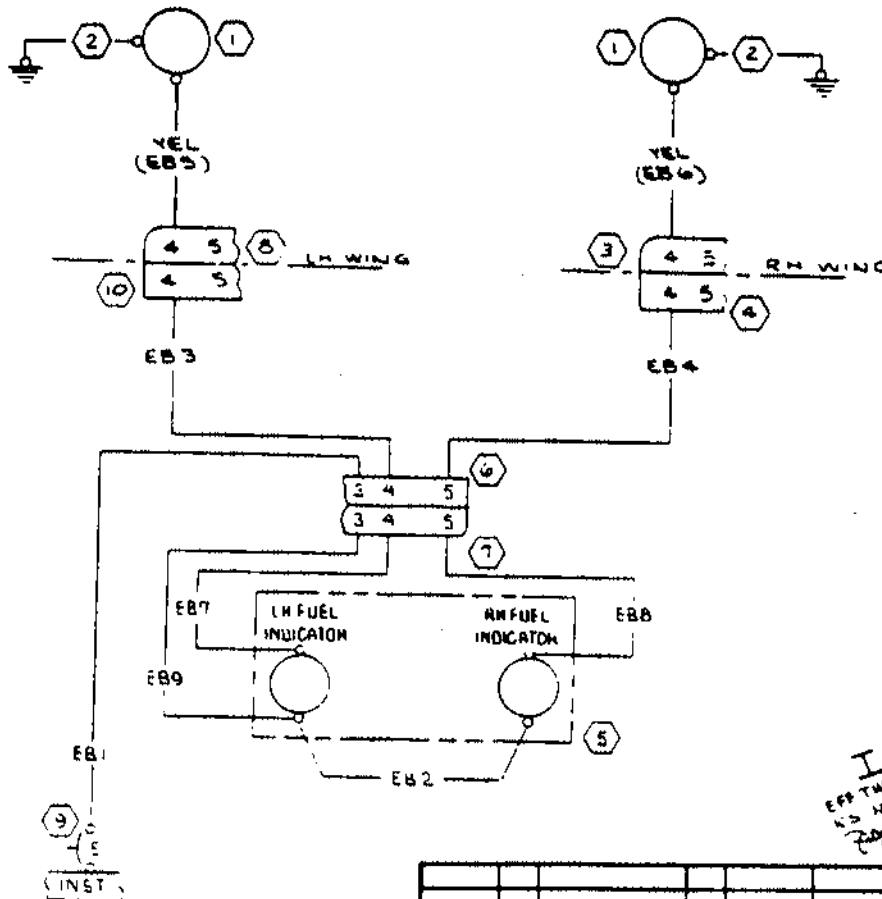
0510311 P 120

[illegible]

CONTRACT NO:			WIRE TABLE		
			COMMERCIAL AIRCRAFT DIV 5800 E. PAWNEE WICHITA, KANSAS		
DESIGN	NAME	DATE	Cessna AIRCRAFT CO.		
GROUP			TITLE		
DRAWN			WIRING DIAGRAM -		
CHECK			OIL TEMPERATURE		
STRESS					
PREP			SIZE	CODE IDENT NO	DWG NO
APPRO			C	71379	0570101
OTHER			SCALE: NONE		PAGE: 1 of 1

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPO
A	BY REV: ADD EB7, EBB, EBB, S-1640-9 & S-1641-9; S-1640-6 WAS S-1640-1, S-1636-1 WAS S-1367-1 D/EB1, S-1636-1 WAS S-1367-1 D/EB3 & S-1636-1 WAS S-1367-1 D/EB4 (NOW SHOP PRACTICE)	8-8-75	25



INACTIVE
EFF THRU 8-8-75 (S-1640-9)
13-12-76
25

54 0916
53 0916

10	S-1641-6	HOUSING
9	S-1360-3L	CIRCUIT BREAKER
8	S-1640-6	HOUSING
7	S-1640-9	CONNECTOR
6	S-1641-9	CONNECTOR
5	CL69511-0102	INST CLUSTER
4	S-1641-6	HOUSING
3	S-1640-6	HOUSING
2	0413247	STRAP-GND
1	CS23557-1	INST-FUEL GAGE

WIRE	CODE NO.	GA	MATERIAL	LG	TERMINALS	SERIALS
EB9	22				S-1635-1 S-1367-1-10	
EB8	22				S-1367-1-10 S-1635-1	
EB7	22				S-1367-1-10 S-1635-1	
EB6	22	-18-4	38	S-1635-1	S-1367-1-10	
EB5	22	-18-4	38	S-1635-1	S-1367-1-10	
EB4	1		82	S-1636-1	S-1636-1	
EB3	1		45	S-1636-1	S-1636-1	
EB2	1		3	S-1367-1-10	S-1367-1-10	
EB1	22		16	S-1367-1-10	S-1636-1	

PART NO.	DESCRIPTION

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX-CESNA SPEC. NO.
S-XXX OR CHXXXX-CESNA
STD. NO.

SUPERSEDES P B.1.2
0500042 P B.1.3
SUPERSEDED BY
0510311 P B.1.0

CONTRACT NO.			WIRE TABLE		
DESIGN	NAME	DATE	Cessna AIRCRAFT CO.		
GROUP	R. HADEN	10-75	COMMERCIAL AIRCRAFT DIV 3800 E. PAWNEE WICHITA, KANSAS		
DRAWN	MERRICK	10-31-74	TITLE		
CHECK	J. TOWEL	11-10-74	WIRING DIAGRAM — FUEL GAGE & TRANSMITTER		
SYNOPSIS					
PROJ.					
APPO					
OTHER					
SIZE	C	71379	CODE IDENT NO.	0570101	
SCALE	NONE		(081703) 547508	PAGE: 5-1-C	

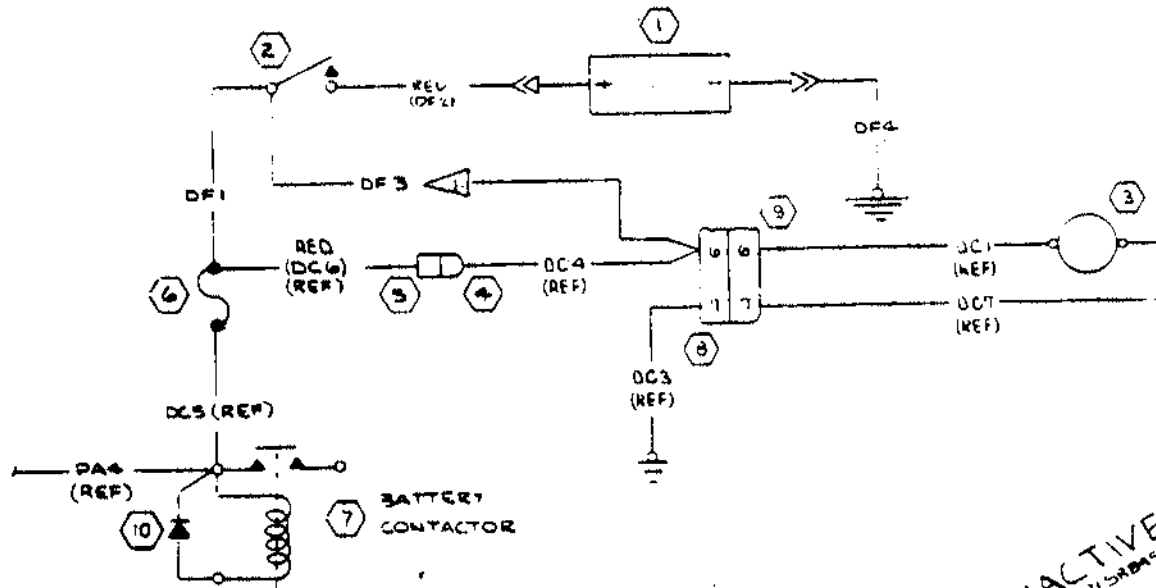
22 R170, R172
12-1-75 R170, R172, R173, R174, R175, R176, R177, R178, R179, R180, R181, R182, R183, R184, R185, R186, R187, R188, R189, R190, R191, R192, R193, R194, R195, R196, R197, R198, R199, R200, R201, R202, R203, R204, R205, R206, R207, R208, R209, R210, R211, R212, R213, R214, R215, R216, R217, R218, R219, R220, R221, R222, R223, R224, R225, R226, R227, R228, R229, R230, R231, R232, R233, R234, R235, R236, R237, R238, R239, R240, R241, R242, R243, R244, R245, R246, R247, R248, R249, R250, R251, R252, R253, R254, R255, R256, R257, R258, R259, R260, R261, R262, R263, R264, R265, R266, R267, R268, R269, R270, R271, R272, R273, R274, R275, R276, R277, R278, R279, R280, R281, R282, R283, R284, R285, R286, R287, R288, R289, R290, R291, R292, R293, R294, R295, R296, R297, R298, R299, R300, R301, R302, R303, R304, R305, R306, R307, R308, R309, R310, R311, R312, R313, R314, R315, R316, R317, R318, R319, R320, R321, R322, R323, R324, R325, R326, R327, R328, R329, R330, R331, R332, R333, R334, R335, 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MODEL 172 SERIES SERVICE MANUAL

NOTES:

1. WHEN OPTIONAL CLOCK IS INSTALLED
SP. WIRE IS OMITTED & DF3 WIRE
IS USED

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV C664508-0101 WAS S-1317N2 (S-1317N2)	8/24/75	STW
B	BY REV: ADD S-1640-9, S-1641-9, DC1 (REF) DC2 (REF); DC4 (REF) WAS DC2 (REF); S-1636-2 WAS S-1367-1-B/DF3; ADD 0770728-1 (NOW SHOP PRACTICE)	2/10/75	STW
C	BY REV RED (DF2) WAS DF2. ADD POS SYMBOLS TO C664508-0101 INALT. DING (S-1367-1-B/DF3) (S-1367-1-B/DF3)	2/25/75	STW



INACTIVE
EPA 172 SER (S-1367-1-B/DF3) (S-1367-1-B/DF3)
AS
1/5 RE

PART NO.	DESCRIPTION
1	0770728-1 DIODE ASSY
2	S-1640-9 CONNECTOR
3	S-1641-9 CONNECTOR
4	S-1637-2 CONTACTOR
5	S-1091-1 FUSE
6	S-1637-2 HOUSING
7	S-1637-1 HOUSING
8	C664508-0101 CLOCK
9	S-1711-1 SWITCH-OIL PRESS
10	C664508-0101 HOURMETER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1000
CES-1000-CESNA SPEC. NO.
S-1000 OR CESNA/CESNA
STD. NO.

SUPERSEDED:
0700062 P 8.3
SUPERSEDED BY:
05 0311 P 8.2.0

WIRE	GA	MATERIAL	LG	TERMINALS	SERIALS
DF4	22		32	S-1493-1 S-1367-1-B	
DF3	22		51	S-1367-1-B S-1636-2	
REV (DF2)	22	-22-2	52	S-1493-1 S-1367-1-B	
DF1	22		52	S-1367-1-B SOLDER	

WIRE TABLE

DESIGN	NAME	DATE
GROUP	G. STAMPA	12-1-75
DRAWN	MERRICK	10-9-75
CHECK	J. YOUNG	12-6-75
STRESS		
PROJ		
APPRO		
OTHER		

CONTRACT NO.		COMMERCIAL AIRCRAFT DIV. 3800 E. PAWNEE WICHITA, KANSAS	
NAME	DATE	TITLE	
Cessna	AIRCRAFT CO.	WIRING DIAGRAM— HOURMETER (OPT)	
SIZE	CODE IDENT.	DWG NO.	
C	71379	0570101	
SCALE: NONE		(S-1367-1-B)	PAGE: 8.2.0

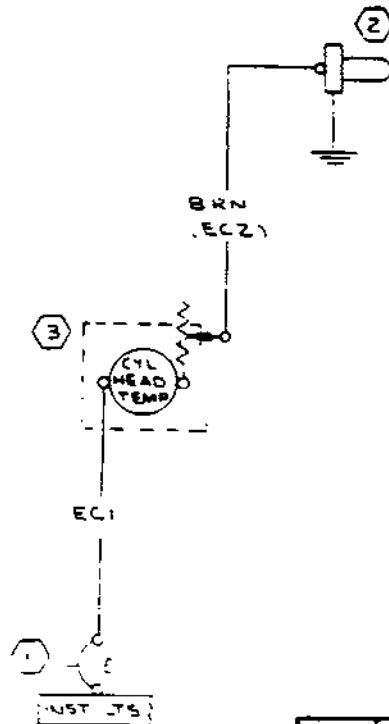
172 FILE
17865695, 07201383

MODEL 172 SERIES SERVICE MANUAL

NOTES:

- 1 CRIMP 5136-5 TERMINAL AROUND WIRE INSULATION. BEND 25 OF STRIPPED WIRE BACK OVER CRIMP & SOLDER PER CES 1040. USE MULEX MT-1921 CRIMPING TOOL ONLY
- 2 MATERIAL IS ALPHA 5837-7 (VENDOR CODE 92194) OR BELDEN 83009-1 (VENDOR CODE 70903)

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV 51360-5L WAS 51360-10L MT1921 IN NOTE 1 WAS MT1715-C (CH/KAH/RET)	J M S 10-6-75	SCY 248 PG 25
B	BY REV: ADD NOTE 2 (NOW SHOP PHANTREE)	10-1-76 J M S	SCY 248 PG 25



INACTIVE
EFF THRU SER 58453 (58454)
AS 10-1-76
H. J. W. 25

REV	DATE	DESCRIPTION	BY	CHKD
1	10-1-76	WIRING DIAGRAM	J M S	
2	10-1-76	WIRING DIAGRAM	J M S	
3	10-1-76	WIRING DIAGRAM	J M S	
4	10-1-76	WIRING DIAGRAM	J M S	
5	10-1-76	WIRING DIAGRAM	J M S	
6	10-1-76	WIRING DIAGRAM	J M S	
7	10-1-76	WIRING DIAGRAM	J M S	
8	10-1-76	WIRING DIAGRAM	J M S	
9	10-1-76	WIRING DIAGRAM	J M S	
10	10-1-76	WIRING DIAGRAM	J M S	
11	10-1-76	WIRING DIAGRAM	J M S	
12	10-1-76	WIRING DIAGRAM	J M S	
13	10-1-76	WIRING DIAGRAM	J M S	
14	10-1-76	WIRING DIAGRAM	J M S	
15	10-1-76	WIRING DIAGRAM	J M S	
16	10-1-76	WIRING DIAGRAM	J M S	
17	10-1-76	WIRING DIAGRAM	J M S	
18	10-1-76	WIRING DIAGRAM	J M S	
19	10-1-76	WIRING DIAGRAM	J M S	
20	10-1-76	WIRING DIAGRAM	J M S	
21	10-1-76	WIRING DIAGRAM	J M S	
22	10-1-76	WIRING DIAGRAM	J M S	
23	10-1-76	WIRING DIAGRAM	J M S	
24	10-1-76	WIRING DIAGRAM	J M S	
25	10-1-76	WIRING DIAGRAM	J M S	
26	10-1-76	WIRING DIAGRAM	J M S	
27	10-1-76	WIRING DIAGRAM	J M S	
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31	10-1-76	WIRING DIAGRAM	J M S	
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37	10-1-76	WIRING DIAGRAM	J M S	
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39	10-1-76	WIRING DIAGRAM	J M S	
40	10-1-76	WIRING DIAGRAM	J M S	
41	10-1-76	WIRING DIAGRAM	J M S	
42	10-1-76	WIRING DIAGRAM	J M S	
43	10-1-76	WIRING DIAGRAM	J M S	
44	10-1-76	WIRING DIAGRAM	J M S	
45	10-1-76	WIRING DIAGRAM	J M S	
46	10-1-76	WIRING DIAGRAM	J M S	
47	10-1-76	WIRING DIAGRAM	J M S	
48	10-1-76	WIRING DIAGRAM	J M S	
49	10-1-76	WIRING DIAGRAM	J M S	
50	10-1-76	WIRING DIAGRAM	J M S	
51	10-1-76	WIRING DIAGRAM	J M S	
52	10-1-76	WIRING DIAGRAM	J M S	
53	10-1-76	WIRING DIAGRAM	J M S	
54	10-1-76	WIRING DIAGRAM	J M S	
55	10-1-76	WIRING DIAGRAM	J M S	
56	10-1-76	WIRING DIAGRAM	J M S	
57	10-1-76	WIRING DIAGRAM	J M S	
58	10-1-76	WIRING DIAGRAM	J M S	
59	10-1-76	WIRING DIAGRAM	J M S	
60	10-1-76	WIRING DIAGRAM	J M S	
61	10-1-76	WIRING DIAGRAM	J M S	
62	10-1-76	WIRING DIAGRAM	J M S	
63	10-1-76	WIRING DIAGRAM	J M S	
64	10-1-76	WIRING DIAGRAM	J M S	
65	10-1-76	WIRING DIAGRAM	J M S	
66	10-1-76	WIRING DIAGRAM	J M S	
67	10-1-76	WIRING DIAGRAM	J M S	
68	10-1-76	WIRING DIAGRAM	J M S	
69	10-1-76	WIRING DIAGRAM	J M S	
70	10-1-76	WIRING DIAGRAM	J M S	
71	10-1-76	WIRING DIAGRAM	J M S	
72	10-1-76	WIRING DIAGRAM	J M S	
73	10-1-76	WIRING DIAGRAM	J M S	
74	10-1-76	WIRING DIAGRAM	J M S	
75	10-1-76	WIRING DIAGRAM	J M S	
76	10-1-76	WIRING DIAGRAM	J M S	
77	10-1-76	WIRING DIAGRAM	J M S	
78	10-1-76	WIRING DIAGRAM	J M S	
79	10-1-76	WIRING DIAGRAM	J M S	
80	10-1-76	WIRING DIAGRAM	J M S	
81	10-1-76	WIRING DIAGRAM	J M S	
82	10-1-76	WIRING DIAGRAM	J M S	
83	10-1-76	WIRING DIAGRAM	J M S	
84	10-1-76	WIRING DIAGRAM	J M S	
85	10-1-76	WIRING DIAGRAM	J M S	
86	10-1-76	WIRING DIAGRAM	J M S	
87	10-1-76	WIRING DIAGRAM	J M S	
88	10-1-76	WIRING DIAGRAM	J M S	
89	10-1-76	WIRING DIAGRAM	J M S	
90	10-1-76	WIRING DIAGRAM	J M S	
91	10-1-76	WIRING DIAGRAM	J M S	
92	10-1-76	WIRING DIAGRAM	J M S	
93	10-1-76	WIRING DIAGRAM	J M S	
94	10-1-76	WIRING DIAGRAM	J M S	
95	10-1-76	WIRING DIAGRAM	J M S	
96	10-1-76	WIRING DIAGRAM	J M S	
97	10-1-76	WIRING DIAGRAM	J M S	
98	10-1-76	WIRING DIAGRAM	J M S	
99	10-1-76	WIRING DIAGRAM	J M S	
100	10-1-76	WIRING DIAGRAM	J M S	

CONTRACT NO.		COMMERCIAL AIRCRAFT DIV 3800 E. FAIRWAY WICHITA, KANSAS	
DESIGN	G STAMM	DATE	1-2-75
GROUP	D HANSEN	DATE	10-1-76
DRAWN	MERRICK	DATE	10-1-76
CHECK	L TONER	DATE	12-1-76
STRESS		DATE	
PROJ		DATE	
APPRO	J M S	DATE	
OTHER		DATE	
TITLE		SIZE	CODE IDENT
WIRING DIAGRAM — CYLINDER HEAD TEMP		C	71379
DWG NO		0570101	
SCALE NONE		PAGE 030	

PART NO.	DESCRIPTION
3	EW69514-0101 INST CLUSTER
2	5-1372-2 TEMP BULB
1	51360-34 CIRCUIT BREAKER

CES-000 IS APPLICABLE VENDOR CODES PER S-400 CES-XXXX-CESNA SPEC. NO S-XXX OR CESNA-CESNA STD. NO.	SUPERSEDES J200042 P 8.4 SUPERSEDED BY 0570311 P 8.3.0

FR172

MODEL 172 SERIES SERVICE MANUAL

MODEL APPLICATION		REVISION			
MODEL	BEGIN	REV	DESCRIPTION	DATE	APPRO
2	SR7903	A	BY REV ADD EA4 TO S 311-3 (SR7903) REF (SR7904) REF	JMS 10-3-75	JMS
SR72	SR7904	B	BY REV ADD MS 3057-6A CLAMP (NEW SHOP PRACTICE)	LSS 2-2-77	LSS

NOTES

▷ TERMINALS ARE YZ14-M AND FURNISHED BY VENDOR (09922)

INACTIVE

EFF THRU SER (098453) X528453

62 12 16 76

62 12 16 76

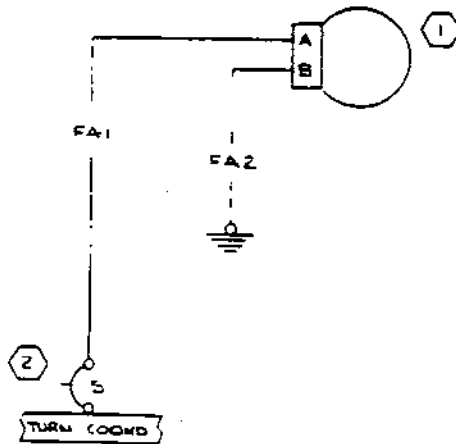
CODE NO	GA	MATERIAL	LG	TERMINALS	SERIALS
EA4	18			SOLDER S1367-18	
EA3	18			SOLDER S1367-18	
EA2	18			SOLDER S1367-18	
EA1	18			SOLDER S1367-18	

EQUIPMENT TABLE		
4	MS3057-6A	CLAMP
3	S-1311-3	INDICATOR
2	MS3106A-15-75	PLUG
1	0950209-1	PROBE - CARB AIR TEMP
	PART NO.	DESCRIPTION

WIRE TABLE		
CONTRACT NO:	NAME	DATE
	G. STAMM	8-4-75
	GROUP	11/11/75
	DRAWN	WHITSON 7-31-75
	CHECK	Yonah 7-31-75
	STRESS	
	PROJ	7-14-75
	APPRO	
	OTHER	

Cessna Aircraft Co.		
COMMERCIAL AIRCRAFT DIV 3800 E. PAWNEE WICHITA, KANSAS		
WIRING DIAGRAM - CARBURETOR AIR TEMPERATURE GAUGE		
SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0570101
SCALE: NONE		PAGE: 3.5

MODEL 172 SERIES SERVICE MANUAL



INACTIVE
EFF 1 NOV 54 0845 32484936
2-16-76
JCH
net, 2E
54 0716
53 0916

[illegible]

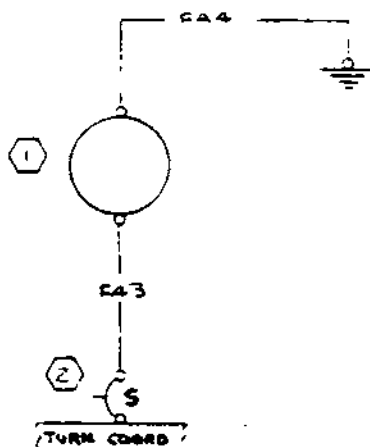
2	5-1360 -5L	CIRCUIT BREAKER	
	C601002-0501	TURN COORDINATOR	
	PART NO.	DESCRIPTION	
EQUIPMENT TABLE			

CES-1000 IS APPLICABLE VENDOR CODES PER S-1000 CES-XXXX-CESBNA SPEC. NO. S-XXXX OR CMXXXX-CESBNA STD. NO.	SUPERSEDES: 552006L = 9.3 SUPERSEDED BY: 2570311 P 9.1 O

CONTRACT NO:			WIRE TABLE		
			COMMERCIAL AIRCRAFT DIV 5800 E. PAWNEE WICHITA, KANSAS		
NAME			Cessna, Aircraft Co.		
DATE			TITLE		
DESIGN 6 STAMPA 2-74			WIRING DIAGRAM —		
GROUP 5 HANDED 1-74			TURN COORDINATOR		
DRAWN MERRICK 03-74					
CHECK J. TUBBS 01-74					
STRESS					
PROJ					
APPD 1/2					
OTHER					
			SIZE CODE IDENT DWG NO		
			C 71379 C5701C1		
			SCALE NONE		
			SHEET 1 OF 1		

172 5172, F4172
7463434 5172-585 54172-23452

↑



REVISION			
LET	DESCRIPTION	DATE	APPRO

INACTIVE
EFF - HAU SER (SRBAS) (SRBAS)
MS
4-11-76
4-11-76

54-7916
55-7916

[illegible]

WIRE TABLE

2	3-360-5L	CIRCUIT BREAKER
1	2-413-2	TURN 5 BANK IND
	PART NO.	DESCRIPTION
EQUIPMENT TABLE		

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-400
CES-1000-CESIMA SPEC. NO.
S-400 OR CESIMA-CESIMA
SPEC. NO.

SUPERSEDED:
 0912062 0 9.4
 SUPERSEDED BY:
 0570311 0 310

CONTRACT NO:		
	NAME	DATE
DESIGN	G STAMBA	7-74
GROUP	SHANLEN	11-74
DRAWN	MERRICK	10-2-76
CHECK	STUWEL	12-6-74
STRESS		
PROJ		
APPRO		
OTHER		

 Cessna. AIRCRAFT CO.	COMMERCIAL AIRCRAFT DIV. 3800 E. PARKWAY WICHITA, KANSAS
	TITLE WIRING DIAGRAM — TURN & BANK INDICATOR (OPT)

SIZE	CODE IDENT.	DRWG NO
C	NO. 71379	0570101

SCALE: NONE	STATUS: (S41904)	PAGE: 3.2-0

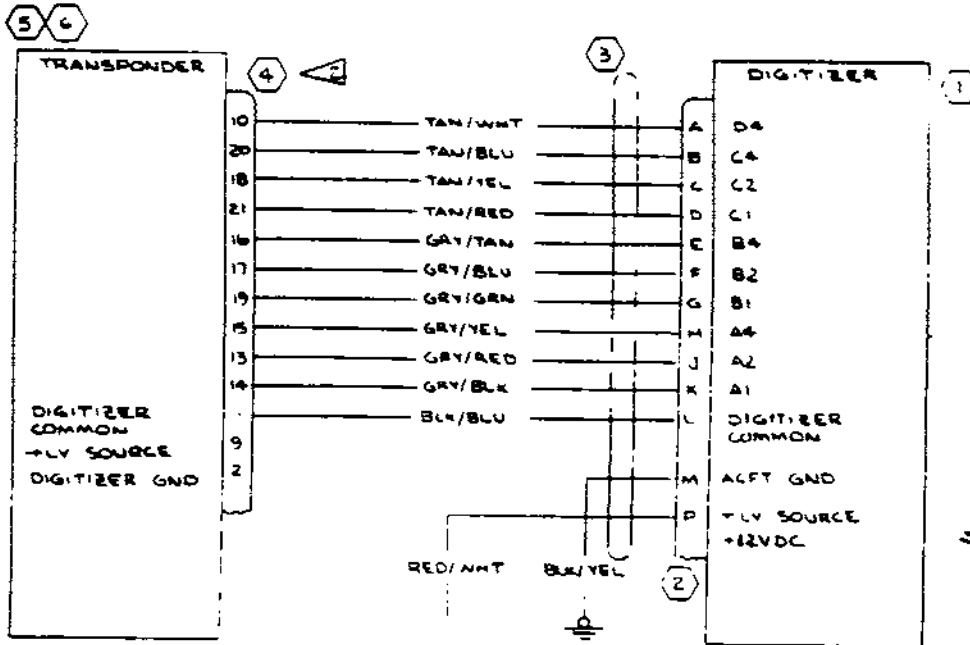
172 2176 F-112
1163643.2 40181 541200368122

MODEL 172 SERIES SERVICE MANUAL

NOTES:

1. FOR WIRE & WIRE TERMINALS, REFER TO 1270623 PAGE 9/1
2. TRANSPONDER CONNECTOR HOUSING IS PART OF TRANSPONDER CABLE ASSY
3. FOR WIRING DIAGRAM OF 300 & 400 TRANSPONDER REFER TO 332042
4. ATTACH BOTH TRANSPONDER AND ENCODING ALTIMETER TO THE NO. 4 CIRCUIT BREAKER
5. PINS ARE CRIMP TYPE & ARE FURNISHED BY VENDOR WITH CONNECTOR

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV ADD FRITZ REQUIREMENTS (SR7504)	TMS -27-75	SR
B	BY REV ADD RT-455A (SR8276)	DLR -2-5-75	SR
C	BY REV ADD WIRE TABLE (NOTE 5; 1570312 WMS 1570312-3; DELETE NOTE 1 (SR7692XREF)	GD5 6-18-76	R2P-WMF K2 AF



INACTIVE
LEFT THRU SER (SR8453) 22-10-11 11201634
C112224E 11201634

5060-0900
05060-0900

RED/WHT	20	20-2-9	60	5-1367-1-8	5
BLK/YEL	22	22-0-4	60	5-1367-1-8	5
BLK/BLK		22-0-6	43	5-2190-1	
GRY/BLK		22-8-0			
GRY/RED		22-8-2			
GRY/YEL		22-8-4			
GRY/GRN		22-8-5			
GRY/BLU		22-8-6			
GRY/TAN		22-8-10			
TAN/YEL		22-10-6			
TAN/RED		22-10-2			
TAN/BLU		22-10-6			
TAN/WHT	22	22-10-9	43	5-2190-1	5
WIRE CODE NO.	04	MATERIAL	LG	TERMINALS	SERIALS

PART NO.	DESCRIPTION
7	5-1360-5L CIRCUIT BREAKER
6	RT-455A TRANSPONDER
5	RT-355A TRANSPONDER
4	5-2189-1 CONNECTOR
3	1570312 CABLE ASSY
2	42816 CONNECTOR
1	EA-401A ALT DIGITIZER

CONTRACT NO.			WIRE TABLE		
DESIGN	G STAMM	12-76	Cessna, AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV 3800 E. PAWNEE WICHITA, KANSAS		
GROUP	12-11-20-2				
DRAWN	MERRICK	10-31-76			
CHECK	J TOWNE	12-1-76			
STRESS			TITLE WIRING DIAGRAM — ENCODING ALTIMETER (OPT)		
PROJ					
APPD	1/25/76				
OTHER					
SIZE	C	CODE IDENT	71379	DWG NO	0570101
SCALE	NONE	(SR7503) (SR7504) PAGE 9.3.C			

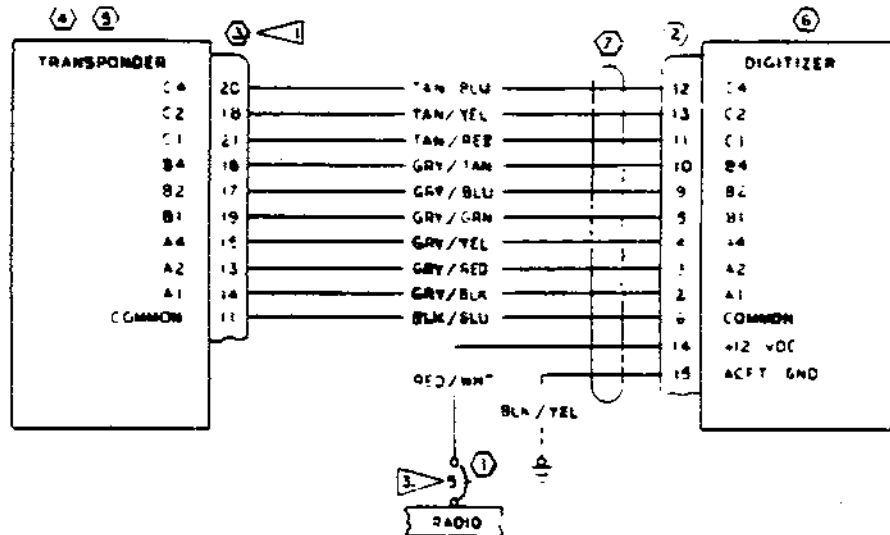
CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-1111-CESNA SPEC. NO
S-1111 OR CESNA-CESNA
STD. NO.

SUPERSEDES:
0500062 2 9.6
SUPERSEDED BY:

MODEL 172 SERIES SERVICE MANUAL

NOTES:

1. TRANSPONDER CONNECTOR HOUSING IS PART OF TRANSPONDER CABLE ASSY
2. FOR WIRING DIAGRAM OF 300 & 400 TRANSPONDER REFER TO 1920166
3. ATTACH BOTH TRANSPONDER AND ENCODING ALTIMETER TO THE NO. 4 CIRCUIT BREAKER



INACTIVE
EPP TRAU SER (DAB-53) (SAB-53A)
AS 12-16-76 SER 7267309
F17201639, R1722824
F171200620
11805
11806
11807
11808
11809
11810

TAN/BLU	22	22-10-6	S-2190-1	SOLDER	
TAN/YEL		22-10-4			
TAN/RED		22-10-2			
GRY/TAN		22-8-10			
GRY/BLU		22-8-8			
GRY/GRN		22-8-5			
GRY/YEL		22-8-4			
GRY/RED		22-8-2			
GRY/BLK		22-8-0			
BLK/BLU		22-0-6	S-2190-1		
BLK/YEL		22-0-4	S-1362-1-B		
RED/WH	22	22-2-9	S-1362-1-B	SOLDER	

7	0470404	CABLE ASSY	
6	C74001-DCH	ALT DIGITIZER	
5	RT-459A	TRANSPONDER	
4	RT-359A	TRANSPONDER	
3	S-2190-1	CONNECTOR	
2	DA-153	CONNECTOR	
1	S-1360-9L	CIRCUIT BREAKER	

PART NO.	DESCRIPTION

EQUIPMENT TABLE

CSB-4000 IS APPLICABLE
VENDOR CODES PER 8-4000
CSB-4000-CEBNA SPEC. NO.
8-4000 OR CABLE-CEBNA
STD. NO.

SUPERSEDED BY
37C0221

WIRE TABLE

DESIGN	NAME	DATE
GROUP	G. STAMMA	6-23-76
DRAWN	R. KLEIN	4-22-76
CHECK	Y. OUEL	4-22-76
SYMBOL		

CSB AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. FAIRWAY
WICHITA, KANSAS
**WIRING DIAGRAM —
BLIND ENCODER
172, F172, R172, F172**

PREP	3-6-76
APPD	5-5-76
OTHER	

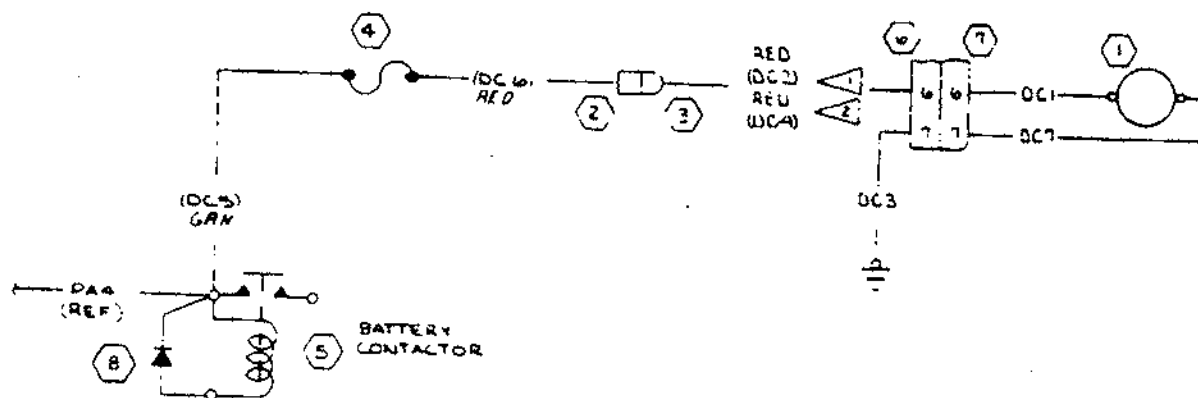
SIZE	CODE IDENT	DATE
C	71379	0570101
SCALE: NONE	SER (SR 8490)	PAGE: 9.4

MODEL 172 SERIES SERVICE MANUAL

NOTES :

1. APPLIES TO FR172 & R112 ONLY
2. APPLIES TO 172 & FR172 ONLY

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD DC1, DC7, 5-164D-9, 5-1649-9, 5-1636-2 WAS 5-1367-1-B/DC2-DC4, 5-1636-1 WAS 5-1367-1-B/DC3, 5-16450B-001 WAS 5-1317N2; ADD 070702B-1 (NOW SHOP PRACTICE)	4/4 10-8-73	LT 1/5 2/5
B	BY REV: ADD R172 (3A8146)	803 2-23-76	LT 1/8 2/8

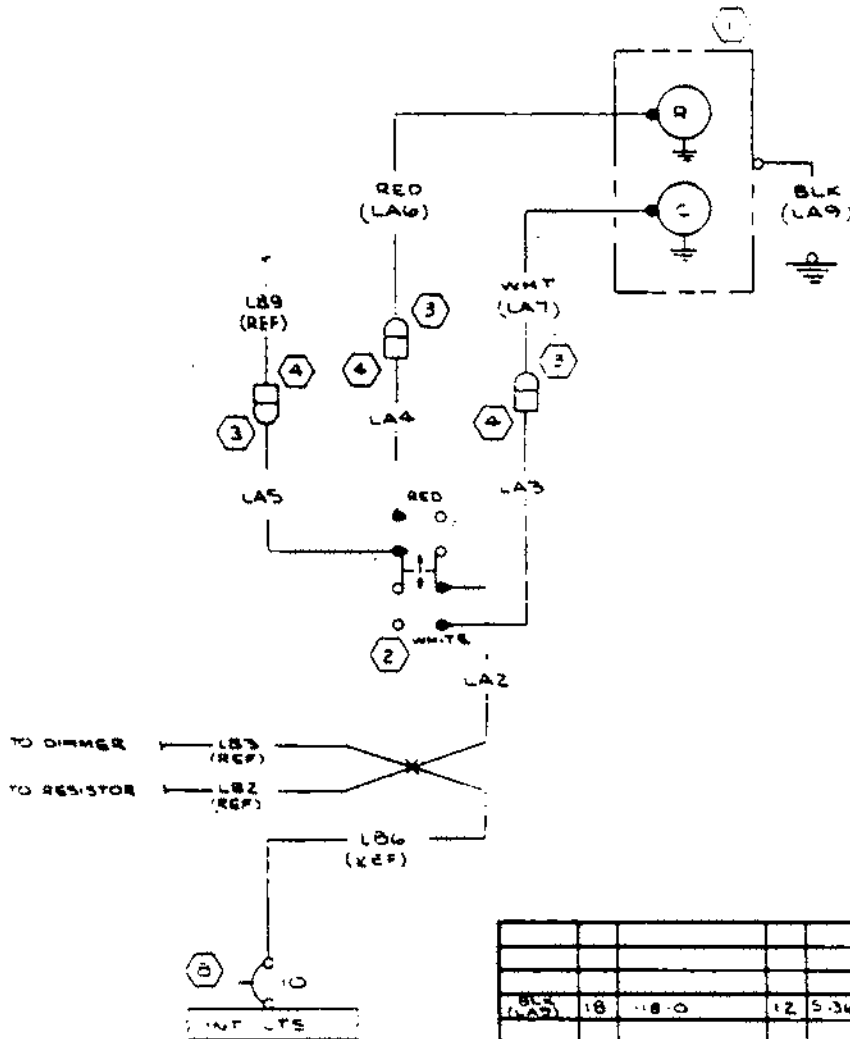


INACTIVE
EFF THRU SER(SAB453)(SAB454)
12-16-76
VND
RF

[illegible]

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: DELETE: S-1600-10, S-1601-10, LAB, GLB11(REF); ADD LAB, GLB11(REF); ADD LAB, GLB11(REF) (NOW SHOP PRACTICE)	RFP 0-8-75	WHS 2F



INACTIVE
SEE THRU SER (SMBAS5) (SMBAS5)
AS
(AP. ONE) OF
S + 0910
S + 0916

WIRE	CODE	GA	MATERIAL	LG	TERMINALS	SERIALS
BLK (LA9)	18	18-0		12	S-360-10 S-360-10	
WHT (LA7)	18	18-0		10	S-1635-2 SOLDER	
RED (LA6)	18	18-2		10	S-1635-2 SOLDER	
LA5				8	SOLDER S-1635-1	
LA4				6	SOLDER S-1635-1	
LA3				7	SOLDER S-1635-1	
LA2	18			7	SOLDER S-1635-1	

PART NO.	DESCRIPTION
8 S-1360-10L	CIRCUIT BREAKER
4 S-1635-2	HOUSING
2 S-1637-1	HOUSING
2 S-1501-1	SWITCH
1 1470089-14	LIGHT ASSY

PART NO.	DESCRIPTION
0500062	P11.1.3
0410311	P11.1.0

CONTRACT NO.			Cessna AIRCRAFT CO.		COMMERCIAL AIRCRAFT DIV.	
DESIGN	NAME	DATE	TITLE		5800 E. PAWNEE	
GROUP	S-1111-1	1-1-75	WIRING DIAGRAM -		WICHITA, KANSAS	
DRAWN	MERLICK	10-9-75	MAP & AUXILLARY			
CHECK	YOUNG	12-6-74	INSTRUMENT LIGHT			
SYNTH			(OPT)			
PROJ			SCALE NONE			
APPD	WHS		CODE IDENT. 71379		OWG NO 0570101	
OTHER			PAGE 11.1.0			

