SERVICE MANUAL

100 – SERIES

1963 THRU 1968

REVISION 1

4 Aug 2003

D637R1-13

INSERT THE FOLLOWING REVISED PAGES INTO BASIC MANUAL

Cessna
A Textron Company

SERVICE MANUAL

100 - SERIES

1963 THRU 1968

MEMBER of GAMA

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

REVISION 1 TO THE BASIC MANUAL IS BEING SUPPLIED TO PROVIDE ADDITIONAL INFORMATION NECESSARY TO MAINTAIN THE AIRPLANE. REVISION 1 INCORPORATES:

TEMPORARY CHANGE 1, DATED 18 OCTOBER 1977
SERVICE MANUAL CHANGE NOTICE #77-25, DATED 5 DECEMBER 1977
TEMPORARY REVISION 2, DATED 1 JUNE 1993
TEMPORARY REVISION 3, DATED 3 OCTOBER 1994
TEMPORARY REVISION 4, DATED 7 JANUARY 2000 AND
TEMPORARY REVISION 5, DATED 7 OCTOBER 2002.

SEPTEMBER 1968

D637-1-13 **REVISION 1** **4 Aug 2003**

TEMPORARY REVISION NUMBER 7

DATE July 1, 2007

MANUAL TITLE	**100 Series (1963-1968) Service Manual**
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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 and CD information.

SECTION	PAGE	AEROFICHE FICHE/FRAME	SECTION	PAGE	AEROFICHE FICHE/FRAME
2	24	1B24			
2	24A	ADD			
2	24B	ADD			
5	4	1D10			
5	4A	ADD			
5	4B	ADD			

REASON FOR TEMPORARY REVISION

1. Incorporate inspection of horizontal stabilizer trim actuators (Section 2).
2. Incorporated inspection of flat spring main landing gear (Section 5).

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 Insert the new pages into the publication at the appropriate locations and remove and discard the superseded pages.

2. For Aerofiche Publications, draw a line with permanent red ink marker, through any aerofiche frame (page) affected by the Temporary Revision. This will be a visual identifier that the information on the frame (page) is no longer valid and the Temporary Revision should be referenced. For "added" pages in a Temporary Revision, draw a vertical line between the applicable frames. Line should be wide enough to show on the edges of the pages. Temporary Revisions should be collected and maintained in a notebook or binder near the aerofiche library for quick reference.

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TEMPORARY REVISION NUMBER 6

DATE 5 April 2004

MANUAL TITLE Model 100 Series Service Manual (1963 Thru 1968)

MANUAL NUMBER - PAPER COPY D637-1-13

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TEMPORARY REVISION NUMBER D637-1TR6

MANUAL DATE 1 September 1968 **REVISION NUMBER** 1 **DATE** 4 August 2003

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	22	1/B21			
2	24	1/B24			

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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LIST OF EFFECTIVE PAGES
INSERT THE LATEST CHANGED PAGES.
DESTROY THE SUPERSEDED PAGES.

Dates of issue for original and Revisions are:

Original.................. 0................September 1, 1968
Revision................. 1...................August 4, 2003

Note: The portion of the text affected by the revision is indicated by a vertical line in the outer margins of the page.

*The asterisk indicates pages revised, added, or deleted by current revision.

Page No.	Revision No.	Page No.	Revision No.
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"A"	0	13-1 thru 13-4B	0
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1-1 thru 1-13	0	13-33 thru 13-37	0
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2-11 thru 2-20	0	15-4B Blank	0
*2-21 thru 2-27	1	15-5 thru 15-14	0
3-1 thru 3-14A	0	*16-1 thru 16-6B	1
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3-15 thru 3-22A	0	16-26B Blank	0
3-22B Blank	0	*16-27 thru 16-36	1
3-23 thru 3-32	0	16-37 thru 16-38A	0
4-1 thru 4-13	0	16-39 thru 16-45	0
5-1 thru 5-52	0	17-1 thru 17-4A	0
6-1 thru 6-8A	0	17-4B Blank	0
6-8B Blank	0	17-5 thru 17-16A	0
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8-1 thru 8-12	0	*19-9 thru 19-10	1
*9-1 thru 9-10	1	19-11 thru 19-30	0
*9-11 Blank (Deleted)	1	20-1 thru 20-5	0
10-1 thru 10-10A	0	20-6 Blank	0
10-10B Blank	0	A1-1	0
10-11 thru 10-20	0	A1-2 Blank	0
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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 the various aircraft, model numbers will be used in this publication unless names are required to differentiate between versions of the same basic model. The following table provides a cross reference listing of popular name vs. model numbers.

POPULAR NAME	MODEL YEAR	MODEL	SERIALS BEGINNING	SERIALS ENDING
150 STANDARD 150 TRAINER, or 150 COMMUTER	1963	150C	15059701	15060087
	1964	150D	15060088	15060772
	1965	150E	15060773	15061532
	1966	150F	15061533	15064532
	1967	150G	15064533	15067198
	1968	150H	15067199	
FRENCH 150	1966	F150F	F150-0001	F150-0067
	1967	F150G	F150-0068	F150-0219
	1968	F150H	F150-0220	
172 or SKYHAWK	1963	172D	17249545	17250572
	1964	172E	17250573	17251822
	1965	172F	17251823	17253392
	1966	172G	17253393	17254892
	1967	172H	17254893	17256512
	1968	172I	17256513	
FRENCH 172	1963	F172D	F172-0001	F172-0018
	1964	F172E	F172-0019	F172-0085
	1965	F172F	F172-0086	F172-0179
	1966	F172G	F172-0180	F172-0319
	1967	F172H	F172-0320	F172-0446
	1968	F172H	F172-0447	
172 POWERMATIC or SKYHAWK POWERMATIC	1963	P172D	P17257120	P17257188
FRENCH POWERMATIC	1963	FP172D	FP172-0001	FP172-0003
180	1963	180F	18051184	18051312
	1964	180G	18051313	18051445
	1965	180H	18051446	18051607
	1966	180H	18051608	18051774
	1967	180H	18051775	18051875
	1968	180H	18051876	
182 or SKYLANE	1963	182F	18254424	18255058
	1964	182G	18255059	18255844
	1965	182H	18255845	18256684
	1966	182J	18256685	18257625
	1967	182K	18257626	18258505
	1968	182L	18258506	
ARGENTINE 182	1966	A182J	A182-0001	A182-0056
	1967	A182K	A182-0057	A182-0096
	1968	A182L	A182-0097	
185 SKYWAGON (260 H. P. Engine)	1963	185B	185-0513	185-0653
	1964	185C	185-0654	185-0776
	1965	185D	185-0777	185-0967
	1966	185E	185-0968	185-1149
185 SKYWAGON (300 H. P. Engine)	1966	A185E	185-0968	185-1149
	1967	A185E	185-1150	185-1300
	1968	A185E	185-1301	

FOREWORD

This manual contains factory recommended procedures and instructions for ground handling, servicing and maintaining Cessna 100-Series aircraft. These include the Models 150, 172, P172, 180, 182, 185, and A185. The Model F172, which is manufactured by Reims Aviation S.A., Reims (Marne) France, is identical to the 172 except that it is powered by an O-300-D engine, manufactured under license by Rolls Royce, Crewe, England. All 172 information in this manual pertains to the F172 as well. Likewise, the Model FP172 is identical to the P172 except that it is powered by a GO-300-E Rolls Royce engine, and the Model F150 is identical to the 150 except that it is powered by an O-200-A Rolls Royce engine.

The Model A182, which is manufactured by Directorate National of Fabrication and Investigation Aeronautical, Cordoba, Argentina, is identical to the Model 182. All 182 information in this manual pertains to the A182 as well.

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 100-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 airplanes. Therefore, it is recommended that Cessna owners utilize the knowledge and experience of the factory-trained Dealer Service Organization.

In addition to the information in this Service Manual, a group of vendor publications are available from the Cessna 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 in service letters.

SECTION 1

GENERAL DESCRIPTION

1-1. GENERAL DESCRIPTION. Cessna single-engine aircraft described in this manual are similar in that all models are high-wing monoplanes, employing patented spring-steel main landing gear struts, horizontally opposed air-cooled engines, and all-metal semi-monocoque airframe construction.

1-2. MODEL 150 SERIES. The Model 150 is equipped with a tricycle landing gear, a four-cylinder Continental engine, and a fixed-pitch propeller. Two-place seating is standard, and a two-place child's seat may be installed as optional equipment. The Model 150D and on features a "wrap around" rear window, which replaces the rear side windows used on the Model 150C. Beginning with the Model 150F, a swept-back fin and rudder is used.

1-3. MODEL 172 SERIES. The Model 172 is equipped with a tricycle landing gear. Four-place seating is standard, and a two-place child's seat may be installed as optional equipment. The Model 172 features rear side windows, a "wrap around" rear window, and a swept-back fin and rudder. Prior to 1968, the Model 172 is powered by a six-cylinder Continental engine, and a fixed-pitch propeller. Beginning with 1968, the aircraft is powered by a four-cylinder "Blue-Streak" (Lycoming) engine, and a fixed-pitch propeller.

1-4. MODEL P172. The Model P172 is equipped with a tricycle landing gear, a six-cylinder geared Continental engine, and a constant-speed propeller. Four-place seating is standard, and a two-place child's seat may be installed as optional equipment. The Model P172 features rear side windows, a "wrap-around" rear window, and a swept-back fin and rudder.

1-5. MODEL 180 SERIES. The Model 180 is equipped with a tailwheel-type landing gear, a six-cylinder Continental engine, and a constant-speed propeller. On the Model 180F, four-place seating is standard, and a two-place child's seat may be installed as optional equipment. Beginning with the Model 180G, the pilot's seat only is standard, while optional seating arrangements include two front seats only, two front seats with one, two-place rear seat, and two front seats with two, two-place rear seats of stowable design. Beginning with 1967, the center stowable seat is replaced with two individual stowable seats. The four-place version may be furnished with either utility or deluxe fabrics, and the rearmost stowable seat may also be used with the four-place version as a child's seat.

1-6. MODEL 182 SERIES. The Model 182 is equipped with a tricycle landing gear, a six-cylinder Continental engine, and a constant-speed propeller. Four-place seating is standard, and a two-place child's seat may be installed as optional equipment. The Model 182 features rear side windows, a "wrap around" rear window, and a swept-back fin and rudder.

1-7. MODEL 185 SERIES. The Model 185 is equipped with a tailwheel-type landing gear, a fuel-injected six-cylinder Continental engine, and a constant-speed propeller. The pilot's seat only is standard, while optional seating arrangements include two front seats only, two front seats with one, two-place rear seat, and two front seats with two, two-place rear seats of stowable design. Beginning with 1967, the center stowable seat is replaced with two individual stowable seats. The four-place version may be furnished with either utility or deluxe fabrics, and the rearmost stowable seat may also be used with the four-place version as a child's seat.

1-8. Leading particulars of each model, with dimensions based on gross weight, are given in the following charts. If these dimensions are used for constructing a hangar or computing clearances, remember that such factors as nose strut inflation, tire pressures, tire sizes, and load distribution may result in some dimensions that are considerably different from those listed.

MODEL 150

DESIGN GROSS WEIGHT (150C)	1500 lb
DESIGN GROSS WEIGHT (150D & on)	1600 lb
FUEL CAPACITY (Total)	26 gal
Optional	38 gal
OIL CAPACITY	6 qt
ENGINE MODEL (Refer to Section 12 for Engine Data)	CONTINENTAL O-200 Series
PROPELLER (Fixed Pitch)	69" McCAULEY
MAIN WHEEL TIRES (Standard thru 150E)	5.00 × 5, 4-Ply Rating
Pressure	30 psi
MAIN WHEEL TIRES (Standard 150F & on)	6.00 × 6, 4-Ply Rating
Pressure	21 psi
MAIN WHEEL TIRES (Optional thru 150E)	6.00 × 6, 4-Ply Rating
Pressure	21 psi
NOSE WHEEL TIRE (Standard)	5.00 × 5, 4-Ply Rating
Pressure	30 psi
NOSE WHEEL TIRE (Optional)	15 × 6.00 × 6, 4-Ply Rating
Pressure	35 psi
NOSE GEAR STRUT PRESSURE (Strut Extended)	20 psi
WHEEL ALIGNMENT	
Camber	4° to 6°
Toe-In	0" to .06"
AILERON TRAVEL	
Up	20°, +2°-0°
Down	14°, +2°-0°
WING FLAP TRAVEL	
(Thru 150E)	0°, 10°, 20°, 30°, 40°, ± 2°
(150F & on)	0° to 40° ± 2°
RUDDER TRAVEL (Measured perpendicular to hinge line)	
Right (Thru 150E)	16° ± 1°
Left (Thru 150E)	16° ± 1°
Right (150F & on)	23°, +0°-2°
Left (150F & on)	23°, +0°-2°
ELEVATOR TRAVEL	
Up	25° ± 1°
Down	15° ± 1°
ELEVATOR TRIM TAB TRAVEL	
Up	10° ± 1°
Down	20° ± 1°
PRINCIPAL DIMENSIONS	
Wing Span	
(Thru 150E)	33'6"
(150F & on)	32' 8-1/2"
Length	
With Large Spinner (Thru 150E)	22'0"
With Small Spinner (Thru 150E)	21'7"
With Large Spinner (150F & on)	23'9"
With Small Spinner (150F & on)	23'0"
Fin Height (Maximum with Nose Gear Depressed)	
(Rotating Beacon Installed on Fin, thru 150E)	7'10"
(Rotating Beacon Installed on Fin, 150F)	8'9"
(Flashing Beacon Installed on Fin, 150G & on)	8' 7-1/2"
Track Width (Thru 150E)	6'5"
Track Width (150F & on)	6' 6-1/2"
BATTERY LOCATION	
(150C)	Aft of Baggage Compartment
(150D & on)	Firewall

DESIGN GROSS WEIGHT	2300 lb
FUEL CAPACITY (Total)	
(1963 thru 1968 - Except P172)	42 gal.
(P172)	52 gal.
USABLE FUEL	
(1963 thru 1967 - Except P172)	39 gal.
(P172) Refer to Owner's Manual	41-1/2 gal.
(1968 Model 172I)	38 gal.
PROPELLER (Fixed Pitch)	76" McCAULEY
MAIN WHEEL TIRES	6.00 × 6, 4-ply rating
Pressure	24 psi
NOSE WHEEL TIRE (Standard)	5.00 × 5, 4-ply rating
Pressure	26 psi
NOSE WHEEL TIRE (Optional)	6.00 × 6, 4-ply rating
Pressure	26 psi
NOSE GEAR STRUT PRESSURE (Strut Extended)	
Pressure (Thru 172G)	35 psi
Pressure (172H & on)	45 psi
WHEEL ALIGNMENT	
Camber	3° to 5°
Toe-in	0" to .06"
AILERON TRAVEL	
Up	20°±1°
Down	15°±1°
WING FLAP TRAVEL	
Manual	0°, 10°, 20°, 30°, 40°, ± 2°
Electric	0° to 40° ± 2°
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	36'2"
Tail Span	11'4"
Length (Thru 172F)	26'6"
Length (172G & on)	26'11"
Fin Height (Maximum with Nose Gear Depressed)	
(Rotating Beacon Installed on Fin)	8'11"
(Flashing Beacon Installed on Fin)	8'9-1/2"
Track Width	7'2"
BATTERY LOCATION	Firewall

MODEL P172 (1963)

DESIGN GROSS WEIGHT	2500 lb
FUEL CAPACITY (Total)	52 gal
OIL CAPACITY	10 qt
ENGINE MODEL (Refer to Section 12 for Engine Data)	CONTINENTAL GO-300 Series
PROPELLER (Constant Speed)	84" McCAULEY
MAIN WHEEL TIRES	6.00 x 6, 4-ply rating
Pressure	24 psi
NOSE WHEEL TIRE (Standard)	5.00 x 5, 4-ply rating
Pressure	26 psi
NOSE WHEEL TIRE (Optional)	6.00 x 6, 4-ply rating
Pressure	26 psi
NOSE GEAR STRUT PRESSURE (Strut Extended)	35 psi
WHEEL ALIGNMENT	
Camber	3° to 5°
Toe-in	0" to .06"
AILERON TRAVEL	
Up	20°±1°
Down	15°±1°
WING FLAP TRAVEL	0°, 10°, 20°, 30°, 40°, ±2°
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	36' 2"
Tail Span	11' 4"
Length	26' 6"
Fin Height (Maximum with Nose Gear Depressed and Rotating Beacon Installed on Fin)	8' 11"
Track Width	7' 2"
BATTERY LOCATION	Aft of Baggage Compartment

DESIGN GROSS WEIGHT (180F)	2650 lb
DESIGN GROSS WEIGHT (180G & on)	2800 lb
FUEL CAPACITY (Total)	65 gal
Optional	84 gal
OIL CAPACITY	12 qt
ENGINE MODEL (Refer to Section 12 for Engine Data)	CONTINENTAL O-470 Series
PROPELLER (Constant Speed)	82" McCAULEY
MAIN WHEEL TIRES (Standard)	6.00 × 6, 6-Ply rating
Pressure	30 psi
MAIN WHEEL TIRES (Optional, Prior to 180G)	7.00 × 6, 4-Ply rating
Pressure	23 psi
MAIN WHEEL TIRES (Optional)	8.00 × 6, 6-Ply rating
Pressure	23 psi
TAILWHEEL TIRE (Thru Serial No. 18051262)	8.00 S.C., 6-Ply rating
Pressure	35 psi
TAILWHEEL TIRE (Serial No. 18051263 & on)	8.00 × 2.80, 4-Ply rating
Pressure	*55 psi to 65 psi maximum
WHEEL ALIGNMENT	
Camber	4° to 6°
Toe-In	0" to .12"
AILERON TRAVEL	
Up	20° ± 2°
Down	14° ± 2°
WING FLAP TRAVEL	0°, 10°, 20°, 32°, 38°, +2° -1°
RUDDER TRAVEL (Measured perpendicular to hinge line)	
Right	24°, +0° -1°
Left	24°, +0° -1°
ELEVATOR TRAVEL (With stabilizer full down)	
Up	25° ± 1°
Down	23° ± 1°
STABILIZER TRAVEL	
Up	0°45' ± 15'
Down	8°45' ± 15'
PRINCIPAL DIMENSIONS	
Wing Span	36'2"
Tail Span	10'10"
Length	
(Thru 1966)	25'6"
(1967 and on)	25'9"
Fin Height	
(Rotating Beacon Installed on Fin)	7'10-1/2"
(Flashing Beacon Installed on Fin)	7'9"
Track Width	7'8"
BATTERY LOCATION	Aft of Baggage Compartment

*55 psi to 65 psi maximum (2300 lb to 2800 lb normal operating loads).

DESIGN GROSS WEIGHT	2800 lb
FUEL CAPACITY (Total)	65 gal
Optional	84 gal
OIL CAPACITY	12 qt
ENGINE MODEL (Refer to Section 12 for Engine Data)	CONTINENTAL O-470 Series
PROPELLER (Constant Speed)	82" McCAULEY
MAIN WHEEL TIRES (Standard)	6.00 × 6, 6-Ply rating
Pressure	32 psi
MAIN WHEEL TIRES (Optional)	8.00 × 6, 6-Ply rating
Pressure	25 psi to 35 psi
NOSE WHEEL TIRE (Standard)	5.00 × 5, 6-Ply rating
Pressure (Thru 182J)	32 psi
Pressure (182K & on)	50 psi
NOSE WHEEL TIRE (Optional)	6.00 × 6, 4-Ply rating
Pressure (Thru 182J)	20 psi to 29 psi
Pressure (182K & on)	30 psi
NOSE GEAR STRUT PRESSURE (Strut Extended)	
(Thru 182J)	50 psi
(182K & on)	55 psi to 60 psi
WHEEL ALIGNMENT	
Camber	5° to 7°
Toe-In	0" to .06"
AILERON TRAVEL	
Up	20° ± 2°
Down	15° ± 2°
WING FLAP TRAVEL (Electrically Operated)	0° to 40°, +1° -2°
RUDDER TRAVEL (Measured perpendicular to hinge line)	
Right	27°13' ± 1°
Left	27°13' ± 1°
ELEVATOR TRAVEL	
Up	26° ± 1°
Down	17° ± 1°
ELEVATOR TRIM TAB TRAVEL	
Up	25° ± 2°
Down	15° ± 1°
PRINCIPAL DIMENSIONS	
Wing Span	36'2"
Tail Span	
(Thru 182G)	10'10"
(182H & on)	11'8"
Length	
(Thru 182G)	27'4"
(182H thru 182J)	27'10"
(182K & on)	28'-1/2"
Fin Height (Maximum with Nose Gear Depressed)	
(Rotating Beacon Installed on Fin)	9'0"
(Flashing Beacon Installed on Fin)	8'10-1/2"
Track Width	7'11-1/2"
BATTERY LOCATION	Aft of Baggage Compartment

DESIGN GROSS WEIGHT	
(Thru 1965 Model 185D)	3200 lb
(1966 and 1967 Models 185E & A185E)	3300 lb
(1968 Model A185E)	3350 lb
FUEL CAPACITY (Total)	65 gal
Optional	84 gal
OIL CAPACITY	12 qt
ENGINE MODEL (Refer to Section 12 for Engine Data)	
260 HP (Thru 185E)	CONTINENTAL IO-470 Series
300 HP (A185E and on)	CONTINENTAL IO-520 Series
PROPELLER (Constant Speed)	
260 HP (Thru 185E)	88" McCAULEY
300 HP (A185E and on)	82" McCAULEY
MAIN WHEEL TIRES (Standard)	6.00 × 6, 6-Ply rating
Pressure	35 psi
MAIN WHEEL TIRES (Optional)	8.00 × 6, 6-Ply rating
Pressure	25 psi
TAILWHEEL TIRE (185B)	10.00 × 3.50, 4-Ply rating
Pressure	45 psi
TAILWHEEL TIRE (185C and on)	8.00 × 2.80, 4-Ply rating
Pressure	*55 psi to 70 psi (max)
WHEEL ALIGNMENT	
Camber	4° to 6°
Toe-In	0" to .12"
AILERON TRAVEL	
Up	20° ± 2°
Down	14° ± 2°
WING FLAP TRAVEL	0°, 10°, 20°, 32°, 38°, +2° -1°
RUDDER TRAVEL (Measured perpendicular to hinge line)	
Right	24°, +0° -1°
Left	24°, +0° -1°
ELEVATOR TRAVEL (With stabilizer full down)	
Up	25° ± 1°
Down	23° ± 1°
STABILIZER TRAVEL	
Up	
(Thru 185E)	0°45' ± 15'
(A185E and on)	0°45', +45'-15'
Down	8°30' ± 15'
PRINCIPAL DIMENSIONS	
Wing Span	36'2"
Tail Span	10'10"
Length	
(Thru 1966)	25'6"
(1967 and on)	25'9"
Fin Height	
(Rotating Beacon Installed on Fin)	7'10-1/2"
(Flashing Beacon Installed on Fin)	7'9"
Track Width	7'8"
BATTERY LOCATION	Aft of Baggage Compartment

*55 psi to 70 psi maximum (2300 lb to 3200 lb normal operating loads). If the 10-inch tire has been replaced with the 8-inch tire, these pressures also apply to the Model 185B.

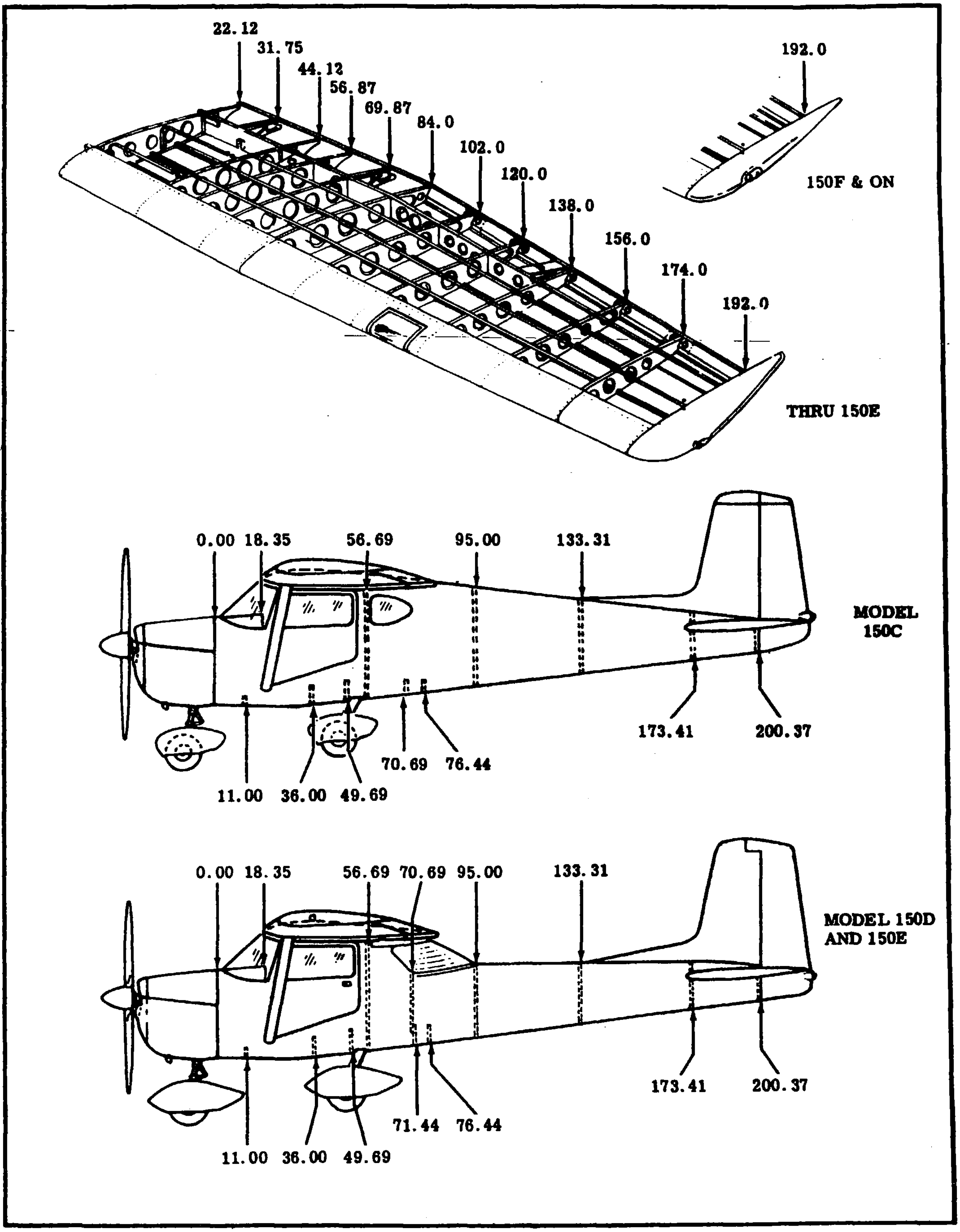
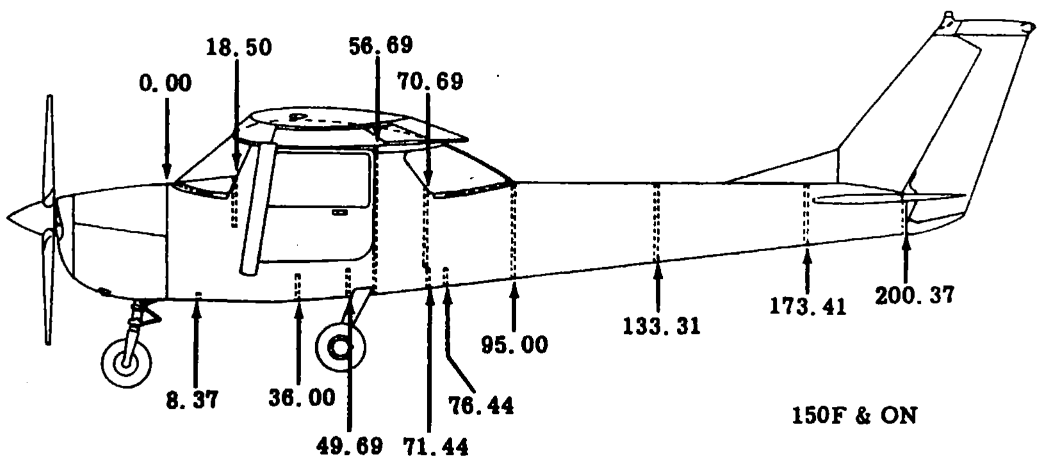


Figure 1-1. Reference Stations - Model 150 (Sheet 1 of 2)



SHOP NOTES:

Figure 1-1. Reference Stations - Model 150 (Sheet 2 of 2)

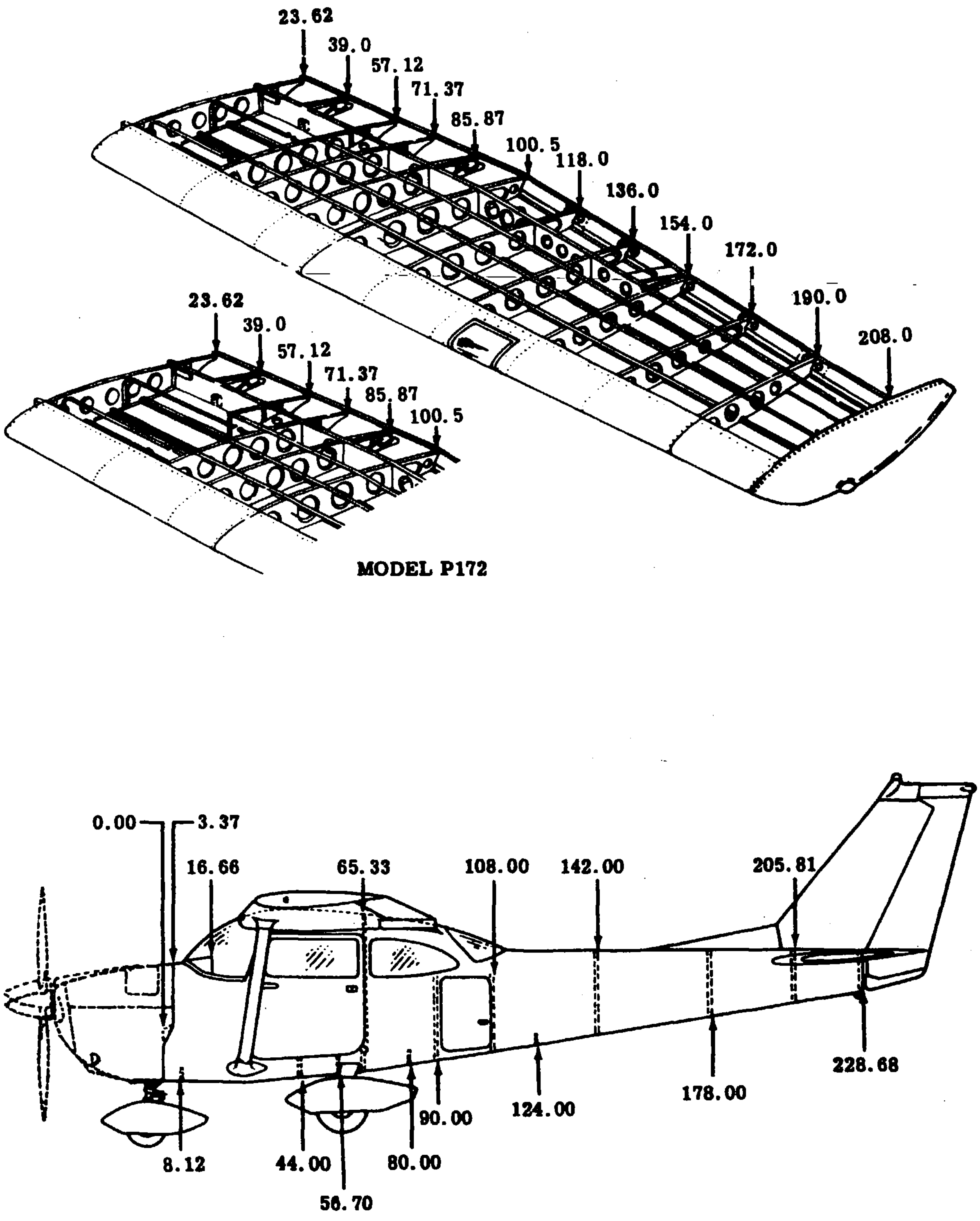


Figure 1-2. Reference Stations - Models 172 and P172

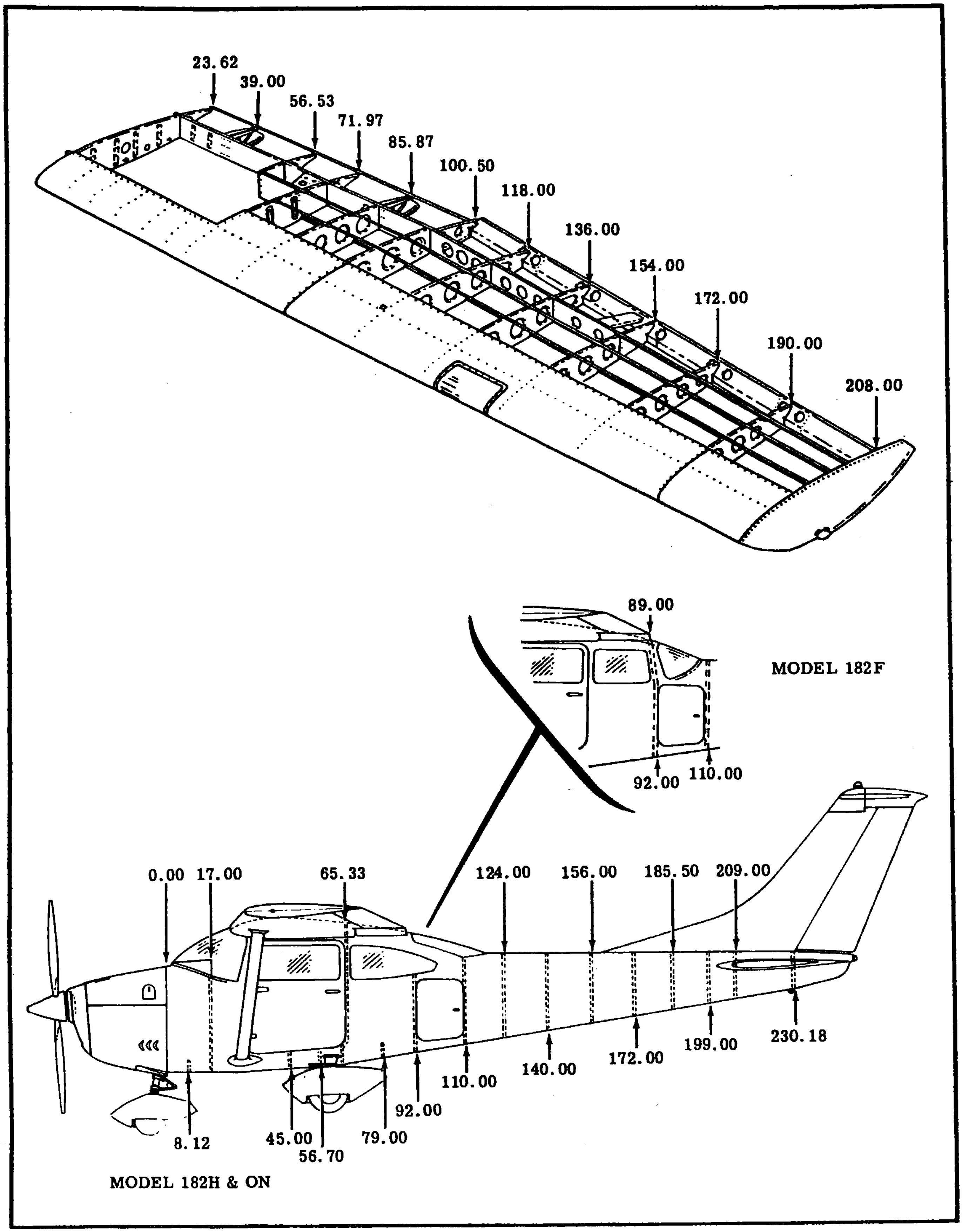


Figure 1-3. Reference Stations - Model 182

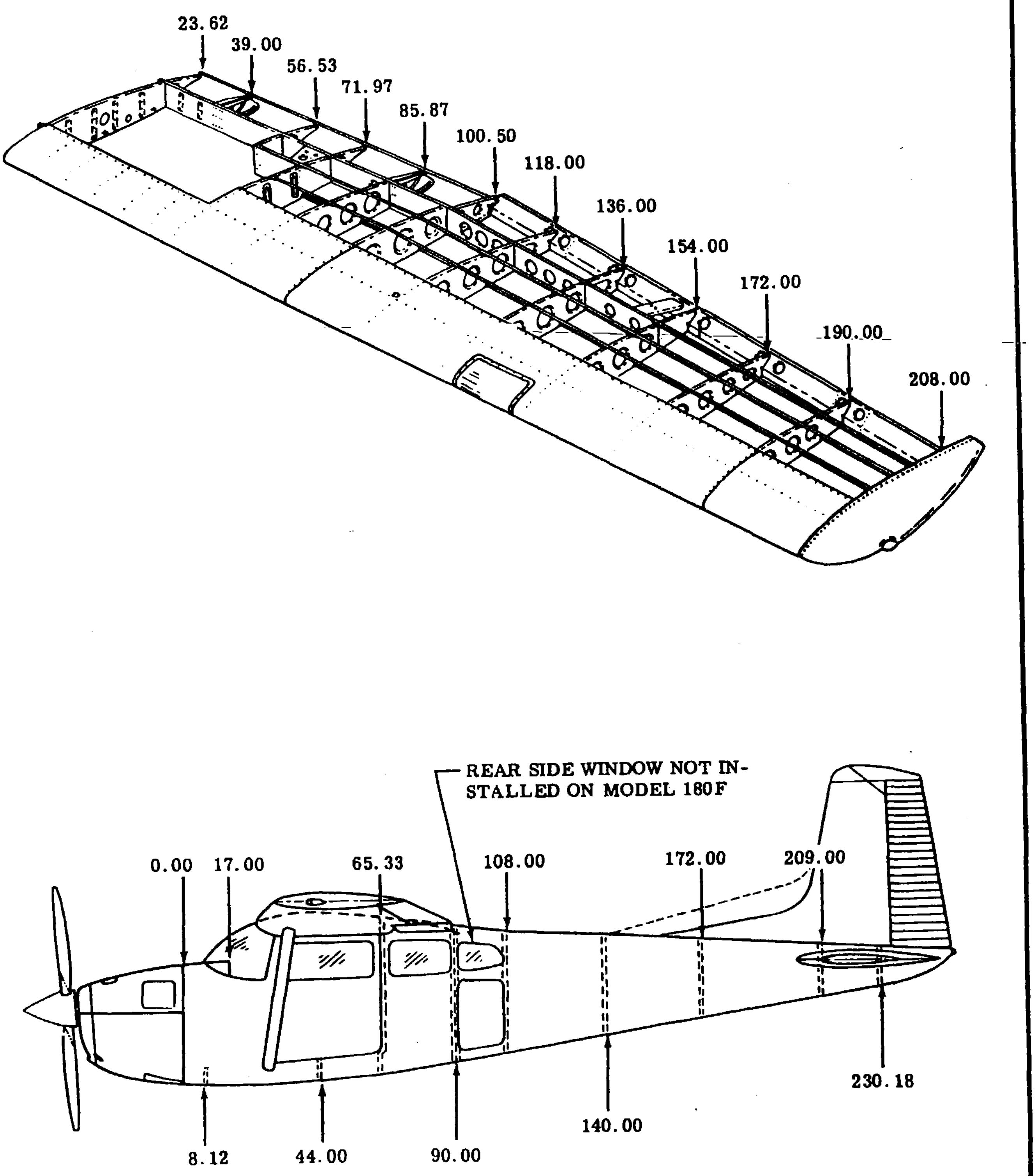


Figure 1-4. Reference Stations - Models 180 and 185

TORQUE VALUES IN POUND-INCHES

FINE THREAD SERIES

BOLT SIZE (See Note 1)	STANDARD TYPE NUTS (See Note 2)	STANDARD TYPE NUTS Alternate Values AN310 (See Note 4)	SHEAR TYPE NUTS MS20364, AN320 AN316, AN7502	SHEAR TYPE NUTS Alternate Values AN320 (See Note 4)
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	2500-4650	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

BOLT SIZE (See Note 1)	STANDARD TYPE NUTS (See Note 3)	SHEAR TYPE NUTS MS20364, AN320, AN316
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) AN3, AN23, AN42, AN173, MS20004, NAS334, NAS464 Series Bolts; AN502, AN503, NAS220 and NAS517 Series Screws.

(2) AN310, AN315, AN345, AN362, AN363, MS20365, AN366, NAS679, "EB," "1452," "Z1200," "UWN" and other self-locking nuts.

(3) AN310, AN340, MS20365, AN366 and other self-locking anchor nuts.

(4) When using AN310 and AN320 castellated nuts where alignment between bolt and cotter pin holes is not reached using normal torque values, use alternate torque values or replace nut.

These torque values 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.

SECTION 2

GROUND HANDLING, SERVICING, LUBRICATION, AND INSPECTION

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2-1. GROUND HANDLING.

2-2. TOWING.

Moving the airplane 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 airplane. 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 airplane can be turned by pivoting it about the main wheels.

CAUTION: WHEN TOWING THE AIRPLANE, 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.

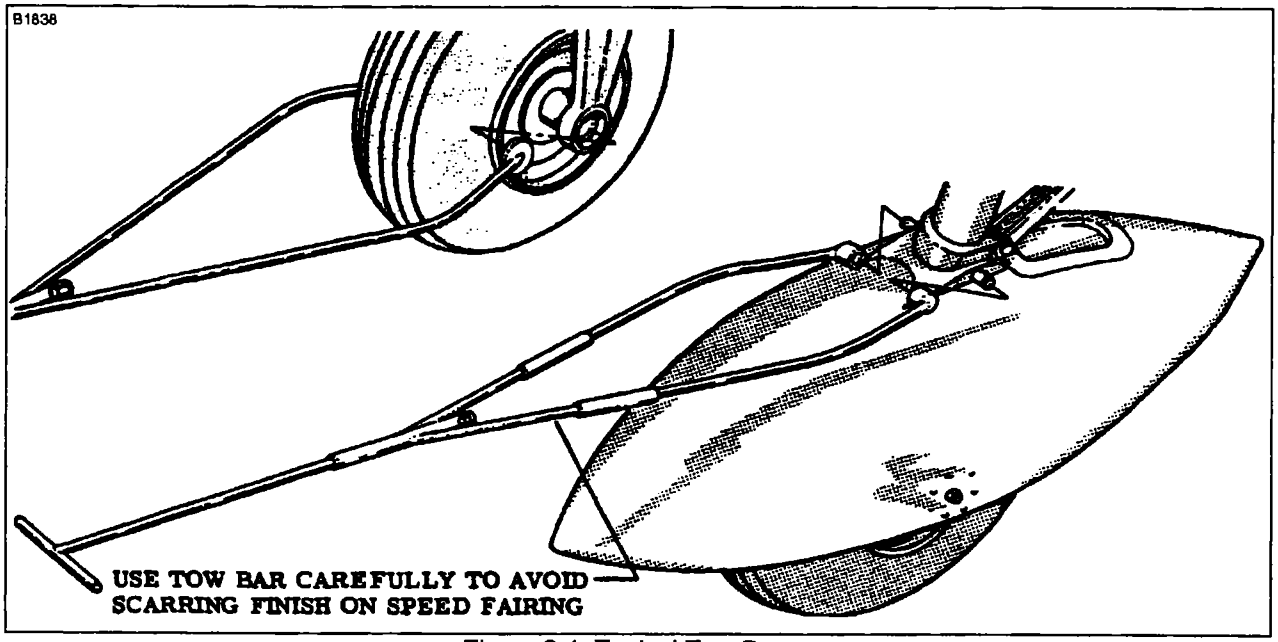
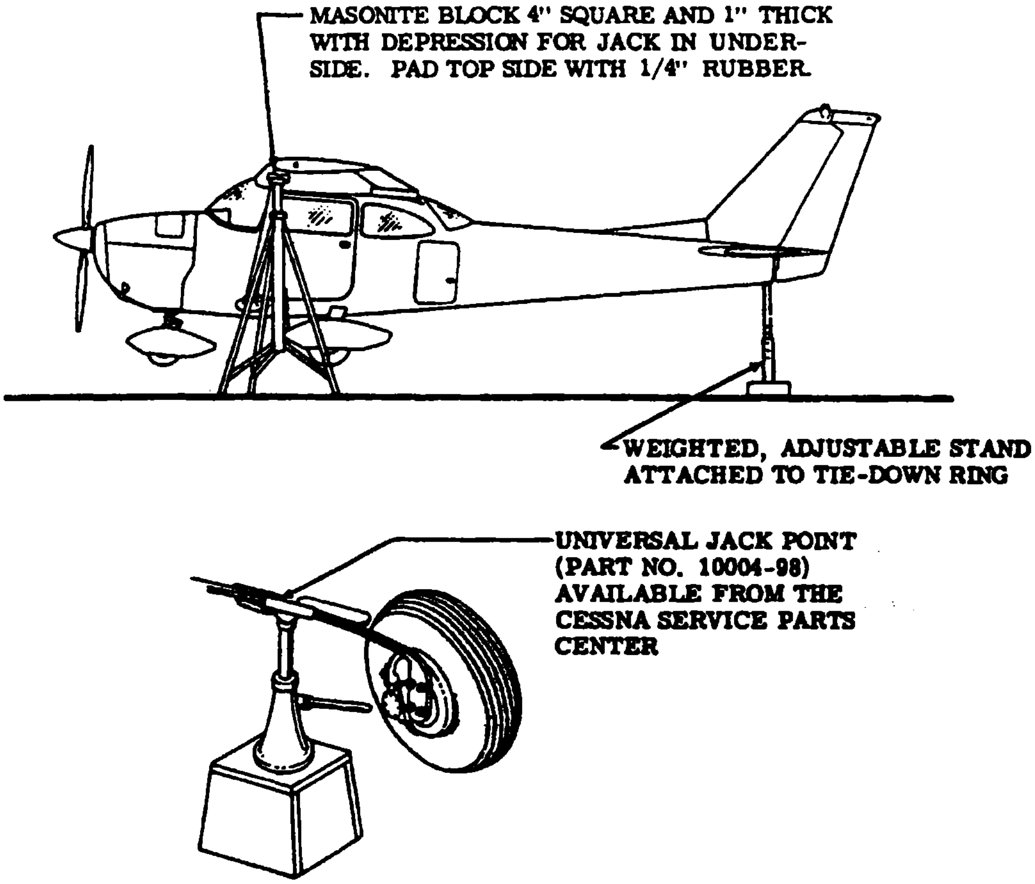


Figure 2-1. Typical Tow Bars

B1840



1. Wing jacks must be short enough to slide under front spar of wing just outboard of wing strut, must extend far enough to raise wheels off ground, and must be of adequate strength.
2. Jacks short enough to slide under Model 150 wings, with leg extensions or adapter stands for other models with higher wings, are recommended.
3. 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.
4. Jacking one wing is not recommended due to landing gear flexibility. However, if adequate precautions against slipping are taken, it is permissible.
5. Lowering the tail on tricycle gear aircraft and pushing up at the front spar of the wing will gain additional height for initially positioning jacks.
6. Operate jacks evenly until desired height is reached.
7. The universal jack point may be used to jack one wheel. Do not use the brake casting as a jack point. Flex brake line away from gear spring when using the universal jack point.
8. The nose may be raised by weighting down the tail. Place weight on each side of stabilizer, next to fuselage.
9. On conventional gear aircraft, place a suitable stand under the tailwheel to raise the tail until the aircraft is approximately level before jacking the wings.

Figure 2-2. Jacking Details

2-3. HOISTING. The airplane may be lifted with a hoist of two-ton capacity by using hoisting rings, which are optional equipment on all airplanes except the Model 150, 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.

CAUTION

When using the universal jack point, flexibility of the gear strut will cause the main wheel to slide inboard as the wheel is raised, tilting the jack. The jack must then be lowered for a second jacking operation. Jacking both wheels simultaneously with universal jack points is not recommended.

2-5. PARKING. Parking precautions depend principally on local conditions. As a general precaution, it is wise to set the parking brake or chock the wheels, and install the control lock. In severe weather and high wind conditions, tie down the airplane as outlined in paragraph 2-6 if a hangar is not available.

2-6. TIE-DOWN should be accomplished in anticipation of high winds. Tie down airplane as follows:
a. Tie ropes or chains to the wing tie-down fittings located at the upper end of each wing strut. Secure the opposite ends of the ropes or chains to ground anchors.
b. Secure a tie-down line through the nose gear tie-down ring. On tricycle gear aircraft without a nose gear tie-down ring, use a rope (no chains or cables) to secure the upper strut (exposed portion of engine mount on the Model 150) to ground anchors.
c. On tricycle gear aircraft, secure the middle of a length of rope to tail tie-down ring. Pull each end of rope away at a 45° angle and secure to ground anchors at each side of tail. On aircraft with conventional tailgear, tie down the tailwheel. Some Model 180 and 185 aircraft are equipped with a tie-down ring at the tailgear.
d. Install surface control locks between wing tip and aileron, and over fin and rudder.
e. Install control lock on pilot's control column if available; if control lock is not available, tie pilot's control wheel back with front seat belt.

2-7. HANGAR STORAGE. An aircraft stored in a hangar will require little attention. The following operations will maintain it in a serviceable condition.

NOTE

If the aircraft is to be stored for a period of more than 30 days, see paragraph 2-9.

a. Rotate the propeller by hand at least four revolutions every few days to maintain an oil film on the internal parts of the engine.

WARNING

Ignition switch must be OFF when rotating propeller by hand.

b. Keep fuel tanks full to retard moisture condensation in the tanks.
c. Keep battery fully charged to prevent the electrolyte from freezing in an unheated hangar.

2-8. OUTSIDE STORAGE. Short-term storage of an aircraft requires secure tie-down procedures in accordance with paragraph 2-6, as well as the precautions listed in paragraph 2-7. In addition, the pitot tube, air vents, openings in the engine cowling, and other similar openings should have protective covers installed if rain, sleet, snow, or blowing dust are anticipated.

2-9. EXTENDED STORAGE. Although the aircraft is constructed of corrosion resistant Alclad aluminum which will last indefinitely under normal conditions if kept clean, these alloys are subject to oxidation. The first indication of corrosion on unpainted surfaces is 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 three months, the following methods of treatment are suggested:
a. Fill fuel tanks with 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. Block up fuselage to remove weight from tires.

NOTE

Tires will take a set, causing them to become out-of-round, if an aircraft is left parked for more than a few days. For this reason, a stored aircraft should not have its weight on the tires.

e. Lubricate all airframe items and seal or cover all openings.
f. Remove battery and store in a cool dry place; service battery periodically and charge as required.
g. Inspect for corrosion at least once a month and remove dust collections as frequently as possible. Clean and wax as required.

If the engine has been in temporary storage and will be stored and not operated for a period of from 30 to 60 days, the engine should be treated for extended storage. The engine is treated for storage prior to airframe treatment.

a. Operate engine until oil temperature reaches normal operating range. Drain engine oil sump completely, and install sump drain plug.

b. (LYCOMING ENGINE). Fill oil sump to normal capacity with corrosion-preventive mixture meeting specification MIL-C-6529C (Esso "Rust Bane 628" or equivalent) which has been preheated to 220°F (104°C).

(CONTINENTAL ENGINE). Fill oil sump to normal capacity with corrosion-preventive oil (Continental Motors Corporation recommends Cosmoline No. 1223, supplied by E. F. Houghton & Co., 305 W. Lehigh Ave., Philadelphia, Pa.), which has been pre-heated to 225°F (107.2°C).

c. Start and operate engine at 1200-1500 rpm for four to five minutes.

CAUTION

Do not exceed maximum allowable engine temperatures.

d. Stop engine and drain preservative mixture from oil sump. The preservative mixture may be saved and re-used.

NOTE

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

e. Remove, clean, and install oil filter screens. Install new filter element on aircraft equipped with external filter.

NOTE

Preheat the preservative mixture to 200-220°F (93-104°C) for all spraying operations described in the following.

f. Disconnect ignition harness and remove all spark plugs. Spray each cylinder through the spark plug holes with two ounces of preservative mxiture while the engine is turned five full revolutions for each cylinder. Store spark plugs.

g. Remove and store the exhaust pipes and spray the exhaust port and exhaust valve of each cylinder with piston 1/4 turn before top dead center on the cylinder exhaust stroke.

h. Spray each cylinder through spark plug holes without engine rotation. Install spark plugs or solid plugs in lower spark plug holes; install cylinder dehydrator plugs in upper spark plug holes, and install metal covers over cylinder exhaust ports.

i. Cover spark plug cable terminals with tape, and cover all other engine and accessory vents, and other openings with a vapor-proof covering material.

j. Attach a warning placard on the throttle control to the effect that the engine contains no lubricating oil. Placard the propeller to the effect that it should

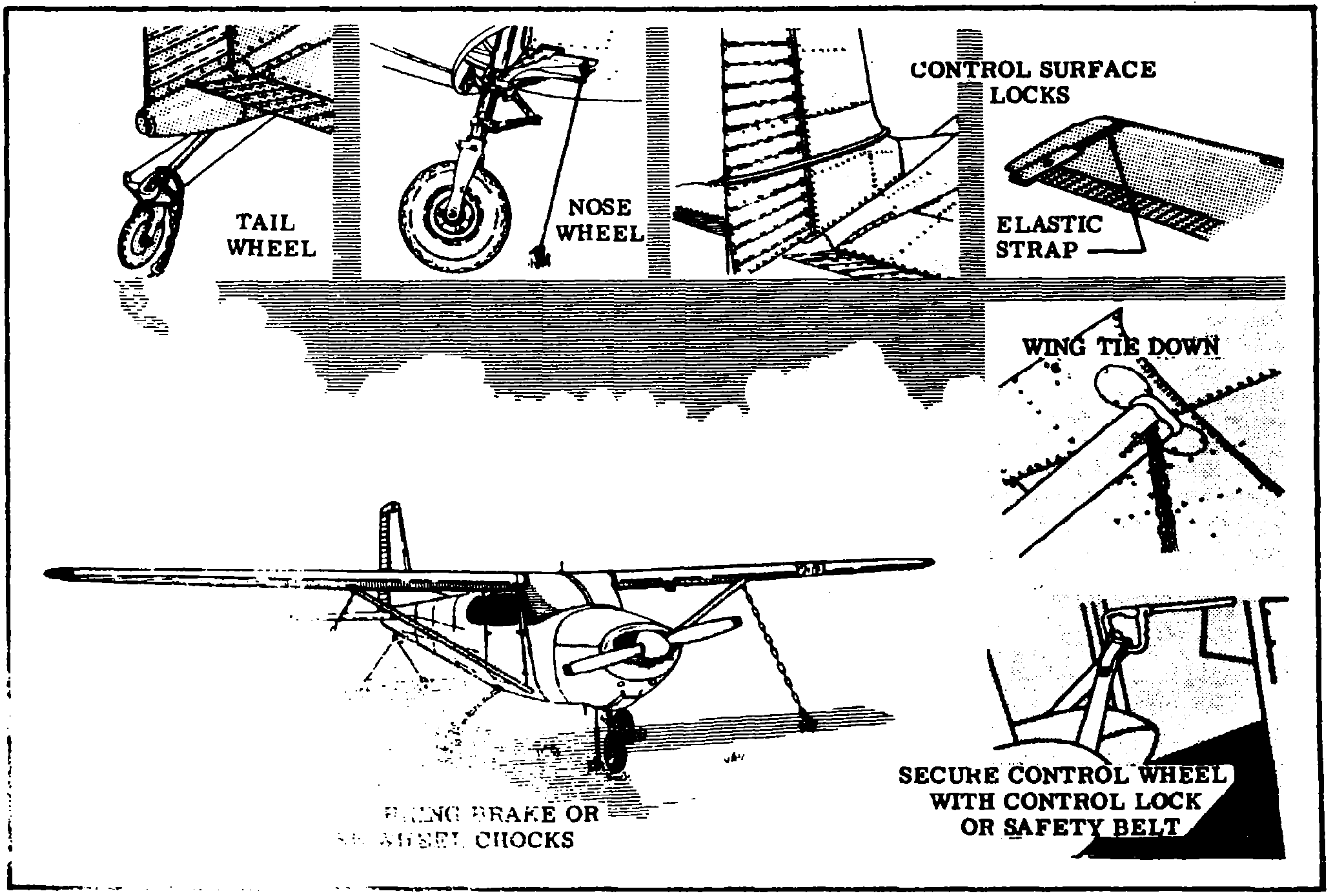


Figure 2-3. Tie-Down Details

not be rotated while the engine is in storage.

k. Perform steps "a" thru "g" after the engine is prepared for storage.

l. The preceding is applicable only for storage periods not exceeding 60 days. Should it become necessary to extend the storage period beyond the 60 day limit, the storage procedure shall be repeated.

2-10. RETURNING AIRCRAFT TO SERVICE. After short-term storage, returning the aircraft to service is accomplished by completing a thorough pre-flight inspection. After an extended storage, use the following procedure to return the aircraft to service.

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

b. Check and install battery.

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

d. Remove warning placards posted at throttle control and on propeller.

e. Remove and clean engine oil screens, then install and safety screens. If an external filter is installed, install new element.

f. Drain engine oil sump. Install and safety drain plug, then service engine with correct grade and quantity of engine oil.

NOTE

The corrosive-preventive mixture will mix with engine lubricating oil, so flushing the oil system is not necessary. Draining the oil sump will remove enough of the corrosive-preventive mixture. However, after 25 hours of operation the engine oil should be drained while the engine is hot. This will remove any residual corrosive-preventive mixture that may be present in the oil system.

g. Remove dehydrator plugs installed in upper spark plug holes, and remove spark plug or solid plugs installed in lower spark plug holes. Rotate propeller several revolutions to clear corrosion-preventive mxiture from the cylinders and to saturate the interior of the engine with clean lubricating oil.

NOTE

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

h. Remove cover plates and install exhaust pipes.

i. Clean, gap, and install spark plugs and connect spark plug leads.

j. Check fuel strainer and drain carburetor. Remove and clean fuel strainer filter screen if necessary. Check fuel tanks and fuel lines for moisture condensation and sediment and drain enough fuel to eliminate any moisture.

k. Service induction air filter.

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

2-11. LEVELING. Corresponding points on both upper door sills may be used to level all models laterally. References for longitudinal leveling are:

Model 150C (1963) - Top edge of fuselage splice plate.

Models 150D & on, 172, P172, and 182 - Top of tailcone between rear window and vertical fin.

Models 180 and 185 - Lower surface of upper door sill.

2-12. SERVICING.

2-13. Servicing requirements are shown in the Servicing Chart (figure 2-4). The following paragraphs supplement this figure by adding details not included in the chart.

2-14. FUEL. Fuel tanks should be filled immediately after flight to lessen moisture condensation. Tank capacities are listed in Section 1. The recommended fuel is 80/87 minimum, aviation grade gasoline, for all except the Model 185 and A185 Series airplanes, which require 100/130 aviation grade gasoline.

2-15. FUEL DRAINS are located at various points in the fuel systems to provide for drainage of water and sediment. Each aircraft is equiped with a fuel strainer drain valve, fuel line or selector valve drain plugs or drain valves, and fuel tank sump drain plugs or drain valves. In many airplanes, the fuel strainer drain valve may be operated by a control located at the instrument panel. During the 1967 model year the strainer drain control was removed from the instrument panel and relocated adjacent to the engine oil dipstick. Access to the strainer drain control is through the engine oil dipstick access door. Remove drain plugs and open strainer drain at the intervals specified in figure 2-4 to drain water and sediment from the fuel system. Also, during daily inspection of the fuel strainer, if any water is found in the fuel strainer, there is a possibility that wing tank sumps, lines, and accumulator tank contain water. Therefore, all fuel drain plugs should be removed and all water drained from the fuel system.

2-16. ENGINE OIL. Check engine lubricating oil with the oil 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 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 four months even though less than the specified hours have accumulated. Reduce these intervals for prolonged operation 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, clean oil screens, and/or change external filter element whenever oil on the dipstick appears dirty.

Detergent or ashless dispersant oil conforming to Lycoming Specification No. 301E for the "Blue Streak" (Lycoming) engine or conforming to Continental Motors Specification MHS-24A for the Continental engine 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

New or newly overhauled engines should be operated on aviation grade straight mineral oil until the first oil change, or until oil consumption has stabilized. If a detergent or ashless dispersant oil is used in a new engine, or a newly overhauled engine, high oil consumption might possibly be experienced. The anti-friction additives of some detergent and ashless dispersant oil will retard the "break-in" of the piston rings and cylinder walls. This condition can be avoided by the use of straight mineral oil until normal oil consumption is obtained, then change to detergent or ashless dispersant oil. The aircraft is delivered from Cessna with straight mineral oil of the correct viscosity.

"BLUE STREAK" (Lycoming) ENGINE. On aircraft NOT equipped with an external oil filter, change oil and clean oil screens at 50-hour intervals. On aircraft equipped with an external oil filter, the engine oil change intervals may be extended to 100-hour intervals providing the external filter element is changed AT 50-HOUR INTERVALS.

CONTINENTAL ENGINE. On aircraft equipped with an external oil filter, change engine oil and filter element at 50-hour intervals. On aircraft NOT equipped with an external oil filter, change engine oil and clean the oil screen EVERY 25 HOURS.

NOTE

Detergent or ashless dispersant oil conforming to Continental Motors Specification MHS-24A MUST be used in all Model A185 series aircraft and in the 1966 and 1967 Model 172 series aircraft. ~~However straight mineral oil may~~ be used in all other models equipped with Continental engines, detergent or ashless dispersant oil conforming to Continental Motors Specification MHS-24A is recommended. On models where a straight mineral oil has been used continuously, converting to detergent or ashless dispersant oil is not recommended except at engine overhaul or replacement.

Oil capacities for the different models 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). 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.

ALL ENGINES

MODEL	CAPACITY (TOTAL)	CAPACITY (TOTAL WITH FILTER)	NORMAL OPERATION	MINIMUM FOR FLIGHT
150	6	7	5	4
172	8	9	7	6
P172	10	11	8	6
180	12	13	10	9
182	12	13	10	9
185	12	13	10	9

SHOP NOTES:

When adding or changing oil, use aviation grade oil in accordance with the following chart.

CONTINENTAL ENGINES

ABOVE 40° F		BELOW 40° F	
MODEL	GRADE	MODEL	*GRADE
150	SAE 40	150	SAE 10W30 or SAE 20
172 (Prior to 172G)	SAE 40	172 (Prior to 172G)	SAE 10W30 or SAE 20
P172	SAE 40	P172	SAE 10W30 or SAE 20
172G and on	SAE 50	172G and on	SAE 10W30 or SAE 30
180	SAE 50	180	SAE 10W30 or SAE 30
182	SAE 50	182	SAE 10W30 or SAE 30
185	SAE 50	185	SAE 10W30 or SAE 30
A185	SAE 50	A185	SAE 10W30 or SAE 30

*Multi-viscosity oil with a range of SAE 10W30 is recommended for improved cold weather starting. However, since this oil is also a detergent oil, it should not be used in those models where a straight mineral oil is being used, except as noted in the preceding text.

"BLUE STREAK" (Lycoming) ENGINE

MODEL	GRADE	AMBIENT TEMPERATURE
172I and on	SAE 50	ABOVE 60°F
	SAE 30	0° to 70°F
	SAE 20	BELOW 10°F
	*SAE 10W30	

*Multi-viscosity oil with a range of SAE 10W30 is recommended for improved cold weather starting and lubrication of the engine during the critical warm-up period. Detergent or ashless dispersant oil, conforming to Lycoming Specification No. 301E MUST BE USED.

2-17. ENGINE INDUCTION AIR FILTER. The induction air filter keeps dust and dirt from entering the induction system. The value of maintaining the air filter in a good clean condition can never be overstressed. More engine wear is caused through the use of a dirty or damaged air filter than is generally believed. The frequency with which the filter should be removed, inspected, and cleaned will be determined primarily by aircraft operating conditions. A good general rule however, is to remove, inspect, and clean the filter at least every 50 hours of engine operating time and more frequently if warranted by operating conditions. Some operators prefer to hold spare induction air filters at their home base of operation so that a clean filter is always readily available for use. Under extremely dusty conditions, daily servicing of the filter is recommended. Two types of filters are used. One is a flock-coated, oiled filter and the other is a dry, paper-media filter.

NOTE

The Model 172-series prior to 1968, and all Model 150 aircraft are equipped with a flock-coated, oiled filter when it leaves the factory. However, when spares stocks are exhausted, new filters ordered from Cessna Service Parts Center will be the dry type with an improved element. The 1968 Model 172I is equipped with the dry type filter.

To service the flock-coated, oiled filter, proceed as follows:

a. Remove filter from aircraft.
b. Wash filter thoroughly, soiled face down in solvent (Federal Specification P-S-661 or equivalent).
c. Drain and dry filter, then dip flock-coated screen filter in the same grade of oil used in the engine and allow excess oil to drain off.
d. Be sure air box is clean, inspect filter and replace if damaged.

NOTE

A damaged filter may have broken filtering panels or the flock coating may be missing from the filtering panels, which will allow unfiltered air to enter the induction system. Any filter that appears doubtful shall be replaced.

e. Install filter in air box with gasket on aft face of filter frame and with air flow arrow on filter pointed in the correct direction.

NOTE

Keeping a supply of clean, serviced filters on hand will speed up air filter servicing. Refer to figure 2-5.

To service the dry type filter, proceed as follows:
a. Remove filter by releasing the quick-release fasteners.

NOTE

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

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

CAUTION

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

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

NOTE

The filter assembly may be cleaned with compressed air a maximum of 30 times or it may be washed a maximum of 20 times. The filter should be replaced after 500 hours of engine operating time or one year, whichever should occur first. An exception to this is the dry filter formerly used on Models 180, 182, and 185 (Cessna Part No. 0750038, without a dash number), which should be replaced after 300 hours or one year. Cessna Part No. 0750038-4 contains an improved element; this filter should be replaced after 500 hours or one year. However, the filter should be replaced at any time it is damaged. A damaged filter, may have sharp or broken edges in the filtering panels which would allow unfiltered air to enter the induction system. Any filter that appears doubtful shall be replaced.

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

NOTE

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

e. Be sure induction air box and air inlet ducts to the engine are clean, inspect and install new filter if filter is damaged.
f. Install filter. Be sure gasket on aft face of filter is in good condition.

NOTE

An optional air filter installation for the alternate air source (SK 172-21) is available for Model 172 Series aircraft through the 1966 Model year. Refer to paragraph 12-24A.

2-17A. VACUUM SYSTEM FILTERS keep dust and dirt from entering the vacuum operated flight instruments. On airplanes NOT equipped with the central air filter system (see Section 16), the filters in the instruments should be replaced every 100 hours of operation and whenever erratic or sluggish responses are noted with normal suction gage readings. On airplanes equipped with vacuum systems containing a central air filter, change the filter every 500 hours of operation and whenever suction gage reading drops below 4.6 inches of mercury. Change the gyro instrument air filters, when equipped with central air filter, whenever the gyro instruments are overhauled. Beginning with the 1967 models and on, different gyro instruments are used in the vacuum system. These instruments are not equipped with internal filters. The new instruments are smaller with a beveled box-type case. Also, these instruments and related plumbing are used as service parts.

2-18. BATTERY servicing involves adding distilled water to maintain the electrolyte even with the horizontal baffle plate at the bottom of filler holes, checking the battery cable connections, and neutralizing and cleaning off any 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 noticed. 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 17 for detailed battery replacement and testing.

2-19. TIRES should be maintained at the air pressures specified in the charts in Section 1. When checking tire pressure, examine tire for wear, cuts, bruises, and slippage. Remove oil and grease with soap and water.

NOTE

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

2-20. NOSE GEAR SHOCK STRUT. The nose gear strut requires periodic checking to ensure that the strut is filled with hydraulic fluid and is inflated to the correct air pressure. When servicing the nose gear strut, proceed as follows:

a. Remove valve cap and release air pressure.
b. Remove valve housing assembly.
c. Telescope strut to its shortest length and fill to bottom of filler hole with hydraulic fluid.
d. Lift nose of airplane, extend and compress strut several times to expel any entrapped air, then lower nose of airplane and repeat step "c."
e. Install valve housing assembly and inflate strut with nose wheel off ground (strut extended). Shock strut pressures are listed in Section 1.

NOTE

Keep the nose gear shock strut, especially the exposed portion of the strut piston, wiped off with a clean dry cloth to remove dust and grit which may cut the seals in the strut barrel. Do not wipe the strut with hydraulic fluid, since this tends to collect even more dust and grit.

2-21. NOSE GEAR SHIMMY DAMPENER (MODELS 150 AND 172). The shimmy dampener should be serviced at least every 100 hours. The shimmy dampener must be filled completely with fluid, free of entrapped air, to serve its purpose. Two types of shimmy dampeners are used, one of which must be removed to check fluid level and refill. If the dampener has a filler plug, refill as follows:

a. Remove filler plug, and turn nose gear in the direction that places the dampener piston at the end opposite the filler plug.
b. While holding in this position, fill dampener with hydraulic fluid and install and safety filler plug.

If the dampener does not have a filler plug, refill as follows:

a. Remove dampener and pull the fitting end of the dampener shaft to its travel limit.
b. Fill through the opposite end with hydraulic fluid, while holding the dampener vertical.
c. Push the shaft upward slowly to seal off the filler hole, and reinstall the dampener on the airplane. Be sure to keep the shaft protruding through the filler hole until the dampener is installed.

NOTE

Keep 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. Wipe dampener and shaft with a clean cloth. Do not use a cloth saturated with hydraulic fluid, since this tends to collect even more dust and grit.

2-21A. NOSE GEAR SHIMMY DAMPENER (MODEL 182 PRIOR TO 1967). The shimmy dampener should be serviced at least every 100 hours. Two sizes of shimmy dampeners are used. The shimmy dampener on the Model 182 is subjected to more heat than other models, and a small airspace is needed for fluid expansion. Both shimmy dampeners must be removed for filling, since each must be filled with a specific amount of hydraulic fluid.

If the dampener has a filler plug, refill as follows:

a. Remove dampener from airplane.
b. Remove filler plug and drain all hydraulic fluid from the dampener, then fill with the amount of hydraulic fluid specified on the placard.

NOTE

Fill the smaller dampener with 52cc of fluid and the larger one with 74cc of fluid.

c. Install and safety filler plug and reinstall dampener on airplane.

If the dampener does not have a filler plug, refill as follows:

a. Remove dampener and pull the fitting end of the dampener shaft to its travel limit. Drain all fluid from the dampener.
b. Fill through the opposite end with the amount of hydraulic fluid specified on the placard, while holding the dampener vertical.

NOTE

Fill the smaller dampener with 52cc of fluid and the larger one with 74cc of fluid.

c. Push the shaft upward slowly to seal off the filler hole, and reinstall the dampener on the airplane. Be sure to keep shaft protruding through the filler hole until dampener is installed.
d. Observe "note" in preceding paragraph.

2-21B. NOSE GEAR SHIMMY DAMPENER (1967 MODEL 182 AND ON). The Model 182 is equipped with a different shimmy dampener which contains a compensating meahcnism within the hollow piston rod for thermal expansion and contraction of the hydraulic fluid. The shimmy dampener must be filled completely with hydraulic fluid, free of entrapped air with the compensating piston bottomed. Beginning with serial number 18258404 and on, the filling procedure is changed. It is recommended that aircraft prior to serial number 18258404 have the excessive fluid removed from the compensating mechanism as follows:

a. Remove shimmy dampener from the aircraft.
b. While holding the shimmy dampener in a vertical position with the filler plug pointed upward, loosen the filler plug.
c. Allow the spring to bottom out the floating piston inside the shimmy dampener rod.
d. When the fluid stops flowing, insert a length of stiff wire through the air bleed hole in the setscrew at the end of the piston rod until it touches the floating piston. The depth of insertion should be 3-13/16 inches.

NOTE

If the wire insertion is less than 3-13/16 inches, the floating piston is lodged in the shaft. If the wire cannot be used to free the piston, the rod assembly and piston should be replaced.

e. Tighten filler plug and install shimmy dampener in aircraft.

To service the shimmy dampener proceed as follows:
a. Remove shimmy dampener from aircraft.
b. Remove filler plug from dampener.
c. Submerge dampener in clean hydraulic fluid and work dampener shaft in and out to remove any entrapped air and ascertain complete filling.

NOTE

Be sure that the shimmy dampener and hydraulic fluid at 70° to 80° while filling the shimmy dampener.

d. ~~Install filler plug before removing dampener~~ from hydraulic fluid.

NOTE

Be sure to keep the shaft protruding through barrel at filler end, until the dampener is installed.

e. Wash dampener in cleaning fluid and wipe dry with a cloth.
f. Install shimmy dampener on aircraft.

NOTE

Keep shimmy dampener, especially the exposed portion of the dampener shaft, wiped clean with a clean, dry cloth to remove dust and grit which may cut the seals in the dampener barrel. Do not wipe the shaft with hydraulic fluid, since this tends to collect even more dirt and grit.

2-22. HYDRAULIC BRAKE SYSTEMS should be checked and the brake master cylinder refilled as required at least every 100 hours with hydraulic fluid. Bleed the brake system of entrapped air whenever there is a spongy response to the brake pedals.

2-22A. CASTERING AXLE. Check and refill if required per paragraph 5-22H, at each 100-hour inspection.

2-23. OXYGEN CYLINDER. Refer to Section 15.

2-24. FACE MASKS. Refer to Section 15.

2-25. CLEANING.

2-26. Keeping the aircraft clean is important. Besides maintaining the trim appearance of the airplane, cleaning lessens the possibility of corrosion and makes inspection and maintenance easier.

2-27. 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 since 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. 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 clean 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.

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.

2-28. PLASTIC TRIM. The instrument panel, plastic trim, plastic control wheels, and control knobs need only be wiped off 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 2-27, must never be used since they soften and craze the plastic.

2-29. ALUMINUM SURFACES require a minimum of care, but should never be neglected. The airplane may be washed with clean water to remove dirt, and with carbon tetrachloride or other 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.

2-30. PAINTED SURFACES. The painted exterior surfaces of the airplane, under normal conditions, require a minimum of polishing or buffing. Approximately 15 days are required for acrylic or lacquer paint to cure completely and approximately 90 days are required for vinyl paint to cure completely; in most cases, the curing period will have been completed prior to delivery of the airplane. In the event that polishing or buffing is required within the curing period, it is recommended that the work be done by 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 a chamois. Harsh or abrasive soaps or detergents which 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 airplane may be waxed with a good automotive wax. A heavier coating of wax on the leading edges of the wings and tail and on the engine nose cap will help reduce the abrasion encountered in these areas.

2-31. ENGINE COMPARTMENT cleaning is essential to minimize any danger of fire, and for proper inspection of components. The engine and engine compartment may be washed down with a suitable solvent, then dried thoroughly.

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 oil, fuel, and air openings on the engine and accessories should be covered before washing the engine with solvent. Caustic cleaning solutions should be used cautiously and should always be properly neuiralized after their use.

2-32. UPHOLSTERY AND INTERIOR cleaning prolongs the life of upholstery fabrics and interior trim. To clean the interior:

a. Empty the ash trays.
b. Brush out or vacuum clean the carpeting and upholstery to remove dirt.
c. Wipe off leather, Royalite, and plastic surfaces with a damp cloth.
d. Soiled upholstery fabrics and carpeting may be cleaned with a foam-type detergent, used according to the manufacturer's instructions.
e. Oily 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 a volatile solvent; it may damage the padding and backing materials.
f. Scrape off sticky materials with a dull knife, then spot clean the area.

2-33. PROPELLERS should be wiped off occasionally with an oily cloth to clean off grass and bug stains. In salt water areas this will assist in corrosion-proofing the propeller.

2-34. WHEELS should be washed off periodically and examined for corrosion, chipped paint, and cracks or dents in the wheel castings. Sand smooth, prime, and repaint minor defects.

2-35. LUBRICATION.

2-36. Lubrication requirements are shown on the Lubrication Chart (figure 2-4). Before adding grease to grease fittings, wipe off all dirt. Lubricate until new grease appears around parts being lubricated, and wipe off excess grease. The following paragraphs supplement this figure by adding details.

2-37. NOSE GEAR TORQUE LINKS. The nose gear torque links should be lubricated at least every 50 hours, or oftener when operating in dusty areas. Under extremely dusty conditions, daily lubrication is recommended.

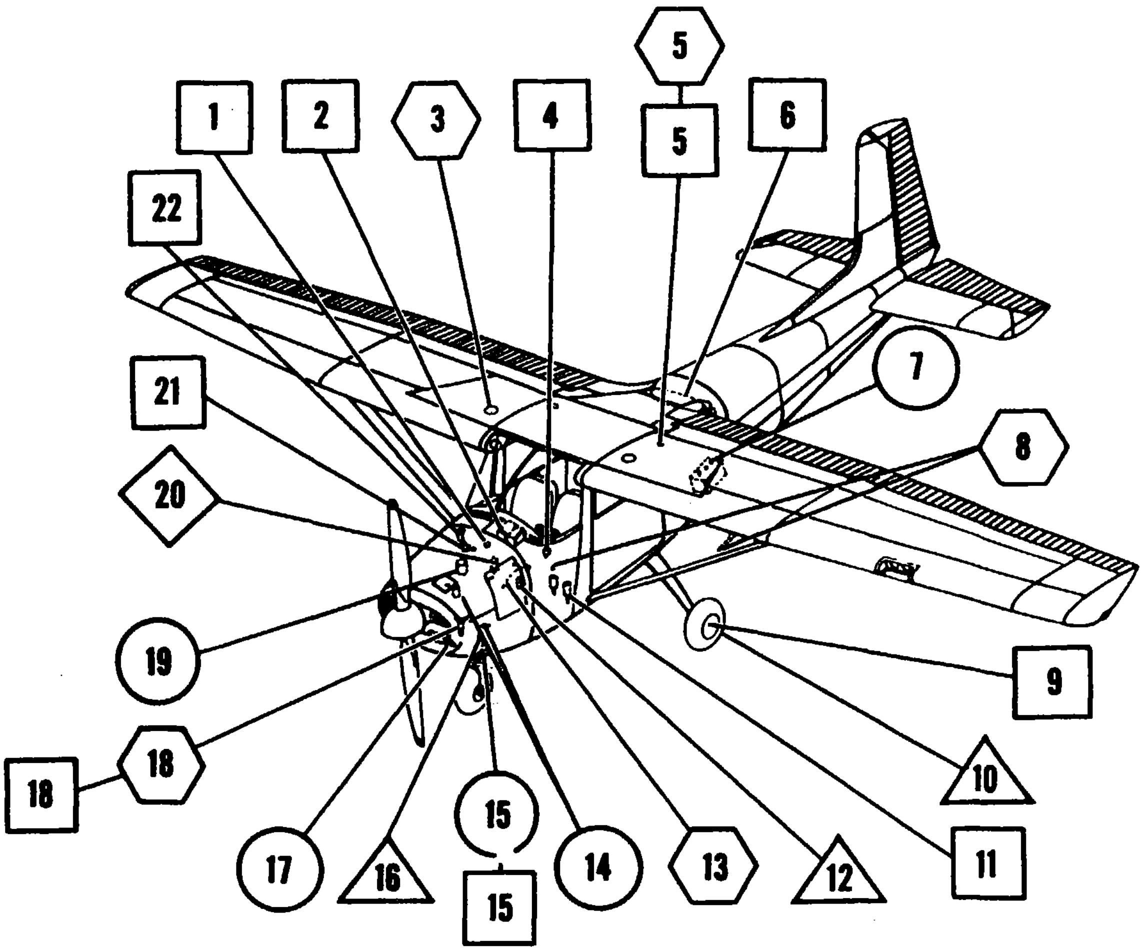
2-38. RUDDER TRIM WHEEL THREADS (MODEL 185 SERIES). Spray the rudder trim wheel threads with Electrofilm Lubri-Bond "A" which is available in aerosol spray cans.

2-39. TACHOMETER DRIVE SHAFT. Refer to Section 16 for lubrication.

2-40. WHEEL BEARING LUBRICATION. It is now recommended that nose and main wheel bearings be cleaned and repacked at the first 100-hour inspection and at each 500-hour inspection thereafter. If more than the usual number of take-off and landings are made, extensive taxiing is required, or the airplane is operated in dusty areas or under seacoast conditions, it is recommended that cleaning and lubrication of wheel bearings be accomplished at each 100-hour inspection.

2-41. CASTERING AXLE. Lubricate pivot pin during assembly. Also lubricate the pivot pin through the grease fittings after assembly and at each 100-hour inspection.

SHOP NOTES:



DAILY

3 FUEL TANK FILLERS
Fill after each flight. Keep full to retard condensation. Refer to paragraph 2-14 for details.

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

6 OXYGEN CYLINDER
Check for anticipated requirements before each oxygen flight. Refer to Section 15 for details.

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

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

18 FUEL STRAINER
Drain off any water and sediment before the first flight of the day.

SERVICING

Figure 2-4. Servicing and Lubrication (Sheet 1 of 7)

50 HOURS

7 BATTERY
Check level of electrolyte. Check at least every 30 days, oftener in hot weather. Refer to paragraph 2-18 for details.

14 19 ENGINE OIL SYSTEM
Change engine oil and external filter element. Without external filter, change oil and clean oil screen EVERY 25 HOURS. Reduce these intervals under severe operating conditions. Refer to paragraph 2-16 for details.

17 INDUCTION AIR FILTER
Service oftener under dusty conditions. Refer to paragraph 2-17 for details.

~~15 SHIMMY DAMPENER (1967 MODEL 182)~~
Check shimmy dampener compensating ~~mechanism. Refer to paragraph 2-21B for details.~~

100 HOURS

1 FUEL/AIR CONTROL UNIT SCREEN
Remove and clean screen in bottom of fuel/air control unit on fuel injection engines, then reinstall and safety the screen.

2 GYRO INSTRUMENT AIR FILTERS
If not equipped with central air filter, replace every 100 hours and when erratic or sluggish responses are noted with normal suction gage readings. Refer to paragraph 2-17A for details.

4 FUEL LINE DRAIN PLUGS OR VALVES
Remove plugs and drain off any water and sediment. Reinstall and resafety plugs. Some aircraft use drain valves instead of drain plugs.

5 FUEL TANK SUMP DRAINS
If quick-drain valves are not installed, remove plugs and drain off any water and sediment. Reinstall and resafety plugs.

11 BRAKE MASTER CYLINDERS
Check fluid level and refill as required with hydraulic fluid.

15 SHIMMY DAMPENER
Check fluid level and refill as required with hydraulic fluid. Refer to paragraphs 2-21 and 2-21A for details.

18 FUEL STRAINER
Disassemble and clean strainer bowl and screen.

9 CASTERING AXLE
Check and refill if required. Refer to paragraph 2-22A for details.

21 VACUUM SYSTEM OIL SEPARATOR
Remove, flush with solvent, and dry with compressed air.

22 SUCTION RELIEF VALVE SCREEN OR FILTER
Check inlet screen or filter for cleanliness. Remove, flush with solvent, and dry with compressed air to clean. On Garwin valves, remove retaining ring to remove screen. On filter-equipped valves, replace garter filter at engine overhaul periods.

SERVICING

Figure 2-4. Servicing and Lubrication (Sheet 2 of 7)

500 HOURS

20 VACUUM SYSTEM CENTRAL AIR FILTER

Replace central air filter every 500 hours and when suction gage reading drops below 4.6 inches of mercury. Refer to paragraph 2-17A for details.

AS REQUIRED

10 TIRES

Maintain proper tire inflation as listed in the charts in Section 1. Also refer to paragraph 2-19.

12 GROUND SERVICE RECEPTACLE (PRIOR TO 1967 MODELS)

Connect to 12-volt, DC, negative-ground power unit for cold weather starting and lengthy ground maintenance of the electrical system. Master switch should be turned on before connecting a generator type external power source; it should be turned off before connecting a battery type external power source. Refer to paragraph 12-14.

CAUTION

Be certain that the polarity of any external power source or batteries is correct (positive to positive and negative to negative). A polarity reversal will result in immediate damage to semiconductors in the airplane's electronic equipment.

12 GROUND SERVICE RECEPTACLE (1967 MODELS AND ON)

Connect to 12-volt, DC, negative-ground power unit for cold weather starting and lengthy ground maintenance of the airplane's electrical equipment with the exception of electronic equipment. Master switch should be turned on before connecting a generator type or battery type external power source. Refer to paragraph 12-14A.

NOTE

The ground power receptacle circuit incorporates a polarity reversal protection. Power from the external power source will flow only if the ground service plug is connected correctly to the airplane.

16 NOSE GEAR SHOCK STRUT

Keep strut filled and inflate to correct pressure. Refer to paragraph 2-20 for details.

SERVICING

Figure 2-4. Servicing and Lubrication (Sheet 3 of 7)

FREQUENCY (HOURS)

50 100 500

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

METHOD OF APPLICATION

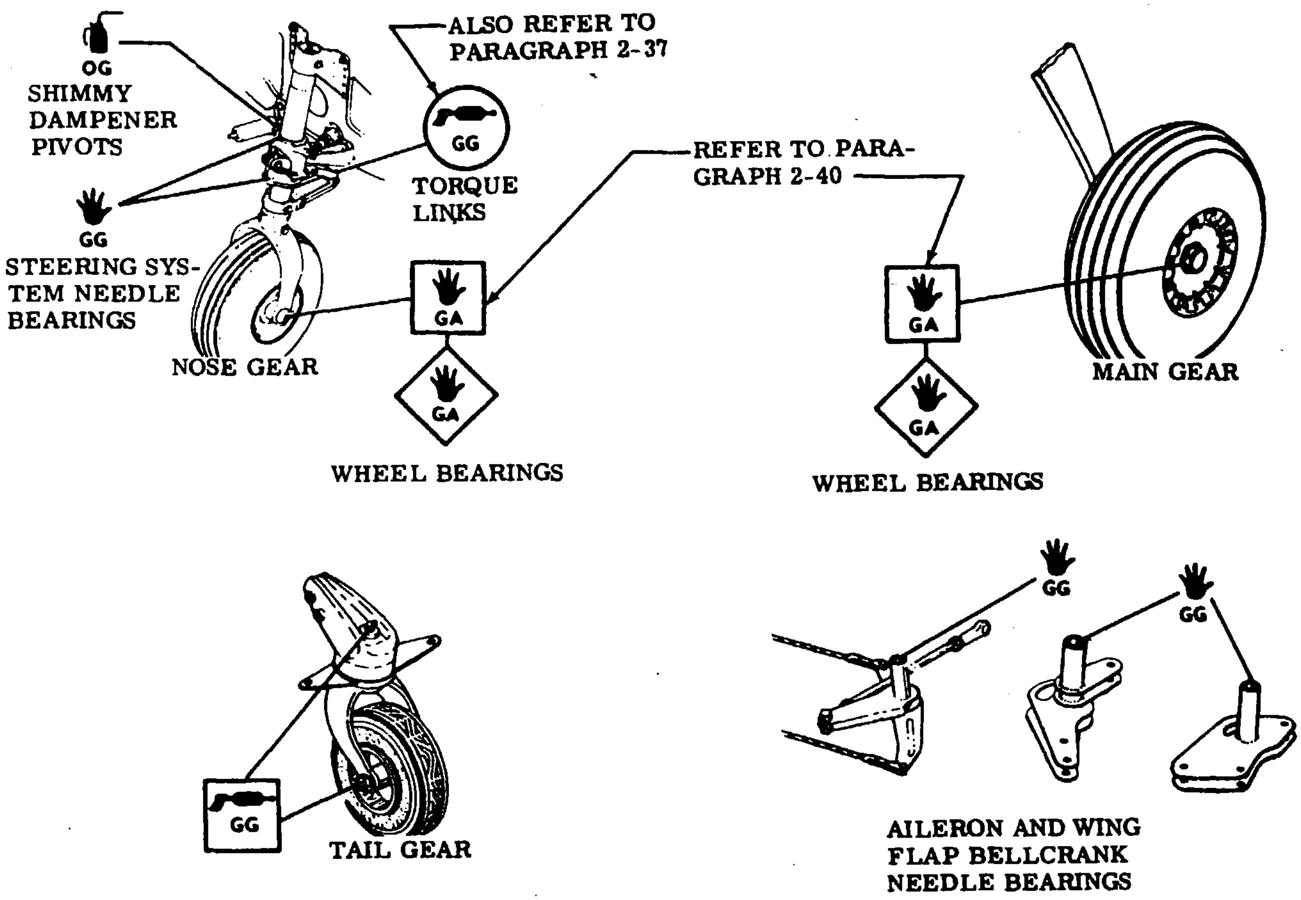
HAND GREASE GUN OIL CAN SYRINGE (FOR POWDERED GRAPHITE)

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 — MIL-G-6711	POWDERED GRAPHITE
GG — MIL-G-7711	GENERAL PURPOSE GREASE
GA — MIL-G-25760	AIRCRAFT WHEEL BEARING GREASE
GH — MIL-G-23827	AIRCRAFT AND INSTRUMENT GREASE
GL — MIL-G-21164	HIGH AND LOW TEMPERATURE GREASE
OG — MIL-L-7870	GENERAL PURPOSE OIL
PL — VV-P-236	PETROLATUM
GS	SIL-GLYDE (OR EQUIVALENT)



LUBRICATION

Figure 2-4. Servicing and Lubrication (Sheet 4 of 7)

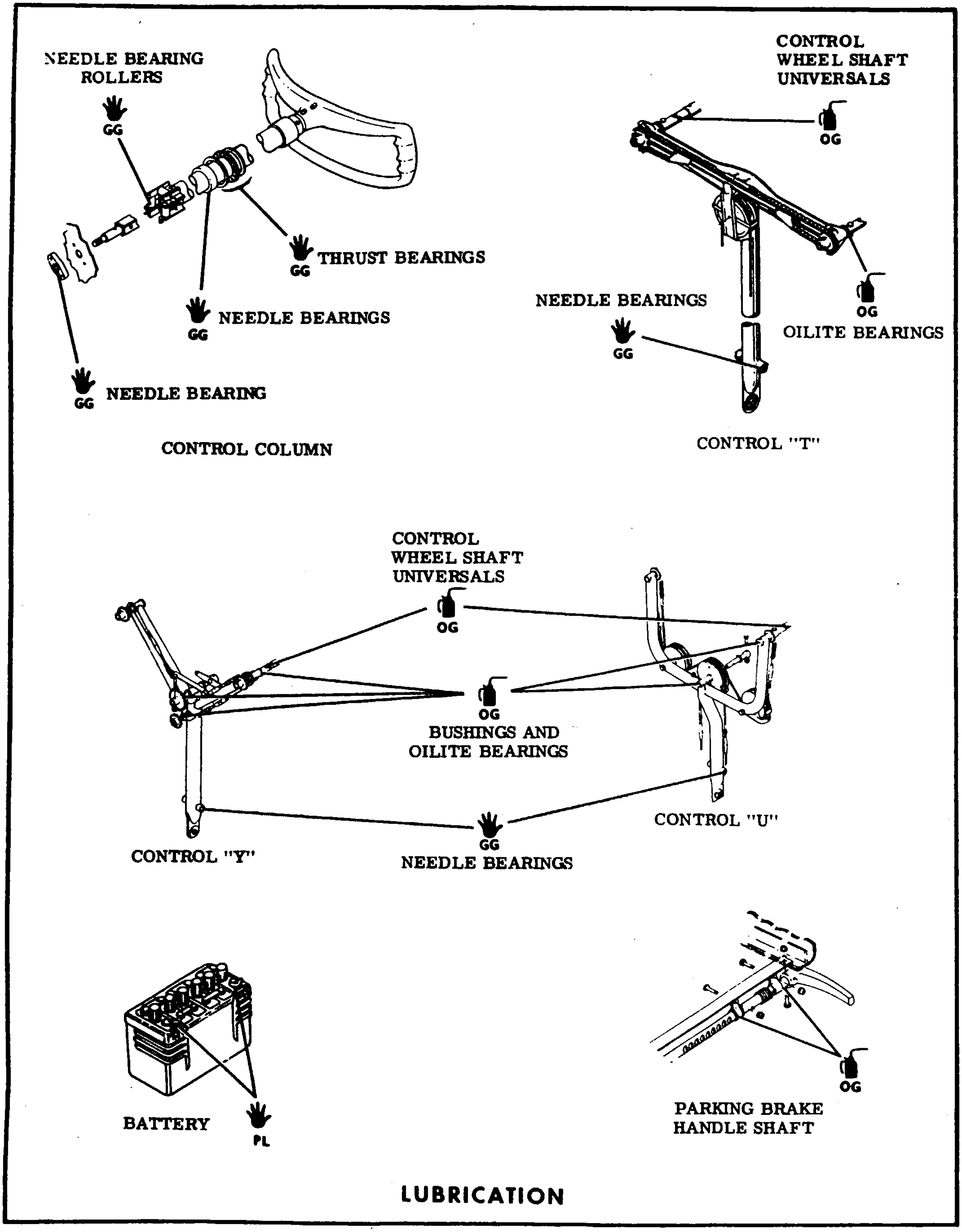


Figure 2-4. Servicing and Lubrication (Sheet 5 of 7)

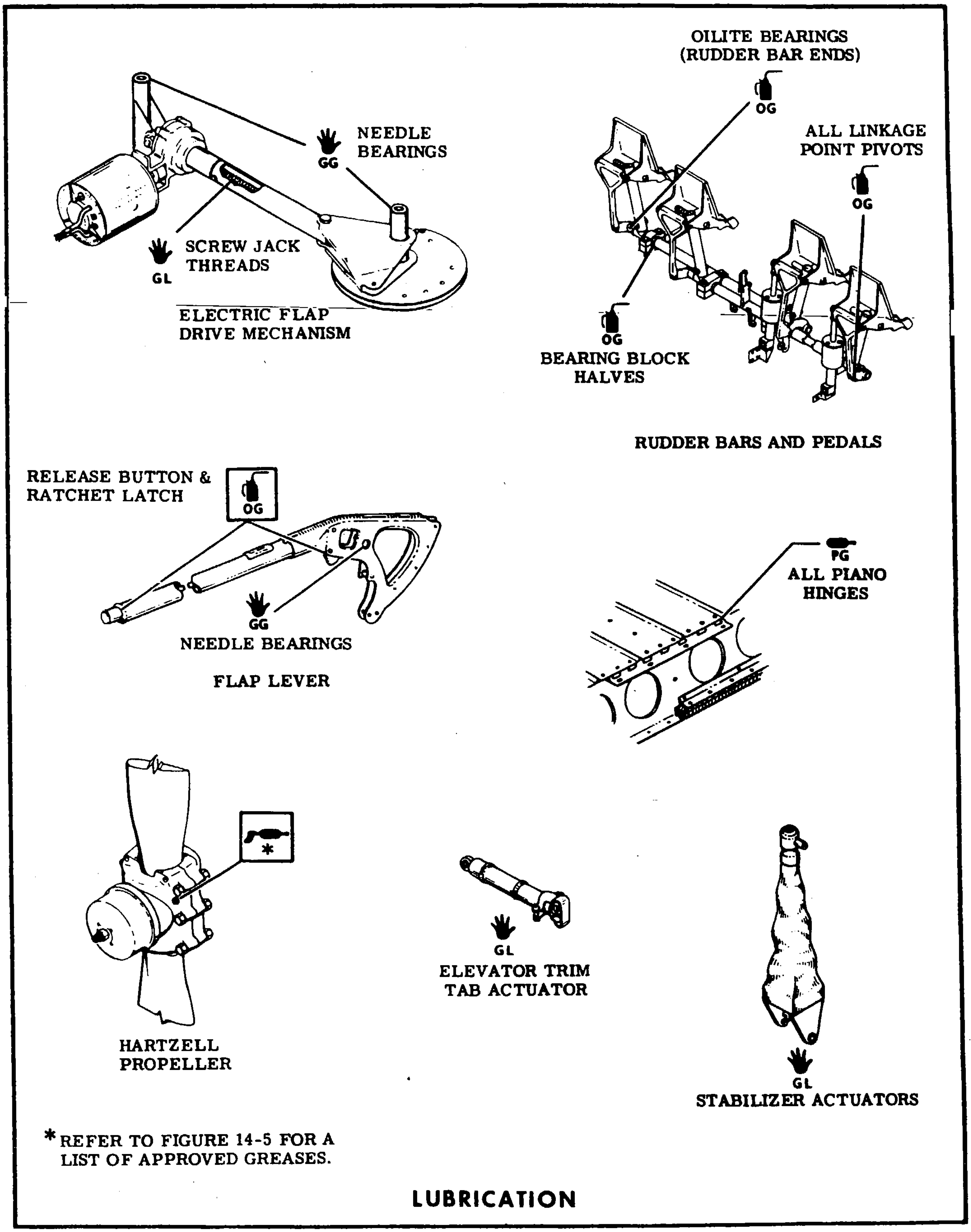
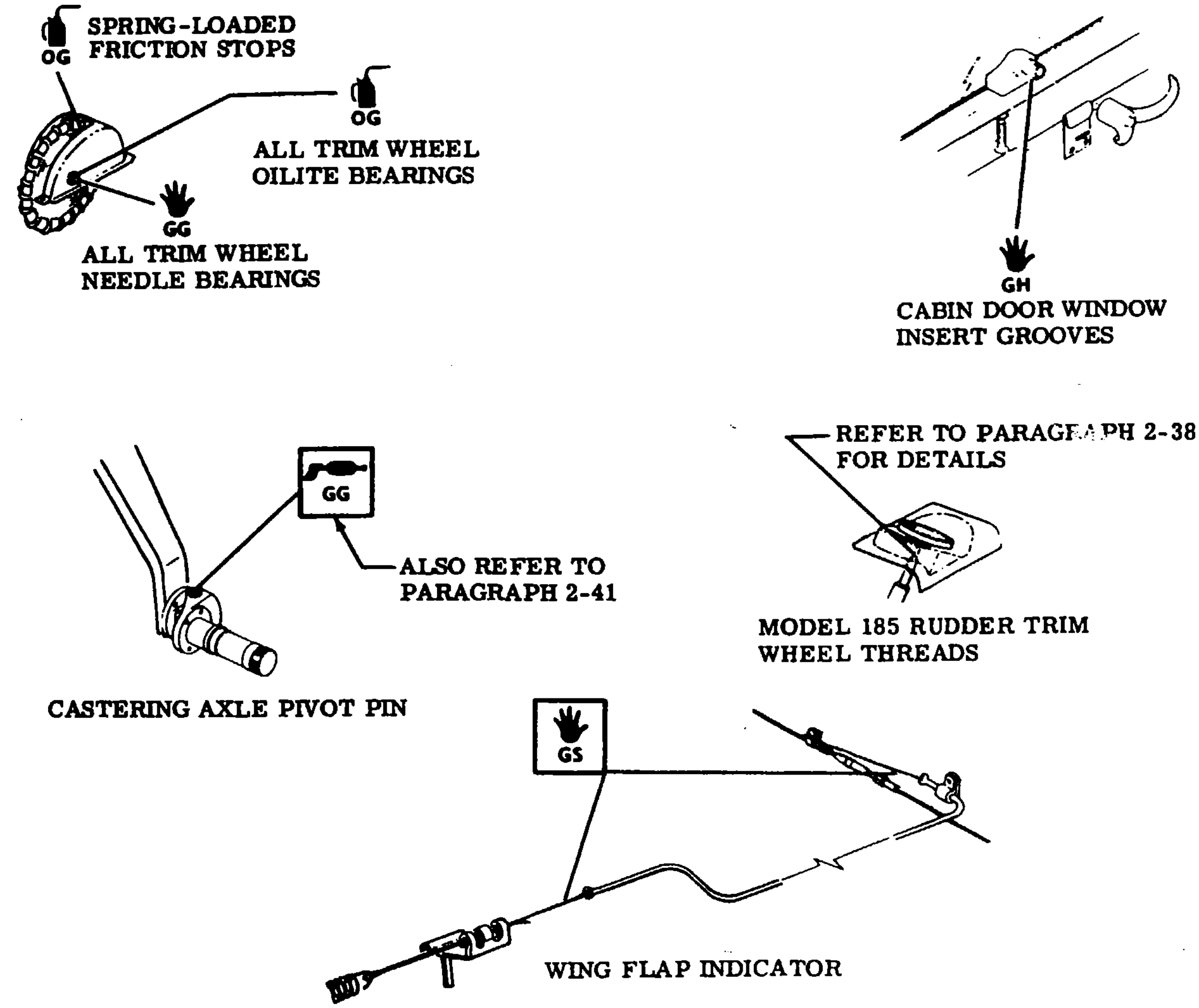


Figure 2-4. Servicing and Lubrication (Sheet 6 of 7)



NOTES

Sealed bearings require no lubrication.

McCauley propellers are lubricated at overhaul and require no other 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-7711 general purpose grease, applied sparingly to friction points, every 1000 hours or oftener if binding occurs. No lubrication is recommended on the rotary clutch.

LUBRICATION

Figure 2-4. Servicing and Lubrication (Sheet 7 of 7)

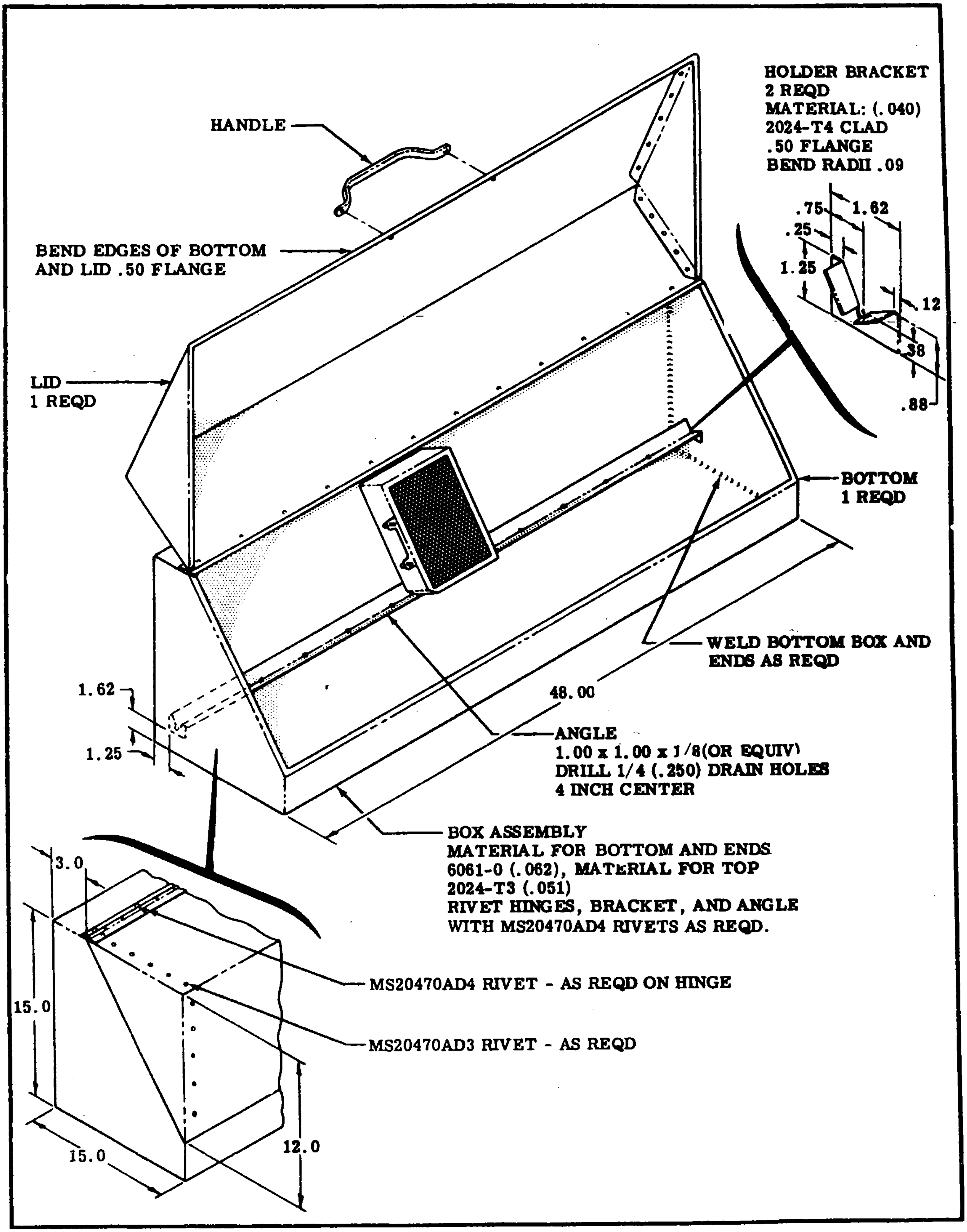


Figure 2-5. Construction of Induction Air Filter Servicing Box

INSPECTION

To avoid repetition throughout the inspection, general points to be checked are given below. In the inspection, only the items to be checked are listed; details as to how to check, or what to check for, are excluded. The inspection covers several different models. Some items apply only to specific models, and some items are optional equipment that may not be found on a particular airplane. Check FAA Airworthiness Directives and Cessna Service Letters for compliance at the time specified by them. Federal Aviation Regulations require that all civil aircraft have a periodic (annual) inspection as prescribed by the administrator, and performed by a person designated by the administrator. The Cessna Aircraft Company recommends a 100-hour periodic inspection for the airplane.

CHECK AS APPLICABLE:

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 tensions.
FLUID LINES AND HOSES for: leaks, cracks, dents, kinks, chafing, proper radius, security, corrosion, deterioration, obstructions, and foreign matter.
METAL PARTS for: security of attachment, cracks, metal distortion, broken spotwelds, corrosion, condition of paint, and any other apparent damage.
WIRING for: security, chafing, burning, defective insulation, loose or broken terminals, heat deterioration, and corroded terminals.
BOLTS IN CRITICAL AREAS for: correct torque in accordance with the torque values given in the chart in Section 1, when installed or when visual inspection indicates the need for a torque check.
FILTERS, SCREENS, AND FLUIDS for: cleanliness, contamination and/or replacement at specified intervals.

AIRPLANE FILE.

Miscellaneous data, information, and licenses are a part of the airplane file. Check that the following documents are up-to-date and in accordance with current Federal Aviation Regulations. Most of the items listed are required by the 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 airplane at all times:
1. Aircraft Airworthiness Certificate (Form FAA 1362B).
2. Aircraft Registration Certificate (Form FAA 500A).
3. Aircraft Radio Station License, if transmitter installed (Form FCC 404-2).

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

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

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.
3. Magneto drop (See Owner's Manual).
4. Engine response to changes in power.
5. Any unusual engine noises.
6. Propeller response (See Owner's Manual).
7. Fuel tank selector and/or shut-off valve; operate engine on each tank position and off position long enough to make sure the valve functions properly.
8. Idling speed and mixture; proper idle cut-off.
9. Alternator and ammeter.
10. Suction Gage.
11. Fuel flow indicator.

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

SCOPE AND PREPARATION.

CONTINENTAL ENGINE:
If the engine is equipped with an external oil filter, change engine oil and filter element at 50-hour intervals. If the engine is NOT equipped with an external oil filter, change engine oil and clean the oil screen EVERY 25 HOURS.

"BLUE-STREAK" (Lycoming) ENGINE:
If the engine is NOT equipped with an external oil filter, change engine oil and clean oil screens at 50-hour intervals. If the engine is equipped with an external oil filter, the engine oil change intervals may be extended to 100-HOUR intervals providing the external filter element is changed at 50-HOUR intervals.

The 50-hour inspection includes a visual check of the engine, propeller, and aircraft exterior for any apparent damage or defects; an engine oil change as required above; and accomplishment of lubrication and servicing requirements. Remove propeller spinner and engine cowling, and replace after the inspection has been completed.

The 100-hour (or annual) inspection includes everything in the 50-hour inspection, and oil change as required above. Also loosen or remove the fuselage, wing, empennage, and upholstery inspection doors, plates, and fairings only as necessary to perform a thorough, searching inspection of the aircraft. Replace after the inspection has been completed.

NOTE

Numbers appearing in the "AS SPECIFIED" column refer to the data listed at the end of the inspection chart.

	EACH 50 HOURS	EACH 100 HOURS	AS SPECIFIED
PROPELLER.			
1. Spinner and spinner bulkhead	●		
2. Blades	●		
3. Hub	●		
4. Lubrication (Hartzell)		●	
5. Bolts and/or nuts	●		
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.			
1. Engine oil, screen, filler cap, dipstick, drain plug and external filter element	●		1
2. Oil cooler	●		
3. Induction air filter (Also see paragraph 2-17.)	●		2

	EACH 50 HOURS	EACH 100 HOURS	AS SPECIFIED
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 pan, reduction gear housing, accessory section and front crankshaft seal	•		
9. All lines and hoses	•		
10. Intake and exhaust systems (Also see paragraph 12-101)	•		
11. Ignition harness	•		
12. Spark plugs and compression check		•	
13. Crankcase and vacuum system breather lines	•		
14. Electrical wiring	•		
15. Vacuum pump and oil separator, and relief valve	•		
16. Vacuum relief valve screen or filter		•	3
17. Engine controls and linkage	•		
18. Engine shock mounts, engine mount structure, and ground straps	•		
19. Cabin heater valves, doors and controls	•		
20. Starter, solenoid and electrical connections, and engagement lever	•		
21. Starter brushes, brush leads and commutator			4
22. Generator or Alternator, drive belt, pulley, and electrical connections	•		
23. Generator or Alternator brushes, brush leads, commutator or slip ring			4
24. Voltage regulator mounting and electrical leads	•		
25. Magnetos (externally) and electrical connections	•		
26. Bendix magneto breaker compartment and timing (Also see paragraph 12-77)		•	5
27. Slick magneto timing			6
28. Slick magneto breaker compartment (Also see paragraphs 12-71 and 12-71E)			6
29. Fuel injection fuel-air control unit, fuel pump, fuel manifold valve, fuel lines, and nozzles	•		
30. Fuel-air control unit screen		•	

	EACH 50 HOURS	EACH 100 HOURS	AS SPECIFIED
31. Carburetor	•		
32. Firewall		•	
33. Engine cowling	•		
34. Cowl flaps and control	•		
FUEL SYSTEM			
1. Fuel strainer, drain valve, and control	•		
2. Fuel strainer screen and bowl		•	
3. Electric fuel pump, throttle switch, and electric connections	•		
4. Fuel tanks, fuel accumulator tank, fuel lines, drains, filler caps, and placards		•	
5. Drain fuel and check tank interior, attachment and outlet screens			7
6. Fuel vents and vent valves		•	
7. Fuel selector and/or shut-off valve and placards		•	
8. Fuel quantity gages and transmitter units		•	
9. Engine primer		•	
10. Vapor return line and check valve		•	
11. Perform a fuel quantity indicating system operational test. Refer to Section 16 for detailed accomplishment instructions.			13
12. For airplanes equipped with an engine that uses a carburetor, drain fuel from carburetor bowl and check for fuel contaminants. Refer to Cessna Service Bulletin SEB99-19, Engine Carburetor Fuel Inspection (or latest revision) for detailed accomplishment instructions.			14
13. Fuel injection nozzles			15
LANDING GEAR			
1. Brake fluid, lines and hoses, linings, disc and clips, brake assemblies and master cylinders		•	
2. Main gear wheels, wheel bearings, step and spring strut, tires, and fairings		•	
3. Main and nose gear wheel bearing lubrication (Refer to paragraph 2-40)			8
4. Torque link lubrication (Refer to paragraph 2-36)	•		
5. Tailgear lubrication and nose gear strut servicing		•	
6. Nose gear shimmy dampener servicing			9
7. Tailwheel friction check (Refer to paragraph 5-60)		•	10
8. Nose gear wheels, wheel bearings, strut, steering system, shimmy dampener, tire, fairing, and torque links		•	
9. Tailwheel, tire, wheel bearings, steering system, anti-swivel mechanism, tailwheel locking system, cables, and spring tube		•	
10. Parking brake system		•	

AIRFRAME

Item	EACH 50 HOURS	EACH 100 HOURS	AS SPECIFIED
1. Aircraft exterior	•		
2. Aircraft structure		•	
3. Windows, windshield, and doors	•		
4. Seat stops, seat rails, upholstery, structure and seat mounting	•		
5. Safety belts and attaching brackets	•		
6. Control bearings, sprockets, pulleys, cables, chains and turnbuckles		•	
7. Control lock, control wheel and control mechanism		•	
8. Instruments and markings		•	
9. Gyro filter and central air filter (Also see paragraph 2-17A)		•	11
10. Magnetic compass compensation			7
11. Instrument wiring and plumbing		•	
12. Instrument panel, shock mounts, ground straps, cover, decals and labeling		•	
13. Defrosting, heating and ventilating systems and controls		•	
14. Cabin upholstery, trim, sun visors and ashtrays		•	
15. Area beneath floor, lines, hoses, wires and control cables		•	
16. Electrical horns, lights, switches, circuit breakers, fuses, and spare fuses	•		
17. Exterior lights	•		
18. Pitot and static systems		•	
19. Stall warning sensing unit and pitot and stall warning heaters		•	
20. Radios and radio controls		•	
21. Radio antennas		•	
22. Battery, battery box and battery cables		•	
23. Battery electrolyte level (Also see paragraph 2-18)	•		
24. Oxygen system		•	
25. Oxygen supply, masks, and hoses			12

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	AS SPECIFIED
1. Cables, terminals, pulleys, pulley brackets, cable guards, turnbuckles and fairleads		•	

Item	EACH 50 HOURS	EACH 100 HOURS	AS SPECIFIED
2. Chains, terminals, sprockets and chain guards		•	
3. Trim control wheels, indicators, actuator, and bungee		•	16
4. Travel stops		•	
5. All decals and labeling		•	
6. Flap control lever latch, flap rollers and tracks, flap position transmitter and linkage, flap position indicator, and flap electric motor and transmission		•	
7. Elevator downspring system		•	
8. Rudder pedal assemblies and linkage		•	
9. Skin and structure of control surfaces and trim tabs		•	
10. Balance weight attachment			

SPECIFIED INTERVAL

1 Each 25 hours, if NOT equipped with an external filter.

2 Replace paper media filters per paragraph 2-17.

3 Each 1000 hours, or to coincide with engine overhauls, replace garter-type filters.

4 Starters and generators each 200 hours; alternators, each 500 hours.

5 First 25 hours, each 100-hour inspection thereafter.

6 Check timing each 200 hours. Check breaker compartment each 500 hours, unless timing is off (except on the Slick Model 4001 magneto).

7 Each 1000 hours, or to coincide with engine overhauls.

8 First 100 hours, each 500 hours thereafter.

9 Without temperature-compensating mechanism, service every 100 hours; with temperature-compensating mechanism, check at 50-hour intervals. (See paragraph 2-21 and 2-21A)

10 First four 25 hours, each 100 hours thereafter.

11 Central filter each 500 hours and gyro filters at overhaul; gyro filters each 100 hours without central filter.

12 Anticipated requirements before each oxygen flight. Also see Section 15.

13 Fuel quantity indicating system operational test is required every 12 months. Refer to Section 16 for detailed accomplishment instructions.

14 Drain fuel from carburetor bowl and check for fuel contaminants once every 12 months. Refer to Cessna Service Bulletin SEB99-19, Engine Carburetor Fuel Inspection (or latest revision) for detailed accomplishment instructions

15 At the first 100-hour inspection on new, rebuilt or overhauled engines, remove and clean the fuel injection nozzles. Fuel nozzles must be cleaned at 300-hour intervals or more frequently if fuel stains are found.

16 For 180 and 185 airplanes: Each 1000 hours, measure the amount of free play between the horizontal stabilizer and the fuselage. To measure the free play:

A. Set the trim wheel to the takeoff position.

B. Lift up on the horizontal stabilizer forward spar adjacent to the fuselage and measure the free play between the front spar of the stabilizer and the fuselage. Do this procedure again on the opposite side of the fuselage.

C. The maximum permitted free play is 0.019 inch with a maximum difference between the two sides of the stabilizer is 0.010 inch.

1 If the free play is 0.019 inch or less and within 0.010 inch of each side, this inspection is complete, no more action is necessary.

2 If the free play is more than the permitted tolerance, remove the horizontal stabilizer and examine the free play between the top and bottom of each actuator.
3 The maximum actuator free play is 0.019 inch. If an actuator free play is greater than 0.019 inch or 0.010 inch of each side, remove and repair the actuator.
4 If an actuator has 0.019 inch or less of free play and is within 0.010 inch of each side, examine the attach brackets and attach hardware for wear.
5 Replace worn attach brackets and hardware.

D. Install the brackets, hardware, actuators, and horizontal stabilizer as applicable.

E. Do steps 16. A. thru C. again, as applicable.

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2-20. 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 occurs 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 occurs 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 occurs first. (Note 1)	NO
Engine Air Filter	500 hours or 36 months, whichever occurs 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 Textron Lycoming engines, refer to latest Textron Lycoming Engine Service Bulletins. For TCM engines, refer to Teledyne Continental Service Bulletin SB97-6, or latest revision.

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: Refer to Teledyne Continental Service Information Letter SIL98-9, 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 or Hartzell 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.

SECTION 3

FUSELAGE

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3-1. WINDOWS AND WINDSHIELDS.

3-2. CLEANING. (See paragraph 2-25.)

3-3. 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 the wax to a high polish by rubbing lightly with a clean, dry flannel cloth.

3-4. REPAIRS. Damaged window panels and windshield may be removed and replaced if the damage is extensive. However, certain repairs as prescribed in the following paragraphs can be made successfully without removing the damaged part from the airplane. Three types of temporary repairs for cracked plastic are possible. No repairs of any kind are recommended on highly-stressed or compound curves where the repair would be likely to affect the 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.

3-5. 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 the surface around the scratch with a circular motion, keeping the abrasive constantly wet with clean water to prevent scratching the surface further. Use minimum pressure and cover an area large enough to prevent the formation of "bull's-eyes" or other optical distortions.

CAUTION

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

b. Continue sanding operation, using progressively finer grade abrasives until the scratches disappear.

c. When the scratches have been removed, wash the 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 the wheel against the plastic surface, moving it constantly over the damaged area until the cloudy appearance disappears. A 2000-foot-per-minute surface speed is recommended to prevent heating, distortion, or burns.

NOTE

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

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

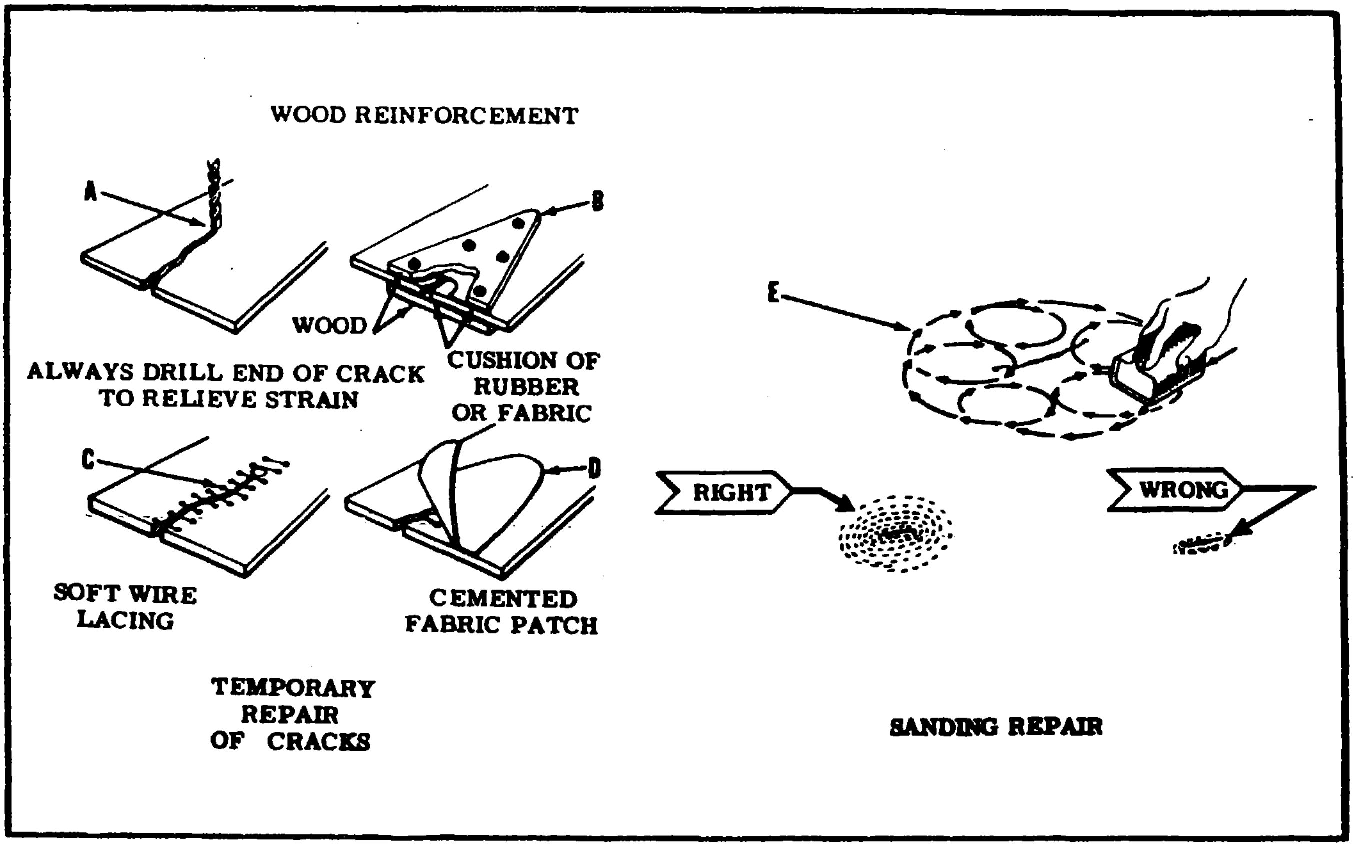


Figure 3-1. Repair of Windows and Windshield

NOTE

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

3-6. CRACKS. (See figure 3-1.)

a. When a crack appears in a panel, drill a hole at the end of the crack to prevent further spreading. The hole should be approximately 1/8 inch in diameter, depending on the length of the crack and thickness of the material.

b. Temporary repairs to flat surfaces can be effected by placing a thin strip of wood over each side of the surface and then inserting small bolts through the wood and plastic. A cushion of sheet rubber or airplane fabric should be placed between the wood and plastic on both sides.

c. A temporary repair can be made on a curved surface by placing fabric patches over the affected areas. Secure the patches with airplane dope, Specification No. MIL-D-5549; or lacquer, Specification No. MIL-L-7178. Lacquer thinner, Specification No. MIL-T-6094 can also be used to secure the patch.

d. A temporary repair can be made by drilling small holes along both sides of the crack 1/4 to 1/8 inch apart and lacing the edges together with soft wire. Small-stranded antenna wire makes a good temporary lacing material. This type of repair is used as a temporary measure only, and as soon as facilities are available the panel should be replaced.

3-7. WINDSHIELDS. (See figure 3-2.) Windshields are single-piece, "free-blown" acrylic plastic panels set in sealing strips and held by formed retainer strips riveted to the fuselage. In many aircraft, a windshield centerstrip supports the center of the windshield. Various sealants have been used to prevent leakage around the windshield. However, Presstite No. 579.6 sealing compound used in conjunction with a felt strip at the top and sides, and EC-1202 tape (manufactured by the Minnesota Mining and Mfg. Co., St. Paul, Minnesota) used at the bottom of the windshield will give satisfactory results. If desired, the EC-1202 tape, which is available in different widths and thicknesses, can be used as a sealant at all edges of the windshield.

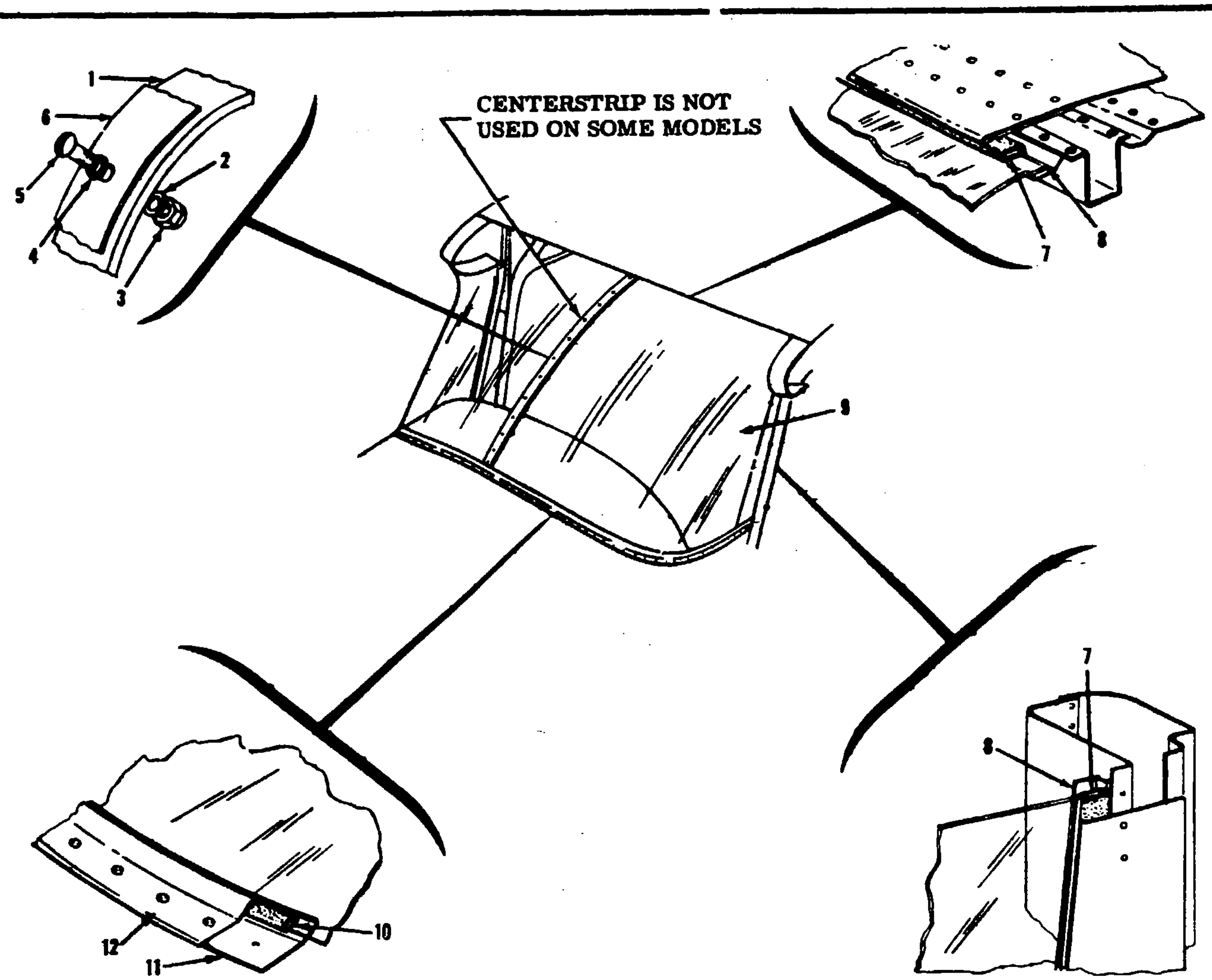
3-8. REMOVAL.

a. Remove the screws and attaching parts at the windshield centerstrip.

b. Drill out all rivets securing the retainer strip at the front of the windshield.

c. Remove wing fairings over windshield edges.

d. Pull windshield straight forward, out of side and top retainers. Remove top retainer if necessary.



NOTE

Presstite No. 579.6 sealer should be applied to all edges of windshield where felt sealing strip (7) is used. This sealer may be used to seal any leaks around windshield. Where EC-1202 tape (10), manufactured by the Minnesota Mining and Manufacturing Company, St. Paul, Minnesota, is used, the Presstite sealer is not required.

1. Inner Centerstrip
2. Washer
3. Nut
4. Washer
5. Screw
6. Outer Centerstrip
7. Felt Seal
8. Retainer Strip
9. Windshield
10. Sealing Tape
11. Inner Retainer Strip
12. Outer Retainer Strip

Figure 3-2. Typical Windshield Installation

3-9. REPLACEMENT.

a. Apply felt strip and sealing compound or sealing tape to all edges of windshield to prevent leaks.

b. Reverse steps listed in preceding paragraph to install a windshield.

c. When installing a new windshield, check the fit and carefully file or grind away any excess plastic.

d. Use care not to crack windshield when installing. If not previously removed, top retainer may be removed if necessary. Starting at an upper corner and gradually working windshield into position is recommended.

NOTE

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

3-10. MOVABLE WINDOWS. (See figure 3-4.) Movable windows, hinged at the top, are installed in some doors. Window assemblies, that is the clear plastic and frame unit, may be replaced by pulling the hinge pins and disconnecting the window stop. To remove the frame from the plastic, it is necessary to drill out the blind rivets where the frame is spliced. When replacing a window in a frame, make sure that the sealing strip and an adequate coating of Presstite No. 579.6 sealing compound is used all around the edges of the plastic panel.

3-11. FIXED WINDOWS. Fixed windows are mounted in sealing strips and sealing compound, and are held in place by various retainer strips. To replace the side windows, remove upholstery and trim panels, then drill out rivets as necessary to remove the retainer strips.

3-12. REMOVAL OF REAR WINDOWS. The "wrap-around" rear windows may be removed as follows:

MODEL 182F (See figure 3-3.)

a. Remove external centerstrip.

b. Remove upholstery as necessary to expose retainer strips securing the window to be replaced. The window is made in two sections, consisting of a right and a left half.

c. Drill out rivets as necessary to remove the retainer strips at the top, bottom, and outboard edges of the window. Do not remove any rivets at the centerstrip.

d. Slide the outboard edge of the window down, pulling the inboard edge away from the centerstrip hat section, then remove. The window may be flexed slightly if necessary to clear the hat section.

MODEL 182G AND ON (See figure 3-3.) This rear window is a one-piece window. Merely remove upholstery and retainer strips, then pull window into the cabin area to remove.

MODELS 150 AND 172 (See figure 3-3.) These rear windows are one-piece windows. To remove a rear window on either of these models, use the following procedure:

a. Remove external centerstrip.

b. Remove upholstery as necessary to expose retainer strips inside the cabin.

c. Drill out rivets as necessary to remove external retainer strip along the aft edge of the window.

d. Remove window by lifting aft edge and pulling window aft. If difficulty is encountered, rivets securing retainer strips inside the cabin may also be drilled out and the retainer strips loosened or removed.

3-13. INSTALLATION OF REAR WINDOWS. Installation of the "wrap-around" rear windows may be accomplished by reversing the procedures listed in paragraph 3-12, observing the following precautions:

a. Check the fit of a new window and carefully file or grind away any excess plastic.

b. Use care not to crack plastic when installing.

c. Be sure to use sealing strips and sealing compound to prevent leaks.

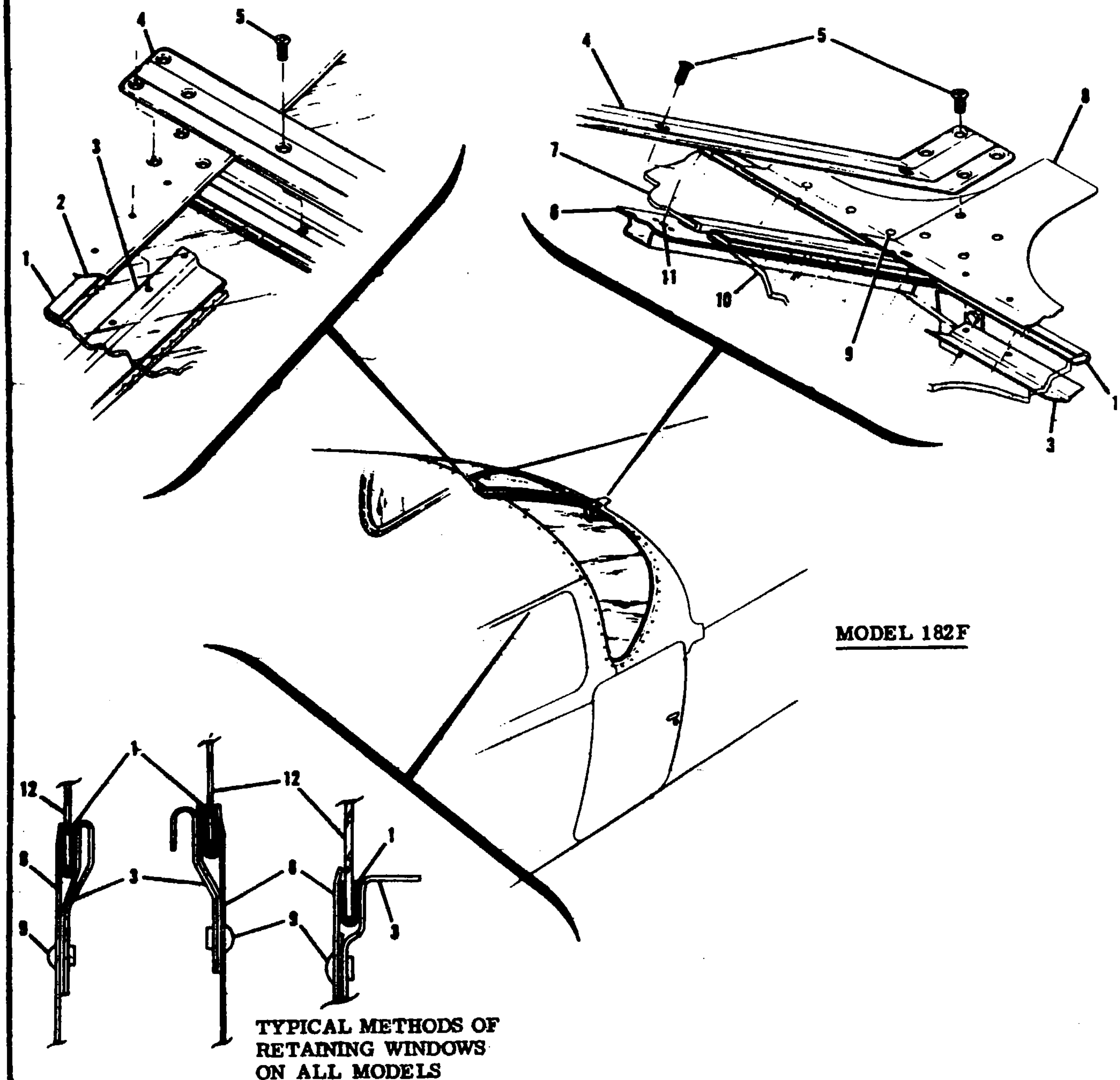
3-14. CABIN DOORS. (See figure 3-4.)

3-15. REMOVAL AND INSTALLATION. Removal of cabin doors is accomplished either by removing the screws which attach the hinges or by removing the hinge pins. If the type of door stop which is connected to the fuselage and the door is used, it must also be disconnected. Some airplanes are equipped with removable hinge pins to facilitate door removal. If the permanent hinge pins were 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 the door skin at the edges and some re-forming with a soft mallet may be necessary to achieve a good fit.

3-16. CABIN DOOR WEATHERSTRIP is cemented around all edges of the 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.

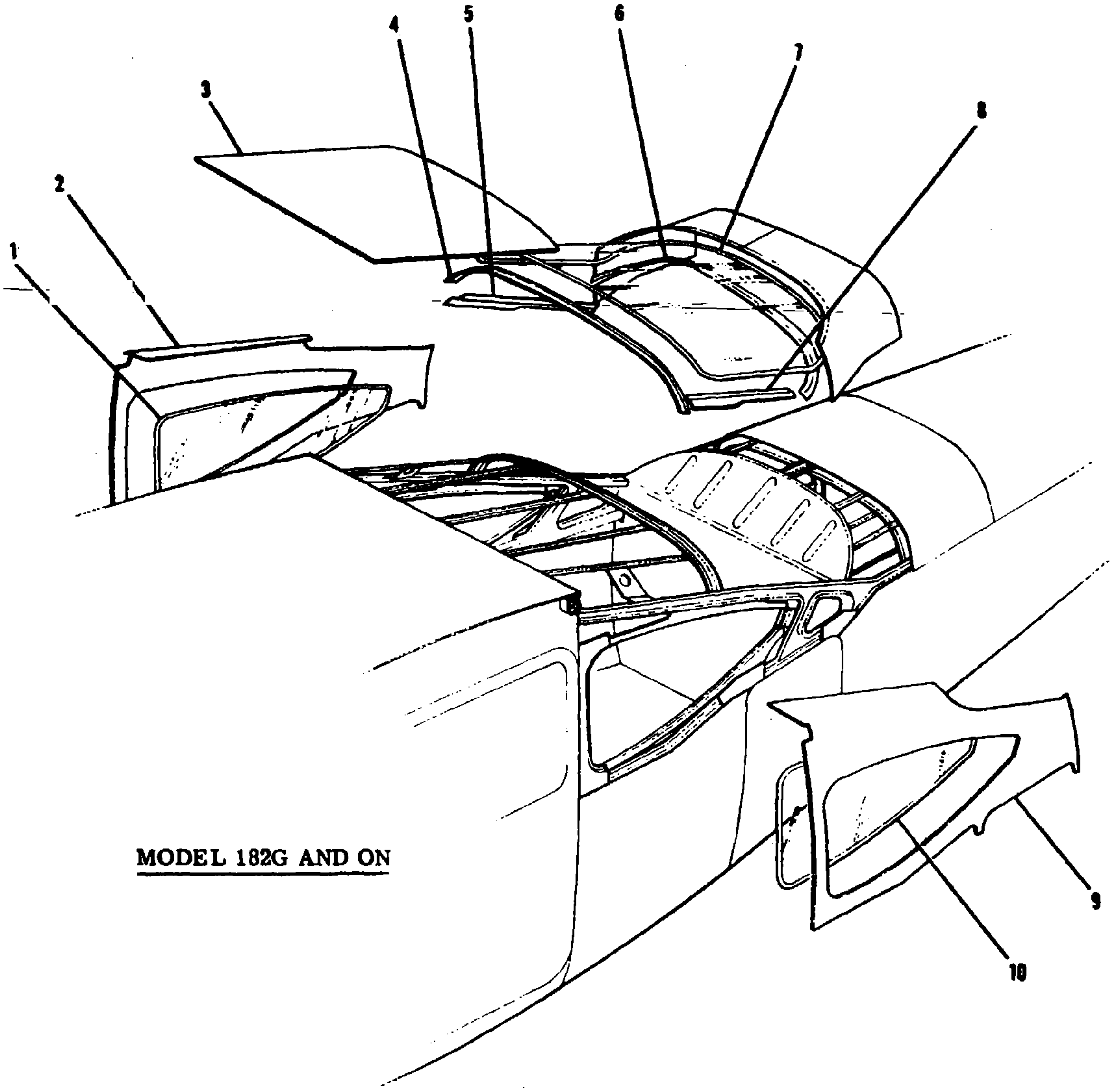
3-17. ADJUSTMENT OF CABIN DOOR. The cabin door should be adjusted so the cabin door skin fairs with the fuselage skin. Slots at the latch strike plate permit re-positioning of the strike plate. Depth of latch engagement may be changed by adding or removing washers or shims between the strike plate and the doorpost. Some airplanes contain wedges at the upper forward edge of the door which aid in preventing air leaks at this point. They engage as the door is closed. Several attaching holes are located in the wedges, and the set of holes which gives best results should be selected.

3-18. CABIN DOOR LATCHES. Flush-mounted outside door handles and conventional inside door handles are used to actuate door latches. The Model 150 inside door handles are also flush, similar to the outside handles. The different types of door latches are shown in figure 3-5, which may be used



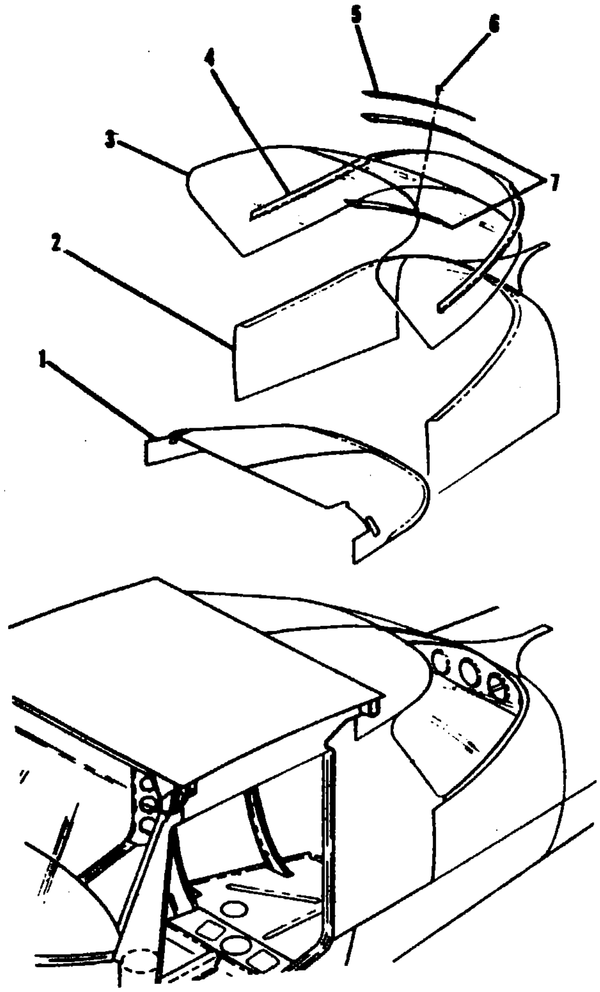
1. Seal
2. Cabin Skin
3. Retainer
4. Centerstrip
5. Screw
6. Stringer
7. Right Rear Window
8. Fuselage Skin
9. Rivet
10. Left Rear Window
11. Nutplate
12. Window

Figure 3-3. Fixed Windows (Sheet 1 of 3)

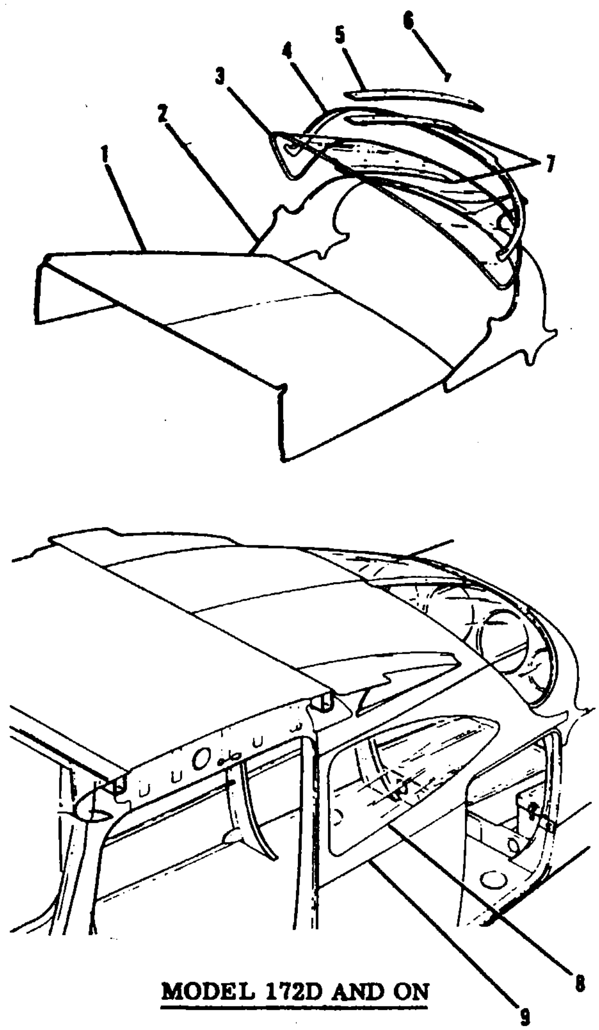


1. Right Side Window
2. Right Window Skin
3. Upper Skin
4. Upper Retainer
5. Right Retainer
6. Aft Retainer
7. Rear Window
8. Left Retainer
9. Left Window Skin
10. Left Side Window

Figure 3-3. Fixed Windows (Sheet 2 of 3)



MODEL 150D AND ON



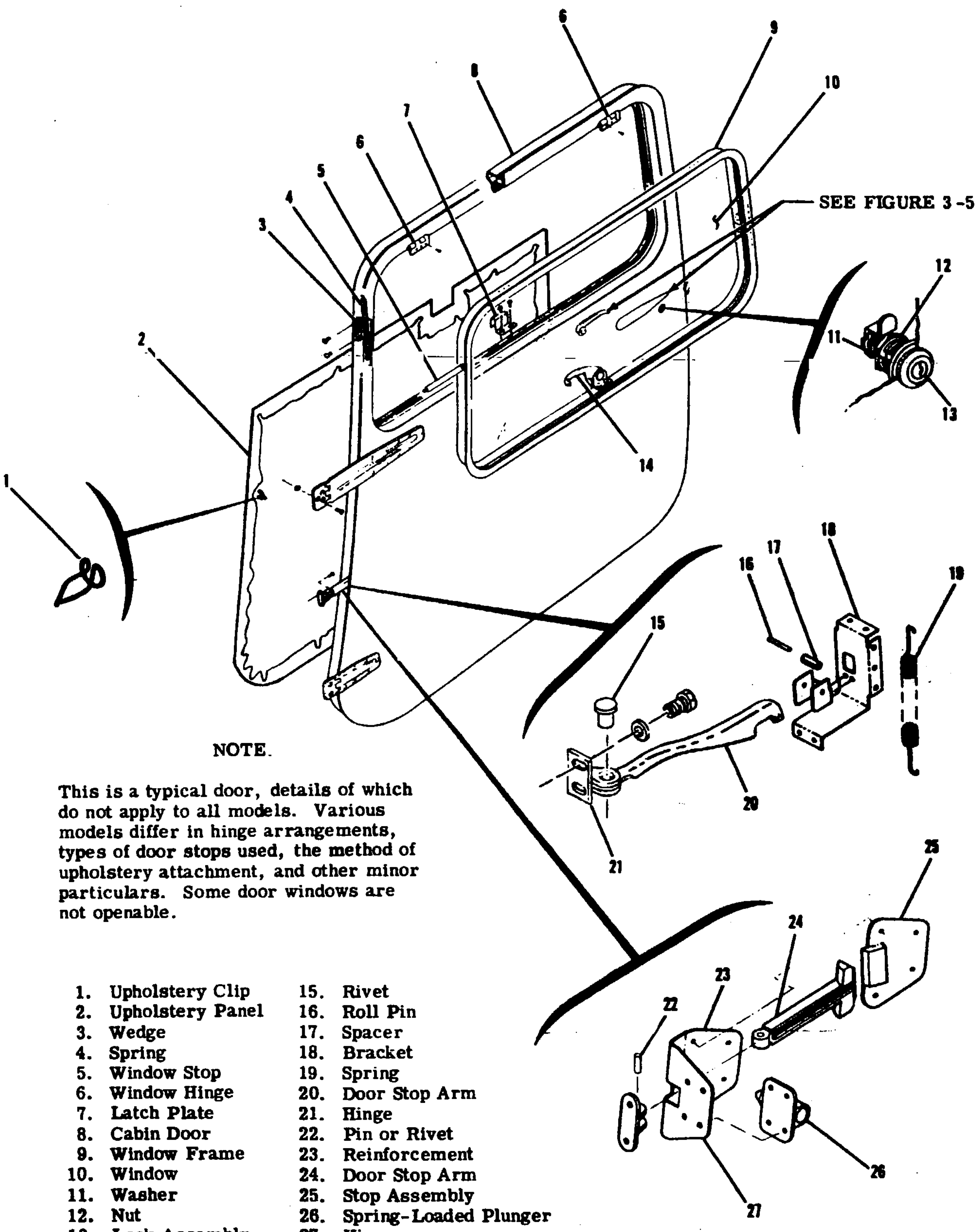
MODEL 172D AND ON

NOTE

Prior to the Model 150D, side windows were used without the rear window.

1. Upper Skin
2. Lower Skin
3. Rear Window
4. External Retainer
5. External Centerstrip
6. Screw
7. Felt Seals
8. Side Window
9. Side Window Skin

Figure 3-3. Fixed Windows (Sheet 3 of 3)

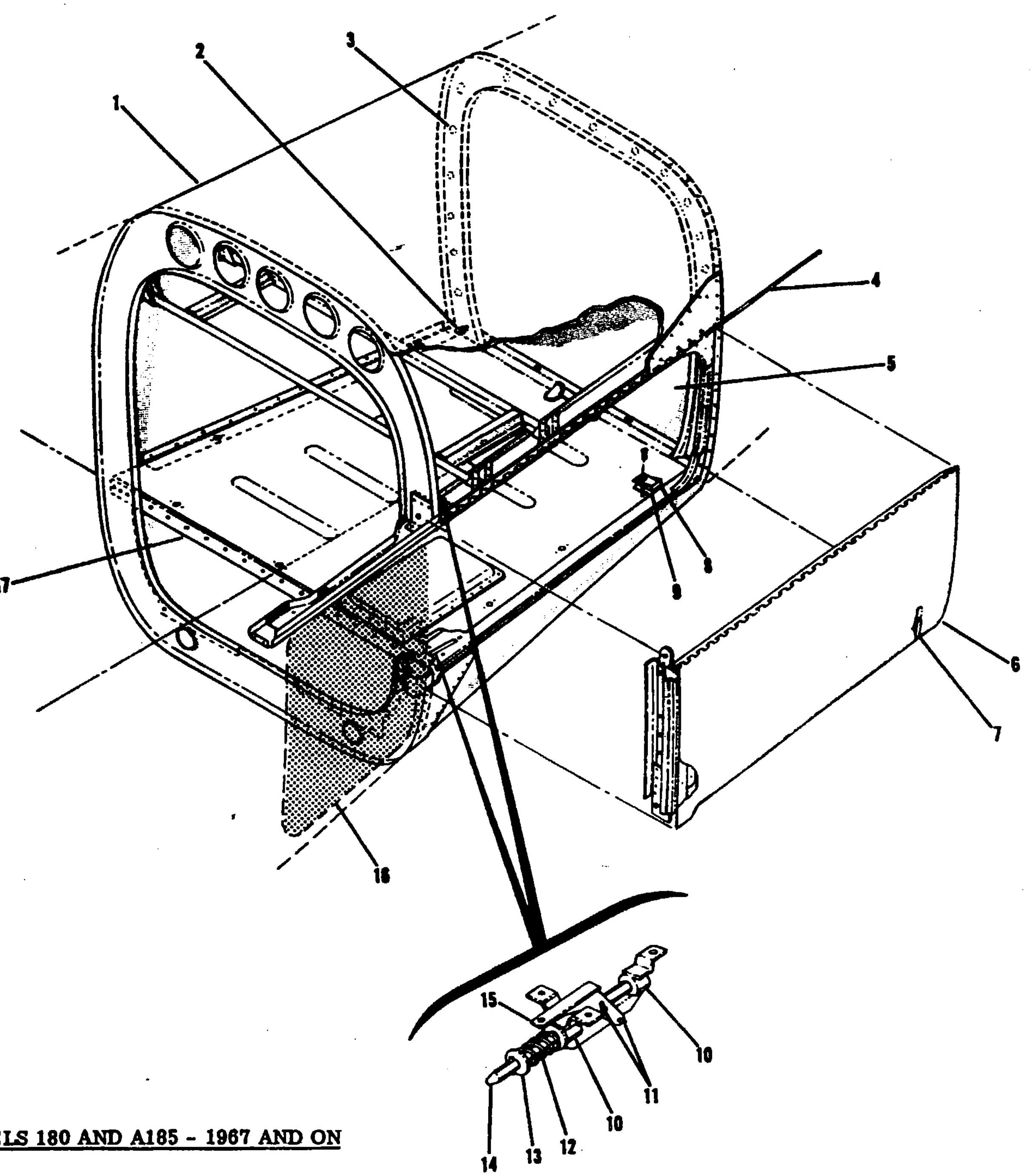


NOTE.

This is a typical door, details of which do not apply to all models. Various models differ in hinge arrangements, types of door stops used, the method of upholstery attachment, and other minor particulars. Some door windows are not openable.

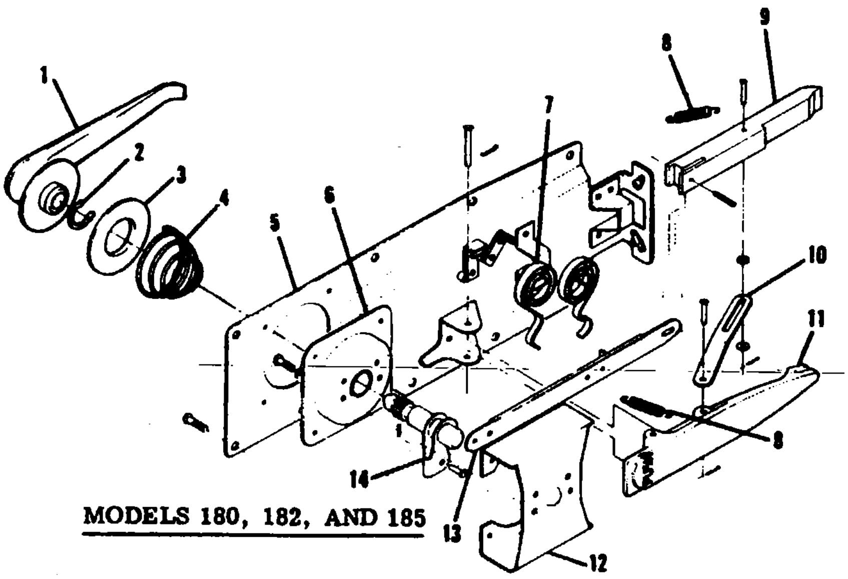
1. Upholstery Clip
2. Upholstery Panel
3. Wedge
4. Spring
5. Window Stop
6. Window Hinge
7. Latch Plate
8. Cabin Door
9. Window Frame
10. Window
11. Washer
12. Nut
13. Lock Assembly
14. Latch Handle
15. Rivet
16. Roll Pin
17. Spacer
18. Bracket
19. Spring
20. Door Stop Arm
21. Hinge
22. Pin or Rivet
23. Reinforcement
24. Door Stop Arm
25. Stop Assembly
26. Spring-Loaded Plunger
27. Hinge

Figure 3-4. Cabin Doors



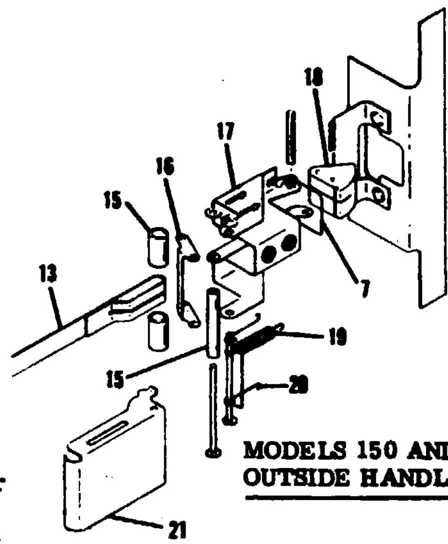
1. Fuselage Structure
2. Eyebolt
3. Stud and Eyelet
4. Hinge Pin
5. Canvas Panel
6. Litter Door
7. Outside Latch
8. Striker Plate
9. Shim
10. Bolt Guide
11. Roll Pin
12. Spring
13. Washer
14. Bolt
15. Handle
16. Baggage Door Opening
17. Floor Pan

Figure 3-4A. Litter Door



MODELS 180, 182, AND 185

ALL MODELS PRIOR TO 1966

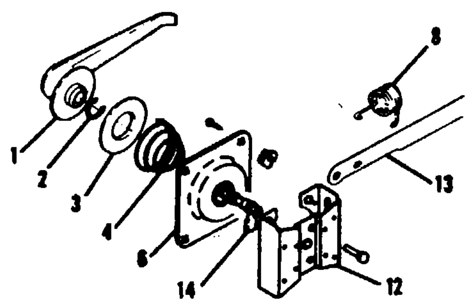


MODELS 150 AND 172 OUTSIDE HANDLE

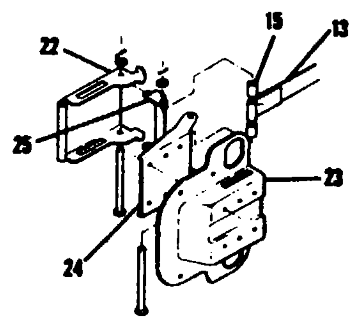
1. Inside Handle
2. Retaining Clip
3. Escutcheon
4. Spring
5. Base Plate
6. Bearing Plate
7. Spring
8. Spring
9. Latch Bolt
10. Pull Bar
11. Outside Handle
12. Bracket
13. Latch Strap
14. Shaft Assembly
15. Spacer
16. Spacer
17. Housing
18. Catch
19. Spring (150)
20. Spring (172)
21. Outside Handle
22. Inside Handle
23. Pan Assembly
24. Bracket
25. Spacer

NOTE

On the Model 172, spring (4) is currently not being used in order to reduce friction. Spring may be removed from earlier models if desired.

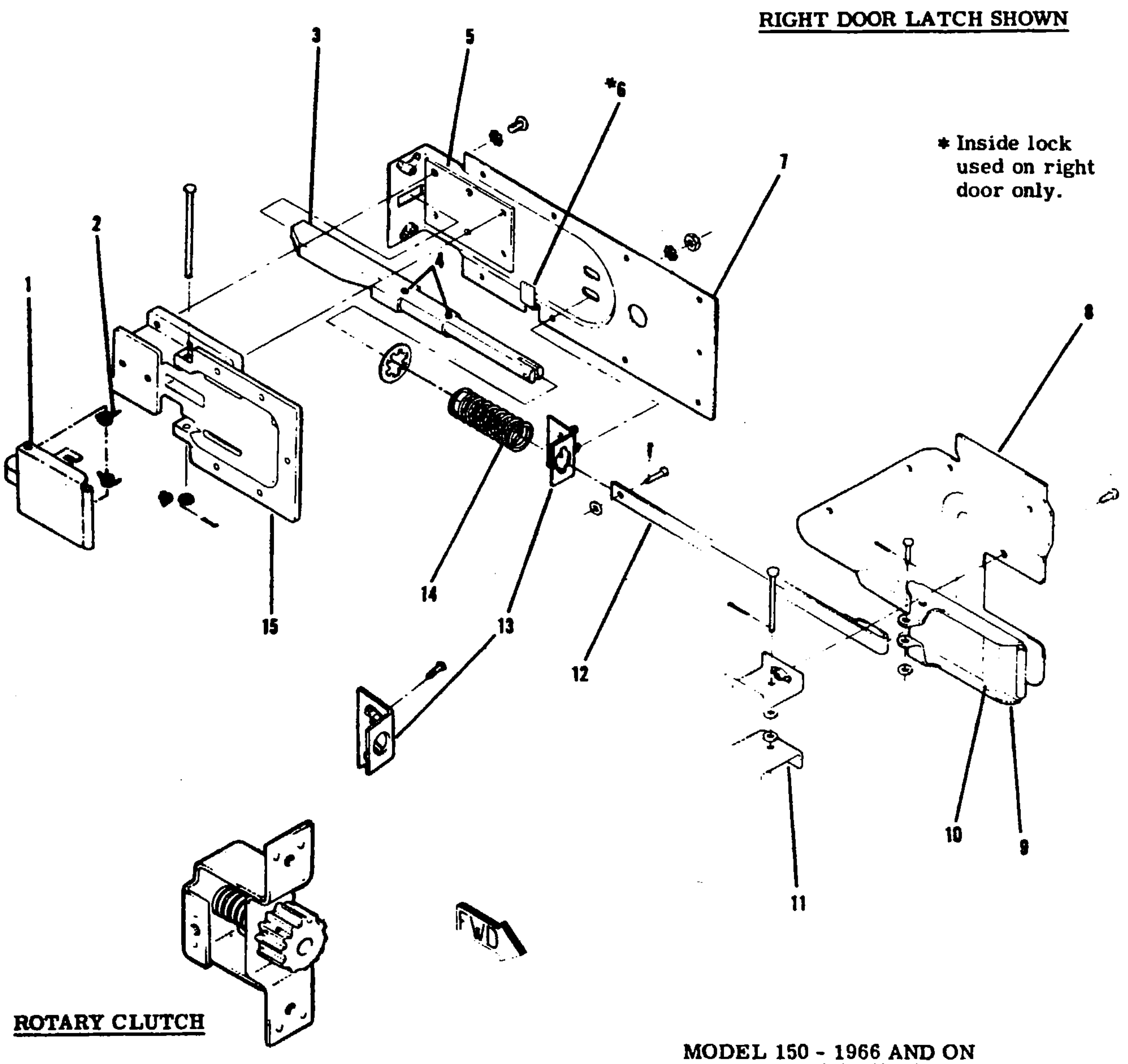


MODEL 172 INSIDE HANDLE



MODEL 150 INSIDE HANDLE

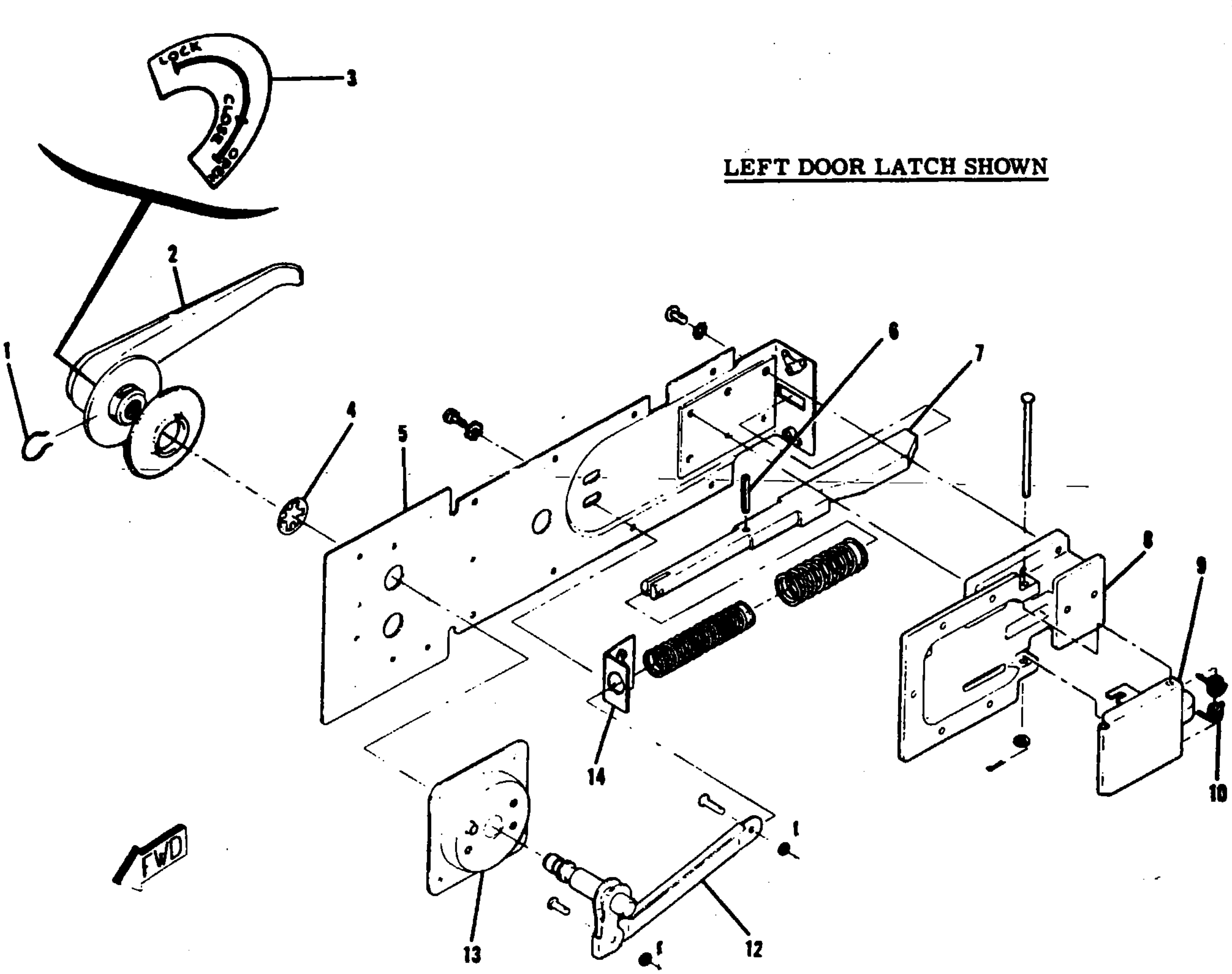
Figure 3-5. Cabin Door Latches (Sheet 1 of 5)

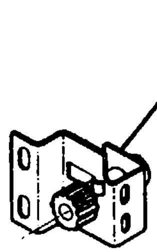


1. Outside Handle
2. Spring
3. Bolt
4. Roll Pin
5. Spacer
6. Inside Lock
7. Mounting Plate
8. Handle Plate
9. Inside Handle
10. Seal
11. Mounting Structure
12. Draw Bar
13. Support
14. Spring
15. Housing

Figure 3-5. Cabin Door Latches (Sheet 2 of 5)

LEFT DOOR LATCH SHOWN





ROTARY CLUTCH

NOTE

Handle (2) is marked with OPEN, CLOSE, and LOCK positions. The handle must be installed relative to position of bolt (7), which is spring-loaded to the CLOSE position. Temporarily install handle and move back and forth until spring-loaded position is noted. Remove handle, re-position with CLOSE mark at index mark on door (handle approximately vertical), and install. Bolt must clear doorpost, but teeth must engage when door is closed with handle at CLOSE position.

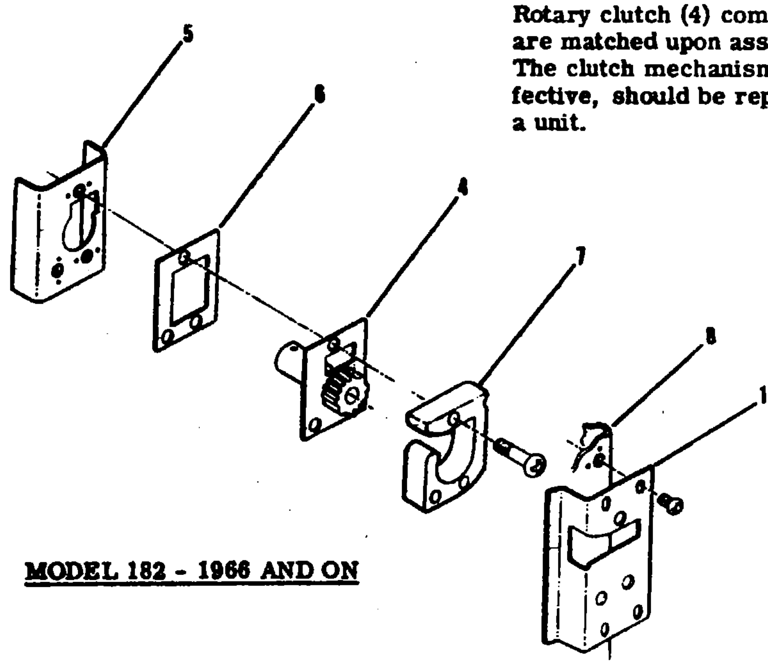
MODEL 172 - 1966 AND ON

1. Retaining Clip
2. Inside Handle
3. Index Placard
4. Retaining Ring
5. Mounting Plate
6. Roll Pin
7. Bolt
8. Housing
9. Outside Handle
10. Spring
11. Rotary Clutch
12. Push Rod
13. Bearing Plate Assembly
14. Support

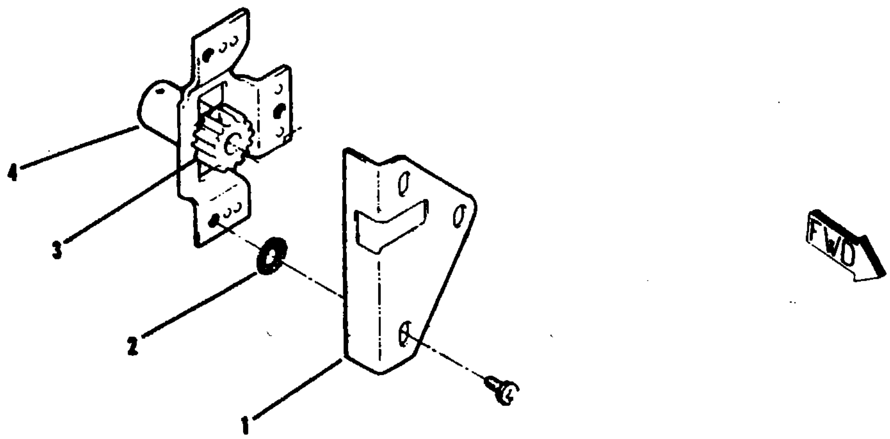
Figure 3-5. Cabin Door Latches (Sheet 3 of 5)

NOTE

Rotary clutch (4) components are matched upon assembly. The clutch mechanism, if defective, should be replaced as a unit.



MODEL 182 - 1966 AND ON

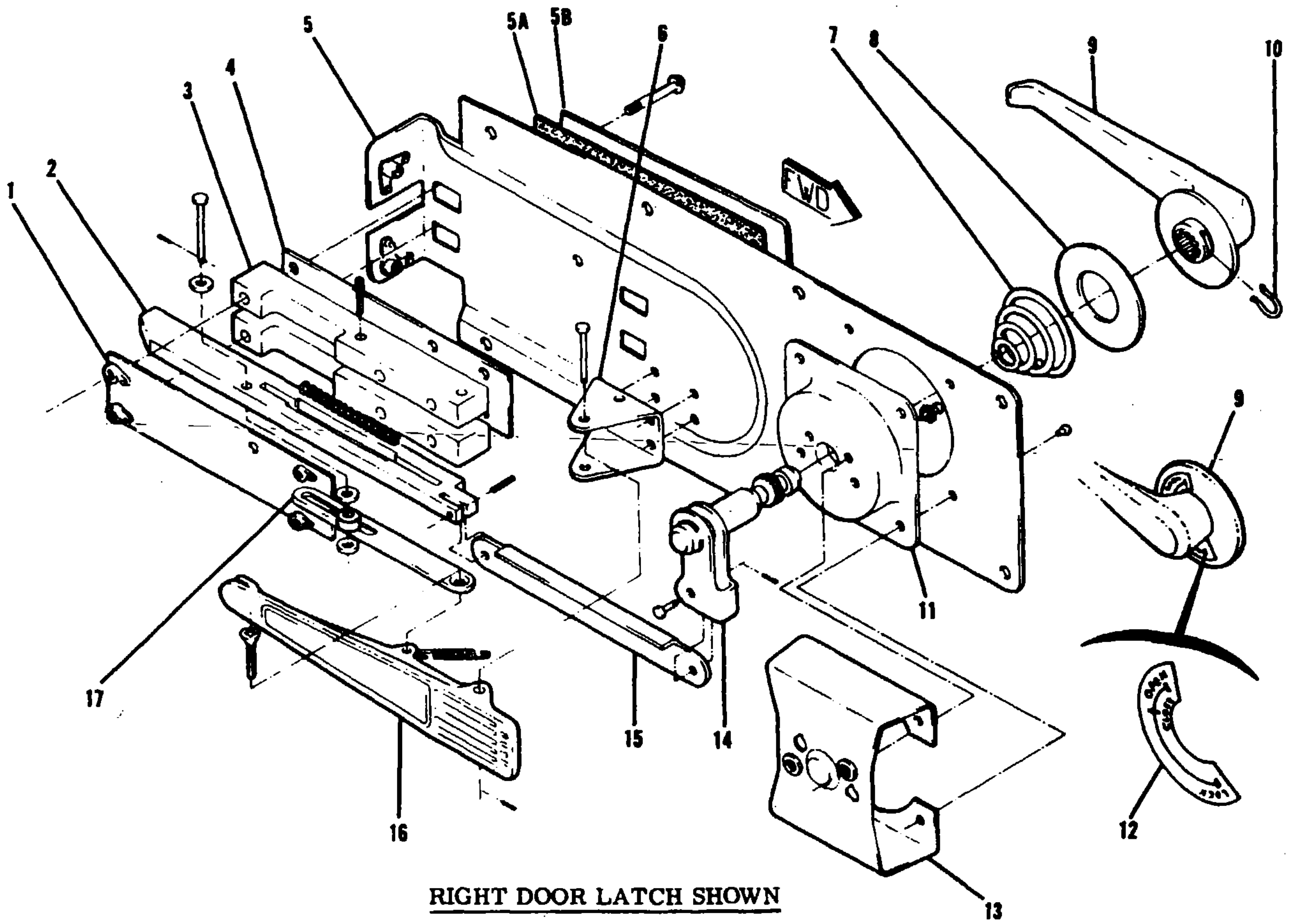


MODEL 180/185 - 1966 AND ON

ROTARY CLUTCH INSTALLATIONS

1. Cover
2. Abrasive Washer
3. Gear
4. Rotary Clutch.
5. Mounting Structure
6. Shim
7. Guide
8. Door Post

Figure 3-5. Cabin Door Latches (Sheet 4 of 5)



RIGHT DOOR LATCH SHOWN

FWD

MODELS 180, 182, AND 185 - 1966 AND ON

NOTE

Handle (9) is marked with OPEN, CLOSE, AND LOCK positions. The handle must be installed relative to position of bolt (2), which is spring-loaded to the CLOSE position. Temporarily install handle and move back and forth until spring-loaded position is noted. Remove handle, re-position with CLOSE mark at index mark on door (handle approximately vertical), and install. Bolt must clear doorpost, but teeth must engage when door is closed with handle at CLOSE position.

Abrasive pad (5A) and lockplate (5B) were added to the Model 182 during the 1966 Model-year to aid adjustment.

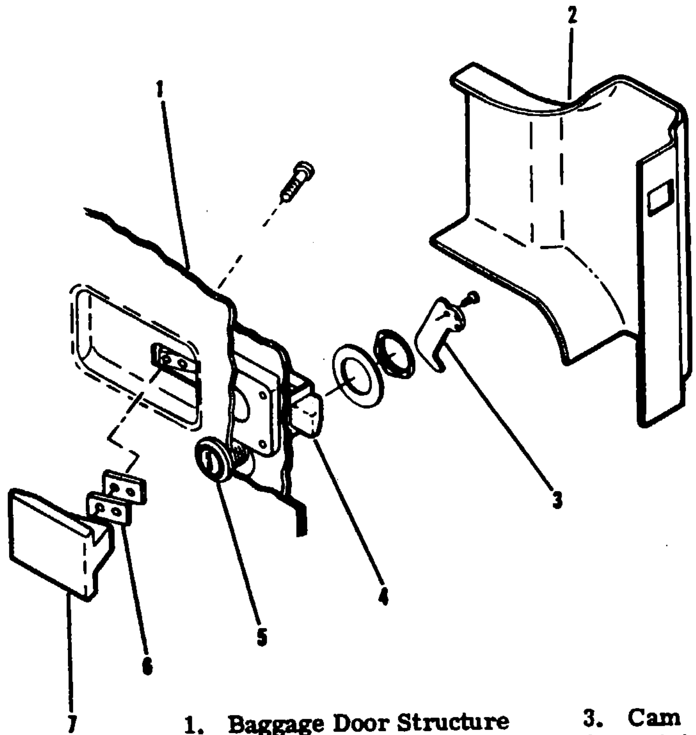
1. Top Plate
2. Bolt
3. Side Plate
4. Base Plate
5. Plate

5A. Abrasive Pad
5B. Lockplate
6. Bracket
7. Spring
8. Nylon Escutcheon

9. Inside Handle
10. Clip
11. Guide
12. Placard
13. Support

14. Push-Pull Shaft
15. Push-Pull Bar
16. Outside Handle
17. Pull Bar

Figure 3-5. Cabin Door Latches (Sheet 5 of 5)



1. Baggage Door Structure
2. Cover
3. Cam
4. Latch Assembly
5. Lock
6. Shim
7. Handle

Figure 3-5A. Baggage Door Latch

SHOP NOTES:

as a guide during removal, disassembly, assembly, and installation. When installing an inside door handle, locate it in the same relative position as the opposite door handle.

3-18A. ADJUSTMENT OF DOOR LATCH - ALL MODELS - 1966 AND ON. 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 the rotary clutch.

3-18B. DOOR LOCK. Standard equipment on 100-Series aircraft includes, in addition to interior locks, a cylinder and key type lock on the left door. If the 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 the ignition switch and the cabin door lock. After removing the old lock from the 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.

3-19. BAGGAGE AND LITTER DOORS.

3-19A. Beginning in 1967, a litter loading door may be installed on the Models 180 and A185 as optional equipment. When the baggage door and litter door are opened, a single opening is available through the side of the fuselage to permit loading of a stretcher without removing the cabin door. When closed and latched, the forward part of the litter door becomes a structural member of the fuselage. The aircraft should not be flown until the litter door and baggage door are both closed and latched.

3-20. REMOVAL AND INSTALLATION. Baggage door removal is accomplished by disconnecting the door stop, then removing hinge pins or bolts securing door to hinges. The litter door may be removed after the piano hinge pin has been removed.

3-21. SEATS. (See figures 3-6 thru 3-13.)

3-22. INDIVIDUAL SEATS. Standard individual seats are equipped with manually operated reclining seat backs. Rollers permit the seats to slide fore-and-aft on seat rails, and pins which engage various holes in seat rails lock seats in the selected positions. Seat stops limit travel. Removal is accomplished by removing the seat stops, and sliding the seats forward and aft to disengage them from the seat rails. Be sure to replace seat stops after installing a seat.

WARNING

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

Vertically adjustable individual seats, operated manually or by electrical power, may be installed in all airplanes except the Model 150. The Model 150 standard seat does not slide fore-and-aft. Removal is accomplished by unlatching the top of the seat back and releasing the spring-loaded pins at the bottom of the seat back. After removal of the seat back, the seat bottom can be pivoted at the forward pins for removal. The Model 150 optional reclining seat also slides fore-and-aft. Removal is similar to the other rail-mounted seats.

3-23. TWO-PLACE SEATS. Standard two-place seats consist of a double-width seat bottom, and either a double-width seat back or two single-width seat backs. The single-width seat backs recline separately. Removal is accomplished by removing the bolts which secure the seat bottom to the fuselage. Use care not to damage upholstery when removing seats. If desired, seat backs may first be removed from seat bottoms. Additional clearance may be obtained by removing one or more arm rests.

NOTE

To help prevent upholstery damage, several thicknesses of waxed heavy paper (waxed is preferred) should be inserted between the seat and the side panel and arm rest during removal and installation of the seat.

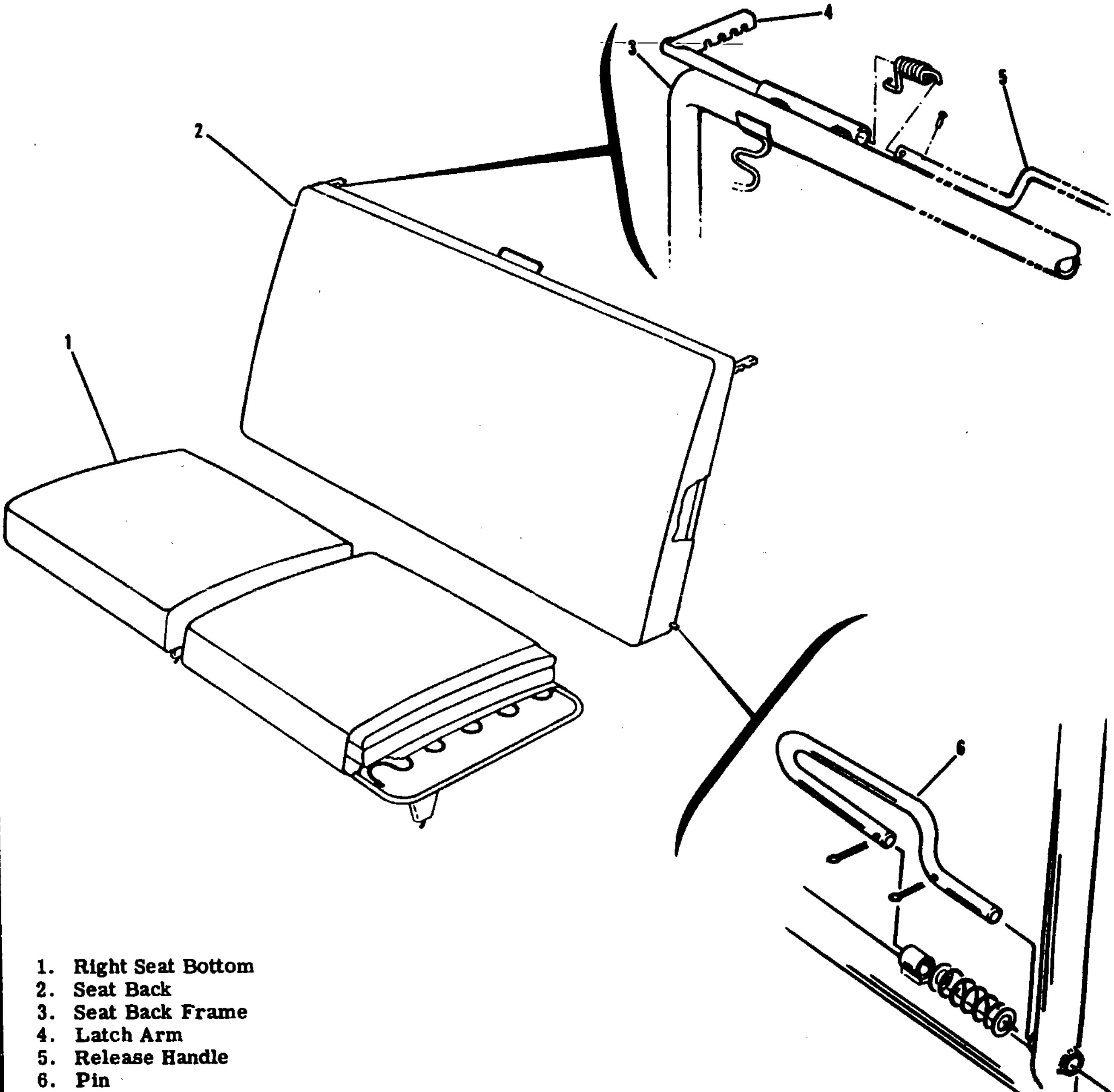
3-24. STOWABLE SEATS. Stowable center and rear seats may be installed as optional equipment in the Model 180G and on, and in all Model 185 airplanes. The center stowable seat (prior to 1967) is removed by releasing the spring-loaded seat back catches and removing the eyebolts attaching the seat bottom to the fuselage. The rear stowable seat is removed by unsnapping the seat back and removing the seat bottom pivot bolts. The seat bottom also may be pivoted upward and snapped to the rear wall. Except for minor details, the rearmost stowable seat installation may be used on all models as an auxiliary seat.

Beginning in 1967 the center seat on optional six-place versions (Model 180 and 185) is divided into two individual seats, each of which is equipped with a removable seat back. Each seat is bolted to the cabin structure with hand-removable eyebolts. The seat is shown in figure 3-13.

3-25. POWER SEATS. Optional power seats for the pilot and copilot may be installed in all airplanes (prior to 1967) except the Model 150. An electric motor, geared to a screwjack actuator, operates the mechanism which raises and lowers the seat vertically. Fore-and-aft adjustment and seat back reclining adjustment are still accomplished manually.

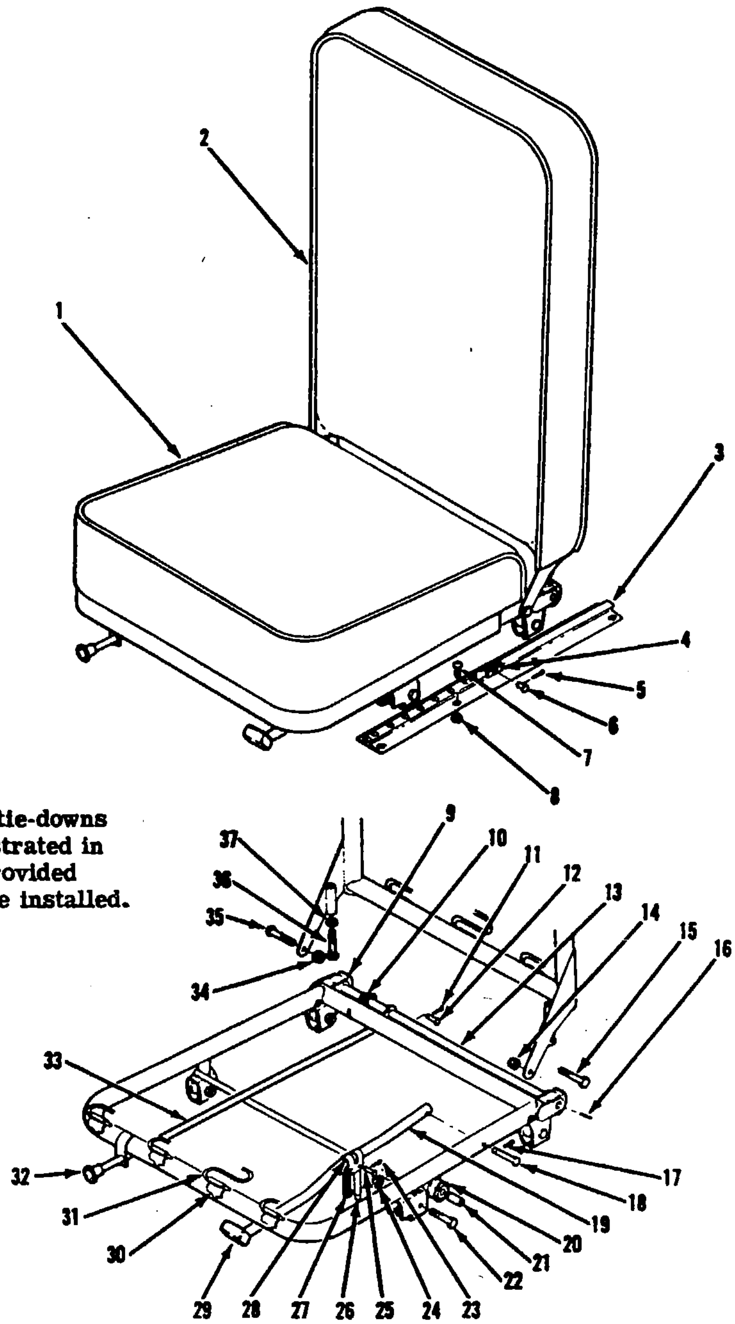
The reclining mechanism is locked automatically in any desired position throughout the travel range of the seat back by releasing the reclining adjustment handle. The seat is removed in the usual manner after disconnecting electrical wires at the quick-disconnects in the floorboard, under the seat. When installing a seat, either electrical wire may be attached to either quick-disconnect without affecting seat operation. No limit switches are needed, as the actuator "free-wheels" at each end of its travel.

3-26. REPAIR OF SEAT STRUCTURE. Replacement of defective parts is recommended in repair of seats. However, a cracked seat framework may be heliarc welded, provided the crack is not in an area of stress concentration (close to a hinge or bearing point). The square-tube aluminum framework used on most seats is 6061 aluminum, heat-treated to a T-6 condition. Torch welds are not feasible because the excessive heat destroys the heat-treatment of the frame structure. Figure 3-14 gives instructions for replacing defective cams on reclining seat backs of the type illustrated.



1. Right Seat Bottom
2. Seat Back
3. Seat Back Frame
4. Latch Arm
5. Release Handle
6. Pin
7. Left Seat Bottom

Figure 3-6. Standard Seats (Model 150)



NOTE

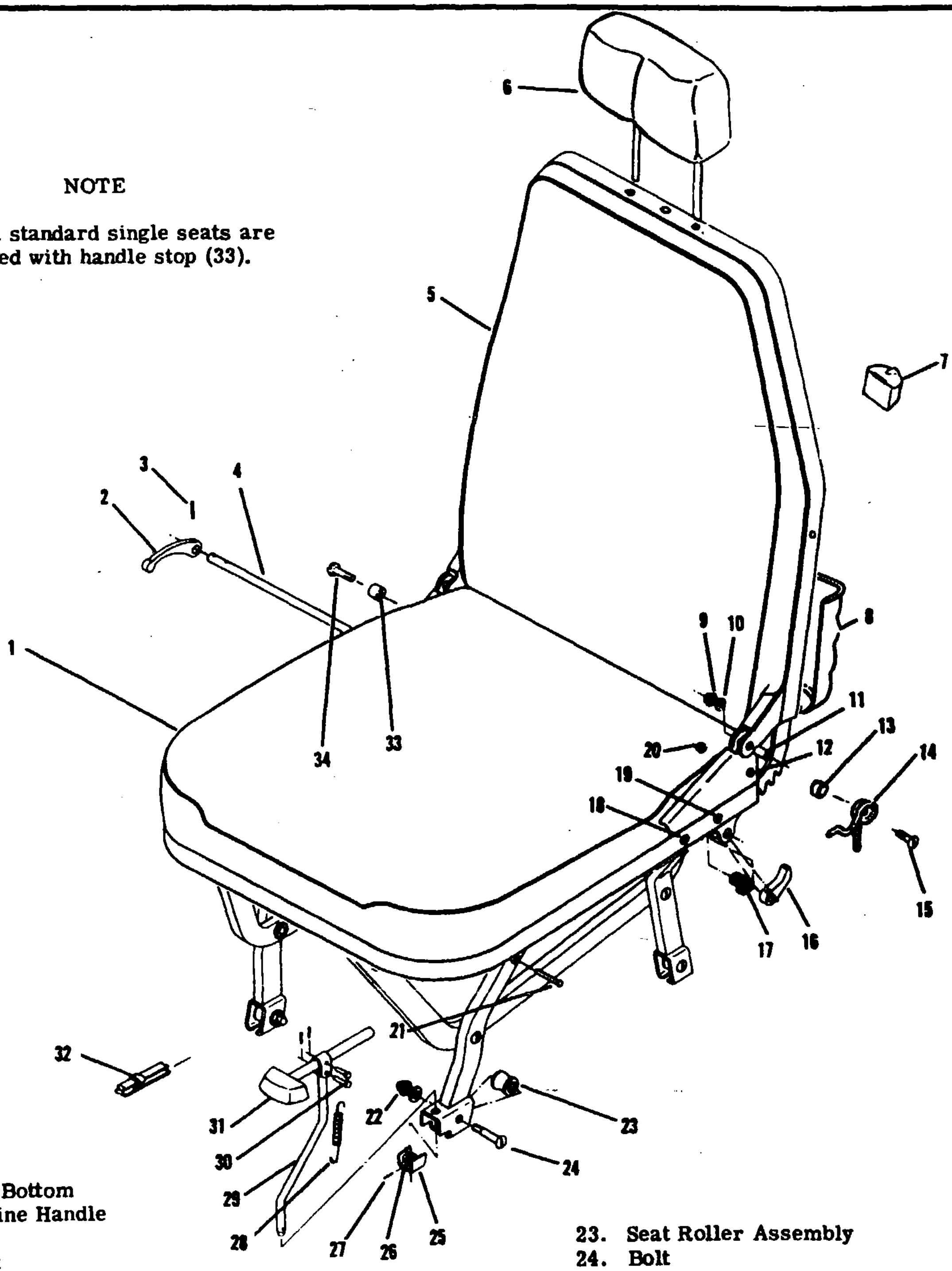
The baggage and cargo tie-downs for the Model 150, illustrated in figure 3-18, must be provided when reclining seats are installed.

1. Seat Bottom
2. Seat Back
3. Seat Rail
4. Seat Stop
5. Cotter Pin
6. Clevis Pin
7. Screw
8. Nut
9. Cam
10. Spring
11. Cotter Pin
12. Clevis Pin
13. Shaft
14. Nut
15. Bolt
16. Roll Pin
17. Cotter Pin
18. Clevis Pin
19. Seat Adjustment Tube
20. Roller
21. Bushing
22. Bolt
23. Cotter Pin
24. Nut
25. Clevis Pin
26. Seat Adjustment Pin
27. Spring
28. Seat Adjustment Clevis
29. Seat Adjustment Knob
30. Clip
31. Seat Spring
32. Seat Reclining Knob
33. Seat Reclining Tube
34. Nut
35. Bolt
36. Bolt
37. Nut

Figure 3-7. Reclining Seats (Model 150)

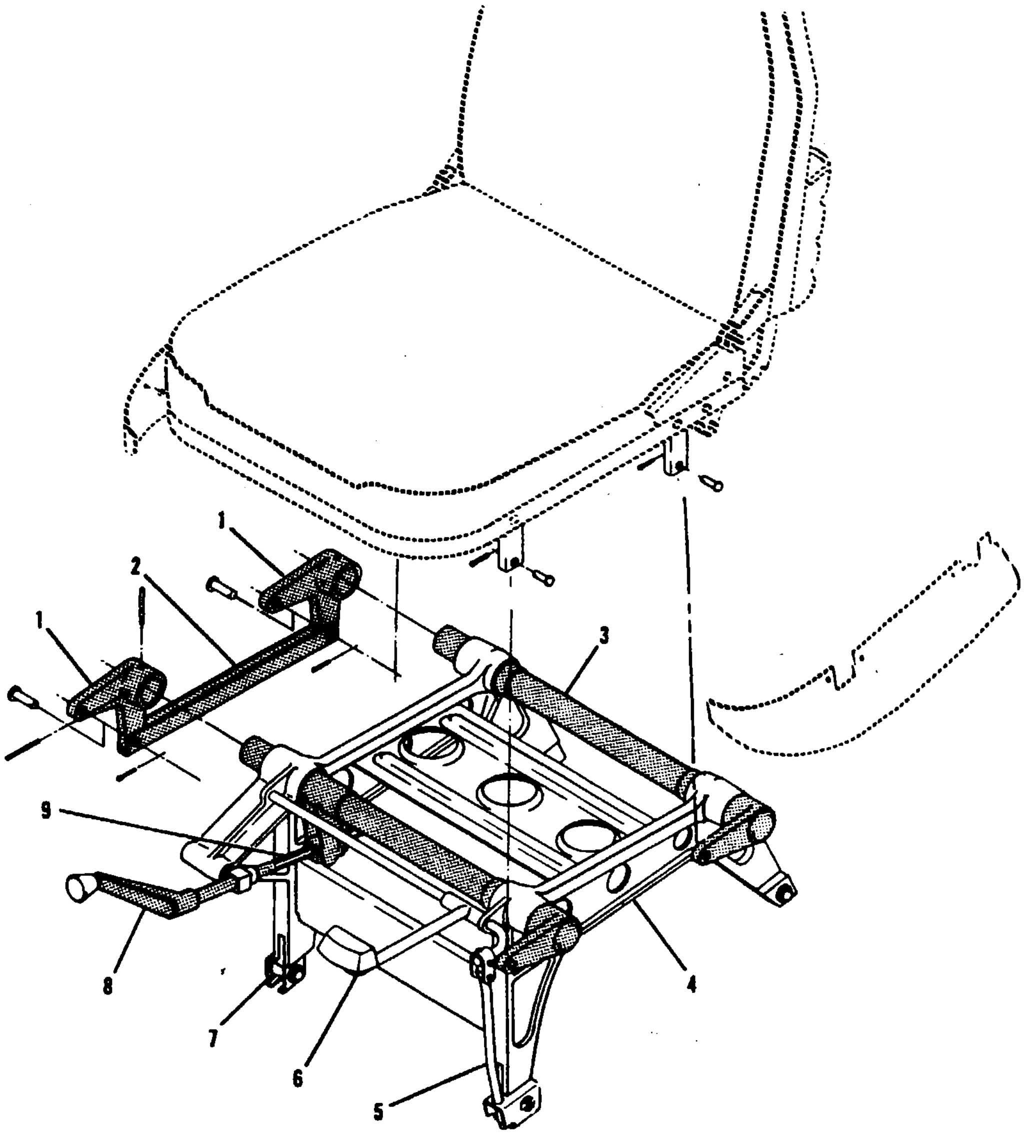
NOTE

Not all standard single seats are equipped with handle stop (33).



1. Seat Bottom
2. Recline Handle
3. Pin
4. Shaft
5. Seat Back
6. Headrest
7. Ash Tray
8. Pocket
9. Nut
10. Washer
11. Bushing
12. Screw
13. Bushing
14. Spring
15. Screw
16. Pawl
17. Spring
18. Bolt
19. Bolt
20. Nut
21. Pin
22. Nut
23. Seat Roller Assembly
24. Bolt
25. Bracket
26. Washer
27. Pin
28. Spring
29. Pin
30. Pin
31. Fore-and-Aft Adjustment Handle
32. Seat Stop
33. Handle Stop
34. Clevis Bolt

Figure 3-8. Standard Single Seat



NOTE

Seat bottom, seat back, reclining mechanism, and fore-and-aft adjusting mechanism are similar to the standard seat.

1. Bellcrank
2. Channel
3. Torque Tube
4. Seat Structure
5. Pin
6. Fore-and-Aft Adjustment Handle
7. Seat Roller
8. Vertical Adjustment Handle
9. Adjustment Screw

Figure 3-9. Vertically Adjustable Seat Mechanism

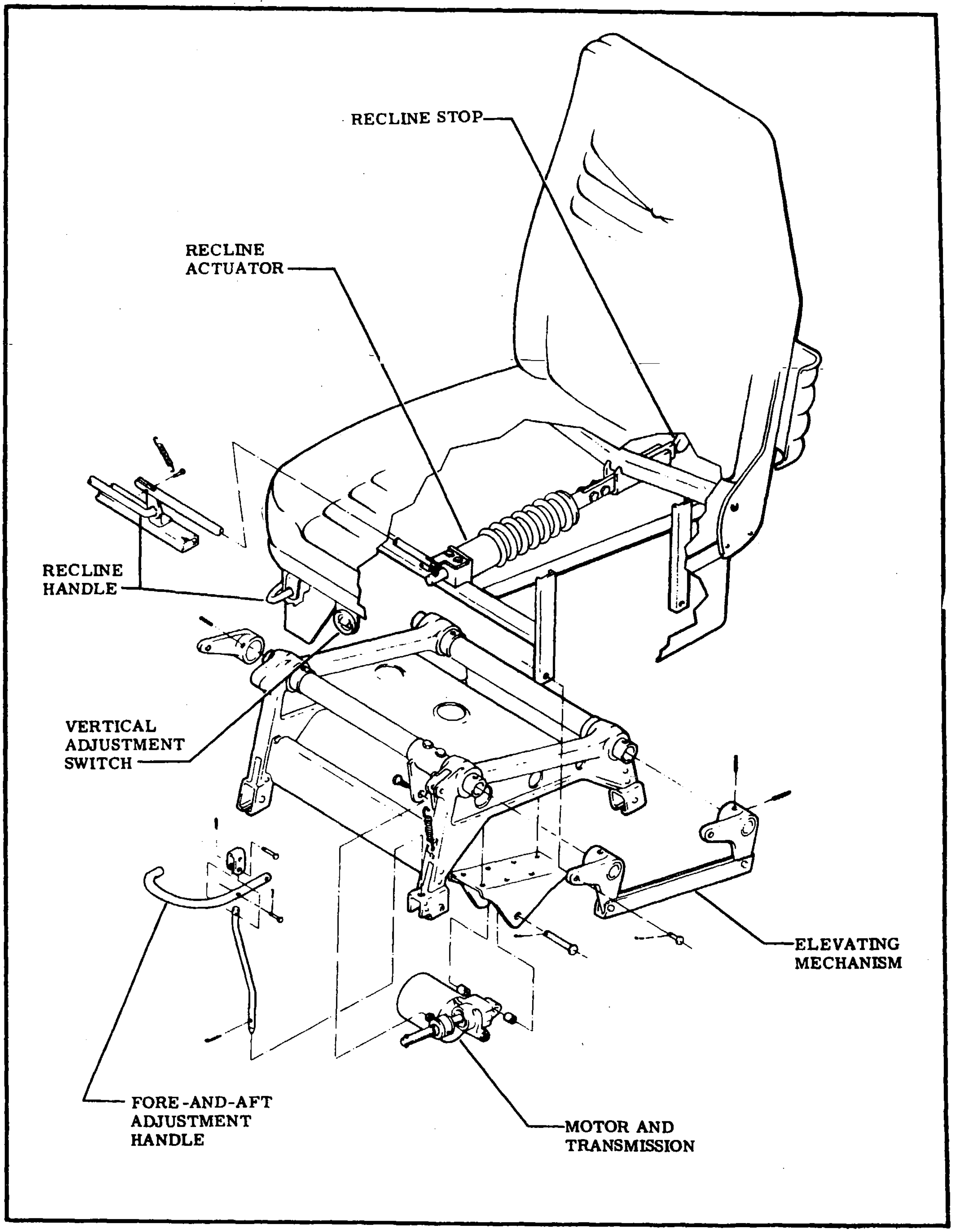
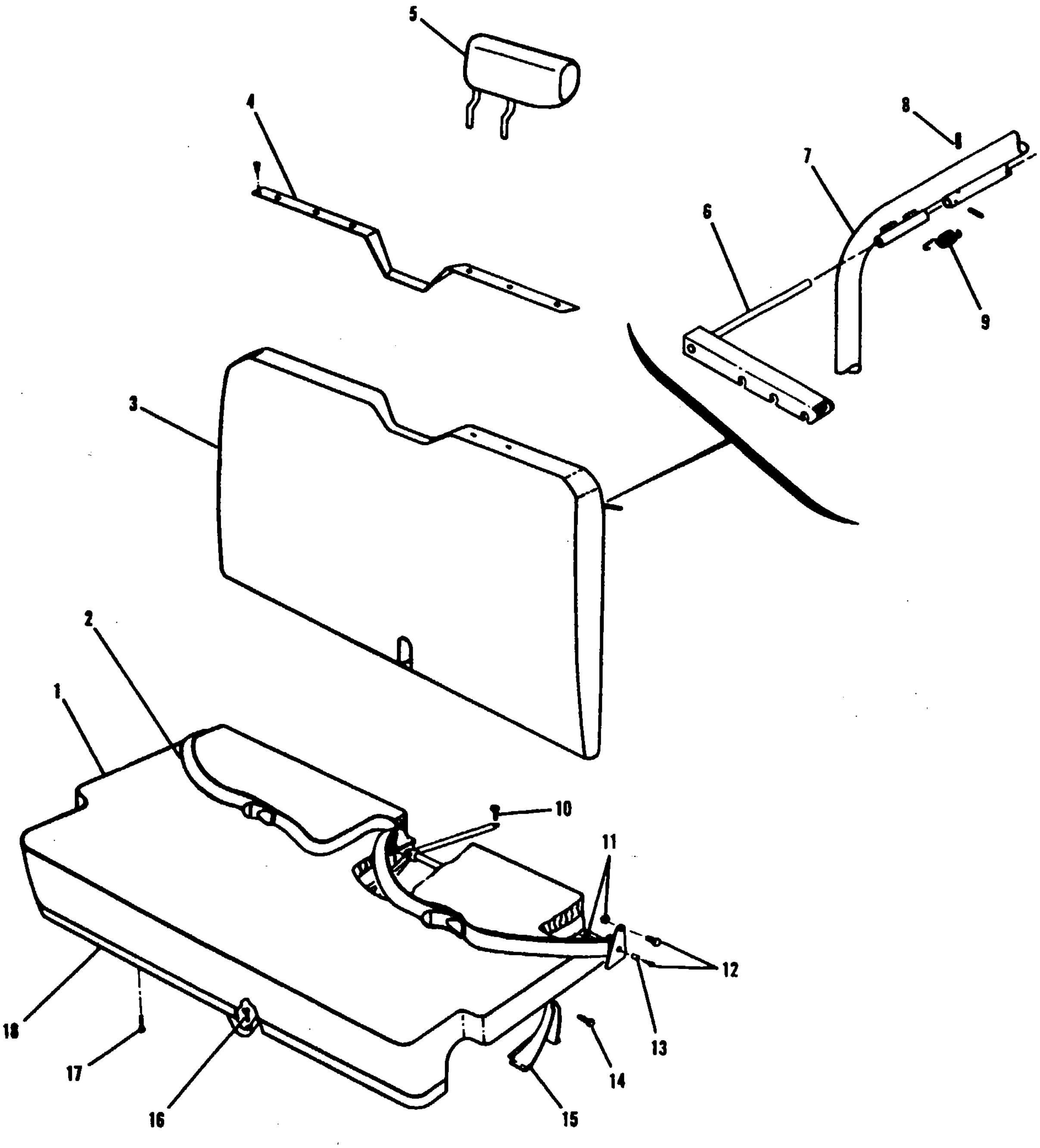


Figure 3-9A. Power Seat



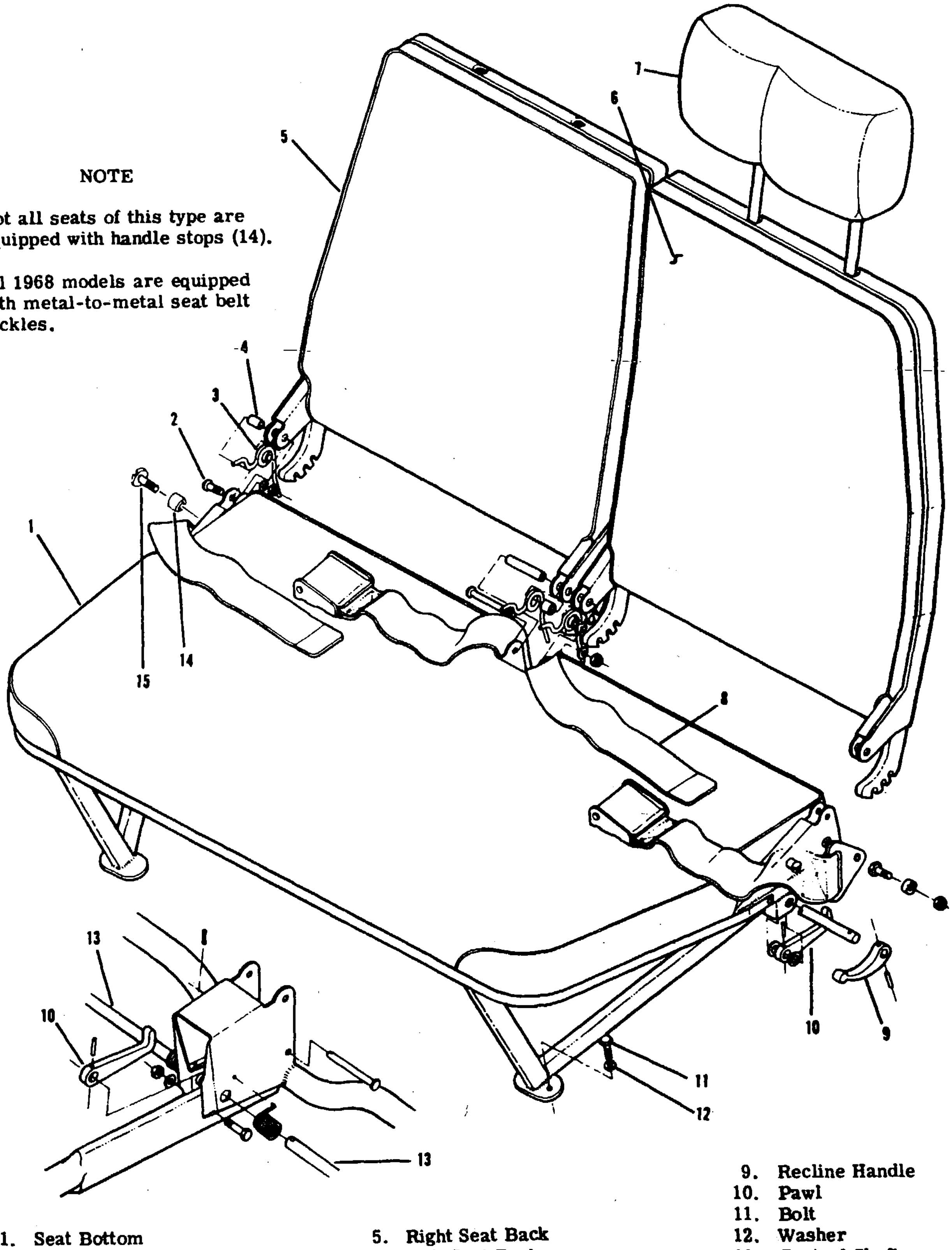
1. Seat Bottom	7. Seat Back Frame	13. Spacer
2. Safety Belt	8. Roll Pin	14. Bolt
3. Seat Back	9. Spring	15. Support
4. Bolster Strip	10. Bolt	16. Bolt
5. Head Rest	11. Nut	17. Screw
6. Latch	12. Bolt	18. Upholstery Retainer

Figure 3-10. Two-Place Seat with Double-Width Back

NOTE

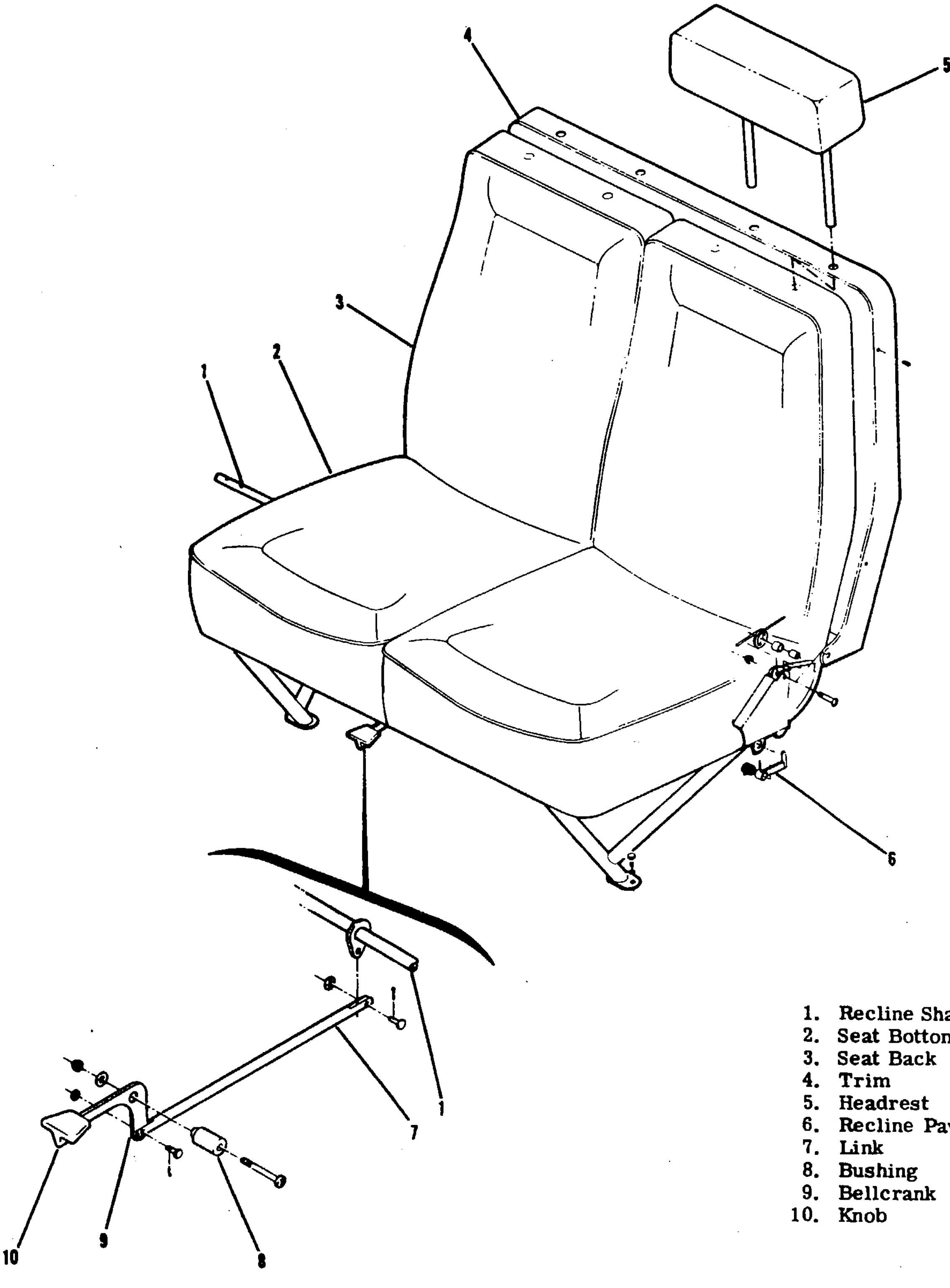
Not all seats of this type are equipped with handle stops (14).

All 1968 models are equipped with metal-to-metal seat belt buckles.



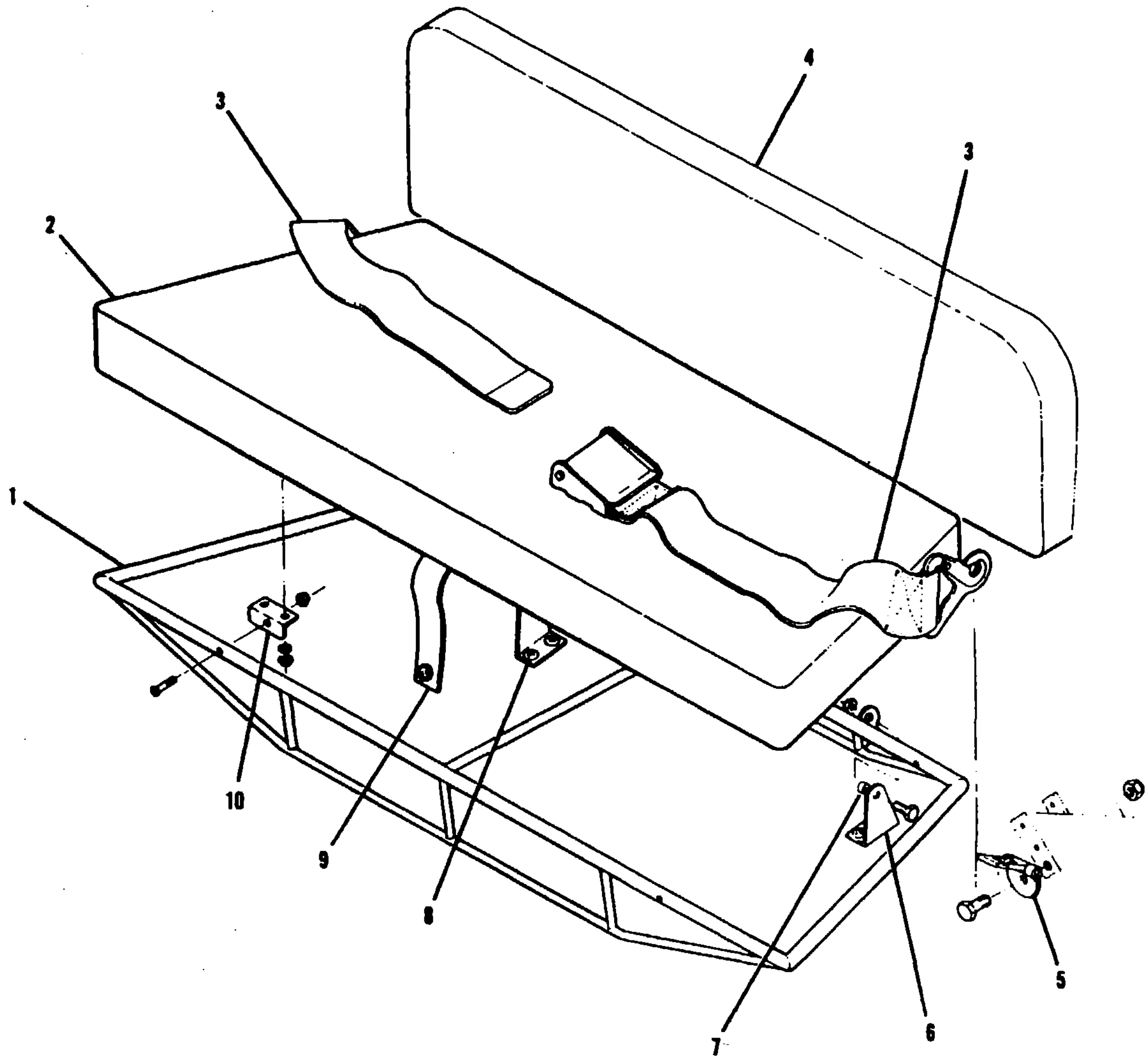
1. Seat Bottom
2. Bolt
3. Spring and Bushing
4. Bushing
5. Right Seat Back
6. Left Seat Back
7. Head Rest
8. Safety Belt
9. Recline Handle
10. Pawl
11. Bolt
12. Washer
13. Control Shaft
14. Handle Stop
15. Clevis Bolt.

Figure 3-11. Two-Place Seat with Individual Backs



1. Recline Shaft
2. Seat Bottom
3. Seat Back
4. Trim
5. Headrest
6. Recline Pawl
7. Link
8. Bushing
9. Bellcrank
10. Knob

Figure 3-11A. Standard Two-Place Seat - 1968 Model 172

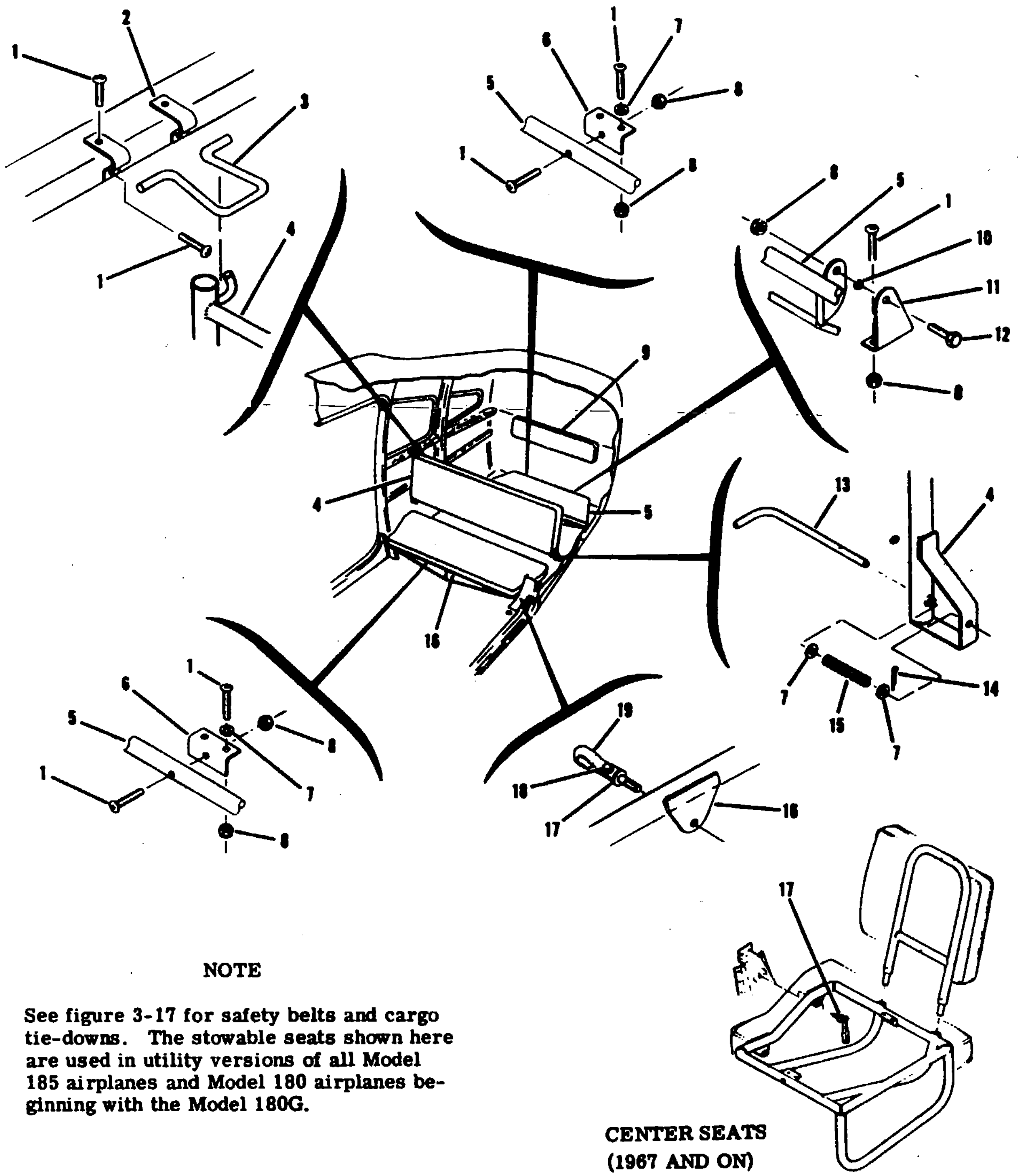


NOTE

The stowable seat installation shown here, except for minor details, is used as an auxiliary seat in all models. It is also used as the rearmost stowable seat in utility versions of all Model 185 airplanes and Model 180 airplanes beginning with the Model 180G. The 1966 Model 150 auxiliary seat bottom no longer folds up, and the seat back is supported from the sides of the cabin.

1. Bottom Frame
2. Seat Bottom
3. Safety Belt
4. Seat Back
5. Latch Assembly
6. Left Floor Hinge
7. Spacer
8. Right Floor Hinge
9. Strap
10. Support Bracket

Figure 3-12. Auxiliary Seat

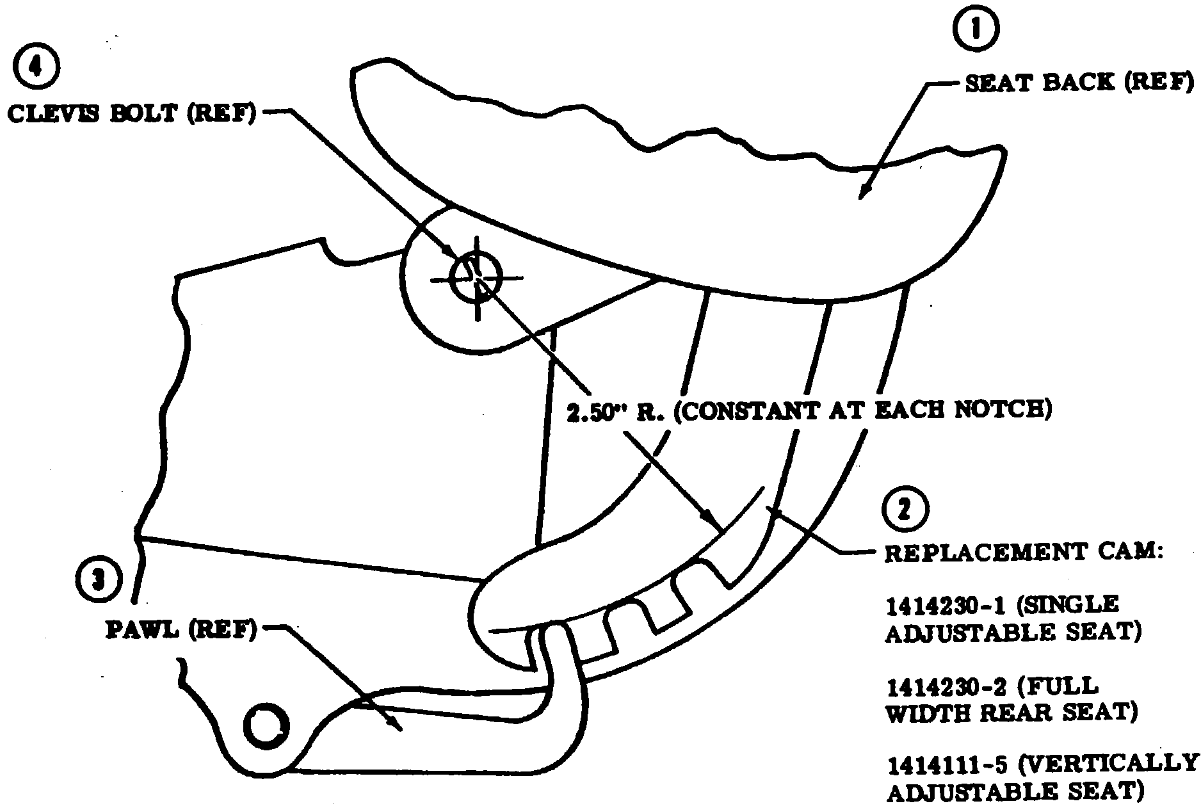


NOTE

See figure 3-17 for safety belts and cargo tie-downs. The stowable seats shown here are used in utility versions of all Model 185 airplanes and Model 180 airplanes beginning with the Model 180G.

1. Screw
2. Clamp
3. Support
4. Center Seat Back
5. Rear Seat Bottom
6. Clip
7. Washer
8. Nut
9. Rear Seat Back
10. Spacer
11. Hinge
12. Bolt
13. Handle
14. Cotter Pin
15. Spring
16. Center Seat Bottom
17. Eyebolt
18. Clevis Pin
19. Cable Yoke

Figure 3-13. Stowable Seats



REPLACEMENT PROCEDURE:

a. Remove seat from aircraft.

b. Remove plastic upholstery panels from aft side of seat back, loosen upholstery retaining rings and upholstery material as required to expose the rivets retaining the old cam assembly.

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

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

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 3-14. Reclining Seat Cam Replacement

3-27. CABIN UPHOLSTERY.

3-28. Due to wide selection of fabrics and styles, it is impossible to show 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 the removal of each item to facilitate its replacement later.

3-29. UPHOLSTERY MATERIALS AND TOOLS will vary with the job. Scissors for trimming upholstery to size and a dull-bladed putty knife for wedging the material beneath the 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 19 for thermoplastic repairs.

3-30. SOUNDPROOFING. The airplane is insulated with spun glass mat-type insulation and a sound deadener compound applied to the inner surfaces of the skin in most areas of the cabin and baggage compartment. Some airplanes utilize aluminum foil backed tape to help reduce noise level in the cabin. All soundproofing material should be replaced in its original position any time it is removed. A soundproofing panel is placed in the gap between the wing and fuselage and held in place by the wing root fairing. Cabin and baggage compartment upholstery and carpeting also assist in reducing noise level.

3-31. CABIN HEADLINER REMOVAL.

a. Remove sun visors, all inside finish strips and plates, door post upper shields, front spar trim shield, dome light panel, and any other visible retainers securing the headliner.

b. Work edges of headliner free from metal tabs which hold the fabric.

c. Starting at the front of the headliner, work the headliner down, removing screws through metal tabs which hold the wire bows to the cabin top. Pry loose the outer ends of the bows from the retainers above the doors. Detach each wire bow in succession.

NOTE

Always work from front to rear when removing the headliner; it is impossible to detach the wire bows when working from rear to front.

d. Remove the headliner assembly and bows from the airplane.

NOTE

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

e. Remove the spun glass soundproofing panels.

NOTE

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

3-32. CABIN HEADLINER INSTALLATION.

a. Before installing headliner, check all items concealed by the headliner to see that they are mounted securely. Use wide cloth tape to secure loose wires to the fuselage, and to seal any openings in the wing roots. Straighten any tabs bent during removal of the headliner.

b. Apply cement to inside of skin in areas where soundproofing panels are not supported by wire bows, and press soundproofing in place.

c. Insert wire bows into headliner seams, and secure rearmost edges of headliner after positioning the two bows at the rear of the headliner. Stretch the material along the edges to make sure it is properly centered but do not stretch it tight enough to destroy the ceiling contours or distort the wire bows. Secure the edges of the headliner with sharp tabs, or , where necessary, rubber cement.

d. Work the headliner forward, installing each wire bow in place with the tabs. Wedge the ends of wire bows into the retainer strips. Stretch the headliner just taut enough to avoid wrinkles and maintain a smooth contour.

e. When all bows are in place and fabric edges are secured, trim off any excess fabric and reinstall all items removed.

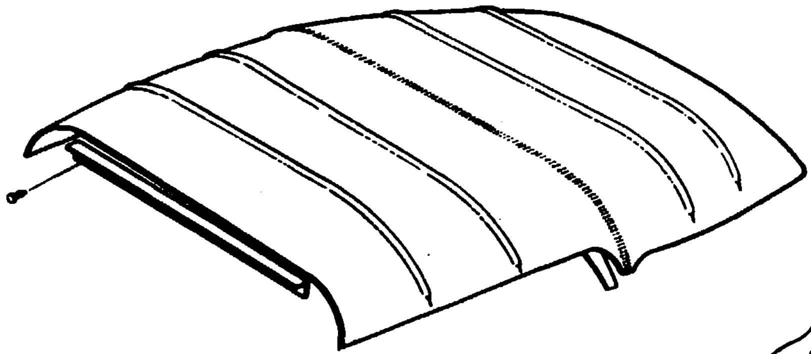
3-33. UPHOLSTERY SIDE PANELS. Removal of upholstery side panels is accomplished by removing seats for access, then removing parts attaching the panels. Remove screws, retaining strips, arm rests, and ash trays as required to free the various panels. Automotive type spring clips attach most door panels. A dull putty knife makes an excellent tool for prying loose the clips. When installing upholstery side panels, do not over-tighten sheet metal screws. Larger screws may be used in enlarged holes as long as the area behind the hole is checked for electrical wiring, fuel lines, and other components which might be damaged by using a longer screw.

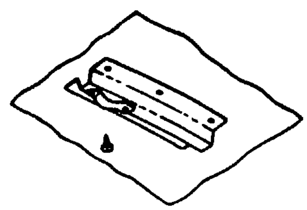
3-34. WINDLACE (DOOR SEAL). To furnish an ornamental edging for the door opening and to provide additional sealing, a windlace is installed between the upholstery panels or trim panels and the doorpost structure. The windlace is held in place by sheet metal screws.

3-35. CARPETING. Cabin area and baggage compartment carpeting is held in place by rubber cement, sheet metal screws, or retaining strips. When fitting a new carpet, use the old one as a pattern for trimming and marking screw holes. Utility airplanes use a light weight, heavy-duty vinyl floor covering instead of carpeting.

3-36. BAGGAGE COMPARTMENT UPHOLSTERY is washable plastic held in place by screws and retainers. The floor covering is cemented to the floor in some models. Cargo tie-downs and/or safety belt brackets may be removed as necessary where they are installed through the floor covering.

TYPICAL EXCEPT MODEL 150

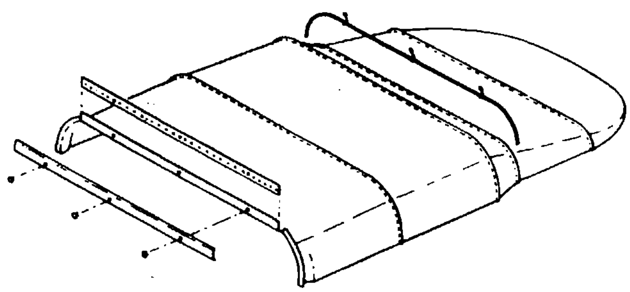




NOTE

These are typical headliner installations. There are minor differences among the various models, but maintenance procedures are similar. Soundproofing panels are used above the headliner on most models.

MODEL 150D & ON



PRIOR TO MODEL 150D

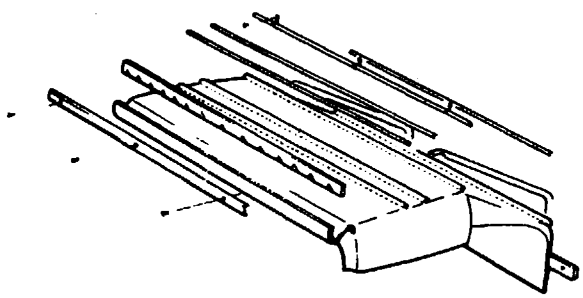


Figure 3-15. Cabin Headliner

3-37. SAFETY BELTS should be replaced if they are frayed or cut, latches are defective, or stitching is broken. Attaching parts should be replaced if excessively worn or defective. Some safety belts are attached to the fuselage and others are attached to the seats. Safety belt attachment fittings on some models are also used as cargo tie-downs after unsnapping the quick-release type end fittings.

NOTE

When installing front seat safety belt fittings, it is important that the correct attaching parts be used. A large washer (AN970-3) or a plate is used as a reinforcement under the floorboard at each front safety belt fitting. The large washer is used between the forward nut and the underside of the floorboard on the Models 172, P172, 180, and 185. In addition, the Models 172 and P172 use a plate type spacer on top of the floorboard. Beginning with the Model 172F, a reinforcing channel is riveted under the floorboard, so that the large washer and plate type spacer is not needed. The Model 182 uses a reinforcing plate on the underside of the floorboard, between nuts and the floorboards.

3-38. CARGO TIE-DOWN PROVISIONS are used to ensure that baggage cannot enter the seating area during flight. The tie-down arrangements vary with different aircraft and model year. Methods of attaching the tie-downs are shown in figure 3-16 through 3-18. The eyebolt and nutplate can be located at various points, including cabin side walls, floor, and aft baggage compartment wall. The sliding tie-down lug also utilizes the eyebolt and attaches to a seat rail. A baggage net is standard equipment on Models 172, P172, 182 and 150F and on. Tie-down straps are standard equipment on the Models 150D and 150E. Prior to the Model 150D, the tie-down straps are optional except when individual reclining seats are installed.

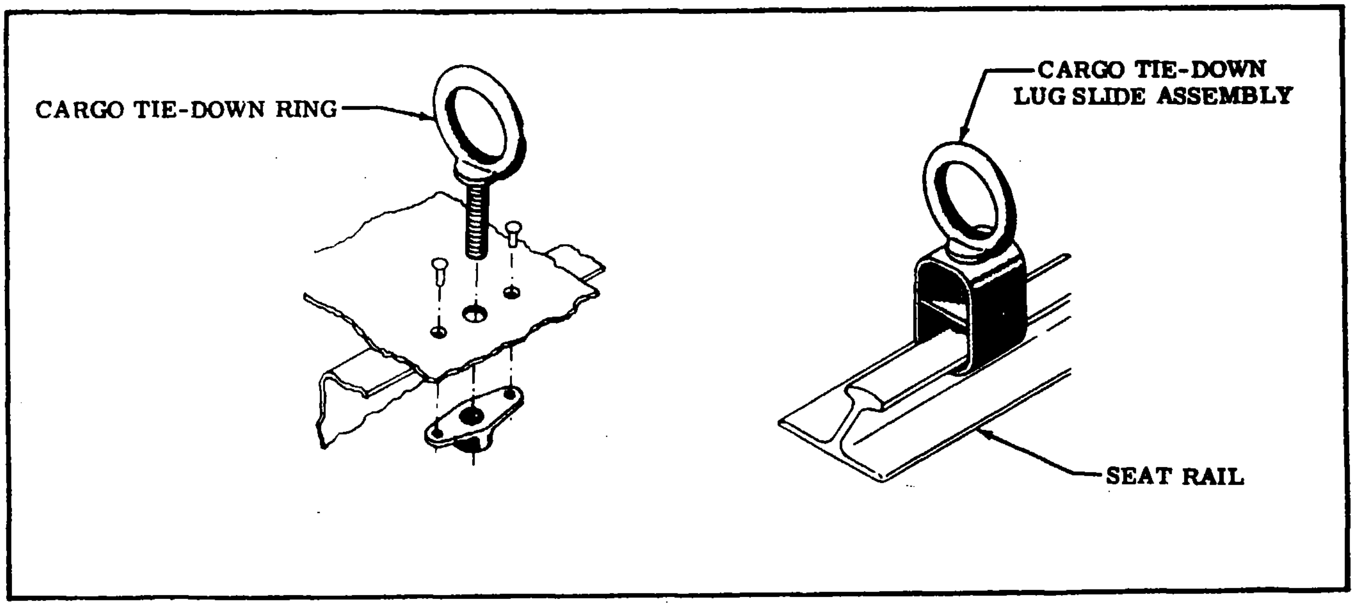
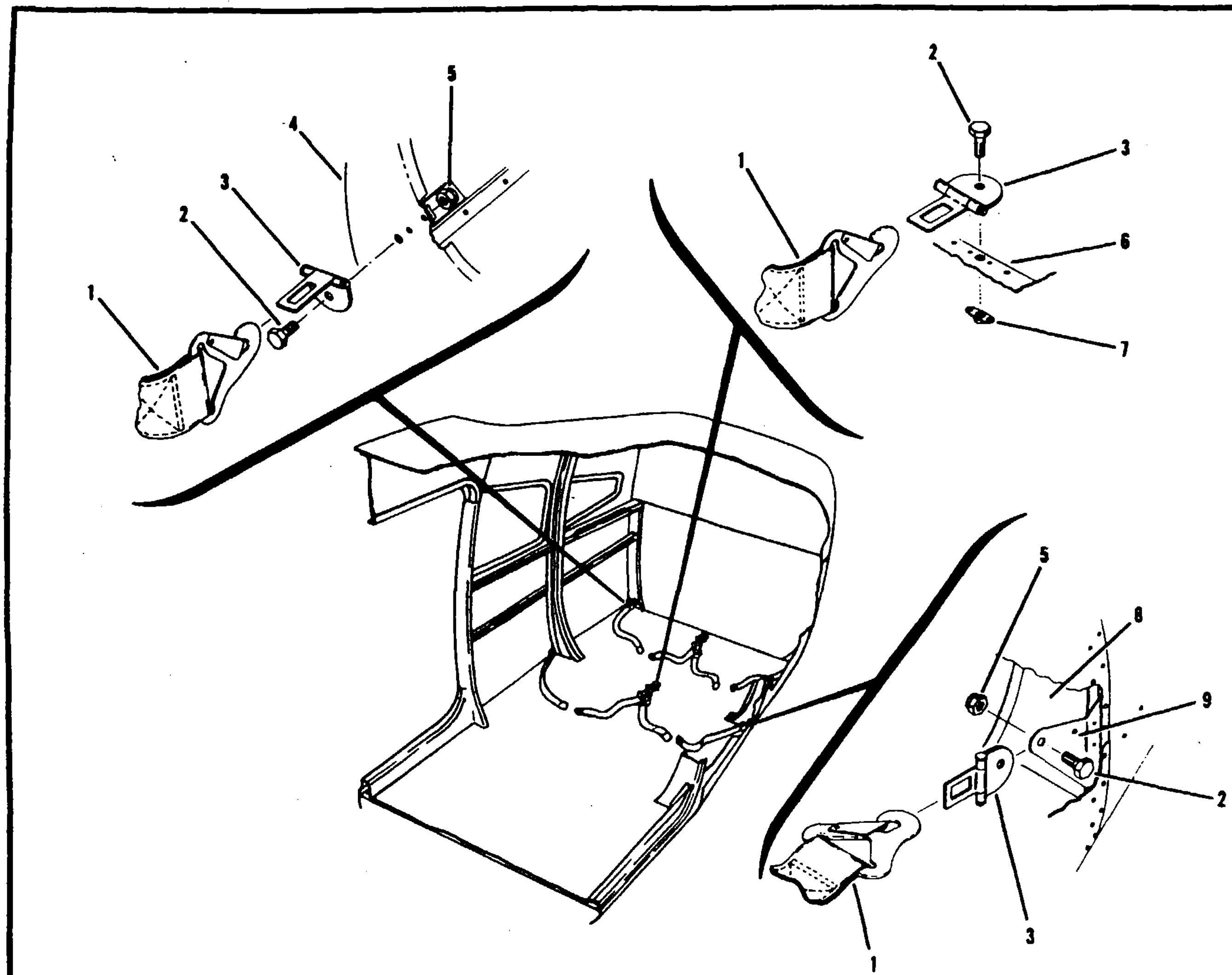
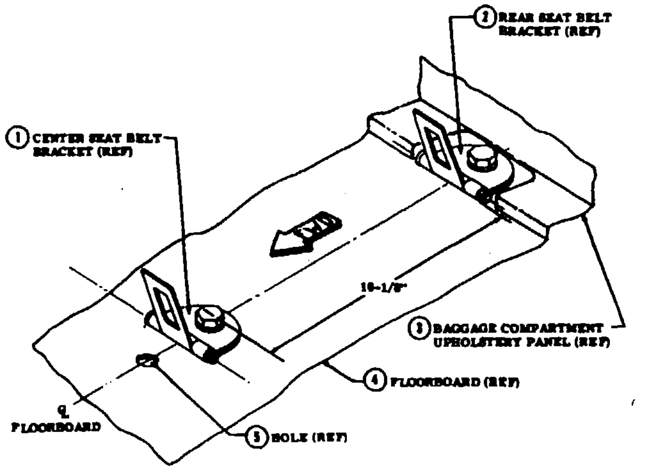


Figure 3-16. Cargo Tie-Down Rings

SHOP NOTES:



BE SURE CENTER SEAT BELT BRACKET IS IN LOCATION SHOWN. THE FLOORBOARD IS REINFORCED AT THE AFT HOLE FOR STRUCTURAL REQUIREMENTS OF THE SEAT BELT AND CARGO TIE-DOWN ATTACHMENTS.



NOTE

These safety belts can be removed quickly by unsnapping them from their brackets. The same brackets then serve as cargo tie-down brackets.

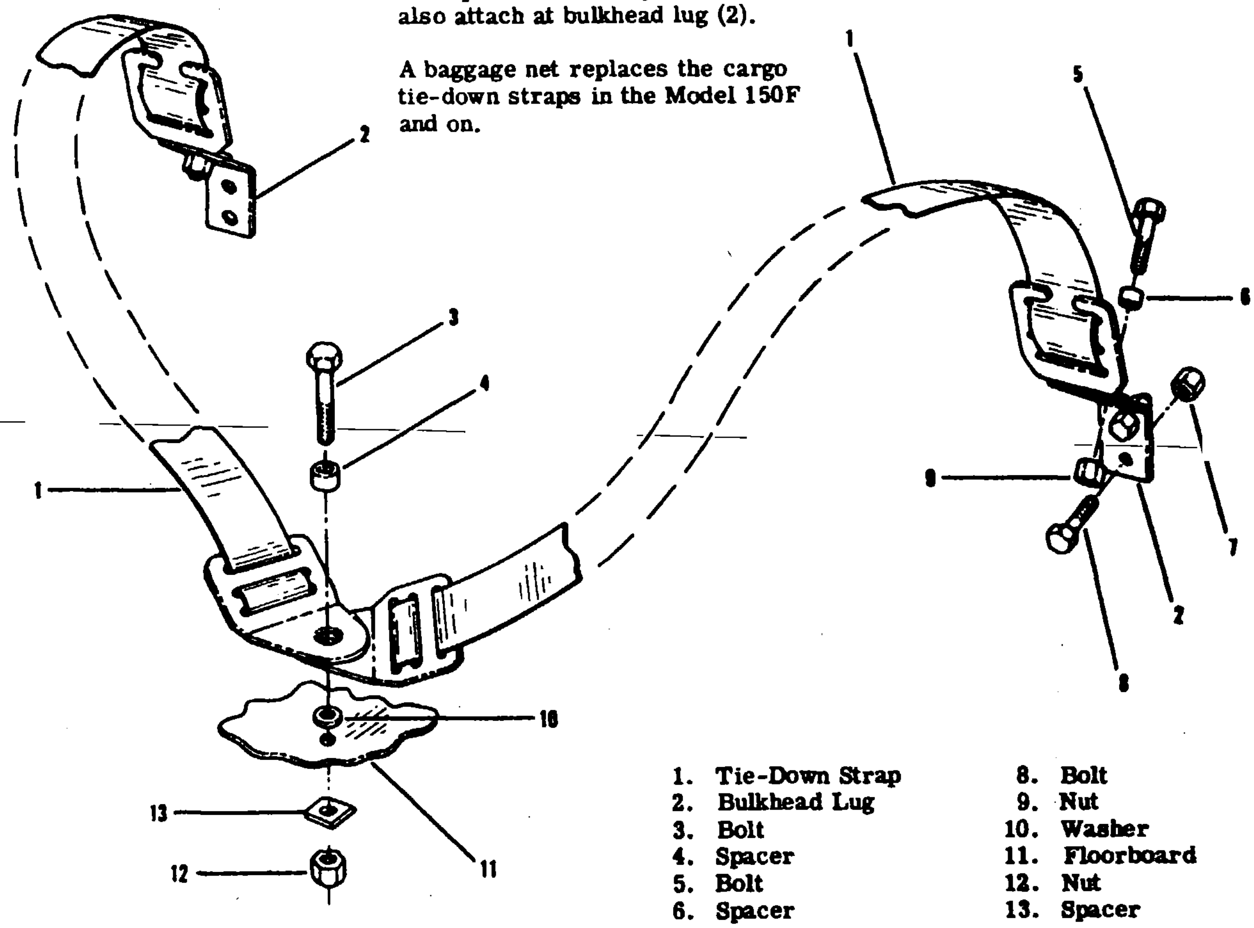
1. Safety Belt
2. Bolt
3. Bracket
4. Bulkhead (Station 108)
5. Nut
6. Floorboard
7. Nutplate
8. Bulkhead (Station 90)
9. Anchor Plate

Figure 3-17. Safety Belt and Cargo Tie-Downs (Utility Models 180 and 185)

NOTE

The optional auxiliary seat belts also attach at bulkhead lug (2).

A baggage net replaces the cargo tie-down straps in the Model 150F and on.



1. Tie-Down Strap
2. Bulkhead Lug
3. Bolt
4. Spacer
5. Bolt
6. Spacer
7. Nut
8. Bolt
9. Nut
10. Washer
11. Floorboard
12. Nut
13. Spacer

MODEL 150 - PRIOR TO 1966

Figure 3-18. Model 150 Adjustable Cargo Tie-Down Straps

3-39. CARGO PACK. (MODEL 185.)

NOTE

Prior to serial No. 185-0541, a rotating beacon was installed on the underside of the fuselage. When the cargo pack was installed, the rotating beacon had to be transferred to the cargo pack. Starting with the serial number noted, there is no rotating beacon on the underside of the fuselage. During the following procedure, delete all references to the rotating beacon if the airplane does not have one installed at the cargo pack location. When installing the cargo pack prior to serial No. 185-0745, move cylinder head temperature bulb to No. 2 cylinder unless the baffle listed in Service Letter 64-32 has been installed. The bulb remains in No. 1 cylinder on all other serials.

3-40. REMOVAL OF CARGO PACK.

a. Remove rotating beacon assembly from the bottom of the pack and disconnect the wire leads at the quick disconnects.

b. Position a support under the pack, remove all attaching screws and lower the pack from the fuselage.

NOTE

Lower the pack slowly while checking to be sure that the beacon lead wires are slipping through the hole in the pack.

c. Remove the rotating beacon extension lead wires from the airplane.

d. Connect the rotating beacon leads and install the beacon assembly on the airplane.

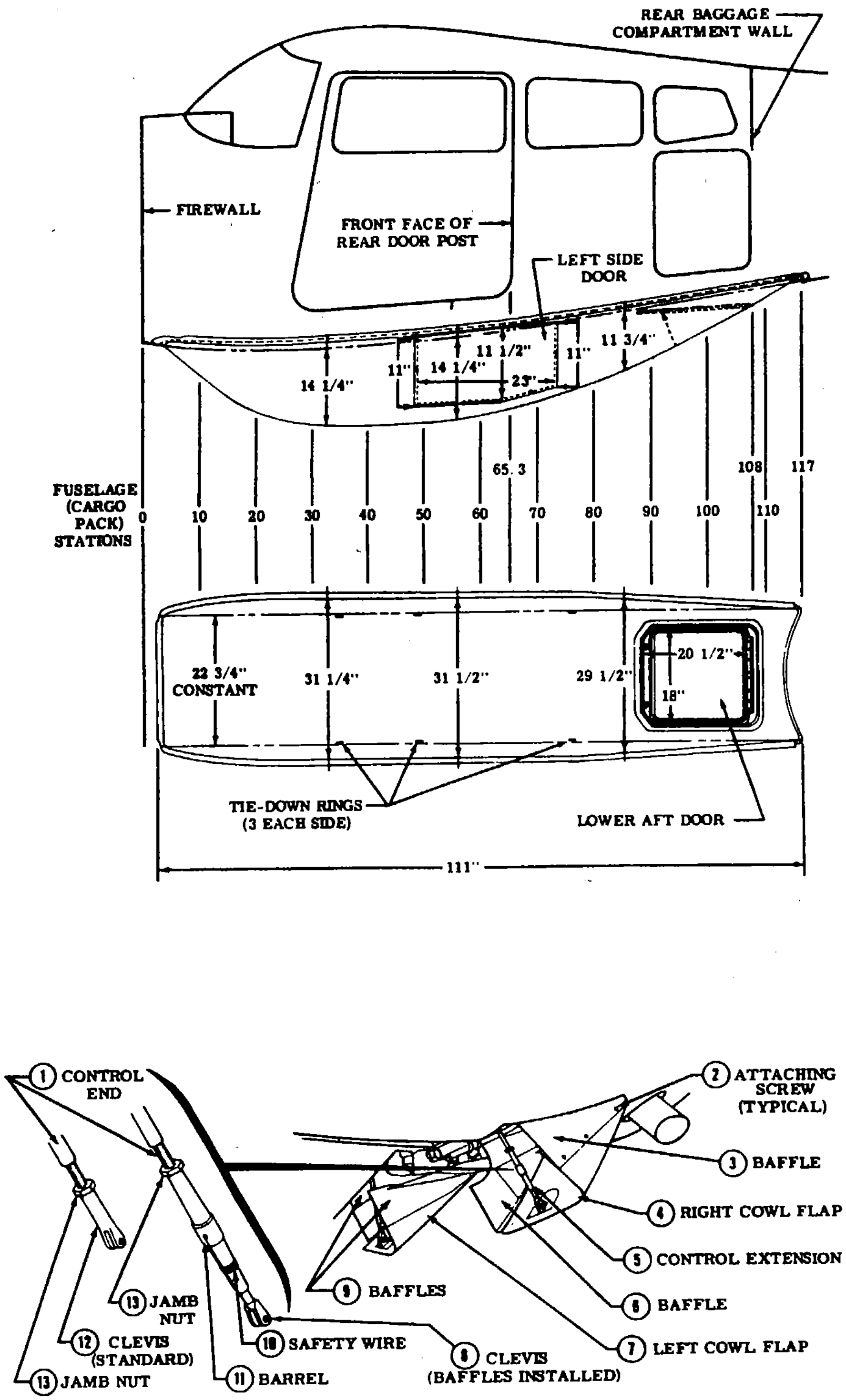


Figure 3-19. Model 185 Cargo Pack and Cowl Flap Extensions

3-41. REMOVAL OF COWL FLAP BAFFLES AND CONTROL EXTENSIONS. (See figure 3-19.)

a. Disconnect the cowl flap controls (1) from the flaps and take off all four baffles (3) by removing the screws (2).

b. Remove each clevis (8) and barrel (11) from the control ends and install the clevis (12) on each control end. Intentionally leave the control longer than necessary.

c. Put the cowl flap control lever in the "OPEN" position and connect the control ends to the cowl flaps but do not secure at this time. Move the control lever to the "CLOSED" position and measure the gap between the cowl flaps and the fuselage skin. Open the cowl flaps, disconnect the control ends from the cowl flaps and shorten each control, by screwing the clevis end, the distance measured on each flap. Connect the control end to each cowl flap temporarily and repeat the above procedure until each cowl flap fairs in the closed position. Attach the control ends to the cowl flaps securely and tighten the jamb nuts against the clevis ends. Operate the cowl flap control lever several times to check cowl flap operation.

3-42. INSTALLATION OF CARGO PACK.

a. Remove the rotating beacon from the bottom of the aircraft and disconnect the wires. Disconnect the positive (hot) wire at the quick disconnect terminal and the negative (ground) wire from the stringer just aft of the beacon light.

b. Attach the extension wire with the quick disconnect terminals on each end to the existing positive lead for the rotating beacon.

c. Pass the extension wire through the grommet of the access cover plate and install the plate over the hole vacated by the beacon. Using the forward attaching screw for the cover plate, secure the wire with a clamp.

d. Route the wire forward and inboard against the belly skin to the aft screw of the forward access cover plate. Use this screw to secure the positive lead with a second clamp and to attach the ground (negative) extension lead.

e. Move the pack into position under the airplane. Raise the aft end of the pack and insert a block under it.

f. Raise the forward end of the pack and align the two forward holes in the pack with the two Rivnuts which are located just aft of the firewall.

NOTE

Feed the wire leads down through the hole in the rotating beacon cover while raising the pack to the bottom of the airplane.

Install the two forward attaching screws.

g. Raise the aft end of the pack and install the aft two attaching screws. Install and tighten all remaining screws.

h. Attach the wire leads to the rotating beacon and install the beacon in the bottom of the pack.

NOTE

Coil excess wire above the beacon assembly as it is inserted into the mounting hole.

3-43. INSTALLATION OF COWL FLAP BAFFLES AND CONTROL EXTENSIONS. (See figure 3-19.)

a. Disconnect the control (1) from each cowl flap and remove the clevis (12) from each control end.

b. Leave the jamb nut (13) on the control ends. Install the clevis (8) into the barrel (11) and install the barrel on each control end (1). Do not tighten the jamb nut (13) or attach the clevis (8) to the cowl flaps at this time.

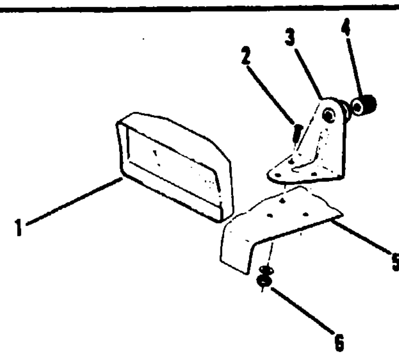
c. Position a baffle (3) along the side of the cowl flap so that the holes in the baffle are aligned over the nut plates in the cowl flap; secure with screws (2). Repeat for remaining three baffles.

NOTE

Each baffle is designed for installation on a specific cowl flap. Determine the correct baffle for each flap before installation. Note that the flanges on the baffles are turned toward the inside of each cowl flap opening.

d. Connect the cowl flaps to the control ends. Make sure the cowl flap control lever is in the "CLOSED" position; then adjust the barrels on the control ends so that the cowl flaps are 16° ± 1° open (or 3 3/4" ± 1/8" measured from the lower outboard corner of the cowl flap to the mating point on the fuselage). Set the jamb nuts tightly against the barrels, and safety wire each clevis to each barrel to maintain the specified setting.

3-44. GLIDER TOW HOOK. A glider tow hook, which is mounted in place of the tail tie-down ring, is available for all Models 150, 172, P172, and 182.



1. Mirror Assy
2. Screw
3. Bracket
4. Knurled Nut
5. Cowl Deck
6. Locknut

Figure 3-20. Rear View Mirror Installation

3-45. REAR VIEW MIRROR. An optional rear view mirror may be installed on the cowl deck above the instrument panels of the 150D & on, 172D & on, and 182H & on aircraft. Figure 3-20 shows details of the rear view mirror installation.

SECTION 4

AIRFRAME

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

4-2. Each all-metal wing panel is a semicantilever, semi-monocoque 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, a high-lift flap, and a detachable wing tip are mounted on each wing assembly. A single fuel tank is mounted between the wing spars at the inboard end of each wing and the leading edge of the left wing may be equipped with landing and taxi lights. Colored navigation lights are mounted at each wing tip.

4-3. REMOVAL. Removal of a wing panel is accomplished most easily 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 the 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.
3. Pitot line (left wing only) at wing root or at forward door post.
4. Cabin ventilator hose at wing root.
5. Wing leveler vacuum tube at wing root.

e. Slack off tension on aileron and mechanical flap cables by loosening turnbuckles, then disconnect cables at the flap and aileron bellcranks. On aircraft with electric flap systems, it is easier to disconnect flap cables at turnbuckles above headliner and pull them into the 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. Then disconnect cable from wire and leave the 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 fittings. On the Model 182, the fuselage fitting projects from the fuselage and is covered by the strut fairing. Loosen the fairing and slide it up the strut; the strut may then be lowered without damage.

NOTE

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

g. Mark position of wing attachment eccentric bushings; these bushings are used to rig out "wing-heaviness."

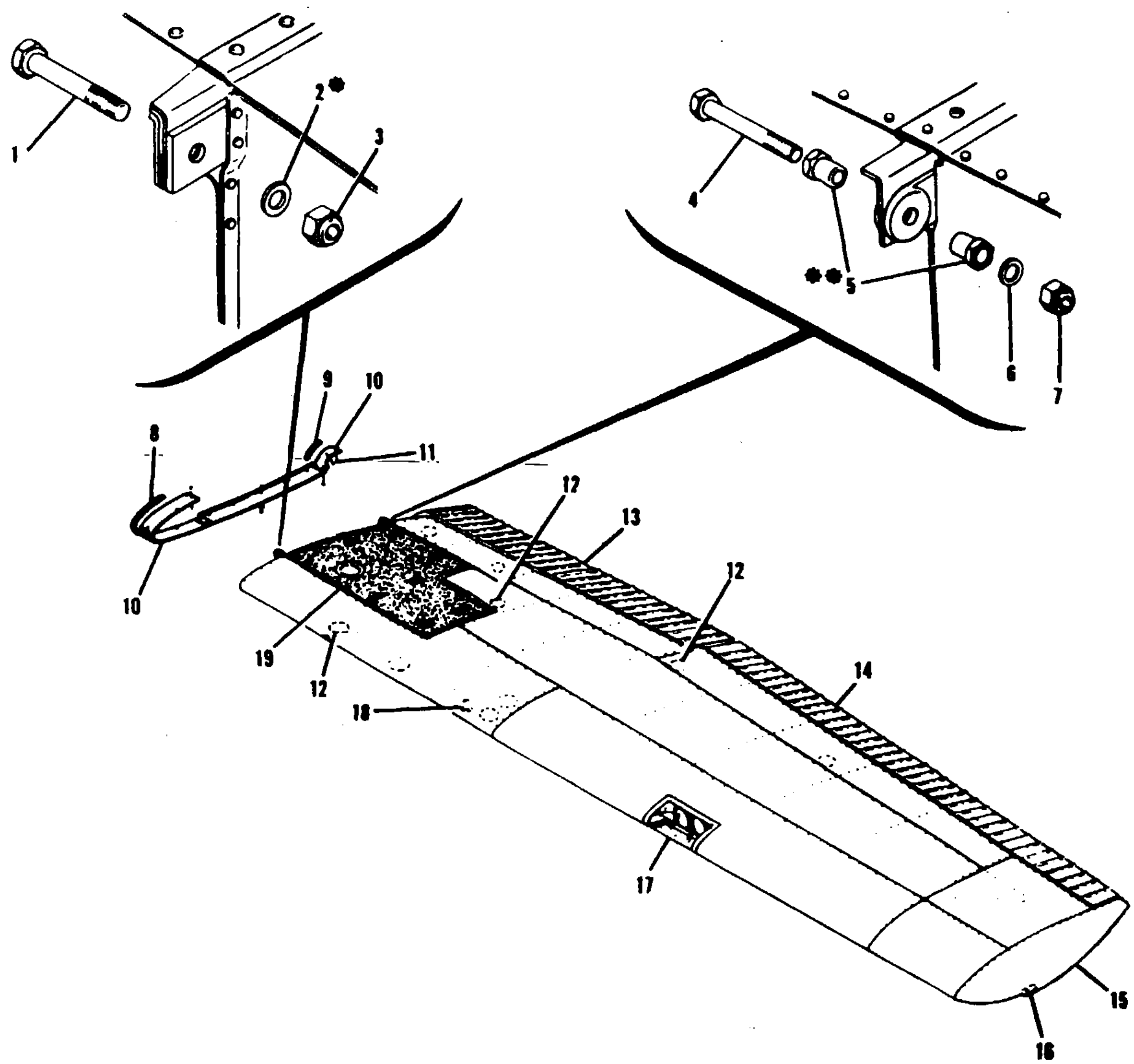
h. Remove nuts, washers, bushings and bolts attaching wing spars to fuselage.

NOTE

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

i. Remove wing and lay on padded stand.

4-4. REPAIR of a damaged wing panel may be accomplished in accordance with instructions given in Section 19. Extensive repairs of wing skin or structure are best accomplished using the wing repair jig,



1. Bolt
2. Washer
3. Nut
4. Bolt
5. Bushing
6. Washer
7. Nut
8. Rub Strip
9. Moulding
10. Fairing
11. Screw
12. Inspection Plate
13. Flap
14. Aileron
15. Wing Tip
16. Navigation Light
17. Landing and Taxi Lights
18. Stall Warning Unit
19. Fuel Tank

* On the Model 150, five washers are installed under the nut on the front spar-to-fuselage fitting.

** On the Model 182, the forward bushing is approximately half the length of the aft bushing. Care should be taken to install the short bushing in the forward side and the long bushing in the aft side. At least one washer should always be installed under the bolt head and under the nut. Torque the bolts to value listed in Torque Table in Section 1.

Figure 4-1. Typical Wing Installation

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.

4-5. INSTALLATION.

a. Hold wing in position and install bolts, bushings, washers and nuts attaching wing spars to fuselage fittings.

b. Install bolt, spacer, and nut to attach upper end of wing strut to wing fittings. On the Model 182, reinstall the strut fairing at the lower end of the strut.

c. Route flap and aileron cables.

d. Connect:
   1. Electrical wires at wing root disconnects.
   2. Fuel lines at wing root.
   3. Pitot line (if left wing is being installed).
   4. Ventilator hose.
   5. Wing leveler vacuum tube at wing root.

e. Rig aileron system (Section 6).

f. Rig flap system (Section 7).

g. Refuel wing tank and check for leaks.

h. Check operation of wing tip and landing lights.

i. Check operation of fuel gage.

j. Install wing root fairings and fairing plates.

NOTE

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

k. Install all inspection plates and interior panels and upholstery.

4-6. ADJUSTMENT (CORRECTING "WING-HEAVY" CONDITION). 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 airplane.

b. (See figure 4-1.) Loosen nut (7) and rotate bushings (5) 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 the 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 airplane. 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 eccentric 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.

4-7. WING STRUTS. (See figure 4-2.)

4-8. 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.

4-9. REMOVAL AND INSTALLATION.

a. Remove screws attaching strut fairings to wing and fuselage. Slide fairings away from the ends of the strut.

b. Remove fuselage and wing inspection plates or fairings at strut junction points.

c. Support wing securely, then remove nut and bolt securing strut to fuselage.

d. Remove nut, bolt, washers and spacer used to attach strut to wing, then remove strut from airplane.

e. Install strut by reversing preceding steps.

4-10. REPAIR of wing struts is limited to replacement of strut seals, tie-downs and attaching parts. A badly dented, cracked, or deformed wing strut should be replaced.

4-11. FIN. (See figures 4-3 thru 4-7.)

4-12. The fin is primarily of metal construction consisting of ribs and spars covered with skin. Some fin tips, dorsals, and sections of leading edges are of thermo-formed plastic or glass fiber construction. Hinge brackets at the fin rear spar attach the rudder.

4-13. REMOVAL. The fin on all models except the 150 (prior to 1966) may be removed without first removing the rudder. However, for access and ease of handling, the rudder may be removed on all models if desired, following procedures outlined in Section 10.

a. Remove fairings on either side of fin.

b. Disconnect rotating or flashing beacon lead, tail navigation light lead, antennas and antenna leads, and rudder cables if rudder has not been removed.

NOTE

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

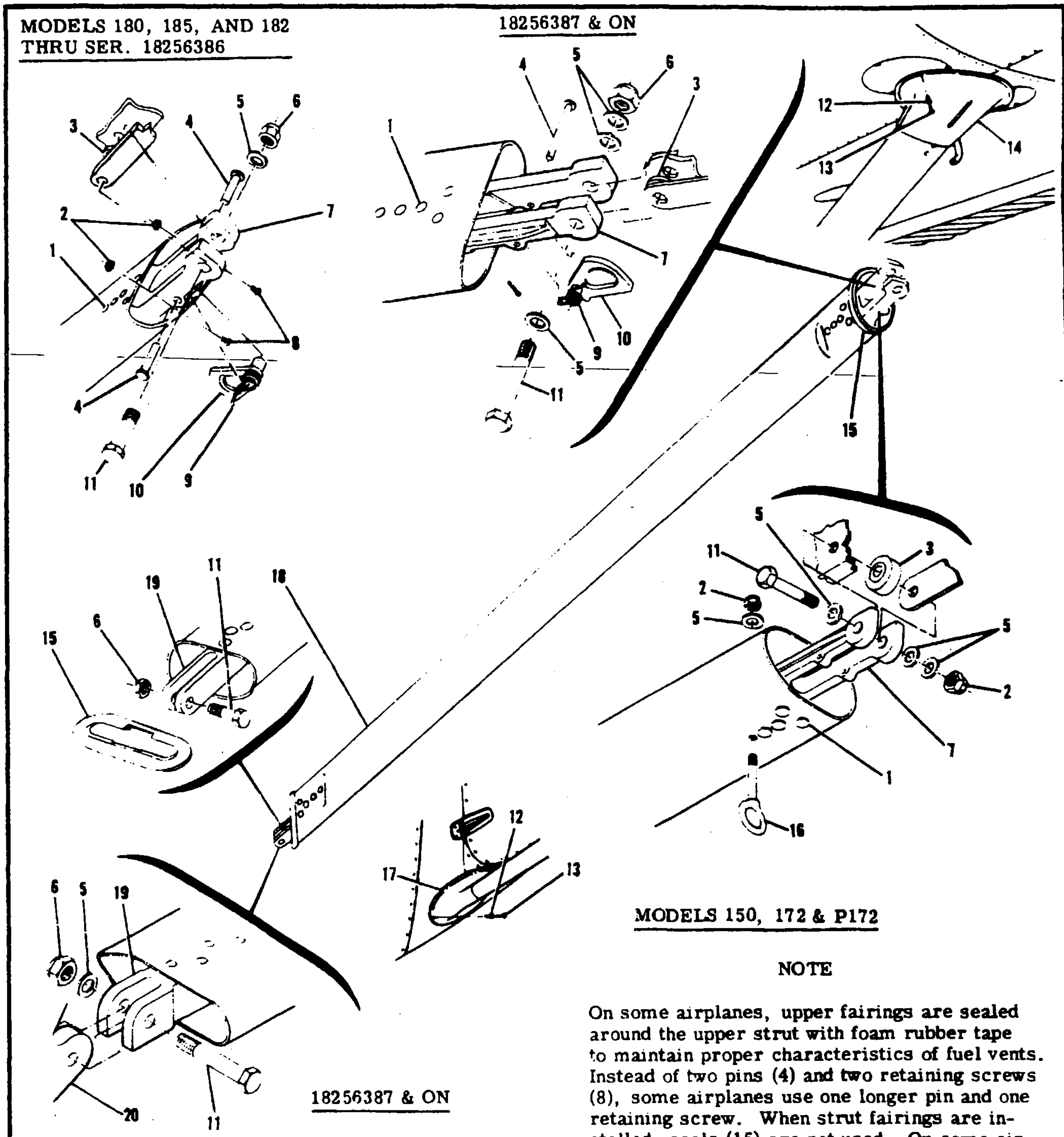
c. Remove any screws attaching dorsal to fuselage and dorsal to fin.

NOTE

The dorsal is a part of the fin on some models and a part of the fuselage on others. On those airplanes where the dorsal is riveted to the fuselage, it is ordinarily left in place when removing the fin.

d. Disconnect elevator cable from elevator bellcrank on Models 172 and P172.

e. Remove bolts attaching fin rear spar to fuse-



NOTE

On some airplanes, upper fairings are sealed around the upper strut with foam rubber tape to maintain proper characteristics of fuel vents. Instead of two pins (4) and two retaining screws (8), some airplanes use one longer pin and one retaining screw. When strut fairings are installed, seals (15) are not used. On some airplanes, fairings are standard equipment.

1. Rivet
2. Nut
3. Spacer
4. Pin
5. Washer
6. Nut
7. Wing Attachment Fitting
8. Screw
9. Spring
10. Mooring Ring
11. Bolt
12. Rivnut
13. Screw
14. Upper Fairing
15. Seal
16. Mooring Ring
17. Lower Fairing
18. Strut
19. Fuselage Attachment Fitting
20. Fuselage Fitting

Figure 4-2. Wing Strut

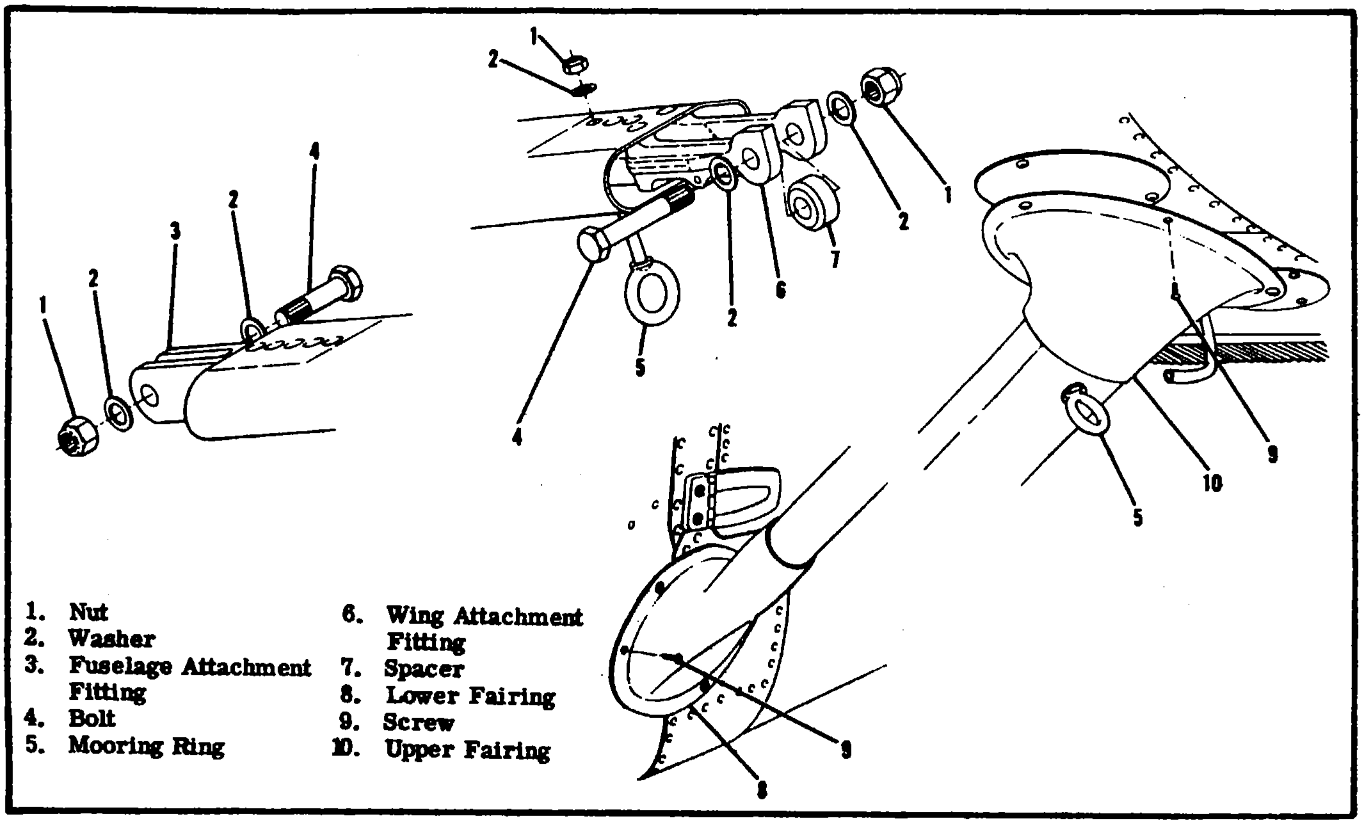


Figure 4-2A. Wing Strut (1968 Model 150H)

lage. Remove upper elevator stop bolts on Models 172 and P172.

f. Remove bolts attaching fin front spar to fuselage and remove fin. On the Model 150 (prior to 1966) the forward part of the fin is attached to the fuselage with a bolt passing through the fuselage into a nutplate in the fin base. Remove this bolt and remove the fin.

g. Retain any shims installed between the rear spar of the fin and the fuselage bulkhead on the Models 172 and P172.

4-14. REPAIR of the fin should be accomplished in accordance with the applicable instructions in Section 19.

4-15. INSTALLATION of the fin may be accomplished by reversing the procedure in paragraph 4-13. Be sure to check and reset rudder and elevator travel if any stop bolts were removed or settings disturbed.

a. Reinstall any shims removed from between the fin rear spar and the fuselage bulkhead on the Models 172 and P172. If a new fin is being installed, measure any gap existing between the fin rear spar and the fuselage 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.

4-16. HORIZONTAL STABILIZER (FIXED).

NOTE

On Models 180 and 185, the horizontal stabilizer is adjustable to provide the longitudinal trim afforded by the elevator trim tab of other models. Refer to Section 11 for information concerning adjustable stabilizers.

4-17. Horizontal stabilizers are primarily of all-metal construction consisting of ribs and spars covered with skin. Some stabilizer tips are thermoformed plastic or glass fiber. 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.

4-18. REMOVAL.

NOTE

For removal and installation of adjustable stabilizers, see Section 11.

a. Remove elevators and rudder in accordance with procedures outlined in Sections 8 and 10.

b. Remove vertical fin in accordance with procedure outlined in paragraph 4-13.

c. Disconnect elevator trim control cables at clevis and turnbuckle inside tailcone, remove pulleys which route the aft cables into horizontal stabilizer, and

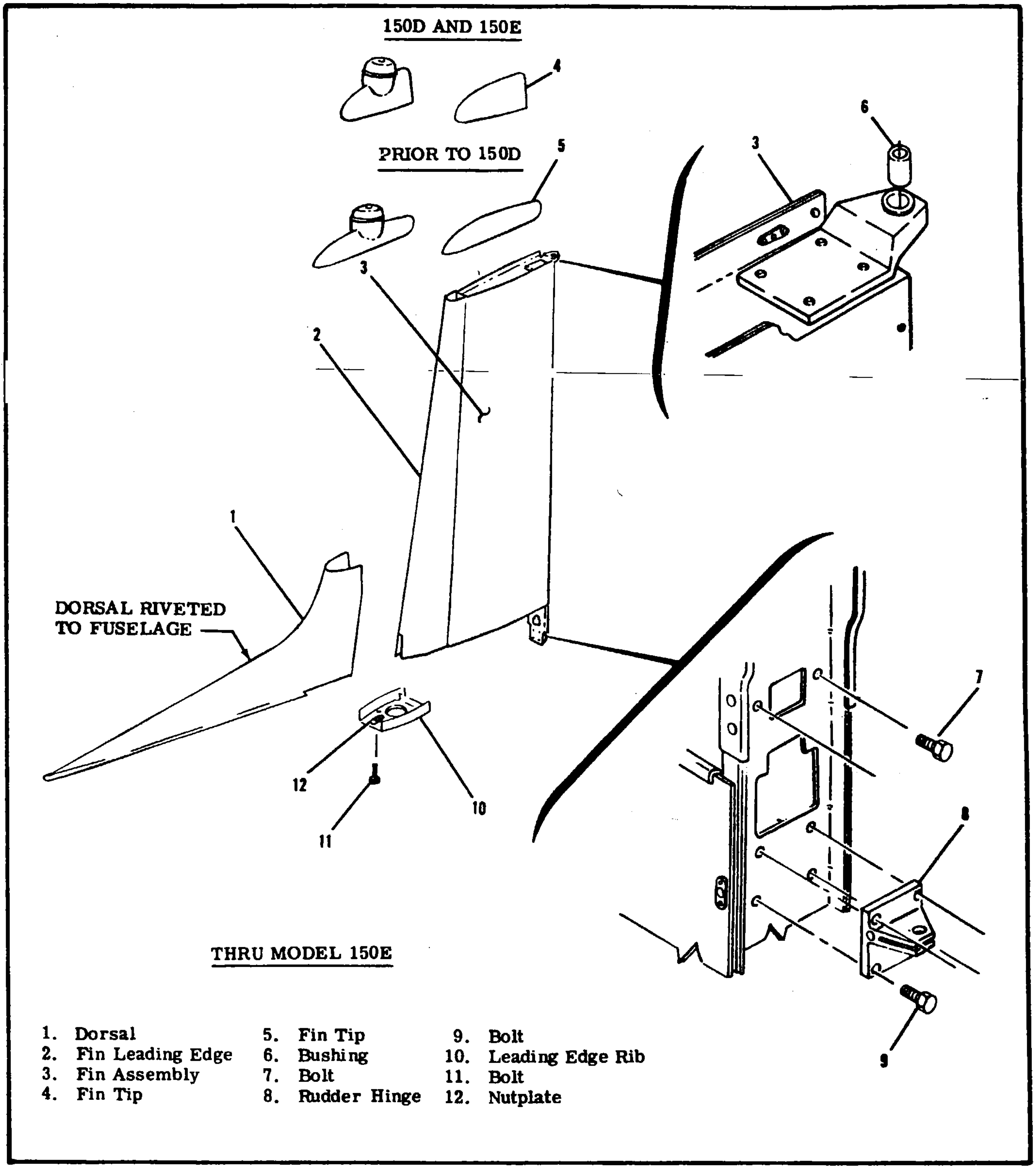


Figure 4-3. Vertical Fin - Model 150 (Sheet 1 of 2)

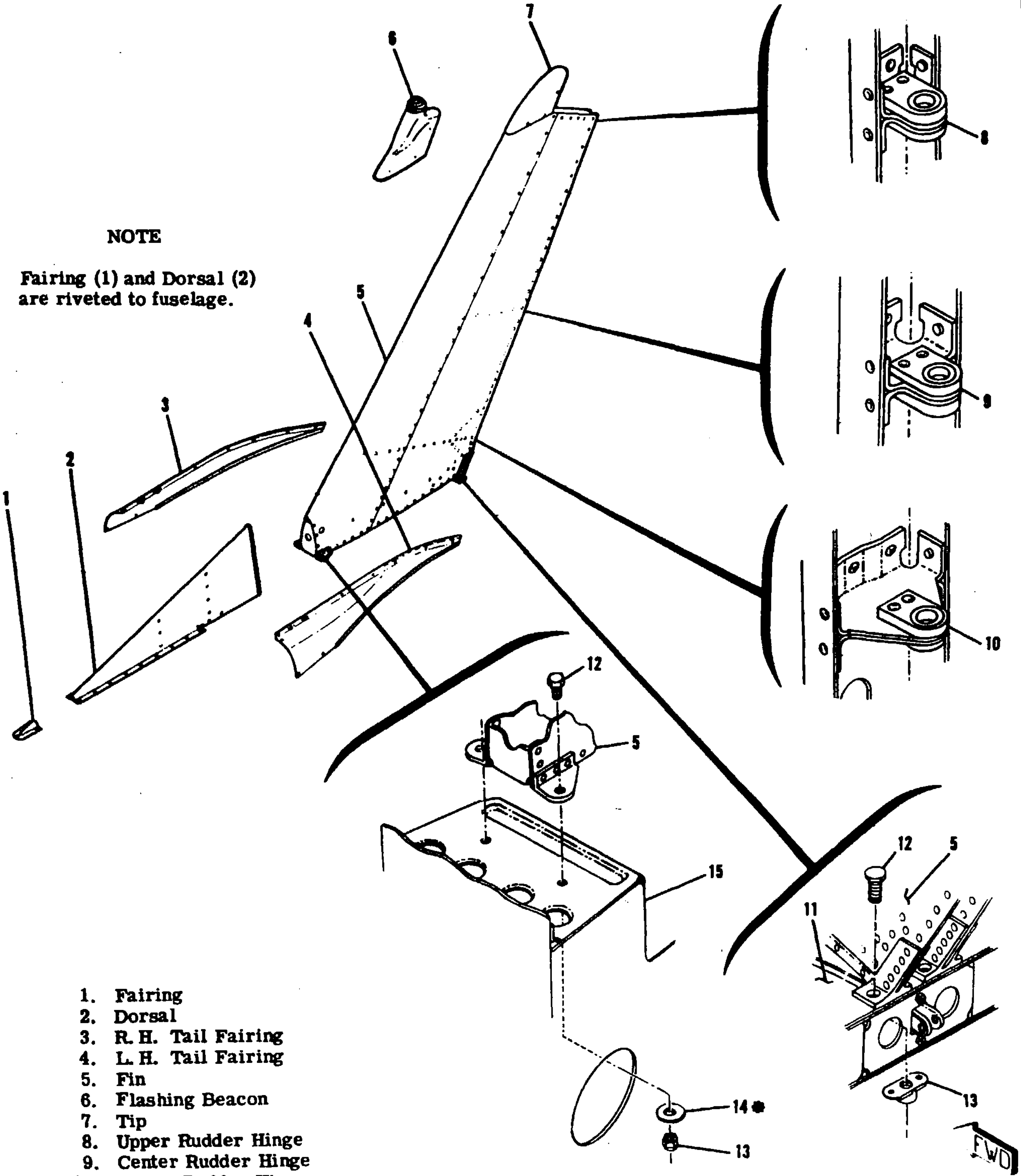
pull cables out of tailcone.
d. Remove bolts securing horizontal stabilizer to fuselage.
e. Remove horizontal stabilizer.

4-19. REPAIR of the horizontal stabilizer should be accomplished in accordance with applicable instructions in Section 19.

4-20. INSTALLATION.
a. Install the horizontal stabilizer by reversing the procedures outlined in paragraph 4-18, rigging the control systems as necessary. Check operation of tail navigation light and rotating or flashing beacon.

NOTE

Fairing (1) and Dorsal (2) are riveted to fuselage.



1. Fairing
2. Dorsal
3. R. H. Tail Fairing
4. L. H. Tail Fairing
5. Fin
6. Flashing Beacon
7. Tip
8. Upper Rudder Hinge
9. Center Rudder Hinge
10. Lower Rudder Hinge
11. Horizontal Stabilizer
12. Bolt
13. Nutplate
14. Washer
15. Fuselage

MODEL 150F & ON

* Used on some airplanes. Install if originally used.

Figure 4-3. Vertical Fin - Model 150 (Sheet 2 of 2)

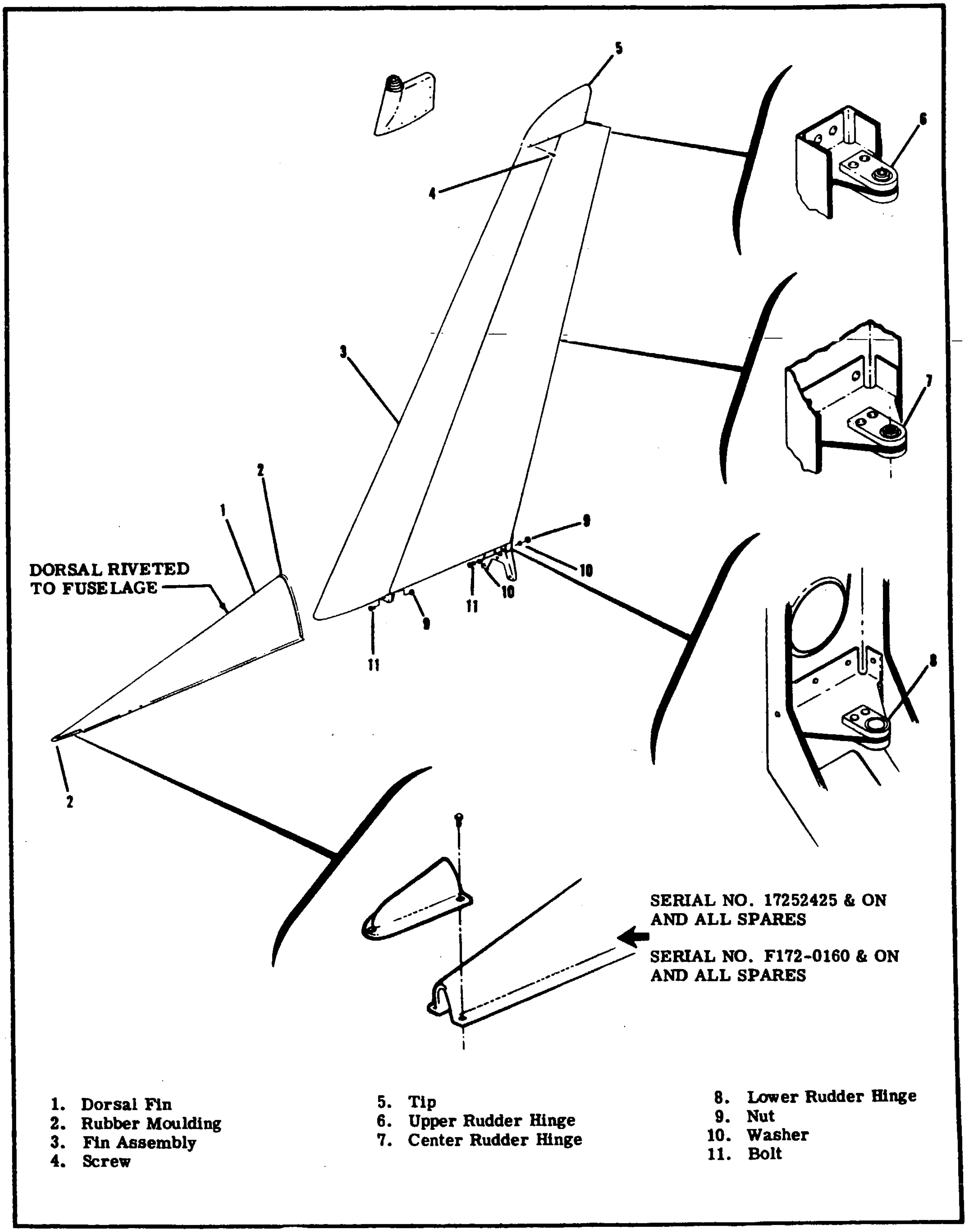
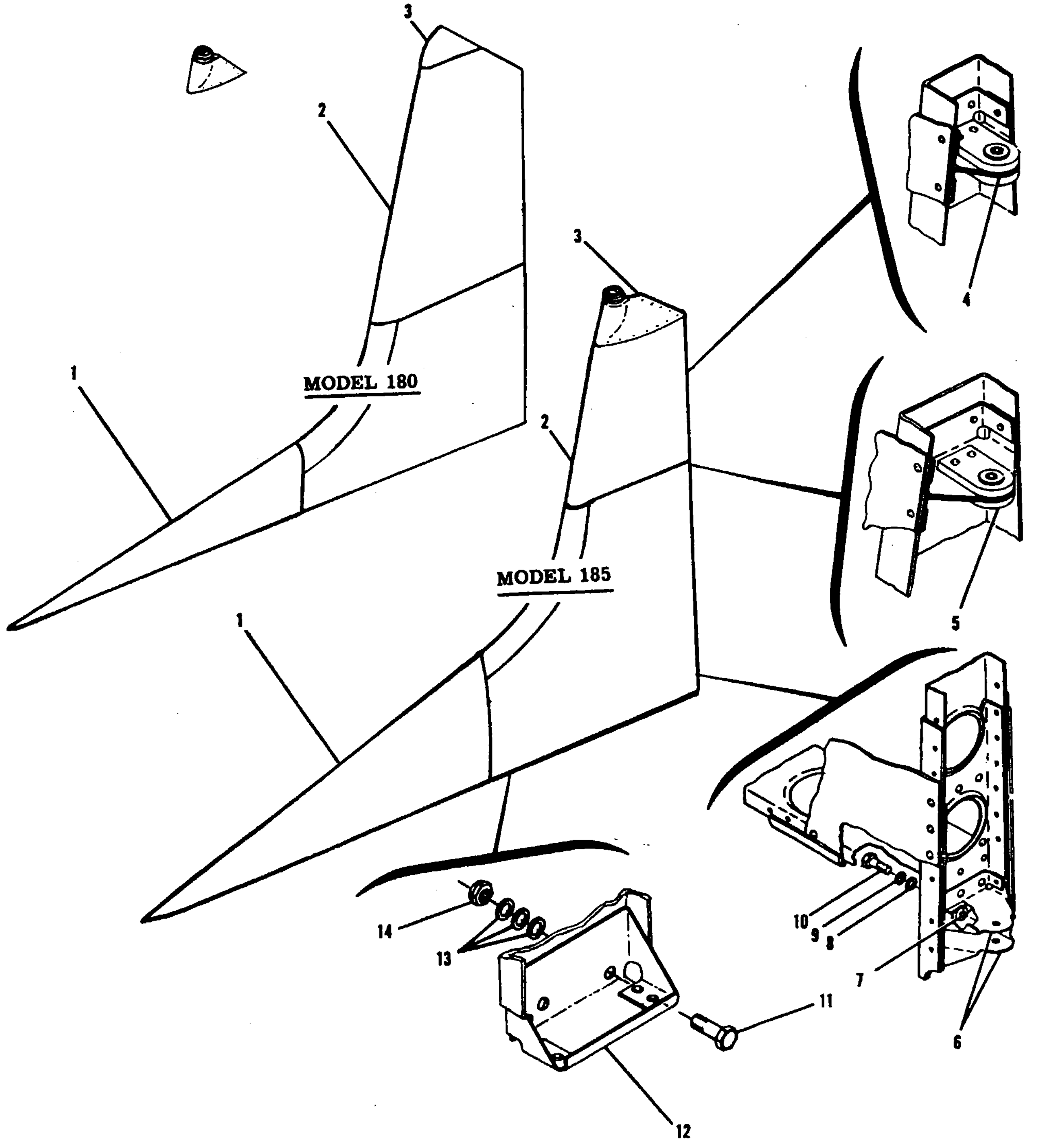
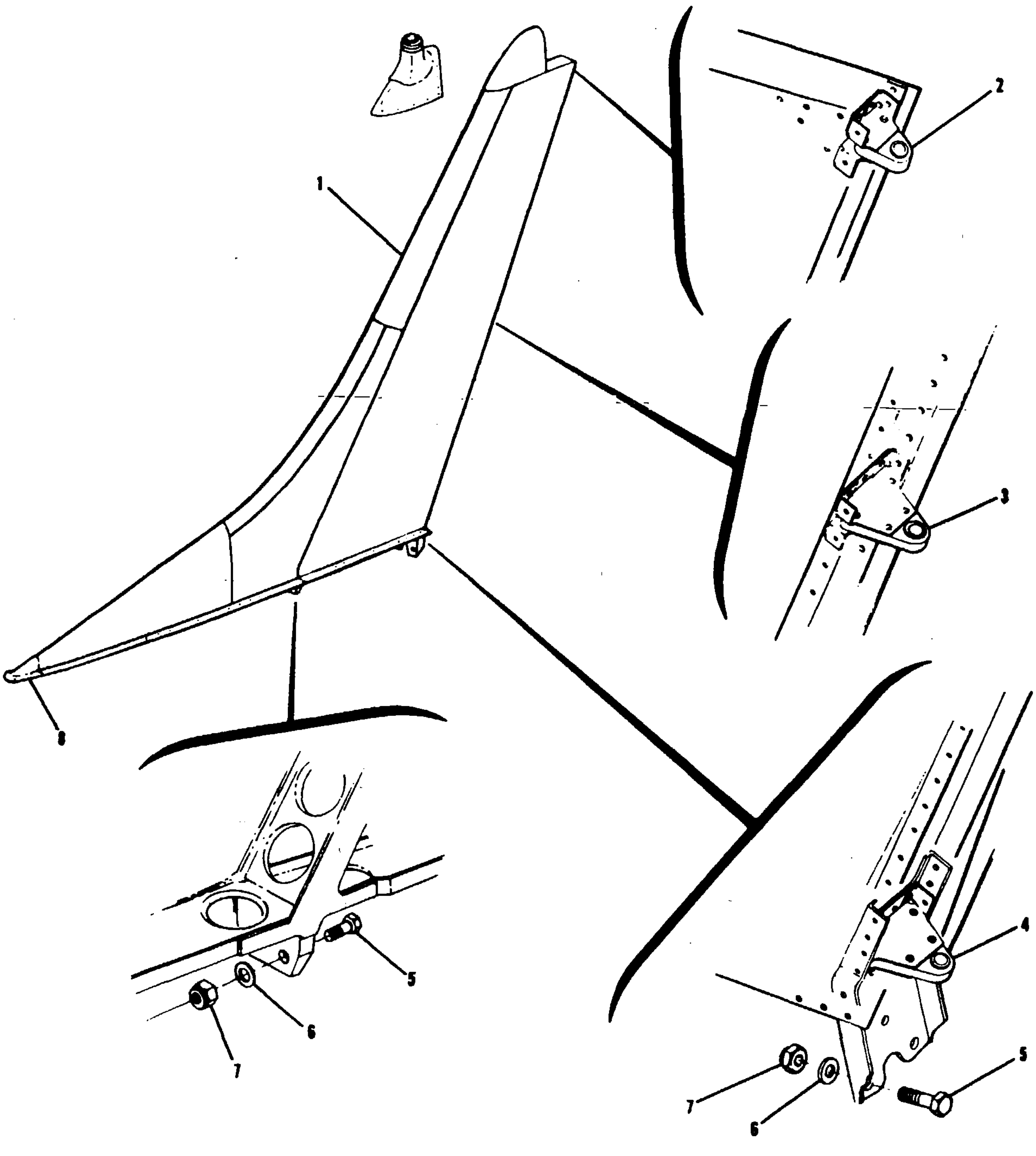


Figure 4-4. Vertical Fin - Models 172 and P172



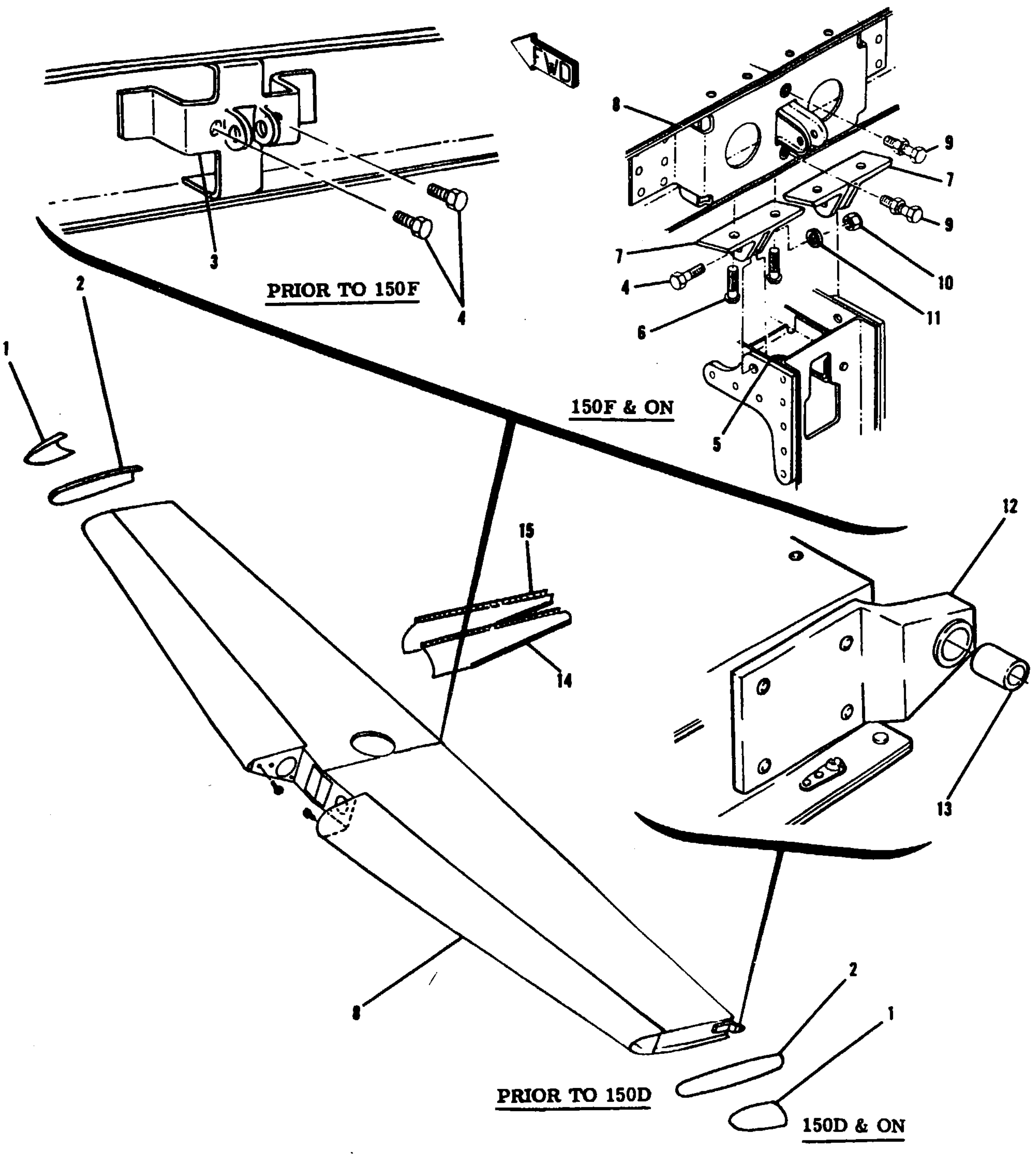
1. Dorsal
2. Fin Assembly
3. Fin Tip
4. Upper Rudder Hinge
5. Center Rudder Hinge
6. Lower Rudder Hinge
7. Nutplate
8. Washer
9. Washer
10. Bolt
11. Bolt
12. Stabilizer Stop
13. Washer
14. Nut

Figure 4-5. Vertical Fin - Models 180 and 185



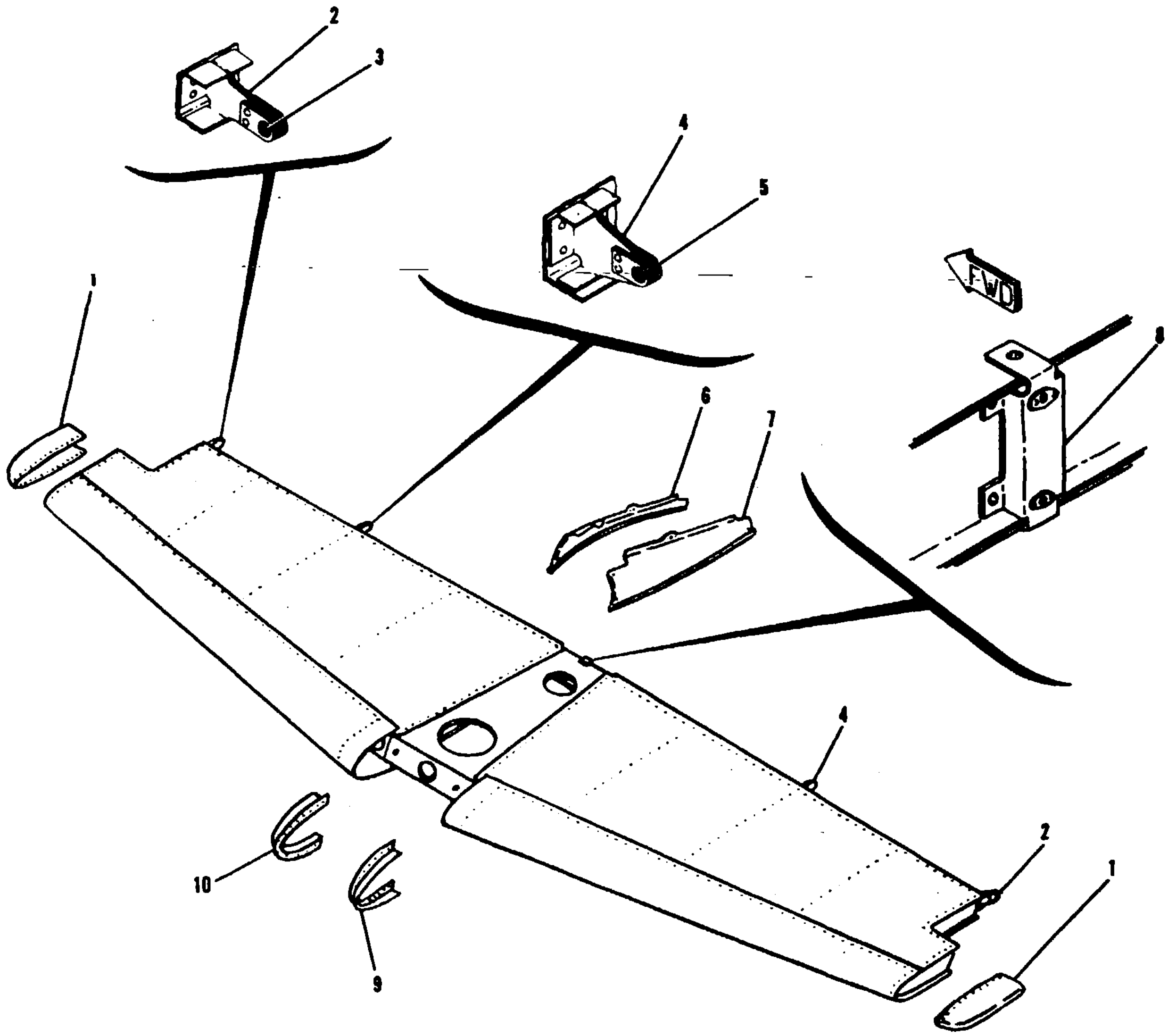
1. Fin Assembly
2. Upper Rudder Hinge
3. Center Rudder Hinge
4. Lower Rudder Hinge
5. Bolt
6. Washer
7. Nut
8. Fairing

Figure 4-6. Vertical Fin - Model 182



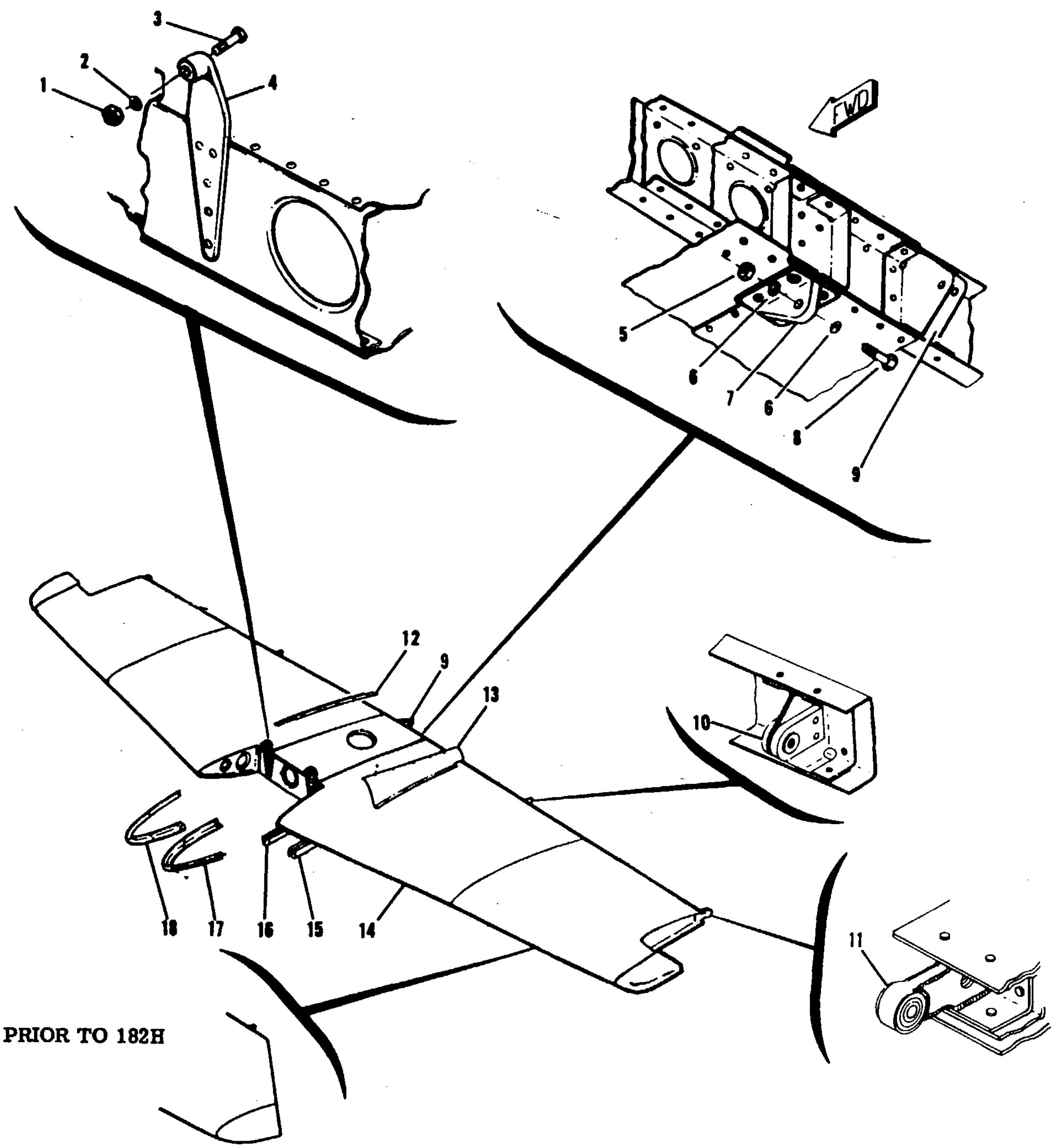
1. Stabilizer Tip
2. Stabilizer Tip
3. Elevator Center Hinge
4. Bolt
5. Fuselage
6. Screw
7. Fitting
8. Stabilizer
9. Stop Bolt
10. Nut
11. Washer
12. Elevator Outboard Hinge
13. Bushing
14. Upper Left Fairing
15. Upper Right Fairing

Figure 4-7. Horizontal Stabilizer - Model 150



1. Stabilizer Tip
2. Elevator Hinge
3. Bushing
4. Elevator Hinge
5. Bushing
6. Upper Right Fairing
7. Upper Left Fairing
8. Bracket
9. Forward Left Fairing
10. Forward Right Fairing

Figure 4-8. Horizontal Stabilizer - Models 172 and P172



1. Nut
2. Washer
3. Bolt
4. Bracket
5. Nut
6. Washer
7. Bracket
8. Bolt
9. Elevator Pylon Bracket
10. Elevator Inboard Hinge
11. Elevator Outboard Hinge
12. Upper Right Fairing
13. Upper Left Fairing
14. Stabilizer Assembly
15. Lower Left Moulding
16. Lower Right Moulding
17. Forward Left Fairing
18. Forward Right Fairing

Figure 4-9. Horizontal Stabilizer - Model 182

SECTION 5

LANDING GEAR

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5-1. LANDING GEAR.

5-2. A tapered, spring-steel strut supports each main wheel, and a steerable nosewheel is mounted on an air-oil shock strut in all tricycle-gear equipped airplanes. Model 180 and 185 series airplanes are equipped with conventional gear utilizing spring-steel main gear struts and a tapered, tubular tailwheel strut. The tailwheel is steerable with the rudder pedals up to maximum pedal deflection, after which it becomes free-swiveling. Model 185 series airplanes are equipped with a tailwheel lock, which still permits steering of approximately 2.5° each side of neutral while the lock is engaged. The nosewheel is also steerable with the rudder pedals up to maximum pedal deflection, after which it becomes free-swiveling up to a maximum travel of 30° right or left of center. Through use of the brakes, tricycle gear airplanes can be pivoted about the outer wing strut fitting.

Cleveland wheels and brakes are used on all Model 150 and 185 series airplanes, Model 172F and on, Model 180G and on, and Model 182H and on. All other models were equipped with Goodyear wheels and brakes. Cleveland and Goodyear nose wheels are interchangeable on all models. Tube-type tires are used on all models except the first ten Model 150C airplanes, which were equipped with tubeless tires.

Speed fairings of reinforced, resin-bonded glass-fiber are standard equipment on some models and optional equipment on others.

5-3. TROUBLE SHOOTING THE LANDING GEAR.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
AIRPLANE LEANS TO ONE SIDE.		
Incorrect tire inflation.	Check with tire gage.	Inflate to correct pressure.
Landing gear attaching parts not tight.	Hoist or jack airplane and check attaching parts.	Tighten loose parts and replace defective parts.
Landing gear spring excessively sprung.	Check visually.	Remove and replace.
Incorrect shimming at inboard end of spring.	If no defects are found, incorrect shimming is indicated.	Install shims as required. Refer to paragraph 5-6 for limitations.
Bent axles.	Check visually.	Replace axles.
WHEEL BOUNCE EVIDENT EVEN ON SMOOTH SURFACE.		
Out of balance condition.	Check wheel balance.	Correct in accordance with paragraph 5-44.
NOSE WHEEL SHIMMY.		
Nose strut loose in attaching clamps.	Raise nose, remove cowl and check strut attachment.	Tighten nose strut attaching clamp bolts.
Shimmy dampener lacks fluid.	Refer to paragraphs 2-21, 2-21A, or 2-21B.	Refer to paragraphs 2-21, 2-21A, or 2-21B.
Defective shimmy dampener.	Raise nose, turn nose wheel back and forth to check dampening.	Repair or replace defective shimmy dampener.
Loose or worn nose wheel steering linkage.	Check for evidence of play.	Tighten or replace defective linkage.

TIRES WEAR EXCESSIVELY.		
Incorrect tire inflation.	Check with tire gage.	Inflate to correct pressure.
Wheels out of alignment.	Check toe-in and camber.	Align in accordance with paragraph 5-23.
Landing gear spring excessively sprung.	Check visually.	Remove and replace.
Incorrect shimming at inboard end of spring.	If no defects are found, incorrect shimming is indicated.	Install shims as required. Refer to paragraph 5-6 for limitations.
Bent axles.	Check visually.	Replace axles.
Dragging brakes.	Jack wheel and spin to check for friction.	See paragraph 5-72.
Wheel bearings too tight.	Jack wheel and check for bearing drag.	Adjust properly.
Loose torque links.	Check for excessive clearances.	Add washers or replace as necessary.
Loose or defective nose wheel bearings.	Raise nose, check wheel bearings.	Tighten wheel bearings properly; replace, if defective.
Nose wheel out of balance.	Check wheel balance.	Correct in accordance with paragraph 5-44.
HYDRAULIC FLUID LEAKAGE FROM NOSE STRUT.		
Defective strut seals.	Check for evidence of fluid leakage.	Replace defective seals.
NOSE STRUT WILL NOT HOLD AIR PRESSURE.		
Defective air filler valve, or valve not tight.	Check for air leakage at valve.	Check gasket and tighten loose valve. Replace, if defective.
Defective strut seals.	Check for evidence of fluid leakage.	Replace defective seals.

5-4. MAIN GEAR.

5-5. REMOVAL.

NOTE

Three different methods are used to attach the main landing gear spring to the fuselage outboard structure. Wide U-bolts are used on some models, shims and wedges on others, and steel channels on others. The spring is attached to the fuselage inboard structure with a bolt which passes through a hole in the end of the spring.

a. Remove floorboard access covers over spring, remove screws and slide external fairing and seal down around spring, drain hydraulic brake fluid and hoist or jack airplane in accordance with Section 2.

b. On those models where the brake line is attached to a bulkhead fitting through the fuselage skin, disconnect the brake line at this fitting. On those models where the brake line connection is inside the fuselage beneath the floor, disconnect the brake line from the spring and the wheel brake cylinder. Remove the gear, leaving the brake line protruding from the fuselage.

c. On aircraft with U-bolts, remove the nuts and washers from the U-bolts and tap them free of the attaching structure. On aircraft with shims and wedges, remove the attaching bolts and pry the shims and wedges out of the fuselage. On aircraft with a channel, remove the attaching bolts, washers, and nuts and remove the channel.

d. Remove the bolt, washer, and nut attaching the inboard end of the spring and pull the entire gear out of the fuselage. Note shims placed under the inboard end of the spring and mark them to be sure they are replaced correctly at reinstallation of the landing gear.

5-5A CORROSION CONTROL ON LANDING GEAR SPRINGS.

a. General
   (1) The main landing gear springs are made from high strength steel that is shot peened on the lower surface to increase the fatigue life of the part.
   (2) The shot peened layer is between 0.010 and 0.020 inch thick.
   (3) If the protective layer of paint is chipped, scratched, or worn away, the steel may corrode (rust).

   NOTE: Corrosion pits that extend past the shot peen layer of the gear spring will cause a significant decrease in the fatigue life of the spring.

   (4) Operation from unimproved surfaces increases the possibility of damage.

b. Corrosion removal and repair.

   WARNING: Do not use chemical rust removers or paint strippers on landing gear springs. High-strength steel parts are very susceptible to hydrogen embrittlement. Acidic solutions, such as rust removers and paint strippers, can cause hydrogen embrittlement. Hydrogen embrittlement is an undetectable, time-delayed process. Since the process is time delayed, failure can occur after the part is returned to service.

   (1) Examine for signs of corrosion (red rust) if damage to the paint finish of the landing gear spring is found.
   (2) Carefully remove any rust by light sanding.
      (a) The sanding must blend the damage into the adjacent area in an approximate 20:1 ratio.
      EXAMPLE: An 0.005-inch-deep pit. The pit must be blended to a 0.10-inch radius or 0.20-inch diameter.
      (b) Make sure the last sanding marks are along an inboard-to-outboard direction, or along the long dimension of the spring.
   (3) After the sanding is complete, measure the depth of the removed material from the damaged area.

   NOTE: The maximum combined depth of removed material to the top and bottom or leading and trailing edge is not to be more than 0.063 inch at any two opposite points on the gear spring. This measurement limitation includes areas that have previously been damaged and repaired.

      (a) Make sure the depth of the damage area on the bottom of the gear spring is not more than 0.012 inch deep.
         1 If the damage is deeper than 0.012 inch deep and less than 0.063 inch deep, replace or shot peen the gear spring. The gear spring must be removed and sent to an approved facility to be shot peened.
            a The shot peen specification is to be Almen intensity of 0.012 to 0.016 with 330 steel shot.
      (b) Make sure the depth of any damage on the leading edge, trailing edge, or top of the gear spring is not more than 0.063 inch deep.
         1 If the damage is deeper than 0.063 inch deep, replace the gear spring.
   (4) Touch-up paint as required.

   NOTE: Additional information regarding corrosion control can be found in FAA documents AC-43-4, Chapter 6, or AC43.13-1B Chapter 6.

c. Axle bolt hole corrosion.
   (1) Operation of an airplane on skis increases the loads on the lower part of the gear spring because of the unsymmetrical and twisting loads.
      (a) The increased loads have produced spring fractures that originate from pits in the axle attach holes.
         1 Catastrophic failures can occur from fatigue cracks as small as 0.003 to 0.010-inch long that originated at pits.

   NOTE: Although operation on skis causes more loads, the criteria apply to all airplanes.

   (2) There is no maximum damage depth for pits that develop in the axle bolt holes. If pits or corrosion is found, ream to remove it, subject to the following limitations:
      (a) Remove the minimum material necessary to repair the damage.
      (b) Make sure the diameter of the axle attachment holes are no more than 0.383 inch for 3/8- inch bolts.
      (c) Make sure the diameter of the axle attachment holes are no more than 0.321 inch for 5/16- inch bolts.
      (d) If reaming to the maximum dimension does not remove all signs of corrosion, discard the landing gear spring.

5-6. INSTALLATION.

a. Slide seal and external fairing plate over upper end of landing gear spring.
b. Slide the spring into place and work shims in position under inboard end of spring. Install bolt, washer, and nut to secure inboard end of spring.

NOTE: Shims are installed under the inboard end of the spring as required to level the wings within a total tolerance of three inches. Maximum number of shims permissible is three for the Models 150, 180, and 185; two for the Models 172 and P172; one for the Model 182.

c. Where U-bolts are used, install with washers and nuts. Where shims and wedges are used, tap them securely in place and install attaching bolts. Avoid excessive pounding of wedges to prevent deforming supporting structure, especially on the Model 150 prior to serial no. 15060127. After the noted serial, a bolt replaces a rivet in the forward end of each lower inboard angle. Where a channel is used, install with bolts, washers, and nuts. Make sure the identification arrow on the channel points outboard; it is possible to install it incorrectly.
d. Lower aircraft to ground.
e. Connect brake lines; bleed brakes.
f. Install parts removed for access.

5-7. STEP BRACKET REPLACEMENT.

NOTE: The step bracket is secured to the landing gear spring strut with Conley-Weld, or a similar epoxy base adhesive.

a. Mark the position of the bracket so that the replacement bracket will be installed in approximately the same position.
b. Remove all traces of the original adhesive as well as any rust, paint, or scale with a wire brush and coarse sand paper.
c. Leave surfaces slightly roughened or abraided, but deep scratches or nicks should be avoided.
d. Clean the surfaces to be bonded thoroughly. If a solvent is used, remove all traces of the solvent with a clean, dry cloth. It is important for the surfaces to be clean and dry.
e. Check the fit of the step bracket on the spring. A gap of not more than 1/32 inch is permissible.
f. Mix the adhesive carefully according to manufacturer's directions.
g. Spread a coat of adhesive on the surfaces to be bonded, and place step bracket in position on the spring. Tap the bracket upward to insure a tight fit.
h. Form a small fillet of the adhesive at all edges of the bonded surfaces. Remove excess adhesive with lacquer thinner.
i. Allow the adhesive to cure thoroughly according to manufacturer's recommendations before flexing the gear spring or applying loads to the step.
j. Repaint gear spring and step bracket after curing is complete.

5-7A. BRAKE LINE FAIRING REPLACEMENT (182).

a. Disconnect brake line at wheel and drain fluid, or plug line to avoid draining. Flex brake line away.
b. Remove all traces of the original adhesive as well as any rust, paint, or scale with a wire brush and coarse sand paper. Sand inner surface of fairing strip, running sanding marks lengthwise.
c. Leave surfaces slightly roughened or abraided, but deep scratches or nicks should be avoided.
d. Clean the surfaces to be bonded thoroughly. If a solvent is used, remove all traces of the solvent with a clean, dry cloth. It is important for the surfaces to be clean and dry. Solvent should not be used on the vinyl fairing strip.
e. Mix the adhesive (B.F. Goodrich A-1188-B) according to manufacturer's directions.
f. Apply a thin, uniform coat of adhesive to each bonding surface. Allow adhesive to air dry until solvent odor is gone (approx. 3 to 4 minutes at room temperature). Make assembly within ten minutes after solvent evaporates.

