Cessna

Service Manual

1968 thru 1976

REIMS ROCKET

Member of GAMA

THIS REPRINT CONSISTS OF THE BASIC MANUAL, DATED 15 AUGUST 1970, CHANGE 1, DATED 1 SEPTEMBER 1971; CHANGE 2, DATED 1 NOVEMBER 1972; CHANGE 3, DATED 15 JUNE 1973; CHANGE 4, DATED 1 SEPTEMBER 1974; AND CHANGE 5, DATED 1 OCTOBER 1975.

15 AUGUST 1970

D849-5-13
(RGI-50-8/00)

Cessna
A Textron Company

TEMPORARY REVISION NUMBER 4

DATE 5 April 2004

MANUAL TITLE	Reims Rocket 1968 Thru 1976 Service Manual
MANUAL NUMBER - PAPER COPY	D849-5-13
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This Temporary Revision consists of the following pages, which affect and replace existing pages in the paper copy manual and supersede aerofiche information.

SECTION	PAGE	AEROFICHE FICHE/FRAME	SECTION	PAGE	AEROFICHE FICHE/FRAME
2	21	1/B17			
2	24	1/B20			

REASON FOR TEMPORARY REVISION

1. To add the cleaning interval of the engine fuel injection nozzles.

FILING INSTRUCTIONS FOR THIS TEMPORARY REVISION

1. For Paper Publications, file this cover sheet behind the publication's title page to identify the inclusion of the Temporary Revision into the manual. Insert the new pages into the publication at the appropriate locations and remove and discard the superseded pages.

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TEMPORARY REVISION NUMBER 3

DATE 7 October 2002

MANUAL TITLE Reims Rocket 1968 Thru 1976 Service Manual

MANUAL NUMBER - PAPER COPY D849-5-13

MANUAL NUMBER - AEROFICHE D849-5-13AF

TEMPORARY REVISION NUMBER D849-5TR3

MANUAL DATE 15 August 1970 **REVISION NUMBER** 5 **DATE** 1 October 1975

This Temporary Revision consists of the following pages, which affect and replace existing pages in the paper copy manual and supersede aerofiche information.

SECTION	PAGE	AEROFICHE FICHE/FRAME	SECTION	PAGE	AEROFICHE FICHE/FRAME
2	21	1/B17			
2	22A/Deleted	NA			
2	24	1/B20			
2	24A/Deleted	NA			
2	25	Added			
2	26	Added			
2	27	Added			
15	20A	Added			
15	20B	Added			
15	20C	Added			

REASON FOR TEMPORARY REVISION

1. To add a Component Time Limits section and a fuel quantity indicating system operational test.

FILING INSTRUCTIONS FOR THIS TEMPORARY REVISION

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TEMPORARY REVISION NUMBER 2

DATED 7 January 2000

MANUAL TITLE REIMS ROCKET 1968 THRU 1976 SERVICE MANUAL

MANUAL NUMBER - PAPER COPY D849-5-13 **AEROFICHE** D849-5-13AF

TEMPORARY REVISION NUMBER PAPER COPY D849-5TR2 **AEROFICHE** N/A

MANUAL DATE 15 AUGUST 1970 **REVISION NUMBER** 5 **DATE** 1 OCTOBER 1975

This Temporary Revision consists of the following pages, which affect existing pages in the paper copy manual and supersede aerofiche information.

SECTION	PAGE	AEROFICHE FICHE/FRAME	SECTION	PAGE	AEROFICHE FICHE/FRAME
2	22A	Added			
2	24A	Added			
17	4A	Added			
17	4B	Added			

REASON FOR TEMPORARY REVISION

To include the inspection requirements of Cessna Service Bulletin SEB99-18.

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

For Paper Publications:

File this cover sheet behind the publication's title page to identify the inclusion of the Temporary Revision into the manual. Insert the new pages into the publication at the appropriate locations. Draw a line, with a permanent red ink marker, through any superceded information.

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TEMPORARY REVISION NUMBER 1

DATED 3 October 1994

MANUAL TITLE REIMS ROCKET 1968 THRU 1976 SERVICE MANUAL

MANUAL NUMBER - PAPER COPY D849-5-13 **AEROFICHE** D849-5-13AF

TEMPORARY REVISION NUMBER - PAPER COPY D849-5TR1-13 **AEROFICHE** N/A

MANUAL DATE 15 AUGUST 1970 **REVISION NUMBER** 5 **DATE** 1 OCTOBER 1975

This Temporary Revision consists of the following pages, which affect and replace existing pages in the paper copy manual and supersede aerofiche information.

SECTION	PAGE	AEROFICHE FICHE/FRAME	SECTION	PAGE	AEROFICHE FICHE/FRAME
15	18	1 L10			
15	19	1 L11			
15	20	1 L12			
15	20A	added			
15	20B	added			
15	21	1 L13			

REASON FOR TEMPORARY REVISION

1. To revise procedure to incorporate both Stewart Warner and Rochester fuel gage transmitter calibration.
2. To revise procedures to incorporate both electrically and pressure controlled oil temperature gages.
3. To add tables to aid in trouble shooting the cylinder head and oil temperature gages.

FILING INSTRUCTIONS FOR THIS TEMPORARY REVISION

For Paper Publications:
File this cover sheet behind the publication's title page to identify the inclusion of the Temporary Revision into the manual. Insert the new pages into the publication at the appropriate locations and remove and discard the superseded pages.

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INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

LIST OF EFFECTIVE PAGES

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

Dates of issue for original and changed pages are;

Original . . . 0 . . . 15 August 1970 Change . . . 2 . . . 1 November 1972
Change . . . 1 . . . 1 September 1971 Change . . . 3 . . . 15 June 1973
Change . . . 4 . . . 1 September 1974
Change . . . 5 . . . 1 October 1975

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 420, CONSISTING OF THE FOLLOWING:

Page No.	Change No.	Page No.	Change No.	Page No.	Change No.	Page No.	Change No.
*Title	5	*5-17 thru 5-18	5	*15-2A	5	17-10A	1
*A	5	*5-18A	5	*15-2B Blank	5	17-10B	4
*i thru iii	5	*5-18B Blank	5	*15-3 thru 15-6	5	17-11 thru 17-29	0
*iv Blank	5	*5-19 thru 5-22	5	*15-6A thru 15-6B	5	17-30 thru 17-32	1
1-1	0	5-23	3	*15-7	5	*18-1 thru 18-2	5
*1-2	5	*5-24	5	15-8	0	*19-1	5
1-3	3	5-25 thru 5-27	3	15-9 thru 15-10	4	19-2	4
1-4	4	5-28 Blank	3	15-11	0	*19-3	5
*2-1 thru 2-2	5	6-1 thru 6-3	4	15-12 thru 15-13	3	19-4	4
*2-2A	5	6-4	1	*15-14	5	*19-5	5
*2-2B Blank	5	*6-5	5	*15-14A	5	19-6	1
*2-3 thru 2-10	5	6-6	2	15-14B	4	*19-7 thru 19-8	5
*2-10A thru 2-10B	5	6-7	0	15-15 thru 15-20	4	19-9	1
*2-11 thru 2-17	5	6-8 Blank	0	15-21	3	*19-10	5
2-18	3	7-1 thru 7-7	2	15-22 thru 15-24	4	19-11	2
*2-19 thru 2-22	5	7-8	3	*16-1 thru 16-2	5	*19-12 thru 19-14	5
2-23	3	7-9	4	*16-2A	5	*19-14A thru 19-14B	5
*2-24	5	7-10 thru 7-12	2	*16-2B Blank	5	*19-15 thru 19-21	5
*3-1	5	8-1 thru 8-6	4	16-3	4	19-22	3
3-2	0	9-1 thru 9-4	4	16-4	0	*19-23	5
3-3	4	9-4A	4	*16-5	5	19-24	3
*3-4	5	9-4B Blank	4	16-6 thru 16-12	4	*19-25 thru 19-27	5
*3-4A	5	9-5	4	*16-13	5	19-28	3
*3-4B Blank	5	9-6	3	16-14	4	*19-29	5
*3-5 thru 3-6	5	10-1 thru 10-7	4	*16-15 thru 16-16	5	19-30 thru 19-31	3
3-6A	4	10-8 Blank	4	*16-16A thru 16-C	5	*19-32	5
*3-6B	5	*11-1 thru 11-42	5	*16-16D Blank	5	19-33	3
3-7	3	*12-1	5	*16-17	5	*19-34	5
*3-8 thru 3-15	5	12-2 thru 12-3	3	16-18 thru 16-19	3	19-35 thru 19-36	3
3-16	2	*12-4	5	*16-20	5	*19-37	5
3-17	4	*12-4A	5	16-20A	4	19-38	3
*3-18	5	*12-4B Blank	5	16-20B Blank	4	*19-39	5
3-19 thru 3-21	4	*12-5 thru 12-6	5	16-21	2	19-40	3
3-22 Blank	4	*12-6A	5	*16-22	5	*19-41	5
4-1 thru 4-2	4	*12-6B Blank	5	16-23	3	19-42	3
4-3	2	12-7	3	16-24	4	*19-43	5
4-4	4	*12-8 thru 12-10	5	*16-24A	5	19-44	3
4-5	2	*12-10A thru 12-10C	5	*16-24B Blank	5	*19-45	5
4-6 thru 4-7	4	*12-10D Blank	5	16-25 thru 16-27	2	19-46	3
4-8 Blank	4	*12-11	5	*16-28	5	*19-47 thru 19-49	5
*5-1 thru 5-5	5	12-12	2	16-29	2	*19-50 (Blank)	5
5-6	3	*13-1 thru 13-3	5	16-30 thru 16-34	4	*19-51 thru 19-56	5
*5-7 thru 5-8	5	13-4	2	*16-35 thru 16-36	5	*19-56A	5
*5-8A	5	13-5	3	17-1	4	*19-56B Blank	5
*5-8B Blank	5	*13-6 thru 13-7	5	17-2	0	*19-57 thru 19-83	5
*5-9 thru 5-11	5	*13-8 Blank	5	17-3 thru 17-4	1	*19-84 Blank	5
5-12	3	14-1 thru 14-2	0	17-5 thru 17-6	4		
*5-13	5	*14-3	5	*17-7	5		
5-14 thru 5-16	3	14-4	0	17-8 thru 17-9	3		
		*15-1 thru 15-2	5	17-10	1		

Upon receipt of the second and subsequent changes to this book, personnel responsible for maintaining this publication in current status should ascertain that all previous changes have been received and incorporated.

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

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

All aircraft, regardless of manufacturer, are certificated 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	SERIALS BEGINNING	SERIALS ENDING
REIMS ROCKET	1968	FR172E	FR172-0001	FR172-0060
	1969	FR172F	FR172-0061	FR172-0145
	1970	FR172G	FR17200146	FR17200225
	1971	FR172H	FR17200226	FR17200275
	1972	FR172H	FR17200276	FR17200350
	1973	FR172J	FR17200351	FR17200440
	1974	FR172J	FR17200441	FR17200530
	1975	FR172J	FR17200531	FR17200559 & FR17200561
	1976	FR172J	FR17200560 & FR17200562	

FOREWORD

This manual contains factory recommended procedures and instructions for ground handling, servicing and maintaining Cessna Model FR172-Series aircraft.

Besides serving as a reference for the experienced mechanic this book also covers step-by-step procedures for the less experienced man. This manual should be kept in a handy place for ready reference. If properly used, it will better enable the mechanic to maintain Cessna FR172-Series aircraft and thereby establish a reputation for reliable service.

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

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

Information for Nav-O-Matic Autopilots, Electronic Communications and Navigation Equipment is not included in this manual. These systems are described in separate manuals, available from the Cessna Service Parts Center.

SECTION 1

GENERAL DESCRIPTION

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1-1. GENERAL DESCRIPTION.

1-2. MODEL FR172-SERIES.

1-3. DESCRIPTION. Cessna Model FR172-Series aircraft, described in this manual, are high-wing monoplanes of all-metal, semimonocoque construction. These aircraft are equipped with a fixed tricycle landing gear. Through 1970 Models, they are equipped with flat spring-steel main landing gear struts. Beginning with 1971 Models, these aircraft are equipped with tubular spring-steel main landing gear struts. The steerable nose gear is equipped with an air/hydraulic fluid shock strut. Standard seating accommodations consist of individual, reclining back, pilot and copilot seats and dual reclining back, bench-type center seats. A fold-up auxiliary rear seat may be installed as optional equipment. A baggage area is provided aft of the center seats when the auxiliary seat is folded up. These aircraft are powered by a Continental six-cylinder, horizontally opposed, air-cooled, fuel injection engine, driving an all-metal, constant-speed propeller. The Model FR172-Series features 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 pressures, tire sizes, and load distribution may result in some dimensions that are considerably different from those listed.

1-5. STATIONS. A station diagram is shown in figure 1-2 to assist in locating equipment when a written description is inadequate or impractical.

1-6. TORQUE VALUES. A chart of recommended nut torque values is shown in figure 1-3. These torque values are recommended for all installation procedures contained in this manual, except where other values are stipulated. They are not to be used for checking tightness of installed parts during service.

GROSS WEIGHT	
Normal Category (Thru 1969)	2500 lb
Normal Category (Beginning with 1970)	2550 lb
Utility Category	2200 lb
FUEL CAPACITY	
Total	52 gal.
Usable	46 gal. (THRU FR17200530) 49 gal. (BEGINNING WITH FR17200531)
OIL CAPACITY	
(Without External Filter)	8 qt
(With External Filter)	9 qt
ENGINE MODEL (Refer to Section 11 for Engine Data)	CONTINENTAL IO-360 Series
PROPELLER (Constant Speed)	76" McCauley
MAIN WHEEL TIRES	6.00 x 6, 6-Ply Rating
Pressure (Thru 1969 Models)	24 psi
Pressure (1970 Models)	30 psi
Pressure (Beginning with 1971 Models)	38 psi
NOSE WHEEL TIRE (Standard)	5.00 x 5, 6-Ply Rating
Pressure (Thru 1969 Models)	26 psi
Pressure (1970 Models)	30 psi
Pressure (Beginning with 1971 Models)	45 psi
NOSE WHEEL TIRE (Optional)	6.00 x 6, 4-Ply Rating
Pressure (Thru 1969 Models)	26 psi
Pressure (Beginning with 1970 Models)	21 psi
NOSE GEAR STRUT PRESSURE (Strut Extended)	45 psi
WHEEL ALIGNMENT (Flat Spring Struts)	
Camber	3° to 5°
Toe-In	0" to .06"
WHEEL ALIGNMENT (Tubular Spring)	
Camber	2° to 4°
Toe-In	0" to .18"

No provisions are made for aligning wheels on tubular gear aircraft. The tolerances provided here are to be used only for checking existing wheel alignment.

AILERON TRAVEL	
Up	20° ± 1°
Down	15° ± 1°
WING FLAP TRAVEL	0° to 40°(±2° THRU FR17200350) (+0° -2° BEGINNING WITH FR17200351)
RUDDER TRAVEL (Measured parallel to waterline)	
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	28°, +1° -0°
Down	13°, +1° -0°
PRINCIPAL DIMENSIONS	
Wing Span (Conventional Wing Tip)	36' 2"
Wing Span (Conical-Camber Wing Tip)	35' 10"
Wing Span (Conical-Camber With Strobe Lights)	36' (Thru 1971) 36' 7" (Beginning with 1972)
Tail Span	11' 4"
Length	26' 9-1/2" (Thru 1973) 27' 2" (Beginning with 1974)
Fin Height (Maximum With Nose Gear Depressed and Flashing Beacon Installed on Fin)	8' 9-1/2"
Track Width (Flat Spring Struts)	7' 2"
Track Width (Tubular Spring)	8' 3-1/2"
BATTERY LOCATION	Aft of Baggage Area

Figure 1-1. Aircraft Specifications

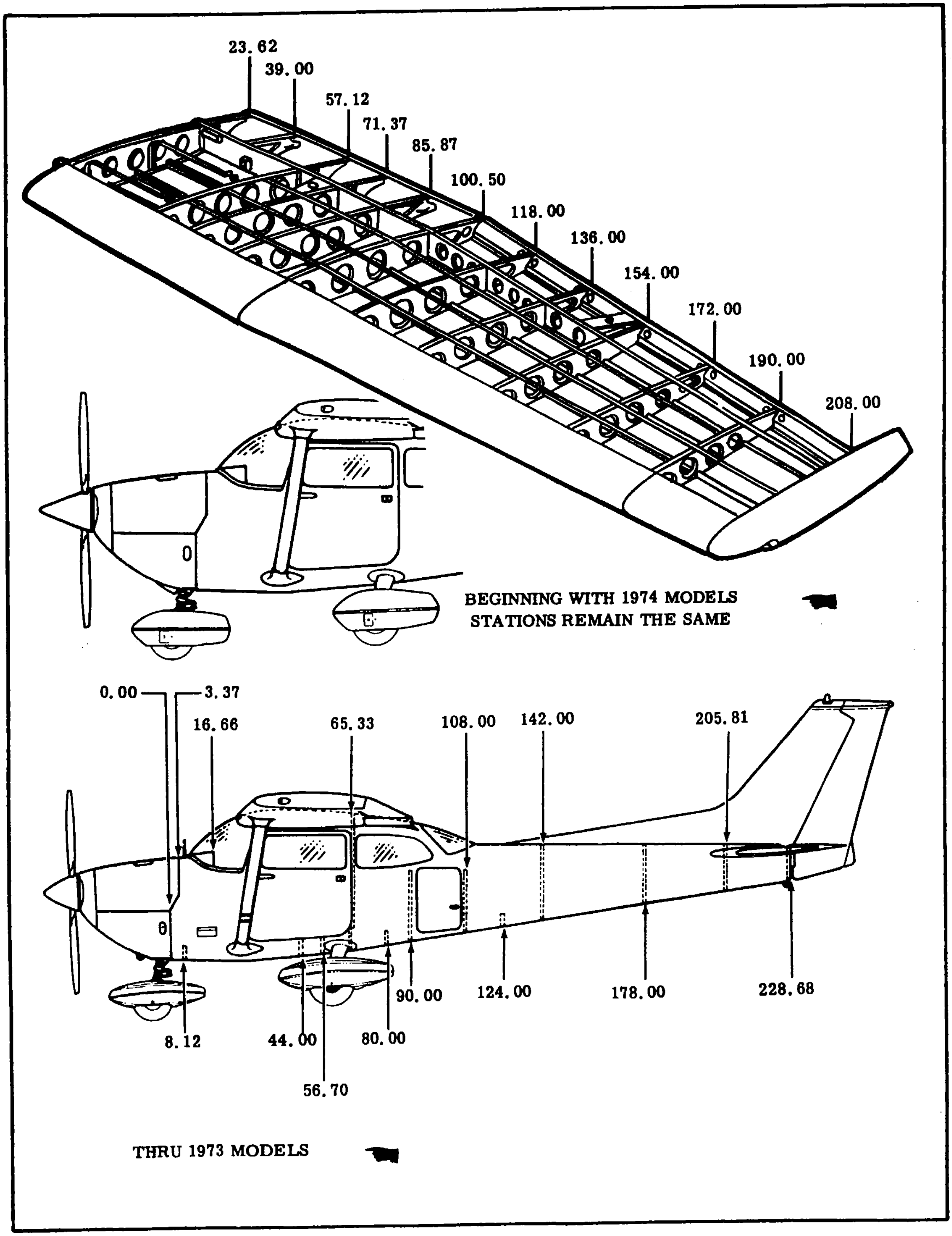

Figure 1-2. Reference Stations

RECOMMENDED NUT TORQUES

THE TORQUE VALUES STATED ARE POUND-INCHES, RELATED ONLY TO STEEL NUTS ON OIL-FREE CADMIUM PLATED THREADS.

FINE THREAD SERIES

TAP SIZE	TENSION TORQUE STD (NOTE 1)	TENSION TORQUE ALT (NOTE 2)	SHEAR TORQUE STD (NOTE 3)	SHEAR TORQUE ALT (NOTE 2)
8-36	12-15		7-9	
10-32	20-25	20-28	12-15	12-19
1/4-28	50-70	50-75	30-40	30-48
5/16-24	100-140	100-150	60-85	60-106
3/8-24	160-190	160-260	95-110	95-170
7/16-20	450-500	450-560	270-300	270-390
1/2-20	480-690	480-730	290-410	290-500
9/16-18	800-1000	800-1070	480-600	480-750
5/8-18	1100-1300	1100-1600	660-780	660-1060
3/4-16	2300-2500	2300-3350	1300-1500	1300-2200
7/8-14	2500-3000	2500-4630	1500-1800	1500-2900
1-14	3700-5500	3700-6650	2200-3300	2200-4400
1-1/8-12	5000-7000	5000-10000	3000-4200	3000-6300
1-1/4-12	9000-11000	9000-16700	5400-6600	5400-10000

COARSE THREAD SERIES

	(NOTE 4)		(NOTE 5)	
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		95-100	
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	

NOTES

1. Covers AN310, AN315, AN345, AN363, MS20365, MS21042, MS21044, MS21045 and MS21046.
2. When using AN310 or AN320 castellated nuts where alignment between the bolt and cotter pin slots is not reached using normal torque values, use alternate torque values or replace the nut.
3. Covers AN316, AN320, MS20364 and MS21245.
4. Covers AN363, MS20365, MS21042, MS21043, MS21044, MS21045 and MS21046.
5. Covers AN340.

CAUTION

DO NOT REUSE SELF-LOCKING NUTS.

The above values are recommended for all installation procedures contained in this manual, except where other values are stipulated. They are not to be used for checking tightness of installed parts during service.

Figure 1-3. Torque Values

SECTION 2

GROUND HANDLING, SERVICING, CLEANING, LUBRICATION AND INSPECTION

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2-1. GROUND HANDLING.

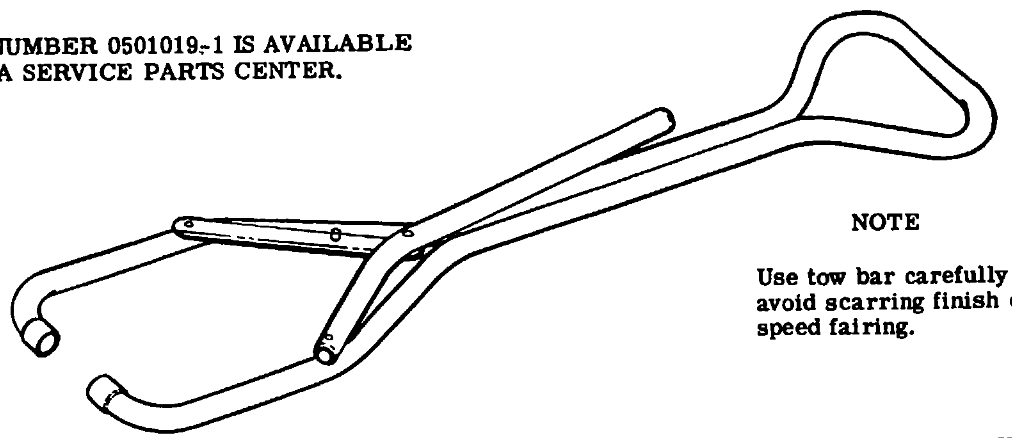
2-2. TOWING. Moving the aircraft by hand is accomplished by using the wing struts and landing gear struts as push points. A tow bar attached to the nose gear should be used for steering and maneuvering the aircraft on the ground. When no tow bar is available, press down at the horizontal stabilizer front 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.

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,

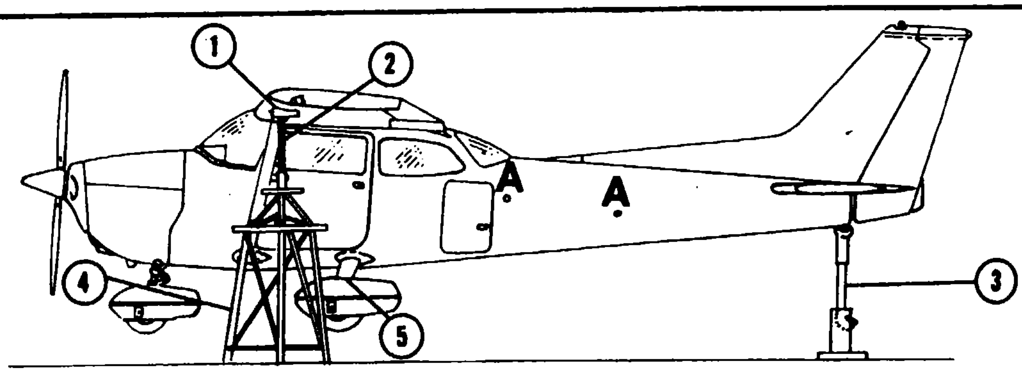
TOW BAR: PART NUMBER 0501019-1 IS AVAILABLE FROM THE CESSNA SERVICE PARTS CENTER.



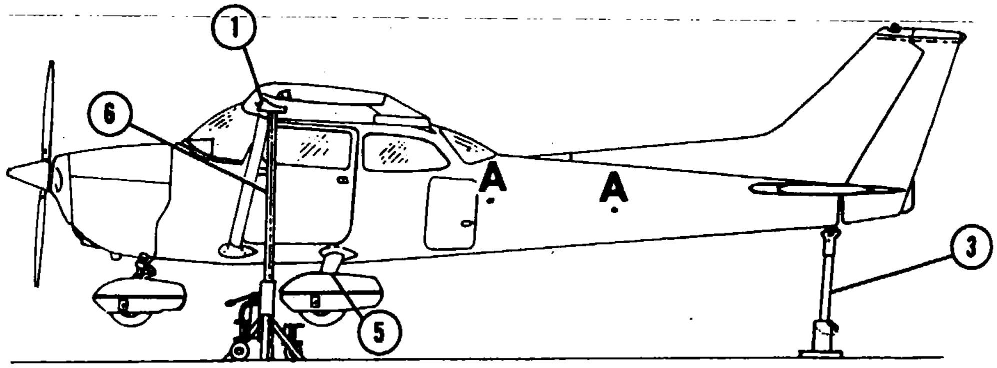
NOTE

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

Figure 2-1. Tow Bar



REFER TO SHEET 2 FOR JACKING INFORMATION



ITEM NUMBER	TYPE AND NUMBER	REMARKS
1	Block (Jack point not available)	1x4x4 padded with 1/4" rubber
2	Jack	Any short jack of capable capacity
3	Universal tail stand	Any tail stand of capable capacity
4	Cessna #SE-576 (41-1/2" high)	Universal jack stand (FOR USE WITH ITEM 2)
5	Cessna #10004-98 Cessna #0541208-1 Built-in jack pad	Jack point * (SEE CAUTION) Jack point # (SEE NOTE 5) Part of step bracket †
6	#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"

* THRU FR17200225
\# FR17200226 THRU FR17200341
† BEGINNING WITH FR17200342

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

Prior to 1972 Models, reference points for leveling the aircraft longitudinally are the top of the tailcone between rear window and vertical fin.

Beginning with 1972 Models, 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)

JACKING INFORMATION

1. Wing jacks, which must be of adequate strength, are placed under front spar of wing just outboard of wing strut and must extend far enough to raise wheels off ground.

2. Attach a suitable stand to tail tie-down ring. BE SURE the tail stand weighs enough to keep the tail down under all conditions and that it is strong enough to support any weight that may be placed on it.

NOTE

Place additional weights (shot bags or sand bags) on the weighted tail stand to hold the tail down. In addition, the base of the 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 universal jack point (10004-98), 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 with universal jack points is not recommended. Universal jack point may be used to raise only one main wheel. DO NOT USE brake casting as a jack point.

4. Items (4), (5) and (6) are available from the Cessna Service Parts Center.

5. On tubular gear aircraft, the only fairing requiring removal is the fuselage-to-tube gear fairing. Jack pad is inserted on tube in area between fuselage and upper end of tube fairing, then jack aircraft as required.

SHOP NOTES:

Figure 2-2. Jacking and Leveling (Sheet 2 of 2) 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. Refer to figure 2-2 for jacking procedures.

2-5. LEVELING. Corresponding points on both upper door sills may be used to level the aircraft laterally. Prior to 1972 Models, the reference point for leveling the aircraft longitudinally is the top of the tailcone, between the rear window and vertical fin. Beginning with 1972 Models, the reference points for longitudinally leveling, are the two screws located on the left side of the tailcone. Refer to figure 2-2 for screw location.

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 internal control lock and set brakes.

CAUTION

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

After setting control lock and brakes, moor the aircraft as follows:

a. Tie ropes, cables or chains to wing tie-down fittings located at upper end of each wing strut. Secure opposite ends to ground anchors.

b. Secure rope (no chains or cables) to forward mooring ring and secure opposite end to ground anchor.

c. Secure middle of a rope to 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. If internal control lock is not available, tie pilot control wheel back with front seat belt.

e. These aircraft are equipped with spring-loaded steering arms which afford 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 non-operational storage and/or the first 25 hours of intermittent engine operation.

NOTE

The aircraft is delivered from Cessna with a Corrosion Preventive Aircraft Engine Oil (MIL-C-6529, Type II, RUST BAN). This engine oil is a blend of aviation grade straight mineral oil and a corrosion preventive compound. This engine oil should be used for the first 50 hours of engine operation. Refer to paragraph 2-20 for oil changes during the first 50 hours of operation.

During the 30 day non-operational 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 cowling 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.

CAUTION

Excessive ground operation shall be avoided.

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, clean oil screens and change external oil filter element, if installed. Service engine with correct grade and quantity of engine oil. Refer to figure 2-3 and paragraph 2-20 for correct grade of oil.

2-10. TEMPORARY STORAGE. Temporary storage is defined as aircraft in a non-operational 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.

a. Fill fuel tanks with correct grade of gasoline.

b. Clean and wax aircraft thoroughly.

c. Clean any oil or grease from tires and coat tires with a tire preservative. Cover tires to protect against grease and oil.

d. Either block up fuselage to relieve pressure on tires or rotate wheels every 30 days to prevent flat spotting the tires.

e. 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 warrant 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.

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

NOTE

An engine treated in accordance with the following may be considered 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-L-46002, Grade 1 or equivalent. The following oils are approved for spraying operations by Teledyne Continental Motors: Nucle Oil 105-Daubert Chemical Co., 4700 So. Central Ave., Chicago, Illinois; Petratect VA - Pennsylvania Refining Co., Butler, Pennsylvania; Ferro-Gard 1009G-Ranco Laboratories, Inc. 3617 Brownsville Rd., Pittsburgh, Pennsylvania.

h. Using a portable pressure sprayer, 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 propeller so that blades as near horizontal as possible to provide maximum clearance with 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 outlined in paragraph 2-7. In addition, the pitot tube, static source vents, air vents, openings in the engine cowling 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.

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 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 non-operational storage, again perform 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. (Refer to Section 1.)
b. Check and install battery.
c. Check oil sump for 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, clean and gap spark plugs.
g. While spark plugs are removed, rotate propeller several revolutions to clear excess rust preventive oil from cylinders.
h. Install spark plugs. Torque spark plugs to value specified in Section 11 and connect spark plug leads.
i. Check fuel strainer. Remove and clean filter screen if necessary. Check fuel tanks and fuel lines for moisture and sediment. Drain enough fuel to eliminate moisture and sediment. Torque bottom nut of strainer to 25-30 lb-in and safety wire to top assembly of strainer. Wire must have right-hand wrap, at least 45 degrees.
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 non-operational 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.
b. Fill oil sump to normal operating capacity with corrosion preventive mixture which has been thoroughly mixed and pre-heated to a minimum of 221°F at the time it is added to the engine.

NOTE

Corrosion preventive mixture consists of one part compount MIL-C-6529, Type I, mixed with three parts new lubricating oil of the grade recommended for service. Continental Motors Corporation recommends Cosmoline No. 1223, supplied by E. F. Houghton & Co., 305 W. LeHigh Avenue, Philadelphia, Pa. During all spraying operation corrosion mixture is pre-heated to 221° to 250°F.

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

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 pre-heated to 221° to 250°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."

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 60 days and then reserviced per paragraph 2-10.

2-14. INSPECTION DURING STORAGE. Aircraft in indefinite storage shall be inspected as follows:

a. Inspect cylinder protex plugs each 7 days.

b. Change protex plugs if their color indicates an unsafe condition.

c. 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.

d. 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.

a. Remove aircraft from blocks and check tires for correct inflation. Check for correct nose gear strut inflation.

b. Check battery and install.

c. Remove all materials used to seal and cover openings.

d. Remove warning placards posted at throttle and propeller.

e. Remove and clean engine oil screen, then reinstall and safety. On aircraft that are equipped with an external oil filter, install new filter element.

f. Remove oil sump drain plug and drain sump. Install and safety drain plug.

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.

g. Service and install the induction air filter.

h. 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.

i. Clean, gap, and install spark plugs. Torque plugs to the value listed in Section 11.

j. Check fuel strainer. Remove and clean filter screen. Check fuel tanks and fuel lines for moisture and sediment, and drain enough fuel to eliminate.

k. Perform a thorough pre-flight inspection, then start and warm-up engine.

l. Thoroughly clean aircraft and flight test aircraft.

2-16. SERVICING.

2-17. Requirements are shown in figure 2-3. The following supplements this figure by adding details.

2-18. FUEL. Fill tanks immediately after flight to lessen condensation. Fuel capacities are listed in Section 1 and fuel grades are shown in figure 2-3.

2-19. FUEL DRAINS. Fuel drains are located at various places throughout the fuel system. Refer to Section 12 for location of the various drains in the system. The strainer drain 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 in the upper engine cowl. Remove drain plugs and open strainer drain at the intervals specified in figure 2-3. Also, during daily inspection of the fuel strainer, if water is found in the fuel strainer, there is a possibility that the wing tank sumps or fuel lines contain water. Therefore, all fuel drain plugs should be removed and all water drained from system. To activate drain valve for fuel sampling, place cup up to valve and depress valve with rod protruding from cup. (Refer to Section 12.)

2-20. 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 positive draining of any sludge which may have collected in the engine oil sump. Engine oil should be changed every six months, even though less than the specific hours have accumulated. 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 clean oil screens (when no full-flow oil filter is installed) whenever oil on the dipstick appears dirty. Ashless dispersant oil, conforming to Continental Motors Specification No. MHS-24A, shall be used in these engines. Multi-viscosity oil may be used to extend the operating temperature range, improve cold engine starting and lubrication of the engine during the critical warm-up period, thus permitting flight through wider ranges of climate change without the necessity of changing oil. The multi-viscosity grades are recommended for aircraft engines subjected to wide variations in ambient air temperatures when cold starting of the engine must be accomplished at temperatures below 30°F.

NOTE

The aircraft is delivered from Cessna with a corrosion preventative aircraft engine oil (MIL-C-6529, Type II RUST BAN). If oil must be added during the first 25 hours, use only aviation grade straight mineral oil conforming to Specification MIL-L-6082. After the first 25 hours of operation, drain engine oil sump and clean both the oil suction strainer and the oil pressure screen if an optional full-flow oil filter is not installed. If an optional full-flow oil filter is installed, change the filter element (or optional spin-on oil filter). Refill sump with aviation grade straight mineral oil and use until a total of 50 hours has accumulated or oil consumption has stabilized, then change to ashless dispersant oil.

Newly-overhauled engines should also be operated on aviation grade straight mineral oil until a total of 50 hours has accumulated or oil consumption has stabilized.

When changing engine oil, remove and clean oil screens if aircraft is not equipped with an optional external oil filter. If the aircraft is equipped with an external oil filter, install a new spin-on filter or oil filter element. Refer to Section 11 for filter applications and removal and installation. An oil quick-drain valve may be installed in the oil drain port of the oil sump. This valve provides a quick and cleaner method of draining the engine oil. 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 oil sump. Push up on quick-drain valve until it locks open, and allow oil to drain through hose into container.

c. (Without Quick-Drain Valve.) Remove oil drain plug from oil sump and allow oil to drain into a container.

d. After oil has drained, close quick-drain valve as shown in figure 2-2A and remove hose or reinstall and safety oil drain plug.

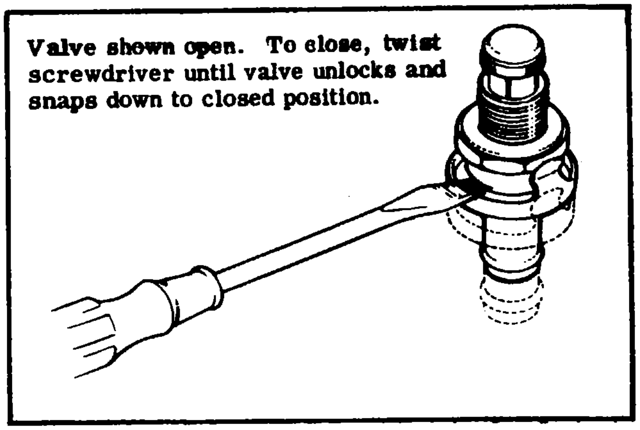


Figure 2-2A. Quick-Drain Valve

e. Remove and clean oil screen, or change external oil filter in accordance with Section 11.
f. Service engine with correct quantity and grade of engine oil. Refer to figure 2-3 and Section 11.

2-21. ENGINE INDUCTION AIR FILTER. The engine induction air filter keeps dust and dirt from entering the induction system. The value of maintaining the induction air filter in a good clean condition can never be overstressed. More engine wear is caused through the use of dirty and/or damaged air filters than is generally believed. The frequency with which the filter should be removed and cleaned will be determined primarily by the airplane operating conditions. A good general rule, however, is to remove, clean, and inspect filters at least every 50 hours of engine operating time and more frequently if warranted by operating conditions. Under extremely dusty conditions, daily servicing of the filters is recommended.
a. Remove filter from airplane as outlined in Section 11.
b. Clean filter by blowing with compressed air (not over 100 psi) from direction opposite of normal air flow. Normal air flow for the cylindrical filter is from outside to inside.

NOTE

Use care to prevent damage to filter element when cleaning with compressed air. Never use air pressure greater than 100 psi to clean filter.

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

CAUTION

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

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. The filter should be replaced after 500 hours of engine operation or one year, whichever should occur first. However, the filter should be replaced anytime it is damaged. A damaged filter may have the perforated band broken on the inside or the outside of the filter, or the filtering media may have sharp or broken edges. However, any filter that appears doubtful should be replaced.

d. After washing, rinse filter in clean water until rinse water runs clear from filter. 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 induction air box and air inlet ducts to the engine are clean, inspect and replace filter if it is damaged.
f. Install filter as outlined in Section 11.

2-22. VACUUM SYSTEM FILTER. The vacuum system central air filter keeps dust and dirt from entering the vacuum operated instruments. Inspect filter every 100 hours for damage. Change central air filter element every 500 hours of operating time and whenever suction gage reading drops below 4.6 inches of mercury. Also, do not operate the vacuum system with the filter removed, or a vacuum line disconnected as particles of dust or other foreign matter may enter the system and damage the gyros.

2-23. BATTERY. Battery servicing involves adding distilled water to maintain the electrolyte even with the horizontal baffle plate at the bottom of the filler holes, checking the battery cable connections, and neutralizing and cleaning off and 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 50 hours (or at least every 30 days) oftener in hot weather. See Section 16 for detailed battery removal, installation and testing.

2-24. TIRES. Maintain tire pressure at the air pressures specified in Section 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. Expecially in cold weather, remember that any drop in temperature of the air inside a tire causes a corresponding drop in air pressure.

2-25. 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:
a. Remove valve cap and release air pressure.
b. Remove valve housing.

c. Compress nose gear to its shortest length and fill strut with hydraulic fluid to the bottom of the filler hole.

d. Raise nose of aircraft, extend and compress strut several times to expel any entrapped air, then lower nose of aircraft and repeat step "c."

e. With strut compressed, install valve housing assembly.

f. With nose wheel off ground, inflate strut. Shock strut pressure is listed in Section 1.

NOTE

The nose landing gear shock strut will normally require only a minimum amount of service. Maintain the strut extension pressure as shown in Section 1. Lubricate landing gear as shown in figure 2-4. 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 excess hydraulic fluid.

2-26. NOSE GEAR SHIMMY DAMPENER. The shimmy dampener should be serviced at least every 50 hours. The shimmy dampener must be filled completely with fluid, free of entrapped air, to serve its purpose. To service the shimmy dampener, proceed as follows:

a. Remove shimmy dampener from aircraft.

b. While holding the dampener in a vertical position with fitting end pointed downward, pull fitting end of the dampener shaft to its limit of travel.

c. While holding dampener in this position, fill dampener through open end of cylinder with hydraulic fluid.

d. Push the shaft upward slowly to seal off the filler hole.

e. Clean dampener with solvent. Be sure to keep the shaft protruding through the filler hole until dampener is installed on the aircraft.

f. Install dampener on aircraft.

NOTE

Keep the shimmy dampener, especially the exposed portions of the dampener piston shaft clean to prevent collection of dust and grit which could cut the seals in the dampener 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 excess hydraulic fluid.

2-27. 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.

SHOP NOTES:

2-28. CLEANING.

2-29. 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.

2-30. WINDSHIELD AND WINDOWS. Windshield and windows should be cleaned carefully with plenty of fresh water and a mild detergent, using the palm of the hand to feel and dislodge any caked dirt or mud. A sponge, soft cloth, or chamois may be used, but only as a means of carrying water to the plastic. Rinse thoroughly, then dry with a clean moist chamois. Do not rub the plastic with a dry cloth as this builds up an electrostatic charge which attracts dust. Oil and grease may be removed by rubbing lightly with a soft cloth moistened with Stoddard solvent.

CAUTION

Do not use gasoline, alcohol, benzene, acetone, carbon tetrachloride, fire extinguisher fluid, de-icer fluid, lacquer thinner, or glass window cleaning spray. These solvents will soften and craze the plastic.

After washing, the plastic windshield and windows should be cleaned with an aircraft windshield cleaner. Apply the cleaner with soft cloths and rub with moderate pressure. Allow the cleaner to dry, then wipe it off with soft flannel cloths. A thin, even coat of wax, polished out by hand with soft flannel cloths, will fill in minor scratches and help prevent further scratching. Do not use a canvas cover on the windshield or windows unless freezing rain or sleet is anticipated since the cover may scratch the plastic surface.

2-31. 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 2-30, must never be used since they soften and craze the plastic.

2-32. PAINTED SURFACES. The painted exterior surfaces of the aircraft, under normal conditions, require a minimum of polishing and buffing. Approximately 15 days are required for acrylic or lacquer paint to cure completely; in most cases, the curing period will have been completed prior to delivery of the aircraft. In the event that polishing or buffing is required within the curing period, it is recommended that the work be done by an experienced painter. 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 make scratches should never be used. Remove stubborn oil and grease with a cloth moistened with Stoddard solvent. After the curing period, the aircraft may be waxed with a good automotive wax. A heavier coating of wax on the leading edges of the wing and tail and on the engine nose cap will help reduce the abrasion encountered in these areas.

2-33. 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 non-alkaline 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.

2-34. ENGINE AND ENGINE COMPARTMENT. The engine should be kept clean since dirty cooling fins and baffle plates can cause overheating of the engine. Also, cleaning is essential to minimize any danger of fire and provide for easier inspection of components. The entire engine cowling may be removed to facilitate engine and interior cowl cleaning. Wash down the engine and components with a suitable solvent, such as Stoddard solvent or equivalent, then dry thoroughly witn compressed air.

CAUTION

Particular care should be given to electrical equipment before cleaning. Solvent should not be allowed to enter magnetos, starters, alternators, voltage regulators, and the like. Hence, these components should be protected before saturating the engine with solvent. Any fuel, oil, and air openings should be covered before washing the engine with solvent. Caustic cleaning solutions should not be used. After cleaning engine, re-lubricate all control arms and moving parts.

2-35. 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 the 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.

2-36. 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.

2-37. 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.

2-38. LUBRICATION.

2-39. Lubrication requirements are shown in figure 2-4. 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 2-4 by adding details.

2-40. TACHOMETER DRIVE SHAFT. Refer to Section 15 for details on lubrication of shaft.

2-41. WHEEL BEARINGS. Clean and repack the wheel bearings at the first 100-hour inspection and at each 500-hour inspection thereafter. If more than the usual number of take-offs 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.

a. On aircraft prior to FR17200298, not modified by Service Kit SK150-37B or SK150-41, proceed as follows:

1. At each 100 hour inspection, inspect wing flap actuator jack screw and ball retainer assembly for lubrication, and lubricate if required. Also, remove, clean and lubricate jack screw whenever actuator slippage is experienced. If lubrication is required, proceed as follows:

a. Gain access to actuator by removing appropriate inspection plates on lower surface of wing.

b. Expose jack screw by operating flaps to full-down position.

c. Wipe a small amount of lubricant from jack screw with a rag and examine for condition. (Lubricant should not be dirty, sticky, gummy or frothy in appearance.)

d. Inspect wiped area on jack screw for presence of hard scale deposit. Previous wiping action will have exposed bare metal if no deposit is present.

e. If any of the preceding conditions exist, clean and relubricate jack screw as outlined in steps "f" thru "o".

f. Remove actuator from aircraft in accordance with procedures outlined in Section 7.

g. Remove all existing lubricant from jack screw and torque tube by running the nut assembly to the end of the jack screw away from the gear box, and soaking the nut assembly and jack screw in Stoddard solvent.

NOTE

Care must be taken to prevent solvent from entering gear box. The gear box lubricant is not affected and should not be disturbed.

h. After soaking, clean entire length of jack screw with a wire brush, rinse with solvent and dry with compressed air.

NOTE

Do not disassemble nut and ball retainer assembly.

i. Relubricate jack screw with MIL-G-21164 (Molybdenum Disulfide Grease) as outlined in steps "j" thru "m".

j. Rotate nut down screw toward the motor.

k. Coat screw and thread end of nut with grease and run nut to full extension.

l. Repeat the process and pack lubricant in the cavity between the nut and ball retainer at the threaded end of the nut.

m. Repeat the process and work nut back and forth several times.

n. Remove excess grease.

o. Reinstall actuator in aircraft in accordance with procedures outlined in Section 7.

b. On aircraft prior to Serial FR17200298, which have been modified by Service Kit SK150-37B, proceed as follows:

1. At each 100 hour inspection, expose jack screw by operating flaps to full-down position, and inspect wing flap actuator jack screw for proper lubrication. If lubrication is required, proceed as follows:

a. Clean jack screw with solvent rag, if necessary, and dry with compressed air.

b. Relubricate jack screw with MIL-G-21164 (Molybdenum Disulfide Grease) as required.

c. On aircraft beginning with FR17200298, clean and lubricate wing flap actuator jack screw each 100 hours as follows:

1. Expose jack screw by operating flaps to full-down position.

2. 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.

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

2-44. FUEL SELECTOR VALVE. At each 100-hour inspection, check the fuel selector valve and drive shaft for the following:

a. 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.

b. All drive shaft attach points for security, binding, excessive wear and lubrication, if required.

c. Operate valve handle through all positions and check for proper operation, detent feel and freedom of movement.

SHOP NOTES:

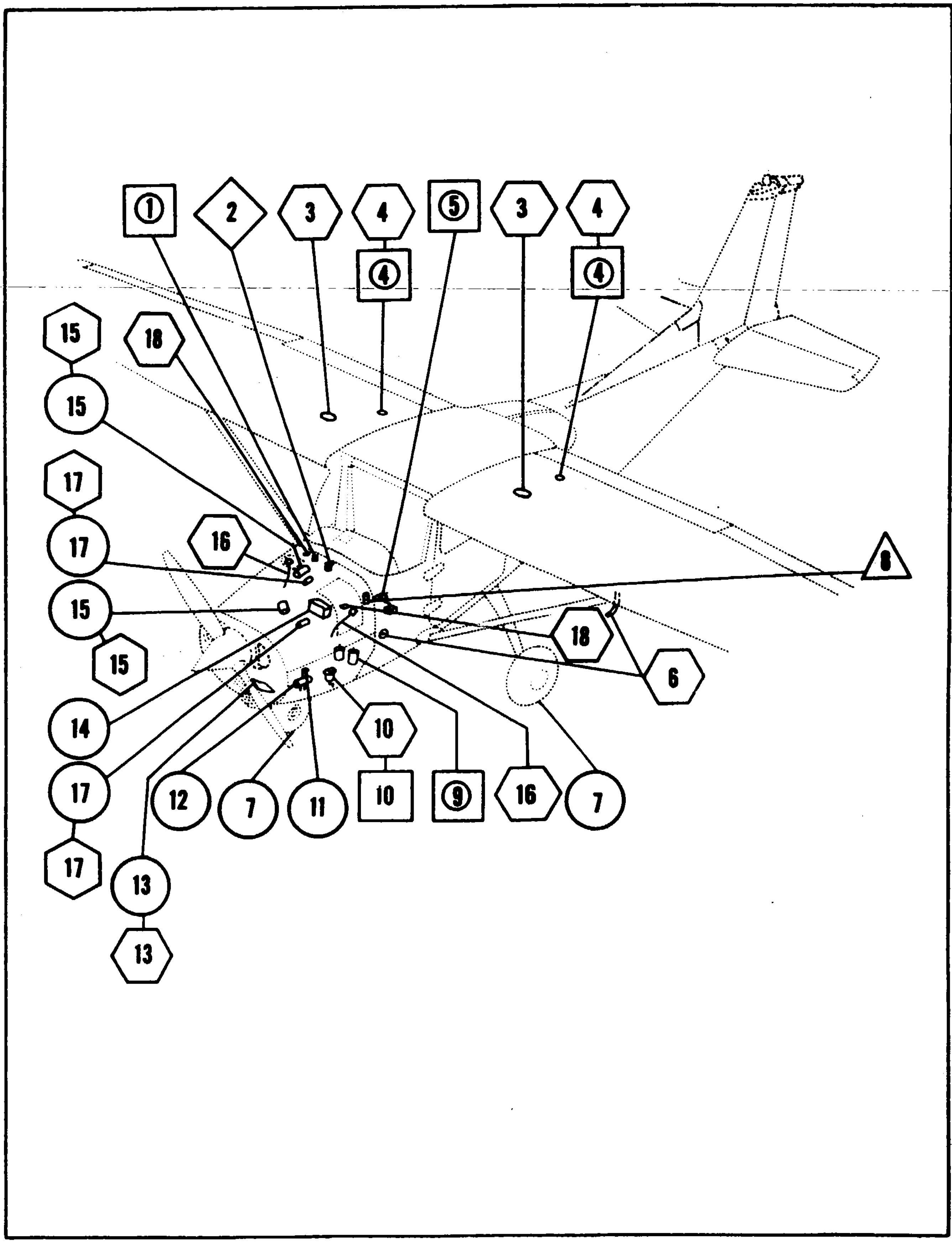


Figure 2-3. Servicing (Sheet 1 of 4)

HYDRAULIC FLUID:
SPEC. NO. MIL-H-5606

RECOMMENDED FUEL:

ENGINE MODEL IO-360 Series CONTINENTAL

Compliance with conditions stated in Continental Aircraft Engine Service Bulletins M74-6 and M75-2 and supplements or revisions thereto are recommended when using alternate fuel.

1. MINIMUM: 100/130 Aviation Grade
2. ALTERNATE:
a. 115/145 Aviation Grade (with lead content limited to a maximum of 4.6 cc Tetraethyl lead per gallon.

RECOMMENDED ENGINE OIL:

ENGINE MODEL IO-360 Series CONTINENTAL

AVIATION GRADE:

Below 40°F	SAE 30
Above 40°F	SAE 50

Aviation Grade ashless dispersant oil, conforming to Continental Motors Specification MHS-24 and all revisions and supplements thereto, must be used except as noted in paragraph 2-20 Refer to Continental Engine Service Bulletin M75-2 and any other superseding bulletins, revisions or supplements thereto for further recommendations.

NOTE

Oil capacities for the aircraft are given in the following chart. To minimize loss of oil through the breather, fill to specified oil level on dipstick for normal operation (flight of less than three hours duration). 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 element is changed.

CAPACITY (TOTAL)	CAPACITY (TOTAL WITH FILTER)	NORMAL OPERATION	MINIMUM FOR FLIGHT
8	9	7	6

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

DAILY

3 FUEL TANK FILLER
Service after each flight. Keep full to retard condensation. Refer to paragraph 2-18 for details.

4 FUEL TANK SUMP DRAINS
If quick-drain valves are installed, drain off any water and sediment before first flight of the day.

6 PITOT AND STATIC PORTS
Check for obstructions before first flight of the day.

10 FUEL STRAINER
Drain off any water and sediment before the first flight of the day. Refer to paragraph 2-19 for details.

13 INDUCTION AIR FILTER
Inspect and service under dusty conditions. Refer to paragraph 2-21 for details.

16 OIL DIPSTICK
Check oil on preflight. Add oil as necessary. Refer to paragraph 2-20 for details.

18 OIL FILLER CAP
Whenever oil is added, check that filler cap is tight and oil filler door is secure.

FIRST 25 HOURS

15 17 ENGINE OIL SYSTEM
Refill with straight mineral oil, non-detergent, and use until a total of 50 hours has accumulated or oil consumption has stabilized, then change to ashless dispersant oil.

50 HOURS

13 INDUCTION AIR FILTER
Clean filter per paragraph 2-21. Replace as required.

14 BATTERY
Check electrolyte level and clean battery compartment each 50 hours or each 30 days.

15 17 ENGINE OIL SYSTEM
Change oil each 50 hours if engine is NOT equipped with external oil filter; if equipped with external oil filter, change filter element each 50 hours and oil at each 100 hours, or every 6 months.

12 SHIMMY DAMPENER
Check fluid level and refill as required with hydraulic fluid. Refer to paragraph 2-26.

7 TIRES
Maintain correct tire pressure as listed in chart of Section 1. Also refer to paragraph 2-24 for details.

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

50 HOURS (Cont)

11 NOSE GEAR SHOCK STRUT
Keep strut filled and inflate to correct pressure. Refer to paragraph 2-25 for details.

100 HOURS

10 FUEL STRAINER
Disassembly and clean strainer bowl and screen.

200 HOURS

1 VACUUM RELIEF FILTER
Change each 1000 hours, or to coincide with engine overhauls.

4 FUEL TANK SUMP DRAINS
If quick-drain valves are not installed, remove plugs and drain off water or sediment. Reinstall plugs and safety. Also refer to paragraph 2-19.

5 SELECTOR VALVE DRAIN
Remove plug and drain off any water or sediment. Also refer to paragraph 2-19.

9 BRAKE MASTER CYLINDERS
Check fluid level and refill as required with hydraulic fluid. Refer to paragraph 2-27.

500 HOURS

2 VACUUM SYSTEM CENTRAL AIR FILTER
Replace every 500 hours.

AS REQUIRED

8 GROUND SERVICE RECEPTACLE
Connect to 12-volt DC, negative-ground power unit. Refer to Section 11 for details.

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

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
GH —	MIL-G-23827A	AIRCRAFT AND INSTRUMENT GREASE
GL —	MIL-G-21164C	MOLYBDENUM DISLULFIDE GREASE
OG —	MIL-L-7870A	GENERAL PURPOSE OIL
PL —	VV-P-236	PETROLATUM
GS —	MIL-S-8660	DC4 DOW CORNING
GP —		NO. 10-WEIGHT, NON-DETERGENT OIL

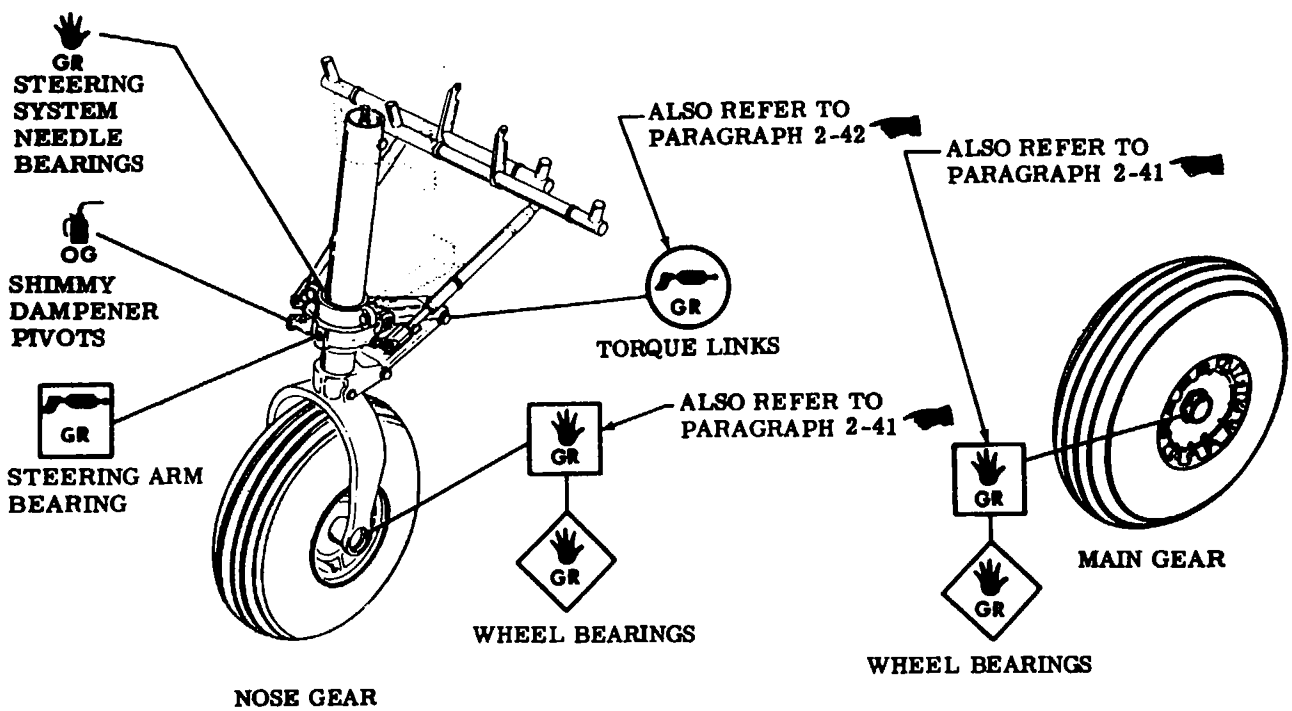


Figure 2-4. Lubrication (Sheet 1 of 3)

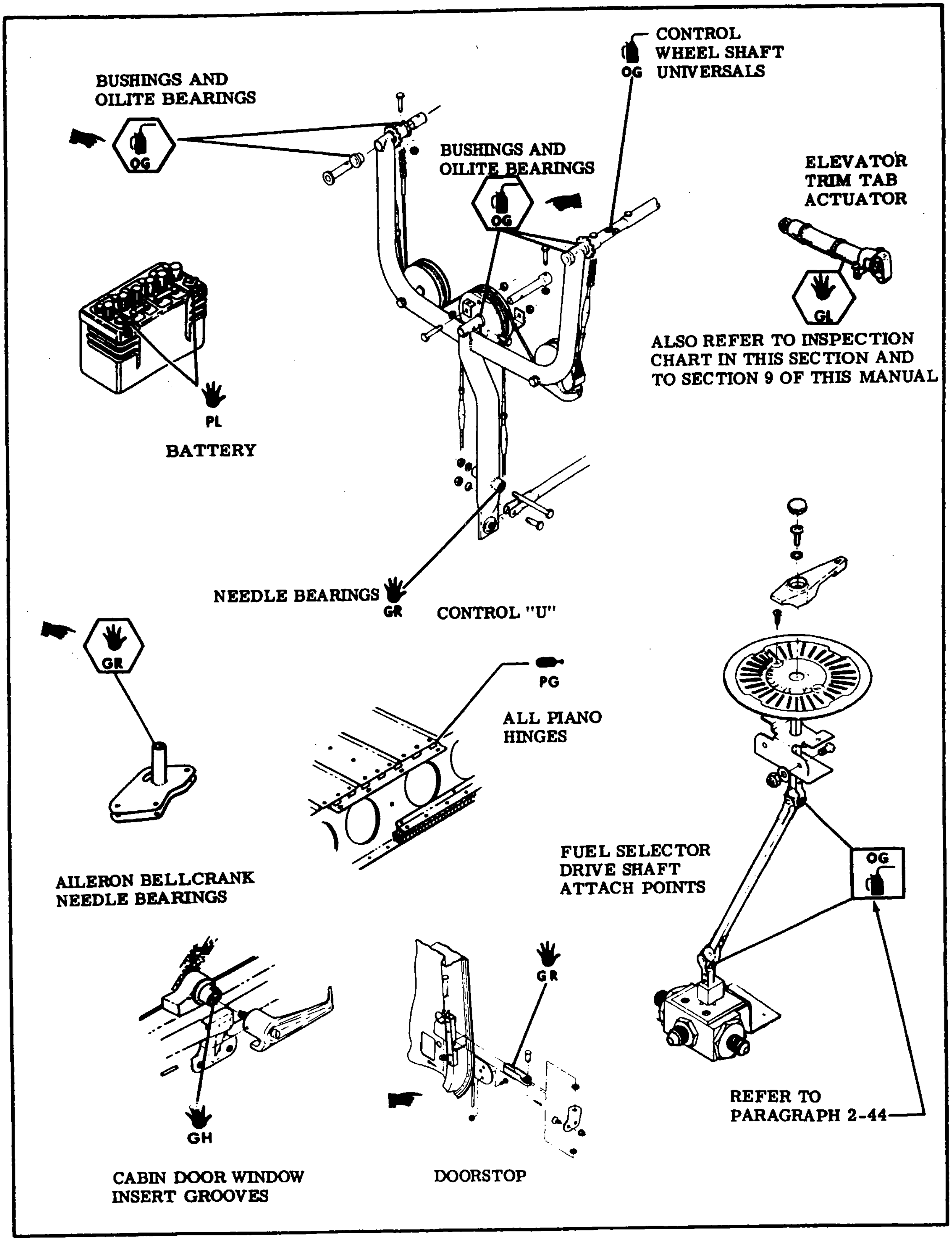
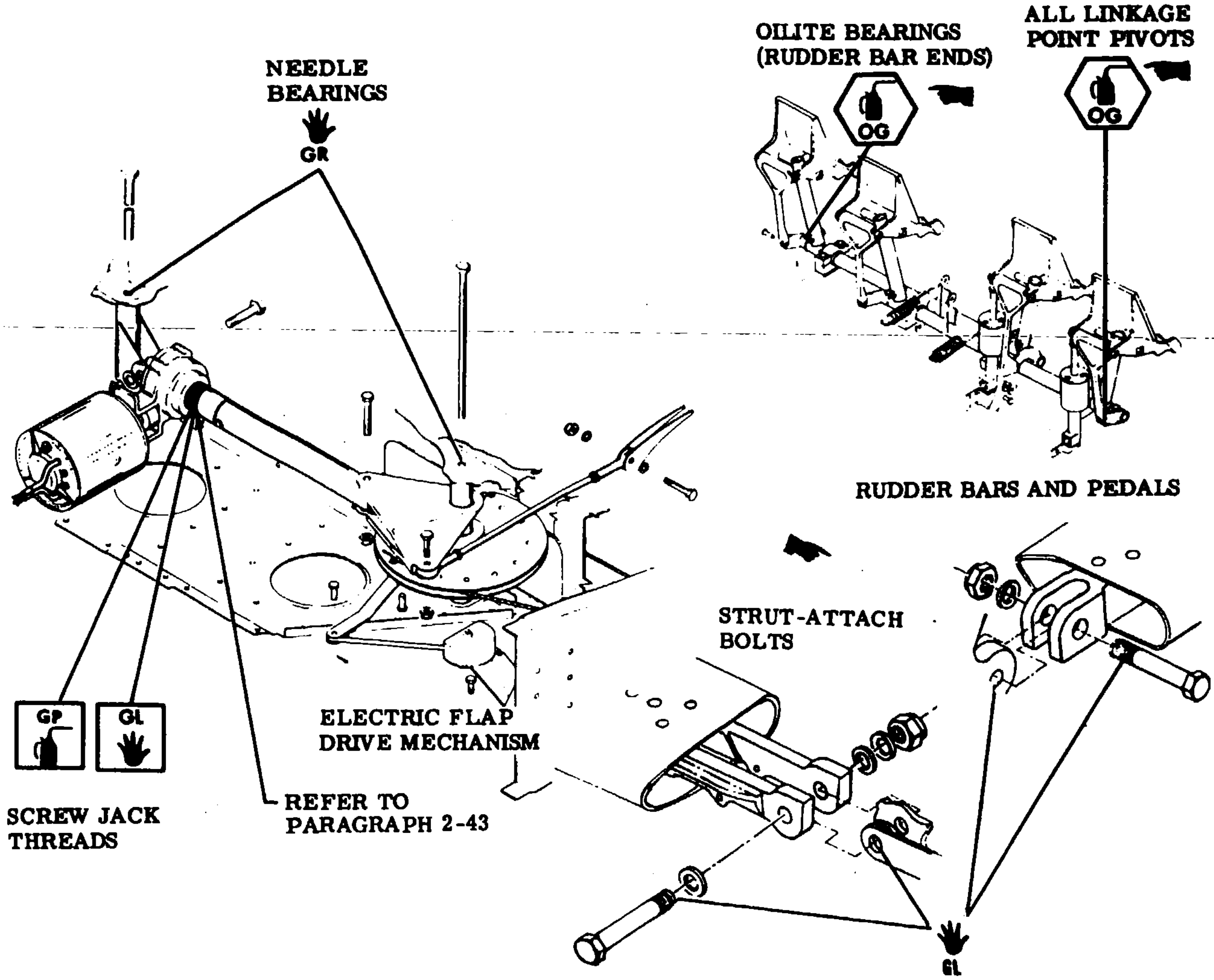


Figure 2-4. Lubrication (Sheet 2 of 3)



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 2-4. Lubrication (Sheet 3 of 3)

I INSPECTION REQUIREMENTS.

As required by Federal Aviation Regulations, all civil aircraft of U.S. registry must undergo a COMPLETE INSPECTION (ANNUAL) each twelve calendar months. In addition to the required ANNUAL inspection, aircraft operated commercially (for hire) must also have a COMPLETE AIRCRAFT INSPECTION every 100 hours of operation.

In lieu of the above requirements, an aircraft may be inspected in accordance with a progressive inspection schedule, which allows the work load to be divided into smaller operations that can be accomplished in shorter time periods.

Therefore, the Cessna Aircraft Company recommends PROGRESSIVE CARE for aircraft that are being flown 200 hours or more per year, and the 100 HOUR inspection for all other aircraft.

II INSPECTION CHARTS.

The following charts show the recommended intervals at which items are to be inspected.

As shown in the charts, there are items to be checked each 50 hours, each 100 hours, each 200 hours, and also Special Inspection items which require servicing or inspection at intervals other than 50, 100 or 200 hours.

a. When conducting an inspection at 50 hours, all items marked under EACH 50 HOURS would be inspected, serviced or otherwise accomplished as necessary to insure continuous airworthiness.

b. At each 100 hours, the 50 hour items would be accomplished in addition to the items marked under EACH 100 HOURS as necessary to insure continuous airworthiness.

c. An inspection conducted at 200 hour intervals would likewise include the 50 hour items and 100 hour items in addition to those at EACH 200 HOURS.

d. The numbers appearing in the SPECIAL INSPECTION ITEMS column refer to data listed at the end of the inspection charts. These items should be checked at each inspection interval to insure that applicable servicing and inspection requirements are accomplished at the specified intervals.

e. A COMPLETE AIRCRAFT INSPECTION includes all 50, 100 and 200 hour items plus those Special Inspection Items which are due at the time of the inspection.

III INSPECTION PROGRAM SELECTION.

AS A GUIDE FOR SELECTING THE INSPECTION PROGRAM THAT BEST SUITS THE OPERATION OF THE AIRCRAFT, THE FOLLOWING IS PROVIDED.

1. **IF THE AIRCRAFT IS FLOWN LESS THAN 200 HOURS ANNUALLY.**

   a. IF FLOWN FOR HIRE

   An aircraft operating in this category must have a COMPLETE AIRCRAFT INSPECTION each 100 hours and each 12 calendar months of operation. A COMPLETE AIRCRAFT INSPECTION consists of all 50, 100, 200 and Special Inspection Items shown in the inspection charts as defined in paragraph II above.

   b. IF NOT FLOWN FOR HIRE

   An aircraft operating in this category must have a COMPLETE AIRCRAFT INSPECTION each 12 calendar months (ANNUAL). A COMPLETE AIRCRAFT INSPECTION consists of all 50, 100, 200 and Special Inspection Items shown in the inspection charts as defined in paragraph II above. In addition, it is recommended that between annual inspections, all items be inspected at the intervals specified in the inspection charts.

2. IF THE AIRCRAFT IS FLOWN MORE THAN 200 HOURS ANNUALLY.

Whether flown for hire or not, it is recommended that aircraft operating in this category be placed on the CESSNA PROGRESSIVE CARE PROGRAM. However, if not placed on Progressive Care, the inspection requirements for aircraft in this category are the same as those defined under paragraph III 1. (a) and (b).

Cessna Progressive Care may be utilized as a total concept program which insures that the inspection intervals in the inspection charts are not exceeded. Manuals and forms which are required for conducting Progressive Care inspections are available from the Cessna Service Parts Center.

IV INSPECTION GUIDE LINES.

(a) MOVABLE PARTS 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.

(b) FLUID LINES AND HOSES for: leaks, cracks, dents, kinks, chafing, proper radius, security, corrosion, deterioration, obstruction and foreign matter.

(c) METAL PARTS for: security of attachment, cracks, metal distortion, broken spotwelds, corrosion, condition of paint and any other apparent damage.

(d) WIRING for: security, chafing, burning, defective insulation, loose or broken terminals, heat deterioration and corroded terminals.

(e) BOLTS IN CRITICAL AREAS for: correct torque in accordance with torque values given in the chart in Section 1, when installed or when visual inspection indicates the need for a torque check.

NOTE

Torque values listed in Section 1 are derived from oil-free cadmium-plated threads, and are recommended for all installation procedures contained in this book except where other values are stipulated. They are not to be used for checking tightness of installed parts during service.

(f) FILTERS, SCREENS & FLUIDS for: cleanliness, contamination and/or replacement at specified intervals.

(g) AIRCRAFT FILE.

Miscellaneous data, information and licenses are a part of the aircraft 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 United States Federal Aviation Regulations. Since the regulations of other nations may require other documents and data, owners of exported aircraft should check with their own aviation officials to determine their individual requirements.

To be displayed in the aircraft at all times:
1. Aircraft Airworthiness Certificate (FAA Form 8100-2).
2. Aircraft Registration Certificate (FAA Form 8050-3).
3. Aircraft Radio Station License, if transmitter is installed (FCC Form 556).

To be carried in the aircraft at all times:
1. Weight and Balance, and associated papers (Latest copy of the Repair and Alteration Form, FAA Form 337, if applicable).
2. Aircraft Equipment List.

To be made available upon request:
1. Aircraft Log Book and Engine Log Book.

(h) ENGINE RUN-UP.

Before beginning the step-by-step inspection, start, run up and shut down the engine in accordance with instructions in the Owner's Manual. During the run-up, observe the following, making note of any discrepancies or abnormalities:

1. Engine temperatures and pressures.
2. Static RPM. (Also refer to Section 11 of this Manual.)
3. Magneto drop. (Also refer to Section 11 of this Manual.)
4. Engine response to changes in power.
5. Any unusual engine noises.
6. Fuel selector and/or shut-off valve; operate engine(s) on each tank (or cell) position and OFF position long enough to ensure shut-off and/or selector valve functions properly.
7. Idling speed and mixture; proper idle cut-off.
8. Alternator and ammeter.
9. Suction gage.
10. Fuel flow indicator.

After the inspection has been completed, an engine run-up should again be performed to determine that any discrepancies or abnormalities have been corrected.

SHOP NOTES:

IMPORTANT

READ ALL INSPECTION REQUIREMENTS PARAGRAPHS PRIOR TO USING THESE CHARTS.

PROPELLER.

	EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTION ITEM
1. Spinner	●			
2. Spinner bulkhead			●	
3. Blades	●			
4. Bolts and/or nuts			●	
5. Hub			●	
6. Governor and control			●	

ENGINE COMPARTMENT

Check for evidence of oil and fuel leaks, then clean entire engine and compartment, if needed, prior to inspection.

	EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTION ITEM
1. Engine oil, filler cap, dipstick, drain plug and oil screen (or external full-flow oil filter)	●			
2. Oil cooler		●		
3. Induction air filter	●			2
4. Induction airbox, air valves, doors and controls		●		
5. Cold and hot air hoses			●	
6. Engine baffles	●			
7. Cylinders, rocker box covers and push rod housings		●		
8. Crankcase, oil sump, accessory section and front crankshaft seal		●		
9. Hoses, metal lines and fittings	●			3
10. Intake and exhaust systems	●			4
11. Ignition harness		●		
12. Spark plugs		●		
13. Compression check			●	
14. Crankcase and vacuum system breather lines			●	
15. Electrical wiring		●		
16. Vacuum pump and oil separator		●		
17. Vacuum relief valve filter (cabin area)			●	5
18. Engine controls and linkage	●			6
19. Engine shockmounts, mount structure and ground straps			●	

Item	EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTION ITEM
20. Cabin heat valves, doors and controls			•	
21. Starter, solenoid, and electrical connections		•		
22. Starter brushes, brush leads and commutator			•	
23. Alternator and electrical connections		•		
24. Alternator brushes, brush leads, commutator or slip ring				7
25. Voltage regulator mounting and electrical leads		•		
26. Magnetos (external) and electrical connections		•		
27. Magneto timing				8
28. Firewall			•	
29. Fuel-air (metering) control unit		•		
30. Fuel injection system			•	
31. Auxiliary fuel pump		•		
32. Engine-driven fuel pump		•		
33. Engine cowling and cowl flaps	•			
FUEL SYSTEM				
1. Fuel strainer, drain valve and control	•			
2. Fuel strainer screen and bowl		•		
3. Fuel, tank vents, caps, and placards	•			
4. Fuel bays, sump drains, and fuel line drains			•	
5. Drain fuel and check bay interior, attachment and outlet screens				5
6. Fuel vent valves			•	
7. Fuel vent line drain			•	
8. Fuel shut-off valve and placard	•			
9. Fuel selector valve and placard	•			
10. Engine primer		•		
11. Perform a fuel quantity indicating system operational test. Refer to Section 15 for detailed accomplishment instructions.				15
12. Fuel injection nozzles				16
LANDING GEAR				
1. Main gear wheels and fairings	•			
2. Nose gear wheel, torque links, steering tubes, boots and fairings	•			
3. Wheel bearings				9

Item	EACH 50 HOURS	EACH 100 HOURS	EACH 200 HOURS	SPECIAL INSPECTION ITEM
4. Nose gear strut and shimmy dampener (service as required)	•			
5. Tires	•			
6. Brake fluid, lines and hoses, linings, discs, brake assemblies and master cylinders			•	
7. Parking brake system			•	
8. Main gear springs			•	
9. Nose gear steering arm lubrication		•		
10. Torque link lubrication	•			
11. Parking brake and toe brakes - operational test	•			
AIRFRAME				
1. Aircraft exterior	•			
2. Aircraft structure			•	
3. Windows, windshield, doors and seals	•			
4. Seat belt and shoulder harness	•			
5. Seat stops, seat rails, upholstery, structure and mounting			•	
6. Control "U" bearings, sprockets, pulleys, cables, chains and turnbuckles			•	
7. Control lock, control wheel and control "U" mechanism			•	
8. Instruments and markings	•			
9. Gyros central air filter			•	10
10. Magnetic compass compensation				5
11. Instrument wiring and plumbing			•	
12. Instrument panel, shock mounts, ground straps, cover, decals and labeling			•	
13. Defrosting, heating and ventilating system controls	•			
14. Cabin upholstery, trim, sun visors and ashtrays			•	
15. Area beneath floor, lines, hoses, wires and control cables			•	
16. Lights, switches, circuit breakers, fuses, and spare fuses	•			
17. Exterior lights	•			
18. Pitot and static systems			•	
19. Stall warning system			•	

Item	Each 50 Hours	Each 100 Hours	Each 200 Hours	Special Inspection Item
20. Radios, radio controls, avionics and flight instruments	•			
21. Antennas and cables			•	
22. Battery, battery box and battery cables	•			
23. Battery electrolyte				11
24. Emergency locator transmitter		•		12
25. Inspect all fluid-carrying lines and hoses in the cabin and wing areas for leaks, damage, abrasion, and corrosion.		•		

CONTROL SYSTEMS

In addition to the items listed below, always check for correct direction of movement, correct travel and correct cable tension.

Item	Each 50 Hours	Each 100 Hours	Each 200 Hours	Special Inspection Item
1. Cables, terminals, pulleys, pulley brackets, cable guards, turnbuckles and fairleads			•	
2. Chains, terminals, sprockets and chain guards			•	
3. Trim control wheels, indicators, actuator and bungee	•			
4. Travel stops			•	
5. Decals and labeling			•	
6. Flap control switch, flap rollers and tracks, and flap indicator	•			
7. Flap motor, transmission, limit switches, structure, linkage, bell cranks, etc.			•	
8. Elevator and trim tab hinges and control rods	•			
9. Elevator trim tab actuator lubrication and tab free-play inspection				13
10. Rudder pedal assemblies and linkage			•	
11. Skins (external) of control surfaces and tabs	•			
12. Internal structure of control surfaces			•	
13. Balance weight attachment			•	
14. Flap actuator jackscrew threads				14

SPECIAL INSPECTION ITEM

1. Deleted.
2. Clean filters per paragraph 2-21. Replace as required.
3. Replace hoses at engine overhaul or after 5 years, whichever comes first.
4. General inspection every 50 hours. Refer to Section 11 for 100-hour inspection.
5. Each 1000 hours, or to coincide with engine overhauls.
6. Each 50 hours for general condition and freedom of movement. These controls are not repairable. Replace as required at each engine overhaul.
7. Each 500 hours.
8. Internal timing and magneto-to-engine timing are described in detail in Section 11.
9. First 100 hours and each 500 hours thereafter. More often if operated under prevailing wet or dusty conditions.
10. Replace each 500 hours.
11. Check electrolyte level and clean battery compartment each 50 hours or each 30 days.
12. Refer to Section 16 of this Manual.
13. Lubrication of the actuator is required each 1000 hours and/or 3 years, whichever comes first. Refer to figure 2-4 for grease specifications.

    Refer to Section 9 of this manual for free-play limits, inspection, replacement and/or repair.
14. Refer to paragraph 2-43 for detailed instructions for various serial ranges.
15. Fuel quantity indicating system operational test is required every 12 months. Refer to Section 15 for detailed accomplishment instructions.
16. At the first 100-hour inspection on new, rebuilt or overhauled engines, remove and clean the fuel injection nozzles. Thereafter, the fuel injection nozzles must be cleaned at 300-hour intervals or more frequently if fuel stains are found.

2-45. COMPONENT TIME LIMITS

1. General

A. Most components listed throughout Section 2 should be inspected as detailed elsewhere in this section and repaired, overhauled or replaced as required. Some components, however, have a time or life limit, and must be overhauled or replaced on or before the specified time limit.

NOTE: The terms overhaul and replacement as used within this section are defined as follows:

Overhaul - Item may be overhauled as defined in FAR 43.2 or it can be replaced.

Replacement - Item must be replaced with a new item or a serviceable item that is within its service life and time limits or has been rebuilt as defined in FAR 43.2.

B. This section provides a list of items which must be overhauled or replaced at specific time limits. Table 1 lists those items which Cessna has mandated must be overhauled or replaced at specific time limits. Table 2 lists component time limits which have been established by a supplier to Cessna for the supplier's product.

C. In addition to these time limits, the components listed herein are also inspected at regular time intervals set forth in the Inspection Charts, and may require overhaul/replacement before the time limit is reached based on service usage and inspection results.

2. Cessna-Established Replacement Time Limits

A. The following component time limits have been established by The Cessna Aircraft Company.

Table 1: Cessna-Established Replacement Time Limits

COMPONENT	REPLACEMENT TIME	OVERHAUL
Restraint Assembly Pilot, Copilot, and Passenger Seats	10 years	NO
Trim Tab Actuator	1,000 hours or 3 years, whichever comes first	YES
Vacuum System Filter	500 hours	NO
Vacuum System Hoses	10 years	NO
Pitot and Static System Hoses	10 years	NO
Vacuum Relief/Regulator Valve Filter (If Installed)	500 hours	NO
Engine Compartment Flexible Fluid Carrying Teflon Hoses (Cessna-Installed) Except Drain Hoses (Drain hoses are replaced on condition)	10 years or engine overhaul, whichever comes first (Note 1)	NO

COMPONENT	REPLACEMENT TIME	OVERHAUL
Engine Compartment Flexible Fluid-Carrying Rubber Hoses (Cessna-Installed) Except Drain Hoses (Drain hoses are replaced on condition)	5 years or engine overhaul, whichever comes first (Note 1)	NO
Engine Air Filter	500 hours or 36 months, whichever comes first (Note 9)	NO
Engine Mixture, Throttle, and Propeller Controls	At engine TBO	NO
Engine Driven Dry Vacuum Pump Drive Coupling (Not lubricated with engine oil)	6 Years or at vacuum pump replacement, whichever occurs first	NO
Engine Driven Dry Vacuum Pump (Not lubricated with engine oil)	500 hours (Note 10)	NO
Standby Dry Vacuum Pump	500 hours or 10 years, whichever occurs first (Note 10)	NO

3. Supplier-Established Replacement Time Limits

   A. The following component time limits have been established by specific suppliers and are reproduced as follows:

Table 2: Supplier-Established Replacement Time Limits

COMPONENT	REPLACEMENT TIME	OVERHAUL
ELT Battery	Note 3	NO
Vacuum Manifold	Note 4	NO
Magnetos	Note 5	YES
Engine	Note 6	YES
Engine Flexible Hoses (Lycoming and TCM Installed)	Note 2	NO
Auxiliary Electric Fuel Pump	Note 7	YES
Propeller	Note 8	YES

NOTES:

Note 1: This life limit is not intended to allow flexible fluid-carrying Teflon or rubber hoses in a deteriorated or damaged condition to remain in service. Replace engine compartment flexible Teflon (AE3663819BXXXX series hose) fluid-carrying hoses (Cessna-installed only) every ten years or at engine overhaul, whichever occurs first. Replace engine compartment flexible rubber fluid-carrying hoses (Cessna-installed only) 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 2: For TCM engines, refer to Teledyne Continental Service Bulletin SB97-6, or latest revision. For Textron Lycoming engines, refer to latest Textron Lycoming Engine Service Bulletins.

Note 3: Refer to FAR 91.207 for battery replacement time limits.

Note 4: Refer to Airborne Air & Fuel Product Reference Memo No. 39, or latest revision, for replacement time limits.

Note 5: For airplanes equipped with Slick magnetos, refer to Slick Service Bulletin SB2-80C or latest revision for time limits.

For airplanes equipped with TCM/Bendix magnetos, refer to Teledyne Continental Motors Service Bulletin No. 643, or latest revision, for time limits.

Note 6: For TCM engines, refer to Teledyne Continental Service Information Letter SIL98-9, or latest revision, for time limits.
For Textron Lycoming engines, refer to Textron/Lycoming Service Instruction S.I. 1009AJ, or latest revision, for time limits.

Note 7: Refer to Cessna Service Bulletin SEB94-7 Revision 1/Dukes Inc. Service Bulletin NO. 0003, or latest revision.

Note 8: Refer to the applicable McCauley Service Bulletins and Overhaul Manual for replacement and overhaul information.

Note 9: The air filter may be cleaned, refer to Section 2 of this service manual for servicing instructions.
For airplanes equipped with an air filter manufactured by Donaldson, refer to Donaldson Aircraft Filters Service Instructions P46-9075 for detailed servicing instructions.
The address for Donaldson Aircraft Filters is:
Customer Service
115 E. Steels Corners RD
Stow OH. 44224

Do not overservice the air filter, overservicing increases the risk of damage to the air filter from excessive handling. A damaged/worn air filter may expose the engine to unfiltered air and result in damage/excessive wear to the engine.

Note 10: Replace engine driven dry vacuum pump not equipped with a wear indicator every 500 hours of operation, or replace according to the vacuum pump manufacturer's recommended inspection and replacement interval, whichever occurs first.

Replace standby vacuum pump not equipped with a wear indicator every 500 hours of operation or 10 years, whichever occurs first, or replace according to the vacuum pump manufacturer's recommended inspection and replacement interval, whichever occurs first.

For a vacuum pump equipped with a wear indicator, replace pump according to the vacuum pump manufacturer's recommended inspection and replacement intervals.

FUSELAGE

TABLE OF CONTENTS Page

3-1. FUSELAGE.

3-2. WINDSHIELD AND WINDOWS.

3-3. DESCRIPTION. The windshield and windows are single-piece acrylic plastic panels set in sealing strips and held by formed retaining strips secured to the fuselage with screws and rivets. Presstite No. 579.6 sealing compound used in conjunction with a felt seal is applied to all edges of the windshield and windows with exception of wing root area. The wing root fairing has a heavy felt strip that completes the windshield sealing.

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

3-5. WAXING. Waxing will fill in minor scratches in clear plastic and help protect the surface from further abrasion. Use a good grade of commercial wax applied in a thin, even coat. Bring wax to a high polish by rubbing lightly with a clean, dry flannel cloth.

3-6. REPAIRS. Damaged window panels and windshield may be removed and replaced if damage is extensive. However, certain repairs as prescribed in the following paragraphs can be made successfully without removing damaged part from aircraft. Three types of temporary repairs for cracked plastic are possible. No repairs of any kind are recommended on highly-stressed or compound curves where repair would be likely to affect pilot's field of vision. Curved areas are more difficult to repair than flat areas and any repaired area is both structurally and optically inferior to the original surface.

3-7. SCRATCHES. Scratches on clear plastic surfaces can be removed by hand-sanding operations followed by buffing and polishing, if 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.

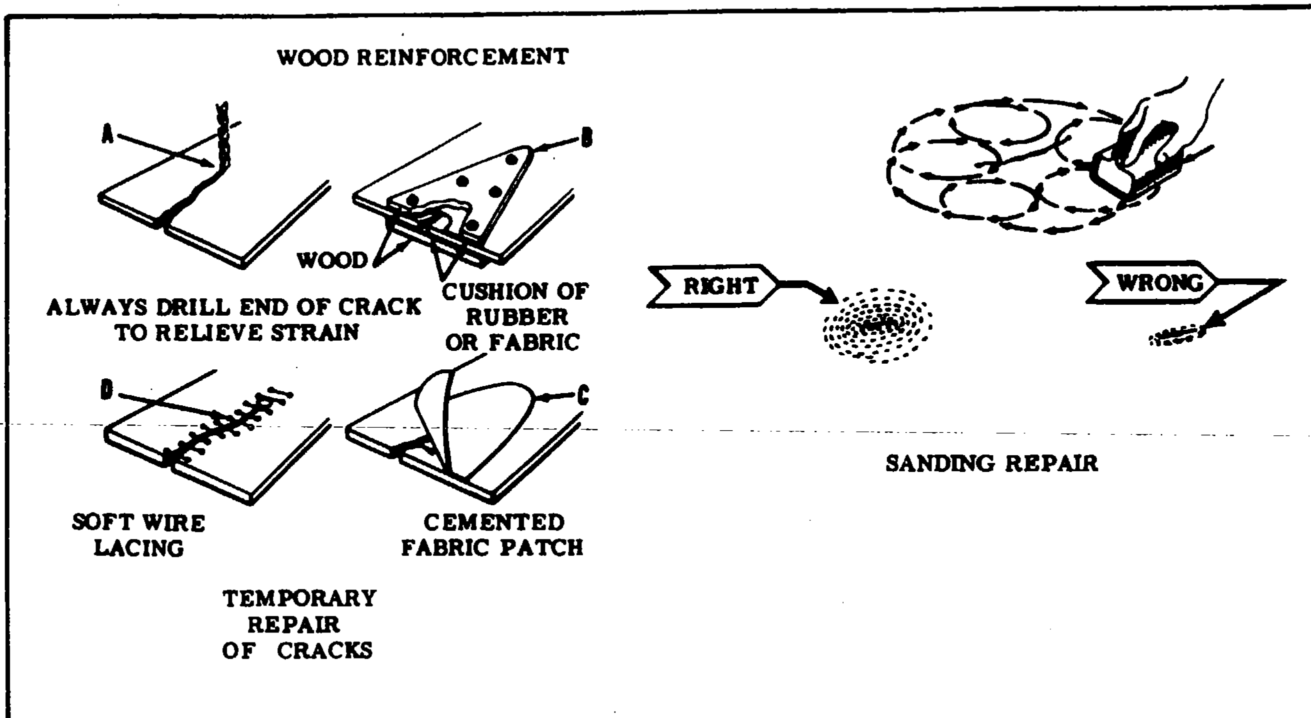


Figure 3-1. Repair of Windshield and Windows

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 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. (Refer to figure 3-1.)

a. When a crack appears, drill a hole at end of crack to prevent further spreading. Hole should be approximately 1/8 inch in 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 surface and inserting small bolts through 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 on a curved surface by placing fabric patches over affected areas. Secure patches with aircraft dope, Specification No. MIL-D-5549, or lacquer, Specification No. MIL-L-7178. Lacquer thinner, Specification No. MIL-T-6094 can also be used to secure patch.

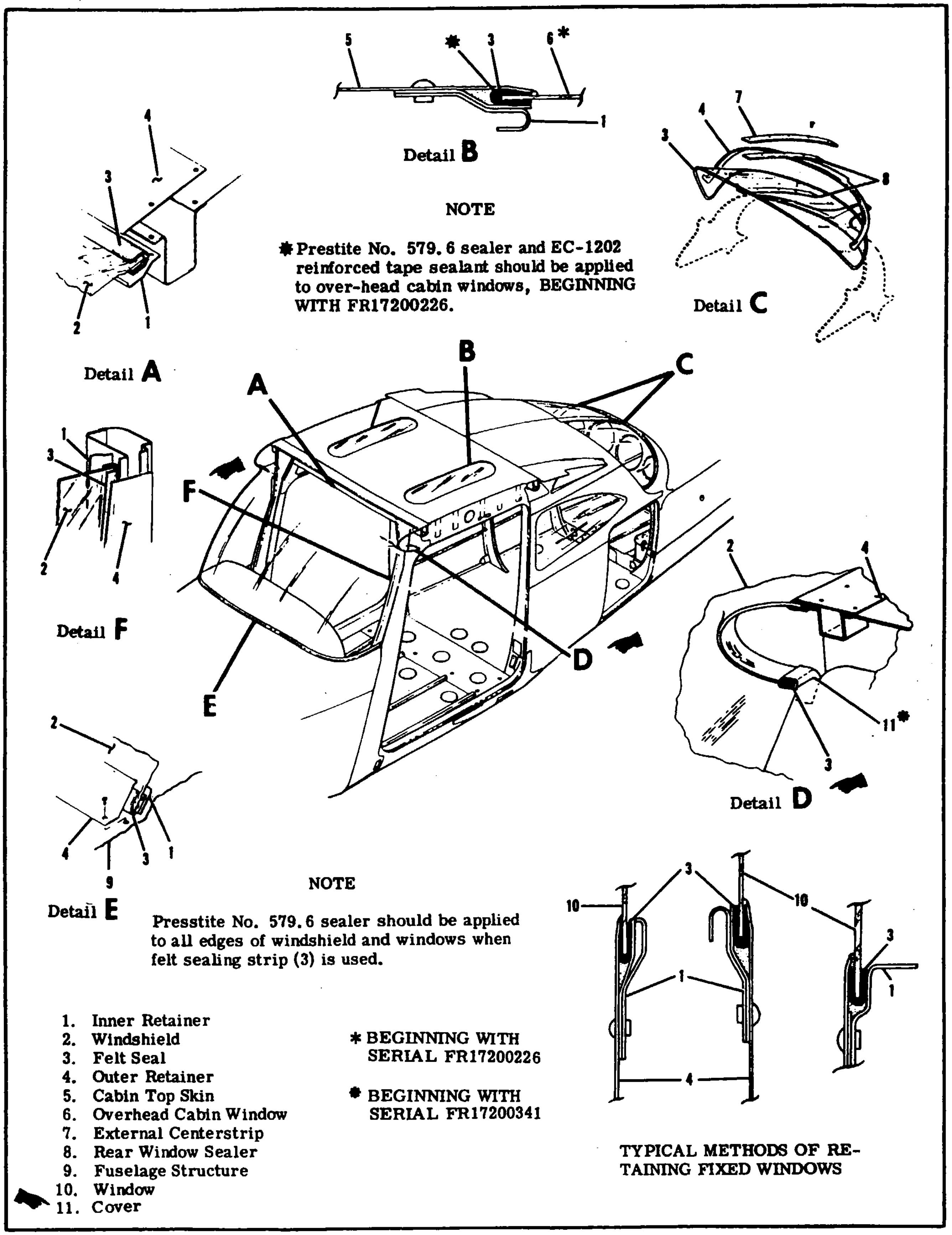


Figure 3-2. Windshield and Fixed Window Installation

d. 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. (Refer to figure 3-2.)

3-10. REMOVAL.
a. Drill out rivets securing front retainer strip.
b. Remove wing fairings over windshield edges.
c. Pull windshield straight forward, out of side and top retainers. Remove top retainer if necessary.

3-11. INSTALLATION.
a. Apply felt strip and sealing compound or sealing tape to all edges of windshield to prevent leaks.
b. Reverse steps in preceding paragraph for installation.
c. When installing a new windshield, check fit and carefully file or grind away excess plastic.
d. Use care not to crack windshield when installing. If not previously removed, top retainer may be removed if necessary. Starting at upper corner and gradually working windshield into position is recommended.

NOTE

Screws and self-locking nuts may be used instead of rivets which fasten front retaining strip to cowl deck. If at least No. 6 screws are used, no loss of strength will result.

3-12. WINDOWS.

3-13. MOVABLE. (Refer to figure 3-3.) A movable window, hinged at the top, is installed in the left cabin door.

3-14. REMOVAL AND INSTALLATION.
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. (Refer to figure 3-2.) 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.
a. Remove 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

SHOP NOTES:

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 when installing.

3-17. OVERHEAD. (Refer to figure 3-2.) 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.

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. (Refer to figure 3-2.) 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 compound to all edges of window to prevent leaks. Check fit and file or grind away excess plastic. Use care not to crack plastic when installing.

3-20. CABIN DOORS. (Refer to figure 3-3.)

3-21. REMOVAL AND INSTALLATION. Removal of cabin doors is accomplished either by removing screws which attach hinges or by removing hinge pins.

NOTE

Beginning with aircraft serials FR17200560 and FR17200562, remove clevis pin (21) at bracket (19) before removing door.

If permanent hinge pins are removed, they may be replaced by clevis pins secured with cotter pins or new hinge pins may be installed and "spin-bradded." When fitting a new door, some trimming of door skin at edges and some reforming with a soft mallet may be necessary to achieve a good fit.

NOTE

Reforming bonded door is not permissible since damage to bonded areas could result.

3-22. ADJUSTMENT. Cabin doors should be adjusted so skin fairs with fuselage skin. Slots at latch plate permit re-positioning of striker plate. Depth of latch engagement may be changed by adding or removing washers or shims between striker plate and doorpost.

3-23. WEATHERSTRIP. A weatherstrip is cemented around all edges of door. New weatherstrip may be applied after mating surfaces of weatherstrip and door are clean, dry and free from oil or grease. Apply a thin, even coat of adhesive to each surface and allow to dry until tacky before pressing strip in place. Minnesota Mining and Manufacturing Co. No. EC-880 cement is recommended.

3-24. LATCHES. (Refer to figure 3-4.)

3-25. DESCRIPTION. The cabin door latch is a push-pull bolt type, utilizing a rotary clutch for posi-

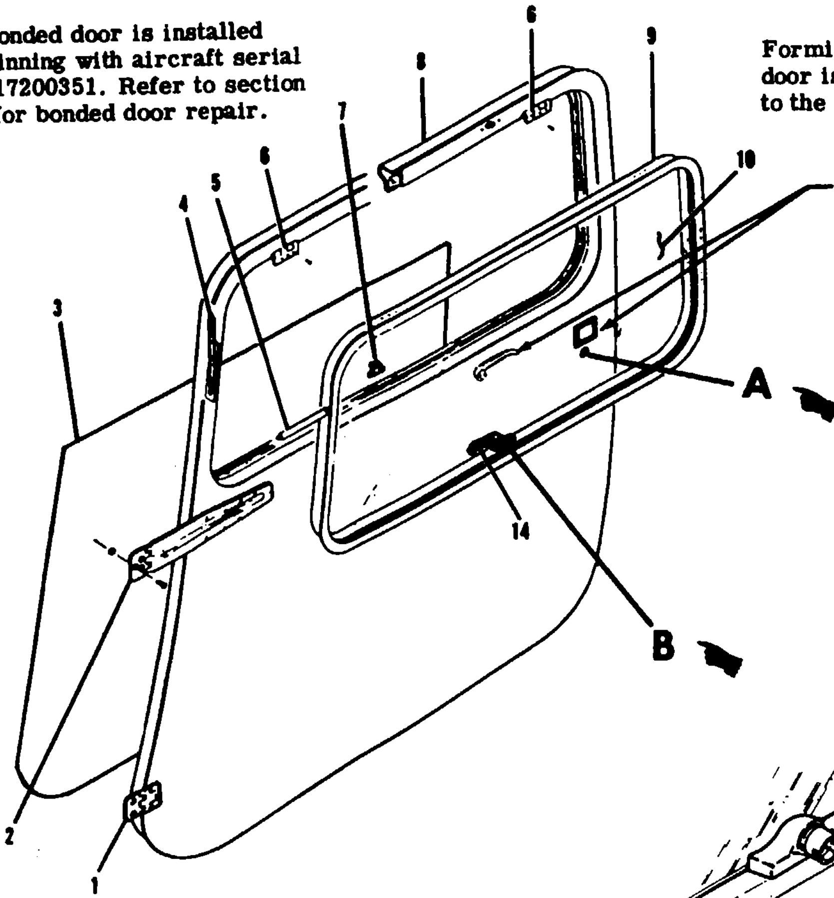
SHOP NOTES:

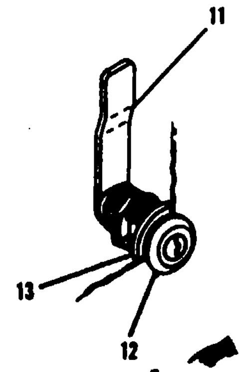
NOTE

A bonded door is installed beginning with aircraft serial FR17200351. Refer to section 17 for bonded door repair.

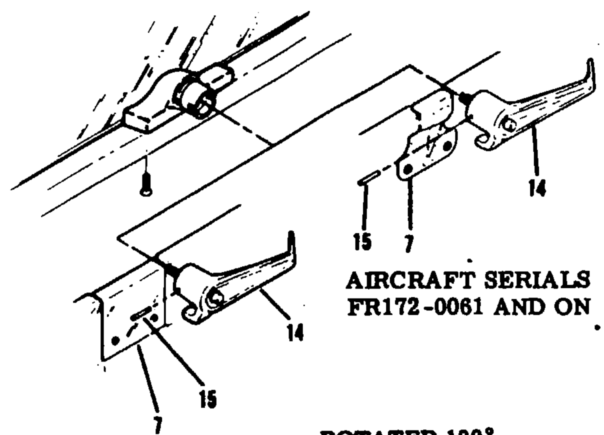
NOTE

Forming of the flange on the bonded door is not permissible since damage to the bonded areas could result.





Detail A



Detail B

1. Lower Hinge
2. Upper Hinge
3. Upholstery Panel
4. Spring
5. Window Stop
6. Window Hinge
7. Latch Plate
8. Cabin Door
9. Window Frame
10. Window
11. Cam
12. Lock Assembly
13. Washer
14. Latch Handle
15. Roll Pin
16. Inside Door Handle
17. Arm Rest

NOTE

A right hand movable window may be installed in the aircraft. Removal and installation procedures are the same.

THRU AIRCRAFT SERIAL FR17200530

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

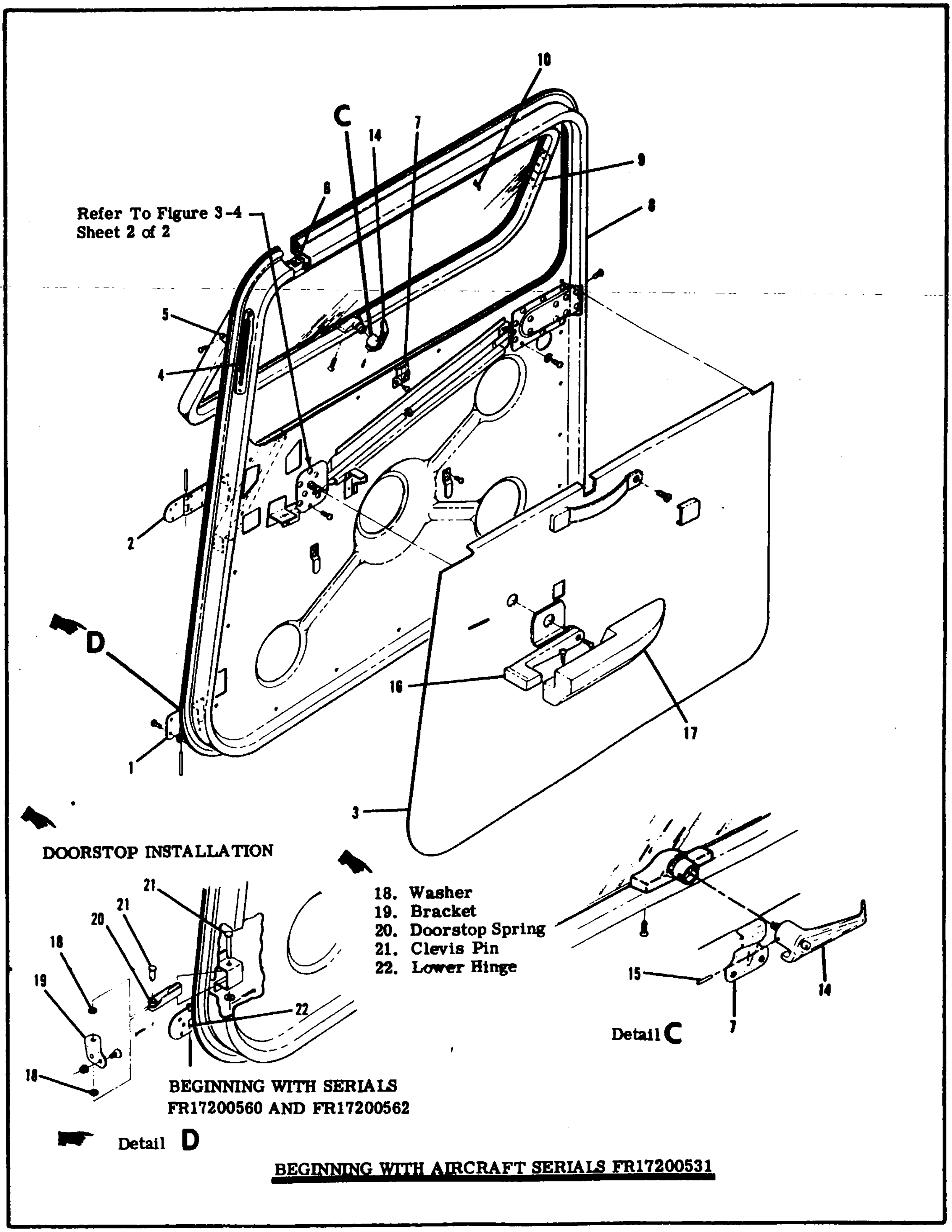


Figure 3-3. Cabin Door Installation(Sheet 2 of 2)

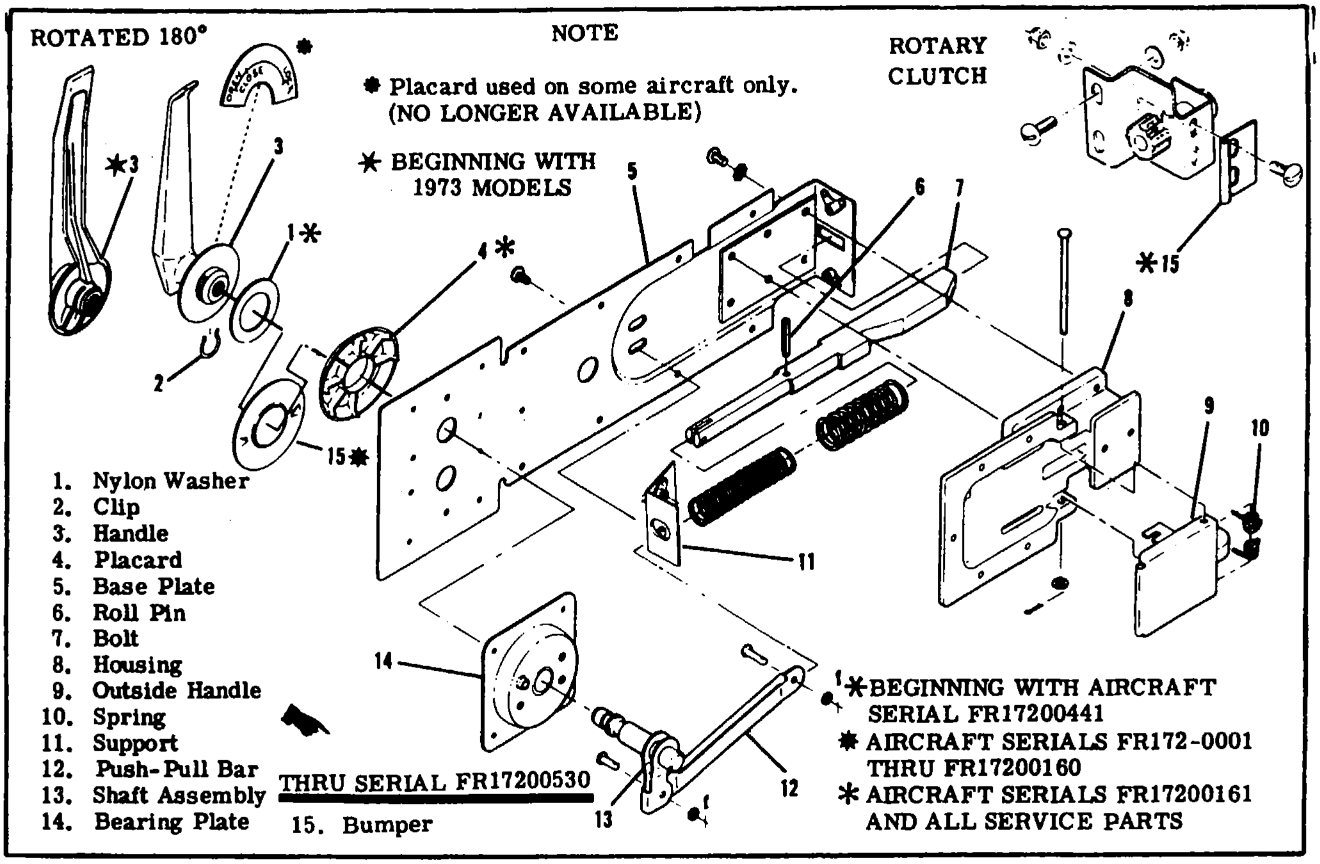


Figure 3-4. Door Latch Installation(Sheet 1 of 2)

tive 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.

3-26. 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.

NOTE

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

3-27. 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 one 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:

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.

3-28. INDEXING INSIDE HANDLE. (Refer to figure 3-4.) When inside door handle is removed, reinstall in relation to position of bolt (7) which is spring-loaded to CLOSE position. The following procedure may be used:

a. THRU AIRCRAFT FR17200530.
1. Temporarily install handle (3) on shaft assembly (13) approximately vertical.
2. Move handle (3) back and forth until handle centers in spring-loaded positions.
3. Without rotating shaft assembly (13), remove handle and install placard (4) with CLOSE index at top and press placard to seat prongs.
4. Install nylon washer (1).
5. Install handle (3) to align with CLOSE index on placard (4) and install clip (2).
6. Ensure bolt (7) clears doorpost and teeth engage clutch gear when handle (3) is in CLOSE position.

NOTE

On aircraft serials FR17200276 thru FR17200293 should door handle to seat back interference occur, Cessna Single-engine Service Letter SE72-5 dated March 3, 1972 should be complied with.

b. BEGINNING WITH FR17200531. (Refer to figure 3-4, Sheet 2.)
1. Temporarily install handle (24) on shaft assembly (18) approximately vertical.
2. Move handle (24) back and forth until handle centers in spring-loaded position.

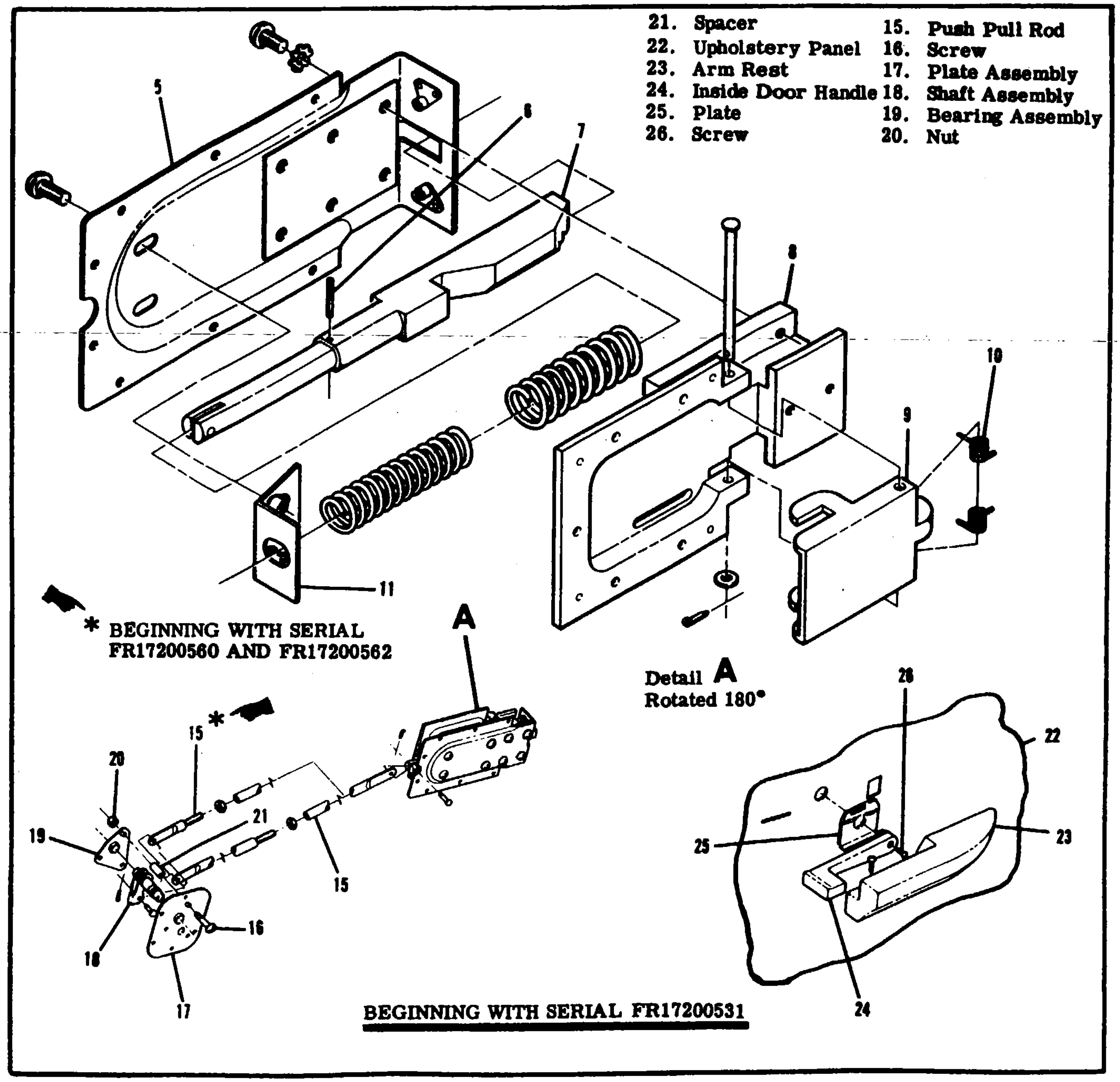


Figure 3-4. Door Latch Installation(Sheet 2 of 2)

3. Without rotating shaft assembly (18), remove handle (24) and install placard (25) with CLOSE index at top.

4. Install handle (24) to align with CLOSE index on placard (25), using screw (26).

5. Install arm rest (23) on upholstery panel (22).

3-29. BAGGAGE DOOR. (Refer to figure 3-5.)

3-30. REMOVAL AND INSTALLATION.

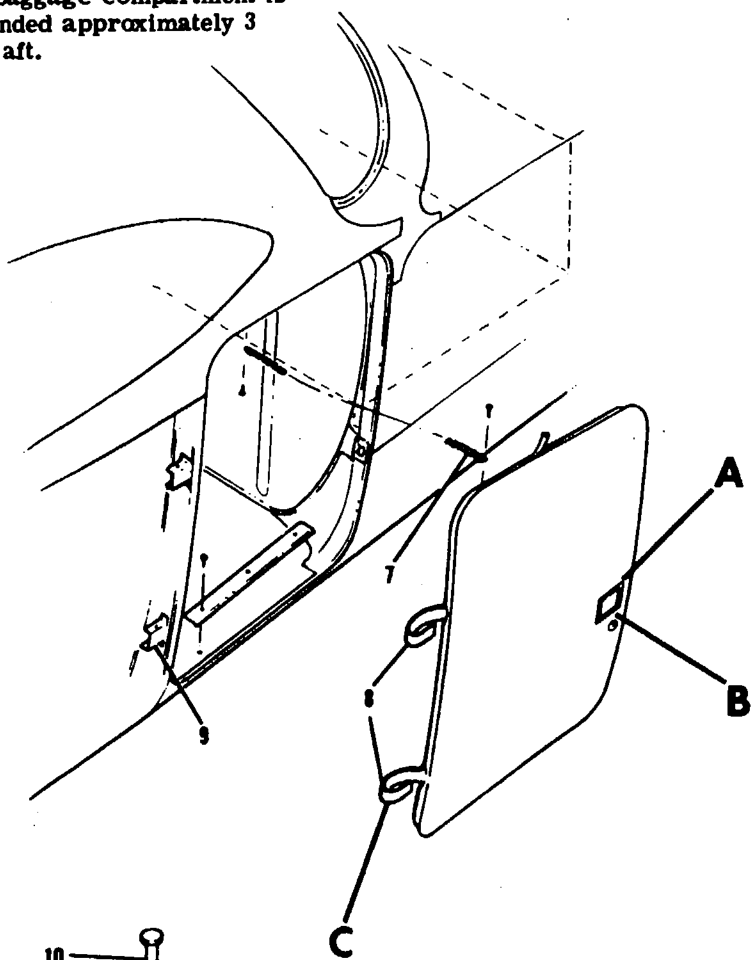
a. Remove inside latch handle (1).

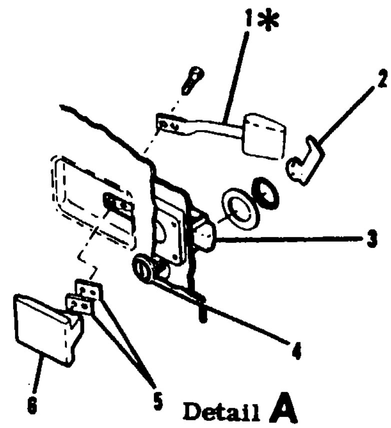
b. Remove door-pull handle.

NOTE

Beginning with 1974 models the baggage compartment is extended approximately 3 feet aft.

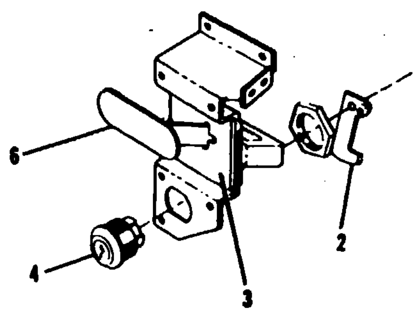
*THRU FR17200276





Detail A

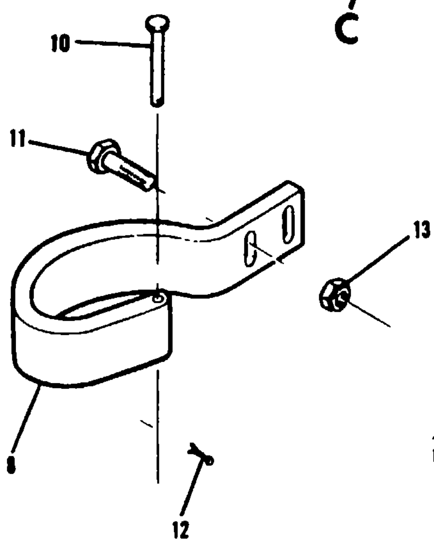
AIRCRAFT SERIALS FR17200146 AND ON



Detail B

AIRCRAFT SERIALS FR172-0001 THRU FR172-0145

1. Inside Handle
2. Cam
3. Latch Assembly
4. Lock Assembly
5. Shim
6. Outside Handle
7. Chain
8. Hinge
9. Hinge Bracket
10. Clevis Pin
11. Bolt
12. Cotter Pin
13. Nut



Detail C

NOTE

A bonded door is installed beginning with aircraft serial FR17200351. Refer to section 17 for bonded door repair.

NOTE

Forming of the flange is not permissible on the bonded door as forming of the flange could cause damage to the bonded area.

Figure 3-5. Baggage Door Installation

c. Disconnect door-stop chain (7).
d. Remove buttons securing upholstery panel and remove panel.
e. Remove bolts (11) securing door to hinges.
f. Reverse preceding steps for installation.

NOTE

When fitting a new door, trimming of door at edges and reforming with a soft mallet may be necessary to achieve a good fit.

3-31. SEATS. (Refer to figure 3-6. and 3-6A.)

3-32. PILOT AND COPILOT.
a. Reclining Back.
b. Reclining Back/Vertical Adjust.
c. Articulating Recline/ Vertical Adjust.

3-33. DESCRIPTION. These seats are manually-operated throughout their full range of operation. Seat stops are provided to limit fore-and-aft travel.

3-34. REMOVAL AND INSTALLATION.
a. Remove seat stops from rails.
b. Slide seat fore-and-aft to disengage seat rollers from rails.
c. Lift seat out.
d. Reverse preceding steps for installation. Ensure all seat stops are reinstalled.

WARNING

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

3-35. CENTER.
a. Double Width Bottom/Individual Reclining Backs.

3-36. DESCRIPTION. These seats are permanently bolted to the cabin structure and incorporate no adjustment provisions other than manually-adjustable three position backs.

3-37. REMOVAL AND INSTALLATION.
a. Remove bolts securing seat to cabin structure.
b. Lift seat out.
c. Reverse preceding steps for installation.

3-38. AUXILIARY.
a. Fold-Up.

3-39. 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.

3-40. REMOVAL AND INSTALLATION.
a. Remove bolts securing seat structure to hinge brackets.
b. Unsnap seat back from aft cabin wall. (Aircraft Serials FR172-0001 thru FR172-0145.)
c. Lift seat out.
d. Reverse preceding steps for installation.

3-41. REPAIR. Replacement of defective parts is recommended in repair of seats. However, a cracked framework may be welded, provided the crack is not in an area of stress concentration (close to a hinge or bearing point). The square-tube framework is 6061 aluminum, heat-treated to a T-6 condition. Use a heliarc weld on these seats, as torch welds will destroy heat-treatment of frame structure. Figure 3-7 outlines instructions for replacing defective cams on reclining bench-type seat backs.

3-42. 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 a guide 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.

3-43. 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 17 for thermo-plastic repairs.

3-44. 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 any time it is removed. A soundproofing panel is placed in gap between wing and fuselage and held in place by wing root fairings.

3-45. CABIN HEADLINER. (Refer to figure 3-8.)

3-46. REMOVAL AND INSTALLATION.
a. Detail A.
1. Remove sun visors, all inside finish strips and plates, doorpost upper shields, front spar trim shield, dome light console and any other visible retainers securing headliner.
2. Work edges of headliner free from metal teeth which hold fabric.
3. Starting at front of headliner, work headliner down, removing screws through metal tabs which hold wire bows to cabin top. Pry loose outer ends of bows from retainers above doors. Detach each wire bow in succession.

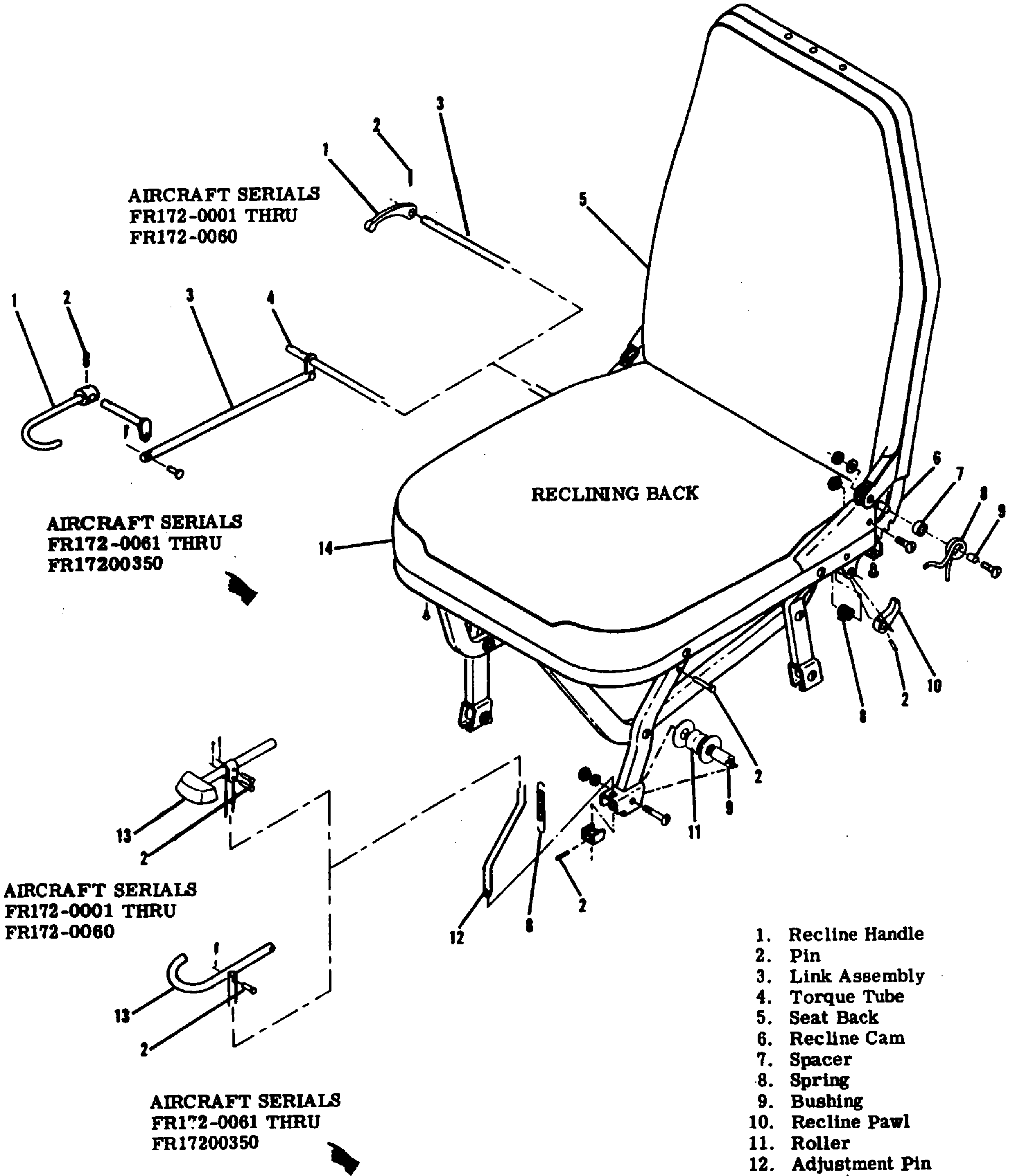
NOTE

Always work from front to rear when removing headliner.

PILOT AND COPILOT SEAT

(STANDARD)

THRU AIRCRAFT SERIALS FR17200350



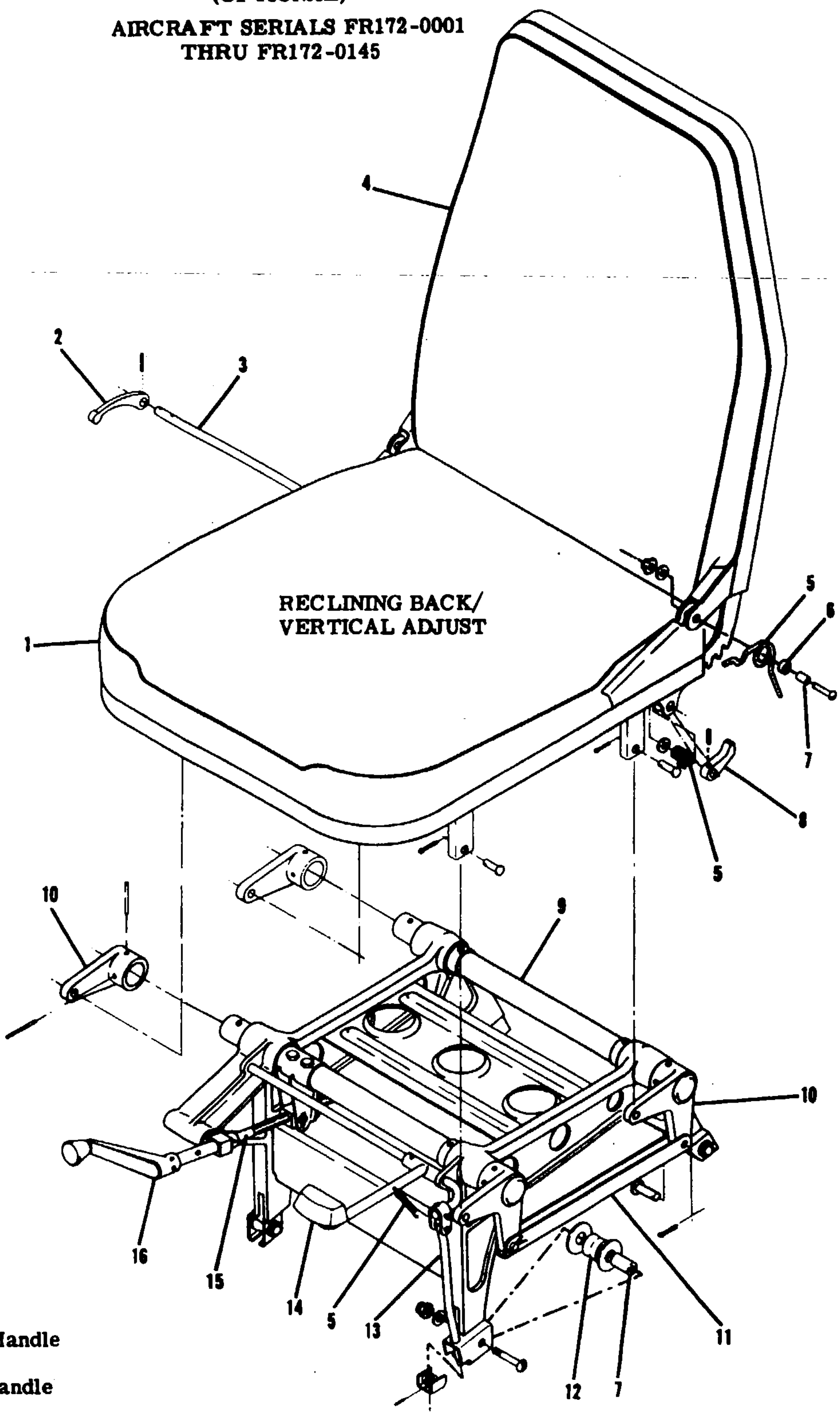
1. Recline Handle
2. Pin
3. Link Assembly
4. Torque Tube
5. Seat Back
6. Recline Cam
7. Spacer
8. Spring
9. Bushing
10. Recline Pawl
11. Roller
12. Adjustment Pin
13. Fore/Aft Handle
14. Seat Bottom

Figure 3-6. Seat Installation (Sheet 1 of 7)

PILOT AND COPILOT SEAT

(OPTIONAL)

AIRCRAFT SERIALS FR172-0001
THRU FR172-0145



1. Seat Bottom
2. Recline Handle
3. Shaft
4. Seat Back
5. Spring
6. Spacer
7. Bushing
8. Recline Pawl
9. Torque Tube
10. Bellcrank
11. Channel
12. Roller
13. Adjustment Pin
14. Fore/Aft Adjustment Handle
15. Adjustment Screw
16. Vertical Adjustment Handle

Figure 3-6. Seat Installation (Sheet 2 of 7)

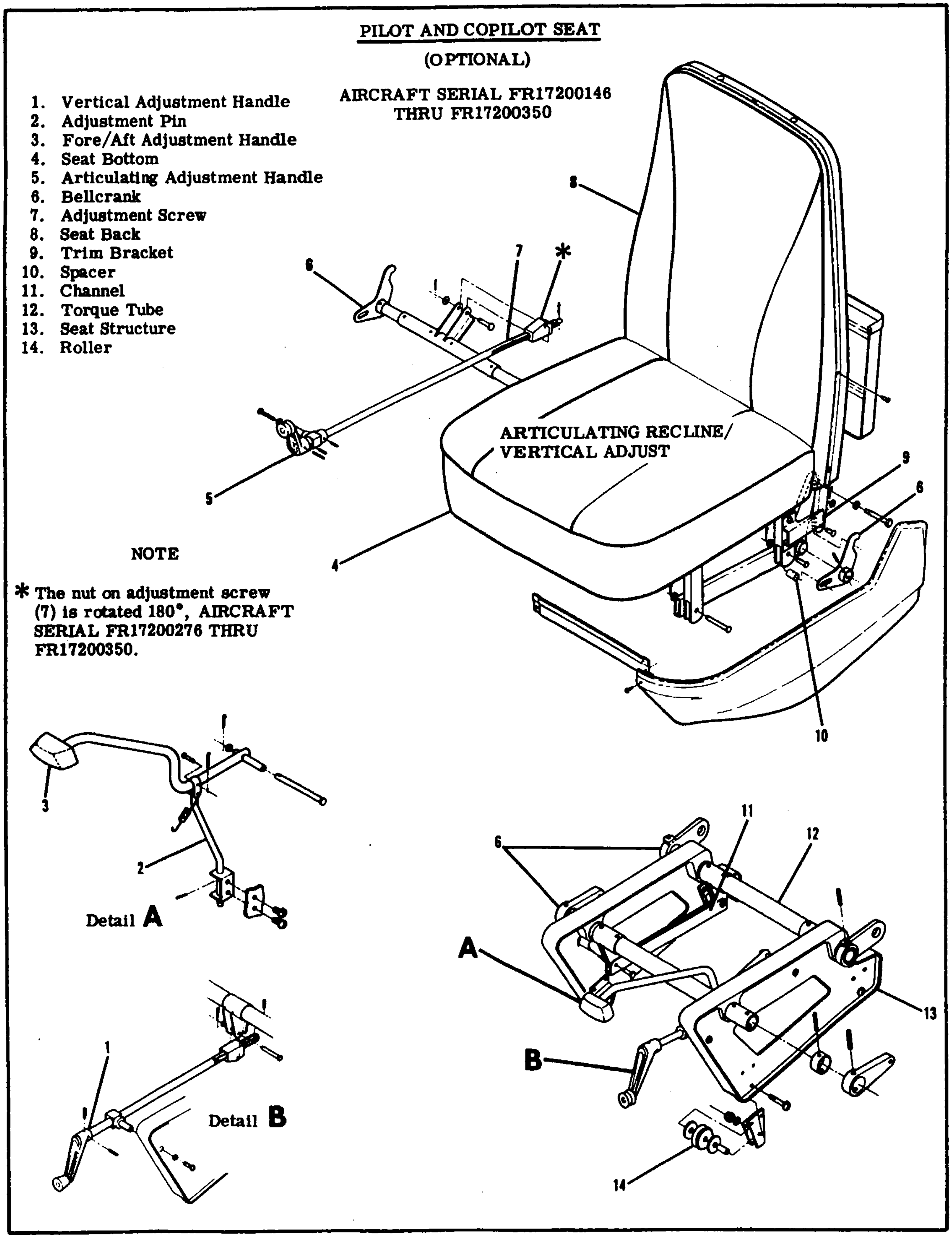
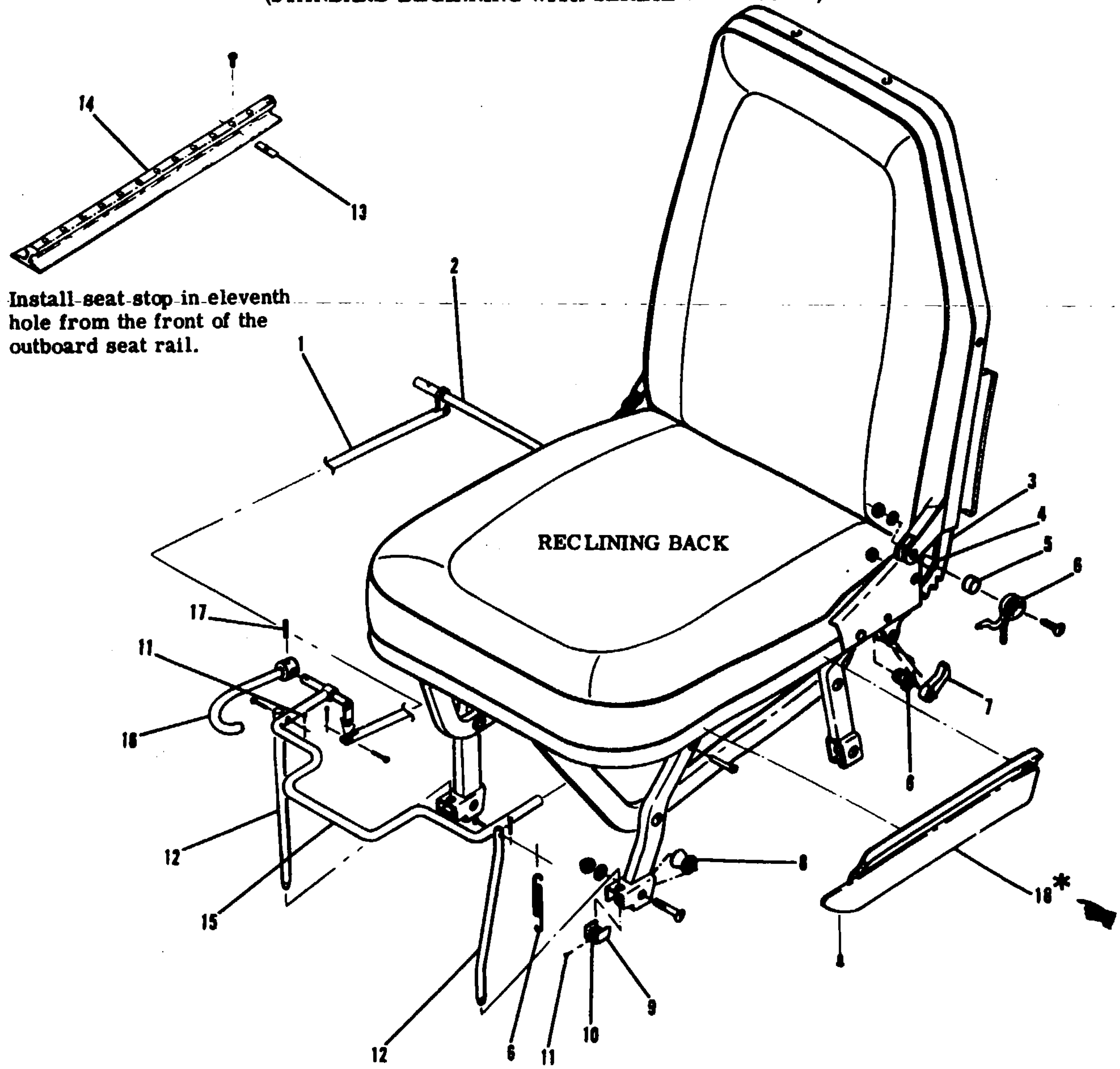


Figure 3-6. Seat Installation (Sheet 3 of 7)

PILOT AND COPILOT SEAT
(STANDARD BEGINNING WITH SERIAL FR17200351)



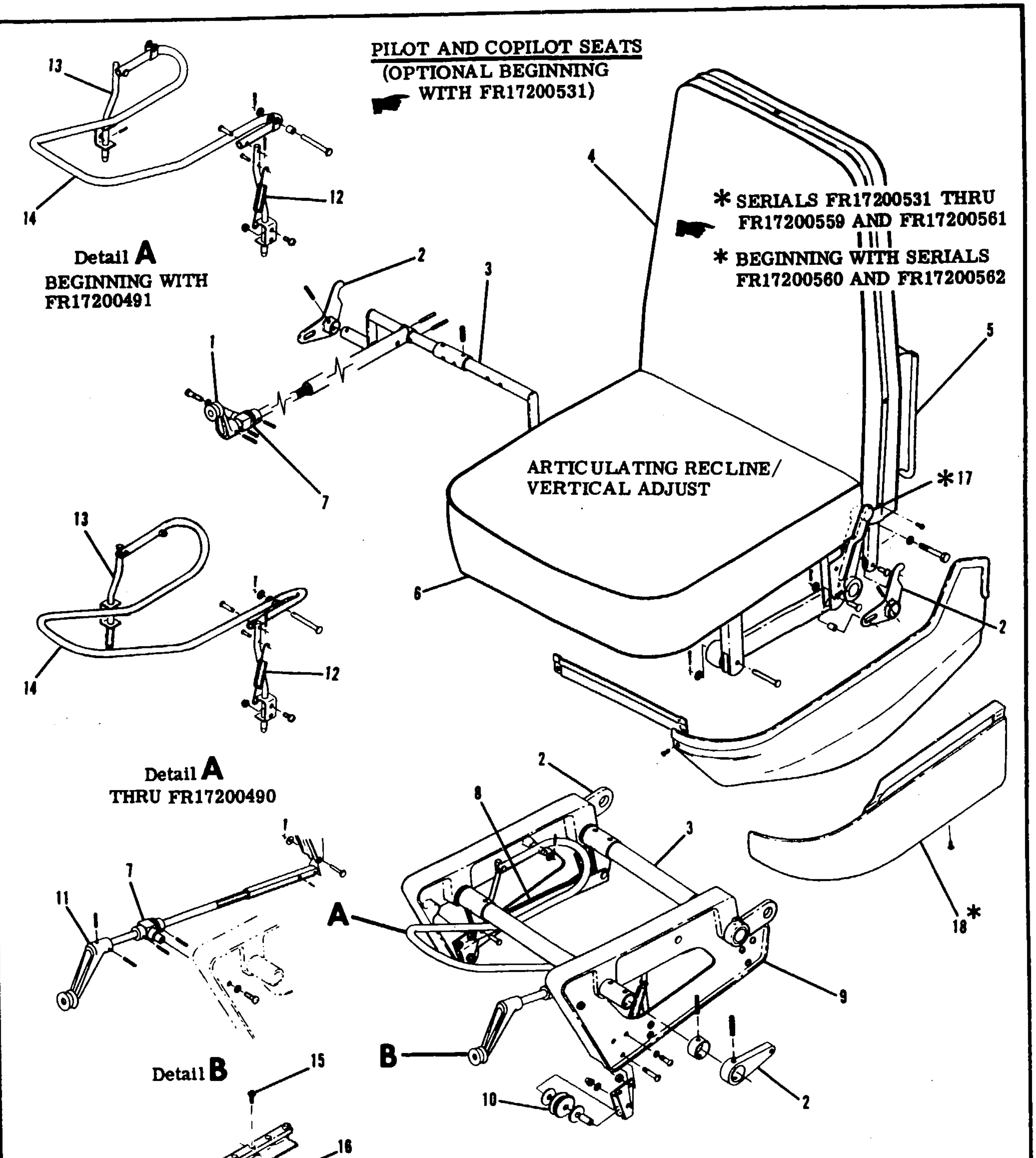
NOTE

Refer to figure 3-7 for seat back cam replacement.

* BEGINNING WITH SERIALS FR1720560 AND FR1720562

1. Link Seat Back Adjust
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

Figure 3-6. Seat Installation (Sheet 4 of 7)



Install seat stop in thirteenth hole from the front of the outboard seat rail.

1. Articulating Adjustment Handle
2. Bellcrank
3. Torque Tube
4. Seat Back
5. Magazine Pocket
6. Seat Bottom
7. Bearing Block
8. Channel
9. Seat Structure
10. Roller
11. Vertical Adjustment Handle
12. Spring
13. Adjustment Pin
14. Fore/Aft Adjustment Handle
15. Seat Stop
16. Screw
17. Stiffener
18. Seat Belt Retainer

Figure 3-6. Seat Installation (Sheet 5 of 7)

CENTER SEAT

(STANDARD)

1. Seat Bottom
2. Spring
3. Spacer
4. Seat Back
5. Bushing
6. Recline Handle
7. Recline Pawl
8. Control Shaft

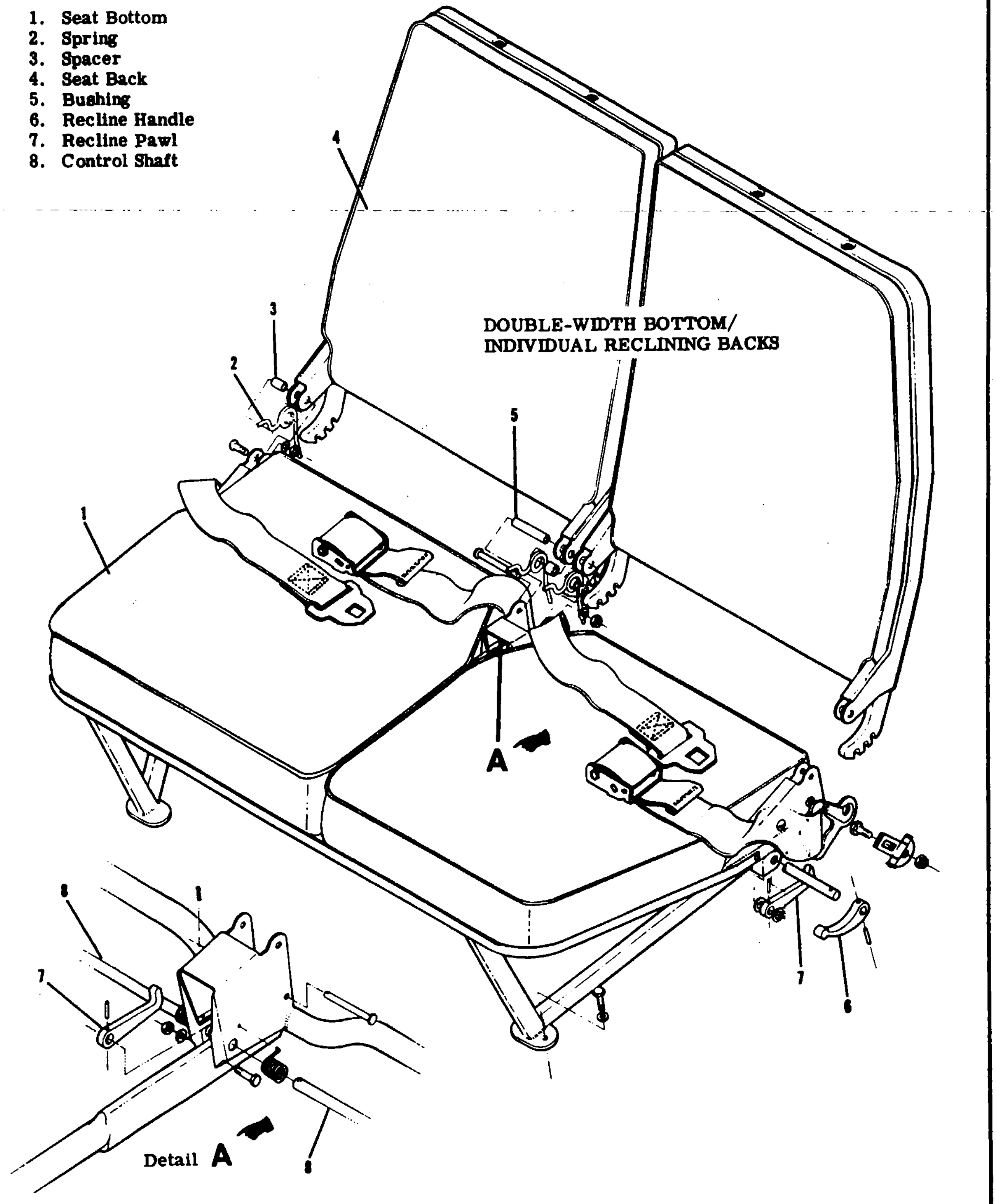
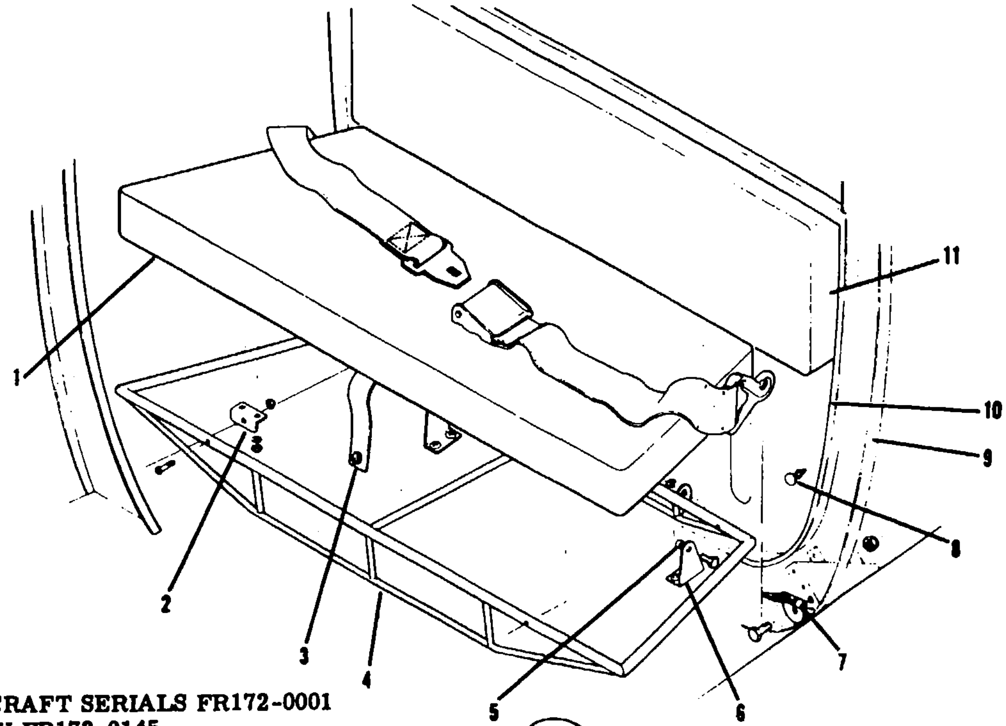
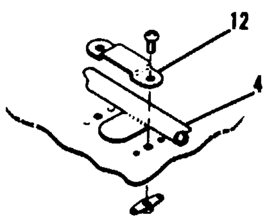


Figure 3-6. Seat Installation (Sheet 6 of 7)

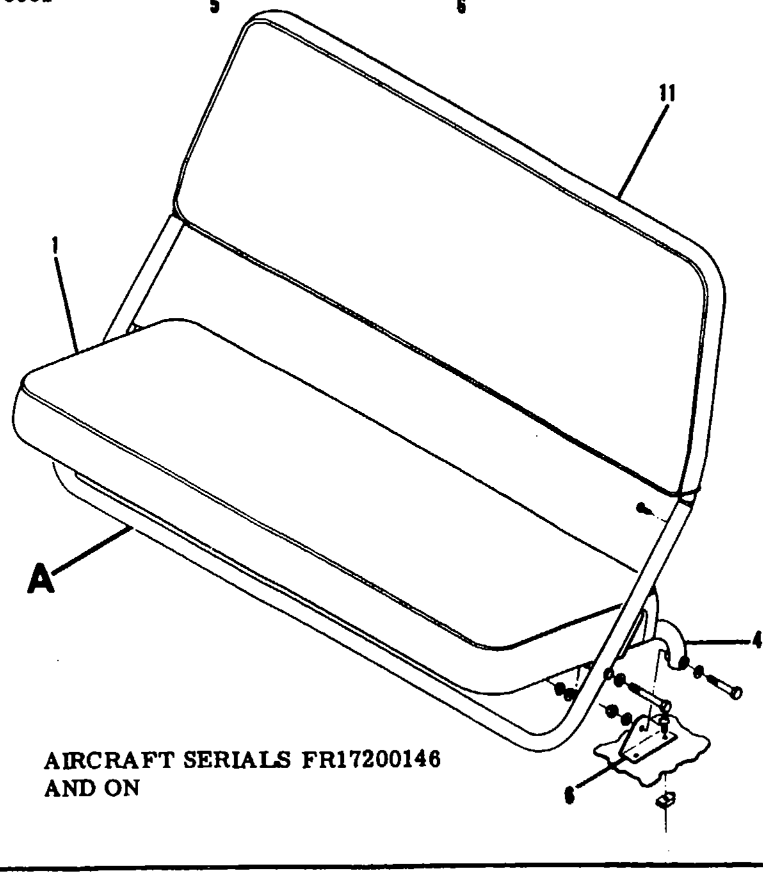
AUXILIARY SEATS (OPTIONAL)



AIRCRAFT SERIALS FR172-0001 THRU FR172-0145



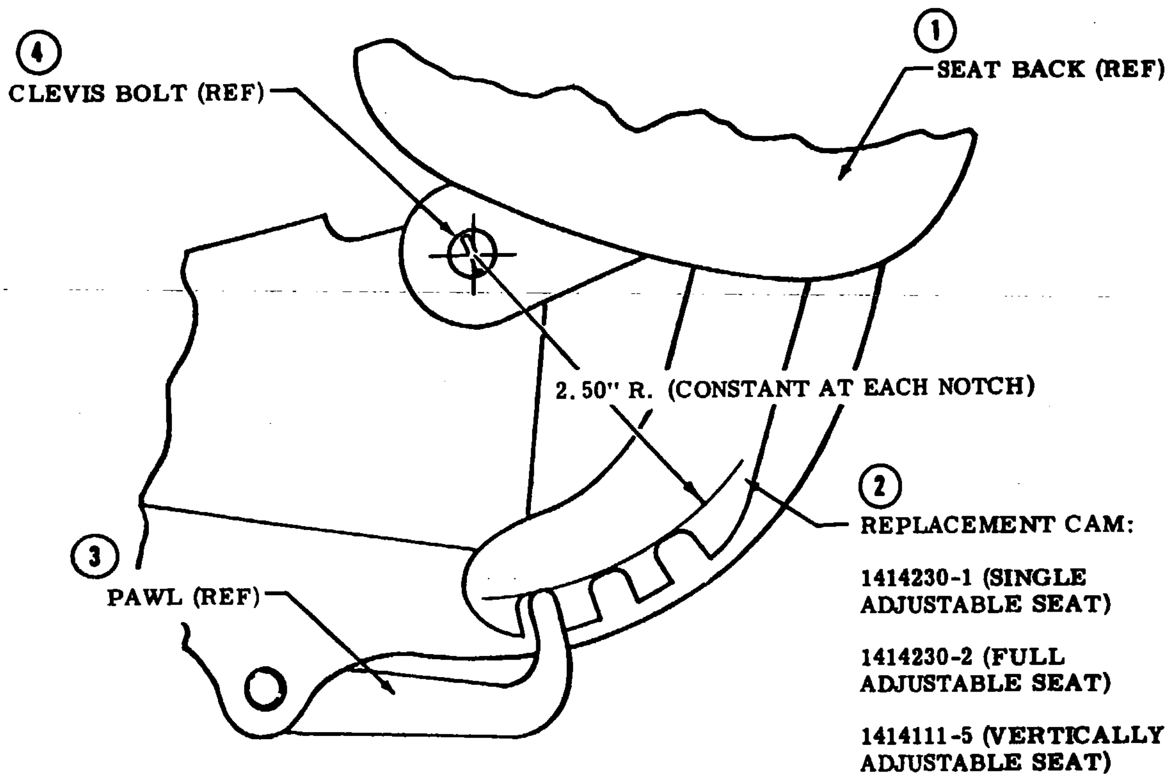
Detail **A**
BEGINNING WITH SERIAL FR17200441



AIRCRAFT SERIALS FR17200146 AND ON

1. Seat Bottom
2. Mounting Bracket
3. Strap
4. Seat Bottom Structure
5. Spacer
6. Hinge Bracket
7. Seat Belt Anchor
8. Plunger
9. Fuselage Structure
10. Aft Cabin Wall
11. Seat Back
12. Bracket

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



REPLACEMENT PROCEDURE:

a. Remove seat from aircraft.

b. 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.

c. Drill out existing rivets and insert new cam assembly (2). Position seat back so pawl (3) engages first cam slot as illustrated.

d. Position cam so each slot bottom aligns with the 2.50" radius as illustrated.

e. 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.

f. Reinstall upholstery, upholstery panels and seat.

Figure 3-7. Seat Back Cam Replacement

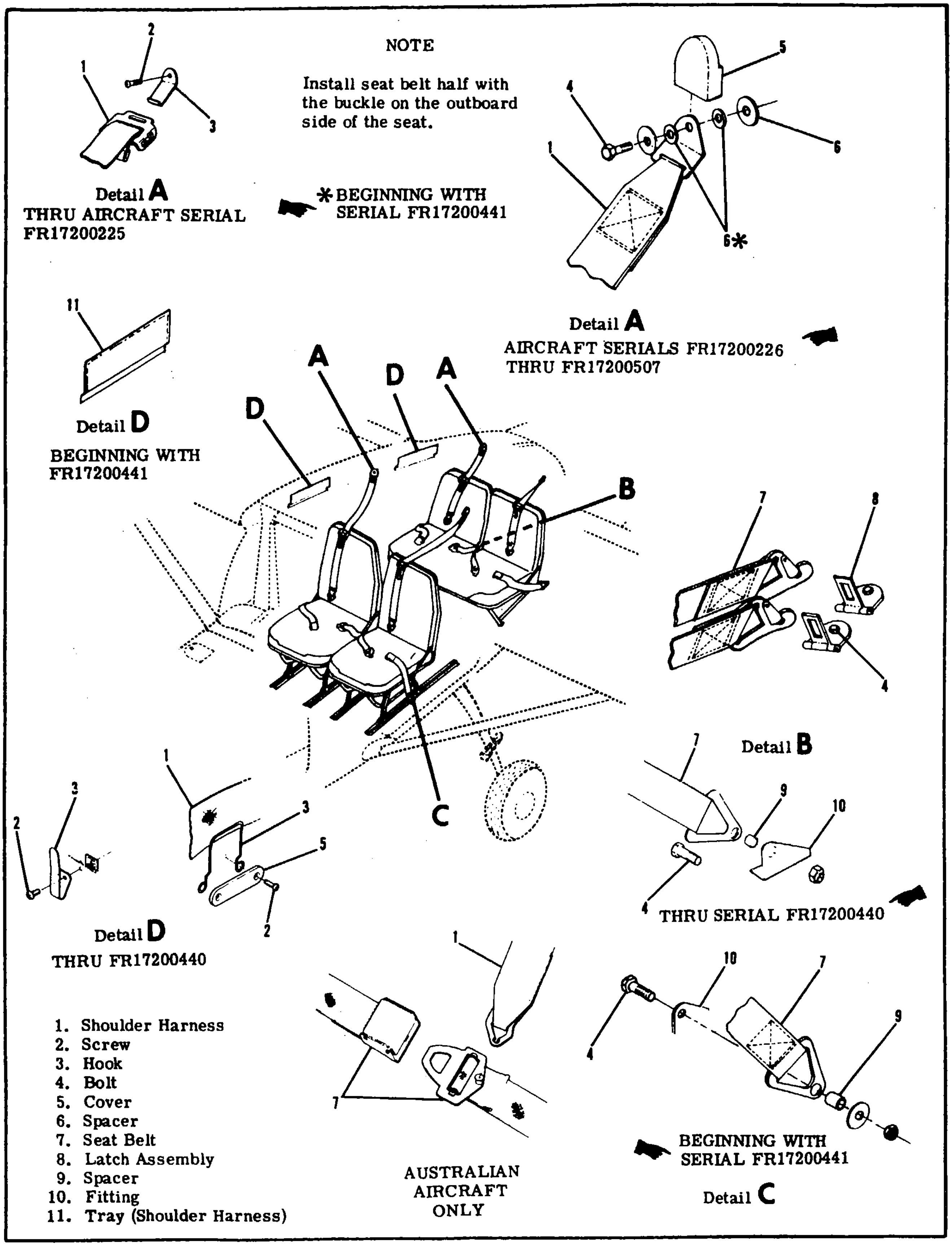


Figure 3-7A. Seat Belt and Shoulder Harness Installation(Sheet 1 of 2)

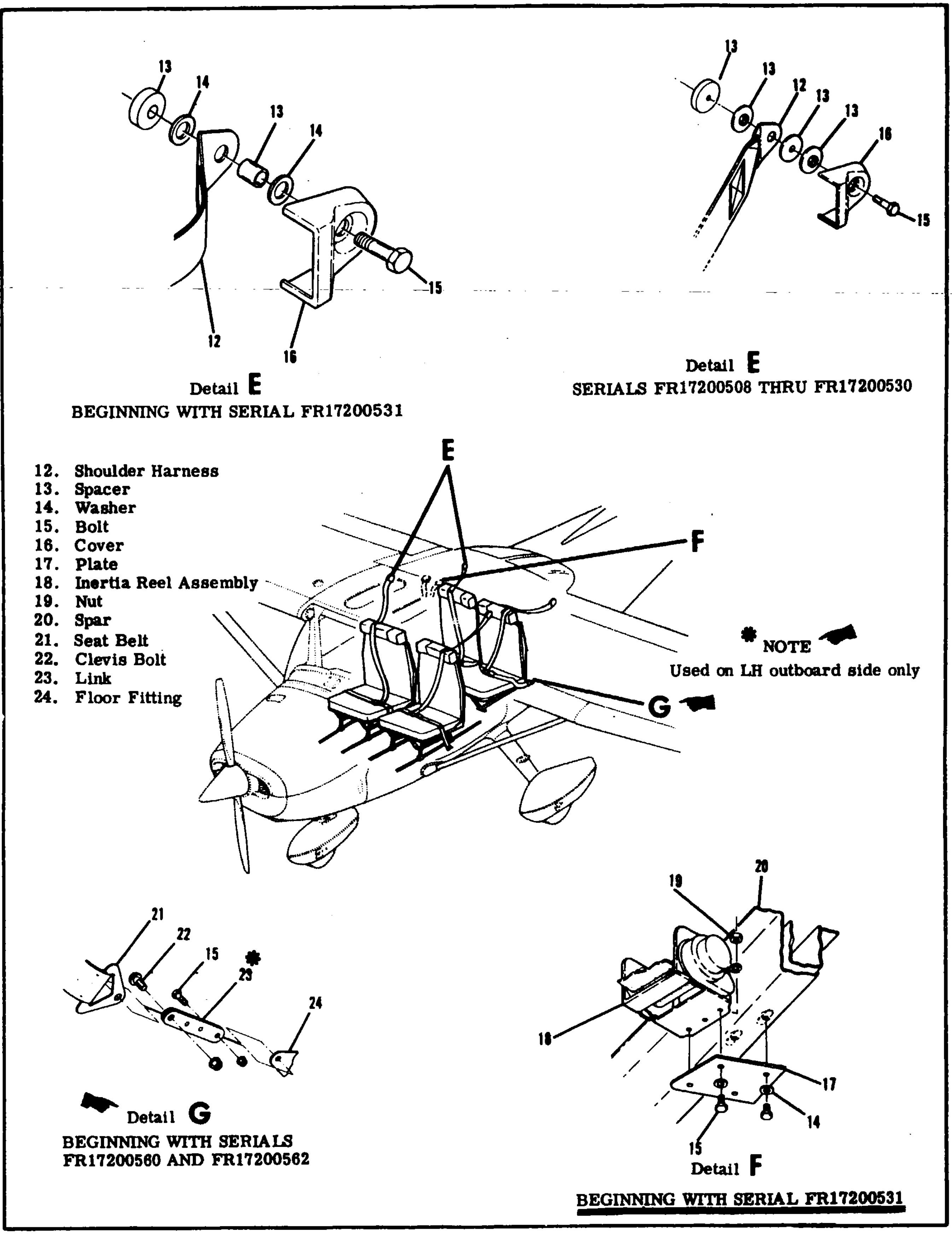
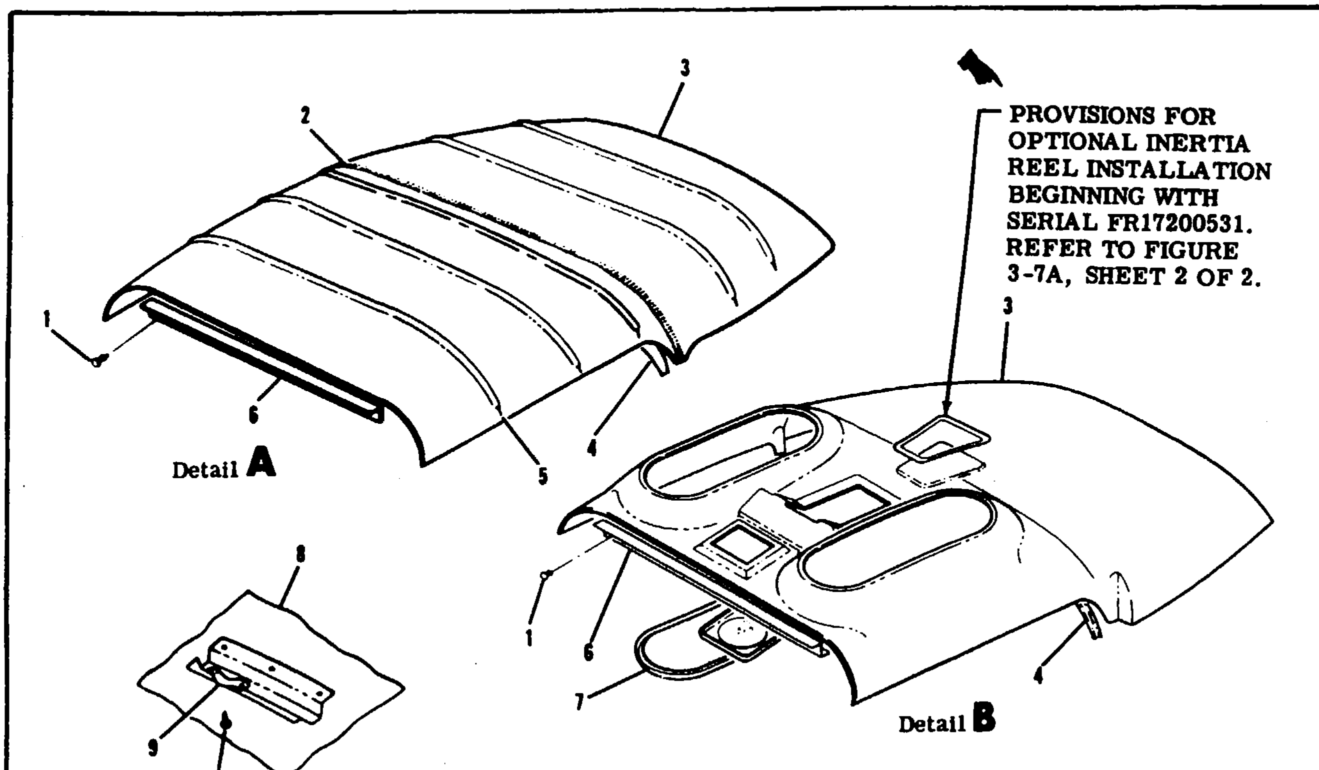


Figure 3-7A. Seat Belt and Shoulder Harness Installation(Sheet 2 of 2)



1. Stud
2. Zipper
3. Headliner Assembly
4. Tiara
5. Wire Bow
6. Front Spar Shield
7. Window Molding
8. Cabin Top
9. Retaining Tab
10. Screw

Figure 3-8. Cabin Headliner Installation

4. Remove headliner assembly and bows from aircraft.

NOTE

Due to difference in length and contour of wire bows, each bow should be tagged to assure proper location in headliner.