172, 4112, 7-172,
172C5085, 172B408, 172B408, 172B408, 172B408

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: 34003-55-3410 WAS 34003-55-3410 DELETE 18 GA JUMPER	7MS 2-27-75	STAMP 15
B	BY REV: ADD 5-1640-9, 5-1641-9 & LB25. LB1 WAS LB14, LB7 WAS LB12, 5-1636-1 WAS 5-1370-3/LB8, 5-1635-2 WAS 5-1636-2/ LB10, 5-1635-1 WAS 5-1636-1/LB10, BLU (REF) WAS BRN(REF) TAN(REF) WAS WHT(REF) DELETE LB11; ADD L45(REF) (NOW SHOPPRACTICE)	RTP 10-8-75	STAMP 15 25
C	BY REV: MS 15584-2 WAS 0511481, C60501-0101 WAS 0713068 ADD R172 DELETE C669513-0101 (SRB133)(SRB134)(SRB146)	DDI 2-25-76	STAMP 15 25

NOTES:

1. THESE WIRES VENDOR FURNISHED
2. OPTIONAL WITH POST LIGHTS INSTL

INACTIVE
EFF TANK SER (SRB133)(SRB146)
RS
10-10-76
15-25

54 0916
54 0916

20	5-1641-9	CONNECTOR
19	5-1640-9	CONNECTOR
18	C669514-0101	INST CLUSTER
17	C669512-0103	INST CLUSTER
16	1270473-12	LIGHT ASSY
15	C669512-0102	INST CLUSTER
14	C669511-0102	INST CLUSTER
13	MS 15584-2	LAMP
12	C60501-0101	COMPASS ASSY
11	5-1640-6	HOUSING
10	5-1641-2	HOUSING
9	1570166-1	DIMMING ASSY
8	5-1632-1	HOUSING
7	5-1637-2	HOUSING
6	1270473-10	LIGHT ASSY
5	5700082703	RESISTOR
4	5-2091-5	RESISTOR ASSY
3	34003-55-3410	TERMINAL BOARD
2	5-340-10L	CIRCUIT BREAKER

LB 7	20	20	5-1635-1	5-1367440
LB 12	18	4	SOLDER	5-1367440
LB 6	20	76	5-1635-2	5-1635-1
LB 9	20	25	5-1636-1	SEE RIG
LB 3	18		5-1636-1	5-1635-1
LB 25	18		5-1370-3	5-1635-1
LB 1	18		5-1635-1	5-1829-1
LB 5	18	15	SOLDER	5-1636-1
LB 4	18	15	SOLDER	5-1635-1
LB 3	18	5	5-1635-1	SEE RIG
LB 2	18	3	SOLDER	SEE RIG
LB 6	18	5	5-1636-1	5-1635-1

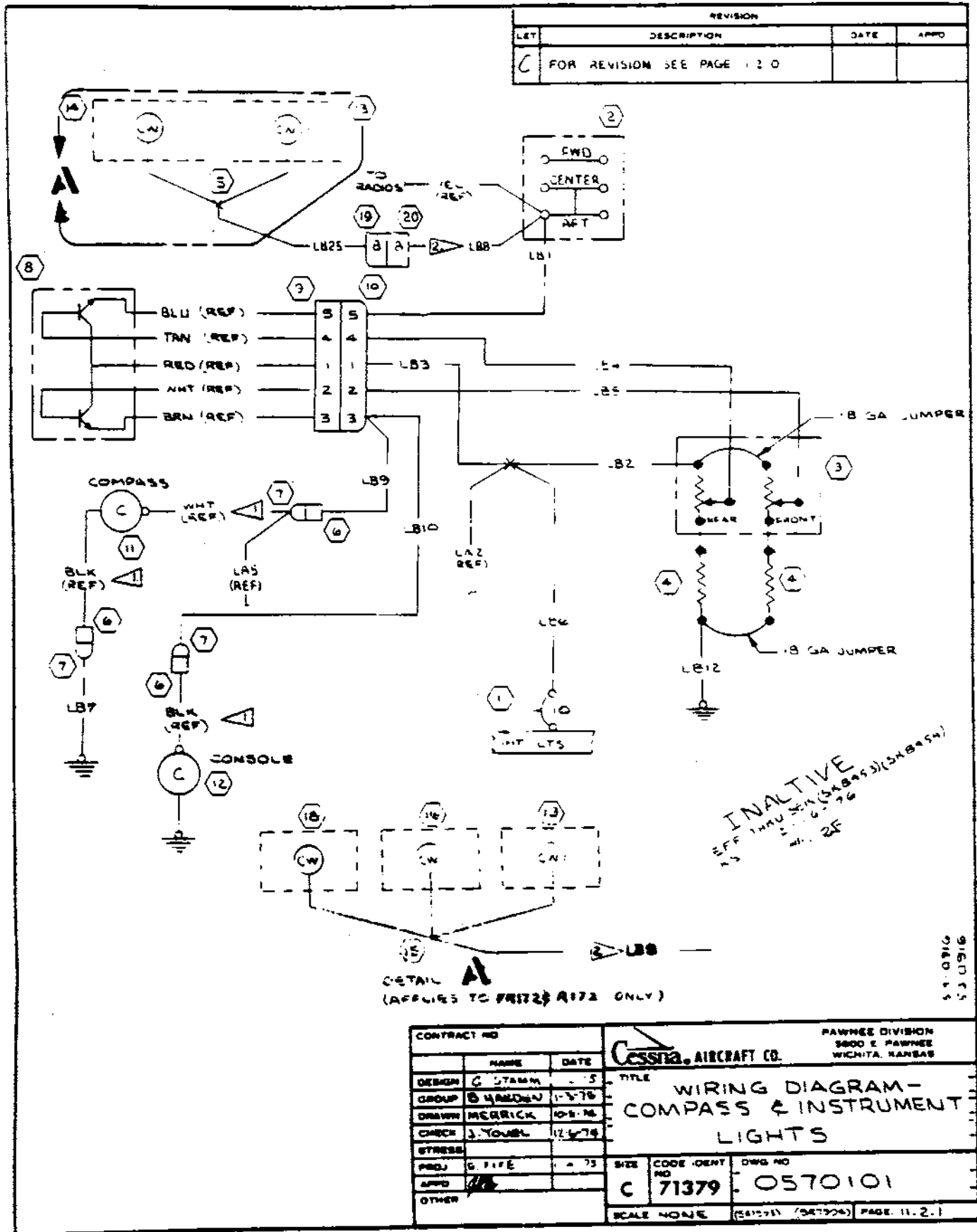
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS	SERIALS
WIRE TABLE					
CONTRACT NO.			Cessna AIRCRAFT CO.		
NAME			DATE		
DESIGN			TITLE		
GROUP			WIRING DIAGRAM -		
DRAWN			COMPASS & INSTRUMENT		
CHECK			LIGHTS		
STRESS					
PROJ			SIZE		
APPRO			CODE IDENT		
OTHER			DWG NO		
			C 71379 0570101		
			SCALE NONE		
			PAGE 1 OF 2		

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-1112-CESBNA SPEC. NO.
S-1112 OR CES-1112-CESBNA
BYD. NO.

SUPERSEDED BY:
0500062 P 11.2.4
SUPERSEDED BY:
0570101 P 11.10

12 5172, 5172, 5172, 5172
126-153, 5172-135, 5172-135, 5172-135

MODEL 172 SERIES SERVICE MANUAL



MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: DELETE 5-1641-6, 5-1640-6 & LB11(REF); ADD BLK/LB216 23, RED/TEL/LB22 & LB24; 0513454 WAS 05114B1 & 1213379 WAS 1213379-9 (NOW SHOP PRACTICE)	839 10-8-75	J. P. 25

NOTES:

- SEE PG. 11.2.0 & PG. 11.2.1 FOR INSTRUMENT CLUSTER LIGHTS

NA-1 VE
SEE -WU 2A (0513454)
12-16-76
J. P. 25

9	0513454	WST LT
8	5-1501-1	SWITCH
7	5-1641-6	HOUSING
4	1213379	POST LT ASSY
3	5-1640-6	HOUSING
2	5-1638-2	HOUSING
1	5-1637-1	HOUSING

PART NO.	DESCRIPTION

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-400
CES-1113-CESNA SPEC. NO.
S-1113 OR CESNA-CESNA
STD. NO.

SUPERSEDES. P 11.2.5.1
0500042 P 11.2.5.0
SUPERSEDED BY.
0570311 P 11.3.0

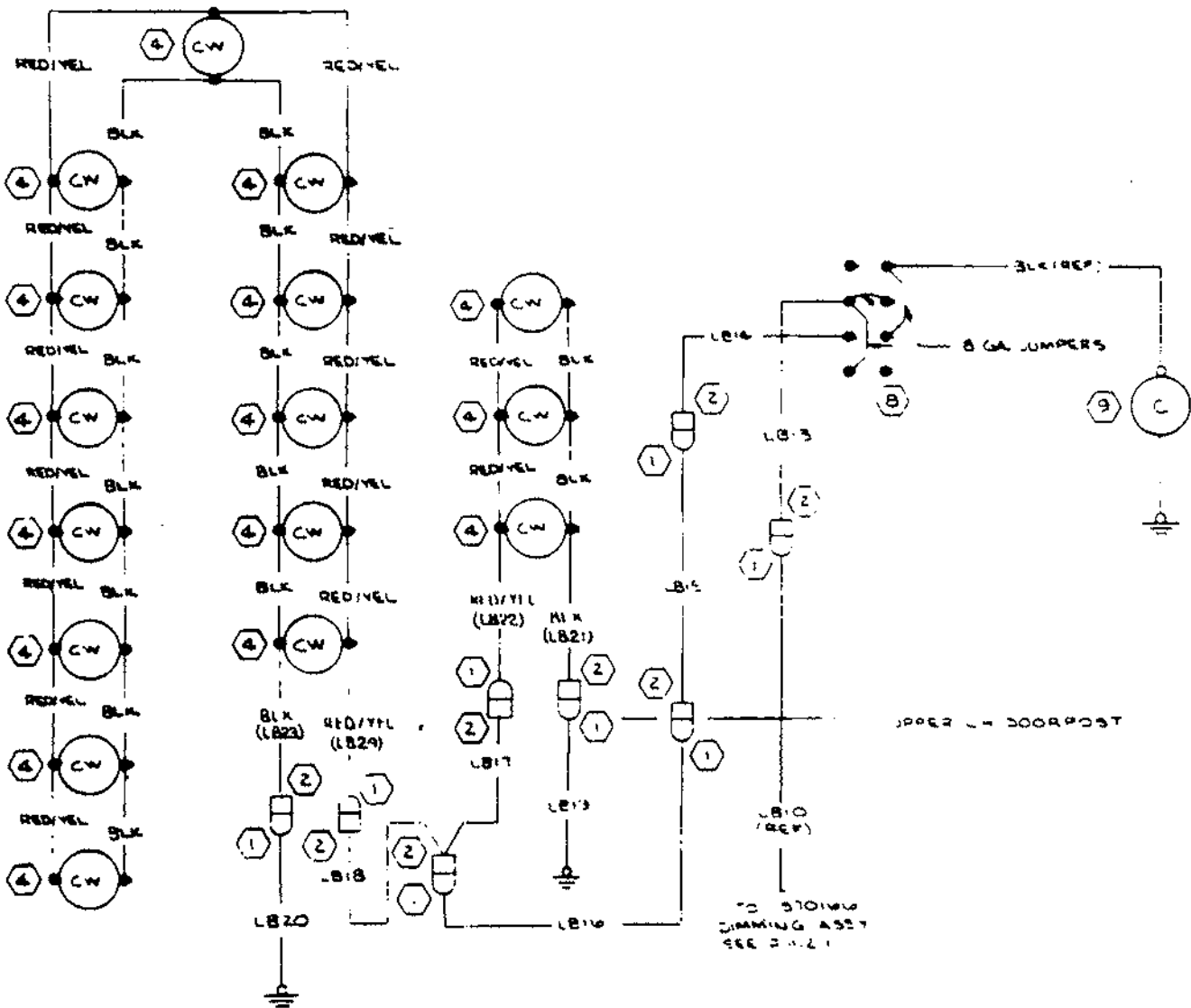
RED/TEL	22	+22-2-4	SOLDER	SOLDER
BLK	22	+22-0	SOLDER	
RED/TEL	22	+22-2-4	5-1635-1	
BLK	22	+22-0	5-1636-1	
RED/TEL	22	+22-2-4	5-1635-1	
BLK	22	+22-0	5-1636-1	SOLDER
LB10	22		5-1635-1	5-1637-1 B
LB19	22		5-1635-1	5-1637-1 B
LB18	22		5-1636-2	5-1637-1
LB17	22		5-1636-1	SEE B-6
LB16	18		5-1635-2	5-1635-1
LB15	18		5-1636-1	5-1635-1
LB14	18		5-1636-1	SOLDER
LB13	18		5-1636-1	SOLDER

WIRE TABLE			
CONTRACT NO.	NAME	DATE	TITLE
	G. STAMM	11-2-75	WIRING DIAGRAM— INSTRUMENT PANEL POST LIGHTING (OPT)
DESIGN	B. HAKKEN	11-15	
DRAWN	MERICK	03-14	
CHECK	J. TOWAL	12-14-74	
STRESS			
PROJ			
APPRO	JES		
OTHER			
SIZE	C	CODE IDENT NO 71379	OWG NO 0570101
SCALE	NONE	1547504-1547513 PAGE 11.3.C	

172 F102, F51E
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45682, 45683, 45684, 45685, 45686, 45687, 45688, 45689, 45690, 45691, 4

1

LET	DESCRIPTION	DATE	APPD
A	SEE P. II.3.0 FOR REVISIONS		



INACTIVE
EFF THRU 22 (SABSS) (SABSSA)
AS 12-16-76
JUL 20, RF

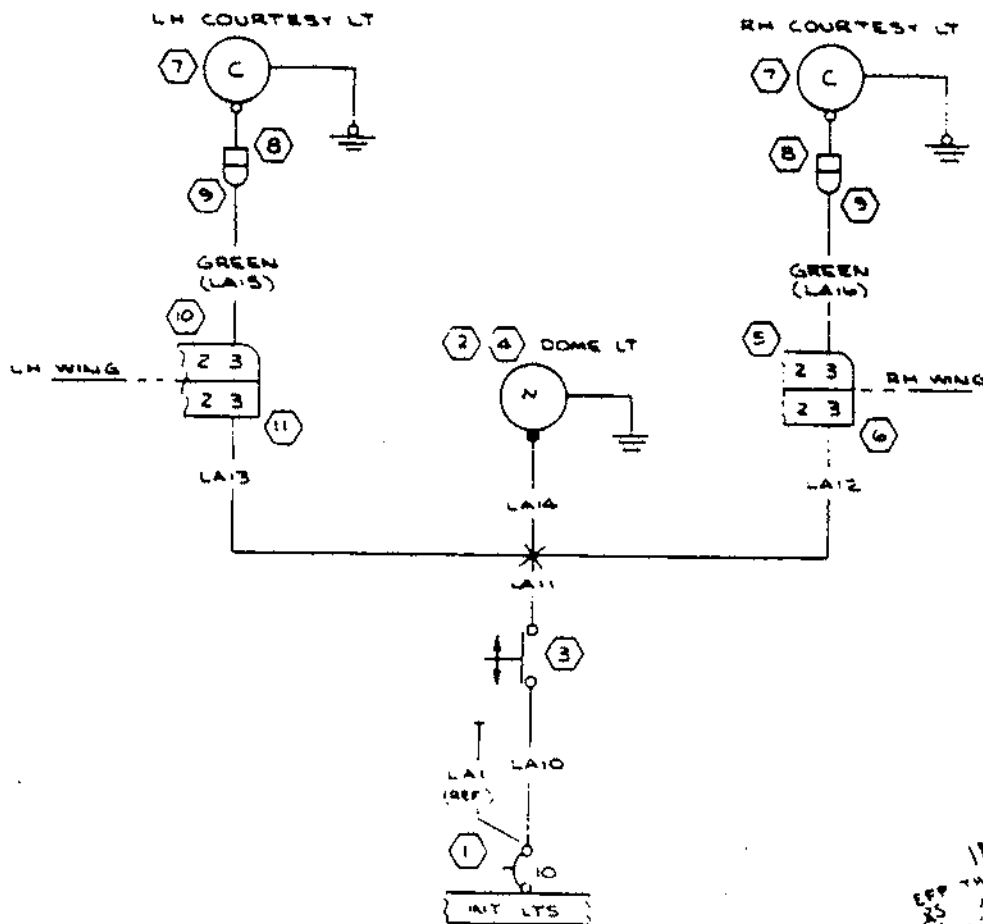
7150 15
7150.45

CONTRACT NO.			 CESSNA AIRCRAFT CO.			PAWNEE DIVISION 5800 E. PAWNEE WICHITA, KANSAS		
DESIGN	NAME	DATE	TITLE					
GROUP			WIRING DIAGRAM-					
DRAWN			INSTRUMENT PANEL					
CHECK			POST LIGHTING (OPT)					
STAMP								
PROJ.			SIZE	CODE IDENT NO	DWG NO			
APPD			C	71379	0570101			
OTHER			SCALE NONE		(58700 > 58799) PAGE 11, 3, 1			

172 6172 58172
725-648, F. 725-125, 15120064 28 562

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: ADD 5-1876-1, 0513208 WAS 0511481 R172 (SRB133)(SRB134) (SRB146)	2-23-76	SAW 8/13/76



INACTIVE
EXP THRU SER (540953) (DATE) 10
25 16-16-76
104# 1, RE
5 5 0910

11	5-1641-6	HOUSING
10	5-1640-6	HOUSING
9	5-1637-1	HOUSING
8	5-1637-2	HOUSING
7	0521101	COURTESY LT
6	5-1641-9	HOUSING
5	5-1640-9	HOUSING
4	0513208	SOCKET
3	5-1831-1	SWITCH
2	5-1876-1	LIGHT
1	5-1360-10L	CIRCUIT BREAKER

WIRE	CODE	NO	GA	MATERIAL	LO	TERMINALS	SERIALS
GREEN	18	-18-5			117	5-1635-1	5-1635-1
GREEN	18	-18-5			117	5-1635-1	5-1635-1
LA13					45	5-1636-1	5-1636-1
LA12					45	5-1636-1	5-1636-1
LA11					45	5-1636-1	5-1636-1
LA10	18				84	5-1830-1	5-1830-1

CONTRACT NO.		COMMERCIAL AIRCRAFT DIV.	
NAME		Cessna Aircraft Co.	
DATE		12/74	
DESIGN		G. STAMBA	
GROUP		D. H. B. D. N. 1-3-75	
DRAWN		MERRICK 10-3-74	
CHECK		K. YOUNG 12-6-74	
STRESS			
PROJ		1-1-75	
APPRO		V. R. G.	
OTHER			
SIZE	CODE IDENT	DWG NO	
C	71379	0570101	
SCALE: NONE		(547903) (547904) PAGE 11, 12, 13	

CES-1000 IS APPLICABLE
VENDOR CODES PER S-400
CES-XXXX-CESNA SPEC. NO.
S-XXX OR CESNA-CESNA
STD. NO.

SUPERSEDES:
0500062 F. 11.7.1

SUPERSEDED BY:
0570211 P. 11.4.0

72 0.72 0.12 5 72
782567 71379 325 10 72064 766 9 7 21 20

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LEY	DESCRIPTION	DATE	APPRO
A	BY REV: EXCHANGE TAXI LT & LOG LT TABLE (2) & GRAY (LC2) LEI & LCI, LE4 & LK5 (SR7903) (SR7904)	FMS 1-10-75	SYDNEY ZF
B	BY REV: ADD 4C2 (REF), #522 WAS 1500 5-1360-256 WAS 5-1360-20X ADD 2172 (SR8133) (SR8134) (SR846)	WAS 2-25-76	SYDNEY ZF
C	BY REV: NACT PAGE 1.5.1 & ADD PAGE 11.5.2 (SR8596)	JAS 8-17-76	SYDNEY ZF

INACTIVE
EFF THRU SEP 98ASJ115A04541
GW 048
20/ 1001 BSE

34 0905
33 0905
46 0905

YAM	12	-12-0	36	5-1635-4	5-13673-8	SER(SR8596) & ON
LES			50	5-1493-3	5-1636-4	SER(SR8596) & ON
BLA/WH		-12-0-9	28	5-1635-4	5-13673-4	SER(SR8596) & ON
BLA/WH		-12-0-9	33	5-13673-8	5-1636-4	SER(SR8596) & ON
QSA		-12-10	32	5-1636-4	5-13673-8	SER(SR8596) & ON
LC6			50	5-1493-3	5-1635-4	SER(SR8596) & ON
LCS	12			5-1493-3	5-13673-4	
LES	12			5-1493-3	5-13673-4	
BLA/WH	12	-12-0-3	6	5-13673-8	5-1636-4	
QSA		-12-3	36	5-1493-3	5-13673-4	THRU SER(SR8596)
LEI			50	5-1493-3	5-1493-3	THRU SER(SR8596)
BLA/WH	1	-12-0-9	48	5-1493-3	5-13673-4	THRU SER(SR8596)
BLA/WH		-12-0-9	33	5-13673-8	5-1493-3	THRU SER(SR8596)
QSA		-12-10	32	5-1493-3	5-13673-4	THRU SER(SR8596)
LC1	12		50	5-1493-3	5-1493-3	THRU SER(SR8596)
YAM	GA	MATERIAL	LS	TERMINALS	SERIALS	

9	S-1637-3	HOUSING-SOCKET
8	S-1637-4	HOUSING-PLUG
7	4522	LAMP
6	S-2160-5	SWITCH
5	4509	LAMP
4	S-2064-1	CONNECTOR
3	S-2160-4	SWITCH
1	S-1360-25L	CIRCUIT BREAKER

	PART NO.	DESCRIPTION
EQUIPMENT TABLE		

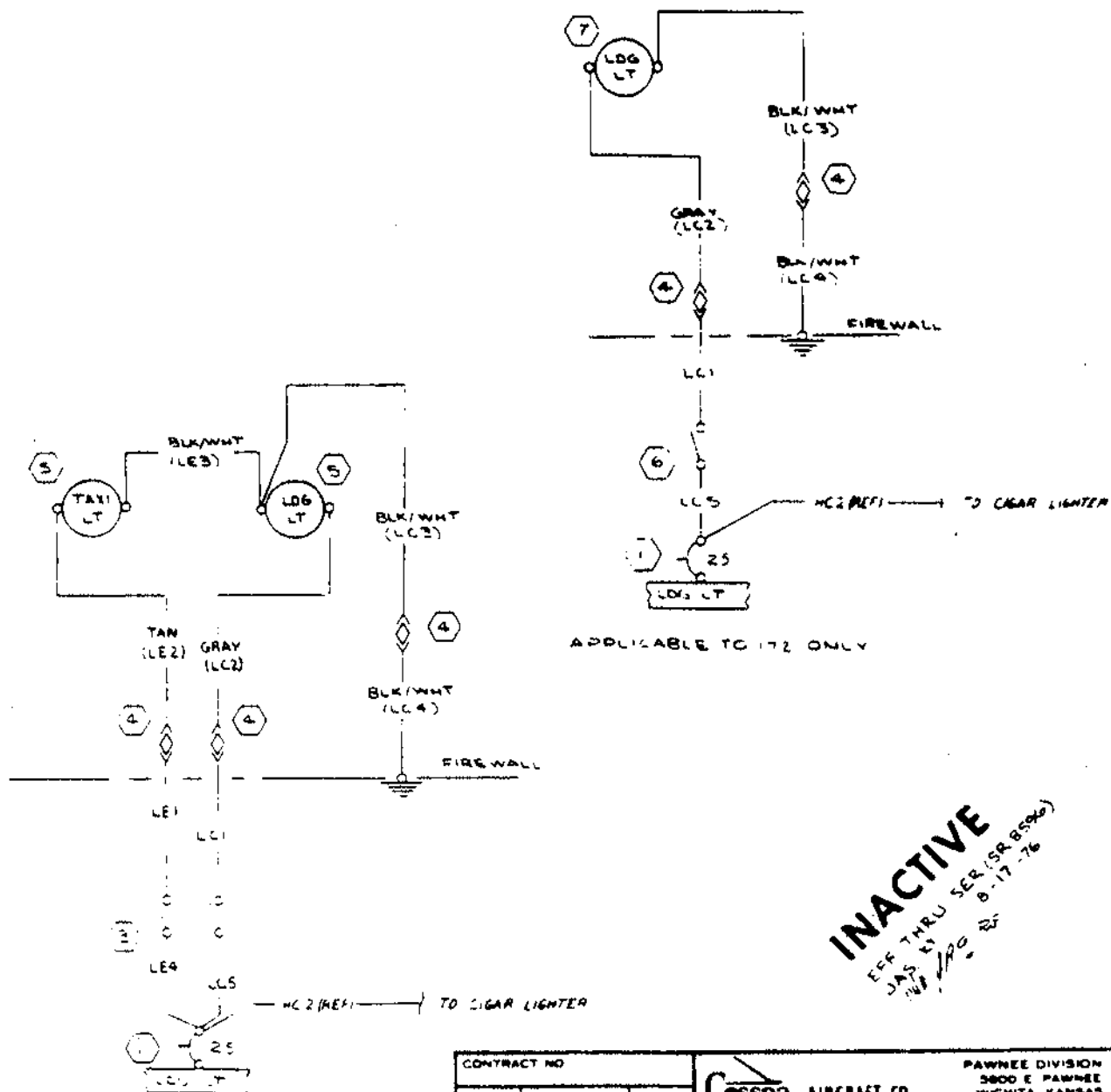
CES-1000 IS APPLICABLE VENDOR CODES PER S-400 CES-1000-CESINA SPEC. NO. S-400 ON CESINA-CESINA STD. NO.	IMPROVED: 0500062 IMPROVED BY 057031 PG

CONTRACT NO.			WIRE TABLE COMMERCIAL AIRCRAFT DIV. 3800 E. PARKWAY WICHITA, KANSAS		
NAME G. STANLEY			TITLE AIRCRAFT CO.		
DATE 1-2-75			WIRING DIAGRAM— LANDING & TAXI LIGHT (OPT)		
DESIGN G. STANLEY					
GROUP 1-2-75					
DRAWN MERRICK					
CHECK J. YOUNG					
STRESS					
PROJ. 1-2-75			SIZE C	CODE IDENT. NO. 71379	DWG NO. 0570101
APPD. J. YOUNG					
OTHER					
			SCALE: 1"=1'-0" (3/16"=1'-0") (3/16"=1'-0")		
			PAGE: 11.5.0		

172.5172.54:72.2172
126.5681.1:720.985, CW:72093.0562, 4:722020

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
C	FOR REVISION SEE SHEET 11.5.0		



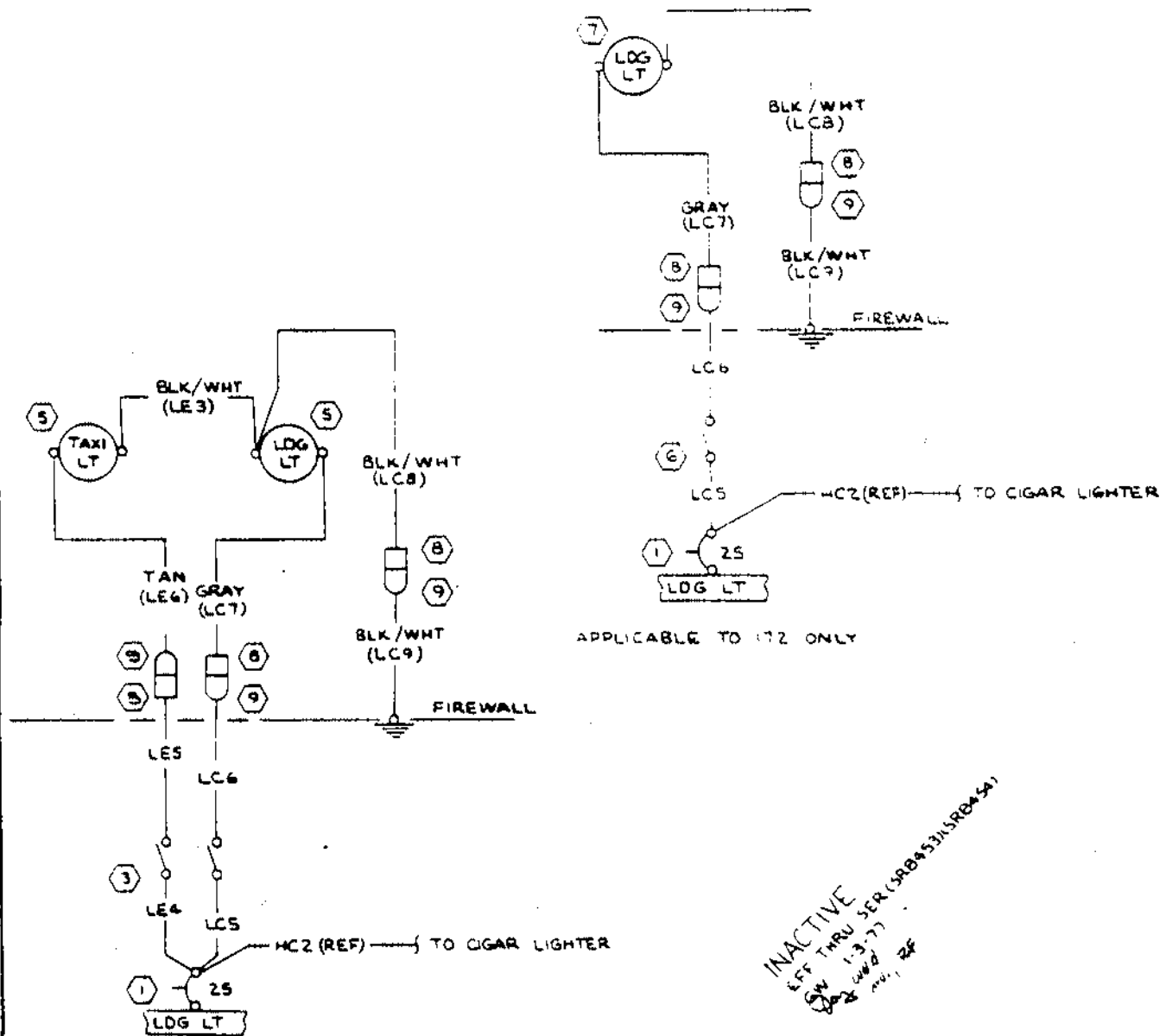
APPL. LABEL TO FIG. 172-11.5.0
ALTERNATE OPTION ON 172

CONTRACT NO.		Cessna AIRCRAFT CO.		PAWNEE DIVISION 5800 E. PAWNEE WICHITA, KANSAS	
DESIGN	G STAMPA	DATE	12-74	TITLE	
GROUP	51142-001	DATE	11-75	WIRING DIAGRAM	
DRAWN	MERRILL	DATE	10-74	LANDING & TAXI LIGHT	
CHECK	SYDNEY	DATE	11-74	(OPT)	
SYNOPSIS					
PROJ	A 1151	DATE	11-74	SIZE	CODE IDENT
APPRO	1151			C	71379
OTHER				SCALE	DWG NO
				NONE	1547903
					0570101
					PAGE 11.5.0

11.5.0 11.5.0 11.5.0 11.5.0 11.5.0 11.5.0

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
C	FOR REVISION SEE SHEET 11.5.2		



APPLICABLE TO 172 ONLY

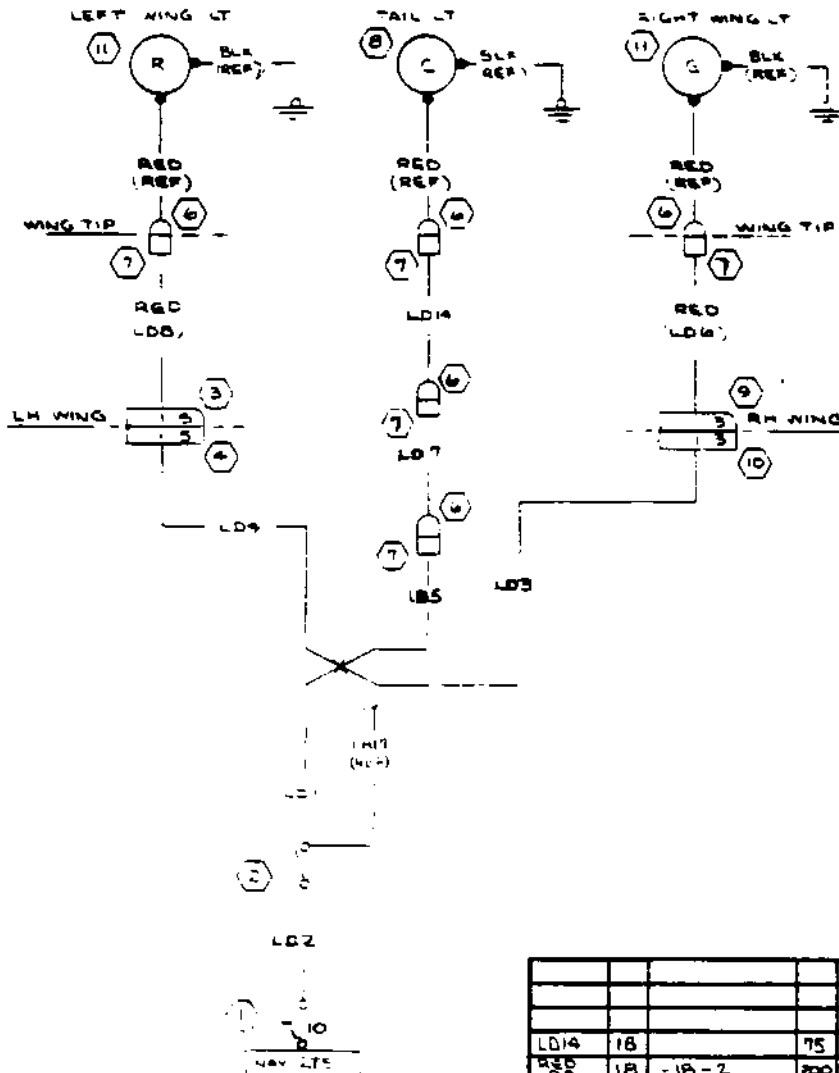
APPLICABLE TO F172, F172Z, R172 &
ALTERNATE OPTION OF 172

CONTRACT NO.		Cessna AIRCRAFT CO.		PAWNEE DIVISION 3800 E. PAWNEE WICHITA, KANSAS	
DESIGN	NAME	DATE	TITLE		
GROUP	J. SCHMIT	8-23-76	WIRING DIAGRAM LANDING & TAXI LIGHT (OPT)		
DRAWN	J. YOUNG	8-24-76			
CHECK					
STRESS					
PROJ	E. C. B.	11-8-76	SIZE	CODE IDENT	DWG NO.
APPRO	J. P.		C	71379	0570101
OTHER			SCALE	NONE	(SR8596) PAGE 11.5.2

INACTIVE
EFF THRU SER (SR8453) (SR8454)
1-3-77
GW
26

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: ADD LD14 & LD17 (REF); S-1635-1 WBS S-1636-1/LD7 & S-1636-1 WBS S-1635-1/LD5 (NOW SHOP PRACTICE)	RJP 10-8-75	CT 111 112 25



INACTIVE
REF THRU SER (DAP53) (S-1635-1)
RJ 12-10-76
RJP HRP RF

57 11216
53 11216

LD14	18	75	S-1635-1	S-1636-1
LD5	18	-18-2	200 S-1635-1	S-1636-1
LD7	18	290	S-1635-1	S-1636-1
RED LD6	-18-2	200	S-1635-1	S-1636-1
LD9	18	54310-2	S-1636-1	
LD4	18	40	SEE	S-1636-1
LD3	18	60	SEE	S-1636-1
LD2	18		S-1635-1	S-1636-1
LD1	18	6	S-1635-1	S-1636-1
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS
				SERIALS

PART NO.	DESCRIPTION
11	C622001-0102 WING LIGHT
10	S-1641-9 HOUSING
9	S-1640-9 HOUSING
8	C622001-0102 TAIL LIGHT
7	S-1637-2 HOUSING
6	S-1637-1 HOUSING
4	S-1641-6 HOUSING
3	S-1640-6 HOUSING
2	S-2160-1 SWITCH
1	S-1360-HOL CIRCUIT BREAKER

WIRE TABLE		
CONTRACT NO.	NAME	DATE
	G. STAMM	11-7-75
	GROUP	51140-1
	DRAWN	MERRICK
	CHECK	J. YAMBL
	STRESS	
	PROJ	
	APPRO	
	OTHER	

EQUIPMENT TABLE		SUPERSEDED BY	
		0500062	P.11.9.1

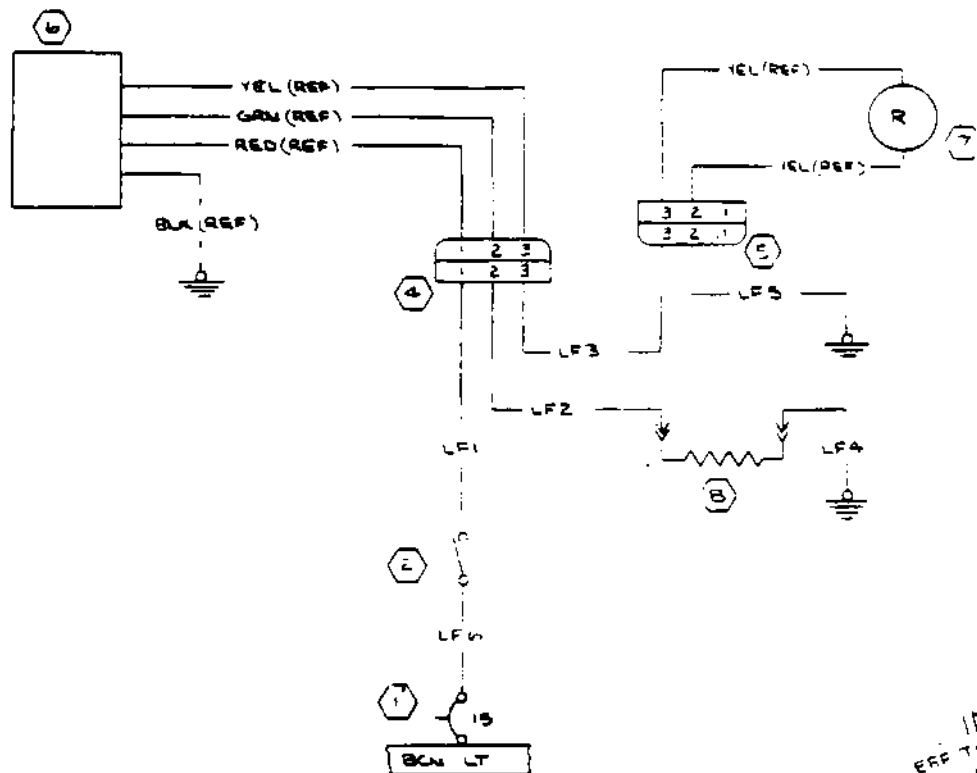
CEX-4000 IS APPLICABLE
VENOOR CODES PER S-4000
CEX-4000-CEXNA SPEC. NO.
S-XXX OR CEXNA-CEXNA
STD. NO.

SIZE	CODE IDENT	DWG NO
C	71379	0570101
SCALE: NONE		

172 RITE PRINT
1205485, 51225-385, 511220-1-146

1

REVISION			
LET	DESCRIPTION	DATE	APPD
A	UT REF 5-261-3 WAS 5-1360-10L REF 5A 5-1367-26 WAS 5-261-29 PER LFS (5A19114) (5A19134)	2-2-75	JH 1088 DMS RF
B	BY REV 5-360-5L WAS 5-1360-10L 2FI 6 LFG 16 GA WIRE WAS 18 GA (5E7907) (5E7904)	3AN 5-13-75	JHM 108 RF
C	BY REF 5594502-3102 WAS 5594502-3101 (5R8552)	505 8-2-76	JH 1088 RF



INACTIVE
EFF THRU SER(SABAS3)(SABAS4)
AS 12-16-76
JAN 1977

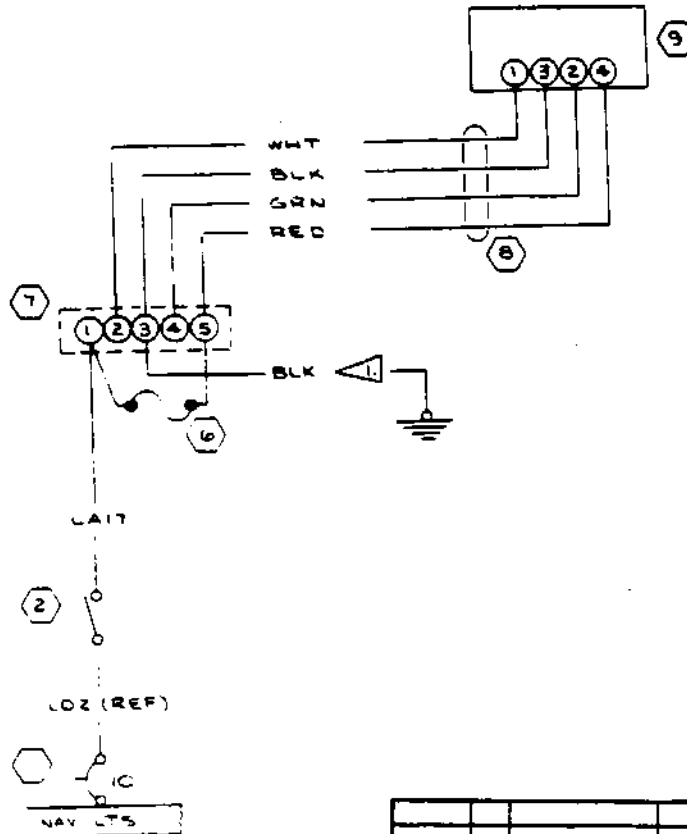
[illegible]

MODEL 172 SERIES SERVICE MANUAL

NOTES:

1. THIS WIRE NOT REQUIRED WHEN BOOM MIKE IS INSTALLED. REFER TO 0570400 PAGE 2.35 FOR REPLACEMENT WIRING WHEN BOOM MIKE IS INSTALLED.
2. VENDOR FOR 320733 & 320736 IS (00775);
VENDOR FOR 8409 IS (70903);
VENDOR FOR 35111-05-001 IS (71785).