WARNING: Keep catalyst away from heat, sparks, and open flame. Use with adequate ventilation and avoid prolonged breathing of vapor. Avoid contact with skin, eyes, and mouth.

g. Position fairing strip between brake line and strut, and press firmly against strut. Press brake line into groove of fairing strip and wrap immediately with masking tape in five equally spaced places. Excess adhesive may be removed with solvent.
h. Allow the adhesive to cure thoroughly according to manufacturer's directions before flexing the gear.
i. After the recommended curing time, remove tape and connect brake line.
j. Paint the area as required.
k. Fill and bleed brake system.

5-8. MAIN WHEEL AND AXLE.

5-9. REMOVAL.

a. Disconnect, drain, and plug the hydraulic brake line at the brake cylinder.
b. Remove the wheel in accordance with paragraph 5-12 (or 5-18 for Cleveland wheels).
c. Remove the nuts and bolts securing axle and brake components to the spring strut. Note the number and position of the wheel alignment shims. Mark these shims or tape them together carefully so they will be reinstalled in exactly the same position to ensure that wheel alignment is not disturbed. Remove axle and brake components.

5-10. INSTALLATION.

a. Secure axle and brake components to spring strut, making sure that wheel alignment shims are reinstalled in their original positions.

b. Install the wheel assembly in accordance with paragraph 5-16 (or 5-22 for Cleveland wheels).

c. Connect brake line. Fill and bleed the brake system.

5-11. MAIN WHEELS (Goodyear).

5-12. REMOVAL.

NOTE

This paragraph involves removing the wheel from the axle. The procedure may be used for tire replacement, wheel bearing replacement, and replacement of wheel brake parts.

a. Jack the wheel, using the universal jack point.

b. Remove the wheel speed fairing (if installed), or the outer dust cover.

c. Remove cotter pins and axle nut.

d. Pull the wheel assembly off the axle, leaving the brake disc in place in the brake assembly. Cantilever brake clips must be disengaged from disc.

5-13. DISASSEMBLY.

a. Completely deflate the tire by removing the valve core.

WARNING

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

b. Break tire beads loose.

c. Remove thru-bolts and separate wheel halves.

d. Remove tire and tube.

e. Remove bearing retaining rings, grease seals, and bearing cones.

NOTE

To remove the bearing cups, heat the wheel half in boiling water for 15 minutes. Using an arbor press, if available, press out the bearing cup and press in the new one while the wheel is still hot.

5-14. INSPECTION AND REPAIR.

a. Clean all metal parts and the grease seal felts in solvent and dry thoroughly.

b. Inspect wheel halves for cracks. Cracked wheel halves should be replaced. Sand out nicks, gouges, and corroded areas. Where the protective coating has been removed, the area should be cleaned thoroughly, primed with zinc chromate primer, and repainted with aluminum lacquer.

c. Brake discs should be replaced if excessively scored or warped. Small nicks and scratches should be sanded smooth.

d. Bearing cups and cones should be inspected carefully for damage and discoloration. After cleaning, repack bearing cones with clean bearing grease before installation in the wheel.

5-15. ASSEMBLY.

a. Insert tube in tire, aligning indexing mark on tube with red dot on tire. Place outboard wheel half in tire and position valve stem through valve hole. Insert thru-bolts, position inboard wheel half, and secure with nuts and washers. Take care to avoid pinching tube between wheel halves. Torque to value marked on wheel.

CAUTION

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

b. Clean and repack bearing cones with clean wheel bearing grease.

c. Assemble bearing cones, seals, and retainers into the wheel halves.

5-16. INSTALLATION.

a. Place wheel on axle. Prior to the Model 150F, install collar (17, figure 5-6) on axle first.

b. Position disc in the wheel as the wheel is being slipped into place. The cantilever anti-rattle disc clips must be raised at one end while installing the disc.

c. Make sure outer bearing, seal, and retaining parts (and the outer collar prior to the Model 150F) are in place, then install axle nut and tighten until a slight bearing drag is obvious when the wheel is turned. Back off the nut to the nearest castellation and install cotter pins.

d. Install the speed fairings, if used, or the outer dust cover. Remove jack.

CAUTION

Whenever a tire is changed, a speed fairing is installed, or scraper adjustment is disturbed, set scraper clearance in accordance with paragraph 5-66.

5-17. MAIN WHEELS (Cleveland).

5-18. REMOVAL.

NOTE

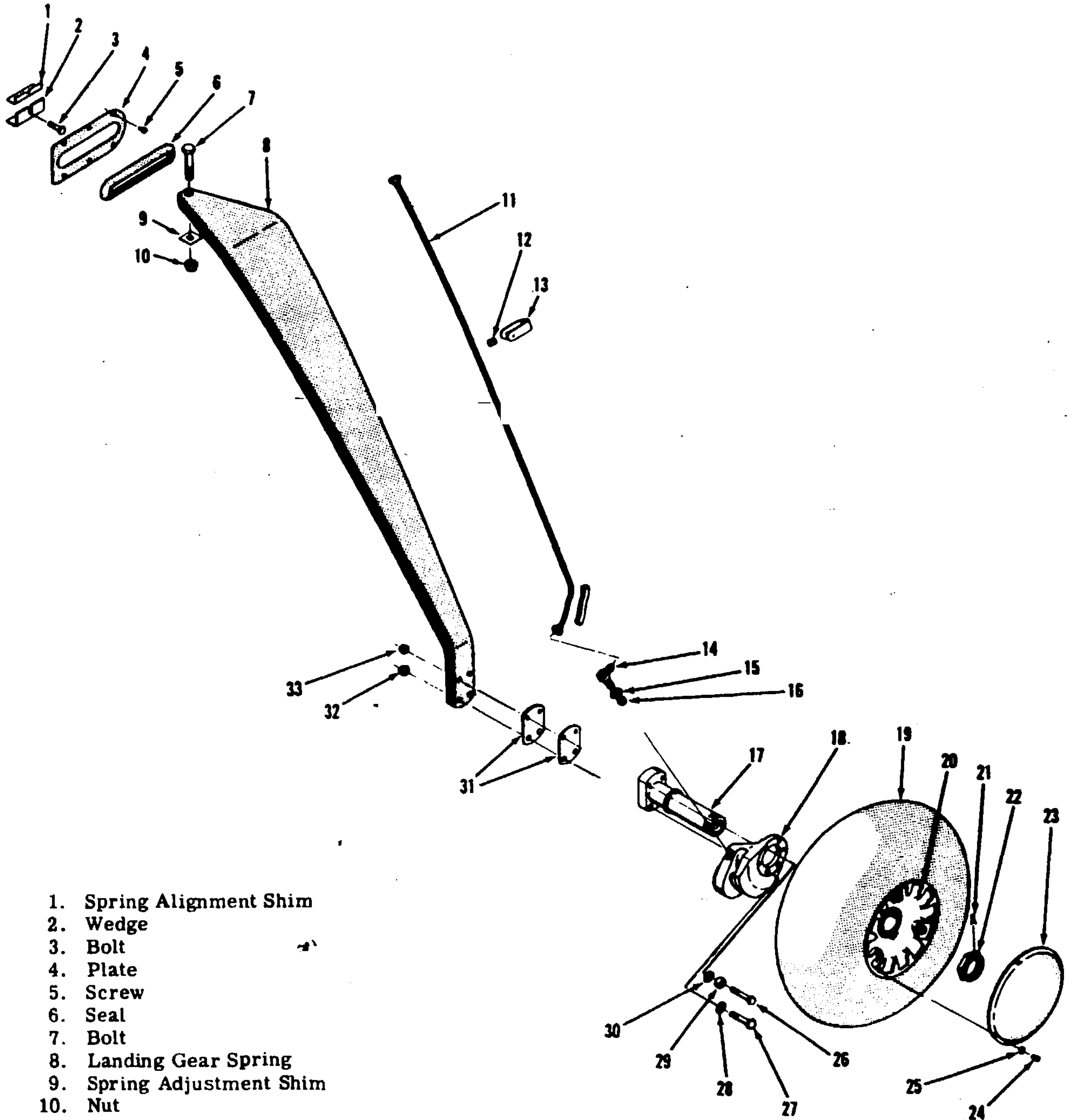
It is not necessary to remove the wheel to reline brakes or remove brake parts (other than the brake disc or torque plate) on Cleveland wheel and brake assemblies.

a. Jack the wheel, using the universal jack point.

b. Remove the speed fairing (if installed), or the outer dust cover.

c. Remove hub cap to expose axle nut. Hub cap is not used when speed fairings are installed, and is not used beginning with the 1964 models. When not used, the hub cap is replaced with grease seals and retainer rings.

d. Remove cotter pins and axle nut.

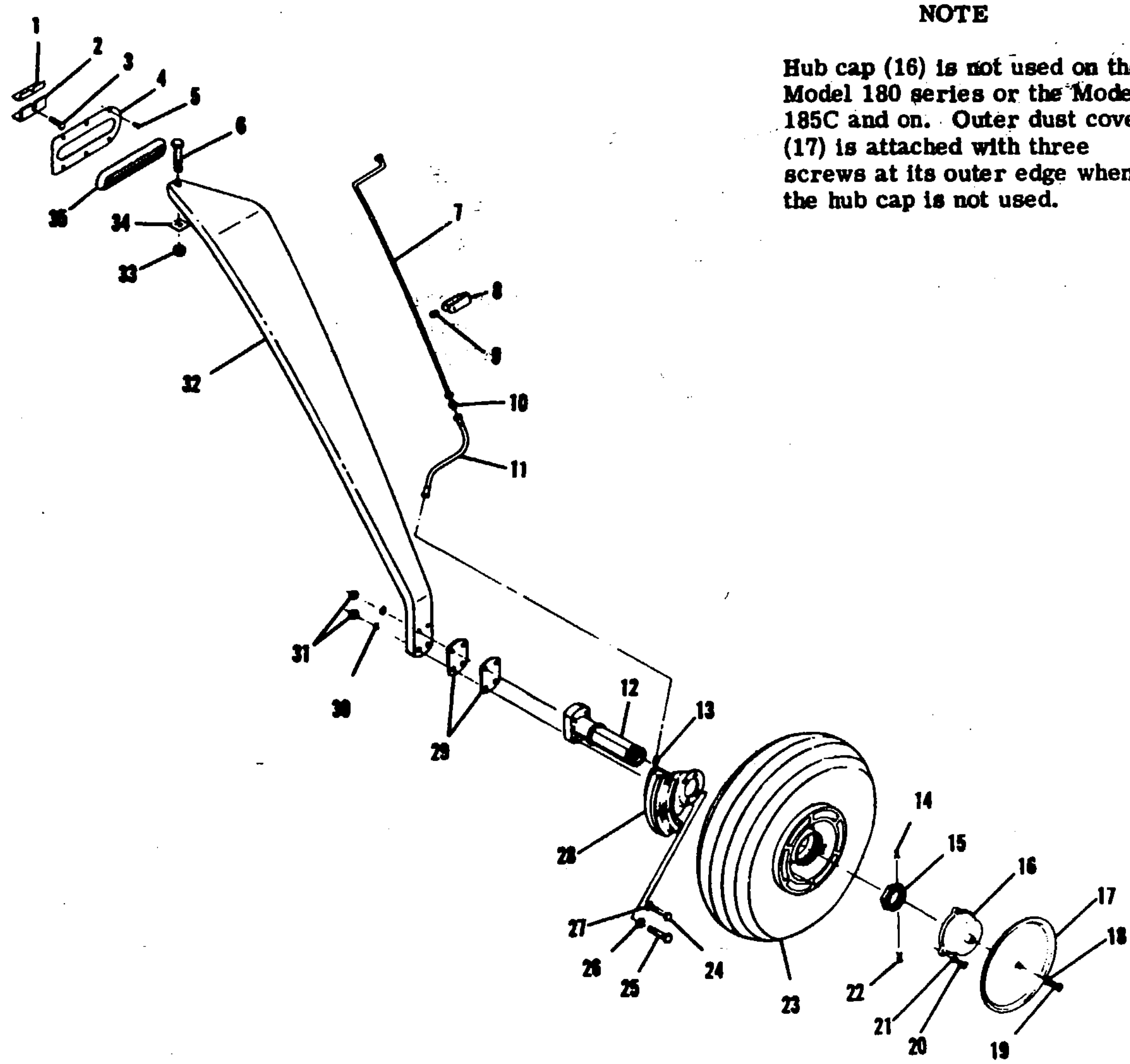


1. Spring Alignment Shim
2. Wedge
3. Bolt
4. Plate
5. Screw
6. Seal
7. Bolt
8. Landing Gear Spring
9. Spring Adjustment Shim
10. Nut
11. Brake Line
12. Hose
13. Brake Line Retainer Bracket
14. Elbow
15. Nut
16. Gasket
17. Axle
18. Brake Assembly
19. Tire and Tube
20. Wheel Assembly
21. Cotter Pin
22. Axle Nut
23. Dust Cover
24. Screw
25. Washer
26. Bolt
27. Bolt
28. Washer
29. Bushing
30. Washer
31. Wheel Alignment Shims
32. Nut
33. Nut

Figure 5-1. Main Gear - Model 180F

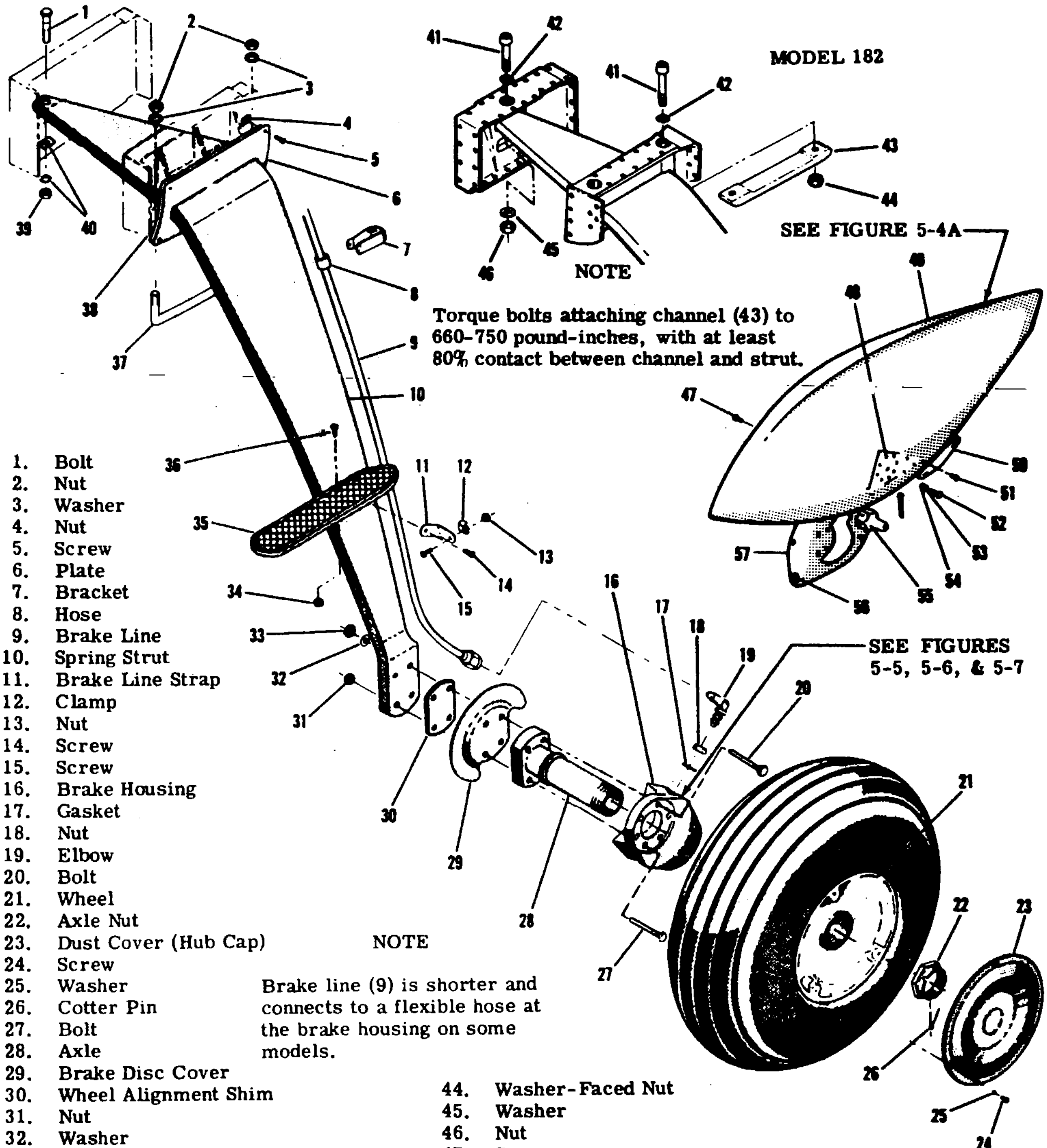
NOTE

Hub cap (16) is not used on the Model 180 series or the Model 185C and on. Outer dust cover (17) is attached with three screws at its outer edge when the hub cap is not used.



1. Shim	13. Fitting	24. Bolt
2. Wedge	14. Cotter Pin	25. Bolt
3. Bolt	15. Nut	26. Washer
4. Plate	16. Hub Cap	27. Washer
5. Screw	17. Outer Dust Cover	28. Brake Assembly
6. Bolt	18. Lockwasher	29. Shims
7. Brake Line	19. Screw	30. Washers
8. Brake Line Clip	20. Screw	31. Nuts
9. Hose	21. Lockwasher	32. Spring
10. Fitting	22. Cotter Pin	33. Nut
11. Brake Hose	23. Wheel Assembly	34. Shim
12. Axle		35. Seal

Figure 5-2. Main Gear - Model 185 Series, and 180G and on



NOTE

Torque bolts attaching channel (43) to 660-750 pound-inches, with at least 80% contact between channel and strut.

1. Bolt
2. Nut
3. Washer
4. Nut
5. Screw
6. Plate
7. Bracket
8. Hose
9. Brake Line
10. Spring Strut
11. Brake Line Strap
12. Clamp
13. Nut
14. Screw
15. Screw
16. Brake Housing
17. Gasket
18. Nut
19. Elbow
20. Bolt
21. Wheel
22. Axle Nut
23. Dust Cover (Hub Cap)
24. Screw
25. Washer
26. Cotter Pin
27. Bolt
28. Axle
29. Brake Disc Cover
30. Wheel Alignment Shim
31. Nut
32. Washer
33. Nut
34. Nut
35. Step
36. Screw
37. U-Bolt
38. Seal
39. Nut
40. Washer or Shim
41. Bolt
42. Countersunk Washer
43. Channel
44. Washer-Faced Nut
45. Washer
46. Nut
47. Screw
48. Doubler
49. Speed Fairing
50. Scraper
51. Screw
52. Bolt
53. Lockwasher
54. Washer
55. Axle Nut
56. Nutplate
57. Support Plate

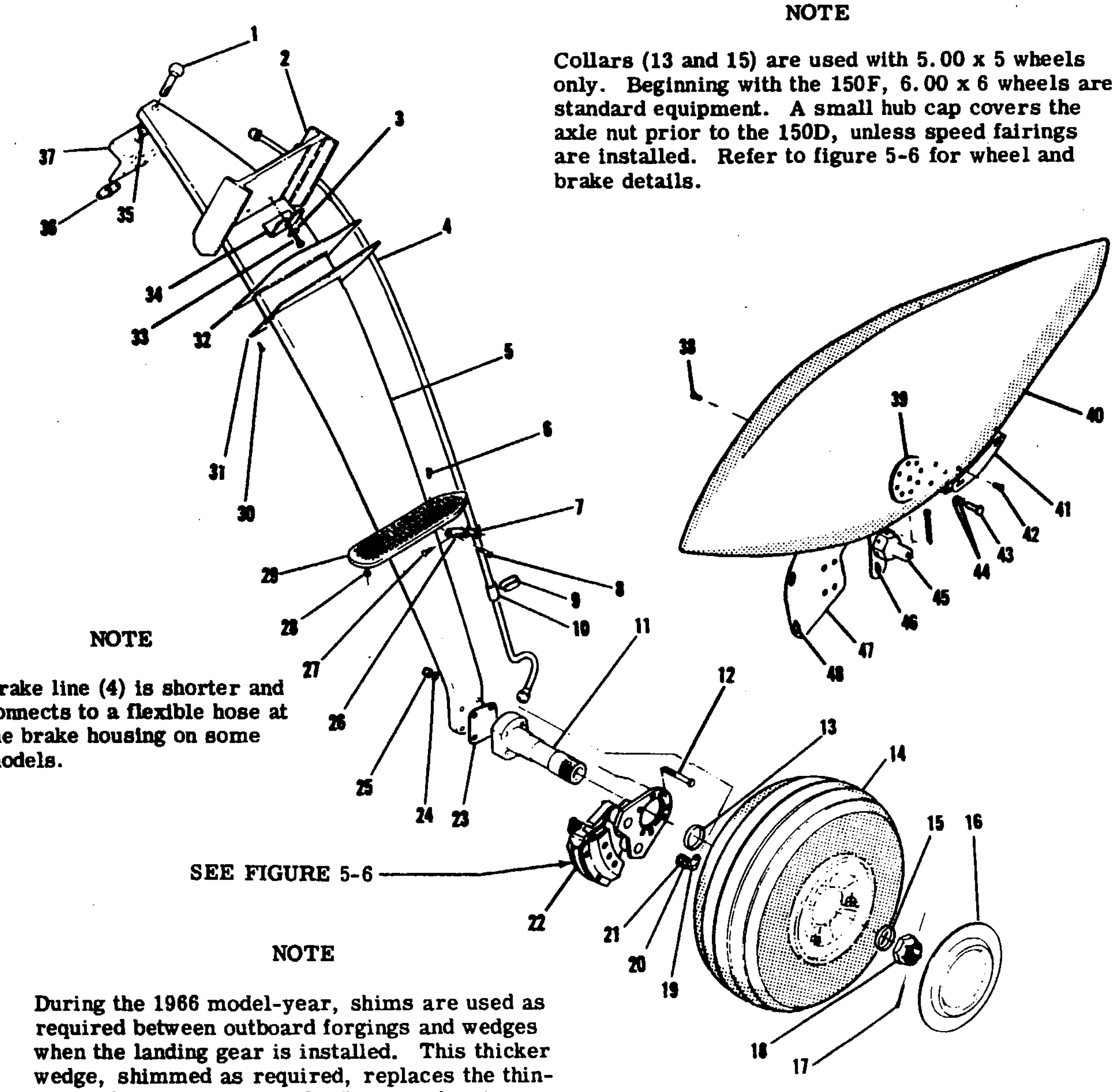
NOTE

Brake line (9) is shorter and connects to a flexible hose at the brake housing on some models.

NOTE

A vinyl plastic brake line fairing is installed between the spring strut and the brake line on the Model 182 series only.

Figure 5-3. Typical Tricycle Main Gear (Except Model 150)



NOTE

Collars (13 and 15) are used with 5.00 x 5 wheels only. Beginning with the 150F, 6.00 x 6 wheels are standard equipment. A small hub cap covers the axle nut prior to the 150D, unless speed fairings are installed. Refer to figure 5-6 for wheel and brake details.

NOTE

Brake line (4) is shorter and connects to a flexible hose at the brake housing on some models.

NOTE

During the 1966 model-year, shims are used as required between outboard forgings and wedges when the landing gear is installed. This thicker wedge, shimmed as required, replaces the thinner wedges formerly used. This combination may also be used on earlier Model 150 airplanes.

1. Bolt
2. Outboard Support
3. Washer
4. Brake Line
5. Spring
6. Screw
7. Brake Line Clamp
8. Screw
9. Brake Line Clip
10. Hose
11. Axle
12. Bolt
13. Collar
14. Wheel Assembly
15. Collar
16. Outer Dust Cover
17. Cotter Pin
18. Nut
19. Elbow
20. Nut
21. Gasket
22. Brake Assembly
23. Shim
24. Washer
25. Nut
26. Bracket
27. Screw
28. Nut
29. Step
30. Screw
31. Plate
32. Seal
33. Bolt
34. Wedge
35. Washer
36. Nutplate
37. Inner Support
38. Screw
39. Doubler
40. Speed Fairing
41. Scraper
42. Screw
43. Bolt
44. Washers
45. Support Nut
46. Anchor Nut
47. Support Plate
48. Anchor Nut

Figure 5-4. Main Gear - Model 150

e. (See figure 5-6.) On the Models 150, 172, and 182, remove bolts (29) and washers (31) securing back plate (39) and shim (36), and remove the back plate and shim. Shim (36) is used only on the Model 150 (prior to 1966). Pull the wheel from the axle, removing collars (8 and 17) and bearing cone (9) as the wheel is removed. The collars are used only on the standard Model 150 wheel (prior to 1966). If speed fairings are installed, the bearing cone and grease seals will be removed during disassembly.

f. (See figure 5-7.) On the Models 180 and 185, remove bolts (29) and washers (30) securing back plates (41) and shim (36), and remove the back plates and shim. The shim is not used beginning with the 1964 models. Pull the wheel from the axle, removing bearing cone (5) as the wheel is removed. Beginning with the 1964 models, the bearing cone and grease seals will be removed during disassembly.

5-19. DISASSEMBLY.

a. Deflate tire and break tire beads loose.

CAUTION

Avoid damaging wheel flanges when breaking tire beads loose. A scratch, gouge, or nick may cause wheel failure.

b. Remove thru-bolts and separate wheel halves, removing tire and tube and brake disc.

c. Remove snap ring, grease seal felt, grease seal rings or plates, and bearing cones from both wheel halves. Details of parts used in a particular wheel are shown in figures 5-6 and 5-7.

NOTE

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

5-20. INSPECTION AND REPAIR. Instructions given in paragraph 5-14 for the Goodyear wheels also apply to the Cleveland wheels.

5-21. ASSEMBLY.

a. Insert thru-bolts through brake disc and position in the inner wheel half, using the bolts to guide the disc. Assure that the disc is bottomed in the wheel half.

b. Position tire and tube with inflation valve through hole in outboard wheel half. Place the other wheel half in position. Apply a light force to bring the wheel halves together. Maintaining the light force, assemble a washer and nut on one thru-bolt and tighten snugly. Assemble the remaining nuts and washers on the thru-bolts and torque to the value marked on the wheel.

CAUTION

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

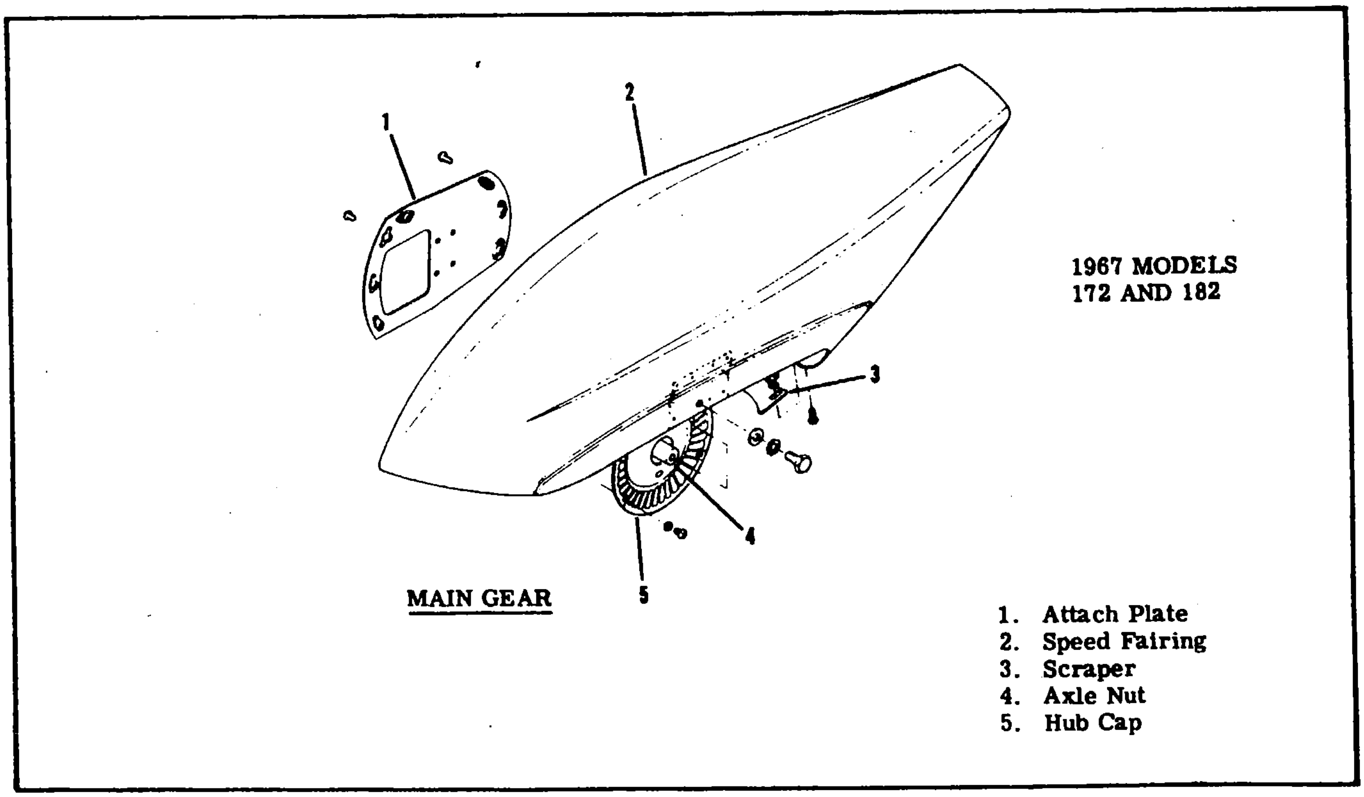
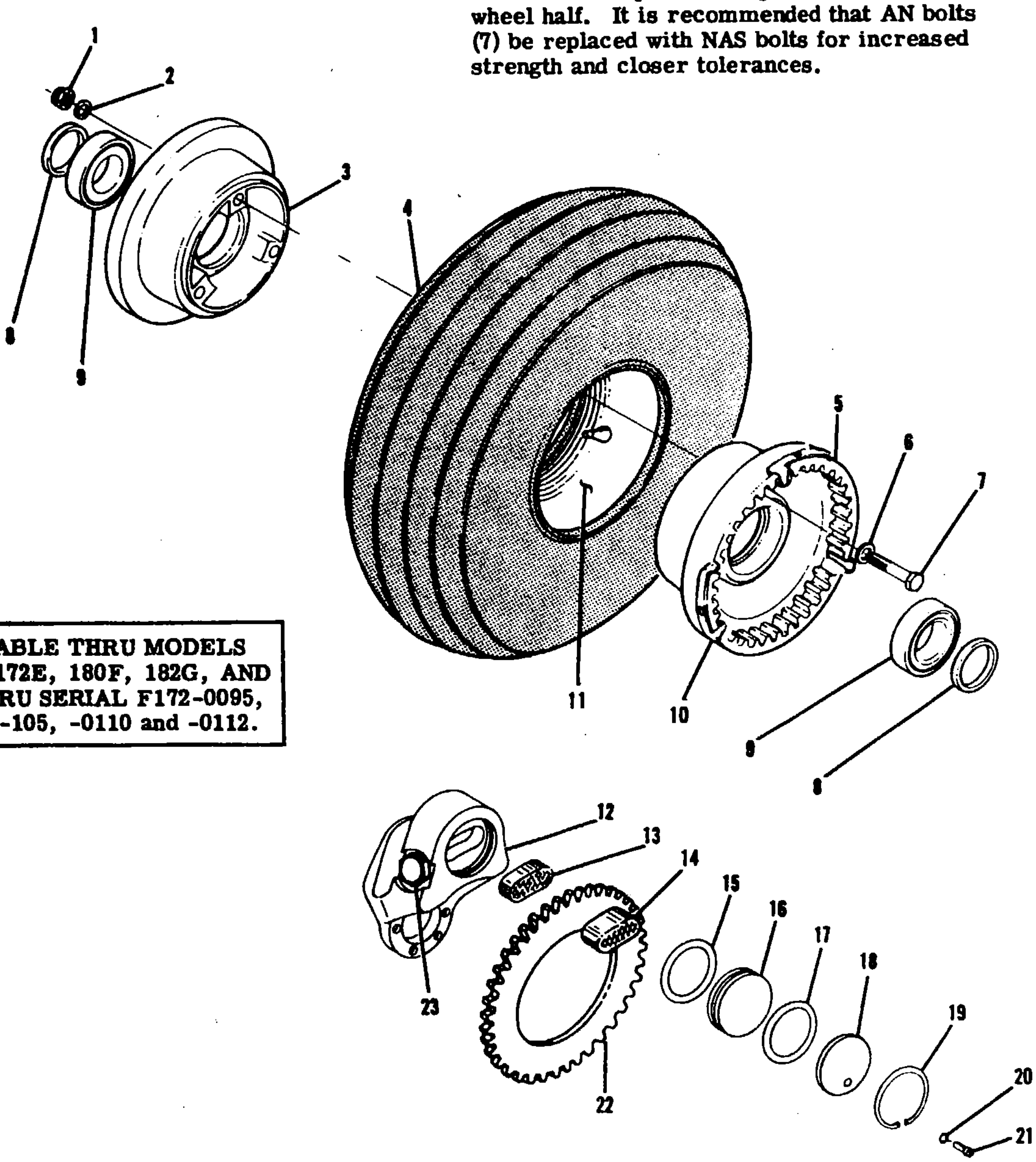


Figure 5-4A. Main Wheel Speed Fairing

NOTE

Wheel bolt torque is stamped on the outboard wheel half. It is recommended that AN bolts (7) be replaced with NAS bolts for increased strength and closer tolerances.



APPLICABLE THRU MODELS P172D, 172E, 180F, 182G, AND F172 THRU SERIAL F172-0095, & -103, -105, -0110 and -0112.

1. Nut
2. Washer
3. Outboard Wheel Half
4. Tire
5. Inboard Wheel Half
6. Washer
7. Bolt
8. Seal
9. Bearing
10. Disc Clip
11. Tube
12. Housing
13. Stationary Lining
14. Piston Lining
15. O-ring
16. Piston
17. O-ring
18. Cylinder Head
19. Retaining Ring
20. Bleeder Seal
21. Bleeder Screw
22. Brake Disc
23. Plug

Figure 5-5. Goodyear Wheel and Brake

NOTE

Wheel bolt torque is stamped on the outboard wheel half. Collars (8 and 17) are used only with the standard size wheels prior to the Model 150F.

These parts are also used in the outboard wheel half when speed fairings are installed on the Model 150C.

Dust cover attached with 3 screws on the Models 150D and on, 172F and on, and 182H and on.

NOTE

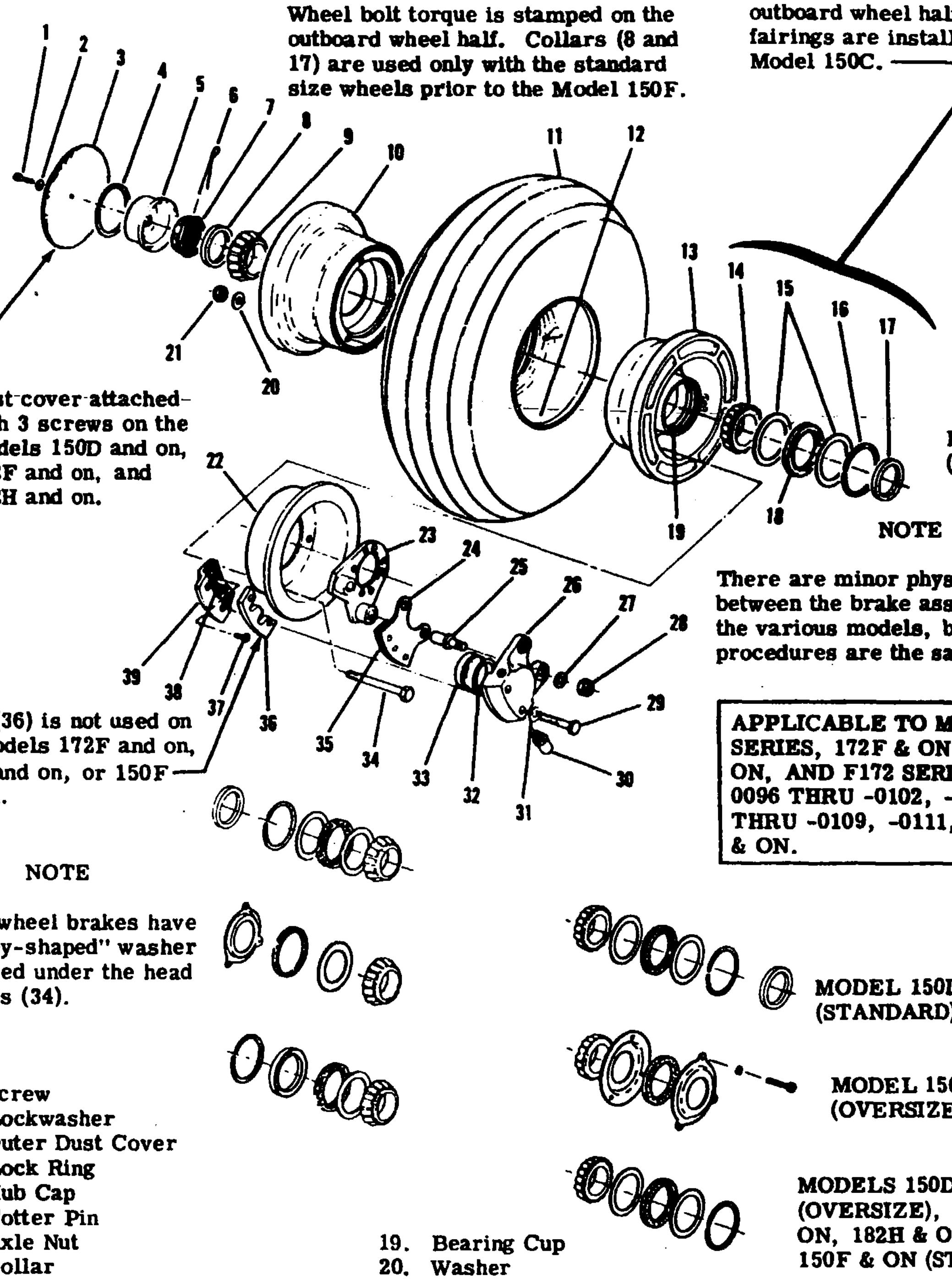
There are minor physical differences between the brake assemblies used on the various models, but maintenance procedures are the same.

APPLICABLE TO MODEL 150 SERIES, 172F & ON, 182H & ON, AND F172 SERIAL F172-0096 THRU -0102, -0104, -0106 THRU -0109, -0111, AND -0113 & ON.

Shim (36) is not used on the Models 172F and on, 182H and on, or 150F and on.

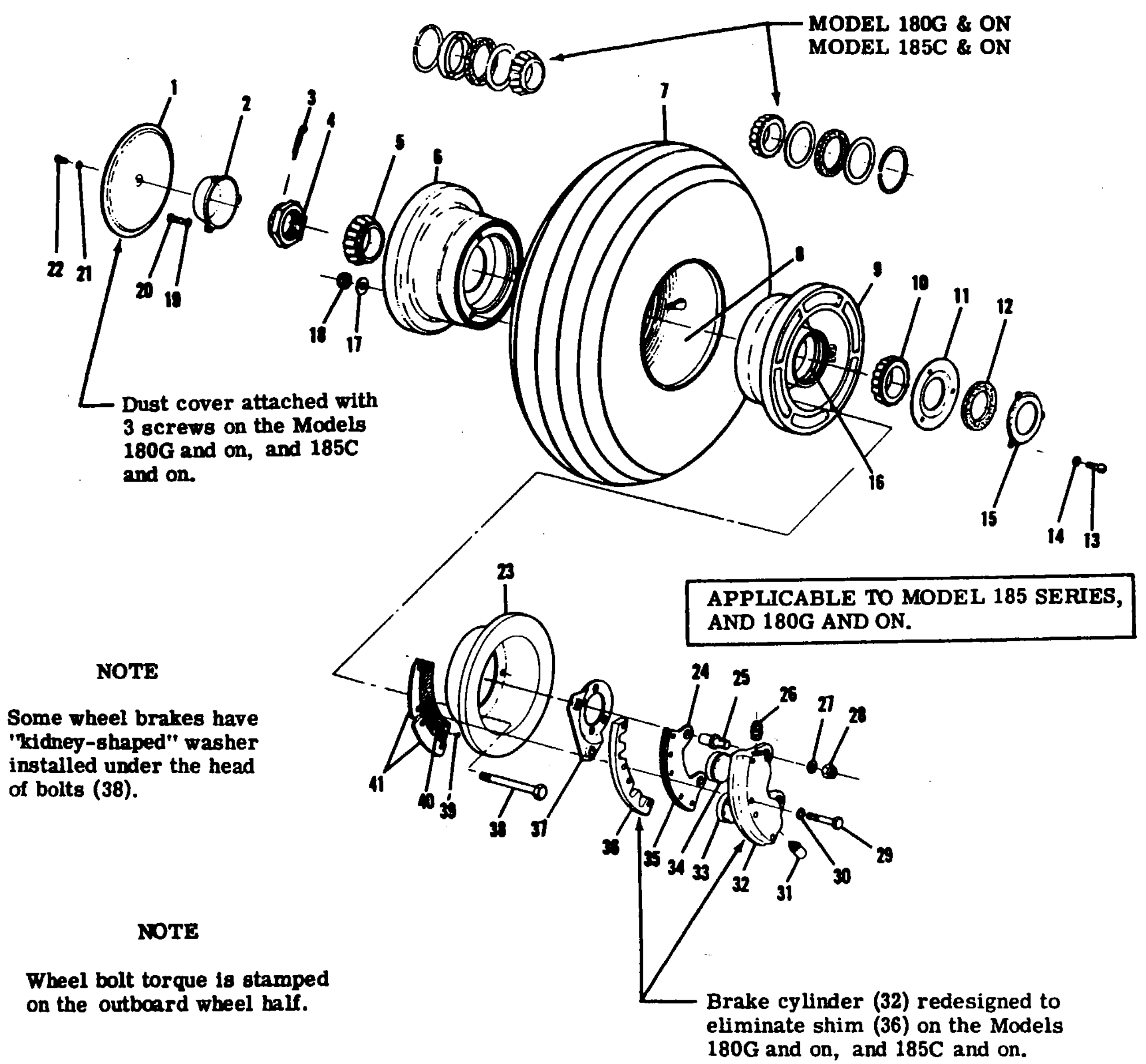
NOTE

Some wheel brakes have "kidney-shaped" washer installed under the head of bolts (34).



1. Screw
2. Lockwasher
3. Outer Dust Cover
4. Lock Ring
5. Hub Cap
6. Cotter Pin
7. Axle Nut
8. Collar
9. Bearing Cone
10. Outer Wheel Half
11. Tire
12. Tube
13. Inner Wheel Half
14. Bearing Cone
15. Grease Seal Rings
16. Snap Ring
17. Collar
18. Grease Seal Felt
19. Bearing Cup
20. Washer
21. Nut
22. Brake Disc
23. Torque Plate
24. Pressure Plate
25. Anchor Bolt
26. Brake Cylinder
27. Washer
28. Nut
29. Bolt
30. Brake Bleeder
31. Washer
32. O-Ring
33. Piston
34. Thru-Bolt
35. Brake Lining
36. Shim
37. Brake Rivet
38. Brake Lining
39. Back Plate

Figure 5-6. Cleveland Wheel and Brake



1. Outer Dust Cover
2. Hub Cap
3. Cotter Pin
4. Nut
5. Bearing Cone
6. Outer Wheel Half
7. Tire
8. Tube
9. Inner Wheel Half
10. Bearing Cone
11. Grease Seal Plate
12. Grease Seal Felt
13. Screw
14. Lockwasher
15. Grease Seal Ring
16. Bearing Cup
17. Washer
18. Nut
19. Lockwasher
20. Screw
21. Lockwasher
22. Screw
23. Brake Disc
24. Pressure Plate
25. Anchor Bolt
26. Brake Line Fitting
27. Washer
28. Nut
29. Bolt
30. Washer
31. Brake Bleeder
32. Brake Cylinder
33. Piston
34. O-ring
35. Brake Lining
36. Shim
37. Torque Plate
38. Thru-Bolt
39. Rivet
40. Brake Lining
41. Back Plates

Figure 5-7. Cleveland Wheel and Brake

c. Clean and repack bearing cones with clean wheel bearing grease.

d. Assemble bearing cones, grease seal plates or rings, and grease seal felts into both wheel halves. Details of parts used in a particular wheel are shown in figures 5-6 and 5-7. On models using the small inner hub cap, the outer bearing cone will be assembled as the wheel is installed.

e. Inflate tire to seat tire beads, then adjust to correct pressure.

5-22. INSTALLATION.

a. Place wheel on axle. Collars (8 and 17, figure 5-6) are used on the Model 150 with standard size wheels only (prior to 1966). Place the inboard collar on the axle before positioning the wheel on the axle.

b. Install outer bearing cone on those models using the small inner hub cap. Bearing cone is already assembled into wheel if the small hub cap is not used.

c. Install axle nut and tighten until a slight bearing drag is obvious when the wheel is turned. Back off nut to nearest castellation and install cotter pins.

d. Install hub cap, if used, and outer dust cover. Outer dust covers are not used when speed fairings are installed.

e. (See figure 5-6.) On the Model 150, place shim (36) and back plate (39) in position and secure with bolts (29) and washers (31). Safety the bolts, except where self-locking bolts are used. Shim (36) is not used beginning with the 1966 model.

f. (See figure 5-6.) On the Models 172 and 182, place back plate (39) in position and secure with bolts (29) and washers (31). Safety the bolts, except where self-locking bolts are used.

g. (See figure 5-7.) On the Models 180 and 185, place shim (36) and back plates (41) in position and secure with bolts (29) and washers (31). Safety the bolts, except where self-locking bolts are used. Shim (36) is not used beginning with the 1964 models.

h. Install speed fairings, if used.

CAUTION

Whenever a tire is changed, a speed fairing is installed, or scraper adjustment is disturbed, set scraper clearance in accordance with paragraph 5-66.

5-22A. CESSNA MAIN LANDING GEAR CASTERING AXLES. Beginning with the 1967 Models 180 and Skywagon, optional castering axles may be installed on the main landing gear. In the event of improper drift correction at touchdown, the castering axles permit the main wheel on the downwind side of the airplane to momentarily swivel outboard to align with the drifting ground track of the airplane. However, the opposite (upwind) wheel is incapable of swiveling inboard, and it scrubs lightly until the drifting motion has ceased. The net effect is to minimize the lurching action at touchdown caused by sideward drift and to restore the intended ground track during the landing roll. During normal taxi, the castering axles will not swivel. The axle is essentially a spring-loaded, fluid-filled, orifice-dampened cylinder. Figure 5-7A shows details of the axle assembly.

5-22B. REMOVAL.

a. Remove wheel from axle and pull floating brake assembly from brake torque plate (17).

b. Remove bolts (36) and washers (35) securing axle assembly (32) to landing gear spring strut. Note number and position of wheel alignment shims (33). Tape them together so they may be reinstalled in exactly the same positions.

5-22C. DISASSEMBLY.

a. Remove screw (5) securing stop block (4) and pin (2).

b. Deflect axle and remove stop block.

c. Using a soft punch, drive out pivot pin (2) and pull axle assembly from adapter (1).

d. Remove bleeder screw (15), washer and seal (14), and plunger (16).

e. Remove internal retainer ring (7), orifice plate (8), piston (9), and spring (10).

f. Remove bolts (28) and washers (29) to remove brake torque plate (17). Note relative position of torque plate to facilitate assembly.

5-22D. CLEANING, INSPECTION, REPAIR, AND LUBRICATION.

a. Clean all parts in solvent (Fed. Spec. P-S-661, or equivalent) and dry thoroughly. Make sure the small hole in the orifice plate and the bleeder passage in the plunger are not restricted.

b. Inspect parts for excessive wear, cracks, nicks, dents, scratches, scoring, and other obvious defects.

c. Repair, other than dressing out minor external nicks, dents, and scratches, is limited to replacement of defective parts.

d. Lubricate pivot pin (2) with MIL-G-7711 grease during assembly. Also lubricate the pin through the grease fittings after assembly.

5-22E. ASSEMBLY. Since too much hydraulic fluid or insufficient hydraulic fluid both will reduce the efficiency of the castering axle, it is important that the following procedure be used.

NOTE

Because of the very small hole in the orifice plate, it is essential that internal parts be clean. Only clean hydraulic fluid should be used to lubricate the plunger, orifice plate, piston, spring, O-rings, and the inner bore of the axle during assembly.

a. Install new O-rings on piston (9) and plunger (16).

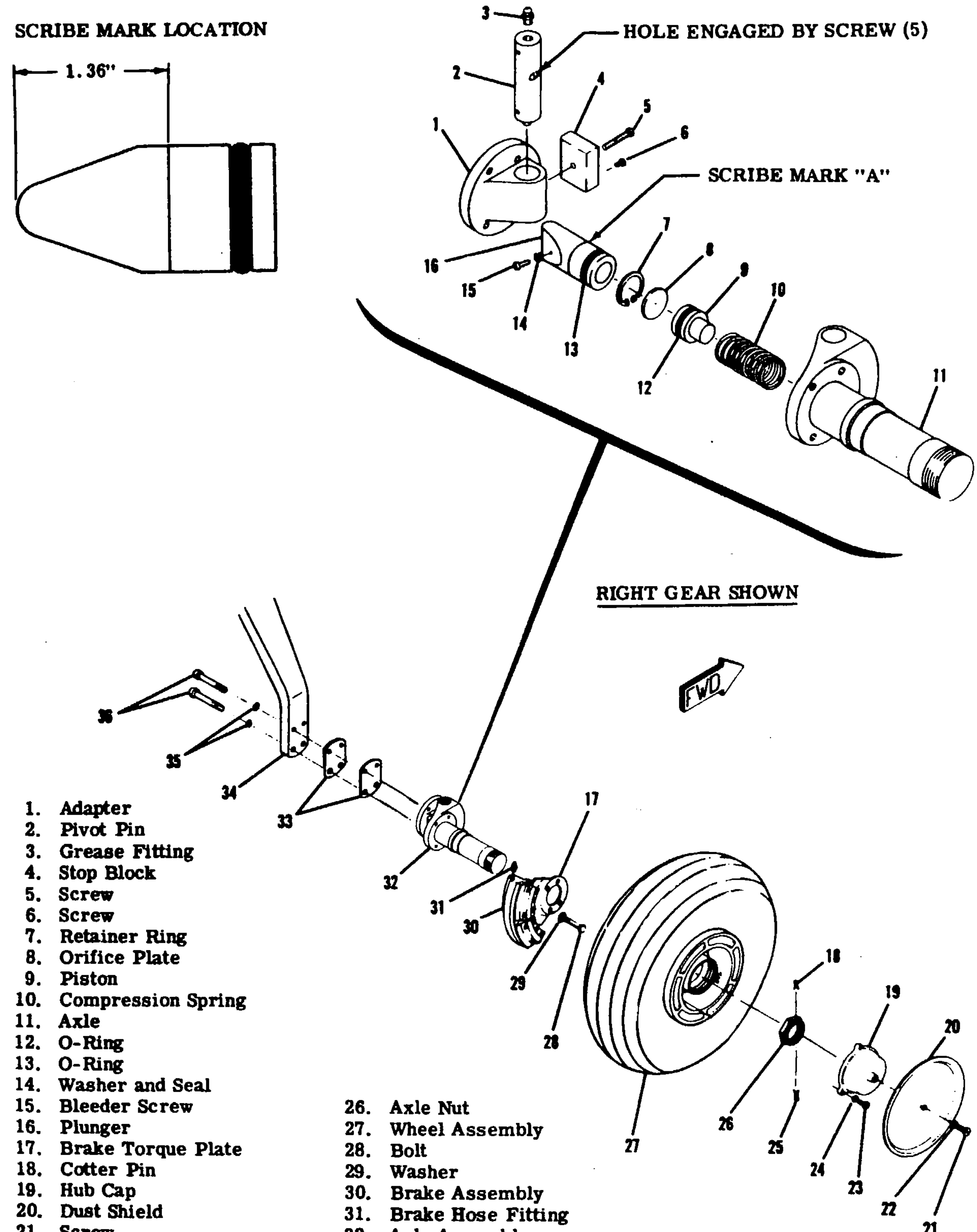
b. Position spring (10) on piston (9), and insert into axle, spring first.

c. Place orifice plate (8) against piston. Using a brass or aluminum rod, press the assembly into the axle, compressing spring (10) until retainer ring (7) can be installed. Be sure the retainer ring seats properly in its groove.

d. With the open end of the axle up, fill to the top with MIL-H-5606 hydraulic fluid.

e. With bleeder screw (15) removed, slowly slide plunger (16) into the axle until all air has been expelled and fluid starts to flow from the bleeder hole.

f. Continue forcing plunger slowly into axle until scribe mark "A" is flush with axle surface. Install



1. Adapter
2. Pivot Pin
3. Grease Fitting
4. Stop Block
5. Screw
6. Screw
7. Retainer Ring
8. Orifice Plate
9. Piston
10. Compression Spring
11. Axle
12. O-Ring
13. O-Ring
14. Washer and Seal
15. Bleeder Screw
16. Plunger
17. Brake Torque Plate
18. Cotter Pin
19. Hub Cap
20. Dust Shield
21. Screw
22. Washer
23. Screw
24. Washer
25. Cotter Pin
26. Axle Nut
27. Wheel Assembly
28. Bolt
29. Washer
30. Brake Assembly
31. Brake Hose Fitting
32. Axle Assembly
33. Wheel Alignment Shims
34. Landing Gear Spring
35. Countersunk Washers
36. Bolts

Figure 5-7A. Cessna Castering Axle

bleeder screw, washer, and seal, and tighten bleeder screw (15) while maintaining this position.

NOTE

Scribe mark "A" is used during assembly and refilling. It indicates the correct amount of hydraulic fluid in the unit.

g. Lubricate pivot pin (2) with MIL-G-7711 grease and assemble adapter (1) to axle (11) with the pivot pin. Be sure to align the hole for screw (5) properly.
h. Deflect axle, forcing plunger (16) into the axle, until stop block (4) can be installed. The beveled edge of the stop block must be inboard for clearance. Tighten screws (5 and 6) and safety to each other.
i. Attach torque plate (17) to the axle with washers (29) and bolts (28), positioning torque plate as noted during disassembly. Tighten the bolts and safety in pairs.

5-22F. INSTALLATION.
a. Place wheel alignment shims (33) between spring strut (34) and axle assembly (32), in the same positions from which they were removed, and install countersunk washers (35) and bolts (36).

NOTE

AN960-516, -516L, -616, and -616L washers are to be added between the countersunk washers and the spring strut as required to make bolts (36) flush with the outboard flat surface of adapter (1).

b. Perform a functional check in accordance with paragraph 5-22G.
c. Position floating brake assembly on torque plate (17), and install wheel and brake assembly.

5-22G. FUNCTIONAL CHECK.
a. Measure torque required to deflect axle just clear of stop block as shown in figure 5-7B. During assembly, torque required should not be less than 160 lb-in. On an aircraft in service, torque required should be more than 120 lb-in. Failure to meet these requirements indicates a weak or broken compression spring, or insufficient hydraulic fluid in the unit.
b. Operate axle rapidly through its full range of travel and check for hydraulic leaks. Defective O-rings or a scored inner bore of the axle are the usual causes of leakage.
c. Check that castering travel is 25° minimum. Too much hydraulic fluid will restrict travel, and not enough will cause too little axle torque as measured in figure 5-7B.
d. Deflect axle to the full castered position, then let it snap back. The plunger should remain in contact with the adapter. Failure to maintain contact indicates a weak or broken compression spring, or insufficient hydraulic fluid.

5-22H. CHECKING FLUID QUANTITY ON AIRCRAFT IN SERVICE. (See figure 5-7A.)

NOTE

The quantity of fluid is determined by checking the torque required to deflect the axle just clear of the stop block.

a. Using universal jack point, jack one wheel clear of the ground.
b. Remove wheel and measure the torque required to deflect axle just clear of the stop block, as shown in figure 5-7B. If the torque required is 120 lb-in or less, hydraulic fluid must be added.
c. To add fluid, proceed as follows:
1. Remove wheel and axle assembly in accordance with paragraph 5-22B.
2. With stop block (4) removed, remove pivot pin (2) and pull axle from adapter (1).
3. Remove bleeder screw (15), washer and seal (14), and plunger (16).
4. With open end of axle up, fill to the top with MIL-H-5606 hydraulic fluid.
5. Install a new O-ring on plunger (16) and lubricate with hydraulic fluid.
6. With bleeder screw (15) removed, slowly slide plunger (16) into the axle until all air has been expelled and fluid starts to flow from the bleeder hole.
7. Continue forcing plunger slowly into axle until scribe mark "A" is flush with axle surface. Install bleeder screw, washer, and seal, and tighten bleeder screw (15) while maintaining this position.

NOTE

Scribe mark "A" is used during assembly and refilling. It indicates the correct amount of hydraulic fluid in the unit.

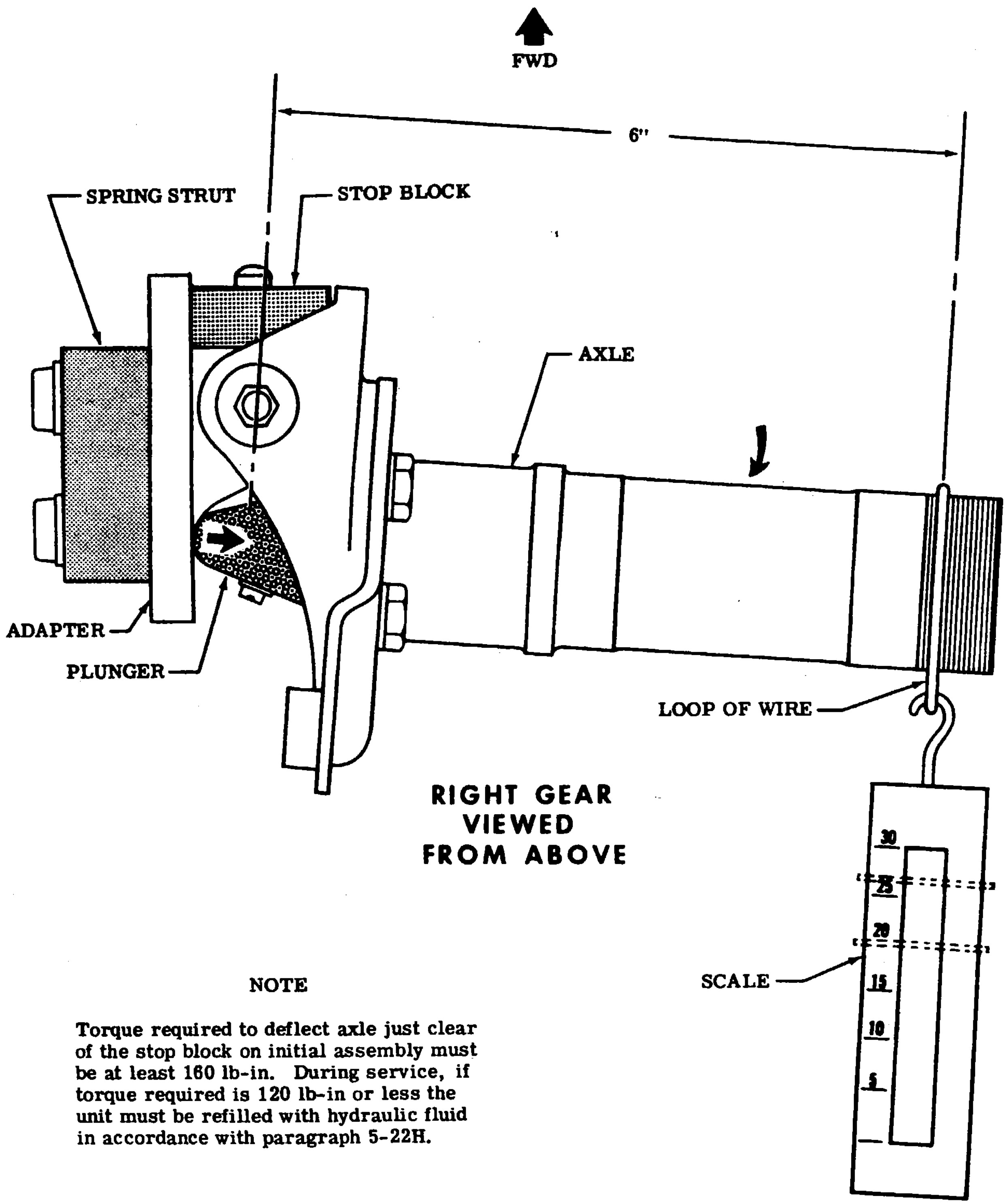
8. Lubricate pin (2) with MIL-G-7711 grease and assemble adapter (1) to axle (11) with the pivot pin. Be sure to align the hole for screw (5) properly.
9. Deflect axle, forcing plunger (16) into the axle, until stop block (4) can be installed. The beveled edge of the stop block must be inboard for clearance. Tighten screws (5 and 6) and safety to each other.
10. Reinstall wheel and axle assembly in accordance with paragraph 5-22F.
d. Lower wheel to ground and remove jack.

5-23. WHEEL ALIGNMENT.

5-24. Refer to figure 5-8.

5-24A. CROSSWIND WHEELS. (See figure 5-7C.)

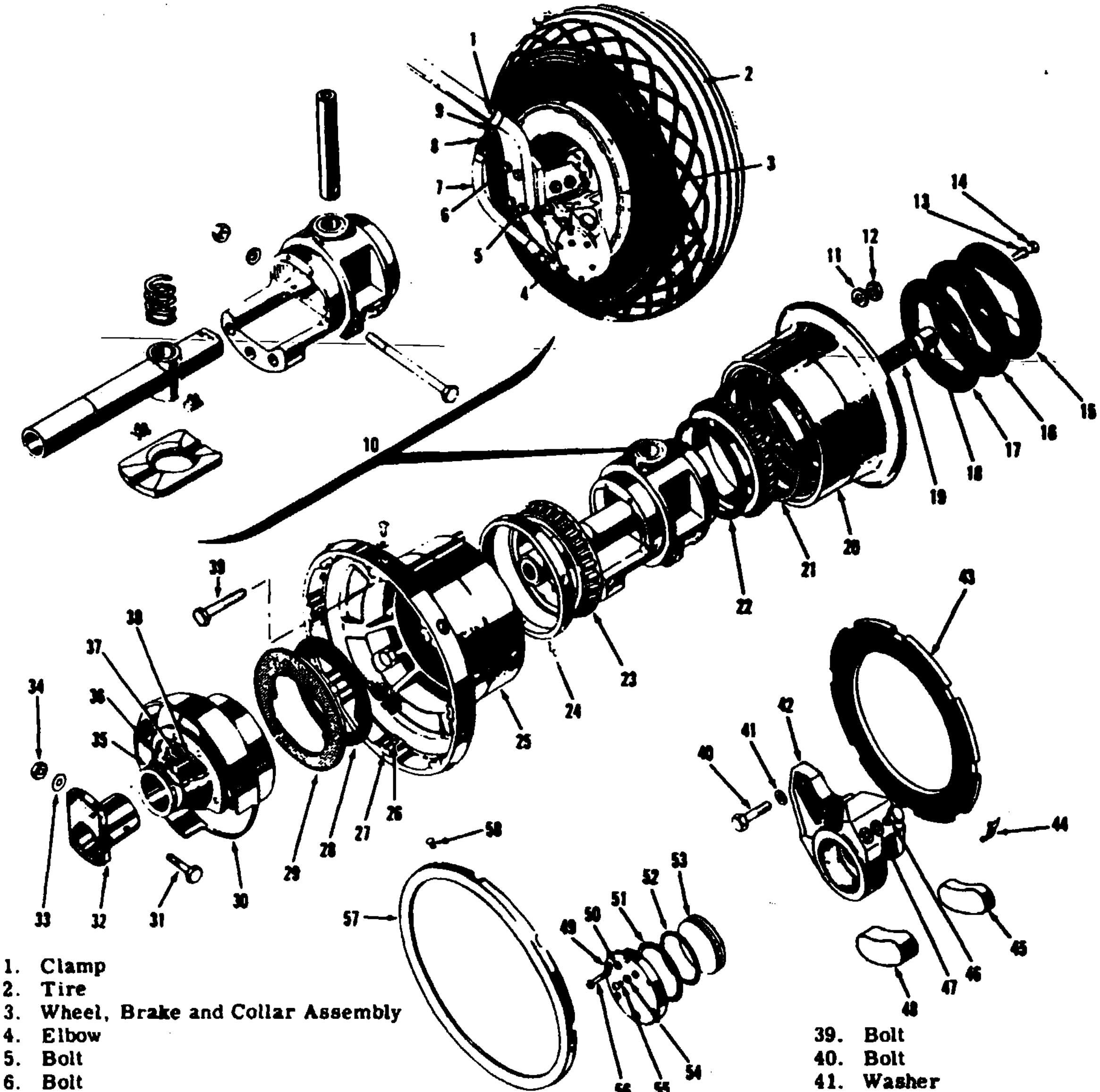
5-24B. Crosswind wheels are optional equipment on the Model 180. The crosswind wheel installation requires a flexible, rather than rigid, brake line because of the castering movement of the wheel. Components of the crosswind wheel are illustrated in figure 5-7C, which may be used as a guide during maintenance. Further information may be found in Goodyear publications.



NOTE

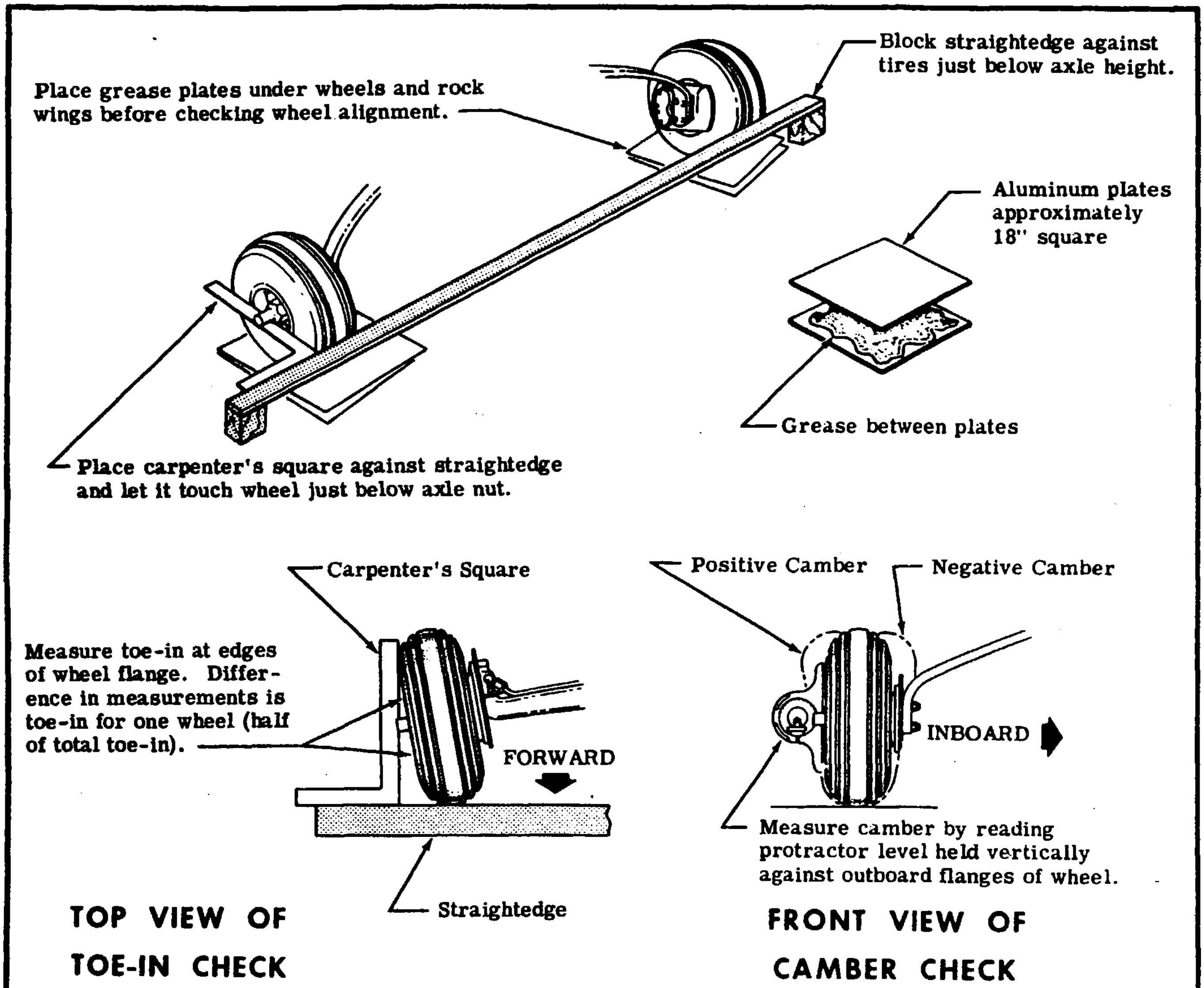
Torque required to deflect axle just clear of the stop block on initial assembly must be at least 160 lb-in. During service, if torque required is 120 lb-in or less the unit must be refilled with hydraulic fluid in accordance with paragraph 5-22H.

Figure 5-7B. Castering Axle Torque Measurement



1. Clamp
2. Tire
3. Wheel, Brake and Collar Assembly
4. Elbow
5. Bolt
6. Bolt
7. Hose Assembly
8. Union
9. Brake Line
10. Hub and Axle Subassembly
11. Washer
12. Nut
13. Lockwasher
14. Bolt
15. Stabilizer Cap
16. Stabilizer Gasket
17. Stabilizer Tap Gasket Plate
18. Stabilizer Brake Lining
19. Stabilizer Brake Spring
20. Outboard Wheel Half
21. Bearing Cup
22. Pack Shim
23. Bearing Cone
24. Bearing Cup
25. Inboard Wheel Half
26. Key Retainer Screw
27. Disc Drive Key
28. Inboard Bearing Seal Plate
29. Bearing Seal Gasket
30. Deflector Left Plate
31. Bolt
32. Crosswind Wheel Axle Collar
33. Washer
34. Nut
35. Clamp
36. Axle Boot
37. Screw
38. Lockwasher
39. Bolt
40. Bolt
41. Washer
42. Brake Housing
43. Brake Disc
44. Anti-Rattle Clip
45. Brake Stationary Lining
46. Inlet Plug
47. Inlet Gasket
48. Brake Piston Side Lining
49. Brake Cylinder Head
50. Washer
51. Cylinder Head Seal
52. Piston Seal
53. Brake Piston
54. Bleeder Screw Seal
55. Bleeder Screw
56. Flathead Screw
57. Disc Retaining Ring
58. Stud Fastener

Figure 5-7C. Crosswind Wheel



AIRPLANE MODEL	TOTAL TOE-IN	POSITIVE CAMBER
150	0" to .06"	4° to 6°
172	0" to .06"	3° to 5°
P172	0" to .06"	3° to 5°
180	0" to .12"	4° to 6°
182	0" to .06"	5° to 7°
185	0" to .12"	4° to 6°

NOTE

Setting toe-in and camber in accordance with the chart while the cabin and fuel tanks are empty will give approximately zero toe-in and zero camber at gross weight. Ideal setting is zero toe-in and zero camber at normal operating 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 condition under which the airplane normally operates.

The maximum accumulated shim thickness, measured at the thickest corner (do not include any speed fairing plates or cover plates), is .22 inch for all except the Model 182. Refer to sheet 3 for shim combinations permitted on the Model 182. Always use the least number of shims possible to obtain the desired result.

Figure 5-8. Wheel Alignment (Sheet 1 of 3)

SHIM CHART FOR ➧ MODELS 180 AND 185

SHIM PART NO.	POSITION OF THICKEST CORNER OF SHIM	CORRECTION IMPOSED ON WHEEL			
		TOE-IN	TOE-OUT	POS. CAMBER	NEG. CAMBER
0541111-2	UP & FWD	----	.11"	2°56'	----
	UP & AFT	.25"	----	2°17'	----
	DOWN & FWD	----	.25"	----	2°17'
	DOWN & AFT	.11"	----	----	2°56'
0441139-5	UP & FWD	----	.10"	0°30'	----
	UP & AFT	.12"	----	0°5'	----
	DOWN & FWD	----	.12"	----	0°5'
	DOWN & AFT	.10"	----	----	0°30'
0441139-6	UP & FWD	----	.20"	1°0'	----
	UP & AFT	.25"	----	0°10'	----
	DOWN & FWD	----	.25"	----	0°10'
	DOWN & AFT	.20"	----	----	1°0'

SHIM CHART FOR ➧ MODELS 172, P172, AND 150F & ON

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	.06"	----	----	0°3'
	FWD	----	.06"	0°3'	----
0541157-2	UP	.006"	----	0°30'	----
	DOWN	----	.006"	----	0°30'
0541157-3	AFT	.12"	----	----	0°7'
	FWD	----	.12"	0°7'	----
0541111-2	UP & FWD	----	.15"	2°50'	----
	UP & AFT	.23"	----	2°29'	----
	DOWN & FWD	----	.23"	----	2°29'
	DOWN & AFT	.15"	----	----	2°50'
0441139-5	UP & FWD	----	.11"	0°25'	----
	UP & AFT	.12"	----	0°11'	----
	DOWN & FWD	----	.12"	----	0°11'
	DOWN & AFT	.11"	----	----	0°25'
0441139-6	UP & FWD	----	.22"	0°50'	----
	UP & AFT	.24"	----	0°22'	----
	DOWN & FWD	----	.24"	----	0°22'
	DOWN & AFT	.22"	----	----	0°50'
1241061-1	UP & FWD	.03"	----	2°50'	----
	UP & AFT	.06"	----	2°49'	----
	DOWN & FWD	----	.06"	----	2°49'
	DOWN & AFT	----	.03"	----	2°50'

Figure 5-8. Wheel Alignment (Sheet 2 of 3)

SHIM CHART FOR ▶ MODEL 182

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'
1241061-1	UP & FWD UP & AFT DOWN & FWD DOWN & AFT	.03" .06" ---- ----	---- ---- .06" .03"	2°50' 2°49' ---- ----	---- ---- 2°49' 2°50'
0411139-5	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'
0541157-3	AFT FWD	.12" ----	---- .12"	---- 0°7'	0°7' ----

MODEL 182

SHIM NO.	1241061-1	0441139-6	0441139-5	0541157-2	0541157-1	0541157-3
1241061-1	0	0	0	0	0	0
0441139-6	0	0	0	1	1	0
0441139-5	0	0	1	1	2	0
0541157-2	0	1	1	2	2	0
0541157-1	0	1	1	2	2	0
0541157-3	0	0	1	2	1	0
SHIM NO.	Max. number of shims to be used with shims in column 1.					
COLUMN 1	COLUMN 2					

MODEL 150 SHIM DATA (PRIOR TO 150F)

0441157-1	1/2° Camber Correction	.06" Toe-in or Toe-out Correction
0441157-2	2° Camber Correction	.23" Toe-in or Toe-out Correction
0441157-3	1° Camber Correction	.12" Toe-in or Toe-out Correction

NOTE

Model 150 shims may be rotated to any one of four positions to obtain the desired result.

Figure 5-8. Wheel Alignment (Sheet 3 of 3)

5-25. NOSE GEAR.

5-26. A steerable nose wheel mounted on an air-oil shock strut comprises the nose gear. In all models except the 150, the shock strut is attached to forgings riveted to the firewall and lower fuselage. In the 150, the shock strut is secured to the tubular engine mount. Nose wheel steering on all models except the 182 is afforded by two spring-loaded push-pull tubes linking the nose gear to the rudder pedal bars. The Model 182 has one steering bungee linking the nose gear to a bellcrank which is operated by push-pull rods from the rudder pedal bars. The aft end of the bungee incorporates a sprocket-operated screw mechanism to furnish rudder trim when airborne. A fluid-filled shimmy dampener is provided on all models to minimize wheel shimmy. A speed fairing of reinforced, resin-bonded glass-fiber construction is standard equipment on some models and optional equipment on others.

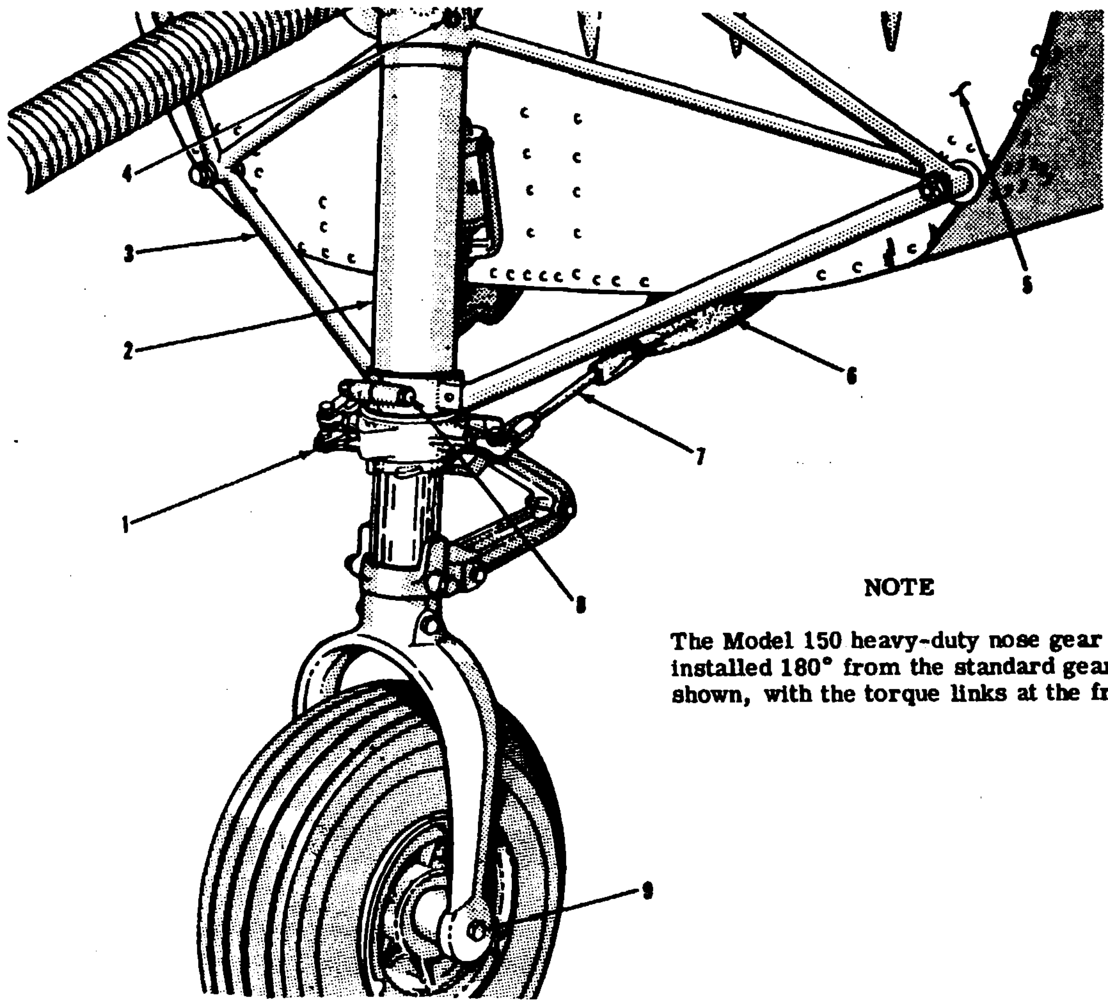
5-27. NOSE GEAR SHIMMY DAMPENER. The shimmy dampener provided for the nose gear offers resistance to shimmy by forcing hydraulic fluid through small orifices in a piston. The housing or the piston rod is secured to a stationary part and the other is secured to a part which moves as the nose wheel turns, causing relative motion between the dampener and rod.

5-28. NOSE GEAR TORQUE LINKS. Forged aluminum alloy torque links, which keep the lower strut aligned with the nose gear steering system but permit shock strut action, are provided for the nose gear.

5-29. REPLACEMENT OF NOSE GEAR. (See figures 5-9, 5-10, or 5-11.)

a. Remove the engine cowl and weight or tie down the tail to raise the nose wheel off the ground.

b. Disconnect the nose gear steering tubes or bungee from the nose gear.

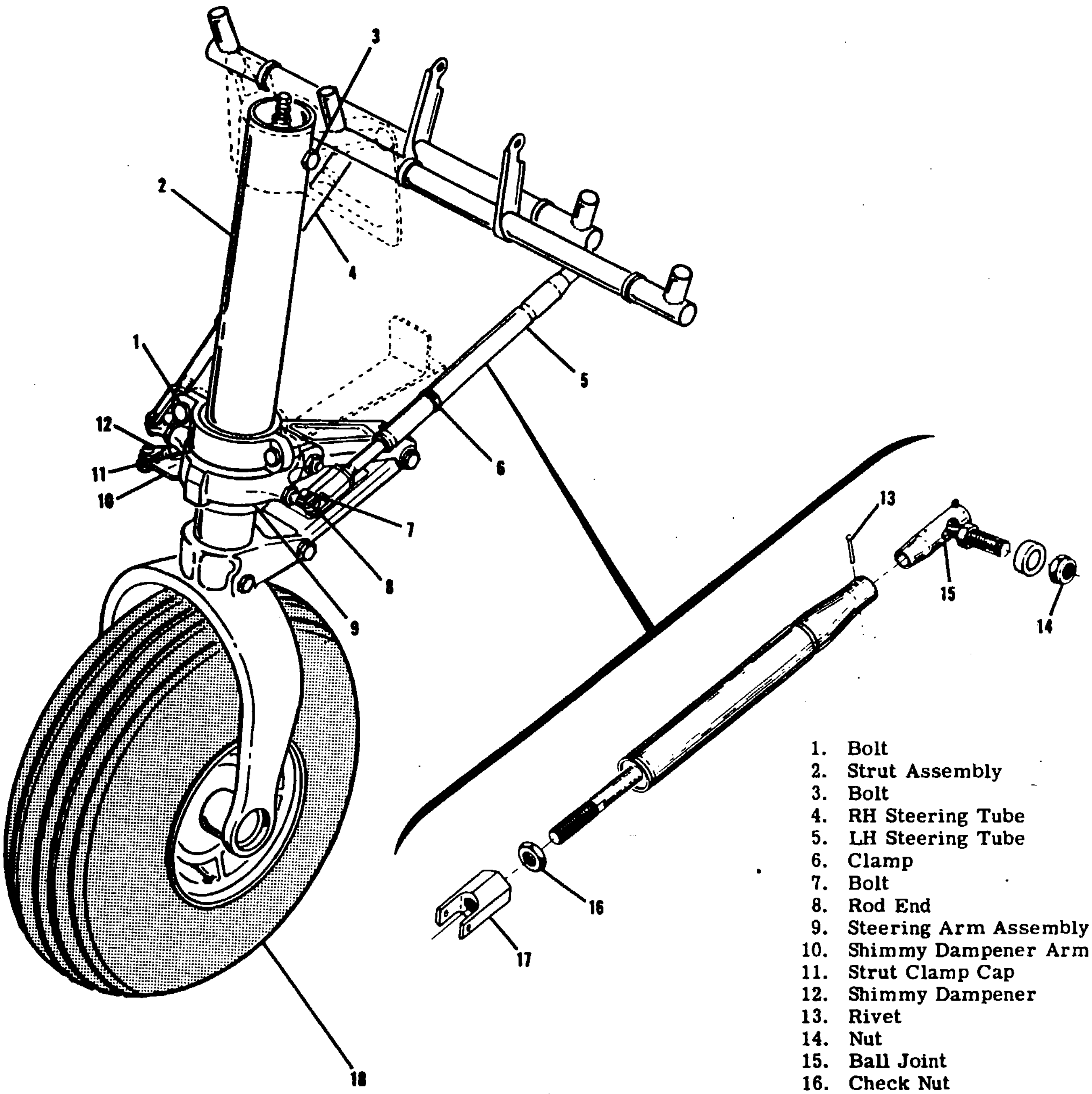


NOTE

The Model 150 heavy-duty nose gear is installed 180° from the standard gear shown, with the torque links at the front.

1. Shimmy Dampener
2. Nose Gear Shock Strut
3. Engine Mount
4. Roll Pin
5. Firewall
6. Steering Tube Boot
7. Steering Tube
8. Bolt
9. Axle Bolt

Figure 5-9. Nose Gear - Model 150

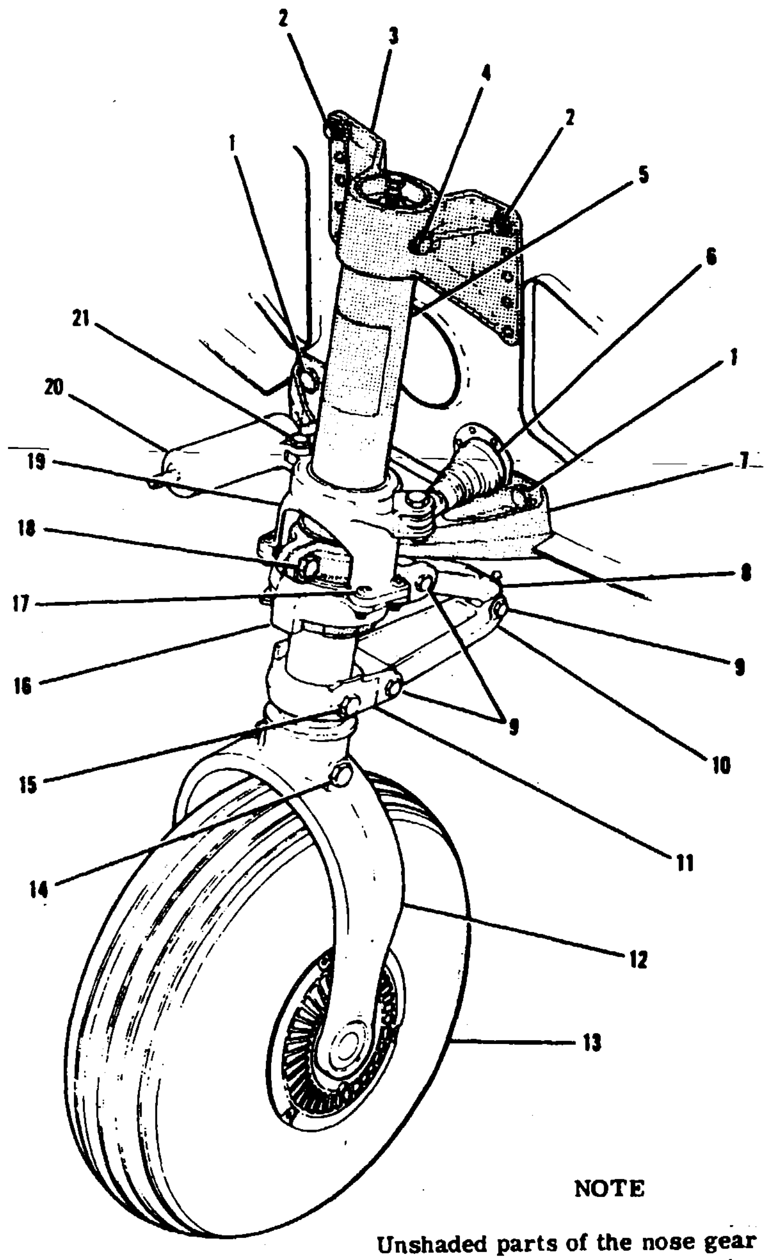


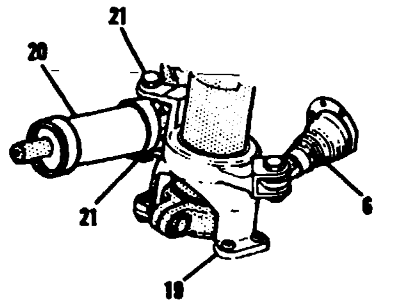
1. Bolt
2. Strut Assembly
3. Bolt
4. RH Steering Tube
5. LH Steering Tube
6. Clamp
7. Bolt
8. Rod End
9. Steering Arm Assembly
10. Shimmy Dampener Arm
11. Strut Clamp Cap
12. Shimmy Dampener
13. Rivet
14. Nut
15. Ball Joint
16. Check Nut
17. Clevis
18. Wheel

CAUTION

When installing cap (11), check the gap between the cap and the strut fitting before the attaching bolts are tightened. Gap tolerance is .010" minimum and .016" maximum. If gap exceeds maximum tolerance, install shims, Part No. 0543042-1 (.016") and Part No. 0543042-2 (.032"), as required to obtain gap tolerance. Replace the cap if gap is less than minimum, again using the shims to obtain proper gap. Install shims as equally as possible between sides.

Figure 5-10. Nose Gear - Models 172 and P172





MODEL 182K & ON

NOTE

Unshaded parts of the nose gear turn as the nose gear steering system is operated on the ground, but do not turn while airborne. As the lower strut extends, a centering block on the upper torque link contacts a flat spot on the bottom end of the upper strut, thus keeping the lower strut and wheel from turning.

1. Bolt
2. Nut
3. Upper Forging
4. Bolt
5. Upper Strut
6. Steering Bungee
7. Lower Forging
8. Upper Torque Link
9. Bolt
10. Lower Torque Link
11. Torque Link Fitting
12. Nose Gear Fork
13. Wheel and Tire
14. Bolt
15. Bolt
16. Steering Collar
17. Screw
18. Bolt
19. Steering Torque Arm
20. Shimmy Dampener
21. Bolt

Figure 5-11. Nose Gear - Model 182

c. Deflate the strut completely and telescope it to its shortest length.

WARNING

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

d. (See figure 5-9.) On the Model 150, remove roll pin (4) securing top of strut and loosen bolt (8) which clamps strut to lower part of engine mount. Pull strut down through lower attachment to remove.

e. (See figure 5-10.) On the Models 172 and P172, remove bolt (3) securing top of strut and remove bolts (1) securing strut at lower attachment. Pull strut down, out of upper forging to remove.

f. (See figure 5-11.) On the Model 182, either of two methods may be used to remove the strut. The following procedure outlines removing the strut along with the lower forging at the fuselage. An alternate method is to remove and disconnect parts as required to slide strut down through lower forging, leaving the forging attached to the fuselage.

1. Remove bolt (4) securing top of strut.
2. Remove bolts (1) and the two bolts on the underside of lower forging (7). Remove rudder bar shields from inside the cabin for access to the nuts.
3. Pull strut assembly down, out of upper forging to remove.

g. To install the nose gear, reverse the preceding steps. Always tighten the upper attachment before clamping strut in lower support to prevent misalignment.

5-30. DISASSEMBLY OF MODEL 150 STRUT. (See figure 5-12.) The following procedure applies to the shock strut after it has been removed from the airplane, and the speed fairing (if used) and the nose wheel have been removed from the strut. In many cases, separating the upper and lower struts will permit inspection and parts replacement without removal or complete disassembly.

WARNING

Be sure strut is deflated completely before removing roll pin at top of strut, lock ring (16), or bolt (26). Do not disconnect torque links until strut is deflated completely.

a. Remove torque links. Note position of washers and spacers.

b. Remove shimmy dampener.

c. Remove lock ring (16) from groove inside lower end of upper strut. A small hole is provided at the lock ring groove to facilitate removal of the lock ring.

NOTE

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

d. Use a straight, sharp pull to separate upper and lower struts. Invert lower strut and drain remaining hydraulic fluid.

e. Remove lock ring (10) and bearing (11) from top end of lower strut.

f. Slide packing support ring (13), scraper ring (14), retaining ring (15), and lock ring (16) from lower strut, noting relative position and top side of each ring; wire together if desired.

g. Remove O-rings and backup rings from packing support ring (13).

h. Remove bolt (26) and tow-bar spacers (27), and slide torque link fitting (28) from lower strut. Tow-bar spacers are located at a different position when speed fairings are installed.

NOTE

Bolt (26) also holds base plug (21) in place.

i. Remove bolt (25) and pull base plug (21) and assembled parts out of lower strut. Remove O-rings and metering pin from base plug. Beginning with Serial No. 15061784 through the 1966 model-year (standard gear), an orifice piston with a smaller hole is used and the metering pin is deleted. A straight metering pin replaces the contoured metering pin for all service parts prior to the 1967 models (where a metering pin was used). The 1967 model standard gear uses a shorter contoured metering pin. Beginning with the Model 150G, the heavy-duty nose gear is not available.

NOTE

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

j. Pull orifice piston support (3) out of upper strut. Remove O-ring and valve.

k. Remove retaining ring (6), then slide steering arm (7) from upper strut. Remove washer (9) and any shims used next to the washer.

5-31. ASSEMBLY OF MODEL 150 STRUT. (See figure 5-12.)

a. Thoroughly clean all parts in solvent and examine them carefully. Replace all worn or defective parts, and all rubber or plastic seals and rings.

NOTE

Packing support rings with different width inner grooves and various seals have been used in the strut. On packing support rings with the wide groove, install a contoured rubber back-up ring above and below the O-ring. If strut is equipped with a packing support ring having the narrow groove, install one contoured rubber back-up ring below the O-ring. If any struts are found with Teflon or leather back-up rings installed in the packing support ring inner groove, replace with the contoured back-up rings above and below the O-ring.

b. Assemble the strut by reversing the order of the procedure outlined in paragraph 5-30. Note that bearing (11) must be installed with beveled edge up (next to lock ring).

c. Lubricate needle bearing in steering arm (7) with MIL-G-7711 grease (or equivalent) before installing. If needle bearing is defective, replace the entire steering arm assembly.

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.

e. Sharp metal edges should be smoothed with #400 emery paper, then cleaned. Tape or other coverings should be used to protect seals where possible. Remove after seals are past edges.

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

g. When installing lock ring (16), position the lock ring so one of its ends covers the small access hole in the lock ring groove.

h. 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.

i. Service shock strut after installation.

5-32. DISASSEMBLY OF MODELS 172 AND P172 STRUT. (See figure 5-13.) The following procedure applies to the shock strut after it has been removed from the airplane, and the speed fairing (if used) and the nose wheel have been removed from the strut. In many cases, separating the upper and lower struts will permit inspection and parts replacement without removal or complete disassembly.

WARNING

Be sure strut is deflated completely before removing bolt at top of strut or lock ring (15). Do not disconnect torque links until strut is deflated completely. Although it is possible to remove bolt (24) without deflating the strut, some airplanes were not equipped with bushing (23) which makes this possible. If any doubt exists whether the bushing is present, deflate the strut as a safety precaution.

a. Remove torque links. Note position of washers and spacers.

b. Remove shimmy dampener.

c. Remove lock ring (15) from groove inside lower end of upper strut. A small hole is provided at the lock ring groove to facilitate removal of the lock ring.

NOTE

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

d. Use a straight, sharp pull to separate upper and lower struts. Invert lower strut and drain remaining hydraulic fluid.

e. Remove lock ring (9) and bearing (10) from top end of lower strut.

f. Slide packing support ring (12), scraper ring (13), retaining ring (14), and lock ring (15) from lower strut, noting relative position and top side of each ring; wire together if desired.

g. Remove O-rings and back-up rings from packing support ring (12).

h. Remove bolt (24), bushing (23), and pull base plug (20) and assembled parts out of lower strut. Remove O-rings and metering pin from base plug.

NOTE

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

i. Pull orifice piston support (3) out of upper strut. Remove O-ring and valve.

j. Remove retaining ring (6), then slide steering arm (7) from upper strut. Remove washer (8) and any shims used next to the washer.

5-33. ASSEMBLY OF MODELS 172 AND P172 STRUT. (See figure 5-13.)

a. Thoroughly clean all parts in solvent and examine them carefully. Replace all worn or defective parts, and all rubber or plastic seals and rings.

NOTE

Packing support rings with different width inner grooves and various seals have been used in the strut. On packing support rings with the wide groove, install a contoured rubber back-up ring above and below the O-ring. If strut is equipped with a packing support ring having the narrow groove, install one contoured rubber back-up ring below the O-ring. If any struts are found with Teflon or leather back-up rings installed in the packing support ring inner groove, replace with the contoured back-up rings above and below the O-ring.

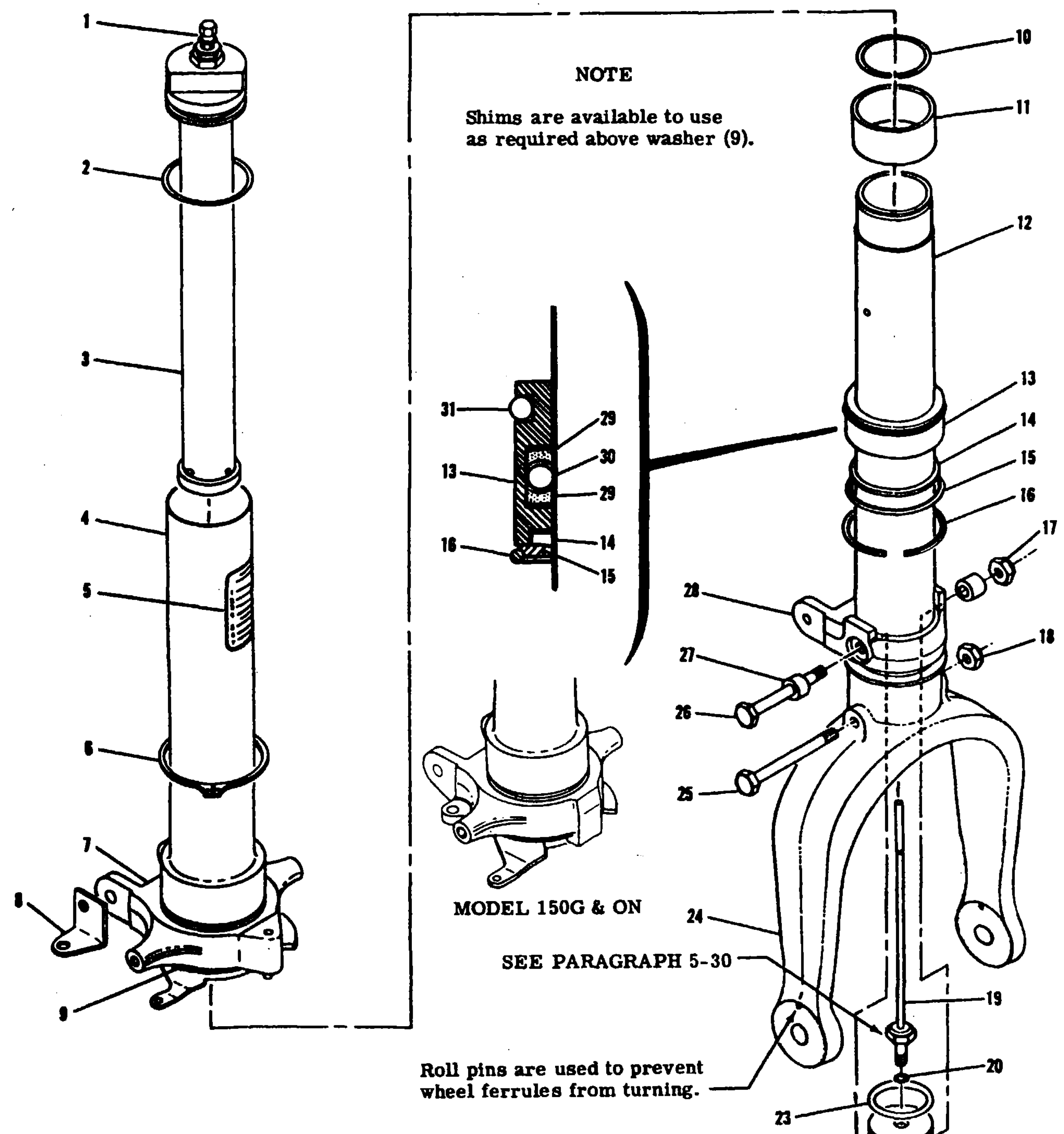
b. Assemble the strut by reversing the order of the procedure outlined in paragraph 5-32. Note that bearing (10) must be installed with beveled edge up (next to lock ring).

c. Lubricate needle bearing in steering arm (7) with MIL-G-7711 grease (or equivalent) before installing. If needle bearing is defective, replace the entire steering arm assembly.

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.

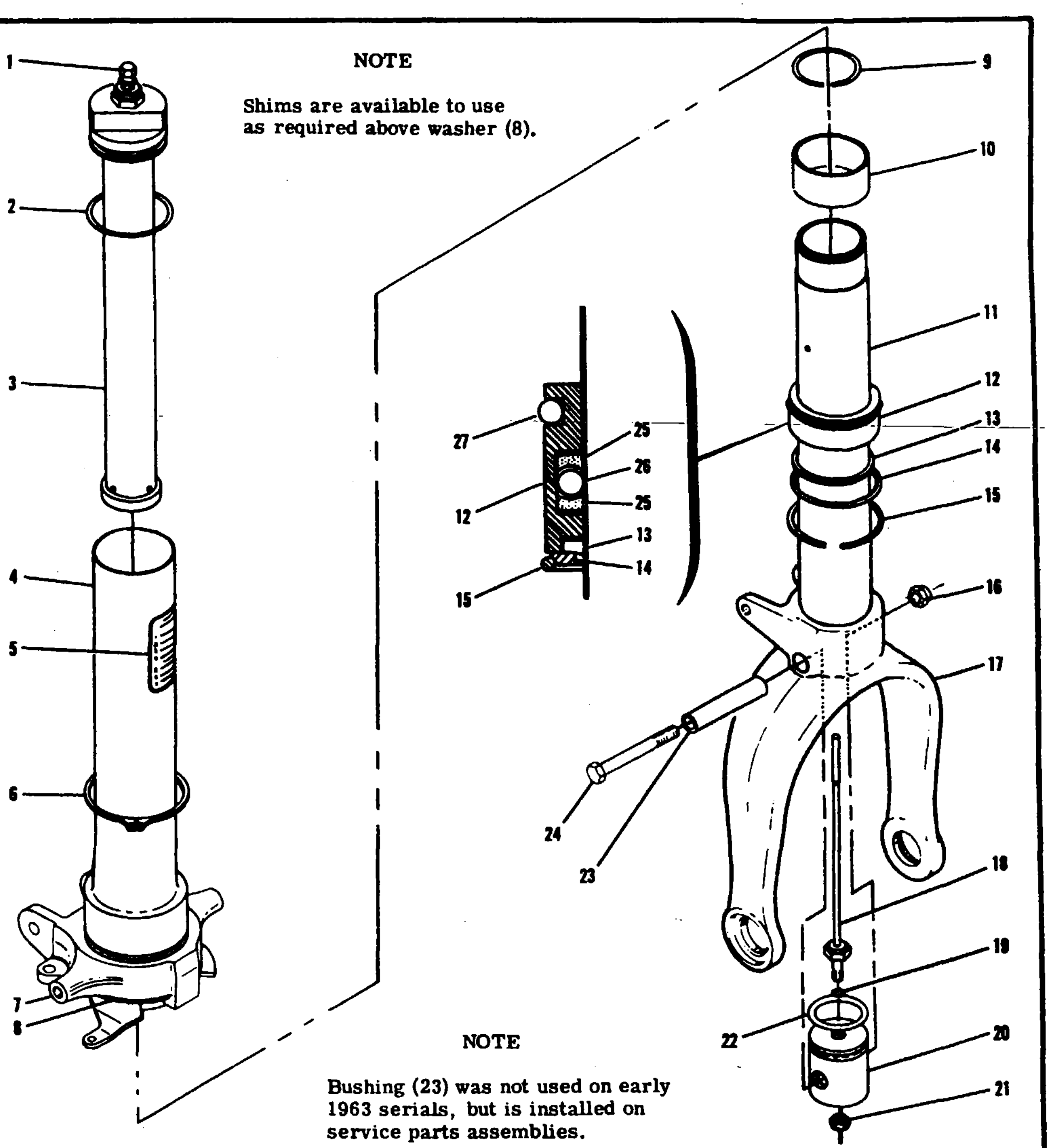
e. Sharp metal edges should be smoothed with #400 emery paper, then cleaned. Tape or other coverings should be used to protect seals where possible. Remove after seals are past edges.

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



1. Valve	11. Bearing	21. Base Plug
2. O-Ring	12. Lower Strut	22. Nut
3. Orifice Piston Support	13. Packing Support Ring	23. O-Ring
4. Upper Strut	14. Scraper Ring	24. Fork
5. Decal	15. Retaining Ring	25. Bolt
6. Retaining Ring	16. Lock Ring	26. Bolt
7. Steering Arm Assembly	17. Nut	27. Tow-Bar Spacer
8. Shimmy Dampener Support	18. Nut	28. Torque Link Fitting
9. Washer	19. Metering Pin	29. Back-Up Ring
10. Lock Ring	20. O-Ring	30. O-Ring
		31. O-Ring

Figure 5-12. Nose Gear Strut - Model 150



NOTE

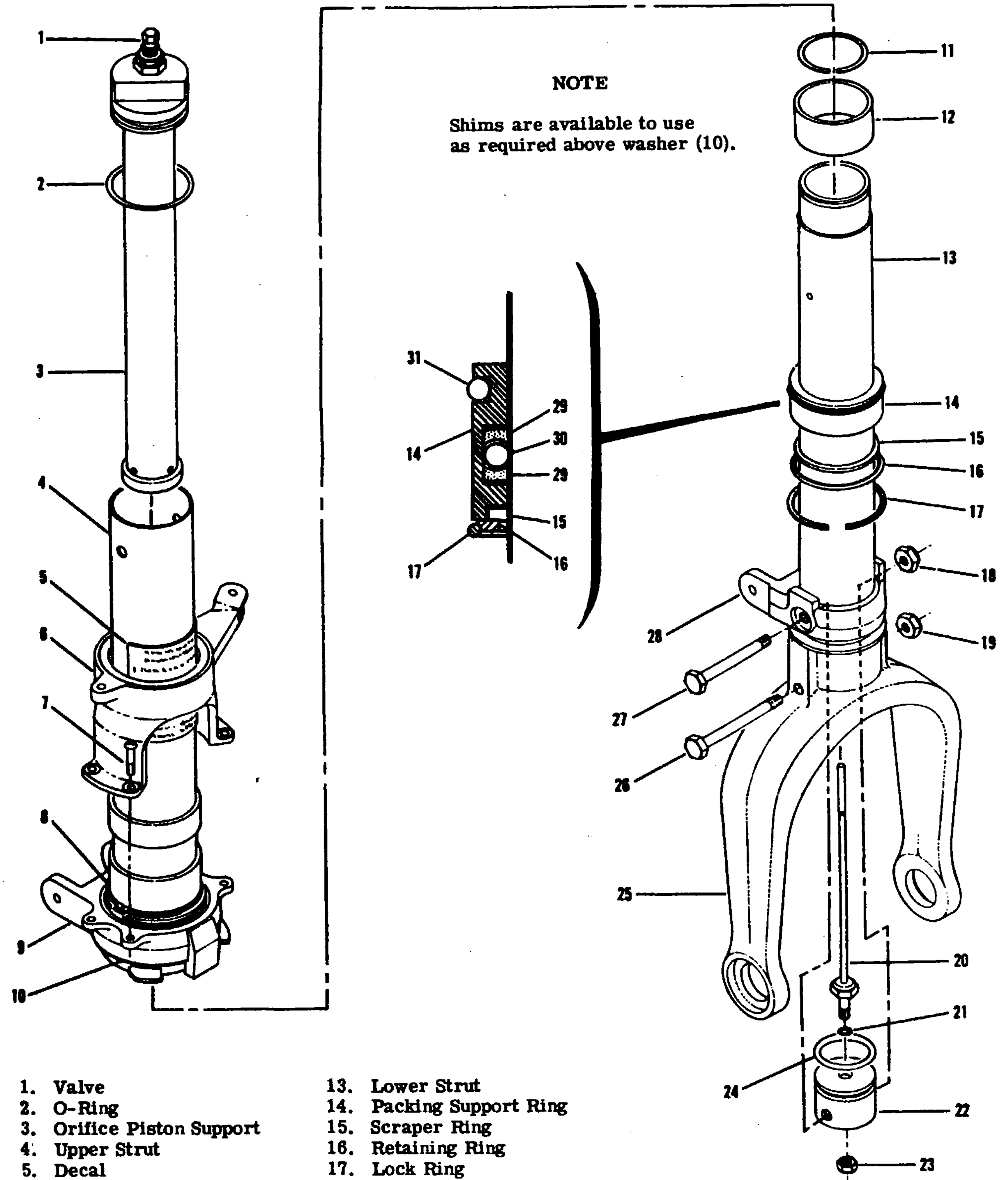
Shims are available to use as required above washer (8).

NOTE

Bushing (23) was not used on early 1963 serials, but is installed on service parts assemblies.

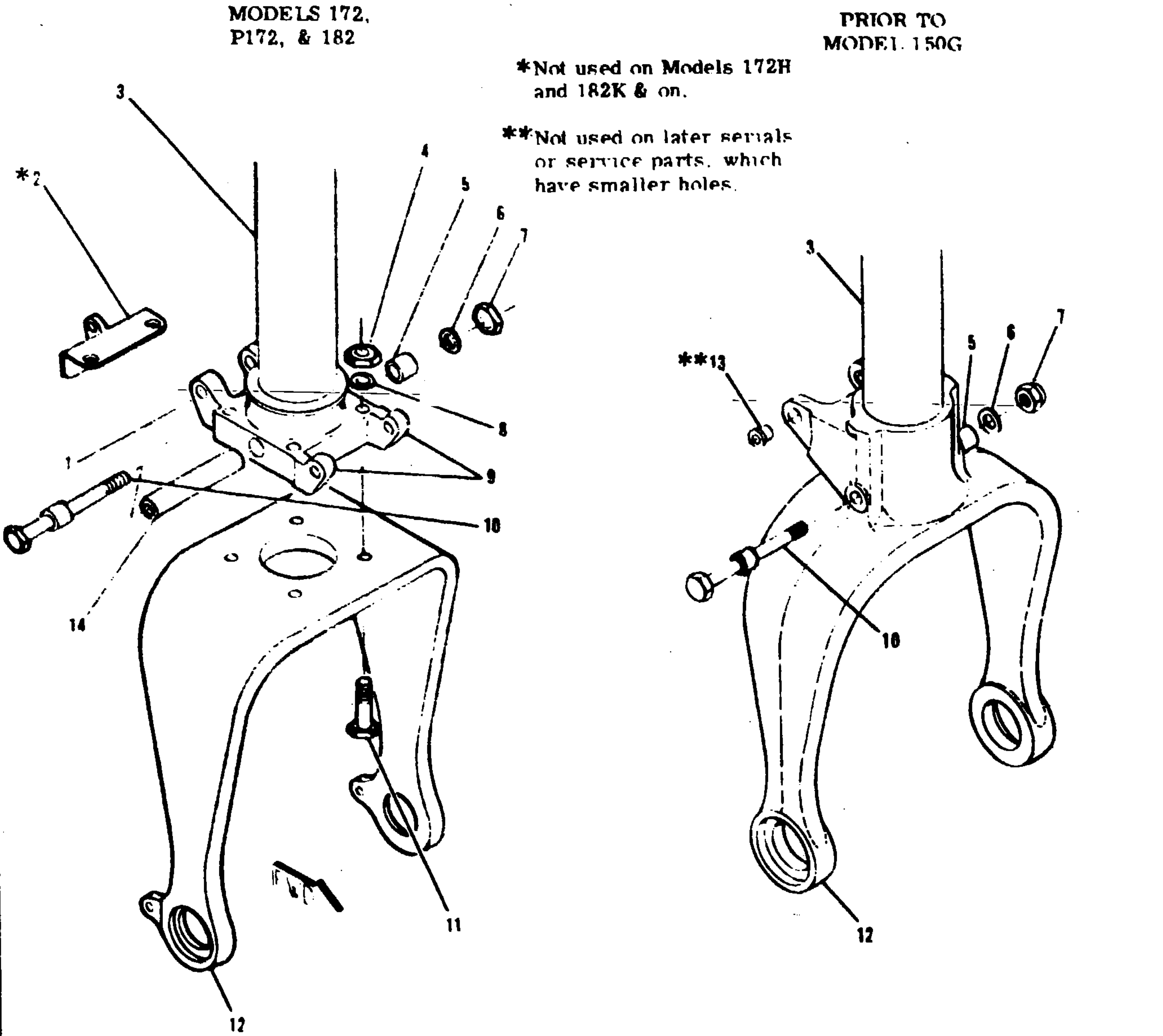
1. Valve
2. O-Ring
3. Orifice Piston Support
4. Upper Strut
5. Decal
6. Retaining Ring
7. Steering Arm Assembly
8. Washer
9. Lock Ring
10. Bearing
11. Lower Strut
12. Packing Support Ring
13. Scraper Ring
14. Retaining Ring
15. Lock Ring
16. Nut
17. Fork
18. Metering Pin
19. O-Ring
20. Base Plug
21.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

Figure 5-13. Nose Gear Strut - Models 172 and P172



1. Valve
2. O-Ring
3. Orifice Piston Support
4. Upper Strut
5. Decal
6. Steering Torque Arm
7. Screw
8. Retaining Ring
9. Steering Collar
10. Washer
11. Lock Ring
12. Bearing
13. Lower Strut
14. Packing Support Ring
15. Scraper Ring
16. Retaining Ring
17. Lock Ring
18. Nut
19. Nut
20. Metering Pin
21. O-Ring
22. Base Plug
23. Nut
24. O-Ring
25. Fork
26. Bolt
27. Bolt
28. Torque Link Fitting
29. Back-Up Ring
30. O-Ring
31. O-Ring

Figure 5-14. Nose Gear Strut - Model 182



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

NOTE

Refer to figure 5-23 for attaching parts if speed fairings are used.

Lugs (9) are used on the Model 182 only.

Bushing (14) installed on Model 172H and on.

Model 150 heavy-duty nose gear is installed with the torque links at the front.

Figure 5-15. Heavy-Duty Nose Gear Strut

g. When installing lock ring (15), position the lock ring so one of its ends covers the small access hole in the lock ring groove.
h. 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.
i. Service shock strut after installation.

5-34. DISASSEMBLY OF MODEL 182 STRUT. (See figure 5-14.) The following procedure applies to the shock strut after it has been removed from the airplane, and the speed fairing (if used) and the nose wheel have been removed from the strut. In many cases, separating the upper and lower struts will permit inspection and parts replacement without removal or complete disassembly.

WARNING

Be sure strut is deflated completely before removing bolt at top of strut, lock ring (17), or bolt (27). Do not disconnect torque links until strut is deflated completely.

a. Remove torque links. Note position of washers and spacers.
b. Remove shimmy dampener.
c. Remove steering torque arm (6) and lower forging (7, figure 5-11) if these parts have not been removed previously.
d. Remove lock ring (17) from groove inside lower end of upper strut. A small hole is provided at the lock ring groove to facilitate removal of the lock ring.

NOTE

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

e. Use a straight, sharp pull to separate upper and lower struts. Invert lower strut and drain remaining hydraulic fluid.
f. Remove lock ring (11) and bearing (12) from top end of lower strut.
g. Slide packing support ring (14), scraper ring (15), retaining ring (16), and lock ring (17) from lower strut, noting relative position and top side of each ring; wire together if desired.
h. Remove O-rings and back-up rings from packing support ring (14).
i. Remove bolt (27) and slide torque link fitting (28) from lower strut.

NOTE

Bolt (27) also holds metering pin base plug (21) in place.

j. Remove bolt (26) and pull base plug (22) and assembled parts out of lower strut. Remove O-rings and metering pin from base plug.

NOTE

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

k. Pull orifice piston support (3) out of upper strut. Remove O-ring and valve.
l. Remove retaining ring (8), then slide steering collar (9) from upper strut. Remove washer (10) and any shims used next to the washer.

5-35. ASSEMBLY OF MODEL 182 STRUT. (See figure 5-14.)
a. Thoroughly clean all parts in solvent and examine them carefully. Replace all worn or defective parts, and all rubber or plastic seals and rings.

NOTE

Packing support rings with different width inner grooves and various seals have been used in the strut. On packing support rings with the wide groove, install a contoured rubber back-up ring above and below the O-ring. If strut is equipped with a packing support ring having the narrow groove, install one contoured rubber back-up ring below the O-ring. If any struts are found with Teflon or leather back-up rings installed in the packing support ring inner groove, replace with the contoured back-up rings above and below the O-ring.

b. Assemble the strut by reversing the order of the procedure outlined in paragraph 5-34. Note that bearing (12) must be installed with beveled edge up (next to lock ring).
c. Lubricate needle bearings in steering torque arm (6) and steering collar (9) with MIL-G-7711 grease (or equivalent) before installing. If needle bearings are defective, replace the entire steering torque arm assembly or steering collar assembly.
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.
e. Sharp metal edges should be smoothed with #400 emery paper, then cleaned. Tape or other coverings should be used to protect seals where possible. Remove after seals are past edges.
f. Cleanliness and proper lubrication, along with careful workmanship, are important during assembly of the shock strut.
g. When installing lock ring (17), position the lock ring so one of its ends covers the small access hole in the lock ring groove.
h. 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.

i. The lower strut-to-fuselage forging must be in place on the strut before installing steering torque arm (6). If the lower forging was left on the fuselage, the steering torque arm must be positioned on the strut after it has been inserted through the lower forging and before inserting the strut into the upper forging.

j. Service shock strut after installation.

5-36. HEAVY-DUTY NOSE GEAR. The optional heavy-duty nose gears are shown in figure 5-15, which may be used as a guide during maintenance. Removal and disassembly procedures are the same as those given for the standard nose gear except for the differences shown in the illustration.

5-37. NOSE WHEEL.

5-38. The Goodyear nose wheel is illustrated in figure 5-17 and the Cleveland nose wheel is illustrated in figure 5-18. They may be used interchangeably on all models.

5-39. REPLACEMENT. (See figure 5-18.)

a. Tie down or weight the tail of the airplane to raise nose wheel off the ground.

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 the nose wheel from the fork.

NOTE

Buckets are used on aircraft without speed fairings and on the Model 150 heavy-duty nose gear with speed fairings. With this exception, solid ferrules are used on all other aircraft with speed fairings and on all other Model 150 aircraft.

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 turned. Back off the nut to the nearest castellation and install cotter pin. On the Model 150, position the ferrules so the slots in the ferrules engage the roll pins in the fork.

CAUTION

Whenever a tire is changed, a speed fairing is installed, or scraper adjustment is disturbed, set scraper clearance in accordance with paragraph 5-66.

5-40. DISASSEMBLY.

a. Completely deflate the tire and break tire beads loose.

WARNING

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

b. Remove thru-bolts and separate wheel halves.

c. Remove tire and tube.

d. Remove bearing retaining rings, grease seals, and bearing cones.

NOTE

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

5-41. INSPECTION AND REPAIR. Instructions given in paragraph 5-14 for the main wheels may be used as a guide for inspection and repair of the nose wheels.

5-42. ASSEMBLY.

a. Insert tube in tire, aligning indexing mark on tube with red dot on tire. Place tire on wheel half and position valve stem through valve hole. Insert thru-bolts, position other wheel half, and secure with nuts and washers. Take care to avoid pinching tube between wheel halves. Torque bolts to value marked on wheel.

CAUTION

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

b. Clean and repack bearing cones with clean wheel bearing grease.

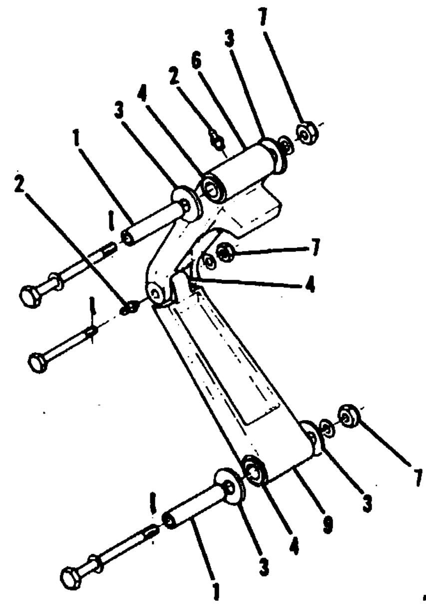
c. Assemble bearing cones, seals, and retainers into the wheel half.

d. Inflate tire to seat tire beads, then adjust to correct pressure.

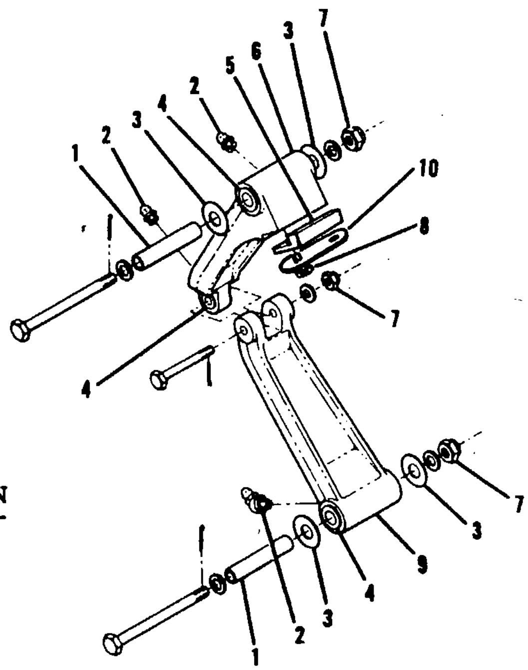
5-43. WHEEL BALANCING.

5-44. Since uneven tire wear is usually the cause of wheel unbalance, replacing the tire will probably correct this condition. Tire and tube manufacturing tolerances permit a specified amount of static unbalance. The lightweight point of the tire is marked with a red dot on the tire sidewall, and the heavyweight point of the tube is marked with a contrasting color line (usually near the valve stem). When installing a new tire and tube, place these marks adjacent to each other. If a wheel becomes unbalanced during service, it may be statically rebalanced. Wheel balancing equipment is available from the Cessna Service Parts Center.

PRIOR TO 1967 MODELS



1967 MODELS AND ON



NOTE

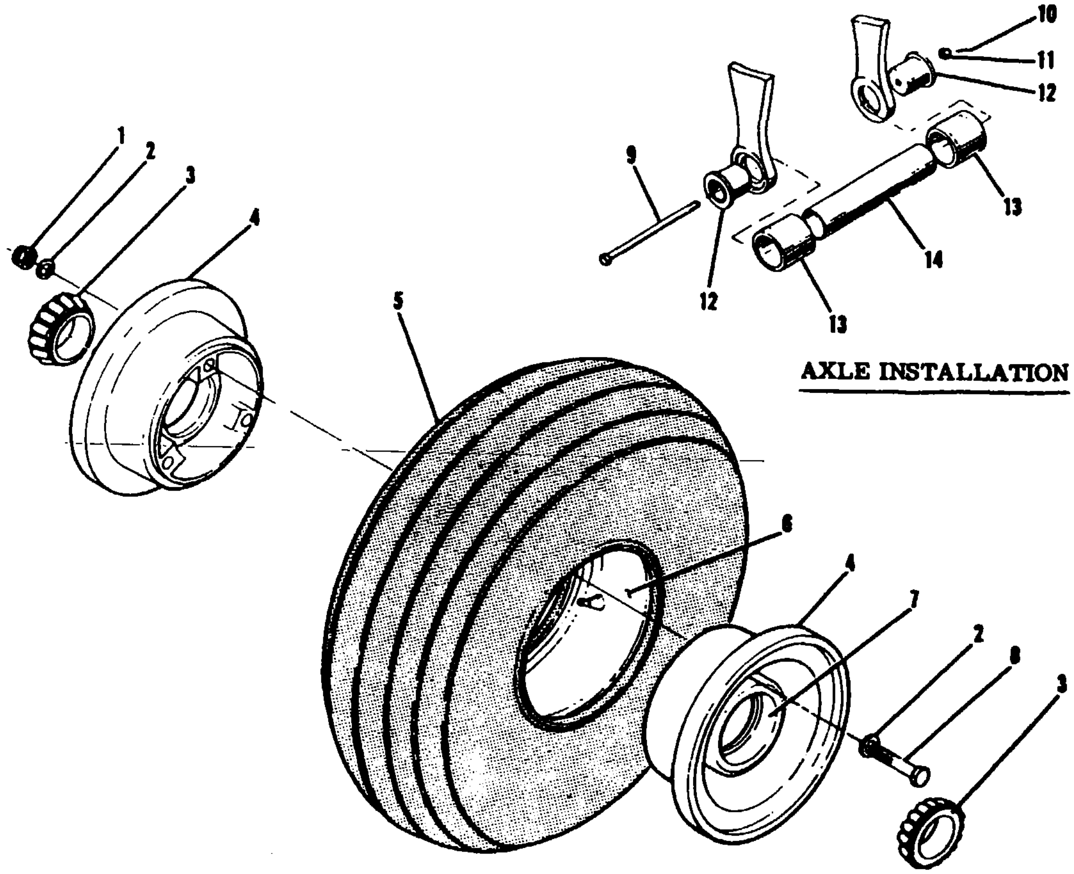
Tighten bolts (8) to 20-25 pound-inches, then safety the bolts by bending tips of safety lug (10).

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 5-16. Torque Links



NOTE

Wheel bolt torque is stamped on each wheel half. It is recommended that AN bolts (8) be replaced with NAS bolts on 6.00 x 6 nose wheels for increased strength and closer tolerances.

1. Nut
2. Washer
3. Bearing
4. Wheel Half
5. Tire
6. Tube
7. Bearing Cup
8. Bolt
9. Thru-Bolt
10. Cotter Pin
11. Nut
12. Axle Bolt Bucket
13. Axle Spacer
14. Axle Tube

Figure 5-17. Goodyear Nose Wheel

SHOP NOTES:

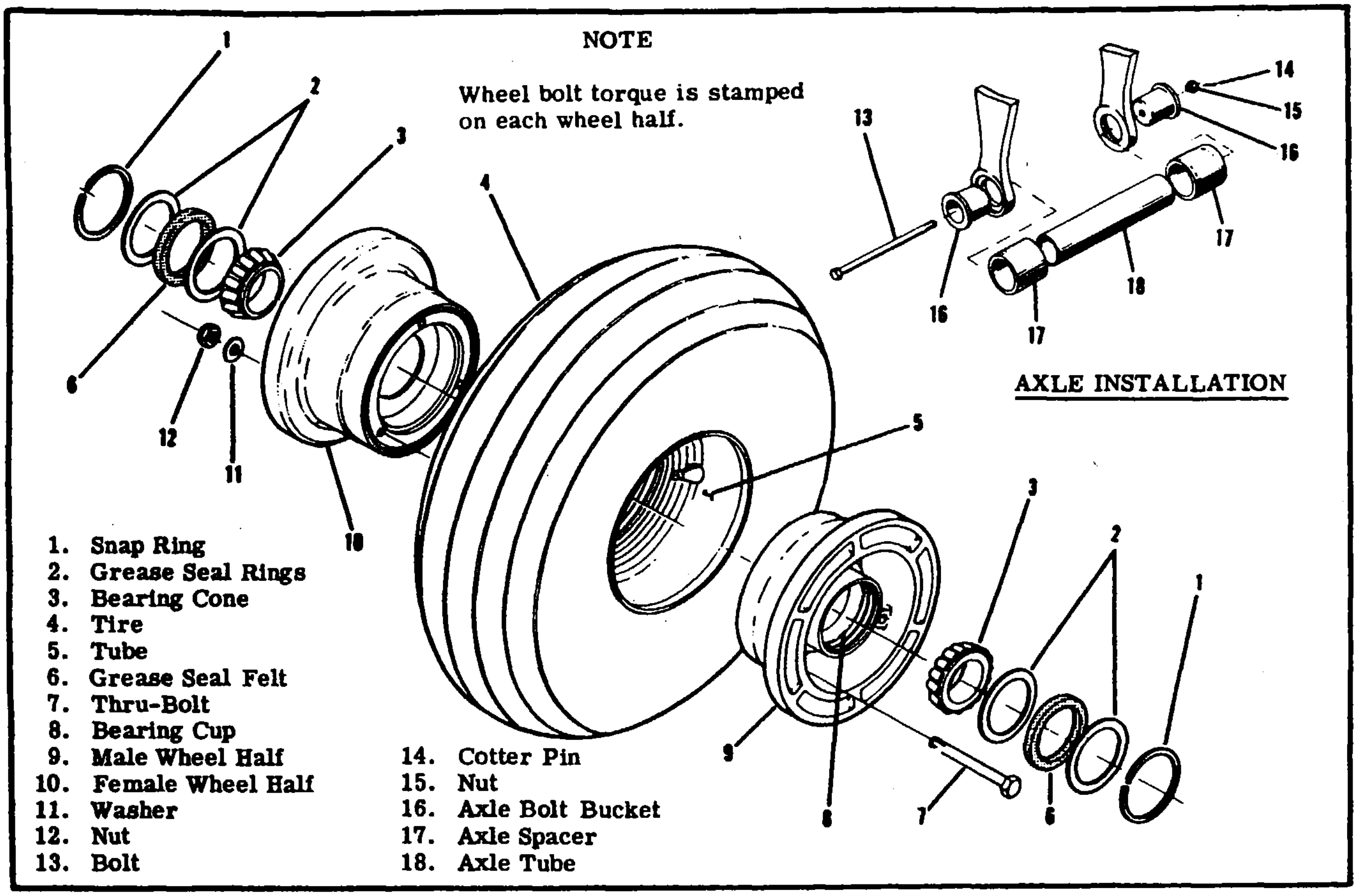
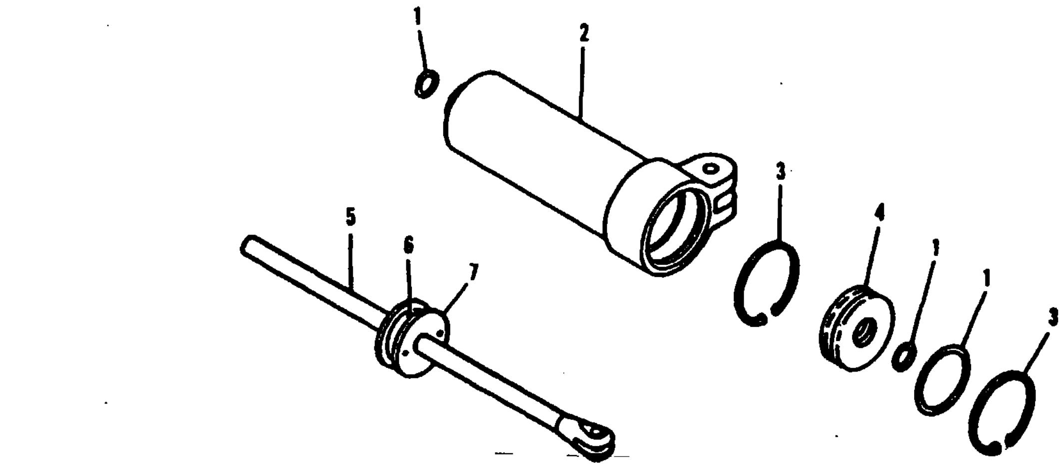
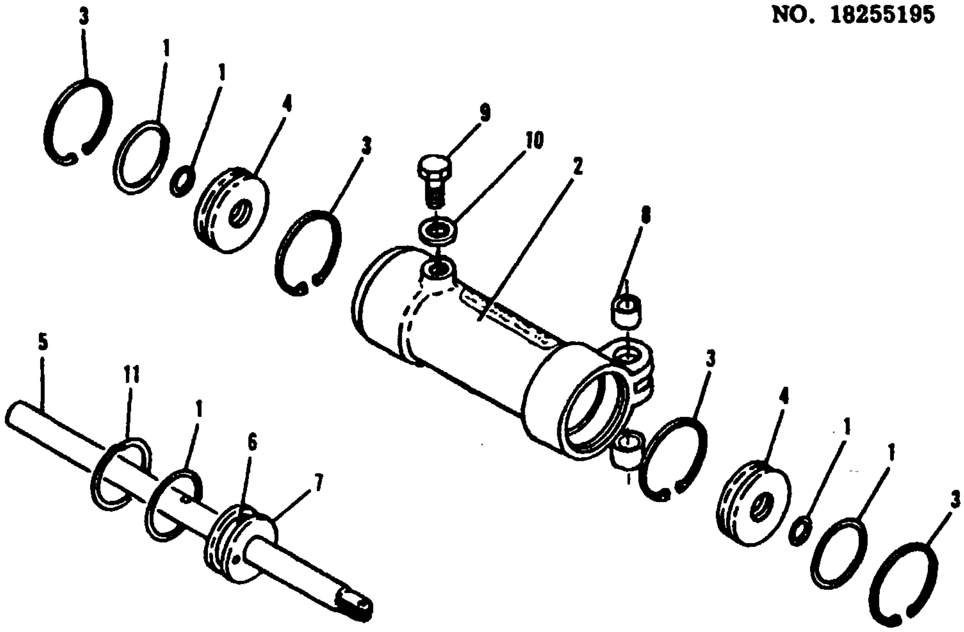


Figure 5-18. Cleveland Nose Wheel

SHOP NOTES:



MODELS 150, 172, AND P172
MODEL 182 PRIOR TO SERIAL NO. 18255195



MODEL 182 SERIAL NO. 18255195 THRU 1966 MODEL, AND SERVICE PARTS PRIOR TO 1967 MODEL

MODEL 172 HEAVY-DUTY NOSE GEAR SERIAL NO, 17252235 & ON, AND SERVICE PARTS

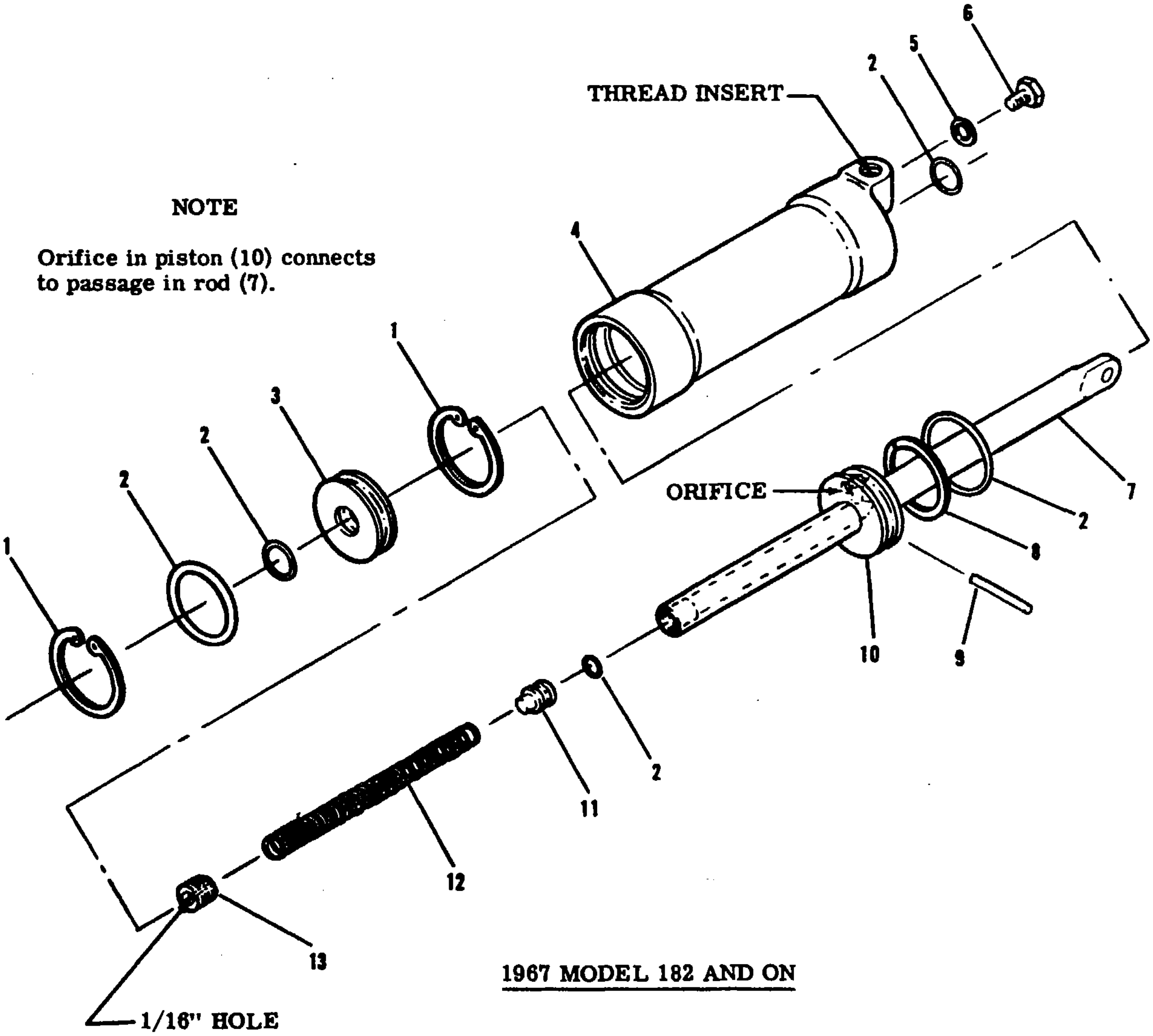
MODEL F172 HEAVY-DUTY NOSE GEAR SERIAL NO. F172-0114 & ON, AND SERVICE PARTS

1. O-Ring
2. Barrel
3. Retaining Ring
4. Bearing Head
5. Piston Rod
6. Roll Pin
7. Piston
8. Bushing
9. Bolt
10. Stat-O-Seal
11. Back-Up Ring

Figure 5-19. Nose Gear Shimmy Dampener (Sheet 1 of 2)

NOTE

Orifice in piston (10) connects to passage in rod (7).



1967 MODEL 182 AND ON

NOTE

When installing the shimmy dampener, use washers as required between the dampener and the steering torque arm to cause a snug fit.

1. Retainer
2. O-Ring
3. Bearing Head
4. Barrel
5. Stat-O-Seal
6. Filler Plug
7. Rod
8. Back-Up Ring
9. Roll Pin
10. Piston
11. Floating Piston
12. Spring
13. Set Screw

Figure 5-19. Nose Gear Shimmy Dampener (Sheet 2 of 2)

5-45. NOSE WHEEL STEERING SYSTEM.

5-46. Nose wheel steering is accomplished through use of the rudder pedals. On all models except the 182, two spring-loaded push-pull tubes connect the rudder bars to the nose gear. On the 182, a steering bungee links the nose gear to a bellcrank which is operated by push-pull rods connected to the rudder bars. Steering is afforded up to approximately 10° each side of neutral, after which brakes may be used to gain a maximum deflection of 30° right or left of center. Flexible boots seal the fuselage entrance of the steering tubes or bungee. A sprocket-operated screw mechanism to provide rudder trim on the 182 is incorporated at the aft end of the bungee. The trim system is discussed in Section 10.

5-47. STEERING TUBE AND BUNGEE ASSEMBLIES are spring-loaded and should not be disassembled internally. The steering tubes are connected by clevises to rod ends extending from the steering arm assembly on the nose gear and by a ball joint connection at the rudder pedal crossbars. The steering bungee is connected to the steering torque arm by a bearing end assembly and to the steering bellcrank by a rod end.

5-48. ADJUSTMENT OF NOSE WHEEL STEERING. Since the nose wheel steering system, rudder system, and rudder trim system are interconnected, adjustments to one system may affect the others. Section 10 contains rigging instructions for the nose wheel steering system as well as the rudder and rudder trim systems.

5-49. TAIL GEAR.

5-50. A steerable tailwheel, mounted on a tubular spring strut, comprises the tail gear of the Models 180 and 185. The spring strut is mounted in rubber bushings to cushion vibration. The tailwheel is steerable, in response to rudder pedal actuation, through an arc of 24° each side of neutral, and is free-swiveling beyond this travel. The Model 185 tailwheel is provided with a tailwheel locking system, either an automatic system operated by linkage to the elevator control system or a manual system operated by a control lever in the cabin. When the tailwheel is locked, it is still steerable approximately 2.5° each side of neutral. The locking lug is spring-loaded to the disengaged position.

5-51. TAIL GEAR REPLACEMENT. (See figure 5-20.)

a. Place a suitable padded stand under an aft fuselage bulkhead to raise the tail gear off the ground.
b. Disconnect steering cables from tail gear.
c. On the Model 185, disconnect tailwheel lock control from the tail gear spring and tailwheel locking yoke.
d. Remove fuselage stinger.
e. Remove cotter pins (10) and clevis pins (4) securing tube (18) to spring fitting (5). Tap the tube out through the spring fitting and pull tailwheel spring (2) aft, out of hose (1) which is cemented to a mounting structure in the fuselage.
f. Replace hose (1) and rubber bushings (8) if deteriorated, and inspect and replace spring and attaching parts as required.
g. Reverse the preceding steps to install the tail gear. Refer to paragraph 5-59 for rigging of the Model 185 tailwheel locking system.

5-52. TAILWHEEL REPLACEMENT. (See figure 5-20.)

a. Place a suitable padded stand under an aft fuselage bulkhead to raise the tailwheel off the ground.
b. Noting position of washers, lockwashers, and spacers, remove cotter pin and axle nut and pull axle bolt out of fork to remove tailwheel.

NOTE

After removal of the tailwheel, the steering mechanism and Model 185 tailwheel locking system may be disassembled and parts replaced as necessary.

c. Install tailwheel by reversing the preceding steps.
d. When assembling the steering mechanism and fork, tighten nut (33, figure 5-20) in accordance with paragraph 5-60.
e. Tighten axle nut until a slight bearing drag is obvious when the tailwheel is rotated. Back off the nut to the first castellation and install cotter pin.

5-53. TAILWHEEL TIRE REPLACEMENT. (See figure 5-21.)

GOODRICH TAILWHEEL:

a. After removing the tailwheel, remove cover plates and deflate tire by removing valve core.
b. Grease seals, retainers, and bearing cones need not be removed to replace a tire, although their removal for cleaning and lubrication is recommended.
c. Press flange (7) inward, forcing the tire beads together, until flange retaining ring (2) can be removed. Remove the flange retaining ring, flange, and the tire and tube.
d. Bearing cups may be replaced as outlined in paragraph 5-13.

SCOTT TAILWHEEL:

a. After removing the tailwheel, deflate tire by removing valve core.
b. Grease seals, retainers, and bearing cones need not be removed to replace a tire, although their removal for cleaning and lubrication is recommended.
c. Remove bolts (18) fastening the wheel halves together, then separate the wheel halves, removing tire, tube, and gasket between the wheel halves.
d. Bearing cups may be replaced as outlined in paragraph 5-13.

NOTE

After cleaning and lubrication in accordance with the following paragraph, reassemble by reversing the preceding applicable steps.

5-54. CLEANING AND LUBRICATION. Wash all metal parts and seals in solvent and dry with compressed air. Remove felt seals from service if, after normal cleaning, they are embedded with foreign matter, the felt is not pliable, or the material is broken or does not retain the shape necessary to afford proper sealing. Pack all bearing cones with MIL-G-7711 grease. Oil the seals with a light machine oil before installation.

5-55. MODEL 185 TAILWHEEL LOCKING SYSTEM.

5-56. Three different configurations of tailwheel locking systems may be found on the Model 185. The latest system is a manually controlled system operated by a control lever in the cabin. Prior to the manual system, automatically controlled systems were used. These two automatic systems are the same in method of operation, although routing and detail parts differ. The three types of tailwheel locking systems are illustrated in figure 5-22. Cessna Service Kits and Accessory Kits are available from the Cessna Service Parts Center to modify early type elevator-operated systems to the later type elevator-operated systems, and to change either of these systems to the manual system used on current models.

5-57. TROUBLE SHOOTING.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
EXCESSIVE TAILWHEEL SHIMMY.		
Improper rigging.	See paragraph 5-59.	Rig per paragraph 5-59.
Nut fastening steering mechanism to fork improperly tightened.	See paragraph 5-60.	Tighten per paragraph 5-60.
Incorrect tire pressure.	Check pressure.	Inflate to correct pressure.
NOTE The 10-inch tires are more susceptible to shimmy than the 8-inch tire. If desired, the 10-inch tire and tube may be replaced with the 8-inch tire and tube. Either size will fit the wheel assembly.		
PREMATURE WEAR/BREAKAGE OF STEERING ARM AND PAWL SPRING.		
Early style locking system installed.		Install SK185-11 and SK185-12, which convert the early system to the latest elevator-operated system.
WHIPPING ACTION AT TOUCH-DOWN WITH TAILWHEEL DEFLECTED.		
Early style locking system installed.		Install AK185-28, which is a manually operated locking system. If this system is to be installed, do NOT install SK185-11.

5-58. REPLACEMENT. Figure 5-22 shows details of the various tailwheel locking systems, and may be used as guides for removal and installation. Refer to paragraph 5-59 for rigging of the applicable system.

5-59. RIGGING.

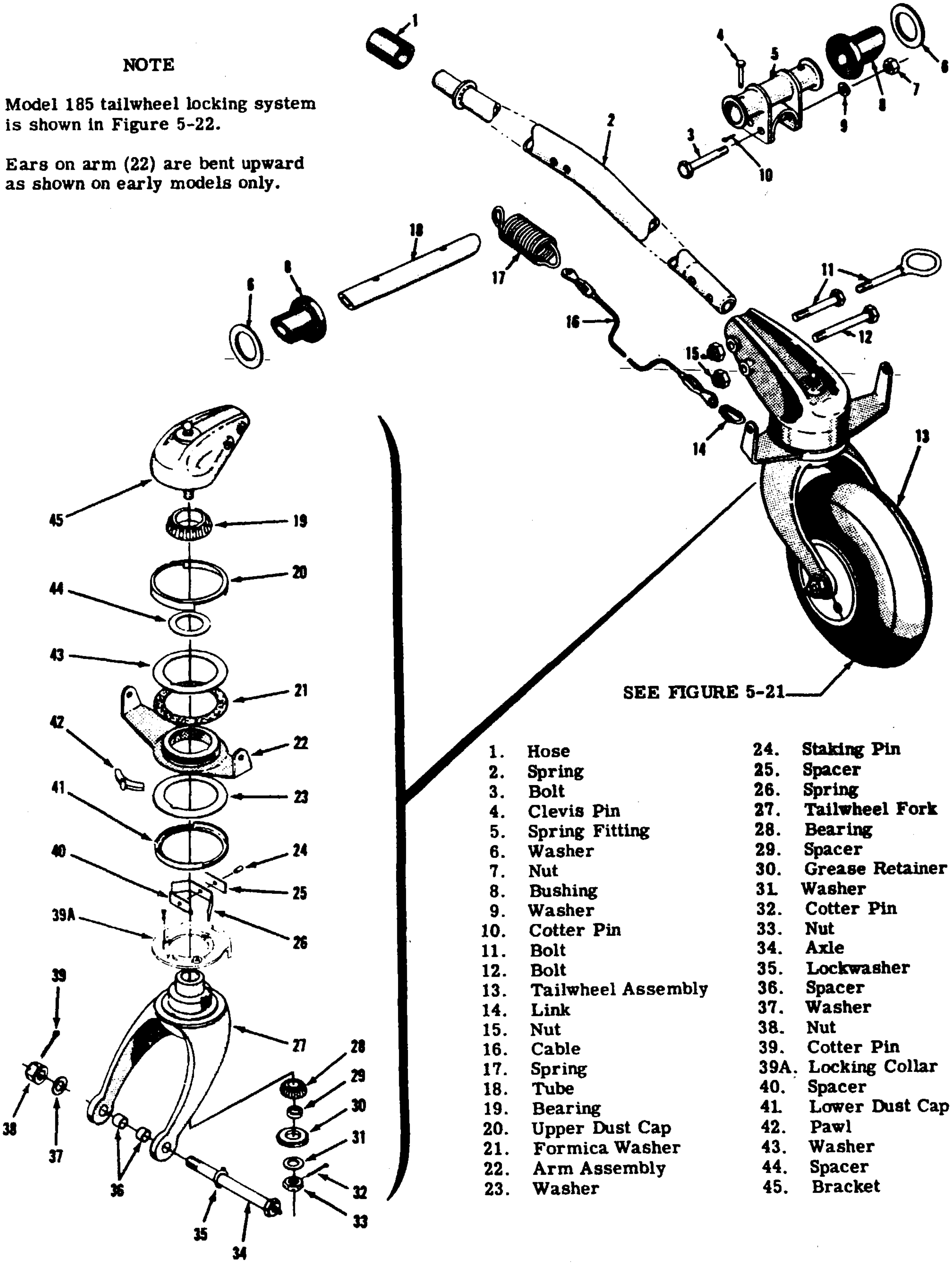
EARLY ELEVATOR-OPERATED SYSTEM. (See figure 5-22.)

a. With tailwheel on ground, rotate stabilizer trim control wheel until leading edge of stabilizer is 2.62 inches down from upper edge of fuselage splice plate.
b. Adjust turnbuckle to provide engagement of locking pin when elevator is moved to the 15-degree up position.

NOTE

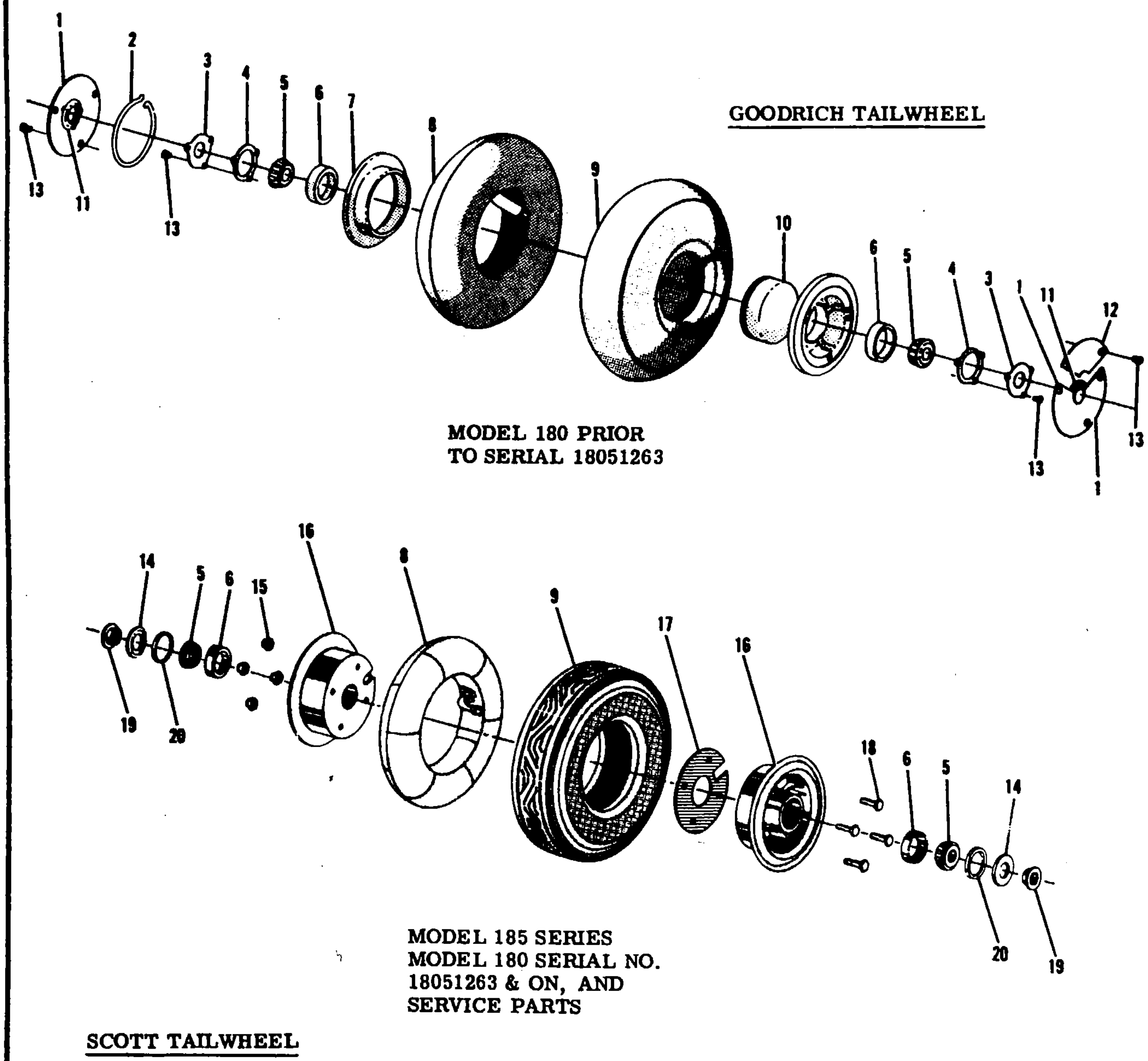
Model 185 tailwheel locking system is shown in Figure 5-22.

Ears on arm (22) are bent upward as shown on early models only.



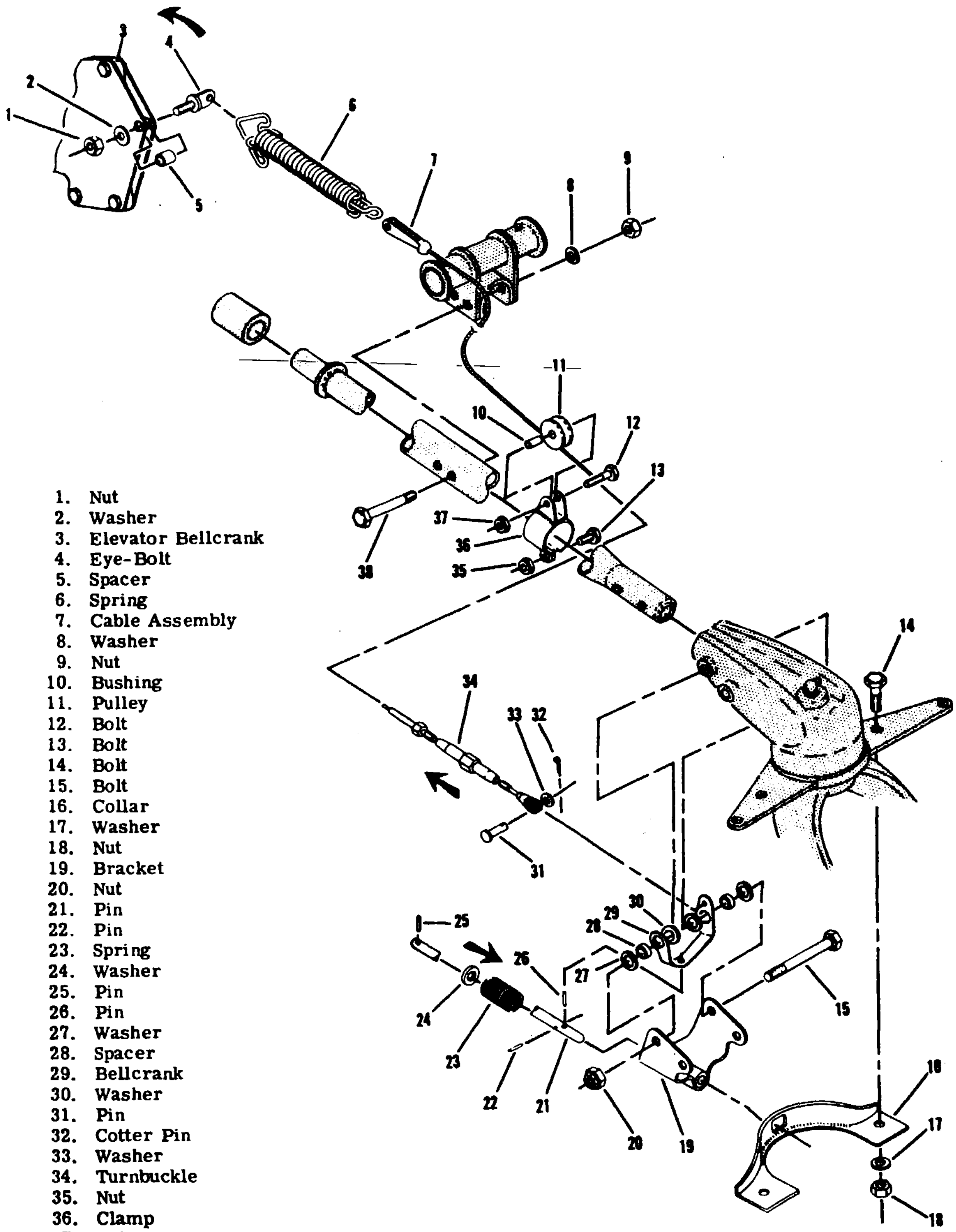
1. Hose
2. Spring
3. Bolt
4. Clevis Pin
5. Spring Fitting
6. Washer
7. Nut
8. Bushing
9. Washer
10. Cotter Pin
11. Bolt
12. Bolt
13. Tailwheel Assembly
14. Link
15. Nut
16. Cable
17. Spring
18. Tube
19. Bearing
20. Upper Dust Cap
21. Formica Washer
22. Arm Assembly
23. Washer
24. Staking Pin
25. Spacer
26. Spring
27. Tailwheel Fork
28. Bearing
29. Spacer
30. Grease Retainer
31. Washer
32. Cotter Pin
33. Nut
34. Axle
35. Lockwasher
36. Spacer
37. Washer
38. Nut
39. Cotter Pin
39A. Locking Collar
40. Spacer
41. Lower Dust Cap
42. Pawl
43. Washer
44. Spacer
45. Bracket

Figure 5-20. Typical Tail Gear



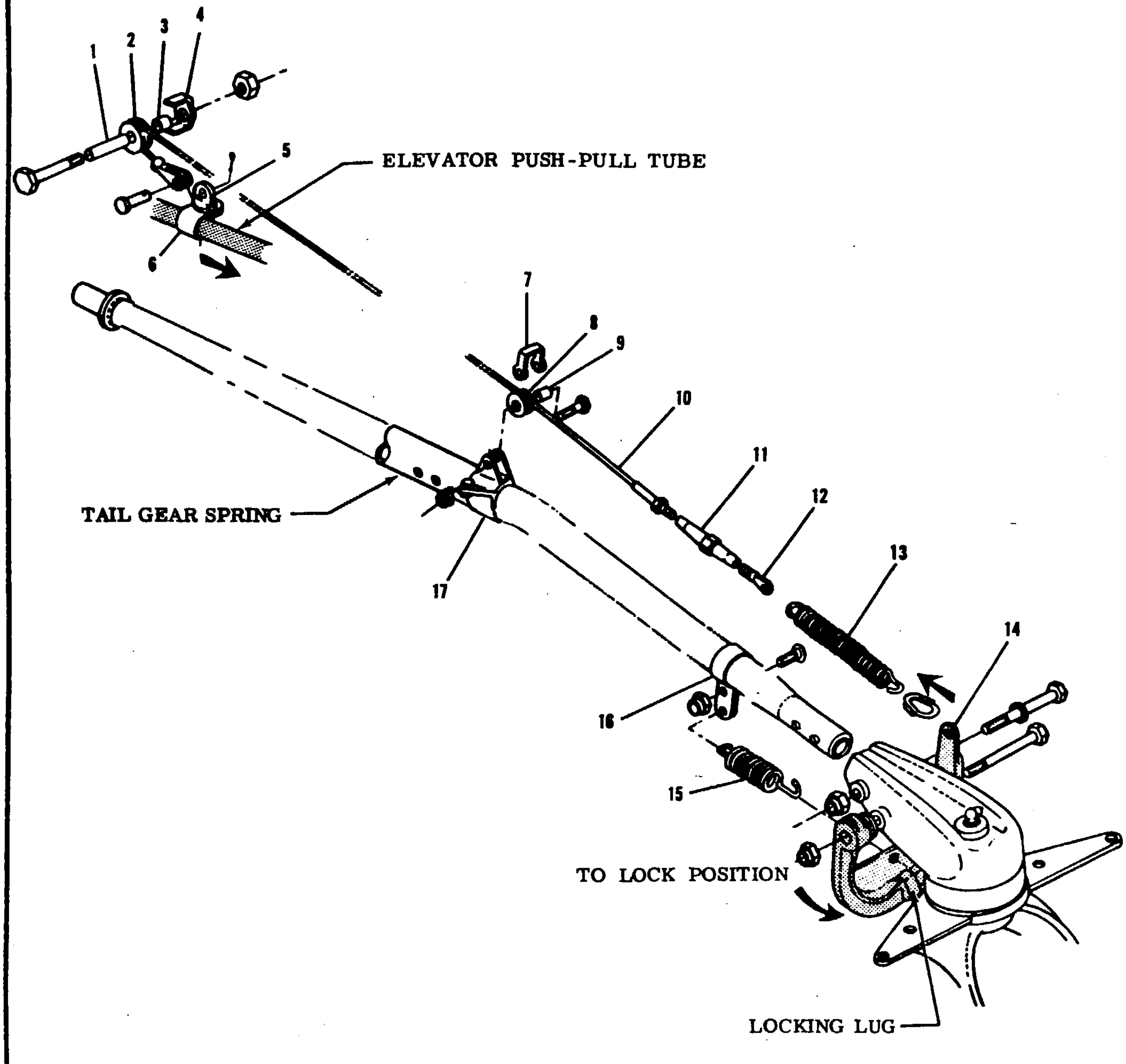
1. Fairing Plate
2. Flange Retaining Ring
3. Bearing Cover
4. Gasket
5. Bearing Cone
6. Bearing Cup
7. Flange
8. Tube
9. Tire
10. Wheel Hub
11. Felt Seal
12. Valve Access Plate
13. Screw
14. Grease Retainer
15. Nut
16. Wheel Half
17. Gasket
18. Bolt
19. Spacer
20. Spacer

Figure 5-21. Tailwheel Assemblies



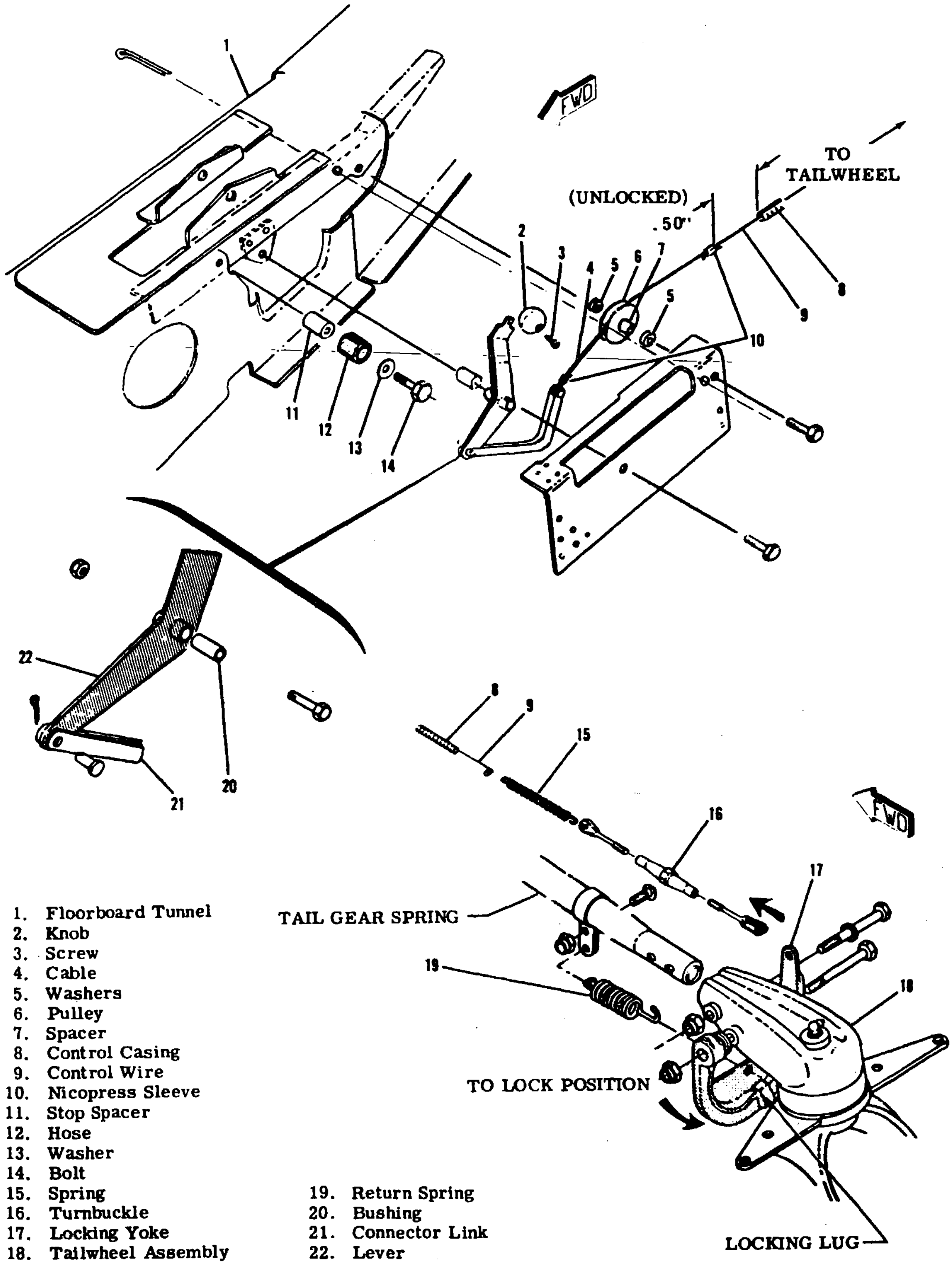
1. Nut
2. Washer
3. Elevator Bellcrank
4. Eye-Bolt
5. Spacer
6. Spring
7. Cable Assembly
8. Washer
9. Nut
10. Bushing
11. Pulley
12. Bolt
13. Bolt
14. Bolt
15. Bolt
16. Collar
17. Washer
18. Nut
19. Bracket
20. Nut
21. Pin
22. Pin
23. Spring
24. Washer
25. Pin
26. Pin
27. Washer
28. Spacer
29. Bellcrank
30. Washer
31. Pin
32. Cotter Pin
33. Washer
34. Turnbuckle
35. Nut
36. Clamp
37. Nut
38. Bolt

Figure 5-22. Model 185 Tailwheel Locking System (Sheet 1 of 3)



1. Bushing
2. Pulley
3. Spacer
4. Cable Guard
5. Eyebolt
6. Clamp
7. Cable Guard
8. Pulley
9. Spacer
10. Cable
11. Turnbuckle
12. Turnbuckle Eye
13. Spring
14. Locking Yoke
15. Return Spring
16. Clamp
17. Clamp Assembly

Figure 5-22. Model 185 Tailwheel Locking System (Sheet 2 of 3)



1. Floorboard Tunnel
2. Knob
3. Screw
4. Cable
5. Washers
6. Pulley
7. Spacer
8. Control Casing
9. Control Wire
10. Nicopress Sleeve
11. Stop Spacer
12. Hose
13. Washer
14. Bolt
15. Spring
16. Turnbuckle
17. Locking Yoke
18. Tailwheel Assembly
19. Return Spring
20. Bushing
21. Connector Link
22. Lever

Figure 5-22. Model 185 Tailwheel Locking System (Sheet 3 of 3)

LATER ELEVATOR-OPERATED SYSTEM. (See figure 5-22.)

a. With tailwheel on ground, rotate stabilizer trim control wheel to the full nose down position (trim control wheel completely forward).
b. With elevator in the neutral (streamlined) position, locate the pivot point of clamp (6) at station 215.68, which is 14.50 inches forward of the rearmost fuselage bulkhead.
c. Adjust turnbuckle to remove slack in the cable. Lock shoula be fully engaged when elevator is moved to the 10-degree up position, while the stabilizer is still in the full nose down position (trim control wheel completely forward).

MANUALLY OPERATED SYSTEM. (See figure 5-22.)

a. With control lever in the unlocked position, check that there is .50-inch clearance between forward end of control casing and Nicopress sleeve (10) as shown in figure 5-22. Shift casing in clamps if necessary to adjust clearance.
b. With control lever still in the unlocked position, adjust turnbuckle so that locking lug is not engaged with slot in tailwheel assembly.
c. Move control lever to the locked position and check that locking lug is positively engaged with slot in tailwheel assembly.
d. Safety the turnbuckle.

5-60. TAILWHEEL FRICTION CHECK. (Models 180 and 185.) At each 25-hour inspection, until the first 100-hour inspection, and at each 100-hour inspection thereafter, perform the following friction check.
a. Place a suitable padded stand under an aft fuselage bulkhead to raise the tailwheel off the ground.
b. Disconnect steering cables. Make sure that the Model 185 tailwheel locking system is disengaged.
c. Using a spring scale hooked into a steering cable attach hole, measure friction required to pivot the tailwheel fork. Force required should be 5 to 6 pounds (approximately 23 to 28 pound-inches of torque). This applies to 8-inch as well as 10-inch tailwheels. Adjustment of friction is provided by the castellated nut (33, figure 5-20) which fastens the fork and steering mechanism together. Be sure to install cotter pin after adjusting the nut.
d. Reconnect steering cables and remove padded stand to lower tailwheel to the ground.

5-61. SPEED FAIRINGS.

5-62. Optional equipment on some models and standard on others, speed fairings of reinforced, resin laminated glass fiber construction are used on tricycle gear Cessna airplanes.

5-63. REPLACEMENT. The main wheel speed fairings may be replaced by removing the screws attaching the inboard side of the fairings to the adapter plate, and removing the bolt securing the outboard side to the axle nut. Nose wheel speed fairings have an opening in the top of the speed fairing which is large enough to permit the nose gear fork to pass through the fairing. A plate covers the opening. Speed fairings used with heavy-duty nose gear assemblies are replaced in a different manner.

STANDARD NOSE WHEEL SPEED FAIRINGS AND MODEL 150F HEAVY-DUTY. (See figure 5-23.)

a. Tie down or weight the tail of the airplane to raise the nose wheel off the ground.
b. Deflate strut and remove cover plate (26).

WARNING

The cover plate is secured by the lower torque link attaching bolt on Models 172 and P172, and by the fork attaching bolt on the Models 150 and 182. Some Models 172 and P172 were equipped with a bushing at the fork attaching bolt to make it possible to remove the speed fairing without deflating the strut. If any doubt exists whether the bushing is present, deflate the strut as a safety precaution.

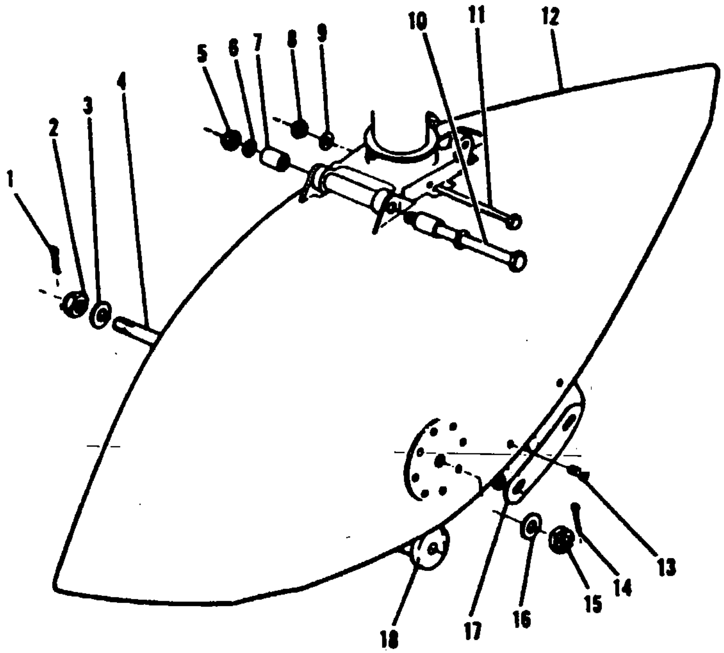
c. Remove bolt (27) securing speed fairing to strut assembly, if it was not removed during cover plate removal.
d. Remove nose wheel axle stud. On the Model 150F and on heavy-duty gear, remove the axle stud after brackets have been disconnected from speed fairing and speed fairing raised.
e. Slide speed fairing up and remove the nose wheel. Loosen scraper (33) if necessary.
f. Rotate speed fairing 90° and pull it down over the fork to remove.
g. Install the speed fairing by reversing the preceding steps. Tighten axle stud until a slight bearing drag is obvious when the wheel is turned. Back off the nut to the nearest castellation and install cotter pins. On the Model 150, position the ferrules so the slots in the ferrules engage the roll pins in the fork.

CAUTION

Whenever a tire is changed, a speed fairing is installed, or scraper adjustment is disturbed, set scraper clearance in accordance with paragraph 5-66.

MODEL 182 HEAVY-DUTY NOSE WHEEL SPEED FAIRINGS. (See figure 5-23.)

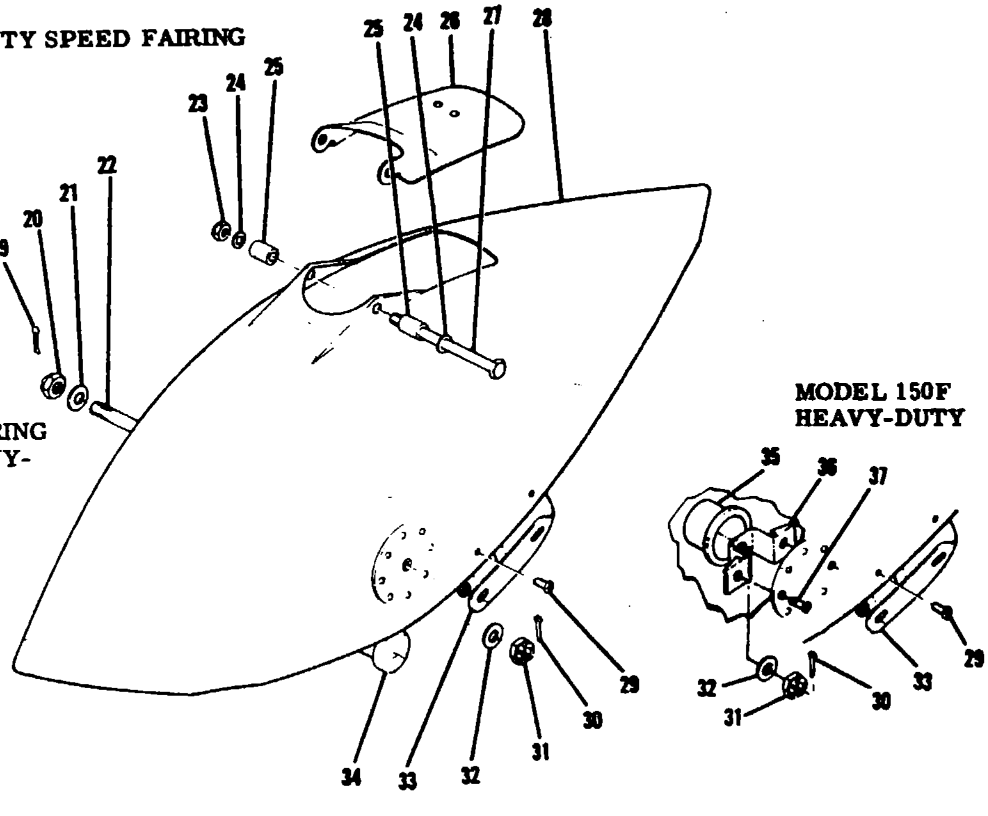
a. Tie down or weight the tail of the airplane to raise the nose wheel off the ground.
b. Remove nose wheel axle stud (4).
c. Remove bolt (10) securing speed fairing to strut assembly. It is not necessary to remove bolt (11), but if bolt (11) is to be removed, be sure to deflate strut first.
d. Slide speed fairing up and remove the nose wheel. Loosen scraper (17) if necessary. Use a rod or long punch inserted through one ferrule (18) to tap the opposite one out of the fork. Remove both ferrules and pull the nose wheel from the fork.
e. Remove bolts (11, figure 5-15) to free fork and speed fairing from strut.



MODEL 182 HEAVY-DUTY SPEED FAIRING

NOTE

Except for the heavy-duty speed fairing used on the Model 182, speed fairings are attached with the same bolt that secures the nose gear fork. Cover plate (26) is also secured with this bolt on some models, and on other models the cover plate is shorter and is fastened with the bolt that secures the lower torque link. Location of tow-bar spacers also varies with the model.



STANDARD SPEED FAIRING AND MODEL 150F HEAVY-DUTY

MODEL 150F HEAVY-DUTY

1. Cotter Pin
2. Nut
3. Washer
4. Axle Stud
5. Nut
6. Washer
7. Tow-Bar Spacer
8. Nut
9. Washer
10. Bolt
11. Bolt
12. Speed Fairing
13. Screw
14. Cotter Pin
15. Nut
16. Washer
17. Scraper
18. Ferrule
19. Cotter Pin
20. Nut
21. Washer
22. Axle Stud
23. Nut
24. Washer
25. Tow-Bar Spacer
26. Cover Plate
27. Bolt
28. Speed Fairing
29. Screw
30. Cotter Pin
31. Nut
32. Washer
33. Scraper
34. Ferrule
35. Bucket
36. Bracket
37. Screw

Figure 5-23. Speed Fairings (Sheet 1 of 2)

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

CAUTION

Whenever a tire is changed, a speed fairing is installed, or scraper adjustment is disturbed, set scraper clearance in accordance with paragraph 5-66.

5-64. REPAIR. A speed fairing repair kit, SK182-12, is available from the Cessna Service Parts Center.

5-65. PRECAUTIONS. Wipe fuel and oil from the speed fairings to prevent stains and deterioration. If the airplane is flown from surfaces with mud, snow, or ice, the fairings should be checked to make sure there is no accumulation which could prevent normal wheel rotation.

5-66. SPEED FAIRING SCRAPER ADJUSTMENT. It is important that speed fairing scraper adjustment be maintained in accordance with the following chart.

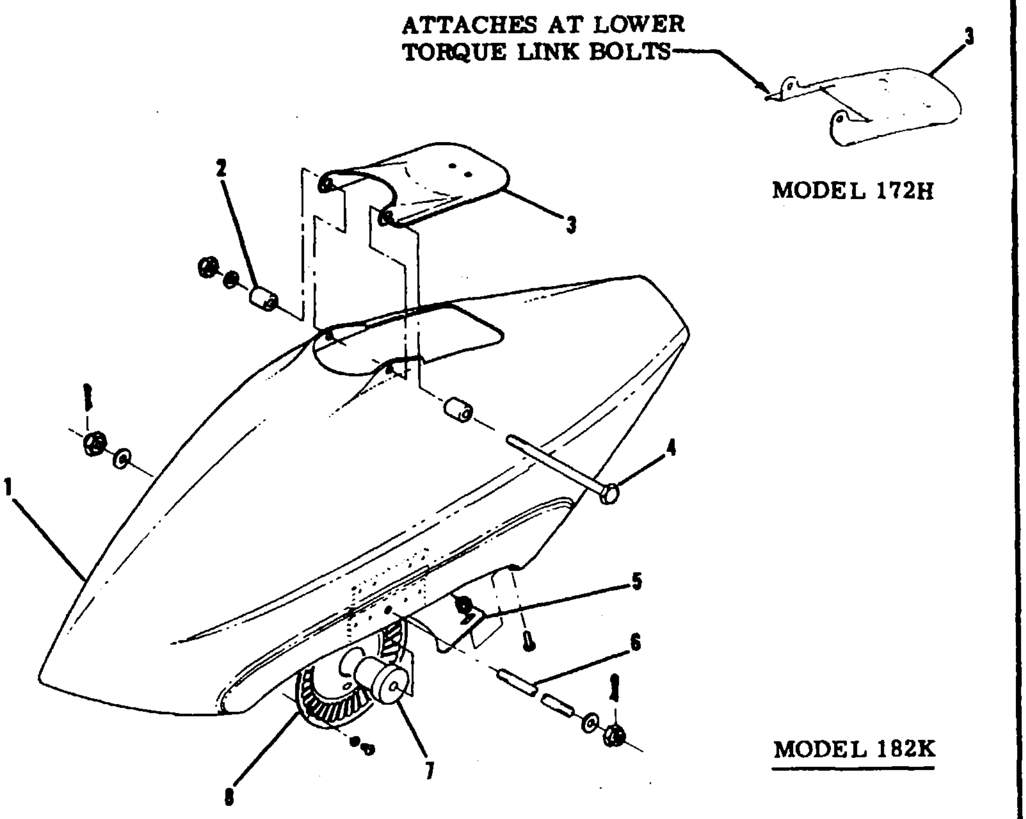
Model	Nose Wheel	Main Wheel
150 (Standard)	.25" to .38"	.25" to .38"
150 (Heavy-Duty)	.40" to .60"	——
172	.38"	.25" to .38"
P172	.38"	.25" to .38"
182	.38"	*.25" to .38"

*.38" for 8.00 × 6 tires.

5-67. BRAKE SYSTEMS.

5-68. The hydraulic brake system consists of two master cylinders, brake lines connecting each master cylinder to its wheel brake cylinder, and the single-disc type brake assemblies, located on each main landing gear.

5-69. BRAKE MASTER CYLINDERS. The brake master cylinders, located just forward of the pilot's rudder pedals, are actuated by applying toe pressure on the rudder pedals. A small reservoir is incorporated with each master cylinder to supply it with fluid. When dual brakes are installed, mechanical linkage permits the copilot's pedals to operate the master cylinders.



1. Speed Fairing
2. Tow-Bar Spacer
3. Cover Plate
4. Fork Bolt
5. Scraper
6. Axle Stud
7. Ferrule
8. Hub Cap

Figure 5-23. Speed Fairings (Sheet 2 of 2)

5-70. HYDRAULIC BRAKE LINES are of rigid aluminum tubing, except for flexible hose used at the master cylinders and at the wheel brake assemblies on some models. A separate line is used to connect master cylinder to its corresponding wheel brake cylinder. During the 1967 Model year the 1/4 inch aluminum brake lines were changed to 3/16 inch aluminum lines and the 1/4 inch brake hose was changed to the smaller automotive type brake hose.

5-71. WHEEL BRAKE ASSEMBLIES. Both Goodyear and Cleveland brakes are used on Cessna airplanes covered in this Manual. To transmit the braking force from the disc to the wheel, Goodyear assemblies use a gear-tooth arrangement. Goodyear brakes contain a fixed brake assembly, with a floating brake disc. The Cleveland brake uses a disc which is affixed to the wheel, and a floating brake assembly.

5-72. TROUBLE SHOOTING THE BRAKE SYSTEM.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
DRAGGING BRAKES.		
Brake pedal binding.	If brake pedals fail to return properly, check pedal for binding.	Check and adjust properly.
Parking brake linkage holding brake pedal down.	Check parking brake if pedal fails to return when released.	Check and adjust properly.
Worn or broken piston return spring. (In master cylinder.)	If brake pedals fails to return after it is released and linkage is not binding, the master cylinder is faulty.	Repair or replace master cylinder.
Insufficient clearance at Lock-O-Seal in master cylinder.	If pressure remains in brake system when pedals are released, disassemble master cylinder and check Lock-O-Seal clearance.	Adjust as shown in figure 5-24.
Restriction in hydraulic lines or restriction in compensating port in master brake cylinders.	Jack up wheel to be checked. Have someone apply and then release brakes. Wheel should rotate freely as soon as brakes are released. If wheel fails to rotate freely, loosen brake line at brake housing to relieve any pressure trapped in the line. If wheel now turns freely, the brake line is restricted or there is a restriction in the brake master cylinder.	Drain brake lines and clean 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.	Visually check discs.	Replace brake discs and linings.
Damage or accumulated dirt restricting free movement of wheel brake parts.	Check parts for freedom of movement.	Clean and repair or replace parts as necessary.
BRAKES FAIL TO OPERATE.		
Leak in system.	Check entire system for leaks.	If brake master cylinders or wheel brake assemblies are leaking, they should be repaired or replaced.
Air in system.		Bleed system.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
BRAKES FAIL TO OPERATE (Cont).		
Lack of fluid in master cylinders.	Check fluid level.	Fill and bleed if necessary.
Master cylinder defective.		Repair or replace master cylinder.

5-73. REPLACEMENT OF BRAKE LINES. After draining, replacement of brake lines and hoses can be accomplished with common tools. All fittings are conventional. If a lubricant is needed when assembling, use clean hydraulic fluid of the type used in the system. If galling is encountered, use petrolatum on male threads only, omitting the first two threads. After installation, fill and bleed the brake system.

5-74. REPLACEMENT OF MASTER CYLINDERS.
a. Drain hydraulic fluid from brake system.
b. Remove front seats and rudder bar shield to gain access to master cylinders.
c. Disconnect parking brake linkage and master cylinders from rudder pedals.
d. Disconnect master cylinders at bottom attachment point.
e. Disconnect hydraulic hoses from master cylinders and remove cylinders.
f. Plug and cap hydraulic fittings, lines, and hoses to prevent entry of foreign materials.
g. Reverse the steps listed above to install master cylinders, then fill and bleed brake system.

5-75. REPAIR OF MASTER CYLINDERS. Figure 5-24 may be used as a guide during disassembly and assembly of the brake master cylinders. Repair is limited to replacement of parts, cleaning, and adjustment. Use clean hydraulic fluid as a lubricant during assembly of the cylinders.

5-76. REMOVAL OF WHEEL BRAKES. Goodyear wheel brake assemblies are secured with the axle attaching bolts. To remove, remove the wheel and axle in accordance with paragraph 5-9. Cleveland brake assemblies are a floating type and can be removed after disconnecting the brake line and removing back plates (39, figure 5-6, or 41, figure 5-7).

NOTE

On Cleveland brakes, the brake disc can be removed after wheel removal and disassembly. Refer to paragraphs 5-18 and 5-19. To remove the torque plate, remove the wheel and axle in accordance with paragraph 5-9.

5-77. DISASSEMBLY OF WHEEL BRAKES. Details of wheel brake assemblies are shown in figures 5-5 through 5-7, which may be used as guides during disassembly.

NOTE

Use of compressed air applied to the brake line fitting is permissible when removing the piston from the brake cylinder.

5-78. INSPECTION AND REPAIR OF WHEEL BRAKES.
a. Clean all parts except brake linings and O-rings in dry cleaning solution and dry thoroughly.
b. O-rings are usually replaced at each overhaul. If their re-use is necessary, they should be wiped with a clean oiled cloth and inspected for damage.

NOTE

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

c. Check brake linings for deterioration and maximum permissible wear (see paragraph 5-81).
d. Inspect brake cylinder bore for scoring. A scored cylinder may leak or cause rapid O-ring wear. A scored brake cylinder should be replaced.
e. If the anchor bolts on Cleveland brakes are nicked or gouged, they should be sanded smooth to prevent binding with the pressure plate or torque plate. When the anchor bolts are replaced, they should be pressed out. New ones can be installed by tapping them in place with a soft hammer.

5-79. ASSEMBLY OF WHEEL BRAKES. Lubricate parts with the type of hydraulic fluid used in the system and assemble components with care to prevent damage to O-rings. Use figures 5-5 through 5-7 as guides during assembly.

5-80. INSTALLATION OF WHEEL BRAKES. On Goodyear assemblies, install the brake assembly as the wheel and axle are installed. Refer to paragraph 5-10. On Cleveland assemblies, place the brake assembly in position with pressure plate in place, then install the shim and back plate, and safety attaching bolts, unless they are self locking.

NOTE

On Cleveland brake assemblies, if the torque plate was removed, install as the wheel and axle are installed in accordance with paragraph 5-10. If the brake disc was removed from the wheel, install as the wheel is assembled and installed in accordance with paragraphs 5-21 and 5-22.

5-81. CHECKING BRAKE LININGS. To check Goodyear brake linings for wear, set the parking brake and attempt to insert a strip of 5/16 inch material between the inboard face of the brake disc and the brake housing. Replace the linings when the strip can be inserted. Cleveland brake linings should be replaced 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 correct size drill bits make excellent tools for checking minimum thickness of brake linings.

5-82. BRAKE LINING REPLACEMENT. On Goodyear brakes, remove the wheel, replace the brake linings, and reinstall the wheel. Replace brake linings on Cleveland brakes as follows:

NOTE

The following procedure applies specifically to the Cleveland brakes used on the Model 150, as shown in figure 5-6. Although brakes used on other models are not identical, the same general procedure can be followed.

a. Remove bolts (29), washers (31), back plate (39), and shim (36).
b. Pull the brake cylinder out of torque plate (23) and slide pressure plate (24) off anchor bolts (25).
c. Place back plate on a table with lining side down flat. Center a 9/64 inch (or slightly smaller) punch in rolled rivet, and hit punch crisply with a hammer. Punch out all rivets securing linings to back plate and pressure plate in the same manner.

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 sides of the anvil in a vise.
e. Align new lining (38) on back plate (39) and place brake rivet (37) in hole with the rivet head in the lining. Place rivet head against the anvil.
f. Center rivet setting punch on lips of rivet. While holding back plate down firmly against lining, hit punch with a hammer to set rivet. Repeat blows on punch until lining is firmly against back plate.
g. Realign the lining on the back plate and install the remaining rivets.
h. Install a new lining on pressure plate (24) in the same manner.
i. Position pressure plate (24) on anchor bolts (25), and place cylinder (26) in position so the anchor bolts slide into torque plate (23).
j. Install shim (36) and back plate (39) with bolts (29) and washers (31). Safety the bolts, except where self-locking bolts are used.

5-83. BRAKE BLEEDING. Standard bleeding, with a clean hydraulic pressure source connected to the wheel cylinder bleeder, is recommended.
a. Remove the master cylinder filler plug and screw a flexible hose with a suitable fitting into the filler hole. Immerse the free end of the hose in a can containing enough hydraulic fluid to cover the end of the hose.
b. Connect a clean hydraulic pressure source, such as a hydraulic hand pump, to the bleeder provision in the wheel cylinder.

NOTE

Either a bleeder valve or a bleeder screw is provided in the wheel cylinder.

c. As fluid is pumped into the system, observe the immersed end of the hose at the master cylinder for evidence of air bubbles being forced from the brake system. When bubbling has ceased, remove the bleeder source from the brake wheel cylinder and tighten the bleeder valve or install the bleeder screw with a new seal.

NOTE

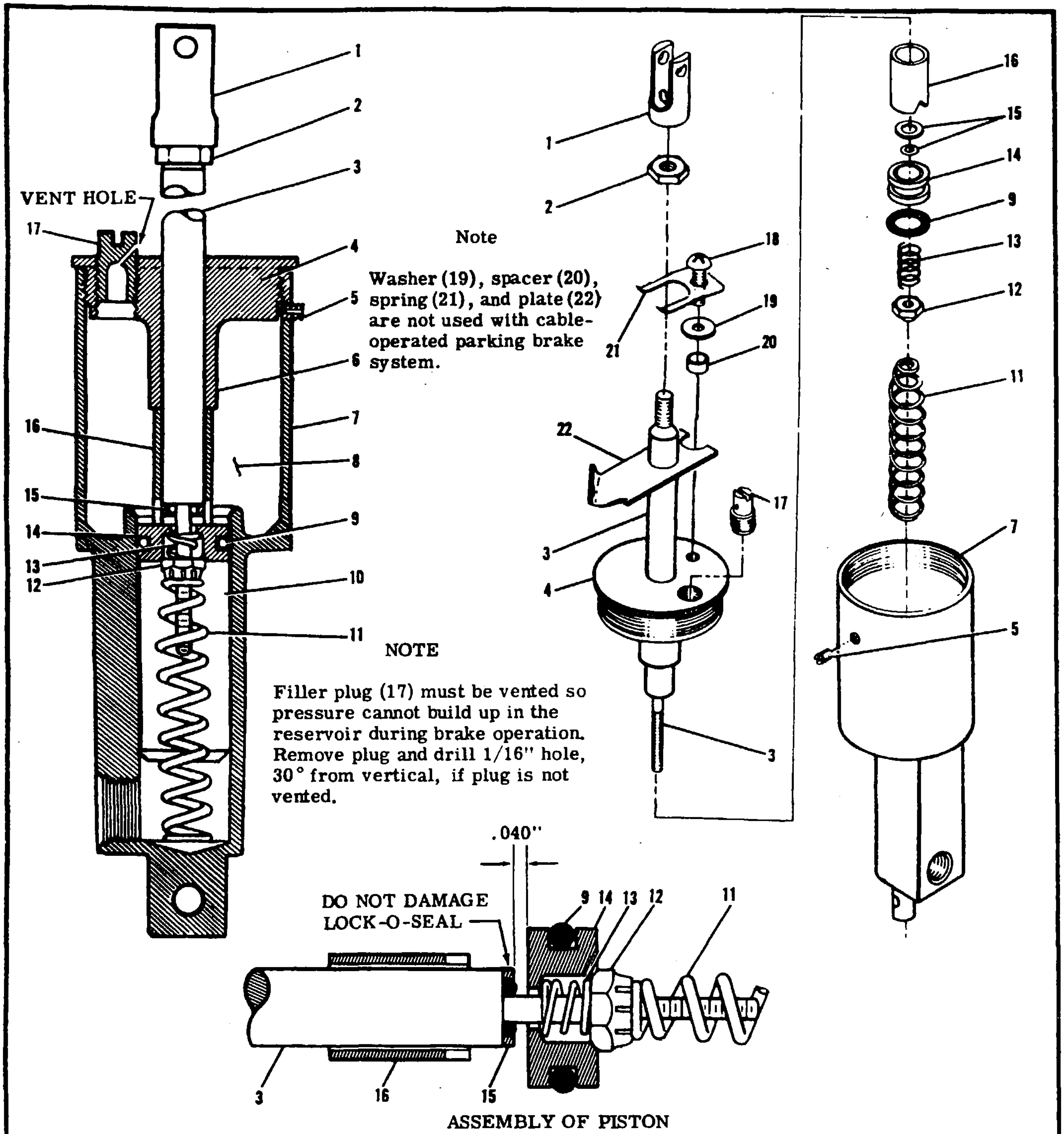
Insure that the free end of the hose from the master cylinder remains immersed during the entire bleeding process.

d. Remove hose from master cylinder and replace filler plug.

5-84. PARKING BRAKE SYSTEMS.

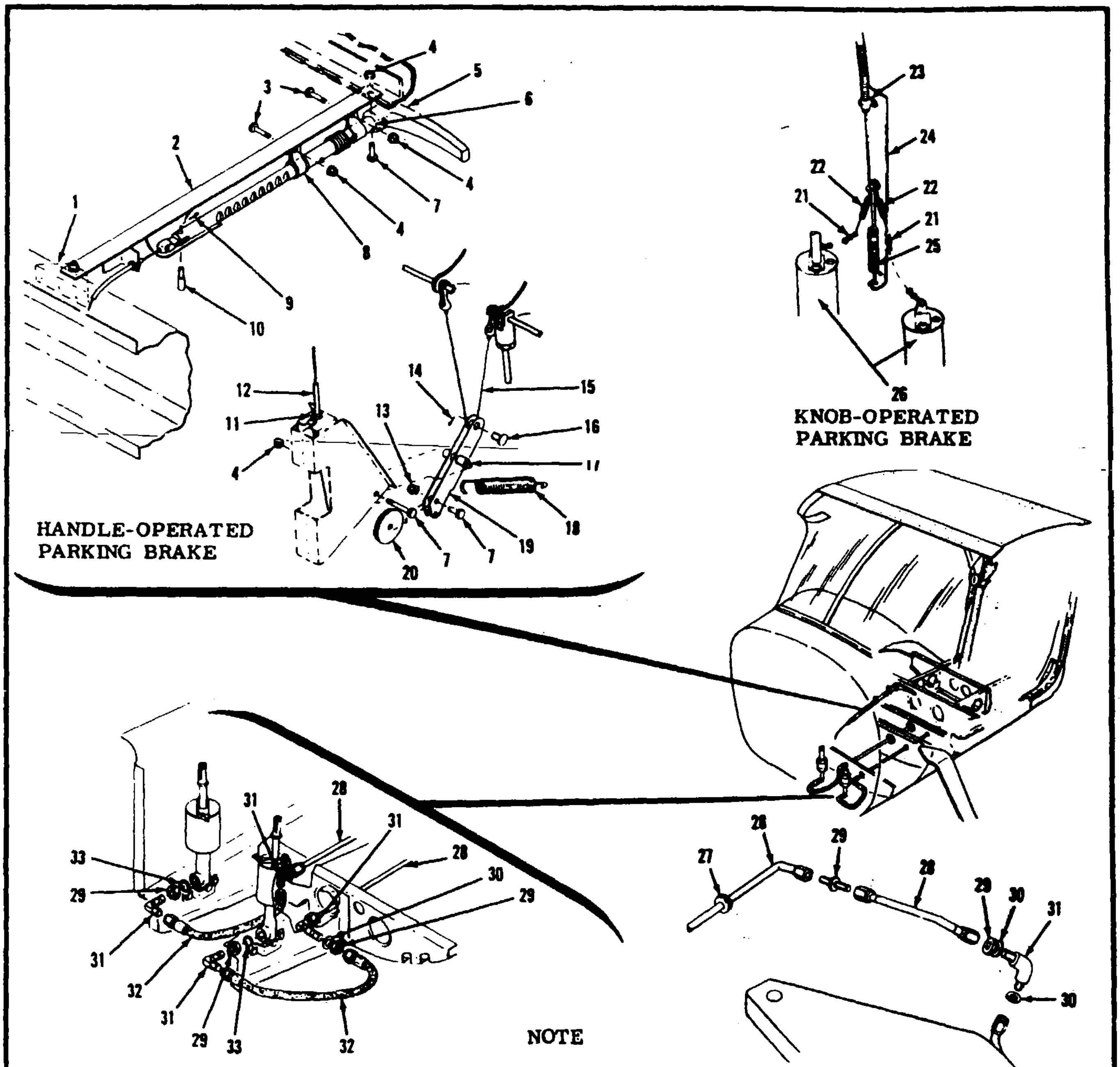
5-85. Two different types of parking brake systems are employed in the different airplane models. One uses a knob-operated control which actuates locking levers on the master cylinders. The levers trap pressure in the system after the master cylinder piston rods have been depressed by toe-operation of the rudder pedals. The other type parking brake system uses a handle and ratchet mechanism connected by a cable to linkage at the master cylinders. Pulling out the handle depresses both master cylinder piston rods and the ratchet locks the handle in this position until the handle is turned and released.

5-86. REPLACEMENT. The various parts of the knob-operated or handle-operated parking brake system are shown in figure 5-25, which may be used as a guide when replacing parts. The knob-operated system should be adjusted so that the locking levers cannot, under any circumstances, be actuated as long as the control knob is pushed full in. At the same time, the locking levers must be engaged when the control knob is pulled out. Various design changes have been made in the locking mechanism on the knob-operated control, but each has a clamp provided for adjustment to attain proper rigging.



1. Clevis
2. Jamb 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
20. Spacer
21. Spring
22. Plate

Figure 5-24. Brake Master Cylinder



NOTE

Changes in brake line routing and resulting changes in fittings occur among the various models.

1. Attaching Angle
2. Stiffener Angle
3. Bolt
4. Nut
5. Handle
6. Housing
7. Bolt
8. Clamp
9. Cotter Pin
10. Positioning Pin
11. Nut
12. Tube Assembly
13. Nut
14. Cotter Pin
15. Cable
16. Clevis Pin
17. Bushing
18. Spring
19. Bellcrank Assembly
20. Pulley
21. Chain
22. Spring
23. Clamp
24. Plate
25. Spring
26. Master Cylinder
27. Grommet
28. Brake Line
29. Nut
30. Washer
31. Elbow
32. Brake Hose
33. O-Ring

Figure 5-25. Typical Brake System

SECTION 6

AILERON CONTROL SYSTEM

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6-1. AILERON CONTROL SYSTEM.

6-2. The aileron control system is comprised of push-pull rods and bellcranks in the wings, cables, pulleys, sprockets, roller chains, and components forward of the instrument panel, all of which link the control wheel (or wheels) to the ailerons on the wings. Four different types of columns are used to operate the various systems: a control "T," a control "Y," a control "U," and a control column. These control column configurations are shown in figures 6-1 through 6-4A, which define their applicability.

6-3. TROUBLE SHOOTING THE AILERON SYSTEM.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
LOST MOTION IN CONTROL WHEEL.		
Loose control cables.	Check cable tension.	Adjust cables to proper tension.
Broken pulley.	Visually check pulleys.	Remove and replace broken pulley.
Sprung bellcranks.	Visually check bellcranks.	Remove and replace sprung bellcranks.
Deformed pulley brackets.	Visually check pulley brackets.	Remove and replace deformed pulley brackets.
Worn rod ends.	Visually check rod ends.	Remove and replace worn rod ends.
Loose chains.	Check chain tension.	Adjust chains to proper tension.

TROUBLE SHOOTING THE AILERON SYSTEM (Cont).

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
RESISTANCE TO CONTROL WHEEL MOVEMENT.		
Cables too tight.	Check cable tension.	Adjust cables to a proper tension.
Pulleys binding.	Observe motion of the pulleys as ailerons are being operated.	Remove and replace defective pulley.
Rusty chain.	Visually check chain.	Remove and replace rusty chain.
Chain binding with sprockets.	Check freedom of movement.	Remove and replace defective parts.
Bellcrank distorted or damaged.	Visually check bellcrank.	Remove and replace bellcrank.
Defective U-joints, if used.	Observe motion of U-joints.	Remove and replace defective U-joints.
Clevis bolts too tight.	Check bolt binding.	Readjust to eliminate binding.
Cable off pulley.	Check rigging of cable.	Replace cable on pulley.
(182) Defective bearings in sleeve weld assy on control wheel tube.	Disconnect chains and check for binding.	Remove and replace defective parts.
(182) Defective bearing in idler sprocket assembly on firewall.	Disconnect chains and check.	Remove and replace defective parts.
(182) Nuts securing shaft in bearing blocks on firewall too tight.	Loosen nuts to check if binding is eliminated.	Loosen nuts the least amount required to eliminate binding and align cotter pin hole, but not over .030" maximum clearance.
CONTROL WHEEL 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).	Readjust chains and cables in accordance with rigging procedure.
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 properly.
DUAL CONTROL WHEELS NOT COORDINATED.		
Chains not properly adjusted on sprockets.	Check rigging of chains.	Adjust in accordance with rigging procedure.
INCORRECT AILERON TRAVEL.		
Aileron system incorrectly rigged.	Check rigging.	Rig in accordance with rigging procedure.
Worn bellcrank stop bushings or bellcrank slots.	Check visually.	Replace worn parts.

6-4. CONTROL "T."

6-5. The control "T" synchronizes the control wheels and transmits rotation of the control wheel(s) to the ailerons through an arrangement of sprockets, roller chains, cables, and pulleys. The control "T" is pivoted a few inches above its lower end to allow fore and aft movement, to operate the elevator control system. The control "T" is shown in figure 6-1.

6-6. REMOVAL AND REPLACEMENT OF CONTROL "T." (See figure 6-1.)
a. Remove control "T" shield (13).
b. Peel back tunnel cover carpet for access to bolt (20). Remove bolt (19) attaching elevator push-pull rod (18) and remove control "T" pivot bolt (20).
c. Remove cotter pins (34) and clevis pins (33). Work cable ends free of control "T" pulleys.
d. Remove bolts (1) securing control tubes to universal joints and remove control "T".
e. Replacement may be accomplished by reversing the above steps.
f. Rig aileron control system in accordance with applicable paragraph in this section.
g. Check and/or rig elevator system in accordance with Section 8.

6-7. CONTROL "Y."

6-8. The control "Y," like the control "T," transmits rotation of the control wheel(s) to the ailerons through an arrangement of sprockets, roller chains, cables, and pulleys. The control "Y" is pivoted a few inches above its lower end to allow fore and aft movement, to operate the elevator control system. The control "Y" is shown in figure 6-2.

6-9. REMOVAL AND REPLACEMENT OF CONTROL "Y." (See figure 6-2.)
a. Remove control "Y" shield.
b. Peel back tunnel cover carpet for access to bolt (36). Remove bolt (37) attaching elevator push-pull tube (31) and remove control pivot bolt (36).
c. Remove bolts attaching cable ends to control arm (18).
d. Remove bolts (8) securing control wheel tubes to universal joints and remove control "Y."
e. Replacement may be accomplished by reversing the above steps.
f. Rig aileron control system in accordance with applicable paragraph in this section.
g. Check and/or rig elevator control system in accordance with Section 8.

6-10. CONTROL "U."

6-11. The control "U," like the control "T" and "Y," transmits rotation of the control wheel(s) to the ailerons through an arrangement of sprockets, roller chains, cables, and pulleys. The control "U" is pivoted a few inches above its lower end to allow fore and aft movement, to operate the elevator control system. The control "U" is shown in figure 6-3.

6-12. REMOVAL AND REPLACEMENT OF CONTROL "U." (See figure 6-3.)
a. Remove control "U" shield and tunnel cover on the Models 180 and 185.
b. Remove rudder bar shields and carpeting as necessary for access to lower end of control "U." Remove bolt securing elevator push-pull tube to control "U," and remove pivot bolt for control "U."
c. Remove safety wire and disconnect turnbuckles (10).
d. Remove bolts attaching control wheel tubes to universal joints and remove control "U."
e. Replacement may be accomplished by reversing the above steps.
f. Rig aileron system in accordance with applicable paragraph in this section.
g. Check and/or rig elevator control system in accordance with Section 8.

6-13. CONTROL COLUMN.

6-14. The control column used on the Model 182 operates in a different manner than the control "T," "Y," and "U." Details are shown in figure 6-4. Rotation of the control wheel rotates four needle bearing rollers on the end of the control wheel tube which, in turn, rotate a square tube (aileron control tube) inside and extending from the control wheel tube. Attached to this square tube is a sprocket which operates the aileron system. The same arrangement is provided for both control wheels and synchronization is obtained by the interconnecting roller chains and sprockets. The sprocket end of the square tube is mounted in a bearing block on the firewall and does not move fore and aft but rotates with the control wheel. The four needle bearing rollers on the end of the control wheel tube reduce friction as the control wheel is moved fore and aft for elevator system operation. A sleeve weld assembly, containing bearings which permit the control wheel tube to rotate within it, is secured to the control wheel tube by a sleeve and retaining ring in such a manner that is moved fore and aft with the control wheel tube. This movement allows the push-pull tube (elevator control tube) attached to the weld assembly to operate an elevator arm assembly, to which one elevator cable is attached. A torque tube connects this arm assembly to the opposite one, to which the other elevator cable is attached. When dual controls are installed, the copilot's control wheel is linked to the aileron and elevator control systems in the same manner as the pilot's control wheel.

6-15. REMOVAL AND REPLACEMENT OF CONTROL COLUMN. (See figure 6-4.)
a. Remove the three screws attaching the control wheel to the control wheel tube. Remove the control wheel.
b. Remove shock-mounted instrument panel in accordance with paragraph 16-5.
c. Remove screws securing plate (10).
d. Remove elevator control tube (15).
e. Loosen turnbuckle (25) and disengage chain from sprocket (22).
f. Remove nut and washer from shaft protruding through bearing block (23) on forward side of firewall.
g. Pull control wheel tube assembly aft to remove.

NOTE

The copilot's control is removed in a similar manner. A plate-covered hole large enough to permit removal is provided in the stationary instrument panel.

h. Remove eight screws securing sleeves (17) and slide the sleeves inboard, clear of the elevator arm assemblies to remove torque tube (19).
i. Disconnect elevator cables from elevator arm assemblies (16 and 20) and remove attaching screws and nuts to remove the arm assemblies.
j. After removal, detail parts may be removed or replaced as required.
k. Replacement may be accomplished by reversing the above steps observing the following:
1. The nuts securing the shafts protruding through bearing blocks (23 and 33) should be tightened snugly, then loosened the least amount required to eliminate binding and align a cotter pin hole, but not more than .030 inch maximum clearance.
2. Adjust screw (13), which forces the tapered plug into the glide to expand it, so that free play is eliminated and the control column does not drag fore and aft.
l. Rig aileron system in accordance with applicable paragraph in this section.
m. Check and/or rig elevator control system in accordance with Section 8.

6-16. REPAIR OF CONTROL "U," "Y," "T," OR CONTROL COLUMN. Worn, damaged or defective shafts, bearings, bushings, sprockets, roller chains, universal joints, and other components should be replaced. Refer to the lubrication diagram in Section 2 for lubrication recommendations.

6-17. REMOVAL, REPAIR, AND REPLACEMENT OF AILERON BELLCRANK.
a. Open access cover inboard of each bellcrank. Relieve control cable tension by loosening turnbuckle barrels, then disconnect control cables from bellcrank. Retain all spacers.
b. Detach aileron push-pull rod from bellcrank by removing attaching nut, washers, and bolt.
c. Remove nuts, washers, and bolts securing bellcrank stop bushing and bellcrank to wing structure. Remove bellcrank through access opening, using care that bushing is not dropped from bellcrank. One or more brass washers may be used as shims between lower end of the bellcrank and the wing.

NOTE

Tape open ends of bellcrank bearings to prevent dust or dirt from entering needle bearings.

d. Repair consists of the replacement of defective bushings and bearings. If needle bearings are dirty or need grease, lubricate as specified in the lubrication diagram in Section 2.
e. Place bushing in bellcrank and position bellcrank in wing, installing brass washers as required to shim out excessive clearance between the bellcrank and the wing. Install bellcrank pivot bolt.
f. Position bellcrank stop bushing and install attaching bolt.
g. Connect aileron cables to bellcrank and rig the aileron system in accordance with applicable paragraph in this section.

6-18. REPLACEMENT OF AILERON CABLES AND PULLEYS may be accomplished after removing access covers, wing root fairings, and upholstery as required for access.
a. Disconnect cables from the aileron bellcranks in the wings, and remove cable guards and pulleys as necessary to work the cables free of the aircraft.

NOTE

To ease rerouting of cables, a length of wire may be attached to the end of a cable before it is withdrawn from the aircraft. Leave the wire in place, routed through the aircraft, then attach it to the cable being installed and use it to pull the cable into position.

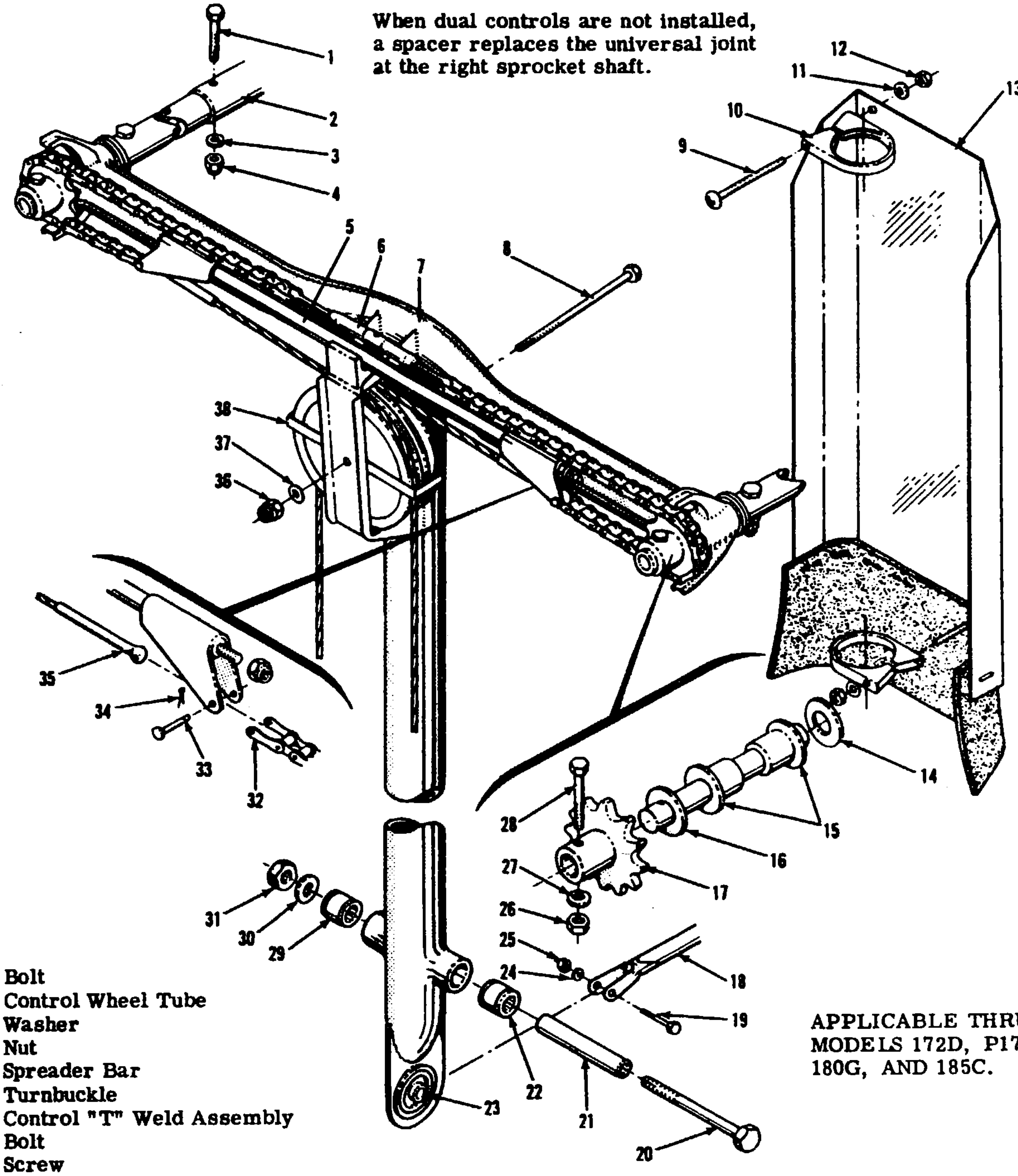
b. After the cable is routed in position, install pulleys and cable guards. Make sure cable is positioned in pulley groove when installing cable guard.
c. Rig the aileron system.

6-19. REMOVAL, REPAIR AND REPLACEMENT OF AILERON. (See figure 6-11.)
a. Disconnect push-pull rod from aileron.
b. Remove screws and nuts attaching aileron hinges to trailing edge of wing, and remove aileron.
c. Aileron repair may be accomplished in accordance with instructions contained in Section 19. After repair, static balance aileron in accordance with instructions in Section 19. Before installation, be sure balance weights and hinges are securely attached to aileron.
d. Position aileron and install screws and nuts attaching aileron hinges to trailing edge of wing.
e. Attach push-pull rod to aileron. If rigging was correct and push-pull rod adjustment was not disturbed, it should not be necessary to rerig system. Check aileron travel and alignment, and rig if necessary in accordance with applicable paragraph in this section.

SHOP NOTES:

NOTE

When dual controls are not installed, a spacer replaces the universal joint at the right sprocket shaft.



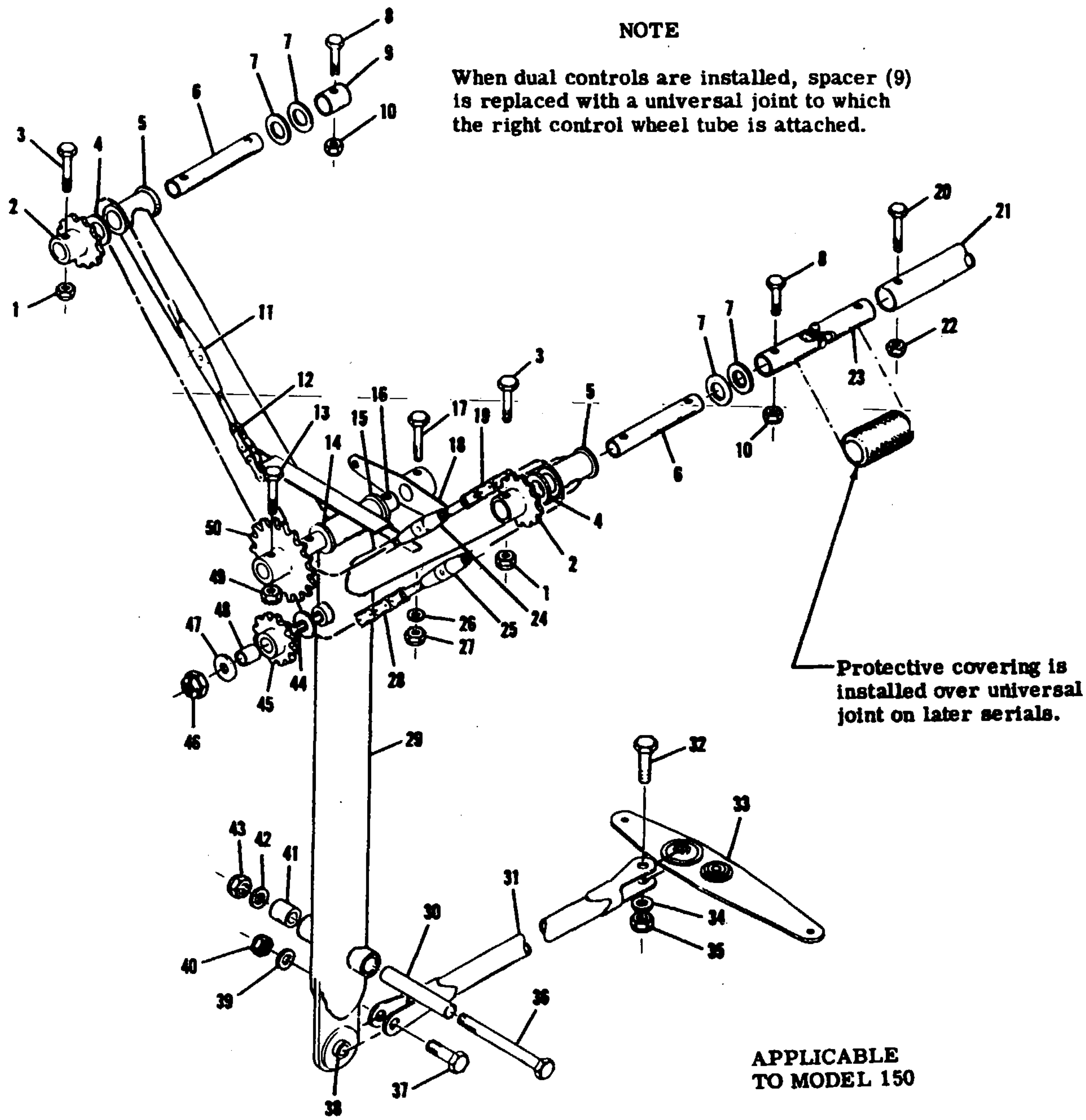
APPLICABLE THRU MODELS 172D, P172D, 180G, AND 185C.

1. Bolt
2. Control Wheel Tube
3. Washer
4. Nut
5. Spreader Bar
6. Turnbuckle
7. Control "T" Weld Assembly
8. Bolt
9. Screw
10. Clamp
11. Washer
12. Nut
13. Trim Shield Assembly
14. Washer
15. Oilite Bushing
16. Washer
17. Sprocket
18. Elevator Push-Pull Tube
19. Bolt
20. Bolt
21. Spacer
22. Needle Bearing
23. Bearing
24. Washer
25. Nut
26. Nut
27. Washer
28. Bolt
29. Needle Bearing
30. Washer
31. Nut
32. Roller Chain
33. Clevis Pin
34. Cotter Pin
35. Aileron Cable End
36. Nut
37. Washer
38. Cable Guard

Figure 6-1. Control "T"

NOTE

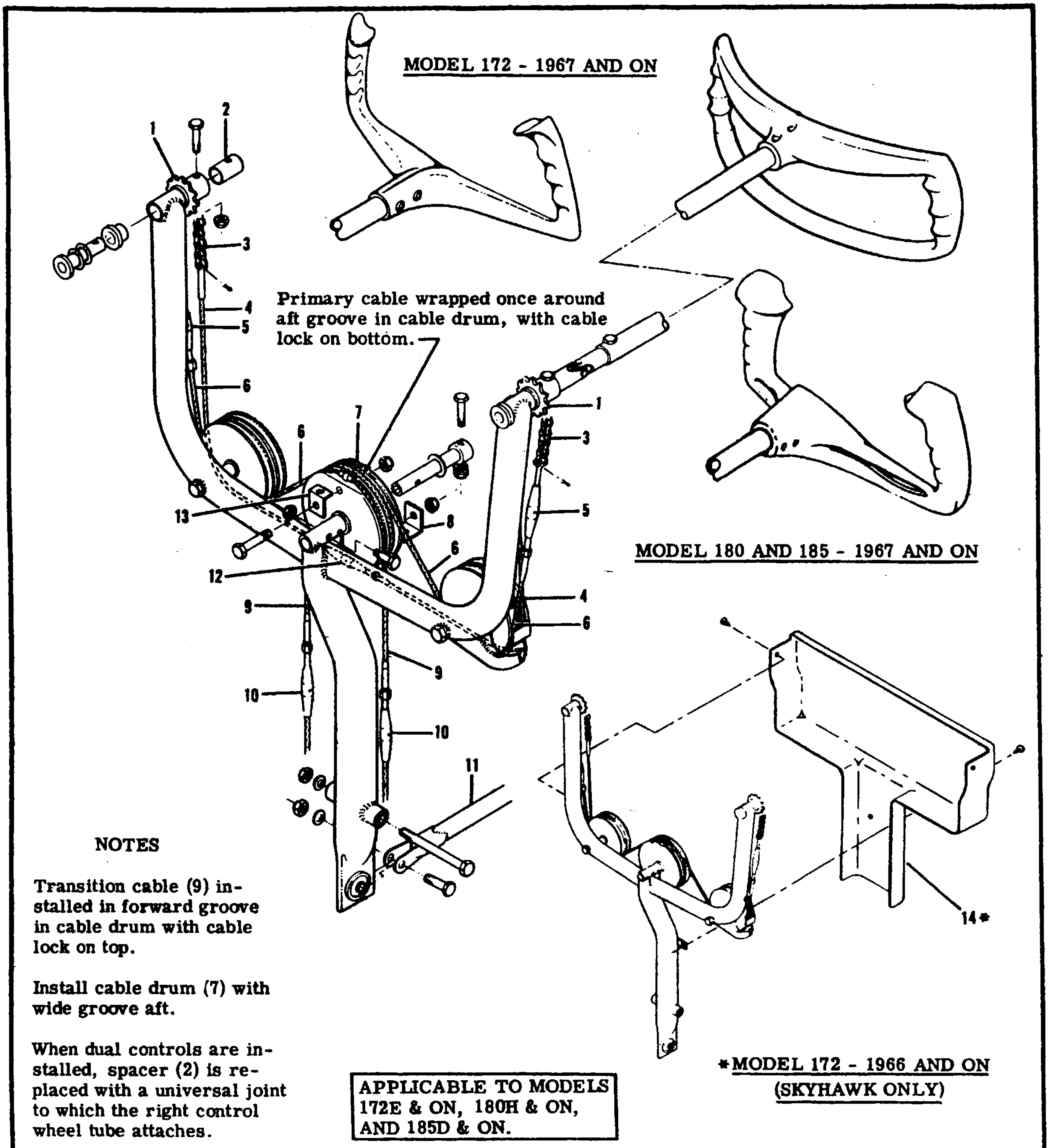
When dual controls are installed, spacer (9) is replaced with a universal joint to which the right control wheel tube is attached.



APPLICABLE TO MODEL 150

1. Nut
2. Sprocket
3. Bolt
4. Washer
5. Bearing
6. Shaft
7. Washer
8. Bolt
9. Spacer
10. Nut
11. Turnbuckle
12. Chain Assembly
13. Bolt
14. Bearing
15. Bearing
16. Shaft
17. Bolt
18. Arm
19. Chain Assembly
20. Bolt
21. Control Wheel Tube
22. Nut
23. Universal Joint
24. Turnbuckle
25. Turnbuckle
26. Washer
27. Nut
28. Chain Assembly
29. Control "Y"
30. Bushing
31. Control Link
32. Bolt
33. Bellcrank
34. Washer
35. Nut
36. Bolt
37. Bolt
38. Bearing
39. Washer
40. Nut
41. Bearing
42. Washer
43. Nut
44. Bolt
45. Sprocket
46. Nut
47. Washer
48. Bushing
49. Nut
50. Sprocket

Figure 6-2. Control "Y"



NOTES

Transition cable (9) installed in forward groove in cable drum with cable lock on top.

Install cable drum (7) with wide groove aft.

When dual controls are installed, spacer (2) is replaced with a universal joint to which the right control wheel tube attaches.

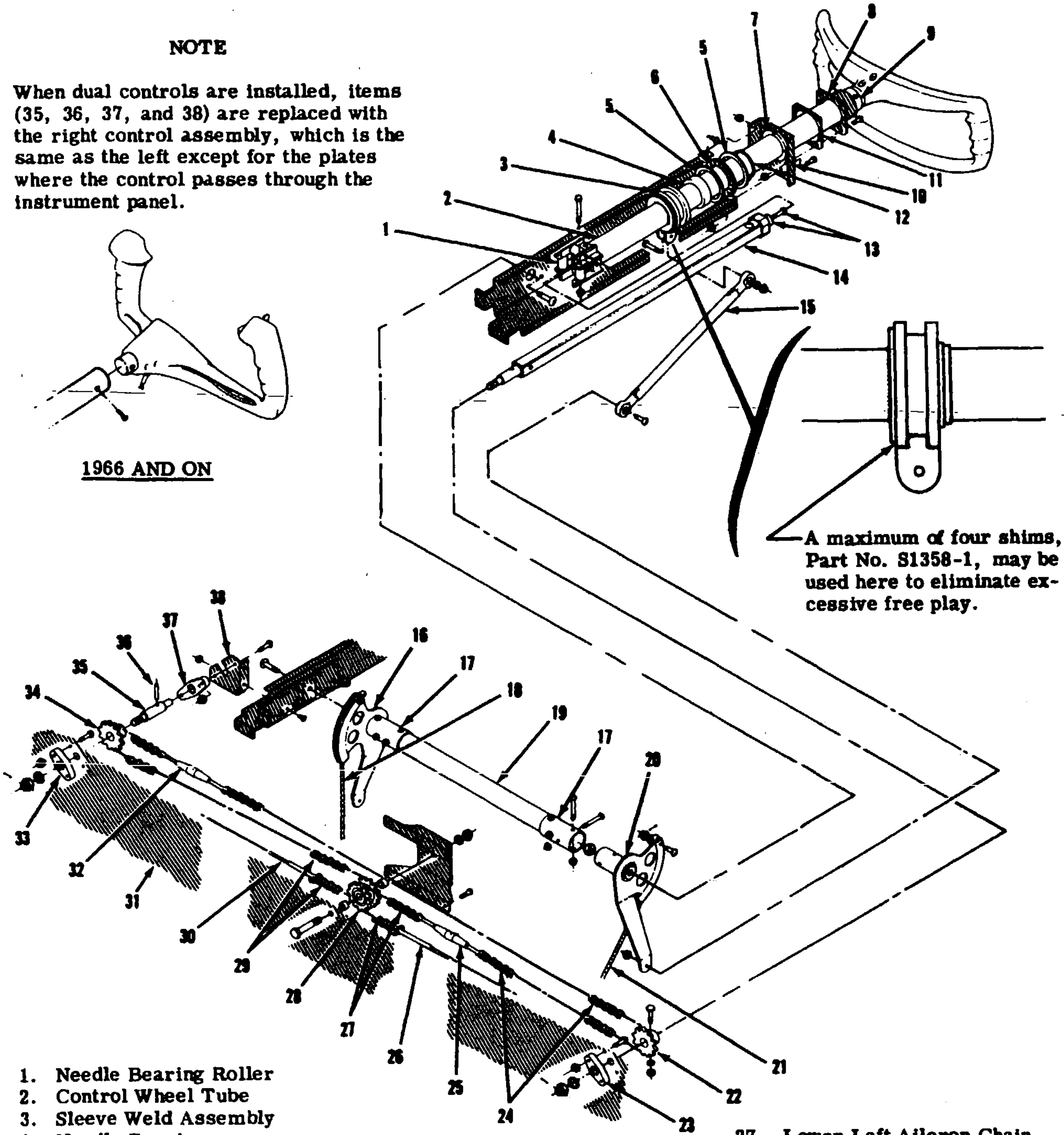
APPLICABLE TO MODELS 172E & ON, 180H & ON, AND 185D & ON.

1. Sprocket
2. Spacer
3. Chain
4. Secondary Cable
5. Turnbuckle
6. Primary Cable
7. Cable Drum
8. Primary Cable Lock
9. Transition Cable
10. Turnbuckle
11. Elevator Push-Pull Tube
12. Turnbuckle (Secondary Cable)
13. Transition Cable Lock
14. Cover

Figure 6-3. Control "U"

NOTE

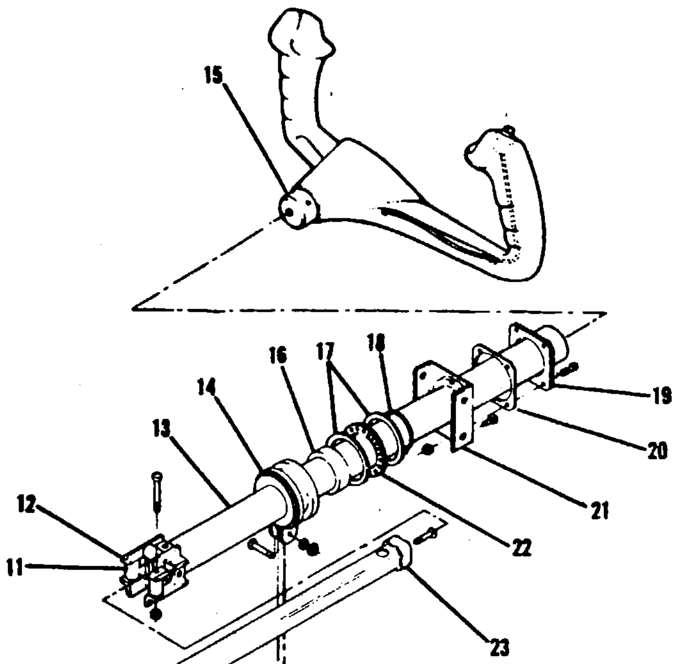
When dual controls are installed, items (35, 36, 37, and 38) are replaced with the right control assembly, which is the same as the left except for the plates where the control passes through the instrument panel.

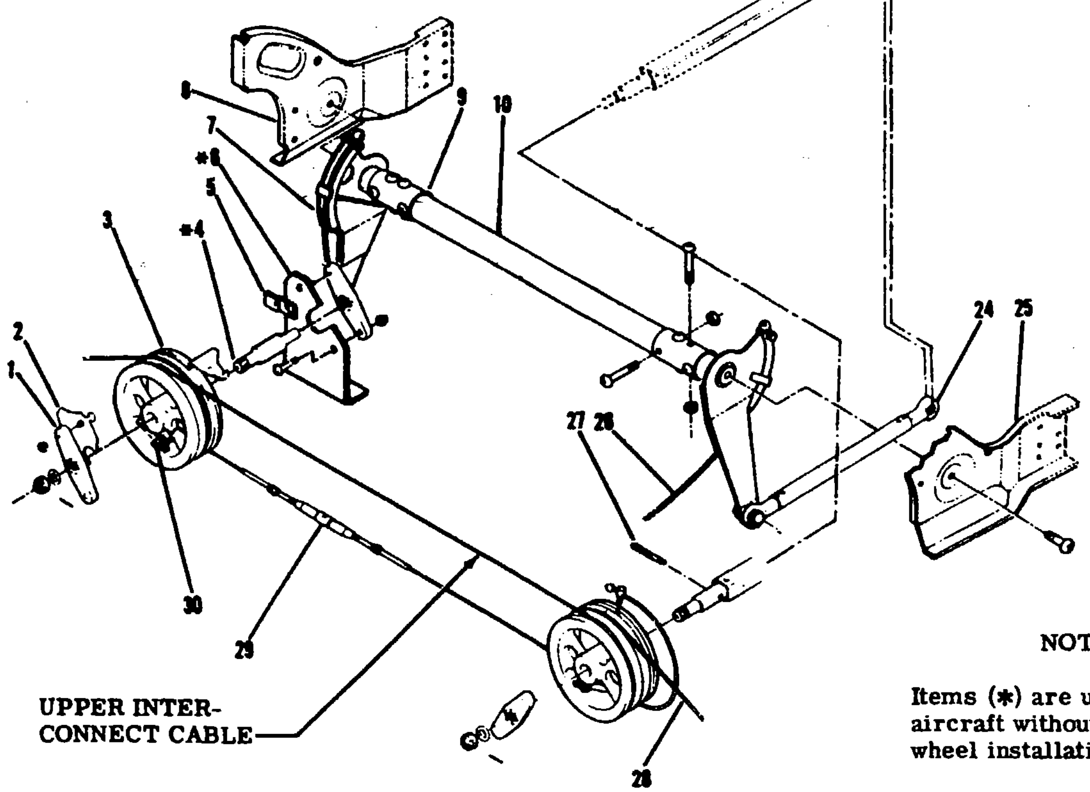


1. Needle Bearing Roller
2. Control Wheel Tube
3. Sleeve Weld Assembly
4. Needle Bearing
5. Thrust Bearing Race
6. Needle Thrust Bearing
7. Grommet
8. Control Lock Collar
9. Control Wheel Adapter
10. Plate
11. Spacer
12. Retainer Ring
13. Screw and Tapered Plug
14. Aileron Control Tube
15. Elevator Control Tube
16. Right Elevator Arm Assembly
17. Sleeve
18. Down Elevator Cable
19. Elevator Torque Tube
20. Left Elevator Arm Assembly
21. Up Elevator Cable
22. Left Aileron Sprocket
23. Bearing Block
24. Upper Left Aileron Chain
25. Turnbuckle
26. Left Aileron Cable
27. Lower Left Aileron Chain
28. Aileron Idler Sprocket
29. Right Aileron Chain
30. Right Aileron Cable
31. Firewall
32. Turnbuckle
33. Bearing Block
34. Right Aileron Sprocket
35. Shaft
36. Roll Pin
37. Bearing Block
38. Support

Figure 6-4. Control Column - Model 182 Prior To 1968

1. Bearing Block
2. Firewall
3. Cable Drum
4. Idler Shaft
5. Elevator Cable Guard
6. Support
7. Arm
8. Structure
9. Sleeve
10. Elevator Torque Tube
11. Bearing Roller
12. Retainer
13. Tube and Bearing Assembly
14. Sleeve Assembly
15. Control Wheel
16. Bearing
17. Bearing Race
18. Snap Ring
19. Collar
20. Spacer
21. Support Plate
22. Bearing
23. Nylon Control Guide
24. Push-Pull Rod
25. Structure
26. Elevator Control Cable
27. Roll Pin
28. Aileron Control Cable
29. Turnbuckle
30. Adjustable Terminal

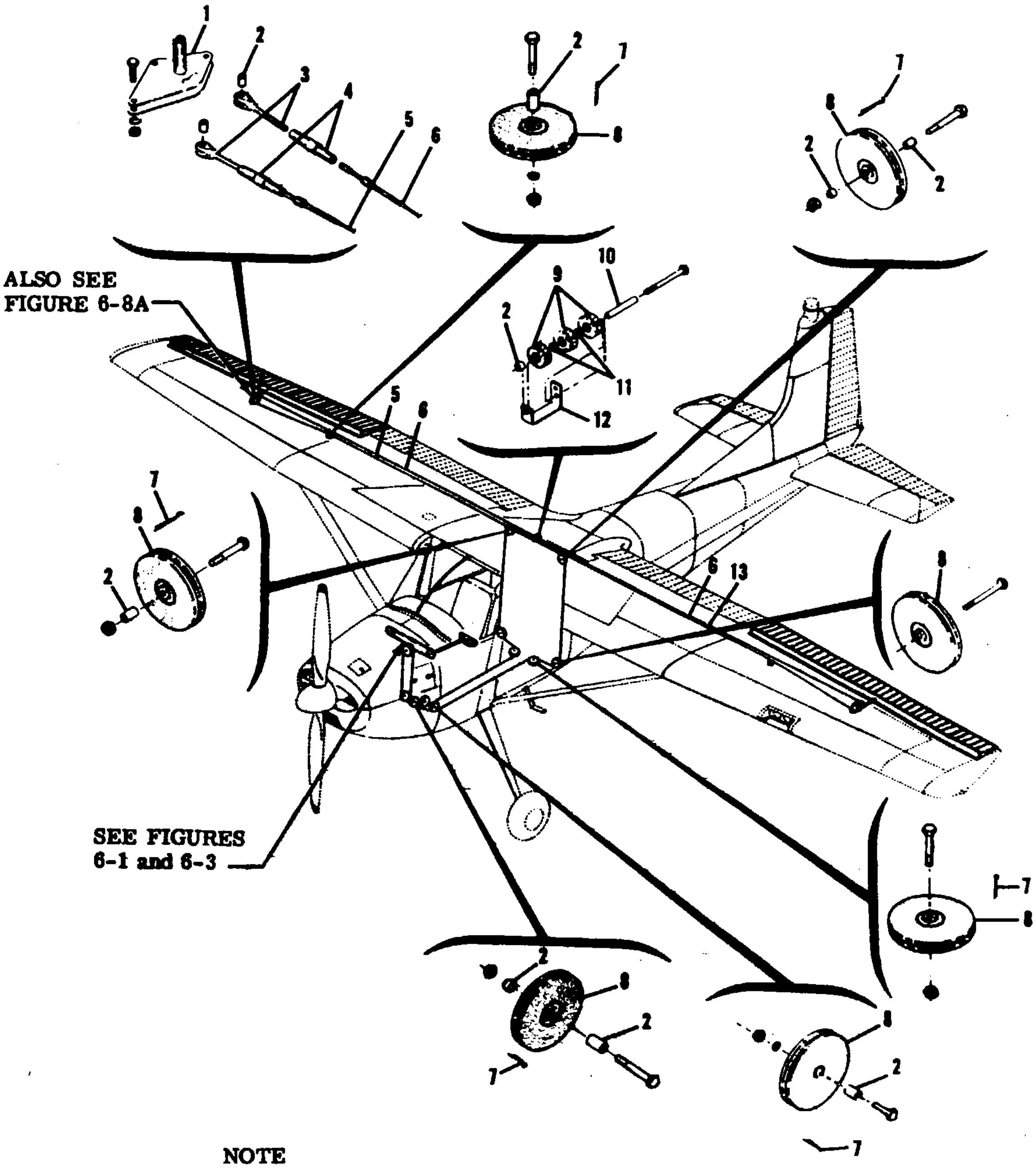




NOTE

Items (*) are used only on aircraft without dual control wheel installation.

Figure 6-4A. Control Column - 1968 Model 182



NOTE

Carry-thru cable turnbuckle may be located at either the right or left aileron bellcrank. Direct cable turnbuckles are located at the bellcranks prior to the 180H and 185D, and they are located at the control "U" on the 180H and 185D and on.

CABLE TENSION:

40LBS ±10LBS ON AILERON CARRY-THRU CABLE (AT THE AVERAGE TEMPERATURE FOR THE AREA)

1. Aileron Bellcrank
2. Spacer
3. Turnbuckle Forks
4. Turnbuckle Barrels
5. Right Direct Cable
6. Carry-Thru Cable
7. Cotter Pin
8. Pulley
9. Pulley
10. Bushing
11. Washer
12. Cable Guard
13. Left Direct Cable

Figure 6-5. Aileron Control System-Models 180 & 185 (Sheet 1 of 2)

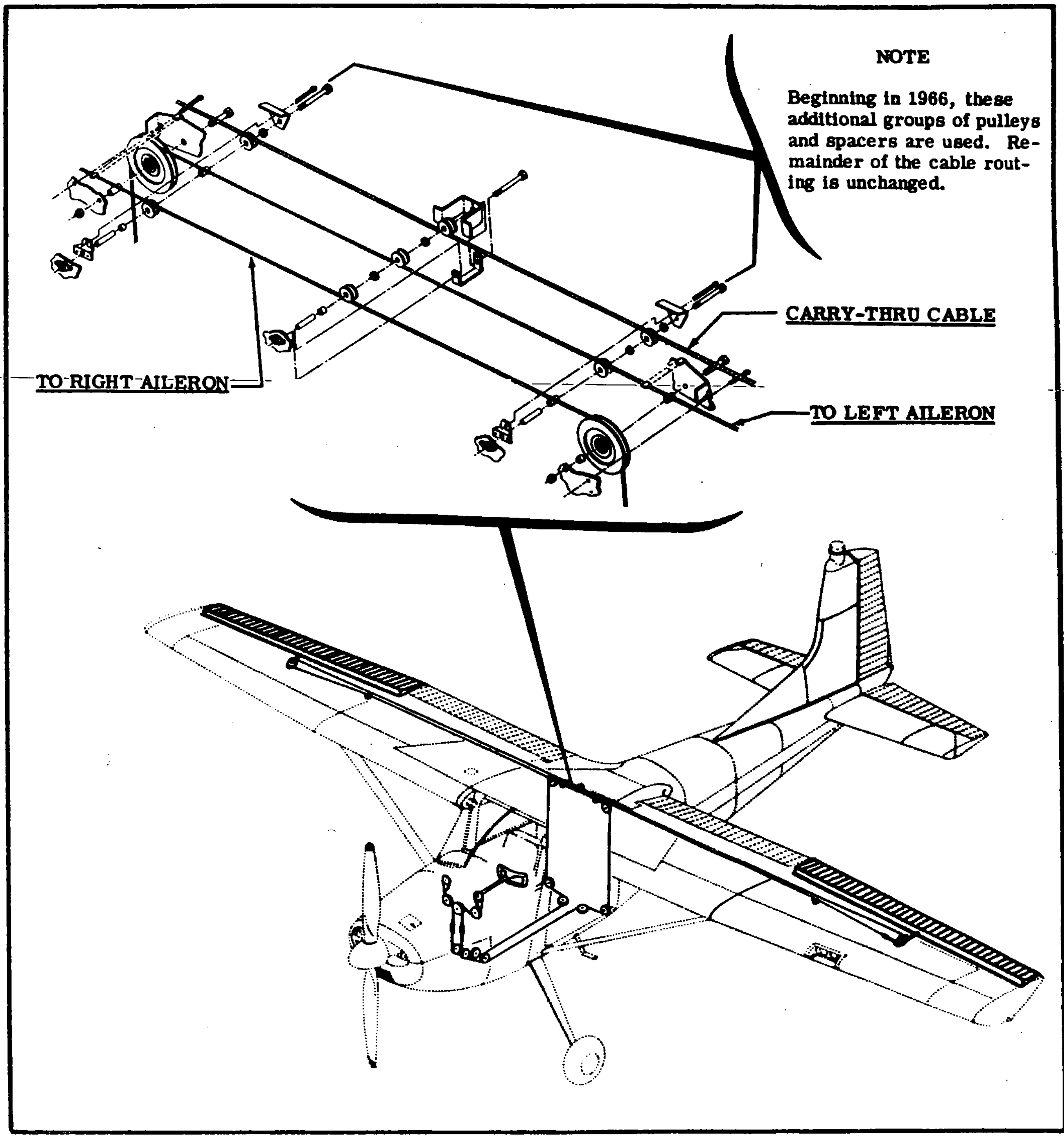
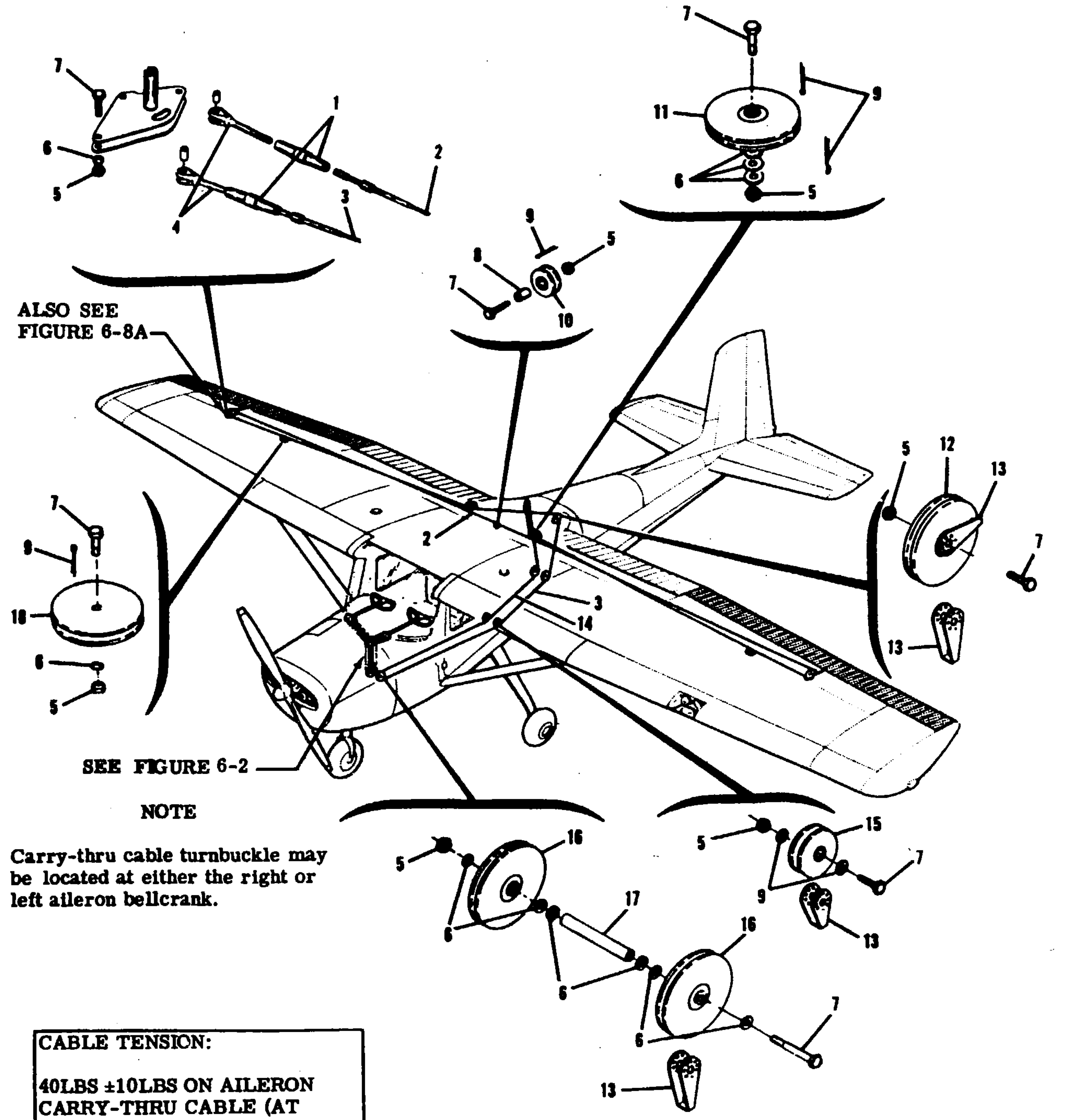


Figure 6-5. Aileron Control System-Models 180 & 185 (Sheet 2 of 2)

SHOP NOTES:



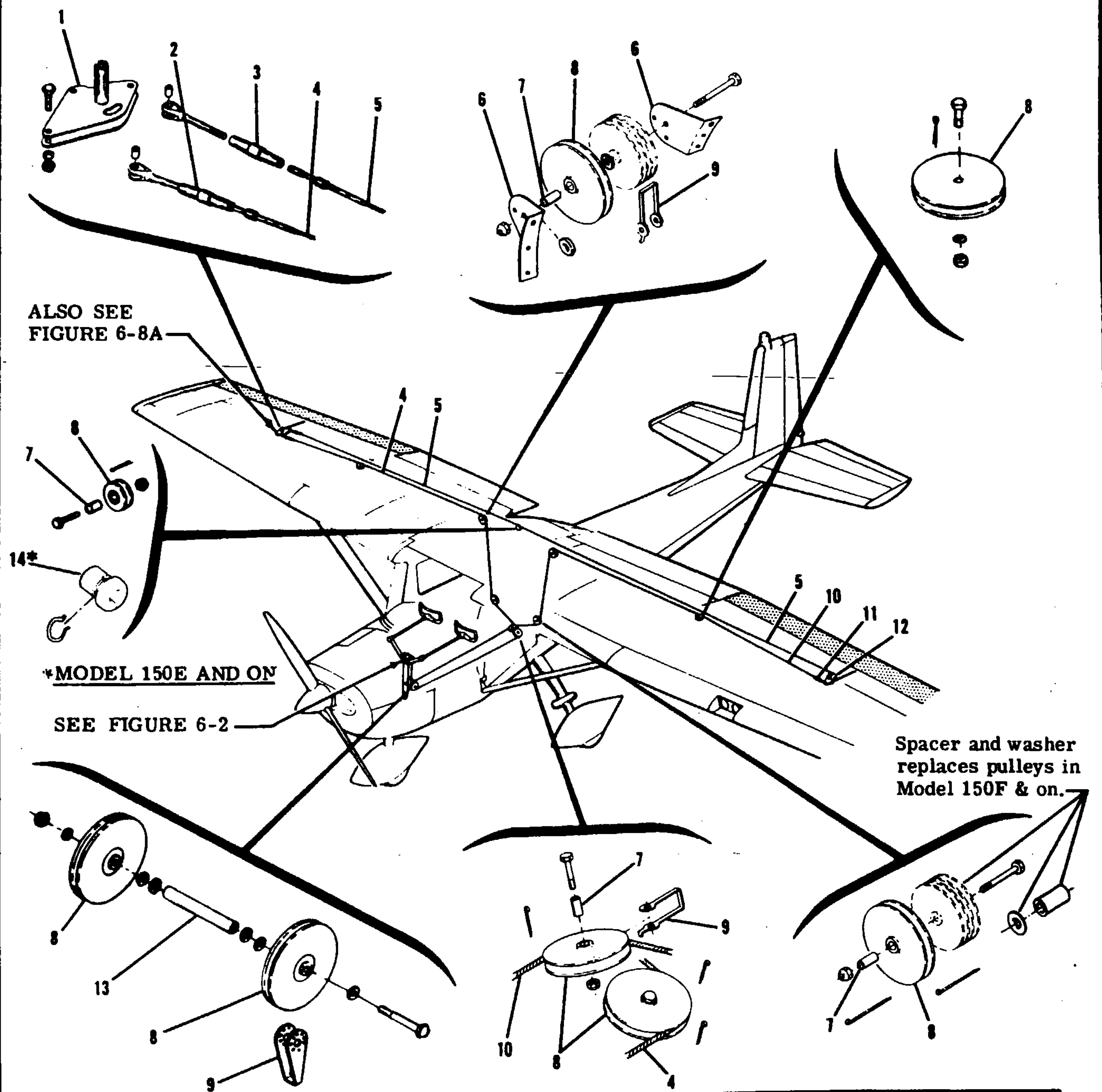
NOTE

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

CABLE TENSION:
40LBS ±10LBS ON AILERON CARRY-THRU CABLE (AT THE AVERAGE TEMPERATURE FOR THE AREA)

1. Turnbuckle Barrel
2. Carry-Thru Cable
3. Right Aileron Direct Cable
4. Turnbuckle Fork
5. Nut
6. Washer
7. Bolt
8. Spacer
9. Cotter Pin
10. Pulley
11. Pulley
12. Pulley
13. Cable Guard
14. Left Aileron Direct Cable
15. Pulley
16. Pulley
17. Spacer
18. Pulley

Figure 6-6. Aileron Control System - Model 150C (Sheet 1 of 2)



NOTE

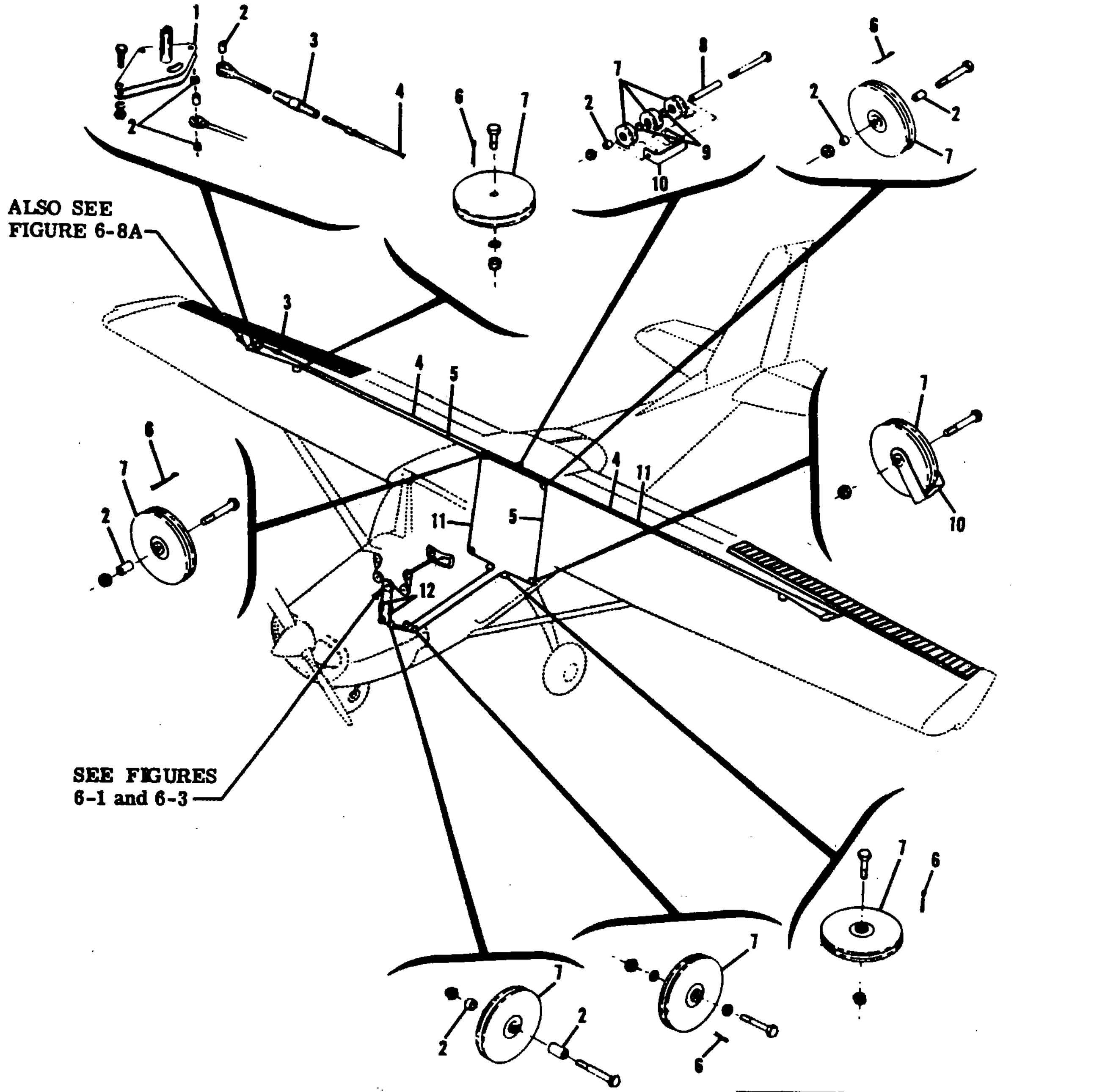
Carry-thru cable turnbuckle may be located at either the right or left aileron bellcrank.

CABLE TENSION:

40LBS ±10LBS ON AILERON CARRY-THRU CABLE (AT THE AVERAGE TEMPERATURE FOR THE AREA)

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

Figure 6-6. Aileron Control System - Model 150D & On (Sheet 2 of 2)



NOTE

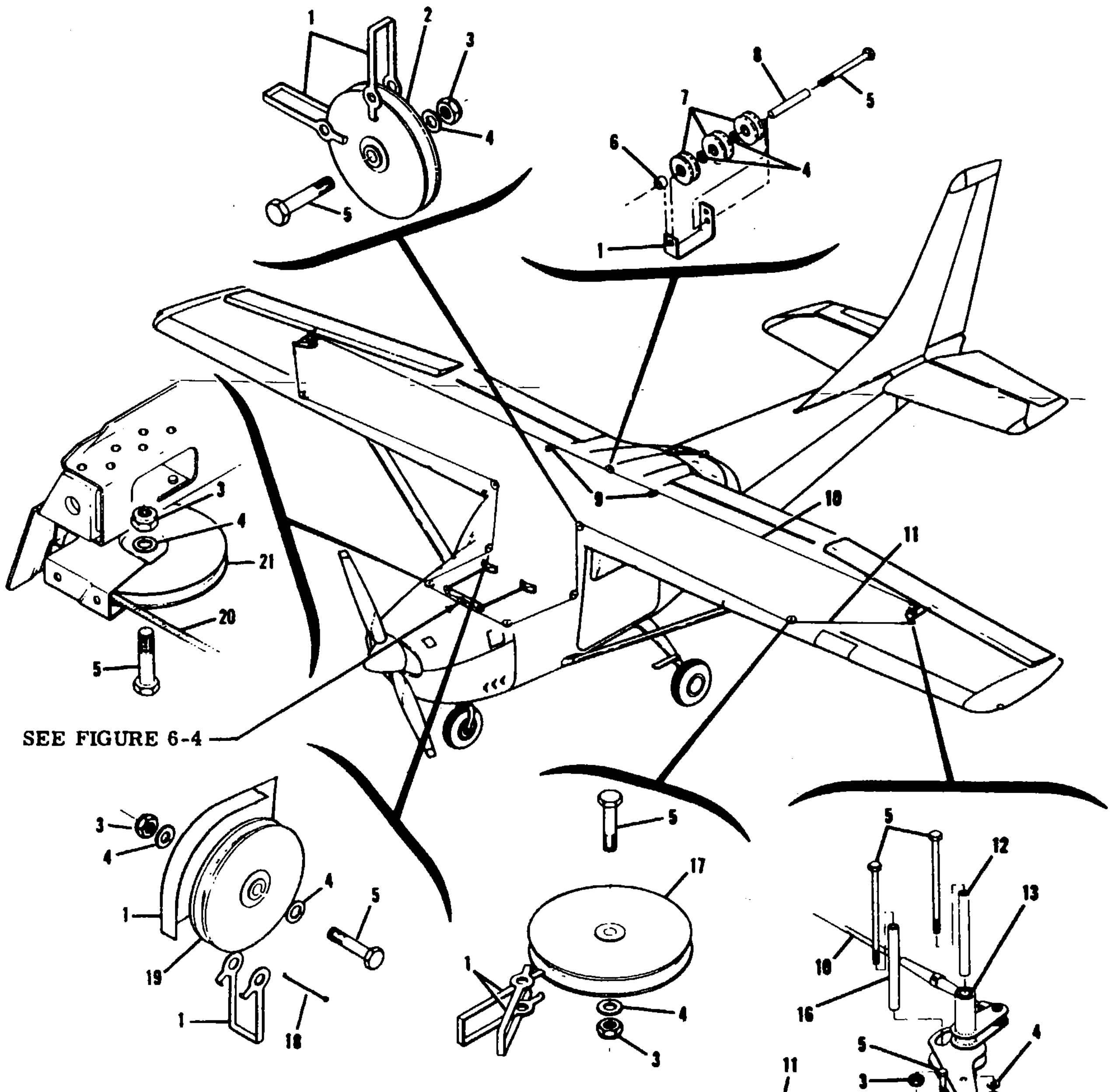
Carry-thru cable turnbuckle may be located at either the right or left aileron bellcrank. Direct cable turnbuckles are located at the bellcranks prior to the 172E, and they are located at the control "U" on the 172E and on.

CABLE TENSION:

40LBS ±10LBS ON AILERON CARRY-THRU CABLE (AT THE AVERAGE TEMPERATURE FOR THE AREA)

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

Figure 6-7. Aileron Control System - Model 172 & P172 Series



NOTE

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

CABLE TENSION:
40LBS ±10LBS ON AILERON CARRY-THRU CABLE (AT THE AVERAGE TEMPERATURE FOR THE AREA)

1. Cable Guard
2. Pulley
3. Nut
4. Washer
5. Bolt
6. Spacer
7. Pulley
8. Bushing
9. Rub Strip
10. Carry-Thru Cable
11. Left Aileron Direct Cable
12. Spacer
13. Aileron Bellcrank
14. Turnbuckle Fork
15. Turnbuckle
16. Bellcrank Stop Bushing
17. Pulley
18. Cotter Pin
19. Pulley
20. Right Aileron Direct Cable
21. Pulley

Figure 6-8. Aileron Control System - Model 182 Series

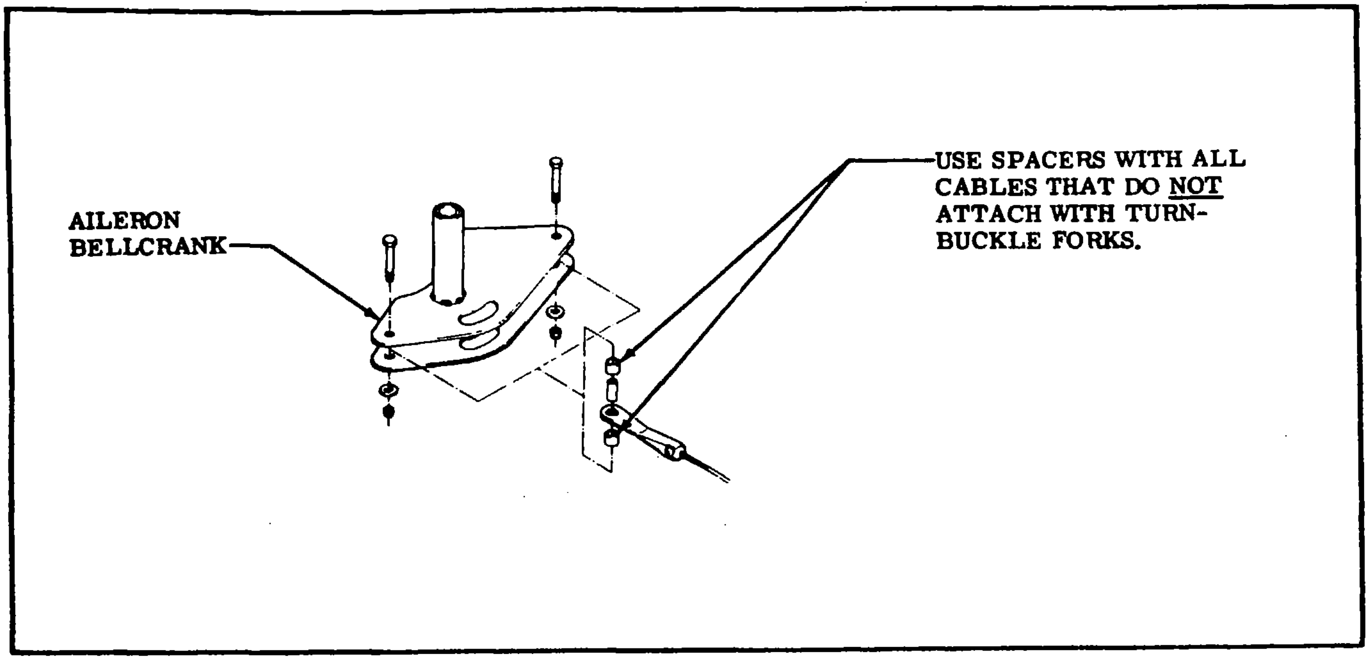
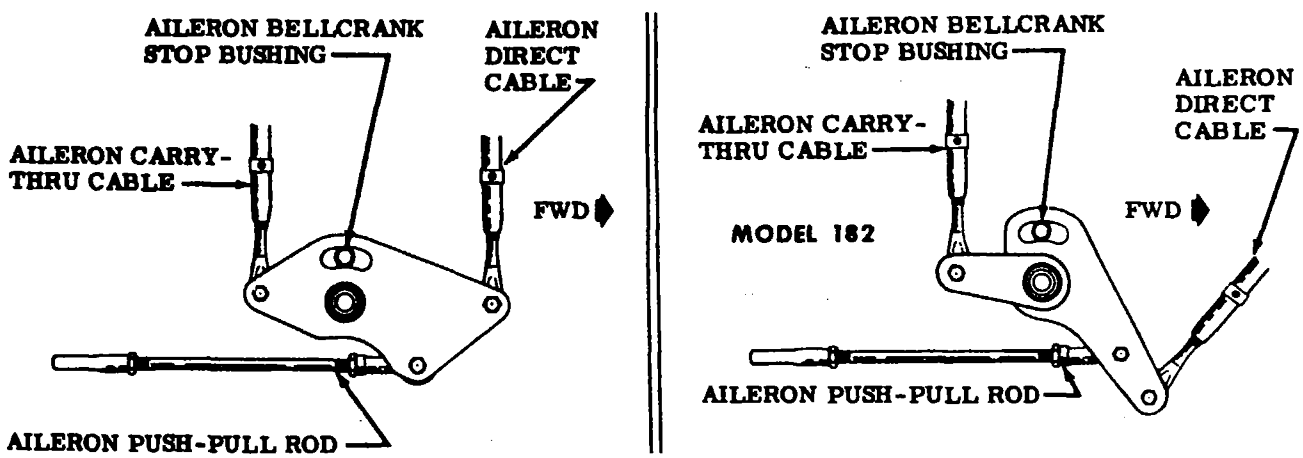


Figure 6-8A. Aileron Cable Attachment



NOTE

Stop bushings should be centered in slots of aileron bellcranks in each wing when control wheels are neutral, with 40±10 pounds tension on aileron carry-thru cable. Push-pull rods are then adjusted to rig the ailerons neutral.

Figure 6-9. Rigging Aileron Bellcranks

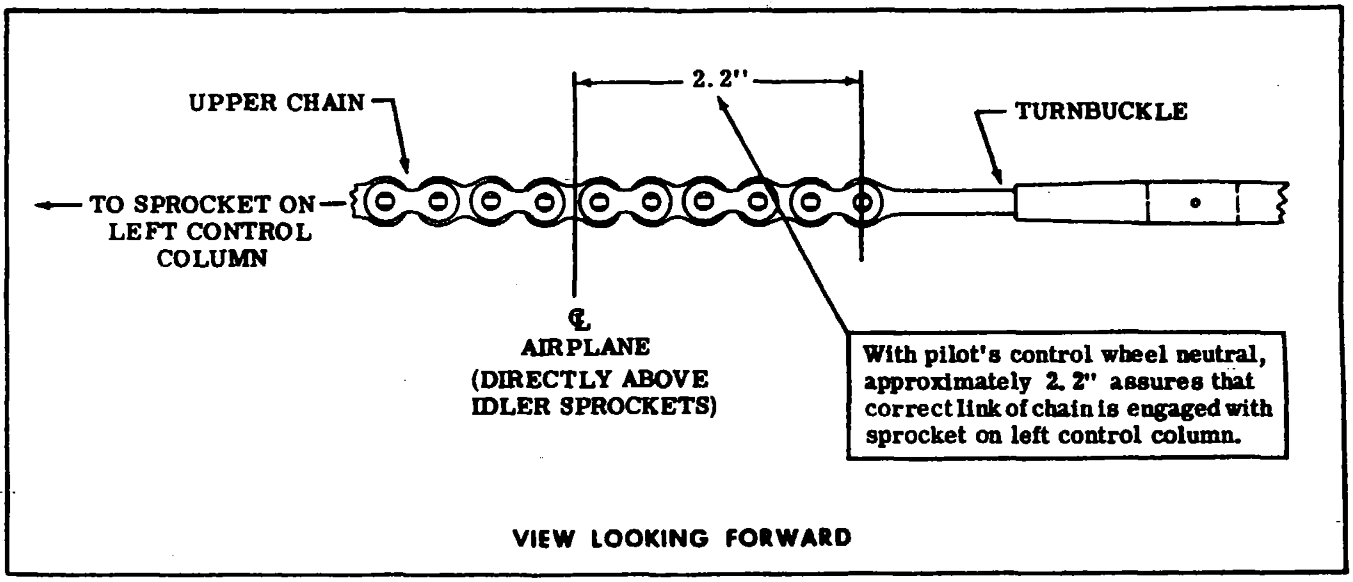
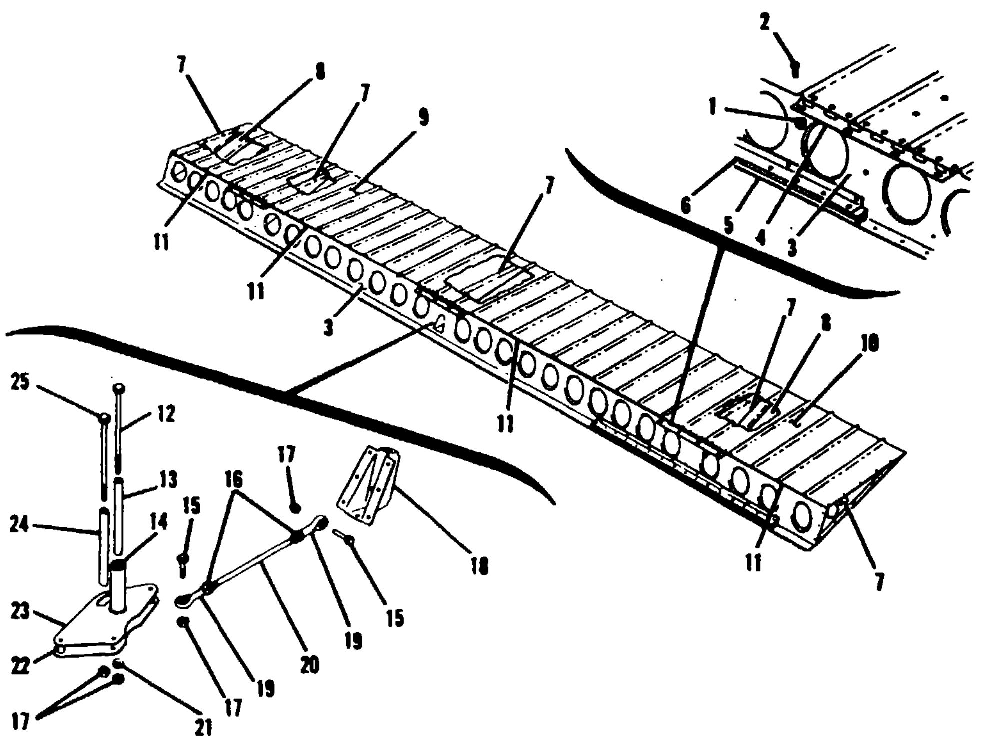


Figure 6-10. Neutral Position for Rigging Control Column



1. Nut
2. Screw
3. Spar
4. Hinge
5. Balance
6. Bracket
7. Rib
8. Lower Skin
9. Upper Inboard Skin
10. Upper Outboard Skin
11. Spacer Strip
12. Bolt
13. Bushing
14. Bearing
15. Bolt
16. Check Nut
17. Nut
18. Bracket
19. Rod End
20. Push-Pull Rod
21. Washer
22. Bushing
23. Bellcrank Assembly
24. Bellcrank Stop Bushing
25. Bolt

Figure 6-11. Typical Aileron Installation

6-20. RIGGING - EXCEPT MODELS 180H, 185D, 172E AND ON AND 182L.

a. (See figure 6-1.) On the control "T," adjust the total length of the spreader bar (5) and turnbuckle (6) so that both control wheels are level in the neutral position (synchronized).

b. (See figure 6-2.) On the control "Y," adjust the turnbuckles (11, 24, and 25) so that both control wheels are level in the neutral position (synchronized) when arm (18) is horizontal. Chain (12) should be engaged so that there is an equal number of links extending from sprocket (50).

c. (See figure 6-4.) On the control column, check that upper left chain (24) is engaged with left aileron sprocket (22) in accordance with figure 6-10. With pilot's control wheel in neutral position, adjust turnbuckles (25 and 32) so that both control wheels are level in neutral position (synchronized).

NOTE

On aileron systems using the control "T," chain tension must be greater than aileron system tension to hold the adjustable end fitting on the spreader bar (5, figure 6-1) against its adjusting nut. However, too much tension will cause binding. On the control "Y," or control column, chains should have the minimum amount of tension that will remove slack from the chains.

d. Tape a bar across both control wheels to hold them in the neutral position.

e. (See figure 6-9.) Adjust the turnbuckles at the aileron bellcranks so that the bellcrank stop bushings are centered in both bellcrank slots, with 40±10 pounds tension on the aileron carry-thru cable. Disregard tension on direct cables, which will be different than tension on carry-thru cable.

f. Adjust push-pull rod at each aileron until the ailerons are neutral with reference to the trailing edge of the wing flaps. Be sure that the wing flaps are fully up when making this adjustment. Tighten push-pull rod jamb nuts.

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 parts removed for access.

i. Check ailerons for correct travel, using inclinometer shown in figure 6-12.

WARNING

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

6-21. RIGGING - MODELS 180H, 185D AND 172E AND ON.

a. (See figure 6-3.) On the control "U," check that primary control cable is in aft groove of cable drum and wrapped once around the drum and the control cable lock is installed at the bottom of the drum. Note that transition cable lock is installed at the top.

b. With control wheels neutral, check that chain ends are equidistant from sprockets.

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

1. Loosening primary cable turnbuckles and tightening secondary cable turnbuckle at center of control "U" will move the 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. (See figure 6-9.) Adjust the two aileron direct cable turnbuckles below the control "U" and the single carry-thru turnbuckle at the aileron bellcrank so that the bellcrank stop bushings are centered in both bellcrank slots with 40±10 pounds tension on the aileron carry-thru cable. Disregard tension on direct cables, which will be different than tension on carry-thru cable.

f. Adjust push-pull rods at each aileron until the ailerons are neutral with reference to the trailing edge of the 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 parts removed for access.

i. Check ailerons for correct travel, using inclinometer shown in figure 6-12.

WARNING

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

6-22. RIGGING - MODEL 182L (See figure 6-4A.)

a. Relieve tension on system at turnbuckles.

b. Disconnect push-pull rods at bellcranks.

c. Adjust interconnect cables on cable drums to position control wheels level (synchronized). While maintaining neutral position of wheels, tighten interconnect cables until snug.

d. Block control wheels to hold neutral position.

e. Adjust the turnbuckles at the aileron bellcranks as shown in figure 6-9 so the bellcrank stop bushings are centered in both bellcranks and to obtain specified aileron carry-thru cable tension.

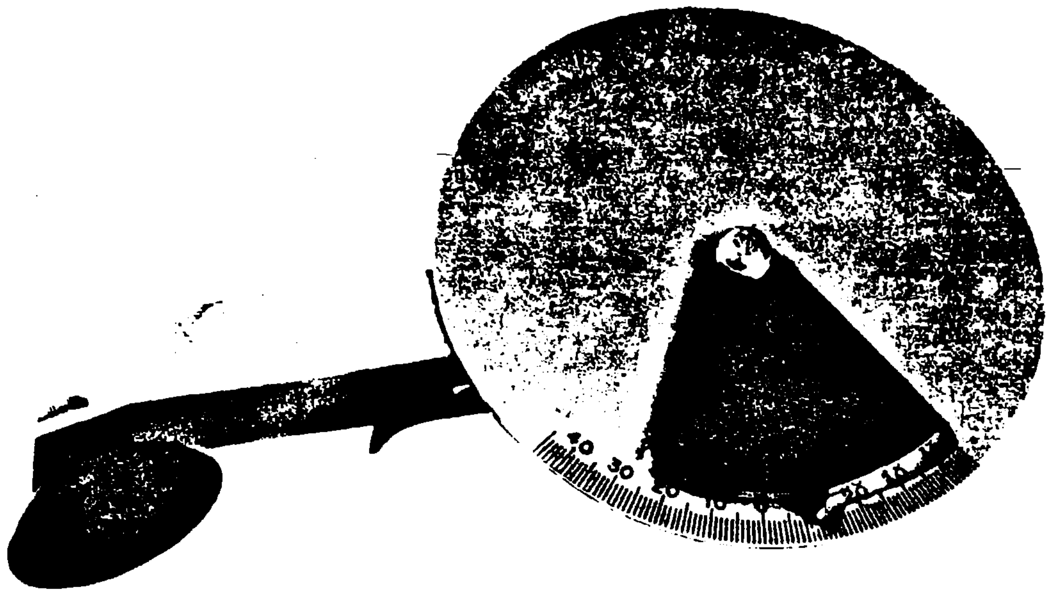
f. Adjust push-pull rod at each aileron to streamline ailerons with reference to flap trailing edge (flaps full up), then secure push-pull rod jam nuts and safety turnbuckles.

g. Remove bar from control wheels, then install all parts removed for access.

h. Check ailerons for correct travel using inclinometer shown in figure 6-12 of the Service Manual.

WARNING

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



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

Figure 6-12. Inclinometer for Measuring Control Surface Travels

SECTION 7

WING FLAP CONTROL SYSTEMS

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7-1. WING FLAP CONTROL SYSTEMS.

7-2. The manually operated wing flap control systems used on Models 180, 185, P172, and prior to Models 150F and 172F are illustrated in figures 7-2 through 7-4. The electrically operated wing flap control systems used on Models 182, 172F and on, and 150F and on are shown in figure 7-5.

7-3. MANUAL WING FLAP OPERATIONAL CHECK.

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

b. Retract wing flaps and check to see that they are completely up. Mount an inclinometer on one flap and set to 0°.

NOTE

An inclinometer for measuring control surface travel is available from the Cessna Service Parts Center. Refer to figure 6-12.

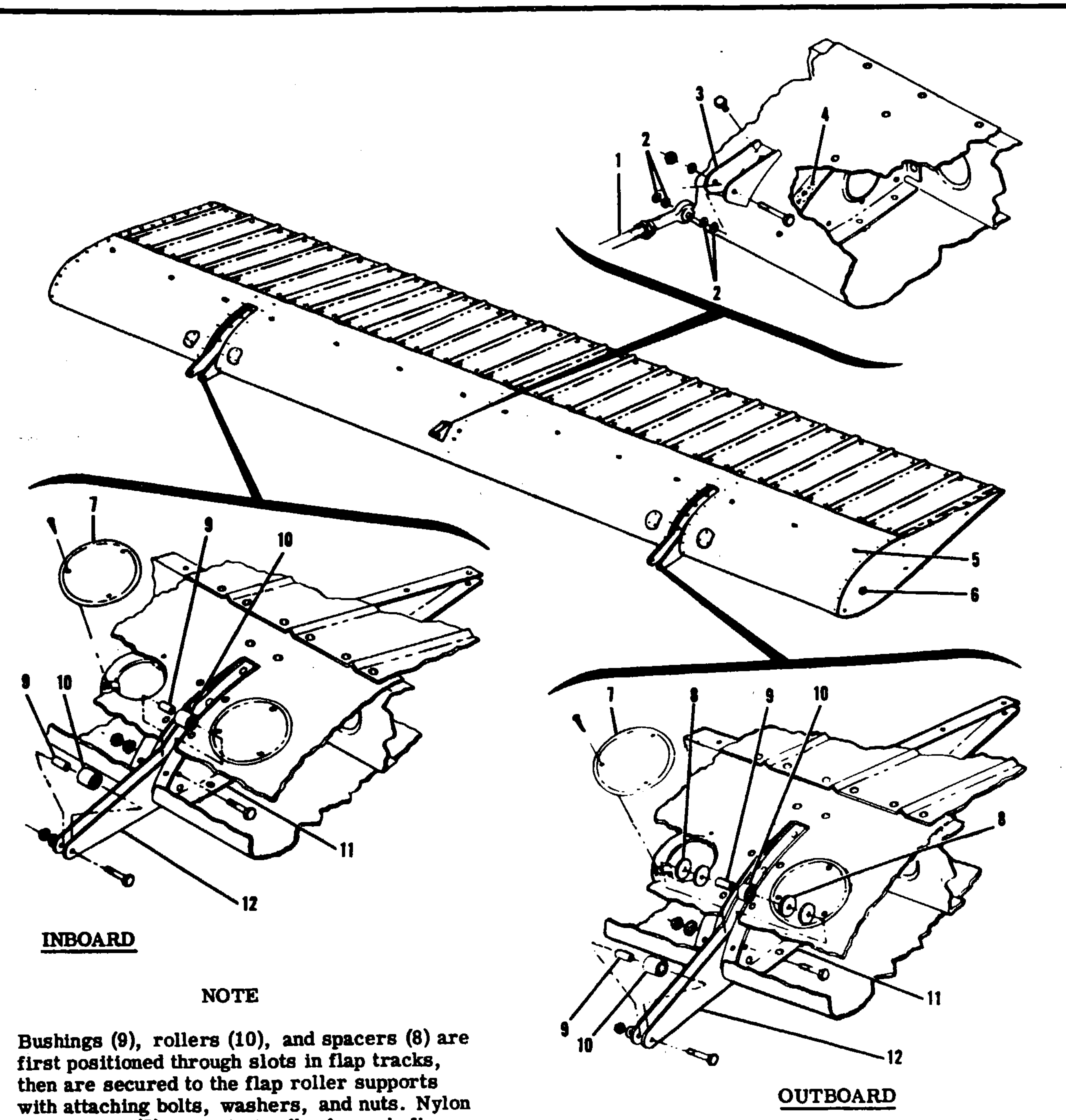
c. Extend wing flaps to full down position and check for correct flap extended angle with inclinometer.

d. Remove wing flaps bellcrank access cover and attempt to rock bellcrank to check for bearing play.

e. Inspect wing flap rollers and tracks for evidence of defective parts.

7-4. TROUBLE SHOOTING WING FLAP SYSTEM - EXCEPT MODELS 182, 172F & ON, AND 150F & ON.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
BOTH FLAPS FAIL TO LOWER WHEN LEVER IS RAISED.		
Broken or detached forward direct cable.	Open tunnel access cover aft of lever and check direct cable.	Attach or replace cable.
ONE FLAP FAILS TO LOWER.		
Broken or detached direct cable to malfunctioning flap.	Open bellcrank access cover and feel for cable tension.	Attach or replace cable.
BOTH FLAPS FAIL TO RETRACT WHEN FLAP LEVER IS LOWERED.		
Broken or detached forward return cable.	Open tunnel access forward of lever and check forward return cable.	Attach or replace cable.
BINDING IN SYSTEM AS FLAPS ARE RAISED OR LOWERED.		
Cables not riding on pulleys.	Open access covers and observe pulleys.	Route cables correctly over pulleys.
Flap lever binding.	Check lever bearings and ratchet.	Replace defective parts.
Binding in flap bellcrank.	Check bellcrank in motion.	Replace defective bellcrank.
	Remove bellcrank and check needle bearings.	Replace or lubricate bearings.
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.
INCORRECT FLAP TRAVEL.		
Incorrect rigging.		Rig flaps correctly.
RELEASE BUTTON STICKS.		
Release mechanism needs lubricating.		Lubricate in accordance with figure 2-4.



NOTE

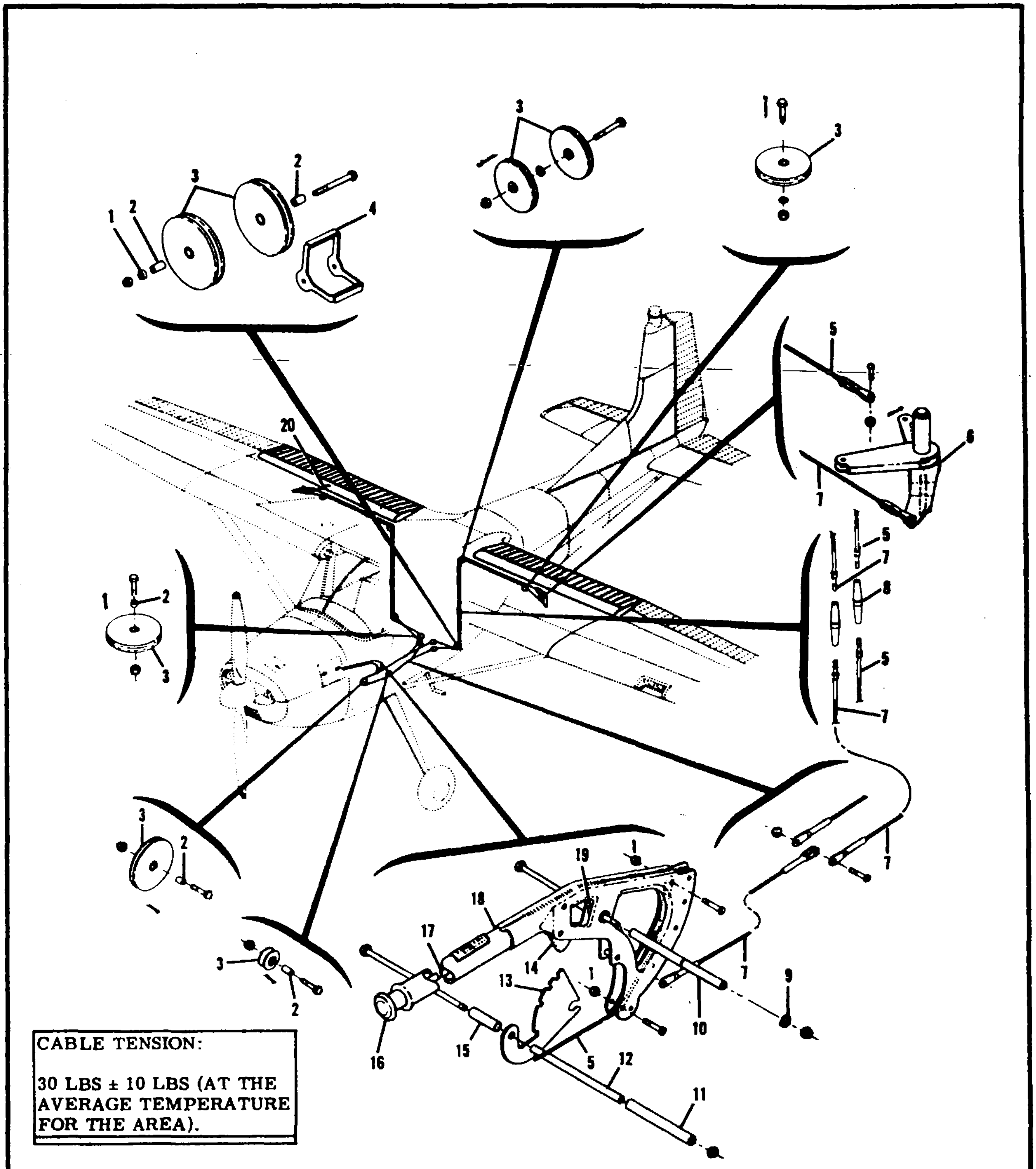
Bushings (9), rollers (10), and spacers (8) are first positioned through slots in flap tracks, then are secured to the flap roller supports with attaching bolts, washers, and nuts. Nylon plug buttons (5) prevent wing flap from chafing wing trailing edge.

On the 1966 Model 182 and on, four metal spacers (8) are replaced with two nylon spacers on outboard hinges only.

Position spacers (8) as required to provide adequate flap clearance at wing root and aileron. Some lateral movement of the flap is inherent due to the width of the roller. This movement should be considered when positioning the spacers.

1. Push-Pull Rod
2. Washer
3. Bracket
4. Nutplate
5. Nylon Plug Button
6. Plug Button
7. Access Cover
8. Spacer
9. Bushing
10. Roller Assembly
11. Rib Assembly
12. Flap Support

Figure 7-1. Wing Flap Installation



1. Spacer
2. Bushing
3. Pulley
4. Cable Guard
5. Retract Cable
6. Bellcrank
7. Direct Cable
8. Turnbuckle
9. Snap Ring
10. Bushing
11. Spacer
12. Bushing
13. Flap Lever Ratchet
14. Latch
15. Spacer
16. Release Button
17. Latch Rod
18. Flap Lever
19. Spacer
20. Push-Pull Rod

Figure 7-2. Wing Flap Control System - Except Models 150, 182, and 172F & on

NOTE

Paragraphs 7-5 through 7-8 are applicable to manual wing flap control systems used in the Models 172, P172, 180, and 185, illustrated in figure 7-2. In the Model 150 manual flap control system, routing and access to components are different, but similar maintenance may be accomplished while using figures 7-3 and 7-4 as guides.

7-5. FLAP LEVER ASSEMBLY REMOVAL, REPAIR AND INSTALLATION. (See figures 7-2 thru 7-4.)

a. Remove front seats, tunnel carpeting, rear door post facing, and access covers to gain access to flap handle attachment.
b. Release cable tension on direct and retract cables by loosening cable turnbuckles at rear door post.
c. Disconnect forward direct and retract cables from lever assembly by removing attaching bolt and nut.
d. Remove flap lever pivot bolt and bushing, and remove flap lever from tunnel structure.

NOTE

The spacer used to secure the flap lever laterally has been replaced with a snap ring which fits into a groove in pivot bolt bushing. This configuration is also used for all spares.

e. Repair of wing flap lever assembly consists of replacement of any defective bearings, spacers, ratchet mechanism and other parts comprising the assembly. Placards on the wing flap lever should be replaced if they have become illegible.
f. Install wing flap lever assembly by reversing the preceding steps and rigging the system as outlined in paragraph 7-9.

7-6. WING FLAP BELLCRANK REMOVAL, REPAIR AND INSTALLATION. (See figures 7-2 thru 7-4.)

a. Remove access covers from wing lower skin at the bellcrank.
b. Remove doorpost covering and release cable tension by loosening cable turnbuckles.
c. Disconnect cables at bellcrank by removing clevis bolts.
d. Disconnect wing flap push-pull rod at bellcrank.
e. Remove bellcrank pivot bolt from top of wing and work bellcrank out through access opening, using care that the bushing is not dropped. One or more brass washers may be used as shims between wing structure and bellcrank.

NOTE

Seal needle bearings with tape after bellcrank is removed to prevent dirt from entering the bearings.

f. Wing flap bellcrank repair is limited to replacement of internal bushings and bearings. Cracked, bent or excessively worn bellcranks should be replaced.
g. To install bellcrank, position bellcrank in wing and install bolt through top of wing through bellcrank pivot bushing. Secure bolt with washer and nut.
h. Attach cables with clevis bolts, nuts and cotter pins.
i. Attach wing flap push-pull rod to bellcrank.
j. Rig wing flap system in accordance with paragraph 7-9.

7-7. REMOVAL AND REPLACEMENT OF CABLES AND PULLEYS in the wing flap system may be accomplished using figures 7-2, 7-3 and 7-4 as a guide.

7-8. WING FLAP REMOVAL, REPAIR AND INSTALLATION. (See figure 7-1.)

a. Extend wing flaps and remove access covers from top leading edge of wing flap.
b. Disconnect push-pull rod at wing flap.
c. Remove bolt and nut at each aft flap track, then pull flap aft and remove remaining nut and bolt. As wing flap is removed from wing, all washers, rollers, and bushings will fall free, and they should be retained for installation.
d. Wing flap repair may be accomplished in accordance with instructions contained in Section 19.
e. To install wing flap, position flap at trailing edge of wing and install rollers and attaching parts as illustrated in figure 7-1.
f. Set wing flap push-pull rods to 8-11/16" ± 1/8" between centers of rod end bearings and tighten rod end jam nuts.
g. Attach wing flap push-pull rod to bracket on flap.
h. Rig flap system in accordance with paragraph 7-9.

7-9. RIGGING MANUAL WING FLAP SYSTEM.

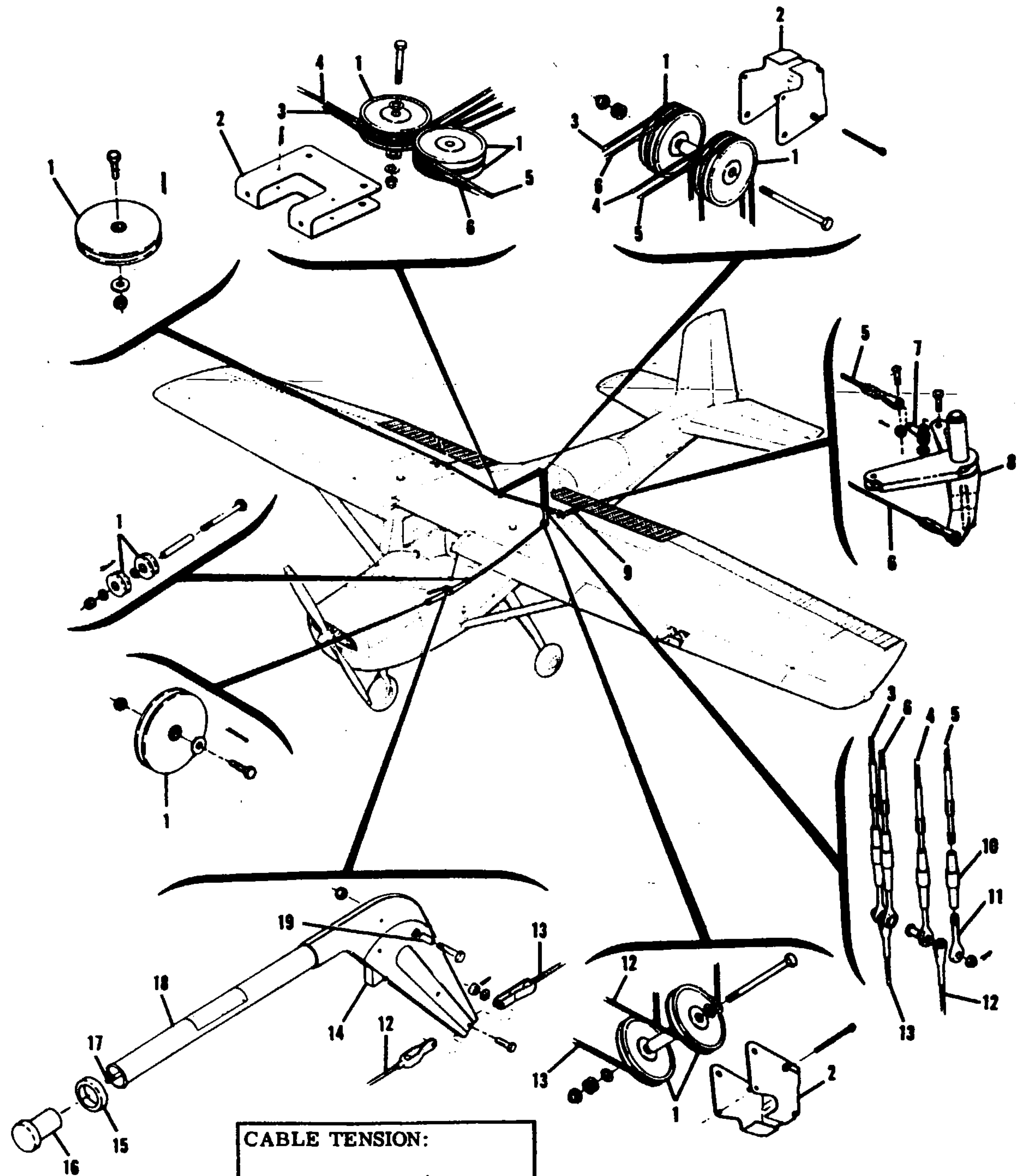
NOTE

Before performing this procedure, release wing flap cable tension at the turnbuckles.

a. Set wing flap push-pull rods to 8-11/16" ± 1/8" between centers of rod end bearings, tighten jam nuts, and install.
b. Set wing flap control handle in the flap retracted position, then tighten retract cables to correct tension.
c. Move wing flap control handle to the full down position, then tighten direct cables to correct tension.
d. Perform an operational checkout of the flap control system, check all jam nuts for tightness, check that all turnbuckles are safetied, and install all parts removed for access.

NOTE

An inclinometer for measuring control surface travel is available from the Cessna Service Parts Center. (See figure 6-12.)

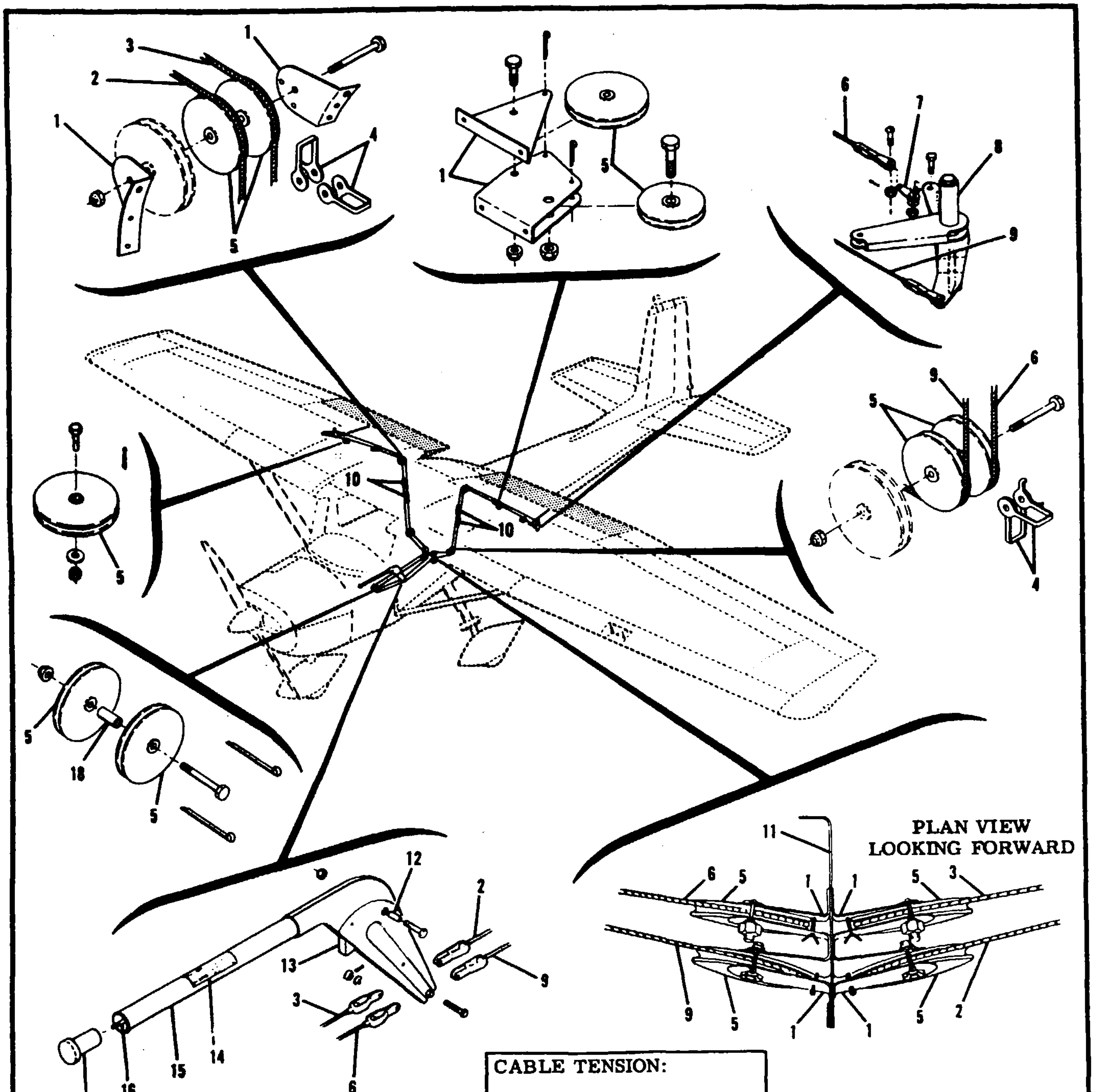


CABLE TENSION:

30 LBS ± 10 LBS (AT THE AVERAGE TEMPERATURE FOR THE AREA).

1. Pulley
2. Pulley Bracket
3. Right Direct Cable
4. Right Retract Cable
5. Left Retract Cable
6. Left Direct Cable
7. Link
8. Bellcrank
9. Push-Pull Rod
10. Turnbuckle Barrel
11. Turnbuckle Eye
12. Forward Retract Cable
13. Forward Direct Cable
14. Latch
15. Collar
16. Release Button
17. Latch Rod
18. Flap Lever
19. Bushing

Figure 7-3. Wing Flap Control System - Model 150C



CABLE TENSION:

30 LBS ± 10 LBS (AT THE AVERAGE TEMPERATURE FOR THE AREA).

1. Pulley Bracket
2. Right Direct Cable
3. Right Retract Cable
4. Cable Guard
5. Flap Pulley
6. Left Retract Cable
7. Link
8. Bellcrank
9. Left Direct Cable
10. Turnbuckle
11. Bulkhead
12. Bushing
13. Latch
14. Decal
15. Flap Lever
16. Latch Rod
17. Release Button
18. Spacer

Figure 7-4. Wing Flap Control System - MODELS 150D & 150E

7-10. ELECTRIC WING FLAP CONTROL SYSTEM - MODELS 182, 172F & ON, and 150F & ON.

7-11. ELECTRIC WING FLAP OPERATIONAL CHECK.

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

b. Deliberately overrun flap motor at each end of stroke to make sure transmission is free wheeling.

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

d. Retract wing flaps and check to see that they are completely up. Check flap position indicator to see that it reads 0°. Mount an inclinometer on one flap and set to 0°.

NOTE

An inclinometer for measuring control surface travel is available from the Cessna Service Parts Center. Refer to figure 6-12.

e. Extend wing flaps to full down position and check for correct flap extended angle with inclinometer.

f. Remove wing flap drive pulley access cover and attempt to rock drive pulley to check for bearing play.

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

7-12. TROUBLE SHOOTING ELECTRIC WING FLAP SYSTEM - MODELS 182, 172F & ON, AND 150F & ON.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
BOTH FLAPS FAIL TO MOVE.		
Popped circuit breaker or fuse.	Check circuit breaker or fuse.	Reset circuit breaker or replace fuse.
Defective switch.	Place jumper across switch.	Replace switch.
Defective motor.	Remove and bench test motor.	Replace motor.
Broken or disconnected wires.	Run continuity check of wiring.	Connect or repair wiring.
Defective or disconnected transmission.	Check to see transmission is connected to flap system. If connected, remove for bench test.	Connect or replace transmission.
Defective limit switch (Model 182L).	Check continuity.	Replace switch.
Follow-up control disconnected or slipping (Model 182L).	Check visually.	Secure control or replace if defective.
BINDING IN SYSTEM AS FLAPS ARE RAISED AND LOWERED.		
Cables not riding on pulleys.	Open access covers and observe pulleys.	Route cables correctly over pulleys.
Bind in drive pulleys.	Check drive pulleys in motion.	Replace drive pulley.
Broken or binding pulleys.	Check pulleys for free rotation or breaks.	Replace defective pulleys.
Frayed cable.	Check condition of cables.	Replace defective cable.
Flaps binding on tracks.	Observe flap tracks and rollers.	Replace defective parts.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
LEFT FLAP FAILS TO MOVE.		
Disconnected or broken cable.	Check cable tensions.	Connect or replace cable.
Disconnected push-pull rod.	Check push-pull rod attachment.	Attach push-pull rod.
INCORRECT FLAP TRAVEL.		
Incorrect rigging.		Rig flaps correctly.
Defective limit switch (Model 182L).	Check continuity.	Replace switch.
Follow-up control disconnected or slipping (Model 182L).	Check visually.	Secure control or replace if defective.

SHOP NOTES:

7-13. FLAP POSITION TRANSMITTER REMOVAL, INSTALLATION, AND ADJUSTMENT. (See figure 7-5A.)

a. Remove access covers from bottom of right wing below right drive pulley.
b. Remove cotter pin and pin which attach wire rod (9) to arm (10) on right drive pulley.
c. Disconnect the transmitter electrical wires at the quick-disconnects.
d. Remove two bolts which secure wing flap position transmitter to wing structure and remove transmitter from wing.
e. Installation of wing flap position transmitter may be accomplished by reversing the preceding steps.
f. After installation of wing flap position transmitter, adjust in accordance with step "o" of paragraph 7-18.

7-14. TRANSMISSION AND MOTOR ASSEMBLY REMOVAL, REPAIR, AND INSTALLATION. (See figure 7-5A.)

a. Transmission (3), motor (1), tube (4), and hinge (2) are removed as one assembly if standard fuel tanks are installed. With long range tanks installed, it is necessary to detach the assembly from hinge (2) before removing motor and transmission from wing and to attach them to the hinge after positioning them in the wing.
b. Remove access covers from bottom of right wing under drive pulley and motor assembly.
c. Remove bolt securing tube (4) to right drive pulley.
d. Remove bolt securing hinge (2) to the wing, or if long range fuel tanks are installed, remove bolt securing transmission to the hinge.
e. Disconnect electrical wires at quick-disconnects and remove screw securing ground wire. Remove assembly from the wing.
f. Repair of the transmission and motor assembly consists of replacement of the motor (1), transmission (3), tube (4), or brake components. Bearings in hinge (2) may be replaced.
g. Installation may be accomplished by reversing the preceding steps and rigging the flap control system in accordance with paragraph 7-18 or 7-19.

7-15. DRIVE PULLEY REMOVAL, REPAIR, AND INSTALLATION. (See figure 7-5 or 7-5A.)

NOTE

The right drive pulley must be removed to detach wing flap position transmitter arm (10) from the drive pulley assembly.

a. Remove access covers under right drive pulley.
b. Remove bolt securing push-pull rod to drive pulley and lower the flap.
c. Remove bolt securing tube (4) to right drive pulley.
d. Remove pin to disconnect wing flap position transmitter rod (9) from arm (10).
e. Loosen turnbuckles and tag and detach control cables from drive pulley by removing bolts and pins.
f. Remove bolt, washer, and nut securing drive pulley to wing.
g. Remove drive pulley through access opening, using care that the bushing is not dropped. One or more brass washers may be used as shims between wing structure and drive pulley.

NOTE

Protect drive pulley needle bearings from dust or dirt by covering open ends with tape.

h. To remove the left wing drive pulley, use this same procedure, omitting steps "c" and "d."
i. Repair of drive pulleys is limited to replacement of needle bearings. Cracked, bent, or excessively worn drive pulleys should be replaced with a new assembly.
j. Installation may be accomplished by reversing the preceding steps and rigging as outlined in paragraph 7-18. Lubricate drive pulley bearings in accordance with Section 2 when installing drive pulley. Control cables may be attached to drive pulleys before installing them in the wing.

NOTE

Transmitter arm (10) must be attached to right drive pulley before installing the drive pulley in the wing.

7-16. WING FLAP REMOVAL, REPAIR, AND INSTALLATION. The wing flap may be removed in accordance with paragraph 7-8 and figure 7-1. If flap push-pull rod adjustment is not disturbed, it should not be necessary to rerig the wing flap system. Check wing flap travel and rig if necessary in accordance with paragraph 7-18. Repair of a damaged wing flap may be accomplished in accordance with instructions contained in Section 19.

7-17. WING FLAP CABLES AND PULLEYS REPLACEMENT. Replacement of wing flap cables and pulleys may be accomplished using figure 7-5 as a guide. Refer to paragraph 7-18 or 7-19 for correct cable attachment.

NOTE

To ease rerouting of cables, a length of wire may be attached to the end of the cable before it is withdrawn from the aircraft. Leave the wire in place, routed through the structure; then attach it to the new cable and use it to pull cable into place.

7-18. RIGGING ELECTRIC WING FLAP SYSTEM - MODEL 182 SERIES (Prior to 1968) AND MODEL 172F AND ON (See figure 7-5.)

NOTE

Before using this procedure, disconnect flap cables at turnbuckles above cabin headliner, disconnect flap push-pull rods at drive pulleys in both wings, and disconnect tube (4) from right drive pulley.

a. If cables are not connected to left and right drive

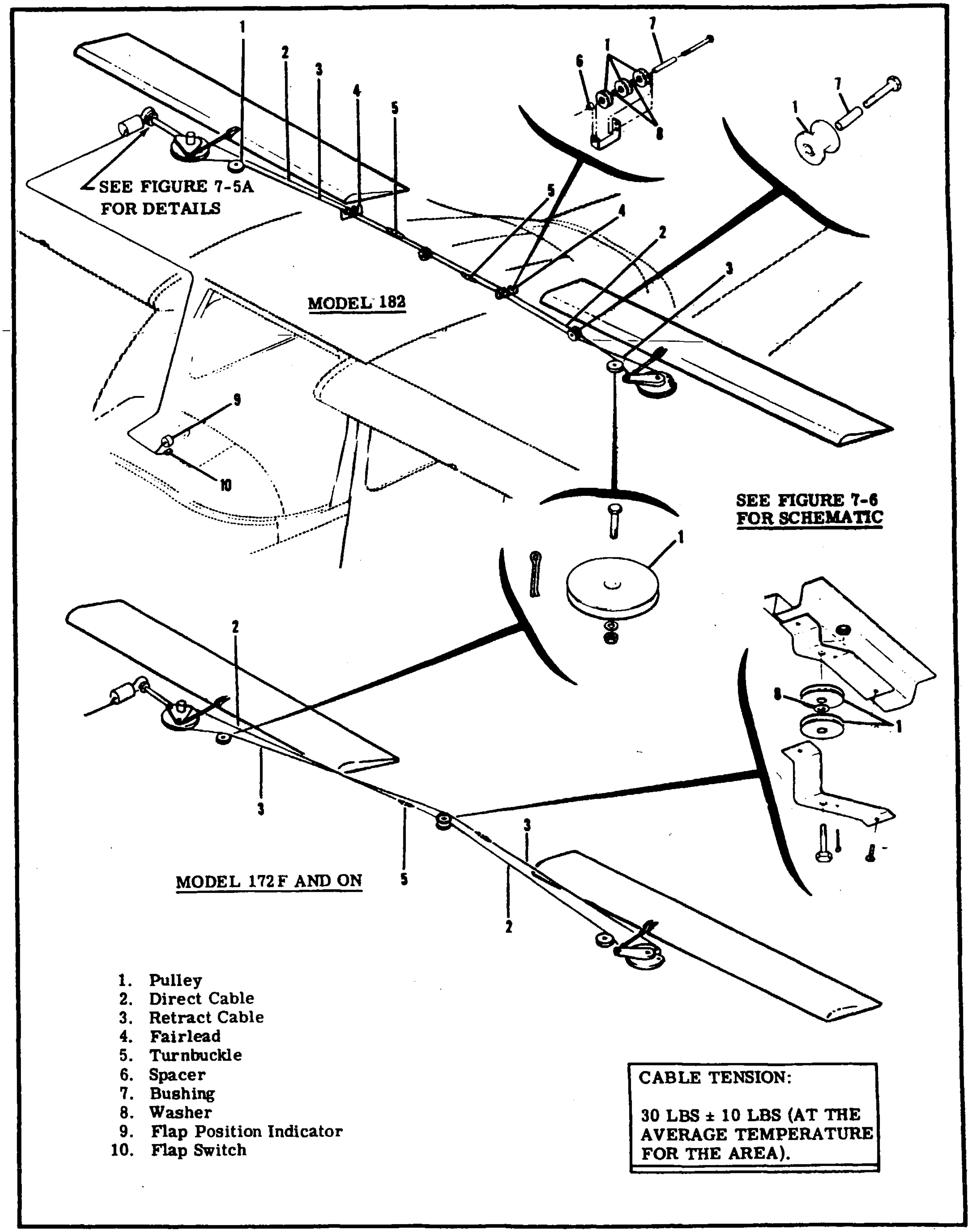
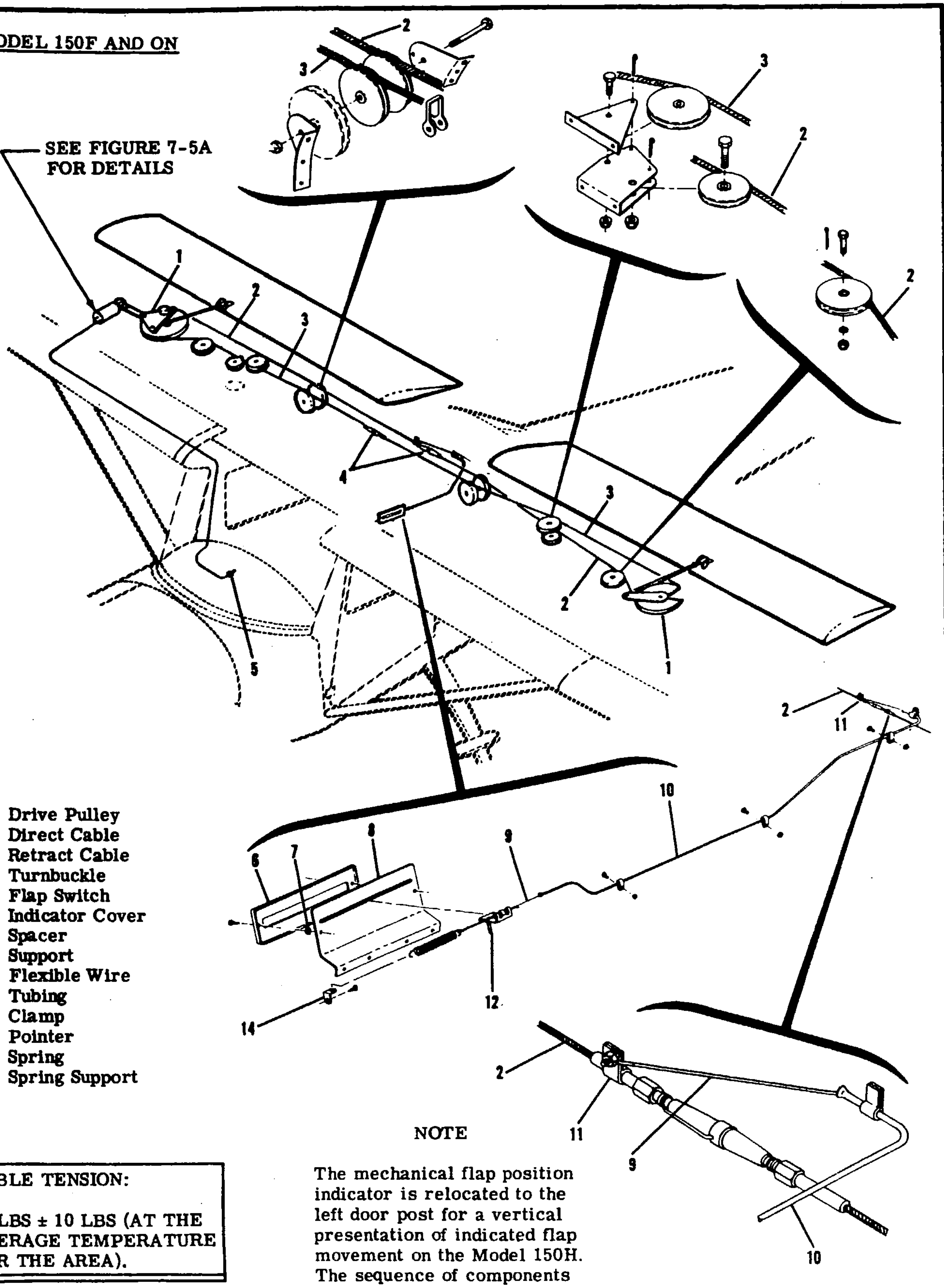


Figure 7-5. Wing Flap Control System - Electric (Sheet 1 of 2)

MODEL 150F AND ON



1. Drive Pulley
2. Direct Cable
3. Retract Cable
4. Turnbuckle
5. Flap Switch
6. Indicator Cover
7. Spacer
8. Support
9. Flexible Wire
10. Tubing
11. Clamp
12. Pointer
13. Spring
14. Spring Support

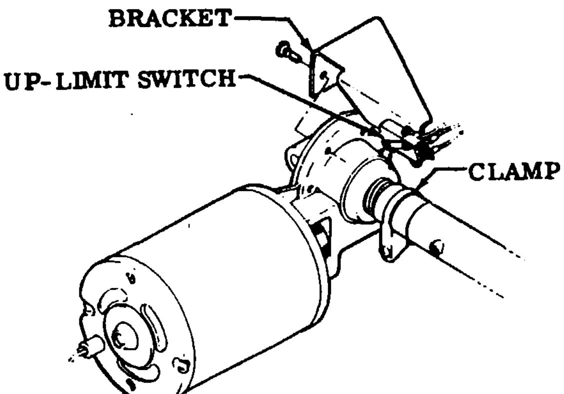
CABLE TENSION:

30 LBS ± 10 LBS (AT THE AVERAGE TEMPERATURE FOR THE AREA).

NOTE

The mechanical flap position indicator is relocated to the left door post for a vertical presentation of indicated flap movement on the Model 150H. The sequence of components remains the same.