5. Remove spun glass soundproofing panels.

NOTE

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

6. 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. Straighten tabs bent during removal of headliner.
7. Apply cement to inside of skin in areas where soundproofing panels are not supported by wire bows and press soundproofing in place.
8. Insert wire bows into headliner seams and secure two bows at rear of headliner. Stretch material along edges to properly center, but do not stretch it tight enough to destroy ceiling contours or distort wire bows. Secure edges of headliner with metal teeth.
9. Work headliner forward, installing each wire bow in place with metal tabs. Wedge ends of wire bows into the retainer strips. Stretch headliner just taut enough to avoid wrinkles and maintain a smooth contour.
10. When all bows are in place and fabric edges are secured, trim off excess fabric and reinstall all items removed.

b. Detail B.
1. Remove sun visors, all inside finish strips and plates, overhead console, upper doorpost shields and any other visible retainers securing headliner.
2. Remove molding from fixed windows.
3. Remove screws securing headliner and carefully take down headliner.
4. Remove spun glass soundproofing panels above headliner.

NOTE

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

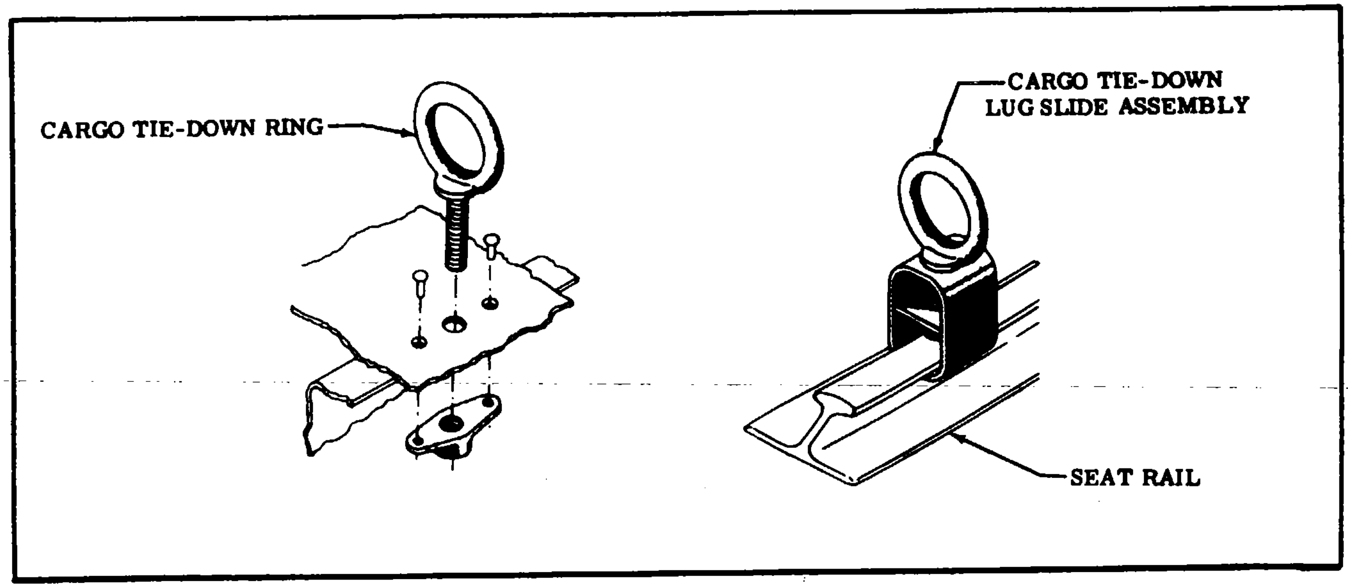


Figure 3-9. Cargo Tie-Down Rings

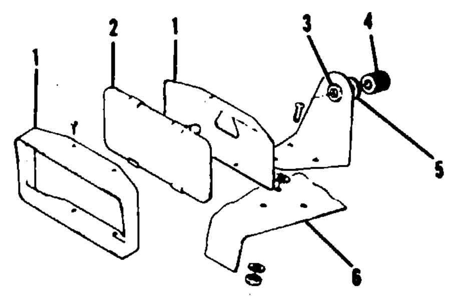


Figure 3-10. Rear View Mirror Installation

5. 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.

3-47. 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 area behind hole is checked for electrical wiring, fuel lines and other components which might be damaged by using a longer screw.

3-48. 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 one as a pattern for trimming and marking screw holes.

3-49. SAFETY PROVISIONS.

3-50. CARGO TIE-DOWNS. Cargo tie-downs are used to ensure baggage cannot enter seating area during flight. Methods of attaching tie-downs are illustrated in figure 3-9. The eyebolt and nutplate can be located at various points. The sliding tie-down lug also utilizes eyebolt and attaches to a seat rail.

3-51. SAFETY BELTS. (Refer to figure 3-7A) 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.

3-52. SHOULDER HARNESS. (Refer to figure 3-7A) Individual shoulder harnesses may be installed for each seat except auxiliary. Each harness is connected to the upper fuselage structure and to the seat safety belt buckle. Component parts should be replaced as outlined in preceding paragraph.

NOTE

Beginning with AIRCRAFT SERIAL FR1720226 AND ON the shoulder harness attaches to the blade half of the safety belt which is connected on the inboard side of each seat.

3-53. GLIDER TOW-HOOK. A glider tow-hook, which is mounted in place of tail tie-down ring, is available for all models.

3-54. REAR VIEW MIRROR. A rear view mirror may be installed on cowl deck above instrument panel. Figure 3-10 shows details for rear view mirror installation.

SHOP NOTES:

SECTION 4

WINGS AND EMPENNAGE

TABLE OF CONTENTS

4-1. WINGS AND EMPENNAGE.

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

4-3. DESCRIPTION. Each all-metal wing panel 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. The leading edge of the left wing may be equipped with landing and taxi lights. Colored navigation lights are mounted at each wing tip.

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 of wing being removed.
d. Disconnect:
   1. Electrical wires at wing root disconnects.
   2. Fuel lines at wing root. (Refer to precautions outlined in paragraph 12-3.
   3. Pitot line (left wing only) at wing root.
   4. Cabin ventilator hose at wing root.
   5. Wing leveler vacuum tube, if installed, at wing root.

e. Slack off tension on aileron cables by loosening turnbuckles, then disconnect cables at aileron bellcranks. Disconnect flap cables at turnbuckles above headliner, and pull cables into wing root area.

NOTE

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

f. Support wing at outboard end and disconnect strut at wing fitting. Tie the strut up with wire to prevent it from swinging down and straining strut-to-fuselage fitting. Loosen lower strut fairing and slide it up the strut, the strut may then be lowered without damage.

NOTE

It is recommended that flap be secured in streamlined position with tape during wing removal to prevent damage, since flap will swing freely.

g. Mark position of wing attachment eccentric bushings (refer to figure 4-1); these bushings are used to rig out "wing heaviness."
h. Remove nuts, washers, bushings and bolts attaching wing spars to fuselage.

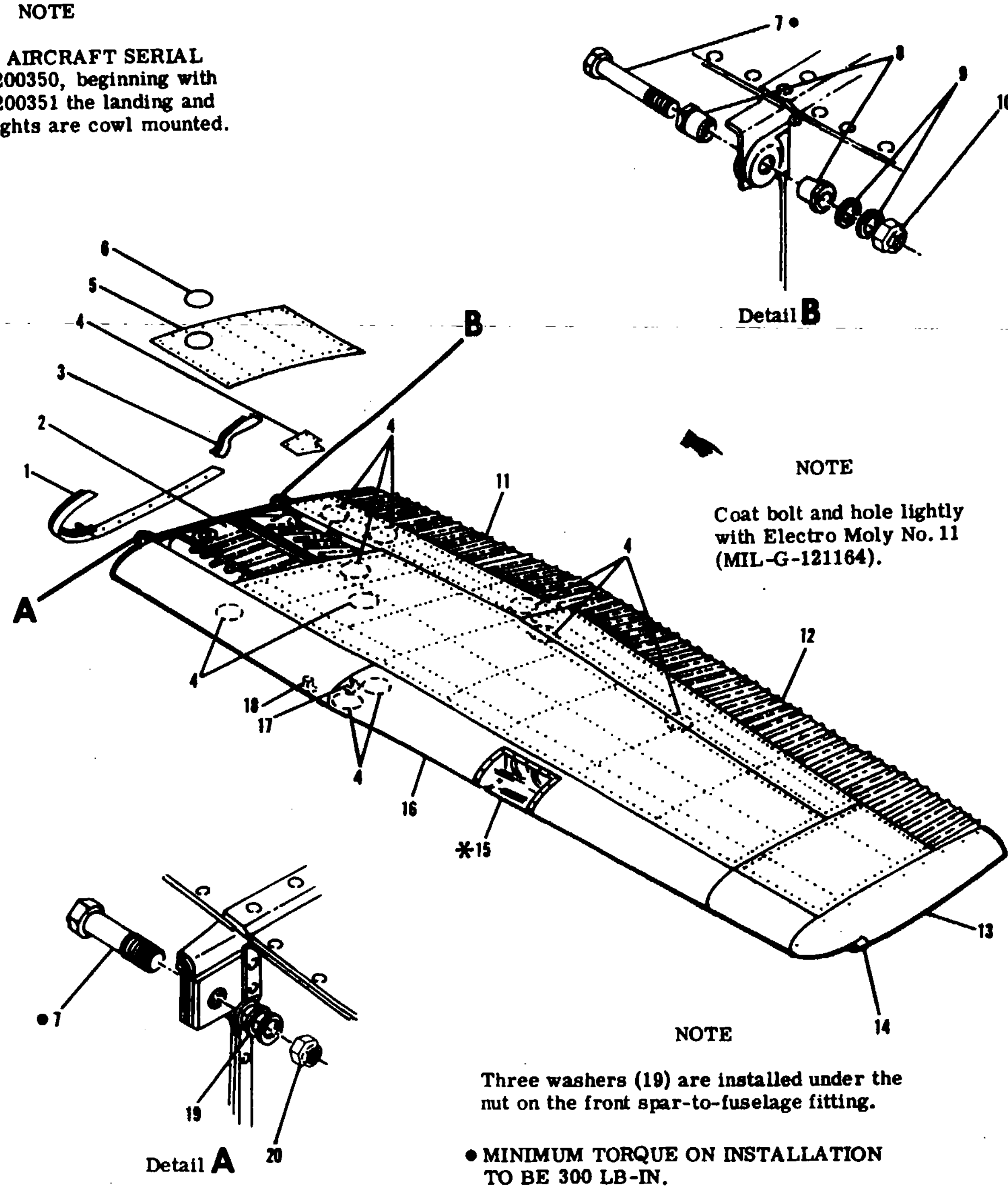
NOTE

It may be necessary to rock the wing slightly while pulling attaching bolts, or to use a long drift punch to drive out attaching bolts.

i. Remove wing and lay on padded stand.

NOTE

✱ THRU AIRCRAFT SERIAL FR17200350, beginning with FR17200351 the landing and taxi lights are cowl mounted.



NOTE

Coat bolt and hole lightly with Electro Moly No. 11 (MIL-G-121164).

NOTE

Three washers (19) are installed under the nut on the front spar-to-fuselage fitting.

● MINIMUM TORQUE ON INSTALLATION TO BE 300 LB-IN.

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

Figure 4-1. Wing Installation

4-5. REPAIR. A damaged wing panel may be repaired in accordance with instructions outlined in Section 18. Extensive repairs of wing skin or structure are best accomplished using the wing 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.

a. Hold wing in position and install bolts, bushings, washers and nuts attaching wing spars to fuselage fittings. Be sure eccentric bushings are positioned as marked.

b. Install bolt, spacers, and nut to secure upper and lower ends of wing strut to wing and fuselage fittings.

c. Route flap and aileron cables, using guide wires. (See note in paragraph 4-3.)

d. Connect:

1. Electric wires at wing root disconnects.
2. Fuel lines at wing root. (Refer to precautions outlined in paragraph 12-3.)
3. Pitot line (if left wing is being installed).
4. Ventilator hose.
5. Wing leveler vacuum tube, if installed, at wing root.

e. Rig aileron system (Section 6).

f. Rig flap system (Section 7).

g. Refuel wing tank and check for leaks. (Refer to precautions outlined in paragraph 12-3.)

h. Check operation of navigation, strobe lights also landing and taxi lights thru FR17200350.

i. Check operation of fuel gage.

j. 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.

k. 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.

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. Tighten nut 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. Tighten nut, install fairing strip, and repeat test flight.

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 airplane.

e. Reverse preceding steps to install strut.

4-11. REPAIR. Wing strut repair is limited to replacement of tie-downs and attaching parts. A badly dented, cracked, or deformed wing strut 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 thermo-plastic. Hinge brackets at the fin rear spar attach the rudder.

4-14. REMOVAL. The vertical fin may be removed without first removing the rudder. However, for access and ease of handling, the rudder may be removed by following procedures outlined in Section 10.

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.

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.

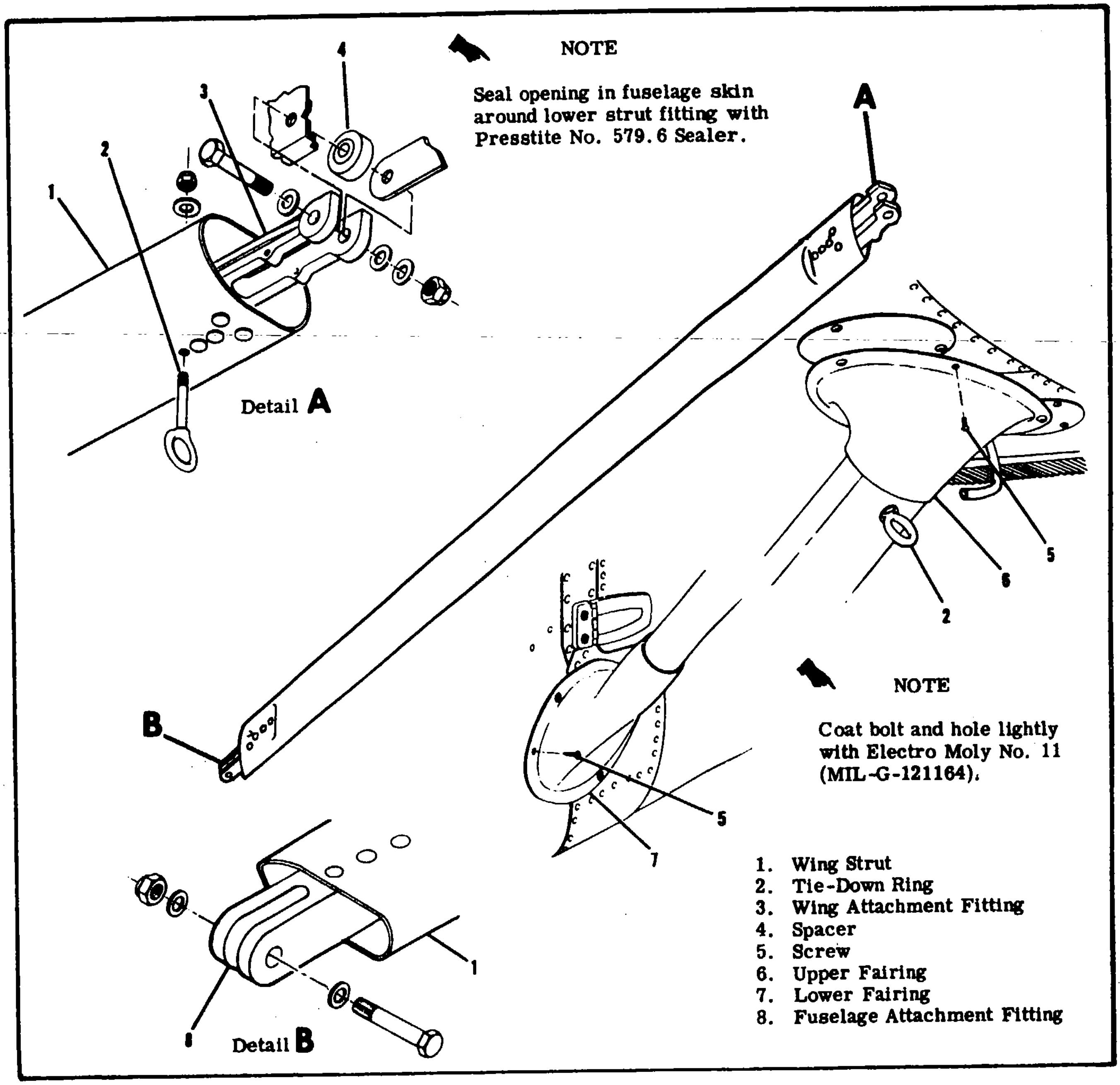


Figure 4-2. Wing Strut

4-15. REPAIR. Fin repair should be accomplished in accordance with appiicable 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 glass-fiber 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.

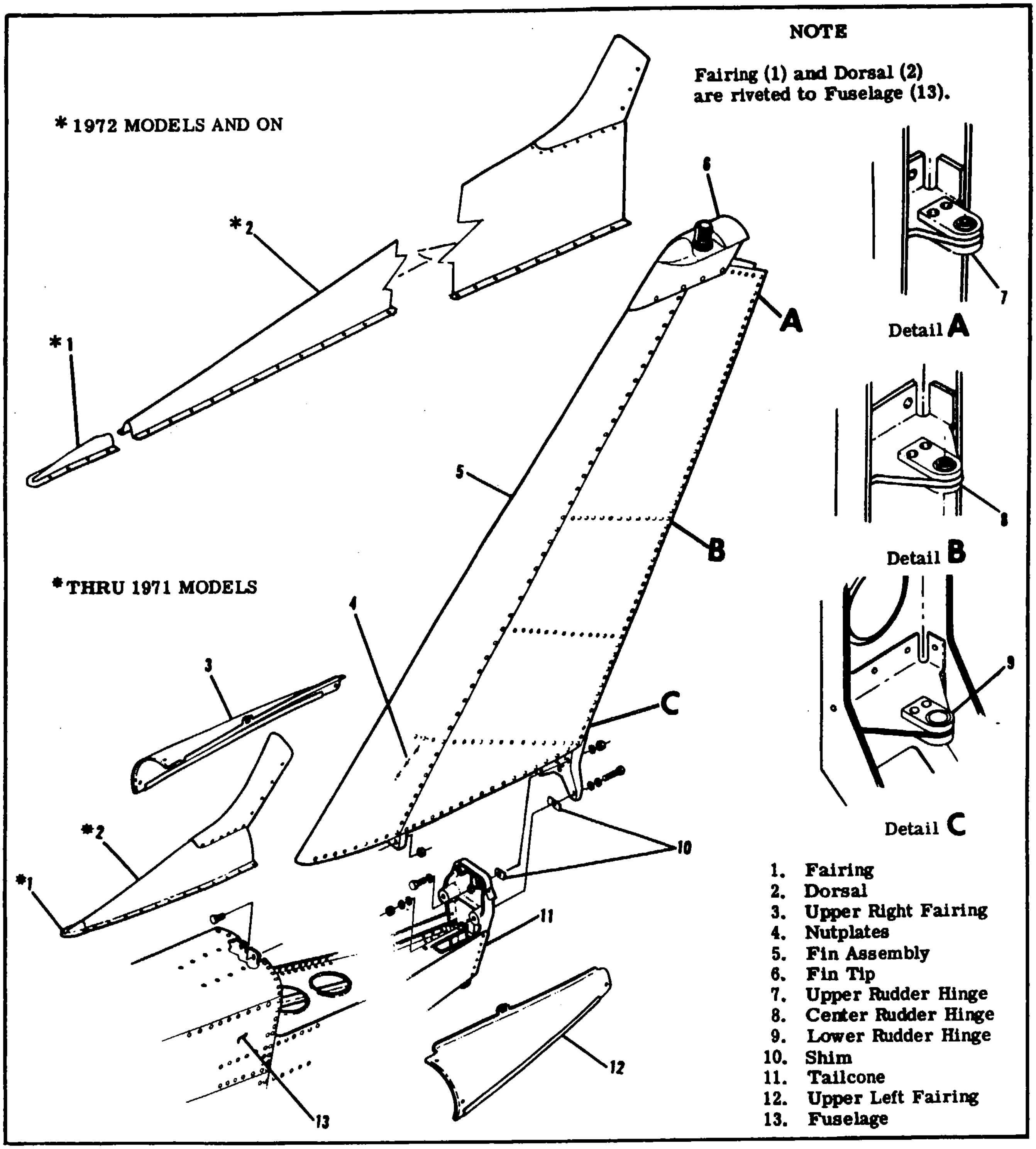
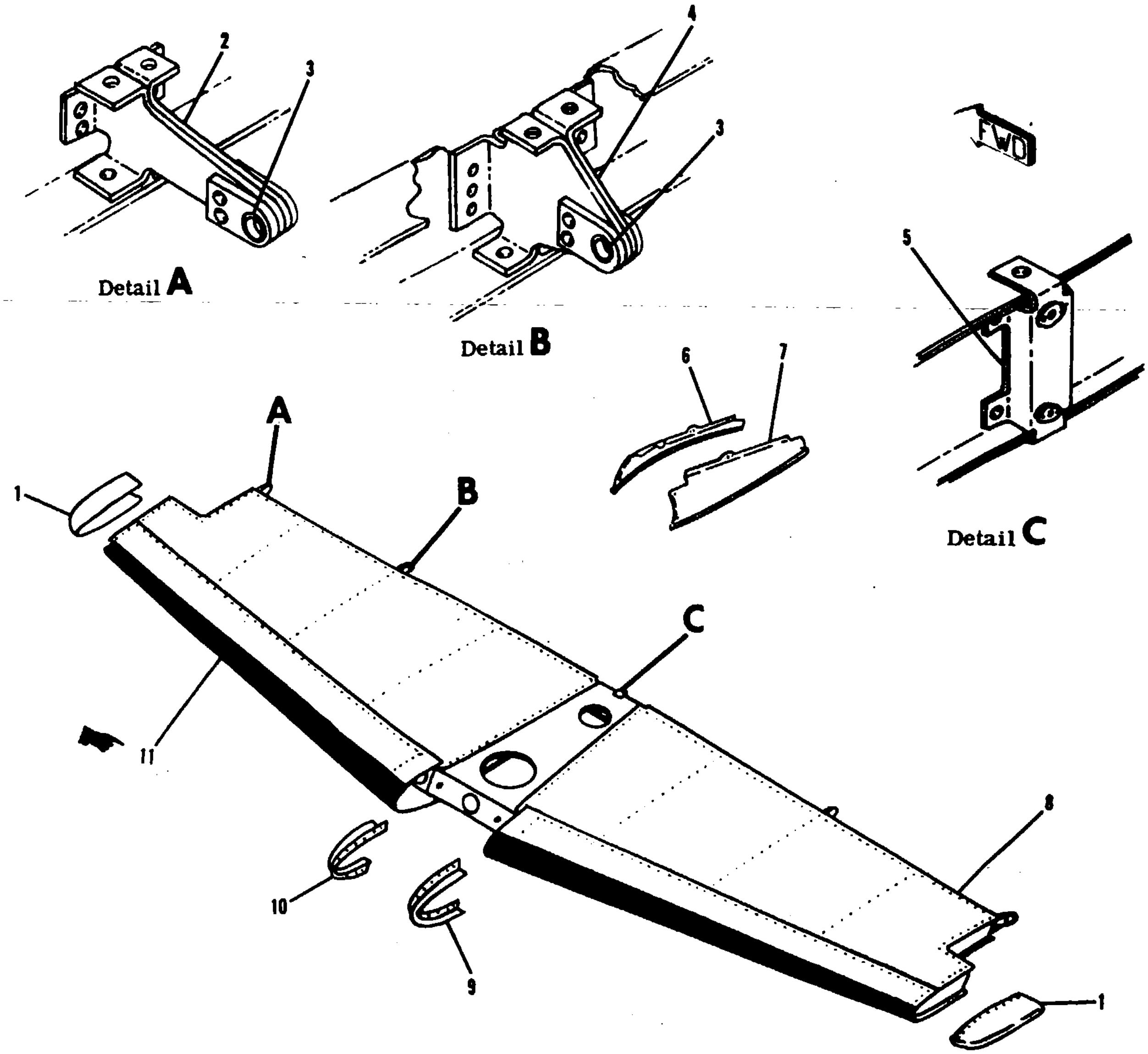


Figure 4-3. Vertical Fin

a. Remove elevator 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 the horizontal stabilizer, and pull cables out of the tailcone.
d. Remove bolts securing horizontal stabilizer to fuselage.
e. Remove horizontal stabilizer.
f. Reverse the preceding steps to install horizontal



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

stabilizer. Rig control system as necessary, check operation of tail navigation light and flashing beacon.

NOTE

Tighten forward stabilizer attach bolts first, install required thickness of washers to allow a maximum gap of .010 between washer and stabilizer rear epar.

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

4-21. ABRASION BOOTS.

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

4-23. REMOVAL. To remove boots use toluol to soften the cement line. A minimum amount of tension is applied to peel back the boot. Removal should be slow to allow time for the toluol to undercut the cement. Excessive quantities of the solvent should be avoided.

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 1/2-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.

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 Manfacturing Co.) thoroughly.
f. Apply one even brush coat to the metal and the inner surface of the boot. Allow 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 slean, 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 EC-539 Sealing Compound (Minnesota Minning and Manufacturing Company) along the trailing edges of the boot to the surface of the skin.
k. Remove masking tape and clean stabilizer of excess material.
l. Mask to the edge of boot for painting stabilizer.

SECTION 5

LANDING GEAR AND BRAKES

TABLE OF CONTENTS Page

5-1. LANDING GEAR.

5-2. DESCRIPTION. On 1968 thru 1970 Model aircraft, a non-retractable tricycle landing gear, equipped with Cessna flat, spring-steel main gear struts, and an air/oil steerable nose gear strut is installed. Beginning with 1971 Model aircraft, a non-retractable tricycle landing gear equipped with Cessna tubular, spring-steel main gear struts and an air/oil steerable nose gear shock strut is used. A bracket to attach a step to each strut is bonded to the main gear strut with a thermo-setting, high-strength cement. Wheels with disc-type brakes and tube-type tires are installed. The brake disc is attached with the wheel thru-bolts or capscrews and becomes an integral part of the wheel. The nose gear is a combination of a conventional air/oil (oleo) strut and fork, incorporating a shimmy dampener. 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 travel of 30 degrees right or left of center. Through use of the brakes, the aircraft can be pivoted about the outer wing strut fittings. Speed fairings for the nose and main wheels are available for installation. A heavy-duty nose gear may be installed on some aircraft.

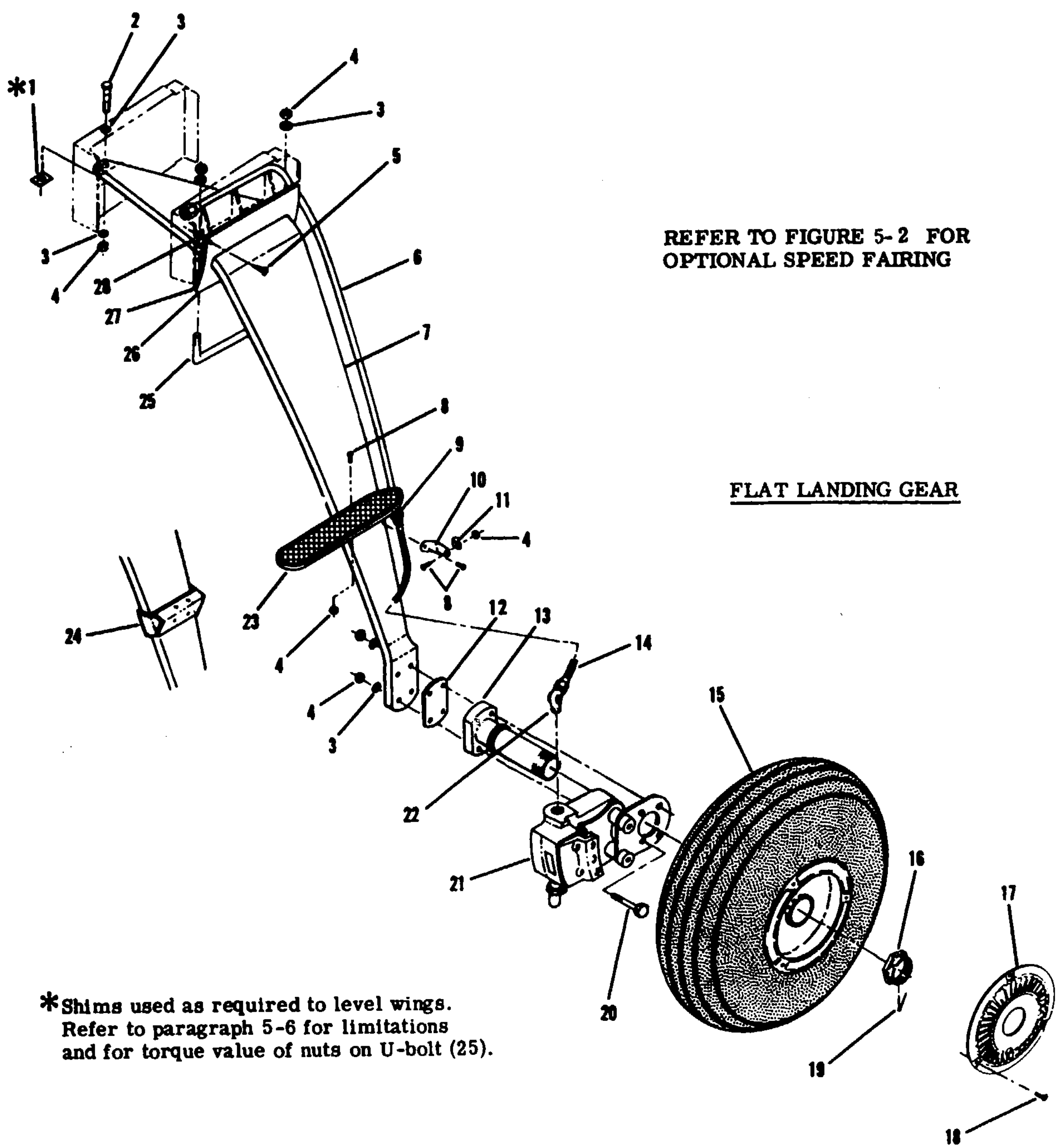
5-3. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
AIRCRAFT LEANS TO ONE SIDE.	Incorrect tire inflation.	Inflate to correct pressure.
	Landing gear attaching parts not tight.	Tighten loose parts and replace defective parts.
	Landing gear spring excessively sprung.	Remove and replace.
	Incorrect shimming at inboard end of spring. (Flat Gear)	Install shims as required. Refer to paragraph 5-6 for limitations.
	Bent axles.	Replace axles.
TIRES WEAR EXCESSIVELY.	Incorrect tire inflation.	Inflate to correct pressure.
	Wheels out of alignment. (Flat Gear)	Align in accordance with paragraph 5-20.
	Landing gear spring excessively sprung.	Remove and replace.
	Incorrect shimming at inboard end of spring. (Flat Gear)	Install shims as required. Refer to paragraph 5-6 for limitations.
	Bent axles.	Replace axles.
	Dragging brakes.	See paragraph 5-39.
	Wheel bearings too tight.	Adjust properly.
WHEEL BOUNCE EVIDENT EVEN ON SMOOTH SURFACE.	Out of balance condition.	Correct in accordance with paragraph 5-21.

5-4. MAIN LANDING GEAR. Paragraph 5-2 describes 1968 thru 1970 flat spring-steel main gear struts, shown in figure 5-1, sheet 1. Also described, are the tubular spring-steel main gear struts, shown on sheet 2 of figure 5-1. These are used beginning with 1971 Models. The illustrations should be used in conjunction with the following procedures during removal and installation of component parts. Disassembly inspection and repair, and reassembly of the various main wheel configurations are described in separate paragraphs for each configuration. The solid wheels, having two wheel halves, assembled with thru-bolts, are manufactured by Cleveland Aircraft Products Co., and webbed wheels, having two flanges and a hub are manufactured by McCauley Industrial Corporation. Cleveland wheels are shown in figure 5-3, sheet 1. McCauley wheels have either aluminum or steel wheel flanges, and are shown on sheet 2 of figure 5-3. McCauley aluminum flanges are attached to the wheel hub by thru-bolts, and steel flanges are attached to the wheel hub with capscrews. During assembly of the main wheels, thru-bolts or capscrews, as applicable, shall be tightened evenly and torqued to the value specified in figure 5-2A.

5-5. MAIN GEAR REMOVAL (Flat Strut.) (Refer to figure 5-1, sheet 1.) The following procedure removes the landing gear as a complete assembly. Refer to applicable paragraphs for removal of individual components.

a. Remove seats as necessary and remove access cover over strut being removed.
b. Hoist or jack aircraft in accordance with procedures outlined in Section 2.
c. Remove screws and slide external fairing plate and seal down over strut.
d. Drain hydraulic fluid from brake line on strut being removed.
e. Disconnect hydraulic brake line at bulkhead fitting at inboard end of strut so that brake line is removed with the strut. Cap or plug disconnected fittings to prevent entry of foreign material.
f. Remove nuts and washers from U-bolt at outboard attaching structure and remove U-bolt.
g. Remove bolt attaching inboard end of strut and pull entire gear assembly out of fuselage.



REFER TO FIGURE 5-2 FOR OPTIONAL SPEED FAIRING

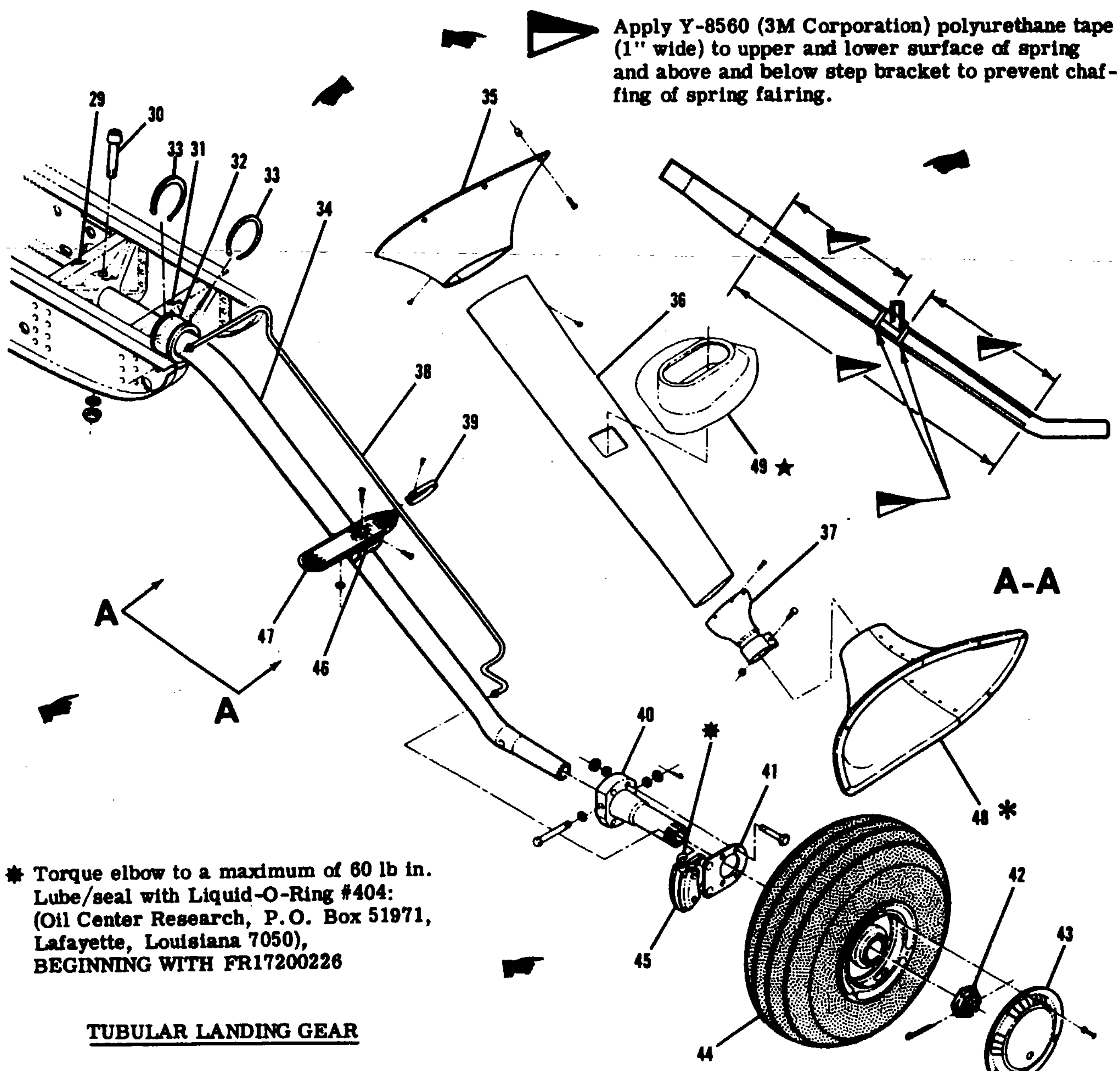
FLAT LANDING GEAR

*Shims used as required to level wings. Refer to paragraph 5-6 for limitations and for torque value of nuts on U-bolt (25).

1. Shim	14. Brake Hose	26. Plate	38. Brake Line
2. Bolt	15. Wheel	27. Seal	39. Clamp
3. Washer	16. Axle Nut	28. Nut	40. Axle
4. Nut	17. Hub Cap	29. Inboard Forging	41. Brake Torque Plate
5. Screw	18. Screw	30. Bolt	42. Nut
6. Brake Line	19. Cotter Pin	31. Outboard Forging	43. Hub Cap
7. Spring Strut	20. Bolt	32. Bushing	44. Wheel Assembly
8. Screw	21. Brake Assembly	33. Bushing Retainer Ring	45. Wheel Brake Assembly
9. Union	22. Elbow	34. Spring-Strut	46. Step Bracket
10. Strap	23. Step	35. Fuselage Fairing	47. Step
11. Clamp	24. Step Bracket	36. Spring-Strut Fairing	48. Brake Fairing
12. Wheel Alignment Shim	25. U-Bolt	37. Cap Fairing	49. Step Fairing
13. Axle			

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

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.



✱ Torque elbow to a maximum of 60 lb in. Lube/seal with Liquid-O-Ring #404: (Oil Center Research, P.O. Box 51971, Lafayette, Louisiana 7050), BEGINNING WITH FR17200226

TUBULAR LANDING GEAR

✱ BEGINNING WITH FR17200441 (USED ONLY WITH WHEEL FAIRINGS)

★ BEGINNING WITH FR17200351

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

NOTE

Note shims (item 1, figure 5-1, sheet 1.) They are placed under inboard end of main gear strut. Mark or tape shims together to be sure they are installed correctly when main gear strut is installed.

5-6. MAIN GEAR INSTALLATION. (Flat Strut.) (Refer to figure 5-1, sheet 1.) The following procedure installs the landing gear as a complete assembly. Refer to applicable paragraphs for installation of individual components.

a. Slide external fairing plate and seal over upper end of landing gear strut.

b. Slide strut into place and work shims into position under inboard end of strut. Install bolt, washer and nut to secure inboard end of strut.

NOTE

Shims are installed under inboard end of the main landing gear strut as required to level the wings within a total tolerance of three inches. Maximum number of shims permissible is two.

c. Install U-bolt at outboard attaching structure with washers and nuts. Torque nuts evenly to 270-300 lb-in. Also torque inboard attach-bolt to the torque specified in the chart in Section 1.

d. Attach seal and external fairing with screws.

e. Lower aircraft and remove jacks or hoist.

f. Connect brake line; fill and bleed brake system as outlined in paragraph 5-51.

g. Install seats and access covers.

5-7. MAIN GEAR REMOVAL. (Tubular Strut.) (Refer to figure 5-1, sheet 2.) The following procedure removes the landing gear as a complete unit. Refer to applicable paragraphs for removal of individual components.

a. Remove seats as necessary, and remove access cover over strut being removed.

b. Hoist or jack aircraft in accordance with procedures outlined in Section 2.

c. Remove screws attaching fairing to fuselage. Remove screw at splice in fairing and work fairing off strut fairing.

d. Drain hydraulic brake fluid from brake line on gear strut being removed.

NOTE

Fluid can be drained at the top of the strut next to the fuselage or brake fairing and cap fairing can be removed to drain fluid at brake assembly.

e. Disconnect brake line in fuselage so that brake line is removed with gear strut. Cap or plug disconnected fittings to prevent entry of foreign material.

f. Remove nut, washer and bolt attaching inboard end of gear strut to inboard landing gear bulkhead fitting.

g. Pull landing gear strut from fitting and bushing, using care to prevent damage to hydraulic brake line.

NOTE

The tubular landing gear strut is a compression fit in the bushing in the outboard landing gear bulkhead.

5-8. MAIN GEAR INSTALLATION. (Tubular Strut.) (Refer to figure 5-1, sheet 2.) The following procedure installs the landing gear as a complete unit. Refer to applicable paragraphs for installation of individual components.

a. Connect brake line at top of strut and at brake if it was disconnected at removal of strut.

b. Apply Dow Corning Compound DC7 to approximately 11 inches of upper end of landing gear tubular strut.

CAUTION

Avoid use of Dow Corning DC7 on surfaces to be painted. DC7 contains silicone which is harmful to painted areas.

c. Work strut into place through bushing in outboard landing gear bulkhead fitting.

d. Align strut in inboard bulkhead fitting and install bolt through fitting and tubular strut. Install washer and nut on bolt and tighten to torque value of 1100-1300 lb-in.

e. Fill and bleed brake system in accordance with procedures outlined in paragraph 5-51.

f. Install all fairings removed during gear removal.

g. Lower aircraft and install all access covers and carpets and seats removed for access.

5-9. STEP BRACKET INSTALLATION.

NOTE

The step bracket is secured to the landing gear strut with EA9309, or a similar epoxy-base adhesive.

a. Remove landing gear fairing, if installed.

b. Mark position of removed step bracket so that the new step bracket will be installed in approximately the same position on the strut.

c. Remove all traces of the original bracket and adhesive, as well as any rust, paint or scale with a wire brush and coarse sandpaper. Brush or scraping motion should be longitudinally with the strut.

d. Leave surfaces of strut slightly roughened or abraded, but deep scratches or nicks should be avoided. Also, roughen bonding surface of new bracket.

e. 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 thoroughly dry.

f. Check fit of the step bracket on the landing gear strut. A small gap is permissible between the bracket and the strut.

g. Mix adhesive (EA9309, or equivalent) in accordance with the manufacturer's instructions.

h. Spread a coat of mixed adhesive on bonding surfaces of strut and bracket, and place step bracket in position on landing gear strut.

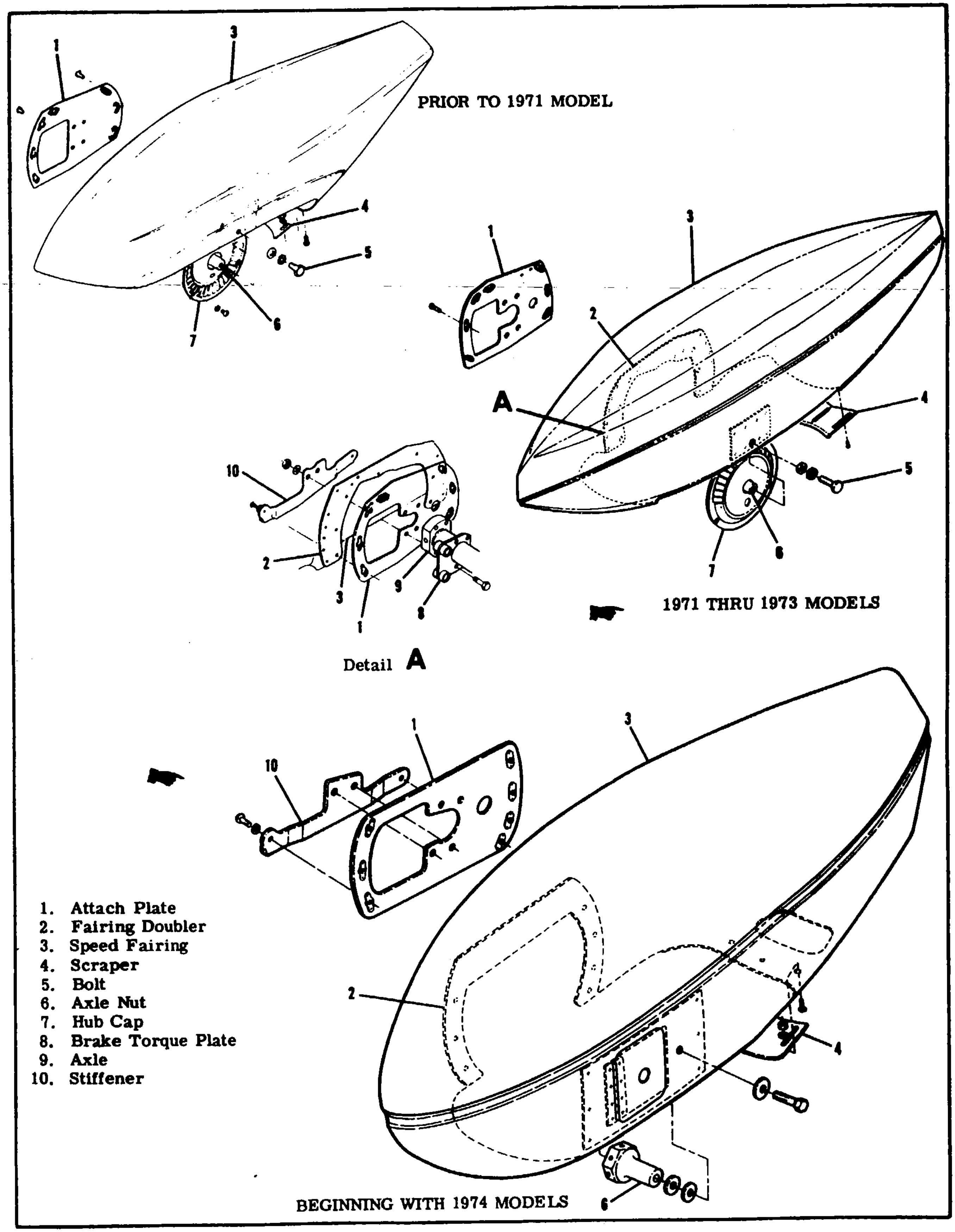


Figure 5-2. Main Wheel Speed Fairing

NOTE

On flat struts, tap bracket upward on strut to ensure a good, tight fit. On tubular struts, clamp bracket to strut to ensure a good, tight fit. Be sure that bracket is aligned straight on the strut.

i. Form a small fillet of the adhesive at all edges of the bonding surfaces. Remove excess adhesive with lacquer thinner.
j. Allow adhesive to thoroughly cure according to manufacturer's recommendations before flexing the landing gear strut or applying loads to the step.
k. Paint landing gear strut and step bracket after curing is completed.
l. If aircraft is equipped with landing gear strut fairings, install them at this time, then install step to bracket.

5-10. MAIN WHEEL SPEED FAIRING REMOVAL AND INSTALLATION. (Refer to figure 5-2.)
a. Prior to 1974 Models, remove screws attaching stiffener and inboard side of wheel speed fairing to attach plate, which is bolted to the axle.

NOTE

Beginning with 1974 Models, remove wheel brake fairing by removing screws around perimeter of fairing, then removing screws from nutplates holding two halves of brake fairing together, then, accomplish instructions outlined in step "a".

b. Remove bolt securing outboard side of fairing to axle nut.
c. Loosen scraper, if necessary, and work speed fairing from the wheel.
d. Reverse preceding steps to install wheel speed fairing.
e. After installation, check scraper-to-tire clearance for a minimum of 0.25-inch to a maximum of 0.38-inch. Elongated holes are provided in the scraper for clearance adjustment.

NOTE

Refer to Cessna Service Kit SK182-12 for repair of wheel speed fairings used on 1969-1970 Model aircraft.

CAUTION

Always check scraper-to-tire clearance after installing speed fairing, 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 fairing should be checked to make sure there is no accumulation which could prevent normal wheel rotation. Wipe fuel and oil from the speed fairings to prevent stains and deterioration.

5-10A. REMOVAL AND INSTALLATION OF MAIN LANDING GEAR FAIRINGS. (Refer to figure 5-1.)
a. To remove brake fairing, proceed as follows:
1. Remove screws from perimeter of fairing.
2. Remove screws from nutplates holding two halves of fairing together; remove two fairing halves.
3. Reverse preceding steps to install brake fairing.
b. To remove cap fairing, proceed as follows:
1. Remove (3) screws attaching fairing to spring-strut fairing.
2. Remove bolt and nut attaching clamp to spring-strut.
3. Spring clamp open to slide over spring-strut; remove fairing.
c. To remove fuselage fairing, proceed as follows:
1. Remove screws attaching fairing to fuselage.
2. Slide fairing down spring-strut fairing.
3. Reverse preceding steps to install fuselage fairing.
d. To remove step and step fairing, proceed as follows:
1. Remove screw from top of step.
2. Depress fairing for access to (2) screws in base of step; remove screws and step.
3. Remove step fairing over step bracket.
4. Reverse preceding steps to install step and step fairing.

NOTE

The step fairing is formed of polyurethane flexible integral skin, which can be stretched to clear step or step bracket. The material will return to its formed shape.

e. To remove spring-strut fairing, proceed as follows:
1. Remove brake fairing as outlined in step "a".
2. Remove cap fairing as outlined in step "b".
3. Remove fuselage fairing as outlined in step "c".
4. Remove step and step fairing as outlined in step "d".
5. Remove screws from "U" -type sheet spring nuts (thru FR1720340); nutplates (beginning with FR1720341).
6. Spring fairing over tubular spring-strut.
7. Reverse preceding steps to install strut fairing.

5-11. MAIN WHEEL REMOVAL. (See figure 5-1.)

NOTE

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

a. Hoist or jack aircraft as outlined in Section 2.
b. Remove speed fairing, if installed, in accordance with paragraph 5-10.
c. Remove hub cap, cotter pin and axle nut.

MAIN GEAR	NOSE GEAR	WHEEL NUMBER	SIZE	MANUFACTURER	NUT/CAPSCREW TORQUE	WHEEL HALF FLANGE
X		C163001-0103	6.00x6	CLEVELAND	150 lb-in	MAGNESIUM
X		C163001-0104	6.00x6	CLEVELAND	90 lb-in	ALUMINUM
X		C163002-0101	6.00x6	McCAULEY	190-100 lb-in	ALUMINUM
X		C163003-0101	6.00x6	McCAULEY	*190-200 lb-in	STEEL
	X	1241156-12	5.00x5	CLEVELAND	150 lb-in	MAGNESIUM
	X	1241156-11	6.00x6	CLEVELAND	90 lb-in	ALUMINUM
	X	C163002-0201	5.00x5	McCAULEY	90-100 lb-in	ALUMINUM
	X	C163003-0201	5.00x5	McCAULEY	*90-100 lb-in	STEEL
	X	C163003-0401	5.00x5	McCAULEY	*190-200 lb-in	STEEL
X		C163003-0102	6.00x6	McCAULEY	*190-200 lb-in	STEEL

*Capscrew

Figure 5-2A. Main and Nose Wheel Thru-Bolt Nut/Capscrew Torque Values

d. Remove bolts and washers attaching brake back plate to brake cylinder and remove back plate.
e. Pull wheel from axle.

5-12. MAIN WHEEL DISASSEMBLY. (Cleveland)
a. Remove valve core and deflate tire. Break tire beads loose from wheel rims.

WARNING

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

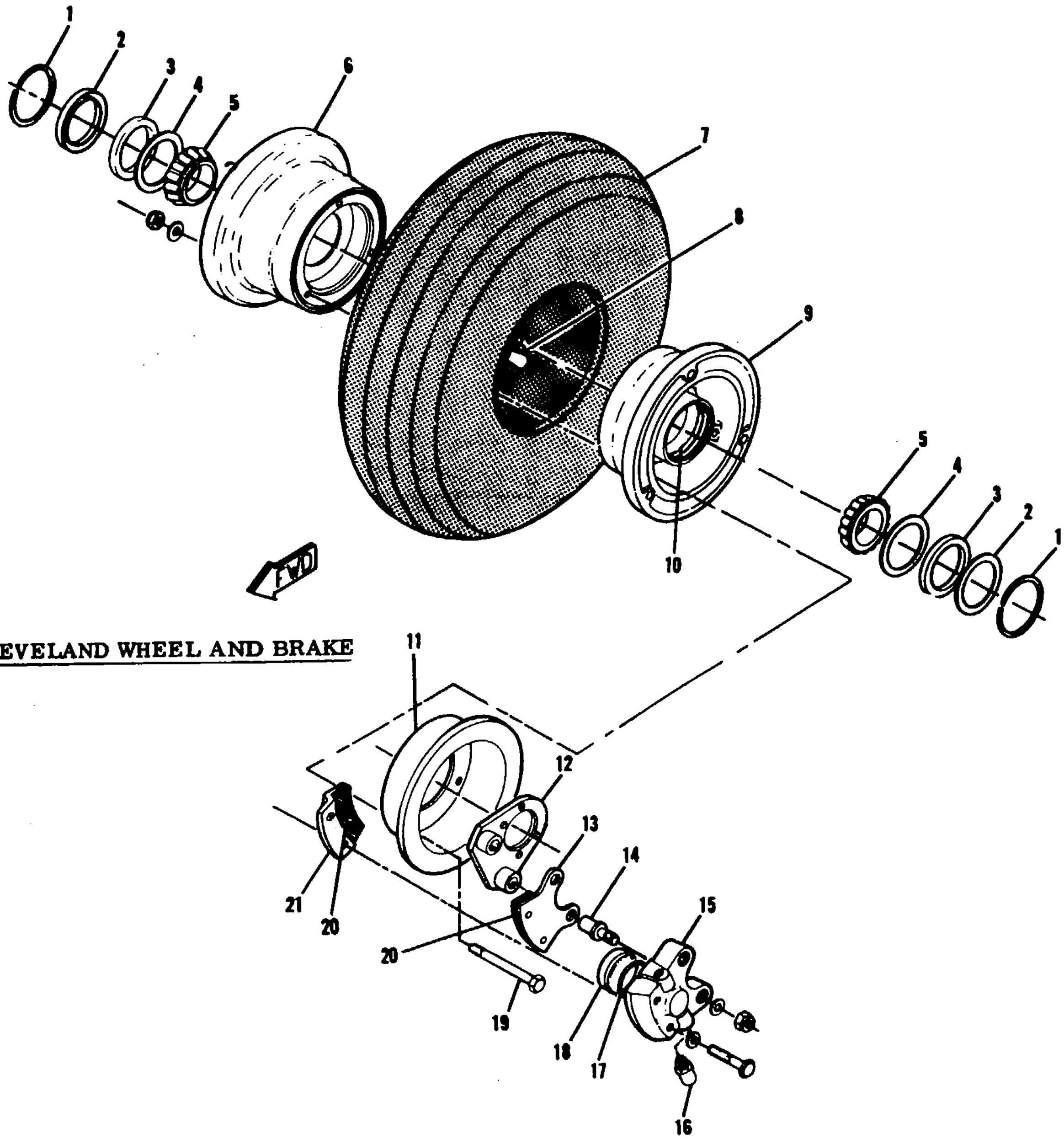
b. Remove thru-bolts and separate wheel halves, removing tire, tube, and brake disc.
c. Remove the grease seal rings, felts, and bearing cones from the wheel halves.

NOTE

The bearing cups (races) are a 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 the new bearing cup while the wheel half is still hot.

5-13. MAIN WHEEL INSPECTION AND REPAIR. (Cleveland Wheel.)
a. Clean all metal parts and grease seal felts in solvent and dry thoroughly.
b. Inspect wheel halves for cracks. Cracked wheel halves shall be discarded and new parts used. Sand out nicks, gouges and corroded areas. When protective coating has been removed, clean the area thoroughly, prime with zinc chromate, and paint with aluminum lacquer.
c. If excessively warped or scored, or worn to a thickness of 0.190-inch, brake disc shall be replaced with a new part. Sand smooth small nicks and scratches.
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) before installation.

5-14. MAIN WHEEL REASSEMBLY. (Cleveland Wheel).



CLEVELAND WHEEL AND BRAKE

1. Snap Ring
2. Grease Seal Ring
3. Grease Seal Felt
4. Grease Seal Ring
5. Bearing Cone
6. Outer Wheel Half
7. Tire
8. Tube
9. Inner Wheel Half
10. Bearing Cup
11. Brake Disc
12. Torque Plate
13. Pressure Plate
14. Anchor Bolt
15. Brake Cylinder
16. Brake Bleeder
17. O-Ring
18. Piston
19. Thru-Bolt
20. Brake Lining
21. Back Plate
22. Snap Ring
23. Grease Seal Retainer(Outbd)
24. Grease Seal Felt (Outboard)
25. Grease Seal Retainer (Outboard)
26. Bearing Cone
27. Wheel Flange (Aluminum)
28. Spacer
29. Tire
30. Tube
31. Wheel Hub
32. Bearing Cup (Race)
33. Grease Seal Retainer (Inboard)
34. Grease Seal Felt (Inboard)
35. Brake Disc
36. Torque Plate
37. Pressure Plate
38. Anchor Bolt
39. Brake Cylinder
40. Bleeder Valve
41. O-Ring (Piston)
42. Brake Piston
43. Brake Lining
44. Thru-Bolt
45. Back Plate
46. Capscrew
47. Wheel Flange (Steel)

Figure 5-3. Wheel and Brake Assembly (Sheet 1 of 2)

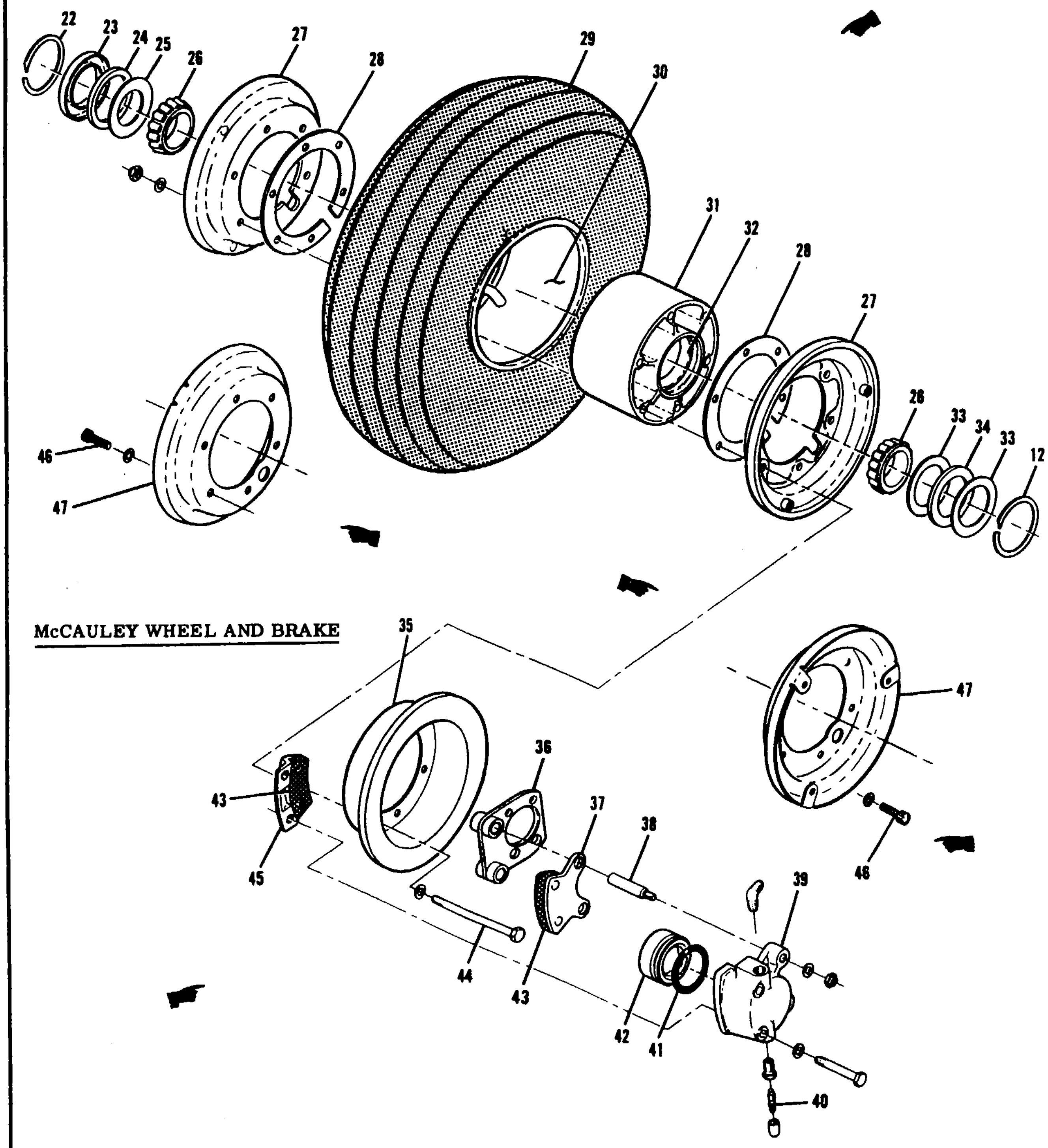


Figure 5-3. Wheel and Brake Assembly (Sheet 2 of 2)

a. 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.

b. Position tire and tube on outboard wheel half with the tube inflation valve through hole in wheel half.

c. Place the inner wheel half in position on outboard wheel half. Apply a light force to bring wheel halves together. While maintaining the light force, assemble washer and nut on thru-bolt, and tighten to maintain force. Assemble the remaining washers and nuts to the thru-bolts. Tighten nuts evenly and torque to the value specified in figure 5-2A.

CAUTION

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

d. Clean and pack bearing cones with clean aircraft wheel bearing grease (refer to Section 2).

e. Assemble bearing cones, grease seal felts, and rings into wheel halves.

f. Inflate tire to seat tire beads, then adjust to correct tire pressure. See figure 1-1.

5-14A. MAIN WHEEL DISASSEMBLY. (McCauley Wheel).

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

WARNING

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

b. Remove hardware as follows:

1. On aluminum-flanged wheels, remove thru-bolt nuts and washer and remove thru-bolts and washers.

2. On steel-flanged wheels, remove capscrews and washers.

c. Separate wheel flanges from wheel hub. Retain spacers between wheel flanges and wheel hub.

d. Remove wheel hub from tire and tube.

e. Remove retainer rings, grease seal retainers, grease seal felts and bearing cones from wheel hub.

NOTE

The bearing cups 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 an arbor press, if available press out the bearing cup and press in the new bearing cup while the wheel hub is still hot.

5-14B. MAIN WHEEL INSPECTION AND REPAIR. (McCauley Wheel).

a. Clean all metal parts, grease seal felts and mylar spacers in cleaning solvent and dry thoroughly.

b. Inspect wheel flanges and wheel hub for cracks. Discard cracked wheel flanges or hub and install new parts. Sand out nicks, gouges and corroded areas. When protective coating has been removed, clean the area thoroughly, prime with zinc chromate, and paint with aluminum lacquer.

c. If excessively warped or scored, or worn to a thickness of 0.190-inch, brake disc should be replaced with a new part. Sand smooth small nicks and scratches.

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) before installing in the wheel hub.

5-14C. MAIN WHEEL REASSEMBLY. (McCauley Wheel).

a. Place wheel hub in tire and tube with tube inflation stem in cutout of wheel hub.

b. Place spacer and wheel flange on inboard side of wheel hub (opposite of tube inflation stem), then install hardware as follows:

1. On aluminum-flanged wheels, place washer under head of each thru-bolt and insert bolt through wheel flange and wheel hub.

2. On steel-flanged wheels, place washer under head of each capscrew and start capscrews into wheel hub threads.

c. Place spacer and wheel flange on other side and align valve stem in cutout in wheel flange.

d. Install hardware as follows:

1. On aluminum-flanged wheels, install washers and nuts on thru-bolts.

2. On steel-flanged wheels, repeat step 2, under item b.

CAUTION

Be sure that spacers and wheel flanges are seated on flange of wheel hub. Uneven or improper torque of thru-bolt nuts or capscrews can cause failure of the bolts or capscrews, with resultant wheel failure.

e. Tighten thru-bolt nuts or capscrews evenly and torque to values specified in figure 5-2A.

f. Clean and pack bearing cones with clean aircraft wheel bearing grease. (Refer to Section 2 for grease type.)

g. Assemble bearing cones, grease seal felts and retainer into wheel hub.

h. Inflate tire to seat tire beads, then adjust to correct tire pressure. Refer to figure 1-1 for correct tire pressure.

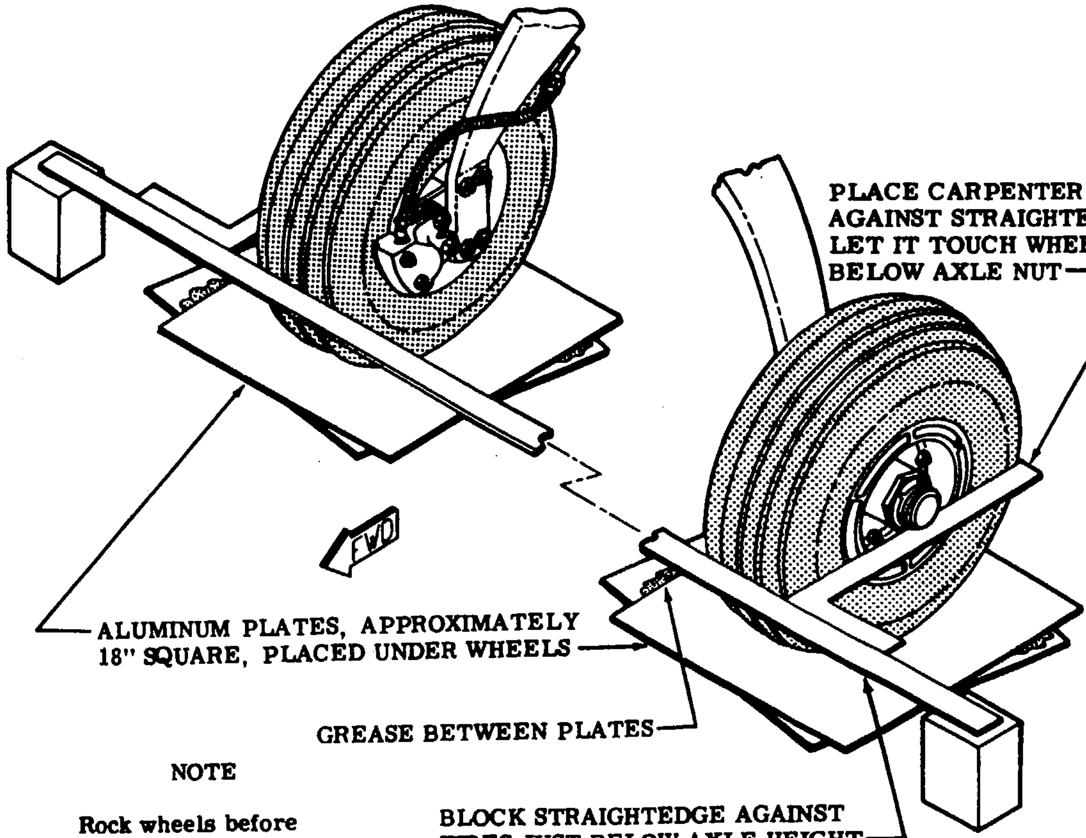
5-15. MAIN WHEEL INSTALLATION.

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 axle nut to the nearest castellation and install cotter pin.

c. Place brake back plate in position and secure with bolts and washers.

d. Install valve extension and hub cap. Install speed fairing (if used) as outlined in paragraph 5-10.

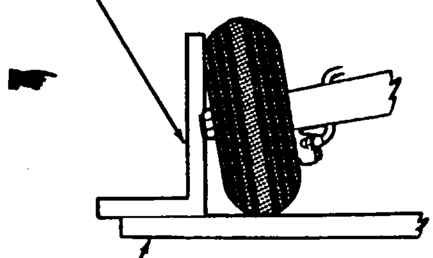


NOTE

Rock wheels before checking wheel alignment.

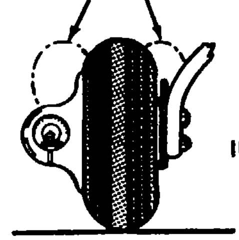
TOP VIEW OF TOE-IN CHECK

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.



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

NOTE

Setting toe-in and camber within these tolerances while the cabin and fuel tanks are empty will give approximately zero toe-in and zero camber at gross weight. Therefore, if normal operation is at less than gross weight and abnormal tire wear occurs, realign the wheels to attain the ideal setting for the load conditions. Refer to sheet 2 of this figure for shims availability and their usage. Always use the least number of shims possible to obtain the desired result.

Figure 5-4. Main Wheel Alignment (Sheet 1 of 2)

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 5-10 for correct scraper-to-tire clearance.

5-16. MAIN WHEEL AXLE REMOVAL. (FLAT GEAR.)

a. Remove speed fairing, if installed, in accordance with paragraph 5-10.
b. Remove wheel in accordance with paragraph 5-11.
c. Disconnect, drain, and plug or cap the hydraulic brake line at the wheel brake cylinder.
d. Remove four nuts, washers, and bolts securing axle, brake components, and speed fairing mounting plate (if used) to spring-strut.

NOTE

When removing axle from spring-strut, note number and position of the wheel alignment shims between axle and spring-strut. Mark these shims or tape them together carefully so that they can be installed in exactly the same position to ensure wheel alignment is not disturbed.

5-17. MAIN WHEEL AXLE INSTALLATION. (FLAT GEAR.)

a. Secure axle and brake components to spring-strut, making sure that wheel alignment shims and speed fairing mounting plate (if used) are installed in their original position.
b. Install wheel assembly on axle in accordance with paragraph 5-15.
c. Connect hydraulic brake line to wheel brake cylinder.
d. Fill and bleed affected brake system in accordance with paragraph 5-51.
e. Install speed fairing (if used) in accordance with paragraph 5-10.

5-18. MAIN WHEEL AXLE REMOVAL. (TUBULAR.)

a. Remove speed fairing, if installed, in accordance with paragraph 5-10.
b. Remove wheel in accordance with paragraph 5-11.
c. Disconnect, drain, and cap or plug hydraulic brake line at the wheel brake cylinder.
d. Remove four bolts attaching brake torque plate and speed fairing mounting plate to axle.
e. Remove cotter pin, nut, washer, and bolt

SHIM PART NO.	POSITION OF THICKEST CORNER OR EDGE OF SHIM	CORRECTION IMPOSED ON WHEEL			
		TOE-IN	TOE-OUT	POS. CAMBER	NEG CAMBER
0541157-1	AFT FWD	.06" ----	---- .06"	---- 0°3'	0°3' ----
0541157-2	UP DOWN	.006" ----	---- .006"	0°30' ----	---- 0°30'
0541157-3	AFT FWD	.12" ----	---- .12"	---- 0°7'	0°7' ----
0541111-2	UP & FWD UP & AFT DOWN & FWD DOWN & AFT	---- .23" ---- .15"	.15" ---- .23" ----	2°50' 2°29' ---- ----	---- ---- 2°29' 2°50'
0441139-5	UP & FWD UP & AFT DOWN & FWD DOWN & AFT	---- .12" ---- .11"	.11" ---- .12" ----	0°25' 0°11' ---- ----	---- ---- 0°11' 0°25'
0441139-6	UP & FWD UP & AFT DOWN & FWD DOWN & AFT	---- .24" ---- .22"	.22" ---- .24" ----	0°50' 0°22' ---- ----	---- ---- 0°22' 0°50'
1241061-1	UP & FWD UP & AFT DOWN & FWD DOWN & AFT	.03" .06" ---- ----	---- ---- .06" .03"	2°50' 2°49' ---- ----	---- ---- 2°49' 2°50'

Figure 5-4. Main Wheel Alignment (Sheet 2 of 2)

attaching axle to tubular strut.
f. Remove axle from spring-strut.

5-19. MAIN WHEEL AXLE INSTALLATION. (TUBULAR GEAR.)
a. Install axle on strut, using wet primer on faying surfaces of axle and strut. Install axle with tapered edges to bottom.
b. Install bolt, washer and nut attaching axle to strut. After tightening nut, install cotter pin.
c. Install brake components and speed fairing mounting plate to axle.
d. Install wheel on axle per paragraph 5-15.
e. Connect brake line to wheel brake cylinder.
f. Fill and bleed brake system per paragraph 5-51.
g. Install speed fairings, if used, per paragraph 5-10.

5-20. MAIN WHEEL ALIGNMENT. (FLAT GEAR.) Correct main wheel alignment, for the flat gear, is obtained through the use of tapered shims between the flange of the axle and spring-strut. See figure 5-4 for procedure to use when main wheel alignment is required. Wheel shims and the correction imposed on the wheel by the various shims and their location are listed in the illustration.

NOTE

Failure to obtain acceptable wheel alignment through the use of shims, indicate a deformed main gear spring-strut or strut attaching bulkhead out of alignment.

5-20A. MAIN WHEEL ALIGNMENT (TUBULAR). (Refer to figure 1-1.)

5-21. WHEEL BALANCING. Since uneven tire wear is usually the cause of wheel unbalance, replacing the tire probably will 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 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 and/or tube, 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 Service Parts Center.

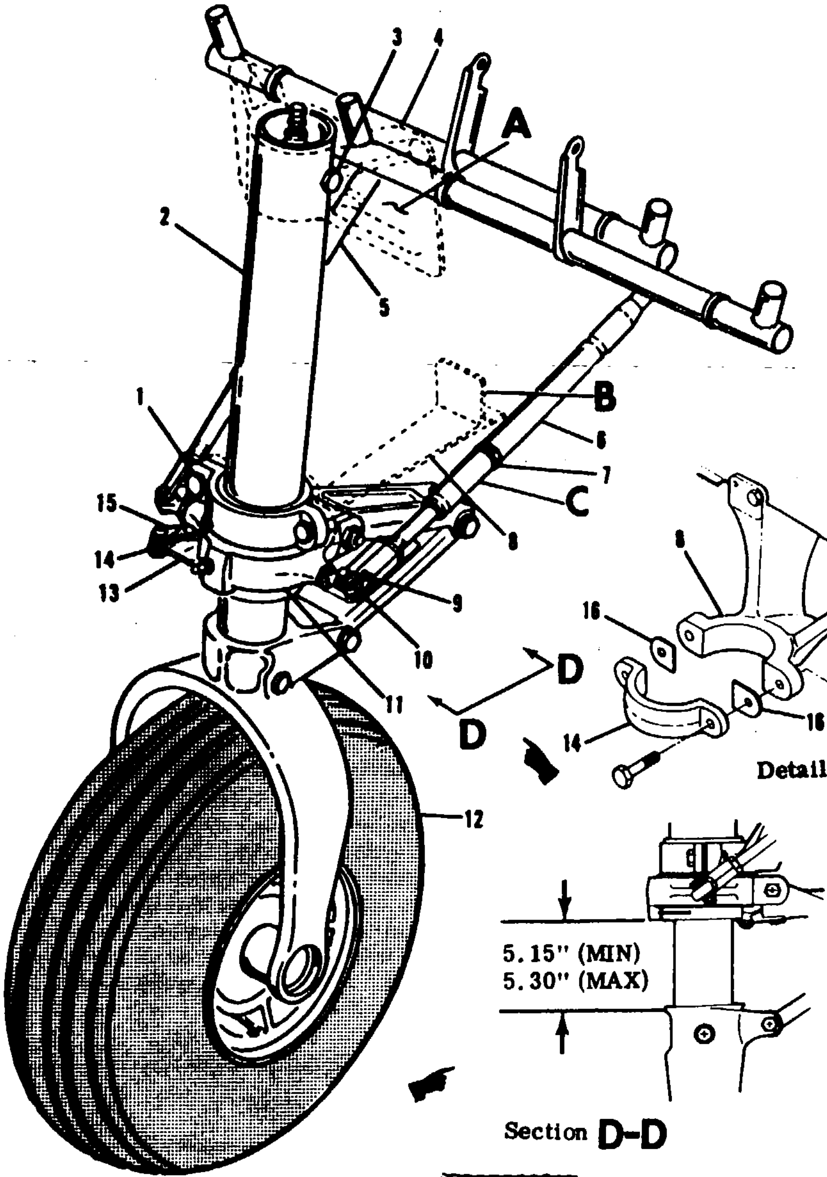
5-22. NOSE GEAR. The nose gear consists of a steerable nose wheel, mounted on an air/oil shock strut. The shock strut is secured to forgings riveted and/or bolted to the firewall and lower fuselage structure. Nose wheel steering is afforded by two spring-loaded push-pull rods from the rudder pedals bars. A hydraulic fluid-filled shimmy dampener is provided to minimize wheel shimmy. Speed fairings are mounted on some aircraft. The various configurations of these nose wheel speed fairings are illustrated in figure 5-6. Disassembly, inspection and repair and reassembly of the various nose wheel configurations are described in separate paragraphs for each configuration. The solid wheels, having two wheel halves are manufactured by Cleveland Aircraft Products Co., and webbed wheels, having two flanges and a hub, are manufactured by McCauley Industrial Corporation. The wheels are illustrated in figure 5-7. McCauley wheels have either aluminum flanges or steel flanges. The aluminum flanges are attached to the wheel hub by thru-bolts and nuts. Steel flanges are attached by either thru-bolts or capscrews. During assembly of the nose wheel, thru-bolt nuts or capscrews, as applicable, shall be tightened evenly and torqued to the value specified in figure 5-2A.

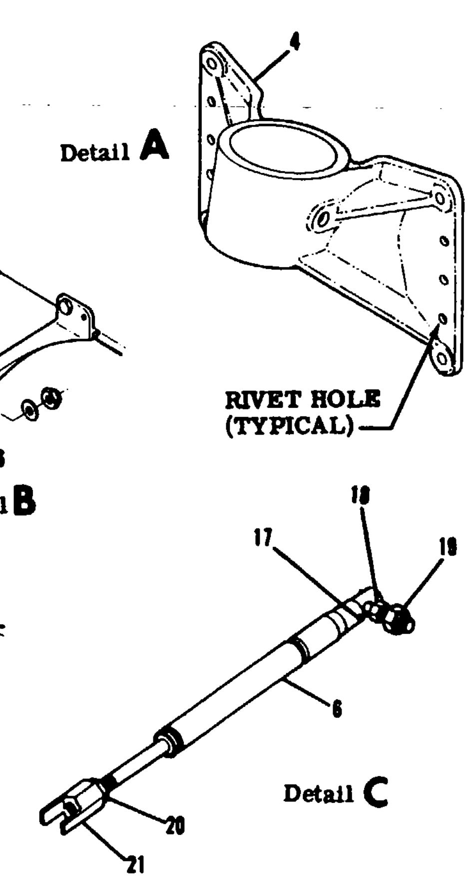
5-22A. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
TIRES WEAR EXCESSIVELY.	Loose torque links.	Add washers or replace as necessary.
	Loose or defective nose wheel bearings.	Tighten wheel bearings properly; replace, if defective.
	Nose wheel out of balance.	Correct in accordance with paragraph 5-29.
NOSE WHEEL SHIMMY.	Nose strut loose in attaching clamps.	Tighten nose strut attaching clamp bolts.
	Shimmy dampener lacks fluid.	Refer to Section 2.
	Defective shimmy dampener.	Repair or replace defective shimmy dampener.
	Loose or worn nose wheel steering linkage.	Tighten or replace defective linkage.

NOTE

If rivets that attach upper nose gear fitting (4) to firewall work loose, it is permissible to replace the Ad5 rivets with the appropriate length AN3 bolts and MS20365-1032 nut. The existing rivet holes should be enlarged to .193 inch to accomodate the bolt.





CAUTION

When installing cap (14), check gap between cap and strut fitting before attaching bolts are tightened. Gap tolerance is .010" minimum and .016" maximum. If gap exceeds maximum tolerance, install shims (16), Part No. 0543042-1 (.016") and Part No. 0543042-2 (.032"), as required, to obtain gap tolerance. Replace cap if gap is less than minimum, using shims to obtain proper gap. Install shims as equally as possible between sides.

1. Bolt
2. Strut Assembly
3. Bolt
4. Upper Nose Gear Fitting
5. RH Steering Tube
6. LH Steering Tube
7. Clamp
8. Lower Strut Fitting
9. Bolt
10. Rod End
11. Steering Arm Assembly
12. Wheel Assembly
13. Shimmy Dampener Arm
14. Strut Clamp Cap
15. Shimmy Dampener
16. Shim
17. Rivet
18. Ball Joint
19. Nut
20. Check Nut
21. Clevis

Figure 5-5. Nose Gear Installation

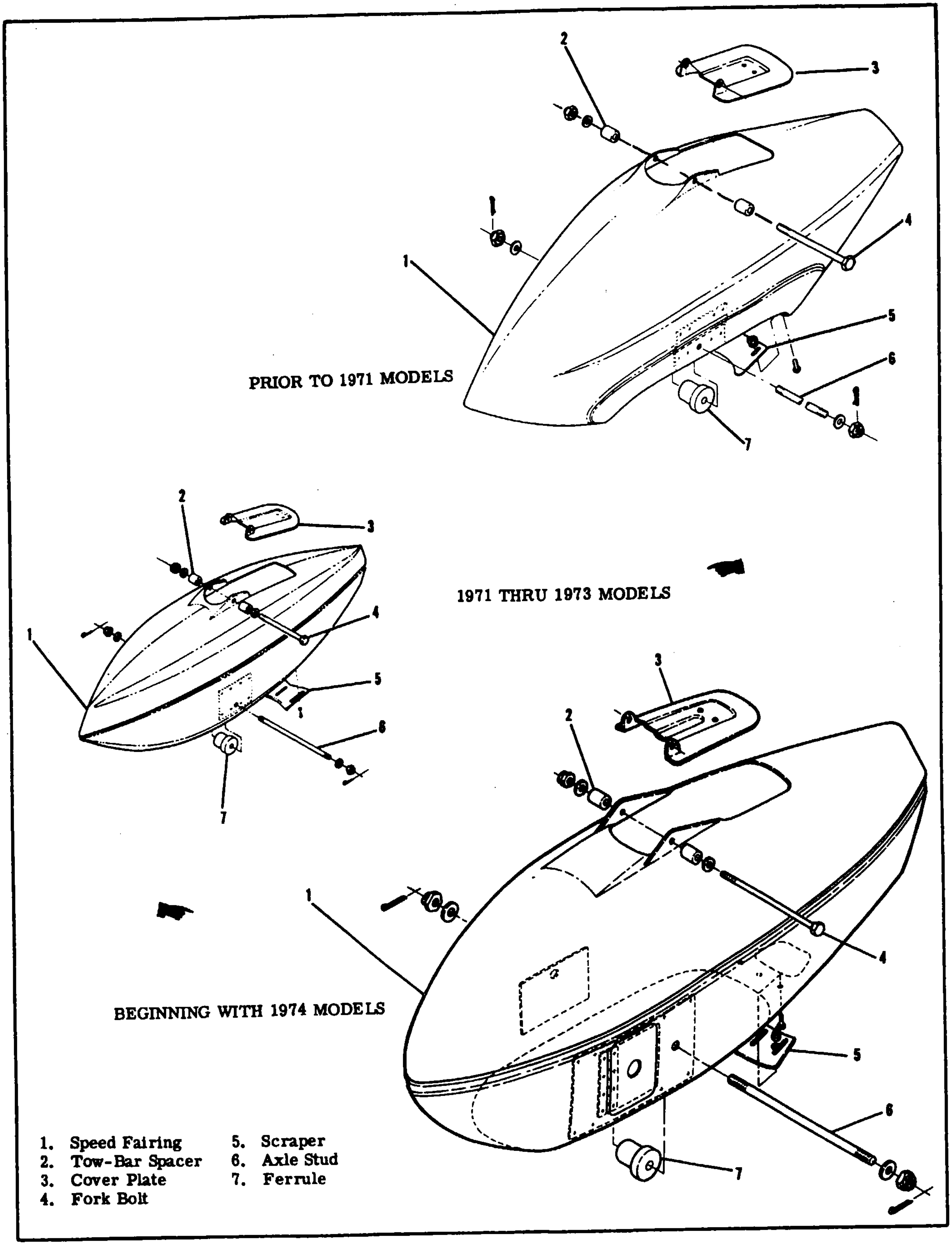


Figure 5-6. Nose Wheel Speed Fairing

5-22A. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
NOSE STRUT WILL NOT HOLD AIR PRESSURE.	Defective air filler valve, or valve not tight.	Check gasket and tighten loose valve. Replace, if defective.
	Defective strut seals.	Replace defective seals.
HYDRAULIC FLUID LEAKAGE FROM NOSE STRUT.	Defective strut seals.	Replace defective seals.

5-23. NOSE GEAR REMOVAL AND INSTALLATION. (See figure 5-5.)

a. Remove engine cowling for access.

b. Weight or tie-down the aircraft tail to raise nose wheel off floor.

c. Disconnect nose wheel steering tubes from nose gear steering collar.

d. Deflate strut completely and telescope strut to its shortest length.

WARNING

Be sure strut is deflated completely before removing bolt at top of strut or disconnecting the torque links.

e. Remove bolt at top of strut and remove bolts, and nuts which clamp strut to lower forging on firewall.

f. Pull the strut assembly down and out of upper attach forging.

g. To install the nose gear assembly, reverse the preceding steps. Always install bolt at top forging before clamping strut in lower forging to prevent misalignment. Tighten clamp bolts in lower forging to 120±20 lb-in.

NOTE

Observe CAUTION in figure 5-5 when installing nose gear strut.

5-24. NOSE WHEEL SPEED FAIRING REMOVAL AND INSTALLATION.

a. Weight or tie-down tail of aircraft to raise nose wheel off the floor.

b. Remove nose wheel axle stud.

WARNING

The cover plate is secured by the lower torque link attaching bolt. Deflate strut before removing this bolt.

c. Deflate strut and remove bolt securing cover plate to strut. Remove cover plate.

d. Remove bolt securing speed fairing and tow-bar spacers to strut.

e. Slide speed fairing up and remove nose wheel. Loosen scraper as necessary.

f. Rotate speed fairing 90 degrees and work it down over the nose wheel fork to remove.

g. Install speed fairing by reversing the preceding steps. Tighten axle stud until a slight bearing drag is obvious when the wheel is rotated. Back off the nut to the nearest castellation and install cotter pins.

h. Service shock strut after installation has been completed.

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 0.38 inch. Elongated holes in the scraper are provided for adjustment. 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 fairing to prevent stains and deterioration.

5-25. NOSE WHEEL REMOVAL AND INSTALLATION.

a. Weight or tie-down tail of aircraft to raise nose wheel off the floor.

b. Remove nose wheel axle bolt.

c. Use a rod or long punch inserted through one axle bolt bucket or ferrule to tap the opposite one out of the fork. Remove both buckets or ferrules and pull nose wheel from fork. Loosen scraper if necessary.

NOTE

Buckets are used on aircraft without speed fairings. Solid ferrules are used on aircraft with speed fairings.

d. Remove spacers and axle tube before disassembling the nose wheel.

e. Reverse the preceding steps to install the nose wheel. Tighten axle bolt until a slight bearing drag is obvious when the wheel is rotated. Back off the nut to the nearest castellation and install cotter pin.

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 paragraph 5-24.

5-26. NOSE WHEEL DISASSEMBLY. (Cleveland).
a. Remove hub caps and valve core, completely deflate tire and break tire beads loose from wheel rims.

WARNING

Injury can result from attempting to separate wheel halves with the 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.
c. Remove tire and tube from wheel halves.
d. Remove bearing retainer rings, grease seal rings, felts and bearing cones.

NOTE

The bearing cups (races) are a press-fit in the wheel halves and should not be removed unless a new part is to be installed. To remove the bearing cups, heat wheel half 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 the bearing cup and press in the new cup while the wheel is still hot.

5-27. NOSE WHEEL INSPECTION AND REPAIR. (Cleveland Wheel).
a. Clean all metal parts and grease seal felts in solvent and dry thoroughly.
b. Inspect wheel halves for cracks. Cracked wheel halves shall 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. Carefully inspect bearing cones and cups for damage and discoloration. After cleaning, pack bearing cones with clean aircraft wheel bearing grease (Section 2) before installing in wheel half.

5-28. NOSE WHEEL REASSEMBLY. (Cleveland).
a. Insert tube in tire, 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. Tighten nuts evenly to the torque value shown in figure 5-2A.

CAUTION

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

d. Clean and pack bearing cones with clean aircraft wheel bearing grease (refer to Section 2).
e. Assemble bearing cones, seals, and retainers into the wheel halves.
f. Inflate tube to seat tire beads, then adjust to correct pressure (figure 1-1).
g. Install axle tube, spacers, and hub caps, and install wheel assembly in accordance with paragraph 5-25.

5-28A. NOSE WHEEL DISASSEMBLY (McCauley).
a. Remove hub caps, completely deflate tire and break tire beads loose at wheel flanges.

WARNING

Injury can result from attempting to remove wheel flanges with tire and tube inflated. Avoid damaging wheel flanges when breaking tire beads loose.

b. Remove hardware as follows:
1. On aluminum-flanged wheels, remove thru-bolt nuts and washer and remove thru-bolts and washers.
2. On steel-flanged wheels, remove capscrews and washers.
c. Separate wheel flanges from wheel hub. Retain spacers between wheel flanges and wheel hub.
d. Remove wheel hub from tire and tube.
e. Remove retainer rings and remove grease seal retainers, grease seal felts and bearing cones from wheel hub.

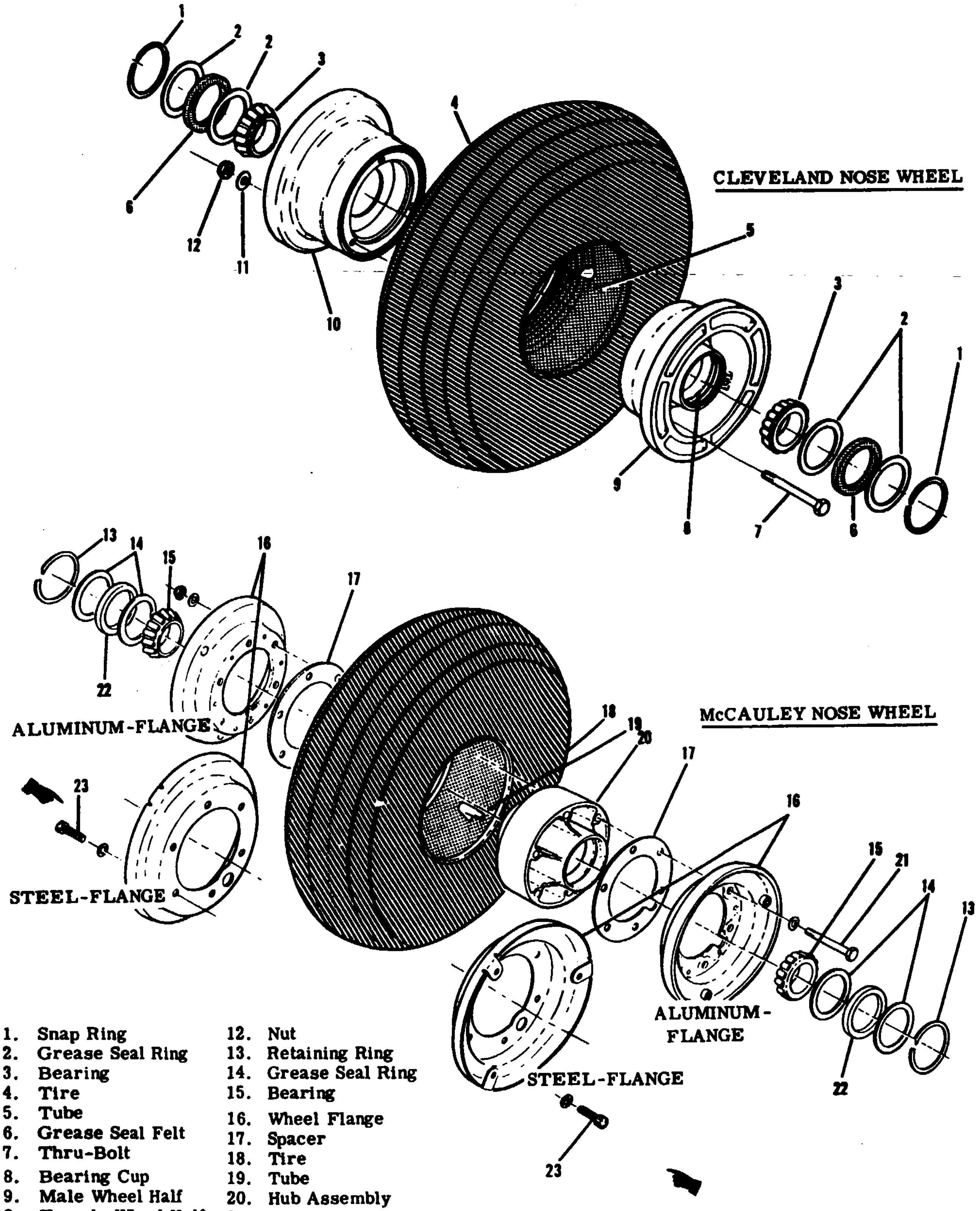
NOTE

The 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 an arbor press, if available, press out the bearing cup and press in the new bearing cup while the wheel hub is still hot.

5-28B. NOSE WHEEL INSPECTION AND REPAIR. (McCauley Wheel).
a. Clean all metal parts, grease seal felts and mylar spacers in cleaning solvent and dry thoroughly.
b. Inspect wheel flanges and wheel hub for cracks. Discard cracked wheel flanges or hub and install new parts. Sand out nicks, gouges and corroded areas. When protective coating has been removed, clean the area thoroughly, prime with zinc chromate, and paint with aluminum lacquer.

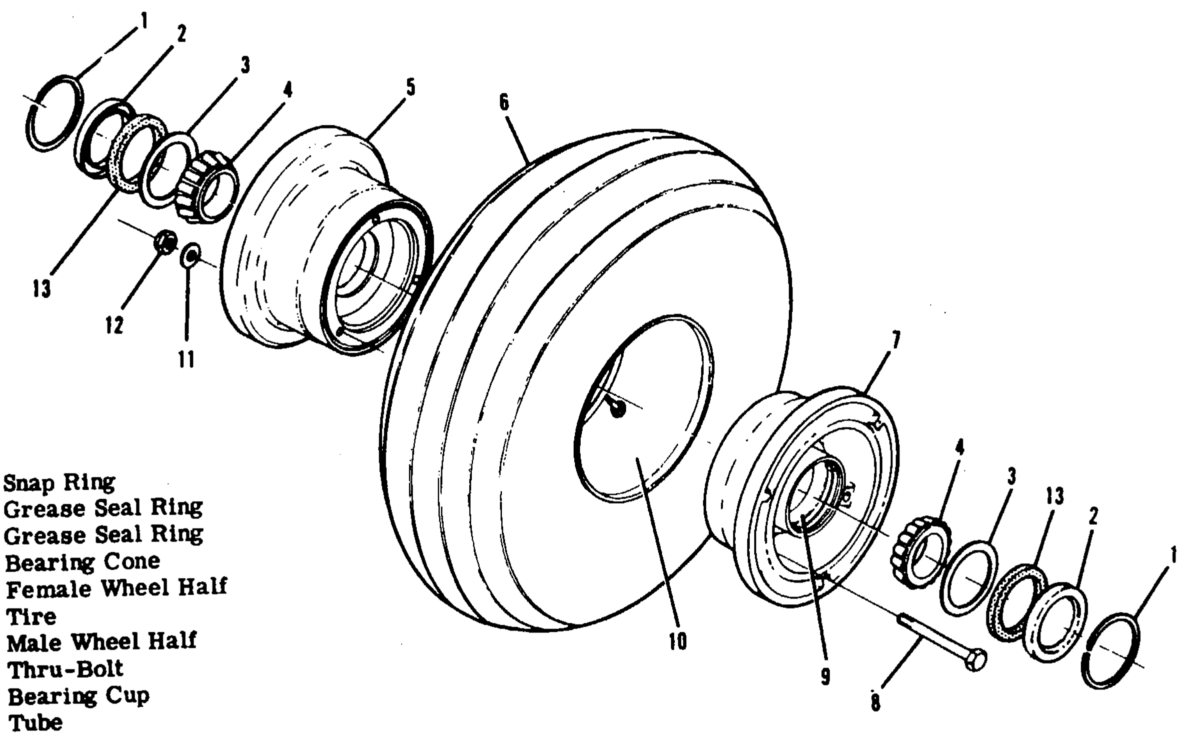
c. Carefully inspect bearing cones and cups for damage and discoloration. After cleaning, pack bearing cones with clean aircraft wheel bearing grease (Section 2) before installing in the wheel hub.

5-28C. NOSE WHEEL REASSEMBLY. (McCauley Wheel).
a. Insert tube in tire, aligning index marks on tire and tube.
b. Place wheel hub in tire with valve stem in cutout of wheel hub.



1. Snap Ring
2. Grease Seal Ring
3. Bearing
4. Tire
5. Tube
6. Grease Seal Felt
7. Thru-Bolt
8. Bearing Cup
9. Male Wheel Half
10. Female Wheel Half
11. Washer
12. Nut
13. Retaining Ring
14. Grease Seal Ring
15. Bearing
16. Wheel Flange
17. Spacer
18. Tire
19. Tube
20. Hub Assembly
21. Thru-Bolt
22. Grease Seal Felt
23. Capscrew

Figure 5-7. Nose Wheel



1. Snap Ring
2. Grease Seal Ring
3. Grease Seal Ring
4. Bearing Cone
5. Female Wheel Half
6. Tire
7. Male Wheel Half
8. Thru-Bolt
9. Bearing Cup
10. Tube
11. Washer
12. Nut
13. Grease Seal Felt

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Figure 5-7A. Heavy-Duty Nose Gear Wheel Assembly

c. Place spacer and wheel flange on one side of wheel hub and install hardware as follows:

1. On aluminum-flanged wheels, place washer under head of each thru-bolt and insert bolt through wheel flange and wheel hub.

2. On steel-flanged wheels, place washer under head of each capscrew and start capscrews into wheel hub threads.

d. Place spacer and wheel flange on other side and align valve stem in cutout in wheel flange.

e. Install hardware as follows:

1. On aluminum-flanged wheels, install washers and nuts on thru-bolts.

2. On steel-flanged wheels, repeat step 2. under item c.

CAUTION

Be sure that spacers and wheel flanges are seated on flange of wheel hub. Uneven or improper torque of thru-bolt nuts or capscrews can cause failure of the bolts or capscrews with resultant wheel failure.

f. Tighten thru-bolt nuts or capscrews evenly and torque to values specified in figure 5-2A.

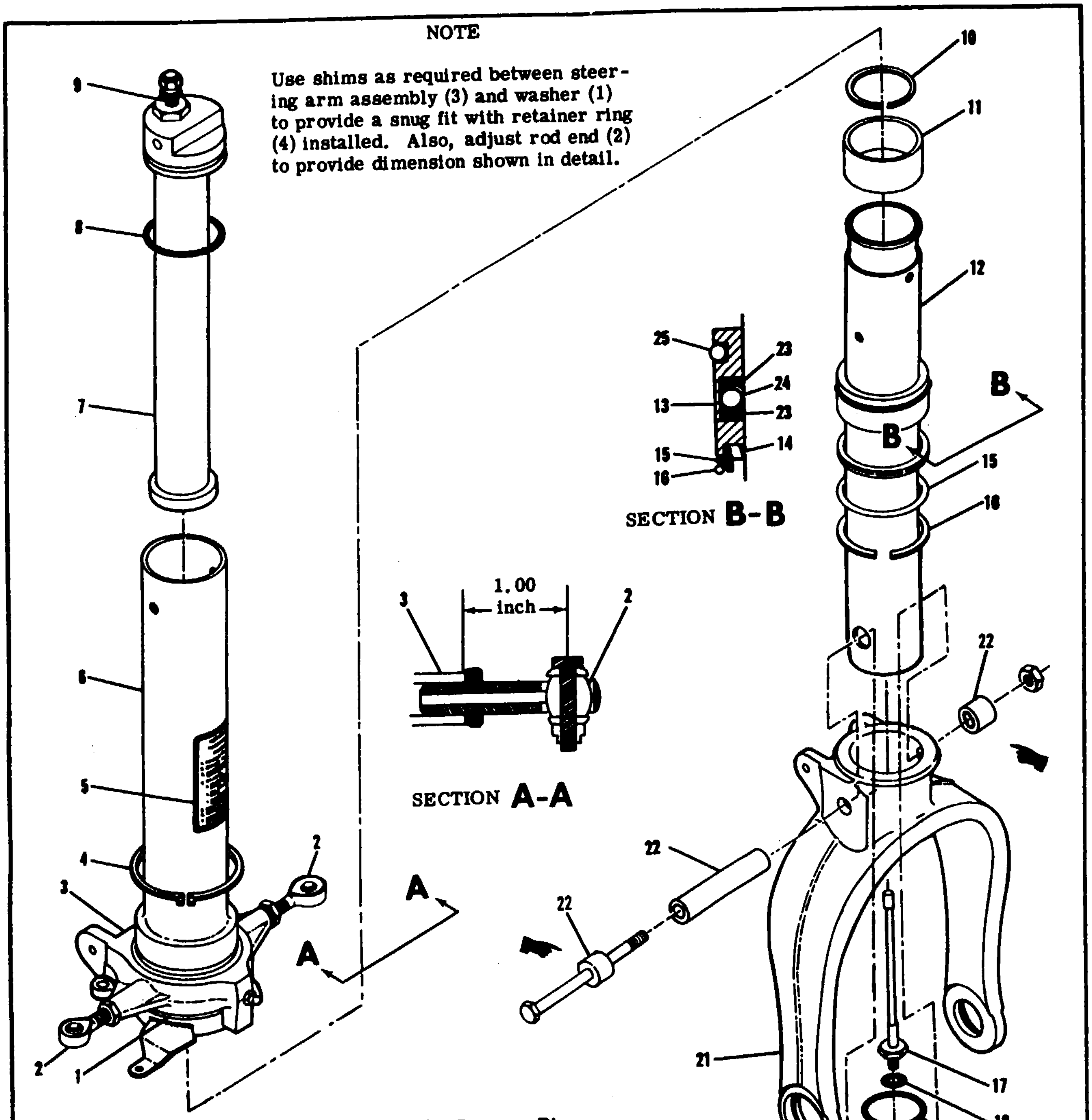
g. Clean and pack bearing cones with clean aircraft wheel bearing grease. (Refer to Section 2 for grease type.)

h. Assemble bearing cones, grease seal felts and retainer into wheel hub.

i. Inflate tire to seat tire beads, then adjust to correct tire pressure (refer to Section 1).

5-29. WHEEL BALANCING. Refer to paragraph 5-21 for wheel balancing.

5-30. NOSE GEAR SHOCK STRUT DISASSEMBLY. The nose gear shock strut is shown in figure 5-8. Removal and installation is outlined in paragraph 5-23. The heavy duty nose gear is shown in figure 5-9 which may be used as a guide during maintenance. Removal, installation, and disassembly procedures are the same as those for the standard nose gear strut except for the differences shown in figure 5-9. 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



1. Washer
2. Rod End
3. Steering Arm Assembly (Collar)
4. Retaining Ring
5. Decal
6. Upper Strut
7. Orifice Piston Support
8. O-Ring
9. Filler Valve
10. Lock Ring
11. Bearing
12. Lower Strut
13. Packing Support Ring
14. Scraper Ring
15. Retaining Ring
16. Lock Ring
17. Metering Pin
18. O-Ring
19. O-Ring
20. Base Plug
21. Fork
22. Bushing
23. Back-Up Ring
24. O-Ring
25. O-Ring

Figure 5-8. Nose Gear Shock Strut

strut will permit inspection and parts installation without removal or complete disassembly of the strut.

WARNING

Be sure strut is completely deflated before removing lock ring in lower end of upper strut, or disconnecting the 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 in the lock ring groove to facilitate removal of the lock ring.

NOTE

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

d. Use a straight, sharp pull to separate upper and lower struts. Invert strut and drain remaining hydraulic fluid.
e. Remove lock ring and bearing at top of lower strut.
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 together if desired.
g. Remove O-ring and back-up rings from packing support ring.
h. Remove bolt securing fork and lower strut and remove bushing from fork and strut.
i. Push metering pin and base plug assembly 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 new parts.

j. Remove retaining ring securing steering arm assembly on upper strut and remove steering arm assembly, shims, and washer.
k. Push orifice support from upper strut and remove O-ring.
l. Remove filler valve assembly from orifice support.

5-31. NOSE GEAR SHOCK STRUT RE-ASSEMBLY (See figure 5-8.)
a. Thoroughly clean all parts in cleaning solvent and inspect them carefully. Replace all worn or defective parts and all O-rings and back-up rings with new parts.
b. Assemble the shock strut by reversing the order of the procedure outlined in paragraph 5-30 with the exception that special attention must be paid to the following procedures.
c. Sharp metal edges should be smoothed with No. 400 emery paper, then thoroughly cleaned with solvent.
d. Used sparingly, Dow Corning DC-4 compound is recommended for O-ring lubrication. All other internal parts should be liberally coated with hydraulic fluid during assembly.

NOTE

Cleanliness and proper lubrication, along with careful workmanship are important during assembly of the shock strut.

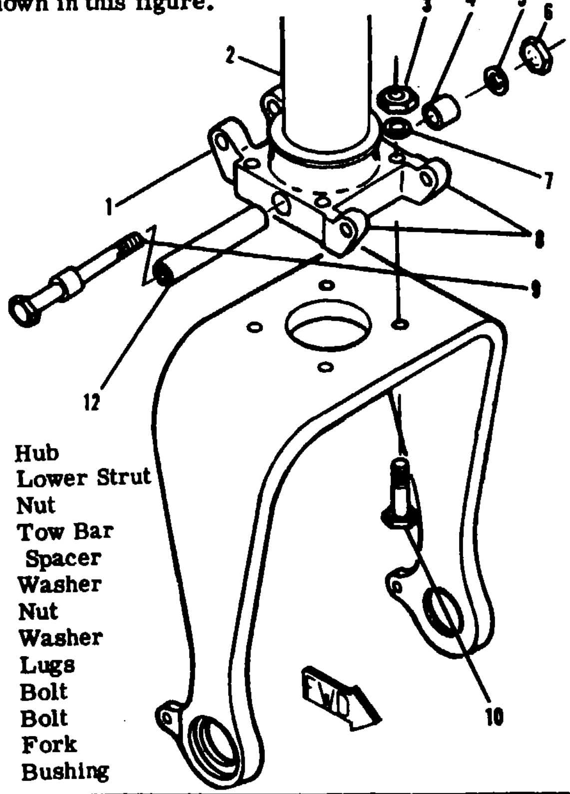
e. When installing steering arm assembly, lubricate needle bearing in collar with general purpose grease (Section 2) before installing. If needle bearing is defective, install new steering arm assembly. Use shims as required between steering arm assembly and washer to provide a no play fit with retainer ring installed. Shims are available from the Cessna Service Parts Center as follows:

1243030-5 . . . . 0.006 inch
1243030-6 . . . . 0.012 inch
1243030-7 . . . . 0.020 inch

f. When installing lock ring in lower end of upper strut groove, position lock ring so that one of its

NOTE

See figure 5-8 for remainder of nose gear shock strut. Disassembly and assembly procedures are the same as those given for the standard nose gear shock strut, except for the differences shown in this figure.



1. Hub
2. Lower Strut
3. Nut
4. Tow Bar Spacer
5. Washer
6. Nut
7. Washer
8. Lugs
9. Bolt
10. Bolt
11. Fork
12. Bushing

Figure 5-9. Heavy-Duty Shock Strut

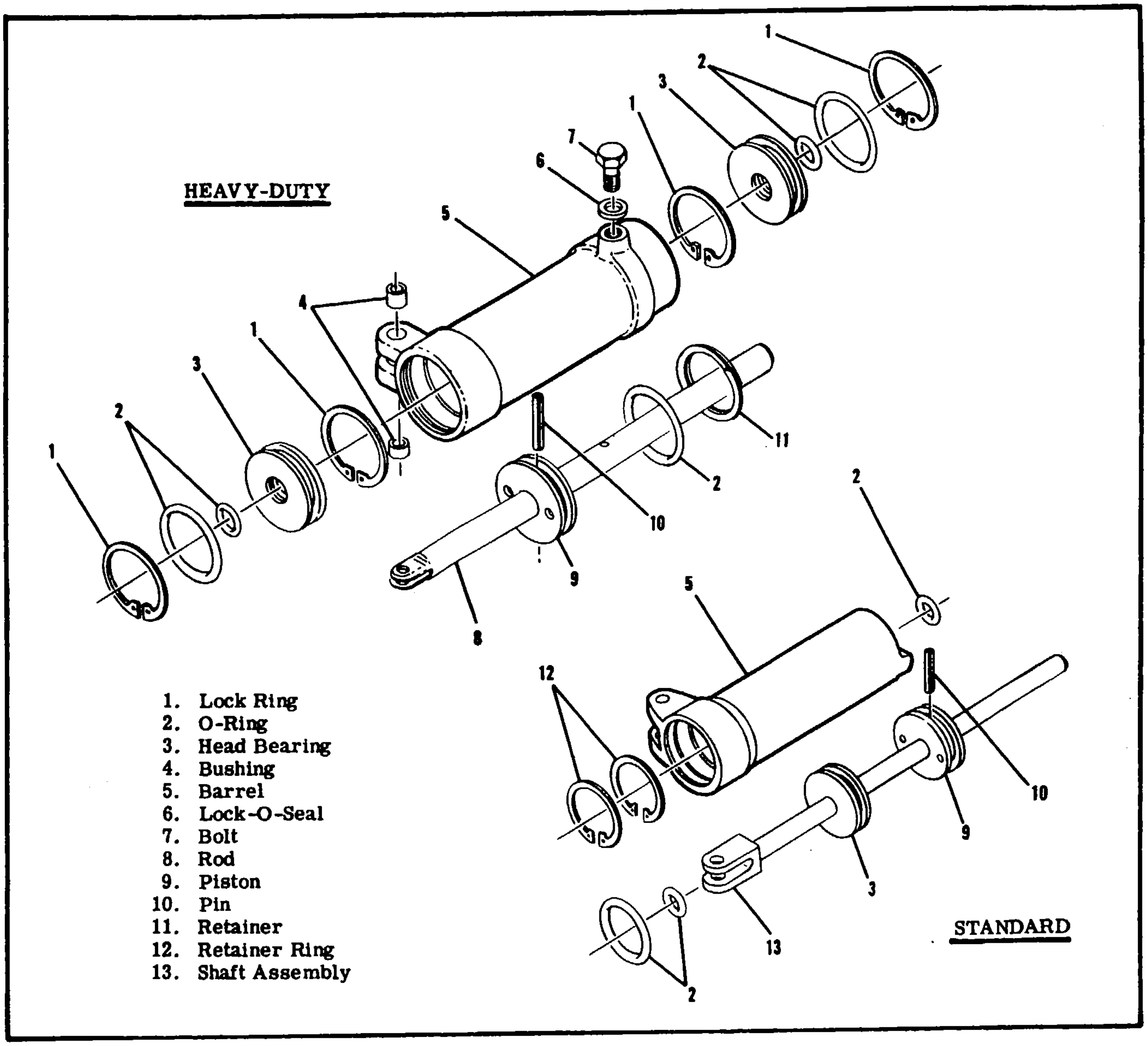


Figure 5-10. Nose Gear Shimmy Dampener

ends covers the small access hole in the lock ring groove at the bottom of the upper strut.

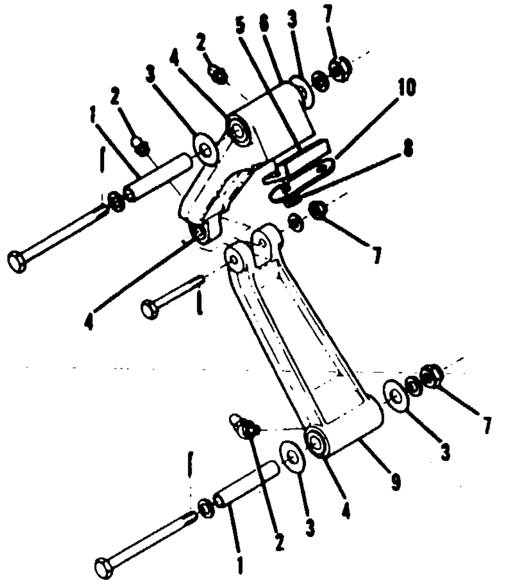
g. Temporary bolts or pins of correct diameter and length are useful tools for holding parts in correct relation to each other during assembly and installation.

h. After re-assembling the strut, install in accordance with paragraph 5-23.

i. After installation, service shock strut as outlined in Section 2.

5-32. TORQUE LINKS. The torque links are illustrated in figure 5-11, which may be used as a guide for removal, disassembly, assembly and installation. Torque links keep the lower strut aligned with the nose gear steering system, but permit shock strut action. Torque link bushings should not be removed except for replacement with new parts. Excessively worn parts should be replaced with new parts. ALWAYS DEFLATE NOSE GEAR STRUT BEFORE DISCONNECTING TORQUE LINKS.

5-33. SHIMMY DAMPENER. The shimmy dampener provided for the nose gear offers resistance to shimmy by forcing hydraulic fluid through small orifices in a piston. The dampener piston shaft is secured to a stationary part and the housing is secured to the nose wheel steering arm assembly which moves as the nose wheel is turned, causing relative motion between the dampener shaft and housing. The shimmy dampener is shown in figure 5-10, which may be used as a guide for disassembly and reassembly. When assembling dampener, use new O-rings. Lubricate parts during assembly with clean hydraulic fluid. Refer to Section 2 for servicing procedures.



NOTE

Tighten bolts (8) to 20-25 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. Nose Gear Torque Links

5-34. NOSE WHEEL STEERING SYSTEM. Nose wheel steering is accomplished through use of the rudder pedals. Spring-loaded steering rod assemblies connect the nose gear steering arm assembly to an arm on the rudder bars. Steering is afforded up to a maximum pedal deflection, after which, it becomes free-swiveling up to a maximum travel of 30 degrees right or left of center. A flexible boot seals the fuselage entrance of the steering rod assembly.

5-35. STEERING ROD ASSEMBLY. The steering rod assembly is spring-loaded and should not be disassembled internally. The steering rods are connected by a clevis to the rod ends extending from the nose gear steering arm assembly and to arms on the rudder crossbars.

5-36. NOSE WHEEL STEERING ADJUSTMENT. Since the nose wheel steering and rudder systems are interconnected, adjustment to one system may affect the other system. Section 10 contains rigging instructions for the nose wheel steering system as well as the rudder system.

SHOP NOTES:

5-37. BRAKE SYSTEM.

5-38. GENERAL DESCRIPTION. The hydraulic brake system consists of two brake master cylinders, located just forward of the pilot rudder pedals, brake lines and hose connecting each brake master brake cylinder to its wheel brake cylinder, the single-disc, floating-cylinder type brake assembly, located at each main landing gear wheel.

5-39. 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 replace master cylinder.
	Insufficient clearance at Lock-O-Seal in master cylinder.	Adjust as shown in figure 5-12.
	Restriction in hydraulic lines or restriction in compensating port in master brake cylinders.	Drain brake lines and clear the inside of the brake line with filtered compressed air. Fill and bleed brakes. If cleaning the lines fails to give satisfactory results, the master cylinder may be faulty and should be repaired
	Worn, scored or warped brake discs.	Replace brake discs and linings.
	Damage or accumulated dirt restricting free movement of wheel brake parts.	Clean and repair or replace parts as necessary.
BRAKES FAIL TO OPERATE.	Leak in system.	If brake master cylinders or wheel brake assemblies are leaking, they should be repaired or replaced.
	Air in system.	Bleed system.
	Lack of fluid in master cylinders.	Fill and bleed if necessary.
	Brake master cylinder defective.	Repair or replace brake master cylinder.

5-40. BRAKE MASTER CYLINDERS. The brake master cylinders, located just forward of the pilot rudder pedals, are actuated by applying pressure at the top of the rudder pedals. A small reservoir is incorporated into each brake master cylinder to supply it with fluid. When dual brakes are installed, mechanical linkage permits the copilot pedals to operate the brake master cylinders.

5-41. BRAKE MASTER CYLINDER REMOVAL AND INSTALLATION.

a. Remove bleeder screw at wheel brake assembly and drain hydraulic fluid from brake system.
b. Remove front seats and rudder bar shield for access to the brake master cylinders.
c. Disconnect parking brake linkage 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.
f. Reverse the preceding to install brake master cylinders. After installation, fill and bleed brake system as outlined in paragraph 5-51.

5-42. BRAKE MASTER CYLINDER REPAIR. Figure 5-12 may be used as a guide during disassembly, repair, and re-assembly of the brake master cylinders. Repair of the cylinders is limited to installation of new parts, cleaning, and adjustment. Use clean hydraulic fluid as a lubricant during assembly of the cylinders.

5-43. HYDRAULIC BRAKE LINES. These lines are of 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 brake cylinder. Install new lines and hose for damaged parts.

5-44. WHEEL BRAKE ASSEMBLIES. Wheel brake assemblies use a disc which is attached to the main wheel with the wheel thru-bolts or capscrews, and a floating brake cylinder attached to the torque plate which is connected to the axle. (Refer to figure 5-3.)

5-45. WHEEL BRAKES REMOVAL. Wheel brake assemblies are the floating type and can be removed after disconncting brake line and removing the back plate. See figure 5-3. The brake disc is removed after wheel removal and disassembly. To remove the torque plate on the flat gear, remove wheel and axle as outlined in paragraph 5-16. To remove the torque plate on the tubular gear, remove four bolts attaching torque plate to axle and work torque plate from spring-strut.

5-46. WHEEL BRAKE INSPECTION AND REPAIR.

a. Clean all parts except brake linings and O-rings in dry cleaning solvent and dry thoroughly.
b. New O-rings are usually installed at each overhaul. If O-rings re-use is necessary, they should be wiped with a clean cloth soaked in hydraulic fluid and inspected for damage.

NOTE

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

c. Check brake lining for deterioration and maximum permissible wear. See paragraph 5-49 for wear limits of the brake lining.
d. Inspect brake cylinder wall for scores or roughness. A scored or rough wall surface will leak or cause rapid O-ring wear. If damaged, install a new cylinder.
e. If the anchor bolts on the brake assembly are nicked, gouged, or corroded, 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 drive new bolts in with a soft mallet.
f. Inspect wheel brake disc for a minimum thickness of 0.190-inch. If brake disc is below minimum thickness, warped or out of round, install a new part.

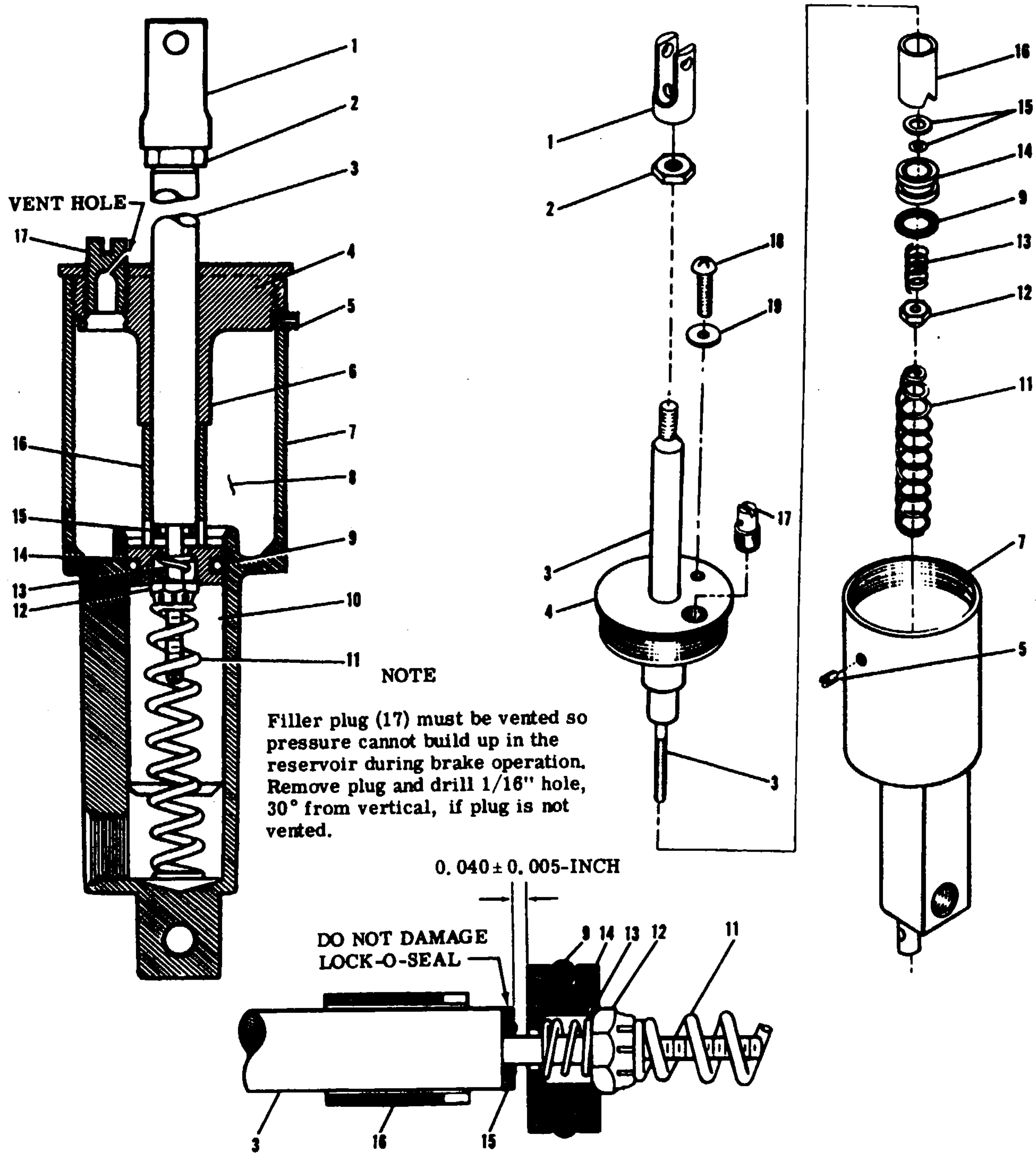
5-47. WHEEL BRAKE RE-ASSEMBLY. Use figure 5-3 as a guide during assembly of wheel brake assembly. Lubricate parts with clean hydraulic fluid and assemble components with care to prevent damage to O-rings and other components of the assembly.

5-48. WHEEL BRAKE INSTALLATION. Place brake assembly in position with pressure plate in place, then install back plate. If the brake disc was removed, install as wheel is assembled. If the torque plate was removed, install as outlined in paragraph 5-17 for the flat gear. On the tubular gear, install torque plate on axle with four bolts (see paragraph 5-19.)

5-49. CHECK BRAKE LINING WEAR. New brake lining should be installed when they are worn to a minimum thickness of 3/32-inch. Visually compare a 3/32-inch strip of material held adjacent to each lining to measure the thickness of the lining. The shank end of a correct size drill bit makes an excellent tool for checking minimum thickness of the brake linings.

5-50. BRAKE LINING INSTALLATION. (See figure 5-3.)

a. Remove bolts securing back plate and remove back plate.
b. Pull the 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 diameter (or slightly smaller) punch in the rolled rivet, and hit the punch sharply with a hammer driving out the rivet. Punch out all rivets securing the lining to the back plate and pressure plate in the same manner.



NOTE

Filler plug (17) must be vented so pressure cannot build up in the reservoir during brake operation. Remove plug and drill 1/16" hole, 30° from vertical, if plug is not vented.

1. Clevis
2. Jam Nut
3. Piston Rod
4. Cover
5. Setscrew
6. Cover Boss
7. Body
8. Reservoir
9. O-Ring
10. Cylinder
11. Piston Return Spring
12. Nut
13. Piston Spring
14. Piston
15. Lock-O-Seal
16. Compensating Sleeve
17. Filler Plug
18. Screw
19. Washer

Figure 5-12. Brake Master Cylinder

NOTE

A rivet setting kit, Part No. R561, is available from the Cessna Service Parts Center. 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 lining. Place the rivet head against the anvil.
f. Center the rivet setting punch on the lips of the rivet. While holding the back plate down firmly against the lining, hit the punch with a hammer to set the rivet. Repeat blows on the punch until lining is firmly against the back plate.
g. Realign the lining on the back plate and install rivets in the remaining holes.
h. Install new lining on the 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.

5-51. BRAKE SYSTEM BLEEDING. Bleeding with a clean hydraulic pressure source connected to the wheel cylinder bleeder valve is recommended.
a. Remove brake master cylinder filler plug and screw a flexible hose with an appropriate fitting into the filler hole at top of the brake master cylinder. Immerse the free end of the flexible hose in a container with enough hydraulic fluid to cover the end of the hose.
b. Connect a clean hydraulic pressure source, such as a hydraulic hand pump or Hydro Fill unit, to the wheel cylinder bleeder valve.
c. As fluid is pumped into the system, observe the immersed end of the hose at the brake master cylinder for evidence of air bubbles being forced from the brake system. When bubbling has ceased, tighten bleeder valve and remove hydraulic pressure source.

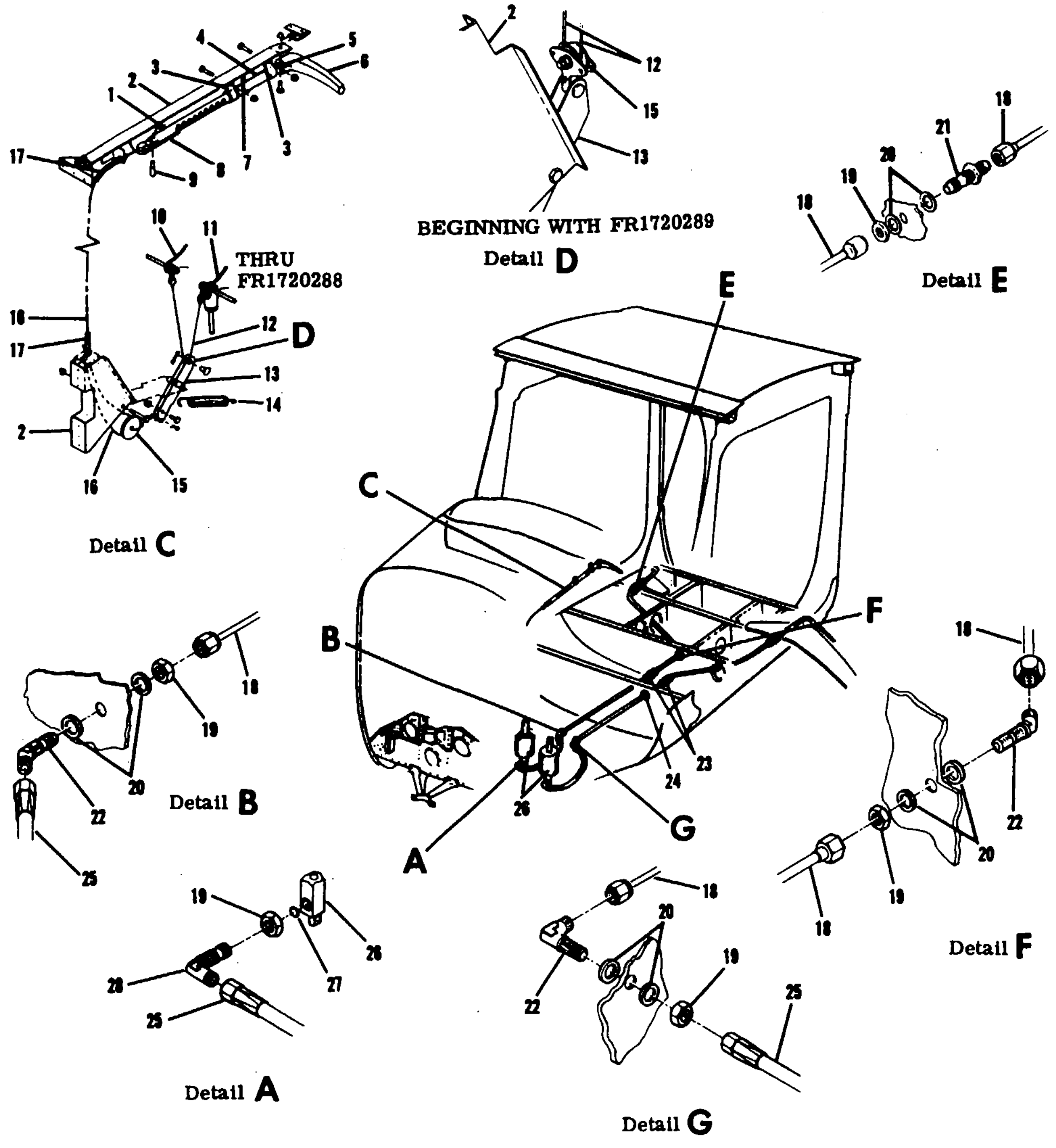
NOTE

Ascertain that the free end of the hose from the brake master cylinder remains immersed during the entire bleeding process.

d. Remove flexible hose and install filler plug in brake master cylinder.

5-52. PARKING BRAKE SYSTEM. (See figure 5-13.) The parking brake system uses a handle and ratchet mechanism connected by a cable to linkage at the brake master cylinders. Pulling out on the handle depresses both brake master cylinder piston rods and the handle ratchet locks the handle in this position until the handle is turned and released.

SHOP NOTES:



1. Cotter Pin
2. Support Structure
3. Spacer
4. Housing
5. Clamp
6. Handle and Ratchet Assembly
7. Catch
8. Positioning Rack
9. Positioning Pin
10. Right Rudder Pedal
11. Left Rudder Pedal
12. Cable
13. Bellcrank
14. Spring
15. Pulley
16. Cable
17. Tube
18. Brake Line
19. Nut
20. Washer
21. Bulkhead Union
22. Bulkhead Elbow
23. Union
24. Grommet
25. Brake Hose
26. Master Cylinder
27. O-Ring
28. Elbow

Figure 5-13. Parking Brake System

SECTION 6

AILERON CONTROL SYSTEM

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6-1. AILERON CONTROL SYSTEM. (Refer to figure 6-1.)

6-2. DESCRIPTION. The aileron control system is comprised of push-pull rods, bellcranks, cables, pulleys, sprockets and roller chains, all of which, link the control wheels to the ailerons. A control "U" interconnects the control wheels to the aileron cables.

6-3. TROUBLE SHOOTING.

NOTE

Due to remedy procedures in the following trouble shooting chart it may be necessary to re-rig system, refer to paragraph 6-18.

TROUBLE	PROBABLE CAUSE	REMEDY
LOST MOTION IN CONTROL WHEEL.	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 bellcranks.	Replace bellcranks.
	Loose chains.	Adjust to proper tension.

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.
	Clevis bolts in system too tight.	Loosen, then tighten properly and safety.
	Rusty chain.	Replace chain.
	Chain binding with sprockets.	Replace defective parts.
	Defective U-joints.	Replace defective U-joints.
CONTROL WHEELS NOT LEVEL WITH AILERONS NEUTRAL.	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 centered in slots, push-pull rods are adjusted incorrectly.	Adjust push-pull rods to obtain proper alignment.
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". (Refer to 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.

6-6. REMOVAL AND INSTALLATION.

a. Disconnect battery cables and insulate terminals as a safety precaution.

b. Remove pedestal cover as outlined in paragraph 9-13.

c. Remove rudder bar shields, carpeting and plates as necessary for access to lower end of control "U".

d. Remove radios, radio cooling plans, dust covers and associated hardware as necessary.

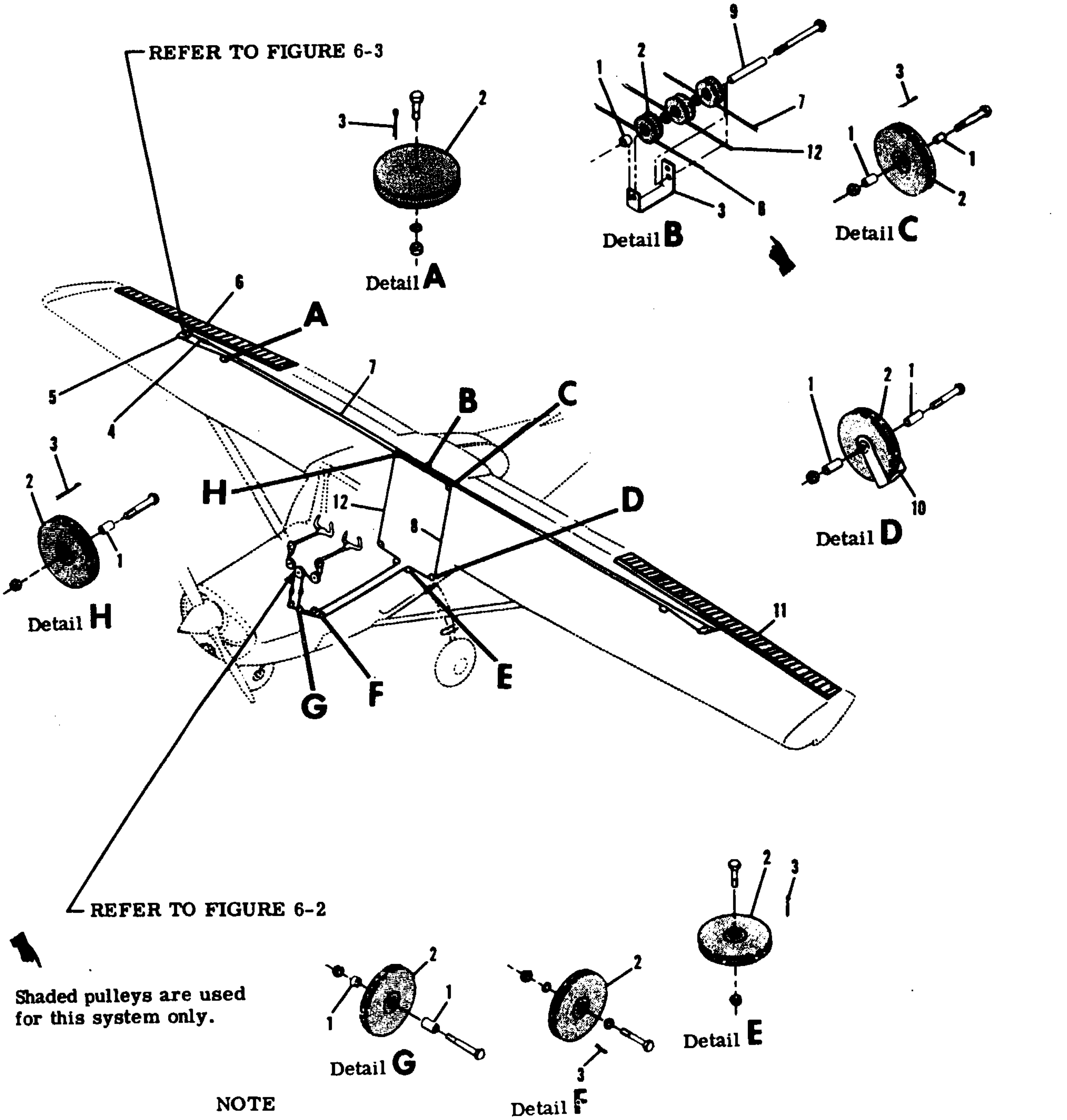
e. Remove glove box.

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.



Shaded pulleys are used for this system only.

NOTE

Carry-thru cable turnbuckle may be located at either the right or left aileron bellcrank.

CAUTION

MAINTAIN PROPER CONTROL CABLE TENSION.

1. Spacer
2. Pulley
3. Cable Guard
4. Carry-Thru Cable Turnbuckle
5. Bellcrank
6. Right Aileron
7. Carry-Thru Cable
8. Right Hand Direct
9. Bushing
10. Cable Guard
11. Left Aileron
12. Left Hand Direct

CABLE TENSION:
40 LBS ± 10 LBS ON AILERON CARRY-THRU CABLE (AT AVERAGE TEMPERATURE FOR THE AREA.)
REFER TO FIGURE 1-1 FOR TRAVEL.

Figure 6-1. Aileron Control System

j. Remove bolt attaching bearing (11) to control "U" and remove bearing and associated 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 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. (Refer to figure 6-3.)

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. (Refer to 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."

6-14. AILERONS. (Refer to 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.

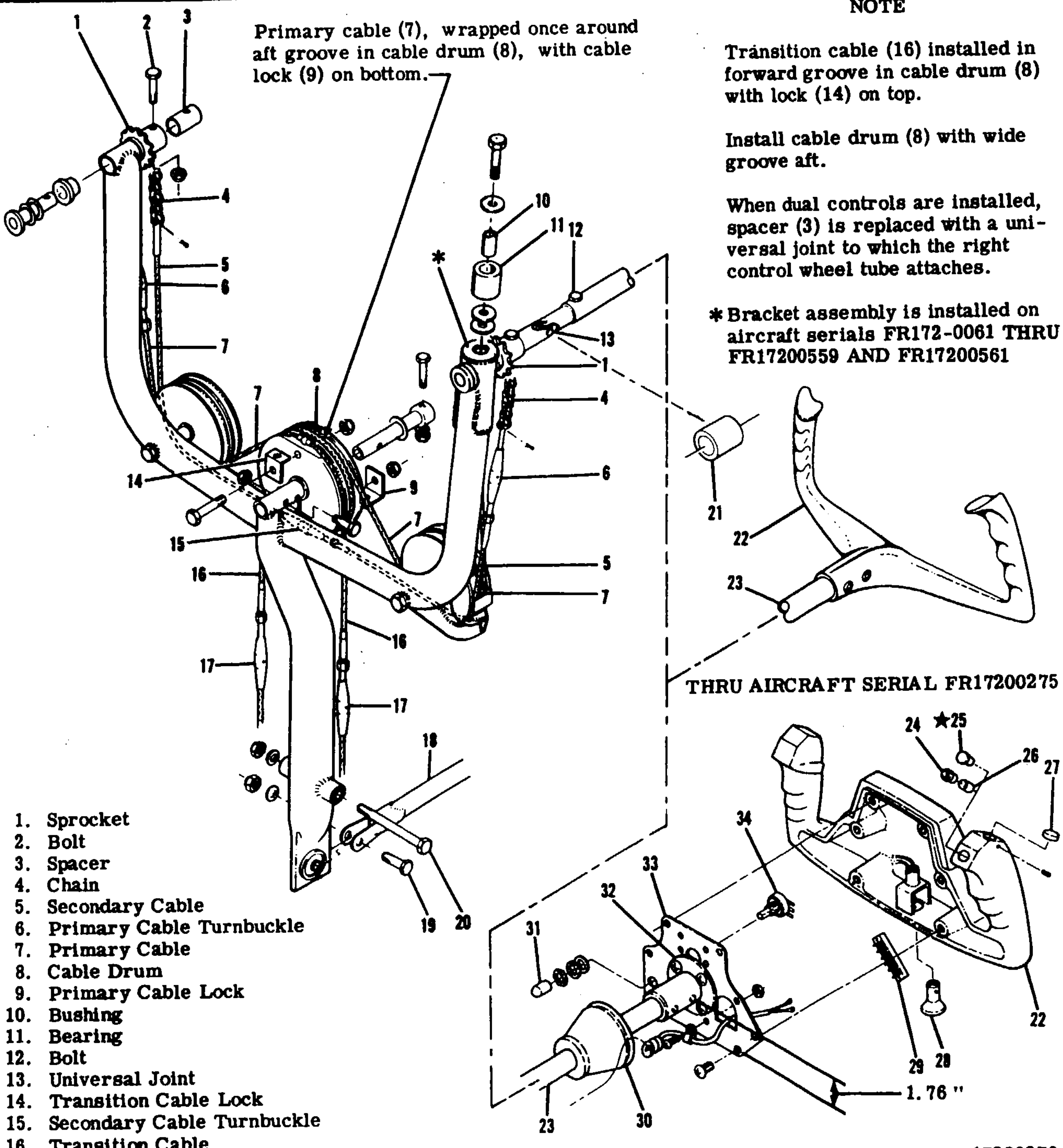
NOTE

Transition cable (16) installed in forward groove in cable drum (8) with lock (14) on top.

Install cable drum (8) with wide groove aft.

When dual controls are installed, spacer (3) is replaced with a universal joint to which the right control wheel tube attaches.

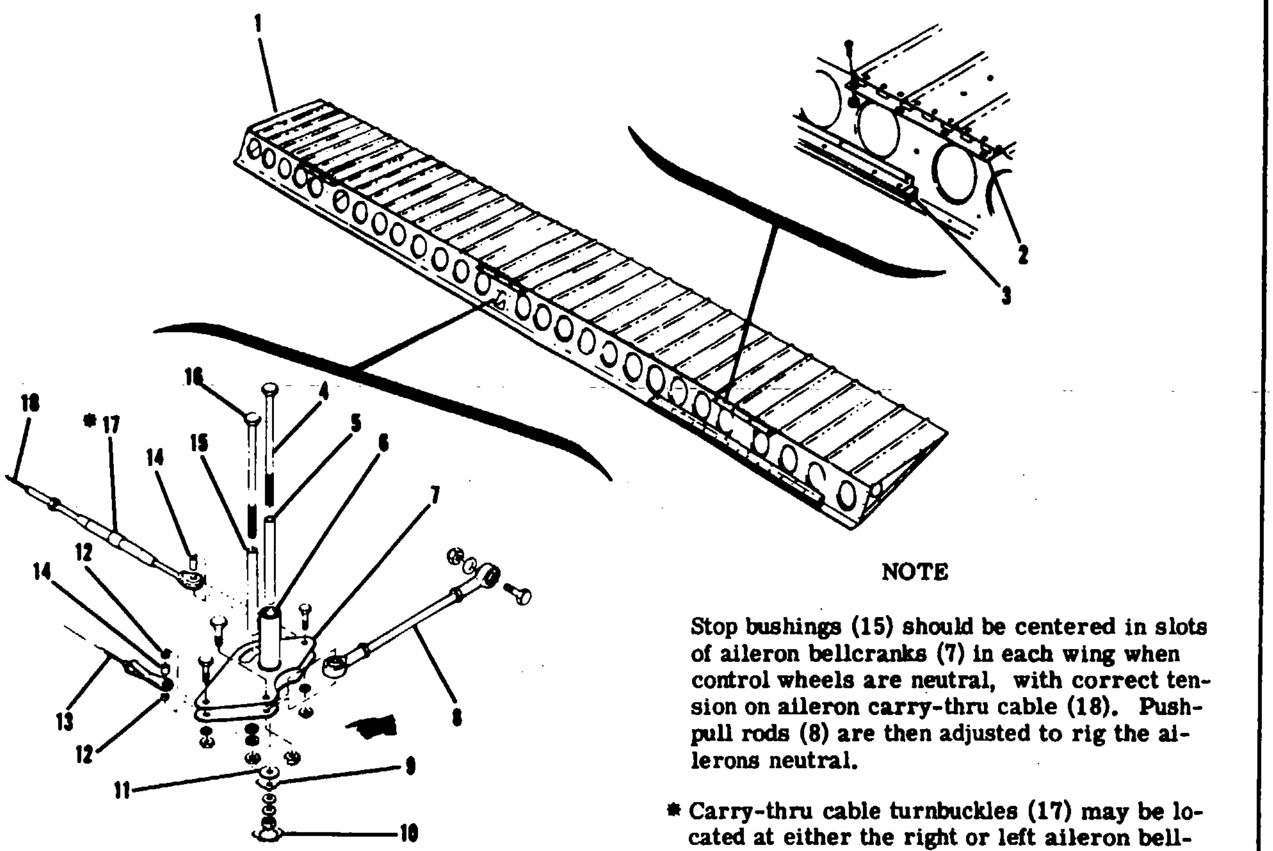
* Bracket assembly is installed on aircraft serials FR172-0061 THRU FR17200559 AND FR17200561



1. Sprocket
2. Bolt
3. Spacer
4. Chain
5. Secondary Cable
6. Primary Cable Turnbuckle
7. Primary Cable
8. Cable Drum
9. Primary Cable Lock
10. Bushing
11. Bearing
12. Bolt
13. Universal Joint
14. Transition Cable Lock
15. Secondary Cable Turnbuckle
16. Transition Cable
17. Direct Cable Turnbuckle
18. Elevator Push-Pull Tube
19. Bolt
20. Bolt
21. Hose
22. Control Wheel
23. Control Wheel Shaft
24. Mike Switch
25. Plug
26. Insulator
27. Plug
28. Map Light
29. Terminal Block
30. Cover
31. Rubber Cover
32. Adapter
33. Plate
34. Map Light Rheostat

★Plug (25) is used when mike switch (24) is not used.

Figure 6-2. Control "U" Installation



1. Aileron
2. Hinge
3. Balance Weight
4. Pivot Bolt
5. Bushing
6. Needle Bearing
7. 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. Turnbuckle
18. Carry-Thru Cable

NOTE

Stop bushings (15) should be centered in slots of aileron bellcranks (7) in each wing when control wheels are neutral, with correct tension on aileron carry-thru cable (18). Push-pull rods (8) are then adjusted to rig the ailerons neutral.

* Carry-thru cable turnbuckles (17) may be located at either the right or left aileron bellcrank. Direct cable turnbuckles are located at the control "U".

Figure 6-3. Aileron Installation

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 17. Before installation, ensure balance weights and hinges are securely attached.

6-18. RIGGING. (Refer to figure 6-2.)

a. Check primary control 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 transition cable lock (14) is installed at top.

b. With control wheels neutral, check chain ends (4) are approximately same distance from sprockets (1).

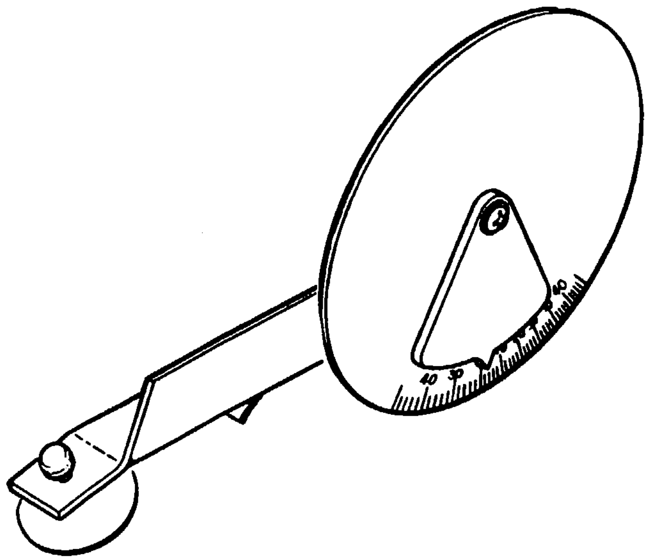
c. Keeping control wheels neutral, tighten turnbuckles (6) so control wheels are level in neutral position (synchronized), with enough tension on cables to remove slack from chains (4), without binding. Results of adjusting turnbuckles are as follows:

1. Loosening primary cable turnbuckles (6) and tightening secondary cable turnbuckle (15) at center of control "U" will move inboard sides of both control wheels down.

2. Tightening either primary control cable turnbuckle and loosening secondary cable turnbuckle 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)



AVAILABLE FROM CESSNA SERVICE PARTS CENTER (TOOL NO. SE 716)

Figure 6-4. Inclinometer for Measuring Control Surface Travel

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. Safety all turnbuckles by the single-wrap method using 0.040-inch monel safety wire.

h. Remove bar from control wheels and install all items removed for access.

i. Check aileron travel, using inclinometer illustrated in figure 6-4.

WARNING

Be sure ailerons move in correct direction when operated by control wheel.

WING FLAP CONTROL SYSTEM

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7-1. WING FLAP CONTROL SYSTEM. (Refer to 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, pulleys and a flap position indicator. 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 a 3-position switch mounted on the instrument panel. The flap position indicator is calibrated to show degrees of extension.

7-3. OPERATIONAL CHECK.

a. Operate flaps through their full range of travel, observing for uneven or jumpy motion, binding and lost motion in system. Ensure flaps are moving together through their full range of travel.

b. THRU AIRCRAFT SERIAL FR17200297 WHEN NOT MODIFIED IN ACCORDANCE WITH FIGURE 7-2, SHEET 3. Attempt to overrun travel extremes and check for transmission free-wheeling at the full up and down positions.

c. BEGINNING WITH AIRCRAFT SERIAL FR172-00298 AND ALL AIRCRAFT MODIFIED IN ACCORDANCE WITH FIGURE 7-2, SHEET 3. Check for positive shut-off of motor at the flap travel extremes, FLAP MOTOR MUST STOP OR DAMAGE WILL RESULT.

d. Check that flaps are not sluggish in operation. In flight at 100 mph, indicated airspeed, flaps should fully extend in approximately 9 seconds and retract in approximately 5 seconds. On the ground, with engine running, the flaps should extend or retract in approximately 6 seconds.

e. 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 Service Parts Center. Refer to figure 6-4.

f. Remove access plates and attempt to rock drive pulleys to check for bearing wear.

g. Inspect flap rollers and tracks for evidence of binding and defective parts.

7-4. TROUBLE SHOOTING.

NOTE

Due to remedy procedures in the following trouble shooting chart it may be necessary to re-rig system, refer to paragraphs 7-16 and 7-22.

TROUBLE	PROBABLE CAUSE	REMEDY
BOTH FLAPS FAIL TO MOVE.	Popped circuit breaker.	Reset and check continuity. Replace breaker if defective.
	Defective switch.	Place jumper across switch. Replace switch if defective.
	Defective motor.	Remove and bench test. Replace motor if defective.
	Broken or disconnected wires.	Run continuity check of wiring. Connect or repair wiring as necessary.
	Disconnected or defective 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.	Open access plates and observe pulleys. 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 condition of cables. Replace defective cables.
	Flaps binding on tracks.	Observe flap tracks and rollers. Replace defective parts.
LEFT FLAP FAILS TO MOVE.	Disconnected or broken cable.	Check cable tension. Connect or replace cable.
	Disconnected push-pull rod.	Attach push-pull rod.
FLAPS FAIL TO RETRACT.	Disconnected or defective UP limit switch.	Check continuity of switch. Connect or replace switch.

7-4. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
FLAPS FAIL TO EXTEND.	Disconnected or defective DOWN limit switch.	Check continuity of switch. Connect or replace switch.
INCORRECT FLAP TRAVEL.	Incorrect rigging.	Refer to paragraph 7-16.
	Defective limit switch.	Check continuity of switches. Replace switches found defective.

7-5. FLAP MOTOR AND TRANSMISSION ASSEMBLY.

7-6. REMOVAL AND INSTALLATION.

a. THRU AIRCRAFT SERIAL FR17200297 WHEN NOT MODIFIED IN ACCORDANCE WITH SK150-37 AND WHEN NOT MODIFIED IN ACCORDANCE WITH FIGURE 7-2, SHEET 3. (Refer to figure 7-2, sheet 1.)

1. Run flaps to full DOWN position.
2. Disconnect battery cables at the battery and insulate cable terminals as a safety precaution.
3. Remove access plates adjacent to drive pulley and motor assembly on right wing.

NOTE

Remove motor (24), transmission (2), hinge (25) and actuating tube (4) from aircraft as a unit on aircraft equipped with standard fuel tanks. On aircraft equipped with long range tanks, detach motor and transmission assembly from hinge assembly (25) prior to removal.

4. Remove bolt (18) securing actuating tube (4) to drive pulley (8).
5. Screw actuating tube (4) IN toward transmission (2) by hand to its shortest length.
6. Remove bolt (1) securing flap motor hinge (25) to wing, or if long range fuel tanks are installed, remove bolt (3) securing transmission to hinge assembly. Retain brass washer between hinge and wing structure for use on reinstallation.
7. Disconnect motor electrical wiring (23) at the quick-disconnects.
8. Using care, work assembly from wing through access opening.
9. Reverse the preceding steps for reinstallation. If the hinge assembly (25) was removed from the transmission (2) for any reason, ensure the short end of hinge is reinstalled toward the top.
10. Complete an operational check as outlined in paragraph 7-3 and re-rig system in accordance with paragraphs 7-16 and 7-22.

b. THRU AIRCRAFT SERIAL FR17200297 WHEN MODIFIED IN ACCORDANCE WITH SK150-37 AND WHEN NOT MODIFIED IN ACCORDANCE WITH FIGURE 7-2, SHEET 3. (Refer to figure 7-2, sheet 2.)

1. Complete steps 1, 3 and 4 of subparagraph "a."
2. Run flap motor to place actuating tube (4) IN to its shortest length.
3. Complete steps 2, 6, 7, 8, 9 and 10 of subparagraph "a."

c. BEGINNING WITH AIRCRAFT SERIAL FR17200298 AND ALL AIRCRAFT MODIFIED IN ACCORDANCE WITH FIGURE 7-2, SHEET 3. (Refer to figure 7-2, sheets 2 and 3.)

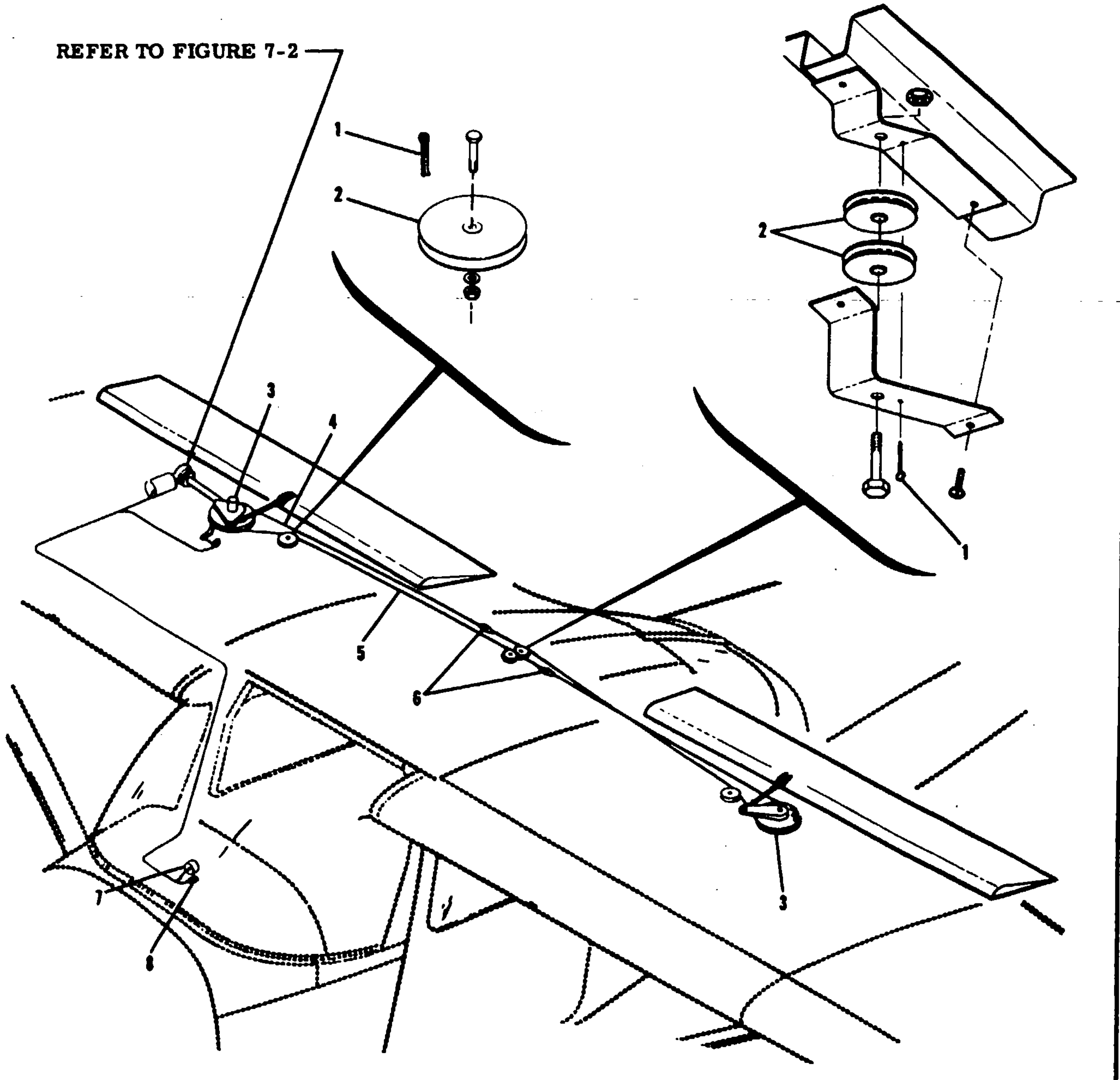
1. Complete steps 1 thru 7 of subparagraph "a."
2. Disconnect electrical wiring at limit switches (33 and 37).
3. Complete steps 8, 9 and 10 of subparagraph "a."

7-7. REPAIR. Repair consists of replacement of motor, transmission, coupling, actuating tube and associated hardware. Bearing in hinge assembly may also be replaced. Lubricate as outlined in Section 2.

7-8. DRIVE PULLEYS. (Refer to figure 7-2.)

7-9. REMOVAL AND INSTALLATION.

a. Remove access plates adjacent to drive pulley (8) in right wing.
b. Unzip or remove headliner as necessary for access to turnbuckles (index 6, figure 7-1), remove safety wire and loosen turnbuckles.
c. Remove bolt (5) securing flap push-pull rod (9) to drive pulley (8) and lower RIGHT flap gently.
d. Remove bolt (18) securing actuating tube (4) to drive pulley (8) and lower LEFT flap gently. Retain bushing.
e. Remove cable locks (7) securing control cables to drive pulley (8). Tag cables for reference on reinstallation.
f. Remove pin (20) attaching transmitter rod (17) to arm (19).



1. Cable Guard
2. Pulley
3. Drive Pulley
4. Direct Cable
5. Retract Cable
6. Turnbuckle
7. Position Indicator
8. Switch

CAUTION

MAINTAIN PROPER CONTROL CABLE TENSION.

CABLE TENSION:
30 LBS ± 10 LBS (AT AVERAGE TEMPERATURE FOR THE AREA.)
REFER TO FIGURE 1-1 FOR TRAVEL.

Figure 7-1. Wing Flap Control System

g. Remove bolt (6) attaching drive pulley (8) to wing structure.
h. 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.
i. To remove left wing drive pulley, use this same procedure omitting steps "d" and "f."
j. Reverse the preceding steps for reinstallation. Rig system in accordance with paragraphs 7-16 and 7-22, 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 drive pulley bearings as outlined in Section 2.

NOTE

The right drive pulley (8) must be removed to detach position transmitter arm (19).

7-11. FLAPS. (Refer to figure 7-3.)

7-12. REMOVAL AND INSTALLATION.
a. Run flaps to full DOWN position.
b. Remove access plates (1) from top leading edge of flap.
c. Disconnect push-pull rod (6) at flap bracket (7).
d. 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.
e. 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, if necessary, in accordance with paragraphs 7-16 and 7-22.

7-13. REPAIR. Flap repair may be accomplished in accordance with instructions outlined in Section 17.

7-14. CABLES AND PULLEYS. (Refer to figure 7-1.)

7-15. REMOVAL AND INSTALLATION.
a. Remove access plates, fairings, headliner and upholstery as necessary for access.
b. Remove safety wire, relieve cable tension, disconnect turnbuckles (6) and carefully lower LEFT flap.
c. Disconnect cables at drive pulleys, 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 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.

d. Reverse the preceding steps for reinstallation.
e. After cables are routed in position, install pulleys and cable guards. Ensure cables are positioned in pulley grooves before installing guards.
f. Re-rig flap system in accordance with paragraphs 7-16 and 7-22, safety turnbuckles and reinstall all items removed in step "a."