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: 374636 LARS 329416/NOTE 2 NOW SHOP PRACTICE	2-7-75	488475



INACTIVE
EFF THRU SER (SR8453) (SR8454)
RS 12-16-76
TJS

55 0316
910 51

PART NO.	DESCRIPTION
9 0570058-1	MAP LIGHT ASSY
8 8409	CABLE
7 35111-05-001	TERMINAL STRIP
6 510141-1	FUSE ASSY
2 5-2160-1	SWITCH
1 5-1560-10L	CIRCUIT BREAKER

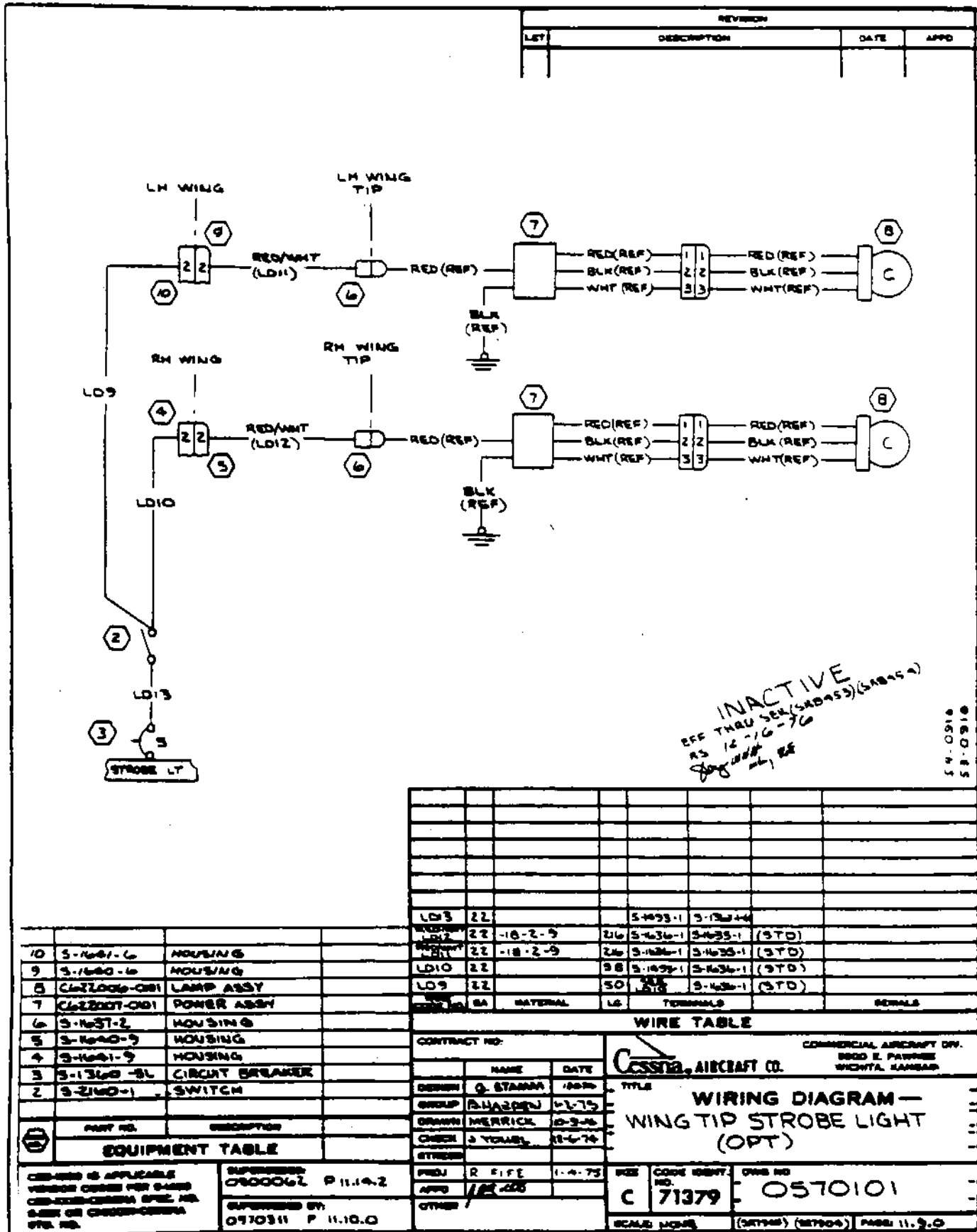
WIRE CODE NO.	G.A.	MATERIAL	LG.	TERMINALS	SERIALS
WHT	8409	320733	320733	2	
BLK					
GRN					
RED	8409	320733	320733		
BLK	20-20-C	3	5-1324-8	329416	
LAIT	20	8	329416	5-1493-1	2

CONTRACT NO.			WIRE TABLE		
DESIGN	NAME	DATE	Cessna AIRCRAFT CO.		
GROUP	B. STAMPA	12-75	TITLE		
DRAWN	MERRICK	10-8-75	WIRING DIAGRAM -		
CHECK	J. TOWEL	11-6-75	MAP LIGHT - CONTROL WHEEL		
STRESS			(OPT)		
PROJ	2-5-75	1-75	SIZE	CODE IDENT	DWG NO
APPD	JTS		C	71379	0570101
OTHER			SCALE	NONE	(SR7903) (SR7906) PAGE 11 OF 12

CES-1000 IS APPLICABLE
VENDOR CODES PER 8-4000
CES-XXXX-CESSNA SPEC. NO.
8-XXX OR CXXXX-CESSNA
STD. NO.

SUPERSEDES:
0500062 P 11.11.1
SUPERSEDED BY:
0570311 P 11.8.0

MODEL 172 SERIES SERVICE MANUAL



REV	DESCRIPTION	DATE	APPD
A	BY REV: SER OUT HC1. ADD HC2 (SER. DETAIL A (R172; 51360-25L WAS 51360-20L (SRB133) (SRB134) (SRB146)	201 2-25-76	SRB133 SRB134 SRB146

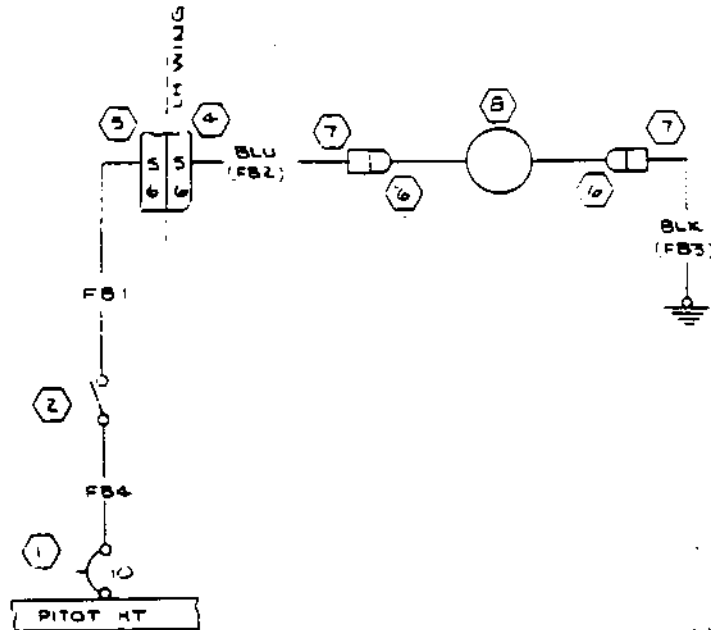
DETAIL A
EFF THRU SER (SRB133) (SRB146)

INACTIVE
EFF THRU SER (SRB133) (SRB146)
RS 12-16-76
Page 1 of 1

ITEM NO	PART NO	DESCRIPTION	CONTRACT NO	NAME	DATE	DESIGN	GROUP	DRAWN	CHECK	STRESS	PROJ	APPD	OTHER	SIZE	CODE IDENT NO	OWG NO	SCALE	PAGE	
4	0513052-3	CIGAR LIGHTER																	
3	60232-1	CIRCUIT BREAKER																	
2	5-1360-20L	CIRCUIT BREAKER																	
1	5-1360-25L	CIRCUIT BREAKER																	
EQUIPMENT TABLE			WIRE TABLE			CONTRACT NO: _____ NAME: _____ DATE: _____ DESIGN: G. STAMPA 4-76 GROUP: B. HADLOW 1-2-75 DRAWN: MERRICK 11-76 CHECK: S. TOWELL 12-76 STRESS: _____ PROJ: S. TOWELL 1-77 APPD: SRB133 1-77 OTHER: _____													
CES-1000 IS APPLICABLE VENDOR CODES PER S-400 CES-1000-CESNA SPEC. NO. S-100 OR CHECKER-CESNA STD. NO.			SUPERSEDES 050006Z P 13.1.1 SUPERSEDED BY: 0570311 P 13.1.0			COMMERCIAL AIRCRAFT DIV. 2800 E. PAWNEE WICHITA, KANSAS Cessna AIRCRAFT CO. TITLE: WIRING DIAGRAM - CIGAR LIGHTER SIZE: C CODE IDENT NO: 71379 OWG NO: 0570101 SCALE: NONE PAGE: 13.1.0													

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO



INACTIVE
EFF THRU SER 588454 (588454)
RS 12-16-76
1/24/76

54 0916
53 0916

5	072105	PITOT HEATER
7	5-1637-2	HOUSING
6	5-1637-1	HOUSING
5	5-1641-6	HOUSING
4	5-1640-6	HOUSING

2	5-2140-1	SWITCH
4	5-1360-OL	CIRCUIT BREAKER

PART NO.	DESCRIPTION

EQUIPMENT TABLE	

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-1111-CESNA SPEC. NO.
S-1111 OR CHECKED-CESNA
STD. NO.

SUPERSEDED
0500062 P 13.1
SUPERSEDED BY:
0570311 P 13.2.0

WIRE	CODE NO.	GA.	MATERIAL	LG.	TERMINALS	SERIALS
FB4	18				5-1493-1	5-1360-1-1
BLK	18	18-0		14	5-1493-2	5-1360-1-8
FB2	18	18-6		48	5-1493-2	5-1360-2 (STD)
FB1	18			48	5-1493-1	5-1360-2

WIRE TABLE		
CONTRACT NO.		
DESIGN	G. STAMM	12-76
GROUP	3 HANSEN	12-76
DRAWN	MERRICK	12-76
CHECK	J. TOWN	12-76
STRESS		
PROJ		
APPRO		
OTHER		

COMMERCIAL AIRCRAFT DIV 3800 E. PAWNEE WICHITA, KANSAS	
Cessna AIRCRAFT CO.	
TITLE	WIRING DIAGRAM - PITOT - HEATED (OPT)
SIZE	C
CODE IDENT. NO.	71379
DWG NO.	0570101
SCALE	NONE
(SHEET) / (SHEETS)	1 / 1
PAGE	13.2.0

12-11-76
17265495 P17201375 P17200506562

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BT REV S&S CC23 WAS 3-13-67-2-6 FOR CC24 S-13-67-2-6 WAS 3-13-67-2-6 FOR CC23. CC22, CC24, CC20, CC24 AND CC28 (248133)	28R 3-20-70	27 28 29

NOTES.

1. THESE SWITCHES PART OF (30:002-010)
ACTUATOR ASSY

INACTIVE
EFF THRU JAN (SAB 453) (SAB 454)
95 12-16-76
WAND, RF

9160-15
9160-25

10	C30002-001	ACTUATOR ASSY
8	5-1636-2	HOUSING
8	8-7638-1	HOUSING
7	5-1641-6	HOUSING
6	3-4640-6	HOUSING
6	3-4641-5	HOUSING
4	5-1640-9	HOUSING
3	5-4508-1	SWITCH
2	3-4360-46L	CKT BLK
1	V3-11-05	SWITCH

PART NO	DESCRIPTION
EQUIPMENT TABLE	

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX-CESNA SPEC NO
S-XXX OR CMXXXX-CESNA
STD NO

SUPERSIDES
2 4...0
SUPERSIDED BY
0570311 P 1410

CC26				5-1672-8	
CC25				5-1672-4	5-1672-4
CC22				5-1672-4	5-1672-4
CC21				5-1672-4	5-1672-4
CC20				5-1672-4	5-1672-4
CC19				5-1672-4	5-1672-4
CC18				5-1672-4	5-1672-4
CC17				5-1672-4	5-1672-4
CC16				5-1672-4	5-1672-4
CC15				5-1672-4	5-1672-4
CC14				5-1672-4	5-1672-4
CC13				5-1672-4	5-1672-4
CC12				5-1672-4	5-1672-4
CC11				5-1672-4	5-1672-4
CC10				5-1672-4	5-1672-4
CC9				5-1672-4	5-1672-4
CC8				5-1672-4	5-1672-4
CC7				5-1672-4	5-1672-4
CC6				5-1672-4	5-1672-4
CC5				5-1672-4	5-1672-4
CC4				5-1672-4	5-1672-4
CC3				5-1672-4	5-1672-4
CC2				5-1672-4	5-1672-4
CC1				5-1672-4	5-1672-4
CC0				5-1672-4	5-1672-4
CC-1				5-1672-4	5-1672-4
CC-2				5-1672-4	5-1672-4
CC-3				5-1672-4	5-1672-4
CC-4				5-1672-4	5-1672-4
CC-5				5-1672-4	5-1672-4
CC-6				5-1672-4	5-1672-4
CC-7				5-1672-4	5-1672-4
CC-8				5-1672-4	5-1672-4
CC-9				5-1672-4	5-1672-4
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CC-11				5-1672-4	5-1672-4
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CC-13				5-1672-4	5-1672-4
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CC-19				5-1672-4	5-1672-4
CC-20				5-1672-4	5-1672-4
CC-21				5-1672-4	5-1672-4
CC-22				5-1672-4	5-1672-4
CC-23				5-1672-4	5-1672-4
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CC-35				5-1672-4	5-1672-4
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CC-54				5-1672-4	5-1672-4
CC-55				5-1672-4	5-1672-4
CC-56				5-1672-4	5-1672-4
CC-57				5-1672-4	5-1672-4
CC-58				5-1672-4	5-1672-4
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CC-67				5-1672-4	5-1672-4
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CC-72				5-1672-4	5-1672-4
CC-73				5-1672-4	5-1672-4
CC-74				5-1672-4	5-1672-4
CC-75				5-1672-4	5-1672-4
CC-76				5-1672-4	5-1672-4
CC-77				5-1672-4	5-1672-4
CC-78				5-1672-4	5-1672-4
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CC-82				5-1672-4	5-1672-4
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CC-87				5-1672-4	5-1672-4
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CC-95				5-1672-4	5-1672-4
CC-96				5-1672-4	5-1672-4
CC-97				5-1672-4	5-1672-4
CC-98				5-1672-4	5-1672-4
CC-99				5-1672-4	5-1672-4
CC-100				5-1672-4	5-1672-4

CONTRACT NO.		
DESIGN	NAME	DATE
GROUP	W. H. H. H. H.	1-7-76
DRAWN	PAPE	1-3-76
CHECK	Y. G. G.	2-3-76
STRESS		
PROJ	FAK	2-4-76
APPD		
OTHER		

WIRE TABLE

Cessna AIRCRAFT CO.

COMMERCIAL AIRCRAFT DIV
3800 E. PAWNEE
WICHITA, KANSAS

TITLE

WIRING DIAGRAM -
WING FLAPS -
ELECTRIC

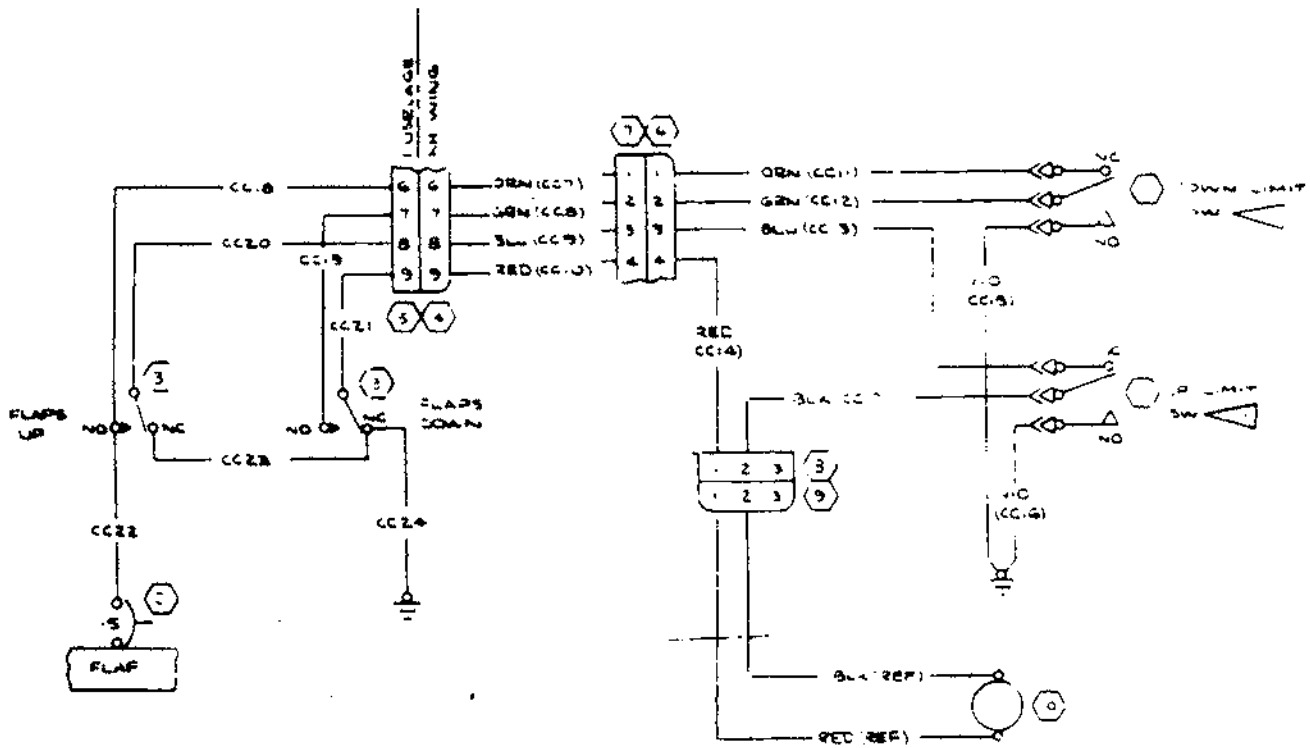
SIZE **C** **CODE IDENT NO** **71379** **DWG NO** **0570101**

SCALE 1/8" = 1" **PAGE**

508133
1126725

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPD



INACTIVE
EFF THRU SER (548453) (548454)
RS
2-16-76
MAY 1976

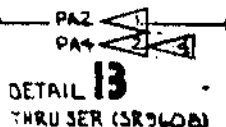
19 0916
13 0916

CONTRACT NO.		Cessna AIRCRAFT CO.		PAWNEE DIVISION 3801 S. PAWNEE WICHITA, KANSAS	
DESIGN	NAME	DATE	TITLE		
GROUP	L. J. H. H. H.	2-6-76	WIRING DIAGRAM -		
DRAWN	PAPE	2-3-76	WING FLAPS -		
CHECK	L. J. H. H.	2-3-76	ELECTRIC		
SYNOPSIS					
PRO	L. J. H. H.	2-6-76	SIZE	CODE - DENT	DWG NO
APPRO			C	71379	0570101
OTHER			SCALE	NONE	PAGE 4 of 1

1925-331
12-1-76

NOTES:

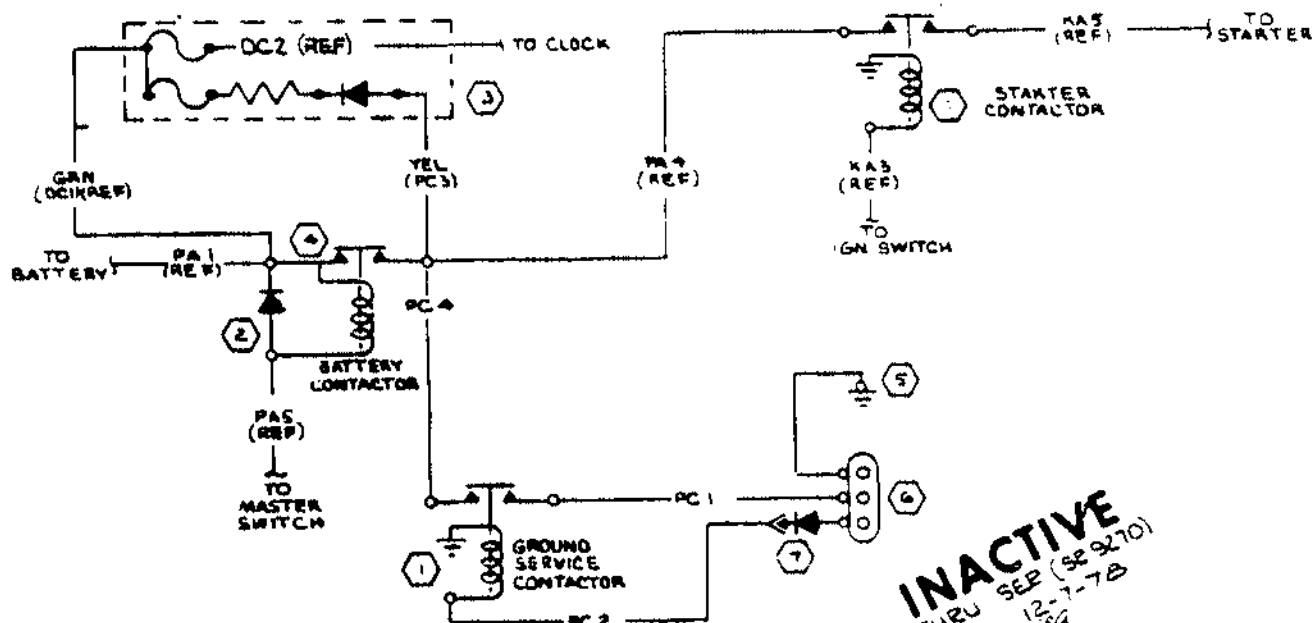
REVISION			
LAST	DESCRIPTION	DATE	APPRO
A	BY REV: ADD PASS WIRE; DELETE FLAG NOTE 3. CG4001-0101 WAS 0870060. (SR80801)(SR8082) (SR80804)	LSJ 4-20-77	WLB RF
B	BY REV: SEE OUT TWA-SIS; ADD DETAIL 7; CG4001-0105 WAS CG4001-0101 (SR8773)(SR8776)(SR9149)	ELJ 4-10-78	WLB RF
C	BY REV: OBSOLETE PA4, ADD DETAIL B, 0570371-1, NOTE 4 (SR9608)	RTL 7-16-79	WLB RF



20-35

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO



INACTIVE
THRU SEP (SE 9270)
DDH 12-7-78
JAB

7	15700-43	DOOR BOARD
6	M53506-1	RECEPTACLE
5	0855010	GROUND STRAP
4	S-1580-1	BATTERY CONTACTOR
3	0112031	FUSE 1 DIODE ASSY
2	0770128	DIODE ASSY
1	S-1577-1	CONTACTOR

EQUIPMENT TABLE

CES-1005 IS APPLICABLE
VERSION CODES PER 5-4005
CES-1005-CES-1005A SPEC. NO.
5-4001 OR CES-1005-CES-1005A
SPEC. NO.

SUPERSEDED
0570101 PG 4.2.0

SUPERSEDED BY
0570311 PG 4.13

ITEM	QTY	DESCRIPTION	QTY	DESCRIPTION	QTY	DESCRIPTION
DC-6	4	S-1562-4-9	S-1562-4-9	S-1562-4-9	S-1562-4-9	S-1562-4-9
PC-1	22	22-4	S-1562-4-9	S-1562-4-9	S-1562-4-9	S-1562-4-9
PC-2	22		S-1562-4-9	S-1562-4-9	S-1562-4-9	S-1562-4-9
PC-1	4	S-1562-4-9	S-1562-4-9	S-1562-4-9	S-1562-4-9	S-1562-4-9
ITEM	QTY	DESCRIPTION	QTY	DESCRIPTION	QTY	DESCRIPTION

WIRE TABLE

CONTRACT NO.		
NAME	DATE	
DESIGN	1-3-77	
GROUP	1-1-77	
DRAWN	12-20-76	
CHECK	12-20-76	
STRESS		
FIELD	1-12-77	
APPRO		
OTHER		

Cessna AIRCRAFT CO.		
TITLE		
WIRING DIAGRAM— GROUND SERVICE RECEPTACLE (OPT) (172 & F172)		
SIZE	CODE IDENT. NO.	QWS NO.
C	71379	0570311
SCALE	NONE	(SK 8453)
Page: 4.2		

[illegible]

MODEL 172 SERIES SERVICE MANUAL

NOTES:

- 1 APPLIES TO R172 & FR172 ONLY.
2 APPLIES TO 172 & F172 ONLY

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: ADD DETAIL 'A' (SRB453) (SRB454)	10-5-77 4-20-77	JAB WHH GF RE
B	BY REV: SER IN PB12 & PB13. ADD DETAIL 'B' & SERIAL ADD (A15, REF) NON SHOP PRACTICE (SR P0141) OWG BECOMES INACTIVE	10-5-77 1-9-77	JAB WHH GF RE
C	BY REV: SER OUT PB6, PB2, PB3 SER IN PB27, PB28, PB29; ADD CS93003-0103 (ALT) (SR9140) (SR9145)	10-5-77 3-31-78	JAB WHH GF RE

INACTIVE
THRU (SR 8773) (SR 8774)
CRS
JAB WHH
11-8-77
JPS
GF RE

74 12010
73 12010

15	CS93003-0103	OVERVOLT SENSOR (ALT)		PB 27	8	S-1562-8-9	S-1943-3	S-1367-4-12	THRU (SR 8773) (SR 8774)
14	TVA 13H5	CAPACITOR		PB 28	22		S-1636-1	S-1367-4-10	THRU (SR 8773) (SR 8774)
13	S-2135-2	LAMP ASSY		PB 29	8	S-1562-8-9	S-1943-2	S-1367-4-10	THRU (SR 8773) (SR 8774)
12	CU11503-0102	ALT ASSY		PB 13	8	S-1562-8-9	S-1943-2	S-1367-4-10	(SR9014) THRU (SR9145)
11	CU11502-0203	ALT ASSY		PB 12	8	S-1562-8-9	S-1943-3	S-1367-4-12	(SR9014) THRU (SR9145)
10	CS93003-0101	OVERVOLT SENSOR		PB 11	8	S-1562-8-9	S-1367-4-10	S-1367-4-10	THRU (SR 8773) (SR 8774)
9	CU11004-0101	VOLTAGE REGULATOR		PB 10	22		S-1636-1	S-1367-4-10	THRU (SR 8773) (SR 8774)
8	S-1636-1	HOUSING		PB 9	8	S-1562-8-9	S-1367-4-12	S-1367-4-10	THRU (SR 8773) (SR 8774)
7	S-1636-2	HOUSING		PB 8	10	S-1562-10-3	S-1367-3-12	S-1367-3-12	
6	S-1636-2	HOUSING		PB 7	10	S-1562-10-3	S-1367-3-10	S-1367-3-12	
5	S-1636-1	HOUSING		PB 6	22		S-1636-1	S-1367-4-10	THRU (SR 8773) (SR 8774)
4	S-1943-1-1	SWITCH		PB 5	1		S-1636-1	S-1636-1	
3	S-1560-5L	CIRCUIT BREAKER		PB 4	1		S-1636-1	S-1636-1	
2	S-1707-60	CIRCUIT BREAKER		PB 3	1		S-1636-2	S-1636-1	
1	S-1560-15L	CIRCUIT BREAKER		PB 2	1		S-1636-1	S-1636-1	
				PB 1	22		S-1367-1-6	S-1636-1	

PART NO.	DESCRIPTION	WIRE CODE NO.	GA.	MATERIAL	LG.	TERMINALS	SERIALS

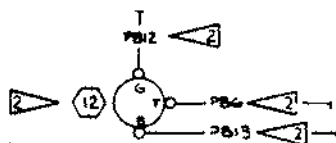
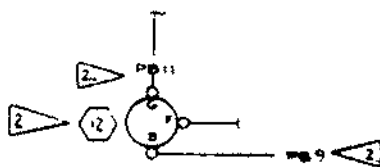
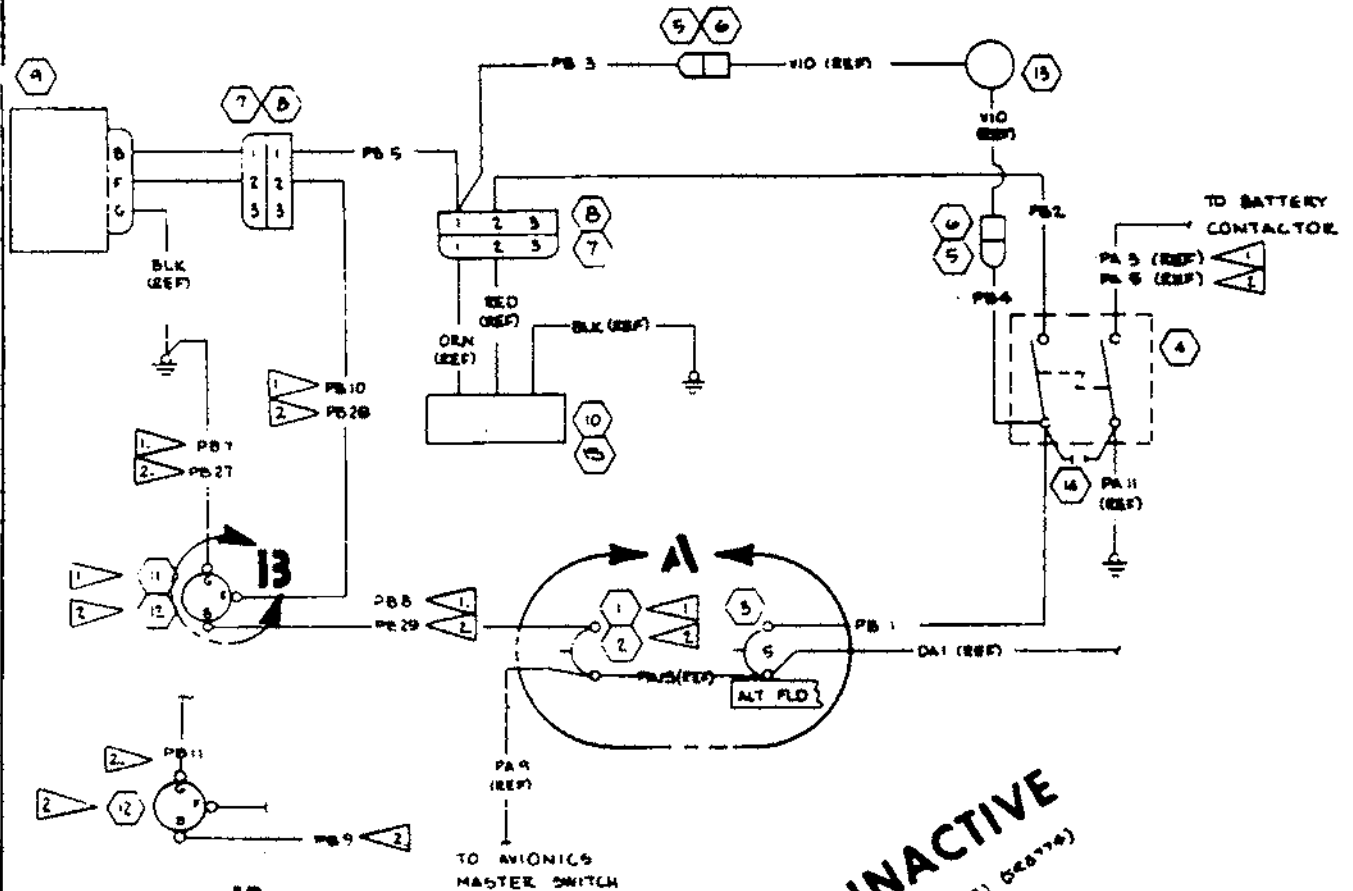
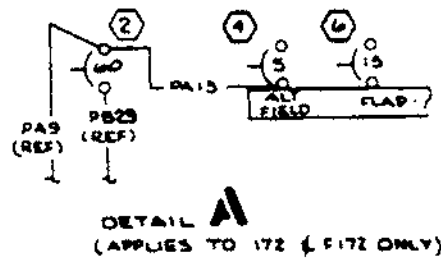
WIRE TABLE		
CONTRACT NO.	NAME	DATE
	WHITSON	1-3-77
DESIGN	GROUP	DATE
	WAVEVEY	2-20-76
CHECK	YOUSEL	12-20-76
SYNOPSIS		
PROJ	FILE	1-12-77
APPRO		
OTHER		

WIRING DIAGRAM— ALTERNATOR SYSTEM		
SIZE	CODE IDENT. NO.	OWG NO.
C	71379	0570311
SCALE: NONE		

CS93003 IS APPLICABLE VERSION CODES FOR S-4000 CS93003-0103-0104-0105-0106-0107-0108-0109-0110-0111-0112-0113-0114-0115-0116-0117-0118-0119-0120-0121-0122-0123-0124-0125-0126-0127-0128-0129-0130-0131-0132-0133-0134-0135-0136-0137-0138-0139-0140-0141-0142-0143-0144-0145-0146-0147-0148-0149-0150-0151-0152-0153-0154-0155-0156-0157-0158-0159-0160-0161-0162-0163-0164-0165-0166-0167-0168-0169-0170-0171-0172-0173-0174-0175-0176-0177-0178-0179-0180-0181-0182-0183-0184-0185-0186-0187-0188-0189-0190-0191-0192-0193-0194-0195-0196-0197-0198-0199-0200-0201-0202-0203-0204-0205-0206-0207-0208-0209-0210-0211-0212-0213-0214-0215-0216-0217-0218-0219-0220-0221-0222-0223-0224-0225-0226-0227-0228-0229-0230-0231-0232-0233-0234-0235-0236-0237-0238-0239-0240-0241-0242-0243-0244-0245-0246-0247-0248-0249-0250-0251-0252-0253-0254-0255-0256-0257-0258-0259-0260-0261-0262-0263-0264-0265-0266-0267-0268-0269-0270-0271-0272-0273-0274-0275-0276-0277-0278-0279-0280-0281-0282-0283-0284-0285-0286-0287-0288-0289-0290-0291-0292-0293-0294-0295-0296-0297-0298-0299-0300-0301-0302-0303-0304-0305-0306-0307-0308-0309-0310-0311-0312-0313-0314-0315-0316-0317-0318-0319-0320-0321-0322-0323-0324-0325-0326-0327-0328-0329-0330-0331-0332-0333-0334-0335-0336-0337-0338-0339-0340-0341-0342-0343-0344-0345-0346-0347-0348-0349-0350-0351-0352-0353-0354-0355-0356-0357-0358-0359-0360-0361-0362-0363-0364-0365-0366-0367-0368-0369-0370-0371-0372-0373-0374-0375-0376-0377-0378-0379-0380-0381-0382-0383-0384-0385-0386-0387-0388-0389-0390-0391-0392-0393-0394-0395-0396-0397-0398-0399-0400-0401-0402-0403-0404-0405-0406-0407-0408-0409-0410-0411-0412-0413-0414-0415-0416-0417-0418-0419-0420-0421-0422-0423-0424-0425-0426-0427-0428-0429-0430-0431-0432-0433-0434-0435-0436-0437-0438-0439-0440-0441-0442-0443-0444-0445-0446-0447-0448-0449-0450-0451-0452-0453-0454-0455-0456-0457-0458-0459-0460-0461-0462-0463-0464-0465-0466-0467-0468-0469-0470-0471-0472-0473-0474-0475-0476-0477-0478-0479-0480-0481-0482-0483-0484-0485-0486-0487-0488-0489-0490-0491-0492-0493-0494-0495-0496-0497-0498-0499-0500-0501-0502-0503-0504-0505-0506-0507-0508-0509-0510-0511-0512-0513-0514-0515-0516-0517-0518-0519-0520-0521-0522-0523-0524-0525-0526-0527-0528-0529-0530-0531-0532-0533-0534-0535-0536-0537-0538-0539-0540-0541-0542-0543-0544-0545-0546-0547-0548-0549-0550-0551-0552-0553-0554-0555-0556-0557-0558-0559-0560-0561-0562-0563-0564-0565-0566-0567-0568-0569-0570-0571-0572-0573-0574-0575-0576-0577-0578-0579-0580-0581-0582-0583-0584-0585-0586-0587-0588-0589-0590-0591-0592-0593-0594-0595-0596-0597-0598-0599-0600-0601-0602-0603-0604-0605-0606-0607-0608-0609-0610-0611-0612-0613-0614-0615-0616-0617-0618-0619-0620-0621-0622-0623-0624-0625-0626-0627-0628-0629-0630-0631-0632-0633-0634-0635-0636-0637-0638-0639-0640-0641-0642-0643-0644-0645-0646-0647-0648-0649-0650-0651-0652-0653-0654-0655-0656-0657-0658-0659-0660-0661-0662-0663-0664-0665-0666-0667-0668-0669-0670-0671-0672-0673-0674-0675-0676-0677-0678-0679-0680-0681-0682-0683-0684-0685-0686-0687-0688-0689-0690-0691-0692-0693-0694-0695-0696-0697-0698-0699-0700-0701-0702-0703-0704-0705-0706-0707-0708-0709-0710-0711-0712-0713-0714-0715-0716-0717-0718-0719-0720-0721-0722-0723-0724-0725-0726-0727-0728-0729-0730-0731-0732-0733-0734-0735-0736-0737-0738-0739-0740-0741-0742-0743-0744-0745-0746-0747-0748-0749-0750-0751-0752-0753-0754-0755-0756-0757-0758-0759-0760-0761-0762-0763-0764-0765-0766-0767-0768-0769-0770-0771-0772-0773-0774-0775-0776-0777-0778-0779-0780-0781-0782-0783-0784-0785-0786-0787-0788-0789-0790-0791-0792-0793-0794-0795-0796-0797-0798-0799-0800-0801-0802-0803-0804-0805-0806-0807-0808-0809-0810-0811-0812-0813-0814-0815-0816-0817-0818-0819-0820-0821-0822-0823-0824-0825-0826-0827-0828-0829-0830-0831-0832-0833-0834-0835-0836-0837-0838-0839-0840-0841-0842-0843-0844-0845-0846-0847-0848-0849-0850-0851-0852-0853-0854-0855-0856-0857-0858-0859-0860-0861-0862-0863-0864-0865-0866-0867-0868-0869-0870-0871-0872-0873-0874-0875-0876-0877-0878-0879-0880-0881-0882-0883-0884-0885-0886-0887-0888-0889-0890-0891-0892-0893-0894-0895-0896-0897-0898-0899-0900-0901-0902-0903-0904-0905-0906-0907-0908-0909-0910-0911-0912-0913-0914-0915-0916-0917-0918-0919-0920-0921-0922-0923-0924-0925-0926-0927-0928-0929-0930-0931-0932-0933-0934-0935-0936-0937-0938-0939-0940-0941-0942-0943-0944-0945-0946-0947-0948-0949-0950-0951-0952-0953-0954-0955-0956-0957-0958-0959-0960-0961-0962-0963-0964-0965-0966-0967-0968-0969-0970-0971-0972-0973-0974-0975-0976-0977-0978-0979-0980-0981-0982-0983-0984-0985-0986-0987-0988-0989-0990-0991-0992-0993-0994-0995-0996-0997-0998-0999-1000-1001-1002-1003-1004-1005-1006-1007-1008-1009-1010-1011-1012-1013-1014-1015-1016-1017-1018-1019-1020-1021-1022-1023-1024-1025-1026-1027-1028-1029-1030-1031-1032-1033-1034-1035-1036-1037-1038-1039-1040-1041-1042-1043-1044-1045-1046-1047-1048-1049-1050-1051-1052-1053-1054-1055-1056-1057-1058-1059-1060-1061-1062-1063-1064-1065-1066-1067-1068-1069-1070-1071-1072-1073-1074-1075-1076-1077-1078-1079-1080-1081-1082-1083-1084-1085-1086-1087-1088-1089-1090-1091-1092-1093-1094-1095-1096-1097-1098-1099-1100-11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MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPD
C	SEE PAGE 4.50 FOR REVISION		



INACTIVE
THRU SER 8773 (SR8774)
SER 14-8-77
JAN 1978

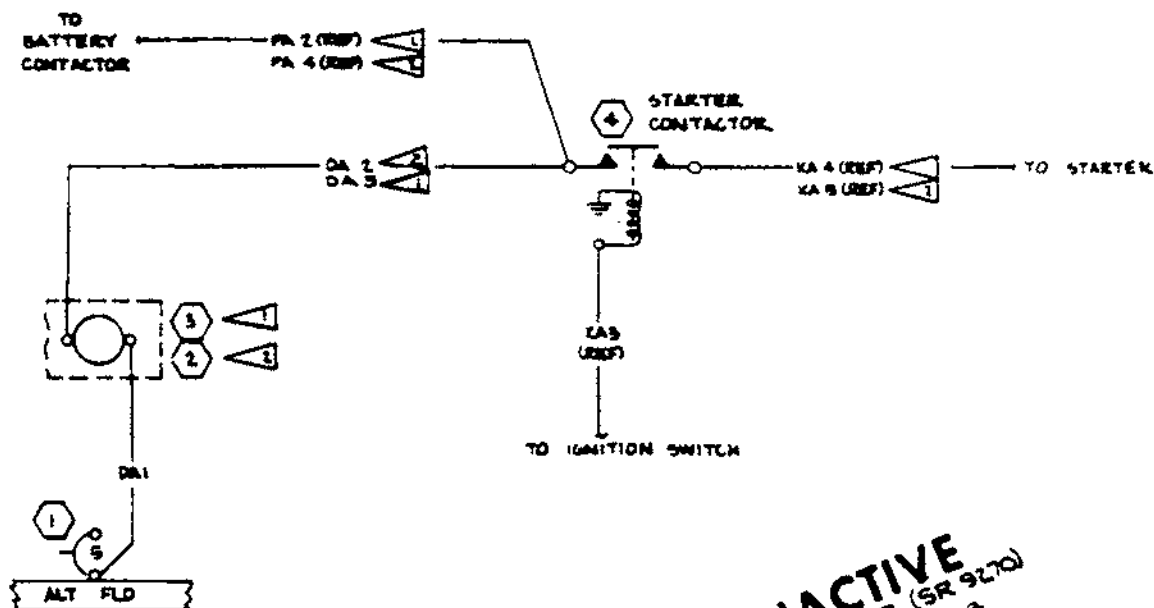
CONTRACT NO.		Cessna AIRCRAFT CO.		PASSENGER DIVISION BIRD & PAWNEE WICHITA, KANSAS	
DESIGN	WATSON	DATE	1-3-77	TITLE	
GROUP	WILLIAMSON	DATE	1-12-77	WIRING DIAGRAM -	
DRAWN	JARVEY	DATE	12-20-76	ALTERNATOR SYSTEM	
CHECK	YOUNG	DATE	12-20-76		
BY	YOUNG	DATE	12-20-76		
PROJ	F.F.E.	DATE	1-12-77	SIZE	CODE IDENT
APPD	W.A.	DATE		C	71379
OTHER		DATE		ORIG NO	0570311
		SCALE	NONE	(SR8452) (SR8453)	PAGE 4 3...