Figure 7-5. Wing Flap Control System--Electric (Sheet 2 of 2)



MODEL 150H

NOTE

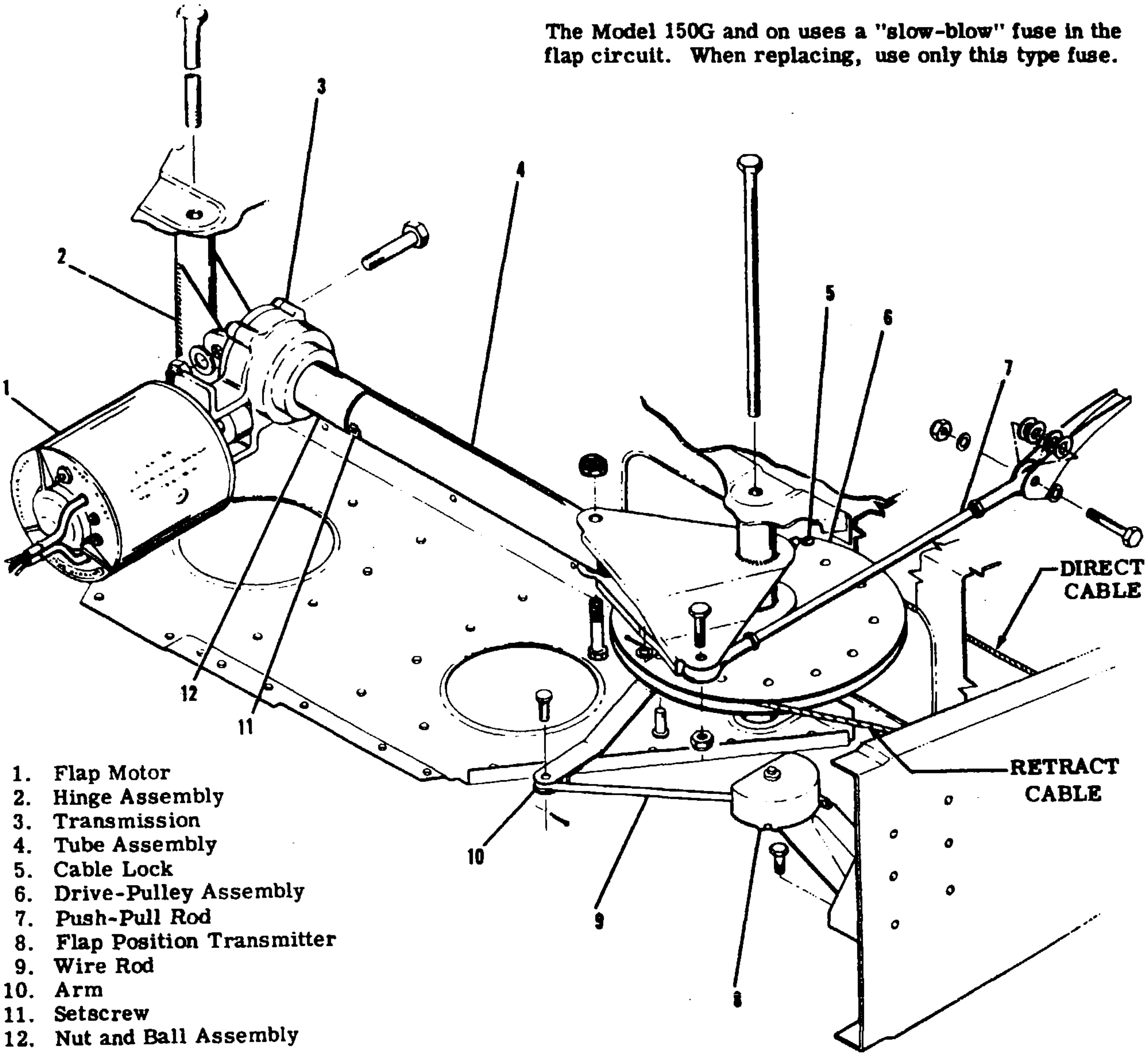
Use Loctite Sealant, Grade C on threads of setscrew (11) after final adjustment.

Items (8 thru 10) do not apply to the Model 150 electric flap system. See Figure 7-5, Sheet 2, for mechanical indicating system details.

A relay, mounted in the right wing near the flap motor, is incorporated in the electrical flap circuits of the Model 150, Serial No. 15062291 thru 15063135 and Model F150, Serial No. F150-0001 thru F150-0034. A Service Kit (SK150-16) is available from the Cessna Service Parts Center to install the relay on earlier serials if desired.

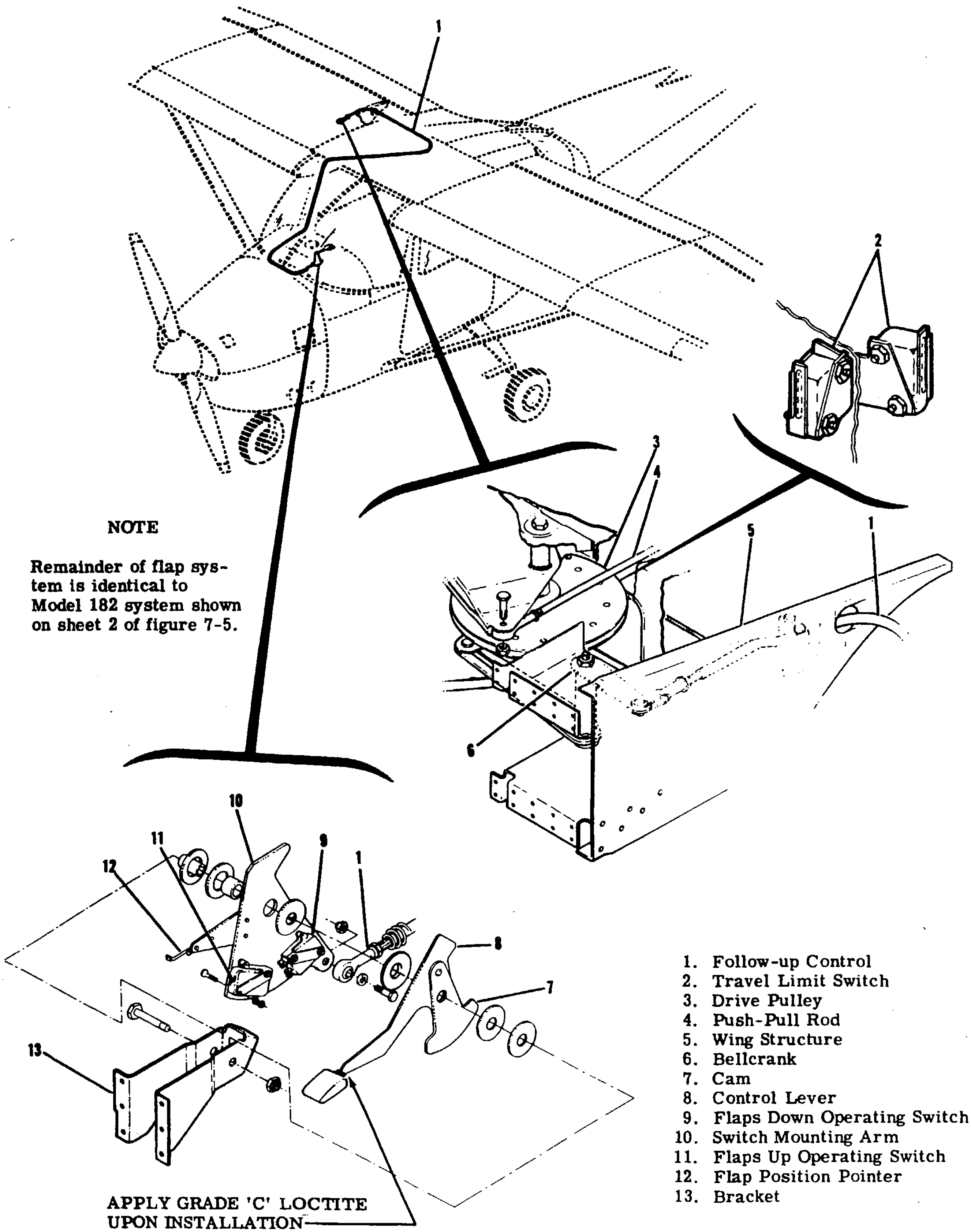
Beginning with the Model 150, Serial No. 15063136; the Model F150, Serial No. F150-0035; the Model 172, Serial No. 17254275; and the Model F127-0320 an improved flap motor is used, and the relay is deleted.

The Model 150G and on uses a "slow-blow" fuse in the flap circuit. When replacing, use only this type fuse.



1. Flap Motor
2. Hinge Assembly
3. Transmission
4. Tube Assembly
5. Cable Lock
6. Drive-Pulley Assembly
7. Push-Pull Rod
8. Flap Position Transmitter
9. Wire Rod
10. Arm
11. Setscrew
12. Nut and Ball Assembly

Figure 7-5A. Wing Flap Motor, Transmission, and Linkage Details



1. Follow-up Control
2. Travel Limit Switch
3. Drive Pulley
4. Push-Pull Rod
5. Wing Structure
6. Bellcrank
7. Cam
8. Control Lever
9. Flaps Down Operating Switch
10. Switch Mounting Arm
11. Flaps Up Operating Switch
12. Flap Position Pointer
13. Bracket

Figure 7-5B. "Pre-Select" Flap Control System - Model 182L

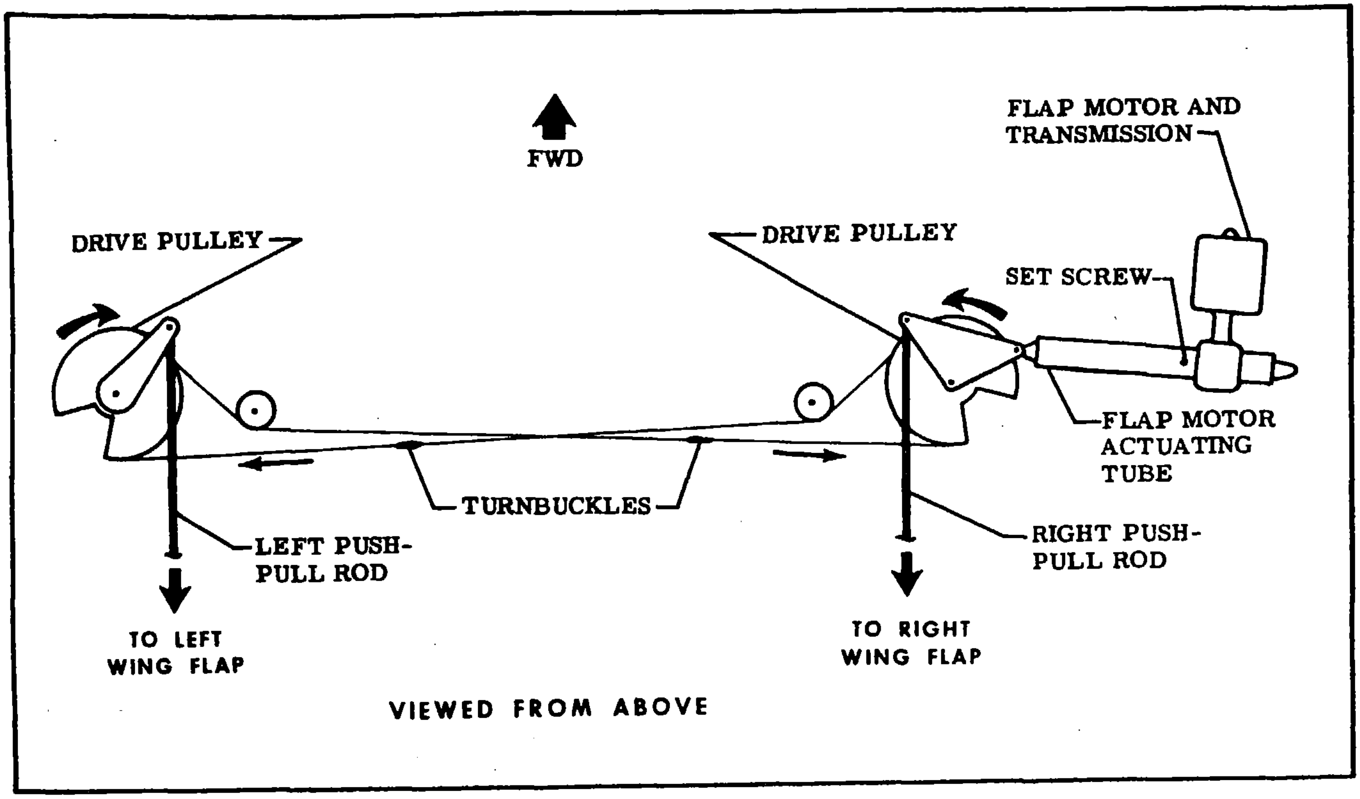


Figure 7-6. Wing Flap System Schematic - Models 182, 172F & on and 150F & on

pulleys, tube (4), left and right push-pull rods, and the flap transmitter arm must be disconnected before installing cables. If drive pulleys are not installed, attach cables before installing drive pulleys in wings.

b. Connect the retract cable to the forward side of the right flap drive pulley and to the aft side of the left flap drive pulley.

c. Connect the direct cable to the aft side of the right flap drive pulley and to the forward side of the left flap drive pulley.

d. Connect flap position transmitter rod (9) to right flap drive pulley arm (10).

e. Adjust both push-pull rods to 8-11/16 ± 1/8 inches between center of rod end bearings and tighten lock nuts on both ends. Connect push-pull rods to right and left flaps and drive pulleys.

NOTE

Temporarily connect the flap cables at turnbuckles above cabin headliner, and test flaps by hand to see that flaps extend together. If they will not, cables are incorrectly attached to drive pulleys. Also see that right drive pulley rotates clockwise, when viewed from below, as flaps are extended. Disconnect turnbuckles above cabin headliner again.

f. Using care not to cause damage, run flap motor to fully retract actuating tube (4) on motor (full up position).

g. Loosen setscrew (11) and while manually holding right flap full up, rotate nut and ball assembly (12) in or out as required to align tube (4) with attaching hole in drive pulley, tighten setscrew and attach tube to drive pulley.

NOTE

Apply Loctite Sealant Grade C (American Sealant Co., Hartford 11, Conn.) to threads of setscrew (11) after final adjustments have been made.

h. If tube (4) does not retract enough to connect to the right drive pulley with flap full up, disconnect push-pull rod at flap drive pulley and connect tube (4) to flap drive pulley.

i. With flap motor full up, manually hold right flap up and readjust push-pull rod to align with attaching hole in drive pulley. Connect push-pull rod and tighten lock nuts.

NOTE

The right flap and motor must be correctly rigged before the flap cables and left flap can be rigged.

j. Operate flap motor to place right flap full up, manually hold left flap full up and connect flap cables at turnbuckles above headliner.

k. With flaps full up tighten flap cable turnbuckles to obtain 30±10 pounds cable tension on each cable. Adjust retract cable first.

NOTE

When tightening cable turnbuckles be sure the cables are in the pulley grooves and cable ends are correctly positioned at the drive pulleys. Rig cable tension to the average temperature for the area.

l. Disconnect push-pull rod at left drive pulley. Run motor to extend flaps approximately 20° and check tension on each flap cable. If necessary re-adjust turnbuckles to maintain 30±10 pounds cable tension on each cable and safety turnbuckles.

m. Fully retract right flap. Manually holding left flap up, readjust left push-pull rod to align with attaching hole in left drive pulley and connect push-pull rod to drive pulley. Tighten locknuts.

n. With flaps up, mount an inclinometer on right flap and set to 0°. Fully extend flaps and check flap down angle. See Section 1 for wing flap travel for appropriate airplane model. Repeat check on left flap.

NOTE

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

o. Raise flaps to full up position and adjust flap position transmitter to make indicator read 0°. Slotted holes in the transmitter bracket are provided for adjustment. If necessary, transmitter rod may be formed slightly for additional adjustment.

p. Perform an operational checkout of the flap control system, check all locknuts for tightness, check that all turnbuckles are safetied, and install all parts removed for access.

NOTE

An inclinometer for measuring control surface travel is available from the Cessna Service Parts Center. Refer to figure 6-12.

7-19. RIGGING ELECTRIC WING FLAP SYSTEM - MODEL 150. (See figures 7-5 and 7-5A.)

NOTE

Before using this procedure, disconnect flap indicating system flexible wire from turnbuckle above cabin headliner, disconnect flap cables at turnbuckles above cabin headliner, disconnect flap push-pull rods at drive pulleys in both wings, and disconnect tube (4) from right flap drive pulley.

a. If cables are not connected to left and right drive pulleys, tube (4) and the push-pull rods must be disconnected before installing cables. If drive pulleys are not installed, attach cables before installing drive pulleys in wings.

b. Connect cables as shown on Sheet 2 of figure 7-5.

c. Adjust both push-pull rods to 8-11/16 ± 1/8 inches between center of rod end bearings and tighten locknuts on both ends. Connect push-pull rods to flaps and drive pulleys.

NOTE

Temporarily connect the flap cables at turnbuckles above cabin headliner, and test flaps by hand to see that flaps extend together. If they will not, cables are incorrectly attached to drive pulleys. Also see that right drive pulley rotates clockwise, when viewed from below, as flaps are extended. Disconnect turnbuckles above cabin headliner again.

d. Using care not to cause damage, run flap motor to fully retract actuating tube (4) on motor (full up position).

e. Loosen set screw (11) and while manually holding right flap full up, rotate nut and ball assembly (12) in or out as required to align tube (4) with attaching hole in drive pulley, tighten setscrew, and attach tube to drive pulley.

NOTE

Apply Loctite Sealant Grade C (American Sealant Co., Hartford, 11, Conn.) to threads of setscrew (11) after final adjustments have been made.

f. If tube (4) does not retract enough to connect to the right drive pulley with flap full up, disconnect push-pull rod at flap drive pulley and connect tube (4) to flap drive pulley.

g. With flap motor full up, manually hold right flap full up and readjust push-pull rod to align with attaching hole in drive pulley. Connect push-pull rod and tighten locknuts.

NOTE

The right flap and motor must be correctly rigged before the flap cables and left flap can be rigged.

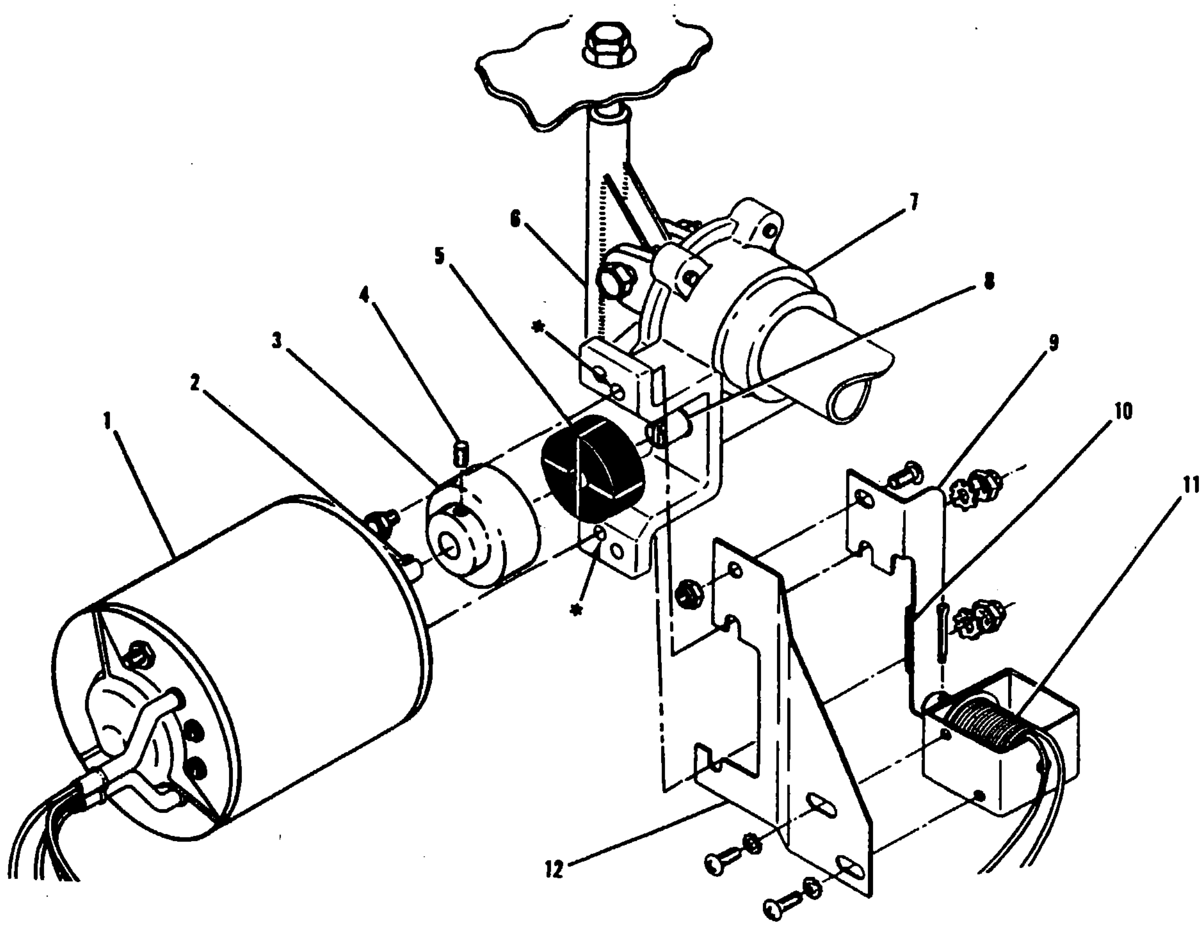
h. Operate flap motor to place right flap full up, manually hold left flap full up, and connect flap cables at turnbuckles above headliner. Be sure direct cables are connected to each other and return cables are connected to each other.

i. With flaps full up, tighten flap cable turnbuckles to obtain 30 ± 10 pounds cable tension on each cable. Adjust retract cable first.

NOTE

When tightening cable turnbuckles, be sure the cables are in the pulley grooves and cable ends are correctly positioned at the drive pulleys. Rig tension to the average temperature for the area.

j. Disconnect push-pull rod at left drive pulley. Run motor to extend flaps approximately 20° and check tension on each flap cable. If necessary, re-adjust turnbuckles to maintain 30 ± 10 pounds cable tension on each cable and safety the turnbuckles.



NOTE

The brake assembly is used on the Model 182 only beginning with serial number 18255845. During the 1966 model-year an improved flap motor replaced the existing motor, eliminating the need for the external brake. Alignment procedure still applies to those aircraft equipped with the external brake.

Adjust brake assembly, with solenoid actuated, so minimum clearance between brake lining and any part of the coupling is .001" and maximum is .010". Do not bend spring (9).

*Alignment of flap motor shaft and transmission shaft is important. After reassembly, coupling assembly must turn freely. It is permissible to enlarge the holes illustrated to a maximum of .250" to obtain proper alignment.

1. Motor
2. Motor Shaft
3. Brake Drum
4. Setscrew
5. Coupling
6. Hinge
7. Transmission
8. Transmission Shaft
9. Spring Assembly
10. Brake Lining
11. Solenoid
12. Bracket

Figure 7-7. Flap Motor Brake

k. Fully retract right flap. Manually holding left flap up, readjust left push-pull rod to align with attaching hole in left drive pulley and connect push-pull rod to drive pulley. Tighten locknuts.

l. With flaps up, mount on inclinometer on right flap and set to 0°. Fully extend flaps and check flap down angle. Repeat check on left flap. On Model 150H, with flaps full up, adjust up-limit switch to operate and shut-off motor at this position, then mount an inclinometer on one flap, extend flaps and check down angle. Repeat down angle check on opposite flap. Check operation of up-limit switch for positive shut-off through several cycles.

NOTE

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

m. Connect and rig flap indicating system (refer to paragraph 7-20), then perform an operational checkout of the flap control system. Check all locknuts for tightness, check that all turnbuckles are safetied, and install all parts removed for access.

7-20. FLAP INDICATING SYSTEM (MODEL 150). The mechanical indicating system consists of a tubing-enclosed flexible wire attached to the flap direct cable at one end and to a pointer at the other end. The pointer is attached to a return spring. Movement of the flap direct cable pulls the pointer along a scale to indicate flap position as flaps are lowered. Opposite movement of the flap direct cable permits the return spring to pull the pointer in the opposite direction as the flaps are raised. The system is shown in figure 7-5, which may be used as a guide for replacement of parts.

7-21. RIGGING OF FLAP INDICATING SYSTEM.

a. Operate flaps to full up position.

b. Open zipper in cabin headliner.

c. Loosen clamp securing flexible wire to flap direct cable and adjust the wire as required to place pointer at 0° (flaps up) position on indicator. Wrap flexible wire around clamp bolt as shown in figure 7-5, then tighten clamp bolt.

d. Operate flaps to check that indicating system functions properly.

e. Close zipper in cabin headliner.

7-22. RIGGING - "PRE-SELECT" WING FLAP SYSTEM - MODEL 182L.

7-23. The three-position switch used prior to 1968 for flap actuation is replaced with a combination of two microswitches mounted on a floating arm, and a camming level. (See figure 7-5B.) These switches actuate the system and control all mid-range settings. Limit switches at the transmission deactuate the system at either travel extreme. The transmission has provisions for freewheeling at each end of travel. As the flap control lever is moved to a desired setting, its cam contacts a microswitch that actuates the motor. As the transmission moves, the follow-up control pulls control lever arm until it clears the microswitch, opening the circuit.

NOTE

Before using this procedure, disconnect flap cables at turnbuckles above cabin headliner, and disconnect flap push-pull rods at drive pulleys and bellcranks in both wings.

a. If cables are not connected to drive pulleys, it is necessary to disconnect parts attached to each drive pulley so it may be rotated beyond its normal range of travel to permit cable attachment. If drive pulleys are not installed, attach cables before installing the drive pulleys in the wings.

b. The 3/32" retract cable connects to the forward side of right drive pulley and to the aft side of the left wing drive pulley. The 1/8" direct cable connects to the forward side of the left wing drive pulley and the aft side of the right wing drive pulley.

c. Adjust both push-pull rods to 8-11/16 ± 1/8 inches between center of rod end bearings and tighten lock nuts on both ends. Connect push-pull rods to right and left flaps and drive pulleys.

NOTE

Temporarily connect the flap cables at turnbuckles above cabin headliner, and test flaps by hand to see that flaps extend together. If they will not, cables are incorrectly attached to drive pulleys. Also see that right drive pulley rotates clockwise, when viewed from below, as flaps are extended. Disconnect turnbuckles above cabin headliner again.

d. Using care not to cause damage, run flap motor to fully retract actuating tube on motor (full up position).

e. Loosen actuating tube setscrew and while manually holding right flap full up, rotate nut and ball assembly in or out as required to align tube with attaching hole in drive pulley, tighten setscrew and attach tube to drive pulley.

NOTE

Apply Loctite Sealant Grade C (American Sealant Co., Hartford 11, Conn.) to threads of setscrew after final adjustments have been made.

f. If tube does not retract enough to connect to the right drive pulley with flap full up, disconnect push-pull rod at flap drive pulley and connect tube to flap drive pulley.

g. With flap motor full up, manually hold right flap up and readjust push-pull rod to align with attaching hole in drive pulley. Connect push-pull rod and tighten lock nuts.

NOTE

The right flap and motor must be correctly rigged before the flap cables and left flap can be rigged.

h. Operate flap motor to place right flap full up, manually hold left flap full up and connect flap cables at turnbuckles above headliner.
i. With flaps full up tighten flap cable turnbuckles to obtain 30±10 pounds cable tension on each cable. Adjust retract cable first.

NOTE

When tightening cable turnbuckles be sure the cables are in the pulley grooves and cable ends are correctly positioned at the drive pulleys. Rig cable tension to the average temperature for the area.

j. Disconnect push-pull rod at left drive pulley. Run motor to extend flaps approximately 20° and check tension on each flap cable. If necessary re-adjust turnbuckles to maintain 30±10 pounds cable tension on each cable and safety turnbuckles.
k. Fully retract right flap. Manually holding left flap up, readjust left push-pull rod to align with attaching hole in left drive pulley and connect push-pull rod to drive pulley. Tighten locknuts.
l. With flaps up, mount an inclinometer on right flap and set to 0°.

NOTE

An inclinometer for measuring control surface travel is available from the Cessna Service Parts Center. Refer to figure 6-12.

m. Fully extend flaps and check flap down angle per Section 1, then repeat check on left flap.

NOTE

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

n. Loosen follow-up control at switch mounting arm (10).
o. Move control lever (8) to full UP position, then without moving control lever, move arm (8) until control lever cam (7) is centered between switches (9) and (11). Secure follow-up control at this position.
p. Adjust switches (9) and (11) in sloted holes until rollers just clear cam, then secure switches.
q. Turn on master switch and run flaps through several cycles, stopping at various mid-range settings and checking that cable tension is within limits. Retract cable tension may increase to 90 pounds when flaps are fully retracted.
r. Run flaps to full UP position and mount an inclinometer on trailing edge of one flap, then set to 0°.
s. Run flaps to full down position and set down-limit switch to deactuate the system at this position.

NOTE

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

t. Flight test aircraft and check that follow-up control does not cause automatic cycling, which indicates the operating switches do not have sufficient clearance at the cam. If cycling occurs, readjust operating switches as necessary per step "p", then complete rigging.
u. Check that all rod ends and clevis ends have sufficient thread engagement, all jam nuts are tight, then replace all parts removed for access.

SECTION 8

ELEVATOR CONTROL SYSTEMS

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8-1. ELEVATOR CONTROL SYSTEM.

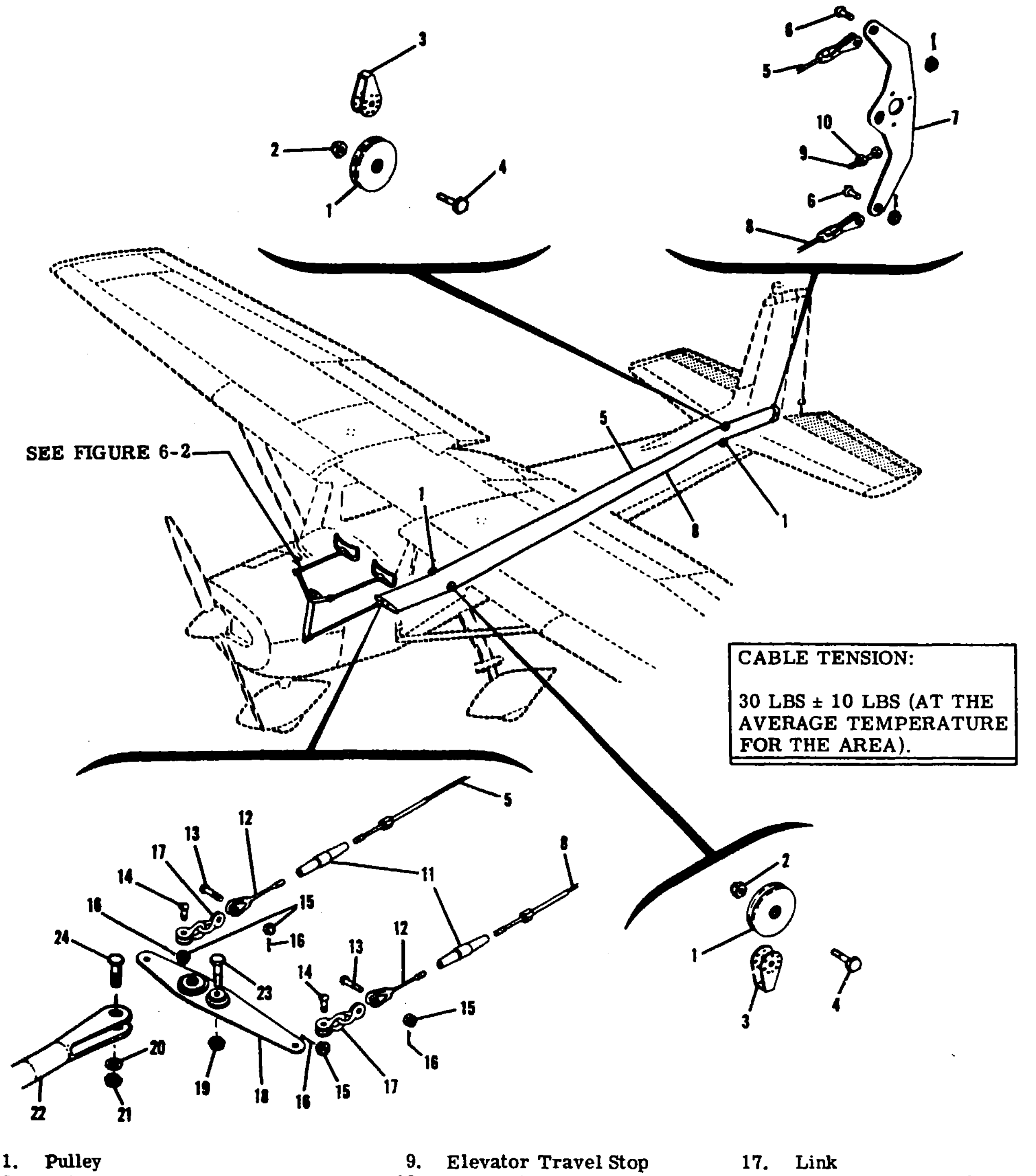
8-2. The elevator control systems for the various models are illustrated in figures 8-1 through 8-4. The forward parts of the systems are operated by four different control installations which are shown in Section 6. On the Models 150, 172, and P172 the elevator control cables are attached directly to a bellcrank installed between the elevators, while on the Models 180, 182, and 185 an additional bell-crank, push-pull tube, and an elevator down-spring are installed in the system.

8-3. TROUBLE SHOOTING.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
NO RESPONSE TO CONTROL WHEEL FORE-AND-AFT MOVEMENT.		
Forward or aft push-pull tube disconnected.	Check visually.	Attach push-pull tube correctly.
Cables disconnected.	Check visually.	Attach cables correctly.
BINDING OR JUMPY MOTION FELT IN MOVEMENT OF ELEVATOR SYSTEM.		
Defective forward bellcrank pivot bearing.	Check bellcrank; move to check for play or binding.	Replace bellcrank.
Defective rear bellcrank pivot bearing.	Check bellcrank; move to check for play or binding.	Replace bellcrank.
Cables slack.	Check for correct tension.	Adjust to correct tensions.
Cables not riding correctly on pulleys.	Check cable routing.	Route cables correctly over pulleys.
Defective elevator hinges.	Move elevator by hand, checking hinges.	Replace defective hinges.
Ball socket on instrument panel too tight.	Disconnect universal joint and check binding at panel.	Add washers as necessary between forward socket half and instrument panel.
Clevis bolts too tight.	Check bolt binding.	Readjust to eliminate bolt binding.
Defective control "T," "Y," or "U" pivot bearings.	Disconnect parts and check that control pivots freely.	Replace defective bearings.

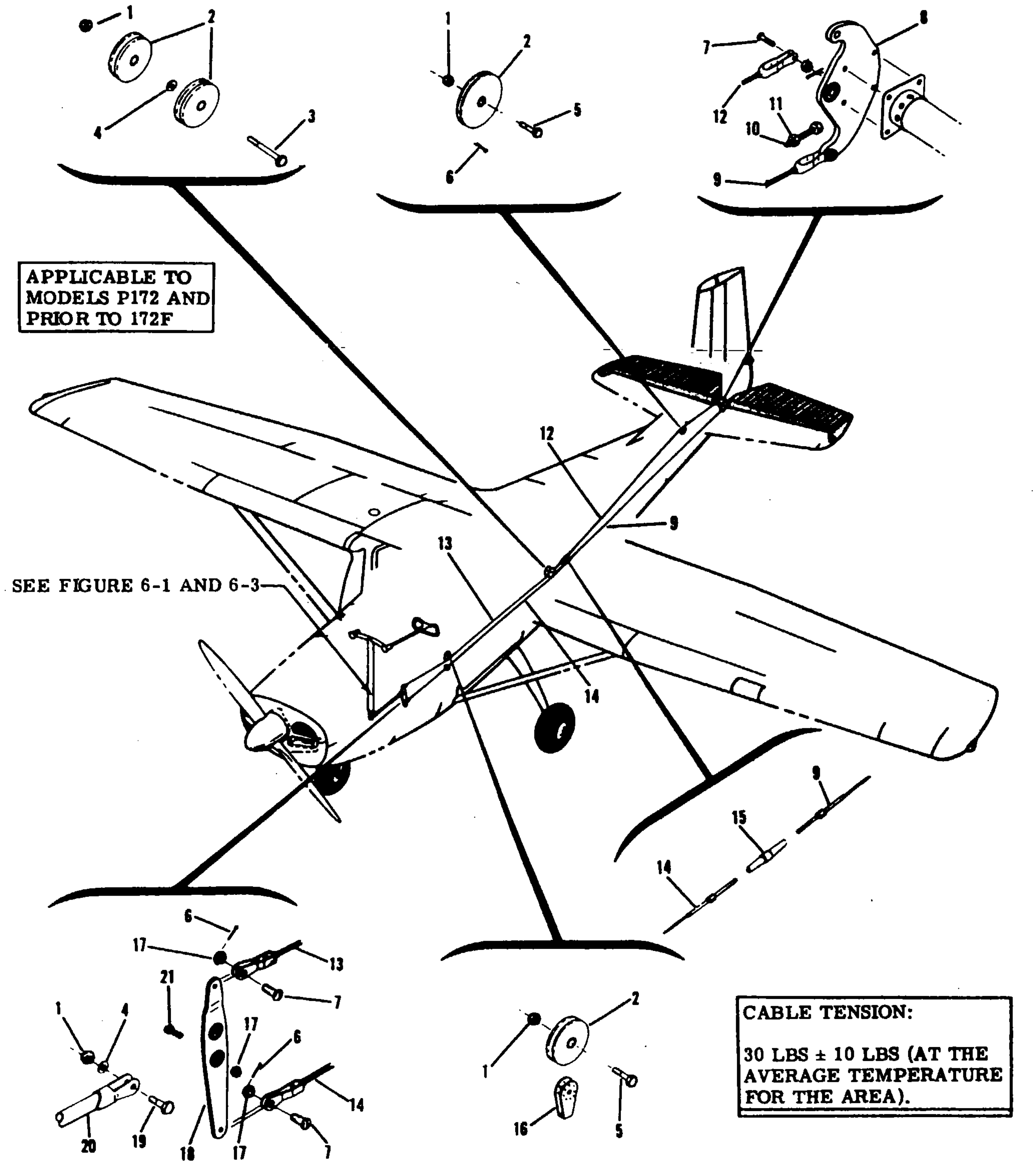
PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
BINDING OR JUMPY MOTION FELT IN MOVEMENT OF ELEVATOR SYSTEM (Cont).		
Defective control column needle bearing rollers.	Check visually.	Replace defective rollers.
Defective control column torque tube bearings.	Disconnect parts and check that torque tube rotates freely.	Replace defective bearings.
Glide on aft end of control square tube adjusted too tightly.	Remove control wheel and check glide for binding.	Loosen screw and tapered plug in end of glide enough to eliminate binding.
Lubrication needed.		Lubricate in accordance with figure 2-4.
Defective pulleys or cable guards.	Check manually.	Replace defective parts and install guards properly.
ELEVATOR FAILS TO ATTAIN PRESCRIBED TRAVEL.		
Stops incorrectly set.		Rig per paragraph 8-11.
Cables unevenly tightened.		Rig per paragraph 8-11.
Interference at firewall or instruments.	Check visually.	Rig per paragraph 8-11.
Forward bellcrank stop bolt (Models 180 and 185) adjusted incorrectly.	With rear bellcrank against elevator up stop, check for 1/8 inch clearance at forward bellcrank up stop.	Adjust per paragraph 8-11.

SHOP NOTES:



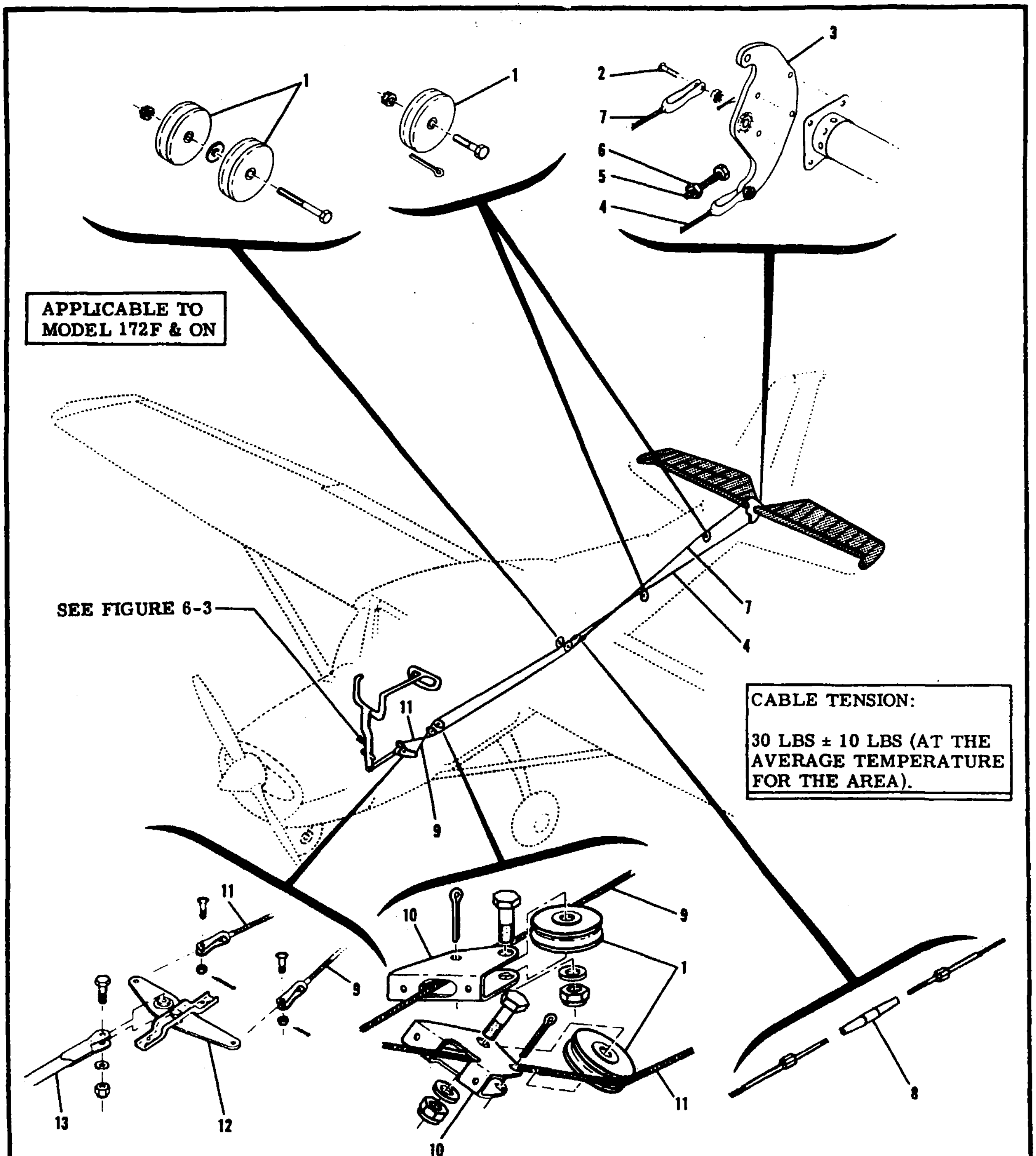
1.	Pulley	9.	Elevator Travel Stop	17.	Link
2.	Nut	10.	Jam Nut	18.	Forward Bellcrank
3.	Guard	11.	Turnbuckle	19.	Nut
4.	Bolt	12.	Cable Fork	20.	Washer
5.	Up Cable	13.	Bolt	21.	Nut
6.	Bolt	14.	Clevis Bolt	22.	Push-Pull Tube
7.	Elevator Bellcrank	15.	Nut	23.	Bolt
8.	Down Cable	16.	Cotter Pin	24.	Bolt

Figure 8-1. Elevator Control System - Model 150



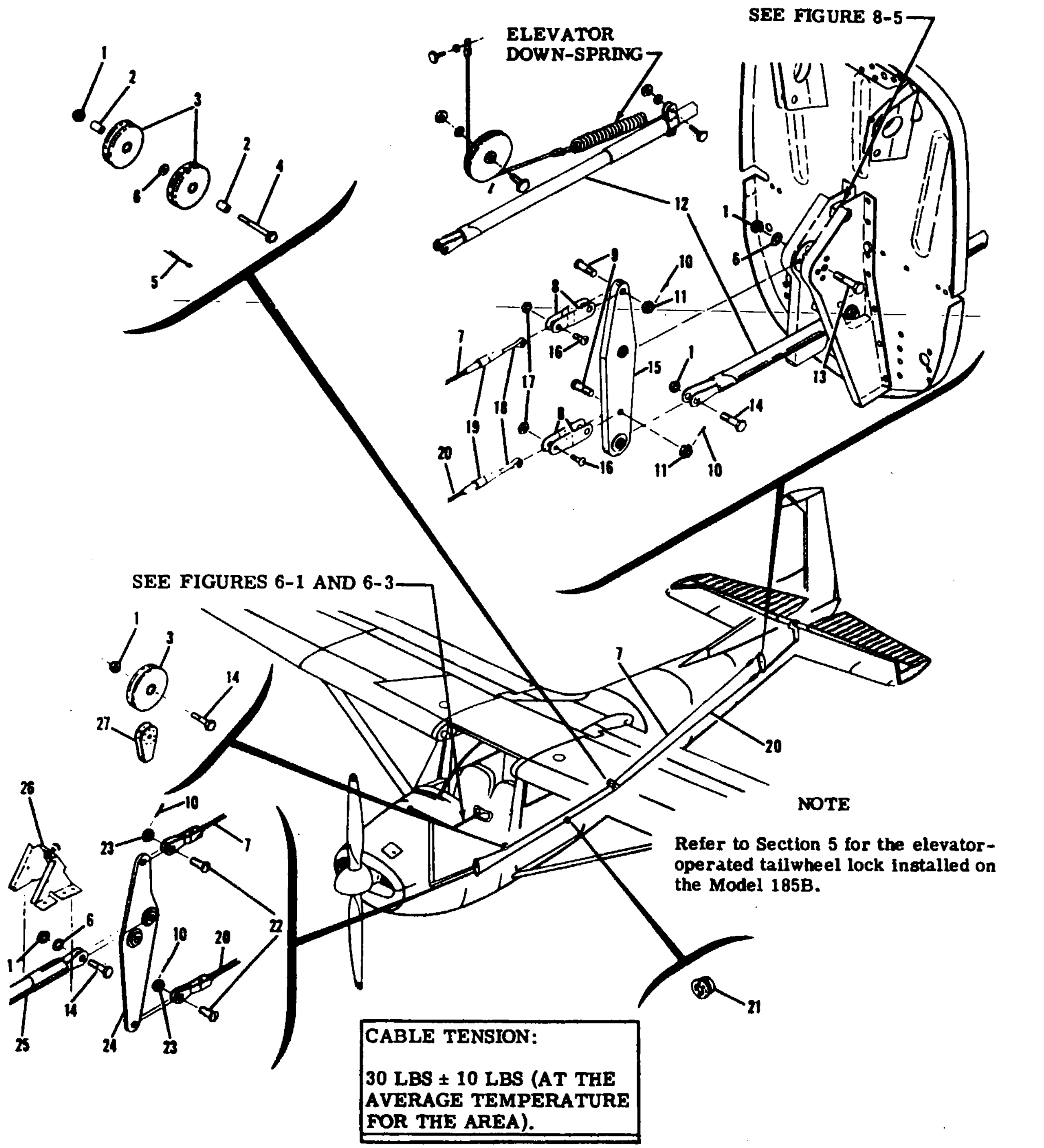
1. Nut
2. Pulleys
3. Bolt
4. Washer
5. Bolt
6. Cotter Pin
7. Clevis Bolt
8. Elevator Bellcrank
9. Rear Down Cable
10. Elevator Travel Stop
11. Jam Nut
12. Rear Up Cable
13. Forward Up Cable
14. Forward Down Cable
15. Turnbuckle
16. Cable Guard
17. Nut
18. Forward Bellcrank
19. Bolt
20. Elevator Push-Pull Rod
21. Bolt

Figure 8-2. Elevator Control System - Models 172 and P172 (Sheet 1 of 2)



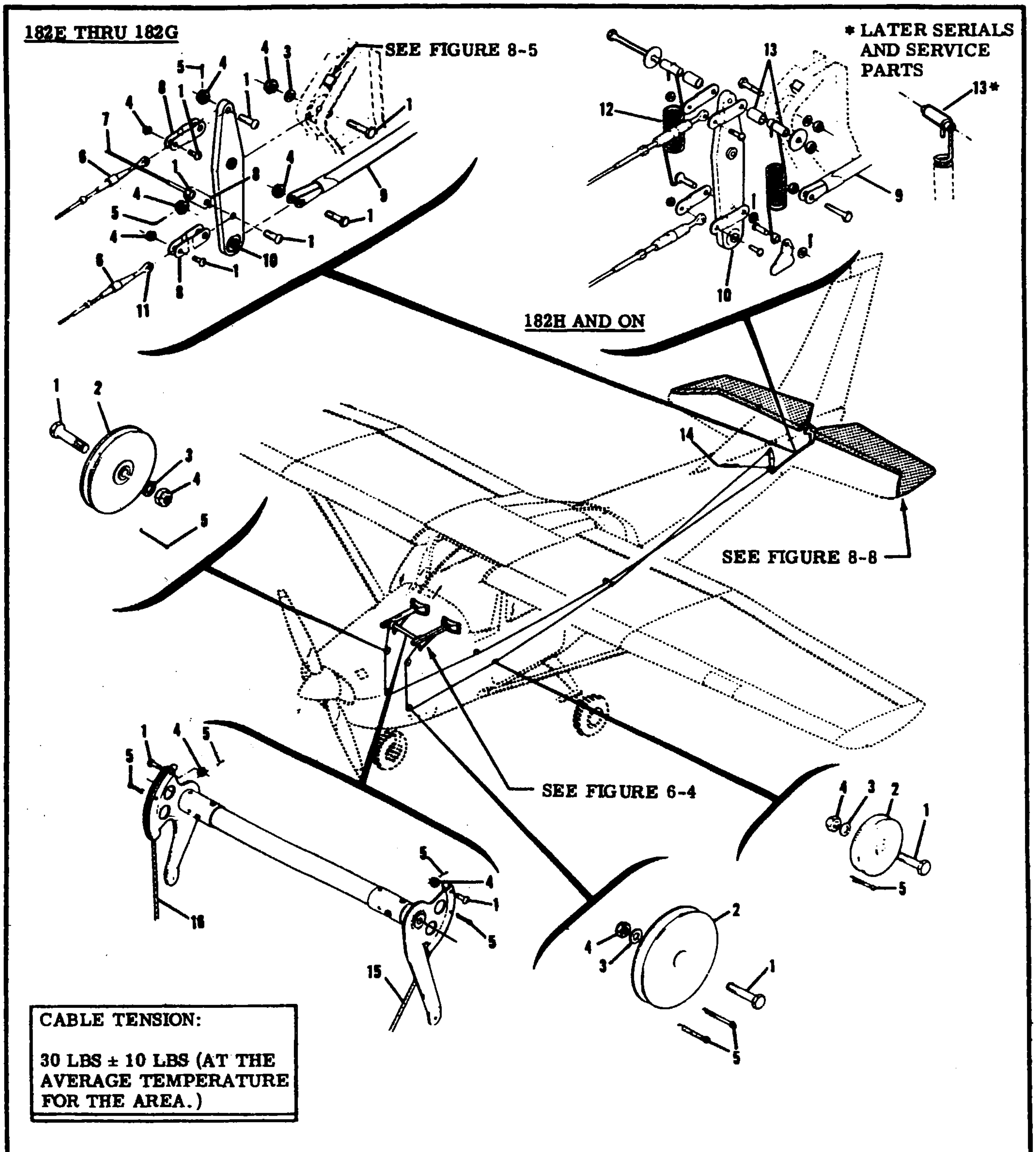
1. Pulley
2. Clevis Bolt
3. Elevator Bellcrank
4. Rear Down Cable
5. Elevator Travel Stop
6. Jam Nut
7. Rear Up Cable
8. Turnbuckle
9. Forward Down Cable
10. Bracket
11. Forward Up Cable
12. Forward Bellcrank
13. Elevator Push-Pull Rod

Figure 8-2. Elevator Control System - Models 172 and P172 (Sheet 2 of 2)



1. Nut
2. Spacer
3. Pulley
4. Bolt
5. Cotter Pin
6. Washer
7. Up Cable
8. Links
9. Bolt
10. Cotter Pin
11. Nut
12. Push-Pull Tube
13. Bolt
14. Bolt
15. Rear Bellcrank
16. Clevis Bolt
17. Nut
18. Turnbuckle Eye
19. Turnbuckle
20. Down Cable
21. Fairlead
22. Clevis Bolt
23. Nut
24. Forward Bellcrank
25. Push-Pull Tube
26. Bellcrank Stop
27. Cable Guard

Figure 8-3. Elevator Control System - Models 180 and 185



1. Bolt
2. Pulley
3. Washer
4. Nut
5. Cotter Pin
6. Turnbuckle
7. Elevator Down-Spring Cable
8. Link
9. Push-Pull Tube
10. Bellcrank
11. Turnbuckle Eye
12. Down-Spring
13. Spacer
14. Down-Spring
15. Left (Up) Elevator Cable
16. Right (Down) Elevator Cable

Figure 8-4. Elevator Control System - Model 182

8-4. REPLACEMENT OF COMPONENTS.

8-5. ELEVATORS.

a. Remove stinger on Models 180, 182, and 185.

b. When removing an elevator with an attached trim tab, disconnect the trim tab push-pull tube at the trim tab. Do not move the trim control wheel or rotate the actuator screw while the trim tab is disconnected, or the trim system will have to be rerigged.

c. Remove bolts attaching elevators to elevator pylon or arm assembly.

d. On some Model 185 airplanes, a tailwheel anti-swiveling lock cable must be disconnected from the elevator pylon or arm assembly.

e. Remove bolts at each elevator hinge point and remove elevator.

f. Reverse the preceding steps to install the elevators. Check elevator and elevator trim tab travels, and rerig if necessary.

8-6. CONTROL COLUMN replacement is described in Section 6.

8-7. REAR BELLCRANK (Models 180, 182, and 185).

a. On all tricycle gear airplanes, position a support stand under the tail tie-down ring to prevent the tailcone from dropping while working inside the tailcone.

b. Loosen elevator cables at turnbuckles in aft tailcone, then disconnect elevator cables from rear bellcrank.

c. Disconnect elevator down-spring system at the rear bellcrank on the Model 182. On the Models 180 and 185, the down-spring system need not be disconnected if care is used when disconnecting the rear push-pull tube.

d. Disconnect rear push-pull tube at rear bellcrank.

e. Remove bellcrank by removing bolt attaching it to support bracket.

f. Reverse the preceding steps to install the rear bellcrank. Refer to paragraph 8-11 for rigging procedure.

NOTE

The elevator pylon or arm assembly, to which each elevator is attached, can be removed without removing the elevators. Remove stinger, disconnect rear push-pull tube, remove bolts attaching elevators to the pylon or arm assembly, and remove pivot bolt. On some Model 185 airplanes, the tailwheel anti-swiveling lock cable must be disconnected from the pylon or arm assembly.

8-8. REAR BELLCRANK (Models 150, 172, and P172).

a. Remove rudder.

b. Remove bolts attaching elevators to rear bellcrank, and either support elevators at inboard ends or remove elevators.

c. Loosen elevator cable turnbuckles, then disconnect elevator cables from rear bellcrank.

d. Remove bellcrank pivot bolt and remove bellcrank. On the Model 150, it may be necessary to remove one of the stabilizer attaching bolts for clearance when removing the bellcrank pivot bolt.

e. Install the rear bellcrank by reversing the preceding steps. Refer to paragraph 8-11 for rigging procedure.

8-9. FORWARD BELLCRANK (All Models except Model 182). Refer to Section 6 for removal of forward components in the Model 182.

NOTE

Access to the forward bellcrank on the Model 150 is gained by removing large access plates from the front seat pans. Access to the forward bellcrank on the Model 172F and on is gained by removing access plates from the floor just aft of the pedestal console. On other models, remove front seats, tunnel cover plate, and access plate on the underside of the fuselage adjacent to the bellcrank.

a. Loosen elevator cables at turnbuckles, then disconnect cables from bellcrank.

b. Disconnect forward push-pull tube from bellcrank.

c. Remove bellcrank pivot bolt and remove bellcrank.

d. Install the forward bellcrank by reversing the preceding steps. Refer to paragraph 8-11 for rigging procedure.

8-10. CABLES in the elevator control system can be removed and installed more easily if a guide wire is attached to one end and the cable pulled out from the opposite end. Leave the guide wire in place to aid installation. Pulleys and cable guards must be removed before cables can be removed. When cables are installed, be sure that cables are in pulley grooves, cable guards are installed, and turnbuckles are safetied. Refer to paragraph 8-11 for rigging procedure.

8-11. RIGGING.

NOTE

An inclinometer for measuring control surface travel is available from the Cessna Service Parts Center. Refer to figure 6-12.

8-12. Models 150, 172, and P172 are equipped with adjustable elevator stop bolts, the heads of which contact the rear elevator bellcrank to limit travel. The Model 182 is equipped with elevator stops which are four-sided bushings, drilled off-center so they may be rotated to any one of four positions to attain correct travel. Each 90-degree rotation changes elevator travel approximately one degree. Travels are relative to horizontal stabilizer. Neutral position of elevators is the position where elevators are streamlined with the stabilizer. Disregard counterweight areas of elevators when streamlining, since some models have these areas contoured to streamline elevator tips in cruise flight.

a. Set elevator stops to attain travel specified for particular model in the applicable chart in Section 1.

b. Tighten elevator cables to tension shown on applicable illustration in this section. Turnbuckles should be adjusted so the control column does not contact the instrument panel in the full-up position and the forward bellcrank does not contact the firewall in the full-down position.

c. Models 150, 172, and P172 are not equipped with an elevator down-spring system. On the Model 182, the down-spring is not adjustable.

d. Check that all safeties are installed, all parts are secure, then reinstall all parts removed for access.

WARNING

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

8-13. The Models 180 and 185 are equipped with two elevator stops, attached to the rear elevator bellcrank bracket (see figure 8-5). These stops are four-sided bushings, drilled off-center so they may be rotated to any one of four positions to attain control travel. Each 90-degree rotation changes elevator travel approximately one degree.

a. With horizontal stabilizer leading edge full down, set elevator stop bushings to attain travel specified in applicable chart in Section 1.

NOTE

An additional stop bolt is located at the forward bellcrank on Models 180 and 185. Adjust this stop bolt for 1/8 inch clearance from the forward bellcrank, while the rear bellcrank is against the rear up-stop. The purpose of this additional stop bolt is to furnish a positive stop, so that excessive back pressure on the control wheel will not stretch control cables and allow instrument panel to be contacted with control column.

b. Tighten elevator cables to tension shown in figure 8-3. Adjust turnbuckles so control column does not contact instrument panel in full-up position, and forward bellcrank does not contact firewall in full-down position.

c. With horizontal stabilizer leading edge full-down, adjust elevator down-spring tension by moving down-spring clamp along the rear push-pull tube. Position clamp in approximately position indicated in figure 8-5.

d. Check that all safeties are installed, all parts are secure, then reinstall all parts removed for access.

WARNING

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

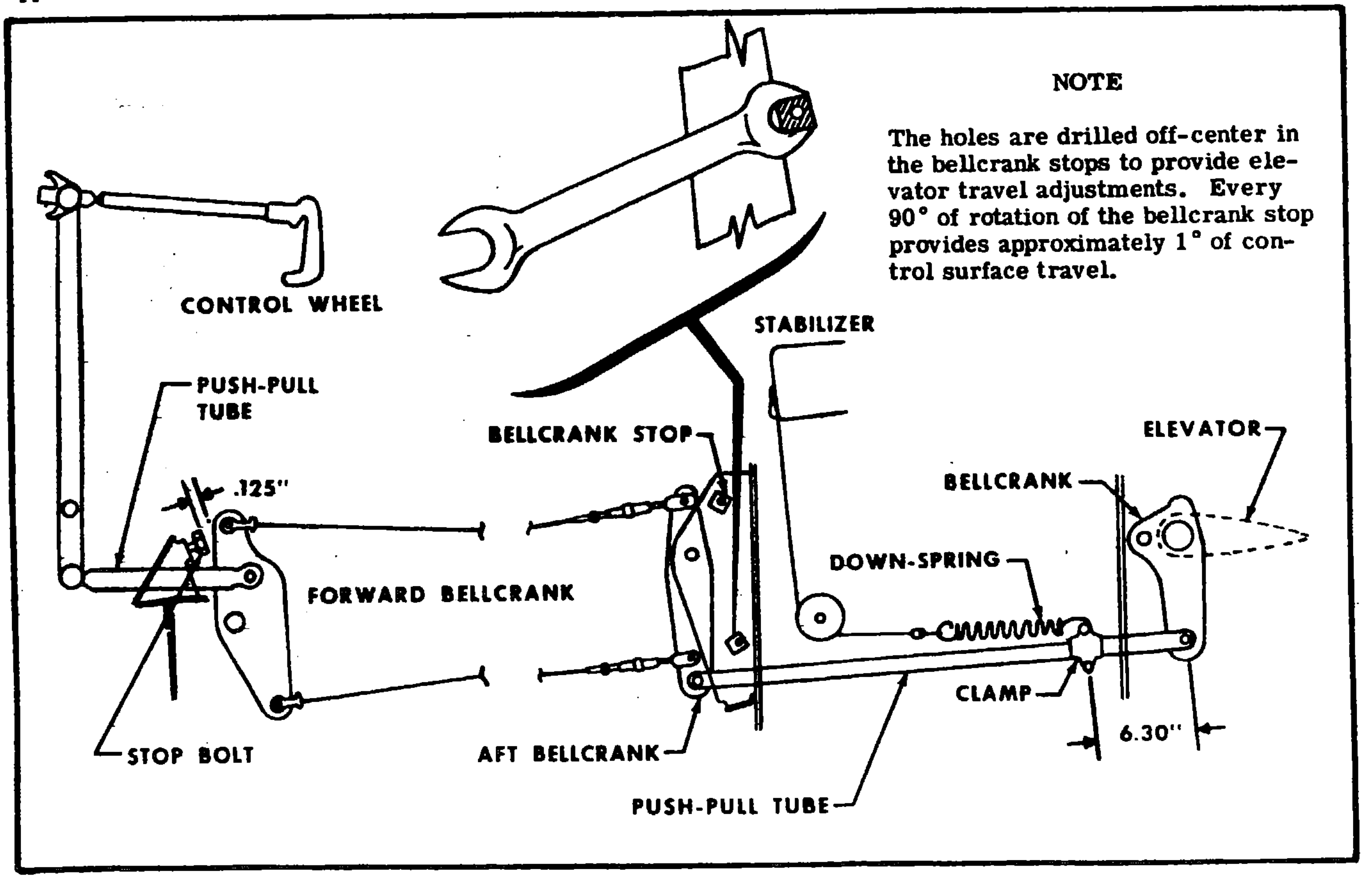
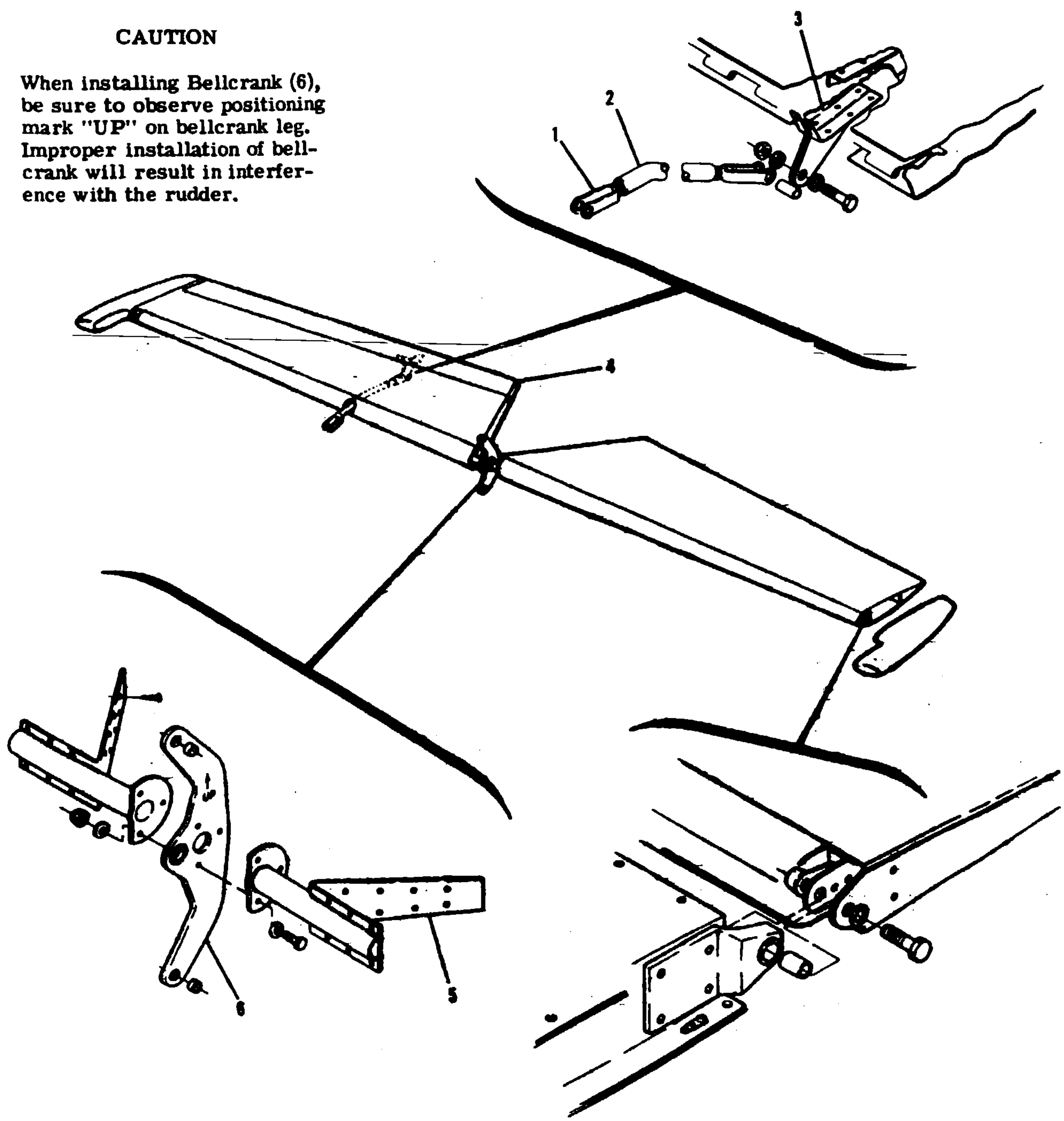


Figure 8-5. Rigging Elevator System (Models 180 & 185)

CAUTION

When installing Bellcrank (6), be sure to observe positioning mark "UP" on bellcrank leg. Improper installation of bellcrank will result in interference with the rudder.

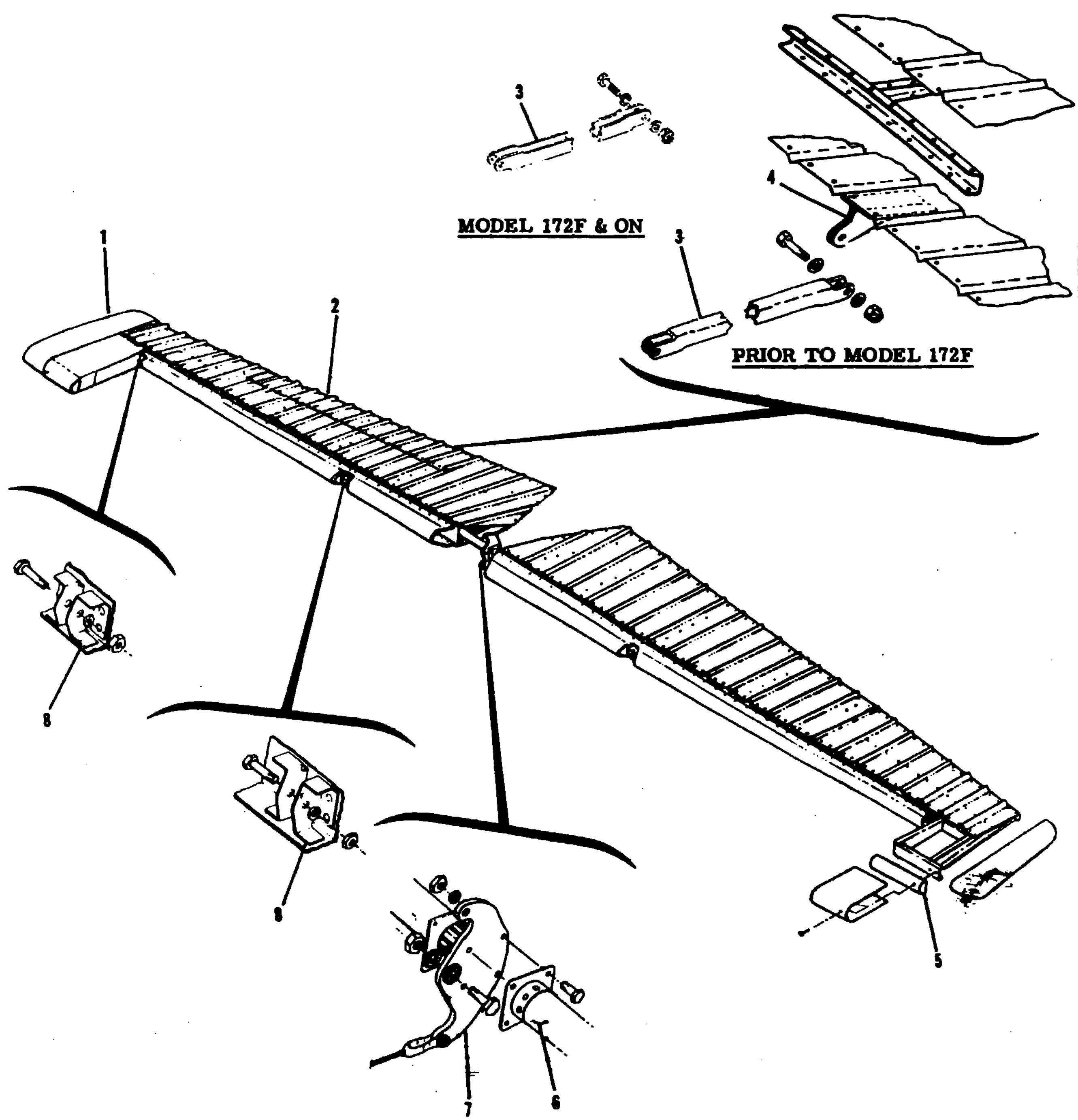


NOTE

Beginning with the Model 150D, an aerodynamic balance weight is included in each elevator tip.

1. Clevis
2. Rod Assembly
3. Horn Assembly
4. Trim Tab
5. Tube Assembly
6. Bellcrank

Figure 8-6. Elevator Installation - Model 150



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

Figure 8-7. Elevator Installation - Model 172 and P172

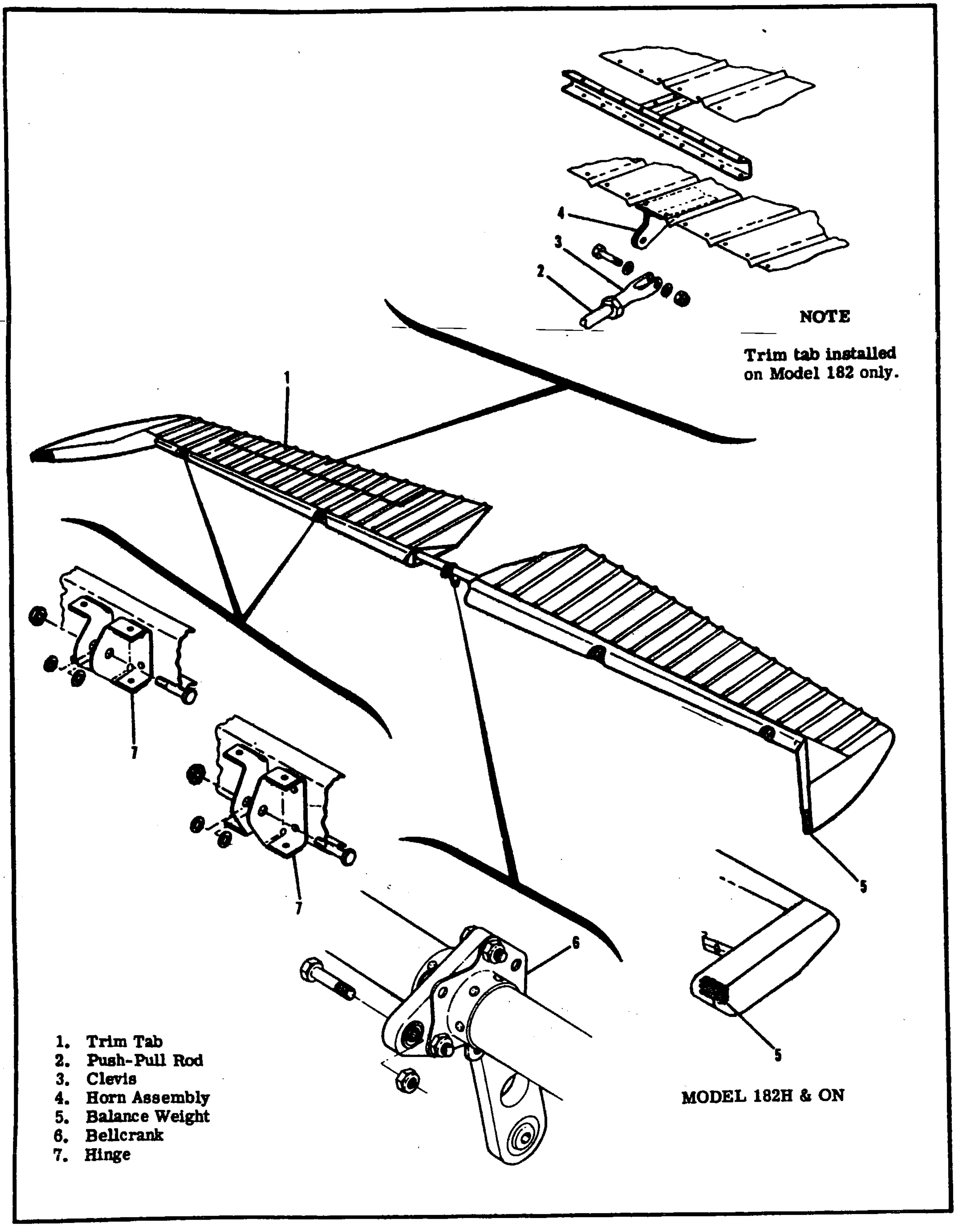


Figure 8-8. Elevator Installation - Models 180, 182, and 185

SECTION 9

ELEVATOR TRIM TAB CONTROL SYSTEM

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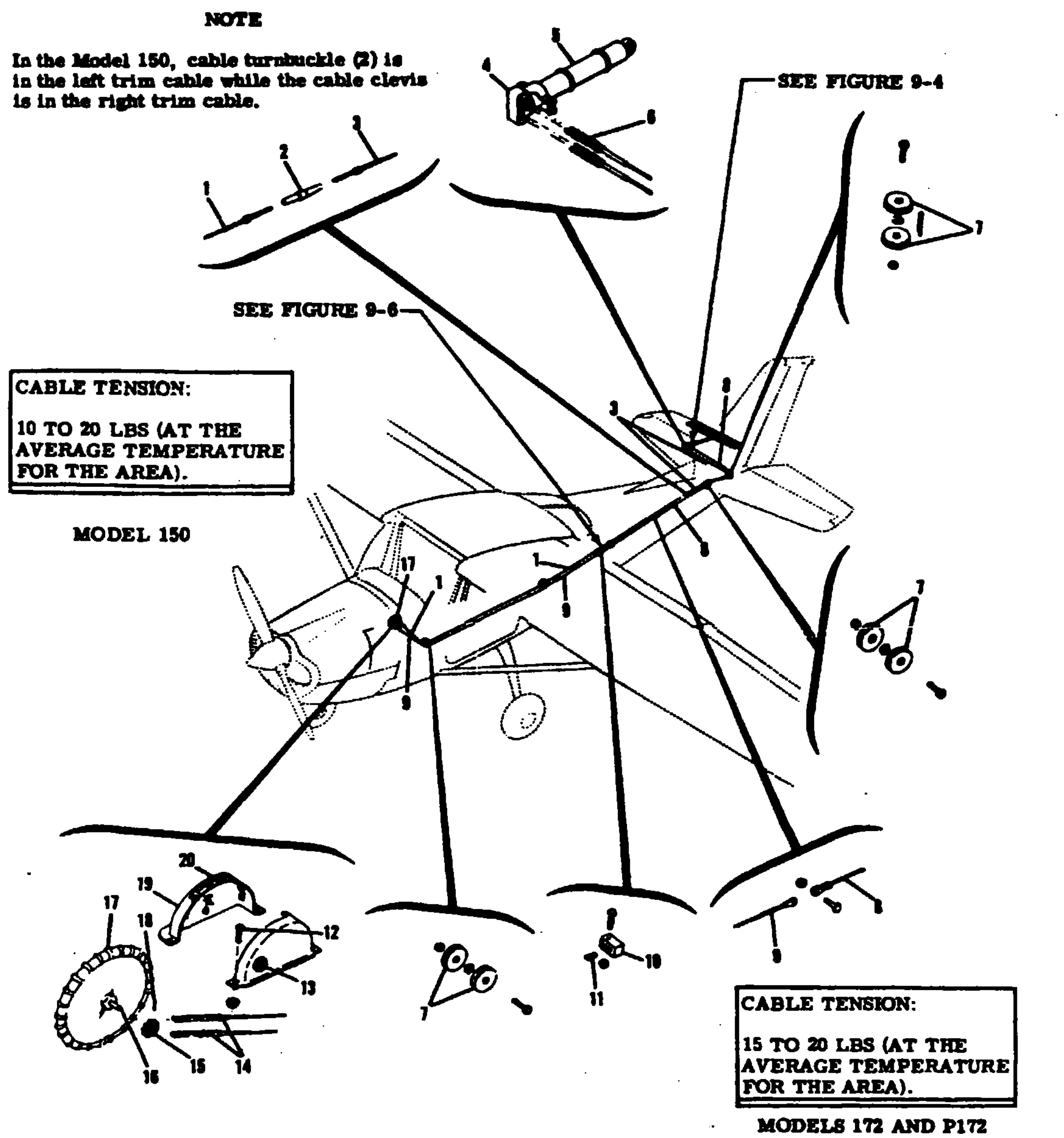
9-1. ELEVATOR TRIM TAB CONTROL SYSTEMS

9-2. The Models 150, 172, P172, and 182 are equipped with a trim tab located on the trailing edge of the right elevator. Prior to the Model 150F, the trim tab is operated by a control wheel mounted to the right of the pilot's seat. In the Models 172 and P172, prior to the Model 172F, the trim tab control wheel is in the tunnel. In the Models 182, 172F, and On, the trim tab control wheel is mounted in the console. A portion of the wheel extends through the control wheel cover and when rotated, operates the tab through roller chains, cables, an actuator, and a push-pull rod. A position indicator at the trim tab control wheel indicates nose attitude of the airplane. In the Models 180 and 185, stabilizer attitude is adjustable, providing longitudinal trim afforded by the elevator trim tab on the other models. (See Section 11 for the stabilizer control system on the 180 and 185.)

9-3. TROUBLE SHOOTING – ELEVATOR CONTROLS

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
TRIM CONTROL WHEEL MOVES WITH EXCESSIVE RESISTANCE.		
Cable tension too high.	Check cable tension.	Adjust tension.
Pulleys binding or rubbing.	Visually check pulleys.	Install cables correctly.
Cables not in place on pulleys	Visually check pulleys.	Install cables correctly
Trim tab hinge binding.	Disconnect the actuator and move the tab up and down to check hinge resistance.	Lubricate or replace hinge as necessary.
Defective trim tab actuator.	Remove the chain from actuator sprocket and operate the actuator with fingers.	Replace the actuator.
Rusty chain.	Visually check the chain.	Remove and replace the rusty chain.
Damaged sprocket.	Visually check the sprockets.	Remove and replace the damaged sprockets.
Bent sprocket shaft.	Observe motion of the sprockets.	Remove and replace the bent sprocket shafts.
LOST MOTION BETWEEN CONTROL WHEEL AND TRIM TAB.		
Cable tension too low.	Check cable tension.	Adjust cable tension.
Broken pulley	Visually check the pulley.	Replace defective pulley.
Cables not in place on pulley.	Visually check cables.	Install the cables correctly.
Worn trim tab actuator.	Visually check actuator for excessive play.	Remove and replace the worn actuator.
Actuator attachment loose.	Attempt to shake actuator	Tighten.
TRIM INDICATOR FAILS TO INDICATE CORRECT TRIM POSITION.		
Indicator incorrectly engaged on the wheel track.		Reset the indicator.
INCORRECT TRIM TAB TRAVEL.		
Stop blocks loose or incorrectly adjusted.		Adjust the stop blocks on the cables.

SHOP NOTES:



1. Right Forward Cable
2. Turnbuckle
3. Right Aft Cable
4. Chain Guard
5. Elevator Trim Actuator
6. Aft Chain
7. Pulley
8. Left Aft Cable
9. Left Forward Cable
10. Stop Block
11. Bushing
12. Screw
13. Bearing
14. Forward Chain
15. Sprocket
16. Shaft
17. Elevator Trim Wheel
18. Roll Pin
19. Cover Half
20. Position Pointer

Figure 9-1. Elevator Trim Tab System – Models P172 and Prior to 150F and 172F

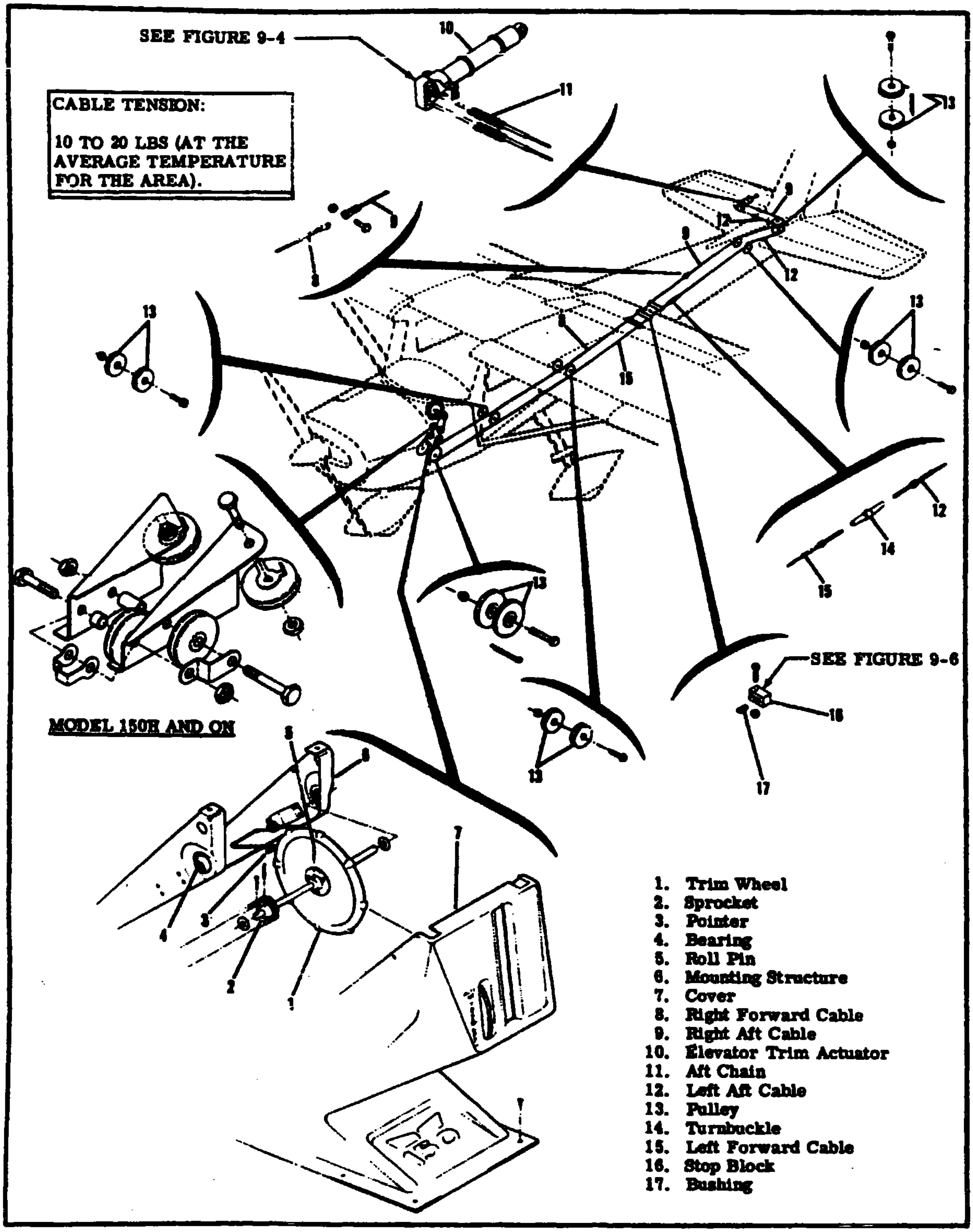


Figure 9-1A. Elevator Trim Tab System – Model 150F and On

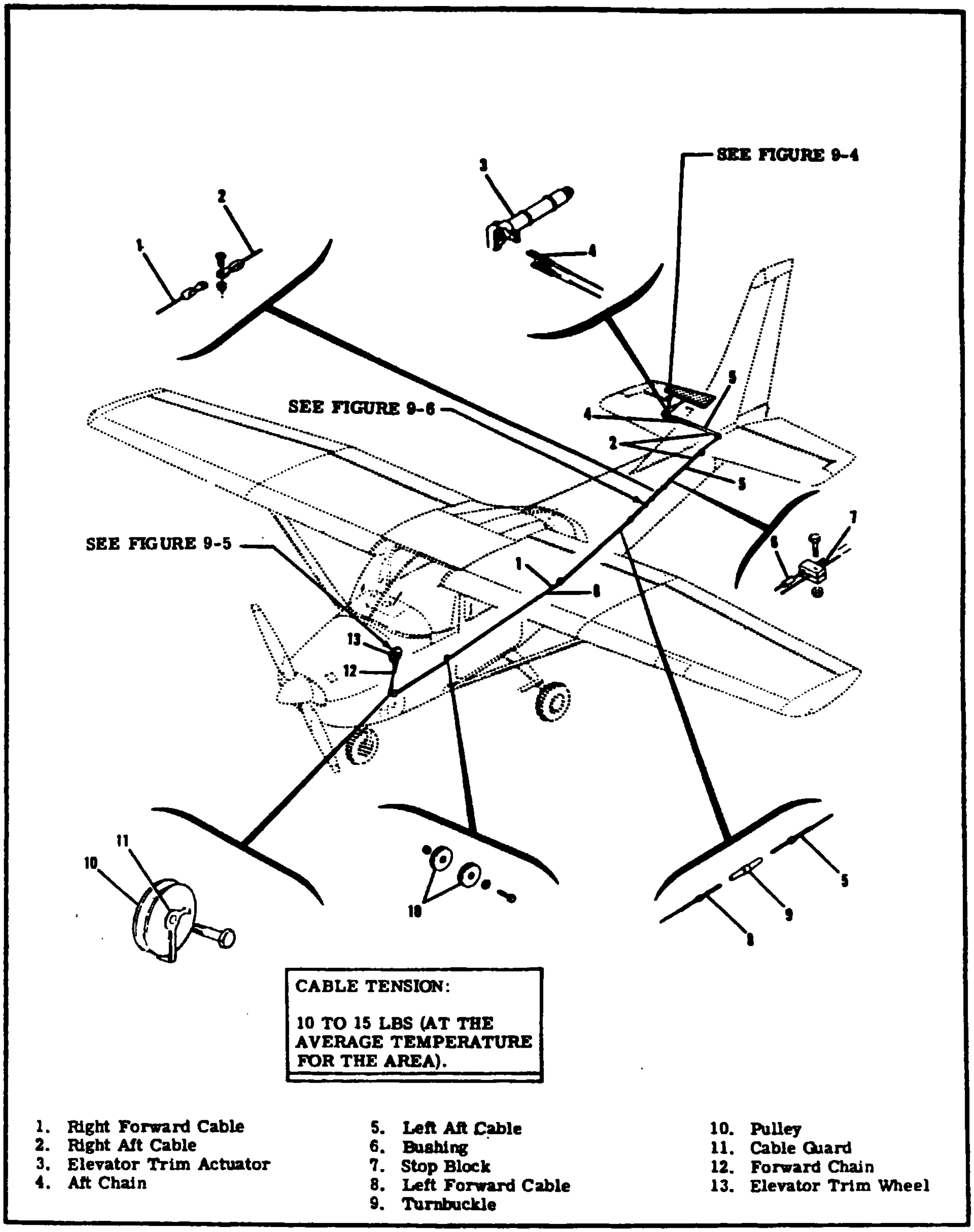


Figure 9-2. Elevator Trim Tab System – Model 182

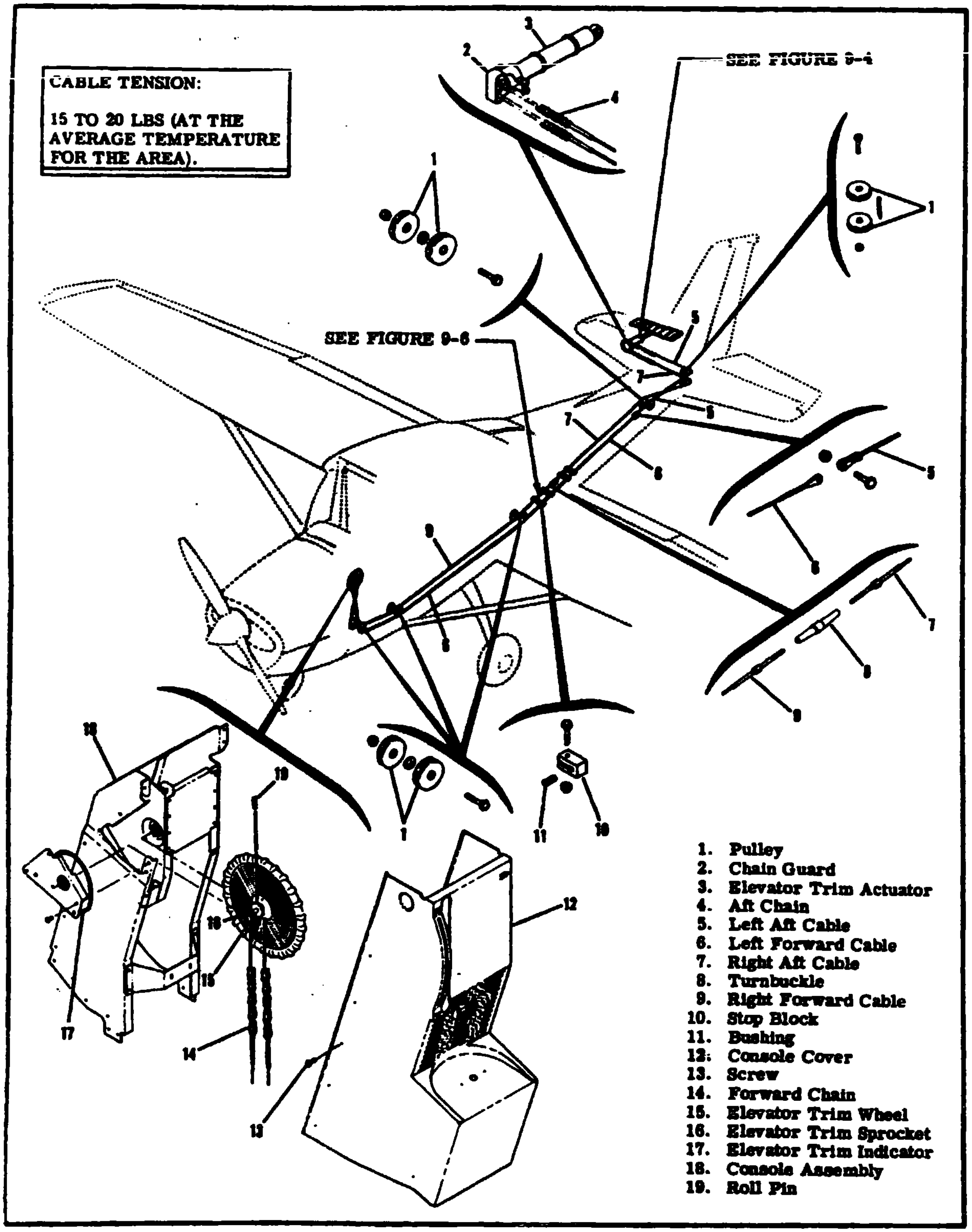


Figure 9-3. Elevator Trim Tab System – Model 172F and On

9-4. REMOVAL AND INSTALLATION OF ELEVATOR TRIM TAB.

1. Disconnect the push-pull rod from the arm on the trim tab.
2. Drill out rivets attaching the trim tab hinge to the elevator.

   NOTE: After the trim tab has been removed and if the hinge pin is to be removed, it is necessary to spread the crimped ends of the hinge before driving the hinge pin out. When a hinge pin has been installed, crimp the ends of the hinge to prevent the hinge pin from working out of the hinge.

3. To install the elevator trim tab, install hinge pin through hinge halves and rivet the hinge and tab assembly to the elevator.
4. Connect the push –pull rod to the arm on the trim tab and rig the system in accordance with paragraph 9-10.

9-5. REMOVAL AND INSTALLATION OF ELEVATOR TRIM TAB ACTUATOR (See Figure 9-4)

1. Release the trim tab cable tension at the turnbuckle.
2. Disconnect the push-pull rod from the actuator.
3. Remove the access cover on the lower skin of the stabilizer beneath the trim tab actuator.
4. Loosen the chain guard at the forward end of the actuator and disengage the chain from the actuator sprocket.
5. On Models 172, P172, and 182, remove the screws and clamps that attach the actuator to the bracket.

   NOTE: After the trim tab has been removed and if the hinge pin is to be removed, it is necessary to spread the crimped ends of the hinge before driving the hinge pin out. When a hinge pin has been installed, crimp the ends of the hinge to prevent the hinge pin from working out of the hinge.

6. On the Model 150, remove the screws and spacers attaching the actuator clamps to the stabilizer rib.
7. To install the elevator trim tab actuator, reverse the preceding steps. Rig the elevator trim system in accordance with paragraph 9-10.

9-6. OVERHAUL OF TRIM TAB ACTUATOR

1. Do not remove bearing from threaded rod end unless replacement of bearing is necessary.
2. Clean all component parts, except bearing, by washing in Stoddard solvent or equivalent. Do not clean sealed bearing.
3. Inspect all component parts for obvious indications of damage such as stripped threads, cracks, deep nicks and dents.
4. Check bearings, screw and threaded rod end for excessive wear and scoring. Refer to Table 201 for dimensions.

TABLE 201 - Actuator Wear Limits

COMPONENT	MAXIMUM DIMENSION	MINIMUM DIMENSION
Forward End Bearing Inside Diameter	0.374 Inch	0.373 Inch
Aft End Bearing Inside Diameter	0.249 Inch (Small Hole)	0.248 Inch (Small Hole)
Aft End Bearing Inside Diameter	0.374 Inch (Large Hole)	0.373 Inch (Large Hole)
Threaded Rod End Outside Diameter	0.246 Inch (Shank)	0.245 Inch (Shank)
Threaded Rod End Outside Diameter	0.370 Inch (Threads)	0.369 Inch (Threads)

NOTE: Relative linear movement between internal threaded screw and bearing should be 0.004 to 0.010 inch at room temperature.

5. Examine threaded rod end and screw for damaged threads or dirt particles that may impair smooth operation.
6. Check sprocket for broken, chipped and/or worn teeth.
7. Check bearing for smoothness of operation.
8. Do not attempt to repair damaged or worn parts of the actuator assembly. Discard all defective items and install new parts during reassembly.
9. Lubricate the actuator with Dow 33 grease.

9-7. REMOVAL AND INSTALLATION OF ELEVATOR TRIM TAB CONTROL WHEEL – EXCEPT MODELS 182, 172F AND ON, AND 150F AND ON. (See Figure 9-1)

1. Release the trim tab cable tension at the turnbuckle.
2. Remove the screws that attach the control wheel cover to the floor or tunnel.
3. Remove the screw, and separate the control wheel cover halves and disengage the roller chain from the control wheel sprocket.

   NOTE: Removal of the sprocket from the control wheel shaft is not recommended except for replacement of parts.

4. To install the trim tab control wheel, reverse the preceding steps. Rig the elevator trim system in accordance with paragraph 9-10.

9-8. REMOVAL AND INSTALLATION OF ELEVATOR TRIM TAB CONTROL WHEEL –MODELS 182, AND 172F AND ON. (See Figures 9-3 and 9-5.)

1. Release the trim tab cable tension at the turnbuckle.
2. Remove the fuel selector valve handle and placard.
3. Remove the cowl flap control knob (Model 182) and screws that attach the console cover.
4. Remove the cover.
5. Remove the screws that attach the trim tab control wheel retainer to the left side of the console structure.
6. Remove the retainer and pointer, using care that the trim control wheel is not dropped.

7. Disengage the roller chain from the sprocket on the trim control wheel and remove the wheel.

NOTE: Removal of the sprocket from the control wheel shaft is not recommended except for replacement of parts.

8. To install the trim control wheel, reverse the preceding steps. Rig the elevator control system in accordance with paragraph 9-10.

9-8A. REMOVAL AND ISTALLATION OF THE ELEVATOR TRIM TAB CONTROL WHEEL – MODEL 150F AND ON. (See Figure 9-1A.)

1. Release the trim tab cable tension at the turnbuckle.
2. Remove the screws securing the cover (7) to structure, then remove the cover.
3. Drill the rivets from one side of the support structure at the brace, and at the point where support structure joins the instrument panel.
4. Carefully spread the structure enough to slide the shaft assembly free of the bearings (4).
5. Replace parts as necessary, then reverse procedure to install the trim control wheel. Rig elevator trim system per paragraph 9-10.

9-9. REPLACEMENT OF CABLES AND CHAINS

Replacement of cables and chains in the elevator trim system may be accomplished using Figures 9-1, 9-1A, 9-2, and 9-3 as guides. Cables and chains can be removed and installed more easily if a guide wire is attached to cable ends and the cable pulled from the system. Leave the guide wires in place to aid installation. Remove pulleys and cable guards as necessary to allow cable ends to pass through the system. When installing cables, attach the cable ends to the guide wires and pull cables through the system. When cables are installed, make sure that the cables are in the pulley grooves, and the chains are properly installed over the sprockets. Rig the elevator control system in accordance with paragraph 9-10.

9-10. RIGGING ELEVATOR TRIM CONTROL SYSTEM. (See Figures 9-1, 9-1A, 9-2, 9-3, and 9-6.)

1. Loosen travel stop blocks on the trim tab cables and disconnect the actuator screw from the link to the trim tab.
2. Check the cable tension and readjust turnbuckle if necessary. Re-safety the turnbuckle. If chains and/or cables are being installed, permit actuator screw to rotate freely as chains and cables are connected, set the cable tension with the turnbuckle, and safety the turnbuckle.
3. Rotate the trim control wheel full forward (nose down), making sure the pointer does not restrict trim wheel movement. If it is necessary to reposition the pointer to where it will not restrict trim wheel movement, use a thin screwdriver to pry the trailing leg of the pointer out of the groove.

NOTE: Full forward (nose down) position of the trim wheel is the position where further movement is prevented by the chain or cable ends contacting sprockets or pulleys.

4. With the elevator and trim tab both in neutral (streamlined), place the inclinometer on the tab and set to zero. Disregard the counterweight areas of the elevators when streamlining. These areas are contoured so that they will be approximately 3° down at cruising speed.

NOTE: An inclinometer for measuring control surface travel is available from the Cessna Service Parts Center. Refer to Figure 6-12.

5. Rotate the actuator screw in or out as required to place the trim tab up with a maximum of 2° over-travel when the actuator screw is connected to the link from the trim tab.

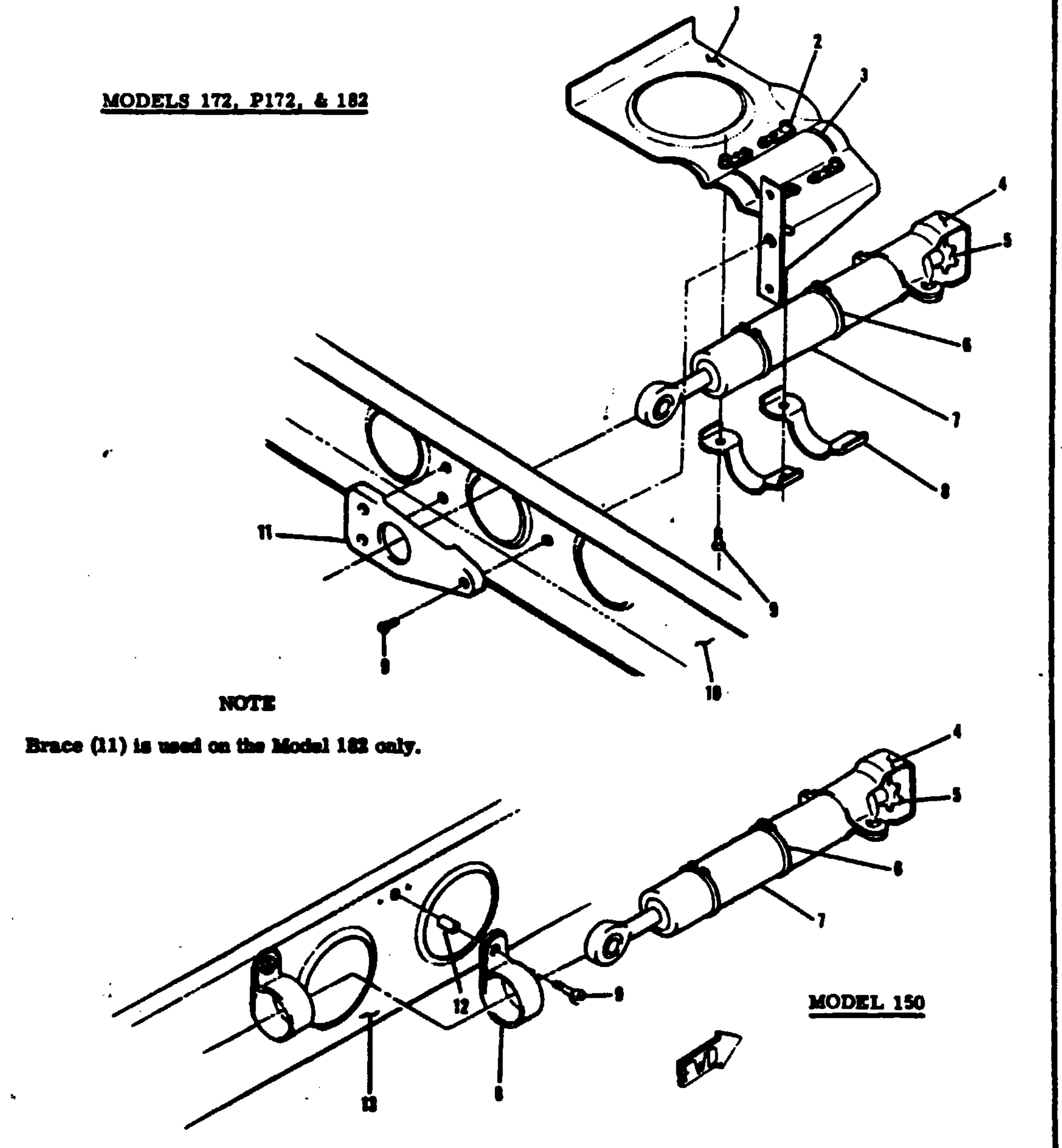
6. Rotate the trim control wheel to place the trim tab up and down, re-adjusting the actuator screw as required to obtain over-travel in both directions.

7. Position the stop blocks and adjust as shown in Figure 9-6 to limit travel as noted in Section 1.
8. Check that the trim wheel pointer travels the same distance from the ends of the slot in the cover. Re-position trailing leg of the pointer if necessary (Refer to step 3).

9. Check that all safeties are installed and all parts are secure, then reinstall all parts removed for access.

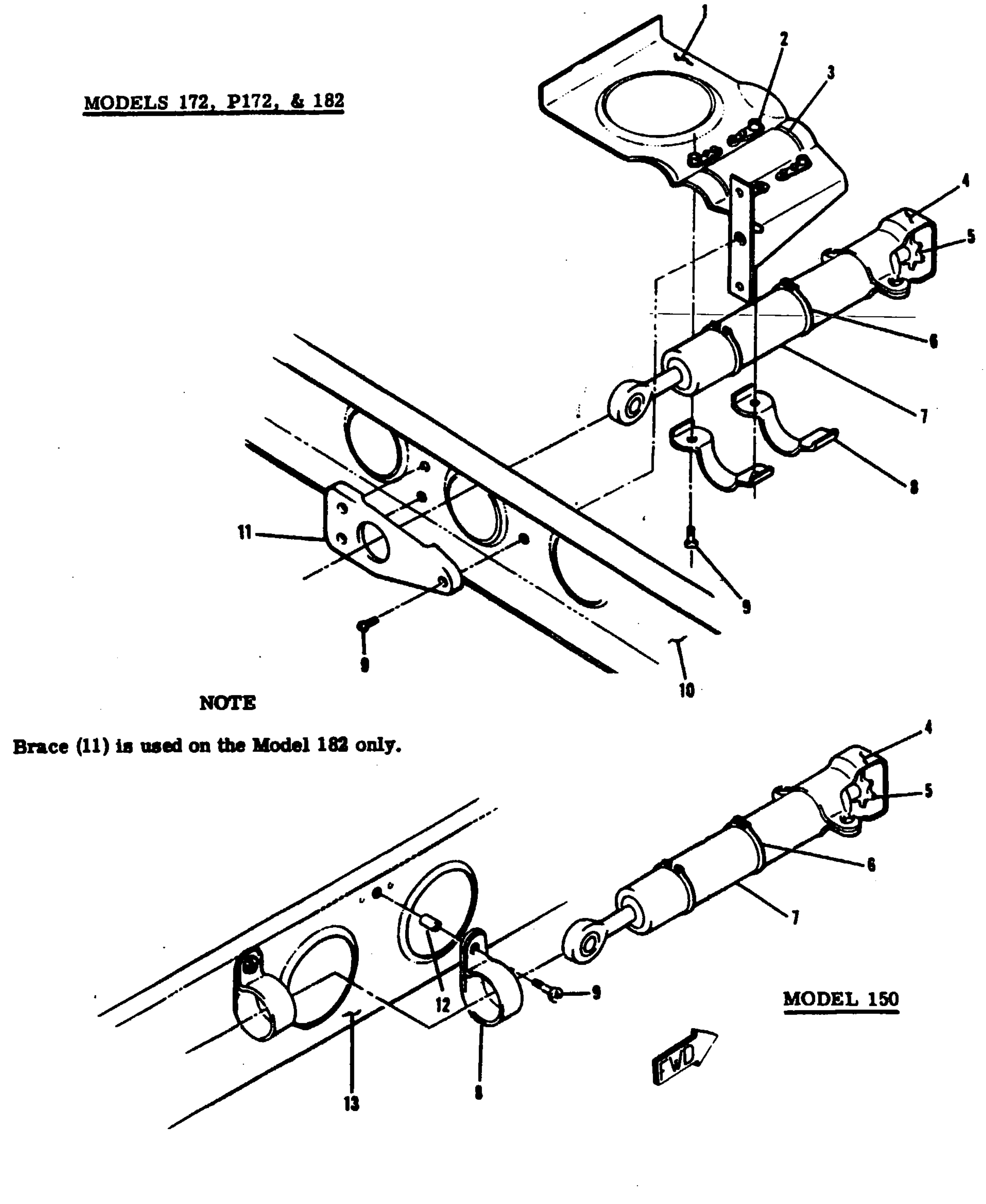
WARNING: BE SURE THE TRIM TAB MOVES IN THE CORRECT DIRECTION WHEN OPERATED BY THE TRIM CONTROL WHEEL. NOSE DOWN TRIM CORRESPONDS TO TAB UP POSITION.

SHOP NOTES:



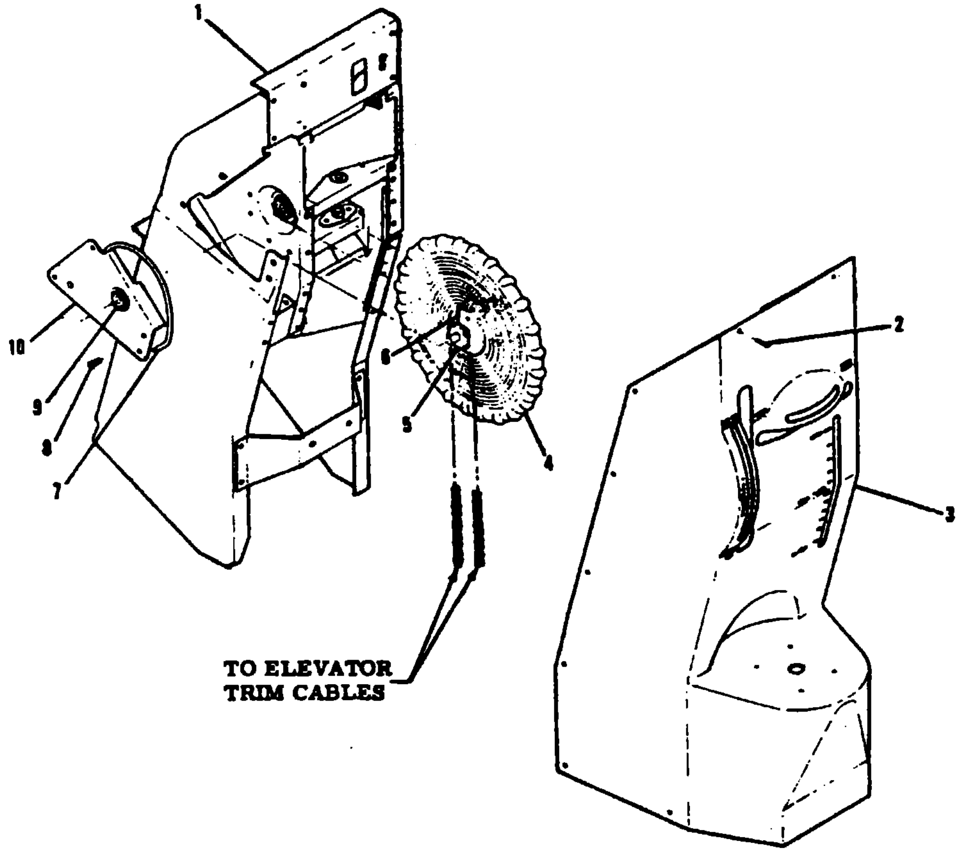
1. Support Bracket
2. Nutplate
3. Retainer Slot
4. Chain Guard
5. Sprocket
6. Retainer Ring
7. Actuator
8. Clamp
9. Screw
10. Stabilizer Rear Spar
11. Brace
12. Spacer
13. Stabilizer Rib

Figure 9-4. Elevator Trim Tab Actuator Installation



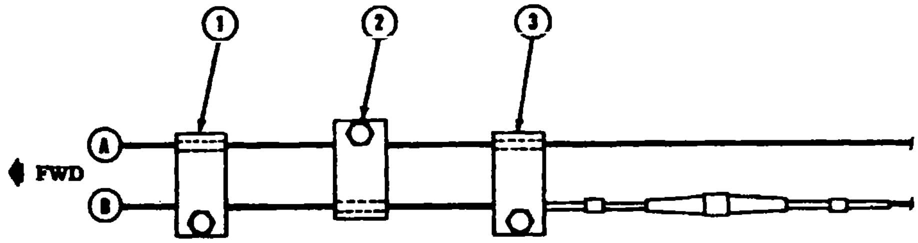
1. Support Bracket
2. Nutplate
3. Retainer Slot
4. Chain Guard
5. Sprocket
6. Retainer Ring
7. Actuator
8. Clamp
9. Screw
10. Stabilizer Rear Spar
11. Brace
12. Spacer
13. Stabilizer Rib

Figure 9-4. Elevator Trim Tab Actuator Installation



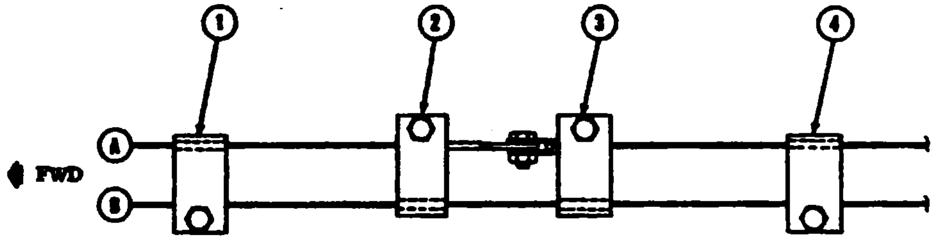
1. Console Structure
2. Screw
3. Console Cover
4. Elevator Trim Wheel
5. Elevator Trim Sprocket
6. Pin
7. Elevator Trim Indicator
8. Screw
9. Bearing
10. Retainer

Figure 9-5 Model 182 Elevator Trim – Console Components



MODEL 150

1. With elevators in neutral, set trim tab to neutral (streamlined).
2. Position stop block (3) against turnbuckle and secure to cable B.
3. Place inclinometer on trim tab and lower tab to degree specified in Section 1.
4. Position stop block (2) against stop block (3) and secure to cable A.
5. Raise trim tab to specified degree, place stop block (1) against stop block (2), and secure to cable B.



MODELS 172, P172 AND 182

1. With elevators in neutral, set trim tab to neutral (streamlined).
2. Position stop blocks (2 and 3) against turnbuckle (Models 172 and P172) or clevis (Model 182), and secure to cable A.
3. Place inclinometer on trim tab and lower tab to degree specified in Section 1.
4. Position stop block (4) against stop block (3) and secure to cable B.
5. Raise trim tab to specified degree, place stop block (1) against stop block (2), and secure to cable B.

Figure 9-6 Elevator Trim Tab Travel Adjustment

9-9. RIGGING ELEVATOR TRIM CONTROL SYSTEM. (See figures 9-1, 9-1A, 9-2, 9-3, and 9-6.)

a. Loosen travel stop blocks on trim tab cables and disconnect actuator screw from link to trim tab.

b. Check cable tension and readjust turnbuckle if necessary. Resafety turnbuckle. If chains and/or cables are being installed, permit actuator screw to rotate freely as chains and cables are connected, set cable tension with turnbuckle, and safety the turnbuckle.

c. Rotate trim control wheel full forward (nose down), making sure pointer does not restrict trim wheel movement. If necessary to re-position pointer where it will not restrict trim wheel movement, use a thin screwdriver to pry trailing leg of pointer out of groove.

NOTE

Full forward (nose down) position of trim wheel is the position where further movement is prevented by chain or cable ends contacting sprockets or pulleys.

d. With elevator and trim tab both in neutral (streamlined), place inclinometer on tab and set to zero. Disregard the counterweight areas of the elevators when streamlining. These areas are contoured so that they will be approximately 3°down at cruising speed.

NOTE

An inclinometer for measuring control surface travel is available from the Cessna Service Parts Center. Refer to figure 6-12.

e. Rotate actuator screw in or out as required to place trim tab up with a maximum of 2° overtravel, when actuator screw is connected to link from trim tab.

f. Rotate trim control wheel to place trim tab up and down, readjusting actuator screw as required to obtain overtravel in both directions.

g. Position stop blocks and adjust as shown in figure 9-6 to limit travel as noted in Section 1.

h. Check that trim wheel pointer travels the same distance from ends of slot in cover. Re-position trailing leg of pointer if necessary (refer to step "c").

i. Check that all safeties are installed and all parts are secure, then reinstall all parts removed for access.

WARNING

Be sure trim tab moves in correct direction when operated by trim control wheel. Nose down trim corresponds to tab up position.

SHOP NOTES:

SECTION 10

RUDDER AND RUDDER TRIM CONTROL SYSTEMS

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10-1. RUDDER AND RUDDER TRIM CONTROL SYSTEMS.

10-2. TROUBLE SHOOTING.

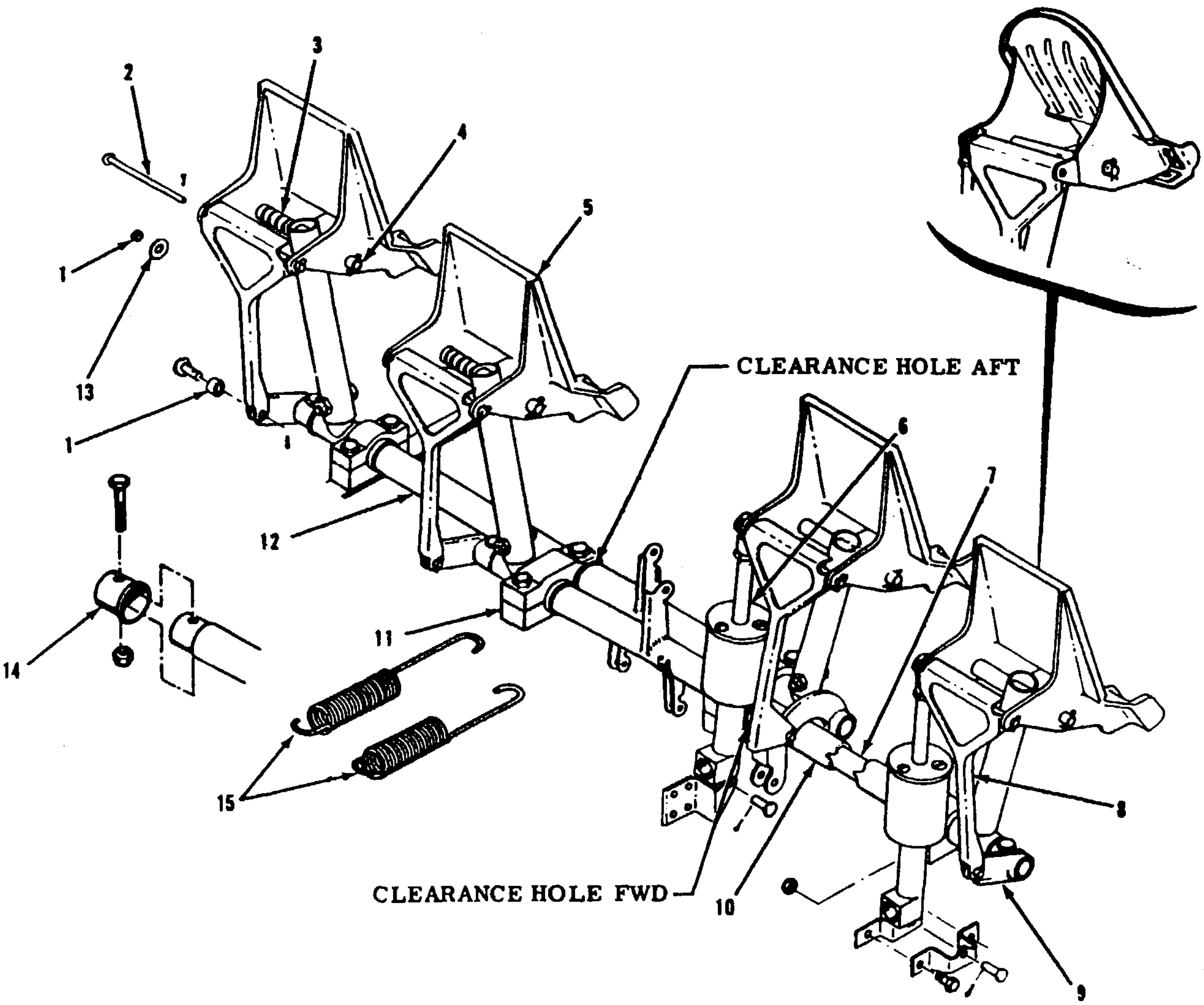
PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
RUDDER DOES NOT RESPOND TO PEDAL MOVEMENT.		
Broken or disconnected cables.	Visually check cables.	Connect or replace cables.
BINDING OR JUMPY MOVEMENT OF RUDDER PEDALS.		
Cables too tight.	Check cable tension with tensiometer.	Adjust cable tension.
Cables not riding properly on pulleys.	Check visually.	Route cables correctly over pulleys.
Binding, broken, or defective pulleys or cable guards.	Check visually, rotate pulleys by hand to feel for binding.	Replace defective pulleys and install guards properly.
Pedal bars need lubrication.		Lubricate with general purpose oil.
Defective rudder bar bearings.	Lubrication fails to eliminate binding.	Replace bearing blocks.
Defective rudder hinge bushings or bearings, or bellcrank bearings.		Replace defective bushings or bearings.
Clevis bolts too tight.	Check for binding.	Readjust to eliminate binding.
Steering rods not adjusted properly.	See paragraph 10-8.	See paragraph 10-8.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
LOST MOTION BETWEEN RUDDER PEDALS AND RUDDER.		
Insufficient cable tension.	Check cable tension.	Adjust cable tension.
RUDDER TRAVEL INCORRECT.		
Bent push-pull rods (Model 182).	Check visually.	Replace push-pull rods.
Incorrect rigging.	Check rigging.	Rig per applicable paragraph.
FALSE READING ON TRIM POSITION INDICATOR.		
Improper rigging.		Rig in accordance with paragraph 10-9.
Worn, bent, or disconnected linkage.	Observe visually.	Repair or replace as necessary.
HARD OR SLUGGISH OPERATION OF TRIM WHEEL.		
Worn, bent, or binding linkage.	Observe visually.	Repair or replace as necessary.
Incorrect rudder cable tension.	Check rudder cable tension.	Adjust rudder cable tension.
FULL TRIM TRAVEL NOT OBTAINED.		
Rudder trim system improperly rigged.		Rig in accordance with paragraph 10-9.

SHOP NOTES:

NOTE

Brake links (8), bellcranks (9), and attaching parts for the **RIGHT-HAND** rudder pedals are replaced with hubs (14) when dual controls are not installed. When dual controls **ARE** installed, washers (13) are used as required to eliminate excessive clearances.



NOTE

Rudder return springs (15) are not used on the Models 182 or 185, which have "closed" rudder control systems.

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

Figure 10-1. Typical Rudder Pedals Installation

10-3 REMOVAL AND INSTALLATION OF RUDDER PEDAL ASSEMBLY.

a. Remove carpeting, shields, and soundproofing from the rudder pedal and tunnel areas as necessary for access.
b. Disconnect the brake master cylinders and the parking brake cables at the pilot's rudder pedals, then remove the pilot's rudder pedals and copilot's rudder pedals and brake links if installed.
c. Slack off rudder cable tension by loosening rudder cable turnbuckles.
d. Disconnect rudder cables from rudder bars. On the Models 150, 172, P172, and 180, disconnect rudder return springs from rudder bars. Disconnect carry-thru cable and rudder trim bungee from rudder bars on the Model 185. On the Model 182, disconnect rudder trim bellcrank push-pull rods from the rudder bars.
e. On the Models 150, 172 and P172, disconnect steering tubes from rudder bars.
f. Remove the bolts through the rudder bar bearing blocks and work the rudder bar assemblies out of the airplane.
g. Install rudder pedal assemblies by reversing the preceding steps and rig the rudder system.

NOTE

Rudder bar assemblies should be checked for lubrication before installation. Internal bearings are oilite bearings which should be saturated with general purpose oil. The bearing blocks are magnesium alloy bearing against the steel shafts and require no lubrication unless binding is evidenced. A few drops of general purpose oil should eliminate such binding.

10-4. REMOVAL AND INSTALLATION OF RUDDER CABLES.

a. Disconnect cable to be removed at each end.
b. Remove cable guards and pulleys as necessary. Connect guide wires to cables and pull cables out of aircraft.

NOTE

The guide wires are to be left in place to aid in reinstallation of the cables. Since routing of cables and accessibility is different in each series of airplanes, the direction of cable removal, choice of cable guard or pulley removal and use of guide wires is optional.

c. When installing a cable, route through the fuselage in the proper position and detach guide wire if used.
d. Check that routing is correct and cables are in pulley grooves as pulleys and cable guards are installed.
e. Connect cable being installed at each end, and rig the rudder system.

10-5. REMOVAL AND INSTALLATION OF RUDDER.

a. Disconnect tail navigation light.
b. Remove stinger on Models 180, 182 and 185, and remove rudder tips on the Model 150 (except Model 150F and on).
c. Relieve cable tension on rudder system, then disconnect cables from rudder bellcrank.
d. With rudder supported, remove all rudder hinge bolts and lift the rudder free of the vertical fin.
e. Install the rudder by reversing the preceding steps, then rig the rudder system.

10-6. REPAIR OF RUDDER may be accomplished in accordance with instructions contained in Section 19.

10-7. CABLE TENSIONS. On the Models 150, 172, P172, and 180, rudder cable tension is automatically determined when the rudder pedals are rigged against rudder-return springs, a specified distance from the firewall. However, on the Models 182 and 185, the rudder control system is "closed" by a bellcrank or a cable, and the 20 to 40 pounds cable tension shown in figures 10-5 and 10-6 is applicable.

10-8. RIGGING - Models 150, 172, P172, and 180.

NOTE

When rigging the Model 180, omit steps "b," "e," and "f."

a. Adjust rudder travel stop bolts to attain correct rudder travel. Correct travels for specific models are listed in the charts in Section 1. Figure 10-14 shows one method of checking rudder travel.

NOTE

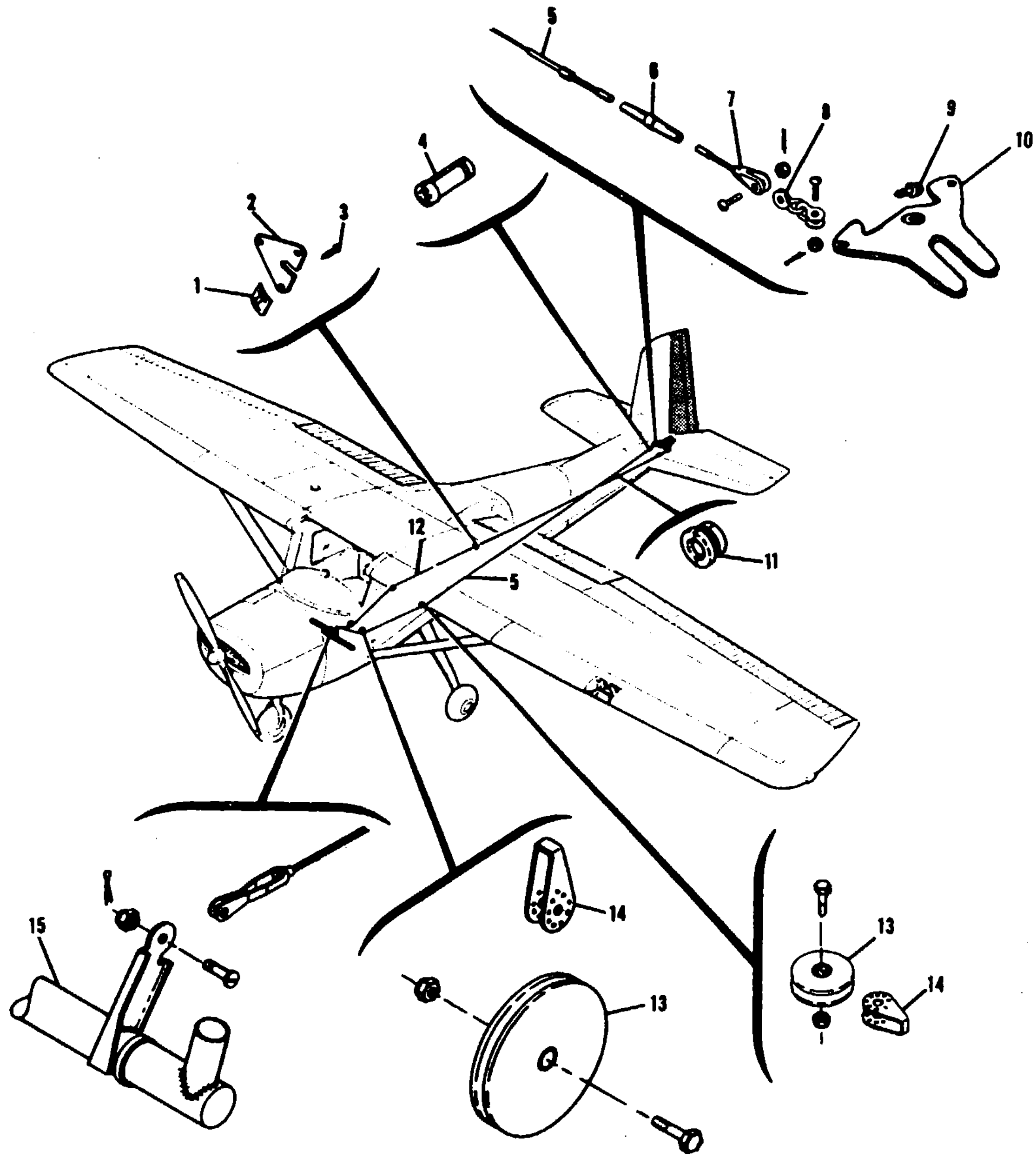
Rudder stop bolts are located at the rear fuselage bulkhead, and may be screwed in or out to adjust travel. Some screw into self-locking nutplates, others use a jam type locknut for security.

b. Disconnect nosewheel steering tubes from nose strut.
c. Block rudder in neutral (streamlined).
d. Adjust rudder cable turnbuckles to align rudder pedals in neutral, 6 1/2 inches from firewall to pedal pivot points (6 inches in the Model 150).

NOTE

Because of the thickness of insulation and material on the firewall, it is recommended that a piece of 1/16 inch welding rod be ground to a sharp point and notched at the 6 and 6 1/2 inch dimensions. Pierce the material on the firewall and use the notches to measure proper dimensions.

e. Tie down or weight tail to raise nosewheel.
f. Pull out sharply on steering tube clevises to seat rods against internal springs, make sure nose gear is centered against external centering stop, then adjust clevises until they align with rod end bearings and install. Do NOT pre-load steering tubes; pre-load is built into steering tubes.

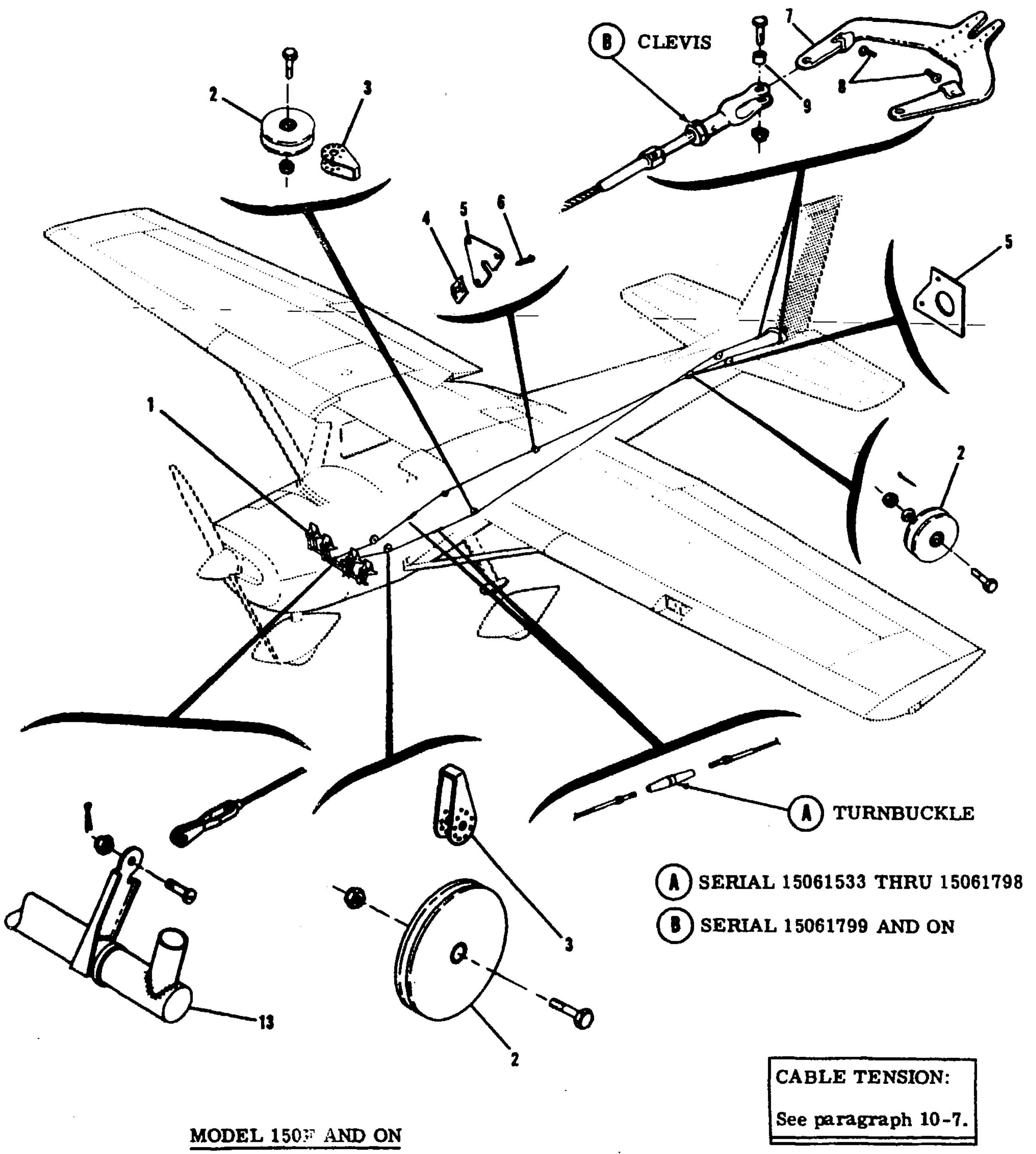


CABLE TENSION:
See paragraph 10-7.

PRIOR TO MODEL 150F

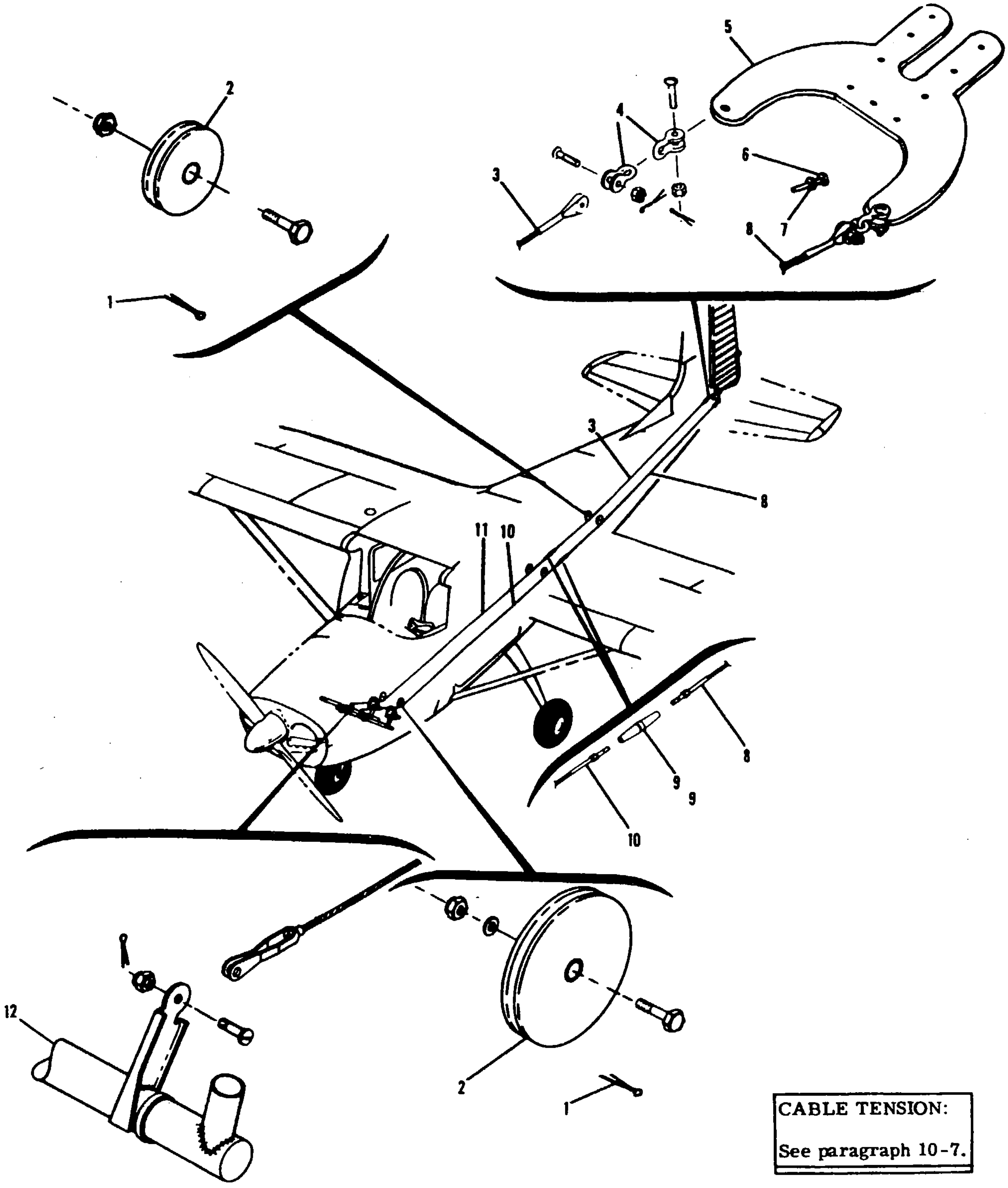
1. Nut	6. Turnbuckle	11. Fairlead
2. Fairlead	7. Fork	12. Right Cable
3. Screw	8. Shackle	13. Pulley
4. Fairlead	9. Rudder Travel Stop	14. Cable Guard
5. Left Cable	10. Rudder Bellcrank	15. Rudder Bar

Figure 10-2. Model 150 Rudder Control System (Sheet 1 of 2)



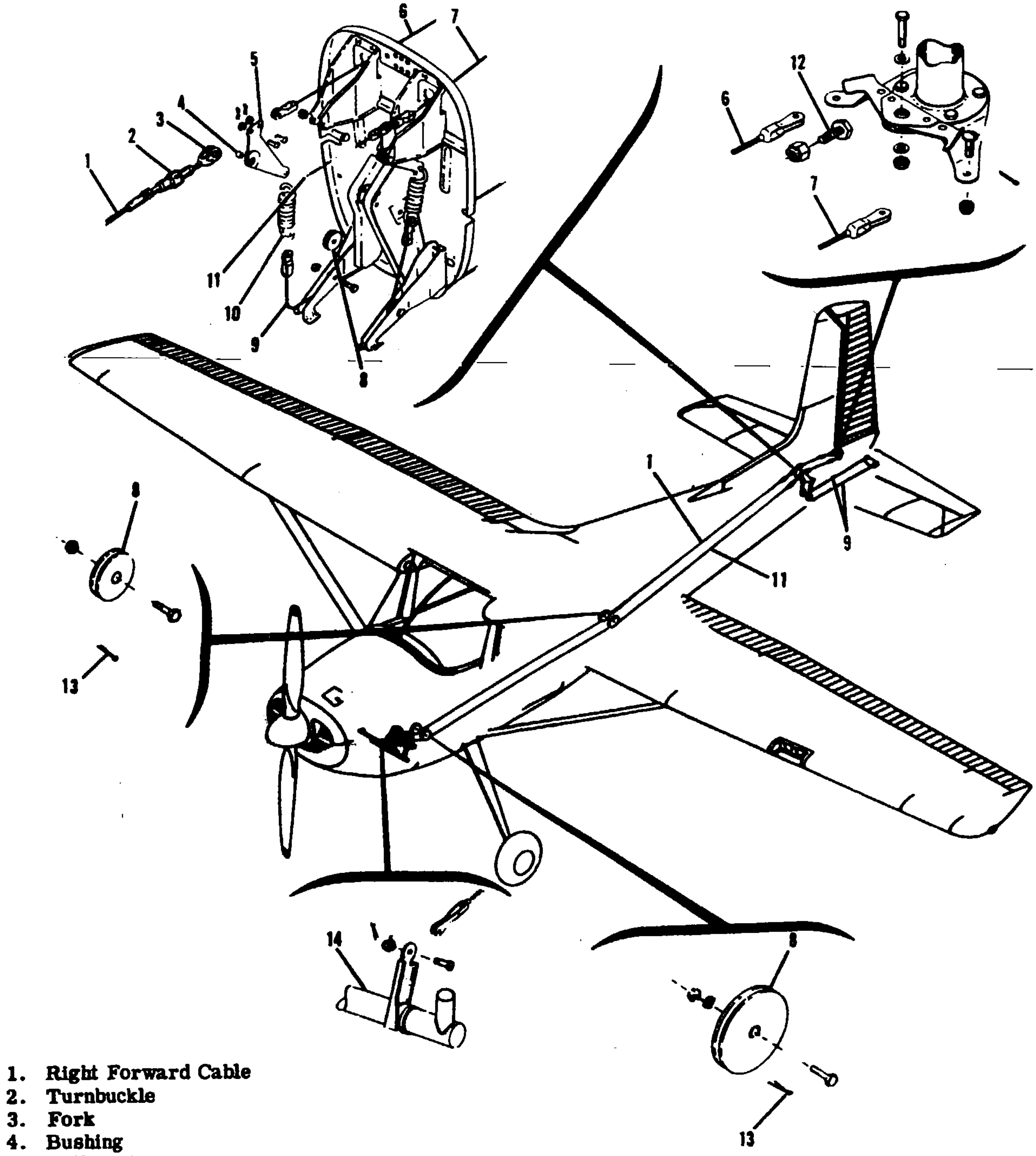
1. Rudder Pedals Installation
2. Pulley
3. Cable Guard
4. Nut
5. Fairlead
6. Screw
7. Rudder Bellcrank
8. Rudder Stop Screw
9. Spacer
10. Rudder Cables
11. Rudder Bar

Figure 10-2. Model 150 Rudder Control System (Sheet 2 of 2)



1. Cable Guard
2. Pulley
3. Right Rear Cable
4. Shackle
5. Rudder Bellcrank
6. Rudder Travel Stop
7. Jamb Nut
8. Left Rear Cable
9. Turnbuckle
10. Left Forward Cable
11. Right Forward Cable
12. Rudder Bar

Figure 10-3. Model 172 and P172 Rudder Control System

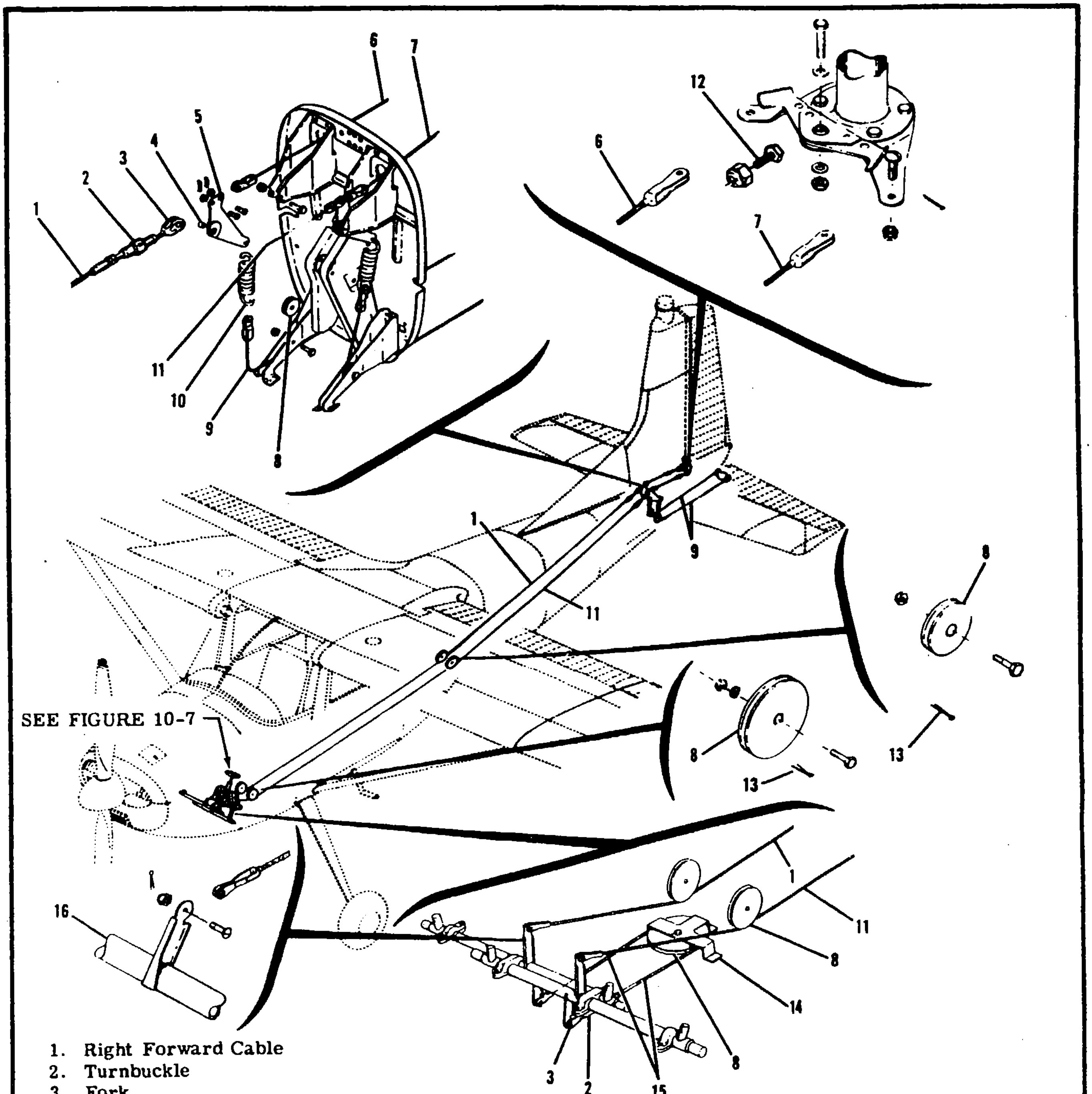


1. Right Forward Cable
2. Turnbuckle
3. Fork
4. Bushing
5. Bellcrank
6. Right Aft Cable
7. Left Aft Cable
8. Pulley
9. Tailwheel Steering Cable
10. Spring
11. Left Forward Cable
12. Rudder Travel Stop
13. Cable Guard
14. Rudder Bar

CABLE TENSION:

See paragraph 10-7.

Figure 10-4. Model 180 Rudder Control System



1. Right Forward Cable
2. Turnbuckle
3. Fork
4. Bushing
5. Bellcrank
6. Right Aft Cable
7. Left Aft Cable
8. Pulley
9. Tailwheel Steering Cable
10. Spring
11. Left Forward Cable
12. Rudder Travel Stop
13. Cable Guard
14. Bracket
15. Carry-Thru Cable
16. Rudder Bar

CABLE TENSION:

30 LBS ± 10 LBS (AT THE AVERAGE TEMPERATURE FOR THE AREA).

Figure 10-5. Model 185 Rudder Control System

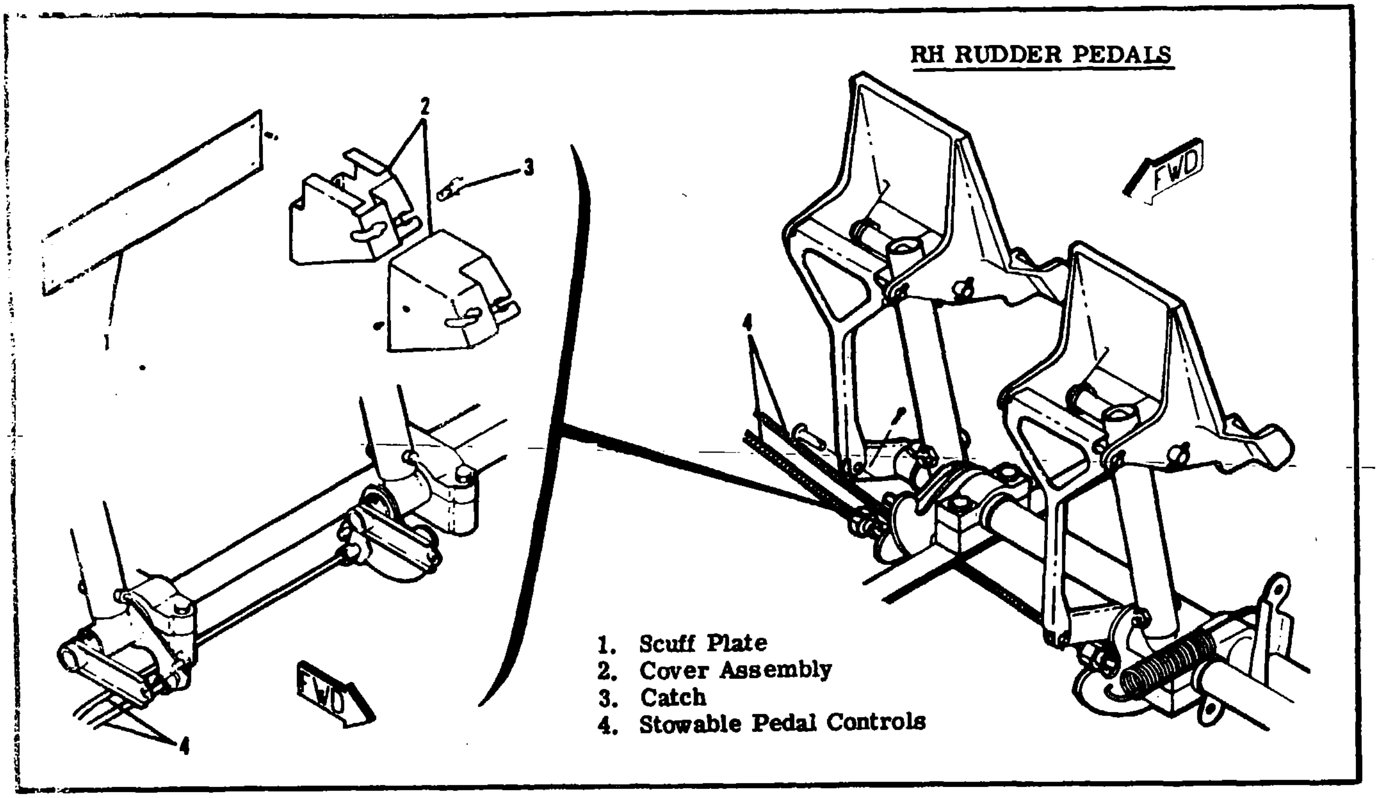
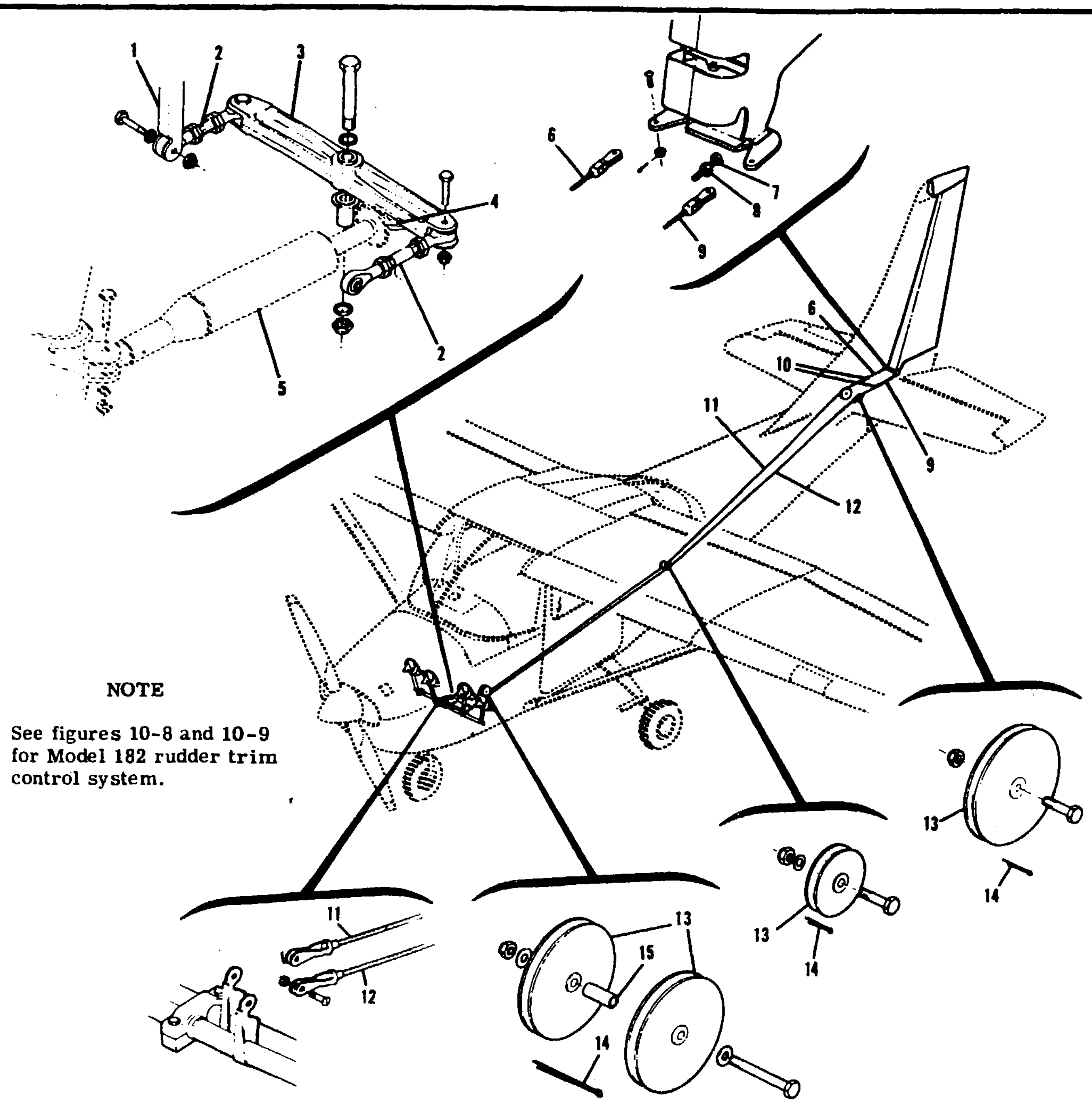


Figure 10-5A. Stowable Rudder Pedals - Models 180 and 185

SHOP NOTES:



NOTE

See figures 10-8 and 10-9 for Model 182 rudder trim control system.

1. Rudder Bar Arm
2. Push-Pull Rod
3. Bellcrank
4. Rod End
5. Bungee
6. Right Aft Cable
7. Rudder Travel Stop
8. Jamb Nut
9. Left Aft Cable
10. Turnbuckle
11. Right Forward Cable
12. Left Forward Cable
13. Pulley
14. Cable Guard
15. Spacer

CABLE TENSION:
30 LBS ± 10 LBS (AT THE AVERAGE TEMPERATURE FOR THE AREA).

Figure 10-6. Model 182 Rudder Control System

g. Remove device used to block rudder and lower nosewheel to ground.

h. On the Model 180, tighten turnbuckle on right rudder cable and loosen turnbuckle on left rudder cable an equal amount to offset rudder one degree to the right (5/16" at lower trailing edge).

i. Be sure turnbuckles are safetied and all jam nuts are tight, then reinstall all parts removed for access.

NOTE

A flight test may determine the need for rigging the rudder slightly off-center. Such correction should be made by tightening one rudder cable turnbuckle and loosening the opposite one an equal amount, thus keeping the nosewheel steering system and rudder pedals aligned while the rudder is shifted minutely. Do NOT attempt to rig the rudder by adjusting the nosewheel steering system.

WARNING

Be sure rudder moves in correct direction when operated by the rudder pedals.

10-9. RIGGING - Model 182.

a. Adjust rudder travel stop bolts to attain correct rudder travel, listed in Section 1. Figure 10-14 shows one method of checking rudder travel.

NOTE

Rudder stop bolts are located at the rear fuselage bulkhead, and may be screwed in or out to adjust travel. Some screw into self-locking nutplates, others use a jam type locknut for security.

b. Remove rudder trim chain by removing screws (17, figure 10-9) using care not to drop washers (15) which are used as shims to adjust chain tension. Spring the bracket downward until chain can be removed.

c. Disconnect bungee from bellcrank (12, figure 10-8).

d. Loosen rudder cable turnbuckles and clamp rudder pedals in neutral.

e. Center bellcrank (12, figure 10-8) by adjusting push-pull rods (15 and 20). Bellcrank is centered when bolts in each end are the same distance from the bulkhead just in front of the bellcrank. Tighten jam nuts.

f. Maintaining rudder pedals in neutral, adjust rudder cable turnbuckles to obtain 20 to 40 pounds cable tension while the rudder is offset one degree to the right (5/16" at lower trailing edge). Safety the turnbuckles.

NOTE

After completing the preceding steps, the rudder control system is rigged. The following steps outline rudder trim control system and nosewheel steering system rigging. The rudder control system must be correctly rigged prior to rigging of the trim and steering systems.

g. Tie down or weight the tail to raise nosewheel off the ground.

h. Make sure nose gear is centered against external centering stop and rudder pedals are still clamped in neutral.

i. Screw bungee sprocket all the way into bungee shaft, then screw rod end all the way into sprocket threads. This sets the bungee at its shortest free length.

j. Holding rod end to prevent it from turning, rotate sprocket until hole in rod end aligns exactly with attaching hole in bellcrank, and install.

k. Rotate rudder trim control wheel until indicator is centered in neutral, and without moving bungee sprocket, engage chain with sprocket (11, figure 10-8).

l. Tighten chain to 1/2 inch free play at its midpoint by adding washers (15, figure 10-9) as required (maximum of four each side), then install the bracket with screws (17).

m. Lower nosewheel to ground, remove clamps from rudder pedals, be sure all turnbuckles are safetied and jam nuts are tight, then reinstall all parts removed for access.

WARNING

Be sure rudder moves in correct direction when operated by the rudder pedals.

10-10. RIGGING - Model 185.

a. Adjust rudder travel stop bolts to attain correct rudder travel, listed in Section 1. Figure 10-14 shows one method of checking rudder travel.

NOTE

Rudder stop bolts are located at the rear fuselage bulkhead, and may be screwed in or out to adjust travel. Some screw into self-locking nutplates, others use a jam type locknut for security.

b. Disconnect bungee from rudder bar arm. Access may be gained by removing access cover beneath the bungee.

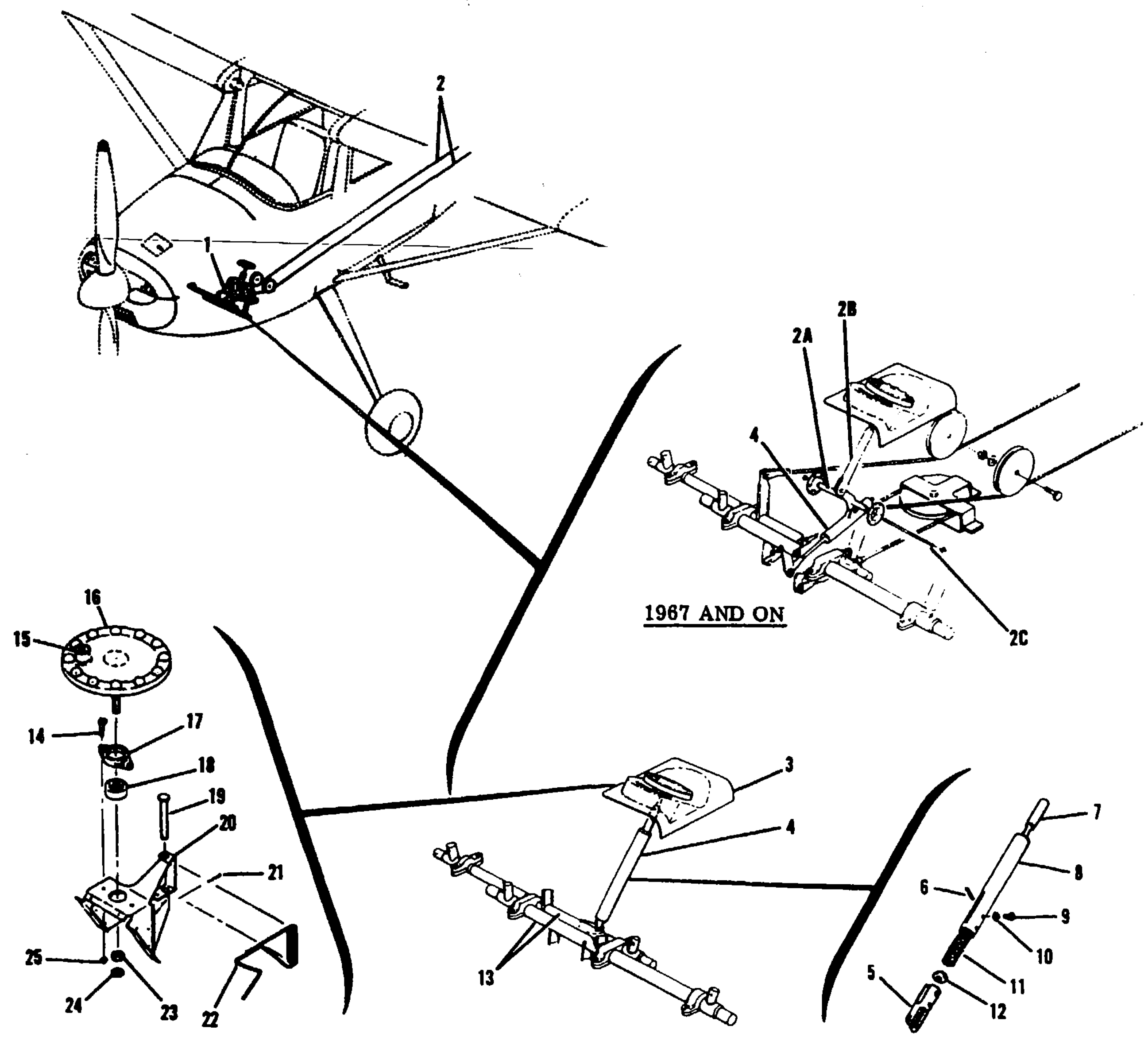
c. Block rudder one degree (5/16" at lower trailing edge) to the right of neutral (streamlined).

d. Adjust rudder cable aft turnbuckles and carry-thru cable turnbuckle to align rudder pedals in neutral, 6 1/2 inches from firewall to pedal pivot points, while maintaining 20 to 40 pounds cable tension.

NOTE

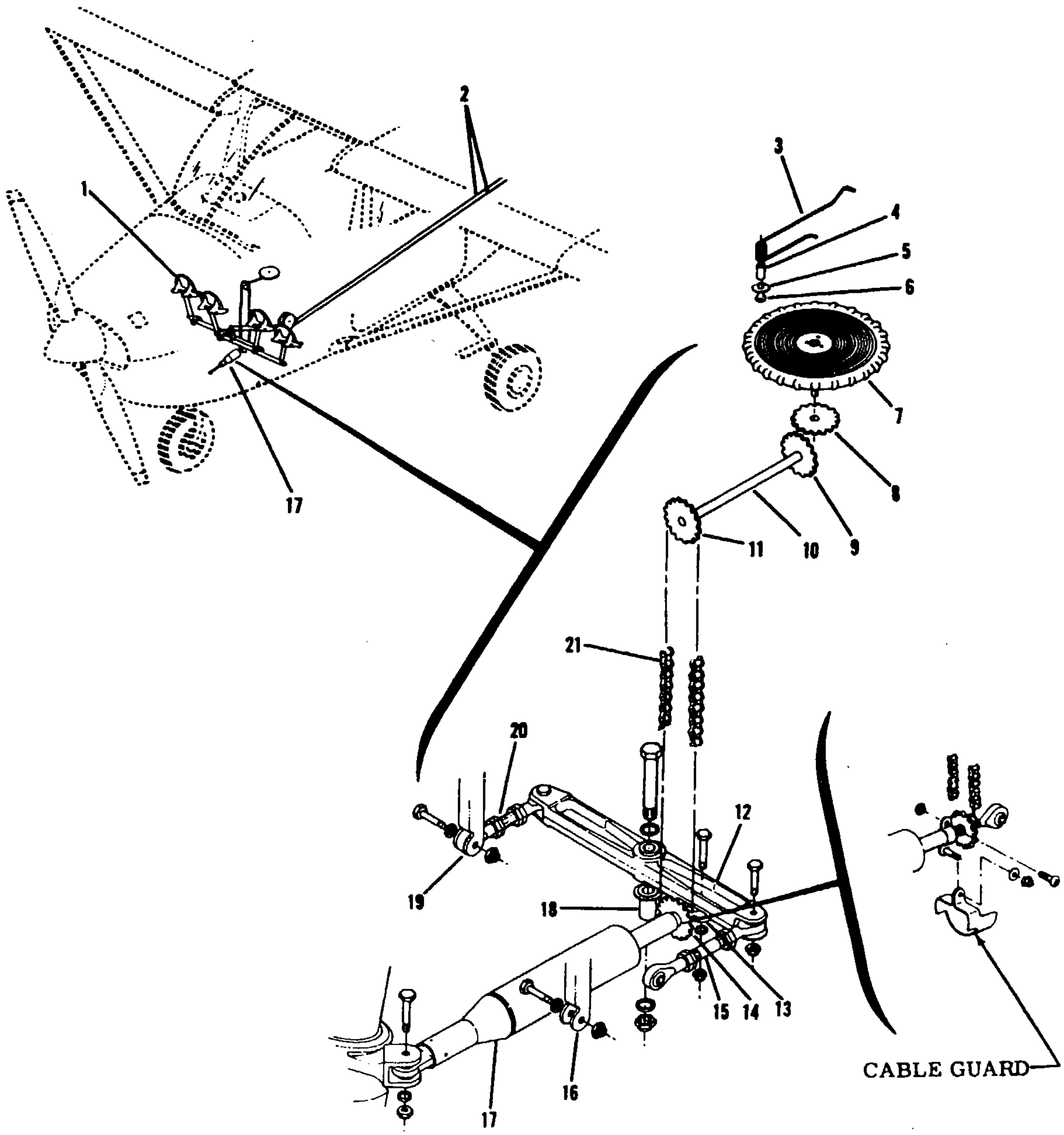
Because of the thickness of insulation and material on the firewall, it is recommended that a piece of 1/16 inch welding rod be ground to a sharp point and notched at the 6 1/2 inch dimension. Pierce the material on the firewall and use the notch to measure the proper dimension.

e. Rotate rudder trim control wheel until clevis on



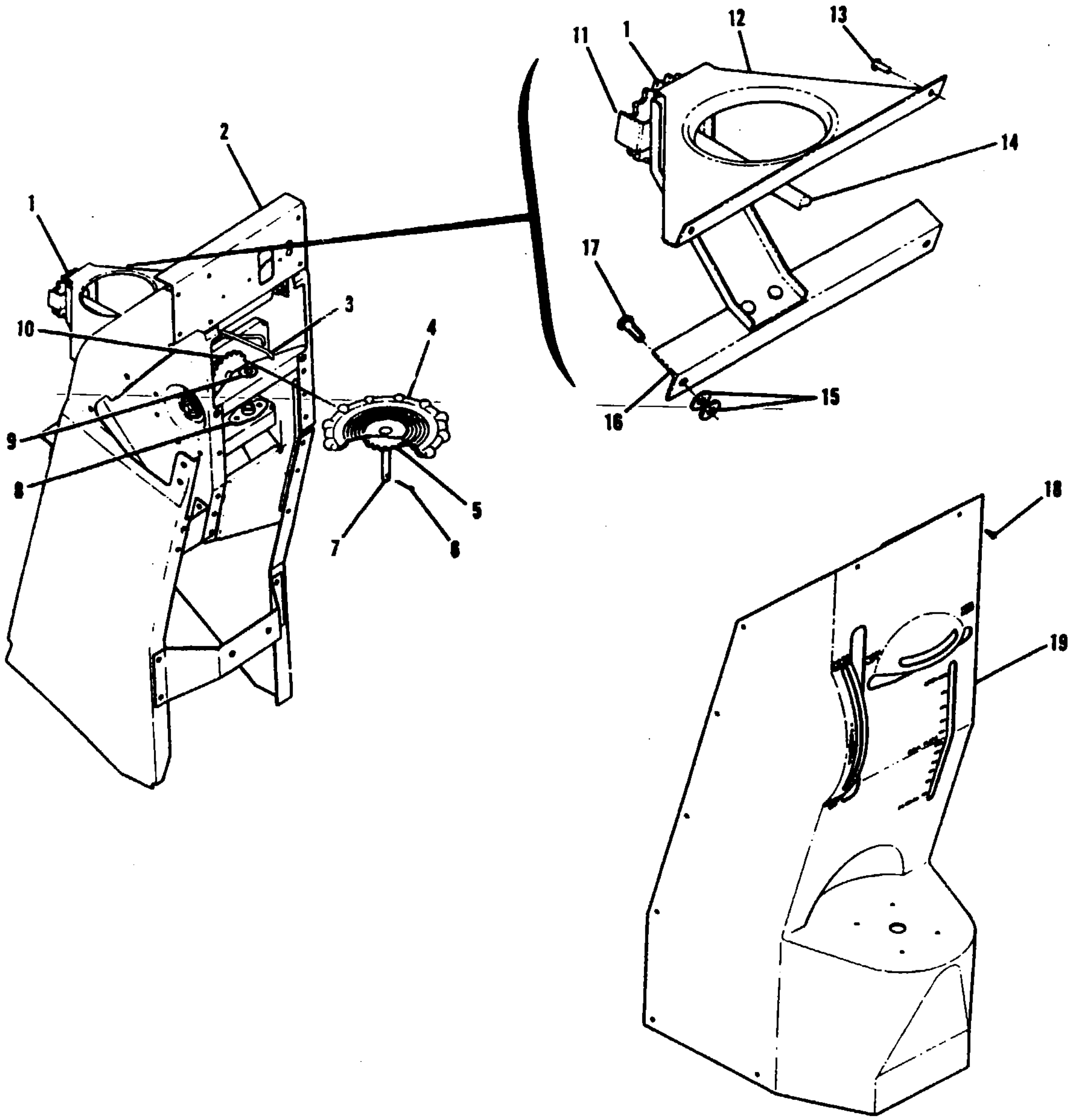
1. Rudder Pedal Assembly	5. Clevis	12. Retainer	19. Pin
2. Rudder Cables	6. Roll Pin	13. Rudder Bars	20. Bracket
2A. Bellcrank	7. Rod	14. Bolt	21. Cotter Pin
2B. Link	8. Tube	15. Knob	22. Indicator
2C. Tie Rod	9. Screw	16. Rudder Trim Wheel	23. Jamb Nut
3. Cover	10. Washer	17. Bearing Cap	24. Nut
4. Rudder Trim Bungee	11. Spring	18. Bearing	25. Nut

Figure 10-7. Model 185 Rudder Trim Control System



1. Rudder Pedal Assembly	8. Trim Wheel Sprocket	15. Push-Pull Rod
2. Rudder Cables	9. Aft Sprocket	16. Forward Rudder Bar Arm
3. Indicator	10. Shaft	17. Bungee
4. Bushing	11. Forward Sprocket	18. Bushing
5. Collar	12. Bellcrank	19. Aft Rudder Bar Arm
6. Rivet	13. Rod End	20. Push-Pull Rod
7. Rudder Trim Wheel	14. Bungee Sprocket	21. Chain

Figure 10-8. Model 182 Rudder Trim Control System



1. Forward Sprocket
2. Console Assembly
3. Rudder Trim Indicator
4. Rudder Trim Wheel
5. Trim Wheel Sprocket
6. Cotter Pin
7. Trim Wheel Shaft
8. Lower Bearing
9. Upper Bearing
10. Aft Sprocket
11. Chain Guard
12. Support Assembly
13. Rivet
14. Shaft
15. Shim Washers
16. Angle
17. Screw
18. Screw
19. Console Cover

Figure 10-9. Model 182 Rudder Trim - Console Components lower end of bungee aligns exactly with mounting hole in rudder bar arm, and install.

f. Check position of rudder trim position indicator. If indicator is not neutral, remove cover under trim control wheel, remove clevis pin securing indicator, reposition indicator to neutral, then reinstall clevis pin and cover.

g. Remove device used to block rudder.

h. Be sure all turnbuckles are safetied and parts are secure, then reinstall all parts removed for access.

WARNING

Be sure rudder moves in correct direction when operated by the rudder pedals.

SHOP NOTES:

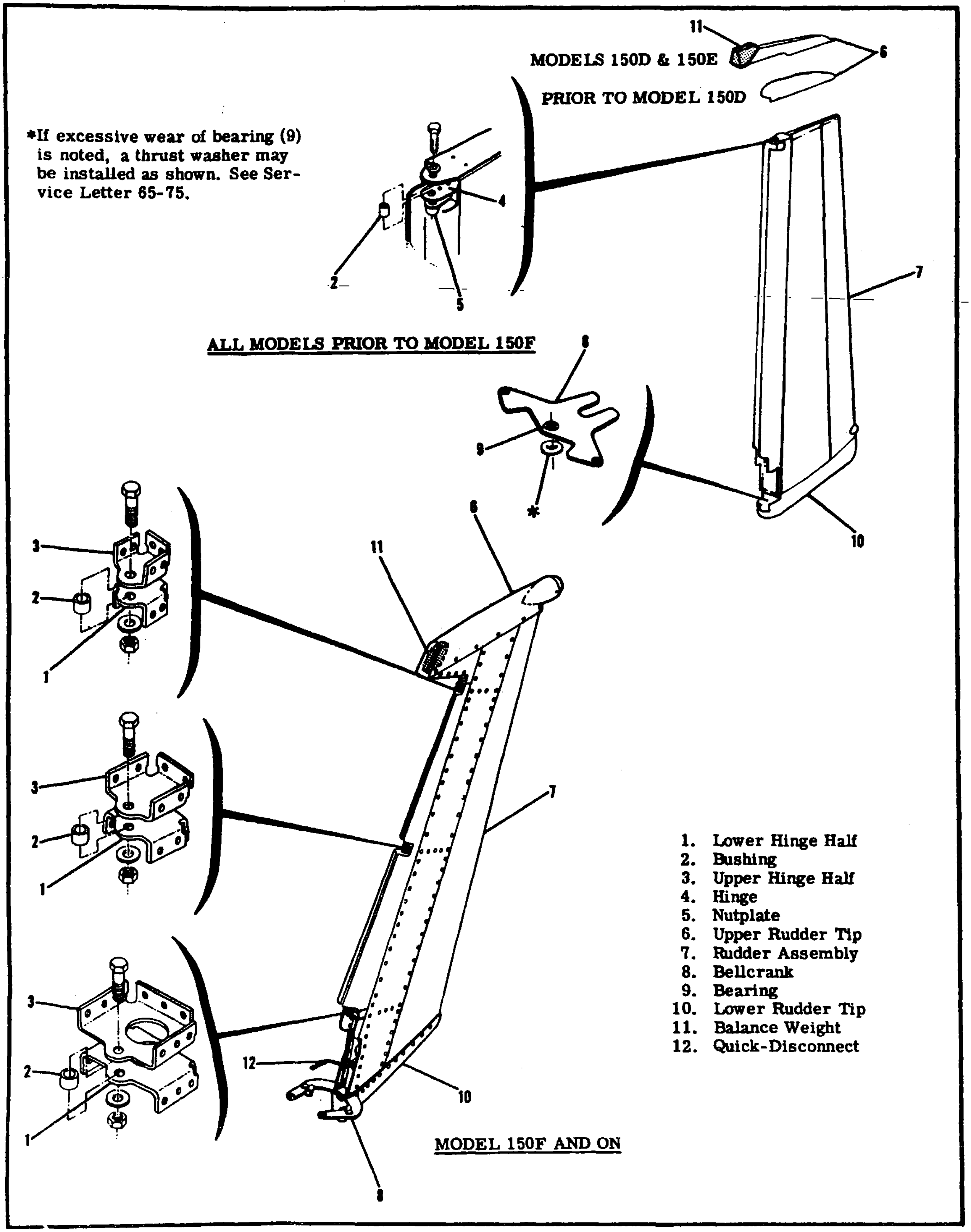
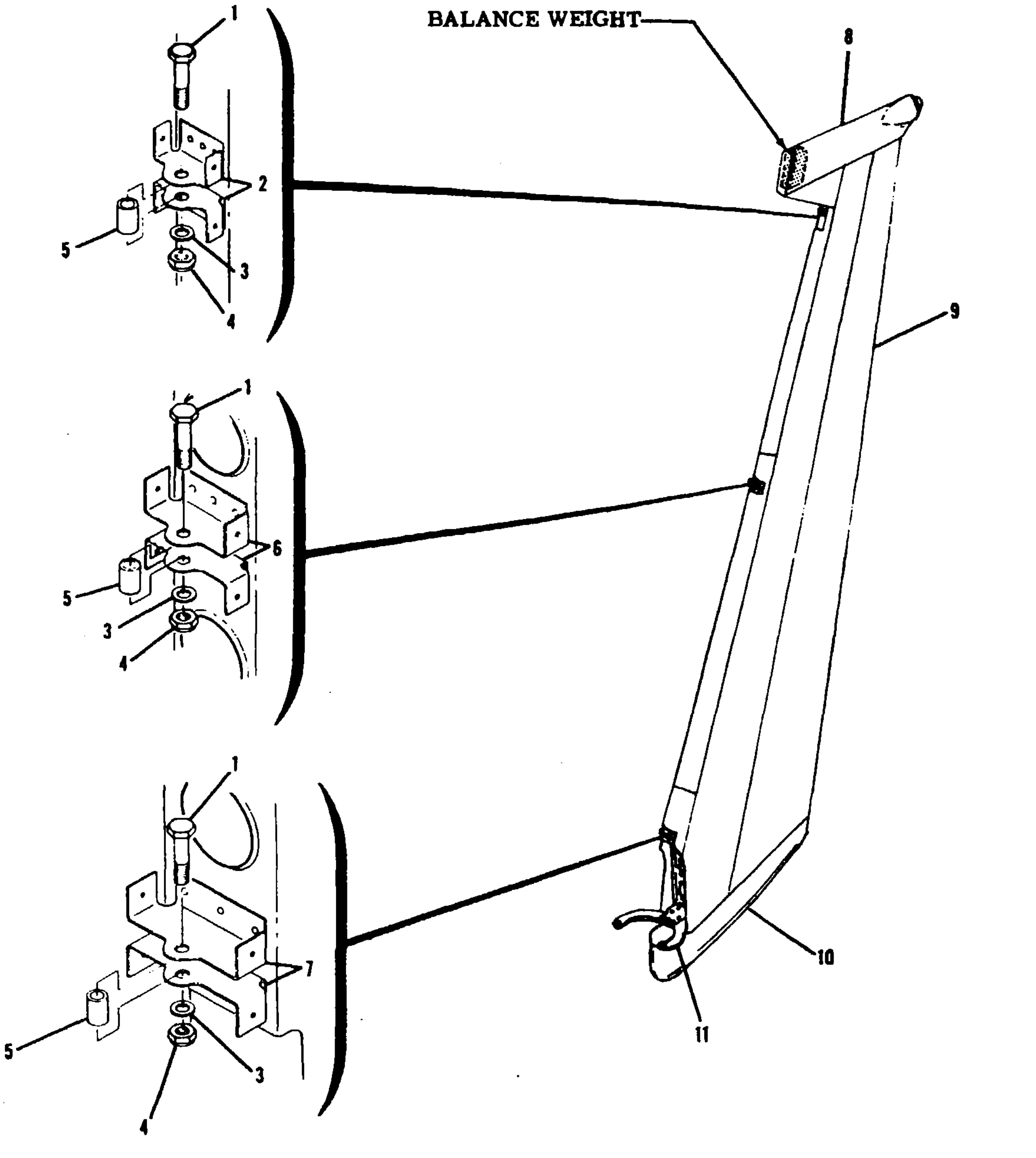
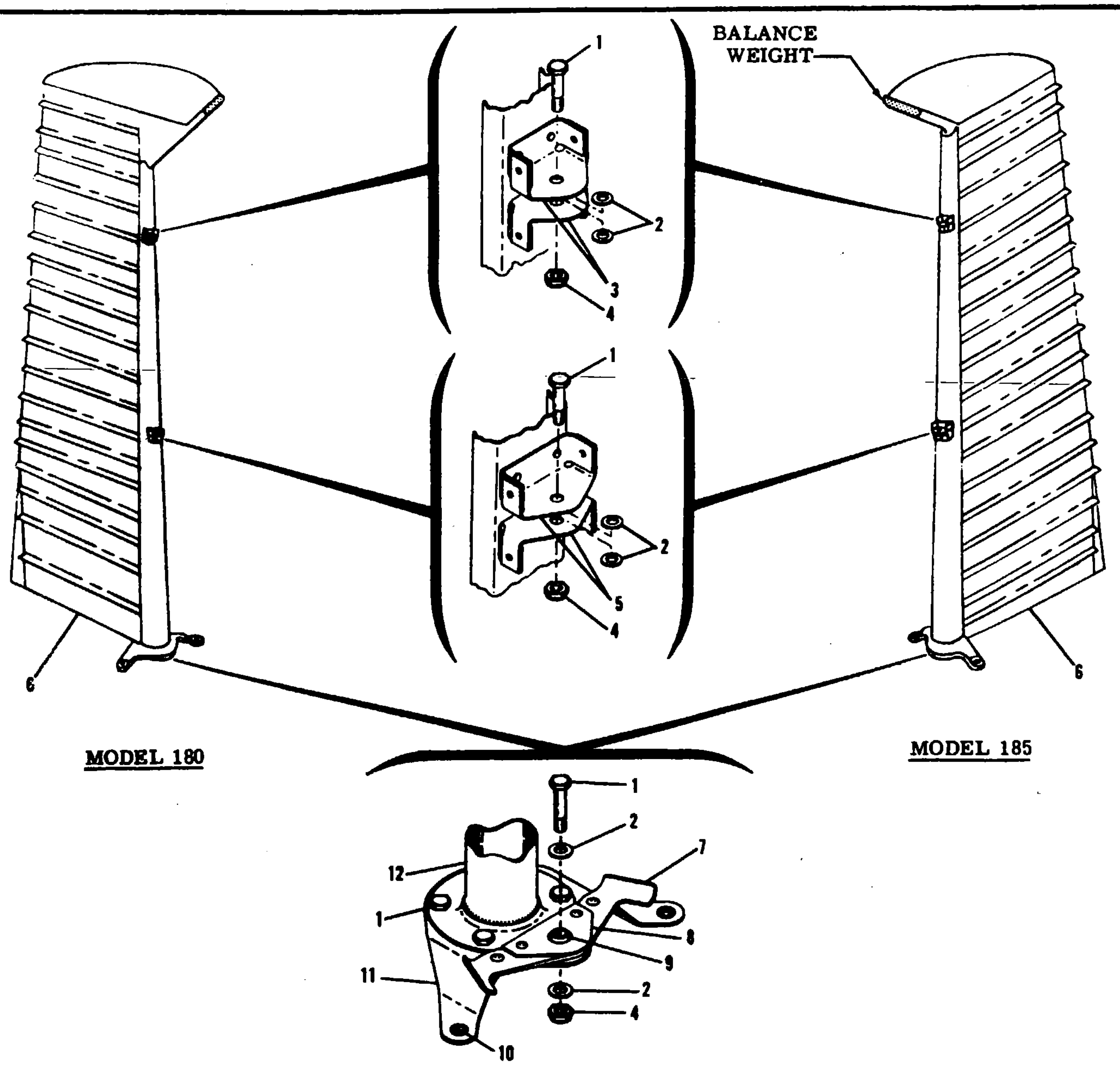


Figure 10-10. Model 150 Rudder Assembly



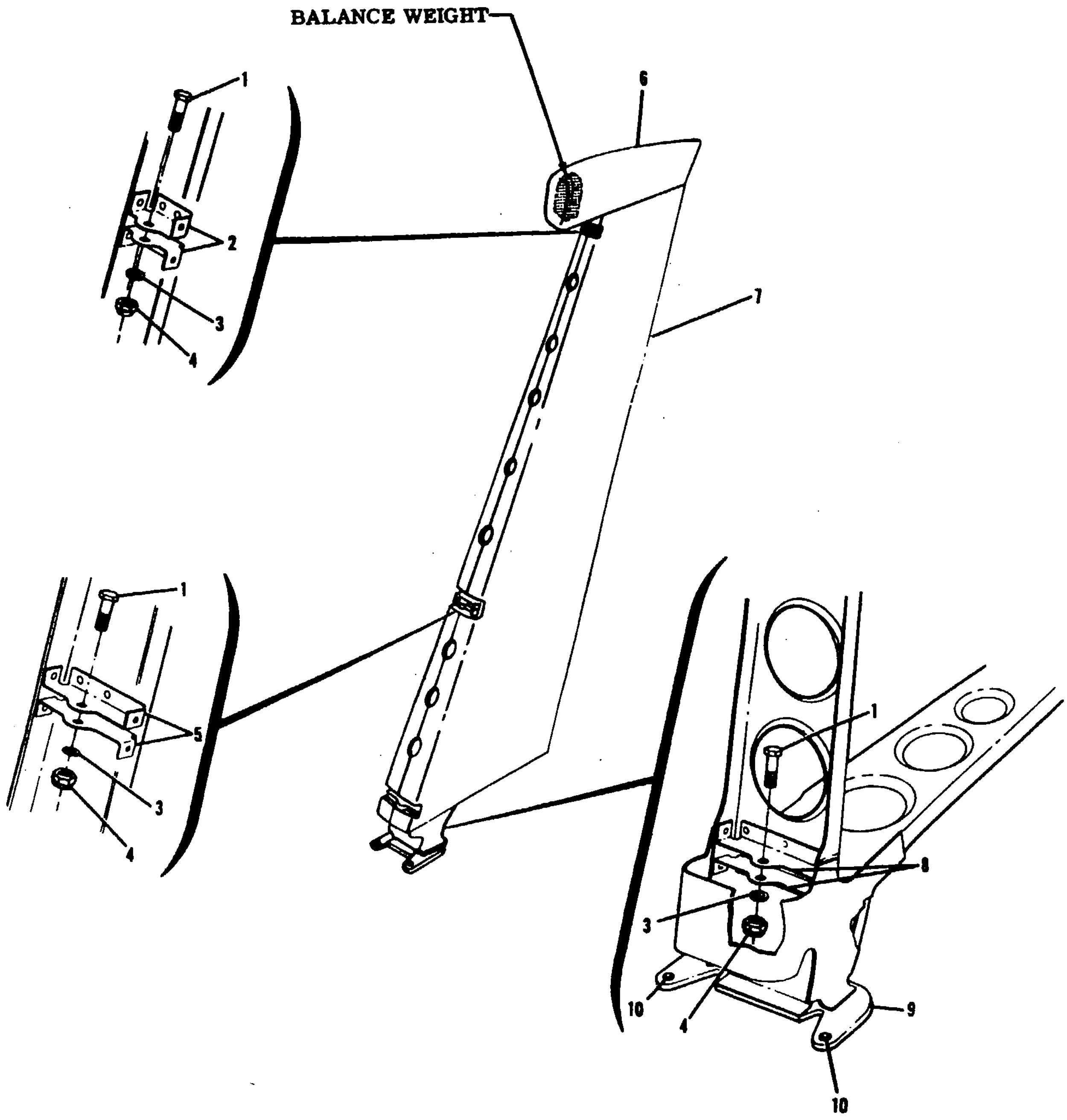
1. Bolt
2. Upper Hinge
3. Washer
4. Nut
5. Bushing
6. Center Hinge
7. Lower Hinge
8. Upper Tip
9. Rudder Assembly
10. Lower Tip
11. Rudder Bellcrank

Figure 10-11. Models 172 & P172 Rudder Assembly



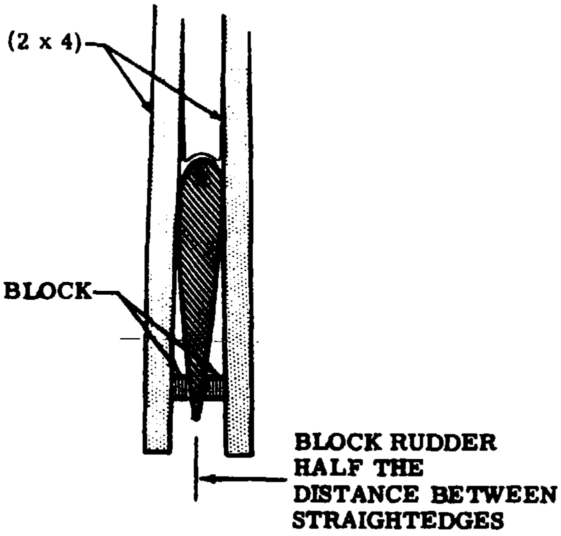
1. Bolt
2. Washer
3. Upper Hinge
4. Nut
5. Center Hinge
6. Rudder Assembly
7. Rudder Stop
8. Bearing Retainer
9. Bearing
10. Bushing
11. Rudder Bellcrank
12. Torque Tube

Figure 10-12. Models 180 & 185 Rudder Assembly

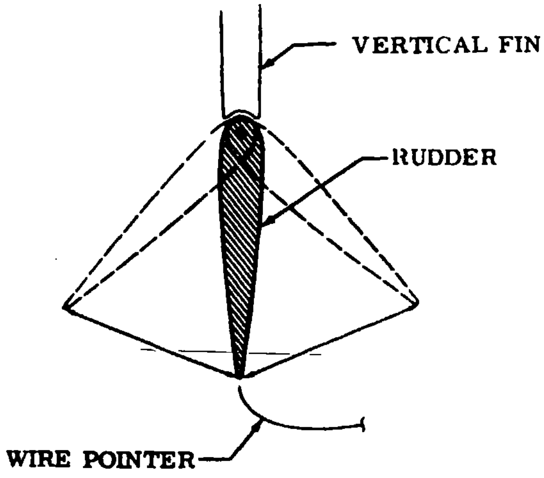


1. Bolt
2. Upper Hinge
3. Washer
4. Nut
5. Center Hinge
6. Rudder Tip
7. Rudder Assembly
8. Lower Hinge
9. Rudder Bellcrank
10. Bushing

Figure 10-13. Model 182 Rudder Assembly



ESTABLISHING NEUTRAL POSITION OF RUDDER



MEASURING RUDDER TRAVEL

1. Establish neutral position of rudder by clamping straightedge (such as wooden 2 X 4) on each side of fin and rudder and blocking trailing edge of rudder half the distance between straightedges as shown.

2. Models 150, 172, and P172 - 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.
   a. This point is just above the lower rudder tip (rudder butt).

3. Models 180, 185, and 182 - Tape a length of soft wire to the stinger in such a manner that it can be bent to index with a point on rudder trailing edge.
   a. On the Models 180 and 185, this point is the bottom corner of the rudder skin (disregard the fixed trim tab).
   b. On the Model 182, this point is the lower corner of the rudder trailing edge.

4. Using soft lead pencil, mark rudder at point corresponding to soft wire indexing point (neutral).

5. Remove straightedges.

6. 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 in accordance with following chart.

MODEL	MINIMUM TRAVEL	MAXIMUM TRAVEL
150 - Prior to Model 150F	4.95"	5.60"
150F & on	6.04"	6.60"
172/P172	5.29"	5.91"
180/185	7.49"	7.81"
182	8.12"	8.72"

Figure 10-14. Checking Rudder Travel

SECTION 11

STABILIZER TRIM CONTROL SYSTEM

(MODELS 180 AND 185)

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11-1. STABILIZER TRIM CONTROL SYSTEM.

11-2. On the Models 180 and 185, the entire stabilizer may be trimmed to meet different speed and load conditions. The stabilizer is adjusted by rotating the stabilizer trim wheel which is mounted in the tunnel to the left of the flap control lever. The stabilizer trim wheel is equipped with a pointer which indicates nose attitude of the aircraft. Stabilizer trim is changed by two screw-jack actuators linked by a roller chain and cable system to the trim wheel. The stabilizer is pivoted at its rear spar and the actuators raise and lower the front of the stabilizer. This system provides longitudinal trim afforded by the elevator trim tab on other models. (See Section 9 for the elevator trim tab systems.)

11-3. TROUBLE SHOOTING.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
FALSE READING ON STABILIZER POSITION INDICATOR.		
Pointer distorted or bent.	Check visually.	Straighten bent pointer.
Trim wheel mechanism improperly rigged.		Rig per paragraph 11-10.
Stabilizer actuators out of adjustment.		Rig per paragraph 11-10.
Sprocket retaining pin on trim wheel axle sheared.	Check for lost motion of trim wheel.	Replace sheared sprocket pin.
HARD OR SLUGGISH MOTION OF TRIM WHEEL MECHANISM.		
Bearings of trim wheel axle binding.	Check bearing condition.	Lubricate or overhaul.
Actuators binding.	Remove and check actuators individually.	Clean, lubricate, repair or replace actuators.
Incorrect cable tension.	Check with tensiometer.	Adjust tension.
Cables or chains not riding properly on pulleys and sprockets.	Check visually.	Route cables and chains correctly.
One screwjack actuator adjusted incorrectly.		Adjust actuators.

HARD OR SLUGGISH MOTION OF TRIM WHEEL MECHANISM (Cont).		
Warped/bent stabilizer.	Check visually.	Replace/repair stabilizer.
Rusty chain.	Check visually.	Replace rusty chains.
Bent sprocket shaft.	Visually check motion.	Replace bent sprocket shafts.
STABILIZER FAILS TO REACH FULL TRAVEL LIMITS.		
Improper screwjack adjustment.		Adjust screwjacks per paragraph 11-10.
Incorrect trim wheel mechanism adjustment.		Adjust per paragraph 11-10.
Excessive slack in control cables.	Check cable tension.	Adjust cable tension.
STABILIZER DOES NOT RESPOND TO TRIM WHEEL MOVEMENT.		
Broken chain or cable.		Replace chain and cable.
Sheared sprocket retaining pin in trim wheel mechanism or actuator assembly.	With chain removed, attempt to turn sprocket by hand on shaft.	Replace sheared pin.

SHOP NOTES:

11-4. REPLACEMENT OF STABILIZER. (See figure 11-1.)

a. Remove stinger, rudder, fin, and elevators. Remove all tail group fairings and access covers.
b. Remove nut, washer and bolt at each stabilizer hinge. Do not lose spacer.
c. Remove nut and bolt securing each screw-jack actuator to the stabilizer bracket.

NOTE

To eliminate the necessity of rigging stabilizer travel after installation, do not disturb actuator setting. Install a 3/8-inch drill rod through both actuators to maintain settings.

d. To install the stabilizer, reverse the preceding steps. Refer to the applicable Section for rigging of the rudder, elevator, and stabilizer control systems.

11-5. REPLACEMENT OF STABILIZER ACTUATORS, CABLES AND CHAINS. (See figure 11-2.)

NOTE

The chain guards on the screw-jack actuators make it necessary to remove the actuators, chains, and cables as an assembly.

a. Disconnect both cables at turnbuckles aft of the baggage compartment.
b. Remove stabilizer as outlined in paragraph 11-4.
c. Remove cable guards as necessary to work cables free of pulleys in aft tailcone.
d. Remove nuts and bolts attaching the screw-jack actuators to fuselage structure and remove actuators, chains, and cables as an assembly.
e. To install actuators and cable assemblies, reverse the preceding steps. Rig actuators and trim system as outlined in paragraph 11-10.

11-6. REPLACEMENT OF STABILIZER TRIM CONTROL WHEEL. (See figure 11-2.)

NOTE

The right half of the trim wheel bearing support bracket contains friction catches which prevent the trim wheel from creeping.

a. Disconnect cables at turnbuckles aft of baggage compartment.
b. Remove trim wheel cover assembly by removing attaching screws.
c. Remove screws attaching right bearing support bracket and remove bracket.

NOTE

On later serials, remove roll pins and washers at ends of trim wheel shaft to remove bracket.

d. Remove trim wheel. Disengage chain from sprocket as wheel is being removed.

NOTE

Removal of sprocket or trim wheel shaft is not recommended except for replacement of parts.

e. To install the trim wheel, reverse the preceding steps. Rig stabilizer trim system in accordance with paragraph 11-10.

11-7. STABILIZER ACTUATOR OVERHAUL.

11-8. DISASSEMBLY OF STABILIZER ACTUATOR. (See figure 11-3.)

a. Remove clamp (15).
b. Remove boot (16) from actuator assembly. The boot is cemented to hinge assembly (20). Use care to prevent damage when removing boot.
c. Unscrew and remove barrel nut (12) from actuator screw (10). Barrel nut is under a slight spring load.
d. Remove collar (11) and spring (17) from actuator screw (10).
e. Remove four screws (9) attaching retainer plate (8) and retainer cap (7) to hinge assembly (20). Remove retainer plate and cap.
f. Remove screws (4) attaching chain guard (5) to hinge assembly (20). Remove chain guard and chain.
g. Remove bushing (18) and eccentric bushing (13).
h. Remove roll pin (3) and remove sprocket (1) and retainer (2) from actuator screw (10).
i. Using a rubber mallet, lightly tap actuator screw (10) out of bearing (6).
j. If necessary, bearing (6) may be removed by pressing it out of hinge assembly (20).
k. Bushings (19) are a press fit. Removal of these bushings is not recommended except for replacement.

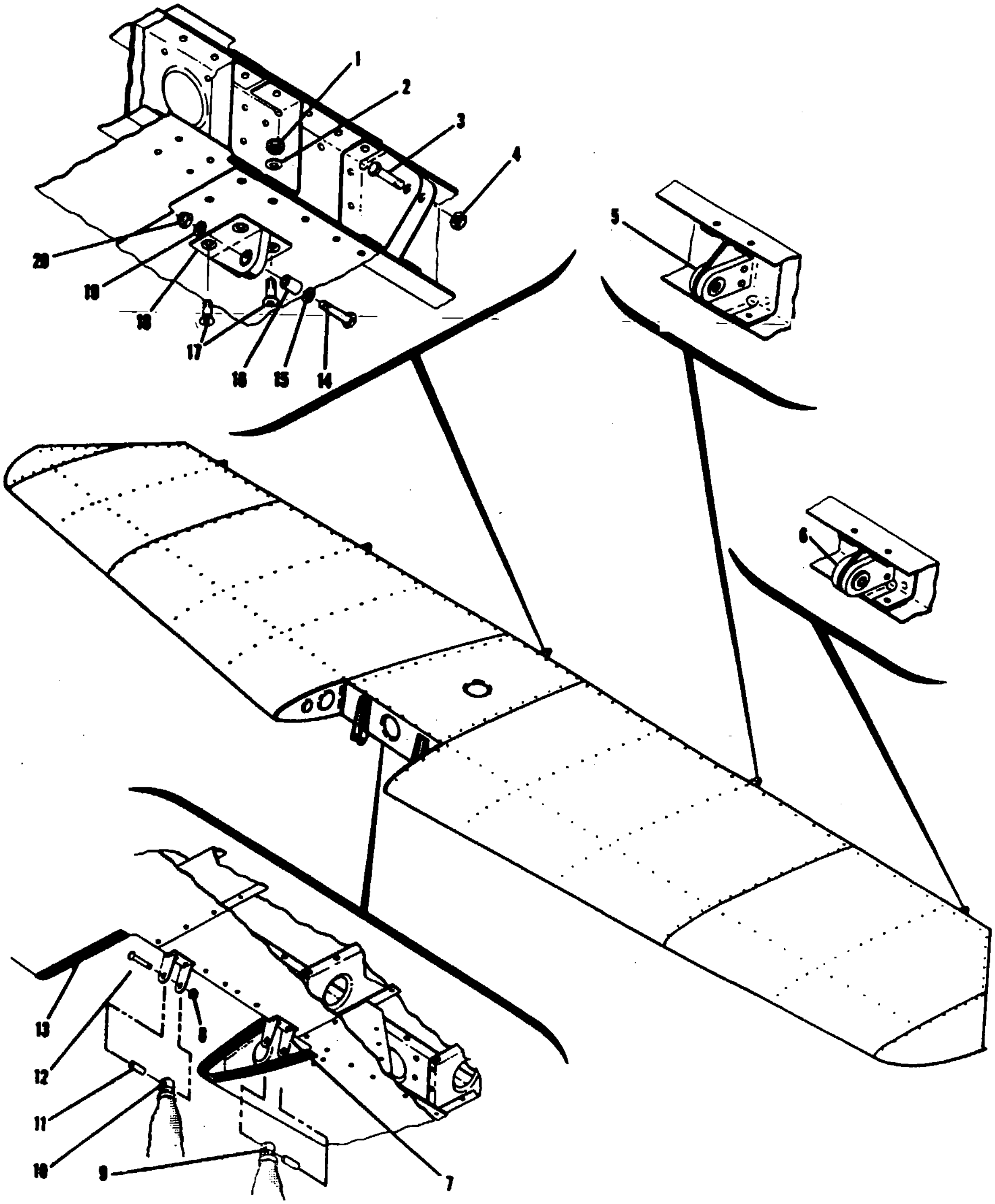
11-9. REPAIR AND REASSEMBLY OF STABILIZER ACTUATOR. (See figure 11-3.)

a. Wash all parts thoroughly in solvent (Federal Specification P-S-661, or equivalent). Inspect all parts for cleanliness, cracks, chips, scratches, pitting and excessive wear. Replace all parts that are unserviceable.
b. If bearing (6) is being replaced, press bearing into hinge assembly (20) until bearing seats against the shoulder in the hinge assembly.
c. Insert actuator screw (10) into bearing (6).

NOTE

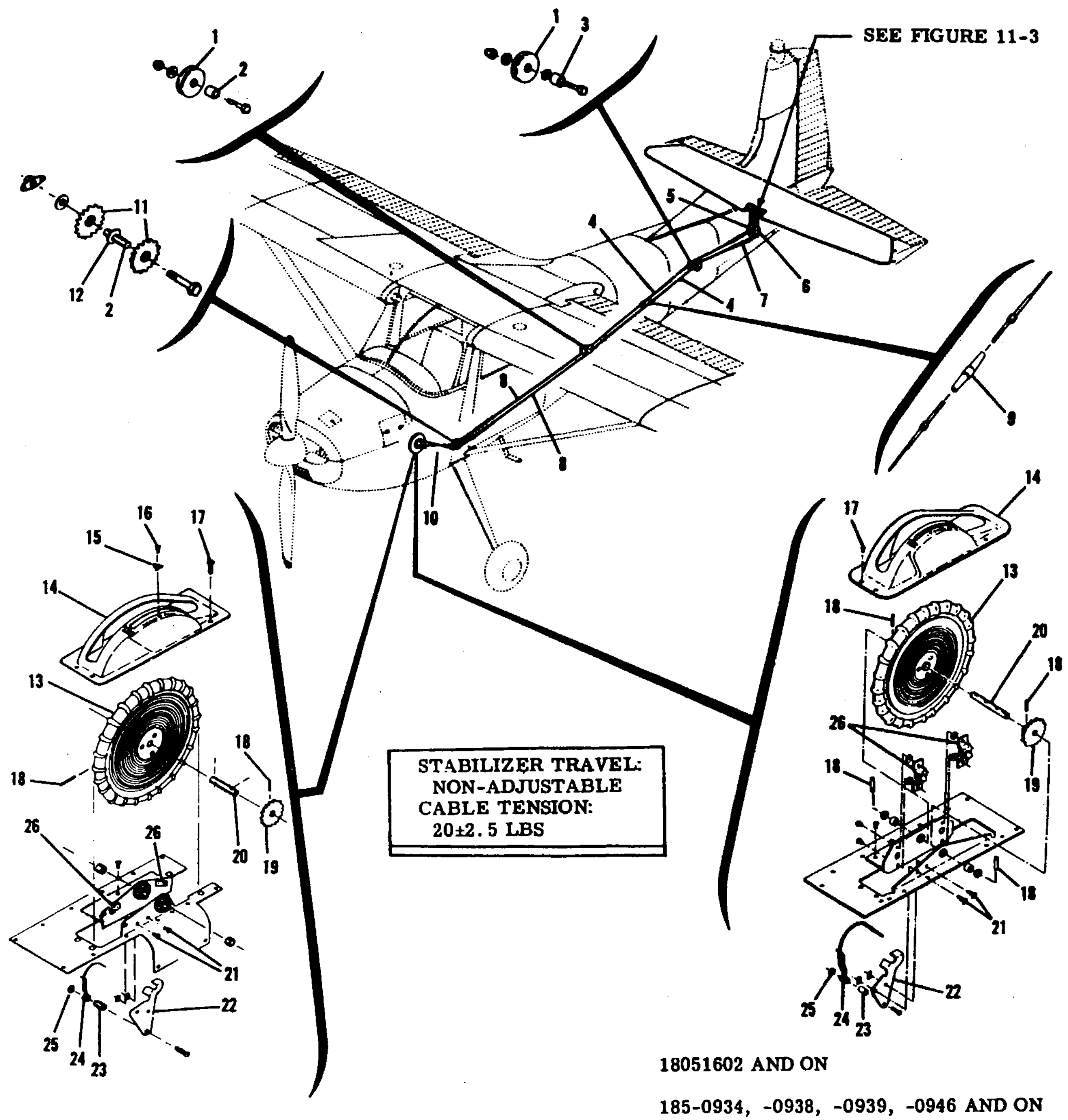
Actuator screw (10) and barrel nut (12) are lapped together. When replacing either or both of these units, they must be lapped with a fine lapping compound until screw can be rotated smoothly in barrel nut. After lapping, thoroughly clean screw and barrel nut to remove all traces of lapping compound.

d. Install retainer (2) and sprocket (1) on actuator screw (10) so that roll pin holes in each part are aligned and install roll pin (3).
e. Position retainer cap (7) and retainer plate (8) on hinge assembly (20), and install screws (9). Safety wire screws (9) two at a time.



1. Nut	8. Nut	14. Bolt
2. Washer	9. Right Stabilizer Actuator	15. Washer
3. Bolt	10. Left Stabilizer Actuator	16. Bushing
4. Nut	11. Eccentric Bushing	17. Screw
5. Inboard Elevator Hinge	12. Bolt	18. Stabilizer Hinge
6. Outboard Elevator Hinge	13. Rubber Moulding	19. Washer
7. Forward Attach Bracket		20. Nut

Figure 11-1. Stabilizer



1. Pulley
2. Bushing
3. Spacer
4. Aft Cables
5. Actuator RH
6. Actuator LH
7. Aft Chain
8. Forward Cables
9. Turnbuckle
10. Forward Chain
11. Sprocket
12. Washer
13. Trim Wheel
14. Trim Wheel Cover
15. Pointer
16. Screw
17. Screw
18. Roll Pin
19. Sprocket
20. Shaft
21. Screw
22. Chain Guard
23. Bushing
24. Indicator
25. Collar
26. Friction Catch

Figure 11-2. Stabilizer Trim Control System

NOTE

When installing retainer plate (8), position plate so that its hole flange faces away from hinge assembly (20). This flange acts as a guide for spring (17).

f. Install collar (11) and spring (17) on barrel nut (12) so that tapered end of spring fits inside of collar.

g. Lubricate threads of actuator screw and barrel nut with MIL-G-21164 grease and install spring (17), collar (11), and barrel nut (12) over actuator screw (10). Spring fits over flange on retainer plate (8). Compress spring so that barrel nut can be started on threads of actuator screw. Rotate barrel nut all the way down on screw assembly.

h. Temporarily install chain guard (5). Chain guard will have to be removed when the chain is installed.

i. Slide boot (16) over stabilizer actuator assembly until small end of boot fits over collar (11). Secure small end of boot to collar (11) with clamp (15).

j. Pull large end of boot away from the square area of hinge assembly and fold the last one inch of the boot back so that inner surface is exposed.

k. Thoroughly clean the exposed inner surface of the boot and the mating surface of the hinge with solvent (Federal Specification P-S-661, or equivalent).

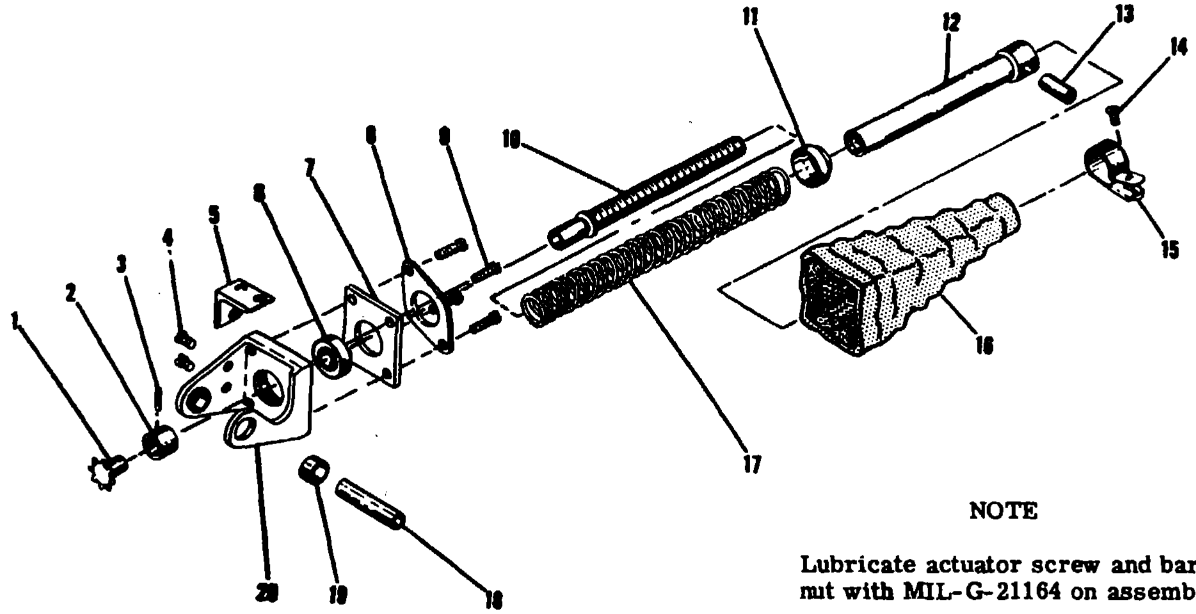
NOTE

Surfaces must be absolutely free from all dirt and grease before applying cement.

l. Apply a thin, even coat of EC-880, Minnesota Mining Co., adhesive (or equivalent) to the boot and hinge mating surfaces.

m. When surfaces become tacky, and will not transfer when touched, slip boot over hinge assembly and press to insure a good bond.

n. Position bushings (13) and (18) as shown in figure 11-3 and wire in place.



NOTE

Lubricate actuator screw and barrel nut with MIL-G-21164 on assembly.

1. Sprocket
2. Retainer
3. Roll Pin
4. Screw
5. Cable Guard
6. Bearing
7. Retainer Cap
8. Retainer Plate
9. Screw
10. Actuator Screw
11. Collar
12. Barrel Nut
13. Eccentric Bushing
14. Screw
15. Clamp
16. Boot
17. Spring
18. Bushing
19. Bushing
20. Hinge Assembly

Figure 11-3. Stabilizer Screw-jack Actuator

11-10. RIGGING STABILIZER TRIM CONTROL SYSTEM.

NOTE

If a stabilizer actuator or rear chain and cable is to be replaced, remove stabilizer as outlined in paragraph 11-4. Install actuator and chain assembly as outlined in paragraph 11-5.

a. Disconnect stabilizer trim cable turnbuckles.
b. Remove trim wheel cover.
c. Rotate stabilizer trim wheel to full forward position with indicator pointer at NOSE DOWN position.
d. Disengage chain from the sprockets and position chain so that three links of the chain are aft of the left sprocket (11, figure 11-2). Tape or block chain so that chain and trim wheel will remain in this position.
e. Remove access covers and fairings from tail group.
f. Pull stabilizer trim cables to raise leading edge of stabilizer as high as possible.
g. Remove bolts attaching actuators to stabilizer and raise leading edge of stabilizer to its full limit of travel (against up-stop bracket). Block stabilizer to hold it against the up-stop bracket.
h. Connect aft trim cables to forward cables and tighten turnbuckles equally to obtain the cable tension specified in figure 11-2. As cables are being connected, rotate actuator barrel nuts as required to prevent interference with the stabilizer. Safety turnbuckles.

NOTE

As aft cables are connected and tightened, do not allow the stabilizer trim control wheel to be moved.

i. With cables at correct tension, rotate actuator barrel nuts to align with holes in brackets on stabilizer.

NOTE

Eccentric bushings in actuator barrel nuts may be rotated to permit installation of attaching bolts with minimum of interference. Do not deflect or warp stabilizer to install bolts.

j. Install stabilizer attaching bolts.
k. Remove blocks placed under stabilizer. Remove tape or block at forward chain sprocket.
l. Rotate trim wheel and check stabilizer for full range of travel.
m. As stabilizer contacts the up-stop, check that pointer indicates NOSE DOWN attitude.
n. Check that turnbuckles are safetied and all cable and chain guards are installed, then install all parts removed for access.

WARNING

Be sure that stabilizer moves in the correct direction when operated by the stabilizer trim control wheel.

SHOP NOTES:

SECTION 12

POWERPLANT

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12-1. ENGINE DATA. (Circled numbers appearing in the chart refer to data at end of chart.)

Aircraft Series	150	172	P172	180, 182
MODEL (Continental)	O-200-A	O-300-C O-300-D	GO-300-E	O-470-R
BHP at RPM	100 at 2750	145 at 2700	175 at 3200 (Crankshaft Speed)	230 at 2600
Number of Cylinders	4	6	6	6
Displacement (Cubic Inches)	200.91	301.37	301.37	471.00
Bore	4. 0625	4. 0625	4. 0625	5. 00
Stroke	3. 875	3. 875	3. 875	4. 00
Compression Ratio	7. 0:1	7. 0:1	7. 3:1	7. 0:1
Magnetos	Slick #4001 ①	Slick #664	Slick #667	Slick #662 ②
Right Magneto	Fires 24° (+1 or -0°) BTC Upper Plugs	Fires 26° BTC Upper Plugs	Fires 28° BTC Upper Plugs	Fires 22° BTC Lower Left, Upper Right
Left Magneto	Fires 24° (+1 or -0°) BTC Lower Plugs	Fires 28° BTC	Fires 28° BTC	Fires 22° BTC Lower Right Lower Right
Firing Order	1-3-2-4	1-6-3-2-5-4	1-4-5-2-3-6	1-6-3-2-5-4
Spark Plugs	See Chart ③			
Carburetor (Marvel-Schebler)	MA-3-SPA	MA-3-SPA	MA-4-5	MA-4-5
Valve Mechanism	Hydraulic Lifters, Non-Adjustable Tappets	Hydraulic Lifters, Non-Adjustable Tappets	Hydraulic Lifters, Non-Adjustable Tappets	Hydraulic Lifters, Non-Adjustable Tappets
Generator	12-Volt	12-Volt	12-Volt	12-Volt ④
Alternator	14-Volt, 60-Amp ⑤	14-Volt, 60-Amp ⑤	Not Applicable	14-Volt, 60-Amp ⑥
Oil Pressure (PSI)				
Normal	30-60	30-60	30-60	30-60
Minimum Idling	10	5	10	10
Oil Temperature				
Normal Operating	Within Green Arc	Within Green Arc	Within Green Arc	Within Green Arc
Maximum	Red Line	Red Line	Red Line	Red Line
Cylinder Head Temperature				
Normal Operating	Within Green Arc	Within Green Arc	Within Green Arc	Within Green Arc
Maximum	Red Line	Red Line	Red Line	Red Line
Cylinder Head Temperature Probe Location	Not Applicable	Not Applicable	Cylinder 4	Cylinder 1 (S/N 54424 - 55884) Cylinder 6 (S/N 55885 - 59305)
Dry Weight ⑦				
With Accessories	200 Lb	298 Lb	351 Lb	438 Lb
Starter (12-Volt)	Manual Engagement	Manual Engagement ⑧	Automatic Engagement	Automatic Engagement
Direction of Crankshaft Rotation (Viewed from Rear)	Clockwise	Clockwise	Counterclockwise	Clockwise

ENGINE DATA. (Cont.)

Aircraft Series	**185**	**A185**
MODEL (Continental)	IO-470-F	IO-520-D
BHP at RPM	260 BPH at 2600 RPM	Not Applicable
Maximum for Take-off	Not Applicable	300 BPH
5 Minutes	Not Applicable	2850 RPM
Maximum Except Take-Off	Not Applicable	285 BPH
Max. Continuous	Not Applicable	2700 RPM
Number of Cylinders	6	6
Displacement (Cubic Inches)	471.00	520.00
Bore	5.00	5.25
Stroke	4.00	4.00
Compression Ratio	8. 6:1	8. 5:1
Magnetos	Slick #662	Slick #662
Right Magneto	Fires 20° BTC Upper Right and Lower Left	Fires 20° BTC Upper Right and Lower Left
Left Magneto	Fires 20° BTC Upper Left and Lower Right	Fires 20° BTC Upper Left and Lower Right
Firing Order	1-6-3-2-5-4	1-6-3-2-5-4
Spark Plugs	See Chart ③	
Fuel Metering System	Continental Fuel System	Continental Fuel System
Unmetered Fuel Pressure	9.0 - 11.0 PSI at 600 RPM 25.3 - 26.8 PSI at 2625 RPM	9.0 - 11.0 PSI at 600 RPM 31.0 - 32.5 PSI at 2850 RPM
Valve Mechanism	Hydraulic Lifters, Non-Adjustable Tappets	Hydraulic Lifters, Non-Adjustable Tappets
Generator	12-Volt ④	Not Applicable
Alternator	14-Volt, 60-Amp ⑥	14-Volt, 60-Amp
Oil Pressure (PSI)		
Normal	30-60	30-60
Minimum Idling	10	10
Oil Temperature		
Normal Operating	Within Green Arc	Within Green Arc
Maximum	Red Line	Red Line
Cylinder Head Temperature		
Normal Operating	Within Green Arc	Within Green Arc
Maximum	Red Line	Red Line
Cylinder Head Temperature Probe Location	Cylinder 1 (S/N 185-0745 - 185-1149) Cylinder 2 (S/N 185-0513 - 185-0744)	Cylinder 1
Dry Weight ⑦		
With Accessories	464 Lb	474 Lb
Starter (12-Volt)	Automatic Engagement	Automatic Engagement
Direction of Crankshaft Rotation (Viewed from Rear)	Clockwise	Clockwise

① Slick #447 magnetos replaced the Model S4LN-21 Bendix magnetos during the 1966 model-year. Slick #4001 magnetos replaced the Slick #447 magnetos beginning with the 1967 model-year.

② Slick #662 magnetos replaced the Model S6RN-25 Bendix magnetos during the 1966 model-year.

③ Refer to the Teledyne Continental Service Information Letter SIL 03-2A for information about spark plug part numbers, torque and gap.

④ Generator ampere rating depends on model, serial number, and whether standard or optional equipment is used.
⑤ Beginning with the 1967 model-year, a 14-volt, 60-ampere alternator is used.
⑥ Beginning with 1965 models, a 14-volt, 52-ampere alternator is used. Beginning with the 1966 models, a 14-volt, 60-ampere alternator is used.
⑦ Weights are approximate and will vary with engine model changes and optional accessories installed.
⑧ Model 172 Skyhawk starter is automatically engaged.

12-2. ENGINES.

12-3. Air cooled, wet-sump, four and six cylinder opposed Continental engines are used on all single-engine Cessna aircraft. In general configuration the engines are similar, except for the engine used on the Model P172 and the fuel-injection engine used on the Models 185 and A185. In the P172 engine, the propeller drive shaft is geared at a 0.750:1 ratio to the engine crankshaft, permitting the engine to operate at a higher RPM to develop an increased horsepower for its displacement.

NOTE: For repair and overhaul of the engines, accessories, and propellers, refer to appropriate publications issued by the manufacturers of these items.

12-4. TROUBLE SHOOTING.

CARBURETOR EQUIPPED ENGINES

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
ENGINE FAILS TO START.		
Improper use of starting procedure.		Review starting procedure.
Defective aircraft fuel system.	See paragraph 13-3.	See paragraph 13-3.
Engine flooded.	See paragraph 12-21.	See paragraph 12-21.
Spark plugs fouled or improperly gapped.	Remove and check.	Clean and regap. Replace if defective.
Failure of magneto impulse couplings.	With ignition switch off, rotate propeller by hand and listen for loud clicks as impulse couplings operate.	Repair or replace magnetos.
Defective magneto switch or grounded magneto leads.	Check continuity.	Repair or replace switch or leads.
Defective ignition system.	See paragraph 12-71, 12-71E, or 12-77.	See paragraph 12-71, 12-71E, or 12-77.
Excessive induction air leaks.	Check visually.	Correct the cause of air leaks.
Vaporized fuel.	Vaporized fuel is most likely to occur in hot weather with a hot engine.	See paragraph 12-21.
Defective carburetor.	If engine will start on primer but stops when mixture is placed in full rich position and priming is discontinued, the carburetor is defective.	Repair or replace carburetor.
Water in fuel system.	Open fuel strainer drain valve and check for water.	Drain fuel tank sumps, fuel lines, fuel strainer, and carburetor.
ENGINE STARTS BUT DIES, OR WILL NOT IDLE.		
Propeller control in low rpm position.	Check visually.	Use high rpm for all ground operations.
Defective aircraft fuel system.	See paragraph 13-3.	See paragraph 13-3.
Improper idle speed or idle mixture adjustment.	See paragraph 12-63.	See paragraph 12-63.
Spark plugs fouled or improperly gapped.	Remove and check.	Clean and regap. Replace if defective.
Water in fuel system.	Open fuel strainer drain valve and check for water.	Drain fuel tank sumps, fuel lines, fuel strainer and carburetor.
Defective ignition system.	See paragraph 12-71, 12-71E, or 12-77.	See paragraph 12-71, 12-71E, or 12-77.

ENGINE STARTS BUT DIES, OR WILL NOT IDLE (Cont).		
Excessive induction air leaks.	Check visually.	Correct the cause of air leaks.
Vaporized fuel.	Vaporized fuel is most likely to occur in hot weather with a hot engine.	See paragraph 12-21.
Manual primer leaking.	Disconnect primer outlet line. If fuel leaks through primer, it is defective.	Repair or replace primer.
Leaking float valve or float level set too high.	Perform an idle mixture check. Attempt to remove any rich indication with idle mixture adjustment. If the rich indication cannot be removed, the float valve is leaking or the float level is set too high.	Replace defective parts; reset float level.
Defective carburetor.	If engine will start on primer but stops when mixture is placed in full rich position and priming is discontinued, the carburetor is defective.	Repair or replace carburetor.
Defective engine.	Check compression. Listen for unusual engine noises.	Engine repair is required.
ENGINE RUNS ROUGHLY OR WILL NOT ACCELERATE PROPERLY.		
Propeller control in low rpm position.	Check visually.	Use high rpm for all ground operations.
Restriction in aircraft fuel system.	See paragraph 13-3.	See paragraph 13-3.
Worn or improperly rigged throttle or mixture control.	Check visually.	Rig properly. Replace worn linkage.
Spark plugs fouled or improperly gapped.	Remove and check.	Clean and regap. Replace if defective.
Defective ignition system.	See paragraph 12-71, 12-71E, or 12-77.	See paragraph 12-71, 12-71E, or 12-77.
Defective or badly adjusted accelerating pump in carburetor.	Check setting of accelerating pump linkage.	Change accelerating pump adjustment.
Float level set too low.	Check float level.	Reset float level.
Defective carburetor.	If engine will start on primer but stops when mixture is placed in full rich position and priming is discontinued, the carburetor is defective.	Repair or replace carburetor.
Defective engine.	Check compression. Listen for unusual engine noises.	Engine repair is required.

POOR IDLE CUT-OFF.		
Worn or improperly rigged mixture control.	Check that idle cut-off stop on carburetor is contacted.	Rig properly. Replace worn linkage.
Manual primer leaking.	Disconnect primer outlet line. If fuel leaks through primer, it is defective.	Repair or replace primer.
Defective carburetor.	If engine will start on primer but stops when mixture is placed in full rich position and priming is discontinued, the carburetor is defective.	Repair or replace carburetor.
Fuel contamination.	Check all screens in fuel system.	Drain all fuel and flush out fuel system. Clean all screens, fuel lines, fuel strainer, and carburetor.

FUEL INJECTION EQUIPPED ENGINES

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
ENGINE FAILS TO START.		
Improper use of starting procedure.		Review starting procedure.
Defective aircraft fuel system.	See paragraph 13-4.	See paragraph 13-4.
Engine flooded.	See paragraph 12-22.	See paragraph 12-22.
Spark plugs fouled or improperly gapped.	Remove and check.	Clean and regap. Replace if defective.
Failure of magneto impulse couplings.	With ignition switch off, rotate propeller by hand and listen for loud clicks as impulse couplings operate.	Repair or replace magnetos.
Defective magneto switch or grounded magneto leads.	Check continuity.	Repair or replace switch or leads.
Defective ignition system.	See paragraph 12-71 or 12-77.	See paragraph 12-71 or 12-77.
Excessive induction air leaks.	Check visually.	Correct the cause of air leaks.
Dirty screen in fuel control unit, or defective fuel control unit.	Remove screen and check visually. Check fuel flow through fuel control unit.	Clean dirty screen. Replace fuel control unit if defective.
Defective electric fuel pump.	See paragraph 13-4.	See paragraph 13-4.
Defective fuel manifold valve, or dirty screen inside valve.	Check fuel flow through valve.	Remove and clean per paragraph 12-45. Replace if defective.

ENGINE FAILS TO START (Cont).

Clogged fuel injection lines or discharge nozzles.	Check fuel flow through lines and nozzles.	Clean lines and nozzles. Replace if defective. Refer to paragraph 12-49.
Fuel pump not permitting fuel from electric pump to bypass.	Check fuel flow through engine-driven fuel pump.	Replace fuel pump.
Vaporized fuel.	Vaporized fuel is most likely to occur in hot weather with a hot engine.	See paragraph 12-22.

ENGINE STARTS BUT DIES, OR WILL NOT IDLE.

Propeller control in low rpm position.	Check visually.	Use high rpm for all ground operations.
Defective aircraft fuel system.	See paragraph 13-4.	See paragraph 13-4.
Improper idle speed or idle mixture adjustment.	See paragraph 12-40.	See paragraph 12-40.
Spark plugs fouled or improperly gapped.	Remove and check.	Clean and regap. Replace if defective.
Water in fuel system.	Open fuel strainer drain valve and check for water.	Drain fuel tank sumps, fuel lines, and fuel strainer.
Defective ignition system.	See paragraph 12-71 or 12-77.	See paragraph 12-71 or 12-77.
Excessive induction air leaks.	Check visually.	Correct the cause of air leaks.
Dirty screen in fuel control unit, or defective fuel control unit.	Remove screen and check visually. Check fuel flow through fuel control unit.	Clean dirty screen. Replace fuel control unit if defective.
Defective fuel manifold valve, or dirty screen inside valve.	Check fuel flow through valve.	Remove and clean per paragraph 12-45. Replace if defective.
Restricted fuel injection lines or discharge nozzles.	Check fuel flow through lines and nozzles.	Clean lines and nozzles. Replace if defective. Refer to paragraph 12-49.
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 engine-driven fuel pump.
Vaporized fuel.	Vaporized fuel is most likely to occur in hot weather with a hot engine.	See paragraph 12-22.
Manual primer leaking.	Disconnect primer outlet line. If fuel leaks through primer, it is defective.	Repair or replace primer.
Defective engine.	Check compression. Listen for unusual engine noises.	Engine repair is required.

ENGINE RUNS ROUGHLY OR WILL NOT ACCELERATE PROPERLY.		
Propeller control in low rpm position.	**Check visually.**	**Use high rpm for all ground operations.**
Restriction in aircraft fuel system.	**See paragraph 13-4.**	**See paragraph 13-4.**
Restriction in fuel injection system.	**Check fuel flow through discharge nozzles, fuel lines, manifold valve, fuel control unit, and fuel pump until restriction is located.**	**Clean out restriction. Replace any item found defective.**
Fuel pump pressure improperly adjusted.	See paragraph 12-42.	See paragraph 12-42.
Worn or improperly rigged throttle or mixture control.	Check visually.	Rig properly. Replace worn linkage.
Spark plugs fouled or improperly gapped.	Remove and check.	Clean and regap. Replace if defective.
Defective ignition system.	See paragraph 12-71 or 12-77.	See paragraph 12-71 or 12-77.
Defective engine.	Check compression. Listen for unusual engine noises.	Engine repair is required.
POOR IDLE CUT-OFF.		
Worn or improperly rigged mixture control.	Check that idle cut-off stop on fuel control unit is contacted.	Rig properly. Replace worn linkage.
Dirty or defective fuel 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 per paragraph 12-45. Replace if defective.
Fuel contamination.	Check all screens in fuel and fuel injection system.	Drain all fuel and flush out fuel system. Clean all screens, fuel lines, discharge nozzles, fuel strainer, fuel manifold valve, and fuel pump.
Defective mixture control valve in fuel control unit.	If none of the preceding causes are found, fuel control unit is probably at fault.	Replace defective fuel control unit.

12-5. ENGINE REMOVAL. Although the routing and location of wires, cables, lines, hoses, and controls vary among the different models, the following general procedure may be followed. When disconnecting parts, it is a good practice to code or tag the parts to aid in reinstallation. Similarly, shop notes made at removal will often clarify reinstallation procedures.

a. Remove the engine cowling and drain engine oil.

b. Turn off fuel selector valve or fuel shut-off valve.

c. Remove the spinner and propeller. Cover the exposed end of the crankshaft or propeller shaft on engines with constant-speed propellers to prevent the entry of dust and dirt.

d. Disconnect hot and cold air flexible hoses.

e. Except on the Model 150, remove the exhaust stacks. Some exhaust stacks have braces which must be disconnected or removed. The exhaust stacks on some models are made in sections, joined by clamps, to facilitate removal. On the Model 150, the engine can be removed with the exhaust stacks attached.

NOTE

During the following procedure remove any clamps which secure controls, wires, hoses, or lines to the engine, engine mount, or attached brackets, so they will not interfere with engine removal. Some of the items listed can be disconnected at more than one place. It may be desirable to disconnect some of these items at other than the places indicated. The reason for engine removal should be the governing factor in deciding at which point to disconnect them. Omit any of the items which are not present on a particular engine installation.

f. Tag and disconnect:
1. Propeller governor control at governor.
2. Induction air control at airbox.
3. Throttle and mixture controls at carburetor or fuel-air control unit.

NOTE

Remove the induction airbox on those models where it interferes with engine removal.

4. Oil breather and vacuum system oil separator vent lines where secured to engine mount.
5. Ignition switch leads at magnetos.

WARNING

The magnetos DO NOT have internal grounding springs. Ground the magneto points to prevent accidental firing.

6. Electrical wires at generator or alternator.
7. Cylinder head temperature thermocouple or bulb at cylinder.
8. Oil temperature bulb or oil temperature electrical connector at engine.
9. Oil pressure line or hose at firewall, or electrical wires at oil pressure transmitter on engine.
10. Tachometer cable at engine tachometer drive.
11. Electrical wires at starter.
12. Starter control at starter.
13. Manifold pressure line or hose at manifold.
14. Fuel and primer lines and hoses at engine.

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.

15. Vacuum system suction hose at vacuum pump.
16. Electrical wires at fuel pumps.

CAUTION

On tricycle gear aircraft, place a padded stand under the tail tie-down ring before removing the engine. The loss of engine weight will allow the tail to drop.

g. Attach a hoist to the hoisting lug on top of the engine and take up engine weight on hoist.
h. Check for and disconnect or remove any other items which would interfere with engine removal.

NOTE

The Model 185 engine is easier to remove with the engine mount attached. However, if the induction airbox and attached linkage is first detached, the engine can be removed from the engine mount.

i. Remove bolts attaching engine to engine mount, and slowly hoist the engine and pull it forward. Balance the engine by hand and carefully guide the disconnected components out of the engine assembly. Remove engine shock mount assemblies, or on the Model 185 remove bolts attaching engine mount to upper part of firewall, then remove bolts attaching engine mount to lugs protruding through lower part of firewall. Balance the engine by hand as the last of these bolts are removed, and slowly hoist the engine and pull it forward. Carefully guide disconnected components out of the engine assembly.

12-6. PIVOTING ENGINE AWAY FROM FIREWALL (SKYWAGON). Access to the engine components and accessories on the back of the engine may be gained by swinging the engine forward and downward, pivoting about the lower engine mount bolts at the lugs protruding through the firewall. Attach a suitable hoist to the hoisting lug on top of the engine and take up engine weight with the hoist.

NOTE

The working space needed will determine just how many items will have to be disconnected before the engine can be pivoted away from the firewall. A very small space may require that only a few items be disconnected or unclamped. A larger working space will require most of the items listed in paragraph 12-5, step "f," to be disconnected. Always be sure that lines, hoses, electrical wires, and controls are not stretched or broken. Cap or plug all disconnected lines, hoses, and fittings.

After disconnecting and/or unclamping items to permit swinging the engine down as much as needed, remove the bolts from the engine mount upper attachment points and loosen the pivot bolts at the bottom of the engine mount. Slowly lower the hoist, watching for any additional items that may need to be disconnected or unfastened. The induction airbox will have to be removed for maximum access.

12-7. POWERPLANT BUILD-UP consists of the installation of parts, accessories and components to the basic engine to build up a powerplant unit ready for installation on the airplane. All safety-wire, lockwashers, palnuts, elastic stop nuts, gaskets and rubber connections should be new parts.

12-8. ENGINE INSTALLATION.
a. Install any parts removed after the engine was removed, then hoist engine near the engine mount and carefully route controls, lines, and hoses in place as the engine is positioned in the engine mount. Be sure engine shock mount assemblies are in place and that any ground straps that were removed are

reinstalled.

b. Install engine mount bolts. On the Model 185, install the upper engine mount bolts, then install bolts securing engine mount to the lugs protruding through the lower part of the firewall. When tightening, use the standard torque values listed in Section 1.

c. Remove cover from end of crankshaft or propeller shaft and install propeller and spinner.

d. Service the engine with the proper grade and amount of oil.

e. Remove hoist. Remove padded stand placed under tailcone of tricycle gear aircraft.

NOTE

During the following procedure reinstall any clamps which secure controls, wires, hoses, or lines to the engine, engine mount, or attached brackets. Some items may have been disconnected at other than the places indicated. Omit any of the items not present on a particular engine installation.

f. Identify and connect:

1. Vacuum system suction hose at vacuum pump.
2. Fuel and primer lines and hoses at engine.

NOTE

Throughout the airplane fuel system, from the tanks to the engine-driven fuel pump or carburetor, use Parker Sealube (or equivalent) as a thread lubricant or to seal a leaking connection. Apply sparingly to male fittings only, omitting the first two threads. Always be sure 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 lubricating oil, on the fitting threads. Do not use any other form of thread compound on the injection system fittings.

3. Manifold pressure line or hose at manifold.
4. Starter control at starter. See figure 12-1.
5. Electrical wires at starter.
6. Tachometer cable at engine tachometer drive. Torque attaching nut to 100 lb-in.
7. Oil pressure line or hose at firewall, or electrical wires at oil pressure transmitter on engine.
8. Oil temperature bulb or oil temperature electrical connector at engine.
9. Cylinder head temperature thermocouple or bulb at cylinder.
10. Electrical wires at generator or alternator.
11. Ignition switch leads at magnetos.
12. Oil breather and vacuum system oil separator vent lines where secured to engine mount.

NOTE

Install induction airbox, if removed.

13. Throttle and mixture controls at carburetor or fuel air control unit. Rig per paragraph 12-54, 12-55, 12-61, or 12-62.
14. Induction air control at airbox. Rig per paragraph 12-52 or 12-60.
15. Propeller governor control at governor. Rig per paragraph 14-22.
16. Electrical wires at auxiliary fuel pump.

g. Install exhaust stacks, shrouds, exhaust stack braces, and hot and cold air flexible hoses. Use new exhaust gaskets regardless of apparent condition of those removed.

h. Install engine cowling.

i. Perform engine run-up and make final adjustments on engine and propeller controls.

j. Check complete engine installation for proper security, correct routing of controls, lines, hoses, and wires, proper safetying, and tightness of all connections.

k. Check cowl flap adjustment.

12-9. EXTREME WEATHER MAINTENANCE.

12-10. COLD WEATHER.

12-11. Cold weather starting will be made easier by the installation of an oil dilution system, a multicylinder priming system and a ground service receptacle, although not all of these items are available for each model.

An optional engine priming system may be installed on the Models P172, 180, 182 and 185 to improve cold weather starting of the engine. On the Models P172, 180 and 182, fuel is taken from the fuel strainer and is delivered to the fuel distributor where individual lines route the fuel to each cylinder. On the Model 185, fuel to the manual primer pump is taken from the fuel strainer and is delivered to the aft end of each intake manifold. This primes the entire length of the intake manifold for each bank of cylinders. This intake manifold priming system is standard equipment on Models 180G and 182G and on.

A high-output coil has been developed for the Bendix-Scintilla S-20 series magnetos. It provides increased voltage output for improved engine starting. Bendix-Scintilla magnetos that have the high-output coil installed are identified by a red nameplate. The original coil in the earlier model magnetos may be replaced with the high-output coil to improve engine starting.

If these aids are not installed, the following procedure may be accomplished:

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 ... 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, insure 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 occurence 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.

12-12. WINTERIZATION KITS are available for all models. The kits are essentially devices to restrict the entry of air through the front opening of the cowl, or to restrict the outlet of air at the rear opening of the cowl. All kits are designed for easy installation on the aircraft and should be used in accordance with instructions accompanying the kits.

12-13. LOW BATTERY STARTING.

12-14. (Prior to 1967 Models.) If a ground service receptacle is installed, the use of an external power source is recommended for low battery starting. Before connecting a generator type external power source, it is important that the master switch be turned on. This will enable the battery to absorb transient voltages which otherwise might damage the semiconductors in the electronic equipment. When using a battery type external power source, the master switch should be turned off to prevent an unnecessary power drain from the power source batteries to the airplane's battery. Starting may also be accomplished by hand-cranking.

CAUTION

Be certain that the polarity of any external power source or batteries is correct (positive to positive and negative to negative). A polarity reversal will result in immediate damage to semiconductors in the airplane's electronic equipment.

12-14A. (1967 Models and On, Except Standard Model 172.) If a ground service receptacle is installed, the use of an external power source is recommended for cold weather starting and lengthy maintenance work on the airplane's electrical system with the exception of the electronic equipment.

NOTE

Electrical power for the airplane's electrical circuits is provided through a split bus bar having all electronic circuits on one side of the bus and other electrical circuits on the other side of the bus. When an external power source is connected, a contactor automatically opens the circuit to the electronic portion of the bus bar as a protection against damage to the semiconductors in the electronic equipment by transient voltages from the power source. Therefore, the external power source cannot be used as a source of power when checking electronic components. Just before connecting an external power source (generator type or battery cart), the master switch should be turned ON.

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 airplane. If the plug is accidentally connected backwards, no power will flow to the airplane's electrical system, thereby preventing any damage to electrical equipment.

12-15. HAND-CRANKING. A normal hand-cranking procedure may be used on all aircraft with impulse coupling equipped magnetos.

12-16. (Deleted.)

12-17. (Deleted.)

12-18. (Deleted.)

12-19. (Deleted.)

12-20. HOT WEATHER.

12-21. CARBURETOR EQUIPPED ENGINES. In hot weather, with a hot engine, fuel may vaporize at certain points in the fuel system. To correct this condition, remove the carburetor vent plug and purge the carburetor by turning the fuel selector valve on. Purge the carburetor in this manner until fuel stands level with the vent plug opening. Replace the carburetor vent plug and operate the engine to make sure that the condition has been corrected.

Engine mis-starts characterized by weak, intermittent explosions followed by puffs of black smoke from the exhausts 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, and the mixture control in IDLE CUT-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 with additional priming.

12-22. FUEL INJECTION EQUIPPED ENGINES. Engine starting in hot weather or with a hot engine is sometimes hampered by vapor formation in the fuel lines. To purge the vapor, move the mixture control to full rich, open the throttle 1-1/2 inches, and prime with the auxiliary fuel pump switch in the HI or EMERG position until the fuel flow indicator reads 4 - 6 gal/hr. Then shut off the fuel pump switch and engage the starter. As the flooded mixture becomes progressively leaner, reaching a combustible mixture, the engine will start. If the engine tends to die, turn the auxiliary fuel pump switch momentarily to HI or EMERG at appropriate intervals until vapor is fully cleared and the engine runs smoothly.

If prolonged cranking is necessary, allow the starter motor to cool at frequent intervals, since excessive heat may damage the armature.

12-23. DUSTY CONDITIONS.

12-24. 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. Anti-dust kits are available for some airplanes.

12-24A. An optional air filter installation for the alternate air source (SK172-21) is available for Model 172 Series airplanes. This kit contains either a permanent type filter element or a replaceable improved filter element. The improved filter element is used for service parts. The permanent type filter has a wire mesh screen around the inside and outside of the filtering media. The improved filter element has a perforated steel band around the inside and outside of the filtering media. The filter element is cylindrical in shape, therefore normal air flow through the filter is from the outside to the inside. The filter may be serviced as outlined for the dry type filter in paragraph 2-17.

NOTE

The improved 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.

The permanent filter may be cleaned and re-used as long as it is not damaged. A damaged filter may have the wire mesh screen 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.

12-25. SEACOAST AREAS, HUMID AREAS.

12-26. 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.

12-27. STARTING SYSTEMS.

12-28. MANUALLY ENGAGED STARTING SYSTEMS employ a manually operated overrunning clutch drive pinion to transmit power from the electric starter motor to the crankshaft starter drive gear. A knob or handle on the instrument panel is connected by a flexible control to a lever on the starter. This lever shifts the starter drive pinion into the engaged position, then closes the starter switch contacts when the starter knob or handle is pulled. The starter lever is attached to a return spring which returns the lever and the flexible control to the off position. When the engine starts, the overrunning action of the clutch protects the starter drive pinion until the shift lever can be released to disengage the pinion.

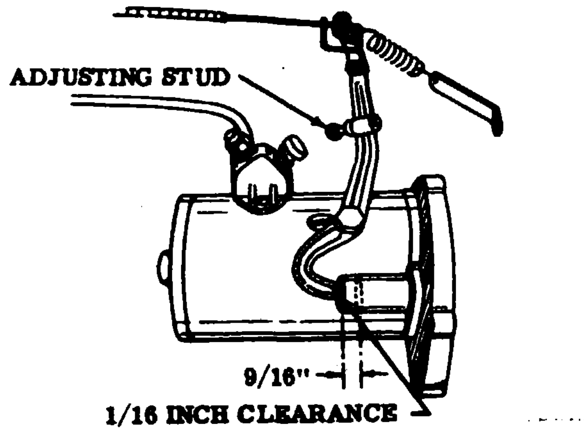
12-29. REPLACEMENT OF STARTER AND DRIVE.

a. Disconnect flexible starter control and return spring from starter lever by removing attaching nut and bolt.
b. Remove starter power cable from starter switch terminal; tape or insulate cable end.
c. Remove three palnuts and three hex nuts attaching starter adapter to crankcase cover studs.
d. Remove safety wire and two 5/16 bolts threaded through crankcase into starter.
e. Tap starter gently to loosen gasket and remove the starter and adapter with a straight rearward movement.
f. Apply engine oil to starter pinion and reduction gear teeth, work a non-hardening gasket paste into both sides of a new adapter gasket, and position starter and adapter assembly against crankcase pad.
g. Install three plain hex nuts on studs and two bolts through crankcase.

CAUTION

Tighten nuts and bolts evenly to prevent warping adapter coverplate.

h. Install palnuts on cover studs and lock wire on bolt heads.
i. Connect starter power cable, starter control, and return spring.



There is 9/16 inch of travel at the starter gear pinion. It is important that the starter lever compress the starter pinion gear 7/16 inch before contacting the starter switch, the remaining 1/8 inch of travel is used in making the electric contact of the starter switch.

Figure 12-1. Starter Lever Adjustment

j. Rig control and starter adjusting stud to obtain the travel and clearance specified in figure 12-1.

12-30. AUTOMATICALLY ENGAGED STARTING SYSTEMS employ an electric starter motor mounted to a 90-degree adapter. A starter solenoid is activated by the push-button or ignition key on the instrument panel. When the solenoid is activated, its contacts close and electrical current energizes the starter motor. Initial rotation of the starter motor engages the starter through an overrunning clutch in the starter adapter, which incorporates worm reduction gears. The starter is located just aft of the right rear cylinder.

12-31. REPLACEMENT OF STARTER.

a. Disconnect electrical leads to the starter solenoid. On some models the solenoid is located on the firewall and only the power cable need be disconnected from starter. Insulate disconnected terminals as a safety precaution.

b. Remove nuts securing starter and remove starter.

c. To install starter, reverse this procedure. Install a new O-ring on starter, then install starter.

12-32. DELETED.

12-33. STANDARD MAINTENANCE of starters includes replacing brushes and brush springs, cleaning dirty commutators and turning down burned or out-of-round commutators.

CAUTION

Never lubricate the commutator. Some starter bearings are sealed and require no lubrication.

Starter brushes should be replaced when worn down to one-half their original length (compare with new ones). Brush spring tension should be sufficient to give brushes a good firm contact with the commutator. Brush leads should be unbroken, with their terminal screws tight. A glazed or dirty commutator can be cleaned by holding a strip of 00 sandpaper or a brush seating stone against it. Move the sandpaper or stone back and forth across the commutator to avoid wearing a groove. Do not use emery paper or carborundum because of their possible shorting action.

CAUTION

Never operate the cranking motor for more than 30 seconds at a time without allowing it to cool. Blow out all dust after the commutator is cleaned.

Roughness, out-of-roundness, or high mica may necessitate turning down the commutator. After the turning operation, the mica should be undercut.

12-34. DELETED.

12-35. TROUBLE SHOOTING STARTER (ALL MODELS).

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
STARTER WILL NOT OPERATE.		
Defective master switch or circuit.	Check master circuit.	Repair circuit.
Defective starter switch or switch circuit.	Check switch circuit continuity.	Replace switch or wires.
Starter lever does not activate switch.	Check starter lever adjustment.	Adjust per figure 12-1.
Defective starter.	Check through items above. If another cause is not apparent, starter is defective.	Remove and repair or replace starter.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
STARTER MOTOR RUNS, BUT DOES NOT TURN CRANKSHAFT.		
Starter lever adjusted to activate switch without engaging pinion with crank-shaft gear.	Check starter lever adjustment.	Adjust per figure 12-1.
Defective overrunning clutch or drive.	Remove starter and check starter drive and overrunning clutch.	Replace defective parts.
Damaged starter pinion gear or crankshaft gear.	Remove starter and check pinion gear and crankshaft gear.	Replace defective parts.
STARTER DRAGS.		
Low battery.	Check battery.	Charge or replace battery.
Starter switch or relay contacts burned or dirty.		Replace with serviceable unit.
Defective starter power cable.	Check cable.	Replace cable.
Defective starter.	Check starter brushes, brush spring tension, thrown solder on brush cover.	Repair or replace starter.
Dirty, worn commutator.	Clean, check visually.	Turn down commutator.
STARTER EXCESSIVELY NOISY.		
Worn starter pinion.	Remove and examine pinion.	Replace starter drive.
Worn or broken teeth on crankshaft gears.	Remove starter and turn over engine by hand to examine crankshaft gear.	Replace crankshaft gear.

12-36. FUEL INJECTION SYSTEM (SKYWAGON SERIES).

12-37. Fuel injection is standard equipment on the Models 185 and A185 Series. This fuel injection system is a simple, low pressure system of injecting fuel into the intake valve port in the cylinder head. It is a multi-nozzle, continuous flow type which controls fuel flow to match engine airflow. Any change in throttle position, engine speed, or a combination of both, causes changes in 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 fuel flow gage is a pressure indicator, calibrated in gallons per hour, and indicates approximately the gallons consumed each hour. The continuous flow system uses a typical rotary-vane fuel pump. There are no running parts in the system except for the engine-driven fuel pump.

NOTE

Throughout the airplane fuel system, from the tanks to the engine-driven fuel pump, use Parker Sealube (or equivalent) as a thread lubricant or to seal a leaking connection. Apply sparingly to male fittings only, omitting the first two threads. Always be sure 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 lubricating oil, on the fitting threads. Do not use any other form of thread compound on the injection system fittings.

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 throughout the fuel injection system.

12-38. FUEL-AIR CONTROL UNIT. This unit occupies the position ordinarily used for a carburetor, at the intake manifold inlet. The function of this unit is to control engine air intake and to set the metered fuel flow for proper fuel-air ratio. There are three control elements in this unit, one for air and two for fuel, one of which is for fuel mixture and the other for fuel metering. Main fuel enters the control unit through a strainer and passes to the metering valve. The position of the metering valve controls this fuel passed to the manifold valve and nozzles. A linkage connecting the metering valve to the air throttle proportions airflow to fuel flow. The position of the mixture valve determines the amount of fuel returned to the fuel pump. The fuel control portion of the fuel-air control unit is enclosed in a shroud and is blast-air cooled to help prevent vapor lock.

12-39. REPLACEMENT OF FUEL-AIR CONTROL UNIT.

a. Detach the induction air box from the fuel-air control unit. Disconnect the two link rods and let the air box swing downward, supported by the throttle and mixture controls. Do not strain throttle microswitch electrical wires and do not disturb microswitch adjustment.

b. Turn off fuel shut-off valve. Tag and disconnect the fuel lines and hoses at the fuel control unit. Some are enclosed inside a flexible duct to aid in cooling. Loosen the clamp and slide the duct back to gain access to fittings. Plug or cap all disconnected lines, hoses, and fittings.

c. Loosen the clamps securing the two hoses which connect the fuel-air control unit to the intake manifold, and slide the hoses away from the connection.

d. Cut the safety wire and remove the four oil pan bolts which secure the fuel-air control unit to the engine. Pull the unit down to remove. Cover the open ends of the intake manifolds to prevent the entry of foreign material.

e. To install the fuel-air control unit, reverse the preceding steps. Check that throttle and mixture controls and linkage, and the induction hot air control are rigged properly.

12-39A. CLEANING AND INSPECTION OF FUEL-AIR CONTROL UNIT.

a. Check control connections, levers, and linkages for security, safetying, and for lost motion due to wear.

b. Remove the fuel screen assembly and clean in fresh cleaning solvent. Reinstall and safety.

c. Check the air control body for cracks and the fuel-air control unit for overall condition.

12-40. FUEL-AIR CONTROL UNIT ADJUSTMENTS. (See figure 12-2.) The idle speed adjustment is a conventional spring-loaded screw located in the air throttle lever. The idle mixture adjustment is the locknut at the metering valve end of the linkage. Tightening the nut to shorten the linkage provides a richer mixture. A leaner mixture is obtained by backing off the nut to lengthen the linkage. 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 cut-off. 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. Idle speed is approximately 600 rpm.

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 idle speed or idle mixture, "clear" the engine between checks to prevent false indications.

12-40A. FUEL INJECTION PUMP. (Model 185 SERIES.) The fuel injection pump is a positive-displacement, rotary vane type. The pump is connected to the accessory drive section of the engine. Fuel enters the pump at the swirl well of the vapor separator. Here, vapor is separated by a swirling motion of the fuel so that only liquid fuel is fed to the pump. The vapor is drawn from the top center of the swirl well by a small pressure jet of fuel and is fed to the vapor return line to the 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 relief valve is provided to maintain a constant fuel pump pressure. A check valve allows auxiliary fuel pump pressure to bypass the engine-driven fuel pump for starting, or in the event of engine-driven fuel pump failure. The engine-driven fuel pump is ram-air cooled to help prevent high fuel pump temperatures. The ram-air is picked up at the upper engine baffle and directed through a flexible tube to the fuel pump shroud. The fuel supply and return hoses from the fuel pump to the fuel control unit are enclosed with flexible cooling tubes.

12-41. REPLACEMENT OF FUEL INJECTION PUMP.

a. Turn off the fuel shut-off valve.

NOTE

The engine can be pivoted away from the firewall for access to accessories on the back of the engine. Refer to paragraph 12-6.

b. Tag and disconnect all hoses and lines attached to the fuel pump and remove the shroud surrounding the pump.

c. Remove the nuts, lockwashers, and washers

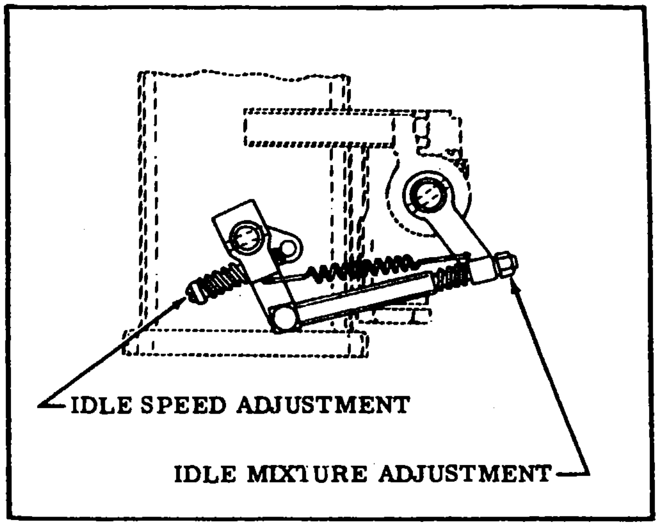


Figure 12-2. Idle Adjustments

securing the fuel pump.

d. Remove the pump and gasket.

e. Install a temporary cover on the engine pad if a replacement pump is not being installed immediately.

f. Reverse the preceding steps to install the fuel pump. Use a new fuel pump gasket.

12-42. ADJUSTMENTS. During the 1967 model year an adjustable orifice is added to the engine-driven fuel pump so that the pressures for the full throttle position may be obtained. This adjustable orifice allows the exact desired pressure setting and will eliminate changing of fixed orifice to get the pressure required. The adjustable orifice applies only to the full throttle setting. Adjustment of the idle position is still obtained through the relief valve. This new pump is used as spare parts and is furnished if a new pump is ordered. Adjustment of pump not incorporating the adjustable orifice is still performed as outlined in Cessna Service Kit No. 320-2, using the pressures outlined in paragraph 12-3 of this Manual. To adjust the pump incorporating the adjustable orifice to the pressures shown in paragraph 12-3, proceed as follows:

a. Adjust engine idle speed to 600±25 rpm using idle speed adjustment on the air throttle with mixture control in full rich position.

b. Set the fuel pump relief valve adjustment, on the centerline of the fuel pump, to within the specified limits by adjusting the screw clockwise to raise the pressure and counterclockwise to lower the pressure.

c. After adjusting the idle unmetered pressure within the specified limits, check the idle mixture by advancing the throttle to approximately 800 rpm. Engine speed should increase approximately 25-50 rpm when mixture control is moved toward the lean position.

d. Advance the throttle to maximum engine speed with the mixture control in full rich position. The unmetered fuel pressure should be within the specified limits.

e. To increase the unmetered fuel pressure, loosen locknut and turn the slotheaded needle valve, located just below the fuel pump inlet fitting, in clockwise direction, and to reduce the pressure turn in a counterclockwise direction.

NOTE

Cessna Service Kit No. 320-2 provides a special indicator, lines, and instructions for connecting indicator to perform accurate calibration of the engine-driven fuel pump.

12-43. FUEL MANIFOLD VALVE (FUEL DISTRIBUTOR). 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 ball check valve or a needle valve in the plunger insures that the plunger fully opens the outlet ports before fuel flow starts, and closes the ports simultaneously for positive engine shutdown. A fine-mesh screen is included in the fuel manifold valve.

12-44. REMOVAL OF FUEL MANIFOLD.

a. Disconnect the two fuel hoses and six fuel injection lines at the fuel manifold.

b. Remove the two crankcase bolts which secure the fuel manifold and remove the manifold and the bracket. The manifold may be removed from the bracket if desired.

12-45. CLEANING FUEL MANIFOLD VALVE.

a. Remove the fuel manifold valve.

b. Hold the top cover down against internal spring until all four attaching screws have been removed, then gently lift off the cover. Use care not to damage the spring-loaded diaphragm below it.

c. Remove upper spring and lift diaphragm assembly straight up.

NOTE

If the plunger valve attached to the diaphragm is stuck in the bore of the valve body, grasp the center nut and rotate and lift at the same time to work gently out of the body.

d. Remove the lower ball and spring. Do not disassemble needle valve in plunger.

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.

e. Using clean gasoline, flush out the chamber below the screen.

f. 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.

g. Clean diaphragm and valve and top cover in the same manner. Be sure the vent hole in the top cover is open and clean.

h. If ball check valve is used, replace lower spring and ball (ball on TOP of spring).

i. Carefully replace diaphragm and valve. Check that valve works freely in body bore.

j. Position diaphragm so that horizontal hole in plunger valve is 90 degrees from the fuel inlet port in the valve body.

k. Place upper spring in position on diaphragm.

l. 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.

m. Install fuel manifold valve assembly on engine and reconnect all lines and hoses to valve.

n. Inspect installation and install cowling.

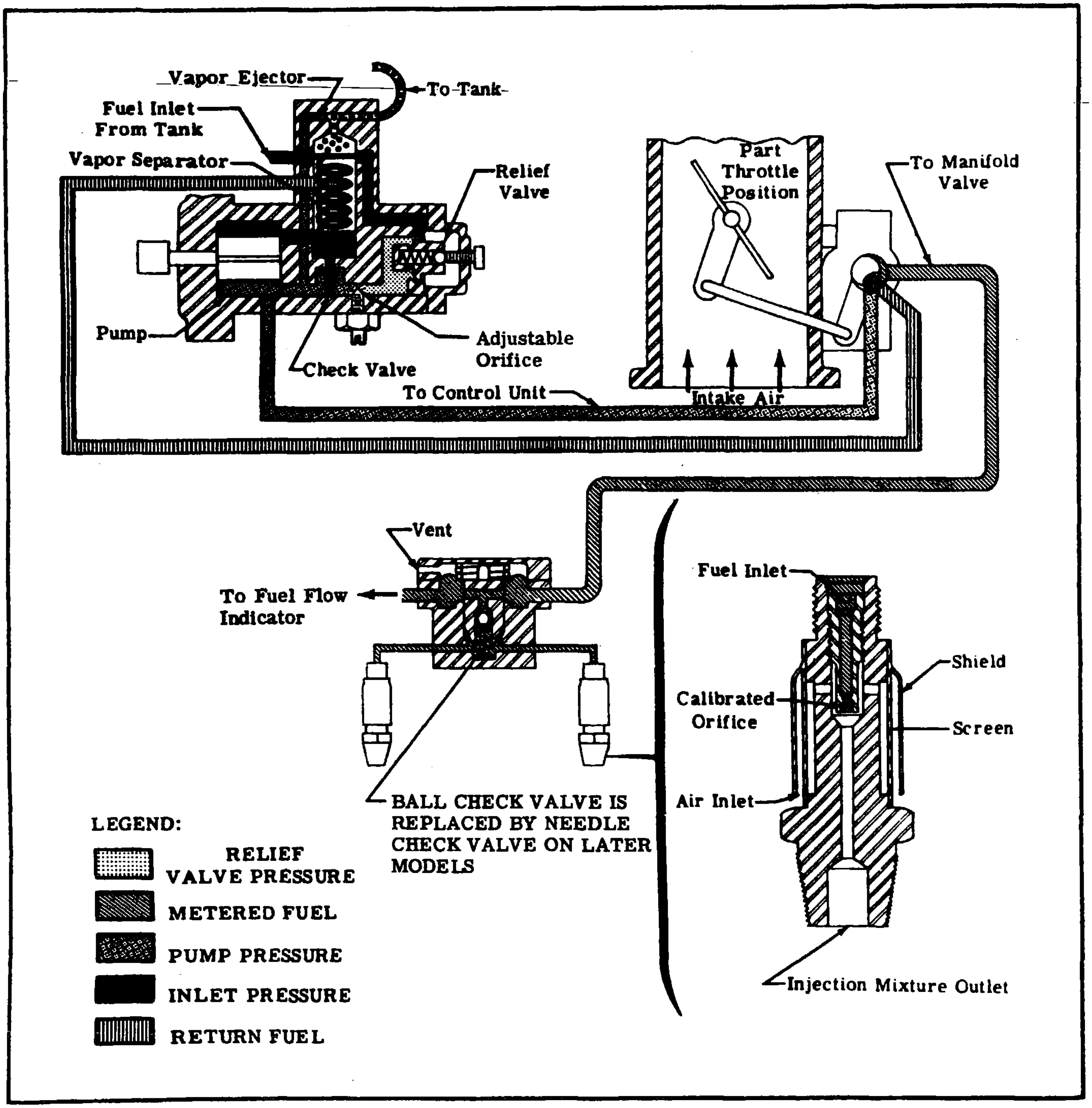


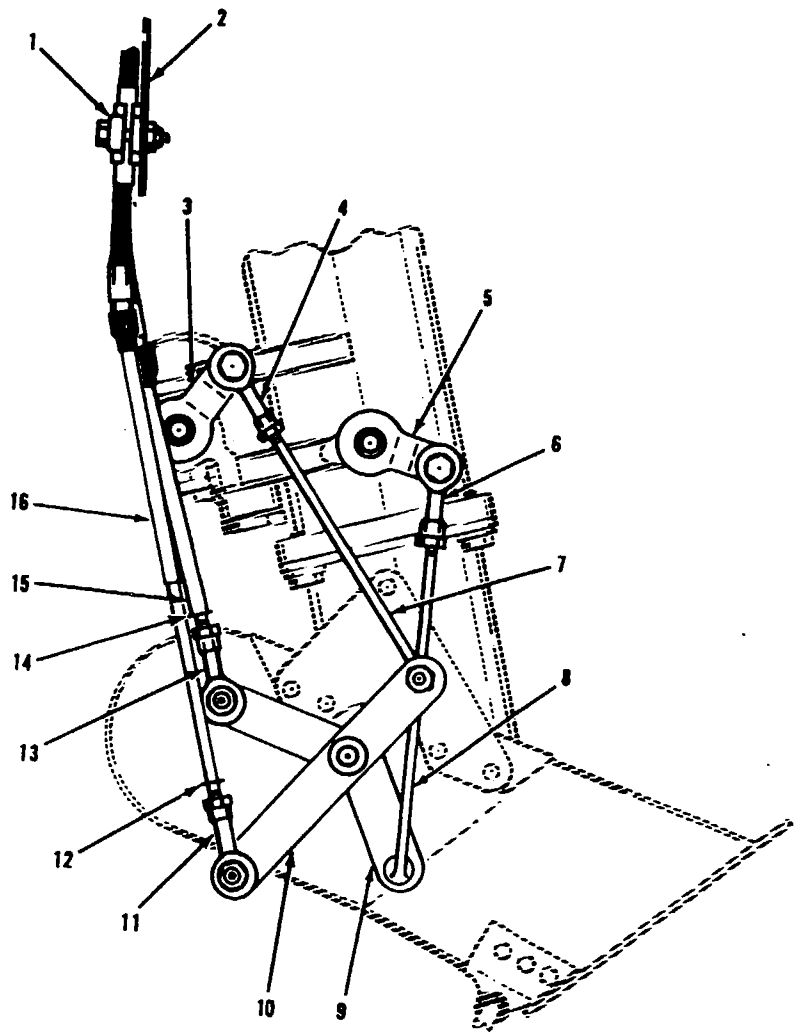
Figure 12-3. Fuel Injection Schematic

12-46. INSTALLATION OF FUEL MANIFOLD.

a. Secure the fuel manifold to the crankcase with two crankcase bolts.

b. Connect the fuel lines and the six fuel injection lines. Inspect completed installation.

12-47. FUEL DISCHARGE NOZZLES. 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.



1. Clamp
2. Bracket
3. Mixture Control Arm
4. Rod End
5. Air Throttle Arm
6. Rod End
7. Mixture Link Rod
8. Throttle Link Rod
9. Throttle Bellcrank
10. Mixture Bellcrank
11. Rod End
12. Retaining Ring
13. Rod End
14. Retaining Ring
15. Throttle Control
16. Mixture Control

Figure 12-4. Throttle and Mixture Controls (Skywagon Series)

12-48. REMOVAL OF FUEL DISCHARGE NOZZLES.

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.

12-49. CLEANING AND INSPECTION OF FUEL DISCHARGE NOZZLES. Remove, clean, and inspect the nozzles every 100 hours. 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 wrench pads on the nozzle.

12-50. INSTALLATION OF FUEL DISCHARGE NOZZLES.

a. Install the fuel discharge nozzles in the cylinders using a 1/2 inch deep socket, and tighten nozzle to a torque value of 60-80 lb-in.
b. Connect the fuel injection lines at the fuel discharge nozzles.
c. Check installation for crimped lines, loose fittings, etc.

12-50A. ENGINE CONTROLS (SKYWAGON).

12-50B. The propeller and mixture controls lock in any position desired. To move these controls, the spring-loaded buttons, one in the end of each control knob, must be depressed. When the button is released, the control is locked. These controls also have a vernier adjustment. Turning the control knob in either direction will change the control setting. The vernier is primarily for precision control setting. The induction air control does not have a locking device. The throttle contains a knurled friction knob which is rotated for more or less friction as desired. During the 1966 model-year, an additional "Palnut" type locknut was installed in back of the existing locknut at the engine end of all throttle, mixture, and propeller controls.

Beginning with the 1968 Model A185, the induction air control is deleted. The alternate air source is automatic. If the air filter should become clogged, suction from the engine intake will open a spring-loaded door in the induction air box. This permits the induction air to be drawn from within the engine compartment. This induction air is unfiltered air. Inspect alternate air spring-loaded door for freedom of operation and complete closing.

NOTE

Some controls have intricate parts that will fall out and possibly be lost if control is pulled from housing while it is disconnected.

12-51. RIGGING ENGINE CONTROLS (SKYWAGON SERIES).

NOTE

Idle speed and idle mixture adjustments are discussed in paragraph 12-40.

CAUTION

Some engine controls have a small retaining ring brazed (or attached with epoxy resin) near the threaded end (engine end of control) of the control. The purpose of these retaining rings is to prevent inadvertent withdrawal and possible damage to the knob end of the controls while jam nuts and rod ends are removed.

12-52. INDUCTION HOT AIR CONTROL RIGGING.

a. Loosen the clamp securing the control to the bracket on the airbox.
b. Push control full in, then pull it out approximately 1/8 inch for cushion.
c. Shift the control housing in its clamp so that the air valve lever is full forward, with valve seating inside the airbox. Tighten clamp in this position.
d. Pull the control out and check that the air valve inside the airbox seats in the opposite direction.
e. Check that the bolt and nut at the air valve lever secures the control wire and that the bolt will swivel in the lever.
f. Bend the wire tip 90° to prevent it from being withdrawn if the attaching nut should become loose.
g. When installing a new control, it may be necessary to shorten the wire and/or control housing.
h. The air valve must seat in both positions and the control should have approximately 1/8 inch cushion at the instrument panel when pushed full in.

12-53. PROPELLER GOVERNOR CONTROL RIGGING is outlined in paragraph 14-22.

12-54. THROTTLE CONTROL RIGGING. (See figure 12-4.)

NOTE

When checking rigging of the throttle control, see that the arm on the throttle body contacts the mechanical stops in both directions, that the throttle has approximately 1/8 inch cushion at the instrument panel, and that the small retaining ring near the end of the control contacts the end of the control housing at the same time that the idle stop is reached. When complete rigging is required, use the following procedure.

a. Disconnect throttle control rod end (13) from bellcrank (9) on airbox. Disconnect rod end (6) on link rod from arm (5) on air body.
b. Shorten the link rod as much as possible and connect to arm on air body.
c. Pull throttle control full out until retaining ring (14) contacts control housing (15).
d. Move arm (5) to idle. With the idle screw against the idle stop, adjust rod end (13) to align

with the bellcrank, and connect in this position.

e. Push throttle control full forward and check that when full throttle stop is reached, there is approximately 1/8 inch cushion at the instrument panel.

f. More or less cushion may be obtained by readjusting the two rod ends as necessary. After rigging is completed, be sure that the idle stop is reached at the same time that retaining ring (14) contacts the throttle control housing and that the full throttle stop is reached with the proper amount of cushion. Tighten the jam nuts to secure the rod ends. Be sure that threaded ends of rods extend into rod ends far enough. An inspection hole is provided in each rod end for checking purposes.

12-55. MIXTURE CONTROL RIGGING. (See figure 12-4.)

NOTE

When checking mixture control rigging, see that the arm on the fuel control unit 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 near the end of the control contacts the end of the control housing at the same time that the idle cut-off stop is reached. When complete rigging is required, use the following procedure.

a. Disconnect mixture control rod end (11) from bellcrank (10) on airbox. Disconnect rod end (4) on link rod from arm (3) on fuel control unit.

b. Shorten the link rod as much as possible and connect to arm on fuel control unit.

c. Pull mixture control full out until retaining ring (12) contacts control housing (16).

d. Move arm (3) to idle cut-off. With the arm against its stop, adjust rod end (11) to align with the bellcrank, and connect in this position.

e. 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. More or less cushion may be obtained by readjusting the two rod ends as necessary. After rigging is completed, be sure that the idle cut-off stop is reached at the same time that retaining ring (12) contacts the mixture control housing and that the full rich stop is reached with the proper amount of cushion. Tighten the jam nuts to secure the rod ends. Be sure the threaded ends of rods extend into rod ends far enough. An inspection hole is provided in each rod end for checking purposes.

CAUTION

Whenever engine controls are disconnected, pay particular attention to the exact position, size, and number of attaching washers and spacers. Be sure to install attaching parts as noted when reconnecting controls.

Beginning with the 1968 Model 150, the clip type thumb operated mixture control is replaced by a "ball" ratchet type control. This control utilizes a spring-loaded ball riding in a serrated groove. This provides a series of "locked" mixture settings from idle cut-off to full rich, thus, providing better mixture control. Rigging of the control remains the same.

12-56. ENGINE CONTROLS (EXCEPT SKYWAGON SERIES).

12-57. Engine controls of the push-pull type include the throttle, mixture control, propeller pitch control and carburetor heat control. Most engine controls are equipped with position-locking devices which prevent vibration-induced "creeping" of the controls. During the 1966 model-year, an additional "Palnut" type locknut was installed in back of the existing locknut at the engine end of all throttle, mixture, and propeller controls that contain rod ends.

NOTE

Some controls have intricate parts that will fall out and possibly be lost if control is pulled from housing while it is disconnected.

12-58. RIGGING ENGINE CONTROLS.

12-59. When adjusting any engine control, it is important to check that the control slides smoothly throughout its full travel, that it locks securely if equipped with a locking device, and the arm or lever which it operates moves through its full arc of travel.

CAUTION

Some engine controls have a small retaining ring brazed (or attached with epoxy resin) near the threaded end (engine end of control) of the control. The purpose of these retaining rings is to prevent inadvertent withdrawal and possible damage to the knob end of the controls while jam nuts and rod ends are removed.

As shown in figure 12-4A, the Model 172 series are equipped with an induction airbox which contains two valves, both of which are operated by a control on the instrument panel. Prior to the 1966 Model 172 series, this control is a double control. One part of the double control operates the forward valve and the other part operates the aft valve. On the 1966 Model 172 series, a single control operates the forward valve and bellcrank, from which a second control is linked to the aft valve. Beginning with the 1967 Model 172 series, the aft valve and interconnecting control have been deleted. Heated air from the left exhaust muffler is used for carburetor heat. When carburetor heat is not being used, this heated air is routed through the aft end of the airbox to the cabin heating system as an additional heated air source.

12-60. INDUCTION AIR CONTROL RIGGING. (EXCEPT MODEL 172 SERIES.)

a. Loosen the clamp securing the control to the bracket on the airbox.

b. Push control full in, then pull it out approximately 1/8 inch for cushion.

c. Shift the control housing in its clamp so that the air valve lever is full forward, with valve seating in-

side the airbox. Tighten clamp in this position.
d. Pull the control out and check that the air valve inside the airbox seats in the opposite direction.
e. Check that the bolt and nut at the air valve lever secures the control wire and that the bolt will swivel in the lever.
f. Bend the wire tip 90 degrees to prevent it from being withdrawn if the attaching nut should become loose.
g. When installing a new control, it may be necessary to shorten the wire and/or control housing.
h. The air valve must seat in both positions and the control should have approximately 1/8 inch cushion at the instrument panel when pushed full in.

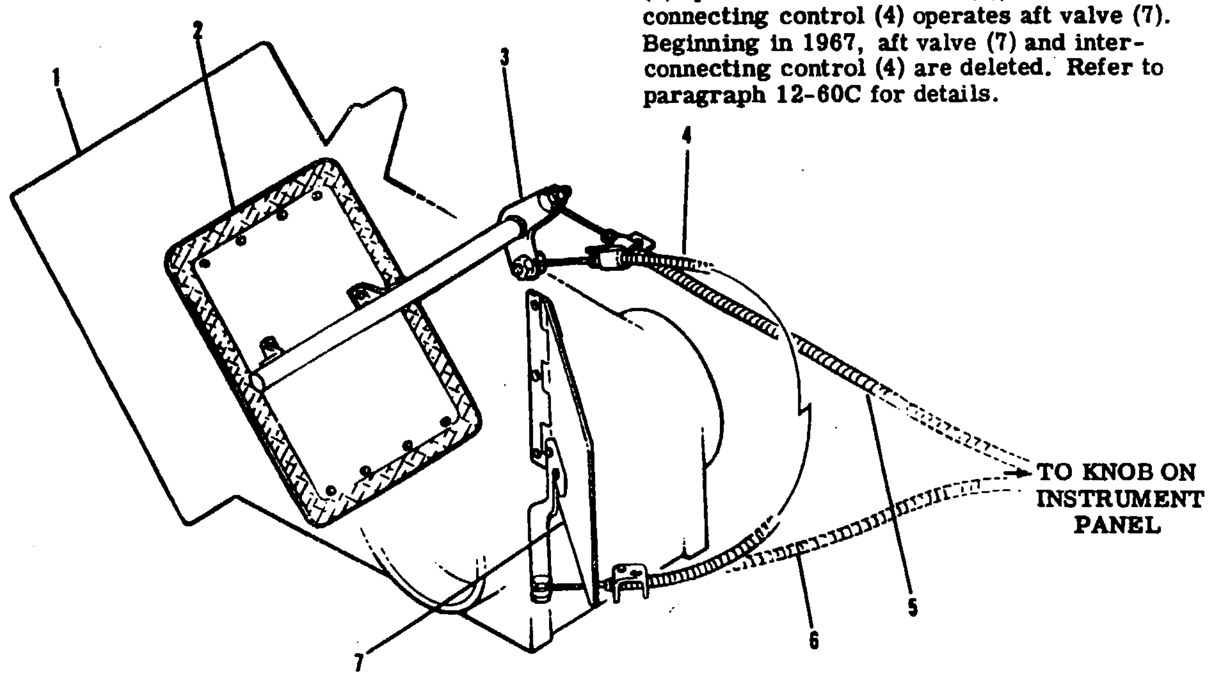
12-60A. INDUCTION AIR CONTROL RIGGING (PRIOR TO 1966 MODEL 172 SERIES).
a. Loosen clamps securing control housings.
b. Push control at instrument panel full in, then pull it out approximately 1/8 inch for cushion.
c. Shift control housings in their clamps so that forward valve lever is full forward, with valve seating inside airbox, and so that aft valve lever is full forward against lever stop in bottom of airbox. Secure all control housing clamps.
d. Pull instrument panel control out and check that both valves seat in the opposite direction.
e. Check that the bolts and nuts at the air valve levers secure the control wires, and that the bolts will swivel in the lever.
f. Bend each wire tip 90 degrees to prevent the wires from being withdrawn if attaching nuts should become loose.
g. When installing new controls, it may be necessary to shorten wires and/or housings.
h. Valves must seat in both positions, and the control should have approximately 1/8 inch cushion at the instrument panel when pushed full in.

NOTE

If the airbox is replaced with a new-style airbox, the dual control may still be used by removing the short control interconnecting the two valves of the newer style airbox. The dual control is then installed and rigged as outlined in the preceding steps.

NOTE

Prior to 1966, double control (5 and 6) was used to operate valves (2 and 7) simultaneously. Beginning in 1966, single control (5) operates forward valve (2), and interconnecting control (4) operates aft valve (7). Beginning in 1967, aft valve (7) and interconnecting control (4) are deleted. Refer to paragraph 12-60C for details.



1. Airbox
2. Forward Valve
3. Bellcrank
4. Interconnecting Control
5. Control
6. Control
7. Aft Valve

Figure 12-4A. Induction Air Controls (Model 172)

12-60B. INDUCTION AIR CONTROL RIGGING (1966 MODEL 172).

a. Loosen clamps securing control housings.

b. Push control at instrument panel full in, then pull it out approximately 1/8 inch for cushion.

c. Shift control housing (from instrument panel) in its clamps so that forward valve lever is full forward with valve seating inside airbox. Shift short interconnecting control housing in its clamps so that aft valve lever is full forward against lever stop in bottom of airbox. Secure all control housing clamps.

d. Pull instrument panel control out and check that both valves seat in the opposite direction.

e. Check that the bolts and nuts at the air valve levers secure the control wires, and that the bolts will swivel in the levers.

f. Bend each wire tip 90 degrees to prevent wires from being withdrawn if attaching nuts should become loose.

g. When installing new controls, it may be necessary to shorten wires and/or housings.

h. Valves must seat in both positions, and the control should have approximately 1/8 inch cushion at the instrument panel when pushed full in.

12-60C. INDUCTION AIR CONTROL RIGGING (1967 MODEL 172 AND ON). Beginning with the 1967 Model 172, the aft valve and interconnecting control are deleted from the airbox. This airbox is used for service parts on prior models when existing stock is exhausted. When installed on models prior to the 1967 models, rig as outlined in paragraph 12-60. Be sure to either replace the dual control or secure it so that it does not interfere with any other equipment and so that other part of control can be operated.

12-61. THROTTLE CONTROL RIGGING.

NOTE

Before rigging the throttle control on aircraft with the type control shown in figure 12-5, check that staked connection (4) between rigid conduit (2) and flexible conduit (3) 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 jamb nut (7) all the way down (clockwise) and reinstall the throttle knob. Screw the knob securely against the jamb nut. Do NOT back the jamb 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 jamb nut hits friction lock (6) while the friction lock is loose, then pull the control out approximately 1/8 inch for cushion.

d. Tighten friction lock (6), being careful not to change the position of the throttle.

e. Move the throttle arm on the carburetor to full open, adjust end of control to fit, and connect to arm on carburetor.

f. Release friction lock and check for full travel of arm on carburetor. If further adjustment is required, make all adjustments at the carburetor end of control. Do NOT change jamb nut (7) setting.

12-62. MIXTURE CONTROL RIGGING.

a. Push mixture control full in, unlock, and pull it out approximately 1/8 inch for cushion.

b. Loosen the clamp securing the control to the engine.

c. Shift the control housing in its clamp so that the mixture arm on the carburetor is full open. Tighten the clamp in this position.

d. Unlock and pull mixture control full out. Check that mixture arm on the carburetor is full closed.

e. Check that the bolt and nut at the mixture arm on the carburetor secure the control wire and that the bolt will swivel in the arm.

f. Bend the wire tip 90° to prevent it from being withdrawn if the attaching nut should become loose.

g. When installing a new control, it may be necessary to shorten the wire and/or control.

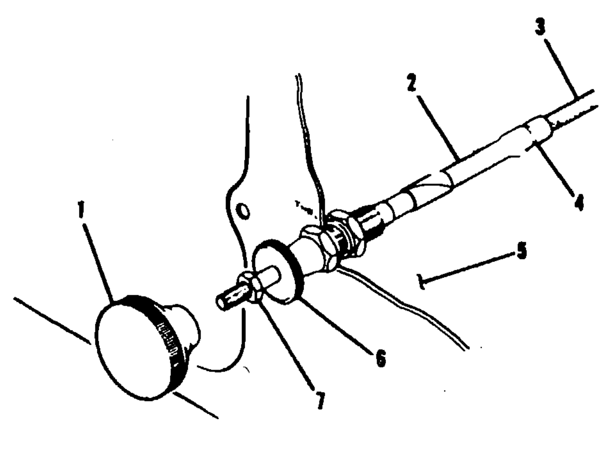
h. The mixture arm on the carburetor must contact the stops in each direction, and the control should have approximately 1/8 inch cushion when pushed full in.

NOTE

Propeller governor control rigging is outlined in paragraph 14-22.

12-63. IDLE SPEED AND MIXTURE ADJUSTMENT should be accomplished after the engine has been warmed up sufficiently. Since idle rpm may be affected by idle mixture adjustment it may be necessary to readjust the idle rpm after setting the mixture correctly.

a. Set the throttle stop screw to obtain between 500 and 600 rpm, with throttle control pulled full out.



1. Knob
2. Rigid Conduit
3. Flexible Conduit
4. Staked Connection
5. Instrument Panel
6. Friction Lock
7. Jamb Nut

Figure 12-5. Throttle Control

NOTE

The idle speed may vary among different aircraft models, and among different engines on the same models. Important points to remember are that the engine should idle smoothly, without excessive vibration, and that the idle speed should be high enough to maintain proper idling oil pressure and preclude any possibility of the engine stopping in flight when the throttle is closed.

b. Increase engine speed to 1000 rpm.
c. Pull mixture control knob slowly and steadily into "idle cut-off" position, observing tachometer, then return control to "full rich" position before engine stops.
d. Adjust mixture adjusting screw at upper end of carburetor intake throat 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 cut-off" position.
e. If mixture is set too "lean," engine speed will drop immediately, thus requiring enrichment. Turn adjusting screw out (counterclockwise) for richer mixture.
f. If mixture is set too "rich," engine speed will increase above 25 rpm, thus requiring leaning. Turn adjusting screw in (clockwise) for leaner mixture.

NOTE

When checking or setting idle speed or idle mixture, "clear" the engine between checks. False results may be obtained from fouling of spark plugs.

12-64. IGNITION SYSTEM.

NOTE

It is recommended that at each 100-hour inspection the lower spark plugs be installed in the upper holes in the cylinders, and vice versa. Since deterioration of lower spark plugs is usually more rapid than that of upper plugs, rotating them helps prolong spark plug service life.

12-65. Bendix-Scintilla and Slick (formerly Case) magnetos are used on Cessna aircraft. Refer to paragraph 12-3 for the type and model of magneto used on the various airplanes. Paragraph 12-3 also lists magneto-to-engine timing and engine firing order. Always use a timing light for accuracy when timing.

WARNING

During all magneto maintenance always take proper precautions to make sure the engine cannot fire or start.

12-66. SLICK MAGNETOS. (EXCEPT 4001 SERIES.)

12-67. Slick magnetos contain a conventional two-pole rotating magnet (rotor), mounted in ball bearings. Driven by the engine through an impulse coupling at one end, the rotor shaft operates the breaker points at the other end. The nylon rotor gear drives a nylon distributor gear which transfers high-tension current from the wedge-mounted coil to the proper outlet in the distributor block. A coaxial capacitor is mounted in the distributor block housing to serve as the condenser as well as a radio noise suppressor. Both nylon gears are provided with timing marks for clockwise or counterclockwise rotation, and the distributor gear and distributor block have timing marks, visible through the air vent holes, for timing to the engine. A timing hole is provided in the bottom of the magneto adjacent to the magneto flange. A timing pin (or .093" 6-penny nail) can be inserted through this timing hole into the mating hole in the rotor shaft to lock the magneto approximately in the proper firing position. The breaker assembly is accessible after removing the screws fastening the magneto halves together and disconnecting the capacitor slip terminals.

12-68. REMOVAL (SLICK). When removal of the complete magneto is desired, remove spark plug leads at the magneto and tag for identification, and disconnect capacitor lead. Remove the nuts securing the magneto to the engine, note the approximate angular position at which the magneto is installed, then remove the magneto. For replacement of the breaker assembly, or where removal of only the engine half of the magneto is desired, remove the screws fastening the halves together, move the distributor half of magneto only far enough to disconnect the capacitor slip terminal, and remove nuts securing the magneto to the engine. As the halves are separated, be sure the large distributor gear is not dropped.

NOTE

When removing the distributor block housing from the engine half of magneto, do not pull it away far enough to break or damage the capacitor lead or slip terminal.

12-69. INTERNAL TIMING (SLICK).
a. Whenever the nylon gear on the rotor shaft or the plastic cam (which also serves as the key for the gear) has been removed, be sure that the gear and cam are installed so the timing mark on the gear aligns with the "O" stamped on the rotor shaft.
b. When replacing breaker assembly or adjusting contact points, place a timing pin (or .093" 6-penny nail) through the timing hole in the bottom of the magneto next to the flange and into the mating hole in the rotor shaft. Adjust contact points so they just break in this position, with a maximum point opening of .008" to .012" when the timing pin is removed. Temporarily assemble the two magneto halves and capacitor slip terminal, and use a timing light to check that the timing marks visible through the ventilation plug holes are aligned at the instant the contact points break. Readjust the points if necessary.

NOTE

The side of the magneto with the manufacturer's insignia has a red timing mark and the side opposite the insignia has a black timing mark. The distributor gear also has a red timing mark and a black timing mark. The contact points should break when the two red lines are aligned at the insignia side of the magneto, or, when the two black lines are aligned at the opposite side of the magneto. Do not time with red and black lines together on the same side.

c. Whenever the large distributor gear and the rotor gear have been disengaged, they must be re-engaged with their timing marks aligned for the correct rotation. Align the timing mark on the rotor gear with LH on the distributor gear for magnetos used on the Model 172 and Model 150 and with RH for those used on all other models. Care must be taken to keep these two gears meshed in this position until the magneto halves are assembled.

NOTE

Rotation of the magnetos, RH for clockwise rotation and LH for counterclockwise rotation, is determined while the magneto is viewed from its drive (impulse coupling) end.

12-70. INSTALLATION AND TIMING TO THE ENGINE (SLICK).

a. Turn the propeller in normal direction of rotation until No. 1 cylinder is in correct firing position on compression stroke, as listed in paragraph 12-3.

NOTE

Various methods and equipment may be used to arrive at this firing position. The Models 150 and 172 have degrees marked on the outer surface of the crankshaft flange, with the parting surface of the crankcase below the crankshaft as the reference point. The Model P172 has a pointer with degrees marked on the end of the crankshaft. These are visible after removing the 5/8" brass plug in the cap covering the end of the crankshaft (just below propeller shaft housing). Model O-470, IO-470 and IO-520 engines have degrees marked on a bracket attached to the starter adapter, with a timing mark on the alternator or generator drive pulley as the reference point.

An accurate top center indicator which screws into a spark plug mounting hole, and a pendulum pointer mounted on a 360-degree timing disc may be used. The timing disc should be adapted to fit over the end of the propeller spinner in such a manner that it may be rotated as necessary.

In all cases, it must be definitely determined that No. 1 cylinder is at the correct firing position, on compression stroke, when the engine is turned in its normal direction of rotation.

b. Turn the magneto shaft until the timing marks visible through the ventilation plug holes are aligned (red-to-red or black-to-black) and insert a timing pin (or .093" 6-penny nail) through the timing hole in the bottom of the magneto next to the flange and into the mating hole in the rotor shaft. This locks the magneto approximately in firing position while installing on the engine.

NOTE

Impulse coupling pawls must be depressed to turn magneto shaft in normal direction of rotation.

c. Be sure magneto gasket is in place, install magneto approximately at the angle noted during removal, then install mounting nuts and tighten.

d. Remove timing pin from magneto. Be sure to remove this pin before turning propeller.

e. Connect a timing light to the capacitor terminal at the rear of the magneto and to a good ground.

f. Turn propeller back a few degrees (approximately 5°) to close contacts.

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.

g. 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. 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.

h. After tightening magneto mounting nuts and rechecking timing, remove timing equipment. Install any spark plugs that were removed and connect all spark plug leads.

NOTE

The No. 1 magneto outlet is the one closest to the ventilation plug on the side of the magneto having the manufacturer's insignia. The magneto fires at each successive outlet in direction of rotation as shown in the ignition schematics, figures 12-9 through 12-12.

i. Connect ignition switch primary lead to the capacitor terminal on the magneto and install any noise filters that were removed.

12-71. MAINTENANCE (SLICK). Magneto-to-engine timing should be checked at each 200-hour inspection. If timing to the engine is not within plus 0° and minus 2°, the magneto should be retimed to the engine. If the internal timing marks visible through the ventilation plug holes on the sides of the magneto are misaligned more than 1/16" when the magneto fires, the magneto should be retimed internally. Whenever, the magneto halves are separated, the breaker assembly should always be checked. As long as internal timing and magneto-to-engine timing are within the preceding tolerances, it is recommended that the magneto be checked internally only at 500-hour intervals.

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 screws securing magneto halves together, disconnect capacitor slip terminal, remove distributor cap, and inspect for moisture.

(2) Check distributor gear finger and carbon brush for moisture.

(3) Check breaker assembly for moisture, especially on contact points.

(4) If any moisture is evident, lightly wipe with a soft, dry, clean, lint-free cloth.

b. Breaker Compartment Check.

(1) Check all parts of the breaker assembly for security.

(2) Check contact points for absence of excessive wear, burning, deep pits, and carbon deposits. Points may be cleaned with a hard-finish paper. Replace defective breaker assemblies. Make no attempt to stone or dress contact points. Clean new points with oleum spirits before installing.

(3) Check cam oiler pad. If dry, apply 2 or 3 drops of SAE 70 oil to the pad. Remove any excessive oil from breaker assembly; too much oil may result in fouling and excessive burning of points. The corner of the cam oiler pad should touch the cam lobe lightly.

(4) Check the capacitor.

(5) Check the carbon brush on the distributor gear for excessive wear. The brush must extend a minimum of 1/32" beyond the end of the gear shaft. The spring which the brush contacts should be bent out approximately 20° from vertical, since spring pressure on the brush holds the distributor gear shaft against the thrust bearing in the distributor cap.

(6) Oil the bearings at each end of the distributor gear shaft with a drop of SAE 20 oil. Wipe off excess.

(7) Make sure internal timing is correct and reassemble the magneto. If removed from the engine, install and time properly.

12-71A. SLICK MAGNETOS. (4001 SERIES.) Beginning with the Model 150G, sealed, lightweight Slick magnetos are used. These magnetos operate in the same manner as those previously used, but MUST NOT BE DISASSEMBLED. Internal timing is fixed and breaker points are not adjustable. Some early models were equipped with magnetos that have no timing pin or timing hole, as used on other Slick magnetos. However, later models and all replacement magnetos have a timing pin and timing hole, as used on other Slick magnetos.

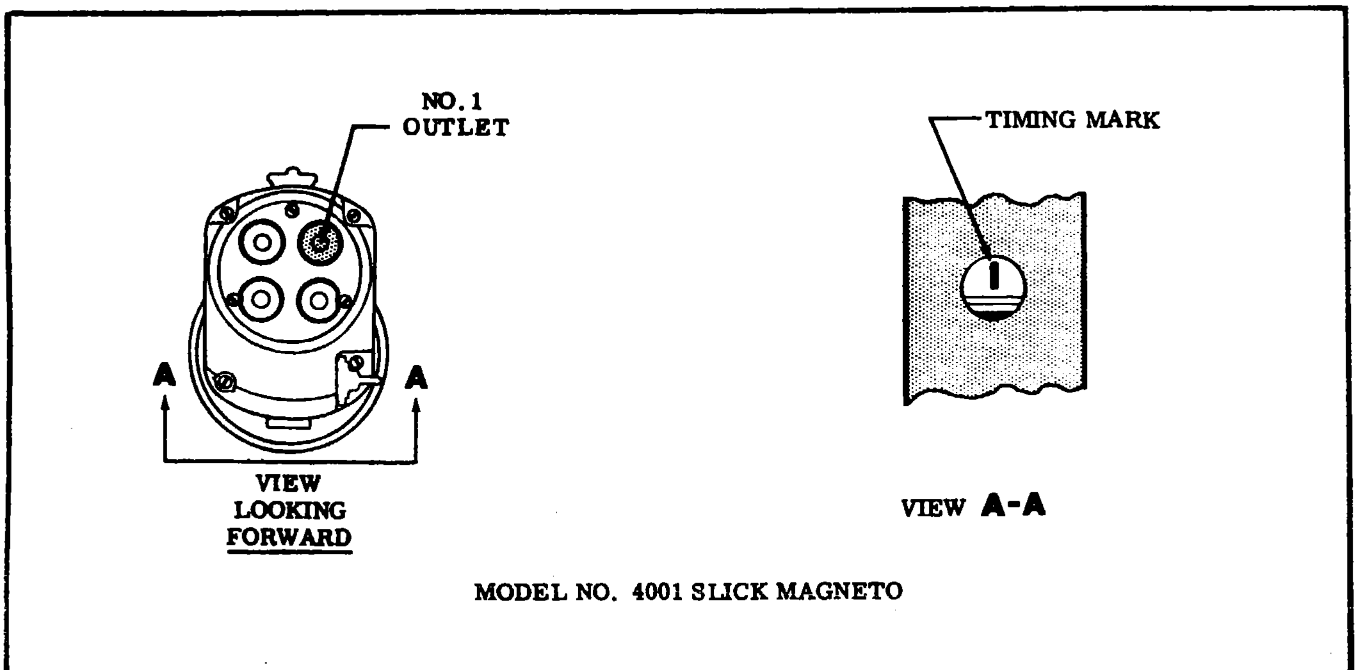


Figure 12-5A. No. 1 Magneto Outlet

12-71B. REMOVAL. Remove high-tension outlet plate, disconnect capacitor lead, and remove the nuts and retainers securing the magneto to the engine. Note the approximate angular position at which the magneto is installed, then remove the magneto.

12-71C. INTERNAL TIMING. Internal timing is accomplished during manufacture of the magneto. Since these magnetos are NOT TO BE DISASSEMBLED, there is no internal timing involved.

12-71D. INSTALLATION AND TIMING TO THE ENGINE. After the engine has been rotated to the correct firing position as outlined in paragraph 12-70, install and time the magneto to the engine in the following manner.

a. Remove the ventilation plug from the bottom of the magneto. The ventilation plug in the top of the magneto need not be removed.

b. Rotate magneto shaft until timing mark on rotor is visible through ventilation plug hole.

c. Establish that the magneto is at the No. 1 firing position. It is possible for the timing mark to be visible while firing position is 180° from the No. 1 firing position.

NOTE

It is necessary to "spark" the magneto to establish the correct firing position. The outlet plate with spark plug leads must be installed. Hold No. 1 spark plug lead (see figure 12-5A) close to the magneto case, or ground the magneto and hold the No. 1 spark plug lead close to a good ground. Rotate the impulse coupling in normal direction of rotation until a spark occurs at this lead. Turn impulse coupling backward a few degrees, until timing mark on rotor is centered in ventilating plug hole and install timing pin (or .093 inch 6-penny nail) through hole in bottom of the magneto next to the flange and into the mating hole in the rotor shaft. This locks the magneto approximately in firing position while installing on the engine.

d. Keep timing mark centered in ventilation plug hole during installation.

e. Be sure magneto gasket is in place and that the engine is in the correct firing position, then install the magneto approximately at the angle noted during removal, and tighten mounting nuts.

NOTE

Remove timing pin from magneto, if installed. Be sure to remove this pin before turning propeller.

f. Connect a timing light to the capacitor terminal at the rear of the magneto and to a good ground. Be sure that all leads are disconnected from spark plugs, then turn on ignition switch.

g. Turn propeller back a few degrees (approximately 5°) to close contacts.

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.

h. 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. Loosen mounting nuts slightly and rotate magneto case to make contacts break at correct position. Tighten mounting nuts.

i. After tightening magneto mounting nuts and rechecking timing, remove timing equipment. Connect spark plug leads.

NOTE

Beginning with the No. 1 outlet, the magneto fires at each successive outlet in direction of rotation as shown in the ignition schematic, figure 12-9.

12-71E. MAINTENANCE. Magneto to engine timing should be checked at each 200-hour inspection. If timing to the engine is not within plus zero degrees and minus two degrees, the magneto should be retimed 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.

a. Remove high-tension outlet plate and check distributor block for moisture.

b. If any moisture is evident, lightly wipe with a soft, dry, clean, lint-free cloth. Reinstall outlet plate.

NOTE

Since these magnetos must not be disassembled, replacement magnetos should be installed if the moisture check does not remedy the trouble.

12-71F. REPLACEMENT INTERVAL. It is recommended that Slick Model No. 4001 magnetos be replaced at engine overhaul periods.

12-72. BENDIX-SCINTILLA MAGNETOS.

12-73. Bendix-Scintilla S-20 magnetos contain a conventional two-pole rotating magnet (rotor) mounted in ball bearings. Engine-driven at one end, the rotor shaft operates breaker contacts 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 aft end of the magneto and a condenser is provided in the breaker compartment.

12-74. REMOVAL (BENDIX). When removal of the complete magneto is desired, remove the high-tension outlet plate, disconnect the primary lead, and remove the nuts securing the magneto to the engine, note the approximate angular position at which the magneto is installed, then remove the magneto. Capacitor or breaker assemblies can be replaced by removing the breaker cover; however, for ease of replacement and internal timing, it is recommended that the magneto be removed. Never remove the screws fastening the two halves of the magneto together - to do so would disengage the distributor gears, causing loss of internal timing and necessitating complete removal and retiming.

12-75. INTERNAL TIMING (BENDIX). 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 12-6.
   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 12-7.

c. Remove magneto from engine, remove breaker compartment cover, and remove timing inspection plug from top of magneto.

d. Attach timing template to breaker compartment as shown in figure 12-8, 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 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 11-851 timing light or equivalent, adjust the 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. Torque to 16-20 lb in.

j. Install magneto and time to engine in accordance with paragraph 12-76.

12-76. INSTALLATION AND TIMING TO THE ENGINE (BENDIX).

a. Turn propeller in normal direction of rotation until No. 1 cylinder is in correct firing position on compression stroke, as listed in paragraph 12-3.

NOTE

Various methods and equipment may be used to arrive at this firing position. The Models 150 and 172 have degrees marked on the outer surface of the crankshaft flange, with the parting surface of the crankcase below the crankshaft as the reference point. The Model P172 has a pointer with degrees marked on the end of the crankshaft. These are visible after removing the 5/8" brass plug in the cap covering the end of the crankshaft (just below propeller shaft housing). Model O-470, IO-470, and IO-520 engines have degrees marked on a bracket attached to the starter adapter, with a timing mark on the alternator or generator drive pulley as the reference point.

An accurate top center indicator which screws into a spark plug mounting hole, and a pendalum pointer mounted on a 360-degree timing disc may be used. The timing disc should be adapted to fit over the end of the propeller spinner in such a manner that it may be rotated as necessary.

In all cases, it must be definitely determined that the No. 1 cylinder is at the correct firing position, on compression stroke, when the engine is turned in its normal direction of rotation.

b. Turn magneto backwards 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.

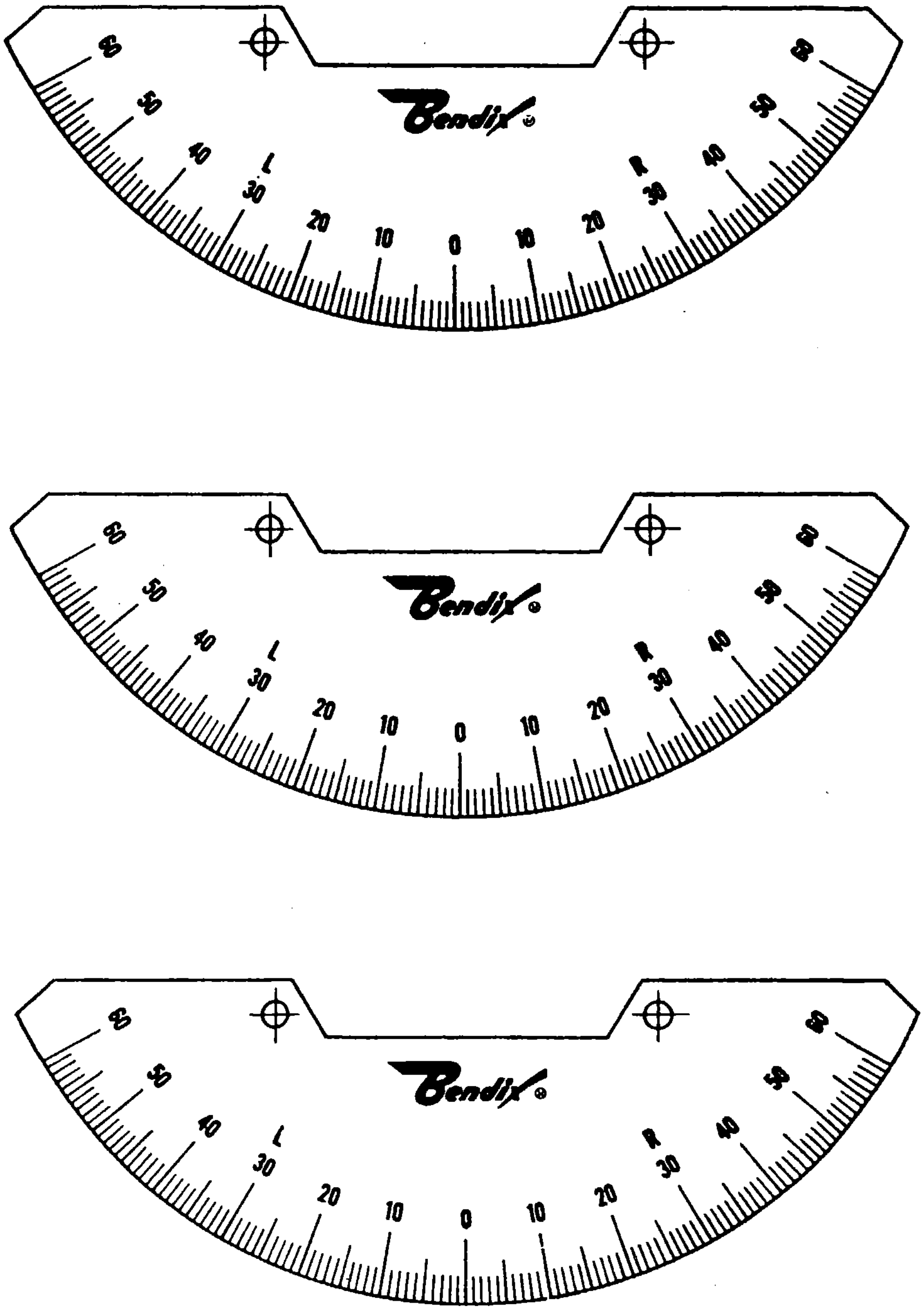


Figure 12-6. Templates For Timing Bendix Magnetos

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.

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. 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 switch primary lead.
h. Install high-tension outlet plate.

NOTE

The No. 1 magneto outlet is identified with the No. "1." The magneto fires at each successive outlet in direction of rotation as shown in the ignition schematics, figures 12-9 thru 12-12.

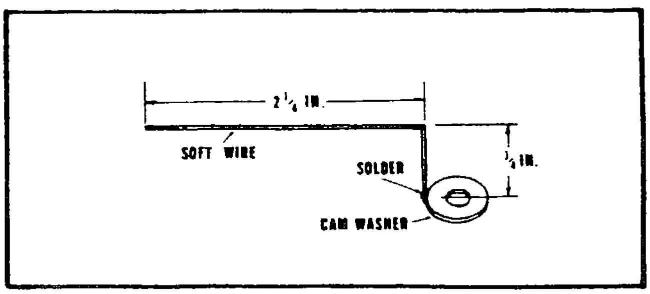


Figure 12-7. Timing Pointer

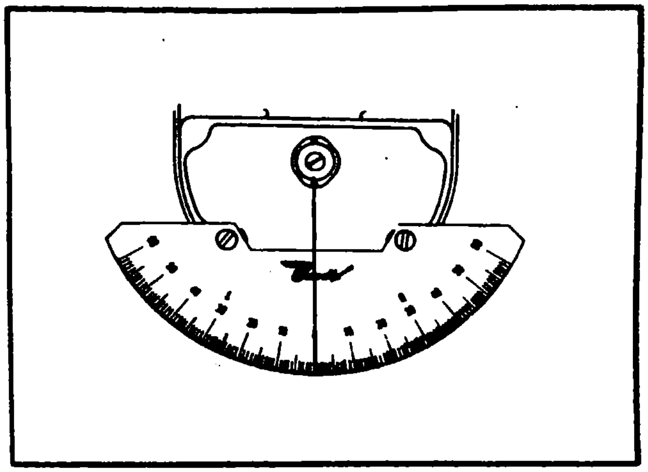


Figure 12-8. Template and Pointer Attached to Breaker Compartment

12-77. MAINTENANCE (BENDIX). At first 25-hour inspection and at each 100-hour inspection thereafter, breaker compartment should be inspected. Magneto-to-engine timing should be checked at each 100-hour inspection. If timing is correct within plus 0° and minus 2°, internal timing need not be checked. If timing is out of tolerance, remove 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 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 available 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.