7-16. RIGGING. (Refer to figure 7-2.)
a. Unzip or remove headliner as necessary for access to turnbuckles (index 6, figure 7-1).
b. Remove safety wire, relieve cable tension, disconnect turnbuckles and carefully lower LEFT flap.
c. Disconnect push-pull rods (9) at drive pulleys (8) in both wings and lower RIGHT flap gently.
d. Disconnect actuating tube (4) from drive pulley (8).

NOTE

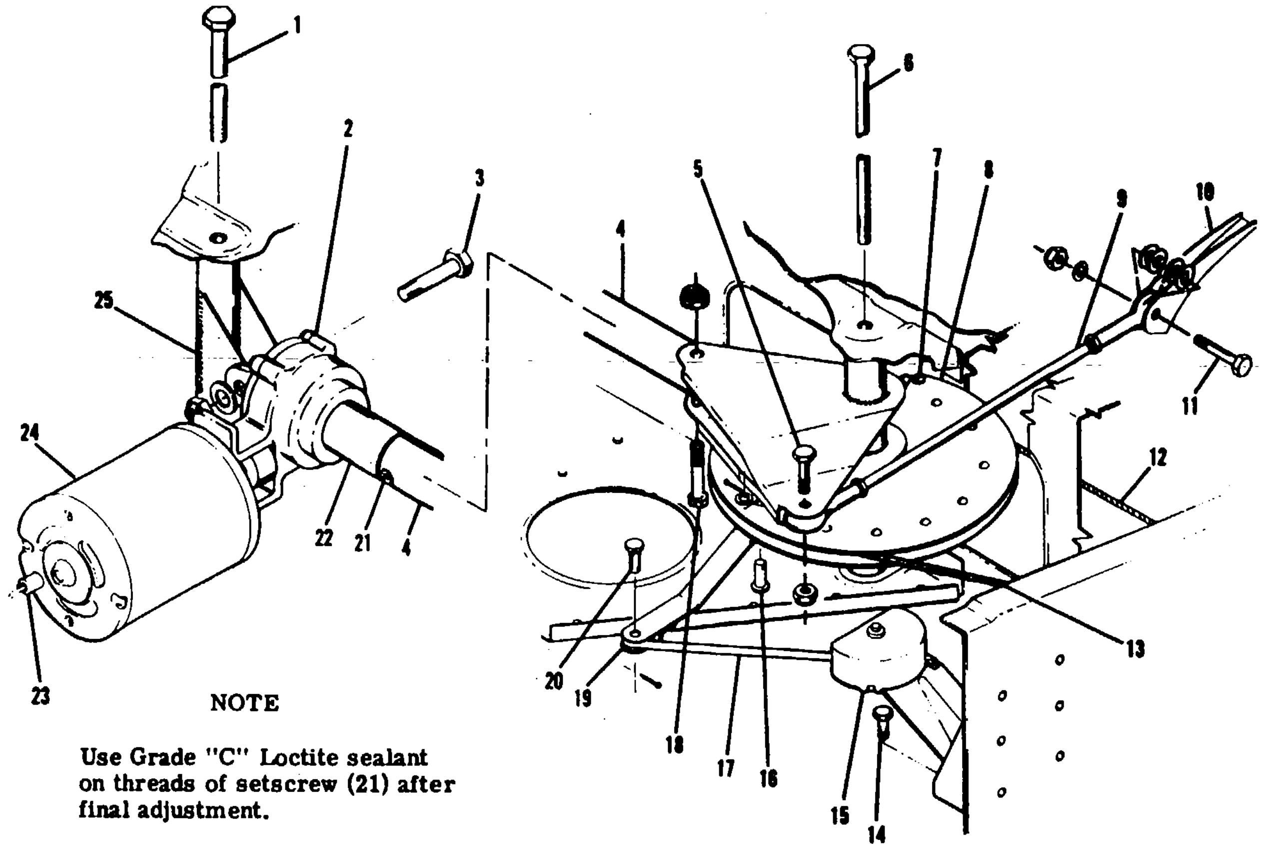
If control cables are not connected to left and right drive pulleys, actuating tube (4) and push-pull rods (9) must be disconnected before installing cables. If drive pulleys (8) are not installed, attach control cables before installing drive pulleys in the wings as illustrated in figure 7-4.

e. The 3/32 inch retract cable connects to the forward side of the right drive pulley and to the aft side of the left drive pulley. The 1/8 inch direct cable connects to the aft side of the right drive pulley and to the forward side of the left drive pulley.
f. Connect position transmitter rod (17) to right drive pulley arm (19).
g. Adjust both push-pull rods (9) to 8.83±.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.

h. THRU AIRCRAFT SERIAL FR172-00297 WHEN NOT MODIFIED IN ACCORDANCE WITH SK150-37 AND WHEN NOT MODIFIED IN ACCORDANCE WITH FIGURE 7-2, SHEET 3. Screw actuating tube (4) IN toward transmission (2) by hand to its shortest length (flaps full up position). Loosen setscrew (21) securing actuating tube (4) to nut and ball assembly (22), hold nut and ball assembly so that it will not move, hold RIGHT flap in the full UP position and adjust actuating tube (4) IN or OUT as necessary to align with attachment hole in drive pulley (8). Tighten setscrew (21) and secure tube to drive pulley with bolt (18).



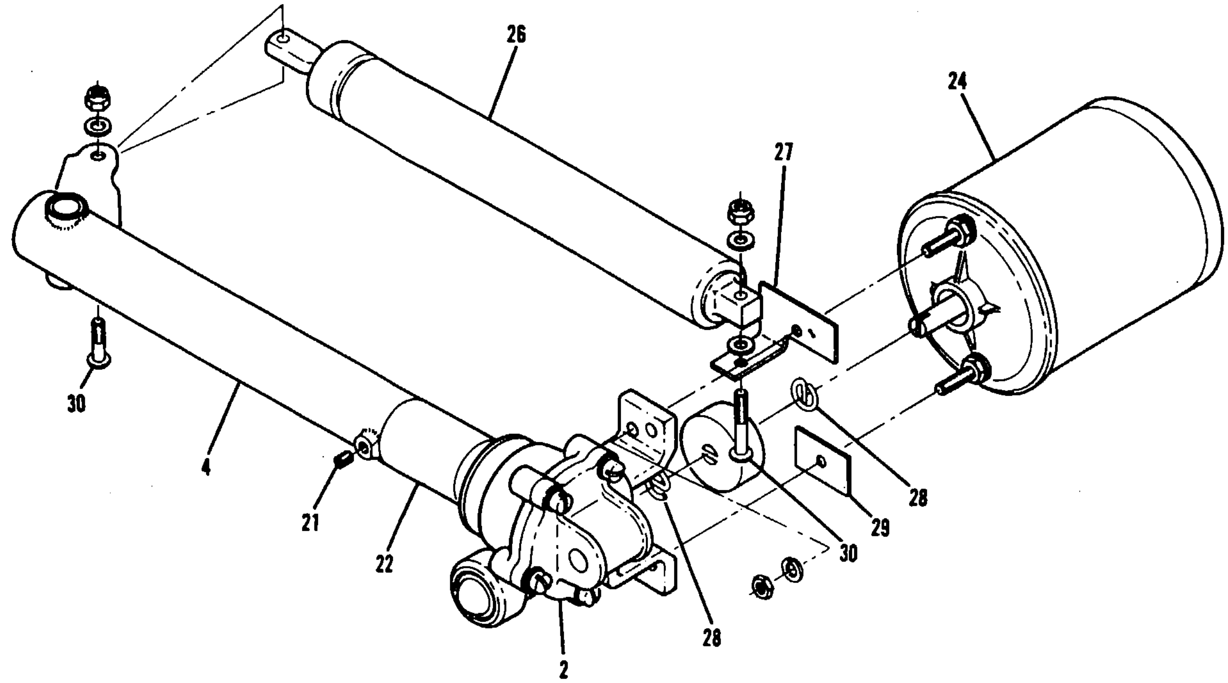
NOTE

Use Grade "C" Loctite sealant on threads of setscrew (21) after final adjustment.

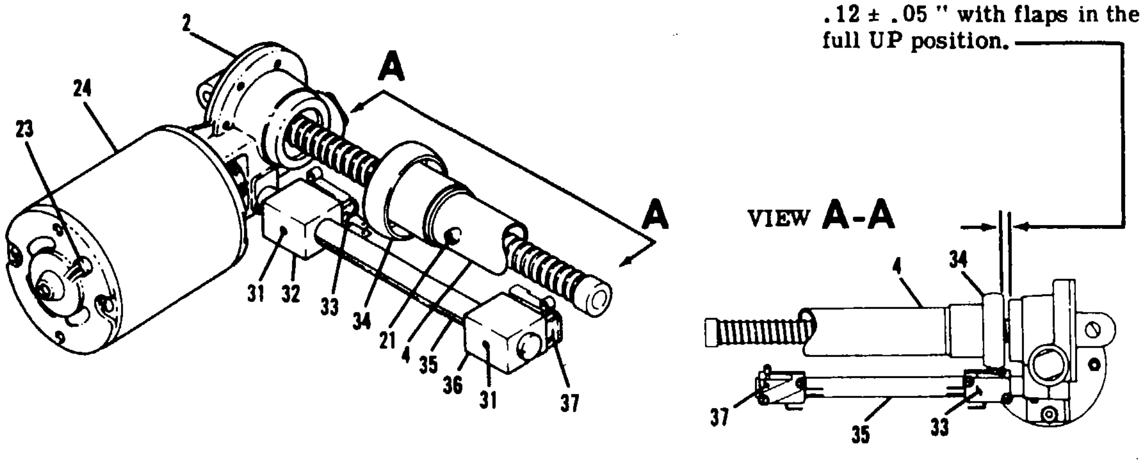
1. Bolt
2. Transmission Assembly
3. Bolt
4. Actuating Tube
5. Bolt
6. Bolt
7. Cable Lock
8. Drive Pulley
9. Push-Pull Rod
10. Flap Attach Bracket
11. Bolt
12. Direct Cable
13. Retract Cable
14. Bolt
15. Position Transmitter
16. Pin
17. Wire Rod
18. Bolt
19. Arm
20. Pin
21. Setscrew
22. Nut and Ball Assembly
23. Electrical Wiring
24. Motor Assembly
25. Hinge Assembly
26. Snubber Assembly
27. Bracket
28. Spacer
29. Shim
30. Screw
31. Setscrew
32. Switch Adjustment Block
33. Up-Limit Switch
34. Switch Actuating Collar
35. Support
36. Switch Adjustment Block
37. Down-Limit Switch

THRU AIRCRAFT SERIAL FR17200297 WHEN NOT MODIFIED IN ACCORDANCE WITH SK150-37

Figure 7-2. Flap Motor and Transmission Assembly (Sheet 1 of 3)

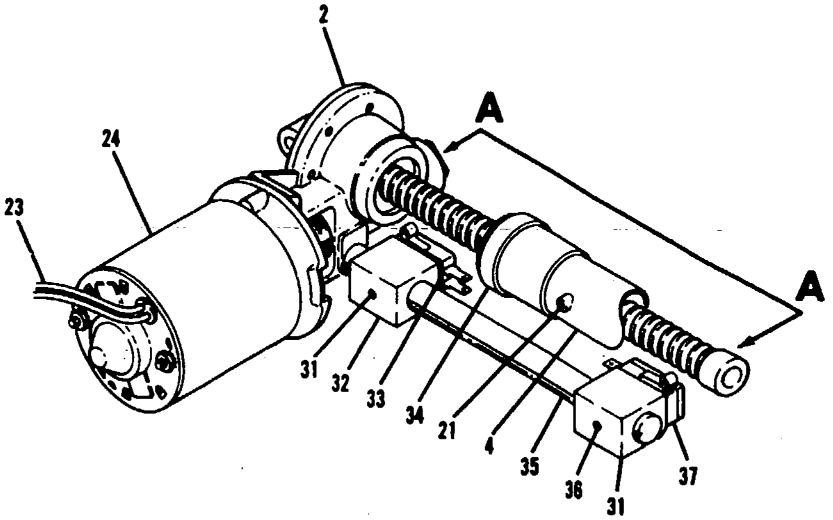


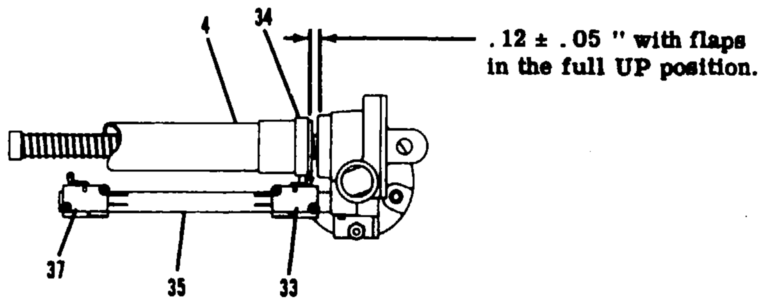
THRU AIRCRAFT SERIAL FR17200297 WHEN
MODIFIED IN ACCORDANCE WITH SK150-37



BEGINNING WITH AIRCRAFT
SERIAL FR17200298

Figure 7-2. Flap Motor and Transmission Assembly (Sheet 2 of 3)





VIEW AA

SK150-41 AND THIS FLAP ACTUATOR INSTALLATION IS EFFECTIVE ONLY WHEN USED AS A REPLACEMENT SPARE, OR ON PRODUCTION FLAP ACTUATOR INSTALLATIONS PRIOR TO AIRCRAFT SERIAL FR17200278

Figure 7-2. Flap Motor and Transmission Assembly (Sheet 3 of 3)

i. THRU AIRCRAFT SERIAL FR17200297 WHEN MODIFIED IN ACCORDANCE WITH SK150-37 AND WHEN NOT MODIFIED IN ACCORDANCE WITH FIGURE 7-2, SHEET 3. Operate flap motor until actuating tube (4) is IN to its shortest length (flaps full up position). Hold RIGHT flap in the full UP position and check actuating tube (4) to drive pulley (8) attachment holes for alignment. Operate flap motor toward the DOWN position until bolt (18) can be installed freely. Loosen setscrew (21) and rotate nut and ball assembly (22) IN against transmission (2). Tighten setscrew (21) and bolt (18).

j. BEGINNING WITH AIRCRAFT SERIAL FR172-00298 AND ALL AIRCRAFT MODIFIED IN ACCORDANCE WITH FIGURE 7-2, SHEET 3. Screw actuating tube (4) IN toward transmission (2) by hand to .12±.05 inches between switch actuating collar (34) and transmission as illustrated in VIEW A-A. Loosen setscrew (21) securing actuating tube (4) to switch actuating collar (34), hold actuating collar to maintain .12±.05", hold RIGHT flap in the full UP position and adjust actuating tube (4) IN or OUT as necessary to align with attachment hole in drive pulley (8). Tighten setscrew (21) and secure tube to drive pulley with bolt (18).

NOTE

If actuating tube (4) is too long to allow attachment to drive pulley after completion of steps "h," "i" and "j," proceed to step "k."

k. Disconnect push-pull rod (9) at drive pulley (8), then connect actuating tube (4) to drive pulley.

l. Manually hold RIGHT flap in full UP position and readjust push-pull rod (9) 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.

m. BEGINNING WITH AIRCRAFT SERIAL FR172-00298 AND ALL AIRCRAFT MODIFIED IN ACCORDANCE WITH FIGURE 7-2, SHEET 3. After completion of step "l," with RIGHT flap in full UP position, loosen setscrew (31) and slide UP-LIMIT switch (33) adjustment block (32) on support (35) to operate switch and shut-off electrical power to motor at this position. Tighten setscrew (31).

n. Manually hold LEFT flap full UP and connect control cables at turnbuckles (index 6, figure 7-1). Remove reference tags previously installed in step "g" as turnbuckles are connected.

o. With flaps full UP, adjust turnbuckles to obtain 30±10 pounds tension on cables. Adjust retract cable first.

NOTE

Ensure cables are positioned in pulley grooves and cable ends are positioned correctly at drive pulleys before tightening turnbuckles.

p. 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.

q. 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 or castellated nuts and install cotter pins.

NOTE

An inclinometer for measuring control surface travel is available from the Cessna Service Parts Center. Refer to figure 6-4.

r. Mount an inclinometer on one flap and adjust to 0°. Extend flaps and check down angle as follows:

1. THRU AIRCRAFT SERIAL FR17200297 WHEN NOT MODIFIED IN ACCORDANCE WITH FIGURE 7-2, SHEET 3. After completion of steps "a" through "r", the flap down angle should be as specified in figure 1-1. Repeat down angle check on opposite flap.

2. BEGINNING WITH AIRCRAFT SERIAL FR172-00298 AND ALL AIRCRAFT MODIFIED IN ACCORDANCE WITH FIGURE 7-2, SHEET 3. After completion of steps "a" thru "r", adjust DOWN-LIMIT switch (37) adjustment block (36) on support (35) to operate switch and shut-off electrical power to motor at degree of travel specified in figure 1-1. Tighten setscrew (31). Repeat down angle check on opposite flap. Check operation of limit switches for positive shut-off through several cycles.

CAUTION

Ensure the limit-switches at the flap actuator are adjusted properly or damage may occur due to overtravel.

NOTE

Since the flap rollers may not bottom in the flap tracks with flaps fully extended, some free play may be noticed in this position.

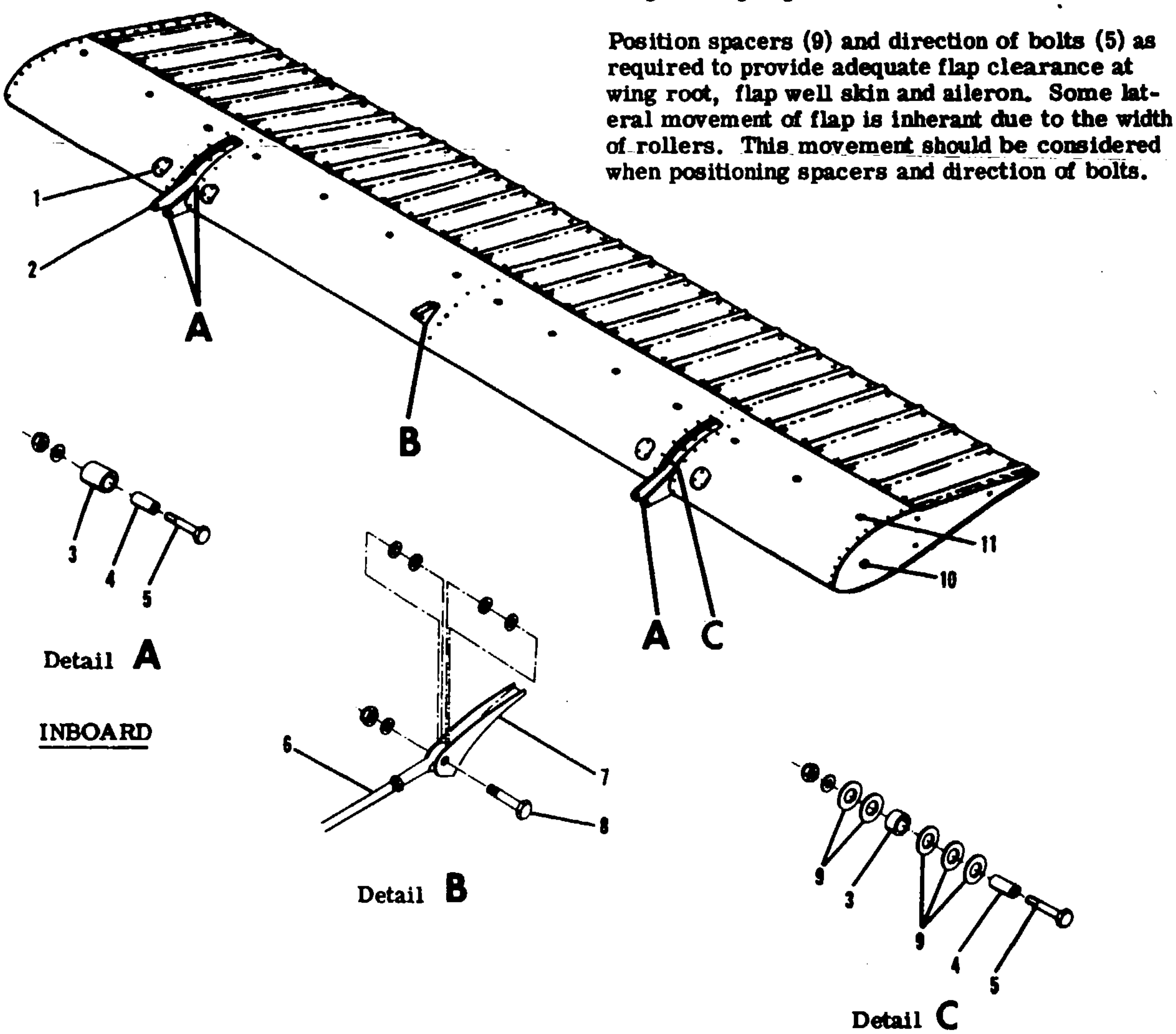
s. Refer to paragraph 7-22 for indicating system rigging.

t. Perform an operational check in accordance with paragraph 7-3, check all locknuts for tightness, all turnbuckles are saftied, cotter pins installed, and reinstall all items removed for access.

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 inherant due to the width of rollers. This movement should be considered when positioning spacers and direction of bolts.



1. Access Plate
2. Flap Support
3. Roller Assembly
4. Bushing
5. Bolt
6. Push-Pull Rod
7. Flap Bracket
8. Bolt
9. Spacer
10. Plug Button
11. Nylon Plug Button

Figure 7-3. Flap Installation

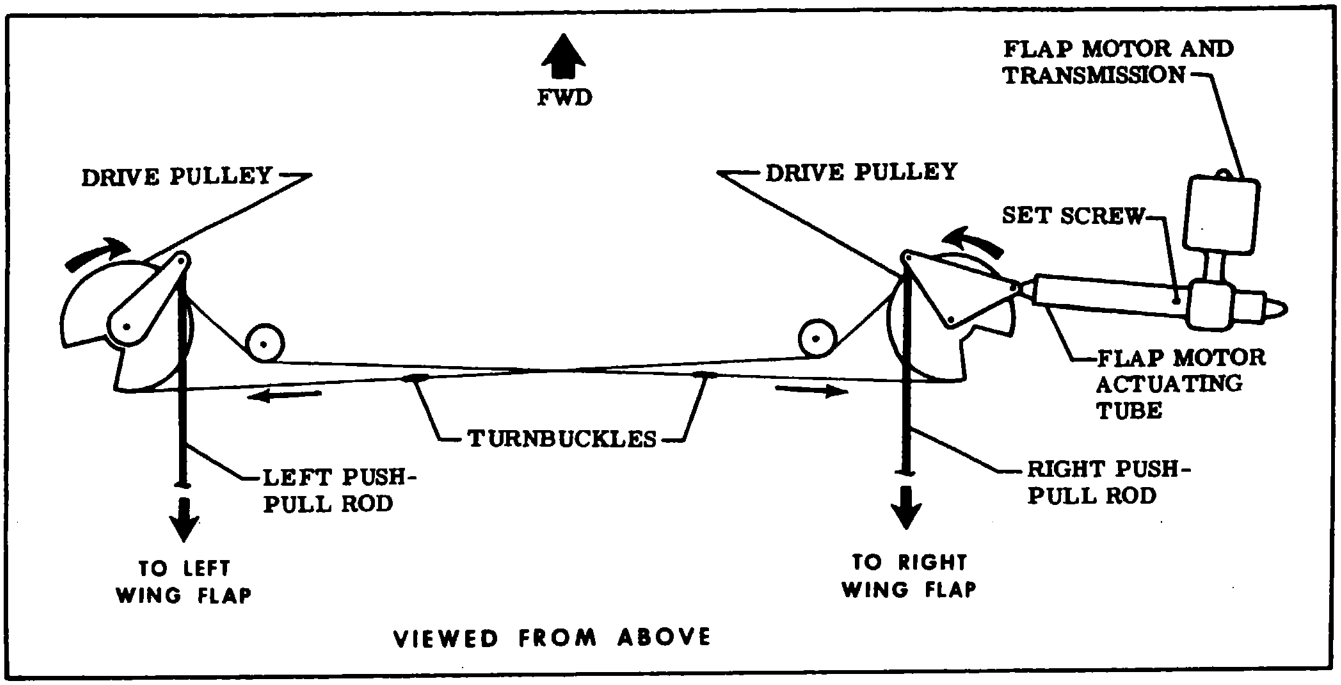


Figure 7-4. Flap System Schematic

7-17. INDICATING SYSTEM.

7-18. DESCRIPTION. The flap position transmitter, located in the right wing, is controlled by mechanical linkage from the right drive pulley. The transmitter delivers an electrical signal to the flap position indicator, located in the instrument panel.

7-19. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
INDICATOR FAILS TO RESPOND.	Popped circuit breaker.	Reset breaker. If it pops out again, determine cause and correct.
	Defective circuit breaker.	Check continuity. Replace breaker.
	Defective wiring.	Check continuity. Repair wiring.
	Defective transmitter.	Disconnect "hot" wire to transmitter. Check transmitter for varying resistance as transmitter arm is moved. Replace transmitter.
	Defective indicator.	If there is voltage to indicator, continuity through wires and transmitter is good, indicator is defective. Replace indicator.

7-19. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
INDICATOR READINGS ERRONEOUS.	Transmitter not adjusted properly.	Substitute a known-good transmitter and check operation. Adjust in accordance with paragraph 7-22.
	Defective transmitter.	Substitute a known-good indicator and check operation. Replace transmitter.
	Defective indicator.	Replace indicator.
	Loose electrical connection.	Check connections and tighten.

7-20. FLAP POSITION TRANSMITTER. (Refer to figure 7-2.)

7-21. REMOVAL AND INSTALLATION.

a. Remove access plate adjacent to drive pulley in right wing.

b. Remove pin (20) attaching transmitter rod (17) to arm (19).

c. Disconnect electrical wiring at transmitter quick-disconnects.

d. Remove bolts (14) securing transmitter to wing structure and lift out transmitter.

e. Reverse the preceding steps for reinstallation. Adjust transmitter in accordance with paragraph 7-22.

7-22. ADJUSTMENT. (Refer to figure 7-2.)

NOTE

The flap control system MUST be rigged properly prior to adjusting the position transmitter. Refer to paragraph 7-16.

a. Run flaps to full UP position.

b. Adjust position transmitter (15) in the slotted adjustment holes so that the position indicator reads 0°. If necessary, the transmitter rod (17) may be bent slightly for additional adjustment.

SECTION 8

ELEVATOR CONTROL SYSTEM

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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 re-rig 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.	Check visually and attach push-pull tube correctly.
	Cables disconnected.	Check visually, attach cables and rig system in accordance with paragraph 8-14.
BINDING OR JUMPY MOTION FELT IN MOVEMENT OF ELEVATOR SYSTEM.	Defective forward or rear bellcrank or bellcrank pivot bearing.	Move to check for play or binding. Replace bellcranks found defective.
	Cables slack.	Check tension and adjust to tension specified in figure 8-1.
	Cables not riding correctly on pulleys.	Open access plates and observe pulleys. Route cables correctly over pulleys.
	Nylon bearing on instrument panel binding.	Disconnect universal joint and check for binding. Replace 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 defective.
	Defective elevator hinges.	Move elevators by hand, checking hinges. Replace hinges found defective.

8-3. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
BINDING OR JUMPY MOTION FELT IN MOVEMENT OF ELEVATOR SYSTEM. (Cont.)	Lubrication needed.	Lubricate in accordance with Section 2.
	Clevis bolts too tight.	Check and readjust bolts to eliminate binding.
	Defective pulleys or cable guards.	Open access plates and check visually. Replace defective parts and install guards properly.
ELEVATORS FAIL TO ATTAIN PRESCRIBED TRAVEL.	Stops incorrectly set.	Check travel with inclinometer. Rig in accordance with paragraph 8-14.
	Cables tightened unevenly.	Rig in accordance with paragraph 8-14.
	Interference at firewall or instrument panel.	Rig in accordance with paragraph 8-14.

8-4. ELEVATORS. (Refer to figure 8-2.)

8-5. 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 (11) 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 applicable paragraph in this section if necessary.

8-6. REPAIR. Repair may be accomplished as outlined in Section 17. If repair has affected static balance, check and rebalance as required.

8-7. BELLCRANKS.

8-8. FORWARD. (Refer to 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 applicable paragraph in this section, safety turnbuckles and reinstall all items removed in step "a".

8-10. REAR. (Refer to 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).

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 applicable paragraph in this section, safety turnbuckles and reinstall all items removed for access.

8-12. CABLES AND PULLEYS. (Refer to 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 (9).

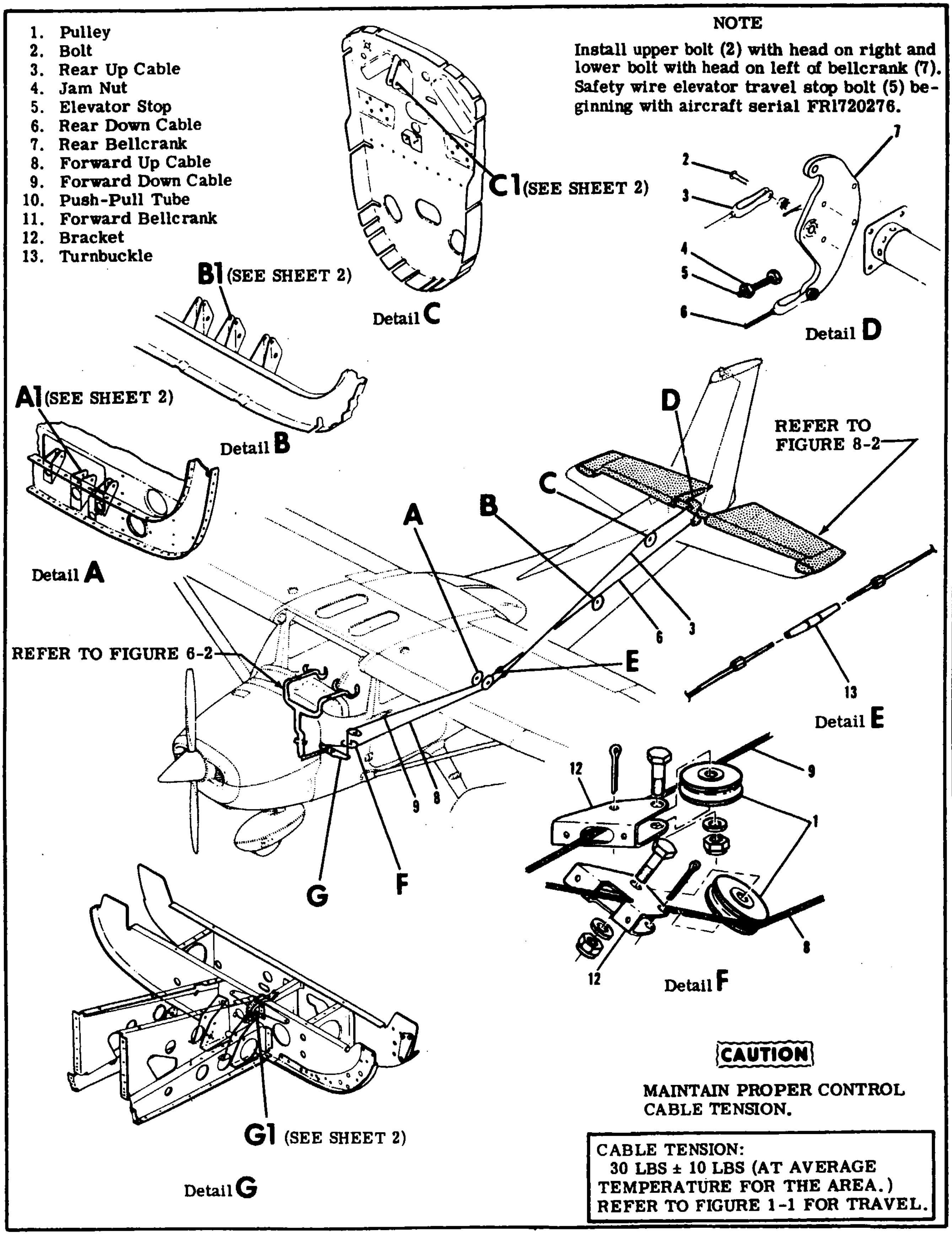
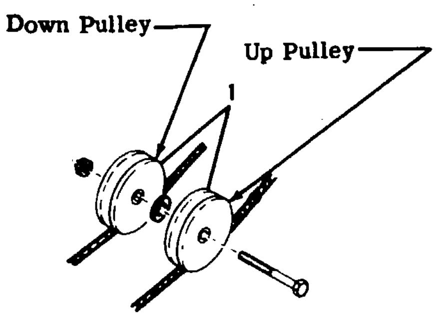
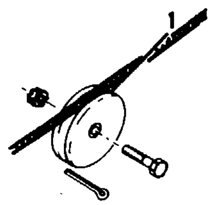


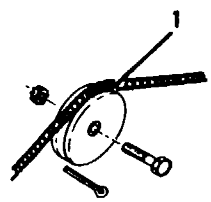
Figure 8-1. Elevator Control System (Sheet 1 of 2)



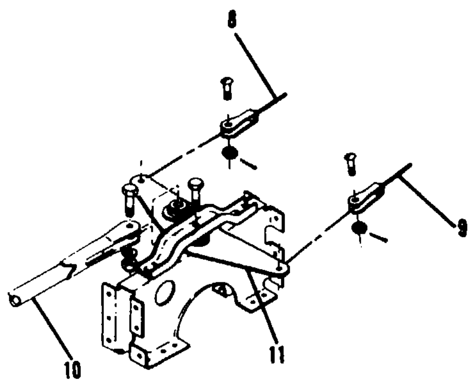
Detail **A1**



Detail **B1**
(Down Pulley)



Detail **C1**
(Up Pulley)

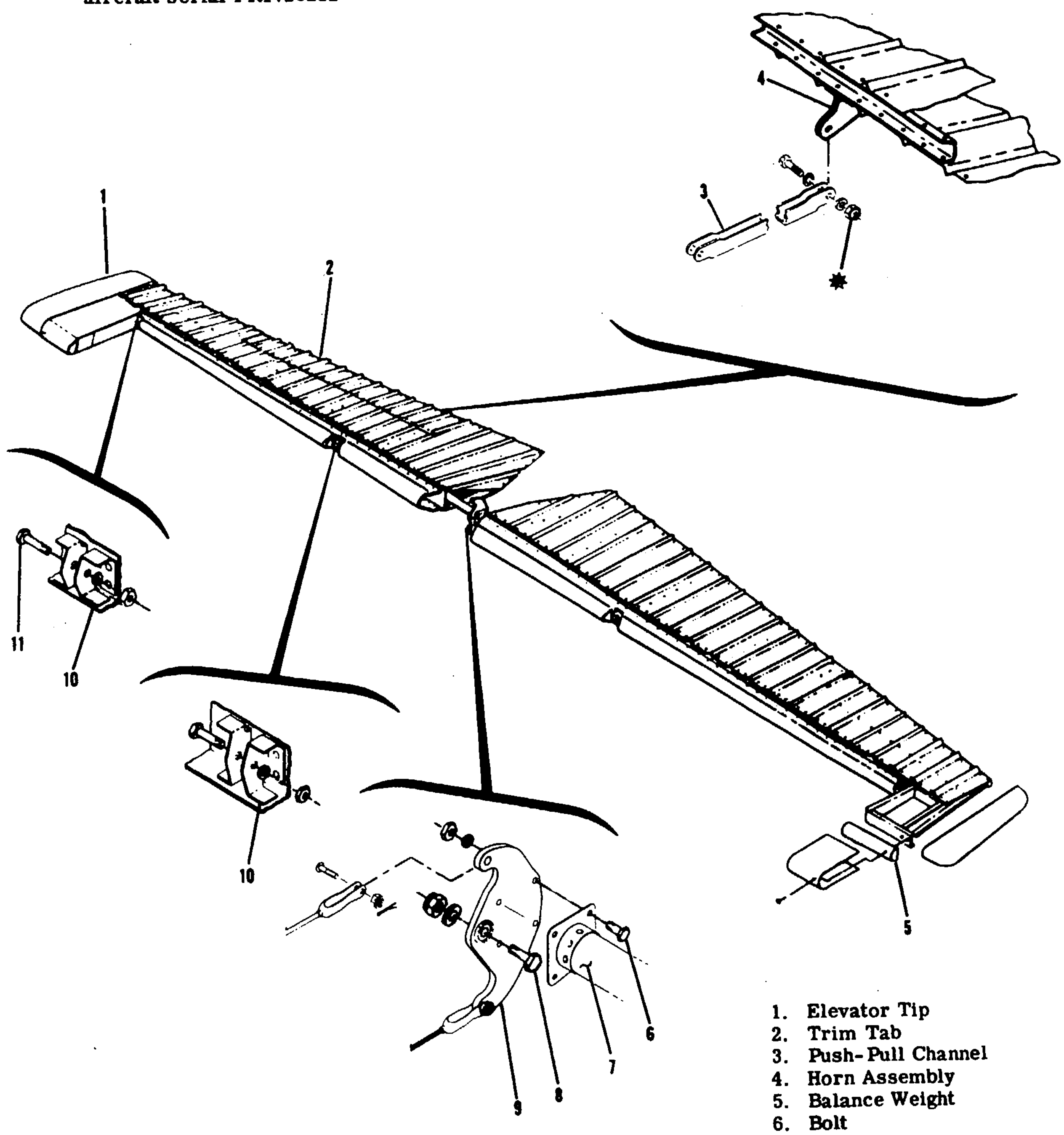


Detail **G1**

Figure 8-1. Elevator Control System (Sheet 2 of 2)

NOTE

* Castellated nut and pin beginning with aircraft serial FR1720212



1. Elevator Tip
2. Trim Tab
3. Push-Pull Channel
4. Horn Assembly
5. Balance Weight
6. Bolt
7. Tube Assembly
8. Bolt
9. Bellcrank
10. Hinge Bracket
11. Bolt

Figure 8-2. Elevator Installation

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 applicable paragraph in this section, safety turnbuckles and reinstall all items removed in step "a".

8-14. RIGGING. (Refer to figure 8-1.)

NOTE

An inclinometer for measuring control surface travel is available from Cessna Service Parts Center. Refer to figure 6-4.

a. Set travel stop bolts (5) to attain travel specified in Section 1.

NOTE

Travels shown are relative to horizontal stabilizer. Neutral position of elevators is where elevators are streamlined with stabilizer. Disregard counterweight areas of elevators when streamlining since these areas are contoured to streamline elevator tips in cruise flight.

b. Locate control yoke and elevators in neutral position by adjusting cable turnbuckles (13) equally to specified tension.

NOTE

Adjust turnbuckles (13) so control "U" does not contact instrument panel in the full "UP" position or firewall in full "DOWN" position.

c. Safety turnbuckles and install all parts removed for access.

WARNING

Be sure elevators move in correct direction when operated by controls.

SHOP NOTES:

SECTION 9

ELEVATOR TRIM CONTROL SYSTEM

TABLE OF CONTENTS

9-1. ELEVATOR TRIM CONTROL SYSTEM. (Refer to 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 procedures in the following trouble shooting chart it may be necessary to re-rig system, refer to paragraph 9-14.

TROUBLE	PROBABLE CAUSE	REMEDY
TRIM CONTROL WHEEL MOVES WITH EXCESSIVE RESISTANCE.	Cable tension too high.	Check and adjust tension as specified in figure 9-1.
	Pulleys binding or rubbing.	Open access plates and check visually. Repair or replace as necessary.
	Cables not in place on pulleys.	Open access plates and check visually. 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.	Check visually. Replace chain.
	Damaged sprocket.	Check visually. Replace sprockets.
	Bent sprocket shaft.	Observe motion of sprockets. Replace bent sprocket shafts.

9-3. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
LOST MOTION BETWEEN CONTROL WHEEL AND TRIM TAB.	Cable tension too low.	Check and adjust tension as specified in figure 9-1.
	Broken pulley.	Open access plates and check visually. Replace defective pulley.
	Cable not in place on pulleys.	Open access plates and check visually. Install cables correctly.
	Worn trim tab actuator.	Remove and replace worn actuator.
	Actuator attachment loose.	Check actuator for security. Tighten as necessary.
TRIM INDICATOR FAILS TO INDICATE CORRECT TRIM POSITION.	Indicator incorrectly engaged on wheel track.	Check visually and reset indicator as necessary.
INCORRECT TRIM TAB TRAVEL.	Stop blocks loose or incorrectly adjusted.	Adjust stop blocks on cables. Refer to figure 9-2.

9-4. TRIM TAB. (Refer to 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. (Refer to 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 channel 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 9-14, safety turnbuckle (8) and reinstall all items removed for access.

9-7A. DISASSEMBLY. (Refer to 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) in the opposite direction from sprocket end, remove bearing (14), O-ring (13) and collar (7).
6. Lightly tap screw (9) toward the sprocket end of housing, remove bearing (6) and collar (7).
7. It is not necessary to remove retaining rings (11).

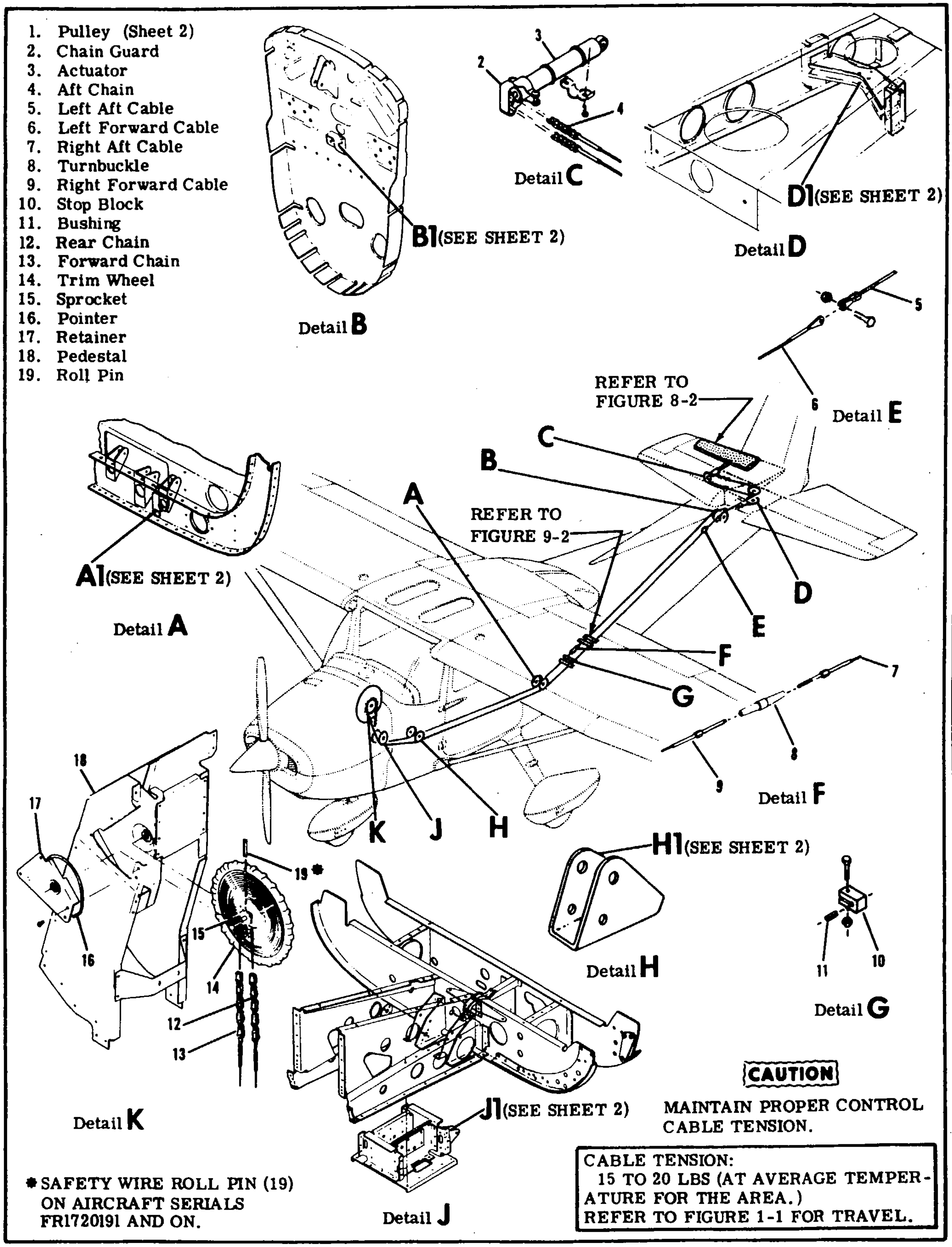


Figure 9-1. Elevator Trim Tab Control System (Sheet 1 of 2)

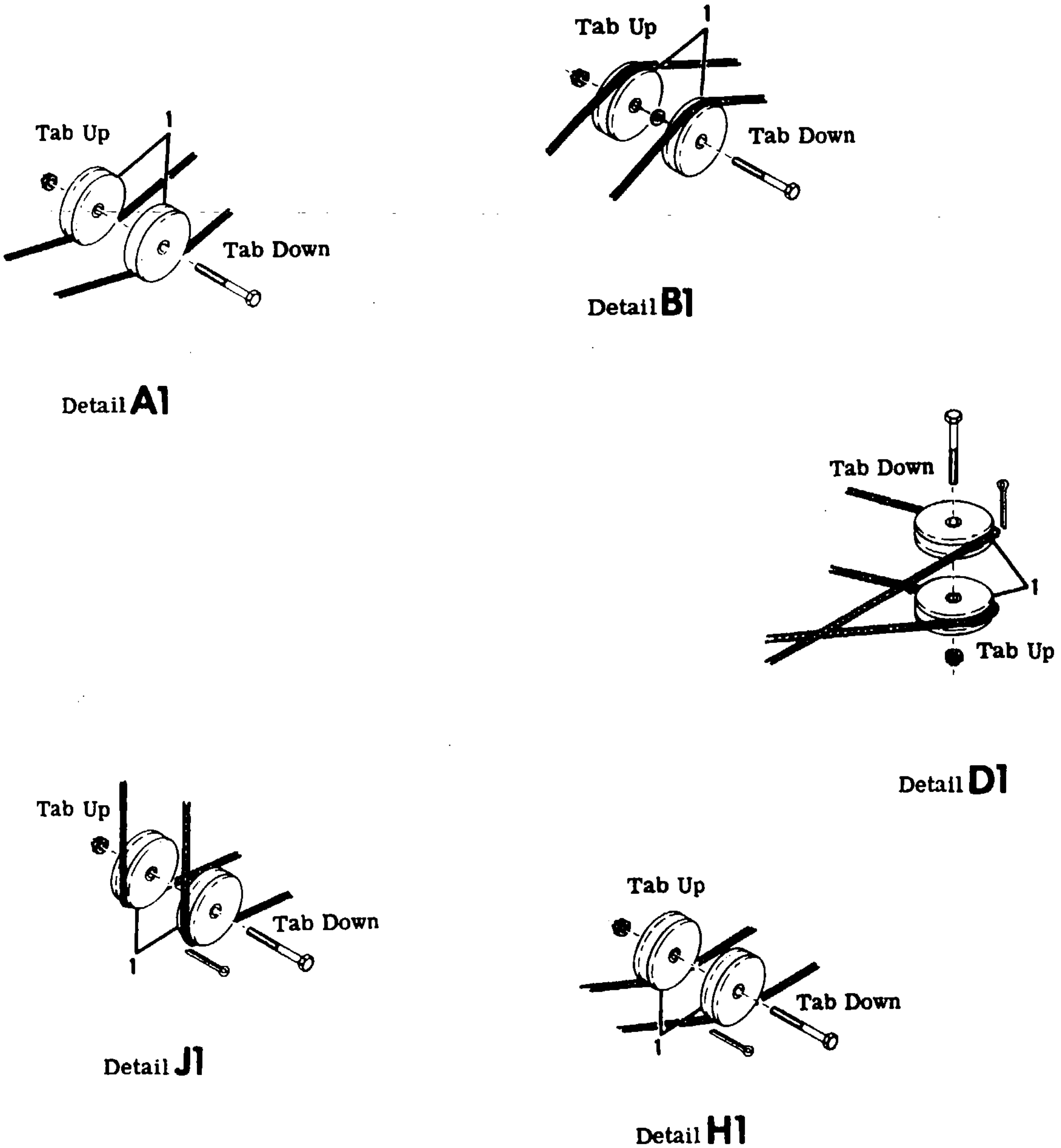


Figure 9-1. Elevator Trim Tab Control System (Sheet 2 of 2)

9-7B. CLEANING, INSPECTION AND REPAIR. (Refer to 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	0.380" MAX.
BEARING (14)	
INSIDE DIAMETER	
SMALL HOLE	0.248" MIN.
SMALL HOLE	0.253" MAX.
LARGE HOLE	0.373" MIN.
LARGE HOLE	0.380" MAX.
THREADED ROD END (15)	
OUTSIDE DIAMETER	
(SHANK)	0.242" MIN.
	0.246" MAX.
SCREW (9)	
OUTSIDE DIAMETER	0.367" 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.

9-7C. REASSEMBLY. (Refer to 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 Section 2.

c. Slip 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).

e. Insert screw (9), with assembled parts, into housing (12) until bearing (6) is flush with the 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).

- New bearings (6 and 14) are not pre-drilled and must be drilled on assembly. The groov pins (10) are 1/16 inch in diameter, there fore, requiring a 1/16 (0.0625) 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.

9-7D. TRIM TAB FREE-PLAY INSPECTION.

a. Place elevators and trim tab in the neutral position.

b. Using moderate pressure, move the trim tab trailing edge up and down by hand to check free-play.

c. A maximum of .131" (total motion up and down) measured at the trim tab trailing edge is permissible.

d. If the trim tab free-play is less than .131", the system is within prescribed limits.

e. If the trim tab free-play is more than .131", check the following items for looseness while moving the 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 9-7C.

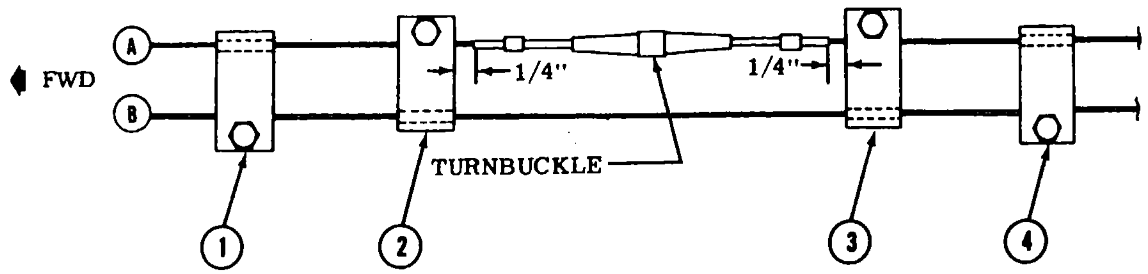
9-8. TRIM TAB CONTROL WHEEL. (Refer to figure 9-1.)

9-9. REMOVAL AND INSTALLATION.

a. Relieve cable tension at turnbuckle (8).

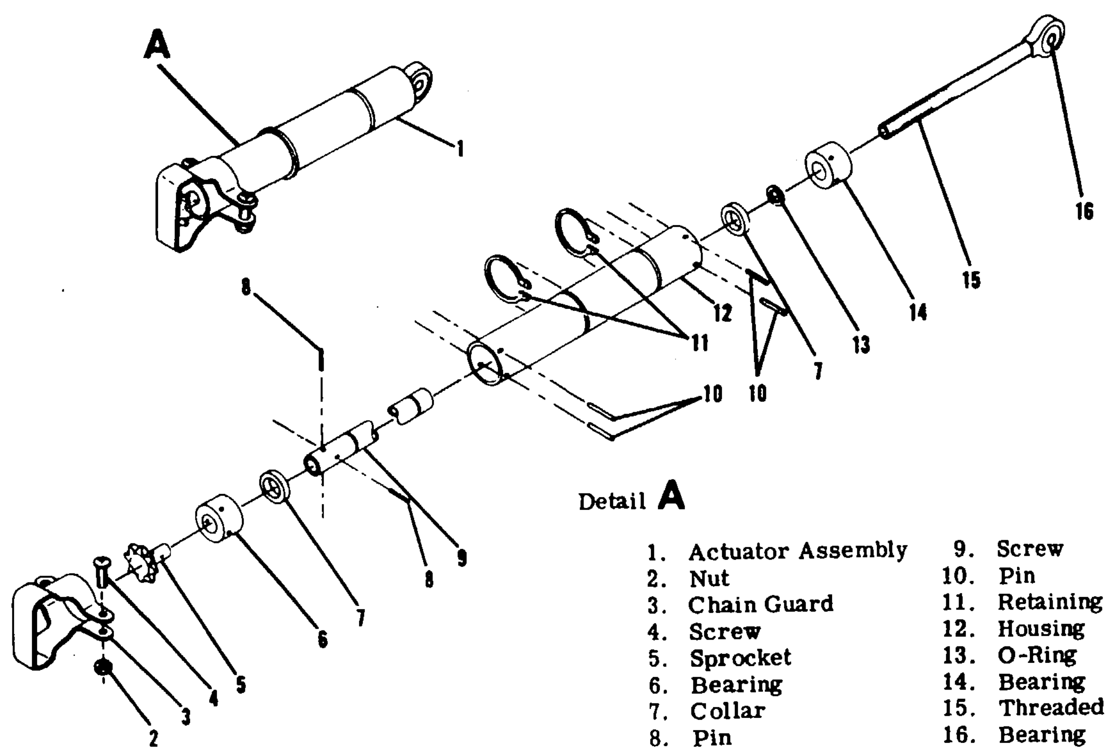
CAUTION

Position a support stand under tail tie-down ring to prevent tailcone from dropping while working inside.



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



1. Actuator Assembly
2. Nut
3. Chain Guard
4. Screw
5. Sprocket
6. Bearing
7. Collar
8. Pin
9. Screw
10. Pin
11. Retaining Ring
12. Housing
13. O-Ring
14. Bearing
15. Threaded Rod End
16. Bearing

Figure 9-3. Elevator Trim Tab Actuator Assembly

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.

9-10. CABLES AND PULLEYS. (Refer to figure 9-1.)

9-11. REMOVAL AND INSTALLATION.
a. Remove seats, upholstery and access plates as necessary.
b. Disconnect cables at turnbuckles (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".

9-12. PEDESTAL COVER. (Refer to figure 9-1.)

9-13. 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.

9-14. RIGGING. (Refer to 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.

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 Service Parts Center. Refer to 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 outlined 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 "e").
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.

SECTION 10

RUDDER CONTROL SYSTEM

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10-1 RUDDER CONTROL SYSTEM. (Refer to 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 re-rig system, refer to paragraph 10-11.

TROUBLE	PROBABLE CAUSE	REMEDY
RUDDER DOES NOT RESPOND TO PEDAL MOVEMENT.	Broken or disconnected cables.	Open access plates and check visually. Connect or replace cables.
BINDING OR JUMPY MOVEMENT OF RUDDER PEDALS.	Cables too tight.	Refer to figure 10-2 for distance between firewall and pedals. Rig per paragraph 10-11.
	Cables not riding properly on pulleys.	Open access plates and check visually. Route cables correctly over pulleys.
	Binding, broken or defective pulleys or cable guards.	Open access plates and check visually. 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.	Check visually. Replace defective bushings.
	Clevis bolts too tight.	Check and readjust bolts to eliminate binding.
	Steering rods improperly adjusted.	Rig system per paragraph 10-11.

10-3. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
LOST MOTION BETWEEN RUDDER PEDALS AND RUDDER.	Insufficient cable tension.	Refer to figure 10-2 for distance between firewall and pedals. Rig per paragraph 10-11.
INCORRECT RUDDER TRAVEL.	Incorrect rigging.	Rig per paragraph 10-11.

10-4. RUDDER PEDAL ASSEMBLY. (Refer to 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. Thru Aircraft Serial FR17200570, relieve cable tension at turnbuckles (index 6, figure 10-1); beginning with Aircraft Serial FR17200571, relieve cable tension at clevises (index 11, figure 10-1).

f. Disconnect cables, return springs and steering tubes from rudder bars.

g. Remove bolts securing bearing blocks (8) and work rudder bars out of tunnel area.

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. (Refer to figure 10-3.)

10-7. REMOVAL AND INSTALLATION.

a. Disconnect tail navigation light quick-disconnect (13).

b. Thru Aircraft Serial FR17200570, relieve cable tension at turnbuckles (index 6, figure 10-1) and disconnect cables from rudder bellcrank (12). Beginning with Aircraft Serial FR17200571, 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 17. Hinge bushings may be replaced as necessary.

10-9. CABLES AND PULLEYS. (Refer to 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. (Refer to 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.

b. Disconnect nose wheel steering tubes (refer to figure 5-5) from nose strut.

c. Thru Aircraft Serial FR17200570, adjust cables at turnbuckles (6); beginning with Aircraft Serial FR17200571, adjust cables at clevises (11) to align rudder and pedals in neutral position, 6.50 inches from firewall and pedal pivot shafts (index 6, figure 10-2). This step automatically determines cable tension through use of return springs (index 9, figure 10-2).

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

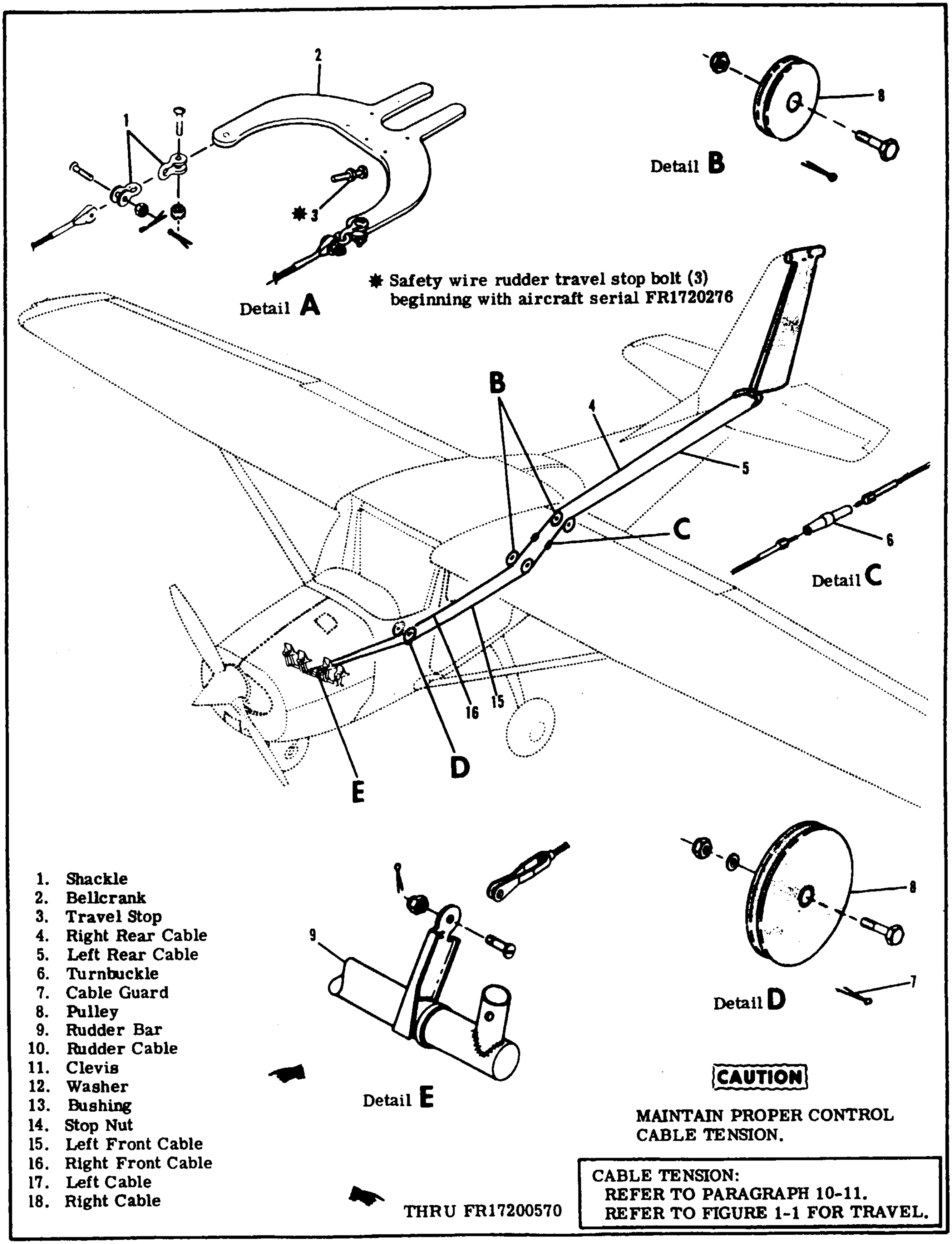


Figure 10-1. Rudder Control System (Sheet 1 of 2)

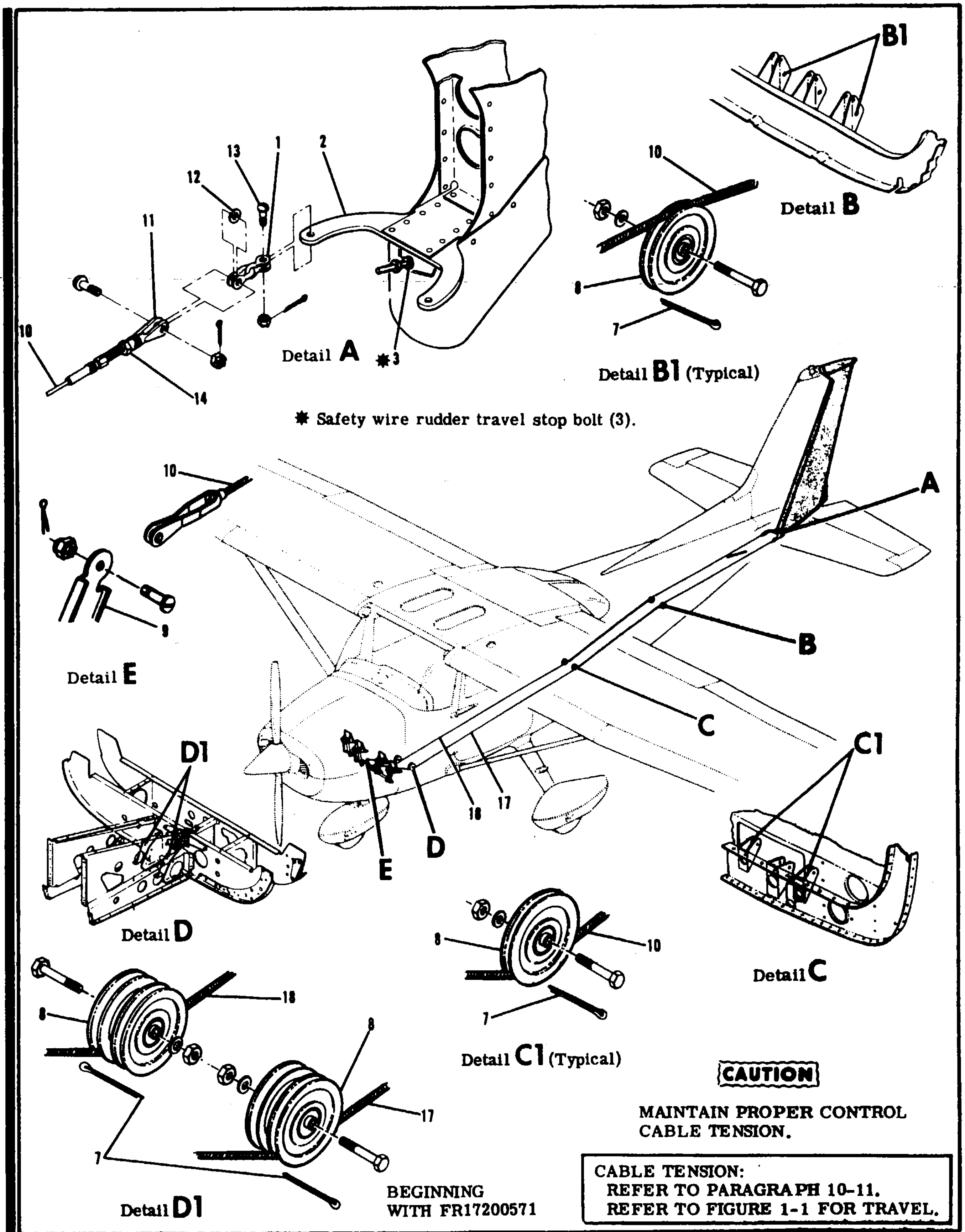
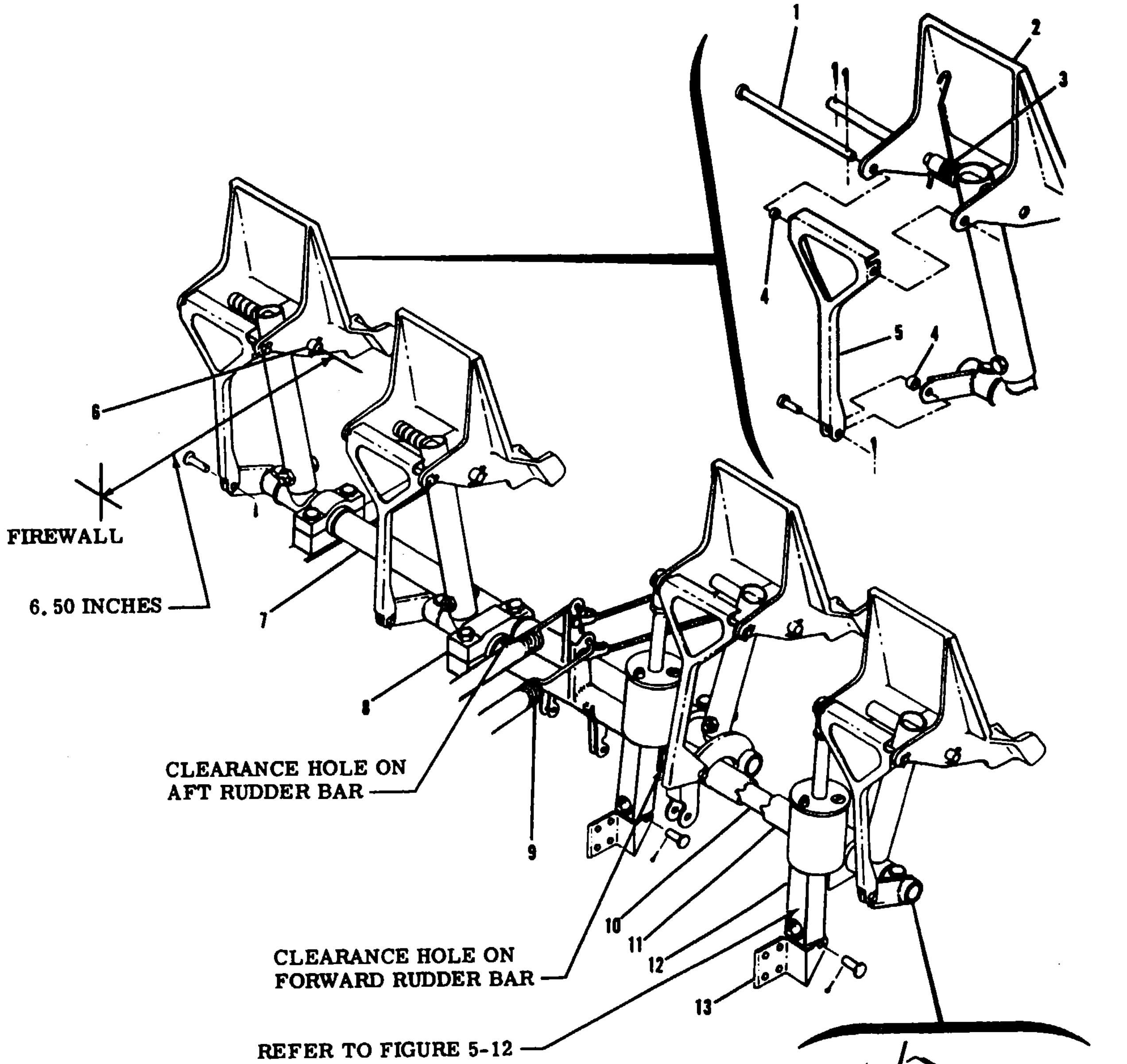
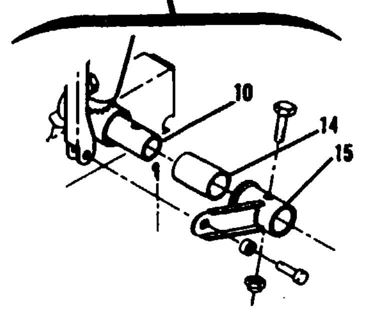


Figure 10-1. Rudder Control System (Sheet 2 of 2)



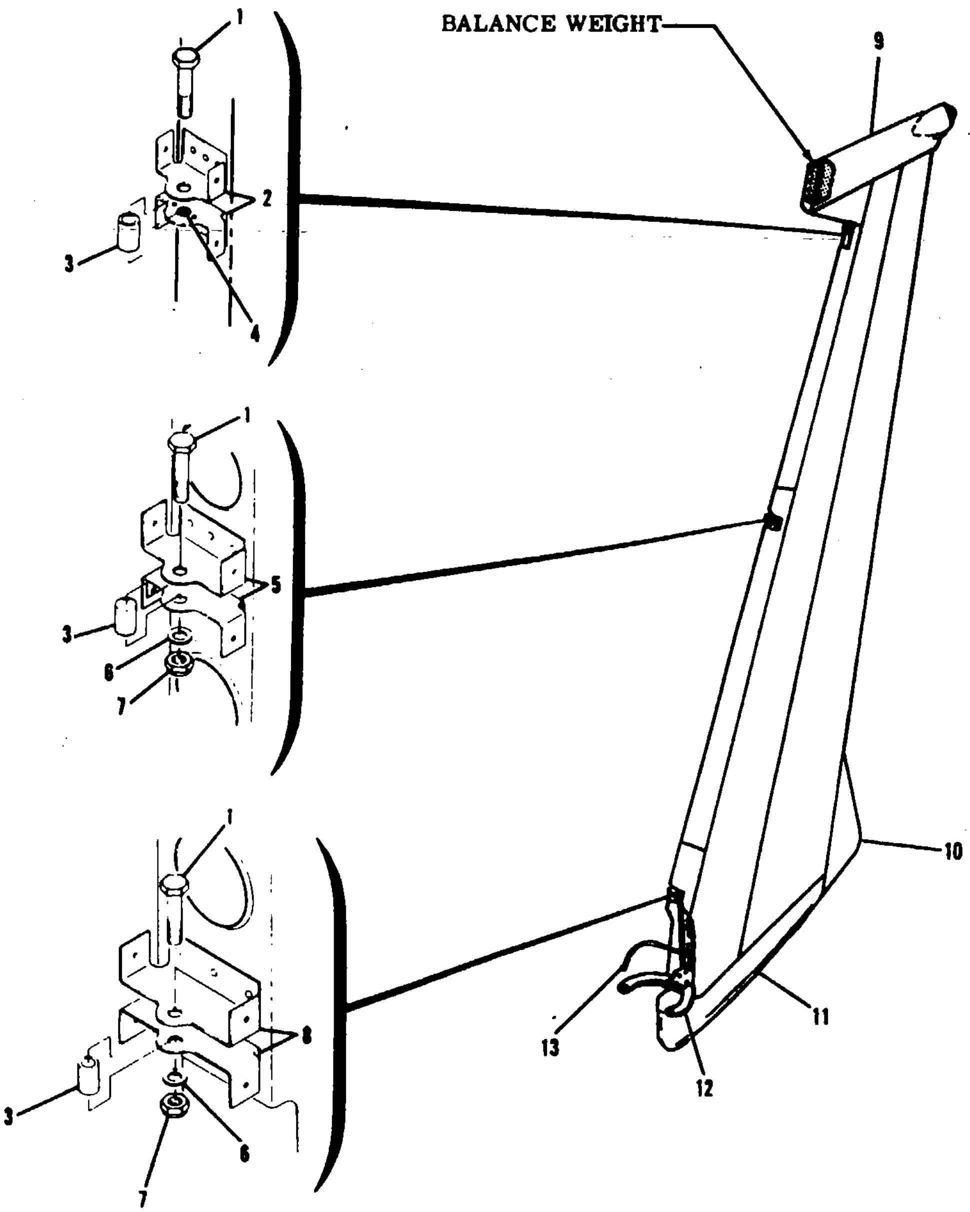


1. Shaft
2. Rudder Pedal
3. Anti-Rattle Spring
4. Spacer
5. Brake Link
6. Pivot Shaft
7. Aft Rudder Bar
8. Bearing Block
9. Return Spring
10. Brake Torque Tube
11. Forward Rudder Bar
12. Master Cylinder
13. Bracket
14. Bearing
15. Bellcrank

NOTE

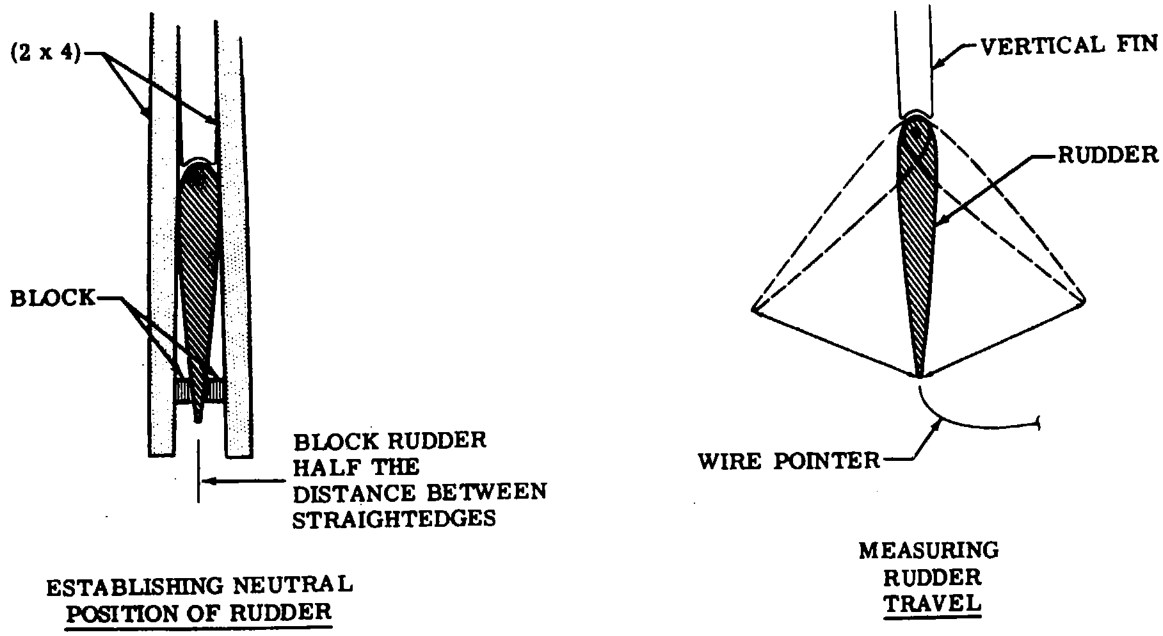
Nylon washers may be installed between shaft (1) and brake link (5) as required to eliminate excessive clearance.

Figure 10-2. Rudder Pedals Installation



1. Bolt	5. Center Hinge	10. Trim Tab
2. Upper Hinge	6. Washer	11. Lower Tip
3. Bushing	7. Nut	12. Bellcrank
4. Nutplate	8. Lower Hinge	13. Quick-Disconnect
	9. Upper Tip	

Figure 10-3. Rudder Assembly



1. Establish neutral position of rudder by clamping straightedge (such as wooden 2 × 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. This point is just above the lower rudder tip (rudder butt).
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 distance from pointer to pencil mark on rudder in each direction of travel. Distance should be 5.29" minimum travel to 5.91" maximum travel.

Figure 10-4. Checking Rudder Travel

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 figure 5-8 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. Safety cable turnbuckles or clevises, as applicable, 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.

SECTION 11

ENGINE

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11-1. ENGINE COWLING.

11-2. DESCRIPTION. The upper and lower engine cowling is shock-mounted. 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 and oil filler neck. Beginning with aircraft serial FR17200351, landing and taxi lights are installed in the lower cowl assembly. Beginning with aircraft serial FR17200441, a single, retractable cowl flap is installed in the aft end of the lower cowl to aid in controlling engine temperature.

11-3. REMOVAL AND INSTALLATION.

a. Release the quick-release fasteners (2, figure 11-1), attaching the cowling at the shock mounts and at the parting surfaces of the upper and lower cowl.

b. Beginning with aircraft serial FR17200351, disconnect the landing and taxi light wires at the quick-disconnects.

c. Beginning with aircraft serial FR17200441, disconnect cowl flap control clevis at cowl flap shock mount.

d. Reverse the preceding steps for reinstallation. Be sure the baffle seals are turned in the correct direction to confine and direct air flow around the engine. The vertical seals must fold forward and the side seals must fold upwards.

NOTE

When 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 predrilled. Install shock mounts on brackets so that cowling stud and shock mount are correctly aligned. Sheet aluminum may be used as shims between bracket halves to provide proper cowling contour.

11-4. CLEANING AND INSPECTION. Wipe the inner surfaces of the cowl with a cloth saturated with cleaning solvent (Stoddard solvent, or equivalent). If the inner surface of the cowl is coated heavily with grease and dirt, allow solvent to soak until the foreign material can be removed. Painted surfaces should be cleaned by washing with a solution of water and mild soap. After washing, a coat of wax on painted surfaces is recommended to prolong paint life. After cleaning, inspect cowling for dents, cracks, and loose rivets. Repair all defects to prevent spread of damage.

11-5. REPAIR. If cowling skins are extensively damaged, complete sections of the cowling should be replaced. Standard insert-type patches 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. Cowl reinforcement angles, if damaged, should be replaced with new parts.

11-6. COWL FLAP.

11-7. DESCRIPTION. A single, retractable cowl flap is installed in the aft end of the lower cowl to aid in controlling engine temperature.

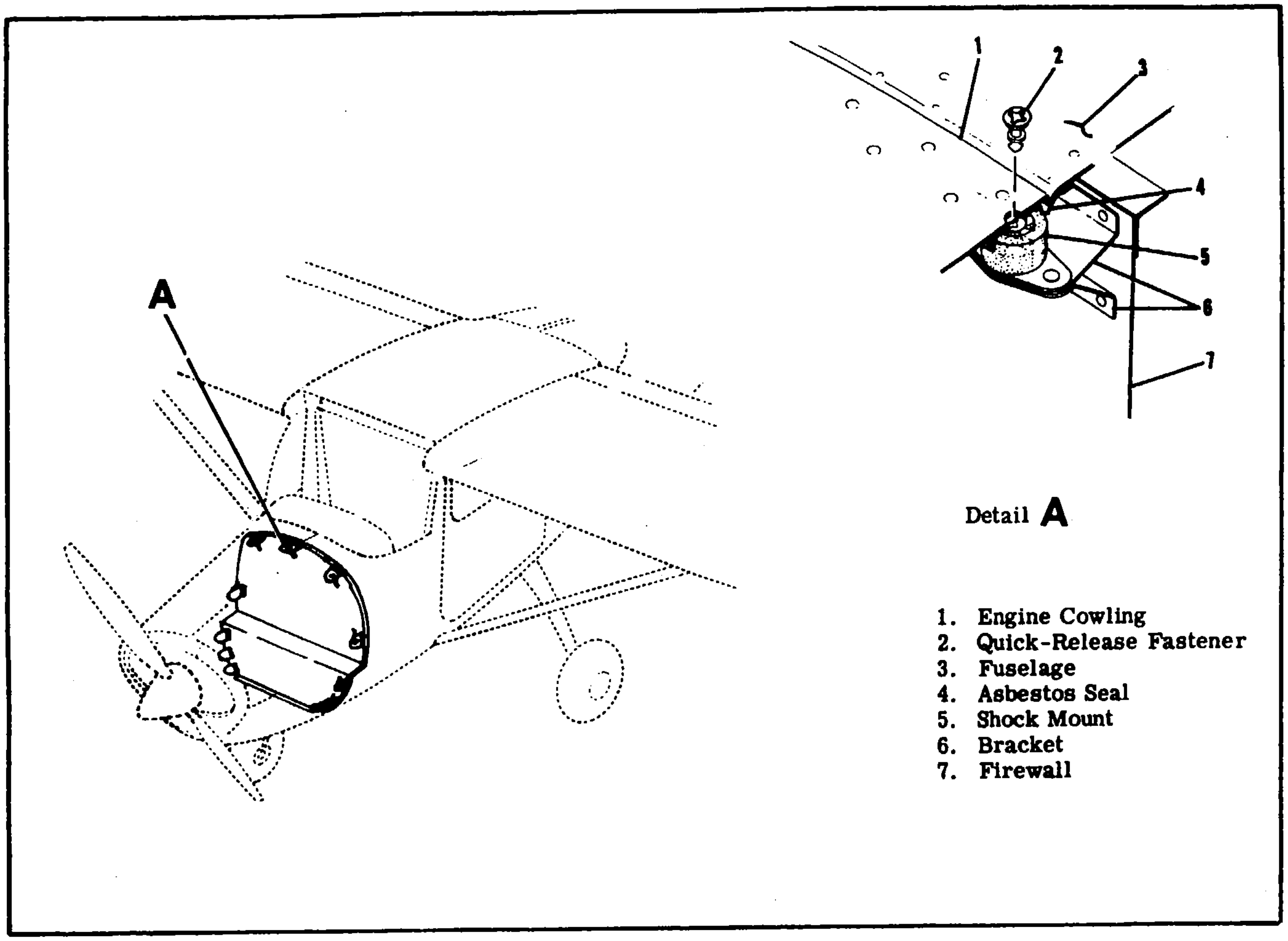


Figure 11-1. Engine Cowling

11-8. REMOVAL AND INSTALLATION. (Refer to figure 11-2.)

a. Place cowl flap lever (3) in the open position.

b. Disconnect cowl flap control clevis (1) from cowl flap shock mount (8).

c. Remove safety wire securing hinge pin (11) to cowl flap, pull pin from hinge and remove flap.

d. Reverse the preceding steps for reinstallation. Rig cowl flap, if necessary, in accordance with paragraph 11-9.

11-9. RIGGING. (refer to figure 11-2.)

a. Disconnect cowl flap control clevis (1) from cowl flap shock-mount (8).

b. Check to make sure that the flexible control reaches its internal stops in each direction. Mark control so that full travel can be readily checked and maintained during the remaining rigging procedures.

c. Place cowl flap lever (3) in the closed position. If the control lever cannot be placed in the closed position, adjust control at upper clevis (1) to position control lever in bottom hole of position bracket (2).

d. With the control lever in closed position, hold cowl flap closed, streamlined with trailing edge of lower cowl. Loosen jam nut and adjust clevis (1) on the control to hold cowl flap in this position and install bolt.

11-10. ENGINE.

11-11. DESCRIPTION. An air-cooled, wet-sump, six-cylinder, horizontally-opposed, Continental IO-360 series engine; equipped with fuel injection, is used to power the aircraft. The engine features inclined valves, with individual rocker box covers for each valve. The intake ports are located on the opposite side of the cylinders from the exhaust ports. An oil cooler is located at the rear (accessory case) end of the engine on the 2-4-6 side. Refer to paragraph 11-12 for engine data. For repair and overhaul of the engine, accessories and propeller, refer to the applicable publications issued by their manufacturer's.

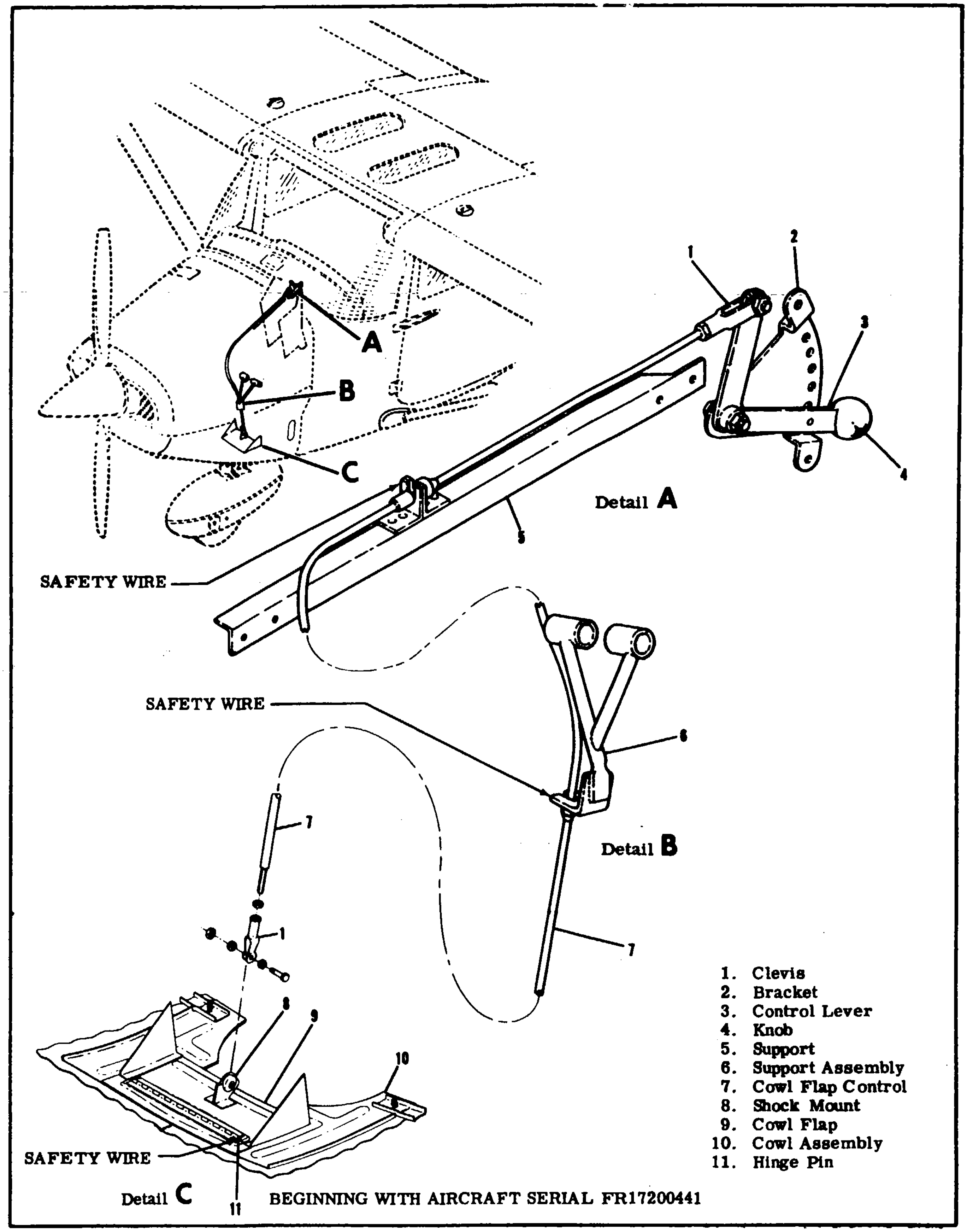


Figure 11-2. Cowl Flap Installation

11-12. ENGINE DATA.

Continental Model	IO-360-D (THRU 1972) IO-360-H (1973 AND 1974) IO-360-J (BEGINNING WITH 1975)
BHP (Maximum Continuous)	210 at 2800 RPM (THRU 1974) 195 at 2600 RPM (BEGINNING WITH 1975; Takeoff BHP: 210 at 2800 RPM, Maximum 5 minutes)
BHP (Maximum Recommended Cruise)	157 at 2600 RPM
Number of Cylinders	6 - Horizontally Opposed
Displacement	360 Cubic Inches
Bore	4.438 Inches
Stroke	3.875 Inches
Compression Ratio	8.5:1
Magnetos	Bendix-Scintilla S6LN-25
Right Magneto	Fires 20° BTC 1-3-5 Upper and 2-4-6 Lower Spark Plugs
Left Magneto	Fires 20° BTC 2-4-6 Upper and 1-3-5 Lower Spark Plugs
Firing Order	1-6-3-2-5-4
Fuel Metering System	Continental Fuel Injection System
Unmetered Fuel Pressure (600 RPM)	6 to 8 psi
Unmetered Fuel Pressure (2800 RPM)	25 to 27 psi
Oil Sump Capacity	8 U.S. Quarts (Refer to paragraph 11-39.)
Tachometer	Mechanical
Oil Pressure (psi)	
Normal	30 to 60
Minimum Idling	10
Oil Temperature	
Minimum	75°F
Maximum	240°F
Cylinder Head Temperature	
Maximum	460°F
Probe Location	Lower Side of No. 4 Cylinder
Dry Weight with Accessories	325 lb (Weight is approximate, excluding baffles, propeller governor, tachometer drive and vacuum pump.)
Direction of Crankshaft Rotation as Viewed from Propeller End of Engine	Counterclockwise
Spark Plugs	18 MM (Refer to current Continental active factory approved spark plug chart.)
Torque	330±30 lb-in.

11-13. TIME BETWEEN OVER HAUL (TBO).

Time Between Overhaul (TBO)	1500 Hours Operating Time *

*Refer to Continental Aircraft Engine Service Bulletin M74-20, Rev. 1; and any superseding bulletins, revisions or supplements thereto; for further recommendations applicable to IO-360 series engines. (Refer to Section 13 for propeller and governor overhaul periods.)

11-14. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE FAILS TO START.	Improper use of starting procedure.	Review starting procedure. Refer to Owner's Manual.
	Defective aircraft fuel system.	Refer to Section 12.
	Spark plugs fouled or defective.	Remove and clean. Check gaps and insulators. Use new gaskets. Check cables to persistently fouled plugs. Replace if defective.
	Defective magneto switch or grounded magneto leads.	Check continuity, repair or replace switch or leads.
	Defective ignition system.	Refer to paragraph 11-85.
	Excessive induction air leaks.	Check visually. Correct cause of air leaks.
	Dirty screen in fuel control unit or defective fuel control unit.	Check screen visually. Check fuel flow through control unit. Replace defective fuel control unit.
	Defective electric fuel pump.	Refer to Section 12.
	Defective fuel manifold valve or dirty screen.	Check fuel flow through valve. Remove and clean. Replace if defective.
	Clogged fuel injection lines or discharge nozzles.	Check fuel through lines and nozzles. Clean lines and nozzles. Replace if defective.
	Fuel pump not permitting fuel from auxiliary pump to bypass.	Check fuel flow through engine-driven fuel pump. Replace engine-driven pump.
	Vaporized fuel in system.	Purge vapor by operating electric fuel pump with mixture control in idle cut-off. If necessary, clean ejector jet in vapor separator cover with solvent. Do not use wire to clean jet.
	Fuel tanks empty.	Visually inspect tanks. Fill with proper grade and quantity of gasoline.
	Fuel contamination or water in fuel system.	Open fuel strainer drain and check for water. Drain all fuel and flush out fuel system. Clean all screens, fuel lines, strainer, etc.
	Mixture control in the IDLE CUT-OFF position.	Move control to the full RICH position.
	Fuel selector valves in OFF position.	Place selector valves in the ON position to tanks known to contain gasoline.
	Magneto impulse coupling failure.	Repair or install new coupling.

11-14. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE STARTS BUT DIES, OR WILL NOT IDLE PROPERLY.	Idle stop screw or idle mixture incorrectly adjusted.	Refer to paragraph 11-65.
	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 and strainer.
	Defective ignition system.	Refer to paragraph 11-85.
	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.
	Dirty screen in fuel control unit or defective fuel control unit.	Check screen visually. Check Fuel flow through control unit. Clean screen. Replace fuel control unit if defective.
	Defective manifold valve or clogged screen.	Check fuel flow through valve. Replace if defective. Clean screen.
	Defective engine-driven fuel pump.	If engine continues to run with electric pump turned on, but stops when it is turned off, the engine-driven pump is defective. Replace pump.
	Defective engine.	Check compression. Listen for unusual engine noises. Engine repair is required.
	Propeller control set in high pitch position (low RPM).	Use low pitch (high RPM) position for all ground operation.
	Defective aircraft fuel system.	Refer to Section 12.
	Restricted fuel injection lines or discharge nozzles.	Check fuel flow through lines and nozzles. Clean lines and nozzles. Replace if defective.
	Obstructed air intake.	Check visually. Remove obstruction; service air filter, if necessary.
	Improper positioning of discharge nozzle shield.	Position lower edge of nozzle shield approximately 1/16" above wrench pads on nozzle.

11-14. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE RUNS ROUGHLY, WILL NOT ACCELERATE PROPERLY, OR LACKS POWER.	Propeller control in high pitch (low RPM) position.	Use low pitch (high RPM) for all ground operations.
	Restriction in aircraft fuel system.	Refer to Section 12.
	Restriction in fuel injection system.	Clean system. Replace any defective units.
	Engine-driven fuel pump pressure improperly adjusted.	Refer to paragraph 11-78.
	Worn or improperly rigged throttle or mixture control.	Check visually. Rig properly. Replace worn linkage.
	Spark plugs fouled or improperly gapped.	Clean and regap. Replace if defective.
	Defective ignition system.	Refer to paragraph 11-85.
	Defective engine.	Check compression. Listen for unusual engine noises. Engine repair is required.
	Propeller out of balance.	Check and balance propeller.
	Interference between engine mount and cowling.	Edges of cowling stiffeners and doublers may be ground for clearance.
	Defective engine shock mount.	Replace defective parts.
	Engine or engine mount attaching bolts loose or broken.	Torque properly. Replace if defective.
POOR IDLE CUT-OFF.	Worn or improperly rigged mixture control.	Rig properly. Replace worn linkage.
	Defective or dirty manifold valve.	Operate electric fuel pump and check that no fuel flows through manifold valve with mixture control in IDLE CUT-OFF. Remove and clean. Replace if defective.
	Auxiliary fuel pump ON.	Turn to OFF position.
	Defective fuel control unit.	If none of the preceding causes corrects the problem, the control unit is probably at fault. Replace control unit.
	Fuel contamination.	Drain fuel, flush out fuel system. Clean all screens, strainer, manifold valve, nozzles, and fuel lines.
	Defective mixture control valve in pump.	Replace fuel pump

11-14. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
HIGH CYLINDER HEAD TEMPERATURE.	Defective cylinder head temperature indicating system.	Refer to Section 15.
	Improper use of cowl flaps.	Refer to Owner's Manual.
	Defective cowl flap operating system.	Refer to paragraph 11-6.
	Engine baffles loose, bent or missing.	Check visually. Install baffles properly. Repair or replace if defective.
	Dirt accumulated on cylinder cooling fins.	Check visually. Clean thoroughly.
	Incorrect grade of fuel.	Drain and refill with proper fuel.
	Incorrect ignition timing.	Refer to paragraph 11-90.
	Defective fuel injection system.	Refer to paragraph 11-61.
	Improper use of mixture control.	Refer to Owner's Manual.
	Defective engine.	Repair as required.
HIGH OR LOW OIL TEMPERATURE OR PRESSURE.		Refer to paragraph 11-40.

11-15. 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 take-off 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 results of the RPM obtained. It should be within 50 RPM of 2785 RPM.

d. If the average results of the RPM obtained are lower than stated above, the following recommended checks may be performed to determine a possible deficiency.

1. Check governor control for proper rigging. It should be determined that the governor control arm travels to the high RPM stop on the governor and that the high RPM stop screw is adjusted properly. (Refer to Section 13 for procedures.)

NOTE

If verification of governor operation is necessary, the governor may be removed from the engine and a flat plate installed over the engine pad. Run-up engine to determine that the governor was adjusted properly.

2. Check operation of alternate air door spring or magnetic lock to make sure door will remain closed in normal operation.

3. Check magneto timing, spark plugs, and ignition harness for setting and condition.

4. Check fuel injection nozzles for restriction and check for correct unmetered fuel flow.

5. Check condition of induction air filter. Clean if required.

6. Perform an engine compression check. Refer to engine Manufacturer's Manual for procedures.

11-16. ENGINE REMOVAL. If the engine is to be placed in storage or returned to the manufacturer, proper preparatory steps should be taken prior to beginning the removal procedure. Refer to Section 2 for engine storage.

NOTE

Tag each item disconnected to aid in identifying wires, hoses, and control linkage when engine is installed. Protect openings, exposed as a result of removing or disconnecting units, against entry of foreign material by installing covers or sealing with tape.

a. Place all cabin switches and fuel shut-off valve in the OFF position.
b. Remove the engine cowling. (Refer to paragraph 11-3.)
c. Open battery circuit by disconnecting battery.
d. Disconnect ignition switch leads at the magnetos.

WARNING

These magnetos DO NOT have internal grounding springs. Ground the magneto points to prevent accidental firing when propeller is rotated.

e. Drain the engine oil.
f. Remove the propeller. Refer to Section 13 for propeller removal.

NOTE

During the following procedures, remove any clamps which secure controls, wires, hoses, or lines to the engine, engine mount, or attached brackets, so they will not interfere with removal of the engine and mount.

g. Disconnect the throttle control, the propeller control, and mixture control at their respective units. Pull these controls free of engine, using care not to damage them by bending too sharply.
h. Remove oil temperature bulb located directly above oil cooler. Work bulb aft through baffles carefully to prevent damage to capillary tube.
i. Disconnect wires and cables as follows:
1. Tachometer drive at adapter.
2. Cylinder head temperature wire at temperature bulb on lower side of cylinder.
3. Electrical wires and wire shielding ground at alternator.

CAUTION

When disconnecting the starter cable, do not permit starter terminal bolt to rotate. Rotation of the terminal bolt could break the conductor between terminal and field coils causing the starter to be inoperative.

4. Starter electrical cable at starter and insulate cable as a safety precaution.
5. Remove all clamps attaching wires or cables to the engine. Pull all wires and cables aft to clear the engine.

j. Disconnect lines and hoses as follows:
1. Vacuum pump hoses at vacuum pump.
2. Manifold pressure line at firewall.
3. Fuel supply hose at fuel strainer and vapor return hose at firewall.

WARNING

Residual fuel draining from lines and hoses is a fire hazard. Use care to prevent the accumulation of such fuel when lines and/or hoses are disconnected.

4. Fuel flow gage line at firewall.
5. Oil pressure hose at firewall.
6. Engine primer line at firewall.

k. Disconnect flexible ducting.
l. Attach a hoist to the hoisting lug on top of the engine and take up engine weight on hoist.

CAUTION

Place a stand under the tail tie-down ring before removing the engine. The loss of engine weight will allow the tail to drop.

m. Remove bolts attaching engine mount to upper part of firewall, then remove bolts attaching engine mount to lower part of firewall. Balance the engine by hand as the last of these bolts is removed.

CAUTION

Hoist engine slowly and make sure all wires, lines, and hoses have been disconnected.

n. Carefully guide disconnected components out of engine assembly.

11-17. CLEANING. The engine and engine compartment should be cleaned thoroughly with a solvent-dampened cloth. Solvent may be applied with a spray gun or brush and allowed to soften and dissolve inaccessible grease deposits before compressed air is used to remove them.

CAUTION

Particular care should be given to electrical components before cleaning. Solvent should not be allowed to enter magnetos, starters, alternators, voltage regulators, and the like. Hence, these should be protected before saturating the engine with solvent. Any oil, fuel, and air openings on the engine and accessories should be covered before washing down the engine with solvent. Caustic cleaning solutions should not be used.

11-18. 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 disassembly process, removed items should be examined carefully, and defective parts should be tagged for repair or replacement.

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 hole. This will prevent entry of foreign particles. If suitable covers are not available, tape may be used to cover the openings.

11-19. INSPECTION. For specific items to be inspected refer to 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. All flexible fluid carrying hoses in the engine compartment should be replaced at engine overhaul or every five years, whichever occurs first.

f. For major engine repairs, refer to the manufacturer's overhaul and repair manual.

11-20. BUILD-UP. Engine build-up consists of the installation of parts, accessories and components to the basic engine to build up a powerplant unit ready for installation in the aircraft. All safety wire, lockwashers, Palnuts, elastic stop nuts, gaskets and rubber connections should be new parts.

11-21. INSTALLATION. Before installing the engine, reinstall any items which were removed from the engine after it was removed from the aircraft.

NOTE

Remove all protective covers, plugs, caps, and identification tags as each item is connected or installed.

a. Hoist engine and mount assembly to a point near the firewall.

b. Route controls, lines, and hoses in place as the engine is positioned near the firewall.

c. Install engine mount bolts. Install the upper engine mount bolts at firewall, then install lower bolts. When tightening, torque to 160 to 190 lb-in.

d. Remove hoist and stand placed under tail.

e. Route throttle, mixture, and propeller controls to their respective units and connect. Secure controls in position with clamps.

f. Connect lines and hoses as follows:

1. Engine primer line at firewall.
2. Oil pressure hose at firewall.
3. Fuel flow gage line at firewall.
4. Fuel supply hose at fuel strainer and vapor return hose at firewall.

NOTE

Throughout the aircraft fuel system, from the fuel tanks to the engine-driven fuel pump, 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 lubricant or to seal a leaking connection. Apply sparingly to male threads only, omitting the first two 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. Throughout the fuel injection system, from the engine-driven fuel pump through the discharge nozzles, use only a fuel-soluble lubricant, such as engine oil, on fitting threads. Do not use any other form of thread compound on the injection system.

5. Manifold pressure line at firewall.
6. Vacuum pump hoses at firewall and separator.

g. Connect wires and cables as follows:

1. Tachometer drive shaft at adapter on engine. Tighten drive shaft attaching nut to 100 lb-in.
2. Cylinder head temperature wire at temperature bulb on lower side of cylinder.
3. Electrical wire and wire shielding ground at alternator.

CAUTION

When connecting the starter cable, do not permit starter terminal bolt to rotate. Rotation of the terminal bolt could break the conductor between terminal and field coils causing the starter to be inoperative.

4. Starter electrical cable at starter.
5. Install all clamps attaching wires or cables to the engine.

h. Install oil temperature bulb.

i. Install propeller. (See Section 13.)

j. Make a magneto switch ground-out and continuity check. Connect magneto primary wires to the magnetos. Remove temporary ground.

WARNING

Be sure magneto switch is in OFF position when connecting primary leads to magnetos.

k. Clean induction air filter and install.

l. Service engine with proper grade and quantity of engine oil. Refer to Section 2 if engine has been in storage.

m. Make sure all switches are in the OFF position, and connect battery ground cable.

n. Rig engine controls in accordance with paragraphs 11-96 thru 11-100.

o. Check engine installation for security, correct routing of controls, lines, hoses, and electrical wiring, proper safetying, and tightness of all components.

p. Install engine cowling.

q. Perform engine run-up and make final adjustments on engine controls.

11-22. FLEXIBLE FLUID HOSES.

11-23. PRESSURE TEST.

a. After each 50 hours of engine operation, all flexible fluid hoses in the engine compartment should be pressure tested as follows:

1. Place mixture control in the idle cut-off position.
2. Operate the auxiliary fuel pump in the high position.
3. Examine the exterior of hoses for evidence of leakage or wetness.
4. Hoses found leaking should be replaced.
5. After pressure testing fuel hoses, allow sufficient time for excess fuel to drain overboard from the engine manifold before attempting an engine start.
6. Refer to paragraph 11-19 for detailed inspection procedures for flexible hoses.

11-24. 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 them or tied with sta-straps 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, Chapter 10, for additional installation procedures for flexible fluid hose assemblies.

11-25. TACHOMETER DRIVE ADAPTER SEAL.

11-26. REMOVAL AND INSTALLATION. To install a new tachometer drive seal, special tools are required. (Refer to figures 11-3 and 11-4.)

NOTE

Tool Kit MK6-1 and tool SE909 are available from the Cessna Service Parts Center. Tools in the MK6-1 kit are used for installing the seal in the adapter and installation of the adapter on the engine. The SE909 tool is used to apply the correct torque value on the tachometer drive connector.

a. Remove engine cowling as required for access.

b. Drain oil until a maximum of eight quarts are left in the engine.

c. Remove alternator. (Refer to Section 16.)

d. Disconnect tachometer drive shaft from tachometer drive reduction adapter.

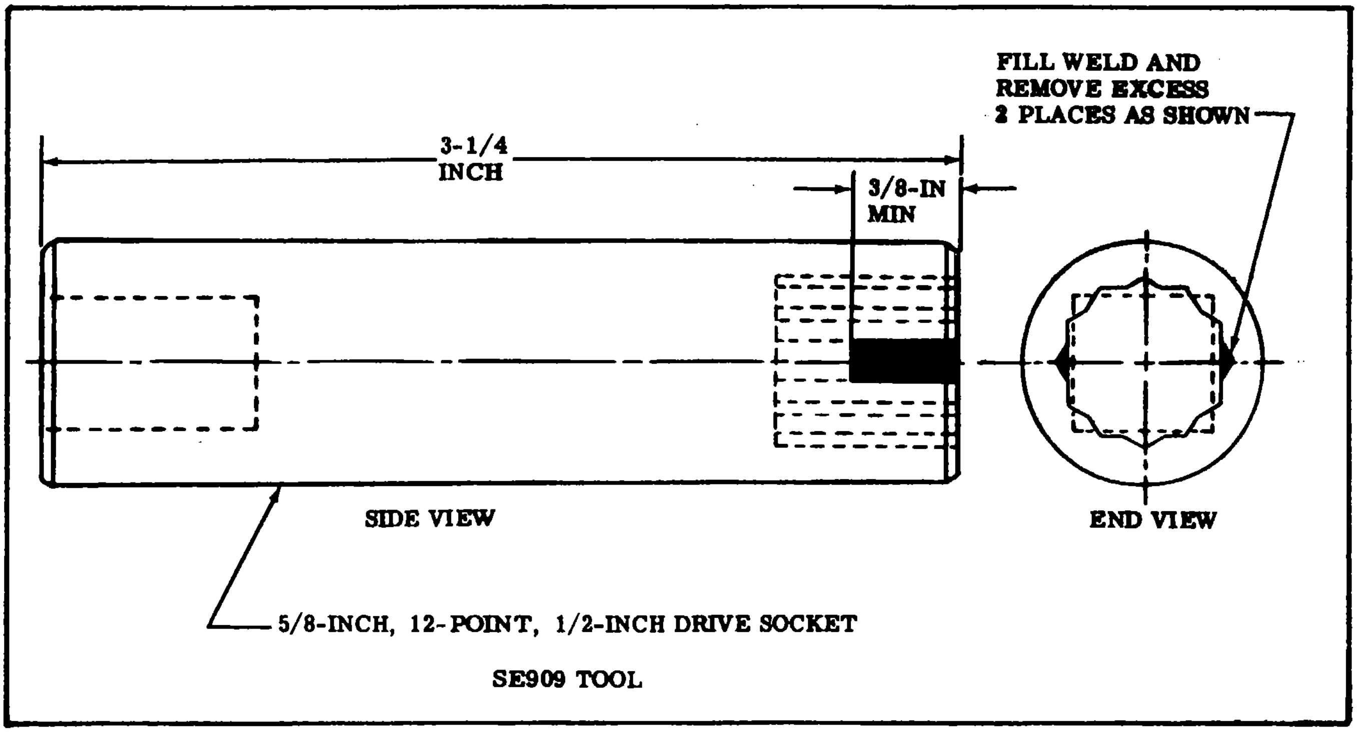


Figure 11-3. Torque Wrench Adapter

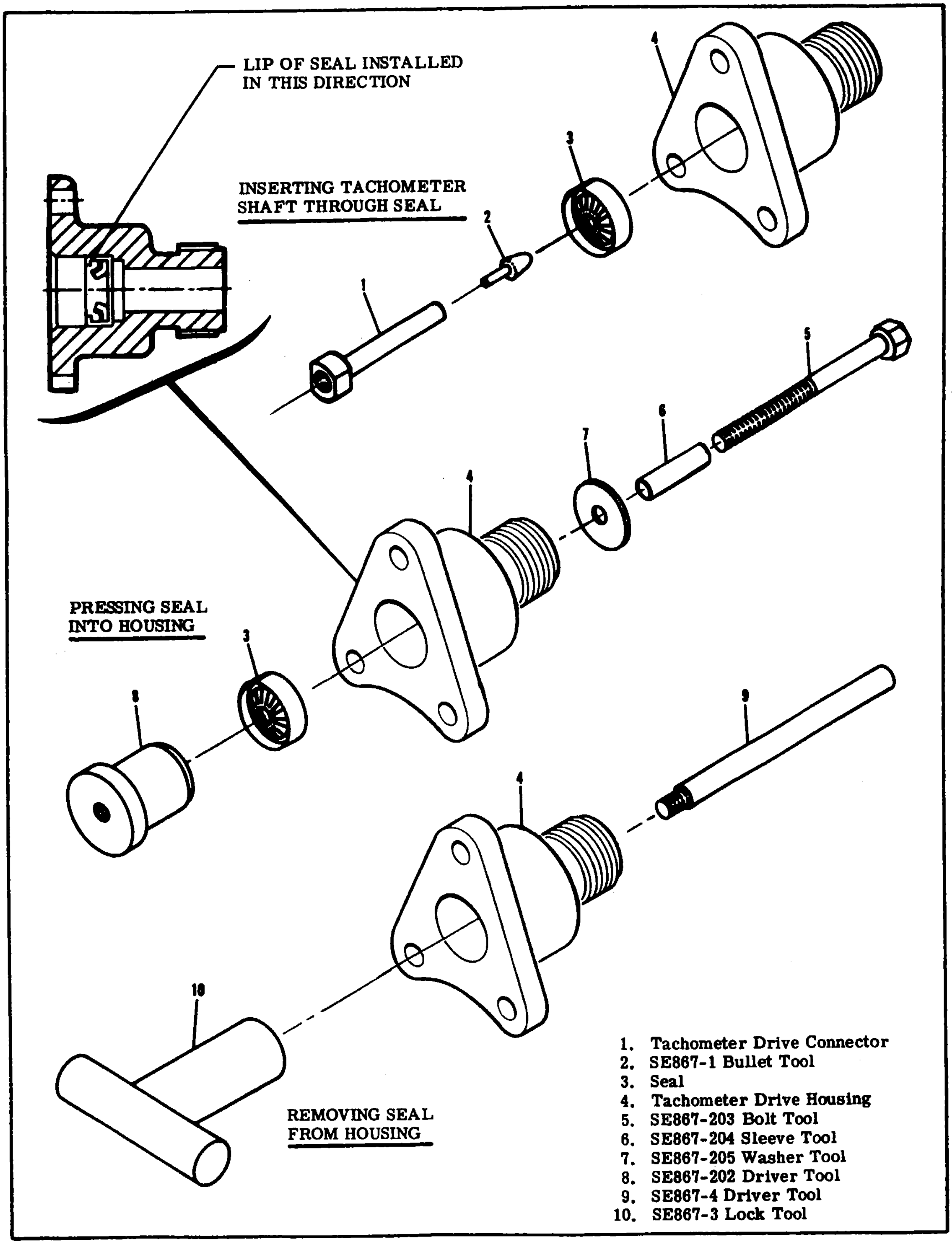


Figure 11-4. Tachometer Drive Seal Installation

e. Remove drive reduction adapter from tachometer drive housing.
f. Remove three sets of nuts and washers and remove tachometer drive housing.
g. Engage lock tool (10) and driver tool (9) through the housing (4) as shown in figure 11-4. Tap the driver tool (9) with a hammer until the seal (4) is removed from the drive housing.
h. Engage bolt (5) through sleeve (6), washer (7), drive housing (4), seal (3), and into driver tool (8) as shown in figure 11-4. Tighten bolt (5) until driver tool (8) comes in contact with the face of drive housing (4).

NOTE

Seal is to be installed with lip of seal as shown in figure 11-4.

i. Remove the tools and inspect seal (3) for proper seating.
j. Using the SE909 tool, remove tachometer shaft connector from engine.
k. Inspect connector for rough or sharp edges along groove for the tachometer cable drive.
l. If sharp or rough edges are found, use a fine stone and smooth the edges of the connector. Rough or sharp edges could damage the seal.
m. Install connector and using tool SE909, torque connector to 280 to 300 lb-in.
n. Insert bullet tool (2) into end of the tachometer drive connector as shown in figure 11-4.

NOTE

The end of connector (1) has a sharp edge. The bullet tool will protect the seal (3) during engagement of the connector with the housing (4).

o. Using a new gasket, install housing and remove bullet tool.
p. Install reduction adapter and connect tachometer drive shaft. Tighten reduction adapter and drive shaft nuts to 100 lb-in.
q. Install alternator. (Refer to Section 16.)
r. Service engine with oil and install cowling removed for access.

11-27. ENGINE BAFFLES.

11-28. 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 of the engine. These baffles incorporate rubber-asbestos composition seals at points of contact with the engine cowling to help confine and direct the airflow to the desired area. It is very important to engine cooling that the baffles and seals are installed correctly and maintained in good condition.

11-29. 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. Replace or repair defective parts.

11-30. REMOVAL AND INSTALLATION. Removal and installation of the various baffle segments is possible with the cowling removed. Be sure that any replaced baffles and seals are installed correctly and that they seal to direct the airflow in the correct direction.

11-31. REPAIR. Baffles ordinarily should be replaced 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.

11-32. ENGINE MOUNT.

11-33. DESCRIPTION. The engine mount is composed of sections of tubing welded together and reinforced with welded gussets. The purpose of the mount is to support the engine and attach it to the air-

11-34. REMOVAL AND INSTALLATION. Removal and installation of the engine mount may be accomplished without completely removing the engine from the aircraft.
a. Remove cowling for acess.
b. Remove engine exhaust system as outlined in paragraph 11-103.
c. Remove clamps attaching lines, hoses, and wiring to engine mount.
d. Attach a suitable hoist to the hoisting lug on top of the engine and take up engine weight with the hoist.

CAUTION

Place a stand under the tail tie-down ring before lifting the engine. The loss of engine weight will allow the tail to drop.

e. Remove nuts, washers, and bolts attaching engine to mount.
f. Raise hoist slightly so that no engine weight is on the mount and remove engine shock mount pads and spacers.

CAUTION

Use care when lifting engine to prevent damage to lines, hoses, wiring, and controls.

g. Remove bolts attaching engine mount to fuselage and work mount from aircraft.
h. To install the engine mount, reverse the preceding steps. Be sure that spacer washers are installed between engine mount and firewall.

NOTE

When tightening mount-to-firewall bolts, tighten to a torque value of 160 to 190 lb-in. When tightening engine-to-mount bolts, tighten to a torque value of 450 to 500 lb-in.

11-35. REPAIR. Repair of the engine mount should be performed carefully as outlined in Section 17. The mount should be painted with heat-resistant black enamel after welding or whenever the original finish has been removed.

11-36. SHOCK MOUNT PADS. 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 dry cloth.

NOTE

Do not clean the rubber parts with any type of cleaning solvent.

Inspect metal parts for cracks and excessive wear due to aging and deterioration. Inspect the rubber parts for swelling, cracking, or a pronounced set of the part. Replace with new parts all of the parts that show evidence of wear or damage.

11-37. ENGINE OIL SYSTEM. (Refer to figure 11-5.)

11-38. DESCRIPTION. A wet-sump, pressure-lubricating oil system is used in the engine. Oil in the sump passes through a sump pick-up tube, through the suction screen, to the suction side of the oil pump. From the pressure side of the oil pump, oil is fed through the pressure screen, through the oil cooler, into the right and left main oil galleries in the crankcase. The galleries pressure-feed the main bearings, camshaft bearings, hydraulic tappets, and propeller governor. Connecting rod bearings are pressure-lubricated from the main bearings through passages in the crankshaft. The starter bearing is lubricated by an oil passage from the rear main bearing. Valve mechanisms are lubricated through hollow push-rods from the tappets. Cylinder walls, piston pins, and connecting rod bushings are spray-lubricated by oil escaping from the connecting rod. A Vernatherm valve permits oil to bypass the oil cooler until operating temperature is reached. The oil pressure relief valve, located at the left side of the accessory section, below and aft of the oil cooler, is connected in the passage between the oil pump and the oil filter screen. Throughout the engine, oil is returned to the sump by gravity. An external full-flow oil filter may be installed as optional equipment.

SHOP NOTES:

* NOTE

Filter bypass valve is in oil filter adapter on aircraft with element type filter and on aircraft with spin-on type filter which have not been modified per Continental Aircraft Engine Service Bulletin M75-7, Rev. 1, dated 4 April 1975. On later aircraft and on those modified per M75-7, the bypass valve is relocated from the adapter to the filter and a "Gold" spin-on filter which has an internal bypass valve is utilized.

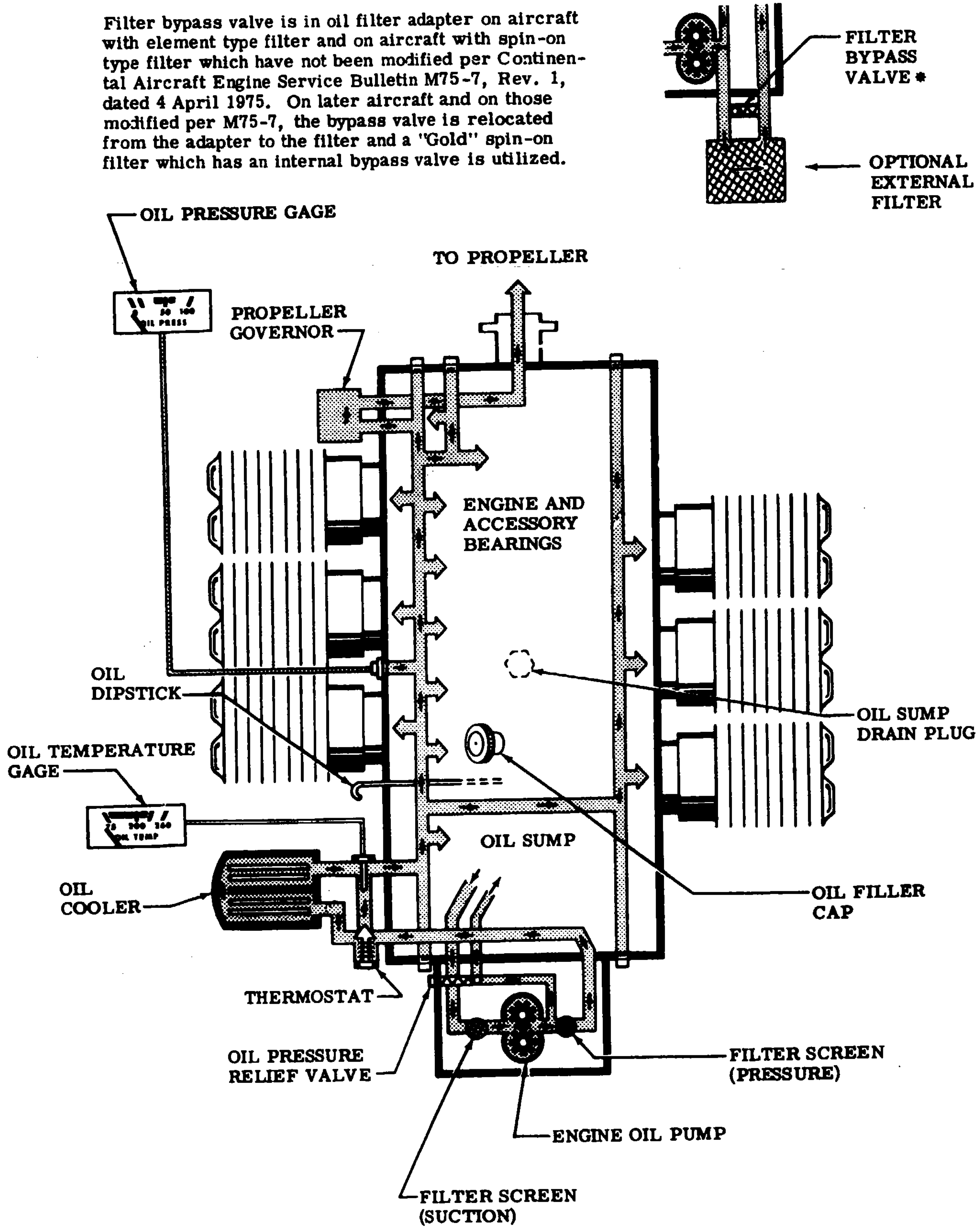


Figure 11-5. Oil System Schematic

11-39. OIL SYSTEM CAPACITY. (Refer also to Section 2.) The oil system has an 8-quart capacity. Engine should not be operated on less than six quarts. To minimize loss of oil through breather, fill to seven quart level for normal flights of less than three hours. For extended flights, fill to eight quarts. These quantities refer to dipstick readings only. For engines that have the optional full-flow oil filter installed, one additional quart is required when the filter is changed.

11-40. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
NO OIL PRESSURE.	No oil in sump.	Check oil with dipstick. Fill sump with proper grade and quantity of oil. Refer to Section 2.
	Oil pressure line broken, disconnected or pinched.	Check visually. Replace or connect.
	Oil pump defective.	Remove and inspect. Examine engine. Metal particles from damaged pump may have entered engine oil passages.
	Defective oil pressure gage.	Check with a known good gage. Replace gage if defective.
	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 defective parts.
LOW OIL PRESSURE.	Low oil supply.	Check with dipstick. Replenish with proper grade and quantity.
	Low viscosity oil.	Check visually. Drain sump and refill with proper grade and quantity of oil.
	Oil pressure relief valve spring weak or broken.	Remove and inspect. Replace weak or broken spring.
	Defective oil pump.	Remove and inspect. Examine engine. Metal particles from damaged pump may have entered engine oil passages.
	Defective oil pressure gage.	Check with a known good gage. Replace gage if defective.
	Secondary result of high oil temperature.	Observe oil temperature gage for high indication. Determine and correct reason for high oil temperature.

TROUBLE	PROBABLE CAUSE	REMEDY
HIGH OIL PRESSURE.	High viscosity oil.	Check visually. 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 defective parts.
	Defective oil pressure gage.	Check with a known good gage. Replace oil pressure gage.
LOW OIL TEMPERATURE.	Defective oil temperature gage or temperature bulb.	Check with another gage. If reading is normal, aircraft gage is defective. If reading is similar temperature bulb is defective. Replace defective part/or parts.
	Oil cooler thermo-bypass valve defective or stuck closed.	Remove valve and check for proper operation. Replace valve if defective.
	Defective wiring.	Check continuity. Repair wiring.
HIGH OIL TEMPERATURE.	Oil cooler air passages clogged.	Check visually. Clean air passages
	Oil cooler oil passages clogged.	Attempt to drain cooler. Inspect for sludge. Remove cooler and flush thoroughly.
	Low oil supply.	Replenish.
	Oil viscosity too high.	Drain and fill sump with proper grade and quantity.
	Prolonged high speed operation on ground.	Hold ground running above 1500 RPM to a minimum.
	Defective oil temperature indicating system.	Refer to Section 15.
	Oil congealed in cooler.	If congealing is suspected, use external heater or a heated hangar to thaw the congealed oil.
	Secondary result of low oil pressure.	Check for low oil pressure reading. Determine cause and correct.
	Secondary result of high cylinder head temperature.	Check for high cylinder head temperature. Determine cause and correct.

11-41. OIL COOLER.

11-42. DESCRIPTION. The fin and plate oil cooler is attached to a plate on the aft left side of the engine crankcase. Oil is allowed to circulate through the adapter plate until the oil reaches a predetermined temperature, the Vernatherm then closes causing the oil to be routed through the oil cooler to be cooled. Cooling air is routed through the cooler from the top side and is exhausted into the lower cowling.

11-43. FULL-FLOW OIL FILTER (ELEMENT TYPE). (Refer to figure 11-6.)

11-44. DESCRIPTION. An optional external oil filter may be installed on the engine. The filter and filter adapter replace the regular oil filter screen. The filter adapter incorporates a bypass valve. If the filter element should become clogged, the bypass valve will open, allowing the engine oil to flow to the engine oil passage.

11-45. REMOVAL AND INSTALLATION (ELEMENT). (Refer to figure 11-6.)

NOTE

Filter element replacement kits are available from the Cessna Service Parts Center.

a. Remove engine cowling as necessary for access.
b. Remove both safety wires from filter can and unscrew hollow stud to detach filter assembly from adapter as a unit. Remove assembly from aircraft discarding top gasket.

NOTE

As filter assembly is separated from the adapter, oil will drain from the filter assembly.

c. Press downward on hollow stud to remove.
d. Lift lid off filter can, discarding lower gasket.
e. Pull filter element out of can and discard element.
f. Wipe parts clean with a soft cloth.

NOTE

When installing a new filter element, it is important that all gaskets are clean, lubricated, and positioned properly, and that correct amount of torque is applied to the filter attaching stud. If the stud is under-torqued, oil leakage will occur. If the stud is over-torqued, filter can may be deformed, again causing oil leakage.

NOTE

Lubricate rubber grommets in new filter element, upper and lower gaskets, and metal gasket with clean engine oil or general purpose grease before installation. Dry gaskets may cause false torque readings, again resulting in oil leakage.

Before assembly, cut adapter nut safety wire and remove screw attaching adapter to bracket and try to rotate adapter by hand. If adapter can be moved, check for thread deformation in engine and on adapter.

After installing a new gasket on the lid, turn lid upside down. If gasket falls off, replace gasket and repeat test. If this gasket falls off, replace lid.

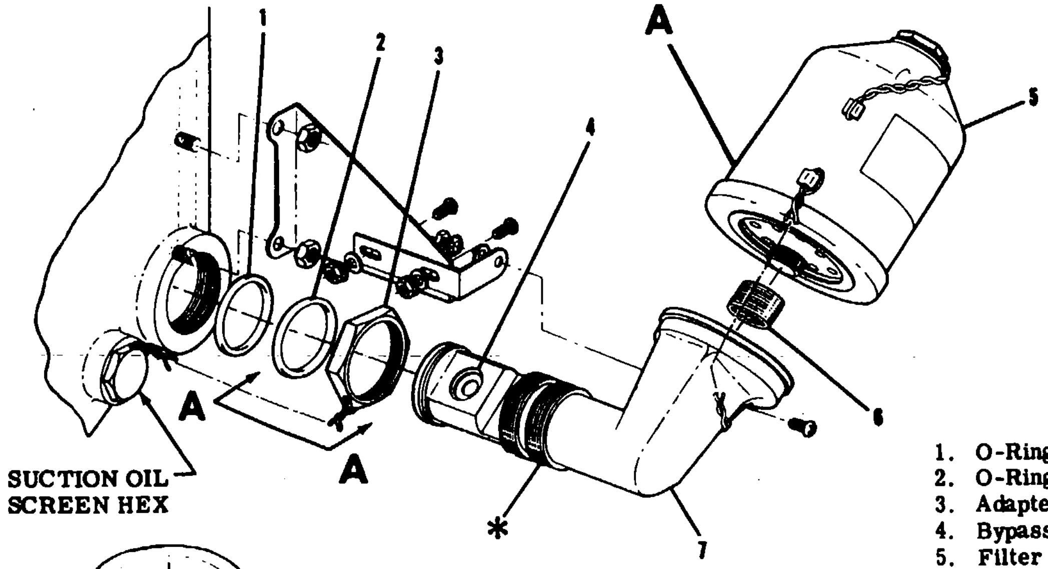
g. Resafety adapter nut and install screw attaching adapter to bracket on engine.
h. Inspect adapter gasket seat for gouges, deep scratches, wrench marks, or mutilation. If any of these are found, replace adapter.
i. Place a new element in can and insert hollow stud, with a new metal gasket in place, through the can and element.
j. Position a new gasket inside lower flange of lid. Position new gasket around upper flange of lid. Place lid in position.
k. Install filter assembly on adapter. Holding can to prevent it from turning, tighten stud and torque to 20-25 lb-ft, using a torque wrench.
l. Reinstall parts removed for access, and service the engine with the proper grade and quantity of oil. One additional quart of oil is required each time the element is changed.
m. Start engine and check for proper oil pressure. Check for oil leaks after warming up engine.
n. Again check for oil leakage after engine has been run at a high power setting (preferably a flight around the field).
o. Check to make sure filter has not been making contact with adjacent parts due to engine torque.
p. While engine is still warm, recheck torque on hollow stud, then safety stud to lower bracket on filter can, and safety adapter to upper bracket on filter can.
q. Install engine cowling.

11-46. REMOVAL (ADAPTER). (Refer to figure 11-6.)
a. Remove filter assembly as outlined during element replacement.
b. Disconnect electrical wiring and remove alternator.
c. Note angular position of the adapter, then remove safety wire and loosen adapter nut. Also, remove screw attaching adapter to bracket.

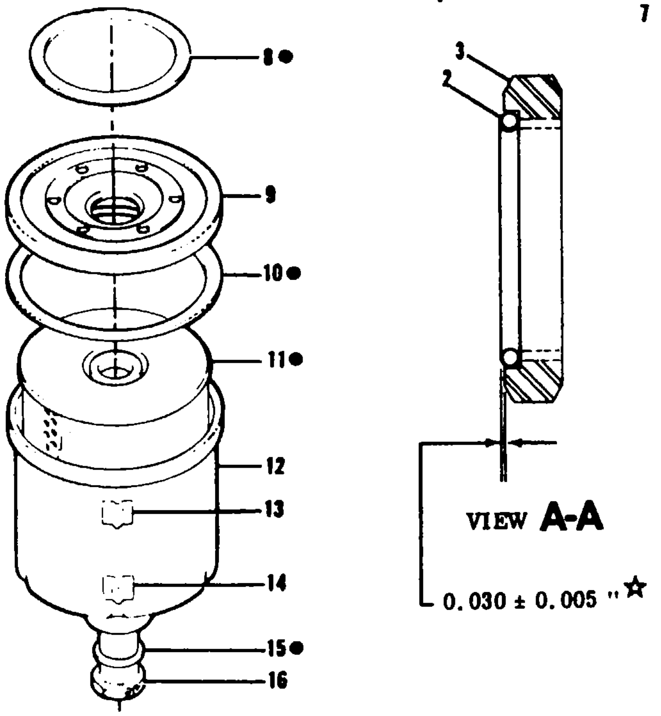
NOTE

A special wrench adapter (Part No. SE-709) for the adapter nut is available from the Cessna Service Parts Center, or one may be made as shown in figure 11-7. Remove any other engine accessory that interferes with removal of the adapter.

d. Unscrew adapter and remove from the engine.



1. O-Ring
2. O-Ring
3. Adapter Locknut
4. Bypass Valve
5. Filter Assembly
6. Thread Insert
7. Adapter
8. Upper Gasket
9. Lid
10. Lower Gasket
11. Filter Element
12. Filter Can
13. Upper Safety Wire Tab
14. Lower Safety Wire Tab
15. Metal Gasket
16. Hollow Stud



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Detail A

☆ O-Ring (2) shall protrude as illustrated when placed in groove of nut (3) prior to installation.

● The replacement oil filter element kit consists of one each element (11), upper gasket (8), lower gasket (10) and metal gasket (15).

NOTES

DO NOT substitute automotive gaskets for any gasket used in this assembly. Use only approved gaskets listed in the Parts Catalog.

Do not allow can (12) to spin when tightening stud (16). Torque stud (16) to 20-25 lb-ft. (240-300 lb-in.)

Reposition suction oil screen hex as required to permit turning of jam nut (3). Clean threads of filter adapter (7). Apply thread lube to the threads (*) in the crankcase. Install oil filter adapter (7) in the approximate position illustrated and torque nut (3) to 80-85 lb-ft. Torque suction oil screen hex to 180-240 lb-in. Install oil filter as illustrated.

When the external oil filter is installed, the internal oil screen is omitted.

Figure 11-6. Full-Flow Filter (Element Type)

11-47. DISASSEMBLY REPAIR AND ASSEMBLY (ADAPTER). Figure 11-6 shows the relative position of internal parts of the filter adapter and may be used as a guide during replacement of parts. The bypass valve may be replaced as a unit, being staked three places at installation. Inspect that bypass valve is not held open by carbon or other foreign material. The heli-coil type thread insert in the adapter may be replaced, although special tools are required for installation. Follow instructions of the tool manufacturer for their use.

11-48. INSTALLATION (ADAPTER). (Refer to figure 11-6.)

a. Assemble adapter nut and new O-ring on adapter in sequence illustrated. Lubricate O-rings with clean engine oil. Tighten adapter nut until O-ring is centered in groove between threads on adapter.

b. Apply anti-seize compound sparingly to adapter threads, then simultaneously screw adapter and nut into engine until the O-ring seats against engine without turning the adapter nut. Rotate adapter to the approximate position noted during removal. Do not tighten adapter nut at this time.

c. Temporarily install filter assembly on adapter, and position adapter so adequate clearance with adjacent parts is attained. Maintaining this position of the adapter, tighten adapter nut to 80-85 lb-ft and safety. Use torque wrench, extension, and wrench adapter as necessary.

d. Install screw attaching adapter to bracket. Adjust bracket as required.

e. Install alternator and connect electrical wiring.

f. Using new gaskets, install the filter assembly as outlined during element replacement.

g. Be sure to service the engine oil system, perform the checks and inspections outlined, and re-safety all parts requiring safetying as noted in paragraph 11-45.

h. Reinstall any other components removed for access.

11-49. FULL-FLOW OIL FILTER (SPIN-ON TYPE THRU FR17200530). (See figure 11-8, sheet 1 of 2.)

11-50. DESCRIPTION. An optional external oil filter may be installed on the engine. When modified in accordance with Continental Aircraft Engine Service Bulletin M74-2, the element type filter is replaced by a throw away type spin-on filter. The filter and filter adapter replace the regular oil filter screen. When not modified in accordance with Continental Aircraft Engine Service Bulletin M75-7 the filter adapter incorporates a bypass valve which will open should the filter become clogged allowing the engine oil to flow to the engine oil passage. This configuration utilizes a "black" oil filter (367584) which does not have a bypass valve in the filter. When modified in accordance with Continental Aircraft Engine Service Bulletin M75-7 the bypass valve is relocated from the adapter to the oil filter. This configuration utilizes a "gold" oil filter (641583) which has an internal bypass valve.

WARNING

Black oil filters (637584) MUST NOT be used with adapters which do not have bypass valves. Since black filters do not have internal bypass valves they are to be used ONLY on aircraft which are equipped with adapters containing bypass valves. Gold oil filter (641583) incorporating an internal bypass valve may be used on earlier aircraft in which case the bypass valve in the adapter is not needed and therefore should be removed and a plug inserted. Refer to Continental Aircraft Engine Service Bulletin M75-7, Rev. 1, dated 4 April 1975.

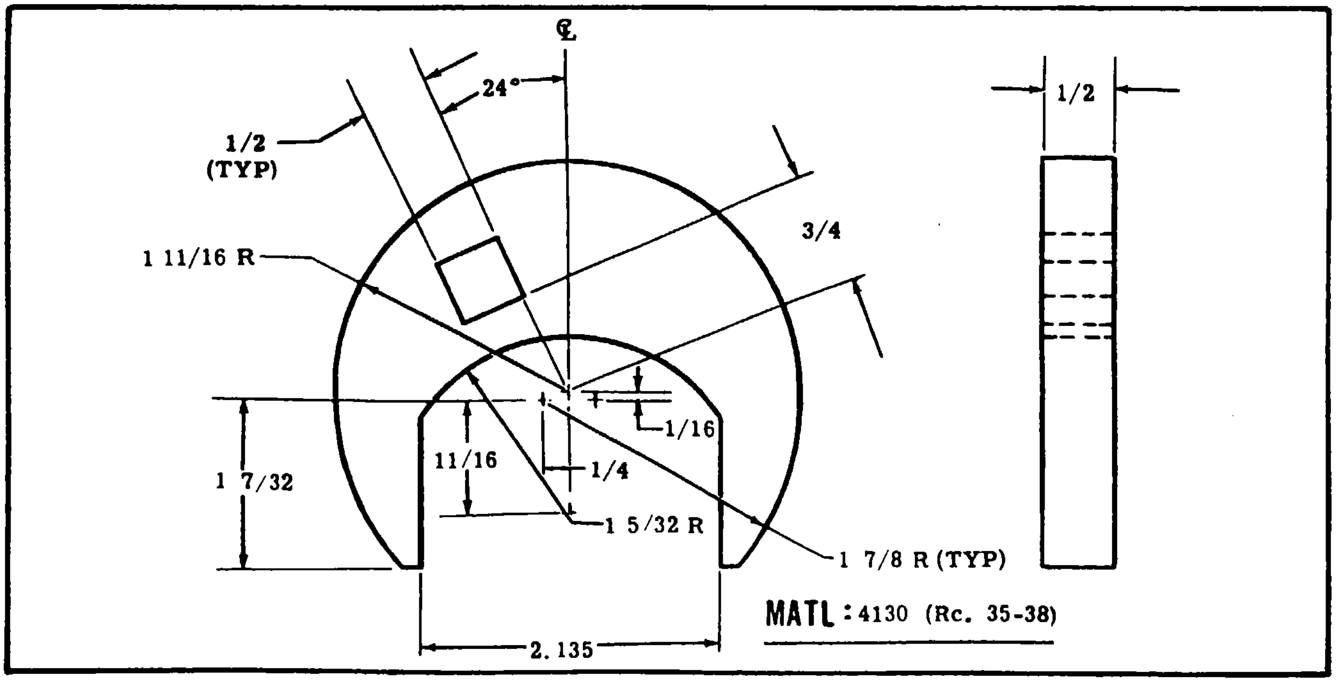
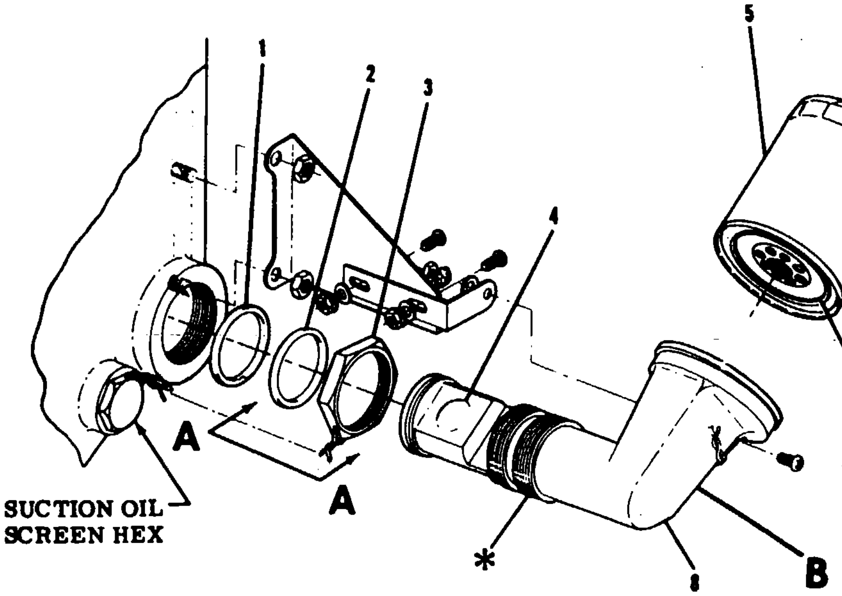
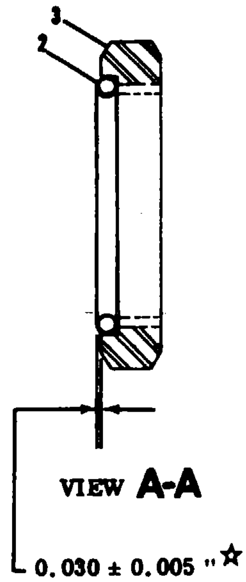
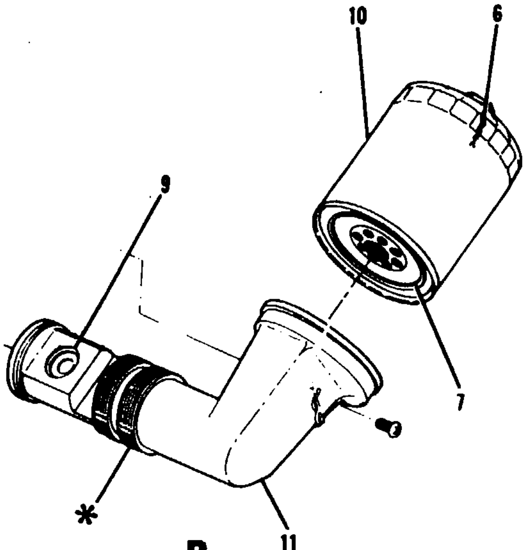


Figure 11-7. Oil Filter Adapter Wrench Fabrication





☆ O-Ring (2) shall protrude as illustrated when placed in groove of nut (3) prior to installation.



Detail B

NOTES

DO NOT substitute automotive gaskets for any gasket used in this assembly. Use only approved gaskets listed in the Parts Catalog.

Reposition suction oil screen hex as required to permit turning of jam nut (3). Clean threads of filter adapter. Apply thread lube to the threads (*) in the crankcase. Install oil filter adapter (7) in the approximate position illustrated and torque nut (3) to 80-85 lb-ft. Torque suction oil screen hex to 180-240 lb-in. Install oil filter as illustrated.

When the external oil filter is installed, the internal oil screen is omitted.

1. O-Ring
2. O-Ring
3. Adapter Locknut
4. Plug
5. Spin-On Filter (Gold)
6. Safety Wire
7. Seal
8. Adapter (for use with Gold Filter)
9. Bypass Valve
10. Spin-On Filter (Black)
11. Adapter (for use with Black Filter)

WARNING

If oil filter 641583 (gold can) is used on this installation, Continental Aircraft Engine Service Bulletin M75-7, Rev. 1, dated 4 April 1975, must be complied with. Oil filter 637584 (black can) without bypass valve must NOT be installed in place of 641583 on adapters which do not incorporate a bypass valve.

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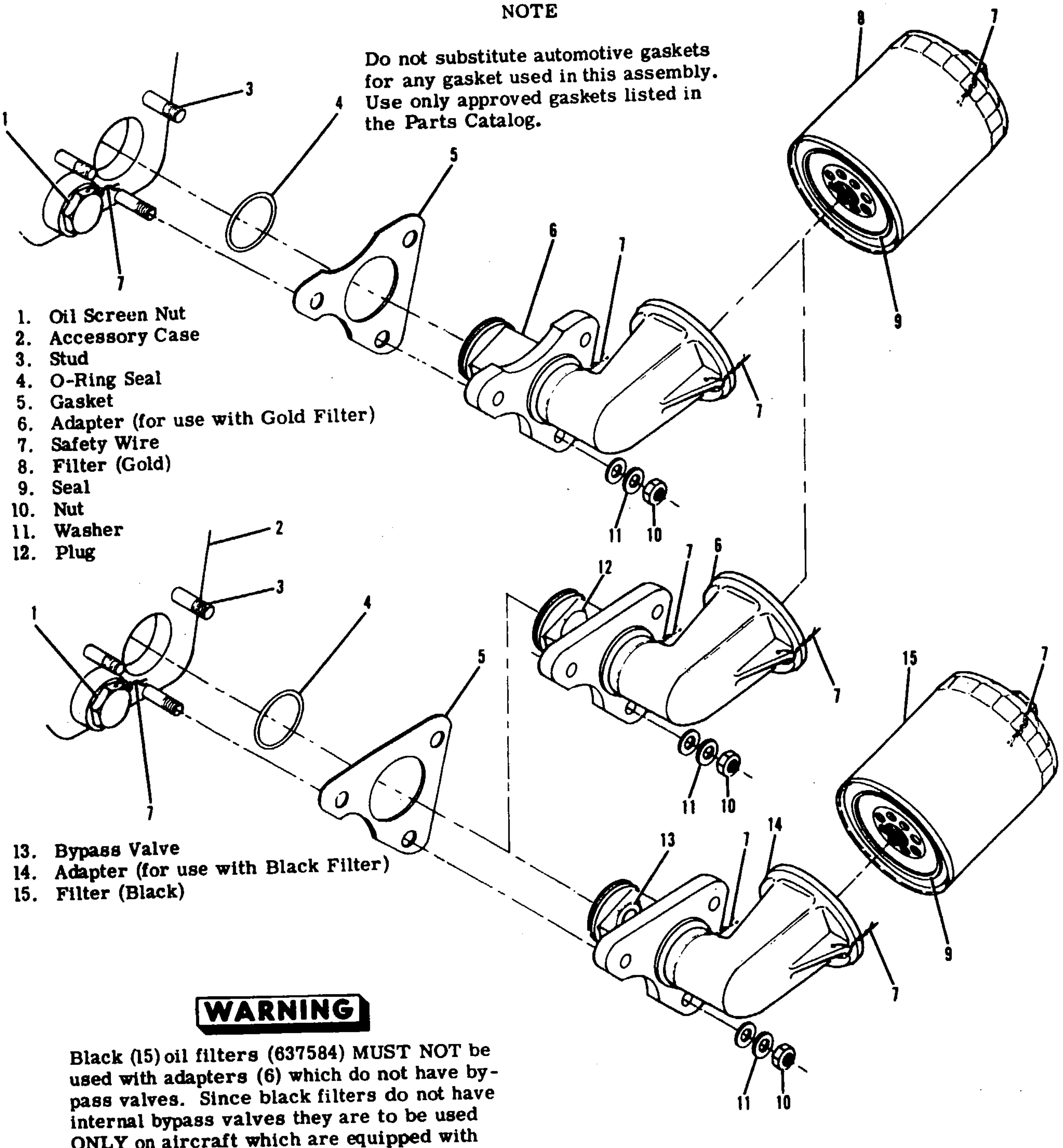
Figure 11-8. Full-Flow Filter (Spin-On Type) (Sheet 1 of 2)

NOTE

Do not substitute automotive gaskets for any gasket used in this assembly. Use only approved gaskets listed in the Parts Catalog.



1. Oil Screen Nut
2. Accessory Case
3. Stud
4. O-Ring Seal
5. Gasket
6. Adapter (for use with Gold Filter)
7. Safety Wire
8. Filter (Gold)
9. Seal
10. Nut
11. Washer
12. Plug
13. Bypass Valve
14. Adapter (for use with Black Filter)
15. Filter (Black)

WARNING

Black (15) oil filters (637584) MUST NOT be used with adapters (6) which do not have by-pass valves. Since black filters do not have internal bypass valves they are to be used ONLY on aircraft which are equipped with adapters (14) containing bypass valves (13). Gold (8) oil filter (641583) incorporating an internal bypass valve may be used on earlier aircraft in which case the bypass valve in the adapter is not needed and therefore should be removed and a plug (12) inserted. Refer to Continental Aircraft Engine Service Bulletin M75-7, Rev. 1, dated 4 April 1975.

BEGINNING WITH FR17200531

Figure 11-8. Full-Flow Filter (Spin-On Type) (Sheet 2 of 2)

11-51. REMOVAL AND INSTALLATION (SPIN-ON FILTER). Use figure 11-8 sheet 1 of 2 as a guide for removal and installation.

a. Remove engine cowl as necessary to gain access to the filter.
b. Remove safety wire from spin-on filter.
c. Unscrew filter from adapter.

NOTE

Teledyne Continental Motors recommends that the spin-on filter be inspected. Refer to Continental Aircraft Engine Service Bulletin M74-2, dated 16 January 1974.

d. Make sure that filter (black or gold) to be installed is compatible with oil filter adapter on engine. Refer to figure 11-8, sheet 1 of 2.
e. Lightly lubricate gasket with engine oil prior to installation.
f. 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.
g. Safety wire spin-on filter to adapter.
h. After first engine run check for oil leaks.

11-52. REMOVAL (ADAPTER). (See figure 11-8, sheet 1 of 2.)

a. Remove spin-on filter per paragraph 11-51.
b. Disconnect electrical wiring and remove alternator per Section 16.
c. Note angular position of the adapter, then remove safety wire and loosen adapter nut. Also, remove screw attaching adapter to bracket.

NOTE

A special wrench adapter (Part No. SE-709) for the adapter nut is available from the Cessna Service Parts Center, or one may be made as shown in figure 11-7. Remove any other engine accessory that interferes with removal of the adapter.

d. Unscrew adapter and remove from the engine.

11-53. DISASSEMBLY, REPAIR AND ASSEMBLY (ADAPTER). Figure 11-8, sheet 1 of 2, shows the relative position of internal parts of the filter adapter and may be used as a guide during replacement of parts. When not modified per Continental Aircraft Engine Service Bulletin M75-7, Rev. 1, dated 4 April 1975, the bypass valve is replaced as an assembly being staked three places at installation. Inspect that bypass valve is not held open by carbon or other foreign material. The helicoil insert in the adapter may be replaced, although special tools are required for installation. Follow instructions of the tool manufacturer for their use. Inspect threads on adapter and in engine for damage. Clean adapter in Stoddard solvent or equivalent and dry with compressed air.

11-54. INSTALLATION (ADAPTER). (Refer to figure 11-8, sheet 1 of 2.)

a. Assemble adapter nut and new O-ring on adapter in sequence illustrated. Lubricate O-rings with clean engine oil. Tighten adapter nut until O-ring is centered in groove between threads on adapter.
b. Apply anti-seize compound sparingly to adapter threads, then simultaneously screw adapter and nut into engine until the O-ring seats against engine without turning the adapter nut. Rotate adapter to the approximate position noted during removal. Do not tighten adapter nut at this time.
c. Temporarily install spin-on filter on adapter, and position adapter so adequate clearance with adjacent parts is attained. Maintaining this position of the adapter, tighten adapter nut to 80-85 lb-ft and safety. Use torque wrench, extension, and wrench adapter as necessary.
d. Install screw attaching adapter to bracket. Adjust bracket as required.
e. Install alternator and connect electrical wiring per Section 16.
f. Using new gaskets, install the spin-on filter as outlined during filter replacement.
g. Be sure to service the engine oil system, perform the checks and inspections outlined, and re-safety all parts requiring safetying.
h. Reinstall any other components removed for access.

11-55. FULL-FLOW OIL FILTER (SPIN-ON TYPE BEGINNING WITH FR17200531). (Refer to figure 11-8, sheet 2 of 2.)

11-56. DESCRIPTION. An external full-flow oil filter may be installed on the engine. The filter adapter is a bolt on type held by three studs installed in the engine accessory case. The filter is a throwaway type spin-on filter. When not modified per Continental Aircraft Engine Service Bulletin M75-7, Rev. 1, dated 4 April 1975, the adapter incorporates a bypass valve which will open in the event the spin-on filter directly to the engine oil passage. When modified per Continental Aircraft Engine Service Bulletin M75-7, Rev. 1, dated 4 April 1975, the bypass valve is relocated from the adapter to the oil filter. This configuration utilizes a "gold" oil filter (641583) which has an internal bypass valve.

WARNING

Black (15) oil filters (637584) MUST NOT be used with adapters (6) which do not have bypass valves. Since black filters do not have internal bypass valves they are to be used ONLY on aircraft which are equipped with adapters (14) containing bypass valves (13). Gold (8) oil filter (641583) incorporating an internal bypass valve may be used on earlier aircraft in which case the bypass valve in the adapter is not needed and therefore should be removed and a plug (12) inserted. Refer to Continental Aircraft Engine Service Bulletin M75-7, Rev. 1, dated 4 April, 1975.

11-57. REMOVAL AND INSTALLATION (SPIN-ON FILTER). (Refer to figure 11-8, sheet 2 of 2.)

a. Remove engine cowl as necessary to gain access to the filter.

b. Remove safety wire (7) from filter, (8) or (15).
c. Unscrew filter from adapter, (6) or (14).

NOTE

Teledyne Continental Motors recommends that the spin-on filter be inspected. Refer to Continental Aircraft Engine Service Bulletin M74-2, dated 16 January 1974.

d. Make sure that filter (black or gold) to be installed is compatible with oil filter adapter on engine. Refer to figure 11-8, items (6), (8), (14) and (15).
e. Lightly lubricate gasket (9) with engine oil only prior to installation.
f. Install spin-on filter, (8) or (15), on the stud and torque to 18-20 lb-ft or 3/4 to 1 full turn after gasket makes contact.
g. Safety wire filter to adapter.
h. After first engine run check for oil leaks.

11-58. REMOVAL AND INSTALLATION (ADAPTER). (Refer to figure 11-8, sheet 2 of 2.)
a. Remove spin-on filter per paragraph 11-57.
b. Remove safety wire between adapter (6 or 14) and oil screen nut.
c. Remove nuts (10) and washers (11) and pull adapter from accessory case (2) taking care not to damage O-ring seal (4). If adapter without cutout for alternator clearance is installed, it will be necessary to loosen nuts on alternator mounting studs to provide clearance for oil filter adapter removal. Refer to Section 16.

NOTE

When not modified per Continental Aircraft Engine Service Bulletin M75-7, Rev. 1, dated 4 April 1975, the bypass valve (13) is replaced as an assembly being staked three places at installation. Inspect that bypass valve is not being held open by carbon or other foreign material.

d. Make certain that adapter configuration and filter (black or gold) to be installed are compatible. Refer to figure 11-8, items (6), (8), (14), and (15).
e. Check O-ring seal for damage.
f. Place new adapter gasket (5) over studs.
g. Lubricate O-ring seal with engine oil and slide adapter into place taking care not to damage O-ring seal.
h. Install washers and nuts. If alternator mounting nuts have been removed, reinstall per Section 16.
i. Safety wire oil screen nut to adapter.
j. Install oil filter per paragraph 11-57.

11-59. ENGINE FUEL SYSTEM. (Refer to figure 11-9.)

11-60. DESCRIPTION. The fuel injection system is a simple, low-pressure system of injecting metered fuel into the intake valve ports in the cylinders. It is a multi-nozzle, continuous-flow system which controls fuel flow to match engine airflow. Any change in throttle position, engine speed, or a combination of both, changes fuel flow in the correct relation to engine airflow. A manual mixture control and a fuel flow indicator are provided for leaning at any combination of altitude and power setting. The continuous-flow system uses a typical rotary-vane fuel pump, which is the only running part in the system. Since the fuel injection nozzles and the intake manifolds are installed on the top side of the cylinders, drain lines are installed in the bottom side of the intake ports to drain any fuel which might accumulate in the intake ports during engine shut-down.

SHOP NOTES:

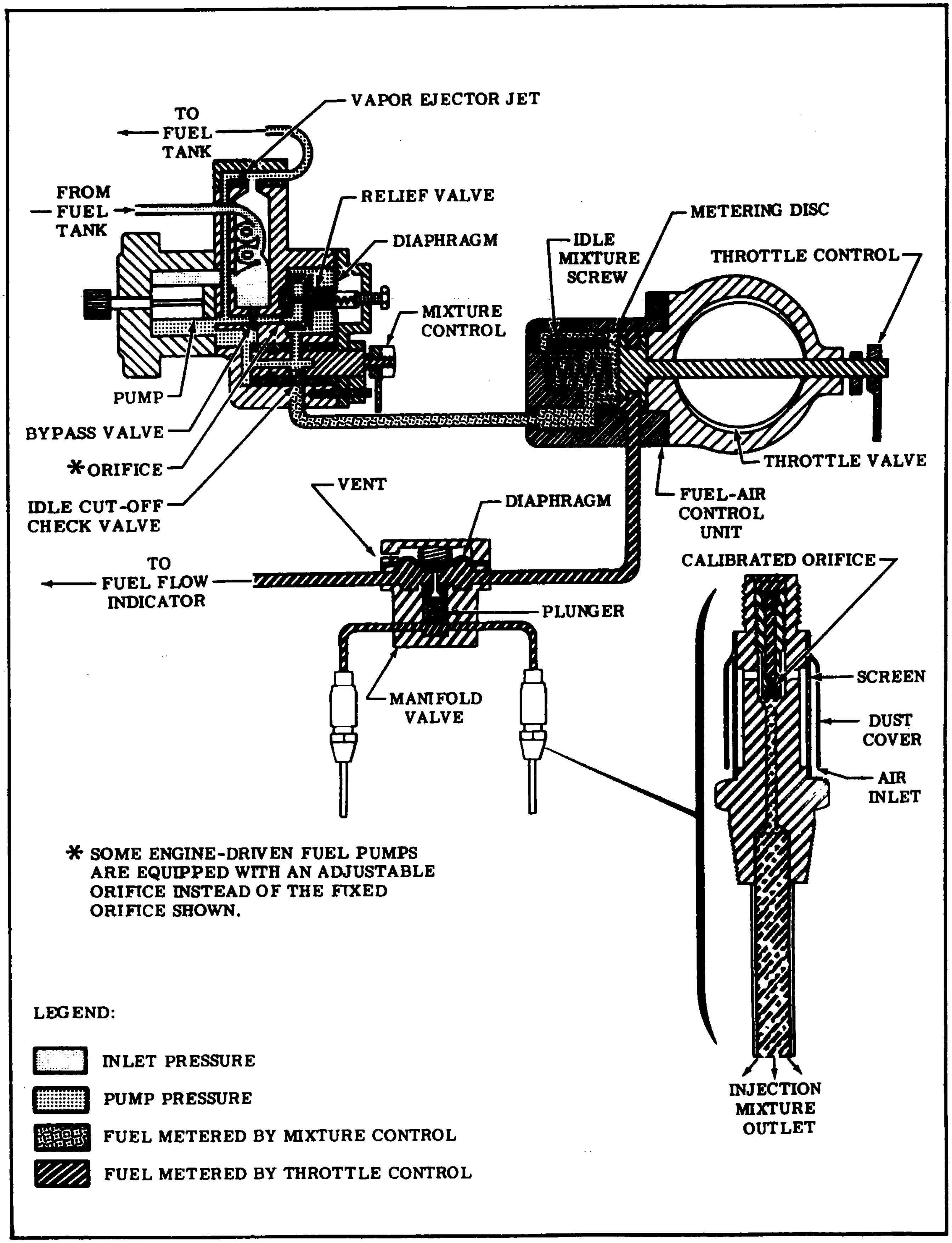


Figure 11-9. Fuel Injection Schematic

11-61. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
NO FUEL DELIVERED TO ENGINE.	Fuel tanks empty.	Check visually. Service with desired quantity of fuel.
	Defective aircraft fuel system.	Refer to Section 12.
	Vaporized fuel. (Most likely to occur in hot weather with a hot engine.)	Purge vapor by operating electric fuel pump with mixture control in idle cut-off. If necessary, clean ejector jet in vapor separator cover with solvent. Do not use wire to clean jet.
	Fuel pump not permitting fuel from electric pump to bypass.	Check fuel-flow through pump. Replace engine-driven fuel pump if defective.
	Defective fuel control unit.	Check fuel flow through unit. Replace fuel-air control unit if necessary.
	Defective fuel manifold valve, or clogged screen inside valve.	Check fuel flow through valve. Remove and clean in accordance with paragraph 11-69. Replace if defective.
	Clogged fuel injection lines or discharge nozzles.	Check fuel flow through lines and nozzles. Clean and replace if defective.
HIGH FUEL PRESSURE.	Restricted discharge nozzles.	Clean or replace plugged nozzle or nozzles.
	Restriction in vapor vent return line or check valve.	Clean vapor return line. Clean or replace check valve.
ENGINE RUNS ROUGH AT IDLE.	Improper idle mixture adjustment.	Refer to paragraph 11-65.
	Restriction in aircraft fuel system.	Refer to Section 12.
	Low unmetered fuel pressure.	Refer to paragraph 11-78.
	High unmetered fuel pressure.	Refer to paragraph 11-78.
	Worn throttle plate shaft or shaft O-rings.	Replace shaft and/or O-rings.
	Intake manifold leaks.	Repair leaks or replace defective parts.
	Leaking intake valves.	Engine repair required.
	Discharge nozzle air vent manifolding restricted or defective.	Check for bent or loose connections, restrictions or defective components. Tighten loose connections; replace defective components.

11-61. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE RUNS ROUGH AT IDLE. (Cont.)	Improper positioning of discharge nozzle dust caps.	Position dust caps to have opening of approximately 1/16-inch between bottom of dust cap and wrench pads on nozzle.
POOR IDLE CUT-OFF.	Dirt in fuel pump or defective pump.	Remove pump and flush out thoroughly. Check that mixture arm contacts cut-off stop.
	Dirty or defective fuel manifold valve.	Remove and clean in accordance with paragraphs 11-68 and 11-69. Replace if defective.

11-62. FUEL-AIR CONTROL UNIT.

11-63. DESCRIPTION. The fuel-air control unit, located at the inlet to the intake manifold, contains the air throttle and a fuel metering unit. The function of the fuel-air control unit is to meter fuel and air in the proper ratio. The throttle control operates the air throttle valve. The valve shaft extends into the fuel metering valve. Idle speed and idle mixture adjustments are provided in the fuel-air control unit. The main mixture control is incorporated in the fuel pump.

NOTE

Throughout the aircraft fuel system, from the fuel tanks to the engine-driven fuel pump, 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 lubricant or to seal a leaking connection. Apply sparingly to male threads only, omitting the first two 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. Throughout the fuel injection system, from the engine-driven fuel pump through the discharge nozzles, use only a fuel-soluble lubricant, such as engine oil, on fitting threads. Do not use any other form of thread compound on the injection system.

11-64. REMOVAL AND INSTALLATION.

a. Place fuel shut-off valve in OFF position.
b. Tag and disconnect fuel hoses at the fuel metering unit.
c. Disconnect manifold pressure line.
d. Loosen clamps securing the two hoses which connect fuel-air control unit to intake manifolds, and slide hoses away from connection.
e. Disconnect throttle control rod end.
f. Disconnect induction air valve return spring from tab on mounting bolt.
g. Remove bolts attaching fuel-air control unit to airbox. Lay microswitch and bracket to one side. Note any other parts secured by these bolts.
h. Remove bolts attaching fuel-air control unit to bracket on engine, and remove the unit. Cover open ends of intake manifolds and airbox.
i. Reverse this procedure to install the fuel-air control unit. Check rigging of throttle and throttle-operated microswitch.

11-65. ADJUSTMENT (IDLE SPEED AND IDLE MIXTURE). (Refer to figure 11-10.) The idle speed may be regulated by adjusting a spring-loaded screw located on the air throttle lever. Idling screw should be set to provide between 575 and 625 RPM. The idle mixture adjustment is a screw/allen screw located on the fuel metering unit. Turning clockwise leans the mixture and counterclockwise richens the mixture. Adjust mixture control to obtain a slight and momentary gain of 25 RPM maximum at 1000 RPM engine speed as mixture control is moved slowly from full RICH toward idle cutoff. If mixture is set too LEAN, engine speed will drop immediately, thus requiring enrichment. If mixture is set too RICH, engine speed will increase above 25 RPM, thus requiring leaning. Return mixture control to full RICH position as soon as leaning effect is observed, to keep engine running.