14-0916
73 0916

MODEL 172 SERIES SERVICE MANUAL

NOTES:

- 1 APPLIES TO RTZ, FRITZ ONLY
2 APPLIES TO :72, F172 ONLY



INACTIVE
THRU SER (SR 9270)
DOM 12-7-78
JAS WILKINS
2

[illegible]

4	5-1577-1	STARTER CONTACTOR
3	6044814	1MST CLUSTER
2	5-1920-5	INDICATOR
1	5-1360-9A	CIRCUIT BREAKER

	PART NO.	DESCRIPTION
	EQUIPMENT TABLE	

CES-1000 IS APPLICABLE
 VENDOR CODES PER S-4000
 CES-1000-CES-1000A SPEC. NO.
 S-1000 OR CES-1000-CES-1000A
 STD. NO.

SUPERSEDED:
 0570101

SUPERSEDED BY:
 0570311

CONTRACT NO:		
	NAME	DATE
DESIGN	WATSON	1-3-77
DRAW	<i>W. Watson</i>	1-1-77
DESIGN	WATSON	2-10-76
CHECK	YOUNG	7-20-76
STRESS		
PROJ	FIFE	1-12-77
APPO	21	
OTHER		

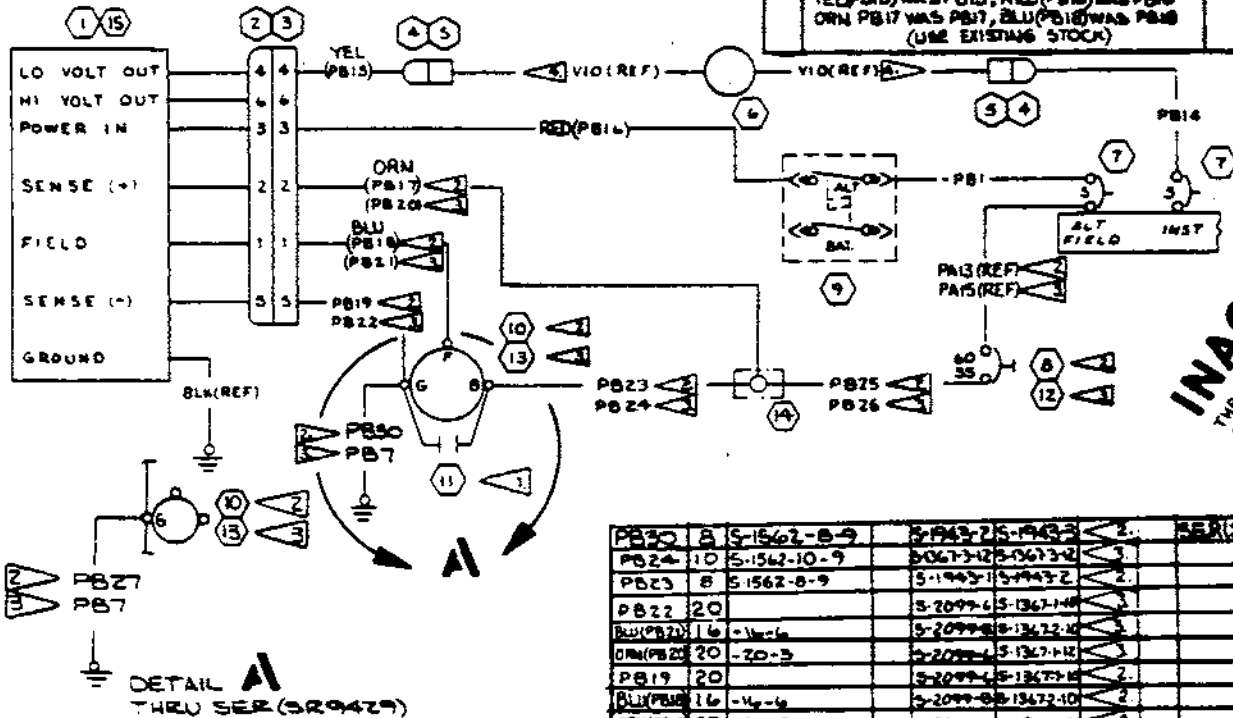
 Cessna AIRCRAFT CO.		PAWNEE DIVISION 1800 E. PAWNEE WICHITA, KANSAS	
TITLE WIRING DIAGRAM — AMMETER			
SIZE C	CODE IDENT. NO. 71379	DWG NO. 05T0311	

MODEL 172 SERIES SERVICE MANUAL

E	BY REV: ADD 0570451, DETAIL B & SER (SR9624) (SR9625)	RAO 1-21-80	125 RNF 103 CAME REF
	BY REV: ADD 2611005-0102 (NOW SHOP PRACTICE)	SER	
F	BY REV: DELETE 0570451 & DETAIL "B"; INACTIVATE DWG; RELEASED PDR PRODUCTION (SR9624) (SR9625)	RAO 3-5-80	125 RNF 103 CAME REF

NOTES:

1. PART OF BASIC AVIONICS KIT
2. FOR USE ON 172 & 5172 ONLY
3. FOR USE ON 3172 & 6172 ONLY
4. TERMINATE VENDOR FURNISHED WIRES WITH 5-1636-1 PIN



15	C6H003-0102	ALT CONTROL UNIT	(ALT)
14	0370314	TERMINAL BOARD	
13	C6H1502-0203	ALTERNATOR ASSY	▲▲
12	S-1232-55	CIRCUIT BREAKER	▲▲▲
11	S-1915-1	CAPACITOR	▲▲▲
10	C6H1503-0102	ALTERNATOR ASSY	▲
9	S-1494-1-1	SWITCH	
8	S-1232-40	CIRCUIT BREAKER	▲▲
7	S-1360-5L	CIRCUIT BREAKER	
6	S-2135-2	LAMP ASSY	▲▲
5	S-1637-2	HOUSING	
4	S-1637-1	HOUSING	
3	S-2373-2	CONNECTOR	
2	S-2573-1	CONNECTOR	
1	C6H003-0101	ALT CONTROL UNIT	

	PART NO.	DESCRIPTION
	EQUIPMENT TABLE	
CES-0000 IS APPLICABLE VENDOR CODES PER S-400 CES-0000-CESBNA SPEC. NO. S-0000 OR CRU000-CESBNA STD. NO.		SUPERSEDES: 0570311 PG 450 445J SUPERSEDED BY: 0570311 PG 4:17

PG#	Q	ANSWER	PG#	Q	ANSWER
PG20	8	5-1562-8-9	5-1943-2	5-1943-3	2
PG24	10	5-1562-10-9	5-1967-12	5-1967-3-2	3
PG23	8	5-1562-8-9	5-1943-3	5-1943-2	2
PG22	20		5-2099-6	5-1367-1-48	2
BUS(PB22)	16	-16-6	5-2099-6	5-1367-2-10	2
ORN(PB20)	20	-20-3	5-2099-6	5-1367-1-12	3
PB19	20		5-2099-6	5-1367-1-6	2
BLN(PB18)	16	-16-6	5-2099-6	5-1367-2-10	2
ORN(PB17)	20	-20-3	5-2099-6	5-1367-1-6	2
RED(PB16)	20	-20-2	5-2099-6	5-1473-1	
TEL(PB15)	20	-20-4	5-2099-6	5-1435-1	
PB14	22		5-1367-1-6	5-1635-1	
PB25	8	5-1562-8-9	5-1943-1	5-1367-4-6	2
PB27	8	5-1562-8-9	5-1943-3	5-1367-4-2	THRU SER(209479) < 2
PB26	10	5-1562-10-9	5-1367-3-12	5-1367-3-8	3
PB7	10	5-1562-10-9	5-1367-3-12	5-1367-3-2	3
PB1	22		5-1473-1	5-1367-1-6	
CODE NO	GA	MATERIAL	LG	TERMINALS	SERIALS

CONTRACT NO.			WIRE TABLE		
			 CESSNA AIRCRAFT CO. PERMIT DIVISION 1000 E. PALMER WICHITA, KANSAS		
			TITLE		
DESIGN	104-130M	11-29-77	WIRING DIAGRAM — ALTERNATOR SYSTEM 172 F172 R172 & FRI72		
GROUP	W44 modified	11-27-77			
DRAWN	C. SNAYK	11-2-77			
CHECK	DORLESKE	11-4-77			
STRESS					
PROJ	RE FILE	12-19-77	SIZE	CODE IDENT. NO.	DWG NO.
APPD	1/85		C	71379	0570311
OTHER			SCALE: NONE (REVISED) (REVISED) PAGES: 4, 7		

INACTIVE
THRU SER (SR9924XSR9925)
RAO 3-6-60
1961
HES

MODEL 172 SERIES SERVICE MANUAL

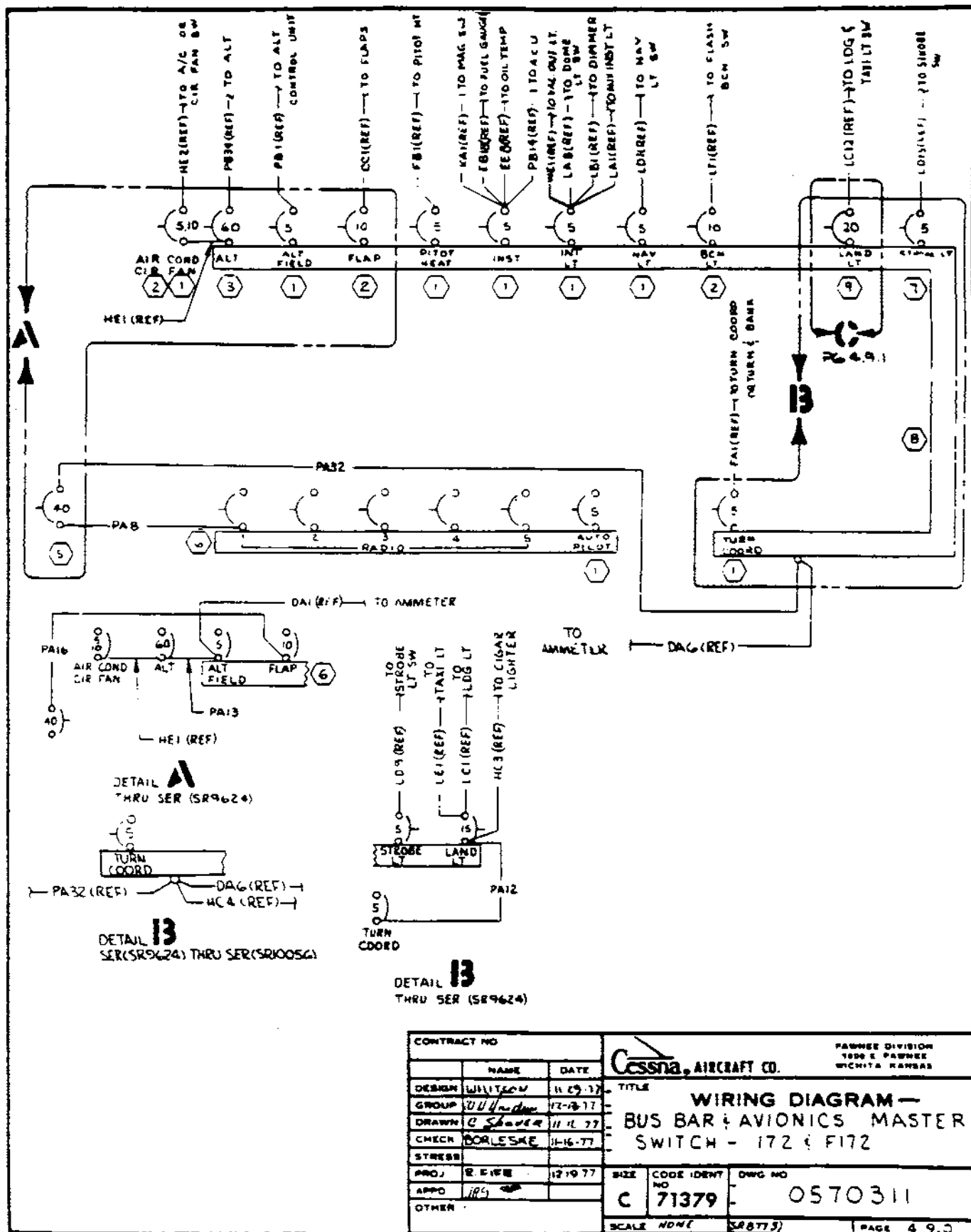
REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: PB25(REF) WAS PB13(REF). EB17(REF) TO FUEL GAUGES WAS EB11(REF) TO FUEL GAUGES. EE7(REF) TO OIL TEMP WAS EC11(REF) TO CYL HD TEMP. ADD DC10(REF) — TO DIGITAL CLOCK. ADD LA1(REF) — TO AUX INST LT. 10 WAS 18 (FLAP). INT LT WAS INST LT. S-1232-60 WAS S-1707-60. (SR9104)	MOR 5-24-79	AR and JR RF
B	BY REV: EB18 WAS EB17 & EB18 WAS EE7 (SR9742) BY REV: ADD S1232-5, 0570451, DETAIL A, B, PA23, & SER (SR9624)	WAG 1-21-80 RAO 1-21-80	WAG and RF RF
C	BY REV: PA32 WAS PA23, PB34 WAS PB25 (ADV 2EL) (SR9624)	RAO 2-12-80	JOS
D	BY REV: DELETED DC10(REF) MUR172E0850 RELEASE FOR PRODUCTION (SR9624)	RAO 3-5-80	JOS
E	BY REV: LD14(REF) WAS LD9(REF) "NOW SHOP PRACTICE" (MER172E0857)	MMK 5-1-80	MMK and JOS
F	BY REV: ADD DETAIL C (PG 4.9.1) "SR100840" ADD DETAIL "B" (SR10054)	DFS 11-25-80	DFS and JOS
G	BY REV: "STROBE LT" NOMENCLATURE WAS "STROBE LT-AVN FAN"; ADD WE1(REF) (SR10412)	GM 9-23-81	GM and JOS
H	BY REV: (SR10412) WAS (SR10092/REV G (SR10412)	REK 6-17-82	REK and JOS

9	S-1360-20L	CIRCUIT BREAKER	PA32	10	S-1562-10-9	S-1367-3-B5-13673-10	SER	SR9624	ON
8	0570451	BUS BAR	PA16	10	S-1562-10-9	S-1367-3-B5-13673-10	THRU SER	SR9624	(SR9625)
7	S-1232-5	CIRCUIT BREAKER	PA13	8	S-1562-8-9	S-1367-4-B5-13674-6	THRU SER	SR9624	
6	0570419	BUS BAR	PA12	18		S-1367-1-B5-13671-4	THRU SER	SR9624	(SR9625)
5	CM3589-40	SWITCH	PA8	10	S-1562-10-9	S-1367-3-B5-13673-4			
4	S-1360-15L	CIRCUIT BREAKER	WIRE	GA	MATERIAL	LG	TERMINALS		SERIALS
3	S-1232-60	CIRCUIT BREAKER	WIRE TABLE						
2	S-1360-10L	CIRCUIT BREAKER	CONTRACT NO.						
1	S-1360-5L	CIRCUIT BREAKER	DESIGN NAME DATE						
EQUIPMENT TABLE			CROSSING AIRCRAFT CO.						
			FABRICATION DIVISION 1500 E. PARKWAY WICHITA, KANSAS						
SUPERSEDED: 0570311 P 4.4			TITLE						
			WIRING DIAGRAM — BUS BAR & AVIONICS MASTER SWITCH - 172 & F172						
SUPERSEDED BY:			SIZE CODE IDENT. DWG NO.						
			C 71379 0570311						
SCALE: NONE			SR8713						
			PAGE: 4.9.9						

CS-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CS-1415-CERNA SPEC. NO.
S-1415 OR CHECKIN-CERNA
STD. NO.

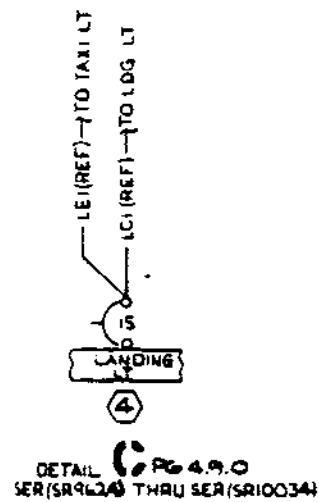
Bus Bar & Avionics Master Switch (Sheet 1 of 2)

MODEL 172 SERIES SERVICE MANUAL



MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
F	SEE 26490 FOR REVISION		

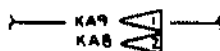


CONTRACT NO:		Cessna AIRCRAFT CO.		PAWNEE DIVISION 3800 E. PAWNEE WICHITA, KANSAS	
DESIGN	NAME	DATE	TITLE		
GROUP	WHITSON	11-25-80	WIRING DIAGRAM-		
DRAWN	SPRINGER	11-25-80	BUS BAR & AVIONICS MASTER		
CHECK	BOYLESKE	11-25-80	SWITCH - 172 & F172		
SYNOPSIS			SIZE	CODE IDENT	DWG NO
PROJ	D. C. SIMES	1-15-81	C	71379	0570311
APPRO			SCALE: NONE		PAGE 49.1
OTHER			(SR10034)		

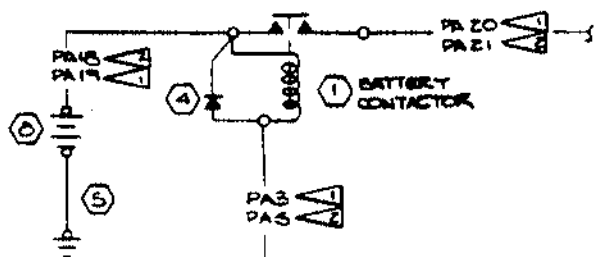
MODEL 172 SERIES SERVICE MANUAL

NOTES

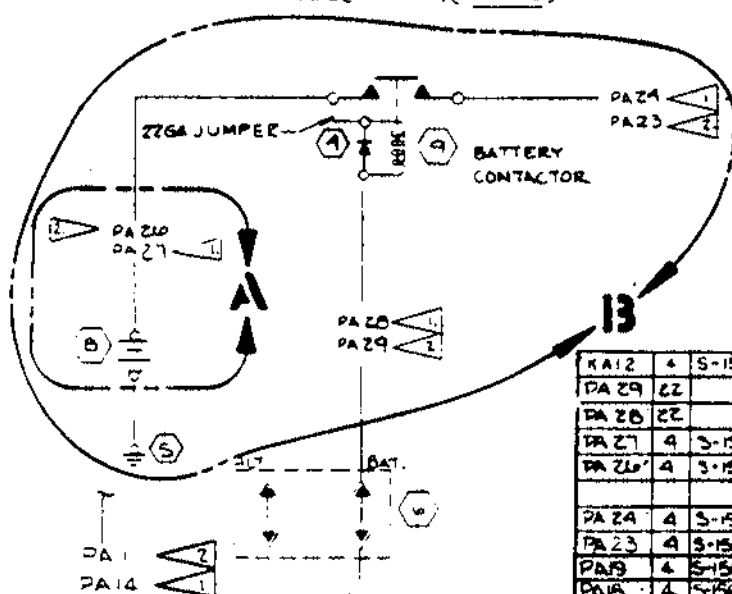
1. APPLIES TO R172 & FR172 ONLY
2. APPLIES TO 172 & F172 ONLY



DETAIL C
THRU SER (SR9624)



DETAIL B
THRU SER (SR9624) & (SR9625)



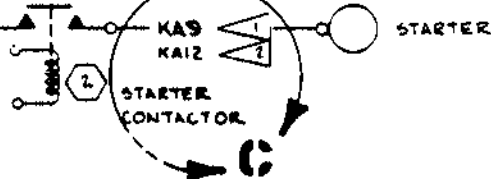
DETAIL A
THRU SER (SR9104) (SR9105)

PART NO.	DESCRIPTION
1 5-2475-1	BATT. CONTACTOR
2 C614002-0101	BATTERY
3 5-1944-1-1	SWITCH
4 0412007	BATTERY GROUND
5 0770728	DIODE ASSY
6 C614001-0105	BATTERY
7 5-2443-1	STARTER CONTACTOR
8 5-1580-1	BATTERY CONTACTOR

PART NO.	DESCRIPTION

CEC-1000 IS APPLICABLE	SUPERSEDES
VENDOR CODES PER S-4000	0570311 - 4.
CEC-XXXX-CESBNA SPEC. NO.	SUPERSEDED BY.
S-XXX OR CHXXXX-CESBNA	
STD. NO.	

LET	DESCRIPTION	DATE	APPRO
A	BY REV: ADD DETAIL A 1 SER, PA18, PA19, C614002-0101 (SR9104) (SR9105)	DDM 12-7-78	JAD
B	BY REV: SER 2447-4 WAS 5-1567-4-13 PA18, PA19 (SR9104) (SR9105)	MDR 5-8-78	JAD
C	BY REV: ADD DETAIL B 2 SER OUT PA19 & PA18, PA20, PA21, PA23, SER IN PA23, PA24, PA25, PA26, PA27, PA28, PA29 1 ADD 5-2475-1 (SR9625) (SR9624)	WAG 1-7-80	JAD
D	BY REV: ADD DETAIL C, KA12 & SER DELETE PA25 (ADV. SER.) (SR9624) (SR9625)	RAO 2-12-80	JAD
E	BY REV: RELEASED FOR PRODUCTION (SR9624) (SR9625)	RAO 3-5-80	JAD
F	BY REV: PA 23 WAS PA 30 (SR9624) (REF)	TLW 4-29-80	JAD
G	BY REV: SER OUT KA9, PA24, PA27, PA28 (SR9624)	CUN 6-5-81	JAD



KA12	4	5-1562-4-9	5-1367-613	5-2447-4	2	SER (SR9624) & ON
PA29	22		5-1493-1	5-1367-140	2	SER (SR9624) & ON
PA28	22		5-1493-1	5-1367-140	1	(SR9625) THRU (SR9624)
PA27	4	5-1562-4-9	5-2447-4	5-2447-4	1	(SR9625) THRU (SR9624)
PA26	4	5-1562-4-9	5-1367-613	5-2447-4	2	SER (SR9624) & ON
PA24	4	5-1562-4-9	5-2447-4	5-2447-4	1	(SR9625) THRU (SR9624)
PA23	4	5-1562-4-9	5-2447-4	5-2447-4	2	SER (SR9624) & ON
PA19	4	5-1562-4-9	5-2447-4	5-1367-613	1	(SR9105) THRU (SR9104)
PA18	4	5-1562-4-9	5-2447-4	5-1367-613	2	(SR9104) THRU (SR9105)
KA9	4	5-1562-4-9	5-1367-613	5-2447-4	1	THRU SER (SR9624)
PA14	4	5-1562-4-9	5-1367-613	5-1367-613	1	THRU SER (SR9105)
PA11	22		5-1493-1	5-1367-613		
KA8	4	5-1562-4-9	5-1367-613	5-2447-4	2	THRU SER (SR9624)
PA5	22		5-1493-1	5-1367-140	2	THRU SER (SR9624)
PA21	4	5-1562-4-9	5-1367-613	5-2447-4	2	THRU SER (SR9624)
PA3	22		5-1493-1	5-1367-140	1	THRU SER (SR9625)
PA20	4	5-1562-4-9	5-1367-613	5-2447-4	1	THRU SER (SR9625)
PA1	4	5-1562-4-9	5-1367-613	5-1367-613	2	THRU SER (SR9104)

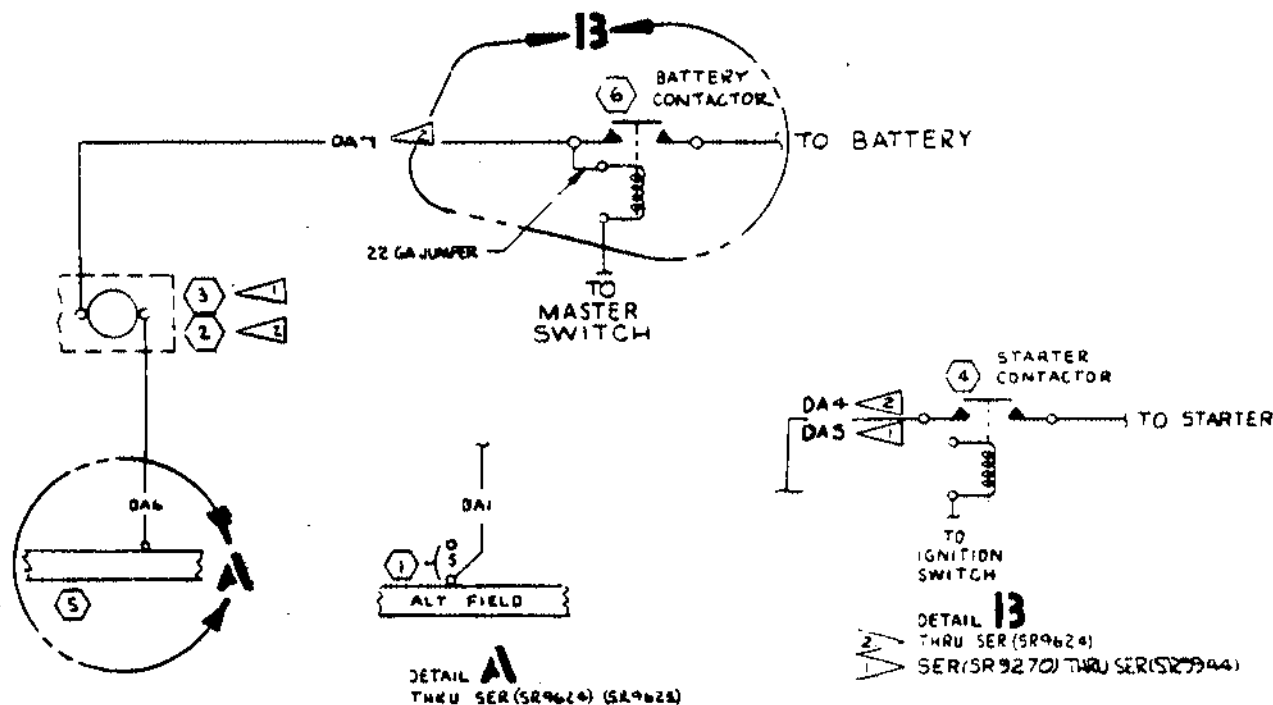
WIRE TABLE			
CONTRACT NO.	NAME	DATE	TITLE
	WILLIAM	12-5-78	WIRING DIAGRAM - BATTERY CIRCUIT
DESIGN	WILLIAM	12-5-78	
GROUP	WILLIAM	12-5-78	
DRAWN	C.D. HAUN	11-21-78	
CHECK	BOYLESKE	12-12-78	
SYNOPSIS			
PROJ	R. PIFE	12-30-78	
APPRO	JAD		
OTHER			
SIZE	C	CODE IDENT. NO	DWG NO
		71379	0570311
SCALE	NONE	(SR 9624)	PAGE: A. 1.

MODEL 172 SERIES SERVICE MANUAL

NOTES

- 1 APPLIES TO R172 & FR172 ONLY
 2 APPLIES TO 172 & R172 ONLY

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV. ADD DETAIL 'A' & 'B' (SR9245) SER IN DRG. DA7 SER OUT DA4 (SR9624) (SR9625)	1-10-80 RAO NAG	JAB 11- RF
B	BY REV. ADD DETAIL 'C' & 'D' (SR9624) (ADV ZEL)	2-12-80 RAO	11- RF
C	BY REV. RELEASED FOR PRODUCTION (SR9624)	3-5-80 RAO	JAB 11- RF
D	BY REV. COMBINE DETAIL 'B' & 'C' DELETE DETAIL 'C'; ADD SER (SR9270) & ON "TO DETAIL 'B' FOR R172 & FR172 CONFIG. "NOW SHOP PRACTICE" MER 172 E0857	5-1-80 MAMA	200-11- 11- RF 2ES
E	BY REV. SER OUT DAS & DETAIL 'B' (SR9944)	6-9-81 GAW	JAB 11- RF



EQUIPMENT TABLE			
PART NO.	DESCRIPTION	QUANTITY	REMARKS
6	S-2475-1 BATTERY CONTACTOR		
5	0570451 BUS BAR		
4	S-2443-1 STARTER CONTACTOR		
3	C669514 INST CLUSTER	1	
2	5-1520-9 INDICATOR	2	
1	5-1560-5L CIRCUIT BREAKER		

WIRE TABLE			
WIRE NO.	GA	MATERIAL	TERMINALS
DA7	8	5-1562-8-9	5-1562-4-10 (SR9624) & ON
DA6	8	5-1562-8-9	5-1562-4-10 (SR9624) & ON
DA5	8	5-1562-8-9	5-1562-4-10 (SR9624) & ON
DA4	8	5-1562-8-9	5-1562-4-10 (SR9624) & ON
DA1	8	5-1562-8-9	5-1562-4-10 (SR9624) & ON

CONTRACT NO.		DATE	
DESIGN		DATE	
GROUP		DATE	
DRAWN		DATE	
CHECK		DATE	
SYNOPSIS		DATE	
PREP		DATE	
APPRO		DATE	
OTHER		DATE	

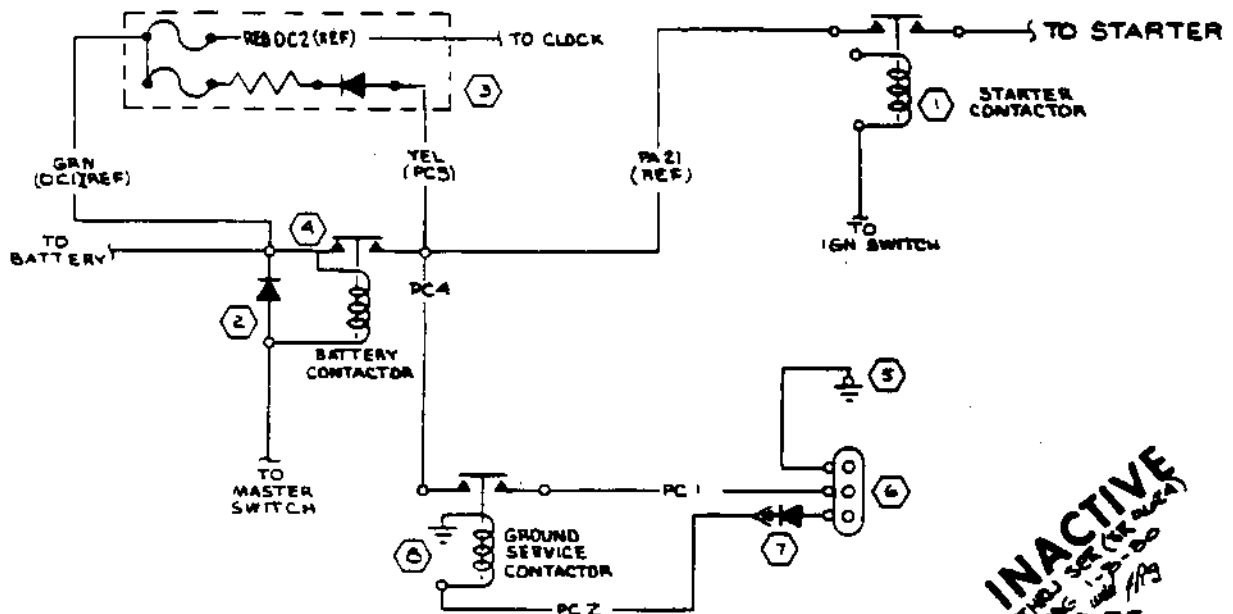
SUPERSEDED BY		DATE	
SUPERSEDED BY		DATE	

CROSSING AIRCRAFT CO.		TITLE	
WIRING DIAGRAM —		AMMETER	

C		71379	
SCALE: NONE		PAGE: 4.12	

MODEL 172 SERIES SERVICE MANUAL

REVISION			
REV	DESCRIPTION	DATE	APPRO

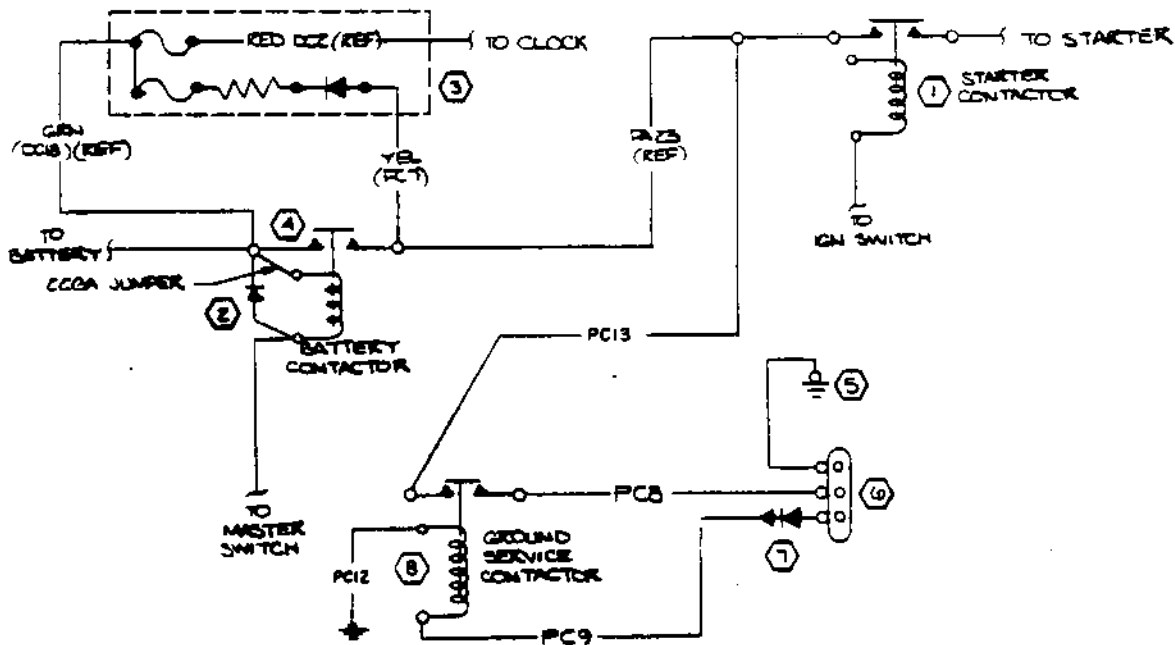


INACTIVE
THIS SET (172-172)
NO 1-7-80
RF

EQUIPMENT TABLE		WIRE TABLE	
5	S-1577-1	CONTACTOR	
7	1570043	DIODE BOARD	
6	M33506-1	RECEPTACLE	
5	0853010	GROUND STRAP	
4	S-1580-1	BATTERY CONTACTOR	
3	0712031	FUSE & DIODE ASSY	
2	0770128	DIODE ASSY	
1	S-2443-1	CONTACTOR	
PART NO. DESCRIPTION 0570311 PG 4.2 SUPERSEDED BY: 0570311 PG 4.15		CONTRACT NO. _____ NAME DATE DESIGN WHITSON 12-5-78 GROUP 11/1/78 DRAWN D. HALL 12-7-78 CHECK BOLESKE 12-13-78 STRESS _____ PROJ R.F.F. 12-12-78 APPD HHS OTHER _____	
CESSNA-1000 IS APPLICABLE VENDOR CODES PER S-400 CESSNA-1000 SPEC. NO. S-XXX OR CESSNA-1000 STD. NO.		CESSNA AIRCRAFT CO. TITLE WIRING DIAGRAM — GROUND SERVICE RECEPTACLE (OPT)(172 & F172) SCALE NONE 1589210 1 PAGE: 4.15	

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD PC12 - PC13 WAS PA31 (ADV ZEL)	2-12-80	11/25
B	BY REV: RELEASED FOR PRODUCTION SR9624	3-5-80	11/25 LWS



24 0000

PART NO.	DESCRIPTION
5-2475-1	EXT PWR CONT.
1510043	DIODE BOARD
M38806-1	RECEPTACLE
609500	GROUND STRAP
5-2475-1	BATTERY CONTACTOR
0712031	FUSE & DIODE ASSY
071076	DIODE ASSY
5-2413-1	CONTACTOR

EQUIPMENT TABLE

CE-1000 IS APPLICABLE
VERSION CODES PER 8-1000
CE-1000-CE-1000A SPEC. NO.
8-1000 OR CE-1000-CE-1000A
STD. NO.