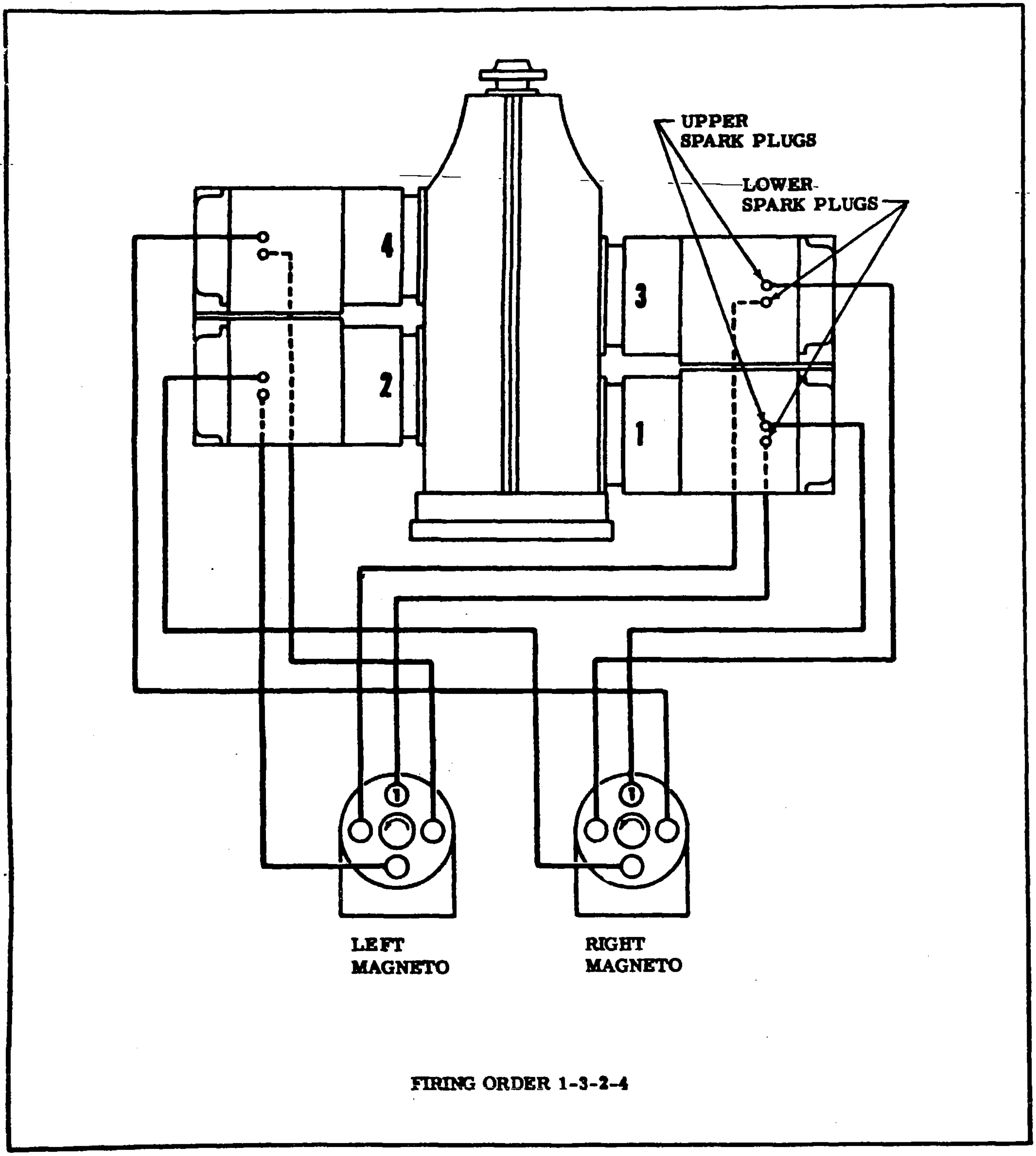


Figure 12-9. Model 150 Ignition Schematic

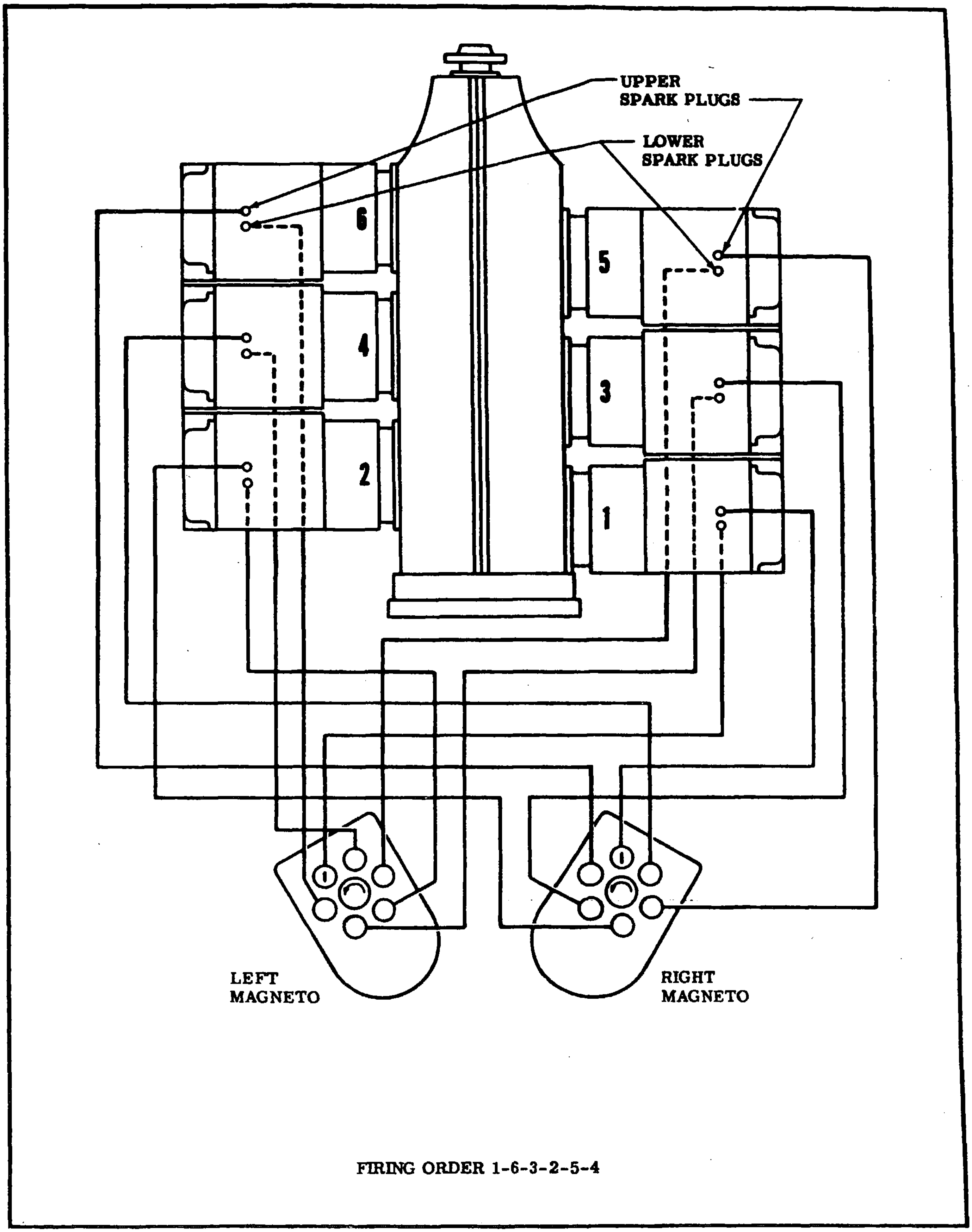


Figure 12-10. Model 172 Ignition Schematic

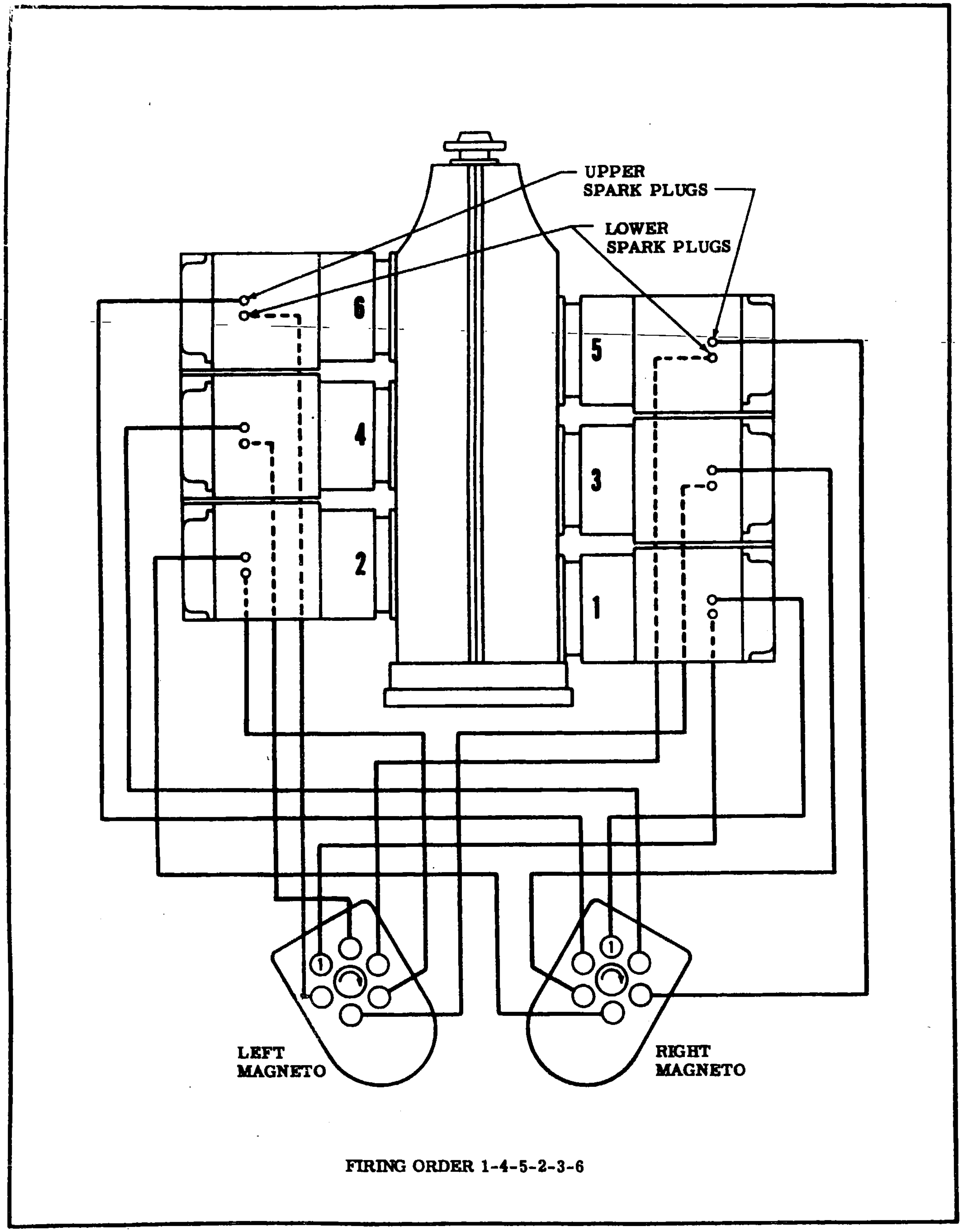


Figure 12-11. Model P172 Ignition Schematic

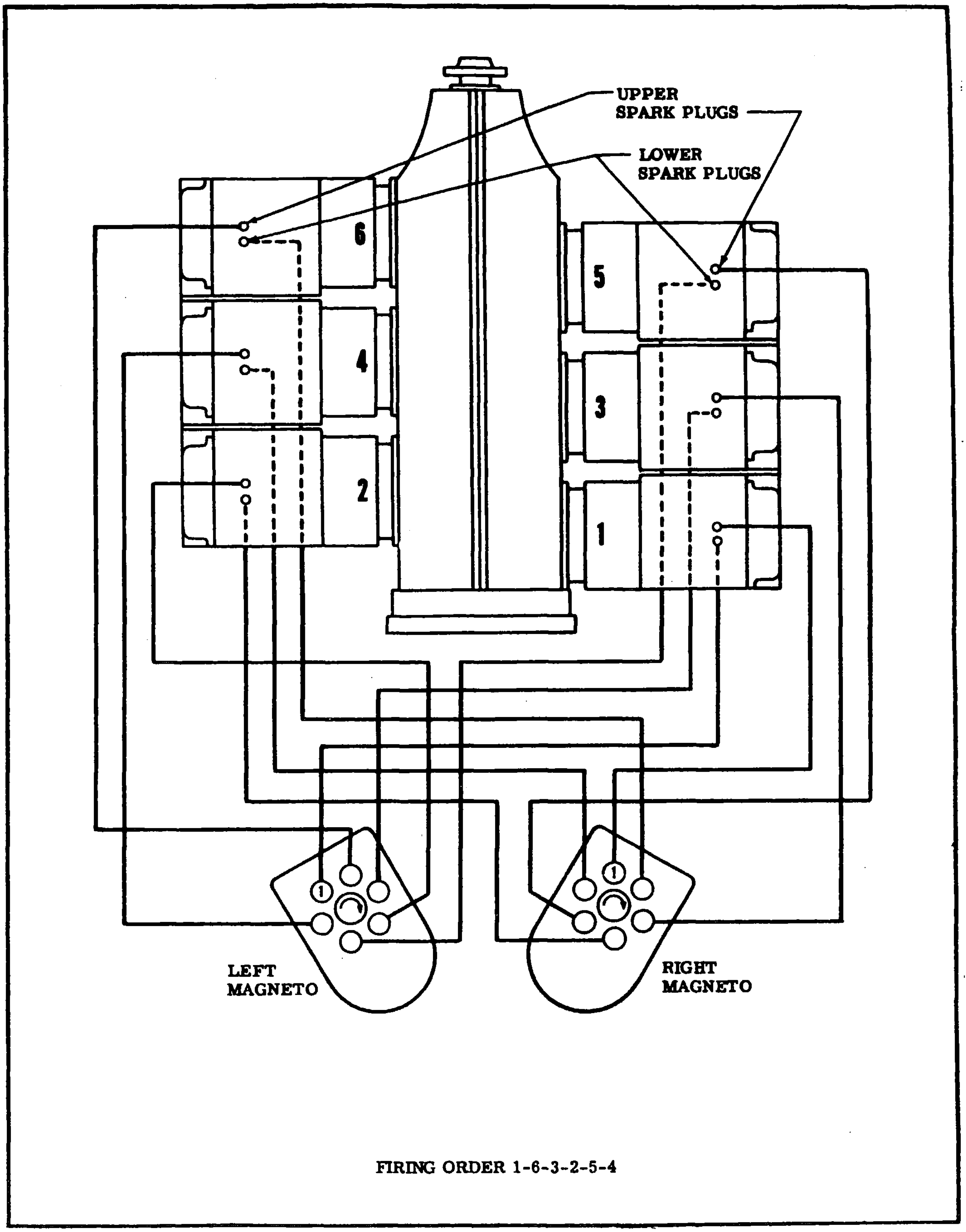


Figure 12-12. Models 180, 182, and 185 Ignition Schematic

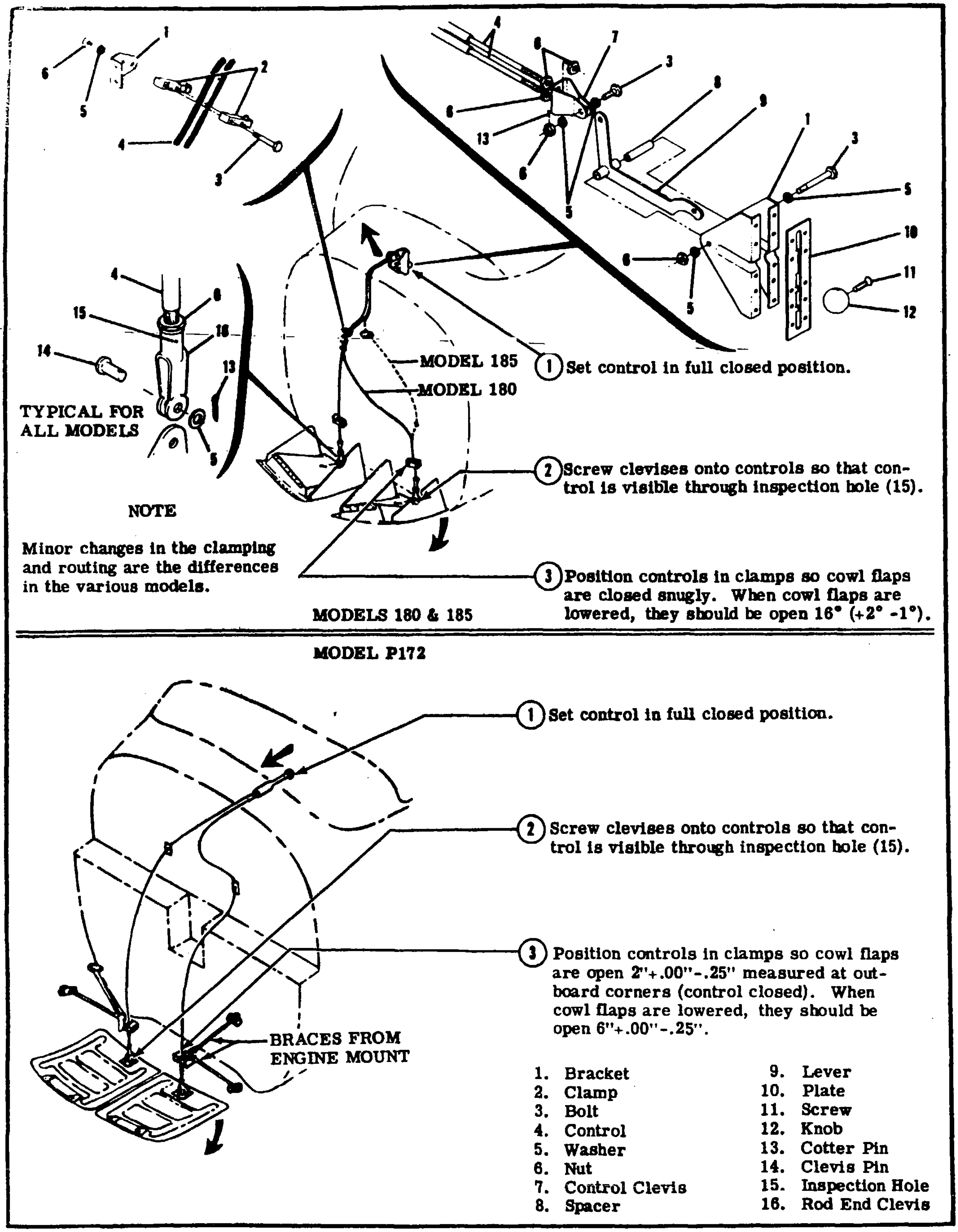
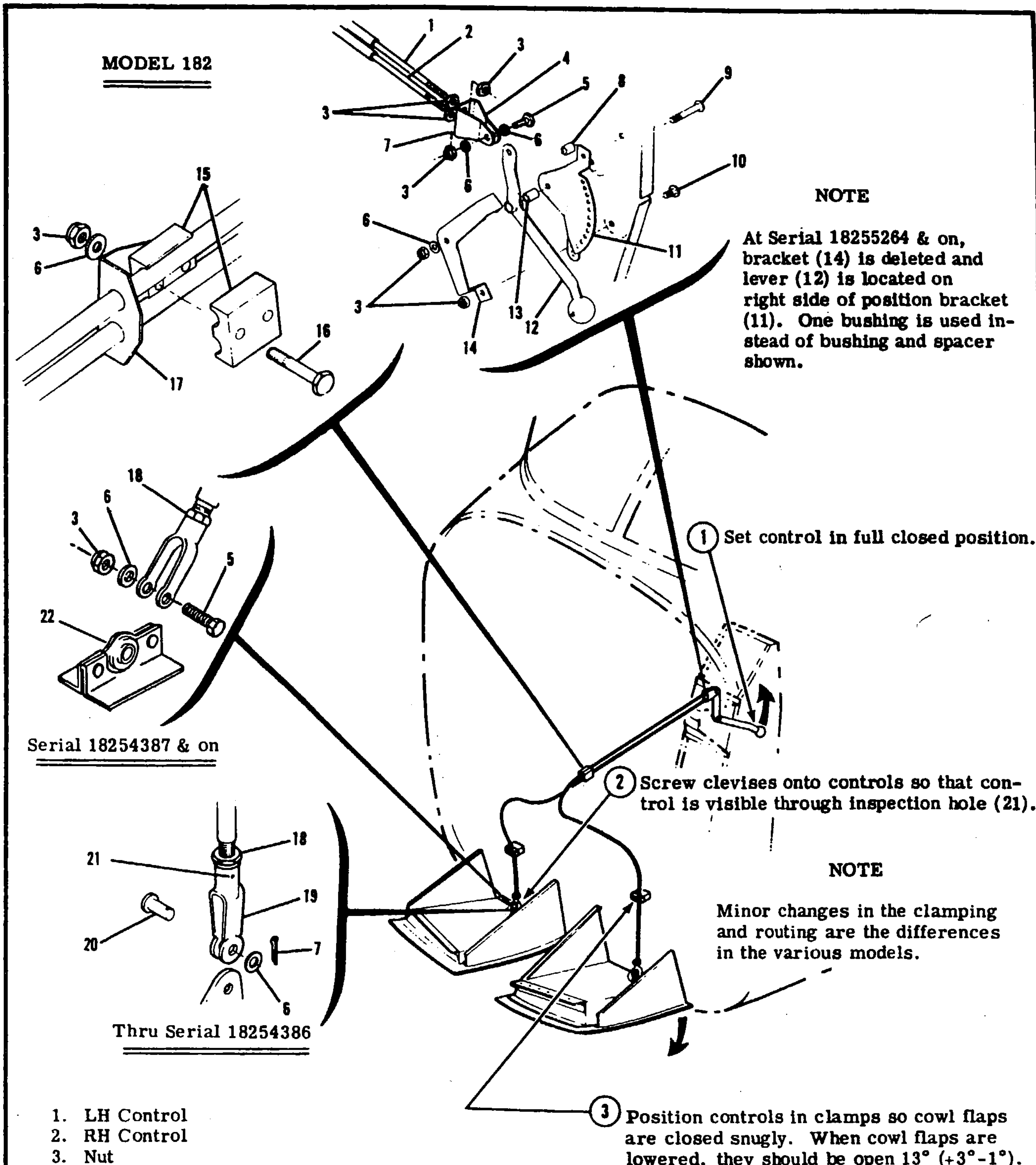


Figure 12-13. Cowl Flaps Rigging (Sheet 1 of 2)



1. LH Control
2. RH Control
3. Nut
4. Clevis
5. Bolt
6. Washer
7. Cotter Pin
8. Spacer
9. Screw
10. Screw
11. Position Bracket
12. Lever
13. Bushing
14. Support Bracket
15. Clamp
16. Bolt
17. Bracket
18. Jamb Nut
19. Rod End Clevis
20. Clevis Pin
21. Inspection Hole
22. Shock Mount

Figure 12-13. Cowl Flaps Rigging (Sheet 2 of 2)

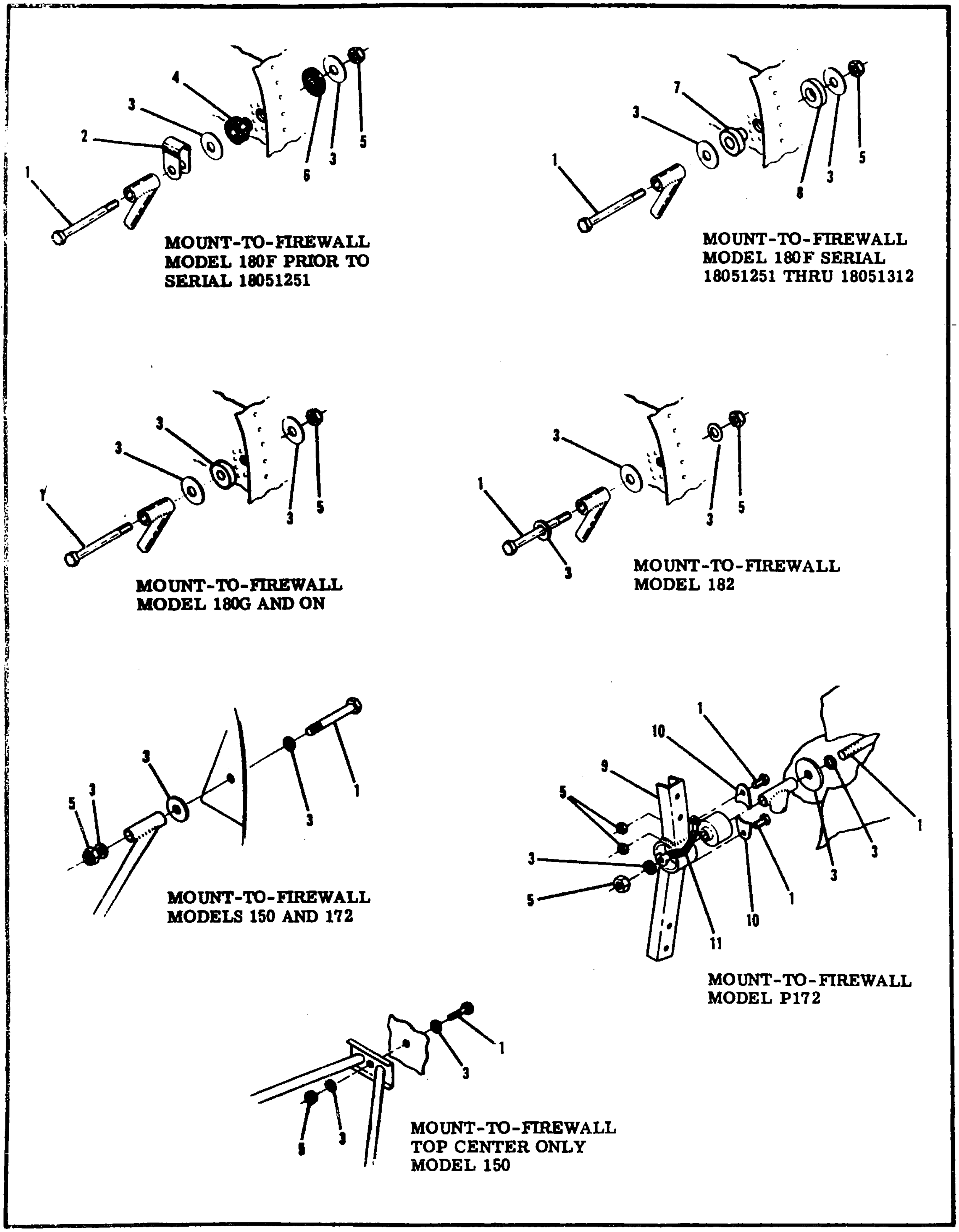
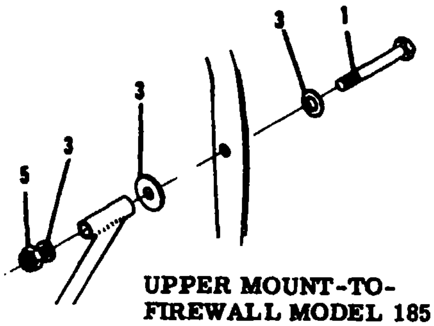
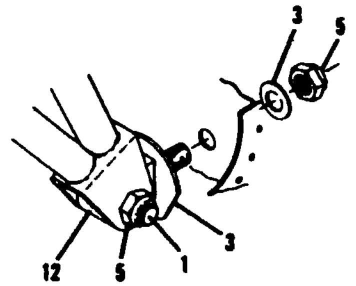


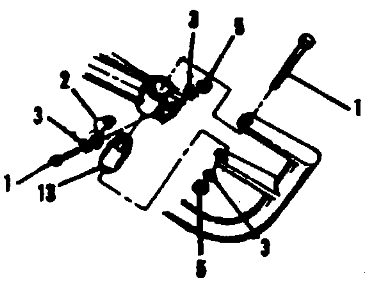
Figure 12-14. Engine Mount Details (Sheet 1 of 2)



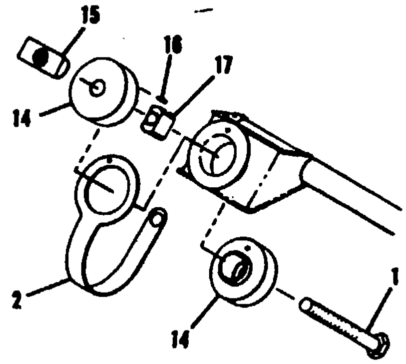
UPPER MOUNT-TO-
FIREWALL MODEL 185



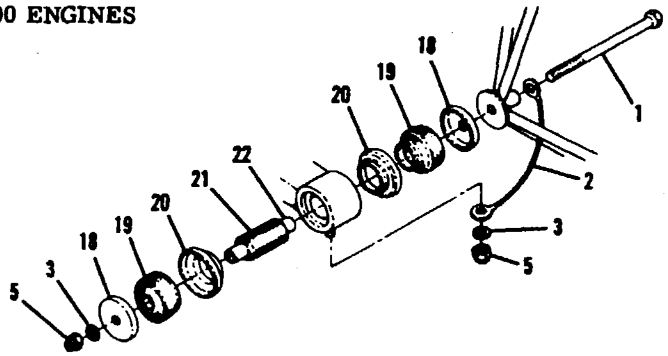
LOWER MOUNT-TO-
FIREWALL MODEL 185



ENGINE-TO-MOUNT
O-300 ENGINES



ENGINE-TO-MOUNT
GO-300, O-470, IO-470
AND IO-520 ENGINES



ENGINE-TO-MOUNT
O-200 ENGINES

NOTE

Tab lockwashers are used under bolt heads of some engine-to-mount attaching bolts. Use them if they were installed originally.

1. Bolt
2. Ground Strap
3. Washer
4. Rubber Bushing
5. Nut
6. Rubber Pad
7. Metal Bushing
8. Metal Pad
9. Cowl Mount Assembly
10. Latch Plate
11. Ground Strap
12. Lug
13. Shock Mount Bushing
14. Shock Mount Pad
15. Barrel Nut
16. Pin
17. Spacer
18. Cup
19. Rubber Bushing
20. Seat
21. Hose
22. Spacer

Figure 12-14. Engine Mount Details (Sheet 2 of 2)

12-78. ENGINE COWLING.

12-79. REMOVAL AND REPLACEMENT of engine cowling is accomplished by removing attaching screws and bolts, and releasing quick-release fasteners. On models with cowl flaps, it is necessary to lower the cowl flaps and disconnect each one from its control or linkage. Various changes have been made in design of air inlets, air filters, ducting, and flexible connections. Disconnect any of these which interferes with removal of the cowling. When replacing the cowling, be sure to connect any items disconnected during removal. If cowl flap adjustment was disturbed, rig per figure 12-13.

12-80. CLEANING. Wipe the inner surfaces of the cowl with a cloth saturated with cleaning solvent. If the inside of the cowl is coated heavily with grease and dirt, allow the solvent to soak until the foreign material can be removed. Painted surfaces should be cleaned by washing with water and a mild soap. Waxing after cleaning is recommended to prolong paint life.

12-81. REPAIR of engine cowling is outlined in Section 19.

12-81A. ENGINE COWLING (SHOCK-MOUNTED). The engine cowling on the 1967 Model 172 and Model 150 is similar to the cowling formerly used, except that it is shock mounted. Instead of attaching directly to the fuselage, the cowling attaches to shock mounts which, in turn, are fastened to the fuselage. Quick-release fasteners are used at the cowling-to-shock mount attach points to facilitate removal of the cowling.

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

12-82. BAFFLES.

12-83. Engine baffles are constructed of metal and strips of asbestos fabric. They are designed to direct ram air around the cylinders and engine components in a manner that will provide optimum cooling of the engine. An additional baffle has been added to the No. 5 cylinder head on the Model 185, beginning with Serial No. 185-0745. As instructed in Service Letter 64-32, this baffle should be added to all earlier Model 185 airplanes.

12-84. REMOVAL AND REPLACEMENT of the various baffle segments is possible with the cowling removed. Be sure that any replaced baffles seal properly.

12-85. REPAIR of engine baffles is outlined in Section 19.

12-86. ENGINE MOUNT (TUBULAR).

12-87. 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 airframe. The engine is attached to the engine mount with shock-mount assemblies which absorb engine vibrations. On some models, the engine mount is also shock-mounted to the fuselage.

NOTE

On the Model 150, the engine mount supports the nosewheel shock strut. Included in the Model P172 engine-mount-to-fuselage attachments are shock mounts which support the free floating engine cowling.

12-88. REPLACEMENT of the engine mount necessitates removal of the engine, followed by removal of the bolts attaching the mount to the fuselage.

NOTE

When tightening engine mount bolts, two different procedures should be used. If the bolt secures metal parts together or tightens against a metal spacer, the standard torque values listed in Section 1 should be used. If the bolt compresses rubber pads with no metal spacer in between, tighten until the rubber pads bulge out slightly, but do not tighten enough to cause damage to the rubber.

A new engine mount and doublers added to the firewall at the four outboard mount attach points are installed on the Model 150, beginning with Serial Number 15061640. As a result of the doublers being installed, the outboard attach legs of the engine mount have been shortened .06 inch. The new engine mount supersedes the engine mount used on the earlier Model 150 as a replacement mount.

NOTE

When installing this new mount on the Model 150 prior to 15061640 (except those modified per Service Kit Number SK150-14), one additional AN970-5 washer must be installed under each of the outboard mount legs to compensate for the .06 inch shortening of the mount legs.

12-89. REPAIR of the engine mount should be performed carefully as outlined in Section 19. The mount should be painted with heat-resistant black enamel after welding or whenever the original finish has been removed.

During the 1968 model year, the paint finish on the Model 180, 182, and 185 engine mounts is changed to provide greater protection against corrosion. This paint C-I High (Chemical Industrial Co., Brooklyn, Ohio) is available from the Cessna Service Parts Center. The mount should be painted after welding or whenever the original finish has been removed. To paint engine mounts that are painted with heat-resistant black enamel and metalized:

a. Remove old finish and any evidence of corrosion.

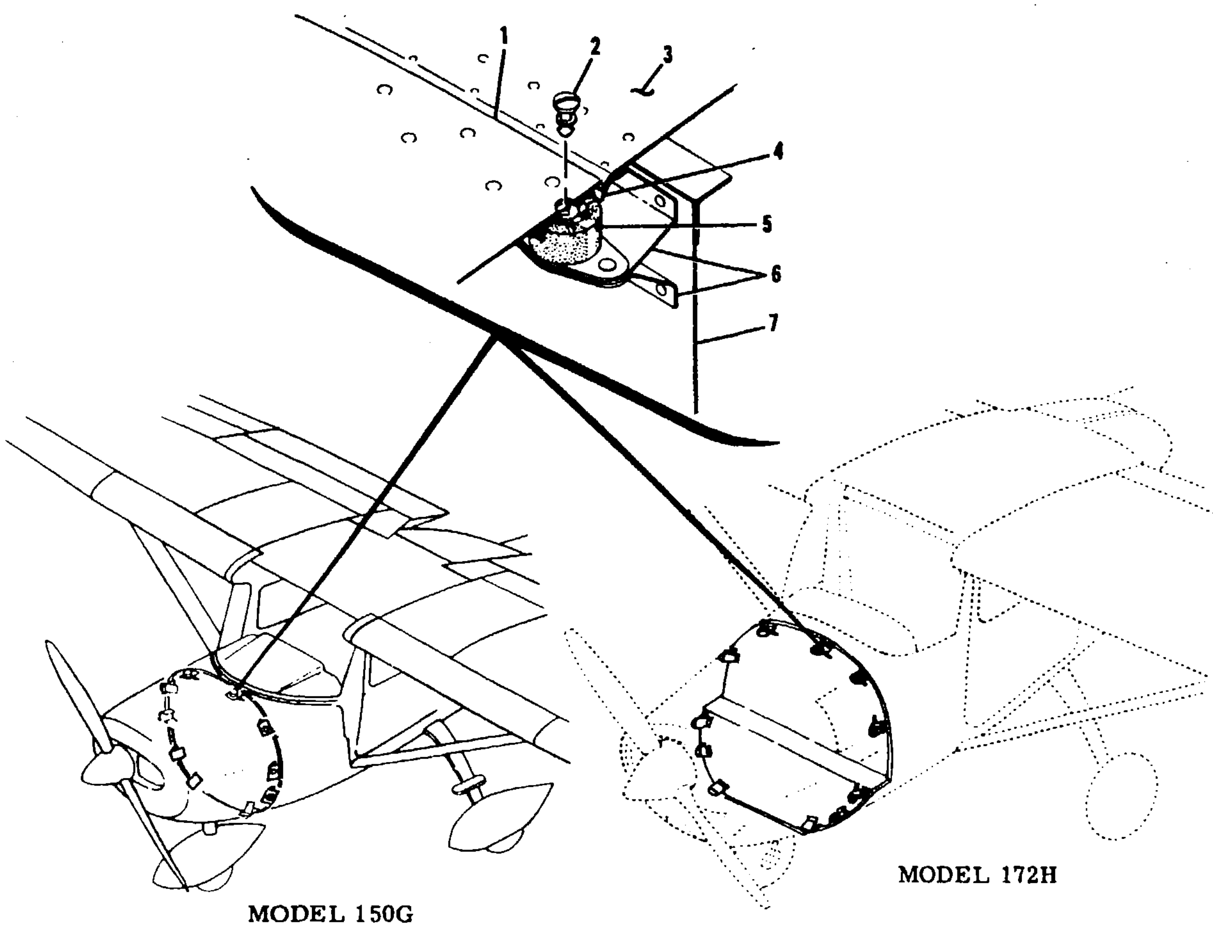
b. Prime the affected area with synthetic red primer. Allow primer to dry a minimum of two hours.

c. Apply heat-resistant back enamel. Apply by spray if possible, if not finish may be applied with a brush.

d. If metalized area is affected, remove corrosion as completely as possible and paint metalized area with C-I High. Do not use a primer under this paint. Paint may be used with spray gun or brush.

e. If refinishing the entire mount is feasible, finish with C-I High paint. Do not use a primer beneath this material.

f. If the engine mount is finished with the C-I High material and refinish is required, remove corrosion and apply finish.



1. Engine Cowling
2. Quick-Release Fastener
3. Fuselage
4. Asbestos Seal
5. Shock Mount
6. Bracket
7. Firewall

Figure 12-14A. Engine Cowling Shock Mounts

12-90. OIL SYSTEM.

12-91. Wet sump, pressure-lubricating oil systems are employed in the engines of all the aircraft covered in this manual. In these engines, oil under pressure from the oil pump is fed through drilled crankcase passages which supply oil to the crankshaft main bearings and camshaft bearings. Connecting rod bearings are pressure lubricated through internal passages in the crankshaft. Valve mechanisms are lubricated through the hollow push-rods, which are supplied with oil from the crankcase oil passages. Oil is returned by gravity to the engine oil sump. Cylinder walls and piston pins are spray-lubricated by oil escaping from connecting rod bearings. Non-congealing and large oil coolers may be installed on some models. The non-congealing oil cooler prevents the oil from congealing when operating in low temperatures by means of warm-up passages through which engine oil is permitted to circulate continuously. Oil coolers are controlled by a thermostat. A pressure relief valve maintains proper engine oil pressure. Removable oil filter screens are provided in the engine oil system and external, replaceable-element filters are optional equipment on most models.

12-92. TROUBLE SHOOTING.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
NO OIL PRESSURE.		
No oil in sump.	Check with dipstick.	Fill sump with proper grade and amount of oil.
Oil pressure line broken, disconnected, or pinched.	Inspect oil pressure line.	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 another gage. If second reading is normal, airplane gage is defective.	Replace gage.
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 reinstall; replace if defective.
LOW OIL PRESSURE.		
Low viscosity oil.		Drain oil and refill sump with proper grade of oil.
Low oil level.	Check with dipstick.	Fill sump to proper level with proper grade of oil.
Oil pressure relief valve spring weak or broken.	Remove and check spring.	Replace weak or broken spring.
Defective oil pump.	Check oil temperature and oil level. If temperature is higher than normal and oil level is correct, internal failure is evident.	Examine engine. Metal particles from damaged oil pump may have entered engine oil passages.
Secondary result of high oil temperature.	Observe oil temperature gage for high indication.	Determine and correct reason for high oil temperature.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
HIGH OIL PRESSURE.		
High viscosity oil.		Drain oil and refill sump with proper grade and amount of oil.
Relief valve defective.	Remove and check for dirty or defective parts.	Clean and reinstall; replace if defective.
Defective oil pressure gage.	Check oil pressure with another gage. If second gage gives a normal reading, airplane gage is defective.	Replace oil pressure gage.
HIGH OIL TEMPERATURE.		
Oil cooler thermostat defective.	Feel front of cooler core with hand. If core is cold, oil is bypassing cooler.	Replace thermostat.
Oil cooler air passages clogged.	Inspect cooler core.	Clean air passages.
Oil cooler oil passages clogged.	Attempt to drain cooler. Inspect any drainings for sediment.	Clean oil passages.
Oil congealed in oil cooler.	This condition can only occur in extremely cold temperatures.	If congealing is suspected, use external heater or a heated hangar to thaw the congealed oil.
Secondary effect of low oil pressure.	Observe oil pressure gage for low indication.	Determine and correct reason for low oil pressure.
Defective oil temperature gage.	Check with another gage. If second reading is normal, airplane gage is defective.	Replace gage.
Defective oil temperature bulb.	Check for correct oil pressure, oil level and cylinder head temperature. If they are correct, check oil temperature gage for being defective; if a similar reading is observed, bulb is defective.	Replace temperature bulb.
LOW OIL TEMPERATURE.		
Defective oil temperature bulb or gage.	Check with another gage. If reading is normal, airplane gage is defective. If reading is similar, temperature bulb is defective,	Replace defective part.
Oil cooler thermostat defective or stuck closed.	Remove valve and check for proper operation.	Replace thermostat.

12-93. FULL-FLOW OIL FILTER.

12-94. Three configurations of optional external full-flow oil filters have been installed on some of these airplanes. The filter and filter adapter replace the regular engine oil filter screen. The earlier configuration, illustrated in figure 12-15, incorporates only a bypass valve in the filter adapter. In a later configuration, illustrated in figure 12-15A, the filter adapter incorporates a bypass valve, outlet valve, and isolation valve. Normally, oil from the engine oil pump flows through the isolation valve, through the filter element, through the outlet valve to the engine oil passages. If the filter element should become blocked, the bypass valve will open, allowing oil to flow to the engine oil passages. The isolation valve blocks off the filter assembly, and oil then flows through the bypass valve, if excessive oil pressure should occur. In the other configuration, the shorter filter can, shown in figure 12-15A, may be used with the earlier filter adapter. Replacement filter adapters are of the latest type as shown in figure 12-15A. Beginning with the 1967 Models 180, 185, and 182, a similar adapter that does not contain the outlet and isolation valves is used. This new adapter is also used for all service parts, except on the Models 150 and 172 which continue to use both valves.

12-95. FILTER ELEMENT REPLACEMENT. (See figures 12-15 and 12-15A.)

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 (1) to detach filter assembly from adapter (10) as a unit. Remove from the airplane, discarding gasket (9).
c. Press downward on stud (1) to remove.
d. Lift lid (7) off filter can, discarding gasket (6).
e. Pull filter element out of can and discard.
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 the correct amount of torque is applied to 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.

Lubricate rubber grommets in new filter element, rubber gaskets (9) and (6), and metal gasket (2) with clean engine oil or general purpose grease before installation. Dry gaskets may cause false torque readings, again resulting in oil leakage.

Before assembly, place a straightedge across bottom of filter can. Check for a distortion or out-of-flat condition greater than .010 inch. Replace if either of these conditions exist.

Before assembly, cut adapter nut safety wire and try to rotate adapter by hand. If adapter can be moved, check for thread deformation in engine and adapter.

After installing a new gasket on lid (7), turn it upside down. If gasket falls, replace gasket and repeat test. If this gasket falls off, replace lid.

g. Inspect adapter gasket seat for gouges, deep scratches, wrench marks, and mutilation. If any of these are found, replace adapter.
h. Place new element in can, and insert stud (1) with new metal gasket (2) in place, through the can and element.
i. Position new gasket (6) inside lower flange of lid (7). Position new gasket (9) around upper flange of lid (7). Place the lid in position.
j. Install filter assembly on adapter. Holding can to prevent it from turning, tighten stud (1) and torque to 20-25 lb-ft, using a torque wrench.
k. Reinstall parts removed for access, and service the engine with proper grade and quantity of oil. One additional quart of oil is required each time the element is replaced.
l. Start engine and check for proper oil pressure. Check for leaks after warming up engine.
m. Again check for leaks after engine has been run at a high power setting (preferably a flight around the field).
n. Check to make sure filter has not been making contact with adjacent parts due to engine torque.
o. While engine is still warm, recheck torque on stud (1), then safety stud to lower bracket (3) on filter can, and safety adapter to upper bracket (3) on filter can.

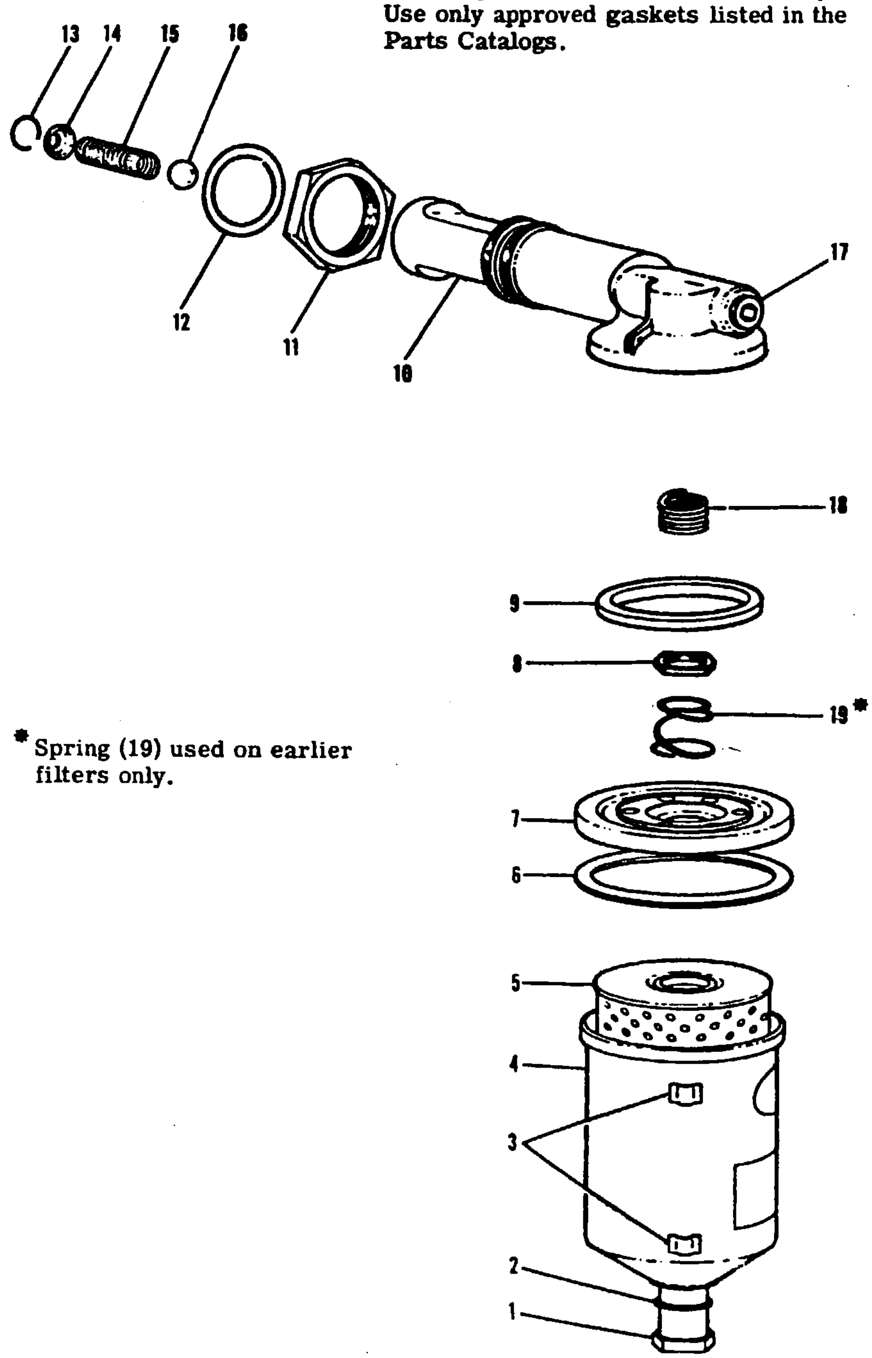
12-96. FILTER ADAPTER REMOVAL. (See figures 12-15 and 12-15A.)
a. Remove filter assembly as outlined during element replacement.
b. Note angular position of adapter, then remove safety wire and loosen adapter nut (11).
c. Unscrew adapter and remove from engine.

NOTE

A special wrench adapter for adapter nut (11) Part No. SE-709, is available from the Cessna Service Parts Center, or one may be made as shown in figure 12-16.

NOTE

Do NOT substitute automotive gaskets for any gaskets used in this assembly. Use only approved gaskets listed in the Parts Catalogs.



* Spring (19) used on earlier filters only.

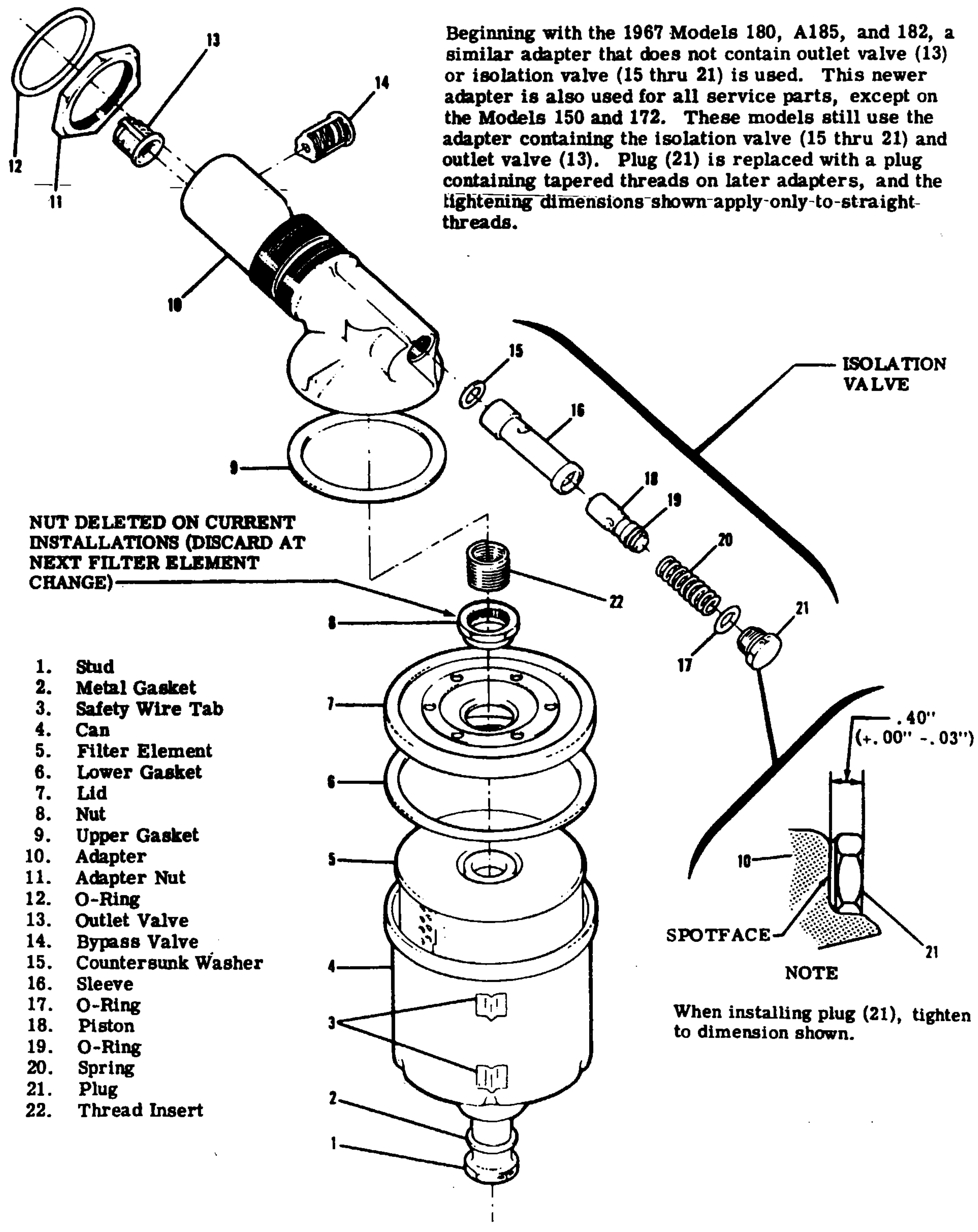
1. Stud
2. Metal Gasket
3. Safety Wire Tab
4. Can
5. Filter Element
6. Lower Gasket
7. Lid
8. Nut
9. Upper Gasket
10. Adapter
11. Adapter Nut
12. O-Ring
13. Snap Ring
14. Retaining Cap
15. Spring
16. Ball
17. Plug
18. Thread Insert
19. Spring

Figure 12-15. Full-Flow Oil Filter

NOTE

Do NOT substitute automotive gaskets for any gaskets used in this assembly. Use only approved gaskets listed in the Parts Catalogs.

Beginning with the 1967 Models 180, A185, and 182, a similar adapter that does not contain outlet valve (13) or isolation valve (15 thru 21) is used. This newer adapter is also used for all service parts, except on the Models 150 and 172. These models still use the adapter containing the isolation valve (15 thru 21) and outlet valve (13). Plug (21) is replaced with a plug containing tapered threads on later adapters, and the tightening dimensions shown apply only to straight threads.



1. Stud
2. Metal Gasket
3. Safety Wire Tab
4. Can
5. Filter Element
6. Lower Gasket
7. Lid
8. Nut
9. Upper Gasket
10. Adapter
11. Adapter Nut
12. O-Ring
13. Outlet Valve
14. Bypass Valve
15. Countersunk Washer
16. Sleeve
17. O-Ring
18. Piston
19. O-Ring
20. Spring
21. Plug
22. Thread Insert

NOTE

When installing plug (21), tighten to dimension shown.

Figure 12-15A. Full-Flow Oil Filter

12-96A. DISASSEMBLY, REPAIR, AND ASSEMBLY OF FILTER ADAPTER. Figure 12-15 shows the relative position of internal parts of the earlier filter adapter and may be used as a guide during replacement of parts. Figure 12-15A shows the relative position of internal parts of later filter adapters and may be used as a guide during replacement of parts. The bypass and outlet valves are to be replaced as units, with the bypass valve being staked three places at installation. The detail parts which form the isolation valve may be replaced individually. Also use new seals, lubricate parts with engine oil, and replace any parts that shows signs of excessive wear. Note that washer (15) is installed with its countersunk side toward outlet valve (13). Tighten plug (21) to a maximum of .40 inch as shown in figure 12-15A. The heli-coil type insert (22) in the adapter may be replaced, although special tools are required. Follow instructions of the tool manufacturer for their use. Since the isolation valve is not used in later adapters on the Models 180, 185, and 182, the isolation valve may be removed, if desired. To remove the isolation valve, remove plug (21) and parts (15 thru 20). Weld shut vent hole in plug (21). Reinstall washer (15), sleeve (16), O-ring (17), and plug (21) in the adapter.

12-97. FILTER ADAPTER INSTALLATION.

a. Assemble adapter nut and new O-ring on adapter in sequence illustrated. Lubricate O-ring with engine oil. Tighten adapter nut until O-ring is centered in groove.

b. Apply anti-seize compound sparingly to adapter threads, then simultaneously screw adapter and nut into engine until O-ring seats against engine without turning adapter nut. Rotate adapter to the approximate angular position noted during removal. Do not tighten nut at this time.

c. Temporarily install filter assembly on adapter, and position so adequate clearance with adjacent parts is attained. Maintaining this position of the adapter, tighten adapter nut to 50-60 lb-ft and safety. Use a torque wrench, extension and adapter as necessary.

d. Using new gaskets, install the filter assembly as outlined during element replacement.

e. Be sure to service the engine oil system, perform the checks and inspections outlined, and resafety all parts requiring safetying, as noted in paragraph 12-95.

f. Reinstall any component removed for access.

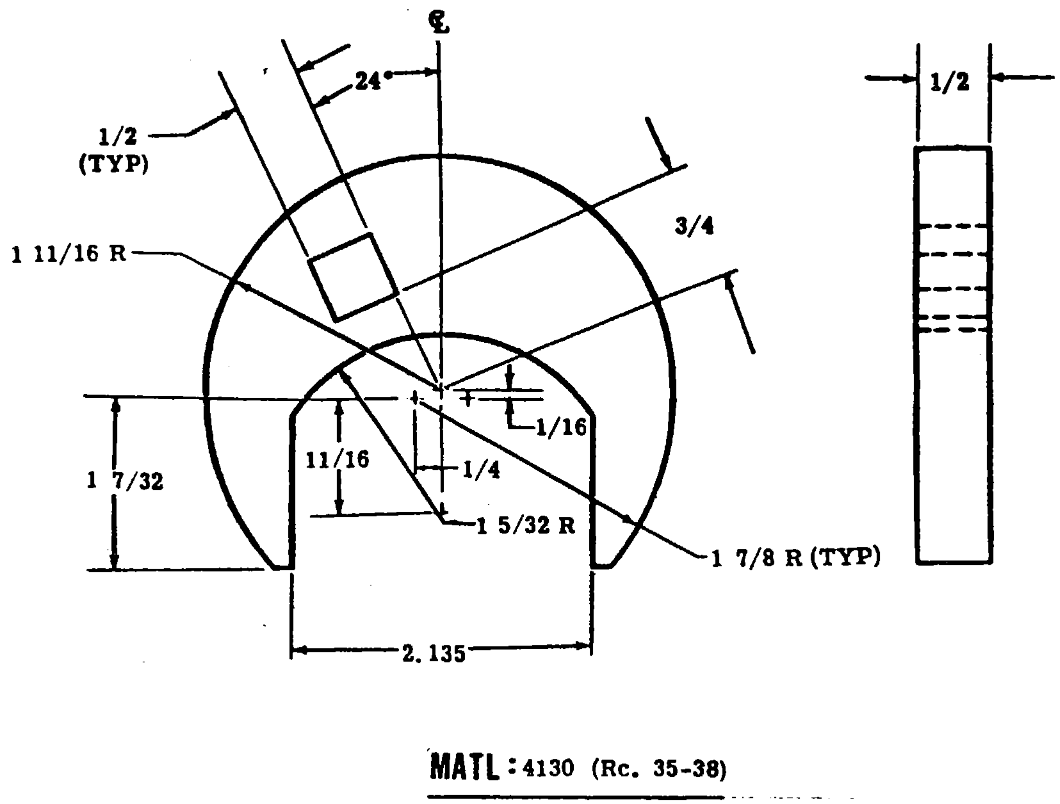


Figure 12-16. Wrench Adapter Fabrication

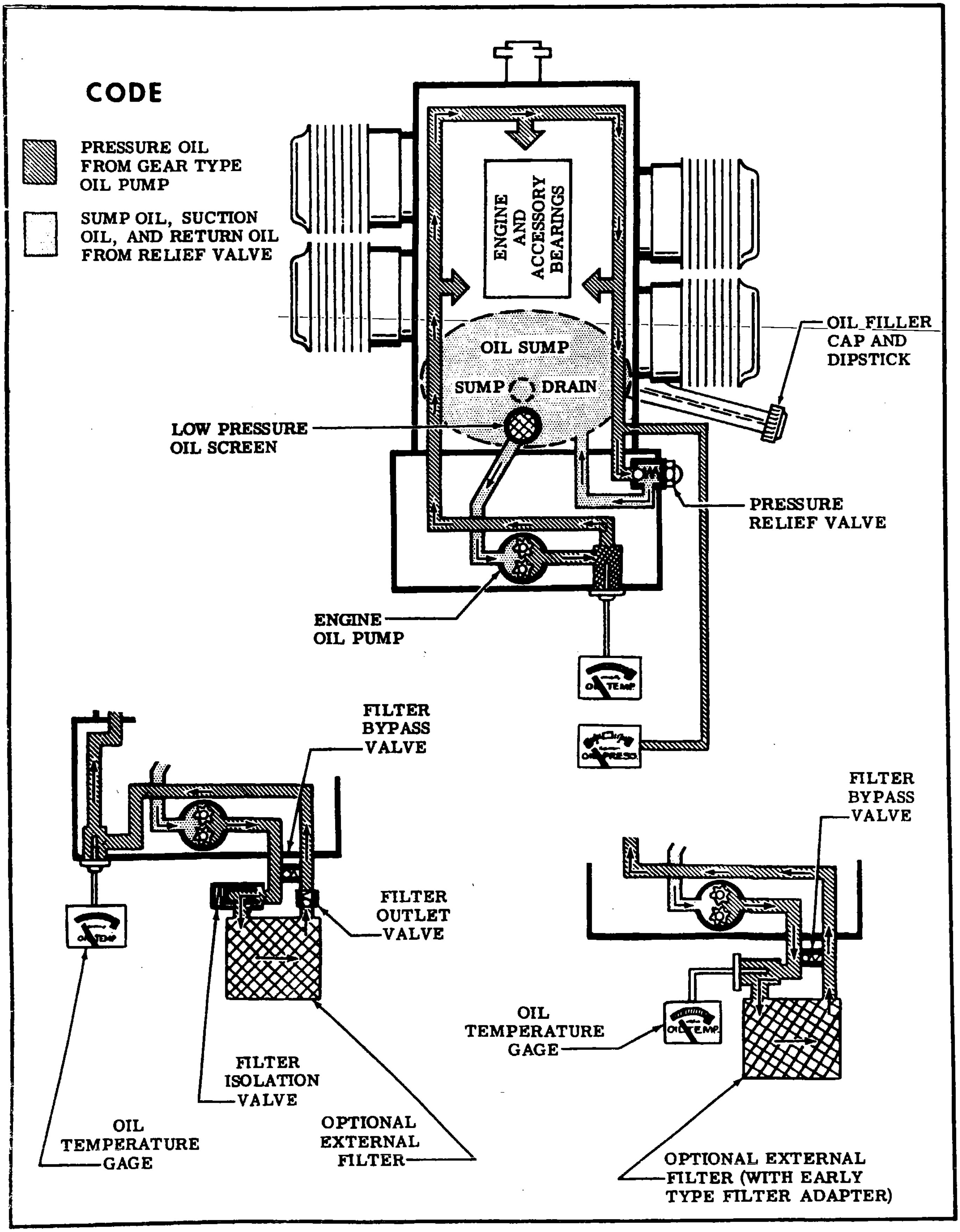


Figure 12-17. Engine Oil Schematic (O-200 Series)

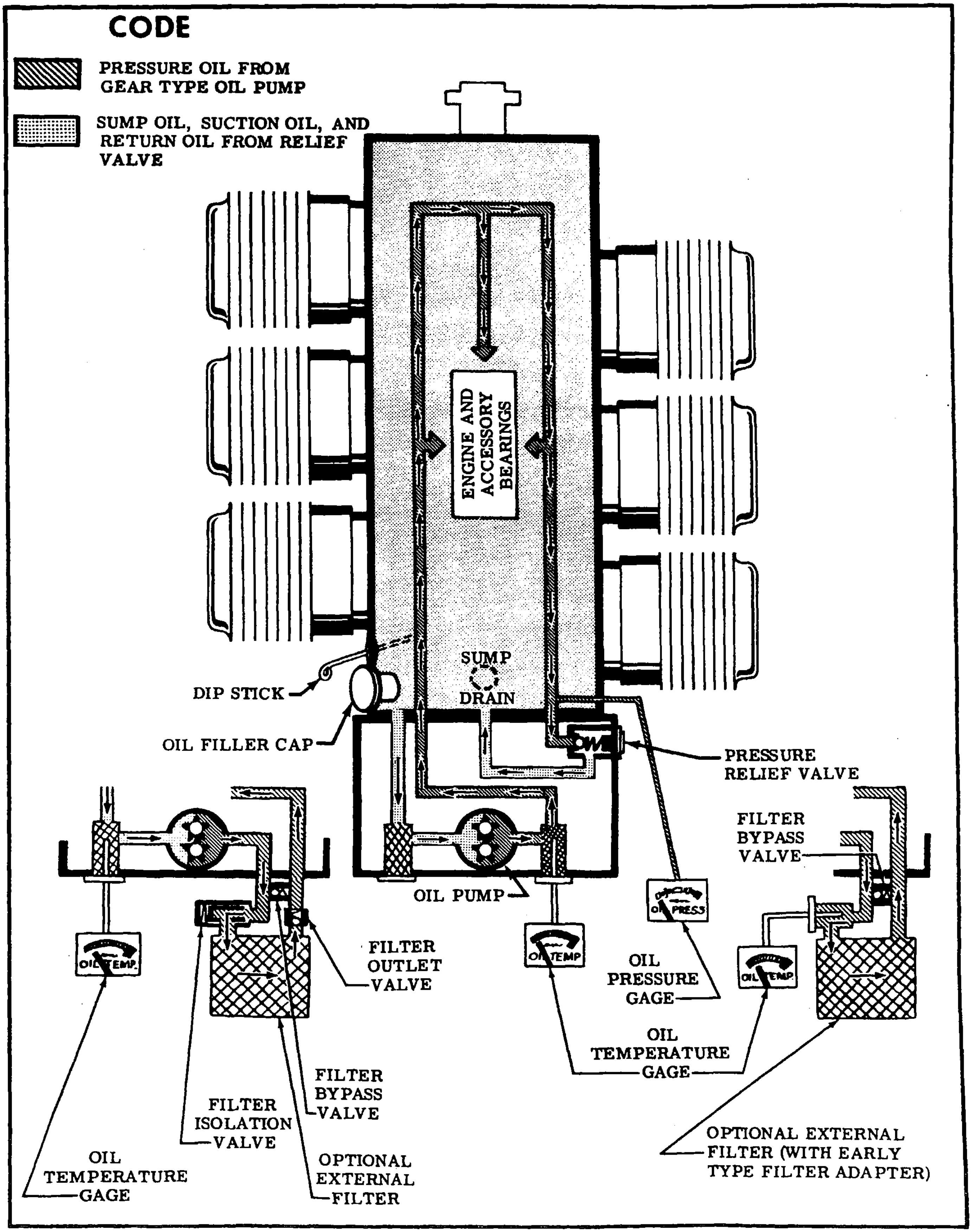


Figure 12-18. Engine Oil Schematic (O-300 Series)

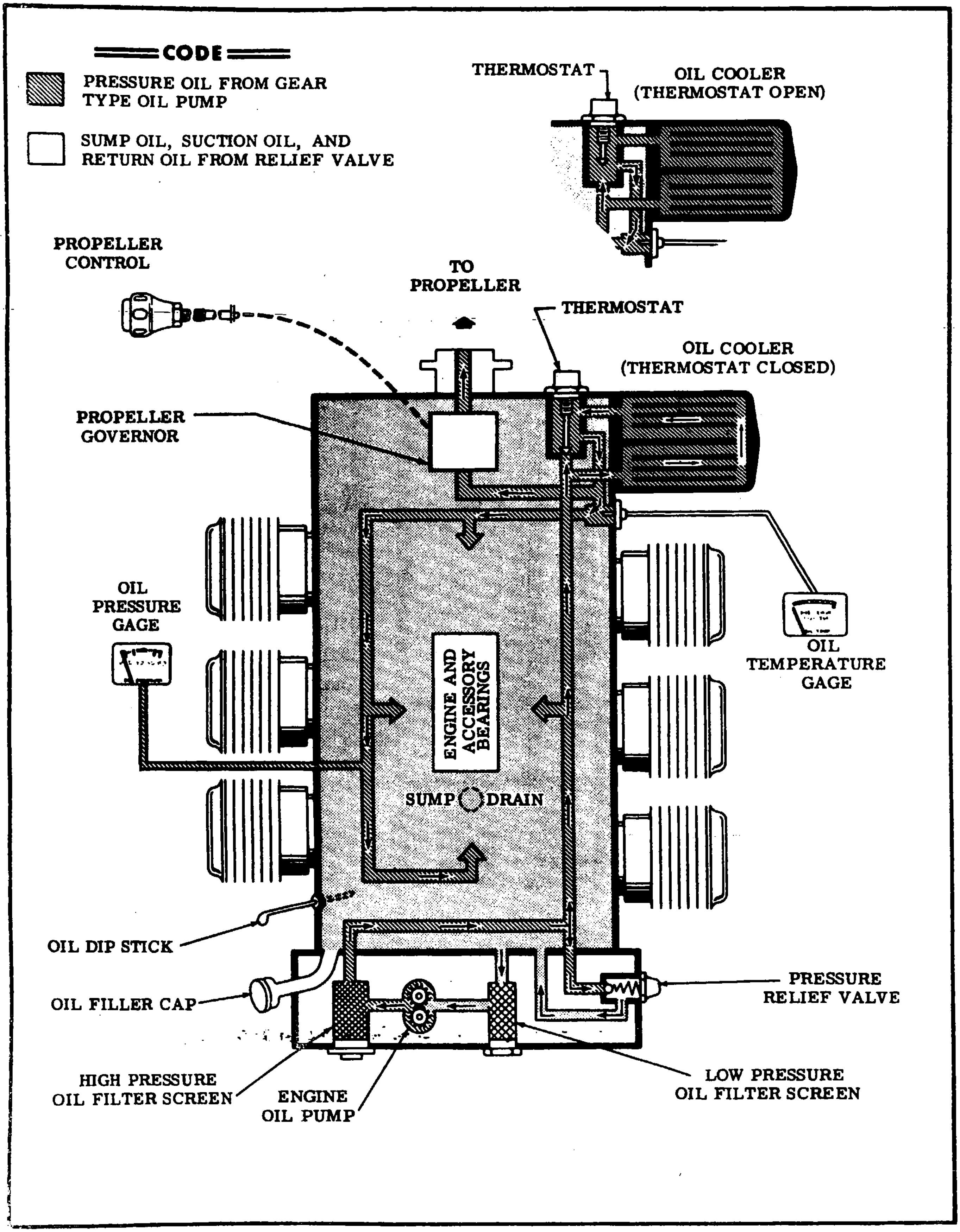


Figure 12-19. Engine Oil Schematic (GO-300 Series)

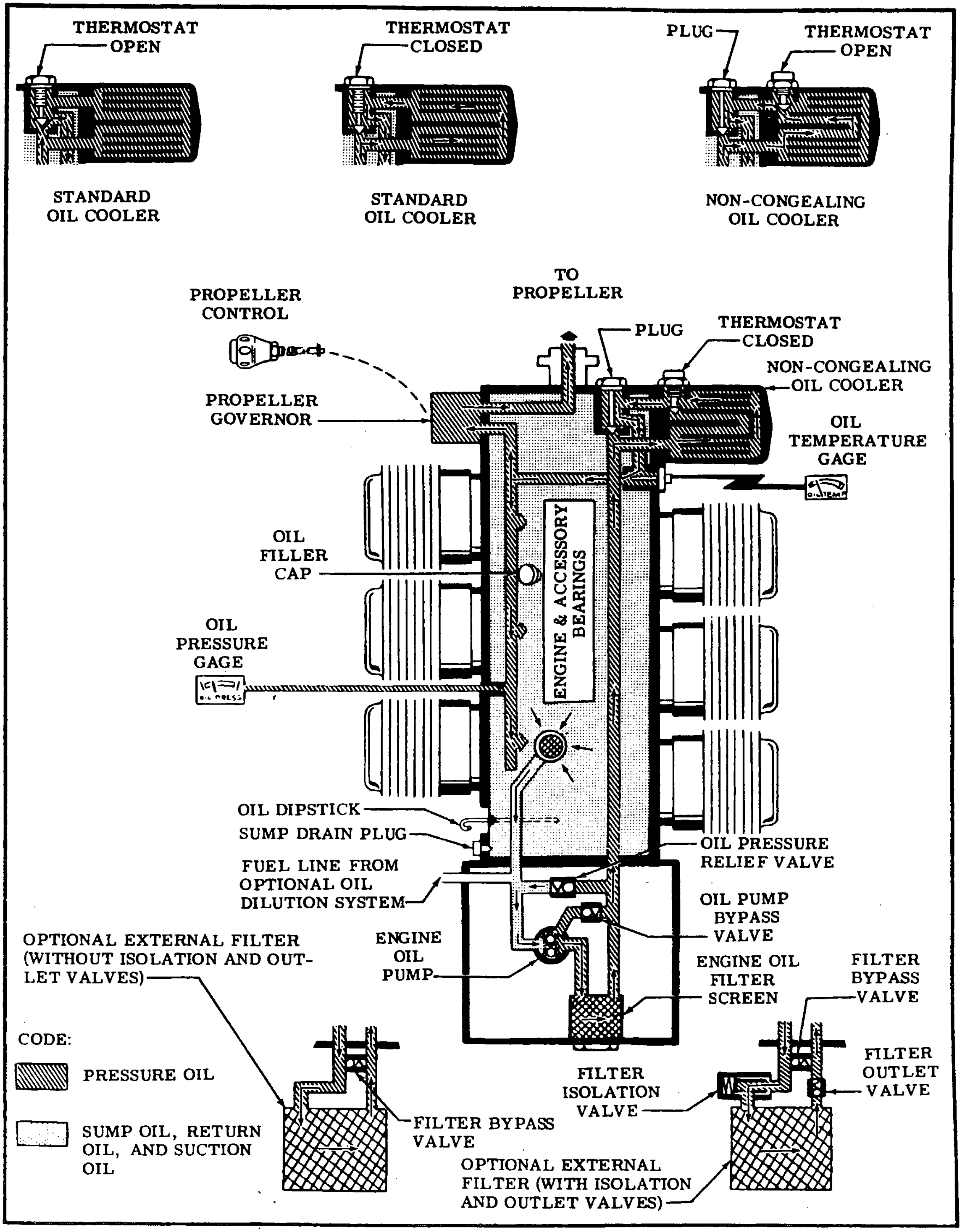
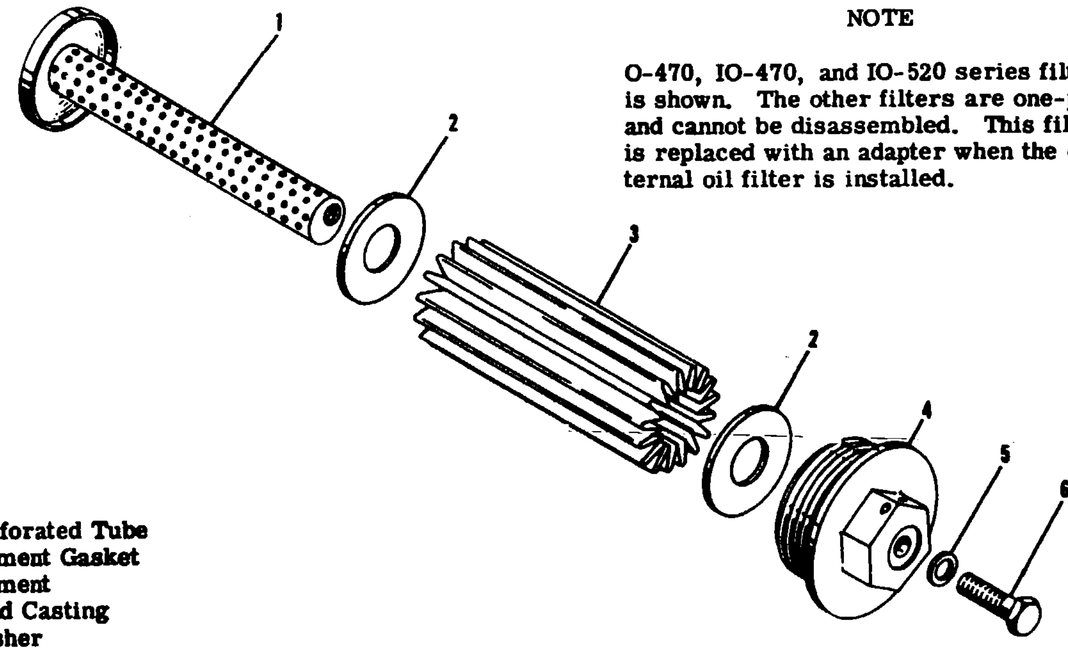


Figure 12-20. Engine Oil Schematic (O-470, IO-470, and IO-520 Series)



NOTE

O-470, IO-470, and IO-520 series filter is shown. The other filters are one-piece and cannot be disassembled. This filter is replaced with an adapter when the external oil filter is installed.

1. Perforated Tube
2. Element Gasket
3. Element
4. Head Casting
5. Washer
6. Bolt

Figure 12-21. Engine Oil Filter

12-98. EXHAUST SYSTEM.

12-99. Exhaust system configurations used on Cessna airplanes vary with each model; however, all are similar in principle of operation. Exhaust gas heat exchangers, shrouds, ducting, valves, and controls furnish heated air to the engine intake system or cabin, or both.

12-100. REMOVAL AND REPLACEMENT of exhaust systems may be accomplished as follows:

a. Remove engine cowling.
b. Disconnect ducting from heater shrouds.
c. Disconnect exhaust stack braces.
d. Remove nuts securing the exhaust stack assembly to the cylinders.

NOTE

Usually the assembly can be removed intact. However, on some models the clamps joining sections of the exhaust stacks must be removed and the assembly removed in sections because of engine mount or engine component interference.

e. Heater shrouds may be removed as desired.
f. Reverse the above procedure to install the exhaust system. Use new exhaust gaskets regardless of apparent condition of those removed.

12-101. INSPECTION of the exhaust system should be thorough because the cabin heating system uses air heated by the heat exchangers of the exhaust system. Since exhaust systems of this type are subject to burning, cracking, and general deterioration from alternate thermal stresses and vibration (comparable to those affecting automotive mufflers), inspection is important and should be accomplished every 100 hours of operation. In addition, an inspection should be performed any time exhaust fumes are detected in the cabin.

a. Remove engine cowling, and loosen or remove heater shrouds so that ALL surfaces of the exhaust stack assembly can be visually inspected. Especially check the areas adjacent to welds. Look for exhaust deposits in surrounding areas, indicating that exhaust gas is escaping through a crack or hole.

b. Where part of the exhaust stack assembly is not accessible for a thorough visual inspection, or is hidden by parts of non-removable shrouds, the following method is recommended.

   1. Remove the exhaust stack assembly and heater shrouds in accordance with paragraph 12-100.
   2. Use rubber expansion plugs to seal openings.
   3. Using a manometer or gage, apply approximately 1 1/2 psi (3 inches of mercury) air pressure while the stack assembly is submerged in water. Any leaks will appear as bubbles and can be readily detected.
   4. It is recommended that any exhaust stacks found defective be replaced before the next flight.
   5. If no defects are found, remove plugs and dry thoroughly with compressed air.

c. Install the exhaust system by reversing the procedure of paragraph 12-100.

SECTION 12A

ENGINE
(LYCOMING "BLUE-STREAK")

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12A-1. ENGINE COWLING.

12A-2. The engine cowling is comprised of an upper and lower cowl segment. A large access door on the upper cowl provides access to the fuel strainer drain, oil filler cap, and oil dipstick. Instead of attaching directly to the fuselage, the cowling attaches to shock mounts which, in turn, are fastened to the fuselage. Quick-release fasteners are used at the cowling-to-shock mount and at parting surfaces of upper and lower cowl attach points to facilitate removal of the cowling.

12A-3. REMOVAL AND INSTALLATION. Removal and installation of the engine cowling is accomplished by removing the attaching screws and releasing the quick-release fasteners. Disconnect any air ducts and control linkage which interfers with removal of the cowling. When installing the cowling, be sure to connect any items disconnected during removal.

NOTE

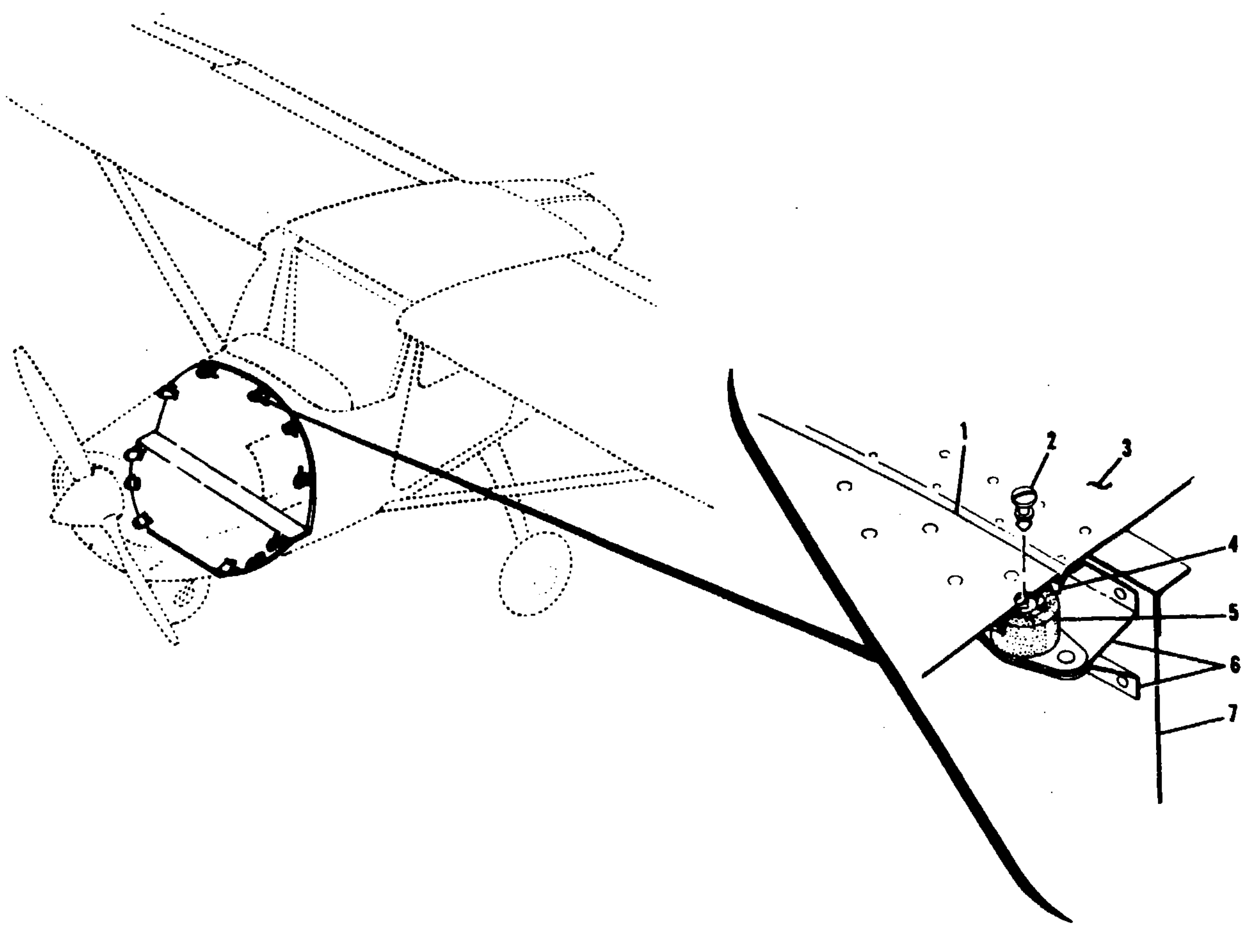
When new shock mounts or brackets are being installed, careful measurements should be made to position these parts correctly on the firewall. The service parts are not pre-drilled. Install shock mounts on brackets so that cowling and shock mounts are correctly aligned. Sheet aluminum may be used as shims between bracket halves to provide proper cowling contour.

12A-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.

12A-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.

12A-6. ENGINE.

12A-7. An air-cooled, wet-sump, horizontal-opposed, low-compression, direct-drive, four-cylinder "Blue-Streak" (Lycoming) O-320-E series engine is used to power the aircraft. The cylinders, numbered from front to rear, are staggered to permit a separate throw on the crankshaft for each connecting rod. The right front cylinder is number 1 and cylinders on the right side are identified by odd numbers 1 and 3. The left front cylinder is numbered 2 and the cylinders on the left side are identified as 2 and 4. Refer to paragraph 12A-8 for engine data. For repair and overhaul of the engine, accessories, and propeller, refer to applicable publication issued by their manufacturers.



1. Engine Cowling
2. Quick-Release Fastener
3. Fuselage
4. Asbestos Seal
5. Shock Mount
6. Bracket
7. Firewall

Figure 12A-1. Engine Cowling Shock Mounts

12A-8. ENGINE DATA.

Aircraft Series	172I
Lycoming Model ("Blue-Streak")	O-320-E2D
Rated Horsepower at RPM	150 at 2700
Number of Cylinders	4-Horizontally Opposed
Displacement	320 Cubic Inches
Bore	5.125 Inches
Stroke	3.875 Inches
Compression Ratio	7.00:1
Magnetos	Slick No. 4051 (left) No. 4050 (right)
Right Magneto	Fires 25° BTC 1-3 Upper and 2-4 Lower
Left Magneto	Fires 25° BTC 2-4 Upper and 1-3 Lower
Firing Order	1-3-2-4
Spark Plugs	SH-20A
Gap	0.015 to 0.018 Inch
Torque	390±30 Lb-In.
Carburetor (Marvel-Schebler)	MA-4SPA
Alternator	14-Volt, 60-Ampere
Starter (12-Volt)	Automatic Engagement
Tachometer	Mechanical
Oil Sump Capacity	8 U.S. Quarts
Oil Pressure (psi)	
Minimum Idling	25
Normal	60-90
Maximum (Starting & Warm-Up)	100
Cylinder Head Temperature	
Normal Operating	Within Green Arc
Maximum	Red Line (500°F)
Direction of Propeller Shaft Rotation (viewed from rear)	Clockwise
Dry Weight - with Accessories	269 lb (Weight is approximate and will vary with optional equipment installed.)

12A-9. TROUBLE SHOOTING.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
ENGINE FAILS TO START.		
Improper use of starting procedure.		Review starting procedure.
Defective aircraft fuel system.	See paragraph 13-3.	See paragraph 13-3.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
ENGINE FAILS TO START (Cont).		
Engine flooded.	See paragraph 12A-68.	See paragraph 12A-68.
Spark plugs fouled or improperly gapped.	Remove and check.	Clean and regap. Replace if defective.
Failure of magneto impulse coupling.	With ignition switch off, rotate propeller by hand and listen for loud click as impulse coupling operates.	Repair or replace magneto.
Defective magneto switch or grounded magneto leads.	Check continuity.	Repair or replace switch or leads.
Defective ignition system.	See paragraph 12A-48.	See paragraph 12A-48.
Excessive induction air leaks.	Check visually.	Correct the cause of air leaks.
Vaporized fuel.	Vaporized fuel is most likely to occur in hot weather with a hot engine.	See paragraph 12A-68.
Defective carburetor.	If engine will start on primer but stops when mixture is placed in full rich position and priming is discontinued, the carburetor is defective.	Repair or replace carburetor.
Water in fuel system.	Open fuel strainer drain valve and check for water.	Drain fuel tank sumps, fuel lines, fuel strainer, and carburetor.
ENGINE STARTS BUT DIES, OR WILL NOT IDLE.		
Defective aircraft fuel system.	See paragraph 13-3.	See paragraph 13-3.
Improper idle speed or idle mixture adjustment.	See paragraph 12A-38.	See paragraph 12A-38.
Spark plugs fouled or improperly gapped.	Remove and check.	Clean and regap. Replace if defective.
Water in fuel system.	Open fuel strainer drain valve and check for water.	Drain fuel tank sumps, fuel lines, fuel strainer and carburetor.
Defective ignition system.	See paragraph 12A-48.	See paragraph 12A-48.
Excessive induction air leaks.	Check visually.	Correct the cause of air leaks.
Vaporized fuel.	Vaporized fuel is most likely to occur in hot weather with a hot engine.	See paragraph 12A-38.
Manual primer leaking.	Disconnect primer outlet line. If fuel leaks through primer, it is defective.	Repair or replace primer.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
ENGINE STARTS BUT DIES, OR WILL NOT IDLE (Cont).		
Leaking float valve or float level set too high.	Perform an idle mixture check. Attempt to remove any rich indication with idle mixture adjustment. If the rich indication cannot be removed, the float valve is leaking or the float level is set too high.	Replace defective parts; reset float level.
Defective carburetor.	If engine will start on primer but stops when mixture is placed in full rich position and priming is discontinued, the carburetor is defective.	Repair or replace carburetor.
Defective engine.	Check compression. Listen for unusual engine noises.	Engine repair is required.
ENGINE RUNS ROUGHLY OR WILL NOT ACCELERATE PROPERLY.		
Restriction in aircraft fuel system.	See paragraph 13-3.	See paragraph 13-3.
Worn or improperly rigged throttle or mixture control.	Check visually.	Rig properly. Replace worn linkage.
Spark plugs fouled or improperly gapped.	Remove and check.	Clean and regap. Replace if defective.
Defective ignition system.	See paragraph 12A-48.	See paragraph 12A-48.
Defective or badly adjusted accelerating pump in carburetor.	Check setting of accelerating pump linkage.	Change accelerating pump adjustment.
Float level set too low.	Check float level.	Reset float level.
Defective carburetor.	If engine will start on primer but stops when mixture is placed in full rich position and priming is discontinued, the carburetor is defective.	Repair or replace carburetor.
Defective engine.	Check compression. Listen for unusual engine noises.	Engine repair is required.
Restricted carburetor air filter.	Check visually.	Clean air filter as outlined in paragraph 2-17.
Cracked engine mount.	Inspect engine mount.	Replace mount.
Defective mounting bushings.	Inspect visually.	Install new mounting bushings.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
POOR IDLE CUT-OFF.		
Worn or improperly rigged mixture control.	Check that idle cut-off stop on carburetor is contacted.	Rig properly. Replace worn linkage.
Manual primer leaking.	Disconnect primer outlet line. If fuel leaks through primer, it is defective.	Repair or replace primer.
Defective Carburetor.	If engine will start on primer but stops when mixture is placed in full rich position and priming is discontinued, the carburetor is defective.	Repair or replace carburetor.
Fuel contamination.	Check all screens in fuel system.	Drain all fuel and flush out fuel system. Clean all screens, fuel lines, fuel strainer, and carburetor.

12A-10. 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 preparing the engine for storage. The following engine removal procedure is based upon the engine being removed from the aircraft with the engine mount attached to the firewall and all engine connections being disconnected at the firewall.

NOTE

Tag each item disconnected to aid in identifying wires, hose, lines, and control linkage when the engine is being 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 valves in the OFF position.
b. Remove engine cowling. (See paragraph 12A-3.)
c. Open battery circuit by disconnecting battery cables(s).
d. Disconnect ignition switch (primary) leads at magnetos.

WARNING

These magnetos DO NOT have internal grounding springs. The magneto is in a SWITCH ON condition when the primary (ignition) lead is disconnected. Ground the magneto breaker points or remove the high tension outlet plate to prevent accidental firing when the propeller is rotated.

e. Drain the engine oil.
f. Remove propeller. (See paragraph 14A-4.)

NOTE

During the following procedures, remove any clamps which secure controls, wires, hose or lines to the engine, engine mount, or attached brackets, so they will not interfere with removal of the engine.

g. Disconnect throttle and mixture control at carburetor. Pull these controls free of engine, using care not to damage them by bending too sharply. Note position, size and number of attaching washers and spacers.
h. Loosen clamps and remove flexible duct from engine baffle and oil cooler duct.
i. Loosen clamps and remove flexible ducts from muffler shroud and heater valve.
j. Disconnect carburetor heat control at airbox and remove clamp attaching control to bracket. Pull control aft to clear engine.
k. Disconnect wires and cables as follows:
   1. Tachometer drive shaft at adapter on engine.
   2. Starter electrical cable at starter.
   3. Electrical wires and wire shielding ground at alternator.
   4. Cylinder head temperature at lower side of cylinder.
   5. Remove all clamps attaching wires or cables to engine. Pull all wires and cables aft to clean engine.
l. Disconnect lines and hose as follows:
   1. Vacuum pump hose at firewall fitting.
   2. Engine breather hose at top of accessory case.

WARNING

Residual fuel and oil draining from disconnected lines and hose is a fire hazard. Use care to prevent accumulation of such fuel and oil.

3. Oil temperature bulb at adapter on engine.
4. Primer line at firewall fitting.
5. Fuel hose at carburetor.
6. Oil pressure line at firewall fitting.
7. Oil cooler hose at oil cooler and firewall.
8. Remove all clamps attaching hose and lines to engine mount and brackets.

m. Attach a hoist to the lifting strap on top of the engine and take up engine weight on hoist.

CAUTION

Place a stand under the tail tie-down fitting before removing the engine. The loss of engine weight will allow the tail to drop. Do not raise the engine higher than necessary when removing the engine-to-mount attach bolts. Raising the engine too high places a strain on the attach bolts and hinders removal.

n. Remove bolts attaching engine-to-engine mount. Balance the engine by hand as the last of these bolts are removed.

CAUTION

Hoist engine slowly and ascertain that all items attaching engine and accessories to the airframe are disconnected.

o. Carefully guide disconnected components out of engine assembly.

12A-11. CLEANING. The engine may be washed down with a suitable solvent, such as Stoddard solvent, or equivalent, then dried thoroughly.

CAUTION

Particular care should be given to electrical equipment before cleaning. Solvent should not be allowed to enter magnetos, starters, alternators, and the like. Hence, these components should be protected before saturating the engine with solvent. Any fuel, oil and air openings on the engine and accessories should be covered before washing the engine with solvent. Caustic cleaning solutions should be used cautiously and should always be properly neutralized after their use.

12A-12. ACCESSORIES REMOVAL. Removal of engine accessories for overhaul or engine replacement involves stripping the engine of parts, accessories, and components to reduce it to the bare engine. During removal, 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 opening. This will prevent entry of foreign particles. If suitable covers are not available, tape may be used to cover the openings.

12A-13. INSPECTION AND REPAIR. For specific items to be inspected refer to the engine manfacturer's manual.

a. Inspect all hose for internal swelling, chafing through protective plys, cuts and breaks, hardening, and loose connections. Excessive heat on hose will cause them to become brittle and easily broken. Hose and lines are most likely to crack or break near the end fittings and support points.

b. Inspect all fittings and mating parts for damaged threads.

c. Visually inspect the engine for loose nuts, bolts, cracks and fin damage.

d. Inspect baffles, baffle seals, and brackets for cracks, deterioration, and breakage.

e. For major repairs, refer to the manufacturer's overhaul and repair manual.

12A-14. ENGINE BUILD-UP. Engine build-up consists of installation of parts, accessories, and components to the basic engine to build-up an engine unit ready for installation on the aircraft. All safety wire, lockwashers, Palnuts, elastic locknuts, gaskets, and rubber connections should be new parts.

12A-15. INSTALLATION. Before installing the engine, install any items that 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 assembly to a point near the engine mount.

b. Route controls, lines, and hose in place as the engine is positioned near the mount.

c. Install engine-to-mount bolts. Install shock mounts as shown in figure 12A-2. Tighten engine-to-mount bolts to the torque value shown in figure 12A-2.

d. Remove hoist and support stand placed under tail tie-down fitting.

e. Route throttle, mixture, and carburetor heat controls to the carburetor and airbox and connect. Secure controls in position with clamps.

NOTE

Throughout the aircraft fuel system, from the tanks to the carburetor, use Parker Sealube (or equivalent) as a thread lubricant or to seal a leaking connection. Apply lubricant sparingly to male fitting threads only, omitting the first two threads. Always be sure that a compound, the residue from a previously used compound, or any other foreign material cannot enter the system.

f. Connect lines and hose as follows:
1. Oil cooler hose at oil cooler on firewall.
2. Oil pressure line at firewall fitting.

3. Fuel hose at carburetor.
4. Primer line at firewall fitting.
5. Oil temperature bulb at adapter on engine.
6. Engine breather hose at top of accessory case.
7. Vacuum pump hose at firewall fitting.
8. Install clamps attaching hose and lines to engine mount and brackets.

g. Connect wires and cables as follows:
1. Cylinder head temperature at lower side of cylinder.
2. Electrical wires and wire shielding ground at alternator.
3. Starter electrical cable at starter.
4. Tachometer drive shaft at adapter on engine. Be sure drive cable engages drive in adapter. Torque housing attach nut to 100 lb-in.
5. Install clamps securing wires and cables to engine, engine mount, and brackets.

h. Install flexible duct to heater valve and baffle, and duct to heater valve and muffler shroud. Tighten clamps.

i. Install flexible duct to engine baffle and oil cooler shroud. Tighten clamps.

j. Install propeller and spinner. (Refer to paragraph 14A-5.)

k. Make a magneto switch ground-out and continuity check. Connect ignition switch (primary) leads to magnetos. Remove temporary ground.

WARNING

Be sure magneto switch is in OFF position before connecting switch (primary) leads to magnetos.

l. Service engine with proper grade and quantity of engine oil. Refer to Section 2 if engine is new, newly overhauled, or has been in storage.

m. Make sure all switches are in the OFF position, and connect battery cables.

n. Rig throttle, mixture, and carburetor heat controls in accordance with paragraph 12A-53 through 12A-56.

o. Check engine installation for security, correct routing of controls, lines, hose, and electrical wiring, proper safetying, and tightness of all components.

p. Install engine cowling. Be sure all hot and cold air ducts are connected.

q. Perform engine run-up and make final adjustments on engine controls.

12A-16. BAFFLES.

12A-17. 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.

12A-18. 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.

12A-19. 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.

12A-20. 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.

12A-21. ENGINE MOUNT.

12A-22. 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 airframe. The engine is attached to the engine mount with shock-mount assemblies which absorb engine vibrations and prevent transmission of these vibrations to the airframe.

12A-23. REMOVAL AND INSTALLATION. Replacement of the engine mount necessitates removal of the engine, followed by removal of the bolts attaching the mount to the fuselage at the firewall. When installing engine mount, tighten mount-to-fuselage bolts, and engine mount-to-engine bolts to the torque value shown in figure 12A-2.

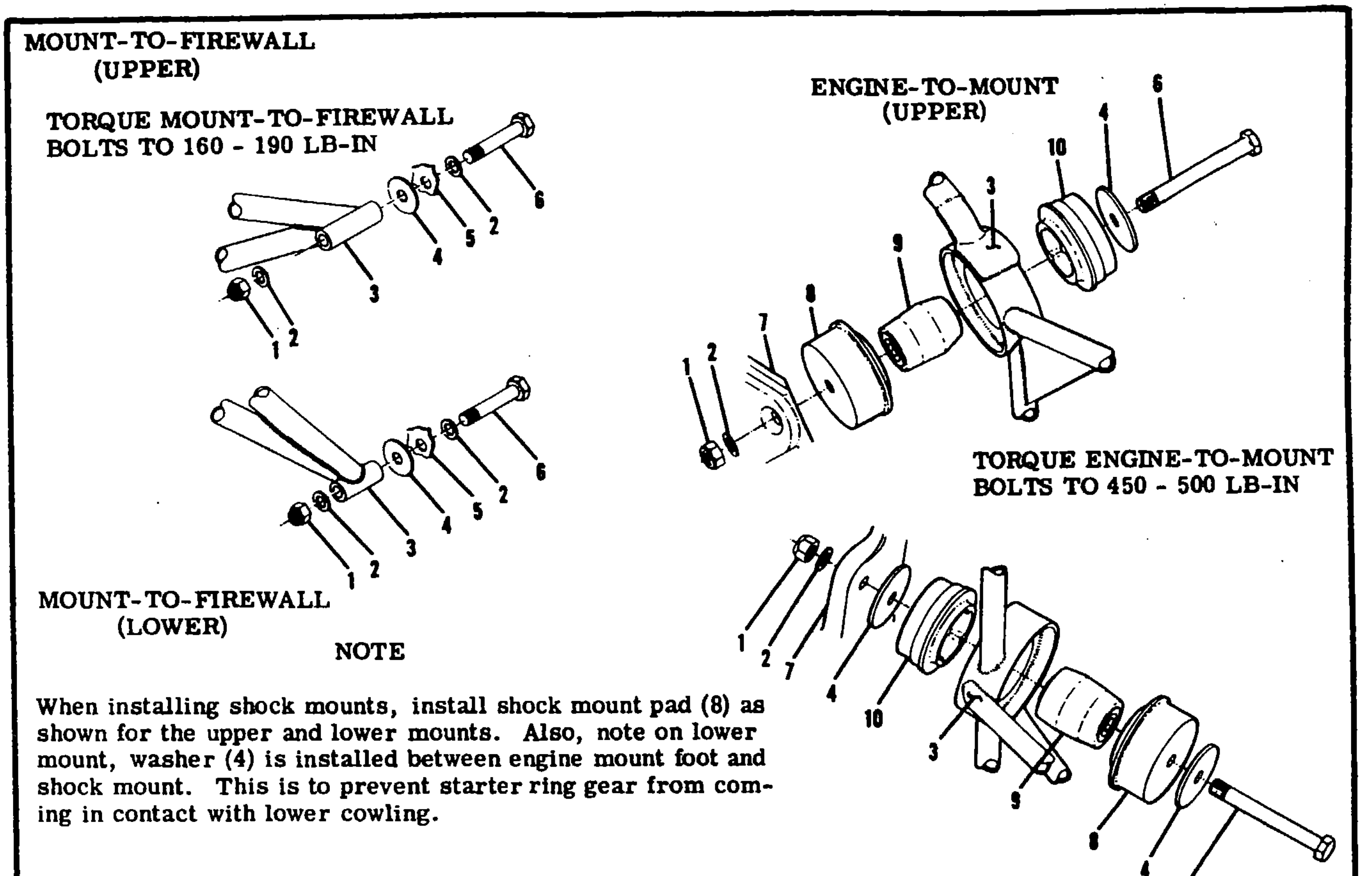
12A-24. REPAIR. Repair of the engine mount should be performed carefully as outlined in Section 19 of the Service Manual. The mount should be painted with heat-resistant black enamel after welding or whenever the original finish has been removed.

12A-25. 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 all parts that show evidence of wear or damage.



NOTE

When installing shock mounts, install shock mount pad (8) as shown for the upper and lower mounts. Also, note on lower mount, washer (4) is installed between engine mount foot and shock mount. This is to prevent starter ring gear from coming in contact with lower cowling.

1. Nut
2. Washer
3. Engine Mount
4. Washer
5. Firewall
6. Bolt
7. Engine Mount Foot
8. Shock Mount Pad
9. Shock Mount Dampener
10. Shock Mount Pad

Figure 12A-2. Engine Mount Details

12A-26. ENGINE OIL SYSTEM.

12A-27. The engine lubricating system is of the full pressure, wet sump type. The main bearings, connecting rod bearings, camshaft bearings, valve tappets, and push rods, are lubricated by positive pressure. The pistons, piston pins, cams cylinder walls, valve rockers, valve stems, and other moving parts are lubricated by oil collectors and oil spray. The oil pump, which is located in the accessory housing, draws oil through a drilled passage leading from the oil suction screen located in the sump. From the pump, the oil enters a drilled passage to a threaded connection and through a flexible hose to the oil cooler. Pressure oil from the oil cooler returns through a flexible hose to a threaded connection on the accessory housing. From there the oil flows through a drilled passage to the oil pressure screen which is contained in a cast chamber mounted on the accessory housing. If cold oil or obstruction should restrict the flow of oil through the cooler, an oil cooler bypass valve is provided to pass the pressure oil directly from the oil pump to the oil pressure screen. The oil is then filtered through the oil pressure screen chamber and fed through a drilled passage to the oil pressure relief valve which is located in the upper right side of the crankcase forward of the accessory housing. This relief valve regulates the engine oil pressure by allowing excessive oil to return to the sump, while the balance of the pressure oil is fed to the main oil gallery in the right half of the crankcase. The oil is distributed from the main gallery by means of a separate drilled passage to each main bearing of the crankshaft. The drilled passages to the bearings are located in such a manner as to form an inertia type filter, thus ensuring that only the cleanest oil will reach the bearings. Drilled passages from the rear main bearing supply pressure oil to the crankshaft idler gears. Angular holes are drilled through the main bearings to the rod journals where sludge removal tubes are located. Oil from the main gallery also flows to the cam and valve gear passages, and then is conducted through branch passages to the hydraulic tappets and camshaft bearings. Oil travels out through the hollow push rods to the valve rocker bearings and valve stems. Residual oil from the bearings, accessory drives, and rocker boxes flows by gravity to the sump where it passes through the suction screen and is re-circulated through the engine. The oil cooler is controlled by a thermostat valve. An external, replaceable element oil filter is available as optional equipment. This external filter replaces the pressure oil screen when installed.

12A-28. TROUBLE SHOOTING.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
NO OIL PRESSURE.		
No oil in sump.	Check with dipstick.	Fill sump with proper grade and amount of oil.
Oil pressure line broken, disconnected, or pinched.	Inspect oil pressure line.	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 another gage. If second reading is normal, airplane gage is defective.	Replace gage.
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 reinstall; replace if defective.
LOW OIL PRESSURE.		
Low viscosity oil.		Drain oil and refill sump with proper grade of oil.
Low oil level.	Check with dipstick.	Fill sump to proper level with proper grade of oil.
Oil pressure relief valve spring weak or broken.	Remove and check spring.	Replace weak or broken spring.
Defective oil pump.	Check oil temperature and oil level. If temperature is higher than normal and oil level is correct, internal failure is evident.	Examine engine. Metal particles from damaged oil pump may have entered engine oil passages.
Secondary result of high oil temperature.	Observe oil temperature gage for high indication.	Determine and correct reason for high oil temperature.
Leak in suction line or pressure line.	Check gasket between accessory housing and crankcase.	Engine repair is needed.
Dirty oil suction and/or pressure screen.	Inspect oil screens.	Remove and clean suction pressure oil screens.
HIGH OIL PRESSURE.		
High viscosity oil.		Drain oil and refill sump with proper grade and amount of oil.
Relief valve defective.	Remove and check for dirty or defective parts.	Clean and reinstall; replace if defective.
Defective oil pressure gage.	Check oil pressure with another gage.	Replace oil pressure gage.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
HIGH OIL TEMPERATURE.		
Oil cooler thermostat defective.	Feel front of cooler core with hand. If core is cold, oil is bypassing cooler.	Replace thermostat.
Oil cooler air passages clogged.	Inspect cooler core.	Clean air passages.
Oil cooler oil passages clogged.	Attempt to drain cooler. Inspect any drainings for sediment.	Clean oil passages.
Oil congealed in oil cooler.	This condition can only occur in extremely cold temperatures.	If congealing is suspected, use external heater or a heated hangar to thaw the congealed oil.
Secondary effect of low oil pressure.	Observe oil pressure gage for low indication.	Determine and correct reason for low oil pressure.
Defective oil temperature gage.	Check with another gage. If second reading is normal, airplane gage is defective.	Replace gage.
Defective oil temperature bulb.	Check for correct oil pressure, oil level and cylinder head temperature. If they are correct, check oil temperature gage for being defective; if a similar reading is observed, bulb is defective.	Replace temperature bulb.
LOW OIL TEMPERATURE.		
Defective oil temperature bulb or gage.	Check with another gage. If reading is normal, airplane gage is defective. If reading is similar, temperature bulb is defective.	Replace defective part.
Oil cooler thermostat defective or stuck closed.	Remove valve and check for proper operation.	Replace thermostat.

12A-29. OIL COOLER. The fin and plate oil cooler is mounted on the right firewall and receives its cooling air from the engine compartment. Oil under pressure from the oil pump enters the inboard side of the cooler, passes through the cooler and back to the engine. A thermostatically operated oil cooler bypass valve, installed in the oil pressure screen mounted pad or external filter adapter, causes oil to bypass the cooler in the event of congealed oil or an obstruction in the cooler. The bypass valves passes the oil directly to the pressure screen or external filter until a predetermined oil temperature is reached, then the oil is routed through the cooler to be cooled.

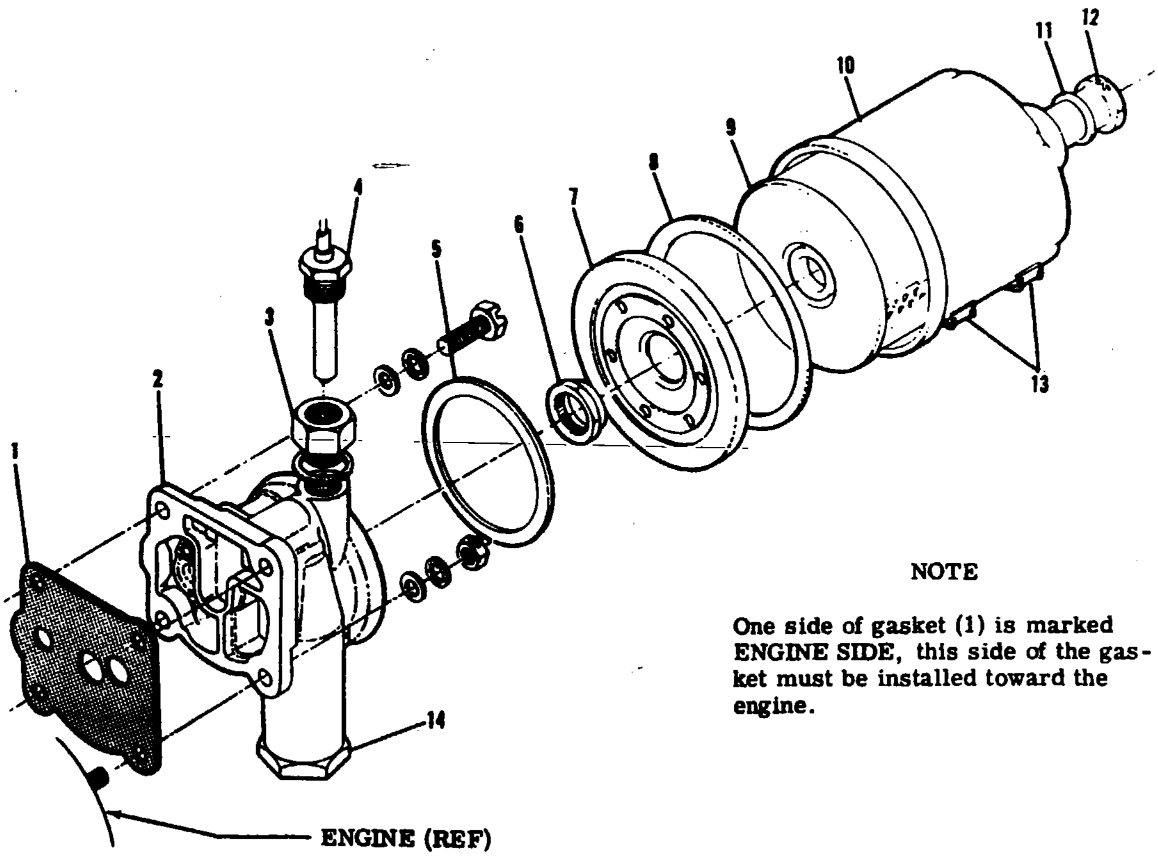
12A-30. FULL-FLOW OIL FILTER. An optional external oil filter may be installed on the engine. The filter and filter adapter replace the regular engine oil pressure screen and cast chamber on the accessory case. The adapter incorporates mounting provisions for the thermostatic oil cooler bypass valve and oil temperature bulb. If the filter element should become clogged, the bypass valve allows engine oil to flow to the engine oil passages.

12A-31. FILTER ELEMENT REPLACEMENT. (See figure 12A-3.)

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 from airplane, discarding gasket.
c. Remove nylon nut from hollow stud at top of lid and press downward on stud to remove.
d. Lift lid off filter can, discarding gasket.



NOTE

One side of gasket (1) is marked ENGINE SIDE, this side of the gasket must be installed toward the engine.

1. Gasket
2. Adapter
3. Oil Temperature
4. Oil Temperature Bulb
5. Gasket
6. Nylon Nut
7. Lid
8. Gasket
9. Filter Element
10. Filter Can
11. Copper Gasket
12. Hollow Stud
13. Safety Wire Tab
14. Thermostatic Valve

Figure 12A-3. Full-Flow Oil Filter

e. Pull filter element out of can.

NOTE

Before discarding removed filter element, remove the outer perforated paper cover; using a sharp knife, cut through the folds of the filter element at both ends, close to the metal caps. Then, carefully unfold the pleated element and examine the material trapped in the filter element for evidence of internal engine damage such as chips or particles from bearings. In new or newly overhauled engines, some small particles or metallic shavings might be found, these are generally of no consequence and should not be confused with particles produced by impacting, abrasion, or pressure. Evidence of internal engine damage found in the oil filter element justifies further examination to determine the cause.

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 the correct amount of torque is applied to the filter attaching stud. If the stud is undertorqued, oil leakage will occur. If the stud is over-torqued, the filter can may be deformed, again causing oil leakage.

Lubricate rubber grommets in new filter element, 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, place a straightedge across bottom of filter can. Check for a distortion or out-of-flat condition greater than 0.010 inch. Replace if either of these conditions exists.

After installing a new gasket on lid, turn it upside down. If gasket falls, replace gasket and repeat test. If this gasket falls off, replace lid.

g. Inspect adapter gasket seat for gouges, deep scratches, wrench marks, and mutilation. If any of these are found, replace adapter.
h. Place new element in can and insert stud with new metal gasket in place, through the can and element.
i. Position new gasket inside flange of lid. Place lid in position and install nylon nut. The nylon nut should be snugly seated against lid by finger-tightening. The nylon nut must not protrude above the metal surface of the lid.
j. Install filter assembly on adapter with safety wire tabs on can down. Holding can to prevent it from turning, tighten stud and torque to 20-25 lb-ft, using a torque wrench.
k. Reinstall parts removed for access, and service the engine with proper grade and quantity of oil. One additional quart of oil is required each time the element is replaced.
l. Start engine and check for proper oil pressure. Check for leaks after warming up engine.
m. Again check for leaks after engine has been run at a high power setting (preferably a flight around the field).
n. Check to make sure filter has not been making contact with adjacent parts due to engine torque.
o. While engine is still warm, recheck torque on stud, then safety stud to bracket on filter can, and safety thermostatic valve to bracket on filter can.

12A-32. FILTER ADAPTER REMOVAL. (See figure 12A-3.)
a. Remove filter assembly as outlined during element replacement.
b. Remove oil temperature bulb from adapter.
c. Remove three bolts and washers attaching adapter to accessory case.
d. Remove nut and washers attaching lower left corner of adapter to accessory case and remove adapter.
e. Remove gasket from mounting pad and discard.

12A-33. DISASSEMBLY, INSPECTION, AND ASSEMBLY OF FILTER ADAPTER. After removal of the adapter, remove thermostatic valve for cleaning. Do not disassemble thermostatic valve. Clean adapter and thermostatic valve in cleaning solvent and dry with compressed air. Ascertain that all passages in adapter are open. Remove any gasket material that may have adhered to adapter. Inspect adapter for cracks, damaged threads, scratches or gouges to adapter gasket seats. If any of these are found replace adapter. Using a new gasket, install thermostatic valve in adapter.

12A-34. FILTER ADAPTER INSTALLATION.
a. Using a good grade of gasket sealent, install a new gasket on accessory case mounting pad. Note that one side of the gasket is marked ENGINE SIDE; this side of the gasket must be installed toward the engine.
b. Install adapter on mounting pad and install bolts, washers and nut. Use plate washer between the lockwasher on bolt or nut.
c. Tighten bolts and nut to 75 lb-in.
d. Install oil temperature bulb.
e. Install filter element as outlined in paragraph 12A-31.
f. Install any components removed for access.

12A-35. ENGINE FUEL SYSTEM.

12A-36. The engine is equipped with a carburetor of the single barrel, float type. This carburetor is equipped with a manual mixture control, and an idle cut-off. It will be found mounted in the standard up-draft position on the bottom of the sump. For repair and overhaul of the carburetor refer to the manufacturer's overhaul and repair manual.

12A-37. CARBURETOR REMOVAL AND INSTALLATION.
a. Place fuel valve in OFF position.
b. Remove engine cowling.
c. Disconnect throttle and mixture controls at carburetor. Note position, and size of washers and spacers so that they may be installed in the same position.
d. Disconnect and cap or plug fuel line at carburetor.
e. Remove induction airbox.
f. Remove nuts and washers attaching carburetor to intake manifold and remove carburetor.
g. Installation of the carburetor is the reversal of the preceding steps. Use new gaskets between carburetor and intake manifold.

12A-38. IDLE SPEED AND MIXTURE ADJUSTMENT should be accomplished after the engine has been warmed up. Since idle rpm is affected by idle mixture, it will be necessary to readjust the idle rpm after setting the idle mixture.
a. Set the throttle stop screw to obtain between 500 and 600 rpm, with throttle closed.

NOTE

Engine idle speed will vary among different engines. An engine should idle smoothly, without excessive vibrations, 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.

b. Advance throttle to increase engine speed to 1000 rpm.
c. Pull mixture control knob slowly and steadily toward idle cut-off position, observing tachometer, then return control to full in position before engine stops.

d. Adjust mixture adjusting screw at upper end of carburetor intake throat to obtain a slight and momentary gain of 25 rpm maximum at 100 rpm engine speed as mixture control is moved from full in toward idle cut-off position.
e. If mixture is set too LEAN, engine speed will drop immediately, thus requiring a richer mixture. Turn adjusting screw out counterclockwise for richer mixture.
f. If mixture is set too RICH, engine speed will increase above 25 rpm, thus requiring a leaner mixture. Turn adjusting screw in (clockwise) for leaner mixture.

NOTE

After each adjustment to the idle mixture, run engine up to approximately 2000 rpm to clear engine of excess fuel and obtain a correct idle speed.

12A-39. INDUCTION AIR SYSTEM.

12A-40. Ram air to the engine enters the induction airbox through an opening in the forward part of the lower engine cowling nose cap. The air is filtered through a filter which is located at the opening in the nose cap. From the induction airbox the air is directed to the inlet of the carburetor, mounted on the lower side of the engine oil sump, through the carburetor to the center zone induction system, which is integral with the oil sump. From the center zone system, the fuel-air mixture is distributed to each cylinder by separate steel intake pipes. The intake pipes are attached to the center zone risers with hose and clamps and to the cylinder with a two bolt flange which is sealed with a gasket. The induction airbox contains a valve, operated by the carburetor heat control in the cabin, which permits air from an exhaust heated source to be selected in the event carburetor icing or filter icing should be incountered.

12A-41. REMOVAL AND INSTALLATION.
a. Remove cowling as required for access.
b. Mark the intake pipes as they are removed from the engine so they may be reassembled in the same location from which they are removed.
c. Loosen hose clamps and side hose connection from sump.
d. Remove two nuts, washers, and lock washers at cylinder.
e. Remove intake pipe and clean gasket from cylinder mounting pad and intake pipe flange.
f. Installation of the intake pipes is the reversal of the removal. Use new gasket when installing and install pipes in the same location from which they were removed.

12A-42. IGNITION SYSTEM.

12A-43. Sealed, lightweight Slick magnetos are used on the aircraft. Magneto Model No. 4051 incorporating an impulse coupling is used as the left magneto, while magneto Model No. 4050 (direct drive) is used as the right magneto. These magnetos MUST NOT BE DISASSEMBLED. Internal timing is fixed and breaker points are not adjustable. Timing marks are provided on the distributor gear and distributor block, visible through the air vent holes, for timing to the engine. A timing hole is provided in the bottom of the magneto adjacent to the magneto flange. A timing pin (or 0.093 inch 6-penny nail) is inserted through this timing hole into the mating hole in the rotor shaft to lock the magneto approximately in the proper firing position.

During all magneto maintenance always take proper precautions to make sure the engine cannot fire or start when the propeller is moved.

12A-44. MAGNETO REMOVAL. Remove high-tension outlet plate, disconnect capacitor lead (ignition switch lead), and remove nuts and washers securing magneto to the engine. Note the approximate angular position at which the magneto is installed, then remove the magneto from engine.

12A-45. INTERNAL TIMING. Internal timing is accomplished during manufacture of the magneto. Since these magnetos are NOT TO BE DISASSEMBLED, there is no internal timing involved.

12A-46. REPLACEMENT INTERVAL. It is recommended that these magnetos be replaced at engine overhaul periods.

12A-47. MAGNETO INSTALLATION AND TIMING TO ENGINE. The magneto must be installed with its timing marks correctly aligned, with number one cylinder on its compression stroke, and with the number one piston at its advanced firing position. Refer to paragraph 12A-8 for the advanced firing position of number one piston. To locate the compression stroke of the number one cylinder, remove the lower spark plug from number 2, 3 and 4 cylinders. Remove the upper spark plug from number 1 cylinder and then place the thumb of one hand over the spark plug hole of number one cylinder and rotate crankshaft in the direction of normal rotation until the compression stroke is indicated by positive pressure inside the cylinder lifting the thumb off the spark plug hole. After the compression stroke is attained, locate number one piston at its advanced firing position. Locating the advanced firing position of number one pistion may be obtained by rotating the crankshaft opposite to its normal direction of rotation until it is approximately 30 degrees before top dead center (BTC) on the compression stroke of number one cylinder. Rotate crankshaft in a normal direction of rotation to align the timing mark on the front face of the starter ring gear support with the drilled hole in the starter, making sure the final motion of the ring gear is in direction of normal rotation.

NOTE

The starter ring gear must always be in this position when either magneto is locked in position.

When the cylinder is in the correct firing position, install and time the magneto to the engine in the following manner.

NOTE

Install the magneto drive coupling retainer and rubber bushings into the magneto drive gear hub slot. Insert the two rubber bushings into the retainer with chamfered edges toward the operator when looking into the magneto mount pad on the engine.

a. Remove the ventilating plug from the bottom of the magneto. The ventilating plug in the top of the magneto need not be removed.

b. Rotate magneto shaft until timing marks is visible through the ventilation plug hole.

c. Establish that the magneto is at the number one firing position. It is possible for the timing mark to be visible while firing position is 180 degrees from number one firing position.

NOTE

It is necessary to "spark" the magneto to establish the correct firing position. The outlet plate with the spark plug leads must be installed. Hold number one spark plug lead (see figure 12A-4) close to magneto case, or ground the magneto and hold the number one spark plug lead close to a good ground. Rotate impulse coupling (left magneto) or drive coupling (right magneto) in normal direction of rotation until a spark occurs at this lead. (Impulse coupling pawls must be depressed to turn magneto shaft in normal direction of rotation.) Turn coupling or drive coupling backwards a few degrees, until timing mark is centered in ventilating plug hole and install timing pin (or 0.096 inch 6-penny nail) through hole in bottom of magneto next to flange and into mating hole in the rotor shaft. This locks the magneto approximately in firing position while installing on the engine.

d. If timing pin is not used, keep timing mark centered in ventilating plug hole during magneto installation.

e. Be sure magneto gasket (right magneto), magneto adapter and gaskets (left magneto) are in place and that the engine is in the correct firing position, then install magneto(s) approximately at the angle noted during removal, tighten mounting nuts finger tight.

NOTE

Remove timing pin (or nail) from magneto, if installed. Be sure to remove this pin before rotating propeller.

f. Connect a timing light to the capacitor (primary lead) terminal at the rear of the magneto and to a good ground.

g. Rotate propeller opposite to normal direction of rotation a few degrees (approximately 5 degrees) to close magneto contact points.

NOTE

Do not rotate propeller back far enough to engage impulse coupling, or propeller will have to be rotated in normal direction of rotation until impulse coupling releases, then again backed up to a few degrees before the firing position.

h. 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 advanced firing position of number one cylinder. Loosen mounting nuts slightly and rotate magneto case to cause the contacts to break at the correct position. Tighten mounting nuts.

i. After tightening magneto mounting nuts, recheck timing. Make sure both magnetos are set to fire at the same time. Remove timing equipment, install spark plugs, and connect spark plug leads and ignition switch leads.

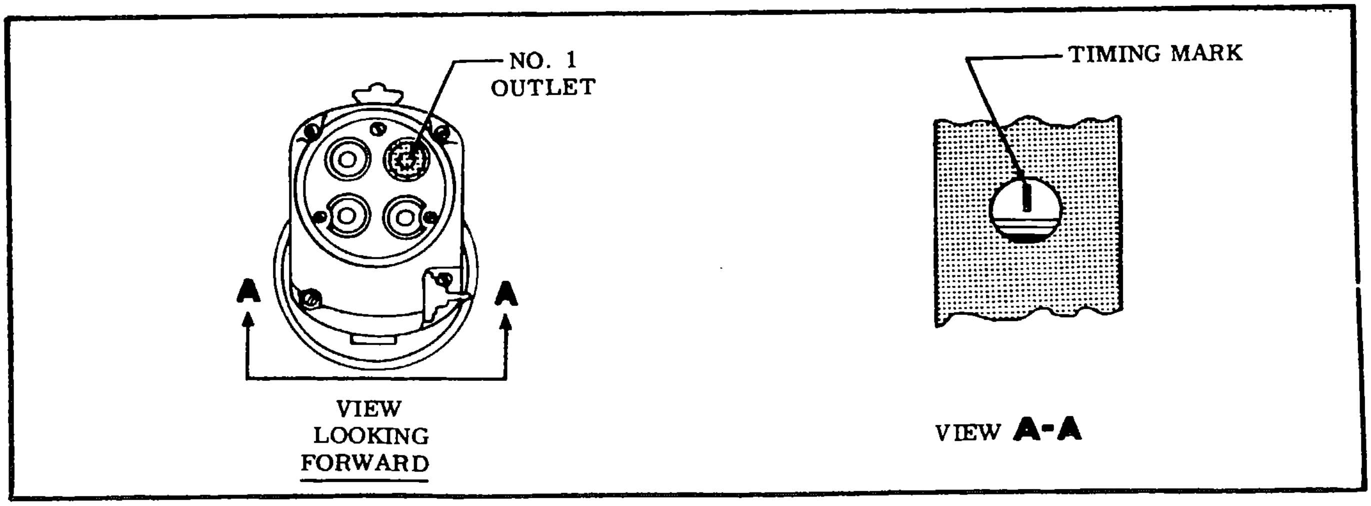


Figure 12A-4. No. 1 Magneto Outlet

NOTE

Beginning with the number one outlet, the magneto fires at each successive outlet in a counterclockwise direction, looking at the outlets. Connect number one magneto outlet to number one cylinder spark plug lead, number two outlet to the next cylinder to fire, etc. Engine firing order is listed in paragraph 12A-8.

12A-48. MAINTENANCE. Magneto-to-engine timing should be checked at the first 50 hours, first 100 hours, and thereafter at each 200 hours. If timing to the engine is not within plus zero degrees and minus two degrees, the magneto should be retimed 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.

a. Remove high-tension outlet plate and check distributor block for moisture.
b. If any moisture is evident, lightly wipe with a soft, dry, clean, lint-free cloth. Install outlet plate.

NOTE

Since these magnetos MUST NOT BE DISASSEMBLED, a new magneto should be installed if the moisture check does not remedy the trouble.

12A-49. SPARK PLUGS. Two 18-mm spark plugs are installed in each cylinder and screw into heli-coil type thread inserts. The spark plugs are shielded to prevent spark plug noise in the radios and have an internal resistor to provide longer terminal life. Spark plug life will vary with operating conditions. A spark plug that is kept clean and properly gapped will give better and longer service than one that is allowed to collect lead deposits and is improperly gapped. The correct gap setting is given in paragraph 12A-8.

NOTE

At each 100-hour inspection, remove, clean, inspect, and regap all spark plugs. Install lower spark plugs in upper portion of cylinders and install upper spark plugs in lower portion of cylinders at each 100-hour inspection. Since deterioration of lower spark plugs is usually more rapid than that of the upper plugs, rotating helps prolong spark plug life.

12A-50. ENGINE CONTROLS.

12A-51. Engine controls of the push-pull type include the throttle, mixture, and carburetor heat control. The engine controls are equipped with position-locking devices which prevent vibration-induced "creeping" of the controls.

NOTE

Some controls have intricate parts that will fall out and possibly be lost if the control is pulled from the housing while the control is disconnected.

12A-52. RIGGING. When adjusting any engine control, it is important to check that the control slides smoothly throughout its full range of travel, that it locks securely if equipped with a locking device, and the arm or lever it operates moves through its full arc of travel.

CAUTION

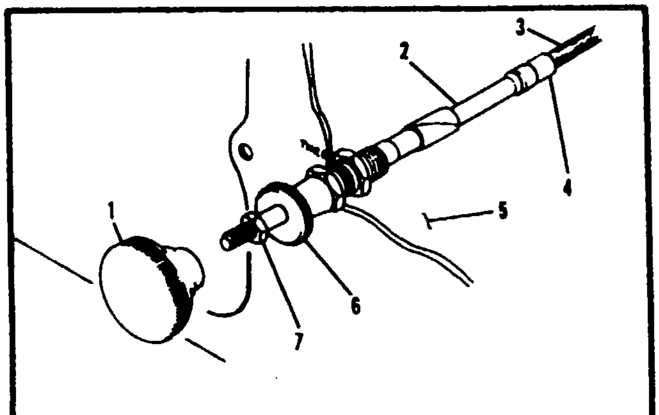
Whenever engine controls are being disconnected, pay particular attention to the exact position, size and number of attaching washers and spacers. Be sure to install attaching parts as noted when connecting controls.

12A-53. THROTTLE CONTROL.

NOTE

Before rigging throttle control shown in figure 12A-5, check that staked connection (4) between rigid conduit (2) and flexible conduit (3) is secure. If any indication of looseness or breakage is apparent, replace the throttle control before continuing with the rigging.

a. Pull throttle control out (idle position) and remove throttle control knob (1).
b. Screw jam nut (7) all the way down (clockwise) and install throttle knob. Screw the knob securely against the jam nut. Do not back jam nut out. This will prevent bottoming and possible damage to the staked connection.
c. Disconnect throttle control at the carburetor throttle arm, push throttle control in until jam nut hits friction lock (6) while the friction lock is loose,



1. Knob
2. Rigid Conduit
3. Flexible Conduit
4. Staked Connection
5. Instrument Panel
6. Friction Lock
7. Jam Nut

Figure 12A-5. Throttle Control

then pull control out approximately 1/8 inch for cushion. Note position of large washer at carburetor end of control. Install washer in same position when connecting control to arm.

d. Tighten friction lock (6), being careful not to change position of the throttle.

e. Move throttle arm on carburetor to full open, adjust rod end at end of throttle control to fit, and connect to arm on carburetor.

f. Release friction lock and check full travel of arm on carburetor. If further adjustment is required, make all adjustment at the carburetor end of control. DO NOT change jam nut (7) setting.

g. Tighten rod end locknuts at carburetor end of control. Be sure to maintain sufficient thread engagement between rod end and control.

12A-54. MIXTURE CONTROL.

a. Push mixture control full in, unlock then pull it out approximately 1/8 inch for cushion.

b. Loosen clamp securing the control to the engine.

c. Shift control housing in the clamp so that the mixture arm on the carburetor is in the full open (RICH). Tighten the clamp in this position.

d. Unlock and pull mixture control full out. Check that idle mixture arm on carburetor is full closed (IDLE CUT-OFF).

e. Check that the bolt and nut at the mixture arm on carburetor secures the control wire and that the bolt will swivel in the arm.

f. Bend the wire tip 90 degrees to prevent it from being withdrawn if the attaching nut should become loose.

g. When installing a new control, it may be necessary to shorten the wire and/or control housing.

h. The mixture arm on the carburetor must contact the stops in each direction, and the control should have approximately 1/8 inch cushion when pushed full in.

12A-55. CARBURETOR HEAT CONTROL.

a. Loosen clamp securing the control to the bracket on engine.

b. Push control full in, then pull it out approximately 1/8 inch from panel for cushion.

c. Shift control housing in its clamp so that the valve in the airbox is seated in the full open position. Tighten clamp in this position.

d. Pull out on the control and check that the air valve inside the airbox seats in the opposite direction.

e. Check that bolt and nut on the air valve lever secures the control wire and that the bolt will swivel in the lever.

f. Bend the wire tip 90 degrees to prevent it from being withdrawn if the attaching nut should become loose.

12A-56. STARTING SYSTEM.

12A-57. The starting system employs an electric starter motor mounted at the front (propeller end) lower left side of the engine. A starter solenoid is activated by the ignition key on the instrument panel. When the solenoid is activated, its contacts close and electrical current energizes the starter motor. Initial rotation of the starter armature shaft, engaged with the reduction gear, drives the Bendix shaft and pinion. When the armature turns the reduction gear, the Bendix drive pinion meshes with the crankshaft ring gear assembly by inertia and action of the screw threads within the Bendix sleeve. A detent pin engages in a notch in the screw threads which prevents demeshing if the engine fails to start when the starting circuit is de-energized. When the engine reaches a predetermined speed, centrifugal action forces the detent pin out of the notch in the screw shaft and allows the pinion to demesh from the ring gear.

12A-58. TROUBLE SHOOTING STARTER SYSTEM.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
STARTER WILL NOT OPERATE.		
Defective master switch or circuit.	Check master circuit.	Repair circuit.
Defective starter switch or switch circuit.	Check switch circuit continuity.	Replace switch or wires.
Defective starter.	Check through items above. If another cause is not apparent, starter is defective.	Remove and repair or replace starter.
STARTER MOTOR RUNS, BUT DOES NOT TURN CRANKSHAFT.		
Defective Bendix drive.	Remove starter and check Bendix drive.	Replace defective parts.
Damaged starter pinion gear or ring gear.	Remove starter and check pinion gear and ring gear.	Replace defective parts.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
STARTER DRAGS.		
Low battery.	Check battery.	Charge or replace battery.
Starter switch or relay contacts burned or dirty.		Replace with serviceable unit.
Defective starter power cable.	Check cable.	Replace cable.
Defective starter.	Check starter brushes, brush spring tension, thrown solder on brush cover.	Repair or replace starter.
Dirty, worn commutator.	Clean, check visually.	Turn down commutator.
STARTER EXCESSIVELY NOISY.		
Worn starter pinion.	Remove and examine pinion.	Replace starter drive.
Worn or broken teeth on ring gear.	Rotate propeller to examine ring gear.	Replace ring gear.

12A-59. REMOVAL AND INSTALLATION.

a. Remove engine cowling as required for access.

b. Disconnect electrical cable at starter motor. Insulate the disconnected cable terminal as a safety precaution.

c. Remove three nuts and washers and one bolt securing starter to crankshaft. Work starter from engine.

d. To install starter, position starter on mounting pad aligning dowel pins in starter mounting pad with holes in mounting pad on engine.

e. Secure starter with washer, lockwasher and nut, three places, and install bolt and washers.

f. Tighten nuts and bolt evenly to a torque value of 150 lb-in.

g. Connect electrical cable to starter terminal and install engine cowling.

12A-60. PRIMARY MAINTENANCE of the starter includes replacing brushes and brush springs, cleaning dirty commutator and turning down burned or out-of-round commutator.

NOTE

No lubrication is required on the starter motor except at overhaul. Never lubricate the commutator. For overhaul of the starter, refer to the manufacturer's service publications.

Starter brushes should be replaced when worn to one-half or less of their original length (compare with a new brush). Brush spring tension should be sufficient to hold brush in form contact with the commutator. Brush leads should be unbroken, with their terminal screws tight. A glazed or dirty commutator can be cleaned by holding a strip of No. 00 or No. 000 sandpaper or a brush seating stone against it. Move the sandpaper or stone back and forth across the commutator to avoid wearing a groove. Do not use emery paper or carborundum because of their possible shorting action.

CAUTION

Never operate the starting motor more than 12 seconds at a time without allowing it to cool.

Roughness, out-of-roundness, or high mica may necessitate turning down the commutator. After the turning operation, the mica should be undercut. Blow out all dust after the commutator is cleaned.

12A-61. EXHAUST SYSTEM. The exhaust system consists of an exhaust pipe from each cylinder to the muffler located beneath the engine. The muffler assembly is enclosed in a shroud which captures exhaust heat that is used to heat the aircraft cabin. A shroud on number three exhaust pipe is used to capture heat for carburetor heat at the engine intake system. The tailpipe welded to the muffler routes exhaust gases overboard.

12A-62. REMOVAL.

a. Remove engine cowling for access.

b. Disconnect flexible ducts from shrouds on muffler assembly and exhaust pipe.

c. Remove nuts, bolts, washers, and clamps attaching exhaust pipes to muffler assembly.

d. Loosen nuts attaching exhaust pipes to the cylinders and remove muffler assembly.

e. Remove nuts and washers attaching exhaust pipes to the cylinders and remove pipes and gaskets.

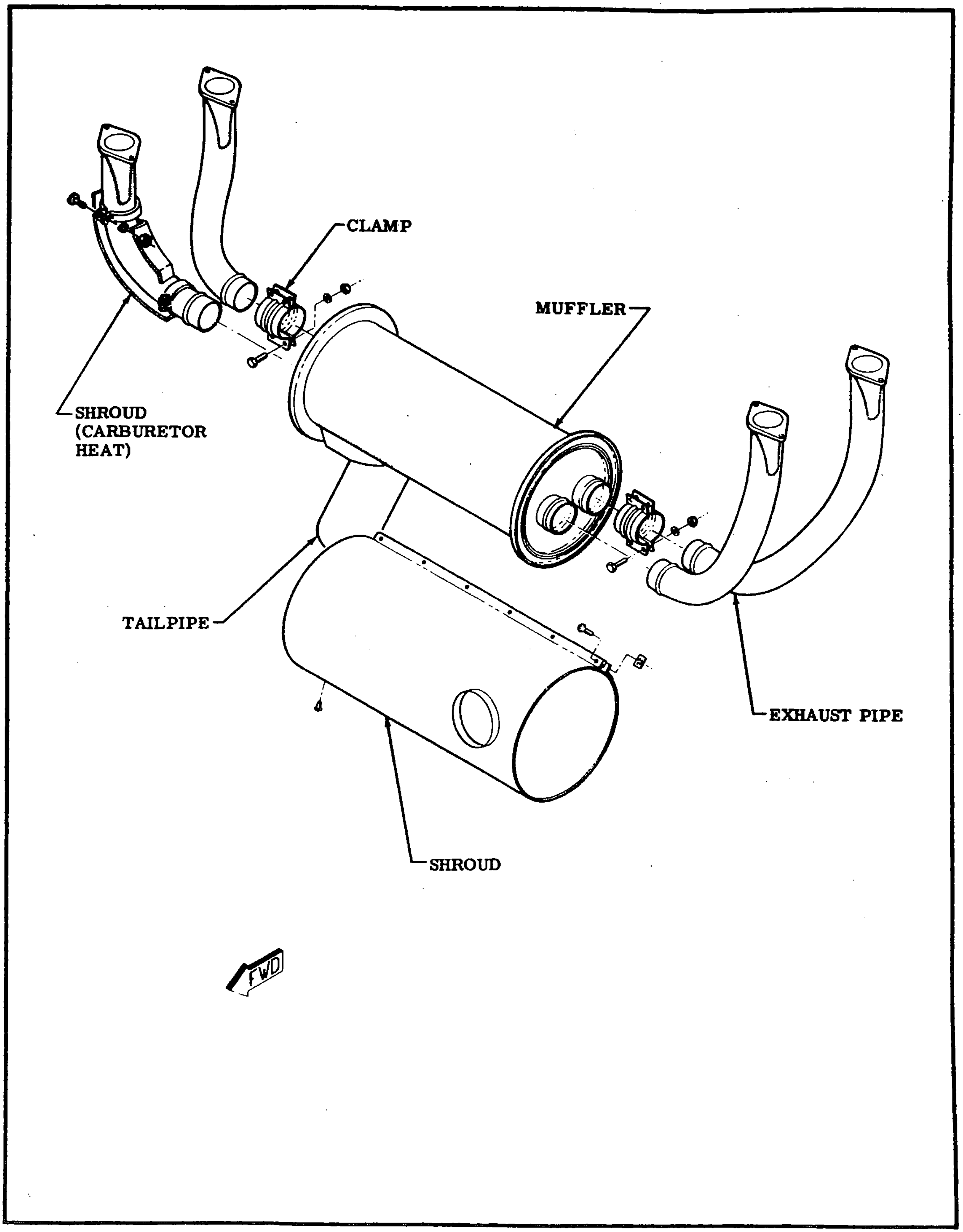


Figure 12A-6. Exhaust System

12A-63. INSPECTION of the exhaust system should be thorough because the cabin heating system uses air heated by the heat exchanger of the exhaust system. Since exhaust systems of this type are subject to burning, cracking, and general deterioration from alternate thermal stress and vibrations (comparable to those affecting automotive mufflers), inspection is important and should be accomplished every 100 hours of operation. In addition, an inspection should be performed anytime exhaust fumes are detected in the cabin.

a. Remove engine cowling, and loosen or remove heating shrouds so that ALL surfaces of the exhaust system can be visually inspected. Especially check areas adjacent to welds. Look for exhaust gas deposits in surrounding areas, indicating that exhaust gas is escaping through a crack or hole.

b. For a more thorough inspection, or if exhaust fumes have been detected in the cabin, the following procedure is recommended:

1. Remove exhaust pipes and mufflers. Remove all shrouds.
2. Use rubber expansion plugs to seal openings.
3. Using a manometer or gage, apply approximately 1-1/2 psig (3 inches of mercury) air pressure while the muffler and each exhaust pipe is submerged in water. Any leaks will appear as bubbles and can be readily detected.
4. It is recommended that any exhaust pipe or muffler found defective be replaced with a new part before the next flight.

c. Reinstall exhaust system.

12A-64. INSTALLATION. Reverse procedure outlined in paragraph 12A-62 to install exhaust system. Be sure there is one new copper-asbestos gasket between each exhaust pipe and its mounting pad on the cylinder. When installing attaching nuts, install plain washer, internal tooth washer and nut. Make sure clamps attaching muffler to exhaust pipes are tight and all air ducts are installed.

12A-65. EXTREME WEATHER MAINTENANCE.

12A-66. 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 intake valve port of the cylinder. Primer lines should be replaced when crushed or broken, and should be properly clamped to prevent vibration and chafing. With an external power receptacle installed, an external power source may be connected to assist in cold weather or low battery starting. Refer to paragraph 12A-67 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.

WARNING

Do not heat the oil above 121°C (250°F). A flash fire may result. Before pulling the propeller through, ascertain that the magneto switch is in the OFF position to prevent accidental firing of the engine.

After preheating the oil, gasoline may be mixed with the heated 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 drain and vent lines for presence of ice. After this procedure has been complied with, pull the propeller through several revolutions by hand before starting engine.

CAUTION

Due to the desludging effect of the diluted oil, engine operation should be observed closely during the initial warm-up of the engine. Engines that have considerable amount of operational hours accumulated since their last dilution period may be seriously affected by the dilution process. This will be caused by the diluted oil dislodging sludge and carbon deposits within the engine. This residue will collect in the oil sump and possibly clog the screened inlet to the oil pump. Small deposits may actually enter the oil pump and be trapped by the main oil filter screen. Partial or complete loss of engine lubrication may result from either condition. If these conditions are anticipated after oil dilution, the engine should be run for several minutes at normal operating temperatures and then stopped and inspected for evidence of sludge and carbon deposits in the oil sump and oil filter screen. Future occurrence of this condition can be prevented by diluting the oil prior to each oil change. This will prevent the accumulation of the sludge and carbon deposits.

12A-67. GROUND SERVICE RECEPTACLE. 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 on the Skyhawk.

NOTE

On the Standard Model 172I, power is supplied to all electrical and electronic circuits from a single bus bar. On Skyhawk models, electrical power is supplied through a split bus bar, one side containing electronic system circuits, and the other side having general electrical system circuits. In the split bus system, 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-conducters 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 electrical equipment.

The battery and external power circuits have been designed to completely eliminate the need to "jumper" across the battery contactors 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.

12A-68. HOT WEATHER. Engine starting in hot weather or with a hot engine is sometimes hampered by vapor formation at certain points in the fuel system. To purge the vapor, remove the carburetor vent plug and purge the carburetor and lines by turning the fuel selector valve on. Purge the carburetor in this manner until fuel stands level with the vent plug opening. Replace the carburetor vent plug and operate the engine to make sure that the condition has been corrected.

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 procedure with the throttle approximately one-half OPEN, and the mixture control in IDLE CUT-OFF. As the engine fires, move mixture control to full RICH and decrease the throttle setting to desired idling speed.

Engine mis-starts characterized by sufficient power to disengage the starter but dying after three to five revolutions are the result of an excessively lean mixture after the start. This can occur in either warm or cold temperatures. Repeat the starting procedure with additional priming.

CAUTION

Never operate the starting motor more than 12 seconds at a time. Allow starter motor to cool between cranking periods to avoid overheating. Longer cranking periods will shorten the life of the starter motor.

12A-69. DUSTY CONDITIONS. Dust induced into the intake system of the engine is probably the greatest single cause of early engine wear. When operating under high dust conditions, service the induction air filter daily as outlined in Section 2 of this Supplement and in the Service Manual. Also, change engine oil and lubricate the airframe more often than specified.

12A-70. SEACOAST AND HUMID AREAS. In salt water areas, special care should be taken to keep the engine and accessories clean to prevent oxidation. In humid areas, fuel and oil should be checked frequently and drained on condensed moisture.

12A-71. HAND CRANKING. A normal hand cranking procedure may be used to start the engine.

SHOP NOTES:

SECTION 13

FUEL SYSTEMS

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13-1. FUEL SYSTEMS.

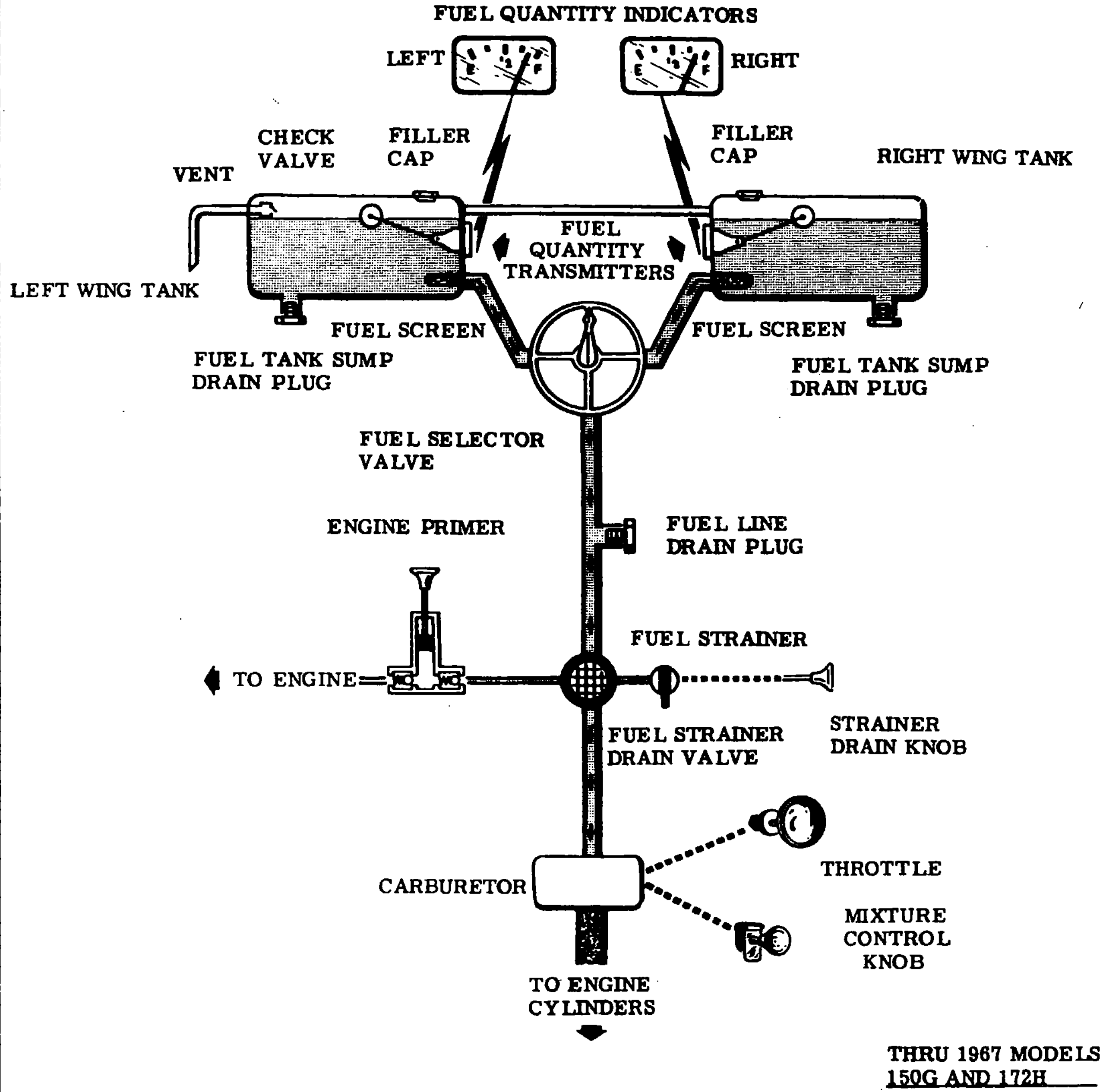
13-2. Fuel systems for the different models are shown in the schematic diagrams beginning with Figure 13-1. Details of the various systems are shown in succeeding illustrations. The Model 185 fuel system differs from that of the other Cessna models to meet engine fuel injection requirements.

WARNING

Fuel draining from fuel tanks and disconnected lines or hoses constitutes a fire hazard. Adequate safety precautions should be taken whenever it is necessary to drain fuel or to disconnect lines or hoses.

13-3. TROUBLE SHOOTING (Except Model 185).

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
NO FUEL TO CARBURETOR.		
Fuel selector valve or shut-off valve not turned on.	Check position of valve.	Turn on.
Fuel tanks empty.	Check fuel quantity.	Service with proper grade and amount of fuel.
Fuel line disconnected or broken.	Inspect fuel lines.	Connect or repair fuel lines.
Inlet elbow or inlet screen in carburetor plugged.	Disconnect fuel line at carburetor, remove elbow and screen and inspect.	Clean and/or replace.
Fuel tank outlet screens plugged.	Disconnect fuel lines from tank outlets. No flow indicates plugged screens.	Remove and clean screens and flush out fuel tanks.



NOTE

On the Model 150, the fuel lines from the tanks are connected to a tee, and a single line is routed from the tee to a fuel shut-off valve, used instead of a selector valve.

Not all aircraft use the strainer drain control. Optional quick-drain valves may be used instead of sump drain plugs.

CODE

VENT
FUEL
MECHANICAL LINKAGE
ELECTRICAL CONNECTION

Figure 13-1. Fuel System Schematic - Models 150, 172, and P172 (Sheet 1 of 3)

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
NO FUEL TO CARBURETOR (Cont).		
Defective fuel selector valve or shut-off valve.	Disconnect outlet and inlet lines from valve. If fuel flows from inlet line but not through valve, it is defective.	Remove and repair or replace valve.
Plugged fuel strainer.	Inspect strainer.	Remove and clean strainer and screen.
Fuel line plugged.	Starting at the carburetor, disconnect fuel lines successively until plugged line is located.	Clean out or replace fuel line.
	NOTE	
	To preclude possible leaks at fuel tank filler necks (the type that screws into the adapter plate inside the tank), fill the cavity immediately surrounding the threads with Parker Sealube (or equivalent).	
FUEL STARVATION AFTER STARTING.		
Partial fuel flow from the preceding causes.	Use the preceding isolation procedures, checking for sufficient rate of flow.	Use the preceding remedies.
Plugged fuel vent.	Check per paragraph 13-18.	See paragraph 13-18.
Water in fuel.	Open fuel strainer drain valve and check for water.	Drain fuel tank sumps, fuel lines, and fuel strainer.
NO FUEL QUANTITY INDICATION.		
Fuel tanks empty.	Check fuel quantity.	Service with proper grade and amount of fuel.
Circuit breaker open or defective, or blown fuse.	Check visually; check continuity if circuit breaker is not open.	Reset circuit breaker; replace blown fuse or defective circuit breaker.
Loose connections or open circuit.	Check connections and wiring.	Tighten connections; repair or replace wiring.
Defective fuel quantity indicator or transmitter. (Also see paragraphs 16-47 thru 16-49.)	Disconnect wire from transmitter at indicator not reading. Install jumper wire from good indicator (corresponding terminal) to indicator not reading. If indicator does not register, it is defective; if it does, transmitter is faulty.	Replace defective indicator or transmitter.
PRESSURIZED FUEL TANK.		
Plugged bleed hole in fuel vent.	Check per paragraph 13-18.	See paragraph 13-18.

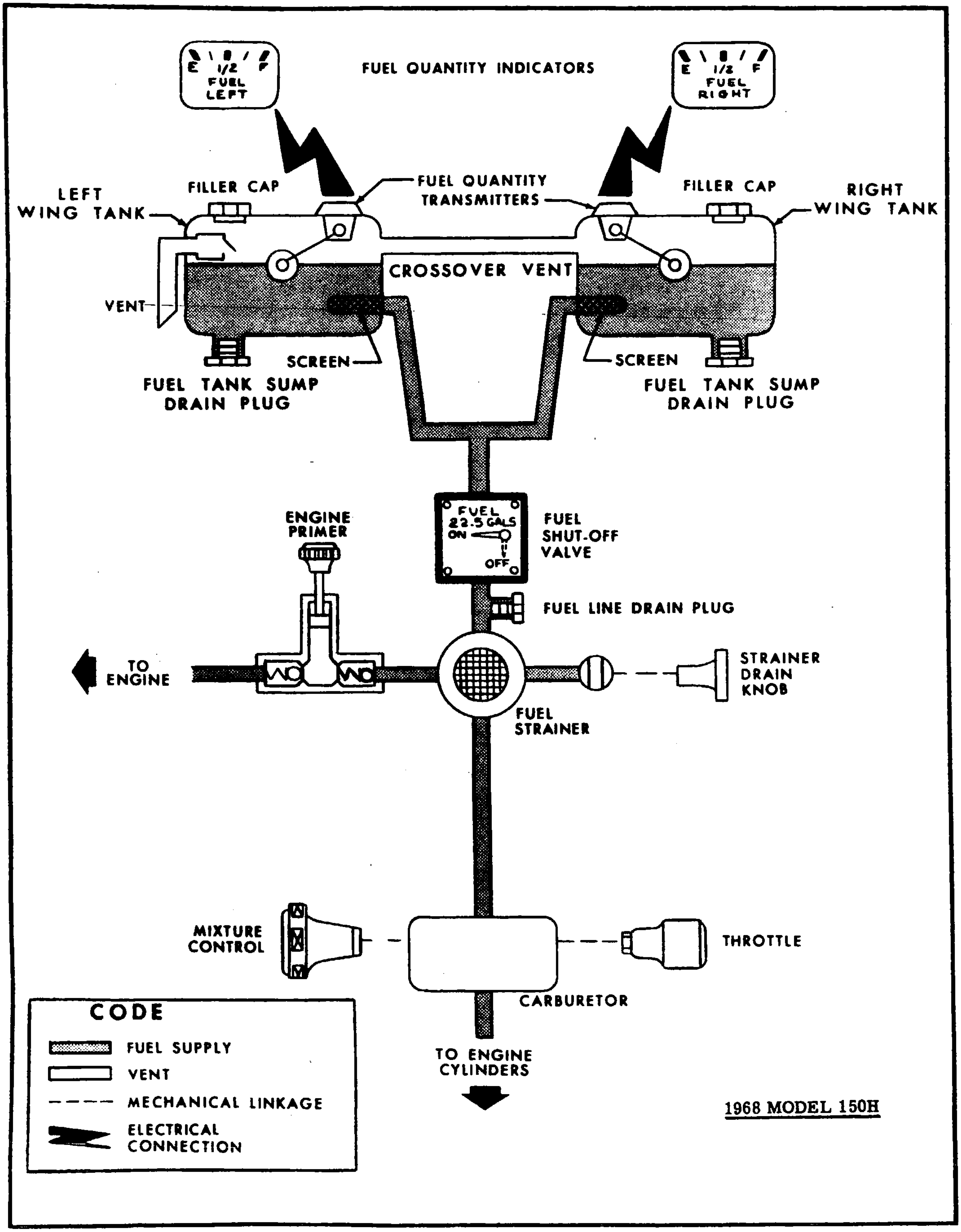


Figure 13-1. Fuel System Schematic - Model 150 (Sheet 2 of 3)

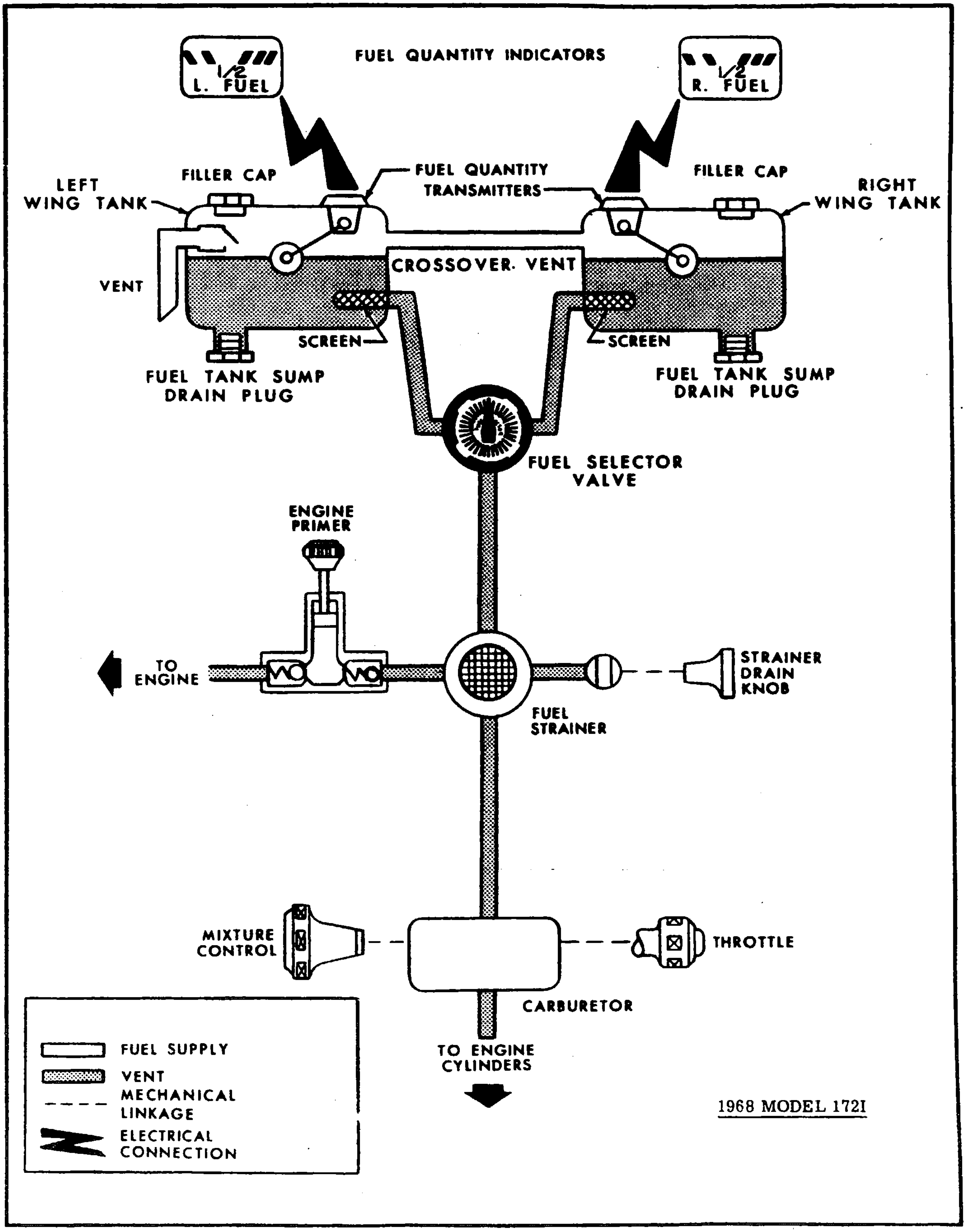
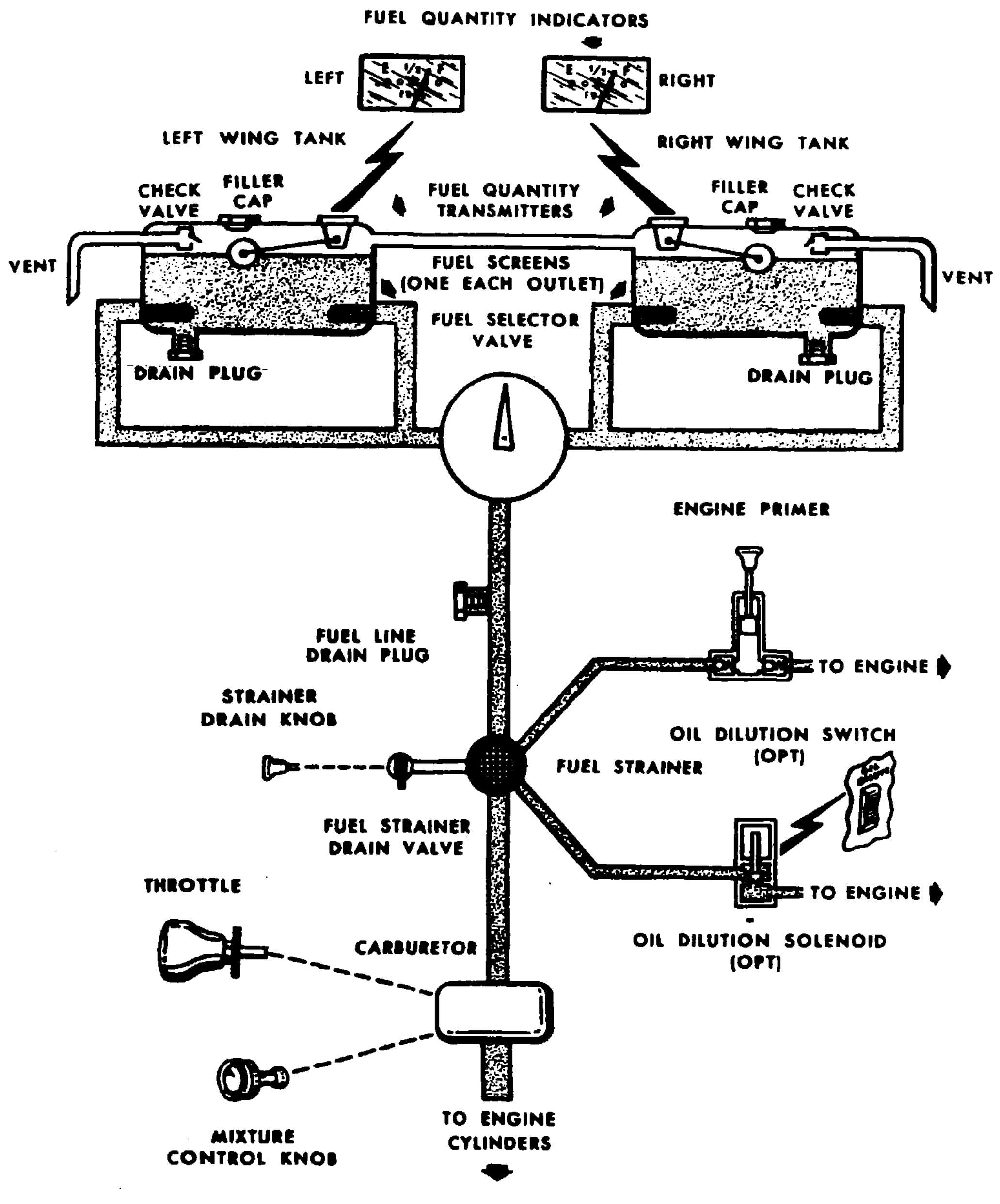


Figure 13-1. Fuel System Schematic - Model 172 (Sheet 3 of 3)



NOTE

The Model 180 fuel system schematic is shown. The Model 182 system prior to serial No. 18255786 is identical, except that the vent and check valve are used in the left tank only. See sheet 2 for the Model 182 system beginning with the serial noted, as well as prior serials on which the later system has been installed.

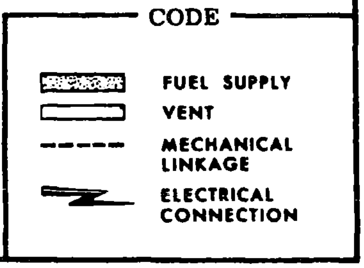
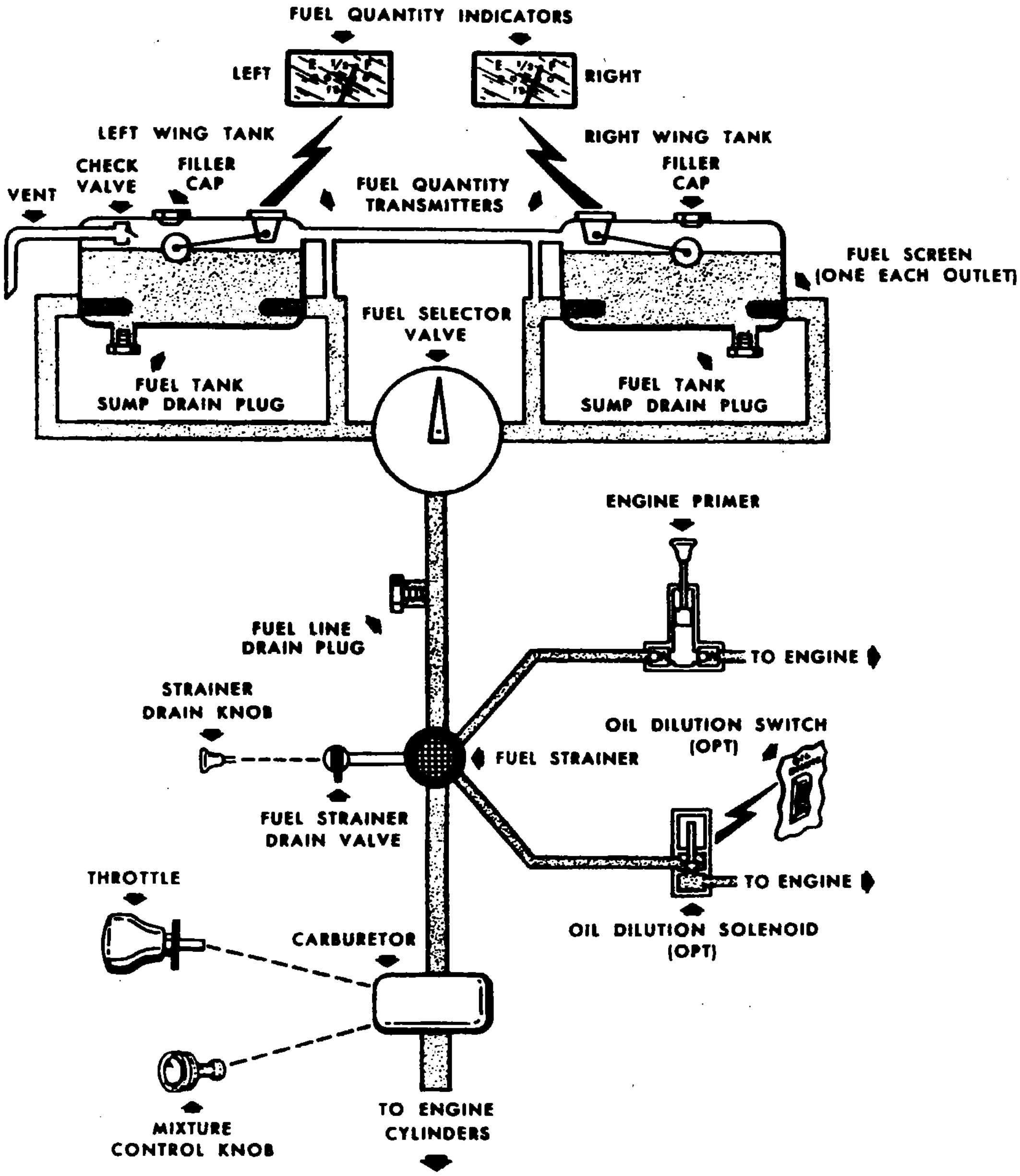


Figure 13-2. Fuel System Schematic - Models 180 & 182 (Sheet 1 of 2)



NOTE

The fuel system shown in this schematic is applicable to the Model 182, beginning with serial No. 18255786, as well as prior serials on which Service Kit No. SK182-38 (thru serial No. 18255785) or SK182-41 (thru serial No. 18256144) has been installed.

CODE	
	FUEL SUPPLY
	VENT
------	MECHANICAL LINKAGE
	ELECTRICAL CONNECTION

Figure 13-2. Fuel System Schematic - Models 180 & 182 (Sheet 2 of 2)

13-4. TROUBLE SHOOTING (Model 185).

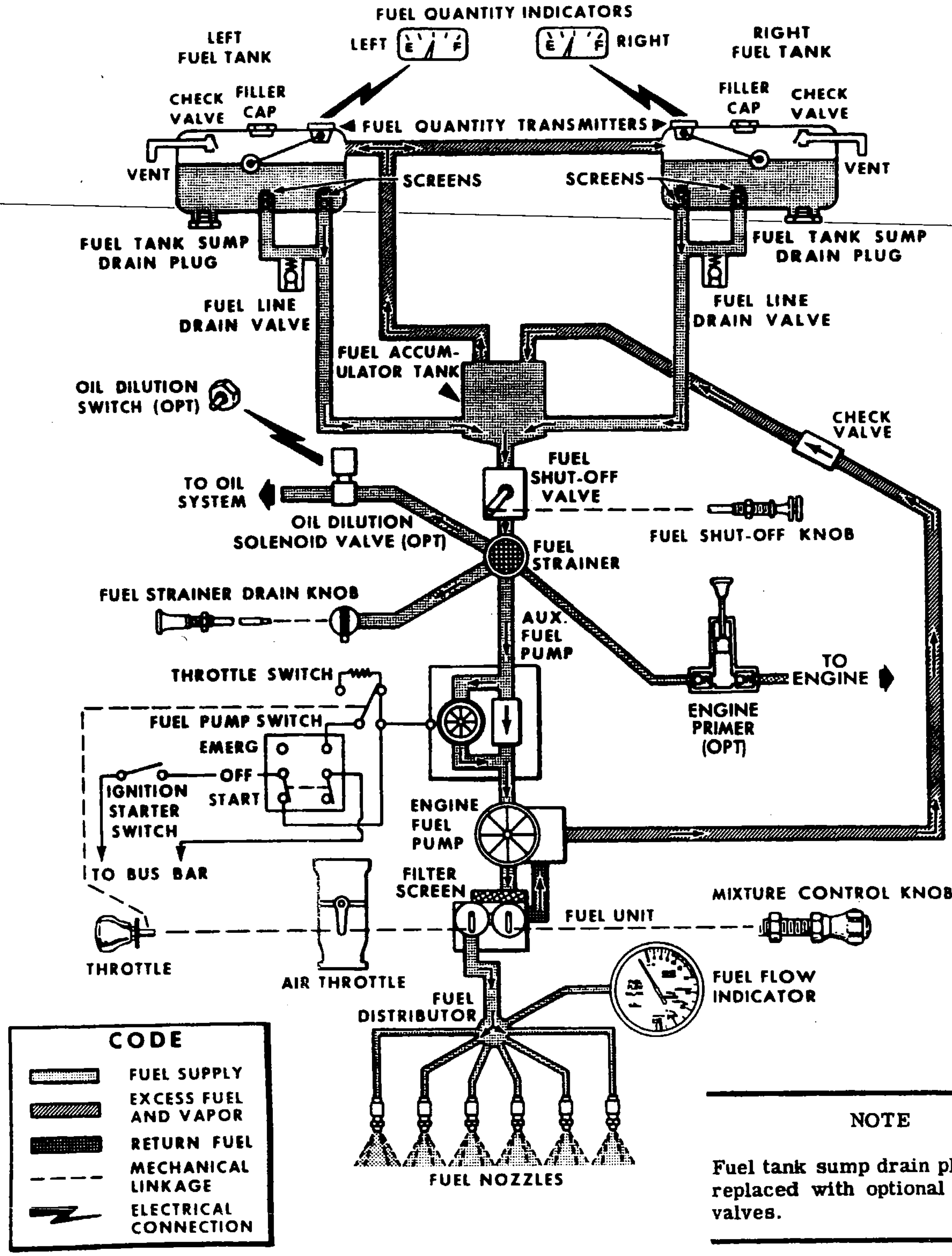
NOTE

This trouble shooting chart should be used in conjunction with the engine trouble shooting chart in Section 12.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
NO FUEL FLOW TO ENGINE-DRIVEN FUEL PUMP.		
Fuel shut-off valve not turned on.	Check position of valve.	Turn fuel shut-off valve on.
Fuel tanks empty.	Check fuel quantity.	Service with proper grade and amount of fuel.
Fuel line disconnected or broken.	Inspect fuel lines.	Connect or repair fuel lines.
Fuel cell outlet screens plugged.	Disconnect fuel lines from cell outlets. No flow indicates plugged screens.	Remove and clean screens and flush out fuel cells.
Defective fuel selector valve.	Disconnect inlet and outlet lines from valve. If fuel flows from inlet line but not through valve. it is defective.	Remove and repair or replace selector valve.
Plugged fuel strainer.	Inspect strainer.	Clean strainer and screen.
Defective check valve in electric fuel pump.	Disconnect inlet and outlet lines from fuel pump. If fuel flows from inlet line but not through pump, it is defective.	Repair or replace electric pump.
Fuel line plugged.	Starting at fuel pump inlet, disconnect fuel lines successively until plugged line is located.	Clean out or replace fuel line.
FUEL STARVATION AFTER STARTING.		
Partial fuel flow from the preceding causes.	Use the preceding isolation procedures, checking for sufficient rate of flow.	Use the preceding remedies.
Malfunction of engine-driven fuel pump or fuel injection system.	Refer to Section 12.	Refer to Section 12.
Fuel vents plugged.	Check per paragraph 13-18.	See paragraph 13-18.
Water in fuel.	Open fuel strainer drain valve and check for water.	Drain fuel tank sumps, fuel lines, and fuel strainer.
NO FUEL FLOW WHEN ELECTRIC PUMP IS TURNED ON.		
Defective fuel pump switch.	Check continuity of switch.	Replace defective switch.
Defective throttle switch.	Check continuity of switch.	Replace defective switch.
Open or defective circuit breaker.	Check visually; if not open, check continuity.	Reset. Replace if defective.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
NO FUEL FLOW WHEN ELECTRIC PUMP IS TURNED ON. (Cont)		
Loose connections or open circuit.	Check connections and wiring.	Tighten connections; repair or replace wiring.
Defective electric fuel pump.	Disconnect outlet line. With proper fuel supply to pump, fuel under pressure should flow from outlet.	Replace defective pump.
Defective engine-driven fuel pump by-pass or defective fuel injection system.	Refer to Section 12.	Refer to Section 12.
NO FUEL QUANTITY INDICATION.		
Fuel tanks empty.	Check fuel quantity.	Service with proper grade and amount of fuel.
Circuit breaker open or defective.	Check visually; if not open, check continuity.	Reset. Replace if defective.
Defective fuel quantity indicator or transmitter. (Also see paragraphs 16-47 thru 16-49.)	Disconnect wire from transmitter at indicator not reading. Install jumper wire from good indicator (corresponding terminal) to indicator not reading. If indicator does not register, it is defective; if it registers, transmitter is defective.	Replace defective indicator or transmitter.
Loose connections or open circuit.	Check connections and wiring.	Tighten connections; repair or replace wiring.

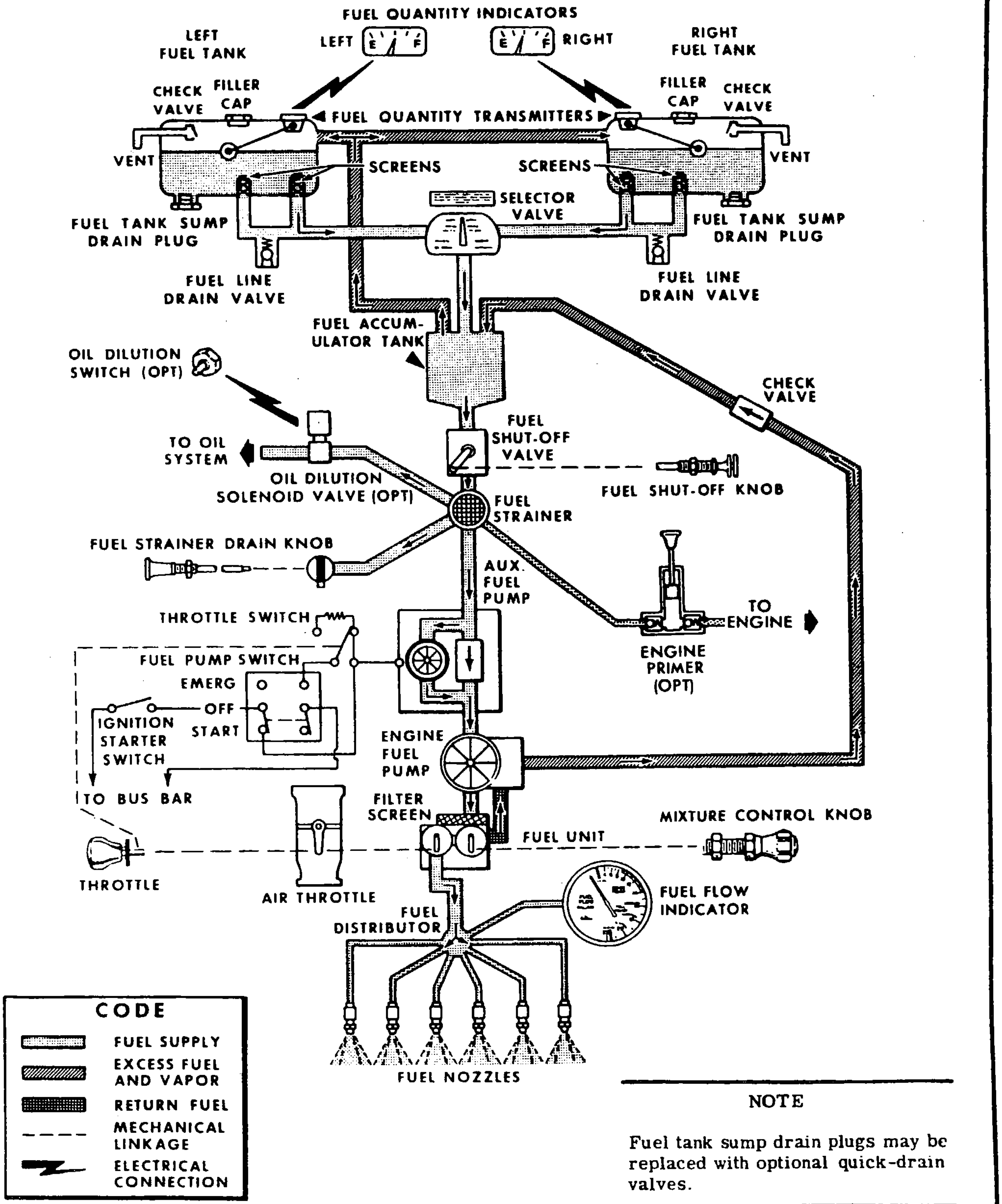
SHOP NOTES:



NOTE

Fuel tank sump drain plugs may be replaced with optional quick-drain valves.

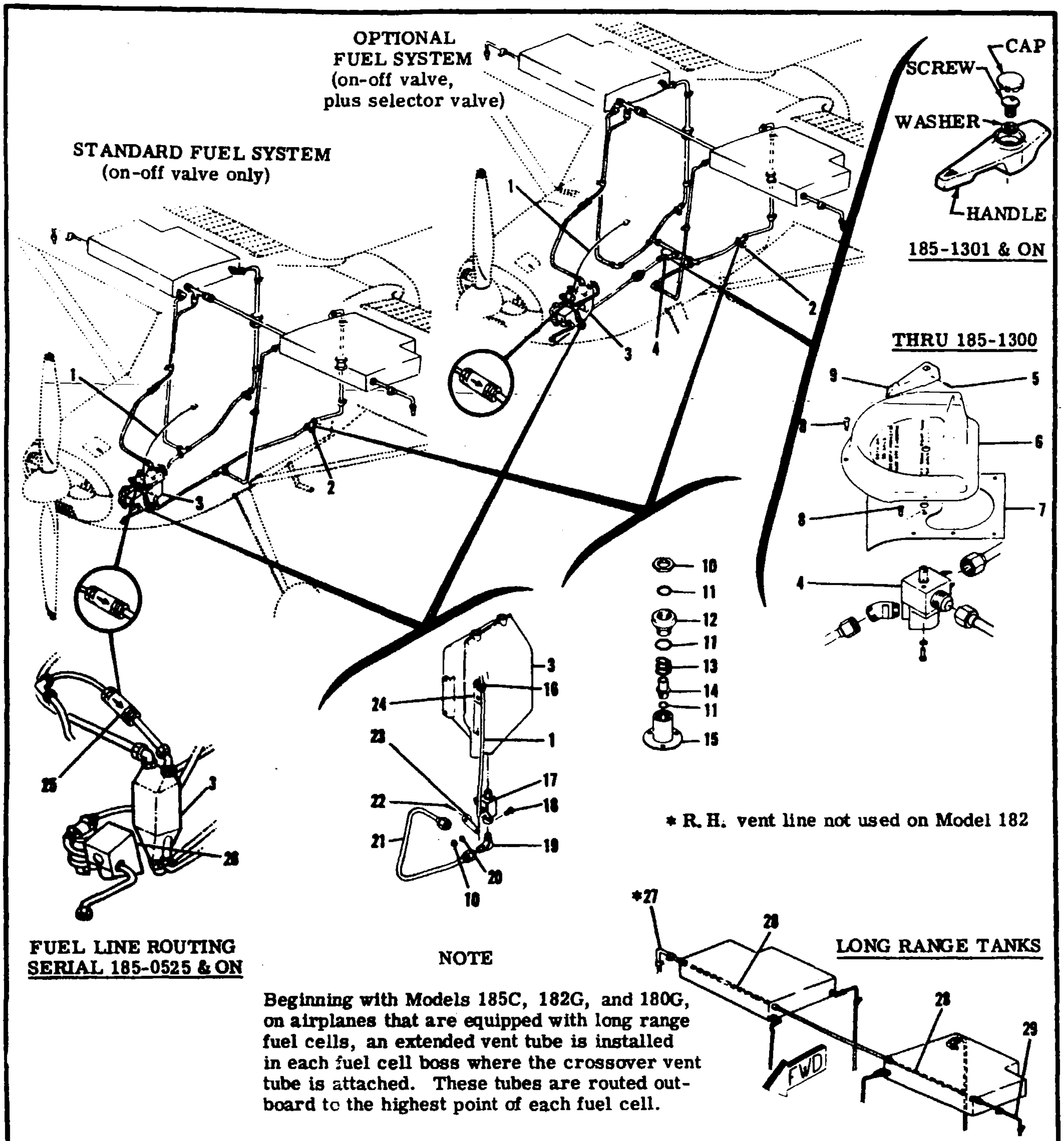
Figure 13-3. Fuel System Schematic - Model 185 Standard On - Off Valve



NOTE

Fuel tank sump drain plugs may be replaced with optional quick-drain valves.

Figure 13-4. Fuel System Schematic - Model 185 Optional Selector Valve

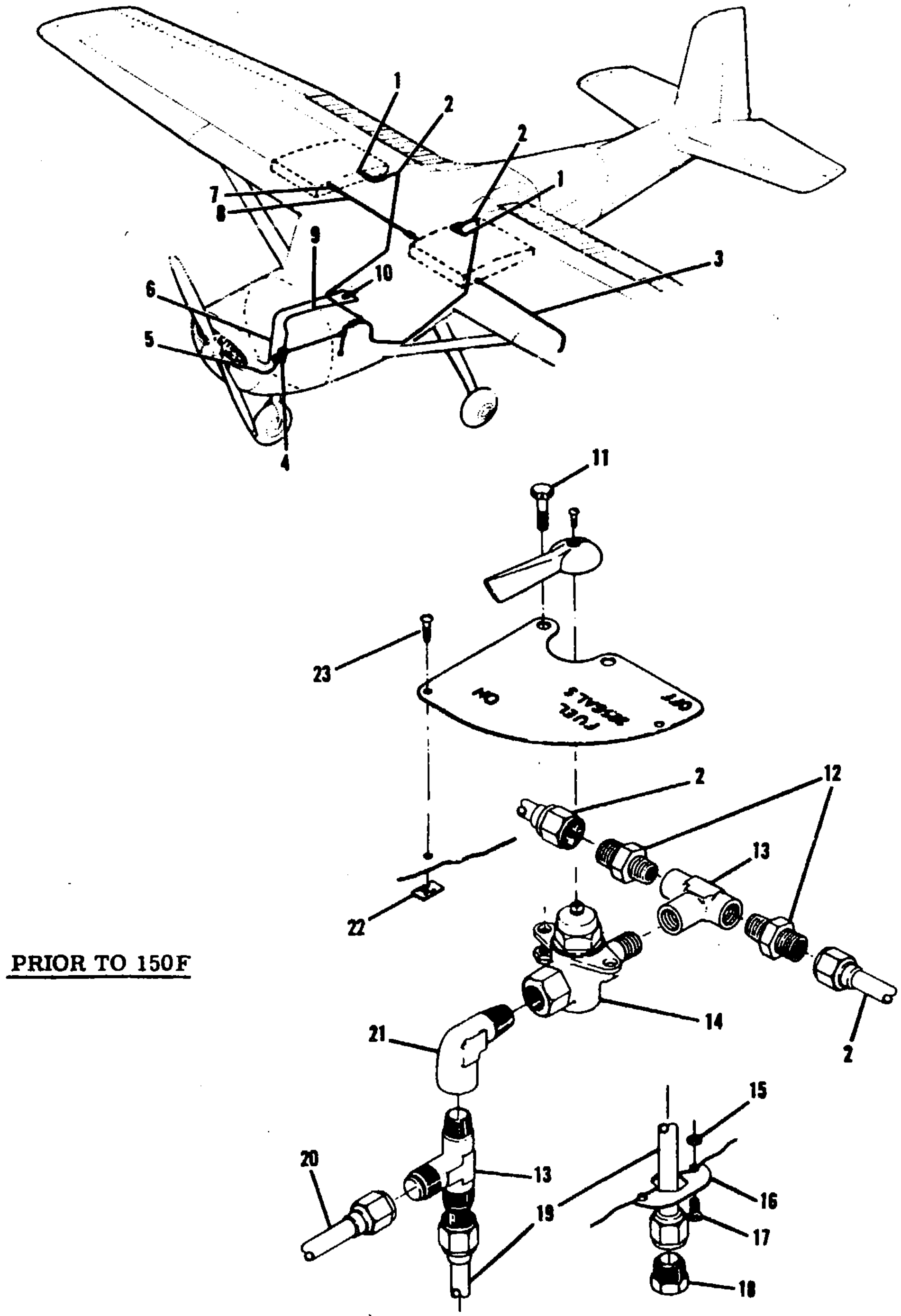


NOTE

Beginning with Models 185C, 182G, and 180G, on airplanes that are equipped with long range fuel cells, an extended vent tube is installed in each fuel cell boss where the crossover vent tube is attached. These tubes are routed outboard to the highest point of each fuel cell.

1. On-Off Control
2. Fuel Drain Valve
3. Vapor Separator and Fuel Accumulator Tank
4. Fuel Tank Selector Valve
5. Roll Pin
6. Selector Cover
7. Cover Plate
8. Screw
9. Handle
10. Nut
11. O-Ring
12. Fitting
13. Spring
14. Poppet Valve
15. Valve Body
16. Clamp
17. On-Off Fuel Valve
18. Bolt Clamp
19. Elbow
20. Washer
21. Fuel Line
22. Cotter Pin
23. Arm
24. Bracket
25. Check Valve
26. Shield
27. R. H. Vent Line
28. Vent Extension Tube
29. L. H. Vent Line

Figure 13-5. Fuel Systems - Model 185

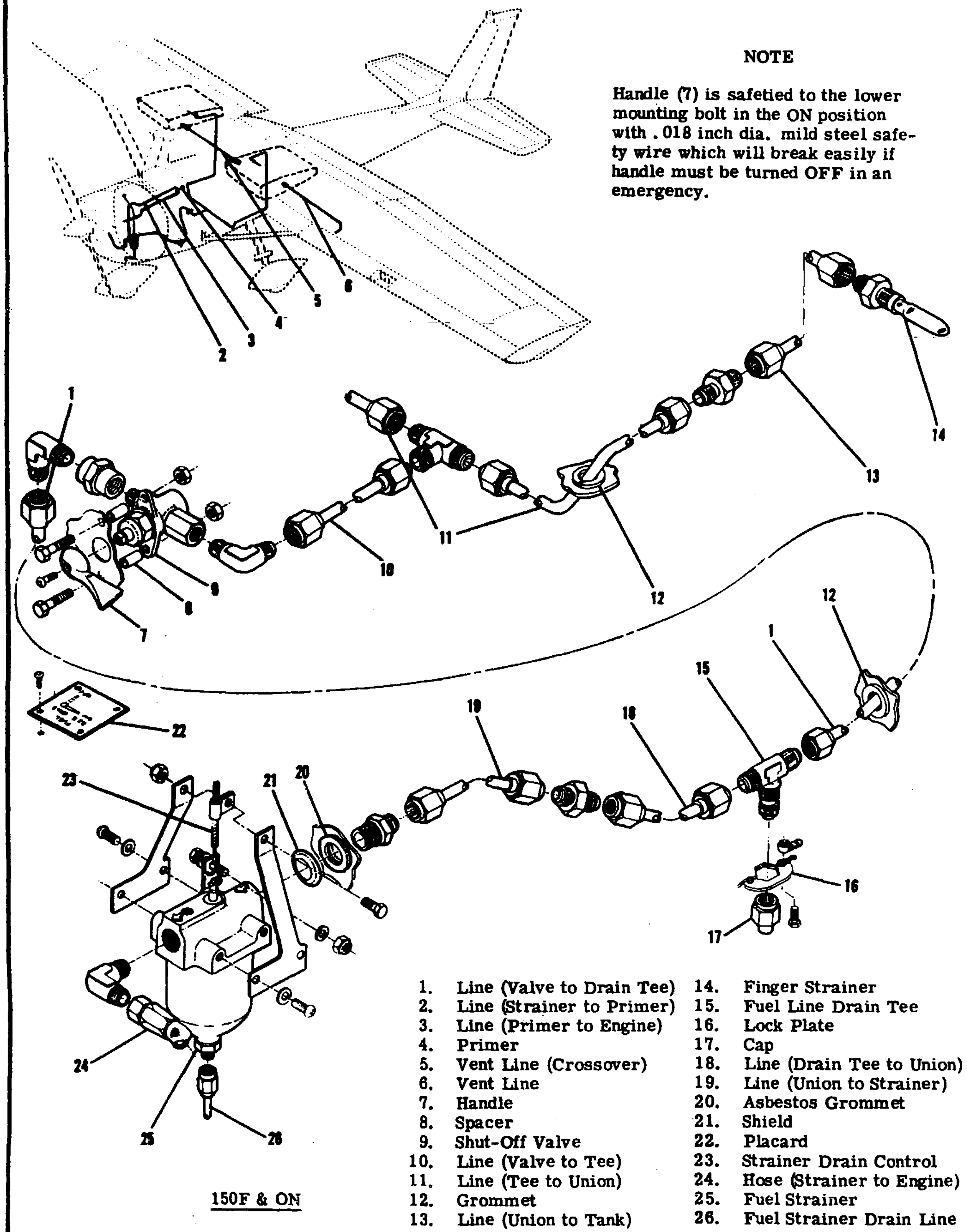


1. Finger Strainer
2. Line (Tank to Valve
3. Vent Line
4. Fuel Strainer
5. Hose
6. Line (Primer to Engine)
7. Hose
8. Vent Line (Crossover)
9. Line (Strainer to Primer)
10. Primer
11. Bolt
12. Unions
13. Tee
14. Shut-Off Valve
15. Nut
16. Lock Plate
17. Bolt
18. Drain Plug
19. Drain Line
20. Line (Tee to Strainer)
21. Elbow
22. Nut
23. Screw

Figure 13-6. Fuel System - Model 150 (Sheet 1 of 2)

NOTE

Handle (7) is safetied to the lower mounting bolt in the ON position with .018 inch dia. mild steel safety wire which will break easily if handle must be turned OFF in an emergency.



1. Line (Valve to Drain Tee)
2. Line (Strainer to Primer)
3. Line (Primer to Engine)
4. Primer
5. Vent Line (Crossover)
6. Vent Line
7. Handle
8. Spacer
9. Shut-Off Valve
10. Line (Valve to Tee)
11. Line (Tee to Union)
12. Grommet
13. Line (Union to Tank)
14. Finger Strainer
15. Fuel Line Drain Tee
16. Lock Plate
17. Cap
18. Line (Drain Tee to Union)
19. Line (Union to Strainer)
20. Asbestos Grommet
21. Shield
22. Placard
23. Strainer Drain Control
24. Hose (Strainer to Engine)
25. Fuel Strainer
26. Fuel Strainer Drain Line

Figure 13-6. Fuel system - Model 150 (Sheet 2 of 2)

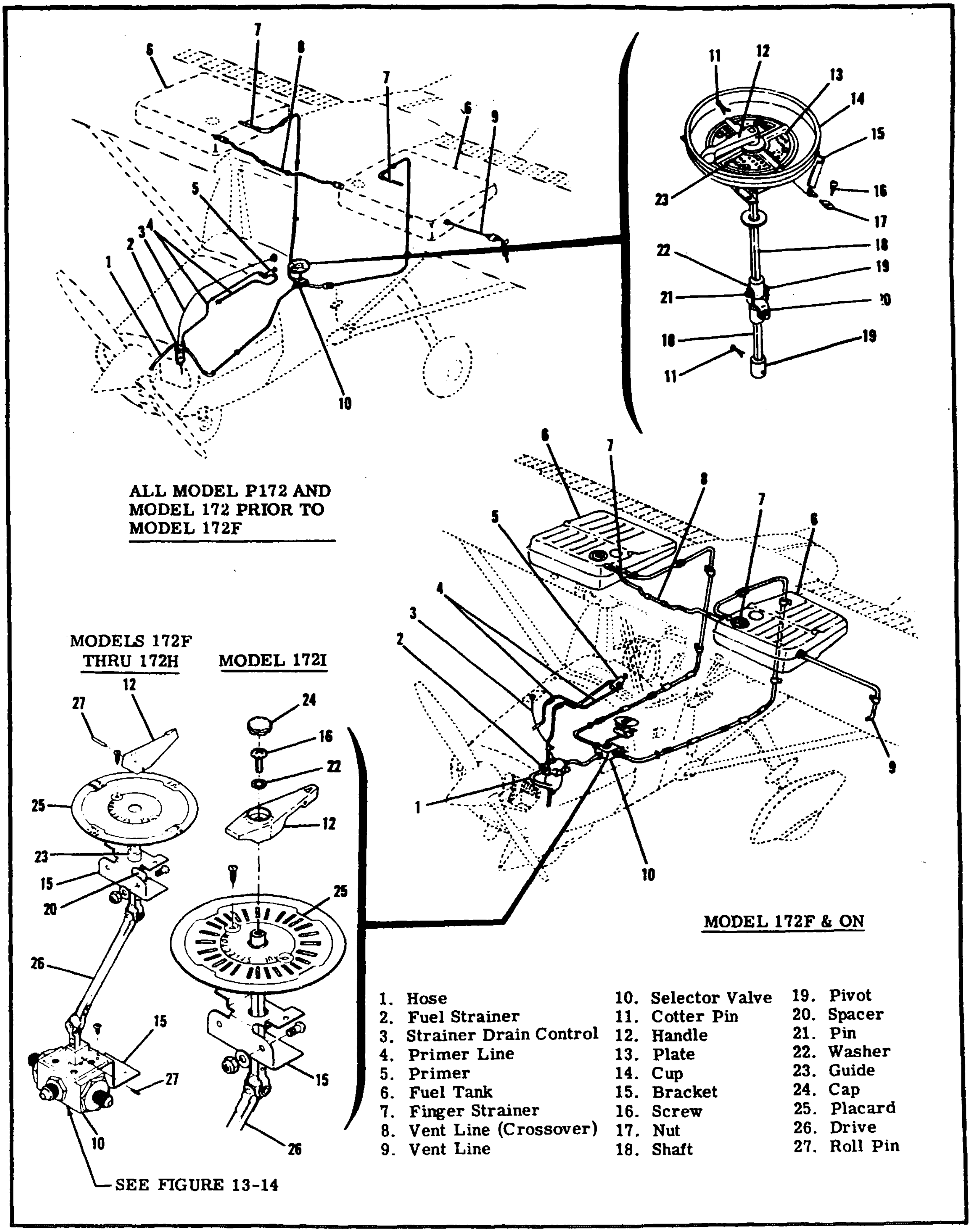
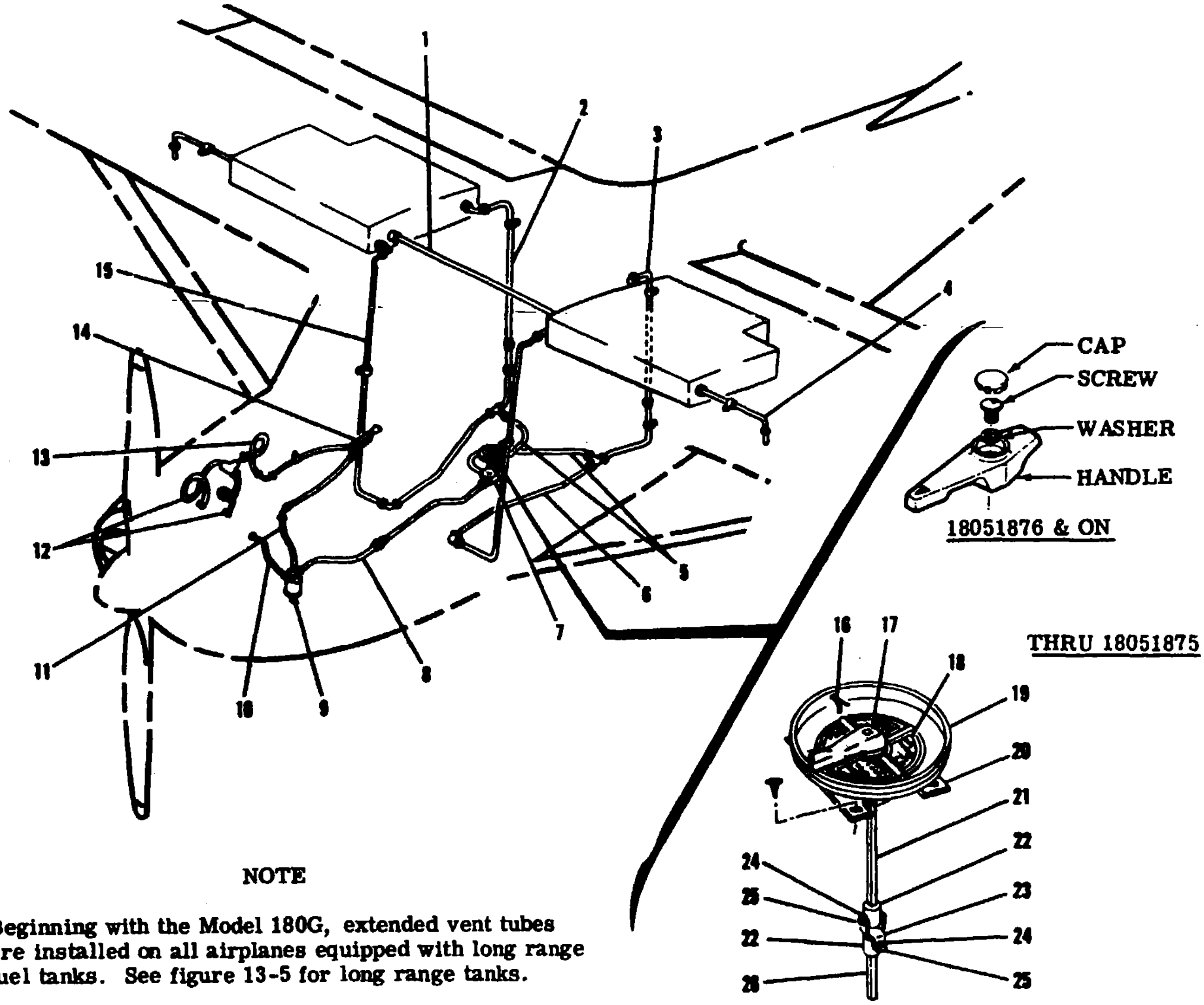


Figure 13-7. Fuel System - Models 172 and P172

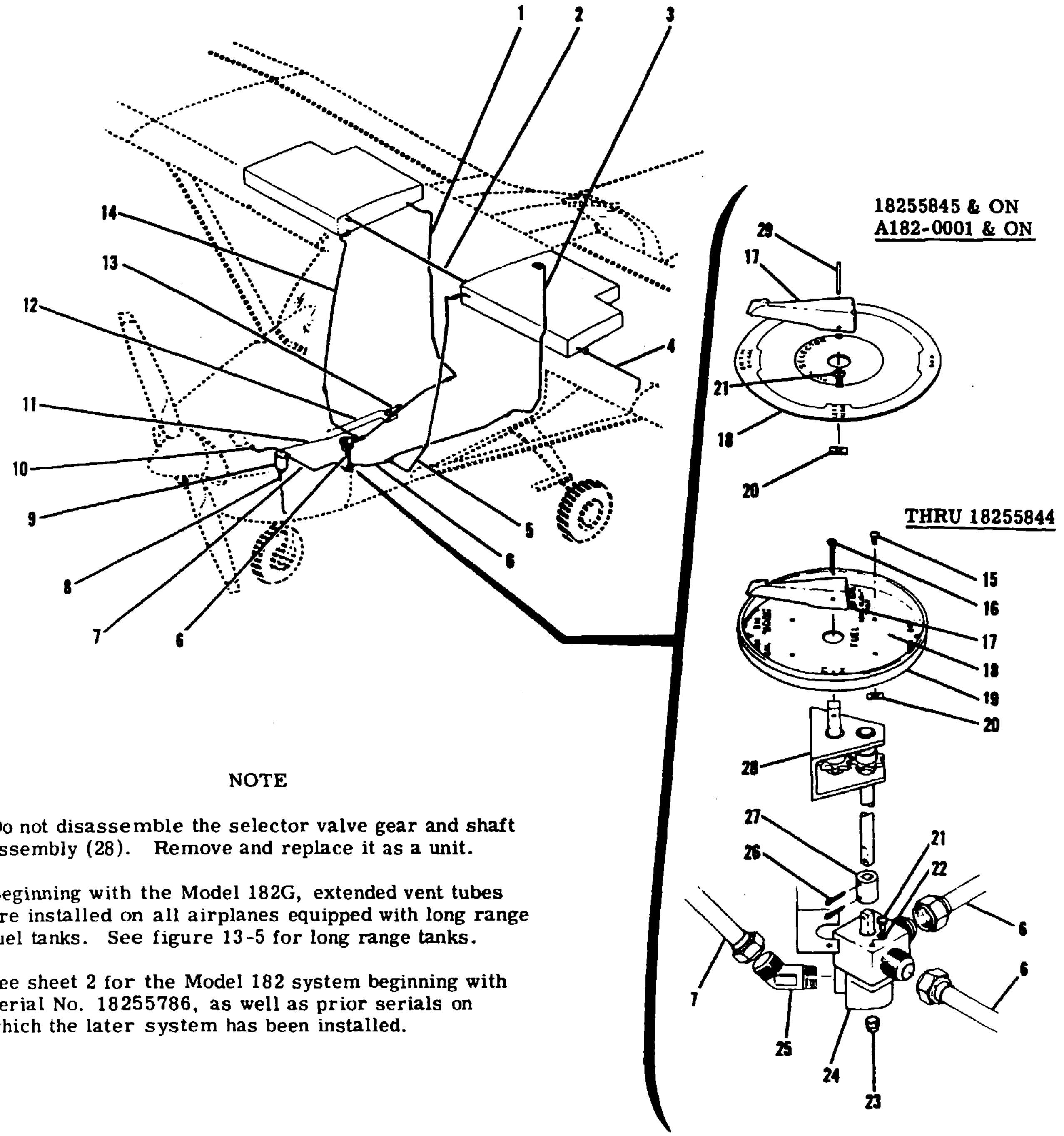


NOTE

Beginning with the Model 180G, extended vent tubes are installed on all airplanes equipped with long range fuel tanks. See figure 13-5 for long range tanks.

1. Vent Line (Crossover)
2. Aft Right Fuel Line
3. Aft Left Fuel Line
4. Fuel Tank Vent Line
5. Fuel Line (Tee to Valve)
6. Forward Left Fuel Line
7. Selector Valve
8. Fuel Line (Valve to Strainer)
9. Fuel Strainer
10. Fuel Hose (Strainer to Engine)
11. Primer Line (Strainer to Primer)
12. Primer Line (Tee to Engine)
13. Primer Line (Primer to Tee)
14. Primer
15. Forward Right Fuel Line
16. Cotter Pin
17. Handle
18. Plate
19. Cup
20. Bracket
21. Upper Shaft
22. Pivot
23. Spacer
24. Washer
25. Pin
26. Lower Shaft

Figure 13-8. Fuel System - Model 180



NOTE

Do not disassemble the selector valve gear and shaft assembly (28). Remove and replace it as a unit.

Beginning with the Model 182G, extended vent tubes are installed on all airplanes equipped with long range fuel tanks. See figure 13-5 for long range tanks.

See sheet 2 for the Model 182 system beginning with serial No. 18255786, as well as prior serials on which the later system has been installed.

1. Aft Right Fuel Line
2. Vent Line (Crossover)
3. Aft Left Fuel Line
4. Fuel Tank Vent Line
5. Forward Left Fuel Line
6. Fuel Line (Tee to Valve)
7. Fuel Line (Valve to Strainer)
8. Drain Line
9. Fuel Strainer
10. Hose (Strainer to Engine)
11. Primer Line (Strainer to Primer)
12. Primer Line (Primer to Engine)
13. Primer
14. Forward Right Fuel Line
15. Screw
16. Cotter Pin
17. Handle
18. Placard
19. Cup
20. Nut
21. Screw
22. Washer
23. Plug
24. Selector Valve
25. Elbow
26. Cotter Pin
27. Coupling
28. Gear and Shaft Assembly
29. Spring Pin

Figure 13-9. Fuel System - Model 182 (Sheet 1 of 2)

NOTE

This fuel system is applicable to the Model 182, beginning with serial No. 18255786, as well as prior serials on which Service Kit No. SK182-38 (thru serial No. 18255785) or SK 182-41 (thru serial No. 18256144) has been installed.

Remaining components of the fuel system are the same as those shown on sheet 1.

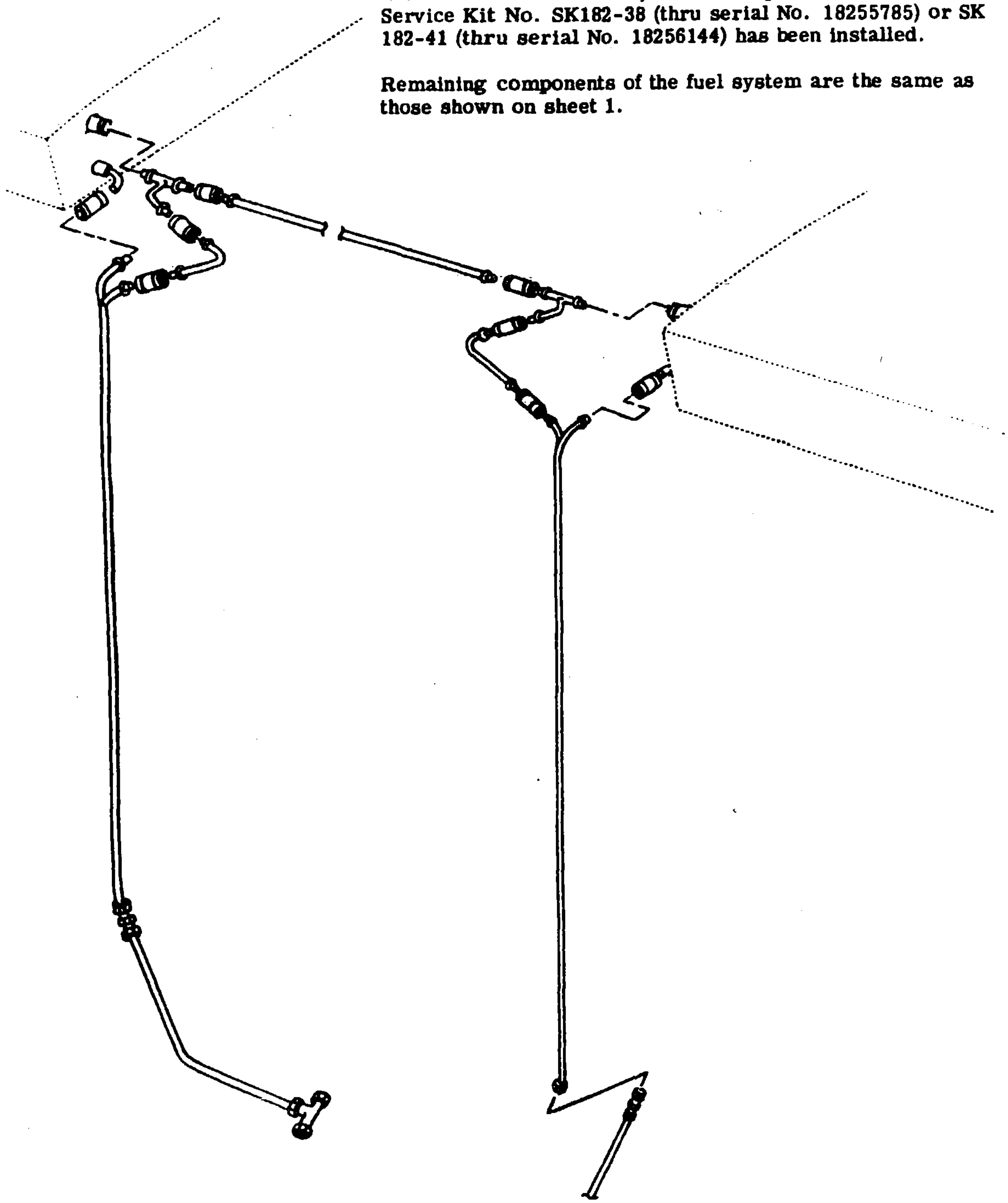
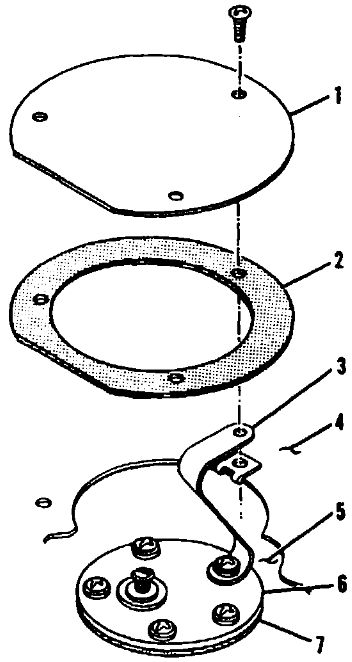
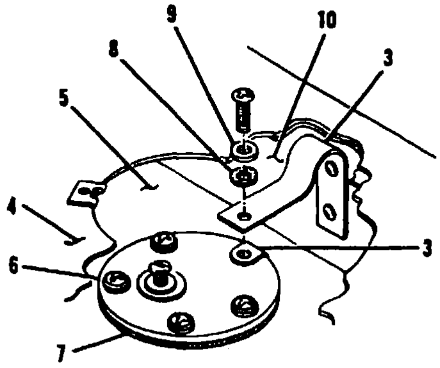


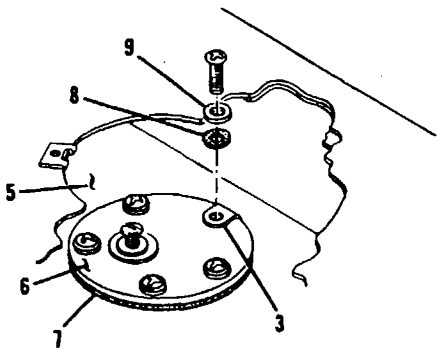
Figure 13-9. Fuel System - Model 182 (Sheet 2 of 2)

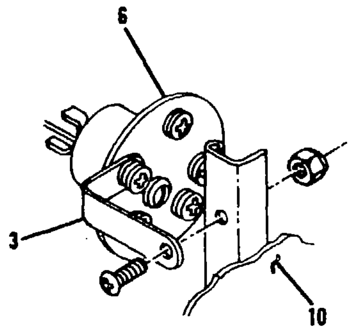




SERIAL NO. 15063441 & ON
SERIAL NO. F150-0053 & ON
SERIAL NO. 17254356 & ON
SERIAL NO. F172-0320 & ON

PRIOR TO SERIAL NO. 15063441
AND F150-0053





PRIOR TO SERIAL NO. 17254356
AND F172-0320

MODELS 180, 182, AND 185

1. Access Cover
2. Cork Gasket
3. Ground Strap
4. Wing Skin
5. Fuel Tank
6. Transmitter
7. Gasket
8. Cork Washer
9. Washer
10. Wing Root Rib

Figure 13-9A. Fuel Transmitter Grounding

13-5. FUEL CELLS -- MODELS 180, 182, AND 185.

13-6. These airplanes are equipped with rubberized bladder-type fuel cells, one of which is located in the inboard bay of each wing panel. The cells are secured by snap fasteners to prevent collapse of the flexible cells. The airplane may be equipped with either Goodyear or U.S. Rubber Company fuel cells. Goodyear and U.S. Rubber Company fuel cells are interchangeable, therefore either type cell may be used. Goodyear fuel cells are BTC-37, or BTC-39 type construction and U.S. Rubber Company fuel cells may be either US-907N, US-943, or US-932 type construction. Repair procedures for the fuel cells differ for the type used. Therefore, determine which fuel cell is used before repairs are attempted. To determine this, inspect the top outer surface of the fuel cell. Each fuel cell is marked as to manufacturer and type of construction.

13-5. GENERAL PRECAUTIONS. When storing, inspecting or handling Goodyear fuel cells, the following should be adhered to:

a. Fold cells smoothly and lightly as possible with a minimum number of folds. Place protective wadding between folds.

b. Wrap cell in moisture-proof paper and place it in a suitable container. Do not crowd cell in container, use wadding to prevent movement.

c. Stack boxed cells to allow access to oldest cells first. Do not allow stacks to crush bottom boxes. Leave cells in boxes until used.

d. Storage area must be cool, +30°F to +85°F, and free of exposure to sunlight, dirt, and damage.

e. Used cells must be cleaned with soap and warm water prior to storage. Dry and package as outlined in the preceding steps.

f. Do not carry cells by fittings. Maintain original cell contours or folds when refolding for boxing.

13-8. FUEL CELL REMOVAL AND INSTALLATION. When removing a fuel cell the following procedure is suggested as a guide:

a. Drain applicable fuel cell by removing drain plugs.

NOTE

Prior to removal of Goodyear fuel cells, drain fuel, purge with fresh air, and swab out to remove all traces of fuel.

b. Remove wing root fairings and disconnect fuel lines at wing root.

c. Remove clamps from forward and aft fuel cell boss at wing root and carefully work fuel strainer and line from cell boss.

d. Disconnect electrical lead and ground strap from fuel quantity transmitter. Remove transmitter by removing attaching screws and carefully work it from fuel cell and wing rib.

e. Remove screws attaching drain adapter to lower surface of wing.

f. Remove clamps attaching cross-over vent line to fuel cells and work vent line out of cell being removed. In airplanes equipped with long range tank (1964 and on), remove vent extension tube from inside the fuel cell. Vent extension tube is attached to the crossover vent boss on the cell.

g. Remove clamps and work overboard vent line from cell. Remove vent valve from inside of fuel cell.

h. Remove fuel filler adapter and gaskets by removing screws attaching adapter to wing and fuel cell. On airplanes equipped with long range tanks, remove cover plate and gaskets.

i. Working through filler neck opening, loosen snap fasteners. Tilt snap fasteners slightly when pulling cell free, to prevent tearing the rubber.

j. Collapse and carefully fold cell for removal, then work cell out of fuel cell bay through filler opening. Use care when removing and prevent damage to cell.

k. Unfold cell and remove fittings, snap fasteners and fuel sump drain adapter.

To install a new or repaired fuel cell, proceed as follows:

a. Cell compartment must be thoroughly cleaned of all filings, trimmings, loose washers, bolts, nuts, etc.

b. All sharp edges of cell compartments must be rounded off and protective tape applied over all sharp edges and protruding rivets.

c. Inspect cell compartment just prior to installation of a cell for the above mentioned conditions.

d. Install fuel drain adapter and snap fasteners.

e. Check to be sure cell is warm enough to be flexible and fold as necessary to fit through fuel cell access opening.

f. Place fuel cell in compartment, develop it out to its full size and attach snap fasteners, then reverse the removal procedures for installation. When fastening snap fasteners, tilt the fastener to one side slightly to prevent placing a strain on the rubber.

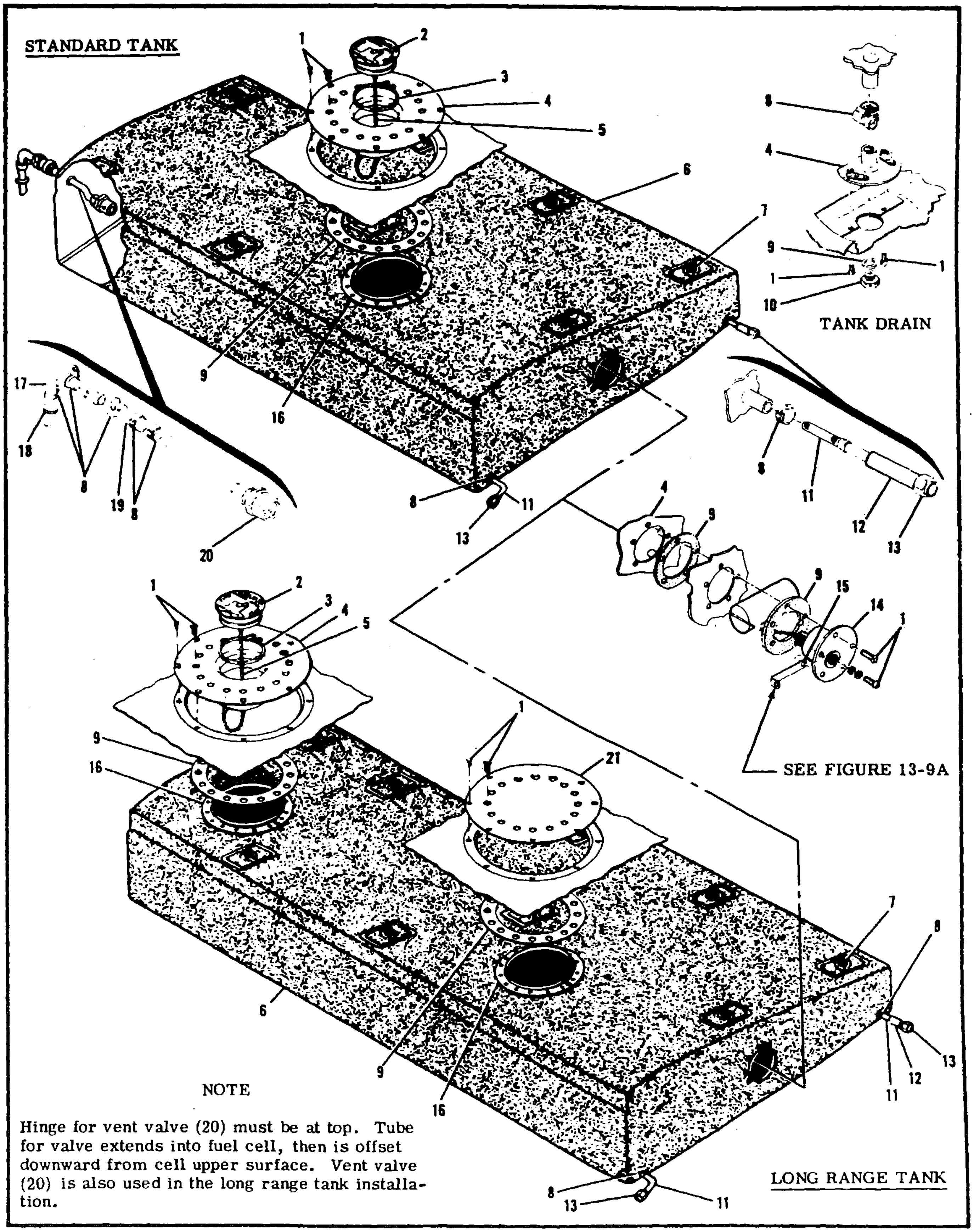
g. Install all new gaskets when installing fuel cell.

h. When tightening screw-type clamps, apply a maximum of 20 pound-inches of torque to clamp screws. No oil is to be applied to fittings prior to installing.

i. When installing filler adapter, cover plate, and fuel quantity transmitter to the wing and fuel cell, tighten attaching screws evenly. The sealing or

References for Figure 13-10

1. Screw	8. Clamp	15. Ground Strap
2. Cap	9. Gasket	16. Fitting
3. O-Ring	10. Plug	17. Line
4. Adapter	11. Strainer	18. Grommet
5. Chain	12. Protector	19. Hose
6. Tank	13. Nut	20. Valve
7. Hanger	14. Fuel Transmitter	21. Cover Plate



NOTE

Hinge for vent valve (20) must be at top. Tube for valve extends into fuel cell, then is offset downward from cell upper surface. Vent valve (20) is also used in the long range tank installation.

Figure 13-10. Fuel Cell Installation - Models 180, 182, and 185 compression surfaces must be assembled when absolutely dry (NO SEALING PASTE TO BE USED).

j. After installation has been completed, cell should be inspected for final fit within compartment, making certain that cell is extended out to the structure and no corners are folded in.

k. The final inspection prior to closing the cell should be a close check to be sure cell is free of foreign matter such as lint, dust, oil, or any installation equipment. If cell is not thoroughly clean, it should be cleaned with a lint-free cloth soaked in water, alcohol, or kerosene. NO OTHER SOLVENT SHALL BE USED.

NOTE

Throughout the airplane fuel system, from the tanks to the engine-driven fuel pump or carburetor, use Parker Sealube (or equivalent) as a thread lubricant or to seal a leaking connection. Apply sparingly to male fittings only, omitting the first two threads. Always be sure 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 lubricating oil, on the fitting threads. Do not use any other form of thread compound on the injection system fittings.

13-9. FUEL CELL PRESERVATION. The following is a reprint of U.S. Rubber Company directive:

"When synthetic rubber fuel cells are placed in service, the gasoline has a tendency to extract the plasticizer from the inner liner of the cell. This extraction of plasticizer is not detrimental as long as gasoline remains in the fuel cells, as the gasoline itself will act as a suitable plasticizer. When the gasoline is drained from the fuel cell, the plasticizing effect of the gasoline is lost and the inner liner of the cell begins to dry out and subsequent cracking or checking will occur. This cracking or checking may penetrate through the inner liner permitting gasoline to diffuse through walls of the cell after the cell has been re-fueled. To prevent this failure, a thin coating of light engine oil should be applied to the inner liner of all serviceable fuel cells, which have contained gasoline, when it is evident that the cells will remain without fuel for more than ten days, whether installed in airplanes or in storage. The oil will act as a temporary plasticizer and will prevent the inner liner from drying out and cracking. If it becomes necessary to return the cell to the contractor or the vendor for testing or repair, do not allow quantities of oil to be puddled in the cell as it will make handling and repair much more difficult. Cells should be repacked as similar to the original factory pack as possible."

13-10. FUEL CELL REPAIRS.

13-11. U.S. RUBBER - US-907N AND US-943 CELLS.

WARNING

No repairs are to be made on the radius of a cell or in the fitting area of a cell. No damaged areas such as cuts and tears larger than one inch are to be repaired in the field. Cells with such damage should be replaced, or repaired by the manufacturer. Arrangements for manufacturer to repair a fuel cell should be made through Cessna.

OUTSIDE OF CELL:

a. Use a piece of synthetic rubber coated fabric (U.S. Rubber 5200 outside repair material) large enough to cover damage at least 2" from cut in any direction. Buff this material lightly and thoroughly with garnet paper and wash with Methyl Ethyl Ketone (U.S. Rubber Co. 3339 solution) to remove buffing dust.

b. Cement buffed side of patch with two coats of U.S. Rubber Co. 3230 cement or Minnesota Mining Co. EC-678. Allow each coat to dry 10-15 minutes.

c. Buff cell area to be patched lightly and thoroughly with garnet paper and wash with 3339 solution to remove buffing dust.

d. Cement buffed area with two coats of U.S. Rubber 3230 or Minnesota Mining Co. EC-678 cement. Allow each coat to dry 10-15 minutes.

e. Freshen cemented area of patch and cemented area of cell with 3339 solution.

f. While still tacky, apply edge of patch to edge of cemented area on the cell. With a roller or blunt instrument, roll or press the patch to the cemented area and roll or press it down a half-inch to an inch across at a time so as not to trap air between patch and cell. Lay 50 lb shot bag over patch which is protected by piece of Holland Cloth to prevent sticking. Weight should not be removed for 6 hours.

g. Seal coat edge of patch 1/2" with one coat of U.S. Rubber 3230 or Minnesota Mining Co. EC-678 cement and allow the cement to dry thoroughly.

INSIDE OF CELL:

a. After the damaged area has been patched on the outside of the cell and the repair allowed to stand a minimum of 6 hours, the cell is then ready to have the patch applied on the inside of the cell.

b. Lightly and thoroughly buff a piece of cured U.S. Rubber 5200/5187 nylon sandwich material large enough to cover damage at least 2" from cut in any direction. Wash buffing dust off patch with Methyl Ethyl Ketone solution (U.S. Rubber 3339).

c. Cement buffed side of patch with two coats of black rubber cement, U.S. Rubber 3230 or Minnesota Mining Co. EC-678, and allow each coat to dry 10-15 minutes.

d. Buff cell area to be patched lightly and thoroughly with fine sandpaper (#"0") and then wash off buffing dust with Methyl Ethyl Ketone solution (U.S. Rubber 3339).

e. Coat buffed area with two coats of black rubber cement, U.S. Rubber 3230 or Minnesota Mining Co. EC-678, and allow each coat to dry 10-15 minutes.

f. Freshen cemented area of patch and cemented area of cell with Methyl Ethyl Ketone (U.S. Rubber 3339) solution.

g. While still tacky, apply edge of patch to edge of cemented area, centering patch over cut in cell. With a roller or blunt instrument, roll or press the patch to the cemented area on the cell. Hold part of patch off the cemented area and roll or press it down a half-inch to an inch across at a time so as not to trap air between patch and cell. Apply 50 lb shot bag to repaired area and do not disturb for 6 hours.

h. Seal coat patch and 1/2" from edge of patch with two coats of U.S. Rubber 3230 or Minnesota Mining Co. EC-678 cement. Allow the first coat to dry one hour or more. Wipe patch and cemented area lightly with #10 oil, so that when the cell is in its original position the patch area will not stick to other areas of the cell.

SCUFFED FABRIC:

a. Buff area surrounding scuffed fabric.

b. Wash buffing dust from area with 3339 solution.

c. Apply two coats of U.S. Rubber 3230 or Minnesota Mining Co. EC-678 cement to the buffed area, allowing 10 minutes drying time between coats.

NOTE

A fuel cell repair kit, U.S. Rubber Kit No. RK-30S, contains all the necessary materials to repair a US-907N or a US-943 fuel cell. This kit is available from the Cessna Service Parts Center.

13-12. U. S. RUBBER - US-932 CELLS.

REPAIRS. All field repairs are to be made by FAA certificated repair stations using the Repair Kit RK-932 which is available from the Cessna Service Parts Center. Fuel cells should be pressure tested before repair and 24 hours after repair using the procedure outlined in paragraph 13-13.

WARNING

No repairs are to be made on the radius of a cell or in the fitting area of a cell. No damaged areas such as cuts and tears larger than one inch are to be repaired in the field. Cells with such damage should be replaced, or repaired by the manufacturer. Arrangements for manufacturer to repair a fuel cell should be made through Cessna.

KIT CONTENTS. Following is a list of materials contained in the kit:

DESCRIPTION	QUANTITY	
3413 Patching Material	(one)	Piece Urethane Film 8" x 8"
5356 Patching Material	(one)	Piece Urethane Nylon Fabric 8" x 8"
Paint Brushes	(five)	1/2" Commercial
3339 Solvent	(one)	1/2 Pint Can
Emery Cloth	(five)	Pieces 4 1/2" x 5 1/2" # 180 Grit
Cheese Cloth	(one)	Piece 18" x 36"
3420-A Adhesive	(five)	1/2 Pint Cans, 32 Grams Each
3420-B Adhesive	(five)	Plastic Containers 2 Grams Each
Spatula	(five)	Wooden

SHOP NOTES:

TYPES OF REPAIRS:

a. Use patches of Urethane film for small pin hole type leaks.

b. Use fabric patches for tears or cuts up to 1" long.

c. Patches may be applied to either the inside or the outside surface of the fuel container, whichever is more convenient.

d. Use a patch that will extend a minimum of 1" in every direction beyond the area to be repaired.

MIXING INSTRUCTIONS FOR ADHESIVES.

a. Cut a small hole in the plastic container and pour contents (3420-B) into the can containing the 3420-A.

b. Mix well with wood spatula (tongue depressor).

c. Allow mixture to stand for 10 minutes.

d. Mix again.

e. The mixed adhesive (3420) must be kept in a closed container until used. Once this adhesive has been mixed, it must be used within 12 hours.

PREPARATION FOR REPAIR.

a. Wash damaged area on fuel container with 3339 solvent. Surface must be clean and dry.

b. Buff area to be repaired with emery cloth and wipe clean with a cheesecloth swab dampened in 3339 solvent. Buffed area should be larger than repair patch.

c. Buff and clean one side of repair patch as outlined in step "b".

d. Cement buffed surfaces of patch and article to be repaired with two coats of mixed adhesive, allowing each coat to dry 10 minutes. Between adhesive coat applications, brush may be kept in 3339 solvent.

PATCH APPLICATION.

a. Allow cemented surfaces to dry until tacky.

b. Center patch over damaged area and apply slowly, 1/2" to 1" at a time, making sure no air is trapped under the patch.

c. Apply pressure by rubbing a well rounded screwdriver handle (or similar tool) across the patch.

d. Weight or clamp repaired area between two pieces of wood (or metal) for a minimum of 8 hours with waxed paper (or similar material) between the repair and clamping blocks to prevent sticking. Avoid sharp edges on clamping blocks or plates.

CAUTION

Do not disturb repair for 24 hours and repaired container should be aged for 5 days at temperatures of 60°F to 80°F before returning to service.

13-13. FUEL CELL TESTING - U.S. RUBBER.

PROCEDURE FOR PHENOLPHTHALEIN - AMMONIA TESTING. When cells are removed from the airplane for suspected leakage, the following method for locating leaks may be used. This method may also be employed after local repairs have been made to check both the efficiency of the repair and presence of other leaks not originally found.

MATERIALS NEEDED:

a. Commercial or household ammonia (28-29% concentration).

b. Indicator solution -- contents per gallon as follows:

1. 1/2 gallon of distilled water.
2. 1/2 gallon of denatured alcohol.
3. 15 grams of phenolphthalein crystals or powder.

c. Approximately three yards of balloon cloth or airplane cloth.

PROCEDURE:

a. Pour ammonia on an absorbent cloth at the rate of 3cc per cubic foot of cell capacity with a minimum of 10 cc. Place saturated cloth inside cell.

b. Close all openings and apply positive test air pressure of 1/4 psi (4 ounces).

CAUTION

Never inflate an unsupported cell above a pressure of 1/4 psi (4 ounces). Pressures in excess of four ounces may damage the cell.

c. Soak cloth in phenolphthalein indicator solution.

d. Wring out cloth and spread evenly and smoothly over area of cell being checked.

e. Check all surfaces of cell. Leaks will be indicated by the appearance of pink spots on the cloth.

PRECAUTIONS:

a. Extreme caution must be maintained to prevent cover plates from damaging or cutting the cell during installation, phenol test, deflation and removal.

b. Unsupported test must be conducted on a flat, dirt free surface having no sharp projections or anything which could damage the inflated cell. An unsupported bladder cell can be inflated only to a pressure of 1/4 psi (4 ounces) maximum. Any pressure in excess of this will cause damage or rupture of the cell.

c. If phenolphthalein-ammonia solution is used more than 8 hours a new solution should be prepared.

SHOP NOTES:

13-14. GOODYEAR BTC-37 OR BTC-39 CELLS. Recommended repair procedures for Goodyear fuel cells are as follows:

REPAIRS. All field repairs should be made on a suitable size, well-lighted table, having a flat, smooth, clean surface. Prevent contact with sharp edges, corners, dirty floors or other surfaces. Repair area must be well ventilated.

WARNING

DO NOT PERMIT SMOKING OR OPEN FLAME NEAR REPAIR AREA OR FUEL CELLS.

Use Repair Kit No. 2F1-3-35342, which is available from the Cessna Service Parts Center. Fuel cells should be tested before and after repair using the procedure outlined in paragraph 13-15

WARNING

No repairs are to be made on the radius of a cell or in the fitting area of a cell. No damaged areas such as cuts and tears larger than three inches are to be repaired in the field. Cells with such damage should be replaced, or repaired by the manufacturer. Arrangements for manufacturer to repair a fuel cell should be made through Cessna.

KIT CONTENTS. The following is a list of materials contained in the repair kit:

DESCRIPTION		QUANTITY
*2331C Repair Cement	(8)	(1/2 pint cans, 173 cc in each can)
*2328C Cross-Linker	(8)	(1 oz bottles, 28 cc in each bottle)
Methyl Ethyl Ketone	(2)	(1 pint cans)
FT-160 Repair Fabric	(2)	(12" x 12" sheets)
Cellophane	(4)	(12" x 24" sheets)
Foam Rubber Cloth Back	(2)	(12" x 12" sheets)

*At room temperature, the shelf life of 2331C Repair Cement and 2328C Cross-Linker is six months from date of packaging.

Additional equipment necessary to perform repairs on Goodyear fuel cells are as follows:

DESCRIPTION		QUANTITY
Paint Brush	(1)	(1")
Roller	(1)	(1" diameter x 3/4" flat or equivalent)
Aluminum Plates	(2)	(1/4" x 6" x 6")
Cure Iron	(1)	(Goodyear Part No. 2F1-3-24721)

REPAIR LIMITATIONS.

a. Outside patches are to lap defect at least two and one quarter inches in any direction from cut.

b. Inside patches are to lap defect at least two inches in any direction from cut.

c. Outside patches are to be applied and cured prior to applying an inside patch.

d. Blisters between innerliner and fabric larger than one inch in diameter require an outside and an inside patch.

e. Separations between outer plies larger than one inch require an outside and inside patch. All holes and punctures require an outside and inside patch.

f. Slits or tears up to three inches maximum length require an outside and inside patch.

g. External abraided or scuffed areas without fabric damage require an outside patch only.

h. A loose lap may be trimmed provided that one inch effective bond remains.

i. Air cure repair patches are to remain clamped and undisturbed for 72 hours at room temperature of approximately 75 degrees F.

PREPARATION FOR REPAIR.

a. Wash damaged area on fuel cell with Methyl Ethyl Ketone, (MEK).

NOTE

When cleaning fuel cell, use a lint free cloth dampened with MEK and clean an area of approximately one square foot surrounding the damaged area. A total of three separate washings are recommended to assure cleanliness.

b. Cut a patch from repair material large enough to cover damaged area by at least two and one quarter inches in any direction from damage.

c. Taper edges and round corners of patch so as to present a feather edge to the cell when patch is applied.

d. Abraid cell wall surface about injury and contact side of patch with fine emery cloth to remove shine.

e. Repeat MEK washing two more times. A total of three washings for each surface is required.

f. Tape a piece of cellophane inside cell over injury. This is done to prevent cell walls from becoming stuck together when applying cement and patch.

g. When all of the preceding preparatory work has been done and cell has been positioned on repair table, mix cement as follows:

MIXING ADHESIVES. Mix repair cement, 2331C (1/2 pint can with 173 cc), with cross-linker 2328C, (1 ounce bottle with 28 cc), and stir thoroughly.

NOTE

Mixing cement is done immediately prior to use. The mixed cement has a pot life of 25 minutes after mixing. 2331C repair cement requires thorough mixing to obtain full adhesive values.

Brush one even coat of mixed repair cement on the cell wall around injury and on the contact side of repair patch. Allow this coat of cement to dry for twenty minutes.

PATCH APPLICATION.

a. Repeat a second mixing of repair cement and brush a second coat on the cell wall around injury and on the contact side of repair patch.

CAUTION

Do not use first can of mixed cement for second coat. Pot life of mixed cement is 25 minutes.

b. After the second coat of cement has been applied, and ten minutes of drying time allowed, center repair patch over injury.

c. With a roller, roll or press patch to cemented area of cell, starting at center of patch and working to outside edge to prevent air from being trapped between patch and cell. Hold the unrolled portion of repair patch off the cemented surface until roller contact insures an air free union. At this time, repair patch may be moved on wet surface to improve lap. Do not lift repair patch, slide it.

NOTE

Make sure cellophane inside cell over injury remains in place as it will prevent the inside surfaces of the cell being cemented together when clamp is placed on patch.

d. Cover one surface of each of the aluminum plates (plates must be larger than patch) with fabric-backed airfoam, fabric side out. Tape airfoam in place. Foam must cover edges of plate for protection.

e. Fold cell adjacent to patch and place prepared plates, one over repair patch, and one on opposite.

f. Secure the assembly with a "C" clamp. Tighten by hand. Check cement flow to determine pressure.

NOTE

Make sure that cell fold is not clamped between plates. This would cause a hard permanent crease. Also, make sure that patch does not move as clamp is tightened.

g. Leave cell clamped to air cure for 72 hours.

NOTE

Air cure repairs to be made at room temperature of approximately 75°F. For each 10 degree drop in temperature add 25 per cent cure time. Example: room temperature is 64 degrees, air cure for 90 hours instead of 72 hours.

h. After cure time has expired, remove clamp, metal plate, foam rubber, and cellophane. To remove cellophane use a wet cloth or sponge to dampen cellophane and remove by peeling off.

i. Inspect repair for any loose edges or unsatisfactory conditions. If a loose edge is found and it is no more than 1/4 inch it is permissible to trim and buff loose edge.

j. Inside patch is applied in the same manner as the outside patch except for size of repair patch after the outside patch has been cured.

NOTE

Success of applying an outside and inside repair patch simultaneously is doubtful and not recommended.

REPAIR PATCH - HEAT CURE METHOD. Follow procedures for air cure method, except attach cure iron to assembly during step "f", and plug electric cord into electrical outlet.

NOTE

After two hours cure time with cure iron, unplug electric and allow repair iron to cool for 15 minutes. Then remove "C" clamp, plates and cellophane. All heat cured patches are ready for use when thoroughly cooled.

13-15. FUEL CELL TESTING — GOODYEAR. Fuel cells should be tested after repair and before installation. Either of the following test procedures may be used; however, the chemical test is the more sensitive and preferred test.

SOAP SUDS TEST.

a. Install test plates on all fitting openings.

b. Inflate the cell with air to a pressure of 1/4 psi (4 ounces) maximum.

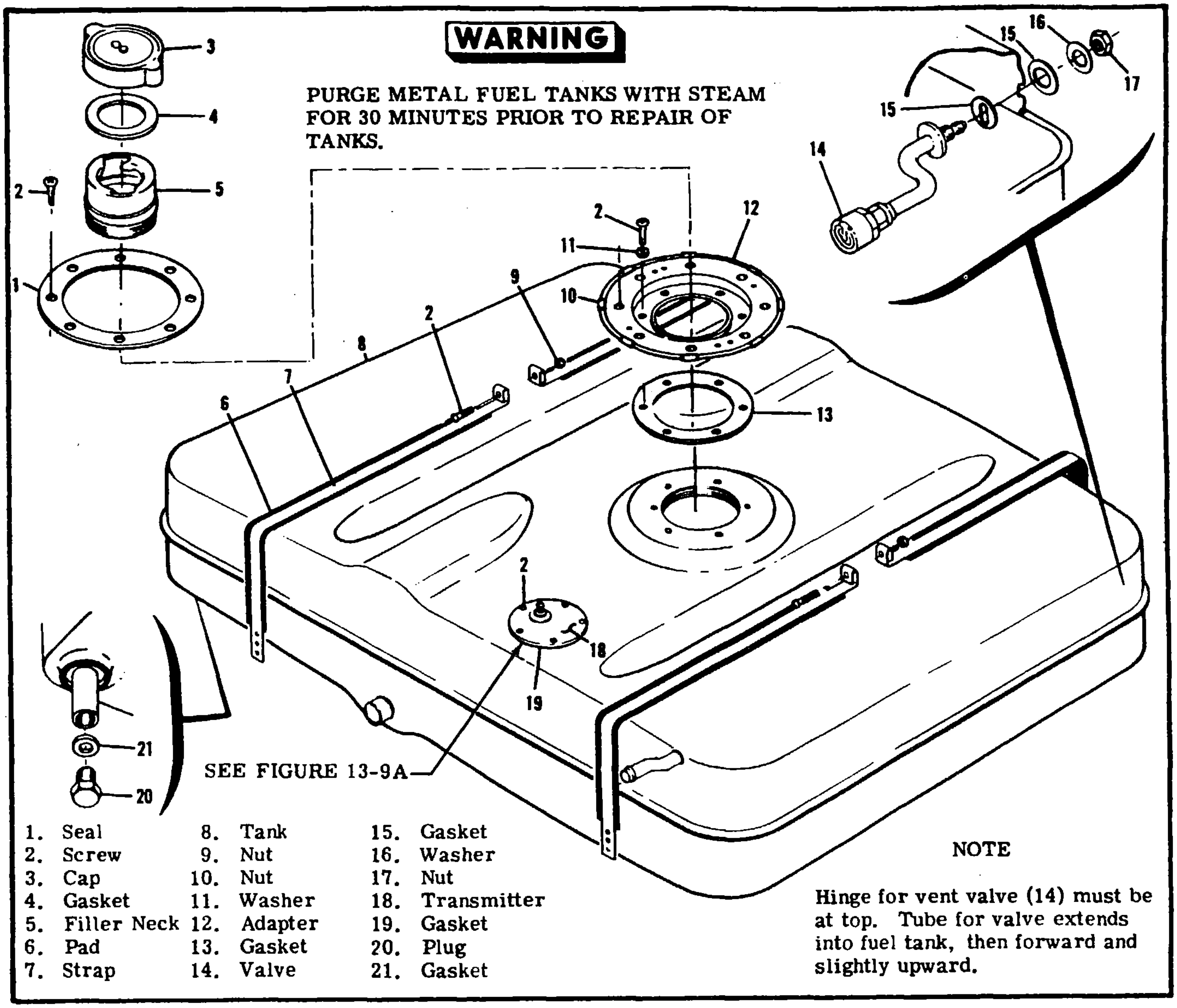


Figure 13-11. Fuel Tank - Model 150

CAUTION

Never inflate an unsupported cell above a pressure of 1/4 psi (4 ounces). Pressures in excess of four ounces may damage the cell.

c. Apply a soap and water solution to all repaired areas and all areas which are suspected of leakage. Bubbles indicate leakage in the cell.
d. After completion of test, clean exterior of cell and remove test plates.

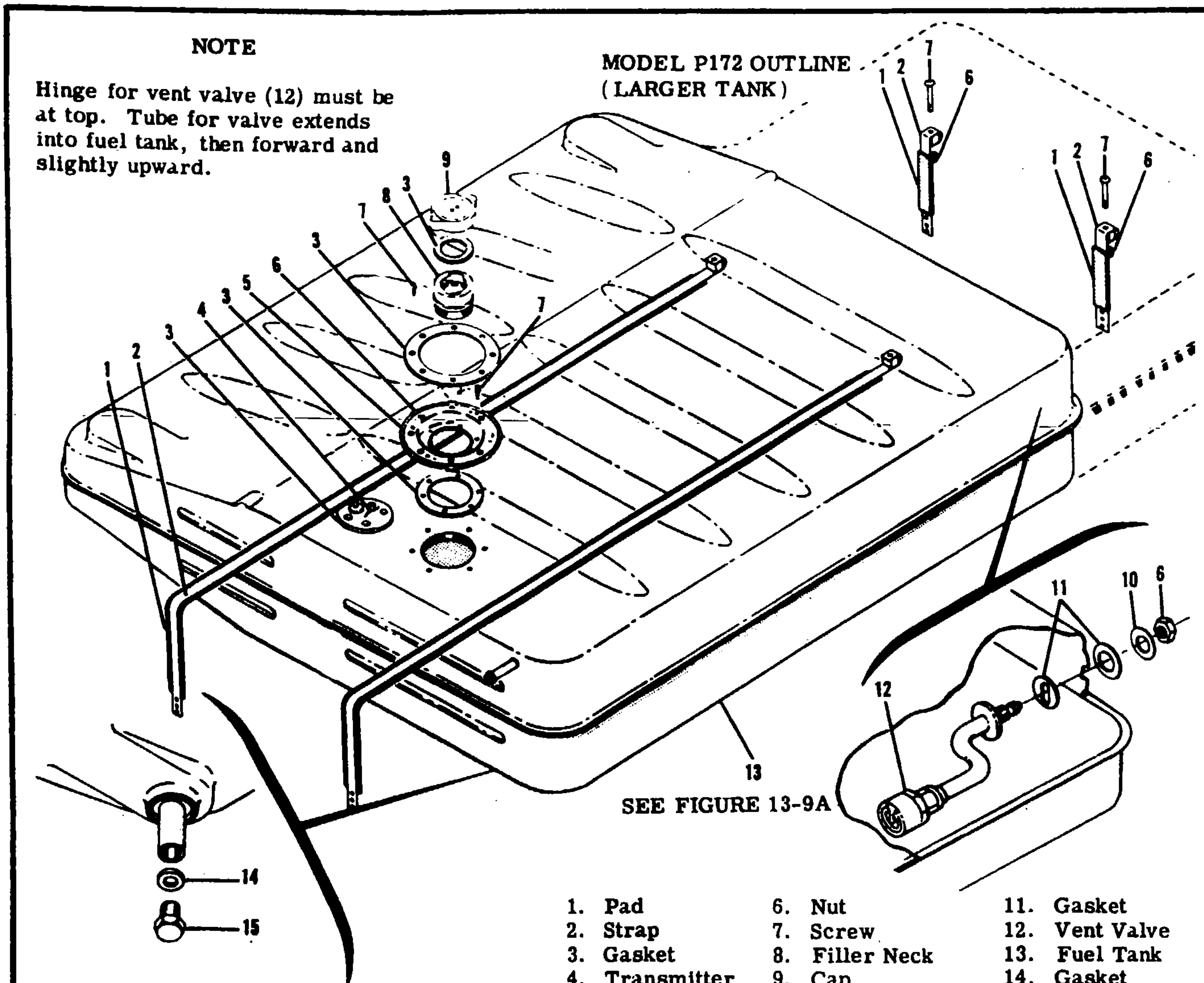
CHEMICAL TEST.
a. Install test plate on all but one fitting opening.
b. Pour ammonia on an absorbent cloth in the ratio of 3 cc per cubic foot of cell capacity.
c. Place the ammonia saturated cloth inside cell and install test plate on opening.
d. Make a phenolphthalein solution as follows: Mix 40 grams of phenolphthalein crystals in 1/2 gallon of ethyl alcohol. To this solution add 1/2 gallon of water.
e. Inflate the cell with air to a pressure of 1/4 psi (4 ounces) maximum.
f. Soak a large white cloth in the phenolphthalein solution.
g. Wring cloth out thoroughly and spread evenly and smoothly over outer surface of cell.
h. Check all surfaces of cell. Leaks will be indicated by the appearance of red spots on the cloth. If red spots appear on the cloth, they may be removed by soaking the cloth in the phenolphthalein solution.

NOTE

The phenolphthalein solution and test cloth are satisfactory only as long as they remain clean. Indicator solution that is not in immediate use should be stored in a closed container to prevent evaporation and deterioration.

NOTE

Hinge for vent valve (12) must be at top. Tube for valve extends into fuel tank, then forward and slightly upward.



REFER TO FIGURE 13-11 FOR PURGING TANKS

1.	Pad	6.	Nut	11.	Gasket
2.	Strap	7.	Screw	12.	Vent Valve
3.	Gasket	8.	Filler Neck	13.	Fuel Tank
4.	Transmitter	9.	Cap	14.	Gasket
5.	Adapter	10.	Washer	15.	Drain Plug

Figure 13-12. Fuel Tank - Model 172 and P172

i. After completion of test, remove all test plates and test equipment. Allow cell to air out.

13-16. FUEL TANK REPLACEMENT - 150, 172, AND P172.

NOTE

These airplanes are equipped with rigid, welded aluminum fuel tanks located in the inboard wing area. Since the installation is similar, the following general procedure may be followed for all subject airplanes.

a. Remove fuel sump drain plug and drain fuel.
b. Remove fuel tank cover by removing attaching screws.
c. Remove wing root fairings.
d. Disconnect all fuel and vent lines from fuel tank. Remove fittings as necessary for clearance when removing tank.
e. Disconnect electrical lead and ground strap from fuel quantity transmitter. Remove transmitter by removing attaching screws and carefully work it from fuel tank.
f. Disconnect straps securing fuel tank and remove the tank. Use care not to damage protruding fittings and hose connections when removing the tank.
g. Install tank by reversing preceding steps.

NOTE

Throughout the airplane fuel system, from the tanks to the engine-driven fuel pump or carburetor, use Parker Sealube (or equivalent) as a thread lubricant or to seal a leaking connection. Apply sparingly to male fittings only, omitting the first two threads. Always be sure that a compound, the residue from a previously used compound, or any other foreign material cannot enter the system.

13-17. REPLACEMENT OF FUEL GAGE TRANSMITTERS. (See figures 13-10, 13-11, and 13-12.)

a. Drain fuel from tank or cell.

b. On Models 150, 172, and P172 series, remove small access cover above fuel tank for access to fuel gage transmitter. On the Models 180, 182, and 185, remove wing root fairing.

c. Disconnect electrical lead and ground strap from transmitter.

d. On Models 150, 172, and P172, remove screws attaching transmitter to top of tank. On Models 180, 182, and 185, remove screws through unit and wing root rib.

e. Replace transmitter by reversing preceding steps. On rubberized fuel cells, no gasket paste should be used.

f. Fill tank; check for leaks and correct gage reading.

NOTE

Be sure grounding is secure and in accordance with figure 13-9A.

13-18. CHECKING FUEL VENT. Field experience has demonstrated that fuel vents can become plugged with possible fuel starvation of the engine or collapse of fuel cells. 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 end of vent line under the wing. On models with drain hole on lower side of vent tube, tape hole closed.

b. On airplanes equipped with a vent for each tank, plug vent on opposite wing from one being tested.

c. Blow into tube to pressurize tank. If air can be blown into tank, vent line is open.

d. After tank is slightly pressurized, insert end of tube into a container full of water and watch for continuous stream of bubbles which indicate bleed hole in valve assembly is open and relieving pressure.

e. On airplanes equipped with a vent for each tank repeat procedure for opposite tank.

NOTE

Remember that a plugged vent line or bleed hole can cause either fuel starvation and collapsing of fuel cells or the pressurizing of the tanks by fuel expansion.

13-19. FUEL SELECTOR VALVE REPLACEMENT. (MODELS P172, 180, 185, AND PRIOR TO 172F.) A fuel selector valve is installed in the Model 185 optional fuel system. To replace a fuel selector valve proceed as follows:

a. Completely drain all fuel from wing tanks, fuel strainer, fuel lines, and valve.

b. Remove tunnel cover rectangular access plate and access plate on bottom of fuselage adjacent to selector valve.

c. Disconnect and cap or plug all fuel lines at selector valve.

d. Disconnect handle shaft from valve.

e. Remove screws or bolts attaching valve to structure and remove valve.

f. Reverse the preceding steps to install the valve.

NOTE

Throughout the airplane fuel system, from the tanks to the engine-driven fuel pump or carburetor, use Parker Sealube (or equivalent) as a thread lubricant or to seal a leaking connection. Apply sparingly to male fittings only, omitting the first two threads. Always be sure 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 lubricating oil, on the fitting threads. Do not use any other form of thread compound on the injection system fittings.

13-20. FUEL SELECTOR VALVE REPLACEMENT. (MODEL 182 AND MODEL 172F AND ON.)

a. Completely drain all fuel from wing tanks, fuel strainer, fuel lines, and valve.

b. Remove fuel selector valve handle and cup.

c. Remove console cover.

d. Unfasten and fold carpet back, then remove access plates at bottom of console and just aft of console.

e. Disconnect handle shaft from valve.

f. Disconnect and cap or plug all fuel lines at selector valve.

g. Remove screws attaching valve to structure and remove valve.

h. Reverse the preceding steps to install the valve. Observe the note in paragraph 13-19.

13-21. FUEL SHUT-OFF VALVE REPLACEMENT. (MODEL 150.)

a. Completely drain all fuel from wing tanks, fuel strainer, fuel lines, and valve.

b. Remove shut-off valve handle.

c. Prior to the Model 150F, unfasten and fold carpet back on the right side of the valve and remove access plate just forward of the right seat. On the Model 150F and on, remove the right seat and the access plate under it.

d. Disconnect and cap all lines at shut-off valve.

e. Remove bolts attaching valve and remove valve.

f. Reverse the preceding steps to install the valve. Observe the note in paragraph 13-19.

13-22. FUEL SHUT-OFF VALVE REPLACEMENT. (MODEL 185.)

a. Completely drain all fuel from wing tanks, fuel strainer, fuel lines, and valve.

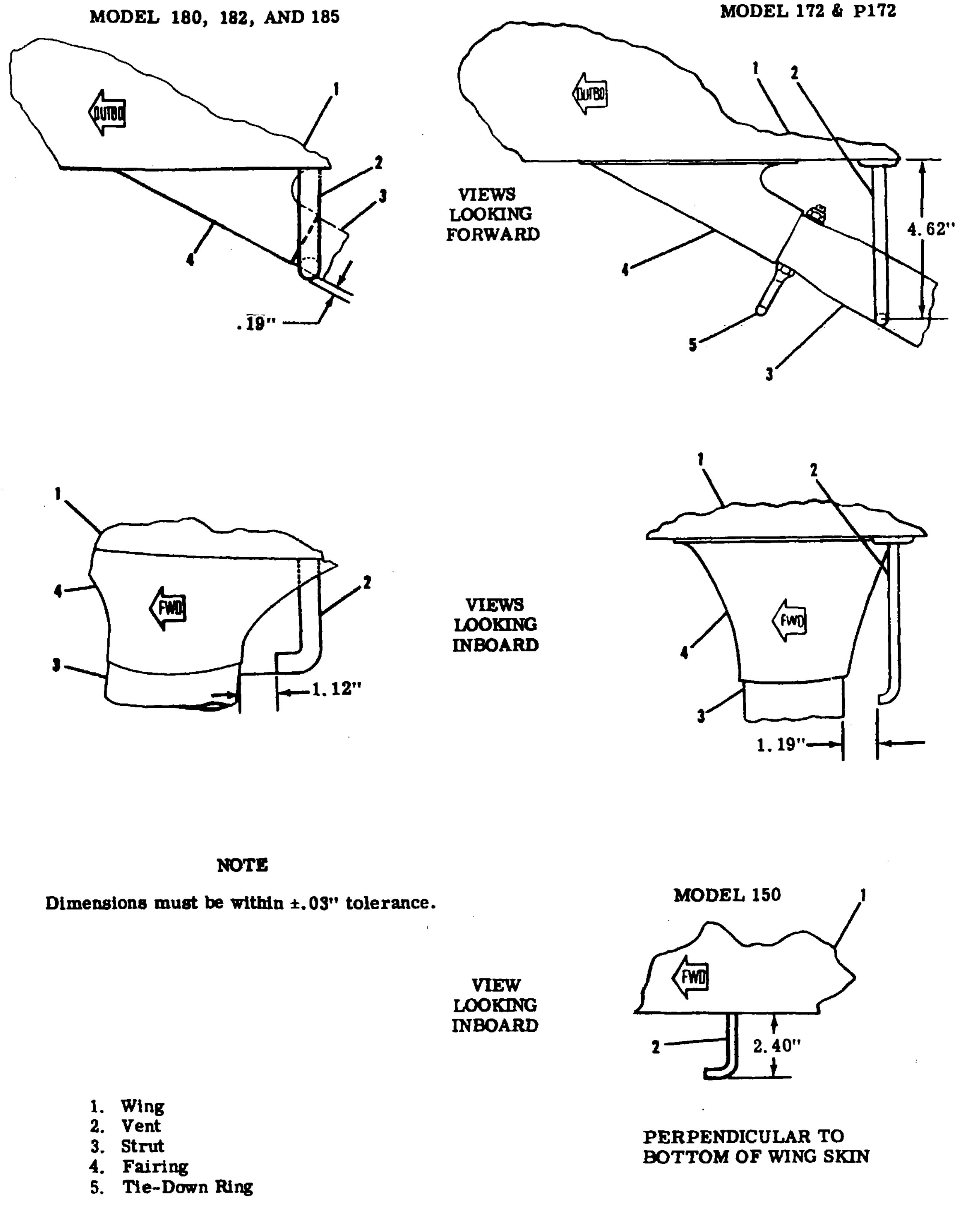
b. Remove access plate from underside of fuselage below accumulator tank and shut-off valve.

c. Remove cotter pin attaching valve handle to valve and remove handle.

d. Disconnect and cap or plug fuel line at shut-off valve.

e. Screw valve from bottom of accumulator tank.

f. Reverse the preceding steps to install the valve. Observe the note in paragraph 13-19.

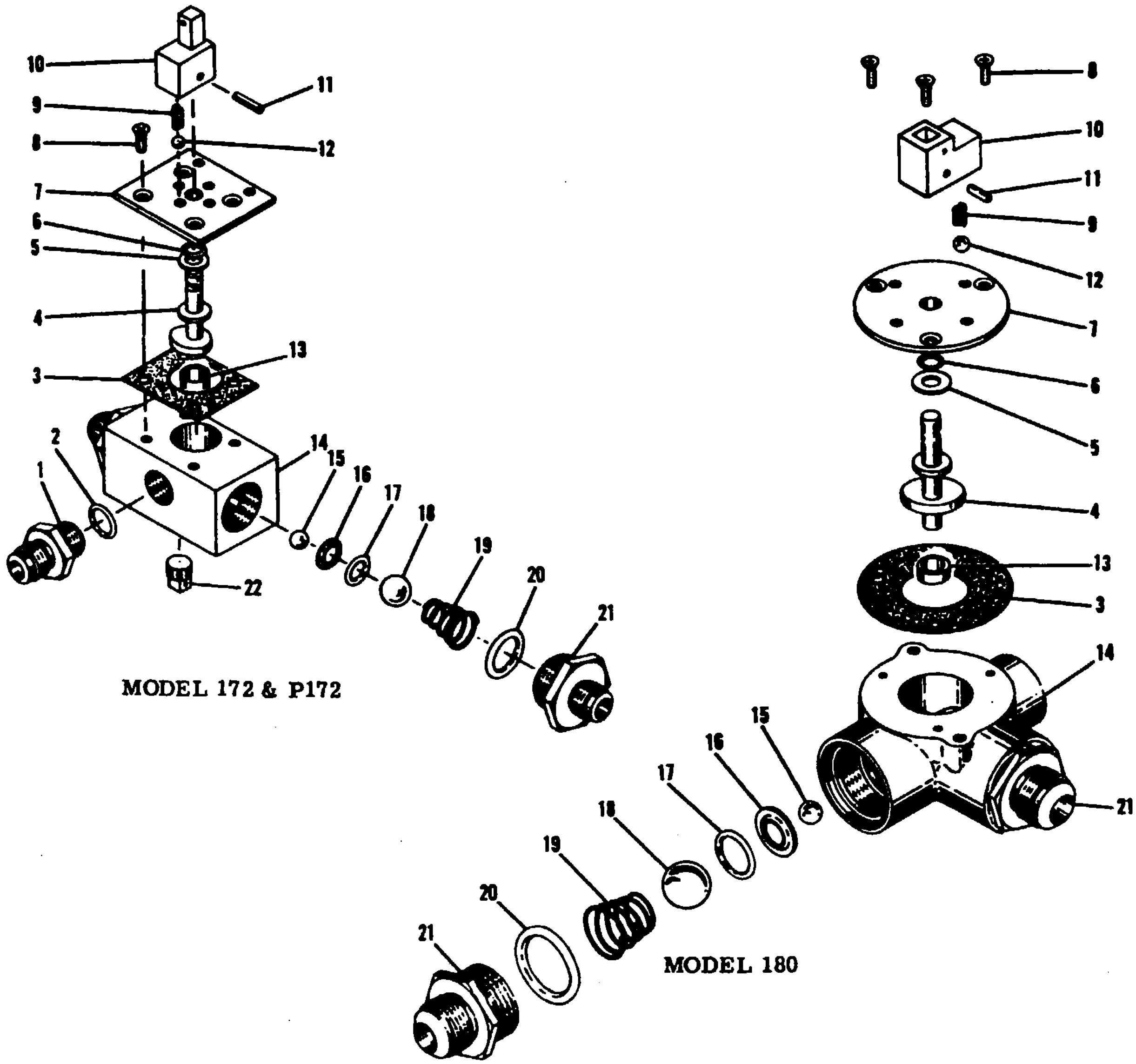


NOTE

Dimensions must be within ±.03" tolerance.

1. Wing
2. Vent
3. Strut
4. Fairing
5. Tie-Down Ring

Figure 13-13. Fuel Vent Location



NOTE

Model 185 and Model 150 standard fuel systems utilize a fuel shut-off valve. Model 185 optional fuel systems uses both a fuel shut-off valve and a fuel selector valve.

1. Nipple
2. O-Ring
3. Gasket
4. Cam
5. Washer
6. O-Ring
7. Cover
8. Screw
9. Spring
10. Housing
11. Roll Pin
12. Ball
13. Bushing
14. Body
15. Ball
16. Retainer
17. O-Ring
18. Ball
19. Spring
20. O-Ring
21. Nipple
22. Plug

Figure 13-14. Fuel Selector Valves (Sheet 1 of 2)

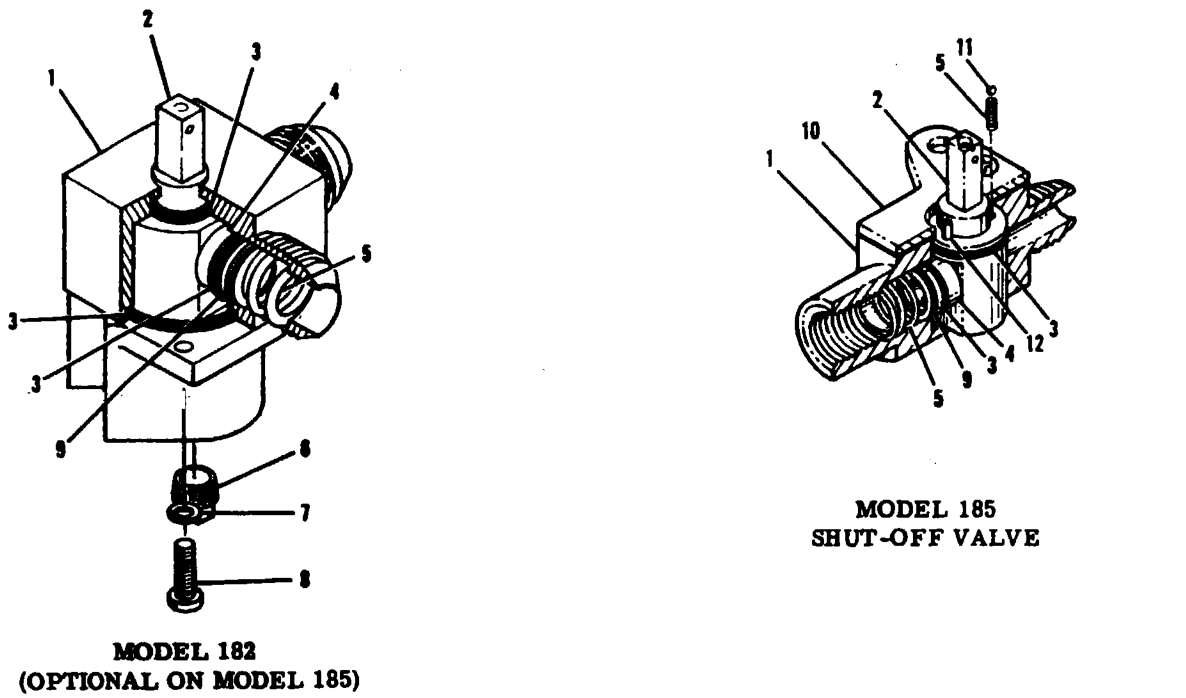


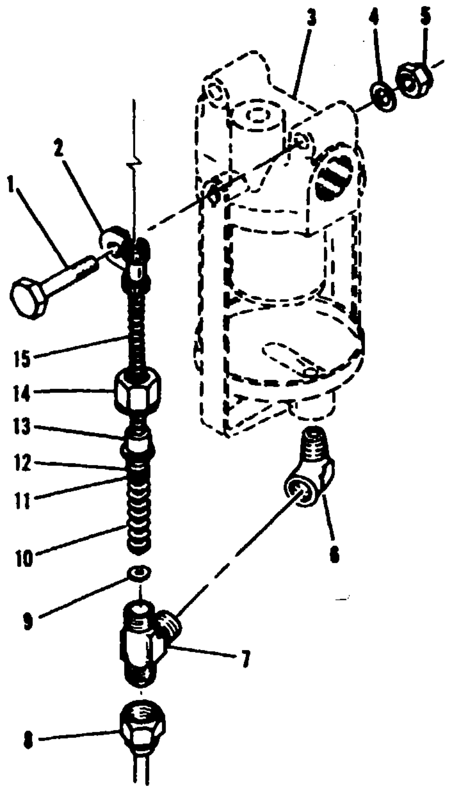
Figure 13-14. Fuel Selector Valves (Sheet 2 of 2)

13-23. SELECTOR VALVE AND SHUT-OFF VALVE REPAIR consists of replacement of seals, springs, balls, and other detail parts. Figure 13-14 shows the proper relationship of parts and may be used as a guide during disassembly and assembly of these valves. Do not disassemble Model 150 valve.

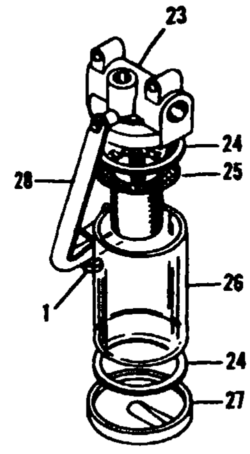
13-24. FUEL STRAINER REPLACEMENT AND CLEANING. The fuel strainer is mounted on the firewall in the engine compartment. On some models, the strainer is attached to a bracket mounted on the firewall. The fuel strainer may be removed by detaching fuel lines, disconnecting strainer drain control, if used, and removing mounting bolts. Disassembly of the strainer shown on sheet 1 of figure 13-15 is accomplished by loosening the bolt at the bottom of the strainer and swinging the arm aside. Clean with solvent and dry with compressed air. Use new gaskets at assembly. Be sure to resafety bottom bolt. The fuel strainer shown on sheet 2 of figure 13-15 has an integral remote strainer drain control. To disassemble this type strainer, proceed as follows:

a. Turn off fuel selector valve and drain strainer.
b. Remove drain tube if installed, 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 if installed.
g. Turn on fuel selector valve, close strainer drain and check for leaks. Check for proper operation of strainer drain control.
h. Safety wire bottom nut to top assembly. Wire must have right hand wrap, at least 45 degrees.

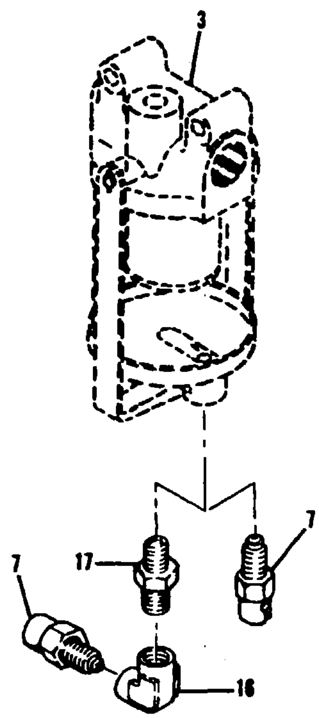
13-25. FUEL STRAINER DRAIN. All strainers are equipped with drain valves, some of which are oper-



THRU 18256039



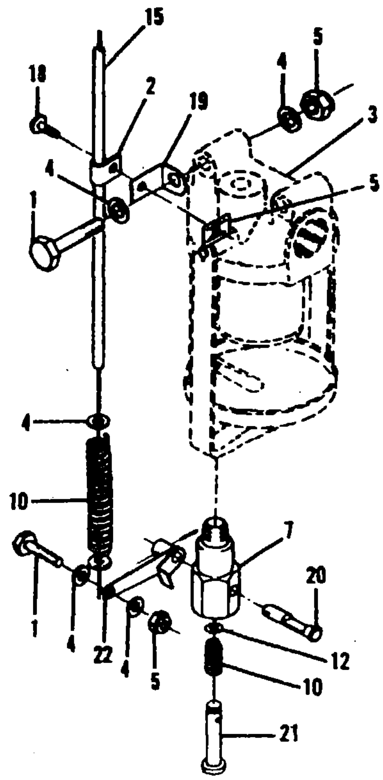
TYPICAL ALL MODELS
PRIOR TO STRAINER
SHOWN ON SHEET 2



THRU 15061152

NOTE

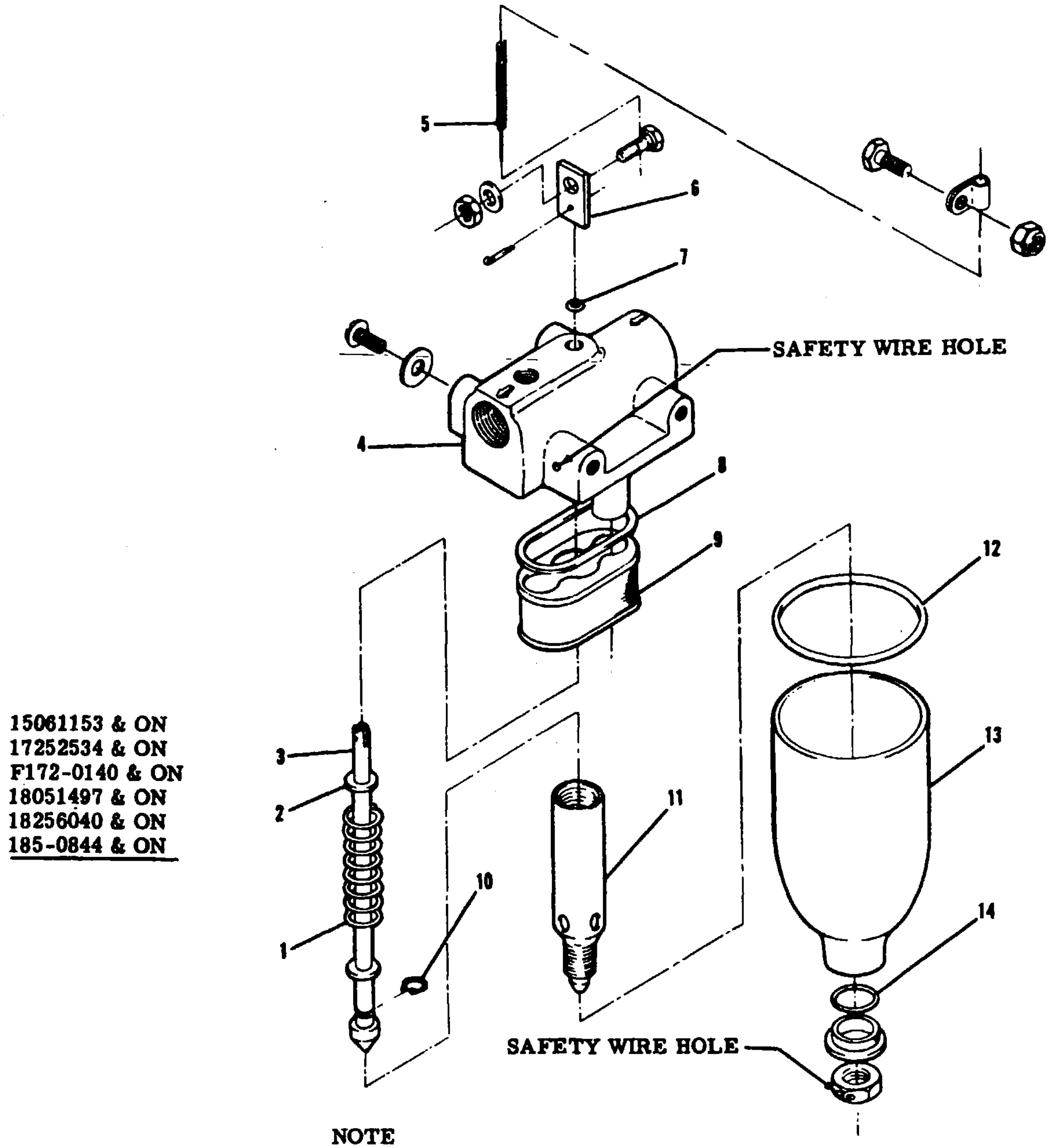
Fuel strainers vary in methods of mounting and strainer drain controls vary in routing and attachment to the drain valve for the different models. Elbow (16) and nipple (17) are used when speed fairings are installed on the Model 150.



THRU
17252533
F172-0139
P172D
18051496
185-0843

1. Bolt
2. Clamp
3. Fuel Strainer Assembly
4. Washer
5. Nut
6. Elbow
7. Valve Body
8. Drain Tube
9. Valve Seat
10. Spring
11. Washer
12. O-Ring
13. Sleeve
14. Nut
15. Control
16. Elbow
17. Nipple
18. Screw
19. Support Angle
20. Valve Shaft
21. Valve Plunger
22. Arm
23. Strainer Body
24. Gasket
25. Filter Screen
26. Glass Bowl
27. Bottom Cap
28. Arm Assembly

Figure 13-15. Fuel Strainer (Sheet 1 of 2)

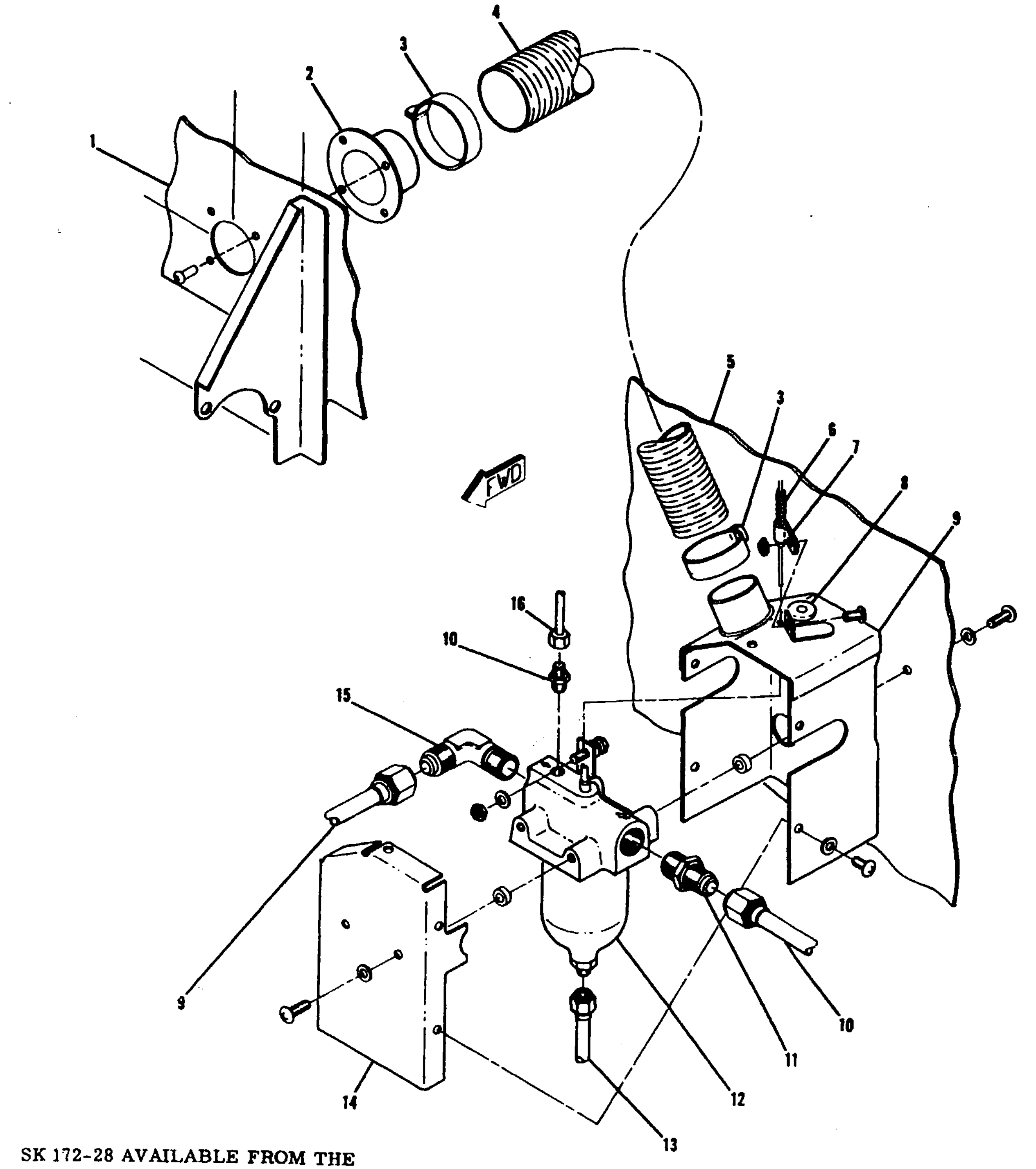


NOTE

Fuel strainers vary in methods of mounting and strainer drain controls vary in routing for the different models. On some models, a drain tube is attached to standpipe (11) to drain fuel overboard.

1. Spring
2. Washer
3. Plunger
4. Top Assembly
5. Drain Control
6. Plate
7. O-Ring
8. Gasket
9. Filter
10. Retainer
11. Standpipe
12. O-Ring
13. Bowl
14. O-Ring

Figure 13-15. Fuel Strainer (Sheet 2 of 2)

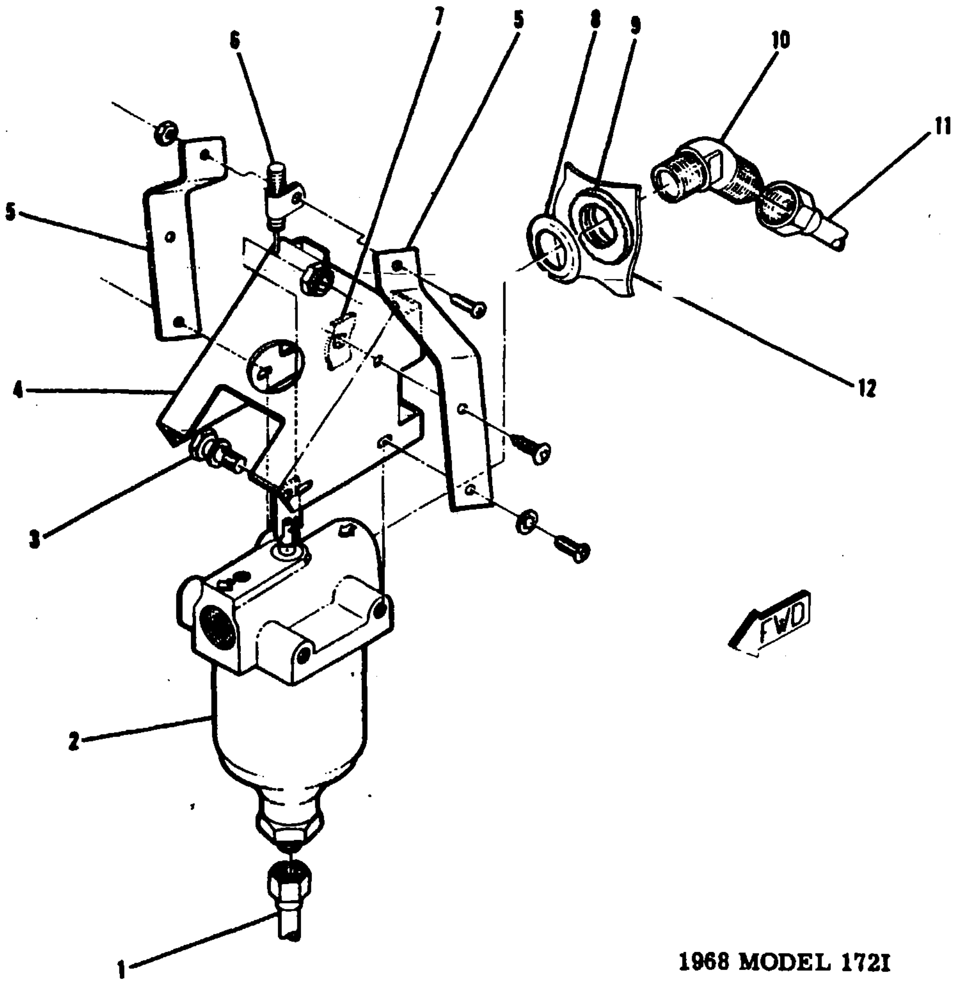


SK 172-28 AVAILABLE FROM THE
CESSNA SERVICE PARTS CENTER

SERIALS 17252534 THRU 17256512

1. Upper RH Engine Baffle
2. Union Assembly
3. Clamp
4. Duct
5. Firewall
6. Drain Control
7. Bracket
8. Grommet
9. Support Assembly
10. Fuel Line
11. Nipple
12. Fuel Strainer
13. Drain Line
14. Cover Assembly
15. Elbow
16. Primer Line

Figure 13-15A. Fuel Strainer Blast Tube Installation - Model 172



1968 MODEL 172I

1. Drain Tube
2. Fuel Strainer
3. Clamp Bolt
4. Bracket
5. Bracket
6. Control
7. Nut
8. Shield
9. Grommet
10. Elbow
11. Fuel Line
12. Firewall

Figure 13-15B. Fuel Strainer Shroud Installation - Model 172 ated by a strainer drain control. The type shown on sheet 2 of figure 13-15 is an integral drain which is removed as the strainer is disassembled. Two types of strainer drain controls are used with the strainer shown on sheet 1 of figure 13-15. The type that uses an arm to operate the valve may be disassembled and reassembled while using the illustration as a guide. The type that resembles a tee fitting should be disassembled and reassembled as follows:

CAUTION

Use care not to bend the control or damage parts during disassembly or reassembly.

a. Remove clamp (2).
b. Unscrew nut (14) connecting the control to valve body (7) and pull control out of the body.
c. To replace valve seat (9), remove the old seat with a hook and tap the new seat into position.
d. To replace O-ring (12), remove the old one and discard it. Place a smooth, thin-walled, well-greased tube over spring and small washer (11) on the end of the control (greased tape may be used) and carefully slide the O-ring into position past the washer. Remove the tube or tape.
e. From the cabin, pull the control knob out only far enough to remove all slack between the parts at the lower end of the control. Maintaining this position of the control, align the O-ring with washer (11) and sleeve (13).
f. Insert the control into the valve body until it bottoms. Pull the control knob out until the lower end of the control can be pushed into the valve body far enough for the O-ring to slip past the chamfer on top of the valve body. After the O-ring is inside the valve body, pull the control knob all the way out and keep it out until nut (14) has been tightened. After tightening the nut, release the control knob.
g. Reinstall clamp (2).

13-26. PRIMER SYSTEMS are all of the 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. Several methods are used to distribute this fuel. On some models, fuel is injected into intake manifolds or riser. Some models use a tee fitting and prime two cylinders. Other models use a primer distributor and prime either five or six cylinders. Replacement of the primer is accomplished by disconnecting the fuel lines at the primer and removing the primer from the instrument panel. Before installing a primer, check it for correct pumping action and positive fuel shut-off in the locked position. Primer lines should be replaced when crushed or broken and should be properly clamped to prevent fatigue due to vibration and chafing.

13-27. ELECTRIC AUXILIARY FUEL PUMP.

13-28. The electric auxiliary fuel pump used on the Model 185 is a 35 gallon-per-hour pump supplying a pressure of 23-24 psi when powered by 14 vdc. The pump is mounted (see figure 13-16) on the firewall and is enclosed by a cooling shroud. An integral bypass and check valve permits fuel flow through the pump even when the pump is not operat-

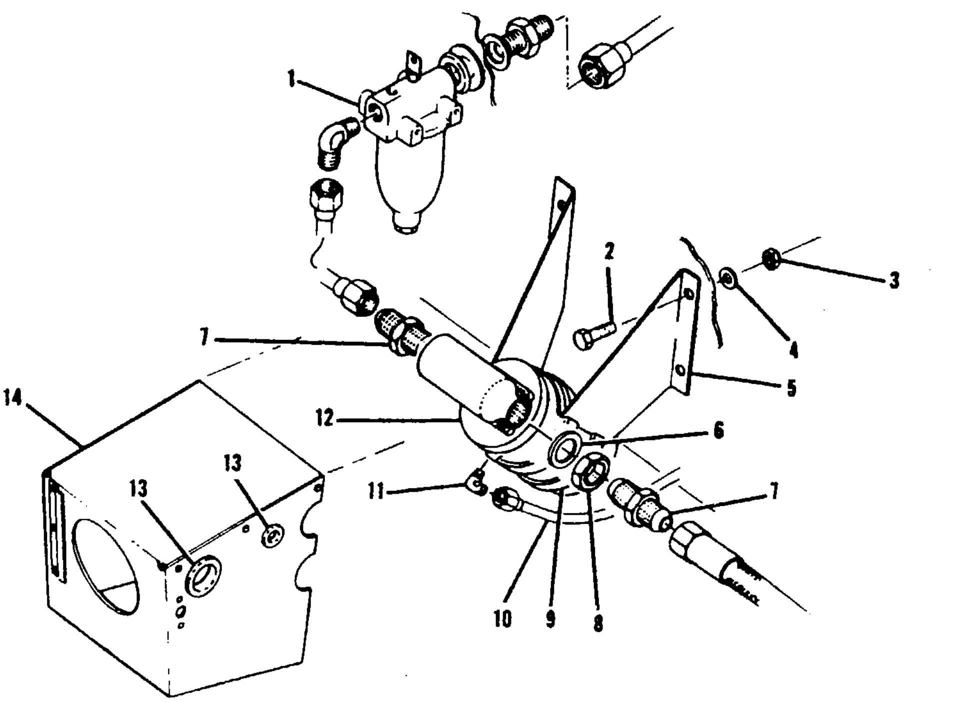
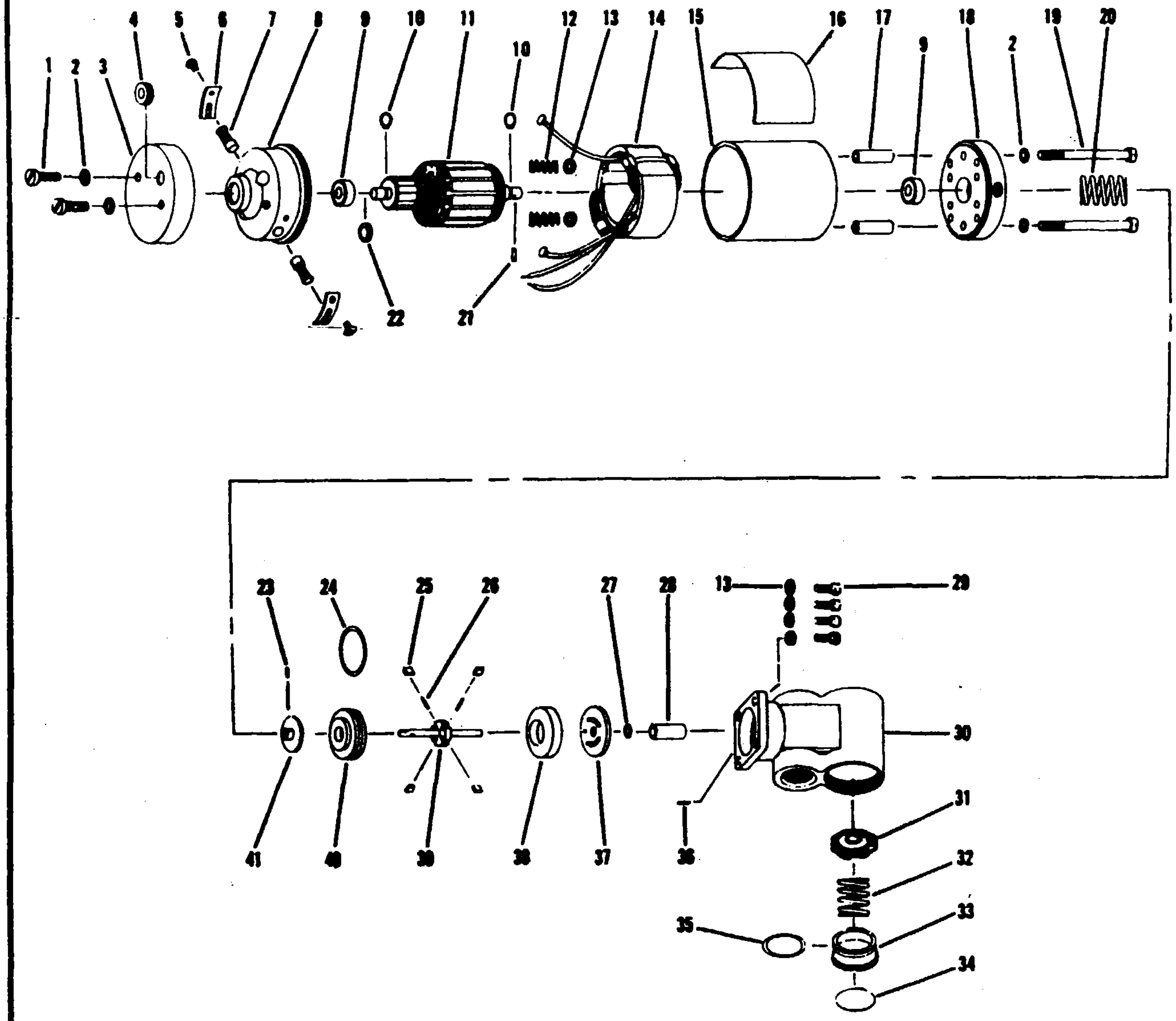


Figure 13-16. Electric Auxiliary Fuel Pump Installation - Model 185



1. Screw	15. Shell
2. Lockwasher	16. Nameplate
3. Cover	17. Spacer
4. Grommet	18. Shaft End Bell
5. Screw	19. Screw
6. Brush Retainer	20. Retention Spring
7. Brush Assembly	21. Motor Shaft Pin
8. End Bell	22. Spacer
9. Bearing	23. Slinger Pin
10. Truarc Ring	24. Bearing O-Ring
11. Armature	25. Vane
12. Spring	26. Vane Pin
13. Lockwasher	27. Bearing O-Ring
14. Field Assembly	

28. Body Bearing
29. Screw
30. Pump Body
31. Swing Check Assembly
32. Spring
33. Adjusting Plug
34. Nameplate
35. O-Ring
36. Housing Pin
37. Bearing Plate
38. Spacer
39. Rotor and Shaft Assembly
40. Bearing and Seal Assembly
41. Slinger Ring

Figure 13-17. Electric Auxiliary Fuel Pump - Model 185 ing 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.

13-29. DISASSEMBLY. (See figure 13-17.)
a. Remove screws (29) and washers (13), and separate motor and pump.

CAUTION

Use care when removing screws (29) as spring (20) is under compression.

13-30. DISASSEMBLY OF MOTOR. (See figure 13-17.)
a. Loosen screws (19) but do not remove.
b. Remove cover (3) by removing screws (1) and washers (2).
c. Remove brush holders (6) and brush assemblies (7) by removing screw (5).
d. Loosen screws (19) and remove end bell (8), but do not remove screws (19) from shaft end bell (18).
e. Remove bearing (9) from end bell (8).
f. Remove armature (11).
g. Remove springs (12), washers (13), field (14), shell (15), spacers (17), screws (19), and washers (2) from shaft end bell (18).
h. Remove bearing (9) from shaft end bell (18).
i. Do not remove spacer (22), Truarc ring (10), or motor shaft pin (21) unless replacement is necessary.

13-31. INSPECTION OF MOTOR COMPONENTS.
a. Thoroughly wash all parts of motor, except brushes (7), bearings (9), armature (11), and field (14) in cleaning solvent (Federal Specification P-S-661, or equivalent) and dry parts with filtered compressed air.
b. Wipe parts not washed in solvent with a clean cloth.
c. Inspect all parts for damage and evidence of excessive wear.
d. Inspect all parts for breakage or distortion.
e. Replace any worn or damaged parts.

13-32. REASSEMBLY OF MOTOR. The assembly procedure for the motor is the reverse of the disassembly procedure. When reassembling, pay special attention to the following items:
a. Spacers (17), springs (12), and washers (13) must be held in place by screws (19) when assembling end bell (8).
b. Compress end bell (8) until screws (19) are engaged, then tighten screws (19) evenly to a torque value of 10 pound-inches.
c. Brushes (7) are contoured, therefore the contour of the brush must match the armature commutator when being installed.

13-33. DISASSEMBLY OF PUMP.
a. Remove pin (23) and remove slinger ring (41).
b. Remove bearing and seal assembly (40) and rotor and shaft assembly (39) from pump body (30).

NOTE

Vanes (25) and pins (26) are attached to rotor (39) and are removed with rotor and shaft assembly.

c. Remove spacer (38), bearing plate (37), O-ring (27), and body bearing (28) from pump body (30).

13-34. INSPECTION OF PUMP COMPONENTS.
a. Thoroughly wash all parts in cleaning solvent (Federal Specification P-S-661, or equivalent) and dry with filtered compressed air.
b. Inspect all parts for damage and evidence of excessive wear.
c. Replace all O-rings, and bearing and seal assembly.
d. Replace any damaged or worn parts.

13-35. REASSEMBLY OF PUMP. The assembly procedure for the pump is the reverse of the disassembly procedure. When reassembling, pay special attention to the following items:
a. Pin (36) must be correctly located in pump body (30) in order to properly position bearing plate (37) and spacer (38). Location holes in bearing plate and spacer must align with pin.
b. Vanes (25) and pins (26) must be assembled to the rotor and shaft assembly (39), and held in place while installing in pump body (30).
c. Use a suitable lubricant on O-rings to prevent damage when installing. Recommended lubricant for O-rings is Dow Corning Silicone No. 4.

13-36. DISASSEMBLY OF BYPASS AND PRESSURE RELIEF.
a. Remove nameplate (34), plug assembly (33), spring (32), and swing check assembly (31) from pump body (30).

13-37. INSPECTION OF BYPASS AND PRESSURE RELIEF.
a. Thoroughly wash all parts in cleaning solvent (Federal Specification P-S-661, or equivalent) and dry with filtered compressed air.
b. Inspect all parts for damage and evidence of excessive wear.
c. Inspect swing check assembly seat for damage.
d. Replace O-rings and all other damaged parts.

13-38. REASSEMBLY OF BYPASS AND PRESSURE RELIEF. The assembly procedure for the bypass and pressure relief is the reverse of the disassembly procedure. When reassembling, pay special attention to the following:
a. Install swing check assembly (31) so it is seated on seat in pump body (30). The valve must open inwardly.

13-39. ADJUSTING PRESSURE RELIEF.
a. Install pump assembly in appropriate test stand (see figure 13-18).
b. While maintaining a no flow condition, adjust plug (33) until a relief pressure of 23 to 24 psi is obtained.
c. After correct pressure is obtained, seal plug (33) at threads with Epocast Epoxy No. 212-10 mixed with hardener No. 9816. (Reference: Furane Plastics.)
d. Allow Epoxy to dry and install nameplate (34).

13-40. FUNCTIONAL TEST PROCEDURE. Each unit shall be set up in test stand as shown in figure

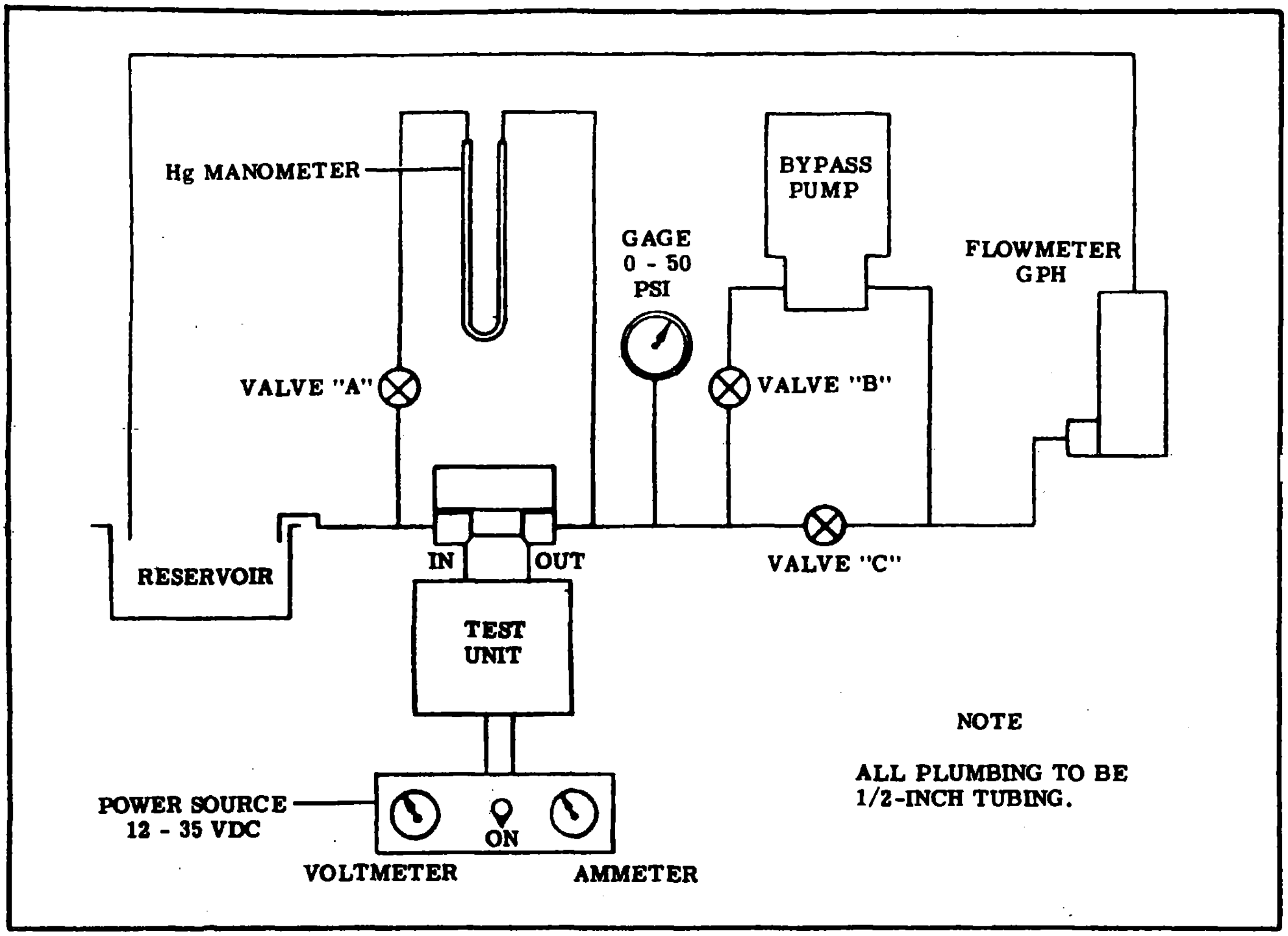


Figure 13-18. Test Stand Schematic

13-18 and functional tested as follows:

a. Flow Tests.

1. Apply 14 vdc to test unit.

2. With valves A and B closed, adjust valve C to outlet pressures of 5.0 psi increments until maximum relief is reached at no flow.

NOTE

No flow pressure shall be 27.5 psig maximum.

b. Bypass Pressure Drop.

1. With unit shut-off, open valves A and B.

2. Close valve C and energize bypass pump.

3. Adjust valve B until flowmeter reads 40 gph and record inches of mercury as read on Hg manometer.

NOTE

Pressure drop shall not exceed 0.60 inches of mercury. Bypass pressure drop is 0.35 psi maximum at 40 gph.

c. Installation Resistance Test.

1. Apply 50 volts dc across both leads and pump case. Insulation resistance shall be 50 megohms maximum.

13-41. ELECTRIC FUEL PUMP CIRCUIT - Model 185. (See figures 13-3 and 13-4.) 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 (PRIME) or START, is used for starting the engine. With the switch in this position and the ignition-starter switch turned to START, 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.

NOTE

The auxiliary fuel pump will not operate with the switch in the LOW (PRIME) or START position until the ignition-starter switch is turned to the START position.

The up position of the switch, labeled HIGH or EMERGENCY, 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 let-down, 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. This action automatically prevents an excessively rich mixture during these periods of reduced engine speed.

The auxiliary fuel pump is not to be on HIGH 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 HIGH or EMERGENCY and leaning the mixture as required to prevent an excessively rich mixture. Successful vapor purging is evidenced by smooth engine operation and steady and normal fuel flow indications with the auxiliary fuel pump switch OFF.

NOTE

If the auxiliary fuel pump switch is accidentally turned to HIGH or EMERGENCY (with master switch on) with the engine stopped, intake manifolds will be flooded unless the mixture is in idle cut-off.

The center position of the auxiliary fuel pump switch is OFF.

13-42. RIGGING THROTTLE-OPERATED SWITCH. The Model 185 is equipped with a throttle microswitch which slows down the electric fuel pump whenever the throttle is retarded while the electric pump is being used. The microswitch should slow down the pump as the throttle is retarded to approximately 16 inches of mercury manifold pressure.

a. Start engine and set throttle to obtain 16 inches of mercury manifold pressure. Carefully mark throttle position, then stop engine.

NOTE

The throttle may be maintained in this position if desired, for the engine may be stopped by use of the mixture control and ignition switch.

b. Loosen screws on the throttle microswitch (located on induction airbox) and adjust microswitch as required to cause the electric fuel pump to slow down as the throttle is retarded to the marked position. With master switch ON, auxiliary fuel pump in HIGH or EMERGENCY, and mixture control in IDLE CUT-OFF, listen for change in sound of electric fuel pump as it slows down (16±1 inches of mercury).

SHOP NOTES:

SECTION 14

PROPELLERS

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NOTE

Federal Aviation Regulations, Part 43, (FAR 43) define major and minor repairs and alterations and who may accomplish them. This section may be used as a guide, but the Federal Aviation Regulations and the propeller manufacturer's instructions must be observed.

14-1. PROPELLERS.

14-2. All-metal, fixed-pitch propellers are used on Models 150 and 172. All other aircraft described in this manual are equipped with all-metal, constant-speed, governor-regulated propellers. All propellers are equipped with spinners.

14-3. REPAIR of metal propellers first involves evaluating the damage and determining whether the repair will be a major or minor one and, in accordance with Federal Aviation Regulations, who is permitted to accomplish the repair.

a. General Repair Considerations:

Under no circumstances are the raised edges of defects to be corrected by peening. No welding, soldering or compounds of any nature are to be used to fill or correct defects. All repair is to be in accordance with standard approved and accepted practice.

More than one defect on blade is not cause for considering blade not airworthy if repair is within indicated limits. A reasonable number of repairs per blade is permissible if their location with respect to each other is not such as to form a continuous line that may materially weaken blade. Any transverse crack shall be cause for considering blade not airworthy.

Repair necessitating the removal of an appreciable amount of metal shall be reason to check horizontal and vertical balance.

The repair of defects is permissible providing the treatment does not materially weaken the blade, reduce its weight, or impair its performance.

b. Defects on Thrust Face or Camber Side:

Repair by removal of metal to form shallow, large radius, round bottomed depressions. Periodic inspection during repair should be made to avoid removal of excessive amounts of metal. All raised edges should be carefully smoothed out to reduce the area of the defect and the amount of metal to be removed. Repair with suitable fine cut files and coarse grain emery cloth and smooth all edges and surfaces with fine grain emery cloth. Any blade repair on these surfaces which necessitates a depression that exceeds the manufacturer's tolerances or those listed in FAR 43 shall be cause for considering blade not airworthy.

c. Defects on Leading and Trailing Edge:

Repair defects as outlined in step "b" with suitable half round file and emery cloth. Carefully smooth all edges of repaired defect. Any blade repair on leading and trailing edges which necessitates metal removal that exceeds the manufacturer's tolerances or those listed in FAR 43 shall be cause for considering blade not airworthy.

Blades that have leading or trailing edges pitted from normal wear may be reworked by removing sufficient metal to eliminate the pitting. Start well back from the edge and work over the edge in such a manner that the contour of the blade remains substantially the same. Avoid abrupt section changes and blunt edges. Permissible reductions in blade thickness and width, listed in the manufacturer's publications or FAR 43, must be observed.

d. Tip Damage:

Damage on blade tips may be removed in accordance with steps "b" and "c," as long as metal removed is within the tolerances specified. Damage which cannot be repaired by local removing of metal may be repaired by removing metal so as to shorten blades, although shortening blades is a propeller major repair. Any shortening of one blade requires an identical shortening of the other one, and any change in tip plan form or contour of one blade requires an identical change on the other one. Limitations concerning shortening of blades are specified in the manufacturer's publications or FAR 43.

e. Refinishing:

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

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

14-4. FIXED-PITCH PROPELLERS.

14-5. REMOVAL.

a. On the Model 150, remove the small spinner. If the optional large spinner is installed, remove the spinner dome.

b. On the Model 172, remove the spinner dome.

c. Remove propeller mounting bolts and pull the propeller forward to remove.

d. The Model 150 small spinner mounting bracket is attached by two of the propeller mounting bolts. The Model 150 large spinner and the Model 172 spinner are attached to two spinner bulkheads, one in front of the propeller and one aft of the propeller. These bulkheads are secured by propeller mounting bolts and will be freed by removal of the bolts as the propeller is removed.

14-6. INSTALLATION.

a. Clean mating surfaces of propeller and the crankshaft flange.

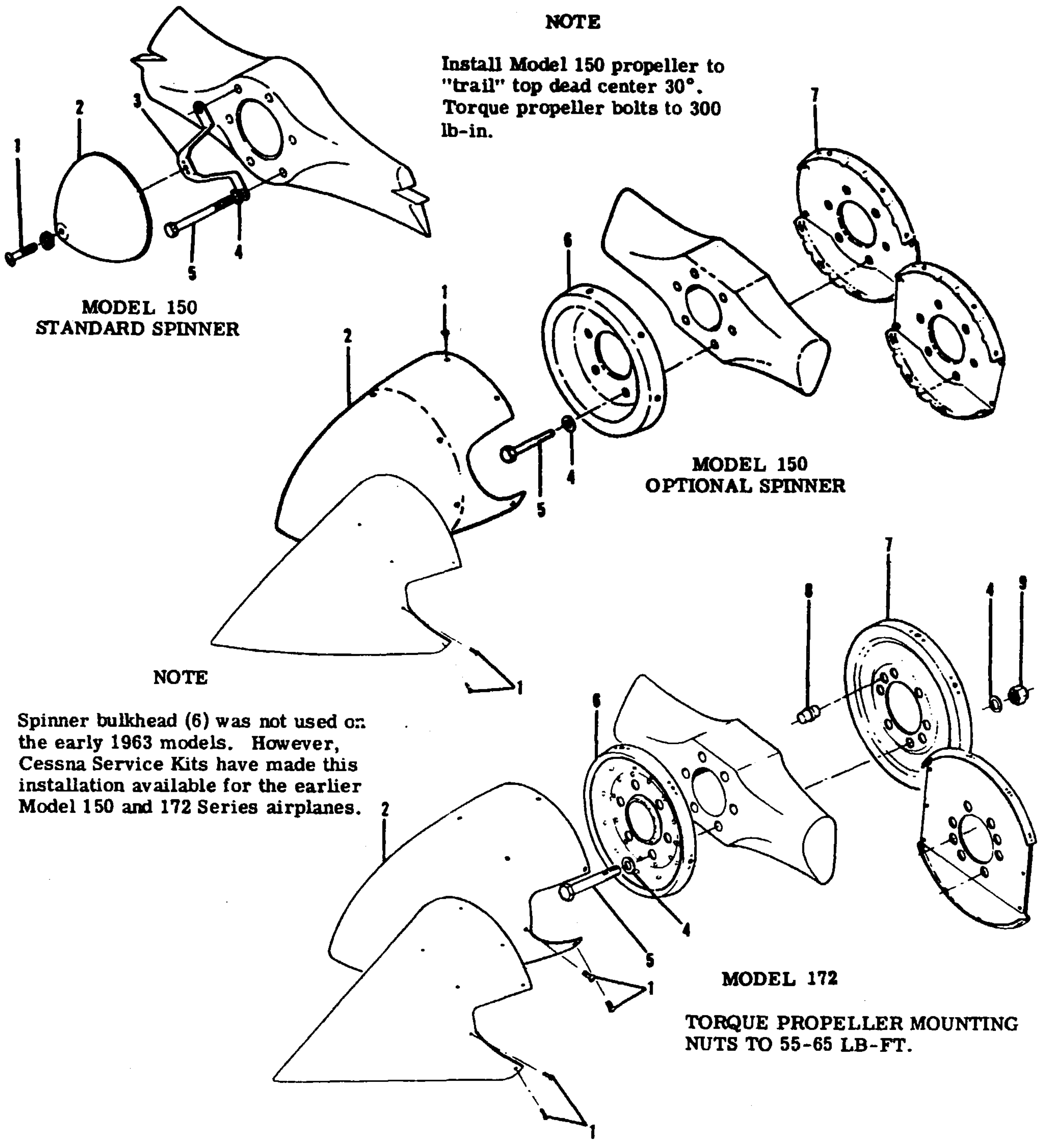
b. On the Model 150, the propeller must be installed to "trail" 30° after top center of the crankshaft.

c. Position propeller and spinner bulkhead or spinner bracket as shown in figure 14-1 and install propeller mounting bolts. Tighten evenly, torque to the values shown, and safety as required. The spinner bulkheads must be positioned so propeller blades will emerge from spinner domes with ample clearance.

d. Install spinner or spinner dome.

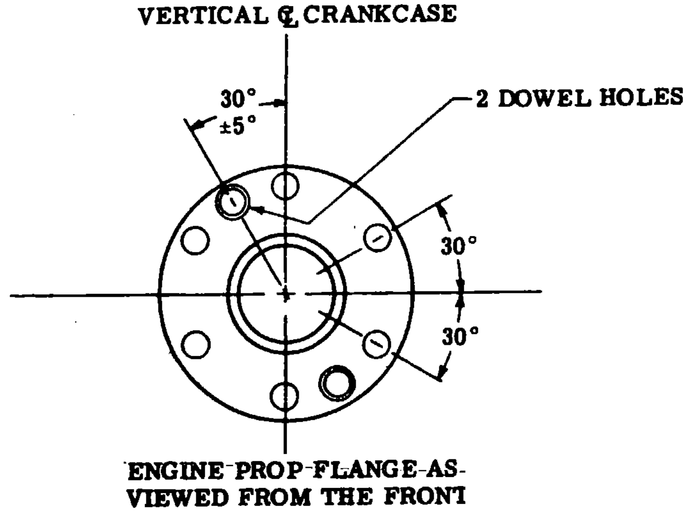
14-7. REPAIR of fixed-pitch propellers is included in paragraph 14-3.

SHOP NOTES:



1. Screw
2. Spinner Dome
3. Bracket
4. Washer
5. Bolt
6. Spinner Bulkhead (Front)
7. Spinner Bulkhead (Rear)
8. Dowel Pin
9. Nut

Figure 14-1. Fixed Pitch Propeller Installation

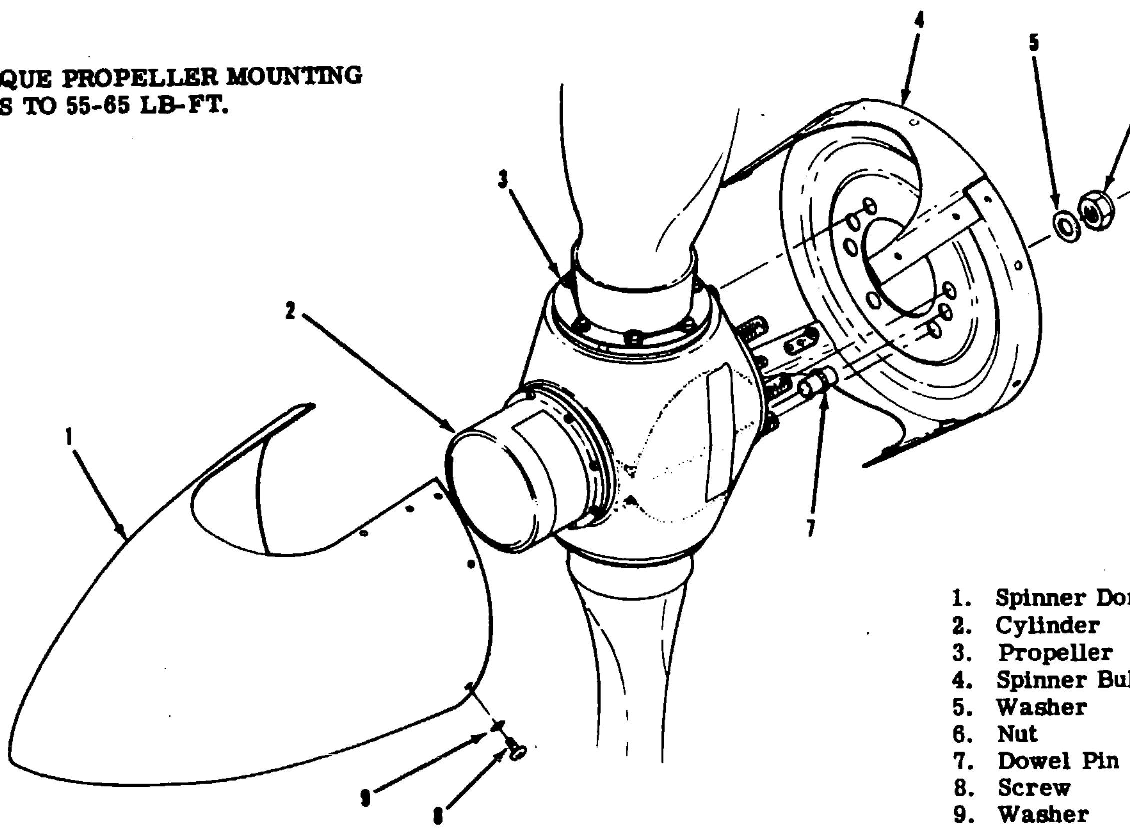


NOTE

If the reduction gear housing has been removed from the engine, install it as follows: Position prop shaft with dowel holes in the location shown, when No. 1 cylinder is on top dead center and on compression stroke. Change gear mating as required to position prop shaft as shown. Secure the reduction gear housing to the engine.

Figure 14-2. Reduction Gear Mating - Model P172

TORQUE PROPELLER MOUNTING NUTS TO 55-65 LB-FT.



1. Spinner Dome
2. Cylinder
3. Propeller
4. Spinner Bulkhead
5. Washer
6. Nut
7. Dowel Pin
8. Screw
9. Washer

Figure 14-3. McCauley Propeller - Model P172

14-8. CONSTANT-SPEED PROPELLERS.

14-9. McCauley propellers are used on all models that require constant-speed propellers except some 1963 Model 182F aircraft which are equipped with an alternate Hartzell propeller. Both McCauley and Hartzell propellers are single-acting propellers in which oil pressure, boosted and regulated by a governor, is used to increase blade pitch, and the natural, centrifugal twisting moment of the rotating blades, and the force of an internal spring, are used to decrease blade pitch.

14-10. TROUBLE SHOOTING.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
FAILURE TO CHANGE PITCH.		
Control disconnected or broken.	Check visually.	Connect or replace control.
Governor not correct for propeller. "Sensing" wrong.	Check that correct governor is installed.	Install correct governor.
Defective governor.	See paragraph 14-18.	See paragraph 14-18.
Defective pitch changing mechanism or excessive blade friction.	Lubricate Hartzell propeller. Check propeller manually.	Propeller repair or replacement is required.
FAILURE TO CHANGE PITCH FULLY.		
Improper rigging of governor control.	Check that arm on governor has full travel.	Rig correctly.
Defective governor.	See paragraph 14-18.	See paragraph 14-18.
SLUGGISH RESPONSE TO PROPELLER CONTROL.		
Excessive friction in pitch changing mechanism or excessive blade friction.	Lubricate Hartzell propeller. Check propeller manually.	Propeller repair or replacement is required.
STATIC RPM TOO HIGH.		
Governor high rpm stop set too high.	See "Note" at end of this chart.	Rig correctly.
Defective governor.	See paragraph 14-18.	See paragraph 14-18.
Incorrect propeller or incorrect low pitch blade angle.	Check aircraft specifications.	Install correct propeller, with correct blade angle.
STATIC RPM TOO LOW.		
Governor high rpm stop set too low.	See "Note" at end of this chart.	Rig correctly.
Defective governor.	See paragraph 14-18.	See paragraph 14-18.
Incorrect propeller or incorrect low pitch blade angle.	Check aircraft specifications.	Install correct propeller, with correct blade angle.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
ENGINE SPEED WILL NOT STABILIZE.		
Sludge in governor.	See paragraph 14-18.	See paragraph 14-18.
Air trapped in propeller actuating cylinder.	This condition may occur after the propeller has been reinstalled or has been idle for an extended period.	Trapped air should be purged by exercising the propeller several times prior to take-off after the propeller has been reinstalled or has been idle for an extended period.
Excessive friction in pitch changing mechanism or excessive blade friction.	Lubricate Hartzell propeller. Check propeller manually.	Propeller repair or replacement is required.
Defective governor.	See paragraph 14-18.	See paragraph 14-18.
OIL LEAKAGE AT MOUNTING FLANGE.		
Damaged O-ring seal between engine and propeller.	Check visually for oil leakage.	Replace O-ring seal.
Foreign material between engine and propeller mating surfaces or nuts not tight.	Check visually for oil leakage.	Clean propeller and engine mating surfaces and tighten nuts properly.
OIL LEAKAGE BETWEEN HUB AND CYLINDER. (McCAULEY)		
Defective gasket or screws not tight.	Check visually for oil leakage.	Replace gasket and tighten screws properly.
GREASE LEAKAGE AT GREASE FITTING. (HARTZELL)		
Loose or defective grease fitting.	Check visually for grease leakage.	Tighten loose grease fitting; replace, if defective.
OIL OR GREASE LEAKAGE AT ANY OTHER PLACE.		
Defective seals, gaskets, threads, etc. or incorrect assembly.	Check visually for oil or grease leakage.	Propeller repair or replacement is required.

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 airplane. 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.

SHOP NOTES:

14-11. REMOVAL OF McCAULEY PROPELLER.
a. Remove spinner dome.
b. If used, remove spinner support and spacers from front of propeller.
c. Remove propeller mounting nuts and pull propeller forward to remove.

NOTE

As the propeller is separated from the engine, oil will drain from the propeller and crankshaft cavities.

d. The spinner bulkhead on some models is located between the propeller and the crankshaft flange and is freed by propeller removal. On other models, the spinner bulkhead is attached by six lugs which must be removed before the bulkhead can be removed from the crankshaft flange.

14-12. INSTALLATION OF McCAULEY PROPELLER.
a. On models using the spinner bulkhead with attaching lugs, slide the bulkhead over the crankshaft flange and install attaching lugs. On models where the bulkhead is located between the propeller and the crankshaft flange, position the bulkhead on the propeller before mounting the propeller.

NOTE

When installing spinner bulkheads, position them so the propeller blades will emerge from the spinners with ample clearance. Avoid scraping metal from the spinner bulkhead and wedging scrapings between the propeller and the engine flange. Trim the inside diameter of the bulkhead as necessary when installing a new one. See figure 14-2 for mating of crankshaft and propeller gears if housing was removed from geared engines.

b. Remove any nicks, burrs, or sharp edges from the crankshaft, and clean the propeller and crankshaft cavities and mating surfaces.
c. Lightly lubricate a new O-ring and the crankshaft pilot, and install the O-ring in the groove in the propeller hub.
d. Check that the two dowel pins are in place in the aft side of the propeller hub. Align mounting holes and slide propeller carefully over the crankshaft pilot.
e. Install mounting nuts, tighten evenly, and torque to 55-65 lb-ft.

NOTE

Washers are used under the mounting nuts on some models and are not used on others. Install them if originally used.

f. Position spacers and spinner support, if used, on front of propeller.
g. Reinstall spinner dome.

14-13. CLEANING OF McCAULEY PROPELLER HUB.

NOTE

Disassembly beyond the following procedure is not recommended except by properly authorized propeller shops.

a. Remove spinner dome, and spinner support and spacers, if used.
b. Remove cylinder from front of propeller hub.
c. Use a solution of one part light engine oil and two parts solvent to clean exposed parts and the interior of the cylinder. Dry gently with compressed air, then use clean engine oil to lubricate parts lightly before assembly.
d. Install new O-rings and gaskets at each cleaning of propeller hub.
e. Reinstall cylinder.
f. Position spacers and spinner support, if used, on front of propeller.
g. Reinstall spinner dome.

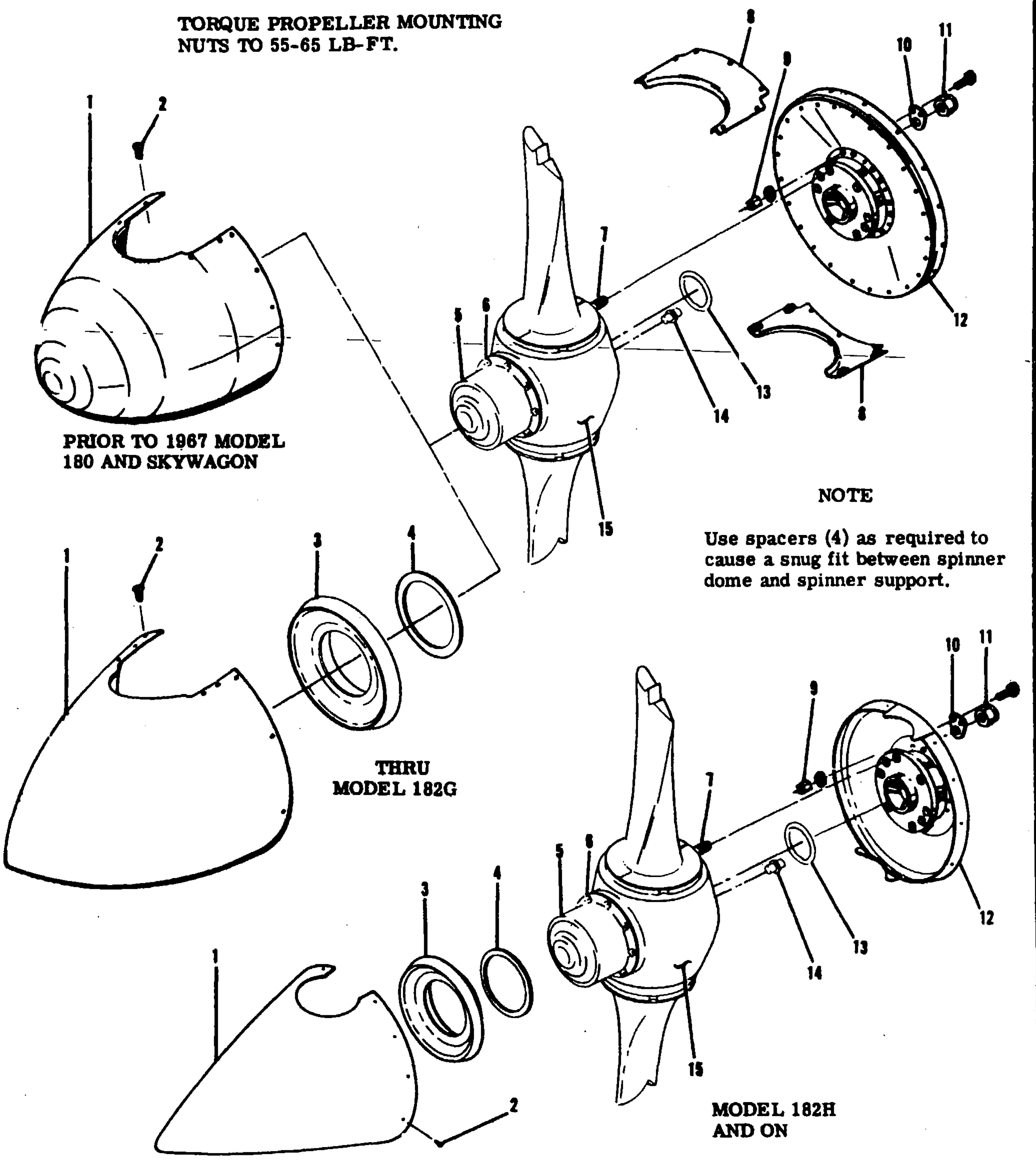
14-14. REMOVAL OF HARTZELL PROPELLER.
a. Remove spinner dome.
b. Remove spacers and spinner support from front of propeller. If desired, spinner support bulkhead may be removed from the front of the propeller.
c. Remove propeller mounting nuts and washers, and pull propeller forward to remove.

NOTE

As the propeller is separated from the engine, oil will drain from the propeller and crankshaft cavities.

d. If desired, the spinner bulkhead may be removed from the propeller hub.

14-15. INSTALLATION OF HARTZELL PROPELLER.
a. If the spinner bulkhead was removed, reassemble it to the propeller hub, with the spacers located between the bulkhead and the hub. Torque to 20-22 lb-ft (do not over-torque).
b. Remove any nicks, burrs, or sharp edges from the crankshaft, and clean the propeller and crankshaft cavities and mating surfaces.
c. Lightly lubricate a new O-ring and the crankshaft pilot and install the O-ring in the groove in the propeller hub.
d. Check that the two dowel pins are in place in the aft side of the propeller hub. Align mounting holes and slide propeller carefully over the crankshaft pilot.
e. Install mounting nuts and washers, tighten evenly, and torque to 60-65 lb-ft.
f. Reinstall the spinner support bulkhead if it was removed from the front of the propeller.
g. Position spacers and spinner support on spinner support bulkhead.
h. Reinstall spinner dome.

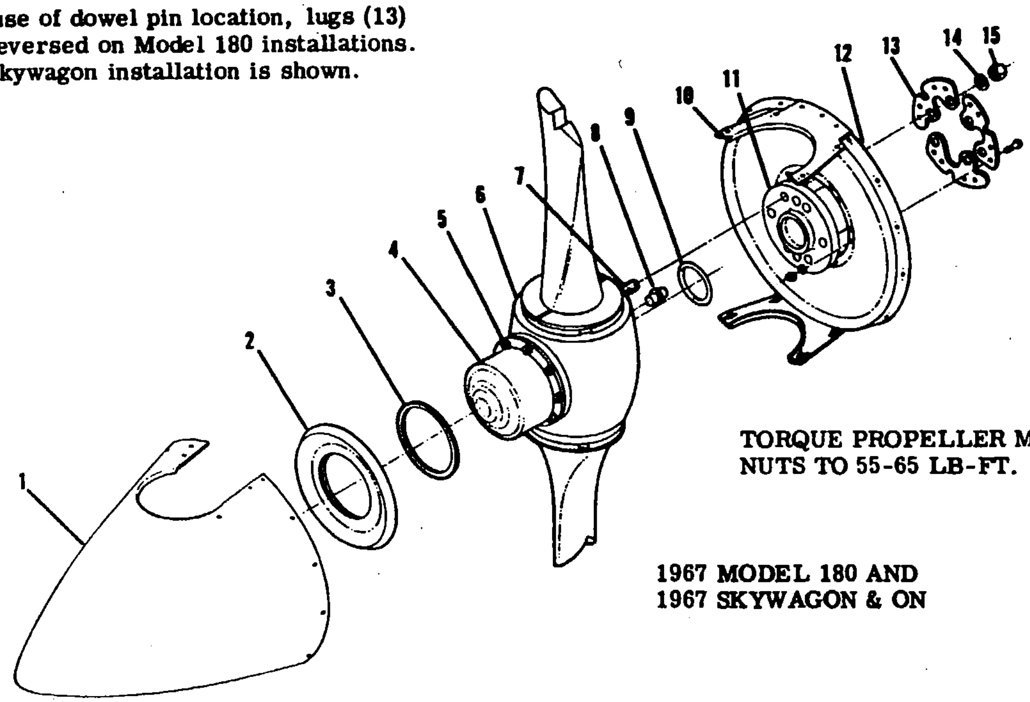


1. Spinner Dome
2. Screw
3. Spinner Support
4. Spacer
5. Cylinder
6. Screw
7. Stud
8. Fillet
9. Nut
10. Lug
11. Nut
12. Spinner Bulkhead
13. O-Ring
14. Dowel Pin
15. Propeller

Figure 14-4. McCauley Propeller (Sheet 1 of 2)

NOTE

Because of dowel pin location, lugs (13) are reversed on Model 180 installations. The Skywagon installation is shown.