NOTE

Engine idle speed may vary among different engines. An engine should idle smoothly, without excessive vibration, and 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. When checking or setting

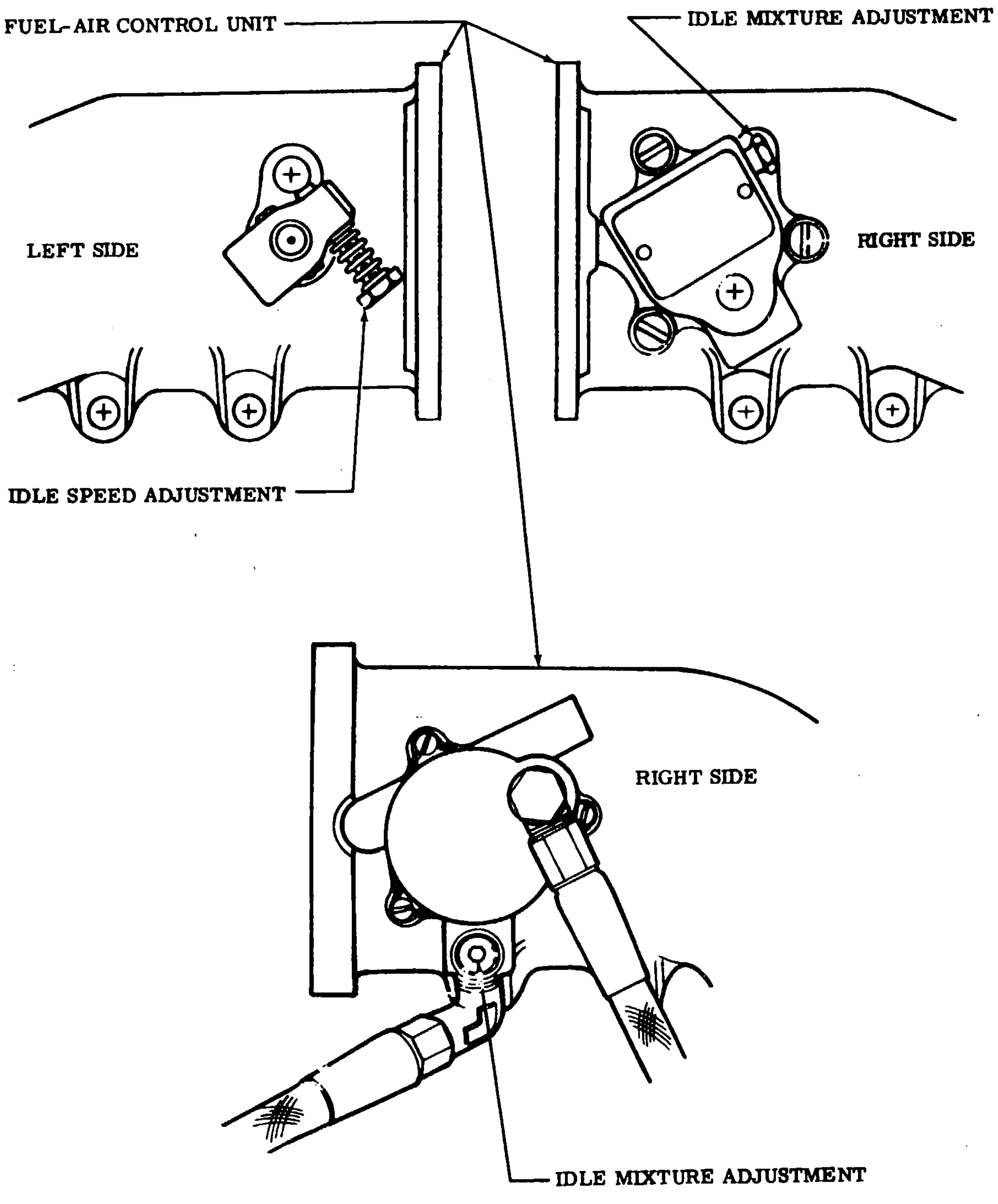


Figure 11-10. Idle Speed and Idle Mixture Adjustment

idle speed or idle mixture, "clear" the engine between checks to prevent false indications.

11-66. FUEL MANIFOLD VALVE.

11-67. DESCRIPTION. Metered fuel flows to the fuel manifold valve, which provides a central point for distributing fuel to individual cylinders. An internal diaphragm, operated by fuel pressure, raises or lowers a plunger to open and close the individual cylinder supply ports simultaneously. A needle valve in the plunger ensures that the plunger fully opens the outlet ports before fuel flow starts, and closes the ports simultaneously for positive engine shut-down. A fine-mesh screen is included in the fuel manifold valve.

11-68. REMOVAL AND INSTALLATION.

a. Disconnect all lines and hoses from the fuel manifold valve.

b. Remove the two crankcase bolts which secure mounting bracket. After removal, bracket may be disassembled from manifold valve if desired.

c. Reverse this procedure to install the fuel manifold valve.

11-69. CLEANING.

a. Remove fuel manifold valve from engine and remove safety wire from cover attaching screws.

b. Hold the top cover down against internal spring until all four cover attaching screws have been removed, then gently lift off the cover. Use care not to damage the spring-loaded diaphragm below cover.

c. Remove the upper spring and lift the diaphragm assembly straight up.

NOTE

If the valve attached to the diaphragm is stuck in the bore of the body, grasp the center nut and rotate and lift at the same time to work gently out of the body.

CAUTION

Do not attempt to remove needle or spring from inside plunger valve. Removal of these items from the valve will disturb the calibration of the valve.

d. Using clean gasoline, flush out the chamber below the screen.

e. Flush above the screen and inside the center bore making sure that outlet passages are open. Use only a gentle stream of compressed air to remove dust and dirt and to dry.

CAUTION

The filter screen is a tight fit in the body and may be damaged if removal is attempted. It should be removed only if a new screen is to be installed.

f. Clean diaphragm and valve and top cover in the same manner. Be sure the vent hole in the top cover is open and clean.

g. Carefully replace diaphragm and valve. Check that valve works freely in body bore.

h. Position diaphragm so that horizontal hole in plunger valve is 90 degrees from the fuel inlet port in the valve body.

i. Place upper spring in position on diaphragm.

j. Place cover in position so that vent hole in cover is 90 degrees from inlet port in valve body. Install cover attaching screws and tighten to 20±1 lb-in. Install safety wire on cover screws.

k. Install fuel manifold valve assembly on engine and reconnect all lines and hoses to valve.

l. Inspect installation and install cowling.

11-70. FUEL DISCHARGE NOZZLES.

11-71. DESCRIPTION. From the fuel manifold valve, individual, identical size and length fuel lines carry metered fuel to the fuel discharge nozzles located in the cylinder heads. The outlet of each nozzle is directed into the intake port of each cylinder. An air bleed, incorporated into each nozzle, aids in vaporizing the fuel by breaking the high vacuum in the intake manifold at idle RPM and keeps the fuel lines filled. The nozzles are calibrated in several ranges All nozzles furnished for one engine are the same range and are identified by a number and a suffix letter stamped on the flat portion of the nozzle body. When replacing a fuel discharge nozzle be sure that it is of the same calibrated range as the rest of the nozzles in the engine. When a complete set of nozzles is being replaced, the number must be the same as the one removed, but the suffix letters may be different, as long as they are the same for all nozzles being installed on a particular engine.

11-72. REMOVAL.

NOTE

Plug or cap all disconnected lines and fittings.

a. Disconnect the fuel injection lines at the fuel discharge nozzles. Remove the nozzles with a 1/2-inch deep socket.

11-73. CLEANING AND INSPECTION. To clean nozzles, immerse in clean solvent and use compressed air to dry them. When cleaning the nozzle with compressed air, direct air through the nozzle in the direction opposite of normal fuel flow. Do not remove the nozzle shield or distort it in any way. Do not use a wire or other metal object to clean the orifice or metering jet. After cleaning, check the shield height from the hex portion of the nozzle. The bottom of the shield should be approximately 1/16 inch above the hex portion of the nozzle.

11-74. INSTALLATION.

a. Install the fuel discharge nozzles in the cylinders using a 1/2-inch deep socket, and tighten nozzle to a torque value of 60 to 80 lb-in.

b. Connect the fuel injection lines at the fuel discharge nozzles.

c. Check installation for crimped lines, loose fittings, etc.

11-75. FUEL INJECTION PUMP.

11-76. DESCRIPTION. The fuel pump is a positive-displacement, rotating vane type, located just forward of number five cylinder at the propeller end of the engine. Fuel enters the pump at the swirl well of the pump vapor separator. Here, vapor is separated by a swirling motion so that only liquid fuel is fed to the pump. The vapor is drawn from the top center of the swirl well by small pressure jet of fuel and is fed into the vapor return line, where it is returned to the aircraft fuel tank. Since the pump is engine-driven, changes in engine speed affect total pump flow proportionally. The pump supplies more fuel than is required by the engine: therefore, a spring-loaded, diaphragm type relief valve is provided, with a fixed orifice installed in the fuel passage to this relief valve to maintain a constant pressure. The fuel pump is equipped with a manual mixture control to provide positive mixture control throughout the range required by the injection system. This control limits output of the pump from full rich to idle cutoff. Non-adjustable mechanical stops are located at these positions. A check valve allows the auxiliary fuel pump pressure to bypass the engine-driven fuel pump for starting, or in the event of an engine-driven fuel pump failure. During the 1968 model year and for all spares the fixed orifice is replaced with an adjustable orifice to allow the exact desired pressure setting at the full-throttle position. Fuel pumps with the adjustable orifice feature are identified by the presence of a brass plug with a stainless steel adjusting needle having a screwdriver slot located below the fuel inlet fitting.

11-77. REMOVAL AND INSTALLATION.

a. Place fuel shut-off valve in OFF position and remove cowling, baffles, and covers as necessary for access.

b. Disconnect mixture control from lever on pump.

c. Tag and disconnect fuel hoses attached to pump.

d. Remove mounting nuts, and pull pump and gasket from mounting pad.

e. The drive shaft coupling may come off with the fuel pump, or it may remain in the engine. If it comes off with the pump, reinstall it in the engine to prevent dropping or losing it.

f. If a pump is not to be installed for some time, install a cover on the engine pad.

g. Using a new gasket, reverse this procedure to install the fuel pump. Do not force engagement of drive. Rotate engine crankshaft and drive will engage smoothly when aligned properly. Check mixture control rigging.

11-78. ADJUSTMENT.

NOTE

On fuel pumps requiring full throttle fuel pressure calibration and the adjustable orifice is sealed, Continental Aircraft Engine Service Bulletin No. M70-10 must be complied with before calibration can be performed.

a. Remove engine cowling as required for access.

b. Disconnect engine-driven fuel pump hose at the fuel metering unit. Using test hose and fittings, connect test gage pressure port into fuel injection system in accordance with figure 11-11.

NOTE

Cessna Service Kit No. SK320-2 provides a special indicator, lines, and instructions for connecting the indicator into the system to perform accurate calibration of the engine-driven fuel pump.

c. Allow engine to warm-up. Set mixture control full rich and propeller control full forward (low pitch high RPM).

d. Idle engine at 600 RPM and check fuel pressure on special indicator per paragraph 11-12.

WARNING

DO NOT make fuel pump pressure adjustments while engine is operating.

e. If pressure is not within prescribed tolerances, stop engine and adjust pressure by turning the screw on the fuel pump relief valve (turn IN to increase pressure and OUT to decrease pressure) to attain correct pressure and repeat steps "c" and "d".

NOTE

After adjusting fuel pressure, idle speed and idle mixture must be readjusted (refer to paragraph 11-65).

f. Advance throttle to obtain maximum RPM and check fuel pressure on special indicator per paragraph 11-12.

NOTE

Fuel injection pumps with a fixed orifice, the full throttle pressure is not adjustable.

WARNING

DO NOT make fuel pump pressure adjustments while engine is operating.

g. If pressure is not within prescribed tolerances, (paragraph 11-12) on the adjustable orifice pump; stop engine and adjust pressure by loosening locknut and turning the slotheaded needle valve located just below the fuel pump inlet fitting (turn clockwise to increase pressure and counterclockwise to decrease pressure) to attain the correct pressure and repeat steps "c and d".

h. After correct pressure is obtained, safety adjustable orifice locknut and remove test equipment.

i. Install cowling.

11-79. AUXILIARY ELECTRIC FUEL PUMP FLOW RATE ADJUSTMENT. (Refer to Section 12.)

11-80. INDUCTION AIR SYSTEM.

11-81. DESCRIPTION. Induction air enters the cylindrical air filter and flows through the airbox, through the air throttle body, into the intake manifolds. The complete air induction system, including the intake manifolds, is located on the top side of the engine. The alternate air source is automatic. If the air filter should become clogged, suction from the engine intake will open a spring-loaded door. This permits the induction air to be drawn from within the engine compartment.

11-82. REMOVAL AND INSTALLATION.

a. Remove and install the air filter as follows:

1. Cut safety wire and loosen wing nut at outer end of filter.

2. Remove element for cleaning or replacement. Refer to Section 2 for servicing.

3. Do not over-tighten wing nut when installing but be sure to resafety.

b. Remove and install the induction airbox as follows:

1. Disconnect alternate air duct.

2. Disconnect lever return spring.

3. Remove four bolts and nuts securing airbox to air throttle body, and remove airbox. Lay parts of the throttle-operated microswitch to one side. Note any other parts secured by these bolts.

4. Reverse this procedure to install airbox, using new gasket. Check rigging of throttle-operated microswitch.

NOTE

The air throttle body is a part of the fuel-air control unit, which is included in the fuel injection system discussed later.

c. Removal of various intake manifold sections is accomplished by loosening hose clamps, sliding hoses back, and removing nuts attaching those segments which are secured to engine cylinders. Disconnect any lines or hoses interfering with removal. Reverse this procedure to install the intake manifold.

11-83. IGNITION SYSTEM.

11-84. DESCRIPTION. The ignition system is comprised of two 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.

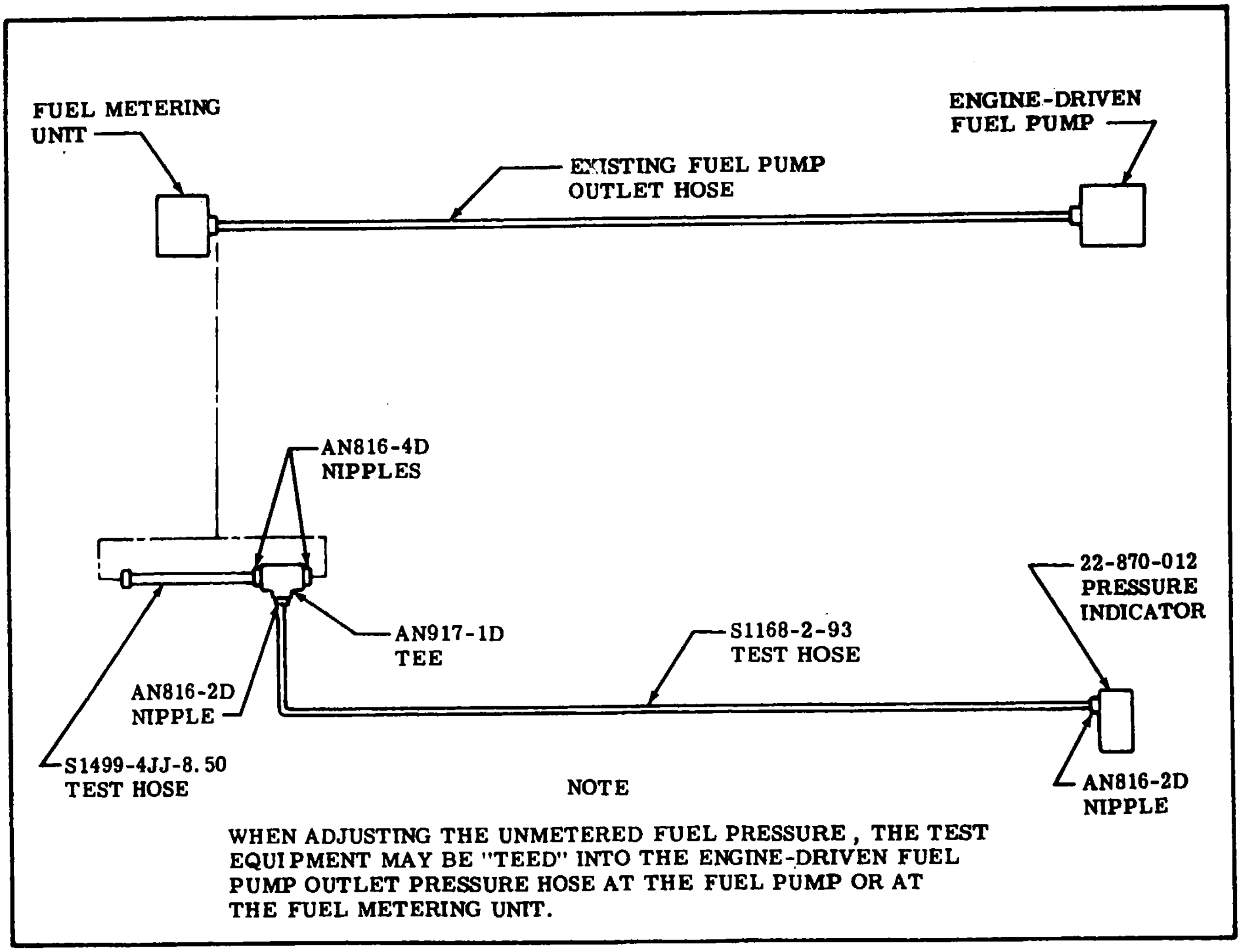


Figure 11-11. Test Harness Fuel Injection Pump Adjustment

11-85. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
ENGINE FAILS TO 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 couplings.	Impulse coupling pawls should engage at cranking speeds. Listen for loud clicks as impulse couplings operate. Remove magnetos and determine cause. Replace defective parts.
	Defective magneto.	Refer to paragraph 11-91.
	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 PROPERLY.	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 11-91.
	Impulse coupling pawls remain engaged.	Pawls should never engage above 450 RPM. Listen for loud clicks as impulse coupling operates. Remove magneto and determine cause. Replace defective parts.
	Spark plugs loose.	Check and install properly.

11-86. MAGNETOS.

11-87. DESCRIPTION. Two magnetos, equipped with impulse couplings are used on the engine. The magnetos contain a conventional two-pole rotating magnet (rotor) mounted in ball bearings. Engine-driven at one end, the rotor shaft operates breaker contact points at the other end. A gear on the rotor shaft drives a distributor gear which transfers high-tension current from the coil to the proper outlet in the distributor block. A breaker compartment is located at the opposite end of the drive end and a capacitor is provided in this breaker compartment next to the breaker contact points.

11-88. REMOVAL. Access to the breaker compartment is gained by removing the breaker compartment cover at the back end of the magneto. To remove the magneto from the engine, proceed as follows:

a. Remove cowling as necessary for access.

b. Remove high-tension outlet plate, and disconnect magneto "P" lead.

c. Disconnect any noise filters used with radio installations.

d. Note the approximate angular position at which the magneto is installed, then remove magneto mounting clamps.

NOTE

Never remove the screws fastening the two halves of the magneto together. Separating the halves would disengage distributor gears, causing loss of internal timing and necessitating complete removal and internal retiming.

11-89. INTERNAL TIMING. The following information gives instructions for adjusting breaker contacts to open at the proper position. It is assumed that the magneto has not been disassembled, and that the distributor gear, rotor gear, and cam have been assembled for correct meshing of gears and direction of rotation. Magneto overhaul, including separating the two major sections of the magneto, is not covered in this manual. Refer to applicable Bendix publications for disassembly and overhaul.

a. Fabricate a timing template as follows:

1. Cut a paper template from figure 11-12.

2. Cement paper template to a thin piece of metal for use as a support plate, then trim the plate to the shape of the paper template.

3. Drill the two mounting holes with a No. 18 drill.

b. Fabricate a timing pointer as shown in figure 11-13.

c. Remove magneto from engine per paragraph 11-88, remove breaker compartment cover, and remove timing inspection plug from top of magneto.

d. Attach timing template to breaker compartment as shown in figure 11-14, using 8-32 screws 1/4 inch long.

e. Turn rotating magnet in its direction of rotation until the painted chamfered tooth on distributor gear is approximately in the center of inspection window, then turn rotating magnet back until it locates in its magnetic neutral position.

NOTE

Impulse coupling pawls must be depressed to turn rotating magnet in its normal direction of rotation.

f. Remove cam screw, lockwasher, and washer, and use cam screw to install timing pointer so it indexes with 0° mark on template, while rotating magnet is still in its magnetic neutral position.

g. Turn rotating magnet in proper direction of rotation until pointer indexes with 10° mark ("E" gap). Using a 11-9110 timing light or equivalent, adjust breaker contacts to open at this point.

h. Turn rotating magnet until cam follower is on high part of cam lobe, and measure clearance between breaker contacts. Clearance must be .018± .006 inch. If clearance is not within these limits, readjust breaker contacts until they are within tolerance, then recheck the 10° ("E" gap) position. Tolerance on the "E" gap position is ± 4°. Replace breaker assembly if "E" gap and contact clearance will not both fall within the specified tolerances.

i. Remove timing pointer and timing template, and install cam screw, lockwasher, and washer.

j. Install magneto and time to engine in accordance with paragraph 11-90.

11-90. INSTALLATION AND TIMING TO ENGINE.

a. Turn propeller in normal direction of rotation until No. 1 cylinder is 20° BTC on compression stroke, the correct firing position.

NOTE

A plugged hole, through which timing marks on a crankshaft counterweight hanger are visible, is provided to facilitate timing. This hole is located under a brass, hex-head plug on the upper left side of the engine, above No. 2 cylinder. Marks are scribed from 24° BTC to 16° BTC, plus a mark for top center (TC). Reference for the marks is the centerline of the hole. Determine compression stroke by placing thumb over spark plug hole.

b. Turn magneto backwards (so impulse coupling pawls will not engage) until painted chamfered tooth is approximately in center of timing window. Be sure magneto gasket is in place, then install magneto approximately at the angle noted during removal. Tighten mounting clamps enough to hold magneto in place, but loose enough to permit magneto to be rotated in its clamps.

c. Using a timing light connected across the breaker contacts, rotate magneto case in normal direction of cam rotation until contacts have just closed, then rotate in the opposite direction until timing light indicates position at which contacts break. Secure magneto.

d. Turn propeller back a few degrees (approximately 5°) to close contacts.

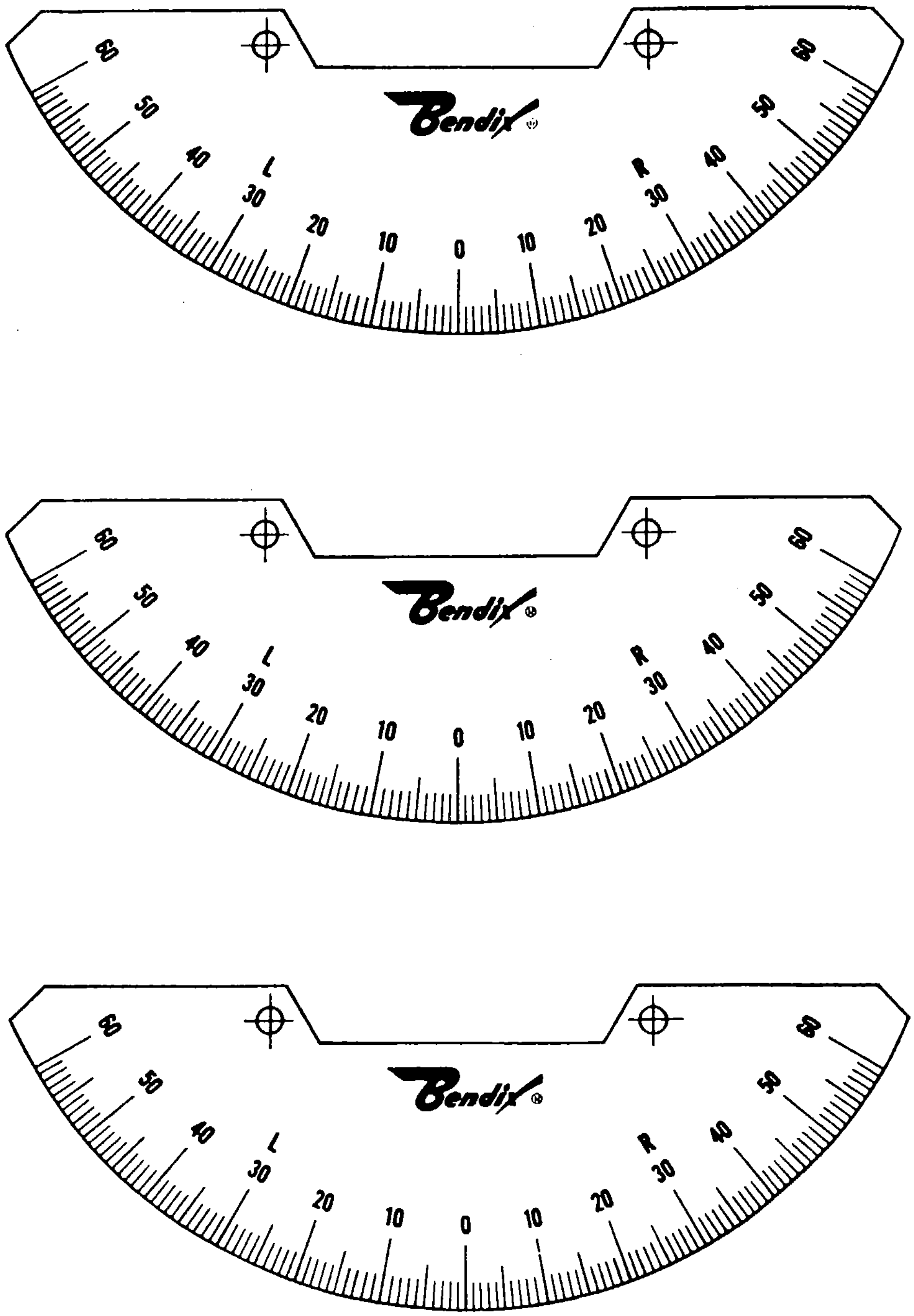


Figure 11-12. Templates For Timing Bendix Magnetos

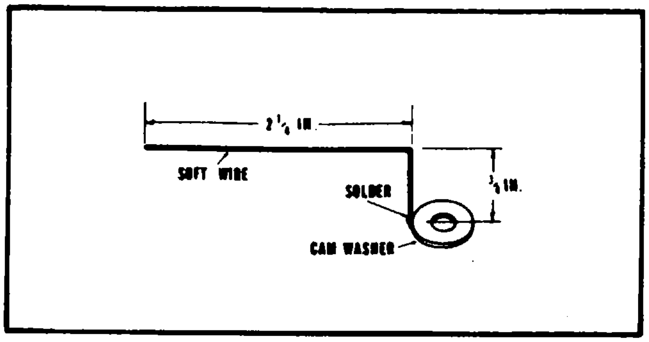


Figure 11-13. Timing Pointer

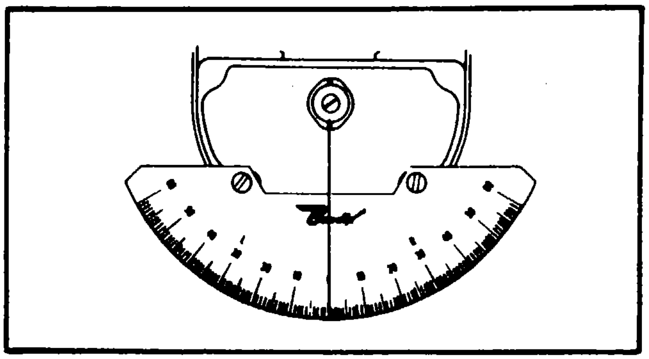


Figure 11-14. Template and Pointer Attached

NOTE

Do not turn propeller back far enough to engage impulse coupling, or propeller will have to be turned in normal direction of rotation until impulse coupling releases, then again backed up to a few degrees before the firing position.

e. Slowly advance propeller (tap forward with minute movements as firing position is approached) in normal direction of rotation until timing light indicates position at which contacts break. The contacts should break at the advance firing position of No. 1 cylinder listed in step "a." Rotate magneto case to make contacts break at correct position.

CAUTION

Do not adjust contacts to compensate for incorrect magneto-to-engine timing. Breaker contact adjustment is for internal timing only, and any readjustment after internal timing has been accomplished will result in a weaker spark, with reduced engine performance.

f. After tightening magneto mounting clamps and rechecking magneto-to-engine timing, remove timing equipment. Install and connect any spark plugs that were removed.

g. Install timing inspection plug, breaker compartment cover, any noise filters that were removed, and magneto "P" lead.

h. Install high-tension outlet plate.

NOTE

The No. 1 magneto outlet is identified with the number "1." The magneto fires at each successive outlet in direction of rotation. No. 1 magneto outlet routes to No. 1 cylinder, No. 2 magneto outlet to the next cylinder to fire, etc. Cylinder firing order is 1-6-3-2-5-4.

i. Reinstall cowling removed for access.

11-91. MAINTENANCE. At the first 25-hour inspection and at each 100-hour inspection thereafter, the breaker compartment should be inspected. Magneto-to-engine timing should be checked at each 100-hour inspection. If timing is 20° (plus zero, minus 2°), internal timing need not be checked. If timing is out of tolerance, remove the magneto and set internal timing, then reinstall and time to the engine.

NOTE

If ignition trouble should develop, spark plugs and ignition wiring should be checked first. If the trouble appears definitely to be associated with a magneto, the following may be used to help disclose the source of trouble without overhauling the magneto.

a. Moisture Check.

1. Remove the high-tension outlet plate, cables, and grommet, and inspect for moisture.
2. Inspect distributor block high-tension outlet side for moisture.
3. If any moisture is evident, lightly wipe with a soft, dry, clean, lint-free cloth.

CAUTION

Do not use gasoline or other solvents, as these will remove the wax coating on some parts and could cause electrical leakage.

b. Breaker Compartment Check.

1. Remove breaker cover.
2. Check all parts of the breaker assembly for security.
3. Check breaker contacts for excessive wear, burning, deep pits, and carbon deposits. Contacts may be cleaned with a hard-finish paper. Replace defective breaker assemblies. Make no attempt to stone or dress contacts. Clean new contacts with clear, unleaded gasoline and hard-finish paper before installing.
4. Check cam follower oiling felt. If it appears dry, re-oil with 2 or 3 drops of lubricant (Scintilla 10-86527, or equivalent). Allow about 30 minutes for the felt to absorb the oil, then blot off excess with a clean cloth. Too much oil may result in fouling and excessive burning of contacts.
5. Check that the condenser mounting bracket is not cracked or loose. If equipment is available, check condenser for a minimum capacitance of .30 microfarads. If equipment for testing is not avail-

able and a defective condenser is suspected, replace with a new one.

c. If the trouble has not been corrected after accomplishing steps "a" and "b," check magneto-to-engine timing. If timing is not within prescribed tolerance, remove magneto and set internal timing, then reinstall and time to the engine.

d. If the trouble has still not been corrected, magneto overhaul or replacement is indicated.

11-92. MAGNETO CHECK. Advanced timing settings in some cases, is the result of the erroneous practice of bumping magnetos up in timing in order to reduce RPM drop on single ignition. NEVER ADVANCE TIMING BEYOND SPECIFICATIONS IN ORDER TO REDUCE RPM DROP. Too much importance is being attached to RPM drop on single ignition. RPM drop on single ignition is a natural characteristic of dual ignition design. The purpose of the following magneto check is to determine that all cylinders are firing. If all cylinders are not firing, the engine will run extremely rough and cause for investigation will be quite apparent. The amount of RPM drop is not necessarily significant and will be influenced by ambient air temperature, humidity, airport altitude, etc. In fact, absence of RPM drop should be cause for suspicion that the magneto timing has been bumped up and is set in advance of the setting specified. Magneto checks should be performed on a comparative basis between individual right and left magneto performance.

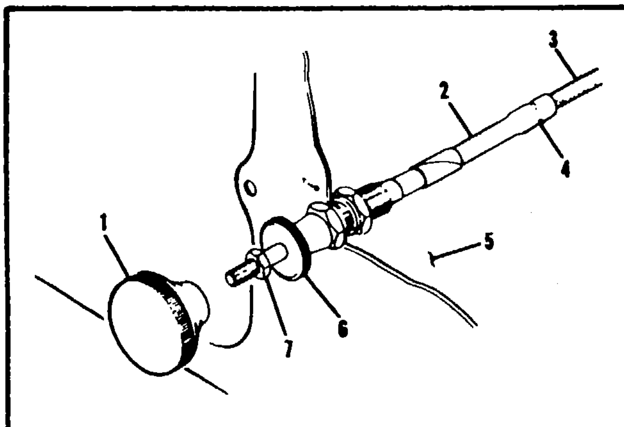
a. Start and run engine until the oil and cylinder head temperature is in the normal operating range.

b. Place the propeller control in the full low pitch (high RPM) position.

c. Advance engine speed to 1800 RPM.

d. 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.

e. Turn the switch to the "L" position and note the RPM drop, then return the switch to the "BOTH" position.



1. Knob
2. Rigid Conduit
3. Flexible Conduit
4. Staked Connection
5. Instrument Panel
6. Friction Lock
7. Jamb Nut

Figure 11-15. Throttle Control

f. The RPM drop should not exceed 150 RPM on either magneto or show greater than 50 RPM differential between magnetos. 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.

11-93. SPARK PLUGS. Two 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 service 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. At each inspection, remove, clean, inspect and regap all plugs. 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.

11-94. ENGINE CONTROLS.

11-95. DESCRIPTION. The throttle, mixture and propeller controls are of the push-pull type. The propeller 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 propeller control also has a vernier adjustment. Turning the control 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 mixture control has no locking device. An additional "Palnut" type locknut is installed in back of the locknut at the engine end of the throttle, mixture and propeller controls.

11-96. RIGGING. When adjusting any engine control, it is important to check that the control slides smoothly throughout its full travel, that it locks securely and the arm or lever which it operates moves through its full arc of travel. Throttle and mixture control arms at their corresponding engine components may be repositioned on ther shafts if necessary. Make sure the countersunk side of the arm faces the serrated portion of its shaft. If throttle arm is repositioned, check rigging of throttle-operated cam and microswitch.

CAUTION

Whenever a fuel pump arm or fuel-air control unit arm is removed or installed, always use a wrench at the wrench pads on the arm when removing or installing attaching nut. This will prevent twisting the shaft or other damage which might be caused.

11-97. THROTTLE CONTROL.

NOTE

Before rigging the throttle control shown in figure 11-15, check that the staked connection between rigid conduit and flexible conduit is secure. If any indications of looseness or breakage is apparent, replace the throttle control before continuing.

a. Pull throttle control out (idle) and remove the throttle knob.
b. Screw jam nut all the way down (clockwise) and reinstall the throttle knob. Screw the knob securely against the jam nut. Do NOT back the jam nut out. This will prevent bottoming and possible damage to the staked connection.
c. Disconnect the throttle control at the engine, push the control in until jam nut hits friction lock while the friction lock is loose, then pull the control out approximately 1/8 inch for cushion.
d. Tighten friction lock, being careful not to change the position of the throttle.
e. Move the throttle arm on the fuel-air control unit to full open, adjust end of control to fit, and connect to arm on fuel-air control unit.
f. Release friction lock and check for full travel of arm on fuel-air control unit. If further adjustment is required, make all adjustments at the fuel-air control unit end of control. Do NOT change jam nut setting.

NOTE

Refer to the inspection chart in Section 2 for inspection and/or replacement interval for the throttle control.

11-98. MIXTURE CONTROL.

NOTE

When checking mixture control rigging see that the arm on the fuel injection pump contacts the mechanical stops in both directions, that the mixture control has approximately 1/8 inch cushion at the instrument panel, and that the small retaining ring contacts the end of the control housing at the same time that the idle cut-off stop is reached.

a. Disconnect mixture control rod end from arm on fuel injection pump.

CAUTION

The mixture control has a small retaining ring brazed (or attached with epoxy resin) near the threaded end (engine end of control) of the control. The purpose of this retaining ring is to prevent inadvertent withdrawal and possible damage to the knob end of the control while jam nuts and rod end are removed.

b. Pull mixture control full out until retaining ring contacts control housing.
c. Move mixture control arm to idle cut-off. With arm against stop, adjust rod end to align with arm, and connect in this position.
d. Push mixture control full forward and check that when the full rich stop is reached, there is approximately 1/8 inch cushion at the instrument panel. After rigging is completed, be sure that the idle cut-off stop is reached at the same time that the retaining ring contacts the mixture control housing and that the full rich stop is reached with the proper amount of cushion. Tighten jam nuts to secure the rod end. Be sure the threaded end of the rod extends into the rod end far enough. An inspection hole is provided in the rod end for checking purposes.

NOTE

Refer to the inspection chart in Section 2 for inspection and/or replacement interval for the mixture control.

11-99. PROPELLER GOVERNOR CONTROL. (Refer to Section 13.)

11-100. RIGGING THROTTLE-OPERATED MICROSWITCH. (Refer to Section 12.)

11-101. EXHAUST SYSTEM.

11-102. DESCRIPTION. The exhaust system consists of two exhaust stack assemblies, one for the left and one for the right bank of cylinders. Each cylinder has a riser pipe attached to the exhaust port. The three risers at each bank of cylinders are joined together into a collector pipe forming an exhaust stack assembly. Each exhaust stack assembly connects to the muffler assembly beneath the engine. The muffler assembly is enclosed in a shroud which captures exhaust heat that is used to heat the airplane cabin. The tailpipe is welded to the muffler.

11-103. REMOVAL.
a. Remove engine cowling for access.
b. If installed, remove exhaust gas temperature probes or disconnect leads.
c. Disconnect ducts from heater shroud on muffler

assembly.

d. Remove nuts, bolts, and clamps attaching stack assemblies to the muffler.

e. Loosen nuts attaching exhaust stacks to the cylinders and remove muffler assembly.

f. Remove nuts attaching exhaust stack assemblies to the cylinders and remove exhaust stacks and gaskets.

11-104. INSPECTION.

NOTE

Refer to the inspection chart in Section 2 for inspection interval for the exhaust system.

The exhaust system must be thoroughly inspected, especially the heat exchange section of the muffler. Any time exhaust fumes are detected in the cabin, an immediate inspection must be performed. All components that show cracks and general deterioration must be replaced with new parts.

a. Remove engine cowling as necessary for access.

b. Loosen or remove shrouds so that ALL surfaces of the exhaust system is visible.

c. Check for holes, cracks, and burned spots. Expecially 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 stacks and muffler.
2. Remove shrouds.
3. Seal openings with expansion rubber plugs.
4. Using a manometer or gage, apply approximately 1-1/2 psi (3 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.

11-105. INSTALLATION.

NOTE

Use new gaskets between riser and mounting pad on cylinder, regardless of apparent condition of those removed. Install the exhaust flange gasket with raised bead toward exhaust port on engine.

a. Place all sections of the assembly in position and join together loosely with attaching clamps.

b. Tighten nuts securing risers to cylinders first; then tighten all clamps joining sections together.

c. Torque exhaust stack nuts at cylinders to 100-110 pound-inches.

d. Install engine cowling.

e. Check for adequate clearance where tailpipe emerges through the cowling.

11-106. STARTING SYSTEM.

11-107. DESCRIPTION. An electric starter motor, mounted on a 90 degree starter adapter, is provided as an integral part of the engine. A starter solenoid is activated by the ignition switch on the instrument panel. When the starter solenoid is actuated, its contacts close and electrical current energizes the starter motor. Initial rotation of the starter motor engages the starter through an overrunning clutch in the starter adapter, which incorporates worm reduction gears. The starter motor is located just aft of the right rear cylinder.

SHOP NOTES:

11-108. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
STARTER WILL NOT OPERATE.	Defective master switch or circuit.	Check continuity. Install new switch or wires.
	Defective starter switch or switch circuit.	Check continuity. Install new switch or wires.
	Defective starter motor.	Check voltage to starter. Repair or replace starter motor.
STARTER MOTOR RUNS, BUT DOES NOT TURN CRANK-SHAFT.	Defective overrunning clutch or drive.	Remove starter and inspect. Install new starter adapter.
	Starter motor shaft broken.	Install new starter motor.
STARTER MOTOR DRAGS.	Low battery.	Charge or install new battery.
	Starter switch or relay contacts burned or dirty.	Check continuity. Install serviceable unit.
	Defective starter motor power cable.	Check visually. Install new cable.
	Loose or dirty connections.	Check visually. 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.	Check visually. Clean and turn commutator.
STARTER EXCESSIVELY NOISY.	Worn starter pinion.	Remove starter and inspect. Replace starter drive.
	Worn or broken teeth on crankshaft gears.	Check visually. Replace crankshaft gear.

11-109. PRIMARY MAINTENANCE. The starter circuit should be inspected at regular intervals, the frequency of which should be determined by the amount of 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 or No. 000 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 slowly in direction of normal rotation. Clean sanding dust from motor after seating brushes.

11-110. STARTER MOTOR.

11-111. REMOVAL AND INSTALLATION.

CAUTION

When disconnecting on connecting the starter cable do not permit starter terminal bolt to rotate. Rotation of the terminal bolt could break the conductor between terminal bolt and field coils causing the starter to be inoperative.

a. Disconnect electrical cable from starter motor. Insulate cable terminal as a safety precaution.
b. Remove two sets of nuts and washers securing motor to the starter adapter and pull motor from mounting pad.

NOTE

If a new starter motor is to be installed, refer to Continental Aircraft Engine Service Bulletin M74-17, dated 26 August 1974.

c. To install the starter motor, reverse the preceding steps. Install a new O-ring on the starter, then install to starter motor, be sure that starter motor drive engages drive in the starter adapter.

11-112. EXTREME WEATHER MAINTENANCE.

11-113. COLD WEATHER. Cold weather starting is made easier by the installation of the engine primer system. The primer system is a manually operated type. Fuel is supplied by a line from the fuel strainer to the plunger type primer. Operating the primer forces fuel to the engine. Fuel is delivered to the forward end of each intake manifold. This primes the entire length of the intake manifold for each bank of cylinders. Primer lines should be replaced when crushed or broken, and should be properly clamped to prevent vibration and chafing. With the external power receptacle installed, an external power source may be connected to assist in cold weather or low battery starting. Refer to paragraph 11-117 for use of the external power receptacle.

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. After preheating the oil, gasoline may be mixed with the oil in a ratio of 1 part gasoline 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. After the engine compartment has been preheated, inspect all engine compartment drain and vent lines for presence of ice. After this procedure has been followed, pull the propeller through several revolutions by hand before starting the engine.

WARNING

Do not heat oil above 121°C (250°F). A flash fire may result. Before pulling propeller through, ensure that magneto switch is in the OFF position to prevent engine from firing.

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 a 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, in some cases, 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, oil cooler, 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 build-up accumulation of the sludge and carbon deposits within the engine.

11-114. HOT WEATHER. In hot weather, with a hot engine, fuel may vaporize at certain points in the fuel system. Vaporized fuel may be purged by setting the mixture control in IDLE CUT-OFF and operating the auxiliary fuel pump on HI.

Engine mis-starts characterized by weak, intermittent explosions followed by puffs of black smoke from the exhaust are caused by over-priming or flooding. This situation is more apt to develop in hot weather, or when the engine is hot. If it occurs, repeat the starting routine with the throttle approximately one-half OPEN, the mixture control in IDLE-CUT-OFF, and the auxiliary fuel pump switch OFF. As the engine fires, move the mixture control to full RICH and decrease the throttle to desired idling speed.

Engine mis-starts characterized by sufficient power to disengage the starter but dying after 3 to 5 revolutions are the result of an excessively lean mixture after the start. This can occur in either warm or cold temperatures. Repeat the starting routine but allow additional priming time with the auxiliary fuel pump switch on LOW before cranking is started, or place the auxiliary fuel pump switch on HI immediately for a richer mixture while cranking.

If prolonged cranking is necessary, allow the starter motor to cool at frequent intervals, since excessive heat may damage the starter.

11-115. DUSTY CONDITIONS. Dust inducted into the intake system of the engine is probably the greatest single cause of early engine wear. Under high dust conditions the induction air filter should be serviced daily as outlined in Section 2.

11-116. SEACOAST AND HUMID AREAS. In salt water areas special care should be taken to keep the engine and accessories clean to prevent oxidation. Fuel and oil should be checked frequently and drained of condensed moisture in humid areas.

11-117. LOW-BATTERY STARTING. With the ground service receptacle installed, the use of an external power source is recommended for cold weather starting and lengthy maintenance of the aircraft electrical system with the exception of electronic equipment.

NOTE

Electrical power is supplied through a split-bus bar, one side containing electronic system circuits, and the other side having general electrical system circuits. Both sides of the bus are on at all times except when either an external power source is connected or the starter switch is turned on; then a power contactor is automatically activated to open the circuit to the electronic bus. Isolating the electronic circuits in this manner prevents harmful transient voltages from damaging the semi-conductors in the electronic equipment.

The ground service plug receptacle circuit incorporates a polarity reversal protection. Power from the external power source will flow only if the ground service plug is correctly connected to the aircraft. If the plug is accidentally connected backwards, no power will flow to the aircraft electrical system, thereby preventing any damage to the electrical equipment.

The battery and external power circuits have been designed to completely eliminate the need to "jumper" across the battery contactor to close it. A special fused circuit in the external power system supplies the needed "jumper" across the contacts so that with a dead battery and an external power source applied, turning the master switch ON will close the battery contactor.

11-118. HAND-CRANKING. A normal hand-cranking procedure may be used on airplanes with impulse coupling equipped magnetos.

SECTION 12

FUEL SYSTEM

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12-1. FUEL SYSTEM.

NOTE

The fuel system as described in this section does not include the fuel injection system. Refer to Section 11 for that part of the fuel system.

12-2. DESCRIPTION. Fuel is gravity-fed from a metal tank in the inboard section of each wing, through a selector valve, fuel reservoir tank and shut-off valve, to the fuel strainer. From the strainer, fuel flows through an electric auxiliary fuel pump with by-pass provisions, to the engine-driven fuel pump. Beginning with aircraft serial FR17200531, the position of the auxiliary fuel pump and the strainer drain in the system is reversed. Positive ventilation is provided by a vent line and check valve assembly located in the left wing tank and a crossover vent line connecting the two tanks together. The vent line from the check valve assembly extends overboard through the lower wing skin adjacent to the left wing strut. The reservoir tank has a vapor return line from the engine and a vent line teed into the tank crossover line.

12-3. PRECAUTIONS.

NOTE

There are certain general precautions and rules concerning the fuel system which should be observed when performing the operations and procedures in this section. These are as follows:

a. During all fueling, defueling, tank purging, and tank repairing or disassembly, ground the aircraft to a suitable ground stake.

b. Residual fuel draining from lines and hose constitutes a fire hazard. Use caution to prevent the accumulation of fuel when lines or hose are disconnected.

c. Cap open lines and cover connections to prevent thread damage and the entrance of foreign matter.

Throughout the aircraft fuel system from the fuel tanks to the engine-driven fuel pump, 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 lubricant or to seal a leaking connection. Apply sparingly to male threads only, omitting the first two threads, exercising extreme care 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. Throughout the fuel injection system, from the engine-driven fuel pump through the discharge nozzles, use only a fuel-soluble lubricant, such as engine oil, on fitting threads. Do not use any other form of thread compound on the injection system.

12-4. TROUBLE SHOOTING.

NOTE

Use this trouble shooting chart in conjunction with the engine and fuel-injection trouble shooting charts in Section 11.

TROUBLE	PROBABLE CAUSE	REMEDY
NO FUEL FLOW TO ENGINE-DRIVEN FUEL PUMP.	Fuel shut-off valve control not pushed in.	Push shut-off valve in.
	Fuel tanks empty.	Service with proper grade and amount of fuel.
	Fuel line disconnected or broken.	Connect or repair fuel lines.
	Fuel tank outlet screen plugged.	Remove and clean screen and flush out fuel tank.
	Defective fuel shut-off valve or selector valve.	Remove and repair or replace valves.
	Plugged fuel strainer.	Clean strainer and screen.
	Defective electric fuel pump.	Repair or replace fuel pump.
	Fuel line plugged.	Clean out or replace fuel line.
FUEL STARVATION AFTER STARTING.	Partial fuel flow from the preceding causes.	Use the preceding remedies.
	Malfunction of engine-driven fuel pump or fuel injection system.	Refer to Section 11.
	Fuel vent plugged.	See paragraph 12-13.
	Water in fuel.	Drain fuel tank sumps, fuel lines and fuel strainer.
NO FUEL FLOW WHEN ELECTRIC PUMP IS OPERATED.	Defective fuel pump switch.	Replace defective switch.
	Defective throttle switch.	Replace defective switch.
	Open or defective circuit breaker.	Reset. Replace if defective.
	Loose connections or open circuit.	Tighten connections; repair or replace wiring.
	Defective electric fuel pump.	Replace defective pump.
	Defective engine-driven fuel pump by-pass or defective fuel injection system.	Refer to Section 11.
PRESSURIZED FUEL TANKS	Plugged bleed hole in vent valve.	See paragraph 12-13.

12-4. TROUBLE SHOOTING. (Cont.)

TROUBLE	PROBABLE CAUSE	REMEDY
NO FUEL QUANTITY INDICATION.	Fuel tanks empty.	Service with proper grade and amount of fuel.
	Circuit breaker open or defective.	Reset. Replace if defective.
	Loose connections or open circuit.	Tighten connections; repair or replace wiring.
	Defective fuel quantity indicator.	See Section 15.

SHOP NOTES:

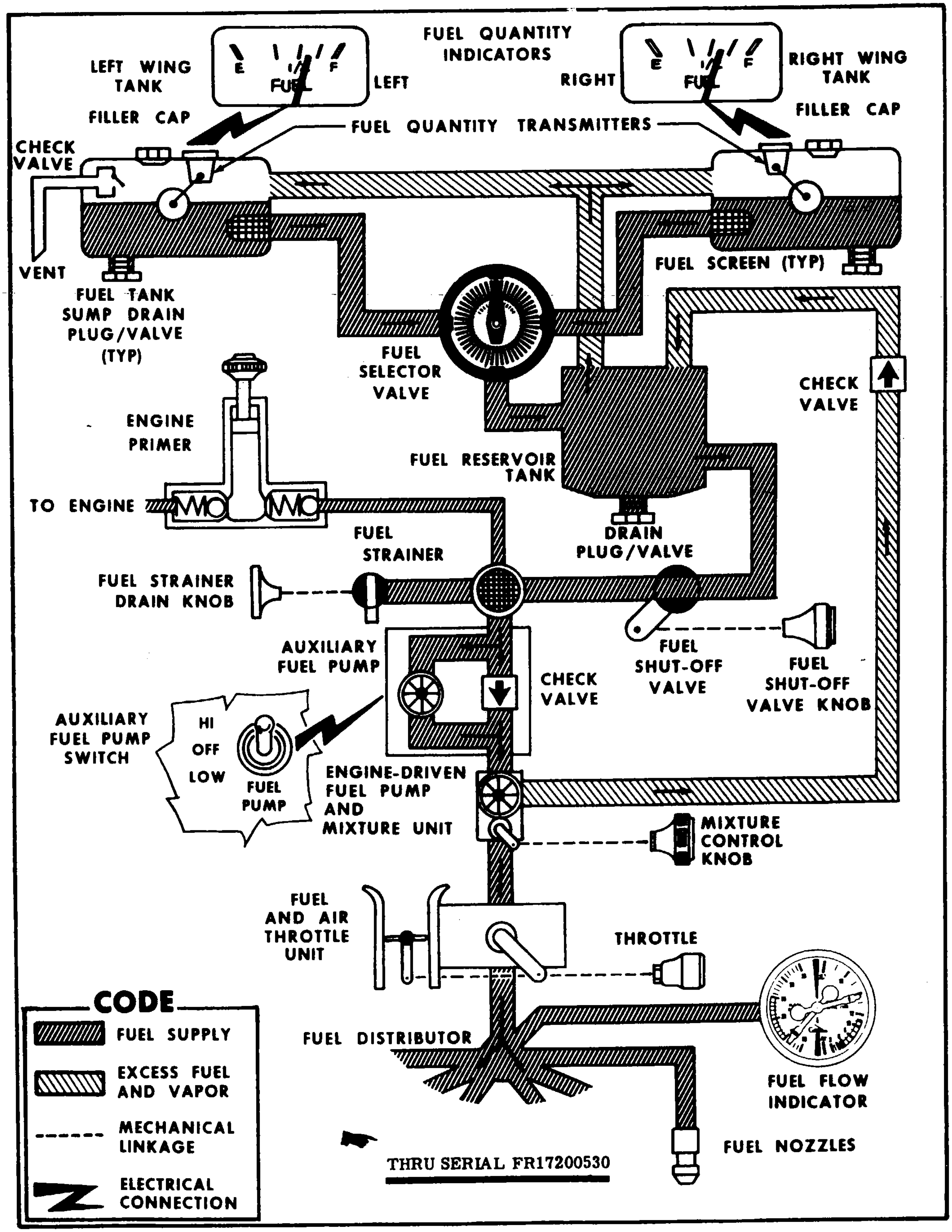


Figure 12-1. Fuel System Schematic (Sheet 1 of 2)

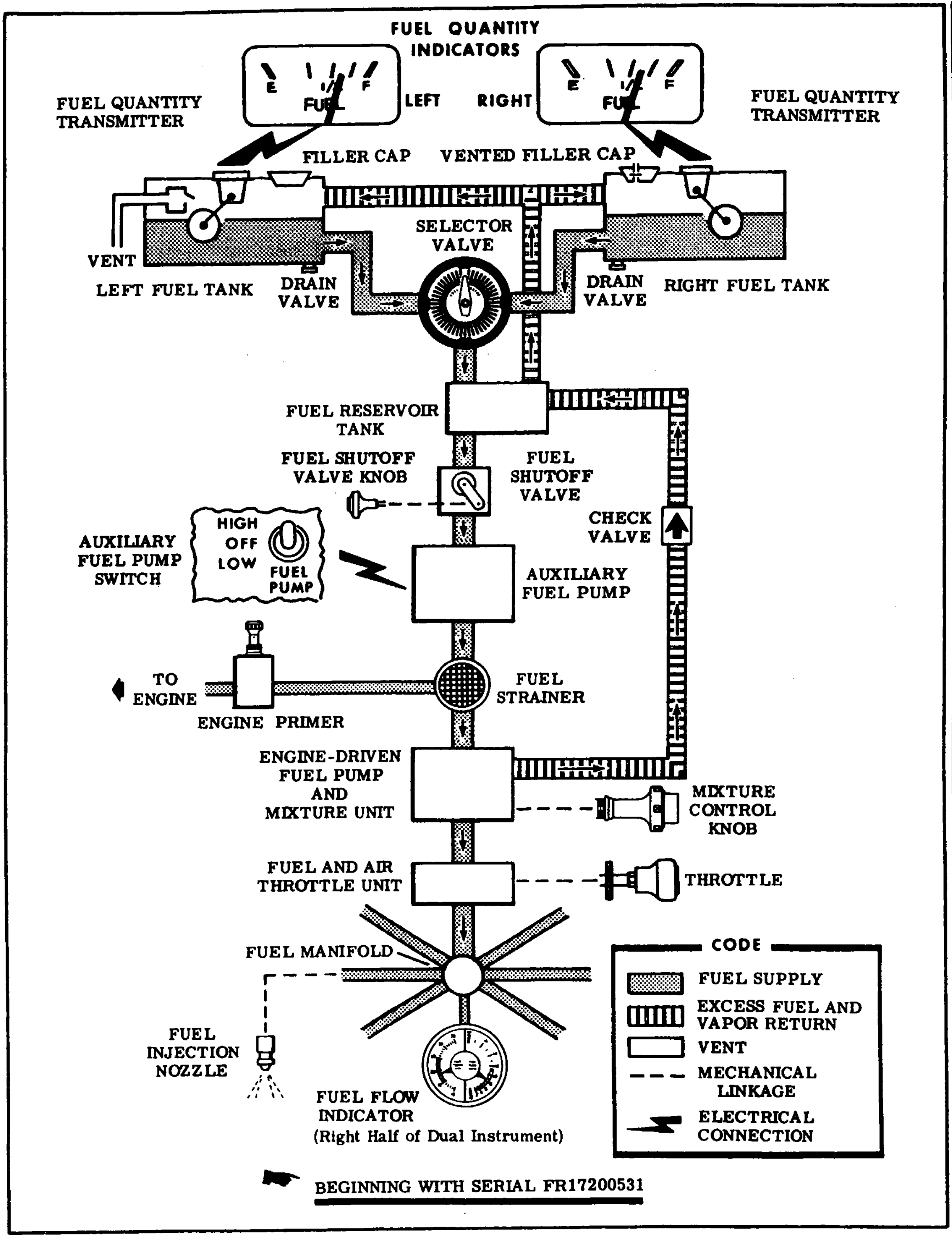
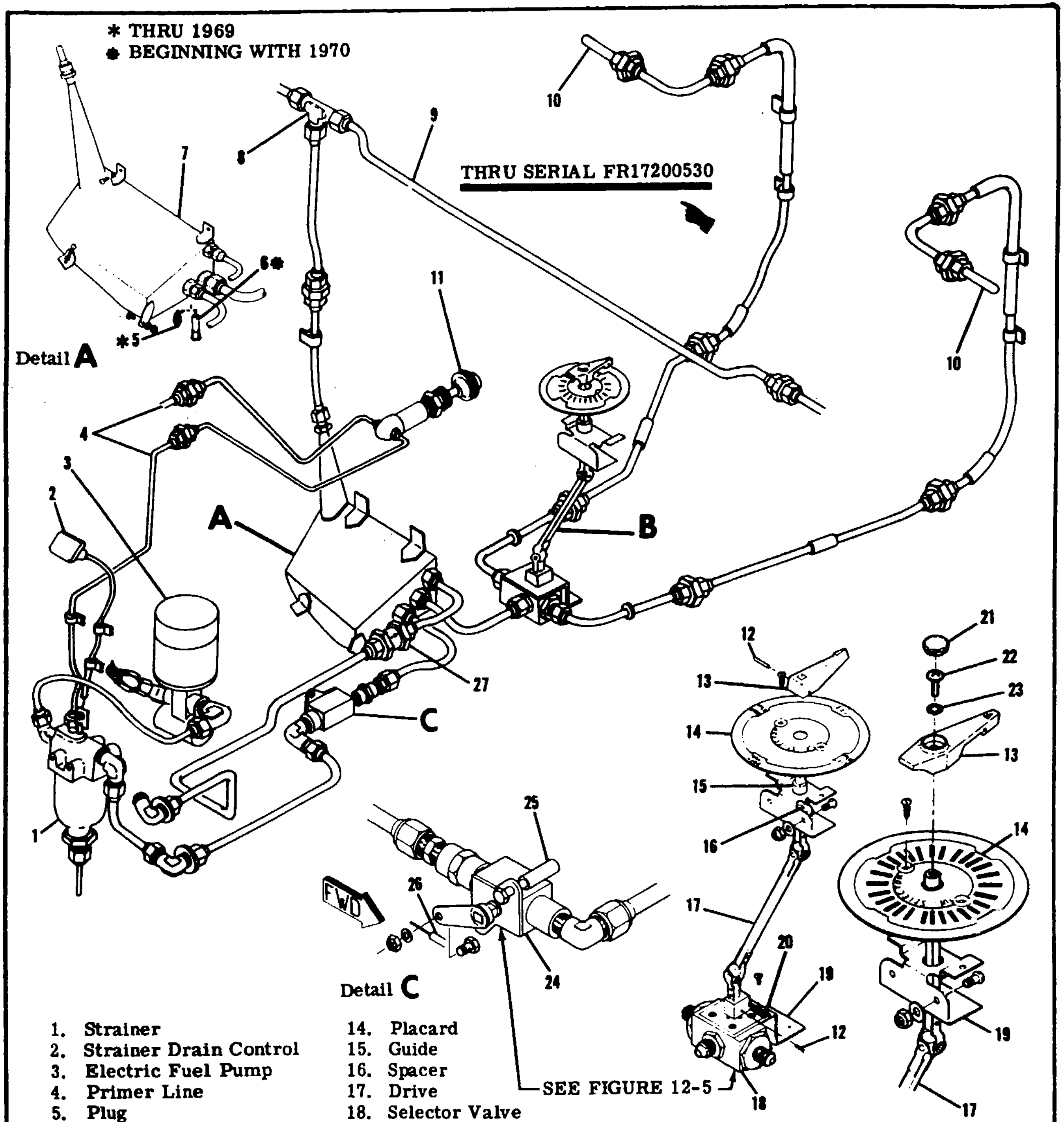


Figure 12-1. Fuel System Schematic (Sheet 2 of 2)

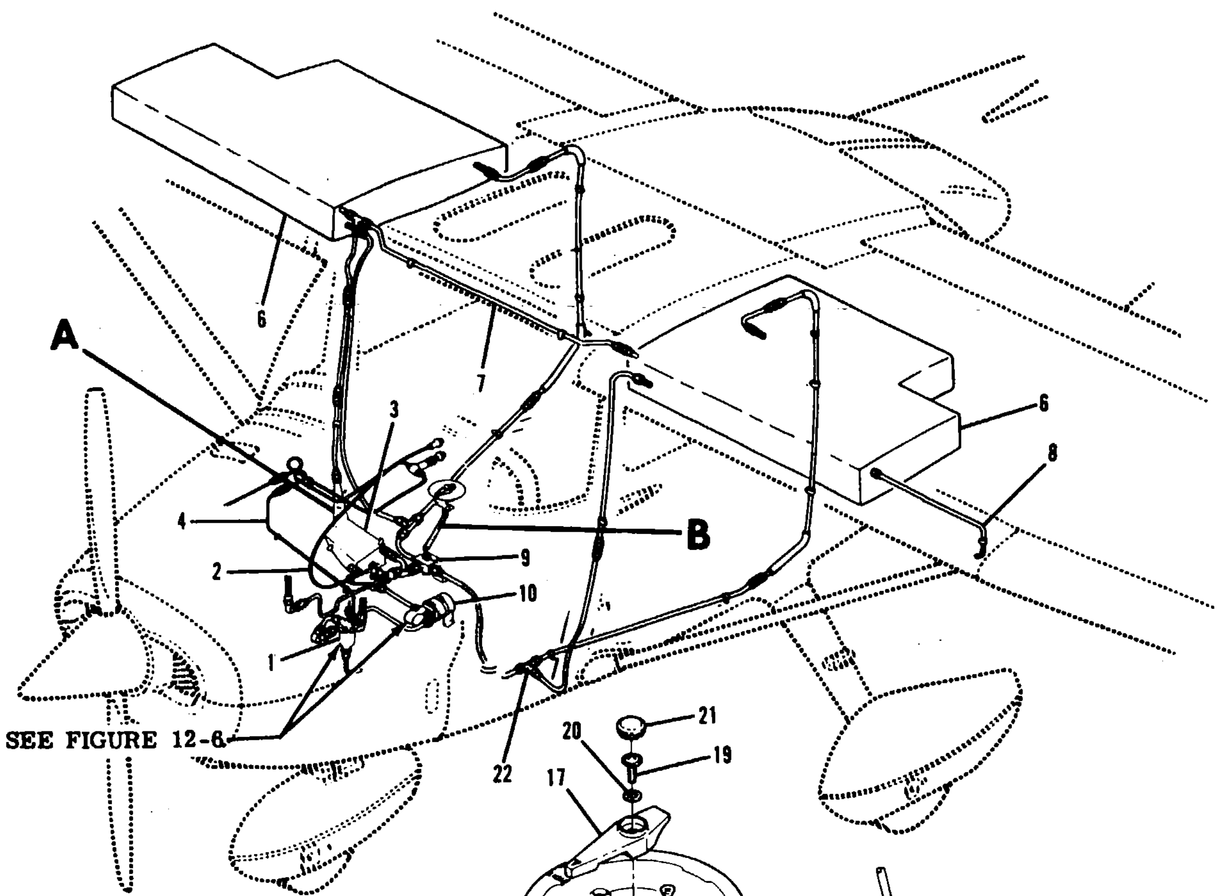


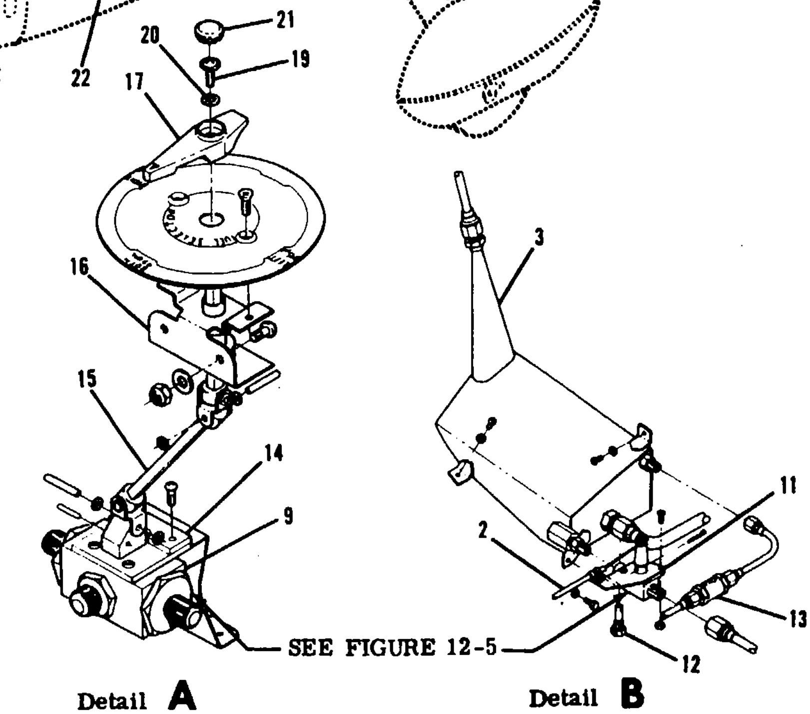
1. Strainer
2. Strainer Drain Control
3. Electric Fuel Pump
4. Primer Line
5. Plug
6. Drain Valve
7. Reservoir Tank
8. Tee
9. Crossover Vent
10. Finger Strainer
11. Primer
12. Roll Pin
13. Handle
14. Placard
15. Guide
16. Spacer
17. Drive
18. Selector Valve
19. Bracket
20. Stop
21. Cap
22. Screw
23. Washer
24. Shut-Off Valve
25. Spacer
26. Shut-Off Valve Control
27. Check Valve

NOTE

All fuel hoses should be replaced at engine overhaul or after 5 years, whichever comes first.

Figure 12-2. Fuel System Installation (Sheet 1 of 2)





1. Strainer Drain
2. Shut-Off Valve Control
3. Reservoir Tank
4. Primer Line
5. Vapor Return Line
6. Fuel Tank
7. Vent Crossover Line
8. Vent Line
9. Selector Valve
10. Auxiliary Fuel Pump
11. Shut-Off Valve
12. Drain Valve
13. Check Valve
14. Stop Block
15. Linkage
16. Bracket
17. Placard
18. Handle
19. Screw
20. Washer
21. Cap
22. Tee

BEGINNING WITH SERIAL FR17200531

Figure 12-2. Fuel System Installation (Sheet 2 of 2)

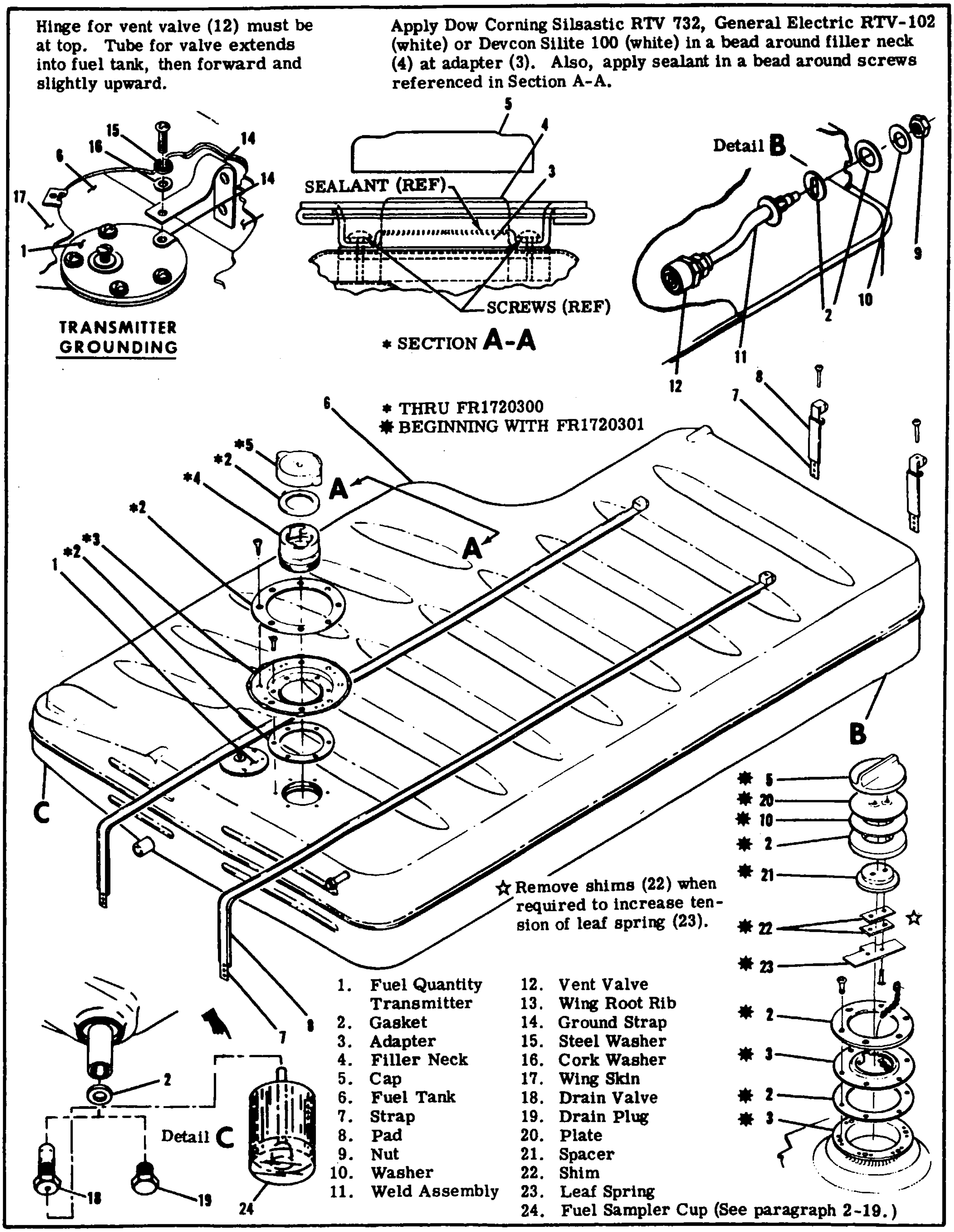
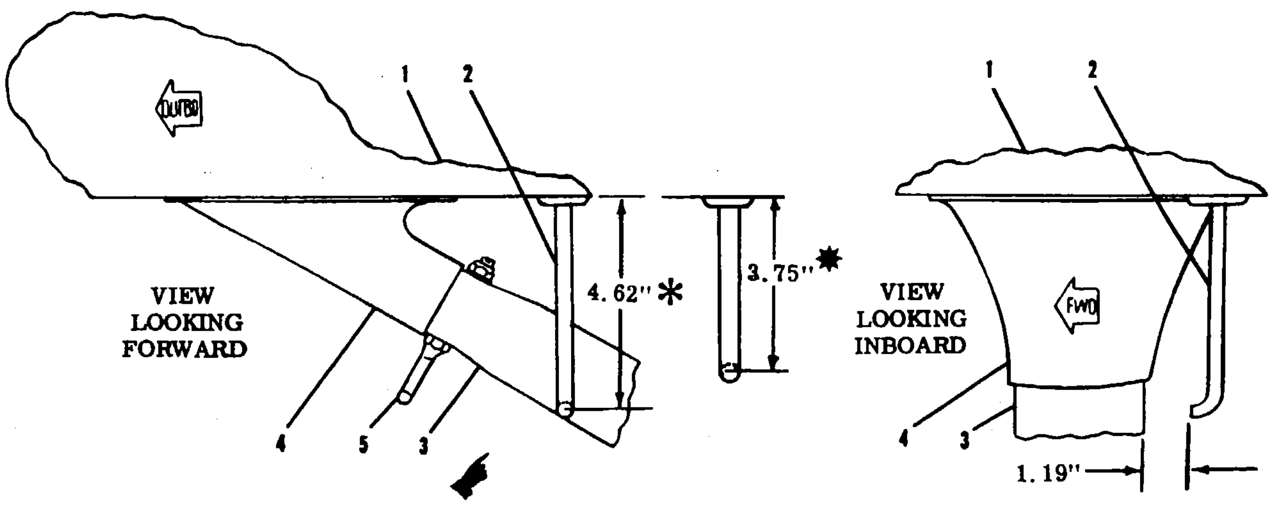


Figure 12-3. Fuel Tank



1. Wing
2. Vent
3. Strut
4. Fairing
5. Tie-Down Ring

* THRU FR1720350
✱ BEGINNING WITH FR1720351

Figure 12-4. Fuel Vent Location

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.

12-7. REMOVAL AND INSTALLATION. (See figure 12-3.)

a. Remove sump drain valves and drain fuel from applicable tank. (Observe precautions in paragraph 12-3.)

b. Remove fuel tank cover by removing attaching screws.

c. Remove wing root fairings.

d. Disconnect and plug or cap all fuel and vent lines from tank. Remove fittings as necessary for clearance when removing tank.

e. Disconnect electrical lead and ground strap from fuel quantity transmitter.

f. Disconnect straps securing fuel tank and remove tank. Use care to avoid damage to protruding fittings and hose connections.

g. Reverse the preceding steps for installation. Ensure transmitter is grounded 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. DELETED.

12-10. DELETED.

SHOP NOTES:

NOTE

Ensure transmitter is properly grounded in accordance with figure 12-3.

12-11. FUEL VENTS.

12-12. 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 the fuel tank, and a crossover vent line connects the two tanks for positive ventilation.

12-13. CHECKING. Field experience has demonstrated that the fuel vent can become plugged, with possible fuel starvation of the engine or collapse of fuel tanks. Also, the bleed hole in the vent valve assembly could possibly become plugged, allowing pressure from expanding fuel to pressurize the tanks. The following procedure may be used to check the vent and bleed hole in the valve assembly.

a. Attach a rubber tube to the end of vent line beneath the wing.

b. Blow into tube to slightly pressurize tank. If air can be blown into tank, vent line is open.

c. 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.

d. 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 pressurizing of tanks by fuel expansion.

e. Any fuel vent found plugged or restricted must be corrected prior to returning aircraft to service.

NOTE

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.

12-14. FUEL RESERVOIR TANK.

12-15. DESCRIPTION. A reservoir tank is installed in the lower fuselage area beneath the floor immediately forward of the copilot position. The tank has four fuel line connections; a fuel supply line from the selector valve, a supply line to the shut-off valve, a vapor return line from the engine and a vent line teed into the tank crossover vent line. A drain plug or valve is installed in the bottom of the tank for draining trapped water and sediment from the fuel system.

12-16. REMOVAL AND INSTALLATION. (See figure 12-2.)

a. Completely drain all fuel from wing tanks, fuel strainer, lines, reservoir tanks and selector valve. (Observe precautions in paragraph 12-3.)

b. Remove copilot's seat and carpeting as necessary to gain access to tank cover plate.

c. Remove access plate from floorboard.

d. Disconnect and cap or plug all fuel lines at tank.

e. Remove tank mounting bolt and screws and lift out tank.

f. Reverse the preceding steps for installation. Prior to reinstalling access plate, service fuel tanks and check for leaks.

12-17. FUEL SELECTOR VALVE.

12-18. DESCRIPTION. A three position fuel selector valve is located between the pilot and copilot positions on the pedestal. The positions on the valve are labeled "LEFT, BOTH ON and RIGHT." Valve repair consists of replacement of seals, springs, balls and other detail parts. Figure 12-5 illustrates the proper relationship of parts and may be used as a guide during disassembly and assembly.

12-19. REMOVAL AND INSTALLATION. (See figure 12-2.)

a. Completely drain all fuel from wing tanks, fuel strainer, lines, reservoir tank and selector valve. (Observe precautions in paragraph 12-3.)

b. Remove fuel selector valve handle.

c. Remove pedestal cover.

d. Remove carpeting as necessary to gain access to plates aft of pedestal and inboard of right front doorpost.

e. Disconnect handle drive shaft from valve.

f. Disconnect and cap or plug all fuel lines at valve.

g. Remove screws attaching valve to bracket and remove valve.

h. Reverse the preceding steps for installation. Prior to installing access plates, service fuel tanks and check for leaks.

12-20. FUEL SHUT-OFF VALVE.

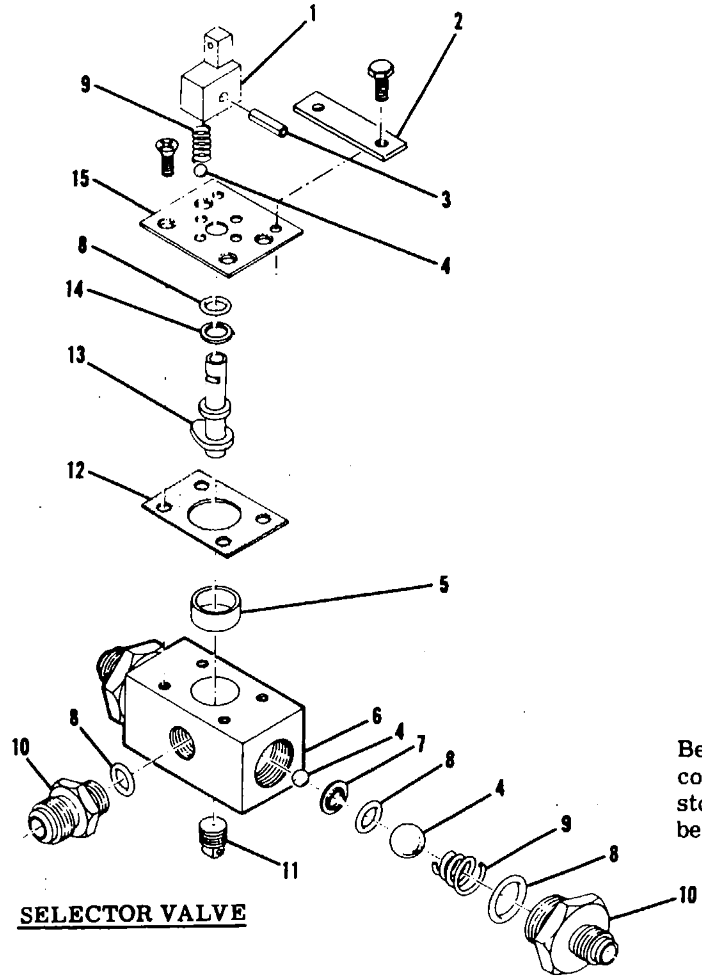
12-21. DESCRIPTION. Thru aircraft serials FR17200530, the fuel shut-off valve is a two position ON-OFF valve located in the lower fuselage area forward and inboard of the fuel reservoir tank. Beginning with aircraft serials FR17200531, the two position ON-OFF valve is mounted directly on the reservoir tank using an adapter. The valve control knob is located on the left lower instrument panel. Valve repair consists of replacement of seals, springs, balls and other detail parts. Figure 12-5 illustrates the proper relationship of parts and may be used as a guide during disassembly and assembly.

12-22. REMOVAL AND INSTALLATION. (See figure 12-2.)

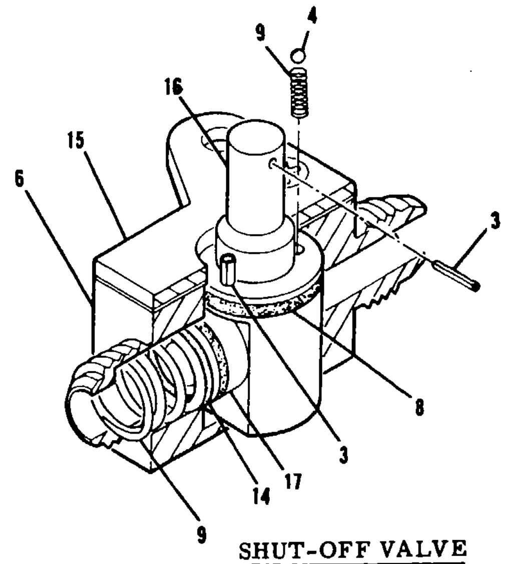
a. Completely drain all fuel from wing tanks, fuel strainer, lines, reservoir tank and selector valve.

b. Remove copilot's seat and carpeting as necessary to gain access to reservoir tank cover plate.

c. Remove access plate from floorboard.



SELECTOR VALVE



SHUT-OFF VALVE

NOTE

Be sure to install stop (2). The selector valve contains an OFF position that is not used. The stop prevents the selector valve handle from being turned to this unused position.

1. Housing	7. Retainer	12. Gasket
2. Stop	8. O-Ring	13. Cam
3. Roll Pin	9. Spring	14. Washer
4. Ball	10. Nipple	15. Cover
5. Bushing	11. Plug	16. Rotor
6. Body		17. Seal

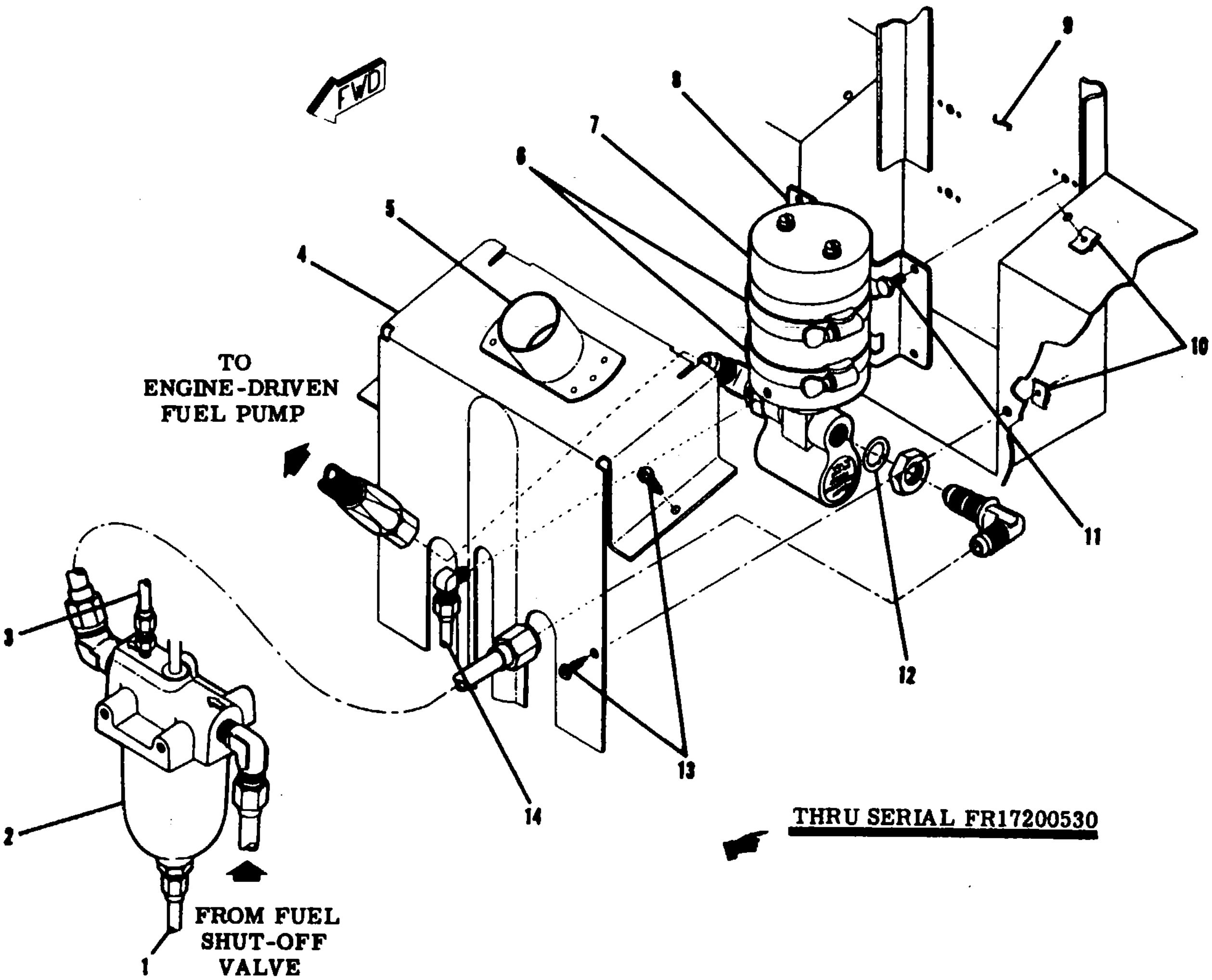
Figure 12-5. Fuel Selector and Shut-Off Valves

d. Disconnect shut-off valve control.
e. Disconnect and cap or plug all fuel lines at valve.
f. Remove valve mounting bolts.
g. Reverse the preceding steps for installation. Prior to reinstalling access plate, rig valve control, service fuel tanks and check for leaks.

12-23. AUXILIARY FUEL PUMP.

12-24. DESCRIPTION. Thru aircraft serial FR17200530, the auxiliary fuel pump, illustrated in figure 12-6, is mounted on the firewall and is enclosed by a cooling shroud. Beginning with aircraft serial FR17200531, the auxiliary fuel pump is located beneath the floorboard just to the left of the selector valve handle. An integral bypass and check valve permits fuel flow through the pump even when inoperative but prevents reverse flow. A separate overboard drain line from the pump prevents entry of fuel into the electric motor, in the event of an internal leak. The auxiliary pump is used in starting and in the event of engine-driven pump malfunction.

12-25. REMOVAL AND INSTALLATION. (THRU SERIAL FR17200530) (Refer to Figure 12-6.)
a. Remove cowling as necessary to gain access to pump.
b. With shut-off valve in "OFF" position, drain fuel from pump and lines with strainer quick-drain control. (Observe precautions in paragraph 12-3.)
c. Disconnect and cap or plug all fuel lines and electrical connections from pump.
d. Remove shroud attaching screws and remove shroud.
e. Loosen clamps securing pump and lift pump out.



1. Strainer Drain Line
2. Fuel Strainer
3. Primer Line
4. Shroud
5. Blast Hose Adapter
6. Clamp
7. Electric Fuel Pump
8. Bracket
9. Firewall
10. Nut
11. Bolt
12. O-Ring
13. Screw
14. Pump Drain Line

Figure 12-6. Auxiliary Fuel Pump and Strainer Drain Installation. (Sheet 1 of 2)

f. Reverse preceding steps for installation. With shut-off valve in "ON" position check for leaks and proper pump operation.

12-25A. REMOVAL AND INSTALLATION. (BEGINNING WITH SERIAL FR17200531) (Refer to Figure 12-6A.)

a. Remove pilot and copilot seats in accordance with Section 3.

b. Peel back carpet as required to expose pump access cover.

c. Place fuel shut-off valve in "OFF" position and drain as much fuel as possible from strainer bowl and associated lines using strainer drain control. (Observe precautions in paragraph 12-3.)

d. Disconnect and cap fuel lines to pump and remove electrical leads.

e. Loosen clamps securing pump and remove.

f. Reverse preceding steps for installation. With fuel shut-off valve to "ON" position check for leaks and proper aux pump operation.

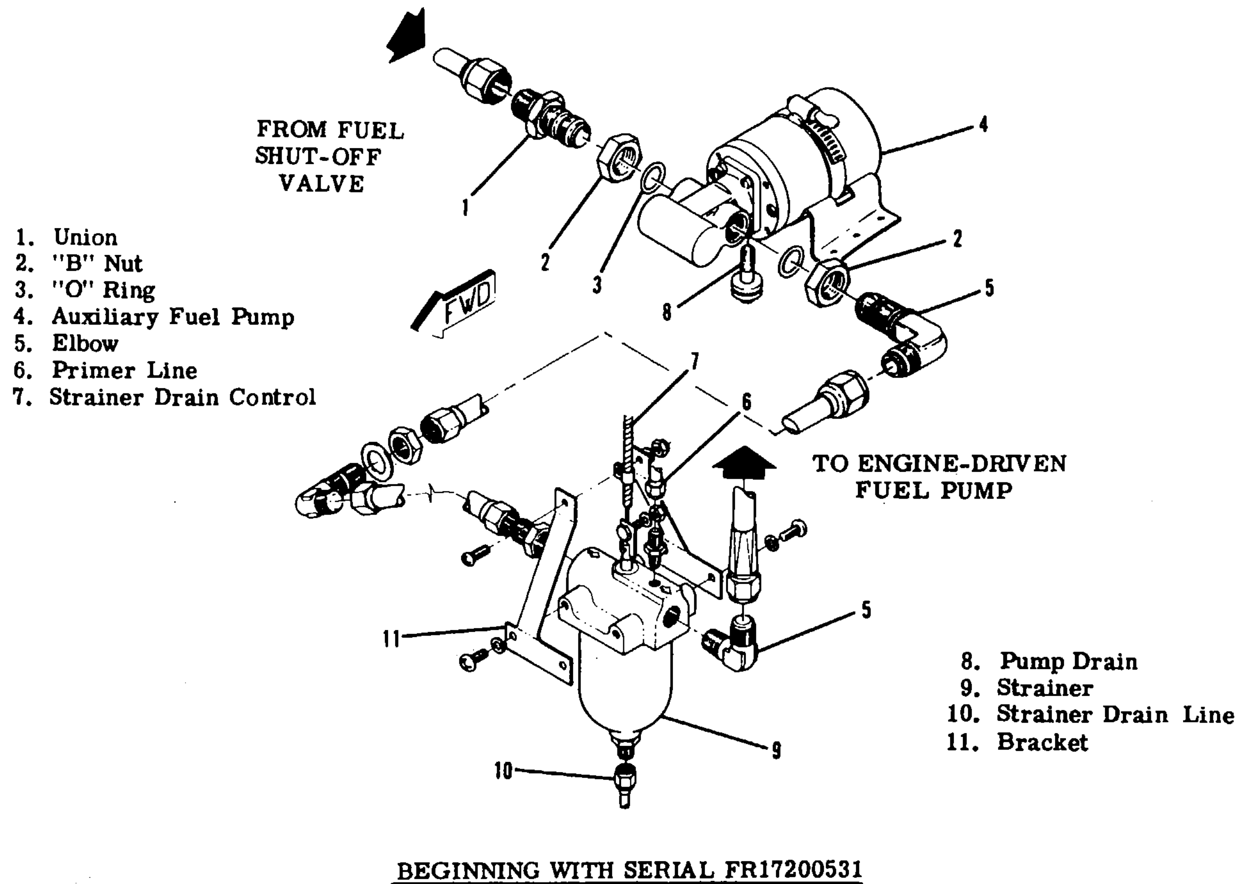


Figure 12-6. Auxiliary Fuel Pump and Strainer Drain Installation (Sheet 2 of 2)

12-26. ELECTRIC AUXILIARY FUEL PUMP CIRCUIT. (AIRCRAFT SERIALS FR17200001 THRU FR17200440 NOT MODIFIED BY SK172-41B) The electric auxiliary fuel pump, which supplies fuel flow for starting and for engine operation if the engine-driven fuel pump should fail, is controlled by the auxiliary fuel pump switch mounted on the instrument panel. The switch is a three-position toggle switch. The down position, labeled LOW, is used for starting the engine. With the switch in this position, the auxiliary fuel pump will operate at a low flow rate (providing the proper fuel mixture for starting) as the engine is being turned with the starter. The up position of the switch, labeled HI, is used for engine operation if the engine-driven fuel pump should fail, or for vapor purging in extremely hot weather. When the switch is in this position, the auxiliary fuel pump can operate at two flow rates depending on the setting of the throttle. With the throttle at a cruise setting, the auxiliary pump is operating at maximum capacity, supplying sufficient fuel flow to maintain flight with the engine-driven pump inoperative. When throttle is moved toward the closed position, as during letdown, landing, and taxiing, a mechanically actuated switch electrically reduces the auxiliary fuel pump flow rate by means of a resistor in the pump power circuit, at a predetermined throttle setting. This automatically prevents an excessively rich mixture during these periods of reduced engine speed. The auxiliary fuel pump is not to be turned on during normal operation because, with the engine-driven pump functioning, a fuel/air ratio considerably richer than best power is produced. If fuel vapor is affecting engine operation, the vapor may be purged by turning the auxiliary fuel pump switch to HI and leaning the mixture as required to prevent an excessively rich mixture. Successful vapor purging is evidenced by smooth engine operation and steady, normal fuel flow indications with the auxiliary fuel pump switch OFF. Refer to paragraph 12-26B for rigging of the throttle-operated microswitch.

NOTE

If the auxiliary fuel pump switch is turned on while the master switch is on but the engine is stopped, the intake manifolds will be flooded unless the mixture control is in IDLE CUT-OFF.

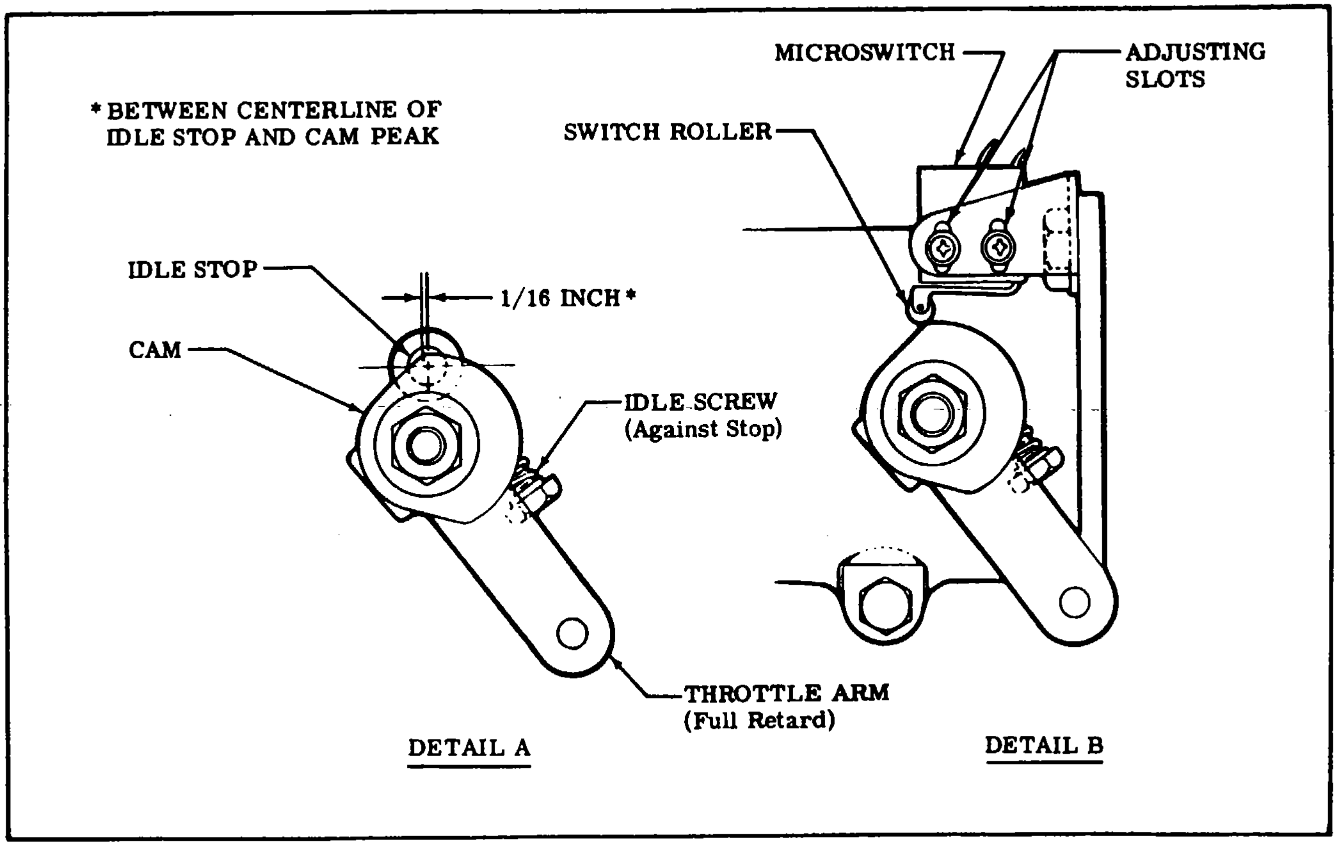


Figure 12-6A. Rigging Throttle Operated Microswitch

12-26A. ELECTRIC AUXILIARY FUEL PUMP CIRCUIT (BEGINNING WITH AIRCRAFT SERIALS FR17200441 AND ALL AIRCRAFT MODIFIED BY SK172-41B). The electric auxiliary fuel pump circuit used on these aircraft is similar to that described in paragraph 12-26 above as it will supply fuel flow for starting and engine operation if the engine-driven pump should fail. The auxiliary pump is controlled by a toggle-type, three position switch located on the lower left switch/circuit breaker panel. With the switch in the up position, labeled HI, the auxiliary fuel pump operates at maximum output.

NOTE

The switch is spring-loaded to OFF from the HI position and must therefore be held in HI to obtain maximum output.

The HI position is used for engine starting for vapor purging in very hot weather and for engine operation with a failed engine-driven pump during takeoff or other very high power operations.

The down position of the auxiliary fuel pump switch, labeled LOW, operates the pump at one of two possible speeds depending on the throttle position. With the throttle at a cruise setting and the auxiliary fuel pump switch in the LOW position, sufficient fuel flow is provided for cruise flight operation with a failed engine-driven fuel pump. When the throttle is moved toward the closed position, the auxiliary fuel pump flow rate is automatically reduced preventing an excessively rich mixture during periods of low engine power operation. With the switch in the LOW position, the pump will supply sufficient flow for vapor suppression during taxi and flight operations in hot climates.

NOTE

If the auxiliary fuel pump switch is turned on while the master switch is on but the engine is stopped, the intake manifolds will be flooded unless the mixture control is in IDLE CUT-OFF.

12-26B. RIGGING THROTTLE OPERATED MICROSWITCH. (Refer to Figure 12-6A.) The aircraft electric auxiliary fuel pump circuit is equipped with a microswitch which operates on a cam attached to the throttle arm of the fuel-air control unit. The cam on the throttle arm actuates the microswitch as the throttle is retarded to a manifold pressure of approximately 18 inches of mercury and hence reduces the speed of the auxiliary fuel pump by introducing a resistor or resistors into the circuit. Rig the microswitch as follows:

a. Perform an initial adjustment of cam and microswitch as follows:

1. Close throttle and adjust cam as shown in detail "A" of figure 12-6A.

2. Refer to detail "B" of figure 12-6A and set microswitch to actuate on the peak of the cam and to de-actuate on the flat portion of the cam. Make sure roller arm of switch actuator clears switch body in actuated position.

b. Start engine and set throttle to obtain approximately 18 inches manifold pressure. Mark this position on throttle control rod. Shut down engine.

c. Set engine controls as follows:

1. Mixture Control - IDLE CUT-OFF.

2. Auxiliary Fuel Pump Switch - HI. (Aircraft Serials FR1720001 thru FR17200440 NOT modified by SK172-41B) - LOW (Aircraft serials beginning with FR17200441 and ALL aircraft modified by SK172-41B).

3. Throttle - FULL OPEN.

4. Master Switch - ON.

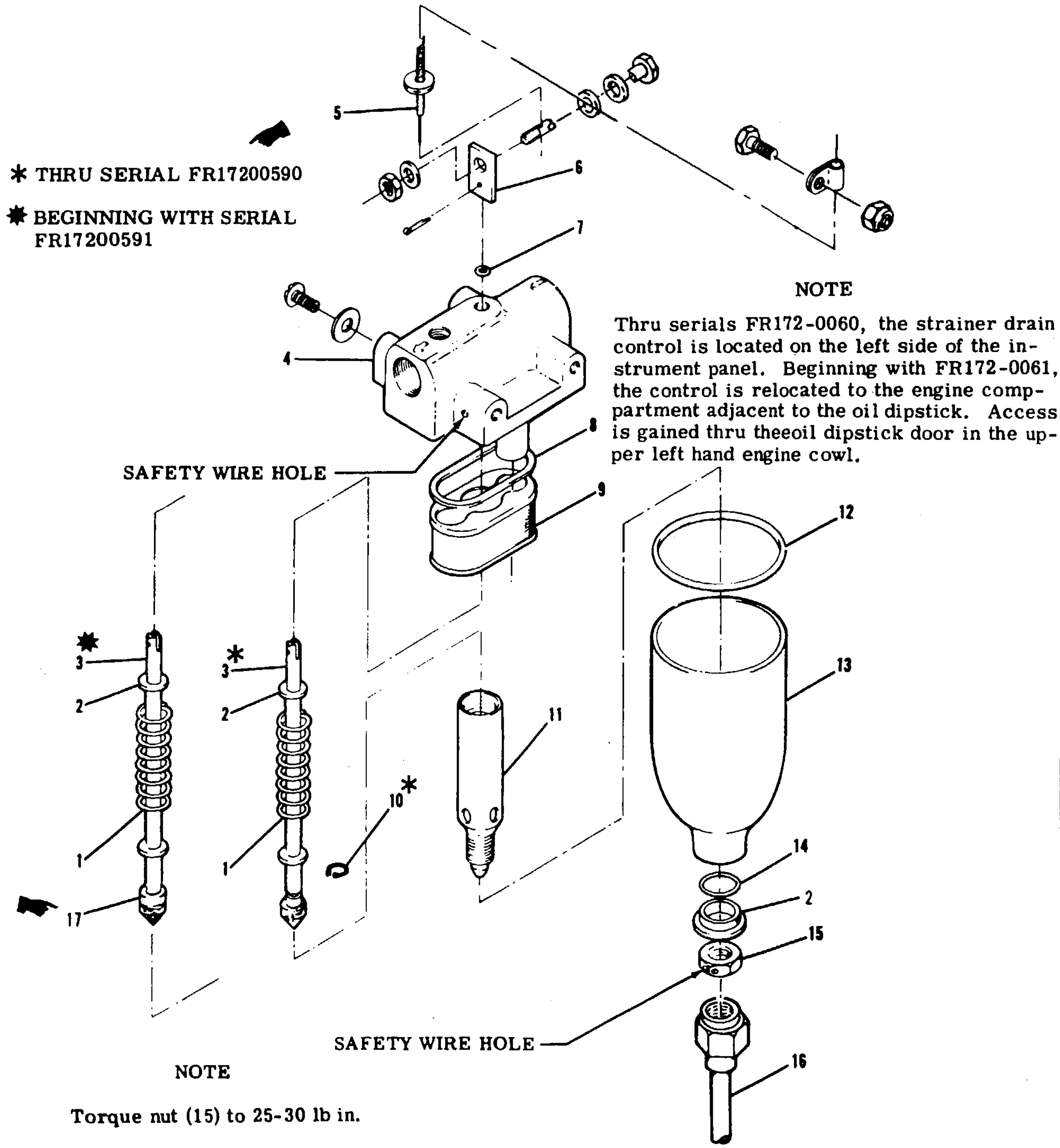
d. Close throttle until mark made in step b appears. At this position the microswitch should actuate and the auxiliary fuel pump should slow down audibly.

e. Adjust microswitch as required to cause auxiliary fuel pump motor to slow down as throttle is closed to marked position.

f. Return all controls to OFF position.

12-26C. AUXILIARY FUEL PUMP FLOW RATE ADJUSTMENT. Refer to NOTES of the appropriate serialized auxiliary fuel pump wiring diagram in Section 19 for this adjustment.

SHOP NOTES:



1. Spring	5. Drain Control	9. Filter	13. Bowl
2. Washer	6. Plate	10. Retainer Ring	14. O-Ring
3. Plunger	7. O-Ring	11. Standpipe	15. Nut
4. Top	8. Gasket	12. O-Ring	16. Drain Line
			17. Collar

Figure 12-7. Fuel Strainer

operation and steady and normal fuel flow indications with the auxiliary fuel pump switch OFF. Refer to Section 11 for rigging of the microswitch.

NOTE

If the auxiliary fuel pump switch is accidentally turned on (while master switch is on) with the engine stopped, intake manifolds will be flooded unless the mixture is in idle cut-off.

12-27. FUEL STRAINER.

12-28. DESCRIPTION. The fuel stainer is mounted on the firewall in the 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. Access to the drain control is made through the oil dipstick cowling door.

NOTE

The fuel strainer can be disassembled, cleaned and reassembled without removing the assembly from the aircraft. (Refer to paragraph 12-30.)

12-29. REMOVAL AND INSTALLATION. (See figure 12-6.)

a. Remove cowling as necessary to gain access to strainer.

b. With shut-off valve in "OFF" position, drain fuel from strainer and lines with strainer quick-drain control.

c. Disconnect and cap or plug all fuel lines and controls from strainer. (Observe precautions in paragraph 12-3.)

d. Remove bolts attaching assembly to firewall and remove strainer.

e. Reverse the preceding steps for installation. With shut-off valve in "ON" position check for leaks and proper operation of quick-drain valve.

12-30. DISASSEMBLY AND ASSEMBLY.

a. With shut-off valve in "OFF" position, drain fuel from bowl and lines with quick-drain control.

b. Remove drain tube, safety wire, nut and washer at bottom of filter bowl and remove bowl.

c. Carefully unscrew standpipe and remove.

d. Remove filter screen and gasket. Wash filter screen and bowl with solvent (Federal Specification P-S-661, or equivalent) and dry with compressed air.

e. Using a new gasket between filter screen and top assembly, install screen and standpipe. Tighten standpipe only finger tight.

f. 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.

g. With shut-off valve in "ON" position, check for leaks and proper operation of quick-drain valve.

h. Safety wire bottom nut to top assembly. Wire must have right hand wrap, at least 45 degrees.

12-31. PRIMING SYSTEM.

12-32. DESCRIPTION. The priming system is comprised of a plunger-type manually-operated primer, which draws fuel from the strainer and forces it through a tee fitting to the front end of each intake manifold. Injecting the fuel into each manifold primes both banks of cylinders.

12-33. REMOVAL AND INSTALLATION.

a. With shut-off valve in "OFF" position, drain fuel from strainer and lines with quick-drain control.

b. Disconnect and cap or plug all fuel lines at primer. (Observe precautions in paragraph 12-3.)

c. Unscrew knurled nut and remove plunger from pump body.

d. Remove pump body from instrument panel.

NOTE

Visually inspect primer lines for crushed, kinked, or broken condition. Ensure proper clamping to prevent fatigue due to vibration and chafing.

e. Prior to installing a primer, check for proper pumping action and positive fuel shut-off in the locked position.

f. Reverse the preceding steps for installation. With shut-off valve in "ON" position, check for leaks and proper pumping action.

SHOP NOTES:

SECTION 13

PROPELLERS AND PROPELLER GOVERNORS

TABLE OF CONTENTS Page

13-1. PROPELLERS.

13-2. DESCRIPTION. The aircraft is equipped with an all-metal, constant-speed, governor-regulated propeller. The constant-speed propeller is single-acting, in which engine oil pressure, boosted and regulated by the governor is used to obtain the correct blade pitch for the engine load. Engine lubricating oil is supplied to the power piston in the propeller hub through the crankshaft. The amount and pressure of the oil supplied is controlled by the engine-driven governor. An increase or decrease in throttle setting or a change in aircraft attitude will affect the balance which maintains a given RPM. If the throttle is opened further or if aircraft speed is increased, engine RPM will try to increase. The governor senses this and directs oil pressure to the forward side of the piston. The blades will be moved to a higher pitch and engine speed will remain constant. Conversely, if the throttle opening or the aircraft speed is decreased, the engine RPM will try to decrease. The governor senses this and allows oil to drain from the forward side of the piston. Spring tension and centrifugal twisting moment will move the blades to a lower pitch to maintain the selected engine speed. Beginning with aircraft serial FR172-0226, a different propeller spinner bulkhead is used. This bulkhead is attached by six lugs which must be removed before the bulkhead can be removed from the crankshaft flange. Beginning with aircraft serial FR17200351, a new threadless blade propeller is installed. With this type blade, the propeller balance weights are moved to a bracket nearer the center line of the propeller. Figure 13-1 illustrates the different propellers used on the aircraft.

13-3. REPAIR. Metal propeller repair first involves evaluating the damage and determining whether the repair will 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 repairs or alterations to a propeller FAR 43, FAA AC No. 43.13 and the propeller manufacturer's instructions must be observed.

13-4. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
FAILURE TO CHANGE PITCH.	Governor control disconnected or broken.	Check visually. Connect or replace control.
	Governor not correct for propeller. (Sensing wrong.)	Check that correct governor is installed. Replace governor.
	Defective governor.	Refer to paragraph 13-9.
	Defective pitch changing mechanism inside propeller or excessive propeller blade friction.	Propeller repair or replacement is required.
FAILURE TO CHANGE PITCH FULLY.	Improper rigging of governor control.	Check that governor control arm and control have full travel. Rig control and arm as required.
	Defective governor.	Refer to paragraph 13-9.
SLUGGISH RESPONSE TO PROPELLER CONTROL.	Excessive friction in pitch changing mechanism inside propeller or excessive blade friction.	Propeller repair or replacement is required.
STATIC RPM TOO HIGH.	Governor high RPM stop set too high.	Refer to paragraph 13-12.
	Defective governor.	Refer to paragraph 13-9.
	Incorrect propeller or incorrect low pitch blade angle.	Check aircraft specification and install correct propeller with correct blade angle.
STATIC RPM TOO LOW.	Governor high RPM stop set too low.	Refer to paragraph 13-12.
	Defective governor.	Refer to paragraph 13-9.
	Incorrect propeller or incorrect low pitch blade angle.	Check aircraft specification and install correct propeller with correct blade angle.
ENGINE SPEED WILL NOT STABILIZE.	Sludge in governor.	Refer to paragraph 13-9.
	Air trapped in propeller actuating cylinder.	Trapped air should be purged by exercising the propeller several times prior to take-off after propeller has been reinstalled or has been idle for an extended period.
	Excessive friction in pitch changing mechanism inside propeller or excessive blade friction.	Propeller repair or replacement is required.
	Defective governor.	Refer to paragraph 13-9.

13-4. TROUBLE SHOOTING (Cont.)

TROUBLE	PROBABLE CAUSE	REMEDY
OIL LEAKAGE AT PROPELLER MOUNTING FLANGE.	Damaged O-ring and seal between engine crankshaft flange and propeller.	Check visually. Remove propeller and install O-ring seal.
	Foreign material between engine crankshaft flange and propeller mating surfaces or mounting nuts not tight.	Remove propeller and clean mating surfaces; install new O-ring and tighten mounting nuts evenly to torque value in figure 13-1.
OIL LEAKAGE AT ANY OTHER PLACE.	Defective seals, gaskets, threads, etc., or incorrect assembly.	Propeller repair or replacement is required.

13-5. REMOVAL. (Refer to figure 13-1.) Thru aircraft serial FR17200225, the propeller (5), spinner (1) and bulkhead (8) may be removed as a complete unit. Beginning with aircraft serial FR172-00226, the spinner (1) must be removed before propeller removal can be accomplished.

a. Remove spinner attaching screws and remove spinner (1).

b. Loosen all mounting nuts (11) approximately 1/4 inch and pull propeller (5) forward until stopped by nuts.

NOTE

As the propeller (5) is separated from the engine crankshaft flange, oil will drain from the propeller and engine cavities.

c. Remove all propeller mounting nuts (11) and washers (10).

d. Pull propeller forward to remove from engine crankshaft (9).

e. If desired, the spinner bulkhead (8) can be removed by removing bolts and nuts attaching lugs (14) to bulkhead. Note direction of lugs (14) and lug attaching bolts (13).

13-6. INSTALLATION.

a. If spinner bulkhead (8) was removed, position bulkhead so the propeller blades will emerge from the spinner (1) with ample clearance and install spinner bulkhead attaching lugs (14) and bolts (13).

CAUTION

Avoid scraping metal from bore of spinner bulkhead and wedging scrapings between engine flange and propeller. Trim the inside diameter of the bulkhead as necessary when installing a new spinner bulkhead.

b. Clean propeller hub cavity and mating surfaces of propeller and crankshaft.

c. Lightly lubricate a new O-ring (7) and the crankshaft pilot with clean engine oil and install the O-ring in the propeller hub.

d. Align propeller mounting studs (12) and dowel pins (6) with proper holes in engine crankshaft flange and slide propeller carefully over crankshaft pilot until mating surfaces of propeller and crankshaft flange are approximately 1/4 inch apart.

e. Install propeller attaching washers (10) and nuts (11) and work propeller aft as far as possible, then tighten nuts evenly and torque to 660-780 lb-in.

f. Install spinner (1).

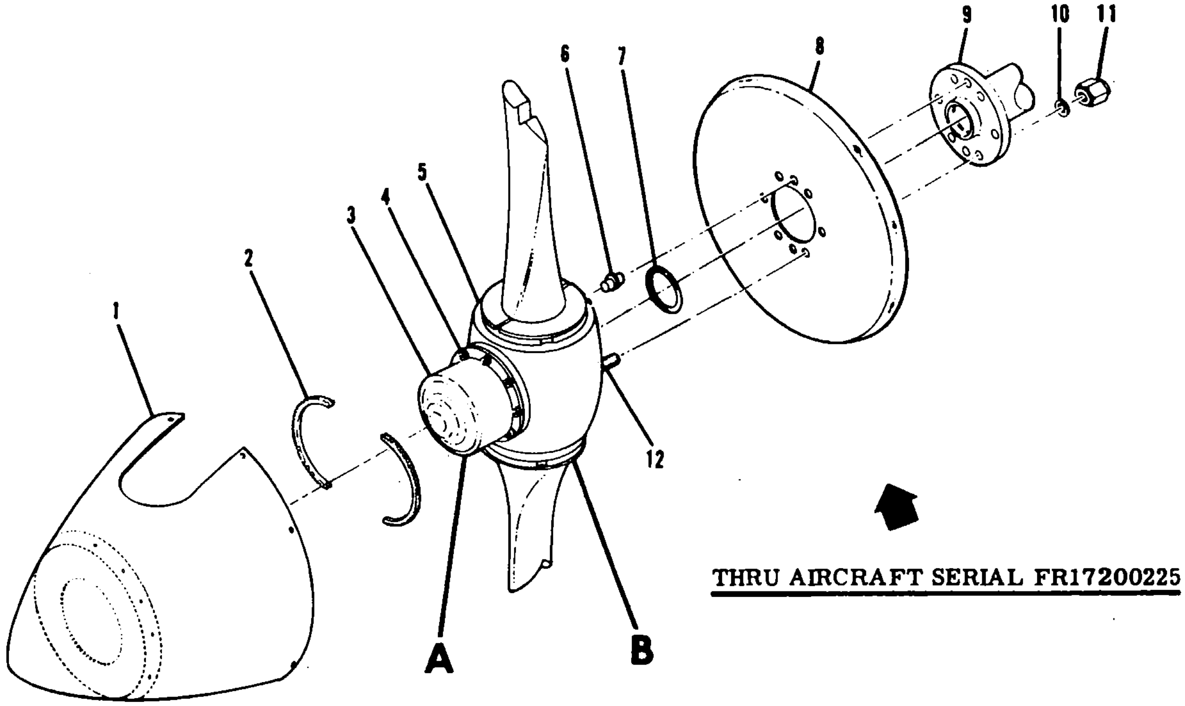
13-6A. TIME BETWEEN OVERHAUL (TBO). Propeller governor overhaul shall coincide with engine overhaul, but interval between overhauls of the propeller shall not exceed 1200 hours. Refer to Section 11 for engine time between overhaul (TBO) periods.

13-7. PROPELLER GOVERNORS.

13-8. DESCRIPTION. The propeller governor is a single-acting, centrifugal type, which boosts oil pressure from the engine and directs it to the propeller where the oil is used to increase blade pitch. A single-acting governor uses oil pressure to effect a pitch change in one direction only; a pitch change in the opposite direction results from a combination of centrifugal twisting moment of rotating blades and compressed springs. Oil pressure is boosted in the governor by a gear type oil pump. A pilot valve, fly weight and speeder spring act together to open and close governor oil passages as required to maintain a constant engine speed.

NOTE

Outward physical appearance of specific governors is the same, but internal parts



TORQUE PROPELLER MOUNTING NUTS (11)
EVENLY TO 660 - 780 POUND-INCHES

1. Spinner
2. Grommet
3. Cylinder
4. Screw
5. Propeller
6. Dowel Pin
7. O-Ring
8. Spinner Bulkhead
9. Engine Crankshaft
10. Washer
11. Mounting Nut
12. Stud
13. Bolt
14. Lug
15. Nut
16. Tube
17. Safety Wire
18. Ring
19. Balance Weight
20. Balance Weight Bracket

NOTE

With number 1 piston on top dead center, position propeller with centerline of blades vertical.

Figure 13-1. Propeller Installation (Sheet 1 of 2)

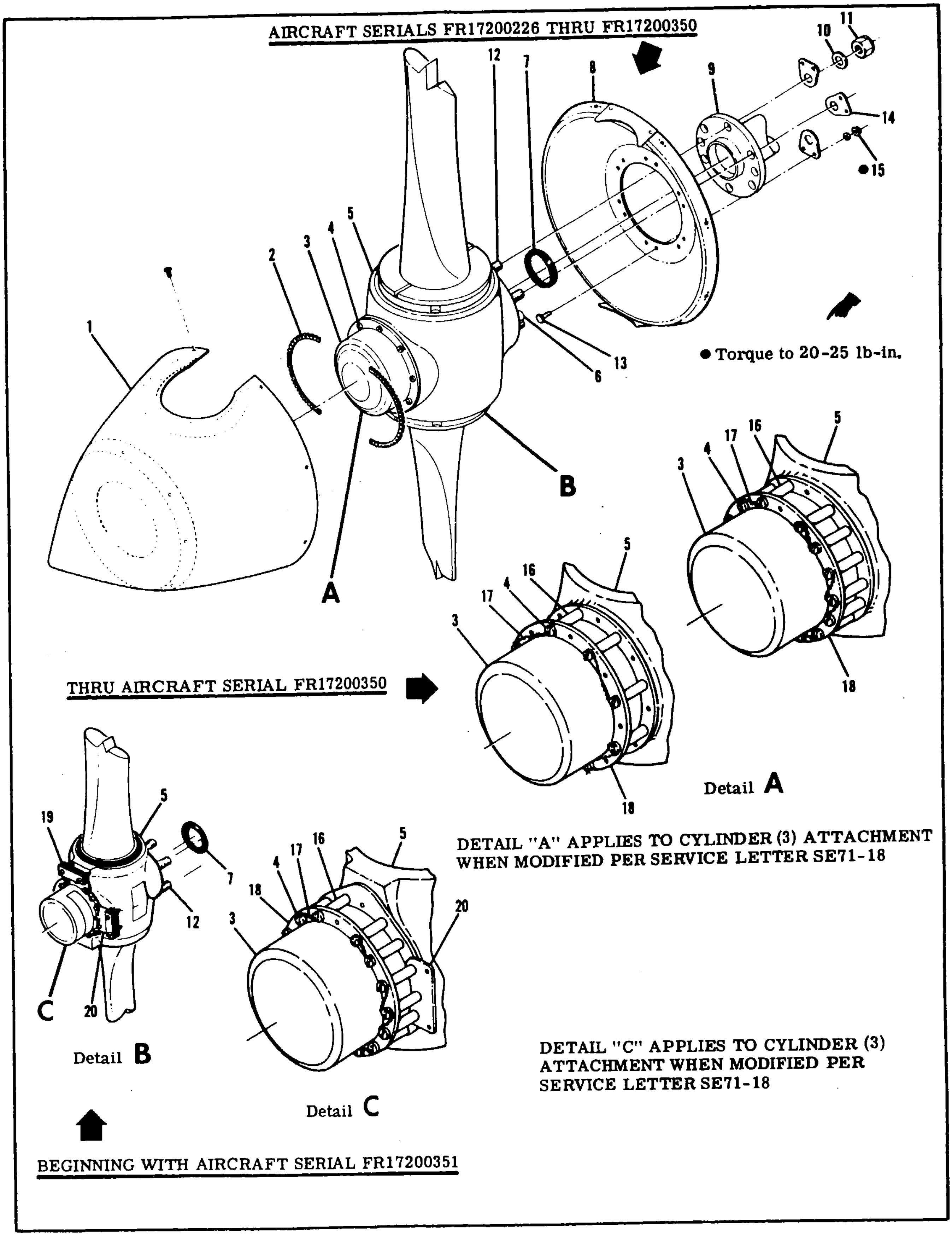
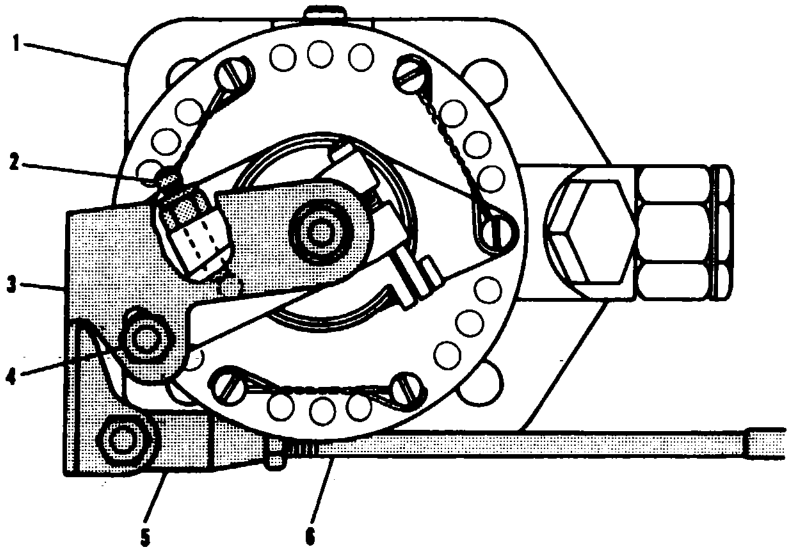


Figure 13-1. Propeller Installation (Sheet 2 of 2)



1. Propeller Governor
2. High Speed Stop Screw
3. Governor Arm Extension
4. Nut
5. Control Rod End
6. Governor Control

Figure 13-2. Governor and Controls Adjustments

determine whether it uses oil pressure to increase or decrease blade pitch. The propellers used on these aircraft require governors which "sense" in a certain manner. "Sensing" is determined by the type pilot valve installed inside the governor. Since the basic governor may be set to "sense" oppositely, it is important to ascertain that the governor is correct for the propeller being used.

13-9. TROUBLE SHOOTING. When trouble shooting the propeller-governor combination, it is recommended that a governor known to be in good condition be installed to check whether the propeller or the governor is at fault. Removal and replacement, rigging, high-speed stop adjustment, desludging and replacement of the governor mounting gasket are not major repairs and may be accomplished in the field. Repairs to propeller governors are classed as propeller major repairs in Federal Aviation Regulations, which also define who may accomplish such repairs.

13-10. REMOVAL.

a. Remove cowling and engine baffles as required for access to governor.

b. Disconnect governor control from governor extension arm.

NOTE

Note EXACT position of all washers so that washers may be installed in the same position on reinstallation.

c. Remove four sets of nuts and washers securing governor to engine and pull governor from mounting studs.

d. Remove gasket from between governor and engine mounting pad.

13-11. INSTALLATION.

a. Wipe governor and engine mounting pad clean.

b. Install a new gasket on the mounting studs. Install gasket with raised surface of the gasket screen toward the governor.

c. Position governor on mounting studs, aligning governor drive splines with splines in the engine and install mounting nuts and washers. Do not force spline engagement. Rotate engine crankshaft slightly and splines will engage smoothly when properly aligned.

d. Connect governor control to governor arm extension and rig control as outlined in paragraph 13-13.

e. Reinstall all items removed for access.

13-12. HIGH RPM STOP ADJUSTMENT.

a. Remove engine cowling and baffles as required for access.

b. Remove safety wire and loosen the high-speed stop screw locknut.

c. Turn the stop screw IN to decrease maximum RPM and OUT to increase maximum RPM. One full turn of the stop screw causes a change of approximately 25 RPM.

d. Tighten stop screw locknut, safety wire stop screw and make propeller control linkage adjustment as necessary to maintain full travel.

e. Install baffles and cowling.

f. Test operate propeller and governor.

NOTE

It is possible for either the propeller low pitch (high RPM) stop or the governor high RPM stop to be the high RPM limiting factor. It is desirable for the governor stop to limit the high RPM at the maximum rated RPM for a particular aircraft. Due to climatic conditions, field elevation, low-pitch blade angle and other considerations, an engine may not reach rated RPM on the ground. It may be necessary to readjust the governor stop after test flying to obtain maximum rated RPM when airborne.

13-13. RIGGING PROPELLER GOVERNOR CONTROL.

CAUTION

The propeller control has a small retaining ring brazed (or attached with epoxy resin) near the threaded end (engine end) of the control. The purpose of this retaining ring is to prevent inadvertent withdrawal and possible damage to the knob end of the control while jam nuts and rod end is removed.

a. Disconnect governor control from governor extension arm.
b. Place propeller governor control, in cabin, full forward, then pull back approximately 1/8 inch. This will allow "cushion" to assure full contact of the governor arm with the governor high RPM stop screw.
c. Place governor arm against high RPM stop screw.
d. Loosen jam nut and adjust control rod end until attaching holes align while governor arm is against high RPM stop screw. Be sure to maintain sufficient thread engagement of the control and rod end. If necessary, shift control in the clamps to achieve this.
e. Attach rod end to the governor arm extension. Be sure all washers are installed correctly.
f. Operate the control to see that the governor arm bottoms out against the low pitch stop and bottoms out against the high pitch stop on the governor before reaching the end of control cable travel.

NOTE

The governor is equipped with an offset extension to the governor arm. The offset extension has an elongated slot to permit further adjustment. The preceding steps may still be used as an outline in the rigging procedure. The result of rigging, in all cases, is full travel of the governor arm (bottom out against both high and low pitch stops) with some "cushion" at both ends of control travel.

13-14. TIME BETWEEN OVERHAUL (TBO). Propeller governor overhaul shall coincide with engine overhaul, but interval between overhauls shall not exceed 1800 hours. Refer to Section 11 for engine time between overhaul (TBO) periods. The governor overhaul manual is available from the Cessna Service Parts Center.

SHOP NOTES:

SECTION 14

UTILITY SYSTEMS

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14-1. UTILITY SYSTEMS.

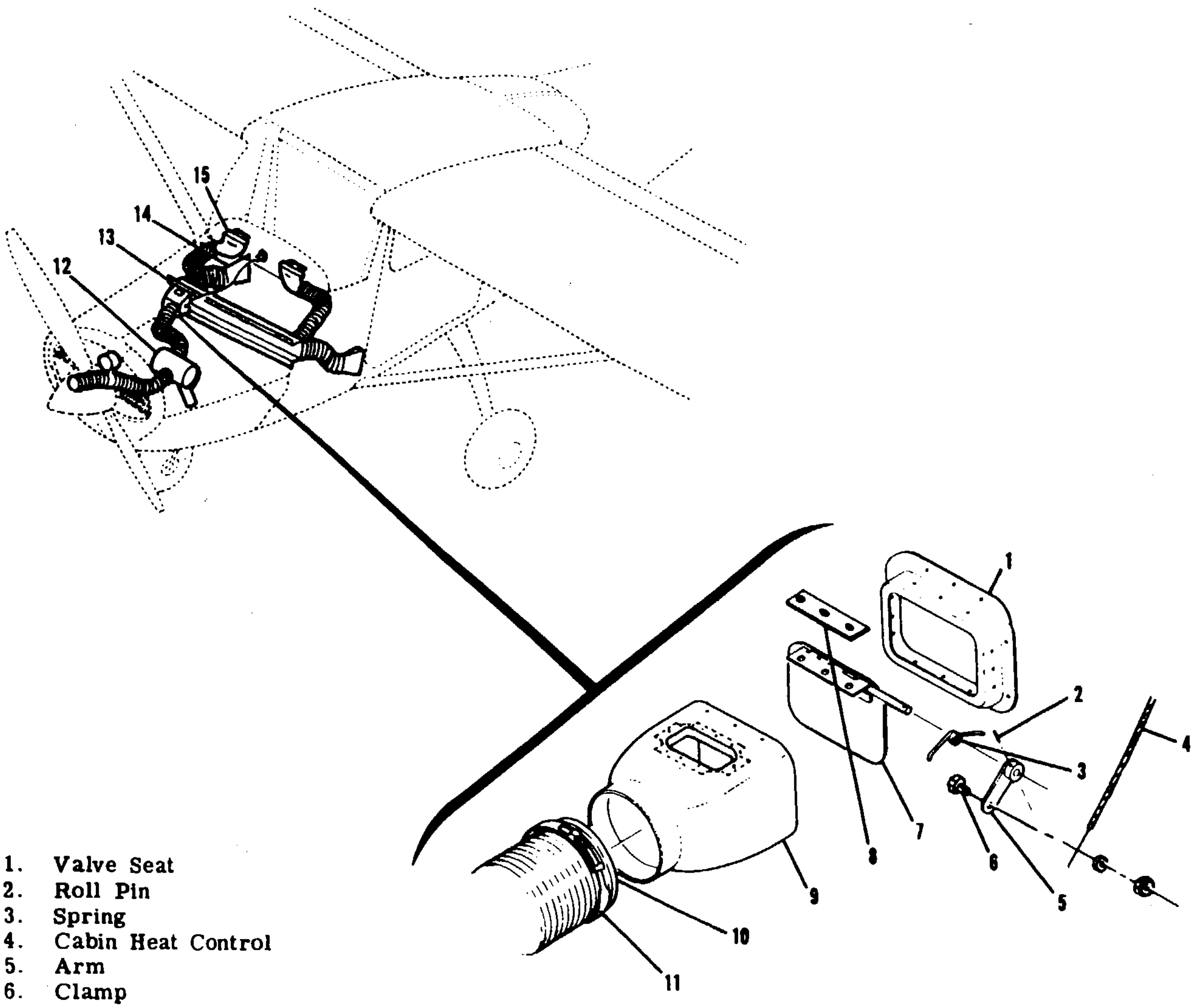
14-2. HEATING SYSTEM.

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. 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 HEAT," 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.

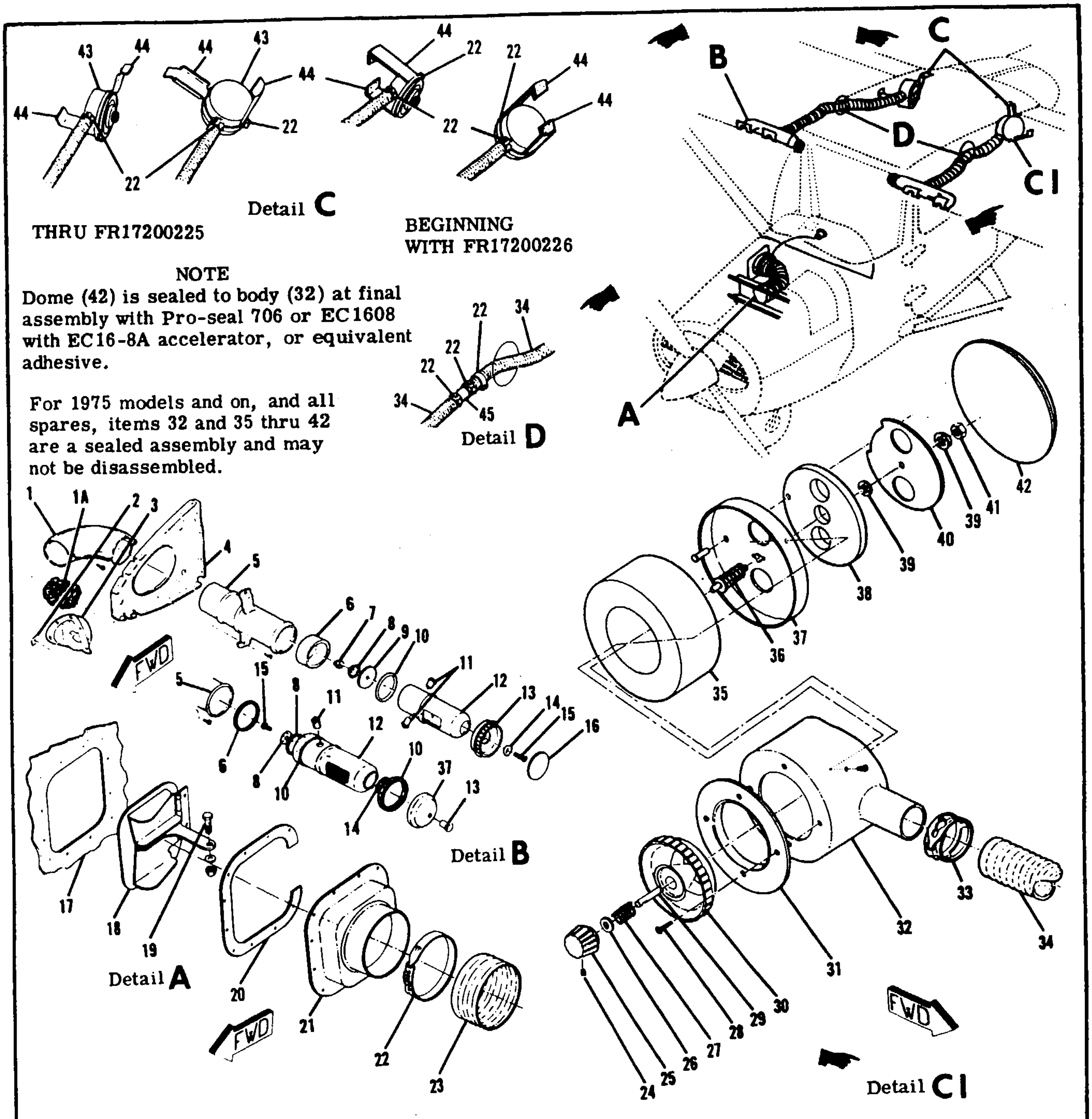
14-5. TROUBLE SHOOTING. Most of the operational troubles in the heating, defrosting, and ventilating systems are caused by sticking or binding air valves and their controls, damaged air ducting, or defects in the exhaust muffler. In most cases, valves or controls can be freed by proper lubrication. Damaged or broken parts must be repaired or replaced. When checking controls, ensure 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 hose are properly secured, and replace hose 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 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, INSTALLATION AND REPAIR. Figure 14-1 illustrates the heating and defrosting systems, and may be used as a guide during removal, installation and repair of heating system components. Burned, frayed, or crushed hose must be replaced with new hose, cut to length and installed in the original routing. Trim hose winding shorter than the hose to allow clamps to be fitted. Defective air valves must be repaired or replaced. Check for proper operation of valves and their controls after repair or replacement.



1. Valve Seat
2. Roll Pin
3. Spring
4. Cabin Heat Control
5. Arm
6. Clamp
7. Valve Plate
8. Shim
9. Valve Body
10. Hose
11. Clamp
12. Muffler
13. Firewall Duct
14. Outlet
15. Defroster Nozzle

Figure 14-1. Heating and Defrosting System



1. Elbow Assembly
1A. Filter Element
2. Nutplate
3. Air Scoop
4. Rib
5. Tube Assembly
6. Seal
7. Nut
8. Washer
9. Washer
10. Seal
11. Bullet Catch
12. Outlet Assembly
13. Knob
14. Washer
15. Screw
16. Insert
17. Fuselage Skin
18. Air Vent Door
19. Clamp Bolt
20. Seal
21. Inlet
22. Clamp
23. Hose
24. Setscrew
25. Volume Knob
26. Washer
27. Spring
28. Screw
29. Shaft
30. Directional Knob
31. Escutcheon
32. Valve Body
33. Clamp
34. Hose
35. Insulator
36. Spring
37. Cap
38. Seal
39. Star Washer
40. Plate
41. Nut
42. Dome
43. Silencer
44. Bracket
45. Tube

Figure 14-2. Ventilating Systems

14-7. DEFROSTER SYSTEM.

14-8. DESCRIPTION. The defrosting system is comprised of a duct across the aft side of the firewall, defroster outlets, mounted on the left and right sides of the cowl deck immediately aft of the windshield, and flexible ducting connecting the system.

14-9. OPERATION. Air from the duct across the aft side of the firewall flows through flexible ducts to the defroster outlets. The temperature and volume of this air is controlled by the settings of the heater system control.

14-10. TROUBLE SHOOTING. Since the defrosting system depends on proper operation of the heating system, refer to paragraph 14-5 for trouble shooting the heating and defrosting system.

14-11. REMOVAL, INSTALLATION AND REPAIR. Figure 14-1 may be used as a guide for removal, installation and repair of defrosting system components. Cut hose to length and install in the original routing. Trim hose winding shorter than the hose to allow clamps to be fitted. Defective defroster outlets must be repaired or replaced.

14-12. VENTILATING SYSTEM.

14-13. DESCRIPTION. The ventilating system is comprised of two airscoops mounted in the inboard leading edge of each wing, a manually-adjustable ventilator installed on each side of the cabin near the upper corners of the windshield, two plenum chambers mounted in the rear cabin wing root areas, a fresh airscoop door on the right side of the fuselage just forward of the copilot's seat, a control knob on the instrument panel and flexible ducting connecting the system.

14-14. OPERATION. Air received from scoops mounted in the inboard leading edges of the wings is ducted to adjustable ventilators mounted on each side of the cabin near the upper corners of the windshield. Rear seat ventilation is provided by plenum chambers mounted in the left and right rear cabin wing root areas. These plenum chambers receive ram air from the airscoops in the inboard leading edges of the wings. Each plenum chamber is equipped with a valve which meters the incoming cabin ventilation air. This provides a chamber of expansion of cabin air which greatly reduces inlet air noise. Filters at the air inlets are primarily noise reduction filters. Forward cabin ventilation is provided by a fresh airscoop door mounted on the right side of the fuselage, just forward of the copilot seat. The scoop door is operated by a control in the instrument panel marked "CABIN AIR." Fresh air from the scoop door is routed to the duct across the aft side of the firewall, where it is distributed into the cabin. As long as the "CABIN HEAT" control is pushed in, no heated air can enter the firewall duct; therefore, when the "CABIN AIR" control is pulled out, only fresh air from the scoop will flow through the duct into the cabin. As the "CABIN HEAT" 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.

14-15. TROUBLE SHOOTING. Most of the operational troubles in the ventilating system are caused by sticking or binding of the inlet scoop door or its control. Check the 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 cabin air. The filters may be removed to increase air flow. However, their removal will cause a slight increase in noise level.

14-16. REMOVAL, INSTALLATION AND REPAIR. Figure 14-2 may be used as a guide for removal, installation and repair of the ventilating system components. A defective ventilator or scoop must be repaired or replaced. Check for proper operation of ventilating controls after installation or repair.

SHOP NOTES:

SECTION 15

INSTRUMENTS AND INSTRUMENT SYSTEMS

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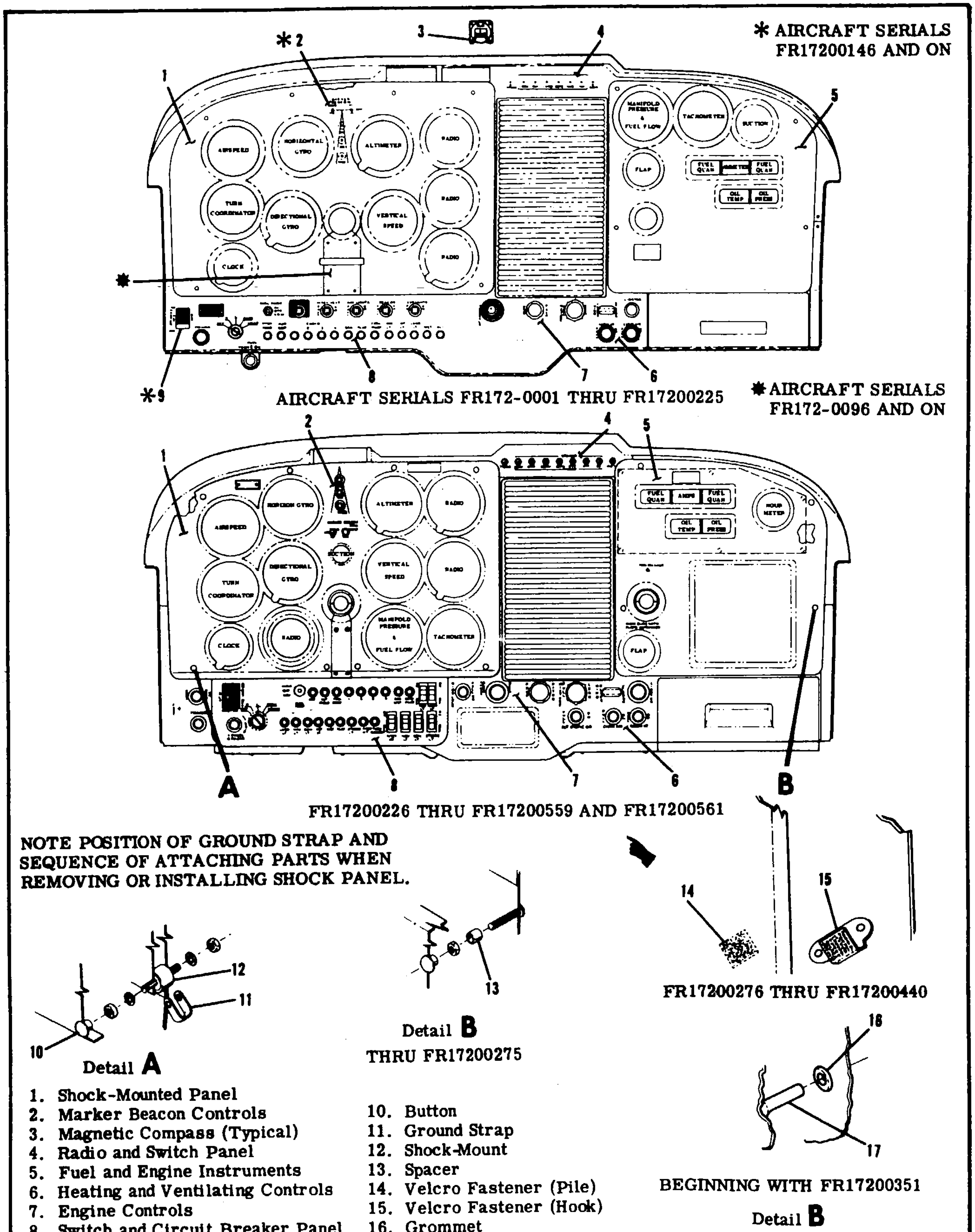
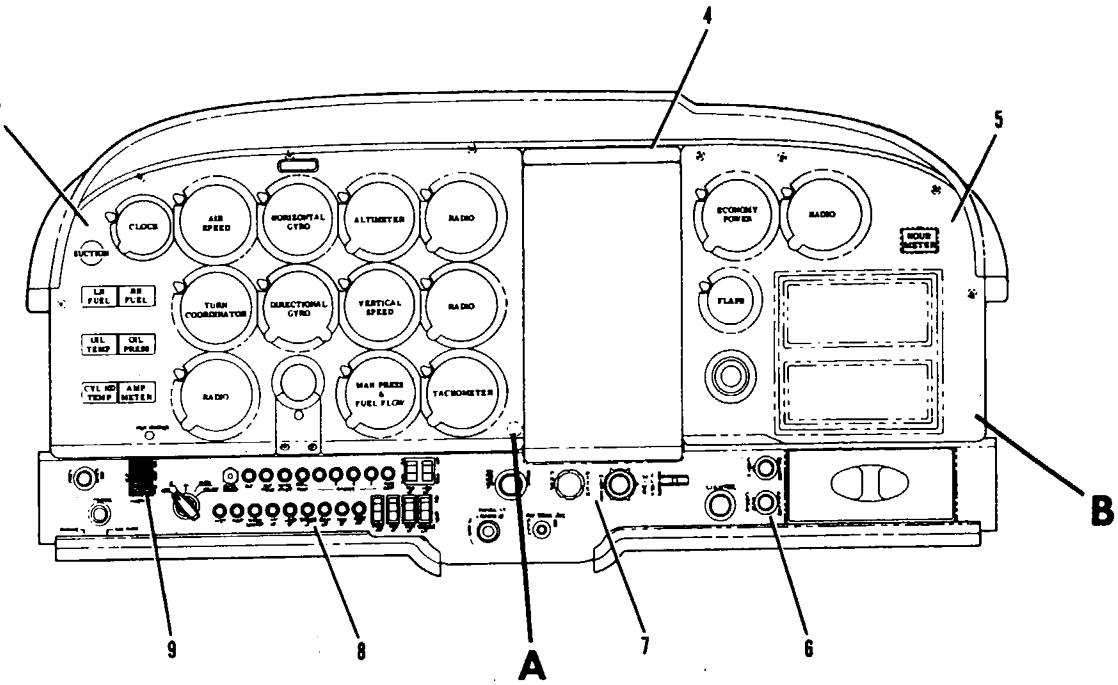
15-1. INSTRUMENTS AND INSTRUMENT SYSTEMS.

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 be sent to an approved instrument overhaul and repair station or returned to manufacturer for servicing. Our concern here is with preventive maintenance on various instrument systems 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 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.



1. Shock-Mounted Panel
2. Marker Beacon Controls
3. Magnetic Compass (Typical)
4. Radio and Switch Panel
5. Fuel and Engine Instruments
6. Heating and Ventilating Controls
7. Engine Controls
8. Switch and Circuit Breaker Panel
9. Split-Master Switch
10. Button
11. Ground Strap
12. Shock-Mount
13. Spacer
14. Velcro Fastener (Pile)
15. Velcro Fastener (Hook)
16. Grommet
17. Pin

Figure 15-1. Typical Instrument Panel (Sheet 1 of 2)



BEGINNING WITH FR17200560 AND FR17200562

Figure 15-1. Typical Instrument Panel (Sheet 2 of 2)

SHOP NOTES:

15-3. INSTRUMENT PANEL. (Refer to figure 15-1.)

15-4. DESCRIPTION. The instrument panel assembly consists of a stationary and shock-mounted panel. The stationary panel contains fuel and engine instruments, which are NOT sensitive to vibration. The shock-mounted panel contains major flight instruments such as horizontal and directional gyros which ARE affected by vibration. Most of the instruments are screw-mounted on the panels.

15-5. REMOVAL AND INSTALLATION. 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 the shock-mounted panel proceed as follows:

a. Remove left control wheel and tube assembly by removing bolt at universal joint. (Aircraft serials FR172-0001 thru FR172-0095.)

b. Thru 1971 Models unscrew threaded buttons securing decorative covers, 1972 and 1973 Models Velcro Fasteners are used. Beginning with 1973 Models a pin and grommet arrangment is used.

c. Remove nuts from shock-mounts, tag and disconnect instrument wiring and plumbing and pull panel straight back.

d. Reverse preceding steps for installation. Ensure ground strap is properly installed.

15-6. SHOCK-MOUNTS. Service life of instruments is directly related to adequate shock-mounting of the panel. If removal of panel is necessary, check mounts for deterioration.

15-7. INSTRUMENTS. (Refer to figure 15-1.)

15-8. REMOVAL. Most instruments are secured to panel with screws inserted through panel face. To remove an instrument, remove decorative cover, disconnect wiring or plumbing to 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.

NOTE

Thru FR17200559 and FR17200561 the clusters are located above the glove box. For simpler cluster removal remove glove box first.

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.

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 Cessna Service Parts Center.

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. (Refer to figure 15-2 and 15-2A.)

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 static ports. A static line sump is installed at each source button to collect condensation in static system. A pitot tube heater may be installed. The heating element is controlled by a switch at the 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 Owner's Manual for flight operations 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. Seal one static source port with pressure sensitive tape. This seal must be air tight.

d. Close static pressure alternate source control, if installed.

e. Attach a source of suction to static pressure source opening. Figure 15-3 shows one method of obtaining suction.

f. Slowly apply suction until altimeter indicates a 1000-foot increase in altitude.

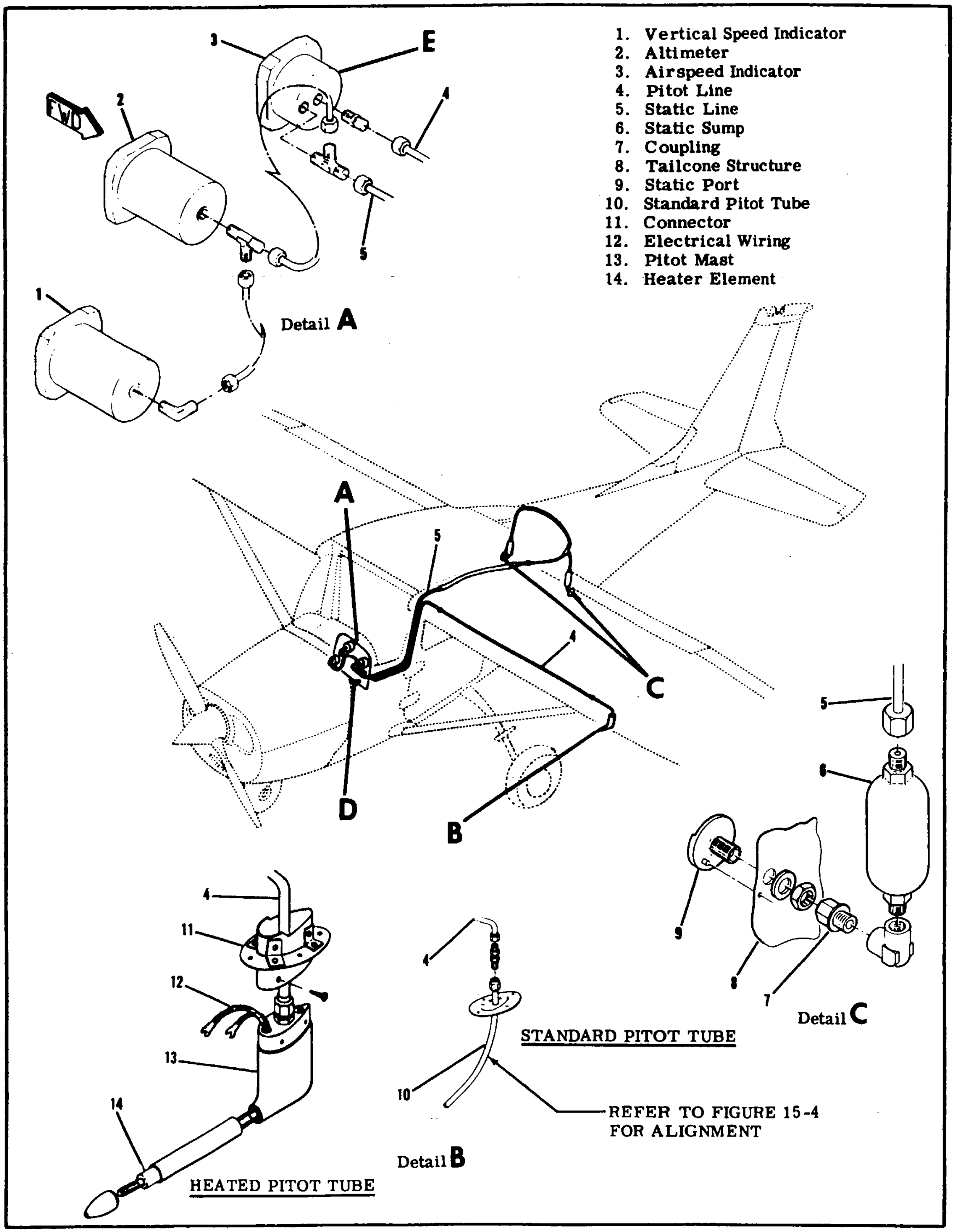
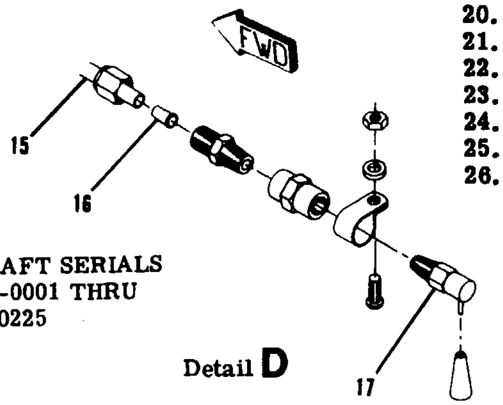


Figure 15-2. Pitot-Static Systems (Sheet 1 of 3)

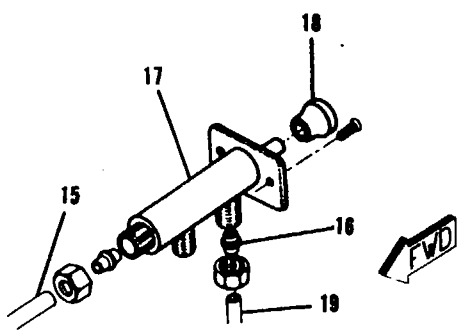
15. Alternate Static Line (to Instruments)
16. Insert
17. Valve
18. Knob
19. Static Line (to Sump)
20. True Airspeed Indicator
21. Spacer
22. Instrument Panel
23. True Airspeed Ring
24. Retainer
25. Mounting Screw
26. Decorative Cover



AIRCRAFT SERIALS
FR172-0001 THRU
FR1720225

Detail D

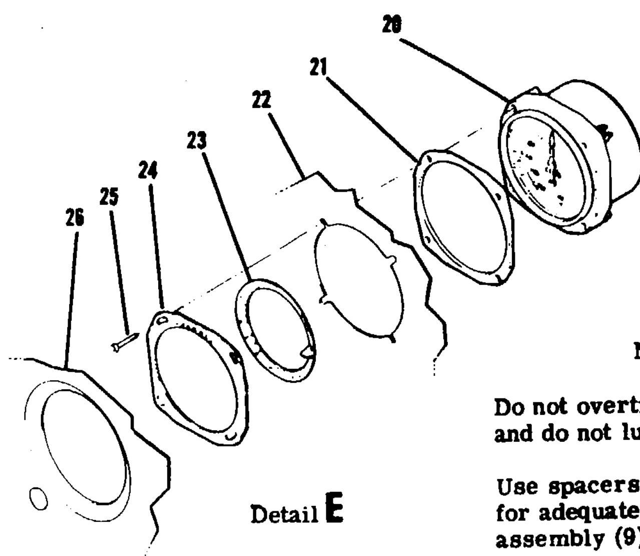
ALTERNATE STATIC SOURCE VALVE



AIRCRAFT SERIALS
FR1720226 AND ON

Detail D

TRUE AIRSPEED INDICATOR



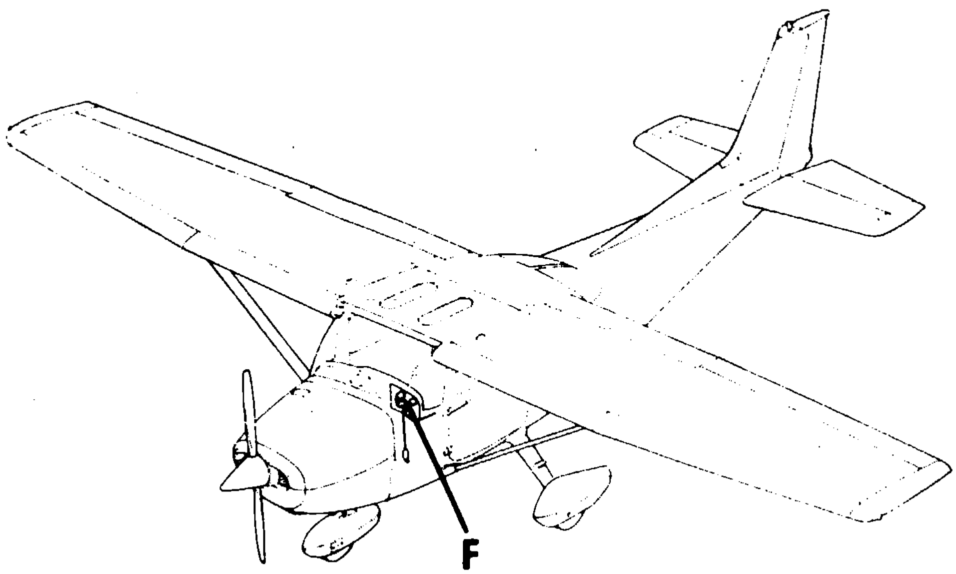
Detail E

NOTE

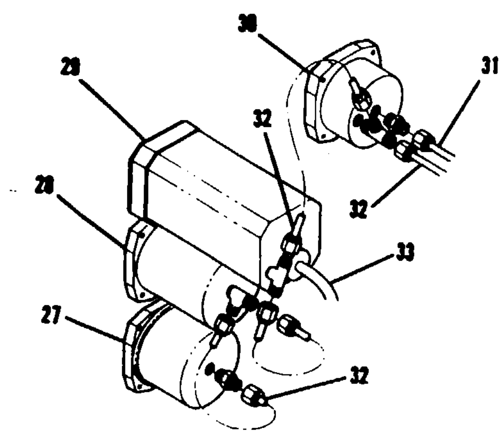
Do not overtighten screws (11) and do not lubricate any parts.

Use spacers (7) as required for adequate friction on ring assembly (9).

Figure 15-2. Pitot-Static Systems (Sheet 2 of 3)



ENCODING ALTIMETER INSTALLATION



Detail F

27. Backup Altimeter
28. Vertical Speed Indicator
29. Encoding Altimeter
30. Airspeed Indicator
31. Pitot Line
32. Static Line
33. Cable (To Transponder)

Figure 15-2. Pitot-Static Systems (Sheet 3 of 3)

CAUTION

When applying or releasing suction, do not exceed range of vertical speed indicator or airspeed indicator.

g. 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.
h. If leakage rate is within tolerance, slowly release suction source and remove tape from static port.

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.

i. 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.
j. 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.
k. 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.

l. 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 LEAK-TEC or a solution of mild soap and water, watching for bubbles to locate leaks.
m. Tighten leaking connections. Repair or replace parts found defective.
n. Reconnect airspeed and vertical speed indicators into static pressure system and repeat leakage test per steps "c" thru "h".

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 a leak in system, check all connections for tightness.

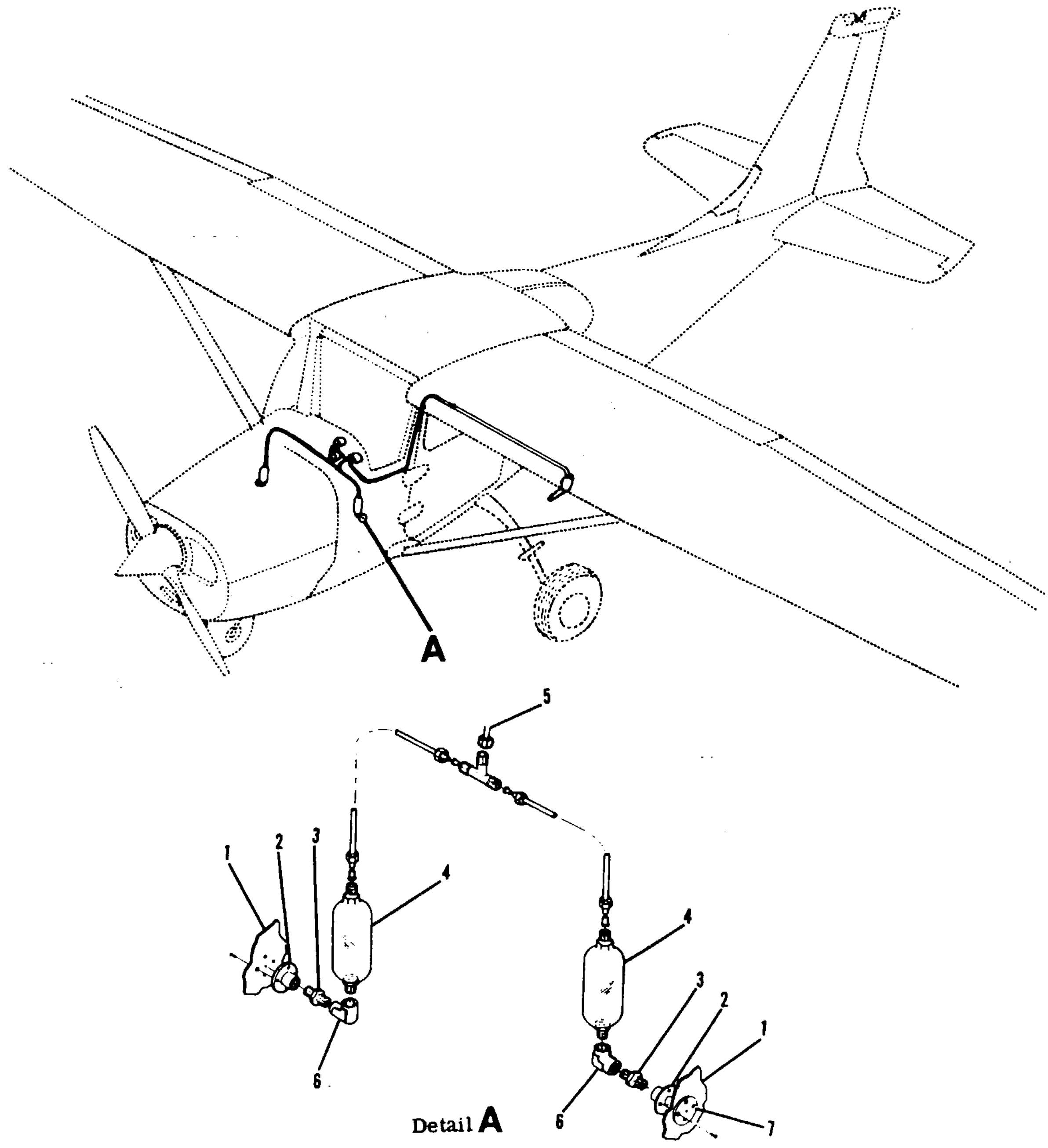
15-15. BLOWING OUT LINES. Although pitot system is designed to drain down to pitot tube opening, condensation may collect at other points in system and produce a partial obstruction. To clear line, disconnect at airspeed indicator. Using low pressure air, blow from indicator end of line toward pitot tube.