SUPERSEDES:
0570311 PG 4.15
SUPERSEDED BY:

PART NO.	DESCRIPTION	QTY	UNIT	TERMINALS	SERIALS
PC12	22			5-1367-1-105-1367-1-12	
PC13	4	5-1502-4-9		5-1447-4	5-1447-4
PC8	22	-22-4		SOLDER 5-1367-1-13	
PC9	4	5-1362-4-9		5-1367-1-105-1367-1-9	
PC9	22			5-1495-1	5-1367-1-10

WIRE TABLE

CONTRACT NO.	NAME	DATE	TITLE
	WHITSON	1-9-80	WIRING DIAGRAM -
	GROUP	1-1-80	GROUND SERVICE RECEPTACLE
	DRAWN	1-7-80	(OPT) (172 & FITZ)
	CHECK	1-8-80	
	STRONG		
	PROJ	1-1-80	
	APPD		
	OTHER		

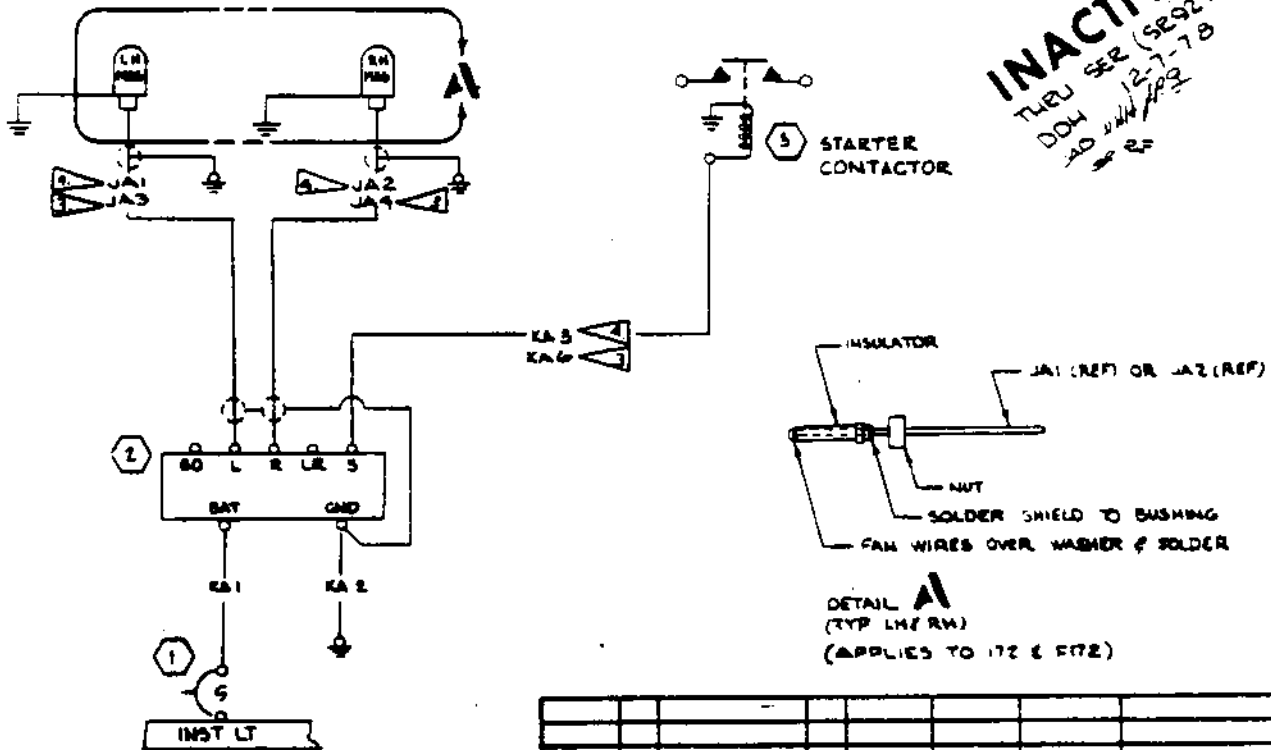
SIZE	CODE IDENT.	DATE
C	71379	0570311
SCALE: NONE	1-8-80	PAGE: 4.15

MODEL 172 SERIES SERVICE MANUAL

NOTES

1. TERMINATE CENTER CONDUCTOR WITH S-1367 1-G; TERMINATE SHIELDS WITH S-1367 2-G (AT SWITCH)
2. TERMINALS SUPPLIED WITH ENGINE (172 & F172)
3. APPLIES TO RITE & FRITE
4. APPLIES TO I72 & F172
5. TERMINATE CENTER CONDUCTOR WITH S-1367-1-B
TERMINATE SHIELDS WITH S1367-2-G
(AT MMB)

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD J43 (J44 WIRE. ADD FLAG NOTE 3 (4; ADD K46 WIRE (SR 8453) (SR 8458)	LSS 4-20-77	<i>[Signature]</i> LSS
B	BY REV: ADD FLAG NOTES (NOW SHOP PRACTICE) NACT J46 (SR 8270)	CCW 12-7-78	<i>[Signature]</i> CCW

[illegible]

3	5-1571-1	STARTER CONTROLLER
2	C27501-000	IGNITION SWITCH
1	5-1540-5L	CIRCUIT BREAKER
	PART NO.	DESCRIPTION

EQUIPMENT TABLE

CONTRACT NO:		
	NAME	DATE
DESIGN	WATSON	1-3-77
GROUP	W. H. H. H.	1-7-77
DRAWN	WATSON	1-20-77
CHECK	W. H. H. H.	1-20-77
STAMP		

WIRE TABLE	
Cessna AIRCRAFT CO.	PAWSEE DIVISION 3600 E. PAWSEE WICHITA, KANSAS
TITLE WIRING DIAGRAM — MAGNETO SYSTEM	

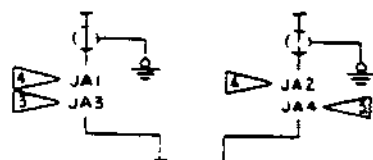
CEN-4000 IS APPLICABLE VENDOR CODES PER 8-4000 CEN-4000/CEN-4000A SPEC. NO. 8-4000 OR CEN-4000/CEN-4000A SPEC. NO.	SUPERSEDED 0570101 P 5.1.0
	SUPERSEDED BY: 0570311 P 5.2

SIZE	CODE IDENT.	CHRG NO
C	71379	0570311
SCALE	NONE (02.0465) (020465) PAGE: 5.1	

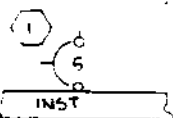
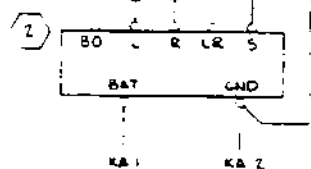
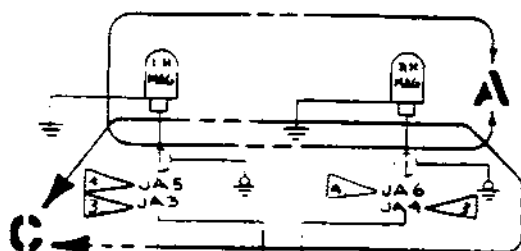
MODEL 172 SERIES SERVICE MANUAL

NOTES

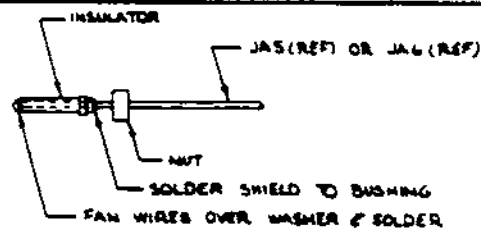
1. TERMINATE CENTER CONDUCTOR WITH S-1367-1-6; TERMINATE SHIELDS WITH S-1367-2-6 (AT SWITCH)
2. TERMINALS SHOWN WITH WASHERS (X) (X) (X)
3. APPLIES TO RITE & FRITE
4. APPLIES TO IITE & FITE
5. TERMINATE CENTER CONDUCTOR WITH S-1367-1-10; TERMINATE SHIELDS WITH S-1367-2-10 (AT MAG)



DETAIL C
THRU SER (SR9624)



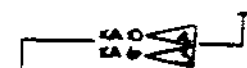
REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: INST HAS INST (NOW SHOP PRACT (C))	MOE 5-24-79	JAS 2F
B	BY REV: SER OUT KAL, SER IN KAL & ADD DETAIL "B" (SR9624)	WAG 1-7-80	JAS 2F
C	BY REV: ADD DETAIL C, JAS, JAG & SER (ADN ZEL) (SR9624)	RAO 2-12-80	JAS 2F
D	BY REV: RELEASED FOR PRODUCTION (SR9624)	RAO 3-5-80	JAS 2F
E	BY REV: DELETE NOTE 2: S-1367-1-10 WAS S-1367-1-8; S-1367-2-10 WAS S-1367-2-6/NOTE 5: SER CUT DETAIL "A" (SR9624)	PAS 4-1-80	JAS 2F
F	BY REV: SER OUT JAS, JAG, & KAG (SR9624)	GW 6-9-81	JAS 2F



DETAIL A
(TYP L/R/R)
(APPLIES TO IITE & FITE)
THRU SER (SR9624)



STARTER
CONTACTOR



DETAIL B
THRU SER (SR9624)

JAG	185						SER (SR9624) & ON
JAS	185						SER (SR9624) & ON
KAL	22						SER (SR9624) & ON
KA7	22						SER (SR9624) & ON
KAG	22						THRU SER (SR9624)
JA4	185						THRU SER (SR9624)
JA3	185						THRU SER (SR9624)
JA2	185						THRU SER (SR9624)
JA1	185						THRU SER (SR9624)
KA10	22						THRU SER (SR9624)
KA2	22						THRU SER (SR9624)
KA1	22						THRU SER (SR9624)

PART NO.	DESCRIPTION
5	5-2443-1 STARTER CONTACTOR
2	242501-0105 IGNITION SWITCH
1	5-1360-5L CIRCUIT BREAKER

EQUIPMENT TABLE
CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-1000-CESNA SPEC. NO. S-1400 OR CHECKING-CESNA STD. NO.
SUPERSEDED: 0570311 PG 5.1
SUPERSEDED BY:

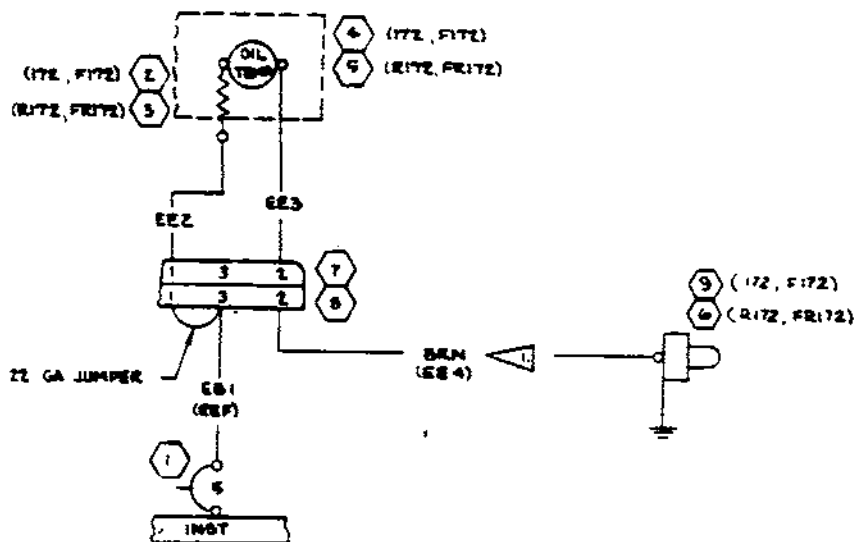
WIRE TABLE			
CONTRACT NO.	NAME	DATE	TITLE
	WAG	12-12-79	WIRING DIAGRAM - MAGNETO SYSTEM
DESIGN	WAG	12-12-79	
GROUP	WAG	12-12-79	
DRAWN	WAG	12-12-79	
CHECK	WAG	12-12-79	
STRESS	WAG	12-12-79	
PROJ	R. F. RE	12-12-79	
APPD	WAG		
OTHER			
SCALE	NONE		
SIZE	CODE IDENT	DWG NO	
C	71379	0570311	
	SE 3210	1 PAGE	2

1

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV. ADD 5-1430-1 SENSING UNIT (SR9053)	L33 4-10-77	200100 25
B	BY REV. ADD GND FOR SENSING UNIT INAC. DWG (SR9104)(SR9105)	NLT 10-18-78	100100 18 25
C	BY REV: C664512-0104 WAS C664512-0102 5-1430-3 WAS 5-1430-1 (SR9435)(REF)	NLT 2-13-79	200100 13 25

NOTES:

1 MATL IS ALPHA 5897-7 OR BELDEN 23009-1



INACTIVE
THRU SERIALIZED (599105)
10-18-78
ATL 211
JAB:23
OF 25

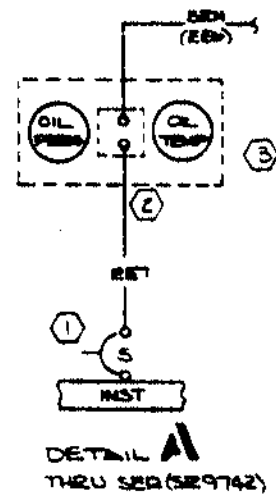
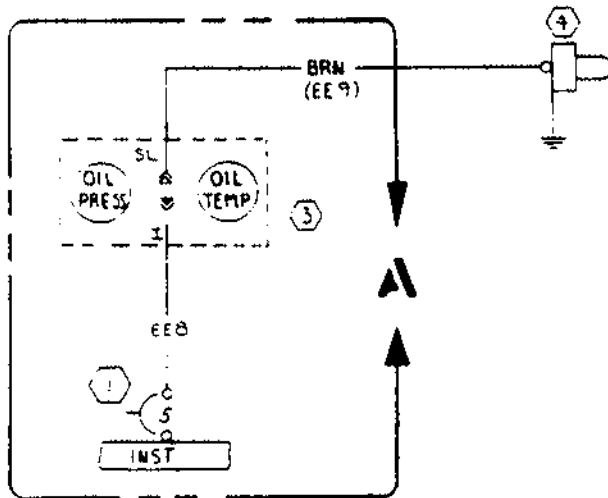
05-0916
04-0916

MODEL 172 SERIES SERVICE MANUAL

NOTES:

- 1 MATERIAL IS ALPHA 5857-7 OR BELDEN 83009-1
- 2 THIS PAGE APPLIES ONLY TO 172, F172
- 3 COVER 5445-1 TERMINAL WITH 5644-0-1-0
NEET SHARK TUBING; TERMINAL DESIGNATIONS
(SL 1) TO BE STAMPED ON TUBING WITH WHITE INK

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD NOTE 2. DELETE (SR 9105) FROM TITLE BLOCK (NOW SHOP PRACTICE)	MOR 5-24-79	JAB (LH) JC RF
B	BY REV: ADD NOTE 1 & EE 9, EEB DETAIL 'A' & SER (SR 9742)	VWEG 1-21-80	MOL
C	BY REV: ADD DETAIL 'B', EE10 & SER (ADV REL) (SR 9624)	RAO 7-12-80	IRS
D	BY REV: DELETE DETAIL 'B', EE10 & SER; RELEASED FOR PRODUCTION (SR 9624)	RAO 3-5-80	IRS DPS
E	BY REV: 'SL' WAS 'S' / NOTE 3 & INST CLUSTER (SR 9742)	GW 9-10-80	JAB (LH) JC RF



EQUIPMENT TABLE PART NO. DESCRIPTION 51630-3 SENDING UNIT 663535-0101 INST CLUSTER 296316-4 CONNECTOR 51560-SL CIRCUIT BREAKER		WIRE TABLE CONTRACT NO: DESIGN NAME DATE GROUP W. H. TSON 11-20-78 DRAWN L. L. LANCaster 10-9-78 CHECK BORLESKE 10-9-78 BY: Z. F. FINE 11-11-78 APPD: J. P. B. 11-11-78 OTHER:		WIRING DIAGRAM — OIL TEMPERATURE TITLE CESSNA AIRCRAFT CO. PAPER DIVISION 3000 E. PAPER WICHITA, KANSAS SIZE CODE IDENT DWG NO C 71379 0570311 SCALE: NONE SR9101-172 PAGE: 7.3	

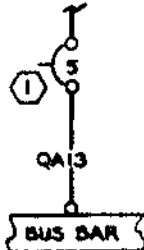
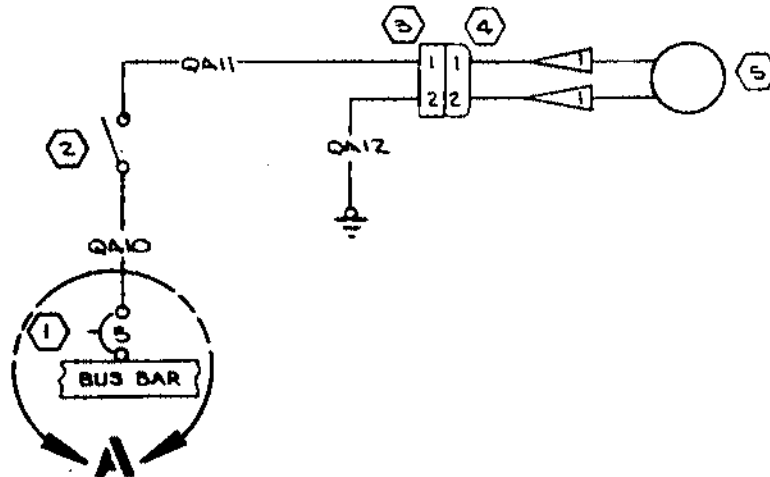
24 0916

MODEL 172 SERIES SERVICE MANUAL

NOTES:

- 1 TERMINATE VENDOR LEADS WITH S-1635-1 TERMINALS.

REVISION			
KEY	DESCRIPTION	DATE	APPRO
A	BY REV: ADD DETAIL "A" F SER (SR 10412)	KWL 9-26-81	EDDY 2/14/81 MPP 3/8/81



DETAIL A
THRU SER (SR10412)

12-00916

WIRE NO	GA	MATERIAL	LG	TERMINALS	SERIALS
QA13	20	S-1364-10	16		THRU SER (SR10412)
QA12	1	S-1636-1	18		
QA11	1	S-1493-1	16		
QA10	20	S-1637-1	16		

WIRE TABLE

PART NO.	DESCRIPTION
5 C29150A-0204	FUEL PUMP
4 S-2035-1	HOUSING
3 S-2035-2	HOUSING
2 S-2160-1	SWITCH
1 S-1360-6L	CIRCUIT BREAKER

EQUIPMENT TABLE

CES-4000 IS APPLICABLE
VENDOR CODES PER S-4000
CES-XXXX-CESNA SPEC. NO.
S-4XX OR CXXXX-CESNA
STD. NO.

SUPERSEDES:

SUPERSEDED BY:

CONTRACT NO:

NAME	DATE
DESIGN HARDEN	3-8-83
GROUP 4/11/83	3-11-83
DRAWN HARDEN	3-8-83
CHECK YOUNGERS	3-9-83
SYNOPSIS	
PROJ 105	3-11-83
APPRO	
OTHER	

Cessna AIRCRAFT CO.

PAWNEE DIVISION
1800 E. PAWNEE
RICHTA, KANSAS

TITLE
**WIRING DIAGRAM -
FUEL PUMP**

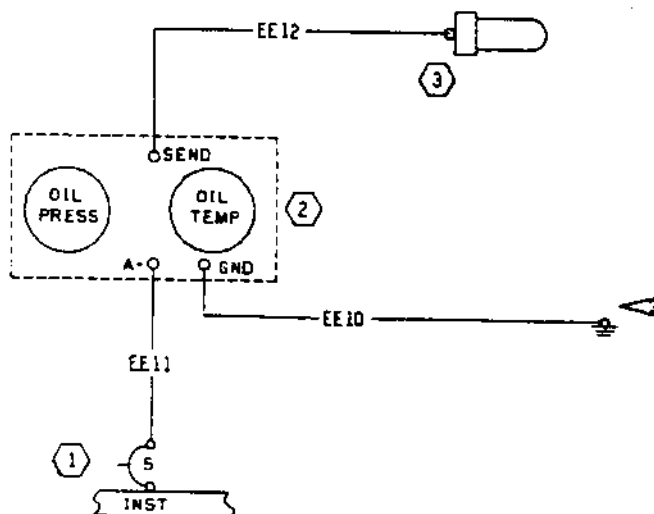
SIZE	CODE IDENT	DWG NO
C	71379	0570311
NO. 1	NO. 2	(S-1635-1) PAGE: 7,4

MODEL 172 SERIES SERVICE MANUAL

REVISIONS			
LTN	DESCRIPTION	DATE	APPROVED

NOTES:

1. MATERIAL IS ALPHA 5857-7 OR BELDEN 63005-1
2. THIS PAGE APPLIES TO 172, F172, 1720
3. GROUND AT ENGINE ACCESSORY CASE ON UPPER LH BOLT OF OIL FILTER MOUNTING ASSY

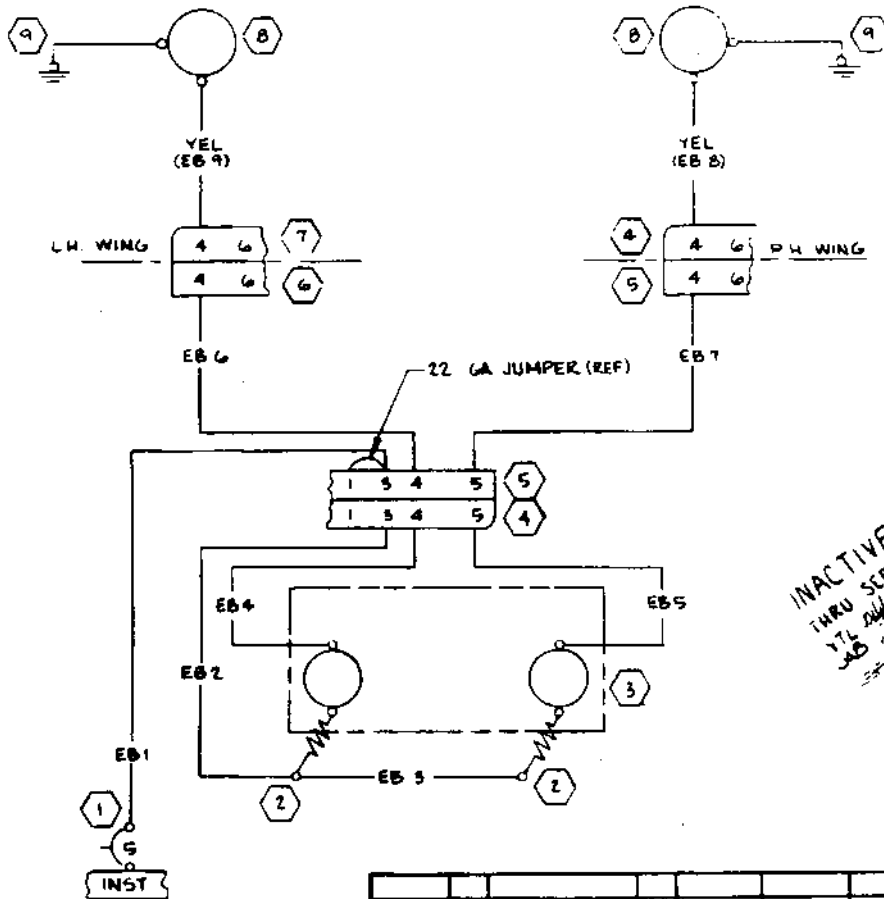


3 S-2335-1		SENDING UNIT	EE12		18	-18-9	1	S-1367-1-10	S-1367-1-10
2 C669564-0102		INST CLUSTER	EE11		22	-22-9	1	S-1367-1-10	S-1367-1-6
1 S-1360-5L		CIRCUIT BREAKER	EE10		18	-18-9	1	S-1367-1-10	S-1367-1-12
PART NO.		DESCRIPTION	WIRE CODE		GA	MATERIAL	TERMINALS		SERIALS

EQUIPMENT TABLE			WIRE TABLE		
CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX-CESSNA SPEC NO S-XXX OR CXXXX-CESSNA STD NO.			CONTRACT NO: DESIGN TACKE 4-25-85 GROUP TACKE 4-25-85 DRAWN TACKE 4-25-85 CHECK PDE 4-26-85 PROJECT FICKEL 4-29-85 APPD PAINE 4-29-85 OTHER		
SUPERSEDES: 0570311 P 7.3 SUPERSEDED BY:			AIRCRAFT DIVISION Cessna Aircraft Company Wichita, Kansas		
SIZE C CODE 71379 SCALE NONE			WIRING DIAGRAM OIL TEMPERATURE 0570311 11072 PAGE 7.5		

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPD



INACTIVE
THRU SER (S-8001) (S-8105)
10-18-78
YEL AWG
30 7/8
ST-24

114-0916
115-0916

PART NO.	DESCRIPTION
9	0413247 GROUND STRAP
8	0513557 TRANSMITTER
7	5-1640-6 HOUSING
6	5-1641-6 HOUSING
5	5-1641-9 HOUSING
4	5-1640-9 HOUSING
3	6649511 INST CLUSTER
2	849210 RESISTOR
1	51360 SL CIRCUIT BREAKER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-KKK-CESNA SPEC. NO.
S-1001 OR CH0000-CESNA
STD. NO.

SUPERSEDES:
0570101 P. 8.10
SUPERSEDED BY:
0570311 P. 8.6

WIRE	GA	MATERIAL	LG	TERMINALS	SERIALS
YEL (EB 9)	20	-20-4		51635-1 51367-10	
YEL (EB 8)	20	-20-4		51635-1 51367-10	
EB 7				51636-1 51636-1	
EB 6	20			51636-1 51636-1	
EB 5	22			51635-1 51367-10	
EB 4				51635-1 51367-10	
EB 3				51367-1 51367-10	
EB 2				51635-1 51367-10	
EB 1	22			51367-1 51636-1	

WIRE TABLE

CONTRACT NO.	NAME	DATE
DESIGN	WHITSON	1-3-77
GROUP	W. J. Anderson	12-77
DRAWN	HARVEY	12-20-76
CHECK	YOUNG	12-20-76
STRESS		
PROJ		1-12-77
APPD		
OTHER		

Cessna AIRCRAFT CO.
TITL
WIRING DIAGRAM —
FUEL GAGES &
TRANSMITTER

PAWNEE DIVISION
3800 E. PAWNEE
WICHITA, KANSAS

SIZE	CODE IDENT.	DWG NO
C	71379	0570311
SCALE: NONE	(S-8453)(S-8454)	PAGE: 8

NOTES

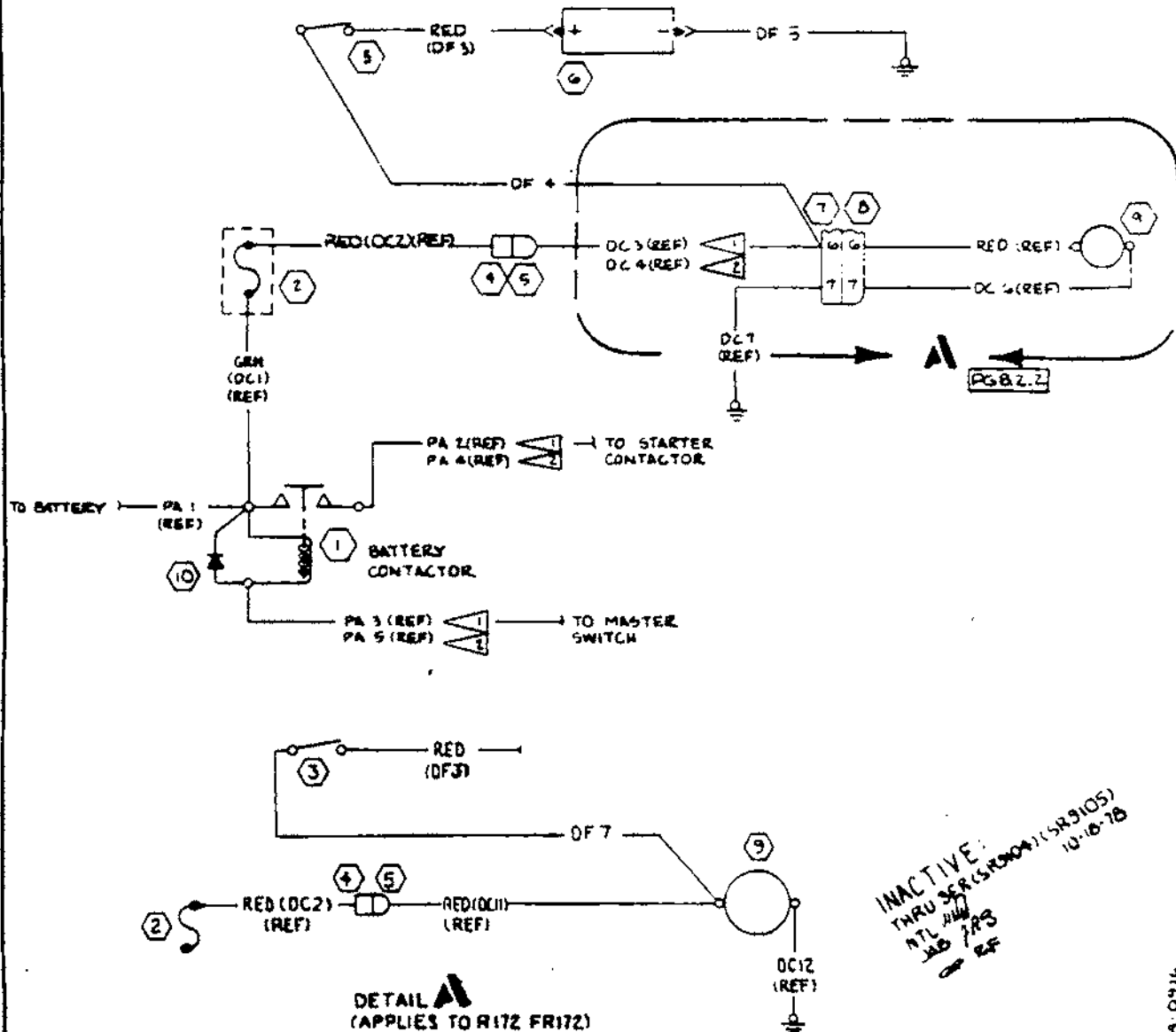
REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: DELETE NOTE 3 OBS NEVER USE OFI = DFL - NOW SHOP PRACTICE"; C664503-0101 WAS C664502-0101; ADD NOTE 4, RED DFG, S1360-5L, C664511-0101, R6R2 4 DETAIL A (SR2080)(SR2187)	ALL CMK 7-13-78	Can 1/3 REP
B	BY REV: ADD DETAIL "A" DF7; RED IDK141(REF) WAS RED (CHENREF; M8B776) (REF) (SR9187) (REF) NAC, DNG (SR9104) (SR9105)	NTL 10-18-78	AD 1/4 REP
C	BY REV: S-1567-HO WAS S-1493-H/ DF7 (NOW SHOP PRACTICE)	ONLY 1-25-80	1/3 REP

INACTIVE
THRU SER 583004115291051
NYL 10/11/76
JED 9/95
COP 10/11/76

04 0914
05 0914

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
B	SEE SHEET 0-2.0 FOR REVISIONS		



INACTIVE:
THRU SER(SR9004)(SR9105)
ATL 11/14
JAB JAS
RF

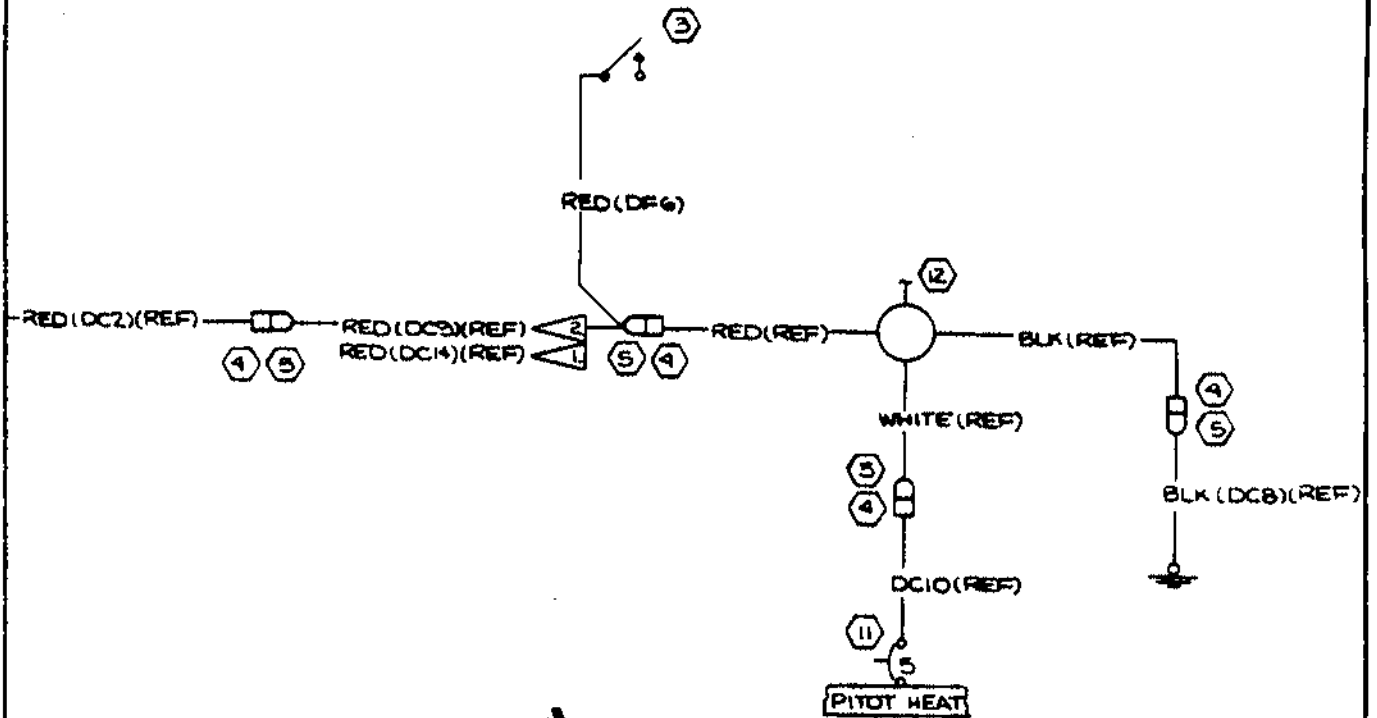
05-0916
04-0916

DETAIL 
(APPLIES TO R172 FR172)
SER(SR8774) ON

CONTRACT NO.			PAYNEE DIVISION 8800 E. PAYNEE WICHITA, KANSAS		
NAME DATE			CESSNA AIRCRAFT CO. TITLE WIRING DIAGRAM - HOURMETER (OPT)		
DESIGN	WILLIAM	1-3-77			
GROUP	W.D. Williams	1-2-77			
DRAWN	HARVEY	12-20-76			
CHECK	YOUNG	12-20-76			
STUDIED					
PROJ.	G.D.A.	1-12-77	SIZE	CODE IDENT. NO.	DWG. NO.
APPRO.			C	71379	0570311
OTHER			SCALE: NONE	(SHEET) (SHEET)	PAGE: 821

MODEL 172 SERIES SERVICE MANUAL

REVISION			
REV	DESCRIPTION	DATE	APPD
B	SEE PG 8.2.0 FOR REVISION		



DETAIL **A** PG 8.2.1
(REQD WHEN OPT DIGITAL CLOCK
IS INSTALLED)

INACTIVE
THRU SER(SR31071(SR3105)
NTL 8/1/78
JLB
10/18/78

04-0916 05-0916

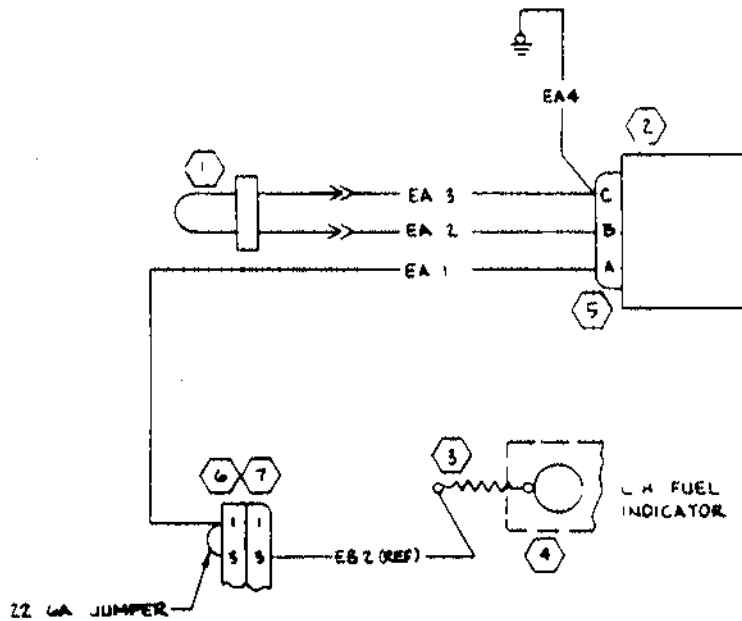
CONTRACT NO:			 CESSNA AIRCRAFT CO.		PAWNEE DIVISION 8800 E. PAWNEE WICHITA, KANSAS	
DESIGN	G STAMM	7-20-78			TITLE WIRING DIAGRAM - HOURMETER (OPT)	
GROUP	119	7-18-78				
DRAWN	CKING	7-15-78				
CHECK	BORLESKE	7-14-78				
STRESS						
PROJ	R FIFE	7-28-78	SIZE	CODE IDENT NO	DWG NO	
APPD			C	71379	0570311	
OTHER			SCALE NONE		(SR3187)	PAGE 8.2.2

MODEL 172 SERIES SERVICE MANUAL

NOTES

TERMINALS ARE YE14-H : FURNISHED
BY VENDOR (09922)

REVISION			
LET	DESCRIPTION	DATE	APPO



INACTIVE
TRU SER (SR3041SR305)
10-8-78
JLB
RF

05-0316

QTY	PART NO.	DESCRIPTION	QTY	PART NO.	DESCRIPTION
7	5-1640-9	HOUSING	EA 4	22	SOLDER 5-1347-1-B
6	5-1641-9	HOUSING	EA 5	22	SOLDER 5-1347-1-B
5	MS3106A-145-75	HOUSING	EA 2	22	SOLDER 5-1347-1-B
4	C649511	INST CLUSTER	EA 1	22	SOLDER 5-1656-1
3	819210	RESISTOR	CODE NO	QA	MATERIAL LG
2	5-1311-4	INDICATOR	TERMINALS		SERIALS
1	0550209	PROBE			

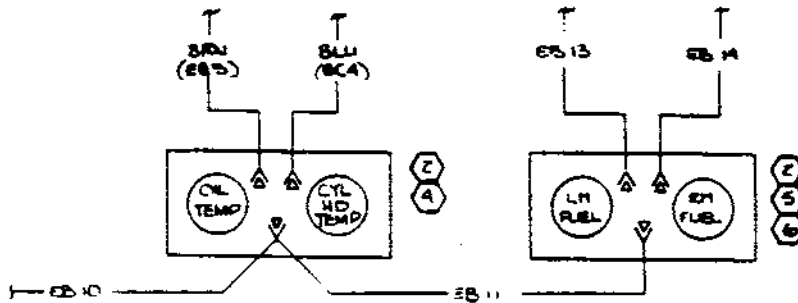
WIRE TABLE		
CONTRACT NO.	NAME	DATE
	WHITSON	1-3-77
	WILKINSON	1-2-77
	HANEY	2-20-77
	COUSL	2-20-77
	STRESS	
	PROJ	1-12-77
	APPO	
	OTHER	

EQUIPMENT TABLE		WIRING DIAGRAM - CARB AIR TEMPERATURE GAGE	
PART NO.	DESCRIPTION	SIZE	CODE IDENT. NO.
0570311	P. 8.8	C	71379

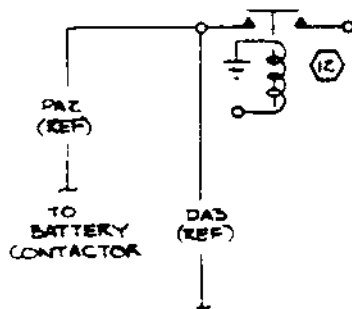
SUPERSEDES		DWG NO	
0570311	P. 8.8	0570311	
SUPERSEDED BY:		SCALE: NONE	PAGE: 8 4

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPD
B	SEE PAGE 8-5.0 FOR REVISIONS		



DETAIL **A**
THRU SER (SR 9742)



DETAIL **13**
THRU SER (SR 9270)

INACTIVE
THRU SER (SR 9944)
GW 55-81
JAB 11/78
DTS

44-0011

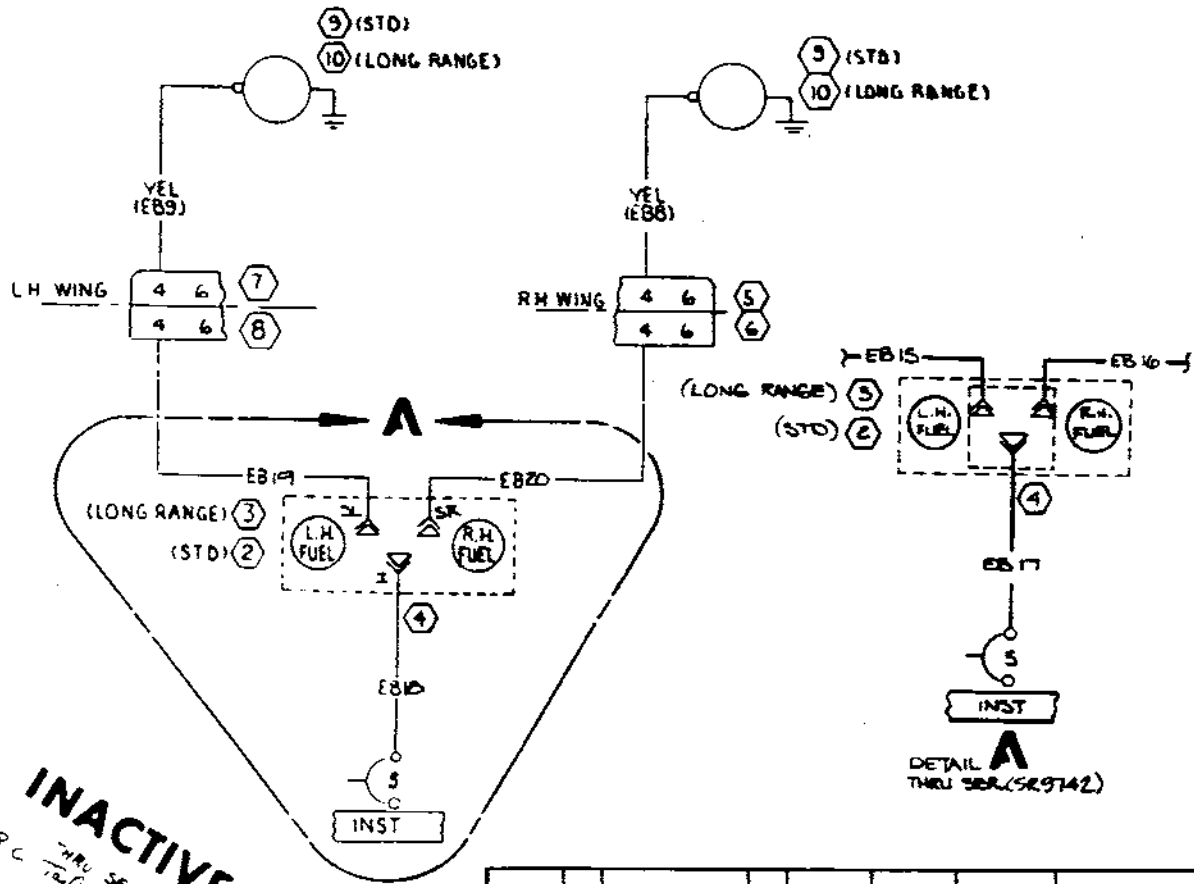
EQUIPMENT TABLE PART NO. DESCRIPTION CEB-1000 IS APPLICABLE VENDOR CODES PER 8-400 CEB-XXXX-CEBINA SPEC. NO. 8-10X OR CMLXXX-CEBINA STD. NO.		WIRE TABLE CONTRACT NO. NAME DATE DESIGN White 1-3-80 GROUP W. J. 1-14-80 DRAWN GONDS 1-1-80 CHECK GODESKE 1-8-80 STRESS PROJ. R. E. F. 1-14-80 APPD. [Signature] OTHER		WIRING DIAGRAM - INSTRUMENT CLUSTERS & TRANSMITTERS TITLE CESSNA AIRCRAFT CO. POWER DIVISION 3000 E. PAWNEE WICHITA, KANSAS SIZE CODE IDENT DWD NO C 71379 0570311 SCALE NONE (SR-7025) PAGE: 8-5.1	

MODEL 172 SERIES SERVICE MANUAL

NOTES:

- COVER 51493-1 TERMINAL WITH 51644-6-1.0 HEAT SHRINK TUBING, TERMINAL DESIGNATION (SL, SR, I) TO BE STAMPED ON TUBING WITH WHITE INK

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV. ADD DETAIL A SER. EB 10, EB 15 & EB 20, NOTE (EB 669537-0107 HAS 669537-0101 (SR 9624)(SR 9742)	WAB 1-14-60	100 L.H. 100 R.H. DES



INACTIVE
THRU SER (SR 11022)
P.C. 4-26-85

EQUIPMENT TABLE			WIRE TABLE			
PART NO.	DESCRIPTION		CONTRACT NO.	NAME	DATE	TITLE
10	523557-1	SENDING UNIT (LONG RANGE)		WHITSON	11-20-78	WIRING DIAGRAM - FUEL GAGES & TRANSMITTER
9	523557	SENDING UNIT (STD)		LANCASTER	10-18-78	
8	5-1641-6	HOUSING		FORLESKE	10-19-78	
7	5-1640-6	HOUSING				
6	5-1641-9	HOUSING				
5	5-1640-9	HOUSING				
4	296514	CONNECTOR				
3	669537-0107	INST CLUSTER (LONG RANGE)				
2	669537-0106	INST CLUSTER (STD)				
1	5-1360-5L	CIRCUIT BREAKER				
EQUIPMENT TABLE			WIRE TABLE			
PART NO.	DESCRIPTION		CONTRACT NO.	NAME	DATE	TITLE
EB 20	20		5-1636-1	5-1636-1		SER (SR 9742) (OM)
EB 19	20		5-1636-1	5-1636-1		SER (SR 9742) (OM)
EB 18	20		5-1636-1	5-1636-1		SER (SR 9742) (OM)
EB 17	22		5-1636-1	5-1636-1		THRU SER (SR 9742)
EB 15	20		5-2376-1	5-1636-1		THRU SER (SR 9742)
EB 16	20		5-2376-1	5-1636-1		THRU SER (SR 9742)
EB 14	20	-20-4	5-1636-1	5-1636-1		
EB 13	20	-20-4	5-1636-1	5-1636-1		
EQUIPMENT TABLE			WIRE TABLE			
PART NO.	DESCRIPTION		CONTRACT NO.	NAME	DATE	TITLE
CES-000	IS APPLICABLE					
VENDOR CODES PER S-1400						
CES-XXXX-CESNA SPEC. NO.						
S-XXX OR CMXXXX-CESNA						
STD. NO.						
SUPERSEDED BY:	0570311 P. 84					
SUPERSEDED BY:	0570311 P. 89					
PROJ. R.F.F.E.	12-11-78					
APPRO. WAB						
OTHER						
SIZE	CODE IDENT.	DWG NO.				
C	71379	0570311				
SCALE: NON S	649109					
PAGE: 2.6						

MODEL 172 SERIES SERVICE MANUAL

NOTES.