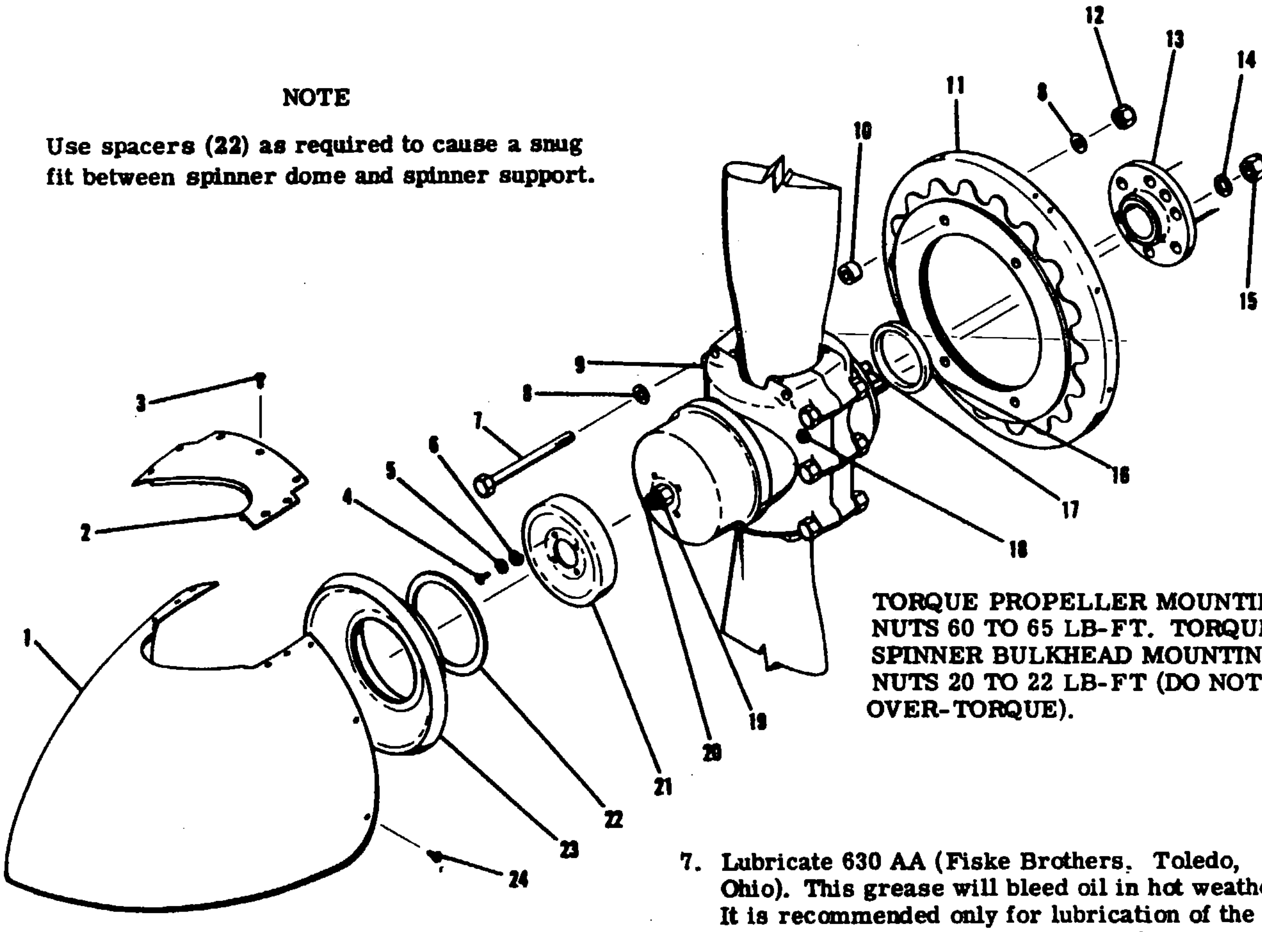
1. Spinner Dome
2. Spinner Support
3. Spacer
4. Cylinder
5. Screw
6. Propeller
7. Stud
8. Dowel Pin
9. O-Ring
10. Fillet
11. Engine Crankshaft
12. Spinner Bulkhead
13. Lug
14. Washer
15. Nut

Figure 14-4. McCauley Propeller (Sheet 2 of 2)

SHOP NOTES:

NOTE

Use spacers (22) as required to cause a snug fit between spinner dome and spinner support.



TORQUE PROPELLER MOUNTING NUTS 60 TO 65 LB-FT. TORQUE SPINNER BULKHEAD MOUNTING NUTS 20 TO 22 LB-FT (DO NOT OVER-TORQUE).

LIST OF APPROVED GREASES

1. MIL-G-23827.
2. Stroma HT-1 (Z-801 Grease). Union Oil Co. of California.
3. Gulflex Moly for blade bushings.
4. Gulflex A. This grease is recommended for the blade ball bearings as it will not bleed oil in hot weather.
5. RPM Aviation Grease No. 2 (Standard Oil Co. of California).
6. Stroma LT-1 (Z-815 Grease). Union Oil Co. of California.
7. Lubricate 630 AA (Fiske Brothers, Toledo, Ohio). This grease will bleed oil in hot weather. It is recommended only for lubrication of the blade pilot tubes, but not the blade bearings.
8. RPM Aviation Grease No. 1 (Standard Oil Co. of California).
9. Lubriplate 707 (Fiske Brothers, Toledo, Ohio).
10. Mobilgrease Aero Lo-Hi PD-535-K (Socony Vacuum Oil Co.).
11. No. 84 Medium Grease (Keystone Lubricating Co.).
12. Texaco Regal Starfax Special.
13. Molub-Alloy No. 2 Grease -10°F.
    No. 1 Grease -25°F. (Imperial Oil & Grease Co., Los Angeles, California).
14. Germany - Calypsol H729 (German Calypsol Company, Dusseldorf).

1. Spinner
2. Fillet
3. Rivet
4. Screw
5. Washer
6. Lockwasher
7. Bolt
8. Washer
9. Propeller
10. Spacer
11. Spinner Bulkhead
12. Nut
13. Engine Crankshaft
14. Washer
15. Nut
16. O-Ring
17. Dowel Pin
18. Grease Fitting
19. Locknut
20. Low Pitch Stop
21. Spinner Support Bulkhead
22. Spacer
23. Spinner Support
24. Screw

Figure 14-5. Hartzell Propeller

14-16. PROPELLER GOVERNORS.

14-17. 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 propeller counterweights, centrifugal twisting moment of rotating blades, compressed springs, or a combination of some of these forces. Oil pressure is boosted in the governor by a gear type oil pump. A pilot valve, flyweights, and a 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 determine whether it uses oil pressure to increase or decrease blade pitch. Always be sure the correct governor is used.

14-18. 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, 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.

14-19. REMOVAL.
a. Remove cowling and engine baffles as required for access.
b. Disconnect governor control from governor.
c. Remove nuts and washers securing governor to engine, and pull governor from mounting studs.
d. Remove gasket between governor and engine mounting pad.

14-20. INSTALLATION.
a. Wipe governor and engine mounting pad clean.
b. Install a new gasket with the raised surface of the screen away from the engine pad.
c. Position governor on mounting studs, aligning governor splines with splines in 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 and rig.
e. Reinstall parts removed for access.

14-21. HIGH RPM STOP ADJUSTMENT.
a. Remove safety wire (not used on some governors) from the high-speed stop screw and loosen the jam nut.
b. Turn the stop screw in to decrease maximum rpm and out to increase maximum rpm. One full turn of the stop screw is approximately 25 rpm.
c. Make propeller control linkage adjustments as necessary for full travel.
d. Tighten jam nut, safety stop screw, and test operate propeller and governor. Refer to the "Note" at the end of the propeller trouble shooting chart.

14-22. RIGGING PROPELLER CONTROL.
a. Disconnect control end from governor arm.
b. Place propeller control in the cabin full forward, then pull it back 1/8" to 1/4" and lock in this position. This will allow "cushion" to assure full contact 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 the control in its clamps to achieve this.
e. Attach control rod end to the governor arm, tighten the jam nut, and install all safeties.
f. Operate the control to see that the governor arm attains full travel in both directions.

NOTE

Some models are 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 of the rigging procedure. The result of rigging, in all cases, is full travel of the governor arm, with some "cushion" at the full-in position.

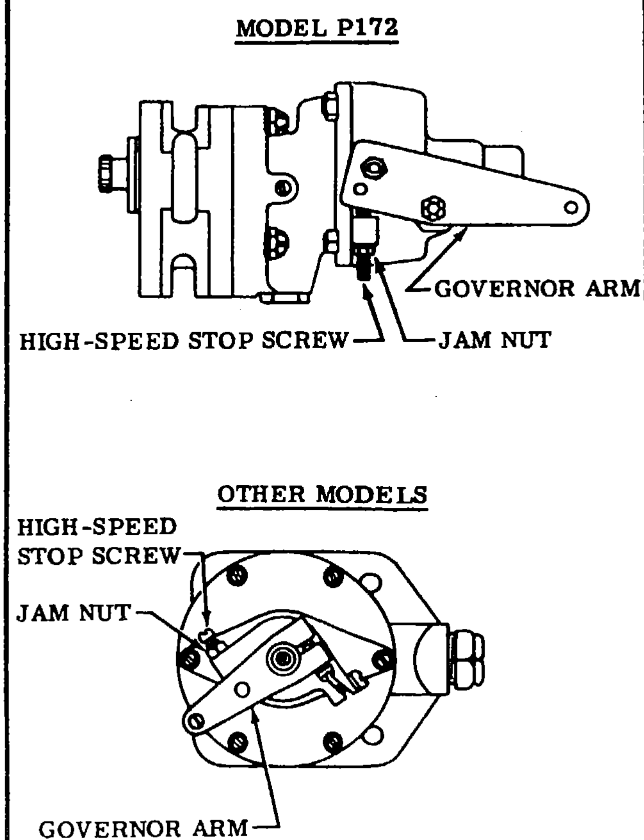


Figure 14-6. Governor High-Speed Stops

SECTION 14A

PROPELLER

NOTE

Federal Aviation Regulations, Part 43 (FAR 43) define major and minor repairs and alterations and who may accomplish them.

14A-1. PROPELLER.

14A-2. An all-metal, fixed-pitch propeller is used on the 1968 Model 172I. The propeller is equipped with a spinner. A spacer is installed between the engine crankshaft and spinner aft bulkhead.

14A-3. REPAIR. Repair of propellers shall be accomplished as stated in Federal Aviation Regulations, Part 43 (FAR43) and the propeller manufacturer's Service Manual. The propeller manufacturer's Service Manual is available from the Cessna Service Parts Center.

14A-4. REMOVAL. (See figure 14A-1.)

a. Remove spinner dome.

b. Remove six propeller mounting bolts and pull forward to remove.

c. The propeller spinner bulkheads and spacer are secured by the propeller mounting bolts. Use care to avoid damage to these parts when removing the propeller.

NOTE

After removal of the propeller, the starter ring gear support assembly may be removed from the engine crankshaft. Loosen alternator adjusting arm and disengage alternator drive pulley belt from pulley on aft face of starter ring gear support assembly.

14A-5. INSTALLATION.

a. If the starter ring gear support assembly was removed, clean mating surface of support assembly and engine crankshaft.

b. Place alternator drive belt in the pulley groove of the starter ring gear support. Fit starter ring gear assembly over propeller flange bushing of the crankshaft.

NOTE

Make sure the bushing hole in the ring gear support that bears the identification "O", is assembled at the "O" identified crankshaft flange bushing. This bushing is marked "O" by an etching on the crankshaft flange next to the bushing. The starter ring gear must be heated correctly to assure proper alignment of the timing marks on the ring gear.

c. Clean mating surfaces of propeller, spinner bulkheads, propeller spacer, and ring gear support and assemble propeller, bulkheads and spacer.

d. Locate top center (TC) mark on aft face of starter ring gear support and with propeller blade over TC mark, rotate propeller clockwise (as viewed from front of engine) to first bushing, install propeller.

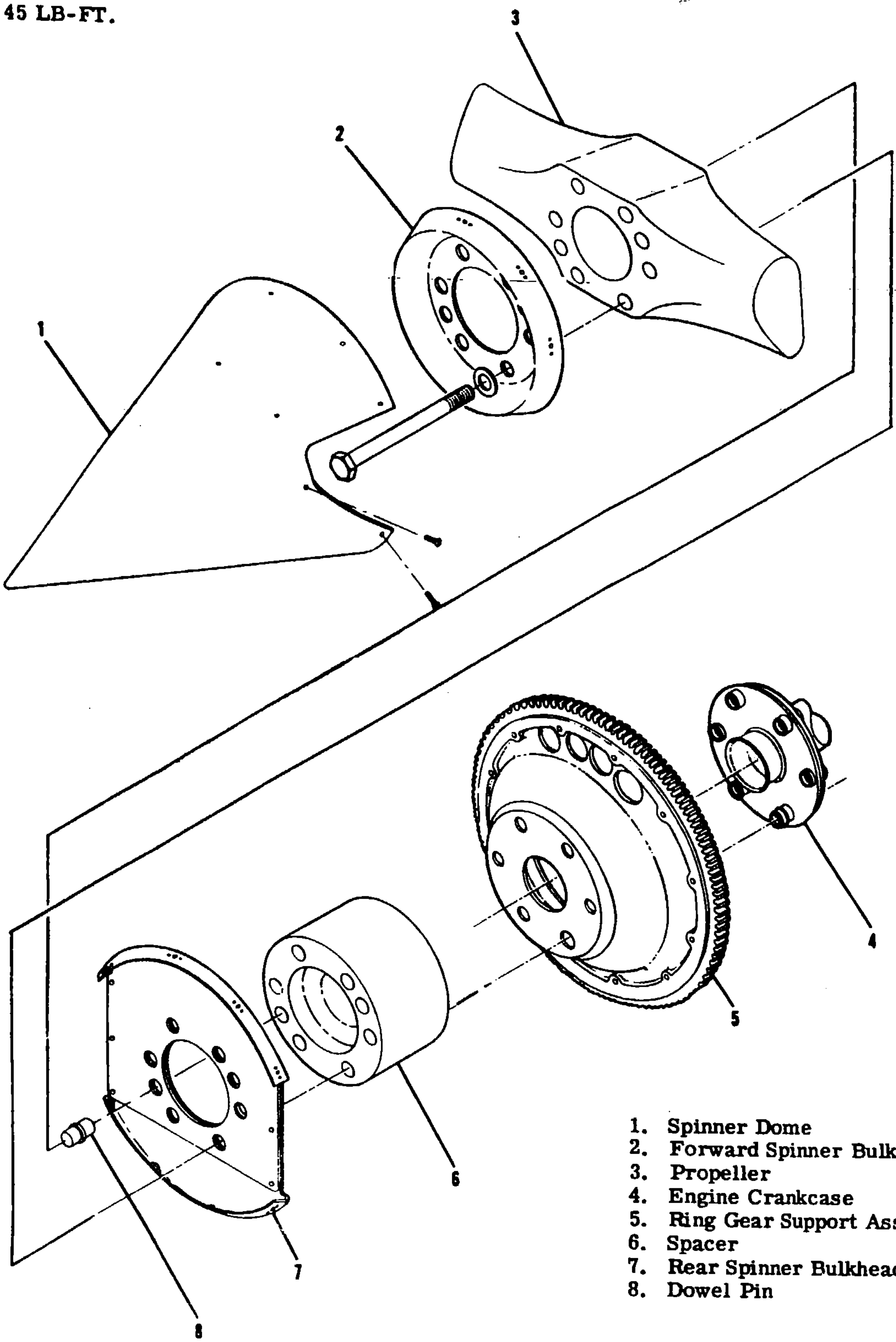
e. Tighten propeller mounting bolts evenly and torque to the value shown in figure 14A-1.

f. Install spinner.

g. Adjust alternator drive belt tension as outlined in Section 17.

NOTE

TORQUE PROPELLER MOUNTING BOLTS TO 45 LB-FT.



1. Spinner Dome
2. Forward Spinner Bulkhead
3. Propeller
4. Engine Crankcase
5. Ring Gear Support Assembly
6. Spacer
7. Rear Spinner Bulkhead
8. Dowel Pin

Figure 14-1. Propeller Installation

SECTION 15

UTILITY SYSTEMS

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Cleaning Oxygen Masks 15-14

15-1. HEATING.

15-2. Cabin heat, defrosting and ventilation are provided by manifold heaters, ducting and valves which allow the entry of heated or unheated air to the cabin outlets. The only moving parts of the system are the valves and their controls, hence there is little mechanical wear involved. Normally the only maintenance check required on the heating system is careful examination to make sure that the heater muff has no burned spots or cracks which could allow exhaust fumes to enter the system and a check of hoses and ducting to make sure that air passage is unobstructed. Heater valves should be checked periodically to insure proper operation.

15-3. TROUBLE SHOOTING.

15-4. 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, air valves or controls can be freed by proper lubrication. Damaged or broken parts should be repaired or replaced. When checking rigging of controls, be sure 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 heater hoses are properly secured and replace hoses that are burned, frayed, or crushed. If fumes are detected in the cabin, a very thorough inspection of the exhaust stacks and heater muffs should be accomplished. Refer to paragraph 12-101 for this inspection. Since any holes or cracks may permit exhaust fumes to enter the cabin, replacement of defective parts is imperative because the fumes constitute an extreme danger. Seal any gaps in heater ducts across the firewall with Pro-Seal #700 (Coast Pro-Seal Co., Chemical Division, 2235 Beverly Blvd., Los Angeles, Calif.), or equivalent compound.

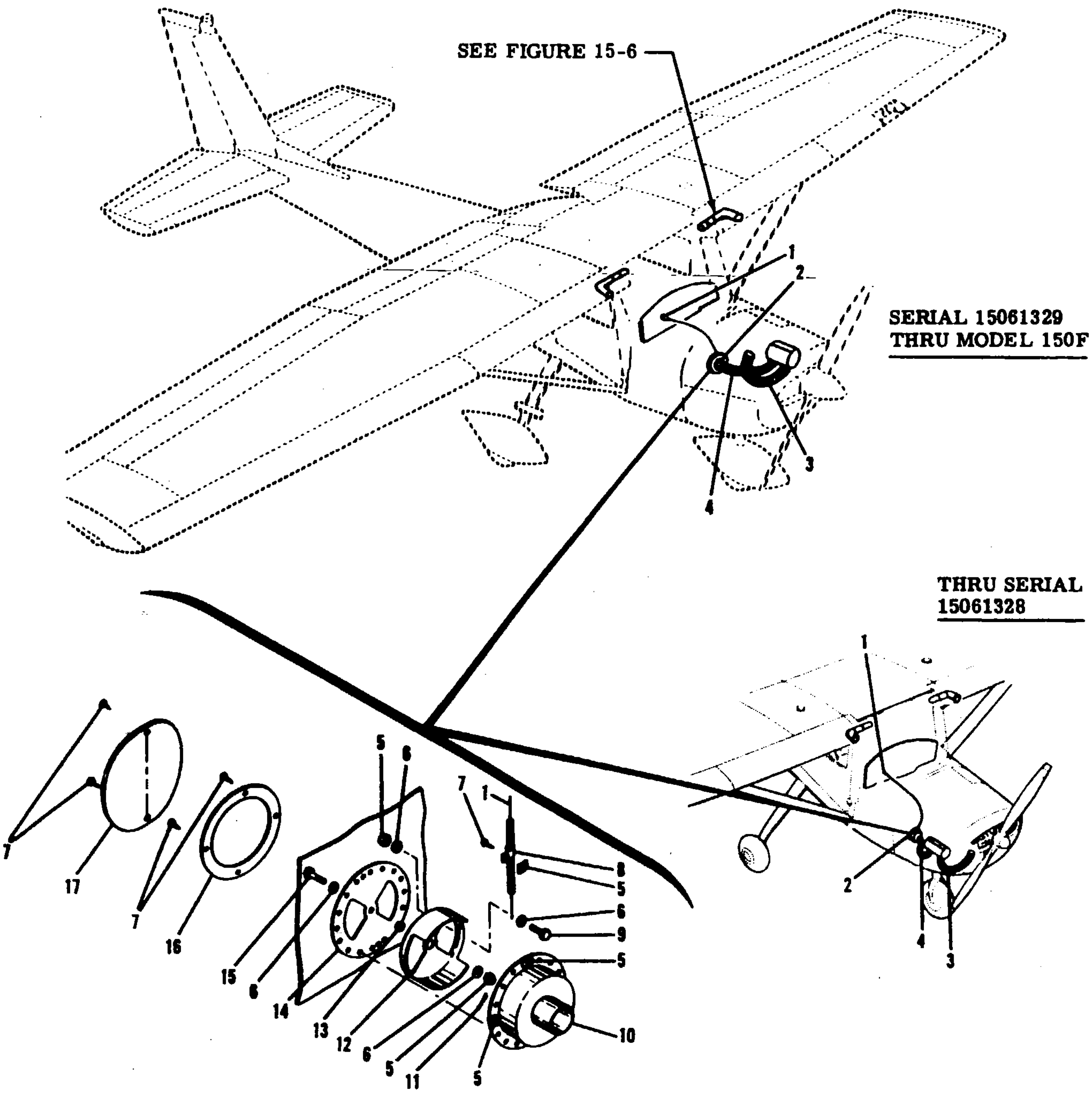
15-5. REPLACEMENT AND REPAIR.

15-6. Figures 15-1 thru 15-6 show heating, defrosting and ventilating systems, and may be used as guides during replacement of components. Burned, frayed, or crushed hose should be replaced with new hose. Cut to length and install in the original routing. Trim the hose winding shorter than the hose to allow hose clamps to be fitted. Air valves that are defective should be repaired or replaced. Check for proper operation and correct rigging of the valves after repair or replacement.

15-7. CABIN AIR VENTS.

15-8. Overhead cabin ventilation is provided by manually adjustable ventilators installed on each side of the cabin near the upper corners of the windshield. Air is received from scoops mounted in the inboard wing leading edges. Formed elbows and ducts deliver ram air to the ventilator assemblies, which are adjustable to regulate the amount and direction of air emitted into the cabin. Rear seat overhead ventilators are installed in some airplanes. The rear seat ventilator installation employs additional air inlets, ducting, and adjustable overhead outlets.

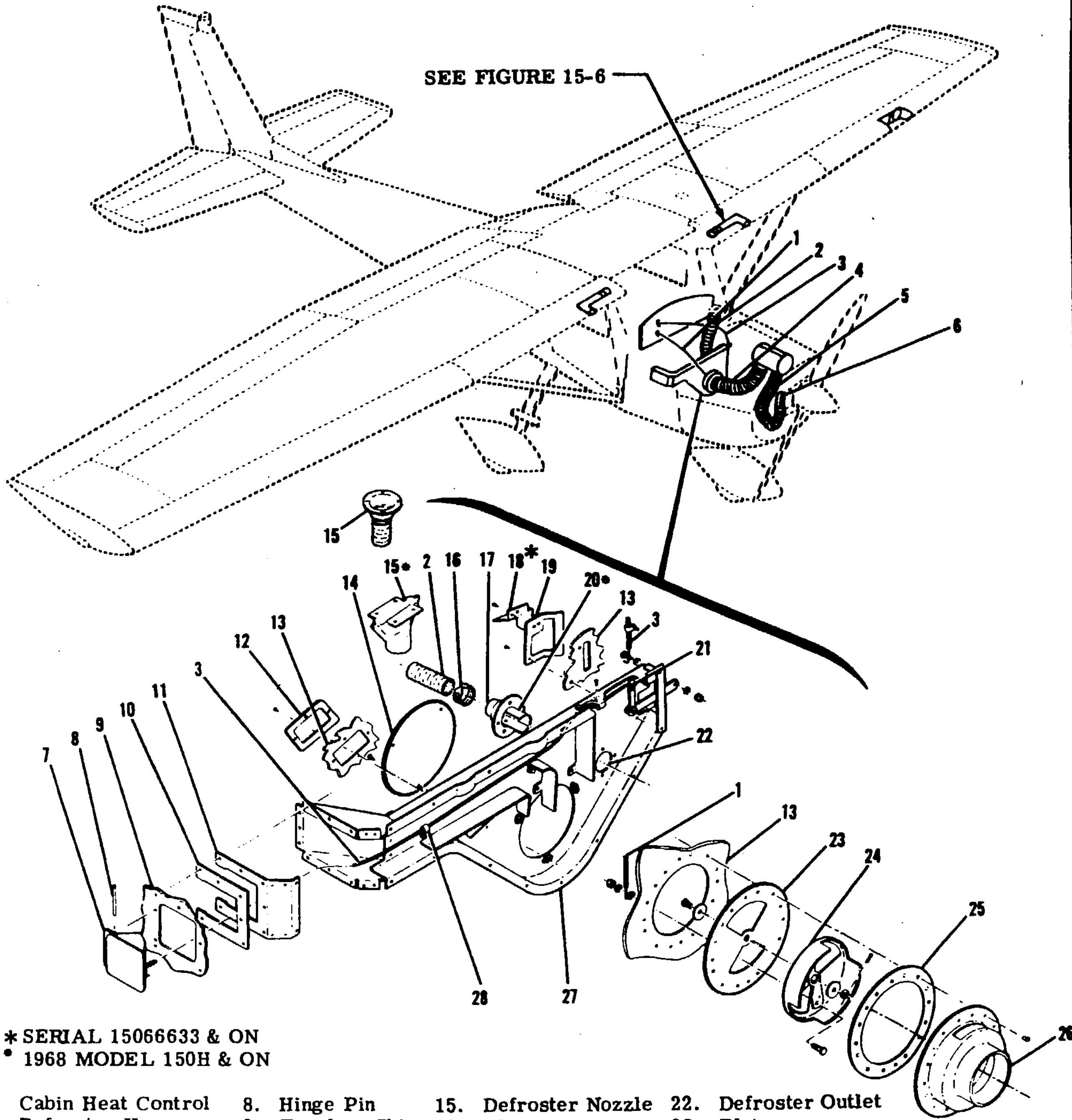
15-9. An adjustable fresh air scoop door is provided on the forward right side of the fuselage of some airplanes. Air entering this door is routed to the duct across the aft side of the firewall for blending with heated air or for distribution as cold air into the cabin.



1. Heat Control
2. Valve
3. Hose (Shroud-to-Baffle)
4. Hose (Valve-to-Shroud)
5. Nut
6. Washer
7. Screw
8. Clamp
9. Clamp Bolt
10. Housing
11. Cotter Pin
12. Cylinder
13. Bearing
14. Plate
15. Bolt
16. Plate
17. Deflector

PRIOR TO MODEL 150G

Figure 15-1. Model 150 Heating and Ventilating System

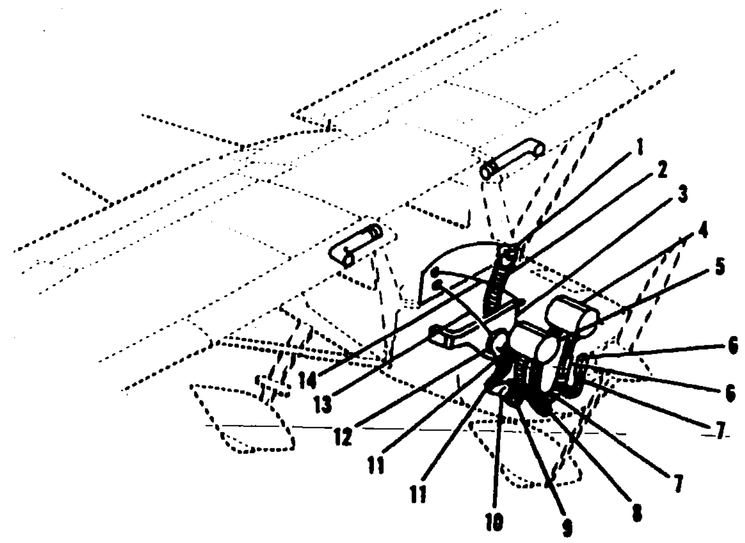


* SERIAL 15066633 & ON
• 1968 MODEL 150H & ON

1. Cabin Heat Control
2. Defroster Hose
3. Cabin Air Control
4. Heater Hose
5. Inlet Hose
6. Air Scoop
7. Scoop Door
8. Hinge Pin
9. Fuselage Skin
10. Seal
11. Doubler
12. Retainer
13. Firewall
14. Access Plate
15. Defroster Nozzle
16. Clamp
17. Adapter
18. Deflector
19. Retainer
20. Insert
21. Retainer
22. Defroster Outlet
23. Plate
24. Cylinder
25. Spacer
26. Housing
27. Plenum Chamber
28. Clamp

MODEL 150G & ON

Figure 15-2. Model 150 Heating and Ventilating System

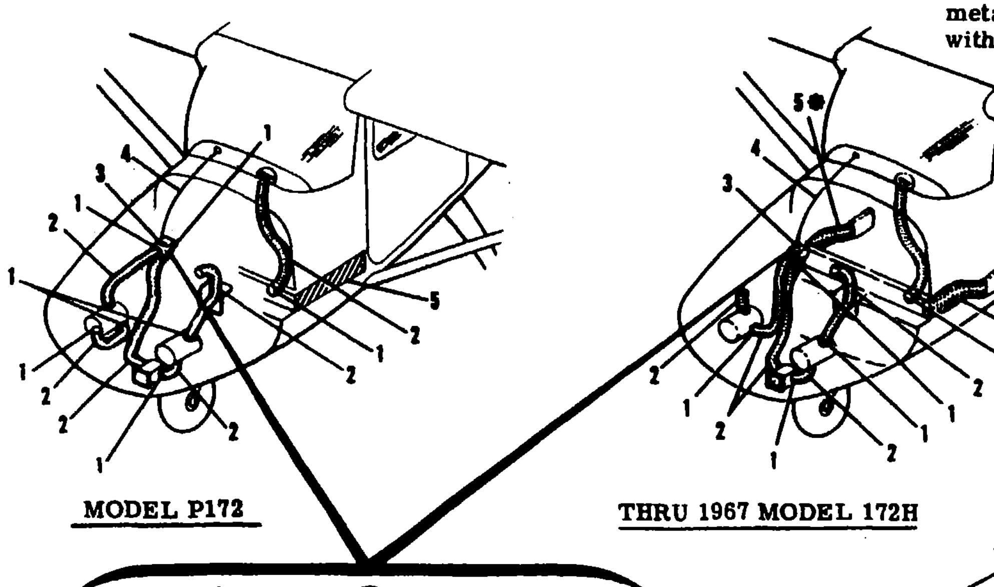


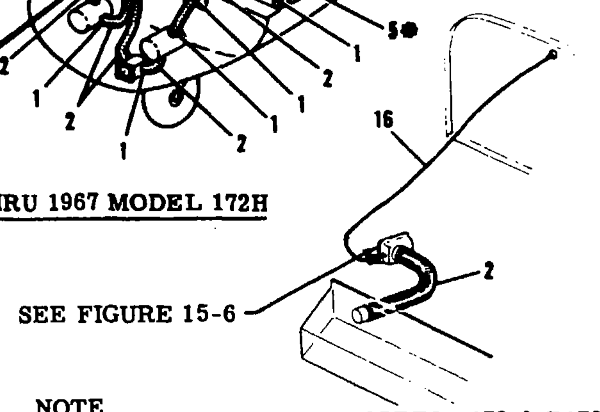
1. Defroster Outlet
2. Defroster Hose
3. Plenum Chamber
4. Left Exhaust Muffler
5. Right Exhaust Muffler
6. Air Scoop
7. Inlet Hose
8. Induction Air Hose
9. Heater Hose
10. "Y" Fitting
11. Heater Hose
12. Tee Fitting
13. Cabin Heat Control
14. Cabin Air Control

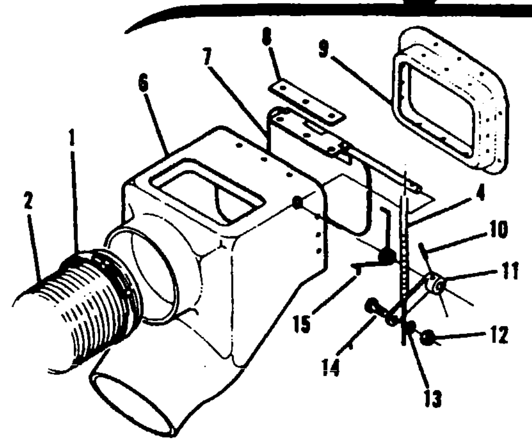
1968 MODEL 150H

Figure 15-2A. Heating and Defrosting System (Winterization Kit Installed)

* Flexible ducts replace metal ducts beginning with Model 172G.





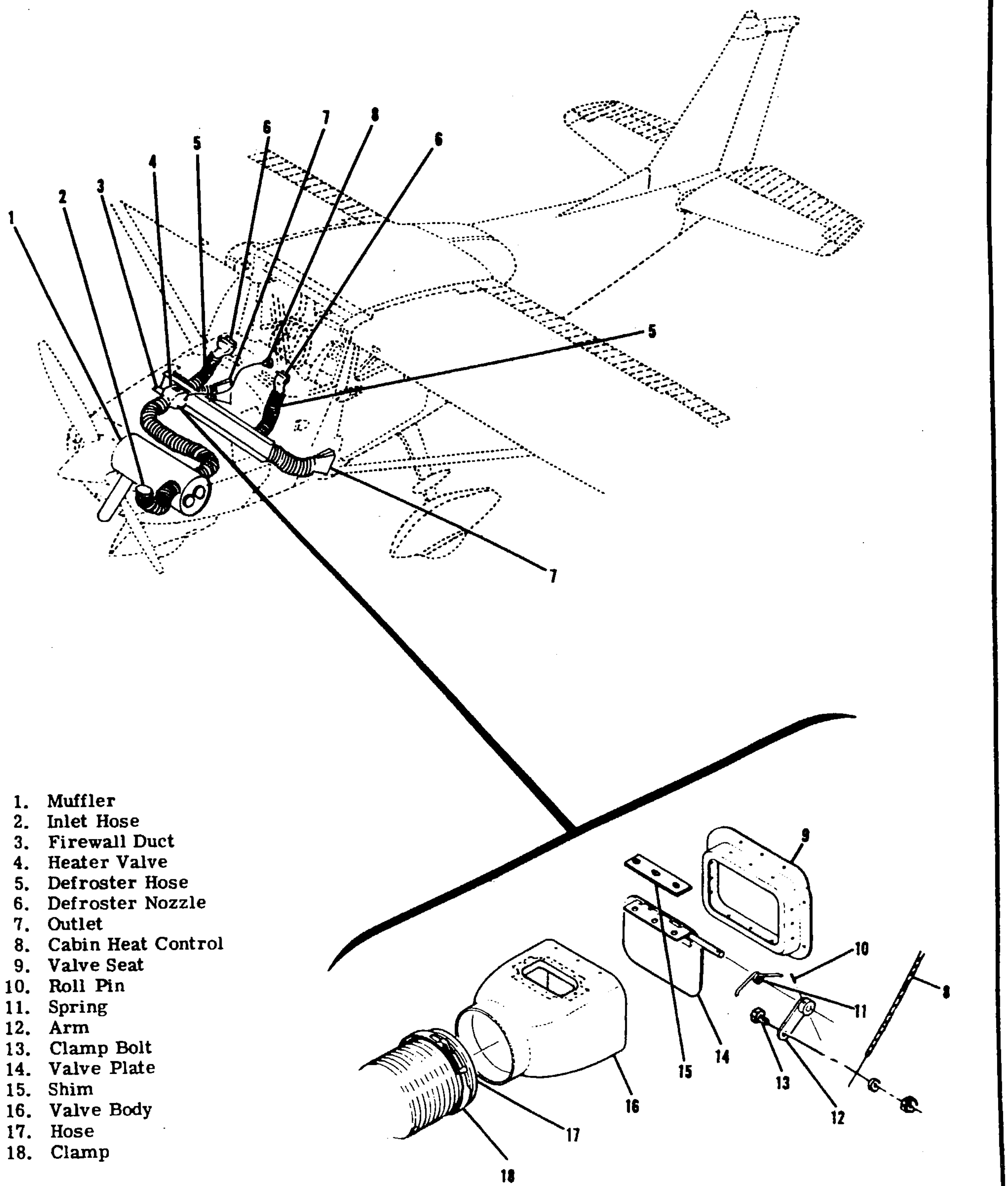


NOTE

See figure 15-6 for wing root fresh air vents and rear seat fresh air vents.

1. Clamp
2. Hose
3. Warm Air Valve
4. Cabin Heat Control
5. Duct
6. Valve Body
7. Valve Plate
8. Shim
9. Valve Seat
10. Roll Pin
11. Arm
12. Nut
13. Washer
14. Clamp
15. Spring
16. Cabin Air Control

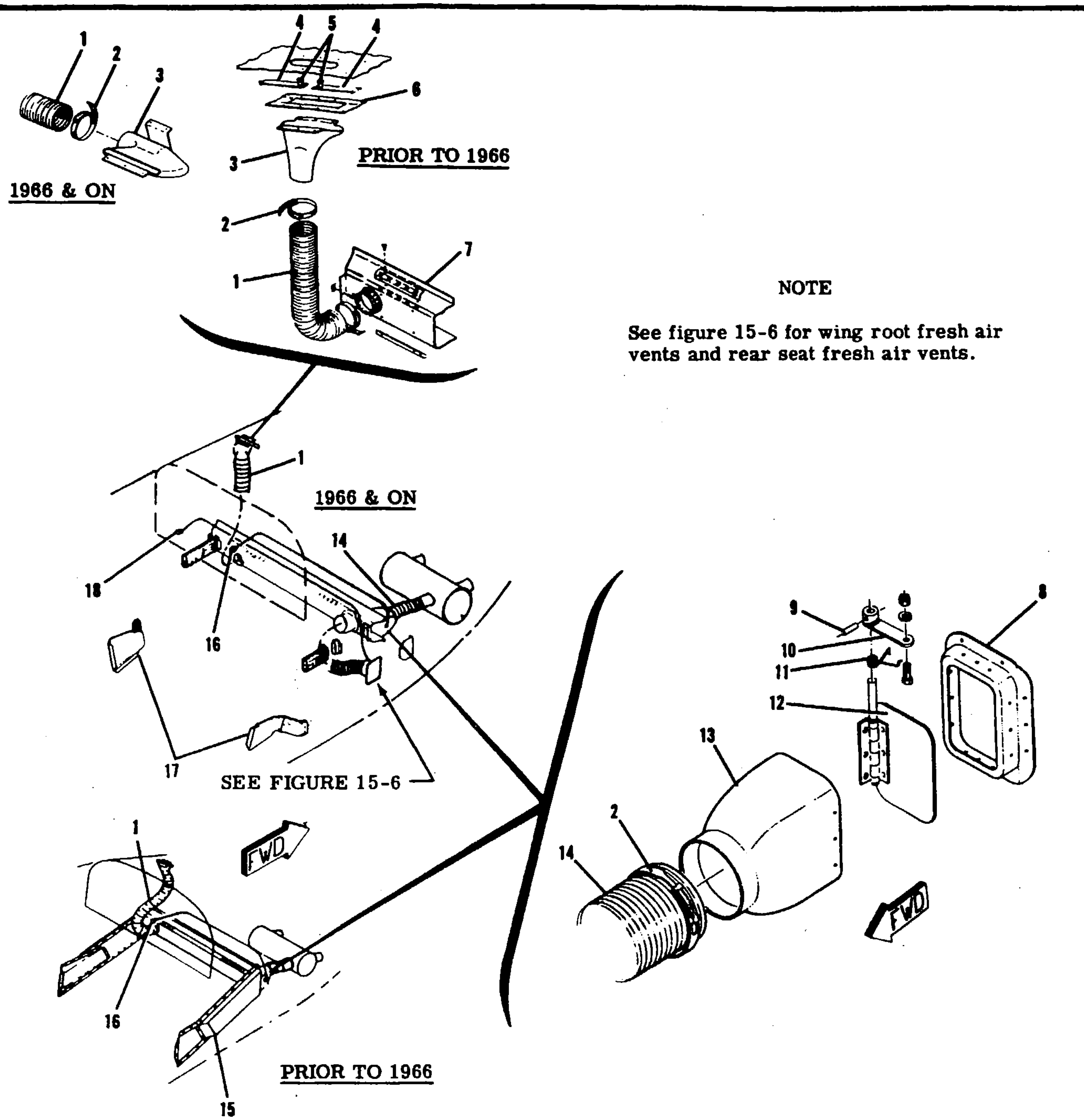
Figure 15-3. Models 172 and P172 Heating and Ventilating System



1. Muffler
2. Inlet Hose
3. Firewall Duct
4. Heater Valve
5. Defroster Hose
6. Defroster Nozzle
7. Outlet
8. Cabin Heat Control
9. Valve Seat
10. Roll Pin
11. Spring
12. Arm
13. Clamp Bolt
14. Valve Plate
15. Shim
16. Valve Body
17. Hose
18. Clamp

1968 MODEL 172I

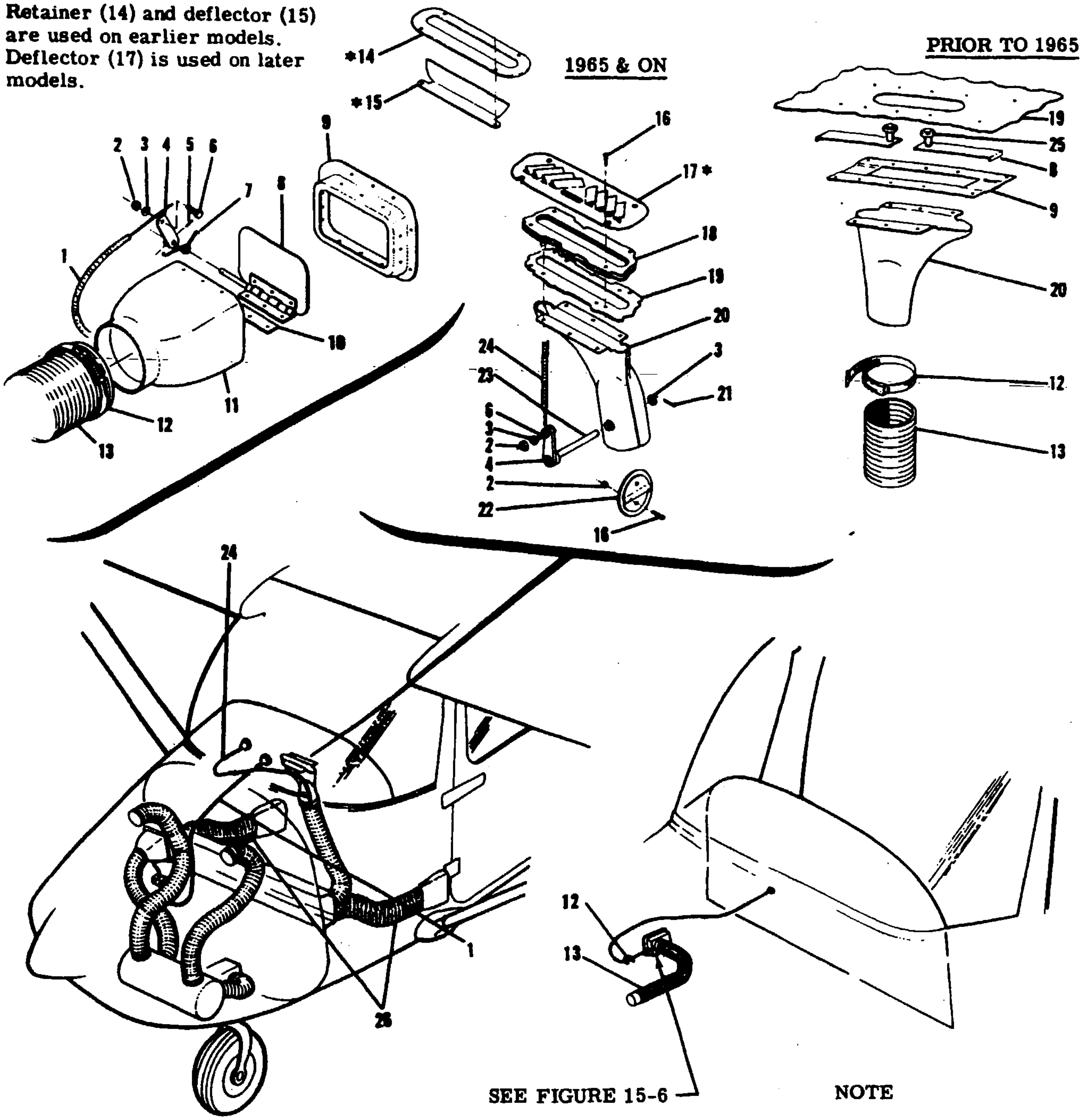
Figure 15-3A. Model 172 Heating and Defrosting System



1. Defroster Hose	7. Duct Assembly	13. Body Assembly
2. Clamp	8. Seat	14. Heater Hose
3. Nozzle	9. Roll Pin	15. Duct Assembly
4. Valve	10. Arm	16. Cabin Heat Control
5. Knob	11. Spring	17. Outlets
6. Guide	12. Valve Plate	18. Air Vent Control

Figure 15-4. Models 180 and 185 Heating and Ventilating System

* Retainer (14) and deflector (15) are used on earlier models. Deflector (17) is used on later models.

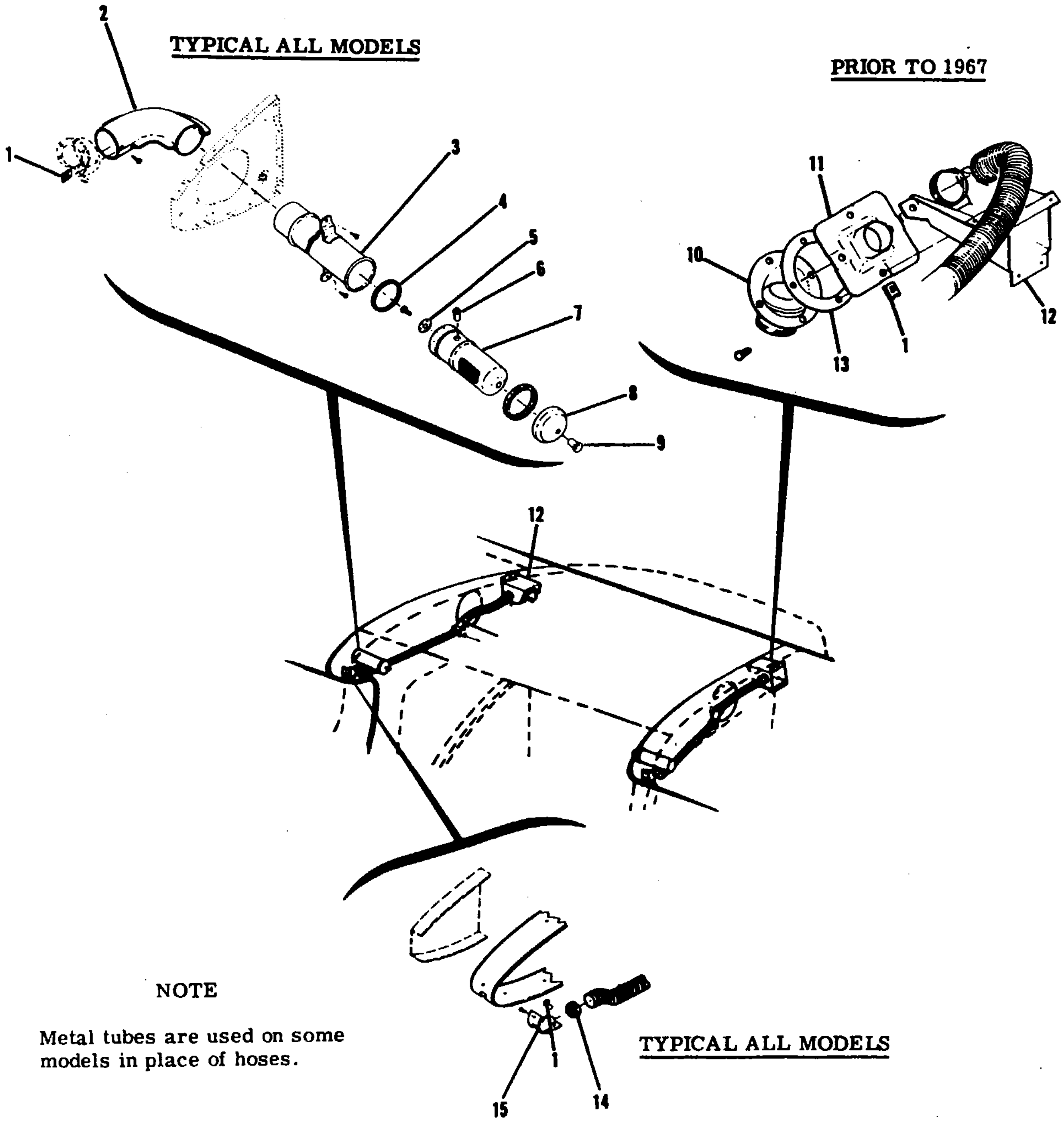


NOTE

See figure 15-6 for wing root fresh air vents and rear seat fresh air vents.

1. Cabin Heat Control
2. Nut
3. Washer
4. Arm
5. Roll Pin
6. Clamp Bolt
7. Spring
8. Valve Plate Assembly
9. Valve Seat
10. Shim
11. Valve Body
12. Clamp
13. Hose
14. Retainer
15. Deflector
16. Screw
17. Deflector
18. Upholstery
19. Cowl Deck
20. Nozzle
21. Cotter Pin
22. Valve
23. Shaft
24. Defroster Control
25. Knob
26. Duct

Figure 15-5. Model 182 Heating and Ventilating System

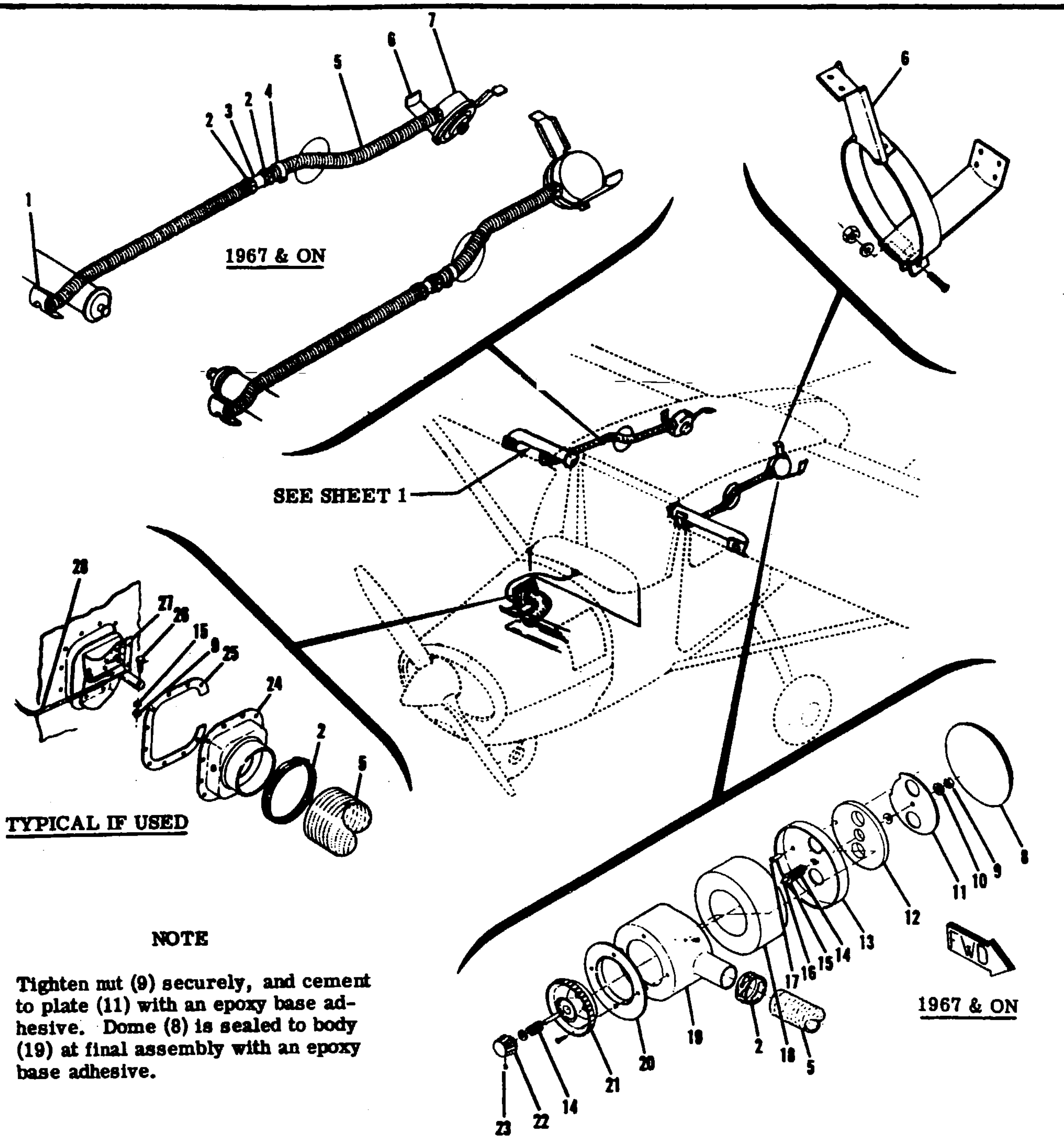


NOTE

Metal tubes are used on some models in place of hoses.

1. Nut
2. Elbow
3. Tube
4. Seal
5. Washer
6. Catch
7. Outlet
8. Cap
9. Knob
10. Valve
11. Adapter
12. Box Assembly
13. Gasket
14. Clamp
15. Adapter

Figure 15-6. Ventilating System Details (Sheet 1 of 2)



NOTE

Tighten nut (9) securely, and cement to plate (11) with an epoxy base adhesive. Dome (8) is sealed to body (19) at final assembly with an epoxy base adhesive.

1. Adapter
2. Hose Clamp
3. Tube
4. Clamp
5. Flexible Hose
6. Bracket
7. Silencer Assembly
8. Dome
9. Nut
10. Star Washer
11. Plate
12. Seal
13. Cap
14. Spring
15. Washer
16. Shaft
17. Spacer
18. Insulator
19. Valve Body
20. Escutcheon
21. Directional Knob
22. Volume Knob
23. Setscrew
24. Inlet
25. Seal
26. Clamp Bolt
27. Air Vent Door
28. Cabin Air Control

Figure 15-6. Ventilating System Details (Sheet 2 of 2)

15-10. OXYGEN SYSTEM.

15-11. Oxygen systems contain an oxygen cylinder, oxygen lines, a pressure gage, an automatic constant-flow regulator, outlets, and mask and line assemblies. Oxygen cylinders are mounted aft of the baggage compartment. Prior to 1965, the regulator, pressure gage, and outlet assembly was located in the cabin ceiling and contained a manifold with either four outlets (Model 182) or five outlets (Models 180 and 185). Beginning in 1965, the regulator is installed in the oxygen cylinder and is equipped with an ON-OFF valve operated manually by a push-pull control located above and to the left of the pilot. Location of pressure gages, filler valves and other components, and oxygen line routing variations are shown in figures 15-7 thru 15-9. The pilot receives a greater flow of oxygen than the passengers. Beginning in 1966, the pilot's mask is equipped with a microphone that is keyed by a switch button on the pilot's control wheel on the Model 182.

WARNING

Oil, grease, or other lubricants in contact with high-pressure oxygen create a serious fire hazard, and such contact must be avoided. Do not permit smoking or open flame in or near airplane while work is performed on oxygen system.

15-12. MAINTENANCE PRECAUTIONS.

a. Working area, tools, and hands must be clean.
b. Keep oil, grease, water, dirt, dust, and all other foreign matter from system.
c. Keep all lines dry and capped until installed.
d. All compounds used on fittings must conform to MIL-C-5542. No compound shall be used on aluminum alloy flared fittings. Compounds are used only on the first three threads of the male threads. No compound is used on coupling sleeves, or outside of tube flares.
e. Fabrication of pressure lines is not recommended. Lines should be replaced by part number.
f. Lines and fittings must be clean and dry. One of the following methods may be used:

1. Clean with a vapor degreasing solution of stabilized trichlorethylene conforming to MIL-T-7003. Follow by blowing lines clean and dry with clean, dry, filtered air.

CAUTION

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

2. Flush with naptha conforming with Specification TT-N-95, then blow clean and dry with clean, dry, filtered air. Flush with anti-icing fluid conforming to MIL-F-5566 or anhydrous ethyl alcohol. Rinse thoroughly with fresh water and dry with clean, dry, filtered air.
3. Flush with hot inhibited alkaline cleaner until free from oil and grease. Rinse with fresh water and dry with clean, dry, filtered air.

NOTE

Cap lines at both ends immediately after drying to prevent contamination.

15-13. REPLACEMENT OF COMPONENTS (PRIOR TO 1965). Removal, disassembly, assembly, and installation of components may be accomplished while using figure 15-7 as a guide.

CAUTION

The pressure regulator, pressure gage, pressure lines, and filler valve should be removed and replaced only by persons familiar with high-pressure fittings. Observe the maintenance precautions listed in the preceding paragraph.

NOTE

Oxygen cylinder and regulator assemblies may not always be installed in the field exactly as illustrated in figure 15-7, which shows factory installations. Important points to remember are these:

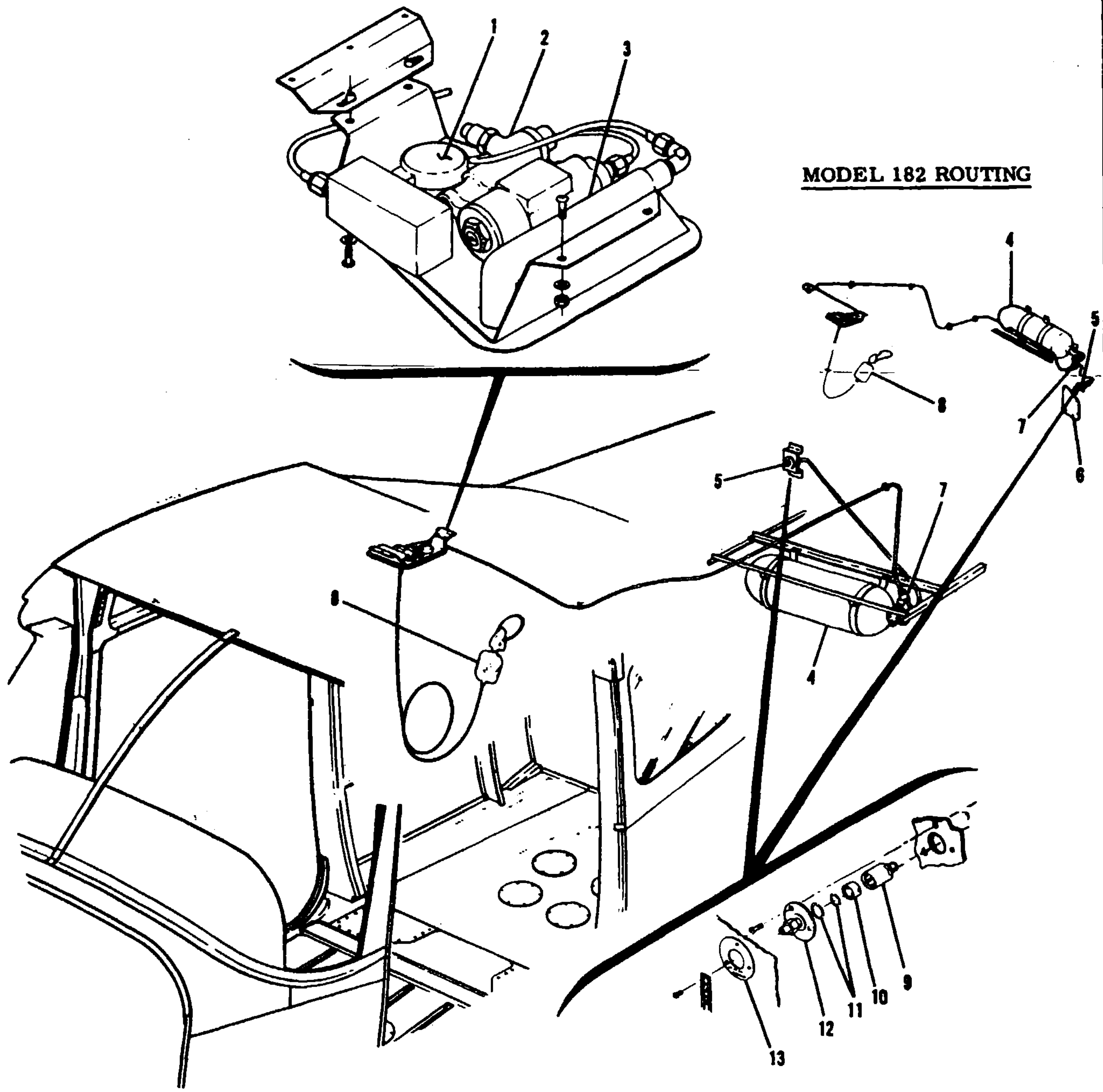
The vent hole in the regulator body must not be covered by the control clamp installed around the regulator body.

The low pressure relief valve should not be removed from the regulator except for replacement; it is installed in a specific port only. Although the other three low pressure ports are common to each other, the low pressure relief valve port is not.

The high pressure relief valve should not be removed from the regulator except for replacement. Although all high pressure ports are common to each other, the thread size is different for the high pressure relief valve.

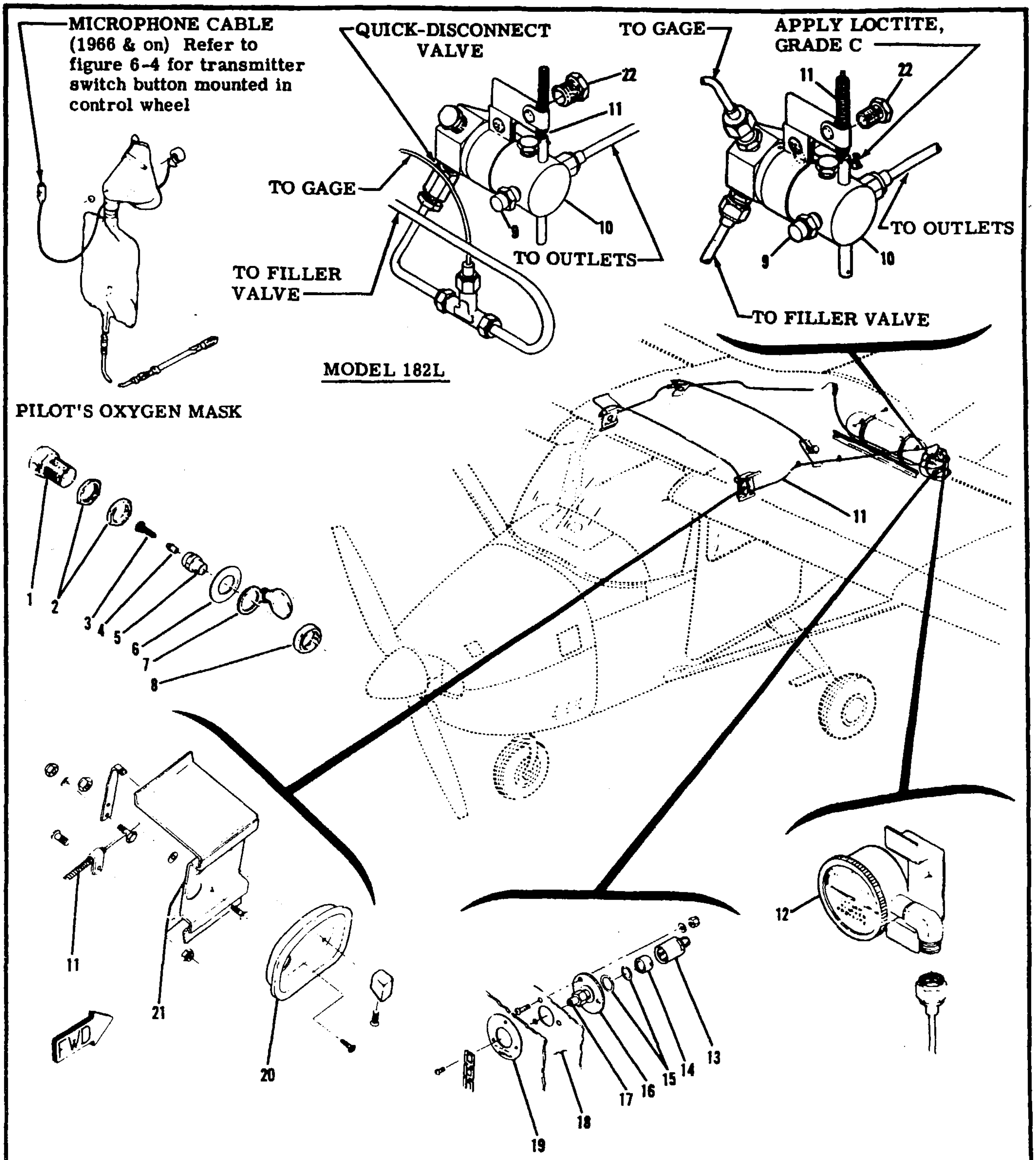
a. Before removing cylinder, release oxygen pressure, then disconnect filler line and outlet line from cylinder. Cap all openings immediately.
b. To replace filler valve O-rings, first release oxygen pressure. Disconnect chain but do not remove cap from filler valve. Remove baggage compartment rear wall or cover plate as required for access. Remove screws securing valve, disconnect pressure line, and cap line and seat. Disassemble, replace O-rings, reassemble, and install.
c. To replace valve core in manifold outlets, refer to step "c" of paragraph 15-14. Similar, although not identical, parts are installed in the manifold and the precautions noted must be observed.
d. To remove the regulator, pressure gage, and outlet assembly, first release oxygen pressure. The headliner must then be lowered and soundproofing removed. Refer to Section 3 for headliner removal.

15-14. REPLACEMENT OF COMPONENTS (1965 AND ON). Removal, disassembly, assembly, and installation of components may be accomplished while using figures 15-8 and 15-9 as guides.



1. Pressure Gage
2. Regulator
3. Outlet Manifold
4. Cylinder
5. Filler Valve
6. Access Door
7. Tee
8. Mask Assembly
9. Seat
10. Piston
11. O-Rings
12. Valve
13. Escutcheon

Figure 15-7. Models 182, 180, and 185 Oxygen Systems (Prior to 1965)



1. Base
2. Jamb Nut
3. Spring
4. Poppet
5. Core
6. Escutcheon
7. Cover
8. Lock Ring
9. Low Pressure Relief Valve
10. Regulator
11. "On-Off" Control Cable
12. Pressure Gage
13. Seat
14. Piston
15. O-Rings
16. Valve
17. Cap
18. Baggage Wall
19. Escutcheon
20. Cover
21. Bracket
22. High Pressure Relief Valve

Figure 15-8. Model 182 Oxygen System (1965 & on)

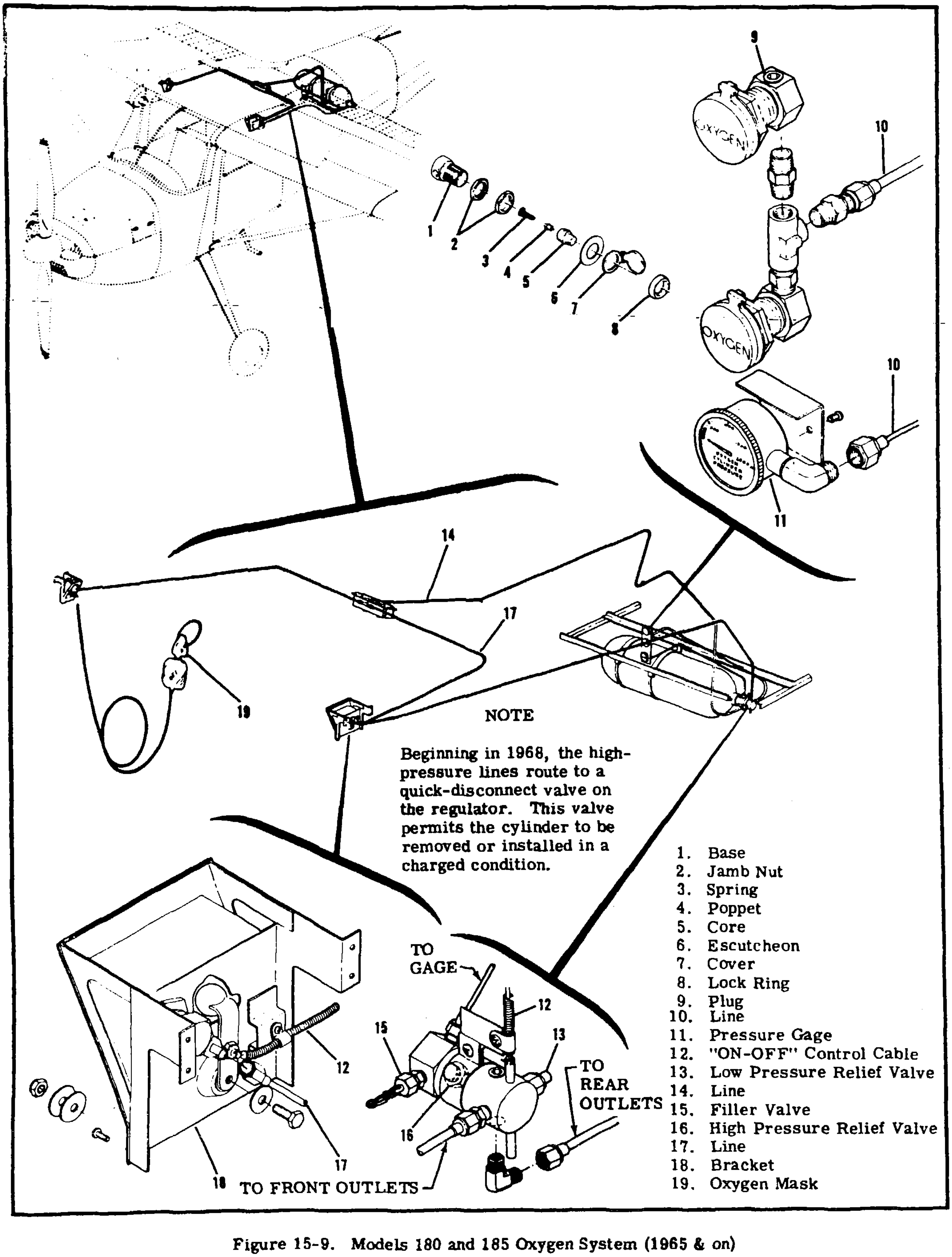


Figure 15-9. Models 180 and 185 Oxygen System (1965 & on)

CAUTION

The pressure regulator, pressure gage, pressure lines, and filler valve should be removed and replaced only by persons familiar with high-pressure fittings. Observe the maintenance precautions listed in paragraph 15-12.

NOTE

Oxygen cylinder and regulator assemblies may not always be installed in the field exactly as illustrated in figures 15-8 and 15-9, which show factory installations. Important points to remember are these:

The vent hole in the regulator body must not be covered by the control clamp installed around the regulator body.

The low pressure relief valve should not be removed from the regulator except for replacement; it is installed in a specific port only. Although the other three low pressure ports are common to each other, the low pressure relief valve port is not.

The high pressure relief valve should not be removed from the regulator except for replacement. Although all high pressure ports are common to each other, the thread size is different for the high pressure relief valve.

a. Before removing cylinder, release oxygen pressure, then disconnect push-pull control cable, filler line on Model 182, pressure gage line, and outlet line from regulator. Cap all lines immediately.

b. To replace filler valve O-rings in the Model 182, release oxygen pressure, then disconnect chain but do not remove cap from filler valve. Remove aft baggage compartment wall. Remove screws securing valve and disconnect pressure line. Cap line and seat. Disassemble, replace O-rings, reassemble, and install. The filler valve is a part of the regulator assembly on Models 180 and 185 (1965 and on). Replace the entire filler valve on these models.

c. To replace valve core (5) in outlets, unscrew core with a suitable tool that will engage lugs protruding at each side of core. When installing the core, be sure that poppet (4) is in place in spring and that other end of poppet enters center of core. If these parts are not positioned properly, the outlet will not operate properly.

d. To remove the entire oxygen system, the headliner must be lowered and soundproofing removed to expose lines. Refer to Section 3 for headliner removal.

15-15. INSPECTION REQUIREMENTS.

a. ICC 3AA 1800 Oxygen Cylinder. This cylinder shall be hydrostatically tested to 5/3 working pressure every five years by an FAA approved facility. The month and year of the latest test is stamped near the neck of the cylinder. This date should also be recorded in the aircraft log book.

b. Regulator. The regulator shall be removed and overhauled by an FAA approved facility every five years.

c. Pressure Gage. The pressure gage shall be checked for accuracy and cleaned by an FAA approved facility every five years.

d. Individual Outlets. Each outlet shall be disassembled and inspected, and the sealing core replaced regardless of condition, every five years.

e. Filler Valve. The filler valve shall be disassembled and inspected, and the O-rings replaced regardless of condition, every five years.

f. Filler Valve (Models 180 and 185, 1966 and on). The filler valve is a part of the regulator assembly noted in step "b."

g. System Leak Test. With 200 to 500 psi on gage, check entire system for leaks, using leak detector compounded for use with oxygen systems. With system under full pressure, repeat leak test on high-pressure lines and fittings. Perform a complete leak test at least every five years. When components are removed and replaced, leak test applicable connections. After the test has been completed, wash away all traces of the leak detector.

h. System Purging. Whenever components have been removed and replaced, plug masks into all outlets and purge the system for 10 minutes. Smell oxygen flowing from outlets and continue to purge until odorless. Refill cylinder as required during and after purging.

15-15A. FUNCTIONAL TEST. Whenever the oxygen system regulator (or regulator and cylinder assembly) has been replaced or overhauled, perform the following flow and internal leakage tests to check that the system functions properly.

a. Fully charge the oxygen system per paragraph 15-16.

b. Install an oxygen outlet adapter (Cessna Part Number C166005-0506) into a pressure gage (gage should be calibrated in one-pound increments from 0 to 100 PSI), and insert adapter into an oxygen outlet. Place control lever in the "ON" position. The gage pressure should be 75 ± 10 PSI.

c. Insert adapters (or mask and line assemblies if they are operating properly) into all remaining outlets. With oxygen flowing from all outlets, the pressure should still be 75 ± 10 PSI.

d. Place oxygen control lever in the "OFF" position and allow pressure to fall to 0 PSI. Remove all adapter assemblies except the one with the pressure gage. The pressure must not rise above 0 PSI when observed for one minute. Remove pressure gage and adapter from oxygen outlet.

NOTE

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

e. Connect oxygen masks to each outlet and check each mask for proper operation.

f. Check proper function of pilot's mask microphone and control wheel switch. After checking, return all masks to mask case.

g. Recharge oxygen system as required.

15-16. CHARGING. Do not charge oxygen systems if fittings on servicing equipment or filler valve are corroded or contaminated. If in doubt, clean with stabilized trichlorethylene and let air dry. Do not permit solution to enter internal parts. Before charging, check the hydrostatic test date as noted in paragraph 15-15, step "a."

CAUTION

Do not charge an oxygen cylinder if it has become contaminated. The regulator and cylinder assembly must then be disassembled, inspected, and cleaned by an FAA approved facility before filling. Contamination, as used here, means dirt, dust, or other foreign matter, as well as ordinary air in large quantities. If a gage line or filler line is disconnected and fittings capped immediately, the cylinder will not become contaminated unless temperature variation has created a suction within the cylinder. Likewise, a regulator may be replaced without contaminating the cylinder, if the same conditions are observed. Ordinary air contains water vapor which could condense and freeze. Since there are very small orifices in the system, it is important that this not be permitted to occur.

a. Connect cascade connection to filler valve.
b. Slowly open valve on cascade cylinder with lowest pressure, as noted on cascade pressure gage, allow pressure to equalize, then close cascade cylinder valve.
c. Repeat this procedure, using a progressively higher pressure cascade cylinder, until system has been charged to the pressure indicated in the following chart.
d. This chart automatically compensates for temperature rise as a result of compression. Ambient temperature listed in the chart is the air temperature in the area where the system is to be charged. Approach the chart filling pressures slowly and do not overcharge.

TABLE OF FILLING PRESSURES

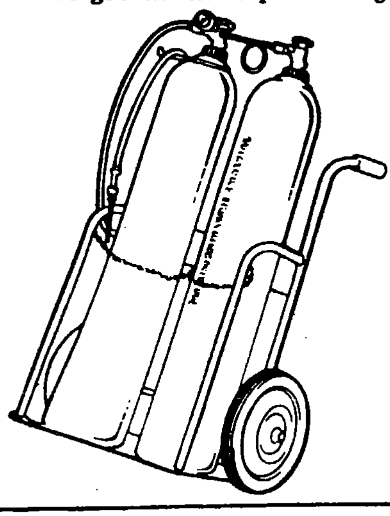
Ambient Temp. °F	Filling Press psig	Ambient Temp. °F	Filling Press. psig
0	1600	50	1825
10	1650	60	1875
20	1700	70	1925
30	1725	80	1975
40	1775	90	2000

15-17. CLEANING OXYGEN MASKS. Oxygen masks may be washed and cleaned in household detergent-type solutions. However, the radio microphone installed in some pilot's masks must either be removed or protected from moisture. Masks may be disinfected with a hospital-type antiseptic spray (Zep Aero SBT-12, or equivalent).

NOTE

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

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



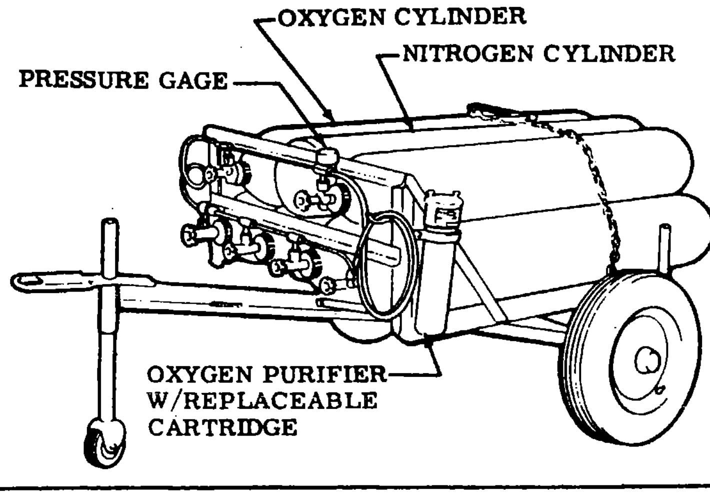


Figure 15-10. Typical Portable Oxygen Cascades

SECTION 16

INSTRUMENTS AND INSTRUMENT SYSTEMS

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16-1. GENERAL.

16-2. This section describes typical instrument installations and the systems operating them, with emphasis on trouble shooting and corrective measures for the systems themselves. 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 that malfunctioning instruments be sent to an approved instrument overhaul and repair station or returned to the manufacturer for servicing. Our concern here is with preventative maintenance on the 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 the instrument technician should be called in.

Some instruments, such as fuel quantity and oil pressure gages, are so simple and inexpensive that repairs usually will be more costly than a new instrument; on the other hand, aneroid and gyro instruments usually are well worth repairing. The words "replace instrument" in the text, therefore, should be taken only in the sense of physical replacement in the airplane. Whether the replacement is to be with a new instrument, an exchanged one, or the original instrument is to be repaired must be decided on the basis of individual circumstances.

16-3. INSTRUMENT PANELS. (See figure 16-1.)

16-4. Instrument panels in Cessna aircraft are made in two main sections: the stationary panel, which carries switches and controls and contains instruments such as fuel quantity and oil pressure and temperature gages, which are not sensitive to vibration, and the shock-mounted panel which carries the major flight instruments. Most of the instruments are screw-mounted on the backs of the shock-mounted panels, which in turn are covered with metal or molded plastic decorative panels.

16-5. REMOVAL.

The stationary instrument panels are secured to the engine mount stringers and a forward fuselage bulkhead and ordinarily are not considered removable. The shock-mounted panels are secured to the stationary panels by rubber shock mount assemblies.

a. To remove the shock-mounted panel, release the clips securing the decorative panel by carefully prying under the buttons on the clips. Remove any control knobs or lock nuts on the panel which would interfere and pull off the cover. Remove the nuts from the shock mount screws, tag, and disconnect the instrument plumbing and wiring and pull the panel straight back. If it should become necessary to remove the shock-mounted panel and its decorative cover from the airplane, on some aircraft, the control where shaft and wheel must first be removed. This is done by removing the nuts and bolts securing the shaft to the control wheel universal on the control tee. On Model 182 aircraft, the control wheel can be removed from the control shaft by removing securing screws, thereby permitting removal of the shock panel with the control shaft installed.

b. Where shock mount assemblies (12) are used, the bolts securing the panel to the shock mounts must be removed. Note the combination of bolts, washers, ground straps and spacers used on each mount for correct replacement when the panel is reinstalled.

16-6. ADDING EXTRA SHOCK MOUNTS.

Service life of instruments is directly related to adequate shock-mounting of the panel. In some cases, particularly when additional instruments have been added in the field, the original shock mounts are inadequate to support the increased weight of the panel. Installing additional shock mounts, when the instrument complement is increased, is a practical fix to prevent rapid deterioration of the mounts at the original locations.

16-7. INSTALLATION.

a. To install the shock-mounted panel, set it in place in the stationary panel, aligning the shock mounts with the holes in the panel, and install the nuts on the shock mount screws.

b. To install the shock-mounted panel where shock mount assemblies (12) are used, place the panel mounting screws and spacers in their proper positions, then position the panel, insert the screws in the mounts, and install the nuts.

c. Replace the instruments and connect the wiring and plumbing. Position the decorative cover and press the retainer clips through the holes in the panel. A light coat of paraffin, beeswax, or soap on the prongs of the retainer clips will make their insertion easier.

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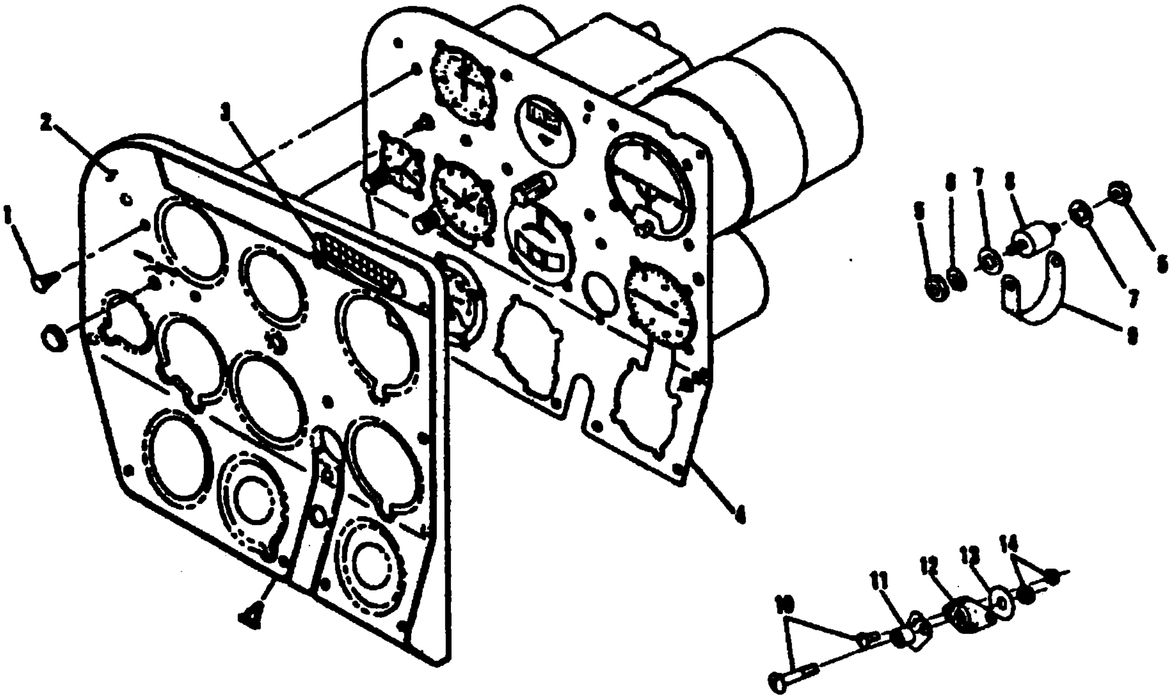
NOTE

This is a typical shock-mounted instrument panel. The panels used in the various models differ in configuration; however, all are similar in method of attachment. Two types of shock mounts are used in Cessna airplanes, and the same type should be used whenever replacement is necessary.

The shock-mounted panel in the Model 182L carries only the gyro instruments. When removing the panel, note sequence of attaching parts and location of ground straps to aid installation.



1. Fastener
2. Decorative Cover
3. Compass Card Holder
4. Shock-Mounted Panel
5. Nut
6. Spacer
7. Lockwasher
8. Shock Mount
9. Ground Strap
10. Screws
11. Spacer
12. Shock Mount
13. Washer
14. Nuts

NOTE

If shock mount (8) has unequal thread length, install shorter threads through stationary panel.

The direction of screws (10) is reversed on some aircraft. Note direction upon removal.

Figure 16-1. Typical Shock-Mounted Panel

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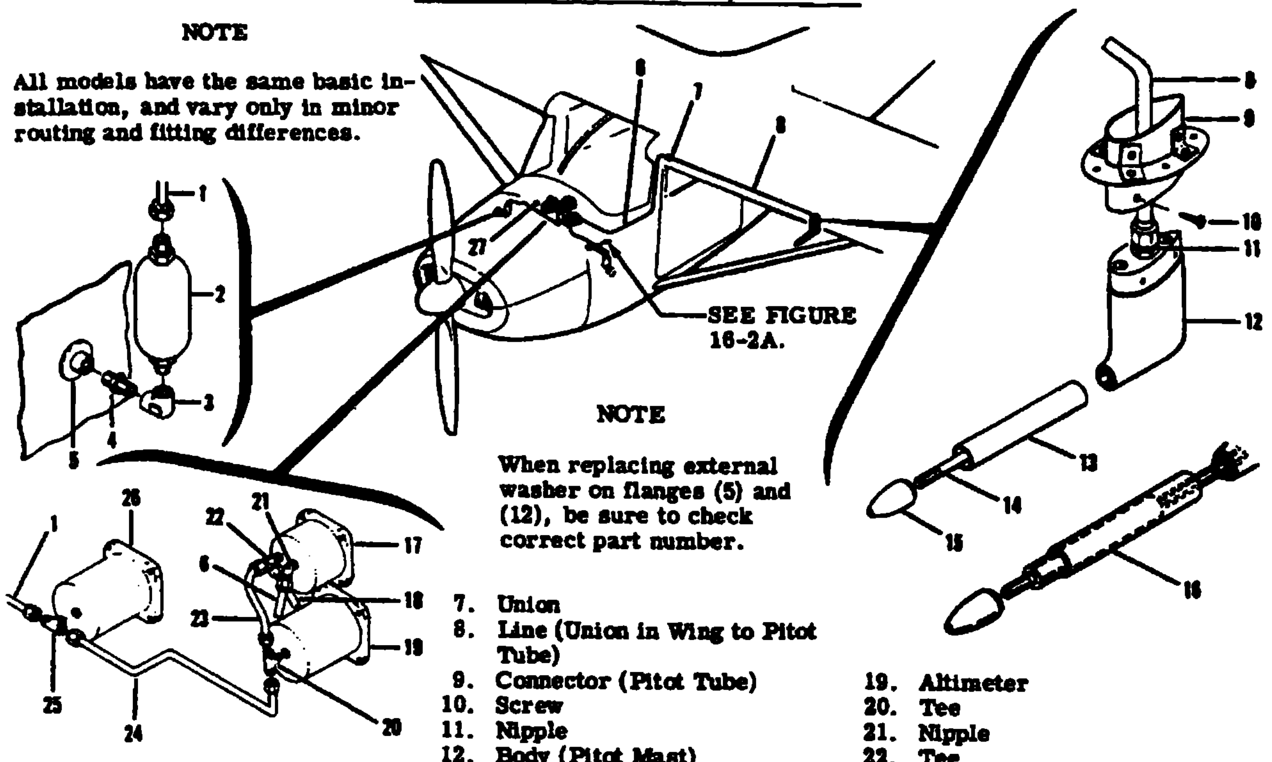
TYPICAL OF MODELS 180, 182 & 185

NOTE

All models have the same basic installation, and vary only in minor routing and fitting differences.

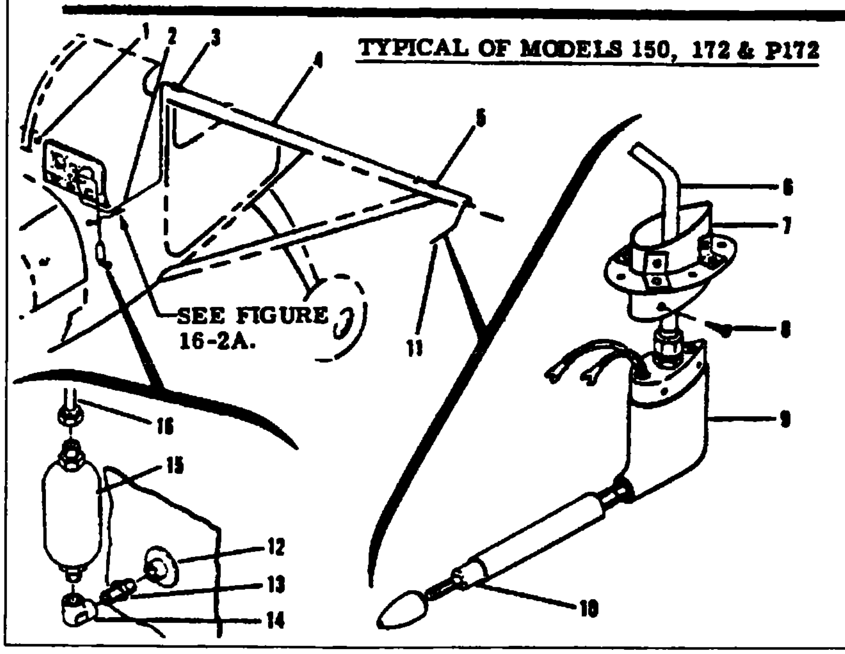


NOTE

When replacing external washer on flanges (5) and (12), be sure to check correct part number.

1. Line (Right Sump to Tee)
2. Right Static Source Sump
3. Elbow
4. Nipple
5. Right Static Port
6. Line (Airspeed Indicator to Union in Wing)
7. Union
8. Line (Union in Wing to Pitot Tube)
9. Connector (Pitot Tube)
10. Screw
11. Nipple
12. Body (Pitot Mast)
13. Tube (Pitot Mast)
14. Stem (Pitot Mast)
15. Nose Fitting (Pitot Mast)
16. Heater Assembly (Pitot Mast)
17. Airspeed Indicator
18. Line (Tee to Left Static Source Sump)
19. Altimeter
20. Tee
21. Nipple
22. Tee
23. Line (Airspeed Indicator Tee to Altimeter Tee)
24. Line (Altimeter Tee to Vertical Speed Indicator Tee)
25. Tee
26. Vertical Speed Indicator
27. Switch (Pitot Heater)

TYPICAL OF MODELS 150, 172 & P172



1. Switch (Pitot Heater)
2. Line (Airspeed Indicator to Union in Wing)
3. Union
4. Line (Pitot Tube to Wing Root)
5. Union
6. Line (Union to Heated Pitot Tube)
7. Connector (Pitot Tube)
8. Screw
9. Pitot Tube Mast Assy (Heated)
10. Heater Element (Pitot Mast)
11. Pitot Tube (Unheated)
12. Static Port
13. Nipple
14. Elbow
15. Static Source Sump
16. Line (Static Source to Airspeed Indicator)

NOTE

The model P172 has two static ports; one on either side of the tailcone.

Figure 16-2. Pitot-Static Systems

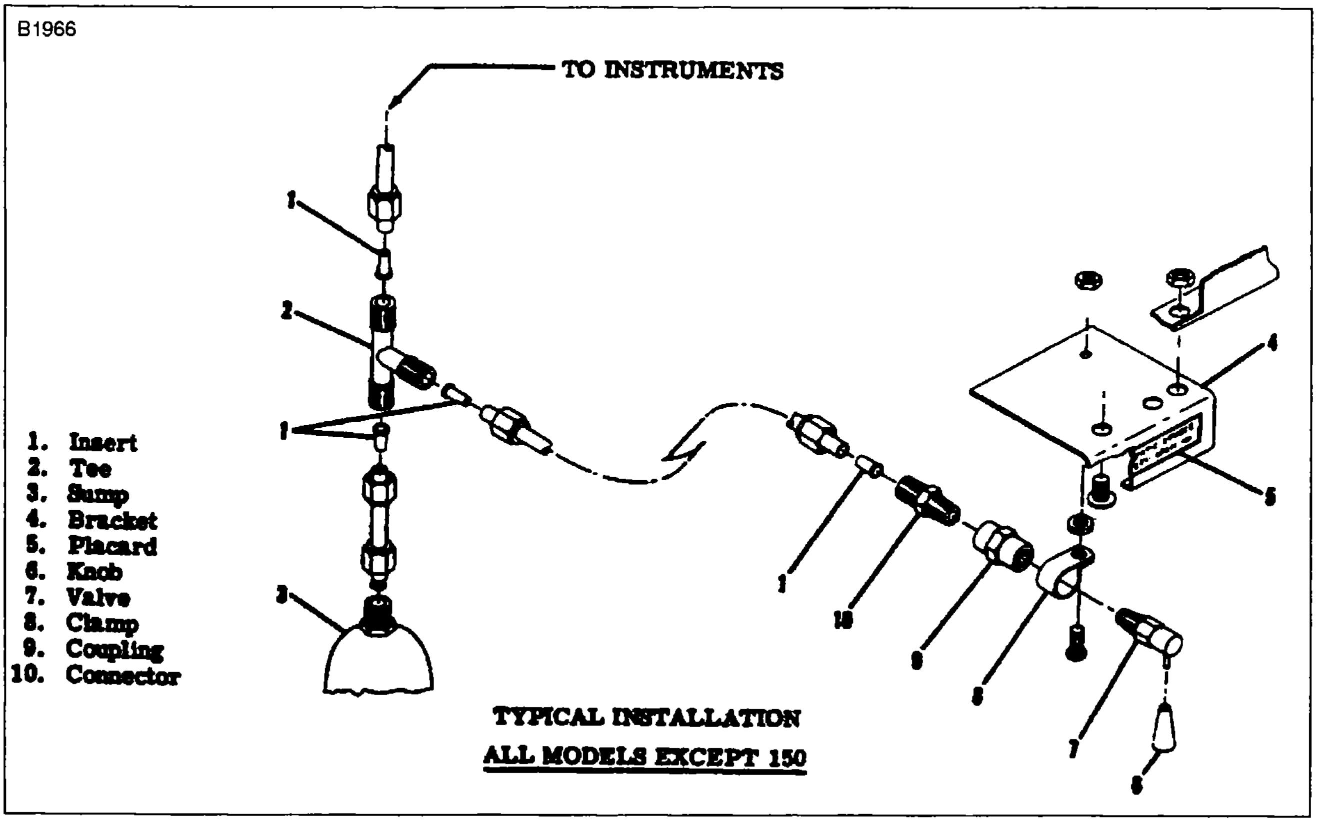


Figure 16-2A. Alternate Static Air Source

SHOP NOTES:

d. Install any previously removed control knobs and lock nuts. If the control wheel and control shaft were previously removed for complete removal of the shock panel and decorative cover, insert the control wheel and shaft through the shock-mounted panel and connect it to the universal on the control tee. Reinstall the control wheel on Model 182 aircraft.

16-8. INSTRUMENT REMOVAL.

Most instruments are secured to the panel with screws inserted through the panel face, under the decorative cover. To remove and instrument, remove the decorative cover (if necessary), disconnect the plumbing or wiring to the instrument concerned, remove the retainer screws and take the instrument out from behind, or, in some cases, from the front of the instrument panel. Some instruments installed on the stationary panel can be removed if desired without removing the decorative cover; the mounting screws for these instruments have jam nuts so that the instrument retainer nuts may be removed and replaced without holding the screw heads. Other instruments on the stationary panel are circumscribed with escutcheons. Instrument mounting screws in the corners of the escutcheons are accessible on the face of the panel; the retainer nuts are accessible from behind the instrument panel. The decorative cover need not be removed to take out these instruments. The instrument cluster used on some models is installed as a unit, secured by a screw on each end of the cluster. The cluster must be removed from the panel to replace an individual gage.

NOTE: In some airplanes, the instrument cluster is located directly above the glove box. Removal of the cluster will be simpler if the glove box is removed first. The box is attached with screws just inside the box opening.

In all cases when an instrument is removed, the lines or wires disconnected from it should be protected. Cap open lines and cover pressure connections on the instrument to prevent thread damage and the entrance of foreign matter. Wire terminals should be insulated or tied up so they will not ground accidentally, or short-circuit on another terminal.

16-9. INSTRUMENT INSTALLATION.

Generally, installation procedure is the reverse of the removal procedure. Make sure that the mounting screw nuts are tightened firmly, but to do not over-tighten them, particularly on instruments having plastic cases. The same rule generally applies to connecting plumbing and wiring. If thread lubricant or sealer is used on plumbing, it should be applied sparingly and only on the male threads. When replacing an electrical gage in an instrument cluster assembly, avoid bending the pointer or dial plate. Distortion of the dial or back plate could change calibration of the gages.

16-10. PITOT AND STATIC SYSTEMS

16-11. The pitot and static systems are systems of metal or plastic tubing which convey ram air pressure and atmospheric pressure to the airspeed and vertical speed indicators and the altimeter. Ram air pressure picked up by the pitot tube on the leading edge of the left wing is transmitted to the airspeed indicator by tubing running through the wing leading edge to the cabin, then down the left forward doorpost and forward to the instrument panel. Atmospheric pressure for the airspeed and vertical speed indicators and the altimeter is picked up by static pressure ports on the fuselage and transmitted through tubing to the instruments. Two general system layouts are used on Cessna single-engine airplanes. The 150 and 172 series have single static ports on the left side of the fuselage and a simple metal pitot tube projecting down and forward from the left wing leading edge. The P172 system is identical except that it has two static ports, one located on either side of the tailcone. All aircraft of these series have static line sumps to collect condensation in the static system. The 180, 182, and 185 series use dual static ports, one on each side of the fuselage. All of these aircraft also have a static line sump adjacent to the static port. The pitot tubes in these series are enclosed in mast-type housings. An optional alternate static air source (see figure 16-2A) may be installed for use in emergencies on all models except 150. When the alternate static air valve is opened, cabin air pressure is substituted for atmospheric pressure, causing instrument readings to vary from normal. Refer to Owner's Manual for flight operation using alternate static source pressure. The alternate static air source valve is located beneath the left side of the instrument panel. Pitot heat installations are optional equipment on some airplanes. On the 150, 172, and P172 series, pitot heat is available when the standard metal pitot tube is replaced with a mast-type pitot tube containing a heating element. The mast-type tube is standard equipment on 180, 182, and 185 series, and the addition of pitot heat to these aircraft is simply a matter of adding the heating element and the necessary wiring. The pitot heater is powered by the airplane's electrical system and controlled by a switch on the instrument panel. The pitot and static line plumbing shown in figure 16-2 is a typical factory installation. Several variations have been used in factory installations to accommodate optional instrumentation and other variations have been made in the field while making custom installations. However, the servicing and maintenance procedures given here will apply in general to all these variations.

16-11A. TRUE AIRSPEED INDICATOR.

A true airspeed indicator may be installed as optional equipment on all 100-Series aircraft. The indicator is equipped with a true airspeed conversion ring. The ring may be rotated until pressure altitude is aligned with outside air temperature, then indicated airspeed on the gage is read as true airspeed on the adjustable ring. The instrument may be removed using figure 16-2B as a guide. Upon installation, and before tightening mounting screws (2), the instrument must be calibrated. This is accomplished as follows: rotate ring (4) until 120 mph on the adjustable ring aligns with 120 mph on the indicator. Holding this setting, move retainer (3) until 60° F. aligns with zero pressure altitude, then tighten mounting screws (2) and replace decorative cover.

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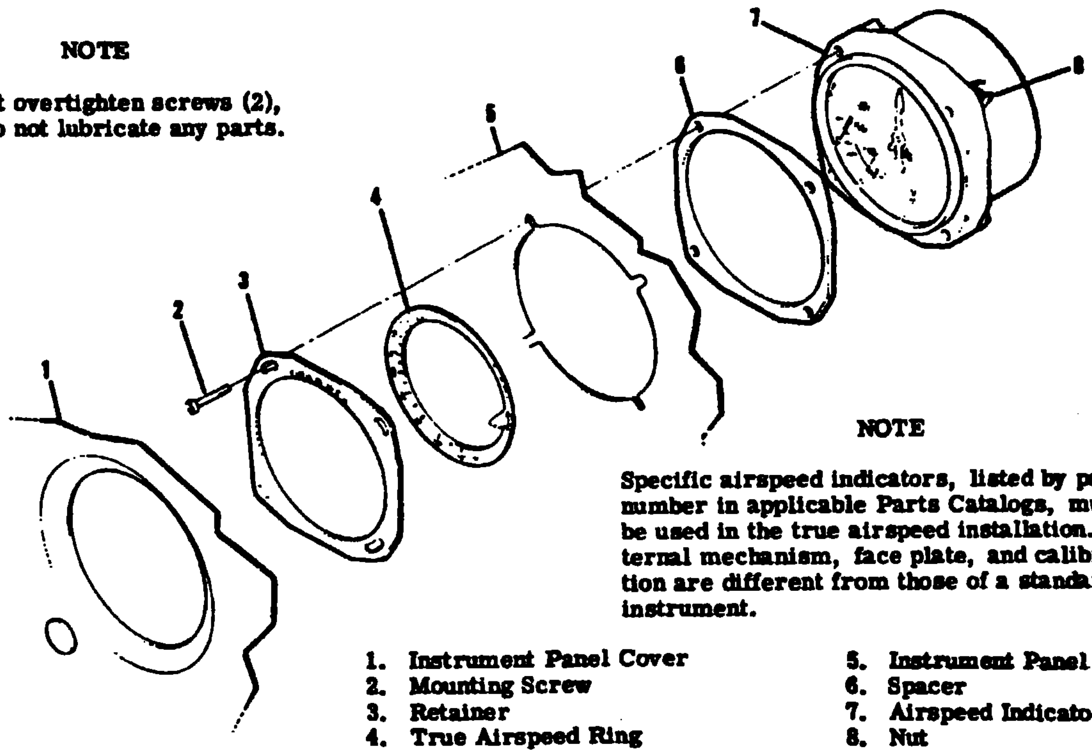
NOTE

Do not overtighten screws (2), and do not lubricate any parts.



NOTE

Specific airspeed indicators, listed by part number in applicable Parts Catalogs, must be used in the true airspeed installation. Internal mechanism, face plate, and calibration are different from those of a standard instrument.

1. Instrument Panel Cover
2. Mounting Screw
3. Retainer
4. True Airspeed Ring
5. Instrument Panel
6. Spacer
7. Airspeed Indicator
8. Nut

Figure 16-2B. True Airspeed Indicator

16-12. TROUBLE SHOOTING--PITOT-STATIC SYSTEM.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
LOW OR SLUGGISH AIRSPEED INDICATION.		
Normal altimeter and vertical speed - Pitot tube deformed, leak or obstruction in pitot line.	Check alignment, test line for leaks or obstructions.	Straighten tube, 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.
Alternate static source valve open.	Check visually.	Close for normal operation.

16-13. TROUBLE SHOOTING -- AIRSPEED INDICATOR.

PROBABLE CAUSE	ISOLATION PROCEDURE	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.	Substitute known-good indicator and check reading.	Replace instrument.
Leaking diaphragm.	Substitute known-good indicator and check reading.	Replace instrument.
Alternate static source valve open.	Check visually.	Close for normal operation.
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.

16-14. TROUBLE SHOOTING -- ALTIMETER.

PROBABLE CAUSE	ISOLATION PROCEDURE	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 obstructions or leaks.	Blow out lines, tighten connections.
Leak in airspeed or vertical speed indicator installations.	Check other instruments and system plumbing for leaks and obstructions.	Blow out lines, tighten connections.

SHOP NOTES:

16-15. TROUBLE SHOOTING -- VERTICAL SPEED INDICATOR.

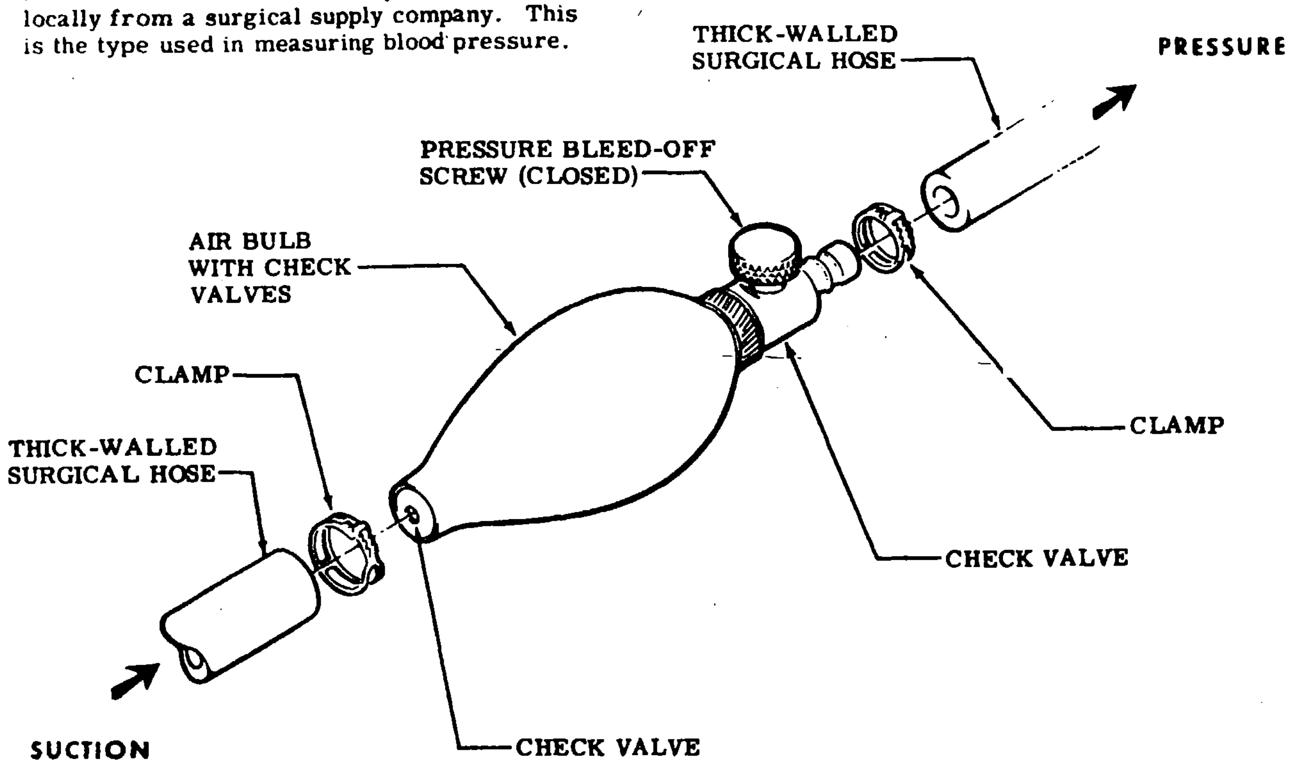
PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
INSTRUMENT FAILS TO OPERATE.		
Static line plugged.	Check line for obstructions.	Blow out lines.
Static line broken.	Check line for damage, connections for security.	Repair or replace damaged line, tighten connections.
INCORRECT INDICATION.		
Partially plugged static line.	Check line for obstructions.	Blow out lines.
Ruptured diaphragm.	Substitute known-good indicator and check reading.	Replace instrument.
Pointer off zero.	Reset pointer to zero.	
POINTER OSCILLATES.		
Partially plugged static line.	Check line for obstructions.	Blow out lines.
Leak in static line.	Test lines and connections for leaks.	Repair or replace damaged lines, tighten connections.
Leak in instrument case.	Substitute known-good indicator and check reading.	Replace instrument.
HAND VIBRATES.		
Excessive vibration.	Check shock mounts.	Replace defective shock mounts.
Defective diaphragm.	Substitute known-good indicator and check for vibration.	Replace instrument.

16-16. TROUBLE SHOOTING -- HEATED PITOT HEAD.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
TUBE DOES NOT HEAT OR CLEAR ICE.		
Switch turned "OFF."	Turn switch "ON."	
Blown fuse or circuit breaker.	Check fuse or circuit breaker.	Replace or reset.
Break in wiring.	Test for open circuit.	Repair wiring.
Heating element burned out.	Check resistance of heating element.	Replace element.

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 16-2C. Static System Test Equipment

16-17. PITOT AND STATIC SYSTEM MAINTENANCE. Proper maintenance of the pitot and static system is essential for the proper operation of the altimeter, and vertical speed and airspeed indicators. Leaks, moisture and obstructions in the pitot system will result in false airspeed indications, while static system malfunctions will affect the readings of all three instruments. Under instrument flight conditions, these instrument errors could be hazardous. Cleanliness and security are the principal rules for pitot and static pressure system maintenance. Both the pitot tube and the static ports must be kept clean and unobstructed.

16-18. ALIGNING PITOT TUBE. For correct airspeed indication the pitot tube on the 150, 172, and P172 series must be properly aligned, so the open end of the tube is perpendicular to the vertical axis and parallel to the longitudinal axis of the airplane. For the P172 and 172 (prior to 1967), a template like the one shown in figure 16-3 will prove the most convenient means of checking this alignment. Prior to using the templates, check that the pitot tube parallels the row of rivets just outboard of the tube. A straightedge may be placed along the row of rivets to check alignment. Tube alignment on Model 150 (prior to 1967) should be checked with a template made to the pattern in figure 16-4. The template shown in figure 16-4A is used to align the pitot tubes on both Models 150 and 172 (1967 and on). All templates fit over the wing leading edge and the pitot tube should conform to the illustration. The illustrations have been drawn carefully to actual size so they may be traced directly on a sheet of stiff plastic, plywood, or metal. Place a piece of carbon paper between the printed page and the template material, then trace the contours.

16-19. CHECKING PITOT SYSTEM FOR LEAKS. To check the pitot system for leaks, fasten a piece of rubber or plastic tubing over the pitot tube, close the opposite end of the tubing and slowly roll up the tube until the airspeed indicator registers in the cruise range. Secure the tube and after a few minutes recheck the airspeed indicator. Any leakage will have reduced the pressure in the system, resulting in a lower airspeed indication. Slowly unroll the tubing before removing it, so the pressure is reduced gradually. Otherwise the instrument may be damaged. If the test reveals a leak in the system, check all connections for tightness. On some airplanes, the pitot system includes a rubber hose connection at the wing root rib. Pay particular attention to this connection when checking the system for security; if the hose shows signs of deterioration, replace it.

16-19A. STATIC PRESSURE SYSTEM INSPECTION AND LEAKAGE TEST. The following procedure outlines inspection and testing of the static pressure system, assuming that the altimeter has been tested and inspected in accordance with current Federal Aviation Regulations.

a. Ensure that the static system is free from entrapped moisture and restrictions.
b. Ensure that no alterations or deformations of the airframe surface have been made that would affect the relationship between air pressure in the static pressure system and true ambient static air pressure for any flight configuration.
c. If dual static pressure sources are used, seal off the opening in one with plastic tape. This must be an air-tight seal.
d. Close the static pressure alternate source valve, if installed.
e. Attach a source of suction to the remaining static pressure source opening. Figure 16-2C shows one method of obtaining suction.
f. Slowly apply suction until altimeter indicates a 1000-foot increase in altitude.

CAUTION

When applying or releasing suction, do not exceed the range of the vertical speed indicator or airspeed indicator.

g. Cut off the 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, then remove tape if used to seal static source on dual installations.

NOTE

If leakage rate exceeds the maximum allowable, first tighten all connections then repeat the leakage test. If leakage rate still exceeds the maximum allowable, use the following procedure.

i. Disconnect static pressure lines from airspeed indicator and vertical speed indicator, and use suitable fittings to connect the lines together so that the altimeter is the only instrument still connected into the static pressure system.
j. Repeat the leakage test to check whether the static pressure system or the removed instruments are the cause of leakage. If instruments are at fault, they must be repaired by an "appropriately rated repair station" or replaced. If the static pressure system is at fault, use the following procedure to locate the leakage.
k. Attach a source of positive pressure to the static source opening. Figure 16-2C shows one method of obtaining positive pressure.

CAUTION

Do not apply positive pressure with the airspeed indicator or vertical speed indicator connected to the static pressure system.

l. Slowly apply positive pressure until altimeter indicates a 500-foot decrease in altitude, and main-

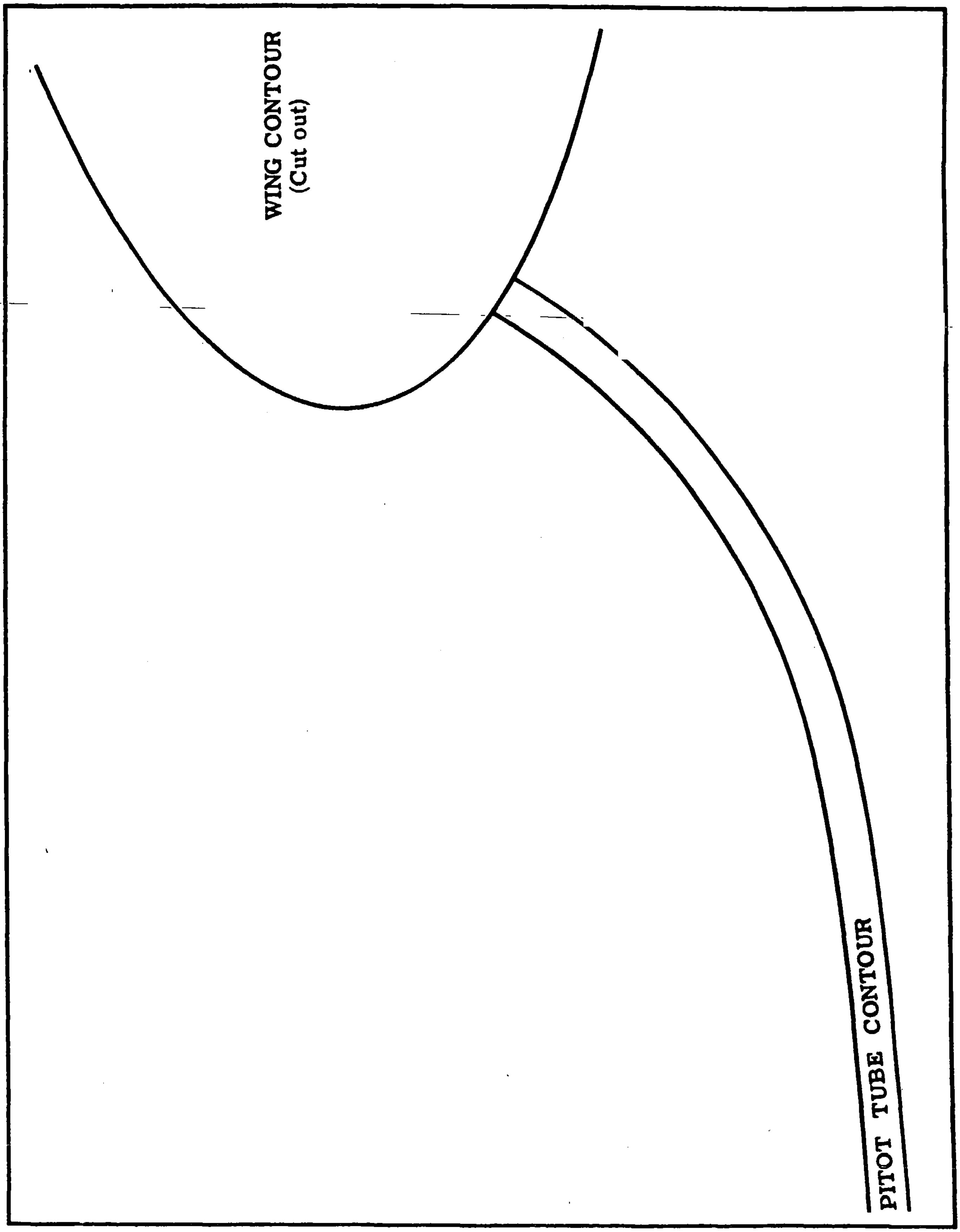


Figure 16-3. Pitot Tube Alignment - Models P172 and 172 (Prior to 1967)

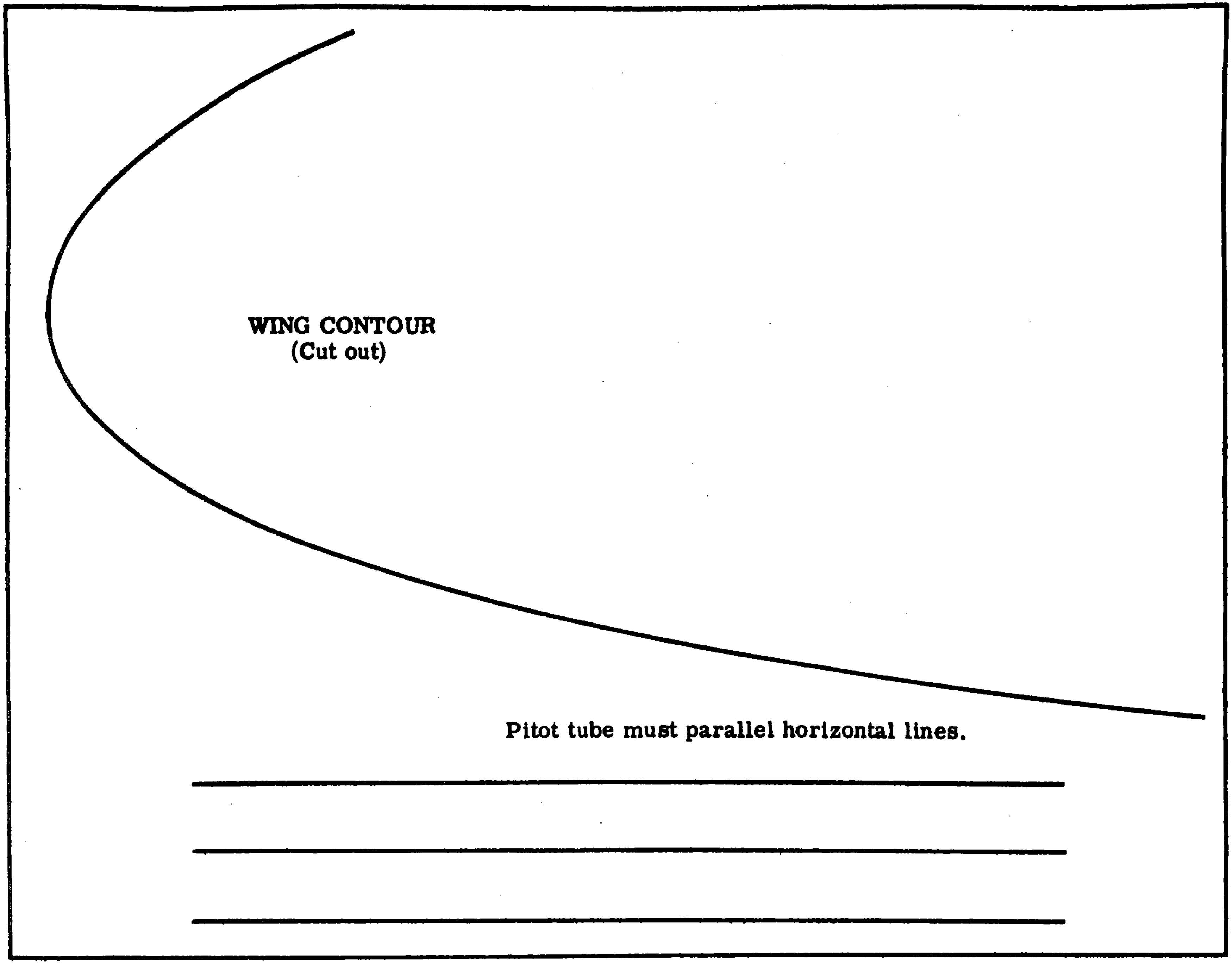


Figure 16-4. Pitot Tube Alignment - Model 150 (Prior to 1967)

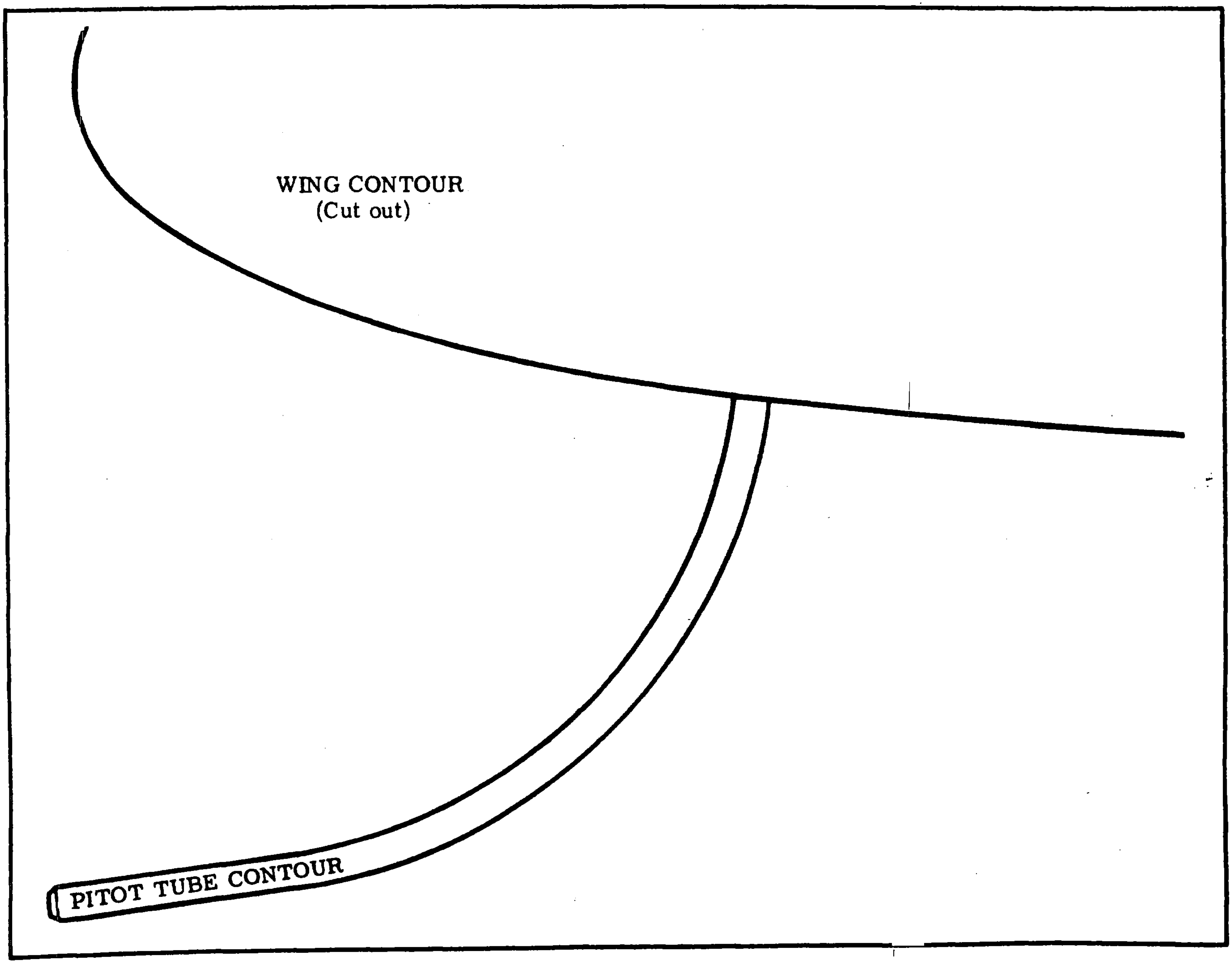


Figure 16-4A. Pitot Tube Alignment - Models 150 and 172 (1967 and on) tain this altimeter indication while checking for leaks. Coat line connections, static pressure alternate source valve, and static source flange with solution of mild soap and water, watching for bubbles to locate leaks.

m. Tighten leaking connections. Repair or replace any parts found defective.

n. Reconnect airspeed indicator and vertical speed indicator into the static pressure system and repeat leakage test per steps "c" thru "h."

16-20. BLOWING OUT PITOT LINES. Although the pitot system is designed to drain down to the pitot tube opening, condensation may collect at other points in the system and produce a partial obstruction. To clear the line, disconnect it at the airspeed indicator and, using low pressure air, blow from the indicator end of the line toward the pitot tube.

CAUTION

Never blow through pitot or static lines toward the instruments. Doing so may damage them.

Like the pitot lines, the static pressure lines must be kept clear and the connections tight. All models have static source sumps that collect moisture and keep the system clear. However, when necessary, disconnect the static line at the first instrument to which it is connected, then blow the line clear with low-pressure air.

NOTE

On aircraft equipped with alternate static source, use the same procedure, opening alternate static source valve momentarily to clear its line, then close valve and clear remainder of the system.

Check all static pressure line connections for tightness. If hoses or hose connections are used, check them for general condition and their clamps for security. Replace hoses which have cracked, hardened or show other signs of deterioration.

16-21. REMOVAL OF PITOT AND STATIC PRESSURE SYSTEM. To remove the pitot mast on models with this type system, remove the four mounting screws on the side of the attaching connector and pull the mast out of the connector far enough to disconnect the pitot line. Electrical connections to the heater assembly (if installed) may be disconnected through the wing access opening just inboard of the mast. On airplanes having the simple metal pitot tube, the tube connection is accessible through the access hole just inboard of the pitot tube. To remove the pitot tube, disconnect the fitting and pull the tube out of the wing through the access hole. The pitot and static lines are removed in the usual manner, after removing the wing access openings, lower wing fairing strip, decorative cover over the left doorpost, and when necessary, the left forward upholstery panel. Reinstallation of the wing line will be simpler if a guide wire is drawn in as the line is removed from the wing. The wing line may be removed intact by drawing it out through the cabin and right cabin door.

16-22. REPLACEMENT OF PITOT AND STATIC PRESSURE SYSTEM. When replacing components of the pitot and static pressure systems, use anti-seize compound sparingly on the male threads on both metal and plastic connections. Avoid excess compound which might enter the lines. Tighten connections firmly, but avoid overtightening and distorting the fittings. If twisting of plastic tubing is encountered when tightening the fittings, VV-P-236 or USP Petrolatum may be applied sparingly between the tubing and fittings.

SHOP NOTES:

16-23. VACUUM SYSTEMS.

16-24. Suction to operate directional gyro and gyro horizon instruments is provided by a single super venturi system, or by an engine-driven vacuum pump. Model 172 airplanes, except the Skyhawk, have no provision for mounting a vacuum pump, therefore these aircraft utilize a single venturi to provide suction. All other aircraft have vacuum pump provisions. The engine-driven vacuum system uses a vacuum pump mounted on the engine accessory case or the engine case. The pump is gear-driven through a spline-type coupling. The vacuum pump discharge is through an oil separator, where the oil, which passes through the pump and lubricates it, is returned to the engine sump and the air is expelled overboard. The 1968 Model 172 and Skyhawk have a dry vacuum pump that utilizes sealed bearings therefore deleting the need for an oil separator. The venturi-type vacuum source is not required on the 1968 Model 172. A suction relief valve, used on engine-driven vacuum pump systems, is used to control system pressure. It is connected between the pump inlet and the instruments. In the cabin, the vacuum line runs from the gyro instruments to a relief valve at the firewall, or to a relief valve and through the side of the fuselage to a venturi. A central air filtering system is utilized in all vacuum systems of 1965 & on aircraft. The reading of the suction gage in the central filter system indicates net difference in suction before and after air passes through a gyro. This differential pressure will gradually decrease as the central filter becomes dirty, causing a lower reading on the suction gage. Prior to 1965 the pictorial gyros are equipped with warning lights to indicate abnormal suction, and do not utilize a suction gage. A test switch provides a means of checking the lights. The venturi for the Model 172 vacuum system is located on the fuselage, just forward of the right landing gear spring.

16-25. TROUBLE SHOOTING -- VACUUM SYSTEM.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
HIGH SUCTION GAGE READINGS.		
Gyros function normally - Relief valve screen clogged, relief valve malfunction.	Check screen, then valve. Compare gage readings with new gage.	Clean screen, reset valve. Replace gage.
NORMAL SUCTION GAGE READING, SLUGGISH OR ERRATIC GYRO RESPONSE.		
Instrument air filters clogged.	Check 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 or venturi, restriction in oil separator or pump discharge line.	Check lines for leaks, check pump discharge volume, disconnect and test pump.	Repair or replace lines, adjust or replace relief valve, repair or replace pump or venturi, clean oil separator.
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 it.
OIL COMES OVER IN PUMP DISCHARGE LINE.		
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 in Stoddard solvent, blow dry. Blow out lines. If pump oil consumption is excessive, replace oil metering collar and pin in pump.

16-26. TROUBLE SHOOTING -- GYROS.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
HORIZON BAR FAILS TO RESPOND.		
Central or instrument 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 or venturi failure.	Check pump or venturi.	Replace pump or venturi.
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.
HORIZON BAR OSCILLATES OR VIBRATES EXCESSIVELY.		
Central or instrument 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 or instrument 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 or venturi failure.	Check pump or venturi.	Replace pump or venturi.
Vacuum line kinked or leaking.	Check lines for damage and leaks.	Repair or replace damaged lines, tighten connections.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
DIAL SPINS IN ONE DIRECTION CONTINUOUSLY.		
Operating limits have been exceeded.		Cage and reset when airplane is level.
Defective mechanism.	Substitute known-good gyro and check indication.	Replace instrument.

16-27. TROUBLE SHOOTING -- VACUUM PUMP.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
EXCESSIVE OIL IN DISCHARGE.		
Excessive flow to pump.	Check pump vent plugs.	Clean vent plugs.
Clogged oil separator.	Check separator for obstructions.	Clean separator.
Damaged engine drive seal.		Replace gasket.
HIGH SUCTION.		
Suction relief valve screen clogged.	Check screen for obstructions.	Clean or replace screen.
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.

16-28. TROUBLE SHOOTING -- VACUUM SWITCH (TYPE 34B GYRO HORIZON).

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
FALSE INDICATION FROM "HI" AND "LO" VACUUM INDICATOR LIGHTS.		
Leakage of pressure through switch connection.	Check connection for security.	Tighten loose connection.
Leaking switch diaphragm.		Replace switch.
Bent or loose contacts.		Replace switch.
INDICATOR LIGHT FAILURE.		
Diaphragm does not return to normal position.		Replace switch.
Loose electrical connections.	Check all connections for security.	Tighten all connections.
Worn or corroded switch contact points.		Replace switch.
Bulb burned out.	Test lights with vacuum lights test switch.	Install new bulb.

16-29. VACUUM SYSTEM REMOVAL. The various components of the vacuum system are secured by conventional clamps, mounting screws and nuts. To remove a component, remove the mounting screws and disconnect the inlet and discharge lines.

16-30. VACUUM SYSTEM REPLACEMENT. When replacing a vacuum system component, make sure connections are made correctly. Use thread lubricant sparingly and only on male threads. Avoid over-tightening connections. Before reinstalling a vacuum pump, probe the oil passages in the pump and engine, to make sure they are open. Place the mounting pad gasket in position over the studs and make sure it does not block the oil passages. Coat the pump drive splines lightly with a high-temperature grease such as Dow Silicone #30 (Dow-Corning Co., Midland, Mich.). After installing the pump, before connecting the plumbing, start the engine and hold a piece of paper over the pump discharge to check for proper lubrication. Proper oil flow through the pump is one to four fluid ounces per hour.

16-31. VACUUM SYSTEM CLEANING. In general, low-pressure, dry compressed air should be used in cleaning vacuum system components removed from the airplane.

Components such as the oil separator and suction relief valve which are exposed to engine oil and dirt should be washed with Stoddard solvent, then dried with a low-pressure air blast. Check hoses for collapsed inner liners as well as external damage.

CAUTION

Never apply compressed air to lines or components installed in the airplane. The excessive pressures will damage the gyro instruments. If an obstructed line is to be blown out, disconnect it at both ends and blow from the instrument panel out.

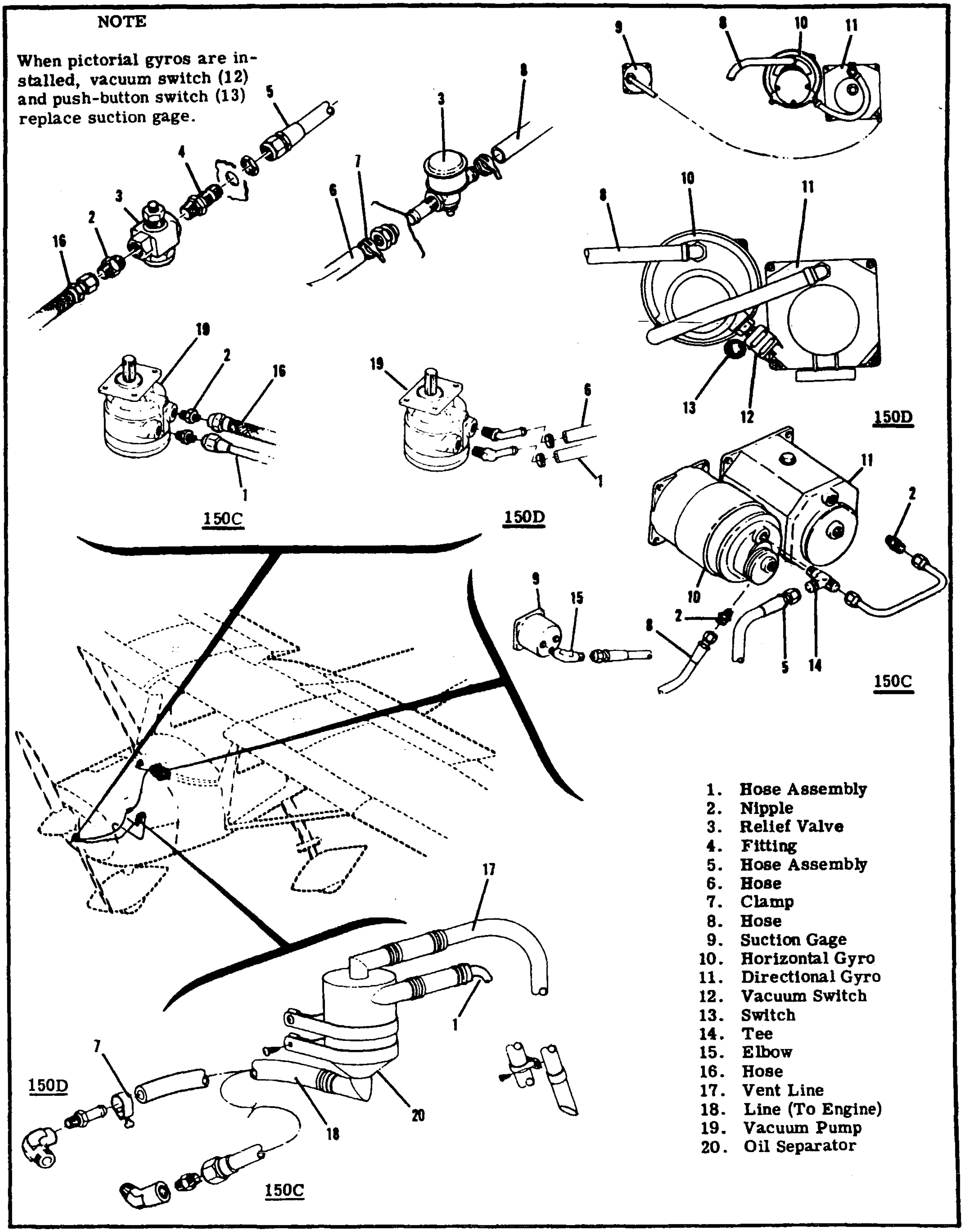
16-32. SUCTION GAGE READINGS. On aircraft equipped with an engine-driven vacuum pump, a suction gage reading of 5.3 inches of mercury is desirable for gyro instruments. However, a range of 4.6 to 5.4 inches of mercury is acceptable. The standard Model 172 uses a single venturi to provide suction, and may be equipped with a relief valve. On venturi systems the suction gage should indicate between 3.5 and 5.4 inches of mercury at cruising speeds. On systems with a vacuum pump, relief valve, and with or without a central filter, adjust relief valve (with engine operating at 1900 rpm) to obtain 5.3±.1 inches of mercury. If no suction gage is used, adjust the relief valve until the "LO VAC" indicator light goes out, count the number of turns required to make the "HI VAC" indicator light illuminate, then adjust the relief valve back one half the number of turns noted. The indicator lights warn of high or low vacuum when illuminated; both are out when vacuum is within permissible limits.

NOTE

On aircraft equipped with a central air filter (1965 and on), remove filter element and make adjustments. Be sure filter element is clean before installing. If reading drops noticeably, install new filter element. An accessory kit is available to equip earlier models with a central filter.

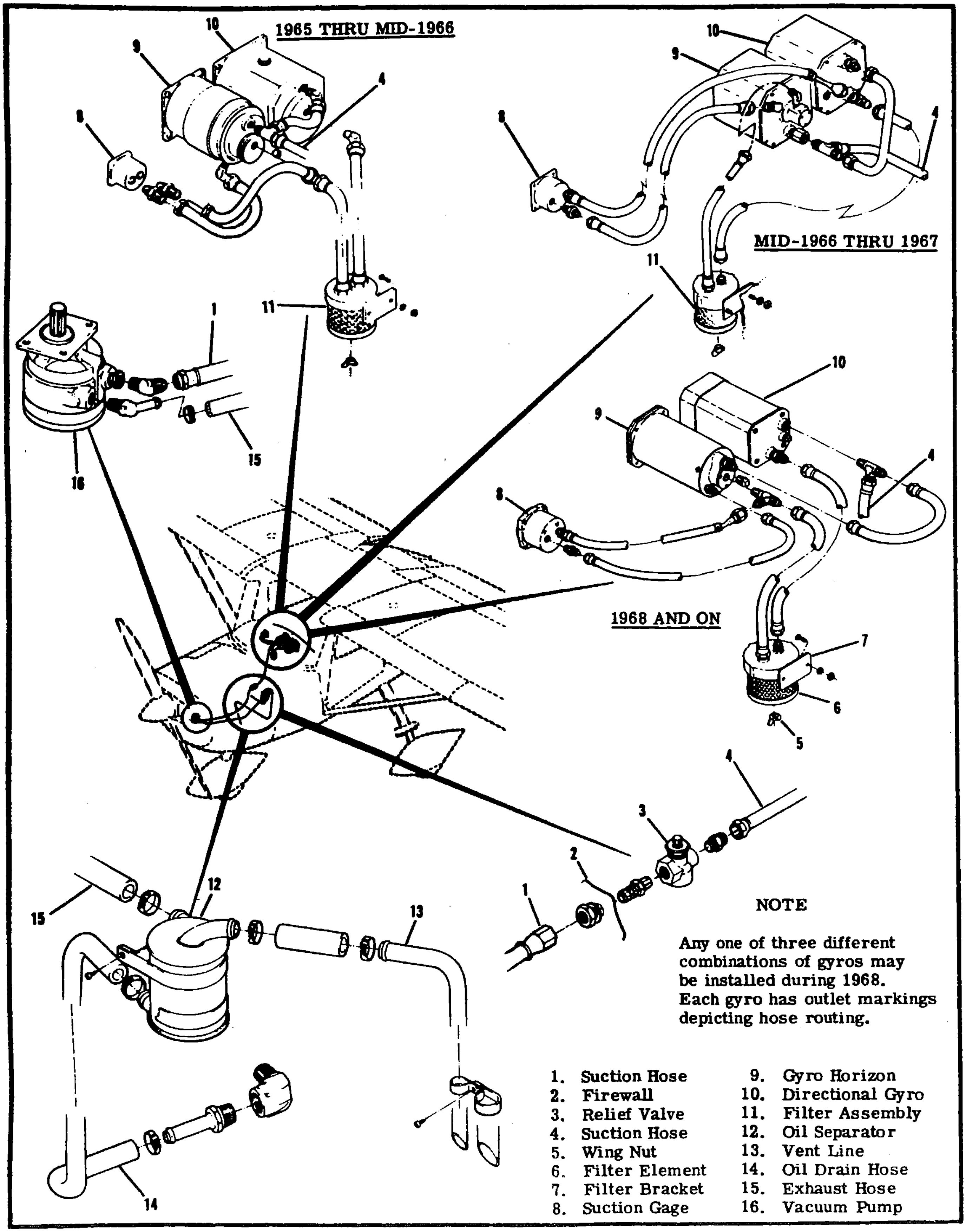
NOTE

When pictorial gyros are installed, vacuum switch (12) and push-button switch (13) replace suction gage.



1. Hose Assembly
2. Nipple
3. Relief Valve
4. Fitting
5. Hose Assembly
6. Hose
7. Clamp
8. Hose
9. Suction Gage
10. Horizontal Gyro
11. Directional Gyro
12. Vacuum Switch
13. Switch
14. Tee
15. Elbow
16. Hose
17. Vent Line
18. Line (To Engine)
19. Vacuum Pump
20. Oil Separator

Figure 16-5. Model 150 Engine-Driven Vacuum Systems (Sheet 1 of 2)



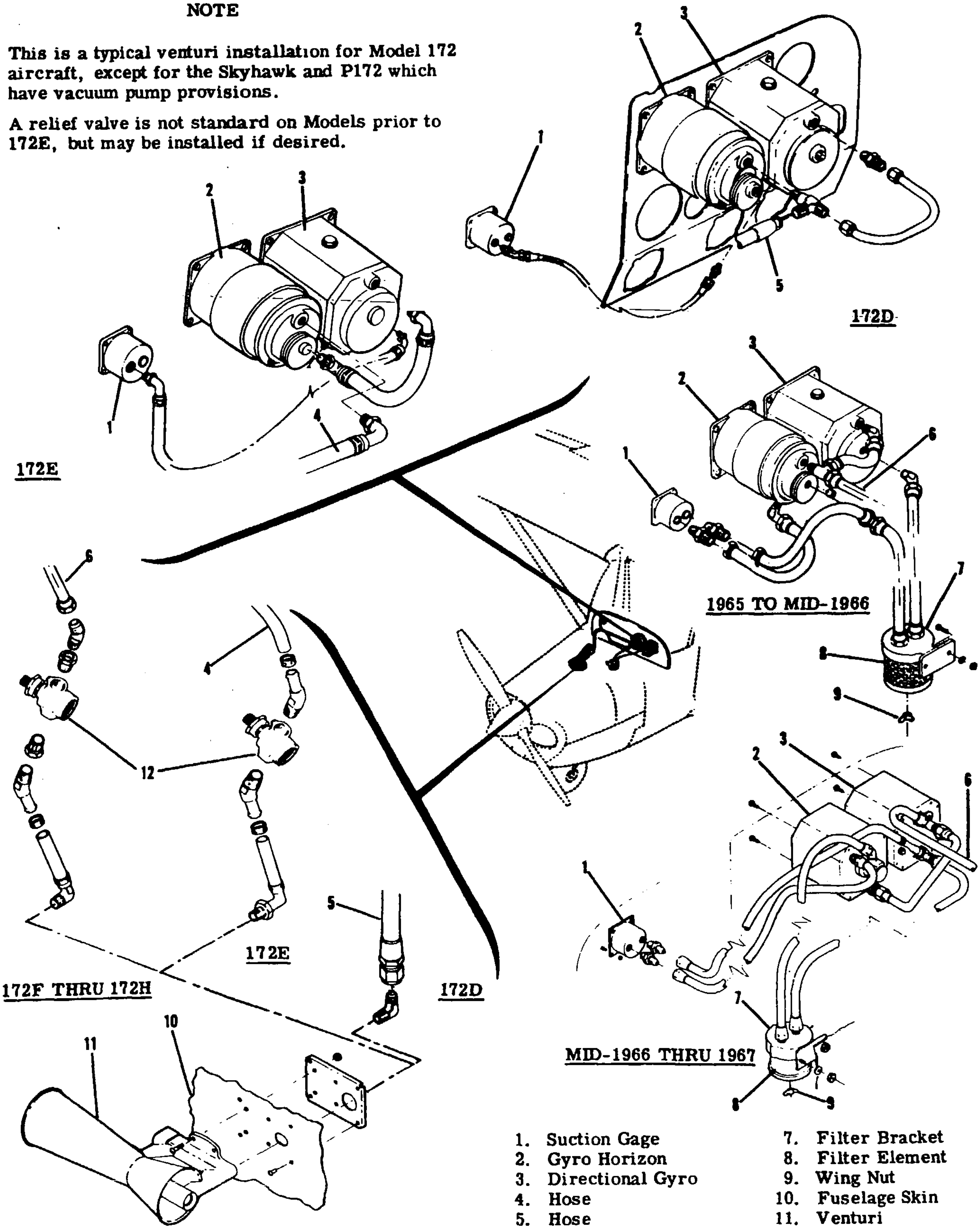
1.	Suction Hose	9.	Gyro Horizon
2.	Firewall	10.	Directional Gyro
3.	Relief Valve	11.	Filter Assembly
4.	Suction Hose	12.	Oil Separator
5.	Wing Nut	13.	Vent Line
6.	Filter Element	14.	Oil Drain Hose
7.	Filter Bracket	15.	Exhaust Hose
8.	Suction Gage	16.	Vacuum Pump

Figure 16-5. Model 150 Engine Driven Vacuum Systems (Sheet 2 of 2)

NOTE

This is a typical venturi installation for Model 172 aircraft, except for the Skyhawk and P172 which have vacuum pump provisions.

A relief valve is not standard on Models prior to 172E, but may be installed if desired.



1. Suction Gage
2. Gyro Horizon
3. Directional Gyro
4. Hose
5. Hose
6. Hose
7. Filter Bracket
8. Filter Element
9. Wing Nut
10. Fuselage Skin
11. Venturi
12. Relief Valve

Figure 16-6. Venturi-Driven Vacuum System

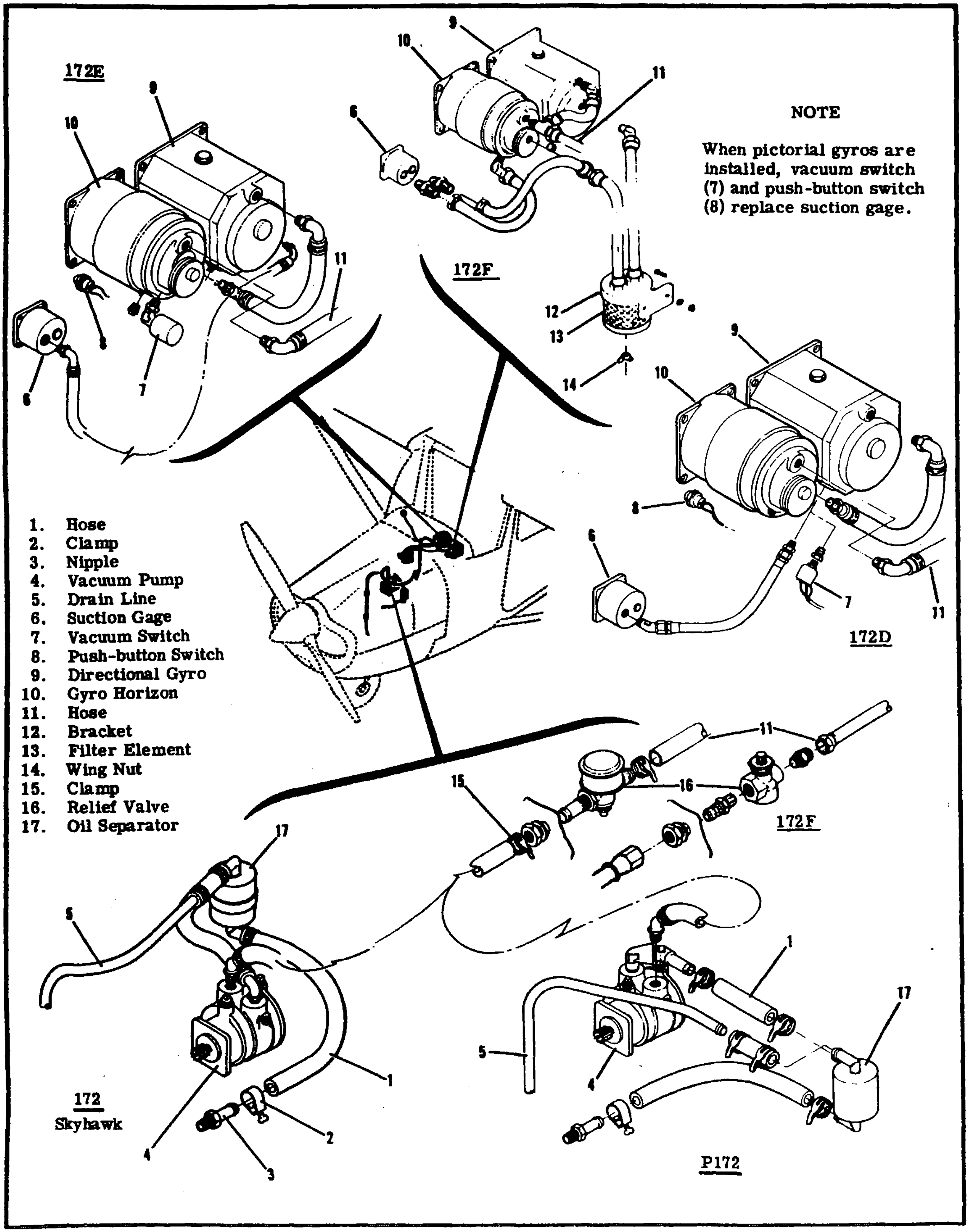


Figure 16-7. Models 172 Skyhawk and P172 Engine-Driven Vacuum Systems

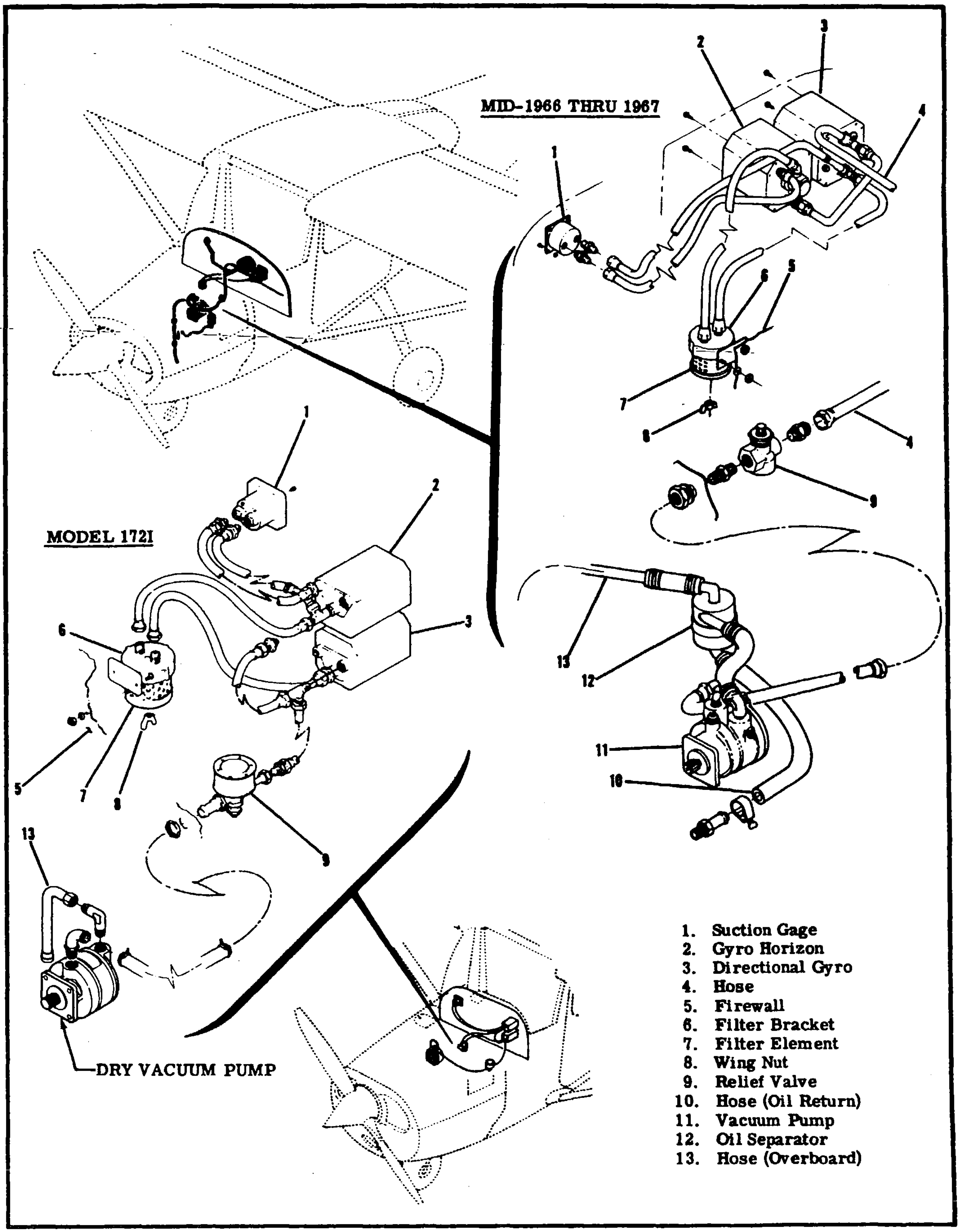
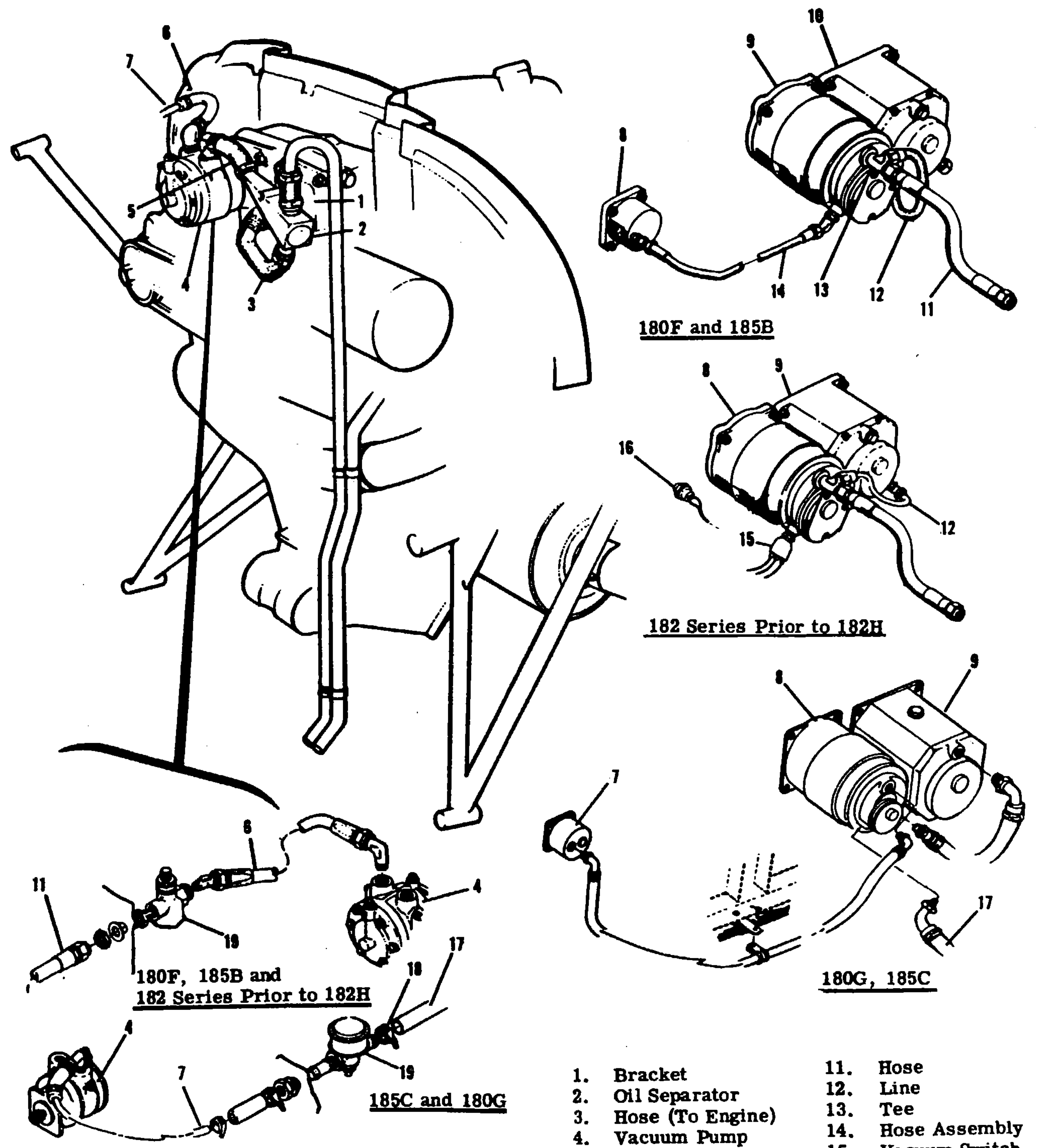


Figure 16-7A. Model 172 Skyhawk Engine-Driven Vacuum System

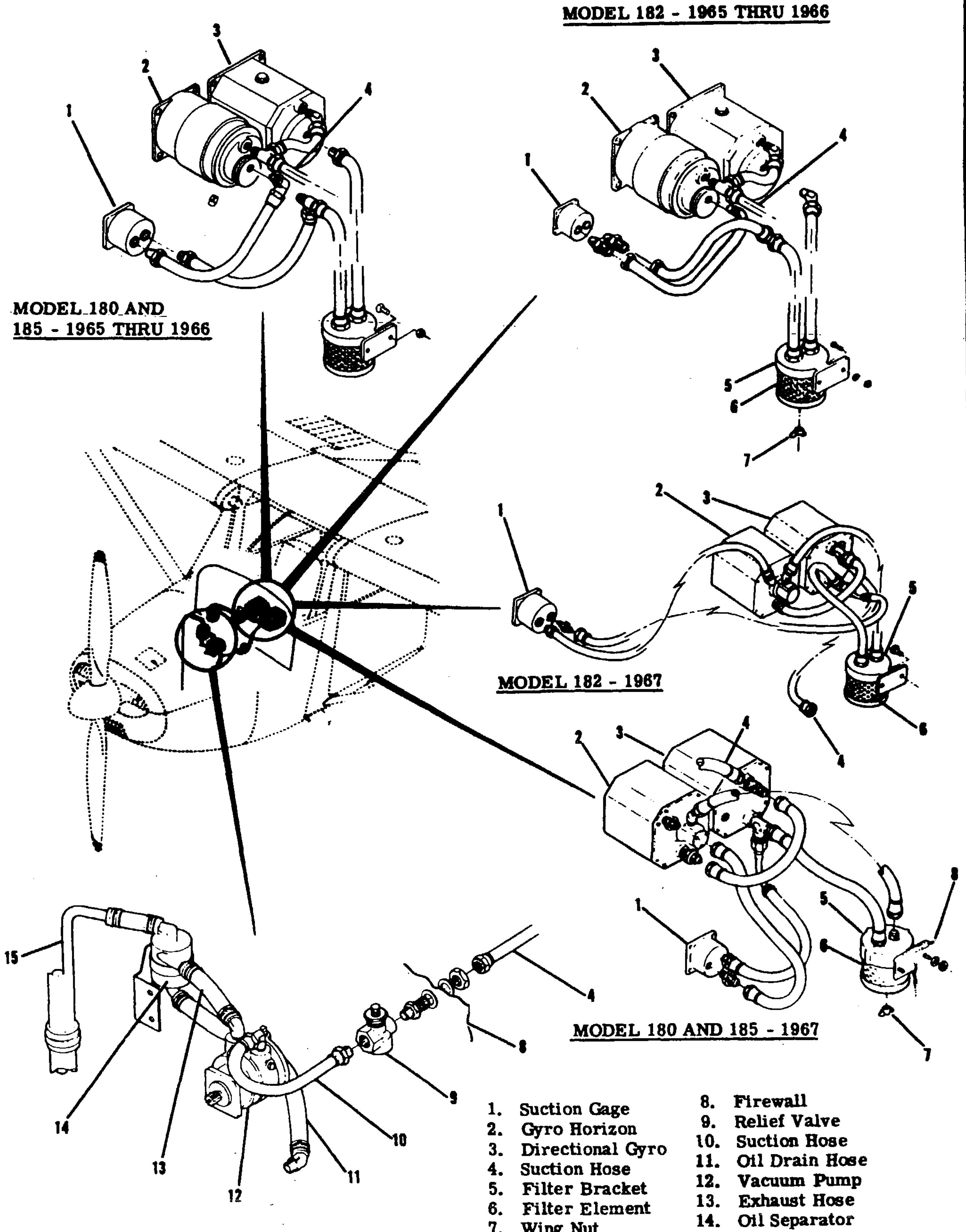


1. Bracket
2. Oil Separator
3. Hose (To Engine)
4. Vacuum Pump
5. Discharge Hose
6. Hose
7. Tube
8. Suction Gage
9. Gyro Horizon
10. Directional Gyro
11. Hose
12. Line
13. Tee
14. Hose Assembly
15. Vacuum Switch
16. Test Switch
17. Hose
18. Clamp
19. Relief Valve

NOTE

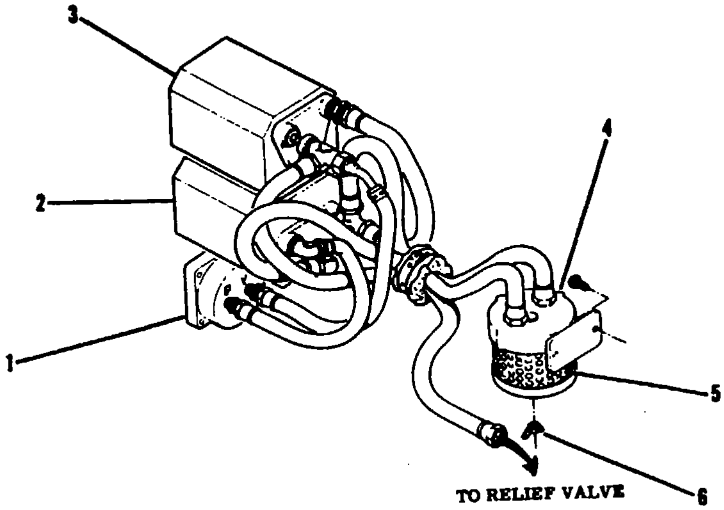
When pictorial gyros are installed, vacuum switch (15) and test switch (16) replace suction gage.

Figure 16-8. Models 180, 182, and 185 Engine-Driven Vacuum Systems (Sheet 1 of 3)

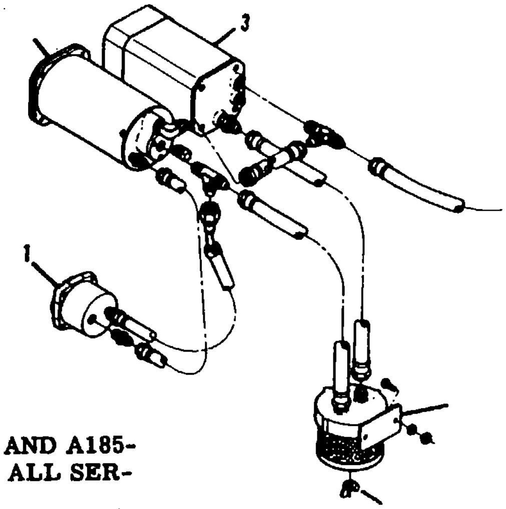


1. Suction Gage
2. Gyro Horizon
3. Directional Gyro
4. Suction Hose
5. Filter Bracket
6. Filter Element
7. Wing Nut
8. Firewall
9. Relief Valve
10. Suction Hose
11. Oil Drain Hose
12. Vacuum Pump
13. Exhaust Hose
14. Oil Separator
15. Vent Line

Figure 16-8. Models 180, 182, and 185 Engine-Driven Vacuum Systems (Sheet 2 of 3)



MODEL 182 - 1968 AND ON
AND ALL SERIVCE PARTS



MODELS 180, 185 AND A185-
1968 AND ON AND ALL SER-
VICE PARTS

1. Suction Gage
2. Directional Gyro
3. Gyro Horizon
4. Filter Bracket
5. Filter Element
6. Wing Nut

NOTE

Any one of three different combinations of gyros may be installed during 1968. Each gyro has outlet markings depicting hose routing.

Refer to Sheet 2 for equipment located forward of the firewall.

Figure 16-8. Models 180, 182, and 185 Engine-Driven Vacuum Systems (Sheet 3 of 3)

16-33. ENGINE INDICATORS

16-34. TACHOMETER.

The tachometer used on Cessna single-engine aircraft are mechanical indicators driven at half of the crankshaft speed by flexible shafts. Most tachometer difficulties will be found in the drive shaft. To function properly, the 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 bends within three inches of either terminal. If a tachometer is noisy or the pointer oscillates, check the cable housing for kinks, sharp bends and damage. Disconnect the cable at the tachometer and pull it out of the housing. Check the cable for worn spots, breaks and kinks.

NOTE: On 551–series tachometers (identified by vendor number on the back of the case), do not remove the drive support. This support appears to be a dust cover, but is essential to proper operation.

Before replacing a tachometer cable in the housing, coat the lower two thirds with AC Type ST-640 Speedometer cable grease or Lubriplate No. 110. Insert the cable in the housing as far as possible, then slowly rotate it to make sure it is seated in the engine fitting. Insert the cable in the tachometer, making sure it is seated in the drive shaft, then reconnect the housing and torque to 50 pound-inches (at the instrument).

16-35 MANIFOLD PRESSURE GAGE

The manifold pressure gage is a barometric instrument which indicates the absolute pressure in the intake manifold in inches of mercury; thus with the engine stopped or at sudden full throttle and maximum RPM, it will register approximately the ambient barometric pressure. The Model A185 (1966 and On) has the manifold pressure and fuel flow gages in one instrument case. However, each instrument operates independently.

16-36 TROUBLESHOOTING – MANIFOLD PRESSURE GAGE

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
EXCESSIVE ERROR AT EXISTING BAROMETRIC PRESSURE.		
Pointer shifted.		Replace instrument.
Leak in vacuum bellows.		Replace instrument.
Loose pointer		Replace instrument.
Leak in the pressure line.	Test the line and connections for leaks	Repair or replace damaged lines, tighten connection.
Condensate or fuel in the line.	Check the lines for obstructions.	Blow out the line.
JERKY MOVEMENT OF THE POINTER.		
Excessive internal friction.		Replace the instrument.
Rocker shaft screws tight.		Replace the instrument.
Link springs too tight.		Replace the instrument.
Dirty pivot bearings.		Replace the instrument.
Defective mechanism.		Replace the instrument.
Leak in pressure line.	Test the lines and connections for leaks.	Repair or replace the damaged line, tighten connections.
SLUGGISH OPERATION OF THE POINTER		
Foreign matter in the line.	Check the line for obstructions.	Blow out the lines.
Damping needle dirty		Replace the instrument
Leak in the pressure line.	Test the line and connection for leaks.	Repair or replace the damaged line, tighten the connections.

16-36 TROUBLESHOOTING – MANIFOLD PRESSURE GAGE (Cont.).

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
EXCESSIVE POINTER VIBRATION.		
Tight rocker pivot bearings.		Replace instrument.
Excessive panel 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.

16-37. CYLINDER HEAD TEMPERATURE GAGES.

Two types of cylinder head temperature gages are used in the various models, the thermocouple-powered type and the electrical-powered bulb type gage. Spark plug gasket thermocouples provide power to the thermocouple-type gages; cylinder head temperature bulbs regulate power to electrical system powered gages. On thermocouple type installations, the length of the thermocouple leads is important; shortening or lengthening the wires will alter circuit resistance and cause erroneous gage indication. The Rochester and Stewart Warner gages are connected the same way, but the Rochester gage does not have a calibration pot and cannot be adjusted. Refer to Table 1 on page 16-34A when troubleshooting the cylinder head temperature gage.

SHOP NOTES:

16-38 TROUBLESHOOTING – CYLINDER HEAD TEMEPERATURE GAGE

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
GAGE INOPERATIVE.		
No current to the circuit (bulb type).	Check circuit breaker, electrical circuit to gages.	Repair electrical circuit.
Defective gage, thermocouple, bulb or circuit.	Isolate with ohmmeter check of circuits.	Repair or replace defective item.
GAGE READS HIGH (THERMOCOUPLE TYPE CIRCUIT).		
Shortened thermocouple lead. (Resistance too low).	Check with ohmmeter. Total resistance through lead and thermocouple should be 2 ohms.	Replace defective parts with Cessna lead.
GAGE READS LOW (THERMOCOUPLE TYPE CIRCUIT).		
Too long a lead, or defective lead or thermocouple.	Check resistance as above.	Replace defective parts with Cessna parts.
GAGE FLUCTUATES RAPIDLY (BULB-TYPE CIRCUIT).		
Loose or broken wire permitting alternate make and brake of gage current.	Inspect the circuit wiring.	Repair or replace defective wire.
GAGE READS TOO HIGH ON SCALE (BULB TYPE CIRCUIT).		
High voltage.		Check "A" terminal.
Gage off calibration.		Replace the instrument.
GAGE READS TOO LOW ON SCALE (BULB-TYPE CIRCUIT).		
Low voltage.		Check the voltage supply and "D" terminal.
Gage off calibration.		Replace the instrument.
GAGE READS OFF SCALE AT HIGH END (BULB-TYPE CIRCUIT).		
Break in bulb.		Replace the instrument.
Break in bulb leads.		Replace the instrument.
Internal break in the gage.		Replace the instrument.
OBVIOUSLY INCORRECT READING (BULB-TYPE CIRCUIT).		
Defective gage mechanism.		Replace the instrument.
Incorrect calibration.		Replace the instrument.

16-39. CYLINDER HEAD TEMPERATURE GAGE MAINTENANCE.

The cylinder head temperature gage and thermocouple or bulb require no maintenance other than cleaning, making sure the lead is properly supported, and all connections are clean, tight, and properly insulated. To make sure the resistance in the thermocouple circuit matches the instrument calibration, always replace the gage, thermocouple, and lead with genuine Cessna parts of the correct number. 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 1 on page 16-34A when troubleshooting the cylinder head temperature gage.

16-40. OIL PRESSURE GAGE.

On some airplanes, a Bourdon tube-type oil pressure gage is installed. This 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 obtain immediate oil indication. Electrically actuated gages are installed on some airplanes which utilize a pressure sending bulb.

16-41. TROUBLESHOOTING – OIL PRESSURE GAGE (DIRECT-READING).

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
GAGE DOES NOT REGISTER.		
Pressure line clogged.	Check line for obstructions.	Clean line.
Presure line broken.	Check line for leaks and damage.	Repair or replace damaged line.
Fractured Bourdon tube.		Replace instrument.
Gage pointer loose on staff.		Replace instrument.
Damaged gage movement.		Replace instrument.
GAGE POINTER FAILS TO RETURN TO ZERO.		
Foreign matter in line.	Check line for obstructions.	Clean line.
Foreign matter in Bourdon tube.		Replace instrument.
Bourdon tube stretched.		Replace instrument.
GAGE DOES NOT REGISTER PROPERLY.		
Faulty mechanism.		Replace instrument.
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.

16-42. DELETED.

16-43. DELETED.

16-44. OIL TEMPERATURE GAGE.

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 tube's 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 2 on page 16-34B when troubleshooting the oil temperature gage.

NOTE: On some Model 172 airplanes, an O-ring has been added on the oil temperature bulb at the engine to provide a better seal for the bulb. This O-ring should be installed on all models with a Bourdon type gage.

16-45. CARBURETOR AIR TEMPERATURE GAGES.

The electric carburetor air temperature gage is of the resistance-bridge type, in which changes in the electrical resistance of the element in the sensing bulb, which occur with temperature changes, are indicated by a meter, its dial calibrated for temperature. The resistance system requires current from the electrical system (aircraft's bus) and operates only when the master switch is on. Although both the instrument and the sensing bulb are grounded, two leads are used between them to avoid the possibility of instrument error intruduced by poor electrical bonds in the airframe.

SHOP NOTES:

16-46 CARBURETOR AIR TEMPERATURE GAUGE (ELECTRIC)

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
GAGE POINTER STAYS OFF LOW END OF SCALE.		
Blown fuse/circuit breaker out.	Check fuse/circuit breker.	Replace fuse/reset circuit breaker.
Master switch OFF or switch defective.	Check the switch ON.	Replace defective switch.
Broken or grounded leads between gage and sensing unit.	Check circuit wiring.	Repair or replace defective wiring
Defective gage or sensing unit.	Substitute a known good gage or sensing unit.	Replace gage or sensing unit.
GAGE POINTER GOES OFF HIGH END OF SCALE.		
Broken or grounded lead.	Check circuit wiring.	Repair or replace defective wiring.
Defective gage or sensing unit.	Substitute a known good gage or sensing unit.	Replace gage or sensing unit.
GAGE OPERATES INTERMITTENTLY.		
Defective Master switch, broken or grounded lead.	Check circuit wiring.	Replace switch, repair or replace defective wiring.
Defective gage or sensing unit.	Substitute a known good gage or sensing unit.	Replace gage or sensing unit.
EXCESSIVE POINTER OSCILLATION.		
Loose or broken lead.	Check circuit wiring.	Repair or replace defective wiring.
Defective gage or sensing unit.	Substitute a known good gage or sensing unit.	Replace gage or sensing unit.
Excessive panel vibration.	Check panel shock mounts.	Replace defective shock mounts.
OBVIOUSLY INCORRECT TEMPERATURE READING		
Defective gage or sensing unit.	Substitute a known good gage or sensing unit.	Replace gage or sensing unit.
POINTER FAILS TO GO OFF THE SCALE WITH THE CURRENT OFF.		
Defective Master switch.		Replace switch.
Defective gage.	Substitute a known good gage.	Replace gage.

16-47.FUEL QUANTITY INDICATORS.

The electric fuel quantity indicators are the magnetic type. In the magnetic type indicator, fuel level indication is instantaneous. The fuel quantity indicators are used in conjunction with a float-operated variable-resistance transmitter in each fuel tank. The tank-full position of the transmitter float produces a minimum resistance through the transmitter, permitting maximum current flow through fuel quantity indicator and maximum pointer deflection. As the fuel level of the tank is lowered, resistance in the transmitter is increased, producing a decreased current flow through the fuel quantity indicator and a smaller pointer deflection.

16-48. TROUBLESHOOTING – FUEL QUANTITY INDICATORS (ELECTRIC).

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
FAILURE TO INDICATE.		
No power to indicator or transmitter. (Pointer stays below E.)	Check fuse/circuit breaker, inspect for open circuit.	Replace fuse/reset breaker, repair or replace defective wire.
Grounded wire. (Pointer stays above E.)	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; also see paragraph 13-3.	Replace indicator.
OFF CALIBRATION.		
Defective indicator.	Substitute known-good indicator; also see paragraph 13-3.	Replace indicator.
Defective transmitter.	Substitute known-good transmitter; also see paragraph 13-3.	Recalibrate or replace.
Low or high voltage.	Check voltage at indicator.	Correct voltage.
STICKY OR SLUGGISH INDICATOR OPERATION.		
Defective indicator.	Substitute known-good indicator; also see paragraph 13-3.	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; also see paragraph 13-3.	Replace indicator or transmitter.
Defective master switch.		Replace switch.

16-49. 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.

16-49A. 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 13-17.

16-49B. ROCHESTER FUEL GAGE TRANSMITTER.

Do not attempt to adjust float arm or stop. No adjustment is allowed.

16-49C. 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:

   WARNING: 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.

16-49D. Cylinder Head Temperature Indicating System Resistance Table 1.

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

16-49E. Oil Temperature Indicating System Resistance Table 2.

The following table is provided to assist in 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

16-50. FUEL FLOW INDICATOR.

A fuel flow indicator is used with the Continental fuel injection system on Model 185 aircraft. The indicator is a fuel pressure gage calibrated to indicate the approximate gallons per hour of fuel being metered to the engine. It is operated by a pressure line from the fuel distributor manifold on the engine. The model A185 (1966 and on) has the manifold pressure and fuel flow gages in one instrument case. However, each instrument operates independently.

16-51. TROUBLE SHOOTING – FUEL FLOW INDICATOR.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
DOES NOT REGISTER.		
Pressure line clogged.	Check line for obstructions.	Blow out line.
Pressure line broken.	Check line for leaks and damage.	Repair or replace damaged line.
Fractured bellows or damaged mechanism.		Replace instrument.
Clogged snubber orifice.		Replace instrument.
Pointer loose on staff.		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 line.	Check line for obstructions or leaks.	Blow out dirty line, repair or tighten loose connections.

16-52. MAGNETIC COMPASS.

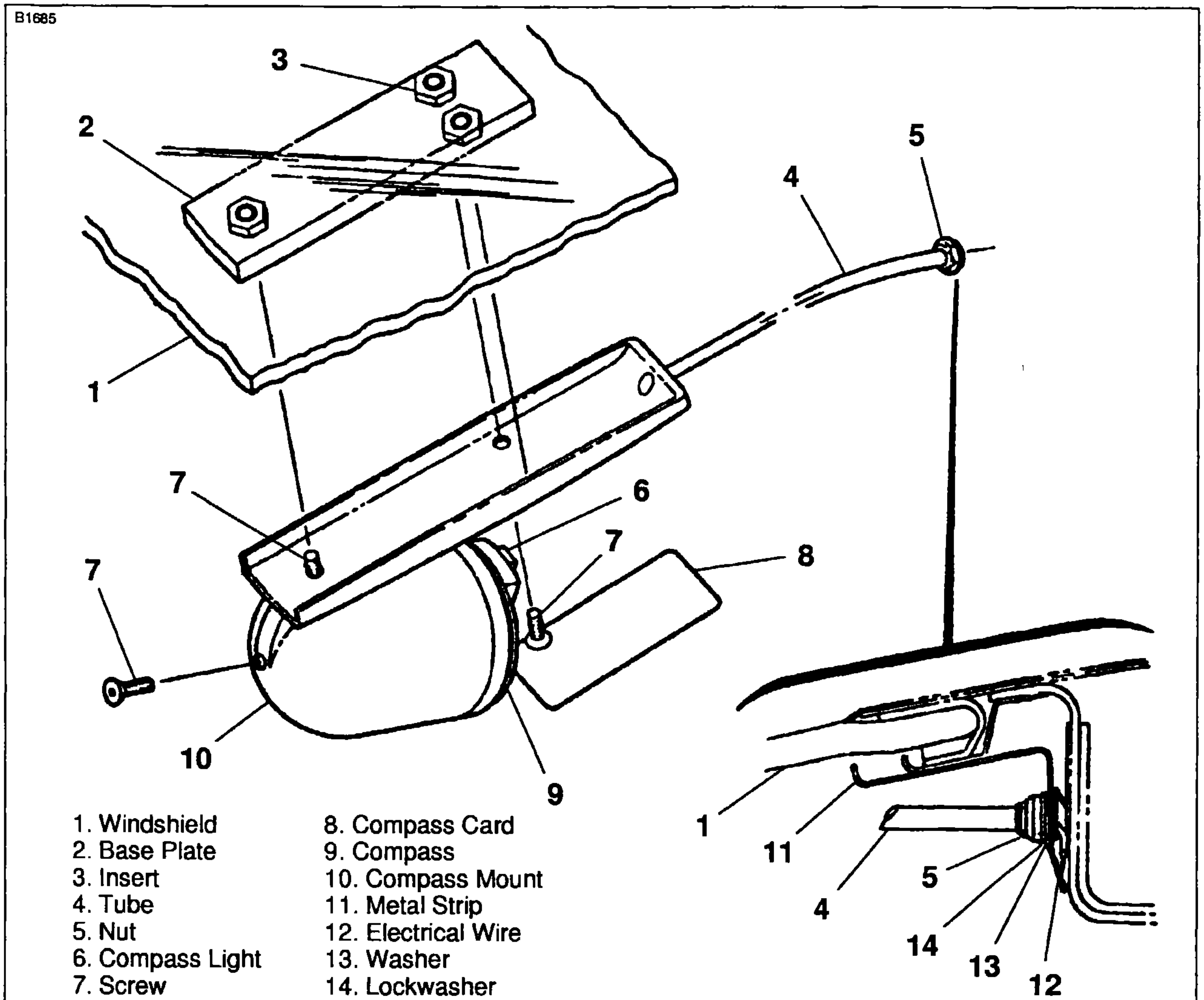
The magnetic compasses used in Cessna single-engine airplanes are liquid-filled, with expansion provisions to compensate for temperature changes. They are equipped with compensating magnets adjustable from the front of the case.

The compasses are individually-lighted by GE No. 330 lamps inside the compass case, controlled by the instrument light's rheostat switch. No maintenance is required on the compass except an occasional check on a compass rose with adjustment of the compensation, if necessary, and replacement of the lamp.

NOTE: Both 3-volt and 12-volt lamps have been used with the compass lights. Check the voltage on the old lamp before installing a replacement.

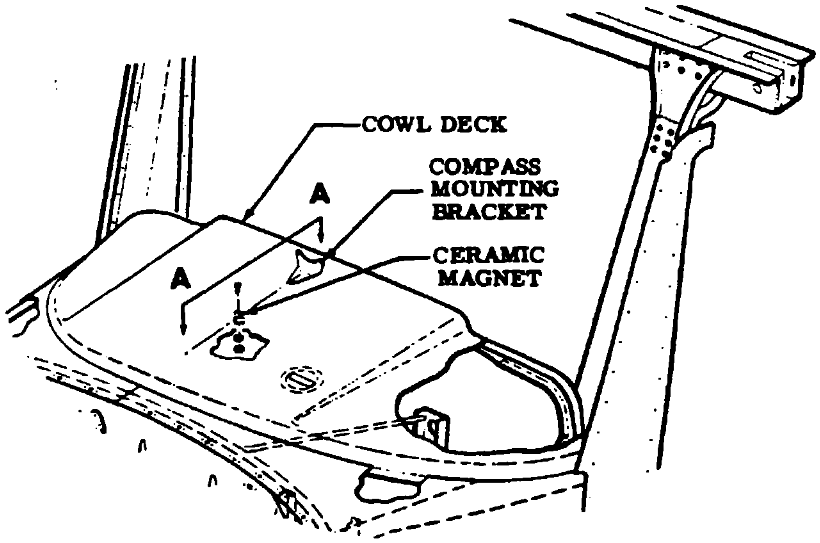
On the Model 182H and on, the compass mount is attached by three screws to a base plate. The base plate is bonded to the windshield with Methylene Chloride. A tube containing the compass light wires is attached to the metal strip at the top of the windshield. Removal of the compass is accomplished by removing the screw at the forward end of the compass mount, unfastening the metal strip at the top of the windshield, and cutting the two wire splices. Removal of the compass mount is accomplished by removing the three screws attaching the mount to the base plate. Access to the inner screw is gained through a hole in the bottom of the mount, through which a thin screwdriver can be inserted. When installing the compass, it will be necessary to re-splice the compass light wires.

During the 1967 model-year and on, a small permanent magnet is installed on the underside of the cowl deck forward of the compass, on Model 150 Series airplanes (prior to 1968). Installation of this magnet aids in compensating the compass, but it must be installed with its north-seeking pole up (against the underside of the cowl deck) and it must be rotated to the left 45°. Installation is shown in Figure 16-19A.

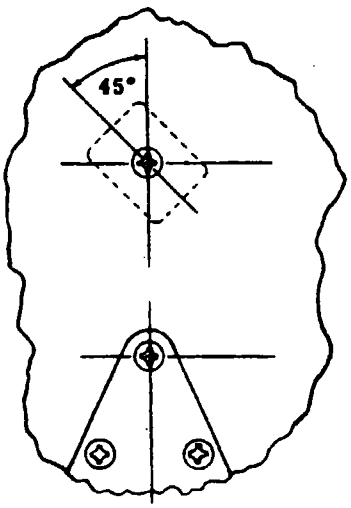


1. Windshield
2. Base Plate
3. Insert
4. Tube
5. Nut
6. Compass Light
7. Screw
8. Compass Card
9. Compass
10. Compass Mount
11. Metal Strip
12. Electrical Wire
13. Washer
14. Lockwasher

Figure 16-9. Compass Installation – Models 182H and On, and 150H and On



VIEW A-A



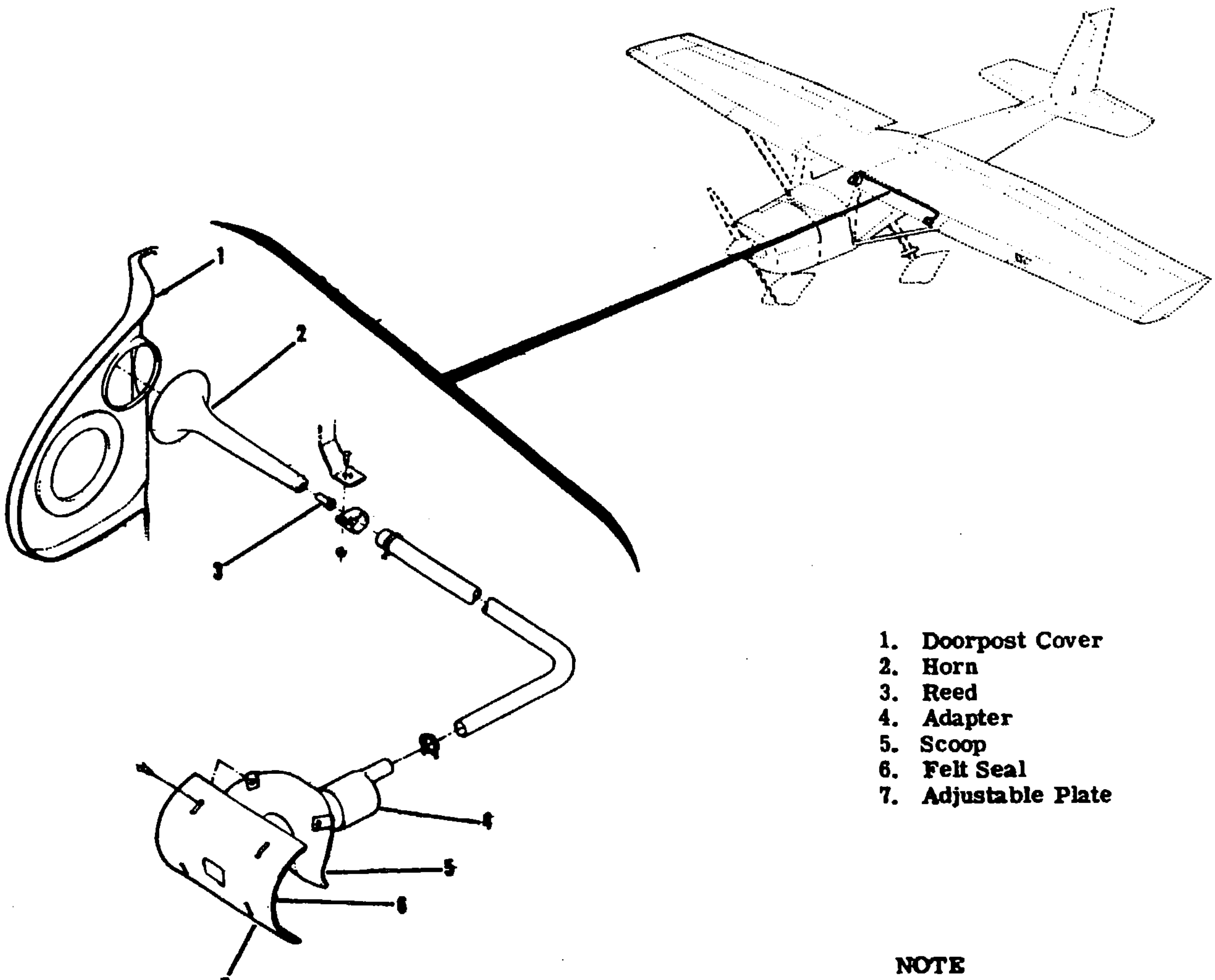
NOTE

An easy method of determining which is the north-seeking pole of the magnet is to hold it with one of its flat sides (through which the hole is drilled) next to the lubber line. If the compass reads north, the north-seeking side of the magnet is adjacent to the compass. If the compass reads south, the south-seeking side of the magnet is adjacent to the compass.

Figure 16-19A. Compass Compensating Magnet Installation – Model 150 (Prior to 1968)

16-53. STALL WARNING HORN AND TRANSMITTER. (See paragraph 17-29.)

16-53A. PNEUMATIC STALL WARNING HORN. (See figure 16-10.) The system is composed of an adjustable plate on the left wing leading edge that is 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 the wing leading edge causes a reverse flow of air through the horn. By moving adjustable plate (7) up, actuation of the horn will occur at a higher speed, and moving the plate down causes actuation to occur at a slower speed. Center the adjustable plate opening in the wing leading edge opening 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 the plate will change speed at which horn actuation occurs by 5 miles per hour. To test horn operation, cover opening in plate (7) with a clean cloth, such as a handkerchief, and apply a slight suction by mouth to draw air through the horn.



1. Doorpost Cover
2. Horn
3. Reed
4. Adapter
5. Scoop
6. Felt Seal
7. Adjustable Plate

NOTE

Use No. 579.6 Presstite sealer between adjustable plate (7) and wing leading edge to ensure positive seal. This seal is essential to proper stall warning horn actuation. Adapter (4) and scoop (5) are bonded together. They should be replaced as an assembly.

MODEL 150 - 1966 AND ON
MODEL 172 - 1967 AND ON
MODELS 180 AND 185 - EARLY 1967 AND ON

Figure 16-10. Pneumatic Stall Warning System

16-54. TURN-AND-BANK INDICATOR. The turn-and-bank indicator used on Cessna single-engine aircraft is an electrically operated instrument. It is powered by the aircraft electrical system, and therefore, operates only when the master switch is on. Its electrical circuit is protected by an automatically-resetting circuit breaker.

16-55. TROUBLE SHOOTING -- TURN-AND-BANK INDICATOR.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
INDICATOR POINTER FAILS TO RESPOND.		
Automatic resetting circuit breaker defective.	Check circuit breaker.	Replace circuit breaker.
Master switch "OFF" or switch defective.	Check switch "ON."	Replace defective switch.
Broken or grounded lead to indicator.	Check circuit wiring.	Repair or replace defective wiring.
Indicator not grounded.	Check ground wire.	Repair or replace defective wire.
Defective mechanism.		Replace instrument.
HAND SLUGGISH IN RETURNING TO ZERO.		
Defective mechanism.		Replace instrument.
Low voltage.	Check voltage at indicator.	Correct voltage.
POINTER DOES NOT INDICATE PROPER TURN.		
Defective mechanism.		Replace instrument.
HAND DOES NOT SIT ON ZERO.		
Gimbal and rotor out of balance.		Replace instrument.
Hand incorrectly sits on rod.		Replace instrument.
Sensitivity spring adjustment pulls hand off zero.		Replace instrument.
IN COLD TEMPERATURES, HAND FAILS TO RESPOND OR IS SLUGGISH.		
Oil in indicator becomes too thick.		Replace instrument.
Insufficient bearing end play.		Replace instrument.
Low voltage.	Check voltage at indicator.	Correct voltage.
NOISY GYRO.		
High voltage.	Check voltage at indicator.	Correct voltage.
Loose or defective rotor bearings.		Replace instrument.

16-55A. TURN COORDINATOR is an electrically operated, gyroscopic, roll-rate turn indicator. Its gyro simultaneously senses rate of motion roll and yaw axes which is projected on a single indicator. The gyro is a non-tumbling type requiring no caging mechanism, and incorporates an a. c. brushless spin motor with a solid state inverter.

16-55B. TROUBLE SHOOTING

PROBABLE CAUSE	ISOLATION PROCEDURE	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.

16-56. ELECTRIC CLOCK. Most 100-series aircraft are equipped with an electric clock which operates on 12 volts and requires a one-amp fuse. The fuse holder is located adjacent to the battery box. The clock's electrical circuit is separate from the main electrical system, and will operate when the master switch is "OFF".

16-56A. HOURMETER. An hourmeter may be installed as optional equipment. The meter operates electrically, and is actuated by a pressure switch in the oil system. The meter is powered by the clock's electrical system, and therefore will operate independent of the master switch. If no clock is installed, a line direct from the battery contactor provides the meter with electrical power independent of the master switch. A one-amp fuse is located adjacent to the battery box. A small indicator on the dial face rotates when the meter is actuated. If the meter is inoperative, and the clock is operating, the meter or its wiring is faulty and must be replaced. Beginning in 1967, an additional hourmeter may be installed as optional equipment. It is electrically operated and is actuated by an oil pressure switch as the engine is started.

16-57. CESSNA ECONOMY MIXTURE INDICATOR is an exhaust gas temperature (EGT) sensing device which is used to aid the pilot in selecting the most desirable fuel-air mixture for cruising flight at less than 75% power. Exhaust gas temperature (EGT) varies with the ratio of fuel-to-air mixture entering the engine cylinders. See appropriate airplane Owner's Manual for operating procedures of system.

16-58. TROUBLE SHOOTING.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
GAGE INOPERATIVE.		
Defective gage, probe or circuit.	Isolate with ohmmeter check of circuit.	Repair or replace defective part.
INCORRECT READING.		
Indicator needs calibrating.	See paragraph 16-59.	See paragraph 16-59.
FLUCTUATING READING.		
Loose, frayed, or broken lead, permitting alternate make and break of current.	Check for defective circuit.	Tighten connections, and repair or replace defective leads.

16-59. CALIBRATION. Three different types of indicators have been used. The earliest type (type "A") was equipped with a calibration adjustment knob on the face of the instrument and a small calibration adjustment screw on the back of the case. A later type (type "B") was equipped with a calibration adjustment knob on the face of the instrument only. The latest type (type "C") is equipped with a calibration adjustment potentiometer on the back of the case, with a reference pointer adjustment screw on the face of the instrument.

NOTE

The meter reading will change slightly after initial calibration because of lead deposit build-up on the probe. These deposits, however, will reach an equilibrium level and will result in a small drop in EGT indication, so that a small recalibration will be desirable. These lead deposits do not in any way affect the use of the indicator for mixture control or trouble detection. Leads and/or probes can be interchanged between types "A" and "B," but neither of these can be interchanged with type "C."

TYPE "A" CALIBRATION:

The calibration adjustment knob located on the face of the instrument is used to position the pointer over the reference increment line (4/5 of scale) at peak EGT with 65% cruise power.

NOTE

This setting will provide relative temperature indications for normal cruise power settings within the range of the instrument.

Rotation of the knob will adjust the pointer three small divisions up or down (±75°F). The knob operates a cam and may be rotated either direction through 360°, without damage to the instrument. If further calibration is required to place the pointer over the reference line at peak EGT with 65% power, remove the instrument and use the small calibration adjustment screw located in the hole at the one o'clock position on the back of the case. Turning the screw one complete turn counterclockwise increases the meter reading one small increment (25°F). Clockwise rotation of the screw decreases the meter reading. Rarely will adjustment of this nature be required after initial installation.

TYPE "B" CALIBRATION:

The calibration adjustment knob located on the face of the instrument is used to position the pointer over the reference increment line (4/5 of scale) at peak EGT with 65% cruise power.

NOTE

This setting will provide relative temperature indications for normal cruise power settings within the range of the instrument.

Rotation of the knob will adjust the pointer seven small divisions up or down (±175°F). The knob operates a cam and may be rotated either direction without damage to the instrument.

TYPE "C" CALIBRATION:

Since there is no calibration adjustment knob on the face of the instrument, all calibration is done at the potentiometer adjustment screw at the back of the case. Turning the screw clockwise increases the meter reading, and turning it counterclockwise decreases the meter reading. There is a stop in each direction and damage can occur if too much torque is applied against the stops. Approximately 600°F total adjustment is provided. The adjustable yellow pointer on the face of the instrument is a reference pointer only.

16-60. REMOVAL AND INSTALLATION. Removal of the indicator is accomplished by removing the mounting screws and disconnecting leads. Tag the leads to facilitate installation. The thermocouple probe is secured to the exhaust stack with a clamp. The clamp should be tightened to 45 pound-inches and safetied as required.

16-61. WING FLAP POSITION INDICATING SYSTEM.

16-62. The wing 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.

NOTE

The Models 150F and on, and 182L and on are equipped with mechanical flap position indicators. Refer to Section 7 for details.

16-63. TROUBLE SHOOTING FLAP INDICATION SYSTEM.

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

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
FLAP POSITION INDICATOR READINGS ERRONEOUS.		
Position transmitter not adjusted properly.	See paragraph 7-18.	Adjust per paragraph 7-18.
Defective position transmitter.	Substitute known-good transmitter and check operation.	Replace transmitter.
Defective position indicator.	Substitute known-good indicator and check operation.	Replace indicator.
Loose electrical connection.	Check connections.	Tighten loose connections.

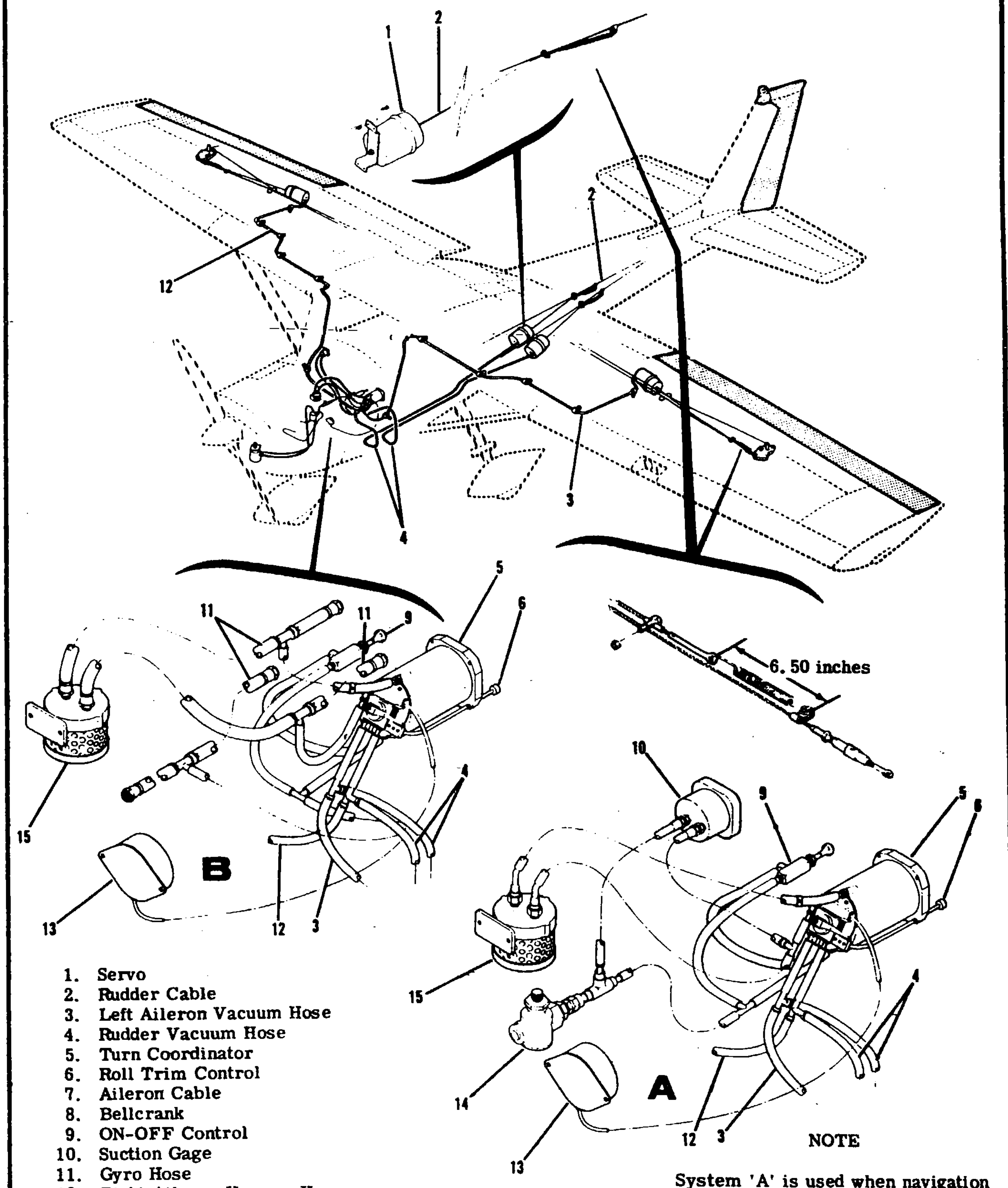
16-63. WING LEVELER. A wing leveler system consisting of a turn coordinator, pneumatic servos and connecting cables and hoses may be installed as optional equipment. The turn coordinator gyro senses changes in roll attitude, then electrically meters vacuum power from the engine-driven vacuum pump to the cylinder-piston servos, operating the ailerons for longitudinal stability. The Model 150 has in addition to the aileron servos, two servos connected to the rudder cables. These servos provide lateral (yaw) stability that prevents excessive changes in heading in turbulent air. Manual control of the system is afforded by the roll trim knob. The roll trim should not be used to correct faulty rigging or "wing heaviness". Manual override of the system may be accomplished without damage to the aircraft or system. The ON-OFF valve controls the vacuum supply to the distributor valve, but does not affect the electrically operated turn coordinator gyro.

Installation of the wing leveler system does not change the vacuum relief valve settings specified in paragraph 16-32.

The system may be removed and installed while using figure 16-11 as a guide and observing general precautions outlined in this section. Refer to appropriate publication issued by the manufacturer for trouble shooting procedures.

16-64. RIGGING. The aileron servos are rigged by positioning the left aileron up, then pulling the servo cable until the piston is extended and the seal is taut but not stretched. Holding this position, attach the servo cable to the aileron cable as shown in applicable figure. Repeat procedure for right wing. The Model 150 rudder servos are rigged by holding full rudder and pulling the servo cable to extend the inactive servo until taut but not stretched, then securing this cable as shown. Hold opposite rudder and rig remaining servo in a similar manner.

SHOP NOTES:



1. Servo
2. Rudder Cable
3. Left Aileron Vacuum Hose
4. Rudder Vacuum Hose
5. Turn Coordinator
6. Roll Trim Control
7. Aileron Cable
8. Bellcrank
9. ON-OFF Control
10. Suction Gage
11. Gyro Hose
12. Right Aileron Vacuum Hose
13. Inverter
14. Vacuum Relief Valve
15. Filter

NOTE

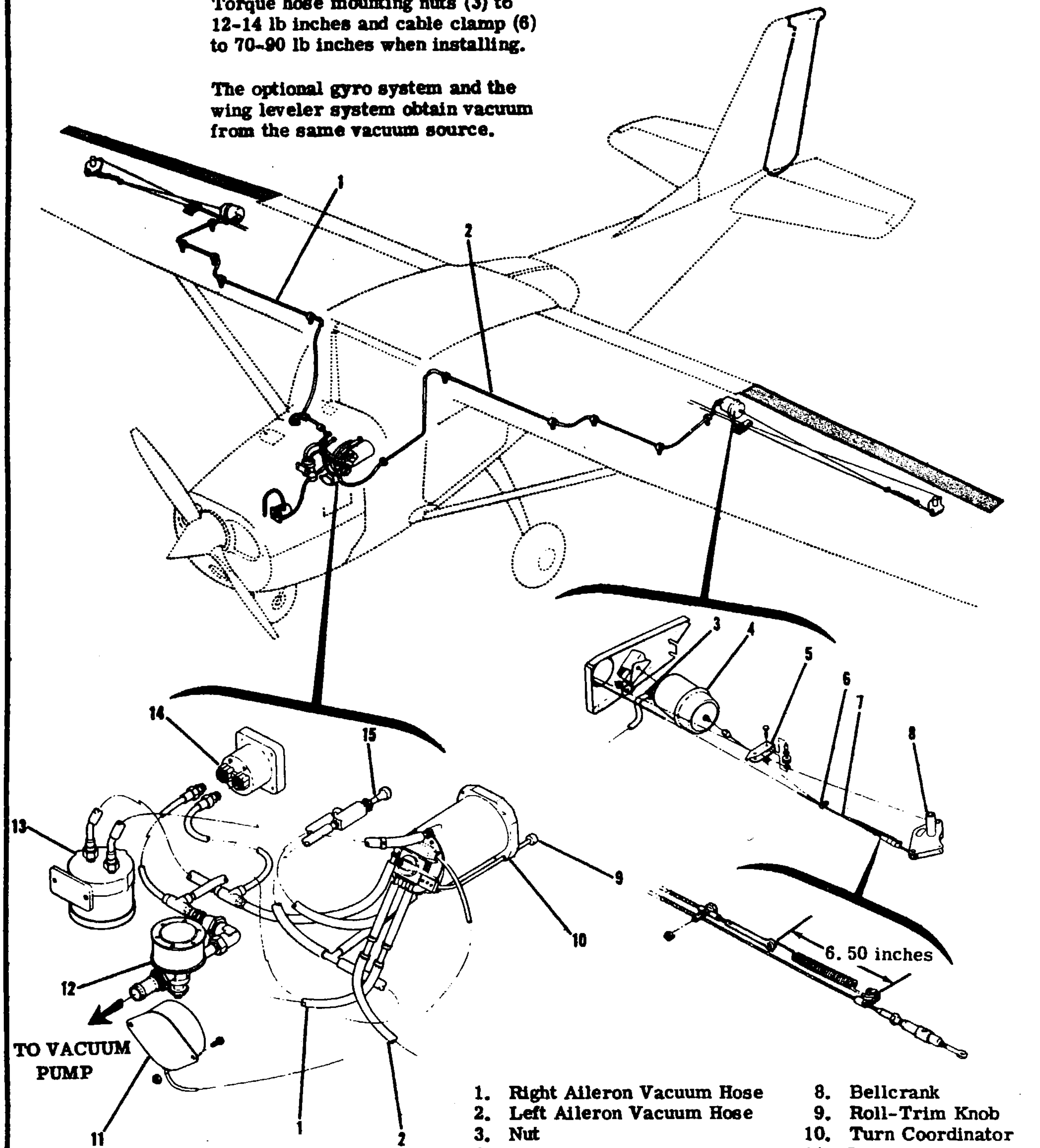
System 'A' is used when navigation gyros are not installed. System 'B' uses a vacuum system common to the navigation gyros and the turn coordinator and leveler system.

Figure 16-11. Wing Leveler Control System (Sheet 1 of 4)

NOTE

Torque hose mounting nuts (3) to 12-14 lb inches and cable clamp (6) to 70-90 lb inches when installing.

The optional gyro system and the wing leveler system obtain vacuum from the same vacuum source.

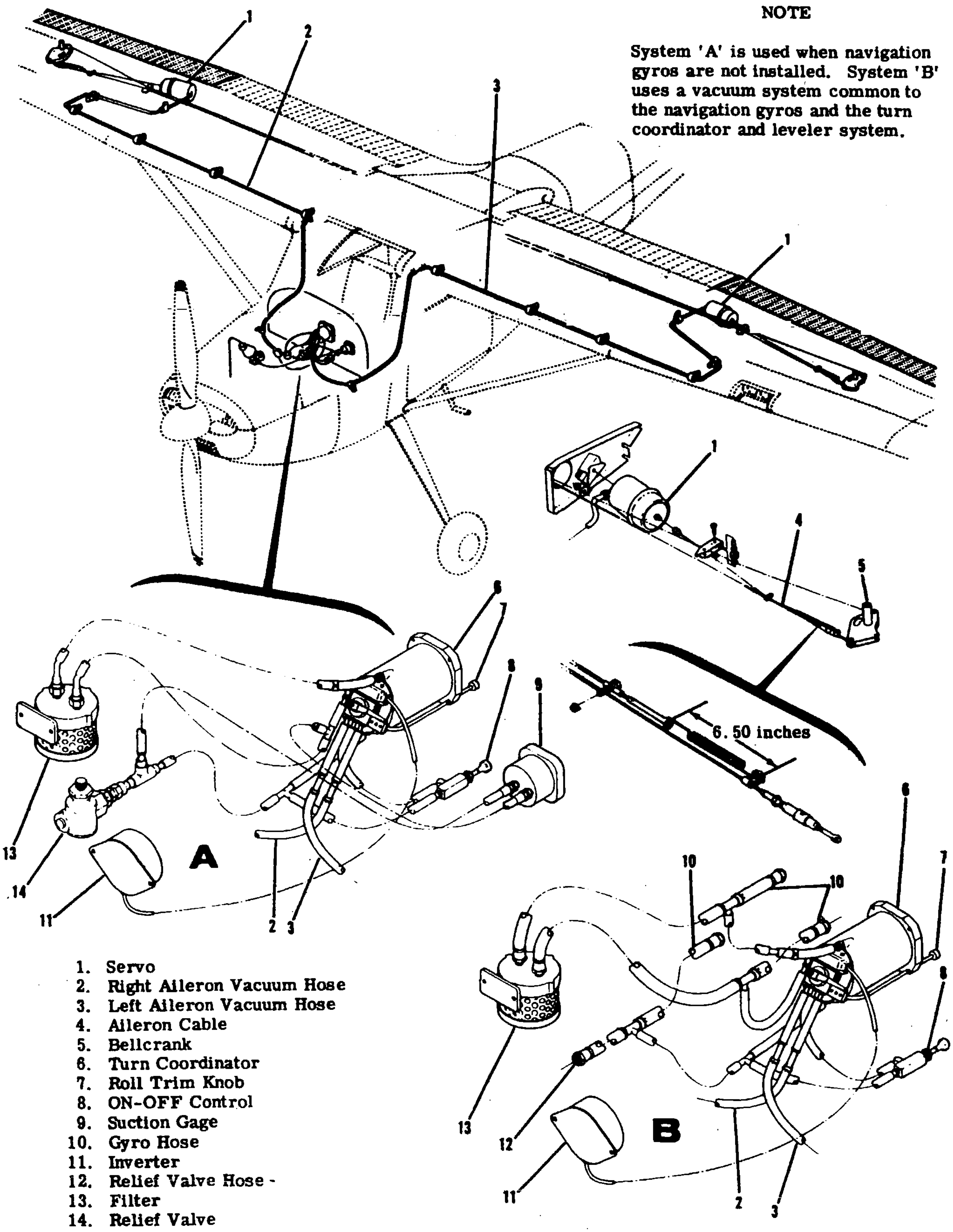


1. Right Aileron Vacuum Hose
2. Left Aileron Vacuum Hose
3. Nut
4. Servo
5. Bracket
6. Clamp
7. Direct Cable
8. Bellcrank
9. Roll-Trim Knob
10. Turn Coordinator
11. Inverter
12. Vacuum Relief Valve
13. Filter
14. Suction Gage
15. ON-OFF Control

Figure 16-11. Wing Leveler Control System (Sheet 2 of 4)

NOTE

System 'A' is used when navigation gyros are not installed. System 'B' uses a vacuum system common to the navigation gyros and the turn coordinator and leveler system.



1. Servo
2. Right Aileron Vacuum Hose
3. Left Aileron Vacuum Hose
4. Aileron Cable
5. Bellcrank
6. Turn Coordinator
7. Roll Trim Knob
8. ON-OFF Control
9. Suction Gage
10. Gyro Hose
11. Inverter
12. Relief Valve Hose -
13. Filter
14. Relief Valve

Figure 16-11. Wing Leveler Control System (Sheet 3 of 4)

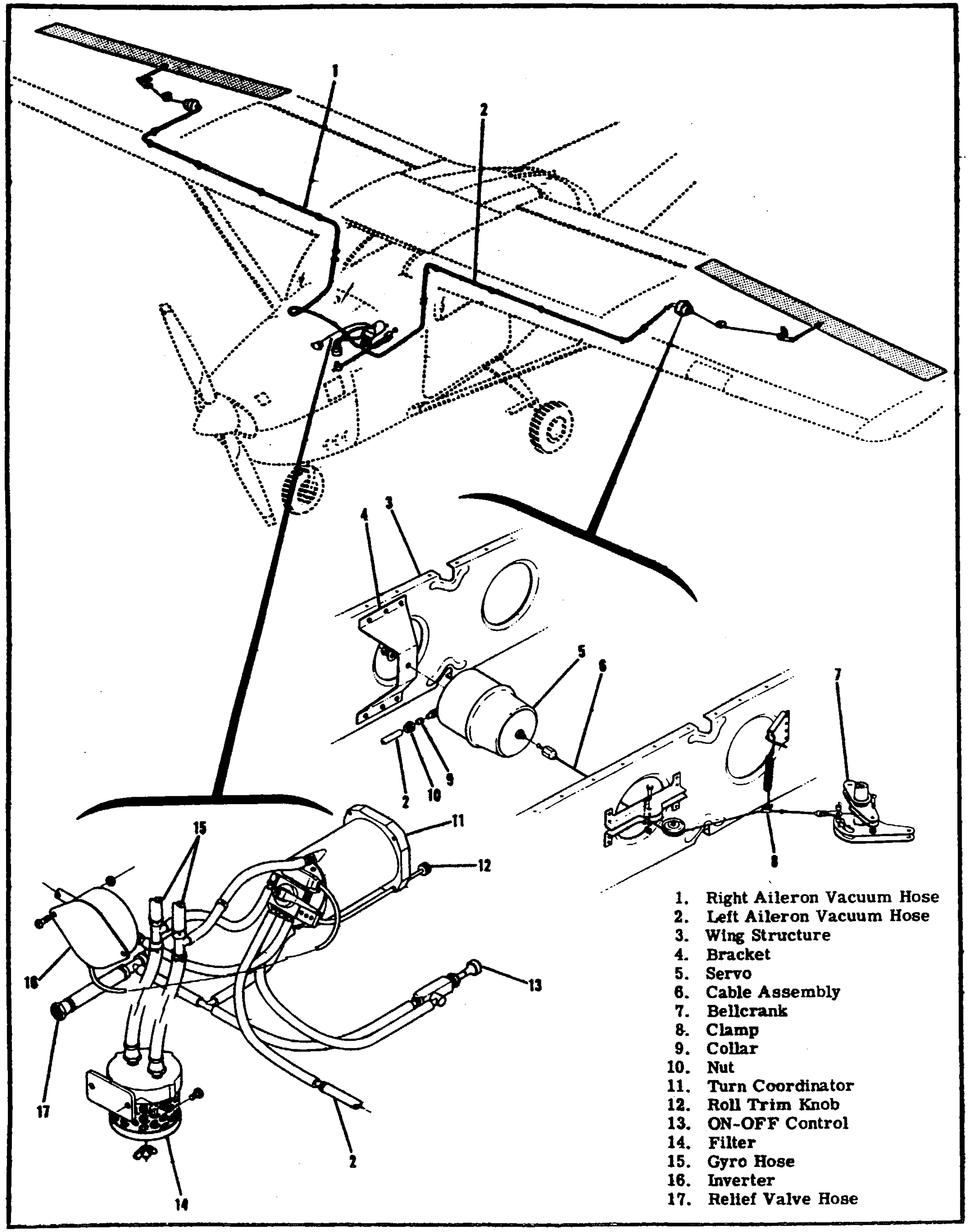


Figure 16-11. Wing Leveler Control System (Sheet 4 of 4)

SECTION 17

ELECTRICAL SYSTEMS

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17-1. ELECTRICAL POWER SUPPLY SYSTEM.

17-2. Electrical energy for the aircraft is supplied by a 12-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 or generator failure. An engine-driven alternator, or generator 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.

17-2A. BATTERY AND EXTERNAL POWER SYSTEM.

17-2B. BATTERY BUS BAR. On all models prior to 1967, all 150 models and all standard 172 models, power is supplied to all electrical and electronic system circuits from a single bus bar. On all other 1967 and on models, electrical power is supplied through a split bus bar, one side containing electronic system circuits and the other side having general electrical system circuits. In the split bus system, 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.

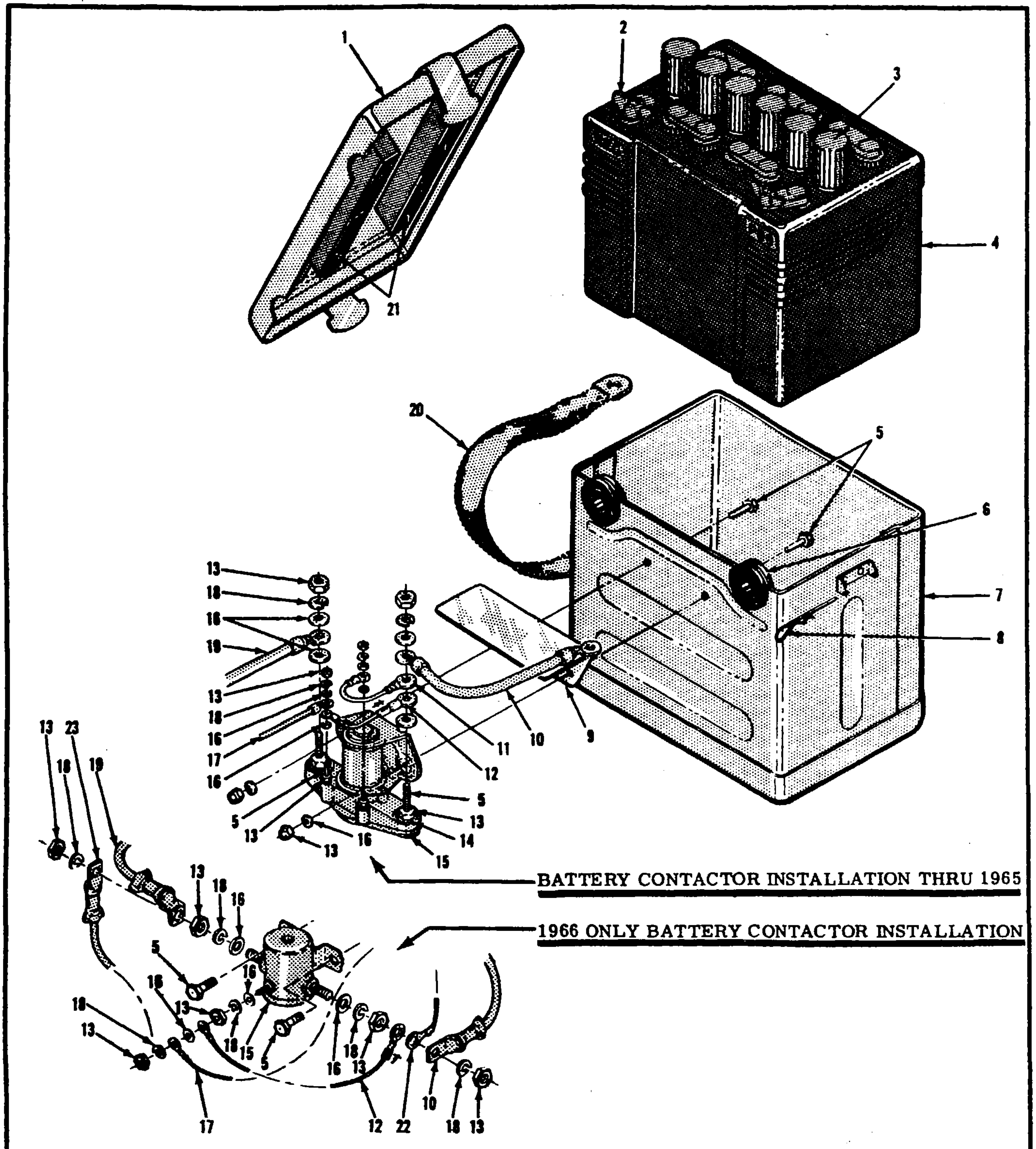
17-2C. BATTERY. The battery is 12 volts and is approximately 33 ampere-hour capacity. The battery is mounted on the forward side of the firewall, or in the tailcone, and is equipped with non-spill filler caps.

17-3. TROUBLE SHOOTING THE BATTERY SYSTEM.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
BATTERY DOES NOT SUPPLY POWER TO BUS WHEN MASTER SWITCH IS ON.		
Dead battery.	Check specific gravity of electrolyte. Gravity reading should be at least 1.256 which indicates a 75% charge at normal temperature.	Replace or charge battery. Check charging rate of generator.
Defective master switch, battery solenoid or wiring.	Short the battery solenoid terminal that is wired to the master switch to ground. If the solenoid does not operate, check the jumper wire connecting the solenoid coil to the "hot" solenoid terminal.	Repair wiring. Check master switch. Replace solenoid.
Faulty battery cable.	Inspect the battery cables for good connection.	Replace cable. Clean and reconnect.
BATTERY SUPPLIES POWER TO BUS BUT WILL NOT CRANK ENGINE.		
Low battery.	Check specific gravity.	Charge battery.
Faulty battery cables.	Inspect for corrosion and poor connection.	Clean and reconnect.
Battery cell shorting under load.	Test battery with a load tester.	Replace battery.
Defective starter contactor or solenoid.	On aircraft with starter switch check operation of switch and solenoid.	Repair wiring. Replace switch. Replace solenoid.
BATTERY USES EXCESSIVE AMOUNT OF WATER.		
Charging rate too high.	Test voltage regulator or try a new unit.	Adjust or replace regulator.

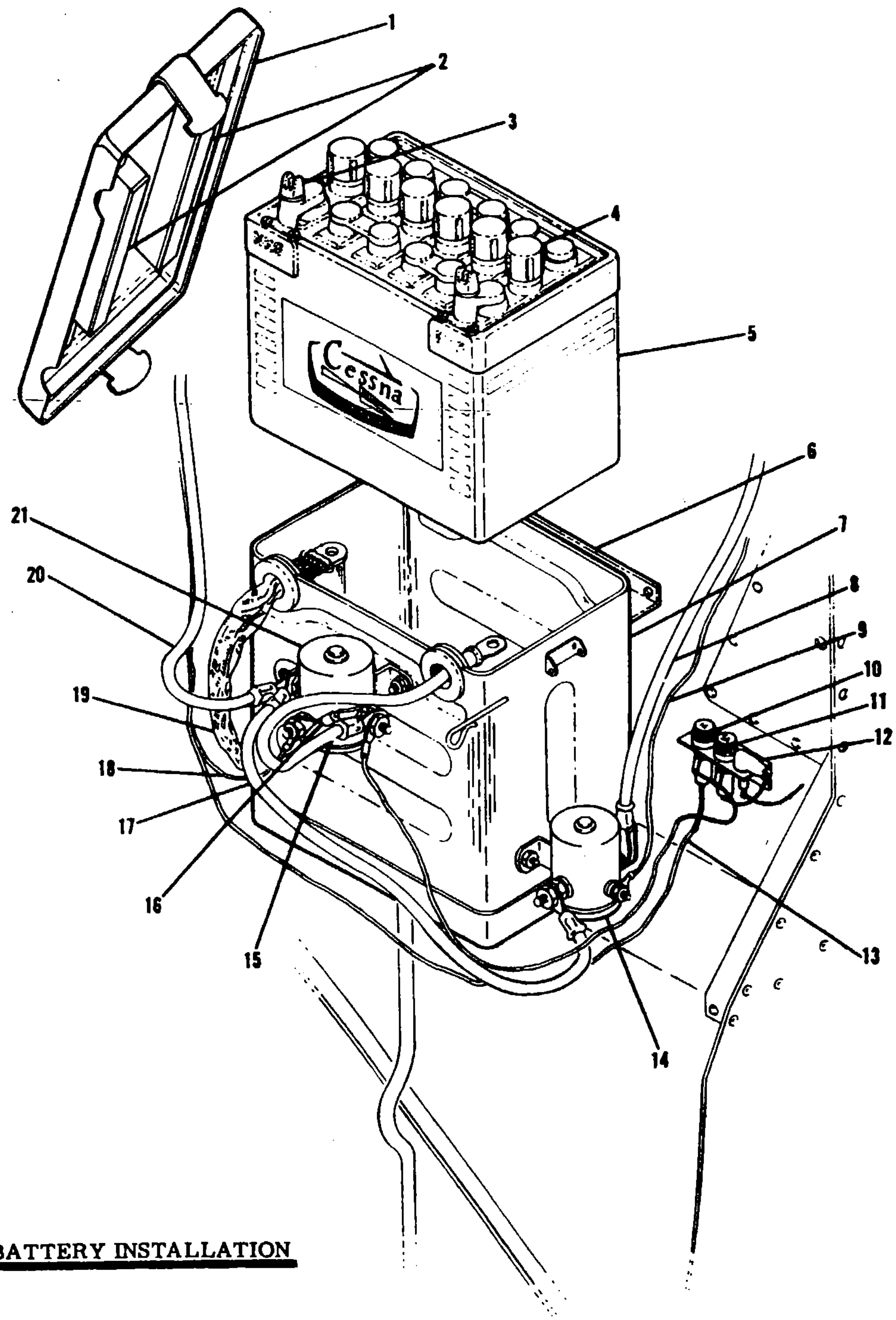
NOTE

Voltage regulators are adjustable, however adjustment should not be attempted unless proper equipment is available. Refer to the Cessna Alternator Charging Systems Manual for instructions.



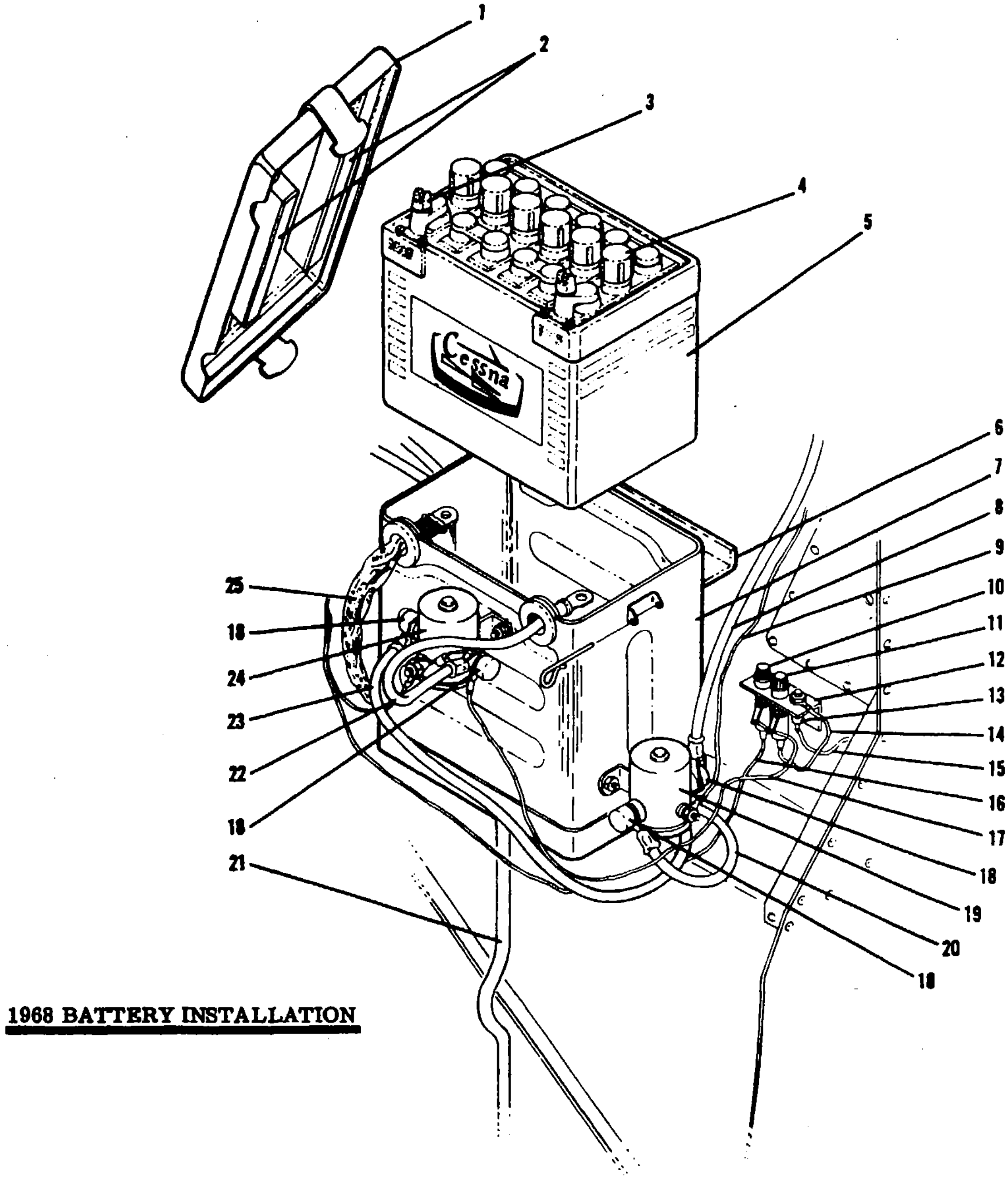
1. Battery Box Lid
2. Wing Nut
3. Filler Cap
4. Battery
5. Bolt
6. Grommet
7. Battery Box
8. Spring Clip
9. Water Shield (Some A/C)
10. Power Cable
11. Jumper Wire
12. Diode Assembly
13. Nut
14. Star Washer
15. Battery Solenoid
16. Washer
17. Wire to Master Switch
18. Lockwasher
19. Starter Cable
20. Ground Strap
21. Insulators
22. Clock Wire
23. Gnd Serv Recpt Cable

Figure 17-1. Firewall Installation of Battery



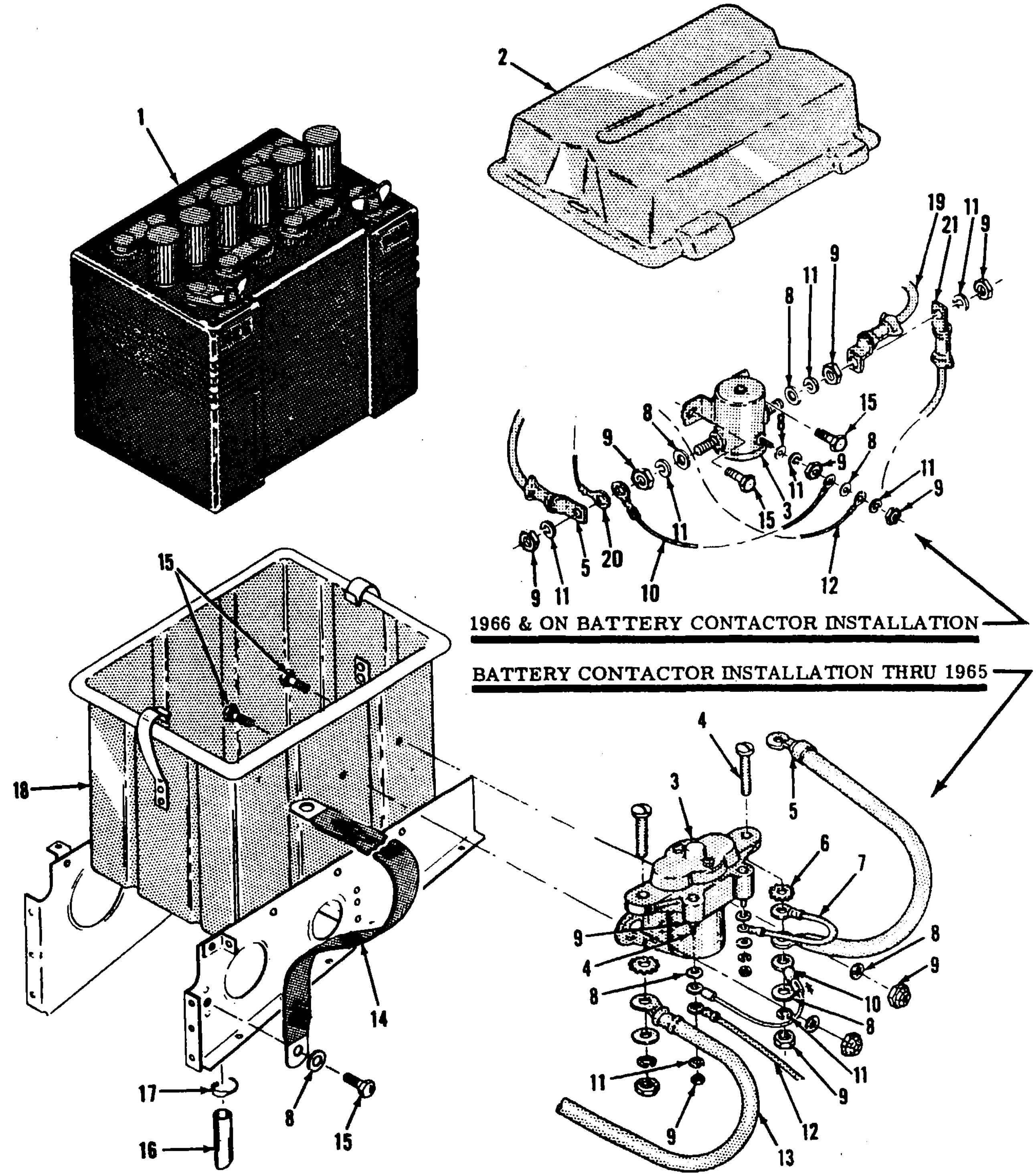
1. Battery Box Lid
2. Insulator
3. Wing Nut
4. Filler Cap
5. Battery
6. Mounting Bracket
7. Battery Box
8. External Power Contactor Line
9. Contactor Control Wire
10. Clock Fuse
11. External Power Fuse
12. Diode
13. Clock Wire
14. External Power Contactor
15. Positive Battery Lead
16. Transient Suppression Diode
17. Power Lead
18. Battery Contactor Control Lead
19. Negative Battery Lead
20. Aircraft Bus Lead
21. Battery Contactor

Figure 17-2. Firewall Installation of Battery



1. Battery Box Lid
2. Insulator
3. Wing Nut
4. Filler Cap
5. Battery
6. Mounting Bracket
7. Battery Box
8. External Power Contactor Line
9. Contactor Control Wire
10. Clock Fuse
11. External Power Fuse
12. Mounting Bracket
13. Diode
14. External Power Fuse to Diode
15. Diode Wire
16. Clock Wire
17. Fuse Wire
18. Cover
19. External Power Contactor
20. Starter Contactor Cable
21. Drain Tube
22. Positive Battery Lead
23. Starter Contactor Power Cable
24. Battery Contactor
25. Negative Battery Lead

Figure 17-2A. Firewall Installation of Battery



1. Battery	8. Washer	15. Bolt
2. Battery Box Cover	9. Nut	16. Drain Tube
3. Battery Contactor	10. Diode Wire	17. Tube Clamp
4. Screw	11. Lockwasher	18. Battery Box
5. Positive Battery Cable	12. Wire to Master Switch	19. Cable to Starter Contactor
6. Star Washer	13. Power Cable to Bus	20. Check Wire
7. Contactor Jumper Wire	14. Negative Ground Strap	21. Gnd Ser Recpt Cable

Figure 17-3. Tailcone Installation of Battery

17-4. REMOVAL AND REPLACEMENT OF BATTERY. (See figure 17-1, 17-2 or 17-3.)

NOTE

Steps a thru c of the following procedure apply to the tailcone battery installation only. The remaining steps apply to both the firewall and tailcone battery installations.

a. Remove the rear baggage compartment panel.
b. Loosen the snap fasteners on the floor pan.
c. Remove the floor pan.
d. Remove the battery box cover.
e. 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.

f. Disconnect the cable from the positive terminal of the battery.
g. Lift the battery out of the battery box.
h. To replace the battery, reverse this procedure.

17-5. CLEANING THE BATTERY. For maximum efficiency the battery and connections should be kept clean at all times.
a. Remove the battery and connections in accordance with the preceding paragraph.
b. Tighten battery cell filler caps to prevent the cleaning solution from entering the cells.
c. Wipe the battery cable ends, battery terminals 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 battery to dry.
e. Brighten up cable ends and battery terminals with emery cloth or a wire brush.
f. Install the battery according to the preceding paragraph.
g. Coat the battery terminals with petroleum jelly or an ignition spray product to reduce corrosion.

17-6. 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.

17-7. TESTING THE BATTERY. The specific gravity of the battery may be measured with a hydrometer to determine the state of battery charge. If the hydrometer reading is low, slow-charge the battery and retest. Hydrometer readings of the electrolyte must be compensated for the temperature of the electrolyte. Some hydrometers have a built-in thermometer and conversion chart. The following chart shows the battery condition for various hydrometer readings with an electrolyte temperature of 80° Fahrenheit.

BATTERY HYDROMETER READINGS

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 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.

17-8. 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, and oxygen gases are generated. Accumulation of these gases can create a hazardous explosive condition. Always keep sparks and open flame away from the battery.

Allow unrestricted ventilation of the battery area during charging.

The main points of consideration during a battery charge are excessive battery temperature and violent gassing. Test the battery with a hydrometer to determine the amount of charge. Decrease the charging rate or stop charging temporarily if the battery temperature exceeds 125°F.

17-8A. BATTERY BOX. The battery is completely enclosed in a box which is painted with acid proof paint. The box has a vent tube which protrudes through the bottom of the aircraft allowing battery gases and spilled electrolyte to escape. The battery box is riveted to the forward side of the firewall in 150 and 172 models and to the mounting brackets in the tailcone in 180, 185 and 182 models.

17-8B. REMOVAL AND REPLACEMENT OF BATTERY BOX. (See figure 17-1, 17-2 or 17-3.) The battery box is riveted to the firewall or 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 and scratches inside the box should be painted with acid-proof lacquer Part No. CES 1054-381, available from the Cessna Service Parts Center.

17-9. MAINTENANCE OF BATTERY BOX. The battery box should be inspected and cleaned periodically. The box and cover should be cleaned with a strong solution of bicarbonate of soda (baking soda) and water. Hard deposits may be removed with a wire brush. When all corrosive deposits have been removed from the box, flush it throughly with clean water.

WARNING

Do not allow acid deposits to come in contact with skin or clothing. Serious acid burns may result unless the affected area is washed immediately with soap and water. Clothing will be ruined upon contact with battery acid.

Inspect the cleaned box and cover for physical damage and for areas lacking proper acid proofing. A badly damaged or corroded box should be replaced. If the box or lid require acid proofing, paint the area with acid proof lacquer Part No. CES 1054-381, available from the Cessna Service Parts Center.

17-10. BATTERY SOLENOID. The battery solenoid is bolted to the side of the battery box. The solenoid 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 solenoid. The small terminal of the diode and the master switch wire connect to the minus terminal of the solenoid coil. On 1968 models a nylon cover has been added to the solenoid terminals to prevent accidental short circuits. (See item 18, figure 17-2A).

17-10A. REMOVAL AND REPLACEMENT OF BATTERY SOLENOID. (See figure 17-1, 17-2, or 17-3.)

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 solenoid.
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 solenoid to the firewall. The solenoid will now be free for removal.
e. To replace the solenoid, reverse this procedure.

17-10B. SPLIT BUS POWER RELAY. 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.

17-10C. MASTER SWITCH. The operation of the battery and alternator systems is controlled by a master switch. The switch is a rocker type with double-pole, double-throw contacts. The switch, when operated, connects the battery solenoid coil ground and the alternator field circuit to the battery, activating the power systems. The master switch is located on the stationary instrument panel.

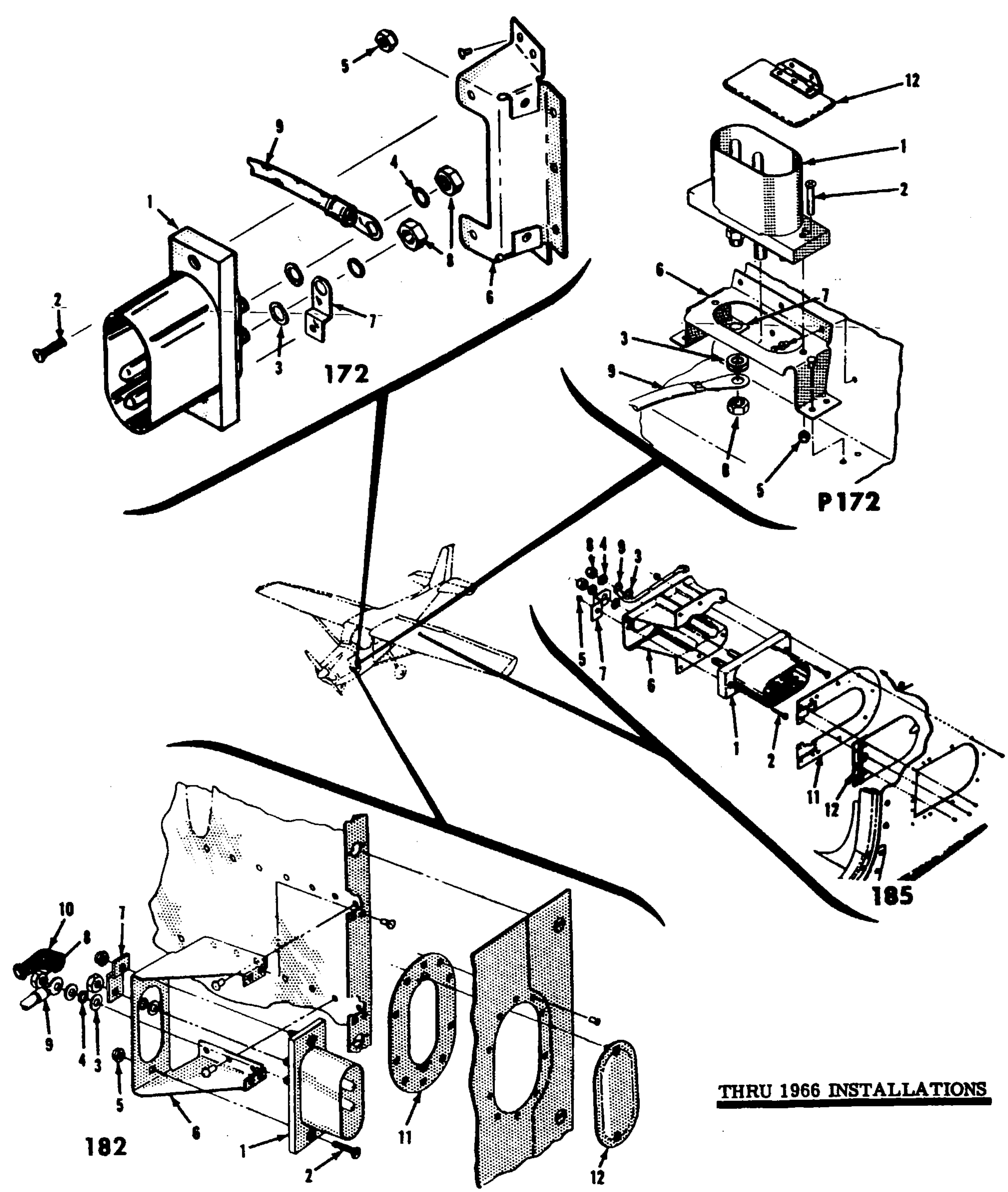
17-10D. GROUND SERVICE RECEPTACLE. A ground service receptacle is offered as optional equipment on all models except the 150 to permit the use of external power for cold weather starting or when performing lengthy electrical maintenance.

On late model aircraft a reverse polarity protection, utilizing blocking diodes, has been incorporated into the ground service receptacle. Power from the external power source will flow only if the ground service plug is correctly connected to the airplane. If the plug is accidentally connected backwards, no power will flow to the airplane's electrical system, thereby preventing any damage to electrical equipment.

Before connecting an external power source, it is important that the master switch be turned "ON." This will close the battery contactor and enable the battery to absorb transient voltages which might damage the electronic equipment.

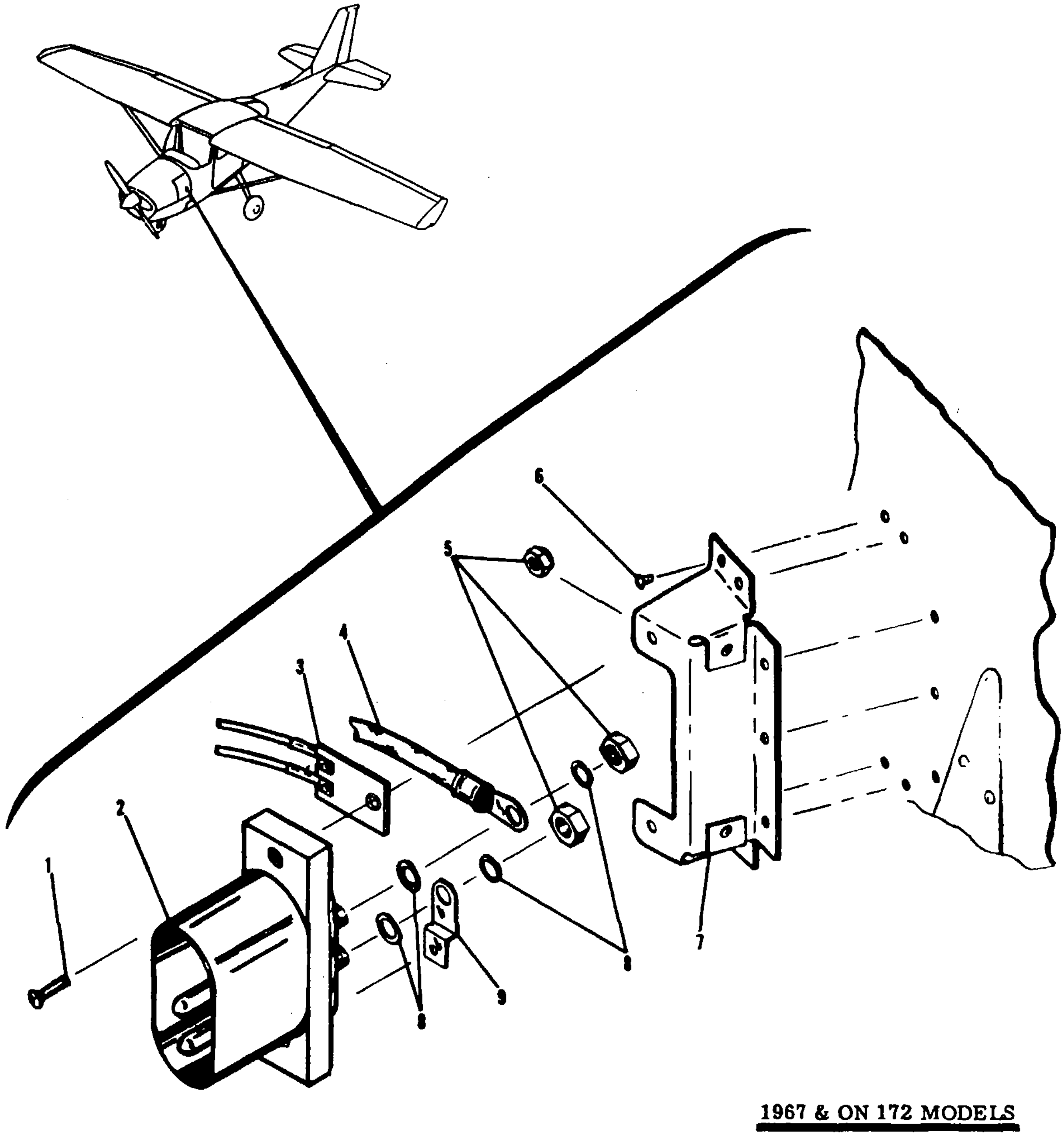
NOTE

An older aircraft not having the battery contactor closing circuit, if it is suspected that the battery is too weak to close the battery contactor as the master switch is turned "ON," turn on the dome light or similar equipment to check battery contactor operation. If the contactor did not close the dome light will not illuminate and it will be necessary to momentarily "jumper"



1. Receptacle
2. Screw
3. Washer
4. Lockwasher
5. Mounting Nut
6. Mounting Bracket
7. Ground Strap
8. Terminal Nut
9. Power Cable
10. Nipple
11. Doubler
12. Cover Plate

Figure 17-4. Ground Service Receptacle Installation (Sheet 1 of 3)



1. Screw
2. Receptacle
3. Diode Board
4. Power Cable
5. Nut
6. Rivet
7. Bracket Assembly
8. Washer
9. Ground Strap

Figure 17-4. Ground Service Receptacle Installation (Sheet 2 of 3)

across the two large battery contactor posts to close the contactor as external power is applied.

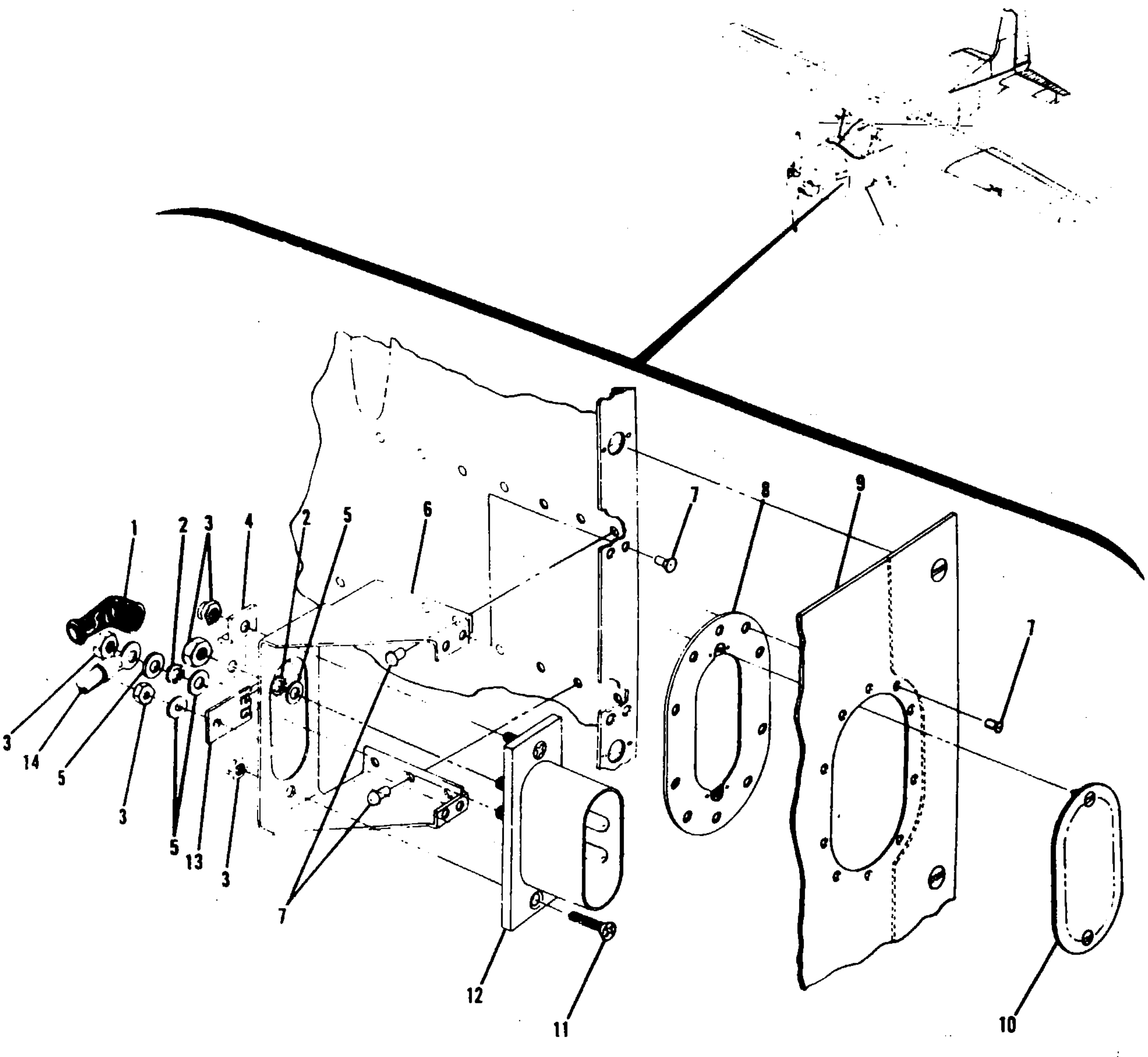
NOTE

On late models having the reverse polarity protection circuit, maintenance on the electronics installations can not be performed when using external power. Application of an external source opens the relay supplying power to the electronic bus.

17-10E. REMOVAL AND REPLACEMENT OF GROUND SERVICE RECEPTACLE. (See figure 17-4.)

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, bus



1967 & ON 180, 185, & 182 MODELS

1. Nipple
2. Lock Washer
3. Nut
4. Ground Strap
5. Washer
6. Bracket Assembly
7. Rivet
8. Doubler Assembly
9. Cowl
10. Door Assembly
11. Screw
12. Receptacle
13. Diode Board
14. Power Cable

Figure 17-4. Ground Service Receptacle Installation (Sheet 3 of 3)

bar and diode board from the stud 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.

17-11. GENERATOR POWER SYSTEM.

17-12. GENERATOR. Generators used on Cessna aircraft are two brush-shunt wound types with negative ground. The generator output is controlled by the current passing thru the field winding of the generator. The field winding is connected to the armature circuit of the generator internally and must be grounded externally (by the regulator) for the generator to operate. The generator is driven either by a gear train in the engine accessory case or by a V-belt. The output is 14 volts at 20, 35 or 50 amperes, depending upon the particular unit. Three electrical connections are required for the generator. Ground is provided thru the generator case and mounting brackets. The field terminal is connected thru the master switch to the voltage regulator and the armature terminal connects directly to the voltage regulator. On some aircraft a capacitor is attached to the armature terminal of the generator. The capacitor suppresses any radio interference which might be created by the generator.

17-13. TROUBLE SHOOTING GENERATOR OR ALTERNATOR SYSTEM.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
WARNING LIGHT OR AMMETER INDICATES CORRECTLY → BATTERY DOES NOT COME UP TO FULL CHARGE		
Blown fuse or circuit breaker. (Generator models only.)	Inspect.	Reset or replace.
Loose drive belt. (Some aircraft.)	Inspect.	Tighten belt.
Poor wiring connections.	Inspect.	Clean and tighten.
Faulty battery.	Test.	Replace.
Faulty regulator.	Test or substitute.	Adjust or replace.
Generator or alternator output low.	Test or substitute. Check alternator for faulty diode.	Repair. Replace diode plate assembly.
Excessive power consumption.	Calculate electrical loading.	Install higher output system.
AMMETER DOES NOT DEFLECT / WARNING LIGHT DOES NOT COME ON → WHEN MASTER SWITCH IS TURNED ON.		
Battery down.	Battery solenoid not closing. Test battery.	Charge battery.
Blown fuse or circuit breaker.	Inspect.	Replace or reset.
Burned out lamp.	Try new lamp.	Replace.
Faulty wiring or battery solenoid.	Test wiring and solenoid.	Repair or replace.
AMMETER DOES NOT SHOW CHARGE / WARNING LIGHT DOES NOT GO OUT → WHEN ENGINE SPEED IS INCREASED.		
Loose or broken drive belt. (Some aircraft.)	Inspect.	Tighten or replace.
Loss of generator polarity. (Does not apply to alternator.)	All components and wiring okay, generator does not charge.	Restore residual magnetism by polarizing generator.
Faulty voltage regulator.	Test or substitute.	Adjust or replace.

17-13. TROUBLE SHOOTING GENERATOR OR ALTERNATOR SYSTEM - Cont.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
AMMETER DOES NOT SHOW CHARGE) WARNING LIGHT DOES NOT GO OUT) WHEN ENGINE SPEED IS INCREASED. (Cont)		
Faulty generator or alternator.	Test or substitute.	Replace.
Faulty circuit wiring.	Inspect and test.	Repair wiring.
ALTERNATOR OUTPUT CONTINUOUSLY HIGH.		
Faulty wiring.	Inspect for loose or dirty connections.	Clean and tighten.
Regulator set too high.	Measure voltage output of alternator.	Adjust or replace regulator.
Regulator faulty.	Substitute.	Adjust or replace.
ALTERNATOR CIRCUIT BREAKER OPENS WHEN MASTER SWITCH IS TURNED ON - ENGINE NOT RUNNING.		
Shorted diode inside alternator.	Test diodes.	Replace diode assembly.
Short in wiring between bus bar and alternator.	Test wiring for shorts.	Repair.
ALTERNATOR OUTPUT CONTINUOUSLY LOW.		
Faulty wiring.	Inspect for loose or dirty connections.	Clean and tighten.
Faulty diode in alternator.	Test diodes.	Replace.
Faulty alternator winding.	Test.	Replace.
BATTERY CONSUMES WATER RAPIDLY.		
Faulty battery.	Slow charge battery and load test.	Replace.
Regulator set too high.	Measure alternator voltage output.	Adjust voltage.
Shorted diode in alternator causing battery to cycle.	Test diodes.	Replace diode and test regulator.

SHOP NOTES:

17-14. REMOVAL AND REPLACEMENT OF GENERATOR - MODELS 180, 182 & 185. (See figure 17-5.)

a. The generator may be removed through the cowl door. However, the job will be performed easier if the top portion of the cowl is removed.

b. Release the clamp securing the generator blast tube and remove the tube.

c. Remove the wiring from the generator.

d. Cut the safety wire securing the generator adjustment bolt and remove the bolt and washer. Leave the generator belt in place to support the generator.

e. Remove the bolts, washers and nuts from the bottom of the generator bracket and remove generator and drive belt.

f. To install the generator, reverse this procedure. Adjust the drive belt for 3/8" deflection with a force of 12 pounds applied.

CAUTION

If the generator has a filter capacitor connected for suppression of radio noise, be sure that it is connected only to the armature terminal of the generator. If the capacitor is accidentally connected to the field terminal, it will cause arcing and burning of the voltage regulator contacts.

17-15. REMOVAL AND REPLACEMENT OF STANDARD 20-AMPERE GENERATOR ON MODELS 172, P172 and 150.

a. Remove the cowl from the aircraft and drain the oil (it is not necessary to drain the oil in the 150).

b. Loosen the clip securing the blast tube and pull the tube clear of the generator.

c. Disconnect the generator wiring and pull it clear of the generator area.

d. Remove the three mounting nuts and washers attaching the generator to the engine accessory case.

e. Remove the bolts, spacers and washers securing the generator to the manifold balance tube. Pull the generator free from the engine and work the generator out of the left side of the engine.

f. To replace the generator, reverse this procedure.

CAUTION

Before replacing the generator, carefully inspect the oil seal on the front of the generator. If there is any sign of wear or deterioration, replace the seal. A leaky seal will cause loss of engine oil

If the generator has a filter capacitor connected for suppression of radio noise, be sure that it is connected only to the armature terminal of the generator. If the capacitor is accidentally connected to the field terminal, it will cause arcing and burning of the voltage regulator contacts.

17-16. REMOVAL AND REPLACEMENT OF OPTIONAL (HEAVY DUTY) GENERATOR ON MODEL P172.

a. Remove the cowl from the aircraft and drain the engine oil.

b. Block up the tail by placing a suitable support under the tail tie-down ring.

c. Using a hoist attached to the engine hoisting lug lift the engine only enough to relieve the tension on the engine shock mount bolts.

NOTE

If the propeller is not removed, the engine will be slightly nose heavy. A sling arranged between the engine crankshaft and hoist will be necessary to balance the engine.

d. Remove the engine shock mount bolts.

e. Disconnect any lines, electrical wiring, controls or clamps which would interfere with lifting the engine clear of its shock mounts and rotate the rear of the engine downward approximately two inches. Secure the engine in this position.

CAUTION

Use care not to damage any parts when moving the engine.

f. Disconnect the electrical wiring from the generator.

g. Release the generator blast tube clamp and pull the tube clear of generator.

h. Remove the three nuts and washers attaching the generator to the engine accessory case.

i. Remove the bolts, spacers and washers attaching the generator to the intake manifold balance tube. and remove the generator from engine.

j. To replace the generator, reverse this procedure.

CAUTION

Before replacing the generator, carefully inspect the oil seal on the front of the generator. If there is any sign of wear or deterioration, replace the seal. A leaky seal will cause loss of engine oil.

If the generator has a filter capacitor connected for the suppression of radio noise, be sure that it is connected only to the armature terminal of the generator. If the capacitor is connected to the field terminal, it will cause arcing and burning of the voltage regulator contacts.

17-17. POLARIZING THE GENERATOR. A generator of the type used on aircraft must maintain a residual magnetism in the pole shoes in order to produce a charge. Whenever any work is performed on the basic electrical system the generator should be polarized to make sure a charge will be produced.

To polarize a generator connect a jumper momentarily between the ARMATURE and BATTERY terminals of the regulator before starting the engine. A momentary surge through the generator is enough to correctly polarize it.

CAUTION

If a generator is not correctly polarized the regulator and generator may be damaged. Do not polarize alternator systems.

17-18. GENERATOR VOLTAGE REGULATOR. The regulator is a vibrating contact type containing three relays. The voltage and current limiting relays control the output of the generator according to the demand of the battery. This control of the generator is accomplished by changing the amount of field current flowing through the generator. The maximum current output of the generator is controlled by the current limiting relay. If the current output of the generator exceeds a preset amount the current limiting relay interrupts the generator field circuit reducing the output by inserting a resistance into the field circuit. Similar conditions apply for generator output voltage control. When the generator is not producing, such as in an idle condition it is necessary to disconnect the battery from the generator. If the generator is not disconnected during no output conditions the armature appears as a path to ground for the battery voltage. To prevent this loss of battery potential the cutout relay portion of the regulator disconnects the battery from the armature circuit when the charging voltage drops below a specified level and current begins to flow in a reverse direction. The operation of the voltage regulator controls the output of the generator with respect to certain preset maximum levels, however the regulator must be informed of the batteries condition to taper the charge and prevent overcharging. This informationis supplied to the regulator by the battery counter electromotive force on the regulator. The rate of charge is determined by the voltage limiting relay. The higher the battery's charge, the higher the charging voltage must be and the most effect the voltage limiter will have on the charging rate. This reduces the charging rate as the battery comes up to charge.

17-19. GENERATOR WARNING LIGHT. The generator warning light is provided to indicate when the generator is not charging the battery. The light is electrically connected across the cutout relay contacts of the voltage regulator. Whenever the cutout contacts are open the light will measure the potential difference between the battery and the generator armature. When the battery voltage is in excess of the generator output (such as an idling condition) the light will come on. As the generator speed (output) is increased, the potential difference across the light will diminish and the light will grow dim. When the cutout relay connects the generator output to the battery the light circuit is bypassed through the voltage regulator and the light will go out.

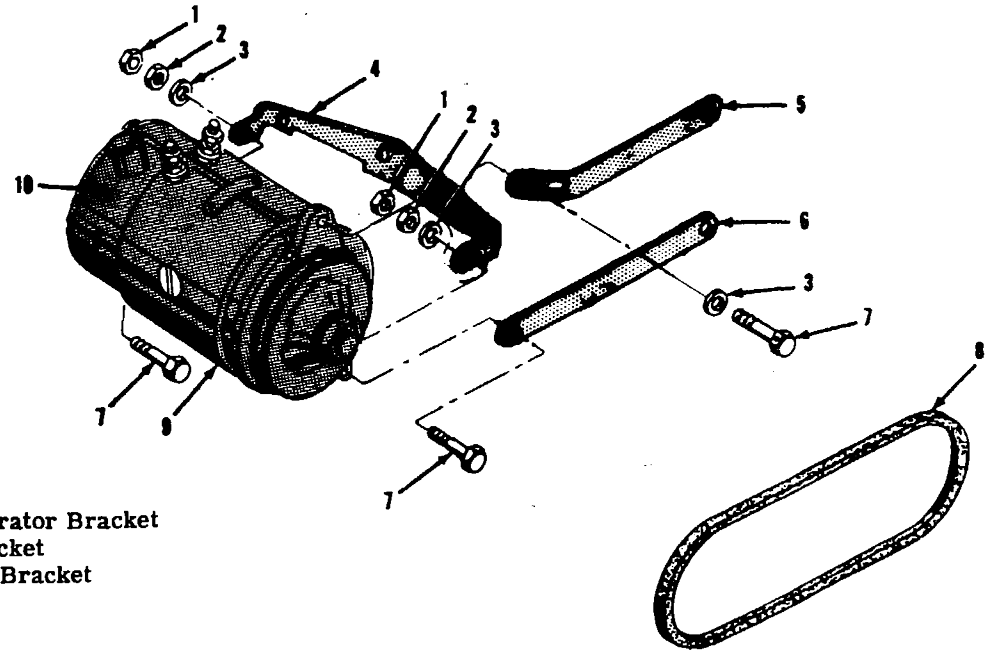
17-20. AMMETER. The ammeter is connected between the battery and the aircraft bus. The meter indicates the amount of current flowing either to or from the battery. With a low battery and the engine operating at cruise speed, the ammeter will show the full generator, or alternator, output. When the battery is fully charged and cruise is maintained with all electrical equipment off, the ammeter will show a minimum charging rate.

17-21. ALTERNATOR POWER SYSTEM. The introduction of the high current silicon diode resulted in a reduction of mass making the alternator suitable for light aircraft use. The alternator power system provides a high power output with a low engine speed and a reduction in weight. The alternator, like the generator, produces an ac voltage by electromagnetic induction. Rectification of the ac is accomplished by the silicon diodes. The alternator system does not require external current regulation. The current regulation of the alternator is inherent and overloading results in a power drop off due to magnetic saturation. The alternator system requires an external exciting voltage to create a magnetic field around the rotor poles before power may be derived.

17-22. ALTERNATOR. Alternators used on Cessna single engine aircraft are three phase with integral silicon diode rectifiers. Early alternators are rated 14 volts at 52 amperes continuous output. Alternators currently being installed on single engine aircraft are rated 14 volts at 60 amperes continuous output. The moving center part of the two alternators (rotor) consists of a radial winding and 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 is the stationary part of the alternator. The stator contains three phase windings and six silicon diodes. As the magnetic lines (created by exciting the rotor with a dc voltage) cut the stator windings an alternating voltage is produced. The alternating voltage from the three phase windings of the stator is fed into six diode rectifiers which are arranged electrically to provide full wave rectification. The diodes output is dc and is combined and applied to the aircraft bus bar and also to the voltage regulator for sensing. The alternators are mounted on the left rear section of the engine and are belt driven. For maintenance of the alternators, refer to the "Cessna Alternator Charging Systems Service/Parts Manual."

17-23. 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.

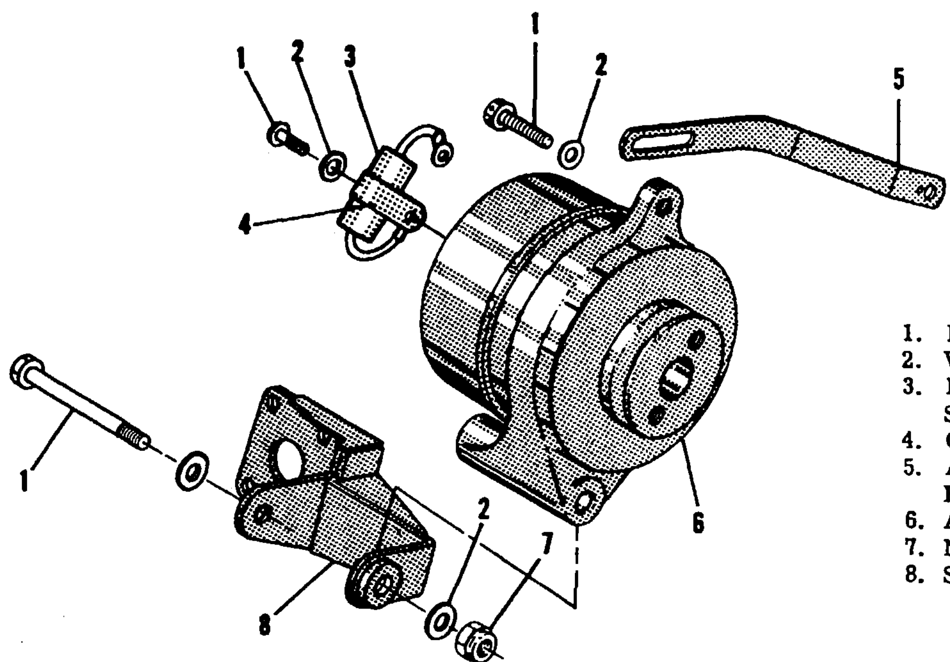
17-24. ALTERNATOR VOLTAGE REGULATOR. The alternator voltage regulator contains two relays.



1. Palnut
2. Nut
3. Washer
4. Lower Forward Generator Bracket
5. Upper Generator Bracket
6. Lower Aft Generator Bracket
7. Bolt
8. Drive Belt
9. Generator
10. Brush Cover Band

Figure 17-5. Generator Installation

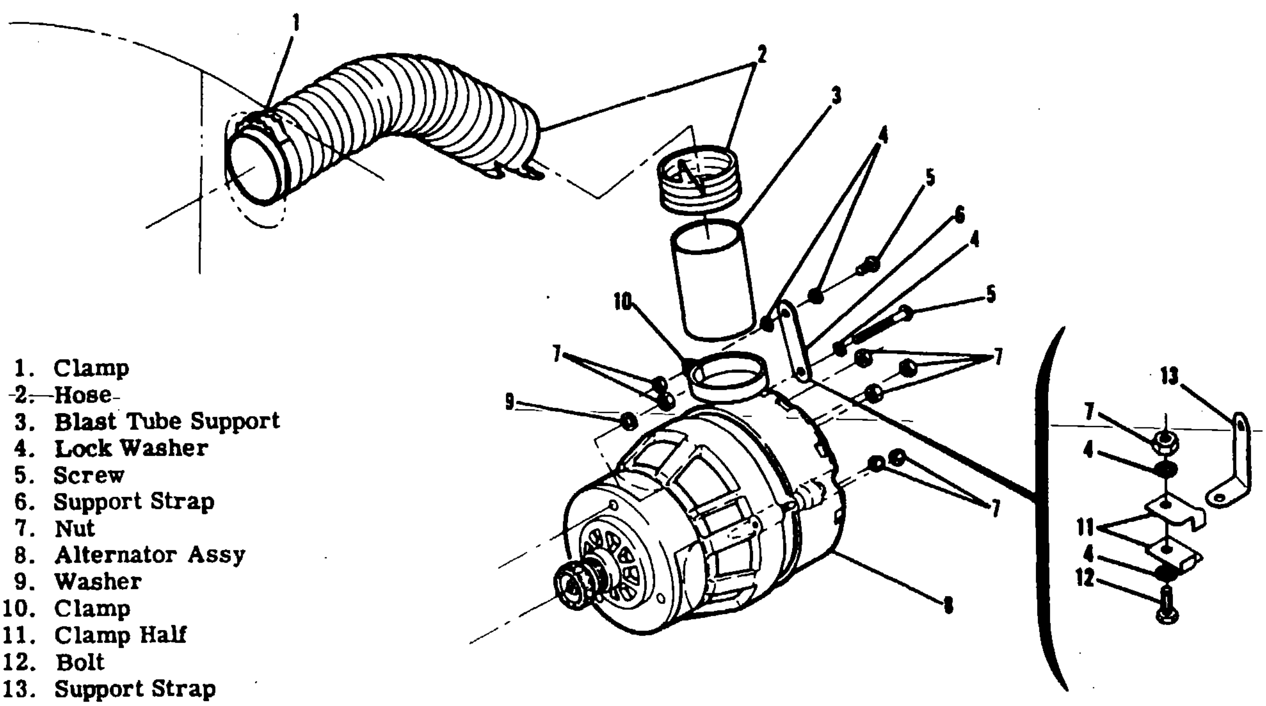
NOTE
LATE MODEL ALTERNATORS HAVE A BUILT-IN RADIO NOISE SUPPRESSOR.



1. Bolt
2. Washer
3. Radio Noise Suppressor
4. Clamp
5. Adjusting Bracket
6. Alternator
7. Nut
8. Support Assy

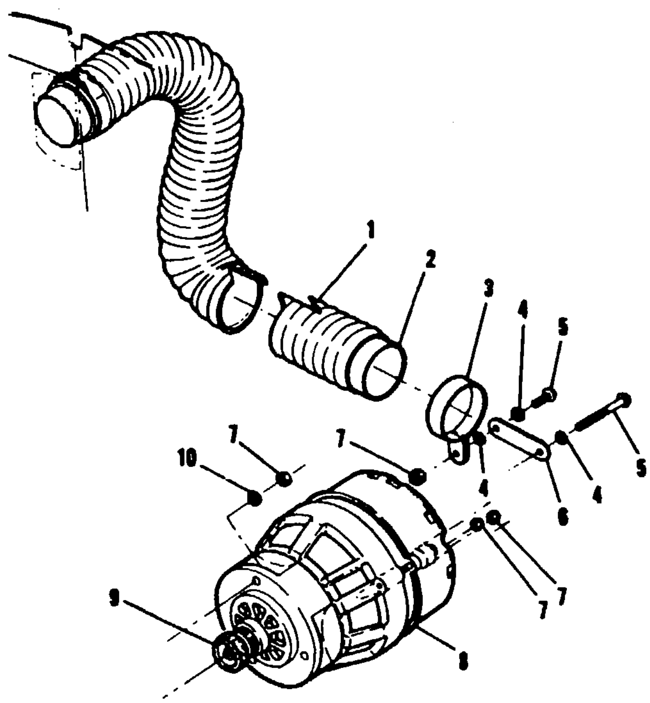
Thru 1966 Models - All Models Except 150 & 172

Figure 17-6. Belt-Driven Alternator Installation



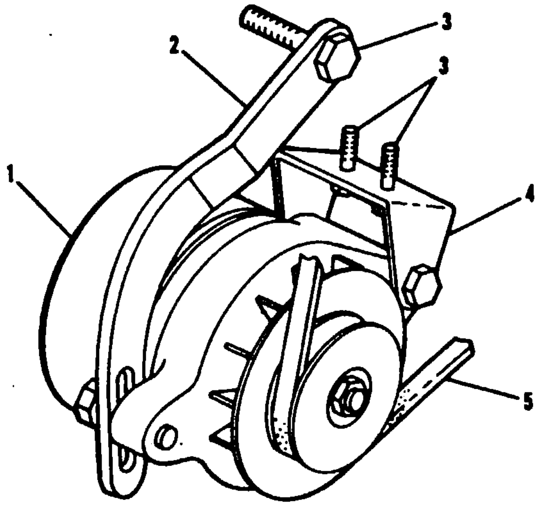
1. Clamp
~~2. Hose~~
3. Blast Tube Support
4. Lock Washer
5. Screw
6. Support Strap
7. Nut
8. Alternator Assy
9. Washer
10. Clamp
11. Clamp Half
12. Bolt
13. Support Strap

Figure 17-7. Model 150 Gear-Driven Alternator Installation



1. Hose
2. Blast Tube Support
3. Clamp
4. Lock Washer
5. Screw
6. Support Strap
7. Nut
8. Alternator Assembly
9. Gear Drive Assembly
10. Washer

Figure 17-8. Model 172 Gear-Driven Alternator Installation



1. Alternator
2. Adjusting Bracket
3. Mounting Bolt
4. Mounting Bracket
5. Drive Belt

1968 & On - Model 172 Only

Figure 17-8A. Model 172 Belt Driven Alternator Installation

SHOP NOTES:

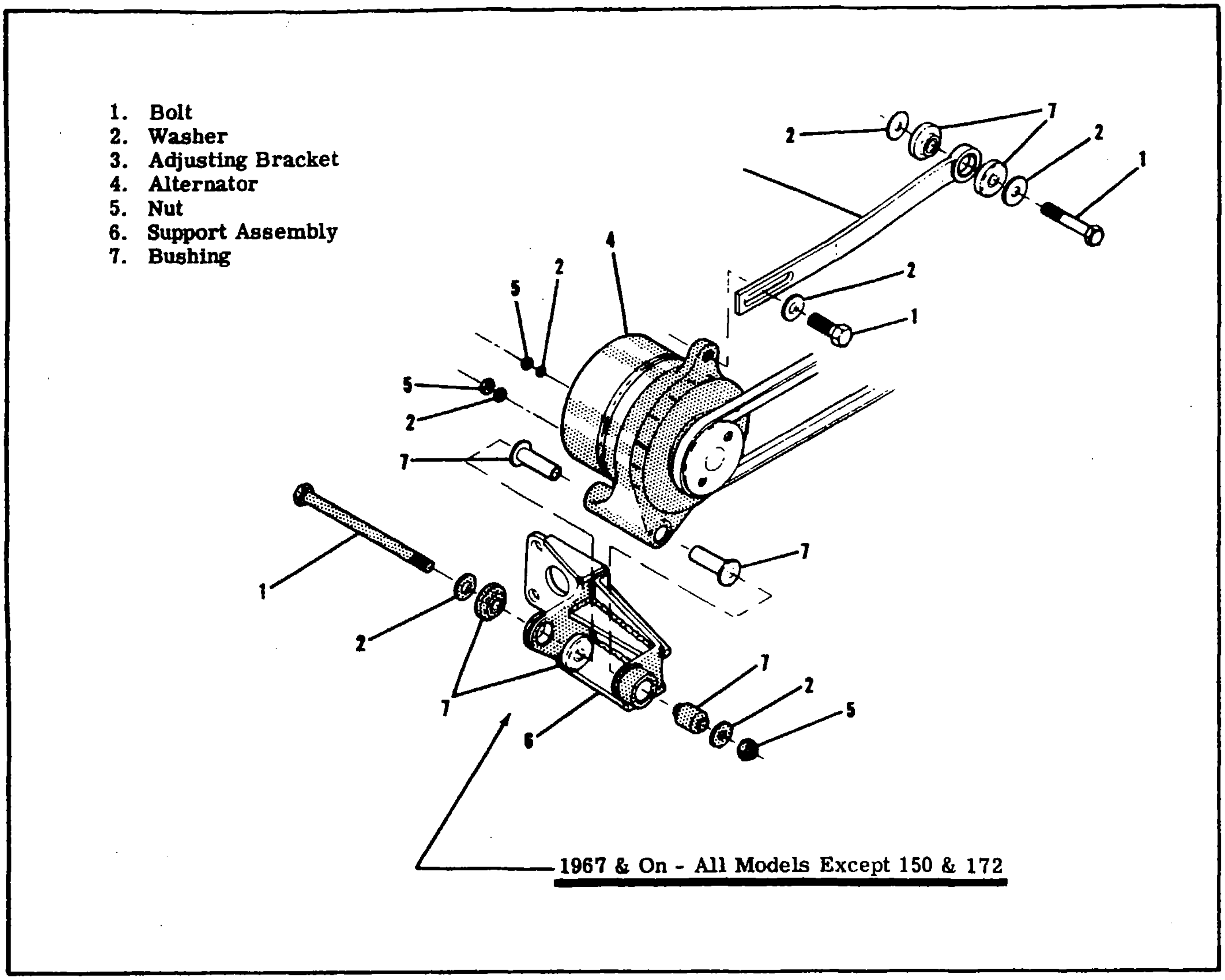


Figure 17-9. Shock-Mounted Alternator Installation

One relay is actuated by the aircraft master switch and connects the regulator to the battery. The second relay is a two-stage voltage regulator which controls the field current to the alternator. The voltage limiter relay vibrates to provide a variable control of the field current depending upon the load. The limiter relay is compensated for temperature variation to provide increased charging during cold weather operation.

17-25. REMOVAL AND REPLACEMENT OF ALTERNATOR ON MODELS 180, 182 AND 185.

a. Make sure the master switch remains in the off position or disconnect the negative lead from the battery.
b. Disconnect the wiring from the alternator.
c. Remove the safety wire from the upper adjusting bolt and remove the bolt from the alternator.
d. Remove the nut and washer from the lower mounting bolt.
e. Remove the alternator drive belt and lower mounting bolt to remove alternator.
f. To replace alternator reverse this procedure.
g. Adjust belt tension to obtain 3/8" deflection at the center of the belt when applying 12 pounds of pressure. After belt is adjusted and the bolt is safety wired, tighten the bottom bolt to 50-70 lb.-lb. torque to remove any play between alternator mounting foot and U shaped support assembly. Whenever a new belt is installed, belt tension should be checked within 10 to 25 hours of operation.

CAUTION

When tightening the alternator belt, apply pry bar pressure only to the end of the alternator nearest to the belt pulley.

17-25A. REMOVAL AND REPLACEMENT OF GEAR-DRIVEN ALTERNATOR.

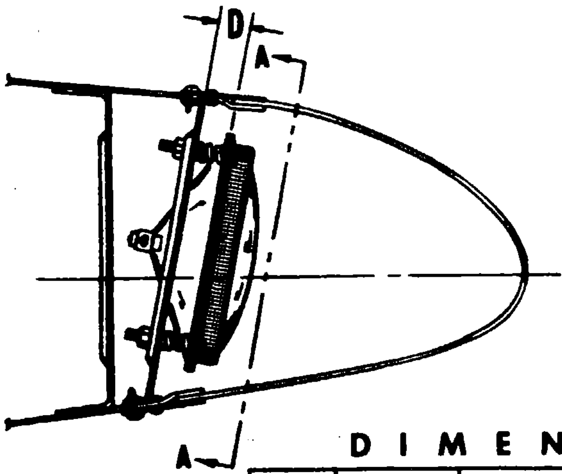
a. Insure that master switch is off and that negative lead is disconnected from battery.
b. Remove wiring from alternator and label.
c. Remove nuts and washers from alternator mounting bolts.
d. Remove alternator.
e. To replace alternator, reverse this procedure.

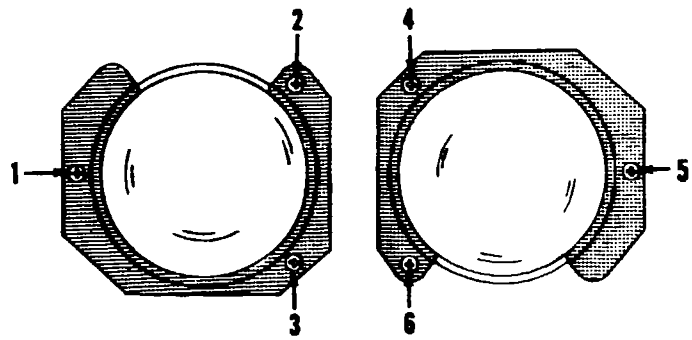
17-26. AIRCRAFT LIGHTING SYSTEM.

17-27. The aircraft lighting equipment consists of landing and taxi lights, navigation lights, flashing and rotating beacon lights, dome and instrument flood lighting, map lighting, instrument post lighting, compass lighting and radio dial lighting.

17-28. TROUBLE SHOOTING THE LIGHTING SYSTEM.

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
LANDING OR TAXI LIGHT OUT.		
Circuit breaker open.	Inspect.	Reset.
Lamp burned out.	Test with voltmeter or new lamp.	Replace lamp.
Defective wiring.	Test circuit for continuity.	Repair wiring.
Defective switch.	Check for continuity.	Replace.
Defective circuit breaker.	Test with voltmeter.	Replace.
ONE NAVIGATION LIGHT OUT.		
Lamp burned out.	Inspect.	Replace lamp.
Defective wiring.	Check continuity.	Replace wiring.
ALL NAVIGATION LIGHTS OUT.		
Circuit breaker open.	Inspect.	Reset.
Faulty switch.	Test for continuity.	Replace.
Defective wiring between circuit breaker and switch.	Test for continuity.	Repair.
ROTATING BEACON WILL NOT OPERATE.		
Circuit breaker open.	Inspect.	Reset breaker.
Defective wiring.	Check continuity of wiring from aircraft bus to rotating beacon plug.	Repair wiring.
Defective beacon.		Repair or replace beacon.
FLASHING BEACON DOES NOT LIGHT.		
Lamp burned out.	Test with new lamp.	Replace lamp.
Circuit breaker open.	Inspect.	Reset.
Faulty Flasher assembly.	Remove and test.	Repair or replace.
Faulty switch or wiring.	Test for continuity.	Repair or replace.
DOME LIGHT TROUBLE.		
Circuit breaker open.	Inspect.	Reset.
Lamp burned out.	Test with new lamp.	Replace lamp.
Faulty switch or wiring.	Test for continuity.	Repair or replace.

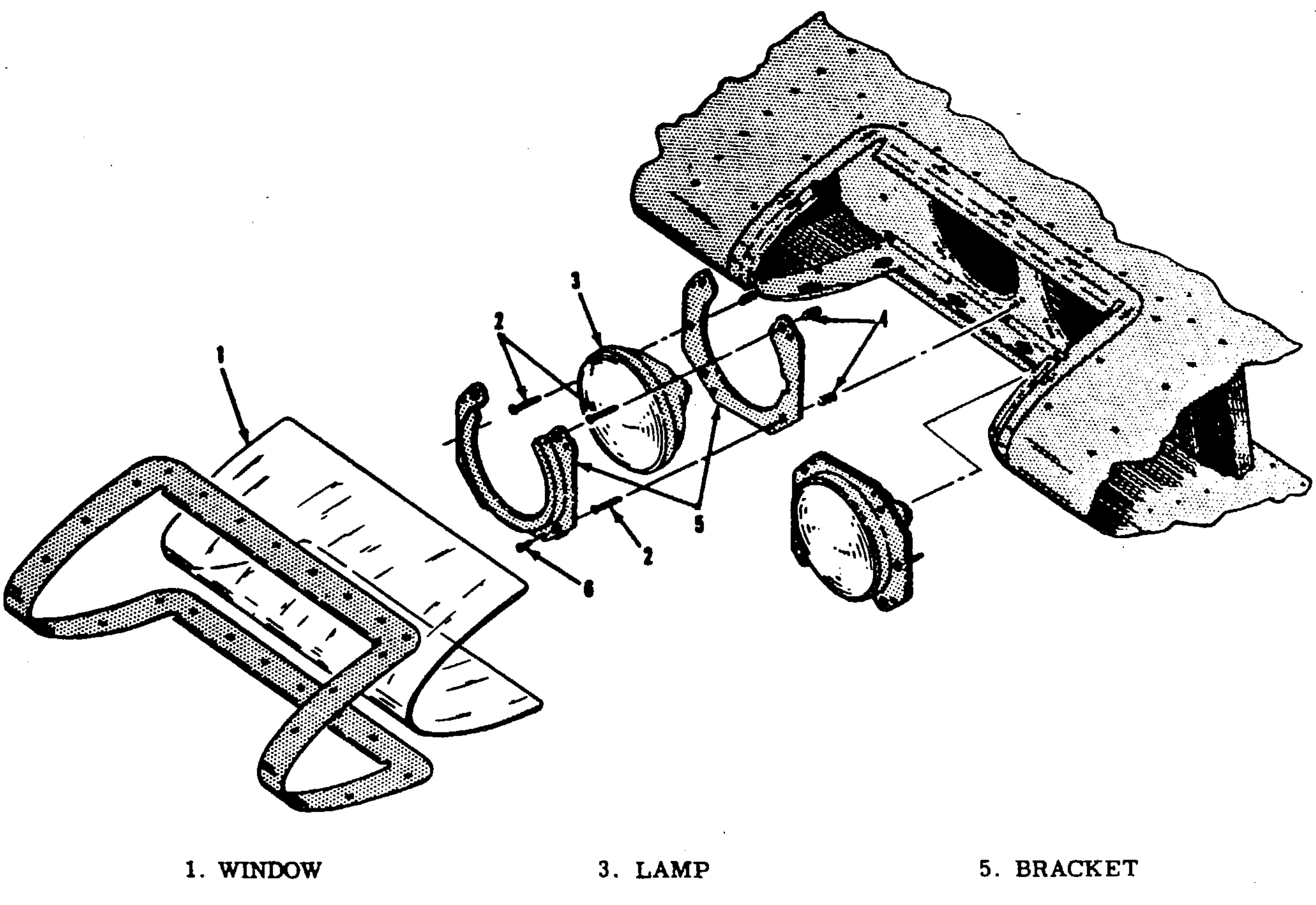




VIEW A-A

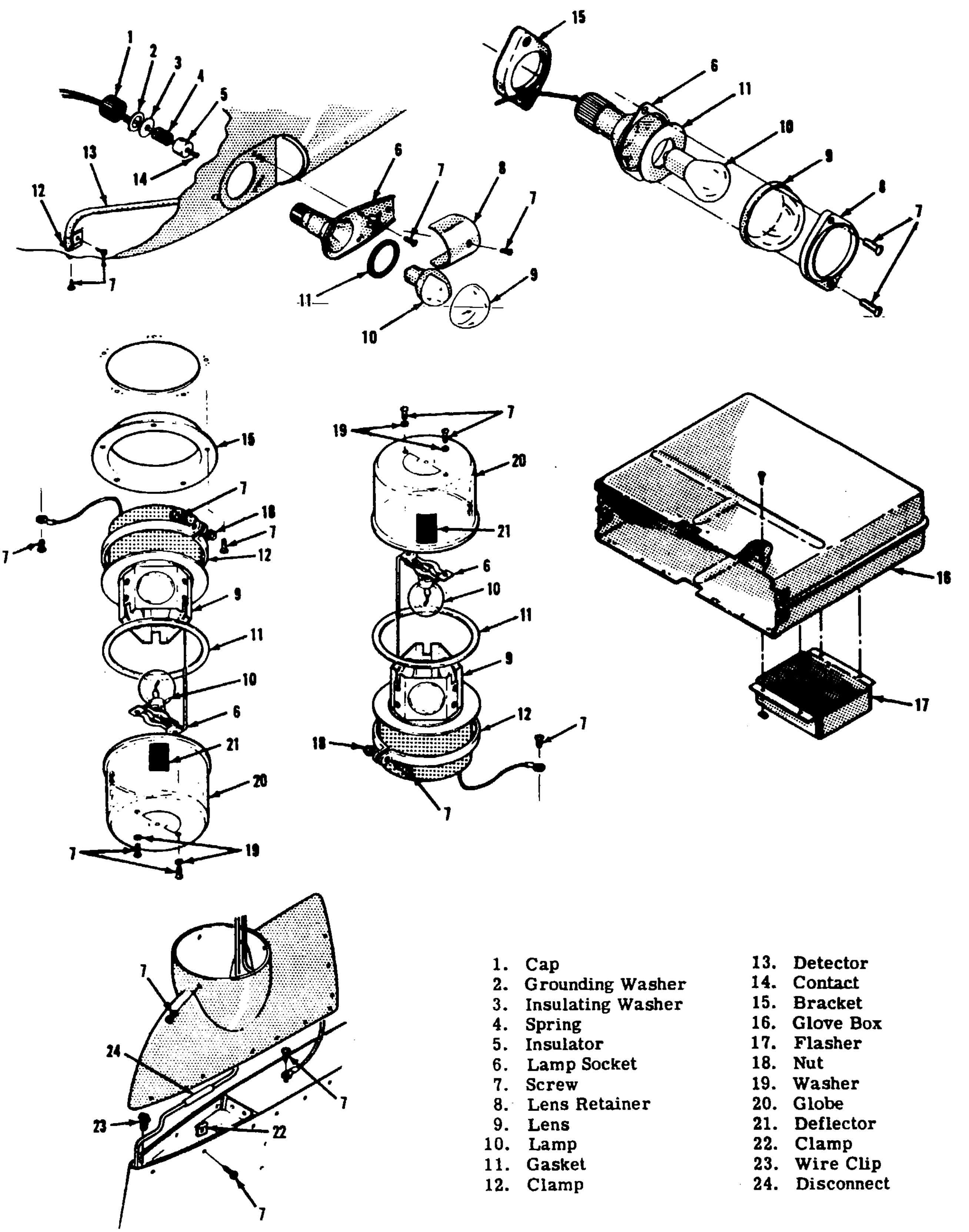
DIMENSION D

NO.	150	172 & P172	180 & 185	182
1	0.68	0.60	0.65	0.68
2	0.50	0.70	0.65	0.60
3	0.75	0.90	0.70	0.95
4	0.50	0.50	0.70	0.60
5	1.18	1.08	1.15	1.16
6	0.95	0.85	0.60	0.95



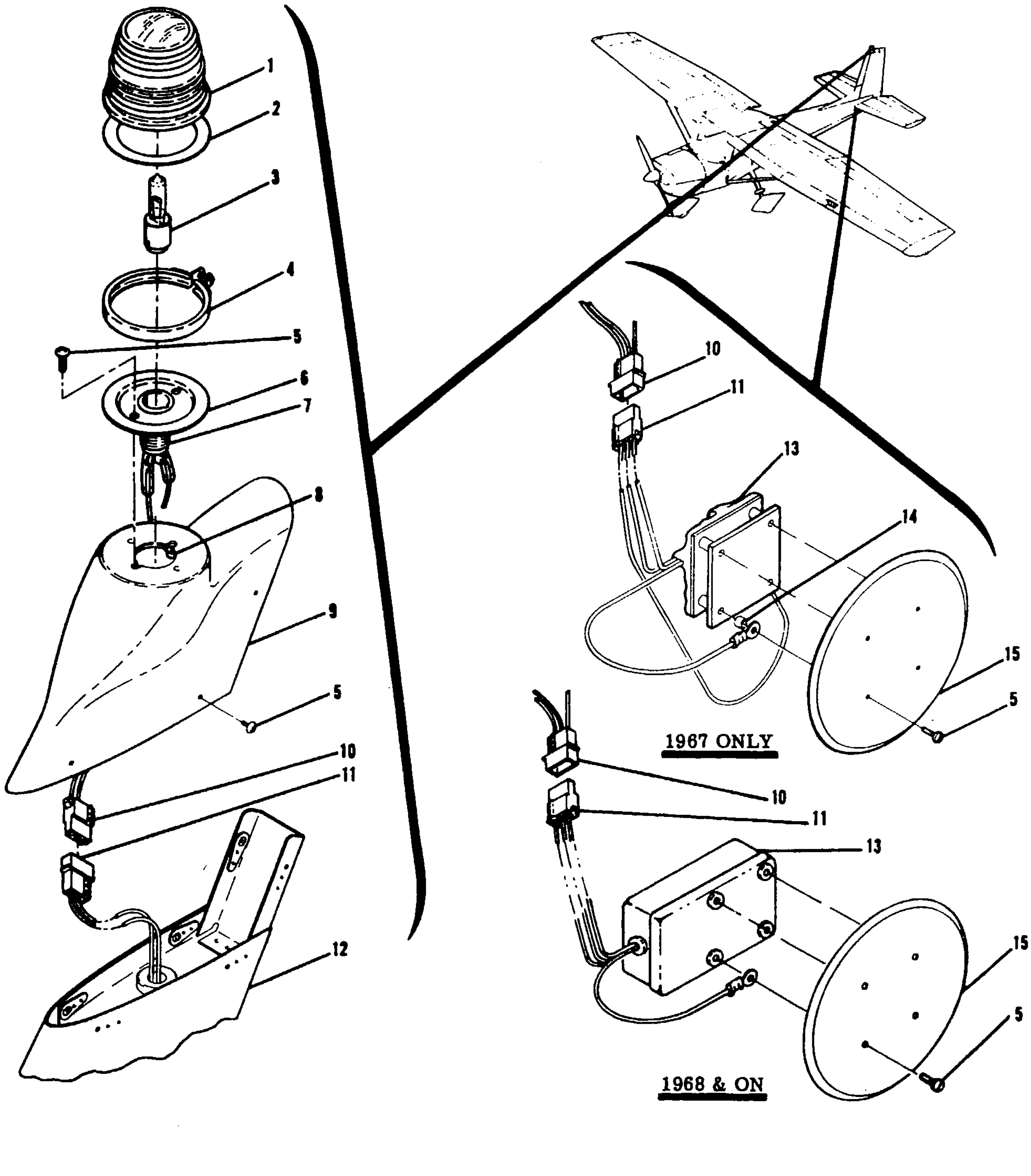
1. WINDOW
2. ADJUSTING SCREW
3. LAMP
4. SPRING
5. BRACKET
6. SCREW

Figure 17-10. Landing and Taxi Light Installation & Adjustment



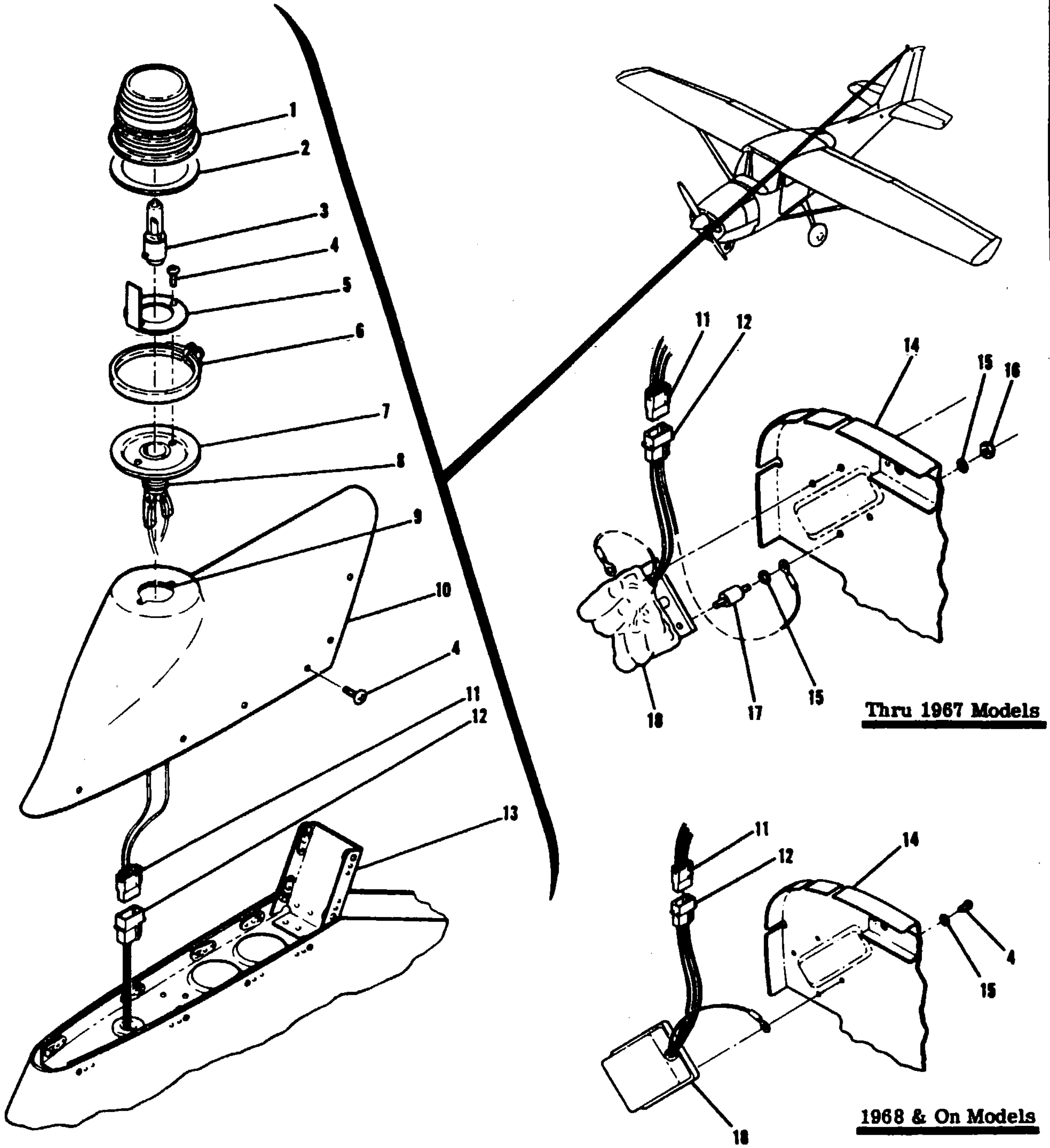
1. Cap
2. Grounding Washer
3. Insulating Washer
4. Spring
5. Insulator
6. Lamp Socket
7. Screw
8. Lens Retainer
9. Lens
10. Lamp
11. Gasket
12. Clamp
13. Detector
14. Contact
15. Bracket
16. Glove Box
17. Flasher
18. Nut
19. Washer
20. Globe
21. Deflector
22. Clamp
23. Wire Clip
24. Disconnect

Figure 17-11. Navigation Lights and Rotation Beacon Installation



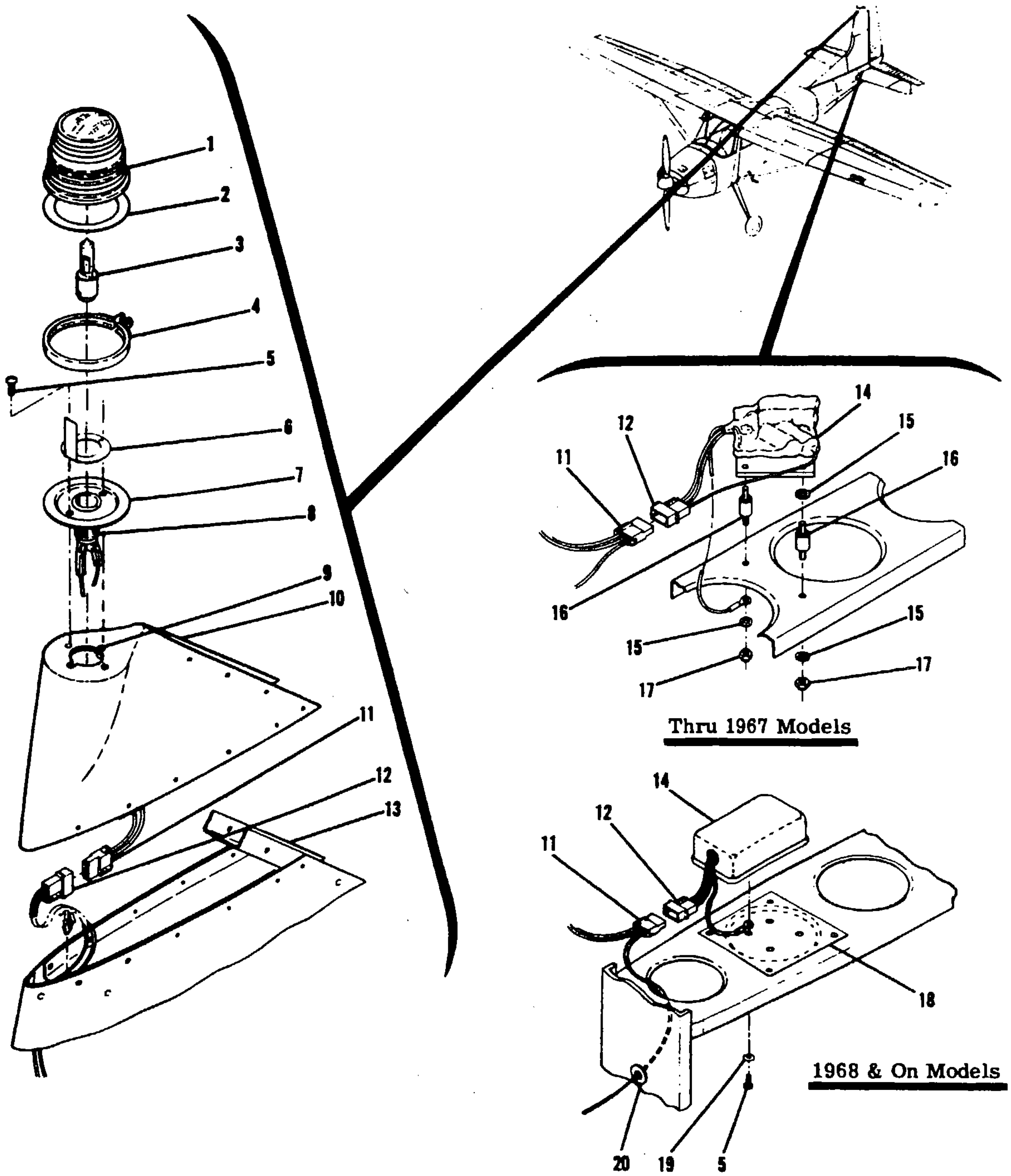
1. Dome
2. Gasket
3. Lamp
4. Clamp Assembly
5. Screw
6. Plate - Mounting
7. Socket Assembly
8. Nutplate
9. Tip Assembly - Fin
10. Housing - Plug
11. Housing - Cap
12. Fin Assembly
13. Flasher Assembly
14. Spacer
15. Inspection Plate

Figure 17-12. Model 150 Flashing Beacon Light Installation (Sheet 1 of 4)



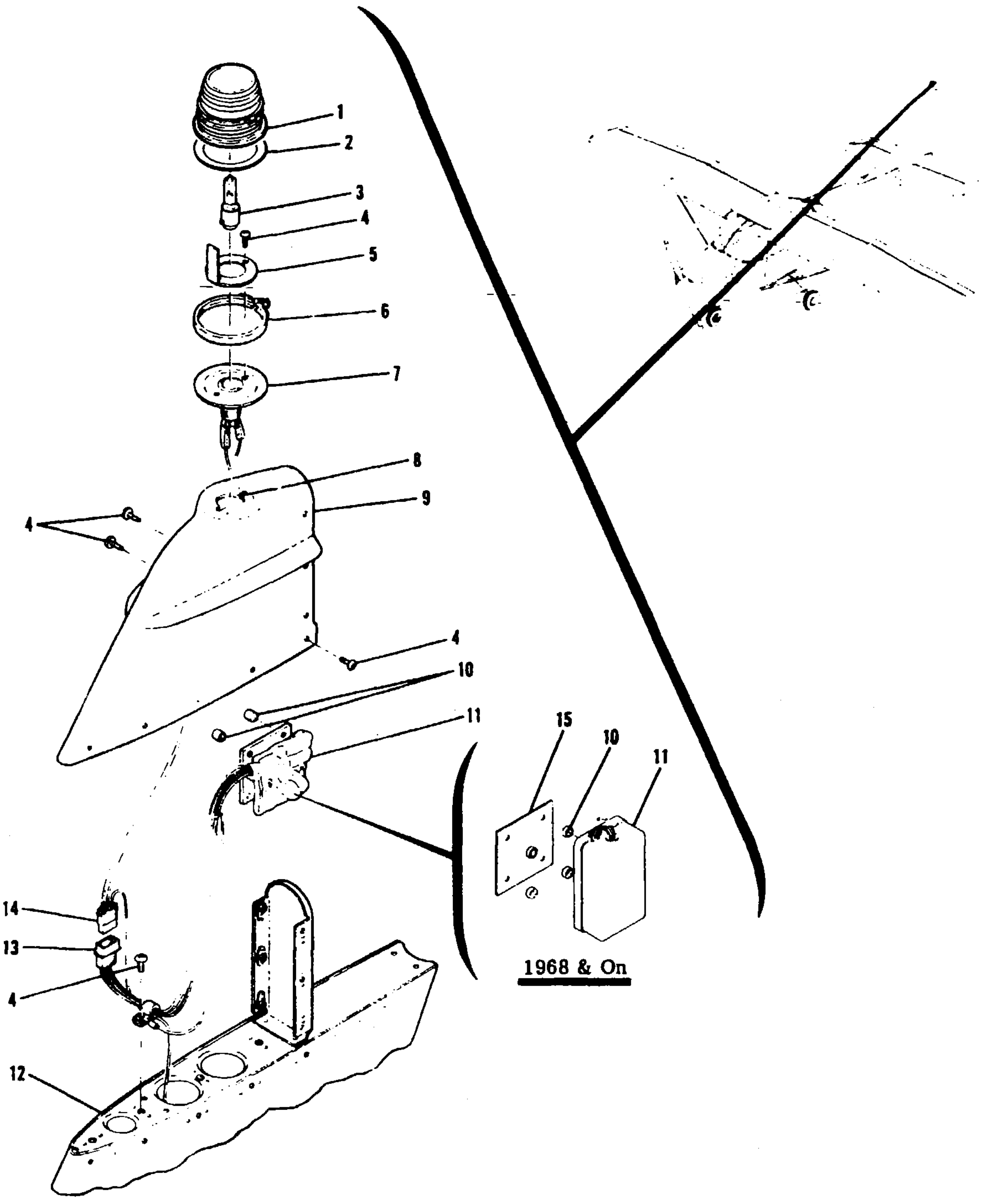
1. Dome
2. Gasket
3. Lamp
4. Screw
5. Baffle
6. Clamp Assembly
7. Plate - Mounting
8. Socket Assembly
9. Nut Plate
10. Tip Assembly - Fin
11. Housing - Plug
12. Housing - Cap
13. Fin Assembly
14. Bulkhead
15. Lock Washer
16. Nut
17. Shock Mount
18. Flasher Assembly

Figure 17-12. Model 172 Flashing Beacon Light Installation (Sheet 2 of 4)



1. Dome
2. Gasket
3. Lamp
4. Clamp Assembly
5. Screw
6. Baffle
7. Plate-Mounting
8. Socket
9. Nut Plate
10. Tip Assembly - Fin
11. Housing - Plug
12. Housing - Cap
13. Fin Assembly
14. Flasher Assembly
15. Lock Washer
16. Shock Mount
17. Nut
18. Plate
19. Washer
20. Grommet

Figure 17-12. Model 180-185 Flashing Beacon Light Installation (Sheet 3 of 4)



1. Dome
2. Gasket
3. Lamp
4. Screw
5. Baffle
6. Clamp Assembly
7. Socket Assembly
8. Nutplate
9. Tip Assembly - Fin
10. Spacer
11. Flasher Assembly
12. Fin Assembly
13. Housing - Cap
14. Housing - Plug
15. Plate

Figure 17-12. Model 182 Flashing Beacon Light Installation (Sheet 4 of 4)

17-28. TROUBLE SHOOTING THE LIGHTING SYSTEM. (Cont)

PROBABLE CAUSE	ISOLATION PROCEDURE	REMEDY
MAP OR INSTRUMENT FLOOD LIGHT TROUBLE.		
Lamp burned out.	Test with new lamp.	Replace.
Circuit breaker open.	Inspect.	Reset.
Rheostat open.	Test for continuity.	Replace.
Faulty wiring.	Test for continuity.	Repair.
Faulty circuit breaker.	Test with voltmeter.	Replace.
ONE OR TWO POST LIGHTS OUT.		
Burned out lamp.	Test with new lamp.	Replace lamp.
Faulty lamp socket or wiring.	Test with voltmeter.	Repair or replace.
ALL POST LIGHTS, COMPASS LIGHT AND RADIO DIAL LIGHTS OUT IN CIRCUIT.		
Circuit breaker open.	Inspect.	Reset.
Faulty section in dropping rheostat.	Lights will work when knob is placed in brighter position.	Replace rheostat.
Faulty wiring.	Test for continuity.	Repair wiring.
CONTROL WHEEL MAP LIGHT.		
Faulty circuit breaker.	Test for continuity.	Replace breaker.
Faulty wiring between circuit breaker and circuit board.	Check for approximately 13 volts dc at terminal 7 of terminal block under control wheel.	Repair or replace wiring.
Faulty circuit board.	Voltage check above will show if voltage is present.	Replace.

17-28A. LANDING AND TAXI LIGHTS. 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 lamp is mounted on the inboard side and adjusted to throw its beam further forward than the taxi light. Both lights are controlled by a single switch.

17-28B. REMOVAL AND REPLACEMENT OF LANDING AND TAXI LIGHTS. (See figure 17-10.)

a. Remove the 18 screws securing the landing light window assembly (1) and the assembly will then be free for removal.

b. 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 17-10.

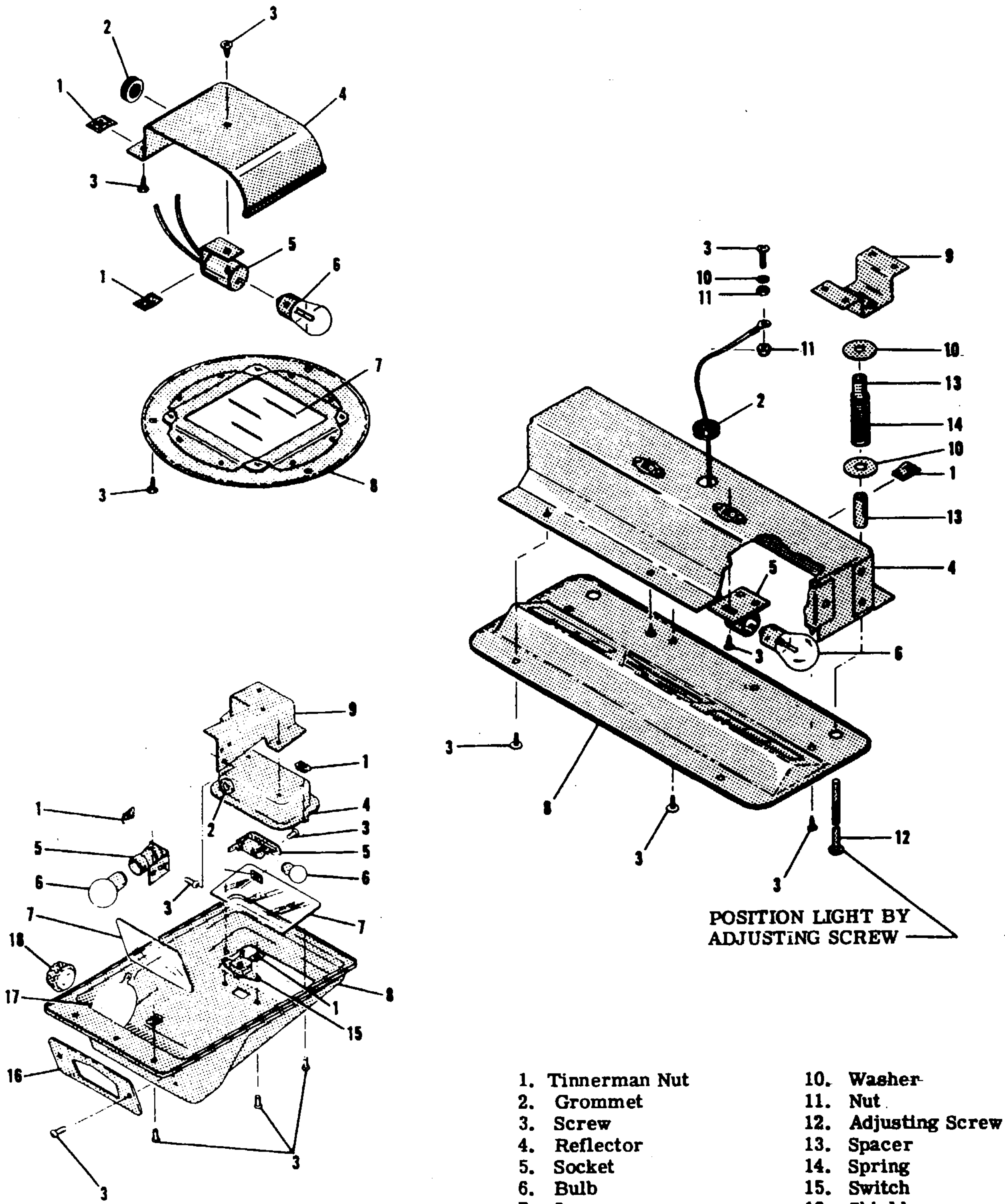
c. Remove the two screws securing the wiring to the lamp contacts and remove the lamp.

d. Install new lamp and reassemble.

17-28C. NAVIGATION LIGHTS. The navigation lights are located on each wing tip and the top edge of the vertical fin. The lights are controlled by a pull type switch located on the instrument panel.

17-28D. REMOVAL AND REPLACEMENT OF NAVIGATION LIGHTS. For removal and replacement of navigation lights refer to figure 17-11.

17-28E. ROTATING BEACON. The rotating beacon contains a small motor which rotates a shutter containing three lens openings around a single bulb to give a flashing warning of the aircraft's position. The beacon is installed in a fiberglass mounting atop the vertical fin on all models thru 1966.



1. Tinnerman Nut
2. Grommet
3. Screw
4. Reflector
5. Socket
6. Bulb
7. Lens
8. Cover
9. Bracket
10. Washer
11. Nut
12. Adjusting Screw
13. Spacer
14. Spring
15. Switch
16. Shield
17. Rheostat
18. Knob

Figure 17-13. Instrument, Map & Utility Lighting

1. Nut
2. Washer
3. Grommet
4. Adjustment Screw
5. Maplight Assembly
6. Socket Assembly
7. Lamp
8. Red Lamp
9. Lens
10. Hood
11. Screw
12. Front Doorpost Shield
13. Maplight Switch
14. Nut

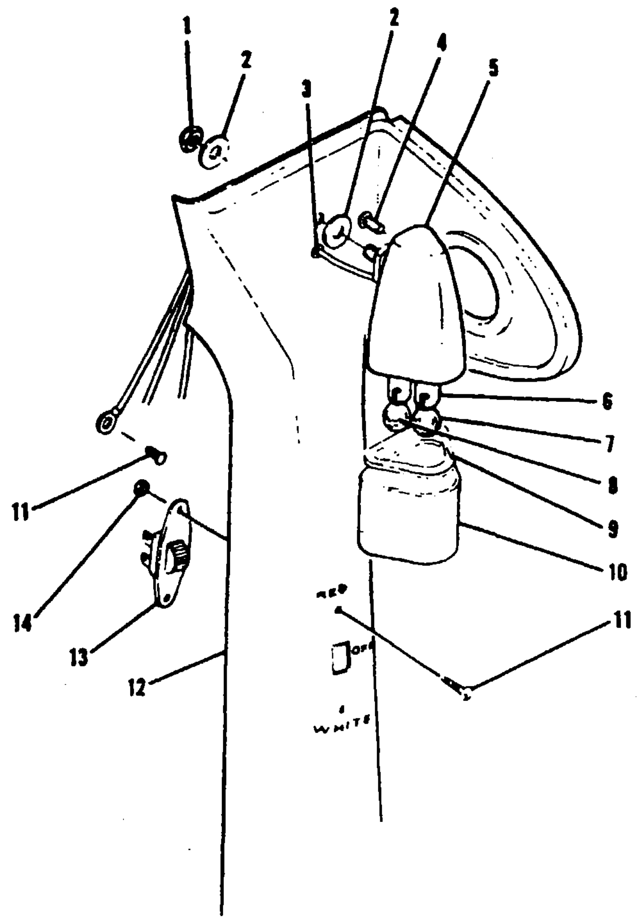


Figure 17-14. Map Light Installation

17-28F. REMOVAL AND REPLACEMENT OF ROTATING BEACON. For removal and replacement of the rotating beacon refer to figure 17-11.

17-28G. FLASHING BEACON. All 1967 models and on have a flashing beacon light 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 tail cone on 150, 172, 180 and 185 models and in the vertical fin on 182 models. The switching frequency of the flasher assembly operates the beacon at approximately 45 flashes per minute.