CAUTION

Never blow through pitot or static lines toward instruments.

Like pitot lines, static pressure lines must be kept clear and connections tight. Static source sumps collect 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 have cracked, hardened or show other signs of deterioration.

15-16. REMOVAL AND INSTALLATION OF COMPONENTS. (Refer to figure 15-2 and 15-2A) To remove pitot mast, remove four mounting screws on side of connector (11) and pull mast out of connector far enough to disconnect pitot line (4). 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 intact by drawing it out through cabin and right door. When replacing components of pitot and static pressure systems, use anti-seize compound sparingly on male threads on both metal and plastic connections. Avoid excess compound which might enter lines. 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.



BEGINNING WITH 1973 MODELS

1. Fuselage Skin
2. Adaptor
3. Nipple
4. Sump
5. Line (To Instruments)
6. Elbow
7. Button

15-2A. Pitot-Static System

15-17. TROUBLE SHOOTING--PITOT STATIC SYSTEM.

TROUBLE	PROBABLE CAUSE	REMEDY
LOW OR SLUGGISH AIRSPEED 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.

15-18. TRUE AIRSPEED INDICATOR. A true airspeed indicator may be installed. This indicator, equipped with a conversion ring, may be rotated until pressure altitude is aligned with outside air temperature, then airspeed indicated on instrument is read as true airspeed on adjustable ring. Refer to figure 15-2, sheet 2 for removal and installation. Upon installation, before tightening mounting screws (11), calibrate instrument as follows: Rotate ring (9) until 120 mph on adjustable ring aligns with 120 mph on indicator. Holding this setting, move retainer (10) until 60° F aligns with zero pressure altitude, then tighten mounting screws (11) and replace decorative cover (12).

NOTE

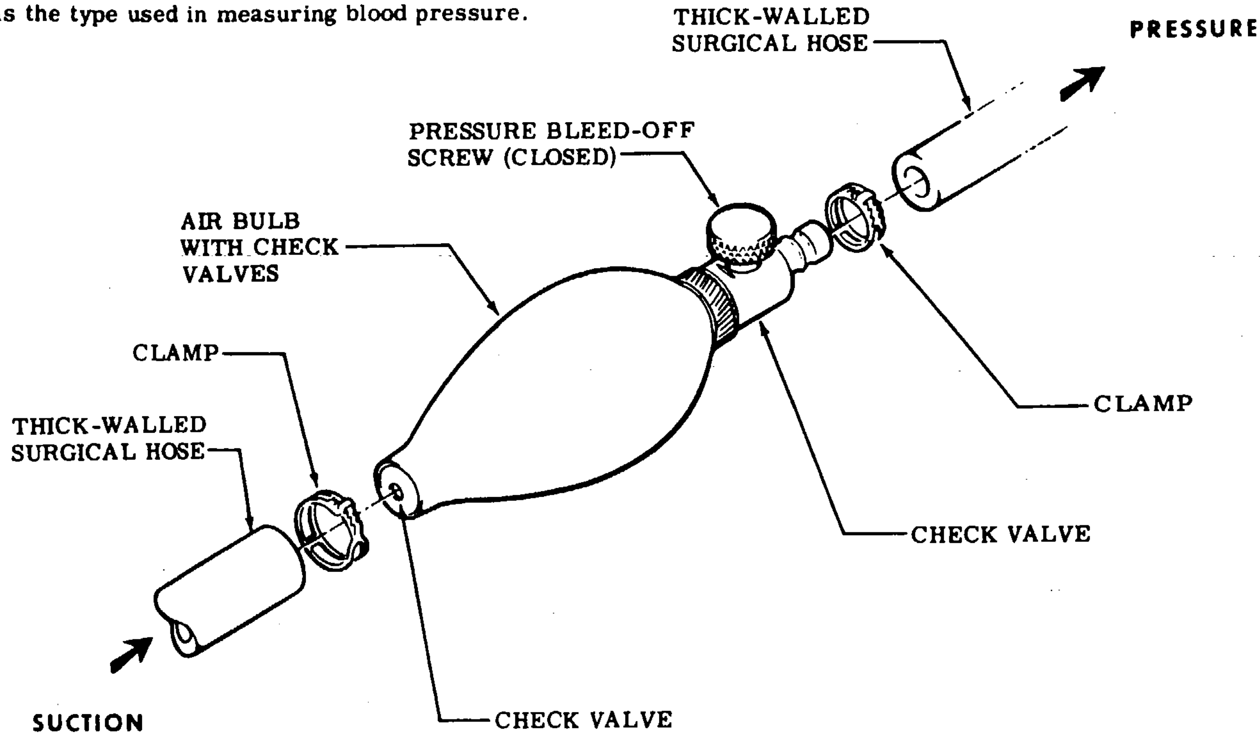
Beginning with aircraft serials FR17200560 and FR17200562, true airspeed indicators are graduated in knots. Therefore, use 105 knots instead of 120 miles per hour in the above calibration procedure.

15-19. 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.

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

15-20. 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.

15-21. 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. Reset pointer to zero.
POINTER OSCILLATES.	Partially plugged static line.	Check line for obstructions. Blow out lines.

15-21. TROUBLE SHOOTING -- VERTICAL SPEED INDICATOR. (Cont.)

TROUBLE	PROBABLE CAUSE	REMEDY
POINTER OSCILLATES (CONT).	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.

15-22. TROUBLE SHOOTING - PITOT TUBE HEATER.

TROUBLE	PROBABLE CAUSE	REMEDY
TUBE DOES NOT HEAT OR CLEAR ICE.	Switch turned "OFF."	Turn switch "ON."
	Popped circuit breaker.	Check visually. Reset breaker.
	Break in wiring.	Test for open circuit. Repair wiring.
	Heating element burned out.	Check resistance of heating element. Replace element.

15-23. PITOT TUBE ALIGNMENT. (Refer to figure 15-2, sheet 1.) For correct airspeed indication, pitot tube (10) must be properly aligned. Open end of tube must be perpendicular to longitudinal axis of aircraft. A template like the one shown in figure 15-4 will prove the most convenient means of checking alignment. Prior to using template, check that pitot tube parallels the row of rivets just outboard of tube. A straightedge may be placed along the row of rivets to check alignment. The template fits over wing leading edge and should conform to the illustration. The illustration has been drawn carefully to actual size and may be traced directly on a sheet of stiff plastic, plywood or metal. Place a piece of carbon paper between printed page and template material, then trace contours.

15-24. VACUUM SYSTEM. (Refer to figure 15-5.)

15-25. DESCRIPTION. Suction to operate the gyros is provided by an engine-driven vacuum pump, gear-driven through a spline-type coupling. The FR172, through aircraft serial FR172-0440, utilized a wet system in which the air discharges into an oil separator after lubricating the pump, then is expelled overboard. Beginning with aircraft serial FR172-0441, a dry-type pump, which requires no separator, is utilized. A suction relief valve, to control system pressure, is connected between the pump inlet and the instruments. In the cabin, the vacuum line is routed from gyro instruments to the relief valve at the firewall. A central air filtering system is utilized. On some later model FR172 aircraft, a disposable type air filter is utilized. 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.

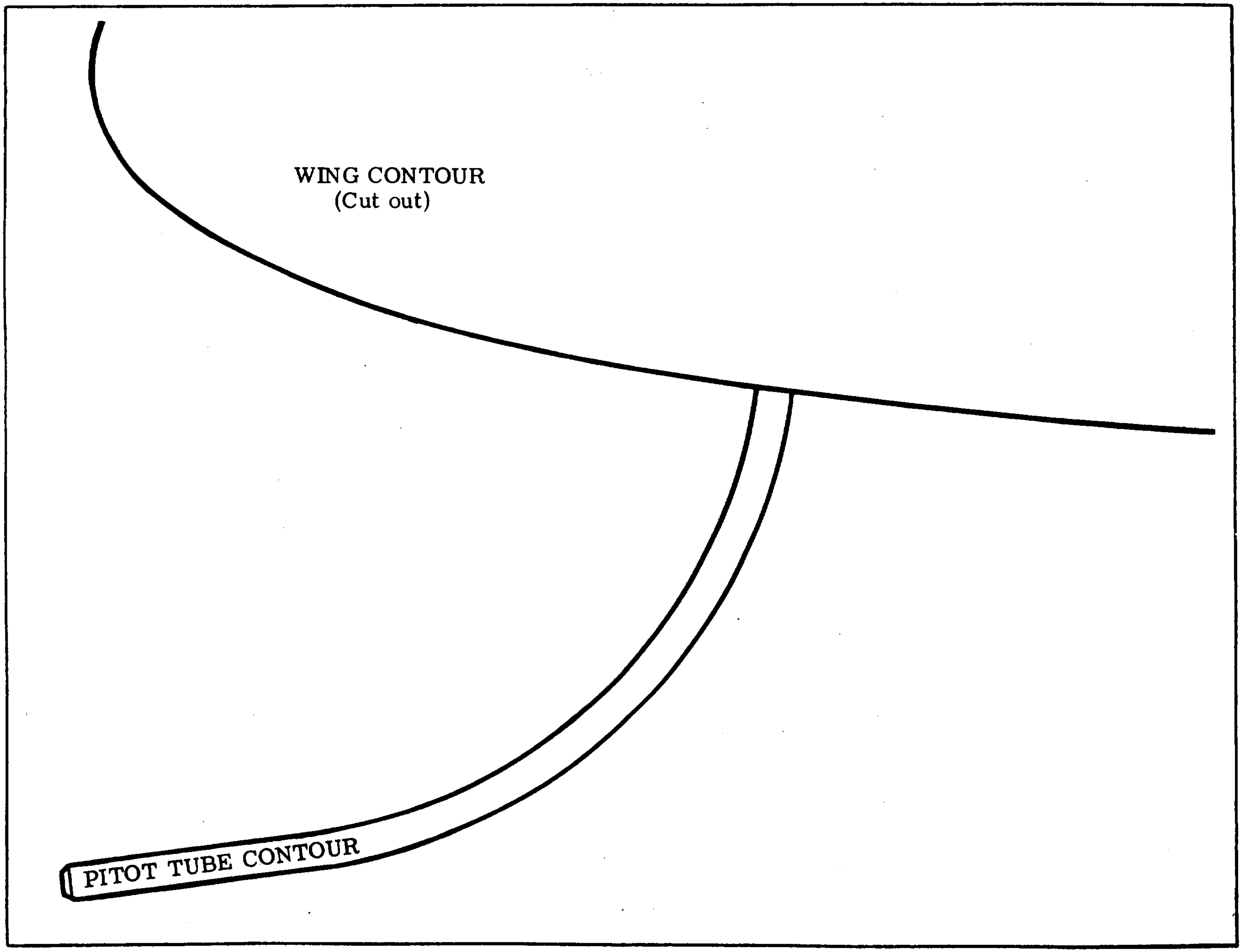


Figure 15-4. Pitot Tube Alignment Template

15-26. TROUBLE SHOOTING--VACUUM SYSTEM

TROUBLE	PROBABLE CAUSE	REMEDY
HIGH SUCTION GAGE READINGS.	Gyros function normally-relief valve screen clogged. relief valve malfunction.	Check screen, than 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 operation with filters removed. Replace filters.
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 operation with filter removed. Clean or replace filter.
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.

15-27. TROUBLE SHOOTING--GYROS.

TROUBLE	PROBABLE CAUSE	REMEDY
HORIZON BAR FAILS TO RESPOND.	Central filter dirty.	Check filter. Clean or replace filter.
	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.

15-27. TROUBLE SHOOTING--GYROS. (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
HORIZON BAR OSCILLATES OR VIBRATES EXCESSIVELY.	Central filter dirty.	Check filter. Clean or replace filter.
	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. Clean or replace filter.
	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.

SHOP NOTES:

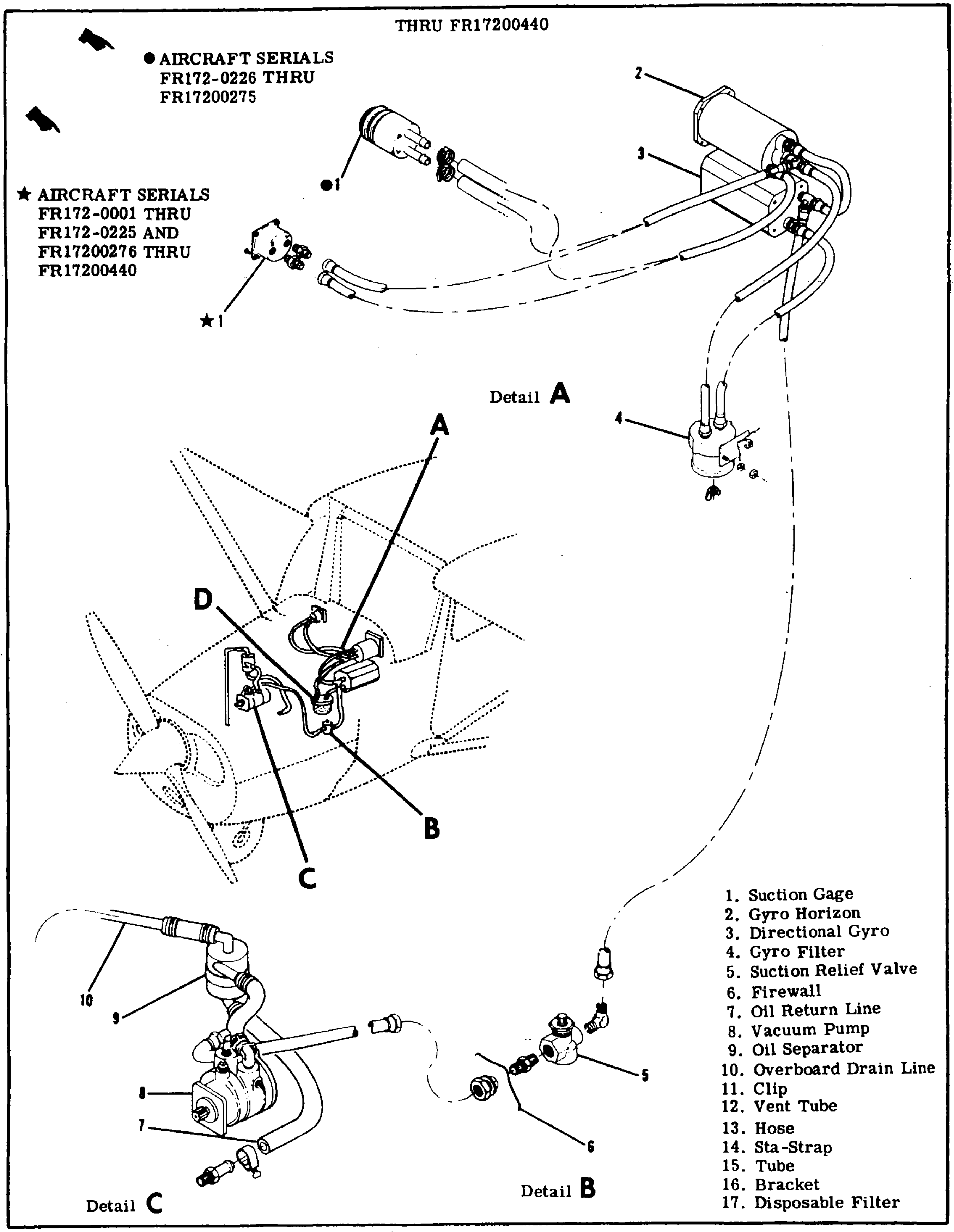


Figure 15-5. Vacuum System (Sheet 1 of 2)

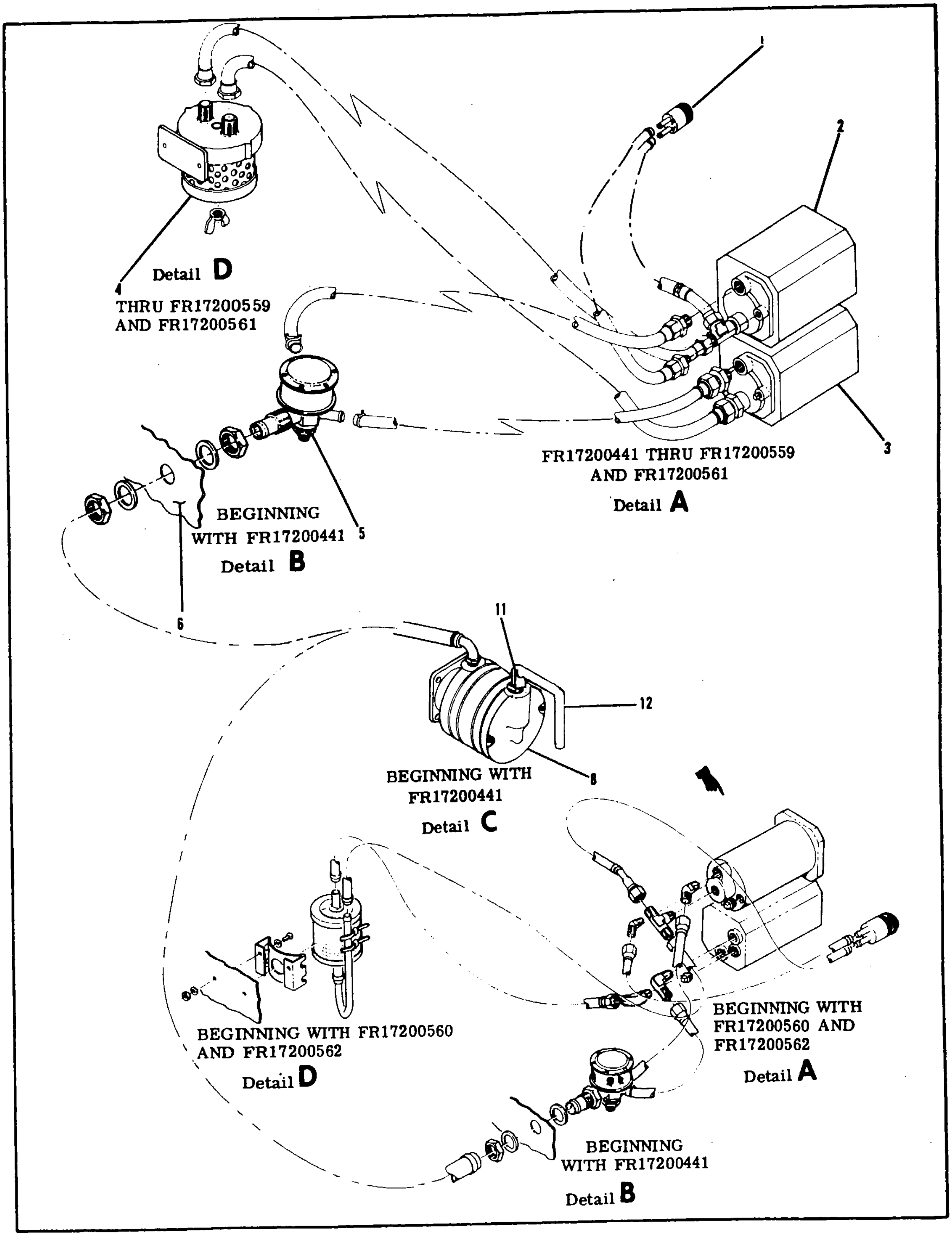


Figure 15-5. Vacuum System (Sheet 2 of 2)

15-28. TROUBLE SHOOTING - VACUUM PUMP. THRU 17200440

TROUBLE	PROBABLE CAUSE	REMEDY
OIL IN DISCHARGE.	Damaged engine drive seal.	Replace gasket.
	Oil separator clogged, oil return line obstructed, excessive oil flow through pump.	Check oil separator, return line; check that pump oil return rate does not exceed 120 cc/hour (approx. 8 drops/minute), at 50 psi oil pressure. Clean oil separator with Stoddard solvent, then blow dry. Blow out lines. If pump oil consumption is excessive, replace oil metering pin in pump.
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.

15-28A. TROUBLE SHOOTING - VACUUM PUMP. BEGINNING WITH 17200441

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.

15-29. REMOVAL AND INSTALLATION OF COMPONENTS. The various components of vacuum system are secured by conventional clamps, mounting screws and nuts. To remove a component, remove mounting screws and disconnect inlet and discharge lines. When replacing a vacuum system component, ensure connections are made correctly. Use no thread lube, but teflon tape may be used on male threads. Avoid over tightening connections. Before reinstalling a vacuum pump, place mounting pad gasket in position over studs. On aircraft equipped with wet system only, coat pump drive splines lightly with a high-temperature grease such as Dow Silicone #30 (Dow-Corning Co. Midland, Mich.). After installing pump, before connecting plumbing, start engine and check for evidence of oil in air discharge. The allowable discharge is one to four onces per hour for a wet system and no discharge is allowable in a dry-type system. Any oil in discharge of a dry system denotes a leaking drive seal.

15-30. CLEANING. In general, low-pressure, dry compressed air should be used in cleaning vacuum system components. The oil separator, exposed to engine oil and dirt, should be washed with Stoddard solvent, then dried with low-pressure air. 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.

15-31. VACUUM RELIEF VALVE ADJUSTMENT. A suction gage reading at 5.3 inches of mercury is desirable for gyro instruments. However, a range of 4.6 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 ±.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.

SHOP NOTES:

15-32. ENGINE INDICATORS.

15-33. TACHOMETER.

15-34. DESCRIPTION. The tachometer 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.

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 torque to 50 pound-inches (at instrument).

15-35. MANIFOLD PRESSURE/FUEL FLOW INDICATOR.

15-36. DESCRIPTION. The manifold pressure and fuel flow indicators are in one instrument case. However, each instrument operates independently. The manifold pressure gage is a barometric instrument which indicates absolute pressure in the intake manifold in inches of mercury. The fuel flow indicator is a pressure instrument calibrated in gallons per hour, indicating approximate gallons of fuel metered per hour to the engine. Pressure for operating the indicator is obtained through a hose from the fuel manifold valve.

15-37. TROUBLE SHOOTING -- MANIFOLD PRESSURE GAGE.

TROUBLE	PROBABLE CAUSE	REMEDY
EXCESSIVE ERROR AT EXISTING BAROMETRIC PRESSURE.	Pointer shifted.	Replace instrument.
	Leak in vacuum bellows.	Replace instrument.
	Loose pointer.	Replace instrument.
	Leak in pressure line.	Test line and connections for leaks. Repair or replace damaged line, tighten connections.
	Condensate or fuel in line.	Check line for obstructions. Blow out line.
JERKY MOVEMENT OF POINTER.	Excessive internal friction.	Replace instrument.
	Rocker shaft screws tight.	Replace instrument.
	Link springs too tight.	Replace instrument.
	Dirty pivot bearings.	Replace instrument.
	Defective mechanism.	Replace instrument.
	Leak in pressure line.	Test line and connections for leaks. Repair or replace damaged line, tighten connections.
SLUGGISH OPERATION OF POINTER.	Foreign matter in line.	Check line for obstructions. Blow out line.
	Damping needle dirty.	Replace instrument.
	Leak in pressure line.	Test line and connections for leaks. Repair or replace damaged line, tighten connections.

15-37. TROUBLE SHOOTING--MANIFOLD PRESSURE GAGE (Cont.)

TROUBLE	PROBABLE CAUSE	REMEDY
EXCESSIVE POINTER VIBRATION.	Tight rocker pivot bearings.	Replace instrument.
	Excessive vibration.	Check panel shock-mounts. Replace defective shock-mounts.
IMPROPER CALIBRATION.	Faulty mechanism.	Replace instrument.
NO POINTER MOVEMENT.	Faulty mechanism.	Replace instrument.
	Broken pressure line.	Check line and connections for breaks. Repair or replace damaged line.

15-38. TROUBLE SHOOTING -- FUEL FLOW INDICATOR.

TROUBLE	PROBABLE CAUSE	REMEDY
DOES NOT REGISTER.	Pressure line clogged.	Check line for obstructions. Blow out line.
	Pressure line broken.	Check line for damage or leaks. Repair or replace damaged line.
	Fractured bellows or damaged mechanism.	Replace instrument.
	Clogged snubber orifice.	Replace instrument.
	Pointer loose on shaft	Replace instrument.
POINTER FAILS TO RETURN TO ZERO.	Foreign matter in line.	Check line for obstructions. Blow out line.
	Clogged snubber orifice.	Replace instrument.
	Damaged bellows or mechanism.	Replace instrument.
INCORRECT OR ERRATIC READING.	Damaged or dirty mechanism.	Replace instrument.
	Pointer bent, rubbing on dial or glass.	Replace instrument.
	Leak or partial obstruction in pressure or vent line.	Check line for obstructions or leaks. Blow out dirty line, repair or tighten loose connections.

15-39. CYLINDER HEAD TEMPERATURE GAGE.

15-40. DESCRIPTION. The temperature sending unit regulates power through the cylinder head temperature gage. The gage and sending unit require little or no maintenance other than cleaning, making sure the lead is properly supported, and all connections are clean and properly insulated. The Rochester and Stewart Warner gages are connected the same, but the Rochester gage does not have a calibration pot and cannot be adjusted. Refer to Table 2 on page 15-20B when trouble shooting the cylinder head temperature gage.

15-41. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
GAGE INOPERATIVE.	No current to circuit.	Check circuit breaker and electrical circuit to gage. Repair electrical circuit.
	Defective gage, bulb or circuit.	Isolate with ohmmeter check of circuits. Repair or replace defective items.
GAGE FLUCTUATES RAPIDLY.	Loose or broken wire permitting alternate make and break of gage circuit.	Inspect circuit wiring. Repair or replace defective wire.
GAGE READS TOO HIGH ON SCALE.	High voltage.	Check voltage supply.
	Gage off calibration.	Replace gage.
GAGE READS TOO LOW ON SCALE.	Low voltage.	Check voltage supply.
	Gage off calibration.	Replace gage.
GAGE READS OFF SCALE AT HIGH END.	Break in bulb.	Replace bulb.
	Break in bulb lead.	Replace bulb.
	Internal break in gage.	Replace gage.
OBVIOUSLY INCORRECT READING.	Defective gage mechanism.	Replace gage.
	Incorrect calibration.	Replace gage.

15-42. OIL PRESSURE GAGE.

15-43. 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. 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.

15-44. 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 shaft.	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.
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.

15-45. OIL TEMPERATURE GAGE.

15-46. DESCRIPTION. On some airplanes, the oil temperature gage is a Bourdon tube type pressure instrument connected by armored capillary tubing to a temperature bulb in the engine. The temperature bulb, capillary tube and gage are filled with fluid and sealed. Expansion and contraction of fluid in the bulb with temperature changes operates the gage. Checking capillary tube for damage and fittings for security is the only maintenance required. Since the tubes inside diameter is small, small dents and kinks, which would be acceptable in larger tubing, may partially or completely close off the capillary, making the gage inoperative. Some airplanes are equipped with gages that are electrically actuated and are not adjustable. Refer to Table 1 on page 15-20A when trouble shooting the oil temperature gage.

15-47. FUEL QUANTITY INDICATORS AND TRANSMITTERS.

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 transmitter is increased, producing a decreased current flow through fuel quantity indicator and a smaller pointer deflection.

15-48A. REMOVAL AND INSTALLATION.

a. Drain fuel from tank. (Observe precautions in Section 12.

b. Remove small 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.

e. Install transmitter by reversing preceding steps. using new gasket around opening in fuel tank and under screw heads.

f. Service fuel tanks. Check for leaks and correct quantity indication.

NOTE

Ensure transmitter is properly grounded in accordance with Section 12.

15-49. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
FAILURE TO INDICATE.	No power to indicator or transmitter. (Pointer stays below E.)	Check circuit breaker and inspect for open circuit. Reset breaker, repair or replace defective wiring.
	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.
	Defective indicator.	Substitute known-good indicator. Replace indicator.
OFF CALIBRATION.	Defective indicator.	Substitute known-good indicator. Replace indicator.
	Defective transmitter.	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.

15-50. TRANSMITTER ADJUSTMENT.
(Refer to page 15-20A).

15-50. TRANSMITTER ADJUSTMENT

WARNING: USING THE FOLLOWING FUEL TRANSMITTER CALIBRATION PROCEDURES ON COMPONENTS OTHER THAN THE ORIGINALLY INSTALLED (STEWART WARNER) COMPONENTS WILL RESULT IN A FAULTY FUEL QUANTITY READING.

15-50A. STEWART WARNER GAGE TRANSMITTER CALIBRATION.

Chances of transmitter calibration changing in normal service is remote; however it is possible that the float arm or the float arm stops may become bent if the transmitter is removed from the fuel cell/tank. Transmitter calibration is obtained by adjusting float travel. Float travel is limited by the 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 the master switch in the "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 the 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 15-48A.

15-50B. ROCHESTER FUEL GAGE TRANSMITTER.

Do not attempt to adjust float arm or stop. No adjustment is allowed.

15-50C. FUEL QUANTITY INDICATING SYSTEM OPERATIONAL TEST.

WARNING: REMOVE ALL IGNITION SOURCES FROM THE AIRPLANE AND VAPOR HAZARD AREA. SOME TYPICAL EXAMPLES OF IGNITION SOURCES ARE STATIC ELECTRICITY, ELECTRICALLY POWERED EQUIPMENT (TOOLS OR ELECTRONIC TEST EQUIPMENT - BOTH INSTALLED ON THE AIRPLANE AND GROUND SUPPORT EQUIPMENT), SMOKING AND SPARKS FROM METAL TOOLS.

WARNING: OBSERVE ALL STANDARD FUEL SYSTEM FIRE AND SAFETY PRACTICES.

1. Disconnect all electrical power from the airplane. Attach maintenance warning tags to the battery connector and external power receptacle stating:

   DO NOT CONNECT ELECTRICAL POWER, MAINTENANCE IN PROGRESS.

2. Electrically ground the airplane.

3. Level the airplane and drain all fuel from wing fuel tanks.

4. Gain access to each fuel transmitter float arm and actuate the arm through the transmitter's full range of travel.

   A. Ensure the transmitter float arm moves freely and consistently through this range of travel. Replace any transmitter that does not move freely or consistently.

   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.

B. While the transmitter float arm is being actuated, apply airplane battery electrical power as required to ensure that the fuel quantity indicator follows the movement of the transmitter float arm. If this does not occur, troubleshoot, repair and/or replace components as required until the results are achieved as stated.

NOTE: Stewart Warner fuel quantity indicating systems can be adjusted. Refer to this section for instructions for adjusting Stewart Warner fuel indicating systems.
Rochester fuel quantity indicating system components are not adjustable, only component replacement or standard electrical wiring system maintenance practices are permitted.

5. With the fuel selector valve in the "OFF" position, add unusable fuel to each fuel tank.

6. Apply electrical power as required to verify the fuel quantity indicator indicates "EMPTY".

A. If "EMPTY" is not indicated, adjust, troubleshoot, repair and/or replace fuel indicating components as required until the "EMPTY" indication is achieved.

NOTE: Stewart Warner fuel quantity indicating systems can be adjusted. Refer to this section for instructions for adjusting Stewart Warner fuel indicating systems.
Rochester fuel quantity indicating system components are not adjustable, only component replacement or standard electrical wiring system maintenance practices are permitted.

7. Fill tanks to capacity, apply electrical power as required and verify that the fuel quantity indicators indicate "FULL".

A. If "FULL" is not indicated, adjust, troubleshoot, repair and/or replace fuel indicating components as required until the "FULL" indication is achieved.

NOTE: Stewart Warner fuel quantity indicating systems can be adjusted. Refer to this section for instructions for adjusting Stewart Warner fuel indicating systems.
Rochester fuel quantity indicating system components are not adjustable, only component replacement or standard electrical wiring system maintenance practices are permitted.

8. Install any items and/or equipment removed to accomplish this procedure, remove maintenance warning tags and connect the airplane battery.

15-50D. OIL TEMPERATURE INDICATING SYSTEM RESISTANCE TABLE 1

The following table is provided to assist in the troubleshooting the oil temperature indicating system components.

Select the oil temperature sending unit part number that is used in your airplane 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 Ω	
S1630-3	Oil Temp		620.0 Ω			52.4 Ω
S1630-4	Oil Temp		620.0 Ω			52.4 Ω
S1630-5	Oil Temp			192.0 Ω		
S2335-1	Oil Temp	990.0 Ω				34.0 Ω

15-50E. CYLINDER HEAD TEMPERATURE INDICATING SYSTEM RESISTANCE TABLE 2

The following table is provided to assist in the troubleshooting the cylinder head temperature indicating system components.

Select the cylinder head temperature sending unit part number that is used in your airplane 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 Ω	34.8 Ω	46.4 Ω
S1372-2	CHT		310.0 Ω	34.8 Ω	
S1372-3	CHT			113.0 Ω	
S1372-4	CHT			113.0 Ω	
S2334-3	CHT	745.0 Ω			38.0 Ω
S2334-4	CHT	745.0 Ω			38.0 Ω

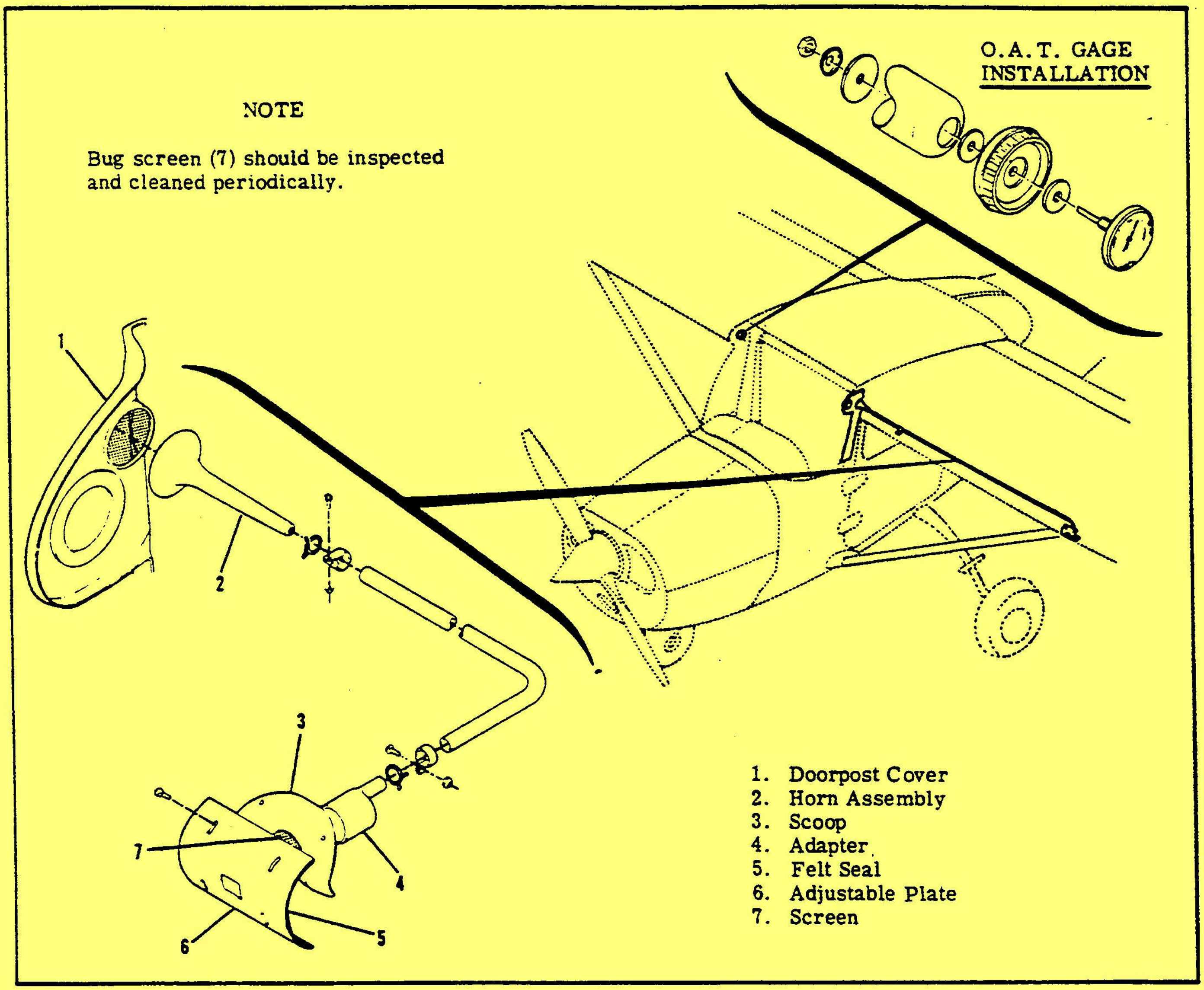


Figure 15-6. Stall Warning System

15-51. MAGNETIC COMPASS.

15-52. DESCRIPTION. The magnetic compass is liquid-filled, with expansion provisions to compensate for temperature changes. It is equipped with compensating magnets adjustable from front of case. The compass is internally lighted, controlled by the panel lights rheostat. No maintenance is required on compass except an occasional check on a compass rose for adjustment of compensation and replacement of lamp.

15-53. STALL WARNING SYSTEM. (Refer to figure 15-6.)

15-54. 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 miles per hour 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 3/32 inch adjustment of plate will change speed at which horn actuation occurs by 5 miles per hour. 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.

15-55. ELECTRIC CLOCK.

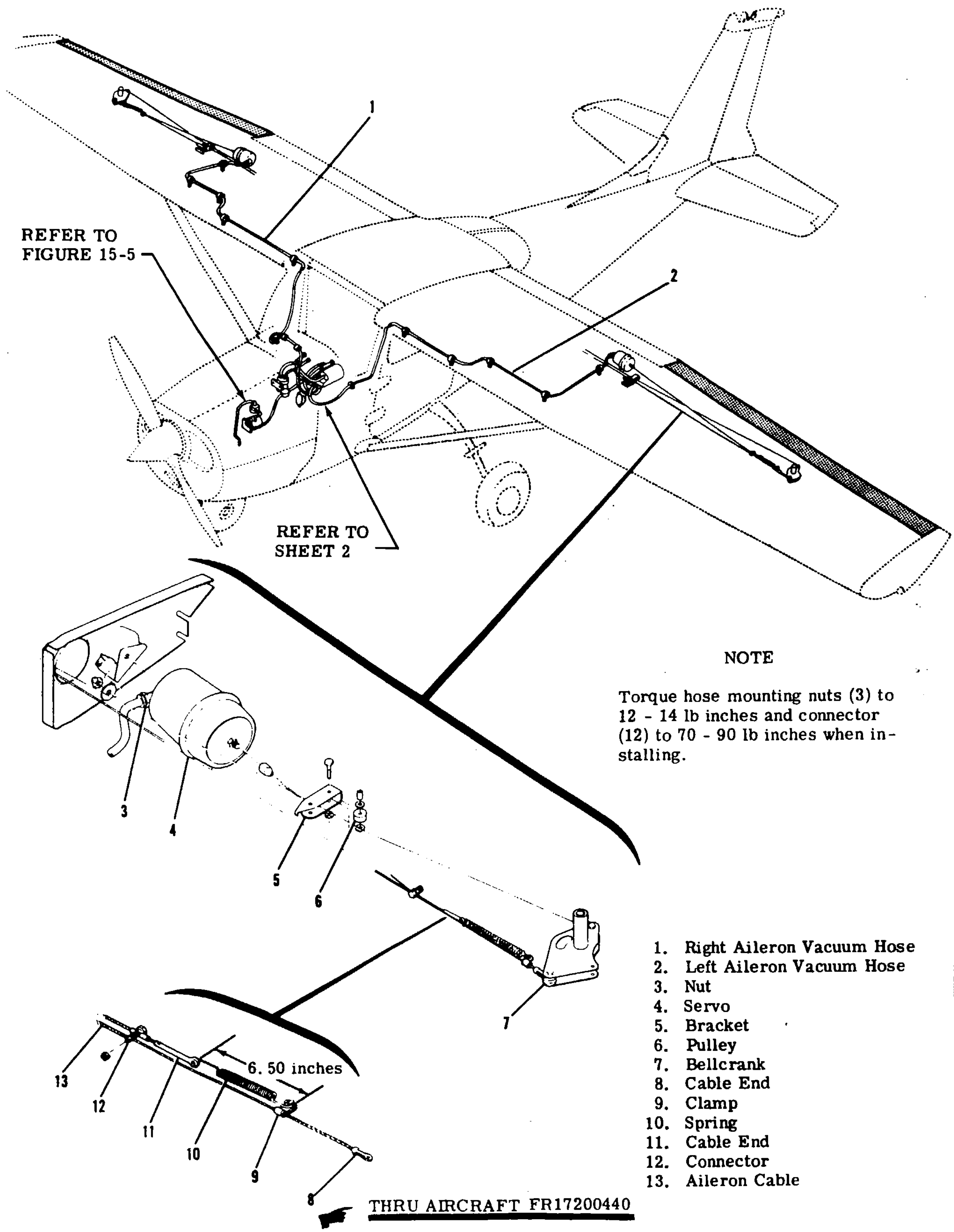
15-56. DESCRIPTION. The electric clock is connected to the battery through a one-ampere fuse mounted adjacent to the battery box. The electrical circuit is separate from the aircraft electrical system and will operate when the master switch is OFF.

15-57. TURN COORDINATOR.

15-58. DESCRIPTION. The turn coordinator is an electrically operated, gyroscopic, roll-turn rate indicator. Its gyro simultaneously senses rate of motion roll and yaw axis which is projected on a single indicator. The gyro is a non-tumbling type requiring no caging mechanism and incorporates an ac brushless spin motor with a solid state inverter.

15-59. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
INDICATOR DOES NOT RETURN TO CENTER.	Friction caused by contamination in the indicator damping.	Replace instrument.
	Friction in gimbal assembly.	Replace instrument.
DOES NOT INDICATE A STANDARD RATE TURN (TOO SLOW).	Low voltage.	Measure voltage at instrument. Correct voltage.
	Inverter frequency changed.	Replace instrument.
NOISY MOTOR.	Faulty bearings.	Replace instrument.
ROTOR DOES NOT START.	Faulty electrical connection.	Check continuity and voltage. Correct voltage or replace faulty wire.
	Inverter malfunctioning.	Replace instrument.
	Motor shorted.	Replace instrument.
	Bearings frozen.	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 instrument. Correct voltage.
NOISY GYRO.	High voltage.	Check voltage to instrument. Correct voltage.
	Loose or defective rotor bearings.	Replace instrument.



NOTE

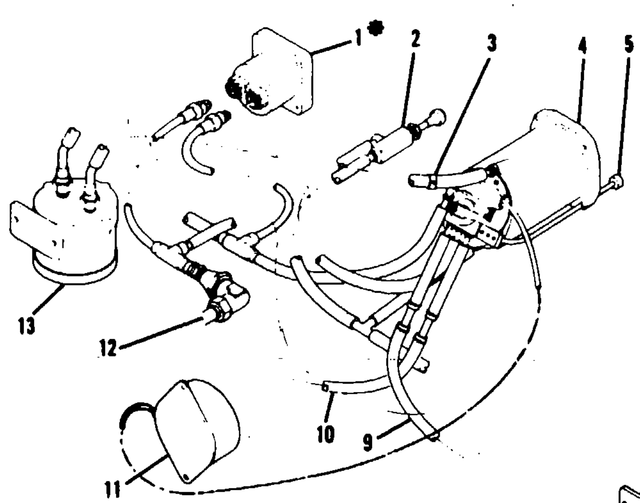
Torque hose mounting nuts (3) to 12 - 14 lb inches and connector (12) to 70 - 90 lb inches when installing.

1. Right Aileron Vacuum Hose
2. Left Aileron Vacuum Hose
3. Nut
4. Servo
5. Bracket
6. Pulley
7. Bellcrank
8. Cable End
9. Clamp
10. Spring
11. Cable End
12. Connector
13. Aileron Cable

THRU AIRCRAFT FR17200440

Figure 15-7. Wing Leveler Control System (Sheet 1 of 2)

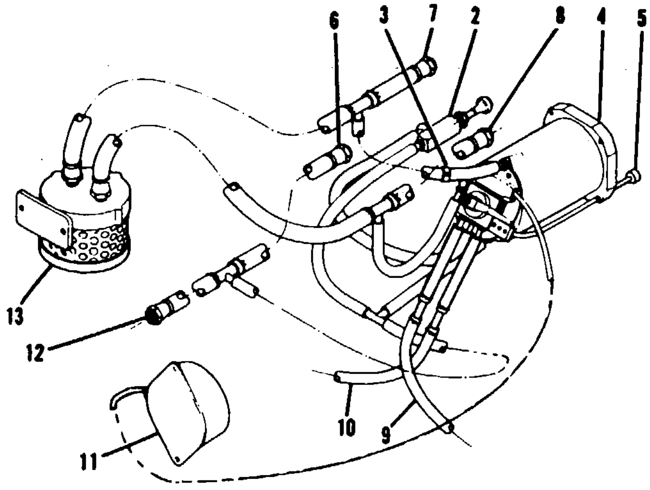
* REFER TO FIGURE 15-5



USED WITHOUT GYROS

NOTE

For field adjustment of restrictor (3) refer to Brittain Level-Matic operation & service Manual



USED WITH GYROS

1. Suction Gage
2. ON-OFF Control
3. Restrictor Valve
4. Turn Coordinator
5. Roll Trim Knob
6. Hose (to Suction Gage)
7. Hose (to Horizontal Gyro)
8. Hose (to Directional Gyro)
9. Left Aileron Vacuum Hose
10. Right Aileron Vacuum Hose
11. Inverter
12. Hose (to Vacuum Relief Valve)
13. Filter

THRU AIRCRAFT FR17200440

Figure 15-7. Wing Leveler Control System (Sheet 2 of 2)

15-60. WING LEVELER. THRU AIRCRAFT FR17200440 (Refer to figure 15-7.)

15-61. DESCRIPTION. The wing leveler control system, consisting of a turn coordinator, pneumatic servos, connecting cables and hose may be installed. The turn coordinator gyro senses changes in roll attitude, then electrically meters vacuum power from the engine-driven vacuum pump to the cylinder-piston servos, operating ailerons for lateral stability. Manual control of system is afforded by the roll trim knob. Roll trim should not be used to correct faulty rigging or "wing heaviness." Manual override of system may be accomplished without damage to aircraft or system. The ON-OFF valve controls vacuum supply to distributor valve, but does not affect electrically operated turn coordinator gyro. Installation of wing leveler does not change vacuum relief valve settings. Refer to appropriate publication issued by the manufacturer for trouble shooting procedures.

15-62. RIGGING. (Refer to figure 15-7, sheet 1.)

a. Loosen connector (12) and clamp (9).
b. Move aileron to full up position.
c. Move clamp (9) outboard until spring (10) is extended to 6.50 inches from hole in servo cable end to hole in clamp and tighten screw and nut.

NOTE

After completion of step "c", servo seal should be taut but not stretched.

d. Move connector (12) outboard until sleeve contacts servo cable end, then back off approximately .06 inch and torque connector to 70-90 pound-inches.
e. Repeat steps "a" through "d" for opposite wing.

SECTION 16

ELECTRICAL SYSTEMS

TABLE OF CONTENTS Page

16-1. ELECTRICAL SYSTEMS.

16-2. GENERAL. This section contains service information necessary to maintain the Aircraft Electrical Power Supply System, Battery and External power System, Aircraft Lighting System, Pitot Heater, Cigar Lighter and Electrical Load Analysis.

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. 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.

16-5A. DESCRIPTION. Beginning with 1968 model aircraft, an electrically operated starter and split bus bar system has been installed. One side of the bus bar supplies power to the electrical equipment while the other side supplies the electronic installation. When the master switch is closed the battery contactor engages and battery power is supplied to the electrical side of the split bus bar. The electrical bus feeds battery power to the electronics bus through a normally-closed relay; this relay opens when the starter switch is engaged or when an external power source is used, preventing transient voltages from damaging the semiconductor circuitry in the electronic installations.

16-6. SPLIT BUS POWER RELAY.

16-6A. DESCRIPTION. (See figure 16-1.) A power relay is installed behind the instrument panel on all aircraft utilizing a split bus bar. The relay is a normally closed type, opening when external power is connected or when the starter is engaged, thus removing battery power from the electronic side of the split bus and preventing transient voltages from damaging the electronic installations.

16-7. MASTER SWITCH.

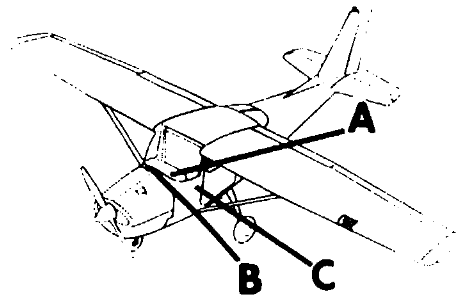
16-7A. DESCRIPTION. On early models the operation of the battery and alternator systems is controlled by a master switch. The switch is a pull type with double-pole, single-throw contacts. The switch, when operated, connects the battery contactor coil to ground and the alternator field circuit to the battery, activating the power systems. On 1970 models and on, a new master switch is utilized. This switch is a interlocking split rocker switch with the battery mode on the right hand side and the 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. The switch is labeled "BAT" and "ALT" below the switch and is located on the left hand side of the switch panel.

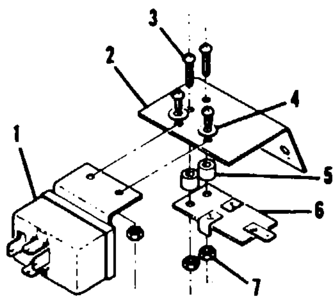
16-8. AMMETER.

16-8A. 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 speed, 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.

16-9. BATTERY POWER SYSTEM.

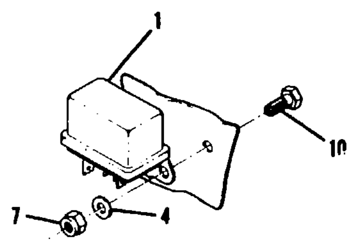
16-10. BATTERY. The battery is 12 volts and is approximately 33 ampere-hour capacity. The battery is mounted on brackets in the tailcone section of the aircraft and is equipped with non-spill filler caps.





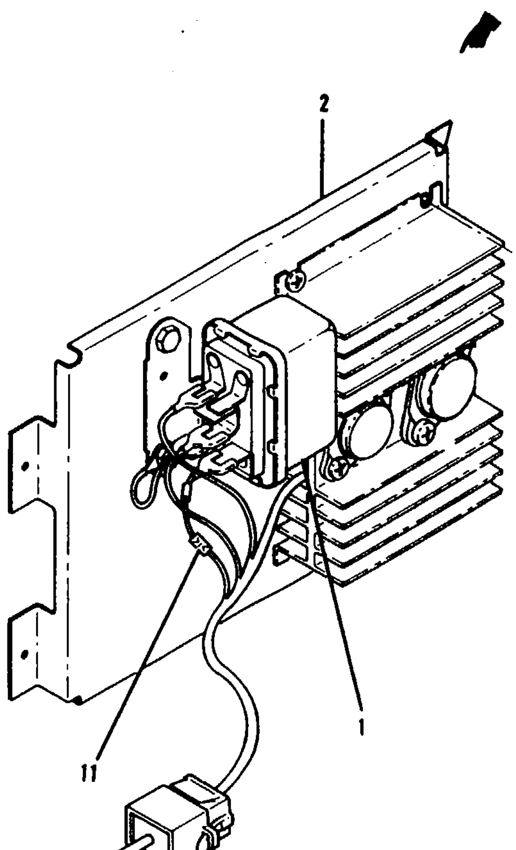
THRU FR17200225

Detail A



FR17200226 THRU FR17200559
AND FR17200561

Detail B



ROTATED 180°

BEGINNING WITH FR17200560
AND FR17200562

Detail C

1. Split Bus Power Relay
2. Bracket Relay Mounting
3. Screw
4. Washer
5. Spacer
6. Diode Board
7. Locknut
8. Nut
9. Skin
10. Bolt
11. Diode

Figure 16-1. Split Bus Power Relay

16-11. 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. 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 battery at 20 amps for approximately 30 minutes or until the battery voltage rises to 15 volts. Check battery with a load type tester. 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 is 16 to 24 ohms (Master switch open). If ohmmeter indicates an open coil, replace contactor. If ohmmeter indicates a good coil, proceed to step 5.
	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 intermittant, 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.

16-12. REMOVAL AND REPLACEMENT OF BATTERY. (See figure 16-2.)

a. Remove the rear baggage compartment panel.
b. Remove the battery box cover.
c. Disconnect the ground cable from the negative battery terminal.

CAUTION

When installing or removing battery always observe the proper polarity with the aircraft electrical system (negative to ground). Reversing 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.

d. Disconnect the cable from the positive terminal of the battery.
e. Lift the battery out of the battery box.
f. To replace the battery, reverse this procedure.

16-13. CLEANING THE BATTERY. For maximum efficiency, the battery and connections should be kept clean at all times.

a. Remove the battery in accordance with the preceding paragraph.
b. Tighten battery cell filler caps to prevent the cleaning solution from entering the cells.
c. Wipe battery cable ends, battery terminal and the entire surface of the battery with a clean cloth moistened with a solution of bicarbonate of soda (baking soda) and water.
d. Rinse with clear water, wipe off excess water and allow batteries to dry.
e. Brighten up cable ends and battery terminals with emery cloth or a wire brush.
f. Install the batteries according to the preceding paragraph.
g. Coat the battery terminals with petroleum jelly or an ignition spray product to reduce corrosion.

16-14. 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. 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.

16-15. 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°F.

BATTERY HYDROMETER READINGS

READINGS	BATTERY CONDITION
1.280 Specific Gravity	100% Charged
1.250 Specific Gravity	75% Charged
1.220 Specific Gravity	50% Charged
1.190 Specific Gravity	25% Charged
1.160 Specific Gravity	Practically Dead

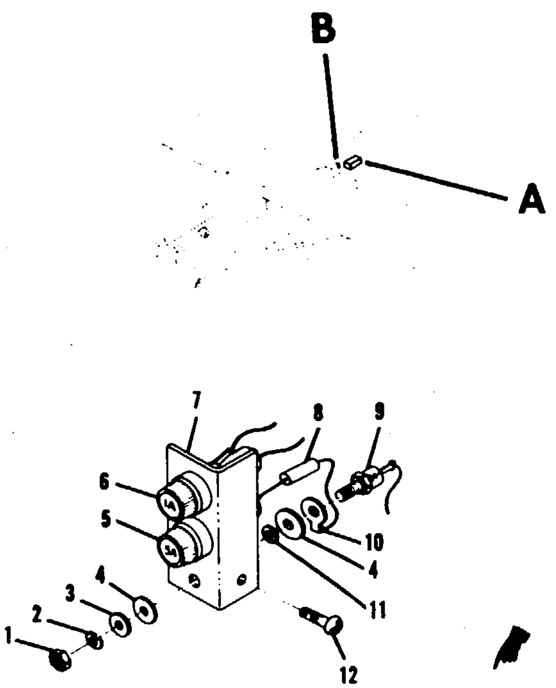
NOTE

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 will have a built-in temperature compensation chart and a thermometer. If this type tester is used, disregard this chart.

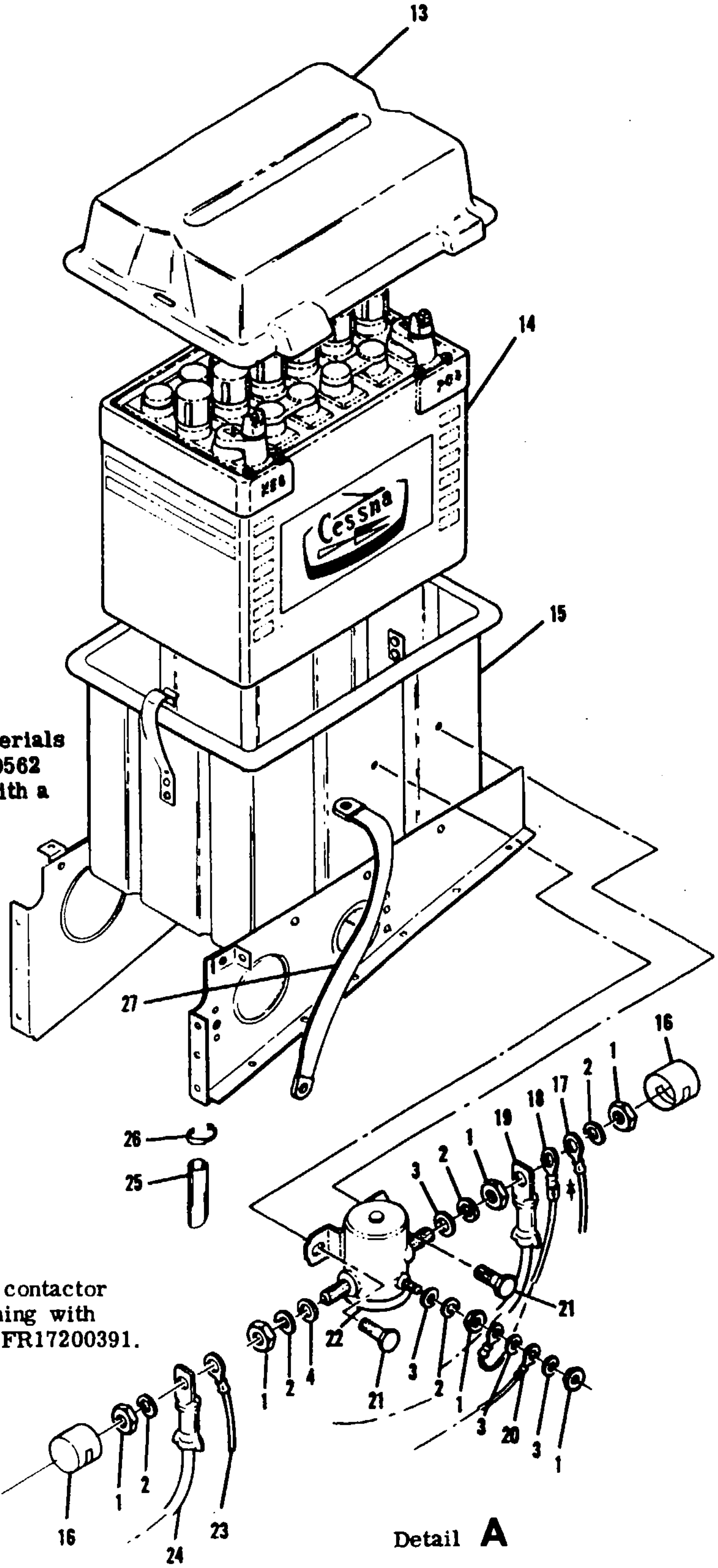
16-16. CHARGING THE BATTERY. When the battery is to be charged, the level of the electrolyte should be checked and adjusted by adding distilled water to cover the tops of the internal battery plates. Remove the battery from the aircraft and place in a well ventilated area for charging.

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.



Detail B



Detail A

NOTE

Beginning with aircraft serials FR17200560 and FR17200562 the battery is equipped with a lift strap.

1. Nut
2. Lockwasher
3. Washer
4. Insulating Washer
5. Fuse-Battery Contactor Closing Circuit
6. Fuse-Clock
7. Bracket-Fuse Mounting
8. Resistor
9. Diode
10. Solder Terminal
11. Spacer
12. Screw
13. Battery Box Lid
14. Battery
15. Battery Box
16. Nylon Cover
17. Wire to Fuses
18. Diode Wire
19. Positive Battery Cable
20. Master Switch Wire
21. Bolt
22. Battery Contactor
23. Wire to Battery Contactor Closing Circuit
24. External Power Cable
25. Battery Drain Tube
26. Clamp
27. Negative Ground Strap

NOTE

Vented battery contactor installed beginning with aircraft serial FR17200391.

Figure 16-2. Battery and Electrical Equipment Installation

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.

16-17. BATTERY BOX. The battery is completely enclosed in an acid-resistant plastic box. 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 mounting brackets in the tailcone.

16-18. REMOVAL AND REPLACEMENT OF BATTERY BOX. (See figure 16-2.) The battery box is riveted to the mounting brackets in the tailcone. The rivets must be drilled out to remove the box. When a battery box is installed and riveted into place, all rivets should be painted with acid-proof lacquer Part No. CES1054-381, available from the Cessna Service Parts Center.

16-19. 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 from the plastic box with a plastic scraper. After all corrosive deposits have been removed from the box, flush it thoroughly with clean water.

WARNING

Do not allow battery acid or deposits to remain in contact with skin, eyes 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.

16-20. BATTERY CONTACTOR. The battery contactor is bolted to the side of the battery box. The contactor is a plunger type contactor 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 negative terminal of the contactor coil. A nylon cover is installed on the contactor terminals to prevent accidental short circuits. (See figure 16-2.)

16-21. REMOVAL AND REPLACEMENT OF BATTERY CONTACTOR. (See figure 16-2.)

a. Open battery box and disconnect ground cable from negative battery terminal. Pull cable clear of battery box.

b. Remove the nut, lockwasher and the two plain washers securing the battery cables to the battery contactor.

c. Remove the nut, lockwasher and the two plain washers securing the wire which is routed to the master switch.

d. Remove the bolt, washer and nut securing each side of the battery contactor to the battery box. The contactor will now be free for removal.

e. To replace the contactor, reverse this procedure.

16-22. BATTERY CONTACTOR CLOSING CIRCUIT. This circuit consists of a 5 amp fuse, a resistor and a diode located on the 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.

16-23. GROUND SERVICE RECEPTACLE. 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 reverse polarity, the external power contactor will not close. This feature protects the diodes in the alternator, and other semiconductor devices used in the airplane, from possible reverse polarity damage.

NOTE

Maintenance of the electronic installation cannot be performed when using external power. Application of external power opens the relay supplying voltage to the electronics bus. For lengthy ground testing of electronic systems, connect a well regulated and filtered power supply directly to the battery side of the battery contactor. Adjust the supply for 14 volts and close the master switch.

NOTE

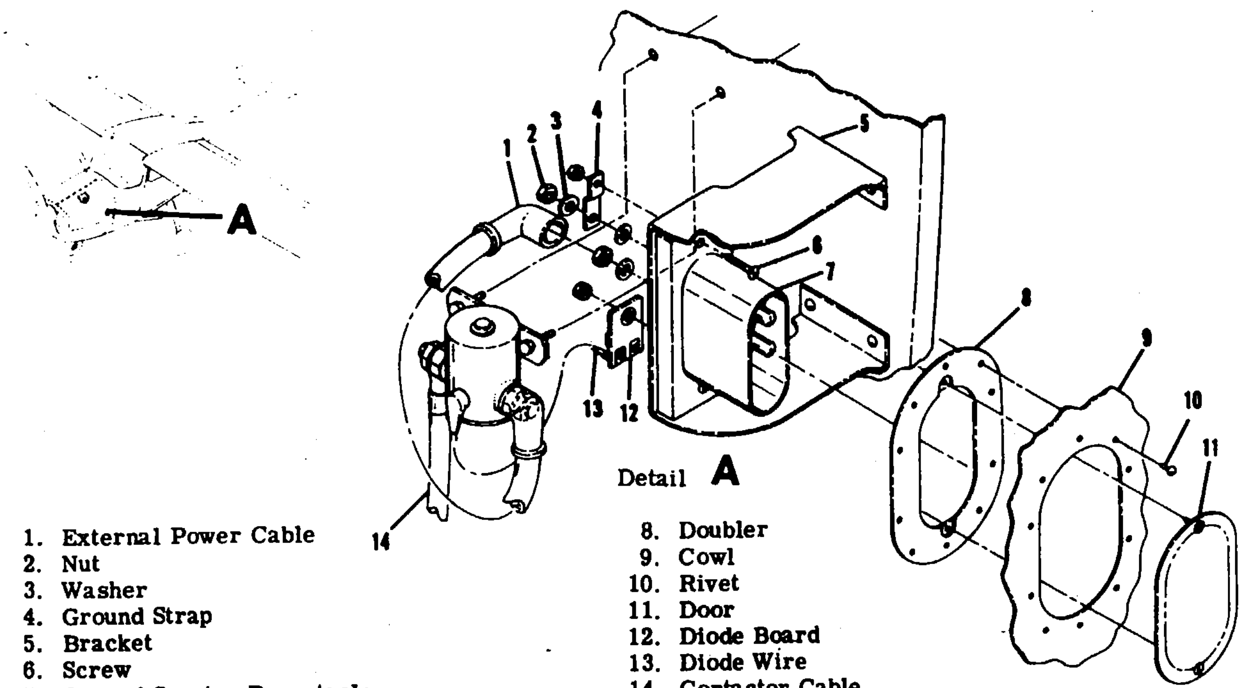
When using ground power to start the airplane, close the master switch before removing the ground power plug. This will insure closure of the battery contactor and excitation of the alternator field in the event that the battery is completely dead.

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 used in the airplane.

WARNING

External power receptacle must be functionally checked after wiring, or after replacement of components of the external power or split bus systems. Incorrect wiring or malfunctioned components can cause immediate engagement of starter when ground service plug is inserted.



1. External Power Cable
2. Nut
3. Washer
4. Ground Strap
5. Bracket
6. Screw
7. Ground Service Receptacle
8. Doubler
9. Cowl
10. Rivet
11. Door
12. Diode Board
13. Diode Wire
14. Contactor Cable

16-3. Ground Service Receptacle Installation

16-24. TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
STARTER ENGAGES WHEN GROUND POWER IS CON-NECTED.	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. 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.

16-24. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
GROUND POWER WILL NOT CRANK ENGINE (Cont).	Open or mis-wired diode on ground service diode board assembly.	3. Check polarity and continuity of diode on 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. If resistance indicates an open coil, replace contactor. If resistance is normal, proceed to step 5.
	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.

16-25. REMOVAL AND REPLACEMENT OF GROUND SERVICE RECEPTACLE. (See figure 16-3.)

a. Open battery box and disconnect the ground cable from the negative terminal of the battery and pull the cable from the battery box.

b. Remove the nuts, washers, ground strap and diode board from the studs of the receptacle and remove the battery cable.

c. Remove the screws and nuts holding the receptacle. The receptacle will then be free from the bracket.

d. To install a ground service receptacle, reverse this procedure. Be sure to place the ground strap on the negative stud of the receptacle.

16-26. ALTERNATOR POWER SYSTEM. The introduction of the high current silicon diode resulted in a reduction of mass required for an alternator rectifier system. This inovation made the alternator practical for use in light aircraft power systems. The alternator, like the generator, produces ac by electromagnetic induction. Rectification of the ac is accomplished by silicon diodes rather than by a commutator as in the generator. The alternators higher efficiency arises from the fact that the ac is produced in a three phase system which means that all of the windings carrying ac are working to produce power most of the time. In the generator, only a small portion of the ac windings are in use at any given time. The alternator, unlike the generator, is self-limiting in its output current capability. Therefore, no current limiting device is required in the alternator regulator. Also, because of the use of silicon diodes in the output network of an alternator the flow of current tack into the alternator is impossible and no reverse current protection device is required either. The alternator field is designed to retain no residual magnetic flux and, therefore, the alternator requires excitation to be applied from an external source (the battery) before the alternator will function.

16-27. ALTERNATOR. The 60-ampere alternators used on the FR172 model are three phase, delta connected with integral silicon diode rectifiers. The alternator is rated at 14 volts at 60 amperes continuous output. The moving center part of the alternator (rotor) consists of an axial winding with radial interlocking poles which surround the winding. With excitation applied to the winding through slip rings the pole pieces assume magnetic polarity. The rotor is mounted in bearings and rotates inside the stator which contains the windings in which ac is generated. The stator windings are three-phase, delta connected and are attached to two diode plates, each of which contain three silicon diodes.

The diode plates are connected to accomplish full-wave, rectification of ac. The resulting dc output is applied to the aircraft bus and sensed by the voltage regulator. The regulator controls the excitation applied to the alternator field, thus controlling the output voltage of the alternator.

CAUTION

The windings of the alternator are cooled in normal operations by a forced air blast. It is possible to overheat the rotor (field) winding if the master switch is left in the ON position for extended periods without the engine running.

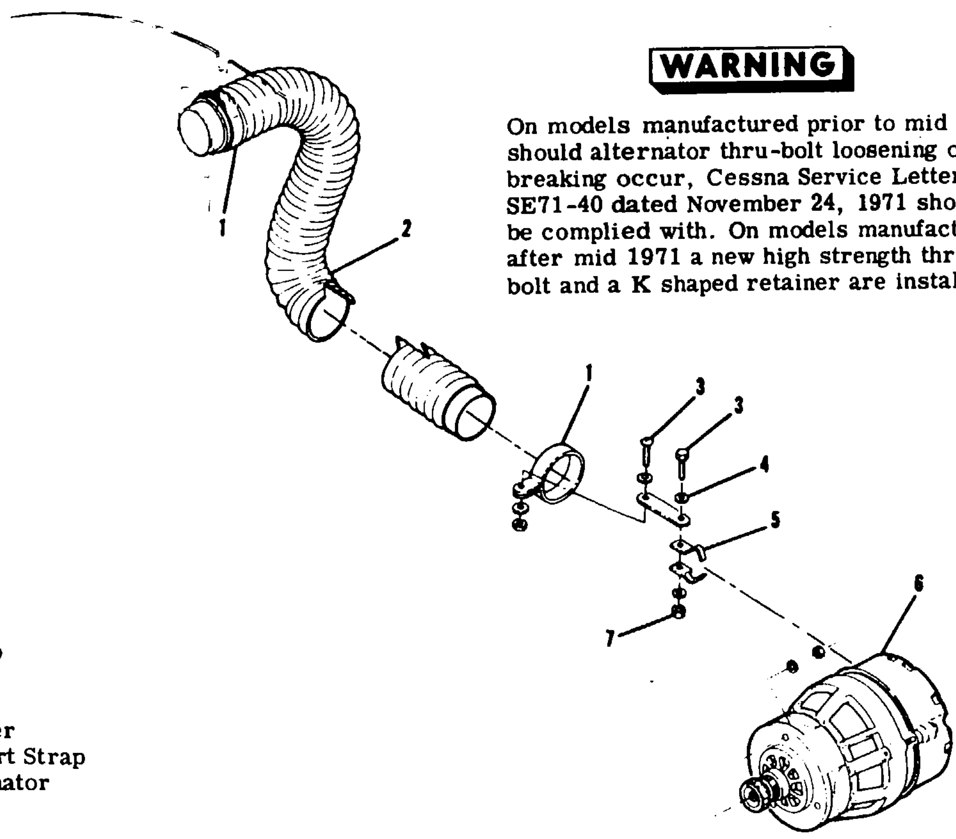
16-28. ALTERNATOR REVERSE VOLTAGE DAMAGE. The alternator is very susceptible to reverse polarity current because of the silicon diodes. The diodes, having a very high resistance to reverse current flow are used without any cutout relay such as used on a generator system. The alternator diodes are arranged with their cathodes connected to the aircraft bus bar which is positive and no back current will flow. If the polarity of the battery is reversed the diodes will offer no resistance to the current flow. The current rating of the diodes is exceeded and diode failure may result.

16-29. TROUBLE SHOOTING THE ALTERNATOR SYSTEM

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.

WARNING

On models manufactured prior to mid 1971 should alternator thru-bolt loosening or breaking occur, Cessna Service Letter SE71-40 dated November 24, 1971 should be complied with. On models manufactured after mid 1971 a new high strength thru-bolt and a K shaped retainer are installed.



1. Clamp
2. Hose
3. Screw
4. Washer
5. Support Strap
6. Alternator
7. Nut

Figure 16-4. Alternator Installation

16-29. TROUBLE SHOOTING THE ALTERNATOR SYSTEM (Cont.)

TROUBLE	PROBABLE CAUSE	REMEDY
AMMETER INDICATES HEAVY DISCHARGE WITH ENGINE NOT RUNNING OR ALTERNATOR CIRCUIT BREAKER OPENS WHEN MASTER SWITCH IS TURNED ON (Cont).	Shorted radio noise filter or shorted wire.	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.
ALTERNATOR SYSTEM WILL NOT KEEP BATTERY CHARGED.	Regulator faulty or improperly 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 consistant with the voltage vs temperature chart on page 16-12. 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.

16-29. TROUBLE SHOOTING THE ALTERNATOR SYSTEM (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
ALTERNATOR SYSTEM WILL NOT KEEP BATTERY CHARGED (Cont).	Regulator faulty or improperly adjusted.	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.
		4. Remove plug from regulator and start engine. Momentarily 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 regulator. If heavy charge rate is not observed, proceed to step 5.
	Faulty wiring between alternator and regulator, or faulty alternator (Cont).	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 continuity, repair or replace wiring from regulator to alternator.
		6. Check resistance from "F" terminal of alternator to alternator case. Normal indication is 6-7 ohms. If resistance is high or low, repair or replace alternator.
		7. 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.
ALTERNATOR OVERCHARGES BATTERY - BATTERY USES EXCESSIVE WATER.	Regulator faulty or improperly adjusted.	Check bus voltage with engine running. Normal indication agrees with voltage vs temperature chart on page 16-12. Observe ship's ammeter, ammeter should indicate near zero after a few minutes of engine operation. Replace regulator.

16-29. TROUBLE SHOOTING THE ALTERNATOR SYSTEM (Cont).

TROUBLE	BROBABLE 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" portions of 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.

16-30. REMOVAL AND REPLACEMENT OF GEAR DRIVEN ALTERNATOR. (See figure 16-4.)

a. Insure 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 screw and nut holding blast tube to support strap clamp, blast tube will then be free for removal.

d. Remove nuts and washers from alternator mounting bolts.

e. Remove alternator.

f. To replace alternator, reverse this procedure.

16-31. ALTERNATOR FIELD CIRCUIT PROTECTION. A 2-amp automatic resetting circuit breaker located on the back of the instrument panel is provided to protect the alternator field circuit.

16-32. ALTERNATOR VOLTAGE REGULATOR. The alternator voltage regulator contains two relays. One relay is actuated by the aircraft master switch and connects the regulator to the battery. The second relay is a two-stage, voltage sensitive device which is used to control the current applied to the field winding of the alternator. When the upper set of contacts on the voltage regulator relay are closed, full bus voltage is applied to the field. This condition will exist when the battery is being heavily charged or when a very heavy load is applied to the system. When the upper contacts open, as the voltage begins to rise toward normal bus voltage, the voltage to the alternator field is reduced through a resistor network in the base of the regulator, thus reducing the output from the alternator. As the voltage continues to rise, assuming a very light load on the system, the lower contacts will close and ground the alternator field and shut the alternator completely off. Under lightly loaded conditions the voltage relay will vibrate between the intermediate charge rate and the lower (completely off) contacts. Under a moderate load, the relay will vibrate between the intermediate charge rate and the upper (full output) contacts. The voltage relay is temperature compensated so that the battery is supplied with the proper charging voltage for all operating temperatures. With the battery fully charged (ship's ammeter indicating at or near zero) and a moderate load applied to the system (a taxi light turned on) the voltage at the bus bar should be within the range shown according to the air temperature on the following chart:

TEMPERATURE	BUS VOLTAGE
60 - 74°F.	13.8 - 14.1
75 - 90°F.	13.7 - 14.0
91 - 100°F	13.6 - 13.9

The voltage regulator is adjustable but adjustment on the airplane is not recommended. A bench adjustment procedure is outlined in the Cessna Alternator Charging Systems Service/Parts Manual.

16-33. TROUBLE SHOOTING THE VOLTAGE REGULATOR. For trouble shooting the voltage regulator refer to paragraph 16-29.

16-34. REMOVAL AND REPLACEMENT OF REGULATOR. (See figure 16-5.)

a. Make sure that the master switch is off, or disconnect the negative lead from the battery.

b. Remove the connector plug from the regulator.

c. Remove two screws holding the regulator on the firewall.

d. To replace the regulator, reverse the procedure. Be sure that the connections for grounding the alternator, wiring shields and the base of the regulator are clean and bright befor assembly. Otherwise, poor voltage regulation and/or excessive radio noise may result.

16-34A. OVER-VOLTAGE SENSOR AND WARNING LIGHT. Beginning with 1972 Models, an over-voltage warning system is incorporated in the aircraft. The over-voltage warning system consists of an over-voltage sensor switch and a red warning light labeled, "HIGH VOLTAGE", on the instrument panel. 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 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 tripout 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 red warning light filament can be tested at any time by turning off the "Alternator" portion of the Master Switch and leaving the "Battery" portion turned on. This test does not induce an over-voltage condition on the electrical system.

NOTE

On aircraft prior to aircraft serial FR17200294 should nuisance trip-outs occur caused by voltage spikes or transients, Cessna Single-engine Le Service Letter, SE72-15 dated April 12, 1972 should be complied with.

16-24B. RIGGING THROTTLE-OPERATED MICRO SWITCHES. Refer to Section 12.

16-24C. AUXILIARY ELECTRICAL FUEL PUMP FLOW RATE ADJUSTMENT. Refer to Section 12.

16-35. AIRCRAFT LIGHTING SYSTEM.

16-36. DESCRIPTION. The aircraft lighting system consists of landing and taxi lights, navigation lights, anti-collision strobe lights, flashing beacon light, dome and instrument flood lights, map light, control wheel map light, compass and radio dial lights.

1. Voltage Regulator
2. Screw
3. Housing
4. Wire Shields to Ground
5. Wire to Alternator "F"
6. Wire to Alternator "A+"
7. Wire to Filter
8. Wire to Alternator Ground
9. Filter - Radio Noise
10. Wire to Master Switch
11. Shield - Ground

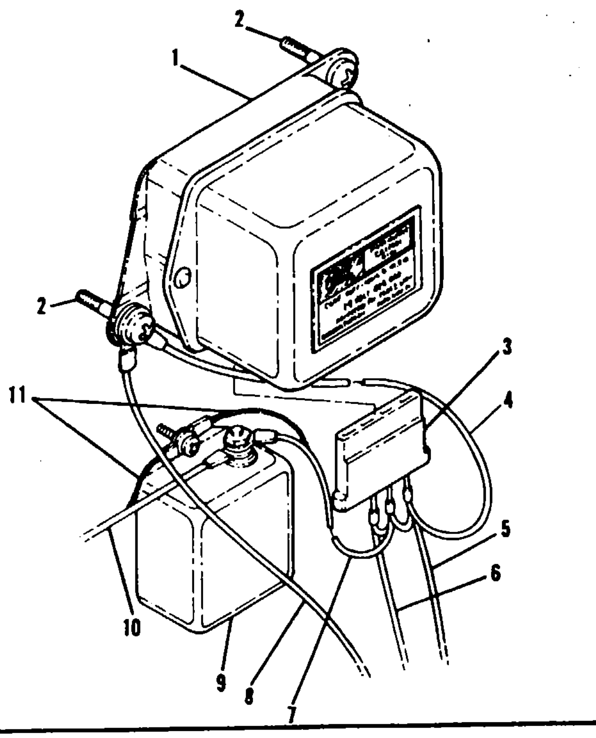


Figure 16-5. Voltage Regulator Installation

16-37. TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
LANDING AND TAXI LIGHT(S) OUT.	Short circuit in wiring.	1. Inspect circuit breaker. If circuit breaker is open, proceed to step 2. If circuit breaker is O.K. 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 circuit breaker is open, proceed to step 2. If circuit breaker is O.K. 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 or a new lamp. Replace lamp. If lamp is good, proceed to step 4.
	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 circuit breaker is open, proceed to step 2. If circuit breaker is O.K. proceed to step 3.

TROUBLE	PROBABLE CAUSE	REMEDY
ALL NAV LIGHTS OUT. (Cont).	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.
ONE ANTI-COLLISION STROBE LIGHT DOES NOT LIGHT. THRU 1972 MODELS.	Flash tube burned out.	Test with new flash tube. Replace flash tube.
	Faulty wiring.	Test for continuity. Repair or replace.
	Faulty trigger head.	Test with new trigger head. Replace trigger head.
BOTH ANTI-COLLISION STROBE LIGHTS WILL NOT LIGHT. THRU 1972 MODELS.	Circuit breaker open.	Inspect. Reset.
	Faulty power supply.	Listen for whine in power supply to determine if power is operating.
	Faulty switch.	Test for continuity. Repair or replace.
	Faulty wiring.	Test for continuity. Repair or replace.

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.

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 supply. If circuit breaker opens on both strobe power supplies proceed to step 3. If circuit breaker does not open proceed to step 4.

TROUBLE	PROBABLE CAUSE	REMEDY
BOTH ANTI-COLLISION STROBE LIGHTS WILL NOT LIGHT. Cont.	Open circuit breaker. Cont.	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.

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 24 volts. 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 O.K. proceed to step 3.
	Defective wiring.	2. Test circuit until short is located. Repair or replace wiring.
	Defective wiring (Cont).	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 or new lamp. Replace lamp.
	Defective switch.	5. Check for voltage at dome light with master and dome light switch on. Should read battery voltage. Replace switch.

16-37. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
INSTRUMENT LIGHTS WILL NOT LIGHT. (THRU 1970 MODELS).	Short circuit in wiring.	1. Inspect circuit breaker. If circuit breaker is open, proceed to step 2. If circuit breaker is O.K. 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.
	Defective rheostat.	4. Check voltage at instrument light with master switch on. Should read battery voltage with rheostat turned full clockwise and 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.
	Lamp burned out.	5. Test lamp with ohmmeter or new lamp. Replace lamp.
INSTRUMENT LIGHTS WILL NOT LIGHT (1971 MODELS & ON).	Short circuit 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.
	Faulty section in dimming potentiometer.	4. Lights will work when control is placed in brighter position. Replace potentiometer.

16-37. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
INSTRUMENT LIGHTS WILL NOT LIGHT (1971 MODELS & ON). (Cont).	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 (1971 MODELS & ON).	Open resistor or wiring in miminum intensity end of potentiometer.	1. Test for continuity. Replace resistor or repair wiring.
	Shorted transistor.	2. Test transistor by substitution. Replace defective transistor.
CONTROL WHEEL MAP LIGHT WILL NOT LIGHT THRU 1970 AIRCRAFT ONLY.	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 terminal board located on back of stationary panel with ohmmeter. If fuse is open, proceed to step 3. If fuse is OK, proceed to step 4.
	Defective wiring.	3. Test circuit until short is located. Repair or replace wiring. 4. Test for open circuit. Repair or replace wiring. If a short or open circuit is not found, proceed to step 5.
CONTROL WHEEL MAP LIGHT WILL NOT LIGHT THRU 1970 AIRCRAFT ONLY (Cont).	Defective map light assembly.	5. Check voltage at map light assembly with master and nav switches on. If battery voltage is present, replace map light assembly.
	CAUTION Failure to observe polarity shown on wiring diagram will result in immediate failure of the transistor on the map light circuit board assembly.	
CONTROL WHEEL MAP LIGHT WILL NOT LIGHT 1971 AIRCRAFT & ON.	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 terminal board located on back of stationary panel with ohmmeter. If fuse is open, proceed to step 3. If fuse is OK, proceed to step 4.

16-37. TROUBLE SHOOTING (Cont).

TROUBLE	PROBABLE CAUSE	REMEDY
CONTROL WHEEL MAP LIGHT WILL NOT LIGHT 1971 AIRCRAFT & ON. (Cont.)	Defective wiring.	3. Test circuit until short is located. Repair or replace wiring. 4. Test for open circuit. Repair or replace wiring. If a short or open circuit is not found, proceed to step 5.
	Defective map light assembly.	5. Check voltage at map light assembly with master and nav switches on. If battery voltage is present, replace map light assembly.

16-38. LANDING AND TAXI LIGHTS. Thru 1972 models the landing and taxi lights are mounted in the leading edge of the left wing. A clear plastic cover provides weather protection for the lamps and is shaped to maintain the leading edge curvature of the wing. The landing light lamp is mounted on the inboard side and adjusted to throw its beam further forward than the taxi light. The landing and taxi lights are controlled by a switch located on the instrument panel. Beginning with 1973 models the landing and taxi light is mounted in lower cowl nose cap. One lamp is utilized for both landing and taxi.

16-39. REMOVAL AND REPLACEMENT OF LANDING AND TAXI LIGHTS. (See figure 16-6.)

a. Thru 1972 Models.
   1. Remove the 18 screws securing the landing light window assembly (1) and the assembly will then be free for removal.
   2. Remove the four attaching screws (7) from the bracket assembly and remove the bracket.

NOTE

Do not reposition the landing and taxi light adjustment screws (3). If readjustment is required refer to figure 16-6.

   3. Remove the two screws securing the wiring to the lamp contacts and remove the lamp.
   4. Install new lamp and reassemble.

b. Beginning with 1973 Models.
   1. Remove lower cowl and disconnect lamp connections.
   2. Remove screws (7) from landing light support (2) and remove light assembly.
   3. Remove screws (8) and remove lamp.
   4. To reinstall reverse this procedure.

16-39A. LANDING AND TAXI LIGHTS (DUAL, COWL MOUNTED, OPTIONAL).

16-39B. DESCRIPTION. Optional, dual, cowl mounted landing and taxi lights may be installed. The left hand light is used for taxi and the right hand for landing. Two rocker type switches on the instrument panel control the lights.

16-39C. REMOVAL AND INSTALLATION. (Refer to figure 16-6.)

a. Remove lower cowl disconnecting lamp leads.
b. Remove screws (8) from plate (7) and remove lamp assembly from support assembly (2). If left hand (taxi) light is being removed, not position of spacers (3) for reinstallation.
c. Remove screws (9) from bracket (4) to disassemble lamp assembly.
d. Install new lamp and reassemble.

16-40. NAVIGATION LIGHTS. The navigation lights

SHOP NOTES:

are located on each wing tip and the top edge of the vertical fin. The lights are controlled by a switch located on the instrument panel.

16-41. REMOVAL AND REPLACEMENT OF NAVIGATION LIGHTS. For removal and replacement of navigation lights refer to figure 16-7.

16-42. ANTI-COLLISION STROBE LIGHTS. A white strobe light is installed on each wing tip and 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 strobe lights from a power supply, mounted just aft of the baggage curtain, on the left side of the aircraft above the battery box thru 1972 models. Beginning with 1973 Models individual power supplies are mounted on the wing tip ribs for each strobe light.

16-42A. OPERATIONAL REQUIREMENTS.

The capacitors in the strobe light power supplies must be reformed if not used for a period of six (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. The connect to the 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.

16-43. REMOVAL AND REPLACEMENT OF ANTI-COLLISION STROBE LIGHTS. Use figure 16-7 as a guide for removal and replacement of the anti-collision strobe light components.

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.

16-44. FLASHING BEACON. The flashing beacon light is attached to a thermoformed plastic mounting on the vertical fin. The flashing beacon is an iodine-vapor lamp electrically switched by a solid-state flasher assembly. The flasher assembly is located in the aft section of the tailcone. The switching frequency of the flasher assembly operates the beacon at approximately 45 flashed per minute.

16-45. REMOVAL AND INSTALLATION OF FLASHING BEACON LIGHT. For removal and instalation of the flashing beacon refer to figure 16-8.

16-46. INSTRUMENT, DOME AND COURTESY LIGHTS. The instrument and dome lights are mounted in an overhead console located on the top of the cabin and provide non-glare instrument flood lighting and cabin lighting. The instrument flood light consists of a red lens and a single bulb. On models thru 1970, instrument flood lighting is controlled by a dimming rheostat mounted on the right side of the overhead console. On 1971 and On Models, instrument flood lighting is controlled by a rheostat mounted on the lower, left hand portion of the instrument panel. The courtesy lights are mounted in the underside of each wing and consist of a lens and single bulb, lighting is controlled by the dome light switch.

16-47. REMOVAL AND REPLACEMENT OF INSTRUMENT, DOME AND COURTESY LIGHTS. For removal and replacement of instrument, dome and courtesy lights refer to figure 16-9.

16-47A. INSTRUMENT POST LIGHTING.

16-47B. DESCRIPTION. Individual post lighting may be installed to provide for non-glare instrument lighting. The post light consists of a cap and a clear lamp assembly with a tinted lens. The intensity of the instrument post lights is controlled by the radio light dimming rheostat located on the switch panel.

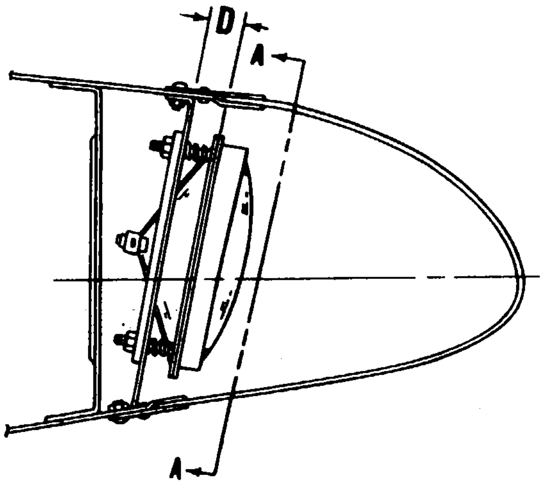
16-47C. REMOVAL AND INSTALLATION. For removal and installation of the instrument post lamps, slide the cap and lens assembly from the base. Slide the lamp from the socket and replace.

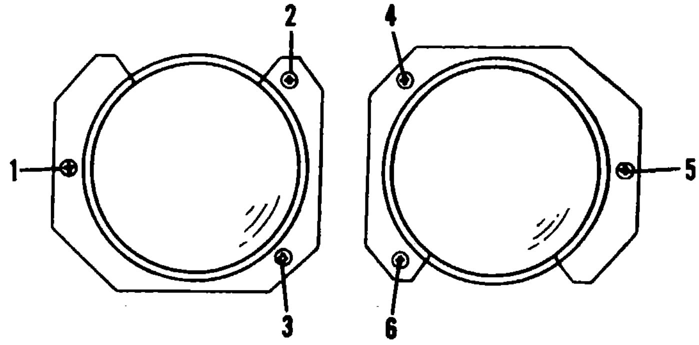
16-48. COMPASS AND RADIO DIAL LIGHTING. The compass and radio dial lights are contained within the individual units. The compass light is controlled by the instrument light dimming rheostat located on the right side of the overhead console. The radio dial lights are controlled by the radio dial light rheostat located on the left side of the overhead console.

16-48A. TRANSISTORIZED LIGHT DIMMIMG. (Refer to figure 16-9A.)

16-48B. DESCRIPTION. Beginning with aircraft serial FR17200226 a remotely located two-circuit transistorized dimming assembly is installed to control instrument, radio and compass lighting. One circuit controls instrument and compass lighting and the other circuit controls the radio lighting. This is accomplished by a concentric knob arrangement on the lower left hand side of the pilot's switch panel. The center portion of the knob controls the instrument and compass lighting and the outer portion controls the radio lighting.

16-48C. REMOVAL AND INSTALLATION. Refer to figure 16-9A for removal and installation of the transistorized dimming assembly.

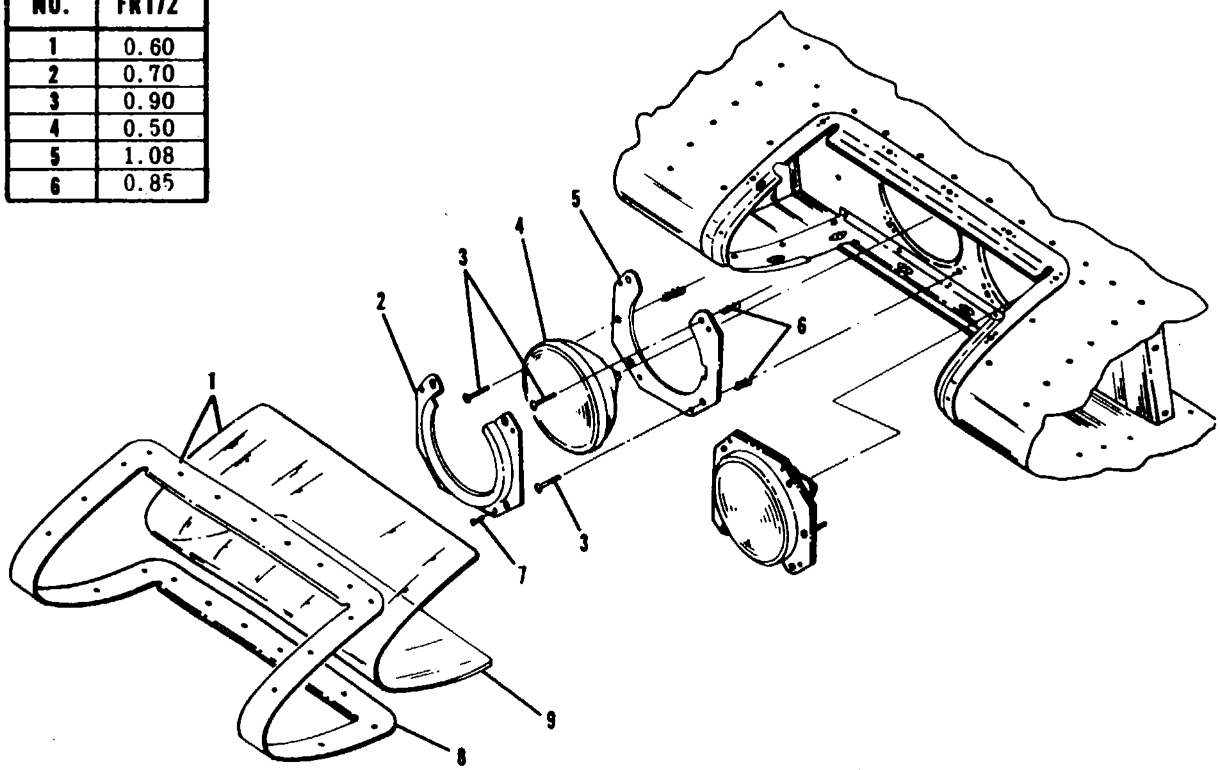




VIEW A-A

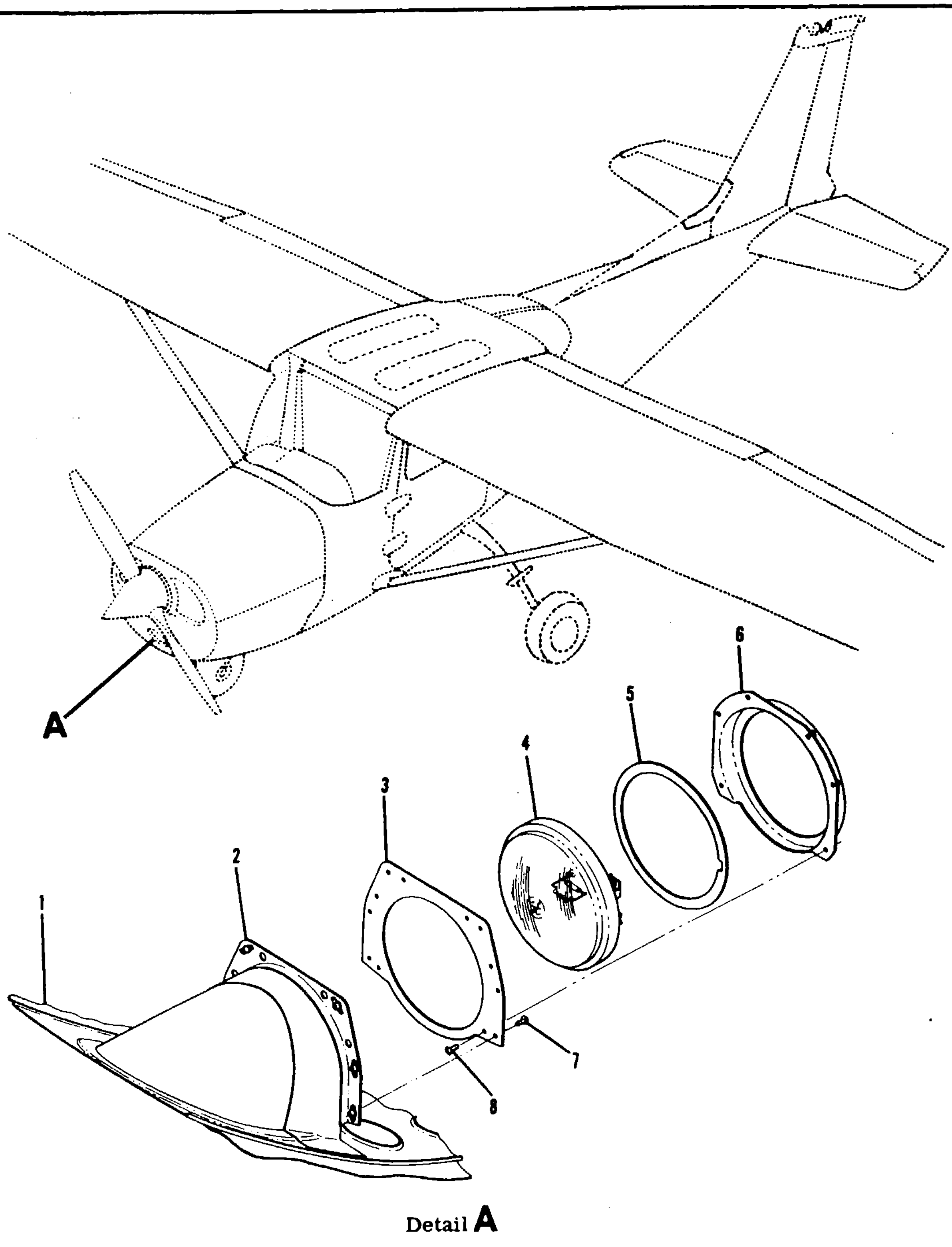
DIMENSION D

NO.	FR172
1	0.60
2	0.70
3	0.90
4	0.50
5	1.08
6	0.85



1. Window Assembly
2. Bracket
3. Adjusting Screw
4. Lamp
5. Plate
6. Spring
7. Screw
8. Retainer
9. Window

Figure 16-6. Landing and Taxi Light Installation and Adjustment (Sheet 1 of 3)



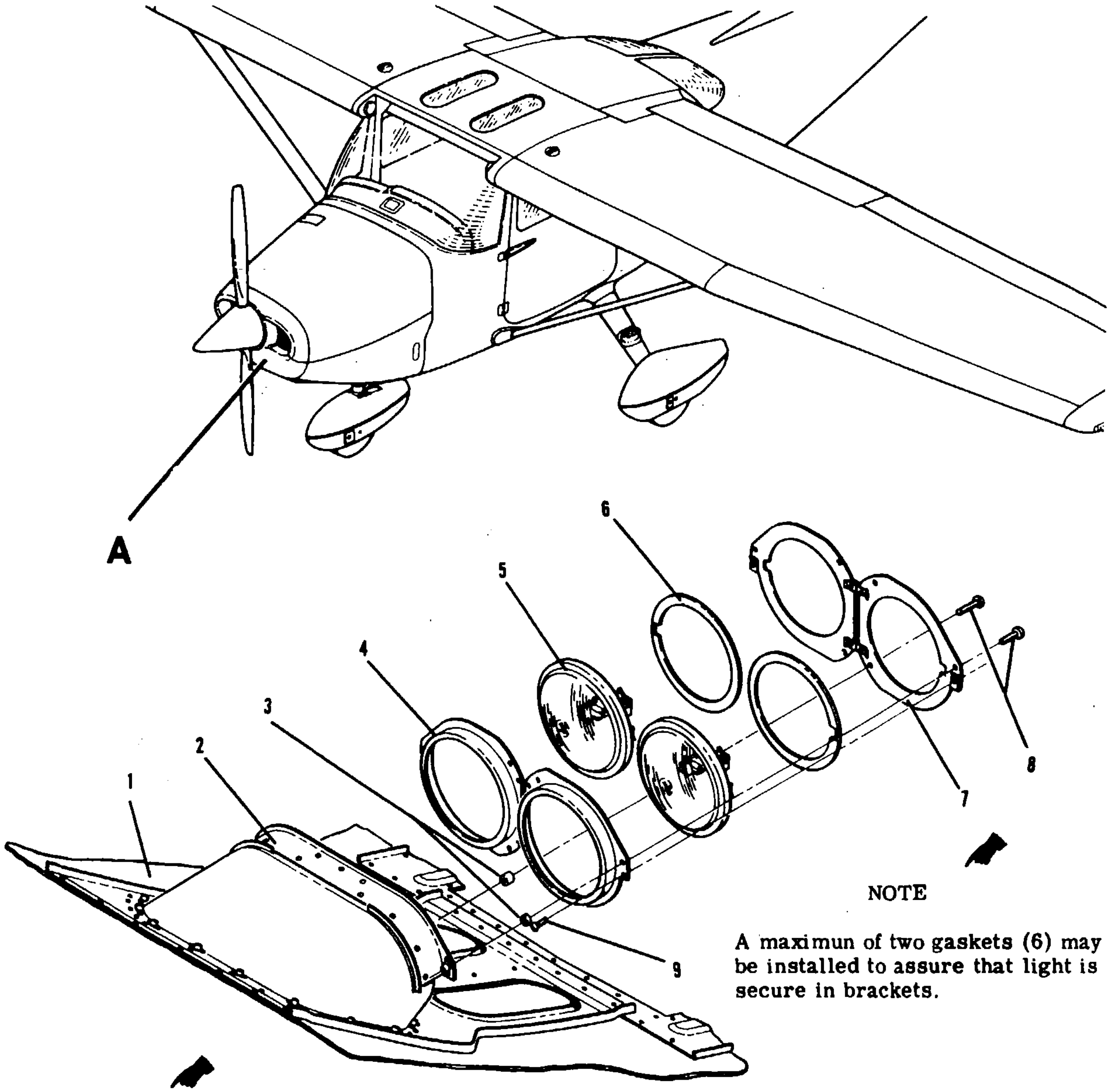
1. Nose Cap
2. Support
3. Plate
4. Lamp
5. Gasket
6. Bracket
7, Screw
8. Screw

NOTE

Should further adjustment be desired, a maximum of two washers may added between plate (3) and support (2).

Figure 16-6. Landing and Taxi Light Installation and Adjustment (Sheet 2 of 3)

OPTIONAL



NOTE

A maximun of two gaskets (6) may be installed to assure that light is secure in brackets.

NOTE

For adjustment of lights washers may be installed between support assembly (2) and bracket (4) as required.

Detail A

1. Nose cap
2. Support assembly
3. Spacer (LH only)
4. Bracket
5. Lamps
6. Gasket
7. Plate
8. Screw
9. Screw

BEGINNING WITH AIRCRAFT SERIAL FR17200441

Figure 16-6 Landing and Taxi Light Installation (Cowl) (Sheet 3 of 3)

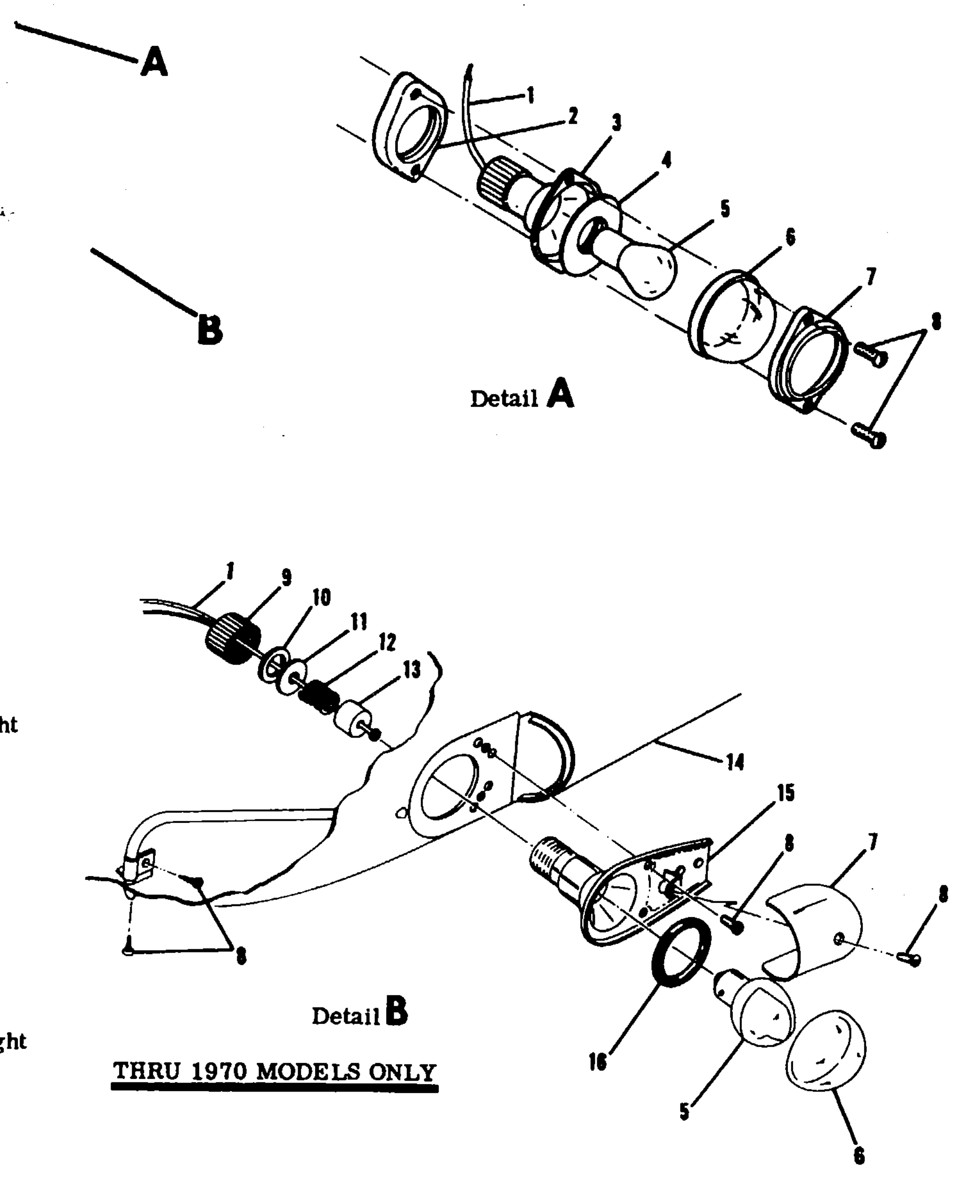
16-49. ENGINE INSTRUMENT CLUSTER PANEL LIGHTS. The engine instrument cluster panel lights consists of four lights with snap-in type sockets on the back of the cluster panel. For replacement of defective lamps pry the snap-in socket out with a small screwdriver, replace defective lamp and snap socket back in place.

16-50. MAP LIGHTING. 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. 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 instrument light dimming rheostat on the overhead console.

16-51. REMOVAL AND REPLACEMENT OF MAP LIGHT. (See figure 16-10.)

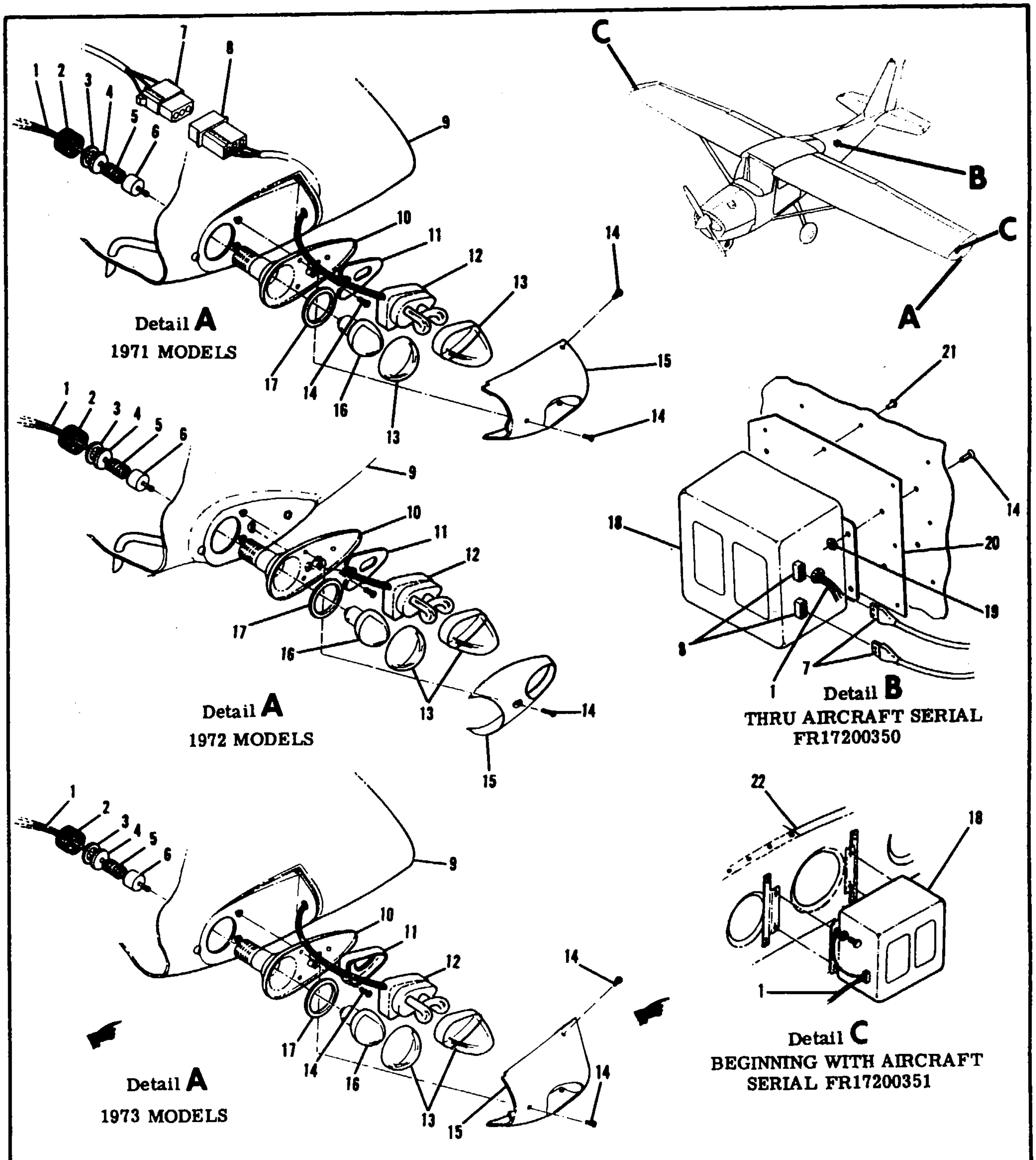
a. For replacement of defective lamp slide the hood and lens from the map light assembly and remove the bayonet type bulb.

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.



1. Electrical Leads
2. Mount
3. Tail Navigation Light
4. Gasket
5. Bulb
6. Lens
7. Lens Retainer
8. Screw
9. Cap
10. Washer
11. Insulated Washer
12. Spring
13. Insulator
14. Wing Tip
15. Wing Navigation Light
16. Seal

Figure 16-7. Navigation and Anti-Collision Strobe Lights Installation (Sheet 1 of 2)



1. Electrical Leads
2. Cap
3. Washer
4. Insulated Washer
5. Spring
6. Insulator
7. Housing-Plug
8. Housing-Cap
9. Wing Tip
10. Wing Navigation Light
11. Gasket
12. Flash Tube Assembly
13. Lens
14. Screw
15. Lens Retainer
16. Bulb
17. Seal
18. Power Supply
19. Nut
20. Doubler
21. Rivet
22. Wing Tip Rib

Figure 16-7. Navigation and Anti-Collision Strobe Lights Installation (Sheet 2 of 2)

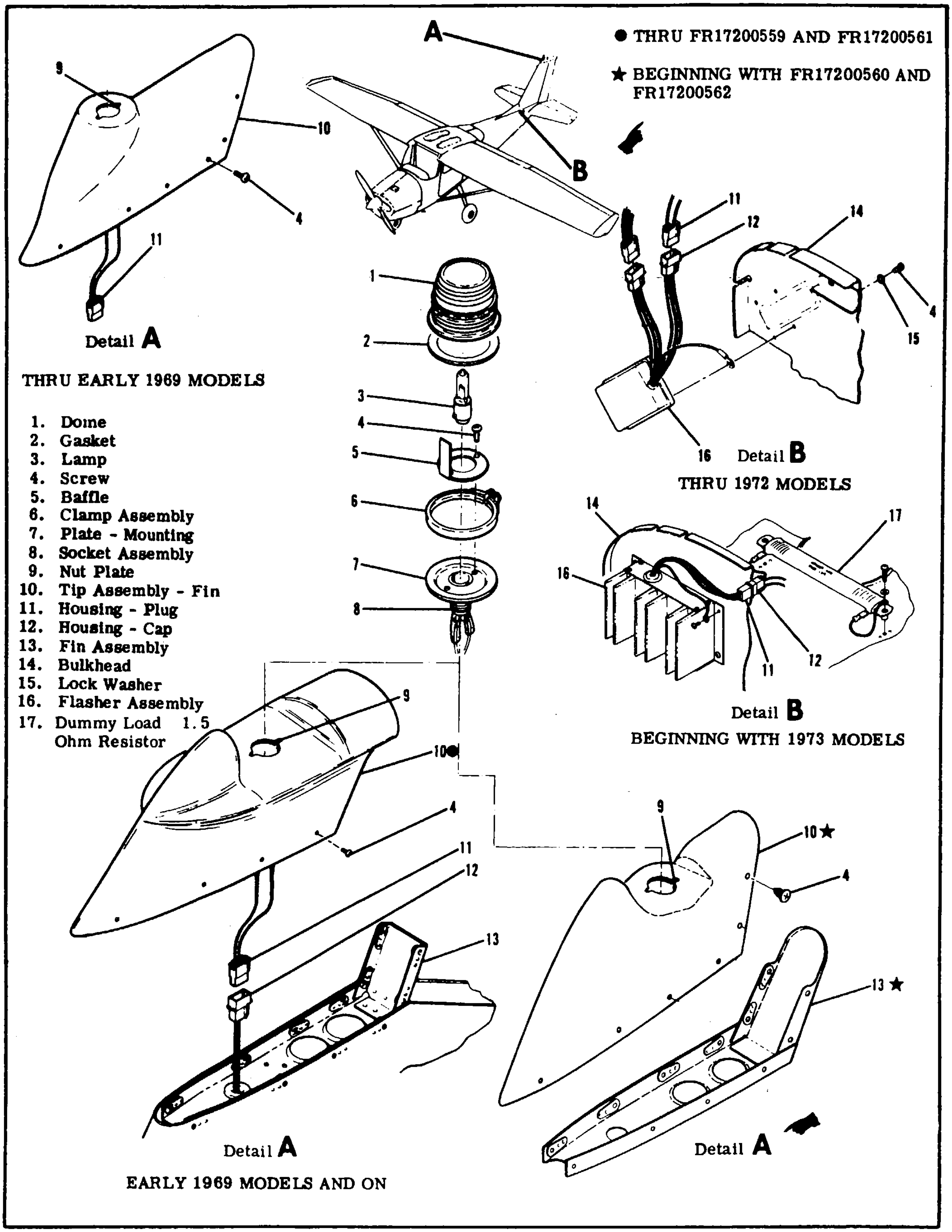
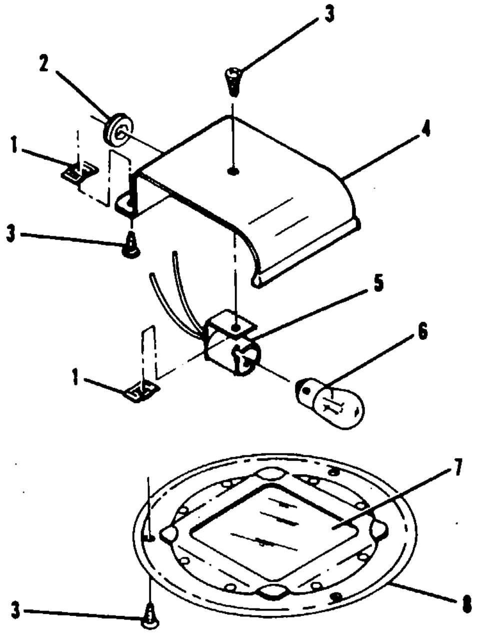
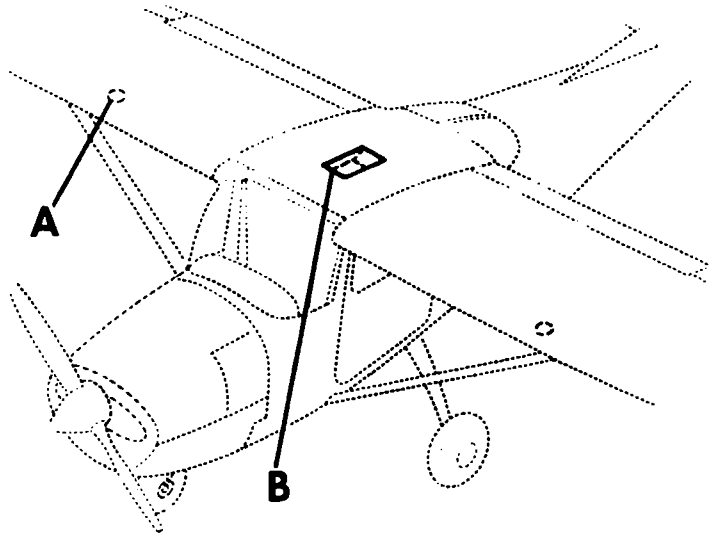


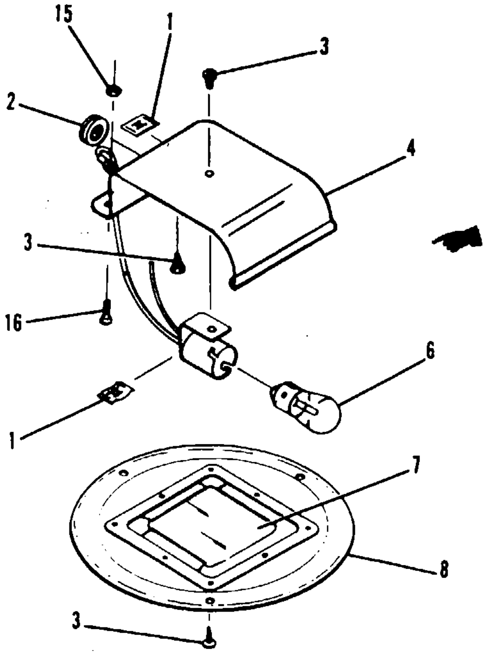
Figure 16-8. Flashing Beacon Light Installation



THRU AIRCRAFT SERIAL FR172-0324

Detail A

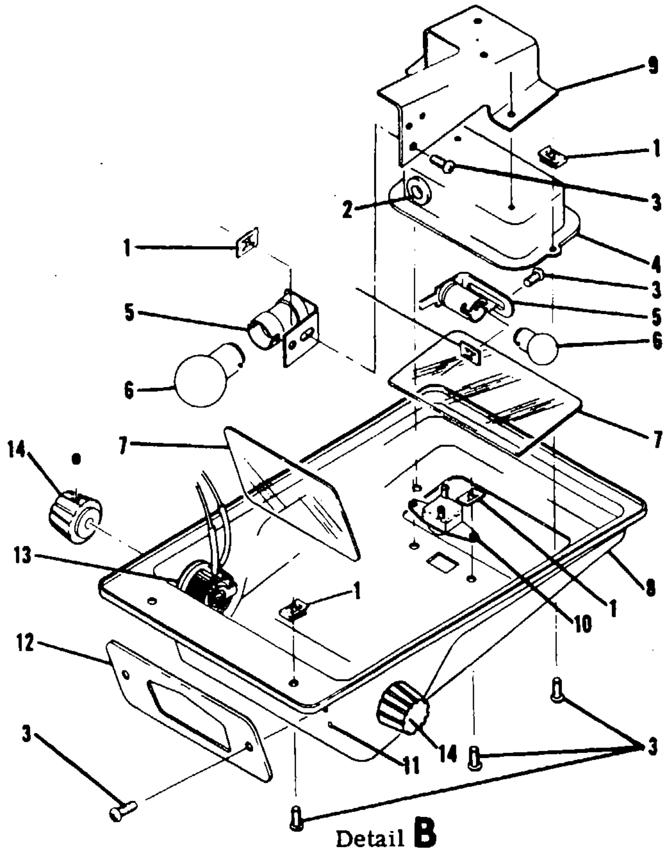




BEGINNING WITH AIRCRAFT SERIAL FR172-0325

Detail A

COURTESY LIGHT INSTALLATION



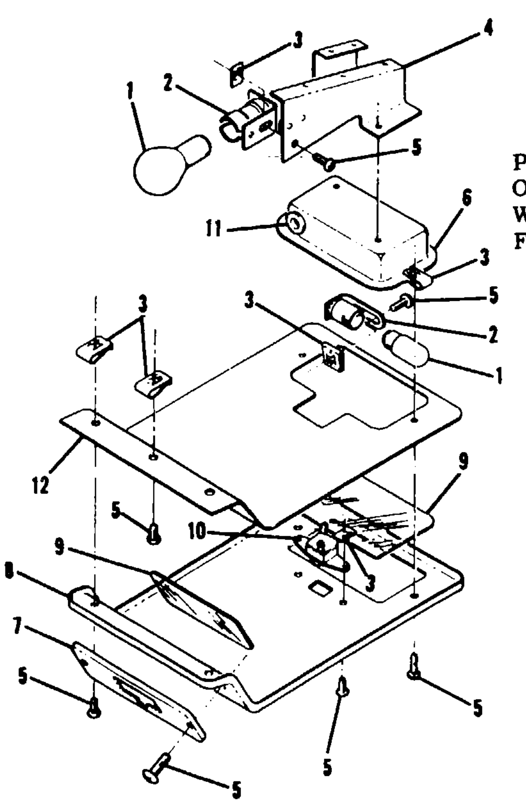
Detail B

INSTRUMENT & DOME LIGHT CONSOLE

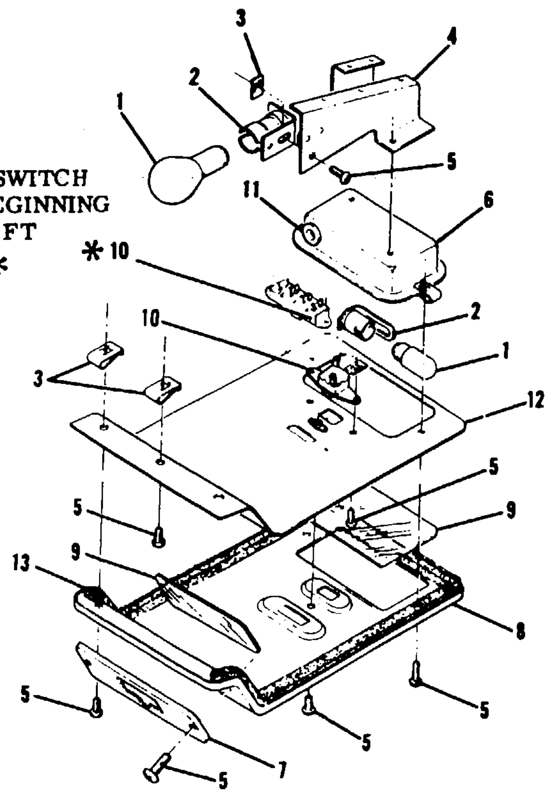
THRU 1970 MODELS ONLY

1. Tinnerman Nut
2. Grommet
3. Tinnerman Screw
4. Reflector
5. Socket
6. Bulb
7. Lens
8. Cover
9. Bracket
10. Switch
11. Nutplate
12. Shield
13. Rheostat
14. Knob
15. Nut
16. Machine Screw

Figure 16-9. Instrument, Dome and Courtesy Light Installation (Sheet 1 of 2)



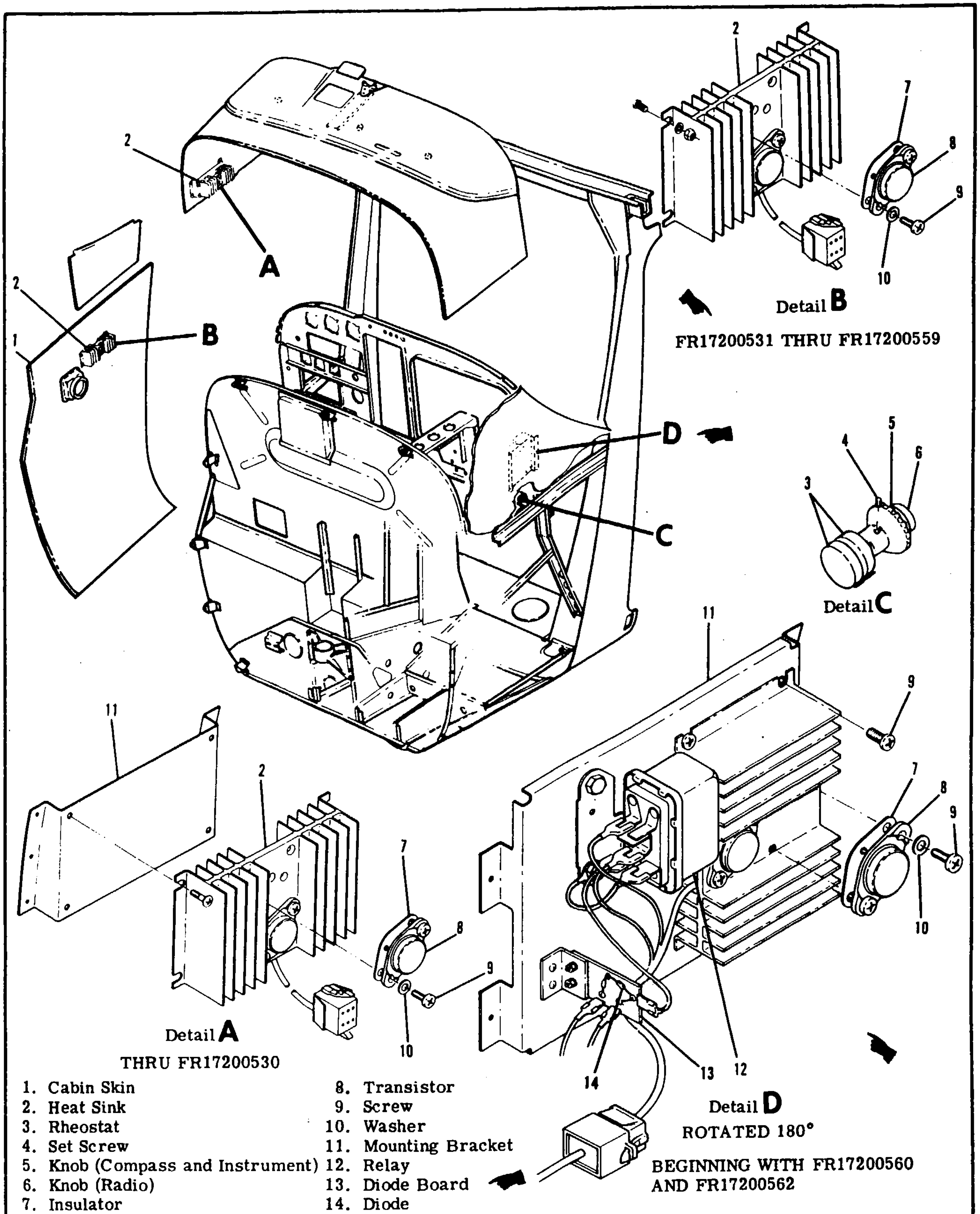
1971 MODELS



BEGINNING WITH 1972 MODELS

1. Lamp
2. Socket
3. Tinnerman Nut
4. Bracket
5. Screw
6. Reflector
7. Adjustment Shield
8. Cover Assembly
9. Lens
10. Switch
11. Grommet
12. Support
13. Seal

Figure 16-9. Instrument, Dome and Courtesy Light Installation (Sheet 2 of 2)



1. Cabin Skin
2. Heat Sink
3. Rheostat
4. Set Screw
5. Knob (Compass and Instrument)
6. Knob (Radio)
7. Insulator
8. Transistor
9. Screw
10. Washer
11. Mounting Bracket
12. Relay
13. Diode Board
14. Diode

BEGINNING WITH AIRCRAFT SERIAL FR17200226

Figure 16-9A. Transistorized Dimming

16-52. CONTROL WHEEL MAP LIGHT. An optional control wheel map light is available on the FR172 model. The map light is mounted on the underside of the control wheel and the light intensity is controlled by a thumb operated rheostat. For dimming, the rheostat should be turned clockwise. Beginning with 1972 models the control wheel map light is internally mounted in the control wheel. A rheostat switch located on the forward side of the control wheel controls the map light.

CAUTION

Thru 1970 aircraft only, failure to observe polarity shown on wiring diagram (page 19-31), will result in immediate failure of the transistor on the map light circuit board assembly.

16-53. REMOVAL AND REPLACEMENT OF CONTROL WHEEL MAP LIGHT ASSEMBLY. (THRU AIRCRAFT SERIAL FR17200225). Refer to figure 16-11.

a. For easy access to the map light assembly, rotate the control wheel 90°.
b. Remove the four screws from the map light circuit board. The map light assembly will then be free for removal from the control wheel.
c. Label the wires connecting to the map light circuit board assembly and remove the screws securing the wires to the circuit board assembly.
d. To install the map light assembly, reverse this procedure.

16-54. REMOVAL AND REPLACEMENT OF CONTROL WHEEL MAP LIGHT ASSEMBLY. (AIRCRAFT SERIAL FR17200226 THRU FR17200275) Refer to figure 16-11.

a. For easy access to the map light assembly rotate the control wheel 90°.
b. Label the wires connecting to the map light assembly (terminal block) and remove the screws securing the wires to the terminal block.
c. The assembly should now be free for removal. Remove the two screws securing the map light to the control wheel and remove the map light assembly.
d. For reassembly reverse this procedure.

16-54A. REMOVAL AND INSTALLATION OF CONTROL WHEEL MAP LIGHT ASSEMBLY (AIRCRAFT SERIAL FR17200276 THRU FR17200340). Refer to figure 16-11.

a. Disconnect electrical cable connector on aft side of the control wheel.
b. Remove screws securing plate to control wheel. back plate to the control wheel tube adapter and remove wheel.
c. Remove the screws securing plate to the control wheel.
d. Remove lamp and reflector unit.

NOTE

Lamp and reflector unit are bonded to the control wheel.

CAUTION

Care must be taken in removing excess bonding material, (do not hammer on control wheel) as control wheel could be damaged.

f. Using Conley Weld C1 and C2 or Hysol 5095 and 3673, bond new lamp and reflector unit to the control wheel.
g. To reassemble, reverse this procedure.

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

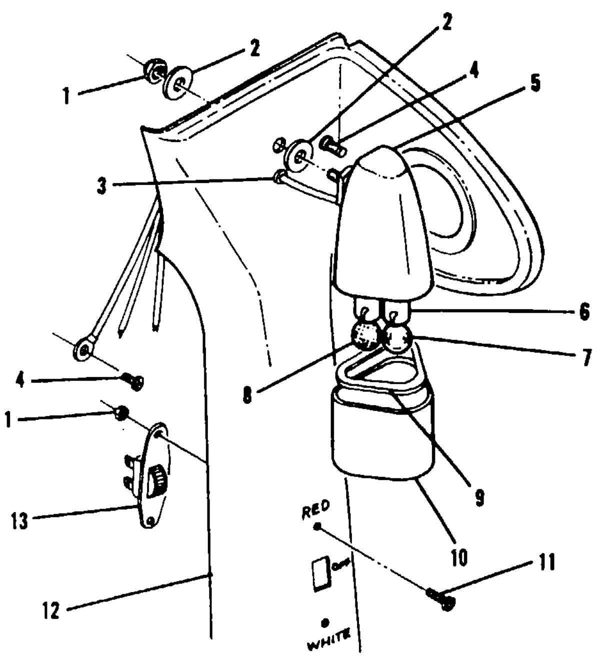


Figure 16-10. Map Light Installation

16-54B. REMOVAL AND REPLACEMENT OF CONTROL WHEEL MAP LIGHT ASSEMBLY (BEGINNING WITH FR17200341). Refer to figure 16-11. To remove, push upward on the lamp and turn. The lamp and reflector is replaced as a unit.

16-55. CONTROL WHEEL MOUNTED MIKE KEY SWITCH. See figure 16-11. An optional control wheel mounted mike key switch is offered on the FR172 in conjunction with the boom microphone installation. The switch is mounted on the left side of the pilots control wheel.

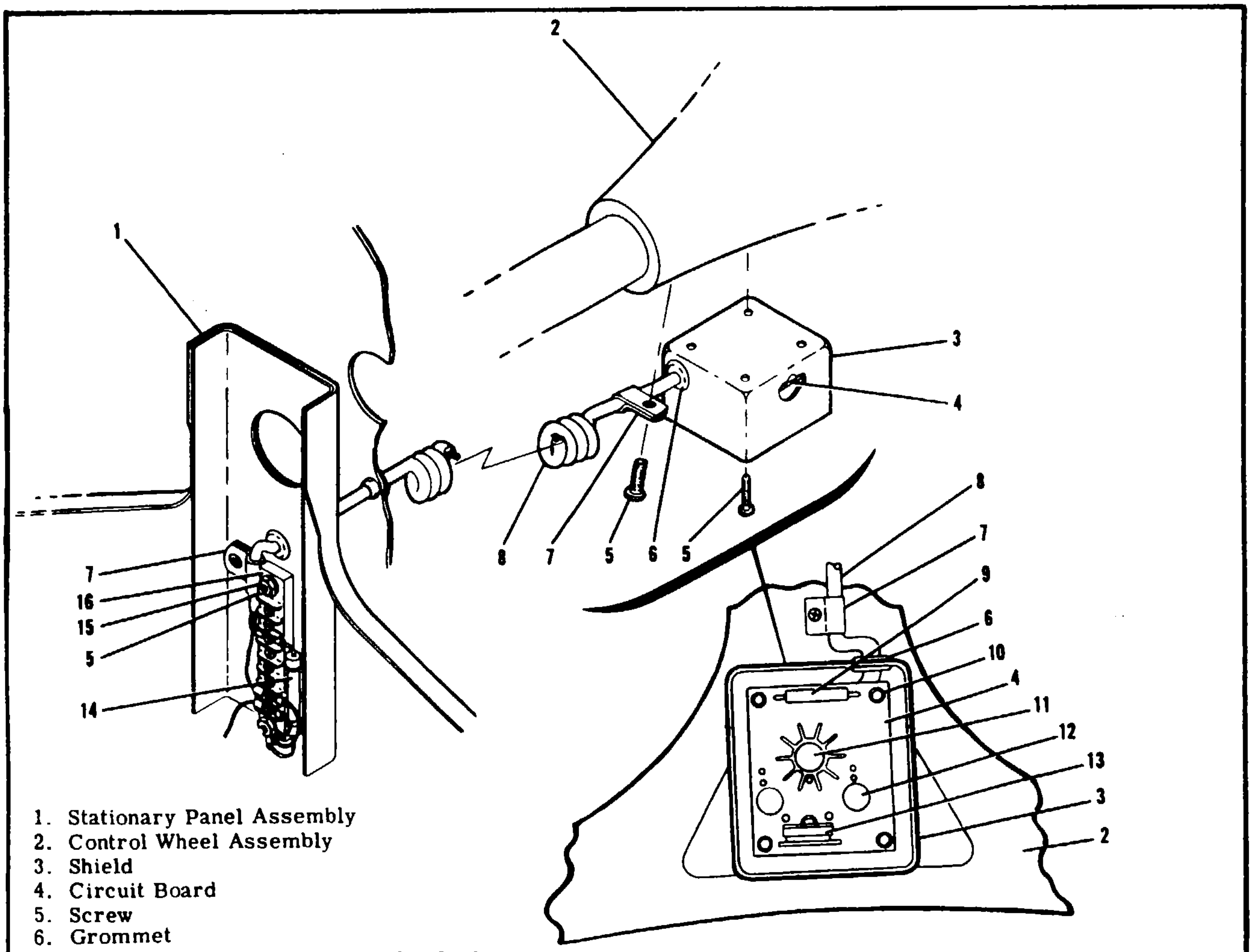
16-56. REMOVAL AND REPLACEMENT OF CONTROL WHEEL MOUNTED MIKE KEY SWITCH. For removal and replacement of mike key switch refer to figure 16-11.

16-57. ELECTRIC CLOCK. The electric clock is connected to the battery through a 1 ampere fuse mounted in the tailcone section near the battery box. The clock has a sweep second hand and is an electro-mechanical type which rewinds approximately every one and one-half minutes.

16-58. PITOT HEATER. 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 pull type switch on the instrument panel. (See figure 16-12.)

16-59. REMOVAL AND REPLACEMENT OF PITOT HEATER. For removal and replacement of the pitot heater refer to figure 16-12.

16-60. CIGAR LIGHTER. The cigar lighter (located on the instrument panel) is equipped with a thermal-actuated circuit breaker which is attached to the rear



1. Stationary Panel Assembly
2. Control Wheel Assembly
3. Shield
4. Circuit Board
5. Screw
6. Grommet
7. Clamp
8. Cable Assembly
9. Resistor
10. Stand-Off
11. Diode
12. Light
13. Rheostat
14. 1/2 Amp - Fuse Assembly
15. Nut
16. Terminal Block

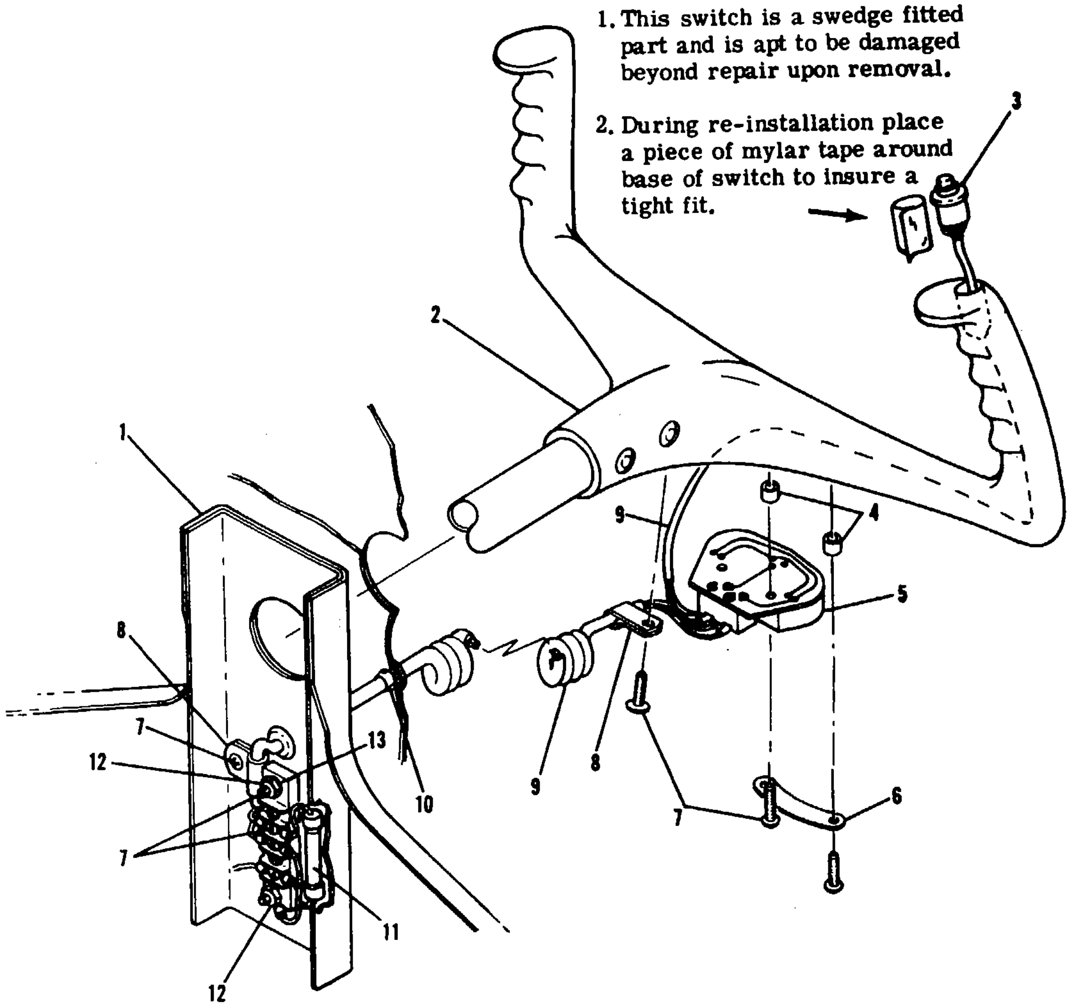
THRU 1970 MODELS

Figure 16-11. Control Wheel Map Light Installation (Sheet 1 of 3)

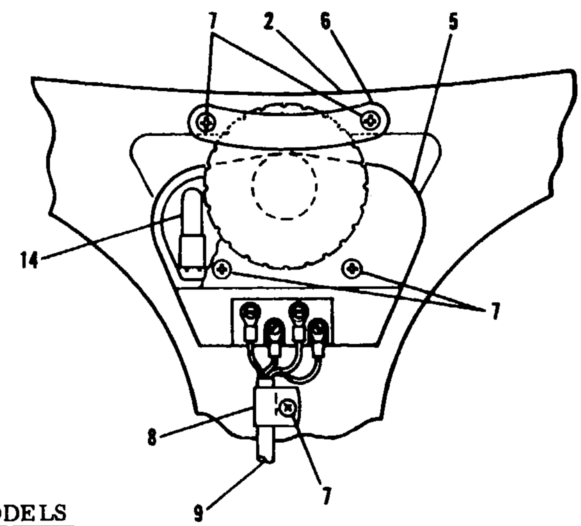
NOTES

1. This switch is a swedge fitted part and is apt to be damaged beyond repair upon removal.

2. During re-installation place a piece of mylar tape around base of switch to insure a tight fit.

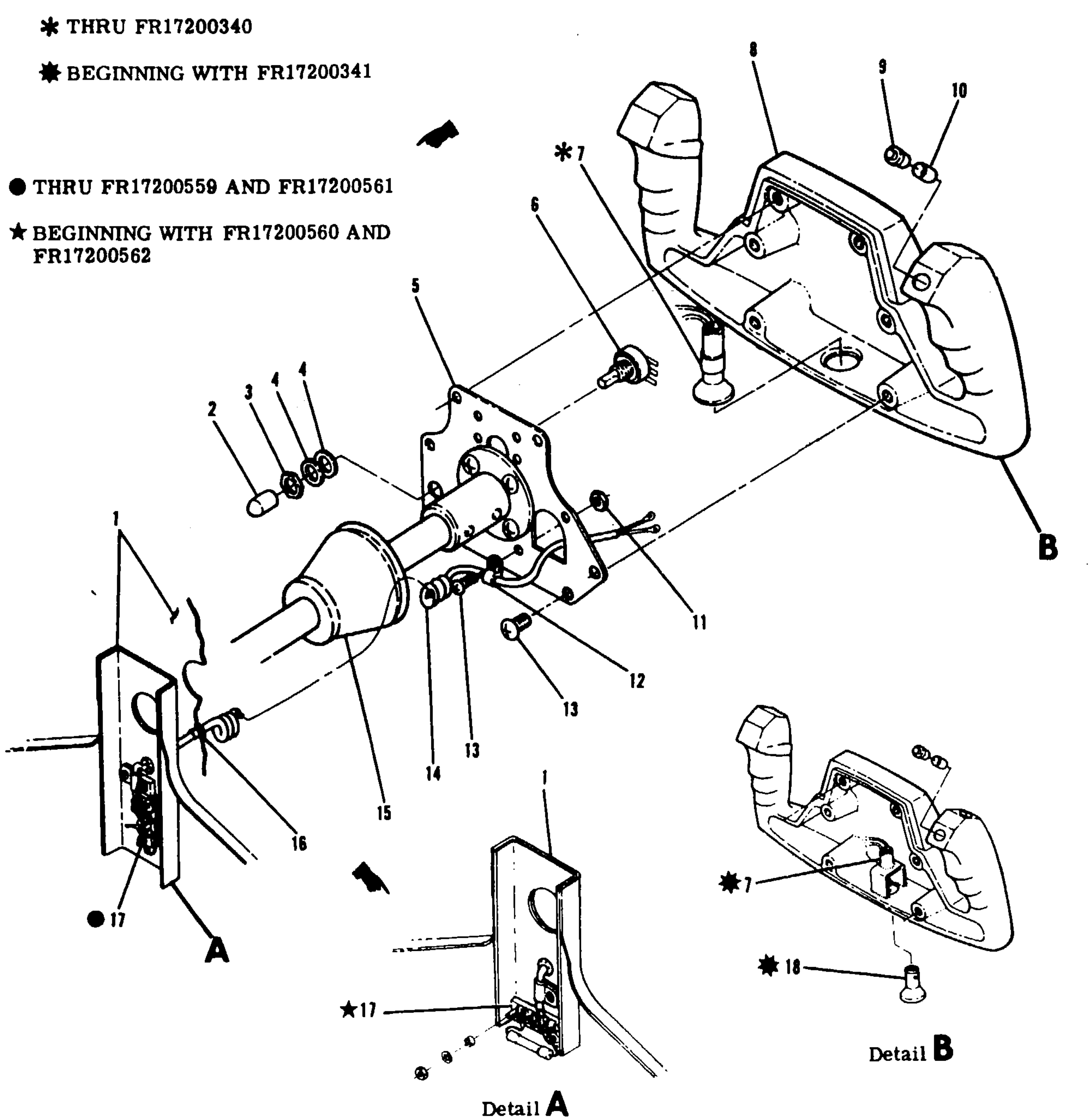


1. Stationary Panel Assembly
2. Control Wheel Assembly
3. Mike Key Switch
4. Spacer
5. Map Light Assembly
6. Bracket
7. Screw
8. Clamp
9. Cable Assembly
10. Grommet
11. Fuse
12. Nut
13. Lockwasher
14. Lamp



1971 MODELS

Figure 16-11. Control Wheel Map Light Installation (Sheet 2 of 3)



1. Stationary Panel
2. Cover
3. Nut
4. Washer
5. Plate
6. Rheostat
7. Socket
8. Control Wheel Assembly
9. Switch
10. Insulator
11. Nut
12. Clamp
13. Screw
14. Cable Assembly
15. Cover
16. Grommet
17. Terminal Block

BEGINNING WITH 1972 MODELS

Figure 16-11. Control Wheel Map Light Installation (Sheet 3 of 3)

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.

16-61. REMOVAL AND REPLACEMENT OF CIGAR LIGHTER. (See figure 16-13.)

a. Ensure that the master switch is "OFF."
b. Remove cigar lighter element.
c. Disconnect wire on back of lighter.
d. Remove shell that screws on socket back of panel.
e. The socket will then be free for removal.
f. To install a cigar lighter, reverse this procedure.

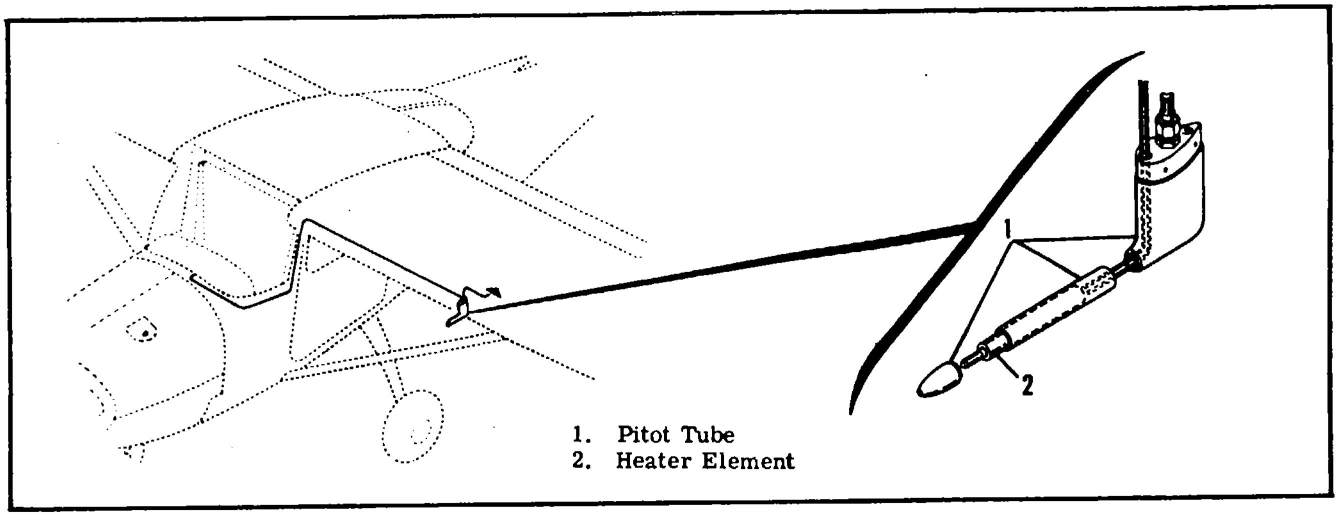


Figure 16-12. Pitot Heater Installation

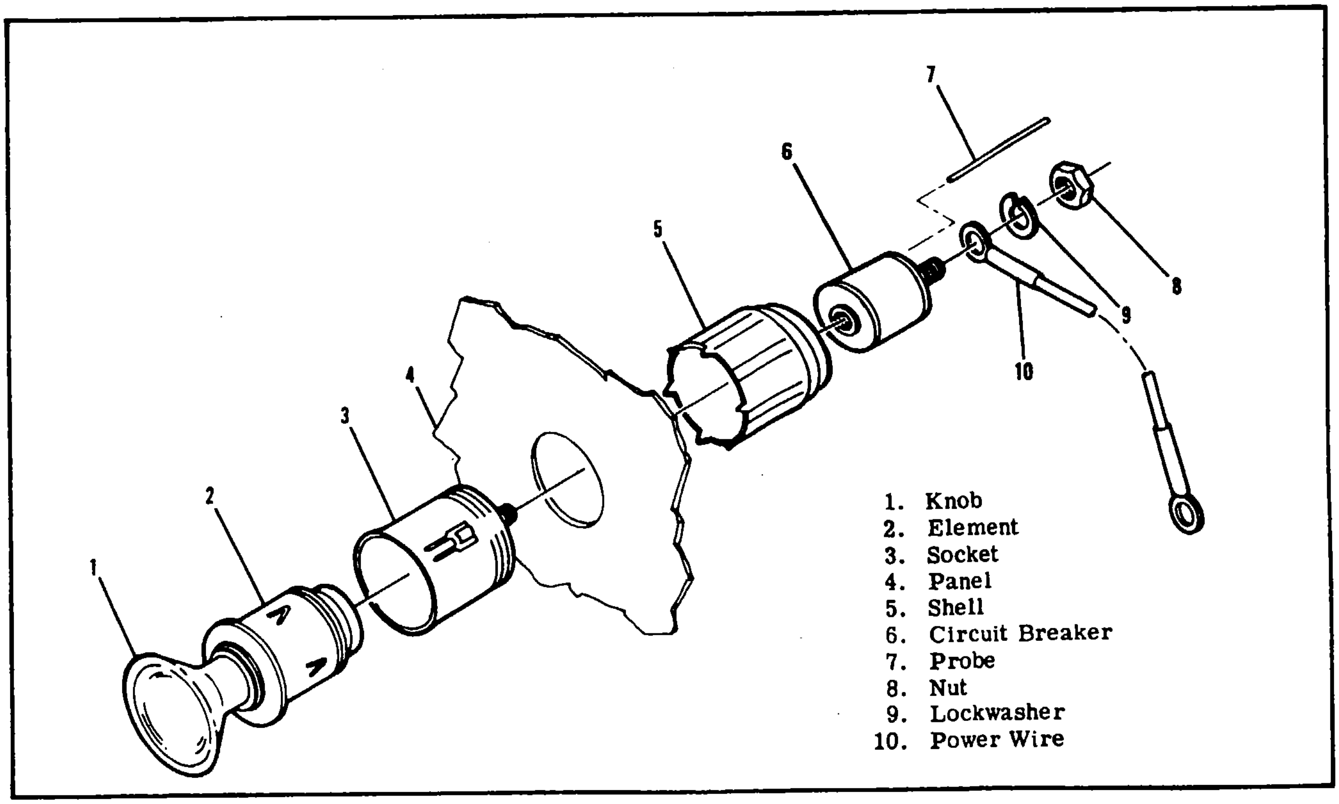


Figure 16-13. Cigar Lighter Installation

16-62. EMERGENCY LOCATOR TRANSMITTER.

16-63. DESCRIPTION. Several types of Emergency Locator Transmitters (ELT) have been installed in Cessna aircraft. Each of the ELT's is a self-contained, solid state unit, having its own power supply, with an external mounted antenna. The transmitters are designed to transmit simultaneously on dual emergency frequencies of 121.5 and 243.0 Megahertz. All units were mounted in the tailcone, aft of the baggage curtain on the right hand side. The transmitters were 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 serarch 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. ELT's thru early 1974 models, were equipped with a battery-pack containing six magnesium "D" size drv cell batteries wired in series. (See figure 16-15) Mid 1974 thru early 1975, ELT's are equipped with a battery-pack containing four "in-line" lithium "D" size batteries wired in series. Early 1975 and on ELT's are equipped with a battery-pack containing four lithium "D" size batteries which are stacked in two's (See fig. 16-16). 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	6 Cell Magnesium Battery Pack	4 Cell Lithium Battery Pack
+130°F	89 hrs	115 hrs
+ 70°F	95 hrs	115 hrs
- 4°F	49 hrs	95 hrs
- 40°F	23 hrs	70 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 3 years replacement of magnesium (6-cell) battery-packs and 5 years replacement of lithium (4-cell) battery packs.

16-64. 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 5 seconds or you may activate downed aircraft procedures by C. A. P., D. O. T. or F. A. A. personnel.

WARNING

Magnesium (6-cell) battery-packs (excluding 4 cell lithium battery-packs) after prolonged continuous use (1 hour) in a sealed environment give off explosive gas. If your ELT has operated for this time period or longer, as a precautionary measure, loosen the ELT cover screws, lift the cover to break air tight seal and let stand for 15 minutes before tightening screws. Keep sparks, flames and lighted cigarettes away from battery-pack.

NOTE

After relatively short periods of inactivation, the magnesium (6-cell) battery-pack develops a coating over its anode which drastically reduces self discharge and thereby gives the cell an extremely long storage life. This coating will exhibit a high resistance to the flow of electric current when the battery is first switched on. After a short while (less than 15 seconds), the battery current will completely dissolve this coating and enable the battery to operate normally. If this coating is present when your ELT is activated, there may be a few seconds delay before the transmitter reaches full power.

16-65. CHECKOUT INTERVAL:

100 HOURS.

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 5 seconds 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.

NOTE

Without its antenna connected, the ELT will produce sufficient signal to reach your receiver, yet it will not disturb other communications or damage output circuitry.

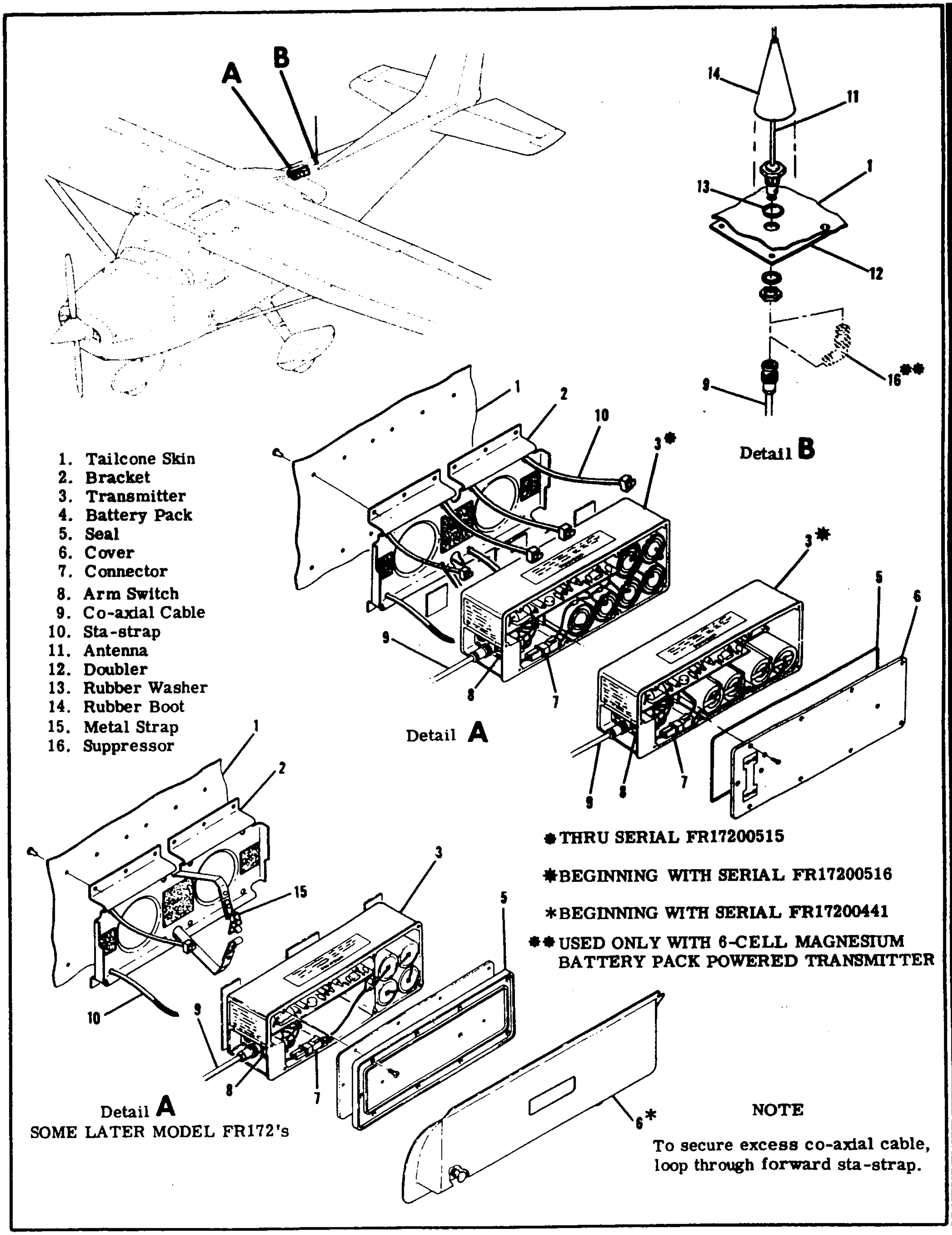


Figure 16-14. Emergency Loactor Transmitter Installation

NOTE

After accumulated test or operation time equals 1 hour, battery-pack replacement is required.

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.

16-66. REMOVAL AND INSTALLATION OF TRANSMITTER. (Refer to figure 16-14.)

a. Thru 1973 Models remove baggage curtain to gain access to the transmitter and antenna.

b. Beginning with 1974 Models remove cover in the extended portion of the baggage compartment to gain access to the transmitter, remove screws securing baggage compartment overhead cover and remove cover to gain access to the antenna.

c. Disconnect co-axial cable from end of transmitter.

d. Cut four sta-straps and remove transmitter.

e. Beginning with some later model FR172's, cut sta-strap and unlatch metal strap to remove transmitter.

NOTE

Transmitter is also attached to the mounting bracket by velcro strips, pull transmitter to free from mounting bracket and velcro.

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 #40 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 insure intimate contact. Allow 24 hours for complete cure.

f. 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.

16-67. REMOVAL AND INSTALLATION OF ANTENNA. (Refer to figure 16-14.)

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.

16-68. REMOVAL AND INSTALLATION OF MAGNESIUM SIX (6) CELL BATTERY-PACK. (Refer to figure 16-15.)

NOTE

Transmitters equipped with the 6 cell battery-pack can only use the 4 cell lithium battery-pack as a replacement battery-pack. Refer to paragraph 16-69 for replacement details.

b. Remove the nine screws and rubber washers attaching the cover to the case and then remove the cover to gain access to the battery-pack.

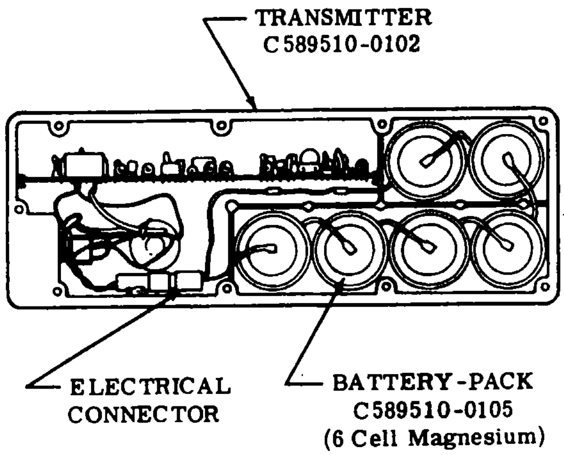


Figure 16-15. Magnesium 6 Cell Battery-Pack Installation

NOTE

Retain the rubber "O" ring gasket, screws and rubber washers for reinstallation.

c. When replacing the battery-pack with another 6 cell battery-pack which has a plastic connector attached to the battery leads, merely disconnect the old battery-pack and replace with a new battery-pack, making sure the plastic connectors are completely mated. (Refer to figure 16-14.)

CAUTION

Some early transmitters equipped with the 6 cell battery-pack were delivered with transmitter leads soldered directly to the battery-pack. Failure to observe proper polarity in connecting a new battery-pack in the transmitter may result in immediate failure of transistorized components attached to the printed circuit board in the transmitter.

NOTE

Before installing the new 6 cell battery-pack, check to ensure that its voltage is 10.8 volts or greater.

d. When replacing a 6 cell magnesium battery-pack with a 4 cell lithium battery-pack, merely disconnect the old battery-pack and replace with a 4 cell battery-pack, 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

If 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.

e. Replace the transmitter cover by positioning the rubber "O" ring gasket on the cover and pressing the cover and case togehter, attach with nine rubber washers and screws.

NOTE

Care should be taken to avoid trapping the rubber "O" ring gasket and over-tightening screws.

f. 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.

16-69. REMOVAL AND INSTALLATION OF LITHIUM FOUR (4) CELL BATTERY-PACK. (Refer to figure 16-16.)

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 the aircraft in accordance with para. 16-66, place the transmitter switch in tne OFF position.
b. Remove the nine screws attaching the cover to the case and then remove the cover to gain access to the battery-pack.

NOTE

Retain the rubber "O" ring gasket, rubber washers 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.