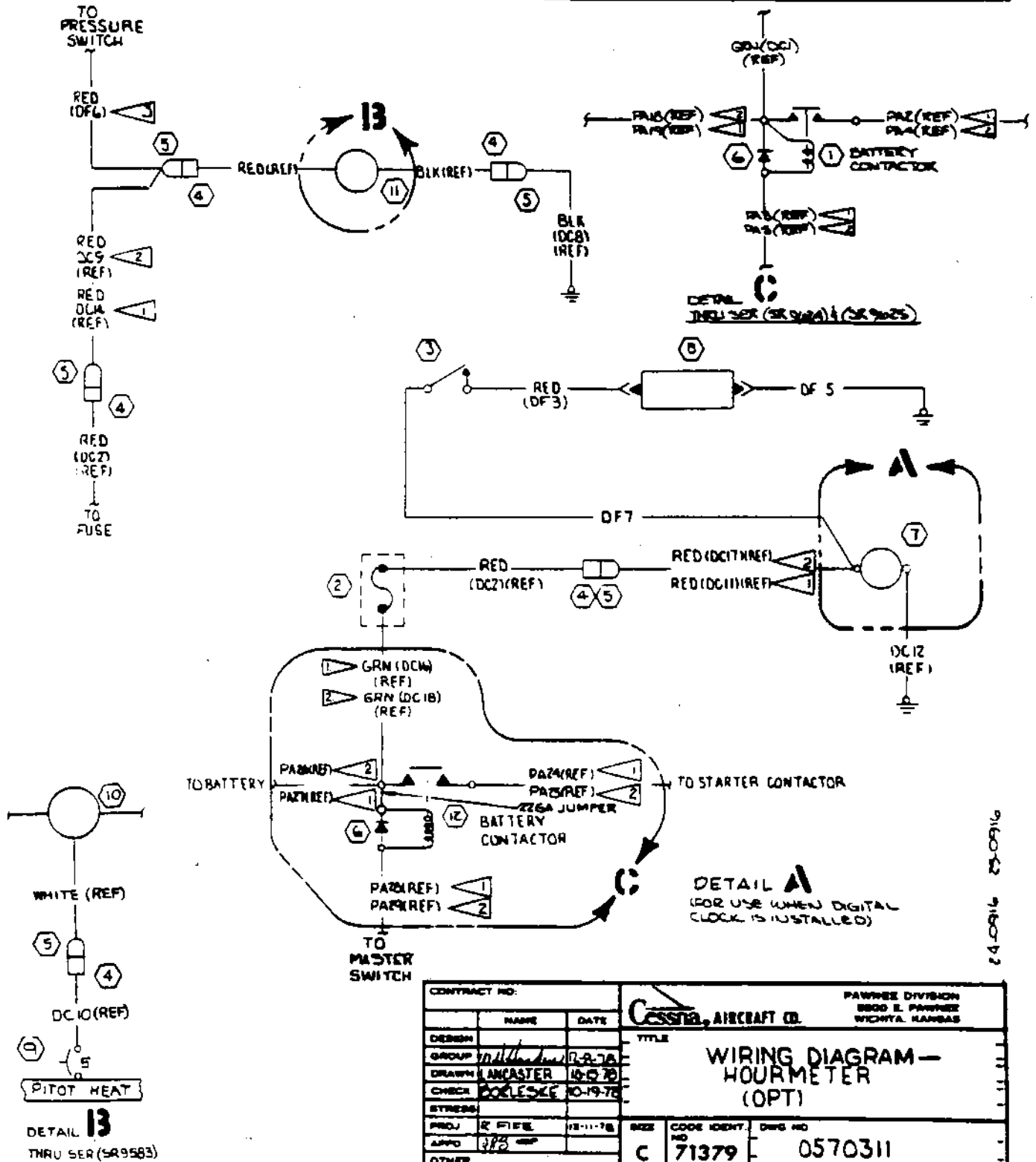
1. APPLIES TO R172 & FR172
2. APPLIES TO 172 & F172
3. REQD ONLY WHEN OPT. DIGITAL CLOCK IS INSTALLED

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: ADD DETAIL C664511-0102 DETAIL C664511-0102 (SR9624) (SR9625)	H H G WAG 1-9-80	JAB HPC R.F.
B	BY REV: ADD JC18(REF) JC17 WAS JC15 (ADV ZEL)	2-2-80	RAO
C	BY REV: RELEASED FOR PRODUCTION (SR9624)	3-5-80	RAO JAB HPC R.F.
D	BY REV: S1367-1-B/DF3, DFG, DFT WAS S1367-1-G NOW SHOP PRACTICE (NUMBER 1520967)	6W 7-8-80	BY JAB MDD HPC R.F.

12	S 2475-1	CONTACTOR					
11	C664511-0102	DIGITAL CLOCK	DF 7	22		S-1367-1-B S-1367-1-G	
10	C664511-0101	DIGITAL CLOCK	REO1049	22	-22-2	S-1367-1-B S-1435-2	
9	S-1360-5L	CIRCUIT BREAKER	DF 5	22		S-1493-1 S-1367-1-G	
8	C664503-0101	HOURLY METER	REO1049	22	-22-2	S-1367-1-B S-1493-1	
7	C664508-0102	CLOCK	WIRE	CODE NO.	GA	MATERIAL	LG
6	0770728	DIODE ASSY					
5	S-1637-1	HOUSING					
4	S-1637-2	HOUSING					
3	S-1711-1	PRESSURE SWITCH					
2	0712031	FUSE ASSY					
1	S-1580-1	CONTACTOR					
EQUIPMENT TABLE			WIRE TABLE				
			CONTRACT NO. DESIGN WHITMAN GROUP 1011 DRAWN LANCASTER CHECK CORLESKE STRESS NAME DATE 11-22-78 DATE 10-18-78 DATE 10-19-78				
CEB-1000 IS APPLICABLE VERSION CODES PER S-1480 CEB-1000-CEB-1000A SPEC. NO. S-100X OR CEB-1000-CEB-1000A STD. NO.			WIRING DIAGRAM— HOURLY METER (OPT)				
SUPERSEDED 0570311 R.20.2-1-82.2 SUPERSEDED BY:			PRJ 2 F1 F1 APPRO 11-22-78 OTHER				
			SIZE C CODE IDENT. NO. 71379 OWS NO. 0570311 SCALE NONE SECTION 0570311 PAGE 6.7.0				

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
C	SEE PAGE B.7.0 FOR REVISION		

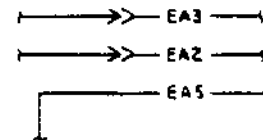
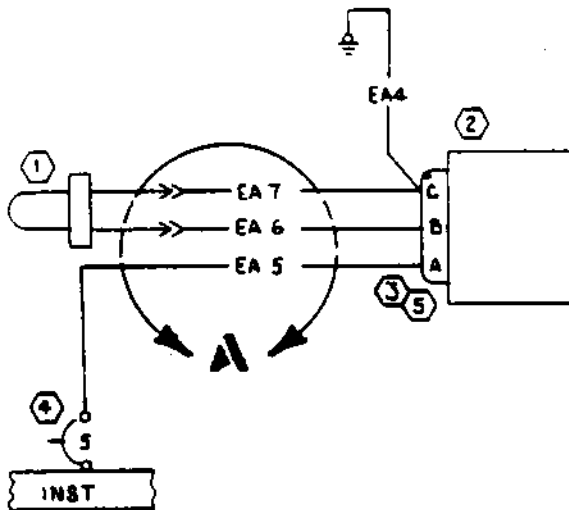


MODEL 172 SERIES SERVICE MANUAL

NOTES:

1. TERMINALS ARE YZ14-H 4FURNISHED BY VENDOR (05922)
2. THIS PAGE APPLIES ONLY TO 172-1-172

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: ADD NOTE 2. DELETE (SR9109) FROM TITLE BLOCK. (NOW SHOP PRACTICE)	MDE 3-26-79	AS 028 1/10 ZF
B	BY REV: ADD DETAIL A, EAB, EAT & SER (ADV REL) (SR9624)	RAO 2-12-80	APC
C	BY REV: RELEASED FOR PRODUCTION (SR9624)	RAO 3-5-80	AS 108 9/8 MPS



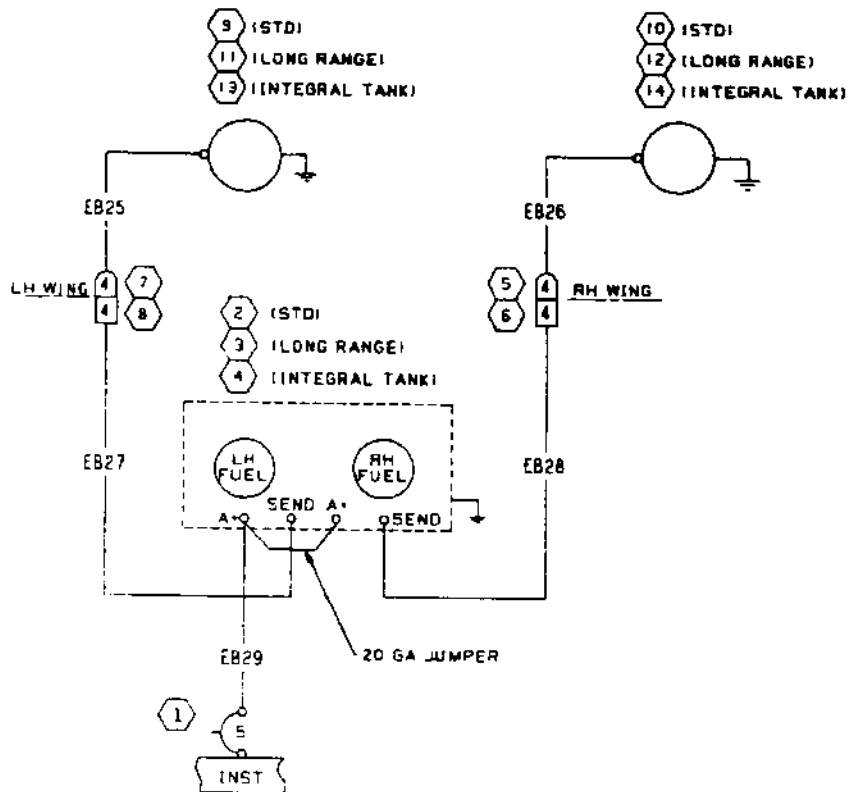
DETAIL A
THRU SER (SR9624)

EQUIPMENT TABLE		WIRE TABLE	
5	MS3057-0A CLAMP	EA 7 22	SOLDER 1
4	S-1360-SL CIRCUIT BREAKER	EA 6 22	SOLDER 1
3	MS3106A-14-18 HOUSING	EA 5 22	S-1367-14 SOLDER
2	S-1511-4 INDICATOR	EA 4 22	SOLDER S-1367-18
1	0550209 PROBE	EA 3 22	SOLDER 1
		EA 2 22	SOLDER 1
PART NO. DESCRIPTION		MATERIAL LB TERMINALS DETAILS	
SUPERVISOR: 0570311 P. 8.4		CONTRACT NO.	
SUGGESTED BY:		DESIGN: WHITSON 2-20-78	
		GROUP: 2-20-78	
		DRAWN: LANCASTER 10-13-78	
		CHECK: COLESEE 10-20-78	
		STRESS:	
		PDS: E. RYCE 12-11-78	
		APPRO: APC	
		OTHER:	
CSB-1000 IS APPLICABLE VENDOR CODES PER 8-4000 CSB-1000-0000A SPEC. NO. 8-4000 OR CHECKED-0000A SYS. NO.		TITLE: WIRING DIAGRAM - CARB AIR TEMPERATURE GAGE	
		SCALE: NONE (SR9109) PAGE: 8.4	

2-0516

MODEL 172 SERIES SERVICE MANUAL

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



1	CE668050-0502	SENDING UNIT-RH	(INTG)
2	CE668050-0501	SENDING UNIT-LH	(INTG)
3	CE668050-0902	SENDING UNIT-RH	(LR)
4	CE668050-0901	SENDING UNIT-LH	(LR)
5	CE668050-0802	SENDING UNIT-RH	(STD)
6	CE668050-0801	SENDING UNIT-LH	(STD)
7	S-1641-6	HOUSING	
8	S-1640-6	HOUSING	
9	S-1641-9	HOUSING	
10	S-1640-9	HOUSING	
11	CE669562-0102	INST CLUSTER	(INTG)
12	CE669562-0101	INST CLUSTER	(LR)
13	CE669562-0108	INST CLUSTER	(STD)
14	S-1360-5L	CIRCUIT BREAKER	

WIRE CODE	GA	MATERIAL	TERMINALS	SERIALS
20	-20-9	S-1367-1-10	S-1367-1-6	
20	-20-9	S-1367-1-10	S-1636-1	
20	-20-9	S-1636-1	S-1367-1-10	
20	-20-9	S-1636-1	S-1367-1-10	
20	-20-9	S-1636-1	S-1367-1-10	

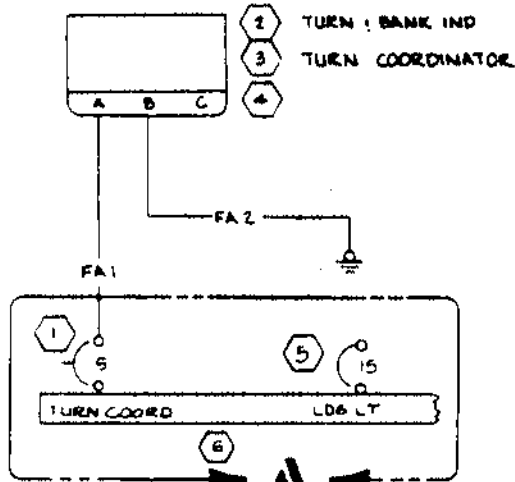
CONTRACT NO.	NAME	DATE	TITLE
	TACKLE	4-26-85	WIRING DIAGRAM -
	TACKLE	4-26-85	FUEL GAGES &
	SPENCER	4-26-85	TRANSMITTER
	POE	4-26-85	
	FICKEL	4-29-30	
	PAINE	4-29-30	
	OTHER		

PART NO	DESCRIPTION	SUPPLIES	0570311 PG 8.6
CE669562-0102	INST CLUSTER	SUPPLIES	
CE669562-0101	INST CLUSTER	SUPPLIES	
CE669562-0108	INST CLUSTER	SUPPLIES	
S-1360-5L	CIRCUIT BREAKER	SUPPLIES	

SIZE	CODE IDENT	DWG NO.
C	71379	0570311
SCALE: NONE	SR110721	PAGE 8.9

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: TURN COORD CALLOUT WAS (BUS BAR) TURN COORD CALL OUT. ADD PA 2 (REF) WIRE & LD6 LT CIRCUIT BREAKER. (SA 8455) REF (SR8454) REF	NOV 9-24-79	JAS 2111 /P. R.F.
B	BY REV: ADD 0570+51, DETAIL A & SER (SR9624) (SR9625)	RAO 1-21-80	JAS 2111 /P. R.F.



DETAIL A
THRU SER (SR9624) (SR9625)

PART NO.	DESCRIPTION
6 0570+51	BUS BAR
5 5-1360-5L	CIRCUIT BREAKER
4 H55106A105L-35	CONNECTOR
3 C661003-0505	TURN COORD
2 5-1505-2	TURN : BANK IND
1 5-1360-5L	CIRCUIT BREAKER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-4000
CES-1000-CESBNA SPEC. NO.
S-3011 OR CES1000-CESBNA
STD. NO.

SUPERSEDES:
0570101 P 910-1920
SUPERSEDED BY:

CONTRACT NO.	NAME	DATE	TITLE
DESIGN	WHITSON	1-3-77	WIRING DIAGRAM -
GROUP	WILLIAMS	1-2-77	TURN COORDINATOR
DRAWN	HAEVEY	2-20-76	TURN : BANK IND
CHECK	YOUNG	7-2-76	
STRESS			
PROJ	5-074	1-10-77	SIZE
APPD	1		CODE IDENT. NO.
OTHER			DWG NO.
			C 71379 0570311
			SCALE: NONE (SR9624) (SR9625) PAGE: 9

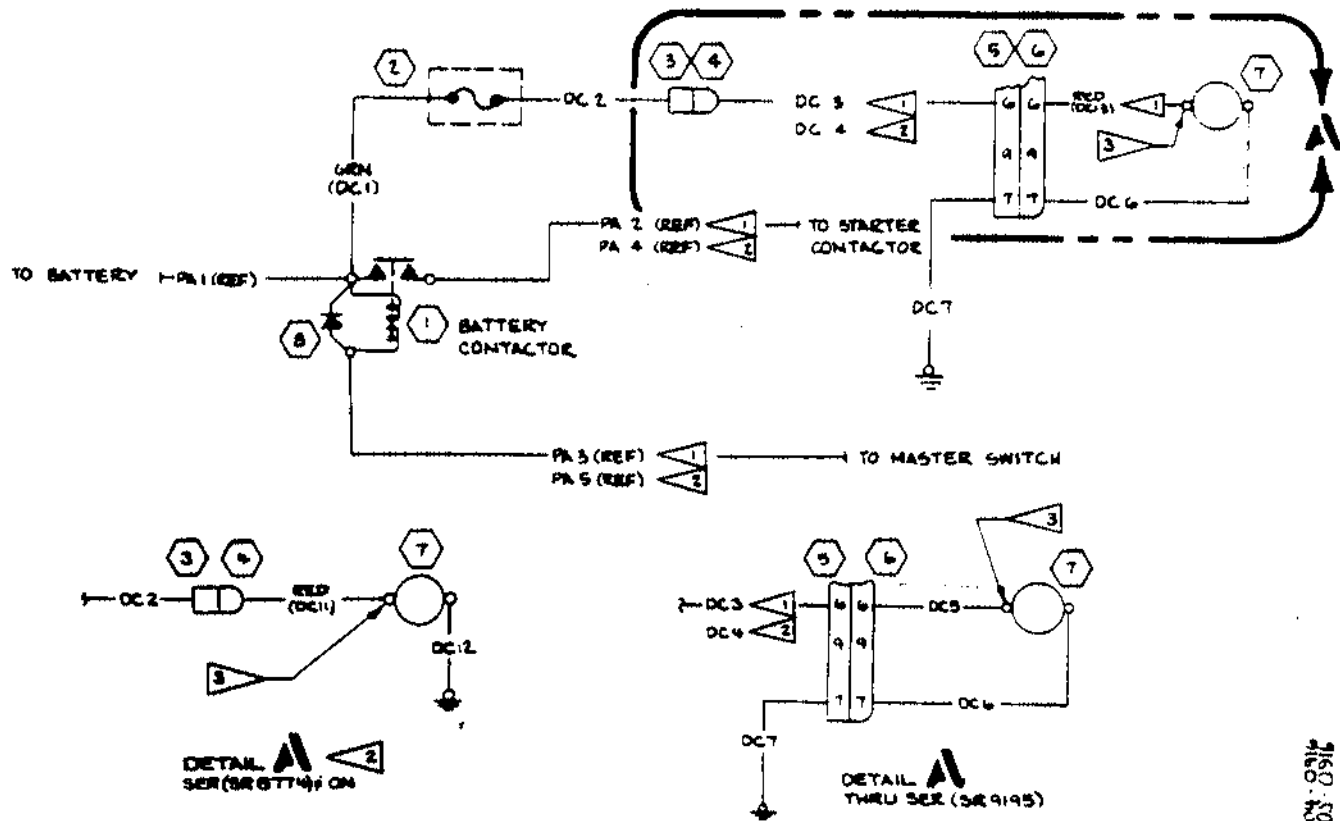
25-0714
24-0716

MODEL 172 SERIES SERVICE MANUAL

NOTES:

- 1 APPLIES TO R172 & I72 ONLY
- 2 APPLIES TO R172 & R172 ONLY
- 3 CAUTION - POWER WIRE MUST BE CONNECTED TO "BATT" TERMINAL OF CLOCK, OTHERWISE INTERNAL DAMAGE TO UNIT WILL RESULT

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: CLOCK (STD) WAS CLOCK (OPT) (SRBASS) (REM) (SRBASS) (REP) S-1367-1-10/DCS & DC6 WAS S-1367-1-10 (NOW SHOP PRACTICE) ADDED DETAIL A (2) DC1, DC2, DC3 (NOTE 3) (SR 9195) (SR 8774)	TRB 4-25-78	2F



INACTIVE
THRU SER (SR 9195)
10-9-78
NTL (10/11)
JAS 7/8
2F

WIRE NO.	GA	MATERIAL	LG	TERMINALS	SERIALS
DC 2	22	-22-2		3-1367-1-10	(SR 9195) ON
DC 12				3-1367-1-10	(SR 8774) ON
DC 7		-22-2		3-1367-1-10	(SR 8774) ON
DC 6				3-1367-1-10	
DC 5				3-1367-1-10	THRU (SR 9195)
DC 4				3-1367-1-10	THRU (SR 8774)
DC 3				3-1367-1-10	
DC 2				SOLDER 5-1636-1	
DC 1	22	-22-8		3-1367-1-10	

PART NO.	DESCRIPTION
8 OTT0728	DIODE ASSY
7 C144908-002	CLOCK
6 S-1640-4	HOUSING
5 S-1641-4	HOUSING
4 S-1657-1	HOUSING
3 S-1657-2	HOUSING
2 OT12031	FUSE ASSY
1 S-1680-1	BATTERY CONTACTOR

EQUIPMENT TABLE

CHG-1000 IS APPLICABLE
VERSION CODES PER 8-4400
CDB-1000-CDB-1000-1
8-4400 OR CDB-1000-1
8-4400

SUPERSEDED
0570311 P 10.3
SUPERSEDED BY
0570311 P 10.3

CONTRACT NO.	NAME	DATE
	WHITMAN	1-3-77
	GROUP	1-12-77
	DRAWN	WAVEY
	CHECK	CHASL
	STRESS	

WIRE TABLE		Cessna AIRCRAFT CO.	
DESIGN	WHITMAN	1-3-77	TITLE
GROUP	1-12-77		WIRING DIAGRAM -
DRAWN	WAVEY	1-3-77	CLOCK
CHECK	CHASL	1-3-77	
STRESS			
SIZE	C	CODE IDENT	0570311
SCALE	NONE	CHG NO	0570311
		(SR 9195) (SR 8774)	PAGE 10.1

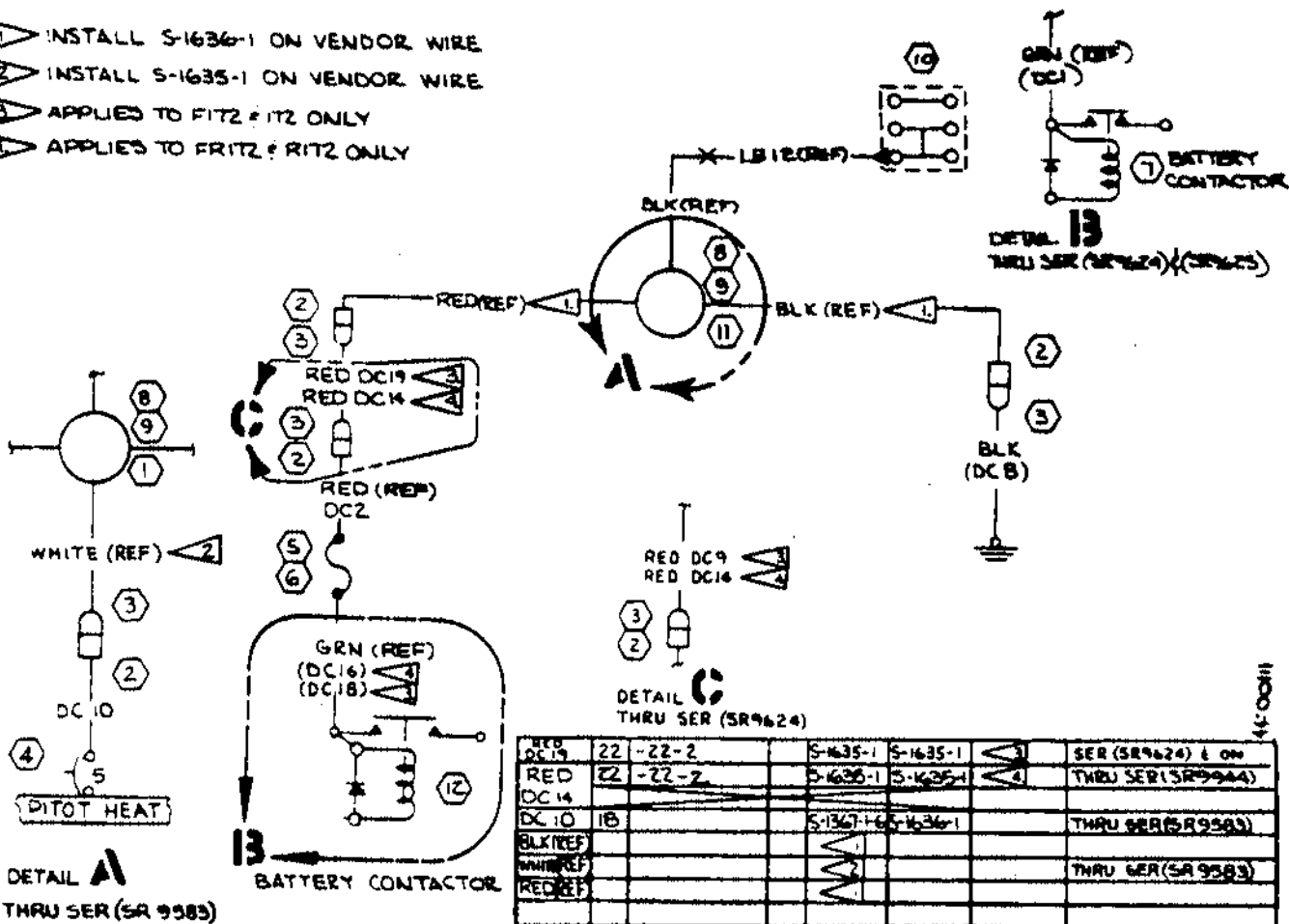
MODEL 172 SERIES SERVICE MANUAL

C	BY REV: ADD DETAIL A & B 3-24-75 1/4 C/44511-010Z (SR 9424)(SR 9425)(SR 9403)	MHG 1-7-80 WAG	JAG 446 9/1 BF
D	BY REV: ADD DETAIL C, DC19 & SER (ADV EBL)	RAO 2-12-80	1/15
E	BY REV: RELEASED FOR PRODUCTION (SR 9424)	RAO 3-5-80	1/15
F	BY REV: SER OUT DC14 (SR 9444)	GAN 5-2-81	1/15

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: ADD NOTE 3, 4: RED DC11; WHITE (REF) WAS RED (REF); RED (REF) WAS BLU (REF); RED DC5 WAS BLU DC5; GAN (DC19) WAS GAN DC1 (SR 9187)	CMK 7-13-78	JAG 446 1/15
B	BY REV: REDDC14 WAS REDDC10 (SR 9187) (REF)	NTL 10-8-78	JAG 446 1/15

NOTES:

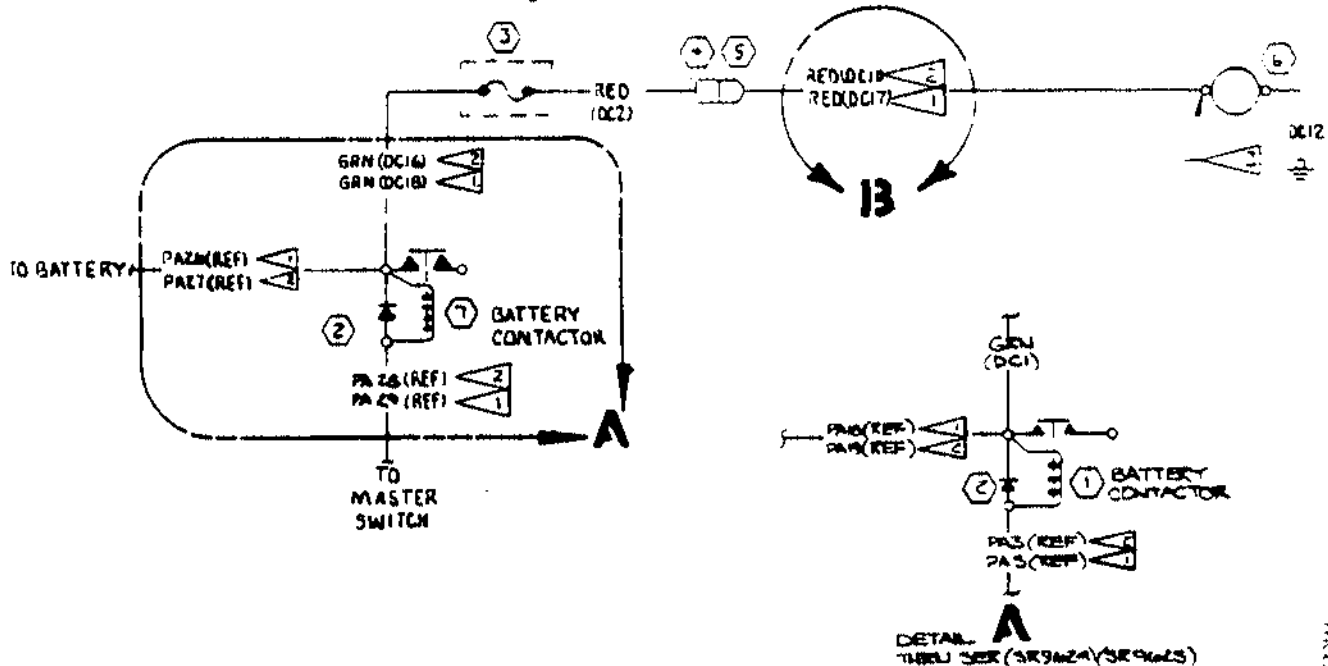
1. INSTALL S-1636-1 ON VENDOR WIRE
2. INSTALL S-1635-1 ON VENDOR WIRE
3. APPLIES TO FITZ & FITZ ONLY
4. APPLIES TO FRITZ & RITZ ONLY



12	S-2475-1	BAT. CONTACTOR	RED	22-22-2	S-425-1S-435-1	THRU SER (SR9624)
11	CG64511-0102	DIGITAL CLOCK	DK9			
10	34003-817	TERMINAL BLOCK	BLK	18-18-0	S-1635-1S-1347-B	
9	S-2413-1	SOCKET	DK8			
8	M525231-1819	LIGHT				
7	S-1580-1	CONTACTOR	CODE NO.	QA	MATERIAL	LS
6	S-1091-1	FUSE			TERMINALS	SERIALS
5	S-1090-22	FUSEHOLDER	WIRE TABLE			
4	S-1360-5L	CIRCUIT BREAKER	CONTRACT NO.		Cessna AIRCRAFT CO. PRINCE DIVISION 1600 E. PRINCE WENITA, KANSAS	
3	S-1637-1	HOUSING	DESIGN	NAME	DATE	TITLE
2	S-1637-2	HOUSING	GROUP	<i>Buller</i>	2-17-78	WIRING DIAGRAM — DIGITAL CLOCK (OPT)
1	CG64511-0101	DIGITAL CLOCK	DRAWN	R. YOUNGERS	2-11-78	
			CHECK	BORLESKE	4-11-78	
			STRESS			
			PROJ	R. F. F.	4-17-78	
PART NO. DESCRIPTION EQUIPMENT TABLE			APPRO	<i>WFS</i>		SIZE C
CES-1000 IS APPLICABLE VERBOR CODES PER S-4000 CES-1000-CESBNA SPEC. NO. S-1000 ON CHG000-CESBNA STD. NO.			SUPERSEDES: SUPERSEDED BY:		CODE IDENT. NO. 71379	DWG NO. 0570311
			OTHER		SCALE: NONE	(SR9624) 1 PAGE: C.2

1

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV 3-15-71 9 WAS 5-10-67... DC11 & DC15 (SR 31041593105)	MAR 5-20-79	10-20 JPS RF
B	BY REV: ADD DETAIL 1. 3. 2. 5. 7. 8. (SR 3024) (SR 7015)	WAG 11-20-79	11-20 JPS RF
C	BY REV: ADD DETAIL 3. DC17, DC18 & SER (ADV REL) (SR 9624)	RAO 2-12-80	JPS
D	BY REV: RELEASED FOR PRODUCTION SR 9624	RAO 3-5-80	JPS JPS
E	BY REV: SER OUT XLII DC16, DELETE BEGINNING (SR 9625) FROM DC16 (529944)	GN 6-9-81	10-20 JPS JPS

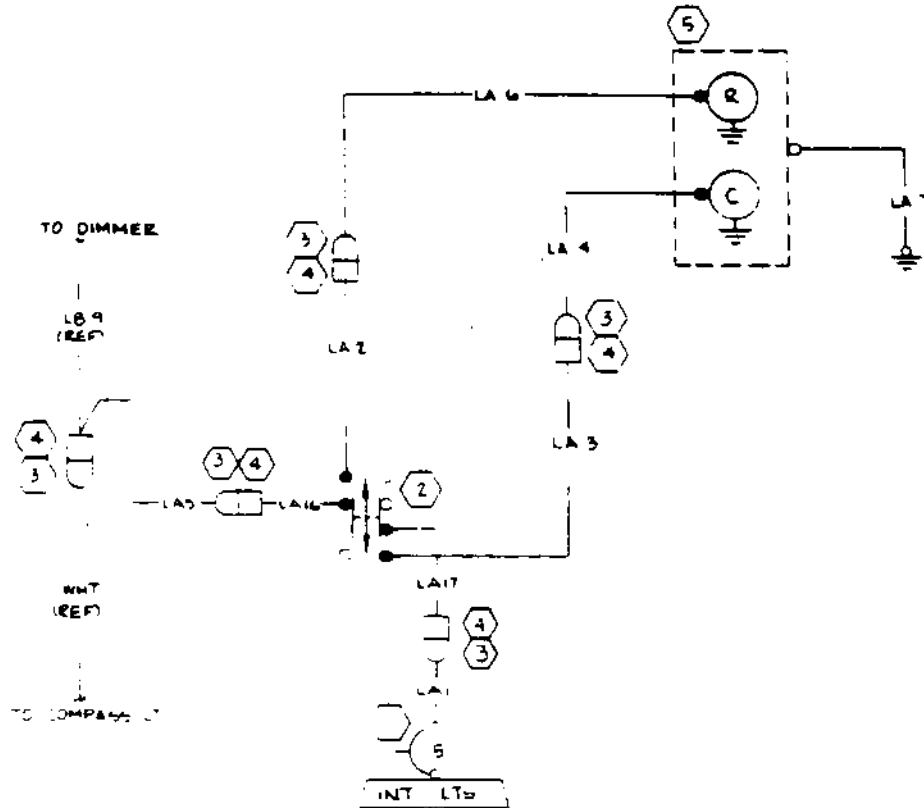


RED (DC11) 
RED (DC15) 
DETAIL 13
THRU SER (SR9624)

20-70

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LOT	DESCRIPTION	DATE	APPRO
A	BY REV: ADD LAW & LAIT WIRE (SA04531) (SA04001)	LSS 4-20-77	~~WAB~~ RF

[illegible]

MODEL 172 SERIES SERVICE MANUAL

NOTES:

1. REQD ONLY WHEN OPTIONAL DIGITAL CLOCK C669511 IS INSTALLED

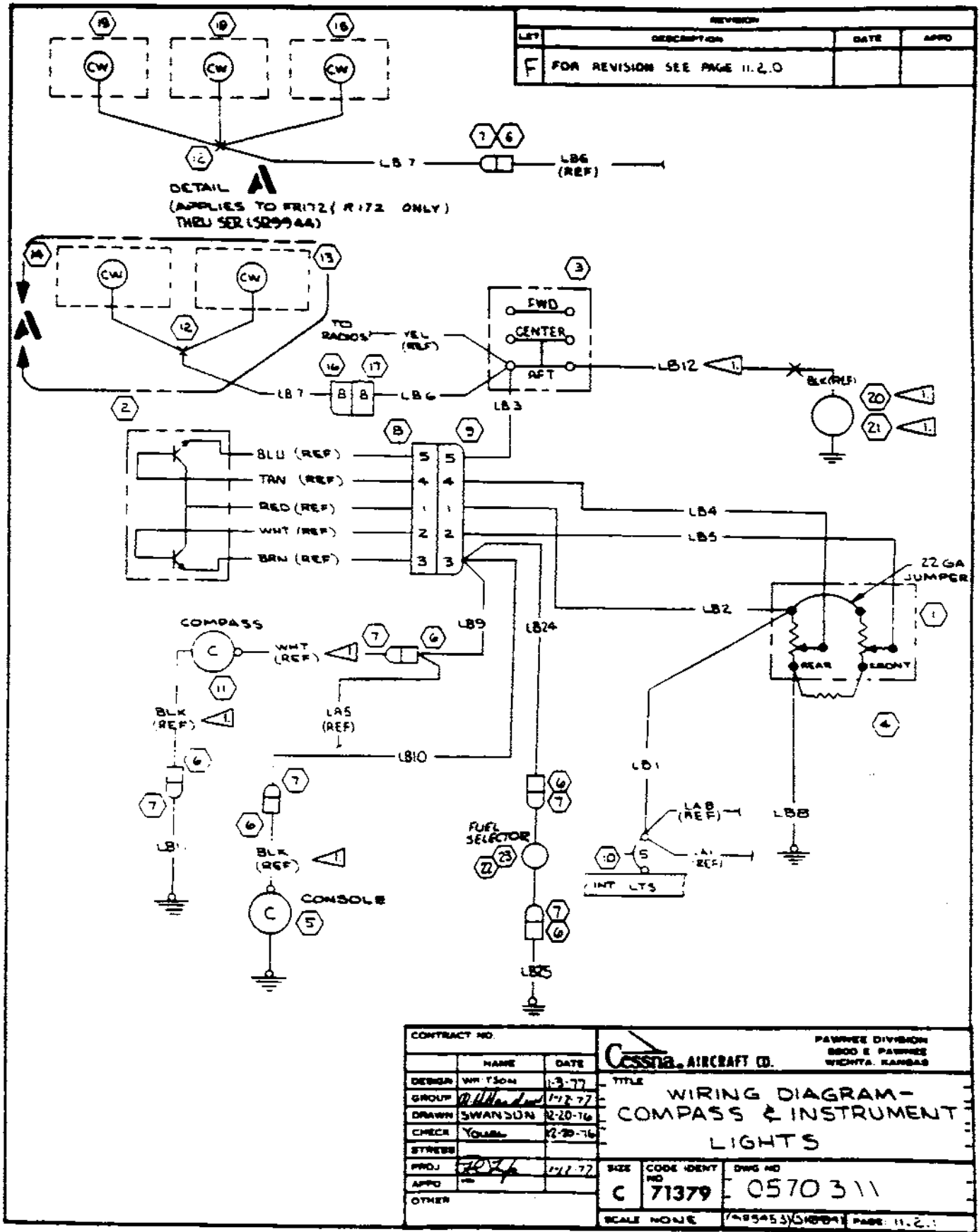
LET	DESCRIPTION	DATE	APPRO
A	BY REV: S-2000C201J WAS S-2000B271J SR89481 C669527 WAS C669514, C669538 WAS C669512, C669537 WAS C669511 ADD S-1637-1 / S-1637-2 TO DETAIL A (SR8774)	C.R.S. 10-3-77	AS/MS G.P. R.F.
B	BY REV: ADD LB12, NOTE 1 MS25231-1B19 & S2413-1 (SR9187)	CMK 7-13-78	AS/MS R.F.
C	BY REV: LB12 WAS 20GA S1829-1 WAS S-1824-1 (SR9573) (REF) C669537 WAS C669512 & C669535 WAS C669511 (SR9105K/SR9104)	NTL 10-20-78	AS/MS G.P. R.F.
D	BY REV: DELETE 22GA JUMPER/ S2000C201J (NOW SHOP PRACTICE)	NTL 10-15-79	AS/MS R.F.
E	BY REV: SER OUT DETAIL A & LB1 (SR9944)	GW 6-9-81	AS/MS G.P. R.F.
F	BY REV: ADD LB24, LB25, S2524-1, & MS25231-1B29 (SR10523)	GW 6-29-82	AS/MS G.P. R.F.