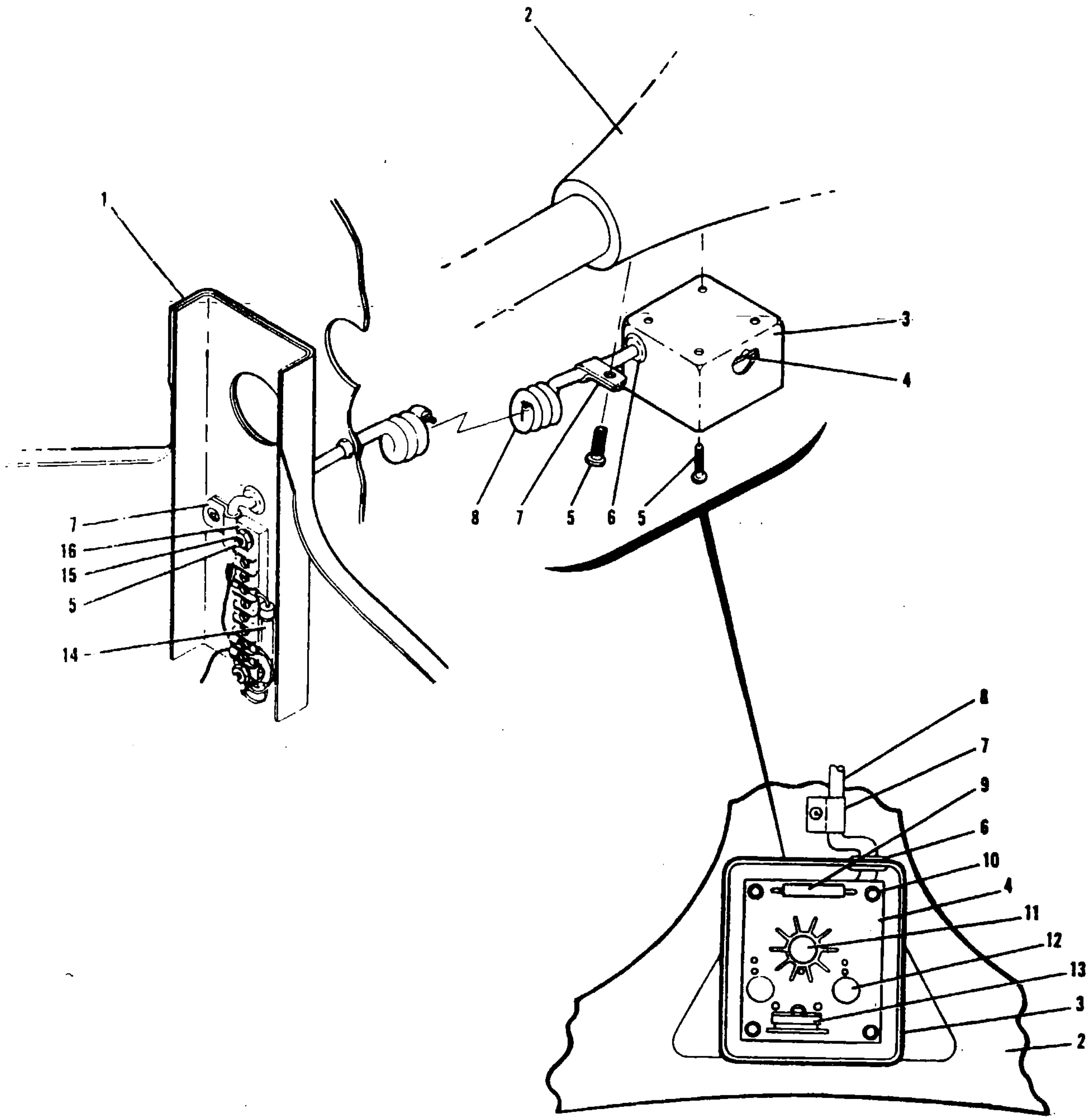
17-28H. REMOVAL AND REPLACEMENT OF FLASHING BEACON LIGHT. For removal and replacement of the flashing beacon refer to figure 17-12.

17-28J. OVERHEAD CONSOLE. On Models 150, 172, 180 and 185 the interior lights console contains a dome light and an instrument light that provide cabin lighting and red, non-glare instrument flood lighting. The dome light consists of a frosted lens and a single bulb controlled by a switch located in the center of the console. The instrument flood light consists of a red lens and a single bulb that is controlled by a dimming rheostat mounted on the right side of the console.

The Model 182 overhead console contains a map light and an instrument flood light. The intensity of the instrument flood light is controlled by a rheostat mounted on the instrument panel. The map light can be exposed by moving the slide covers from the opening holes on the console.

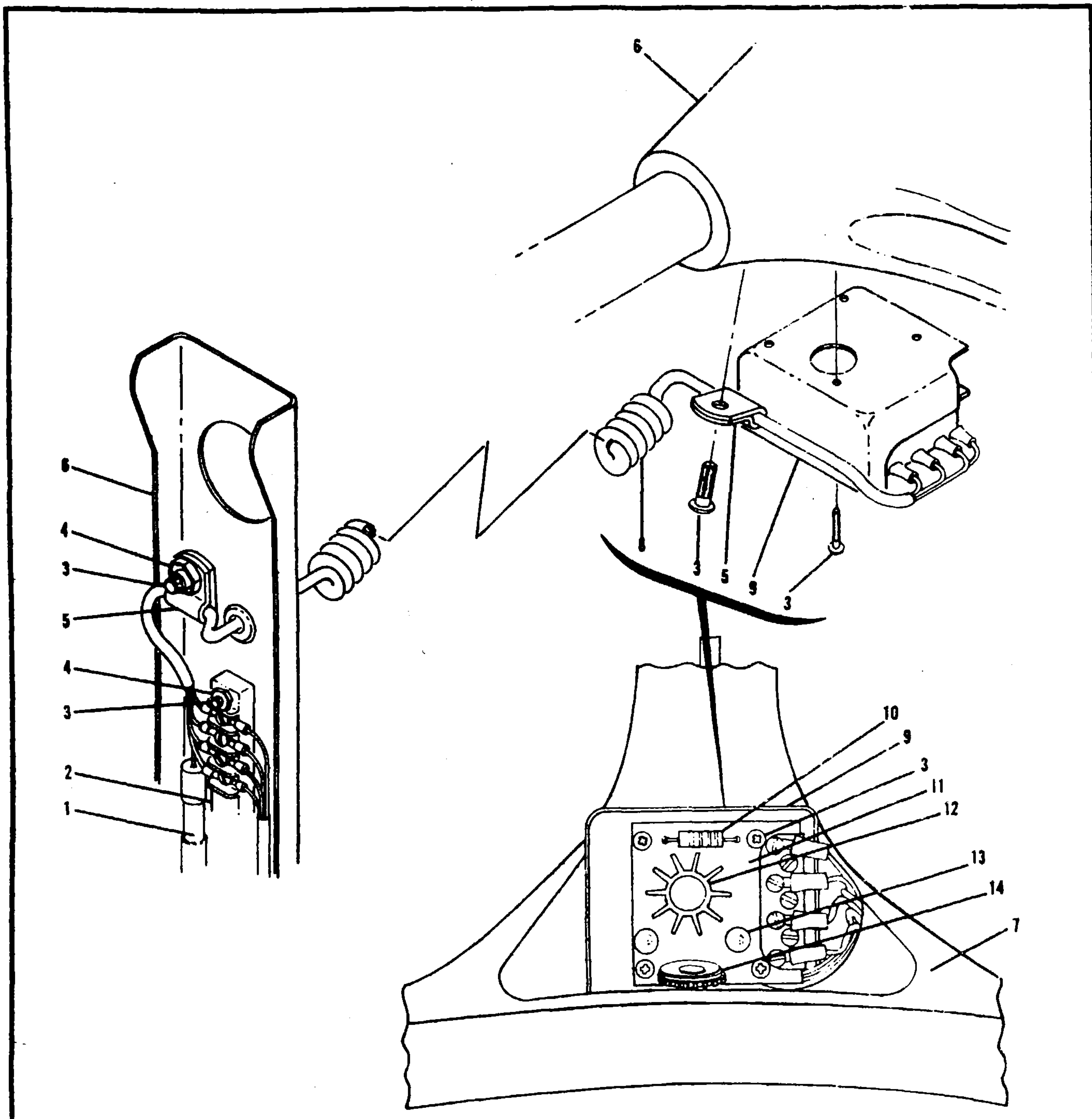
17-28K. REMOVAL AND REPLACEMENT OF OVERHEAD CONSOLE. For removal and replacement of the overhead console refer to figure 17-13.

17-28L. MAP LIGHTING. White map lighting and red, non-glare instrument lighting are provided by an adjustable light mounted on the forward part of the left door post. The switch is a three position type with red, white and off positions. The map light contains a white bulb for general purpose lighting and a red bulb for adjustable instrument lighting. The intensity of the red bulb is controlled by the instrument light dimming rheostat on the overhead console.



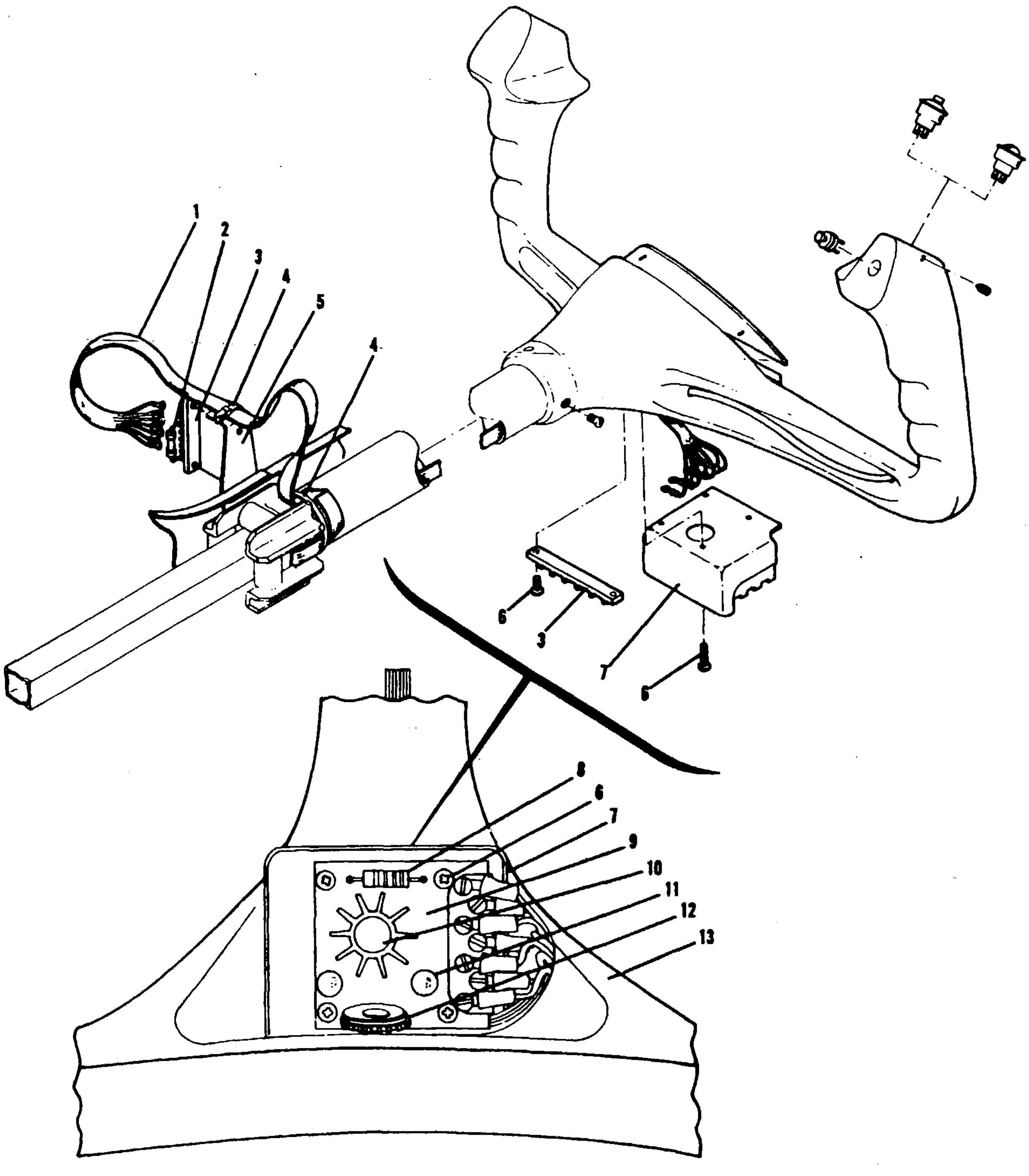
1. Stationary Panel Assembly
2. Control Wheel Assembly
3. Shield
4. Circuit Board
5. Screw
6. Grommet
7. Clamp
8. Cable Assembly
9. Resistor
10. Stand-Off
11. Diode
12. Light
13. Rheostat
14. 1/2 Amp - Fuse Assembly
15. Nut
16. Terminal Block

Figure 17-15. Control Wheel Map Light Installation - Model 172 Only



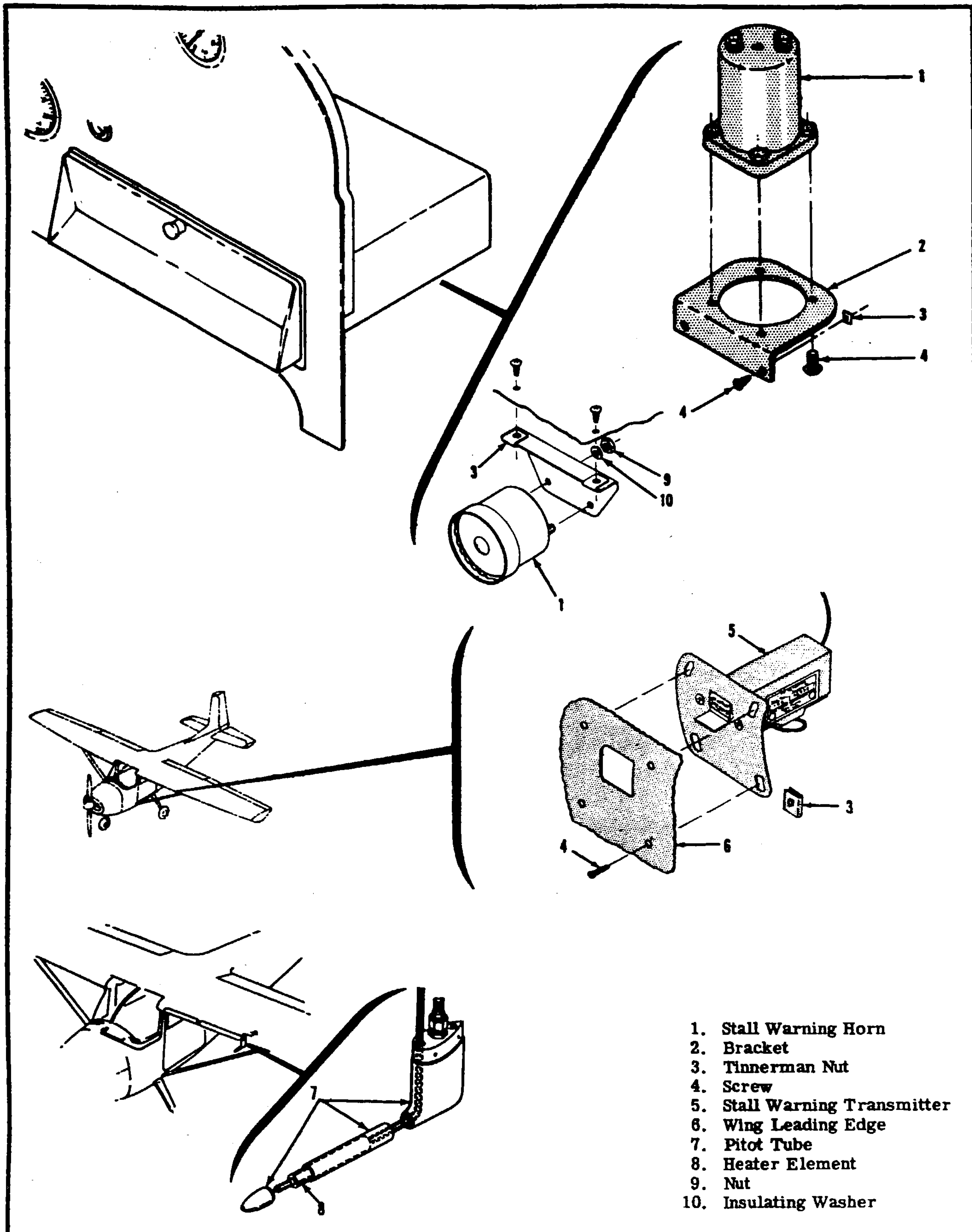
1. 1/2 Amp - Fuse Assembly
2. Terminal Block
3. Screw
4. Nut
5. Clamp
6. Stationary Panel Assembly
7. Control Wheel Assembly
8. Cable Assembly
9. Shield
10. Resistor
11. Circuit Board
12. Diode
13. Light
14. Rheostat

Figure 17-16. Control Wheel Map Light Installation - Models 180 & 185 Only



1. Cable Assembly
2. 1/2 Amp - Fuse Assembly
3. Terminal Block
4. Sta-Strap
5. Bracket
6. Screw
7. Shield
8. Resistor
9. Circuit Board
10. Diode
11. Light
12. Rheostat
13. Control Wheel Assembly

Figure 17-17. Control Wheel Map Light Installation - Model 182 Only



1. Stall Warning Horn
2. Bracket
3. Tinnerman Nut
4. Screw
5. Stall Warning Transmitter
6. Wing Leading Edge
7. Pitot Tube
8. Heater Element
9. Nut
10. Insulating Washer

Figure 17-18. Stall Warning & Pitot Heater Systems

17-28M. REMOVAL AND REPLACEMENT OF MAP LIGHT. (See figure 17-14.)

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 doorpost 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.

17-28N. INSTRUMENT POST LIGHTING. Individual post lights may be installed as optional equipment for Cessna white, non-glare instrument lighting. The post light consists of a cap and clear lamp assembly with a tinted lens. The intensity of the instrument post lights is controlled by the radio light dimming rheostat mounted on the lower left side of the instrument panel.

17-28P. REMOVAL AND REPLACEMENT OF POST LIGHTS. For removal of the post lamp slide the cap and lens assembly from the base. Slide the lamp from the socket and replace.

17-28Q. COMPASS AND RADIO DIAL LIGHTING. The compass and radio dial lights are contained within the individual units. The light intensity is controlled by the radio light dimming rheostat, mounted on the lower left side of the instrument panel on 182 models and on the overhead console on 150, 172, 180 and 185 models.

17-28R. CONTROL WHEEL MAP LIGHT. An optional control wheel map light may be installed on all 1968 models except the Model 150. 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.

17-28S. REMOVAL AND REPLACEMENT OF CONTROL WHEEL MAP LIGHT ASSEMBLY. (See figures 17-15, 17-16 & 17-17.)

a. For easy access of 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.

17-29. STALL WARNING SYSTEM.

17-30. The stall warning circuit is comprised of a warning horn and an actuating switch. The switch is installed in the leading edge of the left wing and is actuated by airflow over the surface of the wing. The switch will close as a stall condition is approached, actuating the warning horn which is mounted on the glove box. The stall warning unit should actuate the stall warning horn approximately five to ten miles per hour above airplane stall speed. Install the lip of the warning unit approximately one-sixteenth of an inch below the center line of the wing skin cut-out. Test fly the aircraft to determine if the unit actuates the warning horn at the desired speed. If the unit actuates the horn at a speed in excess of ten miles per hour above stall speed, loosen the mounting screws and move the unit down. If the unit actuates the horn five miles an hour below stall speed, loosen the screws and move the unit up.

On 150 Models 1966 & on, 172, 180 & 185 Models 1967 & on, these aircraft have incorporated a reed type horn which is actuated directly by airflow ducted from the wing leading edge. The system is described in Section 16, paragraph 16-53A. No heating provisions are used.

17-31. PITOT AND STALL WARNING HEATER CIRCUITS.

17-32. Electrical heater units are incorporated in some pitot tubes and stall warning switch units. The heaters offset the possibility of ice formations on the pitot tube and stall warning actuator switch. The heaters are integrally mounted in the pitot tube and stall warning actuator switch. Both heaters are controlled by the pitot heat switch.

17-33. CIGAR LIGHTER. Some aircraft are equipped with an extra circuit protection device in addition to the primary circuit breaker. The cigar lighter may have a special thermal-actuated cutout which is attached to the rear of the cigar lighter socket. The cutout will open the circuit if the lighter becomes jammed in the socket or held in the heat position too long. The cutout may be reset by inserting a small rod through the small hole in the cutout and pressing the spring into reset position.

ELECTRICAL LOAD ANALYSIS CHART

FOR ALL 1964 & 1965 MODELS

ELECTRICAL EQUIPMENT	AMPS REQD				
	150	172	180	182	185
Battery Contactor	0.8	0.8	0.8	0.8	0.8
Carburetor Air Temperature Indicator		0.03	0.03	0.03	0.03
Cigarette Lighter	10.0	10.0	10.0	10.0	10.0
Clock			Negligible		
Courtesy Lights and Cabin Lights				3.3	
Courtesy Lights and Dome Light	2.5	2.5	2.5		2.5
Cylinder Head Temperature Indicator		0.18	0.18	0.18	0.18
Flap Motor		15.0		15.0	15.0
Flap Position Indicator		0.26		0.26	
Fuel Quantity Indicators	0.36	0.36	0.36	0.36	0.36
Generator Light	0.4	0.4			
Heaters, Stall Warning & Pitot	8.6	8.6	8.6	8.6	8.6
H. F. Antenna Reel Motor		14.0	14.0	14.0	14.0
Instrument Lights:					
Cluster (1965 & on only)			0.3	0.3	0.3
*Console	1.1	1.1	1.1	2.0	1.1
Compass				0.08	
Landing Lights	15.6	15.6	15.6	15.6	15.6
Map Light		0.33	0.33	0.33	0.33
Navigation Light	5.6	5.6	5.6	5.6	5.6
Oil Dilution System		1.0	1.0	1.0	1.0
Pictorial Gyro Indicator Lights (1964 only)		0.08		0.08	
*Post Lighted Panel Installation (1965 & on only)				1.6	
Rotating Beacon	4.8	4.8	4.8	4.8	4.8
Stall Warning Horn	.25	.25	.25	.25	.25
Turn & Bank Indicator	0.2	0.2	0.2	0.2	0.2
Vertical Adjusting Seats				20.0	
Cessna ADF 300 (Type R-521)	1.6	1.6	1.6	1.6	1.6
Cessna ADF 500 (Type R-318-1964 Only)				4.3	
Cessna ADF 500 (Type R-318-1965 Only)			4.3	4.3	4.3
Cessna Marker Beacon 300 (Type R-521-1964 Only)	0.2	0.2	0.2	0.2	0.2
Cessna Marker Beacon 300 (Type R-521-1965 Only)	0.17	0.17	0.17	0.17	0.17
Cessna Nav/Com 300 (Type RT-513)	6.5	6.5	6.5	6.5	6.5
Cessna 1 1/2 Nav/Com 300 & 300R (Types RT-514A & RT-514R)	4.5	4.5	4.5	4.5	4.5
Cessna Nav/Com 500 (Type RT-317)			5.2	5.2	5.2
Cessna Nav/Omni 500 (Type R-319)			7.0	7.0	7.0
Cessna Nav-O-Matic 200 Autopilot	2.0	2.0	2.0	2.0	2.0
Cessna Nav-O-Matic 300 Autopilot		2.0	2.0	2.0	2.0
Cessna Transceiver 500 (Type RT-302A-1964 Only)				5.0	
Cessna Transceiver 500 (Type RT-302G & H-1965 Only)			5.2	5.2	5.2
King KA-10 Isolation Amplifier	0.5	0.5	0.5	0.5	0.5
King KN-60 DME		5.0	5.0	5.0	5.0
King KX-120 with KI-200 Indicator		6.4	6.4	6.4	6.4
King KX-150A & KX-150AE	6.0	6.0	6.0	6.0	6.0
King KY-95	4.0	4.0	4.0	4.0	4.0
Narco Mark IV Superhomer	4.0	4.0			
Narco Mark XII with VOA-4, -5, or -6 Indicator	5.2	5.2	5.2	5.2	5.2
Narco UDI-2 DME Receiver			7.5	7.5	7.5
Narco UGR-1A Glideslope Receiver		2.5	2.5	2.5	2.5
Pantronics DX10-D		5.8	5.8	5.8	5.8
Sunair T-5-DA			4.7	4.7	4.7

*A switching arrangement prevents the console lights from being operated at the same time the post lights are operated.

ELECTRICAL LOAD ANALYSIS CHART

FOR ALL 1966 MODELS

ELECTRICAL EQUIPMENT	AMPS REQD				
	150	172	180	182	185
Battery Contactor	0.6	0.6	0.6	0.6	0.6
Carburetor Air Temperature Indicator		0.03	0.03	0.03	0.03
Cigarette Lighter	10.0	10.0	10.0	10.0	10.0
Clock		Negligible			
Courtesy Lights and Cabin Lights				3.3	
Courtesy Lights and Dome Light	2.5	2.5	2.5		2.5
Cylinder Head Temperature Indicator			0.2	0.2	0.2
Flap Motor	15.0	15.0		15.0	
Flap Position Indicator		0.1		0.1	
Fuel Quantity Indicators	0.33	0.33	0.33	0.33	0.33
Generator Light	0.4	0.4			
Heaters, Stall Warning & Pitot	8.6	8.6	8.6	8.6	8.6
H. F. Antenna Reel Motor		14.0	14.0	14.0	14.0
Instrument Lights:					
Cluster			0.3	0.3	0.3
*Console	1.1	1.1	1.1	2.0	1.1
Compass	0.1	0.1	0.1	0.1	0.1
Landing Lights	15.6	15.6	15.6	15.6	15.6
Map Light	0.33	0.33	0.33	0.33	0.33
Navigation Light	5.6	5.6	5.6	5.6	5.6
Oil Dilution System		1.0	1.0	1.0	1.0
*Post Lighted Panel Installation				1.6	
Rotating Beacon	4.0	4.0	4.0	4.0	4.0
Stall Warning Horn		.25	.25	.25	.25
Turn & Bank Indicator	0.2	0.2	0.2	0.2	0.2
Vertical Adjusting Seats				20.0	
Bendix ADF-T12C	0.8	0.8	0.8	0.8	0.8
Cessna ADF 300 (Type R-521)	1.6	1.6	1.6	1.6	1.6
Cessna ADF 500 (Type R-318)			4.3	4.3	4.3
Cessna Marker Beacon 300 (Type R-521)	0.17	0.17	0.17	0.17	0.17
Cessna 1 1/2 Nav/Com 300 & 300R (Types RT-516A & RT-515R)	4.5	4.5	4.5	4.5	4.5
Cessna Nav/Com 500 (Type RT-317)			5.2	5.2	5.2
Cessna Nav/Omni 300 (Type RT-525)	5.0	5.0	5.0	5.0	5.0
Cessna Nav/Omni 500 (Type R-319)			7.0	7.0	7.0
Cessna Nav-O-Matic 200 Autopilot	2.0	2.0	2.0	2.0	2.0
Cessna Nav-O-Matic 300 Autopilot		2.0	2.0	2.0	2.0
Cessna Nav-O-Matic 400 Autopilot		3.0	3.0	3.0	3.0
Cessna Transceiver 500 (Type RT-302)			5.2	5.2	5.2
King KA-10 Isolation Amplifier	0.5	0.5	0.5	0.5	0.5
King KN-60 DME		5.0	5.0	5.0	5.0
King KX-150B & KX-150BE	4.7	4.7	4.7	4.7	4.7
King KX-160E	3.0	3.0	3.0	3.0	3.0
King KY-95	4.0	4.0	4.0	4.0	4.0
Pantronics DX10-DA		6.5	6.5	6.5	6.5

*A switching arrangement prevents the console lights from being operated at the same time the post lights are operated.

ELECTRICAL LOAD ANALYSIS CHART

FOR ALL 1967 MODELS

ELECTRICAL EQUIPMENT	AMPS REQD				
	150	172	180	185	182
Battery Contactor	0.6	0.6	0.6	0.6	0.6
Carburetor Air Temperature Indicator		0.03	0.03		0.03
Cigar Lighter	10.0	10.0	10.0	10.0	10.0
Clock	Negligible				
Courtesy Lights and Dome Lights		2.5	2.5	2.5	3.3
Cylinder Head Temperature Indicator			0.2	0.2	0.2
Flap Motor	15.0	15.0			15.0
Flap Position Indicator		0.1			0.1
Flashing Beacon	7.0	7.0	7.0	7.0	7.0
Fuel Quantity Indicators	0.4	0.4	0.4	0.4	0.4
Heater, Pitot	6.5	6.5			
Heater, Stall Warning & Pitot			10.0	10.0	10.0
H. F. Antenna Reel Motor		14.0	14.0	14.0	14.0
Instrument Lights:					
Cluster			0.3	0.3	0.3
*Console	1.1	1.1	1.1	1.1	2.0
Compass	0.1	0.1	0.1	0.1	0.1
Landing Lights	15.6	15.6	15.6	15.6	15.6
Map Light		0.33	0.33	0.33	0.33
Navigation Lights	5.6	5.6	5.6	5.6	5.6
Oil Dilution System			1.0	1.0	1.0
*Post Lighted Panel Installation					2.0
Stall Warning Horn			.25	.25	.25
Turn and Bank Indicator	0.2	0.2	0.2	0.2	0.2
Cessna ADF 300 (Type R-521)	1.6	1.6	1.6	1.6	1.6
Cessna ADF 500 (Type R-318)			4.2	4.2	4.2
Cessna DME 300 (Type KN-60)		5.0	5.0	5.0	5.0
Cessna Marker Beacon 300 (Type R-502B)	0.02	0.02	0.02	0.02	0.02
Cessna 1 1/2 Nav/Com 300R (Types RT-515R-1 & RT-517R)	5.5	5.5	5.5	5.5	5.5
Cessna Nav/Com 500 (Type RT-317)			5.2	5.2	5.2
Cessna Nav/Omni 300 (Type RT-525)	6.0	6.0	6.0	6.0	6.0
Cessna Nav/Omni 500 (Type R-319)			7.0	7.0	7.0
Cessna Nav-O-Matic 300 Autopilot		2.0	2.0	2.0	2.0
Cessna Nav-O-Matic 400 Autopilot		3.0	3.0	3.0	3.0
Cessna Transceiver 300 (Type RT-524A)	3.2	3.2	3.2	3.2	3.2
Cessna Transceiver 500 (Type RT 302G)			6.5	6.5	6.5
King KA-25C Isolation Amplifier	0.5	0.5	0.5	0.5	0.5
King KX-150BE	4.7	4.7	4.7	4.7	4.7
King KX-160E, AE or AF	2.5	2.5	2.5	2.5	2.5
King KY-95E	4.0	4.0	4.0	4.0	4.0
Narco Mark 12A with VOA-4 or -5 Indicator		4.8	4.8	4.8	4.8
Pantronics DX10-DA		6.5	6.5	6.5	6.5

*A switching arrangement prevents the console lights from being operated at the same time the post lights are operated.

ELECTRICAL LOAD ANALYSIS CHART

FOR ALL 1968 MODELS

ELECTRICAL EQUIPMENT	AMPS REQD				
	150	172	180	185	182
Battery Contactor	0.6	0.6	0.6	0.6	0.6
Carburetor Air Temperature Indicator		0.03	0.03	0.03	0.03
Cigarette Lighter	10.0	10.0	10.0	10.0	10.0
Clock		Negligible	Negligible	Negligible	3.3
Courtesy Lights and Cabin Lights		2.5	2.5	2.5	
Courtesy Lights and Dome Light			0.2	0.2	0.8
Cylinder Head Temperature Indicator					
Dome Light	.3				
Flap Motor	15.0	15.0			15.0
Flap Position Indicator		0.1			0.1
Flashing Beacon Light	7.0	7.0	7.0	7.0	7.0
Fuel Quantity Indicators	0.4	0.4	0.4	0.4	0.4
Heater - Pitot	6.5	6.5	6.5	6.5	
Heaters - Pitot & Stall Warning					10.0
Instrument Lights	1.1	1.1	1.4	1.4	
Instrument Lights:					
Cluster					0.3
*Console					2.0
Compass					0.1
Switch Panel					0.7
Landing Lights	15.6	15.6	15.6	15.6	15.6
Map Light		.33	.33	.33	.33
Navigation Lights	5.6	5.6	5.6	5.6	5.6
Oil Dilution Valve					1.0
*Post Lighted Panel					2.0
Stall Warning Horn					2.5
Turn & Bank Indicator	0.2	0.2	0.2	0.2	0.2
Turn Coordinator	0.8	0.8	0.8	0.8	0.8
Brittain Wing Leveler	0.8	0.8	0.8	0.8	0.8
Cessna 300 ADF (Type R-521B)	1.6	1.6	1.6	1.6	1.6
Cessna 300 DME (Type KN-60B)		5.2	5.2	5.2	5.2
Cessna 300 Marker Beacon (Type R-502B)	.02	.02	.02	.02	.02
Cessna 300 Nav/Com - 90 Ch. (Type RT-517R)	5.5	5.5	5.5	5.5	5.5
Cessna 300 Nav/Com - 360 Ch. (Type RT-540A)	5.5	5.5	5.5	5.5	5.5
Cessna 300 Transceiver (Type RT-524A)	3.2	3.2	3.2	3.2	3.2
Cessna 300 Nav-O-Matic			2.0	2.0	2.0
Cessna 400 ADF (Type R-318G-2)			4.2	4.2	4.2
Cessna 400 Glide Slope (Type R-543B)	0.5	0.5	0.5	0.5	0.5
Cessna 400 Nav/Com (Type RT-522)			2.0	2.0	2.0
Cessna 400 Transceiver (Type RT-532)			1.0	1.0	1.0
Cessna 400 Nav-O-Matic			3.0	3.0	3.0
King KA-25C Isolation Amplifier	0.5	0.5	0.5	0.5	0.5
King KY-95E	4.0	4.0	4.0	4.0	4.0
King KX-150BE	4.7	4.7	4.7	4.7	4.7
King KX-160E or KX-160AE	2.5	2.5	2.5	2.5	2.5
Narco Glide Slope Receiver UGR-2	0.3		0.3	0.3	0.3
Narco Mark 12A with VOA-8 or VOA-9	4.8		4.8	4.8	4.8
Pantronics DX10-DA		6.5	6.5	6.5	6.5
Antenna Reel Motor		14.0	14.0	14.0	14.0

*A switching arrangement prevents the console lights from being operated at the same time the post lights are Operated.

SECTION 18

ELECTRONIC SYSTEMS

This section has been deleted from this book. The information formerly contained in this section may now be found in one of the individual Cessna Electronic Manuals. For installation, refer to the "Cessna Electronic Installations and Service/Parts Manual." For repair, refer to the appropriate Cessna Service/Parts Manual.

SECTION 19

STRUCTURAL REPAIR

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19-1. REPAIR CRITERIA.

19-2. 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.

19-3. 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 Regulations, Part 43. Consult the factory when in doubt about a repair not specifically mentioned here.

19-4. EQUIPMENT AND TOOLS.

19-5. Equipment and tools for repair of structure may be fabricated locally for all but major repair jobs. For major repair of wings and fuselage, special jogs, available from the factory, are recommended. These jigs are precision equipment designed to ensure accurate alignment of these airframe components.

19-6. CONTROL BALANCING.

Control balancing requires the use of a fixture to determine the static balance moment of the control surface assembly. Plans for, and the use of, such a fixture are shown in figure 19-3.

19-7. SUPPORT STANDS.

Support stands shown in figure 19-1 are used to hold a fuselage or a wing when it is removed. The stands may be manufactured locally of any suitable wood.

19-8. FUSELAGE REPAIR JIG.

The fuselage jig, which may be obtained from the factory, is a sturdy, versatile fixture used to hold an entire fuselage and locate the firewall, wing, and landing gear attachment points. The jig is ideal for assembling new parts in repair of a badly damaged fuselage.

19-9. WING JIG.

The wing jig, which may also be obtained from the factory, serves as a holding fixture during extensive repair of a damaged wing. The jig locates the root rib, leading edge, and tip rib of the wing.

19-10. WING AND STABILIZER ANGLE-OF-INCIDENCE.

Angle-of-incidence and wing twist are listed in the following chart. Stabilizers do not have twist. Wings have a constant angle from the wing root to the strut fitting station. All twist in the panel is between this station 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. See figure 19-2.

MODEL	WING ANGLE-OF-INCIDENCE		WING TWIST (WASHOUT)	STABILIZER ANGLE-OF-INCIDENCE
	ROOT	TIP		
150	+1°	0°	1°	-3°
172 & 72	+1° 30'	-1° 30'	3°	-3° 30'
180 & 185	+1° 30'	-1° 30'	3°	Adjustable
182	+1° 30'	-1° 30'	3°	-3°

19-11. REPAIR MATERIALS.

19-12. Thickness of 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 be readily determined, 2024-T3 may be used in making repairs, since the strength of -T3 is greater than -4 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 gage of the material being repaired unless otherwise noted. It is often practical to cut repair pieces from service parts listed in the Parts Catalogs.

A few components (empennage tips, for example) are fabricated from thermo-formed plastic or glass fiber constructed materials.

19-13. WING.

19-14. The wing assemblies are a semi-cantilever type employing semi-monocoque 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 wing structure.

19-15. ACCESS.

Access openings (hand holds with removable cover plates) are located in the underside of the wing between the wing root and the tip section. These openings afford access to aileron bellcranks, flap bellcranks, electrical wiring, strut attaching fittings, aileron control cable pulley, and control cable disconnect points.

19-16. WING SKIN.

19-17. NEGLIGIBLE DAMAGE.

Any smooth dents in the wing skin that are free from cracks, abrasions, and sharp corners, and 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 should be made as soon as practicable.

19-18. REPAIRABLE DAMAGE.

Figure 19-4 outlines typical repairs to be employed in patching skin. Before installing a patch, trim the damaged area to form a rectangular pattern, leaving at least 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 the patch is 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.

19-19. DAMAGE NECESSITATING REPLACEMENT OF PARTS.

If a skin is badly damaged, repair should be made by replacing an entire skin panel, from one structural member to the next. Repair seams should be made to lie along existing structural members and each seam should 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 seam should be copied. If the repair ends at a structural member where no seam is used, enough repair panel should be used to allow an extra row of staggered rivets, with sufficient edge margin, to be installed.

19-20. WING STRINGERS.

19-21. NEGLIGIBLE DAMAGE.

Refer to paragraph 19-17.

19-22. REPAIRABLE DAMAGE.

Figure 19-5 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.

19-23. DAMAGE NECESSITATING REPLACEMENT OF PARTS.

If a stringer is so badly damaged that more than one section must be spliced into it, replace the entire stringer.

19-24. WING AUXILIARY SPARS.

19-25. NEGLIGIBLE DAMAGE.

Refer to paragraph 19-17.

19-26. REPAIRABLE DAMAGE.

Figure 19-8 outlines a typical auxiliary spar repair.

19-27. DAMAGE NECESSITATING REPLACEMENT OF PARTS.

If damage to an auxiliary spar would require a repair which could not be made between adjacent ribs, replace the auxiliary spar.

19-28. WING RIBS.

19-29. NEGLIGIBLE DAMAGE.

Refer to paragraph 19-17.

19-30. REPAIRABLE DAMAGE.

Figure 19-6 outlines typical wing rib repairs.

19-31. DAMAGE NECESSITATING REPLACEMENT OF PARTS.

Leading and trailing edge ribs that are extensively damaged should be replaced. However, due to the necessity of unfastening so much skin in order to replace ribs, they should be repaired if practicable. Center ribs, between the front and rear spars, should always be repaired if practicable.

19-32. WING SPARS.

19-33. NEGLIGIBLE DAMAGE.

Due to the stresses 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.

19-34. REPAIRABLE DAMAGE. Figure 19-7 outlines typical spar repairs. It is often practical to cut repair pieces from spare parts listed in Parts Catalogs. Service Kits are available for certain types of spar repairs.

19-35. DAMAGE NECESSITATING REPLACEMENT OF PARTS.

Damage so extensive that repair is not feasible requires replacement of a complete wing spar. Refer to paragraph 19-2.

19-36. WING LEADING EDGE.

19-37. NEGLIGIBLE DAMAGE.

Refer to paragraph 19-17.

19-38. REPAIRABLE DAMAGE.

A typical leading edge skin repair is shown in figure 19-9. 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 19-10. If the damage would require a repair which could not be made between adjacent ribs, refer to the following paragraph.

19-39. DAMAGE NECESSITATING REPLACEMENT OF PARTS.

For extensive damage, complete leading edge skin panels should be replaced. To facilitate replacement, extra access holes may be installed in the locations noted in figure 19-10.

19-40.° AILERONS.

19-41. NEGLIGIBLE DAMAGE. Refer to paragraph 19-17.

19-41A. CRACKS IN CORRUGATED AILERON SKINS

1. It is permissible to stop drill crack(s) that originate at the trailing edge of the control surface provided that the crack is not more than two inches in length.

2. Stop drill crack using a #30 (0.128 inch) drill bit.

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.

   NOTE: Refer to paragraphs 19-41, -42, and -43 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 two 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.

   NOTE: Refer to paragraphs 19-41, -42, and -43 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.

19-42. REPAIRABLE DAMAGE.

The flush-type skin patches shown in figure 19-4 should be used to repair damage to an aileron skin. Filler material for corrugated areas must match existing corrugations. Doubler material may be flat. If damage would require a repair that could not be made between adjacent ribs, see the following paragraph.

19-43. DAMAGE NECESSITATING REPLACEMENT OF PARTS.

If the damage would require a repair that could not be made between adjacent ribs, complete skin panels should 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 repainting, balance in accordance with figure 19-3.

19-44. WING FLAPS.

19-45. NEGLIGIBLE DAMAGE.

Refer to paragraph 19-17.

19-45A. CRACKS IN CORRUGATED FLAP SKINS

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 two inches in length.

2. Stop drill crack using a #30 (0.128 inch) drill bit.

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.

   NOTE: Refer to paragraphs 19-45, -46, and -47 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 two 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.

   NOTE: Refer to paragraphs 19-45, -46, and -47 as applicable for repair information.

6. Affected control surfaces with corrugated skins that have a stop drilled crack that does not extend past the stop drilled hole, may remain in service without additional repair.

19-46. REPAIRABLE DAMAGE.

Flap repairs should be similar to aileron repairs discussed in paragraph 19-42. A flap leading edge repair is shown in figure 19-9.

19-47. DAMAGE NECESSITATING REPLACEMENT OF PARTS.

Flap repairs that require replacement of parts should be similar to aileron repairs discussed in paragraph 19-43.

19-48. ELEVATORS AND RUDDERS.

19-49. NEGLIGIBLE DAMAGE.

Refer to paragraph 19-17. 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 tip 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.

19-49A. CRACKS IN CORRUGATED ELEVATOR AND RUDDER SKINS

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 two inches in length.

2. Stop drill crack using a #30 (0.128 inch) drill bit.

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.

   NOTE: Refer to paragraphs 19-49, -50, and -51 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 two 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.

   NOTE: Refer to paragraphs 19-49, -50, and -51 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.

19-50. REPAIRABLE DAMAGE.

Skin patches shown in figure 19-4 may be used to repair skin damage. If the damaged area would require a repair which could not be made between adjacent ribs, see the following paragraph.

19-51. DAMAGE NECESSITATING REPLACEMENT OF PARTS.

If the damaged area would require a repair which could not be made between adjacent ribs, complete skin panels should 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 repainting, balance in accordance with figure 19-3.

19-52. FIN AND STABILIZER

19-53. NEGLIGIBLE DAMAGE.

Refer to paragraph 19-17

19-54. REPAIRABLE DAMAGE.

Skin patches shown in figure 19-4 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.

19-55. DAMAGE NECESSITATING REPLACEMENT OF PARTS.

If the damaged area would require a patch which could not be made between adjacent ribs, or the repair would be located in an area with compound curves, complete skin panels should be replaced. Ribs and spars may be repaired, but replacement is generally preferable. Where damage is extensive, replacement of the entire assembly is recommended.

19-56. FUSELAGE.

19-57. The fuselage is of semi-monocoque construction consisting of formed bulkheads longitudinal stringers, reinforcing channels and skin platings.

19-58. NEGLIGIBLE DAMAGE.

Refer to paragraph 19-17. Mild corrosion appearing upon alclad surfaces does not necessarily indicate incipient failure of the base metal. However, corrosion of all types should be carefully considered, and approved remedial action taken. Small cans appear in the skin structure of all metal airplanes. 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 should not be considered negligible. The skin panel should be opened sufficiently to permit a thorough examination of the lower portion of the landing gear bulkhead and its tie-in structure.

Wrinkles occurring on 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 ½ x ½ x .060 inch 2024-T4 extruded angle, riveted over the wrinkle and extended to within 1/16 to 1/8 inch of the nearest structural members. Rivet pattern should be identical to the existing manufactured seam at the edge of the sheet.

19-59. REPAIRABLE DAMAGE.

Fuselage skin repairs may be accomplished in the same manner as wing skin repairs outlined in paragraph 19-18. Stringers, formed skin flanges, bulkhead channels, and similar parts may be repaired as shown in figure 19-5.

19-60. DAMAGE NECESSITATING REPLACEMENT OF PARTS.

Fuselage skin repairs may be accomplished in the same manner as the wing repairs outlined in paragraph 19-19. Damaged fittings should be replaced. Seat rails serve as structural parts of the fuselage and should be replaced if damaged.

19-61. BULKHEADS.

19-62. 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 such damage should be repaired by replacing the landing gear support assembly as an aligned unit.

19-63. 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 should be carefully examined and all support forgings should be checked for cracks, using a dye penetrant and proper magnification. Bulkheads in the area of possible damage should be checked for alignment and a straightedge should be used to determine deformation of the bulkhead webs. Damaged support structure, buckled floorboards and skins, and damaged or questionable forgings should be replaced.

19-64. REPLACEMENT OF HI-SHEAR RIVETS.

Replacement of Hi-shear rivets with close tolerance bolts or other commercial fasteners of equivalent strength properties is permissible. Holes should not be elongated, and the Hi-shear substitute should be a smooth push fit. Forgings may be spot-faced the least amount necessary for proper seating of fasteners.

19-65. FIREWALL DAMAGE.

Firewall damage may be repaired by removing the damaged material and splicing in a new section of material. The new portion should be lapped over the old material, sealed with Pro-Seal #700 (Coast Pro-Seal Co., Chemical Division, 2235 Beverly Blvd., Los Angeles, CA), or equivalent compound, and secured with stainless steel rivets. Damaged or deformed angles and stiffeners may be repaired as shown in figure 19-11, or they may be replaced. A severely damaged firewall should be replaced as a unit.

19-66. ENGINE MOUNT.

19-67. 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.

19-68. GENERAL CONSIDERATIONS.

All welding on the engine mount should 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 large 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.

19-69. 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 should be replaced.

19-70. 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 should be replaced.

19-71. BAFFLES.

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.

19-72. ENGINE COWLING.

19-73. REPAIR OF COWLING SKINS.

If extensively damaged, complete sections of cowling should be replaced. Standard insert-type 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.

19-74. REPAIR OF REINFORCEMENT ANGLES.

Cowl reinforcement angles, if damaged, should be replaced. Due to their small size, they are easier to replace than to repair.

19-75. REPAIR OF THERMO-FORMED PLASTIC COMPONENTS.

19-76. Repair of puncture or holes in thermo-formed plastics can be made by trimming out the damaged area, removing any paint in the area, and installing an overlapping, beveled, or flush patch of identical material. Doublers may be installed behind the patch where additional strength is desired. MEK, or any commercially available solvent that will soften and dissolve the plastic, may be used as the bonding agent. Dissolving some of the plastic shavings in the solvent will furnish additional working time. Moderate pressure is recommended for best results. Curing time will vary with the agent used, but repairs should not be strained until fully cured. Cracks can be repaired by saturating the crack itself with the solvent, then filling with an epoxy filler or a paste made of the plastic shavings and the solvent. Again, the crack may be reinforced with a doubler on the back side for additional strength. After the repair has been made, the area may be sanded smooth and painted. Parts that are extensively damaged should be replaced instead of repaired.

19-77. REPAIR OF GLASS FIBER CONSTRUCTED COMPONENTS.

19-78. Glass fiber constructed components on the aircraft may be repaired as stipulated in instructions furnished in 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.

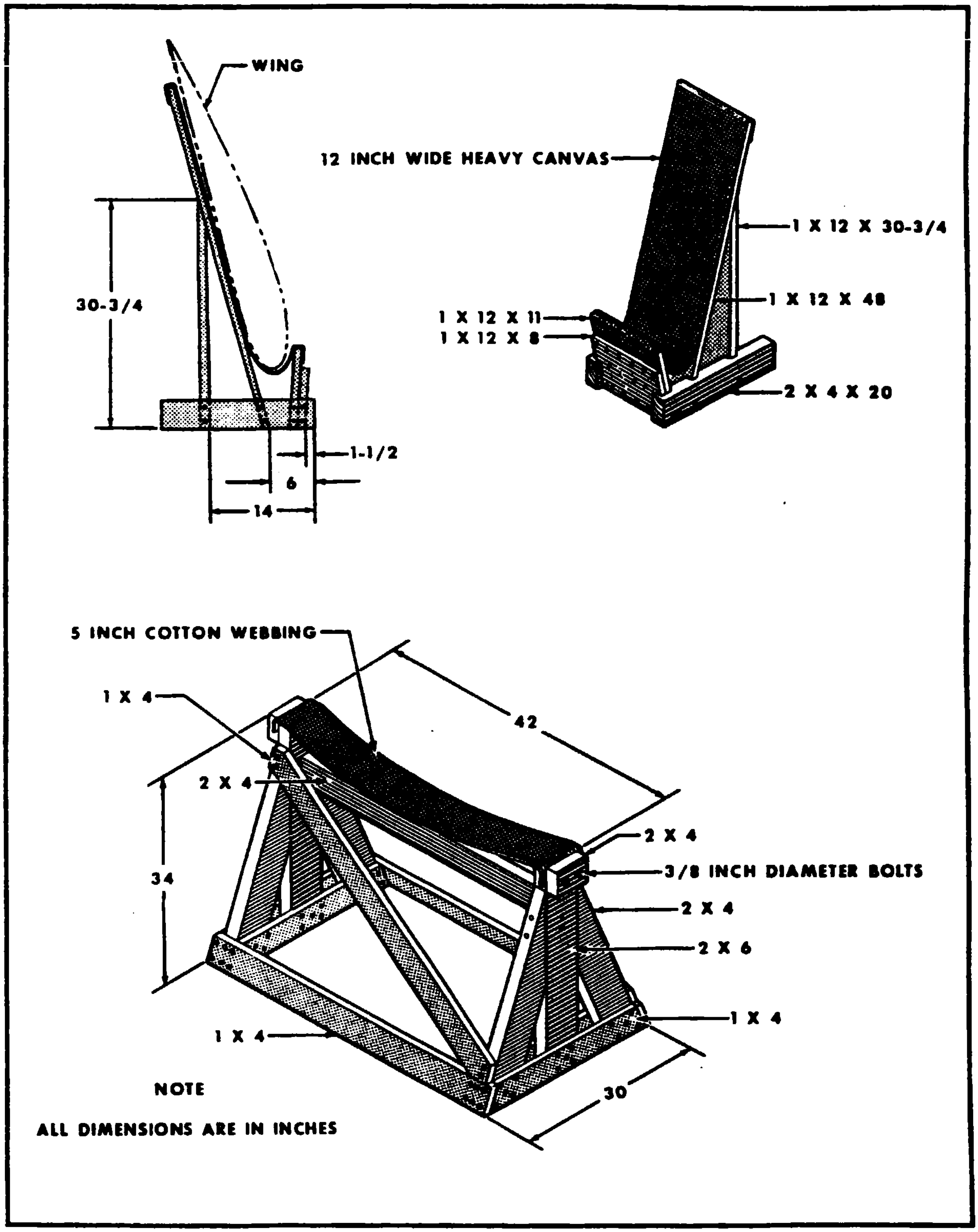
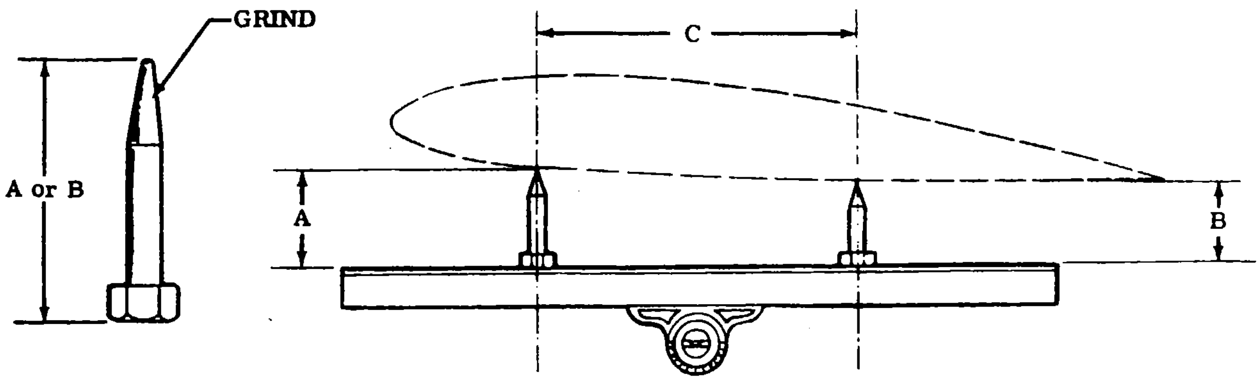


Figure 19-1. Wing and Fuselage Support Stands



MODEL	A	B	C	WING STATION
150 150	2.00 1.38	1.00 1.00	29.50 24.00	39.00 191.00
172 & P172 172 & P172	2.00 .59	1.00 1.00	29.50 24.00	39.00 207.00
180 & 185 180 & 185	2.00 .59	1.00 1.00	29.50 24.00	39.00 207.00
182 182	2.00 .59	1.00 1.00	29.50 24.00	39.00 207.00

MEASURING WING TWIST

If damage has occured 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 leading edge skin.
5. Holding straightedge parallel to wing station, (staying 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 outboard 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 19-2. Checking Wing Twist

GENERAL NOTES

1. Balance control surfaces in a draft-free area.
2. Place hinge bolts through control surface hinges, and position on knife edge balancing mandrels. Insert aileron hinges into slot in end of mandrels.
3. Make sure all control surfaces are in their final flight configuration: painted (if applicable), trim tabs installed, all foreign matter removed from inside of control surface, elevator trim tab push-pull rod installed, and all tips installed.
4. Place balancing mandrels on a table or other suitable flat surface.
5. Adjust trailing edge support to fit control surface being balanced while center of balancing beam is directly over hinge line. Remove balancing beam and balance the beam itself by adding washers or nuts as required at end opposite the trailing edge support.
6. When positioning balancing beam on control surface, avoid rivets to provide a smooth surface for the beam, and keep the beam 90° to the hinge line of the control surface.
7. Paint is a considerable weight factor. In order to keep balance weight to a minimum, it is recommended that existing paint be removed before adding paint to a control surface. Increase in balance weight will also be limited by the amount of space available and clearance with adjacent parts. Good workmanship and standard repair practices should not result in unreasonable balance weight.
8. The approximate amount of weight needed may be determined by taping loose weight at the balance weight area.
9. Lighten balance weight by drilling off part of weight.
10. Make balance weight heavier by fusing bar stock solder to weight after removal from control surface. The ailerons should have balance weight increased by ordering additional weight and attaching bracket listed in applicable Parts Catalogs, and installing the minimum length necessary for correct balance, except that a length which contains at least two attaching rivets must be used. If necessary, lighten new weight and/or existing weights for correct balance.

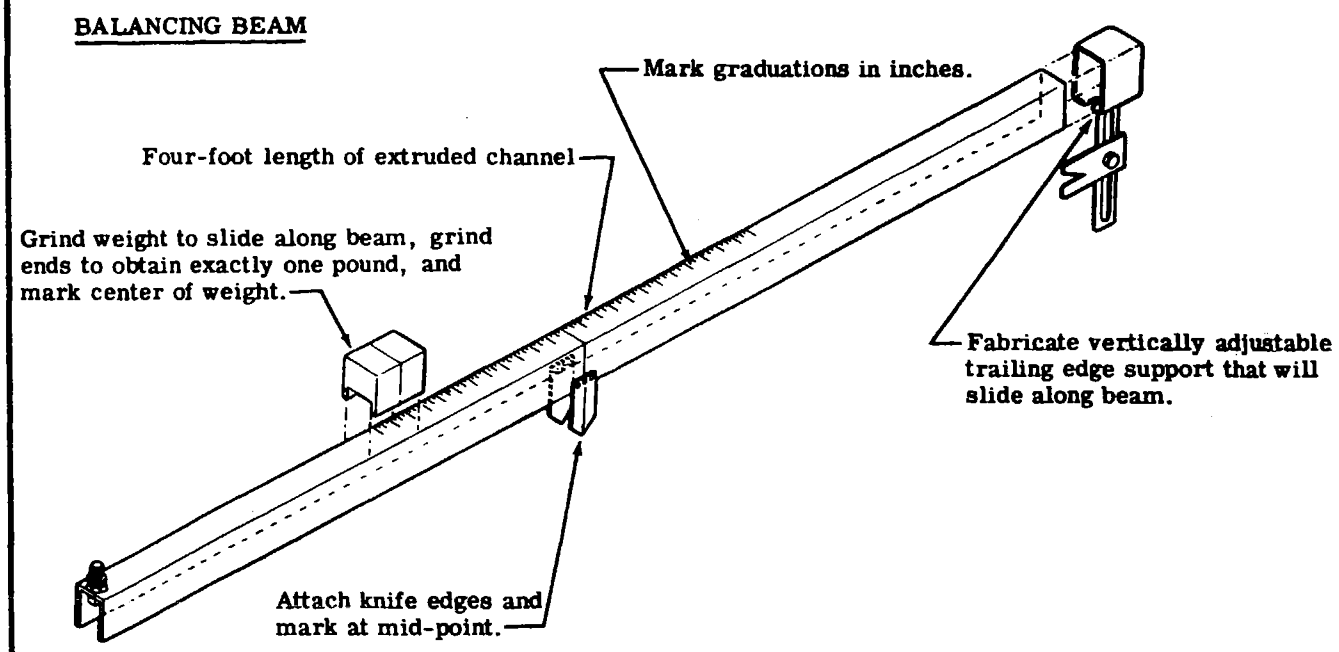


Figure 19-3. Control Surface Balancing (Sheet 1 of 3)

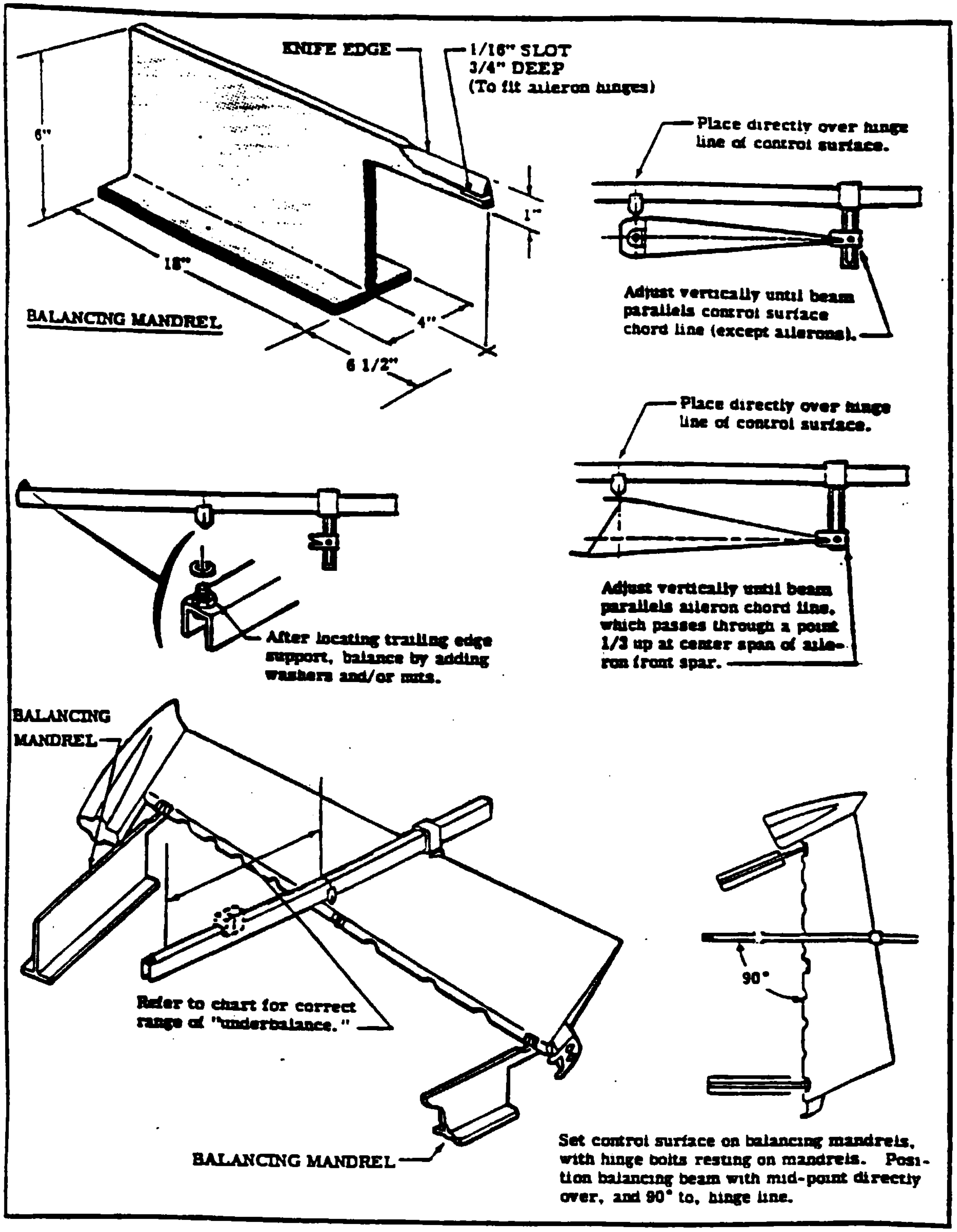


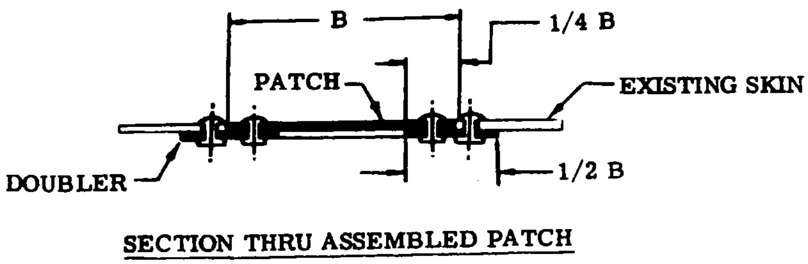
Figure 19-3. Control Surface Balancing (Sheet 2 of 3)

Models & Serials	AILERONS	RUDDER	RIGHT ELEVATOR	LEFT ELEVATOR
	Underbalance (Inch-Pounds)	Underbalance (Inch-Pounds)	Underbalance (Inch-Pounds)	Underbalance (Inch-Pounds)
150C	0.0 to + 8.94	0.0 to +41.47	0.0 to +35.41	0.0 to +29.05
150D & 150E	Same as above	0.0 to +6.94	0.0 to +13.31	0.0 to +13.29
150F, 150G & 150H	Same as above	0.0 to +6.0	Same as above	Same as above
172D & P172D	0.0 to +11.31	0.0 to +6.3	0.0 to +24.5	0.0 to +18.5
172E 172F to 17252001 F172F to F172-0120	Same as above	0.0 to +13.80	Same as above	Same as above
172F 17252001 & on F172F F172-0120 & on 172G, 172H & 172I	Same as above	0.0 to +9.69	Same as above	Same as above
180F	0.0 to +9.64	0.0 to +3.8	0.0 to +17.21	0.0 to +17.21
180G & 180H	0.0 to +4.30	Same as above	Same as above	Same as above
182F & 182G	0.0 to +9.64	0.0 to +6.0	0.0 to +20.20	Same as above
182H, 182J, 182K & 182L	Same as above	Same as above	0.0 to +20.47	0.0 to +20.47
185 & A185 Series	0.0 to +4.30	0.0 to +16.18	0.0 to +17.21	0.0 to +17.21

NOTE:

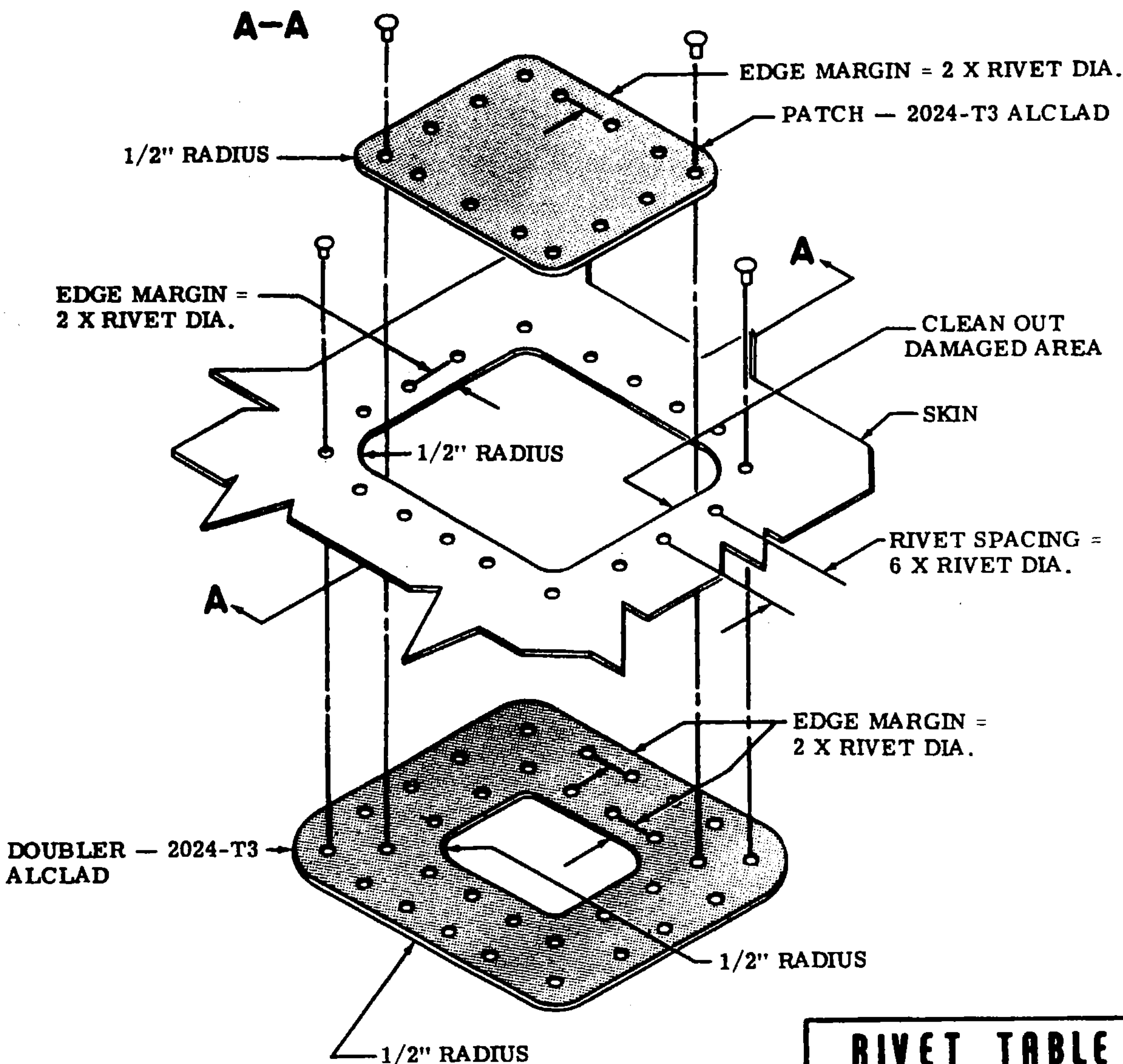
The "Underbalance" columns list the tolerances within which the control surface must balance. These tolerances must never be exceeded in the final flight configuration.

Figure 19-3. Control Surface Balancing (Sheet 3 of 3)



NOTE

For optimum appearance and airflow, use flush rivets, dimpled skin and patch, and countersunk doubler.



ORIGINAL PARTS

REPAIR PARTS

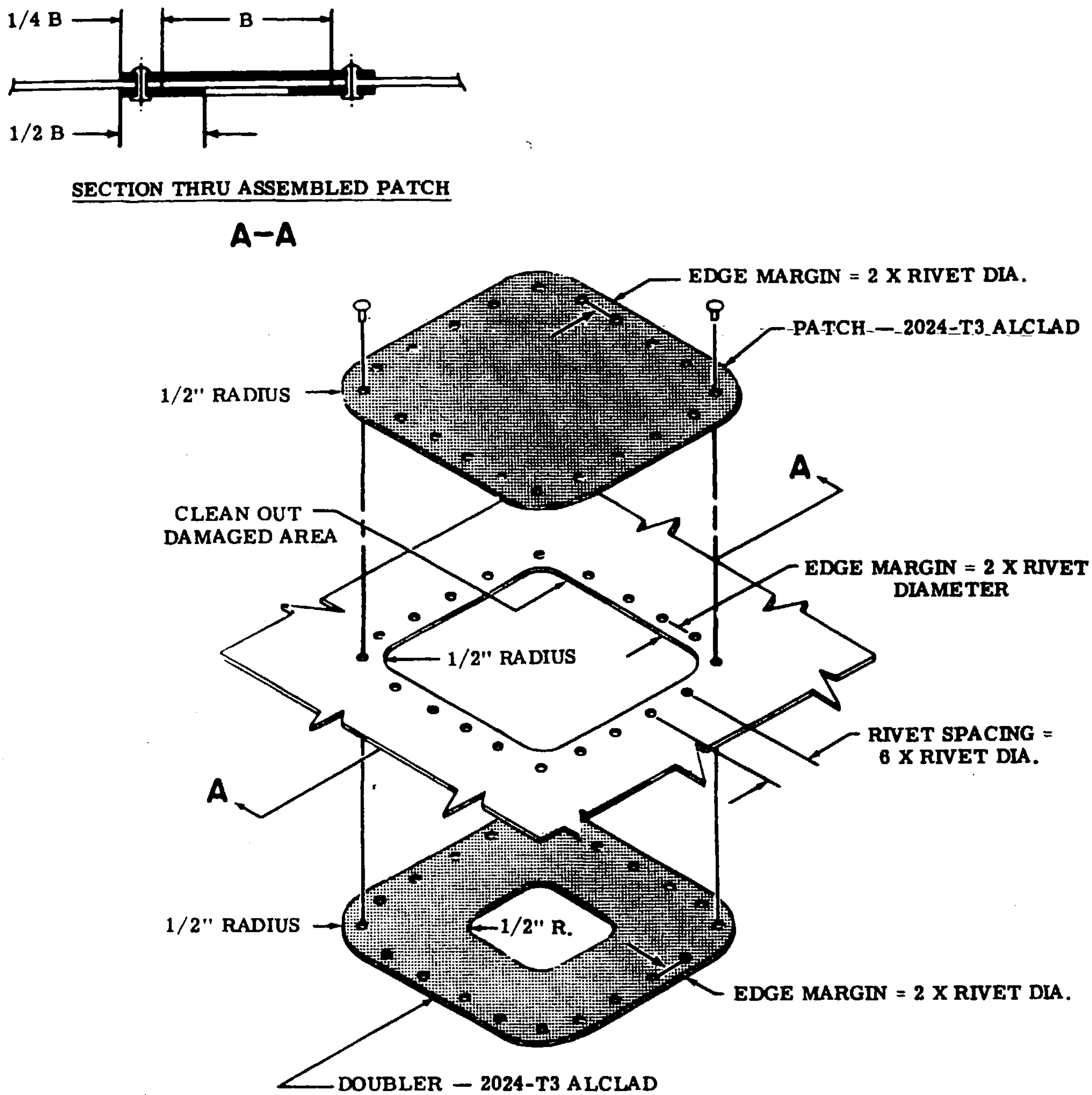
REPAIR PARTS IN CROSS SECTION

FLUSH RECTANGULAR PATCH (CIRCULAR FLUSH PATCH IS SIMILAR)

RIVET TABLE

SKIN GAGE	RIVET DIA.
.020	1/8
.025	1/8
.032	1/8
.040	1/8
.051	5/32

Figure 19-4. Skin Repair (Sheet 1 of 6)



ORIGINAL PARTS

REPAIR PARTS

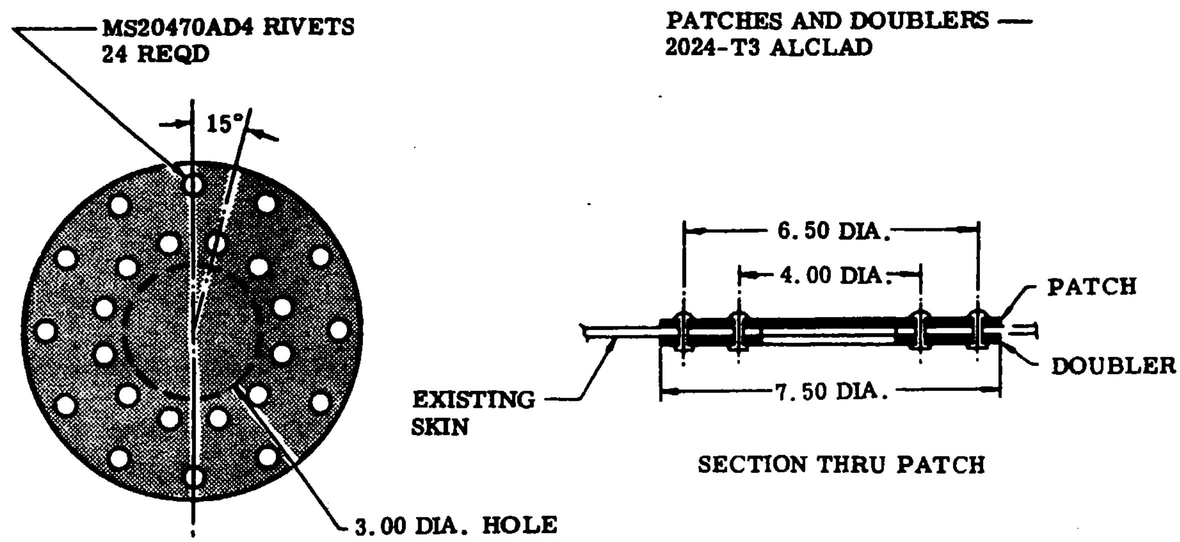
REPAIR PARTS IN CROSS SECTION

OVERLAPPING REC-
TANGULAR PATCH

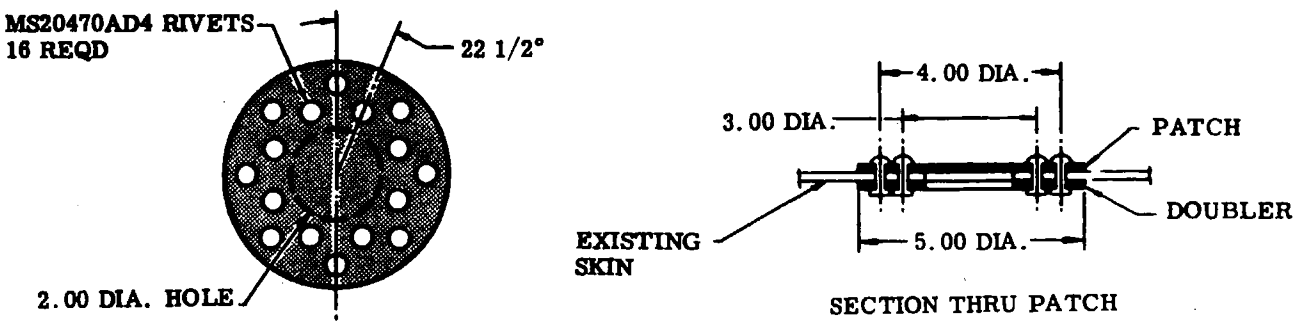
RIVET TABLE

SKIN GAGE	RIVET DIA.
.020	1/8
.025	1/8
.032	1/8
.040	1/8
.051	5/32

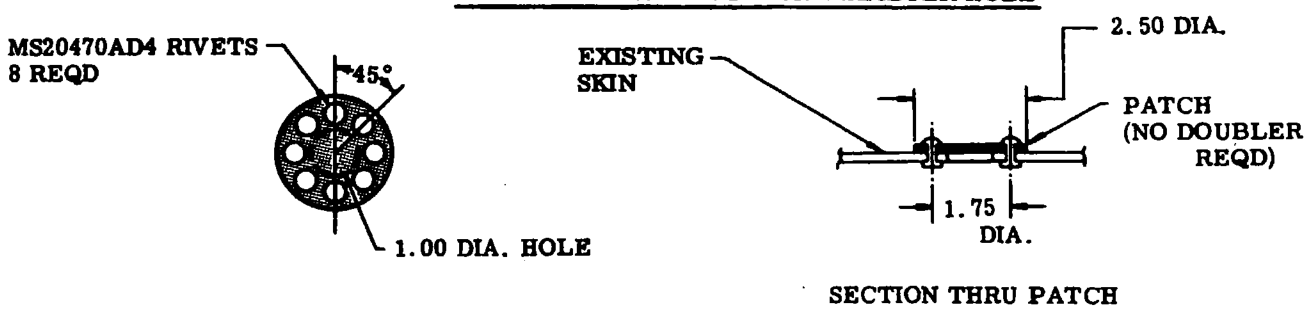
Figure 19-4. Skin Repair (Sheet 2 of 6)



PATCH REPAIR FOR 3 INCH DIAMETER HOLE



PATCH REPAIR FOR 2 INCH DIAMETER HOLE



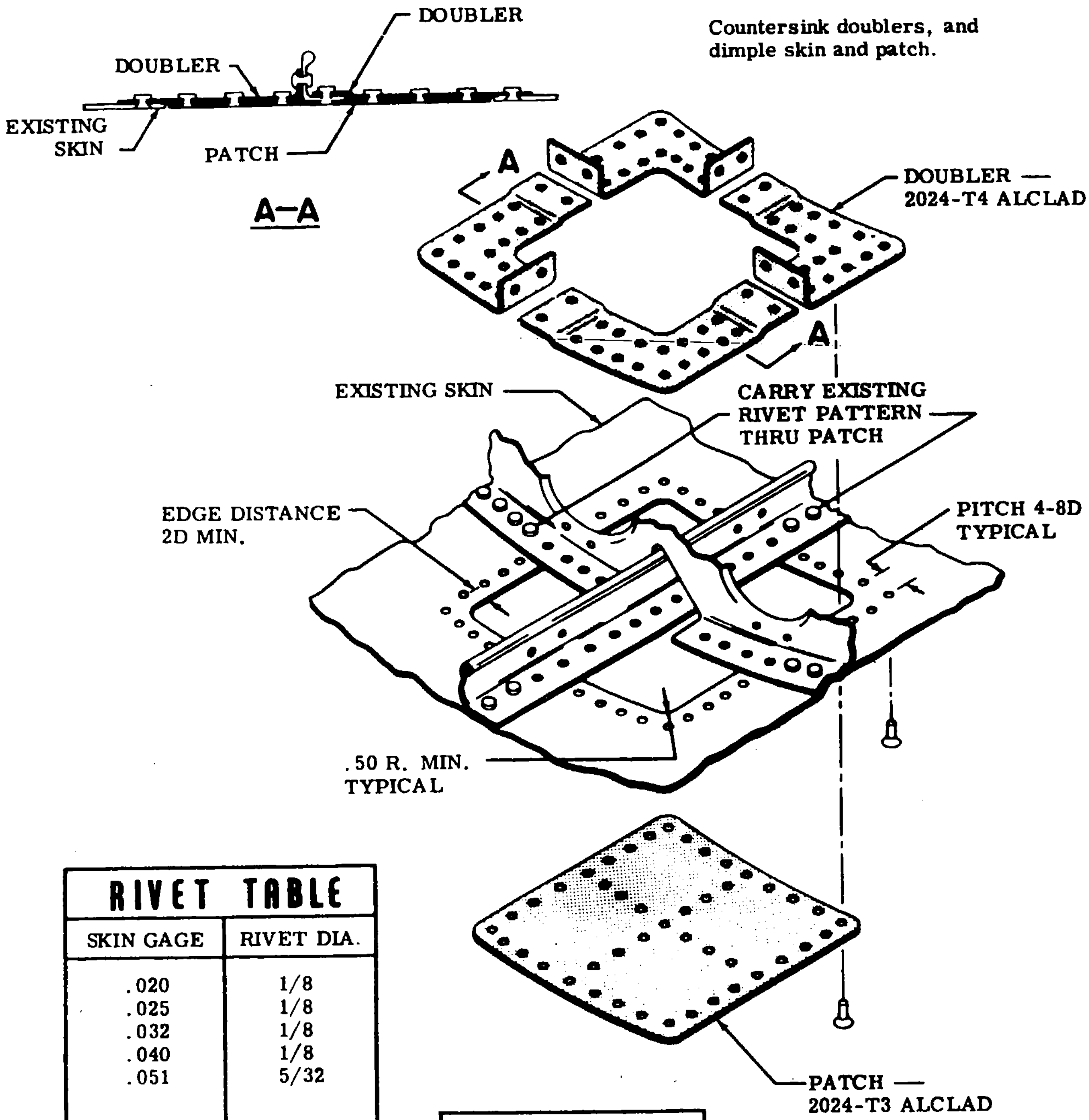
PATCH REPAIR FOR 1 INCH DIAMETER HOLE

OVERLAPPING
CIRCULAR PATCH

Figure 19-4. 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

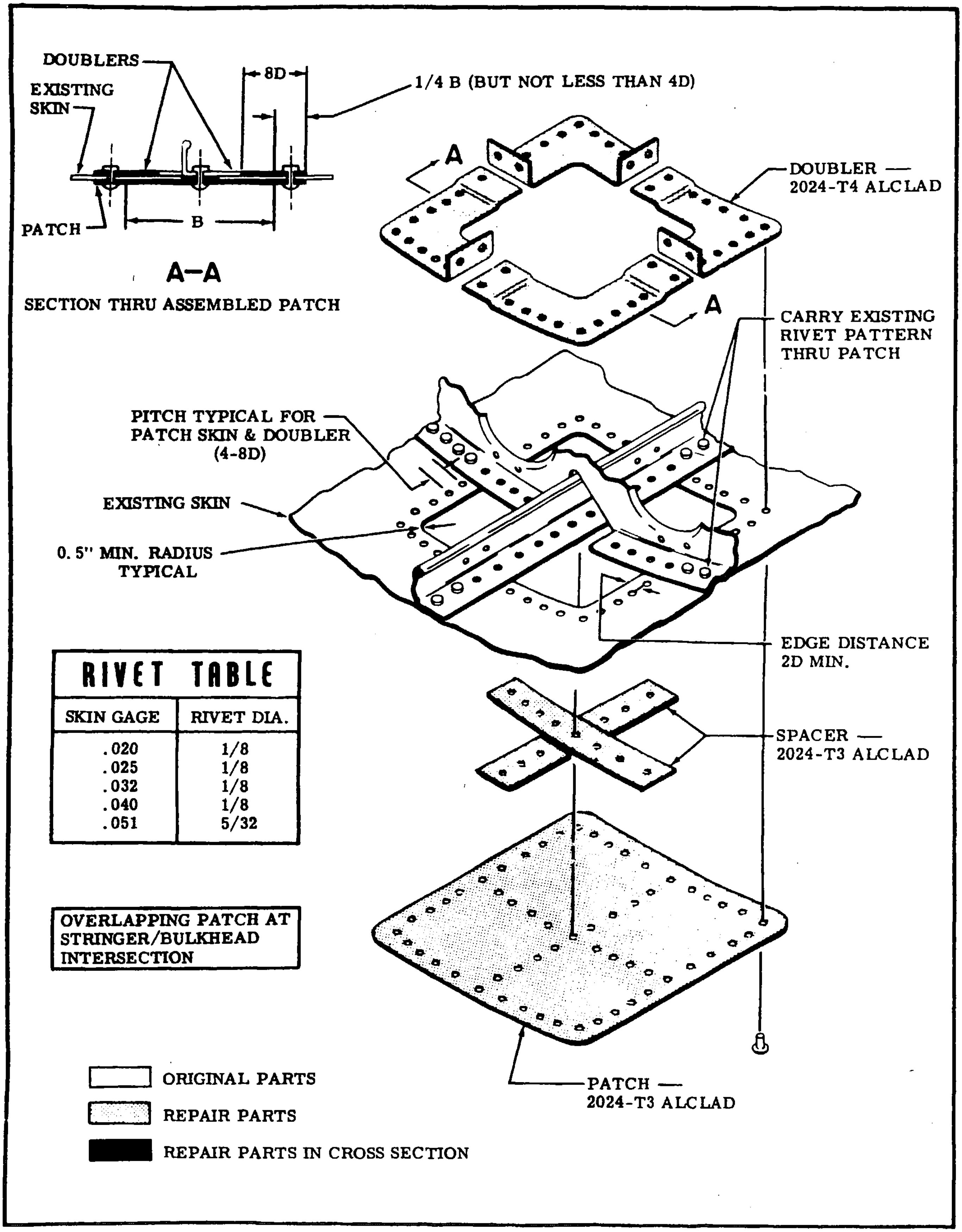
REPAIR PARTS

REPAIR PARTS IN CROSS SECTION

NOTE

This procedure is not recommended in areas where stringers are riveted to bulkheads.

Figure 19-4. Skin Repair (Sheet 4 of 6)



RIVET TABLE

SKIN GAGE	RIVET DIA.
.020	1/8
.025	1/8
.032	1/8
.040	1/8
.051	5/32

Figure 19-4. Skin Repair (Sheet 5 of 6)

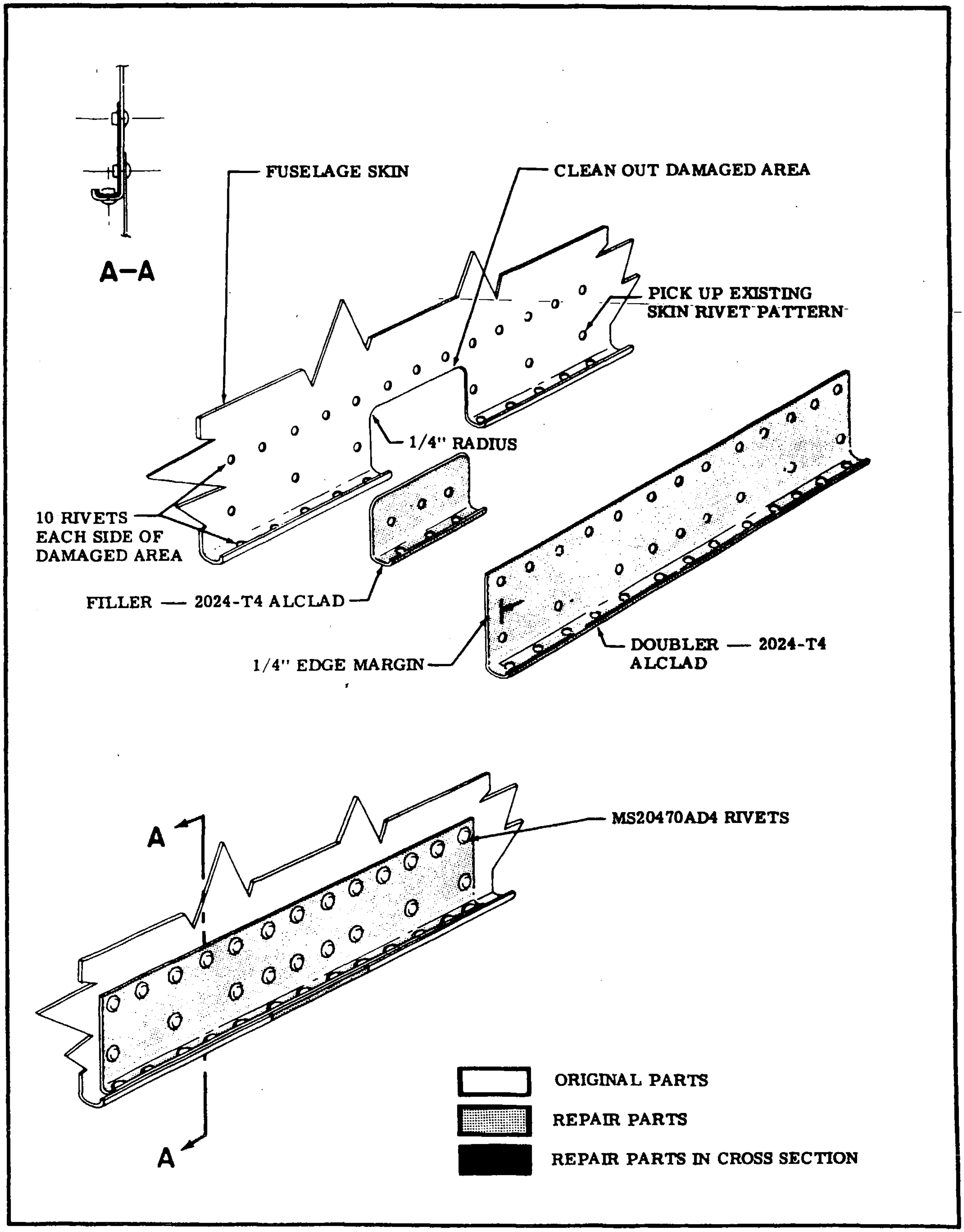


Figure 19-4. Skin Repair (Sheet 6 of 6)

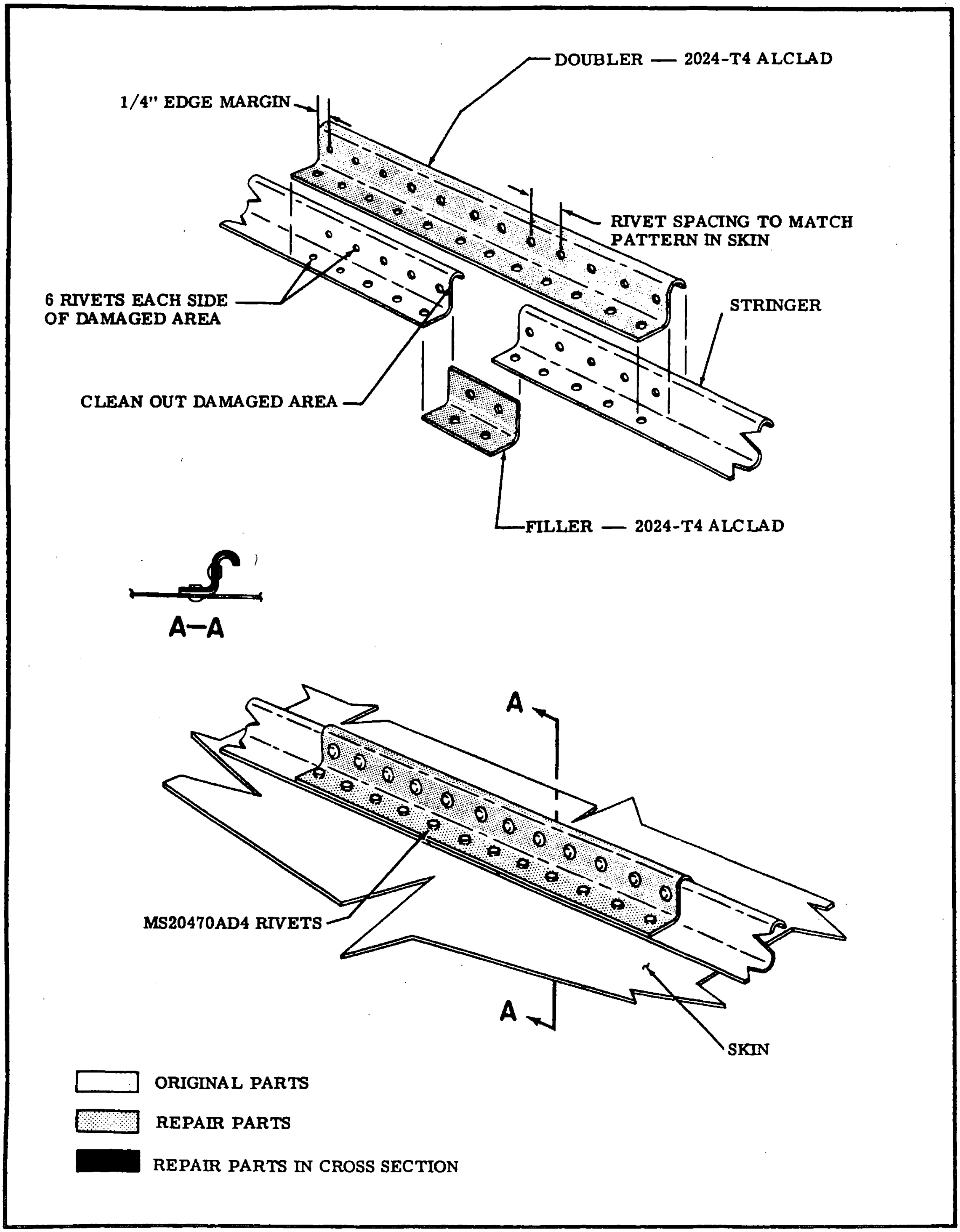


Figure 19-5. Stringer and Channel Repair (Sheet 1 of 4)

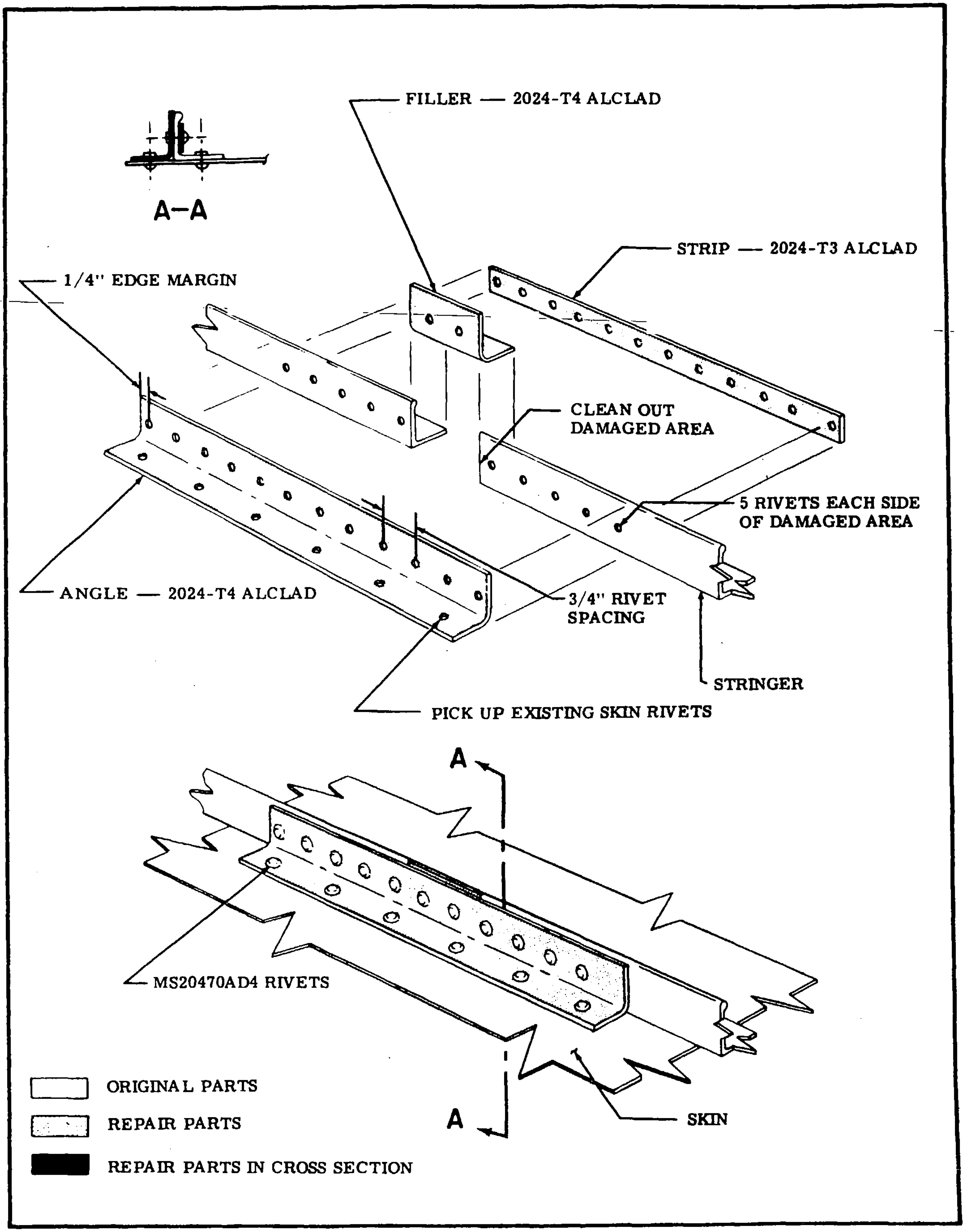


Figure 19-5. Stringer and Channel Repair (Sheet 2 of 4)

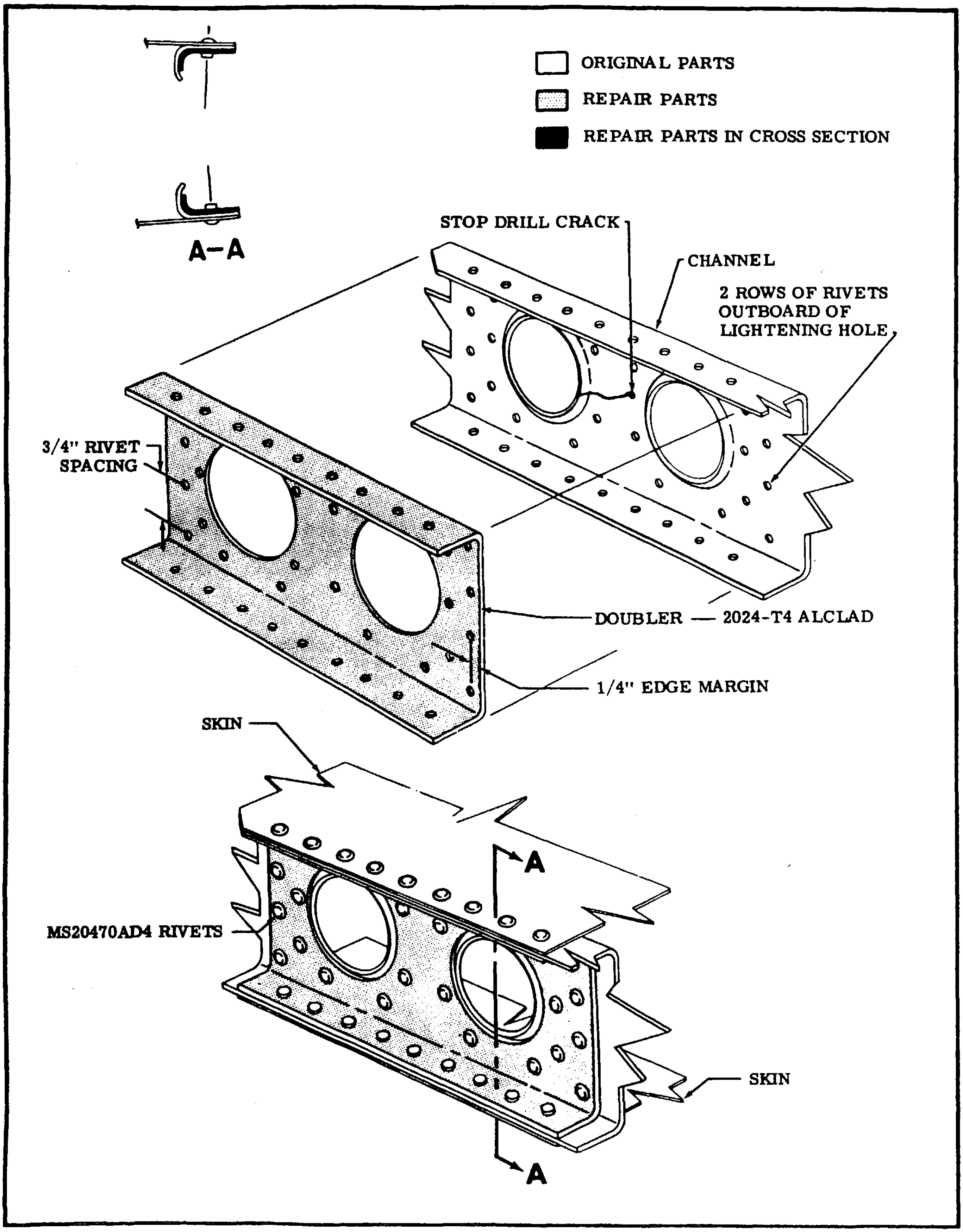


Figure 19-5. Stringer and Channel Repair (Sheet 3 of 4)

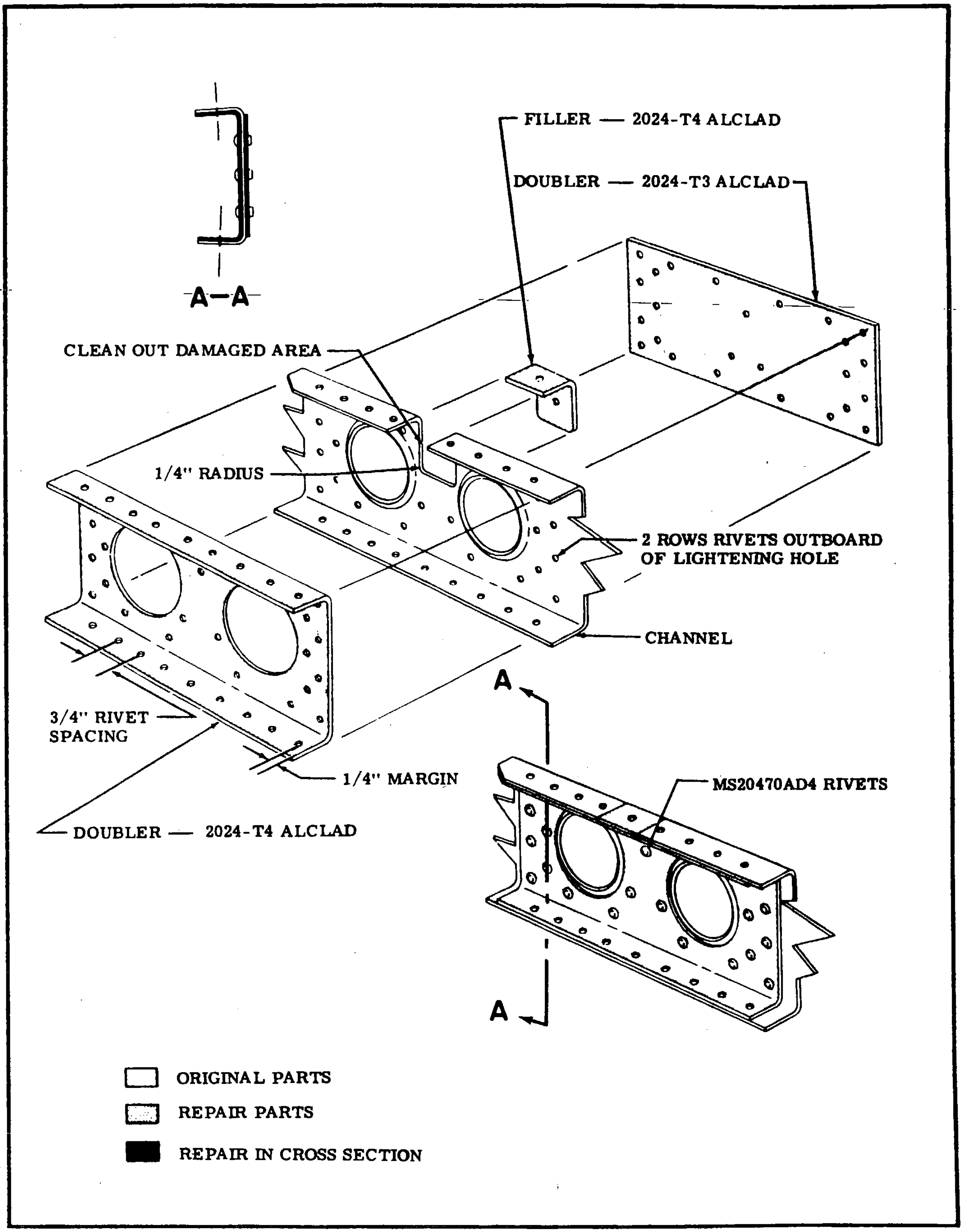


Figure 19-5. Stringer and Channel Repair (Sheet 4 of 4)

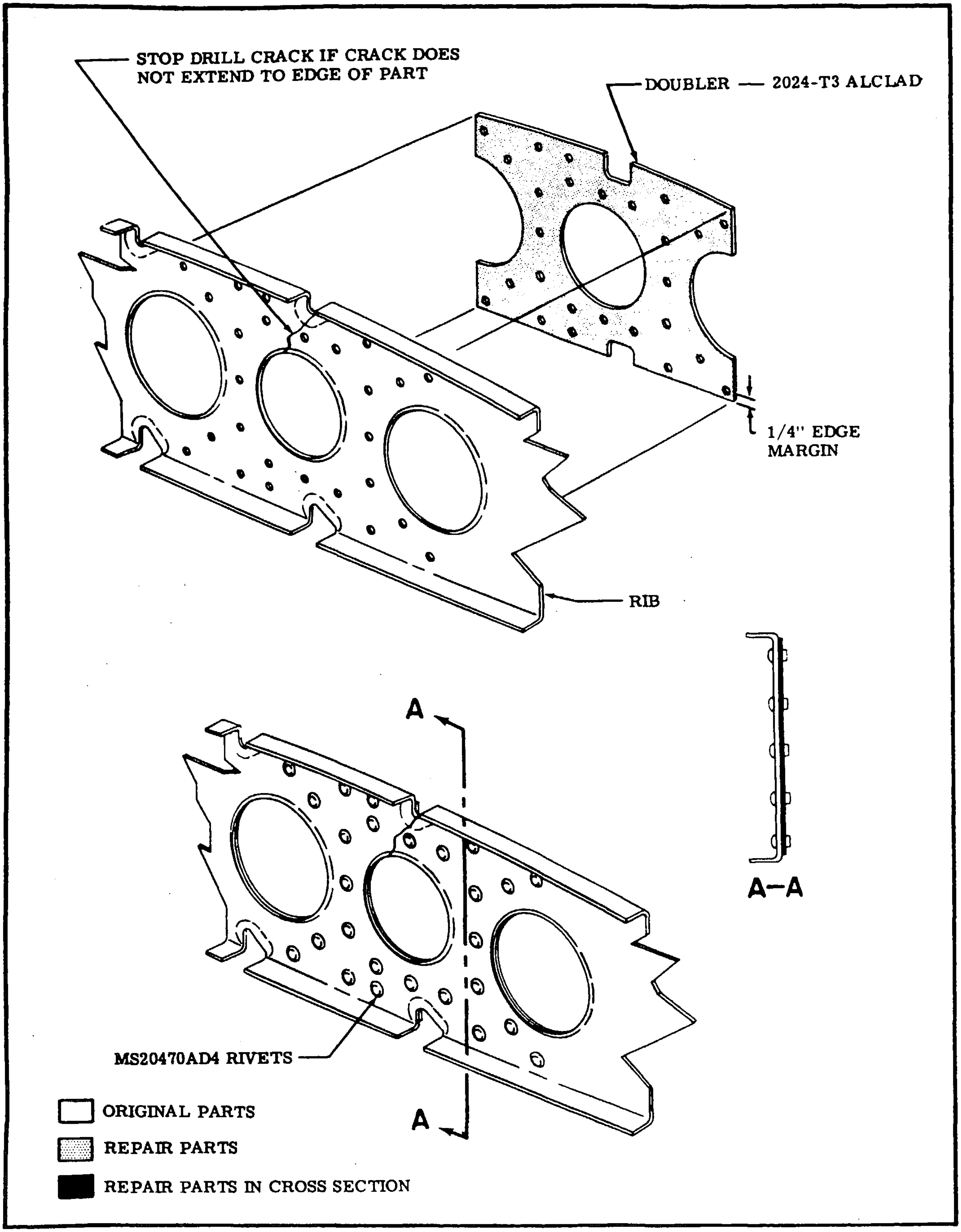


Figure 19-6. Rib Repair (Sheet 1 of 2)

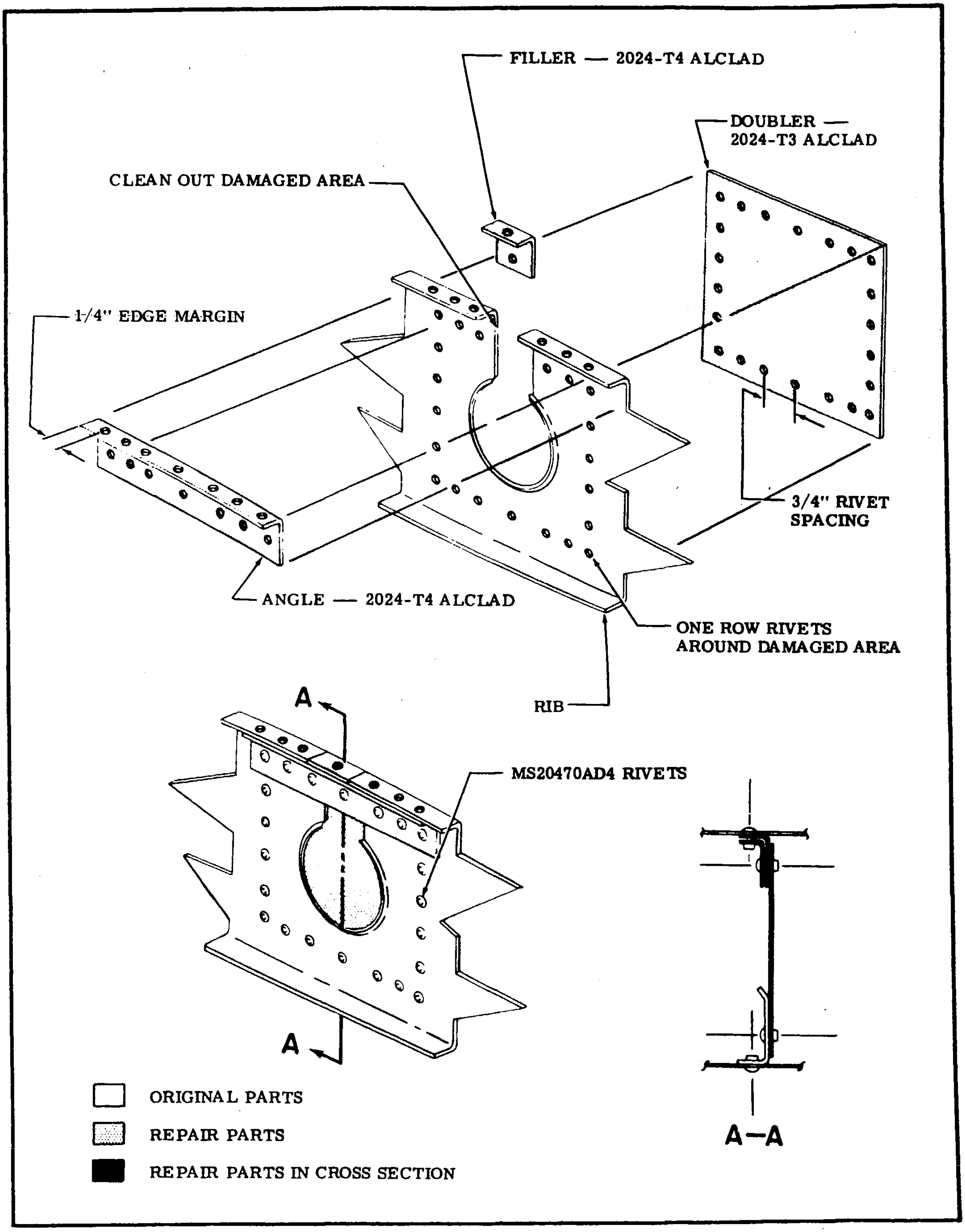


Figure 19-6. Rib Repair (Sheet 2 of 2)

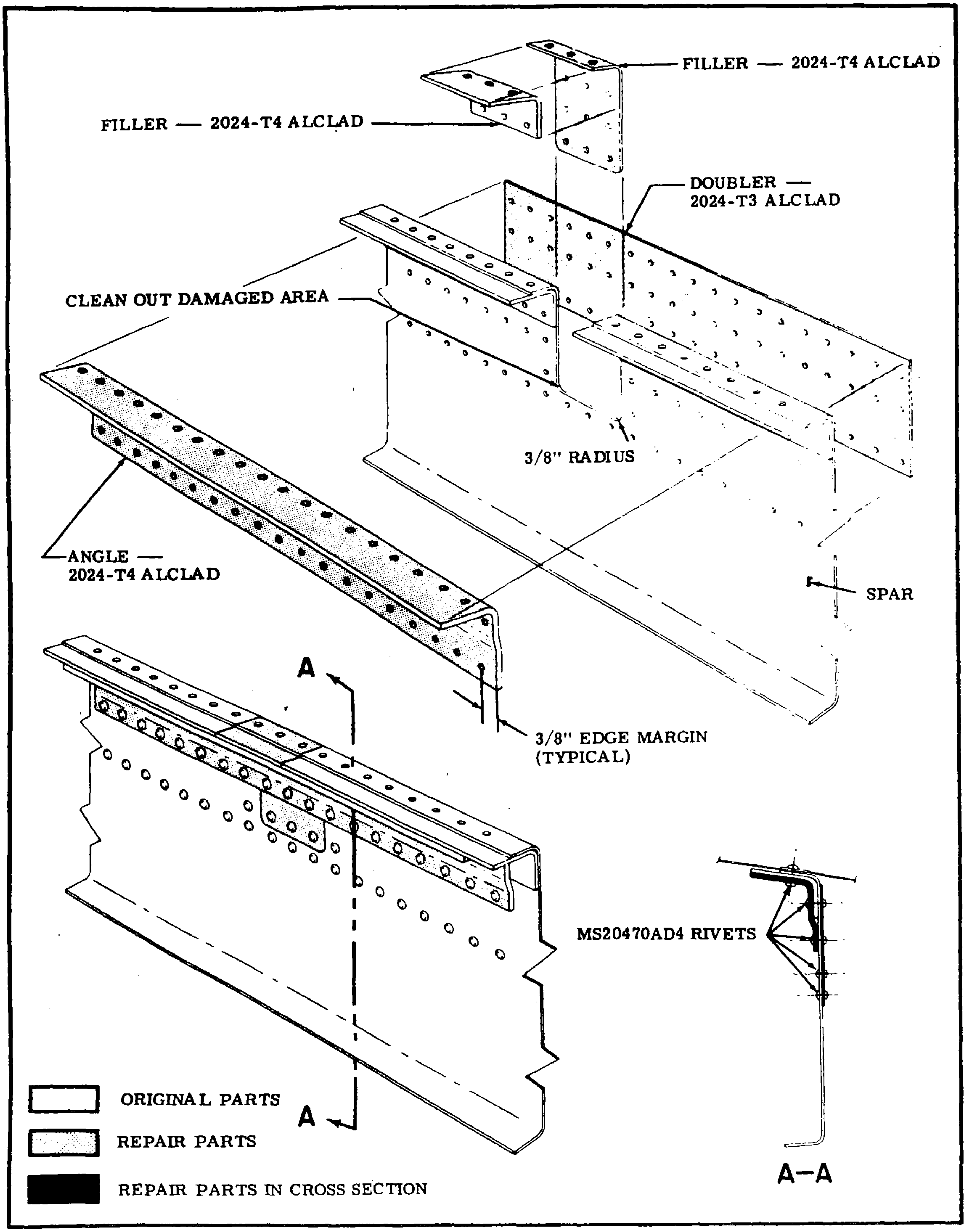
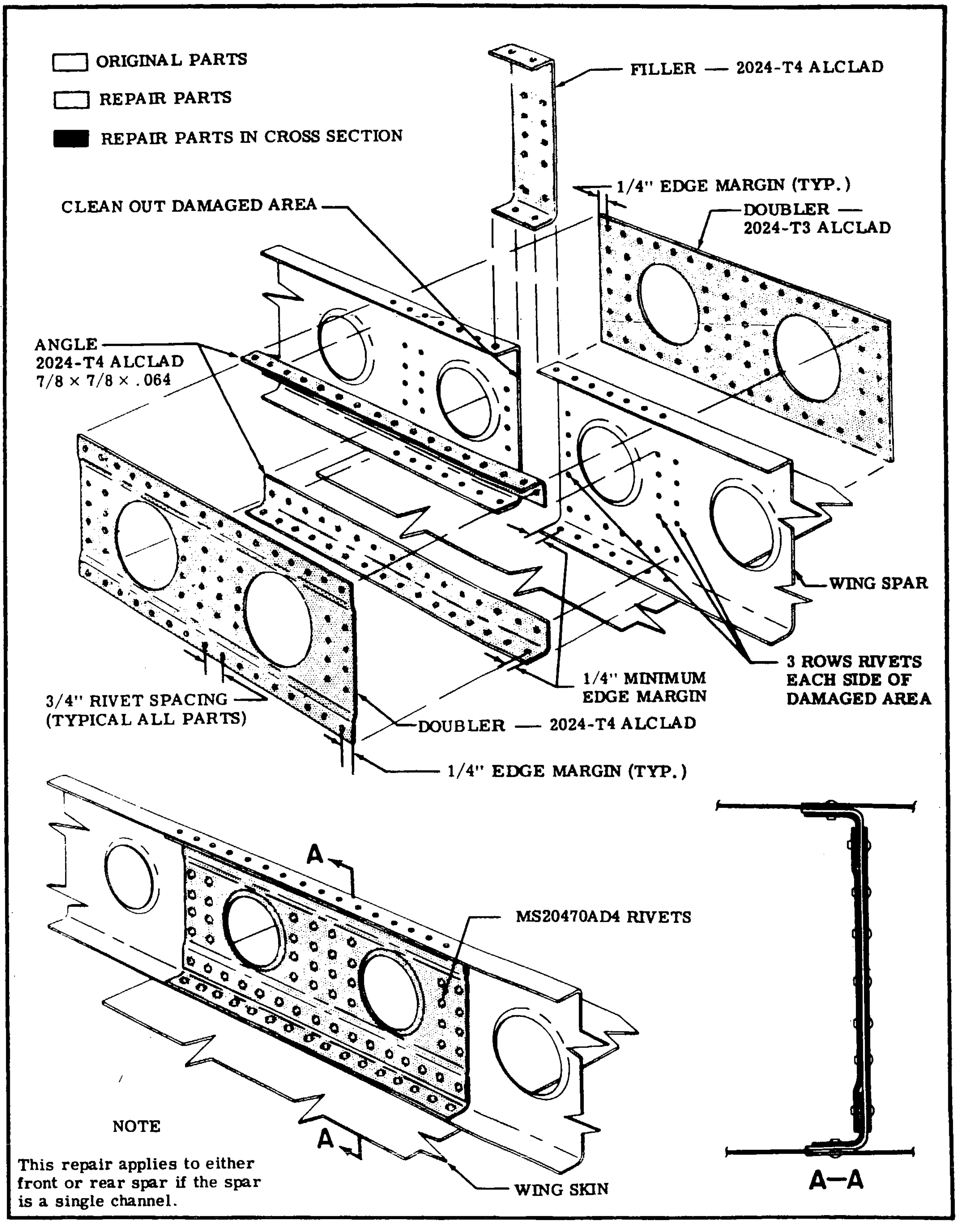


Figure 19-7. Wing Spar Repair (Sheet 1 of 4)



NOTE

This repair applies to either front or rear spar if the spar is a single channel.

Figure 19-7. Wing Spar Repair (Sheet 2 of 4)

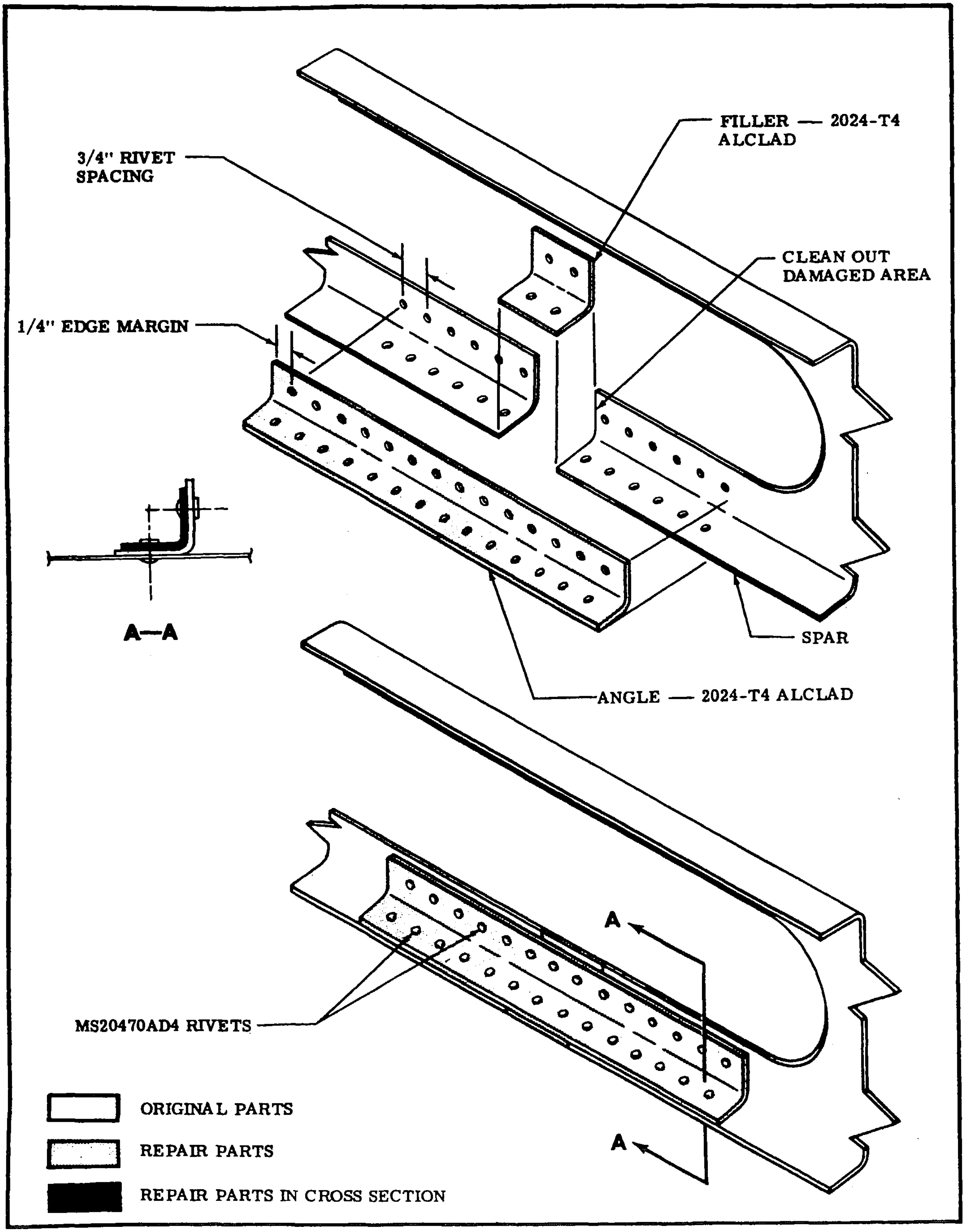


Figure 19-7. Wing Spar Repair (Sheet 3 of 4)

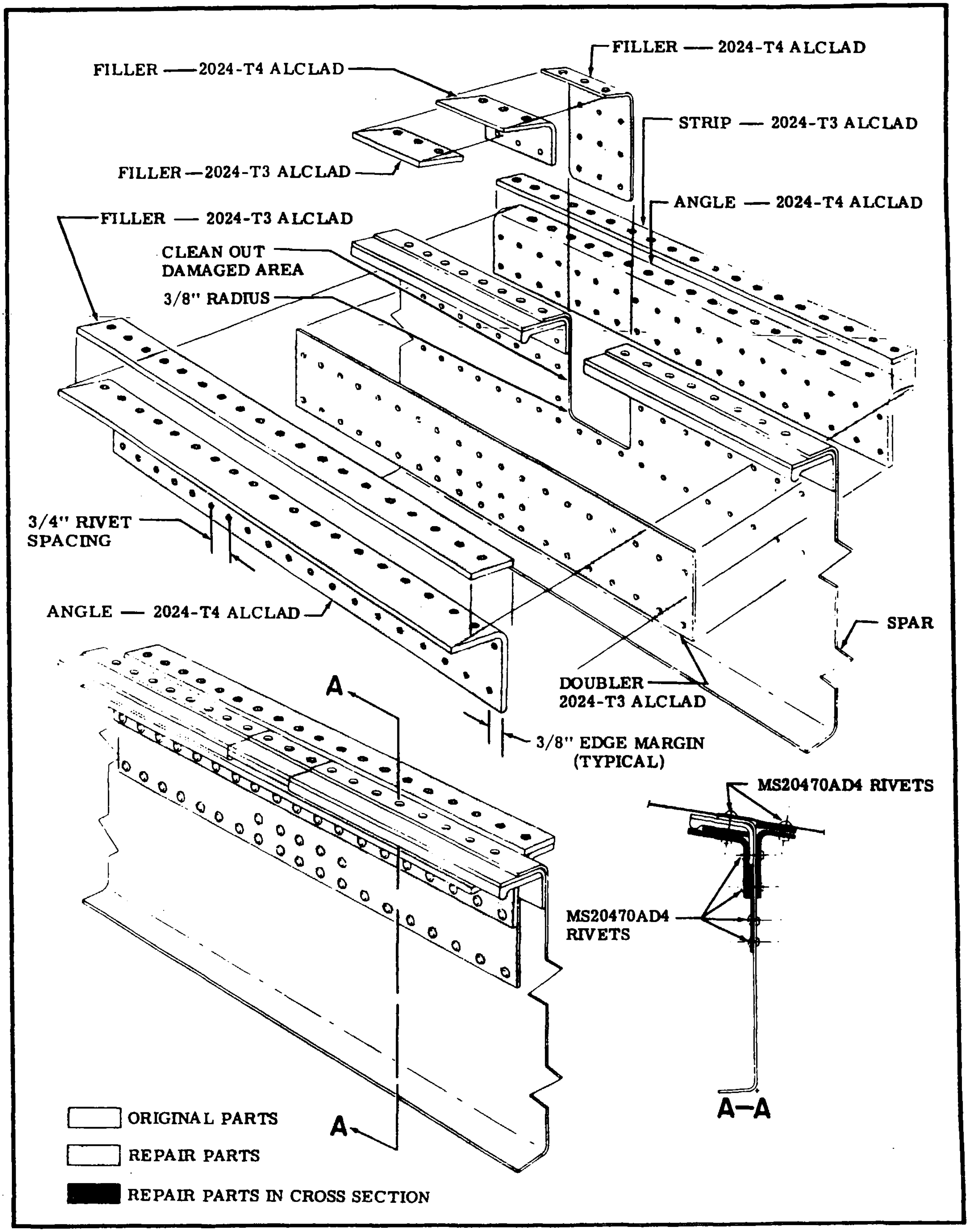


Figure 19-7. Wing Spar Repair (Sheet 4 of 4)

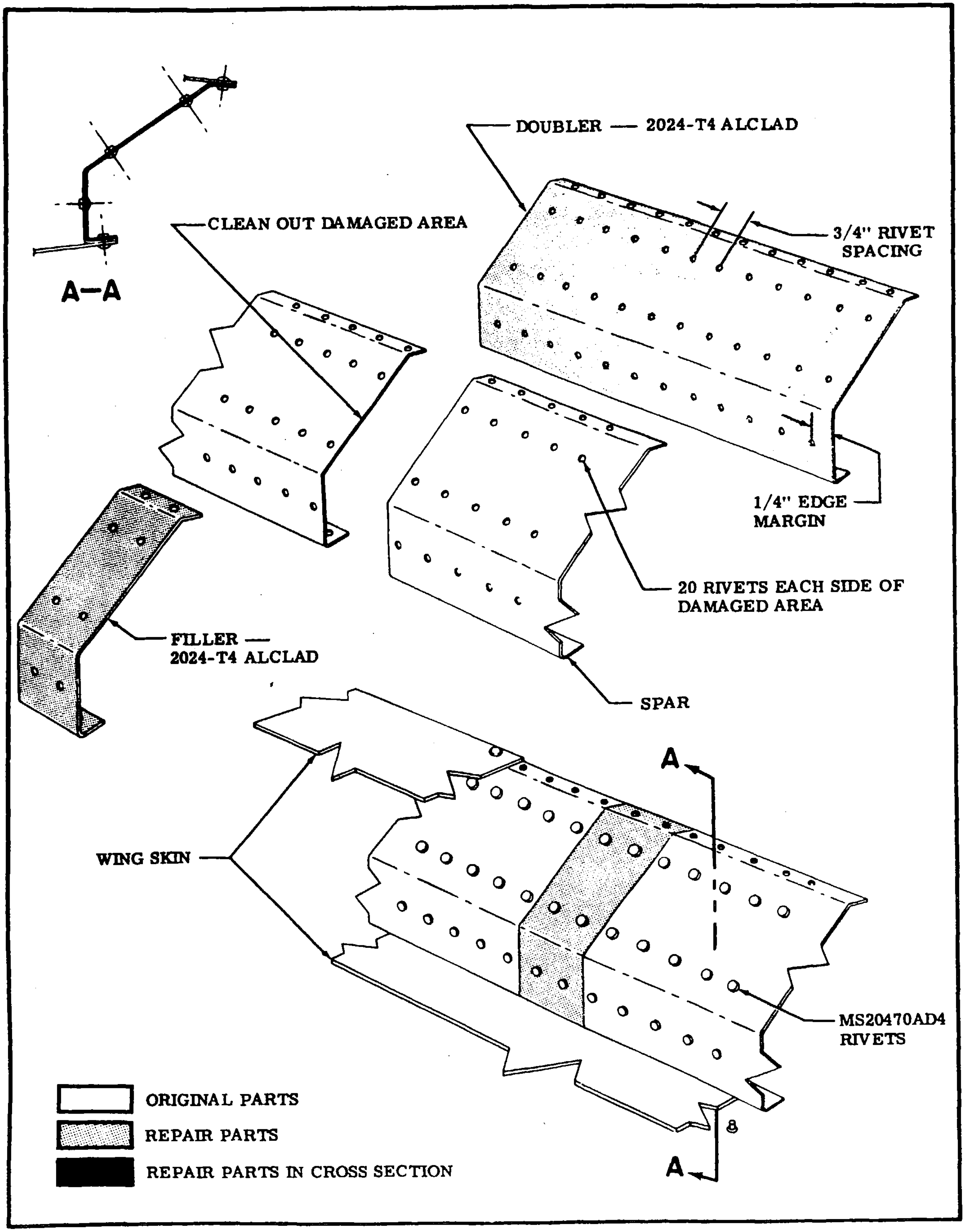


Figure 19-8. Auxiliary Spar Repair

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.

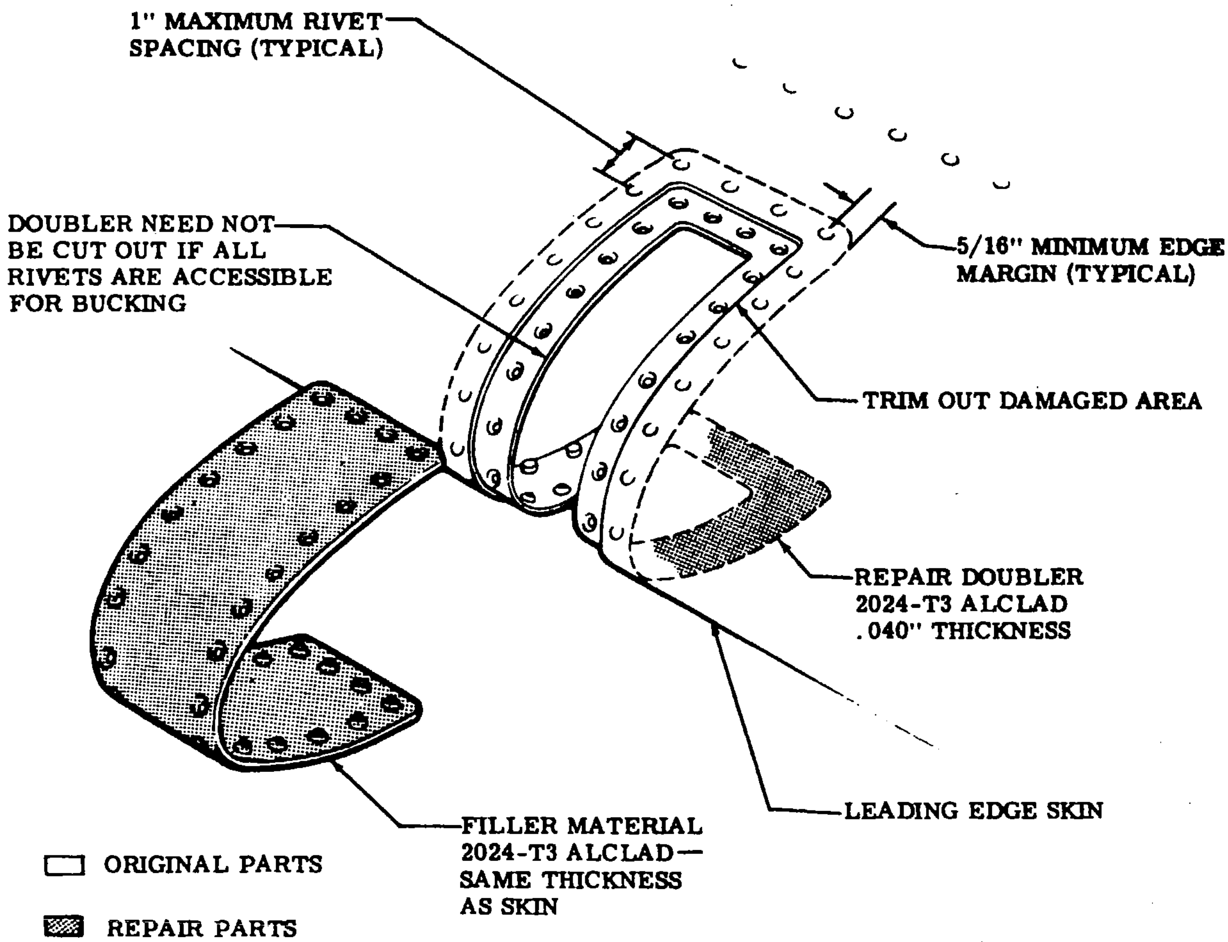
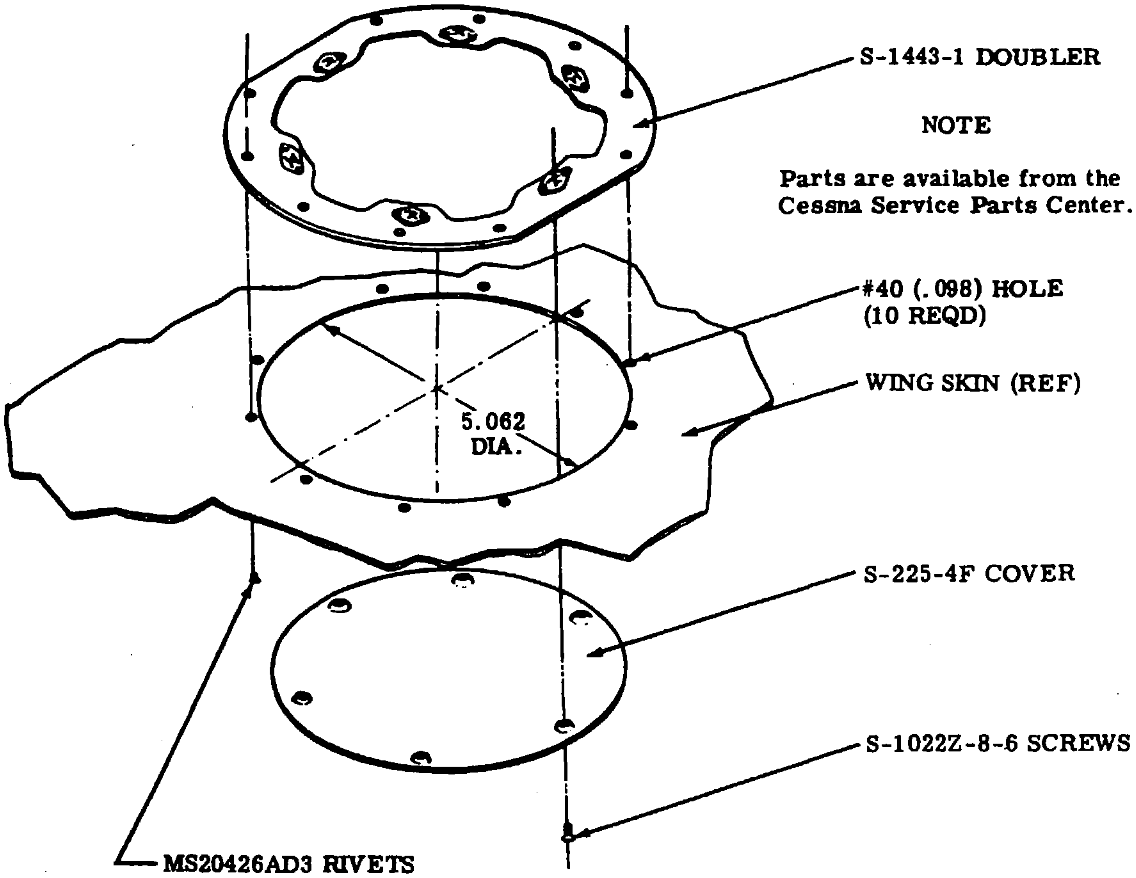


Figure 19-9. Leading Edge Repair



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 spar 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 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. Cut out 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 19-10. Access Hole Installation

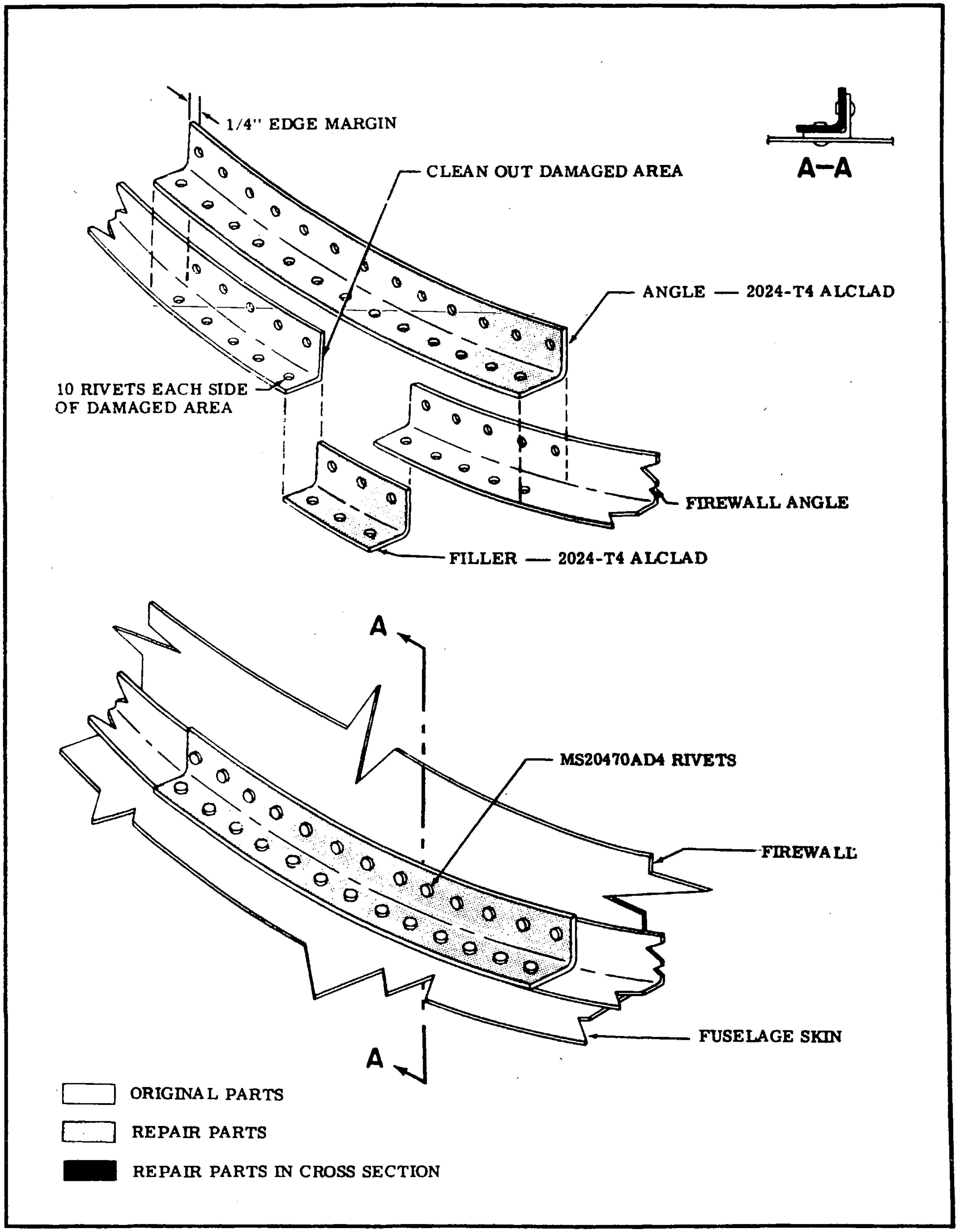


Figure 19-11. Firewall Angle Repair

SECTION 20

PAINTING

NOTE

This section is divided into two parts. Part 1 covers the procedures used, at the factory, for over-all painting of the aircraft. Part 2 covers the procedures for touch-up painting on the aircraft. Before attempting any painting on the aircraft, determine the type and color of the paint that is on the aircraft. The color and type of paint, on the aircraft when it left the factory, is stamped in code of the Finish and Trim Plate located on the left front door post. Applying this code to the applicable Parts Catalog the type and color can be determined. In all cases determine the type of paint that is on the aircraft before adding touch-paint as some types of paint are not compatible.

PART 1

OVER-ALL PAINTING

20-1. PAINTING.

20-2. Painting an aircraft requires little special equipment. The average shop will have the compressor, spray gun, and clean place to work required for a good paint job. Ordinarily, painting involves four basic steps. They are:

1. Stripping - Removing of paint to the bare metal.
2. Cleaning - Washing down the aircraft thoroughly to remove all oil, grease, and dirt.
3. Priming - Applying one priming coat before painting with acrylic paint.
4. Painting - Applying coat of final paint, then adding decorative strips and identification markings.

20-3. MATERAILS. The following list of materials is for use in both Part 1 and Part 2. These materials can be obtained from the Cessna Service Parts Center.

a. Thinner T-6094A
b. Thinner T-8402A
c. Thinner T-7945
d. Thinner T-9275
e. Thinner T-7987
f. Thinner T-9186
g. Solvent No. 2
h. Class A Solvent Proof Paper
i. Wash Primer EX2016G
j. Activator EX2016A
k. Primer Surfacer EX8229B
l. Sealer EX8229A
m. Acrylic Paint PX114A-Series
n. Filler White Streak
o. Filler Green Stuff No. 74
p. Wiping Cloth
q. Polishing Compound No. 606
r. Wax and Grease Remover DX440
s. Klad Polish
t. Imperial Cleaner
u. Tape, Permacel No. 781
v. Thinner T-1411

20-4. CLEANING.

a. Inspect aircraft for any surface defects, such as small dents or unsatisfactory previous repairs. Refer to Part 2 for repairs.
b. Wipe excess sealer from around windows and skin laps.
c. Mask windows and any other areas not to be primed, with Class A Solvent Proof Paper and Permacel tape no. 781.
d. Use Klad Polish to remove stains, oxides, etc., from bare aluminum.
e. Use T-6095A for final cleaning of the aircraft prior to applying primer. Saturate a contaminant-free, lint free cloth in T-6094A thinner and wring out so no thinner is dripping from the cloth. Wipe the aircraft surface using the thinner saturated cloth and immediately following sipe surface with a dry, lint free cloth.

NOTE

It is important that the thinner is wiped before it evaporates. Change cloths often, so that aircraft surface is thoroughly cleaned and the surface is not contaminated from the use of a dirty cloth. Always use clean thinner in the final cleaning. Be sure that thinner is disposed of when contaminated.

20-5. PRIMER PREPARATION.

NOTE

Mix EX2016G primer only in quantities required for use within six hours and then only in a stainless steel container. Mixed primer shall be discarded if not used within six hours.

a. Mix EX2016G primer and EX2016A activator in a 1:1 ratio and stir thoroughly.

NOTE

The mixed primer shall stand a minimum of 30 minutes prior to being applied to the aircraft.

b. Check all tapes to make sure that they are adhered to paper and masked surface. Cover flap tracks, nose gear strut tube, wheels, and shimmy dampener rod ends.
c. Blow all contaminates from surface of aircraft with a jet of dry compressed air.

20-6. PRIMER APPLICATION.

NOTE

Air pressure at gun shall be between 40 to 50 psig. At all times, keep gun six to eight inches from the work and perpendicular to surface being primed. DO NOT PAINT WITH ARCING MOTION. Keep paint room at 75 to 85 degrees Fahrenheit.

a. Apply EX2016G primer in one well broken up wet, even coat to 0.0003 to 0.0005 inch dry film thickness.
b. Allow primer to dry until a firm pressure with the finger nail will not penetrate the coating.

NOTE

Primer shall be top coated within four hours of application.

20-7. PAINT PREPARATION (ACRYLIC WHITE).
a. Thoroughly stir and mix in original container to make sure all pigments are in solution.
b. Mix required amount of acrylic white with T-8204A thinner. Recommended thinning ratio is 100 parts paint to 100-120 parts thinner by volume. This variation in thinning may be required to facilitate application during hot weather and is permitted.
c. Scuff sand the primer only where runs or large dirt particles are in evidence. (Over-all sanding operation will be performed after application of the first coat of paint.)

20-8. PAINT APPLICATION (ACRYLIC WHITE).

NOTE

Air pressure at the gun should be 40 to 50 psig and 12±1 psig at the pot during application. At all times, keep gun six to eight inches from the work and perpendicular to surfaces being painted. DO NOT PAINT WITH ARCING MOTION.

a. Apply one light wet even coat of paint to the aircraft.
b. Let dry until not tacky and lightly sand with No. 400 paper and wipe with a tack cloth.
c. Apply second coat even and wet. The minimum thickness necessary to provide good hiding is recommended. Heavy coats, applied in an attempt to improve gloss, should definitely not be applied or the acrylic may craze.
d. Burn down with T-8402A where necessary as soon after application of paint as practicable. Burn down should be held to a minimum.
e. Allow the finish to flash off for 10 minutes and move airplane to force dry oven and dry for 1-1/2 hours at 120 to 140 degrees Fahrenheit.
f. Remove airplane from oven and allow airplane to cool to room temperature.

20-9. PREPARATION FOR STRIPES. (ACRYLIC COLORS.)
a. Mask stripe area using Permacel No. 781 tape and class A solvent proof paper. Double tape all skin laps to prevent blow by.

NOTE

If an unpainted airplane is to receive stripes only, clean and prime as outlined in paragraphs 20-4 through 20-6.

b. Scuff sand stripe area with No. 400 or No. 600 sandpaper. The use of power sanders should be held to a minimum with care exercised to preclude sanding through the white base coat.
c. Wipe sanded surface with a tack cloth and check all tapes to be sure they are adhered to surface.

20-10. PAINT PREPARATION (ACRYLIC COLOR).
a. Thoroughly stir and mix in original container to make sure all pigments are in solution.
b. Mix required amount of stripe color with T-7945 thinner. Recommended thinning ratio is 100 parts paint to 100-125 parts thinner by volume. This will allow for the slight thinner variation required with different colors.

20-11. APPLICATION OF STRIPES.

NOTE

Air pressure at the gun shall be 40 to 50 psig. At all times keep gun six to eight inches from the work and perpendicular to the surface being painted. DO NOT PAINT WITH ARCING MOTION.

a. Keep first coat even and light. The first coat should be somewhat lighter than the second to avoid sags, but should be wet enough to achieve a smooth surface.
b. Apply second coat in wet passes to achieve full coverage. Heavy coats applied in an attempt to improve gloss, should definitely not be applied or the acrylic may craze.
c. Inspect for overspray and apply burn down agent, T-7945 thinner, to any area showing overspray. Care in application will minimize overspray.

NOTE

Burn down of non-metallic colors shall be accomplished with T-7945 thinner. Burn down of metallic colors shall be accomplished with T-7987 thinner.

d. The masking tape and paper shall not be removed until the paint has dried a minimum of 15 minutes. Care shall be used in removal of masking to prevent damage to the finish.

20-12. PROCEDURE FOR PAINTING WITH CESSNA LACQUER - 27H SERIES.

20-13. PREPARATION. Thoroughly clean all surfaces and beyond area to be painted, with T-6094 thinner. Extreme care should be taken to remove all letters, grease, bugs, etc. Carefully mask off stripe areas to be painted and see that all tapes are firmly adhered to metal to prevent ragged edges. Class "A" wrapping paper and thinner-proof tape should be used to cover windows and windshield. This will prevent damage from solvent and thinner vapors. Newspapers will not provide adequate protection.

20-14. PRIMER - MIXTURE AND APPLICATION.

NOTE

Mix EX-2016 primer only in quantities required for use within six hours and then only in stainless steel bucket.

a. Mix EX-2016 primer and T-6070 activator in a 1:1 ratio and stir thoroughly.

NOTE

The primer shall stand after mixing a minimum of 30 minutes prior to being applied to the airplane.

b. Apply EX-2016 in a well broken up, wet, even coat.
c. Mix one part EX-2414 yellow lacquer primer with two parts T-6094 thinner.
d. Apply one well broken up, wet, even coat of the EX-2414 primer over the EX-2016 primer.

20-15. PREPARATION OF LACQUER COLORS - 27H SERIES.
a. Thoroughly stir and mix in original container to make sure all pigments are in solution.
b. Thin required amount of lacquer color with T-6094 thinner in a 1:1 ratio. Mix thoroughly and strain into cups before using.

20-16. APPLICATION OF LACQUER COLORS - 27H SERIES.

NOTE

Air pressure at gun should not exceed 40 psig. At all times, keep gun six to eight inches from the work and perpendicular to surface being painted. DO NOT PAINT WITH ARCING MOTION. Keep paint room at 75 to 85 degrees Fahrenheit.

a. Apply first coat even and wet; second and third coats in the same manner.
b. Check carefully before second and third coats for defects and correct before final coats.
c. Using T-6094 thinner as a "burn-down" agent, "burn-down" to give smooth, even surfaces free from overspray.

20-17. PROCEDURE FOR PAINTING WITH CESSNA ENAMEL VINYL - 82 SERIES.

NOTE

82A, 82B, and 82 are interchangeable, although 82A and 82B have better flow characteristics.

20-18. PREPARATION. Thoroughly clean all surfaces and seans with T-6094 thinner. Extreme care should be taken to assure that no oil seepage occurs from seams, splices, or rivet heads. All bugs and foreign matter should be removed from the airplane before painting. Thoroughly inspect after cleaning to be sure all surfaces are ready for priming. Class "A" wrapping paper and thinner-proof masking tape should be used to cover windows and windshield. This will prevent damage from solvent and thinner vapors. Newspapers will not provide adequate protection.

20-19. PRIMER - MIXTURE AND APPLICATION.

NOTE

Mix EX-2016 primer only in quantities required for use within six hours and then only in stainless steel bucket.

a. Mix EX-2016 primer and T-6070 activator in a 1:1 ratio and stir thoroughly.

NOTE

The primer shall stand after mixing a minimum of 30 minutes prior to being applied to the airplane.

b. Apply EX-2016 primer in a well broken up, wet, even coat. If primer has to be sanded, dry scuff sand with #600 paper and reprime. Sanding breaks film, result in poor adhesion.

NOTE

On all leading edge surfaces, apply a cross coat, wet and even, of EX-2016 primer.

c. Clean equipment immediately after use and under no consideration use EX-2016 primer that has been mixed longer than six hours.

20-20. PREPARATION OF ENAMEL VINYL COLORS - 82 SERIES.
a. Thoroughly mix and stir in original container to make sure all pigments are in solution.
b. Thin required amount of vinyl color with T-1866 vinyl thinner in a 1:1 ratio. Mix thoroughly and strain into either a cup or pressure pot.

20-21. APPLICATION OF VINYL COLORS - 82 SERIES.

NOTE

If vinyl is to be applied from a pressure pot, do so under the following conditions: Pressure of 10 psig. Regulate gun pressure at gun with test gauge to 25 psig, using gun with FX needle and fluid tip, with fan set wide open and yield two turns open. If cups are used, set fun at 30 psig with EX needle and fluid tips, fan set one turn open and yield wide open.

a. Apply first coat even and wet; second and third coats in same manner.
b. Check second and third coats, mask off and lightly wet sand with #400 paper the painted surfaces of previous color that is in area to be painted.

NOTE

On all leading edges apply a fourth coat. After finishing each color coat, "burn-down" with T-1411 thinner as the "burn-down" agent. Remove all masking from painted surfaces after each color application. If you have a Heat Room, turn up the heat and dry paint at temperatures of 125 to 145 degrees Fahrenheit, for at least three hours. Heat will give a very good reflow on vinyl paint.

20-22. PROCEDURE FOR APPLICATION OF HI-VISIBILITY PAINT.

20-23. MATERIALS REQUIRED are:

3 qts Switzer Orange Day-Glo

2 qts Toluene Thinner

2 qts Switzer Filteray, Type B Top Coat

2 qts White Base Coat

2 qts Thinner

20-24. MIXING PROCEDURE: All paint shall be thinned to spraying consistency as follows:
a. Hi-Visibility paint shall be thinned with two parts Toluene thinner to three parts paint.
b. Clear top coat shall be thinned with one part Xylene thinner to one part paint.
c. White base coat shall be thinned with one part thinner to one part paint. This formula applies to either lacquer or vinyl.

NOTE

Either Toluene or Xylene may be used as the thinner for Hi-Visibility paint and the top coat. Tolueme is recommended for the Hi-Visibility paint and Xylene for the top coat.

20-25. SURFACE PREPARATION. Hi-visibility paint must be applied over a good white undercoat. The preferred white undercoat is white lacquer. If, however, the airplane is already painted with vinyl base paint, the white undercoat may consist of white vinyl. A white primer may also be used as the undercoat.

20-26. APPLICATION.
a. Apply three well broken up, even coats of white undercoat. Allow sufficient drying time. Wipe with tack rag.
b. Apply one heavy wet coat of Hi-Visibility paint. This coat should consists of three wet passes over the entire area. Allow two or three minutes drying time between passes. Dry coat should be 2.5 to 3.5 mils thick. Allow one to two hours drying time.
c. Wipe surface with tack rag to remove overspray.
d. Apply two wet coats of clear top coat, consisting of two passes per coat. Dry coat should be 1.5 to 2.5 mils thick.

NOTE

Hi-Visibility paint is not offered at the factory.

PART 2

TOUCH-UP PAINTING

20-27. TOUCH-UP-GENERAL.

20-28. Where necessary to touch-up or refinish an area, the edge of the finish adjacent to the defect shall be feathered by sanding with No. 320 paper and followed with No. 400 paper. Avoid, if possible, sanding through the primer. If the primer is penetrated over an area 1/2 inch or larger, repriming is necessary. Avoid spraying metal primer on the adjacent paint as much as possible.
a. When touching up acrylic, vinyl, or lacquer, use EX2016G primer mixed one part primer to one part EX2016A activator. Stir thoroughly and allow to set 30 minutes before spraying.
b. When touching up epoxy, use Dupont 818-012 primer mixed two parts primer to one part 8539 activator. Stir thoroughly and allow to set 30 minutes before spraying.

CAUTION

Before attempting touch-up, determine the type of paint that is on the aircraft. Some types of paints are not compatible. Acrylic paint does not adhere to vinyl paint satisfactorily. Therefore, when acrylic paint is to be applied over vinyl paint, a barrier coat of lacquer paint is required between the vinyl and acrylic paint.

20-29. TOUCH-UP-ACRYLIC.

a. Fill the feathered areas by spraying on several light coats of EX8229A Surfacer. Only sufficient Surfacer should be used to assure filling. Allow 5 to 8 minutes drying time between coats of Surfacer used. Sand the Surfacer smooth with No. 400 paper. Apply a light coat of EX8229A Sealer over the sanded Surfacer. After drying for 5 to 8 minutes, spray the Acrylic top coat.

NOTE

Dry overspray may be removed by burndown with T-8402A (White), T-7945 (non-metallic color), T-7987 (metallic color), or by compounding with Dupont No. 808 Rubbing Compound.

20-30. TOUCH-UP-VINYL.

a. If priming with EX2016G primer is required, a light coat of MIL-P-8585 Zinc Chromate primer thinned four parts Toluol to one part primer shall be applied over the EX2016G primer.

b. Fill the feathered areas by spraying on several light coats of ACME 538 Dark Grey Surfacer. Allow 5 to 8 minutes drying time for each coat of Surfacer. Sand the area smooth with No. 400 paper and apply the top coat of vinyl.

NOTE

Dry overspray may be removed by burndown with T-1411, or by compounding with Dupont 808 Rubbing Compound.

20-31. TOUCH-UP-LACQUER.

a. When priming with EX2016G is required, a light coat of EX2414 primer shall be sprayed over the EX2016G primer. Mix one part EX2414 Yellow lacquer primer with two parts T-6094 thinner. Fill the feathered areas by spraying on several light coats of ACME 538 Dark Grey Surfacer. Allow 5 to 8 minutes dry time for each coat of Surfacer applied. Sand the area smooth with No. 400 paper and apply top coat of lacquer.

NOTE

Dry overspray may be removed by burndown with T-6094 thinner, or by compounding with Dupont No. 808 Rubbing Compound.

20-32. TOUCH-UP-EPOXY.

a. If bare metal is not exposed, or after the metal is primed, spray a light coat of Dupont Epoxy Primer over the rework area. Mix two parts 825-8500 Primer with one part VG5943 activator. If a thinner is required, use T-3871 thinner. Stir primer and allow to set 45 minutes before spraying.

NOTE

Top coat must be applied over primer within 72 hours of priming.

b. When the primer is DRY, apply top coat, Cessna Part Number CES1054-826. The Dupont Chemical Resistance Enamel white epoxy base coat shall be mixed one part enamel to one part VG8339 activator. If thinning is required, use T-3871 thinner.

c. The Enmar 5400 series color epoxy is used to paint the stripes. All colors, except the Valor Red, shall be mixed one part by volume paint to one part by volume T-5400 Adduct Thinner. Mix the Valor Red in the same ratios, except use T-6487 Adduct Activator. If a thinner is required, use T-5402 Thinner. Stir thoroughly and allow the mixed paint to set for 30 minutes prior to spraying.

APPENDIX

ELECTRICAL WIRING DIAGRAMS

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150 & F150	0410011
172, P172, F172, FP172 & FR172E	0500062
180 & 185	0700092
182	0770610

NOTE

The page numbering method in this Section differs from that of the rest of the book. However, each model series drawing number begins with an index of diagrams contained therein, which will facilitate locating any particular diagram.

Cessna®

WIRING DIAGRAM

MODEL 150

DWG. NO. 0410011

FORM NO. 6 ..8

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6. "DS" SUFFIX ON WIRE GAUGE IN WIRE TABLE DENOTES DOUBLE SHIELDED WIRE.
7. ALL WIRES TO BE PREFIXED A-XXX.
8. WHEN "(OPT)" IS USED IN THE TITLE BLOCK OF A DIAGRAM, ALL WIRES SHOWN THEREIN ARE OPTIONAL EXCEPT WHERE NOTED AS "(STD)".
9. ALL WIRE NOT SPECIFIED AS "(OPT)" ARE TO BE INSTALLED AS STANDARD EQUIPMENT. THE AIRPLANE ASSEMBLY WILL SPECIFY THE ADDITIONAL EQUIPMENT REQUIRED FOR DELUXE VERSIONS.

Cessna

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DATE	9-13-62	MODEL 150		0410011
APP'D	RCS		REV: "B"	PAGE: 3.0

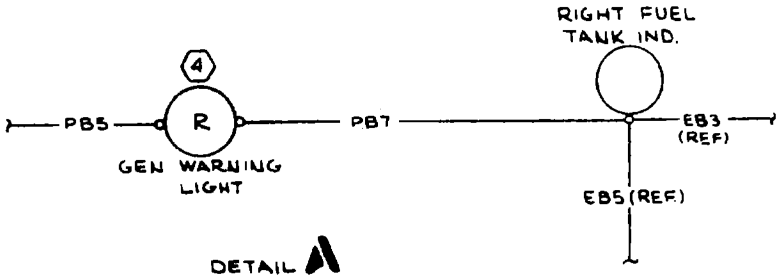
CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

D. C. POWER SECTION

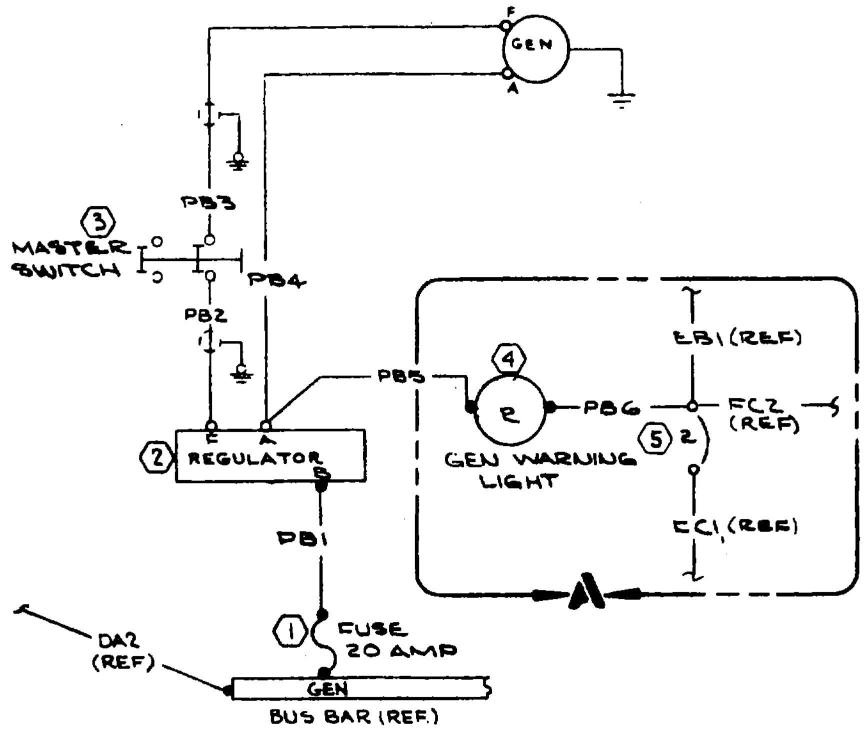
Cessna

DRAWN	GB	TITLE: WIRING DIAGRAM--- MODEL 150		DRAWING NO. 0410011
DATE	9-13-62			
APP'D	RRS		REV: "B"	PAGE: 4.0

CHG LET	REVISION	BY DATE	CHK APPD
B	REDRAWN NO CHG	AFJ 8-6-60	RRS
C	BY REV. ADD PB7, ADD DETAIL A ADD C/T, INACTIVATED PB6 (SR4662)	4/5-65	
D	BY REV. ON PB5 & PB7 S-1493-1 WAS SOLDER, DA2 (REF) WAS PA6 (REF), GEN. WAS DA7 ON BUS BAR (REF)	8-6-65	



DETAIL A
SER 15061533 & ON



Inactive
SER 15064533 & ON
2-3-65 10-29-65
HW
RRS
DKM

PB7	18			S-1493-1	S-1367-1-8		SER 15061533 & ON
PB6	18		13	S-1367-1-8	—		THRU SER 15061532
PB5	18		72	S-1367-1-10	S-1493-1		
PB4	10		25	S-1367-3-10	S-1367-3-12		
PB3	18S		91	S-1367-1-12	S-1367-2-8 S-1367-1-8		
PB2	18S		80	S-1367-1-8 S-1367-2-8	S-1367-1-10 S-1367-2-8		
PB1	10		67	S-1367-3-10	—		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
5	CA-2	CIRCUIT BREAKER	(MTCC)
4	0513051-8	LIGHT ASSY.	
3	0713026-5	SWITCH ASSY	
2	0413205-12	VOLTAGE REGULATOR	
1	S-1091-20	FUSE	

EQUIPMENT TABLE

	NAME	DATE
DRAWN	[illegible]	3-8-60
GROUP		
CHECK	[illegible]	3/1/60
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — GENERATOR & WARNING LIGHT

Cessna.

DWG NO 0410011

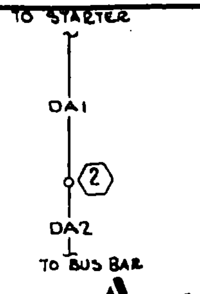
SUPERSEDED BY 0410011 PG 4.7 | SUPERSEDES 0410011 A REV | MODEL 150 | REV D | PAGE: 4.2

FORM NO 80-161

NOTE:
1. DA1, DA2, DA3 & DA4 ARE IDENTICAL TO & SUPERSEDE 0410012-DA1, -DA2, -DA3, & -DA4 RESPECTIVELY

2 DA1 & DA2 TO BE INSTALLED AS STD. TO REPLACE PA6. WHEN AN AMMETER IS NOT INSTALLED CONNECT AS SHOWN IN DET. "A" & COVER CONNECTION WITH S-292-14-8.00 VINYL SLEEVING.

CHG LET	REVISION	BY DATE	CHK APPD
B	ADDED DA1, DA2, DA3, & DA4 WIRES & NOTE 1	5-28-62	
C	BY REV: INACTIVATE DA3 & DA4; ADD LIMITING SER TO VIEWS, ADD DETAIL "A" & NOTE 2; ADD E/T	8-3-65	
D	BY REV: ADDED AN936A10 & S-292-14-8.00 TO E/T.	8-17-65	



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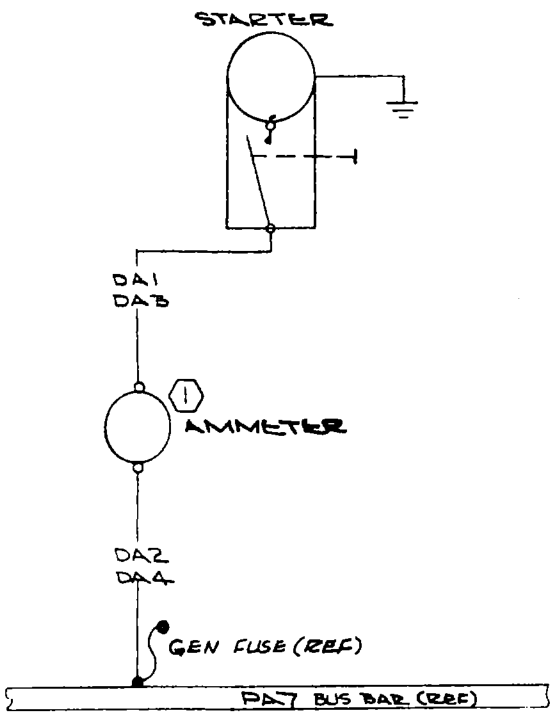

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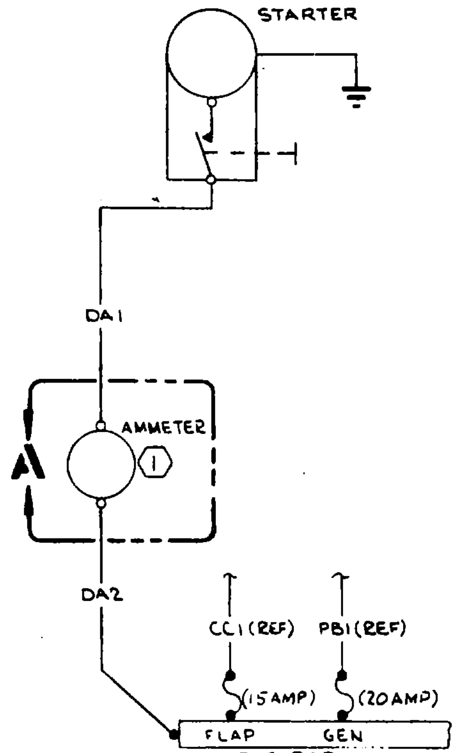


BUS BAR
(SER 15061533 & ON)

Inactive
SER 15061533 & ON
10-8-65 10-28-65

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
DA4	10		20	———	S-1367-3-10	0410012	INACTIVE SER 15060773 & ON
DA3	10		62	S-1367-3-14	S-1367-3-10	0410012	INACTIVE SER 15060773 & ON
DA2	10		26	———	S-1367-3-10	0410012	
DA1	10		89	S-1367-3-14	S-1367-3-10	0410012	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
2	S-292-14-8.00	VINYL SLEEVING	
	AN520-10R6	SCREW	
	AN936A10	WASHER	
	AN345-10	NUT	
1	S-1319-1	AMMETER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	TENNANT	2/6/60
GROUP		
CHECK	Cook	3/8/60
PROJ	CATTLER	3/10/60

TITLE: WIRING DIAGRAM — AMMETER (OPTIONAL)

Cessna.

DWG NO 0410011

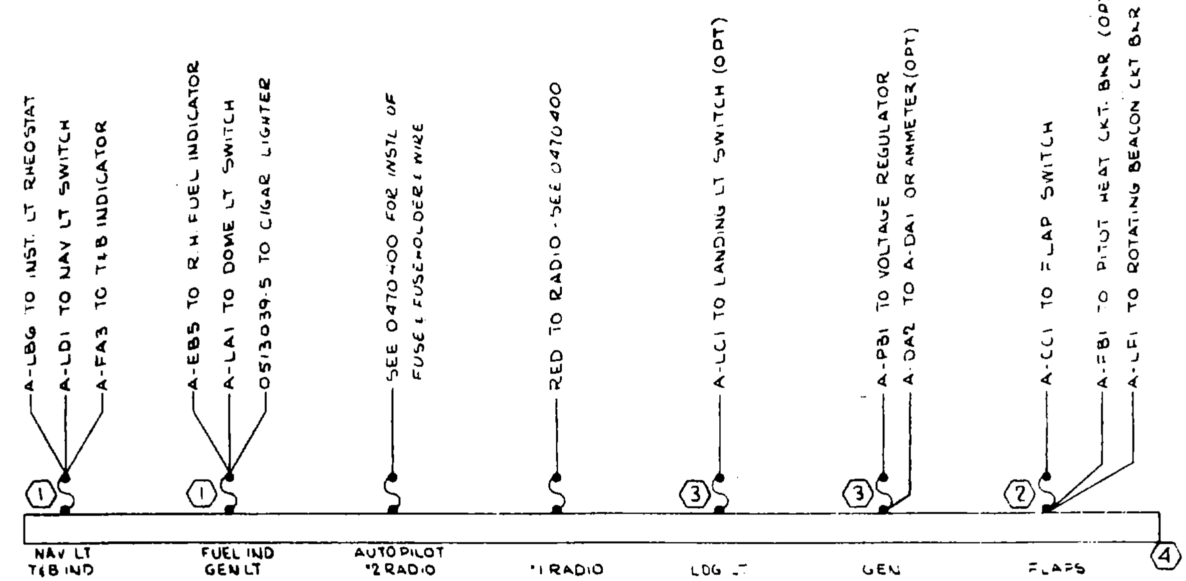
SUPERSEDED BY: 0410011 PG 48 | SUPERSEDES: NOTE 1 | MODEL: 150 | REV: D | PAGE: 4.3

FORM NO 80-181

NOTES:

1. THIS DWG. IS FOR REFERENCE PURPOSES ONLY, FOR WIRE & TERMINAL REQUIREMENT CALLOUTS & WIRING DIAGRAMS SEE INDIVIDUAL PAGES OF 0410011

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV. DELETED A-PA6, A-DA4; ADDED A-DA1 TO GEN FUSE (SR 4920)	10-8-65	



SER 15064533 & ON 10-8-65 10-29-65

4	PA11	BUS BAR	0470100
3	S-1090-5 S-1091-20	FUSEHOLDER FUSE	0470100
2	S-1090-4 S-1627-15	FUSEHOLDER FUSE	0470100
1	S-1090-3 S-1091-10	FUSEHOLDER FUSE	0470100
	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	5-11-65
GROUP	H. Wiese	5-18-65
CHECK		5-19-65
PROJ		5-21-65

TITLE: WIRING DIAGRAM— FUSE & BUS BAR WIRING

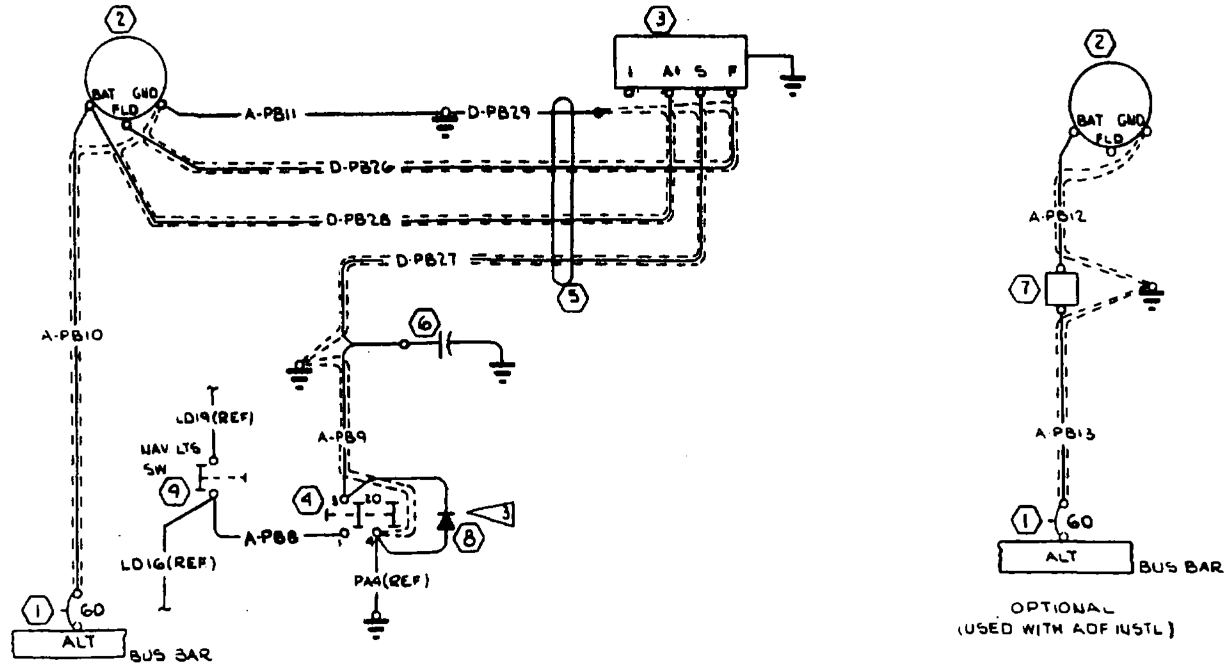
Cessna.

DWG NO: 0410011

SUPERSEDED BY: 0410011 PG.4.9 | SUPERSEDES: | MODEL: 150 | REV: A | PAGE: 4.4

(SR4920) II

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV. ON ITEM 4 TERMINAL 3 WAS 4 & TERMINAL 4 WAS 3 (SR4920)	3-18 3-22	



STANDARD

OPTIONAL
(USED WITH ADF INSTL)

SR 5200 & ON

HLW 6-3-66

NOTES:

1. "D" PREFIX IS USED ON THESE WIRES INSTEAD OF "A" BECAUSE WIRES ARE THE SAME AS THOSE USED ON MODEL 182.
2. 8 GA SHIELDED WIRE MATERIAL PER S-1534-8-9
3. OBSERVE POLARITY SYMBOL ON DIODE ASSY WHEN INSTALLING ON SWITCH TERMINAL OR DIODE WILL FAIL WHEN SYSTEM IS ENERGIZED
4. AMP TERMINALS 41796(ARP)

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
9	0713026-4	SWITCH ASSY	
8	0770719-1	DIODE ASSY.	
7	S-1629-1	NOISE FILTER	
6	0770038-2	FILTER	
5	1250211-1	PLUG ASSY	
4	0713026-5	SWITCH MASTER	
3	C611001-0101	REGULATOR	
2	C611501-0201	ALTERNATOR ASSY	
1	S-1596-60	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS	TERMINALS	N/A	SERIALS
D-PB29	16	1		SOLDER	S-1367-2-12	1250211	
D-PB28	18S			S-1367-1-12 S-1367-2-10	4		
D-PB27	18S			S-1367-1-6 S-1367-2-8	4		
D-PB26	18S	1		S-1367-1-10 S-1367-1-10	4	1250211	
A-PB13	8S	2		[illegible]	S-1367-4-10	OPT	
A-PB12	8S	2		[illegible]	[illegible]	OPT	
A-PB11	10			S-1367-3-10	S-1367-3-12		
A-PB10	8S	2		[illegible]	S-1367-4-10		
A-PB9	18S			S-1367-1-8	[illegible]		
A-PB8	18			S-1367-1-8	S-1367-1-10		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	10-3-65
GROUP	[illegible]	10-29-65
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

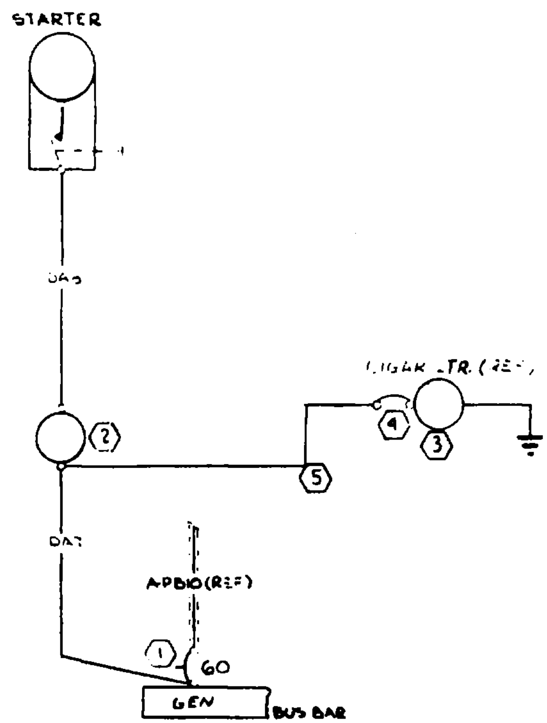
TITLE: WIRING DIAGRAM— ALTERNATOR 60 AMP

Cessna.

DWG NO 0410011

SUPERSEDED BY 0410011 PG 4.10 · SUPERSEDES 0410011 PG 4.2 · MODEL 150 · REV A · PAGE 4.7

LTR	REVISION	BY DATE	CHK APPD
A	[illegible]	[illegible]	[illegible]



DA8	8			5-1361-4-10	5-1361-4-14		
DA7	8			5-1361-4-10	5-1361-4-10		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

5	05-3039-5	WIRE ASSY	
4	40232-1	CIRCUIT BREAKER	(CUE)
3	0513012-3	LIGHTER ASSY	
2	S-1520-1	AMMETER	
1	S-1596-60	CIRCUIT BREAKER	
ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	[illegible]
GROUP	[illegible]	[illegible]
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM— AMMETER 60 AMP

Cessna.

DWG NO 0410011

SUPERSEDED BY

SUPERSEDES 041011 PG. 4.5

MODEL 150

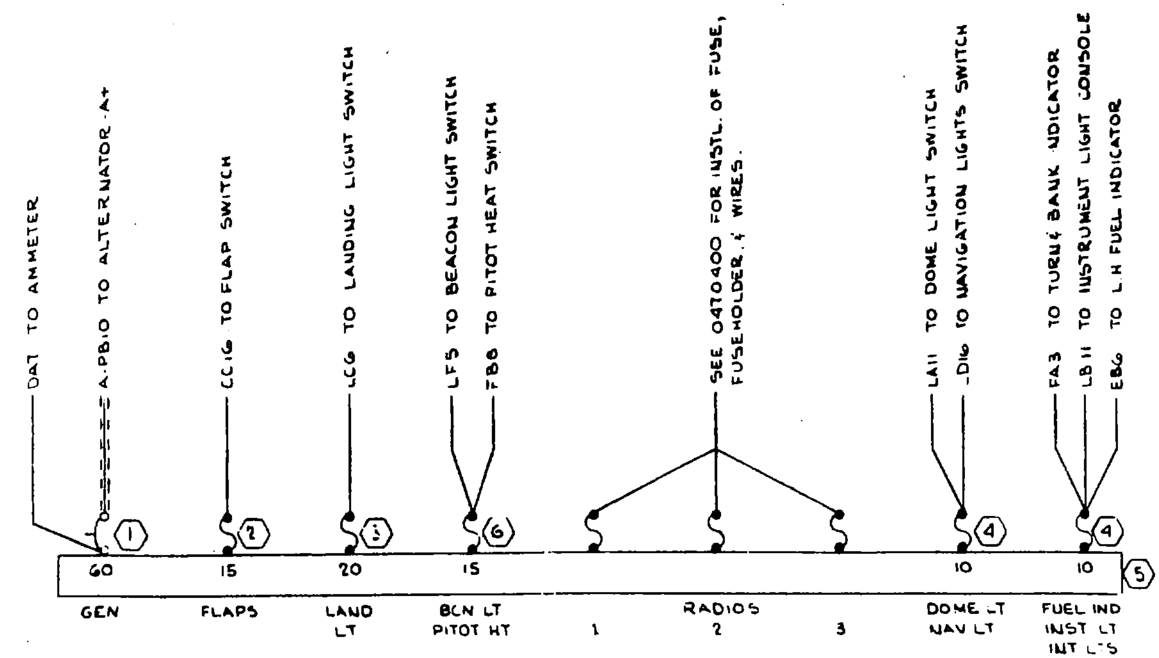
REV A

PAGE 4.8

NOTE:
1. THIS DWG IS FOR REF. PURPOSES ONLY. FOR WIRE & TERMINAL REQUIREMENTS AND WIRING DIAGRAMS SEE THE INDIVIDUAL PAGES OF 0410011.

(SR4920)

CHG LET	REVISION	BY / DATE	CHK / APPD
A	BY REV: ON BUS BAR GEN WAS ALT, BCN LT WAS ROT BCN, DOME LT-NAV LT-V-REG WAS NAV LTS-CIGAR LTR; FUEL IND-INST LT-INT LTS WAS INT LTS-INST, TO BEACON LIGHT SWITCH WAS TO ROTATING BEACON SWITCH; DELETED HC1 TO CIGAR LIGHTER FROM DOME LT FUSE, ADD S1091-15 TO E/T, S1707-60 WAS S-1596-60, BCN LT FUSE S-1091-15 WAS S-1091-10 (SR5153)	JWB 7-20-66	YAK
B	BY REV. ON BUS BAR DOME LT-NAV LT WAS DOME LT-NAV LT-V REG (SR5199)	JWB 9-10-66	



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
6	S1091-15	FUSE	
5	0470016-1	BUS BAR	
4	S1091-10	FUSE	
3	S1091-20	FUSE	
2	S1627-15	FUSE	
1	S1707-60	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	9-8-65
GROUP	J Ward	10-29-65
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM— CIRCUIT BREAKER, FUSE & BUS BAR WIRING

Cessna.

DWG NO 0410011

SUPERSEDED BY:

SUPERSEDES: 0410011 PG 4.4

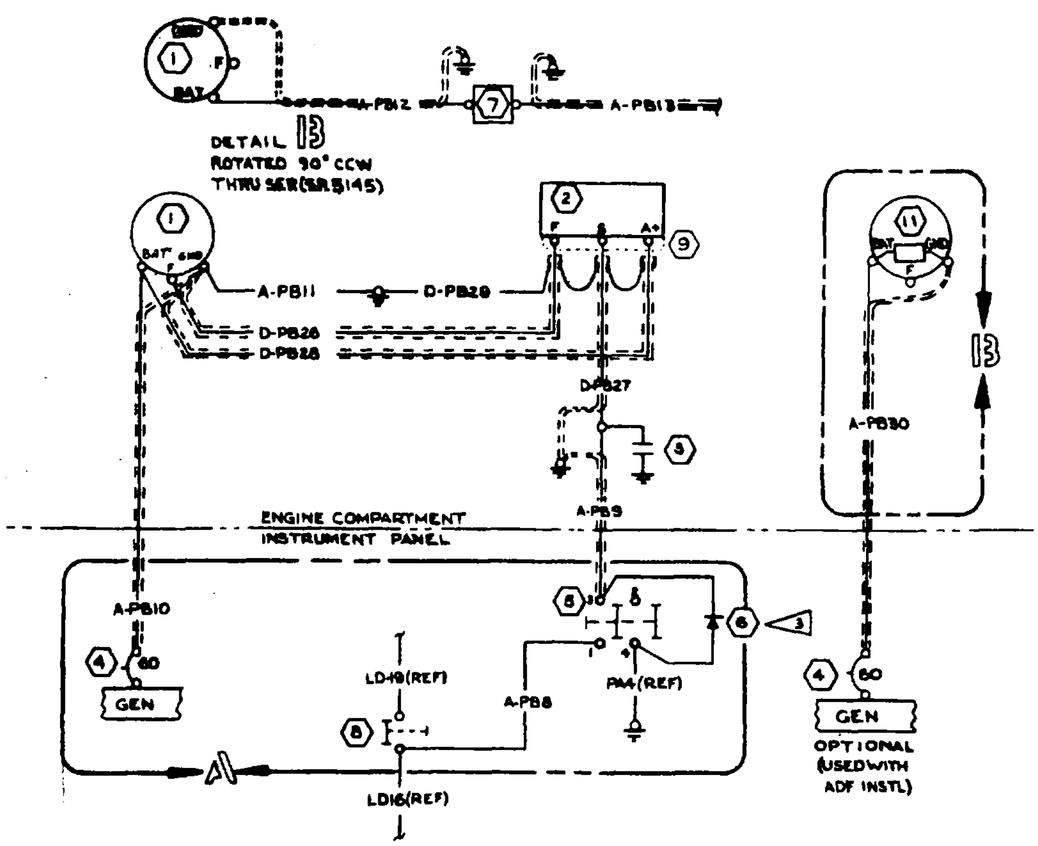
MODEL: 150

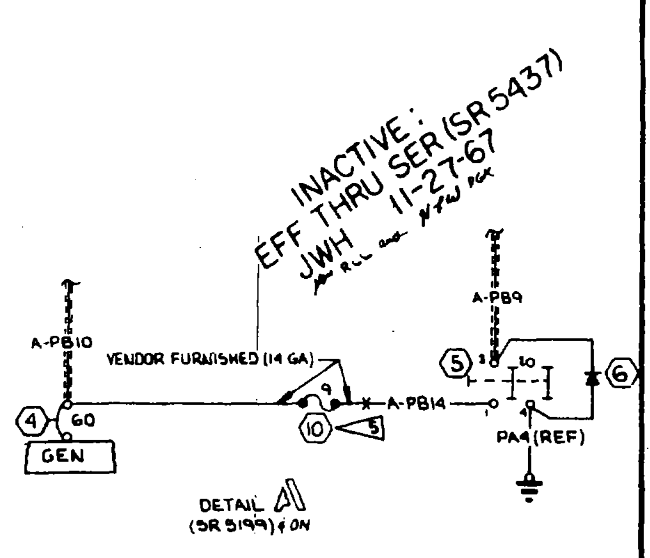
REV. B

PAGE: 4.9

SR 5200

CHG LTR	REVISION	BY DATE	CHK APPD
A	BY REV, ADDED DETAIL A, IN W/T ADDED A-PB14 & INACTIVATED A-PB8, IN E/T ADDED HRH & INACTIVATED 0713026-4, ADDED NOTE 5, IN E/T S-1707-60 WAS S-1596-60 (SR 5199)	9-10-66	
B	BY REV: ADD DETAIL B, INACTIVATED S-1629-1. (SR 5195)	C.G. 8-8-67	





NOTES:

1. AMP TERMINAL 42281-2 ON CONDUCTOR. AMP TERMINAL 2-323931-2 ON SHIELD & GROUNDING WIRE.
2. 8 GAUGE SHIELDED WIRE MATERIAL PER S-1534-8-9.
3. OBSERVE POLARITY SYMBOL ON DIODE WHEN INSTALLING ON SWITCH TERMINALS OR DIODE WILL FAIL WHEN SYSTEM IS ENERGIZED.
4. "D" PREFIX IS USED ON THESE WIRES INSTEAD OF "A" BECAUSE WIRES ARE THE SAME AS THOSE USED IN MODEL 182. THIS DWG. IS SCHEMATICALLY IDENTICAL TO 0770610 PAGE 4.7
5. HRH FUSEHOLDER ASSY CONTAINS A 9 AMP FUSE AS PART OF ASSY

	PART NO.	DESCRIPTION	INSTALLED ON
11	1250209-1	NOISE FILTER ASSY	
10	HRH	FUSEHOLDER ASSY (BUSS)	
9	LCAB-10A7804	HOUSING (ECWS)	
8	0713026-4	SWITCH-NAV LTS	
7	S-1629-1	NOISE FILTER	
6	0770719-1	DIODE ASSY	
5	0713026-3	SWITCH-MASTER	
4	S-1707-60	CIRCUIT BREAKER	
3	0770098-2	FILTER	
2	C611001-0101	REGULATOR	
1	C611501-0101	ALTERNATOR ASSY	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			DETAILS
A-PB14	16			S-1510-2	S-1367-2-8		(SR 5199) & ON
D-PB29	18	4		S-1367-1-12	1		
D-PB28	18S			[illegible]			
D-PB27	18S			[illegible]			
D-PB26	18S	4		[illegible]	1		
A-PB13	8S	2		[illegible]	S-1367-4-10		
A-PB12	8S	2		[illegible]	[illegible]		
A-PB11	10			S-1367-3-10	S-1367-3-12		
A-PB9	18S			S-1367-1-8	[illegible]		
A-PB8	18			S-1367-1-8	S-1367-1-10		INACTIVE (SR 5199) & ON
A-PB10	8S	2		[illegible]	S-1367-4-8		

WIRE TABLE

WIRING DIAGRAM—ALTERNATOR SYSTEM, 60 AMP

Cessna

0410011

0410011 P 4.12 | 0410011 PG 4.7 | 150 | B | 4.10

IGNITION SECTION

Cessna.

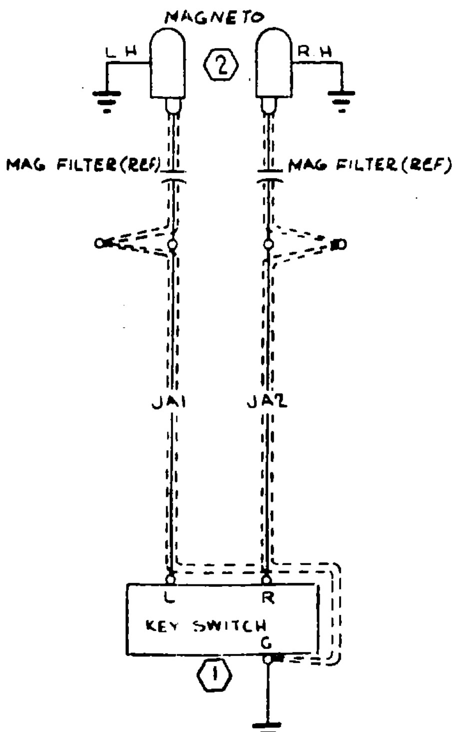
DRAWN GO	TITLE: WIRING DIAGRAM--- MODEL 150		DRAWING NO. 0410011
DATE 9-13-62			
APP'D RRS JR		REV: "B"	PAGE: 5.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

CHG LET	REVISION	BY / DATE	CHK / APPD
B	REDRAWN NO CHG	[illegible]	[illegible]
C	REDRAWN TO SHOW STD. & RADIO WIRING; ADD NOTE 1, JA3, JA4, ADD [illegible] TO JA1 & JA2, ADD W/T	6-2-65	[illegible]
D	BY REV ADDED LIMITING SERIALS, IN W/T 18S WAS 18DS; C447 MAGNETO & S4LN-21 MAGNETO TO E/T, INACTIVATED DWG (5B4920)	[illegible]	[illegible]

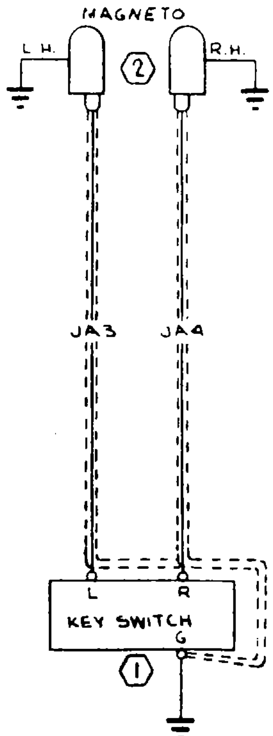
NOTES,

1. WIRES & SHIELDING SOLDERED TO VENDOR SUPPLIED MAGNETO CONNECTORS



(WITH RADIO INSTL.)

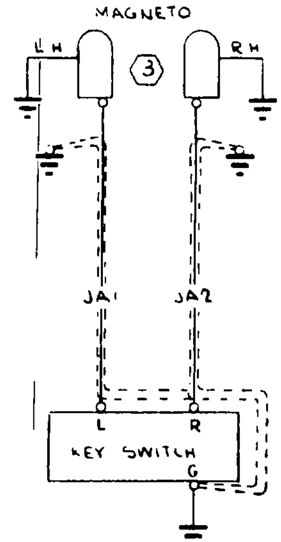
THRU SER 15061734



(STANDARD)

THRU SER 15061734

SER 15064533 & ON



SER 15061735 & ON

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		SERIALS
JA4	18S		92	S-1367-1-6 S-1361-2-6	1	
JA3	18S		91	S-1361-1-6 S-1361-2-6	1	
JA2	18S		92	[illegible]	S-1367-1-10 S-1361-2-6	
JA1	18S		91	S-1367-1-6 S-1361-2-6	S-1367-1-10 S-1367-2-6	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
3	447	MAGNETO (SKEI)	
2	S4LN-21	MAGNETO (BX)	
1	0311038-2	SWITCH	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	[illegible]	3-8-60
GROUP		
CHECK	[illegible]	3-8-60
PROJ	[illegible]	3-10-60

TITLE: WIRING DIAGRAM — MAGNETO

Cessna.

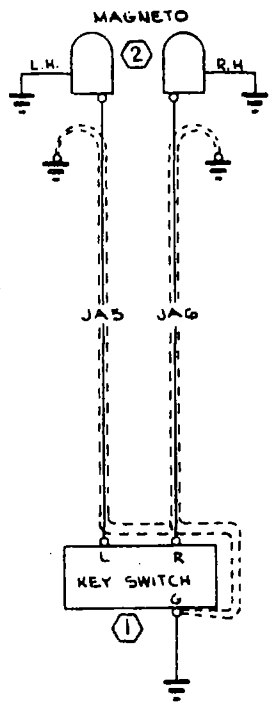
DWG NO 0410011

SUPERSEDED BY: 0410011 PG. 5.2 | SUPERSEDES: 0410011 REV A | MODEL: 150 | REV D | PAGE 5.1

FORM NO. 80181

(SR4920)
IX

CHG LET	REVISION	BY DATE	CHK APPD



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
JA6	18S			[illegible]	[illegible]		
JA5	18S			[illegible]	[illegible]		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
2	447	MAGNETO (SKE I)	
1	0311038-2	SWITCH	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	3-8-65
GROUP	H Wa[illegible]	10-29-65
CHECK	[illegible]	[illegible]-30-65
PROJ	[illegible]	[illegible]-65

TITLE
WIRING DIAGRAM—MAGNETOS

Cessna.

DWG NO: 0410011

SUPERSEDED BY	SUPERSEDES	MODEL	REV:	PAGE:
	0410011 PG 5.1	150		5.2

FORM NO [illegible]

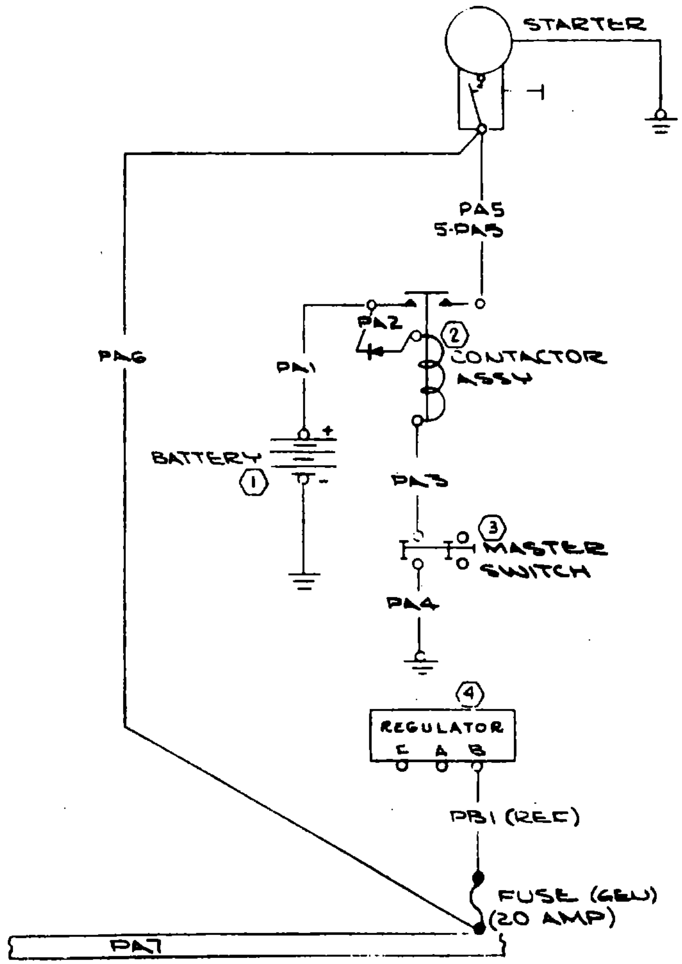
ENGINE CONTROL
SECTION

Cessna.

DRAWN	TJ	TITLE: WIRING DIAGRAM---	DRAWING NO.
DATE	9-13-62	MODEL 150	0410011
APP'D	RRS.	REV: "B"	PAGE: 6.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

CHG LET	REVISION	BY / DATE	CHK / APPD
B	REDRAWN NO CHG	[illegible]	[illegible]
C	ADDED EQUIP. TABLE, PA5 LG. WAS 137 MADE DWG INACTIVE (SR4662)	JJB 1-25-65	[illegible]
D	ADD 5-PA5; PA5 LG WAS 28, SCR OUT PA5	JJB 5-5-65	[illegible]



Inactive 1506153 & ON
1-25-65 JJB
2-10-65 RRS

5-PA5	4		23	S-1367-6-18	S-1367-6-14		SER 15060088 & ON
PA7		48 x .032 COPPER STRIP	5				
PA6	10		77	S-1367-5-14	———		
PA5	4		137	S-1367-6-12	S-1367-6-14		THRU SER 15060087
PA4	18		3	AA783	S-1367-1-8		
PA3	18		101	S-1367-1-6	S-1367-1-8		
PA2	18		3	S-1367-1-6	S-1367-1-12		
PA1	4		5	S-1367-6-14	S-1367-6-12		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
4	0413205-12	REGULATOR	
3	0713026-5	MASTER SWITCH	
2	0712603-2	CONTACTOR ASSY.	
1	0511319-201	BATTERY	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Rammant	3-8-60
GROUP		
CHECK	Cook	3-8-60
PROJ	Spitler	3-10-60

TITLE: WIRING DIAGRAM — CONTACTOR & STARTER

Cessna.

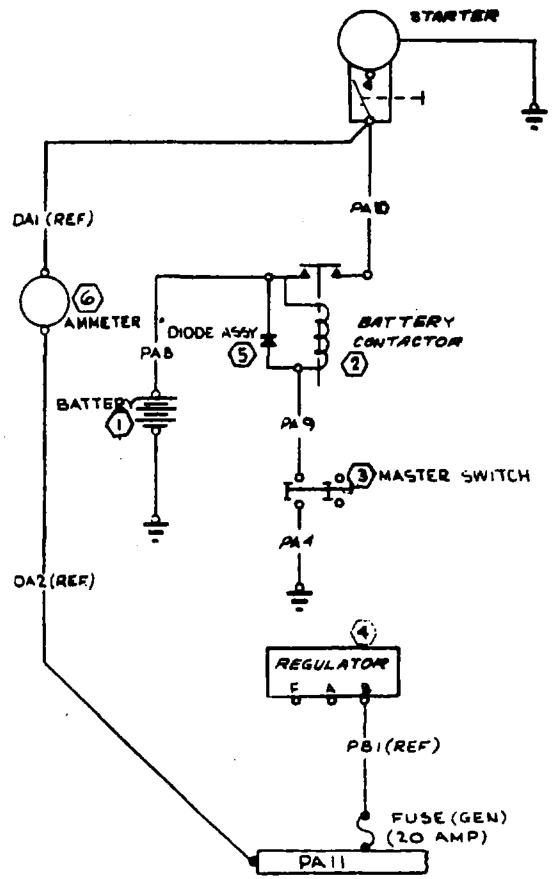
DWG NO 0410011

SUPERSEDED BY: 0411011 PG 6.2 | SUPERSEDES: 0410011 REV 'A' | MODEL: 150 | REV: D | PAGE: 6.1

FORM NO 80-161

(SR 4662)

CHG LET	REVISION	BY DATE	CHK APPR
A	BY REV. PA11 WAS PA7, MOVED PA6 TO END OF PA11 BUS BAR	5-11-65	
B	BY REV. DELETED PA6, ADD DA1(REF) DA2(REF) & S-1319-1 AMMETER INACTIVATED DWG (SR 4920)	11-8-65	



Inactive
SER 15064533 & on
10-8-65
10.29.65

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
PA11		5/8 x .032 COPPER STRIP	8				
PA10	4		23	S-1367-4-13	S-1367-6-10		
PA9	18		101	S-1367-1-10	S-1367-1-8		
PA8	4		5	S-1367-6-14	S-1367-6-13		
PA4	18		3	S-1367-1-14	S-1367-1-8		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
6	S-1319-1	AMMETER	
5	0770728-1	DIODE ASSY.	
4	0413205-12	REGULATOR	
3	0713026-5	MASTER SWITCH	
2	S-1579-1	CONTACTOR	
1	0511319-201	BATTERY	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	J. BLISS	2-9-65
GROUP	PARSONS	2-12-65
CHECK		2-11-65
PROJ		2-10-65
		2-15-65

TITLE: WIRING DIAGRAM— CONTACTOR & STARTER

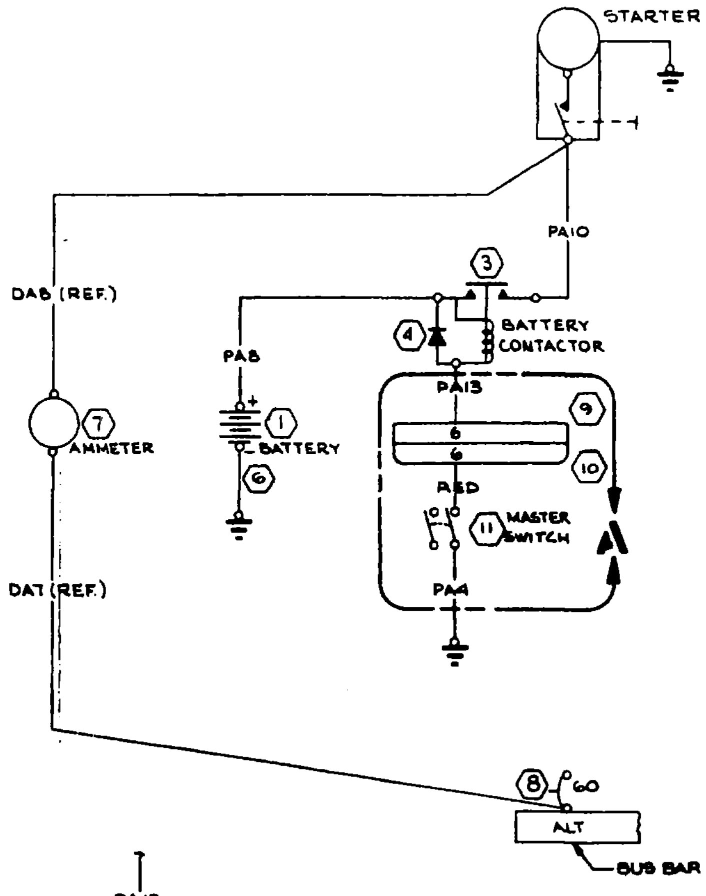
Cessna.

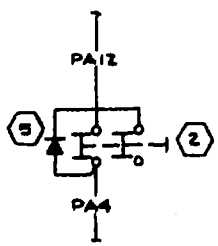
DWG NO. 0410011

SUPERSEDED BY: 0410011 PG. 6.3 | SUPERSEDES: PAGE 6.1 | MODEL: 150 | REV: B | PAGE: 6.2

(SR4920)
II

CHG LET	REVISION	BY / DATE	CHK / APPD
A	BY REV: ADD DETAIL A & SER, PA13, S-1640-9, S-1641-9, RED & S-1159-1; SER OUT PA12. EDERR 00948 (SR5437) II	JWH 12/12/67	RLL NW PK





DETAIL A
THRU SER (SR5437)

11	S-1159-1	SWITCH-MASTER	
10	S-1641-9	HOUSING-SOCKET	
9	S-1640-9	HOUSING-PIN	
8	S-1596-60	CIRCUIT BREAKER	
7	S-1320-1	AMMETER	
6	0412007-9	STRAP-BAT. GND.	
5	0770719-1	DIODE ASSY.	
4	0770728-1	DIODE ASSY.	
3	S-1579-1	CONTACTOR	
2	0713026-5	SWITCH-MASTER	
1	0511319-1	BATTERY, 12V	
ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
RED	18			S-1636-1	S-1493-1		
PA13	18			S-1367-1-10	S-1635-1		
PA12	18			S-1367-1-10	S-1367-1-8		THRU SER (SR5437)
PA10	4		23	S-1367-6-13	S-1367-6-14		
PA8	4		5	S-1367-6-14	S-1367-6-13		
PA4	18		3	S-1493-1	S-1367-1-8		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	10-8-65
GROUP	H. Wise	10-29-65
CHECK	[illegible]	11-30-65
PROJ	[illegible]	11-2-65

TITLE: WIRING DIAGRAM—CONTACTOR & STARTER

Cessna.

DWG NO. 0410011

SUPERSEDED BY: | SUPERSEDES: 0410011 PG 6.2 | MODEL: 150 | REV: A | PAGE: 6.3

ENGINE INSTRUMENTS SECTION

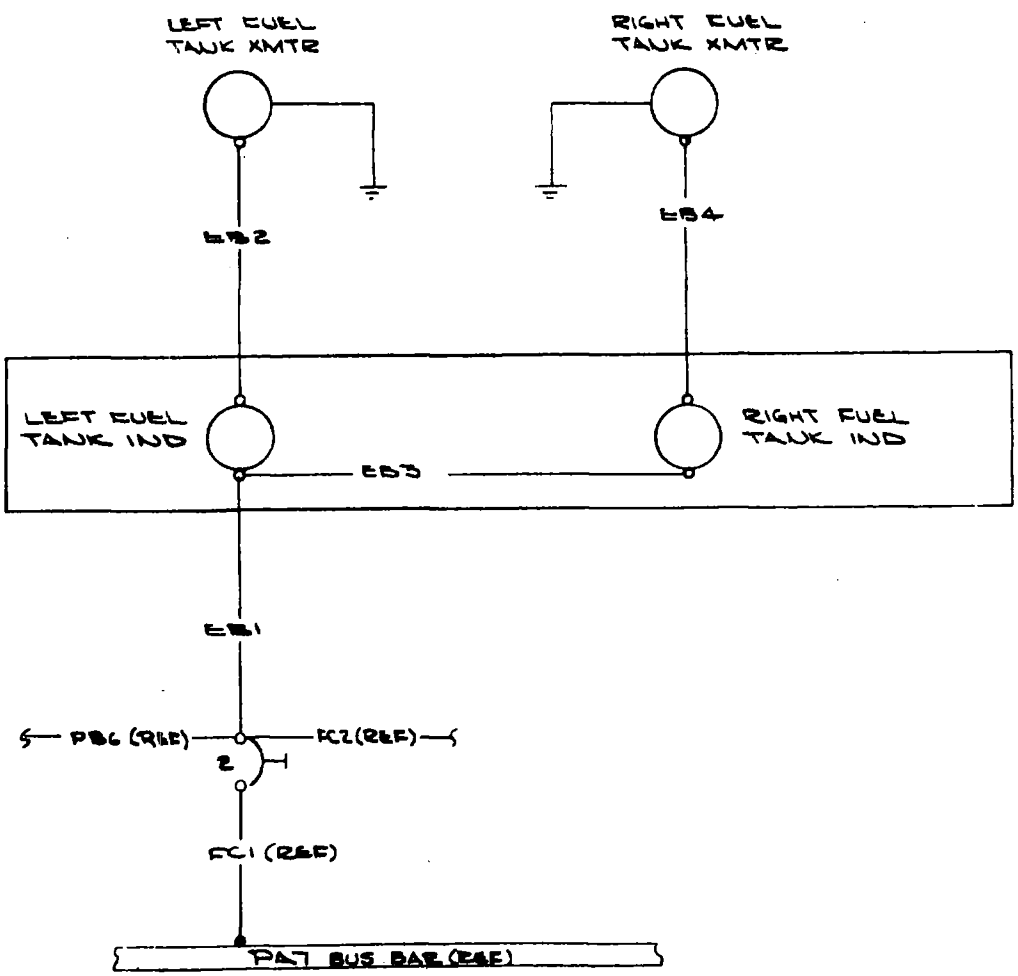
Cessna.

DRAWN	GJL	TITLE: WIRING DIAGRAM---		DRAWING NO.
DATE	6-13-62	MODEL 150		0410011
APP'D	RRS VP		REV: "B"	PAGE: 8.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-16

CHG LET	REVISION	BY DATE	CHK APPD
B	REDRAWN NO CHANGE	RJ 8-28-62	RRS



Inactive
ECR 15061533 ¼ on
3-18-65
4-2-65
RRS

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
EB4	18		75	S-1367-1-10	S-1367-1-10		
EB3	18		5	S-1367-1-10	S-1367-1-10		
EB2	18		68	S-1367-1-10	S-1367-1-10		
EB1	18		12	S-1367-1-8	S-1367-1-10		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	Bammert	3/9/60
GROUP		
CHECK	Cook	3/9/60
PROJ	Sattler	3/10/60

TITLE: WIRING DIAGRAM — FUEL IND & XMTR

Cessna.

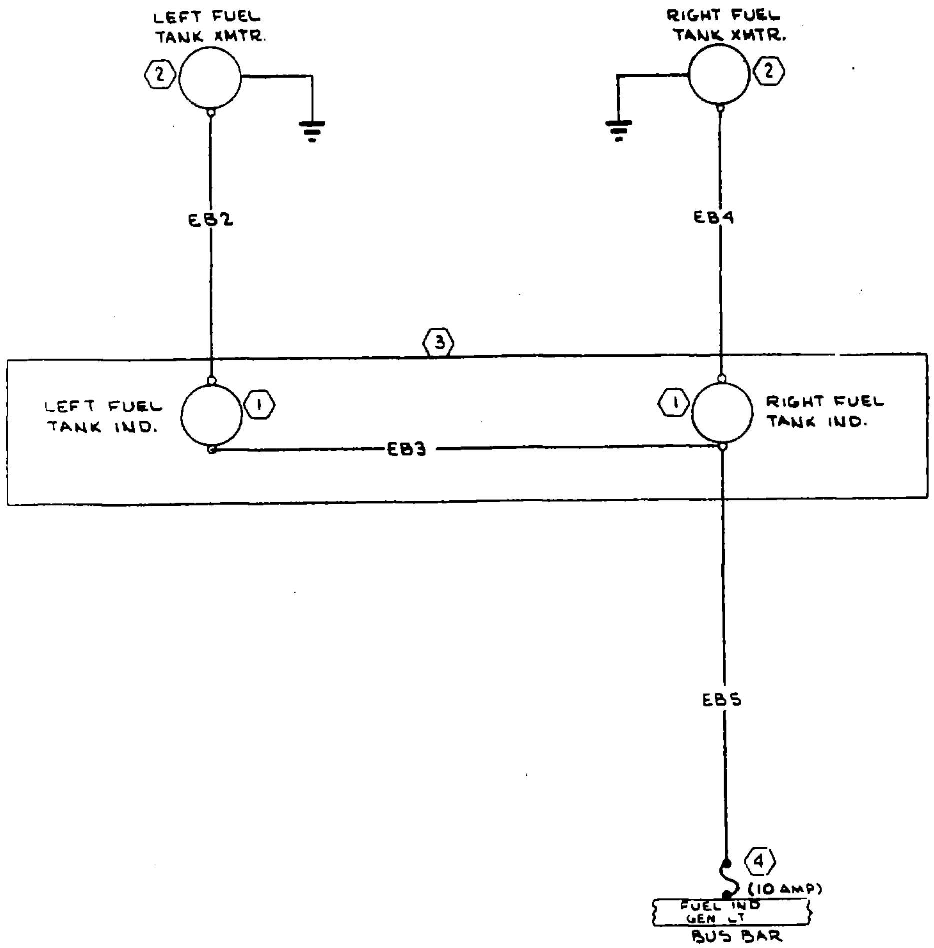
DWG NO. 0410011

SUPERSEDED BY: 0410011 PG. 8.1.1 | SUPERSEDES: 0410011 "A" | MODEL: 150 | REV: B | PAGE: 8.1

FORM NO. 80-161

(SR 4662)

CHG LET	REVISION	BY DATE	CHK APPD
A	EB5 WAS ATTACHED TO LEFT FUEL TANK IND (SR 4662)	4-15-65	
B	BY REV; FUEL IND GEN LT WAS DOME LT; INACTIVATED DWG (SR 4920	10-8-65	



Inactive II
SER 15064533 & ON
10-29-65
10.8.65 H.E.W.
RRS

EB5	18		20	SOLDER	S-1367-1-10		
EB4	18		75	S-1367-1-10	S-1367-1-10		
EB3	18		5	S-1367-1-10	S-1367-1-10		
EB2	18		68	S-1367-1-10	S-1367-1-10		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
4	S-1091-10	FUSE	
3	0413378-2	CASE ASSY.	
2	0426517-1	XMTR-FUEL GAGE	
1	0413378-3	GAGE-FUEL	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	3-18-65
GROUP		4-2-65
CHECK		4-5-65
PROJ		

TITLE: WIRING DIAGRAM— FUEL IND. & XMTR.

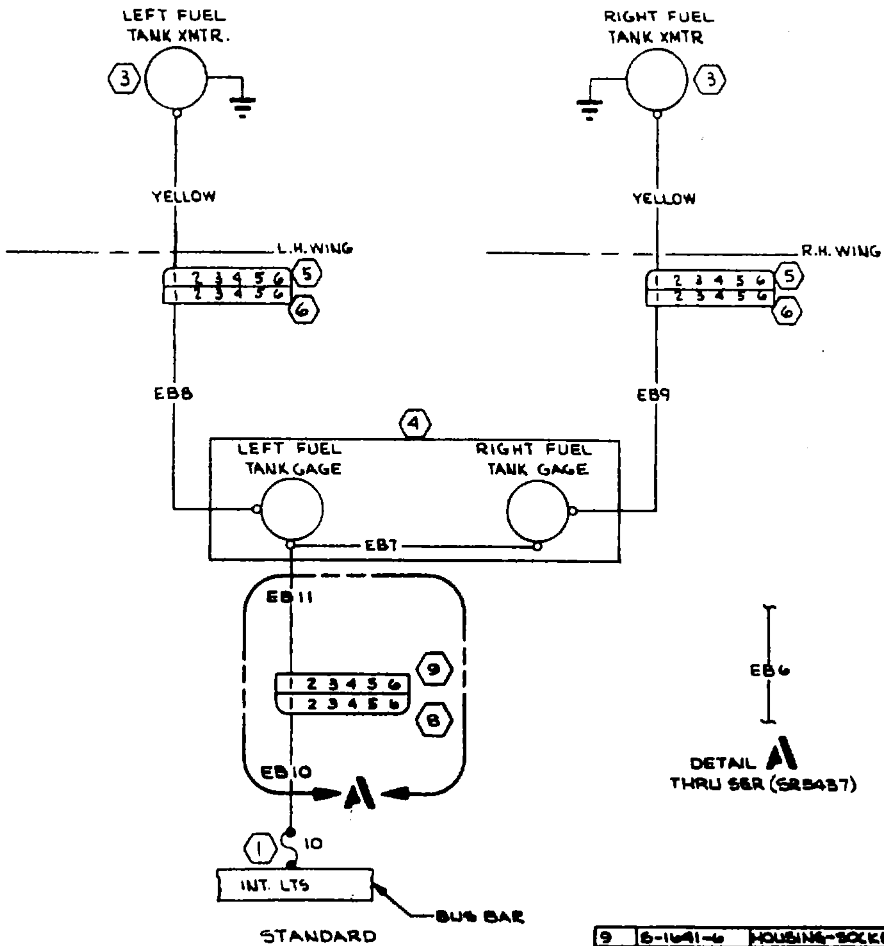
Cessna.

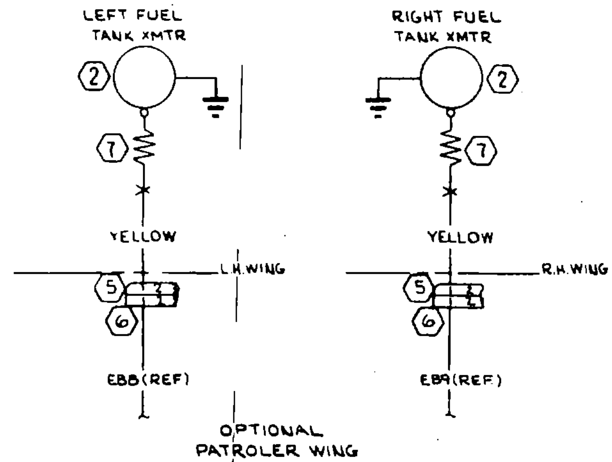
DWG NO: 0410011

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
0410011 PG. 8.1.2	0410011 PG 8.1	150	B	8.1.1

(SR4920)

CHG LET.	REVISION	BY DATE	CHK APPD
A	BY REV. DELETED ITEM 3 FROM OPT. PATROLLER WING DETAIL & ADDED ITEM 2, LEFT & RIGHT FUEL TANK GAGE WAS NO. IN E/T XMTR FUEL LEVEL WAS GAGE (2); 0413035-1 WAS C669504-0202	7-20-66	YAF RLH
B	BY REV: ADD S-1640-6, S-1641-6, EB10, EB11 & DETAIL A & SER; SER OUT EB6. ED&RR 00948 (SR5437)	JWH 12-6-67	RLL DGK





WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
EB11	18			S-1636-1	S-1367-1-10		
EB10	18			SOLDER	S-1635-1		
YELLOW	18	S-1460-18-4		S-1635-2	S-1370-1		
YELLOW	18			S-1635-2	S-1370-1		
YELLOW	18			S-1635-2	S-1367-1-10		
YELLOW	18	S-1460-18-4		S-1635-2	S-1367-1-10		
EB9	18			S-1367-1-10	S-1636-2		
EB8	18			S-1367-1-10	S-1636-2		
EB7	18			S-1367-1-10	S-1367-1-10		
EB6	18			SOLDER	S-1367-1-10	(SR4920) THRU SER (SR5437)	

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
9	S-1641-6	HOUSING-SOCKET	
8	S-1640-6	HOUSING-PIN	
7	20 Ω 5W	RESISTOR (OM)	
6	S-1641-6	HOUSING-SOCKET	
5	S-1640-6	HOUSING-PIN	
4	0413035-1	PANEL ASSY.	
3	0426517-1	XMTR.-FUEL LEVEL	
2	0426517-2	XMTR.-FUEL LEVEL	
1	S-1091-10	FUSE	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	10-8-65
GROUP	[illegible]	10-29-65
CHECK	[illegible]	10-30-65
PROJ	[illegible]	11-2-65

TITLE: WIRING DIAGRAM— FUEL IND. & XMTR

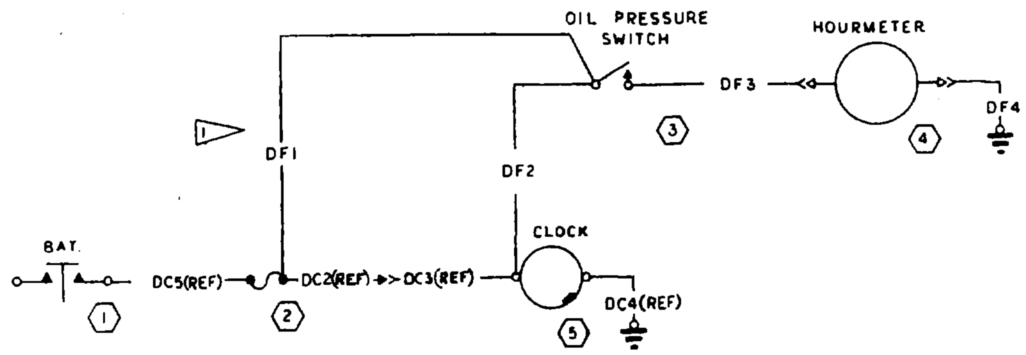
Cessna.

DWG NO: 0410011

SUPERSEDED BY: | SUPERSEDES: 0410011 PG. 8.1.1 | MODEL: 150 | REV: B | PAGE: 8.1.2

(SR 5033)

CHG LET	REVISION	BY DATE	CHK APPD



NOTE:
1 WIRING DIAGRAM SHOWN IS FOR USE WHEN AN OPTIONAL ELECTRIC CLOCK IS INSTALLED. WHEN ELECTRIC CLOCK IS NOT INSTALLED WIRE A-DF1 CONNECTS PRESSURE SWITCH TO FUSEHOLDER. INSTALL S-1091-1 FUSE AND S-1690-22 FUSEHOLDER.

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
5	S-1317N1	CLOCK	
4	C664501-0101	HOURMETER	
3	S-1711-1	OIL PRESSURE SW.	
2	S-1091-1	FUSE	
1	S-1579-1	BAT CONTACTOR	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
DF4	18			S-1493-1	S-1367-1-8		
DF3	18			S-1493-1	S-1367-1-6		
DF2	18			S-1367-1-6	S-1367-1-6		
DF1	18			S-1367-1-6	SOLDER		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Wese.	9-23-66
GROUP	H. Wind	9-27-66
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — HOURMETER (OPT)

Cessna.

DWG NO: 0410011

SUPERSEDED BY | SUPERSEDES | MODEL 150 | REV | PAGE 8.2

FLIGHT INSTRUMENTS SECTION

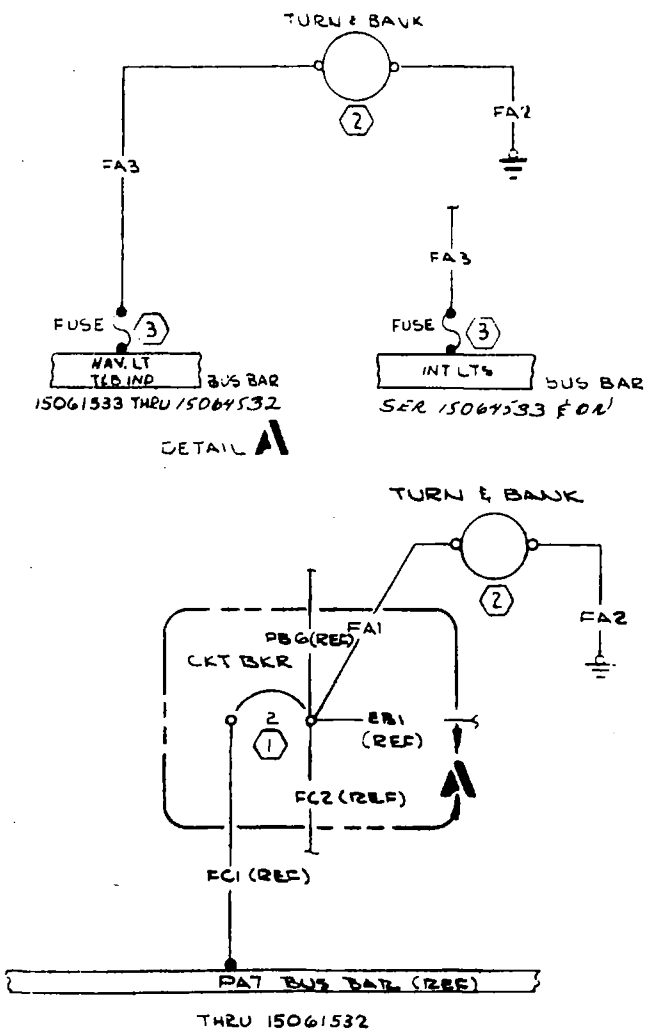
Cessna.

DRAWN	[illegible]	TITLE: WIRING DIAGRAM--- MODEL 150	DRAWING NO. 0410011
DATE	9-13-62		
APP'D	RRS	REV: "B"	PAGE: 9.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

CHG LET	REVISION	BY / DATE	CHK / APPD
B	ADDED FA1 & FA2 & NOTE 1	[illegible]	RRS
C	ADD FA3 ADD DETAIL A ADD E/T FA2 WIRE LG. WAS 8, INACTIVATED FA1 (SR4662)	4 15 65	[illegible]
D	3rd REV. ON DETAIL A NAV LT T&B WAS INST LT; ADD LIMITING SERIALS SR4920	10 8 65	[illegible]

NOTE.
1. FA1 & FA2 ARE IDENTICAL TO & SUPERSEDE 0400302-FA1 & -FA2 RESPECTIVELY



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
FA3	18		38	S-1367-1-8	SOLDER	STD	15061533 & ON
FA2	18		10	S-1367-1-8	S-1367-1-8	STD	
FA1	18		30	S-1367-1-8	S-1367-1-8	0400302	INACTIVE 15061533 & ON

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
3	S-1091-10	FUSE	
2	S-1302N1	T&B INDICATOR	
1	CA-2	CIRCUIT BREAKER	(MTCC)

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	[illegible]	[illegible]
GROUP		
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — TURN & BANK

Cessna.

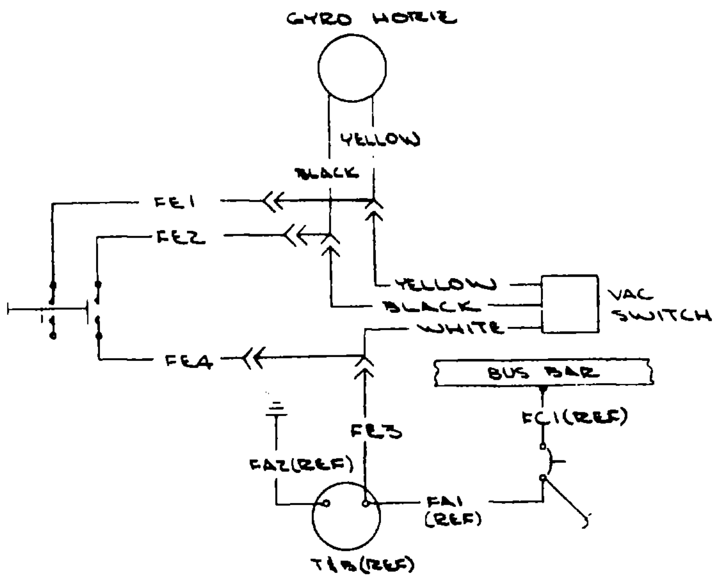
DWG NO 0410011

SUPERSEDED BY: | SUPERSEDES: NOTE 1 | MODEL 150 | REV D | PAGE 9.2

FORM NO 80-161

NOTES:
1. FE1, FE2, FE3, & FE4 ARE IDENTICAL TO & SUPERSEDE 0413384-FE1, -FE2, -FE3, & -FE4 RESPECTIVELY

CHG LET	REVISION	BY DATE	CHK APPD
A	CHANGED WIRE NO'S IN B.M. TO AGREE WITH FIELD		



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		SERIALS
FE4	20			S-341-2	———	
FE3	20			S-341-2	S1367-1-8	
FE2	20			S-341-2	———	
FE1	20			S341-2	———	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	JOHNSON	5-13-63
GROUP	PARSONS	5-22-63
CHECK	R.E. Moore	5-17-63
PROJ	[illegible]	5-22-63

TITLE: WIRING DIAGRAM — PICTORIAL GYRO (OPT)

Cessna.

DWG NO 0410011

SUPERSEDED BY:

SUPERSEDES: NOTE 1

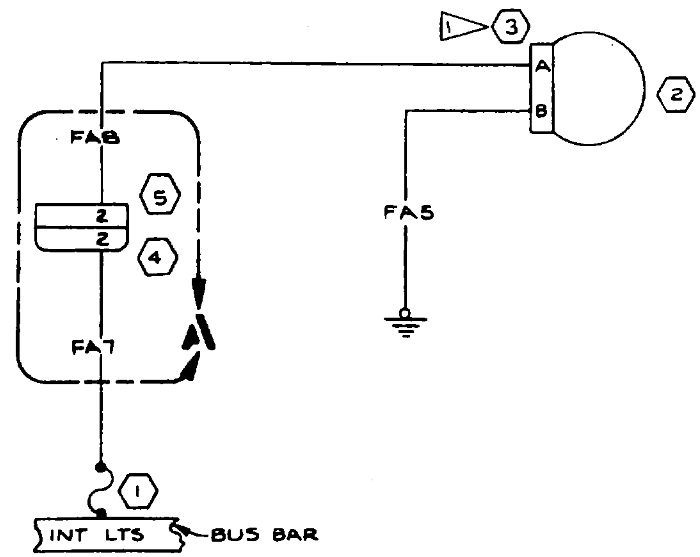
MODEL: 150

REV: A

PAGE: 3.3

FORM NO. 80-161

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	BY REV: ADD S-1640-6, S-1641-6, FA7, FA8 & DETAIL A (SER; SER OUT FA4 ED&RR 00948 (SR 5437) II	JWH 12-6-67	RLC HLW DCK



DETAIL A
THRU SER (SR5437)

NOTES;
1. MS3106A10SL3S CONNECTOR IS SUPPLIED BY VENDOR.

FA8	18		26	SOLDER	SOLDER		
FA7	18		12	SOLDER	S-1635-1		
FA5	18		10	SOLDER	S-1367-1-8		
FA4	18		38	SOLDER	SOLDER		(SR5145) THRU SER (SR5437)
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

5	S-1641-6	HOUSING-SOCKET
4	S-1640-6	HOUSING-PIN
3	MS3106A10SL3S	CONNECTOR
2	C661003-0201	TURN COORDINATOR
1	S-1091-10	FUSE
ITEM NO.	PART NO.	DESCRIPTION

EQUIPMENT TABLE

CONTRACT NO:

	NAME	DATE
DESIGN	W COOK	4-19-67
GROUP	H. Wiese	4-20-67
DRAWN	VANDERHOOF	3/17/67
CHECK	YAKSHAW	4-14-67
STRESS	[illegible]	4-18-67
PROJECT	[illegible]	4-21-67
APPD	[illegible]	4-19-67

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — TURN COORDINATOR

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0410011

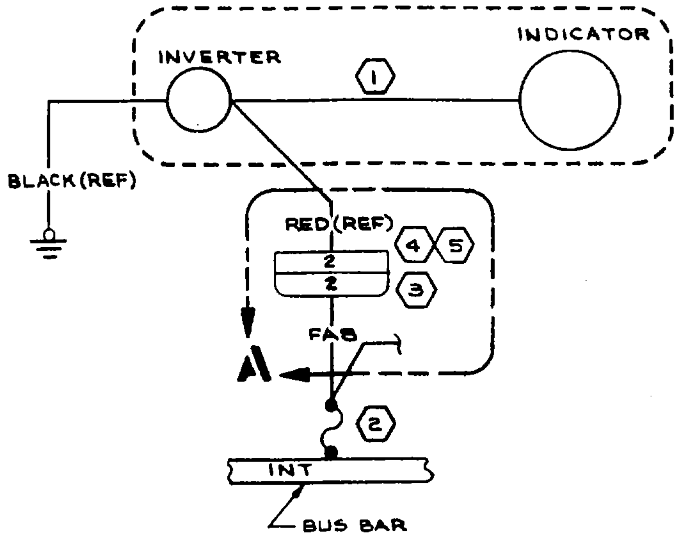
SCALE: NONE (SR 5145) II PAGE: 9.4

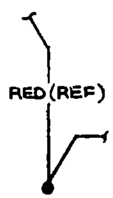
FORM NO. 00215

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	BY REV: ADD S-1636-2, S-1640-6, S-1641-6, FAB & DETAIL A & SER. ED & RR 00948 (SR5437) IX	JWH 12-6-67	RLL HSW DCK

NOTES:

1. ALL WIRING SHOWN FURNISHED WITH C661003-0401.





DETAIL A
THRU SER (SR5437)

FAB	18		12	SOLDER	S-1635-1		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION
5	S-1636-2	SOCKET
4	S-1641-6	HOUSING-SOCKET
3	S-1640-6	HOUSING-PIN
2	S-1091-10	FUSE
1	C661003-0401	TURN COORDINATOR

EQUIPMENT TABLE

CONTRACT NO:

	NAME	DATE
DESIGN	W COOK	12-18-67
GROUP	H. Wise	5-25-67
DRAWN	C. GARCIA	5/19/67
CHECK	YAKSHAW	5-22-67
STRESS	[illegible]	5-25-67
PROJECT	H. Settle	5-25-67
APPD	[illegible]	5-26-67

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — BRITTAIN WING LEVELER (OPT)

SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0410011

SCALE: NONE | (SR 5145) IX | PAGE: 9.5

FORM NO 80-215

OTHER INSTRUMENTS SECTION

Cessna.

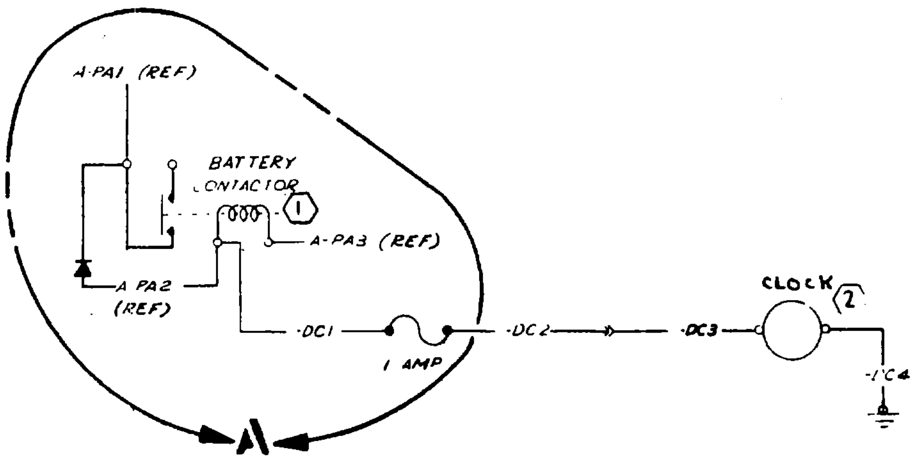
DRAWN	E.S.	TITLE: WIRING DIAGRAM--- MODEL 150	DRAWING NO. 0410011
DATE	10/10/62		
APP'D	PRS Am JP	REV:	PAGE: 10.0

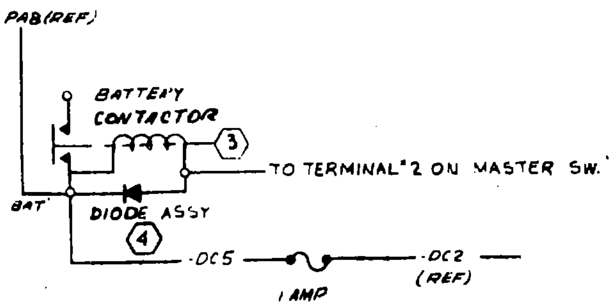
CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

OEM NO. 80-168

(SR 4021)

CHG LET	REVISION	BY DATE	CHK APPD
A	[illegible]	[illegible]	[illegible]
B	BY ZE[illegible] DETAIL A TO TERMINAL #2 [illegible] (SR4920)	[illegible]	[illegible]





DETAIL A
(SR4662) f ON

-DC5	18		9	S-367-13	SOLDER		OPT. 50 [illegible] 33 ON
-DC4	18		3	S-1367-1-8	S-1367-1-6		OPTIONAL 150597[illegible] ON
-DC3	18		66	[illegible]-141-2	S-1367-1-6		OPTIONAL 150597[illegible] ON
-DC2	18		6	S-341-2	SOLDER		STANDARD 150597[illegible] ON
-DC1	18		9	S-1367-1-6	SOLDER		OPT. 1505[illegible] THRU 50[illegible]532
[illegible]	[illegible]	MATERIAL	[illegible]	TERMINALS			REMARKS

WIRE TABLE

4	0770728-1	DIODE ASSY.	
3	S-1579-1	CONTACTOR	
2	S-1317V1	CLOCK	
1	[illegible]-2	CONTACTOR	
	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	SPRIGGS	10-9-62
GROUP	TARSONS	10-12-62
CHECK	[illegible]	[illegible]
PROJ.	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — CLOCK

Cessna.

DWG NO 0410011

MODEL 150

REV. B

[illegible] RD 161

LIGHTING SECTION

Cessna.

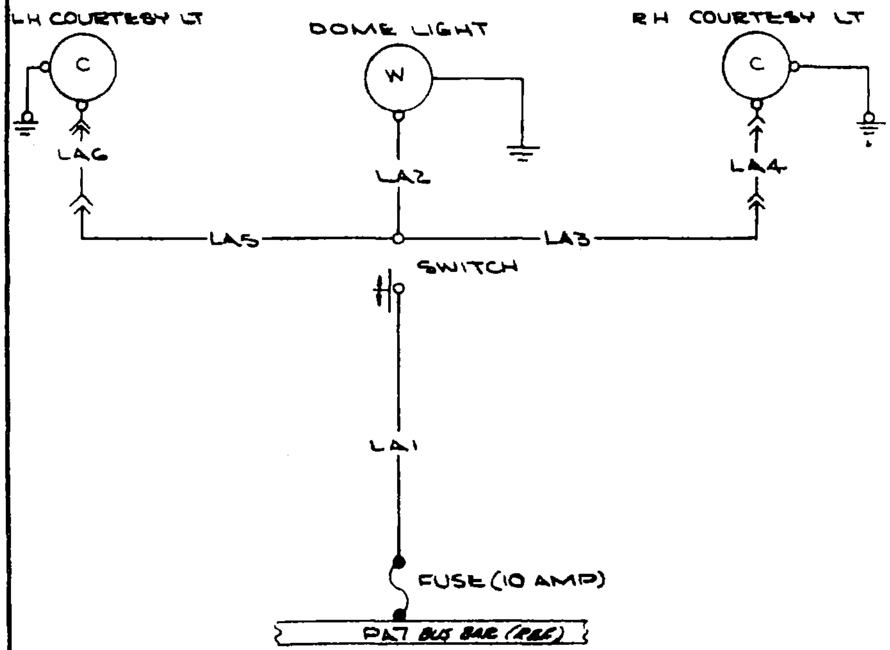
DRAWN	GJ	TITLE: WIRING DIAGRAM--- MODEL 150	DRAWING NO. 0410011
DATE	9-13-62		
APP'D	RRS	REV: "B"	PAGE: 11.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

CHG LET	REVISION	BY DATE	CHK APPD
8	REDRAWN NO CHG		

NOTES:

1. TERMINALS OF WIRES FOR OPT EQUIPMENT SHALL BE SUITABLY PROTECTED AGAINST SHORTING WHEN OPT EQUIPMENT IS NOT INSTALLED



Inactive
S/N 15061533 & on
3-17-65
RRS

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LA6	18		100	S-341-2	S-341-2	1	
LA5	18		48	S-1367-1-8	S-341-2	1	
LA4	18		100	S-341-2	S-341-2	1	
LA3	18		48	S-1367-1-8	S-341-2	1	
LA2	18		6	S-1367-1-6	—		
LA 1	18		72	S-1367-1-6	—		

WIRE TABLE

	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	TRUANT	
GROUP		
CHECK		
PROJ		

TITLE: WIRING DIAGRAM — COURTESY LIGHTS

Cessna.

DWG NO 0410011

SUPERSEDED BY 0410011 PG. 11.1.1 | SUPERSEDES 0410011 | MODEL 150 | REV 8 | PAGE 11.1

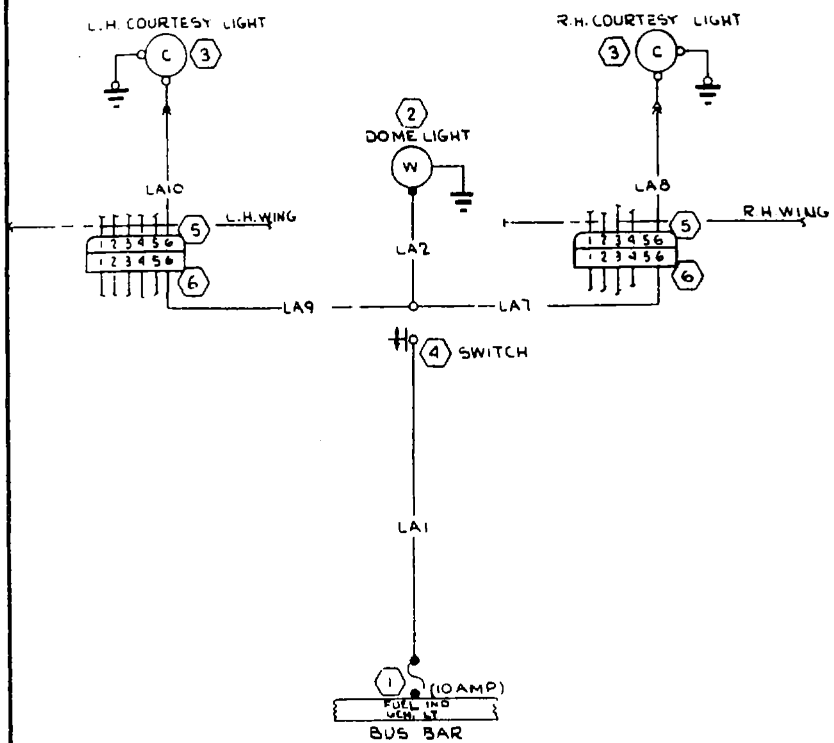
FORM NO 80-161

(SR 4662) II

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV. ON BUS BAR FUEL IND & GEN LT WAS DOME LT INACTIVATED DWG (SR 4920)	JJB 10-8-65	KIW

NOTES:

1. TERMINALS OF WIRES FOR OPT. EQUIPMENT SHALL BE SUITABLY PROTECTED AGAINST SHORTING WHEN OPT. EQUIPMENT IS NOT INSTALLED.



Inactive
SER 15064533 & ON
10-8-65 10-29-65
JJB KIW

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LA10	18		100	S-1635-2	S-341-2	STD	
LA9	18		48	COMMON TO LA7	S-1636-2		
LA8	18		100	S-1635-2	S-341-2		
LA7	18		48	S-1367-2-6	S-1636-2		
LA2	18		6	S-1367-1-6	SOLDER		
LA1	18		72	SOLDER	S-1367-1-6	STD	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
6	S-1641-6	HOUSING (SOCKET)	
5	S-1640-6	HOUSING (PIN)	
4	0713029	SWITCH	
3	0521101-1	COURTESY LIGHT	
2	0511481-6	DOME LIGHT	
1	S-1091-3	FUSE	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	3-16-65
GROUP	[illegible]	4-15-65
CHECK	[illegible]	4-[illegible]
PROJ	[illegible]	4-21-65

TITLE: WIRING DIAGRAM— COURTESY LIGHTS (OPTIONAL)

Cessna.

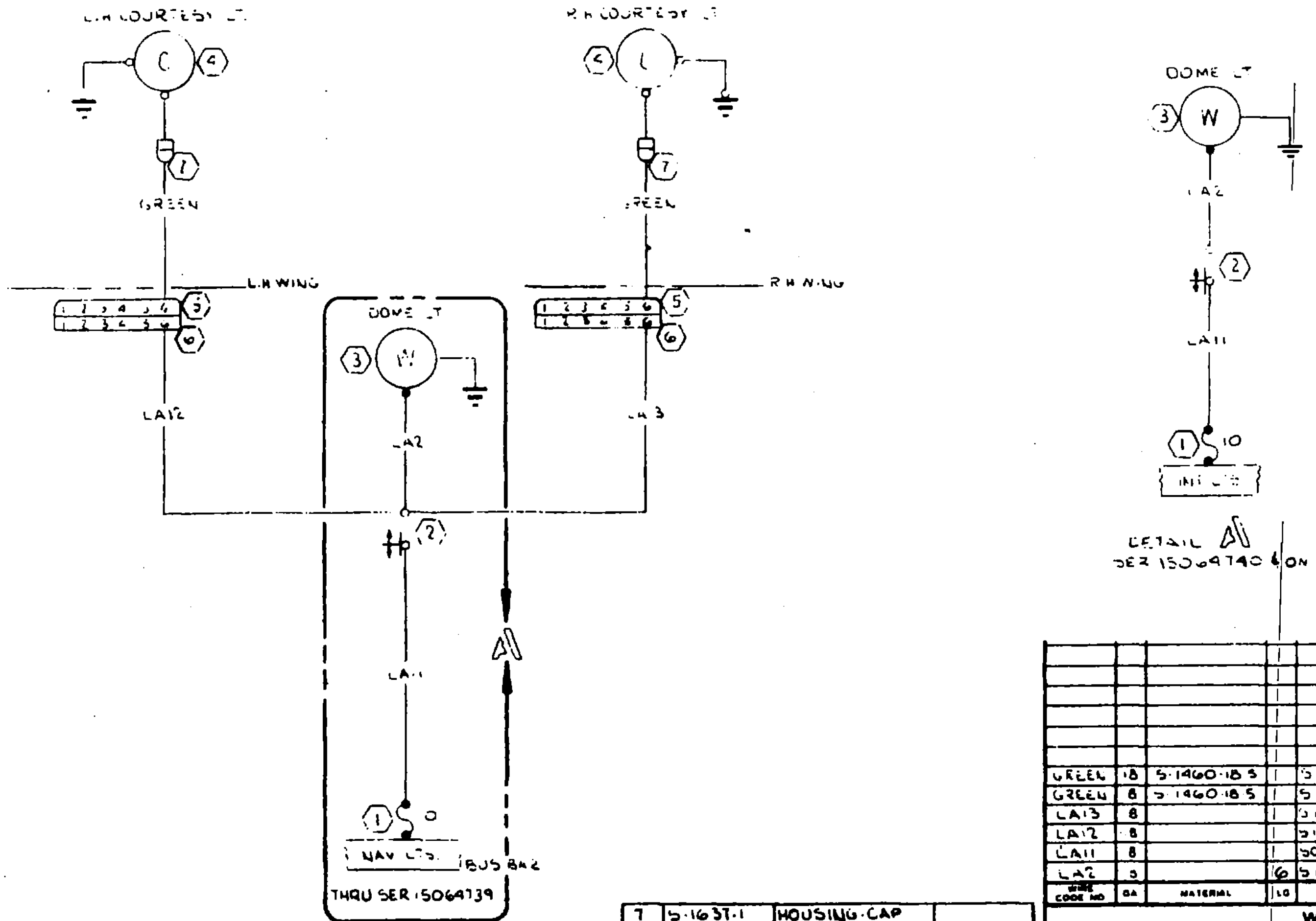
DWG NO: 0410011

SUPERSEDED BY: 0410011 PG 11.1.2 | SUPERSEDES: 0410011 PG 11.1 | MODEL: 150 | REV: A | PAGE: 11.1.1

NOTES:
1. TERMINALS OF WIRES FOR OPT. EQUIPMENT SHALL BE SUITABLY PROTECTED AGAINST SHORTING WHEN OPT. EQUIPMENT IS NOT INSTALLED.

(SR49201)

CHG LET	REVISION	BY DATE	CHK APPD
A	[illegible] LA2 [illegible] GREEN (2) [illegible] W.T. [illegible] STD WAS OPT. ON GREEN [illegible] ADD ITEM 7 [illegible]	[illegible]	[illegible]



7	S-1637-1	HOUSING-CAP	
6	S-1641-6	HOUSING-SOCKET	
5	S-1640-6	HOUSING-PIN	
4	0521101-1	COURTESY LIGHT	
3	0511481-6	DOME LIGHT	
2	0713029	SWITCH	
1	S-1091-10	FUSE	
	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
GREEN	18	S-1460-18 5		S-1635-2	S-1635-2	STD	THRU SER 15064739
GREEN	18	S-1460-18 5		S-1635-2	S-1635-2	STD	THRU SER 15064739
LA13	18			S-1367-6	S-1636-2	STD	THRU SER 15064739
LA12	18			S-1367-6	S-1636-2	STD	THRU SER 15064739
LA11	18			SOLDER	S-1471-6	STD	
LA2	18		16	S-1367-6	SOLDER	STD	

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	10 A 65
GROUP	[illegible]	10-29-65
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM— COURTESY LIGHTS (OPTIONAL)

Cessna.

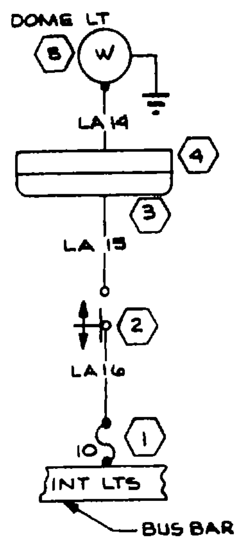
DWG NO 0410011

SUPERSEDED BY | SUPERSEDES 0410011 PG. 11.1.1 | MODEL 150 | REV A | PAGE 11.1.2

NOTES:

1. TERMINALS OF WIRES FOR OPT EQUIPMENT SHALL BE PROTECTED AGAINST SHORTING WHEN OPT EQUIPMENT IS NOT INSTALLED.

REVISION			
LET	DESCRIPTION	DATE	APPD



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
LA 16	18			SOLDER	S-1367-1-6		
LA 15	18			S-1367-1-6	S-1635-2		
LA 14	18			S-1636-2	SOLDER		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
5	0511481-6	DOME LIGHT	
4	S-1641-9	HOUSING-SOCKET	
3	S-1640-9	HOUSING-PIN	
2	0713029-1	SWITCH	
1	S-1091-10	FUSE	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 0410011 P 11.1.2

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	W COOK	12-18-67
GROUP	H. Wan	12-18-67
DRAWN	HARRIS	12-6-67
CHECK	LAURIE	12-14-67
STRESS	aus	12-16-67
PROJECT	D.C. Kolb	12-22-67
APPD	MARTEN	12-15-67

Cessna AIRCRAFT CO.

COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — COURTESY LIGHTS

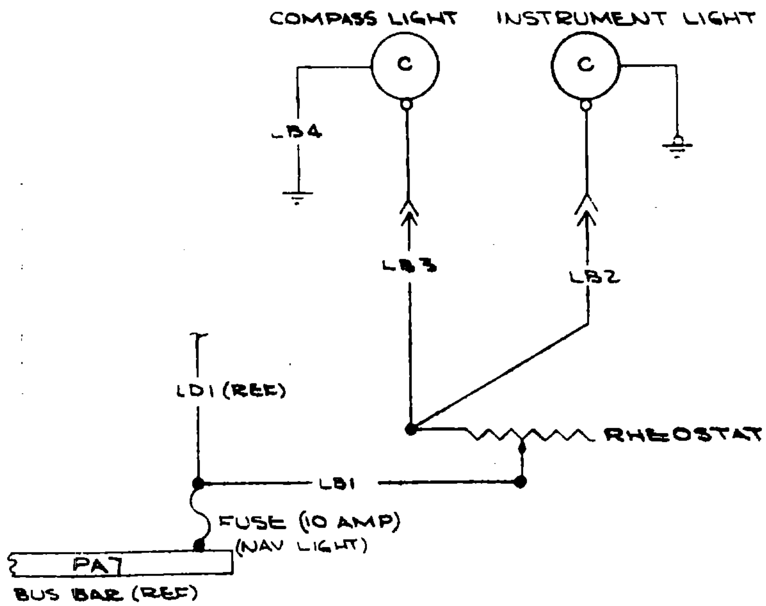
SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0410011

SCALE: NONE | 150 | PAGE: 11.1.3

ED&RR 00948 (SR8437) II

FORM NO. 80-218A

CHG LET	REVISION	BY DATE	CHK APPD
B	REDRAWN NO CHG		



Inactive ser 15061533 & on
3-17-65

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
LB4	18		6	RA733	S-341-2		
LB3	18		20	S-341-2	—		
LB2	18		78	S-341-2	—		
LB1	18		14	—	—		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Trumont	
GROUP		
CHECK	Coor	
PROJ	Spinner	

TITLE: WIRING DIAGRAM — INSTRUMENT LIGHTS

Cessna.

DWG NO 0410011

SUPERSEDED BY 0410011 PG 11.2.1 | SUPERSEDES 0410011 Δ REV | MODEL 150 | REV B | PAGE 11.2

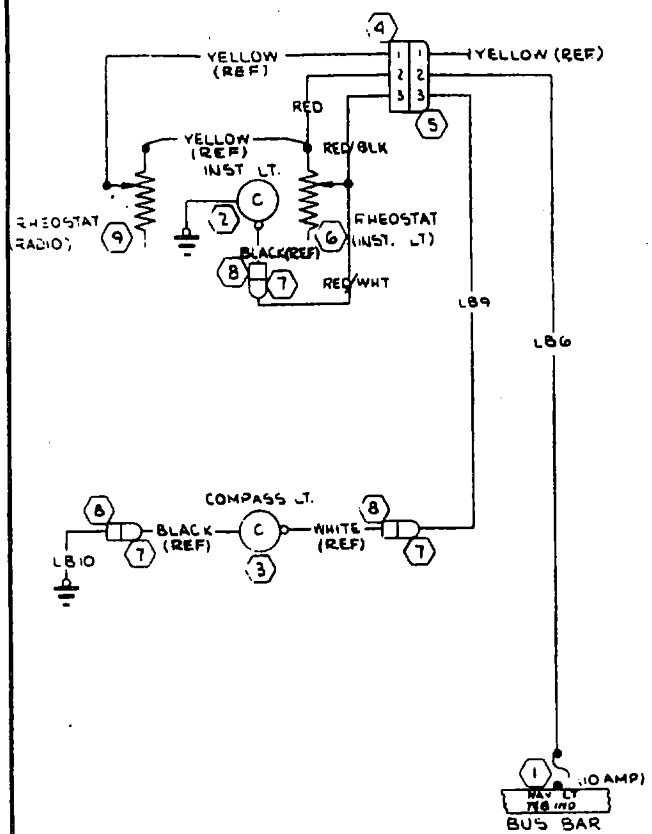
FORM NO 80-16

(SR 4...

CHG LET	REVISION	BY / DATE	CHK / APPD
A	BY REV. NAV LT T&B IND WAS INST LT, RED WAS LB5, RED/BLK WAS LB8, RED/WHT WAS LB7; IN E/T 0413126-6 WAS C413.26-9 INACTIVATED DWG (S24920	10 3 65	2/66

NOTES;

1. INSTALL S-1635-1 PIN ON BLACK WIRE OF COMPASS AND S-1636-1 SOCKET ON WHITE WIRE OF COMPASS.
2. INSTALL S-1636-2 SOCKET ON BLACK WIRE OF INSTRUMENT LIGHT.



SER 15064533 & ON
10 8 65
10.29.65

LB10	18			S-1367-1-14	S-1636-2			
LB9	18		93	S-1635-2	S-1635-2			
LB6	18		66	SOLDER	S-1635-2			
RED/WHT	18	S-1460-18-2-9	12	S-1635-2	SOLDER			
RED/BLK	18	S 1460-18 2-0	12	SOLDER	S-1636-2			
RED	18	S-1460 18-2	12	S-1636-2	SOLDER			
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS				SERIALS

WIRE TABLE

9	0413.26-5	RHEOSTAT	
8	S-1637-2	HOUSING (SOCKET)	
7	S-1637-1	HOUSING (PIN)	
6	0413126-6	RHEOSTAT	
5	S-1638-2	HOUSING (PIN)	
4	S-1638-1	HOUSING (SOCKET)	
3	0713068-2	COMPASS LIGHT	
2	0511481-6	INSTRUMENT LIGHT	
1	S-1091-10	FUSE	
ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	3-16-65
GROUP		
CHECK		
PROJ		3-1-65

TITLE
WIRING DIAGRAM— INSTRUMENT LIGHTS

Cessna.

DWG NO. 0410011

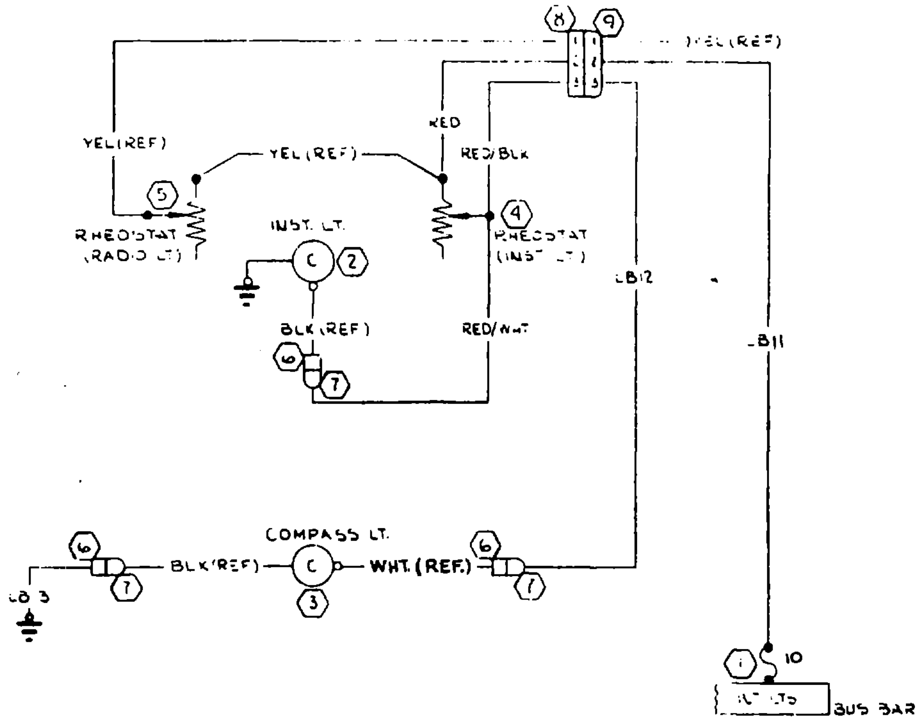
SUPERSEDED BY 0410011 PG 11.2 | SUPERSEDES 0410011 PG 11.2 | MODEL 150 | REV A | PAGE 11.2.1

NOTES:

1. INSTALL S-1635-1 PIN ON BLACK WIRE OF COMPASS & S-1636-1 SOCKET ON WHITE WIRE OF COMPASS
2. INSTALL S-1636-2 SOCKET ON BLACK WIRE OF INSTRUMENT LIGHT

(SR4920)

LTR	REVISION	BY / DATE	CHK / APPD



9	S-1638-2	HOUSING-CAP	
8	S-1638-1	HOUSING-PLUG	
7	S-1637-1	HOUSING-CAP	
6	S-1637-2	HOUSING-PLUG	
5	0413126-5	RHEOSTAT	
4	0413126-6	RHEOSTAT	
3	0713068-2	COMPASS LIGHT	
2	0511481-6	INSTRUMENT LIGHT	
1	S-1091-10	FUSE	
ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

RED/WHT	18	S-1460-18-2-9	12	SOLDER	S-1635-2		
RED/BLK	18	S-1460-18-2-0	12	SOLDER	S-1636-2		
RED	18	S-1460-18-2	12	SOLDER	S-1636-2		
LB13	18			S-1636-2	S-1367-1-14		
LB12	18			S-1635-2	S-1635-2		
LB11	18			SOLDER	S-1635-2		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	10-8-65
GROUP	Y. Wise	10-29-65
CHECK	[illegible]	1-1-65
PROJ	[illegible]	1-2-65

TITLE: WIRING DIAGRAM— INSTRUMENT LIGHTS

Cessna.

DWG NO. 0410011

SUPERSEDED BY:

SUPERSEDES: 0410011 Pg 11.2.1

MODEL 150

REV

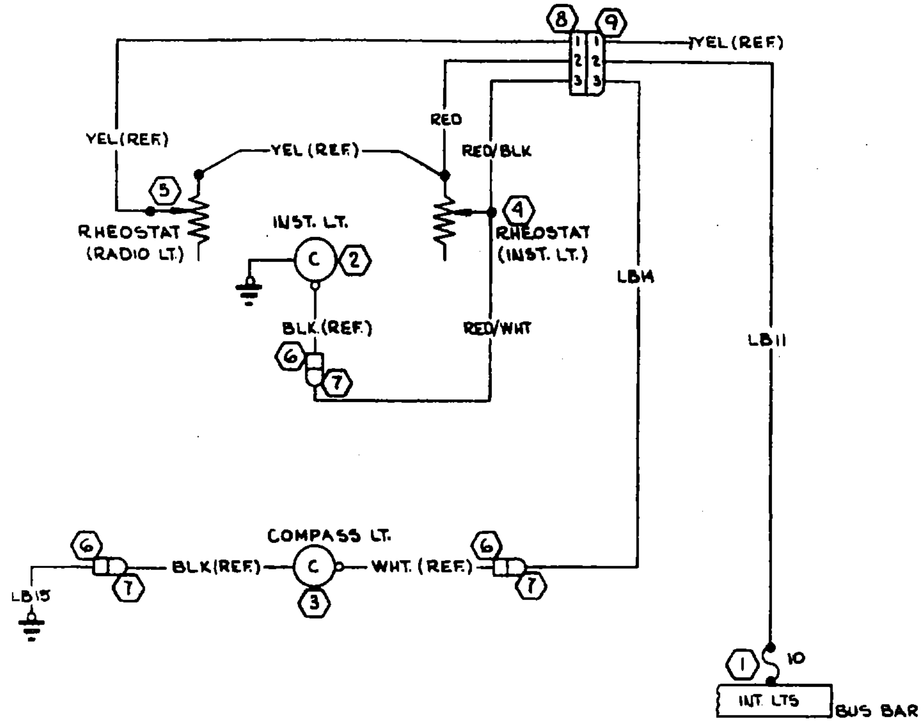
PAGE 11.2.2

NOTES:

1. INSTALL S-1635-1 PIN ON BLACK WIRE OF COMPASS & S-1636-1 SOCKET ON WHITE WIRE OF COMPASS.
2. INSTALL S-1636-2 SOCKET ON BLACK WIRE OF INSTRUMENT LIGHT.

(SR5145)

CHG LET	REVISION	BY DATE	CHK APPD



INACTIVE: EFF THRU SER (SR5437) J.W.H. 11-27-67

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
9	S-1638-2	HOUSING-CAP	
8	S-1638-1	HOUSING-PLUG	
7	S-1637-1	HOUSING-CAP	
6	S-1637-2	HOUSING-PLUG	
5	0413126-5	RHEOSTAT	
4	0413126-6	RHEOSTAT	
3	0713068-2	COMPASS LIGHT	
2	0511481-6	INSTRUMENT LIGHT	
1	S-1091-10	FUSE	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
RED/WHT	18	S-1460-18-2-9	12	SOLDER	S-1635-2		
RED/BLK	18	S-1460-18-2-0	12	SOLDER	S-1636-2		
RED	18	S-1460-18-2	12	SOLDER	S-1636-2		
LB15	18			S-1636-2	S-1367-1-14		
LB14	18			S-1635-2	S-1635-2		
LB11	18			SOLDER	S-1635-2		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	HARRIS	5/22/67
GROUP	H. Vine	5-25-67
CHECK	YAKSHAW	5-23-67
PROJ	[illegible]	5-25-67

TITLE: WIRING DIAGRAM— INSTRUMENT LIGHTS

Cessna.

DWG NO: 0410011

SUPERSEDED BY: 0410011 P. 11.2A | SUPERSEDES: 0410011 PG. 11.2.2 | MODEL: 150 | REV: | PAGE: 11.2.3

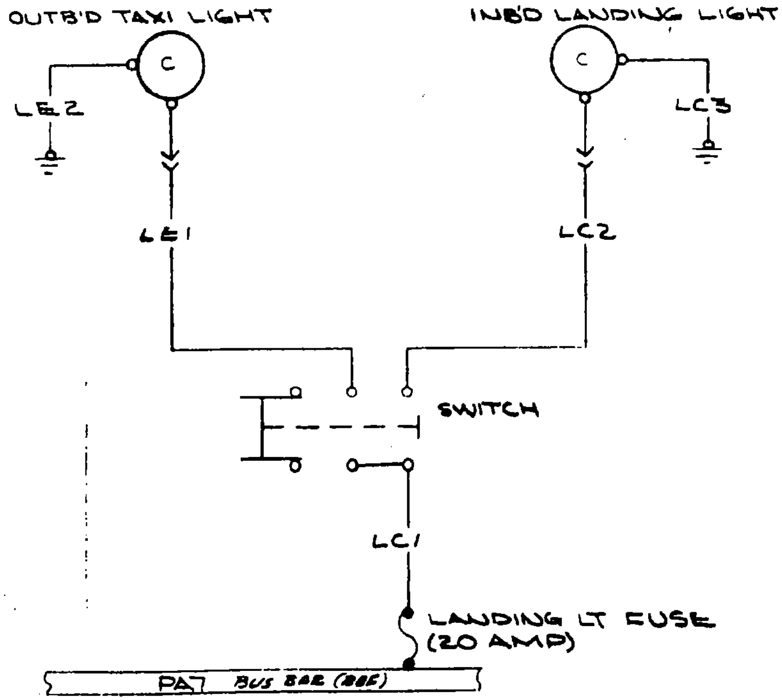
FORM NO 67-1614

NOTES:

1. LC1, LC2, LC3, LE1, & LE2 ARE IDENTICAL TO & SUPERSEDE 0400302-LC1, -LC2, -LC3, -LE1 & -LE2 RESPECTIVELY

2. TERMINALS OF WIRES FOR OPT EQUIPMENT SHALL BE SUITABLY PROTECTED AGAINST SHORTING WHEN OPT EQUIPMENT IS NOT INSTALLED

CHG LET	REVISION	BY DATE	CHK APPD
B	ADDED LC1, LC2, LC3, LE1 & LE2 & NOTES 1 & 2	S9 8-28-61	



Inactive 15061533 & on
3-17-65
4-2-65

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
LE2	14		6	S-1367-2-8	S-1367-2-8	0400302	
LE1	14		55	S-1367-2-8	S-341-1	STD	
LC3	14		6	S-1367-2-8	S-1367-2-8	0400302	
LC2	14		55	S-1367-2-8	S-341-1	STD	
LC1	14		25	S-1367-2-8	———	STD	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Tennant	8/11/60
GROUP		
CHECK	Cope	8/11/60
PROJ	Settle	8/11/60

TITLE: WIRING DIAGRAM — LANDING & TAXI LIGHTS

Cessna.

DWG NO 0410011

SUPERSEDED BY 0410011 PG 11.3.1 | SUPERSEDES NOTE 1 | MODEL 150 | REV B | PAGE 11.3

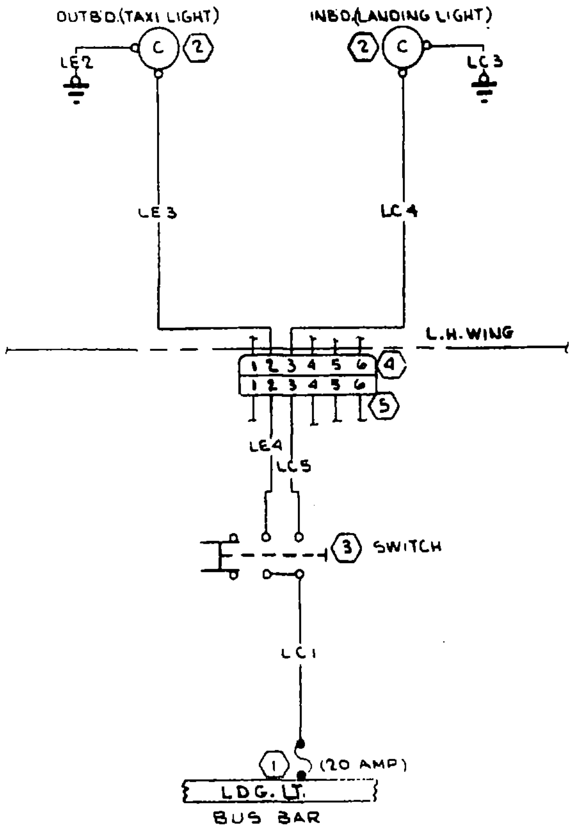
FORM NO 80-161

(SR4662) IX

CHG LET	REVISION	BY DATE	CHK APPD

NOTES;

1. TERMINALS OF WIRES FOR OPT. EQUIPMENT SHALL BE SUITABLY PROTECTED AGAINST SHORTING WHEN OPT. EQUIPMENT IS NOT INSTALLED.



Inactive
SER 15064533 & ON
10-29-65
0.865
VPW
JJB

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LE4	14		65	S-1367-2-8	S-1636-2	STD.	
LE3	14		132	S-1635-2	S-1367-2-8	STD.	
LE2	14		6	S-1367-2-8	S-1367-2-8	0400314	
LC5	14		64	S-1367-2-8	S-1636-2	STD.	
LC4	14		116	S-1635-2	S-1367-2-8	STD.	
LC3	14		6	S-1367-2-8	S-1367-2-8	0400314	
LC1	14		25	SOLDER	S-1367-2-8	STD	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
5	S-1641-6	HOUSING (SOCKET)	
4	S-1640-6	HOUSING (PIN)	
3	0713035	SWITCH	
2	0523181	LIGHT INSTL.	
1	S-1091-20	FUSE	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	3-16-65
GROUP	[illegible]	[illegible]-65
CHECK	[illegible]	4-5-65
PROJ	[illegible]	4-6-65

TITLE: WIRING DIAGRAM — LANDING & TAXI LIGHTS (OPTIONAL)

Cessna.

DWG NO: 0410011

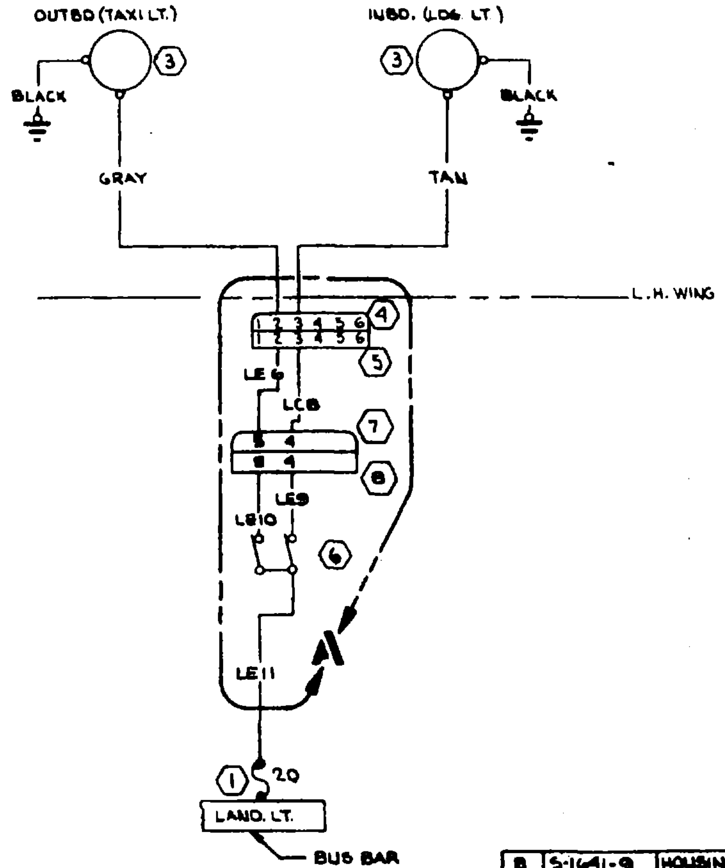
SUPERSEDED BY: 0410011 PG 11.3.2 | SUPERSEDES: 0410011 PG 11.3 | MODEL: 150 | REV: | PAGE: 11.3.1

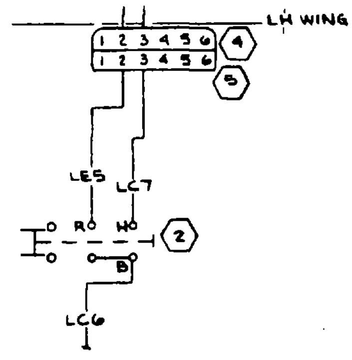
(SR4920)

NOTES:

1. TERMINALS OF WIRES FOR OPT EQUIPMENT SHALL BE SUITABLY PROTECTED AGAINST SHORTING WHEN OPT. EQUIPMENT IS NOT INSTALLED.

CHG LET	REVISION	BY / DATE	CHK / APPD
A	BY RGV: ADD LCB, LE6, LE9, LE10, LE11, S-1640-9, S-1641-9, S-1824-1 & DETAIL A & SER; SER OUT LC6, LC7 & LE5 EO & RR 00946 (SR5437)	JWH 12-66	RLL





DETAIL A
THRU SER (SR5437)

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
LE11	14			SOLDER	S-1493-2		
LE10	14			S-1493-2	S-1636-2		
LE9	14			S-1493-2	S-1636-2		
LE6	14			S-1638-2	S-1636-2		
LCB	14			S-1638-2	S-1636-2		
GRAY	14	S-1460-14-8		S-1635-2	S-1367-2-8	STD.	
TAN	14	S-1460-14-10		S-1635-2	S-1367-2-8	STD	
BLACK	16	S-1460-16-0		S-1367-2-8	S-1367-2-8	0400314	
BLACK	16	S-1460-16-0		S-1367-2-8	S-1367-2-8	0400314	
LE5	14			S-1367-2-8	S-1636-2	STD.	THRU SER(SR5437)
LC7	14			S-1367-2-8	S-1636-2	STD	THRU SER(SR5437)
LC6	14			SOLDER	S-1367-2-8	0400314	THRU SER(SR5437)

WIRE TABLE

	PART NO.	DESCRIPTION	INSTALLED ON
8	S-1641-9	HOUSING-SOCKET	
7	S-1640-9	HOUSING-PIN	
6	S-1824-1	SWITCH	
5	S-1641-6	HOUSING-SOCKET	
4	S-1640-6	HOUSING-PIN	
3	0523118-1	LIGHT INSTL.	
2	0713035	SWITCH ASSY.	
1	S-1091-20	FUSE	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	10-8-65
GROUP	N. Ward	10-8-65
CHECK	F. Burk	10-30-65
PROJ	[illegible]	11-2-65

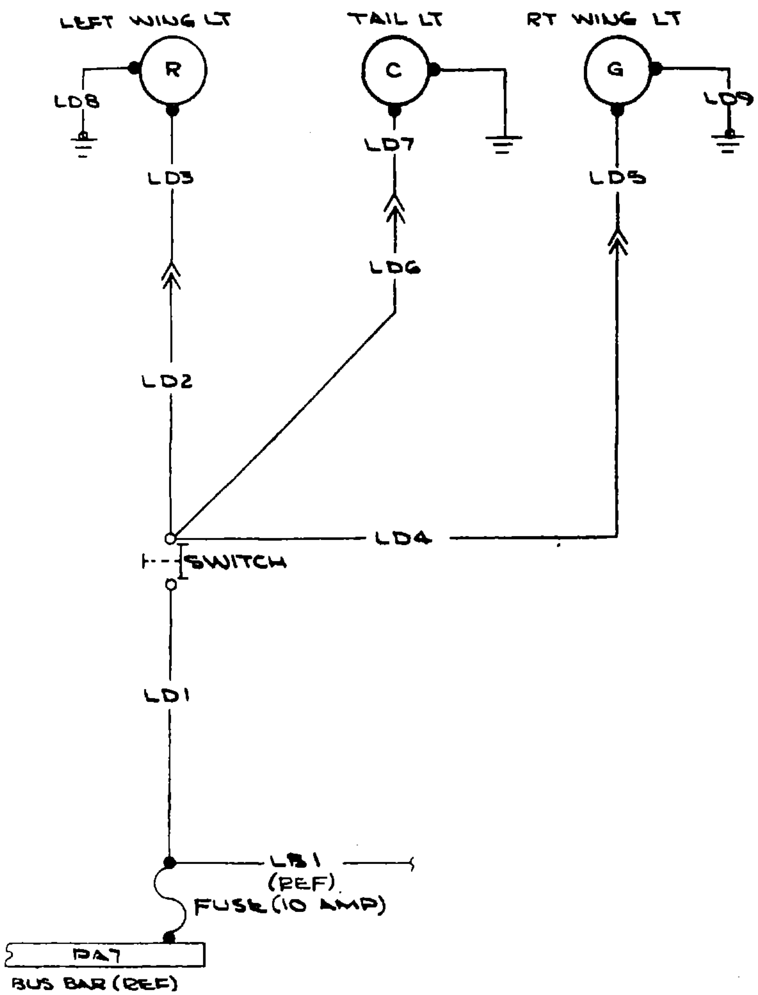
TITLE: WIRING DIAGRAM — LANDING & TAXI LIGHTS (OPTIONAL)

Cessna.

DWG NO 0410011

SUPERSEDED BY: | SUPERSEDES: 0410011 PG. 11.3.1 | MODEL: 150 | REV: A | PAGE: 11.3.2

CHG LET	REVISION	BY DATE	CHK APPD
B	REDRAWN NO CHANGE	8-26-2	RRS
C	DELETE S-1367-1-6 TERM FROM LD8 & LD9 (SR 4121)	1-16-61	



Inactive
Ser 15061533 & on
JJB 3-17-65
RRS 4-2-65

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LD9	18		16	S-1367-1-6	—		
LD8	18		16	S-1367-1-6	—		
LD7	18		20	S-341-2	—		
LD6	18		275	S-341-2	—		
LD5	18		196	S-341-2	—		
LD4	18		39	S-1367-1-8	S-341-2		
LD3	18		196	S-341-2	—		
LD2	18		50	S-1367-1-8	S-341-2		
LD1	18		19	S-1367-1-8	—		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Tennant	3/8/60
GROUP		
CHECK	Cook	3/8/60
PROJ	Sattler	3/10/60

TITLE
WIRING DIAGRAM — NAVIGATION LIGHTS

Cessna.

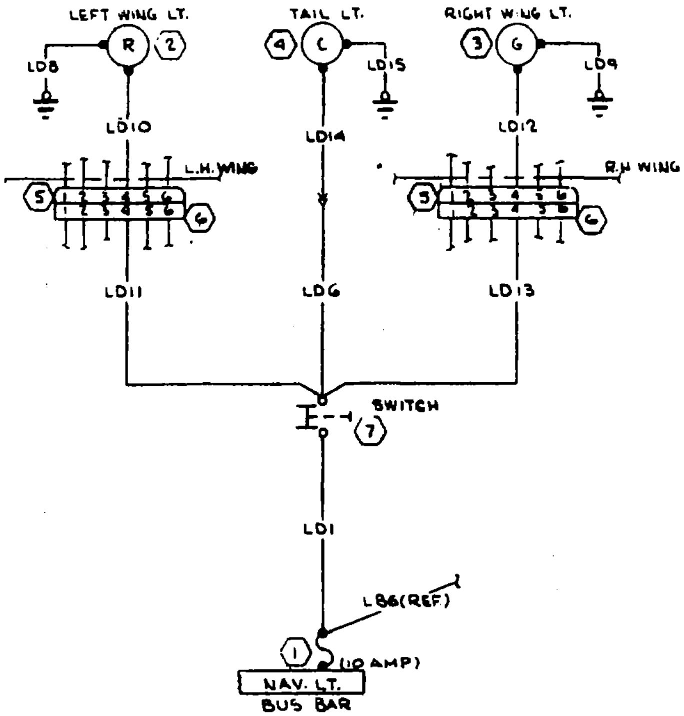
DWG NO. 0410011

SUPERSEDED BY: 0410011 PG. 11.4.1
SUPERSEDES: 0410011 "A" REV
MODEL: 150
REV: C
PAGE: 11.4

FORM NO 80-181

CHG LET	REVISION	BY DATE	CHK APPD
A	ADD LD-5; LD14 WAS LD7 (SR4662)	5-6-65	

(SR4662)



SER 15064533 & ON
10-8-65
10-29-65

LD15	18		12	SOLDER	S-1367-1-6		
LD14	18		80	S-341-2	SOLDER		
LD13	18		51	S-1367-1-8	S-1636-2		
LD12	18		200	S-1635-2	SOLDER		
LD11	18		63	S-1367-1-8	S-1636-2		
LD10	18		200	S-1635-2	SOLDER		
LD9	18		16	SOLDER	S-1367-1-6		
LD8	18		16	SOLDER	S-1367-1-6		
LD6	18		215	S-1367-1-8	S-341-2		
LD1	18		19	SOLDER	S-1367-1-8		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

7	0713026-4	SWITCH	
6	S-1641-6	HOUSING(SOCKET)	
5	S-1640-6	HOUSING(PIN)	
4	0423006-7	TAIL LIGHT	
3	0423006-22	R. WING LT.	
2	0423006-21	L. WING LT	
1	S-1091-10	FUSE	
ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	3-16-65
GROUP		4-2-65
CHECK		4-5-65
PROJ		

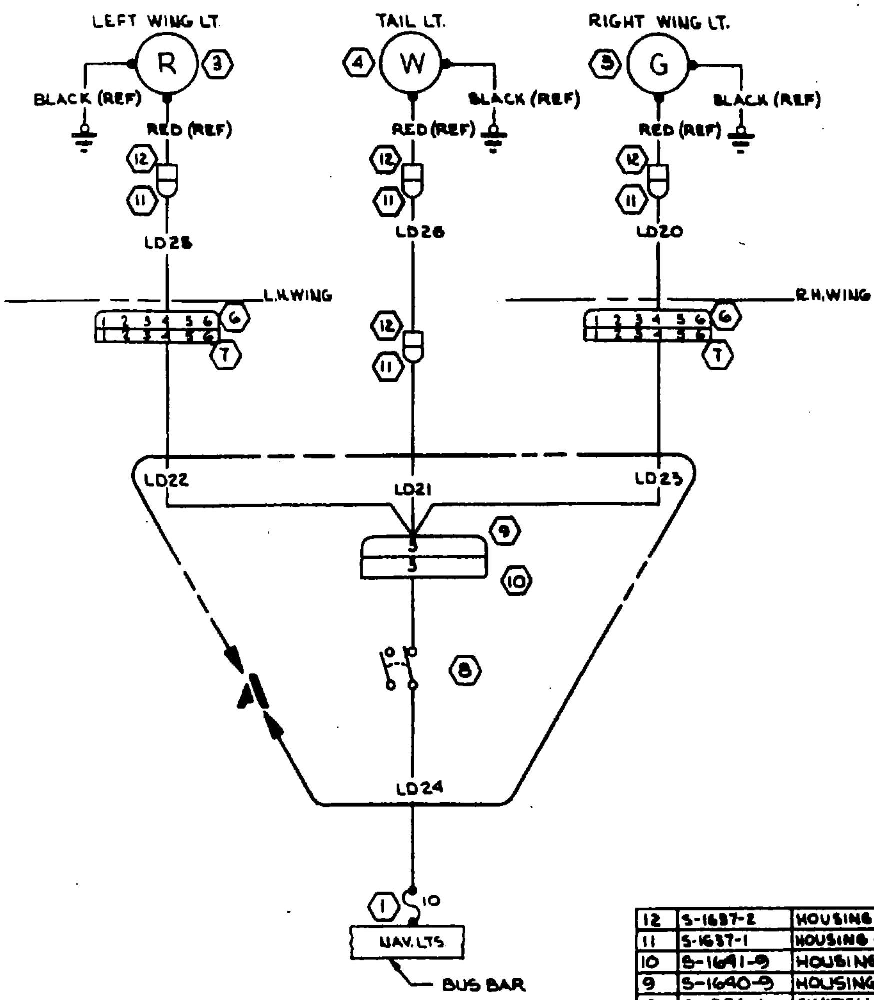
TITLE: WIRING DIAGRAM—NAVIGATION LIGHTS

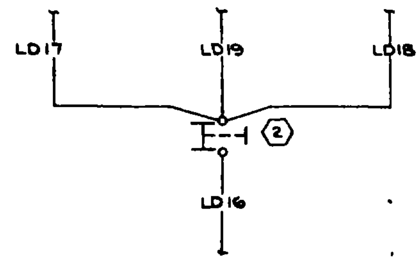
Cessna.

DWG NO: 0410011

SUPERSEDED BY: 0410011 PG. 11.4.2 | SUPERSEDES: 0410011 PG. 11.4 | MODEL: 150 | REV: A | PAGE: 11.4.1

(SR4920)





DETAIL A
THRU SER (SR5437)

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV. DELETED PB8 (REF) FROM NAV LTS SWITCH (SR5199)	9-11-66	
B	BY REV: ADD S-1640-9, LD21, LD22, LD23, LD24, S-1641-9, S-1824-1 & DETAIL A & SER, SER OUT LD16, LD17, LD18 & LD19, C622001-0202 WAS 0425006-21 & 22, C622001-0102 WAS 0438006-7, ITEM 3 WAS ITEM 5 & LD26 WAS LD14; ADD LD20, LD25, S-1637-1, S-1637-2; DELETE 3 RED WIRES & 3 BLACK WIRES FROM WIRE TABLE ED&RR 00948 (SR5437) ED&RR 01163 & ED&RR 01335 (SR5631)	JWM 12-12-61	RLL DCK

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
12	S-1637-2	HOUSING-SOCKET	
11	S-1637-1	HOUSING-PIN	
10	S-1641-9	HOUSING-SOCKET	
9	S-1640-9	HOUSING-PIN	
8	S-1824-1	SWITCH	
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-1091-10	FUSE	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
LD26	18			S-1636-1	S-1635-1		
LD25	18			S-1635-2	S-1635-1		
LD24	18			SOLDER	S-1493-1		
LD23	18			S-1635-1	S-1636-1		
LD22	18			S-1635-1	S-1636-1		
LD21	18			S-1635-1	S-1635-1		
LD20	18			S-1635-2	S-1635-1		
LD19	18			S-1367-1-8	S-341-2		THRU SER (SR5437)
LD18	18			S-1367-1-8	S-1636-2		THRU SER (SR5437)
LD17	18			S-1367-1-8	S-1636-2		THRU SER (SR5437)
LD16	18			SOLDER	S-1367-1-8		THRU SER (SR5437)
LD14	18		80	S-341-2	SOLDER		THRU SER (SR5631)

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	10-8-65
GROUP		10-29-65
CHECK		10-30-65
PROJ		11-2-65

TITLE: WIRING DIAGRAM— NAVIGATION LIGHTS

Cessna.

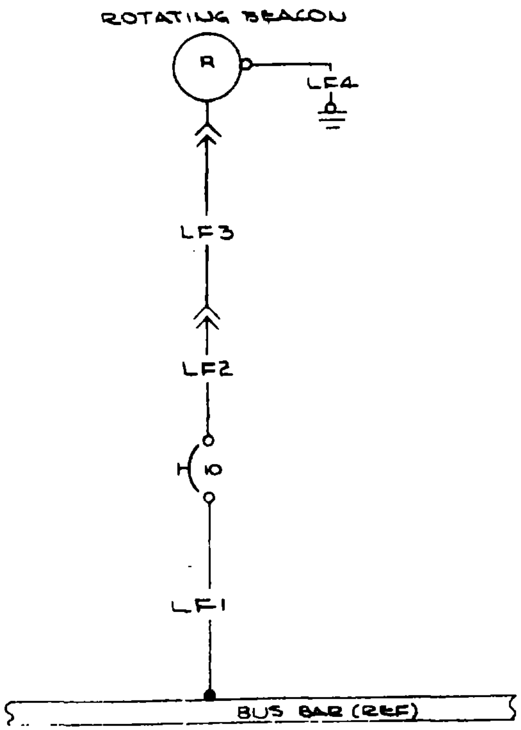
DWG NO. 0410011

SUPERSEDES: 041011 PG 11.4.1 | MODEL: 150 | REV. B | PAGE: 11.4.2

NOTES:

1. LF1 & LF4 ARE IDENTICAL TO & SUPERSEDE 0400301-LF1 & LF4 RESPECTIVELY
2. TERMINALS OF ALL WIRES FOR OPT EQUIPMENT SHALL BE SUITABLY PROTECTED AGAINST SHORTING WHEN OPT EQUIPMENT IS NOT INSTALLED

CHG LET	REVISION	BY DATE	CHK APPD
B	REDRAWN: ADDED LF1 & LF4		
C	LF4 IS OPT WAS STD		



Inactive
SER 15064533 & ON
10-29-65

LF4	18		10	S-1367-1-8	S-1367-1-6	1 2	OPT
LF3	16		58	S-341-1	S-341-1	2	STD
LF2	16		260	S-341-1	S-1367-1-8		STD
LF1	16		18	S-1367-1-8	—	0400301 1	OPT
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS

WIRE TABLE

PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN		3/10-60
GROUP	PARSONS	
CHECK		3/10-60
PROJ		3-10-60

TITLE: WIRING DIAGRAM — ROTATING BEACON (OPTIONAL)

Cessna.

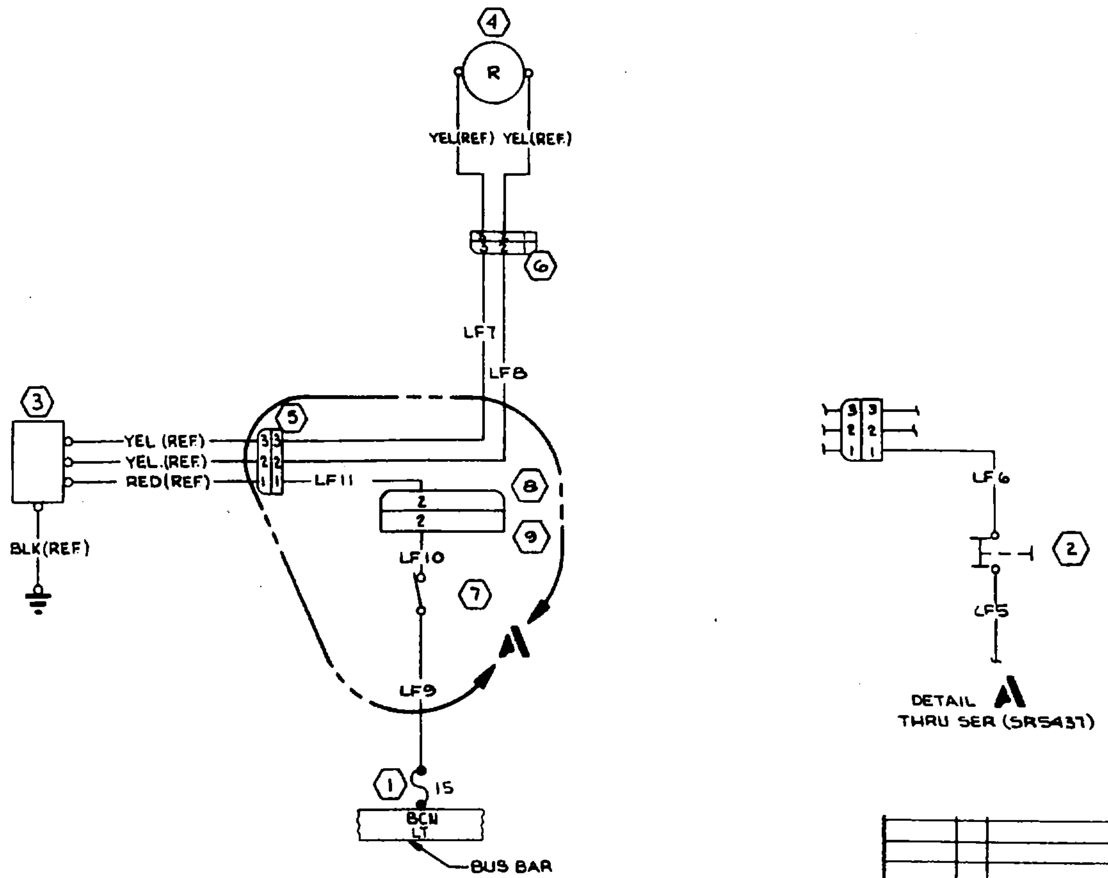
DWG NO 0410011

SUPERSEDED BY 0410011 Pg. 11.6 | SUPERSEDES NOTE 1 A 0410011 REV | MODEL 150 | REV C | PAGE 11.5

FORM NO 80-161

(SR4920)

CHG LET	REVISION	BY / DATE	CHK / APPD
A	BY REV: IN E/T S-1091-15 WAS S-1091-10 IN W/T LF7 (OPT) & LF8 (OPT) WAS LF7 (STD) & LF8 (STD)	7-20-66	YAK
B	BY REV: ADD S-1640-9, S-1641-9, S-1824-1, LF9, LF10, LF11 & DETAIL A & SER; SER OUT LF5 & LF6. ED & RR 00948 (SR5437)	JWH 12-12-66	RLL



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LF11	16			S-1635-2	S-1636-2		
LF10	16			S-1493-2	S-1636-2		
LF9	16			SOLDER	S-1493-2		
LF8	16			S-1636-2	S-1635-2	OPT	
LF7	16			S-1636-2	S-1635-2	OPT	
LF6	16			S-1367-2-8	S-1636-2	STD.	THRU SER(SR5437)
LF5	16			SOLDER	S-1367-1-8	OPT	THRU SER(SR5437)

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
9	S-1641-9	HOUSING-SOCKET	
8	S-1640-9	HOUSING-PIN	
7	S-1824-1	SWITCH	
6	S-1638-2	HOUSING-CAP	
5	S-1638-1	HOUSING-PLUG	
4	C621001-	LIGHT ASSY-14V	
3	C594501-	FLASHER ASSY-14V	
2	0713026-4	SWITCH ASSY	
1	S-1091-15	FUSE	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	12-10-65
GROUP		12-20-65
CHECK		
PROJ		

TITLE: WIRING DIAGRAM— LIGHT-FLASHING BEACON (OPTIONAL)

Cessna.

DWG NO: 0410011

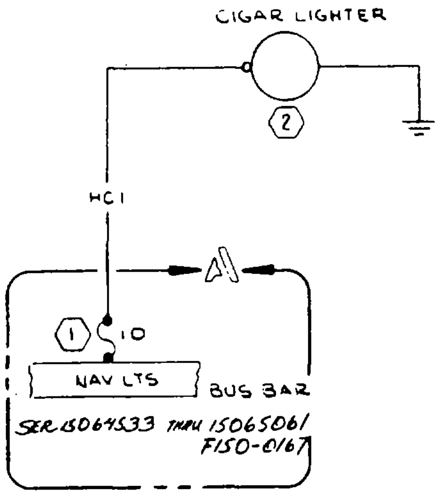
SUPERSEDED BY: | SUPERSEDES: 0410011 PP 11.5 | MODEL: 150 | REV: B | PAGE: 11.6

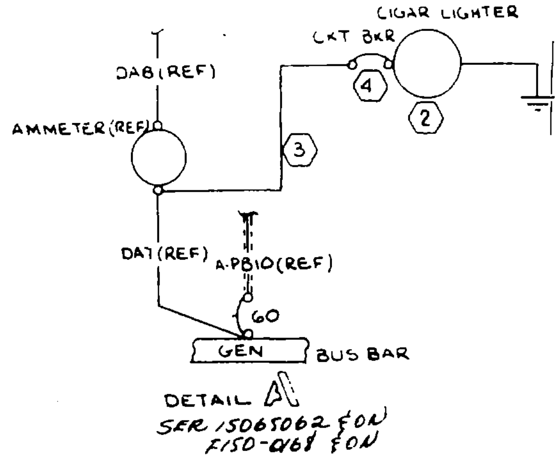
HEATING, VENTILATING, AND DE-ICING SECTION

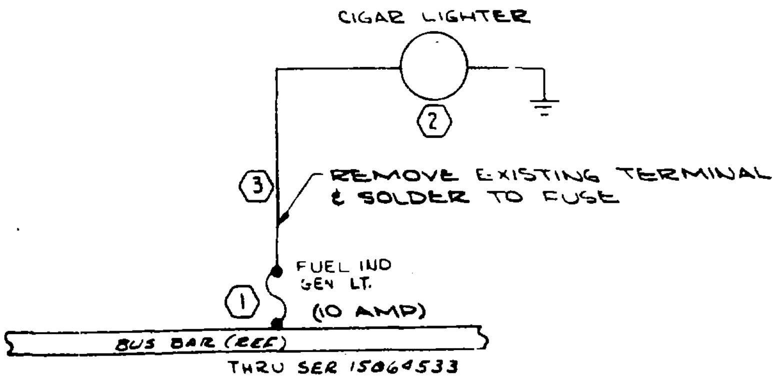
Cessna.

DRAWN		TITLE: WIRING DIAGRAM--- MODEL 150		DRAWING NO. 0410011
DATE	9-13-62			
APP'D	RRS		REV: B	PAGE: 13.0

CHG LET	REVISION	BY DATE	CHK APPD
B	REDRAWN NO CHG	8-8-62	ERS
C	ADDED E/T; ADDED HC1 TO W/T & ADDED LIMITING SERIALS; FUEL IND GEN LT. WAS DONE LT FUSE; (SR4920)	10-8-65	ERS
D	BY REV: ADD 60232-1 TO E/T, ADD DETAIL A TO FLD; IN W/T HC1 SERIALIZED OUT 0513039-3 WAS 0513039-7 IN E/T (SR 5153)	1-10-66	YAK







NOTES;

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		SERIALS
HC1	16			SOLDER	S 1367-2-8	SER 15064533 THRU 15065061 F150-0167

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
4	60232-1	CIRCUIT BREAKER	(CUE)
3	0513039-5	WIRE ASSY.	
2	0513052-3	LIGHTER ASSY.	
1	S 1091-10	FUSE	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	TENNANT	4/6/60
GROUP		
CHECK	COOK	4/8/60
PROJ	SETTLER	4/10/60

TITLE: WIRING DIAGRAM — CIGAR LIGHTER (OPTIONAL)

Cessna.

DWG NO 0410011

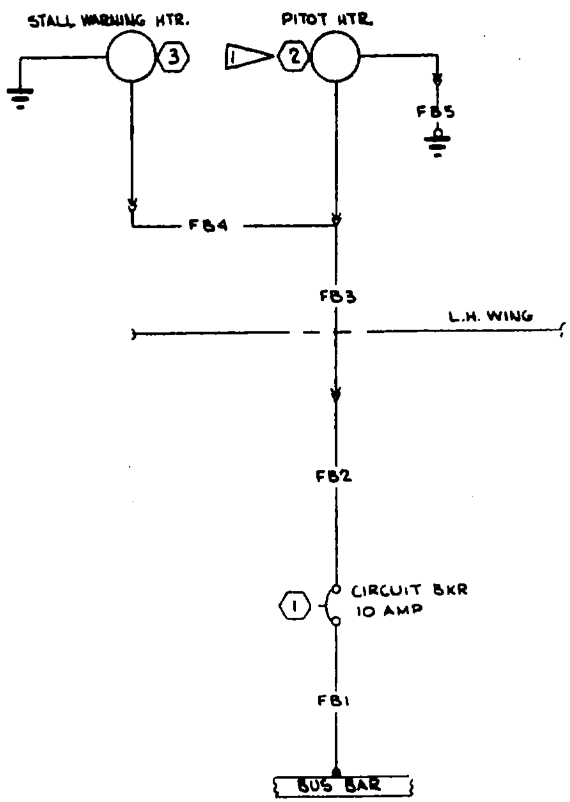
SUPERSEDED BY | SUPERSEDES | MODEL 150 | REV D | PAGE 13.1

FORM NO 80161

NOTES;

[1] PART OF 0511062-5 WING UNIT

CHG LET	REVISION	BY DATE	CHK APPD



Inactive
15061533 & ON
3-16-65 JJB

FB5	18		8	S-1369-1	S-1367-1-6	0422353	
FB4	18		22	COMMON TO FB3	S-341-2		
FB3	16		47	S-341-1	S-1369-2		
FB2	16		51	S-1367-1-6	S-341-1		
FB1	16		15	SOLDER	S-1367-1-6	0422353	
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

3	0511062-5	WING UNIT	
2	0721105-5	PITOT HTR.	
1	S-1360-10	CIRCUIT BKR	
ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	3/16/65
GROUP	H Wine	4-30-65
CHECK	[illegible]	[illegible]
PROJ	[illegible]	4-?-65

TITLE: WIRING DIAGRAM— PITOT & STALL WARNING HEAT (OPTIONAL)

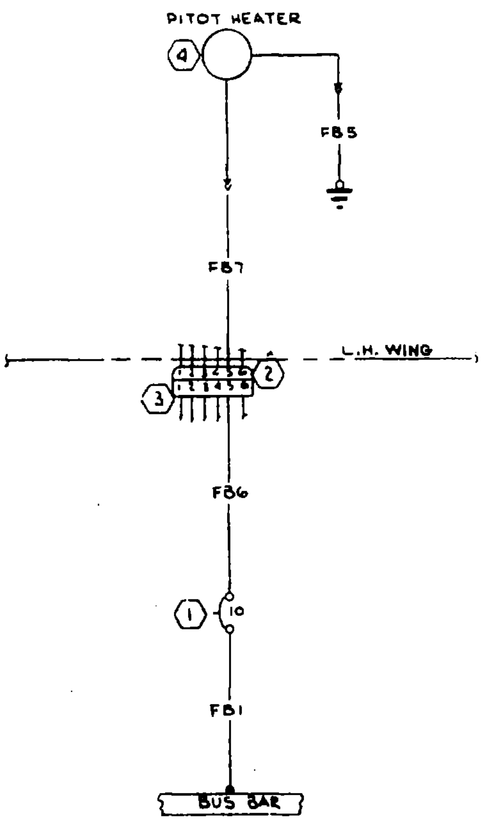
Cessna.

DWG NO: 0410011

SUPERSEDED BY: 0410011 Pg 13.2.1 | SUPERSEDES: | MODEL: 150 | REV.: | PAGE: 13.2

(SR4662)

CHG LET	REVISION	BY DATE	CHK APPD



SER 15061533 & ON
10.29.65

FB7	16		70	S-1635-2	S-1369-2	STD.	
FB6	16		62	S-1367-1-6	S-1636-2	STD	
FB5	18		8	S-1369-1	S-1367-1-8	0422354	
FB1	16		15	SOLDER	S-1367-1-6	0422354	
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

4	0721105-5	PITOT HTR.	
3	S-1641-6	HOUSING (SOCKET)	
2	S-1640-6	HOUSING (PIN)	
1	~~S-1360-10~~	CIRCUIT BKR.	
ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	3/16/65
GROUP	Wise	3-30-65
CHECK		
PROJ		

TITLE: WIRING DIAGRAM— PITOT HEAT (OPTIONAL)

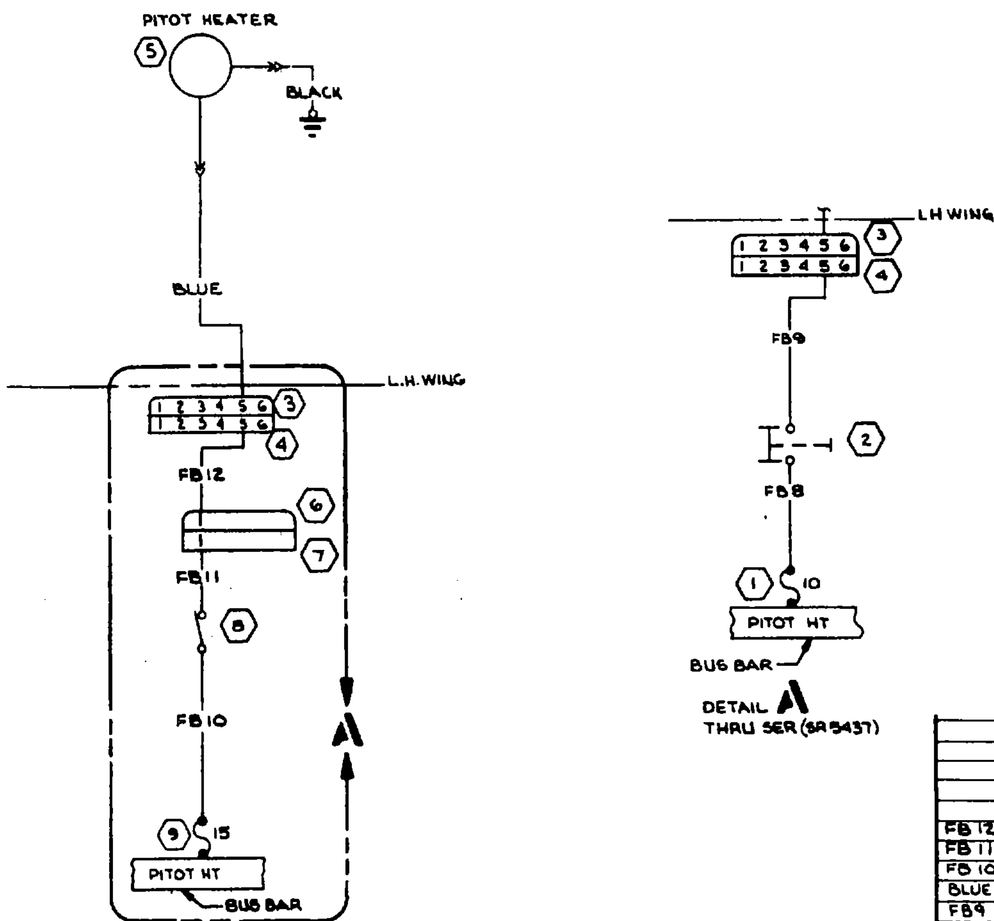
Cessna.

DWG NO. 0410011

SUPERSEDED BY: 0410011 PG 13.3 | SUPERSEDES: 0410011 PG 13.2 | MODEL: 150 | REV | PAGE 13.2.1

(SR4920)

CHG LET	REVISION	BY / DATE	CHK / APPD
A	BY REV: S-1640-9, S-1641-9, FB10, FB11 & FB12, S-1091-15 S-1824-1 & DETAIL A & SER; SER OUT FB 8 & FB 9 ED&RR 00948 (SR5437)	JWH 12-6-65	ALL NJW DGK



FB 12	16			S-1635-2	S-1636-2		
FB 11	16			S-1493-2	S-1636-2		
FB 10	16			SOLDER	S-1493-2		
BLUE	16	S-1460-16-6		S-1635-2	S-1369-2	STD.	
FB9	16			S-1367-2-8	S-1636-2	STD.	THRU SER (SR5437)
FB8	16			SOLDER	S-1367-2-8	0422354	THRU SER (SR5437)
BLACK	18	S-1460-18-0		S-1369-1	S-1367-1-8	0422354	
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
9	S-1091-15	FUSE	
8	S-1824-1	SWITCH	
7	S-1641-9	HOUSING-SOCKET	
6	S-1640-9	HOUSING-PIN	
5	0721105-5	PITOT HEATER	
4	S-1641-6	HOUSING-SOCKET	
3	S-1640-6	HOUSING-PIN	
2	0713026-4	SWITCH ASSY.	
1	S-1091-10	FUSE	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	10-8-65
GROUP	V. Wise	10-29-65
CHECK	J. Stick	10-6-65
PROJ	[illegible]	1-2-66

TITLE: WIRING DIAGRAM— PITOT HEAT (OPTIONAL)

Cessna.

DWG NO. 0410011

SUPERSEDED BY: | SUPERSEDES: 0410011 PG 13.2.1 | MODEL: 150 | REV: A | PAGE: 13.3

CONTROL SURFACE SECTION

Cessna.

DRAWN		TITLE: WIRING DIAGRAM--- MODEL 150	DRAWING NO. 0410011
DATE			
APP'D		REV:	PAGE: 14.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

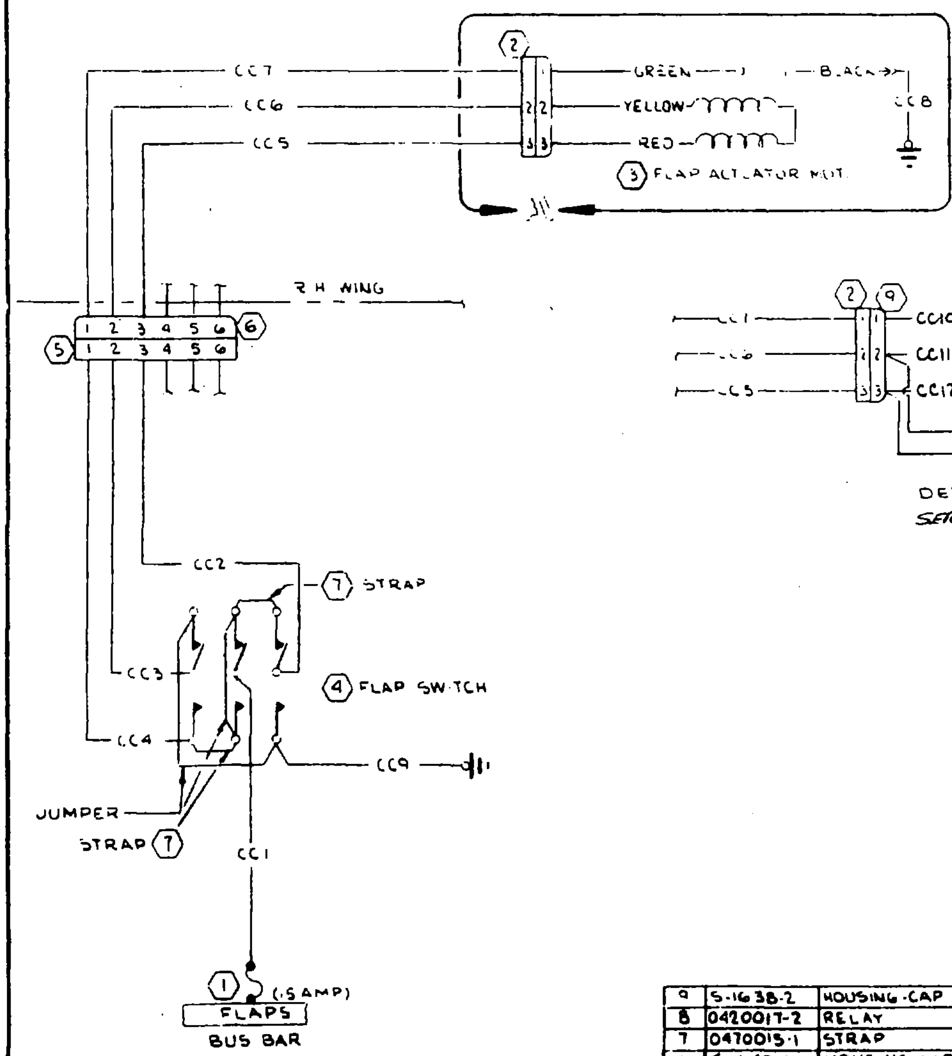
FORM NO. 80-1

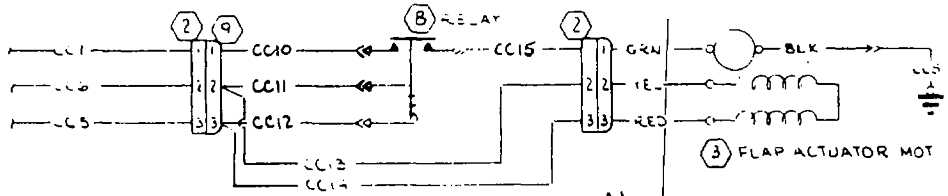
NOTES;

1. AFTER TERMINAL IS INSTALLED ON RELAY SOLDER TERMINAL TO RELAY.

(SR 4662) A

CHG LET	REVISION	BY DATE	CHK APPD
A	[illegible] (SR4936)	9-17-65	





DETAIL A
SER 15062291 & ON

Inactive
Ser 15063136 & ON
Ser F150-0035 & ON
Ser 17254315 & ON
Ser F172-0320 & ON
10-6-65
10-19-65

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
CC15	16		3	S1493-2	S1636-2		
CC14	16		7	MATES WITH CC12	S1636-2		
CC13	16		17	MATES WITH CC11	S1636-2		
CC12	16		8	S1635-3	S1493-2		
CC11	16		8	S1635-3	S1493-2		
CC10	16		8	S1635-2	S1493-2		
CC9	16		16	S1367-2-8	S1367-1-6		
CC8	16		8	S-341-1	S1367-1-8		
CC7	16		70	S-1635-2	S1636-2		
CC6	16		70	S-1635-2	S-1636-2		
CC5	16		70	S-1635-2	S-1636-2		
CC4	16		42	S1367-2-6	S-1636-2		
CC3	16		43	S1367-2-6	S1636-2		
CC2	16		45	S-1367-2-6	S1636-2		
CC1	16		8	S1367-2-6	SOLDER		

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
9	S-1638-2	HOUSING-CAP	
8	0420017-2	RELAY	
7	0470015-1	STRAP	
6	S-1640-6	HOUSING-CAP	
5	S-1641-6	HOUSING-PLUG	
4	HM25S-73	SWITCH (CELI)	
3	0760657-6	FLAP ACTUATOR MOT	
2	S-1638-1	HOUSING-PLUG	
1	S-1627-15	FUSE	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	3-16-65
GROUP	[illegible]	[illegible]
CHECK	[illegible]	4-5-65
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM— WING FLAPS-ELECTRIC

Cessna.

DWG NO 0410011

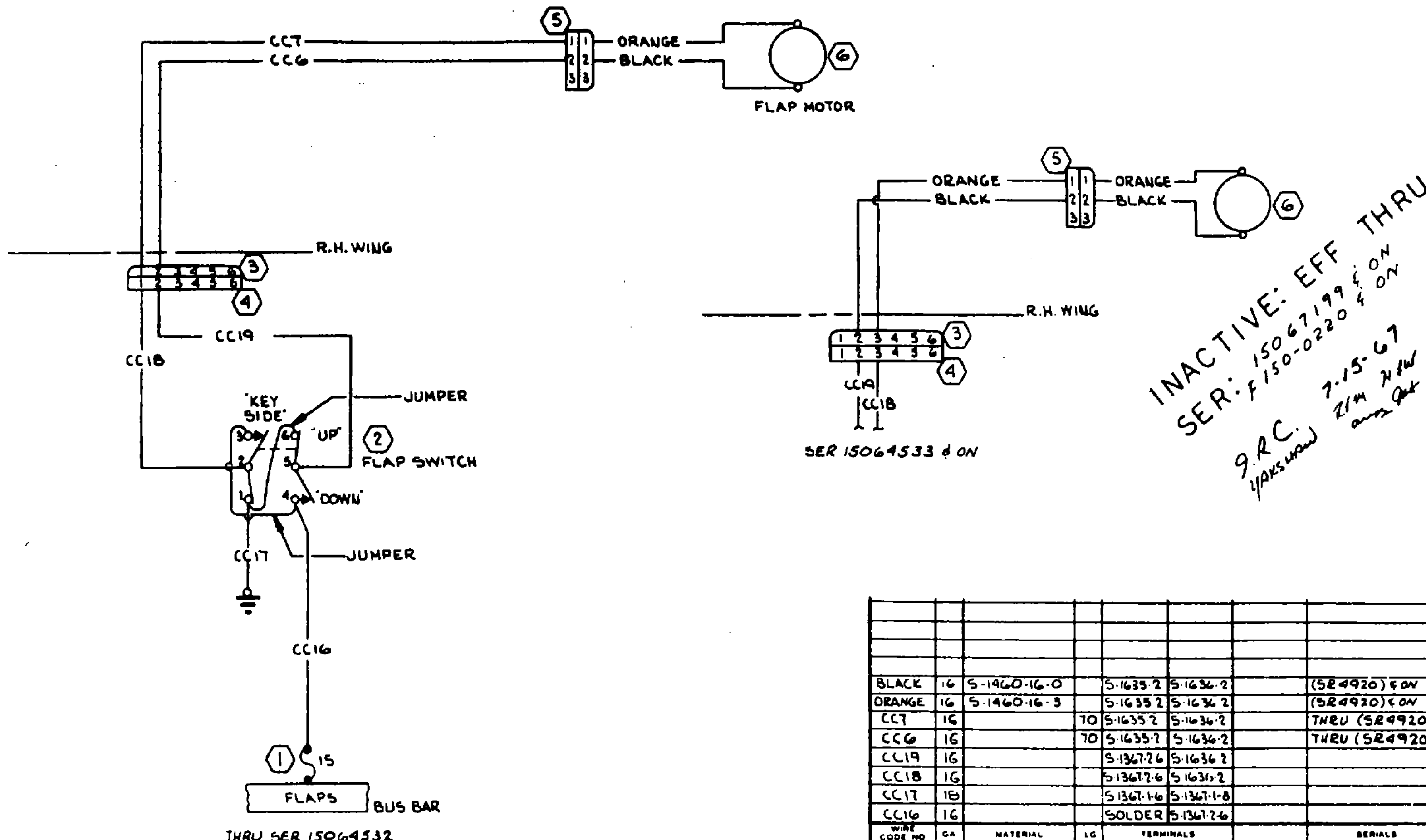
SUPERSEDED BY 0410011 PG. 14.2.1 | SUPERSEDES | MODEL 150 | REV A | PAGE 14.2

NOTES:

1. SWITCH SHOWN IS A "MOMENTARY ON"-"ON"-"MOMENTARY ON" CONFIGURATION SUCH THAT MOTOR IS SHORTED OUT WHEN SWITCH IS IN THE CENTER ("ON") POSITION. SWITCH SHOWN IN CENTER ("ON") POSITION.