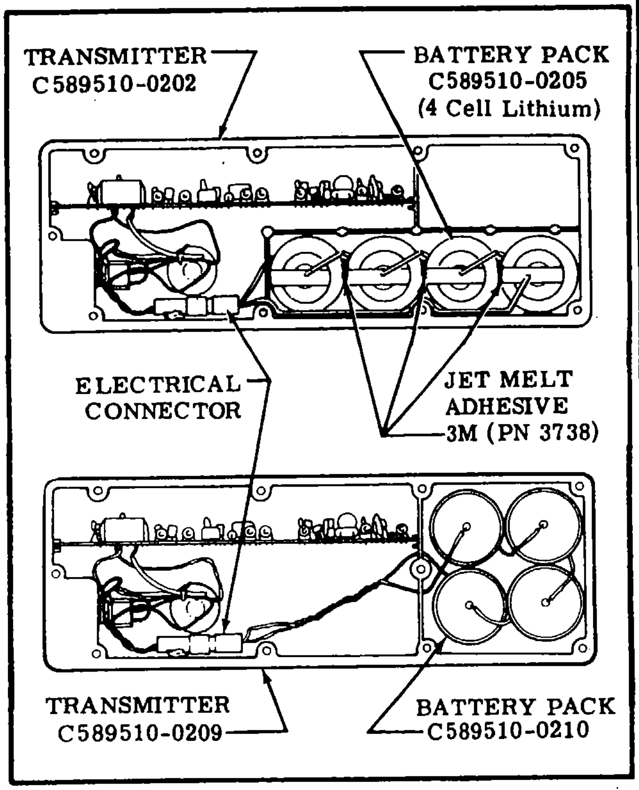


Figure 16-16. Lithium 4 Cell Battery Pack Installations

NOTE

Before installing the new 4 cell battery-pack, check to ensure that its voltage is 11.2 volts or greater.

CAUTION

If 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 by positioning the rubber "O" ring gasket on the cover and pressing the cover and case together. Attach cover with nine screws and rubber washers.

16-70. TROUBLE SHOOTING. Should your Emergency Locating Transmitter fail the 100 Hour 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. Remove plastic plug from the remote jack and by means of a Switchcraft #750 jackplug, connect a Simpson 260 model voltmeter and measure voltage. If the battery-pack voltage on the 6-cell magnesium battery pack transmitter is 10.8 volts or less, and on the 4-cell lithium 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 O.K. If the battery is O.K., check the transmitter as follows: a. Remove the voltmeter. b. By means of a switchcraft 750 jackplug and 3 inch 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.

SHOP NOTES:

ELECTRICAL LOAD ANALYSIS CHART

ALL MODELS

STANDARD EQUIPMENT (RUNNING LOAD)	AMPS REQD 1968	1969	1970	1971	1972	1973	1974	1975	1976
Battery Contactor	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Flap Position Indicator	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Fuel Indicator	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Instrument Lights	1.1	1.1	1 1	1.1	1.1	1.1	1.1	1.1	1.1
Position Lights	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6
Turn Coordinator	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Post Lights	—	—	—	—	—	—	1.12	1.12	—
OPTIONAL EQUIPMENT (RUNNING LOAD)									
Flashing Beacon	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Heated-Pitot	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Strobe Lights	—	—	—	4.0	4.0	4.0	4.0	4.0	4.0
Carburetor Air Temp	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	—
Cessna 300 ADF (Type R-521B)	1.6	1.6	1.6	1.6	—	—	—	—	—
Cessna 300 ADF (Type R-546A)	—	—	—	—	1.0	1.0	1.0	1.0	—
Cessna 300 ADF (Type R-546E)	—	—	—	—	1.0	1.0	1.0	1.0	1.0
Cessna 300 Marker Beacon (Type R-502B)	.02	.02	.02	.02	.02	.02	.02	.02	—
Cessna 300 Nav/Com (90 Channel-Type RT-517R)	4.5	4.5	4.5	4.5	—	—	—	—	—
Cessna 300 Nav/Com (360 Channel-Type RT-540A)	4.5	4.5	4.5	4.5	—	—	—	—	—
Cessna 300 Nav/Com (100 Channel-Type RT-508A)	—	—	—	—	1.9	1.9	—	—	—
Cessna 300 Nav/Com (360 Channel-Type RT-528A)	—	—	—	—	1.9	—	—	—	—
Cessna 300 Nav/Com (360 Channel-Type RT-528E)	—	—	—	—	—	1.9	1.9	1.9	—
Cessna 300 Nav/Com (360 Channel-Type RT-328A)	—	—	—	—	—	—	1.9	—	—
Cessna 300 Nav/Com (360 Channel-Type RT-328C)	—	—	—	—	—	—	1.5	—	—
Cessna 300 Nav/Com (360 Channel-Type RT-328D)	—	—	—	—	—	—	—	1.5	—
Cessna 300 Nav/Com (360 Channel-Type RT-308C)	—	—	—	—	—	—	1.5	1.5	—
Cessna 300 Transceiver (Type RT-524A)	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Cessna 300 HF Transceiver (Type PT-10A)	1.5	1.5	1.5	1.5	1.5	1.5	1.5	—	—
Cessna 300 Transponder (Type KT-75R)	1.5	1.5	1.5	1.5	1.5	—	—	—	—
Cessna 300 Transponder (Type KT-76 & KT-78)	—	—	—	—	1.3	1.3	1.3	1.3	1.3
Cessna 300 Transponder (Type RT-359A)	—	—	—	—	—	—	1.0	1.0	1.0
Cessna 300 Navomatic (Type AF-512C)	3.5	3.5	3.5	3.5	—	—	—	—	—
Cessna 300 Navomatic (Type AF-512D)	—	—	—	—	3.5	—	—	—	—
Cessna 300 Navomatic (Type AF-394A)	—	—	—	—	—	2.0	2.0	—	—
Cessna 300A Navomatic (Type AF-395A)	—	—	—	—	—	—	—	2.0	2.0
Cessna 300 DME (Type KN-60B)	3.0	3.0	3.0	3.0	—	—	—	—	—
Cessna 300 DME (Type KN-60C)	—	—	—	—	3.0	3.0	3.0	—	—
Cessna 400 Glideslope (Type R-543B)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	—	—
Cessna 400 Glideslope (Type R-443A)	—	—	—	—	—	0.4	0.4	0.4	—
King KA-25C Isolation Amplifier	0.5	0.5	0.5	—	—	—	—	—	—
King KY-95E	4.0	4.0	—	—	—	—	—	—	—

ELECTRICAL LOAD ANALYSIS CHART (CONT.)

ALL MODELS

OPTIONAL EQUIPMENT (RUNNING LOAD) (Cont.)	AMPS REQD								
	1968	1969	1970	1971	1972	1973	1974	1975	1976
King KX-160AE, -160E and -160FE (360 Channel)	2.5	2.5	2.5	—	—	—	—	—	—
King KX-160-1 (100 Channel)	2.5	2.5	2.5	—	—	—	—	—	—
King KX-150BE	4.7	—	—	—	—	—	—	—	—
Sunair SSB Transceiver (Type ASB-125)	—	—	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Narco Mark 12A Nav/Com	4.6	4.6	—	—	—	—	—	—	—
Narco Mark 12B Nav/Com with VOA-40 or VOA-50	—	4.6	4.6	4.6	—	—	—	—	—
Narco UGR-2 Glideslope Receiver	.23	.23	.23	.23	—	—	—	—	—
Brittain Wing Leveler	—	—	—	.28	.28	.28	—	—	—
Turn and Bank Indicator	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Cessna 400 Glideslope (Type R-443B)	—	—	—	—	—	—	—	—	0.4
Cessna 300 Nav/Com (360 Channel-Type RT-528E-1)	—	—	—	—	—	—	—	—	1.9
Cessna 400 Marker Beacon (Type-R-402A)	—	—	—	—	—	—	—	—	0.02
Bendix GM-247A Marker Beacon	—	—	—	—	—	—	—	—	0.1
Post Lights	—	—	—	—	—	—	—	—	1.28
Cessna 200A Navomatic (Type AF-295A)	—	—	—	—	—	—	2.0	—	—
Cessna 200A Navomatic (Type AF-295B)	—	—	—	—	—	—	—	2.0	2.0
Cessna EA-401A Encoding Altimeter	—	—	—	—	—	—	.065	.065	.065
Pantronics PT10-A HF Transceiver	—	—	—	—	—	—	—	1.5	1.5
King KN-60C DME	—	—	—	—	—	—	—	3.0	3.0
Narco 190 DME	—	—	—	—	—	—	—	—	3.0
ITEMS NOT CONSIDERED AS PART OF RUNNING LOAD									
Cigarette Lighter	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Clock	†	†	†	†	†	†	†	†	†
Control Wheel Map Light									
Courtesy and Dome Lights	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Flap Motor	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Landing Lights	15.6	15.7	15.6	15.6	15.6	15.6	15.6	15.6	15.6
Map Light	.33	.33	.33	.33	.33	.33	.33	.33	.33
Oil Dilution	—	—	—	—	1.0	1.0	1.0	1.0	1.0

† Negligible

SECTION 17

STRUCTURAL REPAIR

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17-1. STRUCTURAL REPAIR.

17-2. 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 nct specifically mentioned here.

17-3. EQUIPMENT AND TOOLS.

17-4. 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 17-1. 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.

17-5. 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.

17-6. 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.

17-7. WING AND HORIZONTAL STABILIZER ANGLE-OF-INCIDENCE.

17-8. The following chart lists wing angle-of-incidence and wing twist and horizontal stabilizer angle-of-incidence. Stabilizers do not have twist. Wings have a constant angle from the wing root to the strut fitting station. All twist in the wing panel is between the strut fitting and the tip rib. The amount of twist between these points is the difference between the angle-of-incidence at the root and the angle-of-incidence at the tip. Refer to figure 17-2 for instructions for checking wing twist.

WING
- Angle-of-incidence, Root . . . . . . +1° 30'
- Angle-of-incidence, Tip . . . . . . -1° 30'
- Twist (Washout) . . . . 3°

STABILIZER
- Angle-of-incidence . . . . -3° 30'

17-9. REPAIR MATERIALS. Thickness of a material on which a repair is to be made can easily be 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 2024-0 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.

17-10. WING.

17-11. DESCRIPTION. The 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.

17-12. WING SKIN.

17-13. 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 areas of low stress intensity, cracks, deep scratches, or deep, sharp dents, which after trimming or stop-drilling can be enclosed by a two-inch circle, can be considered negligible if the damaged area is at least one diameter of the enclosing circle away from all existing rivet lines and material edges. Stop drilling is considered a temporary repair and a permanent repair must be made as soon as practicable.

17-14. REPAIRABLE DAMAGE. Figure 17-4 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 a 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 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.

17-15. 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.

17-16. WING STRINGERS.

17-17. NEGLIGIBLE DAMAGE. Refer to paragraph 17-13.

17-18. REPAIRABLE DAMAGE. Figure 17-5 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.

17-19. DAMAGE NECESSITATING REPLACEMENT OF PARTS. If a stringer is so badly damaged that more than one section must be spliced, replacement is recommended.

17-20. WING AUXILIARY SPARS.

17-21. NEGLIGIBLE DAMAGE. Refer to paragraph 17-13.

17-22. REPAIRABLE DAMAGE. Figure 17-8 illustrates a typical auxiliary spar repair.

17-23. 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.

17-24. WING RIBS.

17-25. NEGLIGIBLE DAMAGE. Refer to paragraph 17-13.

17-26. REPAIRABLE DAMAGE. Figure 17-6 illustrates a typical wing rib repair.

17-27. 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. Center ribs, between the front and rear spar should always be repaired if practicable.

17-28. WING SPARS.

17-29. 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.

17-30. REPAIRABLE DAMAGE. Figure 17-7 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.

17-31. DAMAGE NECESSITATING REPLACEMENT OF PARTS. Damage so extensive that repair is not practicable requires replacement of a complete wing spar. Also refer to paragraph 17-2.

17-32. AILERONS.

17-33. NEGLIGIBLE DAMAGE. Refer to paragraph 17-13.

17-34. REPAIRABLE DAMAGE. Figure 17-4 may be used as a guide to repair damage to flat surface between corrugations, when damaged area includes corrugations refer to figure 17-10A. 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 17-36 for balancing. If damage would require a repair which could not be made between adjacent ribs, refer to paragraph 17-35.

17-35. 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 17-36 and figure 17-3.

17-36. AILERON BALANCING. Following repair, replacement or painting, the aileron must be balanced. Complete instructions for fabricating balancing fixtures and mandrels and their use are given in figure 17-3.

17-37. WING FLAPS.

17-38. NEGLIGIBLE DAMAGE. Refer to paragraph 17-13.

17-39. REPAIRABLE DAMAGE. Flap repairs should be similar to aileron repairs discussed in paragraph 17-34. A flap leading edge repair is shown in figure 17-10.

17-40. DAMAGE NECESSITATING REPLACEMENT OF PARTS. Flap repairs which require replacement of parts should be similar to aileron repairs discussed in paragraph 17-35. Since the flap is not considered a movable control surface, no balancing is required.

17-41. WING LEADING EDGE.

17-42. NEGLIGIBLE DAMAGE. Refer to paragraph 17-13.

17-43. REPAIRABLE DAMAGE. A typical leading edge skin repair is shown in figure 17-9. 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 17-11. If the damage would require a repair which could not be made between adjacent ribs, refer to the following paragraph.

17-44. 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 17-11.

17-45. ELEVATORS AND RUDDER.

17-46. NEGLIGIBLE DAMAGE. Refer to paragraph 17-13. 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.

17-47. REPAIRABLE DAMAGE. Skin patches illustrated in figure 17-4 may be used to repair skin damage to the rudder and between corrugations on the elevator. For skin damage to the elevator which includes corrugations refer to figure 17-10A. Following repair, the elevator and rudder must be balanced. Refer to paragraph 17-49 and figure 17-3 for balancing. If damage would require a repair which could not be made between adjacent ribs, see the following paragraph.

17-48. 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 17-49 and figure 17-3.

17-49. ELEVATOR AND RUDDER BALANCING. Following repair, replacement or painting, the elevators and rudder must be balanced. Complete instructions for fabricating balancing fixtures and mandrels and their use are given in figure 17-3.

17-50. FIN AND STABILIZER.

17-51. NEGLIGIBLE DAMAGE. Refer to paragraph 17-13.

17-52. REPAIRABLE DAMAGE. Skin patches illustrated in figure 17-4 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.

17-53. 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.

17-54. FUSELAGE.

17-55. DESCRIPTION. The fuselage is of semi-monocoque construction, consisting of formed bulkheads, longitudinal stringers, reinforcing channels, and skin panels.

17-56. NEGLIGIBLE DAMAGE. Refer to paragraph 17-13. 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

17-33A. CRACKS IN CORRUGATED AILERON SKINS (Continued from page 17-3)

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 17-33, -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 17-33, -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.

17-38A. CRACKS IN CORRUGATED FLAP SKINS (Continued from page 17-3)

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 17-38, -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 17-38, -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.

17-46A. CRACKS IN CORRUGATED ELEVATOR SKINS (Continued from page 17-4)

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 17-46, -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 17-46, -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.

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 17-13.

17-57. REPAIRABLE DAMAGE. Fuselage skin repairs may be accomplished in the same manner as wing skin repairs outlined in paragraph 17-14. Stringers, formed skin flanges, bulkhead channels and similar parts may be repaired as shown in figure 17-5.

17-58. DAMAGE NECESSITATING REPLACEMENT OF PARTS. Fuselage skin major repairs may be accomplished in the same manner as the wing repairs outlined in paragraph 17-15. Damaged fittings must be replaced. Seat rails serve as structural parts of the fuselage and must be replaced if damaged.

17-58A. BONDED DOORS.

17-58B. 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 AC 43.13-1 are also applicable to bonded doors.

17-59. BULKHEADS.

17-60. 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. Any other damage must be repaired by replacing the landing gear support assembly as an aligned unit.

17-61. 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.

17-62. REPLACEMENT OF HI-SHEAR RIVETS. Hi-shear rivet replacement with close tolerance bolts of 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:

a. NAS464P* Bolt, MS21042-* Nut and AN960-* washer in place of Hi-Shear Rivets for forgings with machined flat surface around attachment holes.

b. NAS464P* Bolt, ESNA 2935* Mating Base Ring, ESNA LH2935* Nut for forgings (with draft angle of up to a maximum of 8°) without machined flat surface around attachment holes.

*Dash numbers to be determined according to the size of the holes and the grip lengths required. The bolts grip length should be chosen so that no threads remain in the bearing area.

17-63. FIREWALL DAMAGE. Firewalls may be repaired by removing the damaged material 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 stainless steel rivets. Damaged or deformed angles and stiffeners may be repaired as shown in figure 17-12, or they may be replaced. A severely damaged firewall must be replaced as a unit.

17-64. ENGINE MOUNT.

17-65. DESCRIPTION. The mount for the aircraft engine is constructed of 4130 chrome-molybdenum steel tubing. A truss structure, fastened to the firewall at four points, supports a cradle arrangement. This cradle arrangement with its supporting lugs, forms the base for rubber shock mounted engine supports.

17-66. 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.

17-67. ENGINE MOUNT SUPPORT CRADLE DAMAGE. Minor damage such as a crack adjacent to an engine attaching lug may be repaired by rewelding the cradle tube and extending a gusset past the damaged area. Extensively damaged parts must be replaced.

17-68. 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.

17-69. 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.

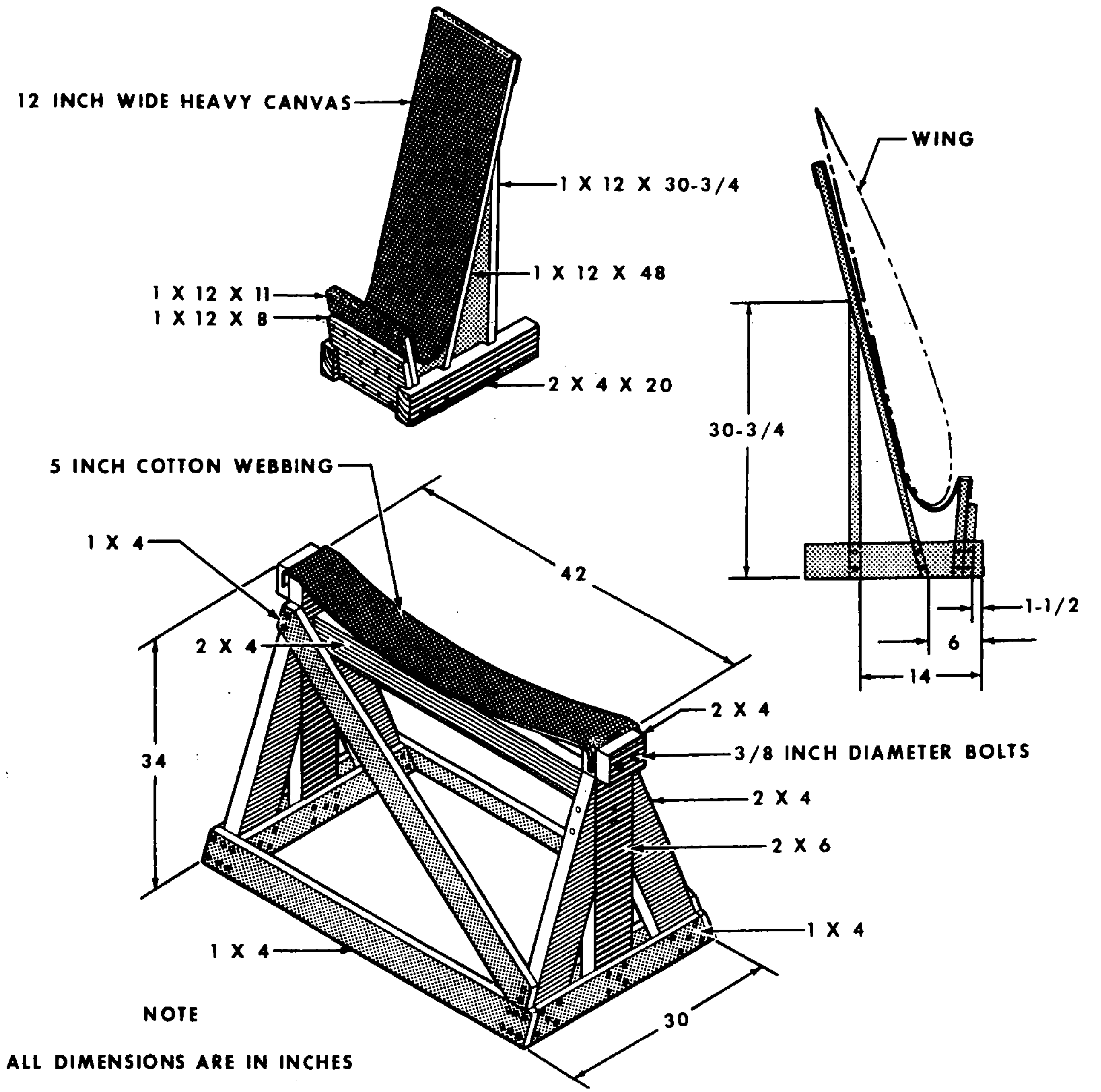


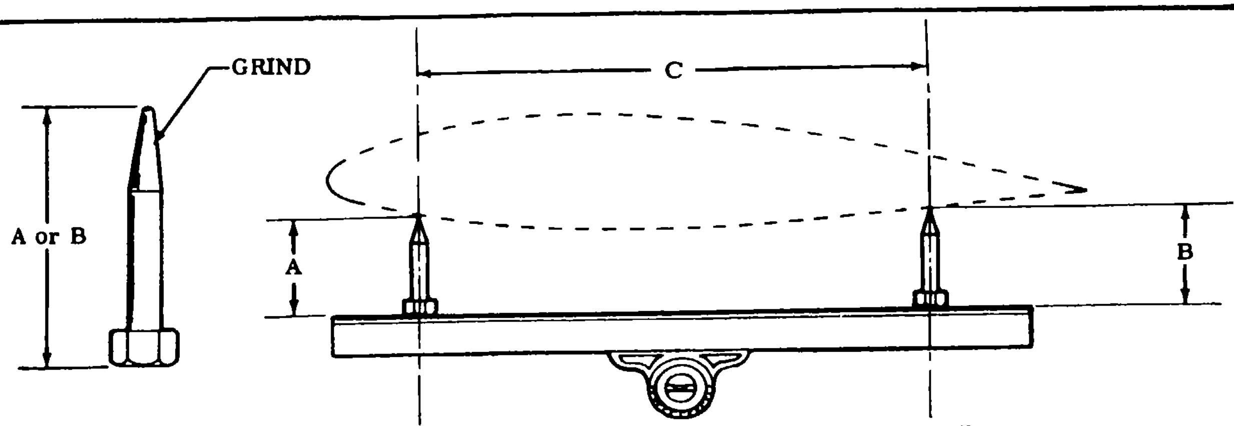
Figure 17-1. Wing and Fuselage Support Stands

17-70. ENGINE COWLING.

17-71. REPAIR OF COWLING SKINS. If extensively damaged, complete sections of cowling 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 cowling 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 cowling may be replaced by a single 3/32, 2117-AD rivet per running inch of bond seam. The standard repair procedures outlined in AC 43.13-1 are also applicable to cowling.

17-72. 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.

17-73. REPAIR OF ABS COMPONENTS. Rezolin Repair Kit Number 404 may be obtained from the Cessna Service Parts Center for repair of ABS components.



	A	B	C	WING STATION
●THRU 1972 MODELS	2.00	1.00	29.50	39.00
	2.00	1.00	29.50	100.50
★BEGINNING WITH 1973 MODELS	★ .45	1.00	24.00	207.00
	● .59	1.00	24.00	207.00

ALL WING TWIST OCCURS BETWEEN STA. 100.50 AND STA. 207.00.
(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 (stating as clear as possible from "cans"), 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 17-2. Measuring Wing Twist

17-74. 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.

BALANCING PROCEDURES

1. Balance control surfaces in an enclosed draft free area.

2. Control surface to be balanced must be in the final flight configuration, painted (if applicable) trim tabs installed, and all foreign matter removed from inside control surface.

3. If control surface is to be painted remove all existing paint prior to repainting and rebalancing. Good workmanship and standard repair practices should not result in excessive additional balance weight.

4. Place balancing mandrels (detail B) on a table or other suitable FLAT, LEVELED surface. Mandrels must be placed at 90° to the hinge line of the control surface.

5. On control surfaces with the piano type hinges, insert inboard and outboard hinges into slotted ends of the balancing mandrels, making sure that balancing mandrels are 90° to the hinge line. On control surfaces with the bearing type hinge point, bolts or pins are inserted through the attaching brackets, then placed on the knife edges of the mandrels as illustrated in (detail H).

6. AILERONS.
   a.
      (1) Block up the trailing edge of the aileron until a spirit-level protractor placed on the front face of the aileron spar at W.S. 154.00 (± 6.00), (detail E), indicates 57° 10', (detail D).

      (2) ALTERNATE METHOD:
      Measure the vertical distance from the aileron hinge point to the leveled surface. Subtract 1.80 inches, then block up trailing edge of the aileron to this measurement.

   b. With the aileron blocked in position place the balancing beam (detail A) at W.S. 154.00, (90° to the hinge line), and adjust the trailing edge support on the balancing beam (detail D) until the beam is level. If the aileron has not been disturbed during this operation, the beam is now parallel to the aileron chord line at W.S. 154.00 (detail D).

      NOTE

      The above procedure must be performed with care. Small angular discrepancies will produce large balancing errors.

   c. Remove balancing beam and balance the beam by itself at the knife edges by adding washers as shown, (detail C).

   d. Place the balancing beam on the aileron in its original position, then remove the blocks from beneath the trailing edge.

   e. Place the sliding weight (detail D) on the forward end of the balancing beam, moving it along the beam until the beam is again level. A small, lightweight, spirit-level may be used for this purpose provided it is symmetrical about its bubble reference and this reference is placed on the beam directly over the aileron hinge line (detail D).

   f. If aileron is correctly balanced, the position of the sliding weight with respect to the aileron hinge line, will produce a moment about the hinge line somewhere within the underbalance tolerance listed in the chart on (Sheet 5 of 5).

   g. If modification of the aileron balance weight is necessary to correct an out-of-tolerance condition, the balance weight can be lightened by drilling out part of the weight on the inboard end. The weight can be increased by a reasonable amount by ordering additional weight and gang channel listed in the applicable Parts Catalog, and installing next to the inboard weight the minimum amount necessary for correct balance. The minimum amount that must be installed, however, must contain at least two attaching rivets. If this minimum amount results in an over-balanced condition, the new weight and/or old weights can be lightened.

Figure 17-3. Control Surface Balancing (Sheet 1 of 5)

7. RUDDER AND ELEVATORS.

a. With the rudder/elevator set upon a FLAT, LEVELED surface, block up the trailing edge until a center line through the attaching bolt and the trailing edge is equal distance from the leveling surface (detail H).

b. Place the balancing beam (detail A) on the rudder/elevator near the center attaching bracket, (90° to the hinge line). Adjust the trailing edge support on the balancing beam (detail H) until the beam is level. If the rudder/elevator has not been disturbed during this operation, the beam is now parallel to the chord line of the rudder/elevator.

NOTE

The above procedure must be performed with care. Small angular discrepancies will produce large balancing errors.

c. Mark position of the balancing beam, then remove and balance the beam by itself at the knife edges by adding washers as shown in (detail C).

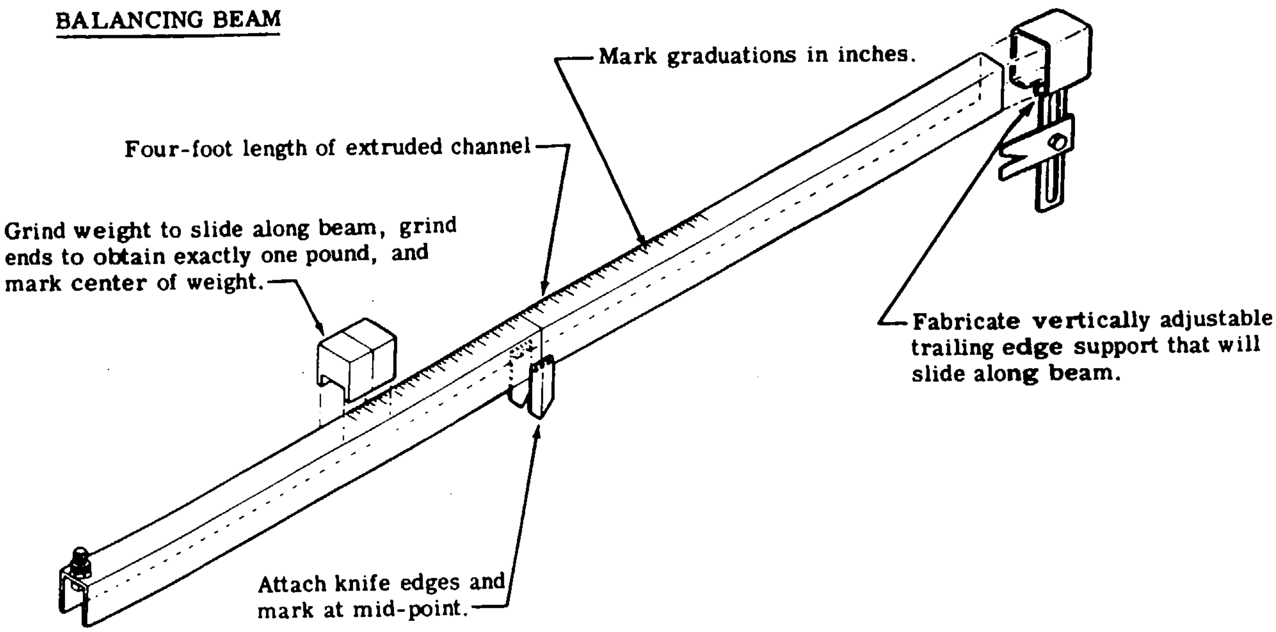
d. Place the balancing beam on the rudder/elevator in its original position, then remove the block from beneath the trailing edge.

e. Place the sliding weight (detail H) on the forward end of the balance beam, move it along the beam until the beam is again level. A small, lightweight, spirit-level may be used for this purpose provided it is symmetrical about its bubble reference and this reference is placed on the beam directly over the rudder/elevator hinge line (detail H).

f. If the rudder/elevator is correctly balanced, the position of the sliding weight with respect to the rudder/elevator hinge line, will produce a moment about the hinge line somewhere within the underbalance tolerance listed in the chart on (Sheet 5 of 5).

g. If modification of the rudder/elevator balance weight is necessary to correct an out-of-balance condition, the balance weight can be lightened by drilling out part of the weight. The weight can be increased by fusing bar stock solder to the weight after removal from rudder/elevator.

BALANCING BEAM



Detail **A**

Figure 17-3. Control Surface Balancing (Sheet 2 of 5)

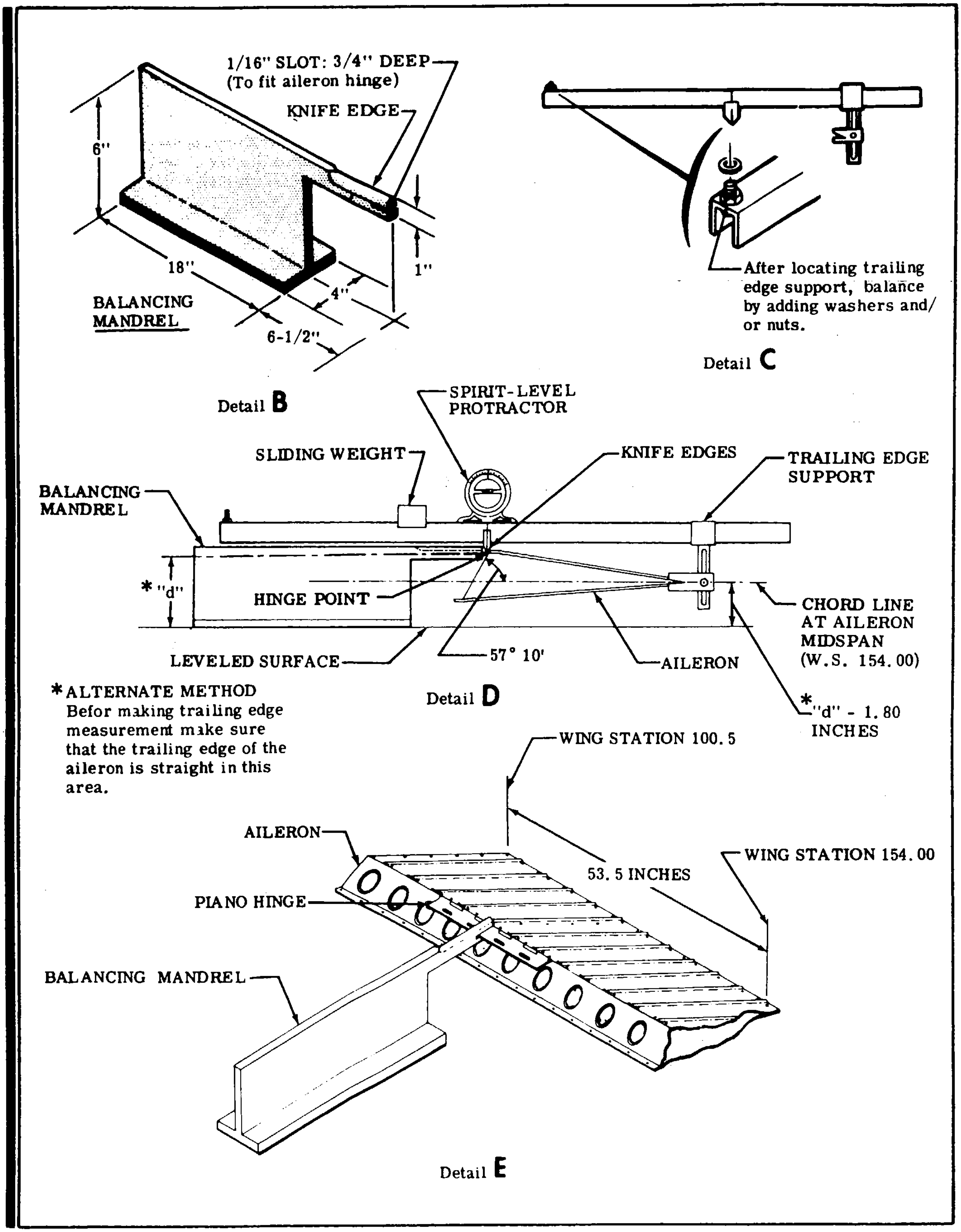


Figure 17-3. Control Surface Balancing (Sheet 3 of 5)

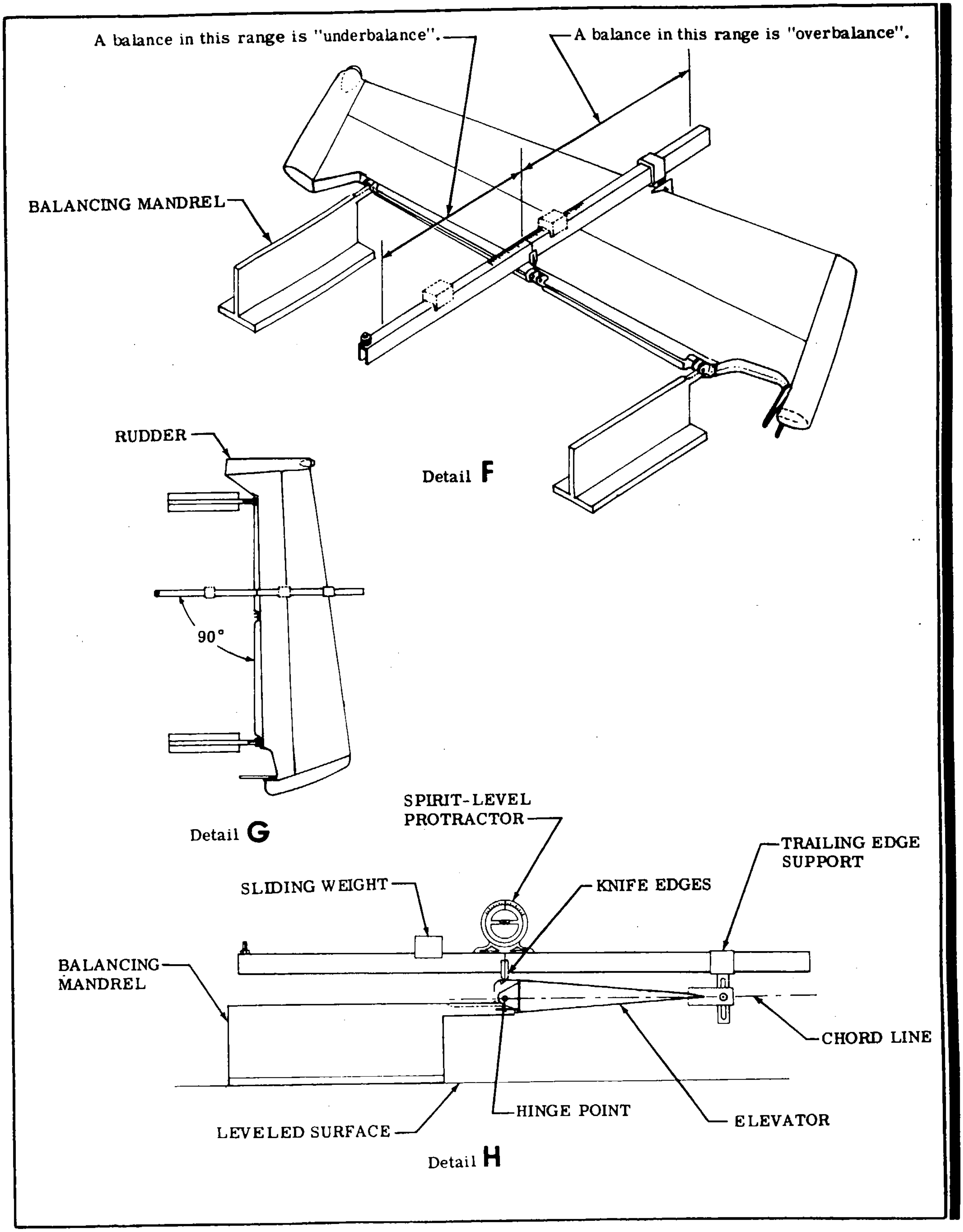


Figure 17-3. Control Surface Balancing (Sheet 4 of 5)

CONTROL SURFACE BALANCE REQUIREMENTS

NOTE

Unpainted values are not limits which must be met. They are given as guides, in order that the unbalance of the control surface in the final aircraft configuration may be predicted. If the control surface in the unpainted condition falls within the unpainted limit, the mechanic may feel confident that the control surface will be acceptable after painting. However, if the surface in the unpainted condition exceeds the unpainted limit, the balance must be checked again after final painting to assure that the control surface falls within the painted unbalance limit. Refer to GENERAL NOTES on sheet 3 for specific conditions.

DEFINITIONS:

UNDERBALANCE is defined as the condition that exists when the control surface is trailing edge heavy, and is symbolized by a plus (+).

OVERBALANCE is defined as the condition that exists when the control surface is leading edge heavy, and is symbolized by a minus (-).

CONTROL: AILERON

PAINTED (Inch-Pounds)	UNPAINTED (Inch-Pounds)
BALANCE LIMITS	BALANCE LIMITS
0.0 to + 11.31	0.0 to + 9.23

CONTROL: RUDDER

PAINTED (Inch-Pounds)	UNPAINTED (Inch-Pounds)
BALANCE LIMITS	BALANCE LIMITS
✱0.0 to +9.69	✱0.0 to +8.85
✱✱0.0 to + 6.7	✱✱0.0 to + 3.61

✱FR172E
✱✱FR172F, FR172G, FR172H, FR172J

CONTROL: RIGHT ELEVATOR

PAINTED (Inch-Pounds)	UNPAINTED (Inch-Pounds)
BALANCE LIMITS	BALANCE LIMITS
0.0 to + 24.5	0.0 to + 21.5

CONTROL: LEFT ELEVATOR

PAINTED (Inch-Pounds)	UNPAINTED (Inch-Pounds)
BALANCE LIMITS	BALANCE LIMITS
0.0 to + 18.5	0.0 to + 15.5

Figure 17-3. Control Surface Balancing (Sheet 5 of 5)

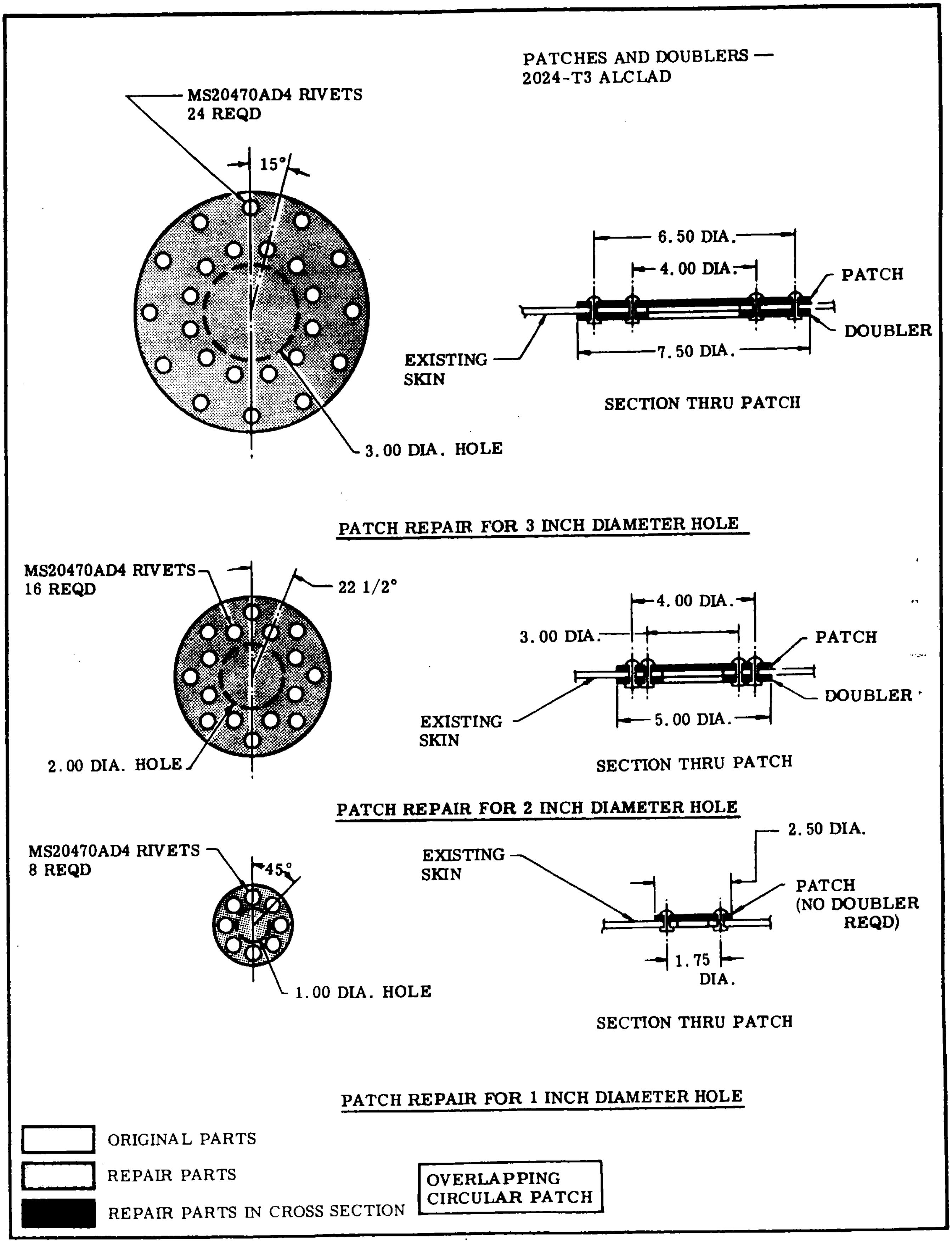
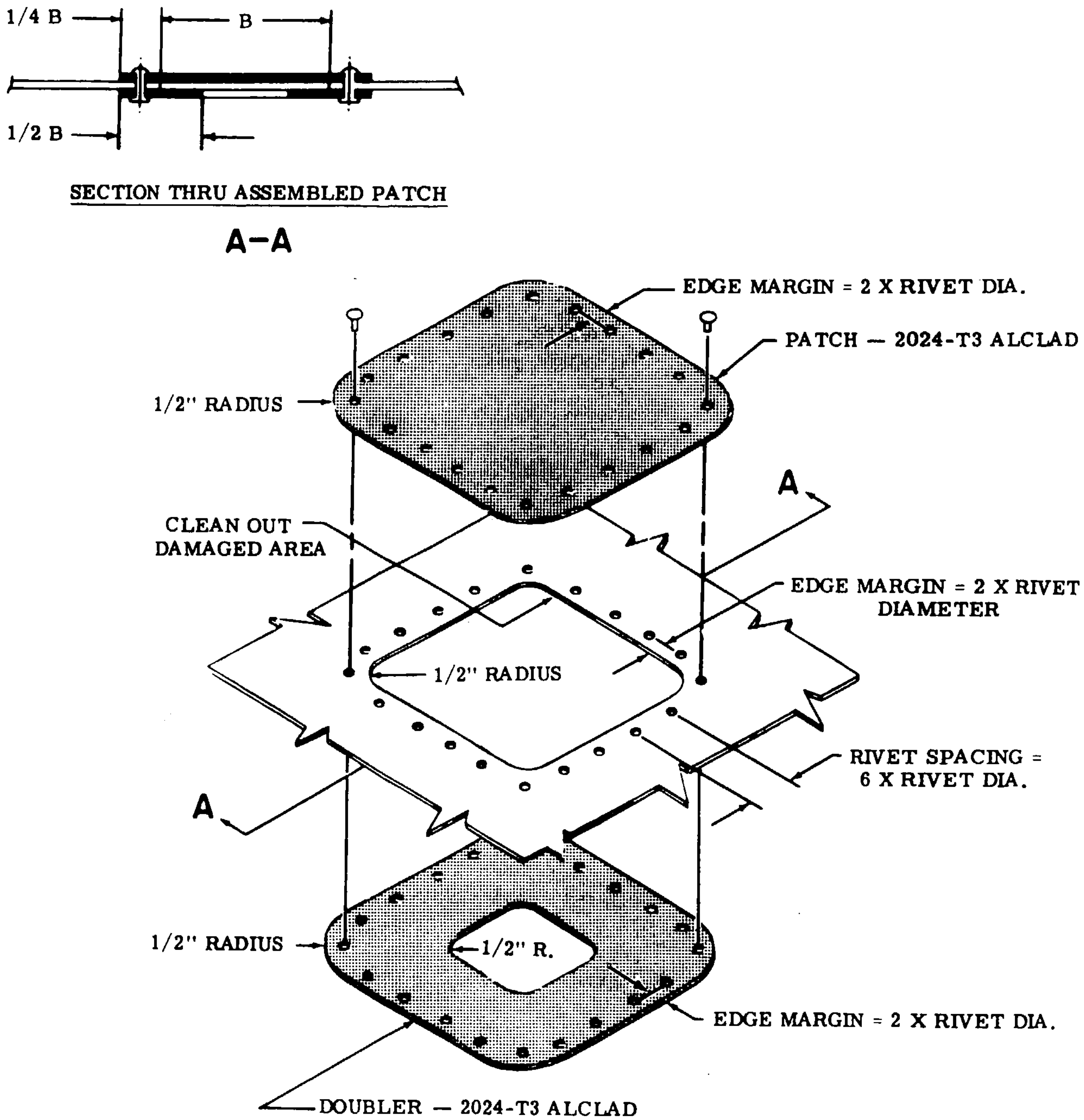


Figure 17-4. Skin Repair (Sheet 1 of 6)



OVERLAPPING RECTANGULAR PATCH

RIVET TABLE

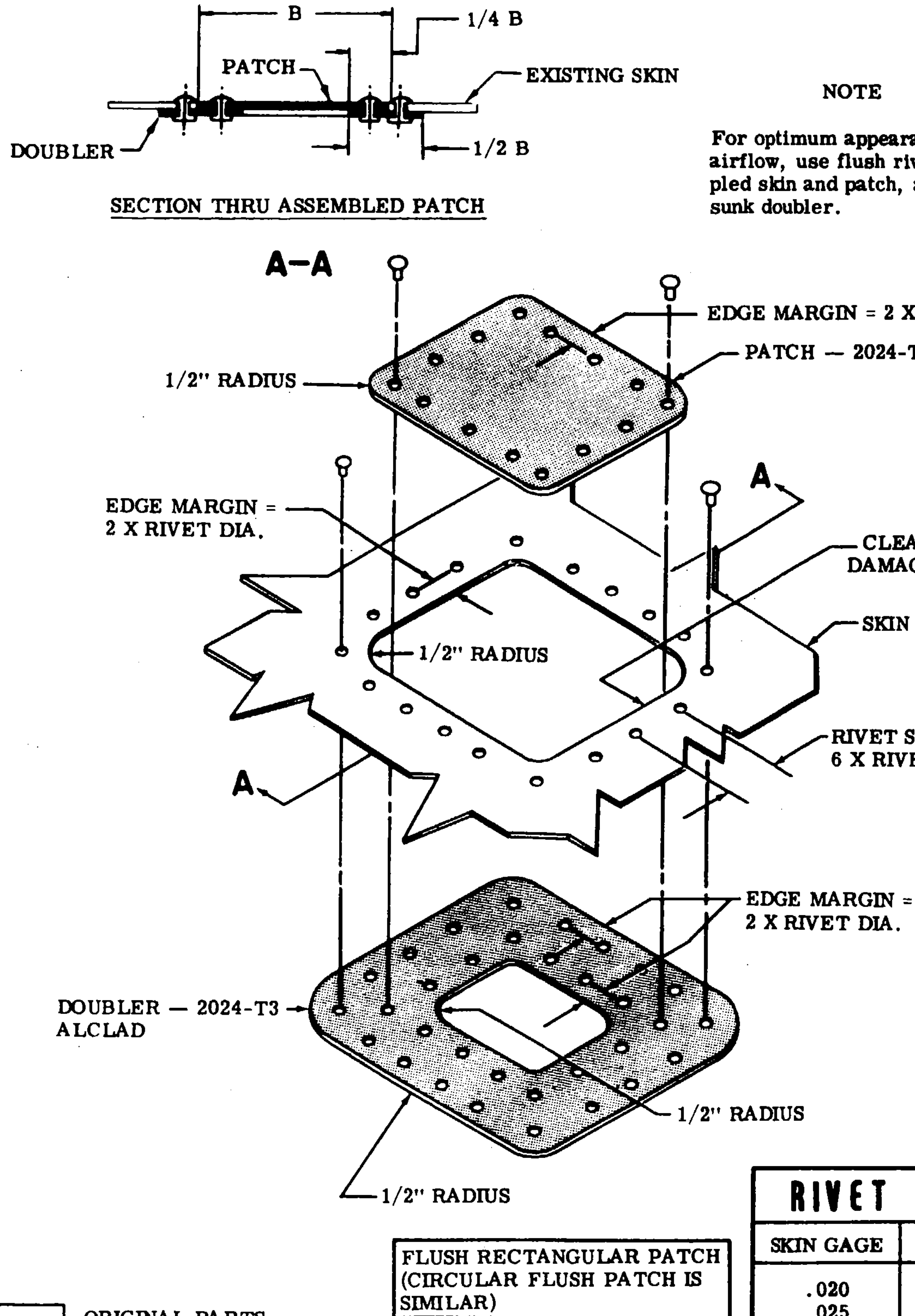
SKIN GAGE	RIVET DIA.
.020	1/8
.025	1/8
.032	1/8
.040	1/8
.051	5/32

ORIGINAL PARTS

REPAIR PARTS

REPAIR PARTS IN CROSS SECTION

Figure 17-4. Skin Repair (Sheet 2 of 6)



NOTE

For optimum appearance and airflow, use flush rivets, dimpled skin and patch, and countersunk doubler.

RIVET TABLE

SKIN GAGE	RIVET DIA.
.020	1/8
.025	1/8
.032	1/8
.040	1/8
.051	5/32

ORIGINAL PARTS

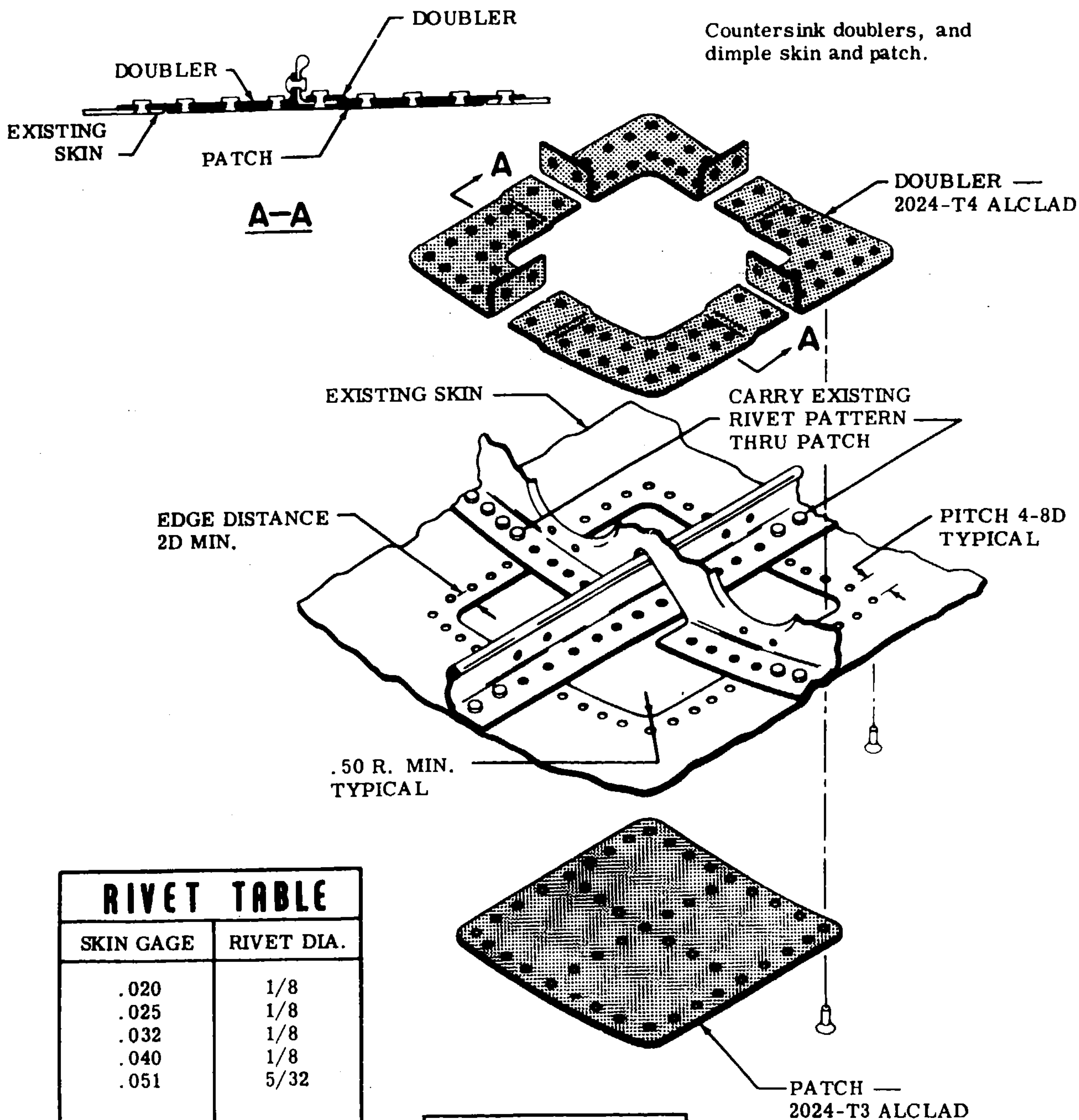
REPAIR PARTS

REPAIR PARTS IN CROSS SECTION

Figure 17-4. Skin Repair (Sheet 3 of 6)

NOTE

Countersink doublers, and dimple skin and patch.



RIVET TABLE	
SKIN GAGE	RIVET DIA.
.020	1/8
.025	1/8
.032	1/8
.040	1/8
.051	5/32

FLUSH PATCH AT STRINGER/BULKHEAD INTERSECTION

ORIGINAL PARTS

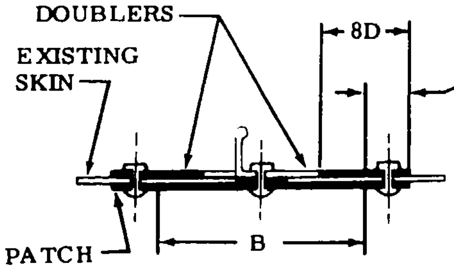
REPAIR PARTS

REPAIR PARTS IN CROSS SECTION

NOTE

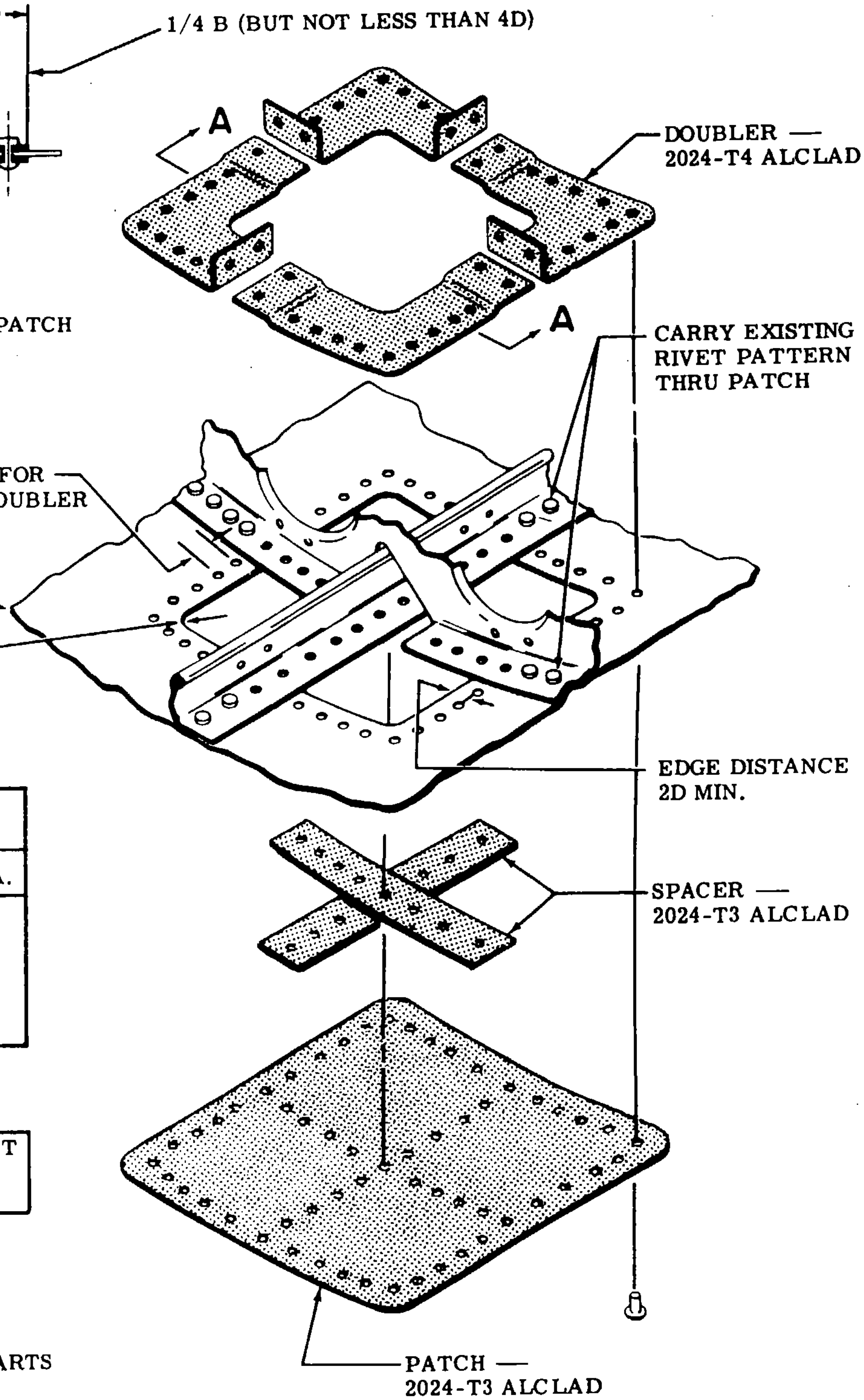
This procedure is not recommended in areas where stringers are riveted to bulkheads.

Figure 17-4. Skin Repair (Sheet 4 of 6)



A–A

SECTION THRU ASSEMBLED PATCH



RIVET TABLE

SKIN GAGE	RIVET DIA.
.020	1/8
.025	1/8
.032	1/8
.040	1/8
.051	5/32

OVERLAPPING PATCH AT STRINGER/BULKHEAD INTERSECTION

ORIGINAL PARTS

REPAIR PARTS

REPAIR PARTS IN CROSS SECTION

Figure 17-4. Skin Repair (Sheet 5 of 6)

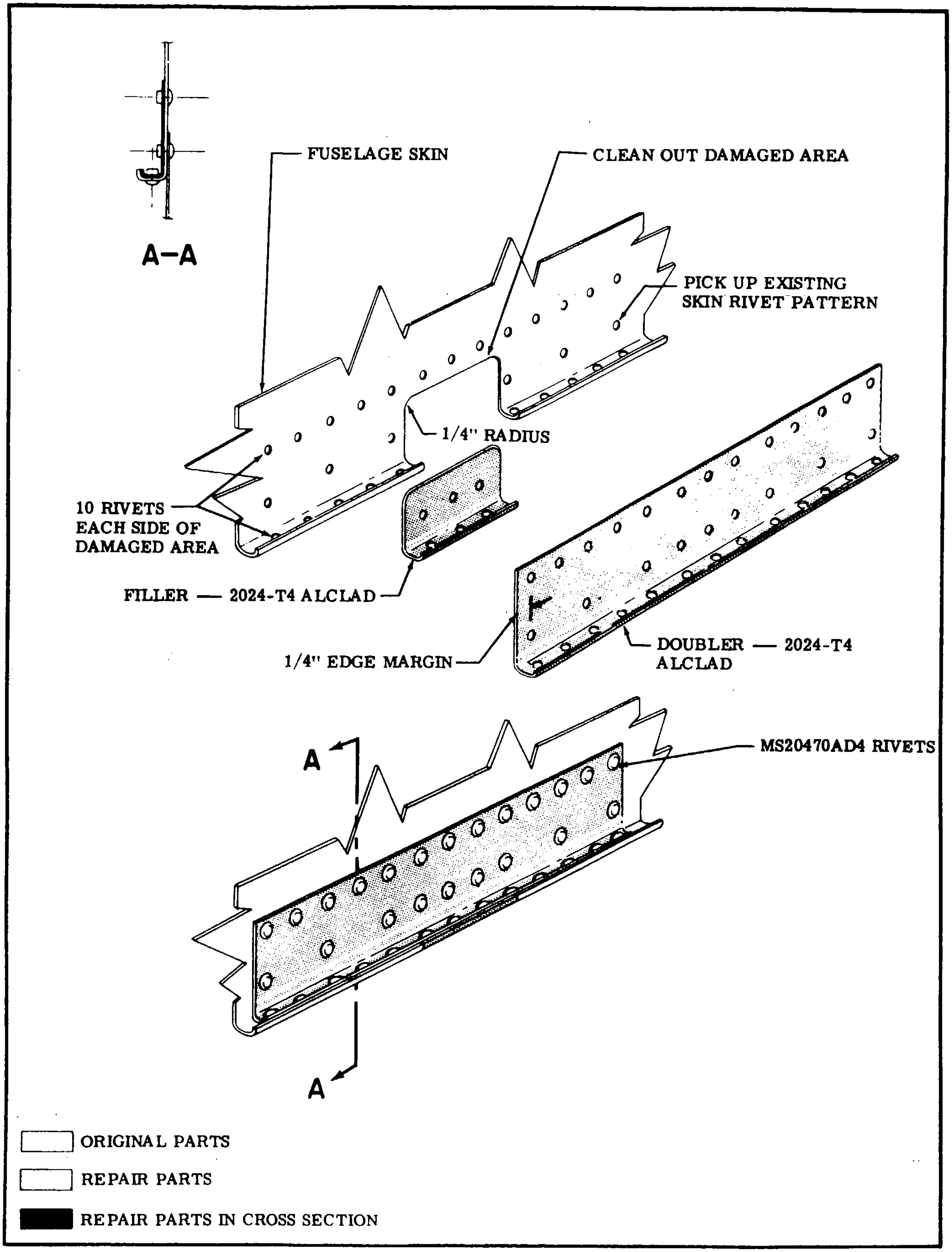


Figure 17-4. Skin Repair (Sheet 6 of 6)

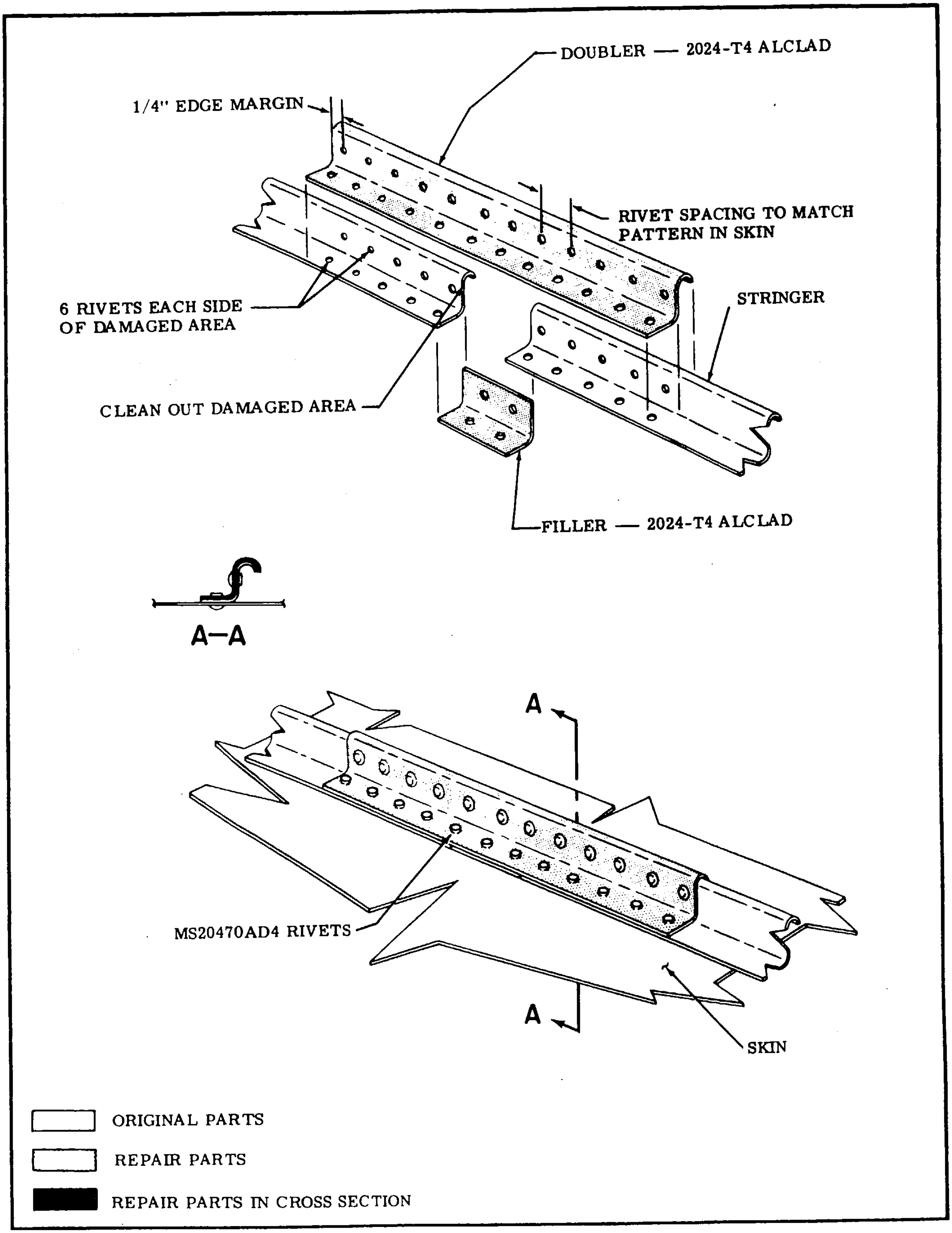


Figure 17-5. Stringer and Channel Repair (Sheet 1 of 4)

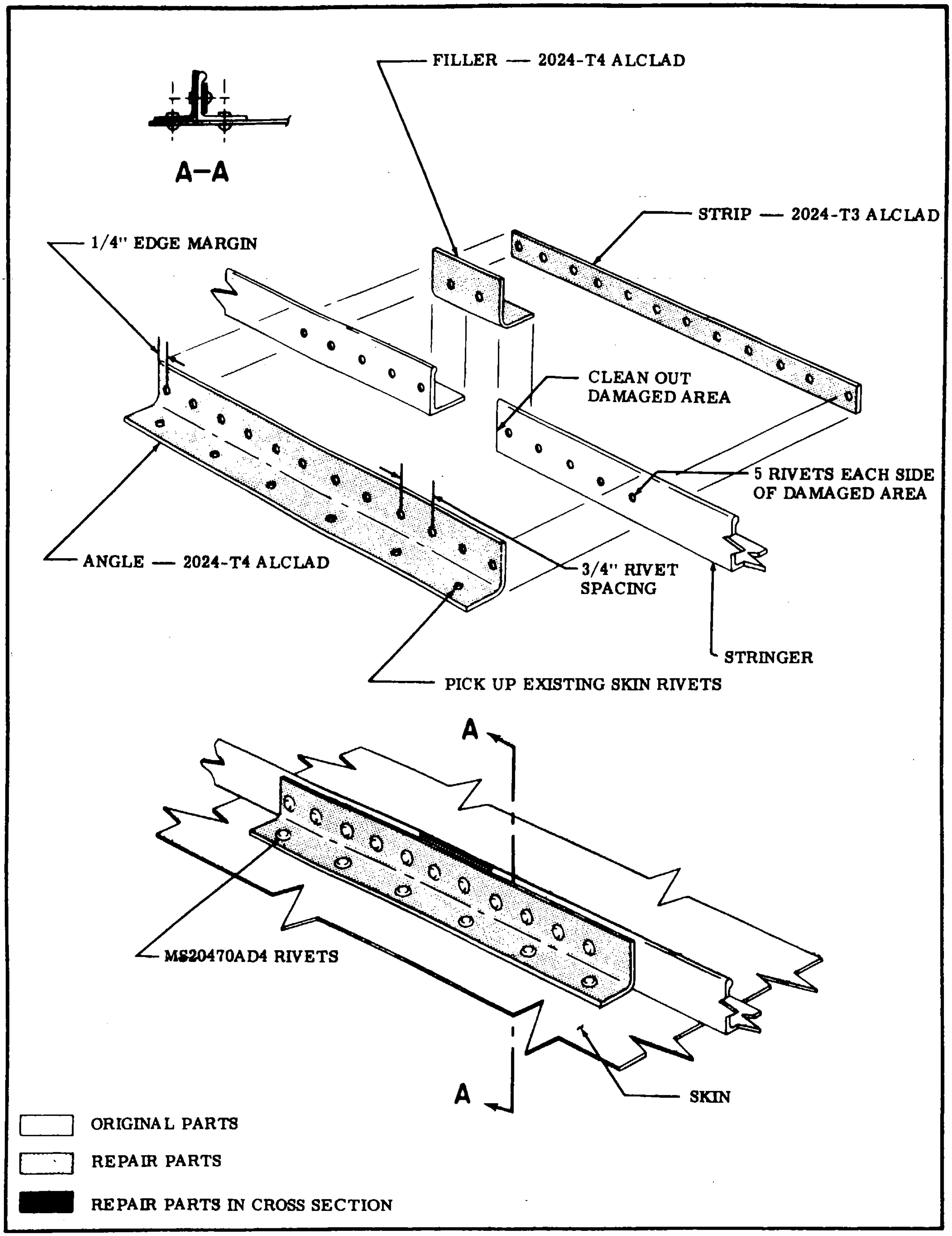


Figure 17-5. Stringer and Channel Repair (Sheet 2 of 4)

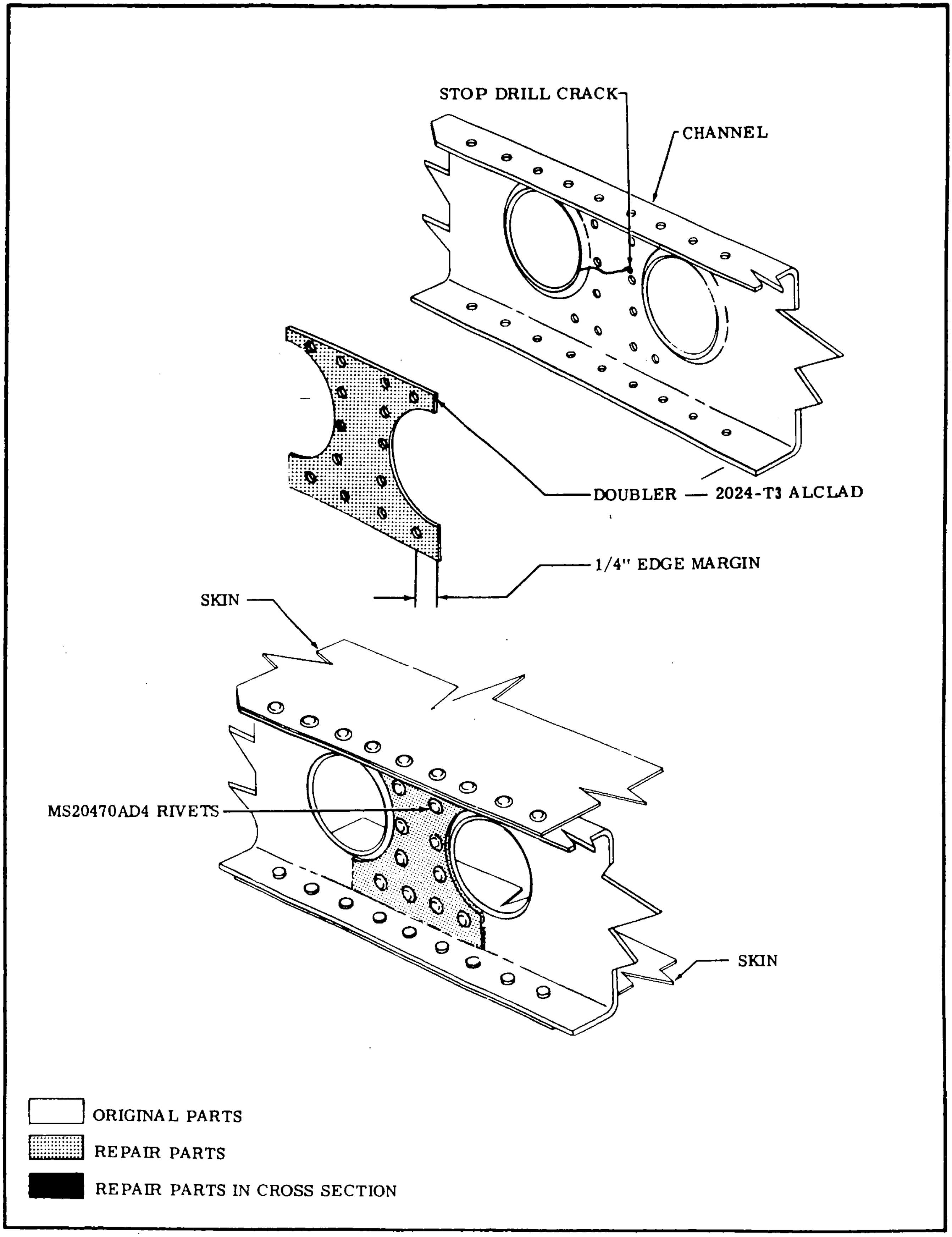


Figure 17-5. Stringer and Channel Repair (Sheet 3 of 4)

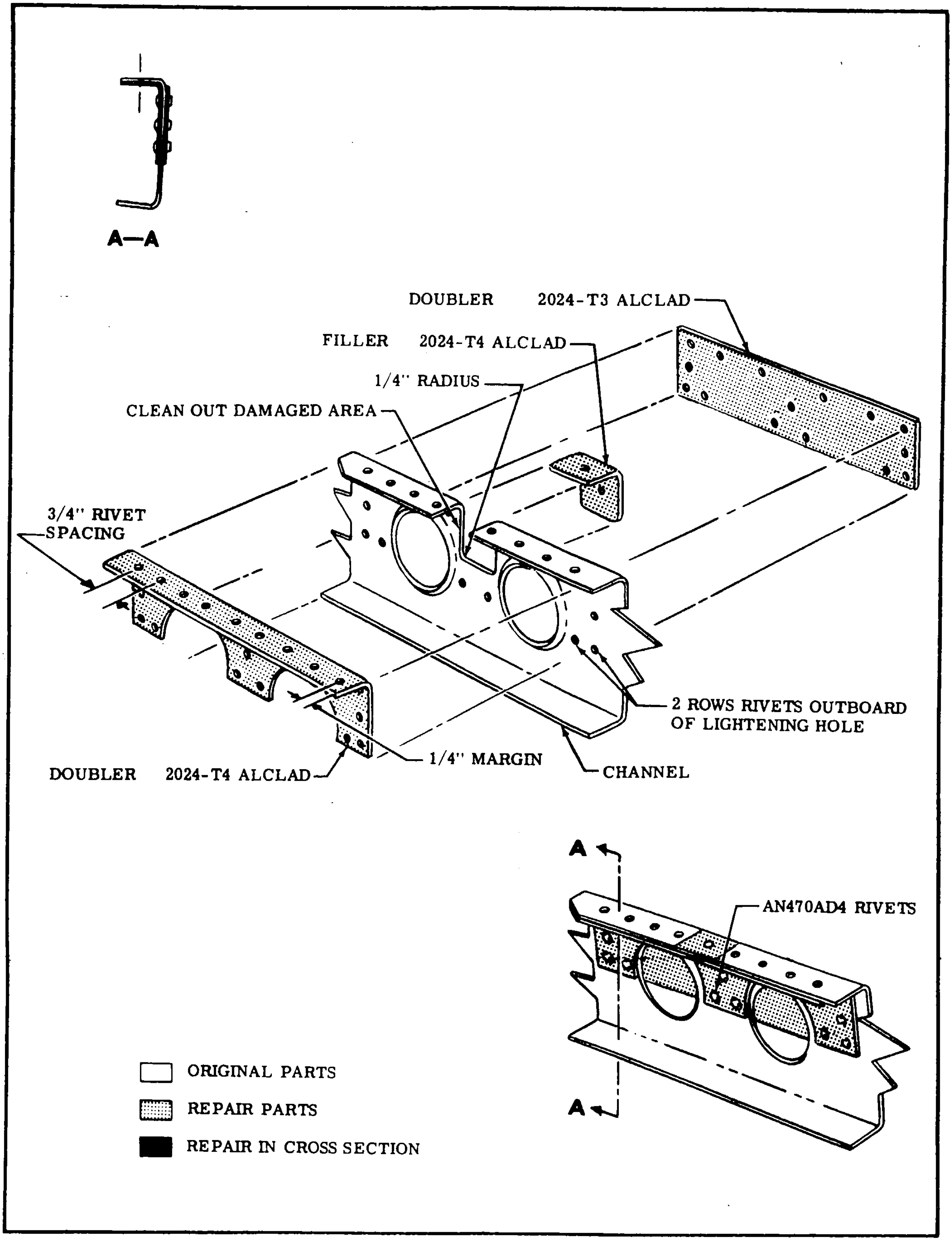


Figure 17-5. Stringer and Channel Repair (Sheet 4 of 4)

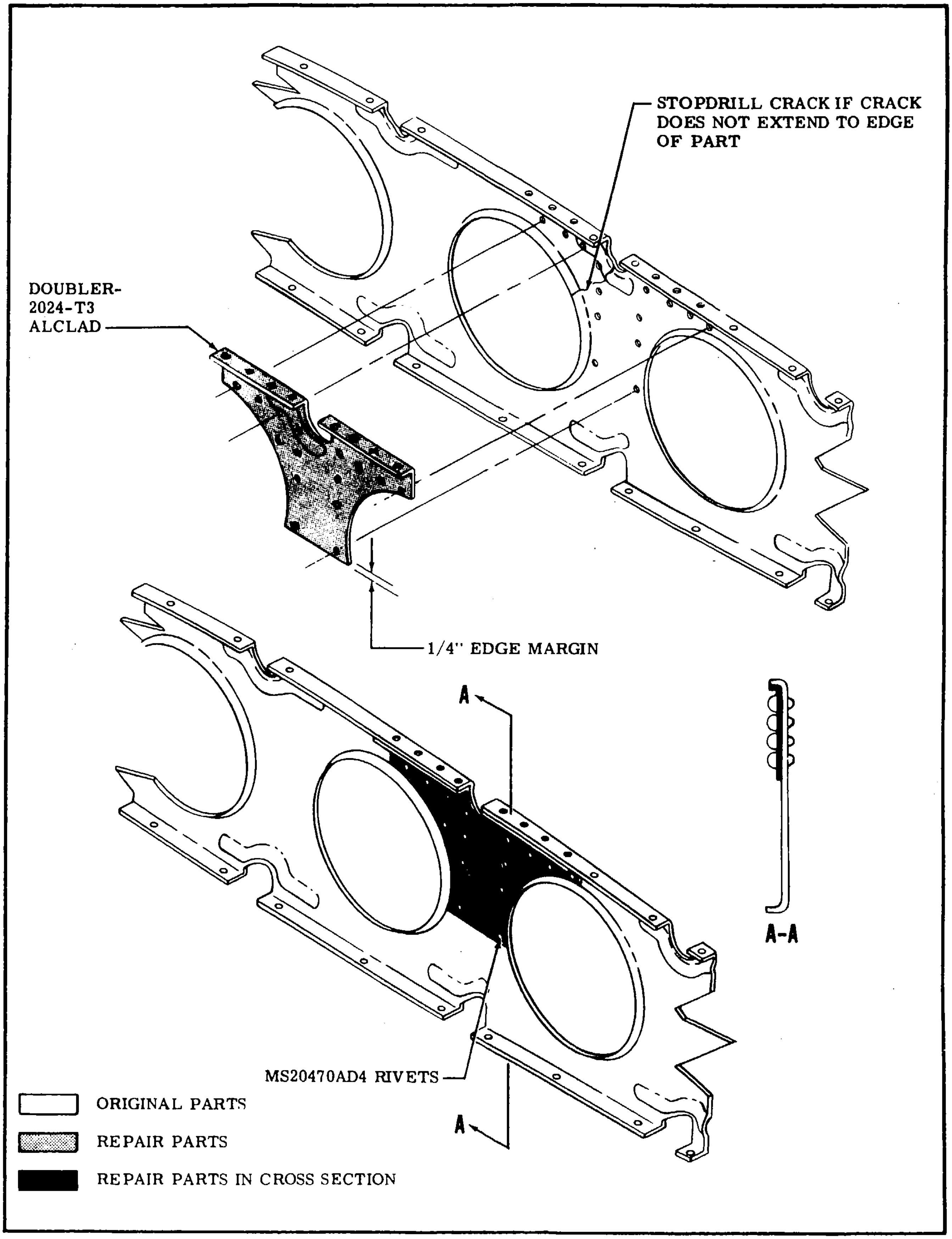


Figure 17-6. Rib Repair (Sheet 1 of 2)

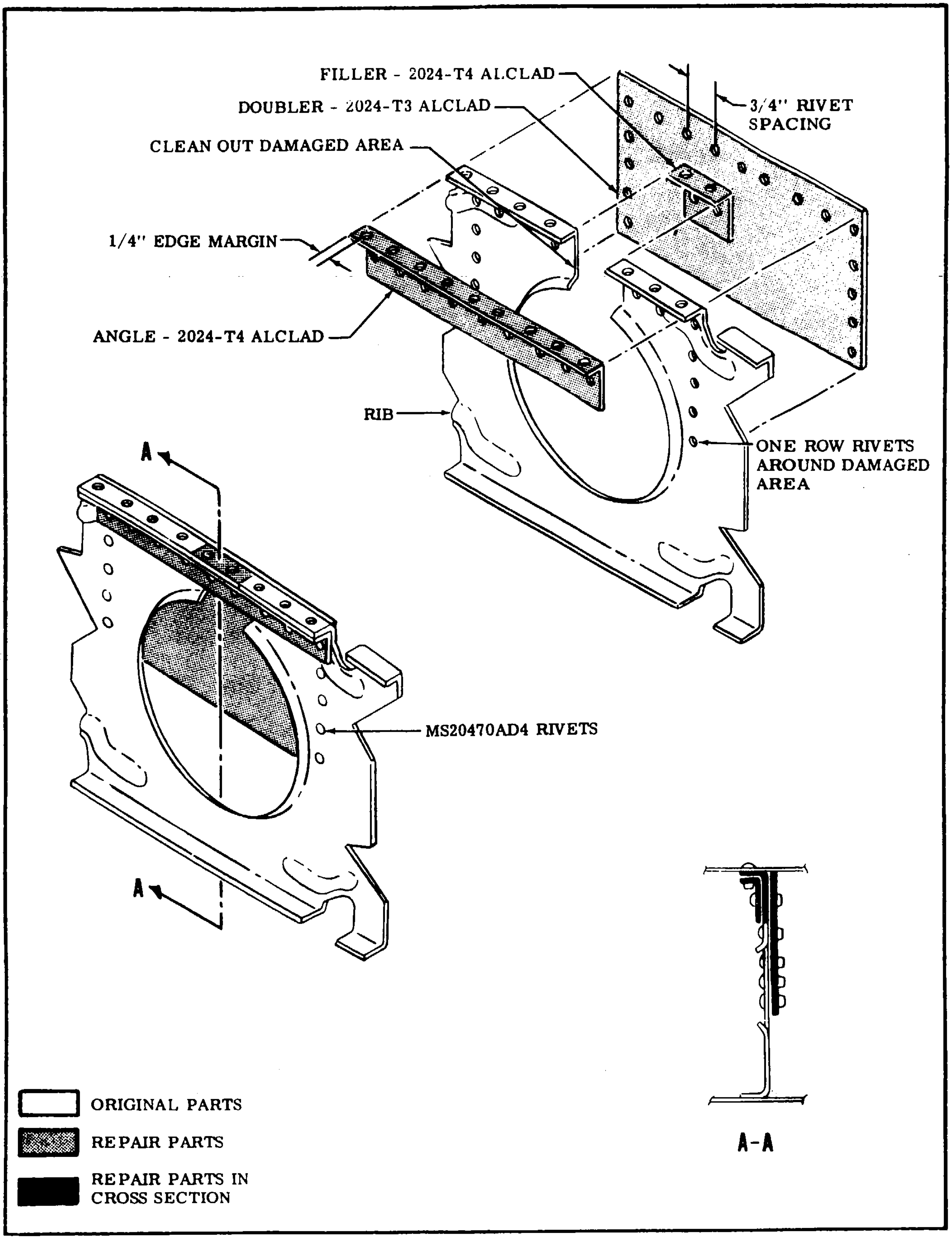


Figure 17-6. Rib Repair (Sheet 2 of 2)

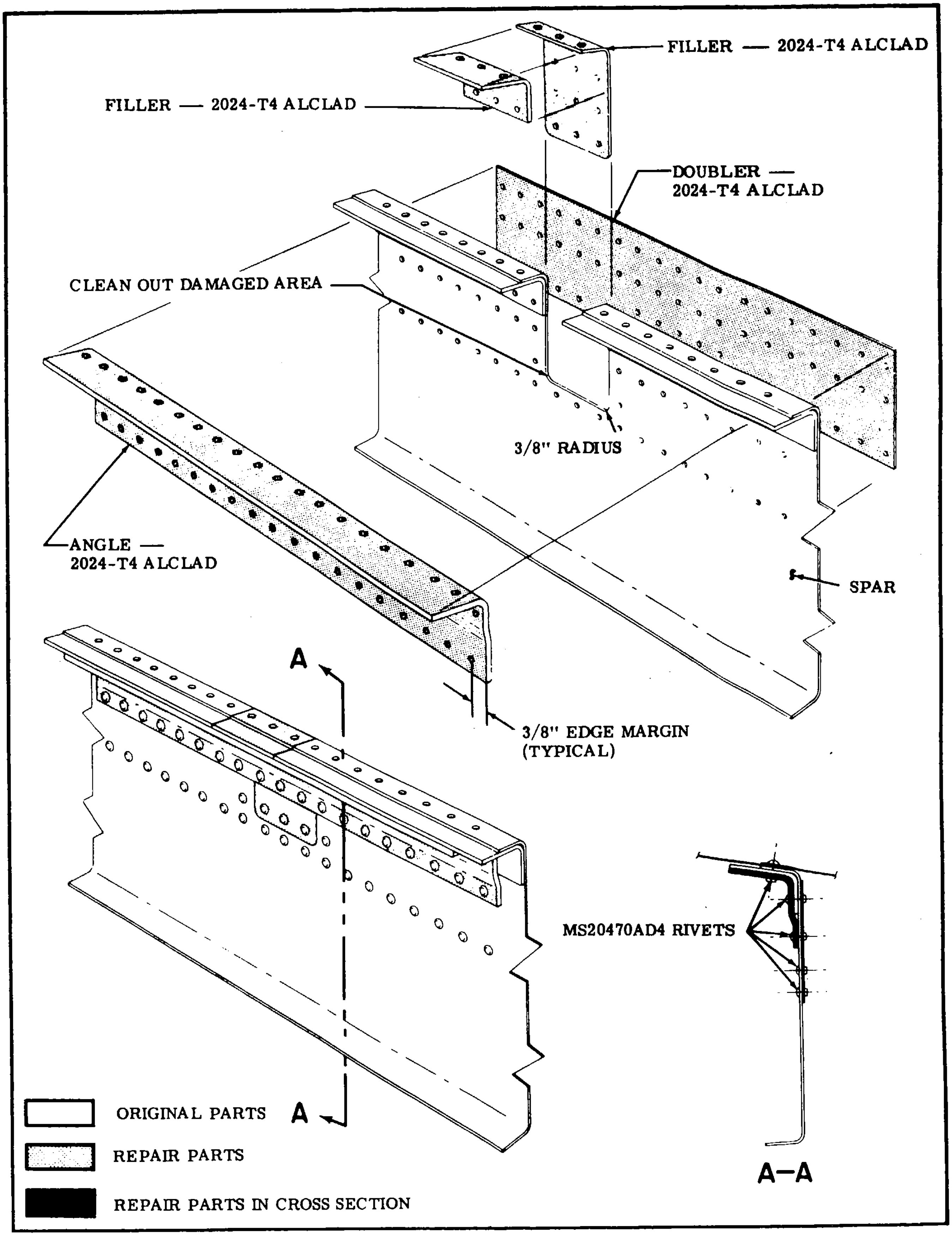


Figure 17-7. Wing Spar Repair (Sheet 1 of 4)

NOTE

This repair applies to either front or rear spar if the spar is a single channel.

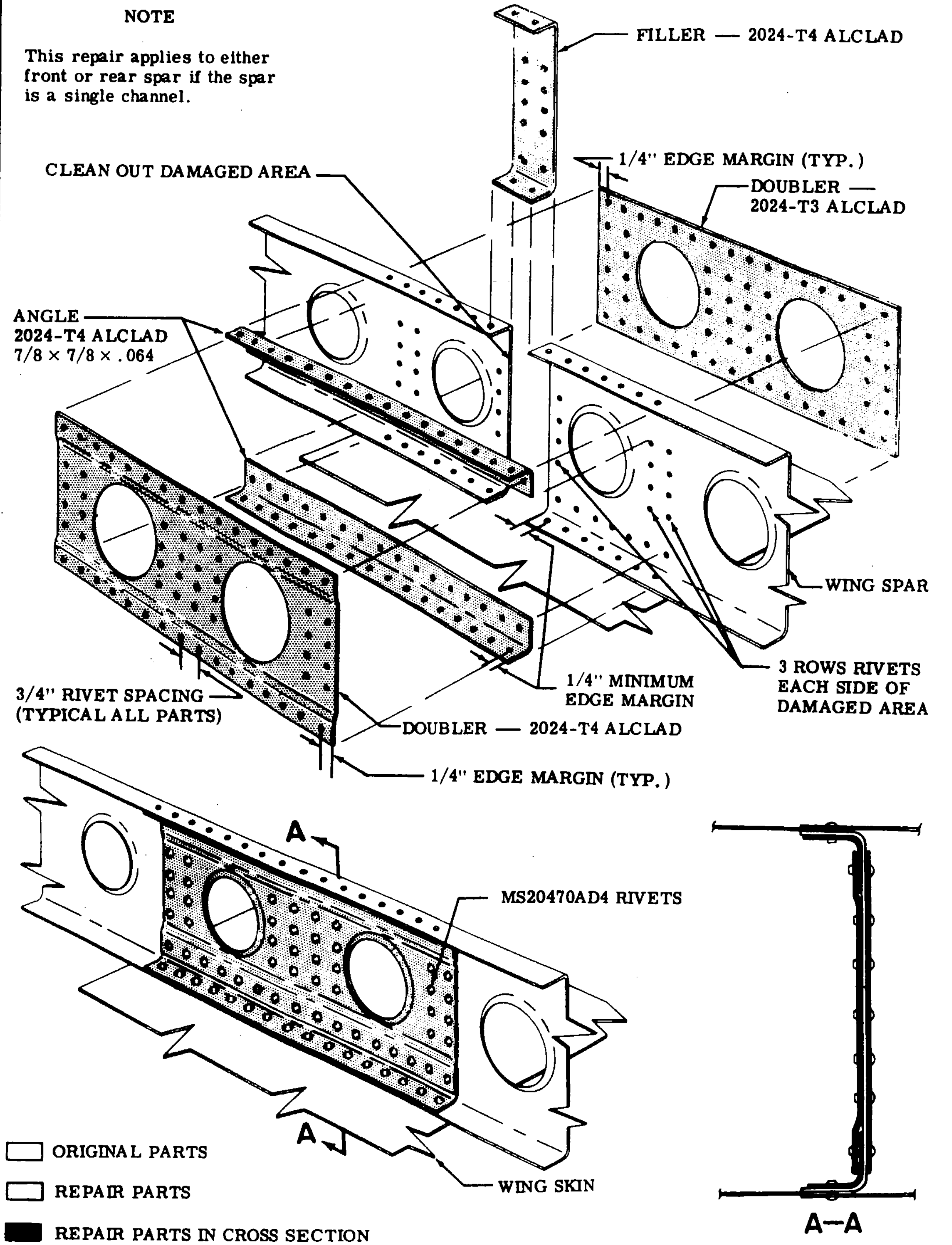


Figure 17-7. Wing Spar Repair (Sheet 2 of 4)

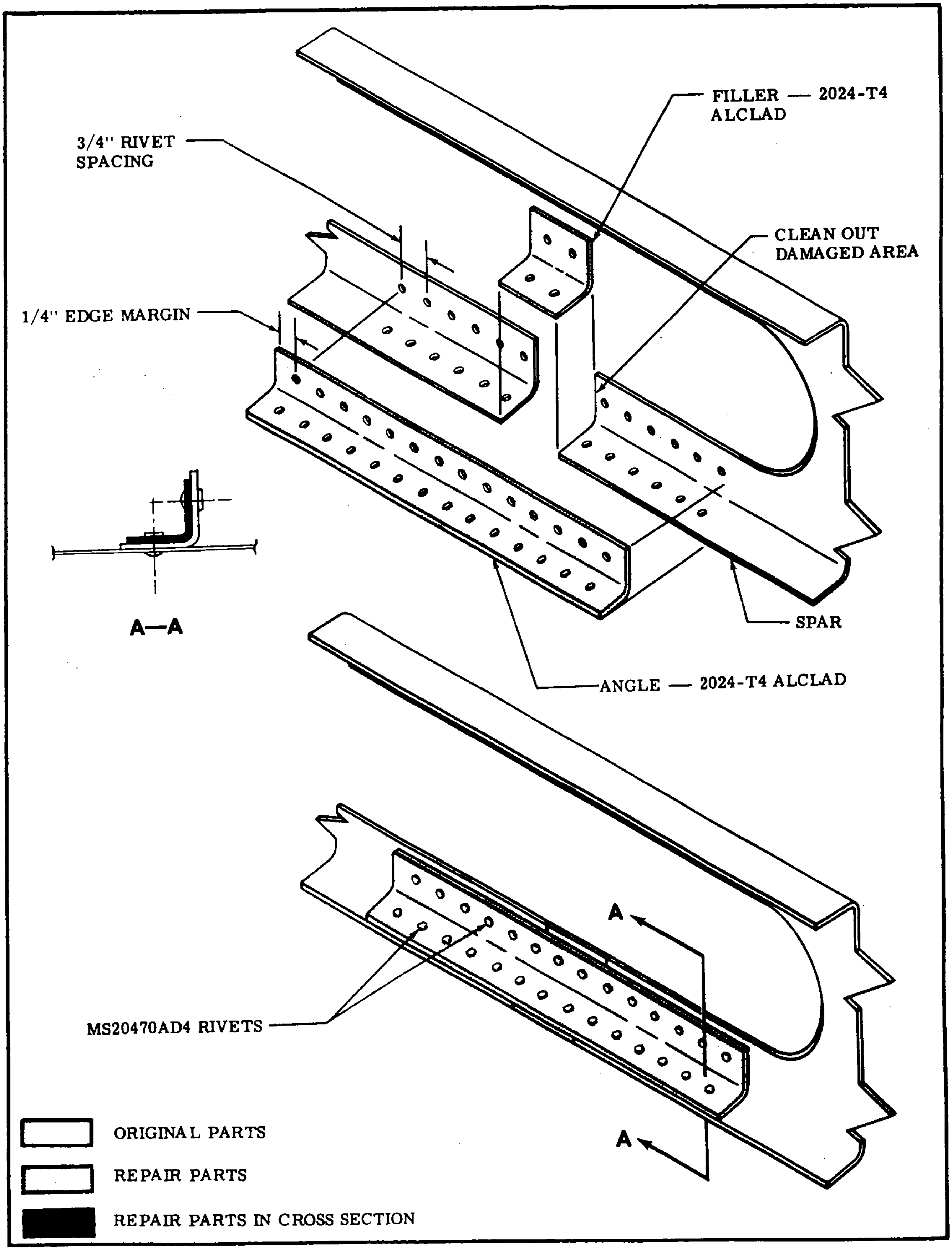


Figure 17-7. Wing Spar Repair (Sheet 3 of 4)

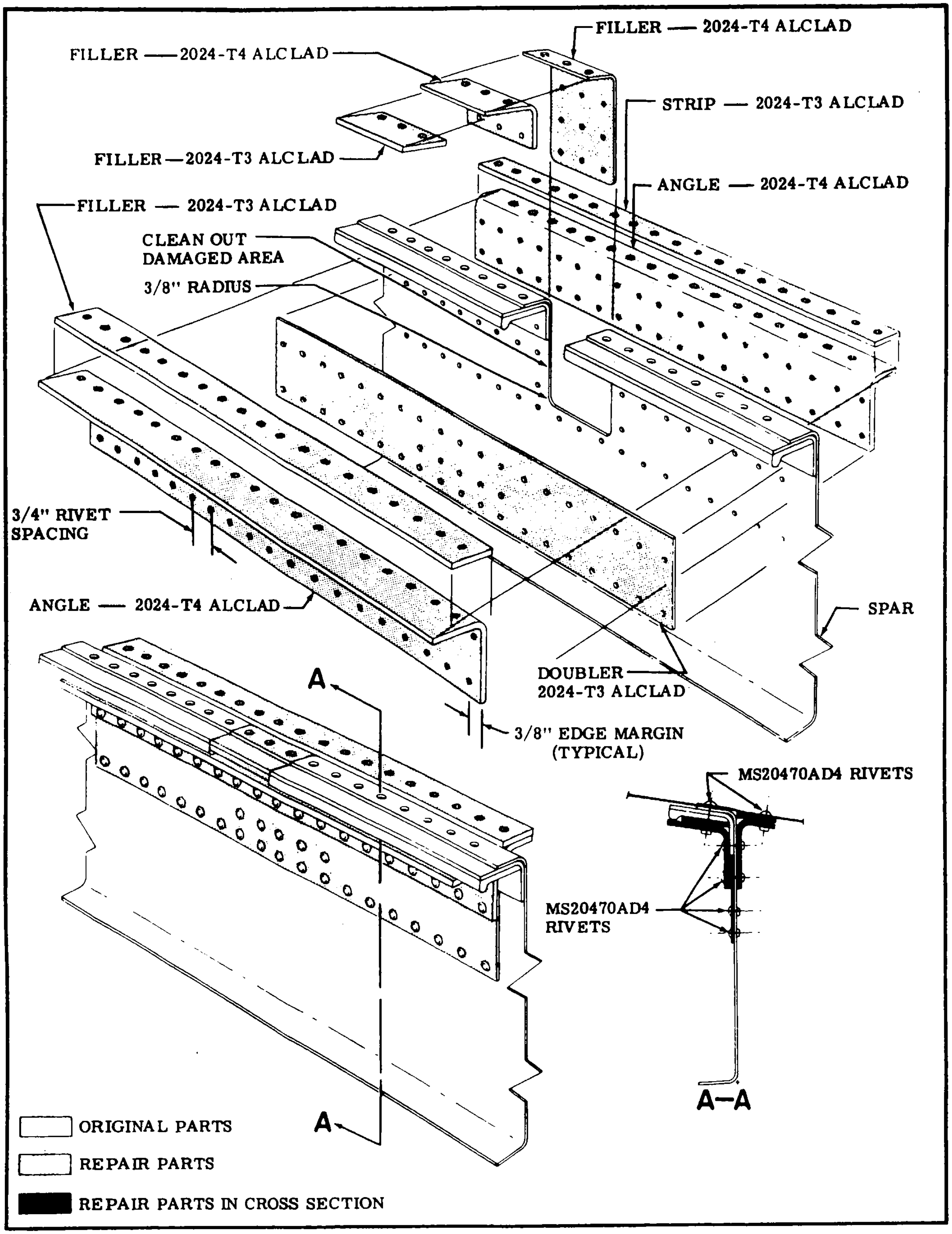


Figure 17-7. Wing Spar Repair (Sheet 4 of 4)

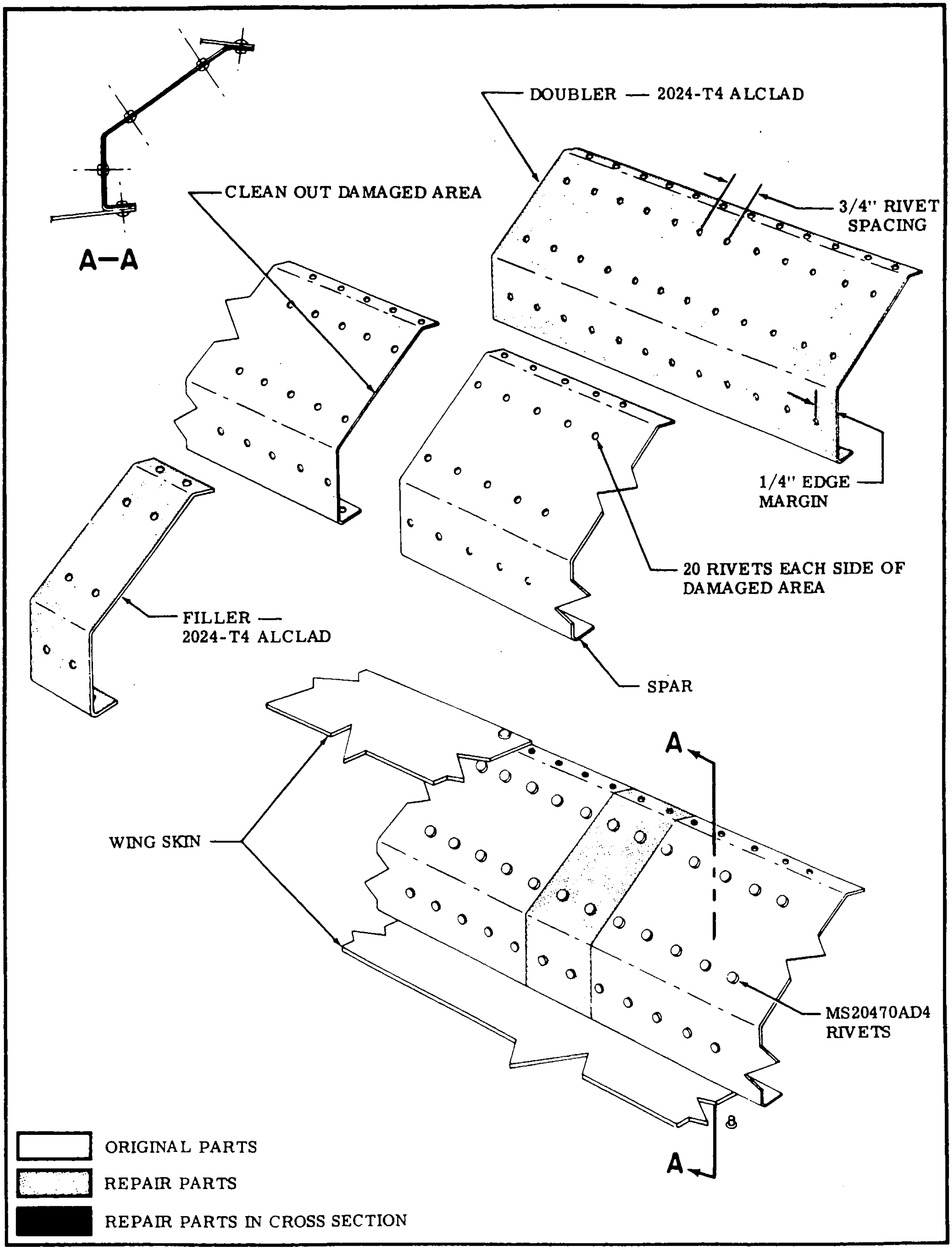


Figure 17-8. Auxiliary Spar Repair

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.

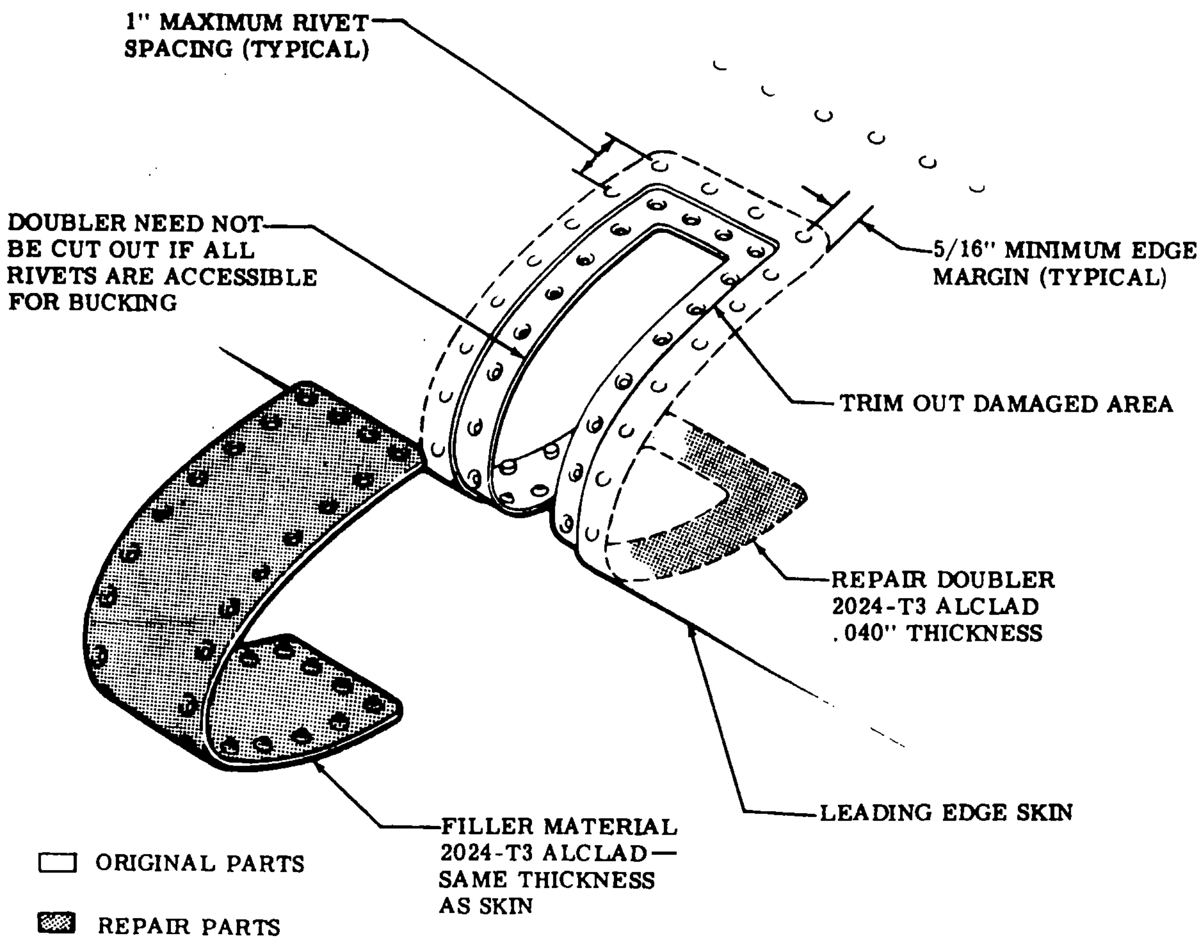


Figure 17-9. Leading Edge Repair

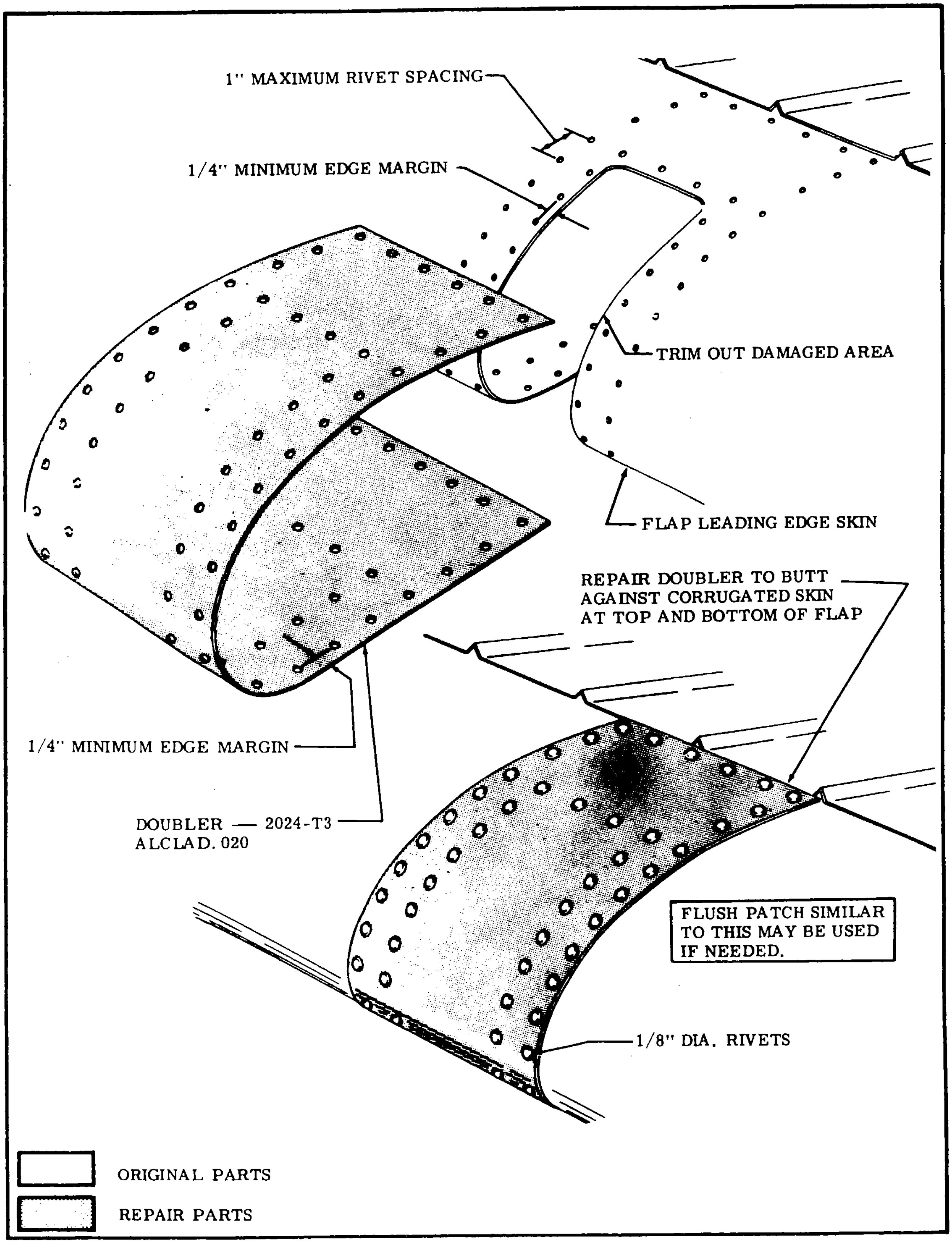


Figure 17-10. Flap Leading Edge Repair

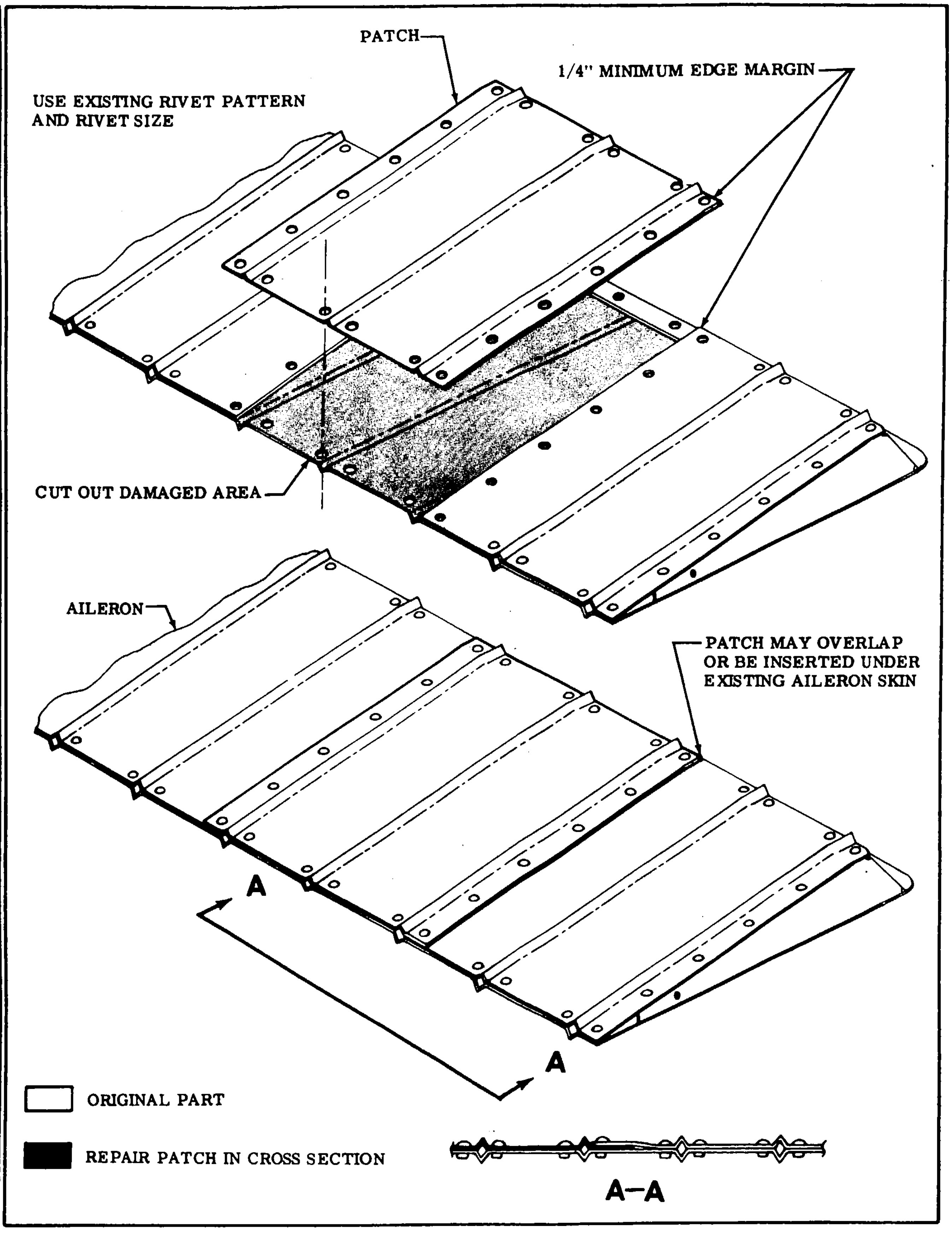
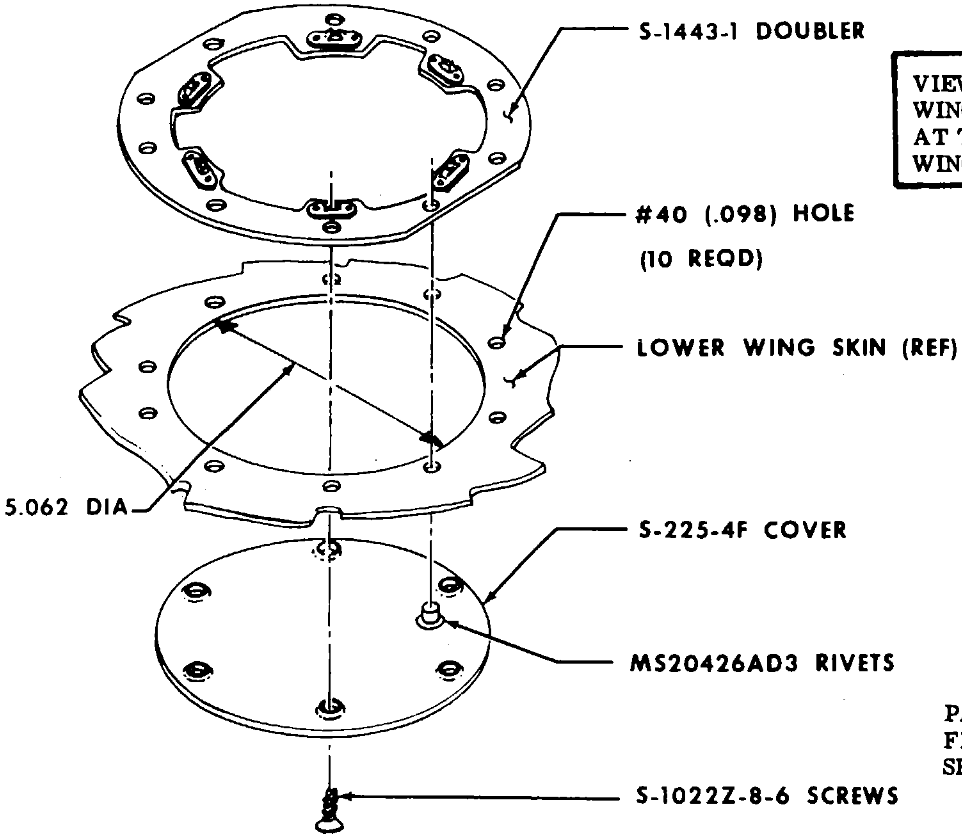


Figure 17-10A. Corrugated Skin Repair



NOTE

PARTS ARE AVAILABLE FROM THE CESSNA SERVICE PARTS CENTER.

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. Use landing light installations instead of adding access holes where possible. 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 17-11. Access Hole Installation

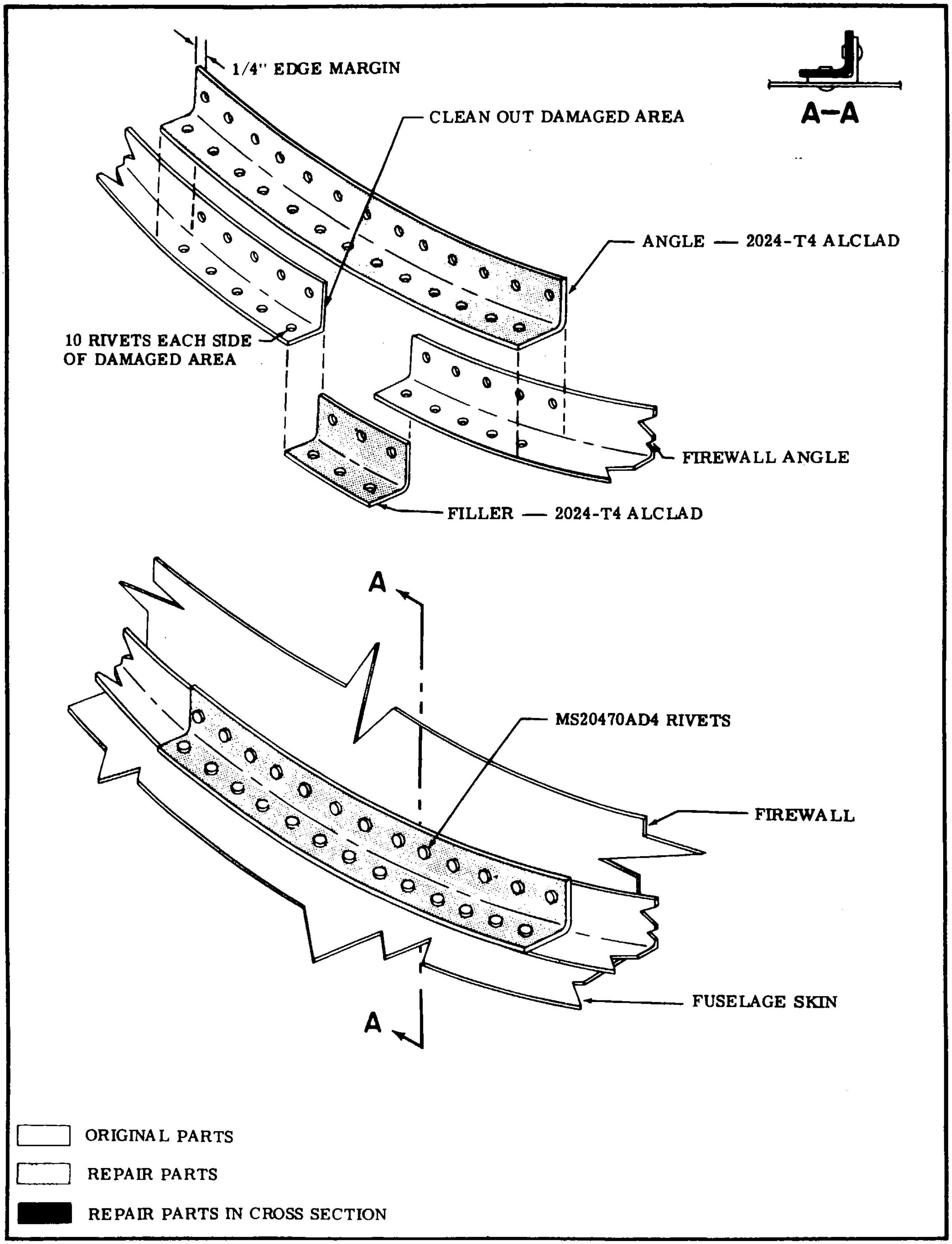


Figure 17-12. Firewall Angle Repair

SECTION 18

EXTERIOR PAINTING

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 the Cessna Service Parts Center.

MATERIAL	NO /TYPE	AREA OF APPLICATION
PAINT	ACRYLIC LACQUER	Used on exterior airframe.
PAINT	EPOXY PAINT	Used on nose gear fairing on 1968 and 1969 Models.
PAINT	VINYL	Used to paint upper inside of cabin door beginning with aircraft serial FR17200441.
PRIMER	ER-7 WITH ER-4 ACTIVATOR	Used with acrylic lacquer.
PRIMER	P60G2 WITH R7K46 ACTIVATOR	Used with acrylic lacquer.
THINNER	T-8402A	Used to thin acrylic lacquer and for burndown.
THINNER	T-3871	Used with epoxy (Du Pont).
THINNER	T-6487	Used with epoxy (Enmar).
SOLVENT	#2 SOLVENT	Used to clean aircraft exterior prior to priming.

NOTE

Do not paint Pitot Tube, Gas Caps or Antenna covers which were not painted at the factory.

18-1. PAINTING OF FORMED ABS PLASTIC PARTS. The following procedures outline some basic steps which are useful during touchup or painting of formed ABS plastic parts.

18-2. 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.

18-3. EXTERIOR PARTS (Acrylic Topcoat)

a. Painting of Spare Parts.

1. Lightly 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.

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.

18-4. EXTERIOR PARTS (Epoxy or Polyurethane Topcoat)

a. Painting of Spare Parts and Touch Up of 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.

CAUTION

Do not use strong solvents such as Xylol, Toluol or Lacquer Thinner since prolonged exposure can soften or embrittle ABS.

3. Apply a primer compatible with Epoxy or Polyurethane topcoat.

4. After the part is thoroughly dry it is ready for the topcoat.

NOTE

Epoxy or Polyurethane topcoats cannot be successfully spotted in - finish should be applied in areas with natural breaks such as skin laps or stripe lines.

When painting interior and exterior polycarbonate parts, or where the part material is questionable, a "barrier primer" should be applied prior to the Enamel, Lacquer, Epoxy or Polyurethane topcoat.

SECTION 19

WIRING DIAGRAMS

THRU FR17200559 AND FR17200561

TABLE OF CONTENTS — Page

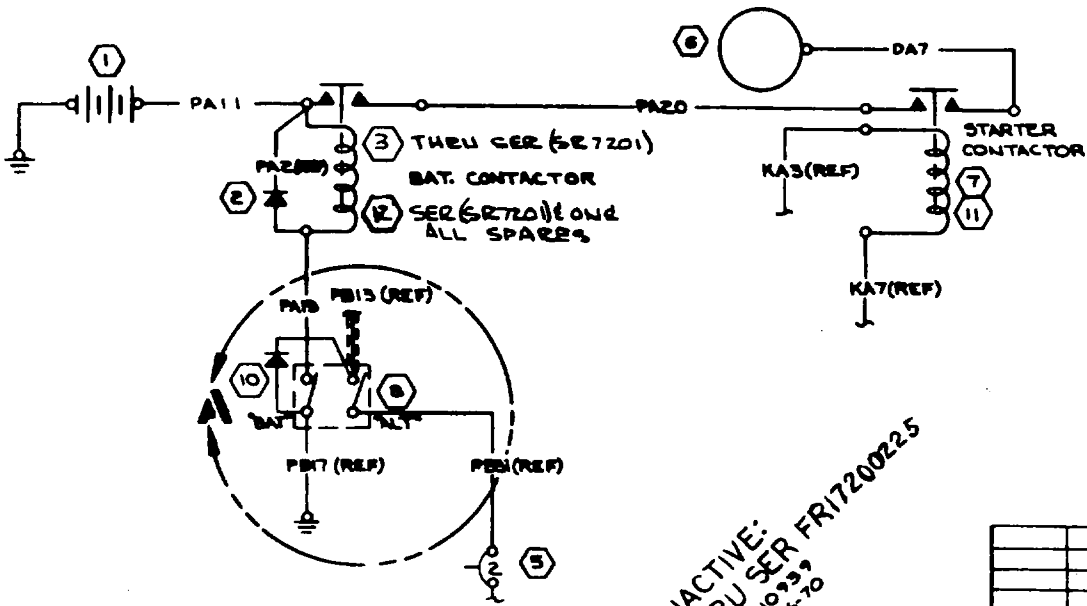
BEGINNING WITH FR17200560 AND FR17200562

NOTES:

1. APPLICABLE MODELS; FR172E & T41-C

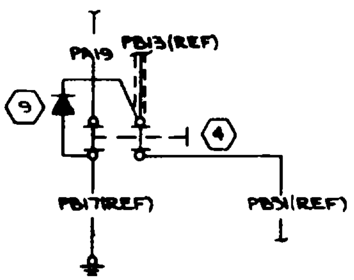
2 THRU SER (SR6050) (FR17200145)

3 SER (SR6050) & ON (FR17200146 & ON)



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	BY REV: 0712605-1 WAS 0511318-1, PA20 WAS PA20(REF), DA7 WAS DA7 (REF); ADD S-1660-1 & NOTE 1 (SER R172E-0257 THRU-0301)(SER FR172E-0001)	JWH 9-19-67	RLL
B	BY REV: PA20 4 6A WAS PA20 26A & S-1367-6-13 WAS S-1367-7-13 ED&RR 01358	RLY 1-8-68	RLL
C	BY REV: IN EQUIPMENT TABLE, "0511319-1 BATTERY ASSY" WAS "0712605-1 BATTERY" ED&RR 10012 (FR172E-0001)(17256513) IX	RBI 9-5-68	GRG DGK
D	BY REV: SER OUT PA19; SER IN PA19; SER OUT 0713026-5; SER IN S-1994-1-1; ADD DETAIL A & NOTES 2 & 3; CA-2 WAS S-1707-60; PB31 WAS PB11; ADD 0770719-1 & 0770719-2 ED&RR10 (SR6045)(SR6050) IX	DLB	
E	BY REV: 628482 WAS SAW-4206-1; DELETE 'SR6045' FROM NOTE 2,3 & DETAIL A; SAW-4206-1 WAS S-1660-1; ADD SAW-4204-1 (ALT) (SR6050) X	MDS	RLY MDS DET
F	BY REV: SER OUT S-1579-1 & ADD S-1579-2 (SR7201)	EPH 7-26-72	LKW HLW PAM BF

INACTIVE: THRU SER FR17200225
ED&RR 10939 3-26-70
DGP
LW
RLY
H/W
BF



DETAIL A
THRU SER (SR6050)

12	S-1579-2	CONTACTOR
11	SAW-4204-1	CONTACTOR - ALT
10	0770719-2	DIODE ASSY
9	0770719-1	DIODE ASSY
8	S-1994-1-1	SWITCH
7	SAW-4206-1	CONTACTOR
6	628482	STARTER (1456)
5	CA-2	CIRCUIT BKR
4	0713026-5	MASTER SWITCH
3	S-1579-1	CONTACTOR
2	0770728-1	DIODE ASSY
1	0511318-1	BATTERY ASSY
	PART NO.	DESCRIPTION

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS	TERMINALS	SERIALS
PA19	18		88	S-1367-1-6	S-1493-1	3
PA11	4		28	S-1367-1-10	S-1367-1-8	
PA20	4			S-1367-6-8	S-1367-6-13	
PA19	18		88	S-1367-1-6	S-1367-1-6	2
DA7	4			S-1367-1-13	S-1367-1-13	

WIRE TABLE

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wing	7-22-67
DRAWN	C. GARCIA	8-8-67
CHECK	LAURIE	8-7-67
STRESS		5-15-67
PROJECT		8-15-67
APPD		8-11-67

SUPERSEDED BY: P 4.1.4

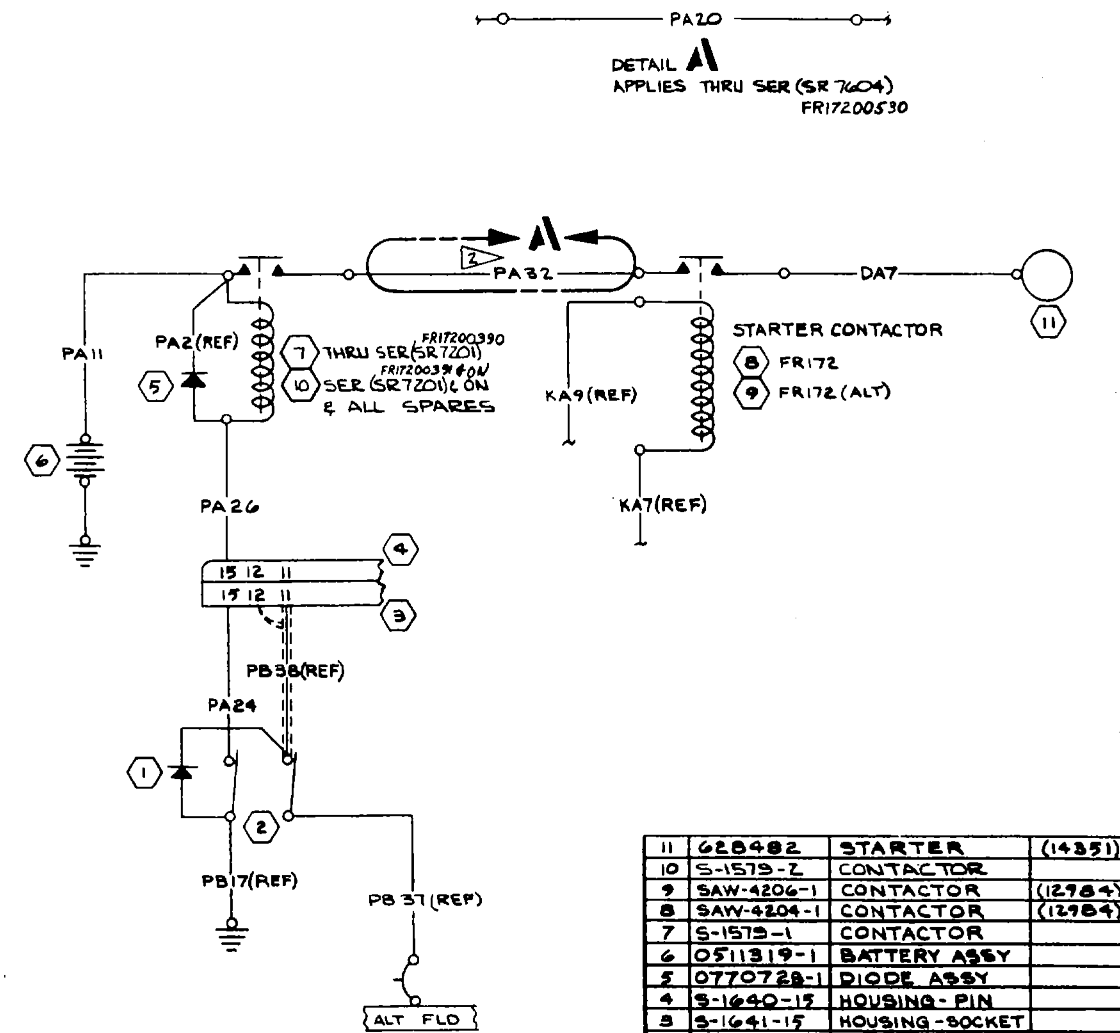
Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE: WIRING DIAGRAM — BATTERY CIRCUIT

SIZE: C | CODE IDENT. NO.: 71379 | DWG NO.: 0500062

SCALE: NONE | PAGE: 4.1.2

(SER FR172E-0001) & ON
(SER R172E-0257 THRU-0301)



INACTIVE: EFF THRU SER (SR7904) II (FR17200559 & FR17200561) 10-23-74 RAM VCY ADB JRB RF

04-231-0905

LET	DESCRIPTION	DATE	APPD
A	BY REV: S-1579-1 WAS S-1660-1 (NOW SHOP PRACTICE) & SER OUT S-1579-1 & ADD S-1579-2 (SR7201)	BPH 7-26-72	HW RF
B	BY REV: S1367-6-14 WAS S-1367-6-10 & S-1367-6-8 PER PA11, ADD WIRE LENGTH (NOW SHOP PRACTICE)	DLD 4-9-73	HW RF
C	BY REV: SER IN PA32; SER OUT PA20; ADD DETAIL "A" (SR 7604) II	BAH 5-20-74	JRB RF

ITEM NO.	PART NO.	DESCRIPTION	
11	628482	STARTER	(14851)
10	S-1579-2	CONTACTOR	
9	SAW-4206-1	CONTACTOR	(12984)
8	SAW-4204-1	CONTACTOR	(12984)
7	S-1579-1	CONTACTOR	
6	0511319-1	BATTERY ASSY	
5	0770728-1	DIODE ASSY	
4	S-1640-15	HOUSING-PIN	
3	S-1641-15	HOUSING-SOCKET	
2	S-1994-1-1	SWITCH	
1	0770719-2	DIODE ASSY	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
PA 32	4			S-1367-6-13	S-1367-6-13		FR17200531 & ON SER (SR 7604) & ON
PA 26	18			S-1635-2	S-1367-1-8		
PA 24	18		19	S-1636-2	S-1493-1		
PA 20	4		180	S-1367-6-13	S-1367-6-13		FR17200530 THRU SER (SR 7604)
PA 11	4		6	S-1367-6-14	S-1367-6-14		
DA7	4			S-1367-6-13	S-1367-6-13		

WIRE TABLE

NOTES:

1. APPLICABLE MODELS: FR172H.

2. SEE PAGE 4.4.3 WHEN OPTIONAL GROUND SERVICE INSTALLATION IS MADE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 4.1.2

SUPERSEDED BY: 0570101 P4.1.0

CONTRACT NO:

	NAME	DATE
DESIGN	COOK	4-7-70
GROUP	H. Wise	4-3-70
DRAWN	D.G. PLAIN	3-26-70
CHECK	H. WHITE	4-1-70
STRESS		
PROJECT	R. Fife	4-10-70
APPD	R. YOUNGKERS	4-2-70

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE: WIRING DIAGRAM — BATTERY CIRCUIT

SIZE: C | CODE IDENT. NO.: 71379 | DWG NO. 0500062

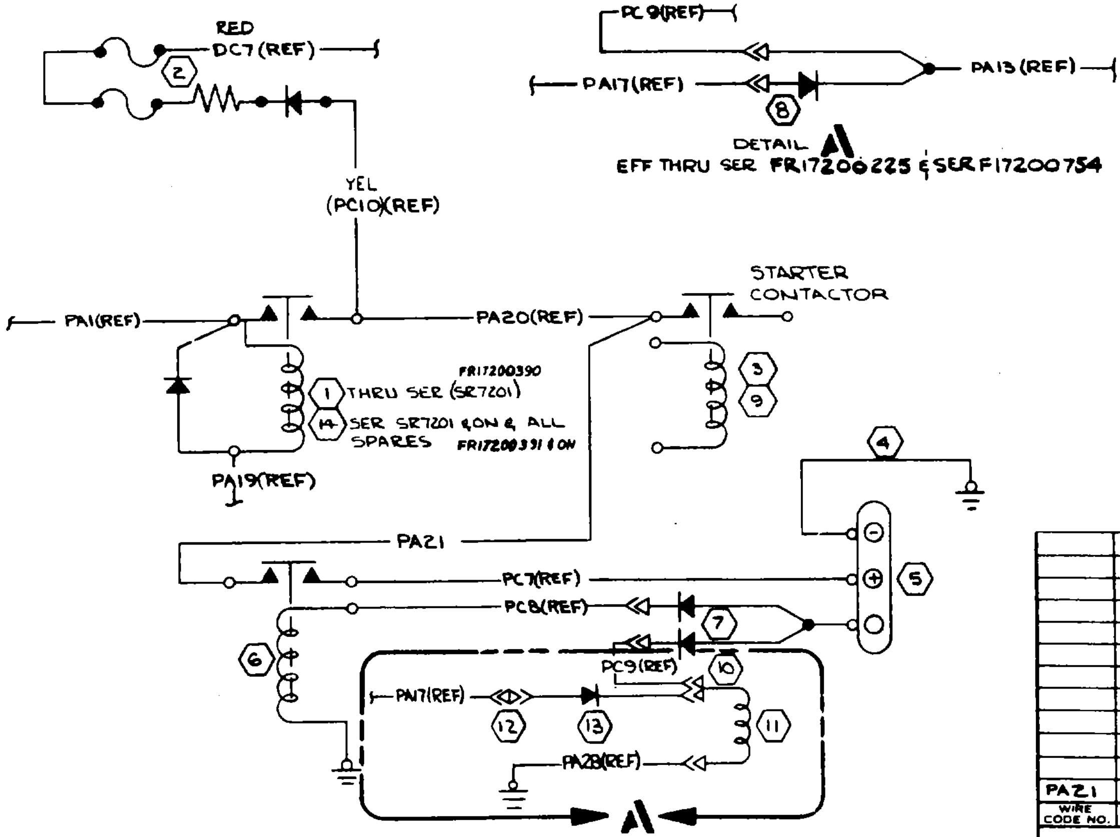
SCALE: NONE | PAGE: 4.1.4

EO/RR 10939 SER (SR 6354) II FR17200266

NOTES:

1. APPLICABLE MODELS; FR172E, T41-C.

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	BY REV: ADD NOTE 1. ED(RR00113(SER FR172E-0001)ON (SER R172E-0181 THRU-0B1)	9-18-67 RCA	RLL
B	BY REV: ADD 172I TO NOTE 1 ED & RR00192 (SER 172I56513)&ON	9-27-67 JSM	RLL
C	BY REV: DELETE "172I" FROM NOTE 1; ADD SAW-4204-1(ALT) & DC6(REF)	MDS 5-27-69	RLY MDS DET RF
D	BY REV: ADD DETAIL A, ITEMS 10,11,12 & 13, ED(RR 10041 SER(SR6353)(SR6354)	J.G. 5-17-70	RLY RF
E	BY REV: SER OUT S-1579-1 & ADD S-1579-2 (SR7201)	BPH 6-16-72	RF
F	BY REV: ADD WIRE COLORS RED DC7 & YEL PC10. INACTIVATE DRAWING MER E0041 (SR 7604)[II]	BAH 5-20-74	JRB RF



INACTIVE: EFF THRU SER (SR 7604)[II] THRU FR17200550 BAH 5-28-74 JRB RF

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS	SERIALS
PA21	2			S-1367-7-13 S-1367-7-13	

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION
9	SAW-4204-1	CONTACTOR - ALT
8	1570043-1	DIODE ASSY
7	1570043-3	DIODE ASSY
6	S-1660-1	CONTACTOR
5	AN2552-3A	RECEPTACLE
4	0312155-10	GROUND STRAP
3	SAW-4206-1	CONTACTOR
2	0712031-3	FUSE & DIODE ASSY
1	S-1579-1	CONTACTOR

EQUIPMENT TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
14	S-1579-2	CONTACTOR	
13	0770719-2	DIODE ASSY	
12	S-2064-1	CONNECTOR	
11	S-1917-1	RELAY	
10	S-2023-1	CONNECTOR	

EQUIPMENT TABLE

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wise	7-27-67
DRAWN	C. GARCIA	8-8-67
CHECK	LAURIE	8-10-67
STRESS		8-15-67
PROJECT		8-11-67
APPD		8-11-67

SUPERSEDED BY P. 4.4.3

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE WIRING DIAGRAM — GROUND SERVICE RECEPTACLE

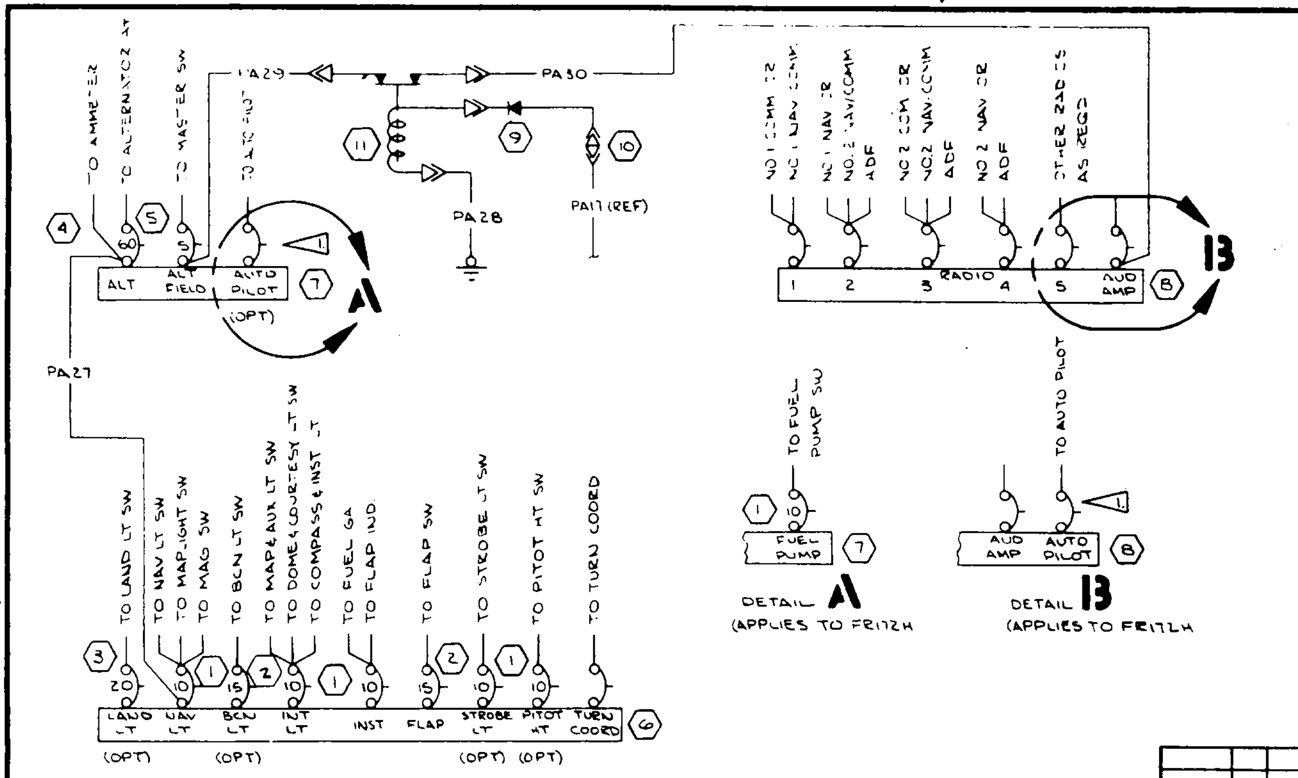
SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0500062

SCALE: NONE | PAGE: 4.4.2

(SER FR172-0001) & ON

F

FORM NO 80-216



REVISION			
LET	DESCRIPTION	DATE	APPD
A	[illegible] 50062; [illegible] [illegible] ... LI	[illegible]	[illegible]
B	BY REV: S-1367-3-6 WAS S-1367-2-6 PER PA29 & PA30, S-1367-1-6 WAS S-1367-2-6 PER PA28 ADD WIRE LENGTH (NOW SHOP PRACTICE)	JLO 3-16-73	ZY X/W RF
C	BY REV: S-1367-3-8 WAS S-1367-3-6 PER PA29 & PA30; S-1367-4-8 WAS S-1367-4-6 PER PA27 (NOW SHOP PRACTICE)	RAM 9-21-73	KY XPW RF
D	BY REV: S-1493-3 WAS 1493-2 PER PA29 & PA30 (NOW SHOP PRACTICE)	TDN 10-8-73	RF
E	BY REV: S-1360-15L WAS S-1360-10L AT BCN LT CKT BKR (SR8260)	BAH 5-13-75	RF

INACTIVE:
EFF THRU SER (SR7903) II (F17201384) (SR7904) II (FR17200559) (FR17200561)
(10-23-74) RAM RF
JCY JRB

0504-231-0905
0503-231-0905

NOTES:

1 VALUE OF THESE CIRCUIT BREAKERS VARY WITH OPTIONAL EQUIPMENT INSTALLED

ITEM NO	PART NO.	DESCRIPTION	
11	S-1917-1	RELAY	
10	S-2064-1	CONNECTOR	
9	0770719-2	DIODE ASSY	
8	0570419-3	BUS BAR	
7	0570419-2	BUS BAR	
6	0570419-1	BUS BAR	
5	S-1360-5L	CIRCUIT BREAKER	
4	S-1596-60L	CIRCUIT BREAKER	
3	S-1360-20L	CIRCUIT BREAKER	
2	S-1360-15L	CIRCUIT BREAKER	
1	S-1360-10L	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
PA30	12		45	S-1493-3	S-1367-3-8		
PA29	12		92	S-1493-3	S-1367-3-8		
PA28	18		35	S-1493-1	S-1367-1-6		
PA27	8		3	S-1367-4-8	S-1367-4-10		

WIRE TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO

SUPERSEDES: P4.8

SUPERSEDED BY: 0570101 P4.3.0

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H Wise	4-9-70
DRAWN	R. YOUNGERS	4-7-70
CHECK	[illegible]	4-1-70
STRESS		
PROJ	[illegible]	4-10-70
APPD		
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — BUS BAR, PRIMARY, ALTERNATOR & ELECTRONIC

SIZE C | CODE IDENT NO. 71379 | DWG NO 0500062

SCALE NONE | PAGE: 4.8.1

FORM NO 80.2138

FR17200:26

EO (RR 10959 (SR6352), (SR6353) - (SR6314) II

NOTES (CONT):

5. THRU SER F17200654 & FR172-0145

6. SER F17200655 & FR172-0146 & ON

NOTES:

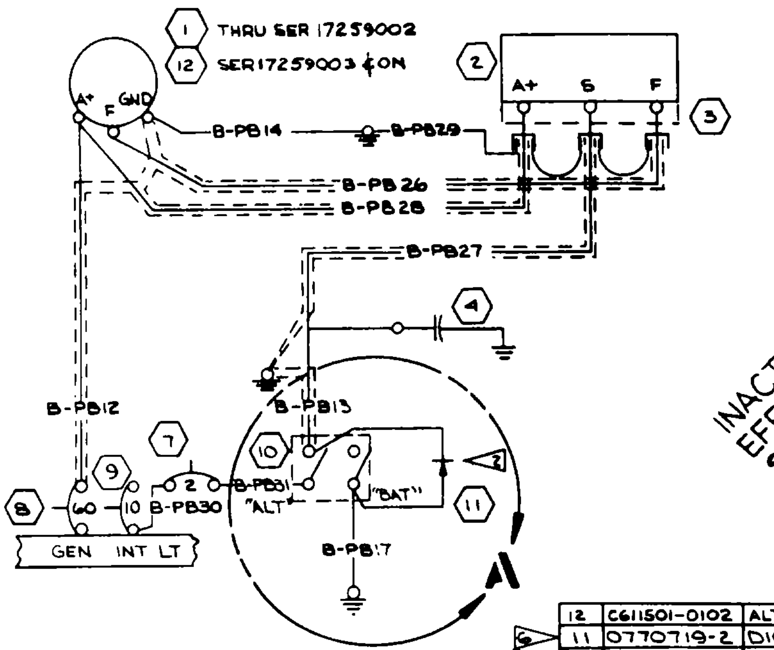
1. 8 GA SHIELDED WIRE MATERIAL PER S-1534-8-9.

2. OBSERVE POLARITY SYMBOL ON DIODE ASSY WHEN INSTL ON SWITCH TERM OR DIODE WILL FAIL WHEN SYSTEM IS ENERGIZED.

3. AMP TERM 42281-2 ON CONDUCTOR. AMP TERM 2-322931-2 ON SHIELD & GND WIRE.

4. APPLICABLE MODELS; FR172E, T41-C, & F172

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD S-1360-10 & GEN TO BUS BAR; REROUTE B-PB30 WIRE FROM S-1596-60 TO S-1360-10; DELETE OPT FROM TITLE FR172E-0001, R172E-0257	CG 1-6-67	RLL
B	BY REV: DELETED S-1367-4-12 FROM WIRE B-PB12 & ADD S-1943-1. ADD 172 TO NOTE 4. (SR6043)	BPC	JWH
C	BY REV: SER OUT 0713026-5, B-PB13, B-PB17 & B-PB31; SER IN S-1994-1-1, B-PB13, B-PB17 & B-PB31; ADD DETAIL A & NOTE 3 & 4; DELETE B-PB11 ADD 0770719-2 ED & RR 10488 (SR6045)(SR6050)	DLB 4-4-68	JWH
D	BY REV: DELETE "(SR6042)" FROM NOTES 5 & 6 & DETAIL A; ADD "F172" TO NOTE 4. (SR6045)(SR6050)	MDS 5-27-69	RLY
E	BY REV: SER OUT C611501-0101 (REF) & SER IN C611501-0102 (REF) ED & RR 10609 (SR6282)	RAINES 10/23/69	JWH



INACTIVE: EFF SER FR172E-0001 & R172E-0257 THRU SER F17200225, F17200754, SER 69-7756 & SER R172E-0301

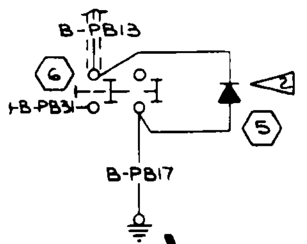
SER FR17200 ED & RR 10939 DGP 3-26-70

B-PB17	18			S-1367-1-8	S-1493-1	6	
B-PB13	18S			[illegible]	S-1493-1	6	
B-PB31	18			S-1367-1-8	S-1493-1	6	
B-PB31	18			S-1367-1-8	S-1367-1-8	5	
B-PB30	18			S-1367-1-10	S-1367-1-8		
B-PB29	16			S-1367-2-12	3		
B-PB28	18S			[illegible]	3		
B-PB27	18S			[illegible]	3		
B-PB26	18S			[illegible]	3		
B-PB17	18			S-1367-1-8	S-1367-1-8	5	
B-PB14	10			S-1367-3-16	S-1367-3-12		
B-PB13	18S			S-1367-1-8	[illegible]	5	
B-PB12	8S	1		[illegible]	S-1367-4-10		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
12	C611501-0102	ALTERNATOR ASSY	
11	0770719-2	DIODE ASSY	
10	S-1994-1-1	SWITCH	
9	S-1360-10	CIRCUIT BREAKER	
8	S-1596-60	CIRCUIT BREAKER	
7	CA-2	CIRCUIT BREAKER	(80602)
6	0713026-5	MASTER SWITCH	
5	0770719-1	DIODE ASSY	
4	0770038-2	FILTER	
3	C6AB-10A730A	HOUSING	(88690)
2	C611001-0101	REGULATOR	
1	C611501-0201	ALTERNATOR ASSY	

EQUIPMENT TABLE



DETAIL A
THRU SER F17200654, FR172-0145

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY: P 4.11.1

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wise	9-21-67
DRAWN	HARRIS	9-13-67
CHECK	LAURIE	9-15-67
STRESS	[illegible]	9-21-67
PROJECT	D.G. Kolln	9-21-67
APPD	[illegible]	9-20-67

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — ALTERNATOR SYSTEM, 60 AMP

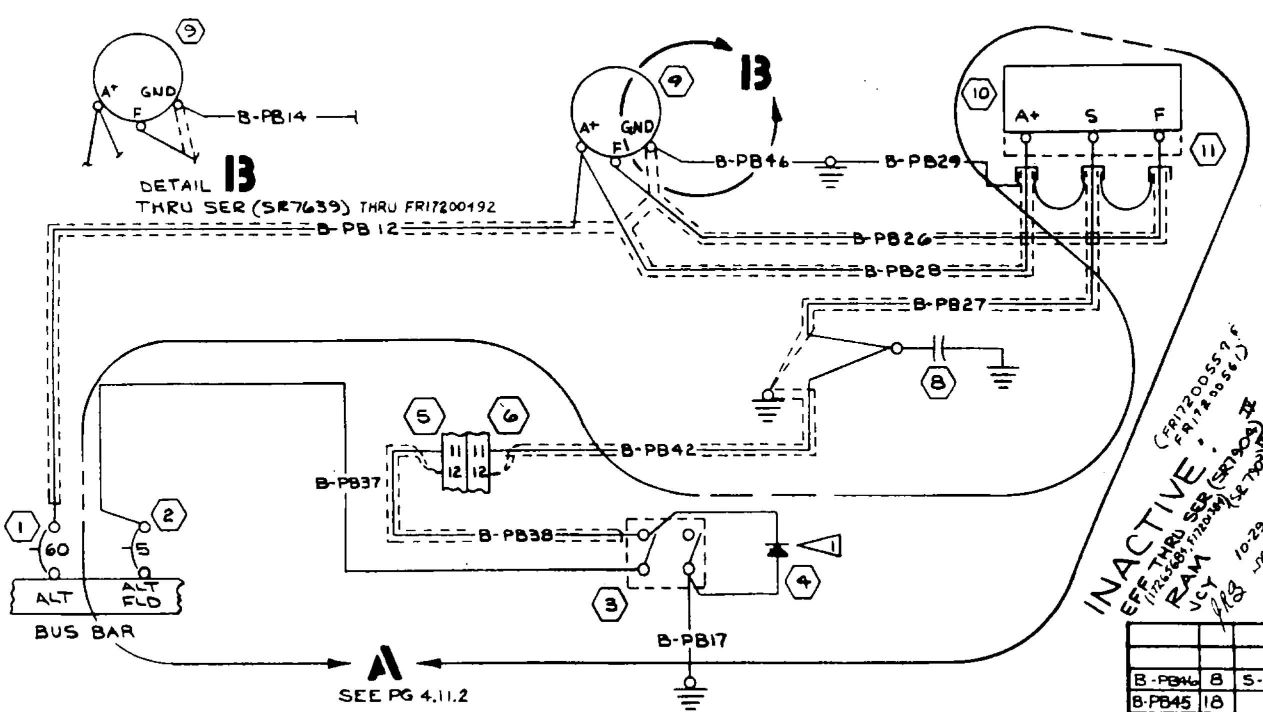
SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0500062

SCALE: NONE | PAGE: 4.11

FORM NO. 80-215A

(SER FR172E-0001) & ON
(SER R172E-0257 THRU -0301)

F



INACTIVE EFF THRU SER (SR7904)(SR7905) (17262683, FR17200561)(FR17200559 & FR17200561) RAM 10-29-74 VCY RF PRB

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD F172K TO NOTE 3 ED&RR 10172	RLY 8-17-70	LW RLY NLW RF
B	BY REV: ADDED DETAIL A; S-2135-1 LIGHT ASSY; C593001-0101 OVERVOLTAGE SENSOR; WIRES B-PB43, B-PB44 & B-PB45. S-1943-2 TERM WAS S-1367-4-12 (SR6783 & 6784) IX	WDA 4-26-71	NLW LW OUT REI
C	BY REV: REPLACED S-1370-1 TERM WITH S-1635-1 TERM ON B PB43 & B-PB44 WIRES. ADDED S-1637-1 & S-1637-2 HOUSINGS, TVA-1315 CAPACITOR TO F/D & E/T SER 17260318 & ON	VRS 1-4-72	LW NLW RF
D	BY REV: S-1367-2-8 WAS S-1367-3-8 PER PB42, S-1367-1-8 WAS S-1367-3-8 PER PB27, ADD WIRE LENGTH (NOW SHOP PRACTICE)	JLO 4-9-73	NLW RF
E	BY REV: SER OUT C611001-0101, SER IN C611001-0102; ADD DETAIL "B", PB46 & SER; SER OUT PB14 (SR7624) (SR7639)	RAM 7-31-73	DLP NLW RF

03-231-0905
04-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
B-PB46	8	S-1562-8-9		S-1943-3	S-1367-4-12		SER [illegible], FR17200[illegible] & ON
B-PB45	18		60	S-1635-2	42281-2	(00779)	SER F17200805, FR17200276 & ON
B-PB44	18		28	S-1635-1	S-1636-2		
B-PB43	18		13	S-1367-1-6	S-1635-1		
B-PB42	18S		46	[illegible]	[illegible]		
B-PB38	18S		17	S-1493-1	[illegible]		
B-PB37	18			S-1493-1	S-1367-1-6		THRU SER F17200804, FR17200275
B-PB29	16			S-1367-2-12	2		
B-PB28	18S			[illegible]	2		
B-PB27	18S		12	[illegible]	2		
B-PB26	18S			[illegible]	2		
B-PB17	18		13	S-1367-1-8	S-1493-1		
B-PB14	10			S-1367-3-10	S-1367-3-12		THRU SER [illegible], FR172[illegible]
B-PB12	8S	S-1534-8-9		S-1943-2 S-1367-2-10	S-1367-4-10		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	VENDOR
17	C611001-0102	REGULATOR	
16	TVA-1315	CAPACITOR	56289
15	S-1637-2	HOUSING-SOCKET	
14	S-1637-1	HOUSING-PIN	
13	S-2135-1	LIGHT ASSY	
12	C593001-0101	OVERVOLTAGE SENSOR	
11	C6AB-10A730A	HOUSING	88690
10	C611001-0101	REGULATOR	
9	C611501-0102	ALTERNATOR ASSY	
8	0770038-2	FILTER	
7			
6	S-1640-15	HOUSING-PIN	
5	S-1641-15	HOUSING-SOCKET	
4	0770719-2	DIODE ASSY	
3	S-1994-1-1	SWITCH	
2	S-1360-5	CIRCUIT BREAKER	
1	S-1596-60	CIRCUIT BREAKER	

EQUIPMENT TABLE

NOTES:

1. OBSERVE POLARITY SYMBOL ON DIODE WHEN INSTALLING ON SWITCH TO AVOID DIODE FAILURE
2. AMP TERM 42281-2 ON CONDUCTOR. AMP TERM 2-323931-2 ON SHIELD & GND WIRE
3. APPLICABLE MODEL; FR172H & F172K

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 4.11

SUPERSEDED BY: P 44.1 0570101 P 44.0

CONTRACT NO:

	NAME	DATE
DESIGN	Cook	4-7-70
GROUP	V. Wise	4-2-70
DRAWN	D.G. PLAIN	3-26-70
CHECK	L.K. WHITE	4-2-70
STRESS		
PROJ	R. Fife	4-13-70
APPD	R. YOUNGERS	4-2-70
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE WIRING DIAGRAM — ALTERNATOR SYSTEM, 60 AMP

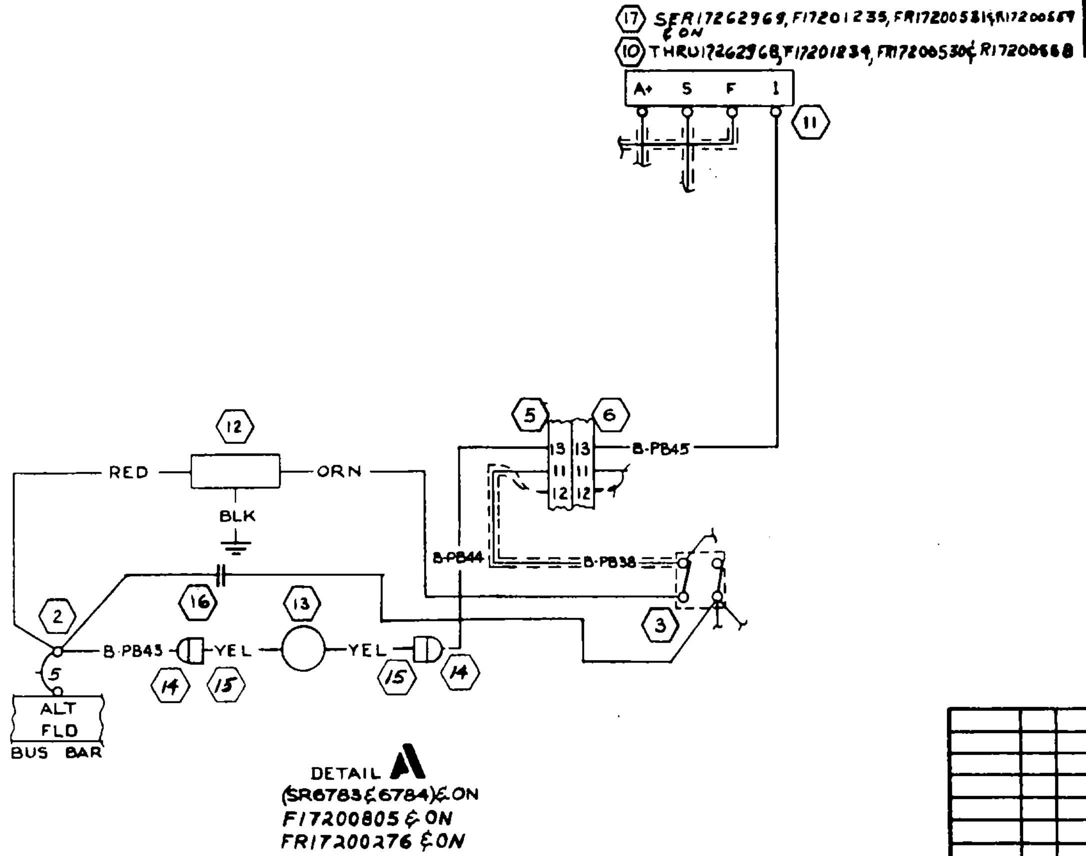
SIZE C CODE IDENT. NO. 71379 DWG NO 0500062

SCALE: NONE PAGE: 4.11.1

FORM NO. 80-2158

ED&RR 10939 SER (SR 6354) IX FR17200226

REVISION			
LET	DESCRIPTION	DATE	APPD
E	SEE PG. 4.11.1 FOR REV.		