23	MS25231-1B29	LAMP							
22	S2524-1	SOCKET ASSY							
21	S-2413-1	SOCKET							
20	MS25231-1B19	LIGHT							
19	C669527	INST CLUSTER							
18	C669538	INST CLUSTER							
17	S-1641-9	HOUSING							
16	S-1640-9	HOUSING							
15	C669537	INST CLUSTER							
14	C669537	INST CLUSTER							
13	C669535	INST CLUSTER							
12	1270419	LAMP ASSY							
11	MS25237-327	LAMP							
10	S-1640-8L	CIRCUIT BREAKER							
9	S-1640-6	HOUSING							
8	S-1641-6	HOUSING							
7	S-1637-1	HOUSING							
6	S-1637-2	HOUSING							
5	MS-15584-15	LAMP							
4	S-2000C201J	RESISTOR							
3	S-1003-817	TERMINAL BLOCK							
2	S-170166	TRIMMING ASSY							
1	S-2091-7	RESISTOR ASSY							

CONTRACT NO.	NAME	DATE	TITLE
	WHITSON	1-3-77	WIRING DIAGRAM - COMPASS & INSTRUMENT LIGHTS
GROUP	SHAWNSON	12-20-76	
CHECK	YOUNG	12-20-76	
STRESS			
PROJ	2074	1-18-77	
APPD			
OTHER			

SIZE	CODE IDENT	OWB NO
C	71379	0570311
SCALE	NONE	(SAB953) (SAB954) PAGE 11.2.0

MODEL 172 SERIES SERVICE MANUAL



CONTRACT NO.			Cessna AIRCRAFT CO.			PAWNEE DIVISION 8800 E PAWNEE WICHITA, KANSAS		
DESIGN	W. TSON	1-3-77	TITLE WIRING DIAGRAM - COMPASS & INSTRUMENT LIGHTS			SIZE C		
GROUP	W. TSON	1-12-77						
DRAWN	SWANSON	2-20-76	CODE IDENT 71379			DWG NO 0570311		
CHECK	YONAS	2-20-76						
STRESS			SCALE NONE			(485453) (SHEET) PAGE 11.2.1		
PROJ	W. TSON	1-11-77						
APPRO								
OTHER								

MODEL 172 SERIES SERVICE MANUAL

NOTES.

THIS LAMP IS NOT USED ON PR112 OR A112
THRU SER(SR9944)

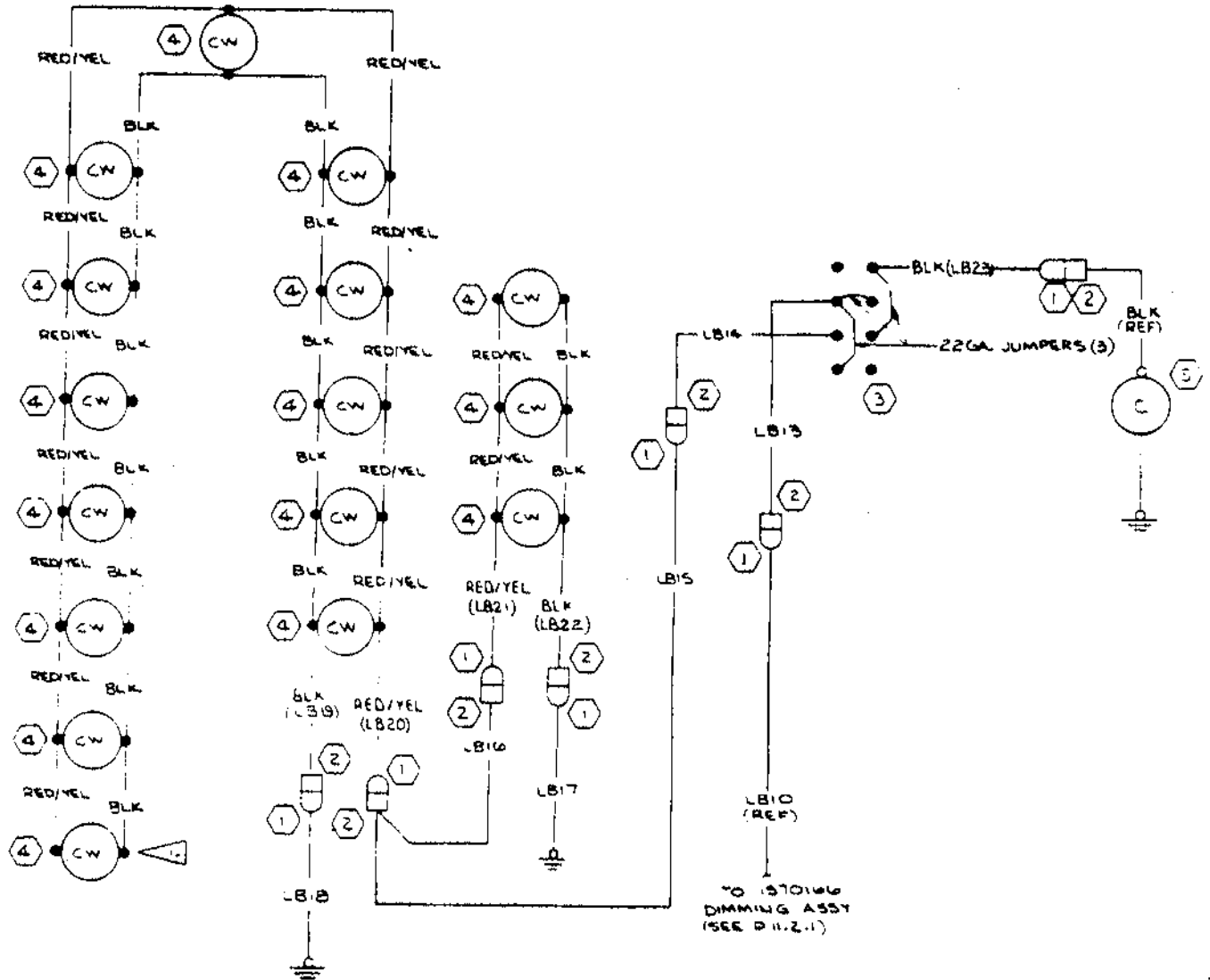
REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: ADD BLK(LB23), S-1637-2, S-1637-1 (SR9944)(REF(SR9945))(REF	HMG 8-3-79	JAD/LLP
B	BY REV: 22 GA JUMPERS(2) HAS 18 GA JUMPERS(3) (NOW SHOP PRACTICE)	MRM 9-24-80	AD/LLP
C	BY REV: SER OUT NOTE 1 (SR9944)	SW 6-9-81	JAD/LLP

BLK(LB23)	22	-22-0	SOLDER	S-1635-1		
BLK	22	-22-0	SOLDER	SOLDER		
RED/YEL	22	-22-2-4	SOLDER	SOLDER		
RED	22	-22-0	SOLDER	S-1636-1		
RED	22	-22-2-4	SOLDER	S-1635-1		
RED	22	-22-2-4	SOLDER	S-1635-1		
RED	22	-22-0	SOLDER	S-1636-1		
LB18	22		S-1635-1	S-1637-1		
LB17	22		S-1635-1	S-1637-1		
LB16	22		S-1636-2	S-1636-1		
LB15	22		S-1635-1	SEE LB16		
LB14	22		SOLDER	S-1636-1		
LB13	22		SOLDER	S-1636-1		
WIRE	GA	MATERIAL	LG	TERMINALS		TERMINALS

EQUIPMENT TABLE PART NO. DESCRIPTION 5 MS-5589-15 LAMP 4 MS25237-327 LAMP 3 S-1501-1 SWITCH 2 S-1637-2 HOUSING 1 S-1637-1 HOUSING		WIRE TABLE CONTRACT NO. NAME DATE DESIGNER WHITSON 1-8-77 GROUP W.H. 1-7-77 DRAWN SWANSON 12-20-76 CHECK YOUNG 12-20-76 STRESS PROJ. 2-2-77 1-8-77 APPD. OTHER		Cessna AIRCRAFT CO. TITLE WIRING DIAGRAM — INSTRUMENT PANEL POST LIGHTING (OPT) SCALE: NONE ORG: 53 (54854) PAGE: 11, 3, 0	
CEB-1000 IS APPLICABLE VENDOR CODES PER S-1600 CEB-1000-CESNA SPEC. NO. S-100 OR CEB-1000-CESNA STD. NO.		SUPERSEDED BY: 0570311 PG. 11, 3, 0 SUPERSEDED BY:		SIZE CODE IDENT. DWG NO. C 71379 0570311	

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
B	SEE SHT 11.3.3 FOR REVISION		



CONTRACT NO.		Cessna AIRCRAFT CO.		PAWNEE DIVISION 5800 E PAWNEE WICHITA KANSAS	
DESIGN	WHITSON	DATE	12-77	TITLE	
GROUP	W. H. H. H.	DATE	12-77	WIRING DIAGRAM -	
DRAWN	SWANSON	DATE	12-20-76	INSTRUMENT PANEL	
CHECK	YOUNG	DATE	12-20-76	POST LIGHTING (OPT)	
STRESS					
PROJ	2574	DATE	12-77	SIZE	CODE IDENT
APPRO				C	71379
OTHER				DWG NO	0570311
SCALE NONE				328453	348454
				PAGE	11.3

44 13916

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO

PART NO.	DESCRIPTION	QUANTITY	MATERIAL	LG	TERMINALS	SERIALS
12	MS1538-15 LAMP	22	-22-5	S-1435-1	S-1435-1	(STD)
11	MS25231-313 LAMP	22	-22-5	S-1435-1	S-1435-1	(STD)
10	0521101 COURTESY LT INSTL	22	-22-5	S-1435-1	S-1435-1	(STD)
9	S-1637-2 HOUSING	22	-22-5	S-1435-1	S-1435-1	(STD)
8	S-1637-1 HOUSING	22	-22-5	S-1435-1	S-1435-1	(STD)
7	0413138 SOCKET	22	-22-5	S-1435-1	S-1435-1	(STD)
6	S-1640-6 HOUSING	22	-22-5	S-1435-1	S-1435-1	(STD)
5	S-1641-6 HOUSING	22	-22-5	S-1435-1	S-1435-1	(STD)
4	S-1640-9 HOUSING	22	-22-5	S-1435-1	S-1435-1	(STD)
3	S-1641-9 HOUSING	22	-22-5	S-1435-1	S-1435-1	(STD)
2	S-1831-1 SWITCH	22	-22-5	S-1435-1	S-1435-1	(STD)
1	S-1360-5L CXT BKR	22	-22-5	S-1435-1	S-1435-1	(STD)

WIRE TABLE			
CONTRACT NO.	NAME	DATE	TITLE

EQUIPMENT TABLE			
PART NO.	DESCRIPTION	QUANTITY	MATERIAL

SUPERSEDES			
PART NO.	DESCRIPTION	QUANTITY	MATERIAL

Cessna AIRCRAFT CO.			
DESIGN	NAME	DATE	TITLE

WIRING DIAGRAM - DOME & COURTESY LIGHTS			
GROUP	NAME	DATE	TITLE

Cessna AIRCRAFT CO.			
DESIGN	NAME	DATE	TITLE

Cessna AIRCRAFT CO.			
DESIGN	NAME	DATE	TITLE

Cessna AIRCRAFT CO.			
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Cessna AIRCRAFT CO.			
DESIGN	NAME	DATE	TITLE

Cessna AIRCRAFT CO.			

MODEL 172 SERIES SERVICE MANUAL

NOTES.

- 1 APPLIES TO R172 & FR172 ONLY
- 2 APPLIES TO 172 & F172 ONLY

REV	DESCRIPTION	DATE	APPRO
A	BY REV: ADD 4553 LAMP. DELETE 4594 LAMP (SR 8962) (SR 8962)	LSS 8-20-77	REF. 100
C	BY REV: 4556 WAS 4553 4594 WAS 4591 (SR 9104) (SR 9105)	GW 11-21-78	REF. 100
D	BY REV: HCl (REF) TO CIGAR LTR WAS CONN TO BUS BAR AT LUG LT CIRCUIT BREAKER 4553 WAS 4594 (SR 9624) (SR 9624)	RAO 1-21-80	REF. 100
E	BY REV: ADD DETAIL A, B, LCB, LCT, LES, NOTE 1, 2 & SER (ADV REL.) (SR 9624)	RAO 2-12-80	REF. 100
F	BY REV: RELEASED FOR PRODUCTION (SR 9624)	RAO 3-5-80	REF. 100

INACTIVE
 REF. 100
 11-25-80
 JAC. 100

44-0111

7	4594	LAMP (100W)	5-1635-2	5-1367-2-B	2	SER (SR 9624) 1 ON
6	4553	LAMP (250W)	5-1367-2-B	5-1635-2	2	SER (SR 9624) 1 ON
5	5143B-1	HOUSING	5-1635-2	5-1367-2-B	2	SER (SR 9624) 1 ON
4	5143B-2	HOUSING	5-1635-2	5-1367-2-B	2	
3	52160-5	SWITCH	5-1635-2	5-1367-2-B	2	
2	52160-4	SWITCH	5-1635-2	5-1367-2-B	2	
1	51360-15L	CIRCUIT BREAKER	5-1635-2	5-1367-2-B	2	

PART NO.	DESCRIPTION	CONTRACT NO.	NAME	DATE	TITLE
			WHITSON	11-27-77	WIRING DIAGRAM -
			HARVEY	12-20-76	LANDING & TAXI LIGHT
			YQUEL	12-20-76	(OPT)

PART NO.	DESCRIPTION	CONTRACT NO.	NAME	DATE	TITLE
			WHITSON	11-27-77	WIRING DIAGRAM -
			HARVEY	12-20-76	LANDING & TAXI LIGHT
			YQUEL	12-20-76	(OPT)

CES-1000 IS APPLICABLE VENDOR CODES PER S-400 CES-1000-CESNA SPEC. NO. S-400 OR CMXXXX-CESNA STD. NO.	SUPERSEDES: 0570101 P150-1161 SUPERSEDED BY: 0570311	PROJ. 11-27-77 APP. 12-20-76 OTHER	SIZE C CODE IDENT 71379 DWG NO. 0570311 SCALE NONE	PAGE 50

1



REVISION		DATE	APPRO
LET	DESCRIPTION	DATE	APPRO
A	BY REV: RED (LD 6) & RED (LD 8) WERE 22 GA (NOW SHOP PRACTICE X MERIT 220969)	GM 6-20-62	<i>[Signature]</i>

REV	LD	DATE	DESCRIPTION	TERMINALS	SERIALS
RED (LD 6)	18	-18-9	5 1635 1	5 1635 1	
LD 7	22	-22-9	5 1635 1	5 1635 1	
RED (LD 8)	18	-18-9	5 1635 1		
LD 5	22	-22-9	5 1629 1		
LD 4	1	-22-9	5 1629 1		
LD 3		-22-9	5 1629 1	5 1635 1	
LD 2		-22-9	5 1635 1	5 1635 1	
LD 1	22	-22-9	5 1635 1	5 1635 1	
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS	SERIALS

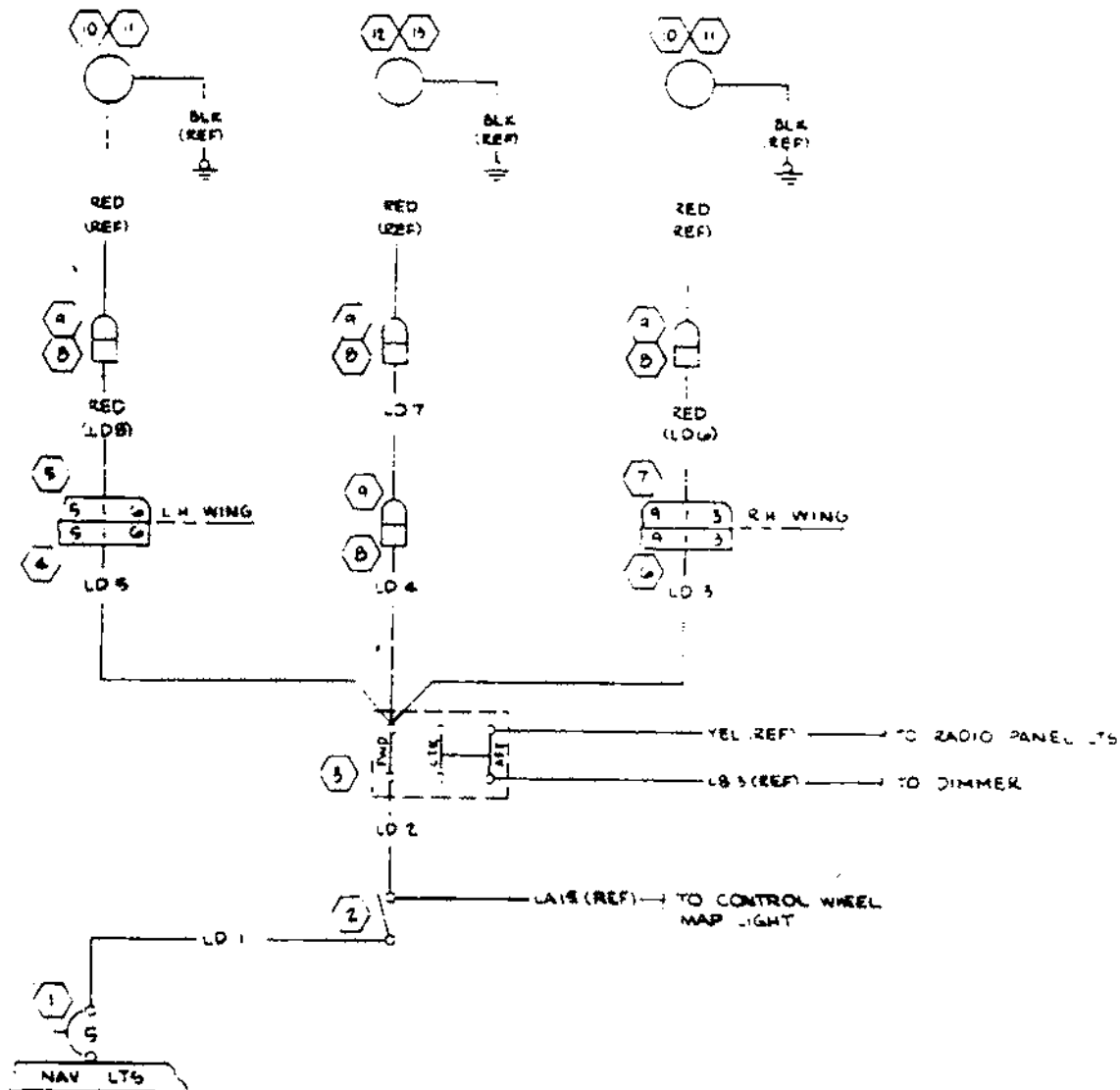
PART NO.	DESCRIPTION
13	M535478 307 LAMP
12	C622001-0102 LIGHT ASSY
11	M525309 7512 LAMP
10	C622001-0702 LIGHT ASSY
9	5 1637 1 HOUSING
8	5 1637 2 HOUSING
7	5 1640 9 HOUSING
6	5 1641 9 HOUSING
5	5 1640 6 HOUSING
4	5 1641 6 HOUSING
3	34005-95 3610 TERMINAL BLOCK
2	5 2160 1 SWITCH
1	5 1360 5L CIRCUIT BREAKER

WIRE TABLE	
CONTRACT NO.	
DESIGN	WHITSON 1-3-77
GROUP	W. H. H. 1-2-77
DRAWN	HARVEY 12-20-76
CHECK	YOUNG 12-20-76
STRESS	
PROD	1-12-77
APPRO	
OTHER	

EQUIPMENT TABLE	
CES-4000 IS APPLICABLE VENDOR CODES PER 8-4400 CES-4000-CESNA SPEC. NO 8-401 OR CHRYSLER-CESNA STD. NO.	SUPERSEDES 0570101 P 1160 SUPERSEDED BY

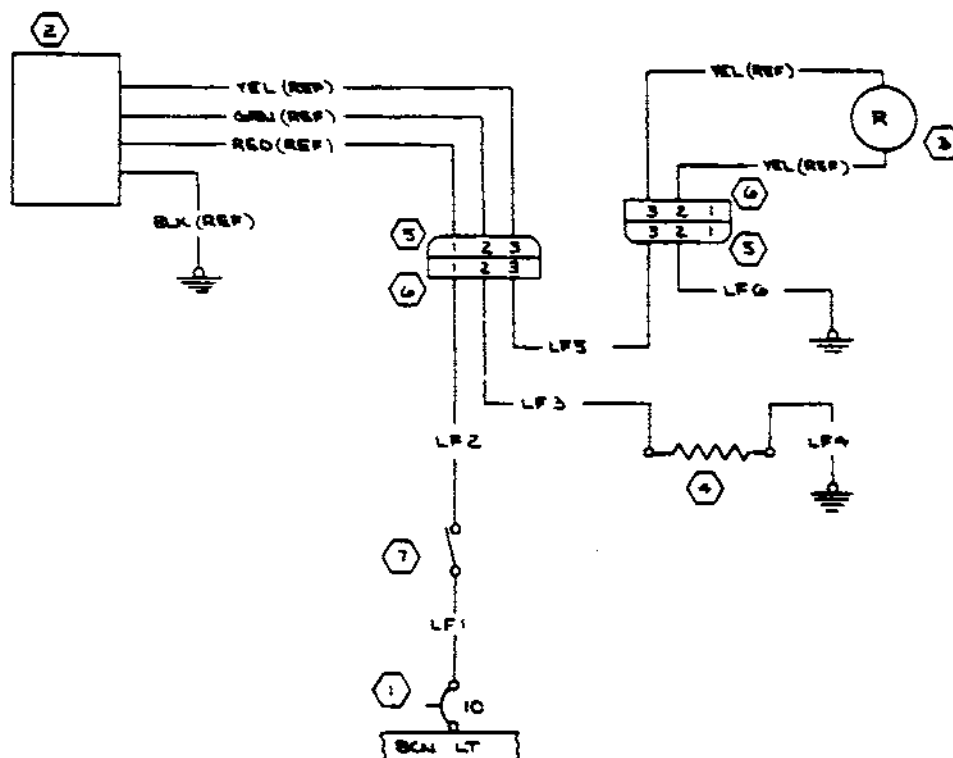
WIRING DIAGRAM - NAVIGATION LIGHTS	
CONTRACT NO. DESIGN WHITSON 1-3-77 GROUP W. H. H. 1-2-77 DRAWN HARVEY 12-20-76 CHECK YOUNG 12-20-76 STRESS PROD 1-12-77 APPRO OTHER	TITLE WIRING DIAGRAM - NAVIGATION LIGHTS SCALE: NONE (5-0455)(4-0094)
CESSNA AIRCRAFT CO. PAWNEE DIVISION 1600 E. PAWNEE WICHITA KANSAS	DWG NO 0570311 PAGE: 1160

MODEL 172 SERIES SERVICE MANUAL



CONTRACT NO.		Cessna AIRCRAFT CO.		PAWNEE DIVISION 3800 E. PAWNEE WICHITA, KANSAS	
DESIGN	NAME	DATE	TITLE		
GROUP	W. H. H. H. H.	1-3-77	WIRING DIAGRAM - NAVIGATION LIGHTS		
DRAWN	HARVEY	12-20-76			
CHECK	YOUNG	12-20-76			
STRESS					
PROJ.		1-17-77	SIZE	CODE IDENT	ORIG. NO.
APPRO			C	71379	0570311
OTHER			SCALE: NONE	(SABOFS) (SABAG4)	PAGE: 1 OF 1

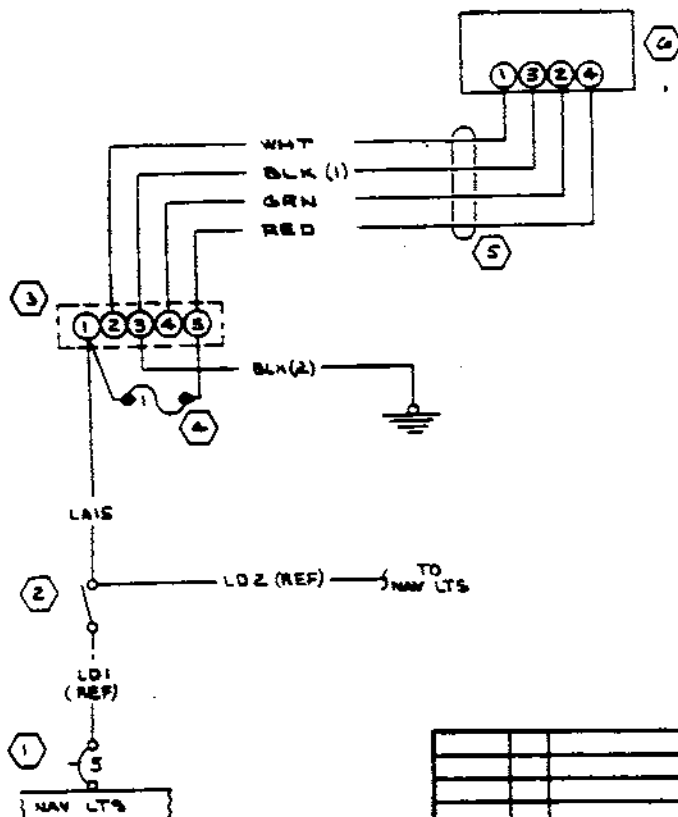
REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: 5-1636-1/LF2 & LF3 WMS 5-1635-1 CORRECTED REFERENCE TO LFCY 6-27-70	JUN 8 1970	[Signature]



54-0914
53-0916

↑

REVISION			
LET	DESCRIPTION	DATE	APPD



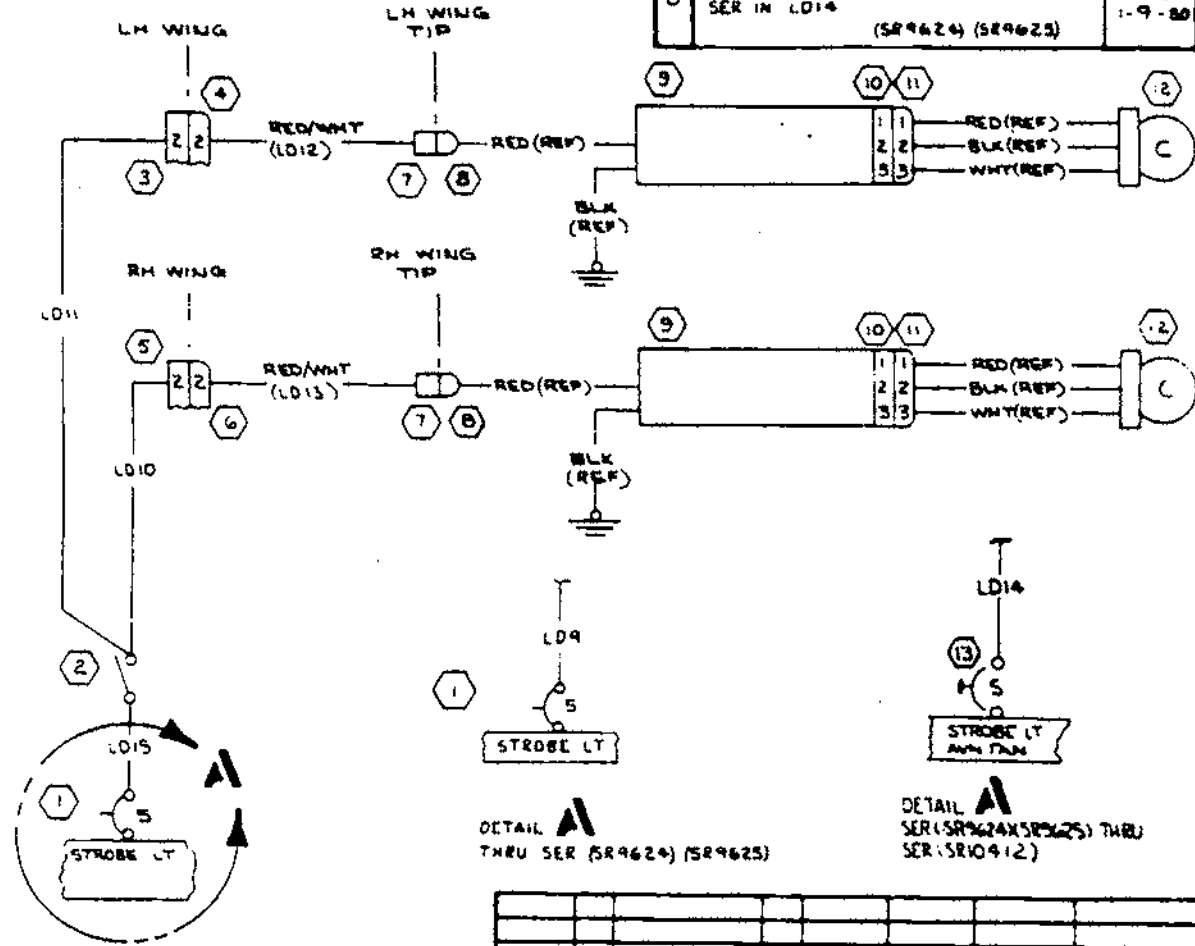
INACTIVE
THRU SER(SR101051)
GW 9-25-81
MO 102 112
253

[illegible]

WIRE TABLE		COMMERCIAL AIRCRAFT DIV. 3800 E. FAHWEE WICHITA, KANSAS	
Cessna, AIRCRAFT CO.			
TITLE WIRING DIAGRAM — MAP LIGHT - CONTROL WHEEL (OPT)			
SIZE C	CODE IDENT. NO. 71379	DWS NO. 0570311	
SCALE: NONE		SXB#531	PAGE: 11.8

MODEL 172 SERIES SERVICE MANUAL

C	BY REV ADD DETAIL A & SER: 51232-5/REV B WAS 51235-5 (SR10412)	GW	REV	DATE	BY	DATE	APPD
	BY REV: (SR10412) WAS (SR10042) - REV C 1 DETAIL A (SR10412)	REV	6-18-82	REV	6-5-78	REV	REV
D	LD12 & LD13 WERE 22 GA (NOW SHOP PRACTICE) (MERITZED 969)	REV	6-18-82	REV	6-5-78	REV	REV
REVISION							
LET	DESCRIPTION	DATE	APPD				
A	BY REV C622006-0107 WAS -0101 DELETE "PIGTAIL"/C622008-0102 (SR8453)(REF)(SR8454)(REF)	DLP	6-5-78	REV	6-5-78	REV	REV
B	BY REV ADD DETAIL "A", 5-1232-5 SER IN LD14 (SR9624) (SR9625)	RAO	1-9-80	REV	1-9-80	REV	REV



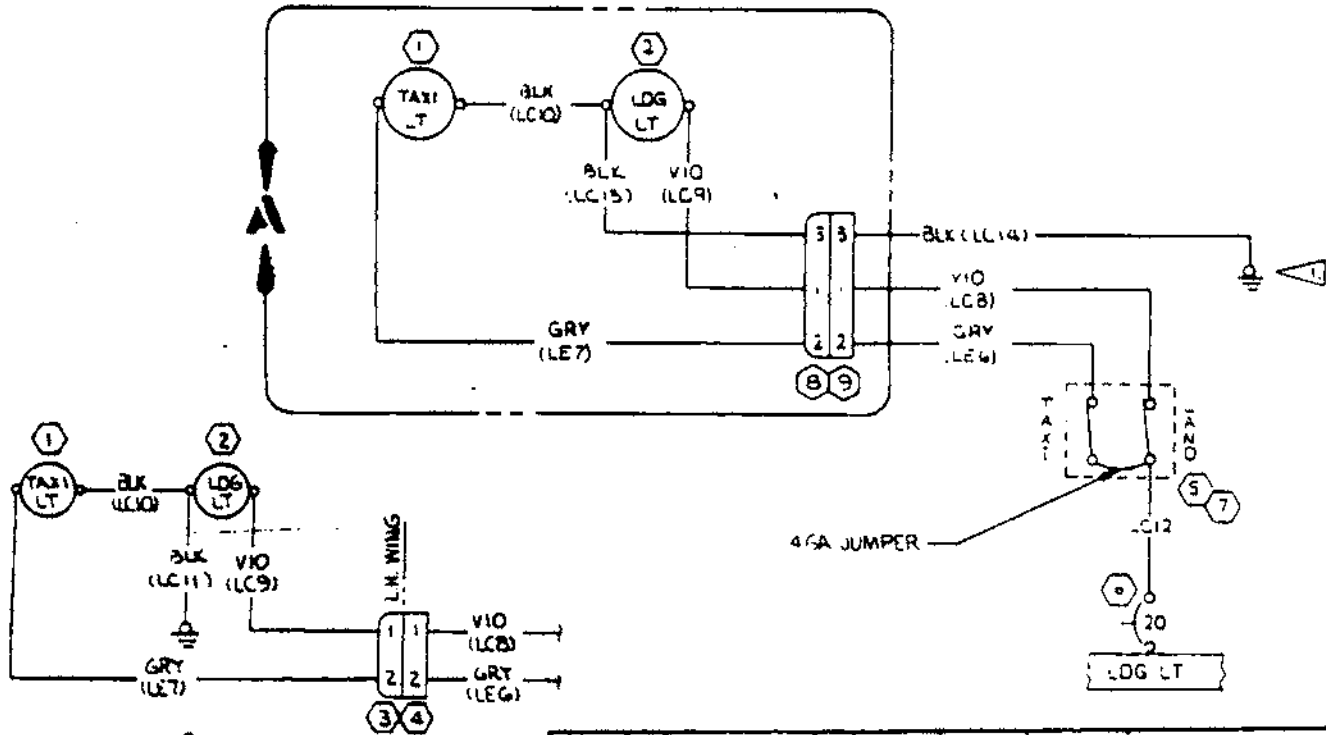
13	5-1232-5	CIRCUIT BREAKER	LD15	22	5-1367-6	5-1493-1	SER (SR10412) & ON
2	C622006-0107	LAMP ASSY	LD14	22	5-1367-8	5-1493-1	SER (SR9624) (SR9625) THRU SER (SR96012)
	5-1638-2	HOUSING	LD11	20	5-1635-1	5-1636-1	(STD)
10	5-1638-1	HOUSING	LD11	22	5-1635-1	5-1636-1	(STD)
9	C622008-0102	STROBE PWR SUPPLY	LD10	22	SEE LD10	5-1636-1	
8	5-1637-1	HOUSING	LD9	22	5-1637-2	5-1636-1	
7	5-1637-2	HOUSING	LD9	22	5-1637-4	5-1493-1	THRU SER (SR9624) (SR9625)
6	5-1640-3	HOUSING					
5	5-1641-9	HOUSING					
4	5-1640-6	HOUSING					
3	5-1641-6	HOUSING					
2	5-2160-1	SWITCH					
1	5-1360-5L	CKT BKR					
WIRE TABLE							
CONTRACT NO.				COMMERCIAL AIRCRAFT DIV. 3800 E. PALMER WICHITA, KANSAS			
DESIGN				NAME	DATE	Cessna Aircraft Co.	
GROUP				(1) W. J. Hoadley	7-17-77	TITLE	
DRAWN				SWANSON	8-20-76	WIRING DIAGRAM —	
CHECK				YOUNG	12-20-76	WING TIP STROBE LIGHT	
BY						(OPT)	
PROJ				5-17-77	142-77	SIZE	CODE IDENT
APPD						C	71379
OTHER						DWG NO	0570311
CER-1000 IS APPLICABLE VENOOR CODES PER S-1000 CER-XXXX-CESNA SPEC. NO. S-1000 OR CHXXXX-CESNA STD. NO.				SUPERSEDER: 0570101 PG 11.9.0 SUPERSEDED BY:			
SCALE: NONE				(528153) (528154) PAGE: 11.0			

MODEL 172 SERIES SERVICE MANUAL

NOTES:

▷ GROUND WITH ALU. MOUNTING BOLT

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: ADD DETAIL 'A' (SR1024B)	GW 7-23-81	JAB MOT 1/85
B	BY REV: S1367-2-2/ LC14 WAS S1367-2-13: NOTE: WAS GROUND WITH BATTERY GROUND STRAP (SR1024B)	GW 9-24-81	JAB MOT 1/85
C	BY REV: CONNECT BLK (LC15) WIRE TO LOG LT. (WAS CONNECTED TO TAXI LT. REF DETAIL 'A'. CONNECT BLK (LC11) TO LOG LT. (WAS TO TAXI LT.) (NOW SHOP PRACTICE)	WJM 3-3-84	ABW/WJM RRO 1/84



DETAIL A
THRU SER (SR1024B)

9	S-1638-1	HOUSING
8	S-1638-2	HOUSING
7	S-2023-1	ADAPTOR
6	S-1360-20L	CIRCUIT BKR
5	S-2160-4	SWITCH
4	S-2035-2	HOUSING
3	S-2035-1	HOUSING
2	4596	LDG LIGHT
1	4587	TAXI LIGHT

EQUIPMENT TABLE

CBS-4000 IS APPLICABLE
VENDOR CODES FOR S-4000
CBS-4000-CBS-4000 SPEC. NO.
S-4000 OR CBS-4000-CBS-4000
SPEC. NO.