(SR4944)
(SR 4920)

CHG LET	REVISION	BY / DATE	CHK APPD
A	BY REV; MOVED ORANGE & CC18 WIRE FROM NO. 1 PIN LOC. TO NO 3 PIN LOC. (SR4920)	9 [illegible] 12-4-65	[illegible]
B	BY REV: S-1091-15 WAS S-1627-15; INACTIVATE DWG. (SR5145)	JRC 8-8-67	[illegible]



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
BLACK	16	S-1460-16-0		S-1635-2	S-1636-2		(SR4920) & ON
ORANGE	16	S-1460-16-3		S-1635-2	S-1636-2		(SR4920) & ON
CC7	16		70	S-1635-2	S-1636-2		THRU (SR4920)
CC6	16		70	S-1635-2	S-1636-2		THRU (SR4920)
CC19	16			S-1367-2-6	S-1636-2		
CC18	16			S-1367-2-6	S-1636-2		
CC17	18			S-1367-1-6	S-1367-1-8		
CC16	16			SOLDER	S-1367-2-6		

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
6	0760657-8	FLAP MOTOR ASSY	
5	S-1638-1	HOUSING-PLUG	
4	S-1641-6	HOUSING-SOCKET	
3	S-1640-6	HOUSING-PIN	
2	S-1661-1	SWITCH ASSY. 1	
1	S-1091-15	FUSE-SLO BLOW	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

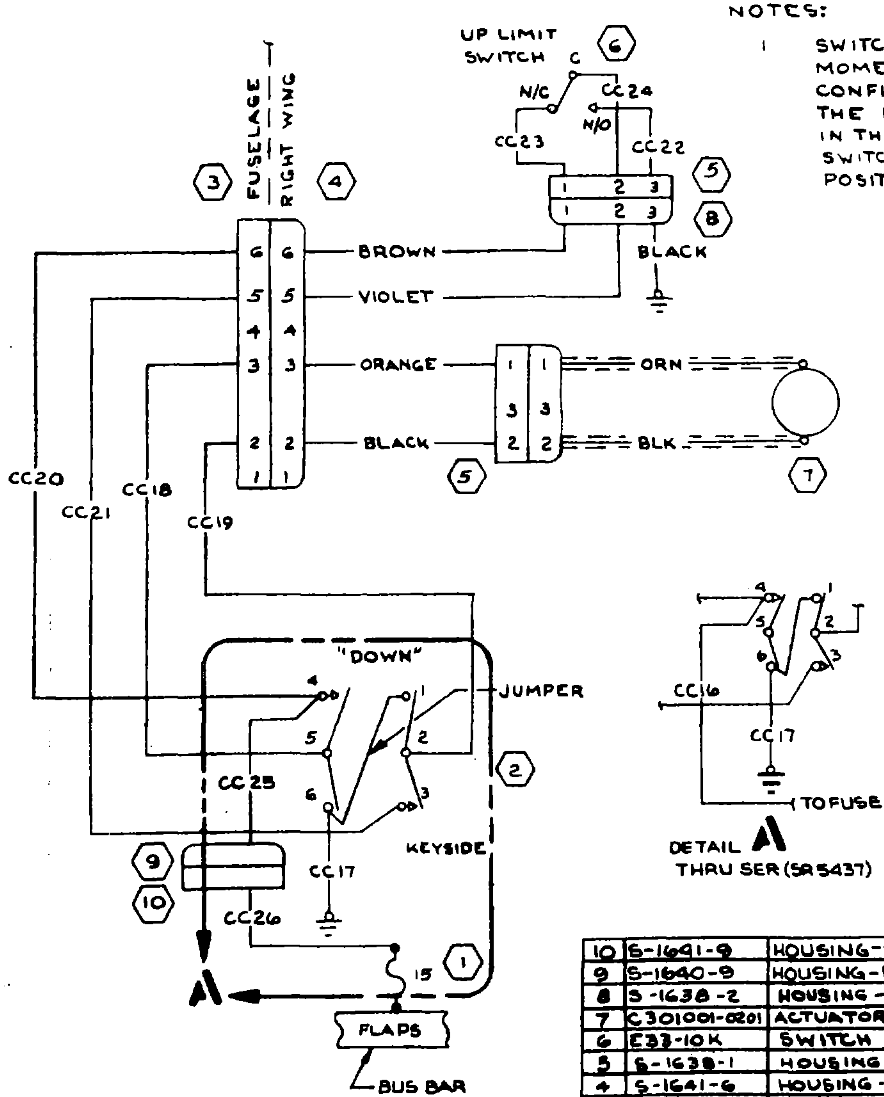
	NAME	DATE
DRAWN	BLISS	10-1-65
GROUP	[illegible]	10-1-65
CHECK	[illegible]	10-19-65
PROJ	[illegible]	10-20-65

TITLE: WIRING DIAGRAM— WING FLAPS - ELECTRIC

Cessna.

DWG NO. 0410011

SUPERSEDED BY: P 14.2.2 & 14.2.3 | SUPERSEDES: 0410011 PG 14.2 | MODEL: 150 | REV: B | PAGE: 14.2.1



NOTES:

1 SWITCH SHOWN IS AN "ON-ON" MOMENTARY "ON" SWITCH CONFIGURATION SUCH THAT THE MOTOR IS SHORTED OUT IN THE CENTER ("ON") POSITION. SWITCH IS SHOWN IN CENTER ("ON") POSITION.

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD CC25, CC26, S-1640-9, S-1691-9 & DETAIL A & SER; SER OUT CC16. ED & RR 00948 (SR5474) II	JWH 12-6-67	RLL HEM DGK

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
CC26	16			SOLDER	S-1636-2		
CC25	16			S-1635-2	S-1367-2-6		
CC24	16			S-1636-2	S-1367-1-6		
CC23	16			S-1636-2	S-1367-1-4		
CC22	18			S-1636-2	S-1367-1-4		
BLACK	16	-16-0		S-1636-2	S-1493-2		
ORANGE	16	-16-3		S-1636-2	S-1493-2		
BLACK	18	-18-0		S-1635-2	S-1367-1-8		
BROWN	16	-16-1		S-1635-2	S-1635-2		
VIOLET	16	-16-7		S-1635-2	S-1635-2		
BLACK	16	-16-0		S-1635-2	S-1636-2		
ORANGE	16	-16-3		S-1635-2	S-1636-2		
CC21	16			S-1367-2-6	S-1636-2		
CC20	16			S-1367-2-6	S-1636-2		
CC19	16			S-1367-2-6	S-1636-2		
CC18	16			S-1367-2-6	S-1636-2		
CC17	18			S-1367-1-6	S-1367-1-3		
CC16	16			SOLDER	S-1367-2-6	(SR5145)	THRU SER (SR5437)

WIRE TABLE

	PART NO.	DESCRIPTION	VENDOR
10	S-1691-9	HOUSING-SOCKET	
9	S-1640-9	HOUSING-PIN	
8	S-1638-2	HOUSING-SOCKET	
7	C301001-0201	ACTUATOR ASSY	
6	E33-10K	SWITCH	(01963)
5	S-1638-1	HOUSING-PLUG	
4	S-1641-6	HOUSING-SOCKET	
3	S-1640-6	HOUSING-PIN	
2	S-1661-2	SWITCH	
1	S-1627-15	FUSE-SLOW-BLO	

EQUIPMENT TABLE

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES: 14.2.3
041001I PG 14.2.2

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN	SIPES VR	8/10/67
GROUP	H. Wiebe	8-11-67
DRAWN	SIPES VR	8/10/67
CHECK	Yaes Hays	8-11-67
STRESS	[illegible]	9-11-67
PROJECT	[illegible]	9-11-67
APPD		

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. 0410011

SCALE: NONE | SR 5145 XI | PAGE: 14.2.4

FORM NO. 05-215A

WARNING AND EMERGENCY SECTION

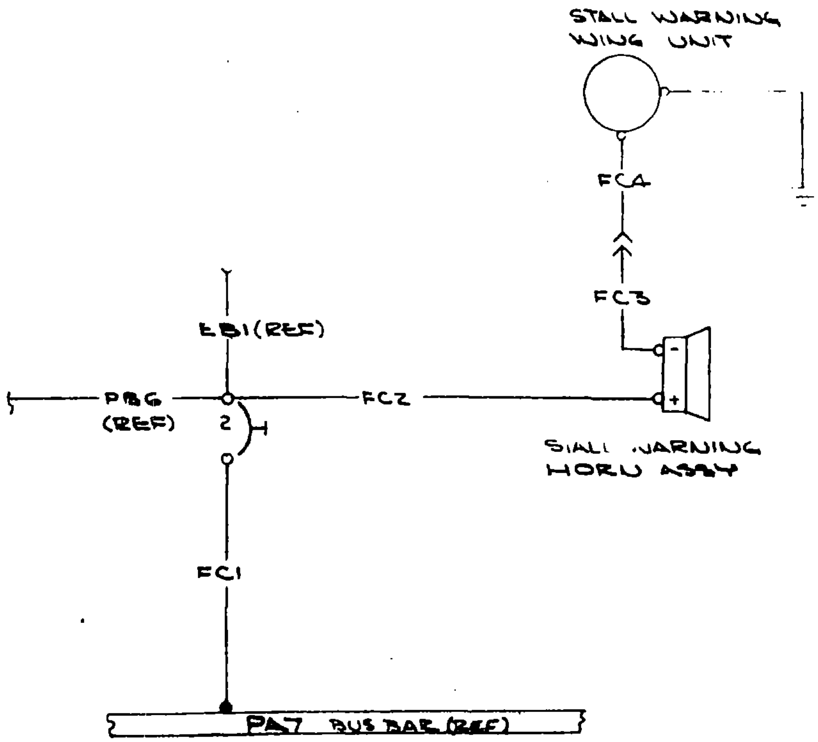
Cessna.

DRAWN	CJ	TITLE: WIRING DIAGRAM--- MODEL 150		DRAWING NO. 0410011
DATE	9-13-62			
APP'D	RES JA		REV: "B"	PAGE: 15.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-173

CHG LET	REVISION	BY DATE	CHK APPD
B	REDRAWN NO CHG	6-28-62	



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
FC4	18		69	S341-2	S1367-1-6		
FC3	18			S-1367-1-6	S-341-2		
FC2	18		6	S-1367-1-8	S-1367-1-6		
FC1	18			S-1367-1-8	—		

WIRE TABLE

PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	IPHANT	3/4/60
GROUP		
CHECK	COOK	3/8/60
PROJ	SHIFLER	3/10/60

TITLE
WIRING DIAGRAM —
STALL WARNING

Cessna.

DWG NO 0410011

SUPERSEDED BY | SUPERSEDES 0410011 | MODEL 150 | REV B | PAGE 18.1

FORM NO 80-161

Cessna

WIRING DIAGRAM

MODEL 172 - P172 - F172

DWG. NO. 0500062

FORM NO. 80-158

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1.0	Title Page		
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2.1	Table of Contents	1-31-68	
2.2	Table of Contents	1-19-68	
3.0	Notes	4-26-62	
4.0	D.C. Power	5-27-63	
4.1	Battery Circuit	5-3-66	H
4.1.2	Battery Circuit	1-19-68	B
4.1.3	Wiring Diagram - Battery Circuit	7-19-68	A
4.2	Regulator, Generator & Warning Light	7-26-66	F-Inac.
4.3	Ammeter (Opt.)	7-8-66	E-Inac.
4.3.1	Starter & Ammeter	9-23-67	D
4.4	Ground Service Receptacle	5-3-66	E-Inac.
4.4.1	Ground Service Receptacle (Opt.)	1-31-67	A
4.4.2	Ground Service Receptacle	9-30-67	B
4.5	Circuit Breaker Wiring	12-20-65	A-Inac.
4.6	Not Used		
4.7	Alternator System - 60 AMP (Opt.)	7-8-66	B-Inac.
4.8	Circuit Breaker Wiring	1-31-68	D
4.9	Wiring Diagram - Alternator System - 60 AMP (Opt.)	9-23-67	C
4.11	Wiring Diagram - Alternator System - 60 AMP (Opt.)	1-19-68	A
4.12	Wiring Diagram - Circuit Breaker Wiring	1-31-68	B
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4.14	W.D. Alternator System 60 AMP	9-30-67	NC
5.0	Ignition	9-26-62	D
5.1	Magneto System	1-19-68	M
6.0	Engine Control	9-26-62	
6.1	Starter	5-27-63	E
6.1.1	Starter & Mag 172-P172	8-8-66	F-Inac.
7.0	Fuel & Oil	5-27-63	
7.1	Fuel Pump	8-17-67	A
7.2	Wiring Diagram - Fuel Pump	1-19-68	B

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8.0	Engine Instruments	9-26-65	
8.1	Fuel Gauge & Transmitter	12-20-65	E-Inac.
8.1.1	W.D. - Fuel Gage & Transmitter	12-20-65	NC
8.1.2	Wiring Diagram - Fuel Gage & Transmitter	1-19-68	B
8.2	Carburetor Air Temp. Gauge	9-23-67	G
8.2.1	Carburetor Air Temp. Gauge	5-29-63	D-Inac.
8.3	Hourmeter (Opt.)	9-29-66	NC
9.0	Flight Instruments	9-26-62	
9.1	Turn & Bank	5-29-63	E
9.2	Optimum Flight Instruments (Opt.)	8-17-67	F
9.3	Turn Coordinator	9-30-67	B
9.4	Wiring Diagram - Turn & Bank Indicator	9-30-67	A
10.0	Other Instruments	10-16-62	
10.1	Clock	2-3-65	F
10.2	Clock	9-30-67	B
11.0	Lighting	9-26-62	D
11.1	Dome, Courtesy, & Map (Opt.)	1-17-64	E-Inac.
11.1.1	Map & Auxillary Instrument Light	8-17-67	C
11.1.2	Dome & Courtesy Lights	12-20-65	NC-Inac.
11.2	Compass & Instruments Lts.	6-21-65	F-Inac.
11.2.1	W.D. Compass & Instrument Lights	9-23-67	B
11.2.2	Wiring Diagram - Compass & Instrument Lights	1-31-68	B
11.3	Landing & Taxi Lts.	12-20-65	E-Inac.
11.4	Wing & Tail Lts.	12-20-65	F-Inac.
11.5	Rotating Beacon (Opt.)	12-20-65	E-Inac.
11.6	Flasher Unit (Opt.)	12-20-65	E-Inac.
11.7	Dome & Courtesy Lights	9-30-67	C
11.8	W.D. Landing & Taxi Lights (Opt.)	9-30-67	C
11.9	W.D. Wing & Tail Lights	1-19-68	E
11.10	Light - Flashing Beacon (Opt.)	11-14-67	D
11.11	W.D. - Map Light, Control Wheel	9-22-67	A
12.0	Not Used		
13.0	Heating, Venting & De-Icing	9-26-62	D
13.1	Cigar Lighter	1-19-68	K
13.2	Pitot & Stall Warning Heat	12-20-65	E-Inac.
13.3	W.D. - Pitot Heat (Opt.)	9-30-67	C

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PAGE NO.	TITLE	DATE ISSUED	REV
14.0	Control Surface Section	5-27-63	
14.1	Not Used		
14.2	Not Used		
14.3	Not Used		
14.4	Wing Flaps	6-2-65	Inac.
14.4.1	Wing Flaps-Electric & Flap Position Indicator	10-20-65	A-Inac.
14.4.2	Wing Flaps - Electric & Flap Position Indicator	12-20-65	NC-Inac.
14.5	Wing Flaps Electric & Flap Position Indicator	8-22-67	B-Inac.
14.6	Wing Flaps Electric & Flap Position Indicator	1-19-68	C
14.7	Wing Flaps Electric & Flap Position Indicator	9-30-67	B
15.0	Warning & Emergency	9-26-62	D
15.1	Stall Warning Horn & XMTR.	12-20-65	E-Inac.
16.0	Miscellaneous Section	9-27-63	
16.1	Power Seats Pilot & Co-Pilot (Opt.)	12-17-63	A

NOTES

1. WIRE CODE DESIGNATIONS PER CES 1100.
2. WIRE CODE APPLICATION AND WIRE LENGTH TOLERANCES PER CES 1015.
3. "S" SUFFIX ON WIRE GAUGE IN WIRE TABLE DENOTES SHIELDED WIRE.
4. NON-SHIELDED WIRES TO BE PER MIL-W-5086, TYPE I (PVC), NYLON JACKET.
5. SHIELDED WIRES TO BE PER MIL-C-7078, TYPE II WITH MIL-W-5086 TYPE I CONDUCTOR.
6. "DS" SUFFIX ON WIRE GAUGE IN WIRE TABLE DENOTES DOUBLE SHIELDED WIRE.
7. WHEN "(OPT)" IS USED IN TITLE BLOCK OF A DIA., ALL WIRES SHOWN THEREIN ARE OPTIONAL EXCEPT WHERE NOTED AS "STD."
8. ALL WIRES NOT SPECIFIED AS "(OPT)" ARE TO BE INSTALLED AS STANDARD EQUIPMENT. THE AIRPLANE ASSEMBLY WILL SPECIFY THE ADDITIONAL EQUIPMENT REQUIRED FOR DELUXE VERSIONS.

Cessna.

DRAWN	GD	TITLE: WIRING DIAGRAM--- MODEL 172-P172	DRAWING NO. 0500062
DATE	9-26-62		
APP'D	RRS	REV: "D"	PAGE: 3.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-160

D. C. POWER SECTION

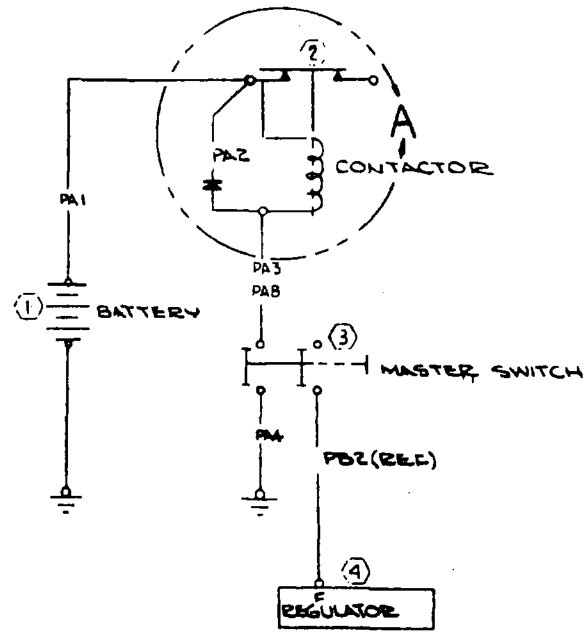
Cessna.

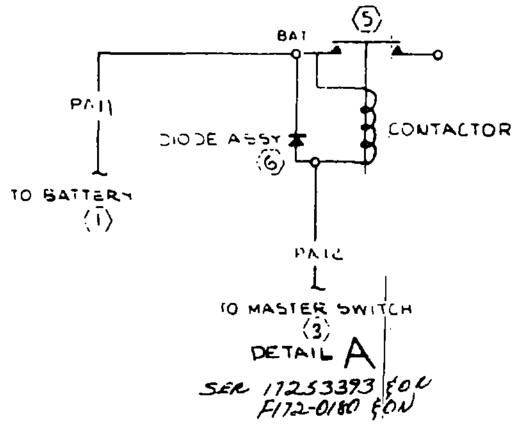
DRAWN	~~J~~d	TITLE: WIRING DIAGRAM---		DRAWING NO.
DATE	9-26-62	MODEL 172-P172		0500062
APP'D	RRS R		REV: "D"	PAGE: 4.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-162

CHG LET	REVISION	BY DATE	CHK APPD
D	REDRAWN NO CHG	[illegible]	[illegible]
E	[illegible] PA2 [illegible]	[illegible]	[illegible]
F	S1367-1-6 WAS S1367-1-7 ON PA8	[illegible]	[illegible]
G	ADDED DETAIL A & SER ; ADDED EQUIPMENT TABLE & ITEM NO ADDED PA9 PA10 INACTIVATED PA1, PA2 & PA8 (SR 4668)	J.J.B 1-23-65	[illegible]
H	PA11 WAS PA9 & PA12 WAS PA10 C611001-0101 WAS C9-3205	Weber 6-8-66	[illegible]





WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
PA12	18		35	S-1367-1-10	S-1367-1-8		SER 17253393 F172-0180 FON
PA11	4		25	S-1367-6-14	S-1367-6-14		
PA8	18		50	S-1367-1-6	S-1367-1-8		172 ONLY INACTIVE SER 17253393 F172-0180 FON
PA4	18		2	S-1367-1-8	S-1367-1-8		
PA3	18		88	S-1367-1-6	S-1367-1-8		P172 ONLY
PA2	18		3	S-1367-1-6	COMBINED WITH PA1		INACTIVE SER 17253393 F172-0180 FON
PA1	4		5	S-1367-6-12	S-1367-6-14		INACTIVE SER 17253393 F172-0180 FON

WIRE TABLE

6	0770728-1	DIODE ASSY	
5	S-1579-1	CONTACTOR	
4	C611001-0101	REGULATOR	
3	0713026-5	MASTER SWITCH	
2	0712603-2	CONTACTOR	
1	0511319-1	BATTERY	
	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	[illegible]	[illegible]
GROUP	[illegible]	[illegible]
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — BATTERY CIRCUIT

Cessna.

DWG NO 0500062

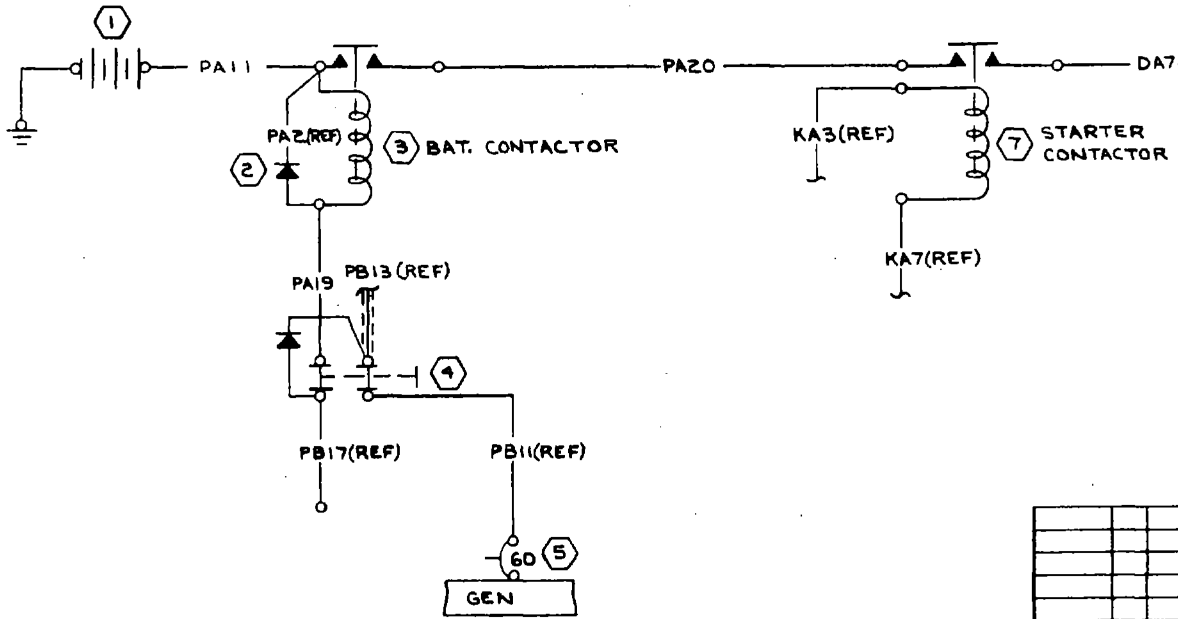
SUPERSEDED BY: | SUPERSEDES 0500062 C REV | MODEL 172 - P172 | REV H | PAGE 4.1

FORM NO 80-161

NOTES:

1. APPLICABLE MODELS; FR172E & T41-C

LTR	DESCRIPTION	DATE	APPROVED
A	BY REV: 0712605-1 WAS 0511319-1, PA20 WAS PA20(REF), DA7 WAS DA7 (REF); ADD S-1660-1 & NOTE 1 (SER R172E-0257 THRU -0301) & ON (SER FR172E-0001)	JWH 9-19-67	
B	BY REV: PA20 4 GA WAS PA20 2GA & S-1367-6-13 WAS S-1367-7-13 ED&RR 01358	RLY 1-8-68	RLL DGV



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
PA11	4		28	S 1367-1-10	S 1367-1-8		
PA20	4			S-1367-6-13	S-1367-6-13		
PA19	18		88	S-1367-1-6	S-1367-1-8		
DA7	4			S-1367-6-13	S-132-6-13		

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION
7	S-1660-1	CONTACTOR
6	SAW-4206-1	STARTER (12984)
5	S-1707-60	CIRCUIT BKR
4	0713026-5	MASTER SWITCH
3	S-1579-1	CONTACTOR
2	0770728-1	DIODE ASSY
1	0712605-1	BATTERY

EQUIPMENT TABLE

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wise	7-27-67
DRAWN	C.GARCIA	8-8-67
CHECK	LAURIE	8-9-67
STRESS		
PROJECT		
APPD		8-11-67

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

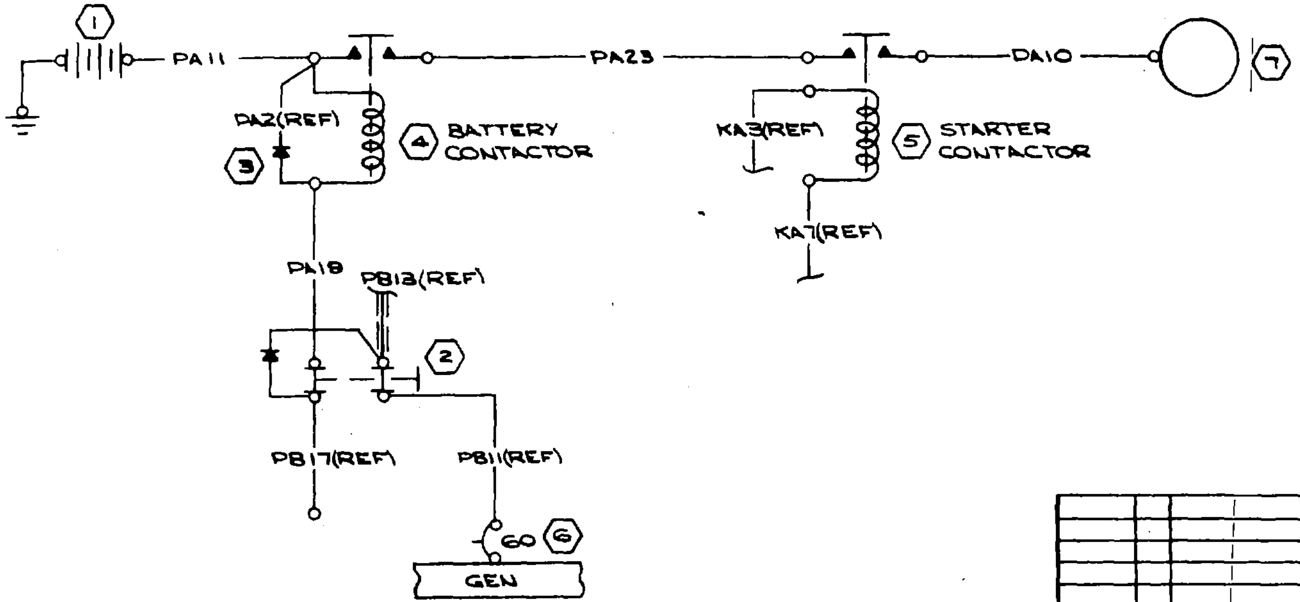
(SER FR172E-0001) & ON
(SER R172E-0257 THRU -0301)

FORM 80 80215

NOTES:

1. APPLICABLE MODELS; 172I

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: PA23 4GA WAS PA20 2 GA & S-1367-6-13 WAS S-1367-7-13 EO&RR 01358	RLY 1 8 68	RLL



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
PA23	4			S-1367-6-13	S-1367-6-13		
PA19	18		88	S-1367-1-6	S-1367-1-8		
PA11	4		28	S-1367-1-10	S-1367-1-8		
DA10	4			S-1367-6-13	S-1367-6-13		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	VENDOR
7	SAW-4206-1	STARTER	(12984)
6	S-1707-60	CIRCUIT BKR	
5	S-1660-1	CONTACTOR	
4	S-1579-1	CONTACTOR	
3	0770728-1	DIODE ASSY	
2	0713026-5	MASTER SWITCH	
1	0712605-1	BATTERY	

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		
GROUP	H. Wise	9-29-67
DRAWN	RCANTELL	9-27-67
CHECK	LAURIE	9-27-67
STRESS	WITHINGTON	9-28-67
PROJECT	D G Kiello	9-30-67
APPD	C.L. Moore	9-28-67

Cessna AIRCRAFT CO. COMMERCIAL AIRCRAFT DIV. 5800 E. PAWNEE WICHITA, KANSAS

TITLE WIRING DIAGRAM — BATTERY CIRCUIT

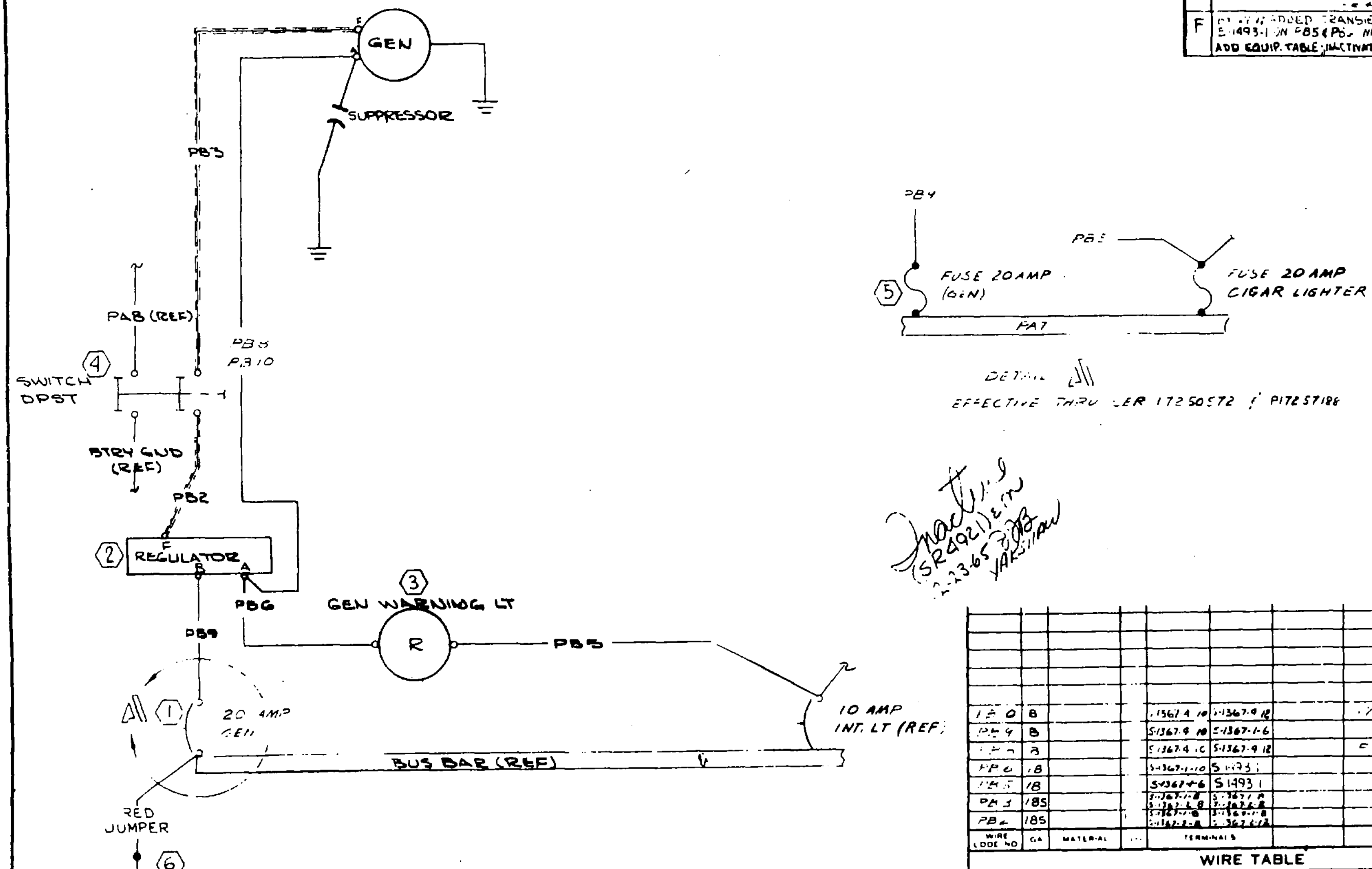
SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0500062

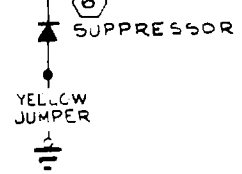
SCALE: NONE | PAGE: 4.1.3

(SER 17256513) & ON

FORM NO. 80-215A

CHG LET	REVISION	BY / DATE	CHK / APPD
D	REDRAWN NO CHG	9-11-62	
E	[illegible]	5-7-63	
F	ADDED TRANSIENT SUPPRESSOR S-1493-1 ON PB5 & PB6 WAS SOLDER; ADD EQUIP. TABLE; INACTIVATE DWG (SR4921)	8-14-65	





WIRE CODE NO	GA	MATERIAL		TERMINALS			SERIALS
PB10	8			S-1367-4-10	S-1367-9-12		172 ONLY
PB9	8			S-1367-4-10	S-1367-1-6		
PB7	8			S-1367-4-10	S-1367-9-12		P172 ONLY
PB6	18			S-1367-1-10	S-1493-1		
PB5	18			S-1367-1-6	S-1493-1		
PB3	18S			S-1367-1-8 S-1367-1-8	S-1367-1-8 S-1672-2-8		
PB2	18S			S-1367-1-8 S-1367-2-8	S-1367-1-8 S-1367-1-12		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
6			
5	S-1091-20	FUSE	
4	0713026-5	SWITCH-MASTER	
3	0513051-1	GEN. WARNING LT. ASSY.	
2	0413205	REGULATOR	
1	S-1360-20	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	GRISWOLD	4-2-59
GROUP		4-3-59
CHECK	COOK	4-3-59
PROJ	TATTLES	4-3-59

TITLE: WIRING DIAGRAM — REGULATOR, GENERATOR & WARNING LIGHT

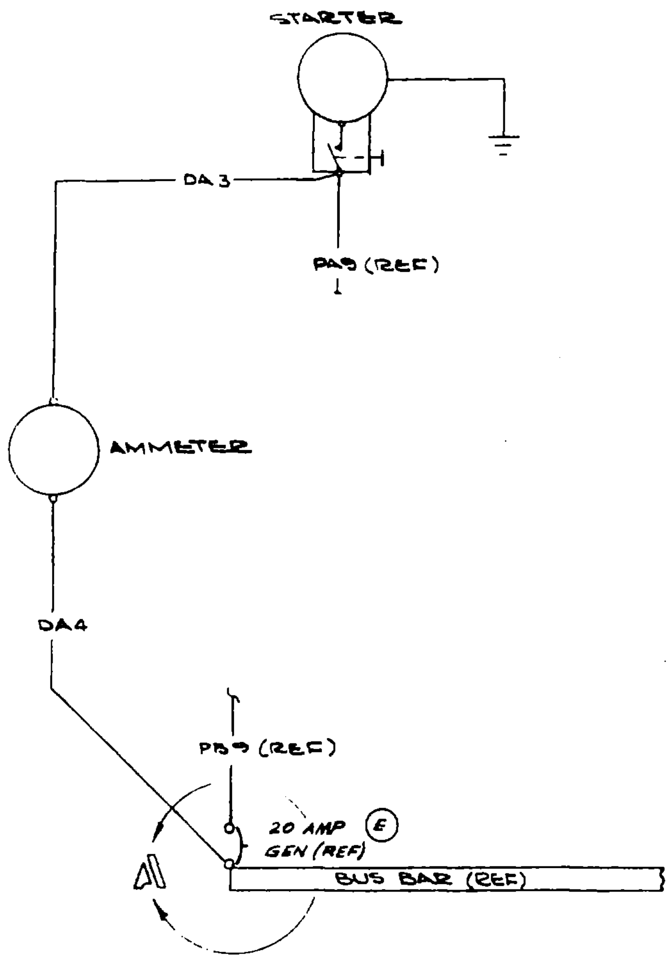
Cessna.

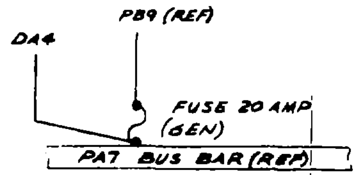
DWG NO 0500062

SUPERSEDED BY PAGE 4.7 | SUPERSEDES 0500062 C REV | MODEL 172-P172 | REV F | PAGE 4.2

FORM NO 80-161

CHG LET	REVISION	BY / DATE	CHK / APPD
D	ADDED 8C-DA3, 8C-DA4 & NOTE 1	[illegible] 9-10-62	[illegible]
E	DELETED PREFIXES ADD [illegible]	4-9-63 [illegible]	[illegible]





DETAIL A

(E) EFFECTIVE THRU SER 17250572 & P17257188

Inactive (SR49211) [illegible]
7-1-66 [illegible]
7-5-66 [illegible]

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
DA4	8		16	S1367-4-6	S1367-4-6	0513[illegible]	
DA3	8		44	S1367-4-10	S1561-4-14	051[illegible]	

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	GRISWOLD	4-2-59
GROUP	DITTMER	4-3-59
CHECK	COOK	4-3-59
PROJ	SATTLER	4-3-59

TITLE: WIRING DIAGRAM — AMMETER (OPT)

Cessna.

DWG NO 0500062

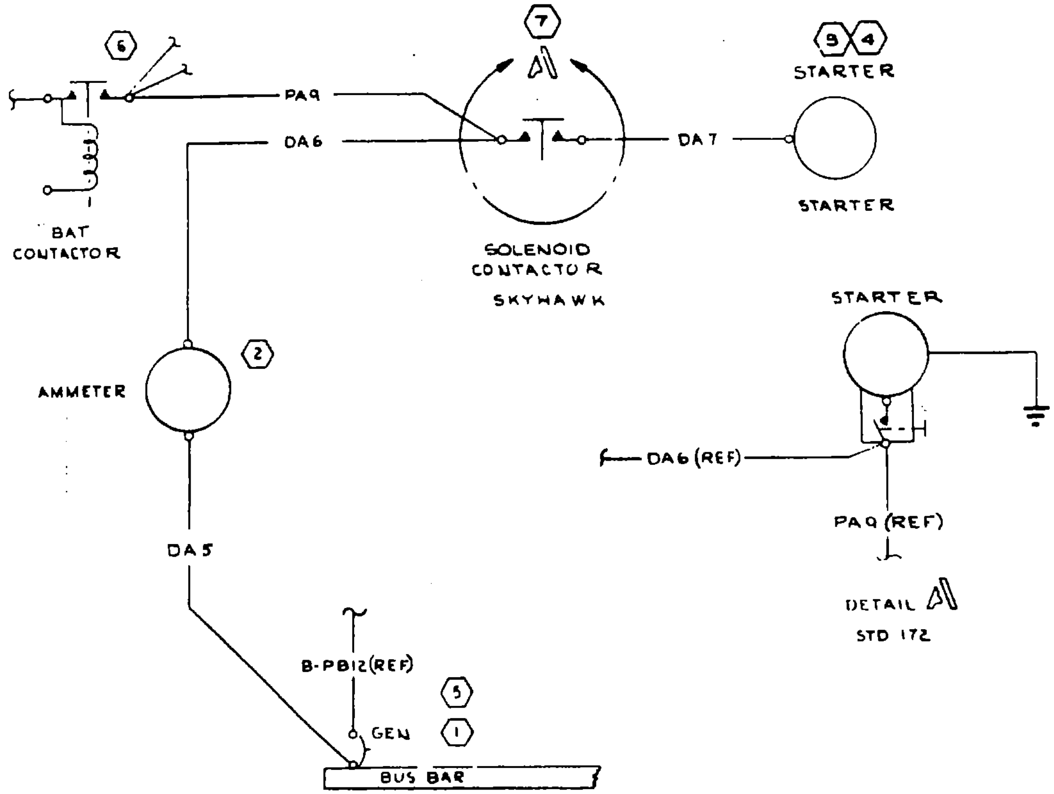
SUPERSEDED BY 0500062 [illegible] 9.3.1 | SUPERSEDES | MODEL 172-P172 | REV E | PAGE 4.3

FORM NO. 80-161

NOTES:
1 PA20 REPLACES PA9 ON FRITZE ONLY.

2 APPLICABLE MODELS; 172.

CHG LET	REVISION	BY DATE	CHG APPD
A	CHANGE TITLE WAS AMMETER. ADD ELECTRIC STARTER TO FIELD (TO BM S-1596-60 (SAW 4206-1 S-1707-60 CIRCUIT BREAKER ADD DETAIL A STARTER FOR STD 172 / WIRE NO DA5, DA6, DA7 PA9. [illegible] (SEE F172-0001) [illegible]	WEBEL [illegible] 66	[illegible]
B	[illegible]	[illegible]	[illegible]
C	BY REV: ADD PA20 WIRE & FRITZE TO MODEL BLOCK & NOTE 1 (SEE FRITZE-0001) & ON	CG [illegible]	RLL
D	BY REV: ADD S-1660-1; DELETE FRITZE FROM MODEL BLOCK, PA20 & NOTE 1: ADD NOTE 2 (SEE FRITZE-0001) & ON	JWH 9-13	RLL



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
PA4	4			S1367-6-14	S1367-6-14		
DA7	4			S1367-6-13	S1367-6-14		
DA6	8		58	S1367-4-10	S1367-4-10		
DA5	8		29	S1367-4-10	S1367-4-10		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
9			
8			
7	S-1660-1	CONTACTOR-SOLENOID	
6	S-1579-1	CONTACTOR BAT	
5	S-1596-60	CIRCUIT BREAKER	THRU SR5136
4	SAW-4206-1	STARTER (12989)	SR5129 /ON
3	1118823	STARTER (16758)	THRU SR5129
2	S-1320-1	AMMETER	
1	S-1707-60	CIRCUIT BREAKER	SR5136 /ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Webel	[illegible]
GROUP	[illegible]	[illegible]
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

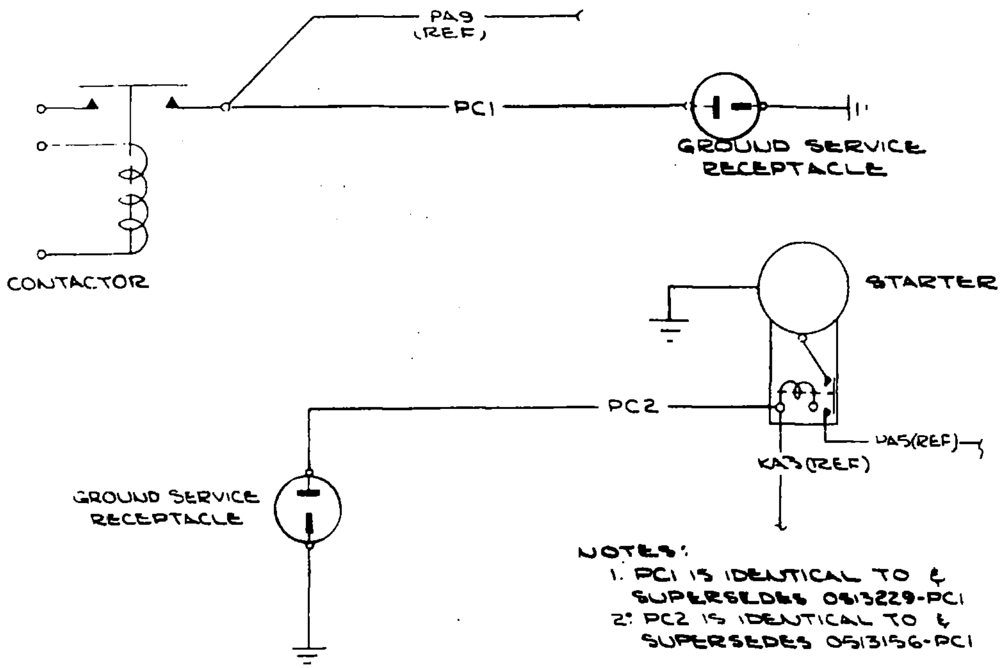
TITLE: WIRING DIAGRAM— STARTER & AMMETER

Cessna.

DWG NO. 0500062

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
	0500062-4.3	NOTED	D	4.31

CHG LET	REVISION	BY / DATE	CHK / APPD
D	ADDED B-PC1 & C-PC2 & NOTES 1 & 2	[illegible]	[illegible]
	DELETED PREFIXES SR 4941	[illegible]	[illegible]



NOTES:
1. PC1 IS IDENTICAL TO & SUPERSEDES 0513229-PC1
2. PC2 IS IDENTICAL TO & SUPERSEDES 0513156-PC1

Inactive (SR 4921) E.O.W. 12-23-65 DDB 4-25-66 RRS 4-27-66

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
PC2	4			5-1368-6-14	5-1367-6-14		F 72 ONLY
PC1	4			5-1367-6-12	5-1367-6-14		172 ONLY

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Griswold	4/2/59
GROUP	Ottmer	4/3/59
CHECK	Cook	4/3/59
PROJ	Sattler	4/3/59

TITLE: WIRING DIAGRAM — GROUND SERVICE RECEPTACLE

Cessna.

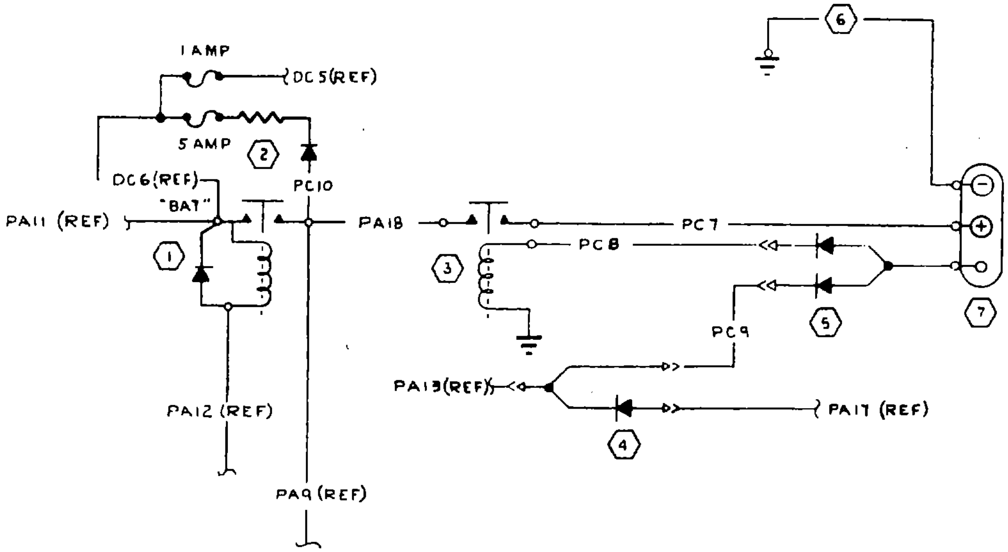
DWG NO 0500062

SUPERSEDED BY: 0500062 PAGE 4.4.1 | SUPERSEDES: NOTE 1 & 2 | MODEL 172 P172 | REV E | PAGE 4.4

FORM NO 80 161

(SER 17254893) & ON

CHG LET	REVISION	BY / DATE	CHK / APPD
A	ADD 15 OHMS RESISTOR TO 0712031-3 ASSY (SER 172-55925 & ON)	[illegible]	[illegible]



ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
8			
7	AN2552-3A	RECEPTACLE	
6	0312155-10	GROUND STRAP	
5	1570043-3	DIODE ASSY	
4	1570043-1	DIODE ASSY	
3	S 1660-1	CONTACTOR	
2	0712031-3	FUSE & DIODE ASSY	
1	S-1579-1	CONTACTOR BAT.	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
PA18	2			S1367-1-13	S-1367-1-13		
PC10	18			S 1367-1-13	SOLDER		
PC9	18			S-1493-1	S-1493-1		
PC 8	18			S 1493-1	S1367-1-10		
PC7	2			S1367-1-14	S 1367-1-13		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	[illegible]	1-13-66
GROUP	[illegible]	4-25-66
CHECK	[illegible]	1-27-66
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM— GROUND SERVICE RECEPTACLE (OPT)

Cessna.

DWG NO: 0500062

SUPERSEDED BY: 0500062-44

SUPERSEDES:

MODEL: 172

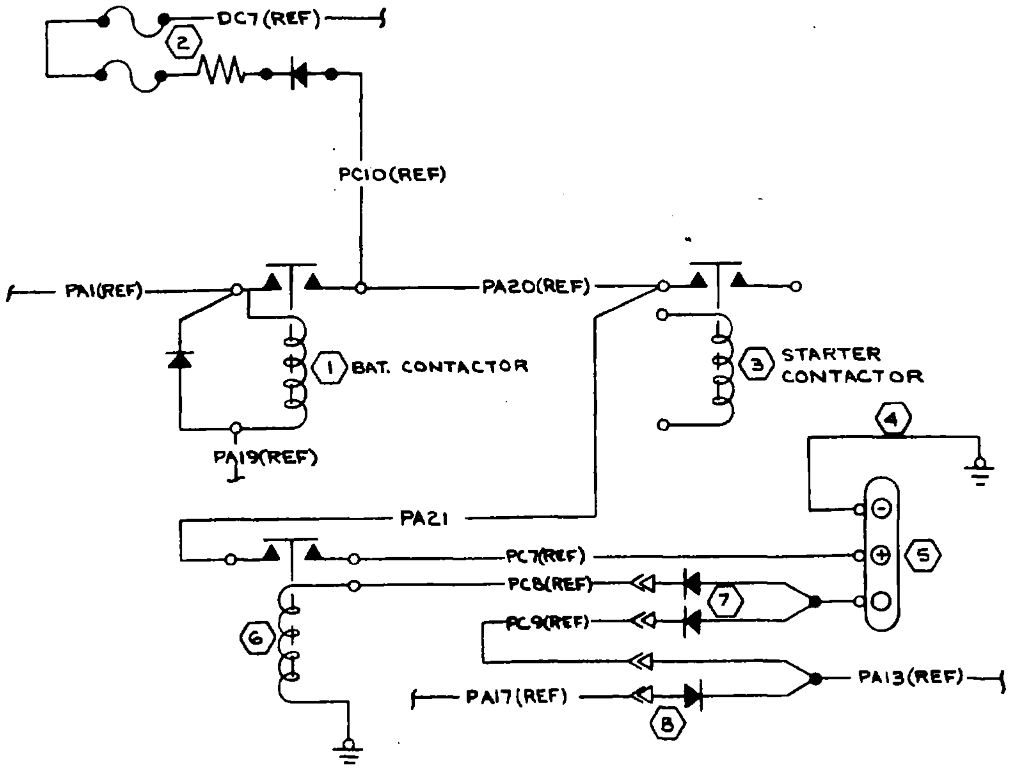
REV. A

PAGE: 44.1

NOTES:

APPLICABLE MODELS: ... 172E ... T41C ... & 1721

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	BY REV: ADD NOTE 1. ED & BR00113 (SER F172E-0001) & ON (SER U172E-0181 THRU-0...)	9-18-67 RCA	RLL NW
B	BY REV: ADD 1721 TO NOTE 1 ED & RR00192 (SER 17256513) & ON	9-27-67 JSM	RLL NW DCR



8	1570043-1	DIODE ASSY
7	1570043-3	DIODE ASSY
6	S-1[illegible]60-1	CONTACTOR
5	AN2552-3A	RECEPTACLE
4	0312155-10	GROUND STRAP
3	SAW-4206-1	CONTACTOR (02989)
2	0712031-3	FUSE & DIODE ASSY
1	S-1579-1	CONTACTOR
ITEM NO	PART NO.	DESCRIPTION

EQUIPMENT TABLE

PA21	2			S-1367-7-13 S-1367-7-13		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS		SERIALS

WIRE TABLE

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	K. Wise	7-27-67
DRAWN	C. GARCIA	8-8-67
CHECK	LAURIE	8-10-67
STRESS	[illegible]	8-15-67
PROJECT	[illegible]	8-11-67
APPD	[illegible]	8-11-67

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

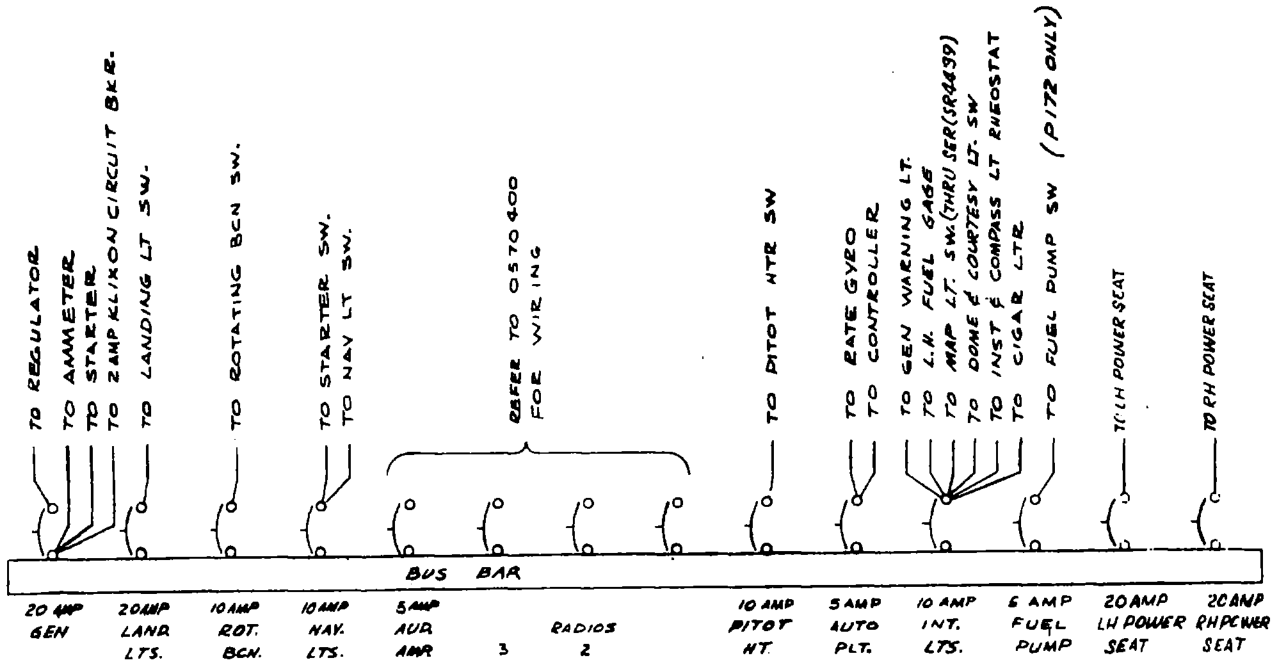
SCALE: NONE

(SER FR172-0001) & ON

FORM NO 80715

NOTES
1. THIS SHEET FOR REFERENCE PURPOSES ONLY
EFFECTIVE SER 17250573 & ON AND P17257189 & ON

CHG LET	REVISION	BY DATE	CHK APPD
A	5AMP AUDIO AMP CKT BKR WAS 10 AMP; DELETED RADIO CKT BKR VALUES.	JRB 12-1963	



Inactive (SR 4921) & ON 11-3-65 JRB
12-16-65 VSW RJC DKM

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	A. [illegible]	[illegible]
GROUP	PARSONS	5-24-61
CHECK	[illegible]	[illegible]
PROJ	[illegible]	5-14-61

TITLE: WIRING DIAGRAM — CIRCUIT BREAKER WIRING

Cessna.

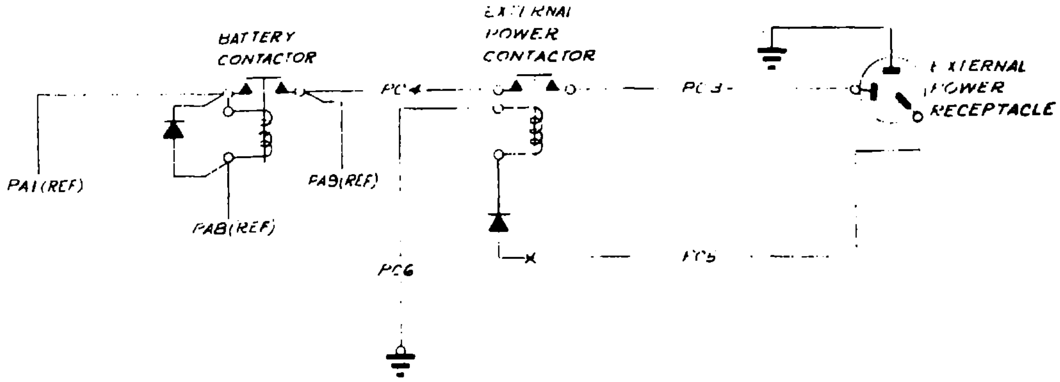
DWG NO 0500062

SUPERSEDED BY: 0500062 FF 4.8
SUPERSEDES:
MODEL 172-P172
REV A
PAGE 45

FORM NO 80-161

(SR 4590)

CHG LET	REVISION	BY DATE	CHK APPD



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
PC6	18			S-1367-1-6	S-1367-1-10		
PC5	18			S-1367-1-10	S-1310-1		
PC4	1			S-1367-6-12	S-1367-6-12		
PC3	1			S-1367-6-12	S-1367-6-14		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	SPRIGGS	4-3-64
GROUP	PARSONS	8-6-64
CHECK	[illegible]	[illegible] 64
PROJ	[illegible]	8-[illegible]64

TITLE: WIRING DIAGRAM — EXTERNAL POWER SYSTEM T-41A TRAINER

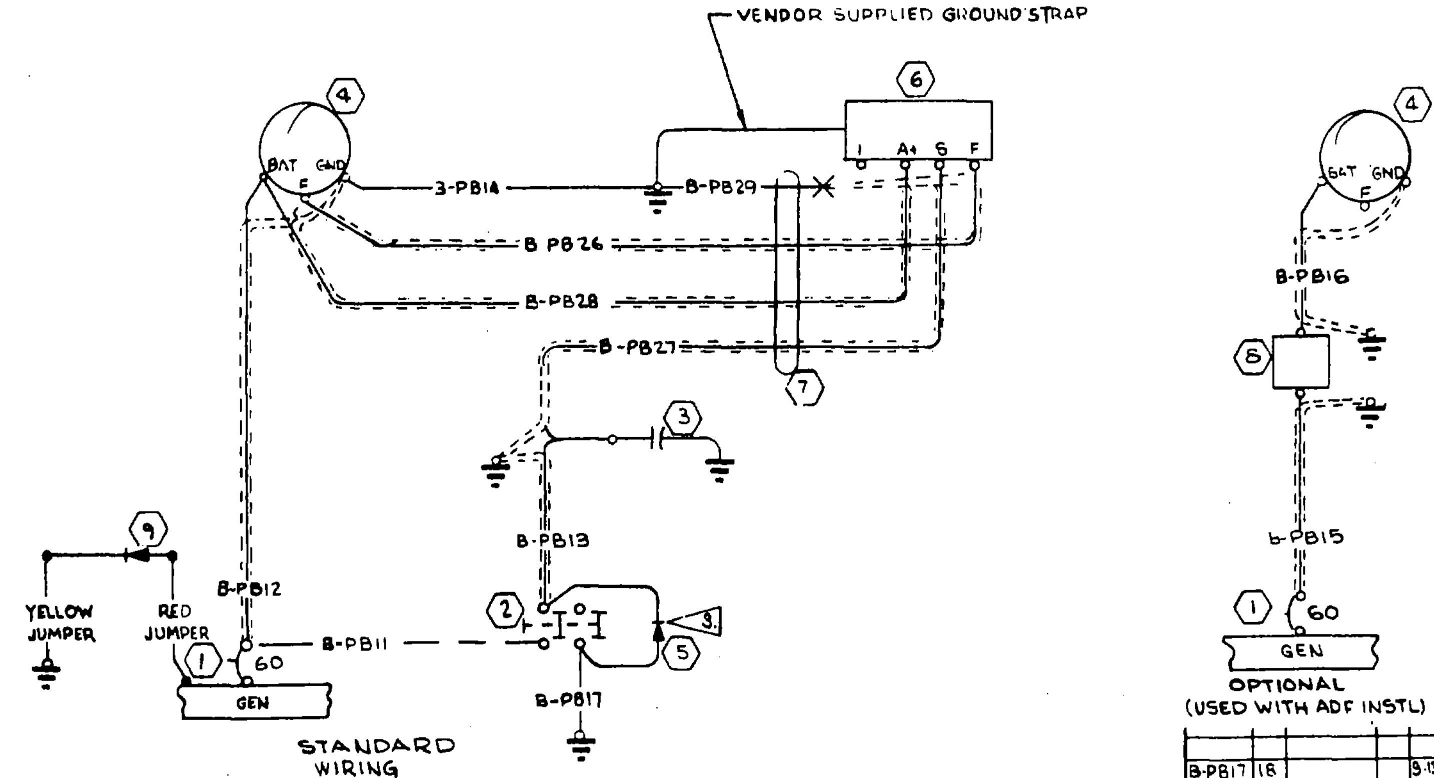
Cessna.

DWG NO 0500062

SUPERSEDED BY: | SUPERSEDES: | MODEL 172 | REV: | PAGE 4.6

(SR4833)

CHG LET	REVISION	BY DATE	CHK APPD
A	B-PB26 WAS D-PB26; B-PB27 WAS D-PB27; B-PB28 WAS D-PB28; B-PB29 WAS D-PB29; [illegible] (SR4833)	WJR 11-2-65	[illegible]
B	[illegible] ADD NOTE 5 INACTIVATED DWG (SR 3200)	[illegible] 4-13-66	[illegible]



Inactive SER (SR 3200) 5-16-66

NOTES:

2. 8 GA. SHIELDED WIRE MATERIAL PER S-1534-8-9.

3. OBSERVE POLARITY SYMBOL ON DIODE ASSY WHEN INSTALLING ON SWITCH TERMINAL OR DIODE WILL FAIL WHEN SYSTEM IS ENERGIZED.

4. AMP TERMINALS 41796 (AMP)

5. THIS PAGE APPLICABLE TO 35 1966 MODEL 172 AIRPLANES AS LISTED BELOW.
17253903-04-05-06-08-09-10-11-12-13-14-15-16-17-18-19-20-22-23-24-25-26-27-28-29-30-31-35-36-37-39-40-42-43 / 17253944

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
9	S-3508	SUPPRESSOR	(SATA)
8	S-1629-1	NOISE FILTER	
7	1250211-1	PLUG ASSY	
6	0750216-1	REGULATOR ASSY	
5	0770719-1	DIODE ASSY	
4	0611501-0201	ALTERNATOR ASSY	
3	0770038-2	FILTER	
2	0713026-5	MASTER SWITCH	
1	S-1596-60	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
B-PB17	18			S-1367-1-8	S-1367-1-8		
B-PB29	18			34138	S-1367-2-12		
B-PB28	18S			S-1367-1-12 S-1367-3-10	4		
B-PB27	18S			S-1367-1-6 S-1367-2-8	4		
B-PB26	18S			S-1367-2-10 S-1367-3-12	4		
B-PB16	8S	2		S-1367-4-12 S-1367-3-10	S-1367-4-10 S-1367-3-8		
B-PB15	8S	2		S-1367-4-12 S-1367-3-8	S-1367-4-10		
B-PB14	10			S-1367-3-10	S-1367-3-12		
B-PB13	18S			S-1367-3-8	S-1367-1-6 S-1367-3-8		
B-PB12	8S	2		S-1367-4-12 S-1367-3-10	S-1367-4-10		
B-PB11	18			S-1367-1-8	S-1367-1-10		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	W. COOK	6-18-65
GROUP	H. Wood	6-18-65
CHECK	[illegible]	7-1-65
PROJ	[illegible]	7-2-65

TITLE: WIRING DIAGRAM — ALTERNATOR SYSTEM — 60 AMP (OPT)

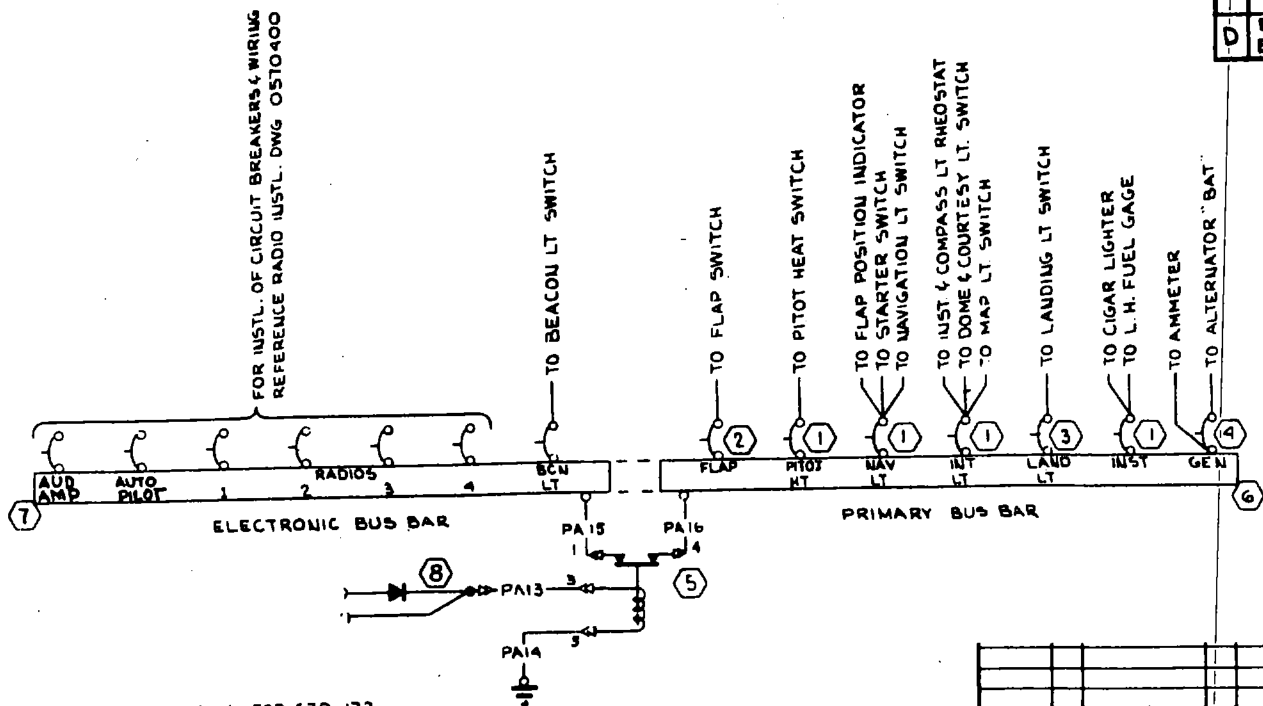
Cessna.

DWG NO 0500062

SUPERSEDED BY: 0500062 PAGE 4.9 | SUPERSEDES: 0500062-4.2 | MODEL 172 | REV B | PAGE 4.7

FORM NO 80-161

CHG LET	REVISION	BY DATE	CHK APPD
A	PA15 WAS PA11 & PA16 WAS PA12; GEN WAS ALT; ADD PIN NOS. TO S-1668-1; 1570043-1 WAS 1770042-1 (SEE 1725089B) & ON		
B	BY REV: ADD FR172E TO MODEL BLOCK (SEE FR172E-0001) & ON	C.G. 8-8-67	RLL
C	BY REV: DELETE FR172E FROM MODEL BLOCK & NOTE 1; AUD (SEE FR172E-0001) & ON	JWH	RLL
D	BY REV; ADD 172I TO MODEL BLOCK	WEC	PCK



NOTES:

1. WIRING SHOWN FOR SKYHAWK. FOR STD 172 WIRING IS IDENTICAL EXCEPT FOR SPLIT BUS BAR.

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		SERIALS
PA15	14			S1493-2	S1367-2-6	
PA16	14			S1493-2	S1367-2-6	
PA13	18			S1493-1	S1493-1	
PA14	18			S1493-1	S1367-1-8	

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
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	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KAN.

	NAME	DATE
DRAWN	BLISS	11-3-65
GROUP	V. Wise	12-6-65
CHECK		12-21-65
PROJ		12-21-65

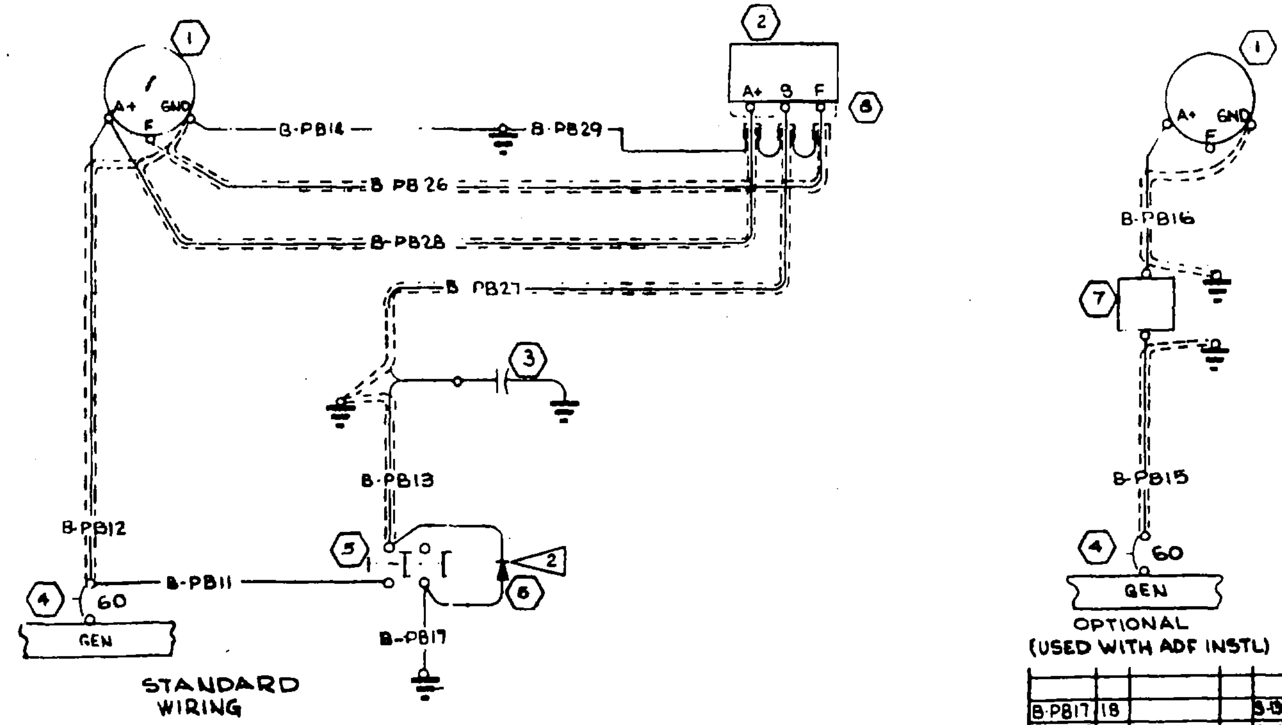
TITLE: WIRING DIAGRAM— CIRCUIT BREAKER WIRING

Cessna.

DWG NO 0500062

SUPERSEDED BY | SUPERSEDES 0500062 PP45 | MODEL 172-172I | REV D | PAGE 4.8

CHG LET	REVISION	BY / DATE	CHK / APPD
A	BY REV. ADD N/A 1250211	JWH 4/18/67	
B	BY REV: ADD FRITZE TO MODEL BLOCK (SER FRITZE-0001) & ON	C.G. 8-8-67	RLL
C	BY REV: DELETE FRITZE FROM MODEL BLOCK	JWH 5-13-[illegible]	RLL



NOTES

1. 8 GA. SHIELDED WIRE MATERIAL PER S-1534-8-9.
2. OBSERVE POLARITY SYMBOL ON DIODE ASSY WHEN INSTALLING ON SWITCH TERMINAL OR DIODE WILL FAIL WHEN SYSTEM IS ENERGIZED.
3. AMP TERMINAL 42281-2 ON CONDUCTOR
AMP TERMINAL 2-323911-2 ON SHIELD & GROUNDING WIRE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
9			
8	C6AB 10A730-A	HOUSING (ECWS)	
7	S-1629-1	NOISE FILTER	
6	0770719-1	DIODE ASSY	
5	0713026-5	SWITCH-MASTER	
4	S-1596-60	CIRCUIT BREAKER	
3	0770038-2	FILTER	
2	C611001-0101	REGULATOR	
1	C611501-0201	ALTERNATOR ASSY	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
B-PB17	18			S-1367-1-8	S-1367-1-8		
B-PB29	18			S-1367-2-12	3	1250211	
B-PB28	18S			S-1367-1-12 S-1367-2-10			
B-PB27	18S			S-1367-1-6 S-1367-2-8			
B-PB26	18S			[illegible]	3	1250211	
B-PB16	8S	1		S-1367-4-12 S-1367-3-10	S-1367-4-10 S-1367-3-[illegible]		
B-PB15	8S	1		[illegible]	S-1367-4-10		
B-PB14	10			S-1367-3-10	S-1367-3-12		
B-PB13	18S			S-1367-1-8	[illegible]		
B-PB12	8S	1		S-1367-4-12 S-1367-3-10	S-1367-4-10		
B-PB11	18			S-1367-1-8	S-1367-1-10		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	ACHESON	5-4-66
GROUP	H. Wise	6-3-66
CHECK	VAKSHAN	6-30-66
PROJ	[illegible]	7-6-66

TITLE: WIRING DIAGRAM — ALTERNATOR SYSTEM-60 AMP (OPT)

Cessna.

DWG NO C500062

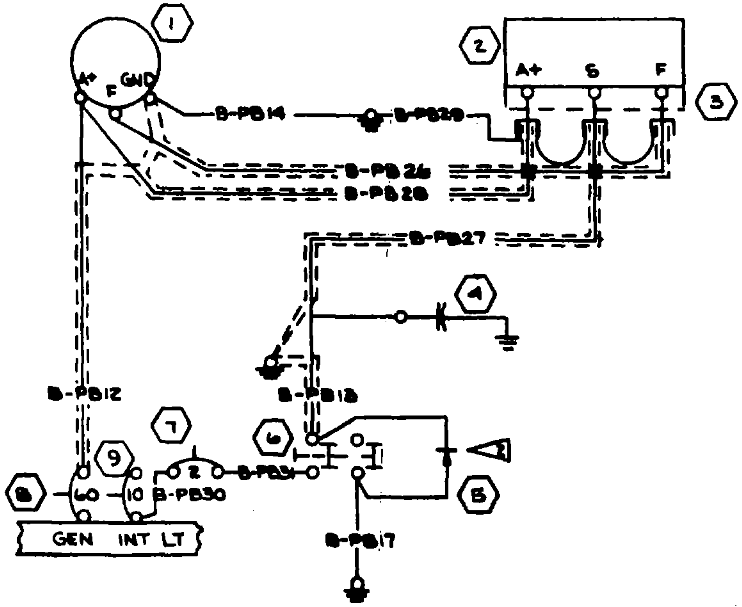
SUPERSEDED BY: | SUPERSEDES: 0500062 [illegible] 4.7 | MODEL 172 | REV C | PAGE 4.9

FORM NO 80-181

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 2-323931-2 ON SHIELD & GND WIRE.
4. APPLICABLE MODELS; FR172E & T41-C.

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-PB31	18			S-1367-1-8	S-1367-1-8	
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	
B-PB14	10			S-1367-3-10	S-1367-3-12	
B-PB13	18S			S-1367-1-8	[illegible]	
B-PB12	8S	1		[illegible]	S-1367-4-10	
B-PB11	18			S-1367-1-8	S-1367-1-10	
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS		SERIALS

WIRE TABLE

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	
	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:

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	V. Wise	9-21-67
DRAWN	HARRIS	9-13-67
CHECK	LAURIE	9-15-67
STRESS		9-21-67
PROJECT	DG Kolb	9-21-67
APPD		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

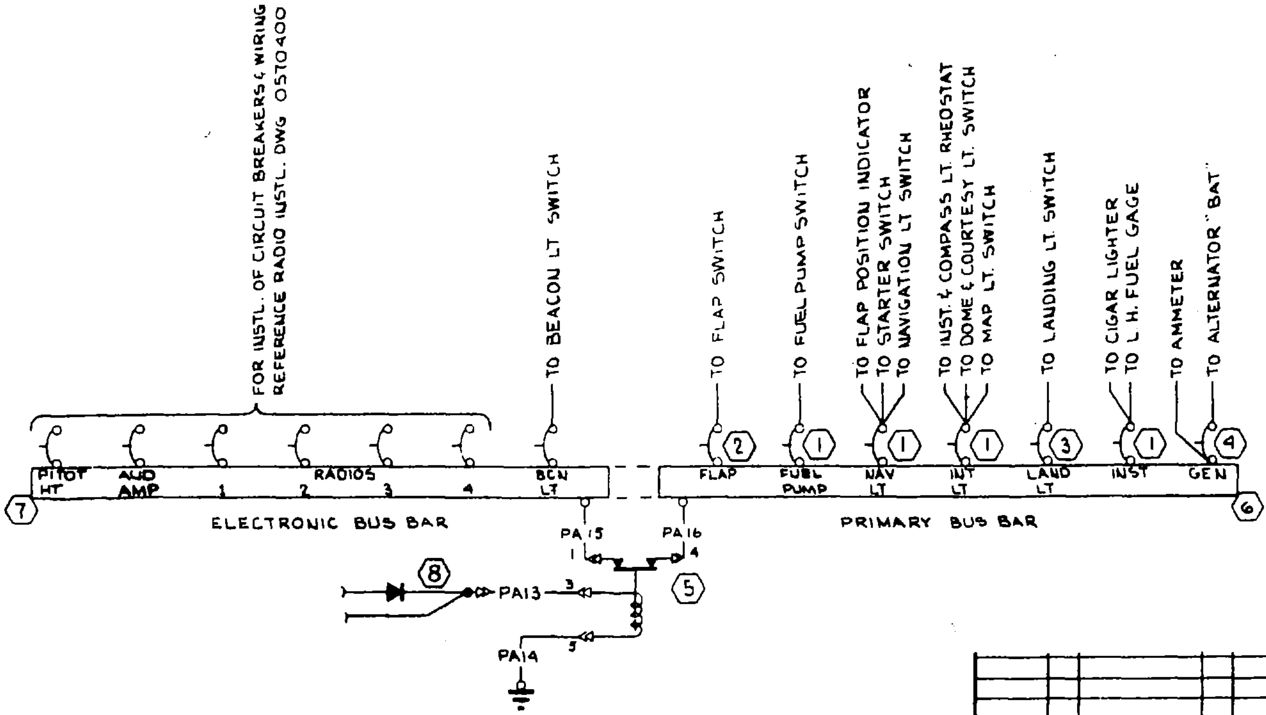
SCALE: NONE | PAGE: 4.11

(SER FR172E-0001) & ON
(SER R172E-0257 THRU -0301)

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV: ADD 172I TO MODEL BLOCK EDS ER 00192 (SER 172I 64513) & ON	JSM 9-27-67	KLI.
B	DELETE MODEL 172I	WRC 1-18-68	

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.



PA14	18			S-1493-1	S-13671-8		
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 CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

8	1570043-1	DIODE ASSY	
7	0570036-2	BUS BAR	
6	0570036-1	BUS BAR	
5	S-1668-1	RELAY	
4	S-1396-60	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

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	HARRIS	9-13-67
GROUP	H Wise	9-11-67
CHECK	LAURIE	9-15-67
PROJ	DGK	9-21-67
	KLI	

TITLE

WIRING DIAGRAM— CIRCUIT BREAKER WIRING

Cessna.

DWG NO. 0500062

SUPERSEDED BY | SUPERSEDES | MODEL T41C, FR172E | REV B | PAGE 4.12

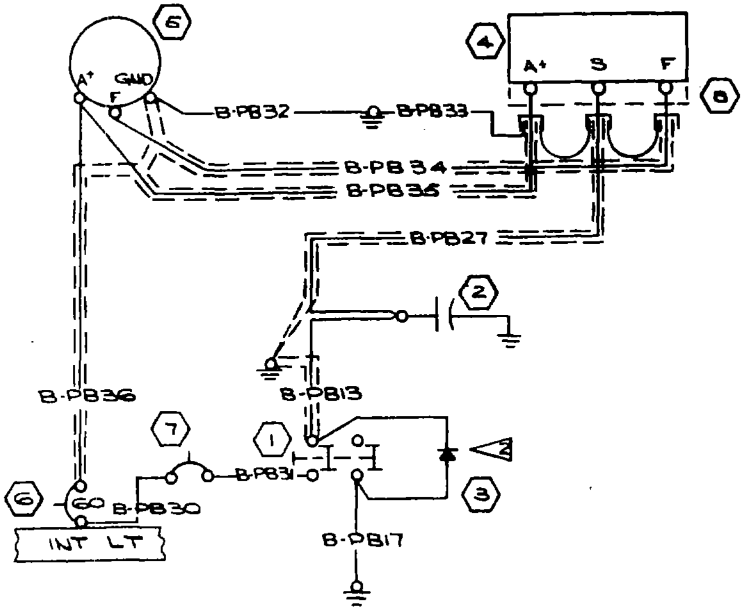
(CESSNA) IX

NOTES:

1. AMP TERM 42281-2 ON CONDUCTOR
AMP TERM 2-323931-2 ON SHIELD & GROUND WIRE

2. OBSERVE POLARITY SYMBOL ON DIODE ASSY WHEN INSTL ON SW. TERM OR DIODE WILL FAIL WHEN SYSTEM IS ENERGIZED.

REVISION			
LET	DESCRIPTION	DATE	APPD



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
B-PB36	8S	S-1534-8-9		S-1367-4-12 S-1367-3-10	S-1367-4-10		
35	16S			S-1367-1-12 S-1367-2-10	1		
34	18S			S-1367-1-8 S-1367-2-9	1		
33	16			S-1367-2-12	1		
32	10			S-1367-3-10	S-1367-3-12		
31	18			S-1367-1-8	S-1367-1-8		
30	18			S-1367-1-10	S-1367-1-8		
27	18S			S-1367-1-6 S-1367-2-8	1		
17	18			S-1367-1-8	S-1367-1-8		
B-PB13	18S			S-1367-1-8	S-1367-1-6 S-1367-2-8		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
8	CGAB-0A730A	HOUSING	(88690)
7	CA-2	CIRCUIT BKR	(80602)
6	S-1596-60	CIRCUIT BKR	
5	C611501-0201	ALTERNATOR ASSY	
4	C611001-0101	REGULATOR	
3	0770719-1	DIODE ASSY	
2	0770038-2	FILTER	
1	0713026-5	MASTER 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:

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Will	9-29-67
DRAWN	RCAstell	9-27-67
CHECK	LAURIE	9-27-67
STRESS	Wetzman N	9-28-67
PROJECT	D.C. Kolb	9-30-67
APPD	E.G. Mabee	9-28-67

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — ALTERNATOR SYSTEM 60 AMP

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0500062

SCALE: NONE | 172I | PAGE: 4.14

(SER 172I 56513) & ON

FORM NO. 00-215A

IGNITION SECTION

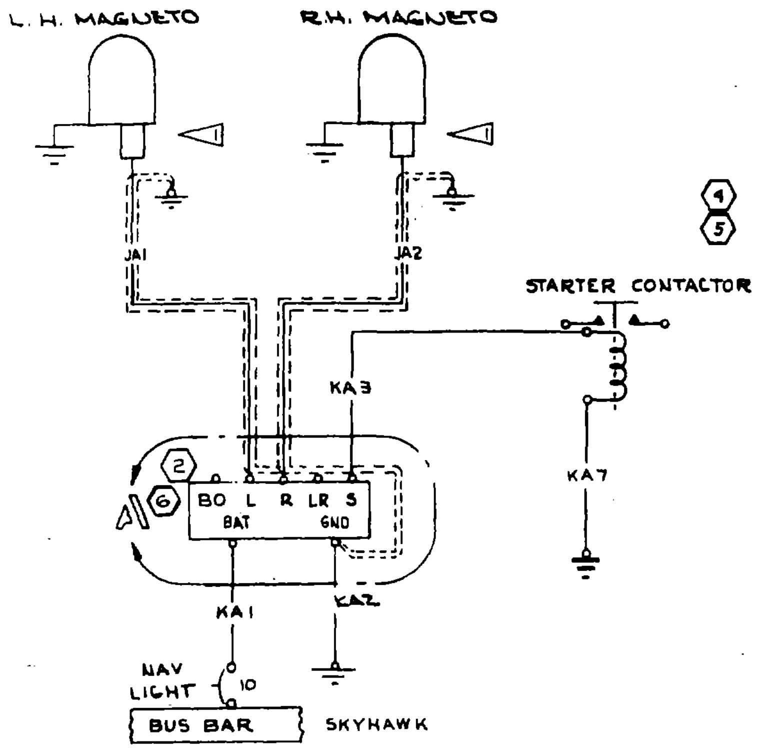
Cessna.

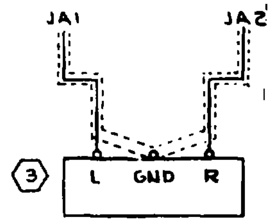
DRAWN		TITLE: WIRING DIAGRAM--- MODEL 172-P172		DRAWING NO. 0500062
DATE	1-16-62			
APP'D			REV: "D"	PAGE: 5.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS

FORM NO. 80-163

CHG LET	REVISION	BY / DATE	CHK / APPD
D	REDRAWN NO CHG	[illegible]	[illegible]
E	DELETED PREFIXES	[illegible]	[illegible]
F	DOUBLE SHIELDED WIRE CHANGED TO SINGLE SHIELD ON JA1 & JA2	WRC 11-16-65	[illegible]
G	ADD NOTE 1 ; S-1488-1 NIPPLE	[illegible]	[illegible]
H	ADD STARTER CONTACTOR, BUS BAR / DETAIL A TO FIELD OF DWG. ADD WIRE NO. KA1, KA2, KA3 / KA7. (SEE F172-0480) & ON	3-11-66	YAK
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-0287 THRU -0301) (SER FR172E-0001) & ON	RCA 8-18-67	RLL
L	BY REV: ADD 172I TO NOTE 3 ED & RR 00192 (SEE 172I ...) & ON	JSM 9-27-67	RLL
M	BY REV: SER OUT DETAIL A (SR5522)	C G -6-67	RLL





DETAIL A
STD 172
THRU SER (SR 5522)

NOTE:

1. ADD S-1488-1 NIPPLES TO MAG END OF WIRES.
2. (4) APPLICABLE THRU SR5129.
   (5) APPLICABLE SR 5129 & ON
3. APPLICABLE MODELS; 172, FR172E, T41-C, & 172I

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
KA7	18		1	S-1367-1-10	S-1367-1-12		SER (SR 5129) & ON
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		1	[illegible]	[illegible]		
JA1	18S		1	[illegible]	[illegible]		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
6	S-1406-1	SWITCH IGN	T41-C
5	SAW-4206-1	STARTER CONTACTOR	PRESTOLITE
4	1118823	STARTER CONTACTOR	DELCO
3	C292501-0201	SWITCH IGN	172-FR172E
2	C292501-0101	SWITCH IGN	172
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	GRISWOLD	[illegible]
GROUP	DITZLER	[illegible]
CHECK	COOK	[illegible]
PROJ	SATTLER	[illegible]

TITLE: WIRING DIAGRAM — MAGNETO SYSTEM —

Cessna.

DWG NO 0500062

SUPERSEDED BY | SUPERSEDES 0500062 "C" | MODEL NOTED | REV M | PAGE 5.1

PAGE 6.1.1

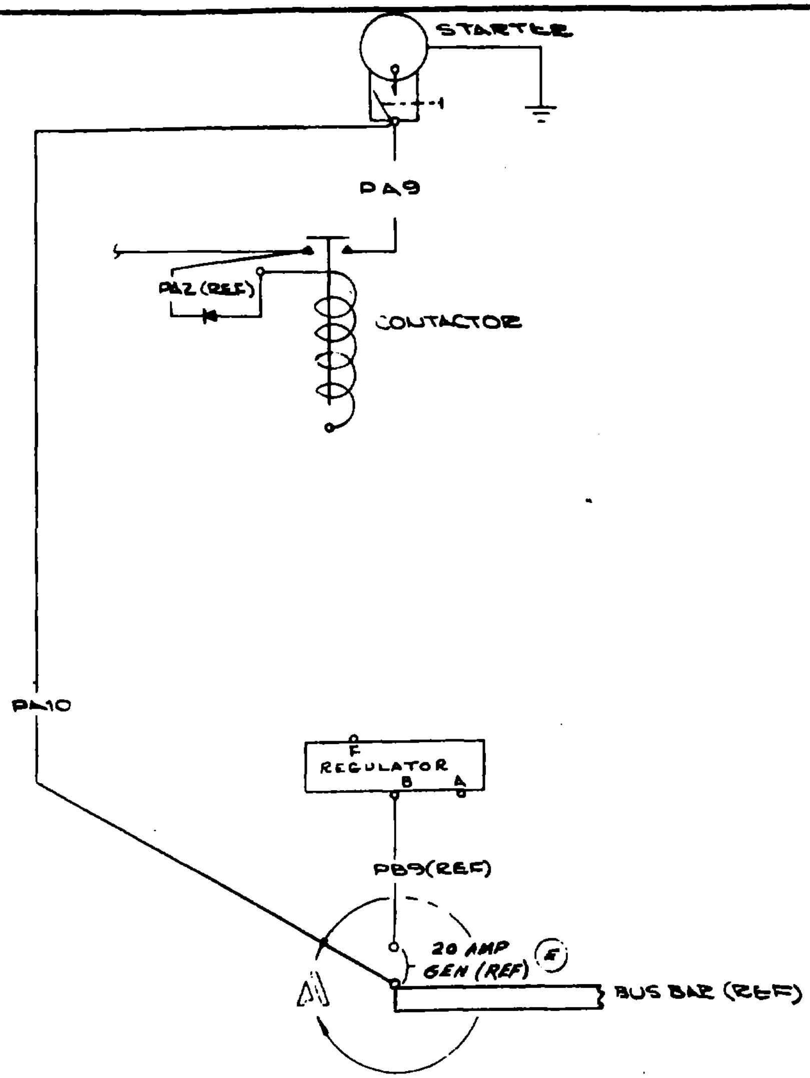
FORM NO 80-161

ENGINE CONTROL SECTION

Cessna.

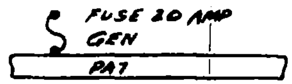
DRAWN	GR	TITLE: WIRING DIAGRAM---	DRAWING NO.
DATE	9-26-62	MODEL 172-P172	0500062
APP'D	RPS JR JHB	REV: "D"	PAGE: 6.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.



CHG LET	REVISION	BY DATE	CHK APPD
D	REDRAWN NO CHG		
E	DELETED PREFIXES ADD 1964 [illegible]		

PB9 (REF)



DETAIL A

(E) EFFECTIVE THRU SER. 17250572 & P17257188

Inactive
SER 17254893 & ON
2-23-65

PA10	8			S-1367-4-14	S-1367-4-6		
PA7		[illegible] COPPER BAR					THRU SER [illegible]
PA9	4			S-1367-6-12	S-1367-6-14		172 ONLY
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	GRISWOLD	4-2-59
GROUP	H. DITTMER	4-3-59
CHECK	W.R. COOK	4-3-59
PROJ	J.E. SATTLER	4-3-59

TITLE: WIRING DIAGRAM — STARTER

Cessna.

DWG NO 0500062

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

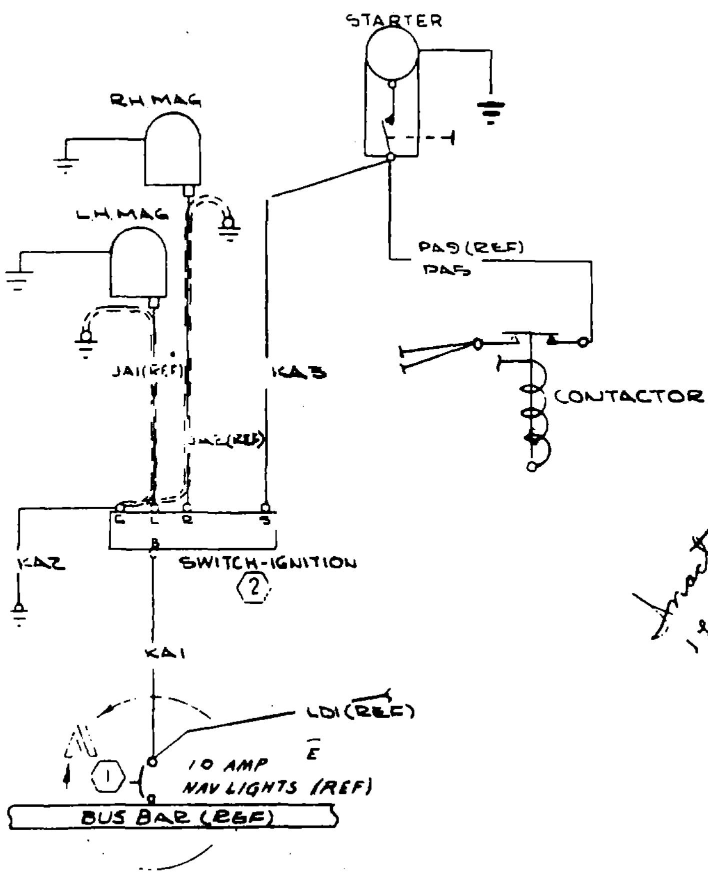
SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
	0800062 REV C	172-P172	E	6.1

FORM NO. 80-161

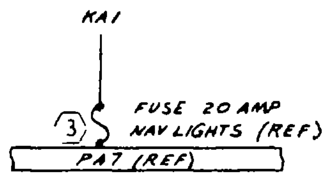
NOTES:

1. STD WIRING DIAGRAM FOR P172 & 172 (SKYHAWK).
2. BC-KA1, BC-KA2, & BC-KA3 ARE IDENTICAL TO & SUPERSEDE 0500096-KA3, -KA4 & -KA6 RESPECTIVELY

CHG LET	REVISION	BY / DATE	CHK / APPD
D	REDRAWN ADD KA1, KA2, KA3 & NOTES 1 & 2	SS 9-16-64	RRS
E	DELETED PREFIXES ADD 461 MOD REQMTS	[illegible]	[illegible]
F	REVISED NOTE 2 FROM -KA [illegible] KA5 TO -KA3, -KA4 & -KA6. CHANGE STARTER SYMBOL ADDED WIRE [illegible]	8 / 465	COM



Inactive SER 17255147 & ON
F172-0480 & ON
J & Wald 7-9-66
YAT [illegible] 7-20-66
[illegible] 8-8-66
HPW



DETAIL [illegible]

EFFECTIVE THRU SER 17250527 & P17250527

WIRE CODE NO	GA	MATERIAL	[illegible]	TERMINALS			SERIALS
PA5	4		172	S-1367-6-12	S-1367-6-14		P172 ONLY
KA3	18		43	S-1367-1-6	S-1367-1-C		
KA2	18		9	S-1367-1-6	S-1367-1-8		
KA1	18		11	S-1367- -6	S-1367-1-6		
JA4	18DS			S-1367-2-6 S-1367-1-6	S-1367-3-10 S-1367-1-8		OBSOLETE - NEVER USED
JA3	18DS			S-1367-2-6 S-1367-1-6	S-1367-3-12 S-1367-1-8		OBSOLETE - NEVER USED

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
3	S-1091-20	FUSE	
2	0311038-2	SWITCH-IGNITION	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	[illegible]	4/2/59
GROUP	[illegible]	4/3/59
CHECK	Cook	4/3/59
PROJ	[illegible]	4/3/59

TITLE: WIRING DIAGRAM — STARTER & MAG 172 - P-172

Cessna.

DWG NO 0500062

SUPERSEDED BY: PAGE 3.1 | SUPERSEDES: 11078 2 | MODEL: 172-P172 | REV F | PAGE 6.1.1

FORM NO 80 161

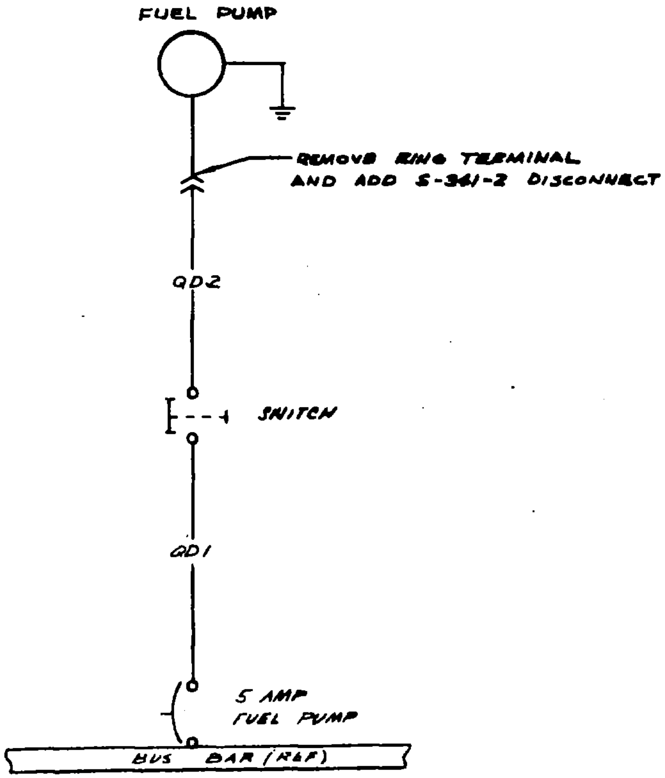
FUEL AND OIL SECTION

Cessna.

DRAWN		TITLE: WIRING DIAGRAM---	DRAWING NO.
DATE	5-27-63	MODEL 172 - P172	0500062
APP'D		REV:	PAGE: 7.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV: ADD FRITZE TO MODEL BLOCK (SEE FRITZE-0001)	C.G.	RLL



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
QD2	18			S-1367-1-8	S-341-2		
QD1	18			S-1367-1-8	S-1367-1-6		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

	NAME	DATE
DRAWN	ALTHER	5-17-63
GROUP	PARSONS	5-29-63
CHECK	R.E. Moore	5-21-63
PROJ	[illegible]	5-28-63

TITLE: WIRING DIAGRAM — FUEL PUMP

Cessna.

DWG NO. 0500062

SUPERSEDED BY | SUPERSEDES | MODEL: FR172E-P172 | REV: A | PAGE: 7.1

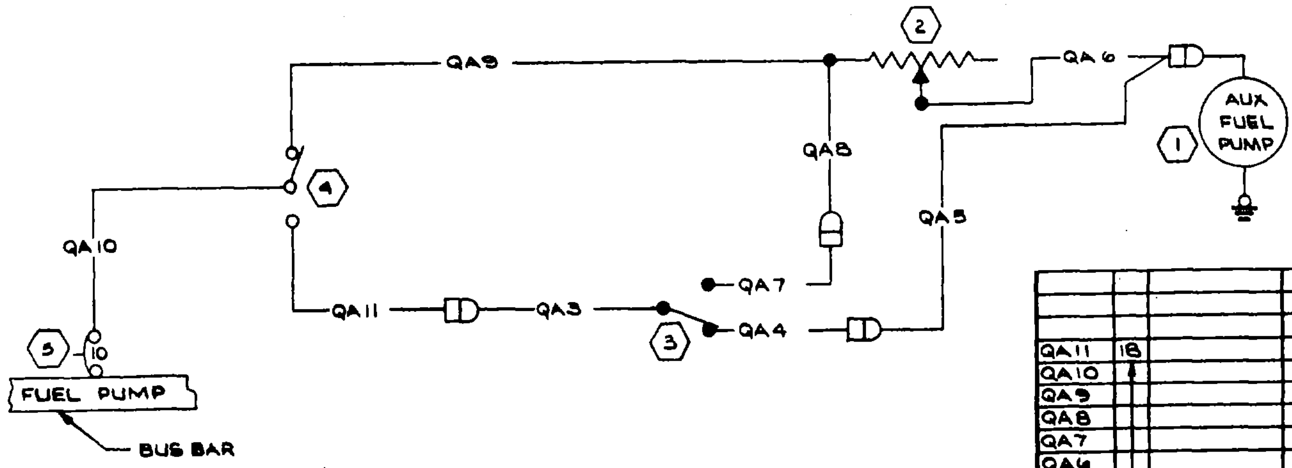
SR 1041

FORM NO. 80-161

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD 172I TO NOTE 3 ED & RR 00192 (SR5471) III	9-27-67 JSM	RLL RKW DGK
B	BY REV: DELETE 172I FROM NOTE 3	CO 1-6-67	RLL RKW DGK

NOTES:

1. TERMINAL IS S-1636-1 & S-1637-2 HOUSING-PLUG.
2. TERMINAL IS S-1635-1 & S-1637-1 HOUSING-CAP.
3. APPLICABLE MODELS; FR172E, T41-C



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
QA11	18			S-1367-1-6	1		
QA10	↓			S-1367-1-6	S-1367-1-6		
QA9				S-1367-1-6	SOLDER		
QA8				2	SOLDER		
QA7				SOLDER	1		
QA6				SOLDER	1		
QA5				2	1		
QA4	↓			SOLDER	1		
QA3	18			2	SOLDER		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	VENDOR
5	S-1360-10	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 CMXXXX=CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY:

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	DG Kolb	9-21-67
APPD	[illegible]	[illegible]

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — FUEL PUMP

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0500062

SCALE: NONE | NOTED | PAGE. 7.2

(SR5357) II

F

FORM NO. 00 2154

ENGINE INSTRUMENTS SECTION

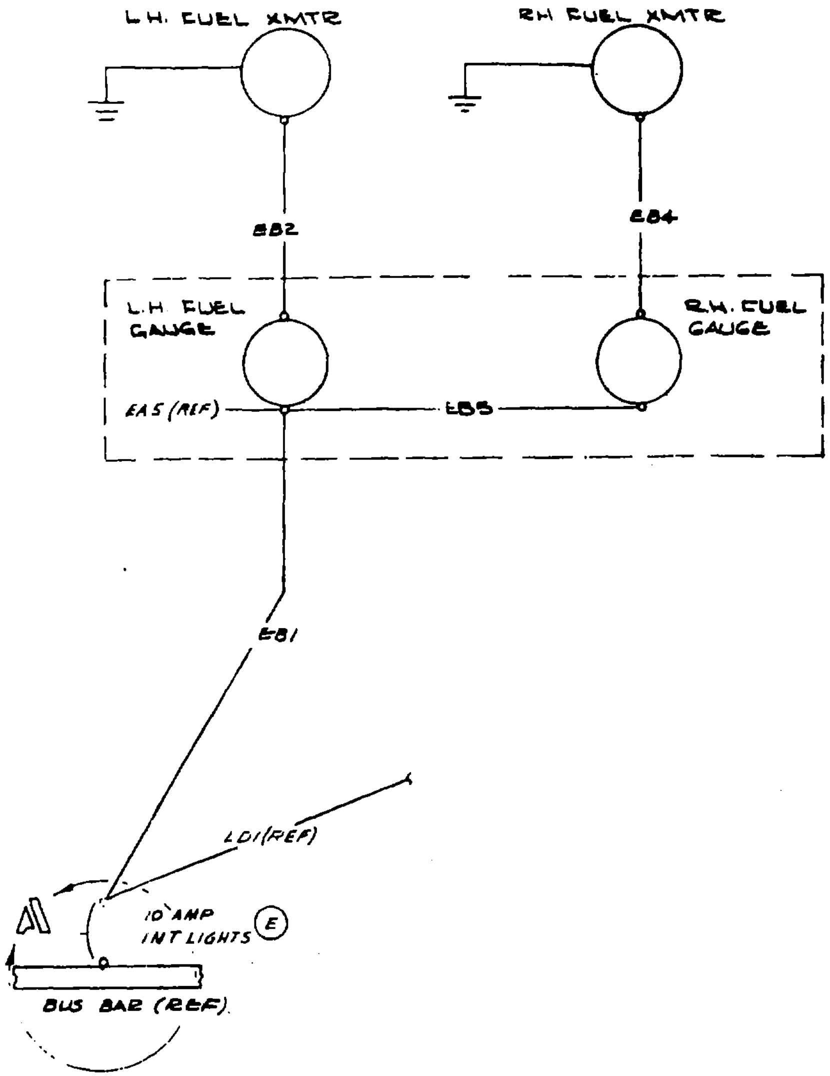
Cessna.

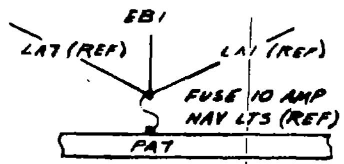
DRAWN	GY	TITLE: WIRING DIAGRAM---	DRAWING NO.
DATE	1-26-62	MODEL 172-P172	0500062
APP'D	RRS JR [illegible]	REV: "D"	PAGE: 8.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-166

CHG LET	REVISION	BY DATE	CHK APPD
D	REDRAWN NC CHG	[illegible]	[illegible]
E	DELETED PREFIXES ADD 1966 ADD REQMTS	[illegible]	[illegible]





(E) DETAIL A

EFFECTIVE THRU SER 17250572 & P17257188

Inactive SER 17254893 & ON 11-3-65 12-16-65 NEW

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS				
EB5	18		7	S-1367-1-10	S-1367-1-10			
EB4	18		70	S-1367-1-10	S-1367-1-10			
EB2	18		102	S-1367-1-10	S-1367-1-10			
EB1	18		30	S-1367-1-10	S-1367-1-6			

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	Griswold	4/3/59
GROUP	Dittmer	4/3/59
CHECK	Cook	4/1/59
PROJ	Sattler	4/3/59

TITLE: WIRING DIAGRAM — FUEL GAUGE & XMTR

Cessna.

DWG NO 0500062

SUPERSEDED BY 0500062 PP 8.1.1 | SUPERSEDES 0500062 C EDV | MODEL 172 - P172 | REV E | PAGE 8.1

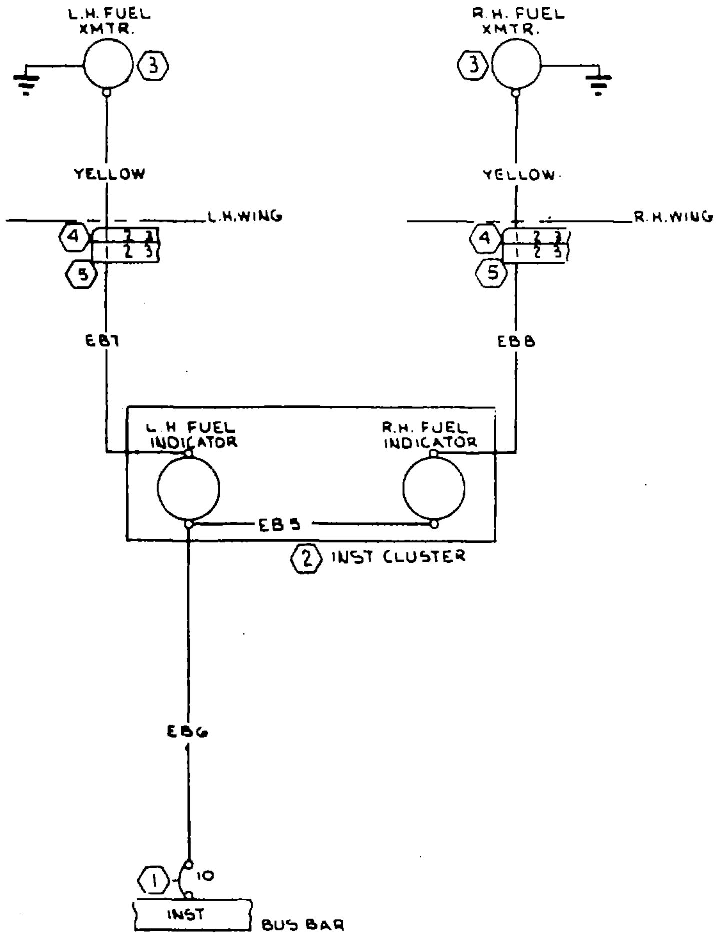
FORM NO 80-161

(SR4921)

NOTES;

1 WIRE MATERIAL PER S-1460

CHG LET	REVISION	BY DATE	CHK APPD



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
YELLOW	18	-18-4		S-1635-2	S-1367-1-10		
YELLOW	18	-18-4		S-1635-2	S-1367-1-10		
EB8	18			S-1367-1-10	S-1636-2		
EB7	18			S-1367-1-10	S-1636-2		
EB6	18			S-1367-1-6	S-1367-1-10		
EB5	18		7	S-1367-1-10	S-1367-1-10		

1 WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
5	S-1641-6	HOUSING-SOCKET	
4	S-1640-6	HOUSING-PIN	
3	0523557-1	XMTR-FUEL GAGE	
2	C669504-0202	INST CLUSTER	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	11-3-65
GROUP	H. Wind	12-16-65
CHECK	E. [illegible]	12-17-65
PROJ	[illegible]	12-20-65

TITLE: WIRING DIAGRAM— FUEL GAGE & TRANSMITTER

Cessna.

DWG NO: 0500062

SUPERSEDED BY:

SUPERSEDES: 0500062 PP 8.1

MODEL: 172

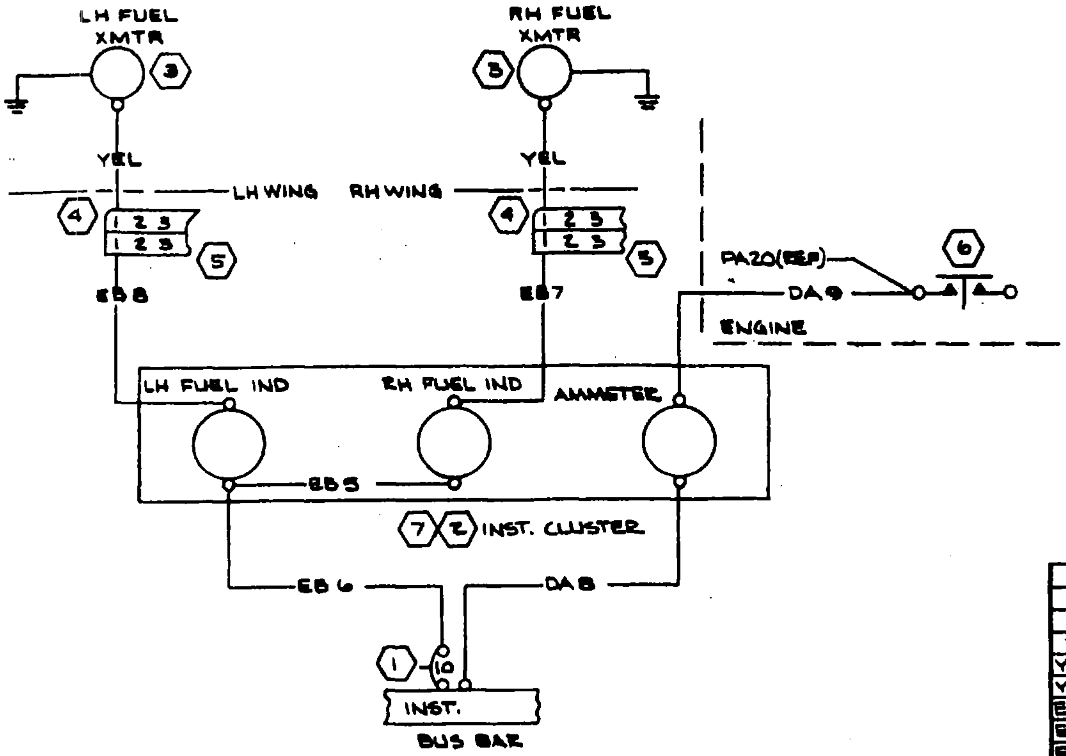
REV.:

PAGE: 8.1.1

NOTES:

1. WIRE MATERIAL PER S-1460.

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD 172I TO MODEL BLOCK ED & RR 00192(SER 17256513)&ON	9-27-67 JSM	RLL RAW
B	BY REV: ADD C669504-0208 (SER 17256513)&ON	CG 1-6-67	RLL RAW DCK



YEL	18	-18-4		S-1635-2	S-1367-1-16		
YEL	18	-18-4		S-1685-2	S-1367-1-16		
EB 8	18			S-1367-1-16	S-1636-2		
EB 7	18			S-1367-1-16	S-1636-2		
EB 6	18			S-1367-1-6	S-1367-1-16		
EB 5	18		7	S-1367-1-16	S-1367-1-16		
DA 9	8			S-1367-4-16	S-1367-4-4		
DA 8	8			S-1367-4-16	S-1367-4-4		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
7	C669504-0208	CLUSTER	172I ONLY
6	S-1559-1	STARTER CONTACTOR	
5	S-1641-6	HOUSING-SOCKET	
4	S-1640-6	HOUSING-PIN	
3	0523357-1	XMTR-FUEL GAGE	
2	C669509-0208	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:

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wise	9-21-67
DRAWN	HARRIS	9-18-67
CHECK	LAURIE	9-15-67
STRESS		9-21-67
PROJECT	D. G. Kollen	9-21-67
APPD	Ed. Mauer	9-10-67

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — FUEL GAGE & TRANSMITTER

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0500062

SCALE: NONE | 172I, T41-C, FR172E | PAGE: 8.1.2

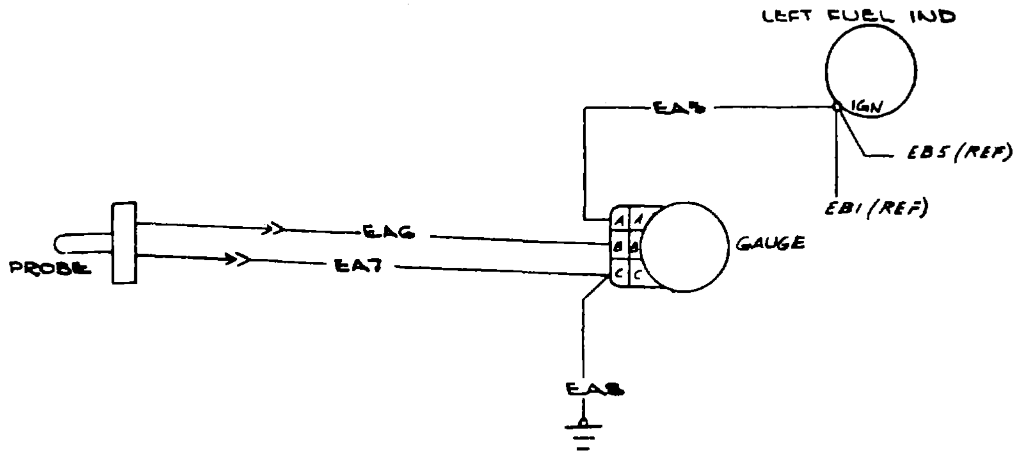
(SER FR172E-0001)&ON
(SER R172E-0251 THRU-0301)

FORM NO. 60-215A

NOTES.

1. EA5, EA6, EA7, & EA8 ARE IDENTICAL TO & SUPERSEDE 0550217-EA5, -EA6, -EA7, & -EA8 RESPECTIVELY
2. TERMINALS FOR EA6 & EA7 TO MATE WITH PROBE LEADS
3. APPLICABLE MODELS; 172

CHG LET	REVISION	BY / DATE	CHK / APPD
D	ADD B-EA5 THRU B-EA8 & NOTE 1	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
F	BY REV: ADD FR172E TO MODEL BLOCK (SER FR172E-0001) & ON	C.G. 8-8-67	RLL
G	BY REV: ADD NOTE 3 & DELETE FR172E, FR172E-0001 & ON ED & RR 00178	RCA 8-18-67	RLL



EA8	18			—	S-1367-1-8		
EA7	18			—	NOTE 2		
EA6	18			—	NOTE 2		
EA5	18			—	S-1367-1-8		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	GRISWOLD	4/2/59
GROUP	DITTMER	4/3/59
CHECK	COOK	4/3/59
PROJ	SATTLER	4/3/59

TITLE: WIRING DIAGRAM — CARBURETOR AIR TEMPERATURE GAUGE

Cessna.

DWG NO. 0500062

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
	NOTE 1	NOTED	G	8.2

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON

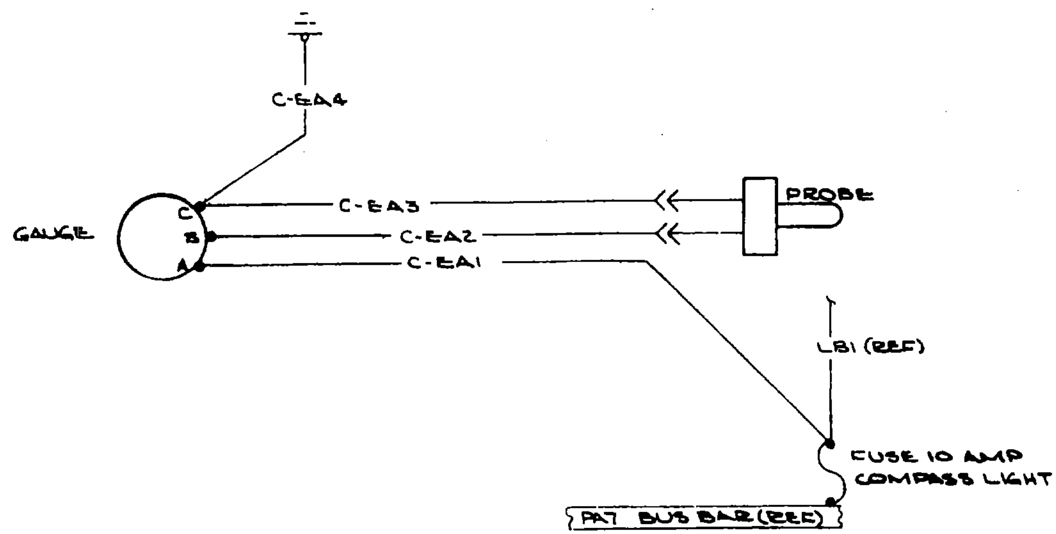
EQUIPMENT TABLE

FORM NO 80-181

NOTES:
1. EA1, EA2, EA3 & EA4 ARE IDENTICAL TO & SUPERSEDE 0550208-EA5, -EA6, -EA7, & -EA8 RESPECTIVELY
2. TERMINALS FOR EA2 & EA3 TO MATE WITH PROBE LEADS

CHG LET	REVISION	BY / DATE	CHK / APPD
D	ADD C-EA1 THRU C-EA4 & NOTE 1 & 2	[illegible]	[illegible]

Inactive SER P17257189 & ON.
Inactive SER 17250573 & ON.
G.A.A. 5-7-63
REM



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
C-EA4	18			—	S-1367-1-8		
C-EA3	18			—	NOTE 2		
C-EA2	18			—	NOTE 2		
C-EA1	18			—	—		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	GRISWOLD	[illegible]
GROUP	DITTMER	[illegible]
CHECK	COOK	[illegible]
PROJ	SATTLER	[illegible]

TITLE: WIRING DIAGRAM — CARBURETOR AIR TEMPERATURE GAUGE

Cessna.

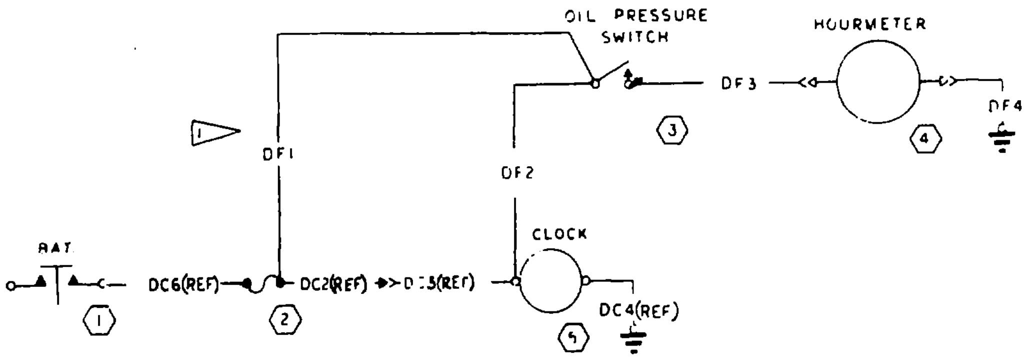
DWG NO. 0500062

SUPERSEDED BY: | SUPERSEDES: NOTE 1 | MODEL: P172 | REV: D | PAGE: 8.2.1

FORM NO. 80-161

(SR 5033)

CHG LET	REVISION	BY DATE	CHK APPD



NOTE:
1. WIRING DIAGRAM SHOWN IS FOR USE WHEN AN OPTIONAL ELECTRIC CLOCK IS INSTALLED. WHEN ELECTRIC CLOCK IS NOT INSTALLED WIRE DF1 CONNECTS PRESSURE SWITCH TO FUSEHOLDER. INSTALL S-1091-1 FUSE AND S-1640 FUSEHOLDER.

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
DF4	18			S-1493-1	S-1367-1-6		
DF3	16			S-14[illegible]-1	S-1367-1-6		
DF2	18			S-1367-1-6	S-1367-1-6		
DF1	18			S-1367-1-6	SOLDER		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	[illegible]	[illegible]
CHECKED	N Weil	9-27-66
CHECK	[illegible]	[illegible]
APPD	[illegible]	[illegible]

TITLE: **WIRING DIAGRAM—HOURMETER (OPT)**

Cessna.

DWG NO 0[illegible]00062

SUPERSEDED BY: | SUPERSEDES: | MODEL 172 | REV | PAGE 8.[illegible]

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
5	S1317N1	CLOCK	
4	[illegible]	HOURMETER	
3	S-1711-1	OIL PRESSURE SW	
2	S-1091-1	FUSE	
1	S-15[illegible]9-1	BAT. CONTACTOR	

EQUIPMENT TABLE

FLIGHT INSTRUMENTS SECTION

Cessna.

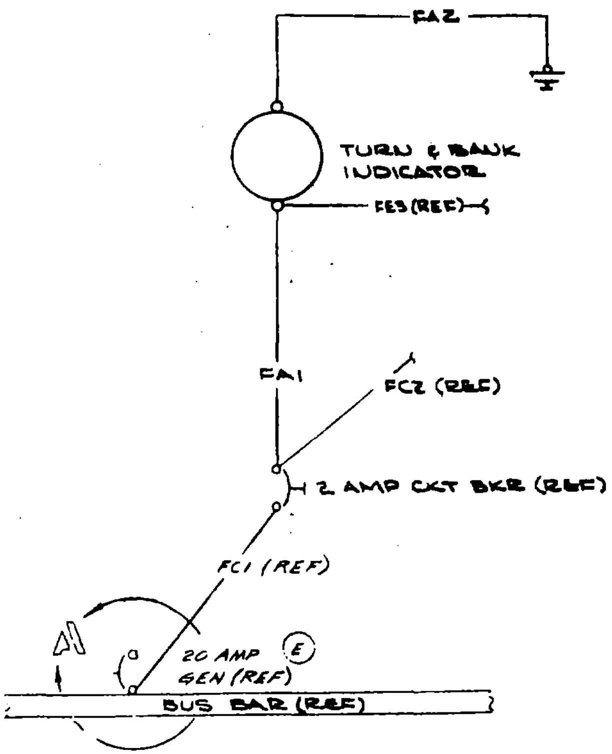
DRAWN	[illegible]	TITLE: WIRING DIAGRAM--- MODEL 172-P172	DRAWING NO. 0500062
DATE	9-26-62		
APP'D	RRS	REV: "D"	PAGE: 9.0

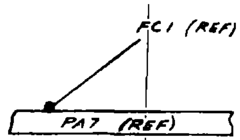
CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-1

NOTES:
1. FA1 & FA2 ARE IDENTICAL TO & SUPERSEDE 0513190-FA1 & -FA2 RESPECTIVELY

CHG LET	REVISION	BY / DATE	CHK / APPD
D	ADDED FA1 & FA2 & NOTE 1		
E	DELETED PREFIXES ADD 1964 REQM'TS (SR 4091)		





(E) DETAIL A
EFFECTIVE THRU SER 17250572 & P17257188

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
FA2	18		12	S-1367-1-8	S-1367-1-8		
FA1	18		47	S-1367-1-8	S-1367-1-8		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Griswold	12/57
GROUP	Arrange	3/59
CHECK	Gee	3/59
PROJ	Snyder	3/59

TITLE: WIRING DIAGRAM — TURN & BANK

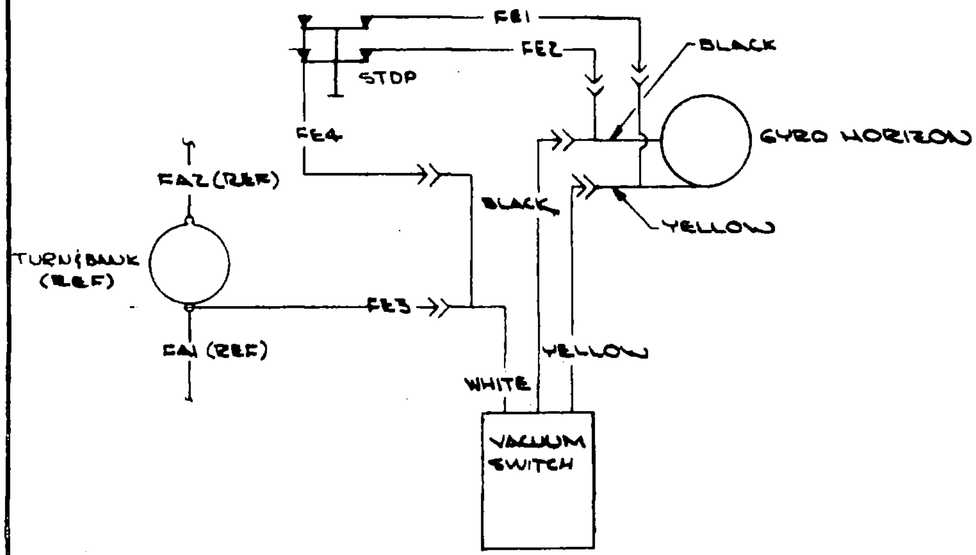
Cessna.

DWG NO 0500062

SUPERSEDED BY: | SUPERSEDES: NOTE 1 | MODEL 172-P172 | REV E | PAGE 9.1

FORM NO. 80-161

CHG LET	REVISION	BY / DATE	CHK / APPD
D	ADDED FAITHBU CA4 & NOTE 1	[illegible]	[illegible]
E	DELETED PREFIXES SP 4041	[illegible]	[illegible]
F	BY REV: ADD FR172E TO MODEL BLOCK (SER FR172E-0001)&ON	C.G. 8-8-67	RLC



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 [illegible]

	NAME	DATE
DRAWN	Grimaldo	4/3/59
GROUP	Dittmer	4/3/59
CHECK	Cox	4/3/59
PROJ	Snyder	4/3/59

TITLE: WIRING DIAGRAM — OPTIMUM FLIGHT INSTRUMENTS (OPT)

Cessna.

DWG NO 0500062

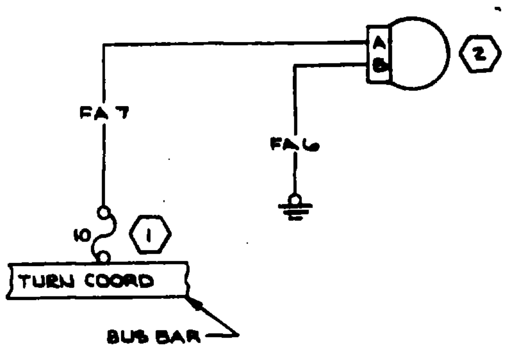
SUPERSEDED BY: | SUPERSEDES: NOTE 1 | MODEL: FR172E-172-P172 | REV F | PAGE 22

FORM NO 80-161

NOTES:

1. APPLICABLE MODELS; FR172E, 172I

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 [illegible]
B	BY REV: ADD 172I TO NOTE 1 ED & RR 00192 (SER 17256513) ON	9-27-67 JSM	RLL RKW RF [illegible]



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS				SERIALS
FA 7	18			S-1367-1-6	SOLDER			
FA 6	18			S-1367-1-6	SOLDER			

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
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

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

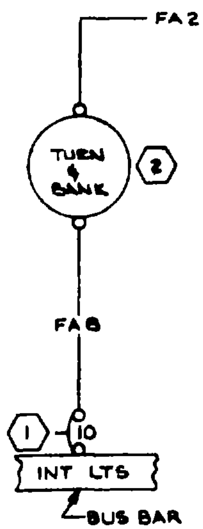
SCALE: NONE

PAGE: 9.3

FORM NO. 80-715

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD 172I TO NOTE 1 ED & RR 00192 (SER 172I 56515) & ON	9-27-67 JSM	RLL RXW HAW

NOTES;
1. APPLICABLE MODELS; 172, FR172E, T41-C & 172I



FA8	18			S-1367-1-6 S-1367-1-6	
FA2	18			S-1367-1-8 S-1367-1-8	
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS	SERIALS

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
2	S-1413N1	TURN & BANK IND
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: 0500062, PG 9.1

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wise	9-22-67
DRAWN	Harris	9-21-67
CHECK	LAURIE	9-21-67
STRESS	[illegible]	9-22-67
PROJECT	D.G. Kolb	9-22-67
APPD	[illegible]	9-1-67

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 90-2136

(SER FR172E-0001) & ON (SER R172E-0257 THRU -0301)

F

OTHER INSTRUMENTS SECTION

Cessna.

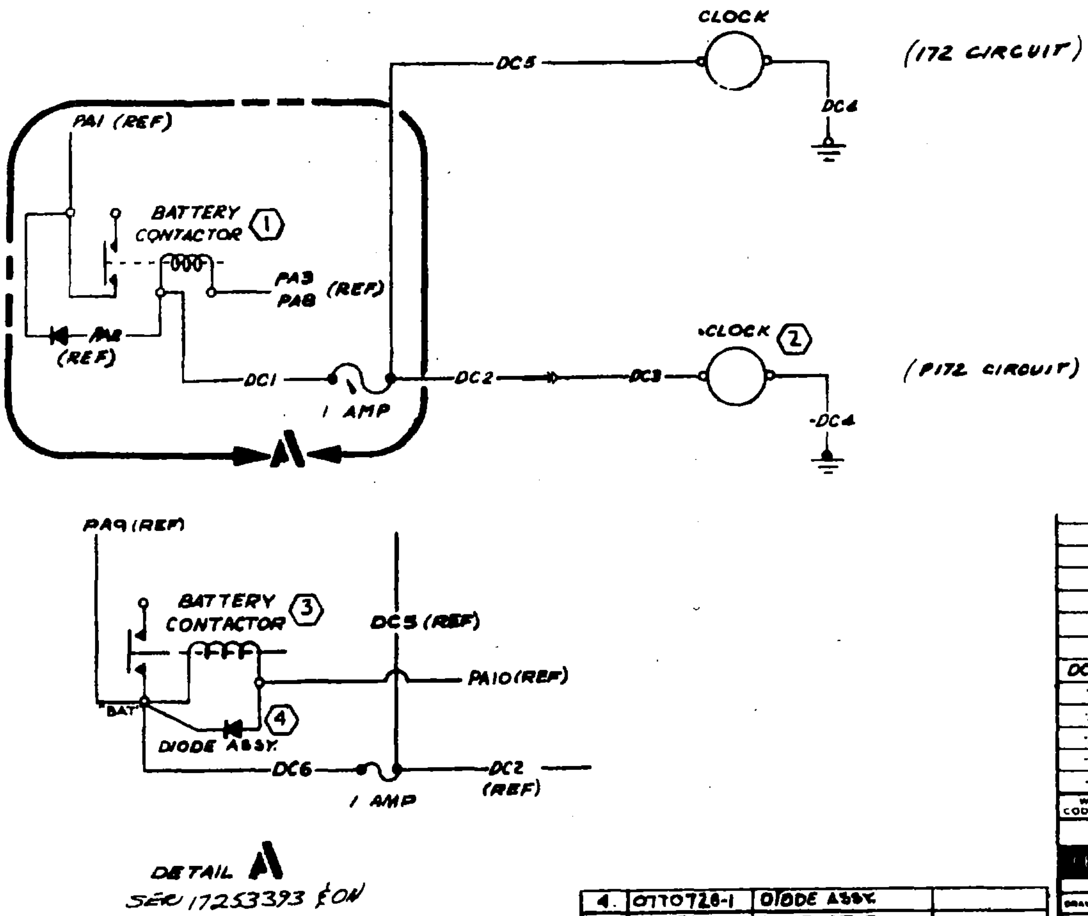
DRAWN	E.S.	TITLE: WIRING DIAGRAM--- MODEL 172-P172	DRAWING NO. 0500062
DATE	10/10/62		
APP'D	RRS Amc A	REV:	PAGE: 10.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-168

(SR 4021)

CHG LET	REVISION	BY DATE	CHK APPD
E	DELETED PREFIXES SR 4091	6-7-63	
F	BY REV: ADD DETAIL A, DC6 & SERIALS. SERIALIZE OUT DCL (SR4668)	LPB 1-8-6	



ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
4.	0770728-1	DIODE ASSY.	
3	S-1579-1	CONTACTOR	
2	S-1317N1	CLOCK	
1	0712603-2	CONTACTOR	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
DC6	18		13	S-1367-1-13	SOLDER		OPTIONAL & ON
DC5	18		65	S-1367-1-6	SOLDER	172 ONLY	OPTIONAL 17249946 & ON
DC4	18		110	S-1367-1-8	S-1367-1-6		OPTIONAL 17249946 & ON P17257163 & ON
DC3	18			S-341-2	S-1367-1-6	P172 ONLY	OPTIONAL P17257163 & ON
DC2	18			S-341-2	SOLDER	P172 ONLY	STANDARD P17257163 & ON
DC1	18		13	S-13671-6	SOLDER		OPT 17249946 P17257163 THRU

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE	TITLE
DRAWN	SPRIGGS	10-9-62	WIRING DIAGRAM — CLOCK
GROUP	PARSONS	10-12-62	
CHECK		10-11-62	
PROJ		10-15-62	

Cessna.

DWG NO 0500062

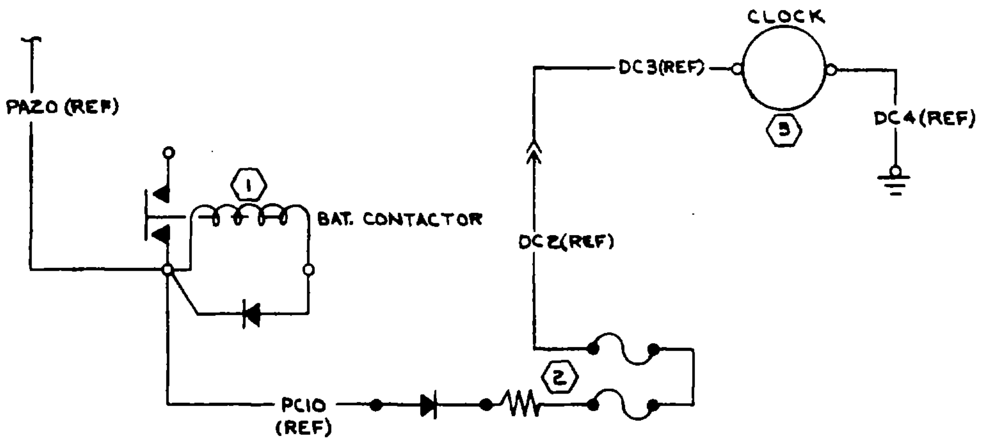
SUPERSEDED BY | SUPERSEDES | MODEL 172, P172 | REV F | PAGE 10.1

FORM NO 80-161

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	BY REV: ADD NOTE 1 ED & RR 00173 (SER FR172E-0001) & ON (SER R172E-0257 THRU -0301)	RCA	RLL
B	BY REV: ADD 172I TO NOTE 1 ED & RR 00192 [illegible] ON	9-27-67 JSM	RLL

NOTES:

1. APPLICABLE MODELS; FR172E, T41-C, & 172I



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
3	S-1317N2	CLOCK
2	0712031-3	FUSE & DIODE ASSY
1	S-1579-1	CONTACTOR

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		9-15-6
PROJECT		8-11-67
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

SCALE: NONE
PAGE: 10.2

(SER FR172E-0001) & ON

LIGHTING
SECTION

Cessna.

DRAWN	[illegible]	TITLE: WIRING DIAGRAM--- MODEL 172-P172
DATE	9-26-67	
APP'D	RRS [illegible]	REV: "D"

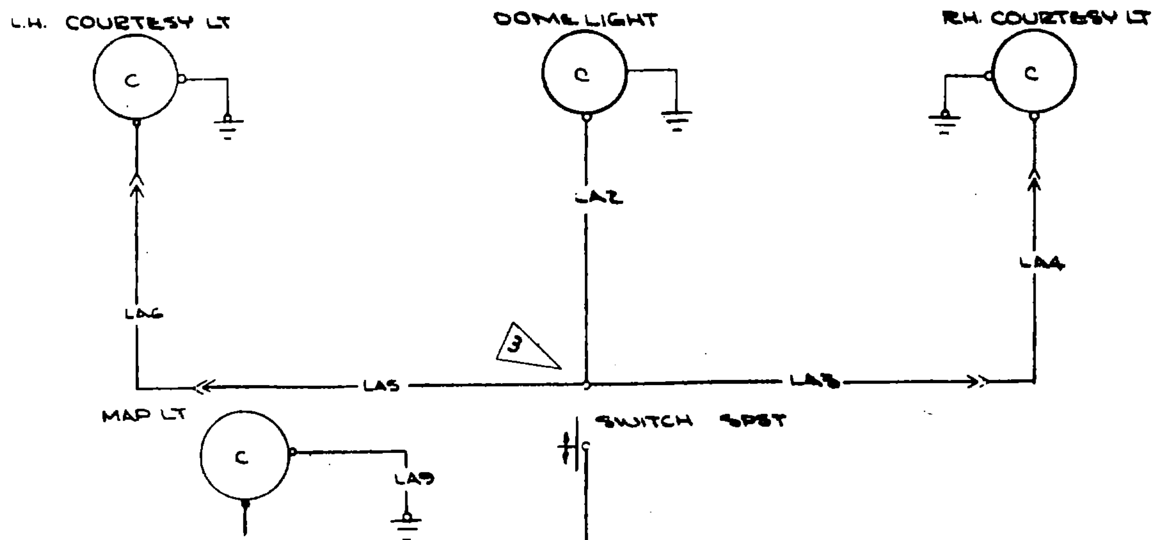
DRAWING NO.
0500062
PAGE: 11.0

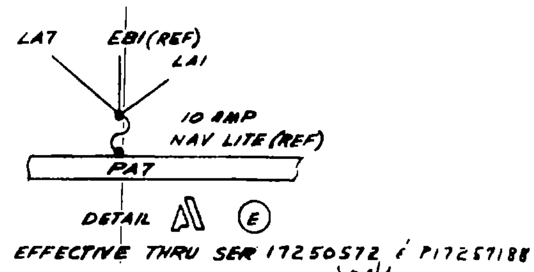
CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-164

(SR 4239)
I

CHG LET	REVISION	BY DATE	CHK APPD
D	ADDED LA8 & LA9 & NOTE 1 & 2		
E	DELETED PREFIXES ADD 1966 ADD REQMTS (SR 4011)		





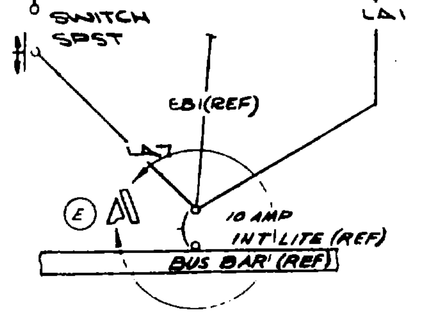
EFFECTIVE THRU SER 17250572 & P17257188

Inactive ser 17251823 & ON

17251823 & ON. 12/14/63

NOTES:
1. LA8 & LA9 ARE IDENTICAL TO & SUPERSEDE 0511048-LA2 & 0511048-LA3 RESPECTIVELY
2. TERMINALS OF WIRES FOR OPT EQUIPMENT SHALL BE SUITABLY PROTECTED AGAINST SHORTING WHEN OPT EQUIPMENT IS NOT INSTALLED

3 WIRES LA3 & LA5 TO TERMINATE IN COMMON S-1367-2-6 TERMINAL.



EFFECTIVE SER 17250573 THRU SER 17251822

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
LA9	18			S-1367-1-6	S-1367-1-8	0511048	
LA8	18			S-1367-1-6	———	0511048	
LA7	18			S-1367-1-6	S-1367-1-6	0511048	
LA6	18			S-341-2	S-341-2	STD	NOTE 2
LA5	18			S-1367-2-6	S-341-2	STD	NOTE 2 3
LA4	18			S-341-2	S-341-2	STD	NOTE 2
LA3	18			S-1367-2-6	S-341-2	STD	NOTE 2 3
LA2	18			S-1367-1-6	———	STD	NOTE 2
LA1	18			S-1367-1-6	S-1367-1-6	STD	NOTE 2

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Griswold	9/2/59
GROUP	Dittmer	9/3/59
CHECK	Cook	9/3/59
PROJ	Schuler	9/3/59

TITLE: WIRING DIAGRAM — DOME, COURTESY, & MAP LIGHTS (OPT)

Cessna.

DWG NO. 0500062

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

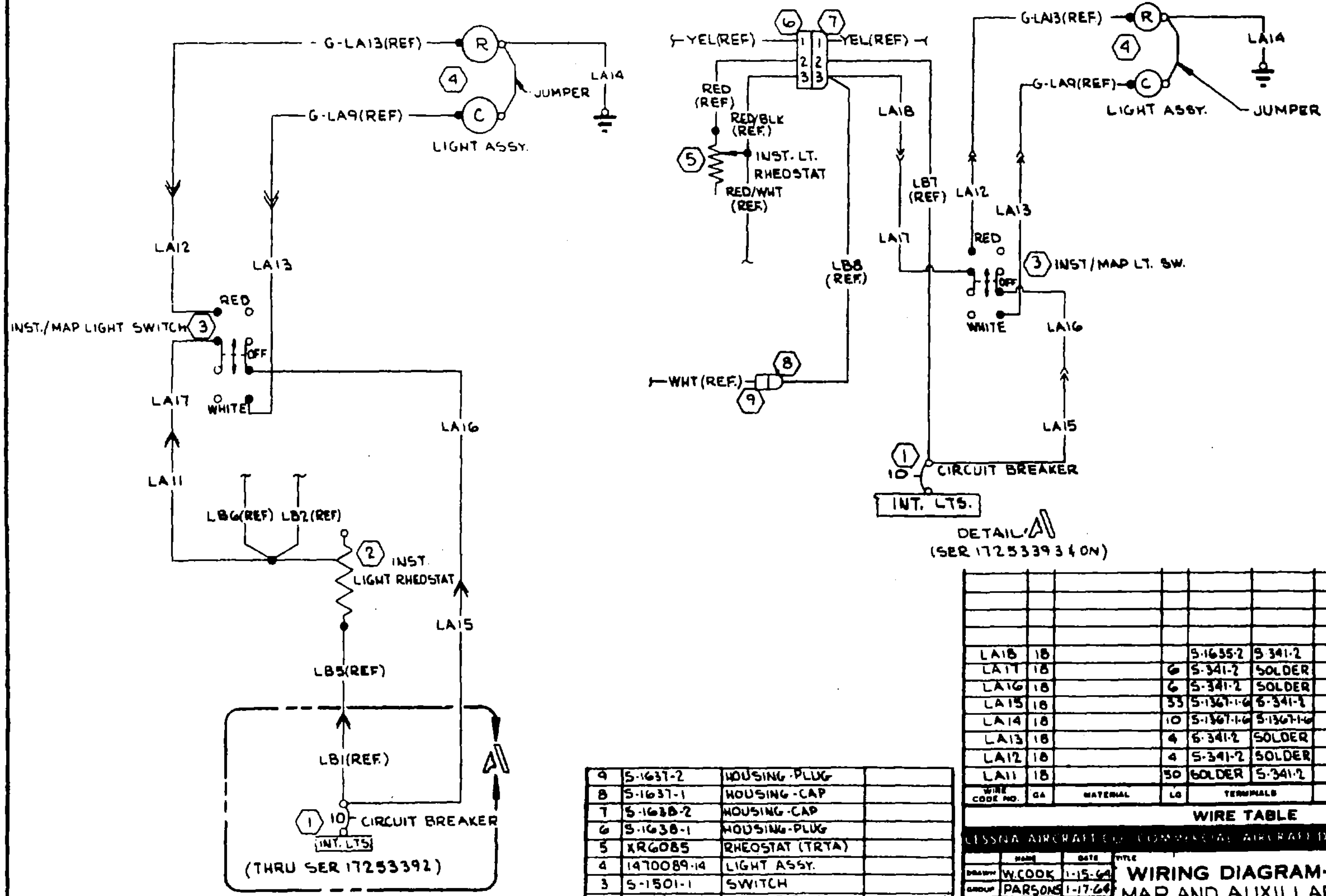
EQUIPMENT TABLE

SUPERSEDED BY: 11.1 & 11.1.2 | SUPERSEDES NOTE 1 & 0500062 'C' REV | MODEL 172-P172 | REV E | PAGE: 11.1

FORM NO 80-181

(SER 17251823 THRU SER 17253392)

CHG LET	REVISION	BY DATE	CHK APPD
A	ADDED LA15 LA16, LA17 DELETED JUMPER WIRE ON SWITCH, ADDED S-341-2 CONNECTOR TO LA11 WIRE WAS SOLDER	1-12-65	
B	ADDED DETAIL A, LA18 XRG085, S-1638-1 & S-1638-2, INACTIVATED LA11	7-21-65	
C	BY REV: ADD FR172E TO MODEL BLOCK (SER FR172E-0001) & ON	C.G. 8-8-67	R.L.



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

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
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		30	SOLDER	S-341-2		THRU SER 17253392

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

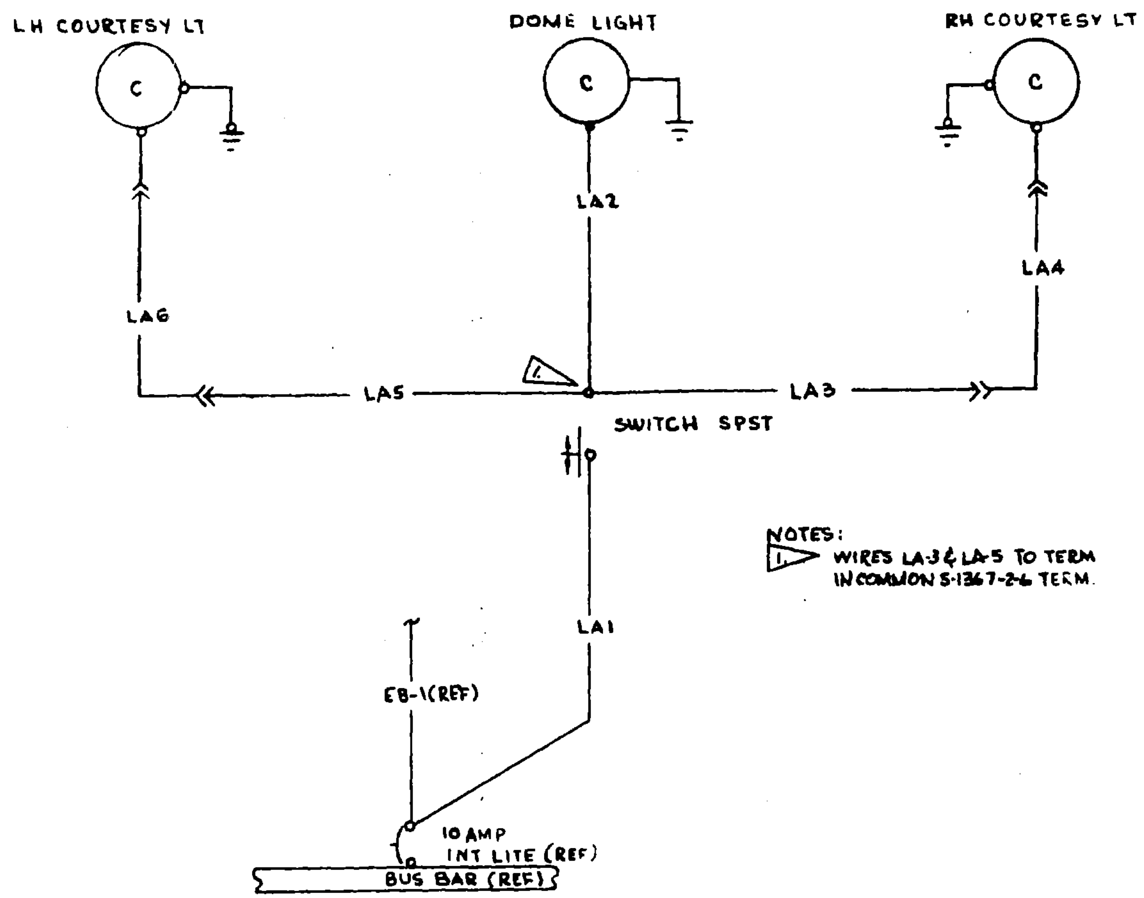
	NAME	DATE
DRAWN	W.COOK	1-15-64
GROUP	PARSONS	1-17-64
CHECK		1-15-64
PROJ		1-17-64

TITLE: WIRING DIAGRAM— MAP AND AUXILLARY INSTRUMENT LIGHT (OPT.)

Cessna.

DWG NO. 0500062

SUPERSEDED BY | SUPERSEDES 11.1 | MODEL: 172-FR172E | REV C | PAGE: 11.1.1



NOTES:
1. WIRES LA-3 & LA-5 TO TERM IN COMMON S-1367-2-6 TERM.

EFFECTIVE SER 17251823 & ON

SER 17254893 & ON 11-3-65 12-16-65

WIRE CODE NO	GA	MATERIAL	LG.	TERMINALS			SERIALS
LA6	18		115	S-341-2	S-341-2		
LA5	18		45	S-1367-2-6	S-341-2		◁1
LA4	18		115	S-341-2	S-341-2		
LA3	18		45	S-1367-2-6	S-341-2		◁1
LA2	18		6	S-1367-1-6	——		
LA1	18		78	S-1367-1-6	S-1367-1-6		

WIRE TABLE

EQUIPMENT TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	N.COOK	1-5-64
GROUP	PARSON	
CHECK		1-15-64
PROJ		1-17-64

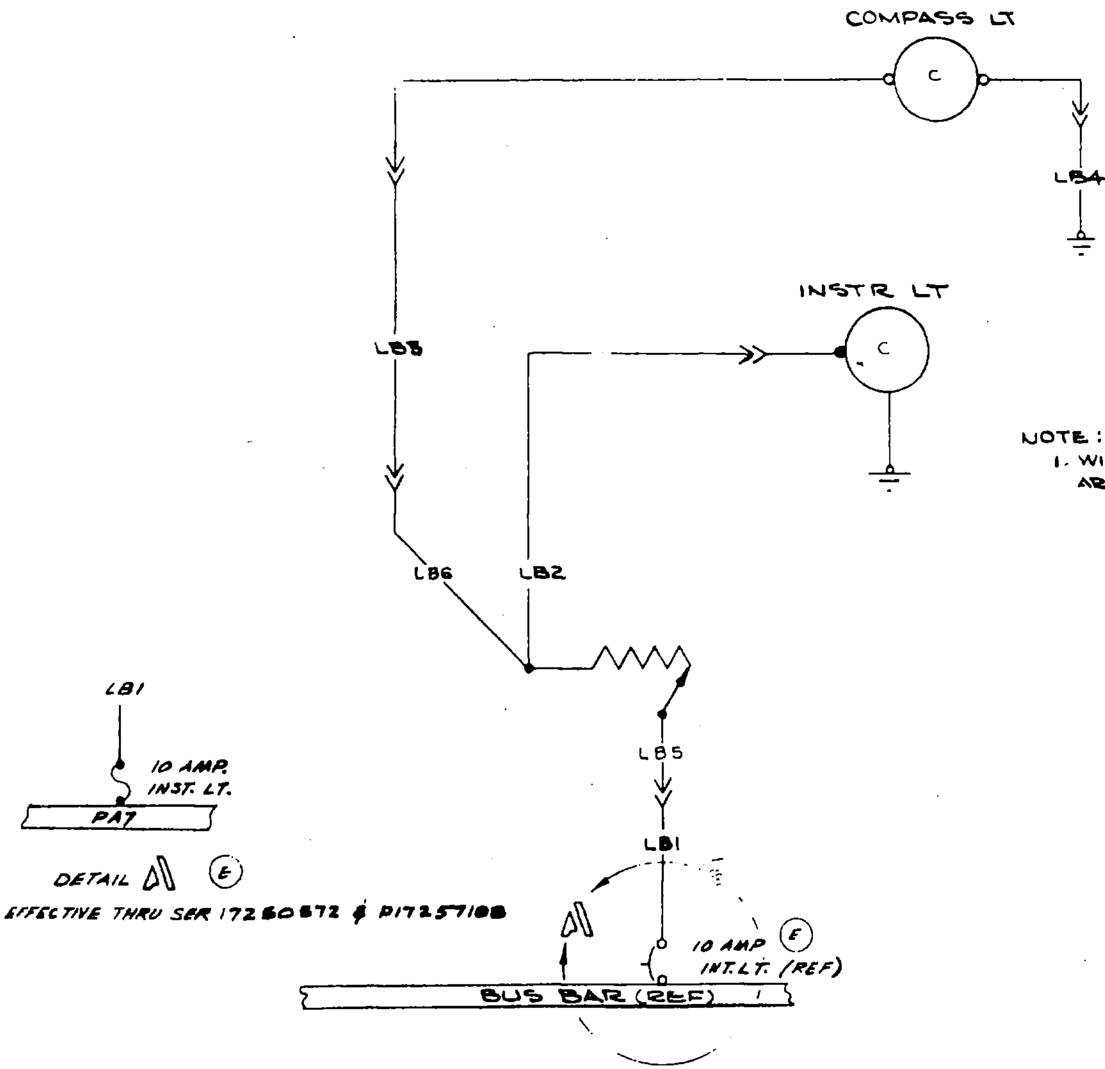
WIRING DIAGRAM — DOME & COURTESY LIGHTS.

Cessna.

DWG NO 0500062

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
0500062 F/ 11.7	11.1	172		11.1.2

CHG LET	REVISION	BY DATE	CHK APPD
D	REDRAWN NO CHG	9-11-6?	
E	ADD .V69 HOD REQMTS -4-47ED PREFIXES SE 4041	5-8-6?	
F	ADD WIRES LB5 AND LB6; ADD S341-2 DISCONNECTS TO LB1 (LB5 WAS SOLDER)	12-26-63	RAS



NOTE:
1. WIRES NOT NUMBERED ARE VENDOR FURNISHED

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LB6	18			———	S-341-2		
LB5	18			—	S-341-2		
LB4	18			S-1367-1-8	S-341-2		
LB3	18			S-341-2	S-341-2		
LB2	18			S-341-2	———		
LB1	18			S-1367-1-6	S-341-2		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Grawels	9/2/59
GROUP	Dismer	9/3/59
CHECK	Cook	9/3/59
PROJ	Sattler	9/3/59

TITLE
WIRING DIAGRAM — COMPASS & INSTRUMENT LIGHTS

Cessna.

DWG NO 0500062

SUPERSEDED BY

SUPERSEDES 0500062 "C" REV

MODEL 172-P172

REV F

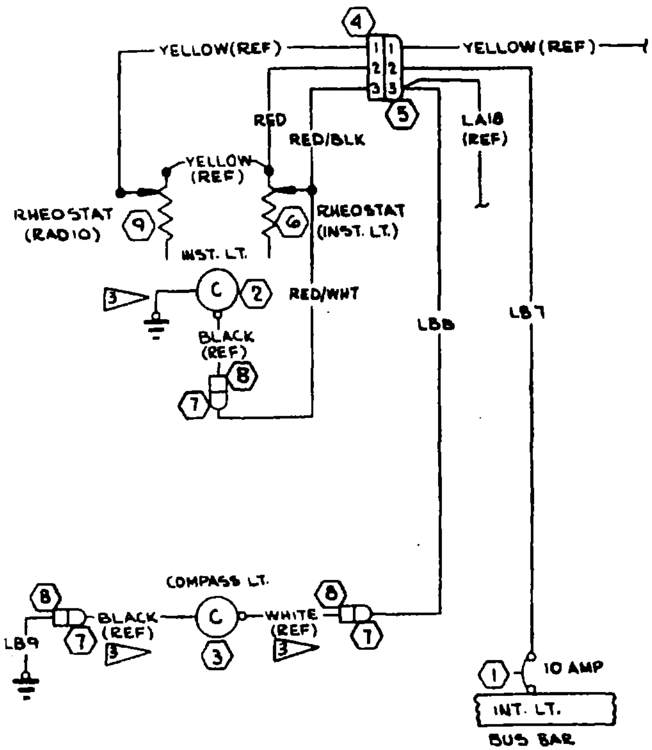
PAGE 11 2

FORM NO 80-181

LTR	REVISION	BY DATE	CHK APPD
A	BY REV: ADD FRITZE TO MODEL BLOCK (SEE FRITZE-0001)§ON	C.G. 3-8-67	[illegible]
B	BY REV: DELETE FRITZE FROM MODEL BLOCK. (SEE FRITZE-0001)§ON	JWH 8-14-[illegible]	[illegible]

NOTES:

1. INSTALL S-1635-1 PIN ON BLACK WIRE OF COMPASS AND S-1636-1 SOCKET ON WHITE WIRE OF COMPASS.
2. INSTALL S-1636-2 SOCKET ON BLACK WIRE OF INSTRUMENT LIGHT.
3. WIRES FURNISHED BY VENDOR.
4. ALL WIRE MATERIAL PER S-1460.



LB9	18			S 1367-1 14	S-1636-2		
LB8	18			S-1635-2	S-1635-3		
LB7	18			S-1367-16	S-1635-2		
RED	18	-18-2		SOLDER	S-1636-2		
RED/BLK	18	18-2-0		SOLDER	S-1636-2		
RED/WHT	18	-18-2-9		S 1635 2	SOLDER		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
9	0413126-5	RHEOSTAT	
8	S-1637-2	HOUSING-PLUG	
7	S-1637-1	HOUSING-CAP	
6	XR6085	RHEOSTAT (TRTA)	
5	S-1638-2	HOUSING-CAP	
4	S-1638-1	HOUSING-PLUG	
3	0713068-2	COMPASS LT	
2	0511481-9	INSTRUMENT LT.	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	5-28-65
GROUP	[illegible]	6-15-65
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM—COMPASS & INSTRUMENT LIGHTS

Cessna.

DWG NO 0500062

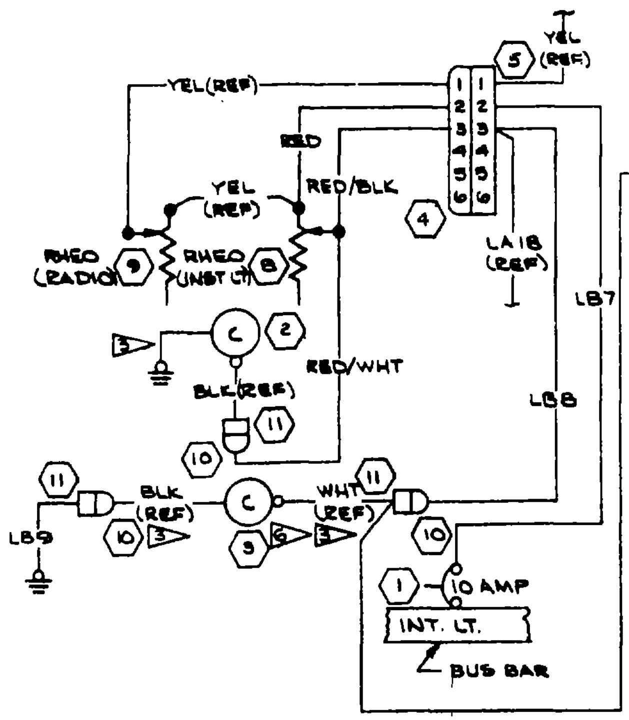
SUPERSEDED BY: | SUPERSEDES: 0500062 PG 11.2 | MODEL: 172 | REV: B | PAGE: 11.2.1

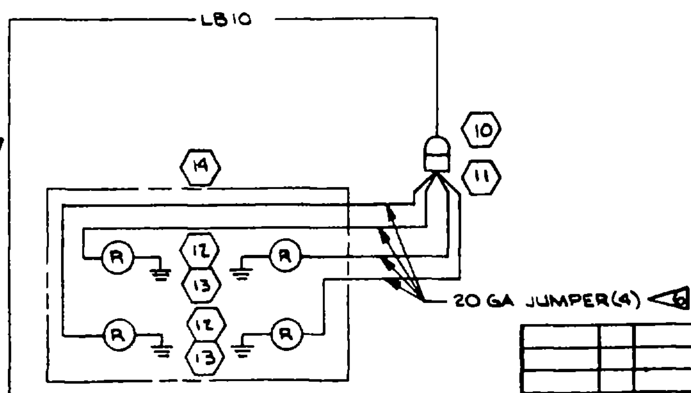
FORM NO [illegible]

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. ~~S-1636-3 SOCKETS USED WHEN TWO WIRES, INCLUDING JUMPERS, ARE ONE TERMINAL.~~
6. TERMINATE IN COMMON S-1636-3.

REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD 172I TO MODEL BLOCK ED & RR00192 (SER 17256513)&ON	9-27-67 JSM	RLL
B	BY REV: ADD, T41-C ONLY, TO C669509-0208; DELETE JUMPERS & NOTE 5; REROUTE LB10 ED&RR 01370	CG 12-6-68	RLL





ITEM NO.	PART NO.	DESCRIPTION	
14	C669509-0208	CLUSTER	T41-C ONLY
13	336R	LAMP	(29446)
12	25-290XP16	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	

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-1635-2	SOLDER		
LB10				S-1636-2	S-1636-2	7	
LB9				S-1367-1-14	S-1636-2		
LB8				S-1636-2	S-1635-3		
LB7	18			S-1367-1-6	S-1636-2		

WIRE TABLE

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wiss	9-21-67
DRAWN	HARRIS	9-14-67
CHECK	LAURIE	9-15-67
STRESS	aus	9-21-67
PROJECT	DG Keller	9-21-67
APPD	R.S. Mixer	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

CES-1000 IS APPLICABLE
VENDOR CODES PER S-1400
CES-XXXX=CESSNA SPEC. NO.
S-XXX OR CMXXXX=CESSNA STD. NO.

SUPERSEDES:

SUPERSEDED BY:

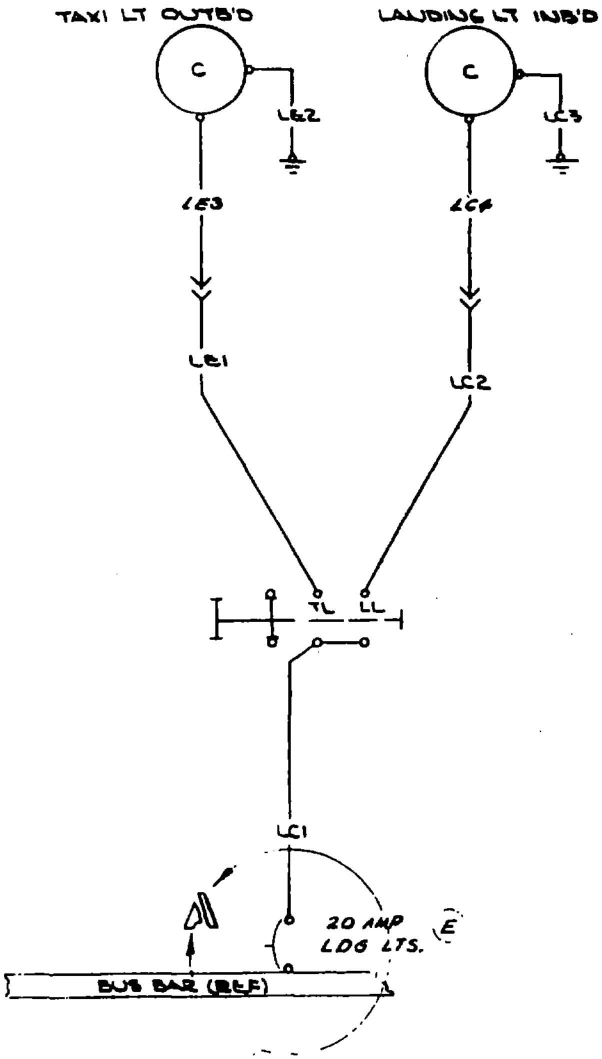
(SER FR172E-0001)&ON(SER R172E-0281 THRU-0301)

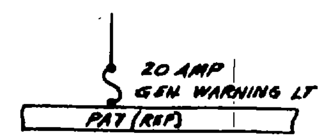
FORM NO 00-313A

NOTES:

1. LC1, LC2, LC3, LE1, & LE2 ARE IDENTICAL TO & SUPERSEDE 0522100-LCA, -LC5, -LC3, -LE3, & -LE2 RESPECTIVELY
2. TERMINALS OF ALL WIRES FOR OPT EQUIPMENT SHALL BE SUITABLY PROTECTED AGAINST SHORTING WHEN OPT EQUIPMENT IS NOT INSTALLED

CHG LET	REVISION	BY DATE	CHK APPD
D	ADD DC-L1 THRU DC-LC5, DC-LE1 & DC-LE2 & NOTE 1 & 2	[illegible]	[illegible]
E	[illegible]	[illegible]	[illegible]





DETAIL A (E)

EFFECTIVE THRU SER 17250572 & P17257188

Inactive SER 17254893 & ON 11-3-65 12-16-65

LE3	14		136	S-341-1	S-1367-2-8	0522100	
LE2	14		6	S-1367-2-8	S-1367-2-8	0522100	
LE1	14		43	S-1367-2-8	S-341-1	STD	
LC4	14		130	S-341-1	S-1367-2-8	0522100	
LC3	14		6	S-1367-2-8	S-1367-2-8	0522100	
LC2	14		44	S-1367-2-8	S-341-1	STD	
• LC1	14		51	S-1367-2-8	S-1161-2-8	STD	
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Gerwold	[illegible]
GROUP	Dittmer	[illegible]
CHECK	Goe	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — LANDING & TAXI LIGHTS

Cessna.

DWG NO 0500062

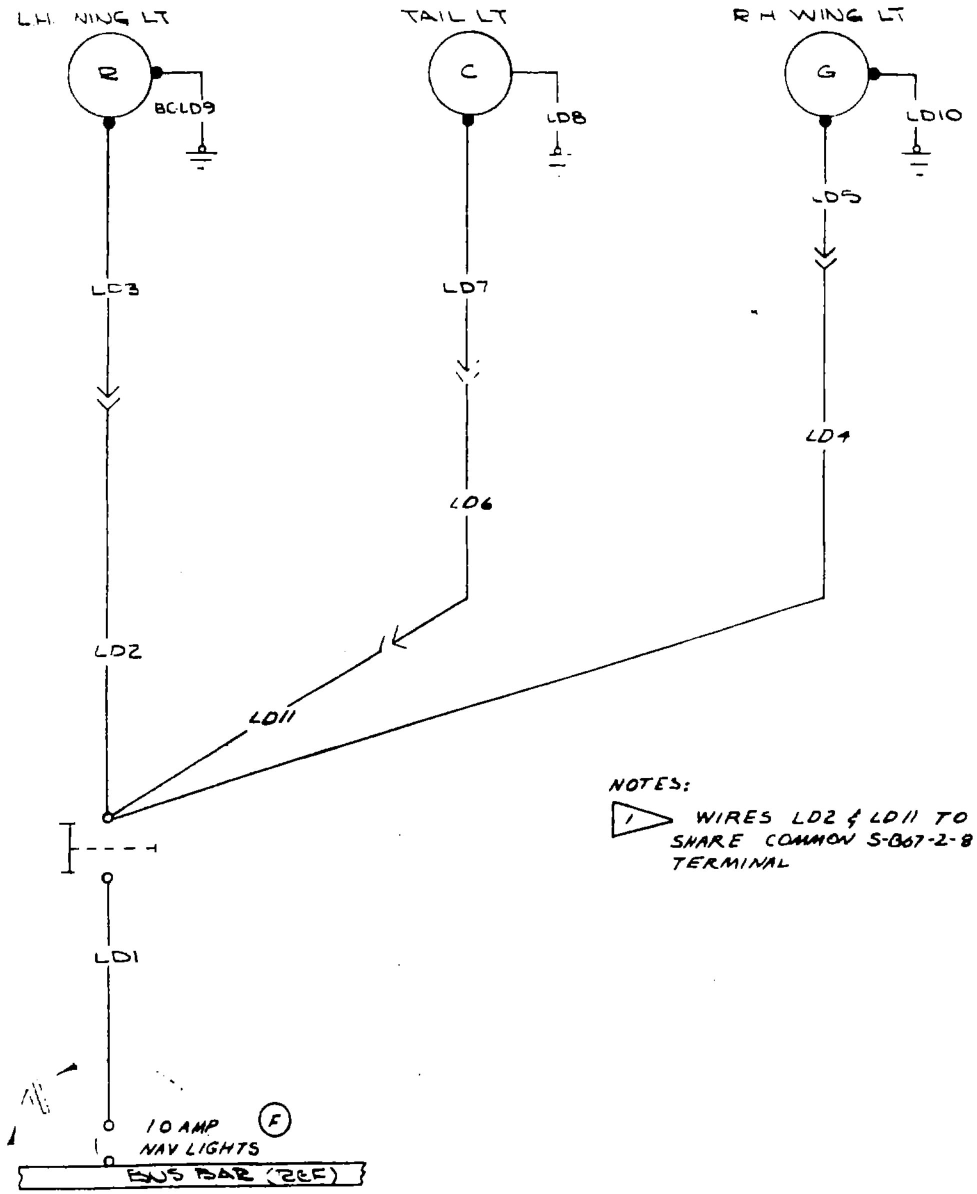
SUPERSEDED BY: C500062 PP 11.8 | SUPERSEDES: NOTE 1 | MODEL: 172-P172 | REV: E | PAGE: 11.3

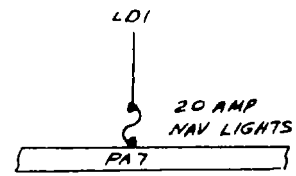
ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

FORM NO 80-181

CHG LET	REVISION	BY / DATE	CHK / APPD
D	REDRAWN NO CHG	[illegible]	[illegible]
E	DELETE S-1367-[illegible] TERM FROM LD 8 & LD 9 (-R4121)	[illegible]	[illegible]
F	DELETED PREFIXES ADD 1961 MOD REQMTS SR 4011	[illegible]	[illegible]





(F) DETAIL A

EFFECTIVE THRU SER 17250572 & P17257188

SER 17254893 & ON

NOTES:

1. WIRES LD2 & LD11 TO SHARE COMMON S-1367-2-8 TERMINAL

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LD11	18		26	S-1367-2-8		1	
LD10	18		18	S-1367-1-6	—		
LD9	18		18	S-1367-1-6			
LD8	18		13	S-1367-1-6	—		
LD7	18		84	S-341-2	—		
LD6	18		290	S-341-2	S-341-2		
LD5	18		214	S-341-2	—		
LD4	18		68	S-341-2	S-1367-1-8		
LD3	18		214	S-341-2	—		
LD2	18		41	S-1367-2-8	S-341-2	1	
LD1	18		4	S-1367-1-8	[illegible]		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	GRISWOLD	4/3/59
GROUP	DITTMER	4/3/59
CHECK	COOK	4/3/59
PROJ	SETTLES	4/3/59

TITLE: WIRING DIAGRAM — WING & TAIL LIGHTS

Cessna.

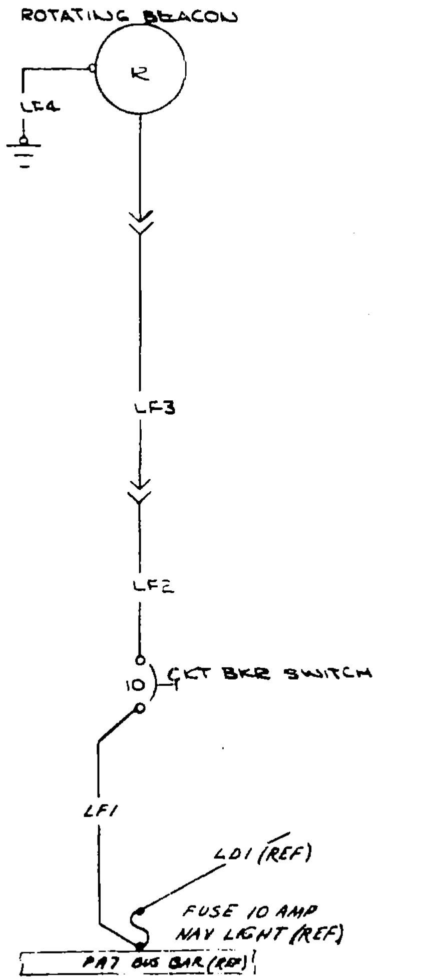
DWG NO 0500062

SUPERSEDED BY: 0500062 PP 11.9 | SUPERSEDES: 0500062 C REV | MODEL 172-P172 | REV F | PAGE 11.4

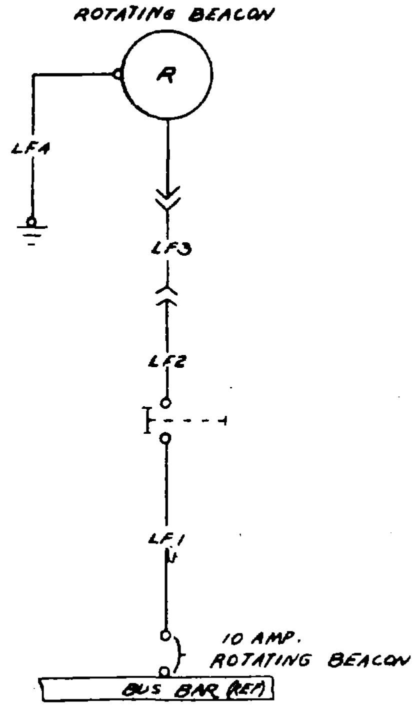
FORM NO 80-161

CHG LTR	REVISION	BY DATE	CHK APPD
D	[illegible] LF4, NOTE 1, & 2	[illegible]	[illegible]
E	DELETED PREFIXES ADDED 709 REQMTS (SR 4091)	[illegible]	[illegible]

NOTES:
1. LF1 THRU LF4 ARE IDENTICAL TO & SUPERSEDE 0531007- LF1 THRU LF4 RESPECTIVELY
2. TERMINALS OF ALL WIRES FOR OPT EQUIPMENT SHALL BE SUITABLY PROTECTED AGAINST SHORTING WHEN OPT EQUIPMENT IS NOT INSTALLED



EFFECTIVE THRU SER 17250572



(E) EFFECTIVE SER 17250573 & ON
SER P17257189 & ON

SER 17254893 & ON
11-3-65

WIRE CODE NO	GA	MATERIAL		TERMINALS		N/A	SERIALS
LF4	8		12	S1367-1-6	S-1367-1-8	NOTE 2	STD
LF3	16		58	S-341-1	S-341-1	NOTE 2	STD
LF2	16		270	S1367-1-8	S-341-1	NOTE 2	STD
LF1	16		4	S1367-1-6	S-1367-1-8	0531007	OPT

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	GRISWOLD	4/1/59
GROUP	DITTMER	4/3/59
CHECK	Cope	4/3/59
PROJ	[illegible]	4/9/59

WIRING DIAGRAM — ROTATING BEACON (OPT)

Cessna.

DWG NO 0500062

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

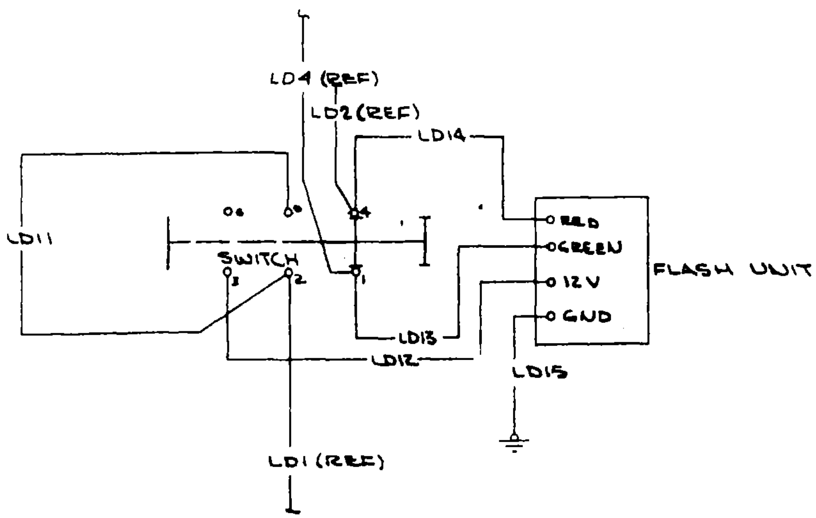
EQUIPMENT TABLE

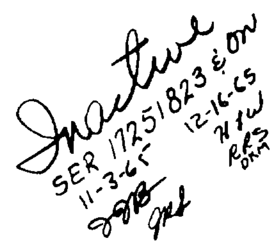
SUPERSEDED BY: 0500062 PP 11.10 | SUPERSEDES: NOTE 1 | MODEL 172-P172 | REV E | PAGE 11.5

FORM NO 80-181

NOTES.
1. LD11 LD12, LD13, LD14, & LD15 ARE IDENTICAL TO & SUPERSEDE 0513191-LD1, -LD2, -LD3, -LD4, & -LD5 RESPECTIVELY

CHG LET	REVISION	BY / DATE	CHK / APPD
D	ADDED EC-LD11 THRU EC-LD15 & NOTE 1		
E	DELETED PREFIXES (-P4CH)		





WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
LD15	18			S-1367-1-8	S-1367-1-6	0513340	
LD14	18			S-1367-1-8	S-1367-1-6	0513340	
LD13	18			S-1367-1-8	S-1367-1-6	0513340	
LD12	18			S-1367-1-8	S-1367-1-6	0513340	
LD11	18			S-1367-1-8	S-1367-1-8	0513340	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

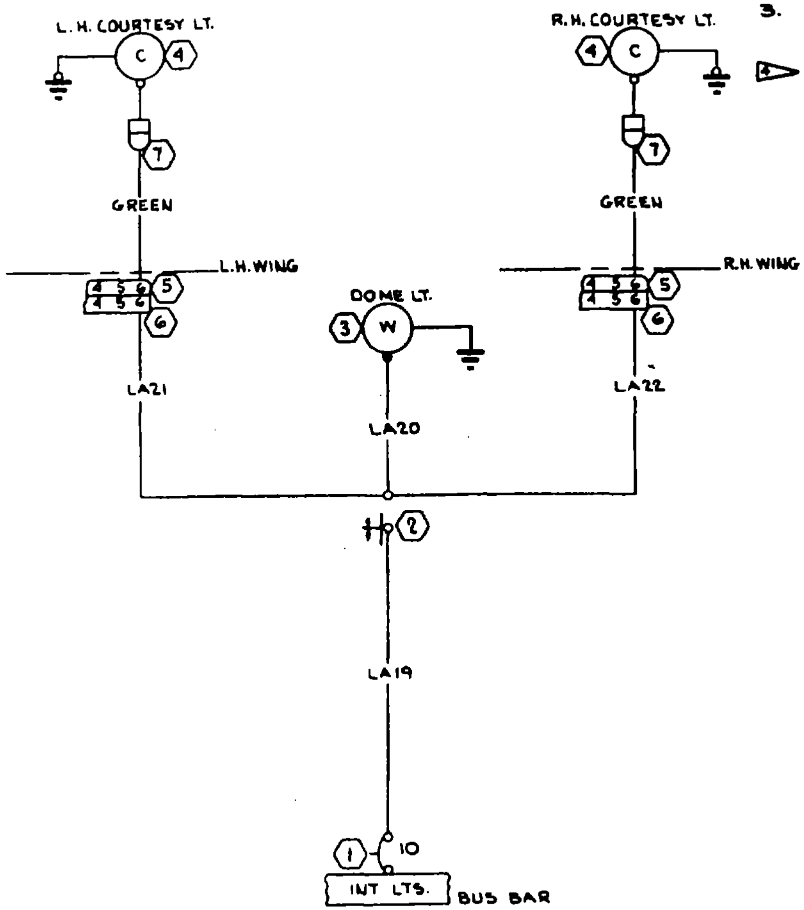
	NAME	DATE
DRAWN	Grinnold	4/2/59
GROUP	Brimer	4/3/59
CHECK	Cook	4/3/59
PROJ	Sattler	4/3/59

TITLE: WIRING DIAGRAM — FLASHER UNIT (OPT)

Cessna.

DWG NO 0500062

SUPERSEDED BY: | SUPERSEDES: NOTE 1 | MODEL 172-P172 | REV E | PAGE 11.6



NOTES:

(SER 17254893) & ON

1. WIRE MATERIAL PER S-1460
2. S-1635-2 PIN ; S-1637-1 HOUSING-CAP
3. APPLICABLE MODELS; 172, FR172E, T41-C, 172I
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 & RR00173 (SER FR172E-0001) & ON (SER R172E-0261 THRU-0[illegible])	RCA 9-18-67	RLL
C	BY REV: ADD 172I TO NOTE 3 (EDRR00192) (SER [illegible]) & ON	JSM 9-27-67	RLL

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

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

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	11-3-65
GROUP	H. Ward	12-16-65
CHECK	R. Buck	12-20-65
PROJ	[illegible]	12-?-65

TITLE: WIRING DIAGRAM— DOME & COURTESY LIGHTS

Cessna.

DWG NO. 0500062

SUPERSEDED BY:

SUPERSEDES: 0500062 PP 11.1.2

MODEL: NOTED

REV: C

PAGE: 11.7

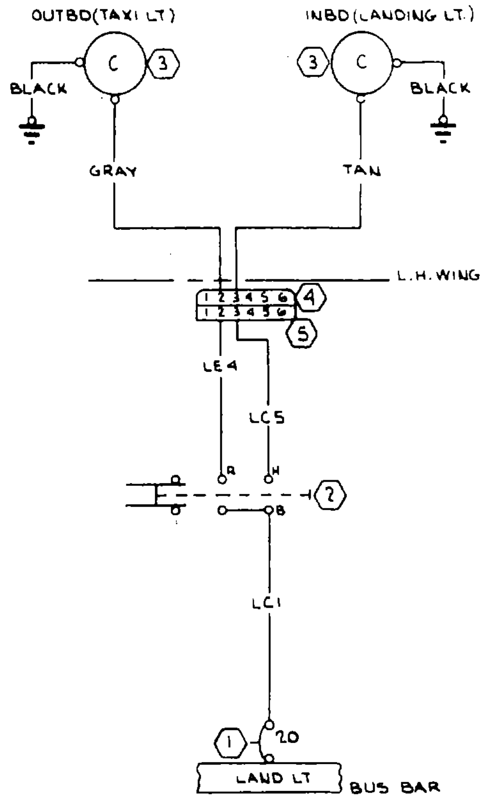
(SER 17254893)&ON

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 TO MODEL BLOCK (SER FR172E-0001)&ON	C.G. 6-8-67	RLL
B	BY REV: ADD NOTE 2 ED&RR 00172 (SER FR172E-0001)&ON (SER R172E-0257 THRU-0801)	RCA 9-18-67	RLL
C	BY REV: ADD 172I TO NOTE 2 (EDRR00192)(SER 17256513)&ON	JSM 9-27-67	RLL



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	OT13035	SWITCH ASSY.	
1	S-1360-20	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	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.

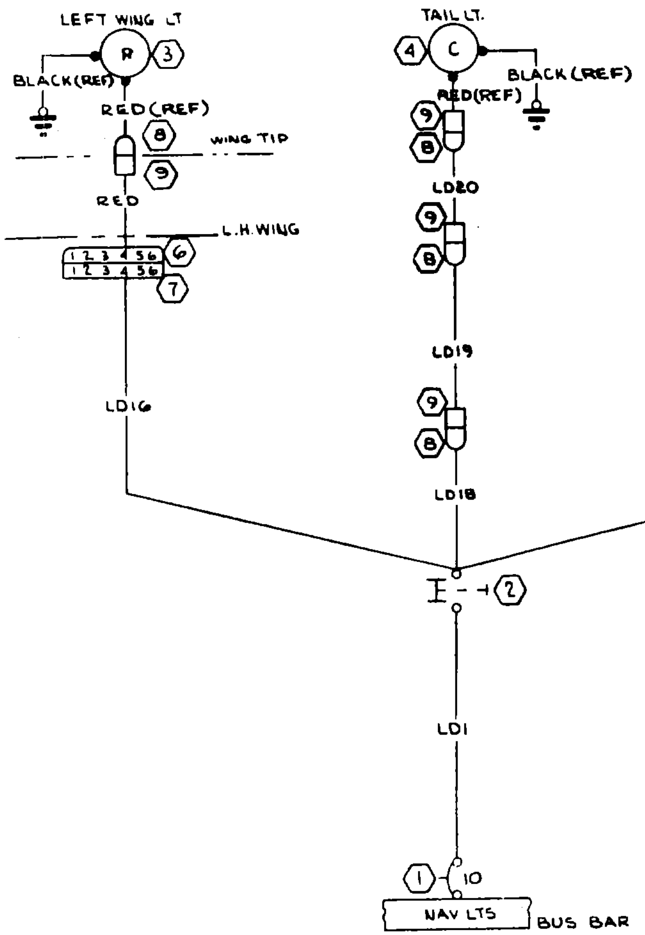
DWG NO. 0500062

SUPERSEDED BY | SUPERSEDES 0500062 PP11.3 | MODEL NOTED | REV C | PAGE 11.8

(SER 7254893) & 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 WING TIPS & ITEMS 8 & 9 - S-1636-2 TERM ON RED WIRES WERE SOLDER	JN 7-26-66	
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 9-19-67	
D	BY REV: ADD 172I TO NOTE 2 (EDRR00192)	JSM 9-27-67	
E	BY REV: C622001-0202 WAS 0423006-21 & -22, C622001-0102 WAS 0433006-7 ITEM 3 WAS ITEM 6 & LD18 WAS LD11, LD19 WAS LD6, LD20 WAS LD7; ADD S-1460-18-2 DELETE 3 RED & 3 BLACK WIRES (EDRR01163)(EDRR01335)	RCC 1-6-67	

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
LD20	18			S-1636-1	S-1635-1		
LD19	18			S-1636-1	S-1635-1		
LD18	18			SOLDER	S-1635-1		
RED	18	-18-2		S-1635-2	S-1636-2 S-1637-2		
RED	18	-18-2		S-1635-2	[illegible]		
LD17	18			S-1367-1-8	S-1636-2		
LD16	18			S-1367-1-8	S-1636-2		
LD11	18	THRU SER(SR5631)	26	S-1367-1-8	S-341-2		
LD7	18	THRU SER(SR5631)	84	S-341-2	SOLDER		
LD6	18	THRU SER(SR5631)	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

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	11-3-65
GROUP	H Ware	12-16-65
CHECK		
PROJ		

TITLE: WIRING DIAGRAM— WING & TAIL LIGHTS

Cessna.

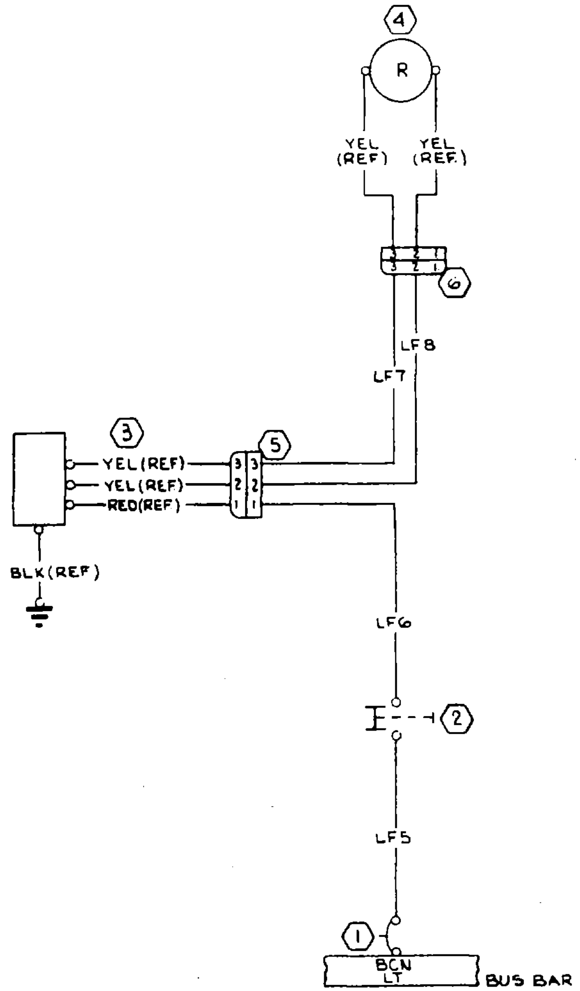
DWG NO 0500062

SUPERSEDED BY: SUPERSEDES: 0500062 PP 11.4 MODEL: NOTED REV: E PAGE: 11.9

NOTES:

1. APPLICABLE MODELS; 172, FR172E (SER 17259893) & ON 172I.

CHG LET	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 00173 (SER R172E -0257 THRU -0301) (FR172E-0001) & ON	RCA 9-19-67	RLL
C	BY REV: ADD 172I TO NOTE 1. (ED RR 00192) (SER 17256...	JSM 9-27-67	RLL
D	BY REV: DELETE MODEL T41-C FROM NOTE 1. (ED & RR 01921) (SER R172E-0251) & ON	JWH 11-13-67	MDS DGA



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 CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

6	S-1638-2	HOUSING-CAP	
5	S-1638-1	HOUSING-PLUG	
4	C621001-	LIGHT ASSY-14V	
3	C594501-	FLASHER ASSY-14V	
2	0713026-4	SWITCH ASSY	
1	S-1360-10	CIRCUIT BREAKER	
ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

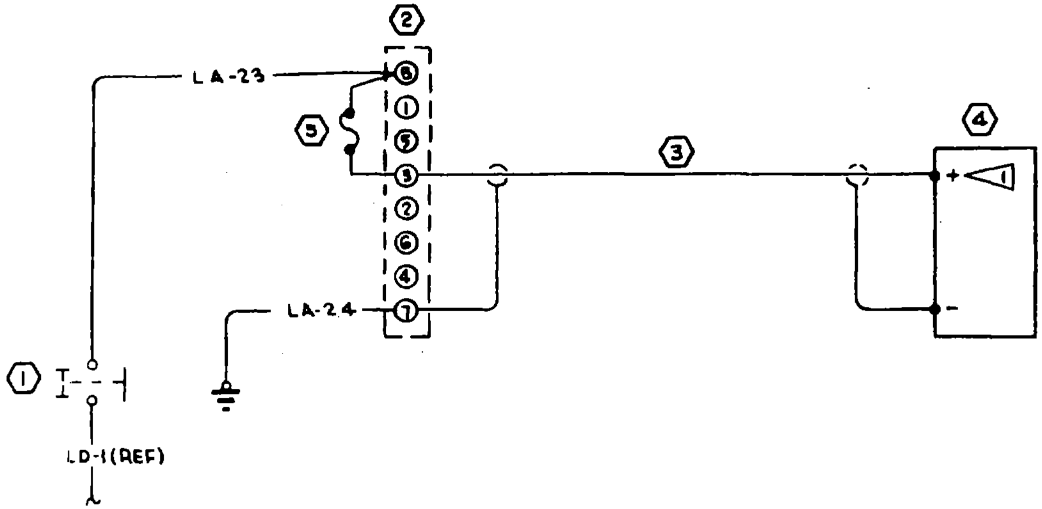
	NAME	DATE
DRAWN	BLISS	12-2-65
GROUP	N Wise	12-20-65
CHECK		
PROJ		

TITLE: WIRING DIAGRAM— LIGHT - FLASHING BEACON (OPTIONAL)

Cessna.

DWG NO 0500062

SUPERSEDED BY: . | SUPERSEDES: 0500062 PP 115 | MODEL: NOTED | REV: D | PAGE: 11-10



REVISION			
LET	DESCRIPTION	DATE	APPD
A	BY REV: ADD NOTE 3 ED & RR 00173 (SEE FR172E-0001 & ON) (SEE 17256513 & ON)	RCA 8-15-67	RLL

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.

WIRE TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS		SERIALS
LA-24	20			2	SOLDER	
LA-23	20			2	SOLDER	

EQUIPMENT 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	

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	W COOK	8-30-67
GROUP	H. Wise	8-31-67
DRAWN	Haas	
CHECK	YAKSHAW	8-30-67
STRESS		8-31-67
PROJECT		9-1-67
APPD		9-1-67

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

(SEE 17256513) & ON

FORM NO. 80-5154

HEATING, VENTILATING, AND DE-ICING SECTION

Cessna.

DRAWN	TITLE: WIRING DIAGRAM---		DRAWING NO.
DATE 9-26-62	MODEL 172-P172		0500062
APP'D RRS		REV: "D"	PAGE: 13.0

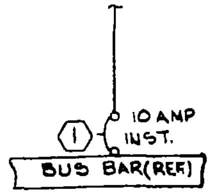
CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-171

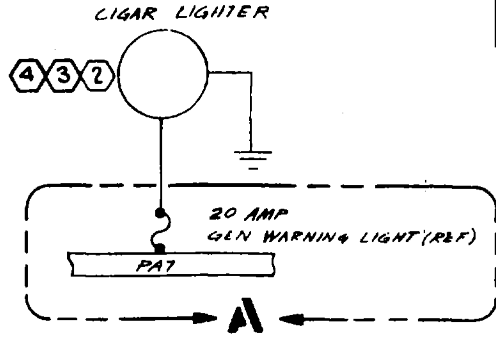
CHG LET	REVISION	BY DATE	CHK APPD
D	REDRAWN NO CHG	[illegible]	[illegible]
E	ADDED [illegible] (SER 17250573 THRU 17254892)	[illegible]	[illegible]
F	BY REV. ADD DETAIL A; ADD [illegible] SER; ADD EQUIP TAB. (SER 172[illegible] THRU 172[illegible])	[illegible]	
G	BY REV: ADD FR172E TO MODEL BLOCK (FR172E-001 & ON)	C.G. 8-8-67	RLL [illegible]
H	BY REV: ADD NOTE 1 ED & RR00173 (R172-0251 THRU 0301) (SER FR172E-001 & ON)	RCA 8-8-67	RLL [illegible]
J	BY REV: ADD 172I TO NOTE 1 (EDRR00192) (SER 17256513)	JSM 9-27-67	RLL [illegible]
K	BY REV: ADD 0513052-3 & 0513052-15 SER 17256513, R172E-0001)	CG 1-6-67	RLL [illegible]

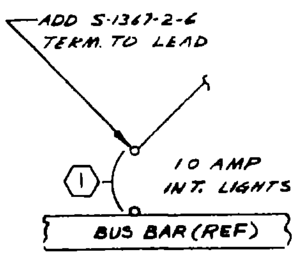
NOTES:

1. APPLICABLE MODELS; 172, P172, FR172E, T41-C, & 172I



DETAIL A
SER (SR 4921) & ON





DETAIL A
SER 17250573 THRU SER 17254892
SER P17257189 THRU SER 17254892

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

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Griswold	9/2/59
GROUP	Dittmer	9/3/59
CHECK	Cook	9/3/59
PROJ	Sattler	9/3/59

TITLE: WI[illegible] DIAGRAM — CIGAR LIGHTER

Cessna.

DWG NO 0500062

SUPERSEDED BY

SUPERSEDES 0500062 C REV

MODEL NOTED

REV K

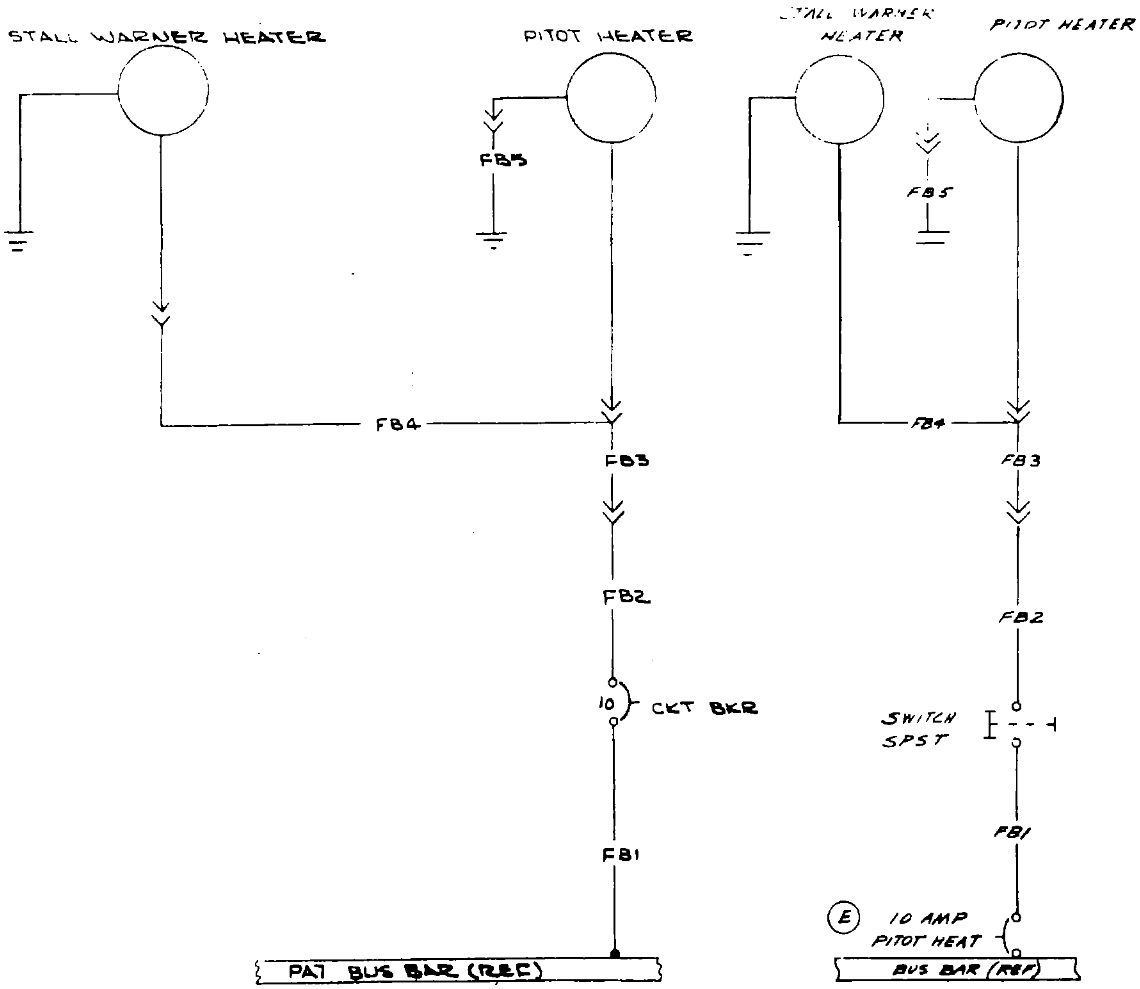
PAGE 13.1

F

FORM NO 80-181

NOTES:
1. FB1, FB2 FB3, FB4 & FB5 ARE IDENTICAL TO & SUPERSEDE 0521100-FB, -FB2, -FB3, -FB4, & -FB5 RESPECTIVELY

CHG LET	REVISION	BY DATE	CHK APPD
D	ADD BK-FB1 THRU BK-FB5 & NOTE	[illegible]	[illegible]
E	[illegible]	[illegible]	[illegible]



EFFECTIVE THRU SER 17250572 & P17257188

EFFECTIVE SER 17250573 & ON
EFFECTIVE SER P17257189 & ON

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
FB5	18			S-1369-1	S-1367-1-8	0521100	
FB4	18			COMMON TO FB3	S-341-2	0521100	
FB3	16			S-341-1	S-1369-2	0521100	
FB2	16			S-1367-1-8	S-341-1	0521100	
FB1	16			S-1367-1-8	S-1367-1-6	0521100	

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	GRISWOLD	4/2/59
GROUP	DITTMER	4/3/59
CHECK	Come	4/3/59
PROJ	SETTLE	4/3/59

TITLE: WIRING DIAGRAM — PITOT & STALL WARNING HEAT

Cessna.

DWG NO 0500062

SUPERSEDED BY | SUPERSEDES NOTE 1 | MODEL 172-P172 | REV E | PAGE 13.2

FORM NO 80-161

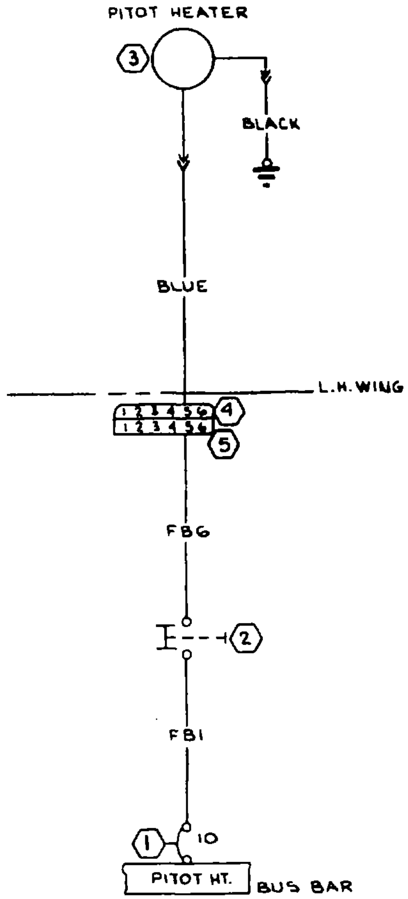
(SER 17254893)

NOTES;

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 FR172E TO MODEL BLOCK (SER FR172E-0011 ON)	CG 8-8-67	
B	BY REV: ADD NOTE 2 EDERR00173 (R172E-0257 THRU 0301) (SER FR172E-001 ON)	RCA 9-19-67	RLL
C	BY REV: ADD 172I TO NOTE 2 (EDRR00192) 17256553 (ON)	JSM 9-27-67	



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

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	11-3-65
GROUP	K. West	12-16-65
CHECK	R. Reid	12-17-65
PROJ		12-16-65

TITLE: WIRING DIAGRAM—PITOT HEAT (OPTIONAL)

Cessna.

DWG NO. 0500062

SUPERSEDED BY:

SUPERSEDES: 0500062 PP 13.2

MODEL: NOTED

REV. C

PAGE: 13.3

CONTROL SURFACE SECTION

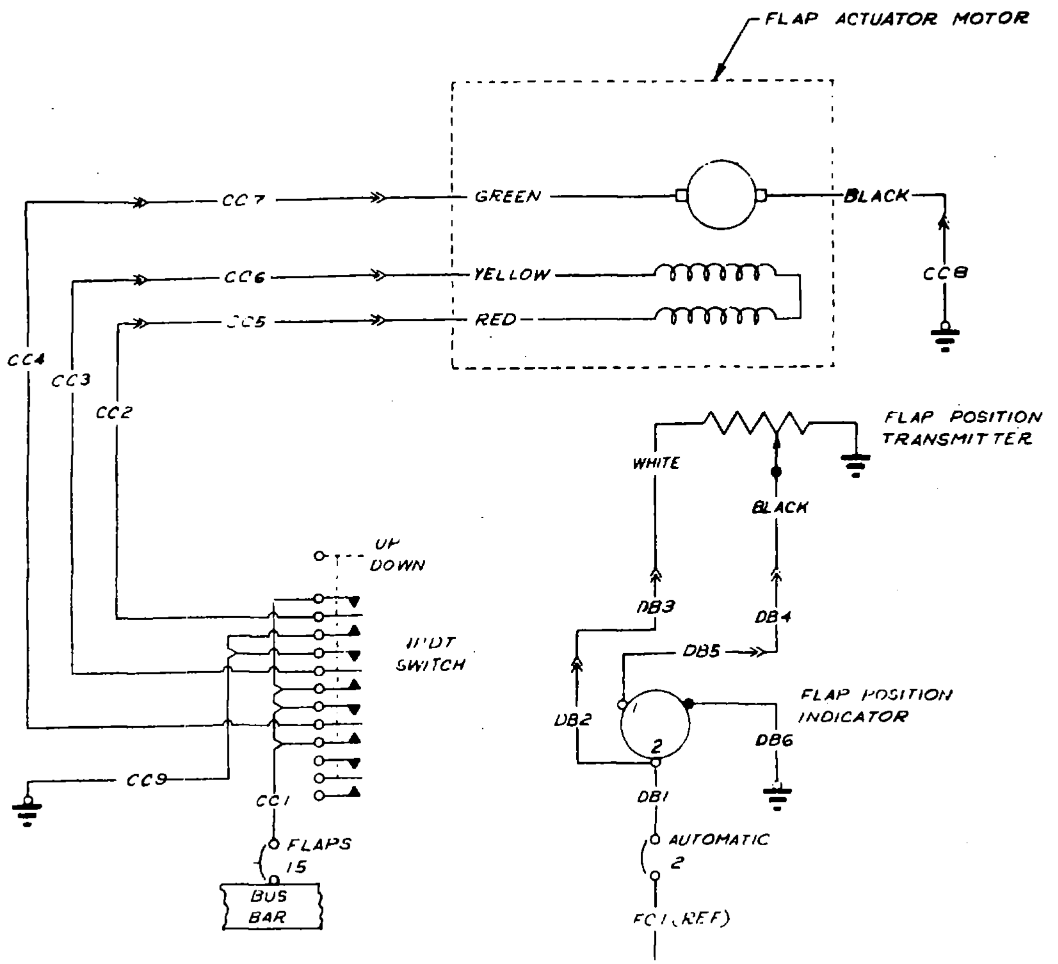
Cessna.

DRAWN	H. WISE	TITLE: WIRING DIAGRAM--- MODEL 172 - P172	DRAWING NO. 0500062
DATE	5-27-63		
APP'D		REV:	PAGE: 14.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

(SR4439)

CHG LET	REVISION	BY / DATE	CHK / APPD



Inactive
SER 17253393 & ON
5-10-65
5-28-65
6-1-65

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
DB6	18			SOLDER	S-1367-1 8		
DB5	18			S-341 2	S-1367 1 8		
DB4	18			↕	S-341-2		
DB3	18				S-341-2		
DB2	18			S-341-2	S-1367-1 10		
DB1	18			S-1367 1 8	S-1367-1-10		
CC9	16			S-1367-2 8	S-1367-2-6		
CC8	16			S-341-1	S-1367 2 8		
CC7	16			↑	S-341-1		
CC6	16				S-341-1		
CC5	16				S-341 1		
CC4	16				S-1367 2 6		
CC3	16			↓	↕		
CC2	16			S-341-1			
CC1	16			S-1367-2-6	S-1367-2 6		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	WIGGS	1-10-64
GROUP	PARSONS	4-29-64
CHECK		
PROJ		4-19-64

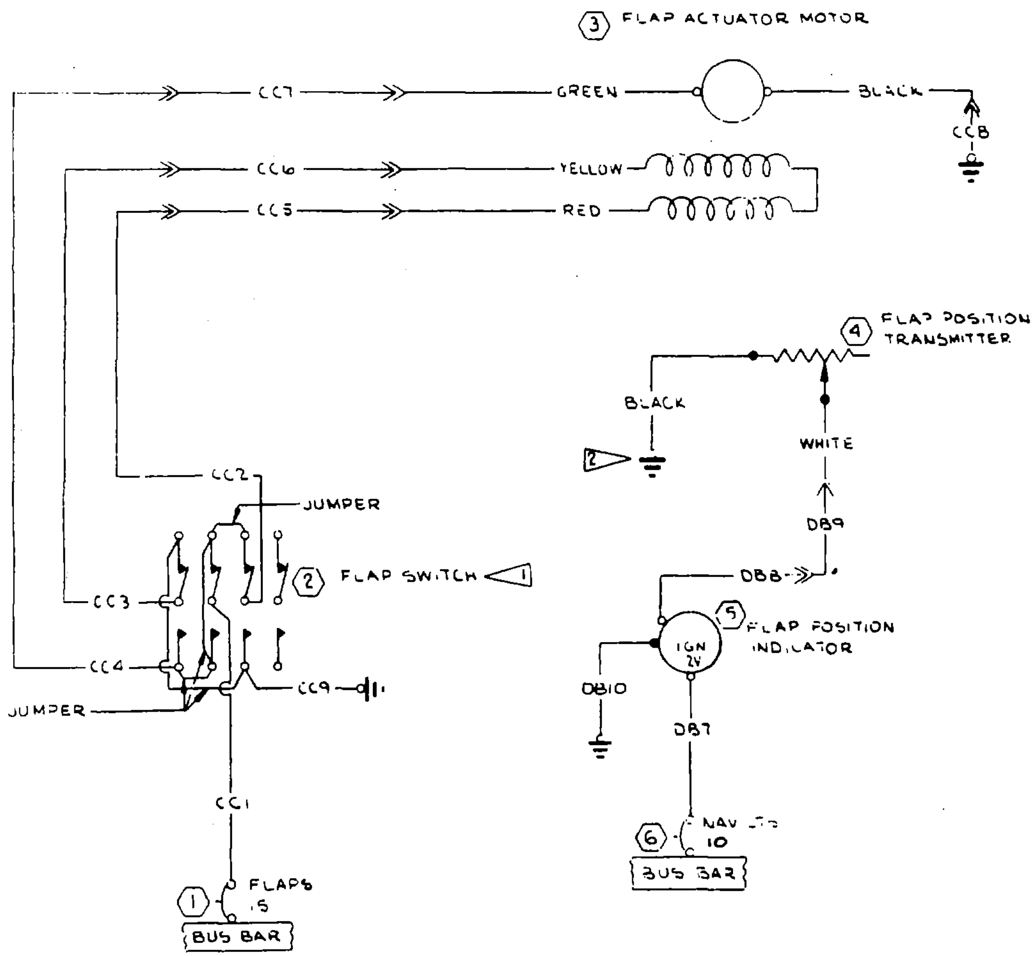
TITLE: **WIRING DIAGRAM — WING FLAPS**

Cessna.

DWG NO 0500062

SUPERSEDED BY 0500062 Pg 14.41 | SUPERSEDES | MODEL 172 | REV | PAGE 14.4

CHG LET	REVISION	BY DATE	CHK APPD
A	ADDED DB10 WIRE TO INDICATOR & TO W/T; REVISED NOTE 2.	SKH 7-8-65	



Inactive
Ser 15063136 & on
Ser F150-0055 & on
Ser 17254215 & on
Ser F172-0520 & on
10-6-65 10-1965
JJB
1-1-65

NOTES:

1. FLAP SWITCH SHOWN IN "FLAP DOWN" POSITION
2. GND BLACK WIRE ON TRANSMITTER MTG BOLT.

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
DB10	18		6	SOLDER	S-1367-1-8		SER 17253393 & ON
DB9	18		99	S-341-2	S-341-2		SER 17253393 & ON
DB8	18		49	S-341-2	S-1367-1-10		SER 17253393 & ON
DB7	18		18	S-1367-1-6	S-1367-1-10		SER 17253393 & ON
CC9	16		7	S-1367-2-8	S-1367-2-6		
CC8	6		6	S-341-1	S-1367-2-8		
CC7	16		90		S-341-1		
CC6	16		90		S-341-1		
CC5	16		90		S-341-1		
CC4	16		54		S-1367-2-6		
CC3	16		54				
CC2	16		54	S-341-1			
CC1	16		21	S-1367-2-6	S-1367-2-6		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
6	S-1360-10	CIRCUIT BREAKER	
5	C668001-0103	FLAP POSITION IND	
4	C590501-0101	FLAP POSITION XMTR	
3	0760657-1	FLAP ACTUATOR MOT.	
2	0760632-1	SWITCH; ELEC. FLAP	
1	S-1360-15	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	5-11-65
GROUP	J. Wiel	5-28-65
CHECK	J. Lynch	6-1-65
PROJ	Mills	6-65

TITLE: WIRING DIAGRAM— WING FLAPS- ELECTRIC & FLAP POSITION INDICATOR

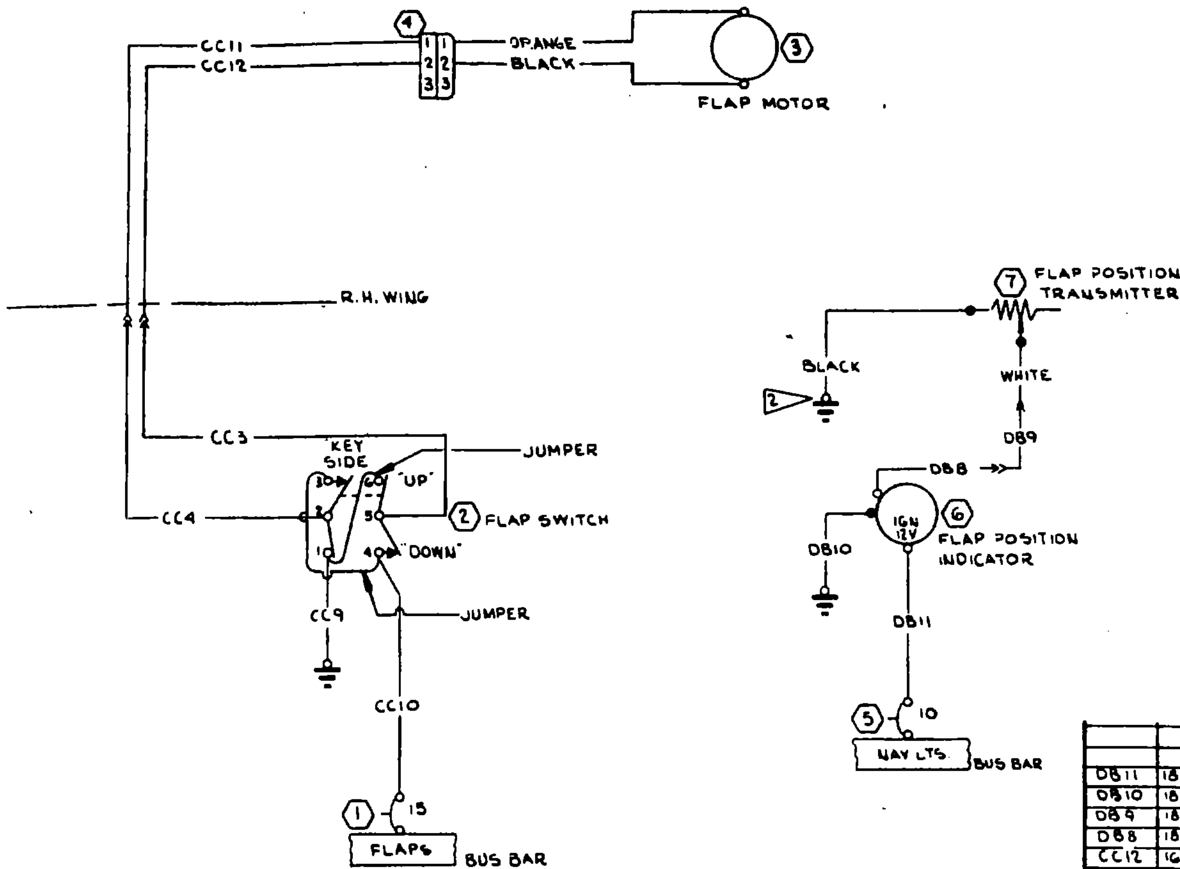
Cessna.

DWG NO. 0500062

SUPERSEDED BY: 0500062 7-14-4-2 | SUPERSEDES: 0500062 4-64 | MODEL: 172 | REV: A | PAGE: 14.4.1

(5R4944)

CHG LET	REVISION	BY DATE	CHK APPD



Inactive SER 17254893 & ON 11-4-65 12-16-65

NOTES:

1. SWITCH SHOWN IS A "MOMENTARY ON"-"ON"-"MOMENTARY ON" CONFIGURATION SUCH THAT MOTOR IS SHORTED OUT WHEN SWITCH IS IN THE CENTER ("ON") POSITION. SWITCH SHOWN IN CENTER ("ON") POSITION.
2. GND. BLACK WIRE ON TRANSMITTER MTG. BOLT

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
7	C590501-0101	FLAP POSITION XMTR	
6	C668001-0103	FLAP POSITION IND.	
5	S-1360-10	CIRCUIT BREAKER	
4	S-1638-1	HOUSING-PLUG	
3	0760657-8	FLAP MOTOR ASSY	
2 (1)	S-1661-1	SWITCH ASSY.	
1	S-1360-15	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
DB11	18		18	S-1367-1-6	S-1367-1-10		
DB10	18		6	SOLDER	S-1367-1-8		
DB9	18		99	S-341-2	S-341-2		
DB8	18		99	S-1367-1-10	S-341-2		
CC12	16		90	S-341-1	S-1636-2		
CC11	16		90	S-341-1	S-1636-2		
CC10	16		21	S-1367-2-6	S-1367-2-6		
CC9	16		17	S-1367-2-6	S-1367-2-8		
CC4	16		54	S-1367-2-6	S-341-1		
CC3	16		154	S-1367-2-6	S-341-1		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	10-6-65
GROUP		10-19-65
CHECK		10-19-65
PROJ		10-21-65

TITLE: WIRING DIAGRAM— WING FLAPS— ELECTRIC & FLAP POSITION INDICATOR

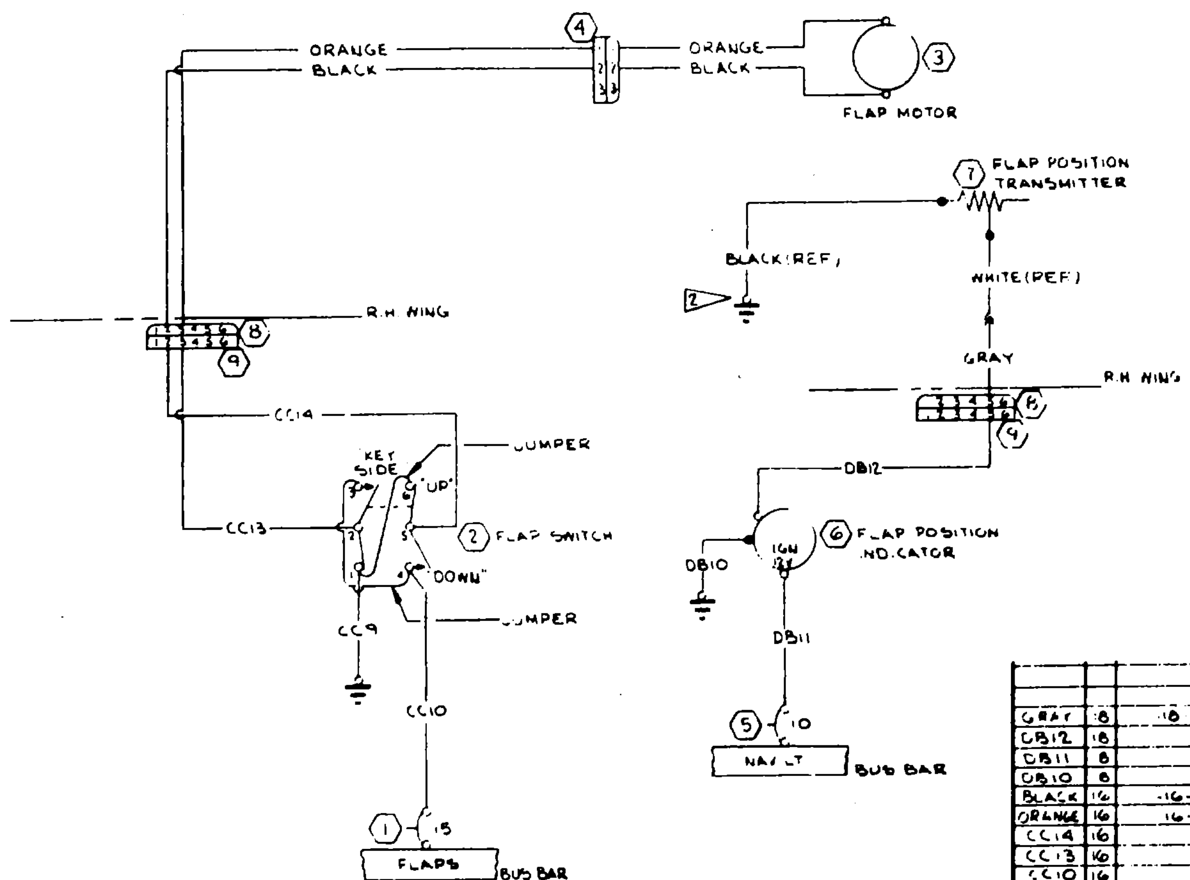
Cessna.

DWG NO: 0500062

SUPERSEDED BY: 0500062 PP 14.5 | SUPERSEDES: 0500062 PP 14.4.1 | MODEL: 172 | REV: | PAGE: 14.4.2

(SR4961)

CHG LTR	REVISION	BY DATE	CHK APPD
A	BY REV: ADD FRIZE TO MODEL BLOCK (SR5357) IX	C.G. 8-8-67	
B	BY REV: DELETE FRIZE FROM MODEL BLOCK. INACTIVATE DWG (SR5357) IX	C.G. 8-19-67	



INACTIVE
SER (SR5357) & ON
8-19-67
C.G.

NOTES:

1. SWITCH SHOWN IS A "MOMENTARY ON"—"ON"—"MOMENTARY ON" CONFIGURATION SUCH THAT MOTOR IS SHORTED OUT WHEN SWITCH IS IN THE CENTER ("ON") POSITION. SWITCH SHOWN IN CENTER ("ON") POSITION.
2. GND. BLACK WIRE ON TRANSMITTER MTG. BOLT
3. WIRE MATERIAL PER S-1460

9	S-1661-6	HOUSING-SOCKET	
8	S-1690-6	HOUSING-PIN	
7	C595501-0101	FLAP POSITION XMTR	
6	C668001-0103	FLAP POSITION IND	
5	S-1360-10	CIRCUIT BREAKER	
4	S-1638-1	HOUSING-PLUG	
3	0760657-8	FLAP MOTOR ASSY	
2	S-1661-1	SWITCH ASSY	
1	S-1360-15	CIRCUIT BREAKER	
ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

GRAY	18	-18-8		S-1635-2	S-1391-1		
DB12	18			S-1367-10	S-1636-1		
DB11	18		18	S-1367-6	S-1367-10		
DB10	18		6	SOLDER	S-1367-8		
BLACK	16	-16-0		S-1635-2	S-1636-2		
ORANGE	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		
CC9	16		7	S-1367-2-6	S-1367-2-8		
WIRE CABLE NO	GA	MATERIAL	LG	TERMINALS			REMARKS

3 WIRE TABLE

CESSNA AIRCRAFT COMPANY, AIRCRAFT DIVISION, WICHITA, KANSAS

WIRING DIAGRAM—WING FLAPS ELECTRIC & FLAP POSITION INDICATOR

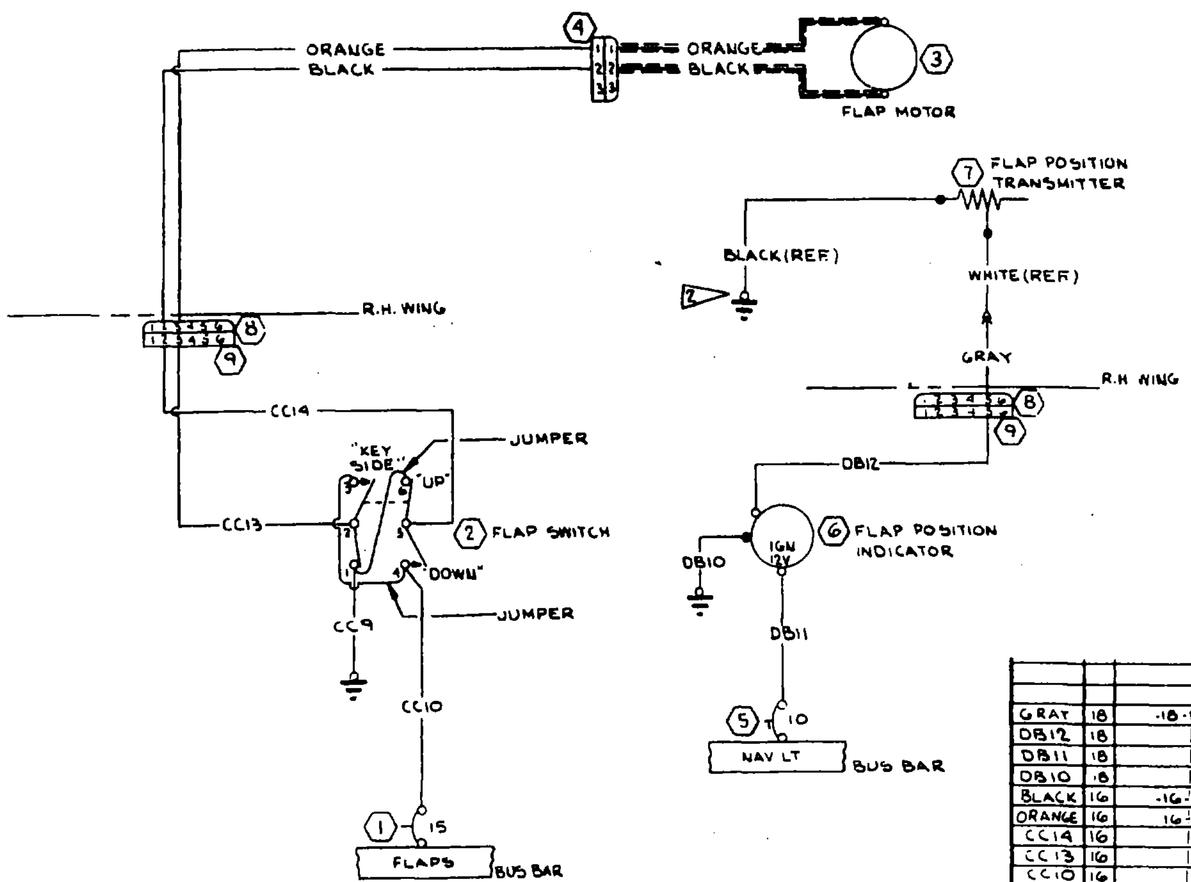
Cessna.

0500062

SUPERSEDES 0500062 PP 46.2 — MODEL 172 — REV B — PAGE 45

(SR5357)
(SR5360) IX

CHG LET	REVISION	BY / DATE	CHK / APPD
A	BY REV: ADD NOTE 5 ED & RR 00173 (SR5451) (SR5357) IX	RCA 9-19-67	KLL
B	BY REV: ADD 172I TO NOTE 5 (EDRR 00192) (SR5471) IX	JSM 9-27-67	
C	BY REV: DELETE T41-C FROM NOTE 5 R172E-0257	CG 1-6-67	KLL



NOTES:

1. SWITCH SHOWN IS A "MOMENTARY ON"—"ON"—"MOMENTARY ON" CONFIGURATION SUCH THAT MOTOR IS SHORTED OUT WHEN SWITCH IS IN THE CENTER ("ON") POSITION. SWITCH SHOWN IN CENTER ("ON") POSITION.
2. GND. BLACK WIRE ON TRANSMITTER MTG. BOLT.
3. WIRE MATERIAL PER S-1460
4. REFER TO PAGE 14.7 WHEN RADIO INSTL OR OPTION A IS MADE
5. APPLICABLE MODELS; FR172E, 172I

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
9	S-1641-6	HOUSING-SOCKET	
8	S-1640-6	HOUSING-PIN	
7	C590501-0101	FLAP POSITION XMTR.	
6	C668001-0103	FLAP POSITION IND.	
5	S-1360-10	CIRCUIT BREAKER	
4	S-1638-1	HOUSING-PLUG	
3	C301001-0801	FLAP MOTOR	
2	S-1661-1	SWITCH ASSY	
1	S-1360-15	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
GRAY	18	-18-8		S-1635-2	S-341-1		
DB12	18			S-1367-1-10	S-1636-1		
DB11	18		18	S-1367-1-6	S-1367-1-10		
DB10	18		6	SOLDER	S-1367-1-8		
BLACK	16	-16-0		S-1635-2	S-1636-2		
ORANGE	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		
CC9	16		7	S-1367-2-6	S-1367-2-8		

3 WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN		8-8-67
GROUP		7-27-67
CHECK	LAURIE	8-10-67
PROJ		8-15-67
		8-11-67

TITLE: WIRING DIAGRAM—WING FLAPS ELECTRIC & FLAP POSITION INDICATOR

Cessna.

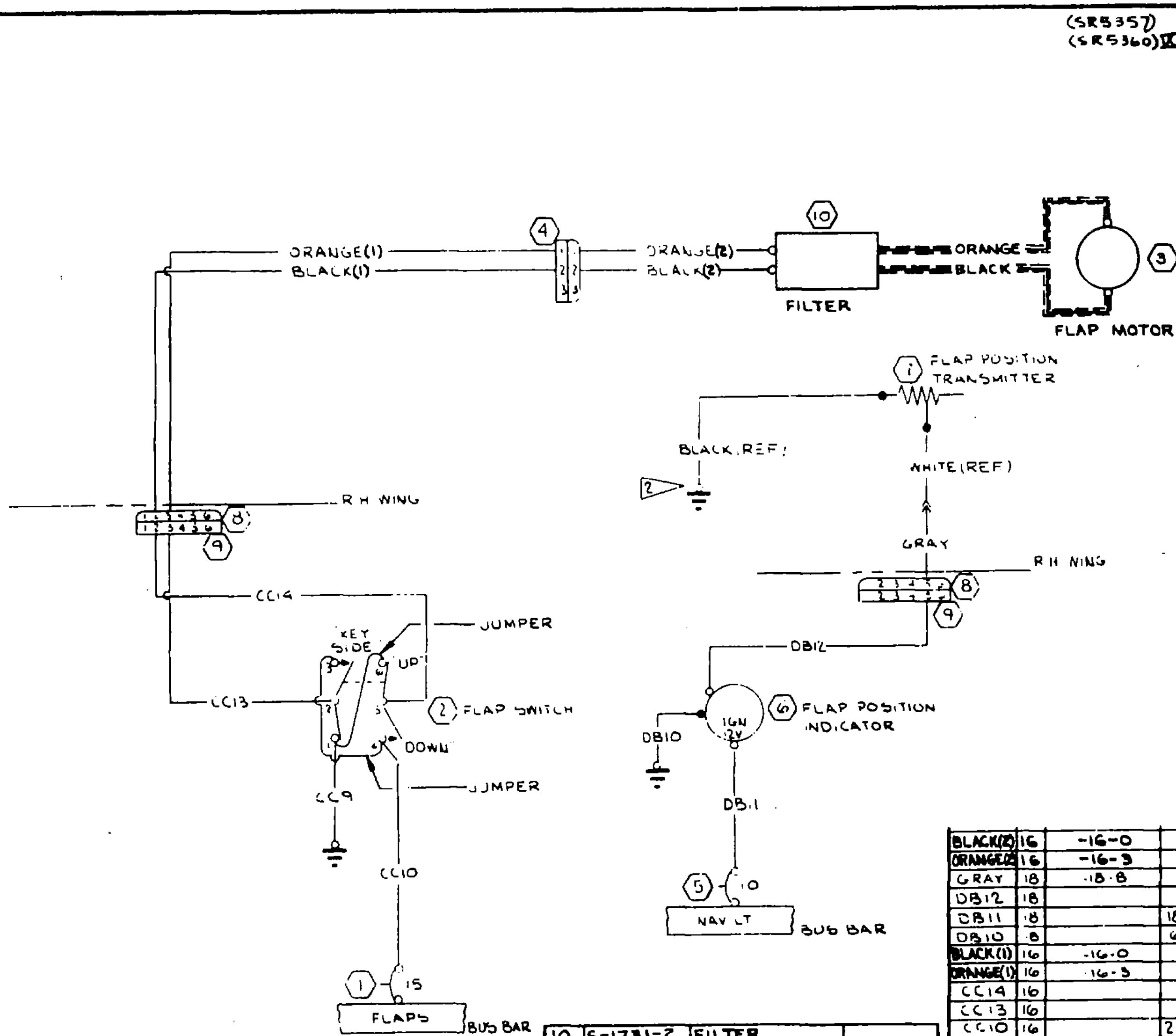
DWG NO: 0500062

MODEL: NOTED

REV: C

PAGE: 14.6

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV: ADD NOTES ED & RR00173(SR5357) (SR5453) IX	RCA 9-15-67	[illegible]
B	BY REV: ADD 172I TO NOTE 5 (EDRR00192) (SR5471) IX	1SM 9-27-67	[illegible]



NOTES

1. SWITCH SHOWN IS A "MOMENTARY ON"—"ON"—"MOMENTARY ON" CONFIGURATION SUCH THAT MOTOR IS SHORTED OUT WHEN SWITCH IS IN THE CENTER ("ON") POSITION. SWITCH SHOWN IN CENTER (ON) POSITION.
2. GND. BLACK WIRE ON TRANSMITTER MTG. BOLT.
3. WIRE MATERIAL PER S 1460
4. WIRING SHOWN ON THIS PAGE APPLICABLE WITH 1ST RADIO INSTL, OR OPTION A
5. APPLICABLE MODELS; FR172E T41-C, 172I

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
10	S-1731-2	FILTER	
9	S-1641-6	HOUSING-SOCKET	
8	S-1640-6	HOUSING-PIN	
7	C590501-0101	FLAP POSITION XMTR	
6	C668001-0103	FLAP POSITION IND	
5	S 1360-10	CIRCUIT BREAKER	
4	S-1638-1	HOUSING-PLUG	
3	C301001-0303	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
BLACK(2)	16	-16-0		S-1636-2	S-1493-2		
ORANGE(2)	16	-16-3		S-1636-2	S-1493-2		
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		
DB10	18		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		
CC9	16		7	S-1367-2-6	S 1367-2-8		

3 WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE	TITLE
DRAWN	C. GARCIA	8-8-67	WIRING DIAGRAM— WING FLAPS ELECTRIC & FLAP POSITION INDICATOR
GROUP	H. Weir	7-27-67	
CHECK	LAURIE	8-10-67	
PROJ	[illegible]	8-15-67	
	[illegible]	8-11-67	

Cessna.

DWG NO 0500062

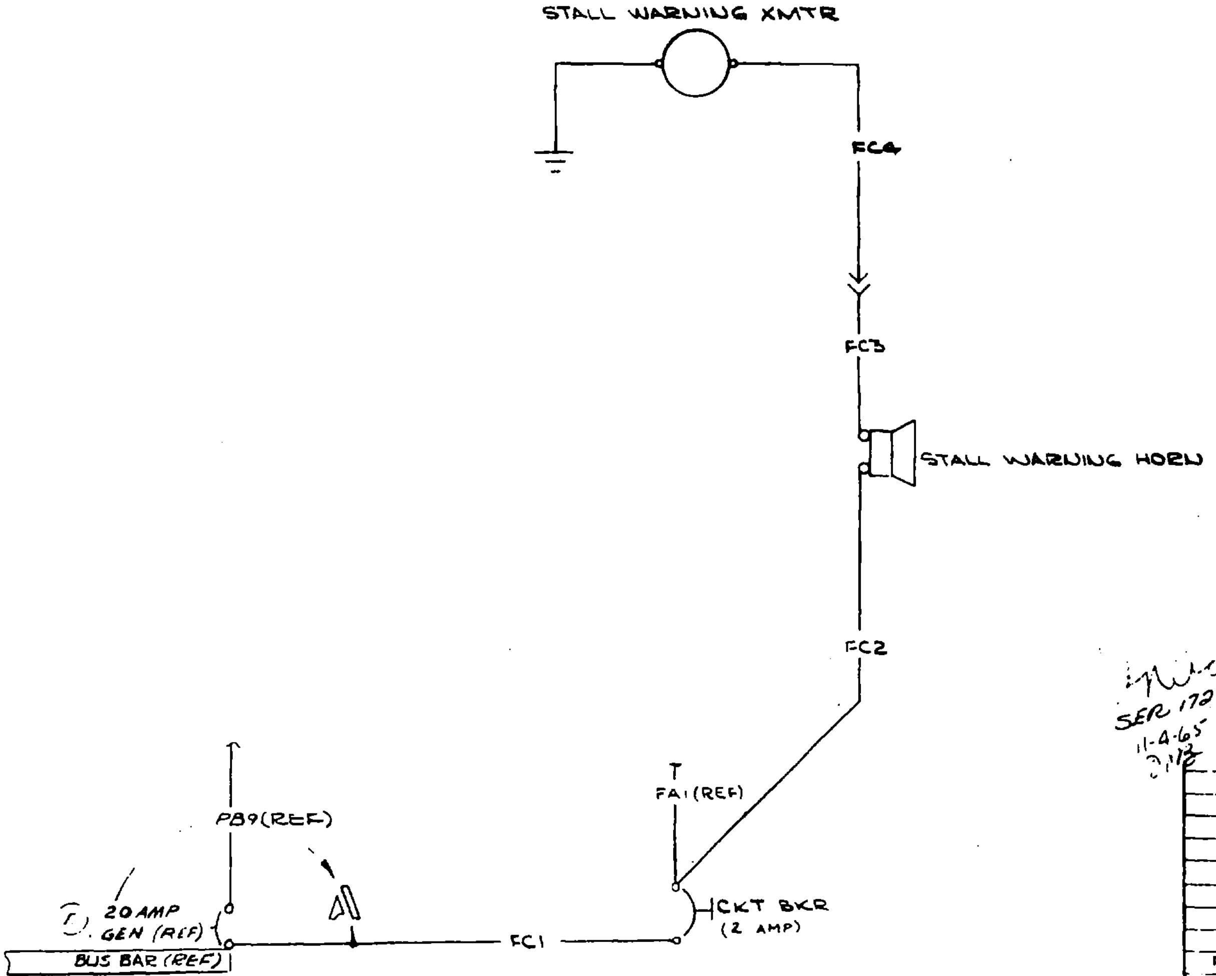
MODEL NOTED | REV B | PAGE 14.7

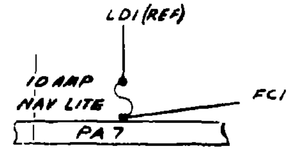
WARNING AND EMERGENCY SECTION

Cessna.

DRAWN		TITLE: WIRING DIAGRAM--- MODEL 172-P172	DRAWING NO. 0500062
DATE	1-26-62		
APP'D		REV: "D"	PAGE: 15.0

CHG LET	REVISION	BY DATE	CHK APPD
D	REDRAWN NO CHG		
E	DELETED PREFIXES ADDED 1969 MOD REQMTS (SRMH)		





DETAIL A

EFFECTIVE THRU SER 17250572 & P17257198

SER 17254893 & ON
11-4-65
12-16-65

WIRE OR NO	GA	MATERIAL		TERMINALS			SERIALS
FC4	18		92	S-1367-1-6	S-341-2		
FC3	18		73	S-1367-1-6	S-341-2		
FC2	18		4	S-1367-1-6	S-1367-1-8		
FC1	18		30	S-1367-1-8	[illegible]		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLATION

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	GRISWOLD	4/2/59
GROUP	DITTMER	4/2/59
CHECK	Cook	4/3/59
PROJ	[illegible]	4/3/59

TITLE: WIRING DIAGRAM — STALL WARNING HORN & XMTR

Cessna.

DWG NO 0500062

SUPERSEDES 0500062 REV C

MODEL 172-P172

REV E

PAGE 15.1

FORM NO 80-161

MISCELLANEOUS SECTION

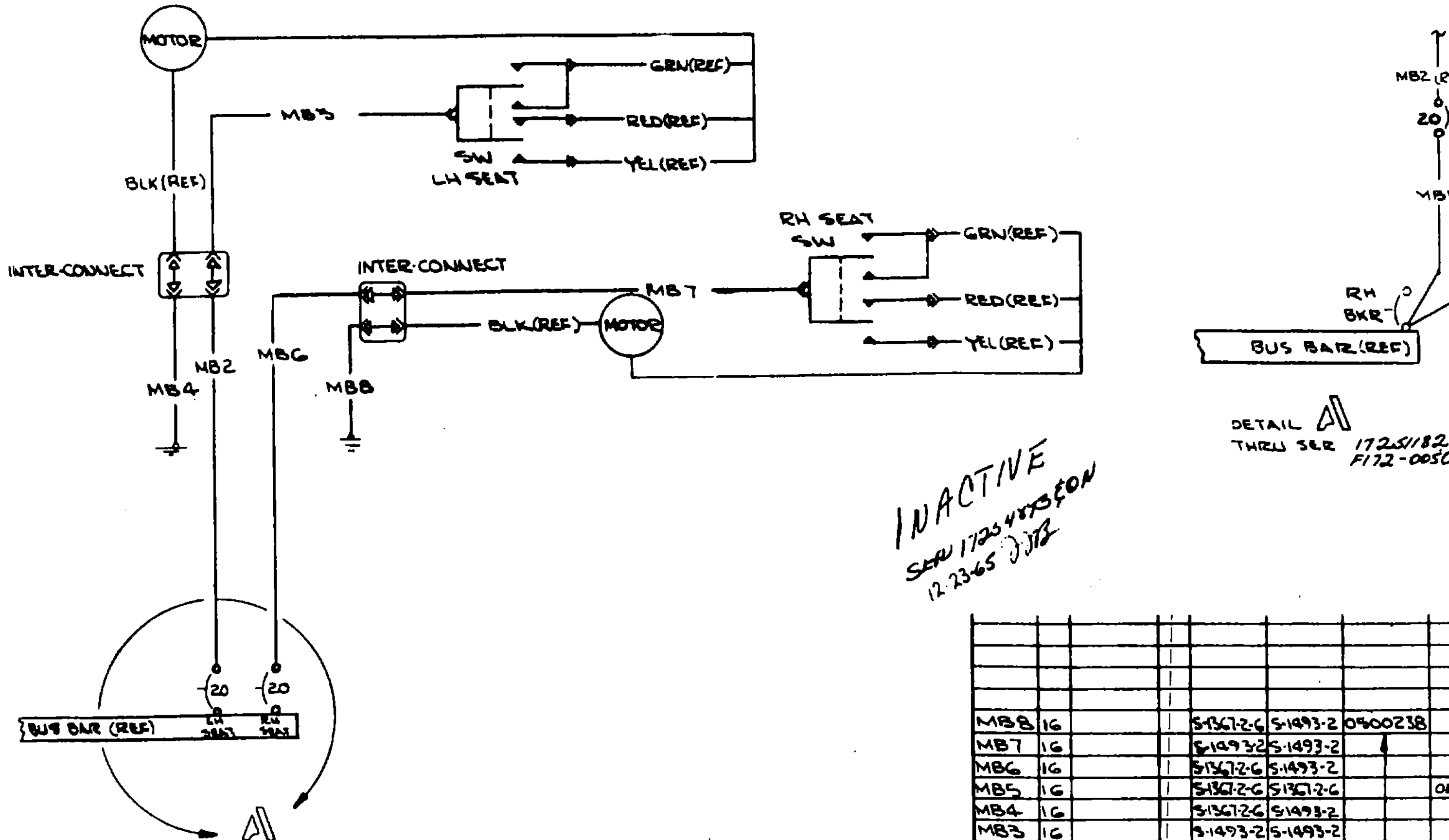
Cessna.

DRAWN		TITLE: WIRING DIAGRAM--- MODEL 172 - R172	DRAWING NO. 0500062
DATE			
APP'D		REV:	PAGE: 16.0

ORM NO. 80-174

(SRA204)

CHG LET	REVISION	BY DATE	CHK APPD
A	ADD DETAIL A SER (SR-44-8) OBS MB1 & MB5 WIRES		



INACTIVE
SER 17234873 & ON
12-23-65 JJB

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
MB8	16			S-1367-2-6	S-1493-2	0500238	
MB7	16			S-1493-2	S-1493-2		
MB6	16			S-1367-2-6	S-1493-2		
MB5	16			S-1367-2-6	S-1367-2-6		OBS SER 17251183 F172-0051
MB4	16			S-1367-2-6	S-1493-2		
MB3	16			S-1493-2	S-1493-2		
MB2	16			S-1367-2-6	S-1493-2		
MB1	16			S-1367-2-6	S-1367-2-6	0500238	OBS SER 17251183 F172-0051

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	JOHNSON	8-28-63
GROUP	PARSONS	9-26-63
CHECK	[illegible]	9-4-63
PROJ	[illegible]	9-26-63

TITLE: WIRING DIAGRAM — POWER SEATS PILOT & CO-PILOT (OPT)

Cessna.

DWG NO 0500062

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
		172-R172	A	18.1

FORM NO 80-161

Cessna.

WIRING DIAGRAM

MODEL 180 - 185

DWG. NO. 0700092

FORM NO. 80-158

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

TABLE OF CONTENTS

PAGE NO.	TITLE	DATE ISSUED	REV
1.0	Title Page		
2.0	Table of Contents	1-16-68	
2.1	Table of Contents	1-16-68	
3.0	Notes	11-2-62	
4.0	D.C. Power	11-2-62	
4.1	Battery, Contactor, Starter & Solenoid	6-16-67	D
4.2	Generator & Regulator	3-23-65	A-Inac.
~~4.3~~	~~Ground Service Receptacle (Opt.)~~	~~1-10-66~~	~~NC-Inac.~~
4.4	Filter (Opt.)	3-23-65	Inac.
4.5	Generating System, 24 Volt (Opt.)	6-16-67	B-Inac.
4.6	Alternator System, 52 AMP	2-3-65	A-Inac.
4.7	Wiring Diagram - Alternator System, 60 AMP 12 Volt	6-16-67	D-Inac.
4.8	Wiring Diagram - Split Bus Bar	11-29-65	NC
4.9	Wiring Diagram - External Power Receptacle (Opt.)	6-7-67	B
4.10	Wiring Diagram - Alternator System, 60 AMP 12 Volt	8-21-67	A-Inac.
4.11	W.D. - 24 Volt Alternator System, 60 AMP	6-7-67	NC
4.12	Alternator System, 60 AMP, 12 Volt	8-21-67	NC
5.0	Ignition	11-2-62	
5.1	Magneto	12-14-65	C
6.0	Not Used		
7.0	Fuel and Oil	11-2-62	
7.1	Fuel Pump	11-21-62	A
7.2	Oil Dilution Valve (Opt.)	11-2-62	NC
8.0	Engine Instruments	11-2-62	
8.1	Cylinder Head Temp. Gauge	2-17-65	NC-Inac.
8.2	Fuel Gauge and Transmitter	2-17-65	NC-Inac.
8.2.1	Wiring Diagram - Fuel Gage XMTR & IND. - 12 Volt Sys.	1-10-66	NC-Inac.
8.3	Carburetor Air Temp. (Opt.)	6-16-67	B
8.4	Cylinder Head Temp Gauge, 24V (Opt.)	2-17-65	NC-Inac.
8.5	Fuel Gage XMTR & IND - 24 Volt Sys.	2-17-65	NC-Inac.
8.5.1	Wiring Diagram - Fuel Gage XMTR & IND. - 24 Volt Sys.	6-16-67	A
8.6	Wiring Diagram - Fuel Gage XMTR & Indicators - 12V	1-10-66	NC
8.7	Hourmeter (Opt.)	9-29-66	NC
9.0	Flight Instruments	11-2-62	
9.1	Turn and Bank Indicator (Opt.) 12 Volt System	6-16-67	A

TABLE OF CONTENTS

PAGE NO.	TITLE	DATE ISSUED	REV
9.2	W.D. - Optimum Flight Instruments (Opt.)	2-17-65	NC-Inac.
9.3	W.D. - T & B Indicator - 24 Volt (Opt.)	2-26-65	NC
9.4	W.D. - Brittain Wing Leveler (Opt.)	6-7-67	NC
9.5	W.D. - Turn Coordinator (Opt.)	9-26-67	NC
10.0	Other Instruments	11-2-62	
10.1	Clock (Opt.)	6-16-67	B
10.2	Ammeter (Opt.)	2-17-65	NC-Inac.
11.0	Lighting	11-2-62	
11.1	Generator Indicator Light	2-23-65	NC-Inac.
11.2	Landing Lights	1-10-66	A-Inac.
11.3	Rotating Beacon	6-16-67	B-Inac.
11.3.1	Flashing Beacon Light	6-16-67	A
11.4	Compass & Inst. Lights	6-21-65	NC-Inac.
11.4.1	W.C. - Compass & Instrument Lights	6-16-67	A
11.5	Map Light (Opt.)	3-23-65	Inac.
11.6	Navigation Lights	1-10-66	NC-Inac.
11.7	Dome Light	1-10-66	NC-Inac.
11.8	Courtesy Lights (Opt.)	1-10-66	NC-Inac.
11.9	Position Light Flasher (Opt.)	3-23-65	NC-Inac.
11.10	Position Light Flasher 24V (Opt.)	3-23-65	NC-Inac.
11.11	Map & Instrument Light - 24 Volt (Opt.)	6-16-67	C-Inac.
11.11.1	Map & Instrument Light (Opt.)	6-16-67	A
11.12	Landing & Taxi Lights (Opt.)	6-16-67	A
11.13	Wing and Tail Lights	1-16-68	B
11.14	Courtesy & Dome Lights	6-16-67	A
11.15	Map Light, Control Wheel (12 Volt)	9-26-67	NC
11.16	W.D. - Map Light, Control Wheel (Opt.)	9-1-67	NC
12.0	Not Used		
13.0	Heating, Venting & De-Icing	11-2-62	
13.1	Cigar Lighter	2-17-65	A-Inac.
13.1.1	W.D. - Cigar Lighter	3-23-65	NC
13.2	Pitot & Stall Warning Heat (Opt.)	1-10-66	NC-Inac.
13.3	Pitot & Stall Warning Heat (Opt.)	8-21-67	B
14.0	Not Used	5-27-63	
15.0	Warning & Emergency	11-2-63	
15.1	Stall Warning Horn & XMTR	1-10-66	A-Inac.
15.2	Wiring Diagram - Stall Warning Horn & XMTR	1-10-66	NC
16.0	Miscellaneous Section	9-27-63	
16.1	Power Seats Pilot & Co-Pilot (Opt.)	9-27-63	NC

NOTES

1. WIRE CODE DESIGNATIONS PER CES 1100.
2. WIRE CODE APPLICATION AND WIRE LENGTH TOLERANCES PER CES 1015.
3. "S" SUFFIX ON WIRE GAUGE IN WIRE TABLE DENOTES SHIELDED WIRE.
4. NON-SHIELDED WIRES TO BE PER MIL-W-5086A, TYPE 1 (PVC), NYLON JACKET. WIRES 10 GAUGE AND LARGER TO BE TYPE II.
5. SHIELDED WIRES TO BE PER MIL-C-7078A, TYPE II, with MIL-W-5086A TYPE I CONDUCTOR.
6. "D.S." SUFFIX ON WIRE GAUGE IN WIRE TABLE DENOTES DOUBLE SHIELDED WIRE.
7. WIRES NOTED HEREIN AS (OPT) ARE OPT. TO THE STANDARD AIRPLANE.
8. ALL WIRES NOT SPECIFIED AS (OPT) ARE TO BE INSTALLED AS STANDARD EQUIPMENT. THE AIRPLANE ASSEMBLY WILL SPECIFY THE ADDITIONAL EQUIPMENT REQUIRED FOR ~~DELUXE VERSIONS~~.
9. WHEN (OPT) IS USED IN TITLE BLOCK OF A DIAGRAM, ALL WIRES SHOWN THEREIN ARE OPTIONAL EXCEPT WHERE NOTED AS (STD).
10. ALL VENDOR CODES PER S-1400.

Cessna.

DRAWN	AJ	TITLE: WIRING DIAGRAM---		DRAWING NO.
DATE	10-11-62	MODEL 180-185		0700092
APP'D	RRS		REV:	PAGE: 3.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-160

D. C. POWER SECTION

Cessna.

DRAWN	AJ	TITLE: WIRING DIAGRAM--- MODEL 180-185	DRAWING NO. 0700092
DATE	10-11-62		
APP'D		REV:	PAGE: 4.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

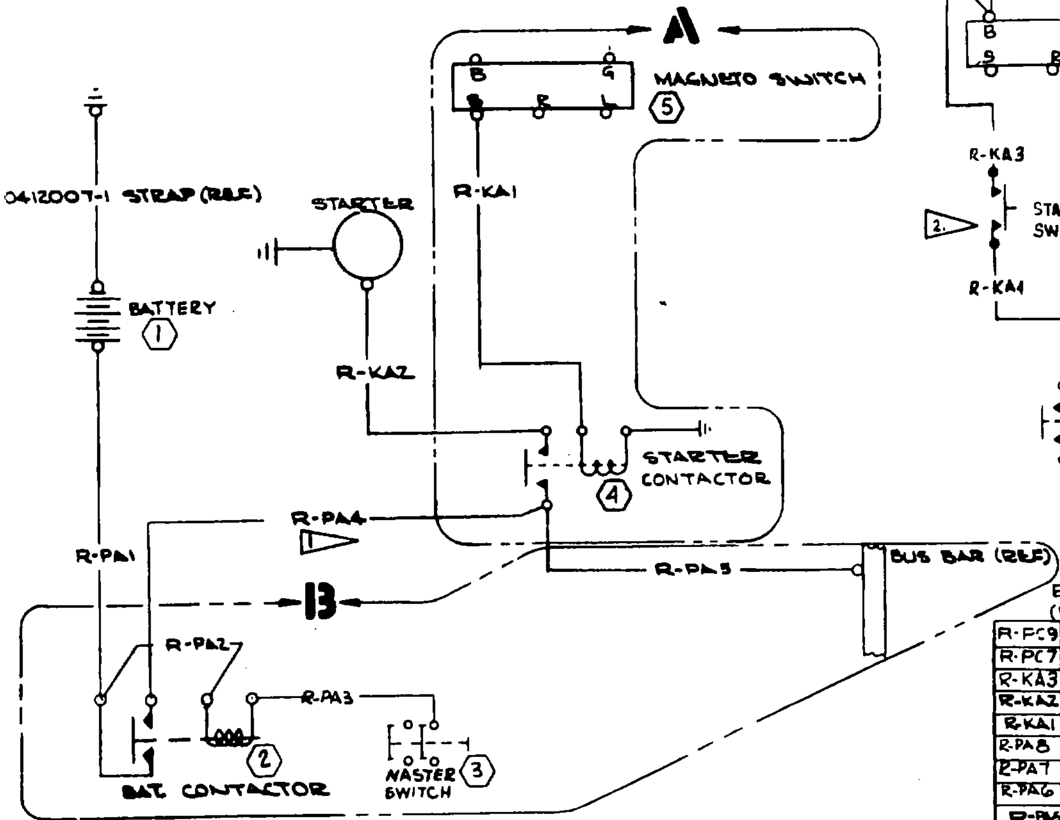
FORM NO 80:16.

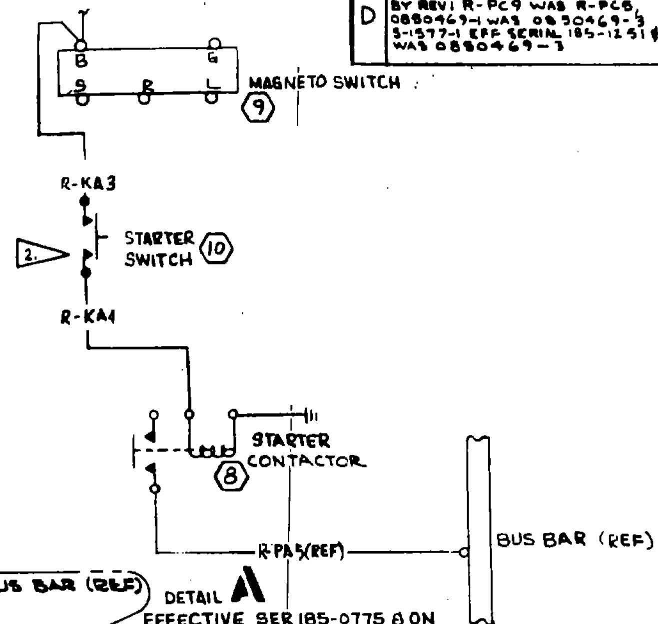
NOTES: (SER 180-81241) & ON (SER 185-0559) & ON

1. PLACE 0713003 FAIRLEAD ON R-PA4 OR R-PA8 BATTERY CABLE BEFORE BOTH ENDS ARE TERMINATED

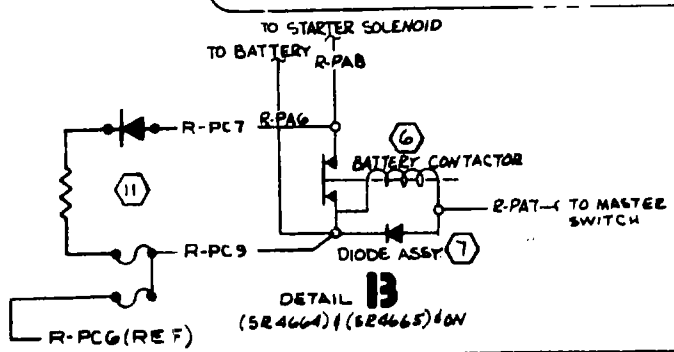
2. REMOVE S-1367-1-10 AND SOLDER TO SWITCH.

CHG LET	REVISION	BY / DATE	CHK / APPD
A	ADD DETAIL A. MILITARY OPTION & R KA3		
B	ADDED EQUIP TABLE, DETAIL B, ADDED R-PA6, R-PA7 & R-PA8, ADDED LIMITING SERIALS TO WIT (SR 4664) & (SR 4665)		
C	ADD 0712031-3 FUSE/DIODE ASSY. R-PC8 & R-PC7 (SR 7647)		
D	BY REV I R-PC9 WAS R-PC8, 0880469-1 WAS 0850469-3 S-1577-1 EFF SERIAL 185-1251 & WAS 0880469-3	C.G. 6-7-67	





DETAIL A
EFFECTIVE SER 185-0775 & ON
(MILITARY OPTION ONLY)



DETAIL B
(SR4664) & (SR4665) & ON

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
11	0712031-3	FUSE & DIODE ASS'Y	
10	0511063	STARTER SWITCH	
9	S-1406-1	MAGNETO SWITCH	
8	S-1577-1	STARTER SOLENOID	
7	0770728-1	DIODE ASSY.	
6	S-1579-1	CONTACTOR	
5	0713129-1	MAGNETO SWITCH	
4	0750027-1	STARTER SOLENOID	
3	0713026-5	MASTER SWITCH	
2	0712603-2	BAT. CONTACTOR	
1	0712605-1	BATTERY	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-PC9	18			S1367-1-13	SOLDER		
R-PC7	18			S-1367-1-13	SOLDER		
R-KA3	18			S-1367-1-4	———		
R-KA2	2			S-1367-7-14	S-1367-7-14		
R-KA1	18			S-1367-1-6	S-1367-1-10		
R-PA8	2			S-1367-7-13	S-1367-7-14		(SR4664) & (SR4665) & ON
R-PA7	18			S-1367-1-10	S-1367-1-8		(SR4664) & (SR4665) & ON
R-PA6	4			S-1367-6-13	S-1367-6-13		(SR4664) & (SR4665) & ON
R-PA5	8			S-1367-4-14	S-1367-4-8		THRU (SR4664) & (SR4665)
R-PA4	2			S-1367-7-12	S-1367-7-14		THRU (SR4664) & (SR4665)
R-PA3	18			S-1367-1-8	S-1367-1-6		THRU (SR4664) & (SR4665)
R-PA2	18			S-1367-1-6	S-1367-1-12		THRU (SR4664) & (SR4665)
R-PA1	4			S-1367-6-12	S-1367-6-14		THRU (SR4664) & (SR4665)

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN		10-2-62
GROUP		
CHECK		10-27-62
PROJ		

TITLE: WIRING DIAGRAM — BATTERY, CONTACTOR, STARTER & SOLENOID

Cessna.

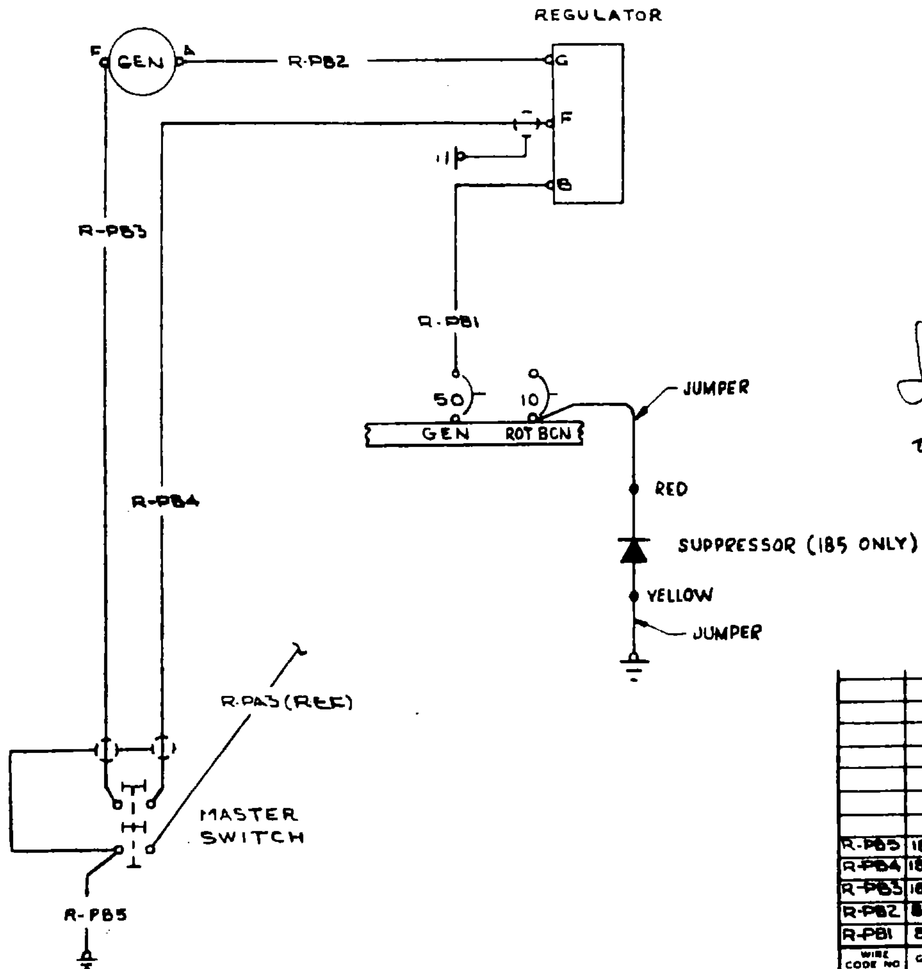
DWG NO 0700092

SUPERSEDED BY | SUPERSEDES | MODEL 180-185 | REV D | PAGE 4.1

FORM NO 80-161

(SR 4012)

CHG LET	REVISION	BY / DATE	CHK / APPD
A	ADD SUPPRESSOR WIRING (SR 4478)	[illegible]	[illegible]



Inactive SER 18051446 & ON
185-0777 & ON
2-16-65
3-22-65
4-25-[illegible]

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-PB5	18		3	S-1367-1-8	S-1367-1-14		
R-PB4	185		47	[illegible]	[illegible]		
R-PB3	185		56	[illegible]	[illegible]		
R-PB2	8		2	S-1367-4-10	S-1367-4-12		
R-PB1	8		39	S-1367-4-8	S-1367-4-10		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	10/3/62
GROUP	[illegible]	10-31-62
CHECK	[illegible]	10-31-62
PROJ	[illegible]	10-31-62

TITLE WIRING DIAGRAM — GENERATOR & REGULATOR

Cessna.

DWG NO 0700092

SUPERSEDED BY 0700092 PAGE 46

SUPERSEDES [illegible]

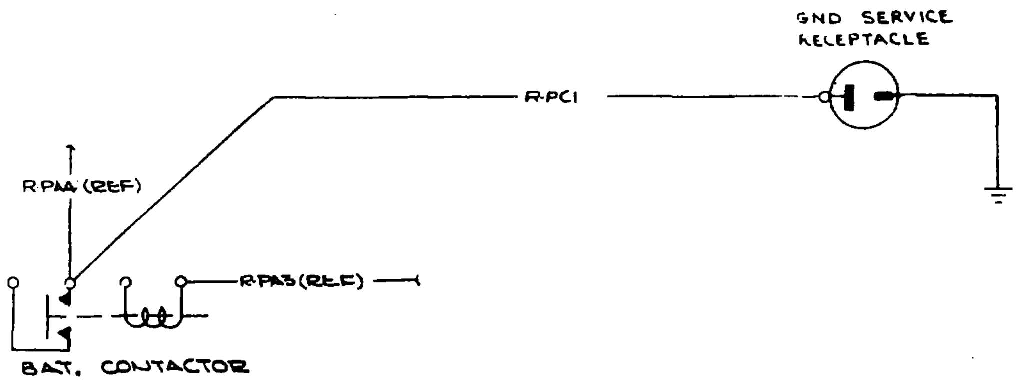
MODEL 180-185

REV A

PAGE 4.2

(SR 4012)

CHG LET	REVISION	BY DATE	CHK APPD



INACTIVE SER 18051775 & ON
185-1150
11-19-65
1-4-66

WIRE CODE NO	GA	MATERIAL		TERMINALS		N/A	SERIALS
R-PC1	2		11	S1568-7-14	S1567-7-14	0712011	

WIRE TABLE

PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Harrison	
GROUP		
CHECK		
PROJ		

TITLE: WIRING DIAGRAM — GROUND SERVICE RECEPTACLE (OPT)

Cessna.

DWG NO 0700092

SUPERSEDES 0700059 0700085

MODEL 180-185

REV

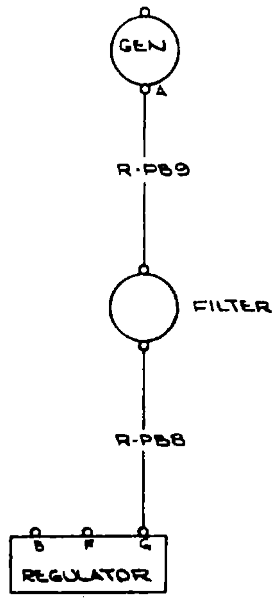
PAGE 4.3

FORM NO 80-181

CHG LET	REVISION	BY DATE	CHK APPD

(9R4012)

NOTE:
1. WHEN FILTER IS INSTALLED PB8 & PB9 REPLACE PB2



Inactive SER 18051446 & ON
185-0777 & ON
W.J.R. 2-16-65
H.J.W. 3-22-65
RLS-DKM

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-PB9	8			S-1367-4-10	S-1367-4-12		
R-PB8	8			S-1367-4-10	S-1367-4-10		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	JOHNSON	10/4/62
GROUP	V. Tennant	10-4-62
CHECK	L. Stuck	10-26-62
PROJ	W. Lott	10-30-62

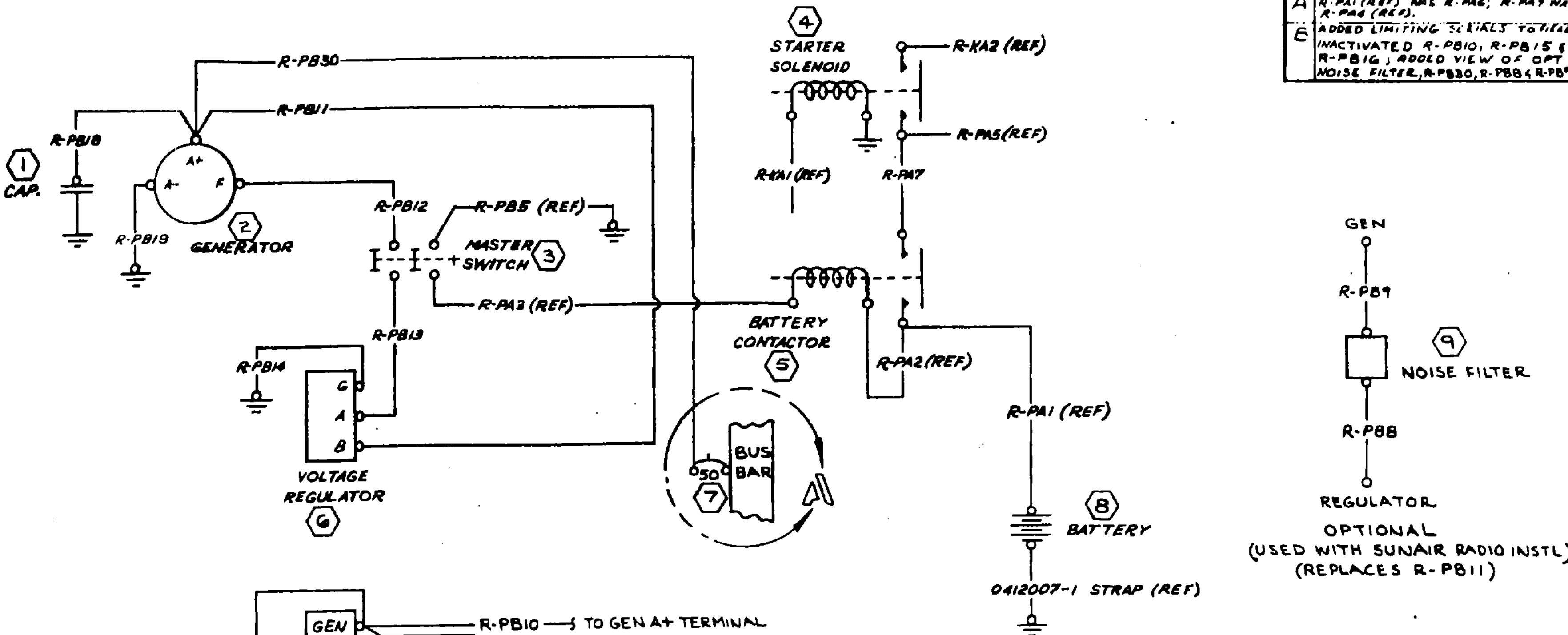
TITLE: WIRING DIAGRAM — FILTER (OPT)

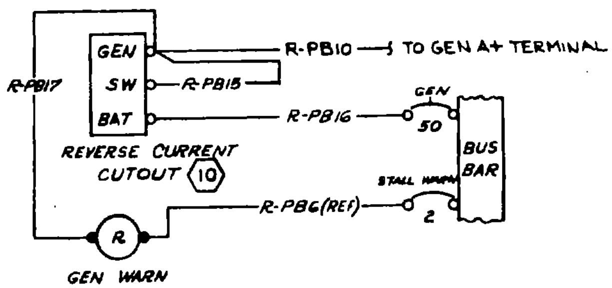
Cessna.

DWG NO 0700092

SUPERSEDED BY | SUPERSEDES 0700012, 0700052 | MODEL 180-185 | REV | PAGE 4.4

CHG LET	REVISION	BY / DATE	CHK APPD
A	ADDED R-PA7; OBSOLETED R-PA6; R-PA1 (REF) WAS R-PA6; R-PA7 WAS R-PA6 (REF).		
B	ADDED LIMITING SERIALS TO FIXED INACTIVATED R-PB10, R-PB15 & R-PB16; ADDED VIEW OF OPT NOISE FILTER, R-PB30, R-PB8 & R-PB9	WJR 2-15-65	





DETAIL A
APPLIES THRU 18051445 & 185-0776

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
10	0812483-2	REV CUR. CUTOUT	
9	1495329	FILTER (SPR)	
8	0870060-1	BATTERY	
7	S-1360-50	CIRCUIT BREAKER	
6	0850460-9	VOLTAGE, REG.	
5	0850469-1	CONTACTOR, BAT.	
4	0850469-3	CONTACTOR, STARTER	
3	0713026-1	MASTER SWITCH	
2	0851731-1	GENERATOR	
1	93874	FILTER (SPR)	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-PB9	8		1	S-1367-4-10	S-1367-4-12		
R-PB8	8		1	S-1367-4-10	S-1367-4-10		
R-PA7	2		179	S-1367-7-12	S-1367-7-12		
R-PA6	4		1	S-1367-6-12	S-1367-6-12		OBSOLETE-NEVER USED
R-PB30	8		1	S-1367-4-8	S-1367-4-14		SER 18051446 & 185-0777 & ON
R-PB19	8		15	S-1367-4-10	S-1367-4-10		
R-PB18	18		15	S-1367-1-10	S-1367-1-10		
R-PB17	18		67	S-1367-1-14	SOLDER		INACTIVE 185-0777 & ON 18051446 & ON
R-PB16	8		44	S-1367-4-14	S-1367-4-8		INACTIVE 185-0777 & ON 18051446 & ON
R-PB15	8		4	S-1367-4-14	S-1367-4-10		INACTIVE 185-0777 & ON 18051446 & ON
R-PB14	16		15	S-1367-2-8	S-1367-2-10		
R-PB13	16		215	S-1367-2-10	S-1367-2-8		
R-PB12	16		54	S-1367-2-10	S-1367-2-8		
R-PB11	16		240	S-1367-2-10	S-1367-2-10		
R-PB10	8		11	S-1367-4-10	S-1367-4-14		INACTIVE 185-0777 & ON 18051446 & ON

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	SPRIGGS	11-20-62
GROUP	V. Jasand	11-27-62
CHECK	R. Strick	11-27-62
PROJ	W. Smith	11-27-62
	W. Sullivan	12-18-62

TITLE: WIRING DIAGRAM — GENERATING SYSTEM, 24 VOLT (OPT)

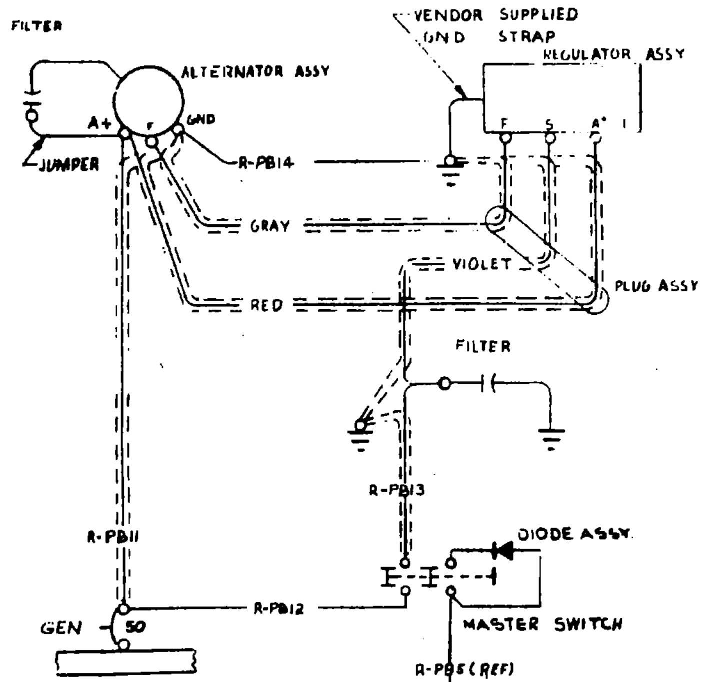
Cessna.

DWG NO 0700092

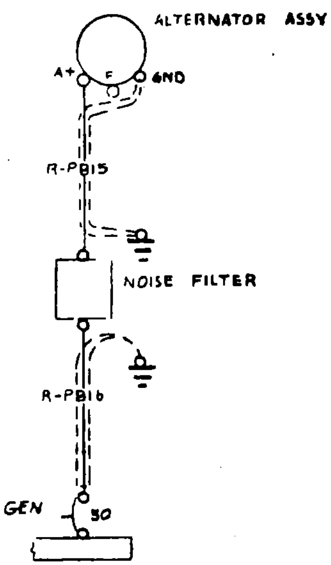
SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
		180, 185	B	4.5

CHG LET	REVISION	BY DATE	CHK APPD
A	WIRE CODES WERE OP (SR 4441) (SR 4442)	5-7-64	[illegible]

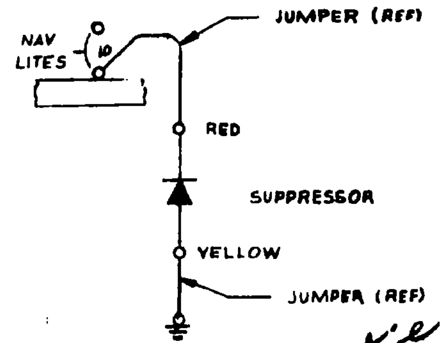
(SR 4441)
(SR 4442)



STANDARD



OPTIONAL
(USED WITH ADF INSTL)



Inactive
Ser 180-51068 & on
Ser 185-0968 & on
1-6-66 RGS LPB RRS
NEW DWG V3
gsd

NOTES:

1. TERMINALS C3XB-14462A / B-14463 ARE (FOR) PART NUMBERS

2. 8 GAGE SHIELDED WIRE MATERIAL PER S-1534

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
JUMPER	18			S-1367-1-6	S-1367-1-18		
R-PB16	8S	2	36	[illegible]	S-1367-4-6	(OPT)	
R-PB15	8S	2	13	[illegible]	[illegible]	(OPT)	
R-PB14	10		22	S-14463	S-1367-3-10		
R-PB13	18S		36	S-1367-1-8	[illegible]		
R-PB12	18		6	S-1367-1-8	S-1367-1-6		
R-PB11	8S	2	45	[illegible]	S-1367-4-6		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION, WICHITA KANSAS

	NAME	DATE
DRAWN	V. THINGUA	2/30/64
GROUP	[illegible]	5-6-64
CHECK	[illegible]	5-4-64
PROJ	[illegible]	5-6-64

TITLE: WIRING DIAGRAM — ALTERNATOR SYSTEM 52 AMP

Cessna.

DWG NO 0700092

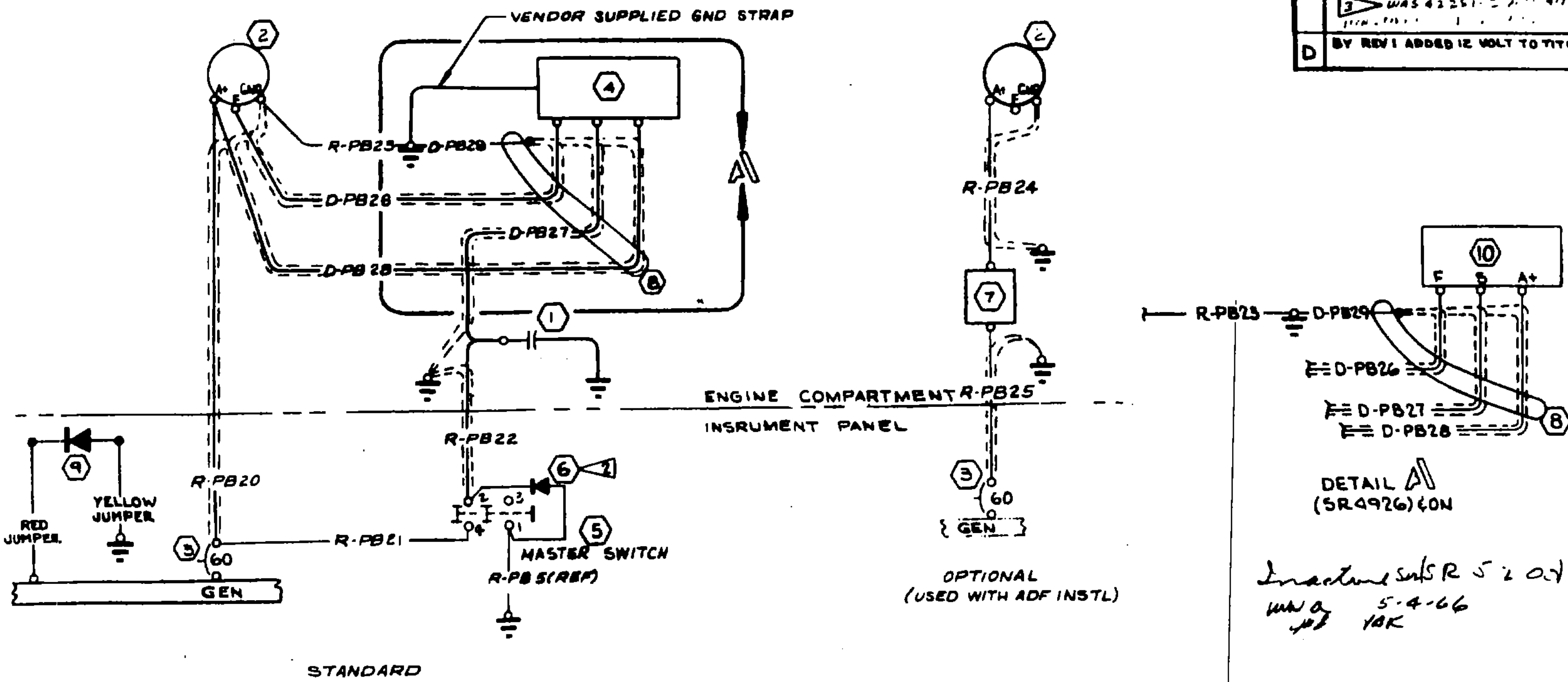
SUPERSEDED BY: 0700092, PAGE 47 | MODEL: 180 - 185 | REV: 4 | PAGE: 4,6

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

FORM NO 80-161

CHG LET	REVISION	BY DATE	CHK APPD
A	REMOVED 1250204 NOISE FILTER FROM [illegible] S-5508 SUPPRESSOR WIRING	[illegible] 2-16-65	[illegible]
B	ADDED C611001-0101 DETAIL "A" [illegible]	[illegible] 9-22-65	[illegible]
C	ADDED TERMINAL [illegible] 3 WAS 42251-[illegible]	[illegible]	YAK
D	BY REV I ADDED 12 VOLT TO TITLE	C.G. 6-5-67	[illegible]



Inactive s/n SR 5201 & ON
5-4-66 YAK

NOTES:

1. 8 GAUGE SHIELDED WIRE MATERIAL PER S-1534-8-9
2. OBSERVE POLARITY SYMBOL ON DIODE ASSY WHEN INSTALLING ON SWITCH TERMINALS OR DIODE WILL FAIL WHEN SYSTEM IS ENERGIZED.
3. AMP TERMINAL 41796 (ARP).
4. "D" PREFIX IS USED ON THESE WIRES INSTEAD OF "R" BECAUSE WIRES ARE THE SAME AS THOSE IN MODEL 182. THIS DRAWING IS SCHEMATICALLY IDENTICAL TO 0770610 PAGE 4.5.

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
10	C611001-0101	REGULATOR	
9	S-5508	KLIPVOLT SUPPRESSOR (SATA)	
8	1250211-1	PLUG ASSY	
7	45329	NOISE FILTER (SPR)	
6	0770719-1	DIODE ASSY	
5	0713026-5	SWITCH-MASTER	
4	0750216-1	REGULATOR ASSY	
3	S-1506-60	CIRCUIT BREAKER	
2	C611501-0101	ALTERNATOR ASSY	
1	0770098-1	FILTER	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
D-PB29	16	4		SOLDER	S-1367-2-12	1250211	
D-PB28	18S			S-1367-1-12	3	1250211	
D-PB27	18S			[illegible]	3	1250211	
D-PB26	18S	4		[illegible]	3	1250211	
R-PB26	8S	1	36	[illegible]	S-1367-4-10		
R-PB24	8S	1	13	[illegible]	[illegible]		
R-PB23	10		27	S-1367-3-10	S-1367-3-12		
R-PB22	18S		36	S-1367-1-8	[illegible]		
R-PB21	18		6	S-1367-1-8	S-1367-1-10		
R-PB20	8S	1	45	[illegible]	S-1367-4-10		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE	TITLE
DRAWN	BREEN	12/8/64	WIRING DIAGRAM— ALTERNATOR SYSTEM, 60 AMP 12 VOLT
GROUP	[illegible]	2-3-65	
CHECK	[illegible]	2-1-65	
PROJ	[illegible]	1-28-65	
	[illegible]	1-3-65	

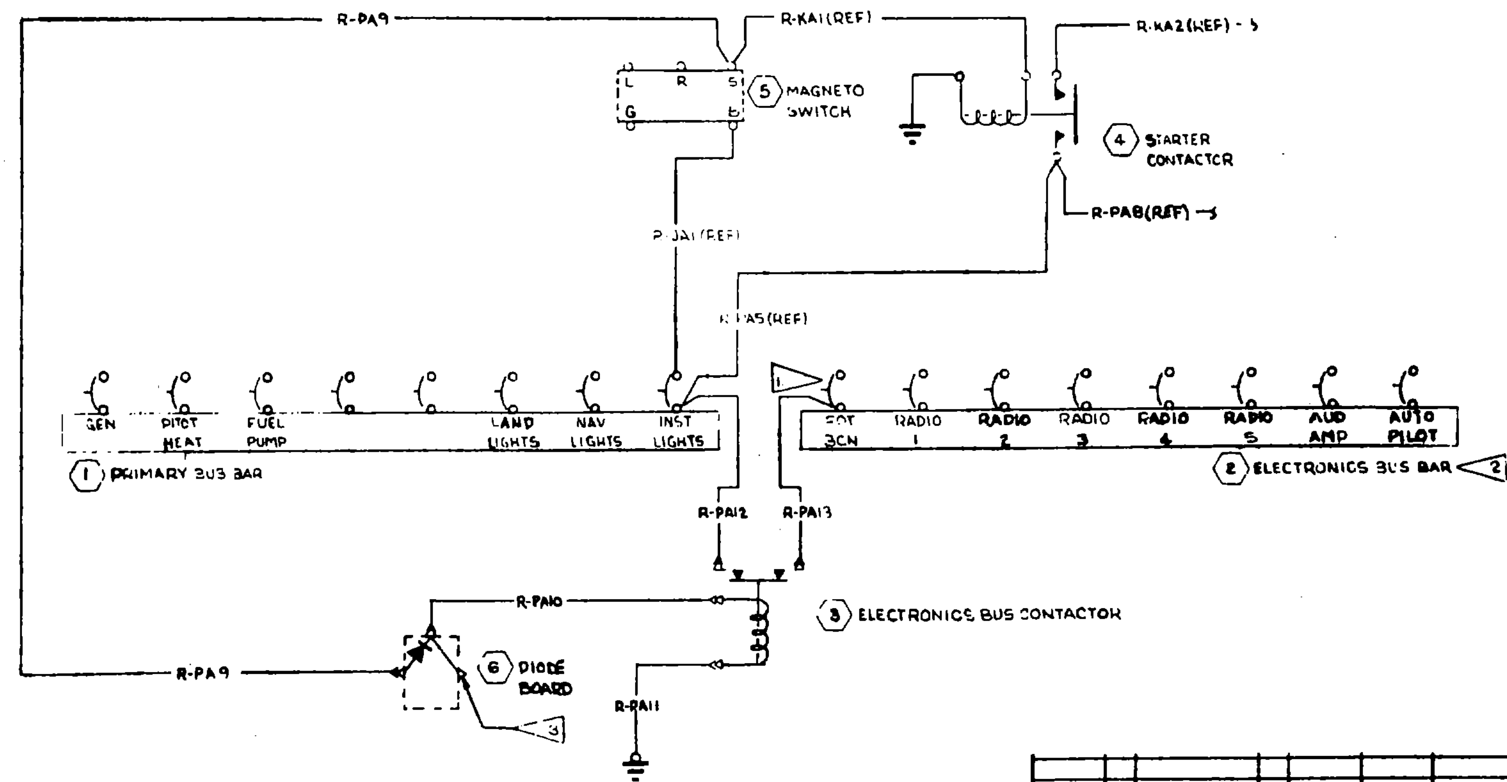
Cessna.

DWG NO 0700092

SUPERSEDED BY: 0700092 Pr. 4.10 | SUPERSEDES: 0700092 PAGE 4.6 | MODEL: 180-185 | REV: D | PAGE: 4.7

(SR4922 (SR4923)

CHG LET	REVISION	BY DATE	CHK APPD



NOTES:

1. WHEN ROTATING BEACON IS THE ONLY EQUIPMENT CONNECTING AT THE ELECTRONICS BUS BAR, WIRE R-PA13 WILL CONNECT DIRECTLY TO THE ROTATING BEACON CIRCUIT BREAKER AND THE ELECTRONICS BUS BAR WILL BE DELETED.
2. UNUSED PORTION OF ELECTRONICS BUS BAR WILL BE TRIMMED .38 INBOARD OF LAST CIRCUIT BREAKER INSTALLED.
3. THIS TERMINAL CONNECTS TO OPTIONAL GROUND SERVICE RECEPTACLE.

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
6	1570042-1	DIODE BOARD ASSY	
5	0713129-1	MAGNETO SWITCH	
4	0750027-1	STARTER SOLENOID	
3	6-1668-1	RELAY	
2	0770104-1	BUS BAR	
1	0770104-2	BUS BAR	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
R-PA13	14			S-367-2-6	S-1493-2		OPTIONAL (180)
R-PA12	14			S-1367-2-6	S-1493-2		
R-PA11	18			S-1367-1-6	S-1493-1		
R-PA10	18			S-1493-1	S-1493-1		
R-PA9	18			S-1367-1-10	S-1493-1		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	V. COOK	11-18-65
GROUP	H. Ward	11-19-65
CHECK	[illegible]	1-20-65
PROJ	[illegible]	1-24-65

TITLE: WIRING DIAGRAM— SPLIT BUS BAR

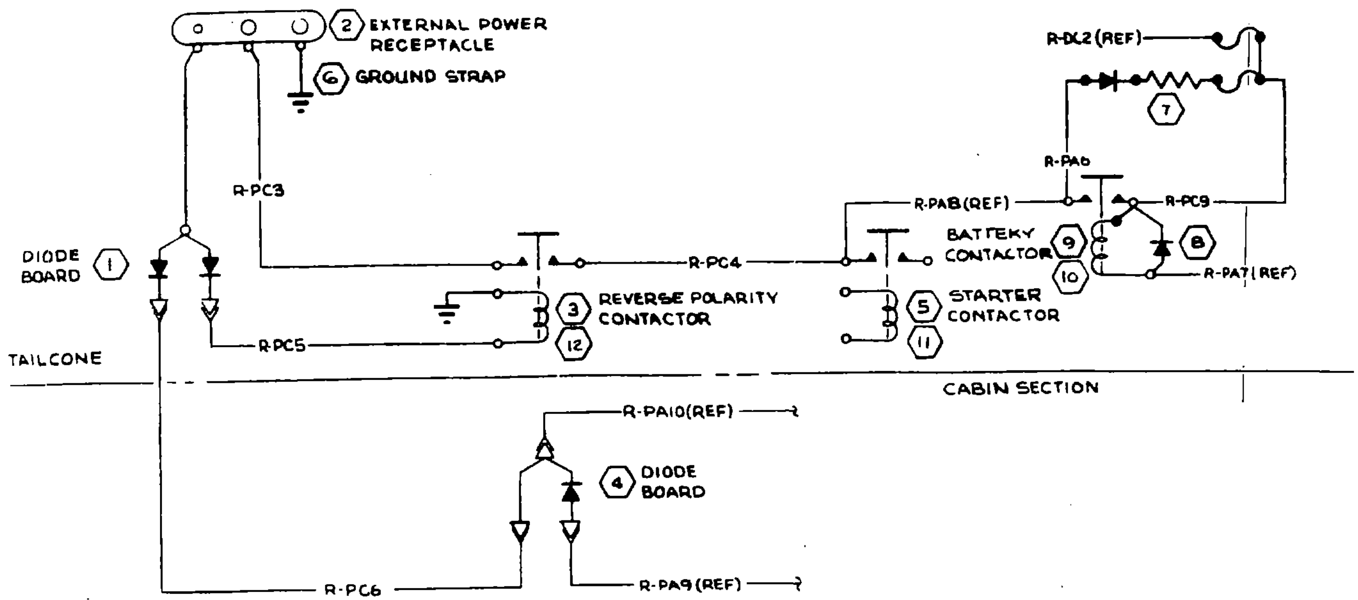
Cessna.

DWG NO. 0700092

SUPERSEDED BY | SUPERSEDES | MODEL: 180-185 | REV. | PAGE: 4.8

(SER 185-1150)&ON
(SER 18051775)&ON

CHG LET	REVISION	BY DATE	CHK APPD
A	[illegible] WAS [illegible] 1673-1 WAS [illegible]	[illegible] 3-11-66	[illegible]
B	BY REV: ADD S-1579-1, 0770728-1, 0712031-3, R-PA6, R-PC9, R-DL2 (REF) & R-PA7 (REF)	[illegible] 5/2/67	[illegible]



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
R-PC9	18			S-1493-1	SOLDER		
R-PA6	4			S-1367-6-13	SOLDER		
R-PC6	18			S-1493-1	S-1493-1		STANDARD
R-PC5	18			S-1493-1	S-1367-1-10	0700170	
R-PC4	2			S-1367-1-13	S-1367-7-19	0700170	
R-PC3	2			S-1367-1-14	S-1367-7-13	0700170	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
12	S-1577-1	CONTACTOR	24V ACFT ONLY
11	S-1577-1	CONTACTOR	24V ACFT ONLY
10	S-1580-1	CONTACTOR	24V ACFT ONLY
9	S-1579-1	CONTACTOR	12V ACFT ONLY
8	0770728-1	DIODE ASSY	
7	0712031-3	FUSE & DIODE ASSY	
6	0312155-10	GROUND STRAP	
5	S-1673-1	CONTACTOR	12V ACFT ONLY
4	1570042-1	DIODE BOARD	12V ACFT ONLY
3	S-1660-1	CONTACTOR	12V ACFT ONLY
2	AN2552-3A	RECEPTACLE	
1	1570043-3	DIODE BOARD	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	W COOK	12-1-65
GROUP	[illegible]	1-4-66
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM— EXTERNAL POWER RECEPTACLE (OPT)

Cessna.

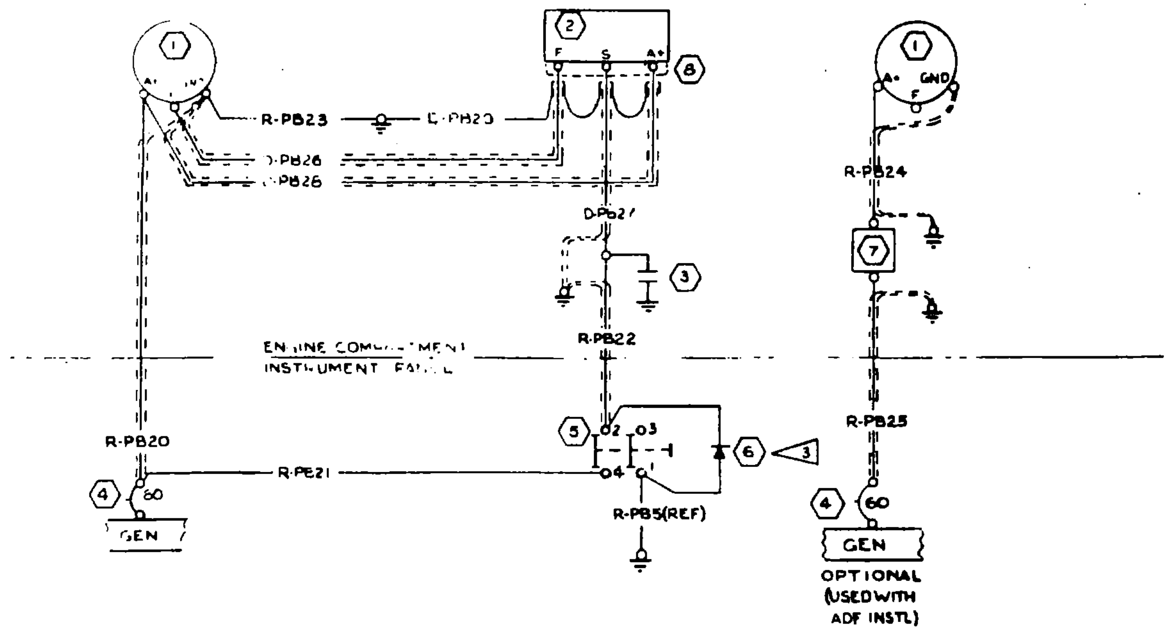
DWG NO: 0700092

SUPERSEDED BY:
SUPERSEDES: 0700092, PP4.3
MODEL: 180-185
REV: B
PAGE: 4.9

FORM NO. [illegible]

SR 5200

LTR	REVISION
A	BY REV: ADD ... [illegible]



Inactive [illegible]

NOTES.

1. AMP TERMINAL 42281-2 ON CONDUCTOR.
AMP TERMINAL 2-323931-2 ON SHIELD & GROUNDING WIRE.
2. 8 GAUGE SHIELDED WIRE MATERIAL PER S-1534-8-9.
3. OBSERVE POLARITY SYMBOL ON DIODE WHEN INSTALLING ON SWITCH TERMINALS OR DIODE WILL FAIL WHEN SYSTEM IS ENERGIZED.
4. "D" PREFIX [illegible] "R" [illegible] WIRE [illegible] IN [illegible] MATICALLY IDENTICAL [illegible] 4.7

	PART NO	DESCRIPTION	INSTALLED ON
8	C6AB-10A780-A	HOUSING (ECWS)	
7	S-1629-1	NOISE FILTER	
6	0770719-1	DIODE ASSY	
5	0713026-5	SWITCH-MASTER	
4	S-1596-60	CIRCUIT BREAKER	
3	0770038-2	FILTER	
2	C611001-0101	REGULATOR	
1	C611501-0101	ALTERNATOR ASSY	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			REMARKS
D-PB29	18	4		[illegible]	1		
D-PB28	18S			[illegible]			
D-PB27	18S			[illegible]			
D-PB26	18S	4		[illegible]	1		
R-PB25	8S	2		[illegible]	[illegible]		
R-PB24	8S	2		[illegible]	[illegible]		
R-PB23	10			[illegible]	[illegible]		
R-PB22	18S			[illegible]	[illegible]		
R-PB21	18			[illegible]	[illegible]		
R-PB20	8S	2		[illegible]	[illegible]		

WIRE TABLE

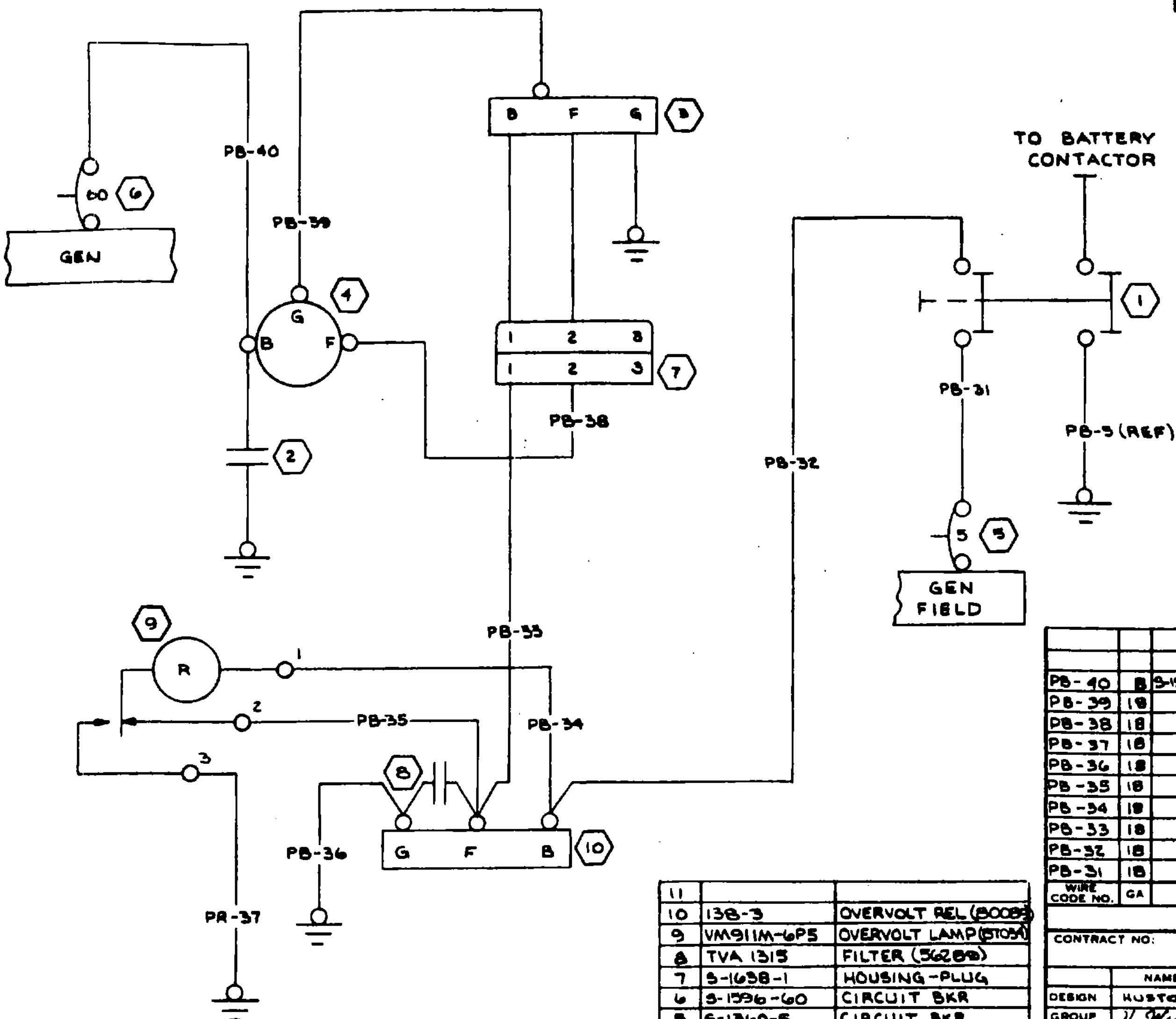
	NAME	DATE
DRAWN	[illegible]	5-3-66
GROUP	[illegible]	5-3-66
CHECK	[illegible]	5-20-66
PROJ	[illegible]	2-1-66

WIRING DIAGRAM—ALTERNATOR SYSTEM, 60 AMP, 12 VOLT

0700092

0700092 PG 4.12 | 0700092 PG 4.7 | MODEL 180-185 | A | 4.7

LTR	REVISIONS DESCRIPTION	DATE	APPROVED



ITEM NO.	PART NO.	DESCRIPTION
11		
10	138-3	OVERVOLT REL (80083)
9	VM911M-6P5	OVERVOLT LAMP (87054)
8	TVA 1315	FILTER (56289)
7	S-1638-1	HOUSING-PLUG
6	S-1596-60	CIRCUIT BKR
5	S-1360-5	CIRCUIT BKR
4	C611503-0101	ALTERNATOR
3	C611002-0102	VOLTAGE REG
2	1250209-1	FILTER ASSY
1	0713026-5	MASTER SW

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
PB-40	8	S-1562-8-9		S-1367-4-12	S-1367-4-10		
PB-39	18			S-1367-1-10	S-1367-1-12		
PB-38	18			S-1636-1	S-1367-1-10		
PB-37	18			S-1367-1-8	SOLDER		
PB-36	18				S-1367-1-8		
PB-35	18				SOLDER		
PB-34	18				SOLDER		
PB-33	18				S-1636-1		
PB-32	18				S-1367-1-6		
PB-31	18			S-1367-1-8	S-1367-1-8		

WIRE TABLE

CONTRACT NO:

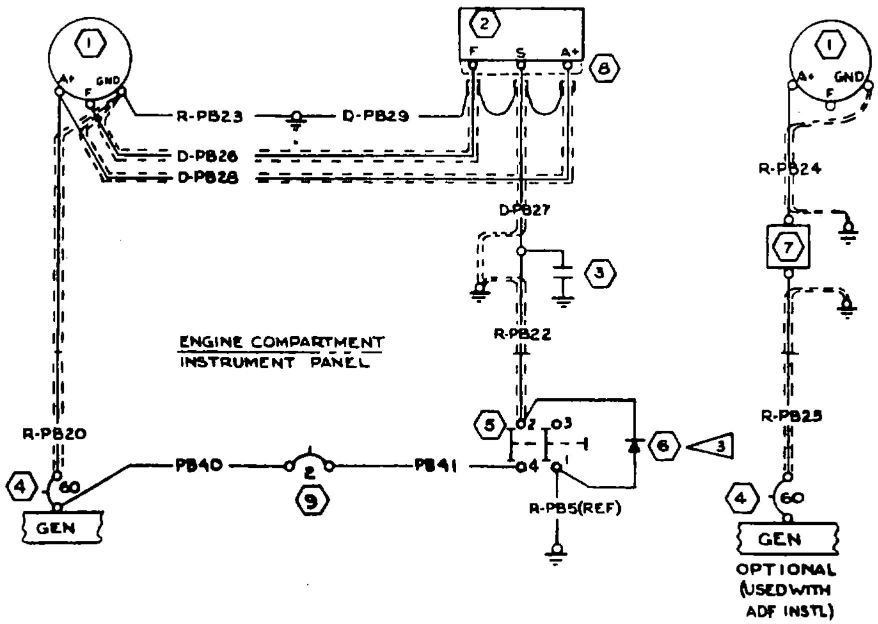
	NAME	DATE
DESIGN	HUSTON	5/5/67
GROUP	H. Wue	5-9-67
DRAWN	J HARRIS	5/1/67
CHECK	YAKSHAW	
STRESS	Worthington	5-8-67
PROJECT	W Sotte	5-9-67
APPD	REM	5-5-67

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — 24VOLT ALTERNATOR SYSTEM, 60 AMP

SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0700092

SCALE: FULL



NOTES:

1. AMP TERMINAL 42281-2 ON CONDUCTOR. AMP TERMINAL 2-323931-2 ON SHIELD & GROUNDING WIRE.
2. 8 GAUGE SHIELDED WIRE MATERIAL PER S-1534-8-8.
3. OBSERVE POLARITY SYMBOL ON DIODE WHEN INSTALLING ON SWITCH TERMINALS OR DIODE WILL FAIL WHEN SYSTEM IS ENERGIZED.
4. "D" PREFIX IS USED ON THESE WIRES INSTEAD OF "R" BECAUSE WIRES ARE THE SAME AS THOSE USED IN MODEL 182. THIS DWG. IS SCHEMATICALLY IDENTICAL TO 0770610 PAGE 4.7

	PART NO.	DESCRIPTION	INSTALLED ON
9	CAE	CKT BKR (80602)	
8	C6AB-10A780A	HOUSING (ECWS)	
7	S-1629-1	NOISE FILTER	
6	0770719-1	DIODE ASSY	
5	0713026-5	SWITCH-MASTER	
4	S-1896-60	CIRCUIT BREAKER	
3	0770038-2	FILTER	
2	C611001-0101	REGULATOR	
1	C611501-0101	ALTERNATOR ASSY	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			REMARKS
PB41	18			S-1367-1-8	S-1367-1-8		
PB40	18			S-1367-1-10	S-1367-1-8		
D-PB29	18	4		S-1367-1-12	1		
D-PB28	18S			[illegible]			
D-PB27	18S			[illegible]			
D-PB26	18S	4		[illegible]	1		
R-PB25	8S	2		[illegible]	S-1367-4-10		
R-PB24	8S	2		[illegible]	[illegible]		
R-PB23	10			S-1367-3-10	S-1367-3-10		
R-PB22	18S			S-1367-1-8	[illegible]		
R-PB20	8S	2		[illegible]	S-1367-4-10		

WIRE TABLE

[redacted]

	NAME	DATE
DRAWN	C. GARCIA	7-31-67
	D. Wind	7-22-67
CHECK	R LAURIE	8-7-67
	D. Jolly	8-8-67

WIRING DIAGRAM— ALTERNATOR SYSTEM, 60 AMP, 12 VOLT

Cessna.

0700092

0700092 PG 4.10 | MODEL 180-185 | PAGE 4.12

CHG LET	REVISION	BY DATE	CHK APPD

IGNITION
SECTION

Cessna.

DRAWN	AJ	TITLE: WIRING DIAGRAM---		DRAWING NO.
DATE	10-11-62	MODEL 180-185		0700092
APP'D			REV:	PAGE: 5.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

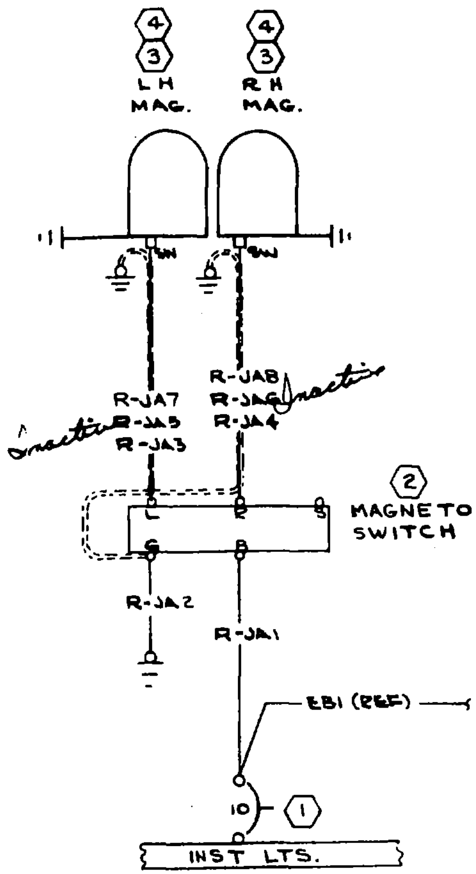
FORM NO. 80-163

(SR 4012)

NOTES:

1. WIRES FLAGGED THUS ARE REQUIRED ONLY WHEN OPTIONAL RADIOS ARE INSTALLED IN MODEL 180.

CHG LET	REVISION	BY / DATE	CHK / APPD
A	INACTIVATED R-JA3 & R-JA4 & ADDED 180 REQUIREMENT FOR R-JA5 & R-JA6 ER 4042	MG 4-2-63	[illegible]
B	REMOVED INACTIVE FROM R-JA3 & R-JA4 WIRES; ADDED ▷ & R-JA7 & R-JAB; INACTIVATED R-JA5 & R-JA6 ADDED WIRE LENGTHS TO W/T & P/N TO E/T	W.J.K. 2-1-65	[illegible]
C	CHANGED DOUBLE SHIELDED WIRE TO SINGLE SHIELD ON JA3, JA4, JA7, JAB	VRC 11-16-65	[illegible]



R-JAB	18S		63	[illegible]	[illegible]	180 & 185	SER 185-0777 & ON
R-JA7	18S		62	[illegible]	[illegible]	180 & 185	SER 185-0777 & ON
R-JA6	18DS		73	[illegible]	[illegible]	185	INACTIVE SER 185-0777 & ON
R-JA5	18DS		73	[illegible]	[illegible]	185	INACTIVE SER 185-0777 & ON
▷1 R-JA4	18S		59	[illegible]	[illegible]	180	
▷1 R-JA3	18S		58	[illegible]	[illegible]	180	
R-JA2	18		5	S-1367-1-6	S-1367-1-8	185-180	
R-JA1	18		18	S-1367-1-10	COMMON TO BUS	185-180	
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		USED ON	SERIALS

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
4	BENDIX	MAGNETO (180)	
3	SLICK	MAGNETO (185)	
2	0713129-1	MAG SWITCH	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

	NAME	DATE
DRAWN	JOHNSON	9/27/62
GROUP	[illegible]	10-3-62
CHECK	[illegible]	10-27-62
PROJ	[illegible]	10-30-62

TITLE: WIRING DIAGRAM — MAGNETO

Cessna.

DWG NO 0700092

SUPERSEDED BY | SUPERSEDES [illegible] | MODEL 180-185 | REV C | PAGE 5.1

FORM NO 80-161

FUEL AND OIL SECTION

Cessna.

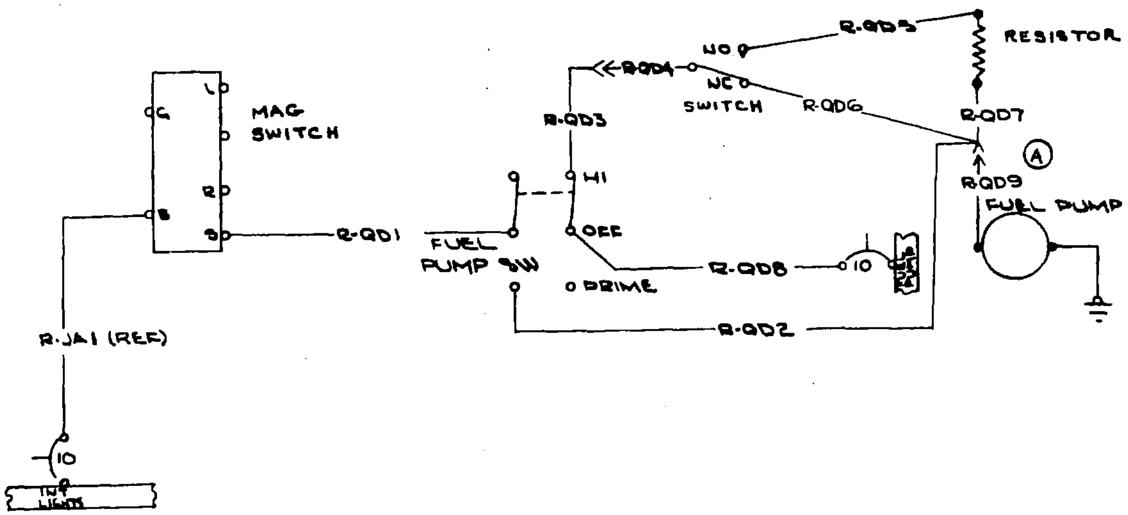
DRAWN	AJ	TITLE: WIRING DIAGRAM--- MODEL 180-185	DRAWING NO. 0700092
DATE	10-11-62		
APP'D	[illegible]	REV:	PAGE: 7.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO 80-165

(S24012)

CHG LET	REVISION	BY DATE	CHK APPD
A	ADDED R-QD9 & TERMINALS TO R-QD2 & R-QD6	1-3-62	



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-QD9	18			S341-2	——		
R-QD8	18			S1367-1-8	S-1367-1-6		
R-QD7	18			——	S341-1		
R-QD6	18			S-1367-1-4	COMMON TO R-QD7		
R-QD5	18			S1367-1-4	——		
R-QD4	18			S1367-1-4	S-1370-1		
R-QD3	18			S1367-1-6	S-1370-1		
R-QD2	18			S1367-1-6	COMMON TO R-QD7		
R-QD1	18			S1367-1-6	S1367-1-6		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	JOHNSON	10/4/62
GROUP	W. Tarrant	10-31-62
CHECK	C. Stuck	10-27-62
PROJ	[illegible]	10-30-62

TITLE
WIRING DIAGRAM — FUEL PUMP

Cessna.

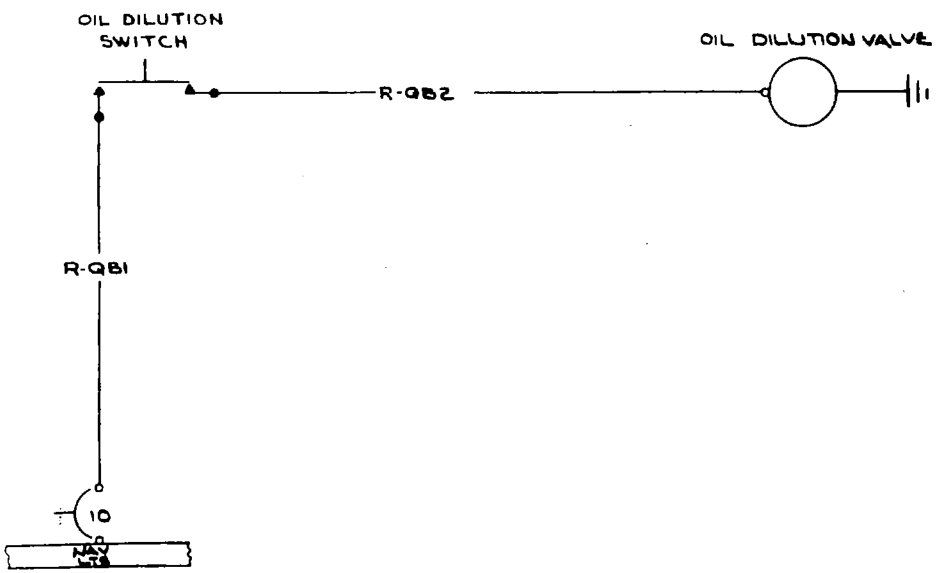
DWG NO 0700092

SUPERSEDED BY | SUPERSEDES 0700085 | MODEL 185 | REV A | PAGE 7.1

FORM NO 80-161

(SR 4012)

CHG LET	REVISION	BY / DATE	CHK / APPD



R-QB2	18			S-1367-1-10	———		
R-QB1	18			S-1367-1-8	———		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	10/9/62
GROUP	V. Tanner	10-31-62
CHECK	R. Stuck	10-27-62
PROJ	W. [illegible]	10-30-62

TITLE
WIRING DIAGRAM — OIL DILUTION VALVE (OPT)

Cessna.

DWG NO. 0700092

SUPERSEDED BY

SUPERSEDES 0700059 0700053

MODEL 180-185

REV

PAGE 7.2

FORM NO 80-161

ENGINE INSTRUMENTS SECTION

Cessna.