INACTIVE: EFF THRU SER (SR7903) II (SR7904) II (17265684, F17201385) (FR17200559 & FR17200561)
10-29-74
RAM
JCY
ARQ RF

04-231-0905
03-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY: 0570101 P4.4.1 P4.4.0

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wise	6-1-71
DRAWN	ACKERSON	6-1-71
CHECK	L.K. WHITE	5-27-71
STRESS		
PROJ	R. Hanna	6-1-71
APPD		
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE
WIRING DIAGRAM — ALTERNATOR SYSTEM, 60 AMP

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0500062

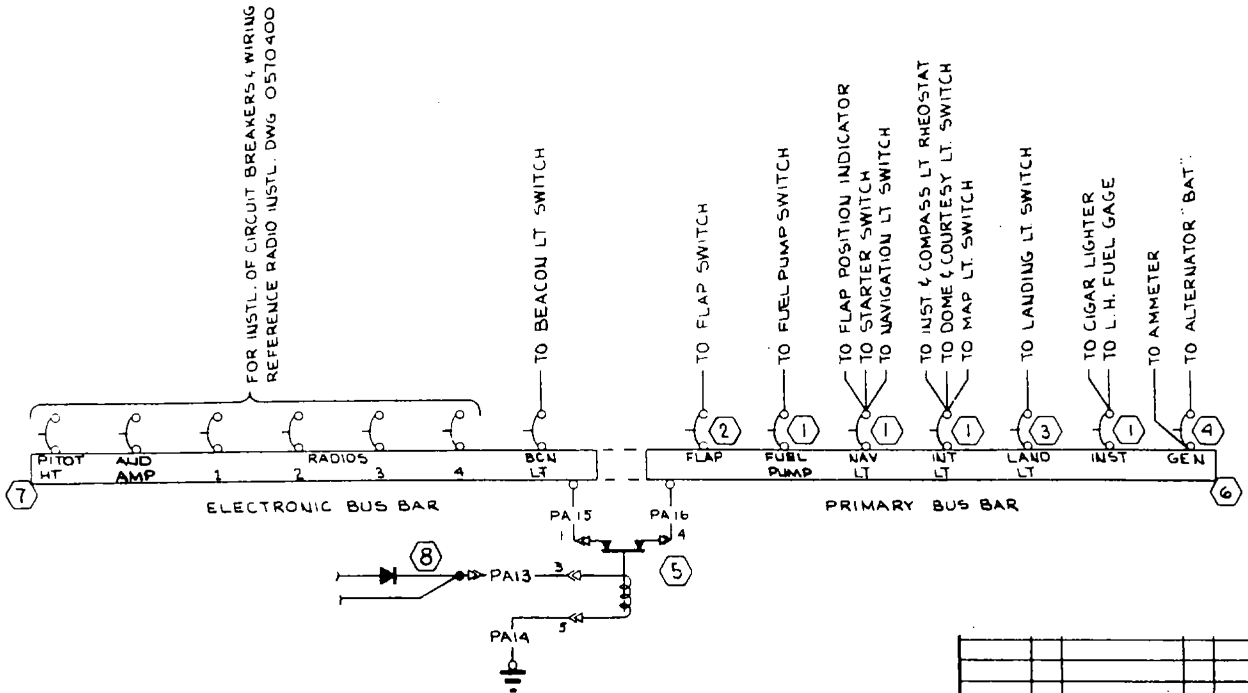
SCALE: NONE | PAGE: 4.11.2

FORM NO. 80-2156

NOTES:

1. ON 60 AIRCRAFT (1ST 60 FR172E'S) ELECTRONIC BUS BAR TO BE SHORTENED TO CLEAR FUEL PUMP CIRCUIT BREAKER & A 18 GA JUMPER WIRE ADDED BETWEEN FUEL PUMP CIRCUIT BREAKER & HOT SIDE OF FLAP CIRCUIT BREAKER.

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV: ADD 172I TO MODEL BLOCK EDEFR 00192(SER 172I&(513)&ON	JSM 9-27-67	RLL
B	DELETE MODEL 172I	WBC 1-18-68	



INACTIVE:
EFF SER FR172E-0001
THRU SER FR17200225
RLV 4-3-70

8	1570043-1	DIODE ASSY.		
7	0570036-2	BUS BAR		
6	0570036-1	BUS BAR		
5	S-1668-1	RELAY		
4	S-1596-60	CIRCUIT BREAKER		
3	S-1360-20	CIRCUIT BREAKER		
2	S-1360-15	CIRCUIT BREAKER		
1	S-1360-10	CIRCUIT BREAKER		
ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
PA14	18			S-1493-1	S-1367-1-8		
PA13	18			S-1493-1	S-1493-1		
PA16	14			S-1493-2	S-1367-2-6		
PA15	14			S-1493-2	S-1367-2-6		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	HARRIS	9-13-67
GROUP	H Wise	9-21-67
CHECK	LAURIE	9-15-67
PROJ	DGKoller	9-21-67

TITLE: WIRING DIAGRAM— CIRCUIT BREAKER WIRING

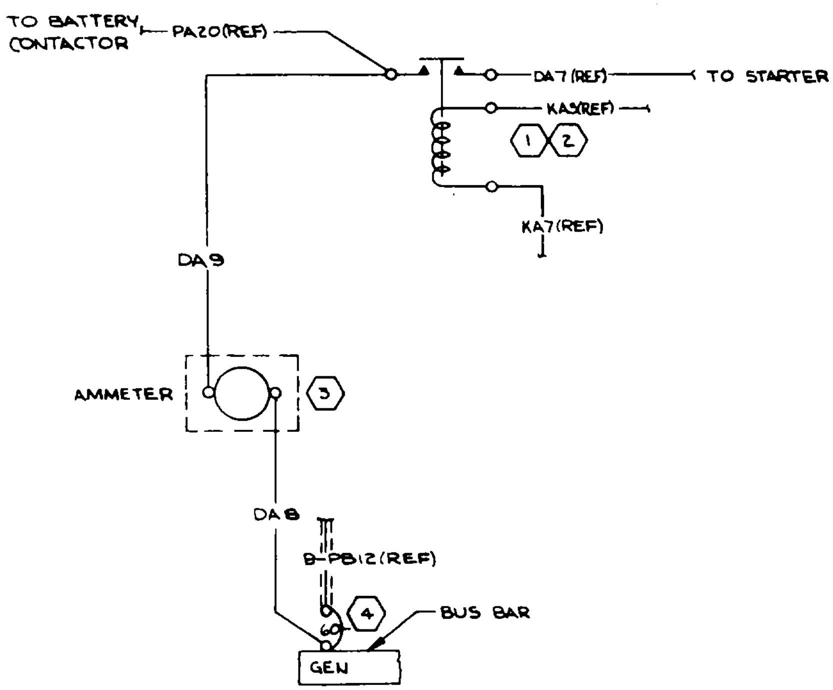
Cessna.

DWG NO: 0500062

SUPERSEDED BY: P4.8.1 & P4.8.2 | SUPERSEDES: | MODEL: T41C, FR172E | REV: B | PAGE: 4.12

(SE5957)IX

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: 39LG WAS 29 & S-1367-4-10 WAS S-1367-4-6 PER DA8, 66LG WAS 59 PER DA9 (NOW SHOP PRACTICE)	XLO 3-16-73	[illegible] RF



INACTIVE: EFF THRU SER (SR7304) II (FR17200559 & FR17200561)
10-29-74
RAM JCY QRG RF

04-231-0905

DA 9	8		66	S-1367-4-10	S-1367-4-14	
DA 8	8		39	S-1367-4-10	S-1367-4-10	
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS		SERIALS

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
4	S-1701-60	CIRCUIT BKR
3	C669502-0208	INST CLUSTER
2	SAW-4204-1	STARTER CONTACTOR-INST
1	SAW-4206-1	STARTER CONTACTOR

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P4.3.1

SUPERSEDED BY: 0570101 P4.5.0

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	V. Wise	6-9-69
DRAWN	M.SWANEY	5-27-69
CHECK	R.YOUNGERS	6-28-69
STRESS	TULLIS	6-9-69
PROJ	[illegible]	6-17-69
APPD	[illegible]	6-2-69
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — AMMETER

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0500062

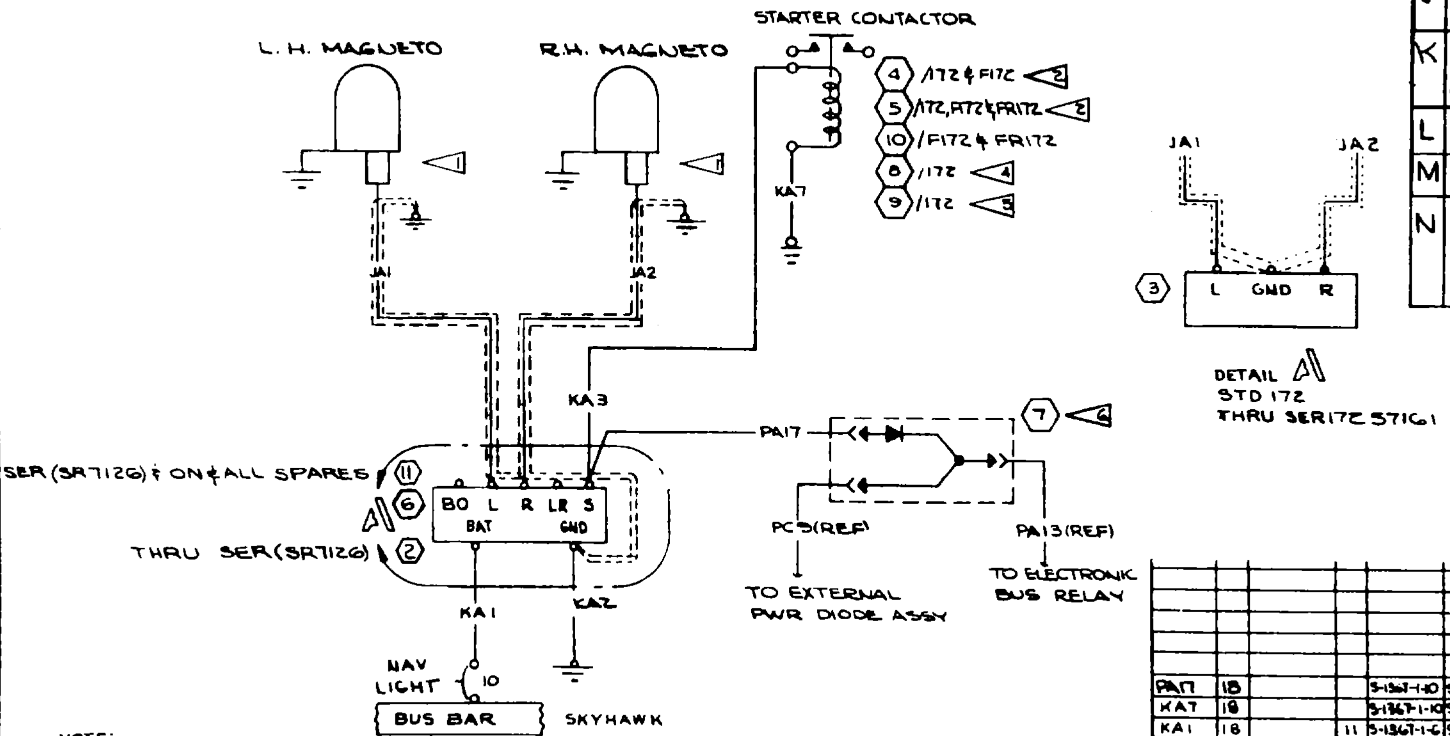
SCALE: NONE | FR172 | PAGE: 4.17

SER FR172E-0001 & ON

FORM NO. 80-2158

CHG LET	REVISION	BY DATE	CHK APPD
P	BY REV: C292501-0105 SUPERSEDES C292501-0101 FOR ALL SPARES (SR7126)	RLY 3-1-72	RF

CHG LET	REVISION	BY DATE	CHK APPD
D	REDRAWN NO CHG		
E	DELETED [illegible] SR4041		
F	DOUBLE SHIELDED WIRE CHANGED TO SINGLE SHIELD ON JA1 & JA2	WRC 11-16-65	
G	ADD NOTE 1 & S 1488-1 NIPPLE		
H	ADD STARTER CONTACTOR, BUS BAR / DETAIL A TO FIELD OF DWG. ADD WIRE NO. KA1, KA2, KA3 & KA7. (SER F172-0480) & ON	8-11-66	
J	BY REV: ADD FR172E TO MODEL BLOCK (SER FR172E-0001) & ON	C.G. 8-8-67	RLL
K	BY REV: ADD NOTE 3 ED & RR 00173 (SER R172E-0257 THRU -0301) (SER FR172E-0001) & ON	RCA 9-18-67	RLL
L	BY REV: ADD 172I TO NOTE 3 ED & RR 00192 (SER 17256??) & ON	JSM 9-27-67	RLC
M	BY REV: SER OUT DETAIL A (SR5522)	C G -6-67	RLL
N	BY REV: ADD 1570045-1, S-1660-1, S-1991-1, PA17, NOTES 4,5 & 6 & SAW-4004-1 (ALT). ED & RR 10476 SER 17258393 & ON	MDS 3-27-68	RLY



NOTE:

1. ADD S-1488-1 NIPPLES TO MAG END OF WIRES
2. (4) APPLICABLE THRU SER172 55146 & SER F172-0429
   (5) APPLICABLE SER172 55147 THRU SER 172 56512; SER F172-0430 & SER FR172E-0001 & ON
3. APPLICABLE MODELS; 172, FR172E, T41-C, & 172I
4. SER172 56513 THRU SER 17253392
5. SER 17258393 & ON
6. SER 17254893, SER F172-0320 & SER FR172E-0001 & ON

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
11	C292501-0105	IGN SWITCH	
10	SAW-4004-1	CONTACTOR-ALT	(12984)
9	S-1991-1	CONTACTOR	
8	S-1660-1	CONTACTOR	
7	1570043-1	DIODE ASSY	
6	S-1406-1	SWITCH IGN	T41-C
5	SAW-4206-1	STARTER CONTACTOR	(12984)
4	1118822	STARTER CONTACTOR	(16758)
3	C292501-0201	SWITCH IGN	172-FR172E
2	C292501-0101	SWITCH IGN	172
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
PA17	18			S-1367-1-10	S-1493-1		6
KA7	18			S-1367-1-10	S-1367-1-12		[illegible]
KA1	18		11	S-1367-1-6	S-1367-1-6		
KA3	18		48	S-1367-1-6	S-1367-1-10		
KA2	18		9	S-1367-1-6	S-1367-1-8		
JA2	18S			[illegible]	[illegible]	1	
JA1	18S			[illegible]	[illegible]	1	

WIRE TABLE

	NAME	DATE
DRAWN	[illegible]	[illegible]
GROUP	[illegible]	[illegible]
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

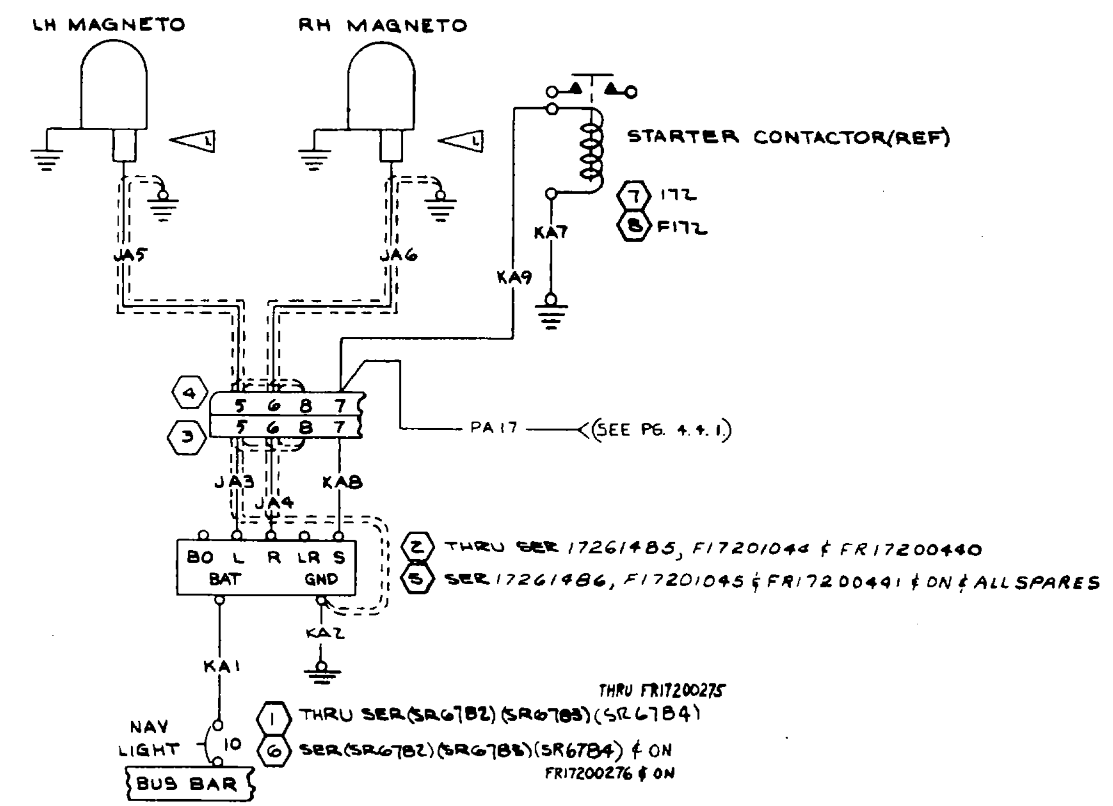
TITLE: WIRING DIAGRAM — MAGNETO SYSTEM —

Cessna.

0500062

SUPERSEDED BY: P 5.1.1
SUPERSEDES: 0500062 PAGE 6.1.1
MODEL: NOTED
REV: P
PAGE: 5.1

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: SER OUT C292501-0101; SER IN C292501-0105; SER OUT S-1360-10, SER IN S-1360-10L (SR7126), (SR6872) II (SR6873) II (REF)	RLY 3-1-72	RF
B	BY REV: S-1367-2-10 WAS S-1367-2-6 PER JA5 & JA6, ADD WIRE LENGTH (NOW SHOP PRACTICE)	4-9-73	RF
C	BY REV: ADDED WIRE PA17, WAS REF (M.E.R. 172-E00058)	MEM 5-7-74	RF
D	BY REV: SR6782 WAS SR6872. SR6783 WAS SR6873. ADD SR6784	WHH 11-8-74	



INACTIVE: EFF THRU SER (SR7903) II (SR7904) II (17265684, F17201384) (FR17200559, FR17200561) 10-29-74 RAM RF

04-231-0905
03-231-0905

NOTES:

1. ADD S-1488-1 NIPPLES TO MAG END OF WIRES
2. APPLICABLE MODELS: 172L, F172K, FR172H,

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
PA17	18		40	S-1635-1	S-1493-1		
KA9	18		58	S-1635-1	S-1367-1-10		
KA8	18		15	S-1367-1-6	S-1636-1		
KA7	18			S-1367-1-10	S-1367-1-10		
JA6	18S		51	S-1635-1	[illegible]		
JA5	18S		48	S-1635-1	[illegible]		
JA4	18S		15	S-1636-1	[illegible]		
JA3	18S		15	S-1636-1	[illegible]		
KA2	18		8	S-1367-1-6	S-1367-1-8		
KA1	18		6	S-1367-1-6	S-1367-1-6		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
8	SAW-4206-1	CONTACTOR
7	SAW-4204-1	CONTACTOR
6	S-1360-10L	CIRCUIT BKR
5	C292501-0105	IGNITION SWITCH
4	S-1640-15	HOUSING-PIN
3	S-1641-15	HOUSING-SOCKET
2	C292501-0101	SWITCH
1	S-1360-10	CIRCUIT BREAKER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 5.1

SUPERSEDED BY: 0570101 P 5.1.0

CONTRACT NO:

	NAME	DATE
DESIGN	C. Crk	4-7-70
GROUP	H. Wise	4-2-70
DRAWN	D.G. PLAIN	4-1-70
CHECK	L.K. WHITE	4-1-70
STRESS		
PROJECT	G. Fife	4-15-70
APPD	R. YOUNGERS	4-2-70

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — MAGNETO SYSTEM

SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0500062

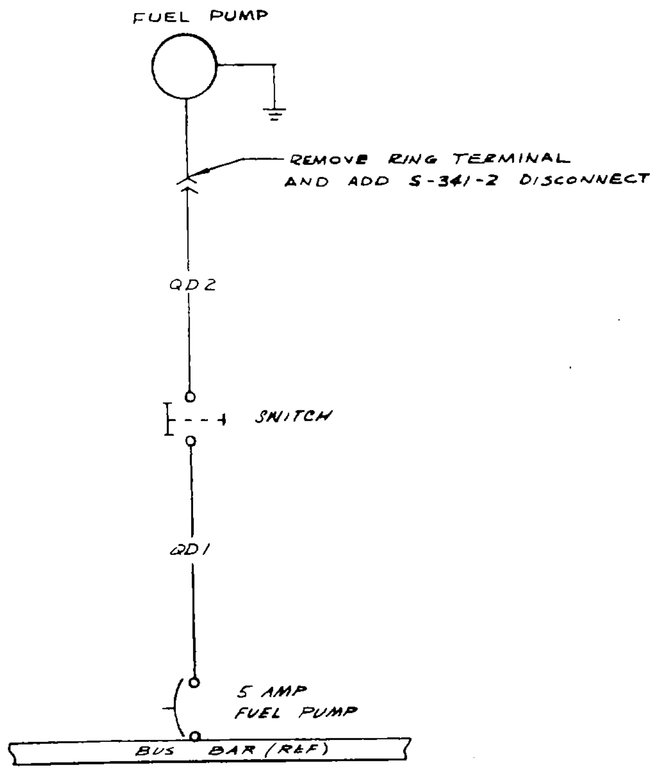
SCALE: NONE | PAGE: 5.1.1

FORM NO. 00-518A

ED.RR 10939

SER (SR 6352) SER (SR 6353) II (17259224; F17200755)
SER (SR 6354) II FR17200226

CHG LET	REVISION	BY / DATE	CHK / APPD
A	BY REV: ADD FR172E TO MODEL BLOCK (SER FR172E-0001) ON	C.G. 8-8-67	RLL



INACTIVE: (FR172-0001) EFF THRU SER (SR5357) 11-12-74
RAM
JRG
RF

SR 4041

QD2	18			S-1367-1-8	S-341-2		
QD1	18			S-1367-1-8	S-1367-1-6		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	ALTHER	5-17-63
GROUP	PARSONS	5-29-63
CHECK	R.E. Moore	5-21-63
PROJ	[signature]	5-29-63

TITLE: WIRING DIAGRAM — FUEL PUMP

Cessna.

DWG NO. 0500062

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

SUPERSEDED BY | SUPERSEDES | MODEL FR172E-P172 | REV. A | PAGE: 7.1

FORM NO. 80-181

NOTES:

1. TERMINAL IS S-1626-1 & S-1637-2 HOUSING-PLUG.
2. TERMINAL IS S-1635-1 & S-1637-1 HOUSING-CAP.
3. APPLICABLE MODELS; FR172E, T41-C

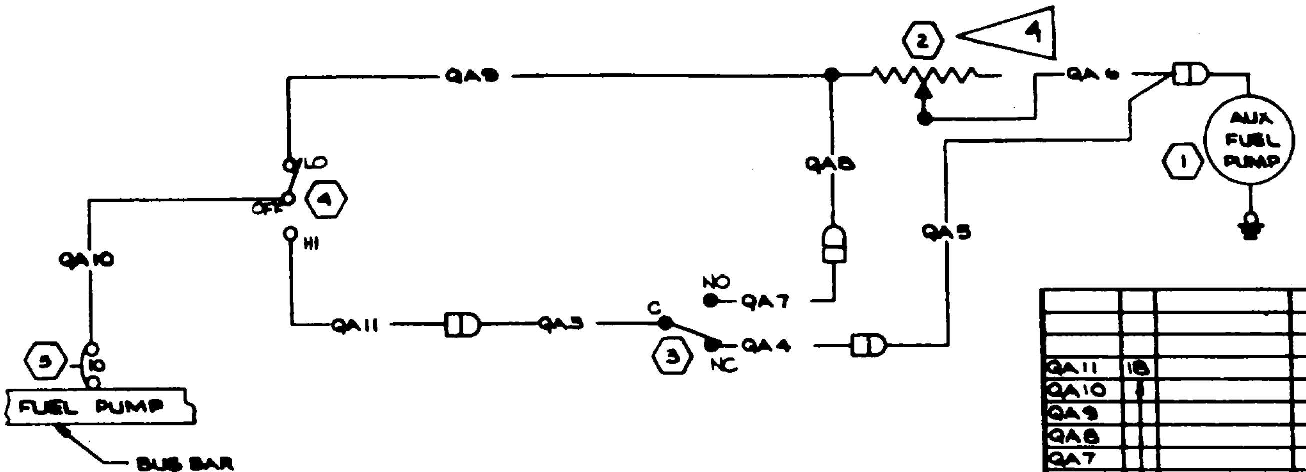
NOTES CONT'D BELOW

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD 172I TO NOTE 3 ED & RR 0092 (SR5471)		
B	BY REV: DELETE 172I FROM NOTE 3	CO	
C	BY REV: ADDED BOLD NOTE TO FIELD OF DWG		
D	BY REV: ADD NOTES 4, SERIAL EFFECTIVITY	BAH 2-28-75	

T-41C & FR172E AIRCRAFT NOT MODIFIED IN THE FIELD BY SK172-41B.

EFF SERIALS R1720257 THRU R1720301 & FR1720001 THRU FR1720225

INACTIVE: THRU SER (SR6354) (FR17200225)
ED&RR 10939 3-20-70



NOTES CONT'D

4. ENGINE NOT RUNNING, ASSURE THAT THROTTLE OPERATED SWITCH IS RIGGED PER 1550005 WITH 14.25 ± .25 VDC, EXT. POWER APPLIED, THROTTLE RETARDED TO POSITION WHERE THROTTLE SWITCH IS ACTIVATED, MIXTURE CONTROL IN FULL RICH POSITION, TURN MASTER SWITCH ON. PLACE AUX FUEL PUMP SWITCH IN LOW POSITION. SET RESISTOR TO OBTAIN REDLINE ON FUEL FLOW METER

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
QA11	18			S-1313-1-6	1		
QA10				S-1313-1-6	S-1313-1-6		
QA9				S-1313-1-6	SOLDER		
QA8				2	SOLDER		
QA7				SOLDER	1		
QA6				SOLDER	1		
QA5				2	1		
QA4				SOLDER	1		
QA3	18			2	SOLDER		

WIRE TABLE

	PART NO.	DESCRIPTION	VENDOR
5	S-1360-10L	CIRCUIT BKR	
4	S-382-1	FUEL PUMP SW	
3	USM-5W	SWITCH	(80207)
2	AR-25-15	RESISTOR	(94310)
1	4140-001	AUX FUEL PUMP	(97545)

EQUIPMENT TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CXXXX=CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY: P 7.2.14 7.2.0.1

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wise	7-21-67
DRAWN	HARRIS	9-13-67
CHECK	LAURIE	9-15-67
STRESS	A-4	9-21-67
PROJECT	DG Kobb	7-31-67
APPD		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

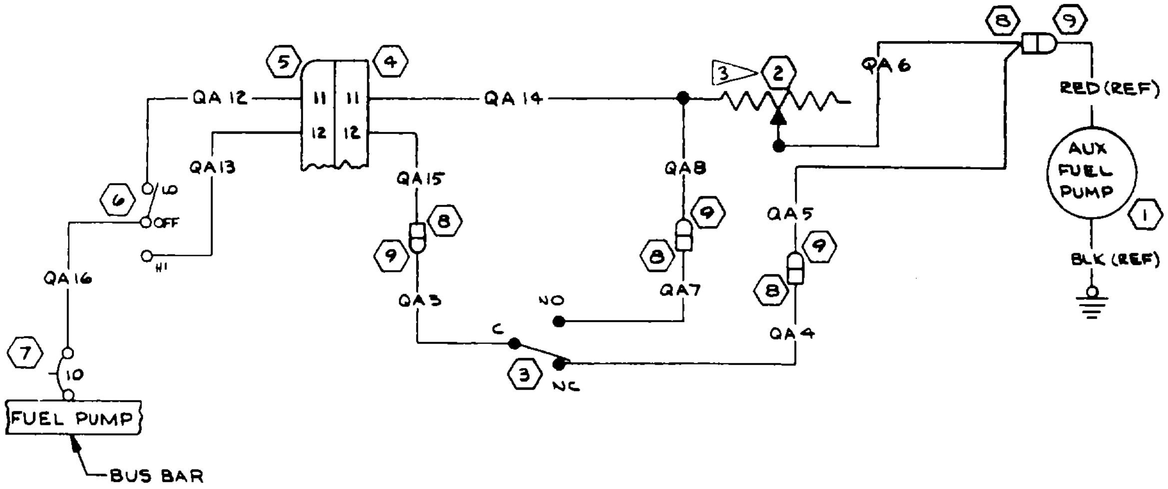
TITLE: WIRING DIAGRAM — FUEL PUMP

SIZE: C | CODE IDENT. NO.: 71379 | DWG NO.: 0500062

SCALE: NONE | NOTED | PAGE: 72

(SR5361)
(SR5453)

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: S-382-1 WAS S-2044-1 S-1367-1-6 WAS S-1498-1 /QA12, QA13 & QA16 ED & RR 10064 (SR6354) IX	RLY 5-22-70	RLY HEW ZF
B	BY REV: ADD NOTE 3 & 4	BAH 2-28-75	MTM HEW RF



INACTIVE THRU FR17200440
EFF THRU SER (SR7304) & (SR7621)
7-5-73
RAM
RLY
HEW
RF

FR172 AIRCRAFT NOT MODIFIED
IN THE FIELD BY SK172-41B
(EFF SERIALS FR1720226 THRU FR1720440)

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
QA 16	18			S-1367-1-6	~~S-1367-1-6~~		
QA 15	18			S-1636-1	S-1636-1		
QA 14	18			S-1636-1	SOLDER		
QA 13	18			~~S-1367-1-6~~	S-1635-1		
QA 12	18			~~S-1367-1-6~~	S-1635-1		
QA 8	18			S-1635-1	SOLDER		
QA 7	18			S-1636-1	SOLDER		
QA 6	18			1.	SOLDER		
QA 5	18			S-1635-1	1.		
QA 4	18			S-1636-1	SOLDER		
QA 3	18			S-1635-1	SOLDER		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
9	S-1637-1	HOUSING - CAP	
8	S-1637-2	HOUSING - PLUG	
7	S-1360-10	CIRCUIT BREAKER	
6	S-382-1	SWITCH	
5	S-1640-15	HOUSING - PIN	
4	S-1641-15	HOUSING - SOCKET	
3	USM-5W	SWITCH	80207
2	AR-25-15	RESISTOR	94310
1	4140-001	FUEL PUMP	97545

EQUIPMENT TABLE

NOTES:

1. THESE WIRES UTILIZE COMMON S-1636-3 TERM.
2. APPLICABLE MODELS: FR172K.
3. ENGINE NOT RUNNING. ASSURE THAT THROTTLE SWITCH IS RIGGED PER 1550005. WITH 14.25 ± .25 VOLTS D.C. EXTERNAL POWER APPLIED, THROTTLE RETARDED TO POSITION WHERE THROTTLE SWITCH IS ACTUATED, MIXTURE CONTROL TO FULL RICH POSITION, TURN MASTER SWITCH ON, PLACE AUXILIARY FUEL PUMP SWITCH IN LOW POSITION. SET RESISTOR TO OBTAIN REDLINE ON FUEL FLOW METER.

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 7.2
SUPERSEDED BY: P. 7.2.2 & 7.3

CONTRACT NO:

	NAME	DATE
DESIGN	Cork	4-1-70
GROUP	H. Wise	4-2-70
DRAWN	D.G. PLAIN	4-1-70
CHECK	L.K. WHITE	4-1-70
STRESS		
PROJECT	R. Fife	4-18-70
APPD	R. YOUNGERS	4-2-70

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — AUX FUEL PUMP

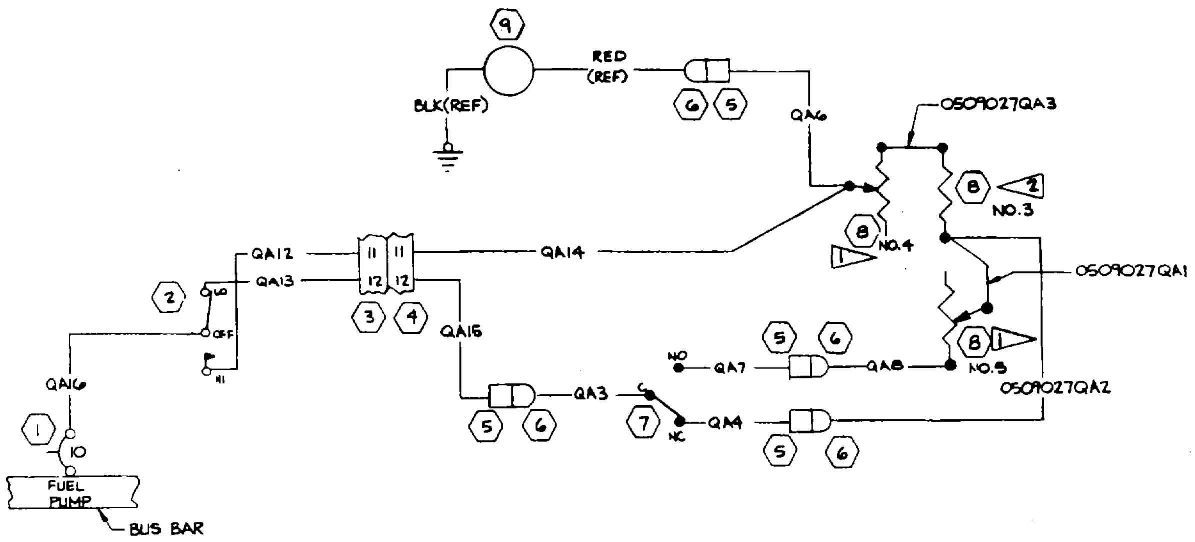
SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0500062

SCALE: NONE | PAGE: 7.2.1

FORM NO. 80-519A

SER (SR 6354) IX FR17200226

REVISION			
LET	DESCRIPTION	DATE	APPD



INACTIVE: EFF THRU SER (SR 7904) (FR17200559 & FR17200561) BAH 3-6-75 IPB 10/1/75 MTM BF

FR172 AIRCRAFT MODIFIED IN THE FIELD BY SK172-41B

(EFF SERIALS FR1720226 THRU FR1720440)

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
0509027 QA3	18			SOLDER	SOLDER		
0509027QA2	18			S-1635-1	SOLDER		
0509027QA1	18			SOLDER	SOLDER		
QA14	18			S-1636-1	SOLDER		
QA6	18			S-1636-1	SOLDER		
QA8	18			S-1635-1	SOLDER		
QA7	18			S-1636-1	SOLDER		
QA4	18			S-1636-1	SOLDER		
QA3	18			S-1635-1	SOLDER		
QA15	18			S-1636-1	S-1636-1		
QA13	18			S-1367-1-6	S-1635-1		
QA12	18			S-1367-1-6	S-1635-1		
QA16	18			S-1367-1-6	S-1367-1-6		

WIRE TABLE

NOTES:

1. ENGINE NOT RUNNING. ASSURE THAT THROTTLE OPERATED SWITCH IS RIGGED PER 1550005 WITH 14.25 ± .25 VDC. EXTERNAL POWER APPLIED, THROTTLE IN OPEN POSITION, MIXTURE CONTROL IN FULL RICH POSITION, TURN MASTER SWITCH ON. PLACE AUXILIARY FUEL PUMP SWITCH IN LOW POSITION. ADJUST NO.4 RESISTOR FOR 6 TO 6.5 GAL/HR FUEL FLOW. WITH THROTTLE SET AT POSITION WHICH REPRESENTS 18 INCHES OF MANIFOLD PRESSURE AND WITH THE THROTTLE ACTUATED SWITCH IN THE "N.O." POSITION, ADJUST NO.5 RESISTOR FOR 2 GAL/HR FUEL FLOW
2. REMOVE WIPER FROM THIS RESISTOR
3. THIS DIAGRAM IDENTICAL TO AND INSTALLED PER 0509027-2. THIS DRAWING IS DRAWN TO FACILITATE SERVICE MANUAL REQUIREMENTS. SK172-41B IS SERVICE KIT EQUIVALENT OF 0509027-2.

ITEM NO.	PART NO.	DESCRIPTION	
9	4140-001	FUEL PUMP	
8	AMOR20-1.5	RESISTOR	
7	USM-5W	SWITCH	
6	S-1637-1	HOUSING	
5	S-1637-2	HOUSING	
4	S-1641-15	HOUSING	
3	S-1640-15	HOUSING	
2	MS35058-31	SWITCH	
1	S-1360-10L	CIRCUIT BREAKER	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 7.2.1

SUPERSEDED BY:

CONTRACT NO.:

	NAME	DATE
DESIGN		
GROUP	W. H. Hardin	3-11-75
DRAWN	B. HARRISON	3-6-75
CHECK	M. McCARTY	3-7-75
STRESS		
PROJ		
APPD	PRS	
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

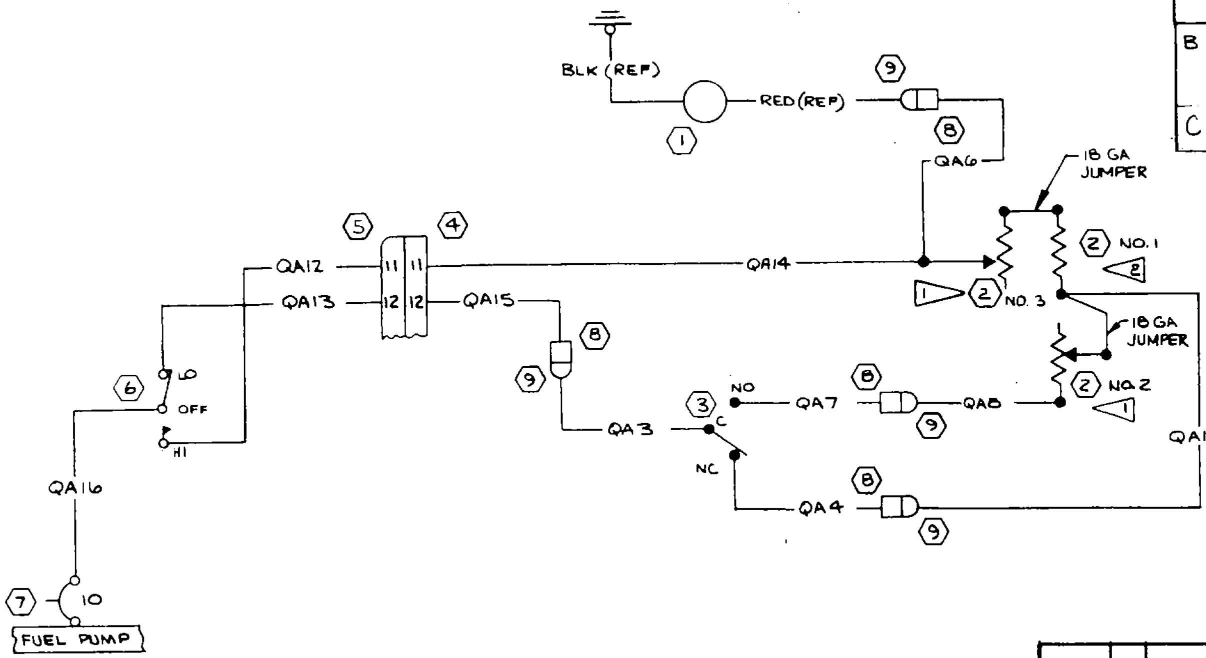
TITLE: WIRING DIAGRAM — FUEL PUMP

SIZE: C | CODE IDENT. NO.: 71379 | DWG NO: 0500062

SCALE: NONE | FR172 | PAGE: 7.2.1.1

FORM NO. 80-2150

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD NO.3 AMOR20-1.5 & NOTE 2, 6 TO 6.5 WAS 16/NOTE 1 SER(SR7304)(REF)	RS 11-20-73	SCY WHH RF
B	BY REV: NO. 3 RESISTOR WAS NO.1 RESISTOR PER NOTE 1. INACT DWG (NOW SHOP PRACTICE) (SR7904)	RAM 10-29-79	SCY PRS RF
C	BY REV: REWRITE NOTE 1; RELOCATE QA12 & QA13 AT SWITCH	BAH 2-28-75	MTW WHH PRS RF



INACTIVE: EFF THRU SER (SR7904) (FR17200559 & FR17200561) 10-29-79 RAM and SCY RF PRS

04-231-0905

NOTES:

1. ENGINE NOT RUNNING. ASSURE THAT THROTTLE OPERATED SWITCH IS RIGGED PER 1550005 WITH 14.25 ± .25 VDC. EXTERNAL POWER APPLIED, THROTTLE IN OPEN POSITION, MIXTURE CONTROL IN FULL RICH POSITION, TURN MASTER SWITCH ON. PLACE AUXILIARY FUEL PUMP SWITCH IN LOW POSITION. ADJUST NO. 3 RESISTOR FOR 6 TO 6.5 GAL/HR FUEL FLOW. WITH THROTTLE SET AT POSITION WHICH REPRESENTS 18 INCHES OF MANIFOLD PRESSURE AND WITH THE THROTTLE ACTUATED SWITCH IN THE "N.O." POSITION, ADJUST NO. 2 RESISTOR FOR 2 GAL/HR FUEL FLOW

2. REMOVE WIPER FROM THIS RESISTOR

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
QA17	18			S-1635-1	SOLDER		
QA16	18			S-1367-1-6	S-1367-1-6		
QA15	18			S-1636-1	S-1636-1		
QA14	18			S-1636-1	SOLDER		
QA13	18			S-1367-1-6	S-1635-1		
QA12	18			S-1367-1-6	S-1635-1		
QA8	18			S-1635-1	SOLDER		
QA7	18			S-1636-1	SOLDER		
QA6	18			S-1636-1	SOLDER		
QA4	18			S-1636-1	SOLDER		
QA3	18			S-1635-1	SOLDER		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
9	S-1637-1	HOUSING	
8	S-1637-2	HOUSING	
7	S-1360-10L	CIRCUIT BREAKER	
6	MS35058-31	SWITCH	
5	S-1640-15	HOUSING	
4	S-1641-15	HOUSING	
3	S-1856-1	SWITCH	
2	AMOR20-1.5	RESISTOR	
1	4140-001	FUEL PUMP	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: R 7.2.1

SUPERSEDED BY: 0570101 P 7.1.0

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wise	7-11-73
DRAWN	MERRICK	6-29-73
CHECK	R. YOUNGERS	6-30-73
STRESS		
PROJ	R. Fife	7-1-73
APPD		
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE: WIRING DIAGRAM — FUEL PUMP

SIZE: C | CODE IDENT. NO. 71379 | DWG NO 0500062

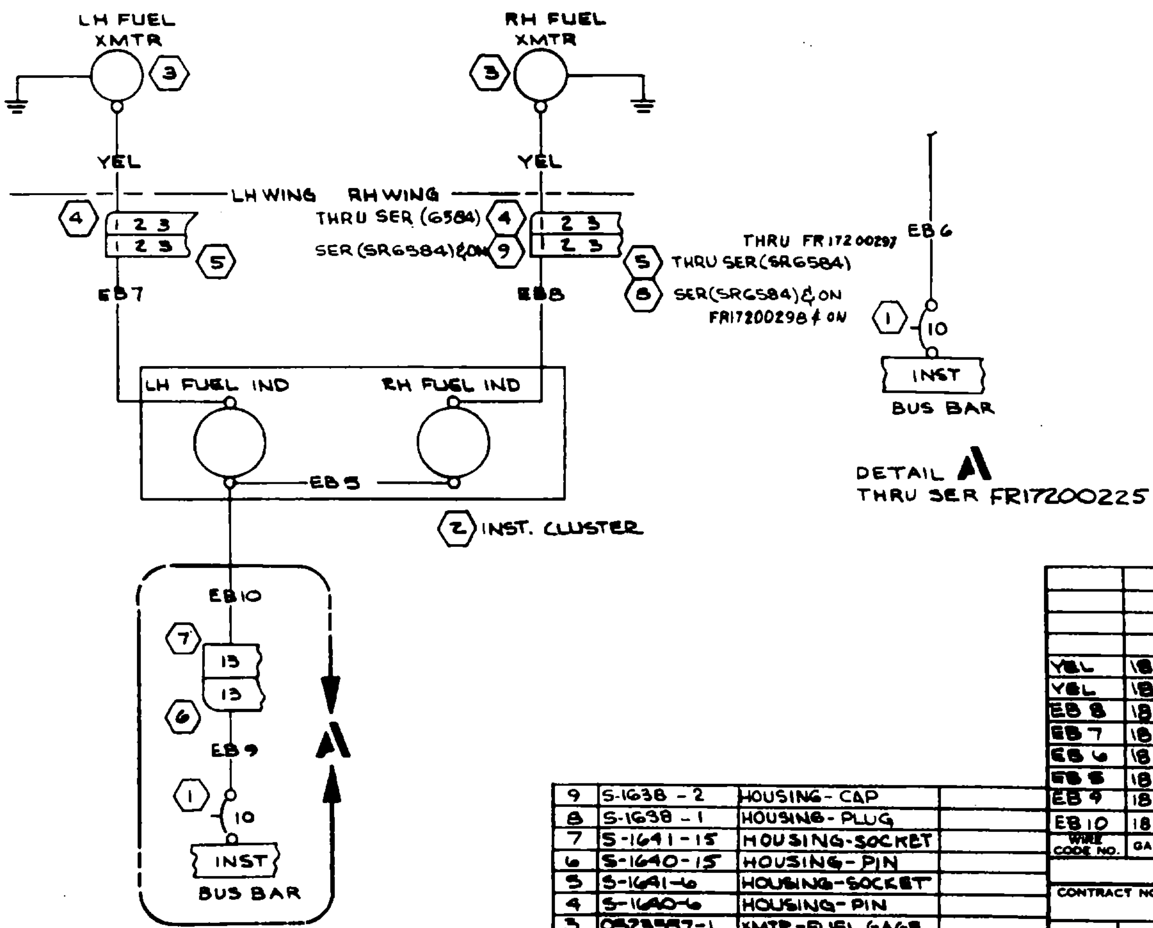
SCALE: NONE | FR172 | PAGE: 7.2.2

(SR7304) & (SR7621) FR17200441

FORM NO. 60-2158

NOTES:

1. WIRE MATERIAL PER S-1460.



REVISION			
LET	DESCRIPTION	DATE	APP'D
A	BY REV: ADD 172I TO MODEL BLOCK ED & RR 00192 (SER 172I56513) & ON	9-27-67 JSM	RLL RF
B	BY REV: ADD C669504-0208 (SER 172I56513) & ON	CG 1-6-67	RLL RFW
C	BY REV: DELETE 172I, DAB, DAB, PA20(REF), S-1555-1, ITEM 7 "C669504-0208" & AMMETER, ITEM 2 "C669502-0208" WAS "C669504-0208	MOS 5-27-69	RLH MOS RF
D	BY REV: ADD & SER OUT DETAIL "A"; ADD EB9 & EB10; ADD S-1640-15 & S-1641-15 ED & RR 10939 (SR6359) II	DGP 5-26-70	RLH RF
E	BY REV: ADD S-1638-1 & S-1638-2: SER OUT S-1640-6 & S-1641-6 IN RH WING (SR6584)	WRC 2-3-71	RF
F	BY REV: ADD WIRE LENGTHS (NOW SHOP PRACTICE)	JLO 4-9-73	RF

INACTIVE: EFF THRU SER (SR7900) II (FR17200255) FR17200...-74 RAM

04-231-0905

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
YEL	18	-18-4	35	S-1635-2	S-1367-1-10		
YEL	18	-18-4	38	S-1635-2	S-1367-1-10		
EB 8	18		86	S-1367-1-10	S-1636-2		
EB 7	18		51	S-1367-1-10	S-1636-2		
EB 6	18			S-1367-1-6	S-1367-1-10		THRU SER(SR6354)
EB 5	18		7	S-1367-1-10	S-1367-1-10		
EB 9	18		13	S-1367-1-6	S-1635-2		SER(SR6359) & ON
EB 10	18			S-1367-1-10	S-1636-2		SER(SR6359) & ON

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
9	S-1638-2	HOUSING-CAP
8	S-1638-1	HOUSING-PLUG
7	S-1641-15	HOUSING-SOCKET
6	S-1640-15	HOUSING-PIN
5	S-1641-6	HOUSING-SOCKET
4	S-1640-6	HOUSING-PIN
3	0523557-1	XMTR-FUEL GAGE
2	C669502-0208	INST CLUSTER
1	S-1360-10	CIRCUIT BREAKER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY: 057001 P 8.10

CONTRACT NO:

	NAME	DATE
DESIGN	COOK	9-21-67
GROUP	H. Wild	9-21-67
DRAWN	HARRIS	9-18-67
CHECK	LAURIE	9-15-67
STRESS		9-21-67
PROJECT	D. G. Kellen	9-21-67
APPD	R.E. Magan	9-26-67

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — FUEL GAGE & TRANSMITTER

SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0500062

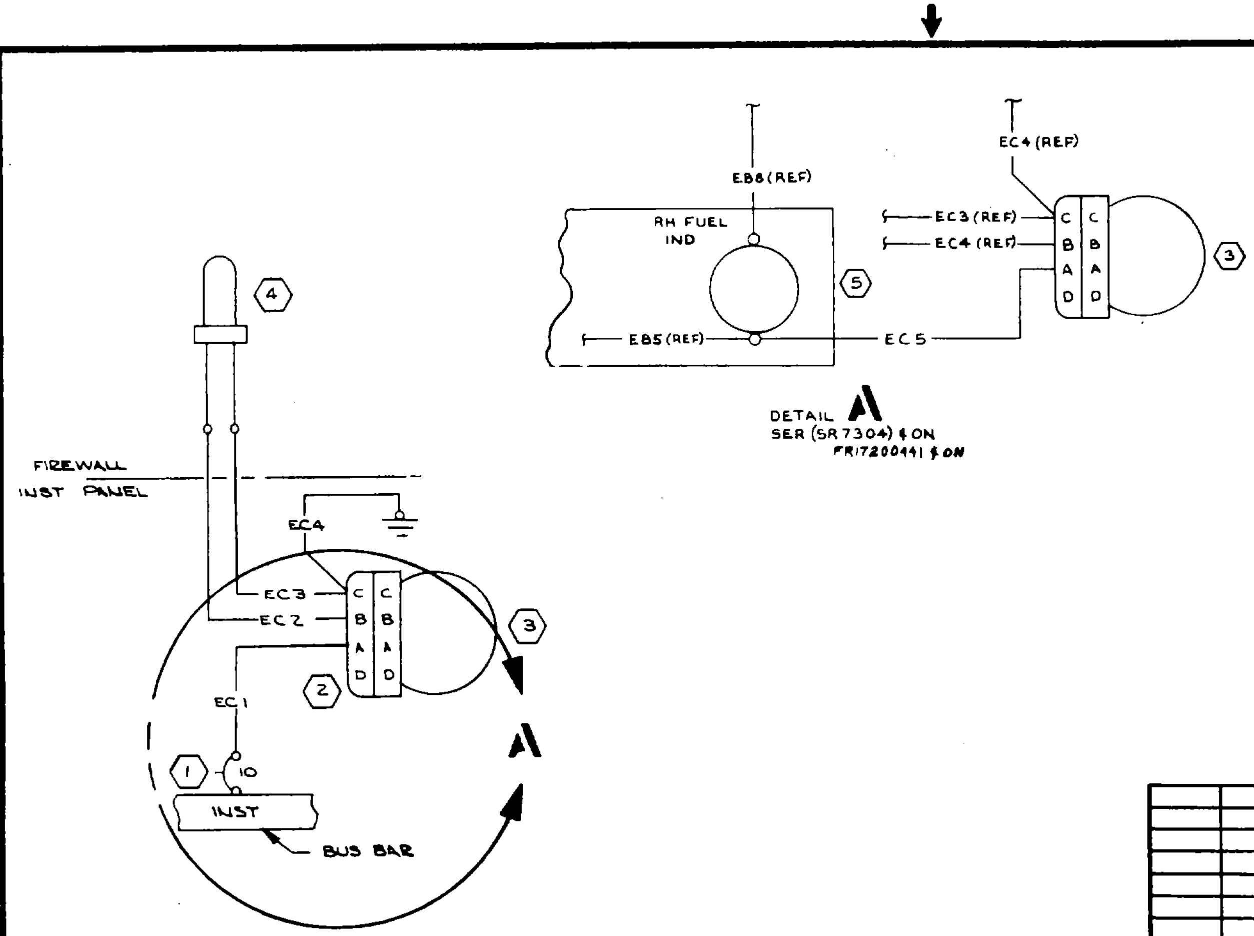
SCALE: NONE | T41-C, FR172E | PAGE: 8.1.2

(SER FR172E-0001) & ON
(SER R172E-0257 THRU-0301)

F

FORM NO. 30-815A

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD DETAIL A, NOTE 1, EC5 & C669502-0208 (SR7304)	TJP 9-24-73	



INACTIVE: EFF THRU SER (SR7304) II (FR17200359 & FR17200561) 10-29-74
RAM JCY RF

09-231-0304

EC5	18			SOLDER	S-1367-1-10		FR17200441 & ON SER (SR7304) & ON
EC4	18			SOLDER	S-1367-1-8		
EC3	18			S-1367-1-8	SOLDER		
EC2	18			S-1367-1-8	SOLDER		THRU FR17200440
EC1	18			S-1367-1-6	SOLDER		THRU SER (SR7304)
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

NOTES:

1. THIS PAGE APPLICABLE TO FR172E

5	C669502-0208	INST CLUSTER	
4	C813601-4	TEMP BULB	
3	S-1310N1	INDICATOR	
2	MS3106A14S2S	CONNECTOR	
1	S-1360-10L	CIRCUIT BKR	
ITEM NO.	PART NO.	DESCRIPTION	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX-CESSNA SPEC. NO.
S-XXX OR CMXXXX-CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY: 0970101 P 8.3.0

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wise	10-6-72
DRAWN	RCAxtell	10-5-72
CHECK	ZYOUNGERS	10-5-72
STRESS		
PROJ		10-17-72
APPD		
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — CYLINDER HEAD TEMP

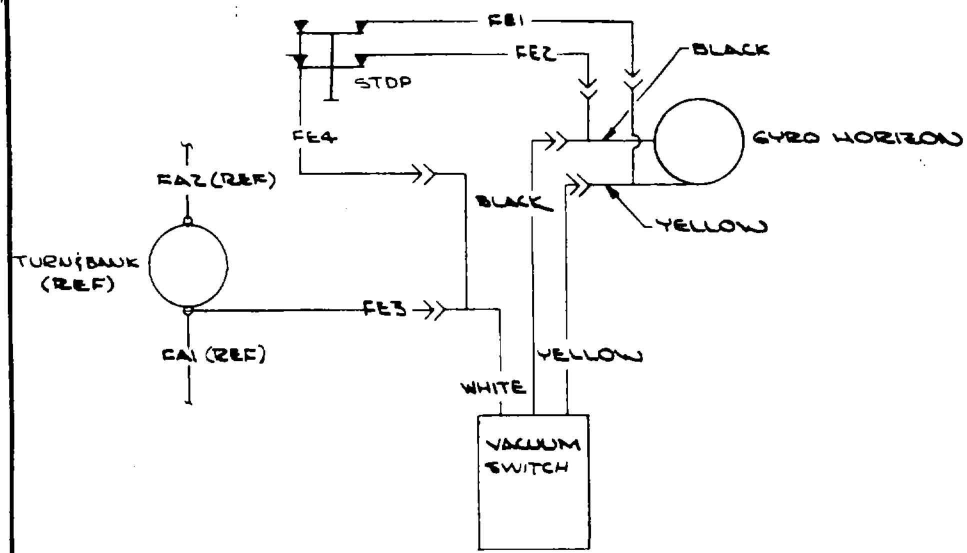
SIZE C | CODE IDENT. NO. 71379 | DWG NO 0500062

SCALE: NONE | (SR7004) II | PAGE: 8.4

FR17200351

FORM NO. 80-2155

CHG LET	REVISION	BY DATE	CHK APPD
D	ADDED FA1 THRU FA4 & NOTE 1		
E	DELETED PREFIXES SP 4041	5-7-63	
F	BY REV: ADD FR172E TO MODEL BLOCK (SER FR172E-0001) ON	C.G. 8-8-67	RLC
G	BY REV: DELETE FR172 FROM MODEL BLOCK	BLA 12-18-74	



INACTIVE: EFF THRU SER 17250572 & P17257188 11-12-74 RAM

NOTES:

1. FE1, FE2, FE3, & FE4 ARE IDENTICAL TO & SUPERSEDE 0513198-FE1, -FE2, FE3, & -FE4 RESPECTIVELY

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
FE4	20			S-341-2	——		
FE3	20			S-341-2	S-1367-1-8		
FE2	20			S-341-2	——		
FE1	20			S-341-2	——		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. ... WICHITA, KANSAS

	NAME	DATE
DRAWN	Griswold	4/2/59
GROUP	Dittmer	4/3/59
CHECK	Cox	4/3/59
PROJ	Sattler	4/3/59

TITLE: WIRING DIAGRAM — OPTIMUM FLIGHT INSTRUMENTS (OPT)

Cessna.

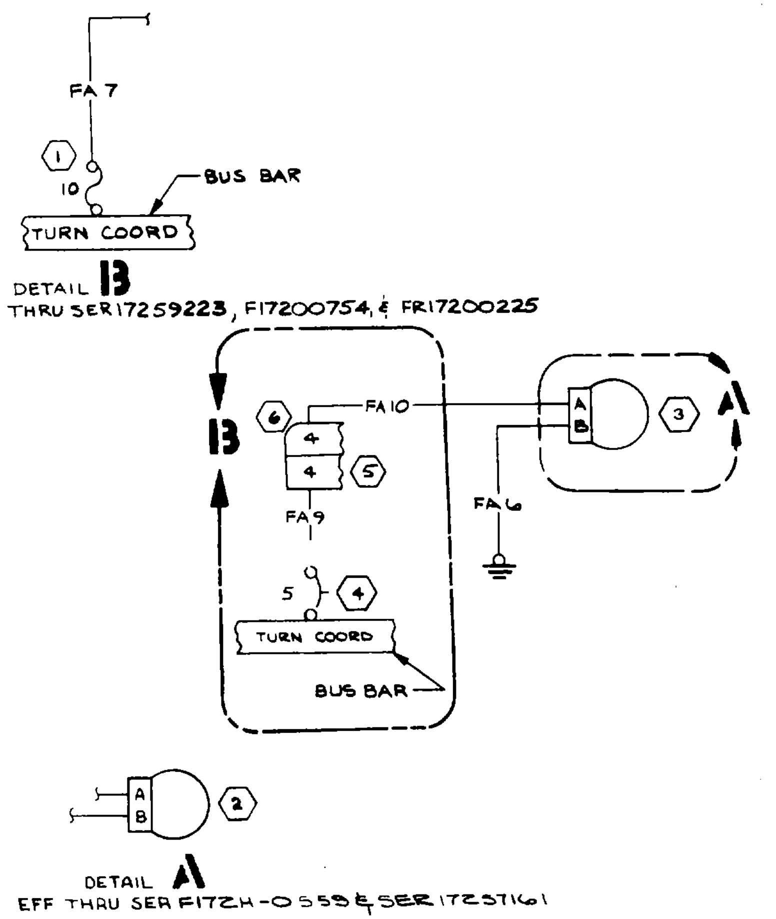
DWG NO. 0500062

SUPERSEDED BY: | SUPERSEDES: NOTE 1 | MODEL: 172-P172 | REV: F | PAGE: 2

FORM NO. 80-161 R

NOTES:

1. APPLICABLE MODELS; FR172 , 172 & F172



INACTIVE; EFF THRU SER (SR7903) II (SR7904) (17265684; F17201384; FR17200591 (FR17200561) 10-29-74 RAM JCY RF PRS RF

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	BY REV: ADD NOTE 1; DELETE (SR6471). ED & RR 00173 (SER FR172E-0001) & ON	7-18-67 RCA	RLL RW HRW
B	BY REV: ADD 172I TO NOTE 1 ED & RR 00192 (SER 172I56513) & ON	9-27-67 JSM	RLL RKW RF HRW
C	BY REV: ADDED DETAIL A & ITEM 3. ED & RR 02375 (SR5605) & (SR5522) II	LES 6-12-68	GKJ RJW HRW DGK
D	BY REV: ADD & SER OUT DETAIL "B"; ADD FA9 & FA10, F172 TO NOTE 1; 172 & FR172 WAS 172I & FR172E IN NOTE 1; ADD S-1640-15, S-1641-15 & S-1360-10 ED & RR 10939 (SR6352)(SR6353)(SR6354) II	DGP 3-26-70	HRW RF
E	BY REV: S-1360-5L WAS S-1360-10 (NOW SHOP PRACTICE)	10-5-72 RCA	BY HRW DKM RF
F	BY REV: ADD WIRE LENGTHS (NOW SHOP PRACTICE)	JLO 4-9-73	BY HRW RF
G	BY REV: 5 WAS 10, ON DWG. FIELD ITEM 4 (NOW SHOP PRACTICE)	MEM 5-9-74	PRS RF

04-231-0505
05-231-0805

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
FA 10	18		28	S-1635-2	SOLDER		
FA 9	18		9	S-1367-1-6	S-1636-2		
FA 6	18		23	S-1367-1-8	SOLDER		
FA 7	18			S-1367-1-6	SOLDER		THRU [illegible]

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
6	S-1640-15	HOUSING-PIN
5	S-1641-15	HOUSING-SOCKET
4	S-1360-5L	CIRCUIT BREAKER
3	C661003-0501	TURN COORDINATOR
2	C661003-0201	TURN COORDINATOR
1	S-1091-10	FUSE

EQUIPMENT TABLE

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wise	8-17-67
DRAWN	HARRIS	8-8-67
CHECK	LAURIE	8-10-67
STRESS	[illegible]	8-15-67
PROJECT	[illegible]	8-15-67
APPD	[illegible]	8-11-67

SUPERSEDED BY: 0570101 P 91.0

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — TURN COORDINATOR

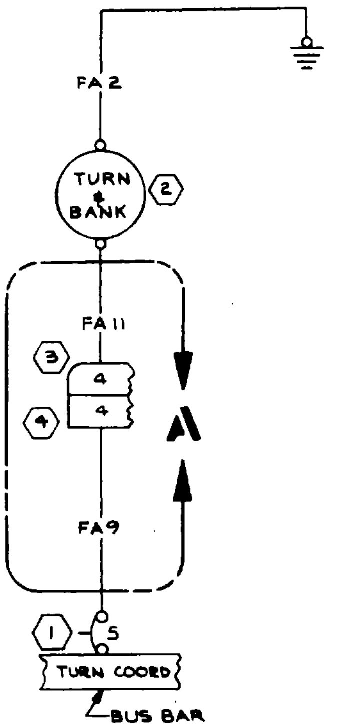
SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0500062

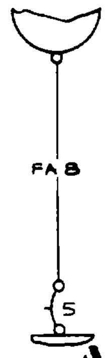
SCALE: NONE | PAGE: 9.3

FORM NO 80-215

NOTES;
1. APPLICABLE MODELS; 172, FR172, T41-C, F172 & T41-A

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD 172I TO NOTE 1 ED & RR 00192 (SER 17275613) & ON	9-27-67 JSM	RLL RXW NAW
B	BY REV: ADD & SER DETAIL "A"; ADD FA9 & FA11, S-1640-15 & S-1641-15; ADD T41-A TO NOTE 1; FR172 WAS FR172E & F172 WAS 172I IN NOTE 1 ED & RR 10939 (SR6352)(SR6353)(SR6354)	DGP 3-26-70	NAW RF
C	BY REV: ADD WIRE LENGTHS, S-1413-2 WAS S-1413N1 (NOW SHOP PRACTICE)	JLO 4-9-73	NAW RF
D	BY REV: S-1360-5 WAS S-1360-10L (NOW SHOP PRACTICE)	MEM 5-3-74	RF





DETAIL A
THRU SER 17259223, F17200754 & FR17200225

INACTIVE: EFF THRU SER (SR7908) II (17265684 & F17201384) (FR17280584 & FR17280SE-1) 10-29-74 RAM JCY PRG RF

04-231-0905
03-231-0905

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
FA11	18		23	S-1635-2	S-1367-1-8		
FA9	18		9	S-1367-1-6	S-1636-2		
FA8	18			S-1367-1-8	S-1367-1-6		THRU SER (SR6352) (SR6353)(SR6354)
FA2	18		20	S-1367-1-8	S-1367-1-8		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
4	S-1641-15	HOUSING-SOCKET
3	S-1640-15	HOUSING-PIN
2	S-1413-2	TURN & BANK IND
1	S-1360-5	CIRCUIT BREAKER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062, PG 9.1
SUPERSEDED BY: 0570101 P 9.2.0

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wise	9-22-67
DRAWN	Harris	9-21-67
CHECK	LAURIE	9-21-67
STRESS		9-22-67
PROJECT	D.G. Kollm	9-22-67
APPD		9-2-67

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE
WIRING DIAGRAM — TURN & BANK INDICATOR

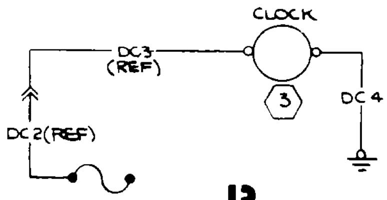
SIZE: C | CODE IDENT. NO. 71379 | DWG NO. 0500062
SCALE: NONE | NOTED | PAGE: 9.4

FORM NO. 80-113A

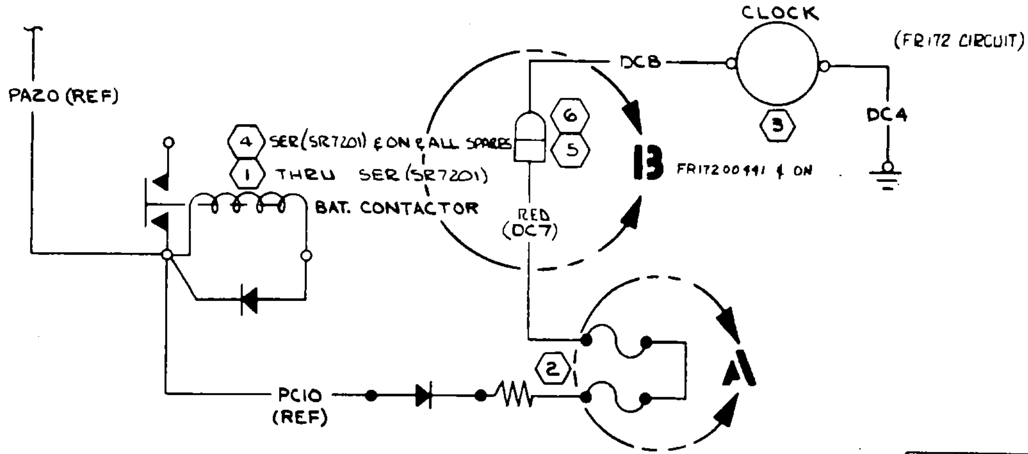
(SER FR172E-0001) & ON (SER R172E-0257 THRU -0301)

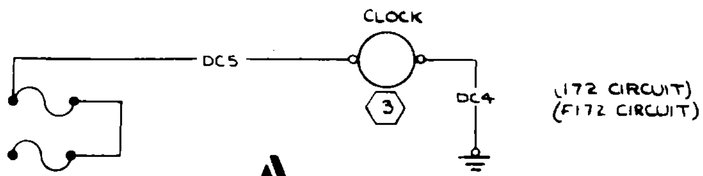
NOTES:

1. APPLICABLE MODELS; FR172, T41-C 172 & F172

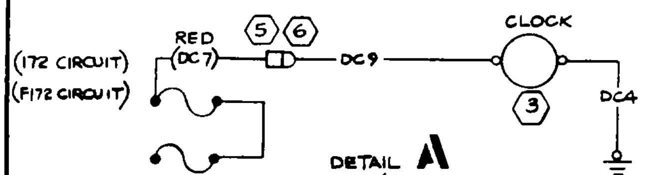


DETAIL B
THRU SER (SR7304)(FR17200440)





DETAIL A
SER (SR7303) THRU (SR7603)(17261899, F17201035 THRU 17263458, F17201234)



DETAIL A
SER(SR 7603) & ON(17263459, F17201285 & ON)

LTR	DESCRIPTION	DATE	APPROVED
A	BY REV: ADD NOTE 1 ED & RR 00173 (SER FR172E-0001) & ON (SER R172E-0257 THRU -0301)	9-18-67 RCA	RLL
B	BY REV: ADD 172I TO NOTE 1 ED & RR 00192 (SER 17256XXX) & ON	9-27-67 JSM	RLL
C	BY REV: SER OUT S-1579-1 & ADD S-1579-2 (SR7201)	BPH 6-16-72	RF
D	BY REV: ADD DETAIL "A" & "B"; DC4 20GA WAS 10GA & DC5 79LG WAS 65 LG, ADD DC5, DC7 & DC8, ITEMS 5&6, 172 WAS 172I & FR172 WAS FR172E (NOW SHOP PRACTICE) (SR7303)IV (SR7304)IV	JLO 5-21-73	RF
E	BY REV: ADD DC9; DETAIL A; RED (DC7) WAS DC7 (MER 180/185 E0041) (SR 7604)IV	JEF 5-22-74 BRF	JLO RF

INACTIVE: EFF THRU SER (7903)IV (SR7904)IV (17265684, F17201384) 10-29-74 (FR17200559 & FR17200560) RAM JCY RF

04-231-0905
03-231-0905

WIRE TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
DC9	18			S-1636-1	SOLDER		SER(SR 7603) & ON
DC8	18			S-1635-1	S-1367-1-6		SER(SR7304) & ON
RED (DC7)	18			S-1636-1	SOLDER		SER(SR7303) & ON
DC5	18		79	S-1367-1-6	SOLDER		OPT. 17249946 & ON
DC4	18		20	S-1367-1-8	S-1367-1-6		OPT. 17249946 & ON

EQUIPMENT TABLE

ITEM NO.	PART NO.	DESCRIPTION
6	S-1637-1	HOUSING
5	S-1637-2	HOUSING
4	S-1579-2	CONTACTOR
3	S-1317N2	CLOCK
2	0712031-3	FUSE & DIODE ASSY
1	S-1579-1	CONTACTOR

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wiese	7-27-67
DRAWN	C. GARCIA	8-8-67
CHECK	LAURIE	8-10-67
STRESS		9-15-67
PROJECT		8-15-67
APPD		8-11-67

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — CLOCK

SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0500062

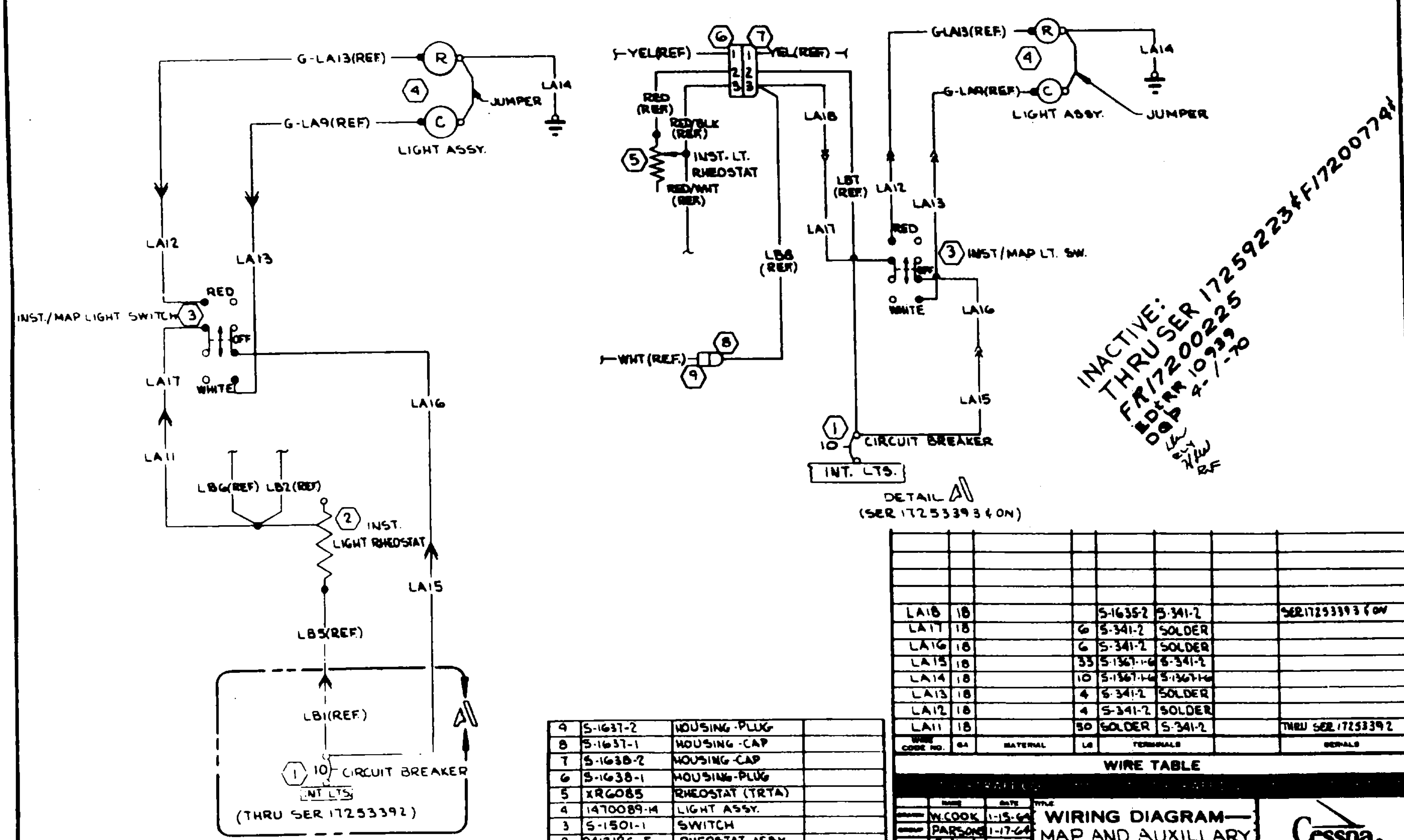
SUPERSEDED BY: 0570101 P 101.0

SCALE: NONE | PAGE: 10.2

(SER FR172E-0001) & ON

(SER 17281823 THRU SER 17253392)

CHG LET	REVISION	BY DATE	CHK APPD
A	ADDED LA15, LA16, LA17 [illegible] D JUMPER WIRE ON SWITC[illegible] D S-341-2 CONNECTOR TO LA[illegible] WAS SOLDER	[illegible] 1-12-65	[illegible]
B	ADDED DETAIL A, LA18, XRG085, S-1638-1 & S-1638-2, INACTIVATED LA11	[illegible] 7-21-65	[illegible]
C	BY REV: ADD FR172E TO MODEL BLOCK (SER FR172E-0001) & ON	C.G. 8-8-67	[illegible]



LA18	18			S-1635-2	S-341-2		SER 17253393 & ON
LA17	18		6	S-341-2	SOLDER		
LA16	18		6	S-341-2	SOLDER		
LA15	18		33	S-1367-1-6	S-341-2		
LA14	18		10	S-1367-1-6	S-1367-1-6		
LA13	18		4	S-341-2	SOLDER		
LA12	18		4	S-341-2	SOLDER		
LA11	18		50	SOLDER	S-341-2		THRU SER 17253392
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
9	S-1637-2	HOUSING-PLUG	
8	S-1637-1	HOUSING-CAP	
7	S-1638-2	HOUSING-CAP	
6	S-1638-1	HOUSING-PLUG	
5	XRG085	RHEOSTAT (TRTA)	
4	1470089-14	LIGHT ASSY.	
3	S-1501-1	SWITCH	
2	0413126-5	RHEOSTAT ASSY	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

	NAME	DATE
DRAWN	W.COOK	1-15-64
GROUP	PARSONS	1-17-64
CHECK	[illegible]	1-15-64
PROJ	[illegible]	1-17-64

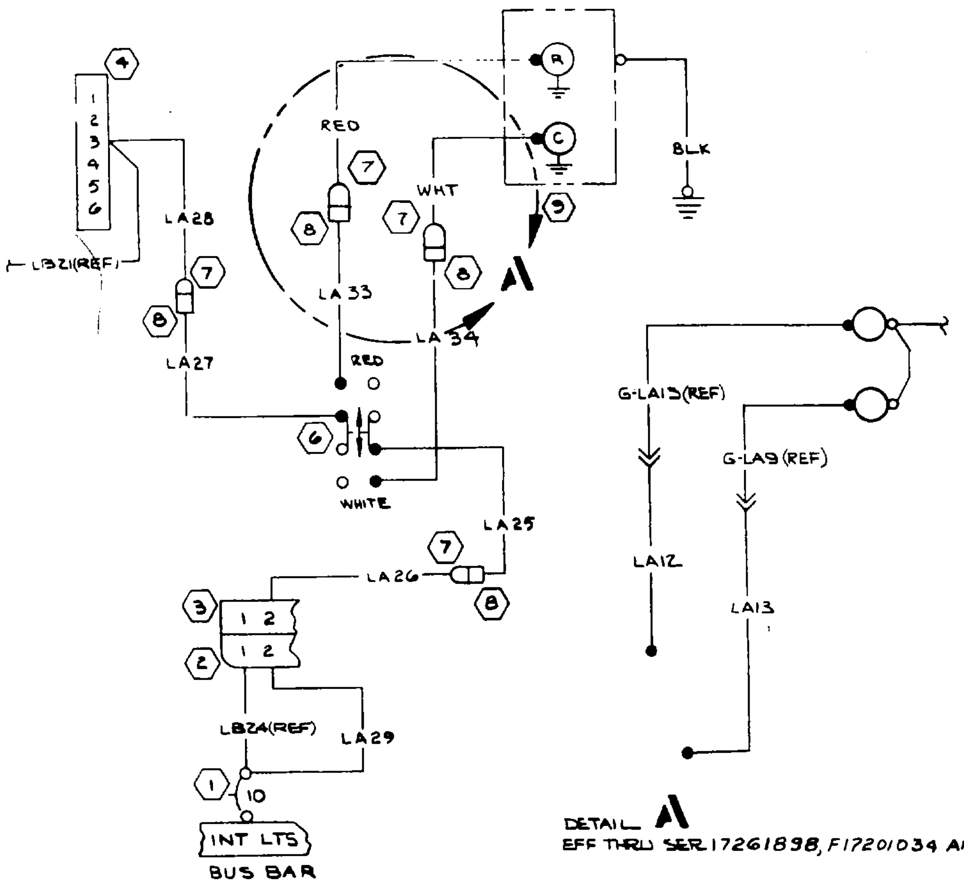
TITLE: WIRING DIAGRAM— MAP AND AUXILLARY INSTRUMENT LIGHT (OPT.)

Cessna.

DWG NO. 0500062

SUPERSEDED BY: P 11.1.2 | SUPERSEDES: 11.1 | MODEL: 172-FR172E | REV: C | PAGE: 11.1.1

LTR	DESCRIPTION	DATE	APPD
A	BY REV: DELETE [illegible] LB14 (REF), LB21 (REF) WAS LB(REF), LB24 (REF) WAS LB1(REF) [illegible] (SR6352)(SR6353)(SR6354) IX	[illegible]	[illegible]
B	BY REV: ADD WIRE LENGTHS, SER OUT G-LA9 & G-LA13, SER IN LA33, LA34 RED, BLK & WHT, ADD DETAIL "A", DELETE JUMPER (SR7308) (SR7309) IX	JLO 5-21-73	RF



INACTIVE: EFF THRU SER (SR7903) IX (SR7908) IX (17265684; F17201384) (FR17200559 & FR17200561) 10-29-74
RAM JCY QRG RF

04-231-0905
03-231-0905

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
BLK	18	-18-0	12	S-1367-1-10	S-1367-1-8		SER 17261899, F17201035 AND FR17200441 & ON
WHT	18	-18-9	10	S-1635-2	SOLDER		SER 17261899, F17201035 AND FR17200441 & ON
RED	18	-18-2	10	S-1635-2	SOLDER		SER 17261899, F17201035 AND FR17200441 & ON
LA 14	18		10	S-1367-1-10	S-1367-1-6		THRU SER 17261898, F17201034 AND FR17200440
LA34	18		7	SOLDER	S-1636-2		SER 17261899, F17201035 AND FR17200441 & ON
LA33	18		6	SOLDER	S-1636-2		SER 17261899, F17201035 AND FR17200441 & ON
LA 29	18		14	S-1635-2	S-1367-1-6		
LA 28	18		10	S-1635-2	S-1636-2		
LA 27	18		7	SOLDER	S-1636-2		
LA 26	18		42	S-1635-2	S-1636-2		
LA 25	18		6	SOLDER	S-1636-2		
LA 13	18		7	S-341-2	SOLDER		THRU SER 17261898, F17201034 AND FR17200440
LA 12	18		6	S-341-2	SOLDER		THRU SER 17261898, F17201034 AND FR17200440

WIRE TABLE

NOTES:

1. MODELS APPLICABLE: 172, F172, FR172,

ITEM NO.	PART NO.	DESCRIPTION
9	1470089-14	LIGHT ASSEMBLY
8	S-1637-2	HOUSING-PLUG
7	S-1637-1	HOUSING-CAP
6	S-1501-1	SWITCH
5		
4	S-1641-6	HOUSING-SOCKET
3	S-1641-15	HOUSING-SOCKET
2	S-1640-15	HOUSING-PIN
1	S-1360-10	CIRCUIT BREAKER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 11.1.1
SUPERSEDED BY: 0570101 P 11.1.0

CONTRACT NO:

	NAME	DATE
DESIGN	Cook	4-7-70
GROUP	N. Wise	4-2-70
DRAWN	D.G. PLAIN	4-1-70
CHECK	L.K. WHITE	4-1-70
STRESS		
PROJECT	R. Fife	4-10-70
APPD	R YOUNGERS	4-2-70

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — MAP AND AUXILLARY INSTRUMENT LIGHT (OPT)

SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0500062
SCALE: NONE | PAGE: 11.1.3

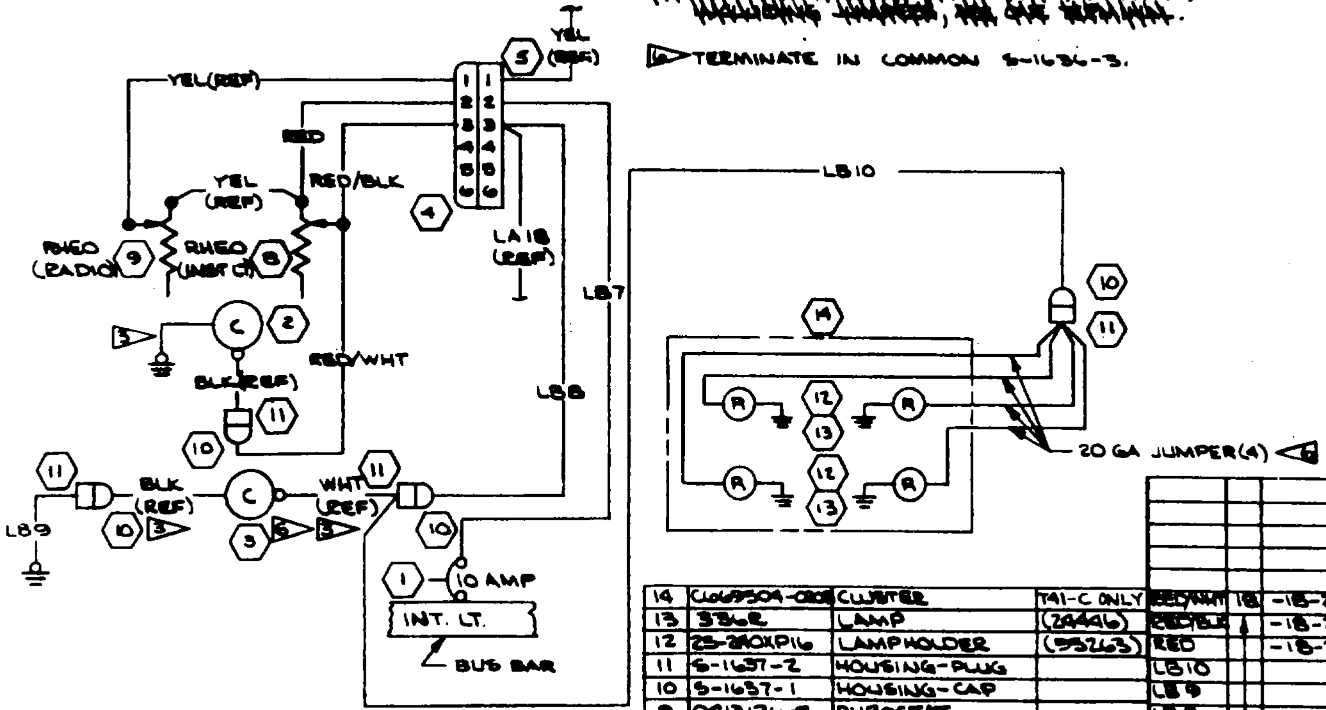
EDERR 10939 (SR 6352) IX (SR 6353) IX (SR 6354) IX 17259224; F17200755 FR17200226

FORM NO 90-215A

NOTES:

1. INSTALL S-1635-1 PIN ON BLK WIRE OF COMPASS AND S-1636-1 SOCKET ON WHT WIRE OF COMPASS.
2. INSTALL S-1636-2 SOCKET ON BLK WIRE OF INST LT.
3. WIRES FURNISHED BY VENDOR.
4. ALL WIRE MATL PER S-1460.
5. ~~[illegible]~~
6. TERMINATE IN COMMON S-1636-3.

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD 172I TO MODEL BLOCK ED & RR00192 (SER 17251513) & ON	9-27-67 JSM	RLL
B	BY REV: ADD, T41-C ONLY, TO C669504-0208; DELETE JUMPERS & NOTE 5; REROUTE LB10 ED & RR 01370	CG 11-6-68	RLL



INACTIVE: THRU SER 17259223 & F17200774 & FR17200225
ED & RR 10939 8-26-70

14	C669504-0208	CLUSTER	T41-C ONLY
13	336R	LAMP	(24446)
12	25-210XP16	LAMPHOLDER	(95263)
11	S-1637-2	HOUSING-PLUG	
10	S-1637-1	HOUSING-CAP	
9	0413126-5	RHEOSTAT	
8	XR6085	RHEOSTAT (94310)	
7			
6			
5	S-1641-6	HOUSING-SOCKET	
4	S-1640-6	HOUSING-PIN	
3	0713068-2	COMPASS LT	
2	0511481-9	INST LT.	
1	S-1360-10	CIRCUIT BREAKER	
ITEM NO.	PART NO.	DESCRIPTION	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
RED/WHT	18	-18-2		SOLDER	S-1635-2		
RED/BLK		-18-2-0		SOLDER	S-1635-2		
RED		-18-2-9		S-1636-2	SOLDER		
LB10				S-1636-2	S-1636-2	7	
LB9				S-1367-1-6	S-1636-2		
LB8				S-1636-2	S-1635-2		
LB7	18			S-1367-1-6	S-1636-2		

WIRE TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY: P 11.2.3

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wiese	9-21-67
DRAWN	HARRIS	9-14-67
CHECK	LAURIE	9-15-67
STRESS	a.s	9-21-67
PROJECT	D G Kello	9-21-67
APPD	E. S. Moses	9-21-67

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

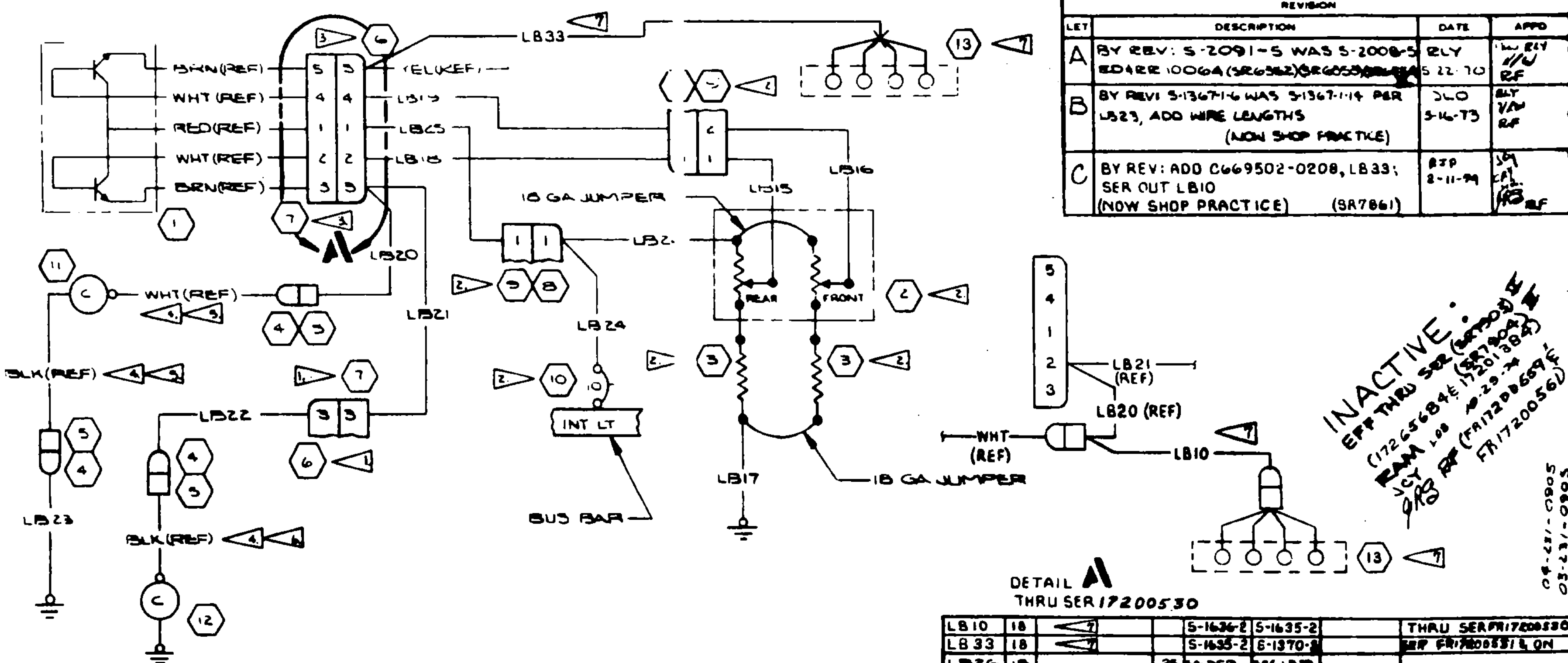
TITLE

WIRING DIAGRAM — COMPASS & INSTRUMENT LIGHTS

SIZE: C | CODE IDENT. NO.: 71379 | DWG NO.: 0500062

SCALE: NONE | 172I, T41-C, FR172E | PAGE: 11.2.2

(SER FR172E-0001)&ON; C172E-0261 THRU 0301



REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: S-2091-5 WAS S-2008-5 EDARR 10064 (SR6362)(SR6050)	RLY 5-22-70	RF
B	BY REV: S-1367-1-6 WAS S-1367-1-14 PER LB23, ADD WIRE LENGTHS (NON SHOP PRACTICE)	DLO 5-16-73	RLY RF
C	BY REV: ADD C669502-0208, LB33; SER OUT LB10 (NOW SHOP PRACTICE) (SR7861)	RJP 8-11-79	RF

NOTES:

1. THESE ITEMS LOCATED AT UPPER LH DOORPOST
2. THESE ITEMS LOCATED AT REMOVABLE PANEL
3. THESE ITEMS LOCATED AT DIMMER ASSY
4. THESE WIRES VENDOR FURNISHED
5. INSTALL S-1635-1 ON WHT WIRE OF COMPASS & S-1636-1 ON BLK WIRE OF COMPASS
6. INSTALL S-1636-1 ON BLK WIRE OF INST LT
7. THESE ITEMS APPLICABLE TO FR172 ONLY

ITEM NO.	PART NO.	DESCRIPTION	
13	C669502-0208	INST CLUSTER	7
12	0511461	INST LT	
11	0713068	COMPASS LT	
10	S-1360-10	CIRCUIT BKR	
9	S-1641-13	HOUSING-SOCKET	
8	S-1640-13	HOUSING-PIN	
7	S-1641-6	HOUSING-SOCKET	
6	S-1640-6	HOUSING-PIN	
5	S-1637-2	HOUSING-PLUG	
4	S-1637-1	HOUSING-CAP	
3	27 Ω ½ WATT	RESISTOR	
2	S-2091-5	RESISTOR ASSY	
1	1370166-1	DIMMING ASSY	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LB10	18	7		S-1636-2	S-1635-2		THRU SER FR17200530
LB33	18	7		S-1635-2	S-1370-2		SER FR17200531 & ON
LB26	18		25	SOLDER	SEE LB19		
LB25			30	S-1635-1	S-1636-1		
LB24			14	S-1635-2	S-1367-1-6		
LB23			20	S-1367-1-6	S-1636-8		
LB22			48	S-1635-1	S-1635-1		
LB21			76	S-1636-2	S-1636-2		
LB20			30	S-1636-1	SEE LB21		
LB19			30	S-1636-1	S-1636-1		
LB18			30	S-1636-1	S-1636-1		
LB17			15	SOLDER	S-1367-1-10		
LB16			20	SOLDER	S-1635-1		
LB15	18		20	SOLDER	S-1635-1		

WIRE TABLE

CEB-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 11.2.2

SUPERSEDED BY: 0570101 P 11.2.0

CONTRACT NO:

	NAME	DATE
DESIGN		5-7-70
GROUP		5-7-70
DRAWN		
CHECK		
STRESS		
PROJ		
APPD		
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE WIRING DIAGRAM — COMPASS & INSTRUMENT LIGHTS

SIZE C | CODE IDENT NO 71379 | DWG NO 0500062

SCALE NONE | 172,FR172,F172 | PAGE: 11.2.4

EDARR 10352 (SR6350)(SR6353)(SR6354)

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: OBSOLETE NEVER USED LB27 & LB28, ADD LB29, LB30, LB31 & LB32, DELETE NOTE 1, ADD NOTE 2 (SR7304)II	JLO 4-9-73	RLW RF
B	BY REV: ADD DETAIL A (SR 7692)	JMK 2-1-74	MTM RF

NOTES:

1. ~~REMOVE S-1636-1 TERM FROM LB28 (LB27) WHEN OPT POST LIGHTING IS INSTALLED SEE LB27 FOR TERM.~~

2. WHEN OPTIONAL POST LIGHTS ARE INSTALLED, THIS DIAGRAM SUPERSEDES PAGE 11.2.4 FOR INSTRUMENT LIGHT WIRING ONLY

INACTIVE: EFF THRU SER (SR7904)II (FR17200559 & FR17200561) 10-29-74

RAM JCY JRS RF

04-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LB32	18			S-1635-1	S-1635-1		
LB31	18			S-1635-1	S-1636-1		
LB30	18			SOLDER	S-1636-1		
LB29	18			S-1636-1	SOLDER		
LB28	18			S-1635-1	SEE LB27		OBSOLETE NEVER USED
LB27	18			S-1635-1	S-1370-2		OBSOLETE NEVER USED
RED/YEL(2)	22			S-1636-1	S-1636-1		
RED/YEL(1)	22			S-1635-1	SOLDER		
RED/YEL	22			SOLDER	SOLDER		
BLK(2)	22			S-1635-1	S-1367-18		
BLK(1)	22			SOLDER	S-1636-1		
BLK	22			SOLDER	SOLDER		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
9	0511481	INST LT	
8	S-1501-1	SWITCH	
7	S-1641-6	HOUSING	
6	1213379-6	POST LT ASSY	
5	1213379-5	POST LT ASSY	
4	1213379-4	POST LT ASSY	
3	S-1640-6	HOUSING-PIN	
2	S-1637-2	HOUSING-PLUG	
1	S-1637-1	HOUSING-CAP	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY: 0510101 P 11.3.0 P 11.3.1

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	[illegible signature]	2-27-73
DRAWN	PAPE	2-26-73
CHECK	R.YOUNGERS	2-26-73
STRESS		
PROJ	[illegible signature]	2-27-73
APPD		
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — INSTRUMENT PANEL POST LIGHTING (OPT)

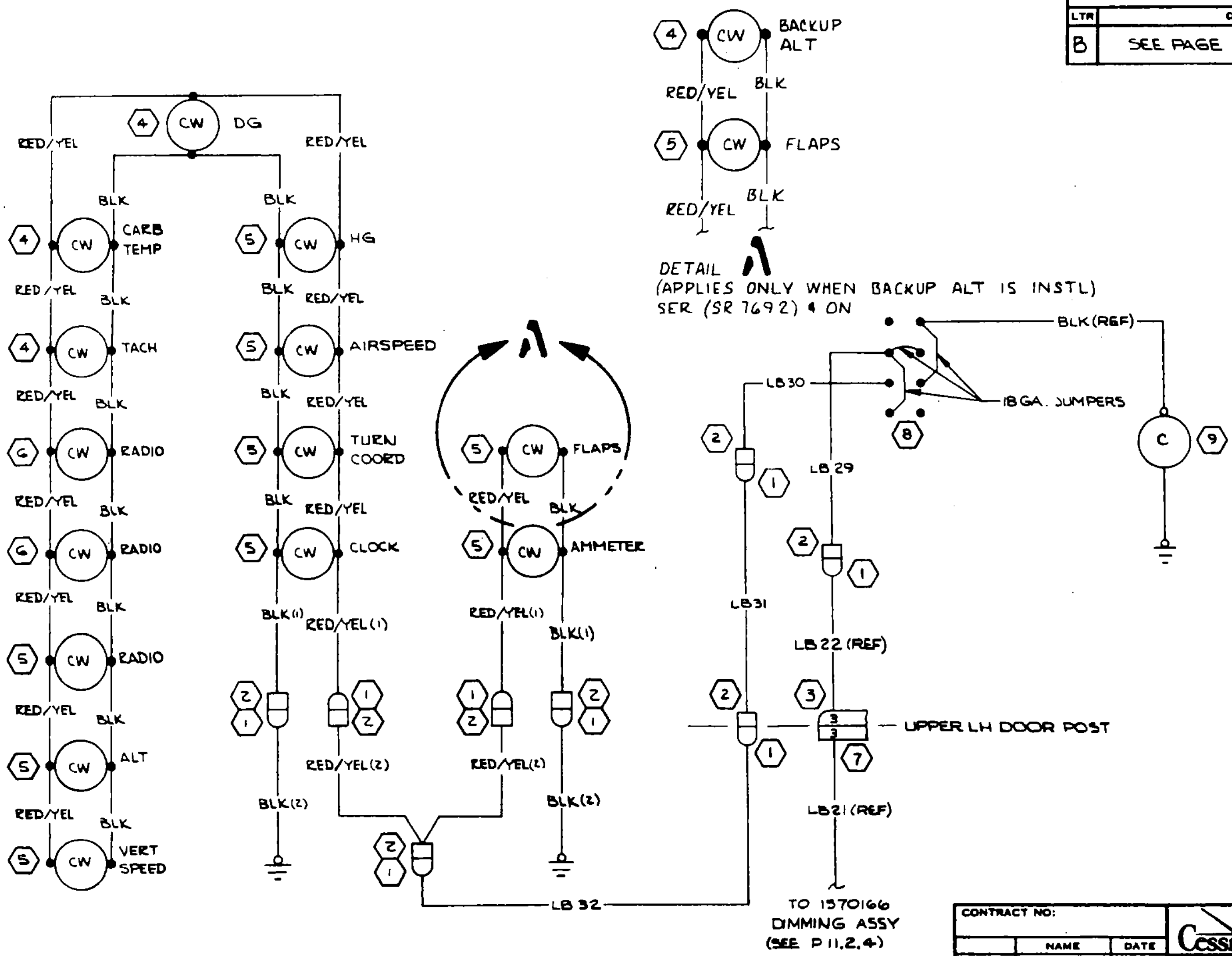
SIZE	CODE IDENT. NO.	DWG NO
C	71379	0500062

SCALE: NONE | FRITZ | PAGE: 11.2.5.0

FORM NO. 50-3188

(SR7904)II (FR17200441)

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
B	SEE PAGE 11.2.5.0 FOR REV		



INACTIVE: EFF THRU SER (SR7904) IX (FR17200659 & FR17200561)
10-29-74
RAM JCY JRB RF

04-231-0905

CONTRACT NO:		
	NAME	DATE
DESIGN		
GROUP	[signature]	2-27-73
DRAWN	PAPE	2-26-73
CHECK	R.YOUNGERS	2-26-73
STRESS		
PROJECT	[signature]	2-27-73
APPD		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

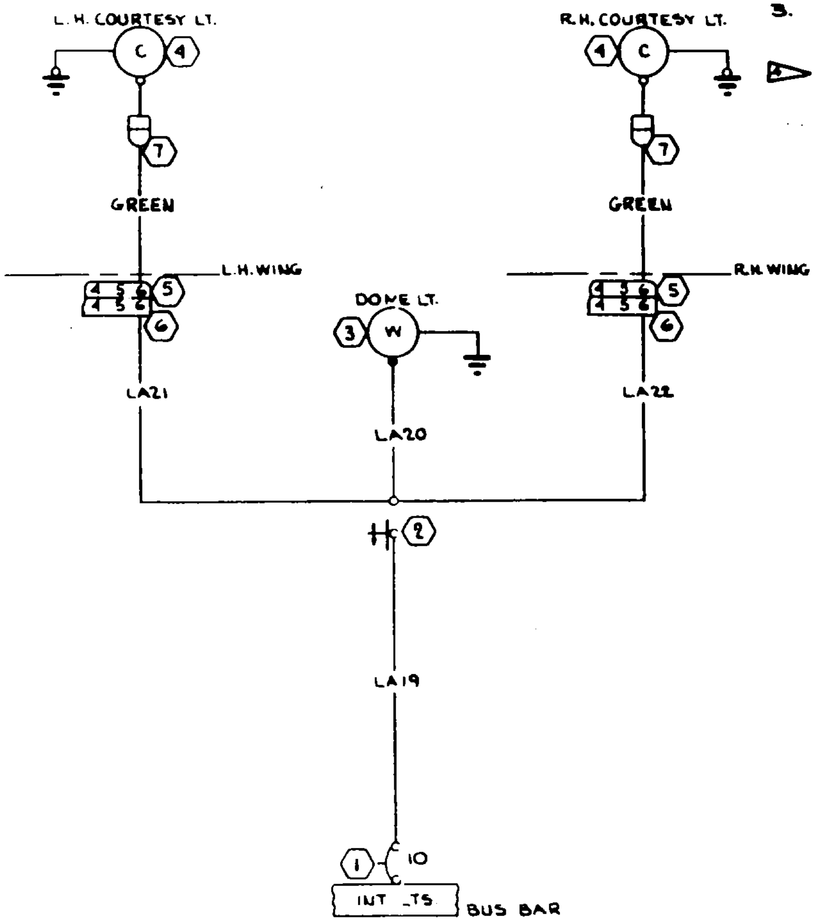
TITLE
WIRING DIAGRAM — INSTRUMENT PANEL POST LIGHTING (OPT)

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0500062

SCALE: NONE FRITZ PAGE: 11.2.5.1

(SR7904)
(FR17200441)

FORM NO. 80-516



NOTES:

1. WIRE MATERIAL PER S-1460
2. S-1635-2 PIN; S-1637-1 HOUSING-CAP
3. APPLICABLE MODELS: 172, FR172E, T41-C, 172I (SER 17254893) & ON
4. COURTESY LIGHTS & ASSOCIATED WIRING ARE NOT APPLICABLE TO THE T41-C.

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV: ADD FR172E TO MODEL BLOCK (SER FR172E-0001) & ON	C.G. 8-867	RLL
B	BY REV: ADD NOTES 3 & 4 ED & RR 0017 (SER FR172E-0001) & ON (SER F172E-0261 THRU-0501)	RCA 9-1867	
C	BY REV: ADD 172I TO NOTE 3 (EDRR0019...)	JSM 9-27-67	ELC

INACTIVE:
THRU SER 17259223, F17200774 & FR17200225
ED&RR 10939
4-1-70
DGP
LW
RCY
VJW
BF

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
GREEN	18	-18-5		S-1635-2	2		
GREEN	18	-18-5		S-1635-2	2		
LA22	18			COMMON TO LA21	S-1636-2		
LA21	18			S-1367-1-6	S-1636-2		
LA20	18			S-1367-1-6	SOLDER		
LA19	18			S-1367-1-6	S-1367-1-6		

1 WIRE TABLE

[redacted]

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
7	S-1637-1	HOUSING-CAP	
6	S-1641-6	HOUSING-SOCKET	
5	S-1640-6	HOUSING-PIN	
4	0521101-2	COURTESY LIGHT	
3	0511481-6	DOME LIGHT	
2	0713029	SWITCH	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

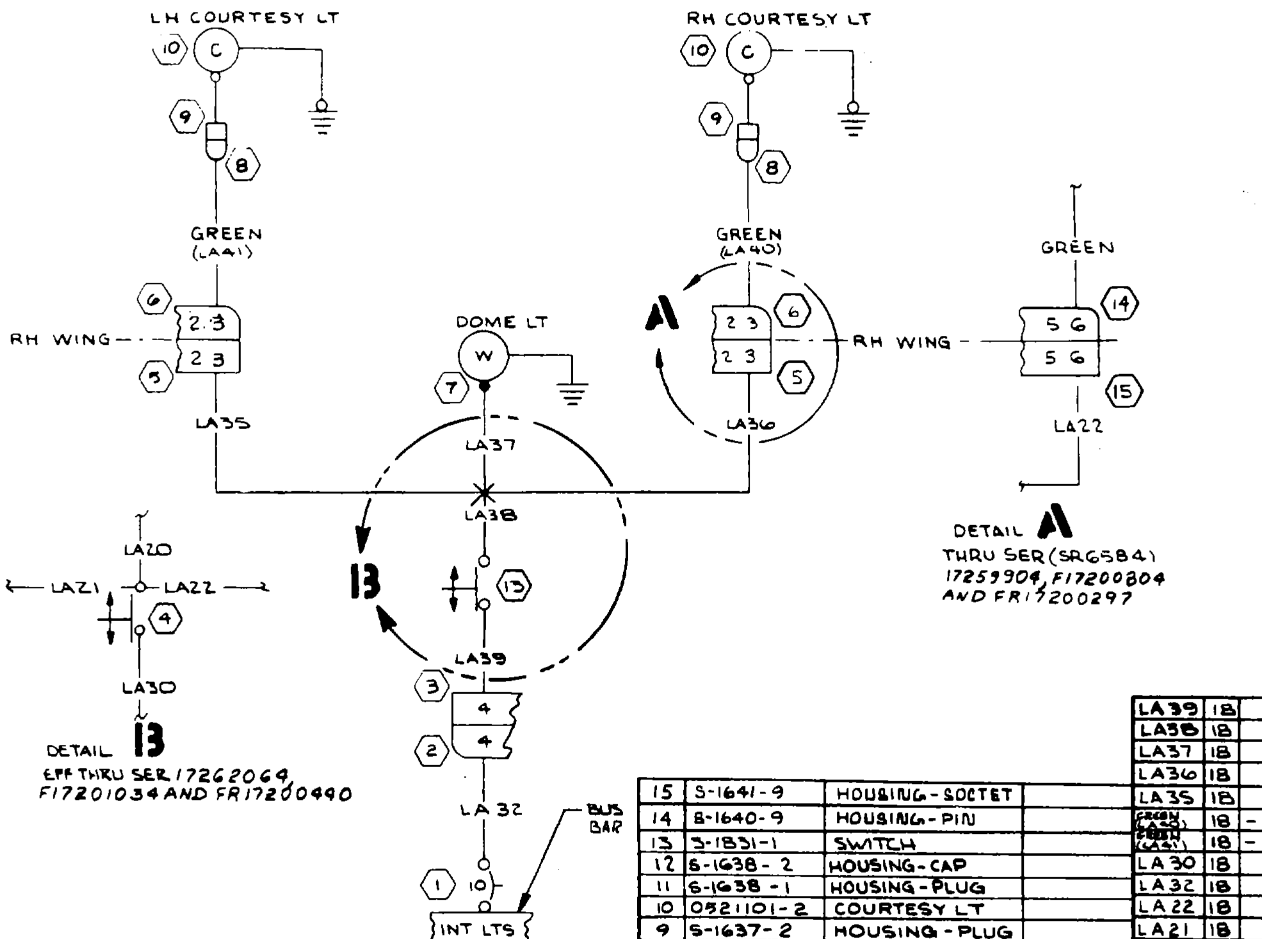
	NAME	DATE
DRAWN	BLISS	11-3-65
GROUP	H. Wine	12-16-65
CHECK	E. Stuck	12-20-65
PROJ	A. Ward	12-20-65

TITLE: WIRING DIAGRAM— DOME & COURTESY LIGHTS

Cessna.

DWG NO. 0500062

SUPERSEDED BY: P 11.7.1 | SUPERSEDES: 0500062 PP 11.2 | MODEL: NOTE 1 | REV C | PAGE: 11.7



INACTIVE: EFF THRU SER (SR7903) (17265684, F17201384) (FR17200559 & FR17200561) 10-29-74

04-231-0905
03-231-0905

LET	DESCRIPTION	DATE	APPD
A	BY REV. ADD DETAIL A: ADD S-1638-1 & S 1638-2 (SR6584)	WRC 12-17-70	
B	BY REV: ADD WIRE LENGTHS (NOW SHOP PRACTICE)	DLO 3-16-73	ELY V/RW RF
C	BY REV: SER OUT LA20, LA21, LA22 & LA30; SER IN LA35, LA36, LA37, LA38 & LA39; ADD S1831-1 & DETAIL "B", LA40 & LA41 WAS GREEN (SR7630)	DLO 7-24-73	DLP V/RW RF
D	BY REV: DELETE NOTE 3; TERM. S-1635-1(LA40) WAS S-1635-2, S-1636-1 WAS S-1636-2(LA30), S-1640-6 WAS S-1638-2, S-1641-6 WAS S-1638-2, S-1637-1 WAS S-1637-2 S-1640-9 WAS S-1640-6 & S-1641-9 WAS S-1641-6; PIN GREEN(LA41) 1 WAS 6 (LA35) 1 WAS (LA35) 6; (172 E0007) (NOW SHOP PRACTICE)	DEF 2/8/74	JRS RF

WIRE TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LA39	18			S-1636-1	S-1830-1		SER 17262065, F17201035 AND FR17200491 & ON
LA38	18			S-1830-1	S-1370-3		SER 17262065, F17201035 AND FR17200491 & ON
LA37	18		6	SOLDER	SEE LA38		SER 17262065, F17201035 AND FR17200491 & ON
LA36	18		45	S-1636-1	SEE LA38		SER 17262065, F17201035 AND FR17200491 & ON
LA35	18		45	S-1636-1	SEE LA38		SER 17262065, F17201035 AND FR17200491 & ON
GREEN (LA40)	18	-18-5	117	S-1635-1	S-1635-1		
GREEN (LA41)	18	-18-5	117	S-1635-1	S-1635-1		
LA30	18		94	S-1636-1	S-1367-1-6		THRU SER 17262064, F17201034 AND FR17200490
LA32	18		14	S-1367-1-6	S-1635-2		
LA22	18		45	SEE LA20	S-1636-2		THRU SER 17262064, F17201034 AND FR17200490
LA21	18		45	SEE LA20	S-1636-2		THRU SER 17262064, F17201034 AND FR17200490
LA20	18		6	S-1367-2-6	SOLDER		THRU SER 17262064, F17201034 AND FR17200490

EQUIPMENT TABLE

ITEM NO.	PART NO.	DESCRIPTION	
15	S-1641-9	HOUSING-SOCKET	
14	S-1640-9	HOUSING-PIN	
13	S-1831-1	SWITCH	
12	S-1638-2	HOUSING-CAP	
11	S-1638-1	HOUSING-PLUG	
10	0521101-2	COURTESY LT	
9	S-1637-2	HOUSING-PLUG	
8	S-1637-1	HOUSING-CAP	
7	0511481	DOME LT ASSY	
6	S-1640-6	HOUSING-PIN	
5	S-1641-6	HOUSING-SOCKET	
4	0713029	SWITCH	
3	S-1641-15	HOUSING-SOCKET	
2	S-1640-15	HOUSING-PIN	
1	S-1360-10	CIRCUIT BREAKER	

NOTES:

1. DASH NUMBER DEPENDS UPON ELECTRONIC CONFIGURATION OF AIRCRAFT

2.

3. ~~ADD SILASTIC TO COMPASS WIRE~~

4. APPLICABLE MODELS: 172, F172, FR172,

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 11.7

SUPERSEDED BY: 0570101 P 114.0

CONTRACT NO:

	NAME	DATE
DESIGN	Coric	4-7-70
GROUP	V Wise	4-2-70
DRAWN	D.G. PLAIN	3-26-70
CHECK	L.K WHITE	4-1-70
STRESS		
PROJ	R. Fife	4-10-70
APPD	R. YOUNGERS	4-2-70
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — DOME AND COURTESY LIGHTS

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0500062

SCALE: NONE | NOTED | PAGE: 11.7.1

FORM NO 60-2155

ED & RR 10939 SER (SR6352) (17259226; F17200755) (FR17200226)

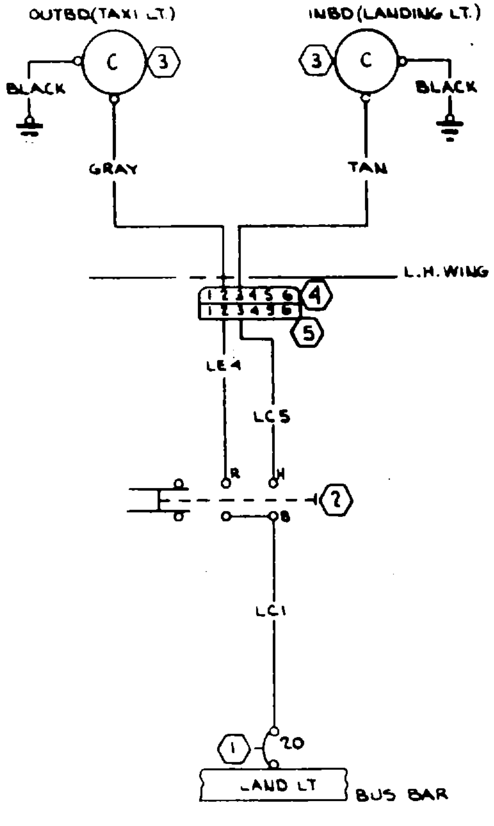
(SER 17254893)&ON

NOTES:

1. WIRE MATERIAL PER S-1460

2. APPLICABLE MODELS; 172, FR172E, T41C & 172I

CHG LET	REVISION		BY DATE	CHK APPD
A	BY REV: ADD FR172E BLOCK (SER FR172E-0	DEL ON	CG 8-8-67	
B	BY REV: ADD NOTE 2 ED&RR 00173 (SER FR172G-0001)&ON (SER R172E-0251 THRU-0301)		RCA 8-18-67	
C	BY REV: ADD 172I TO NOTE 2 (EDRR00192)(SER 17256...)&ON		JSM 8-?-67	



INACTIVE: THRU SER F17200774 & FR17200225
ED&RR 10939 3-26-70
DEP

BLACK	16	-16-0		S-1367-2-8	S-1367-2-8	OPT.	
BLACK	16	-16-0		S-1367-2-8	S-1367-2-8	OPT.	
GRAY	14	-14-8		S-1635-2	S-1367-2-8	STD.	
TAN	14	-14-10		S-1635-2	S-1367-2-8	STD	
LE4	14			S-1367-2-8	S-1636-2	STD.	
LC5	14			S-1367-2-8	S-1636-2	STD	
LC1	14		5	S-1367-2-8	S-1367-2-8	OPT.	
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

1 WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
5	S-1641-6	HOUSING-SOCKET	
4	S-1640-6	HOUSING-PIN	
3	0523118-1	LIGHT INSTL.	
2	0713035	SWITCH ASSY.	
1	S-1360-20	CIRCUIT BREAKER	

EQUIPMENT TABLE

	NAME	DATE
DRAWN	BLISS	11-3-65
GROUP		12-16-65
CHECK		12-17-65
PROJ		12-20-65

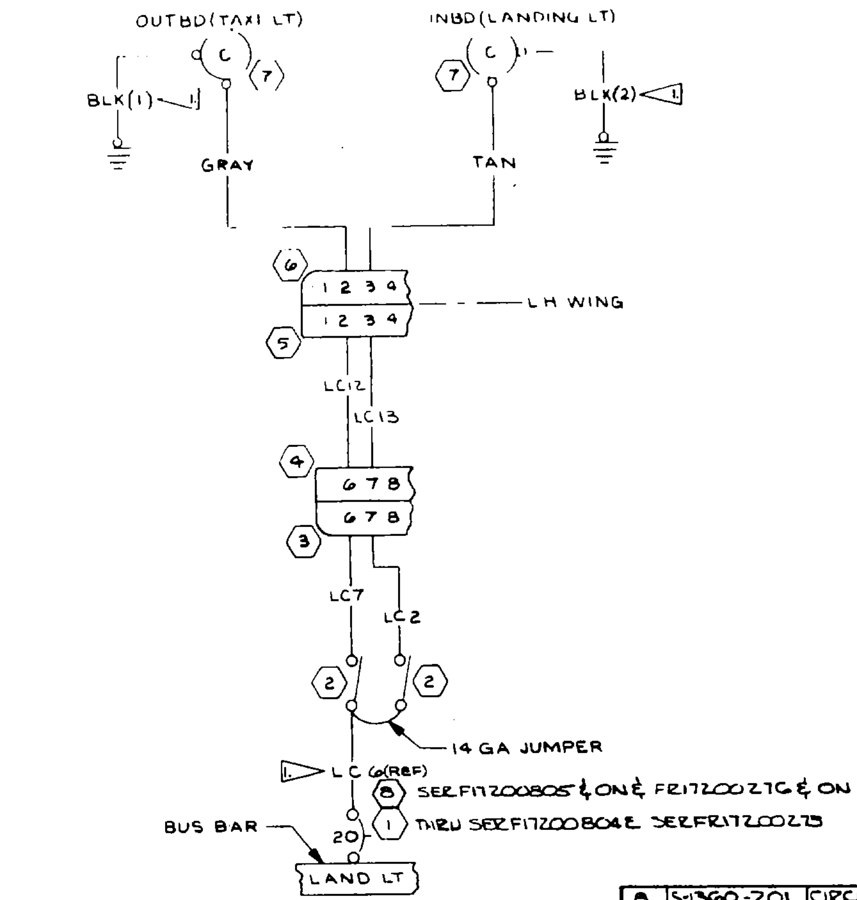
TITLE: WIRING DIAGRAM— LANDING & TAXI LIGHTS (OPTIONAL)

Cessna.

DWG NO. 0500062

SUPERSEDED BY: P 11.8.1 | SUPERSEDES: 0500062 PP11.3 | MODEL: NOTED | REV C | PAGE 11.8

LTR	DESCRIPTION	DATE	APPD
A	BY REV: ADD S-1360-20L & SER; SER OUT S-1360-20; INACT DWG (SE7316)	RCA 9-27-72	
B	BY REV: LC6(REF) WAS LC6. ADD WIRE LENGTHS (NOW SHOP PRACTICE)	DLO 3-16-73	BY KLW RF



INACTIVE: EFF THRU SER F17210034 & FR17200490 9-27-72

RCA BY KLW RF

NOTES:

1. THESE WIRES OPTIONAL ALL OTHERS ARE STANDARD EQUIPMENT
2. APPLICABLE MODELS: F172, FR172

EQUIPMENT TABLE

ITEM NO	PART NO.	DESCRIPTION	
8	S-1360-20L	CIRCUIT BREAKER	
7	0523118-1	LIGHT INSTL	
6	S-1640-6	HOUSING-PIN	
5	S-1641-6	HOUSING-SOCKET	
4	S-1641-15	HOUSING-SOCKET	
3	S-1640-15	HOUSING-PIN	
2	S-1824-1	SWITCH	
1	S-1360-20	CIRCUIT BREAKER	

WIRE TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
BLK(2)	16	-16-0	6	S-1367-2-8	S-1367-2-8		
BLK(1)	16	-16-0	6	S-1367-2-8	S-1367-2-8		
TAN	14	-14-8	130	S-1635-2	S-1367-2-8		
GRY	14	-14-10	136	S-1635-2	S-1367-2-8		
LC13	14			S-1636-2	S-1636-2		
LC12	14			S-1636-2	S-1636-2		
LC7	14			S-1493-2	S-1635-2		
LC2	14			S-1493-2	S-1635-2		

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX-CESSNA SPEC. NO. S-XXX OR CMXXXX-CESSNA STD. NO.

SUPERSEDES: P. 11.8

SUPERSEDED BY: P 11.8.3

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	Y Wise	4-2-70
DRAWN	D.G. PLAIN	3-26-70
CHECK	L K WHITE	4-1-70
STRESS		
PROJ	R Fife	4-15-70
APPD	R. YOUNGER	4-2-70
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE

WIRING DIAGRAM — LANDING TAXI LIGHTS (OPTIONAL)

SIZE	CODE IDENT. NO.	DWG NO
C	71379	0500062

SCALE: NONE NOTED PAGE: 11.8.2

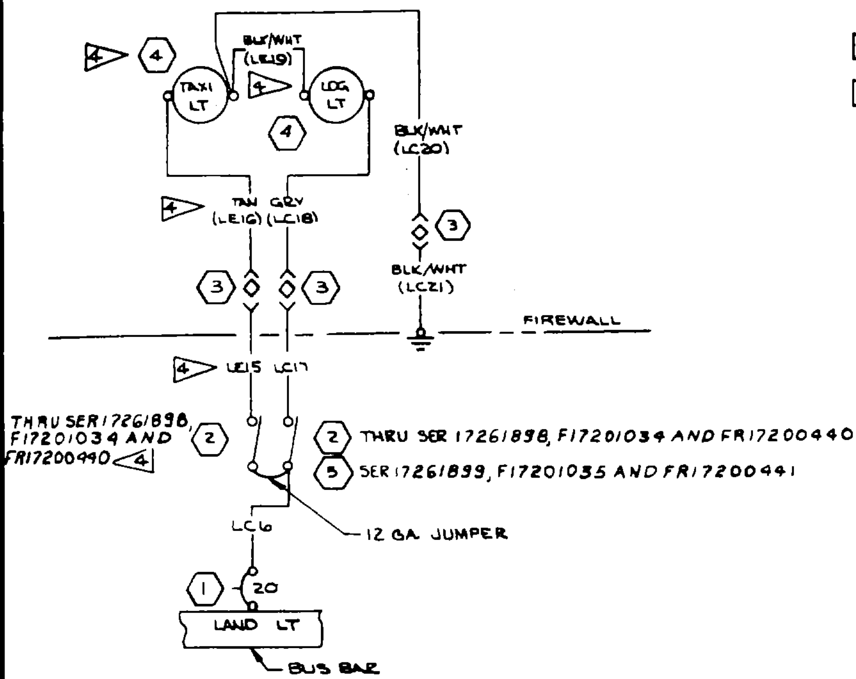
FORM NO 80-2159

ED&RR 10939 SER(SR 6353) SER(SR 6354) IX

NOTES:

1. THIS DIAGRAM APPLICABLE TO FR172 & F172 AS STANDARD OPTION & TO 172 AS AN ALT OPTION
2. ~~REFER TO ... FOR ... STANDARD OPTION FOR DOMESTIC 172~~
3. THESE WIRES SHALL BE FABRICATED FROM COLOR CODED MATERIAL
4. THESE ITEMS REQUIRED ONLY AS PART OF THE ALTERNATE OPTION ON THE DOMESTIC 172

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: SEE OUT S-2061-1 & SEE IN S-2160-4 (SR7303 & SR7304) II	JCY 1-26-73	
B	BY REV: ADD LC21, LC6 & NOTE 4; S-1493-3/LC20 WAS S-1367-3-6 & 12GA JUMPER (SR7303) II	7-5-73 RAM	RF



INACTIVE: EFF THRU SER (SR7303) II (SR7908) II (17265684; F17201384) (FR17200559 & FR17200561) 10-29-74 RAM JCY RF

04-231-0905
03-231-0905

LC6	12			S-1367-3-6	S-1493-3		
BLK/WHT (LC21)	12			S-1493-3	S-1367-3-6		
BLK/WHT (LC20)	12	3		S-1367-3-8	S-1493-3		
BLK/WHT (LE19)	12	3		S-1367-3-8	S-1367-3-8		
GRY (LC18)	12	3		S-1493-3	S-1367-3-8		
LC17	12			S-1493-3	S-1493-3		
TAN (LE16)	12			S-1493-3	S-1367-3-8		
LE15	12			S-1493-3	S-1493-3		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

5	S-2160-4	SWITCH	
4	4509	LAMP	24446
3	S-2064-1	CONNECTOR	
2	S-2061-1	SWITCH	
1	S-1360-20L	CIRCUIT BKR	
ITEM NO.	PART NO.	DESCRIPTION	VENDOR

EQUIPMENT TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 PG 11.8.2

SUPERSEDED BY: 0570101 P 11.5.0 P 11.5.1

CONTRACT NO:

	NAME	DATE
DESIGN	W COOK	10-12-72
GROUP	H. Wise	10-10-72
DRAWN	RCAstell	9-27-72
CHECK	E YOUNGERS	9-27-72
STRESS		
PROJ	RF	11-2-72
APPD		
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE: WIRING DIAGRAM — LANDING & TAXI LIGHT (OPT)

SIZE: C | CODE IDENT. NO.: 71379 | DWG NO: 0500062

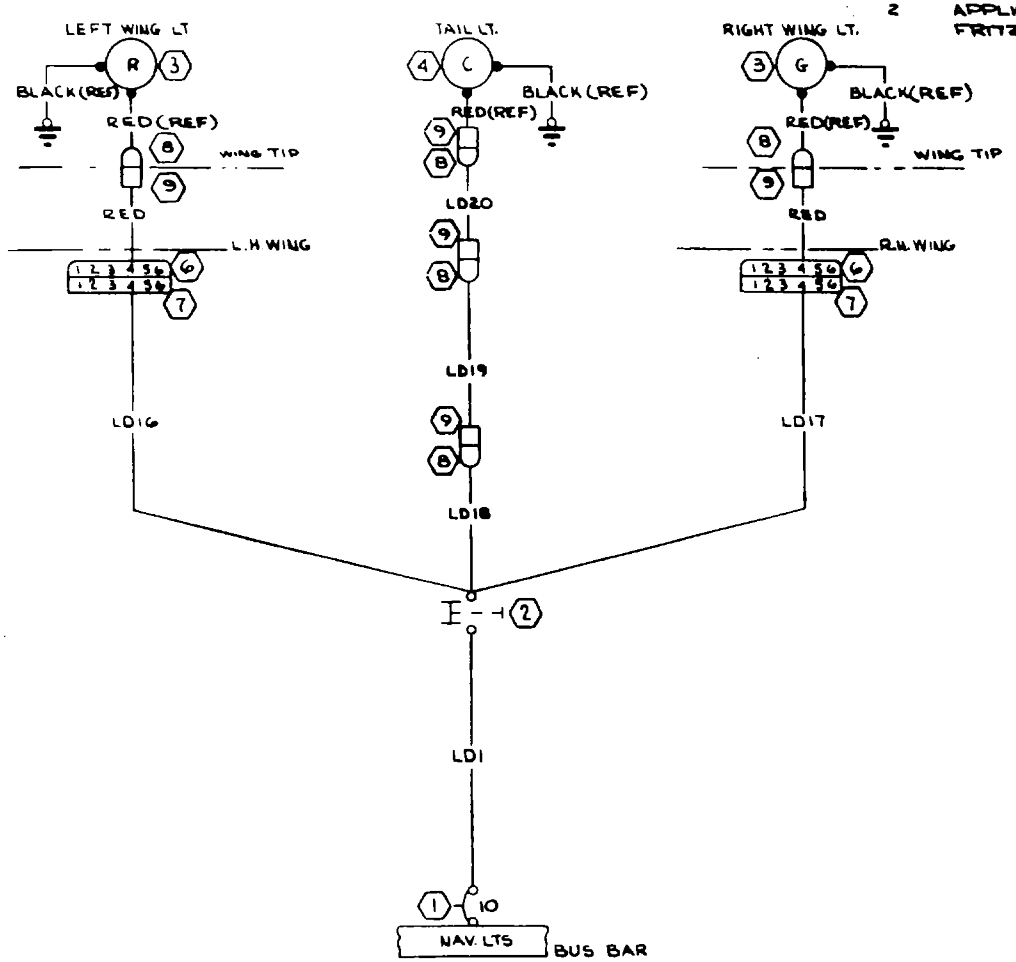
SCALE: NONE | (SR7316) (FR17200441) | PAGE: 11.8.3

FORM NO. 50-2158

(SER 17254893) & ON

NOTES;

1. WIRE MATERIAL PER S-1460
2. APPLICABLE MODELS; 172, FR172E, T41-C & 172I



CHG LET	REVISION	BY DATE	CHK APPD
A	ADD (2) RED WIRES IN WI... & ITEMS 8 & 9 - S-16... ON RED WIRES WERE ...	JR 7-20-...	
B	BY REV: ADD FR172E TO MODEL BLOCK (SER FR172E-0001) & ON	CG 8-8-67	
C	BY REV: ADD NOTE 2 ED & RR 00173 (SER R172E-0257 THRU-0301)(FR172E-0001) & ON	RCA 9-13-67	RLL
D	BY REV: ADD 172I TO NOTE 2 (EDRR00192)	JSM 9-27-67	RLL
E	BY REV: C622001-0202 WAS 0425006-21 & 22, C622001-0102 WAS 0433006-7 ITEM 3 WAS ITEM 6 & LD18 WAS LD11, LD19 WAS LD6, LD20 WAS LD7; ADD S1460-18-2 DELETE 3 RED & 3 BLACK WIRES (EDRR01163)(EDRR01395)	RCC 1-6-67	RLL

INACTIVE: THRU SER 17259223, F17200774 & FR17200225 ED & RR 10939 3-26-70 DEP

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
LD20	18			S-1636-1	S-1636-1		
LD19	18			S-1636-1	S-1636-1		
LD18	18			SOLDER	S-1636-1		
RED	18	-18-2		S-1635-2	S-1636-2 S-1637-2		
RED	18	-18-2		S-1635-2	S-1636-2 S-1637-2		
LD17	18			S-1367-1-8	S-1636-2		
LD16	18			S-1367-1-8	S-1636-2		
LD11	18	THRU SER(...)	26	S-1367-1-8	S-341-2		
LD7	18	THRU SER(...631)	84	S-341-2	SOLDER		
LD6	18	THRU SER(...631)	290	S-341-2	S-341-2		
LD1	18		4	S-1367-1-6	S-1367-1-8		

1 WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
9	S-1637-2	HOUSING - PLUG	
8	S-1637-1	HOUSING - CAP	
7	S-1641-6	HOUSING - SOCKET	
6	S-1640-6	HOUSING - PIN	
5			
4	C622001-0102	TAIL LIGHT	
3	C622001-0202	WING LIGHT	
2	0713026-4	SWITCH ASSY.	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

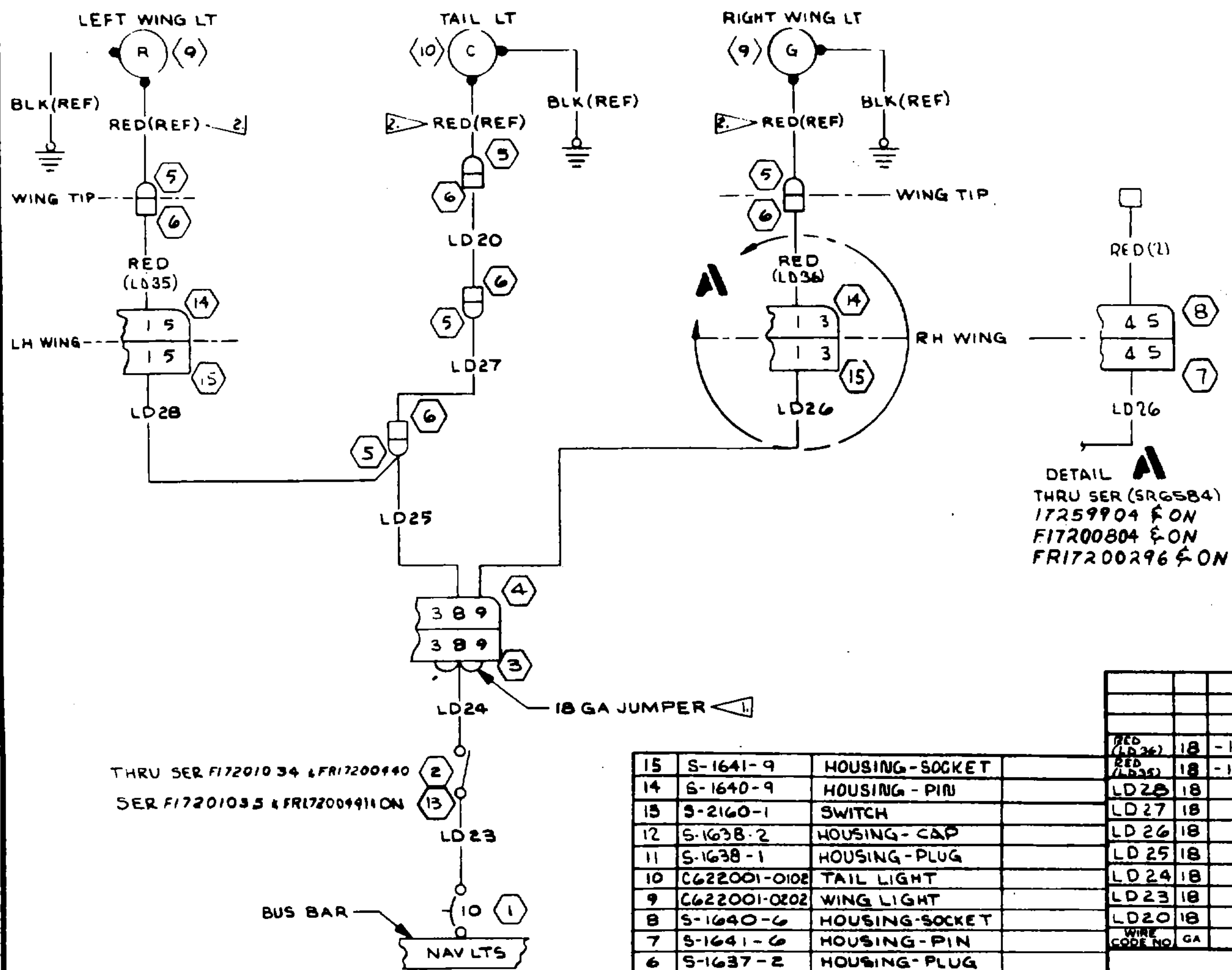
	NAME	DATE
DRAWN	BLISS	11-3-65
GROUP	R. Wing	12-16-65
CHECK	E. Clark	12-17-65
PROJ		12-20-65

TITLE: WIRING DIAGRAM— WING & TAIL LIGHTS

Cessna.

DWG NO. 0500062

SUPERSEDED BY: P 11.9.1 | SUPERSEDES: 0500062 PP 11.4 | MODEL: NOTED | REV. E | PAGE 11.9



15	S-1641-9	HOUSING-SOCKET
14	S-1640-9	HOUSING-PIN
13	S-2160-1	SWITCH
12	S-1638-2	HOUSING-CAP
11	S-1638-1	HOUSING-PLUG
10	C622001-0102	TAIL LIGHT
9	C622001-0202	WING LIGHT
8	S-1640-6	HOUSING-SOCKET
7	S-1641-6	HOUSING-PIN
6	S-1637-2	HOUSING-PLUG
5	S-1637-1	HOUSING-CAP
4	S-1640-15	HOUSING-SOCKET
3	S-1641-15	HOUSING-PIN
2	S-1824-1	SWITCH
1	S-1360-10	CIRCUIT BREAKER
ITEM NO.	PART NO.	DESCRIPTION

EQUIPMENT TABLE

NOTES:

1. JUMPER WIRES TERMINATE WITH S-1635-2
2. ADD S-1637-1 CAP TO VENDOR FURNISHED RED WIRE
3. APPLICABLE MODELS: 172, F172, FR172,

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD [illegible] TAIL A [illegible] S-1641-2 [illegible]	[illegible]	
B	BY REV: S-1640-15 WAS S-1641-15; S-1641-15 WAS S-1640-15 (NOW SHOP PRACTICE)	10-5-72 RCA	
C	BY REV: SER OUT S-1824-1 & SER IN S-2160-1 (SR 7303) (SR 7304)	JCY 2-28-73	RF
D	BY REV: ADD WIRE LENGTHS (NOW SHOP PRACTICE)	JLO 3-16-73	RF
E	BY REV: S-1636-1/LD20 WAS S-1635-1 (NOW SHOP PRACTICE)	JLO 10-1-73	RF
F	BY REV: RED (LD36) WAS RED(2) RED (LD35) WAS RED(1); S-1636-1 (LD36) (LD35)(LD28)(LD26)(LD24) WAS S-1636-2, S-1635-1 (LD36)(LD35)(LD26)(LD25) WAS S-1635-2; S-1640-9 WAS S-1638-1 & S-1640-15, S-1641-9 WAS S-1638-1 & S-1640-15; (172 E0007) (NOW SHOP PRACTICE)	JEF 2-8-74	JRS RF
G	BY REV: SEE LD25 WAS SEE LD27 LD 28 (NOW SHOP PRACTICE)(MER 172 E0035)	MEM 5-9-74	JRS RF

INACTIVE: EFF THRU SER (SR7900) (SR7901) RAM JCY JRS RF 10-29-74 (FR17200559 & FR17200561) (17265684 & F17201389)

04-231-0905
03-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		SERIALS
RED (LD36)	18	-18-2	200	S-1635-1	S-1636-1	
RED (LD35)	18	-18-2	200	S-1635-1	S-1636-1	
LD28	18		43	SEE LD25	S-1636-1	
LD27	18		290	S-1636-1	S-1635-1	
LD26	18		74	S-1635-1	S-1636-1	
LD25	18		38	S-1635-3	S-1635-1	
LD24	18		7	S-1493-1	S-1636-1	
LD23	18		10	S-1367-1-6	S-1493-1	
LD20	18		75	S-1636-1	S-1636-1	

WIRE TABLE

CONTRACT NO:	NAME	DATE
DESIGN		
GROUP	[illegible]	4-2-70
DRAWN	D.G. PLAIN	3-26-70
CHECK	L.E. WHITE	4-1-70
STRESS		
PROJ	[illegible]	4-10-70
APPD	[illegible]	4-2-70
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE WIRING DIAGRAM — WING & TAIL LIGHTS

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0500062

SCALE NONE | NOTED | PAGE: 11.9.1

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 11.9

SUPERSEDED BY: 0570101 P 11.6.0

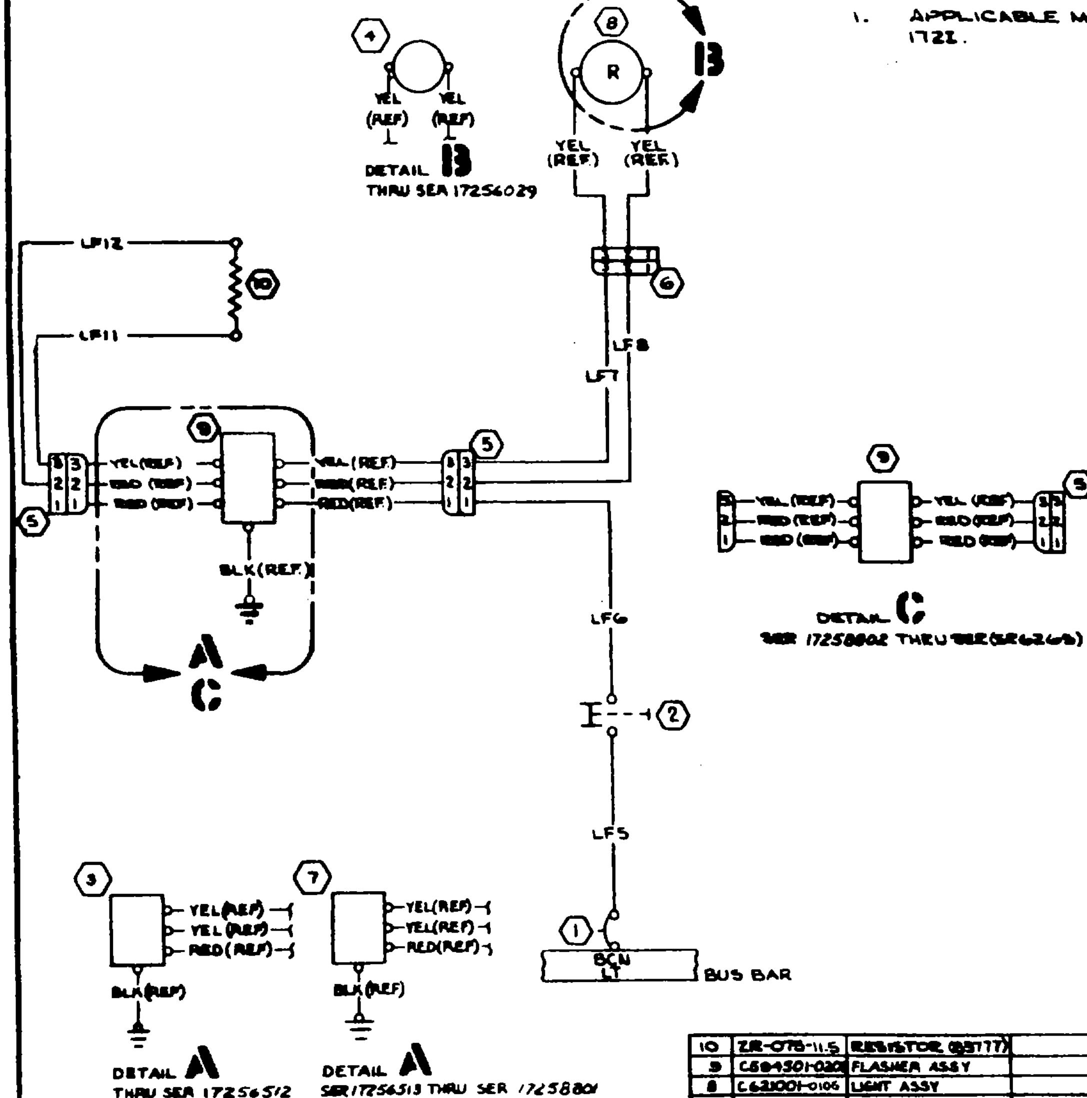
FORM NO 80-2158

ED/RR 10939 (SR 6352) (SR 6353) (SR6354) (17259224; F17200756) (FR17200226)

NOTES: (SER 17254893)&ON

1. APPLICABLE MODELS; 172, FR172E 172I.

LTR	REVISION	BY DATE	CHK APPD
A	BY REV: ADD FR172E TO MODEL BLOCK (SER FR172E-0001)&ON	C.G. 8-8-67	
B	BY REV: ADD NOTE 1 ED&RR 0017 (SER R172E-0257 THRU -0301)(FR172E-0001)&ON	RCA	
C	BY REV: ADD 172I TO NOTE 1. [illegible]		
D	BY REV: DELETE MODEL T41-C FROM NOTE 1. (ED&RR 01321) [illegible]	JWH	MDS
E	BY REV: ADD DETAIL A & B C594501-0203; SER IN C594501-0201 & C621001-0103; SER OUT C594501-0101, -0201 & C621001-0101 ED&RR 10537 (SR6264); (SR5307) (SR5412)	PGP	
F	BY REV: ADD DETAIL C, LF11, LF12 & ZR-078-11.5; RED(REF)/PIN 2 WAS YEL(REF)/PIN 2 ED&ER 10880 (SR6268)	RLY 3-6-70	
G	BY REV C621001-0106 WAS C621001-0103	DLP 1-17-73	



INACTIVE:
EFF SER 17254893, FR172E-0001 & F172-0320
THRU SER 17259223, FR17200225, F17200754
RLY 4-3-70

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
10	ZR-078-11.5	RESISTOR (85777)	
9	C594501-0201	FLASHER ASSY	
8	C621001-0106	LIGHT ASSY	
7	C594501-0201	FLASHER ASSY-14V	
6	S-1638-2	HOUSING-CAP	
5	S-1638-1	HOUSING-PLUG	
4	C621001-0101	LIGHT ASSY-14V	
3	C594501-0101	FLASHER ASSY-14V	
2	0713026-4	SWITCH ASSY	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			REMARKS
LF12	16			S-1636-2	S-1498-2		SER (SR6268) & ON
LF11	16			S-1636-2	S-1498-2		SER (SR6268) & ON
LF8	16			S-1636-2	S-1635-2	STD.	
LF7	16			S-1636-2	S-1635-2	STD.	
LF6	16			S-1367-2-8	S-1636-2	STD.	
LF5	16			S-1367-2-6	S-1367-2-8	OPT	

WIRE TABLE

	NAME	DATE
DRAWN	BLISS	12-2-65
GROUP		
CHECK		
PROJ		

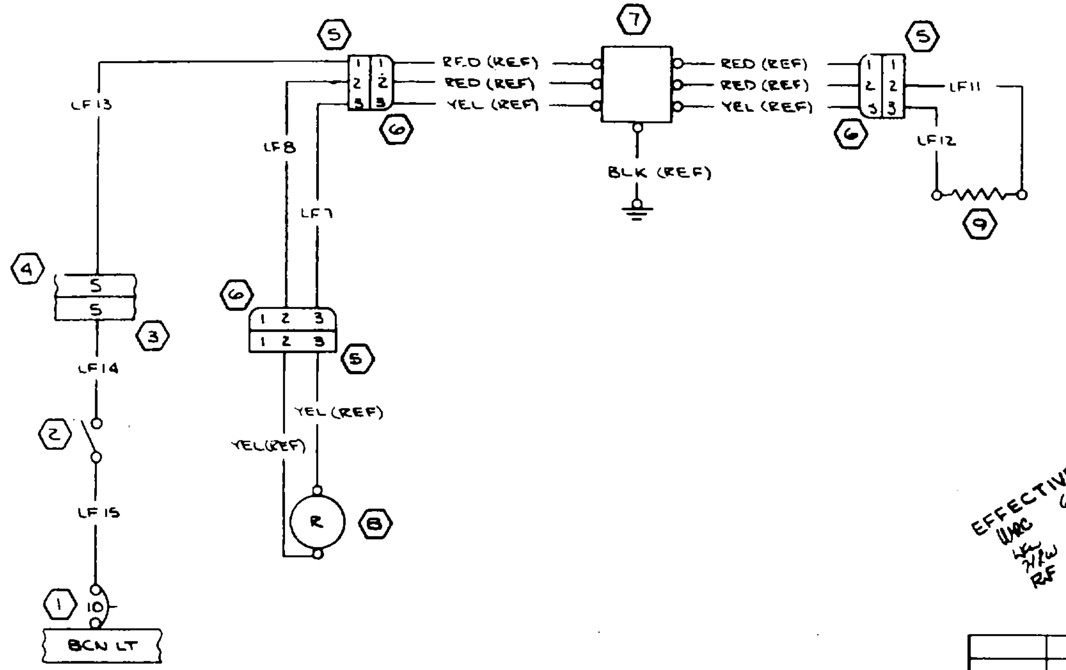
WIRING DIAGRAM— LIGHT - FLASHING BEACON (OPTIONAL)

Cessna.

DWG NO 0500062

SUPERSEDED BY: PIL.O.L | SUPERSEDES: 0500062 PG 11.5 | MODEL NOTED | REV G | PAGE 11.10

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: C621001-0106 WAS C621001-0103	DLP 1-17-73	BY NLW LK
B	BY REV: ADD WIRE LENGTHS (NOW SHOP PRACTICE)	JLO 5-16-73	BY NLW RF



INACTIVE
EFFECTIVE SERS 17259224, F17200755 & FR17200226 THRU SER 17260758, F17200904 & FR17200350
6-16-72
WRC LK NLW RF

NOTES:

1. APPLICABLE MODELS: 172L, F172K, FR172H

ITEM NO.	PART NO.	DESCRIPTION	
9	ZR-075-11.5	RESISTOR	(83777)
8	C621001-0106	LIGHT ASSY	
7	C594501-0203	FLASHER	
6	S-1638-2	HOUSING-CAP	
5	S-1638-1	HOUSING-PLUG	
4	S-1641-15	HOUSING-SOCKET	
3	S-1640-15	HOUSING-PIN	
2	S-1824-1	SWITCH	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
LF15	16		10	S-1493-2	S-1367-2-8		
LF14	16		8	S-1635-2	S-1493-2		
LF13	16		290	S-1636-2	S-1636-2		
LF12	16		8	S-1636-2	S-1493-2		
LF11	16		8	S-1636-2	S-1493-2		
LF8	16		69	S-1636-2	S-1635-2		
LF7	16		69	S-1636-2	S-1635-2		

WIRE TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P11.10 & 11.13
SUPERSEDED BY: P 11.10.2

CONTRACT NO.

	NAME	DATE
DESIGN	N Wise	4-10-70
GROUP		
DRAWN	R YOUNGERS	4-3-70
CHECK	L.K WHITE	4-15-70
STRESS		
PROJECT	R Fife	4-13-70
APPD	R YOUNGERS	4-3-70

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

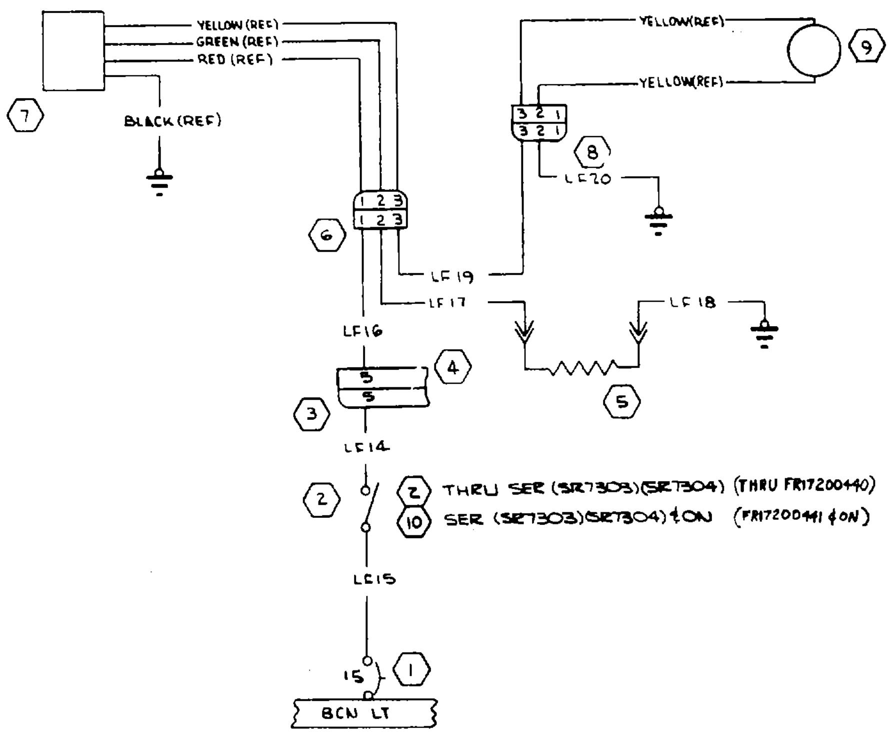
TITLE
WIRING DIAGRAM — FLASHING BEACON (OPTIONAL)

SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0500062

SCALE: NONE | PAGE: 11.10.1

FORM NO. 80-818A

ED & RR 10939 (SR6352), (SR6353) & (SR6354) IX



REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD S-2160-1 & SER, SER OUT S-1824-1: C621001-0106 WAS C621001-0103 (SR7303)II (SR7304)II	JLP 1-10-73	RF
B	BY REV: S-1367-2-8 WAS S-1367-2-6 PER LF20, ADD WIRE LENGTHS (NON SHOP PRACTICE)	JLO 4-9-73	RF
C	BY REV: S-1367-2-6 WAS S-1367-2-8 PER LF20 S-1367-2-8 WAS S-1367-2-6 PER LF18 SHOP PRACTICE	RS 2-6-75	JRS RF
D	BY REV: S-1360-15L WAS S-1360-10L (SR8260)	BAH 5-13-75	RF

INACTIVE: EFF THRU SER (SR7303) II (SR7304) II (17265684 & F17201384) (FR17200559 & FR17200561) 10-29-74

RAM JCY JRS RF

04-231-0905
03-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		SERIALS
LF 20	16		4	S-1635-2	S-1367-2-6	
LF 19	16		75	S-1635-2	S-1636-2	
LF 18	16			S-1493-2	S-1367-2-8	
LF 17	16		8	S-1493-2	S-1636-2	
LF 16	16			S-1636-2	S-1636-2	
LF 15	16		10	S-1493-2	S-1367-2-6	
LF 14	16		8	S-1493-2	S-1635-2	

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
10	S-2160-1	SWITCH	
9	C621001-0106	LIGHT ASSY	
8	S-1638-2	HOUSING-CAP	
7	C594502-0101	FLASHER ASSY	
6	S-1638-1	HOUSING-PLUG	
5	OR95-1.5	RESISTOR (83777)	
4	S-1641-15	HOUSING-SOCKET	
3	S-1640-15	HOUSING-PIN	
2	S-1824-1	SWITCH	
1	S-1360-15L	CIRCUIT BREAKER	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 11.10.