SUPERSEDED
0570311 7G 11.3.0 (11.5.1)
SUPERSEDED BY:

BLK (LC14)	14	-14-0	S-1636-2	S-1367-2-12	SER (SR1024B) < ON
BLK (LC13)	14	-14-0	S-1367-2-8	S-1365-2	SER (SR1024B) < ON
GRY (LE7)	14	-14-8	S-1635-2	S-1367-2-8	
GRY (LEW)	14	-14-8	S-1493-2	S-1636-2	
LC12	14	-14-8	S-1367-2-6	S-1493-2	
BLK (LC11)	14	-14-0	S-1367-2-8	S-1367-2-8	THRU SER (SR1024B)
BLK (LC10)	14	-14-0	S-1367-2-8	S-1367-2-8	
VIO (LC9)	14	-14-7	S-1635-2	S-1367-2-8	
VIO (LC8)	14	-14-7	S-1636-2	S-1493-2	

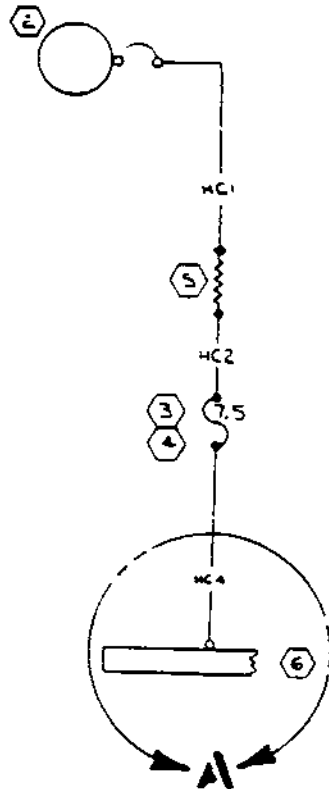
WIRE TABLE

CONTRACT NO.	NAME	DATE
DESIGN	W. J. S. 1001	11-25-80
GROUP	Full Line Diagram	11-25-80
DRAWN	SPRINGER	11-25-80
CHECK	ROLESKE	1-25-81
STRESS		
PROJ	D. E. Sipes	1-13-81
APPRO		
OTHER		

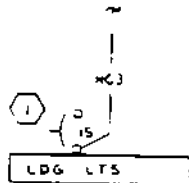
Cessna Aircraft Co.		PARTS DIVISION 3000 E. PARKWAY WICHITA, KANSAS
TITLE		WIRING DIAGRAM— LANDING & TAXI LIGHTS (172)
SIZE	CODE IDENT.	OWB NO.
C	71379	0570311
OTHER	NONE	(SR10034)

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: S-2374-7.5 WAS HMM -A, S-2375-7.5 WAS SFE 7.5 (S-1000 CHG) ADD 6 MAX./HC 3	CS 10-4-79	REV. 018 M. J. JONES 2F
B	BY REV: ADD 0570451, HC4, DETAIL A & SER (SR9624) (SR9625)	RAO 1-21-80	REV. 019 R. A. O'NEILL 2F
C	BY REV: REVISE HCT WIRE TERMIN- ATION FROM S-1367-1-6 TO S-1367-1-8 MBA 172 SD 828	TLW 4-16-80	REV. 020 T. L. WILSON DES



INACTIVE
THRU SER (SR10056)
GW 11-2-81
JW/ 403 P/AS



DETAIL A
THRU SER (SR9624) (SR9625)

WIRE	CODE	NO.	GA.	MATERIAL	LG.	TERMINALS	DETAILS
HC 4	18			S-1367-1-10	SOLDER	SER (SR9624) (SR9625)	ON
HC 3	18			S-1367-1-6	SOLDER	THRU SER (SR9624) (SR9625)	
HC 2	18				SOLDER	SOLDER	
HC 1	18				SOLDER	S-1367-1-8	

PART NO.	DESCRIPTION
6	0570451 BUS BAR
5	S-2041-50-1.6 RESISTOR
4	S-2375-7.5 FUSE
3	S-2374-7.5 FUSE HOLDER
2	0513052 LIGHTER ASSY
	S-1360-15L CAT BNR

EQUIPMENT TABLE	
CES-1000 IS APPLICABLE VENDOR CODES PER S-1000 CES-XXXX-CESNA SPEC. NO. S-XXX OR CHXXXX-CESNA STD. NO.	SUPERSEDES 0570101 PG. 13.10 SUPERSEDED BY.

WIRE TABLE		
CONTRACT NO.	NAME	DATE
DESIGN	WHITSON	1-3-77
GROUP	W. H. Whitson	1-12-77
DRAWN	SWANSON	12-20-76
CHECK	YOWELL	12-20-76
STRESS		
PROJ		1-12-77
APPRO		
OTHER		
SCALE	NONE	(SR8453)(SR8454) PAGE 13

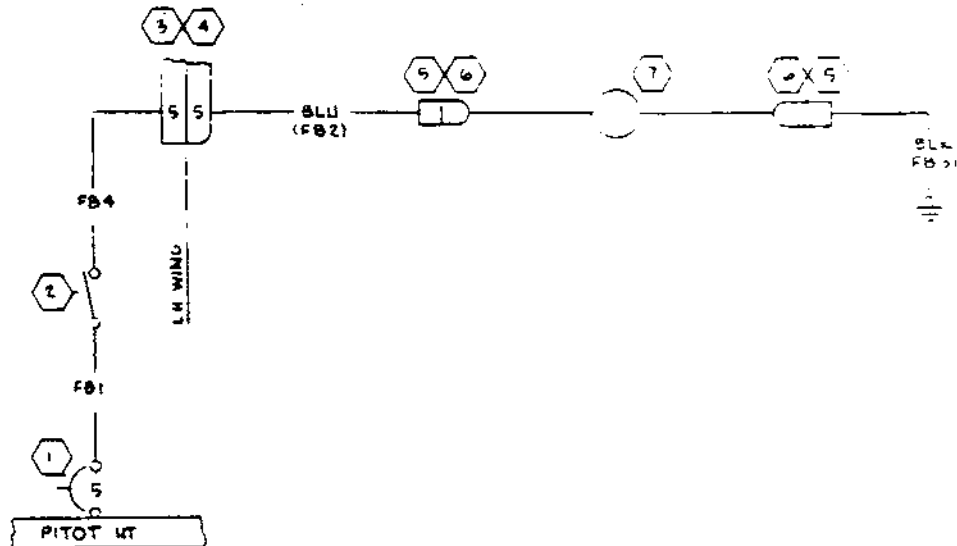
Cessna AIRCRAFT CO.
PAWNEE DIVISION
2000 E. PAWNEE
MICHIGAN, KANSAS

WIRING DIAGRAM —
CIGAR LIGHTER

71379 **0570311**

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: 3LK(FB3) & 3LU(FB2) NERE 22 GA (NOW SHOP PRACTICE)(NER:726096)	SW 6-29-82	PM/ JH CP



54 0916
55 0916

7 0721105 PITOT HEATER		FB 4 22		5 1445 1 5 1430 1	
6 5 1637-1 HOUSING		FB 3 18 -18-0		5 1436 1 5 1437 1 1	
5 5 1637-2 HOUSING		FB 3 18 -18-6		5 1435 1 5 1436 2	
4 5 1640-6 HOUSING		FB 1 22		5 1437 1 1 5 1445 1	
3 5 1641-6 HOUSING		WIRE CODE NO		GA MATERIAL LG TERMINALS SERIALS	
2 5 2160-1 SWITCH		CONTRACT NO:			
1 5 1360-5L CIRCUIT BREAKER		DESIGN WHITSON 1-3-77			
EQUIPMENT TABLE		GROUP 10/11/12/13/14/15/16/17/18/19/20/21/22/23/24/25/26/27/28/29/30/31/32/33/34/35/36/37/38/39/40/41/42/43/44/45/46/47/48/49/50/51/52/53/54/55/56/57/58/59/60/61/62/63/64/65/66/67/68/69/70/71/72/73/74/75/76/77/78/79/80/81/82/83/84/85/86/87/88/89/90/91/92/93/94/95/96/97/98/99/100/101/102/103/104/105/106/107/108/109/110/111/112/113/114/115/116/117/118/119/120/121/122/123/124/125/126/127/128/129/130/131/132/133/134/135/136/137/138/139/140/141/142/143/144/145/146/147/148/149/150/151/152/153/154/155/156/157/158/159/160/161/162/163/164/165/166/167/168/169/170/171/172/173/174/175/176/177/178/179/180/181/182/183/184/185/186/187/188/189/190/191/192/193/194/195/196/197/198/199/200/201/202/203/204/205/206/207/208/209/210/211/212/213/214/215/216/217/218/219/220/221/222/223/224/225/226/227/228/229/230/231/232/233/234/235/236/237/238/239/240/241/242/243/244/245/246/247/248/249/250/251/252/253/254/255/256/257/258/259/260/261/262/263/264/265/266/267/268/269/270/271/272/273/274/275/276/277/278/279/280/281/282/283/284/285/286/287/288/289/290/291/292/293/294/295/296/297/298/299/300/301/302/303/304/305/306/307/308/309/310/311/312/313/314/315/316/317/318/319/320/321/322/323/324/325/326/327/328/329/330/331/332/333/334/335/336/337/338/339/340/341/342/343/344/345/346/347/348/349/350/351/352/353/354/355/356/357/358/359/360/361/362/363/364/365/366/367/368/369/370/371/372/373/374/375/376/377/378/379/380/381/382/383/384/385/386/387/388/389/390/391/392/393/394/395/396/397/398/399/400/401/402/403/404/405/406/407/408/409/410/411/412/413/414/415/416/417/418/419/420/421/422/423/424/425/426/427/428/429/430/431/432/433/434/435/436/437/438/439/440/441/442/443/444/445/446/447/448/449/450/451/452/453/454/455/456/457/458/459/460/461/462/463/464/465/466/467/468/469/470/471/472/473/474/475/476/477/478/479/480/481/482/483/484/485/486/487/488/489/490/491/492/493/494/495/496/497/498/499/500/501/502/503/504/505/506/507/508/509/510/511/512/513/514/515/516/517/518/519/520/521/522/523/524/525/526/527/528/529/530/531/532/533/534/535/536/537/538/539/540/541/542/543/544/545/546/547/548/549/550/551/552/553/554/555/556/557/558/559/560/561/562/563/564/565/566/567/568/569/570/571/572/573/574/575/576/577/578/579/580/581/582/583/584/585/586/587/588/589/590/591/592/593/594/595/596/597/598/599/600/601/602/603/604/605/606/607/608/609/610/611/612/613/614/615/616/617/618/619/620/621/622/623/624/625/626/627/628/629/630/631/632/633/634/635/636/637/638/639/640/641/642/643/644/645/646/647/648/649/650/651/652/653/654/655/656/657/658/659/660/661/662/663/664/665/666/667/668/669/670/671/672/673/674/675/676/677/678/679/680/681/682/683/684/685/686/687/688/689/690/691/692/693/694/695/696/697/698/699/700/701/702/703/704/705/706/707/708/709/710/711/712/713/714/715/716/717/718/719/720/721/722/723/724/725/726/727/728/729/730/731/732/733/734/735/736/737/738/739/740/741/742/743/744/745/746/747/748/749/750/751/752/753/754/755/756/757/758/759/760/761/762/763/764/765/766/767/768/769/770/771/772/773/774/775/776/777/778/779/780/781/782/783/784/785/786/787/788/789/790/791/792/793/794/795/796/797/798/799/800/801/802/803/804/805/806/807/808/809/810/811/812/813/814/815/816/817/818/819/820/821/822/823/824/825/826/827/828/829/830/831/832/833/834/835/836/837/838/839/840/841/842/843/844/845/846/847/848/849/850/851/852/853/854/855/856/857/858/859/860/861/862/863/864/865/866/867/868/869/870/871/872/873/874/875/876/877/878/879/880/881/882/883/884/885/886/887/888/889/890/891/892/893/894/895/896/897/898/899/900/901/902/903/904/905/906/907/908/909/910/911/912/913/914/915/916/917/918/919/920/921/922/923/924/925/926/927/928/929/930/931/932/933/934/935/936/937/938/939/940/941/942/943/944/945/946/947/948/949/950/951/952/953/954/955/956/957/958/959/960/961/962/963/964/965/966/967/968/969/970/971/972/973/974/975/976/977/978/979/980/981/982/983/984/985/986/987/988/989/990/991/992/993/994/995/996/997/998/999/1000/1001/1002/1003/1004/1005/1006/1007/1008/1009/1010/1011/1012/1013/1014/1015/1016/1017/1018/1019/1020/1021/1022/1023/1024/1025/1026/1027/1028/1029/1030/1031/1032/1033/1034/1035/1036/1037/1038/1039/1040/1041/1042/1043/1044/1045/1046/1047/1048/1049/1050/1051/1052/1053/1054/1055/1056/1057/1058/1059/1060/1061/1062/1063/1064/1065/1066/1067/1068/1069/1070/1071/1072/1073/1074/1075/1076/1077/1078/1079/1080/1081/1082/1083/1084/1085/1086/1087/1088/1089/1090/1091/1092/1093/1094/1095/1096/1097/1098/1099/1100/1101/1102/1103/1104/1105/1106/1107/1108/1109/1110/1111/1112/1113/1114/1115/1116/1117/1118/1119/1120/1121/1122/1123/1124/1125/1126/1127/1128/1129/1130/1131/1132/1133/1134/1135/1136/1137/1138/1139/1140/1141/1142/1143/1144/1145/1146/1147/1148/1149/1150/1151/1152/1153/1154/1155/1156/1157/1158/1159/1160/1161/1162/1163/1164/1165/1166/1167/1168/1169/1170/1171/1172/1173/1174/1175/1176/1177/1178/1179/1180/1181/1182/1183/1184/1185/1186/1187/1188/1189/1190/1191/1192/1193/1194/1195/1196/1197/1198/1199/1200/1201/1202/1203/1204/1205/1206/1207/1208/1209/1210/1211/1212/1213/1214/1215/1216/1217/1218/1219/1220/1221/1222/1223/1224/1225/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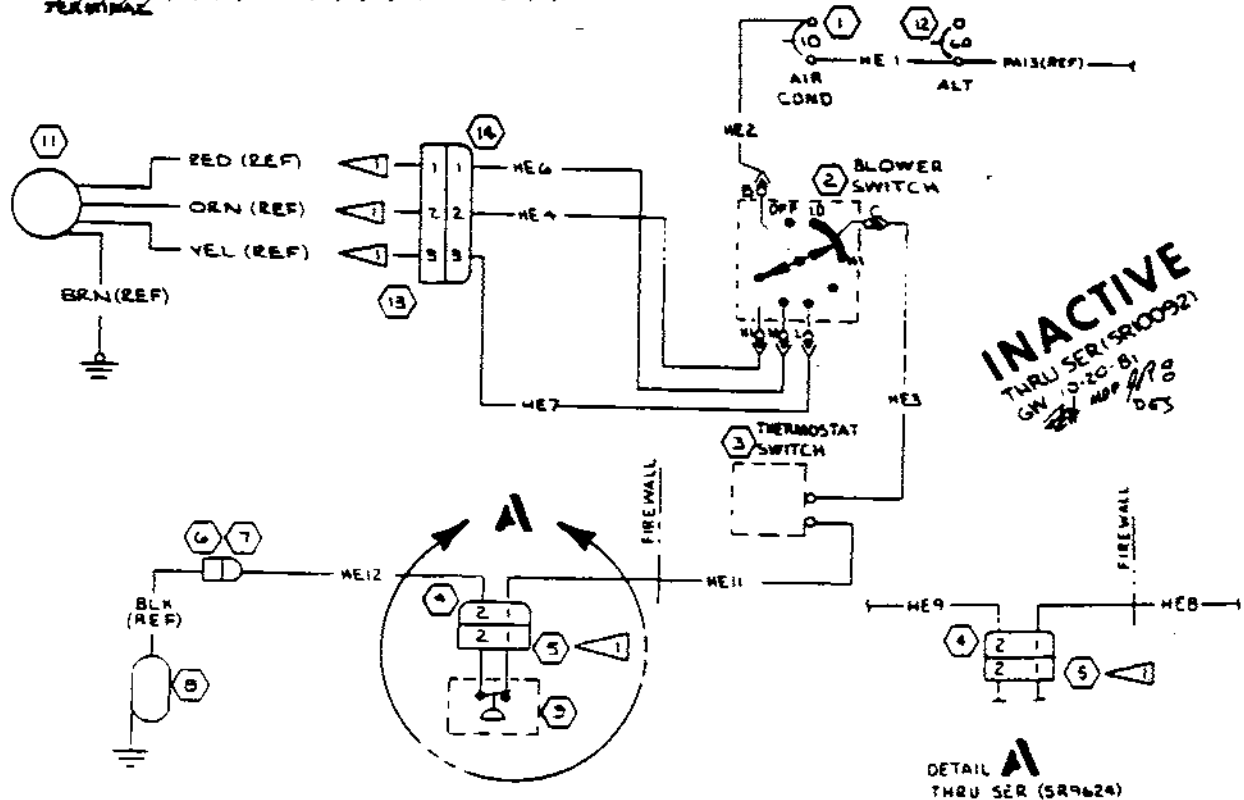
MODEL 172 SERIES SERVICE MANUAL

C	BY REV: ADD DETAIL A, HE11, HE12 & SER (ADD 2BL)	RAO	2-12-80
D	BY REV: RELEASED FOR PRODUCTION (SR9624)	RAO	3-5-80

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: DELETE 1120059. ORIGIN 1 HE3; ADD 1120059, 5-1635-1, 5-1635-2, 280(REF), ORN(REF), YEL(REF), BRN(REF); 5-1635-1 WAS 5-1493-1/HE4. HE6 & HE7 (SR8453) (REF)	ALT 4-10-77	RF
B	BY REV: DELETE NOTE 2. 5-1367-1-A WAS 5-1367-1-A/HE1 (NOW SHOP PRACTICE)	CRS 11-7-77	RF

NOTES:

- REMOVE & DISCARD VENDOR FURNISHED TERMINALS. TERMINATE WITH 5-1636-1 TERMINALS
- TERMINATE VENDOR FURNISHED WIRE WITH 5-1636-1 TERMINAL



14	5-1636-2	HOUSING	HE12	18	5-1635-1	5-1635-1	SER (SR9624) & ON
13	5-1636-1	HOUSING	HE11	18	5-1493-1	5-1635-1	SER (SR9624) & ON
2	5-1707-60	CKT BR	HE9	18	5-1635-1	5-1635-1	THRU SER (SR9624)
11	1120059	BLOWER	HE8	18	5-1493-1	5-1635-1	THRU SER (SR9624)
10			HE7	18	5-1635-1	5-1493-1	
9	0882562	HIGH PRESS. SWITCH	HE6	18	5-1635-1	5-1493-1	
8	50508	COMPRESSOR	HE4	18	5-1635-1	5-1493-1	
7	5-1637-1	HOUSING	HE3	18	5-1493-1	5-1493-1	
6	5-1637-2	HOUSING	HE2	18	5-1367-1-A	5-1493-1	
5	5-2035-2	HOUSING	HE1	18	5-1367-1-A	5-1637-1-B	
4	5-2035-1	HOUSING					
3	247243	(ARA) SWITCH					
2	0882530	(ARA) SWITCH					
1	5-1360-10L	CKT BR					

EQUIPMENT TABLE			
PART NO.	DESCRIPTION		
	SUPERSEDED BY:		
	SUPERSEDED BY:		

CER-1000 IS APPLICABLE VENDOR CODES PER 8-1000 CER-1000-CERNA SPEC. NO. 8-1000 OR CER-1000-CERNA STD. NO.			
SUPERSEDED BY:			

WIRE TABLE			
CONTRACT NO.	NAME	DATE	
DESIGN	WHITSON	1-3-77	
GROUP	11/11/77	1-3-77	
DRAWN	SWANSON	12-20-76	
CHECK	YOUNG	12-20-76	
STRESS			
PROJ	SRP	1-12-77	
APPRO			
OTHER			

Cessna AIRCRAFT CO.			
FABRIC DIVISION 1000 E. PARKWAY WICHITA, KANSAS			
TITLE			
WIRING DIAGRAM - AIR CONDITIONER (OPT)			
SIZE	CODE IDENT	DWG NO	
C	71379	0570311	
SCALE: NONE (SR8453) PAGE: 3			



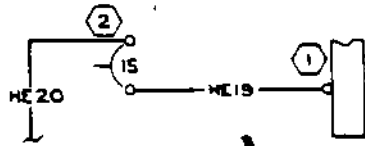
DETAIL **A**
(APPLIES TO R172 ONLY)
THRU SER 389625)

CONTRACT NO:			WIRE TABLE Cessna, AIRCRAFT CO.		
DESIGN: 10-15-11-11-11 GROUP: 11-11-11-11-11 DRAWN: C SHAVER 11-7-77 CHECK: BORLESKE 11-16-77 STRESS:			TITLE WIRING DIAGRAM — CIRCULATION FAN (OPT)		
PROJ: R PIPE 12-10-77 APP: ARS OTHER:			SIZE	CODE IDENT. NO.	DWG NO.
			C	71379	0570311
			SCALE: NONE (SR 6773) (SC 6774) PAGE: 13.4		

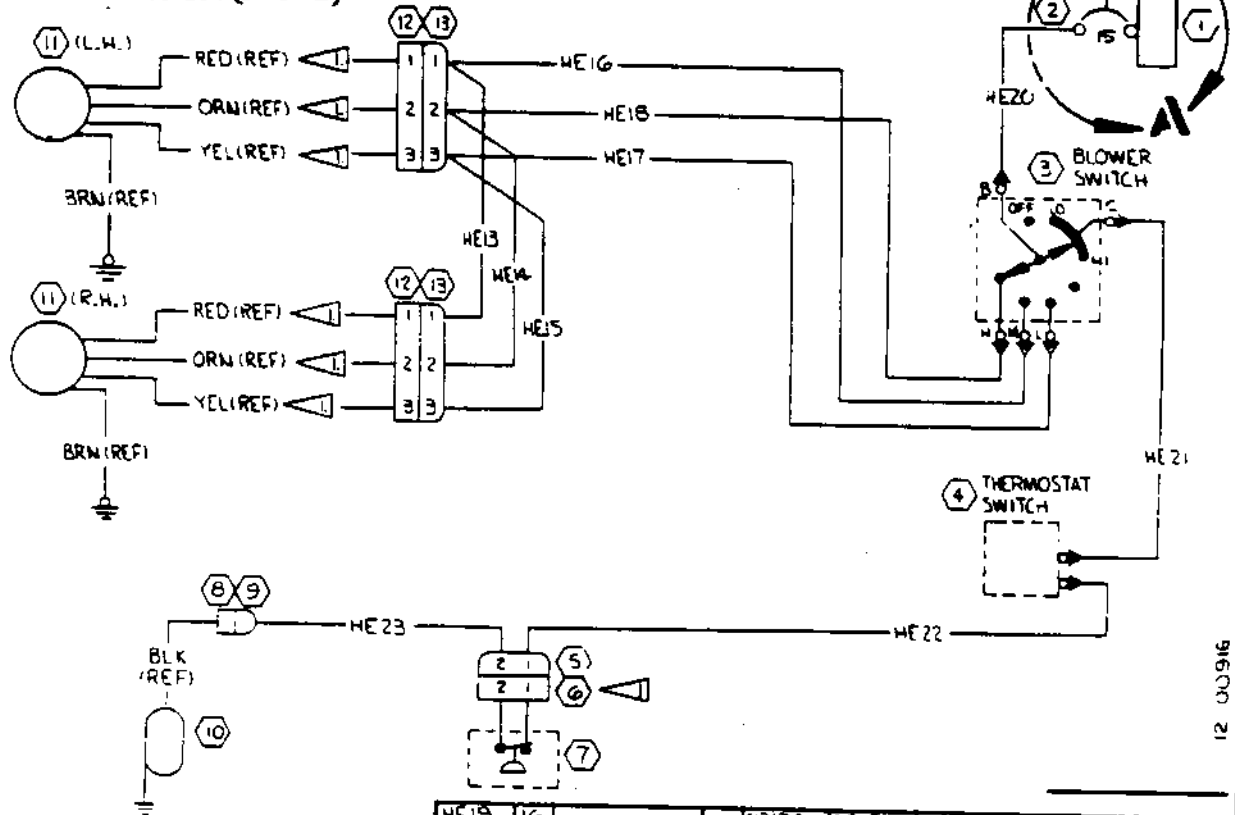
MODEL 172 SERIES SERVICE MANUAL

NOTES:

- 1 REMOVE / DISCARD VENDOR FURNISHED TERMINALS
TERMINATE WITH S-1636-1 TERMINALS



DETAIL A
THRU SER (SR 10412)



12 00916

3	S1638-2	HOUSING
2	S1638-1	HOUSING
1	2201101	EVAPORATOR ASSY
10	SD508	COMPRESSOR
9	S1637-1	HOUSING
8	S1637-2	HOUSING
7	0882862	HIGH PRESS SWITCH
6	S2035-2	HOUSING
5	S2035-1	HOUSING
4	1247243	SWITCH
3	0882590	SWITCH
2	S1360-1SL	CIRCUIT BREAKER
1	0570451	BUS BAR

PART NO.	DESCRIPTION

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-1000-CESNA SPEC. NO.
S-1400 OR CESNA-CESNA
STD. NO.

SUPERSEDES
0570311 PG 13.3
SUPERSEDED BY

HE19	16		S1367-2-6	S1367-2-10	THRU SER (SR 10412)
HE18	1		S1493-2	SEE HE14	
HE17			S1493-2	SEE HE15	
HE16			S1493-2	SEE HE13	
HE15			S1635-2	S1635-2	
HE14			S1635-2	S1635-2	
HE13			S1635-2	S1635-2	
HE23			S1635-2	S1635-2	
HE22			S1493-2	S1635-2	
HE21			S1493-2	S1493-2	
HE20	16		S1367-2-6	S1493-2	

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS	SERIALS

WIRE TABLE

NAME		DATE	Cessna AIRCRAFT CO.		8000 E. PARKWAY MCKINNA KANSAS	
DESIGN	WHITSON	10-28-81	TITLE		WIRING DIAGRAM — AIR CONDITIONER (OPT)	
GROUP	IN PANE	10-29-81				
DRAWN	WHITSON	10-20-81				
CHECK	R. HALL	10-10-81				
STRESS						
PROJ	D. E. SINES	10-29-81	SIZE	CODE IDENT. NO	DWG NO	
APPRO	JRS		C	71379	0570311	
OTHER						

SIZE	C	CODE IDENT	71379	DWG NO	0570311
NONE		(SR 10092)		PAGE 5.5	

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: C301002-0108 WAS C301002-0108 SMOKE-1 WAS V3-1-08 NOW SHOP PRACTICE INACTIVE DWG (SR9101K SR 9105)	NTL 10-18-78	AS/DP NO RF

NOTES:

1. THESE SWITCHES ARE PART OF C301002-0102
ACTUATOR ASSY

INACTIVE
THRU SER (SR 2104) (SR 5051)
NTL 10-18-78
JAS
off

9101-01
03-0916

V10 (CC18)	16	-16-7	S-1493-2	S-1367-2	
V10 (CC17)	16	-16-7	S-1493-2	S-1367-2	
BKA (CC18)	16	-16-0	S-1636-2	S-1493-2	
V10 (CC17)	16	-16-2	S-1635-2	S-1636-2	
V10 (CC18)	16	-16-6	S-1635-2	S-1493-2	
V10 (CC17)	16	-16-5	S-1635-2	S-1493-2	
V10 (CC18)	16	-16-3	S-1635-2	S-1493-2	
V10 (CC17)	16	-16-2	S-1635-2	S-1636-2	
V10 (CC18)	16	-16-6	S-1635-2	S-1636-2	
V10 (CC17)	16	-16-5	S-1635-2	S-1636-2	
V10 (CC18)	16	-16-3	S-1635-2	S-1636-2	
CC 7	16		S-1367-2	S-1367-2	
CC 6	16		S-1367-2	S-1367-2	
CC 5	16		S-1367-2	S-1367-2	
CC 4	16		S-1367-2	S-1367-2	
CC 3	16		S-1367-2	S-1367-2	
CC 2	16		S-1367-2	S-1367-2	
CC 1	16		S-1367-2	S-1367-2	
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS	TERMINALS

10	C301002-0108	ACTUATOR ASSY
9	S-1638-2	HOUSING
8	S-1638-1	HOUSING
7	S-1641-6	HOUSING
6	S-1640-6	HOUSING
5	S-1641-9	HOUSING
4	S-1640-9	HOUSING
3	S-806-1	SWITCH
2	S-1360-15L	CKT BKA
1	S-1706-2	SWITCH

PART NO.	DESCRIPTION

EQUIPMENT TABLE

CER-4000 IS APPLICABLE
VERSION CODES PER S-1400
CER-4000-CERNA SPEC. NO.
S-1400 OR C301002-CERNA
STD. NO.

SUPERSEDED
0570101 PG. 14.50 + 14.51
SUPERSEDED BY:
0570311 R 14.2

PREP
APPD
OTHER

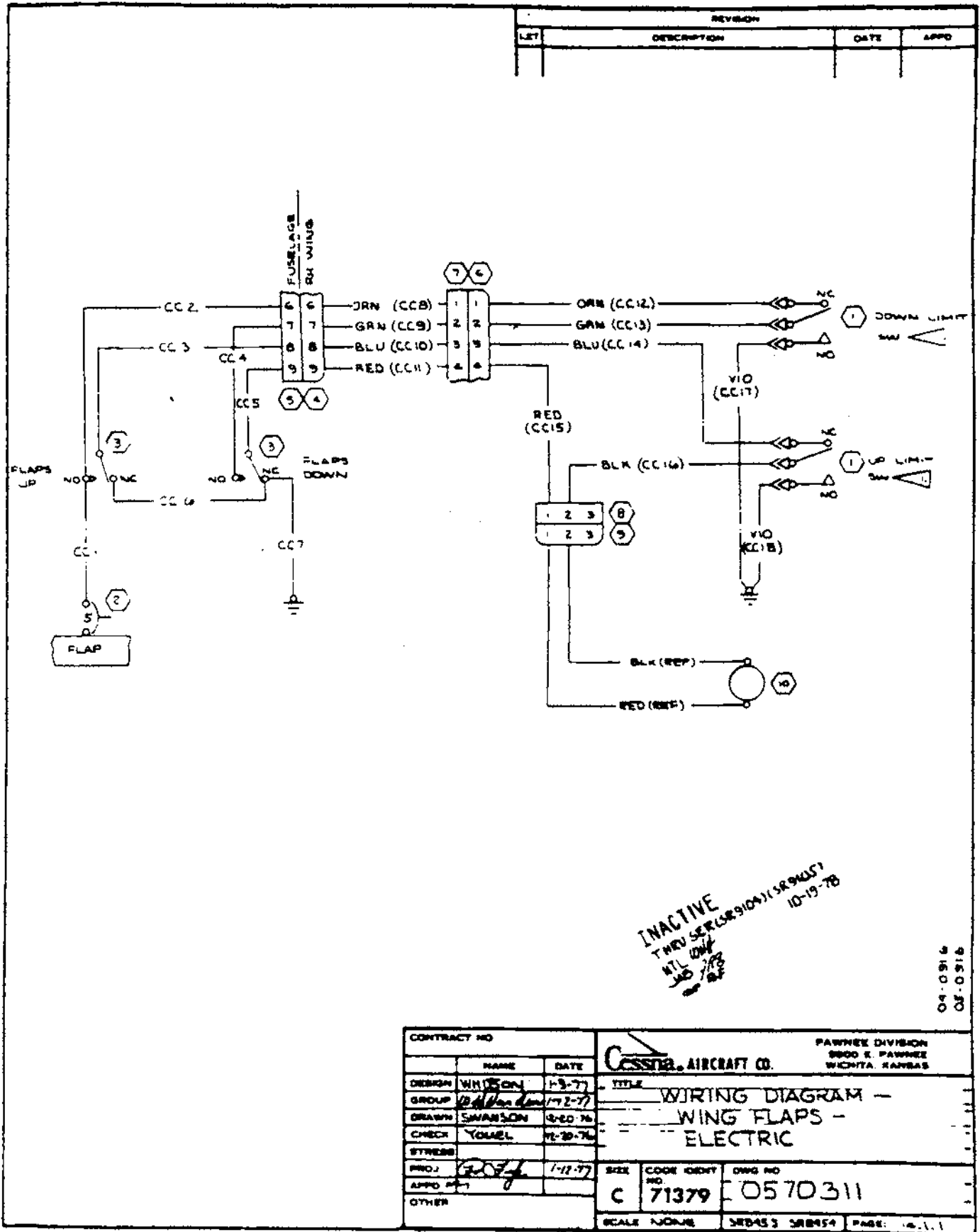
WIRE TABLE

CONTRACT NO.		
NAME	DATE	
DESIGN	WHITSON	1-3-77
DRAWN	SWANSON	1-2-77
CHECK	YOUNG	11-20-76
STRESS		

Cessna AIRCRAFT CO.
TITL
WIRING DIAGRAM—
WING FLAPS—
ELECTRIC

SIZE
C
CODE IDENT
NO.
71379
DWG NO
0570311
SCALE NONE
SRB453 SRB454
PAGE: 14.1.0

MODEL 172 SERIES SERVICE MANUAL



INACTIVE
THIS SERVICION 11 SEP 1957
10-19-78

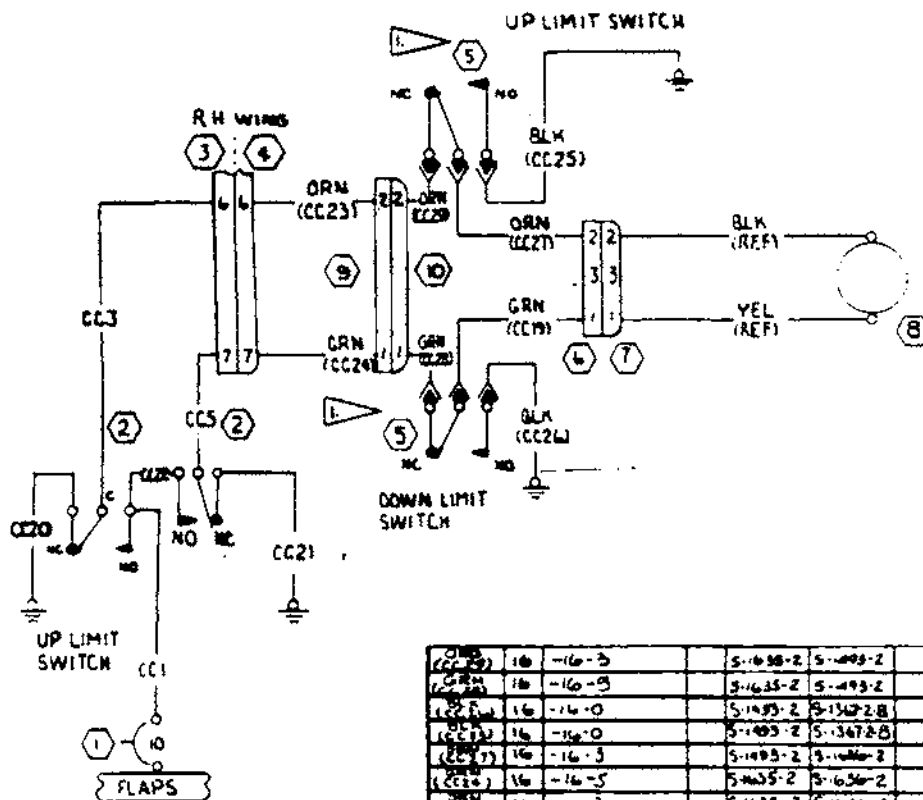
CONTRACT NO.			Cessna AIRCRAFT CO.			PAWNEE DIVISION 8800 E. PAWNEE WICHITA, KANSAS		
DESIGN	NAME	DATE	TITLE					
GROUP	WHITSON	1-9-77	WIRING DIAGRAM -					
DRAWN	SWANSON	2-20-76	WING FLAPS -					
CHECK	YONEL	7-20-76	ELECTRIC					
STRESS								
PROJ.	2074	1-12-77	SIZE	CODE IDENT	QWG NO			
APPRO			C	71379	0570311			
OTHER			SCALE	NONE	SER453	SER454	PAGE: 10.1.1	

MODEL 172 SERIES SERVICE MANUAL

REVISION			
LET	DESCRIPTION	DATE	APPRO
A	BY REV: ADD 5-20352 HOUSING & 5-2035-1 HOUSING. ADD GRN (CC 29) & GRN (CC 28) WIRE. S&B 9104X(8-9-05)	MDR 5-24-79	SEE END P/R R/F

NOTES:

1. THESE SWITCHES ARE PART OF
C301002-0108 ACTUATOR ASSY.



10	S-2035-1	HOUSING
9	S-2035-2	HOUSING
8	C301002-0108	ACTUATOR ASSY
7	S-1438-2	HOUSING
6	S-1438-1	HOUSING
5	S-1504-2	SWITCH
4	S-1440-9	HOUSING
3	S1441-9	HOUSING
2	S-1504-1	SWITCH
1	S-1360-10L	CIRCUIT BREAKER

	PART NO.	DESCRIPTION
		EQUIPMENT TABLE

CEN-1000 IS APPLICABLE
VERSION CODES PER S-MOD
CES-1000-CEN-1000 SPEC. NO.
S-1001 OR CES-1000-CEN-1000
INT. NO.

CS70311 P 14.1.06/14.12

REPRODUCED BY:

QTY	16	-16-5	5-1635-2	5-1635-2		
CC 22	16	-16-5	5-1635-2	5-1635-2		
CC 21	16	-16-0	5-1635-2	5-1635-2		
CC 20	16	-16-0	5-1635-2	5-1635-2		
CC 19	16	-16-5	5-1635-2	5-1635-2		
CC 18	16	-16-5	5-1635-2	5-1635-2		
CC 17	16	-16-5	5-1635-2	5-1635-2		
CC 16	16	-16-5	5-1635-2	5-1635-2		
CC 15	16	-16-5	5-1635-2	5-1635-2		
CC 14	16	-16-5	5-1635-2	5-1635-2		
CC 13	16	-16-5	5-1635-2	5-1635-2		
CC 12	16	-16-5	5-1635-2	5-1635-2		
CC 11	16	-16-5	5-1635-2	5-1635-2		
CC 10	16	-16-5	5-1635-2	5-1635-2		
CC 9	16	-16-5	5-1635-2	5-1635-2		
CC 8	16	-16-5	5-1635-2	5-1635-2		
CC 7	16	-16-5	5-1635-2	5-1635-2		
CC 6	16	-16-5	5-1635-2	5-1635-2		
CC 5	16	-16-5	5-1635-2	5-1635-2		
CC 4	16	-16-5	5-1635-2	5-1635-2		
CC 3	16	-16-5	5-1635-2	5-1635-2		
CC 2	16	-16-5	5-1635-2	5-1635-2		
CC 1	16	-16-5	5-1635-2	5-1635-2		
CC 0	16	-16-5	5-1635-2	5-1635-2		
	QTY	MATERIAL	LG	TERMINALS	SERIALS	

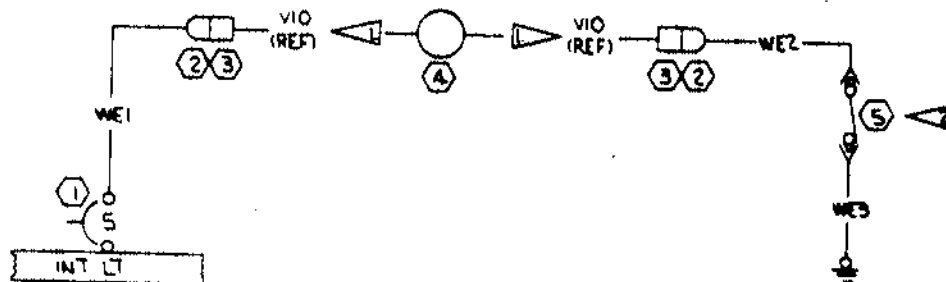
CONTRACT NO:			WIRE TABLE		
			PAWNEE DIVISION 1800 E. PAWNEE WICHITA KANSAS		
NAME DATE			Cassra. AIRCRAFT CO. TITLE		
DESIGN	WHITSON	11-20-78	WIRING DIAGRAM -- WING FLAPS -- ELECTRIC		
GROUP	11-20-78	11-20-78			
DRAWN	LANCASTER	11-19-78			
CHECK	BORLESKE	10-20-78			
STRESS					
PROJ	E. F. F. B.	12-11-78	SIZE	CODE IDENT NO	DWG NO
APPRO	11-20-78		C	71379	0570311
OTHER			SCALE: NONE (549044 54905) PAGE: 1-2		

MODEL 172 SERIES SERVICE MANUAL

NOTES:

- 1. TERMINATE VENDOR SUPPLIED LEAD WITH S1636-1 TERMINAL
- 2. VACUUM SWITCH CONTACTS ARE NORMALLY CLOSED. CONTACTS OPEN AT 35±1 INCHES OF MERCURY VACUUM

REVISION			
LET	DESCRIPTION	DATE	APPD

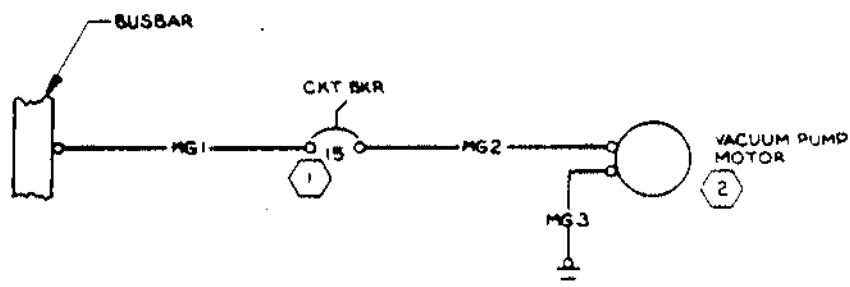


91600-26

5		S2571-1	VACUUM SWITCH	
4		S2519-2	LAMP ASSY	
3		S1637-2	HOUSING	
2		S1637-1	HOUSING	
1		S1360-5L	CIRCUIT BREAKER	
PART NO.		DESCRIPTION		
EQUIPMENT TABLE				
CES-000 IS APPLICABLE VENDOR CODES PER 8-4400 CES-XXXXX-CESNA SPEC. NO 8-XXX OR CHXXXX-CESNA STD. NO.				
SUPERSEDES:				
SUPERSEDED BY:				
OTHER				
CONTRACT NO.				
DESIGN WHITSON 10-20-81 GROUP M PAINE 10-21-81 DRAWN WHITSON 10-21-81 CHECK 25-11-81 STRESS				
PROD D. SINES 10-20-81 APPD 11-2 OTHER				
WIRE TABLE				
WIRE	GA	MATERIAL	LG	TERMINALS
WE3	22	-22-0		S1493-1 S1631-1-B
WE2	22	-22-0		S1635-1 S1493-1
WE1	22	-22-0		S1631-6 S1635-1
WIRE	GA	MATERIAL	LG	TERMINALS
SERIALS				
TITLE WIRING DIAGRAM - VACUUM OUT WARNING SYSTEM				
SIZE C CODE IDENT 71379 DWG NO 0570311				
NONE S10092 PAGE 5				

W/A - 501154

REVISION			
LET	DESCRIPTION	DATE	APPRO



916001-2