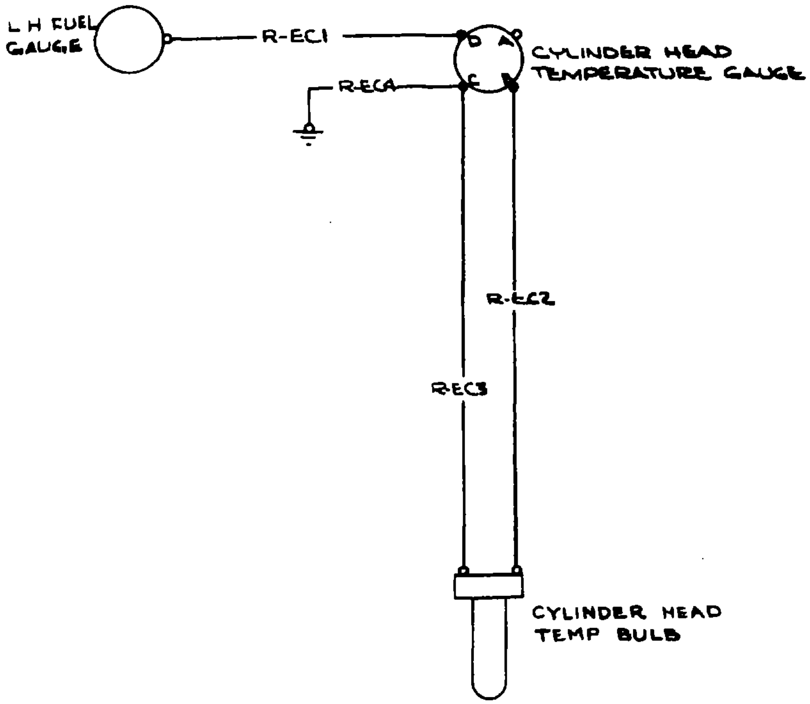
			DRAWING NO.
DRAWN	AJ	TITLE: WIRING DIAGRAM---	
DATE	10-11-62	MODEL 180-185	0700092
APP'D	[illegible]	REV:	PAGE: 8.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-166

(SR 4012)

CHG LET	REVISION	BY / DATE	CHK / APPD



Inactive SER 185-0777 & ON
18051446 & ON
WJR 2-9-65
2-12-65
2-16-65
CGM 2-16-65
DRM

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		SERIALS
R-EC4	18			S-1367-1-6	———	
R-EC3	18			S-1367-1-6	———	
R-EC2	18			S-1367-1-6	———	
R-EC1	18			———	S-1367-1-10	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	9/10/62
GROUP	V. Tomas	10-4-62
CHECK	P. Shuck	10-27-62
PROJ	[illegible]	10-30-62

TITLE: WIRING DIAGRAM — CYLINDER HEAD TEMP GAUGE

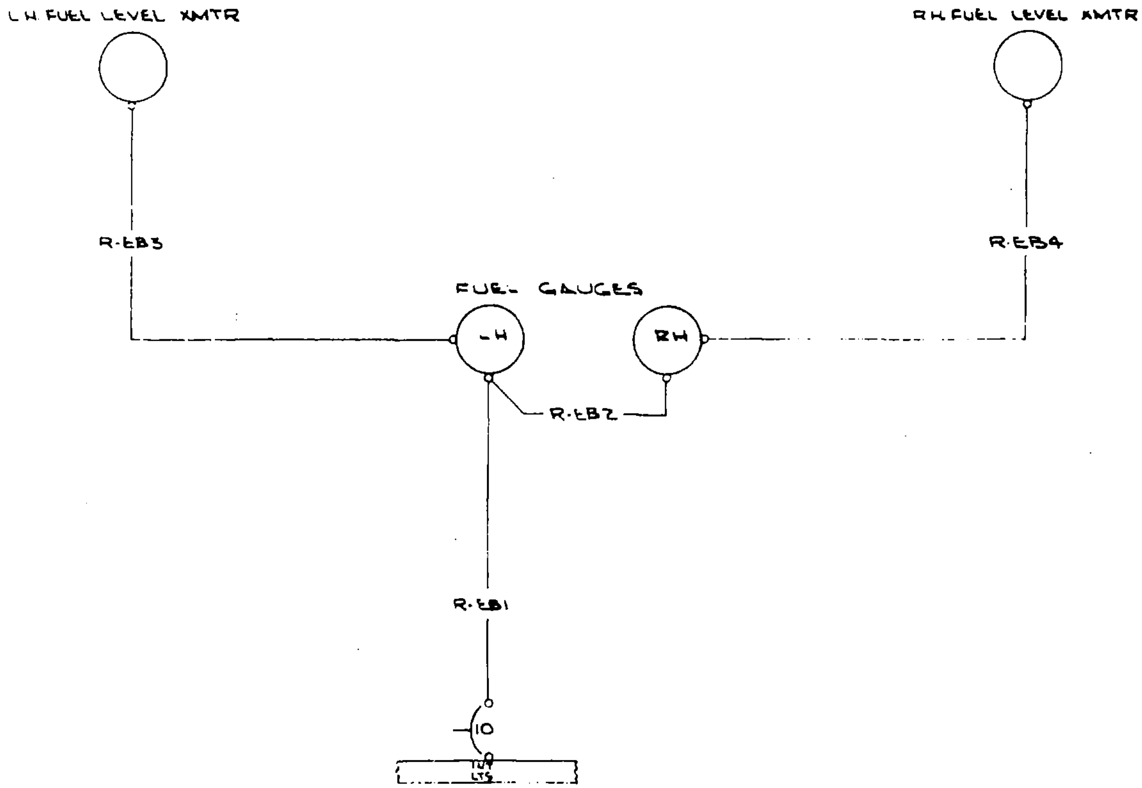
Cessna.

DWG NO 0700092

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
0700092 PAGE 8.2.1	0700085	185		8.1

(SR 4012)

CHG LET	REVISION	BY DATE	CHK APPD



INACTIVE SER 185-0777 & ON
1805144G & ON
Wilcox 2/16/65
2-16-65
CGM 2-16-65

R-EB4	18			S-1367-1-10	S-1367-1-10		
R-EB3	18			S-1367-1-10	S-1367-1-10		
R-EB2	18			S-1367-1-10	S-1367-1-10		
R-EB1	18			S-1367-1-10	COMMON TO [illegible]		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	9/9/62
GROUP	V. [illegible]	10-31-62
CHECK	R. [illegible]	10-26-62
PROJ	[illegible]	10-30-62

TITLE: WIRING DIAGRAM — FUEL GAUGE & XMTR

Cessna.

DWG NO 0700092

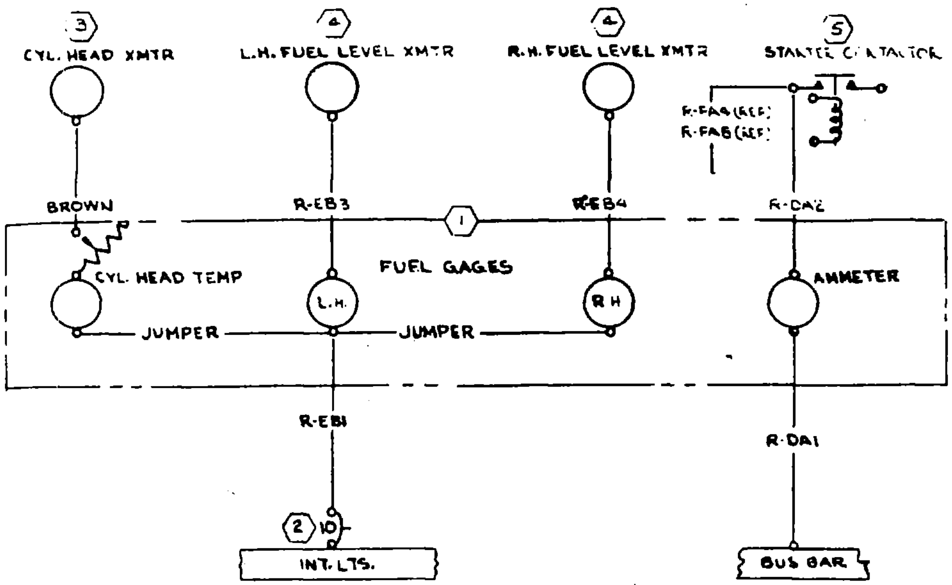
SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
4162 0700092 8.2.1	0700059 0700089	180-185		8.2

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

NOTES:
1. PART NO. 115691 (FASC) COLOR: BROWN.

CHG LET	REVISION	BY DATE	CHK APPD



Inactive [illegible] 18051175 & on 185-1150 & on 11-11-65

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
5	0750027-1	STARTER CONTACTOR	
4	0726110-1	XMTR FUEL LEVEL	
3	S-372-1	BULB CYL HEAD TEMP	
2	S-1360-10	CIRCUIT BREAKER	
1	0669502-0103	INSTRUMENT CLUSTER	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-EB4	16		49	S-367-1-10	S-1367-1-10		
R-EB3	6		102	S-367-1-6	S-367-1-6		
R-EB1	6		[illegible]	S-367-1-6	1367-2-6		
R-DA2	6		2	S-1367-4-10	S-1367-4-10		
R-DA1	6		[illegible]	S-367-4-8	S-1367-4-10		
BROWN	[illegible]	[illegible]	56	S-[illegible]	S-1367-1-4		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	[illegible]	[illegible]
GROUP	[illegible] Wade	
CHECK	[illegible]	
PROJ	[illegible]	

TITLE: WIRING DIAGRAM— FUEL GAGE XMTR & IND - 12 VOLT SYS.

Cessna.

DWG NO: 0700092

SUPERSEDED BY: 0700092, PP 8.6

SUPERSEDES: 0700092 PGS 8.1, 8.2, 10.2

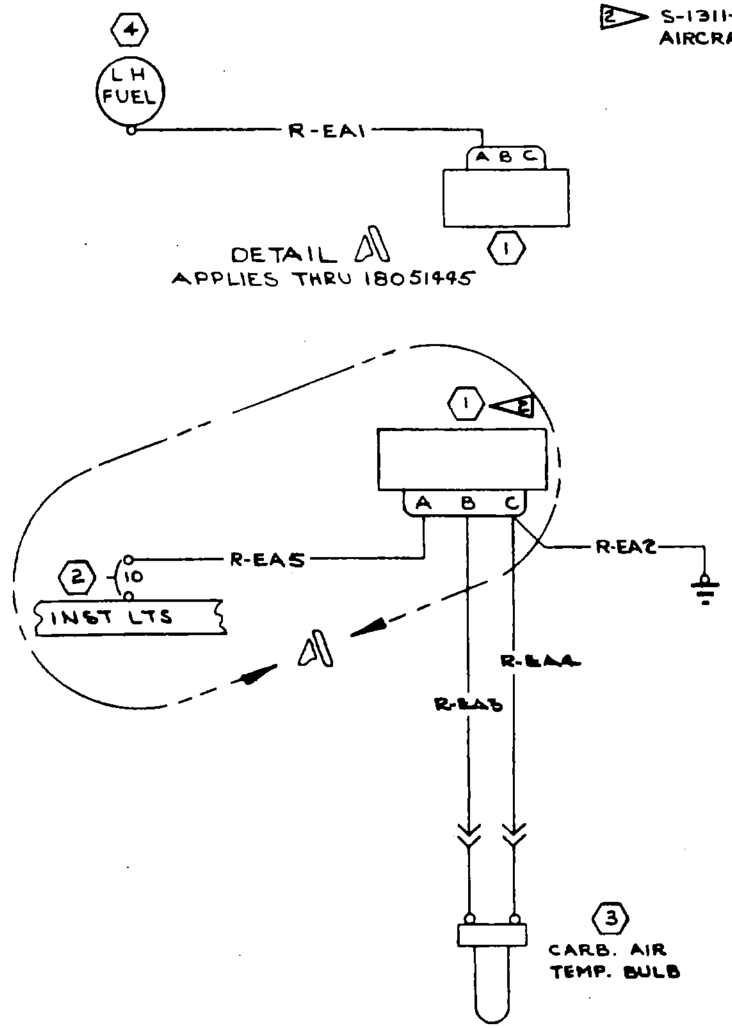
MODEL: 180 & 185

REV:

PAGE: 8.2.1

CHG LET	REVISION	BY DATE	CHK APPD
A	ADD LIMITING SERIALS TO R-EA1; ADDED SOLDER CONNECTION AT PLUG END OF R-EA3 & R-EA4 WIRES, ADD R-EA5; ADD WIRE LENGTH TO W/T & P/N TO E/T	WJR 2-1965	
B	BY REV: ADD NOTE 2	C.G. 6-7-67	YAK

NOTE:
1. TERMINALS FURNISHED WITH CARBURETOR AIR TEMP BULB
2. S-1311-2 GAGE USED ON 24V AIRCRAFT.



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
R-EA5	18			SOLDER	S-1367-1-4		18051446 & ON
R-EA4	18		140	SOLDER	Y214-H	1	
R-EA3	18		140	SOLDER	Y214-H	1	
R-EA2	18		17	S-1367-1-8	SOLDER		
R-EA1	18		14	S-1367-1-10	SOLDER		THRU 18051445

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
4	C669502-0103	INST CLUSTER	
3	0550209-1	BULB-CARB AIR	
2	S-1360-10	CIRCUIT BREAKER	
1	S-1311-1	GAGE	

EQUIPMENT TABLE

	NAME	DATE
DRAWN	Johnson	
GROUP		10-V-62
CHECK		10-29-62
PROJ		

TITLE: WIRING DIAGRAM — CARBURETOR AIR TEMP (OPT)

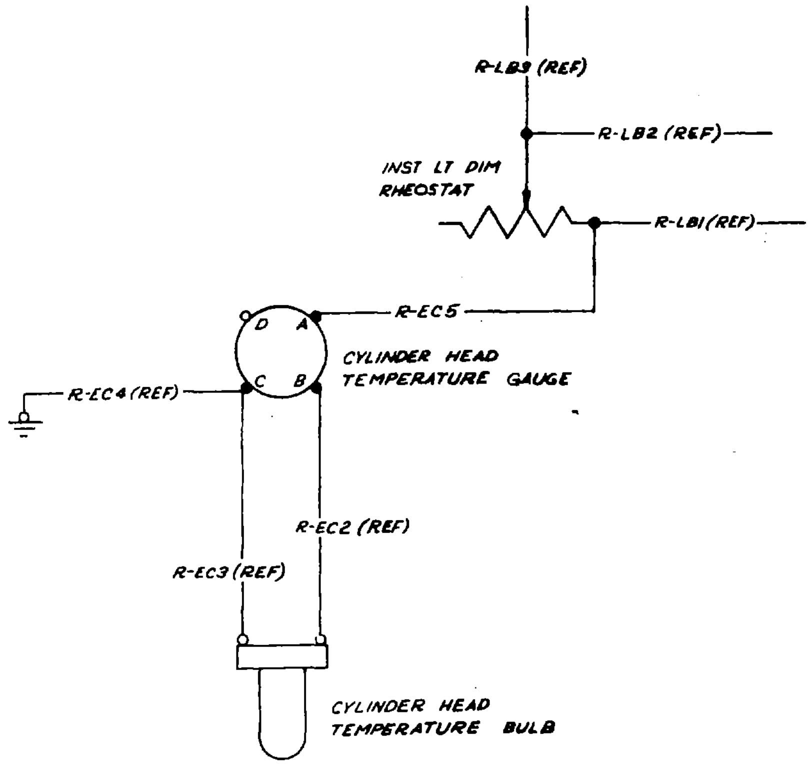
Cessna.

DWG NO 0700092

SUPERSEDED BY | SUPERSEDES 0700039 | MODEL 180 | REV B | PAGE 8.3

FORM NO. 80-161

CHG LET	REVISION	BY DATE	CHK APPD



Inactive SER 185-0777 & ON JB 1-12-65 HPW 2-12-65 CGM 2-16-65 RKM

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R EC5	18			SOLDER	SOLDER		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	SPRIGGS	11-21-62
GROUP	V. [illegible]	11-27-62
CHECK	R. [illegible]	11-27-62
PROJ	[illegible]	11-27-62

TITLE: **WIRING DIAGRAM — CYLINDER HEAD TEMP GAUGE, 24V (OPT)**

Cessna.

DWG NO 0700092

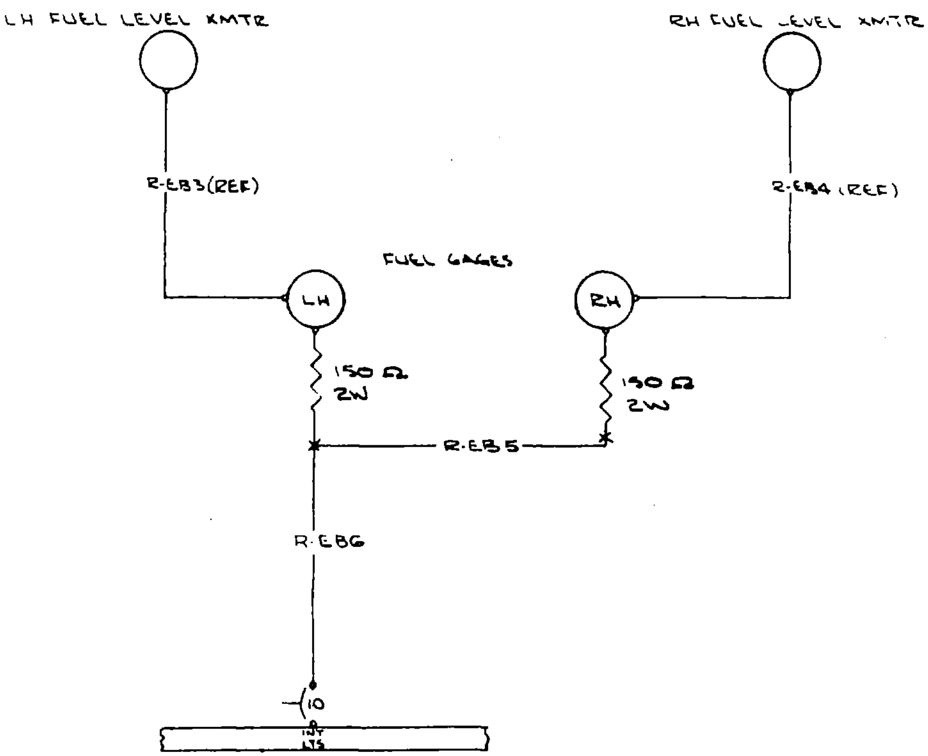
SUPERSEDED BY: 0700092 PAGE 8.5.1 | SUPERSEDES | MODEL 185 | REV | PAGE 8.4

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

(SR4260)

CHG LET	REVISION	BY DATE	CHK APPD



Inactive SER 185-0777 & ON 1-12-65 JB 2-12-65 2-16-65 CGM DKM

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-EB6	18			S1367-1-6	S1370-1		
R-EB5	18			COMMON TO EB6	S1370-1		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	6-4-63
GROUP	[illegible]	6-7-63
CHECK	[illegible]	[illegible]-63
PROJ	[illegible]	6-7-63

TITLE: WIRING DIAGRAM — FUEL GAGE XMTR & IND-24 VOLT SYS

Cessna.

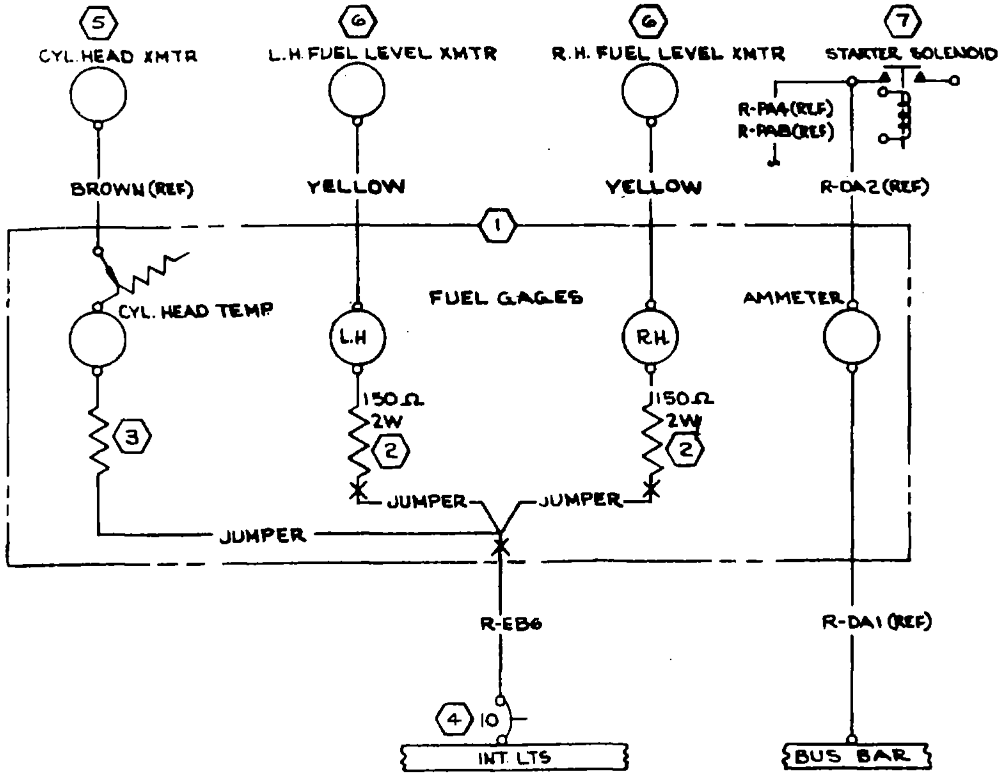
DWG NO 0700092

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
0700092 · PAGE 85.1		185		85

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CHG LTR	REVISION	BY / DATE	CHK / APPD
A	BY REV I S-1577-1 CONTACTOR EFF SERIAL 185-1251 & ON WAS 0850469-3	C.G. 6-7-67	VPK / [illegible] / [illegible]



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
R-EB6	18			S-1367-1-6	S-1370-2		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
7	S-1577-1	STARTER SOLENOID	
6	0726110-1	XMTR, FUEL LEVEL	
5	S-1372-1	BULB, CYL HEAD TEMP	
4	S-1360-10	CIRCUIT BREAKER	
3	B11542	RESISTOR (SW)	
2	150Ω, 2 WATT	RESISTOR (OM)	
1	C669502-0103	INSTRUMENT CLUSTER	

EQUIPMENT TABLE

	NAME	DATE
DRAWN	J. BLISS	1-12-65
GROUP	H. Wise	2-12-65
CHECK	C G MILLER	2-16-65
PROJ	[illegible]	2-17-65

TITLE: WIRING DIAGRAM — FUEL GAGE XMTR & IND.-24 VOLT SYS.

Cessna.

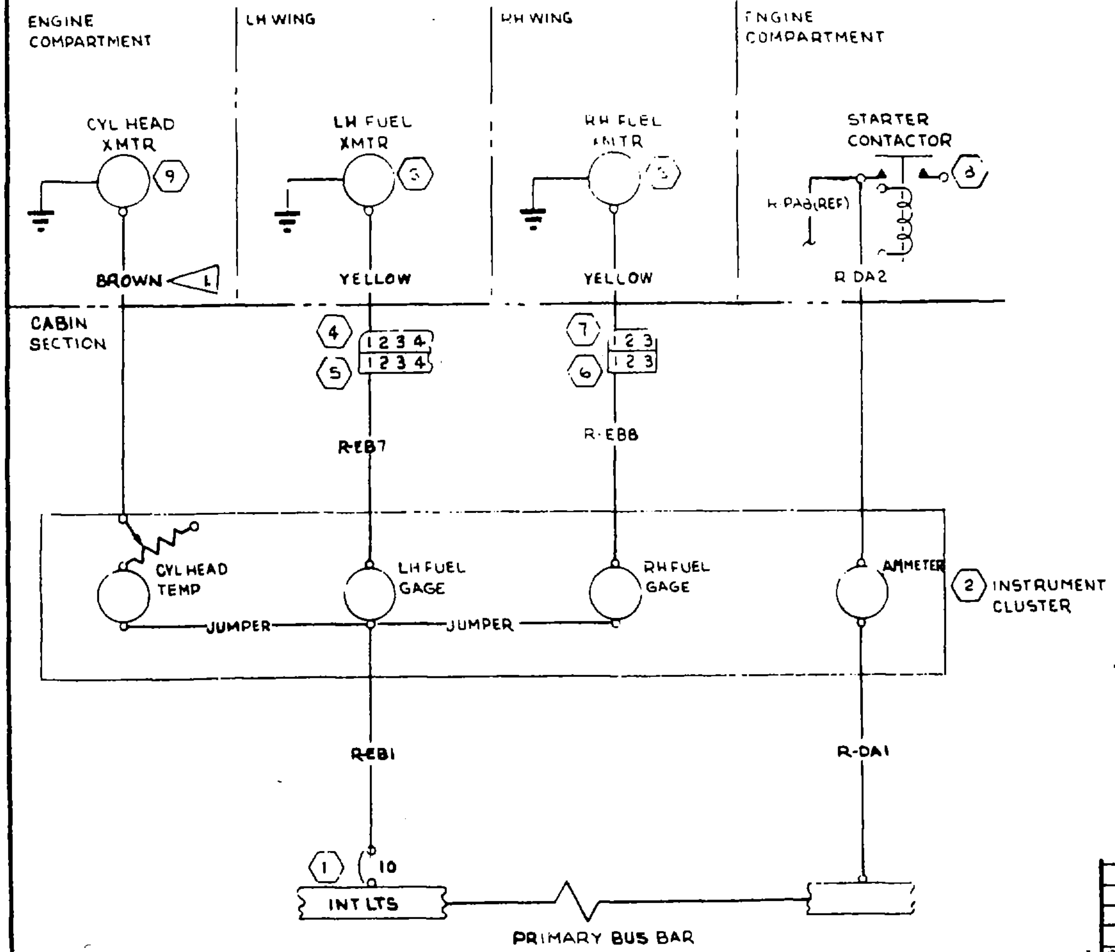
DWG NO. 0700092

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
	0700092 8.4, 8.5	185	A	8.5.1

FORM NO. 80-161

(SR4922)(SR4923)

CHG LET	REVISION	BY DATE	CHK APPD



NOTES:

1. PART NO. 11069-1 (PR50), COLOR; BROWN.

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
BROWN	18	1		S-1367-1-6	S-1367-1-4		
YELLOW	18	S-1460-18-4		S-1635-2	S-1367-1-10		
YELLOW	18	S-1460-18-4		S-1635-2	S-1367-1-10		
R-EB8	18			S-1367-1-10	S-1636-2		
R-EB7	18			S-1367-1-10	S-1636-2		
R-EB1	18		22	S-1367-1-10	S-1367-2-6		
R DA2	8		24	S-1367-4-10	S-1367-4-14		
R-DA1	8		23	S-1367-4-6	S-1367-4-10		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
9	S-1372-1	BULB, CYL HEAD TEMP	
8	0750027-1	STARTER CONTACTOR	
7	S-1638-2	HOUSING-CAP	
6	S-1638-1	HOUSING-PLUG	
5	S-1641-9	HOUSING SOCKET	
4	S-1640-9	HOUSING-PIN	
3	0726110-1	XMTR-FUEL LEVEL	
2	C669502-0103	INSTRUMENT CLUSTER	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	N COOK	1-4-66
GROUP	H Wiens	1-4-66
CHECK	[illegible]	1-5-66
PROJ	[illegible]	1-7-66

TITLE: **WIRING DIAGRAM— FUEL GAGE XMTR & INDICATORS -12 V**

Cessna.

DWG NO. 0700092

SUPERSEDED BY:

SUPERSEDES: 0700092, PP 8.2.1

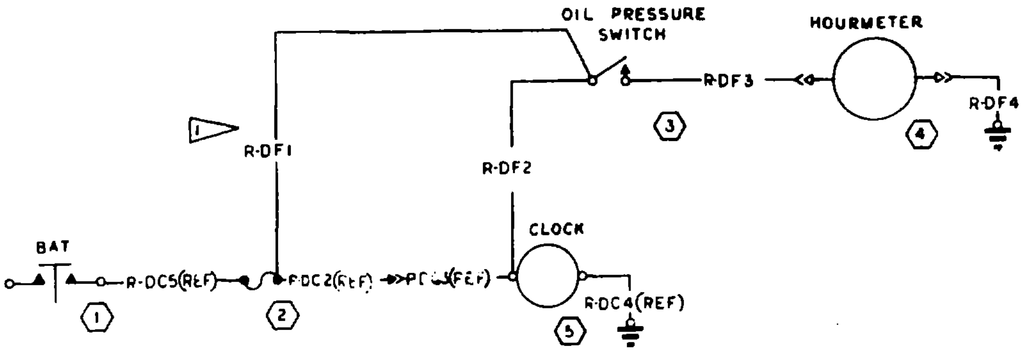
MODEL: 180-185

REV:

PAGE: 8.6

(..R 5033)

CHG LET	REVISION	BY / DATE	CHK / APPR



NOTE:
1. WIRING DIAGRAM SHOWN IS FOR USE WHEN AN OPTIONAL ELECTRIC CLOCK IS INSTALLED. WHEN ELECTRIC CLOCK IS NOT INSTALLED WIRE R-DF1 CONNECTS PRESSURE SWITCH TO FUSEHOLDER INSTALL S-1091-1 FUSE AND S-1690-22 FUSEHOLDER.

WIRE TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-DF4	18			S-1493-1	S-1367-18		
R-DF3	18			S-1493-1	S-1367-1-6		
R-DF2	18			S-1367-1-6	S-1367-1-6		
R-DF1	18			S-1367-1-6	SOLDER		

EQUIPMENT TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
5	S-1317N1	CLOCK	
4	C664501-0101	HOURMETER	
3	S-1711-1	OIL PRESSURE SW.	
2	S-1091-1	FUSE	
1	S-1579-1	BAT. CONTACTOR	

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	Weber	9-13-66
GROUP	H. Weil	9-27-66
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: **WIRING DIAGRAM— HOURMETER (OPT)**

Cessna.

DWG NO: C700092

SUPERSEDED BY: | SUPERSEDES: | MODEL: 180-185 | REV: | PAGE: 8.7

FORM NO 80-1516

FLIGHT INSTRUMENTS SECTION

Cessna.

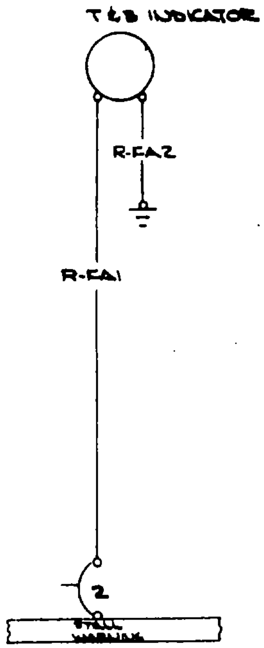
			DRAWING NO.
DRAWN	AJ	TITLE: WIRING DIAGRAM---	
DATE	10-11-62	MODEL 180-185	0700092
APP'D	RRS N 7	REV:	PAGE: 9.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-167

(SER 18051241) & ON
(SER 185-0659) & ON

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV I ADD 12 VOLT SYSTEM TO TITLE	C.G. 6-7-67	[illegible]



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-FA2	18			S-1367-1-14	S-1367-1-8		
R-FA1	18			S-1367-1-8	S-1367-1-8		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	JOHNSON	10/4/62
GROUP	[illegible]	10-9-62
CHECK	[illegible]	10-11-62
PROJ	[illegible]	10-10-62

TITLE
WIRING DIAGRAM — T&B INDICATOR 12 VOLT SYSTEM (OPT)

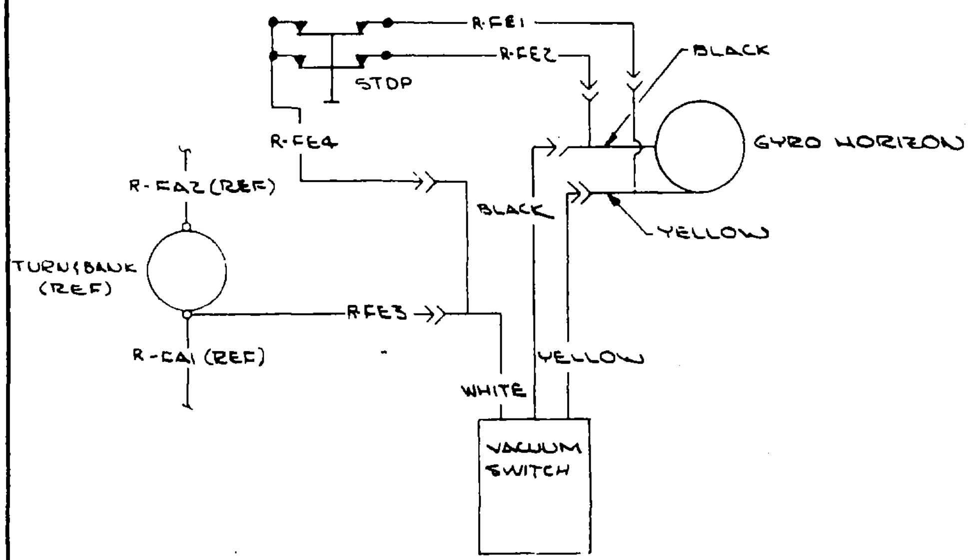
Cessna.

DWG NO 0700092

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
	0700079 0700085	180-185	A	5.1

FORM NO. 80-161

CHG LET	REVISION	BY DATE	CHK APPD



Inactive SER 185-0777 & ON
180-51446 & ON
WJF 2-11-65
HJW 2-12-65
CGM 2-16-65
DRM

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-FE4	20			S-341-2	——		
R-FE3	20			S-341-2	S-1367-1-8		
R-FE2	20			S-341-2	——		
R-FE1	20			S-341-2	——		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	W COOK	3-8-64
GROUP	H Wu	2-12-65
CHECK	C G MILLER	2-16-65
PROJ	[illegible]	2-17-65

TITLE: WIRING DIAGRAM — OPTIMUM FLIGHT INSTRUMENTS (OPT)

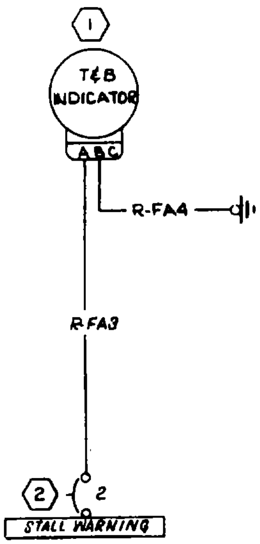
Cessna.

DWG NO 0700092

SUPERSEDED BY | SUPERSEDES | MODEL 180 & 185 | REV | PAGE 22

CHG LET	REVISION	BY / DATE	CHK / APPD

NOTES:
1 THIS SCHEMATIC APPLIES TO 24 V INSTAL & REPLACES SHT 9.1.



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		SERIALS
R-FA4	18			S-1367-1-14	——	
R-FA3	18			S-1367-1-8	——	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
2	CA-2	CIRCUIT BREAKER	
1	S-1303N1	T&B INDICATOR	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	W COOK	1-31-63
GROUP	[illegible]	2-12-65
CHECK	C.G. MILLER	[illegible]
PROJ	[illegible]	2-24-65

TITLE: WIRING DIAGRAM — T&B INDICATOR — 24 VOLT (OPT)

Cessna.

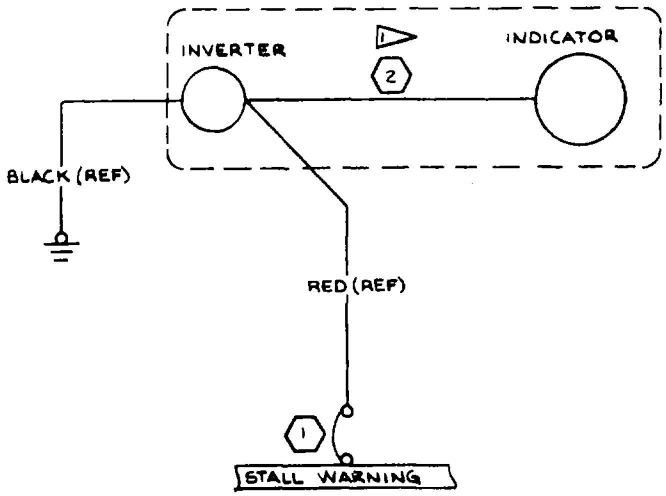
DWG NO 0700092

SUPERSEDED BY: | SUPERSEDES: | MODEL 180-185 | REV: | PAGE 9.3

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

NOTES:

1. TURN COORINATOR INDICATOR INCLUDES ALL WIRES AND CABLES BETWEEN INVERTER INDICATOR AND CIRCUIT BREAKER.



2	C661003-0401	TURN COORDINATOR
1	CA-2	CKT BKR (73803)
ITEM NO.	PART NO.	DESCRIPTION

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wise	5-25-67
DRAWN	HARRIS	5/22/67
CHECK	YAKSHAW	5-23-67
STRESS	[illegible]	[illegible]
PROJECT	[illegible]	[illegible]
APPD	[illegible]	[illegible]

Cessna AIRCRAFT CO.

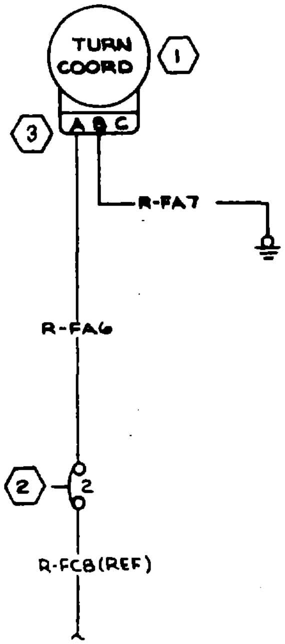
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM —
BRITTAIN WING LEVELER
(OPT)

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0700092

SCALE: NONE 525146 (525107) PAGE: 9.4

FORM NO 20215



REVISION				
LET	DESCRIPTION		DATE	APPD

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS		SERIALS
R-FA7	18			S-1367-1-14 SOLDER		
R-FA6	18			S-1367-1-8 SOLDER		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
3	MS3106A10SL3S	CONNECTOR	
2	CA-2	CIRCUIT BREAKER	(B0602)
1	C661003-0201	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:

SUPERSEDED BY:

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wiel	9-13-67
DRAWN	HARRIS	9-8-67
CHECK	LAURIE	9-9-67
STRESS	[illegible]	9-11-67
PROJECT	[illegible]	9-14-67
APPD	Z. E. Moore	9-9-67

Cessna AIRCRAFT CO.

COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE

WIRING DIAGRAM — TURN COORDINATOR (OPT)

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0700092

SCALE: NONE | 180 & 185 | PAGE: 9.5

(SER 18051876) & ON
(SER 185-1301) & ON

FORM NO. 80-215A

OTHER INSTRUMENTS SECTION

Cessna.

DRAWN	AJ	TITLE: WIRING DIAGRAM--- MODEL 180-185	DRAWING NO. 0700092
DATE	10-11-82		
APP'D	RAS	REV:	PAGE: 10.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-108

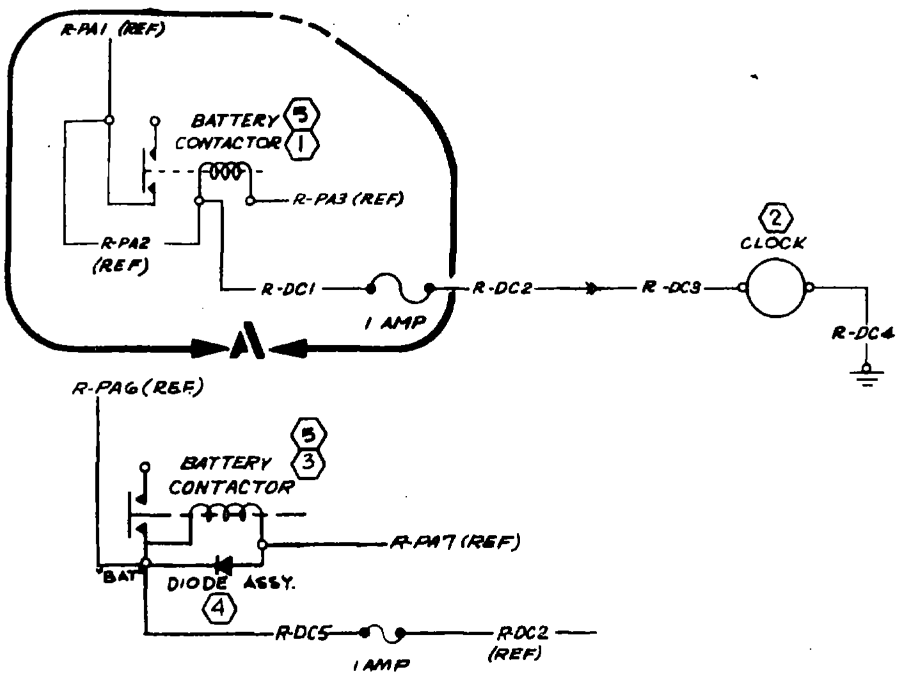
(SER 18051206)&ON(SER 185-0541)&ON
(SER 18051249)&ON(SER 185-0559)&ON

NOTES:

1. 0850469-1 CONTACTOR REPLACES 0712603-2 ON 24 VOLT AIRCRAFT.

2. S1580-1 BATTERY CONTACTOR REPLACES 0850469-1 BATTERY CONTACTOR AT SERIAL 185-1251& ON, ON 24 VOLT AIRCRAFT. ITEM 3 IS APPLICABLE TO 12 VOLT SYSTEMS ONLY.

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV: ADD DETAIL A, R-DC5 & SERIALS. SERIALIZED OUT R-DC1. (SR4664)&(SR4665)	LPB 1-8-65	
B	BY REV: ADD S-1580-1 EFF AT SERIAL 185-1251& ON	C.O. 6-7-67	



DETAIL A
(SR4664)&(SR4665)&ON

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-DC5	18			S-1367-1-13	SOLDER		(SR4664)&(SR4665)&ON
R-DC4	18		17	S-1367-1-8	S-1367-1-6		
R-DC3	18		172	S-341-2	S-1367-1-6		
R-DC2	18			S-341-2	SOLDER		STANDARD
R-DC1	18		11	S-1367-1-6	SOLDER		THRU (SR4664)&(SR4665)

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
5	S-1580-1	CONTACTOR	24 VOLT
4	0770728-1	DIODE ASSY	
3	S-1579-1	CONTACTOR	12 VOLT
2	S-1317N1	CLOCK	
1	0712603-2	CONTACTOR	12 VOLT

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	SPRIGGS	10-9-62
GROUP	[illegible]	10-31-62
CHECK	[illegible]	10-27-62
PROJ	[illegible]	10-30-62

TITLE: WIRING DIAGRAM — CLOCK (OPT)

Cessna.

DWG NO 0700092

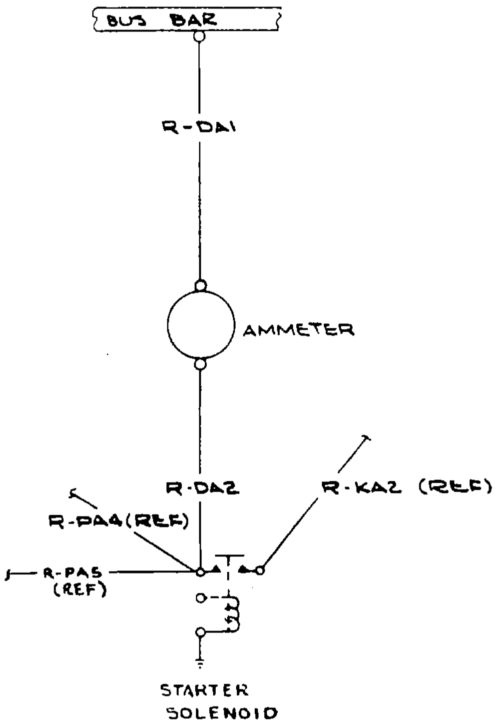
SUPERSEDED BY | SUPERSEDES | MODEL 180-185 | REV B | PAGE 10.1

FORM NO. 80-161

(SR 4012)

CHG LET	REVISION	BY / DATE	CHK / APPD

NOTES
1 WHEN AMMETER IS INSTALLED DA1 & DA2 WIRES REPLACE -PA5 WIRE



Inactive SER. 185-0777 & ON SER. 180-51446 & ON 1-13-65 2-2-65 2-16-65

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
R-DA2	8			S-1367-4-10	S-13674-14	0700036	
R-DA1	8			S-1367-4-8	S-13674-10	0700036	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	10-2-62
GROUP	V. Jernow	10-31-62
CHECK	R. Stuck	10-27-62
PROJ	[illegible]	10-30-62

TITLE: WIRING DIAGRAM — AMMETER (OPT)

Cessna.

DWG NO 0700092

SUPERSEDED BY 0700092 PAGE 8.2.1 | SUPERSEDES [illegible] | MODEL 180-185 | REV | PAGE 10.2

LIGHTING SECTION

Cessna.

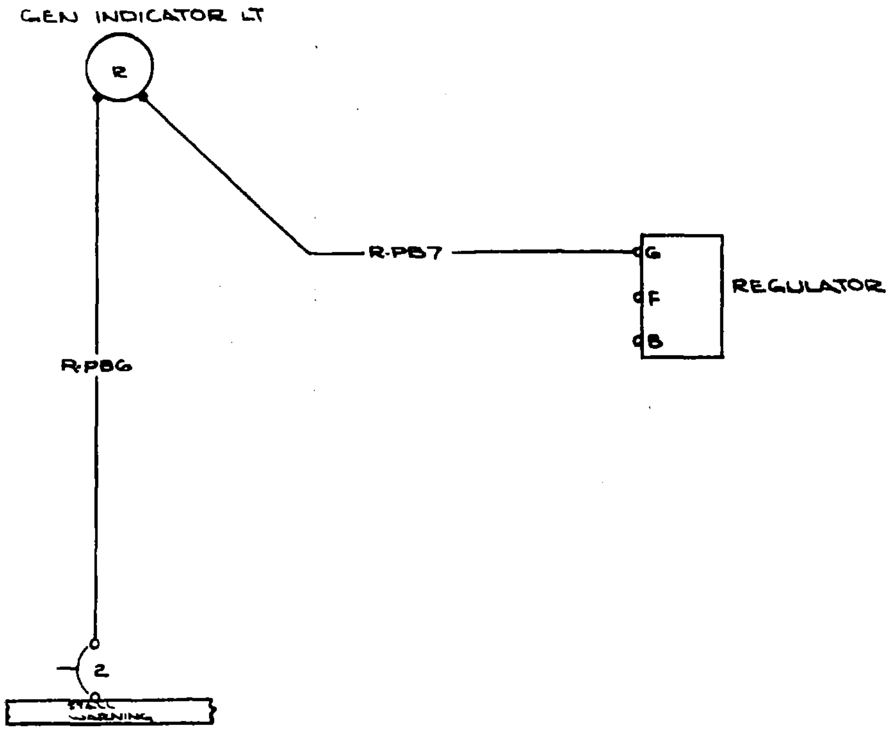
DRAWN	AJ	TITLE: WIRING DIAGRAM---		DRAWING NO.
DATE	10-11-62	MODEL 180-185		0700092
APP'D	RRS		REV:	PAGE: 11.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-1

(SR4012)

CHG LET	REVISION	BY DATE	CHK APPD



Inactive SER 18051446 & ON
185-0777 & ON
W.J.R 2-16-65
H.J.W 3-22-65
R.P.S. ...

R-PB7	18		62	S-1367-1-10	———		
R-PB6	18		16	———	S-1367-2-8		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	9-6-62
GROUP	J. Tennant	10-31-62
CHECK	R. Hook	10-26-62
PROJ	R. Sass	10-30-62

TITLE: WIRING DIAGRAM — GENERATOR INDICATOR LIGHT

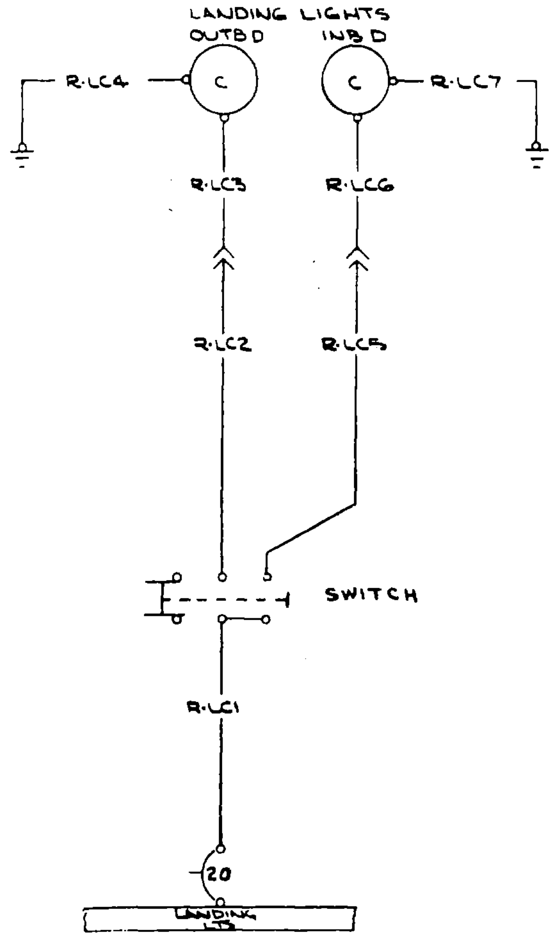
Cessna.

DWG NO 0700092

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
	0700089 0700088	180-185		11.1

CHG LET	REVISION	BY DATE	CHK APPD
A	20 AMP CIRCUIT BKR WAS 15 AMP SR 4361	2-24 7-11-63	ACS

(SR 4012)



Inactive SER 18051775 & ON 185-1150 11-11-65 1-4-66

R-LC7	14		6	S-1367-2-8	S-1367-2-8		
R-LC6	14		136	S-1367-2-8	S-341-1		
R-LC5	14		44	S-1367-2-8	S-341-1		
R-LC4	14		6	S-1367-2-8	S-1367-2-8		
R-LC3	14		143	S-1367-2-8	S-341-1		
R-LC2	14		44	S-1367-2-8	S-341-1		
R-LC1	14		9	S-1367-2-8	S-1367-2-8		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	JOHNSON	10/10/62
GROUP	[illegible]	10-31-62
CHECK	C. [illegible]	12-27-62
PROJ	[illegible]	11-30-62

TITLE: **WIRING DIAGRAM — LANDING LIGHTS**

Cessna.

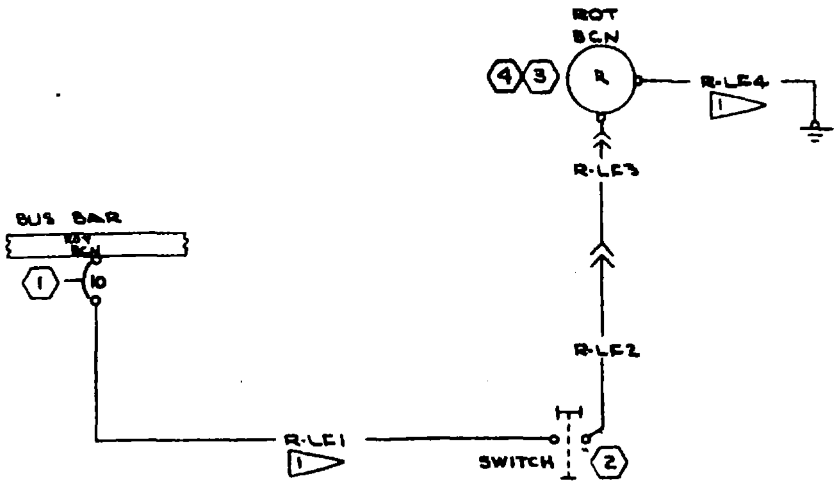
DWG NO 0700092

SUPERSEDED BY 0700092, PP 11.1 | SUPERSEDES 0700059 0700085 | MODEL 180-185 | REV A | PAGE 11.2

FORM NO 80-161

(SER 18051241) & ON
(SER 185-0569) & ON

CHG LET	REVISION	BY / DATE	CHK / APPD
A	R-LF4 WIRE 16 GA WAS 18GA ADDED [illegible] WIRE LENGTH W/T & I/N TO E/T	[illegible]	[illegible]
B	BY REV: ADD 0700120-2 FOR 24 VOLT SYSTEM	CG 6-9-67	HW



Inactive 18051775 & ON IX
185-1150 & ON IX
WJR 12-4-65
HW 1-4-66
RRS
DRM #6

NOTES:
1 WIRES FLAGGED THUS ARE OPTIONAL ON MODEL 180.

R-LF4	16		10	S-1367-2-6	S-1367-2-8	OPT 180	
R-LF3	16		65	S-341-1	S-341-1		
R-LF2	16		271	S-1367-2-8	S-341-1		
R-LF1	16		5	S-1367-2-8	S-1367-2-8	OPT 180	
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
4	0700120-2	ROTATING BCN	24 VOLT
3	0700120-1	ROTATING BCN	12 VOLT
2	0713026-4	SWITCH	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

	NAME	DATE
DRAWN	JOHNSON	9/4/62
GROUP	[illegible]	11-19-62
CHECK	[illegible]	10-22-62
PROJ	[illegible]	11-19-62

TITLE: WIRING DIAGRAM — ROTATING BEACON

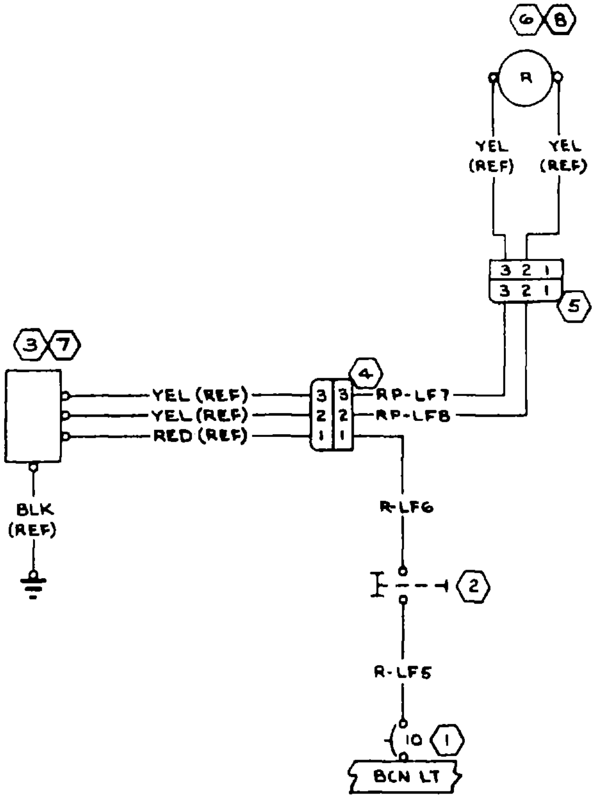
Cessna.

DWG NO. 0700092

SUPERSEDED BY 0700092 PAGE #3.1 | SUPERSEDES [illegible] | MODEL 180-185 | REV B | PAGE: 11.3

FORM NO. 80-161

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV: ADD C[illegible]01-0103 & C621001-0103 FOR 24 VOLT SYSTEM	C.D. 7-7-67	[illegible]



RP-LF8	16			S-1636-2	S-1638-2		
RP-LF7	16			S-1636-2	S-1638-2		
R-LF6	16			S-1367-2-[illegible]	S-1636-2		
R-LF5	16			S-1367-2-6	S-1367-2-[illegible]	(OPT) 180	
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			REMARKS

WIRE TABLE

8	C621001-0103	LIGHT ASSY	24 VOLT
7	C594501-0103	FLASHER ASSY	24 VOLT
6	C621001-0101	LIGHT ASSY	12 VOLT
5	S-1638-2	HOUSING - CAP	
4	S-1638-1	HOUSING - PLUG	
3	C594501-0101	FLASHER ASSY	12 VOLT
2	0713026-4	SWITCH ASSY	
1	S-1360-10	CIRCUIT BREAKER	
ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

	NAME	DATE
DRAWN	RIDDER	12-4-65
GROUP	[illegible]	1-4-66
CHECK	[illegible]	1-4-66
PROJ	[illegible]	1-6-66

TITLE: WIRING DIAGRAM— FLASHING BEACON LIGHT

Cessna.

DWG NO 0700092

SUPERSEDED BY

SUPERSEDES 0700092 PAGE 11.5

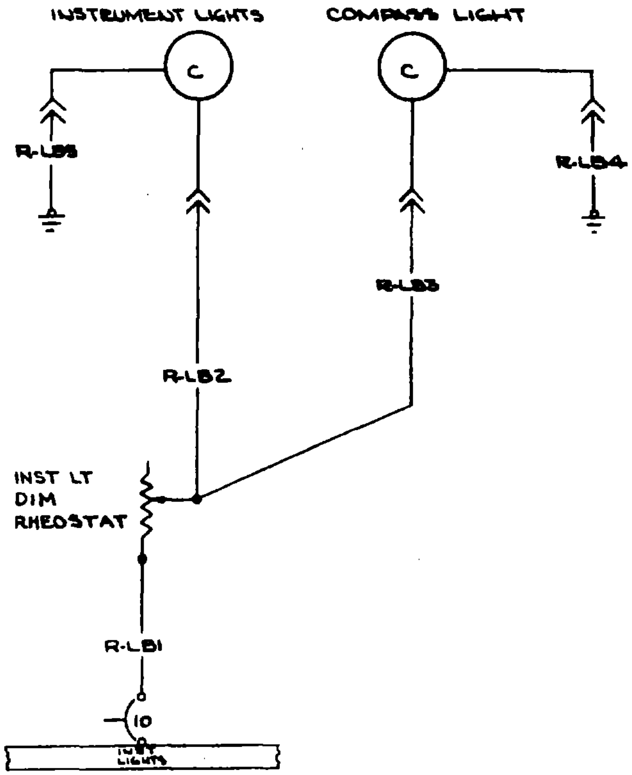
MODEL 180 & 186

REV A

PAGE 11.3.1

(SRA012)

CHG LET	REVISION	BY DATE	CHK APPD



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
R-LB5	18			S-1370-1	S-1367-1-6		
R-LB4	18			S-1367-1-8	S-341-2		
R-LB3	18			——	S-341-2		
R-LB2	18			S-341-2	——		
R-LB1	18			——	S-1367-2-8		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION, WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	9/5/62
GROUP	V. Tuvan	10-2-62
CHECK	R. Stuck	10-27-62
PROJ	JA Scott	10-30-62

TITLE WIRING DIAGRAM — COMPASS & INSTRUMENT LIGHTS

Cessna.

DWG NO. 0700092

SUPERSEDED BY

SUPERSEDES 0700072

MODEL 180-185

REV.

PAGE: 11.4

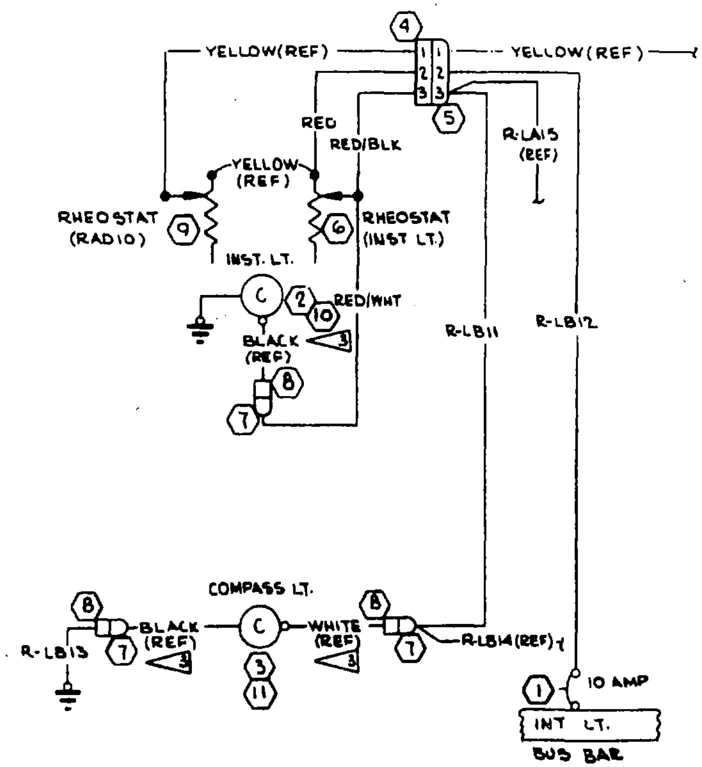
FORM NO. 80-161

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV: ADD MS25237-327 & GE 308 FOR 24 VOLT SYSTEM	C.G. 6-7-67	

(SER 18051608 THRU 18051770)
(SER 185-0968 THRU 185-1149)

NOTES;

1. INSTALL S-1635-1 PIN ON BLACK WIRE OF COMPASS AND S-1636-1 SOCKET ON WHITE WIRE OF COMPASS.
2. INSTALL S-1636-2 SOCKET ON BLACK WIRE OF INSTRUMENT LIGHT.
3. WIRES FURNISHED BY VENDOR
4. ALL WIRE MATERIAL PER S-1460



11	MS25237-327	LAMP	24 VOLT
10	GE 308	LAMP (24446)	24 VOLT
9	0413126-5	RHEOSTAT	
8	S-1637-2	HOUSING-PLUG	
7	S-1637-1	HOUSING-CAP	
6	XR6085	RHEOSTAT (TRTA)	
5	S-1638-2	HOUSING-CAP	
4	S-1638-1	HOUSING-PLUG	
3	0713068-2	COMPASS LT	12 VOLT
2	0511481-9	INSTRUMENT LT.	12 VOLT
1	S-1360-10	CIRCUIT BREAKER	
ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

R-LB13	18			S-1367-1-4	S-1636-2		
R-LB12	18			S-1367-1-6	S-1635-2		
R-LB11	18			S-1635-3	S-1635-3		
RED	18	-18-2		SOLDER	S-1636-2		
RED/BLK	18	-18-2-0		SOLDER	S-1636-2		
RED/WHT	18	-18-2-9		S-1635-2	SOLDER		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

4 WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BLISS	5-28-65
GROUP	H. Wind	1-15-65
CHECK	[illegible]	7-26-65
PROJ	[illegible]	7-26-65

TITLE: WIRING DIAGRAM— COMPASS & INSTRUMENT LIGHTS

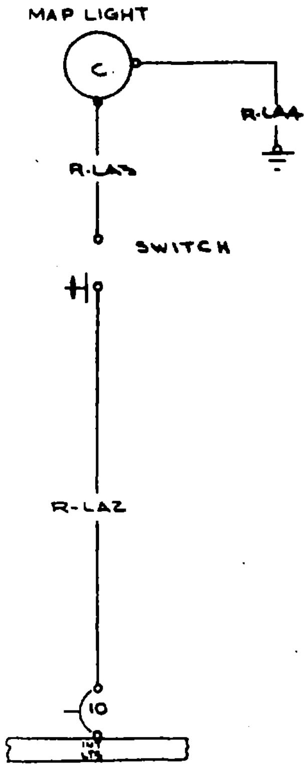
Cessna.

DWG NO 0700092

SUPERSEDED BY | SUPERSEDES 0700092 PG 11.4 | MODEL 180-185 | REV A | PAGE 11.4.1

(SR 4012)

CHG LET	REVISION	BY / DATE	CHK / APPD



Inactive SER 18051341 & ON
185-0684 & ON
W.J.R. 2-16-65
H.P.W. 3-22-65
RRS-pd
DHM

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-LA4	18		12	S-1367-6	S-1367-6		
R-LA3	18		18	S-1367-1-4	———		STD
R-LA2	18		54	S-1367-1-4	S-1367-1-8		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	10/10/62
GROUP	V. Tammel	10-31-62
CHECK	R. Stock	10-27-62
PROJ	[illegible]	10-31-62

TITLE: WIRING DIAGRAM — MAP LIGHT (OPTIONAL)

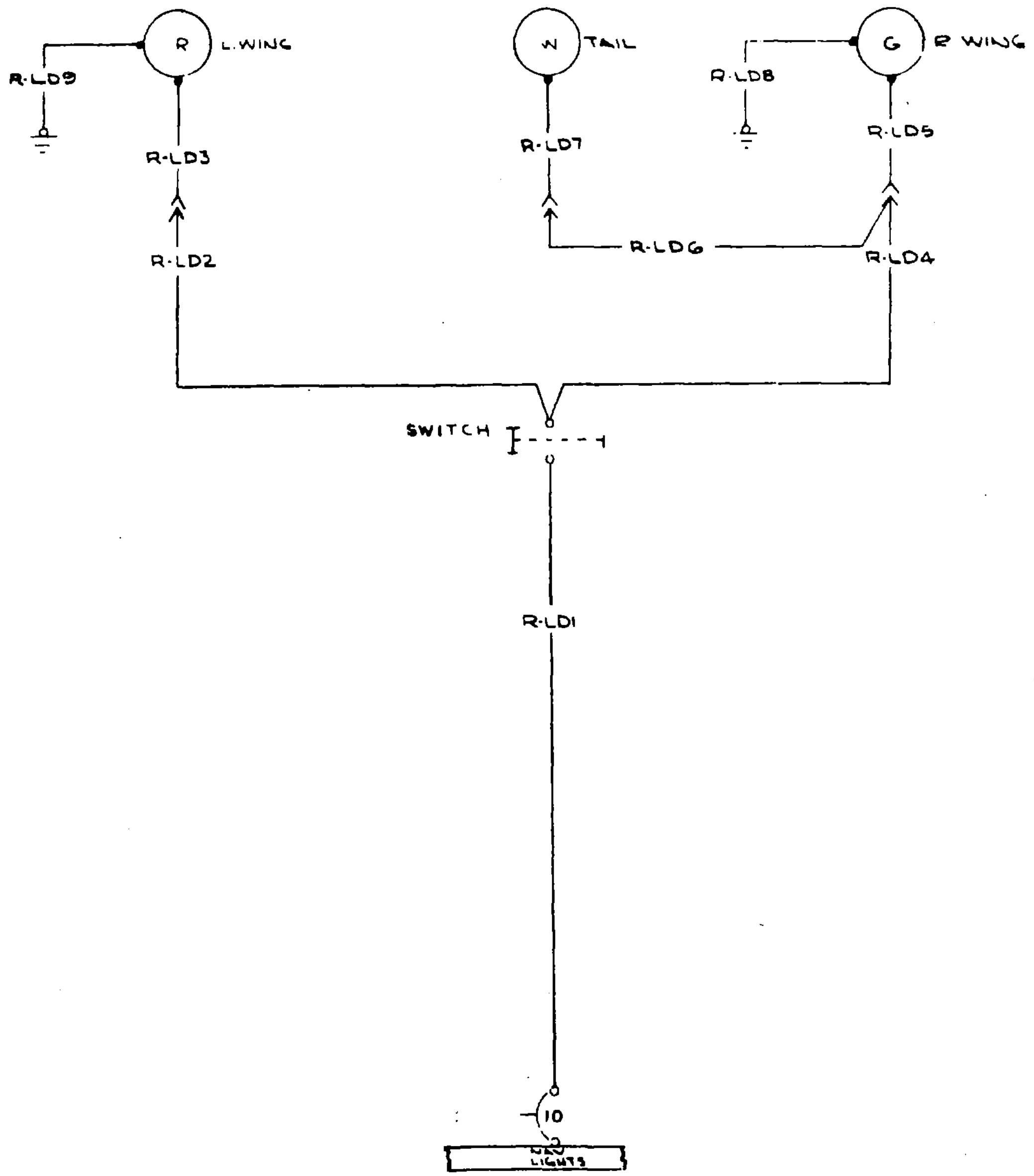
Cessna.

DWG NO 0700092

SUPERSEDED BY: 0700092 PAGE 11.11 | SUPERSEDES 0700059 0700089 | MODEL 180-185 | REV | PAGE 11.5

POSITION LIGHTS (SR 4012)

CHG LET	REVISION	BY DATE	CHK APPD



Inactive SER 18051775 & ON
185-1150 & ON

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-LD9	18		15	S-1367-1-8	——		
R-LD8	18		15	S-1367-1-8	——		
R-LD7	18		20	S-341-2	——		
R-LD6	18		234	S-341-2	COMMON TO LD4		
R-LD5	18		214	S-341-2	——		
R-LD4	18		74	S-1367-1-8	S-341-2		
R-LD3	18		214	S-341-2	——		
R-LD2	18		52	S-1367-1-8	S-341-2		
R-LD1	18		7	S-1367-1-8	S-1367-1-8		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	[illegible]	[illegible]
GROUP	[illegible]	[illegible]
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — NAVIGATION LIGHTS

Cessna.

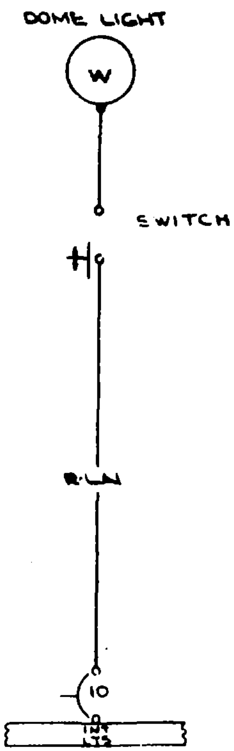
DWG NO 0700092

SUPERSEDED BY 0700092, PP 11.13 | SUPERSEDES [illegible] | MODEL 180-185 | REV | PAGE 11.6

FORM NO 80181

(SR 4012)

CHG LET	REVISION	BY DATE	CHK APPD



SER 18051775 & ON
185-1150
-11-65

WIRE CODE NO	GA	MATERIAL		TERMINALS			SERIALS
R-LA1	18		102	S1367-1-6	COMMON TO LA1		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	9/4/62
GROUP	[illegible]	[illegible]
CHECK	[illegible]	10-27-62
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — DOME LIGHT

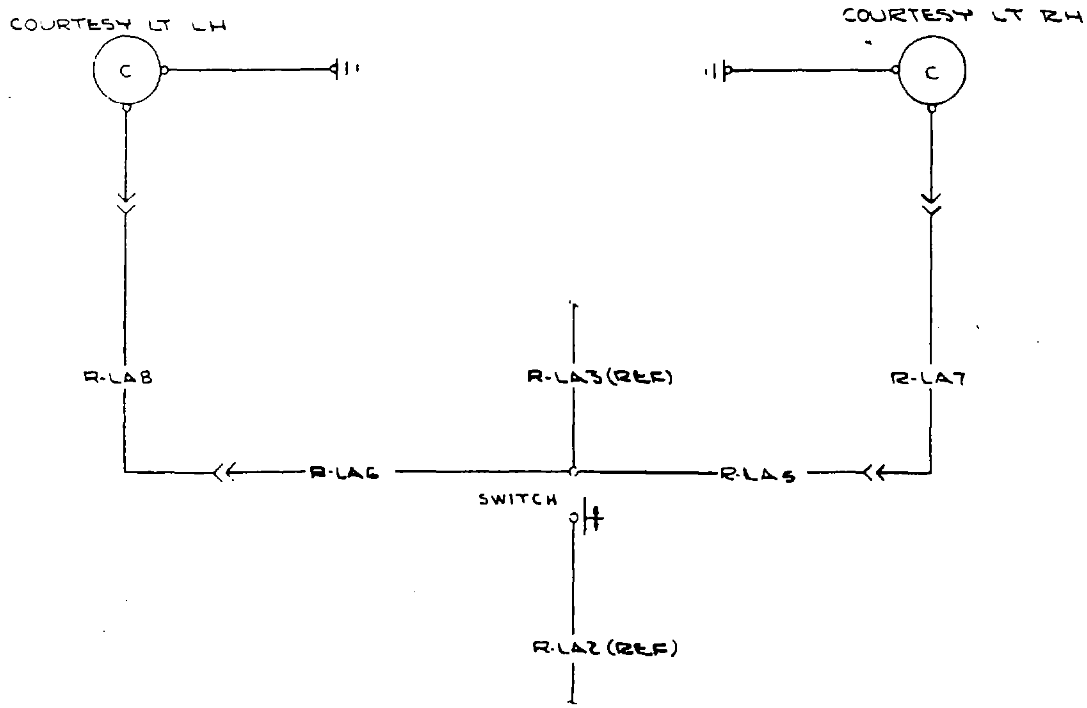
Cessna.

DWG NO 0700092

SUPERSEDED BY: 0700092 [illegible] | SUPERSEDES: 0700032 0100032 | MODEL 160-185 | REV | PAGE 11.7

FORM NO 80-161

CHG LET	REVISION	BY DATE	CHK APPD



inactive SER 1805 1775 & ON
185-1150 & ON
11-11-65
JRC
1-4-66

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-LA 8	18		125	S-341-2	S-341-2		
R-LA 7	18		125	S-341-2	S-341-2		
R-LA 6	18		60	S-341-2	COMMON TO LA5		
R-LA 5	18		60	S-341-2	S-1367-1-6		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	7/31/62
GROUP	V. Tryanol	[illegible]
CHECK	E. [illegible]	[illegible] 26-62
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — COURTESY LIGHTS (OPT)

Cessna.

DWG NO 0700092

SUPERSEDED BY: 0700092, PP 11.14

SUPERSEDES: 0700013

MODEL 180-185

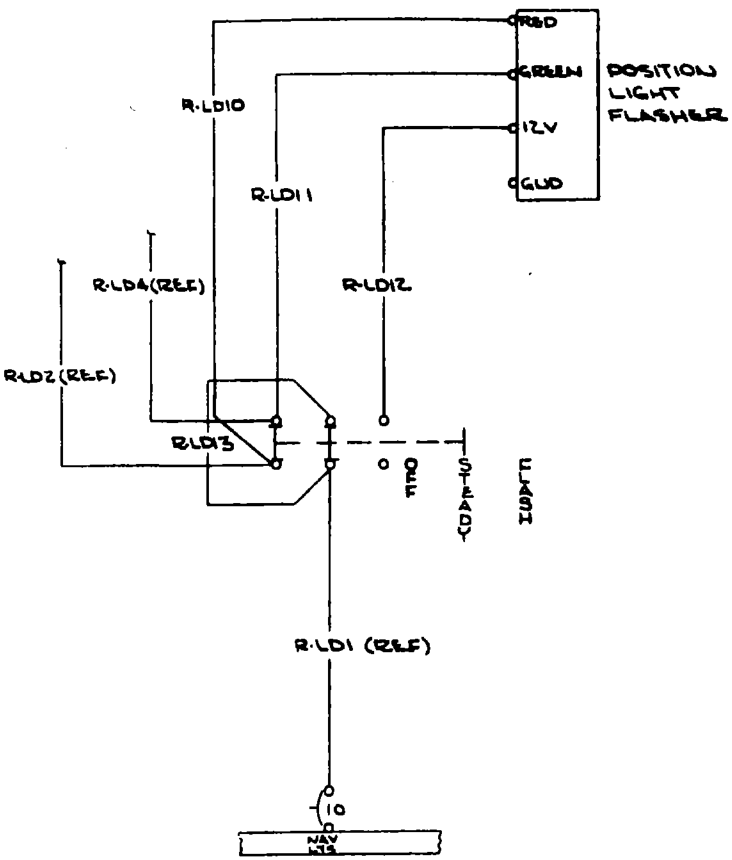
REV

PAGE 11.8

FORM NO 80 '61

(9R4012)

CHG LET	REVISION	BY DATE	CHK APPD



Inactive SER 18051446 & ON
W.J.R. 2-16-65
H.L.W. 3-22-65
RRS. DKM

R-LD13	18		13	S-1367-1-8	S-1367-1-8		
R-LD12	18		19	S-1367-1-6	S-1367-1-8		
R-LD11	18		18	S-1367-1-6	S-1367-1-8		
R-LD10	18		18	S-1367-1-6	S-1367-1-8		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	10/29/62
GROUP	V. Kennedy	10-31-62
CHECK	R. Black	10-31-62
PROJ	R. Settle	10-31-62

TITLE: WIRING DIAGRAM — POSITION LIGHT FLASHER (OPT)

Cessna.

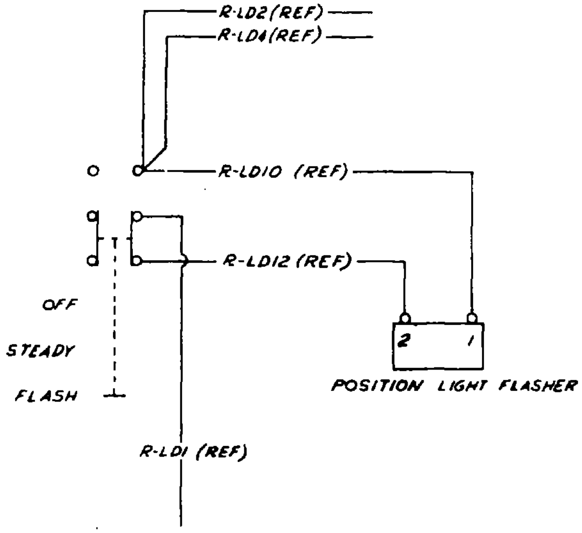
DWG NO 0700092

SUPERSEDED BY: | SUPERSEDES 0700039 | MODEL 180 | REV | PAGE 11.9

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CHG LET	REVISION	BY / DATE	CHK / APPD



Inactive SER 18051446 & ON
W.A.G. 2-16-65
H.J.W. 3-22-65
RRS DKM

WIRE TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS	SERIALS

EQUIPMENT TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	SPRIGGS	11-21-62
GROUP	N. Jerrard	11-27-62
CHECK	E. Stark	11-27-62
PROJ	[illegible]	11-27-62

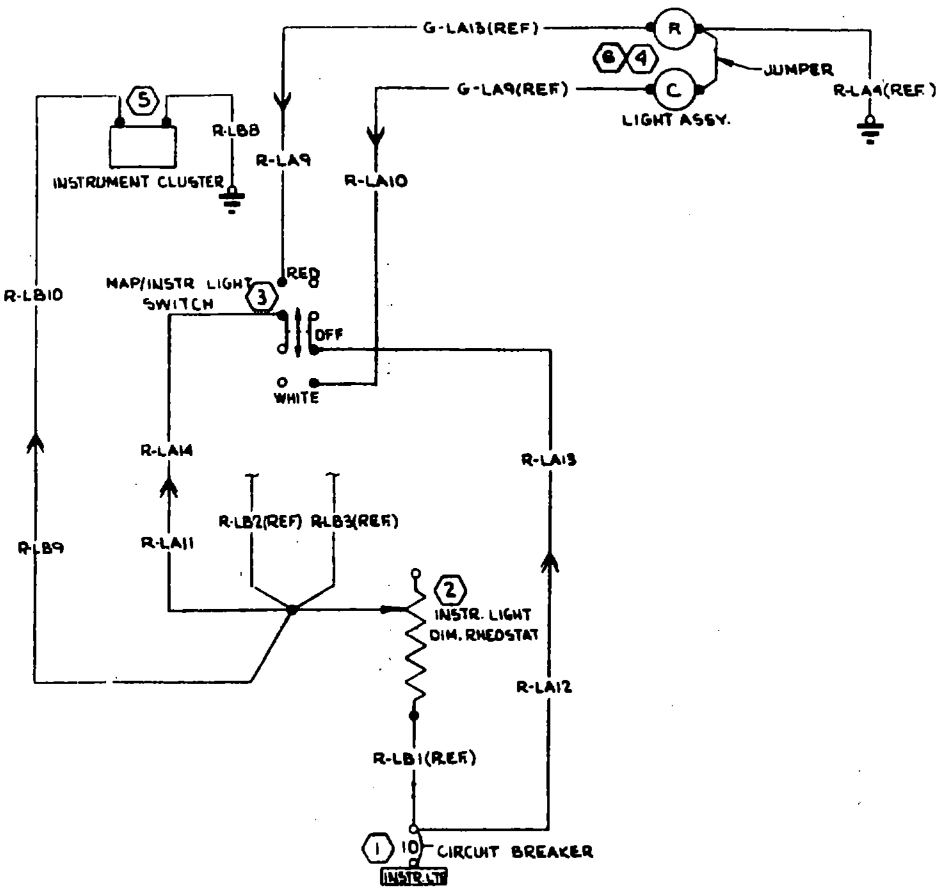
TITLE: WIRING DIAGRAM — POSITION LIGHT FLASHER, 24V (OPT)

Cessna.

DWG NO 0700092

SUPERSEDED BY | SUPERSEDES | MODEL 180 | REV | PAGE 11.10

CHG LET	REVISION	BY / DATE	CHG APPR
A	ADD R-LB8, R-LB9, R-LB10 (SR[illegible])	[illegible]	[illegible]
B	ADD R-LA[illegible]	[illegible]	[illegible]
C	BY REV I ADD 1470089-13 FOR 24 VOLT SYSTEM	C.G. 6-7-67	[illegible]



Inactive
18051608 & ON
185-0968 & ON
7-21-65 [illegible]
8-12-65 [illegible]

R-LA14	18		6	S-341-2	SOLDER		
R-LA13	18		6	S-341-2	SOLDER		
R-LA12	18		45	S-1367-1-6	S-341-2		
R-LB10	20		28	SOLDER	S-341-2		1805485 183-0001 & ON
R-LB9	20		8	SOLDER	S-341-2		1805485 185-0001 & ON
R-LB8	20		10	SOLDER	S-1367-1-8		1805485 185-0801 & ON
R-LA11	18		60	S-341-2	SOLDER		
R-LA10	18		6	S-341-2	SOLDER		
R-LA9	18		6	S-341-2	SOLDER		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
6	1470089-13	LIGHT ASSY	24 VOLT
5	C669502-0103	INSTR. CLUSTER	
4	1470089-14	LIGHT ASSY	12 VOLT
3	S-1501-1	SWITCH	
2	R-12½-8-R534	RHEOSTAT(TRTA)	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	FIFE	9-24-63
GROUP	[illegible]	10-22-63
CHECK	[illegible]	10-11-63
PROJ	[illegible]	10-13-63

TITLE: WIRING DIAGRAM—MAP & INSTRUMENT LIGHT

Cessna.

DWG NO: 0700092

SUPERSEDED BY: 0700092 PG 11.11.1

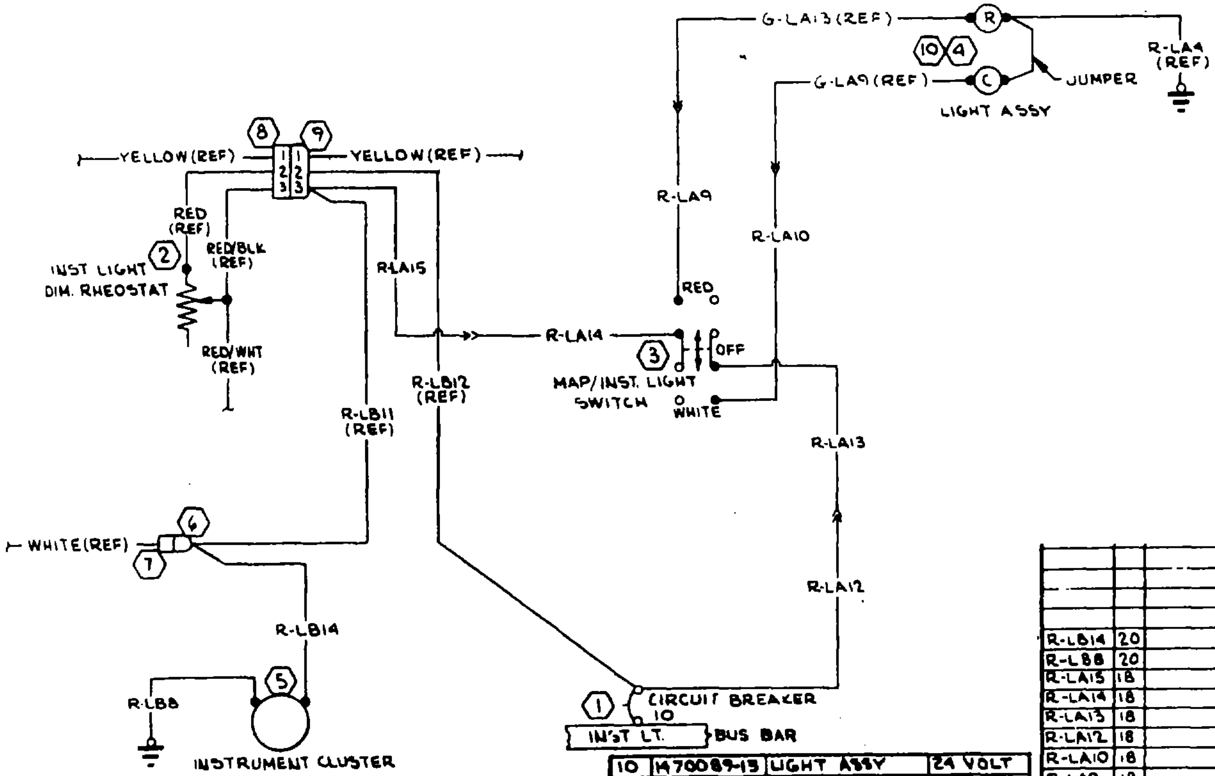
MODEL: 180-185

REV: C

PAGE: 11.11

(SEE 18051608 THRU 18051774)
(SEE 186-0868 THRU 186-1149)

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV: ADD 1470089-13 FOR 24 VOLT SYSTEM	CG 6-7-67	



ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
10	1470089-13	LIGHT ASSY	24 VOLT
9	S-1638-2	HOUSING-CAP	
8	S-1638-1	HOUSING-PLUG	
7	S-1637-2	HOUSING-PLUG	
6	S-1637-1	HOUSING-CAP	
5	C669502-0103	INST CLUSTER	
4	1470089-14	LIGHT ASSY	12 VOLT
3	S-1501-1	SWITCH	
2	XR-6085	RHEOSTAT (TRTA)	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
R-LB14	20			S-1635-3	SOLDER		
R-LB8	20		10	SOLDER	S-1367-1-8		
R-LA15	18			S-1635-3	S-341-2		
R-LA14	18		6	S-341-2	SOLDER		
R-LA13	18		6	S-341-2	SOLDER		
R-LA12	18		45	S-1367-1-6	S-341-2		
R-LA10	18		6	SOLDER	S-341-2		
R-LA9	18		6	SOLDER	S-341-2		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BLISS	6-23-65
GROUP	V Wine	8-12-65
CHECK	R [illegible]	8-12-65
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM— MAP & INSTRUMENT LIGHT (OPTIONAL)

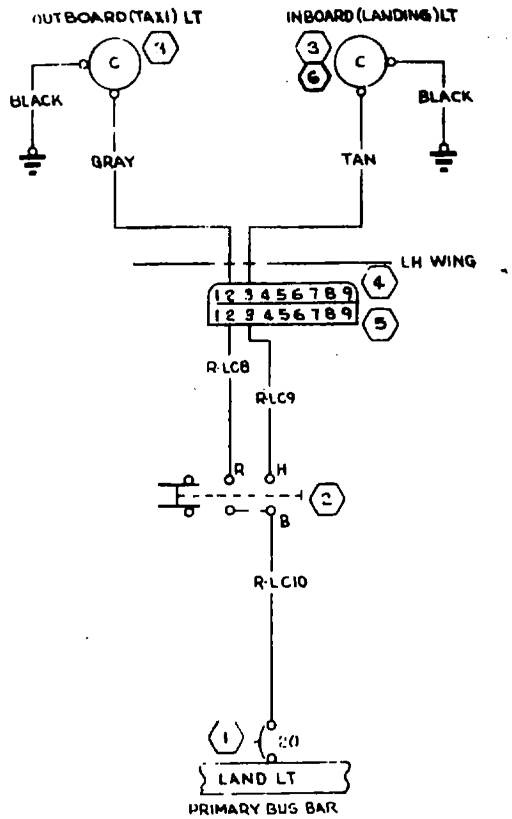
Cessna.

DWG NO 0700092

SUPERSEDED BY:
SUPERSEDES: 0700092 PG 11.11
MODEL: 180-185
REV: A
PAGE: 11.11.1

(SER 1825 173) & ON
(SER 165- 55) & ON

	REVISION	BY / DATE	CHK / APPD
A	BY ... ADD C842215-9 FOR 24 VOLT SYSTEM	CG 6-1-67	



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
BLACK	16	S-1460-16 : 0		.1367 2 8	S-1367-2 8		STD
BLACK	16	S-1460-16 : 0		S 1367 2 8	S 1367 2 8		STD
TAN	14	S-1460-14 : 10		S-1635 2	S-1367 2-8		STD
GRAY	14	S-1460-14 : 8		S 1635-2	S-1367 2-8		STD
R-LC9	14			S 1367 2-8	S-1636-2		STD
R-LCB	14			S 1367 2-8	S 1636-2		
R-LC10	14			S 1367 2 8	S 1367 2 8		

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
6	0842215-9	LIGHT	24 VOLT
5	S 1641-9	HOUSING-SOCKET	—
4	S-1640-9	HOUSING PIN	
3	0523118-1	LIGHT	12 VOLT
2	0713035	SWITCH ASSY	
1	S-1360-20	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	W. COOK	1 4 66
GROUP	H. Wise	1 4 66
CHECK	R. ...	1 4 66
PROJ	...	1-6-66

TITLE: WIRING DIAGRAM— LANDING & TAXI LIGHTS (OPT)

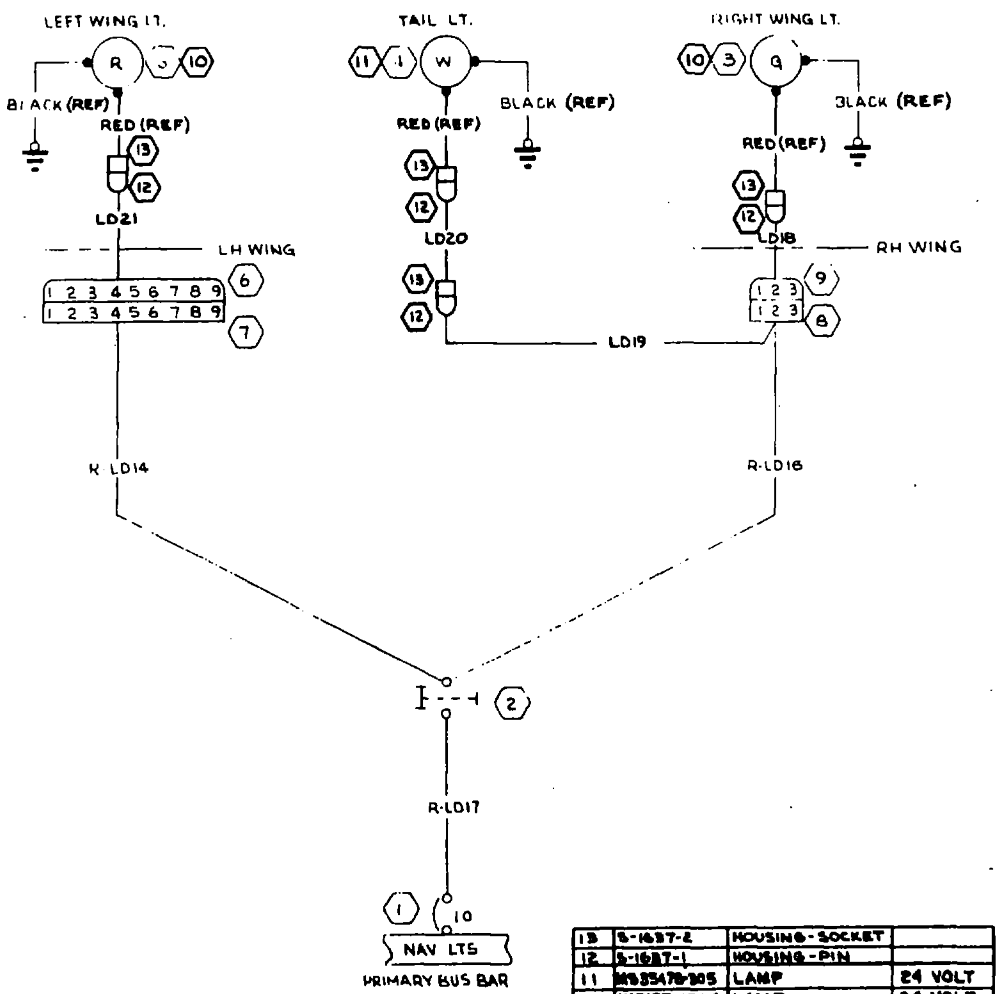
Cessna.

DWG NO: 0100092

SUPERSEDED BY:
SUPERSEDES: 0700092 PP 11.2
MODEL: 180-185
REV: A
PAGE: 11.12

(SER 18051775 & ON)
(SER 185-1150 & ON)

CHG LET	REVISION	BY / DATE	CHK / APPD
A	BY REV: ADD AN3122-1524 & MS35478-305 FOR 24 VOLT SYSTEM	CG 6-7-67	YAK
B	BY REV: C622001-0102 WAS 0423006-21E-22, C622001-0102 WAS 0433006-7 ITEM 3 WAS ITEM 5 R-LD19 WAS R-LD15 & R-LD20 WAS R-LD7; ADD R-LD18, R-LD21 S-1637-1, S-1637-2; DELETE 3 RED WIRES & 3 BLACK WIRES. ED&RR 01163 ED&RR 01338	RCC 1-6-67	RLL JD



ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
13	S-1637-2	HOUSING-SOCKET	
12	S-1637-1	HOUSING-PIN	
11	MS35478-305	LAMP	24 VOLT
10	AN3122-1524	LAMP	24 VOLT
9	S-1638-2	HOUSING-CAP	
8	S-1638-1	HOUSING-PLUG	
7	S-1641-9	HOUSING-SOCKET	
6	S-1640-9	HOUSING-PIN	
5			
4	C622001-0102	TAIL LIGHT ASSY	12 VOLT
3	C622001-0202	WING LIGHT	12 VOLT
2	0113026-4	SWITCH ASSY	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
R-LD21	18			S-1635-2	S-1635-1		
R-LD20	18			S-1636-1	S-1635-1		
R-LD19	18			S-1637-1	COMMON TERM TO R-LD16		
R-LD18	18			S-1635-2	S-1635-1		
R-LD16	18			S-1367-1-8	S-1636-2		
R-LD15	18	THRU SER (185631)		S-341-2	COMMON TERM TO R-LD16		
R-LD14	18			S-1367-1-8	S-1636-2		
R-LD7	18	THRU SER (185631)	20	S-341-2	SOLDER		
R-LD17	18			S-1367-1-6	S-1367-1-8		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	W COOK	12-1-65
GROUP		1-4-66
CHECK		1-4-66
PROJ		

TITLE: WIRING DIAGRAM — WING AND TAIL LIGHTS

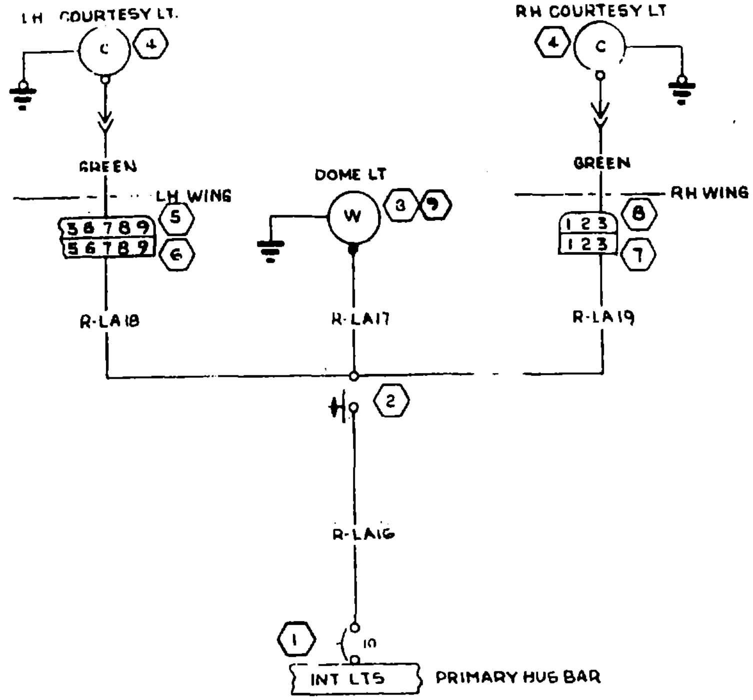
Cessna.

DWG NO. 0700092

SUPERSEDED BY:
SUPERSEDES: 0700092 PP11.6
MODEL: 180-185
REV B
PAGE: 3

(SER 18051775) & ON
(SER 186-1180) & ON

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV: ADD MS25231-313 FOR 24 VOLT SYSTEM	C.G. 6-7-67	



9	MS25231-313	LAMP	24 VOLT
8	S-1638-2	HOUSING-CAP	
7	S-1638-1	HOUSING-PLUG	
6	S-1641-9	HOUSING-SOCKET	
5	S-1640-9	HOUSING-PIN	
4	0700615-5	COURTESY LIGHT INSTL	
3	0413142-5	DOME LIGHT	12 VOLT
2	0713029	SWITCH	
1	1360-10	CIRCUIT BREAKER	
ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

GREEN	18	S-1460-18-5		S-1635-2	S-341-2		
GREEN	18	S-1460-18-5		S-1635-2	S-341-2		
R-LA19	18			S-1367-1-6	S-1636-2		
R-LA18	18			S-1367-1-6	S-1636-2		
R-LA17	18			S-1367-1-6	SOLDER		
R-LA16	18			[illegible]	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	W COOK	12-1-65
GROUP	H Wass	1-4-66
CHECK	[illegible]	1-4-65
PROJ	[illegible]	1-6-66

TITLE: WIRING DIAGRAM— COURTESY & DOME LIGHTS

Cessna.

DWG NO: 0700092

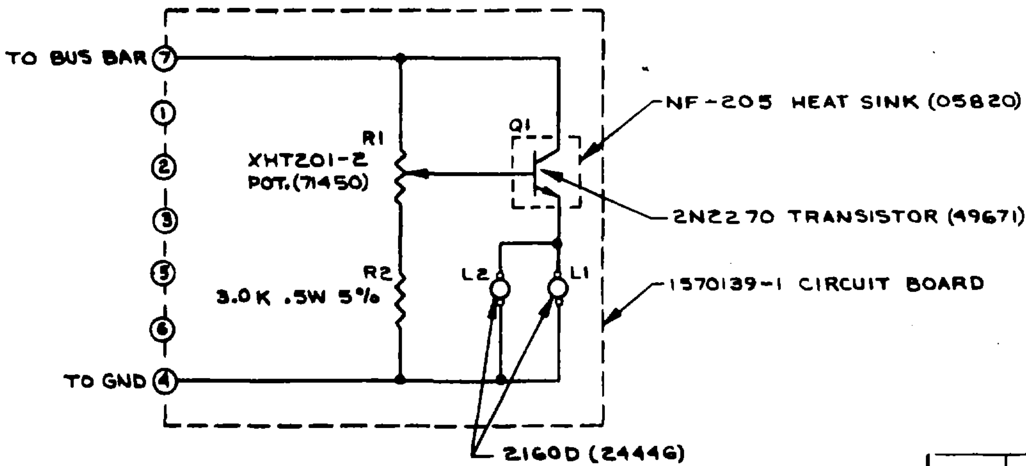
SUPERSEDED BY:
SUPERSEDES: 0700092 PP117,11.E
MODEL: 150-185
REV: A
PAGE: 11.14

FORM NO. 20-1514

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

NOTES:

1. ALL MATERIALS DEFINED ON THIS DRAWING ARE FOR REFERENCE AND TECHNICAL USE ONLY



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION

EQUIPMENT TABLE

CONTRACT NO.

	NAME	DATE
DESIGN	[illegible]	7-28-67
GROUP	H. Wise	7-27-67
DRAWN	C. GARCIA	9-19-67
CHECK	R. STUCK	9-19-67
STRESS	[illegible]	9-19-67
PROJECT	DG [illegible]	9-19-67
APPD	R.C. [illegible]	9-19-67

SUPERSEDES:
12337-794

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM —
MAP LIGHT, CONTROL WHEEL
(12 VOLT)

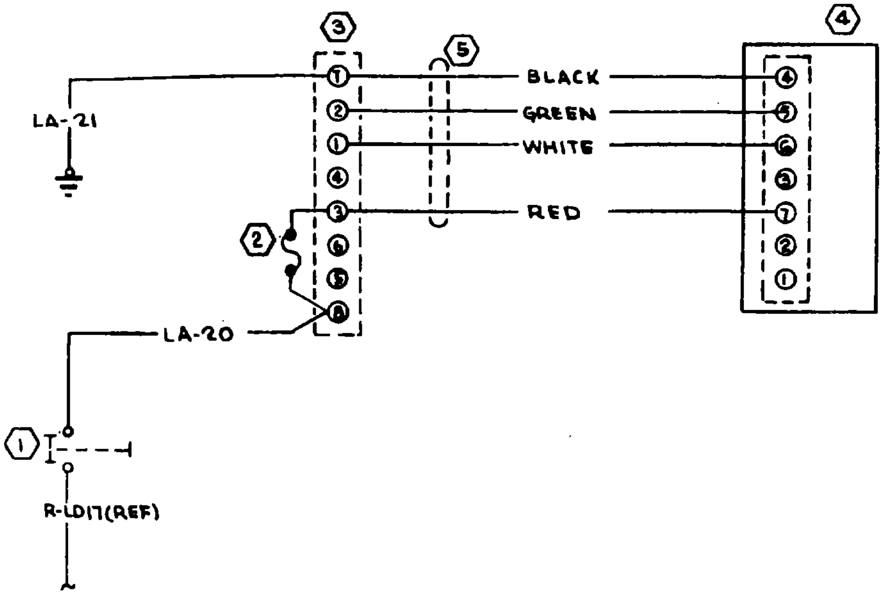
SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0700092

SCALE. NONE | PAGE. 11.15

(SER 18051816) & ON
(SER 186-1301) & ON

FORM 88 68-215

REVISION			
LET	DESCRIPTION	DATE	APPD



NOTES;
1 CORRECT POLARITY MUST BE OBSERVED. OTHERWISE, PERMANENT DAMAGE TO COMPONENTS ON 1570142-2 WILL OCCUR.

2 THESE WIRES PART OF 8409 CABLE.

3 PART NO. 320753, VENDOR CODE 00779.

4 PART NO. 320636, VENDOR CODE 00779.

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
RED				3	5		
WHITE				5	5		
GREEN				3	5		
BLACK				3	3		
LA-21	20			51367-1-8	4		
LA-20	20			51367-1-8	4		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	
5	8409	CABLE	(70903)
4	1570142-2	LIGHT ASSY	
3	B-171	TERMINAL STRIP	(71785)
2	1570141-1	FUSE ASSY	
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:

CONTRACT NO:

	NAME	DATE
DESIGN	W COOK	8-29-67
GROUP	H. Wise	8-31-67
DRAWN	HARRIS	8-29-67
CHECK	YAKSHAW	8-30-67
STRESS	[illegible]	8-31-67
PROJECT	[illegible]	8-31-67
APPD	E.E. Moore	8-29-67

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — MAP LIGHT, CONTROL WHEEL (OPT)

SIZE C | CODE IDENT. NO. 71379 | DWG NO. 0700092

SCALE: NONE | 180 & 185 | PAGE: 11.16

FORM NO. 80-3134

HEATING, VENTILATING, AND DE-ICING SECTION

Cessna.

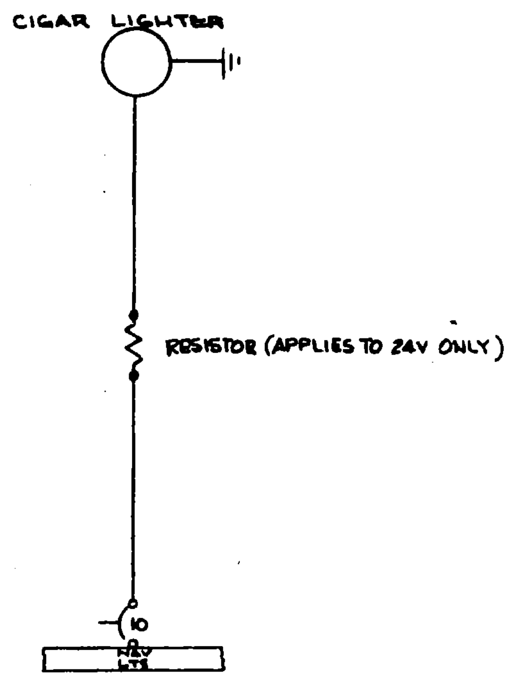
DRAWN	AJ	TITLE: WIRING DIAGRAM---		DRAWING NO.
DATE	10-11-62	MODEL 180-185		0700092
APP'D	[illegible]		REV:	PAGE: 13.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-1

(SR 4012)

CHG LET	REVISION	BY / DATE	CHK / APPD
A	ADD RESISTOR : INACTIVATE DRAWING	2-9-65	



Inactive SER 18051608 & ON
185-0908 & ON
2-9-65
2-12-65
2-16-65
CGM

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		SERIALS

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	
GROUP		10-31-62
CHECK		10-26-62
PROJ		10-26-62

TITLE: WIRING DIAGRAM — CIGAR LIGHTER

Cessna.

DWG NO 0700092

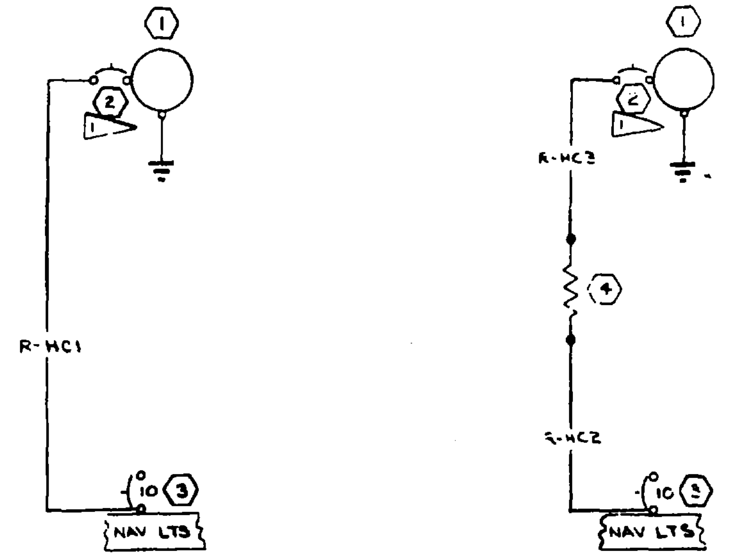
SUPERSEDED BY: 0700092 PAGE 13.1.1 | SUPERSEDES 0700089 | MODEL 180-185 | REV A | PAGE 15.1

FORM NO 80-161

(SE4664)
(SE4665)

CHG LET	REVISION	BY DATE	CHK APPD

NOTES:
1. CIRCUIT BREAKER IS RESET BY INSERTING A PROBE INTO THE HOLE IN BREAKER FACE AND PUSHING LIGHTLY UNTIL A CLICK IS HEARD.



VIEW APPLIES TO 24V SYSTEM ONLY

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			REMARKS
R-HC3	16			SOLDER	S-1367-2-8	(24V SYSTEM ONLY)	
R-HC2	16			S-1367-2-6	SOLDER	(24V SYSTEM ONLY)	
R-HC1	16			S-1367-2-6	S-1367-2-8		

WIRE TABLE

	PART NO.	DESCRIPTION	INSTALLED ON
4	IOI 760	RESISTOR (OM)	
3	S-1360-10	CIRCUIT BREAKER	
2	60232-1	CIRCUIT BREAKER	(CUE)
1	0513062-3	LIGHTER ASSY	

EQUIPMENT TABLE

	NAME	DATE
DRAWN	RIDDER	3-1965
CHECKED	[illegible]	[illegible]
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM— CIGAR LIGHTER

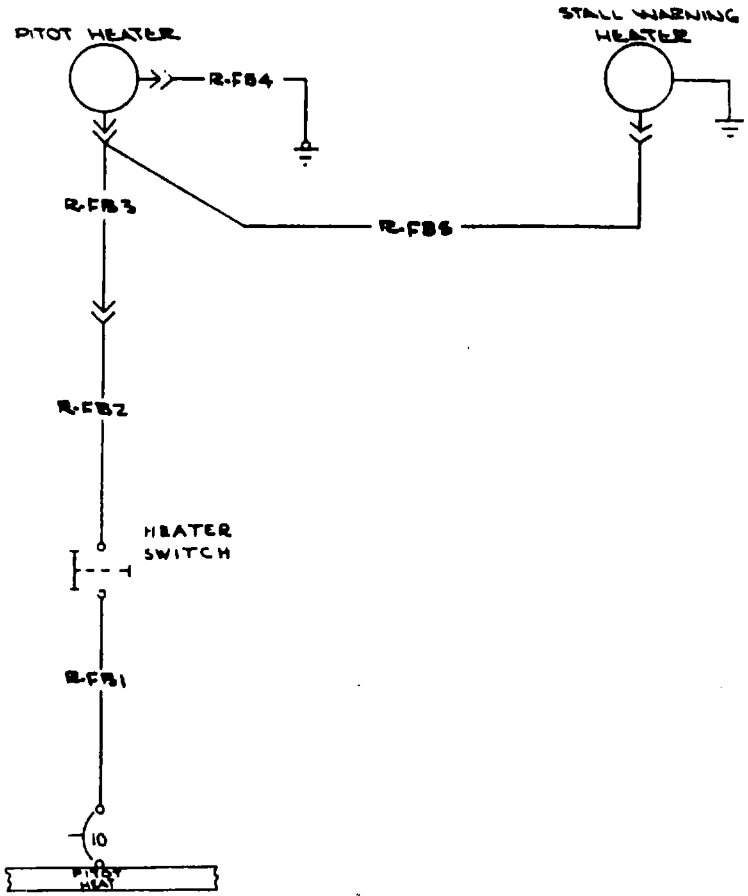
Cessna.

DWG NO. 0700092

SUPERSEDED BY:
SUPERSEDES: 0700092 13.1
MODEL: 180 & 185
REV:
PAGE: 13.1.1

(SR4012)

LTR	REVISION	BY DATE	CHK APPD



effective SER 18051775 & ON
185-1150 & ON
-11-65
-4-66

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
R-FB5	18		46	S-341-2	COMMON TO FB3		STD
R-FB4	18		7	S-1367-1-8	S-1369-1		
R-FB3	16		58	S-341-1	S-1369-2		STD
R-FB2	16		38	S-1367-2-8	S-341-1		STD
R-FB1	16		6	S-1367-2-8	S-1367-2-8		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
		EQUIPMENT TABLE	

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	[illegible]	[illegible]
GROUP	[illegible]	[illegible]
CHECK	[illegible]	11-27-62
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — PITOT & STALL WARNING HEAT (OPT)

Cessna.

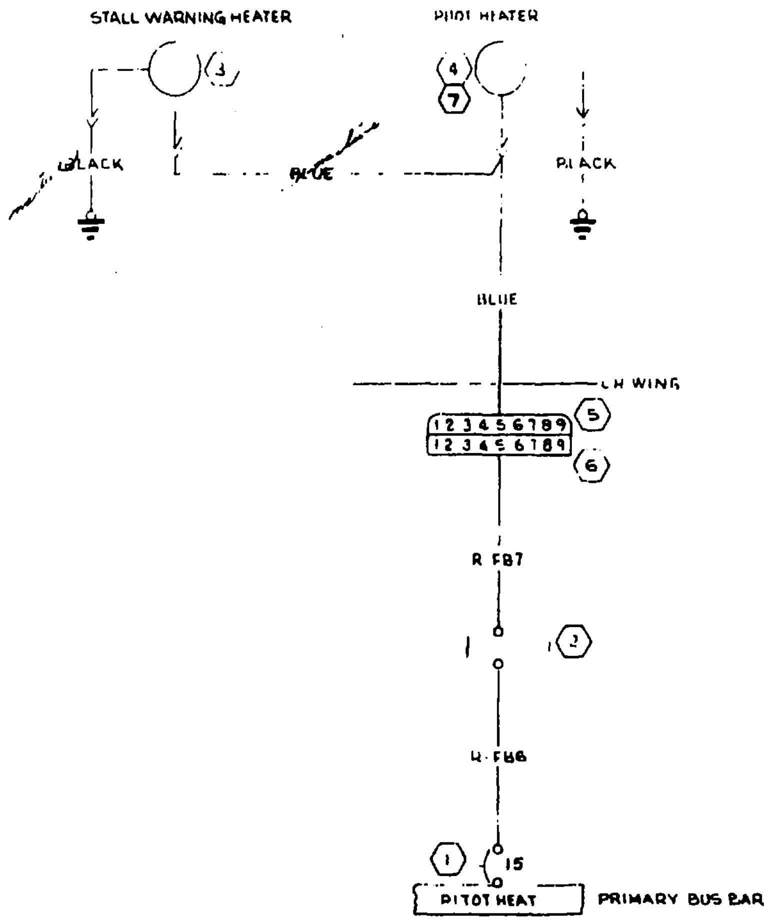
DWG NO 0700092

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
0700092, PP13.3	0700059 0700085	180-185		13.2

FORM NO 80-181

(SER 205115) & ON
(SER 185-1150) & ON

CHG LET	REVISION	BY DATE	CHK APPD
A	S 1360-15 WAS S 1360-10 (SER 205117) & ON (SER 185-1150) ON	SLW	[illegible]
B	BY REV: ADD 0721105-9 FOR 24 VOLT SYSTEM; INACTIVATED BLACK & BLUE WIRES	C.G.	[illegible]



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
BLACK	18	S-1460-18-0		S-341-2	S-1367-1-8		INACT (SR5117) & ON
BLACK	18	S-1460-18-0		S-341-2	S-1367-1-8		
BLUE	16	S-1460-16-6		S-341-2	[illegible]	STD	INACT (SR5117) & ON
BLUE	16	S-1460-16-6		S-1635-2	S-341-2		STD
R-FB7	16			S-1367-2-8	S-1636-2		STD
R-FB6	16			S-1367-2-6	S-1367-2-8		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
7	0721105-9	PITOT HEATER	24 VOLT
6	S-1641-9	HOUSING-SOCKET	
5	S-1640-9	HOUSING-PIN	
4	0721105-5	PITOT HEATER	12 VOLT
3	0511062-5	STALL WARN. HEATER	12 VOLT
2	0713026-4	SWITCH ASSY	
1	S-1360-15	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	N COOK	1-4-66
GROUP	[illegible]	1-4-66
CHECK	[illegible]	1-4-66
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM— PITOT AND STALL WARNING HEAT (OPT)

Cessna.

DWG NO. 0700092

SUPERSEDED BY:
SUPERSEDES: 700092 PP13.2
MODEL: 180-185
REV. B
PAGE: 13.2

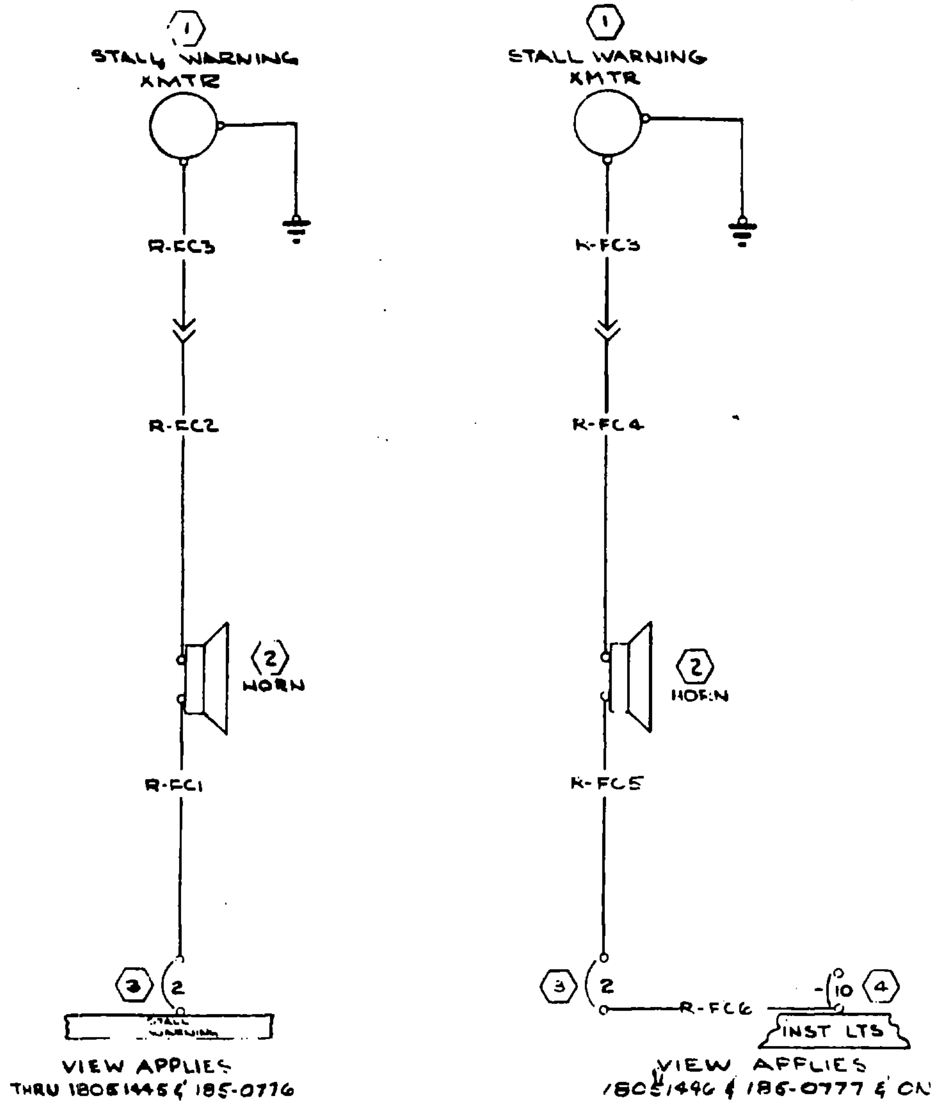
WARNING AND EMERGENCY SECTION

Cessna.

			DRAWING NO.
DRAWN	AFJ	TITLE: WIRING DIAGRAM---	
DATE	10-11-62	MODEL 180-185	0700092
APP'D	RLS N 7	REV:	PAGE: 15.0

(SR4012)

CHG LET	REVISION	BY / DATE	CHK / APPD
A	[illegible] R-FC6 WIRES [illegible]	WJK [illegible]	[illegible]



Inactive SER 18051775 & ON
185-1150 & ON
11-11-65
JRC

R-FC6	18		24	S-1367-1-6	S-1367-1-6		18051496 & 185-0777 & ON
R-FC5	18		6	S-1367-1-6	S-1367-1-8		18051496 & 185-0777 & ON
R-FC4	18		55	S-1367-1-6	S-391-2		18051496 & 185-0777 & ON
R-FC3	18		80	S-1367-1-6	S-391-2		
R-FC2	18		100	S-1367-1-6	S-391-2		THRU 18051495 & 185-0776
R-FC1	18		45	S-1367-1-6	COMMON TO (R-PB)		THRU 18051495 & 185-0776
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

4	S-1360-10	CKT BKR	
3	C4-2	CKT BKR (MTCC)	
2	S-1907-6	HORN ASSY	
1	0511062-4	XMTR STALL WARN	
ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Johnson	9/6/62
GROUP	[illegible]	[illegible]
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — STALL WARNING HORN & XMTR

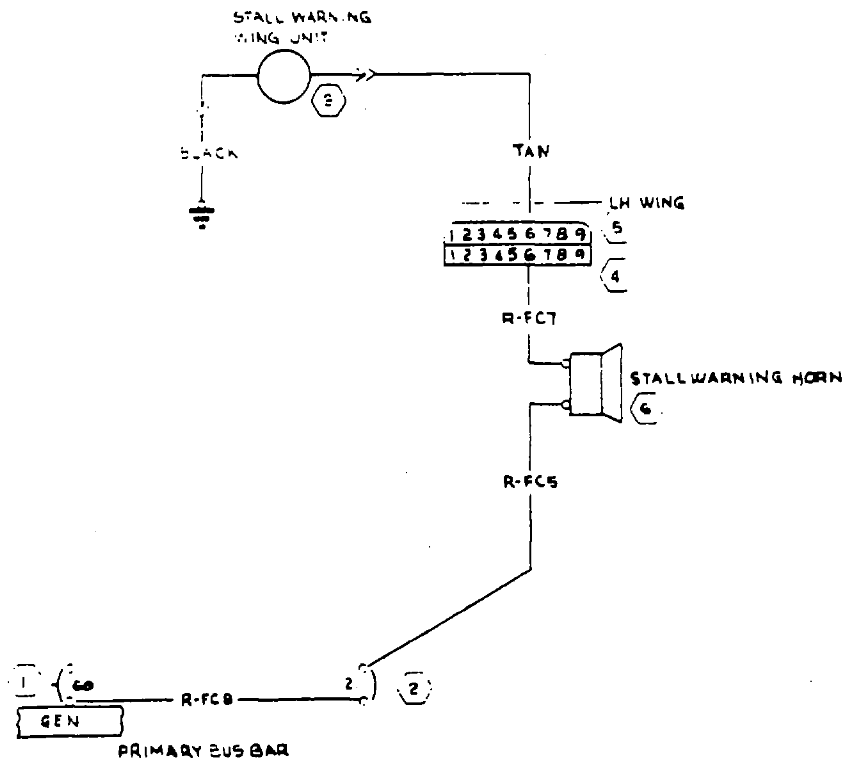
Cessna.

DWG NO 0700092

SUPERSEDED BY: 0700092, PP 15.2 | SUPERSEDES: 0700039, 0700085 | MODEL: 180-185 | REV: A | PAGE: 15.1

FORM NO 80-181

CHG LET	REVISION	BY DATE	CHK DATE



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
BLACK	6	S-1460-18-C		S-341-2	S-36[illegible]-8		
TAN	6	S-1460-5-C		S-1635-2	S-341-2		
R-FC7	8			S-1367-1-6	S-1636-2		
R-FC5	8			S-1367-1-10	S-1367-[illegible]		
R-FC8	8		[illegible]	S-1367-[illegible]-6	S-1367-1-8		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

6	S-1407-6	HORN ASSY	
5	S-1641-9	HOUSING-SOCKET	
4	S-1640-9	HOUSING-PIN	
3	0511062-4	STALL WARNING WING UNIT	
2	CA-2	CIRCUIT BREAKER	[illegible]
1	S-1596-60	CIRCUIT BREAKER	
ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

TITLE: WIRING DIAGRAM— STALL WARNING HORN & XMTR

Cessna.

DWG NO 0700092

MODEL 180-185

PAGE 15.2

MISCELLANEOUS SECTION

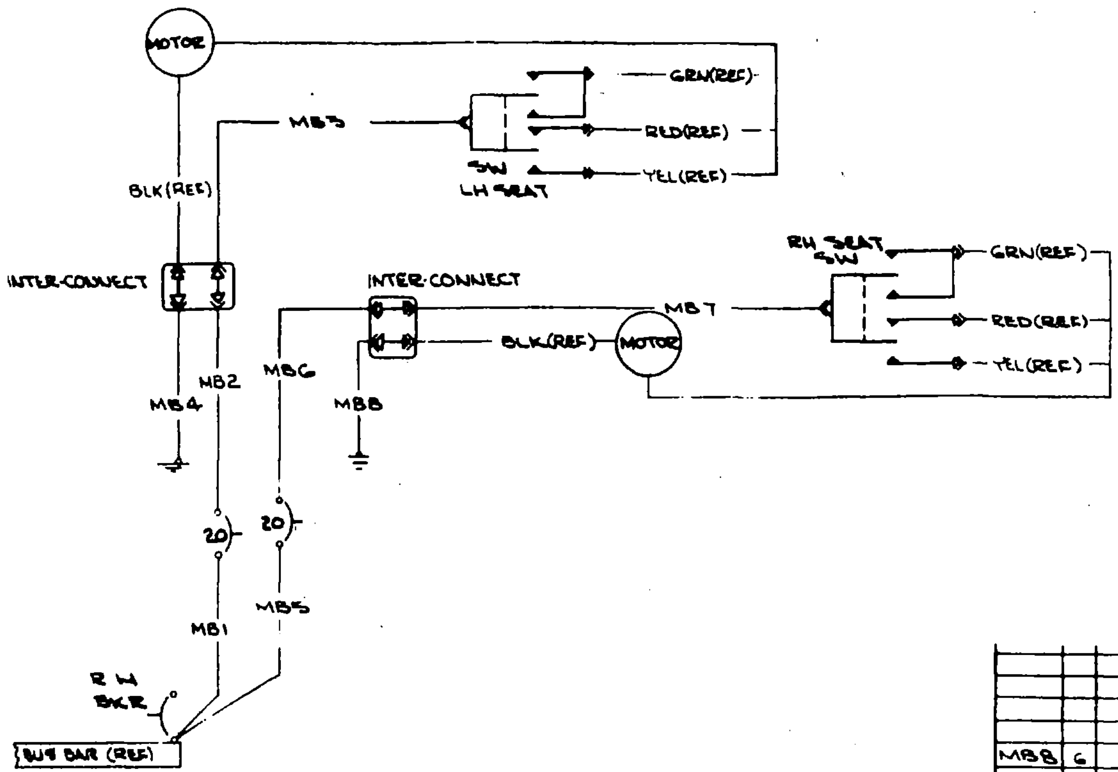
Cessna.

DRAWN		TITLE: WIRING DIAGRAM---		DRAWING NO.
DATE		MODEL 180 - 185		0700092
APP'D			REV:	PAGE: 16.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

(SRA204)

CHG LET	REVISION	BY DATE	CHK APPD



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
MB8	6			S-1367-2-6	S-1493-2	0500238	
MB7	16			S-1493-2	S-1493-2		
MB6	16			S-1367-2-6	S-1493-2		
MB5	16			S-1367-2-6	S-1367-2-6		
MB4	16			S-1367-2-6	S-1493-2		
MB3	16			S-1493-2	S-1493-2		
MB2	16			S-1367-2-6	S-1493-2		
MB1	16			S-1367-2-6	S-1367-2-6	0500238	

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	JOHNSON	8-28-63
GROUP	PARSONS	9-26-63
CHECK	[illegible]	9-4-63
PROJ	[illegible]	9-26-63

TITLE: WIRING DIAGRAM — POWER SEATS PILOT & CO-PILOT (OPT)

Cessna.

DWG NO 0700092

SUPERSEDED BY | SUPERSEDES | MODEL 180-185 | REV | PAGE 16.1

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

FORM NO 80-181

Cessna®

WIRING DIAGRAM

MODEL 182

DWG. NO. 0770610

FORM NO. 80-158

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PAGE NO.	TITLE	DATE ISSUED	REV
1.0	Title Page		
2.0	Table of Contents	1-16-68	
2.1	Table of Contents	1-16-68	
3.0	Notes	5-1-64	B
4.0	D. C. Power	1-13-64	A
4.1	Battery & External Power Systems	2-8-65	B-Inac.
4.1.1	Battery & External Power Systems	1-31-67	D
4.2	Generator System	5-1-64	NC-Ina
4.3	Alternator System, 52 AMP	5-1-64	NC-Ina
4.4	Alternator System, 52 AMP	2-8-65	B-Inac.
4.5	Alternator System, 60 AMP	7-8-66	C-Inac.
4.6	Split Bus Bar	12-22-65	NC-Ina
4.7	Wiring Diagram - Alternator System, 60 AMP	8-21-67	B
5.0	Ignition	10-18-62	
5.1	Ignition System	7-23-65	A-Inac.
5.2	Ignition System	11-12-65	A
6.0	Engine Control	10-18-62	
6.1	Starter System	12-22-65	B
7.0	Fuel & Oil	10-18-62	
7.1	Oil Dilution System (Opt.)	8-20-64	A
8.0	Engine Instruments	9-7-62	
8.1	Cylinder Head Temperature	10-20-64	B
8.2	Fuel Quantity Indicator	8-20-64	A
8.3	Carburetor Air Temp. (Opt.)	3-4-64	A
8.4	Hourmeter (Opt.)	9-29-66	NC
9.0	Flight Instruments Section	10-30-62	
9.1	Turn & Bank & Gyro Horizon Indicator (Opt.)	8-20-64	A
9.2	Not Used		
9.3	Brittain Wing Leveler (Opt.)	6-7-67	NC
9.4	Wiring Diagram - Turn Coordinator (Opt.)	9-25-67	NC
10.0	Other Instruments	10-18-62	
10.1	Clock	4-22-66	C
10.2	Wiring Diagram - Flap Position Indicator	2-21-66	A

TABLE OF CONTENTS

PAGE NO.	TITLE	DATE ISSUED	REV
11.0	Lighting Section	10-30-62	
11.1	Dome & Courtesy Lights (Opt.)	2-21-66	B
11.2	Instrument Lights & Compass	8-7-67	C
11.3	Landing Lights	2-21-66	C
11.4	Navigation Lights	1-16-68	C
11.5	Rotating Beacon (Opt.)	1-29-66	A-Inac.
11.5.1	W.D. - Flashing Beacon Light (Opt.)	1-29-66	NC
11.6	Map Light (Opt.)	9-3-64	A-Inac.
11.6.1	Map Light	8-7-67	C
11.7	Post Lighting & Back Lighting (Opt.)	9-22-66	B-Inac.
11.8	Nav-O-Matic 300 Post Light (Opt.)	11-18-64	Inac.
11.9	Back Lighting	8-7-67	A
11.10	Post Lighting (Opt.)	11-27-67	B
11.11	Map Light, Control Wheel (12 Volt)	9-25-67	NC
13.0	Heating, Ventilating, and De-Icing Section	10-30-62	
13.1	Cigar Lighter	9-3-64	B
13.2	Heated Pitot Tube & Heated Stall Warning System (Opt)	10-4-66	C
14.0	Control Surface Section	10-30-62	
14.1	Wing Flaps	10-26-65	C-Inac.
14.2	Wiring Diagram - Wing Flaps - Electric	9-13-67	A-Inac.
14.3	Wiring Diagram - Wing Flaps	9-13-67	NC
15.0	Warning and Emergency Section	10-30-62	
15.1	Stall Warning System (Non-heated)	2-21-66	D
16.0	Miscellaneous Section	9-27-63	
16.1	Vertically Adjusting Seat (Opt.)	9-3-64	A

NOTES

1. WIRE CODE DESIGNATIONS PER CES 1100.
2. WIRE CODE APPLICATION AND WIRE LENGTH TOLERANCES PER CES 1015.
3. "S" SUFFIX ON WIRE GAUGE IN WIRE TABLE DENOTES SHIELDED WIRE. "DS" suffix on wire gauge in wire table denotes a double-shielded wire.
4. NON-SHIELDED WIRES TO BE PER MIL-W-5086A, Type I(PVC), Nylon Jacket. Wires 10-gauge and larger to be Type II construction.
5. SHIELDED WIRES TO BE PER MIL-C-7078A, Type II with MIL-W-5086A Type I Conductor.
6. Part numbers shown in the "equipment table" of the various pages are for reference only and do not constitute a material requirement unless specifically noted on the individual page. Refer to the various equipment installation drawings for verification of part numbers.
7. Equipment part numbers shown on the various pages that are for reference only, (see Note 6), ~~will not be changed unless it affects wire terminals and fabrication.~~
8. Vendor codes per S-1400. Vendor codes are shown in parentheses.
9. WIRES NOTED HEREIN AS("OPT") ARE OPTIONAL TO THE STANDARD AIRPLANE.
10. ALL WIRES NOT SPECIFIED AS "(OPT)" ARE TO BE INSTALLED AS STANDARD EQUIPMENT. THE AIRPLANE ASSEMBLY WILL SPECIFY THE ADDITIONAL EQUIPMENT REQUIRED FOR DELUXE VERSIONS.
11. WHEN "(OPT)" IS USED IN THE TITLE BLOCK OF A DIAGRAM, ALL WIRES SHOWN THEREIN ARE OPTIONAL EXCEPT WHERE NOTED AS "(STD)".

Cessna.

DRAWN	GWOOD	TITLE: WIRING DIAGRAM--- MODEL 182	DRAWING NO. 0770610
DATE	4-23-62		
APP'D	JM RRS NRW HMC	REV: A	PAGE: 3.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

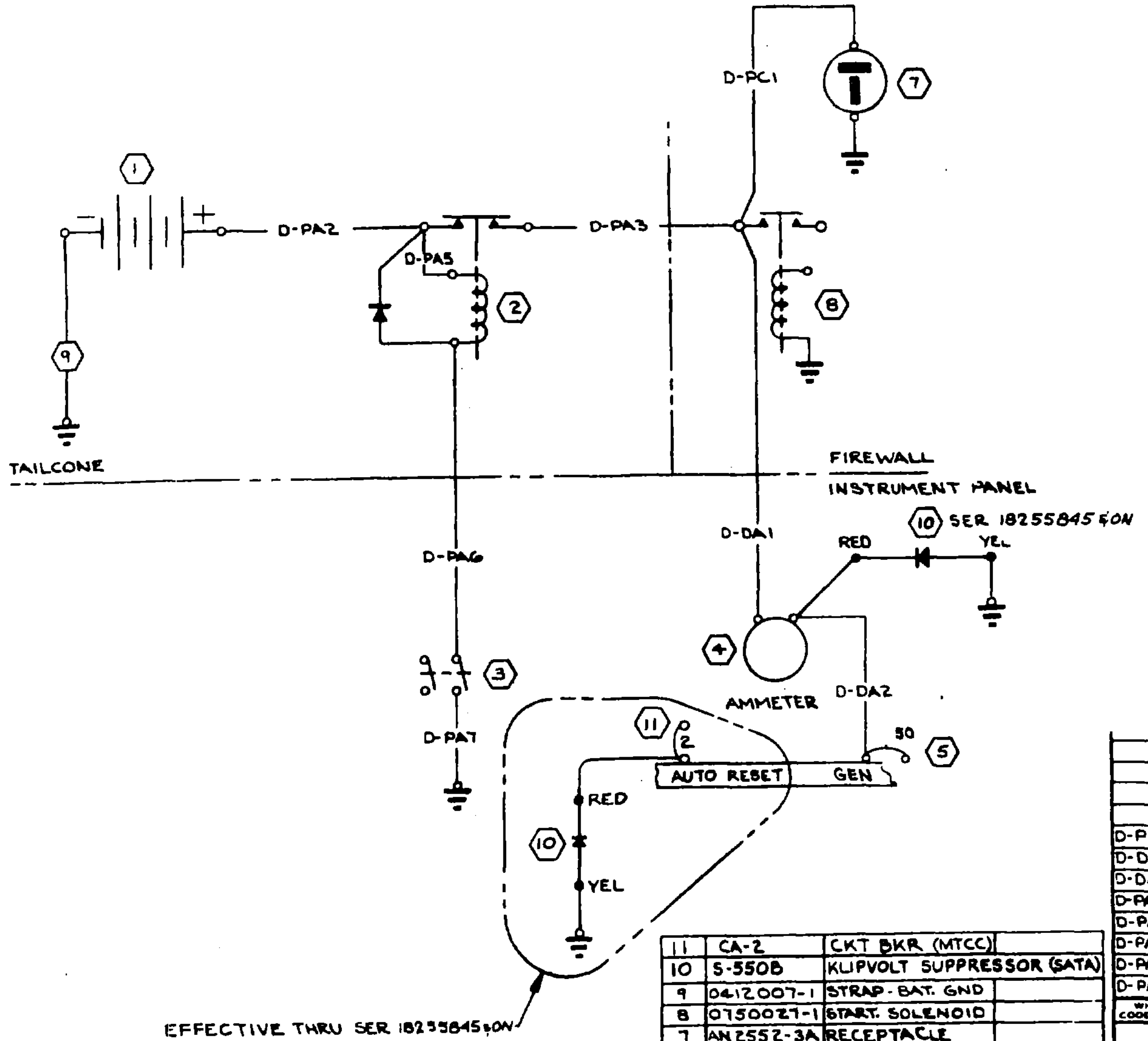
D. C. POWER SECTION

Cessna.

DRAWN	RIDDER	TITLE: WIRING DIAGRAM--- MODEL 182	DRAWING NO. 0770610
DATE	9-10-62		
APP'D	RRS 11/11/c	REV:	PAGE: 4.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

CHG LET	REVISION	BY / DATE	CHK / APPD
A	ADD S 550B KLIPVOLT SUPPRESSOR 0713743-1 WAS [illegible] S 1360-50 WAS [illegible] [illegible]	GLW 12-10-63	[illegible]
B	ADDED LIMITING SERIALS TO FIELD; REMOVED 0713743-1 BUS BAR FROM E/T; ADDED WIRE LENGTHS TO W/T; C669502-0103 WAS 1213505-1 (SR4951)	[illegible] 6-16-64	[illegible]



INACTIVE
SER 18256685 & ON
LPB 12-30-64
HIW 1-28-65
[illegible] 2-1-65

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
11	CA-2	CKT BKR (MTCC)	
10	S-550B	KLIPVOLT SUPPRESSOR (SATA)	
9	0412007-1	STRAP-BAT. GND	
8	0750027-1	START. SOLENOID	
7	AN2552-3A	RECEPTACLE	
6			
5	S-1360-50	CKT BKR	
4	C669502-0103	CLUSTER KIT	
3	S-1159-1-1	SWITCH, MASTER	
2	0712603-2	CONTACTOR BAT.	
1	0712605-1	BATTERY	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
D-PC1	2		38	S-1367-7-14	S-1368-7-14	0700611	(OPT)
D-DA2	8		31	S-1367-4-10	S-1367-4-8		
D-DA1	8		57	S-1367-4-10	S-1367-4-14		
D-PA7	18		4	S-1367-1-6	S-1367-1-8		
D-PA6	18		207	S-1367-1-6	S-1367-1-6		
D-PA5	18		3	S-1367-1-6	S-1367-1-12		
D-PA3	2		180	S-1367-7-14	S-1367-7-12		
D-PA2	2		8	S-1367-7-12	S-1367-7-13		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RIDDER	9-10-62
GROUP	[illegible]	[illegible]
CHECK	[illegible]	10-12-62
PROJ	[illegible]	10-17-62

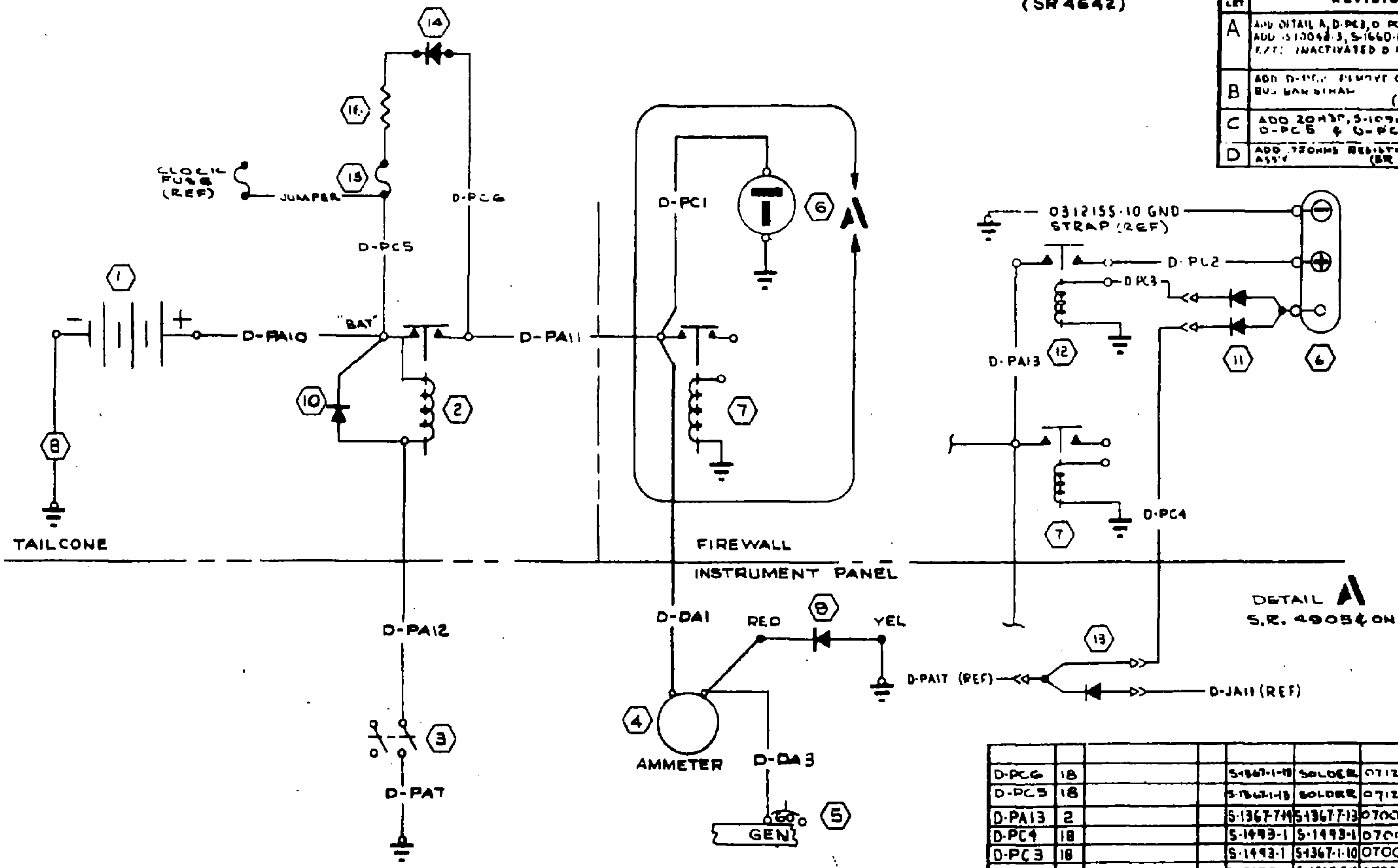
TITLE: WIRING DIAGRAM — BATTERY & EXTERNAL POWER SYSTEMS

Cessna.

DWG NO 0770610

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
0770610 PG 4.1.1		182	B	4.1

FORM NO. 80-181



CHG LET	REVISION	BY / DATE	CHK / APPD
A	ADD DETAIL A, D-PC3, D-PC4 & D-PA13; ADD 1570043-3, S-1660-1 & 1570043-1 TO E/T; INACTIVATED D-PC1 SR4905	J. Webb 4-13-65	
B	ADD D-PC2, REMOVE 0756026-1 BUS BAR STRAP (SR4905)	J. Webb [illegible]	
C	ADD 20H3P, S-1091-5 & WIRES D-PC5 & D-PC6 (SR4905)	[illegible]	
D	ADD .75 OHMS RESISTOR TO 0712081 ASSY (SR 5297)	[illegible]	

16	X26263	.75Ω RESISTOR	(TRTA)
15	S-1091-5	FUSE - 5AMP	
14	20H3P	DIODE (SATA)	
13	1570043-1	DIODE ASSY	
12	S-1660-1	CONTACTOR	
11	1570043-3	DIODE ASSY	
10	0770728-1	DIODE ASSY	
9	S-550B	KLIPVOLT SUPPRESSOR (SATA)	
8	0412007-1	STRAP-BAT. GND	
7	0750027-1	STARTER SOLENOID	
6	AN2552-3A	RECEPTACLE	
5	S-1596-60	CKT BKR	
4	C669502-0103	CLUSTER KIT	
3	S-1189-1-1	SWITCH, MASTER	
2	S-1579-1	CONTACTOR BATTERY	
1	0712608-1	BATTERY	
ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

D-PC6	18			S-1367-1-11	SOLDER	0712081	(OPT) SER (SR4905) & ON
D-PC5	18			S-1367-1-10	SOLDER	0712081	(OPT) SER (SR4905) & ON
D-PA13	2			S-1367-7-14	S-1367-7-13	0700754	(OPT) SER (SR4905) & ON
D-PC4	18			S-1493-1	S-1493-1	0700754	(OPT) SER (SR4905) & ON
D-PC3	18			S-1493-1	S-1367-1-10	0700754	(OPT) SER (SR4905) & ON
D-PC2	2			S-1367-7-14	S-1367-7-12	0700754	(OPT) SER (SR4905) & ON
D-PC1	2		98	S-1367-7-14	S-1368-7-14	0700611	(OPT) INACTIVE SER
D-DA3	8		31	S-1367-4-10	S-1367-4-10		
D-DA1	8		57	S-1367-4-10	S-1367-4-14		
D-PA12	18		207	S-1367-1-6	S-1367-1-10		
D-PA11	2		180	S-1367-7-15	S-1367-7-14		
D-PA10	2		8	S-1367-7-15	S-1367-7-8		
D-PA7	18		4	S-1367-1-8	S-1367-1-8		
WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	BREEN	12-30-64
GROUP	[illegible]	2-2-65
CHECK	[illegible]	2-1-65
PROJ	H Wing	1-28-65

TITLE: WIRING DIAGRAM— BATTERY & EXTERNAL POWER SYSTEMS

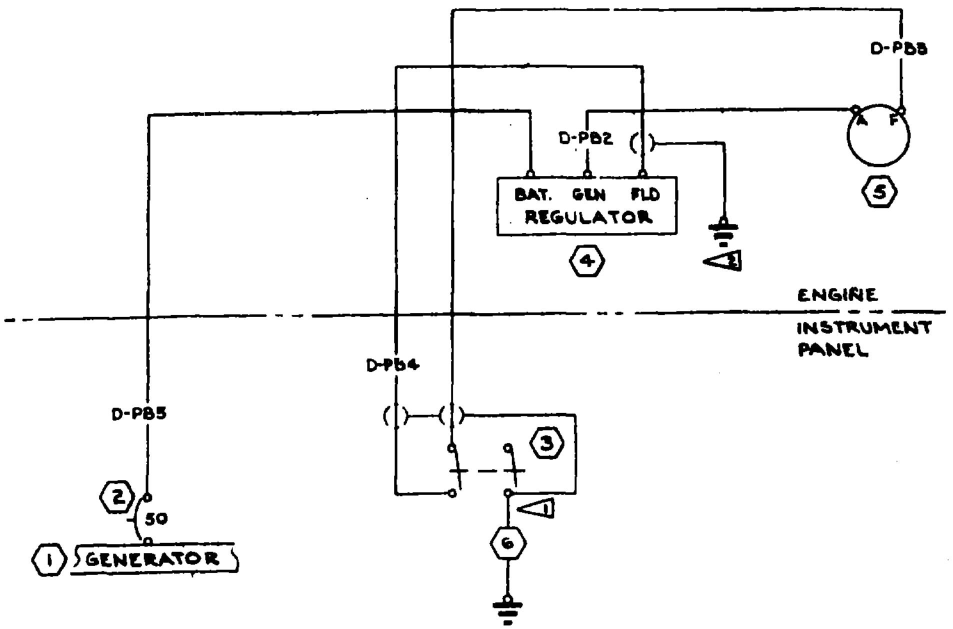
Cessna.

DWG NO. 0770610

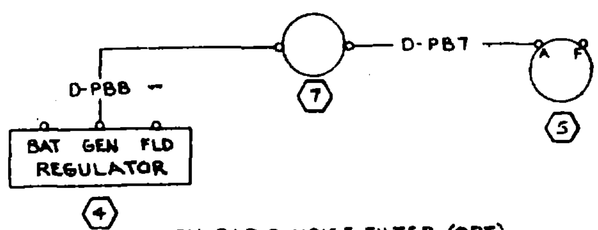
SUPERSEDED BY: | SUPERSEDES: 0770610 PAGE 4.1 | MODEL: 182 | REV: D | PAGE: 4.1.1

NOTES:
1. S-1367-2-6 TERMINAL ON SHIELDS.
2. S-1367-2-8 TERMINAL ON SHIELDS.
3. PART OF 0750201 ENGINE INSTL.

CHG LET	REVISION	BY DATE	CHK APPD



Inactive SER 18255845 & ON
W.J.G. 3-26-64



WHEN RADIO NOISE FILTER (OPT)
IS REQD, REPLACE D-PB2 AS SHOWN

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
7	145329	NOISE FILTER (SPR)	
6	D-PA7	WIRE	
5	3	GENERATOR	
4	0413205-11	REGULATOR	
3	S-1159-1-1	SWITCH-MASTER	
2	S-1360-50	CIRCUIT BREAKER	
1	0713743-1	BUS BAR	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
D-PB8	8			S-1367-4-10	S-1367-4-10	0770615	(OPT)
D-PB7	8			S-1367-4-12	S-1367-4-10	0770615	(OPT)
D-PB5	8			S-1367-4-8	S-1367-4-10		
D-PB4	18S			S-1367-1-6	S-1367-1-10		
D-PB3	18S			S-1367-1-6	S-1367-1-12		
D-PB2	8			S-1367-4-12	S-1367-4-10		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RIDDER	9-10-62
GROUP		10-17-62
CHECK		10-18-62
PROJ		10-17-62

TITLE: WIRING DIAGRAM — GENERATOR SYSTEM

Cessna.

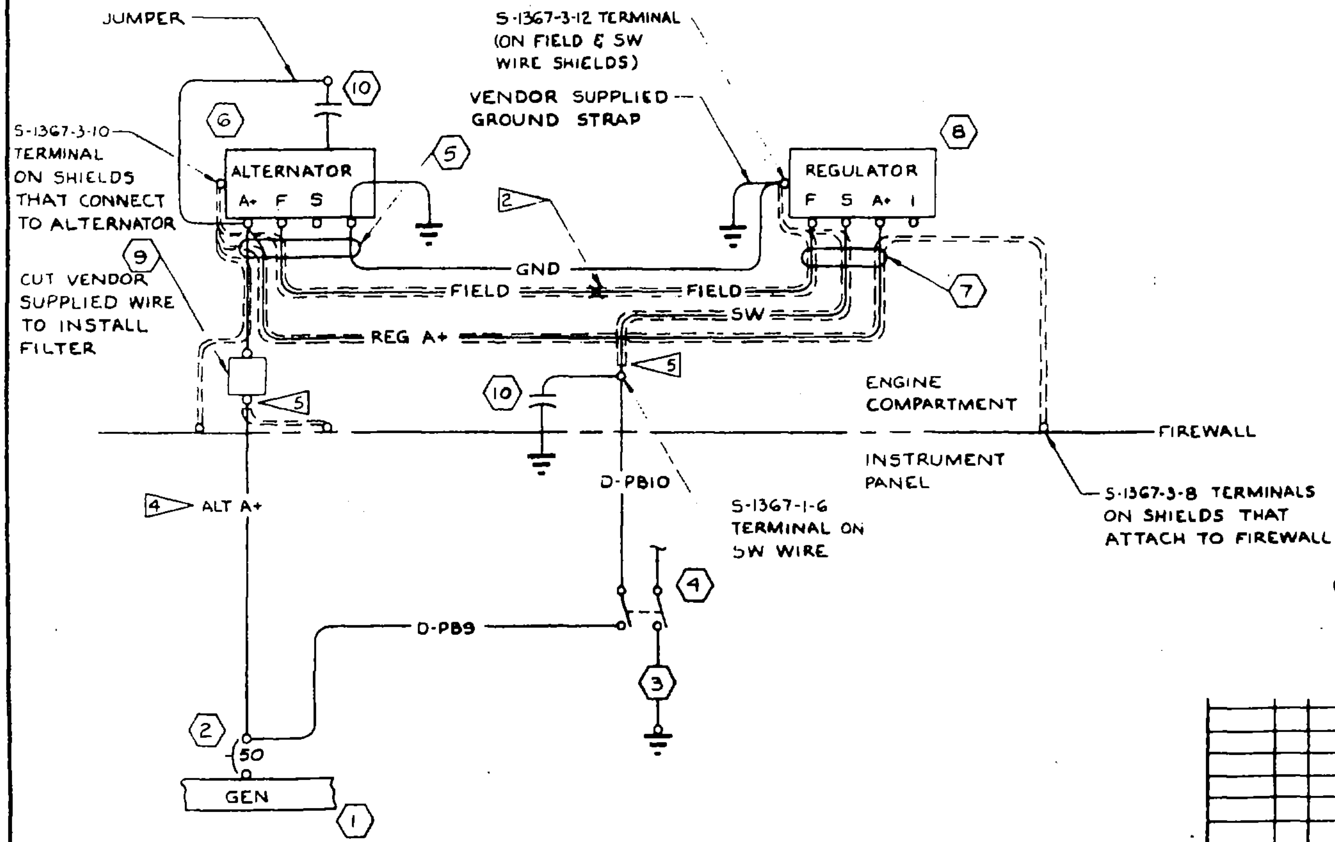
DWG NO. 0770610

SUPERSEDED BY: 0770610 PAGE 4.4 | SUPERSEDES | MODEL 182 | REV | PAGE 4.2

FORM NO. 80-161

(SR 4346)

CHG LET	REVISION	BY / DATE	CHK / APPD
A	REVISED & REDRAWN (SR 4346)	GLW 11-20-63	



Inactive SER 18255126 & ON
WJR 3-26-64
RRS

NOTES:

1. CIRCUIT FUNCTION TO BE STAMPED BY CESSNA ON VENDOR FURNISHED WIRES.
2. S-1370-1 SPLICE CONNECTS WIRES ONLY; SHIELD NOT TO BE CUT.
3. SHIELDING MATERIAL TO BE AS FOLLOWS:
   ALT A+: 8661 $\frac{3}{8}$ ID BRAIDED TINNED COPPER (BDN)
   ALL OTHER WIRES TO BE SHIELDED WITH 8668 $\frac{11}{64}$ ID BRAIDED TINNED COPPER (BDN)
4. S-1367-4-10 TERMINAL ON ALT A+ TO ATTACH WIRE TO 145329 NOISE FILTER.
5. SHIELDS TERMINATED WITH SCOTCH VINYL PLASTIC TAPE #471 BLACK & TIE WITH WAXED CORD.

EQUIPMENT TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
10	0770038-2	FILTER CONDENSER	
9	145329	NOISE FILTER (SPR)	
8	C4FF-10316-A	REGULATOR (FOR)	
7	C4FF-10A568-A	PLUG ASSY (FOR)	
6	C4FF-10300-A	ALTERNATOR (FOR)	
5	C4FF-10B311-A	PLUG ASSY (FOR)	
4	S-1159-1-1	SWITCH - MASTER	
3	D-PA7	WIRE	
2	S-1360-50	CIRCUIT BREAKER	
1	0713743-1	BUS BAR	

WIRE TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
JUMPER	18			S-1367-1-6	S-1367-1-12	0750218	
D-PB10	18			S-1367-1-6	S-1367-1-6	0750218	
D-PB9	18			S-1367-1-6	S-1367-1-6	0750218	

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	G WOOD	9-11-63
GROUP	[illegible]	[illegible]
CHECK	[illegible]	9-19-63
PROJ	N McCab	9-20-63

TITLE: WIRING DIAGRAM — ALTERNATOR SYSTEM, 52 AMP

Cessna.

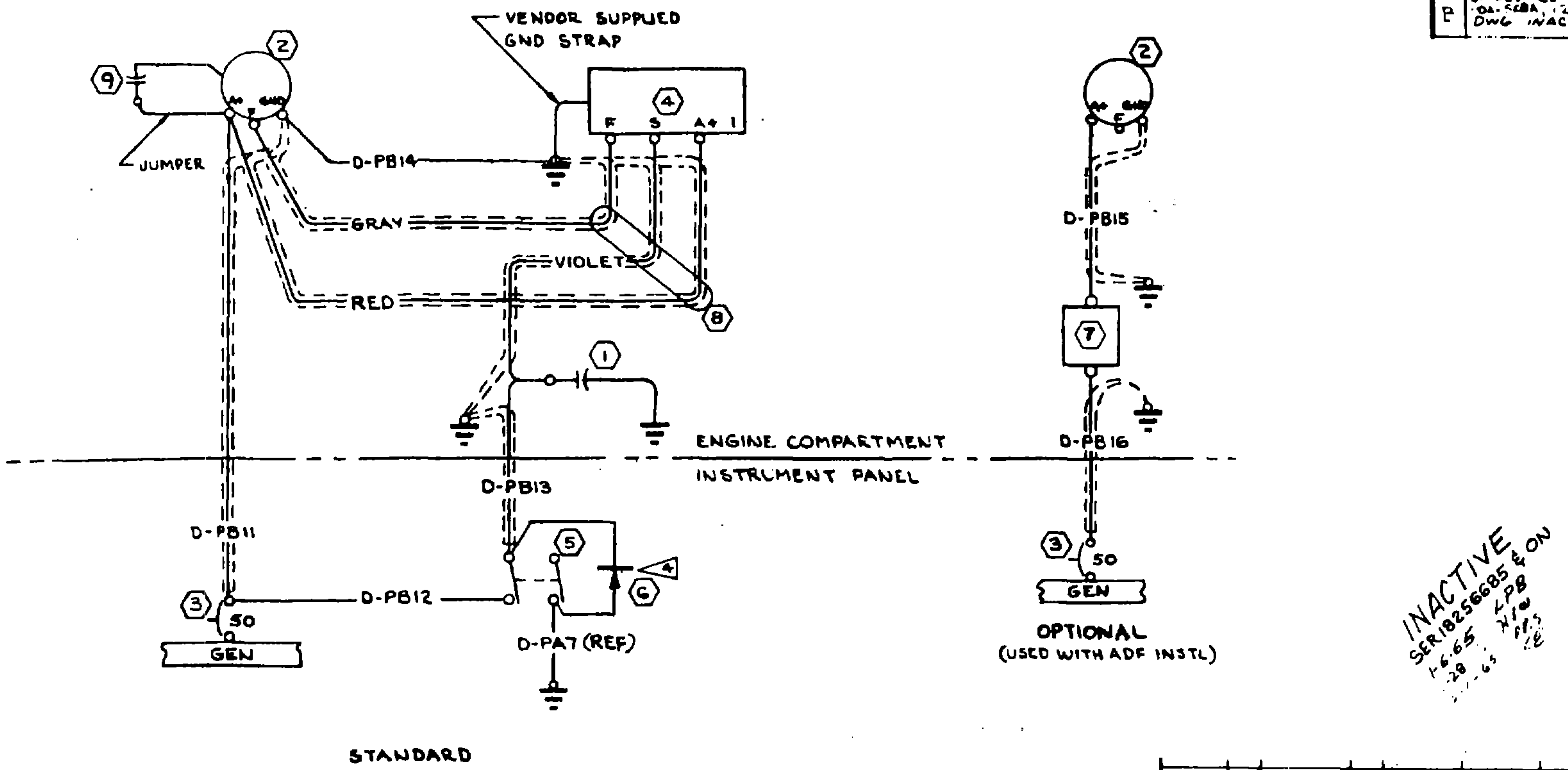
DWG NO 0770610

SUPERSEDED BY 0770610 PAGE 4.2 | SUPERSEDES | MODEL 182 | REV A | PAGE 4.3

FORM NO 80-161

(SR4461)

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV: CHANGED WIRE CODE C-FB WAS C-CF (SR4451)	WJR 5-7-64	
B	BY REV CS-FF-10A-568A WAS C4-H-0A-568A, 1250209-1 WAS 0770038-2 DWG INACTIVE (SR4642)	HLW 1-28-65	



NOTES:
1. TERMINALS C3XB-14462A & B-14463 ARE (FOR) PART NUMBERS.
2. WIRES MADE PER THIS DRAWING ARE USED ON MODELS OTHER THAN 182. CHANGES MADE TO THIS DRAWING SHOULD ALSO BE MADE TO 1270625, PAGE 4.3 & 1270405, PAGE 4.3
3. 8 GAUGE SHIELDED WIRE MATERIAL PER S-1534.
4. OBSERVE POLARITY SYMBOL ON DIODE ASSY WHEN INSTALLING ON SWITCH TERMINALS OR DIODE WILL FAIL WHEN SYSTEM IS ENERGIZED

EQUIPMENT TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
9	1250209-1	FILTER ASSY	
8	CS-FF 10A-568A	PLUG ASSY (FCR)	
7	145329	NOISE FILTER (SPR)	
6	0770719-1	DIODE ASSY	
5	S-1159-1-1	SWITCH - MASTER	
4	0750216-1	REGULATOR ASSY	
3	S-1360-50	CIRCUIT BREAKER	
2	0750217-1	ALTERNATOR ASSY	
1	0770038-2	FILTER	

WIRE TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
JUMPER	18		6	S-1367-1-6	S-1367-1-12	1250206	
D-PB16	8S	3	39	S-1367-4-10 S-1367-3-8	S-1367-4-6	(OPT)	
D-PB15	8S	3	22	[illegible] S-1367-3-10	S-1367-4-10 S-1367-3-8	(OPT)	
D-PB14	10		22	B-14463	S-1367-3-12		
C-PB13	18S		24	S-1367-1-6	S-1367-1-6 S-1367-3-8		
D-PB12	18		20	S-1367-1-6	S-1367-1-6		
D-PB11	8S	3	56	[illegible] S-1367-3-10	S-1367-4-6		

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RIDDER	3-26-64
GROUP		5-1-64
CHECK		
PROJ	N. McCall	5-1-64

WIRING DIAGRAM — ALTERNATOR SYSTEM, 52 AMP

Cessna.

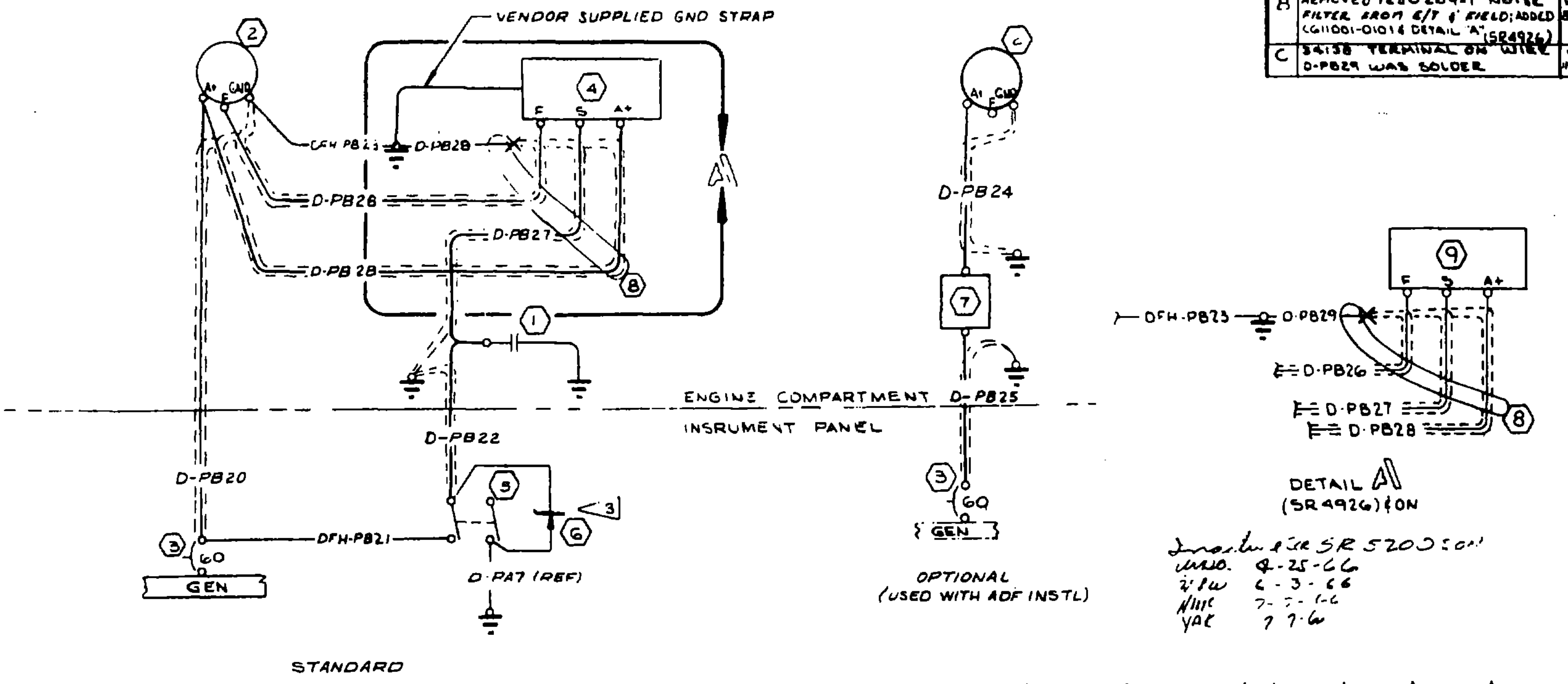
DWG NO 0770610

SUPERSEDED BY: 0770610 PAGE 4.5 | SUPERSEDES: 0770610 PAGE 4.2 | MODEL: 182 | REV B | PAGE 4.4

FORM NO 80-181

(SR4642)

CHG LET	REVISION	BY / DATE	CHK / APPD
A	D-PB20 WAS DFH-PB20; D-PB22 WAS DFH-PB22; D-PB24 WAS DFH-PB24; D-PB25 WAS DFH-PB25; S-1629-1 WAS 145329; IN 4 41796 WAS 42281-2 IN E/T 0770038-2 WAS 0770038-1; ADDED (OPT) TO D-PB24 & D-PB25 (SR4642)	WJR 5-5-65	[illegible]
B	REMOVED 1250209-1 NOISE FILTER FROM E/T & FIELD; ADDED C611001-0101 & DETAIL "A" (SR4926)	WJR 8-16-65	[illegible]
C	34138 TERMINAL ON WIRE D-PB29 WAS SOLDER	WJR 11-29-65	[illegible]



NOTES:

1. WIRES MADE PER THIS DRAWING ARE USED ON MODELS OTHER THAN 182. CHANGES MADE TO THIS DRAWING SHOULD ALSO BE MADE TO 1270625 PAGE 4.4 & 1270405 PAGE 4.4.
2. 8 GAUGE SHIELDED WIRE MATERIAL PER S-1534-8-9
3. OBSERVE POLARITY SYMBOL ON DIODE ASSY WHEN INSTALLING ON SWITCH TERMINALS OR DIODE WILL FAIL WHEN SYSTEM IS ENERGIZED.
4. AMP TERMINAL 41796 (ARP).

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
9	C611001-0101	REGULATOR	
8	1250211-1	PLUG ASSY	
7	S-1629-1	NOISE FILTER	
6	0770719-1	DIODE ASSY	
5	S-1159-1-1	SWITCH-MASTER	
4	0750216-1	REGULATOR ASSY	
3	S-1566-60	CIRCUIT BREAKER	
2	C611501-0101	ALTERNATOR ASSY	
1	0770038-2	FILTER	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
D-PB29	16			34138 (ARP)	S-1367-2-12	1250211	
D-PB28	18S			[illegible]	4	1250211	
D-PB27	18S			[illegible]	4	1250211	
D-PB26	18S			[illegible]	4	1250211	
D-PB25	8S	2		[illegible]	S-1367-4-10	(OPT)	
D-PB24	8S	2		[illegible]	[illegible]	(OPT)	
DFH-PB23	10			S-1367-3-10	S-1367-3-12		
D-PB22	18S			S-1367-1-6	[illegible]		
DFH-PB21	18			S-1367-1-6	S-1367-1-10		
D-PB20	8S	2		[illegible]	S-1367-4-10		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	BREEN	12/8/64
GROUP	[illegible]	[illegible]
CHECK	[illegible]	[illegible]
PROJ	[illegible]	1-28-65

WIRING DIAGRAM—ALTERNATOR SYSTEM, 60 AMP

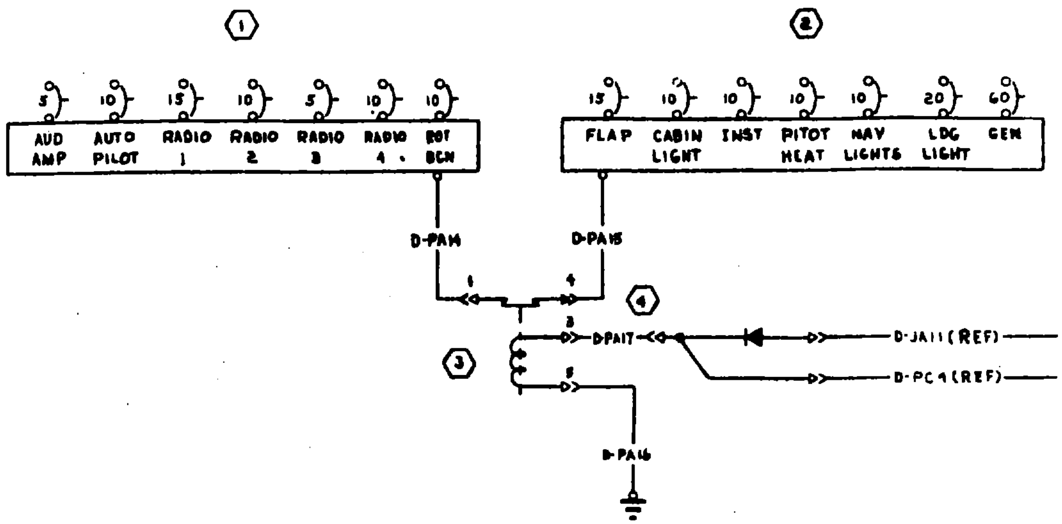
Cessna.

DWG NO. 0770610

SUPERSEDED BY: 0770610 P. 4.7 | SUPERSEDES: 0770610 PAGE 4.4 | MODEL: 182 | REV: C | PAGE: 4.5

(S.R 4905)

CHG LET	REVISION	BY DATE	CHK APPD



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
D-PA17	18			S-1493-1	S-1493-1		
D-PA16	18			S-1493-1	S-1367-1-8		
D-PA15	14			S-1493-2	S-1367-2-6		
D-PA14	14			S-1493-2	S-1367-2-6		

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	INSTALLED ON
4	1570092-1	DIODE ASSY	
3	S-1668-1	RELAY - POWER	
2	0713854-1	BUS BAR-PRIMARY	
1	0713854-1	BUS BAR-ELECT	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	[illegible]	[illegible]
GROUP	V. Wise	12-16-65
CHECK	[illegible]	[illegible]-65
PROJ	H. [illegible]	[illegible]

TITLE: WIRING DIAGRAM— SPLIT BUS BAR

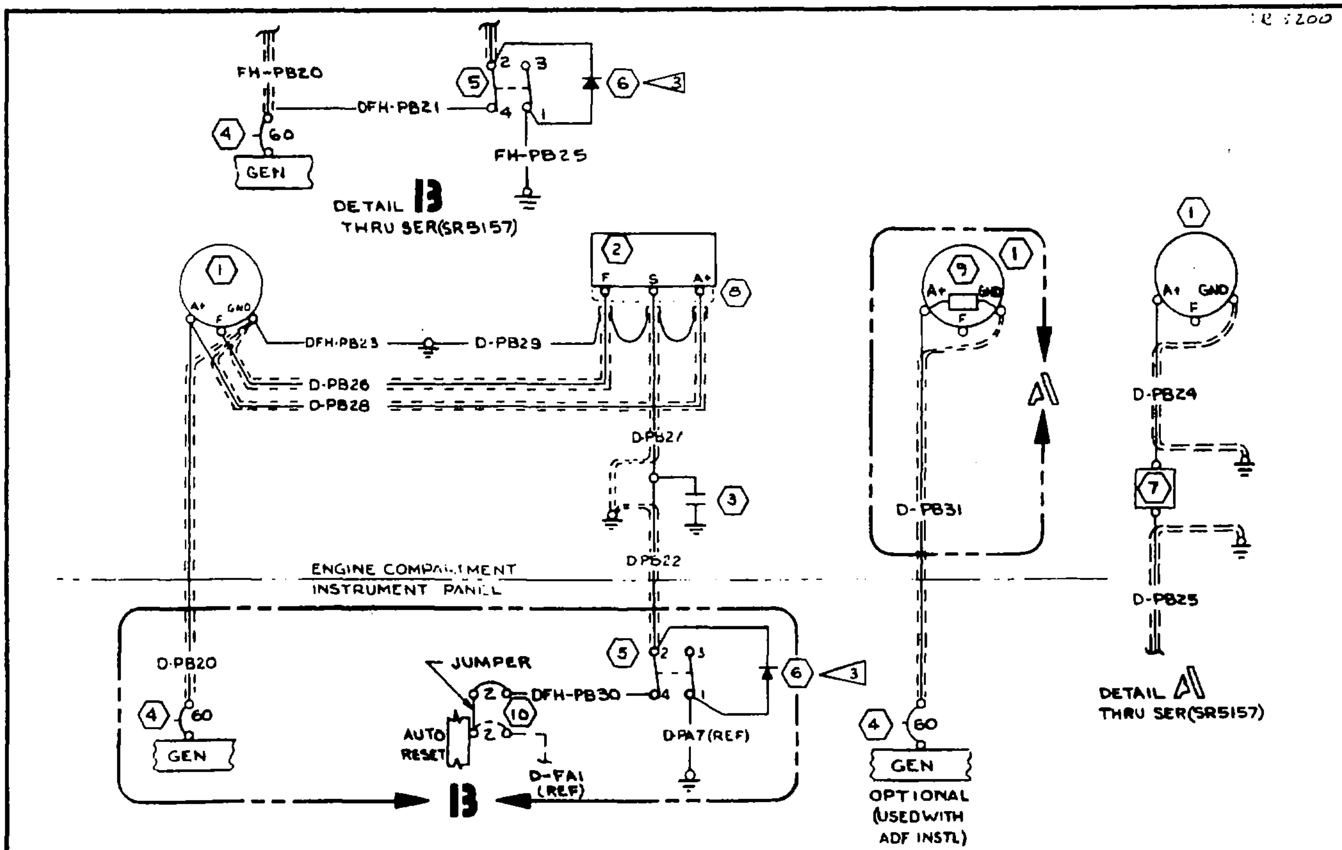
Cessna.

DWG NO. 0770610

SUPERSEDED BY: | SUPERSEDES: | MODEL: 182 | REV: | PAGE: 4.6

FORM NO. 30-1314

CHG LET	REVISION	BY DATE	CHK APPD
A	BY REV. ADD N/A 1250211	JWH 4/6/67	YAK
B	BY REV: ADD DETAIL A, B, DFH-PB30, CA-2(ITEM 10), & 1250209-1(ITEM 9), & D-PB31. (SR5157) IX	CG 8-8-67	N/W



NOTES:

1. AMP TERMINAL 42281-2 ON CONDUCTOR.
   AMP TERMINAL 2-323931-2 ON SHIELD & GROUNDING WIRE.
2. 8 GAUGE SHIELDED WIRE MATERIAL PER S-1534-8-9.
3. OBSERVE POLARITY SYMBOL ON DIODE WHEN INSTALLING ON SWITCH TERMINALS OR DIODE WILL FAIL WHEN SYSTEM IS ENERGIZED.
4. WIRE MADE PER THIS DRAWING USED ON MODELS OTHER THAN 182; CHANGES MADE TO THIS DRAWING SHOULD ALSO BE MADE TO 0410011 PAGE 4.10; 0770602 PAGE 4.10; 1270411 PAGE 4.6; 1270625 PAGE 4.6

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
10	CA-2	CKT BKT(BOGOZ)	
9	1250209-1	NOISE FILTER INSTL	
8	C6AB-10A730-A	HOUSING (ECWS)	
7	S-1629-1	NOISE FILTER	
6	0770719-1	DIODE ASSY	
5	S-1159-1-1	SWITCH-MASTER	
4	S-1596-60	CIRCUIT BREAKER	
3	0770038-2	FILTER	
2	C611001-0101	REGULATOR	
1	C611501-0101	ALTERNATOR ASSY	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
D-PB31	8S	2		S-1367-4-11 S-1367-3-10	S-1367-4-10		SER(SR5157) & ON
DFH-PB30	18			S-1367-1-6	S-1367-1-10		SER(SR5157) & ON
D-PB29	18			S-1367-1-12	1	1250211	
D-PB28	18S			S-1367-1-12 S-1367-2-10			
D-PB27	18S			S-1367-1-8 S-1367-2-8			
D-PB26	18S			S-1367-1-10 S-1367-2-10	1	1250211	
D-PB25	8S	2		S-1367-4-10 S-1367-3-8	S-1367-4-10		THRU SER(SR5157)
D-PB24	8S	2		S-1367-4-11 S-1367-3-10	S-1367-4-10 S-1367-3-8		THRU SER(SR5157)
DFH-PB23	10			S-1367-3-10	S-1367-3-10		
D-PB22	18S			S-1367-1-6	S-1367-1-6 S-1367-2-8		
DFH-PB21	18			S-1367-1-6	S-1367-1-10		THRU SER(SR5157)
D-PB20	8S	2		S-1367-4-11 S-1367-3-10	S-1367-4-10		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	Acherson	5-3-66
GROUP	H. Hub	6-3-66
CHECK	Yakshaw	6-30-66
PROJ	McCarthy	7-7-66

TITLE: WIRING DIAGRAM— ALTERNATOR SYSTEM, 60 AMP

Cessna.

DWG NO. 0770610

SUPERSEDED BY: | SUPERSEDES: 0770610 PAGE 4.5 | MODEL 182 | REV B | PAGE 4.7

IGNITION SECTION

Cessna.

DRAWN	RIDDER	TITLE: WIRING DIAGRAM--- MODEL 182	DRAWING NO. 0770610
DATE	9-10-62		
APP'D	RRS Nlmf	REV:	PAGE: 5.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO 80

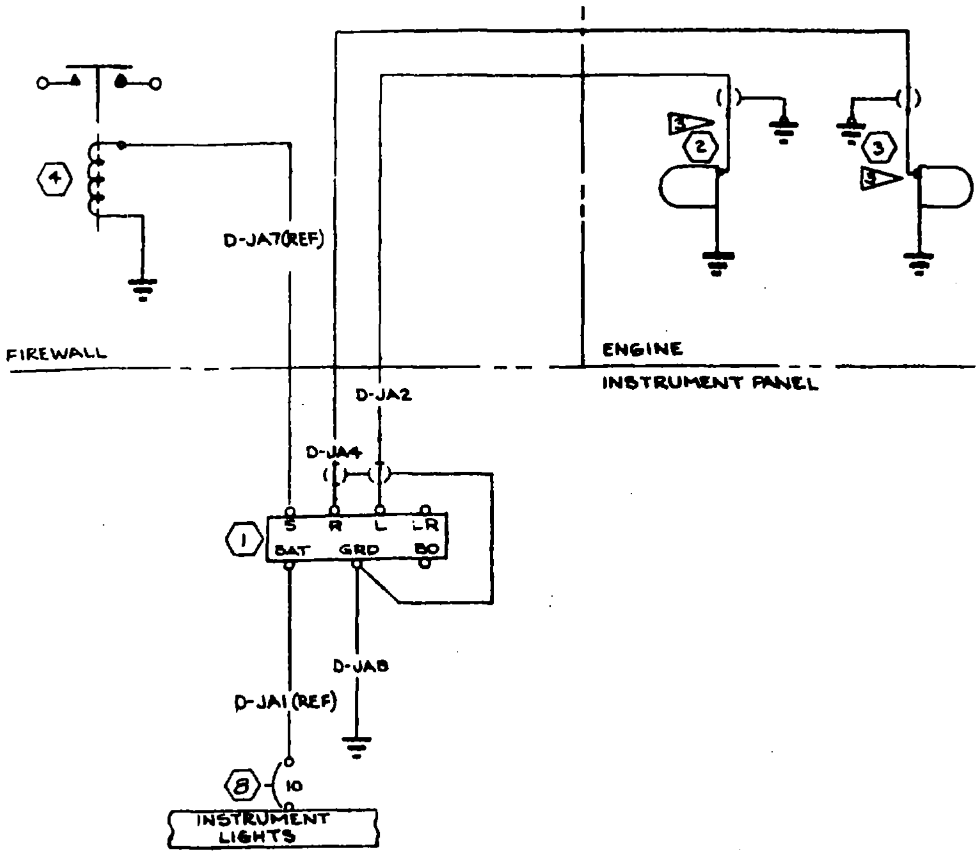
CHG LET	REVISION	BY / DATE	CHK / APPD
A	REROUTE D-JA7 TO COIL TERMINAL; S-1360-10 WAS S-1232-10; REMOVED 0770706 BUS BAR. D-JA1 & D-JA7 FROM E/T; ADDED WIRE LENGTHS TO W/T	WJR 6-25	

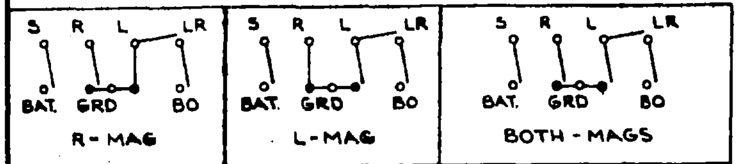
NOTES:

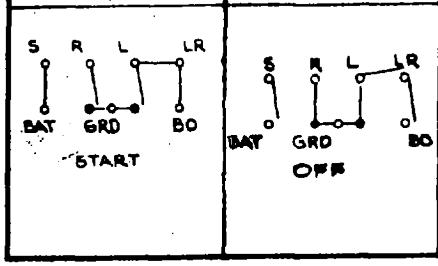
1. SHORTING BAR BETWEEN "R" AND UNMARKED TERMINAL ADJACENT TO IT IS NOT USED FOR THIS CIRCUIT.

2. TERMINATE SHIELDS ON D-JA2 & D-JA4 WIRES AT THE SWITCH WITH S-1367-2-6 TERMINALS & CONNECT TO "GRD" TERMINAL ON SWITCH.

3. WIRES D-JA2 & D-JA4 SOLDER TO CONNECTION SUPPLIED WITH THE MAGNETOS. WHEN OPTIONAL RADIO EQUIPMENT IS INSTALLED THESE WIRES ARE EACH TERMINATED WITH S-1367-1-10 TERMINALS AND CONNECT TO 0770622-1 MAG FILTER.







DIAGRAMS SHOW NOT ACTUAL SWITCH BUT CIRCUIT CONTINUITY AT EACH POSITION.

o EXTERNALLY ACCESSIBLE TERMINAL.

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
8	S-1360-10	CIRCUIT BREAKER	
7			
6			
5			
4	0750027-1	START. SOLENOID	
3	SGRN25	RIGHT MAGNETO	
2	SGRN25	LEFT MAGNETO	
1	0713129-1	SWITCH, MAG	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS				SERIALS
D-JA8	18		6	S-1367-1-6	S-1367-1-8			
D-JA4	18-05		63	S-1367-1-6	SOLDER	3	2	
D-JA2	18-05		60	S-1367-1-6	SOLDER	3	2	

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	RIDDER	9-11-62
GROUP		
CHECK		10-8-62
PROJ		10-12-62

TITLE: WIRING DIAGRAM — IGNITION SYSTEM

Cessna.

DWG NO. 0770610

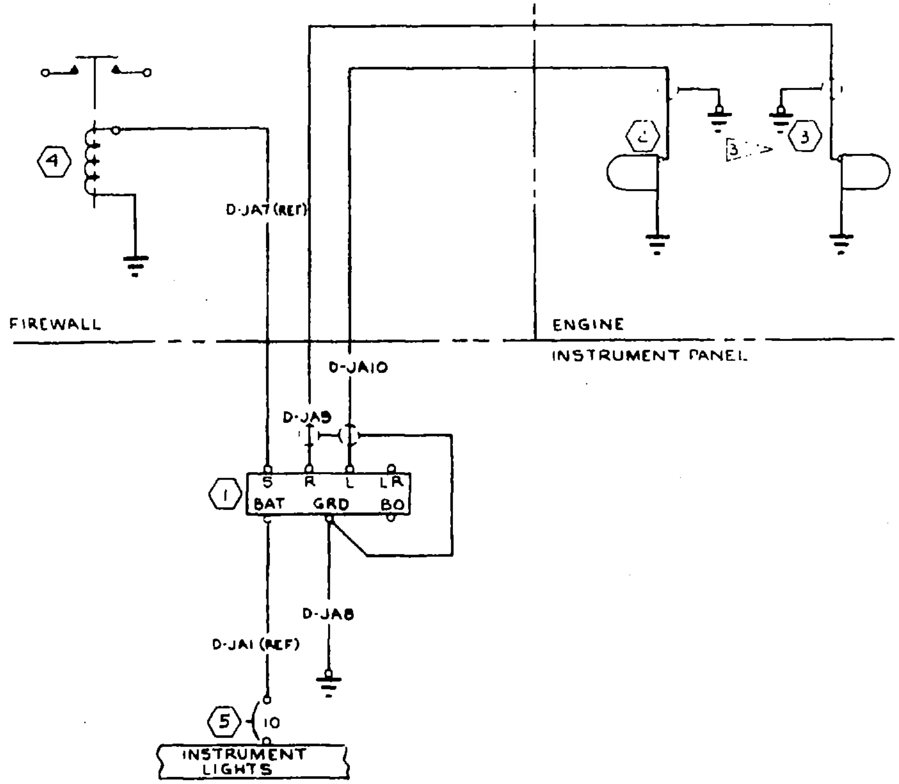
SUPERSEDED BY	SUPERSEDES	MODEL 182	REV. A	PAGE 5.1

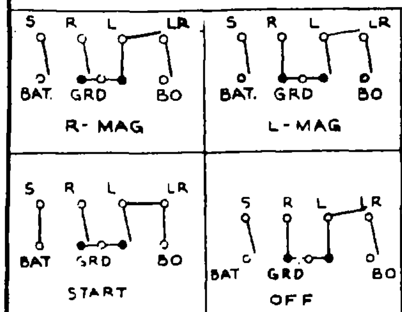
(SR4853)

CHG LET	REVISION	BY / DATE	CHK / APPD
A	ON D-JA10 & D-JA9 WIRES, 18-S WAS 18-DS	GLW 11-1-65	

NOTES:

1. SHORTING BAR BETWEEN "R" AND UNMARKED TERMINAL ADJACENT TO IT IS NOT USED FOR THIS CIRCUIT.
2. TERMINATE SHIELDS ON D-JA9 & D-JA10 WIRES AT THE SWITCH WITH S-1367-2-6 TERMINALS & CONNECT TO "GRD" TERMINAL ON SWITCH.
3. S-1367-1-10 TERMINAL ON HOT LEAD, S-1367-3-10 ON SHIELD.





DIAGRAMS SHOW ACTUAL SWITCH CIRCUIT CONTINUITY AT EACH POSITION.

○ EXTERNALLY ACCESSIBLE TERMINAL.

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
5	S-1360-10	CIRCUIT BREAKER	
4	0750027-1	START. SOLENOID	
3	SLICK #662	RIGHT MAGNETO	
2	SLICK #662	LEFT MAGNETO	
1	0113129-1	SWITCH, MAG	

EQUIPMENT TABLE

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
D-JA10	18-S		60	S-1367-1-6	2	3	
D-JA9	18-S		63	S-1367-1-6	2	3	
D-JA8	18		6	S-1367-1-6	S-1367-1-8		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	G WOOD	7-16-65
GROUP	[illegible]	7-16-65
CHECK	[illegible]	7-9-65
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM— IGNITION SYSTEM

Cessna.

DWG NO. 0770610

SUPERSEDED BY:

SUPERSEDES: 0770610 PAGE 5.1

MODEL: 182

REV: A

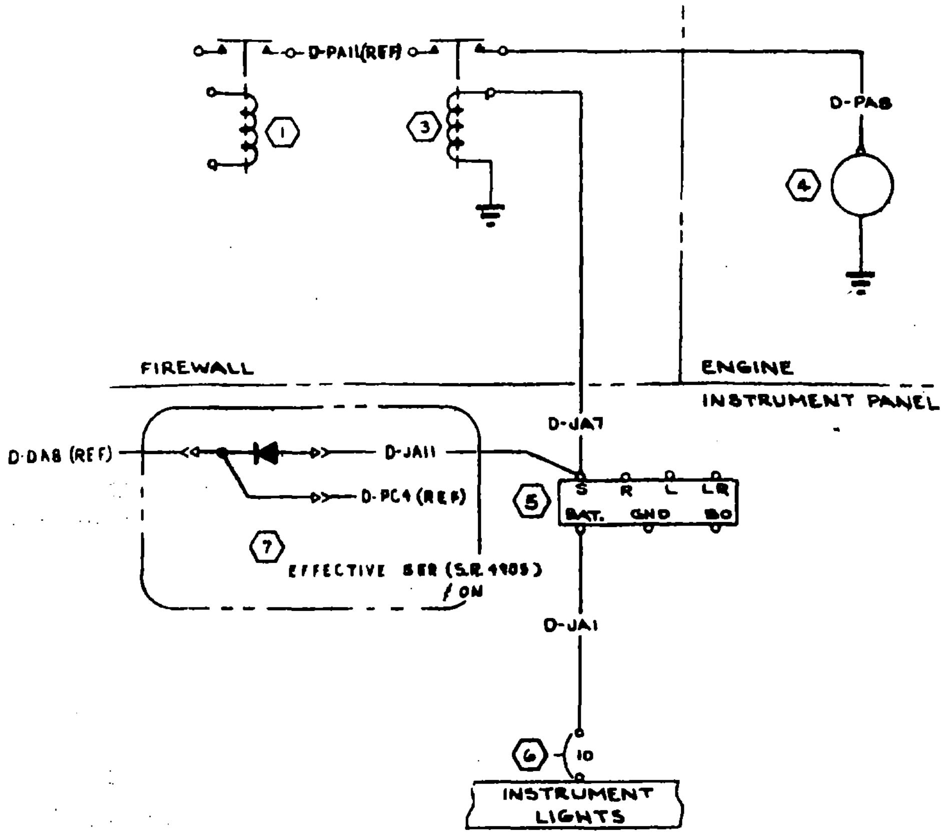
PAGE: 5.2

ENGINE CONTROL
SECTION

Cessna.

DRAWN	RIDDER	TITLE: WIRING DIAGRAM---		DRAWING NO.
DATE	9-11-62	MODEL 182		0770610
APP'D	RRS Nhje		REV:	PAGE: 6.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.



NOTES:
1. PART OF 0750201 ENGINE INSTALLATION.

CHG LET	REVISION	BY / DATE	CHK / APPD
A	INST [illegible] BUS BAR FROM E/T [illegible] WAS S-1232-10 REMOVED [illegible] FROM E/T; ADDED [illegible] TO W/T	[illegible] -29-64	[illegible]
B	ADD D-JA11, 1570042-1 D-PA11(REF) WAS D-PA3(REF) (SR4905)	[illegible] 12-3-65	[illegible]

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
D-JA11	18			S-1493-1	S-1367-1-6		18257626E ON
D-PA8	2		10	S-1367-7-14	S-1367-7-14		
D-JA7	18		77	S-1367-1-6	S-1367-1-10		
D-JA1	18		9	S-1367-1-6	S-1367-1-8		

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
7	1570042-1	DIODE ASSY	
6	S-1360-10	CIRCUIT BREAKER	
5	0713129-1	SWITCH	
4	1	STARTER	
3	0750027-1	START. SOLENOID	
2			
1	0712603-2	CONTACTOR BAT.	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RIDDER	9-11-62
GROUP		
CHECK	[illegible]	9-12-62
PROJ	H. McC[illegible]	9-17-62

TITLE: WIRING DIAGRAM — STARTER SYSTEM

Cessna.

DWG NO 0770610

SUPERSEDED BY | SUPERSEDES | MODEL 182 | REV B | PAGE 6.1

FORM NO 80-16

FUEL AND OIL SECTION

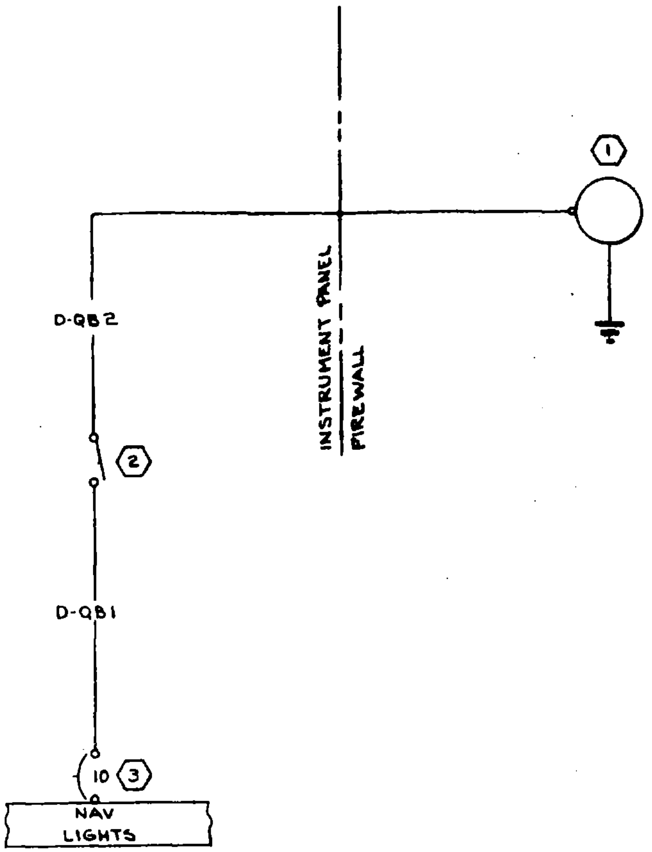
Cessna.

DRAWN	RIDDER	TITLE: WIRING DIAGRAM--- MODEL 182	DRAWING NO. 0770610
DATE	9-11-62		
APP'D	RRS NHIC	REV:	PAGE: 7.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-165

CHG LET	REVISION	BY / DATE	CHK / APPD
A	[illegible]	[illegible]	[illegible]



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		SERIALS
D-QB2	18		60	S-1367-1-6	S-1367-1-10	
D-QB1	18		10	S-1367-1-6	S-1367-1-8	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
4			
3	S-1360-10	CIRCUIT BREAKER	
2	S-1158-1-1	SWITCH	
1	AN4078-1	OIL DIL VALVE	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	RIDDER	9-13-62
GROUP		
CHECK	[illegible]	10-3-62
PROJ	[illegible]	10-11-62

TITLE: WIRING DIAGRAM — OIL DILUTION SYSTEM (OPT)

Cessna.

DWG NO 0770610

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
		182	A	7.1

FORM NO 80-161

ENGINE INSTRUMENTS SECTION

Cessna.

DRAWN	H. WISE	TITLE: WIRING DIAGRAM--- MODEL 182	DRAWING NO. 0770610
DATE	8-27-62		
APP'D	Nhi	REV:	PAGE: 8.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

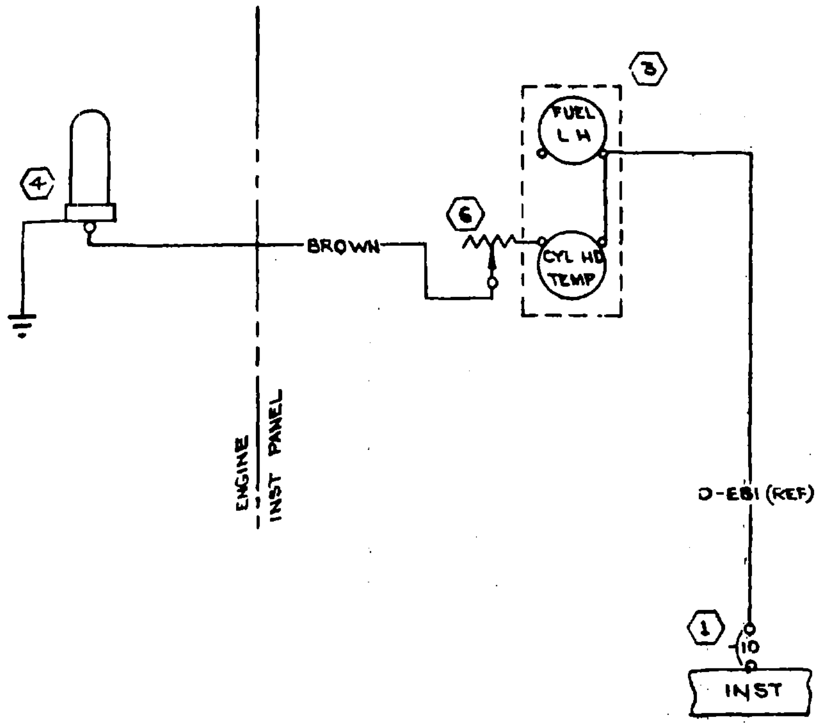
FORM NO. 80-166

(SR 3981)

NOTES:

1. PART NO. 110691 (PRSO) COLOR: BROWN.
2. AT GIVEN SERIALS, MODEL 182 TEMP BULB MOVES FROM NO. 1 CYL TO NO. 6 CYL.

CHG LET	REVISION	BY DATE	CHK APPD
A	INACTIVATED D-EC1 WIRE; ADDED BROWN WIRE & 1 ; INST WAS INST LIGHTS, REMOVED 0713 [illegible] BUS BAR FROM E/T. S-1360-10 WAS S-1232-10; C669502-0103 WAS 0713602-1. REMOVED [illegible] EB1 FROM E/T. ADDED WIRE LENGTHS TO WIT: S-1372-1 WAS C750603-1	[illegible] 7-1-69	[illegible]
B	ADDED BROWN WIRE & NOTE 2 (SR4646)	WJR 10-20-69	[illegible]



BROWN	18	1		S-1367-1-8	S-1367-1-4	NO. 6 CYL	2 SER/18255845 & ON
BROWN	18	1	81	S-1367-1-8	S-1367-1-4	NO. 1 CYL	2 18255O718 THRU/18255844
D-EC1	18		81	S-1367-1-8	S-1367-1-4		INACTIVE 18255O718 & ON
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
6	0713602-4	POTENTIOMETER	
5			
4	S-1372-1	BULB, CYL HD TEMP	
3	C669502-0103	INST CLUSTER KIT	
2			
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	H WISE	8-27-62
GROUP	[illegible]	[illegible]
CHECK	[illegible]	9-5-62
PROJ	[illegible]	10-10-62

TITLE: WIRING DIAGRAM — CYLINDER HEAD TEMPERATURE

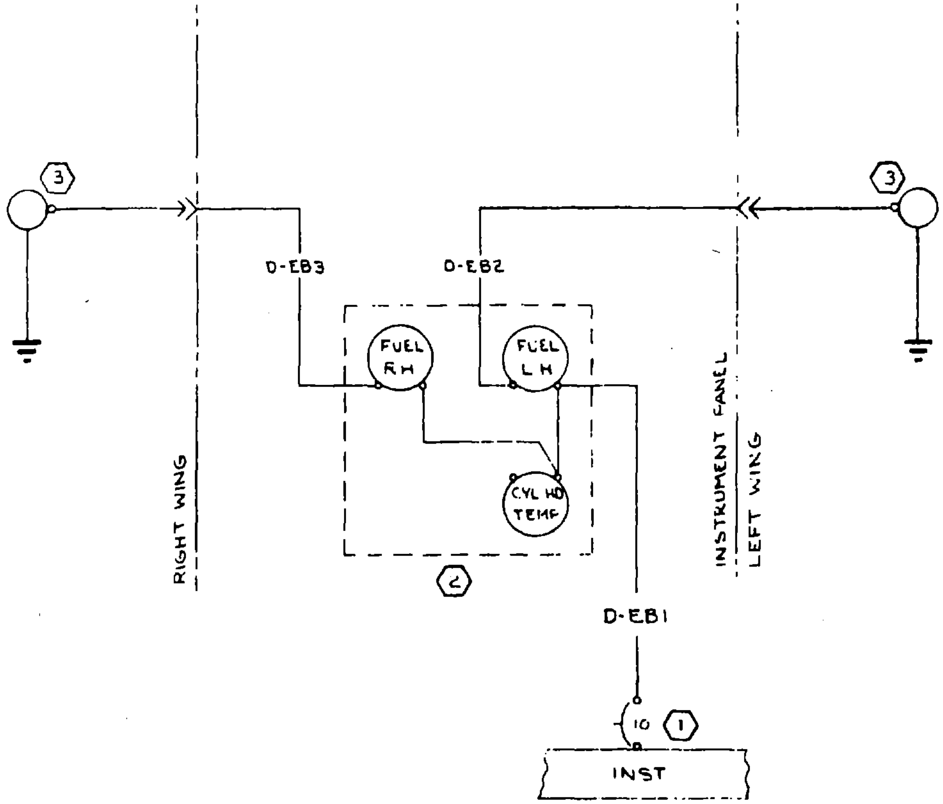
Cessna.

DWG NO 0770610

SUPERSEDED BY: | SUPERSEDES: | MODEL 182 | REV B | PAGE 8.1

FORM NO 80-181

CHG LET	REVISION	BY / DATE	CHK / APPD
A	ADDED WIRE LENGTHS TO WIT: REMOVED 0713106-1 BUS BAR; S-1360-10 WAS S-1232-10; C669502-0103 WAS 0713402-1 INST WAS NET LIGHTS	7-6-64 WJR	



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
D-EB1	18		42	S-1367-1-8	S-1367-1-8		
D-EB3	18		87	S-1367-1-10	S-341-2		
D-EB2	18		107	S-1367-1-10	S-341-2		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
5			
4			
3	0726110-1	XMTR, FUEL LEVEL	
2	C669502-0103	INST CLUSTER KIT	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RIDLER	9-14-62
GROUP		
CHECK	[illegible]	10-12-62
PROJ	[illegible]	10-17-62

TITLE: WIRING DIAGRAM — FUEL QUANTITY INDICATOR

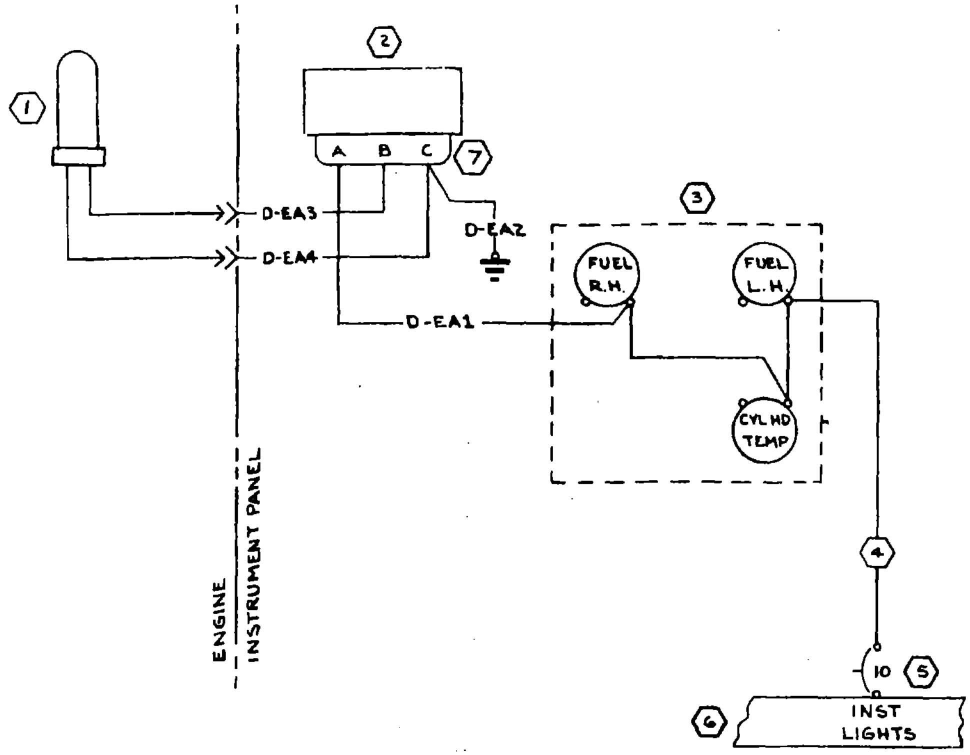
Cessna.

DWG NO 0770610

SUPERSEDED BY: | SUPERSEDES: | MODEL: 182 | REV: A | PAGE: 8.2

NOTES:
1. BURNDY YZ14-H FURNISHED WITH (1).

CHG LET	REVISION	BY / DATE	CHK / APPD
A	[illegible] EA[illegible] WAS ERRONEOUSLY [illegible] TO OTHER TERMINAL ON R.H. FUEL GAUGE	[illegible]	[illegible]



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
D-EA4	18			YZ14-H	SOLDER	1	
D-EA3	18			YZ14-H		1	
D-EA2	18			S-13671-8			
D-EA1	18			S-1367-1-8	SOLDER		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
7	MS3106A-14S-7S	PLUG	
6	0713706-1	BUS BAR	
5	S-1232-10	CIRCUIT BREAKER	
4	DF-EB1	WIRE	
3	0713602-1	INST CLUSTER	
2	S-1311-1	INDICATOR	
1	0550209-1	BULB-CARB AIR	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RILDER	9-14-62
GROUP	[illegible]	
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — CARBURETOR AIR TEMP (OPT)

Cessna.

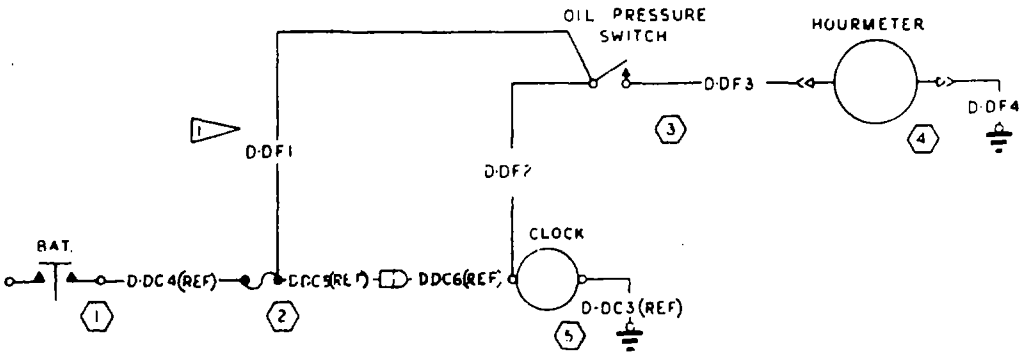
DWG NO 0770610

SUPERSEDED BY | SUPERSEDES | MODEL 182 | REV A | PAGE B.3

FORM NO 80-181

(SP 5033)

CHG LET	REVISION	BY DATE	CHK APPD



NOTE:
1. WIRING DIAGRAM SHOWN IS FOR USE WHEN AN OPTIONAL ELECTRIC CLOCK IS INSTALLED. WHEN ELECTRIC CLOCK IS NOT INSTALLED WIRE D-DF1 CONNECTS PRESSURE SWITCH TO FUSEHOLDER. INSTALL S-1091-1 FUSE AND S-1690-22 FUSEHOLDER.

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
D-DF4	18			S-1493-1	S-1367-18		
D DF3	18			S-1493-1	S-1367-1-6		
D-DF2	18			S-1367-1-6	S-1367-1-6		
D-DF1	18			S-1367-1-6	SOLDER		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
5	S-1317N1	CLOCK	
4	C664501-0101	HOURMETER	
3	S-1711-1	OIL PRESSURE SW.	
2	S-1091-1	FUSE	
1	S-1579-1	BAT. CONTACTOR	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	Weber	9-23-66
GROUP	W. Wace	9-27-66
CHECK		
PROJ	Wm Cut	9-19-66

TITLE: WIRING DIAGRAM— HOURMETER (OPT)

Cessna.

DWG NO 0770610

SUPERSEDED BY | SUPERSEDES | MODEL 182 | REV | PAGE 84

FLIGHT INSTRUMENTS SECTION

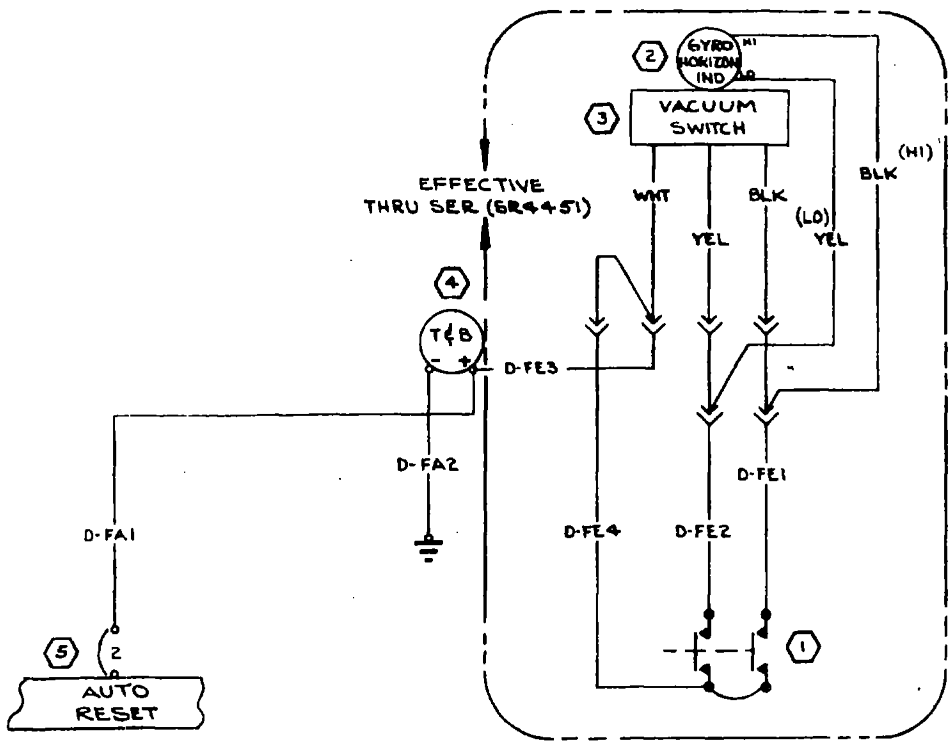
Cessna.

DRAWN	RIDDER	TITLE: WIRING DIAGRAM--- MODEL 182		DRAWING NO. 0770610
DATE	9-14-62			
APP'D	[illegible]		REV:	PAGE: 9.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO 30-1[illegible]

CHG LET	REVISION	BY / DATE	CHK / APPD
A	[illegible]	WJK 7-14-64	



D-FE4	20		6	S-341-2	SOLDER	0713705	Inactive SER (6R4451) & ON
D-FE3	20		6	S-341-2	S-1367-1-8		Inactive SER (6R4451) & ON
D-FE2	20		7	S-341-2	SOLDER		Inactive SER (6R4451) & ON
D-FE1	20		7	S-341-2	SOLDER	0713705	Inactive SER (6R4451) & ON
D-FA2	18		11	S-1367-1-8	S-1367-1-8		
D-FA1	18		12	S-1367-1-8	S-1367-1-8		
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

6			
5	CA-2	CKT BKR (MTCC)	
4	S-1302N1	INDICATOR T&B	
3	S-1365-1	SWITCH, VACUUM	
2	S-1326N1	IND, GYRO HORIZON	
1	S-1284-1	SWITCH	
ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RIDDER	9-11-62
GROUP	[illegible]	[illegible]
CHECK	R. Zl..k	10-23-62
PROJ	H. McC...	10-23-62

TITLE: **WIRING DIAGRAM — TURN & BANK AND GYRO HORIZON INDICATOR (OPT)**

Cessna.

DWG NO 0770610

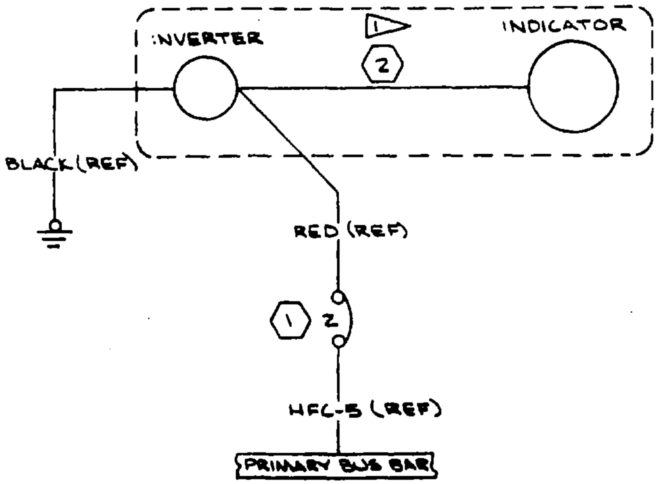
SUPERSEDED BY | SUPERSEDES | MODEL 182 | REV A | PAGE 9.1

FORM NO 80-161

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

NOTES:

1. TURN COORDINATOR INDICATOR INCLUDES ALL WIRES AND CABLES BETWEEN INVERTER, INDICATOR AND CIRCUIT BREAKER.



WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION
2	C661003-0401	TURN COORDINATOR
1	CA-Z	CKT BKR (73803)

EQUIPMENT TABLE

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Wine	5-25-67
DRAWN	HARRIS	5/22/67
CHECK	YAKSHAW	5-22-67
STRESS	[illegible]	5-25-67
PROJECT	N. [illegible]	[illegible]
APPD	[illegible]	[illegible]

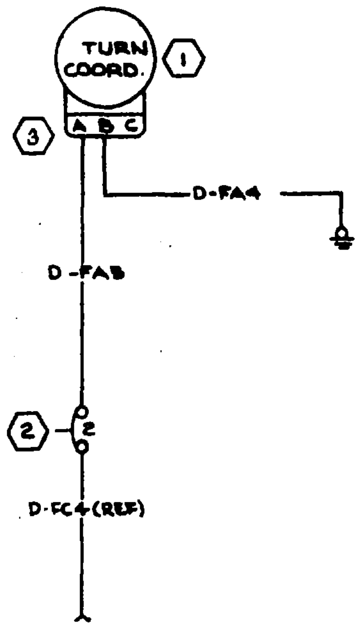
Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — BRITTAIN WING LEVELER (OPT)

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0770610

SCALE: NONE (68,5157) IX PAGE: 9.3

FORM NO. 10 215



REVISION			
LET	DESCRIPTION	DATE	APPD

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS			SERIALS
D-FA4	18			S1367-1-6	SOLDER		
D-FA3	18			S1367-1-6	SOLDER		

WIRE TABLE

3	MS3106A10SL3S	CONNECTOR	
2	CA-2	CIRCUIT BREAKER	(B0602)
1	C661003-0201	TURN COORDINATOR	
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:

CONTRACT NO:

	NAME	DATE
DESIGN		
GROUP	H. Weil	9-13-67
DRAWN	HARRIS	9-8-67
CHECK	LAURIE	9-9-67
STRESS	[illegible]	9-11-67
PROJECT	H. McCarter	9-14-67
APPD	[illegible]	9-9-67

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE
WIRING DIAGRAM — TURN COORDINATOR (OPT)

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0770610

SCALE: NONE | 182 | PAGE: 9.4

SER 18258506 & ON

FORM NO. 00-3154

OTHER INSTRUMENTS SECTION

Cessna.

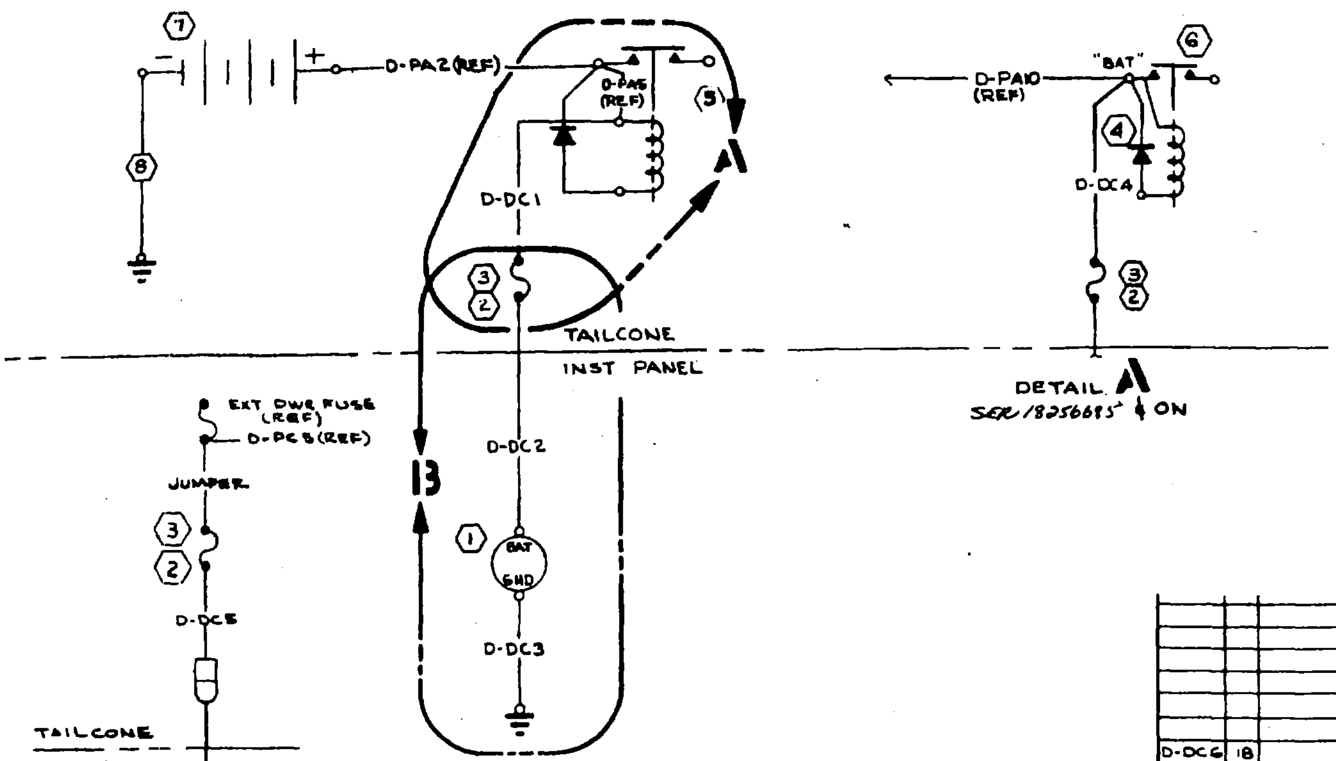
DRAWN	RIDDER	TITLE: WIRING DIAGRAM--- MODEL 182	DRAWING NO. 0770610
DATE	10-8-62		
APP'D		REV:	PAGE: 10.0

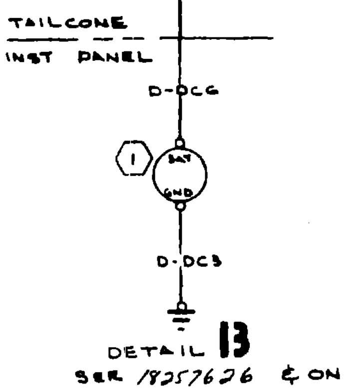
CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-168

(SR4021)

CHG LET	REVISION	BY DATE	CHK APPD
A	REDUCE WIRE LENGTHS TO .../T, REMOVED D-PA2 & D-PA6 FROM E/T	WJR 7-15-6[illegible]	[illegible]
B	BY REV: ADD DETAIL A, D-DC4, SERIALS, & ITEM 6 INACTIVATED D-DC1 (SR4642)	LPB 2-20-6[illegible]	[illegible]
C	ADD DETAIL B, D-DC5 & D-DC6 INACTIVATE D-DC2 (SR4905)	JM 3-18-66	CRS





ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
8	0412007-1	STRAP-BAT. GND	
7	0712605-1	BATTERY	
6	S-1579-1	CONTACTOR-BAT.	
5	0712603-2	CONTACTOR-BAT.	
4	0770728-1	DIODE ASSY.	
3	S-1091-1	FUSE	
2	S-1090-22	FUSEHOLDER	
1	S-1317N1	CLOCK	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
D-DC6	18			S-1367-1-6	S-1657-1 S-1658-1		SER 18257626 & ON
D-DC5	18			S-1657-2 S-1656-1	SOLDER		SER 18257626 & ON
D-DC4	18		18	S-1367-1-13	SOLDER		SER 18256685 & ON
D-DC3	18		18	S-1367-1-6	S-1367-1-8		
D-DC2	18		200	S-1367-1-6	SOLDER		INACTIVE 18257626 & ON
D-DC1	18		18	S-1367-1-6	SOLDER		INACTIVE 18256685 & ON

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	KIDDER	10-8-62
GROUP	"	"
CHECK	[illegible]	10-11-62
PROJ	H. McCabe	10-11-62

TITLE: WIRING DIAGRAM — CLOCK

Cessna.

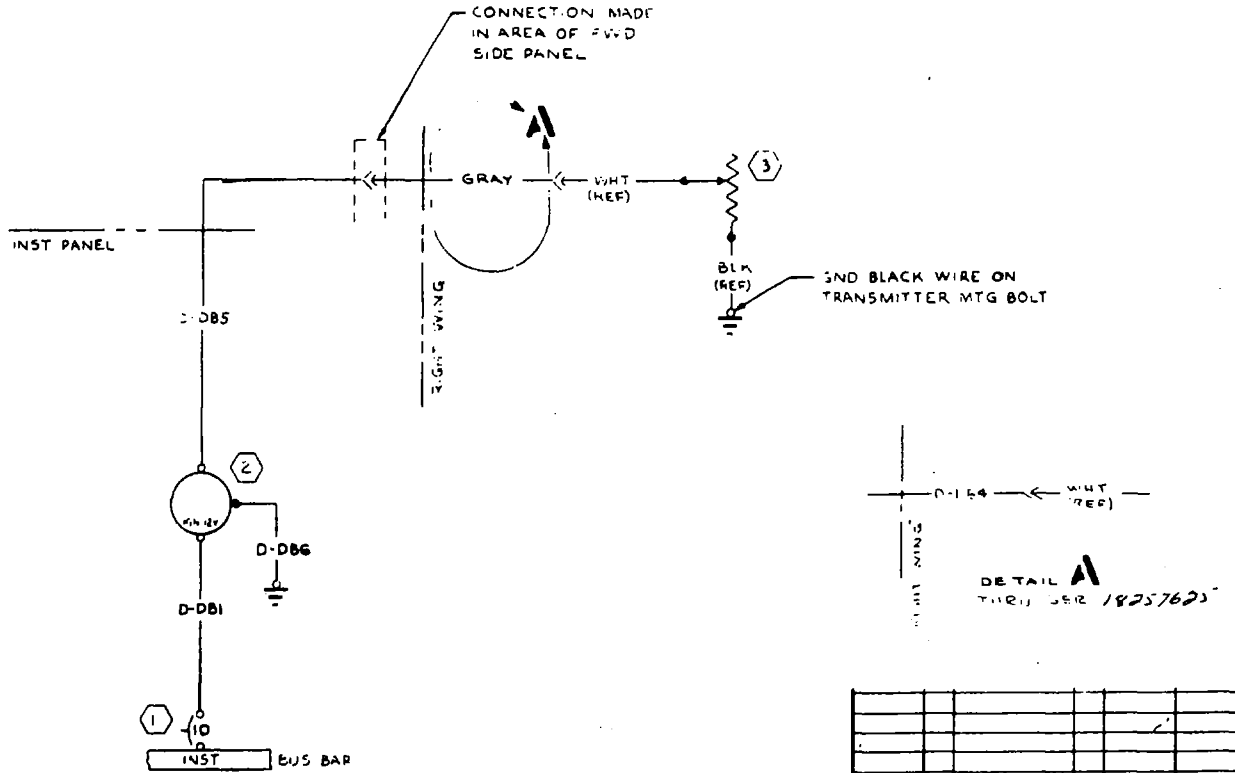
DWG NO 0770610

SUPERSEDED BY | SUPERSEDES | MODEL 182 | REV C | PAGE 10.1

FORM NO 80-161

(SK 4946)

CHG LET	REVISION	BY DATE	CHK APPD
A	INACTIVATED D-DB4; ADDED GRAY WIRE. ADDED DETAIL A (SK 4946)	WJR 1-21-66	



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
GRAY	18	S-1460-18-8	152	S-341-2	S-341-2		SER/18257626 & ON
D-DB6	18		6	SOLDER	S-1367-8		
D-DB5	18		26	S-1367-10	S-341-2		
D-DB4	18		152	S-341-2	S-341-2		SER/18257625 & ON
D-DB1	18		31	S-1367-8	S-1367-10		

WIRE TABLE

	PART NO	DESCRIPTION	INSTALLED ON
3	1590501-0101	TRANSMITTER	
2	C668001-0101	INDICATOR	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	G. WOOD	10-19-65
GROUP	J. Wise	10-19-65
CHECK		
PROJ		10-13-65

TITLE: **WIRING DIAGRAM— FLAP POSITION INDICATOR**

Cessna.

DWG NO 0770610

SUPERSEDED BY | SUPERSEDES 0770610 PAGE 10.1 | MODEL 182 | REV A | PAGE 10.2

LIGHTING
SECTION

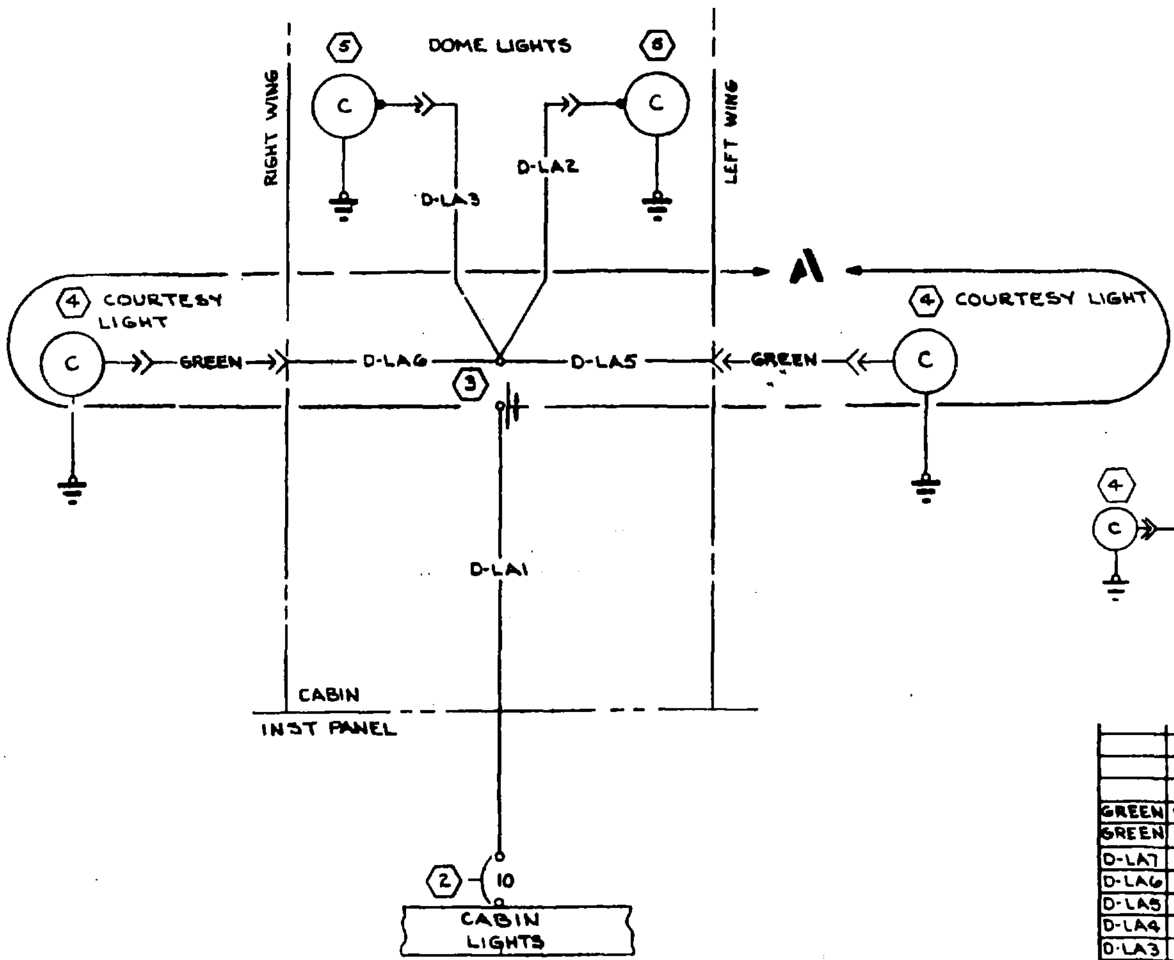
Cessna.

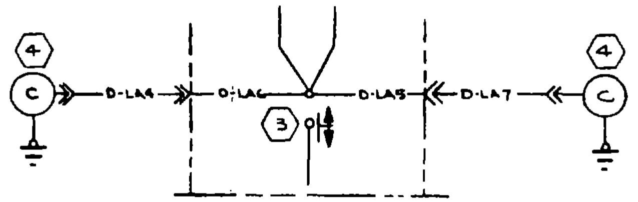
DRAWN	RIDDER	TITLE: WIRING DIAGRAM--- MODEL 182	DRAWING NO. 0770610
DATE	9-18-62		
APP'D	RLS Nm	REV:	PAGE: 11.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. 80-169

CHG LET	REVISION	BY / DATE	CHG APPR
A	ADDED WIRE LENGTHS [illegible]; CABIN LIGHTS WAS INST LIGHTS; S-1360-10 WAS S-1232-10; REMOVED 0713607-1 FROM E/T	[illegible] 7-17-[illegible]	[illegible]
B	INACTIVATED D-LA4 & D-LA7; ADDED GRN (2) WIRES & DETAIL "A" (SR4908)	WJR 1-1966	[illegible]





DETAIL A
THRU SER 18257625 & ON

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
GREEN	18	S-1460-18-5	127	S-341-2	S-341-2	0720600	(STD) SER/18257626 & ON
GREEN	18	S-1460-18-5	127	S-341-2	S-341-2	0720600	(STD) SER/18257626 & ON
D-LA7	18		127	S-341-2	S-341-2	0720600	(STD) INACTIVE SER/18257626 & ON
D-LA6	18		127	S-341-2	SEE D-LA5		
D-LA5	18		50	S-341-2	S-1367-2-6		
D-LA4	18		127	S-341-2	S-341-2	0720600	INACTIVE SER/18257626 & ON
D-LA3	18		76	S-341-2	SEE D-LA2	0700620	
D-LA2	18		30	S-341-2	S-1367-2-6	0700620	
D-LA1	18		109	S-1367-1-8	S-1367-1-4		(STD)

WIRE TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
5	181522	LIGHT ASSY (UCTE)	
4	0700615-1	COURTESY LIGHT	
3	0713029	SWITCH	
2	S-1360-10	CIRCUIT BREAKER	
1			

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RIDDER	9-19-62
GROUP	[illegible]	[illegible]
CHECK	[illegible]	10-22-62
PROJ	[illegible]	10-29-62

TITLE: WIRING DIAGRAM — DOME & COURTESY LIGHTS (OPT)

Cessna.

DWG NO 0770610

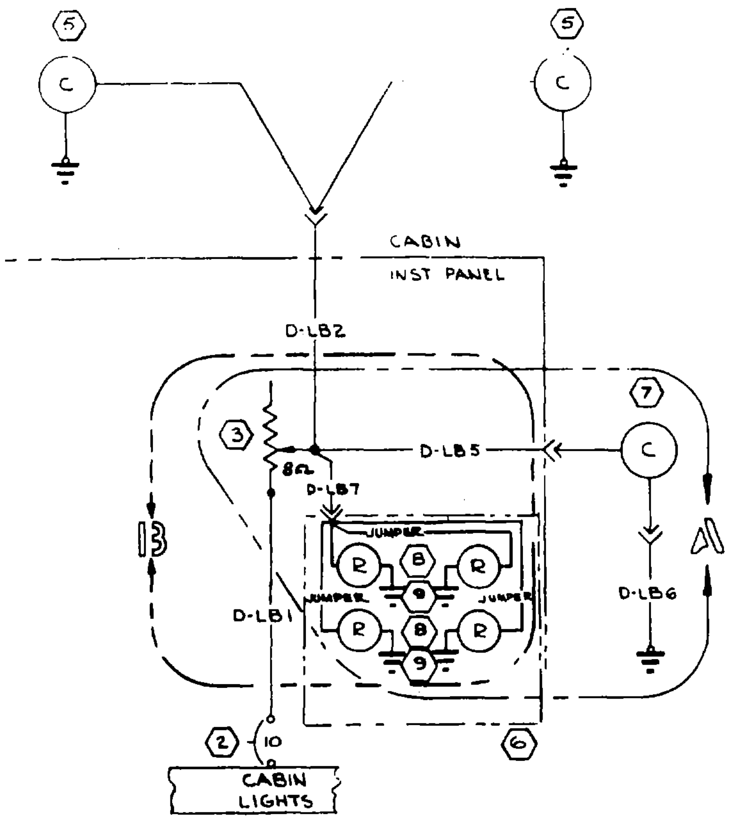
SUPERSEDED BY | SUPERSEDES | MODEL 182 | REV B | PAGE 11.1

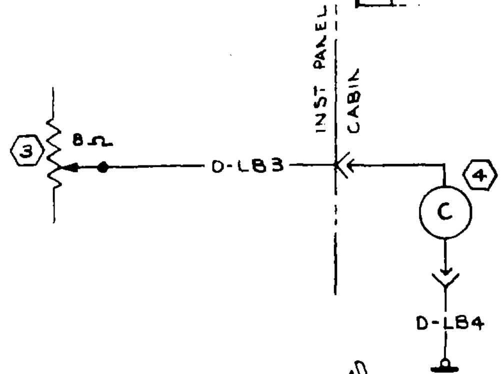
FORM NO. 80-161

NOTES:

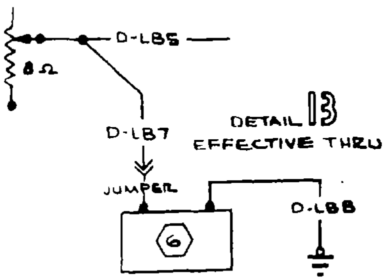
1. WHEN (OPT) POST & BACK LIGHTING IS INSTALLED WIRE D-LB2 IS CONNECTED TO CONSOLE SIDE OF SWITCH S-1238 Z-1 REF 0770610 PG. 11-7
2. JUMPERS ARE 20GA WIRE

CHG LET	REVISION	BY DATE	CHK APPD
A	ADDED WIRE LENGTHS TO W/T; CABIN LIGHTS WAS INST LIGHTS; S-1360-10 WAS S-1232-10; REMOVED 0713607-1 FROM E.T.; INACTIVATED D-LD3 & D-LD4; ADDED D-LB5, D-LB6, D-LB7, D-LB8 C669502-0103 & C660501-0101; ADDED DETAIL 'A' (SR4451)	WJR 8-6-64	[illegible]
B	ADDED DETAIL "B" & NOTES 1 & 2, ITEMS 25-240XP16 & 336R	JH [illegible]	[illegible]
C	XR6637 WAS R12½-8-R934 (SR5151)	VHS [illegible]	[illegible]





DETAIL A
EFFECTIVE THRU SER 18255844



DETAIL B
EFFECTIVE THRU (SR4908)

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
9	336R	LAMP	(24446)
8	25-240XP16	LAMPHOLDER	(95263)
7	C660501-0101	COMPASS	
6	C669502-0103	INST CLUSTER KIT	
5	0700621-1	LIGHT INSTL	
4	0713068-1	COMPASS	
3	XR6637	RHEOSTAT	(83777)
2	S-1360-10	CIRCUIT BREAKER	
1			

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
D-LB8	20			SOLDER	S-1367-1-8		SER (SR4451) & ON
D-LB7	20			SOLDER	SOLDER		
D-LB6	20			S-341-2	S-1367-1-8		
D-LB5	20			S-341-2	SOLDER		SER (SR4451) & ON
D-LB4	18		42	S-341-2	S-1367-1-8		Inactive SER (SR4451)
D-LB3	20		60	S-341-2	SOLDER		Inactive SER (SR4451)
D-LB2	20		88	S-341-2	SOLDER		
D-LB1	18		4	S-1367-1-8	SOLDER		

WIRE TABLE

CESSNA AIRCRAFT CO. · COMMERCIAL AIRCRAFT DIVISION · WICHITA, KANSAS

	NAME	DATE
DRAWN	RIDDER	9-19-62
GROUP	[illegible]	[illegible]
CHECK	R. [illegible]	10-11-62
PROJ	[illegible]	10-19-62

TITLE: WIRING DIAGRAM — INSTRUMENT LIGHTS & COMPASS

Cessna.

DWG NO 0770610

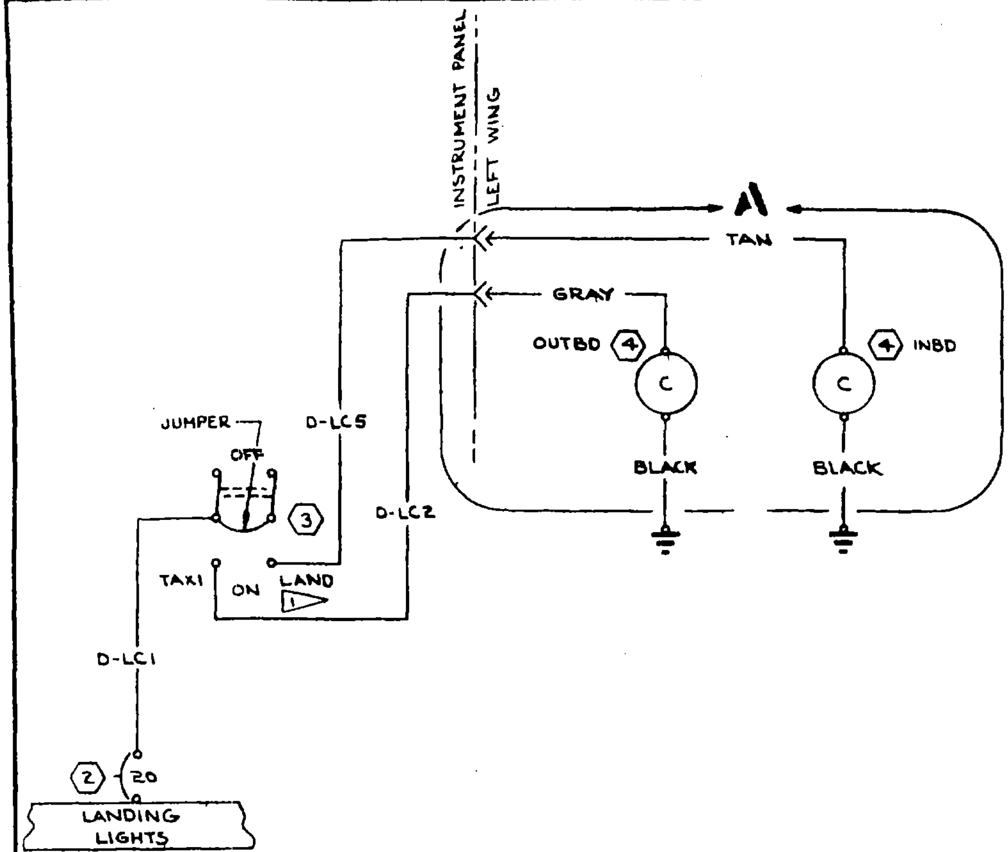
SUPERSEDED BY | SUPERSEDES | MODEL 182 | REV C | PAGE 11.2

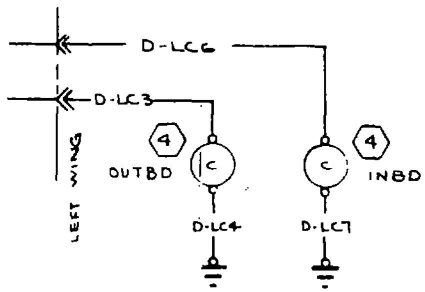
FORM NO 80-181

CHG LET	REVISION	BY DATE	CHK APPR
A	0713743-1 WAS 0713607 BUS BAR S-1360-20 WAS S-1232-5 CKT BKR WIRE D-LC2 & LC5 WERE 16 GA (SR 4037) (SR 4356)		
B	ADDED WIRE LENGTHS TO W/T; REMOVED 0713743-1 FROM E/T	WJR 8-10-6[illegible]	
C	INACTIVATED D-LC3, D-LC4 D-LC6 & D-LC7; ADDED GRAY, BLACK (2) & TAN WIRES ADDED DETAIL "A" (SR4905)	WJR 1-21-65	

NOTES:

1. SWITCH IS MECHANICALLY INTERCONNECTED SO THAT DEPRESSING "LAND" PORTION OF SWITCH TO "ON" POSITION ALSO CARRIES "TAXI" PORTION OF SWITCH TO "ON" POSITION.





DETAIL A
THRU SER 18257625

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
BLACK	16	S-1460-16-0	7	S-1367-2-8	S-1367-2-8		SER 18257626 & ON
TAN	14	S-1460-14-10	160	S-1367-2-8	S-341-1		SER 18257626 & ON
BLACK	16	S-1460-16-0	7	S-1367-2-8	S-1367-2-8		SER 18257626 & ON
GRAY	14	S-1460-14-8	166	S-1367-2-8	S-341-1		SER 18257626 & ON
D-LC7	14		7	S-1367-2-8	S-1367-2-8		Inactive SER 18257626 & ON
D-LC6	14		160	S-1367-2-8	S-341-1		Inactive SER 18257626 & ON
D-LC5	14		26	S-1367-2-6	S-341-1		
D-LC4	14		7	S-1367-2-8	S-1367-2-8		Inactive SER 18257626 & ON
D-LC3	14		166	S-1367-2-8	S-341-1		Inactive SER 18257626 & ON
D-LC2	14		26	S-1367-2-6	S-341-1		
D-LC1	14		3	S-1367-2-6	S-1367-2-8		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
4	0523118-1	LANDING LIGHT	
3	S-1160-1-1	SWITCH	
2	S-1360-20	CIRCUIT BREAKER	
1			

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RIDDER	9-17-62
GROUP	[illegible]	[illegible]
CHECK	[illegible]	10-23-62
PROJ	[illegible]	10-29-62

TITLE: WIRING DIAGRAM — LANDING LIGHTS

Cessna.

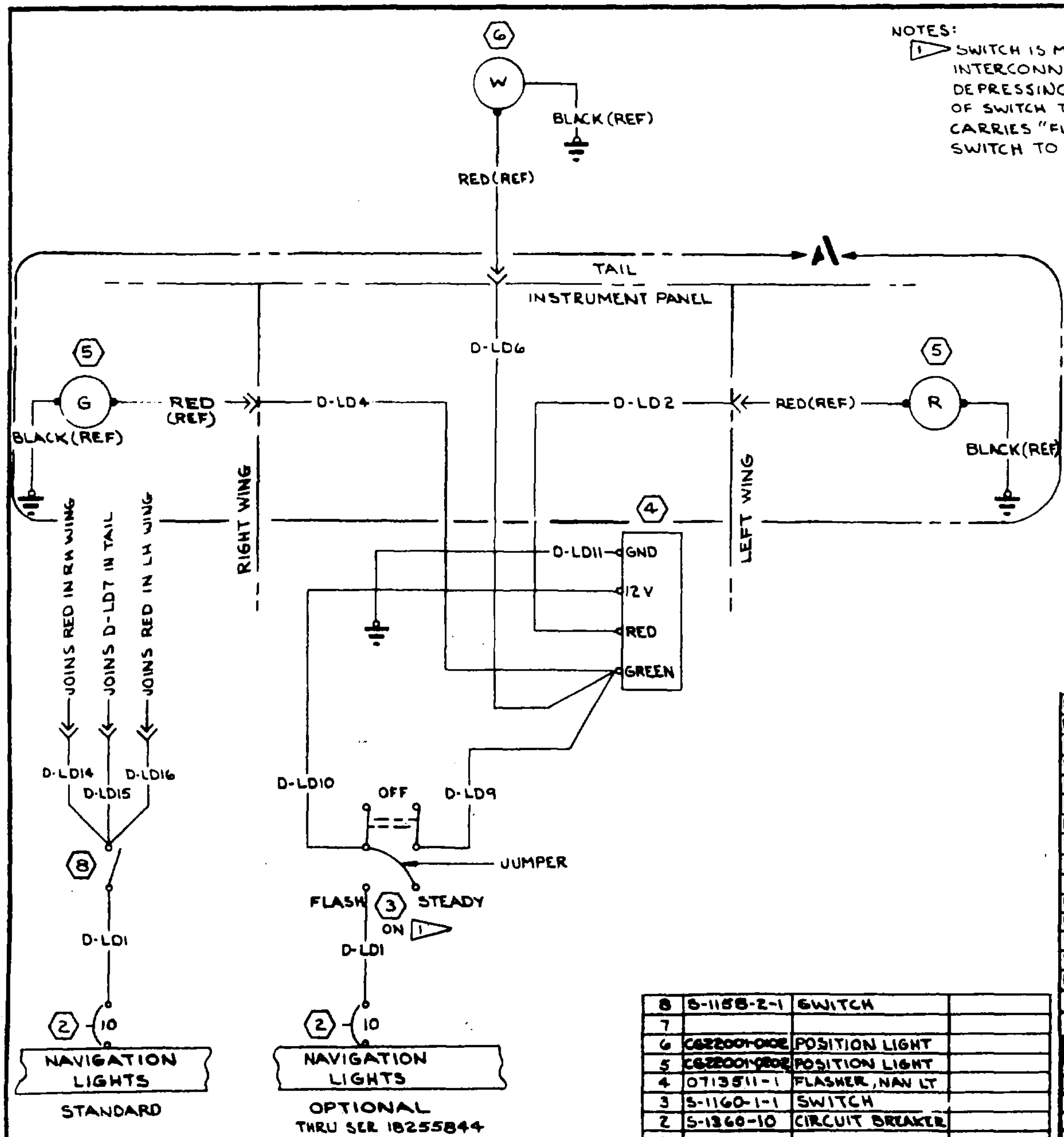
DWG NO. 0770610

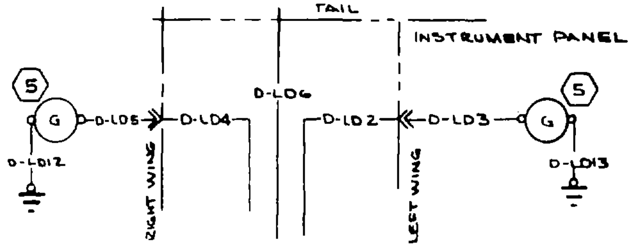
SUPERSEDED BY: | SUPERSEDES: | MODEL 182 | REV C | PAGE 11.3

FORM NO. 80-161

NOTES:
1 SWITCH IS MECHANICALLY INTERCONNECTED SO THAT DEPRESSING "STEADY" PORTION OF SWITCH TO "ON" POSITION ALSO CARRIES "FLASH" PORTION OF SWITCH TO "ON" POSITION.

CHG LET	REVISION	BY DATE	CHK APPD
A	ADDED WIRE LENGTHS TO W/T; ADDED LIMITING SERIALS TO FIELD; INACTIVATED D-LD2, D-LD4, D-LD6, D-LD9, D-LD10 & D-LD11. S-1360-10 WAS S-1232-10; REMOVED 0713706-1 FROM E/T	WJR 8-10-64	
B	INACTIVATE D-LD3, D-LD5, D-LD12 & D-LD13; ADDED BLK(2) RED(2) & DETAIL A	WJR 1-20-66	
C	BY REV: C622001-0202 WAS 0425006-21E-22, C622001-0102 WAS 042306-7, ITEM 5 WAS ITEM 7, INACTIVATE D-LD7, DELETE 2 RED & 2 BLK WIRES (EDRR01163)	RCC 1-6-67	RLL





DETAIL A
THRU SER 18257626

8	S-1158-2-1	SWITCH	
7			
6	C622001-0102	POSITION LIGHT	
5	C622001-0202	POSITION LIGHT	
4	0713511-1	FLASHER, NAV LT	
3	S-1160-1-1	SWITCH	
2	S-1360-10	CIRCUIT BREAKER	
1			
ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

D-LD16	18		24	S-341-2	S-1367-1-6		
D-LD15	18		305	S-341-2	S-1367-1-6		
D-LD14	18		40	S-341-2	S-1367-1-6		
D-LD13	18		24	SOLDER	S-1367-1-8		Inactive SER 18257626 & ON
D-LD12	18		24	SOLDER	S-1367-1-8		Inactive SER 18257626 & ON
D-LD11	18		13	S-1367-1-6	S-1367-1-8	(OPT)	Inactive 18255845 & ON
D-LD10	18		30	S-1367-1-6	S-1367-1-6	(OPT)	Inactive 18255845 & ON
D-LD9	18		30	S-1367-1-6	S-1367-1-6	(OPT)	Inactive 18255845 & ON
D-LD7	18		24	S-341-2	SOLDER		INACTIVE SER 18257626 & ON
D-LD6	18		293	S-1367-1-6	S-341-2	(OPT)	Inactive 18255845 & ON
D-LD5	18		250	S-341-2	SOLDER		Inactive SER 18257626 & ON
D-LD4	18		27	S-1367-1-6	S-341-2	(OPT)	Inactive 18255845 & ON
D-LD3	18		250	S-341-2	SOLDER		Inactive SER 18257626 & ON
D-LD2	18		50	S-1367-1-6	S-341-2	(OPT)	Inactive 18255845 & ON
D-LD1	18		2	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	RIDDER	9-28-62
GROUP		10-1-62
CHECK	R. Buck	10-11-62
PROJ		10-19-62

TITLE: WIRING DIAGRAM — NAVIGATION LIGHTS

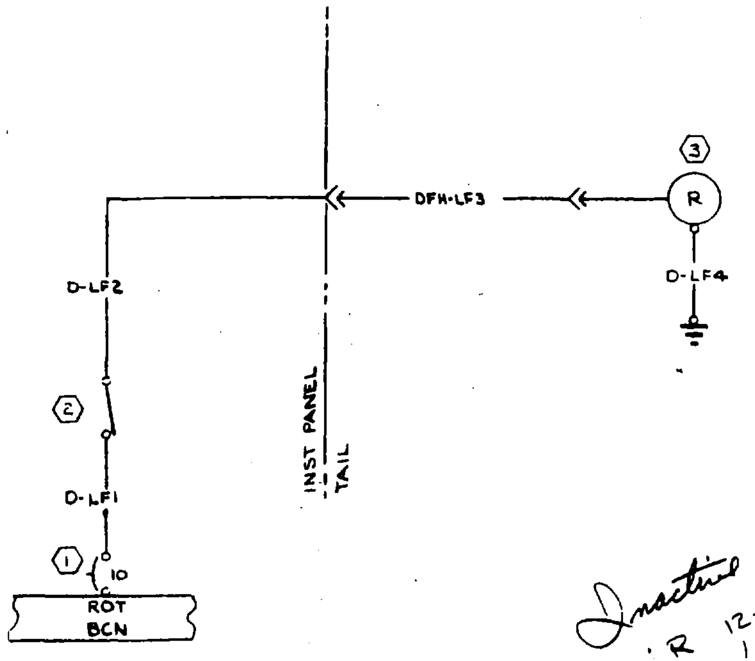
Cessna.

DWG NO 0770610

SUPERSEDED BY | SUPERSEDES | MODEL 182 | REV C | PAGE 11.4

FORM NO 80-181

CHG LET	REVISION	BY / DATE	CHK / APPD
A	[illegible] LENGTHS [illegible] W/T DFH-LF3 WAS D-LF3 [illegible] 136 [illegible] WAS S-252 [illegible] REMOVED [illegible] 3607-1 FROM E/T [illegible] WAS F-L-4 [illegible] W/T [illegible]	[illegible] 8-[illegible]	[illegible]



Inactive SER 18257626 & ON
WOR 12-20-65
HJW 1-24-65

WIRE CODE NO	GA	MATERIAL	[illegible]	TERMINALS			SERIALS
D-LF4	16		12	S-1367-2-6	S-1367-2-8	1270927	
DFH-LF3	16		70	S-341-1	S-341-1		(STD)
D-LF2	16		300	S-1367-2-8	S-341-1		(STD)
D-LF1	16		2	S-1367-2-6	S-1367-2-8	1270927	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
4			
3	0700120-1	ROTATING BCN	
2	S-1158-2-1	SWITCH	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RILDER	10-5-62
GROUP	[illegible]	[illegible]
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — ROTATING BEACON (OPT)

Cessna.

DWG NO 0770610

SUPERSEDED BY: 0770610 PAGE 11.5.1 | SUPERSEDES: | MODEL: 182 | REV: A | PAGE: 11.5

FORM NO 80-181

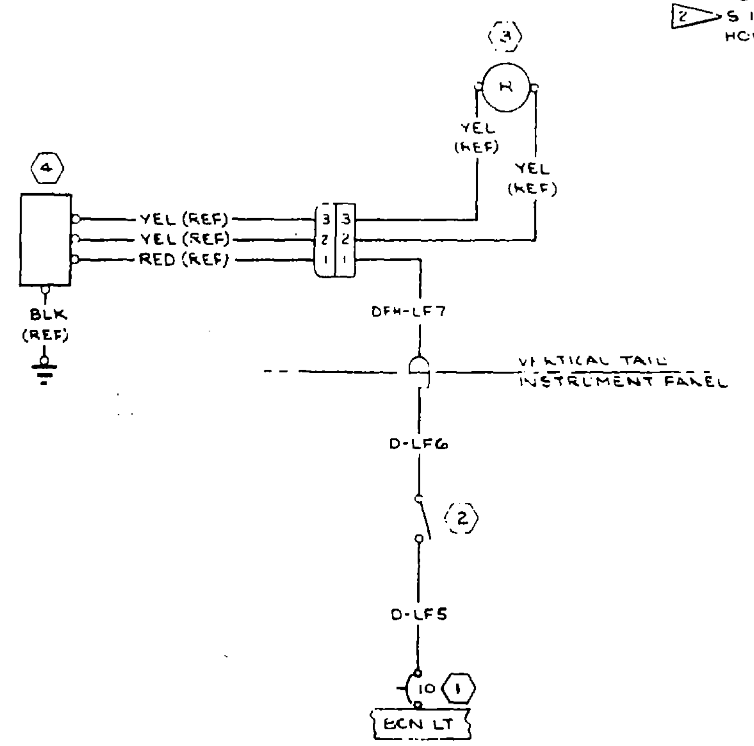
(SR4905)

CHG LET	REVISION	BY DATE	CHK APPD

NOTES:

1 S-1636-2 SOCKET & S-1637-2 HOUSING - PLUG.

2 S 1635-2 PIN & S-1637-1 HOUSING - CAP.



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
DFH-LF7	16			2	S-1636-2		(TO)
D-LF6	16			S-1367-2-8	1		(TO)
D-LF5	16			S-1367-2-6	S-1367-2-8	0700169	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
4	C594511-0101	FLASHER UNIT	
3	C621001-0101	LIGHT ASSY	
2	S-1158-2-1	SWITCH	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RIDDER	7-20-65
GROUP		1-24
CHECK		
PROJ		

TITLE: WIRING DIAGRAM— FLASHING BEACON LIGHT (OPT)

Cessna.

DWG NO. 0770610

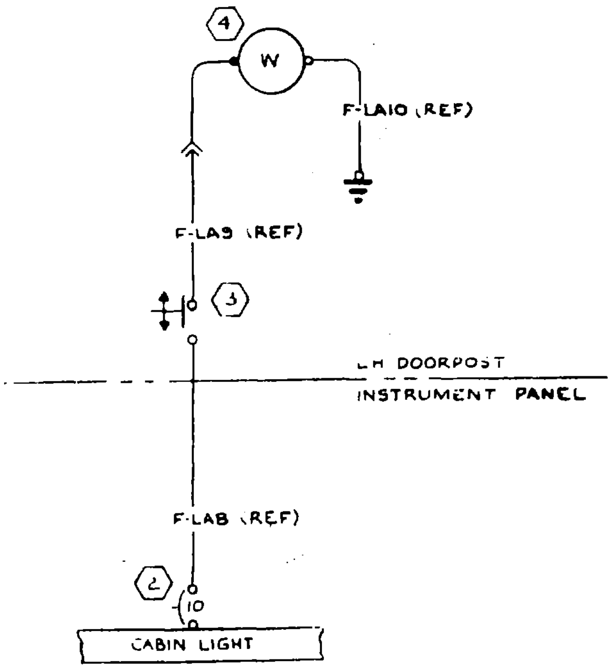
SUPERSEDED BY: | SUPERSEDES 0770610 PAGE 11.5 | MODEL 182 | REV | PAGE 11.5.1

CHG LET	REVISION	BY / DATE	CHK / APPD
A	[illegible] 1213742 [illegible] FROM E/T & INACTIVATED DWG	[illegible] 8-12-64	[illegible]

(SR 4037)

NOTE:

1. "F" PREFIX USED ON THIS DRAWING INSTEAD OF "D" BECAUSE WIRES ARE SAME AS THOSE USED IN MODEL 210. THIS DIAGRAM IS SCHEMATICALLY IDENTICAL TO 1270405 PAGE 11.6.



Inactive SER 12255845 & ON
W.J.R. 8-12-64

WIRE CODE	GA	MATERIAL		TERMINALS		REMARKS

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
4	1470089-10	MAP LIGHT ASSY	
3	0713029	SWITCH	
2	S1360-10	CIRCUIT BREAKER	
1			

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	G WOOD	2-29-63
GROUP		
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

WIRING DIAGRAM — MAP LIGHT (OPTIONAL)

Cessna.

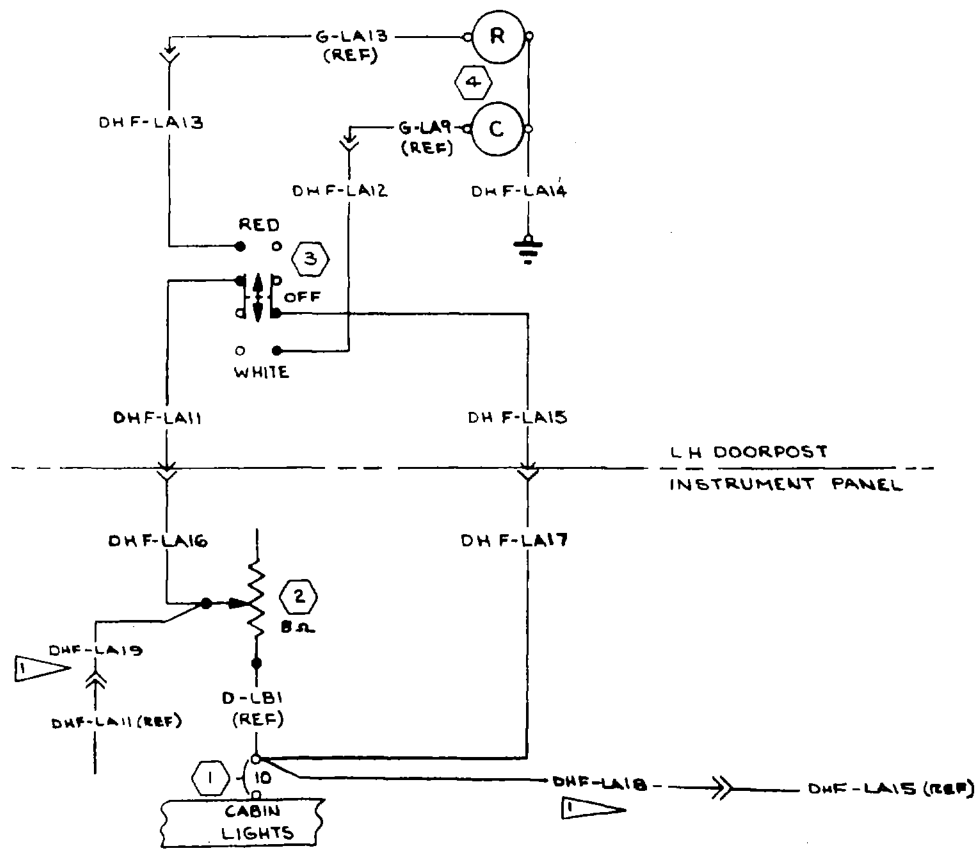
DWG NO 0770610

SUPERSEDED BY: 0770610 PAGE 11.6.1 | SUPERSEDES: | MODEL: 182 | REV: A | PAGE: 11.6

FORM NO 80 181

NOTES:
WIRES DHF-LA18 & DHF-LA19 REQD FOR R.H. MAP LT. INSTL ARE OPT (INSTALLED WITH OPT POST LTS).

CHG LET	REVISION	BY DATE	CHK APPD
A	REMOVED NOTE 1; ADDED 18-1 & JUMPER	11-11-69	
B	REMOVED (OPT) FROM T/B. ADD WIRES DFH-LA18, DFH-LA19 & NOTE 1. REMOVED 18-1 INSULATOR FROM FIELD	JH 7-26-64	RLS
C	CHANGED R12 ½-8-RS34 TO XRG637 RHEOSTAT (SR5451).	VRS 5-23-6	RLL



DHF-LA19	18			SOLDER	S-341-2	0770725	(OPT)
DHF-LA18	18			SOLDER	S-341-2	0770725	(OPT)
DHF-LA17	18			S-1367-1-6	S-341-2	0770725	
DHF-LA16	18			SOLDER	S-341-2	0770725	
DHF-LA15	18			SOLDER	S-341-2	0770725	
DHF-LA14	18			S-1367-1-8	S-1367-1-10	0770725	
DHF-LA13	18			SOLDER	S-341-2	0770725	
DHF-LA12	18			SOLDER	S-341-2	0770725	
DHF-LA11	18			SOLDER	S-341-2	0770725	
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

5	18-1	INSULATOR	81073
4	1470089-14	LIGHT ASSY	
3	S-1501-1	SWITCH	
2	XRG637	RHEOSTAT	(83777)
1	S-1360-10	CIRCUIT BREAKER	
ITEM NO	PART NO	DESCRIPTION	INSTALLED ON

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	RIDDER	8-13-64
GROUP		7-1-64
CHECK		8-24-64
PROJ		

TITLE: WIRING DIAGRAM — MAP LIGHT

Cessna.

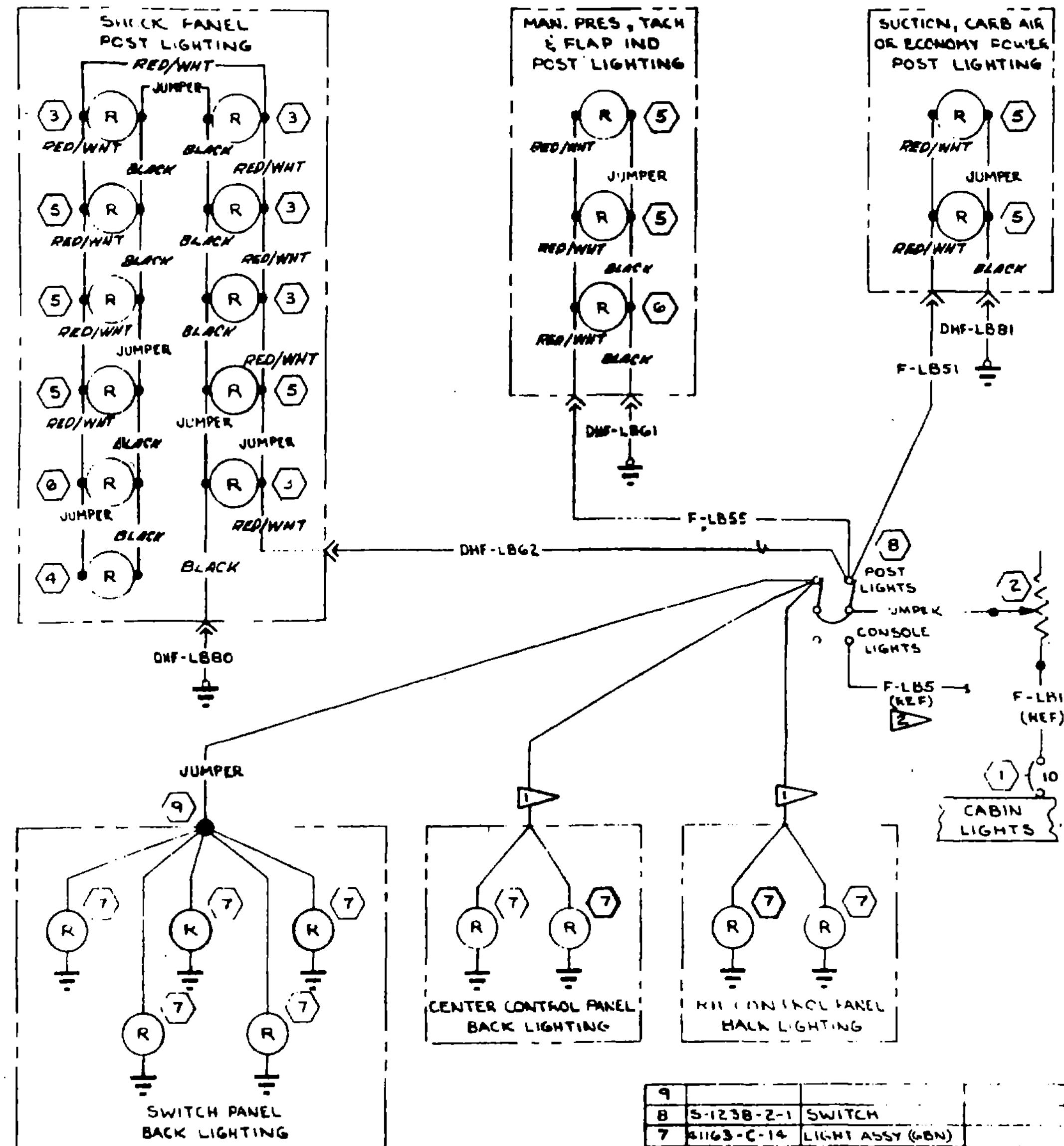
DWG NO 0770610

SUPERSEDED BY | SUPERSEDES 0770610 PAGE 11.6 | MODEL 182 | REV C | PAGE 11.6.1

FORM NO 80 181

(SK46C7)

CHG LET	REVISION	BY / DATE	CHK / APPD
A	BY REV. RED/WHT WIRES BETWEEN POST LIGHTS WERE ... NUMBER ED WIRES (NEVER USED). BLACK WIRES BETWEEN POST LIGHTS WERE 20 GA NUMBERED WIRES (NEVER USED).	PB 7-65	
B	REMOVE JUMPER ... LB ...	9-1-66	



DHF-LB81	18			S-1367-1-8	S-341-2	1200686	
DHF-LB80	18			S-341-2	S-1367-1-8		
BLACK	22	S-1460-22-0		SOLDER	S-341-2		
BLACK	22			SOLDER	SOLDER		
BLACK	22			SOLDER	SOLDER		
BLACK	22			SOLDER	SOLDER		
BLACK	22			SOLDER	SOLDER		
BLACK	22			SOLDER	SOLDER		
BLACK	22			SOLDER	SOLDER		
BLACK	22	S-1460-22-0		SOLDER	SOLDER		
RED/WHT	22	S-1460-22-2-9		SOLDER	SOLDER		
RED/WHT	22			SOLDER	SOLDER		
RED/WHT	22			SOLDER	SOLDER		
RED/WHT	22			SOLDER	SOLDER		
RED/WHT	22			SOLDER	SOLDER		
RED/WHT	22			SOLDER	SOLDER		
RED/WHT	22			SOLDER	SOLDER		
RED/WHT	22			SOLDER	SOLDER		
RED/WHT	22	S-1460-22-2-9		S-341-2	SOLDER		
DHF-LB62	18			S-1367-1-6	S-341-2		
DHF-LB61	18			S-341-2	S-1367-1-8		
BLACK	22	S-1460-22-0		SOLDER	S-341-2		
BLACK	22	-22-0		SOLDER	SOLDER		
RED/WHT	22	-22-2-9		SOLDER	SOLDER		
RED/WHT	22	-22-2-9		SOLDER	SOLDER		
RED/WHT	22	S-1460-22-2-9		S-341-2	SOLDER		
F-LB55	18			S-341-2	S-1367-1-6		
BLACK	22	S-1460-22-0		S-341-2	SOLDER		
RED/WHT	22	S-1460-22-2-9		SOLDER	SOLDER		
RED/WHT	22	S-1460-22-2-9		SOLDER	S-341-2		
F-LB51	18			S-1367-1-6	S-341-2	1200686	
WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
9			
8	S-1238-2-1	SWITCH	
7	41163-C-14	LIGHT ASSY (GBN)	
6	56C2M-3RH-R-14	LIGHT ASSY (GBN)	
5	5452-3RH-R-14	LIGHT ASSY (GBN)	
4	56C2M-3LH-R-14	LIGHT ASSY (GBN)	
3	5452-3LH-R-14	LIGHT ASSY (GBN)	
2	R-12½-B-R534	RHEOSTAT (TRTA)	
1	S-1360-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

NOTES:

1. VENDOR FURNISHED LEADS TERMINATE AT SWITCH WITH S-1367-1-6 TERMINAL.
2. WHEN MAP LIGHT & CONSOLE LIGHTS ARE INSTALLED WITH POST & BACK LIGHTING, WIRE F-LB2 IS CONNECTED TO CONSOLE SIDE OF S-1238-2-1 SWITCH INSTEAD OF R-12½-B-R534 RHEOSTAT.

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	HIDDER	5-20-64
GROUP		4-64
CHECK		9-2-64
PROJ	N. Wa...	9-2-64
		9-11-64

WIRING DIAGRAM — POST LIGHTING & BACK LIGHTING (OPT)

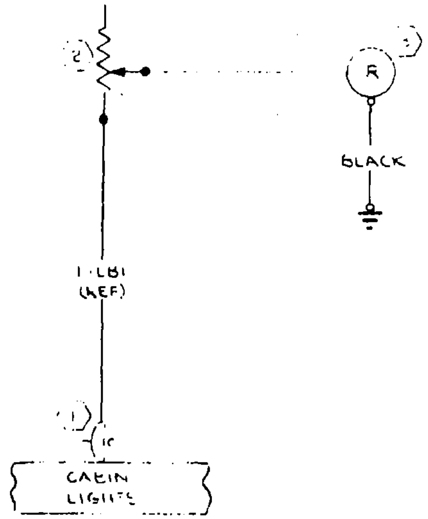
Cessna.

DWG NO 0770610

MODEL 82 | REV B | PAGE 11.7

CSR4921

CHG LET	REVISION	BY / DATE	CHK / APPD



Inactive SER 18255900 & ON
W.J.G. 10-30-64

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
BLACK	22	S1960-22-0		S1287-8	S1367-1-10	0770646	

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
3	AS2991-12	LIGHT ASSY (GNC)	
2	S-1[illegible] P-3[illegible]4	RHEOSTAT (STA.)	
1	[illegible]-260-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RIEDEL	8-16-64
GROUP		
CHECK		
PROJ		

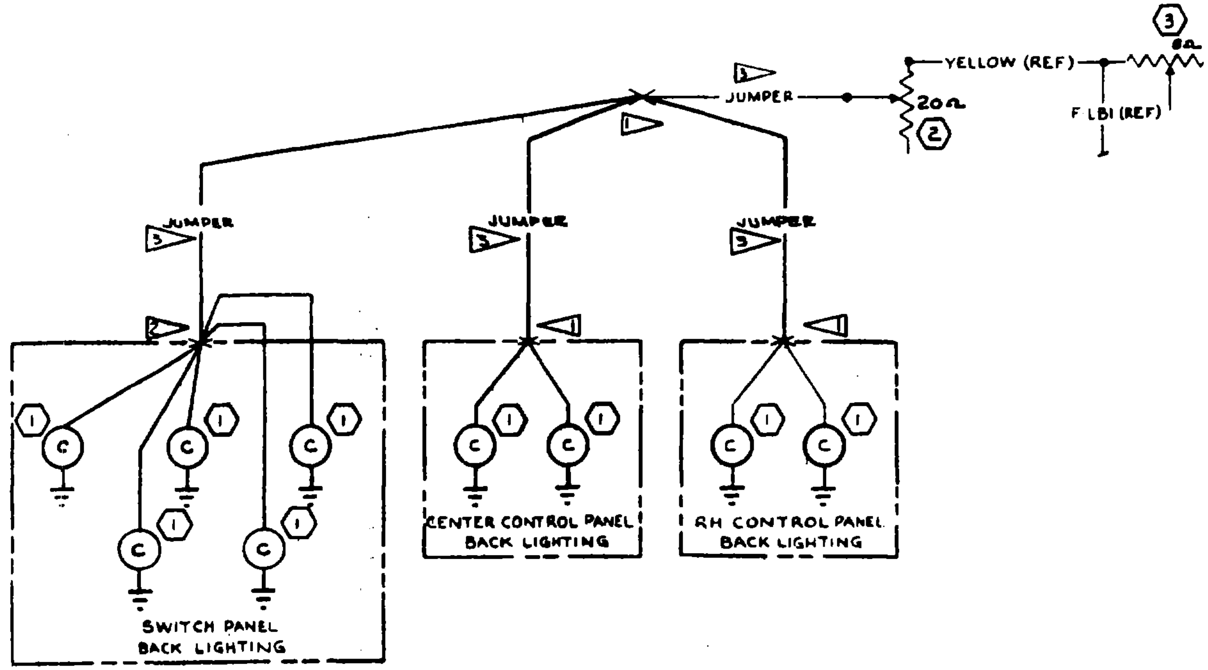
TITLE: **WIRING DIAGRAM—** NAV-O-MATIC 300 POST LIGHT (OPT)

Cessna.

DWG NO 0770610

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
		182		11.8

LTR	REVISION	BY / DATE	CHK / APPR
A	CHANGED R1B 12-8-R534 TO [illegible] XRG638. (SR5057)	[illegible]	[illegible]



NOTES:

1. TERMINATE WITH S-1370-1 SPLICE.
2. TERMINATE WITH S-1370-2 SPLICE.
3. JUMPER TO BE 20 GA WIRE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLATION
4			
3	XR6637	RHEOSTAT	(B3777)
2	XRG638	RHEOSTAT	(B3777)
1	336	BULB	(24446)

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	G WOOD	6-16-66
GROUP	[illegible]	9-8-66
CHECK	[illegible]	9-20-66
PROJ	[illegible]	[illegible]

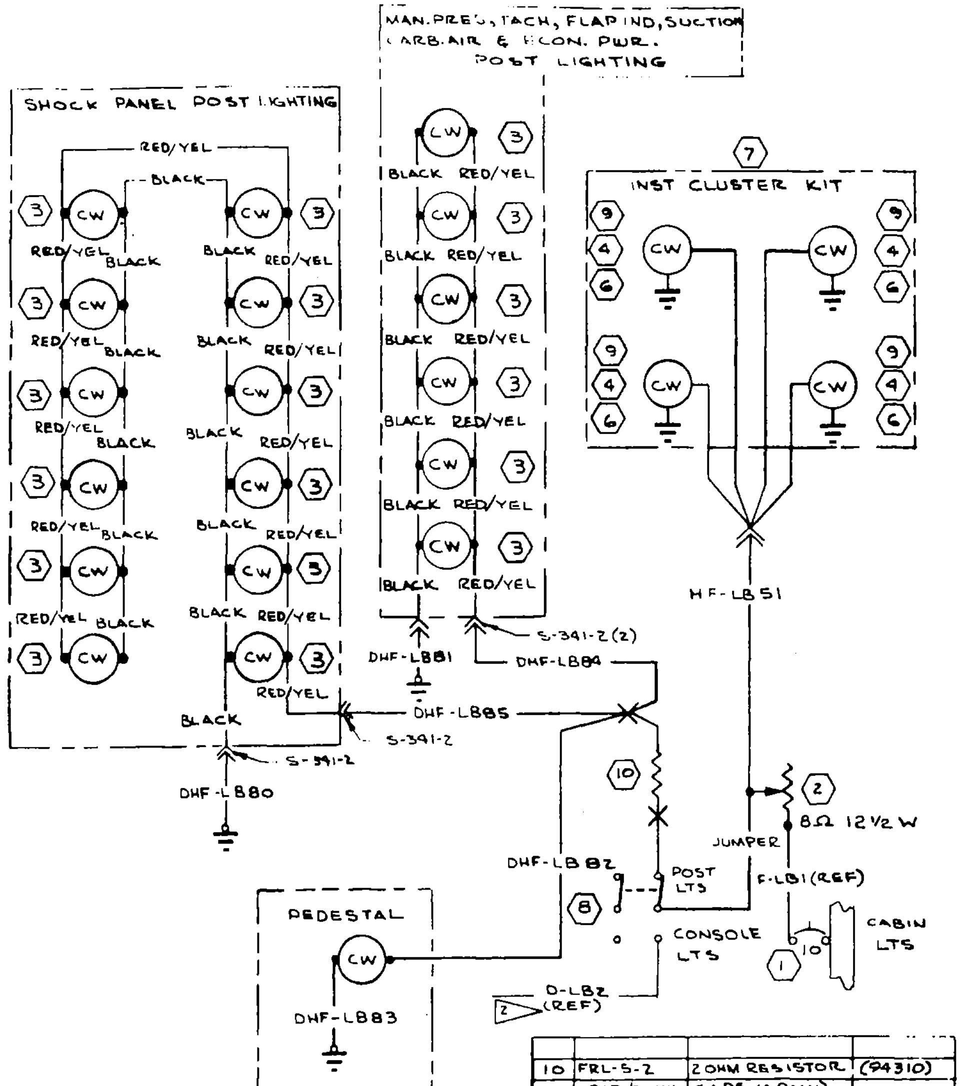
TITLE: **WIRING DIAGRAM— BACK LIGHTING**

Cessna.

DWG NO 0770610

SUPERSEDED BY: | SUPERSEDES: 0770610 PAGE 11.7 | MODEL 182 | REV A | PAGE 11.9

CHG LET	REVISION	BY DATE	CHK APPD
A	CHG'D ITEM 2 FROM R1842-8-R834 TO XR6637, CHG NOTE 2 TO AGREE (SR5157)	VRS	ALL



NOTES:

1. ALL RED/YEL & BLACK WIRES INTERCONNECTING LAMPS TO BE S-1460-22 WITH SOLDER AS TERMINATION UNLESS OTHERWISE IDENTIFIED. WIRES IDENTIFIED AS "JUMPER" ARE TO BE 20 GA.

2. WHEN POST LIGHTS ARE INSTALLED D-LB2 IS CONNECTED TO "CONSOLE" SIDE OF SWITCH INSTEAD OF XR6637 RHEOSTAT.

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
10	FRL-5-2	2 OHM RESISTOR	(94310)
9	1813/2 LWI	CAPS (APMH)	
8	S-1238-2-1	SWITCH	
7	C669502-0204	INST CLUSTER	
6	336	LAMP	(24496)
5	5952-3RH-CW-14	LIGHT ASSY	(17204)
4	25-240XP16	LAMPHOLDER	(94263)
3	5952-3LH-CW-14	LIGHT ASSY	(17204)
2	XR6637	RHEOSTAT	(83777)
1	S-1360-10	CIRCUIT BKR	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
DHF-LB85	20			S-341-2	(SEE LB82)	1200686	
DHF-LB84	20			S-341-2	(SEE LB80)		
DHF-LB83	20			SOLDER	S-1367-1-8		
DHF-LB82	20			S-1370-1	SOLDER		
DHF-LB81	20			S-341-2	S-1367-1-8		
DHF-LB80	20			S-341-2	S-1367-1-8		
HF-LB51	18			S-1367-1-6	S-341-2	1200686	

WIRE TABLE

CESSNA AIRCRAFT CO COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	L. HILTON	12-14-66
CALC	H WISE	12-12-66
CHECK	YAKSHAW	12-19-66
PRO	McCall	12-11-66

TITLE: WIRING DIAGRAM— POST LIGHTING (OPT)

Cessna.

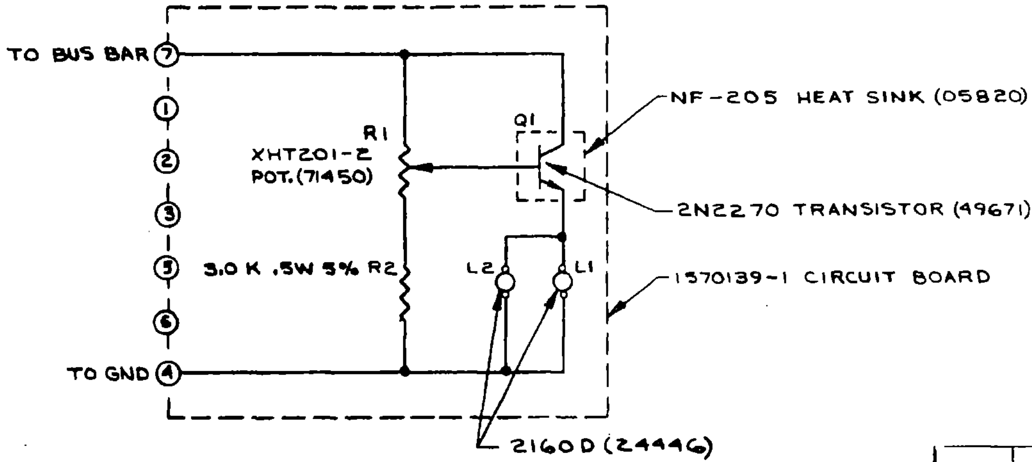
DWG NO 0770610

SUPERSEDED BY	SUPERSEDES	PAGE	MODEL	REV	PAGE
	0770610	11.1	182	1	11.10

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

NOTES:

1. ALL MATERIALS DEFINED ON THIS DRAWING ARE FOR REFERENCE AND TECHNICAL USE ONLY



WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		SERIALS

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION
	EQUIPMENT TABLE	

CONTRACT NO

	NAME	DATE
DESIGN	J Wedel	7-28-67
GROUP	V. Wise	7-27-67
DRAWN	C. GARCIA	9-19-67
CHECK	R. Stuck	9-19-67
STRESS	[illegible]	9-19-67
PROJECT	[illegible]	9-19-67
APPD	R.C. Moser	9-19-67

SUPERSEDES: 12337-794

Cessna AIRCRAFT CO.
COMMERCIAL AIRCRAFT DIV
5800 E PAWNEE
WICHITA KANSAS

TITLE
WIRING DIAGRAM —
MAP LIGHT, CONTROL WHEEL
(12 VOLT)

SIZE	CODE IDENT NO	DWG NO
C	71379	0770610

SCALE NONE (9RS157) IX PAGE 11.11

HEATING, VENTILATING, AND DE-ICING SECTION

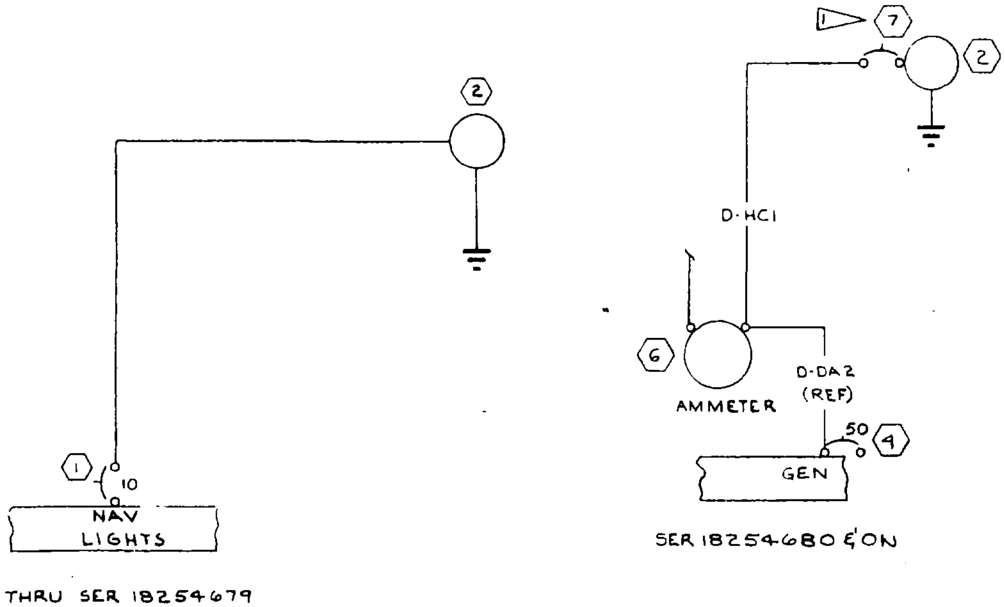
Cessna.

DRAWN	RIDDER	TITLE: WIRING DIAGRAM--- MODEL 182		DRAWING NO. 0770610
DATE	10-5-62			
APP'D	Hm		REV:	PAGE: 13.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO 80-171

CHG LET	REVISION	BY DATE	CHK APPD
A	ADD 60232-1 CKT BKR TO CIGAR LIGHTER. ADD D-HC1 WIRE. ADD NOTE ▷ 0713602-1 & S-1232-50 (SR 4081)	2-5-62	
B	ADDED WIRE LENGTH TO W/T; S-1360-50 WAS S-1232-50; C669502-0103 WAS 0713602-1; REMOVED 0713607-1 & 0770610-DA2 FROM E/T;	JR 8-14-64	



NOTE:

▷1 CIRCUIT BREAKER IS RESET BY INSERTING A PROBE INTO THE 1/16 DIA HOLE IN BREAKER FACE AND PUSHING LIGHTLY UNTIL A CLICK IS HEARD.

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
D-HC1	16		12	S1367-2-10	S-1367-2-8		SER 18254680 & ON

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
7	60232-1	CKT BKR (CUE)	
6	C669502-0103	INST CLUSTER KIT	
5			
4	S-1360-50	CIRCUIT BREAKER	
3			
2	0513052-3	CIGAR LIGHTER	
1	S-1232-10	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RIDDER	10-5-62
GROUP		
CHECK		10-23-62
PROJ	H. McClatchey	10-29-66

TITLE: WIRING DIAGRAM — CIGAR LIGHTER

Cessna.

DWG NO 0770610

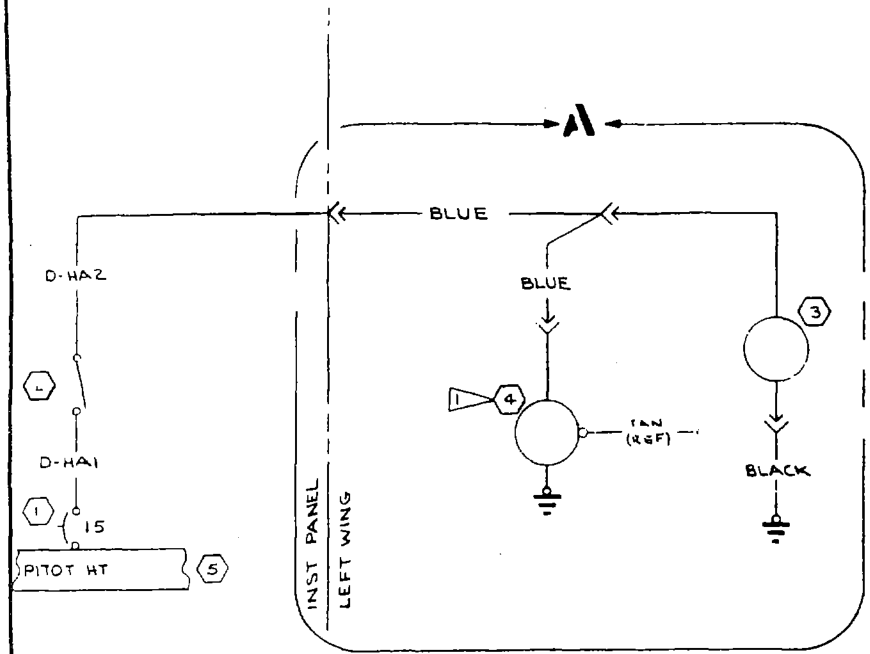
SUPERSEDED BY | SUPERSEDES | MODEL 182 | REV B | PAGE 13.1

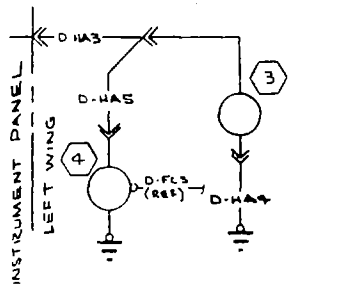
FORM NO 80-161

CHG LET	REVISION	BY DATE	CHK APPD
A	ADDED WIRE LENGTHS TO E/T; REMOVED (STC) FROM D-HA1, & D-HA2 ADDED (STC) TO D-HA3, D-HA4 & D-HA5 S-1360-10 WAS S-1232-10; REMOVED S-1360-1 FROM E/T	WJR 8-14-64	[illegible]
B	INACTIVATE D-HA3, D-HA4 & D-HA5; ADDED BLUE(1) BLACK WIRES & DETAIL "A" - 0721105-15 WAS 0721105-2 (SR 4906)	WJR 1-20-66	[illegible]
C	S-1360-15 WAS S-1360-10 (SR5144)	GLW 7-25-66	[illegible]

NOTES:

1. ONLY HEATER CIRCUIT SHOWN, FOR STALL WARNING CIRCUIT, SEE PAGE 15.1.





DETAIL A
THRU SER 18257625 ON

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
BLUE	16	S-1460-16-6	46	SEE BLUE	S-341-1	0720600	(STD) SER 18257626 & ON
BLACK	18	S-1460-18-0	8	S-1369-1	S-1367-1-8	0720600	(STD) SER 18257626 & ON
BLUE	16	S-1460-16-6	75	S-341-1	S-1369-2	0720600	(STD) SER 18257626 & ON
D-HA5	18		46	SEE D-HA3	S-341-2	0720600	(STD) INACTIVE SER 18257626 & ON
D-HA4	18		6	S-1369-1	S-1367-1-8	0720600	(STC) INACTIVE SER 18257626 & ON
D-HA3	16		75	S-341-1	S-1369-2	0720600	(STD) INACTIVE SER 18257626 & ON
D-HA2	16		22	S-1367-2-6	S-341-1		
D-HA1	16		2	S-1367-2-6	S-1367-2-8		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
5			
4	0511062-5	XMTR STALL WARN, HTD	
3	0721105-15	PITOT TUBE, HEATED	
2	S-1158-2-1	SWITCH	
1	S-1360-15	CIRCUIT BREAKER	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	KIDDER	10-8-62
GROUP	[illegible]	[illegible]
CHECK	[illegible]	[illegible]
PROJ	[illegible]	[illegible]

TITLE: WIRING DIAGRAM — HEATED PITOT TUBE & HEATED STALL WARNING SYSTEM (OPT)

Cessna.

DWG NO 0770610

SUPERSEDED BY: | SUPERSEDES: | MODEL 182 | REV C | PAGE 13.2

FORM NO 80-161

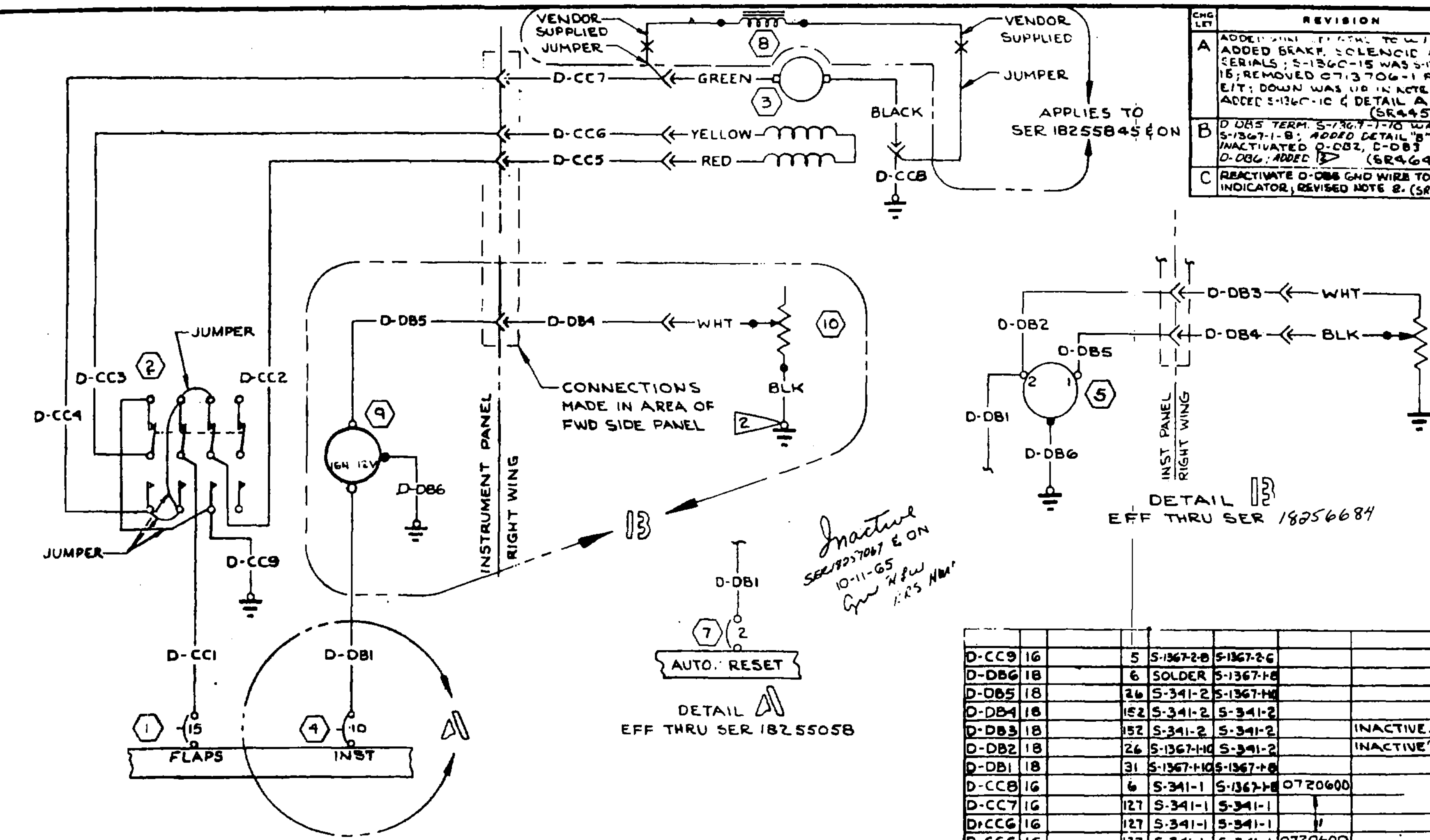
CONTROL SURFACE SECTION

Cessna.

DRAWN	RIDDER	TITLE: WIRING DIAGRAM--- MODEL 182	DRAWING NO. 0770610
DATE	10-22-62		
APP'D		REV:	PAGE: 14.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO 80-172



NOTE:

1. FLAP SWITCH SHOWN IN FLAP "DOWN" POSITION.

2 GND. BLACK WIRE ON TRANSMITTER MTG. BOLT.

CHG LET	REVISION	BY / DATE	CHK / APPD
A	ADDED ... TO W/T ADDED BRAKE, SOLENOID AND SERIALS; S-1360-15 WAS S-1232-16; REMOVED 0713706-1 FROM E/T; DOWN WAS UP IN NOTE 1.; ADDED S-1360-10 & DETAIL A (SR4451)	WJR 8-18-64	
B	D-DB5 TERM. S-1367-1-10 WAS S-1367-1-8; ADDED DETAIL "B"; INACTIVATED D-DB2, D-DB3 & D-DB6; ADDED 2 (SR4642)	WJR 5-12-65	
C	REACTIVATE D-DB6 GND WIRE TO INDICATOR; REVISED NOTE 2. (SR4642)	SKH 7-8-65	

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
10	C590501-0101	TRANSMITTER	
9	C668001-0101	INDICATOR	
8	28INT-12D	SOLENOID (GN)	
7	CA-2	CKT BKR (MTCC)	
6	1260068-2	XMTR, FLAP POS	
5	S-1318-1	INDICATOR, FLAP POS	
4	S-1360-10	CKT BKR	
3	0760657-1	FLAP ACTUATOR	
2	0760632-1	SWITCH, ELECTRIC FLAP	
1	S-1360-15	CIRCUIT BREAKER	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
D-CC9	16		5	S-1367-2-8	S-1367-2-6		
D-DB6	18		6	SOLDER	S-1367-1-8		
D-DB5	18		26	S-341-2	S-1367-1-10		
D-DB4	18		152	S-341-2	S-341-2		
D-DB3	18		152	S-341-2	S-341-2		INACTIVE SER 18256685 & ON
D-DB2	18		26	S-1367-1-10	S-341-2		INACTIVE SER 18256685 & ON
D-DB1	18		31	S-1367-1-10	S-1367-1-8		
D-CC8	16		6	S-341-1	S-1367-1-8	0720600	
D-CC7	16		127	S-341-1	S-341-1		
D-CC6	16		127	S-341-1	S-341-1	"	
D-CC5	16		127	S-341-1	S-341-1	0720600	
D-CC4	16		25	S-1367-2-6	S-341-1		
D-CC3	16		25	S-1367-2-6	S-341-1		
D-CC2	16		25	S-1367-2-6	S-341-1		
D-CC1	16		25	S-1367-2-6	S-1367-2-6		

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA, KANSAS

	NAME	DATE
DRAWN	G WOOD	7-19-62
GROUP	[illegible]	[illegible]
CHECK	[illegible]	[illegible]
PROJ	[illegible]	12-24-62

TITLE: WIRING DIAGRAM — WING FLAPS

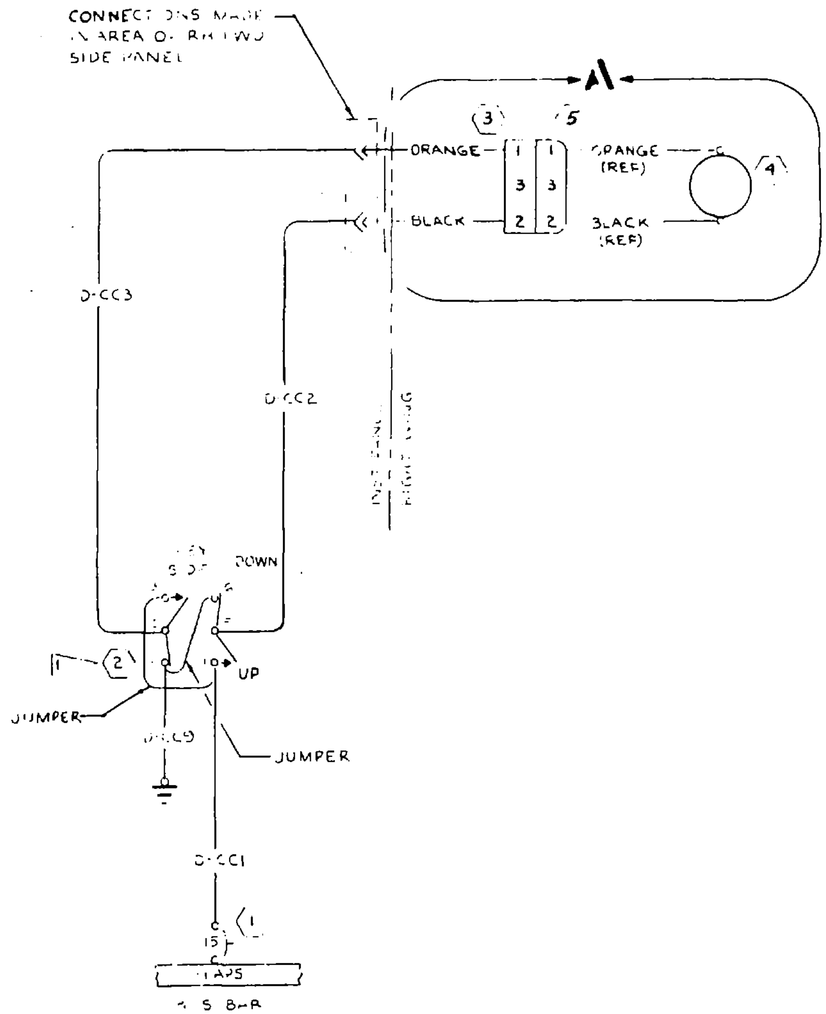
Cessna.

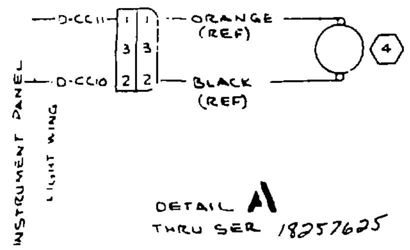
DWG NO 0770610

SUPERSEDED BY PAGE 10.2 C770610 PAGE 14.2 | SUPERSEDES | MODEL 182 | REV C | PAGE 14.1

(SR4946)

CHG LET	REVISION	BY DATE	CHK APPD
A	0760657-B WAS C301001-0101; INACTIVATED D-CC10 & D-CC11; ADDED BLACK & ORANGE WIRES & DETAIL "A" (SR4905)	G.I.W. 0-26-65	





DETAIL A
THRU SER 18257625

NOTES:

1. SWITCH SHOWN IS A "MOMENTARY ON"-ON"-MOMENTARY ON" CONFIGURATION. THE MOTOR IS SHORTED WHEN THE SWITCH IS IN THE CENTER "ON" POSITION. THE SWITCH IS SHOWN IN CENTER "ON" POSITION
2. SWITCH TERMINALS SHOWN AS VIEWED FROM TOGGLE SIDE OF SWITCH.

EQUIPMENT TABLE

ITEM NO	PART NO.	DESCRIPTION	INSTALLED ON
5	S-1638-2	HOUSING, CAP	
4	0760657-B	FLAP MOTOR ASSY	
3	S-1638-1	HOUSING PLUG	
2	S-1661-1	SWITCH - ASSY	
1	[illegible]	CIRCUIT BREAKER	

WIRE TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
ORANGE	16	S-1460-16-3	27	S-341-1	S-1636-2		SER 18257626 & ON
BLACK	16	S-1460-16-0	127	S-391-1	S-1636-2		SER 18257626 & ON
D-CC11	16		127	S-341-1	S-1636-2		Inactive SER 18257626 & ON
D-CC10	16		127	S-341-1	S-1636-2		Inactive SER 18257626 & ON
D-CC9	16		5	S-1672-8	S-1672-8		
D-CC3	16		45	S-1367-2-6	S-341-1		
D-CC2	16		25	S-1367-2-6	S-341-1		
D-CC1	16		25	S-1367-2-8	S-1367-2-8		

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

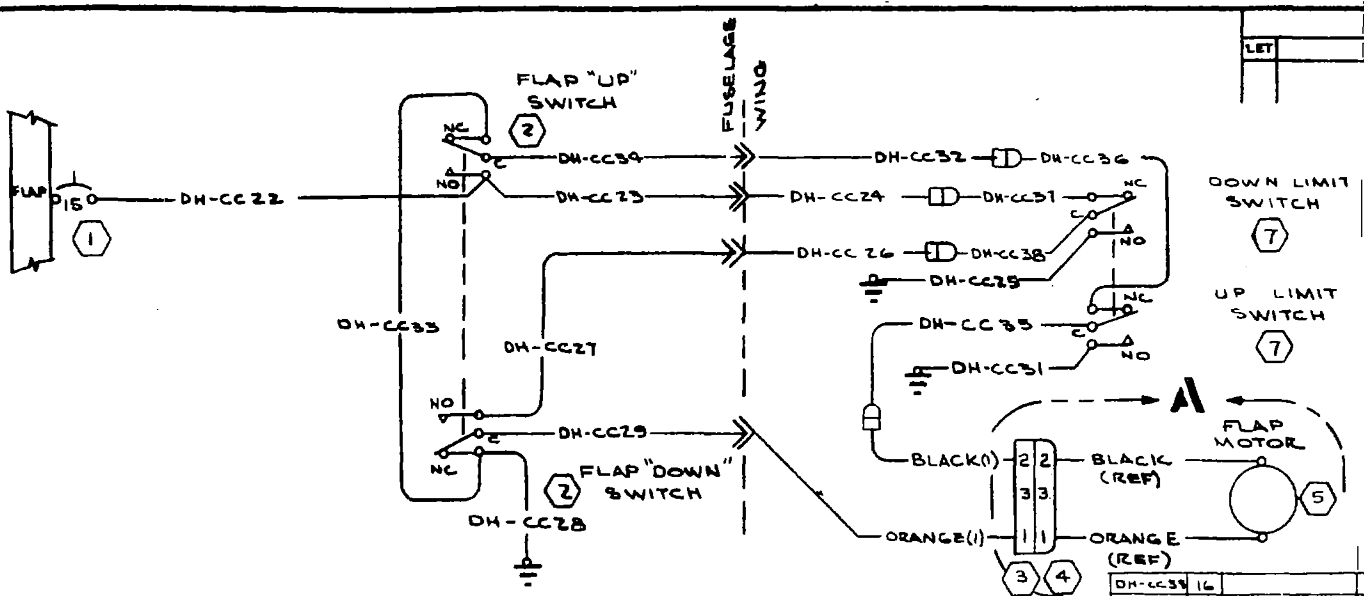
	NAME	DATE
DRAWN	S. WOOD	10-19-65
GROUP	J. Wise	10-19-65
CHECK		
PROJ	[illegible]	

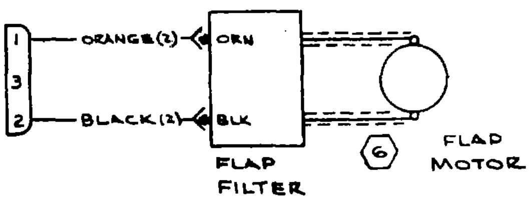
TITLE: WIRING DIAGRAM— WING FLAPS - ELECTRIC

Cessna

DWG NO 0770610

SUPERSEDED BY: | SUPERSEDES: 0770610 PAGE 14.1 | MODEL 182 | REV A | PAGE 14.2





OPTIONAL WIRING USED WHEN RADIO IS INSTALLED

DETAIL A

REVISION			
LET	DESCRIPTION	DATE	APPD

WIRE CODE NO.	GA	MATERIAL	LG	TERMINALS		SERIALS
DH-CC38	16			S-1367-1-4	S-1637-1 S-1635-2	
DH-CC37	16			S-1367-1-4	S-1637-1 S-1635-2	
DH-CC36	16			S-1367-1-4	S-1637-1 S-1635-2	
ORN(2)	16			S-1493-2	S-1636-2	
BLK(2)	16			S-1493-2	S-1636-2	
ORN(1)	16			S-341-1	S-1636-2	
BLK(1)	16			S-1637-2 S-1636-2	S-1636-2	
DH-CC35	16			S-1367-1-4	S-1637-2 S-1638-2	
DH-CC34	16			S-1367-1-4	S-341-1	
DH-CC33	16			S-1367-1-4	S-1367-1-4	
DH-CC32	16			S-341-1	S-1637-2 S-1638-2	
DH-CC31	16			S-1367-1-4	S-1367-1-8	
DH-CC29	16			S-1367-1-4	S-341-1	
DH-CC28	16			S-1367-1-4	S-1367-1-8	
DH-CC27	16			S-341-1	S-1367-1-4	
DH-CC26	16			S-341-1	S-1637-2 S-1638-2	
DH-CC25	16			S-1367-1-4	S-1367-1-8	
DH-CC24	16			S-341-1	S-1637-2 S-1638-2	
DH-CC23	16			S-1367-1-4	S-341-1	
DH-CC22	16			S-1367-1-8	S-1367-1-4	

WIRE TABLE

ITEM NO.	PART NO.	DESCRIPTION	VENDOR
7	MS25253-1	SWITCH	
6	C301001-0303	ACTUATOR ASSY	
5	C301001-0304	ACTUATOR ASSY	
4	S-1638-2	HOUSING - CAP	
3	S-1638-1	HOUSING - PLUG	
2	E33-10K	SWITCH	(01963)
1	S-1360-15	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: 0770610 PAGE 14.2

SUPERSEDED BY:

CONTRACT NO.

	NAME	DATE
DESIGN	G. WOOD	7-22-67
GROUP	H. Wise	8-21-67
DRAWN	J. HUSTON	7-22-67
CHECK	YAKSHAW	8-24-67
STRESS	[illegible]	8-29-67
PROJECT	[illegible]	67
APPD		

Cessna AIRCRAFT CO.

COMMERCIAL AIRCRAFT DIV.
5800 E. PAWNEE
WICHITA, KANSAS

TITLE

WIRING DIAGRAM — WING FLAPS

SIZE	CODE IDENT. NO.	DWG NO.
C	71379	0770610

SCALE: NONE | 182 | PAGE: 14.3

SER 18258506 & ON

FORM NO. 80-215A

WARNING
AND EMERGENCY
SECTION

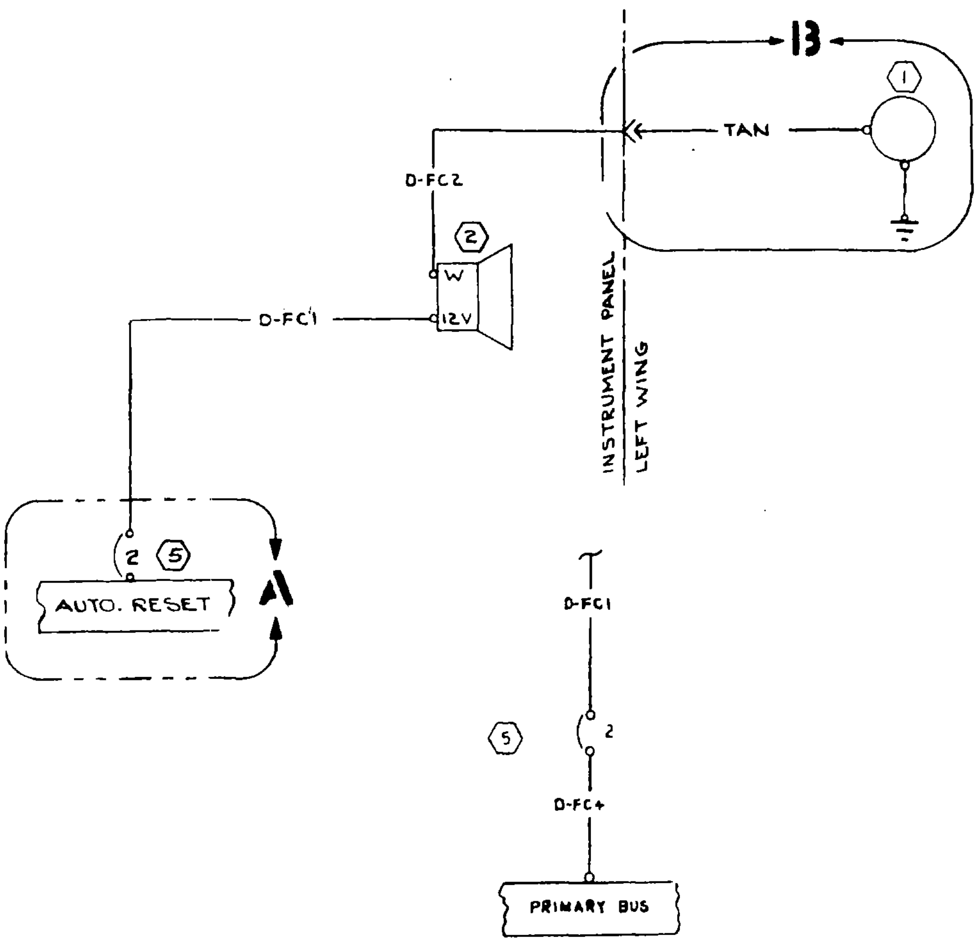
Cessna.

DRAWN	RIDDER	TITLE: WIRING DIAGRAM--- MODEL 182	DRAWING NO. 0770610
DATE	10-22-62		
APP'D	RRS Nm	REV:	PAGE: 15.0

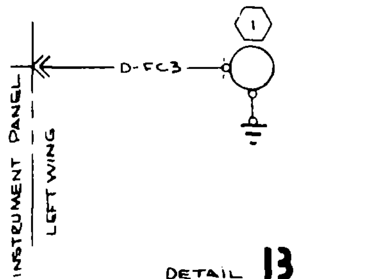
CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO. SO-1/3

CHG LET	REVISION	BY DATE	CHK APPD
A	ADDED WIRE LENGTHS TO W/T [illegible] S-1407-6 [illegible] REMOVED [illegible] & D-DG1 FROM E/T [illegible] ADDED DETAIL A (SR4951)	[illegible] 8-5-64	[illegible]
B	REMOVED DETAIL A ADDED D-FC1 WIRE TO AUTO RESET [illegible] CKR [illegible]	[illegible] 5-16-65	[illegible]
C	BY REV: ADD D-FC4 (SR 4909)	JLW [illegible]	[illegible]
D	INACTIVATED D-FC3; ADDED TAN WIRE (SR4905)	WJR 1-19-66	[illegible]



DETAIL A
SER 1825 7626 & ON



DETAIL B
THRU SER 18257625

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS			SERIALS
TAN	18	S-1460-18-10	110	S-1367-1-6	S-341-2		SER 18257626 & ON
D-FC4	18			S-1367-1-10	S-1367-1-6		
D-FC3	18		110	S-1367-1-6	S-391-2		INACTIVE SER 18257626 & ON
D-FC2	18		68	S-1367-1-6	S-391-2		
D-FC1	18		36	S-1367-1-6	S-1367-1-10		

WIRE TABLE

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
6			
5	CA-2	CKT BKR (MTCC)	
4			
3			
2	S-1407-6	HORN ASSY	
1	0511062-4	XMTR, STALL WARN.	

EQUIPMENT TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	RIDDER	9-17-62
GROUP	[illegible]	[illegible]
CHECK	[illegible]	10-23-62
PROJ	[illegible]	10-19-62

TITLE: WIRING DIAGRAM — STALL WARNING SYSTEM (NON-HEATED)

Cessna.

DWG NO 0770610

SUPERSEDED BY: | SUPERSEDES: | MODEL 182 | REV D | PAGE 15.1

FORM NO 80-16

MISCELLANEOUS SECTION

Cessna.

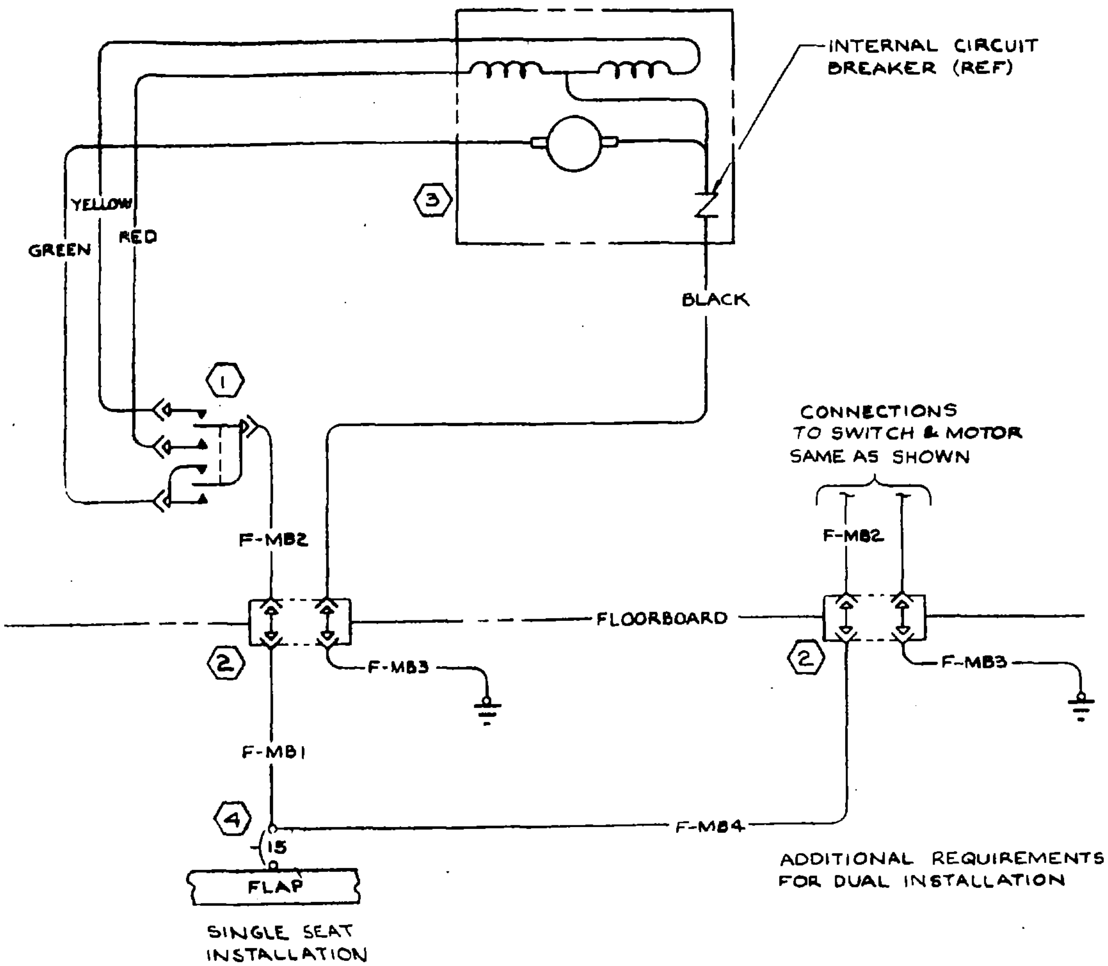
DRAWN	GLW	TITLE: WIRING DIAGRAM--- MODEL 182	DRAWING NO. 0770610
DATE	9-5-63		
APP'D		REV:	PAGE: 16.0

CESSNA AIRCRAFT CO., COMMERCIAL AIRCRAFT DIV., WICHITA, KANS.

FORM NO

(SR 4204)

CHG LET	REVISION	BY DATE	CHK. APPR
A	ALCEC WIRE LENGTHS TO W/T; REMOVED 0713743-1 FROM E/T	R 5-6	



NOTES:

1. COLOR CODED WIRES ARE VENDOR-FURNISHED.
2. "F" PREFIX USED ON THIS DRAWING INSTEAD OF "D" BECAUSE THE WIRES ARE THE SAME AS THOSE USED IN MODEL 210. THIS DIAGRAM IS SCHEMATICALLY IDENTICAL TO 1270405 PAGE 16.1 WIRING DIAGRAM AND IS FOR REF ONLY.

ITEM NO	PART NO	DESCRIPTION	INSTALLED ON
5			
4	S-1360-15	CIRCUIT BREAKER	
3	1414249-2	MOTOR ASSY	
2	S-1491-1	BUSHING TERMINAL	
1	1414268-1	SWITCH ASSY	

EQUIPMENT TABLE

WIRE CODE NO	GA	MATERIAL	LG	TERMINALS		N/A	SERIALS
F-MB4	16		131	S-1493-2	S-1367-2-6	0700718	
F-MB3	16		12	S-1493-2	S-1367-2-6	0700718	
F-MB2	16		26	S-1493-2	S-1493-2	0700718	
F-MB1	16		113	S-1367-2-6	S-1493-2	0700718	

WIRE TABLE

CESSNA AIRCRAFT CO. COMMERCIAL AIRCRAFT DIVISION WICHITA KANSAS

	NAME	DATE
DRAWN	G WOOD	9-6-63
GROUP		
CHECK		
PROJ		9-1-63

TITLE: WIRING DIAGRAM — VERTICALLY ADJUSTING SEAT (OPT)

Cessna.

DWG NO 0770610

SUPERSEDED BY	SUPERSEDES	MODEL	REV	PAGE
		182	A	16.1

FORM NO 80-16