SUPERSEDED BY: 0570101 P 11.7.0

CONTRACT NO:

	NAME	DATE
DESIGN	COOK	6-16-72
GROUP	H. Wise	6-22-72
DRAWN	COOK	6-16-72
CHECK	WHITE	6-19-72
STRESS		
PROJ		6-27-72
APPD		
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE WIRING DIAGRAM — LIGHT-FLASHING BEACON (OPTIONAL)

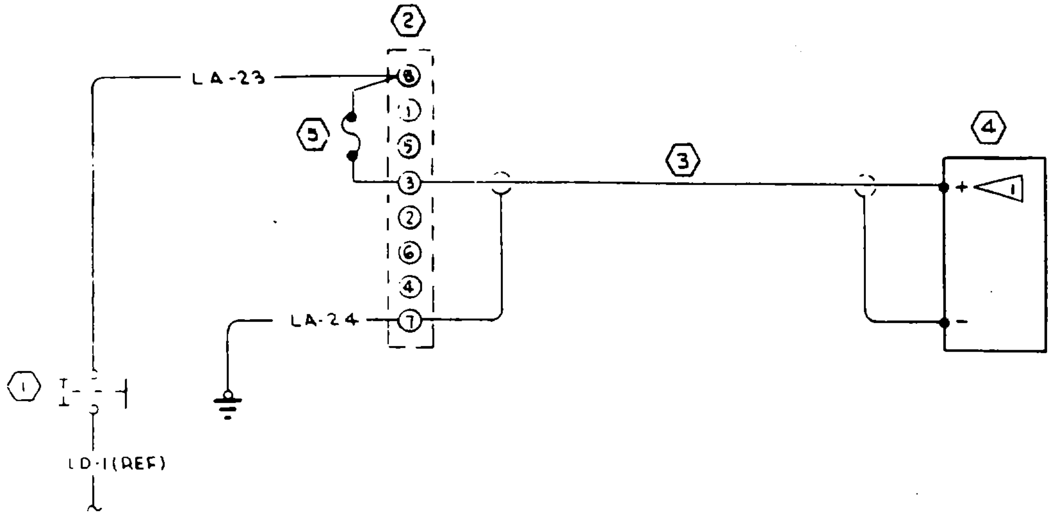
SIZE C | CODE IDENT. NO. 71379 | DWG NO 0500062

SCALE: NONE | PAGE: 11.10.2

(SR7002)(SR7003)(SR7004)(FR17200351)

FORM NO. 80-3168

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD NOTE 3 EDERR 00173 [illegible]	[illegible]	[illegible]



INACTIVE:
SER F172-0432 THRU SER F172-0435,
SER F172-0443,
SER F172-0447 THRU SER F17200754 &
SER 17215613 THRU SER 17259223 &
SER FR172E001 THRU SER FR17200225
EDERR 10939 3-26-70

NOTES:

1. CORRECT POLARITY MUST BE OBSERVED. OTHERWISE, PERMANENT DAMAGE TO COMPONENTS ON 1570142-2 WILL OCCUR.
2. CENTER CONDUCTOR OF 8449 CABLE TO BE TERMINATED WITH 320733 (VENDOR 00779) AND ADJOINING SHIELD TO BE TERMINATED WITH 329636 (VENDOR 00779). TERMINATIONS TO BE MADE ON ONE END ONLY.
3. APPLICABLE MODELS; 172, FR172E, & F172

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
LA-24	20			2	SOLDER		
LA-23	20			2	SOLDER		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
5	1570141-1	FUSE ASSY	
4	1570142-2	CIRCUIT BOARD ASSY	
3	8499	CABLE	(70903)
2	8.171	TERMINAL BLOCK	(71785)
1	0713035	SWITCH	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY: P 11.11.1

CONTRACT NO:

	NAME	DATE
DESIGN	W COOK	8-30-67
GROUP	H. Weil	8-31-67
DRAWN	[illegible]	
CHECK	YAKSHAW	8-30-67
STRESS	[illegible]	[illegible]
PROJECT	[illegible]	[illegible]
APPD	[illegible]	[illegible]

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

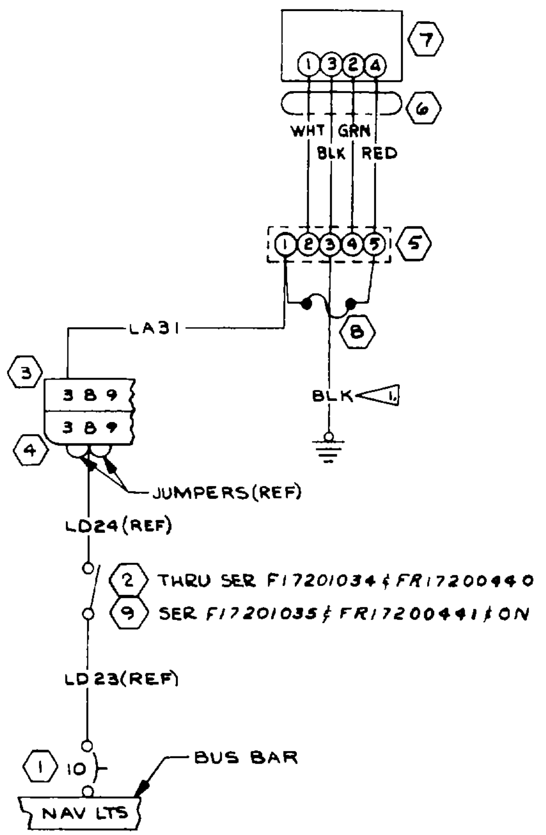
TITLE: WIRING DIAGRAM — MAP LIGHT, CONTROL WHEEL

SIZE: C | CODE IDENT. NO. 71379 | DWG NO. 0500062

SCALE: NONE | PAGE: 11.11

FORM NO. 00-215A

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: 329626 WAS 320733/ LA31 & BLK; ADD 329626 TO NOTE 3 ED&RR 10985 (SR6352) IX	RLY 6-9-70	LKW RLY H/W RF
B	BY REV: REVERSE TERMINALS 1 & 4 ON 0570088-1 ED&RR 10172 SER 17259224	RLY 8-17-70	LKW RLY H/W RF
C	BY REV: SER OUT S-1824-1 & SER IN S-2160-1 (SR7303) & (SR7304)	JCY 2-28-73	H/W RF
D	BY REV: ADD WIRE LENGTHS (NOW SHOP PRACTICE)	JLO 5-4-73	H/W RF



INACTIVE: EFF THRU SER (SR7903) IX (SR7904) IX (17265684; F17201384) (FR17200559; FR17200561) 10-29-74 RAM JCY QRG RF

09-231-0905
03-231-0905

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. APPLICABLE MODELS: 172, F172 & FR172
3. VENDOR FOR 320733 & 329626 IS 00779

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS	TERMINALS		SERIALS
WHT		8409 (70903)		320733	320733	3	
BLK		8409 (70903)		320733	320733	3	
GRN		8409 (70903)		320733	320733	3	
RED		8409 (70903)		320733	320733	3	
BLK	20		3	S-1367-1-8	329626	3	
LA31	20		15	329626	S-1636-1	3	

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
9	S-2160-1	SWITCH	
8	1570141-1	FUSE ASSY	
7	0570088-1	MAP LIGHT ASSY	
6	8409	CABLE	(70903)
5	351-11-05-001	TERMINAL STRIP	(71785)
4	S-1640-15	HOUSING-SOCKET	
3	S-1641-15	HOUSING-PIN	
2	S-1824-1	SWITCH	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 11.11

SUPERSEDED BY: 0570101 P 11.8.0

CONTRACT NO:

	NAME	DATE
DESIGN	Cook	4-7-70
GROUP	H. Wise	4-2-70
DRAWN	D.G. PLAIN	3-26-70
CHECK	L.K. WHITE	4-1-70
STRESS		
PROJ	R. Fink	4-10-70
APPD	R. YOUNGERS	4-2-70
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE: WIRING DIAGRAM — MAP LIGHT, CONTROL WHEEL (OPTIONAL)

SIZE	CODE IDENT. NO.	DWG NO
C	71379	0500062

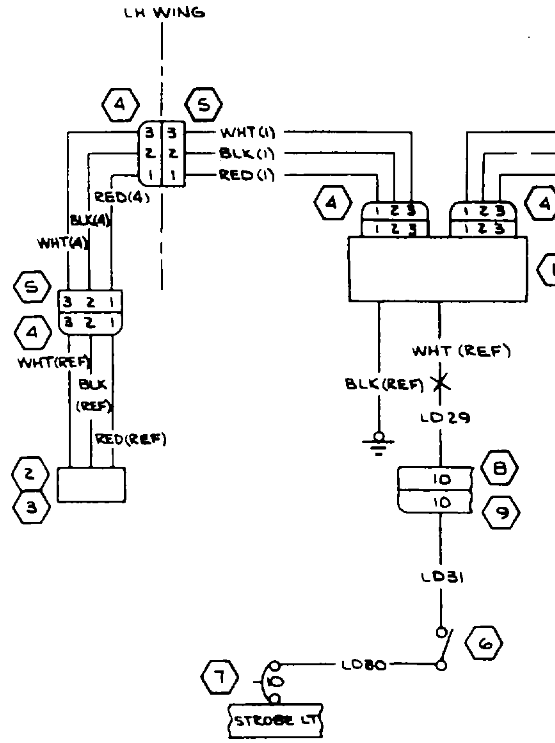
SCALE: NONE | NOTED | PAGE: 11.11.1

FORM NO. PO-215B

ED&RR 10939 SER (SR6352) IX SER (SR6353) IX (17259224; F17200755) SER (SR6354) IX (FR17200226)

REVISION

LET	DESCRIPTION	DATE	APPD
A	BY REV: 18 GA WAS 20 GA/LD29, LD30 & LD31 EDRR 10087	DLP 6-29-70	RF
B	BY REV: C622004-0103 WAS C622004-0101 (NOW SHOP PRACTICE)	RLY 8-20-70	NPW RF



INACTIVE
EFFECTIVE SER 17259224, F17200755 & FR17200226 THRU SER 17260758, F17200904 & FR17200350
WC 6-16-72

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
WHT(4)	18			S-1635-2	S-1636-2		
RED(4)	18			S-1635-2	S-1636-2		
BLK(4)	18			S-1635-2	S-1636-2		
WHT (3)	18			S-1635-2	S-1636-2		
RED(3)	18			S-1635-2	S-1636-2		
BLK(3)	18			S-1635-2	S-1636-2		
BLK(REF)				S-1367-1-8			
RED(2)	18	1		S-1635-2	S-1636-2		
WHT(2)	18						
BLK(2)	18						
RED(1)	18						
WHT(1)	18						
BLK(1)	18	1		S-1635-2	S-1636-2		
LD29	18			S-1636-1	S-1370-1		
LD31	18			S-1635-1	S-1493-1		
LD30	18			S-1367-1-8	S-1493-1		

WIRE TABLE

NOTES:

1. THREE CONDUCTOR CABLE, BELDEN (10903) PART NO. 8770 OR EQUIVILANT TO BE USED
2. APPLICABLE MODELS: 172, F172 & FR172

ITEM NO.	PART NO.	DESCRIPTION
9	S-1640-15	HOUSING-PIN
8	S-1641-5	HOUSING-SOCKET
7	S-1360-10	CIRCUIT BREAKER
6	S-1824-1	SWITCH
5	S-1638-1	HOUSING
4	S-1638-2	HOUSING
3	C622003-0104	LENS
2	C622003-0101	LIGHT UNIT
1	C622004-0103	POWER SUPPLY

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY: P 11.14.2

CONTRACT NO:

	NAME	DATE
DESIGN	Comr	5-6-70
GROUP	H. Will	5-5-70
DRAWN	R.YOUNGERS	5-5-70
CHECK	L.K.WHITE	5-5-70
STRESS		
PROJECT	R. Fyfe	5-8-70
APPD	R.YOUNGERS	5-5-70

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

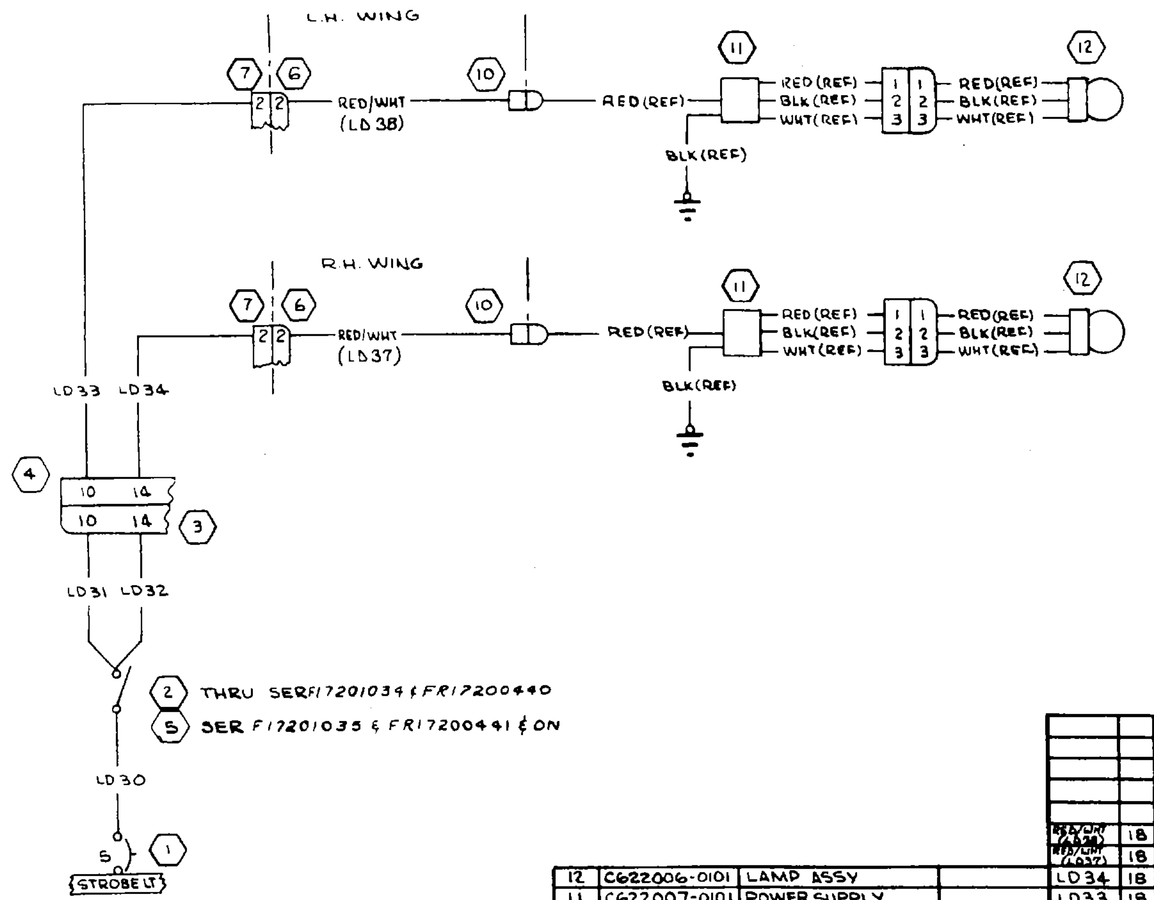
TITLE: WIRING DIAGRAM — WING TIP STROBE LIGHT

SIZE: C | CODE IDENT. NO. 71379 | DWG NO. 0500062

SCALE: NONE | PAGE: 11.14.1

FORM NO. 80-215A

EDERR 10009 (SE6352)(SE6353)(SE6354) II



REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV S-1637-1 & S-1637-2 AT LH & RH WING ROOT WAS S-1640-6 & S-1641-6 LH & S-1640-9 & S-1641-9 RH; S-1636-2/RED/WHT (1) & RED/WHT (2) WAS S-1635-2 NOW SHOP PRACTICE	DLP 9-27-72	HLW RF
B	BY REV: SER OUT S-1824-1 & SER IN S-2160-1 (SR7303)&(SR7304)	JCY 2-28-73	HLW RF
C	BY REV: ADD WIRE LENGTHS (NOW SHOP PRACTICE)	JLO 3-16-73	HLW RF
D	BY REV: S-1640-9 & S-1641-9 WAS S-1637-1 & -2; RED/WHT (LD38) WAS RED/WHT (1) RED/WHT (LD37) WAS RED/WHT (2); S-1635-1 (LD38) (LD37)(LD32)(LD31) WAS S-1635-2, & S-1636-1 (LD38)(LD37)(LD34)(LD33) WAS S-1636-2; (172 E0007) (NOW SHOP PRACTICE)	JEF 2-8-74	JCY RF

INACTIVE: EFF THRU SER (SR7303) (SR7304) (17265684; F17201384) (FR17200559 & FR17200561) 10-29-74
RAM JCY RF

04-231-0905
03-231-0905

RED/WHT (LD38)	18	-18-2-9	216	S-1636-1	S-1635-1	(STD)	
RED/WHT (LD37)	18	-18-2-9	216	S-1636-1	S-1635-1	(STD)	
LD34	18		74	S-1636-1	S-1636-1	(STD)	
LD33	18		81	S-1636-1	S-1636-1	(STD)	
LD32	18		8	SEE LD31	S-1635-1		
LD31	18		8	S-1493-2	S-1635-1		
LD30	18		10	S-1367-1-6	S-1493-1		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
12	C622006-0101	LAMP ASSY
11	C622007-0101	POWER SUPPLY
10	S-1637-2	HOUSING-PLUG
9	S-1637-1	HOUSING-CAP
8		
7	S-1641-9	HOUSING-SOCKET
6	S-1640-9	HOUSING-PIN
5	S-2160-1	SWITCH
4	S-1641-15	HOUSING-SOCKET
3	S-1640-15	HOUSING-PIN
2	S-1824-1	SWITCH
1	S-1360-5L	CIRCUIT BREAKER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 11.14.1

SUPERSEDED BY: 0570101 P 11.9.0

CONTRACT NO:

	NAME	DATE
DESIGN	COOK	6-16-72
GROUP	H. Wise	6-22-72
DRAWN	COOK	6-16-72
CHECK	WHITE	6-19-72
STRESS		
PROJ	[signature]	6-27-72
APPD		
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE WIRING DIAGRAM — WING TIP STROBE LIGHT (OPTIONAL)

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0500062

SCALE: NONE | PAGE: 11 14.2

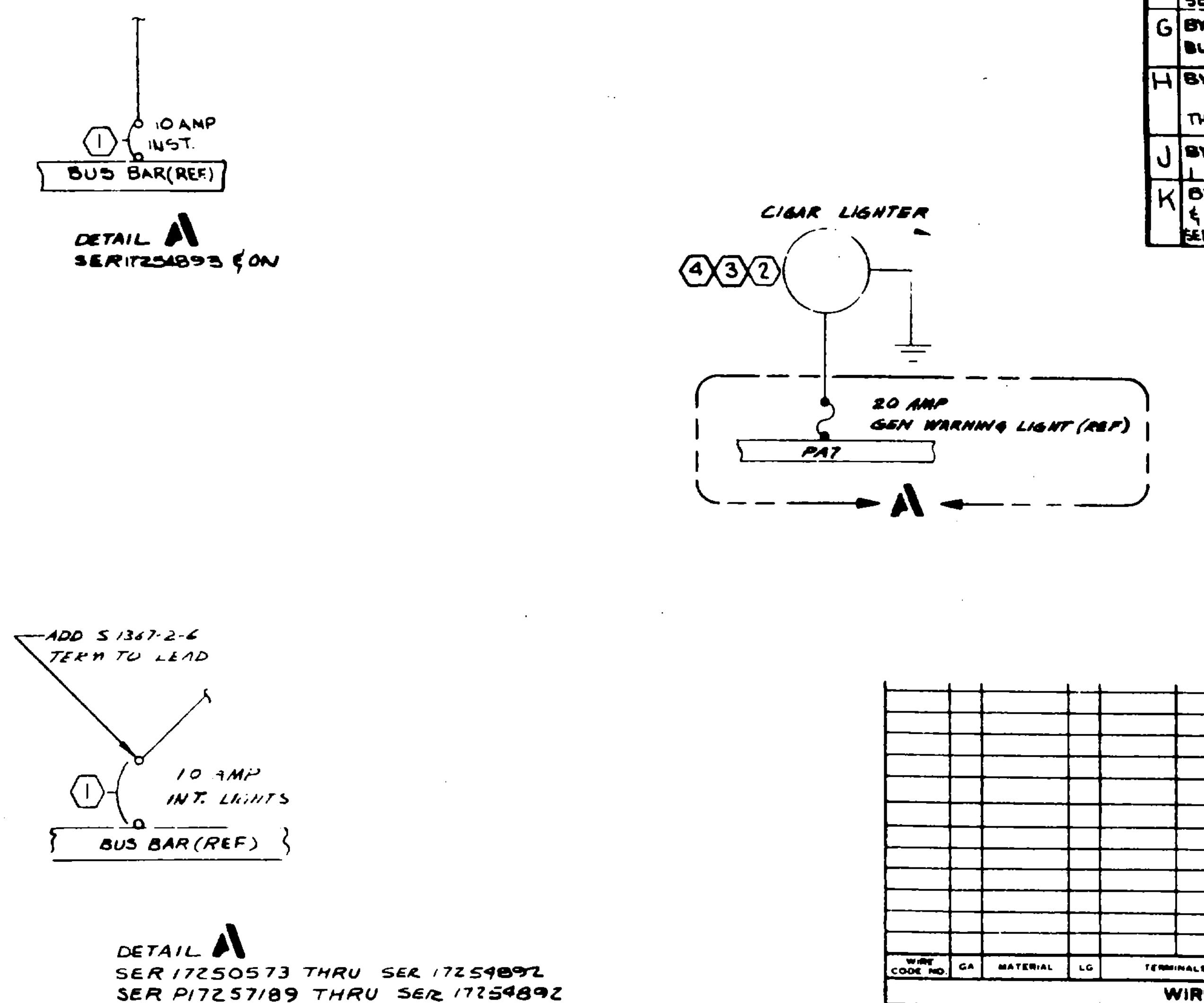
(SR7002)(SR7003)(SR7004) (17259904; F17200805) (FR17200491)

FORM NO. 80-2158

NOTES:

1. APPLICABLE MODELS; 172, P172, FR172E, T41-C, & 172I

CHG LET	REVISION	BY DATE	CHK APPD
D	REDRAWN NO CHG	[illegible]	[illegible]
E	[illegible] (SER 17256513 THRU [illegible])	[illegible]	[illegible]
F	BY REV, ADD DETAIL A; ADD UNIT SER; ADD EQUIP TAB [illegible]	[illegible]	
G	BY REV: ADD FR172E TO MODEL BLOCK (FR172E-001 & ON)	C.G.	RLL
H	BY REV: ADD NOTE 1 ED & RR00173 (R172-0251 THRU 0301) (SER R172E-001 & ON)	RCA	RLL
J	BY REV: ADD 172I TO NOTE 1 (ED RR00192) (SER 17256[illegible])	JSM	RLL
K	BY REV: ADD 0513052-3 & 0513052-15 SER 17256513, R172E-0001)	CG	RLL



INACTIVE: SER (SR6353), SER (SR6354) ED & RR 10939 3-26-70

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS	SERIALS

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
4	0513052-15	LIGHTER ASSY	FR172E (172I ONLY)
3	0513052-3	LIGHTER ASSY	T41-C ONLY
2	0513039-7	LIGHTER ASSY	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

	NAME	DATE
DRAWN	Griswold	9/2/59
GROUP	Dittmer	9/3/59
CHECK	Cook	9/3/59
PROJ	Settle	9/3/59

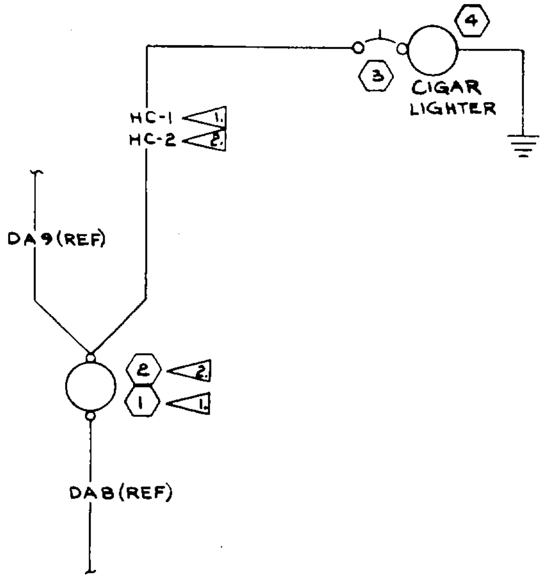
TITLE: WIRING DIAGRAM — CIGAR LIGHTER

Cessna.

DWG NO 0500062

SUPERSEDED BY: P13.1.1 | SUPERSEDES: 0500062 C REV | MODEL: NOTED | REV: K | PAGE: 12.1

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV. ADD WIRE LENGTH, S-1320-5 WAS S1320-1 (NOW SHOP PRACTICE)	4-9-73	RF



INACTIVE:
EFF THRU SER (S27903) (S27904) (FR17200561)
(17265684; F17201384)(FR17200559)
RAM 10-29-74
JCY
RF

04-231-0905
03-231-0905

NOTES:

1. APPLIES TO MODELS: 172, F172

2. APPLIES TO MODELS: FR172

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
HC-2	16			S-1367-2-10	S-1367-2-8		
HC-1	16		18	S-1367-2-10	S-1367-2-8		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	VENDOR
4	0513052-3	CIGAR LIGHTER	
3	60232-1	CIRCUIT BREAKER	(15472)
2	C669502-0208	INST. CLUSTER	
1	S-1320-5	AMMETER	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA
STD. NO.

SUPERSEDES: P 13.1

SUPERSEDED BY: 0570101 P13.1.0

CONTRACT NO:

	NAME	DATE
DESIGN	Cook	4-7-70
GROUP	H. Wise	4-2-70
DRAWN	D.G. PLAIN	3-26-70
CHECK	L.K. WHITE	4-1-70
STRESS		
PROJ	G. R. Fike	4-13-70
APPD	R. YOUNKERS	4-2-70
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM —
CIGAR LIGHTER

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0500062

SCALE: NONE | NOTED | PAGE: 13.1.1

ED RR 10939

SER (SR6352)
SER (SR6353) (17259224; F17200755)
SER (SR6354) (FR17200441)

FORM NO. 60-2159

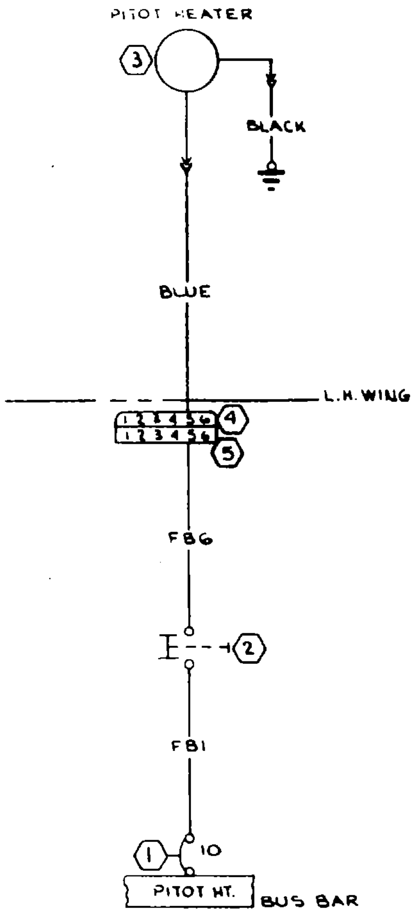
(SER 17254893)

ES;

1 WIRE MATERIAL PER S-1460

2. APPLICABLE MODELS; 172, FR172E, T41-C, & 172I

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV: ADD FR172 ... BLOCK (SER FR172E-0015 ON)	CG 8-6-67	
B	BY REV: ADD NOTE 2 ED ERR 00173 (... THR 0301) (SER FR172E-0016 ON)	RCA 10-19-67	RLL
C	BY REV: ADD 172I TO NOTE 2 (EDERR 00192) (172I 56534 ON)	JSM 9-27-67	



INACTIVE: THRU SER 17259223, F17200774 & FR17200225, EDERR 10939 3-26-70

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
BLACK	18	-18-0		S-1369-1	S-1367-1-8	OPT	
BLUE	16	-16-6		S-1635-2	S-1369-2	STD.	
FB6	16			S-1367-1-8	S-1636-2	STD	
FB1	16			S-1367-1-6	S-1367-1-8	OPT	

1 WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
5	S-1641-6	HOUSING-SOCKET	
4	S-1640-6	HOUSING-PIN	
3	0721105-5	PITOT HEATER	
2	0713026-4	SWITCH ASSY.	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

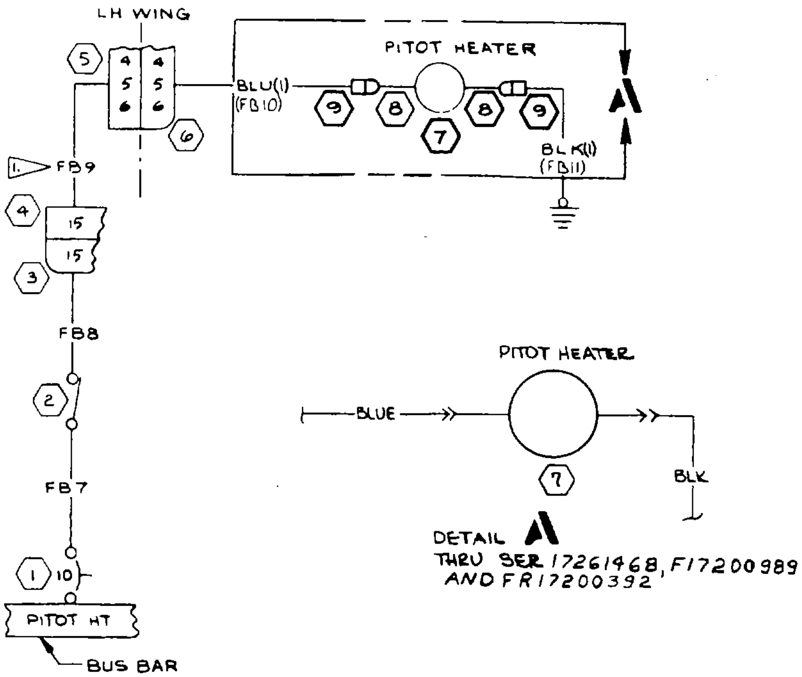
	NAME	DATE
DRAWN	BLISS	11-5-65
GROUP	K. W...	12-16-65
CHECK	R. ...	12-17-65
PROJ	...	12-20-65

WIRING DIAGRAM— PITOT HEAT (OPTIONAL)

Cessna.

DWG NO 0500062

SUPERSEDED BY P 13.3.1 | SUPERSEDES 0500062 PP 13.2 | MODEL NOTED | REV C | PAGE 13.3



LET	DESCRIPTION	DATE	APPD
A	BY REV: SER OUT BLU & BLK; SER IN BLU(1) & BLK(1); ADD DET "A" & SER. (SR 7320)	JCY 11-6-72	B-4 RF
B	BY REV: ADD WIRE LENGTHS, S-1360-10L WAS S-1360-10 (NOW SHOP PRACTICE)	JLO 3-16-73	RF
C	BY REV: ADD (FB11) TO BLK(1) & (FB10) TO BLU(1); S-1640-9 WAS S-1641-6 & S-1641-9 WAS S-1640-6. (NOW SHOP PRACTICE) (172 E0007)	JEF 2-8-74	RF

INACTIVE: EFF THRU SER (SR7903) (17265684; F17201389 & FR17200559 & FR17200561) (SR7904) 10-29-74

RAM JCY

04-231-0905
03-231-0905

NOTES:

1. WIRES FB9 & BLUE ARE STANDARD WIRES

3. APPLICABLE MODELS; 172, F172, FR172.

ITEM NO.	PART NO.	DESCRIPTION
9	S-1637-2	HOUSING - PLUG
8	S-1637-1	HOUSING - CAP
7	0721105-5	PITOT HEATER
6	S-1640-9	HOUSING - PIN
5	S-1641-9	HOUSING - SOCKET
4	S-1641-15	HOUSING - SOCKET
3	S-1640-15	HOUSING - PIN
2	S-1824-1	SWITCH
1	S-1360-10L	CIRCUIT BREAKER

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
BLK(1) (FB11)	18	-18-0	14	S-1636-2	S-1367-1-8		SER 17261469, F17200990 AND FR17200393 & ON
BLU(1) (FB10)	16	-16-6	54	S-1636-2	S-1636-2	(STD)	SER 17261469, F17200990 AND FR17200393 & ON
BLK	18	-18-0	14	S-1369-1	S-1367-1-8		THRU SER 17261468, F17200989 AND FR17200392
BLUE	16	-16-6	54	S-1636-2	S-1369-2		THRU SER 17261468, F17200989 AND FR17200392
FB9	16		60	S-1636-2	S-1635-2	(STD)	
FB8	16		10	S-1493-2	S-1635-2		
FB7	16		7	S-1367-2-6	S-1493-2		

WIRE TABLE

CONTRACT NO:

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

	NAME	DATE
DESIGN		4-7-70
GROUP	H. Weil	4-2-70
DRAWN	D.G. PLAIN	3-26-70
CHECK	K. Wh	4-1-70
STRESS		
PROJ		4-13-70
APPD	R. YOUNGERS	4-2-70
OTHER		

TITLE: WIRING DIAGRAM — PITOT HEAT (OPTIONAL)

SIZE: C | CODE IDENT NO. 71379 | DWG NO 0500062

SCALE: NONE | NOTED | PAGE: 13.3.1

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 13.3

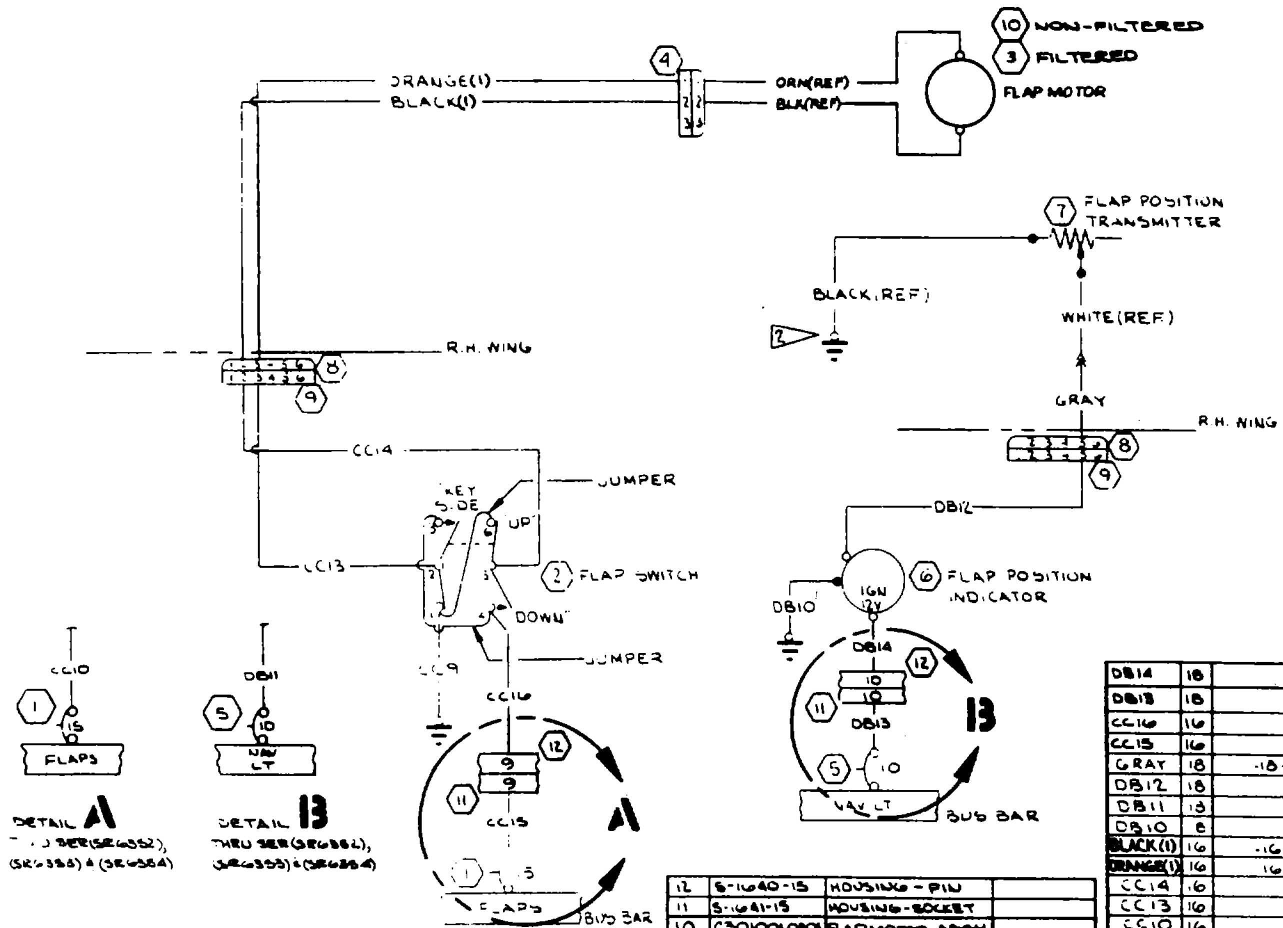
SUPERSEDED BY: 0570101 P 13.2.0

FORM NO 80-215B

ED&RR 10939

SER (SR 6352) I
SER (SR 6353) II (17259229; F17200759)
SER (SR 6354) III (FR17200441)

CHG LET	REVISION	BY / DATE	CHK / APPD
A	BY REV: ADD DET ... A & B ED&RR 10939 (SR6551)(SR6553) (SR6554)	RLN 4-3-70	RF



NOTES

1. SWITCH SHOWN IS A MOMENTARY ON–OFF–MOMENTARY ON CONFIGURATION SUCH THAT MOTOR IS SHORTED OUT WHEN SWITCH IS IN THE CENTER (ON) POSITION. SWITCH SHOWN IN CENTER (ON) POSITION.
2. ... BLACK WIRE ON TRANSMITTER ... BOLT

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
12	S-1640-15	HOUSING - PIN	
11	S-1641-15	HOUSING - SOCKET	
10	C301001-0301	FLAP MOTOR ASSY	
9	S-[illegible]-6	HOUSING - SOCKET	
8	S-[illegible]-0-6	HOUSING - PIN	
7	C[illegible]-0101	FLAP POSITION XMTR.	
6	C668001-0103	FLAP POSITION IND.	
5	S-1360-10	CIRCUIT BREAKER	
4	S-1638-1	HOUSING - PLUG	
3	C301001-0701	FLAP MOTOR ASSY	
2	S-1661-1	SWITCH ASSY	
1	S-1360-15	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
DB14	18			S-1636-1	S-1367-1-10		[illegible]
DB13	18			S-1367-1-6	S-1636-1		[illegible]
CC16	16			S-1367-2-6	S-1635-2		[illegible]
CC15	16			S-1367-2-6	S-1636-2		[illegible]
GRAY	18	-18-8		S-1635-2	S-391-1		
DB12	18			S-1367-1-10	S-1636-1		
DB11	18		18	S-1367-1-6	S-1367-1-10		[illegible]
DB10	8		6	SOLDER	S-1367-1-8		
BLACK(1)	16	-16-0		S-1635-2	S-1636-2		
ORANGE(1)	16	16-3		S-1635-2	S-1636-2		
CC14	16			S-1367-2-6	S-1636-2		
CC13	16			S-1367-2-6	S-1636-2		
CC10	16		21	S-1367-2-6	S-1367-2-6		[illegible]
CC9	16		7	S-1367-2-6	S-1367-2-8		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	R.G. Potts	9-27-68
CHECK	H.L. Wine	9-23-68
CHECK	R.L. Yocum	9-23-68
PROJ	P.E. Ruse	9-23-68

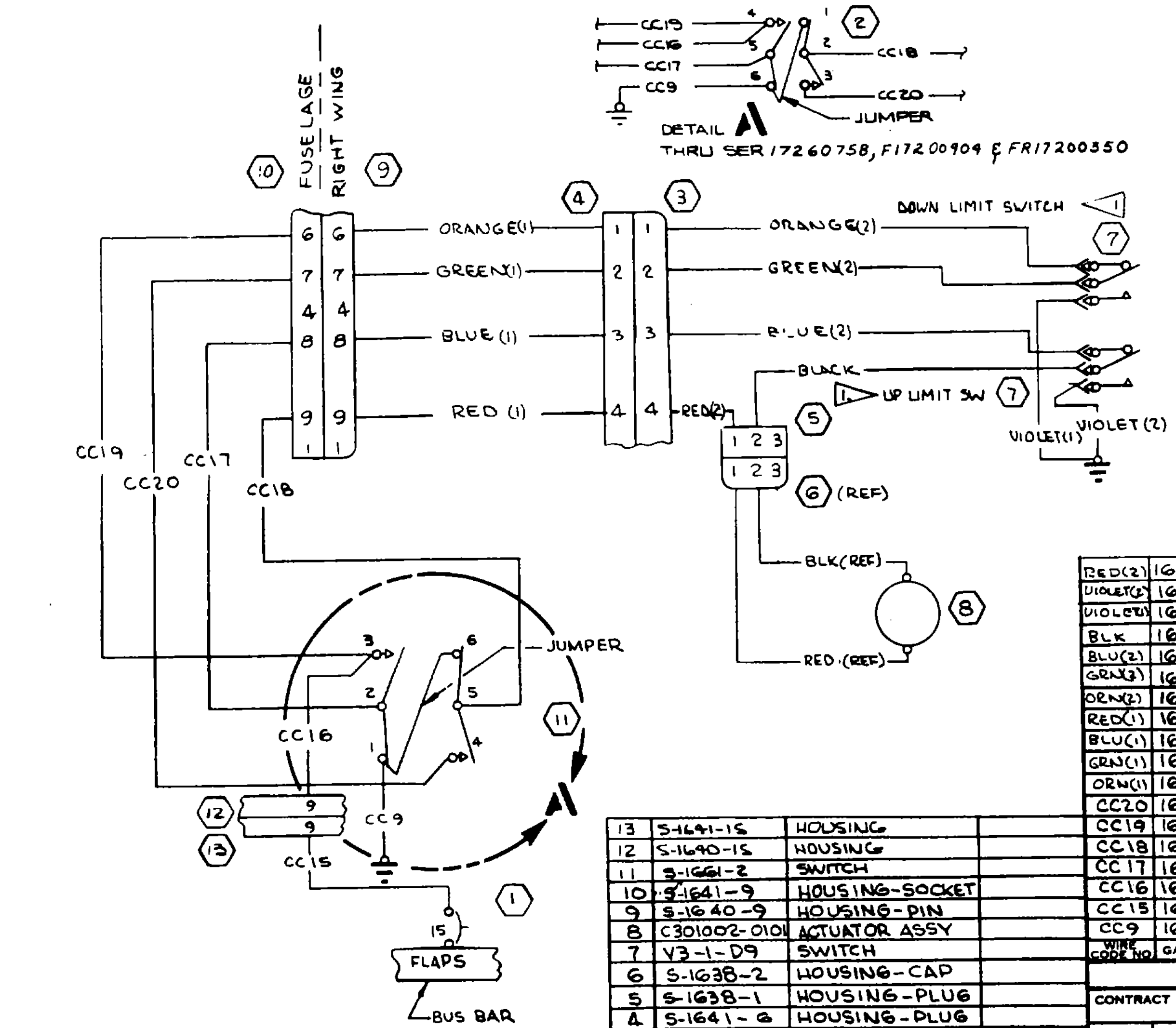
TITLE: **WIRING DIAGRAM— WING FLAPS ELECTRIC & FLAP POSITION INDICATOR**

Cessna.

DWG NO. 0500062

SUPERSEDED BY: P14.7-2, 14.7.5 — SUPERSEDES: P 14.7.0, 14.6 — MODEL: 172, F172, FR172 — REV: A — PAGE: 14.7.1

ED&RR 02629 (SR6330)



NOTES:
1. THESE SWITCHES PART OF C301002-0101 ACTUATOR ASSY.

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: DELETED WIRES CC-21 THRU CC-30 (NEVER USED) REPLACED WITH COLOR CODED WIRES ITEMS 3 & 4 WERE 5 & 6 ITEMS 9 & 10 WERE 3 & 4 (NOW SHOP PRACTICE)	7-1-71 WRC	NFW LEW DKM RF
B	BY REV: ADD DETAIL A, S-1661-2 & SER; SER OUT S-1661-1 (SR7002)(REF)(SR7003)(REF)(SR7004)(REF)	DLP 10-5-72	BY NFW DKM RF
C	BY REV: ADD WIRE LENGTHS (NOW SHOP PRACTICE)	DLO 3-16-73	BY NFW RF
D	BY REV: CHANGE LG, VIOLET (1)&(2) 19 WAS 6, ORN(2) 13 WAS 12 RED BLU GRN ORN(1) 75 WAS 90, S-1636-2 (CC17, 18, 19 & 20) WAS S-1635-2 (172 E0007) (NOW SHOP PRACTICE)	DEF 2/8/74	FRB RF
E	BY REV: S-1640-15 WAS S-1641-9 & S-1641-15 WAS S-1640-9 (NOW SHOP PRACTICE)	DLO 7-10-74	JCY-LOB FRI RF

INACTIVE: EFF THRU SER (THRU 17265684) (F17201384) (SR7905) RAM 10-29-74 JCY (FR17200559) FRB RF & FR17200561)

04-231-0905
03-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
RED(2)	16		13	S-1636-2	S-1635-2		
VIOLET(2)	16		19	S-1493-2	S-1367-2-8		
VIOLET(1)	16		19	S-1493-2	S-1367-2-8		
BLK	16		13	S-1636-2	S-1493-2		
BLU(2)	16		13	S-1635-2			
GRN(2)	16		13	S-1635-2			
ORN(2)	16		13	S-1635-2	S-1493-2		
RED(1)	16		75	S-1635-2	S-1636-2		
BLU(1)	16		75				
GRN(1)	16		75				
ORN(1)	16		75	S-1635-2	S-1636-2		
CC20	16		68	S-1367-2-6	S-1636-2		
CC19	16		68				
CC18	16		68				
CC17	16		68	S-1367-2-6	S-1636-2		
CC16	16		16	S-1636-2	S-1637-2-6		
CC15	16		15	S-1635-2	S-1637-2-6		
CC9	16		6	S-1637-2-6	S-1637-2-8		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
13	S-1641-15	HOUSING
12	S-1640-15	HOUSING
11	S-1661-2	SWITCH
10	S-1641-9	HOUSING-SOCKET
9	S-1640-9	HOUSING-PIN
8	C301002-0101	ACTUATOR ASSY
7	V3-1-D9	SWITCH
6	S-1638-2	HOUSING-CAP
5	S-1638-1	HOUSING-PLUG
4	S-1641-6	HOUSING-PLUG
3	S-1640-6	HOUSING-PIN
2	S-1661-1	SWITCH
1	S-1360-15	CIRCUIT BKR

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 14.7.1

SUPERSEDED BY: 0570101 P14.1.0 P14.1.1

CONTRACT NO:

	NAME	DATE
DESIGN	Cook	12-17-70
GROUP	H. Wine	2-2-71
DRAWN	COOK	12-17-70
CHECK	L.K. WHITE	2-2-71
STRESS		
PROJ	[illegible signature]	2-17-71
APPD		
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE: WIRING DIAGRAM — WING FLAPS-ELECTRIC

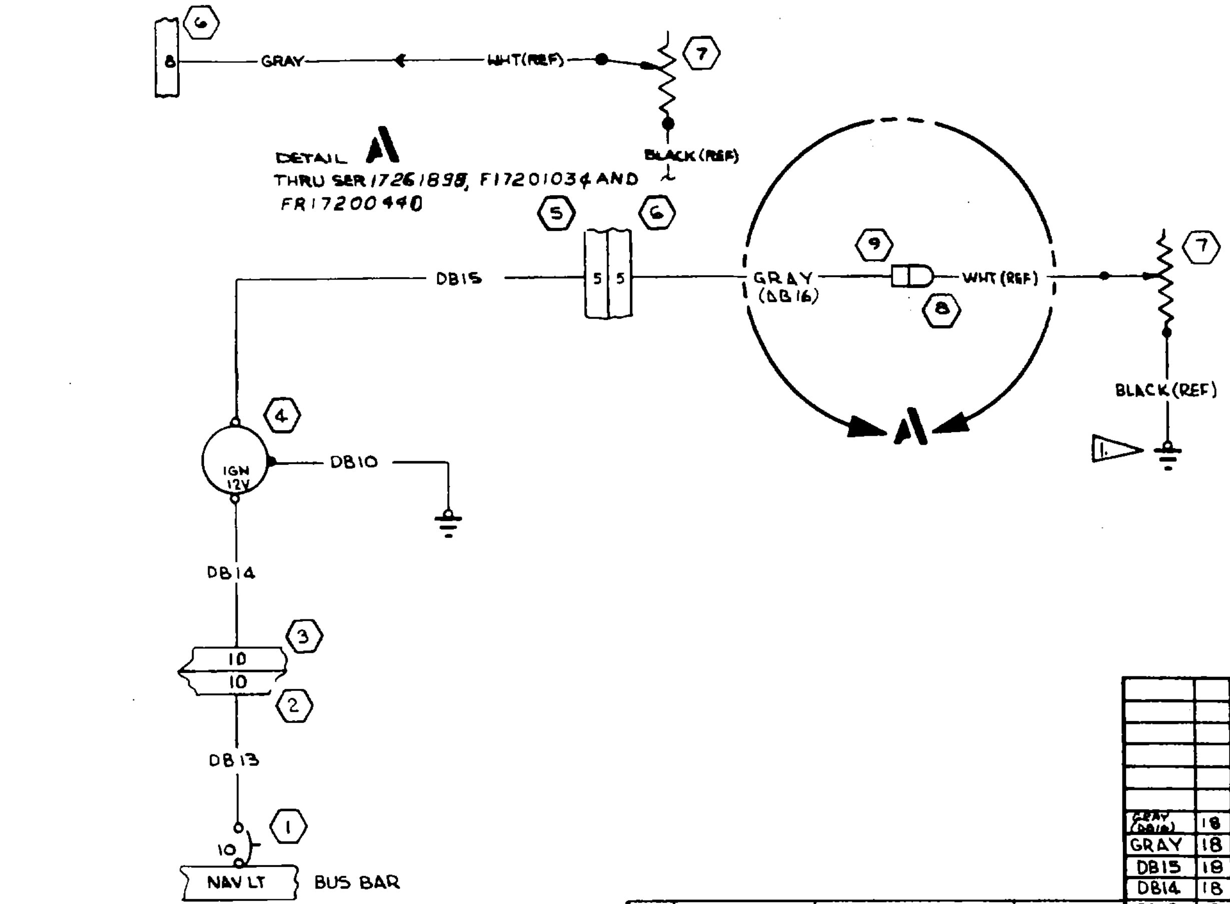
SIZE: C | CODE IDENT. NO. 71379 | DWG NO 0500062

SCALE: NONE | 172-F172-FR172 | PAGE: 14.7.2

(SR6584) (FR17200298)

FORM NO 60-215B

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: PIN 8 WAS PIN 4: ITEMS 5 & 6 WERE S-1640-6 & S-1641-6 (NOW SHOP PRACTICE)	7-1-71 WRC	DKM RF
B	BY REV: S-1367-1-6 WAS SOLDER & S-1367-1-10 WAS S-1367-1-8 PER DB10, ADD WIRE LENGTHS, ADD DETAIL 'A', SER OUT GRAY, SER IN GRAY (1), ADD ITEM 8 & 9 NOW SHOP PRACTICE (SR7303) (SR7304)	5-21-73	RF
C	BY REV: GRAY(DB16) WAS GRAY (1); PINS 5 WAS PIN 8; S-1635-1 GRAY (DB16) WAS S-1636-1 (DB16), S-1636-1 (DB15) WAS S-1635-1 (DB15) (172 E0007) (NOW SHOP PRACTICE)	JEF 2/8/74	JCY RF



NOTES:
1. GROUND BLACK WIRE ON TRANSMITTER MOUNTING BOLT.

INACTIVE: EFF THRU SER (SR7903) (SR7904) (17265684, F17201384) (FR17200559 & FR17200561) 10-29-74 RAM JCY RF

04-231-0905
03-231-0905

ITEM NO	PART NO.	DESCRIPTION	
9	S-1637-2	HOUSING	
8	S-1637-1	HOUSING	
7	C590501-0101	FLAP POSITION XMTR	
6	S-1640-9	HOUSING-SOCKET	
5	S-1641-9	HOUSING-PIN	
4	C668001-0103	FLAP POSITION IND	
3	S-1640-15	HOUSING-PIN	
2	S-1641-15	HOUSING-SOCKET	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
GRAY (DB16)	18	-18-8	100	S-1635-1	S-1636-1		SER 17261899, F17201035 AND FR17200441 & ON
GRAY	18	-18-8	100	S-1635-1	S-341-1		THRU SER 17261898 F17201034 AND FR17200440
DB15	18		62	S-1367-1-10	S-1636-1		
DB14	18		19	S-1635-1	S-1367-1-10		
DB13	18		15	S-1367-1-6	S-1636-1		
DB10	18		5	S-1367-1-6	S-1367-1-10		

WIRE TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: PG 14.7.1

SUPERSEDED BY: 0570101 P 14.2.0

CONTRACT NO:

	NAME	DATE
DESIGN	COOK	2-1-71
GROUP	H. Wine	2-2-71
DRAWN	COOK	2-1-71
CHECK	L.K. WHITE	2-2-71
STRESS		
PROJ	[illegible]	2-17-71
APPD		
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — FLAP POSITION INDICATOR

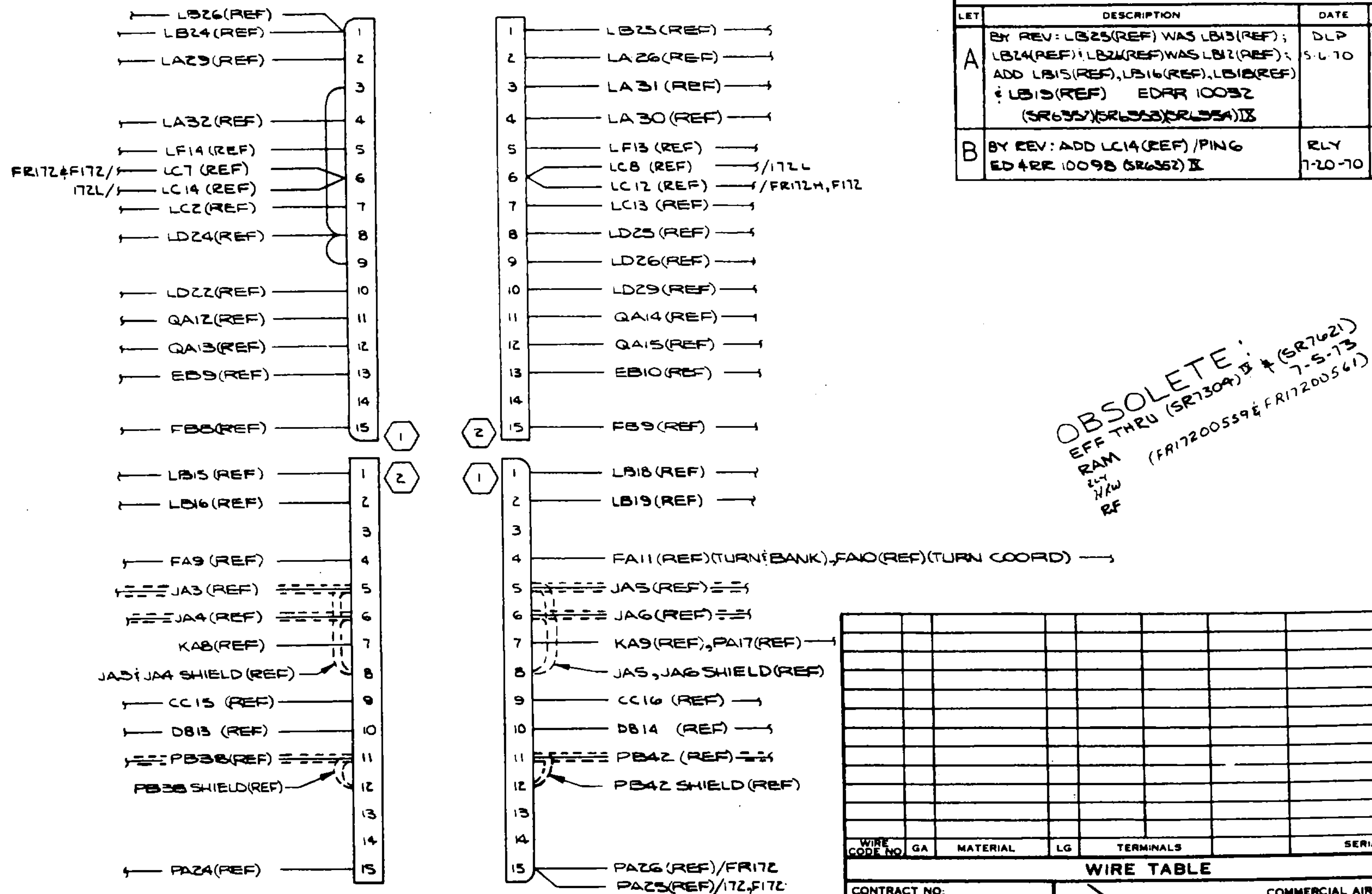
SIZE	CODE IDENT. NO.	DWG NO
C	71379	0500062

SCALE: NONE | 172- F172- FR172 | PAGE: 14.7.3

FORM NO. 80-2158

(SR6584)
(FR17200298)

LET	DESCRIPTION	DATE	APPD
A	BY REV: LB25(REF) WAS LB13(REF); LB24(REF) LB26(REF) WAS LB12(REF); ADD LB15(REF), LB16(REF), LB18(REF) & LB19(REF) EDRR 10032 (SR6352)(SR6353)(SR6354) IX	DLP 5-6-70	RLY NKW RF
B	BY REV: ADD LC14(REF)/PIN 6 ED&RR 10098 (SR6352) IX	RLY 7-20-70	RLY NKW RF



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS	SERIALS

WIRE TABLE

NOTES:

1. THIS DRAWING IS FOR REFERENCE INFORMATION ONLY

ITEM NO.	PART NO.	DESCRIPTION
2	S-1641-15	HOUSING-SOCKET
1	S-1640-15	HOUSING-PIN

EQUIPMENT TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	COOK	4-7-70
GROUP	N Wise	4-2-70
DRAWN	PAPE	4-1-70
CHECK	L.K. WHITE	4-1-70
STRESS		
PROJ	R. Fife	4-10-70
APPD	R YOUNKERS	4-2-70
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE WIRING DIAGRAM — SWITCH PANEL CONNECTORS

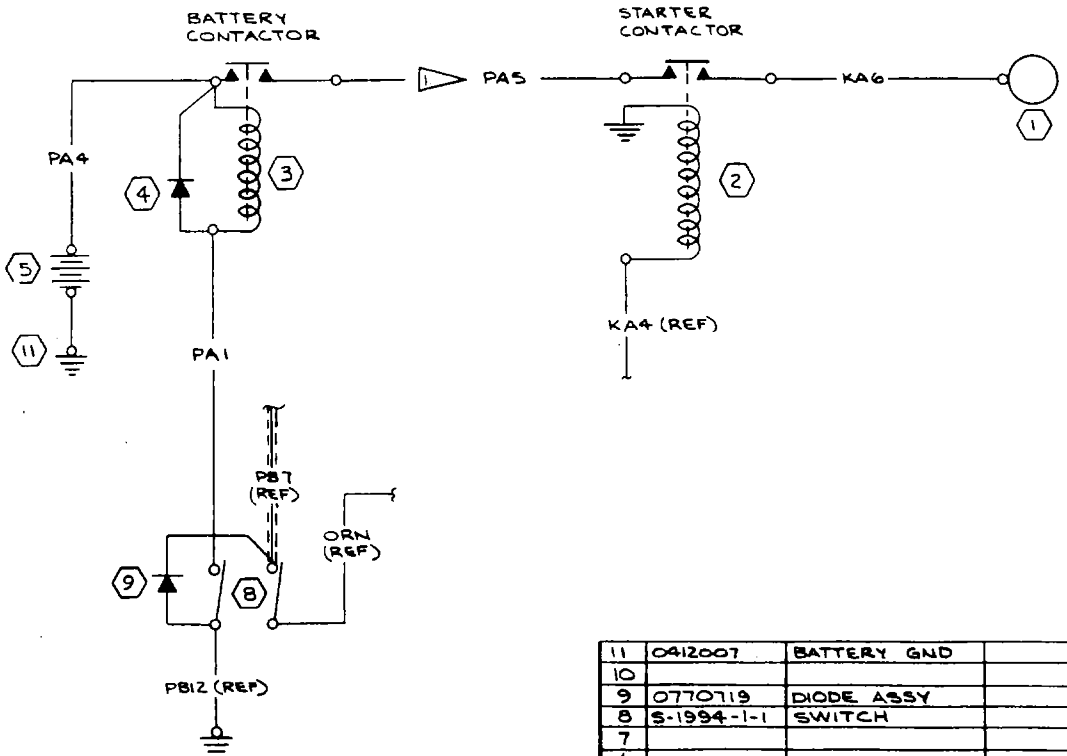
SIZE	CODE IDENT. NO.	DWG NO
C	71379	0500062

SCALE: NONE PAGE: 16.2

FORM NO. 80-2158

EDRR 10939 (SR6352)(SR6353)(SR6354) IX

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD NOTE 1 ; 0712605 WAS 0511319-1 (SR7904)	BLA 1-22-75	RF



NOTES:

1. SEE PAGE 4.6.0 WHEN OPTIONAL GROUND SERVICE INSTALLATION IS MADE

04-231-0905

ITEM NO.	PART NO.	DESCRIPTION	
11	0412007	BATTERY GND	
10			
9	0770719	DIODE ASSY	
8	S-1994-1-1	SWITCH	
7			
6			
5	0712605	BATTERY	
4	0770728	DIODE ASSY	
3	S-1579-2	CONTACTOR	
2	S-1991-1	CONTACTOR	
1	628482	STARTER	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
KA6	4		16	S-1367-6-13	S-1367-6-13		
PA5	4		190	S-1367-6-13	S-1367-6-13		
PA4	4		6	S-1367-6-14	S-1367-6-14		
PA1	22		138	S-1493-1	S-1367-1-8		

WIRE TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P4.1.4

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	12-11-74
GROUP	B. HARDEN	1-2-75
DRAWN	MERRICK	10-29-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-5-75
APPD		
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE

WIRING DIAGRAM — BATTERY CIRCUIT

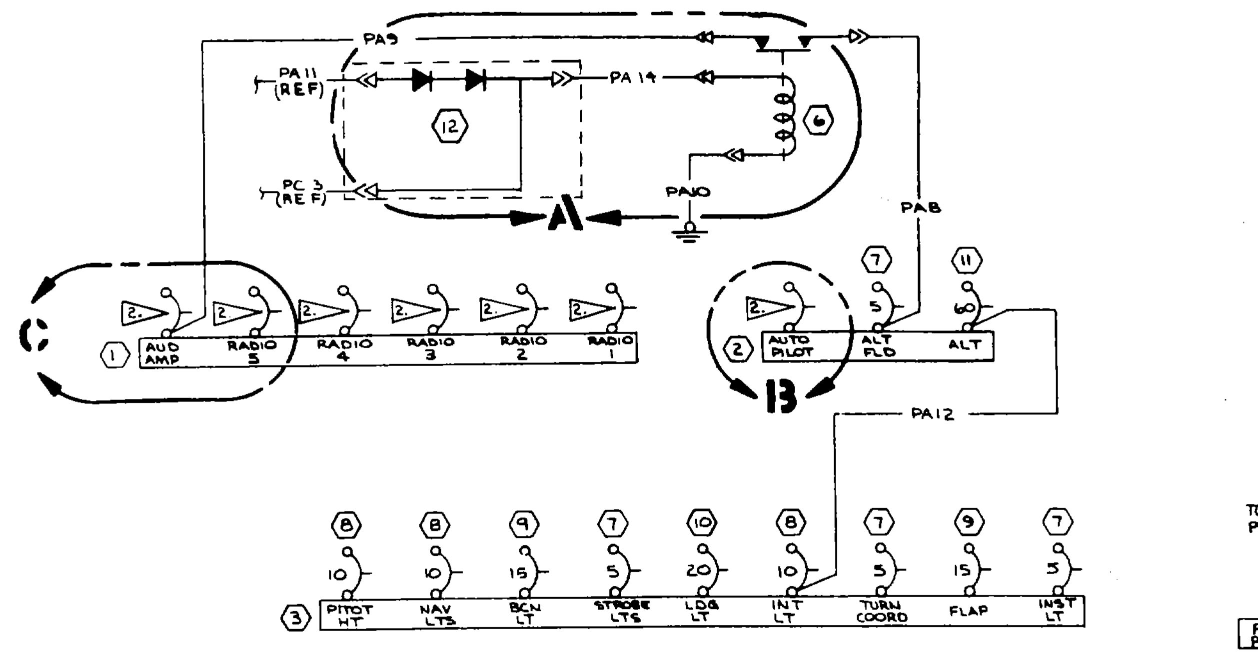
SIZE	CODE IDENT. NO.	DWG NO
C	71379	0570101

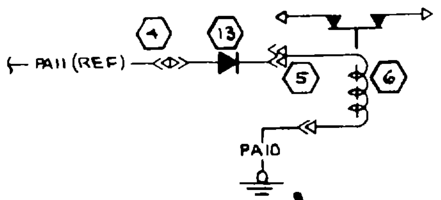
SCALE: NONE (SR7904) PAGE: 4.1.0

FR172

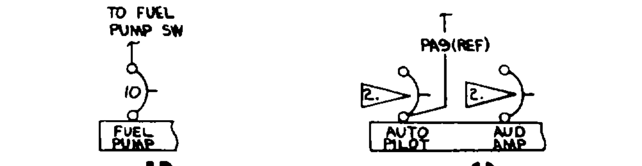
FORM NO. 80-21

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: S-1360-15L WAS S-1360-10L AT BCN LT CKT BKR (SR7905)(SR7901)	BAH 5-13-75	RF
B	BY REV: PA14; 1570043 WAS 0770719-2; DELETE S-2064-1 (SR8259)	RS 5-23-75	RF
C	BY REV: ADD DETAIL "A" S-2023-1, S-2064-1 & 0770719 (SR8259)	RS 6-16-75	
D	BY REV: DELETE NOTE 1 & PART NOS. FROM CKT BKRS REFERED TO BY NOTE 2; ADD NOTE 2 & DETAILS "B" & "C" (SR7904)	TMS 7-23-75	RF





DETAIL A
THRU SER (SR8259)



DETAIL B
(APPLIES TO FR172 ONLY)

DETAIL C
(APPLIES TO FR172 ONLY)

04-231-0905
03-231-0905

NOTES:

1. ~~THIS LOCATION FOR FUEL PUMP CIRCUIT BREAKER ON FR172 ONLY~~

2. VALUE OF THESE CIRCUIT BREAKERS VARY WITH OPTIONAL EQUIPMENT INSTALLED

EQUIPMENT TABLE

ITEM NO.	PART NO.	DESCRIPTION	
13	0770719	DIODE ASSY	
12	1570043	DIODE BOARD ASSY	
11	S-1586-60L	CIRCUIT BREAKER	
10	S-1360-20L	CIRCUIT BREAKER	
9	S-1360-15L	CIRCUIT BREAKER	
8	S-1360-10L	CIRCUIT BREAKER	
7	S-1360-5L	CIRCUIT BREAKER	
6	S-1917-1	RELAY	
5	S-2023-1	ADAPTER	
4	S-2064-1	CONNECTOR	
3	0570419-1	BUS BAR	
2	0570419-2	BUS BAR	
1	0570419-3	BUS BAR	

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX-CESSNA SPEC. NO.
S-XXX OR CMXXXX-CESSNA STD. NO.

SUPERSEDES: 0500062 P 4.8.1

SUPERSEDED BY:

WIRE TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
PA14	18			S-1493-1	S-1493-1		SER (SR8259) & ON
PA12	8		6	S-1367-4-6	S-1367-4-10		
PA10	18		2	S-1493-1	S-1367-1-6		
PA9	12		22	S-1493-3	S-1367-3-6		
PA8	12		16	S-1493-3	S-1367-3-8		

CONTRACT NO:

	NAME	DATE
DESIGN	G STAMM	12-4-74
GROUP	B. HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R FIFE	1-4-75
APPD		
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — BUS BAR, PRIMARY, ALTERNATOR & ELECTRONIC

SIZE	CODE IDENT. NO.	DWG NO
C	71379	0570101

SCALE: NONE (SR7905) (SR7904) PAGE: 4.3.0

172, F172, FR172

FORM NO. 80-3158

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD DETAIL "A" (SR7904)	TMS 3-10-75	JCY RF
B	BY REV: F WAS A+ & A+ WAS F (NOW SHOP PRACTICE)	RJP 10-8-75	JCY RF

NOTES:

1. OBSERVE POLARITY SYMBOL ON DIODE WHEN INSTALLING ON SWITCH TO AVOID DIODE FAILURE

2. AMP TERM 42281-2 ON CONDUCTOR, AMP TERM 2-323931-2 ON SHIELD & GND WIRE

04-231-0905
03-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
PB16	8	S-1562-8-9		S-1493-3	S-1367-4-12		
PB15	18S			S-1367-1-10 S-1367-2-10	<2		
PB14	18S			S-1367-1-10 S-1367-2-10	<2		
PB13	8S	S-1534-8-9		S-1645-2 S-1367-3-10	S-1367-4-10		
PB12	18		4	S-1367-1-8	S-1493-1		
PB11	16		4	S-1367-2-12	<2		
PB10	8	S-1562-8-9	53	S-1493-3	S-1367-4-12		
PB9	18S		54	S-1367-1-10 S-1367-2-10	<2		
PB8	18S		54	S-1367-1-10 S-1367-2-10	<2		
PB7	18S		35	S-1493-1	S-1656-2 S-1656-2		
PB6	18S		3	S-1367-1-6 S-1367-1-8	<2		
PB4	8S	S-1534-8-9		S-1645-2 S-1367-3-10	S-1367-4-10		
PB3	22		34	S-1635-1	42281-2		
PB1	22		6	S-1367-1-6	S-1635-1		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
16	S-2135-1	LIGHT ASSY	
15	S-1360-5L	CIRCUIT BREAKER	
13	S-1596-60L	CIRCUIT BREAKER	
12	S-1637-2	HOUSING	
11	S-1637-1	HOUSING	
10	TVA-1315	CAPACITOR	
9	C593001-0101	OVERVOLTAGE SENSOR	
8	S-1994-1-1	SWITCH	
7	0770719-2	DIODE ASSY	
4	0770038-2	FILTER	
3	C611501-0102	ALTERNATOR ASSY	
2	C6AB-10A730A	HOUSING	
1	C611001-0201	REGULATOR	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: P 4.11.1
0500062 P 4.14.1

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G STAMM	12-11-74
GROUP	B. HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R FIFE	1-4-75
APPD	JRS	
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

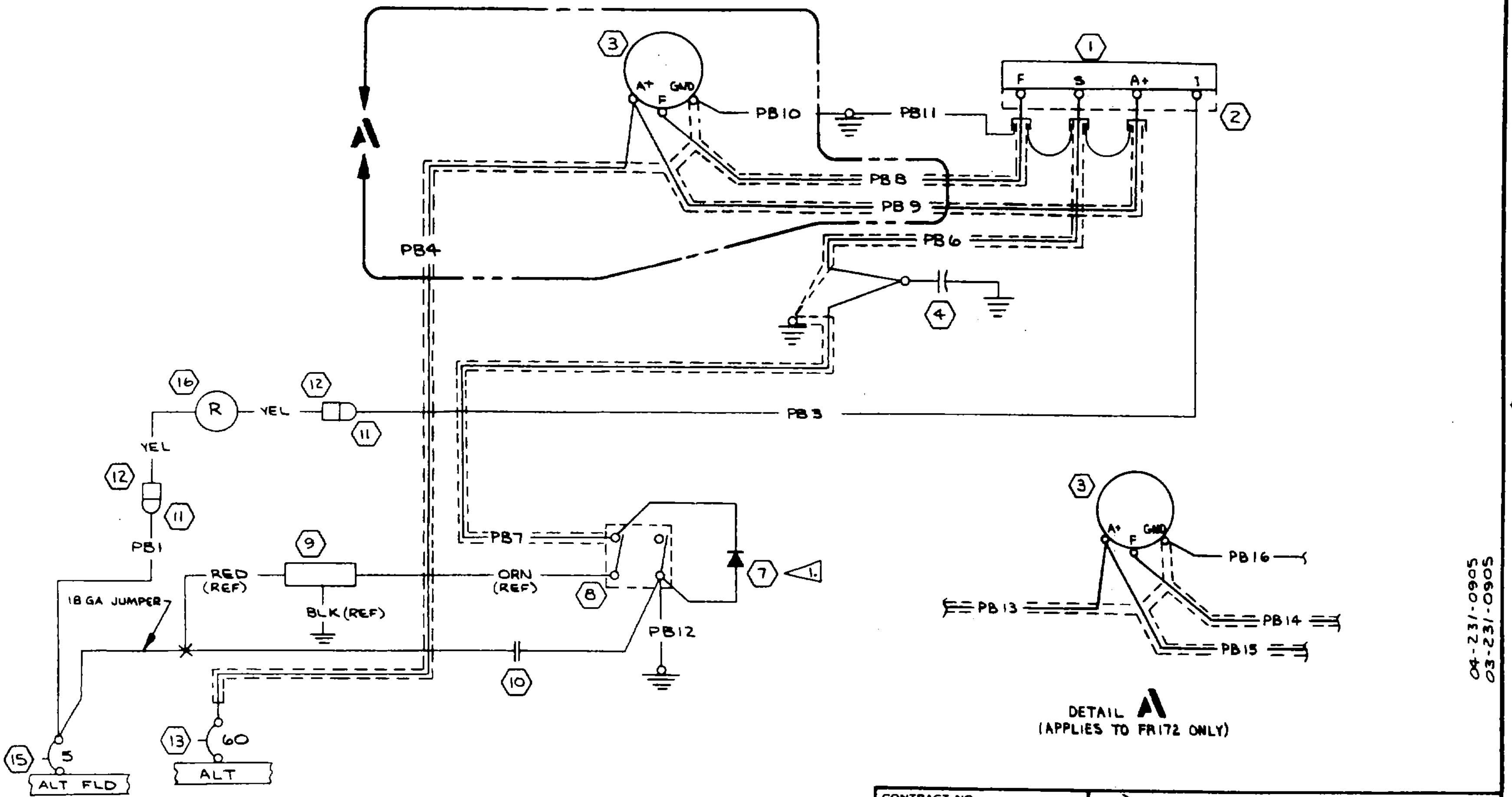
TITLE
WIRING DIAGRAM — ALTERNATOR SYSTEM, 60 AMP

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | (SR7903) (SR7904) | PAGE: 4.4.0

FORM NO. 80-2158

REVISION			
LET	DESCRIPTION	DATE	APPD
B	FOR REVISION SEE PAGE 4.4.0		



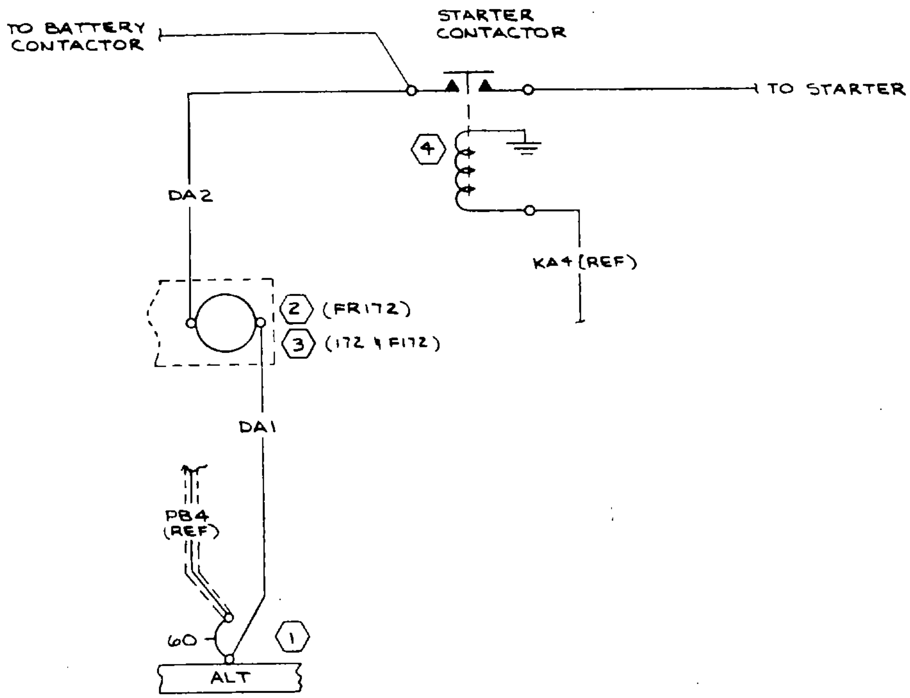
CONTRACT NO.		
	NAME	DATE
DESIGN	G. STAMM	12-11-74
GROUP	B HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-5-75
APPD		
OTHER		

Cessna AIRCRAFT CO.
PAWNEE DIVISION
5800 E. PAWNEE
WICHITA, KANSAS

TITLE WIRING DIAGRAM— ALTERNATOR SYSTEM, 60 AMP

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0570101
SCALE: NONE	(SR7503)(SR7504)	PAGE: 4.4.1

LET	DESCRIPTION	DATE	APPD
REVISION			



04-231-0905
03-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
DA2	8		64	S-1367-4-10	S-1367-4-10		
DA1	8		15	S-1367-4-10	S-1367-4-10		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
4	S-1991-1	CONTACTOR
3	S-1320-5	INDICATOR
2	C669514-0101	INST CLUSTER
1	S-1596-60L	CIRCUIT BREAKER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P 4.15 P 4.16
SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	12-11-74
GROUP		
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD		
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

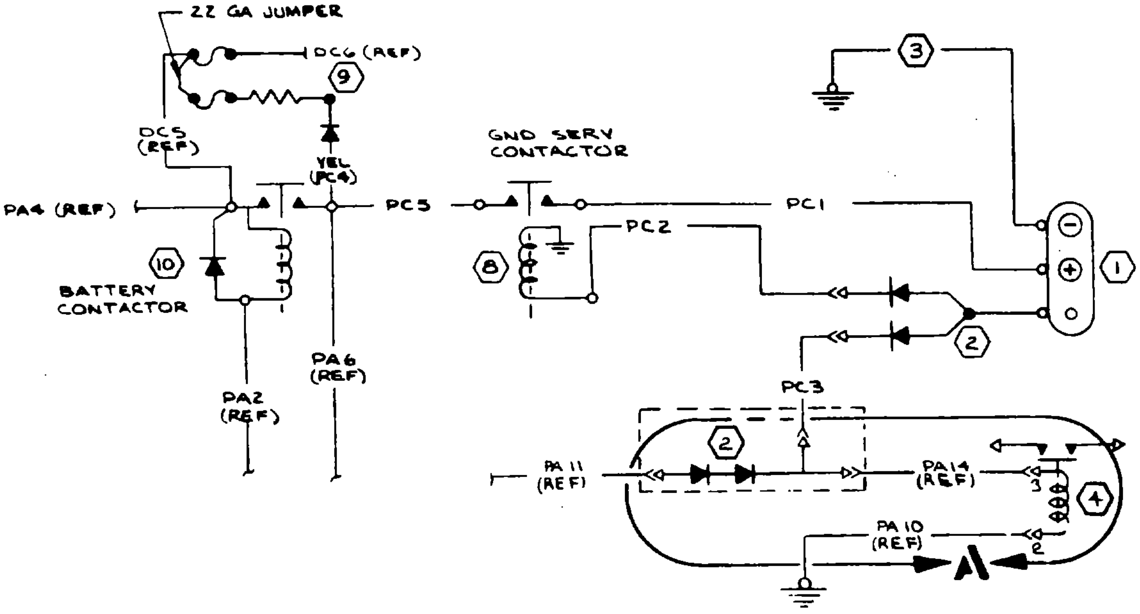
TITLE
WIRING DIAGRAM — AMMETER

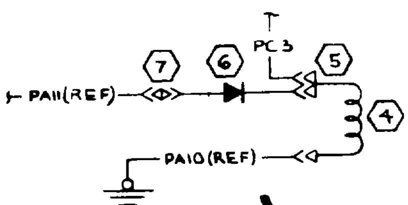
SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101
SCALE: NONE | (SR7903) (SR7904) | PAGE: 4.5.0

172, F172, FR172

FORM NO. 50-2188

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV. ADD PA14(REF): DELETE : 2064-1 1570043 WAS 0770719-2 (SRB259)	RS 5-28-75	
B	BY REV: ADD DETAIL "A" (SRB259)	6-16-75 RS	





DETAIL A
THRU SER (SRB259)

PC5	2		16	S-1367-7-13	S-1367-7-13		
YEL PC4	18	-18-4	18	S-1367-1-13	SOLDER		
PC3	18		66	S-1493-1	S-1493-1		
PC2	18		12	S-1493-1	S-1367-1-10		
PC1	2		12	S-1367-7-14	S-1367-7-13		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

10	S-1579-2	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-1917-1	RELAY
3	0312155	GROUND STRAP
2	1570043	DIODE ASSY
1	AN2552-3A	RECEPTACLE
ITEM NO.	PART NO.	DESCRIPTION

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P 4.4.1

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	12-74
GROUP	B. HARDEN	1-2-75
DRAWN	MERRICK	10-29-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ		
APPD		
OTHER		

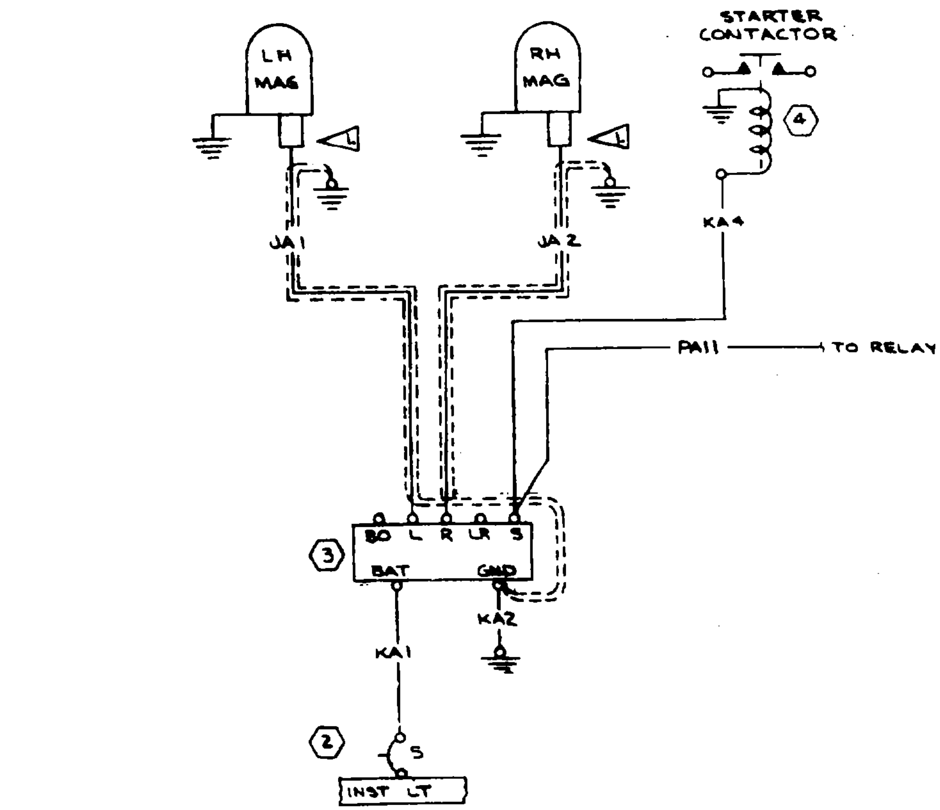
Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — GROUND SERVICE RECEPTACLE (OPT)

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | (SR7903) | PAGE: 4.2.0

172 & F172



NOTES:

1. ADD S-1488-1 NIPPLES TO MAG END OF WIRES

REVISION			
LET	DESCRIPTION	DATE	APPD

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
PA11	18		8	S-1367-1-6	S-1493-1		
JA2	18S		50	S-1367-1-6	[illegible]		
JA1	18S		45	S-1367-1-6	[illegible]		
KA4	18		52	S-1367-1-6	S-1367-1-10		
KA2	18		8	S-1367-1-6	S-1367-1-8		
KA1	22		16	S-1367-1-6	S-1367-1-6		

WIRE TABLE

	PART NO.	DESCRIPTION
4	S-1991-1	CONTACTOR
3	C292501-0105	IGNITION SWITCH
2	S-1360-5L	CIRCUIT BREAKER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-1000I-CESSNA SPEC. NO. S-1001 OR CM0000-CESSNA STD. NO.

SUPERSEDES: 0500062 P 5.1.1

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G STAMM	10-11-74
GROUP	B. LIARDON	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. TOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1 4 75
APPD		
OTHER		

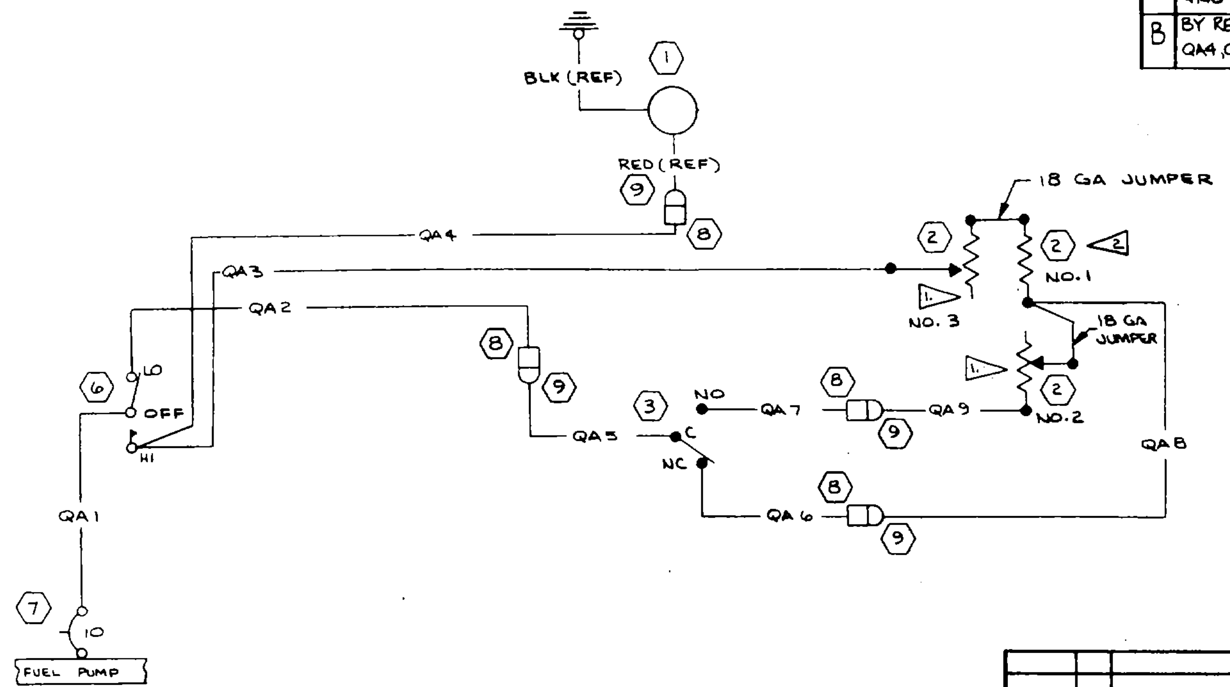
Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE WIRING DIAGRAM — MAGNETO SYSTEM

SIZE	CODE IDENT. NO.	DWG NO
C	71379	0570101

SCALE: NONE (SR7903) (SR7904) PAGE: 5.1.0

172, F172, FR172



REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: C291504-0101 WAS 4140-001 (SR7904)	BLA 1-28-75	
B	BY REV: REWRITE NOTE 1; RELOCATE QA4, QA3 & QA2 AT SWITCH	BAH 3-7-75	MTM

04-231-0905

NOTES:

1. ENGINE NOT RUNNING. ASSURE THAT THROTTLE OPERATED SWITCH IS RIGGED PER 1550005 WITH 14.25 ± .25 VDC. EXTERNAL POWER APPLIED, THROTTLE IN OPEN POSITION, MIXTURE CONTROL IN FULL RICH POSITION, TURN MASTER SWITCH ON. PLACE AUXILIARY FUEL PUMP SWITCH IN LOW POSITION. ADJUST NO. 3 RESISTOR FOR 6 TO 6.5 GAL/HR FUEL FLOW. WITH THROTTLE SET AT POSITION WHICH REPRESENTS 18 INCHES OF MANIFOLD PRESSURE AND WITH THE THROTTLE ACTUATED SWITCH IN THE "N.O." POSITION, ADJUST NO. 2 RESISTOR FOR 2 GAL/HR FUEL FLOW

2. REMOVE WIPER FROM THIS RESISTOR

WIRE TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
QA9	18		30	S-1636-1	SOLDER		
QA8			30	S-1636-1	SOLDER		
QA7			16	S-1635-1	SOLDER		
QA6			16	S-1635-1	SOLDER		
QA5			16	S-1636-1	SOLDER		
QA4			46	S-1367-1-6	S-1635-1		
QA3			45	S-1367-1-6	SOLDER		
QA2			47	S-1367-1-6	S-1635-1		
QA1	18		10	S-1367-1-6	S-1367-1-6		

EQUIPMENT TABLE

ITEM NO.	PART NO.	DESCRIPTION
9	S-1637-1	HOUSING
8	S-1637-2	HOUSING
7	S-1360-10L	CIRCUIT BREAKER
6	MS35058-31	SWITCH
3	S-1856-1	SWITCH
2	AMOR20-1.5	RESISTOR
1	C291504-0101	FUEL PUMP

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P 7.2.2

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	11-1-74
GROUP	B. HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD		
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — FUEL PUMP

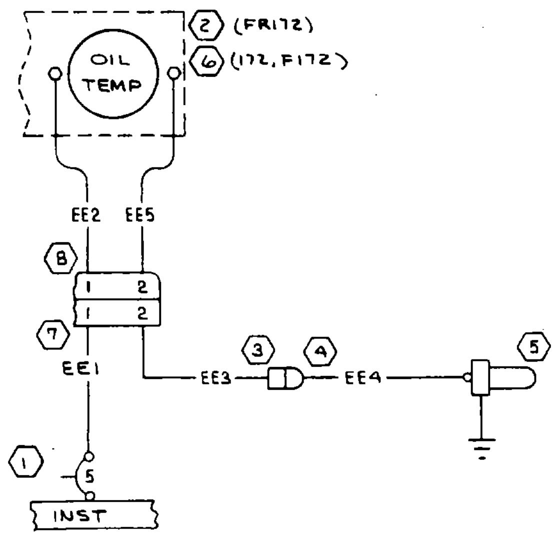
SIZE: C | CODE IDENT. NO.: 71379 | DWG NO: 0570101

SCALE: NONE | (SR7904) | PAGE: 7.1.0

FORM NO. 80-2155

FR172

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: C669512-0102 WAS C669511-0102; (SR7904)	BLA 1-22-75	
B	BY REV: DELETE EE2 (SR7903)(REF)(SR7904)(REF)	RJP 6-6-75	
C	BY REV: ADD EE2, EE5, S-1640-9 & S-1641-9; S-1636-1 WAS SOLDER/EE1 & EE3, S-1360-5L WAS S-1360-10L, S-1367-1-10 WAS SOLDER/EE5 & EE1, C669512-0109 WAS C669512-0101 (NOW SHOP PRACTICE)	RJP 10-8-75	



04-231-0905
03-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS	TERMINALS		SERIALS
EE5	20			S-1635-1	S-1367-1-10		
EE4	20			S-1635-1	S-1367-1-10		
EE3	20			S-1636-1	S-1636-1		
EE2	20			S-1635-1	S-1367-1-8		
EE1	20			S-1636-1	S-1367-1-8		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
8	S-1640-9	CONNECTOR	
7	S-1641-9	CONNECTOR	
6	C669512-0103	INST CLUSTER	
5	S-1630-1	SENDING UNIT	
4	S-1637-1	HOUSING	
3	S-1637-2	HOUSING	
2	C669512-0102	INST CLUSTER	
1	S-1360-5L	CIRCUIT BREAKER	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G STAMM	1-2-75
GROUP	B. HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUBL	12-6-74
STRESS		
PROJ	C. FIFE	1-4-75
APPD		
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

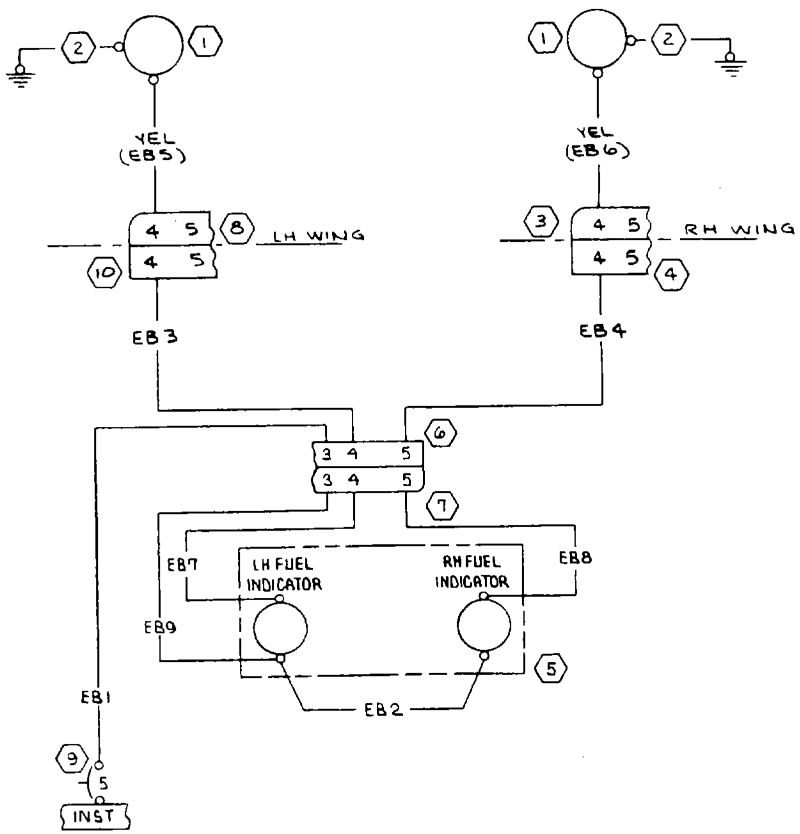
TITLE WIRING DIAGRAM — OIL TEMPERATURE

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | (SR7903)(SR7904) | PAGE: 7.2.0

FORM NO. 60-2188

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD EB7, EB8, EB9, S-1690-9 & S-1691-9; S-1690-6 WAS S-1640-1, S-1636-1 WAS S-1367-1-10/EB1. S-1636-1 WAS S-1367-1-10/EB3 & S-1636-1 WAS S-1367-1-10/EB9 (NOW SHOP PRACTICE)	RJP 10-8-75	JRB RF



04-231-0905
03-231-0905

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		
YEL EB6	22	-18-4	58	S-1635-1	S-1367-1-10		
YEL EB5		-18-4	38	S-1635-1	S-1367-1-10		
EB4			82	S-1636-1	S-1636-1		
EB3			45	S-1636-1	S-1636-1		
EB2			3	S-1367-1-10	S-1367-1-10		
EB1	22		16	S-1367-1-6	S-1636-1		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

10	S-1641-6	HOUSING
9	S-1360-5L	CIRCUIT BREAKER
8	S-1640-6	HOUSING
7	S-1690-9	CONNECTOR
6	S-1691-9	CONNECTOR
5	C669511-0102	INST CLUSTER
4	S-1641-6	HOUSING
3	S-1640-6	HOUSING
2	0413247	STRAP-GND
1	0523557-1	XMTR-FUEL GAGE
ITEM NO.	PART NO.	DESCRIPTION

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P 8.1.2 P 8.1.3

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	11-74
GROUP	B. HARDEN	1-3-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD	JRS	
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — FUEL GAGE & TRANSMITTER

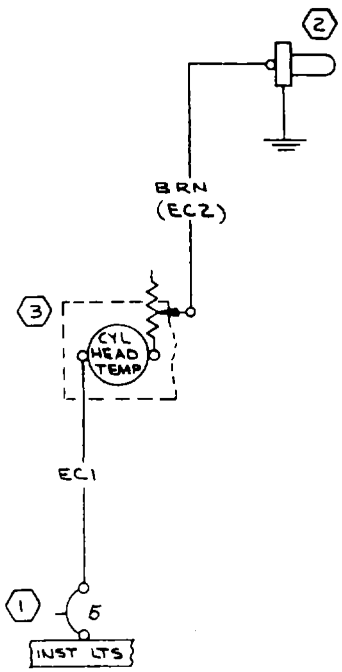
SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE (SR1903) (SR1904) PAGE: 8.1.0

FORM NO. 80-2158

172, F172, FR172

LET	DESCRIPTION	DATE	APPD
A	BY REV: S1360-5L WAS S1360-10L, HT1921 IN NOTE 1 WAS HT1719-C (SR7904)(REF)	J.M.S. 10-8-75	



04-231-0905

NOTES:

1. CRIMP S-1636-5 TERMINAL AROUND WIRE INSULATION, BEND .25 OF STRIPPED WIRE BACK OVER CRIMP & SOLDER PER CES 1040. USE MOLEX HT-1921 CRIMPING TOOL ONLY

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
BRN EC2	18	-18-4		S-1367-1-8	S-1636-5	1	
EC1	18			S-1367-1-8	S-1367-1-8		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
3	C669514-0101	INST CLUSTER
2	S-1372-2	TEMP BULB
1	S-1360-5L	CIRCUIT BREAKER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P 8.4
SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G STAMM	1-2-75
GROUP	D. HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R FIFE	1-4-75
APPD		
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE WIRING DIAGRAM — CYLINDER HEAD TEMP

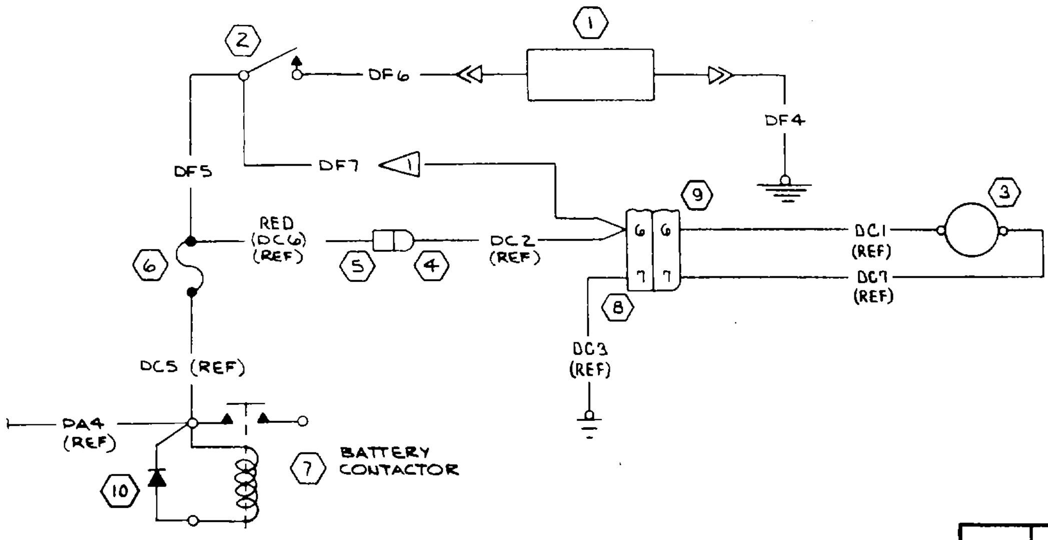
SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | (SR7904) | PAGE: 8.3.0

FORM NO. 80-2158

FR172

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD S-1640-9, S-1641-9, DC1 (REF) & DC7 (REF); S-1636-2 WAS S-1367-1-6 / DF 7; ADD 0770728-1 (NOW SHOP PRACTICE)	RJP 10-8-75	



04-231-0905

NOTES

1. WHEN OPTIONAL CLOCK IS INSTALLED, DF5 WIRE IS OMITTED & DF7 WIRE IS USED

ITEM NO.	PART NO.	DESCRIPTION	
10	0770728-1	DIODE ASSY	
9	S-1640-9	CONNECTOR	
8	S-1641-9	CONNECTOR	
7	S-1579-2	CONTACTOR	
6	S-1091-1	FUSE	
5	S-1637-2	HOUSING	
4	S-1637-1	HOUSING	
3	S-1317NZ	CLOCK	
2	S-1711-1	SWITCH-OIL PRESS	
1	C664502-0101	HOURMETER	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
DF7	22			S-1367-1-6	S-1636-2		
DF6	22			S-1493-1	S-1367-1-8		
DF5	22			S-1367-1-6	SOLDER		
DF4	22		32	S-1493-1	S-1367-1-6		

WIRE TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 Pg. 8.3

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	12-11-74
GROUP	B HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD		
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — HOURMETER (OPT)

SIZE	CODE IDENT. NO.	DWG NO
C	71379	0570101

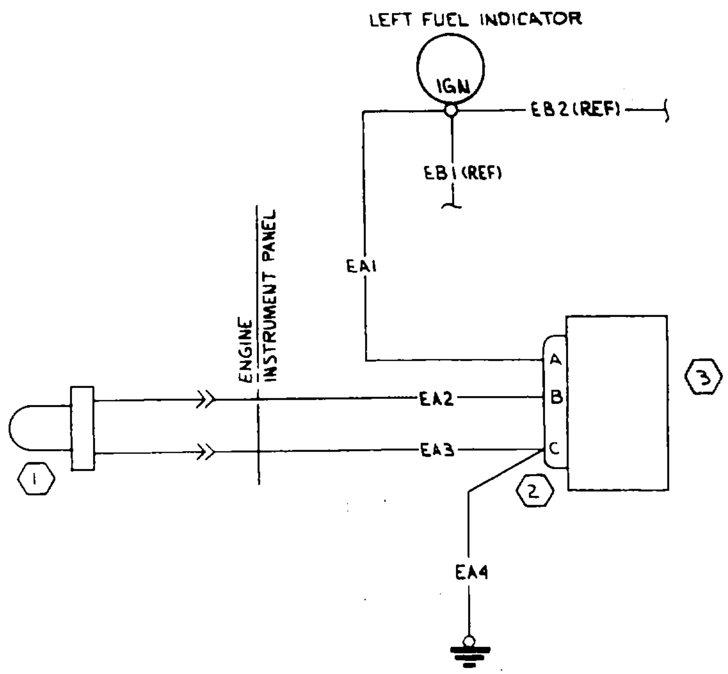
SCALE: NONE (SR7904) PAGE: 8.4.0

FR172

FORM NO. 80-2155

MODEL APPLICATION		
MODEL	BEGIN	END
172	SR7903	
F172	SR7904	

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD EA4 TO S-1311-3 (SR7903)(REF)(SR7904)(REF)	JMS 10-13-75	



03-231-0905 04-231-0905

NOTES:

1. TERMINALS ARE YZ14-H AND FURNISHED BY VENDOR (09922)

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
EA4	18			SOLDER	S-1367-1-8		
EA3	18			SOLDER	1		
EA2	18			SOLDER	1		
EA1	18			SOLDER	S-1367-1-10		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
3	S-1311-3	INDICATOR
2	MS3106A-14S-7S	PLUG
1	0550209-1	PROBE-CARB AIR TEMP

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 PG. 8.2

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G STAMM	8-4-75
GROUP	W. H. Vanden	8-27-75
DRAWN	WHITSON	7-31-75
CHECK	Yousl	7-31-75
STRESS		
PROJ	Fife	8-25-75
APPD		
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE

WIRING DIAGRAM — CARBURETOR AIR TEMPERATURE GAUGE

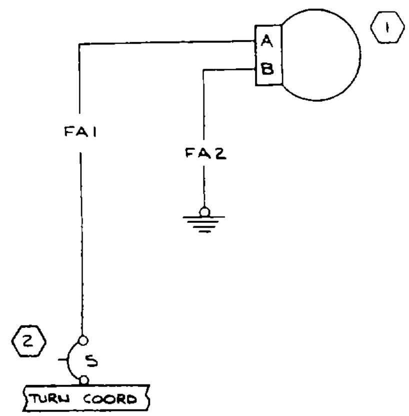
SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | PAGE: 8.5

(SR7903)(REF)(SR7904)(REF)

FORM NO. 80-2155

REVISION			
LET	DESCRIPTION	DATE	APPD



04-231-0905
03-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
FA2	18		12	S-1367-1-8	SOLDER		
FA1	22		10	S-1367-1-6	SOLDER		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
2	S-1360-5L	CIRCUIT BREAKER	
1	C661003-0501	TURN COORDINATOR	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P 9.3

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	[illegible]
GROUP	D. HARDEN	1-2-75
DRAWN	MERRICK	10-9-74
CHECK	J. TOBEL	12-6-74
STRESS		
PROJ	R. FIFE	1-5-75
APPD	[illegible]	
OTHER		

Cessna. AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — TURN COORDINATOR

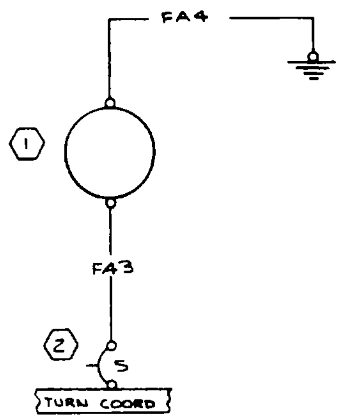
SIZE	CODE IDENT. NO.	DWG NO
C	71379	0570101

SCALE: NONE (SR1903) (SR1904) PAGE: 9.1.0

172, F172, FR172

FORM NO. 80-2156

REVISION			
LET	DESCRIPTION	DATE	APPD



04-231-0905
03-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
FA4	18		12	S-1367-1-8	S-1367-1-8		
FA3	22		10	S-1367-1-6	S-1367-1-8		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
2	S-1360-5L	CIRCUIT BREAKER	
1	S-1413-2	TURN & BANK IND	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P 9.4

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G STAMM	12-11-74
GROUP	B HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J YOUEL	12-6-74
STRESS		
PROJ	R FIFE	1-5-75
APPD	JBG EDH	
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE

WIRING DIAGRAM — TURN & BANK INDICATOR (OPT)

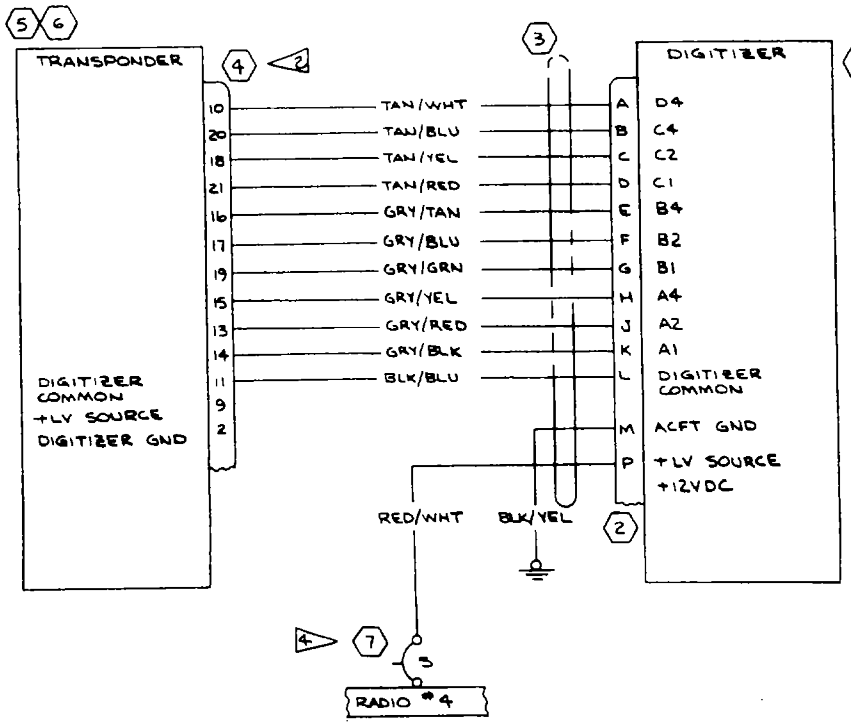
SIZE	CODE IDENT. NO.	DWG NO
C	71379	0570101

SCALE: NONE (SR7902) (SR7904) PAGE: 9.2.0

172, F172, FR172

FORM NO. 50-2100

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD FR172 REQUIREMENTS (SR7904)	TMS 1-27-75	
B	BY REV: ADD RT-459A (SR8335)	DLP 12-15-75	



04-231-0905
03-231-0905

NOTES:

1. FOR WIRE & WIRE TERMINALS REFER TO 1270625 PAGE 9.7
2. TRANSPONDER CONNECTOR HOUSING IS PART OF TRANSPONDER CABLE ASSY
3. FOR WIRING DIAGRAM OF 300 & 400 TRANSPONDER REFER TO 3920143
4. ATTACH BOTH TRANSPONDER AND ENCODING ALTIMETER TO THE NO. 4 CIRCUIT BREAKER

EQUIPMENT TABLE

ITEM NO.	PART NO.	DESCRIPTION
7	S-1360-5L	CIRCUIT BREAKER
6	RT-459A	TRANSPONDER
5	RT-359A	TRANSPONDER
4	S-2189-1	CONNECTOR
3	1570312-3	CABLE ASSY
2	42816	CONNECTOR
1	EA-401A	ALT DIGITIZER

WIRE TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		SERIALS

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P 9.6

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G STAMM	11-8-74
GROUP	B HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R FIFE	1-5-75
APPD		
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE WIRING DIAGRAM — ENCODING ALTIMETER (OPT)

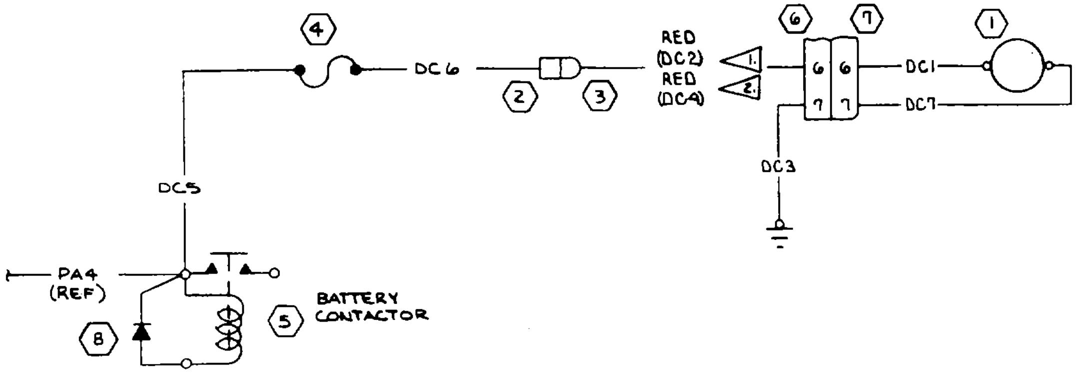
SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE (SR7904)(SR7304) PAGE: 9.3.0

FORM NO. 80-3186

172, FR172

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD DC1, DC7, S-1640-9, S-1641-9, S-1636-2 WAS S-1367-1-8/DC2 & DC4, S-1636-1 WAS S-1367-1-8/DC3, C664508-0101 WAS S-1317N2; ADD 0770728-1 (NOW SHOP PRACTICE)	RJP 10-8-75	XY JRS RF



04-231-0905
03-231-0905

NOTES:

1. APPLIES TO FR172 ONLY
2. APPLIES TO 172 & F172 ONLY

8	0770728-1	DIODE ASSY	
7	S-1640-9	CONNECTOR	
6	S-1641-9	CONNECTOR	
5	S-1579-2	CONTACTOR	
4	S-1091-1	FUSE	
3	S-1637-1	HOUSING	
2	S-1637-2	HOUSING	
1	C664508-0101	CLOCK	
ITEM NO.	PART NO.	DESCRIPTION	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
RED (DC6)	22	-22-2		SOLDER	S-1636-1		
BRN (DC5)	22	-22-4	10	S-1367-1-10	SOLDER		
RED (DC4)	22	-22-2	76	S-1635-1	S-1636-2		
DC3	22		18	S-1636-1	S-1367-1-6		
DC7	22			S-1367-1-8	S-1635-1		
RED (DC2)	22	-22-2	150	S-1635-1	S-1636-2		
DC1	22			S-1635-1	S-1367-1-8		

WIRE TABLE

CONTRACT NO:

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

	NAME	DATE
DESIGN	G. STAMM	12-11-74
GROUP	B. HARDEN	1-2-75
DRAWN	MERRICK	10-3-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD	JRS	
OTHER		

TITLE WIRING DIAGRAM — CLOCK (OPT)

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | (9A7503) (9R7504) | PAGE: 10.1.0

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

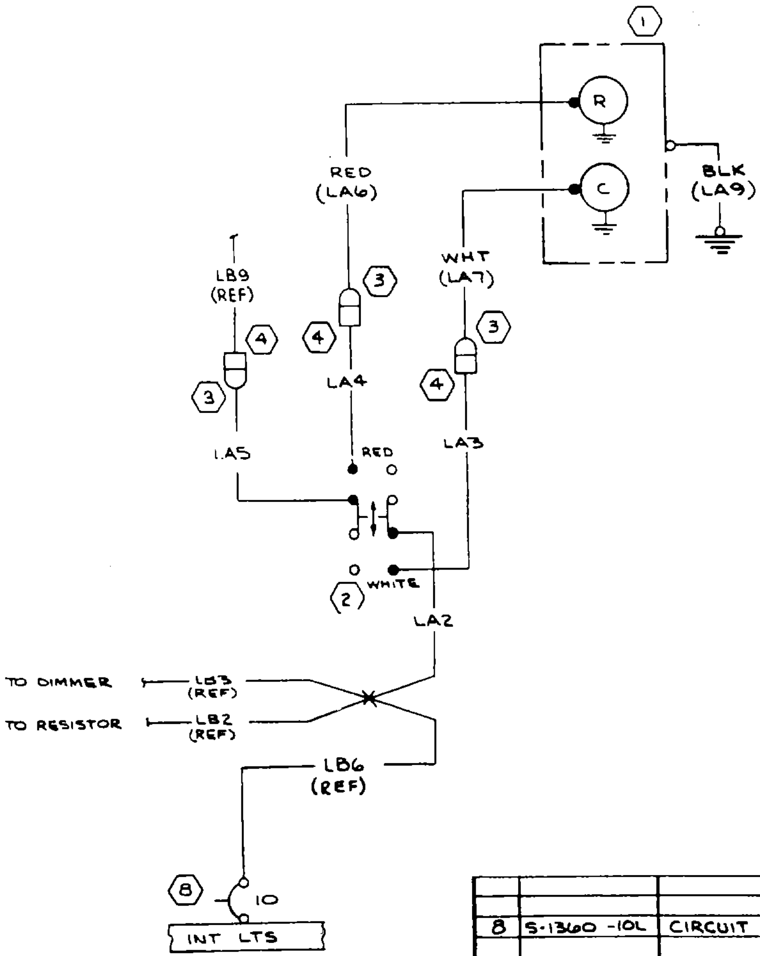
SUPERSEDES: 0500062 P 10.2

SUPERSEDED BY:

FORM NO. 50-2199

172, F172, FR172

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: DELETE: S-1640-6, S-1691-6, LA8, & LB11(REF); ADD LB9(REF) (NOW SHOP PRACTICE)	RJP 10-8-75	JRS RF



04-231-0905
03-231-0905

BLK (LA9)	18	-18-0	12	S-1367-1-10	S-1367-1-8		
WHT (LA7)	18	-18-9	10	S-1635-2	SOLDER		
RED (LA6)	↑	-18-2	10	S-1635-2	SOLDER		
LA5			8	SOLDER	S-1635-1		
LA4			6	SOLDER	S-1636-1		
LA3	↓		7	SOLDER	S-1636-1		
LA2	18		7	SOLDER	SEE LB6		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

8	S-1360-10L	CIRCUIT BREAKER
4	S-1637-2	HOUSING
3	S-1637-1	HOUSING
2	S-1501-1	SWITCH
1	1470089-14	LIGHT ASSY
ITEM NO.	PART NO.	DESCRIPTION

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX-CESSNA SPEC. NO.
S-XXX OR CMXXXX-CESSNA
STD. NO.

SUPERSEDES: 0500062 P11.1.3

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	12-4-74
GROUP	B. HARDEN	1-2-75
DRAWN	MERRICK	10-3-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD	JRS	
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — MAP & AUXILLARY INSTRUMENT LIGHT (OPT)

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | (SR1503) (SR7504) | PAGE: 11.1.0

172, F172, FR172

FORM NO. 80-2150

NOTES:

1. THESE WIRES VENDOR FURNISHED
2. OPTIONAL WITH POST LIGHTS INSTL

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: 34003-55-3410 WAS 34003-55 DELETE 18 GA JUMPER (SR7903)(SR7904)	TMS 2-27-75	[illegible] RS RF
B	BY REV: ADD S-1640-9, S-1641-9 & LB25; LB1 WAS LB14, LB7 WAS LB12, S-1636-1 WAS S-1370-3/LB8, S-1635-2 WAS S-1636-2/LB10, S-1635-1 WAS S-1636-1/LB10, BLU (REF) WAS BRN (REF) & TAN (REF) WAS WHT (REF) DELETE LB11; ADD LAS (REF) (NOW SHOP PRACTICE)	RTP 10-8-75	[illegible] RS

04-231-0905
03-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LB7	20		20	S-1635-1	S-1367-1-10		
LB12	18		4	SOLDER	S-1367-1-10		
LB10	20		76	S-1635-2	S-1635-1		
LB9	20		25	S-1636-1	SEE LB10		
LB8	18			S-1636-1	S-1829-1		
LB25	18			S-1370-3	S-1635-1		
LB1	18			S-1635-1	S-1829-1		
LB5	18		15	SOLDER	S-1636-1		
LB4	18		15	SOLDER	S-1635-1		
LB3	18		5	S-1635-1	SEE LB6		
LB2	18		13	SOLDER	SEE LB6		
LB6	18		5	S-1367-1-6	S-1370-2		

WIRE TABLE

	PART NO.	DESCRIPTION
20	S-1641-9	CONNECTOR
19	S-1640-9	CONNECTOR
18	C669514-0101	INST CLUSTER
17	C669513-0101	INST CLUSTER
16	C669512-0103	INST CLUSTER
15	1270479-12	LIGHT ASSY
14	C669512-0102	INST CLUSTER
13	C669511-0102	INST CLUSTER
12	0511481	INST LT
11	0713068	COMPASS LT
10	S-1640-6	HOUSING
9	S-1641-6	HOUSING
8	1570166-1	DIMMING ASSY
7	S-1637-1	HOUSING
6	S-1637-2	HOUSING
5	1270479-10	LIGHT ASSY
4	S2000B270J	RESISTOR
3	S-2091-5	RESISTOR ASSY
2	34003-55-3410	TERMINAL BOARD
1	S-1360-10L	CIRCUIT BREAKER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX=CESSNA SPEC. NO. S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P11.2.4

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	1-2-75
GROUP	B HARDEN	1-3-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD	[illegible]	
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

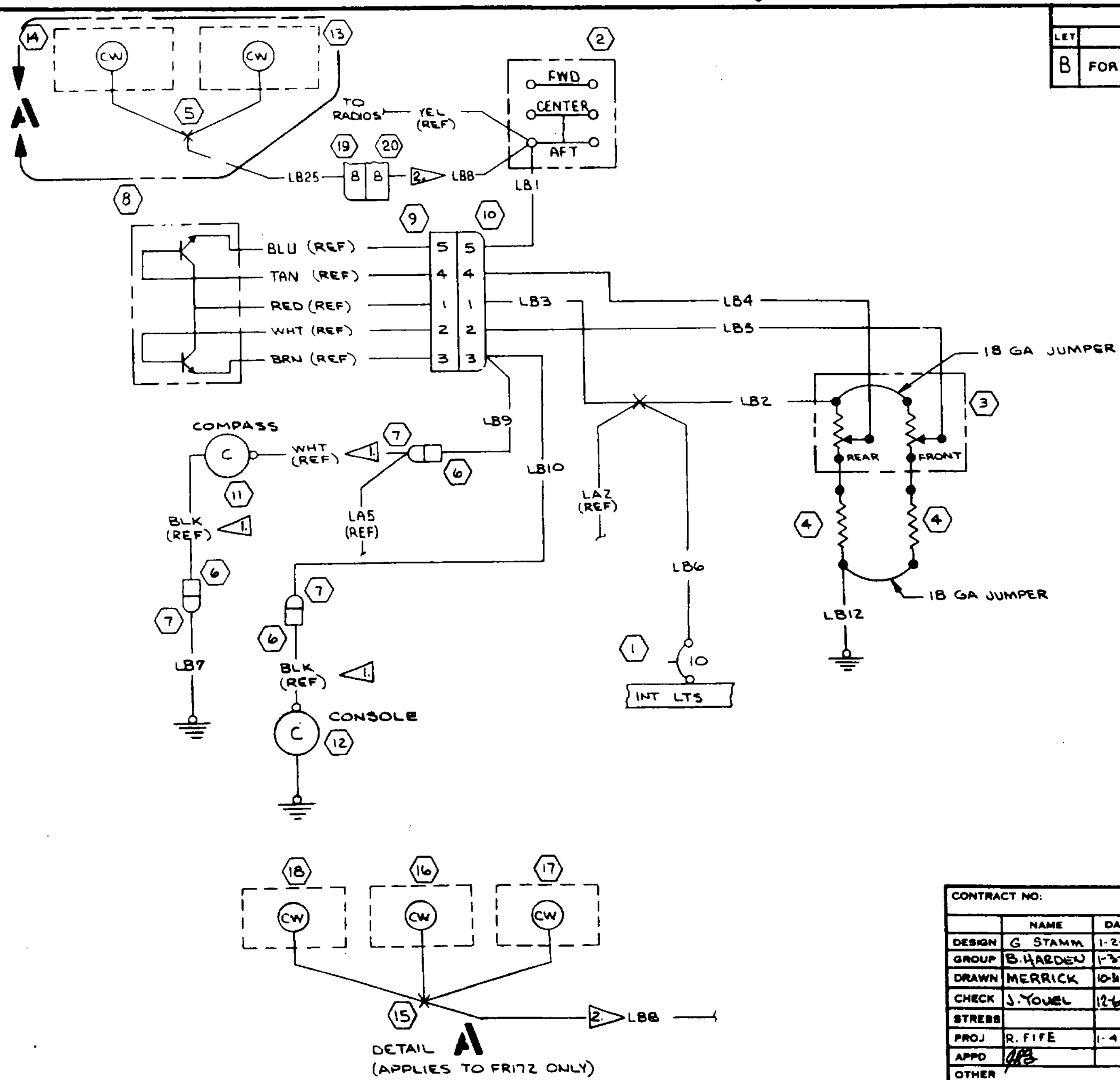
TITLE: WIRING DIAGRAM — COMPASS & INSTRUMENT LIGHTS

SIZE: C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | (SR7903) (SR7904) | PAGE: 11.2.0

FORM NO. 80-3189

172, F172, FR172



REVISION			
LET	DESCRIPTION	DATE	APPD
B	FOR REVISION SEE PAGE 11.2.0		

04-231-0905
03-231-0905

CONTRACT NO:		
	NAME	DATE
DESIGN	G STAMM	1-2-75
GROUP	B. HARDEN	1-3-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD	[illegible]	
OTHER		

Cessna AIRCRAFT CO.
PAWNEE DIVISION
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM–
COMPASS & INSTRUMENT
LIGHTS

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0570101

SCALE: NONE (SA7303) (SR7304) PAGE: 11.2.1

FORM NO. 08-216A

172, F172, FR172

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: DELETE S-1641-6, S-1640-6 & LB11(REF); ADD BLK/LB21 & 23, RED/YEL/LB22 & LB24; 0513454 WAS 0511481 & 1213379 WAS 1213379-9 (NOW SHOP PRACTICE)	RJP 10-8-75	JRS RF

NOTES:

1. SEE PG. 11.2.0 & PG 11.2.1 FOR INSTRUMENT CLUSTER LIGHTS

04-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
RED/YEL	22	-22-2-4		SOLDER	SOLDER		
BLK	22	-22-0		SOLDER			
RED/YEL (LB24)	22	-22-2-4		S-1635-1			
BLK (LB23)	22	-22-0		S-1636-1			
RED/YEL (LB22)	22	-22-2-4		S-1635-1			
BLK (LB21)	22	-22-0		S-1636-1	SOLDER		
LB20	22			S-1635-1	S-1367-1-8		
LB19	22			S-1635-1	S-1367-1-8		
LB18	22			S-1636-2	S-1636-1		
LB17	22			S-1636-1	SEE LB18		
LB16	18			S-1635-2	S-1635-1		
LB15	18			S-1636-1	S-1635-1		
LB14	18			S-1636-1	SOLDER		
LB13	18			S-1636-1	SOLDER		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
9	0513454	INST LT	
8	S-1501-1	SWITCH	
7	S-1641-6	HOUSING	
4	1213379	POST LT ASSY	
3	S-1640-6	HOUSING	
2	S-1637-2	HOUSING	
1	S-1637-1	HOUSING	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P 11.2.5.1 P 11.2.5.0

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	1-2-75
GROUP	B. HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD	JRS	
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — INSTRUMENT PANEL POST LIGHTING (OPT)

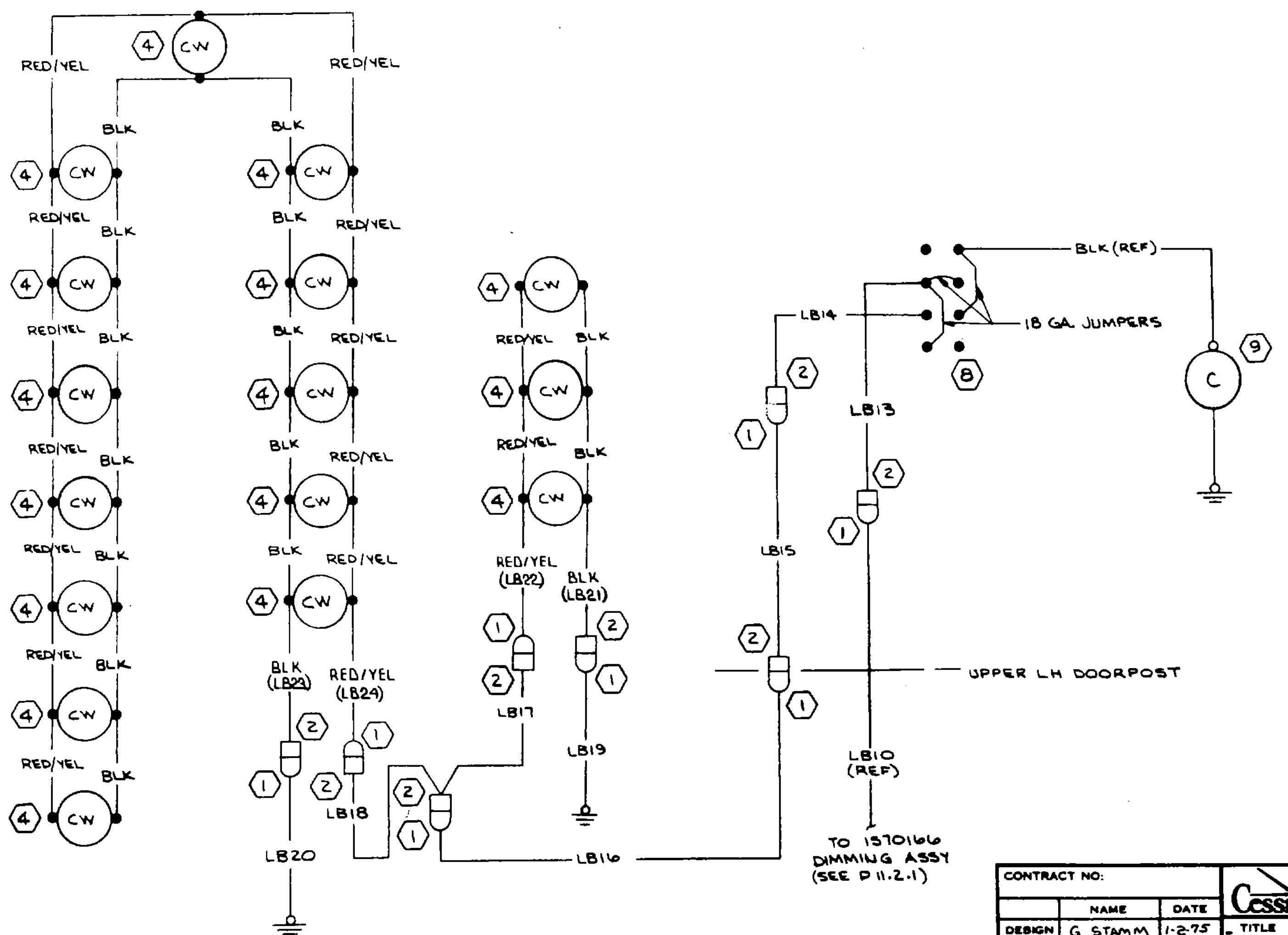
SIZE	CODE IDENT. NO.	DWG NO
C	71379	0570101

SCALE: NONE (SR7904)(SR7903) PAGE: 11.3.0

FORM NO. 80-3150

172, F172, FR172

REVISION			
LET	DESCRIPTION	DATE	APPD
A	SEE P. 11.3.0 FOR REVISIONS		



03-231-0905
04-231-0905

CONTRACT NO:		
	NAME	DATE
DESIGN	G. STAMM	1-2-75
GROUP	B HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-74
APPD		
OTHER		

Cessna AIRCRAFT CO.

PAWNEE DIVISION
5800 E. PAWNEE
WICHITA, KANSAS

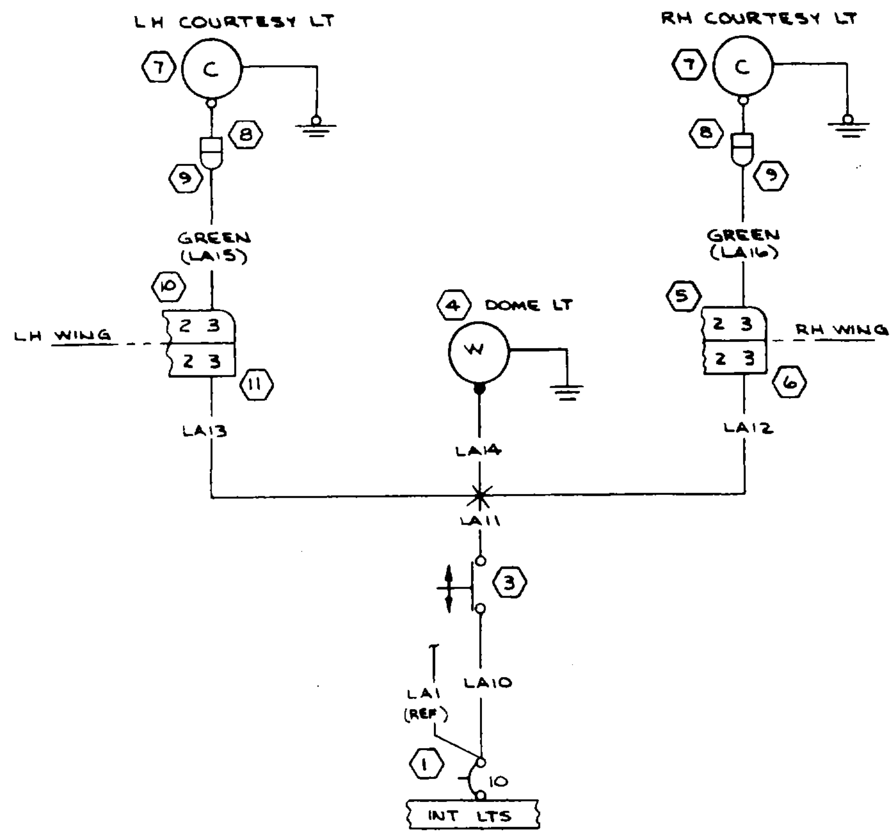
TITLE WIRING DIAGRAM - INSTRUMENT PANEL POST LIGHTING (OPT)

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0570101

SCALE: NONE (SR7904) (SR7903) PAGE: 11.3.1

FORM NO. 88-318A

172, F172, FR172



REVISION			
LET	DESCRIPTION	DATE	APPD

04-231-0905
03-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
GREEN LA16	18	-18-5	117	S-1635-1	S-1635-1		
GREEN LA15	↑	-18-5	117	S-1635-1	S-1635-1		
LA14			6	SOLDER	SEE LA11		
LA13			45	S-1636-1	SEE LA11		
LA12			45	S-1636-1	SEE LA11		
LA11	↓		6	S-1830-1	S-1310-3		
LA10	18		84	S-1830-1	S-1367-6		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
11	S-1641-6	HOUSING	
10	S-1640-6	HOUSING	
9	S-1637-1	HOUSING	
8	S-1637-2	HOUSING	
7	0521101	COURTESY LT	
6	S-1641-9	HOUSING	
5	S-1640-9	HOUSING	
4	0511481	DOME LT ASSY	
3	S-1831-1	SWITCH	
1	S-1360-10L	CIRCUIT BREAKER	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P 11.7.1

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	12-4-74
GROUP	B HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOWELL	12-6-74
STRESS		
PROJ	R FIFE	1-4-75
APPD	GRS -B	
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — DOME & COURTESY LIGHTS

SIZE	CODE IDENT. NO.	DWG NO
C	71379	0570101

SCALE: NONE (SR7303) (SR7306) PAGE: 11.4.0

FORM NO. 80-2158

172, F172, FR172

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: EXCHANGE TAXI LT & LDG LT, TAN(LE2) & GRAY(LC2), LE1 & LC1, LE4 & LC5, (SR7903)(SR7904)	TMS 3-10-75	RF

04-231-0905
03-231-0905

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LC5	12			S-1493-3	S-1367-1-6		
LE4	12			S-1493-3	S-1367-1-6		
BLK/WHT LE3	12	-12-0-9	6	S-1367-3-8	S-1367-3-8		
TAN LE2		-12-8	36	S-1493-3	S-1367-3-8		
LE1			30	S-1493-3	S-1493-3		
BLK/WHT LC4		-12-0-9	28	S-1493-3	S-1367-3-6		
BLK/WHT LC3		-12-0-9	33	S-1367-3-8	S-1493-3		
GRAY LC2		-12-10	32	S-1493-3	S-1367-3-8		
LC1	12		50	S-1493-3	S-1493-3		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
6	S-2160-5	SWITCH
5	4509	LAMP
4	S-2064-1	CONNECTOR
3	S-2160-4	SWITCH
1	S-1360-20L	CIRCUIT BREAKER

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P11.8.3

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	11-1-74
GROUP	B HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD		
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — LANDING & TAXI LIGHT (OPT)

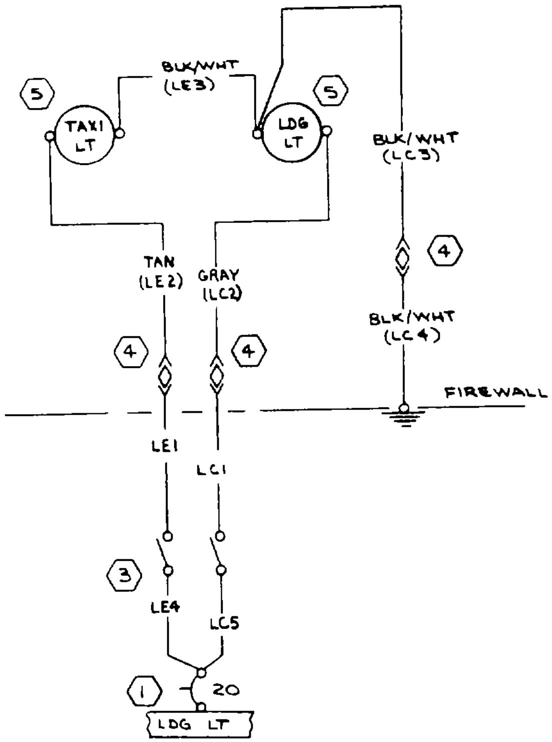
SIZE: C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | (SR7903) (SR7904) | PAGE: 11.5.0

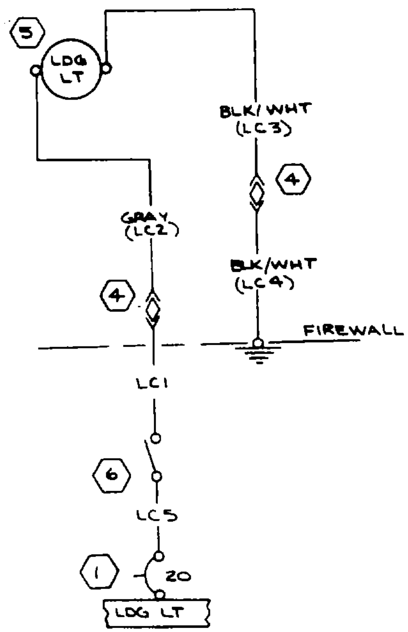
FORM NO. 60-2158

172, F172, FR172

REVISION			
LET	DESCRIPTION	DATE	APPD
A	FOR REVISION SEE SHEET 11.5.0		



APPLICABLE TO F172, FR172 & ALTERNATE OPTION ON 172



APPLICABLE TO 172 ONLY

04-231-0905
03-231-0905

CONTRACT NO:		
	NAME	DATE
DESIGN	G. STAMM	11/1/74
GROUP	B HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R FIFE	1-A-75
APPD	RRJDB	
OTHER		

Cessna AIRCRAFT CO. PAWNEE DIVISION 5800 E. PAWNEE WICHITA, KANSAS

TITLE WIRING DIAGRAM LANDING & TAXI LIGHT (OPT)

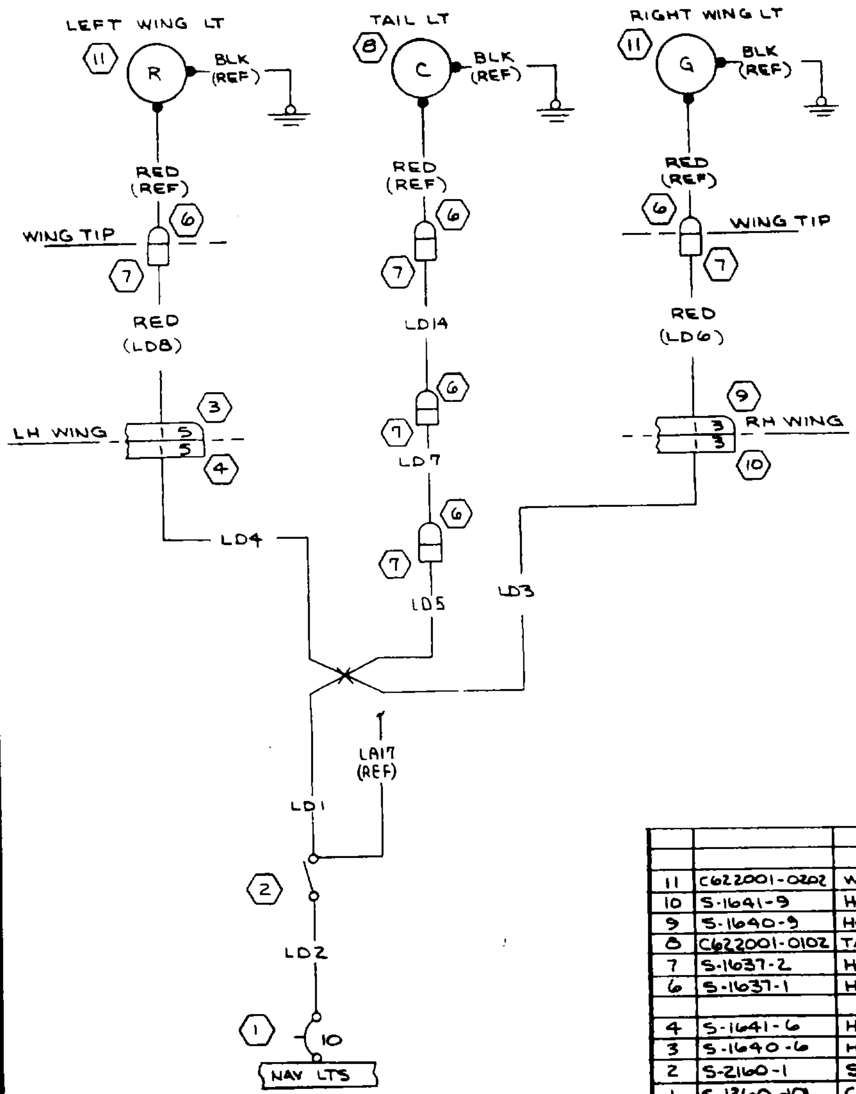
SIZE	CODE IDENT NO.	DWG NO
C	71379	0570101

SCALE NONE (SR7903) (SR7904) PAGE: 11.5.1

FORM NO. 80-316A

172, F172, FR172

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD LD14 & LA17 (REF); S-1635-1 WAS S-1636-1/LD7 & S-1636-1 WAS S-1635-1/LD5 (NOW SHOP PRACTICE)	RJP 10-8-75	RF



11	C622001-0202	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-1360-10L	CIRCUIT BREAKER	
ITEM NO.	PART NO.	DESCRIPTION	

EQUIPMENT TABLE

LD14	18		75	S-1635-1	S-1636-1		
RED LD8	18	-18-2	200	S-1635-1	S-1636-1		
LD7	↑		290	S-1635-1	S-1636-1		
RED LD6		-18-2	200	S-1635-1	S-1636-1		
LD5			18	S-1370-2	S-1636-1		
LD4	↓		40	SEE LD3	S-1636-1		
LD3	18		60	SEE LD3	S-1636-1		
LD2	18			S-1493-1	S-1367-6		
LD1	18		6	S-1493-1	SEE LD3		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P11.9.1

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	10-1-74
GROUP	B. HARDIN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD		
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — NAVIGATION LIGHTS

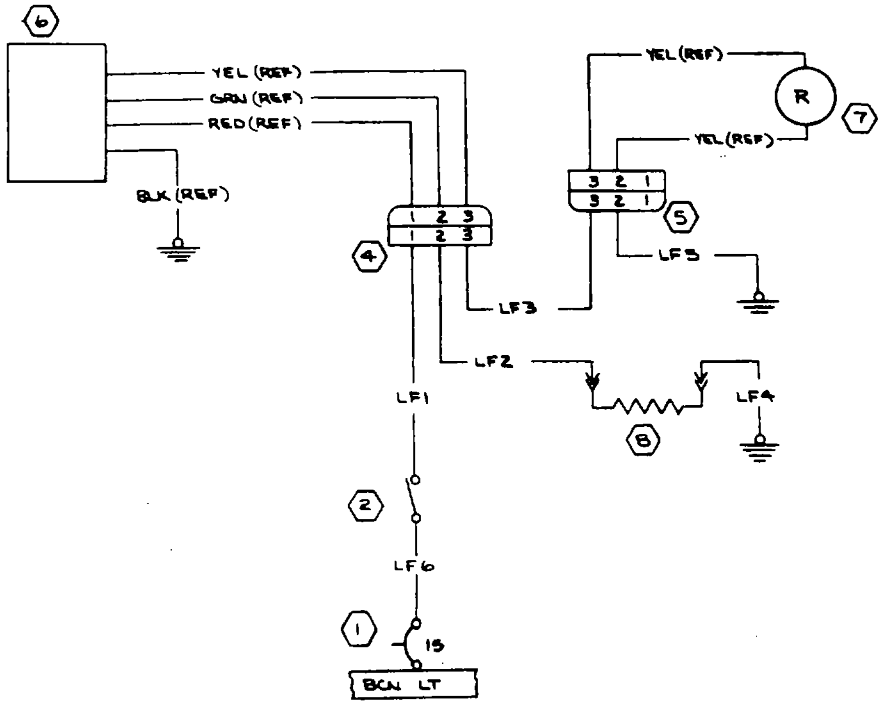
SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | (SR1903) (SR1904) | PAGE: 11.6.0

172, F172, FR172

04-231-0905
03-231-0905

FORM NO. 80-3186



04-231-0905
03-231-0905

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV. S-1367-2-B WAS S-1367-2-6 PER LF4 S-1367-2-6 WAS S-1367-2-B PER LF5 (SR7903) (SR7904)	RS 2-6-75	ARB RF
B	BY REV: S-1360-15L WAS S-1360-10L; LF1 & LF6/16 GA WIRE WAS 18 GA (SR7903)(SR7904)	BAH 5-18-75	RF

WIRE TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LF6	16			S-1493-2	S-1367-2-6		
LF5	18		4	S-1635-2	S-1367-2-6		
LF4	18		8	S-1493-2	S-1367-2-8		
LF3	18		60	S-1635-2	S-1636-2	STD	
LF2	18		8	S-1493-2	S-1636-2		
LF1	16		250	S-1493-2	S-1683-2	STD	

EQUIPMENT TABLE

ITEM NO.	PART NO.	DESCRIPTION
8	OR95-1.5	RESISTOR
7	C621001-0106	LIGHT ASSY
6	C594502-0101	FLASHER ASSY
5	S-1638-2	HOUSING
4	S-1638-1	HOUSING
2	S-2160-1	SWITCH
1	S-1360-15L	CIRCUIT BREAKER

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P11.10.2

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	11-1-74
GROUP	B HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J YOWEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD	ARB	
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — LIGHT-FLASHING BEACON (OPT)

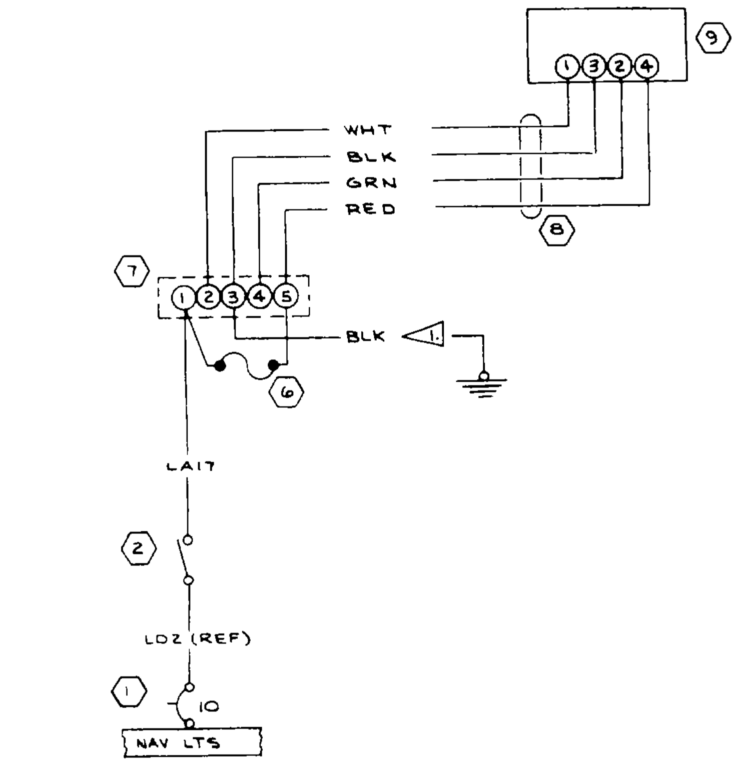
SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | (SR7903)(SR7904) | PAGE: 11.7.0

172, F172, FR172

FORM NO. 60-2188

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: 329636 WAS 329626/NOTE 2 NOW SHOP PRACTICE	RLY 6-11-75	[illegible]



04-231-0905
03-231-0905

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 & 329636 IS (00779)
VENDOR FOR 8409 IS (70903)
VENDOR FOR 351-11-05-001 IS (71785)

ITEM NO.	PART NO.	DESCRIPTION	
9	0570088-1	MAP LIGHT ASSY	
8	8409	CABLE	2.
7	351-11-05-001	TERMINAL STRIP	2.
6	1570141-1	FUSE ASSY	
2	S-2160-1	SWITCH	
1	S-1360-10L	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
WHT		8409		320733	320733	2.	
BLK							
GRN							
RED		8409		320733	320733		
BLK	20	-20-0	3	S-1367-8	329626		
LA17	20		8	329626	S-1493-1	2.	

WIRE TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX-CESSNA SPEC. NO.
S-XXX OR CMXXXX-CESSNA STD. NO.

SUPERSEDES: 0500062 P 11.11.1

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	10-4-74
GROUP	B. HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUEL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD	[illegible]	
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM—
MAP LIGHT-CONTROL WHEEL (OPT)

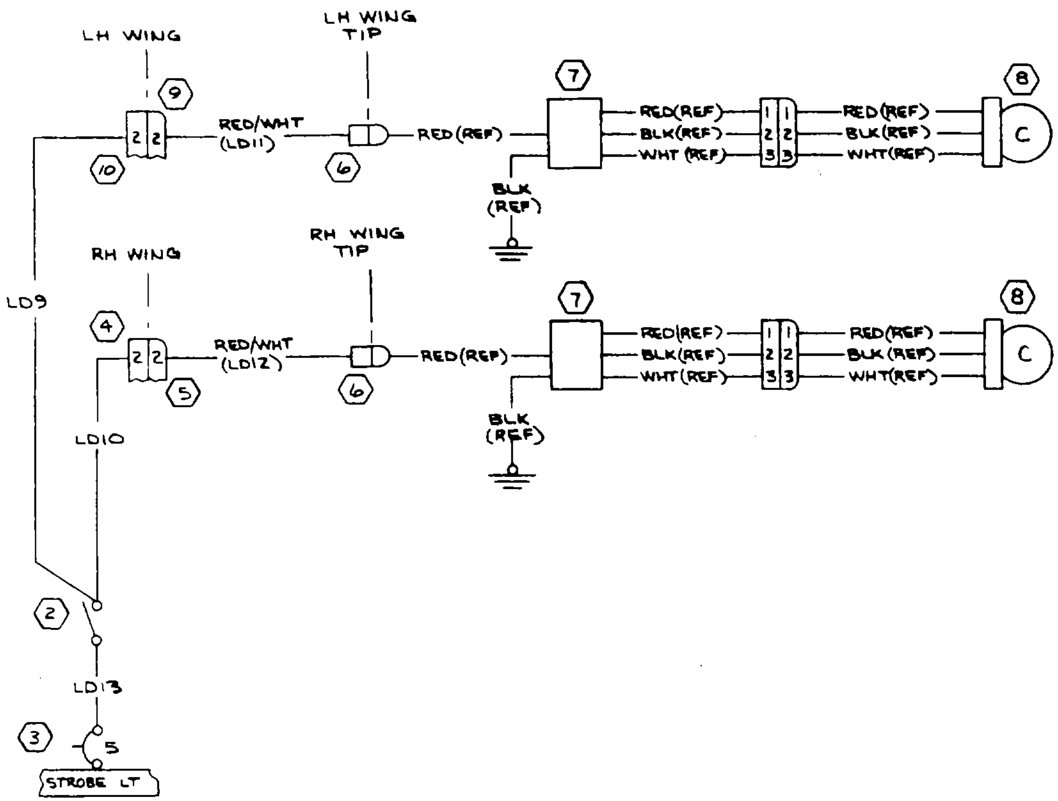
SIZE	CODE IDENT. NO.	DWG NO
C	71379	0570101

SCALE: NONE (SR7903) (SR7906) PAGE: 11.8.0

172, F172, FR172

FORM NO. 80-2158

REVISION			
LET	DESCRIPTION	DATE	APPD



04-231-0905
03-231-0905

LD13	22			S-1493-1	S-1362-1		
RED/WHT LD12	22	-18-2-9	216	S-1636-1	S-1635-1	(STD)	
RED/WHT LD11	22	-18-2-9	216	S-1636-1	S-1635-1	(STD)	
LD10	22		58	S-1493-1	S-1636-1	(STD)	
LD9	22		50	SEE LD13	S-1636-1	(STD)	
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	
10	S-1641-6	HOUSING	
9	S-1640-6	HOUSING	
8	C622006-0101	LAMP ASSY	
7	C622007-0101	POWER ASSY	
6	S-1637-2	HOUSING	
5	S-1640-9	HOUSING	
4	S-1641-9	HOUSING	
3	S-1360-5L	CIRCUIT BREAKER	
2	S-2160-1	SWITCH	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0500062 P 11.14.2

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	11-11-74
GROUP	B. HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J YOUEL	12-6-74
STRESS		
PROJ	R FIFE	1-4-75
APPD	JAS 2003	
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE

WIRING DIAGRAM — WINGTIP STROBE LIGHT (OPT)

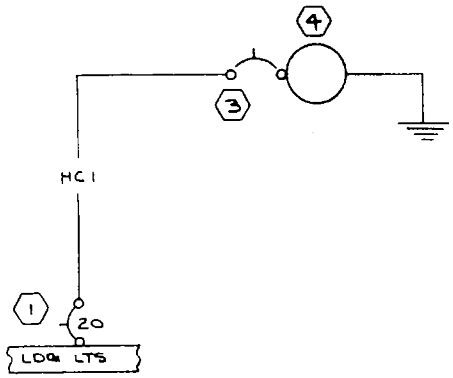
SIZE	CODE IDENT. NO.	DWG NO
C	71379	0570101

SCALE: NONE | (5R1903) (5R1904) | PAGE: 11.9.0

172, F172, FR172

FORM NO. 80-5155

REVISION			
LET	DESCRIPTION	DATE	APPD



04-231-0905
03-231-0905

HC1	16		18	S-1367-2-10	S-1367-2-8		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

4	0513052-3	CIGAR LIGHTER	
3	60232-1	CIRCUIT BREAKER	
2			
1	S-1360-20L	CIRCUIT BREAKER	
ITEM NO.	PART NO.	DESCRIPTION	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX-CESSNA SPEC. NO.
S-XXX OR CMXXXX-CESSNA
STD. NO.

SUPERSEDES: 0500062 P 13.1.1

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	11-1-74
GROUP	B. HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J. YOUELL	12-6-74
STRESS		
PROJ	R. FIFE	1-4-75
APPD	JRS-DB	
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

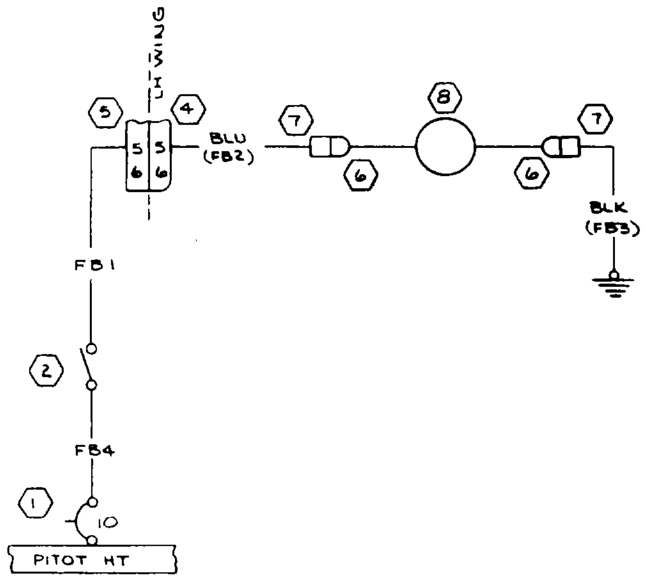
TITLE
WIRING DIAGRAM — CIGAR LIGHTER

SIZE	CODE IDENT. NO.	DWG NO
C	71379	0570101

SCALE: NONE (SR7903) (SR7904) PAGE: 13.1.0

172, F172, FR172

FORM NO. 60-2156



04-231-0905
03-231-0905

REVISION			
LET	DESCRIPTION	DATE	APPD

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
FB4	18			S-1493-1	S-1367-1-6		
BLK FB3	18	-18-0	14	S-1636-2	S-1367-1-8		
BLU FB2	18	-16-6	48	S-1636-2	S-1636-2	(STD)	
FB1	18		48	S-1493-1	S-1635-2		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
8	0721105	PITOT HEATER	
7	S-1637-2	HOUSING	
6	S-1637-1	HOUSING	
5	S-1641-6	HOUSING	
4	S-1640-6	HOUSING	
2	S-2160-1	SWITCH	
1	S-1360 -10L	CIRCUIT BREAKER	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA
STD. NO.

SUPERSEDES: 0500062 P 13.3.1

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	12-11-74
GROUP	B HARDEN	1-2-75
DRAWN	MERRICK	10-31-74
CHECK	J YOUEL	12-6-74
STRESS		
PROJ	R [illegible]	1-4-75
APPD	[illegible]	
OTHER		

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — PITOT - HEATED (OPT)

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | (SR7513) (SR7504) | PAGE: 13.2.0

172, F172, FR172

FORM NO. 80-3158

REVISION			
LET	DESCRIPTION	DATE	APPD

NOTES:

1. THESE SWITCHES PART OF C301002-0101 ACTUATOR ASSY

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
CC15	16	-16-0	13	S-1636-2	S-1493-2		
CC16		-16-7	19	S-1493-2	S-1367-2-8		
CC15		-16-7	19	S-1493-2	S-1367-2-8		
CC14		-16-2	13	S-1636-2	S-1635-2		
CC13		-16-6	13	S-1638-2	S-1498-2		
CC12		-16-5	13	S-1635-2	S-1498-2		
CC11		-16-3	13	S-1638-2	S-1498-2		
CC10		-16-2	75	S-1636-2	S-1638-2		
CC9		-16-6	75	S-1636-2	S-1635-2		
CC8		-16-5	75	S-1636-2	S-1635-2		
CC7		-16-3	75	S-1636-2	S-1635-2		
CC6			16	S-1367-2-6	S-1367-2-8		
CC5			48	S-1367-2-6	S-1636-2		
CC4			48	S-1367-2-6	S-1636-2		
CC3			48	S-1367-2-6	S-1636-2		
CC2			48	S-1367-2-6	S-1636-2		
CC1	16		22	S-1367-2-6	S-1367-2-6		

WIRE TABLE

	PART NO.	DESCRIPTION	
11	C301002-0101	ACTUATOR ASSY	
10	S-1638-2	HOUSING	
9	S-1638-1	HOUSING	
8	S-1640-6	HOUSING	
7	S-1641-6	HOUSING	
6	S-1640-9	HOUSING	
5	S-1641-9	HOUSING	
4	S-1661-2	SWITCH	
2	S-1360-15L	CIRCUIT BREAKER	
1	V3-1-D9	SWITCH	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX-CESSNA SPEC. NO. S-XXX OR CMXXXX-CESSNA STD. NO.

SUPERSEDES: 0500062 P 14.7.2

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	10-74
GROUP	D. HARDEN	1-2-75
DRAWN	MERRICK	10-9-74
CHECK	J. YOUNG	12-6-74
STRESS		
PROJ		
APPD		
OTHER		

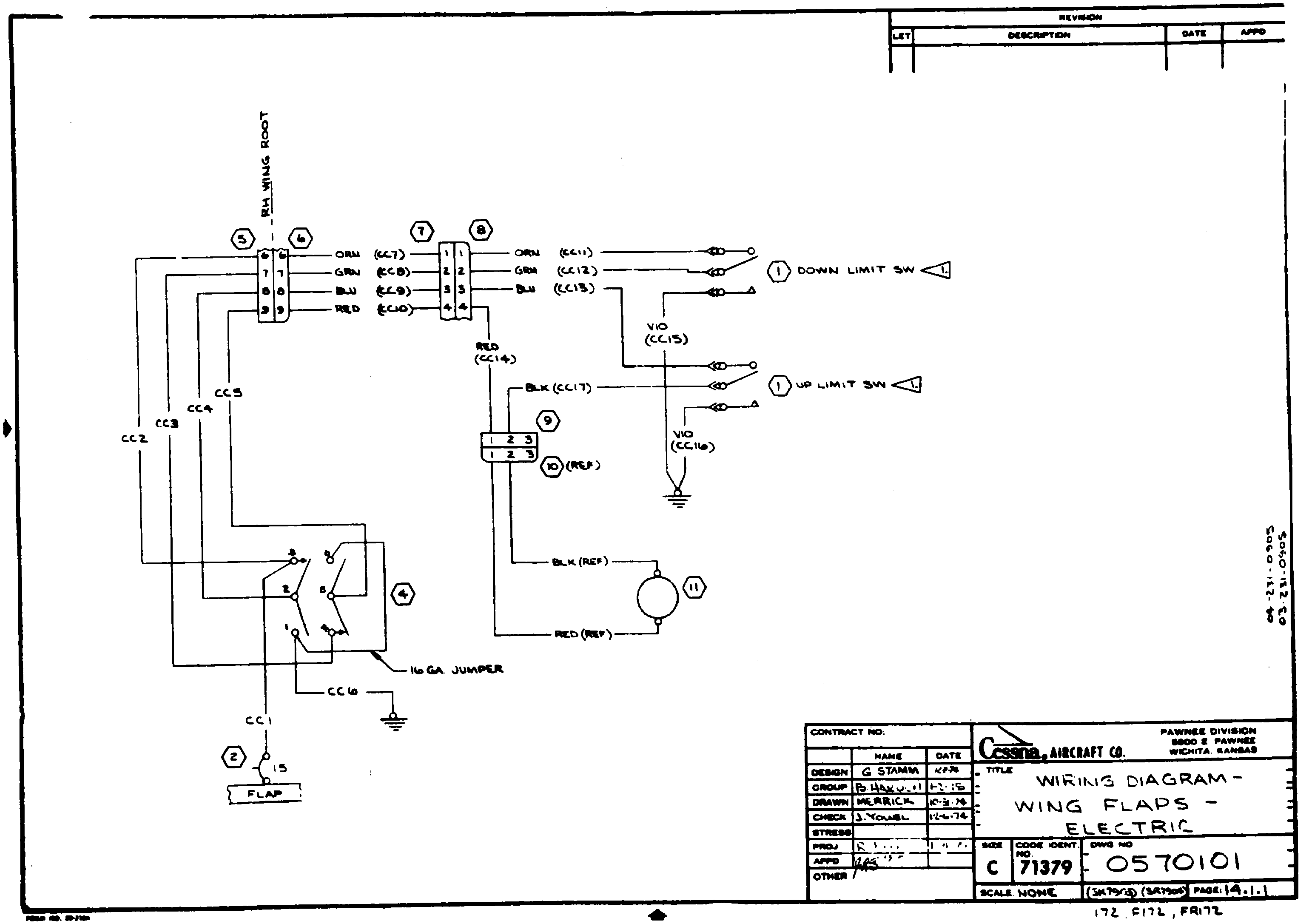
Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE: WIRING DIAGRAM — WING FLAPS — ELECTRIC

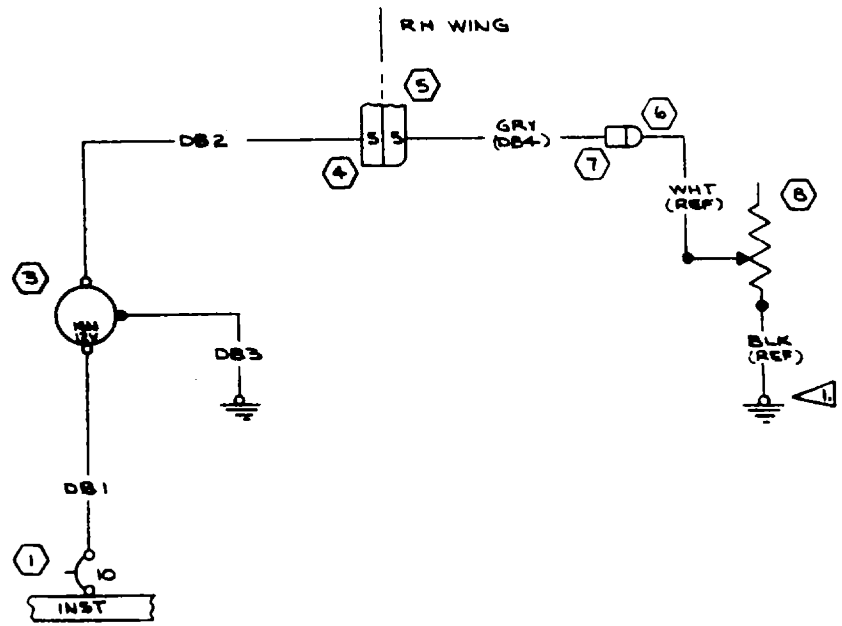
SIZE: C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | PAGE: 16.1.0

172, F172, FR172


REVISION
LET
DESCRIPTION
DATE
APPD
RH WING ROOT
ORN (CC7)
GRN (CC8)
BLU (CC9)
RED (CC10)
ORN (CC11)
GRN (CC12)
BLU (CC13)
DOWN LIMIT SW
UP LIMIT SW
V10 (CC15)
V10 (CC16)
RED (CC14)
BLK (CC17)
(REF)
CC2
CC3
CC4
CC5
BLK (REF)
RED (REF)
16 GA JUMPER
CC6
CC1
15
FLAP
04-231-0905
03-231-0905
CONTRACT NO:
NAME
DATE
DESIGN G STAMM
GROUP
DRAWN MERRICK 10-31-74
CHECK J. YOUEL 12-6-74
STRESS
PROJ
APPD
OTHER
Cessna AIRCRAFT CO.
PAWNEE DIVISION
5800 E PAWNEE
WICHITA, KANSAS
TITLE
WIRING DIAGRAM - WING FLAPS - ELECTRIC
SIZE C
CODE IDENT. NO. 71379
DWG NO 0570101
SCALE NONE
PAGE 14.1.1
172, F172, FR172

REVISION			
LET	DESCRIPTION	DATE	APPD



NOTES :

1. GROUND BLACK WIRE ON TRANSMITTER MOUNTING BOLT

8	C590501-0101	FLAP POSITION XMTR	
7	S-1637-2	HOUSING	
6	S-1637-1	HOUSING	
5	S-1640-9	HOUSING	
4	S-1641-9	HOUSING	
3	C668001-0106	FLAP POSITION IND	
1	S-1360-10L	CIRCUIT BREAKER	
	PART NO.	DESCRIPTION	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
GRY DB4	18	-18-8	100	S-1635-1	S-1636-1		
DB3	18		24	S-1367-1-6	S-1367-1-10		
DB2	22		52	S-1367-1-10	S-1636-1		
DB1	22		30	S-1367-1-10	S-1367-1-6		

WIRE TABLE

CES-1000 IS APPLICABLE VENDOR CODES PER S-1400 CES-XXXX-CESSNA SPEC. NO. S-XXX OR CXXXXX-CESSNA STD. NO.

SUPERSEDES: 0500062 P 14.7.3

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	G. STAMM	11-1-74
GROUP	B HARDEY	1-2-75
DRAWN	MERRICK	10-9-74
CHECK	J. TOWEL	12-6-74
STRESS		
PROJ	R. [illegible]	1-A-75
APPD	[illegible]	
OTHER		

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE

WIRING DIAGRAM — FLAP POSITION INDICATOR

SIZE C | CODE IDENT. NO. 71379 | DWG NO 0570101

SCALE: NONE | (SR7903) (SR7904) | PAGE: 14.2.0

112, F172, FR172