SECTION II
HANDLING AND SERVICING

Reissued: 2/18/81

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SECTION II

HANDLING AND SERVICING

2-1. INTRODUCTION. This section contains routine handling and servicing procedures that are most frequently encountered. Frequent reference to this section will aid the individual by providing information such as the location of various components, ground handling procedures, routine service procedures and lubrication. When any system or component requires service other than the procedures as outlined in this section, refer to the appropriate section for that component.

2-2. DIMENSIONS. The principle airplane dimensions are shown in Figures 2-1, 2-2 and 2-3 and are listed in Table II-I.

2-3. STATION REFERENCE LINES. In order to facilitate the location of various components of the airplane which require maintenance and servicing, a method utilizing fuselage station (Sta.), wing station or buttock line (BL), and water line (WL) designations is frequently employed in this manual. (Refer to Figure 2-6.) Fuselage stations, buttock lines, and water lines are reference points measured by inches in the vertical or horizontal direction from a given reference line which indicates station locations of structural members of the airplane. The BL station 0 of the wing and stabilator is the center line of the airplane; and station 0 (WL) of the vertical stabilizer and rudder is 12 inches below the bottom edge of the forward left side window.

NOTE

For weight and balance purposes, refer to the airplane Flight Manual. The fuselage station reference lines and the datum lines (arm) are not the same. The reference datum line or arm 0 is 6.25 inches forward of fuselage station 0.

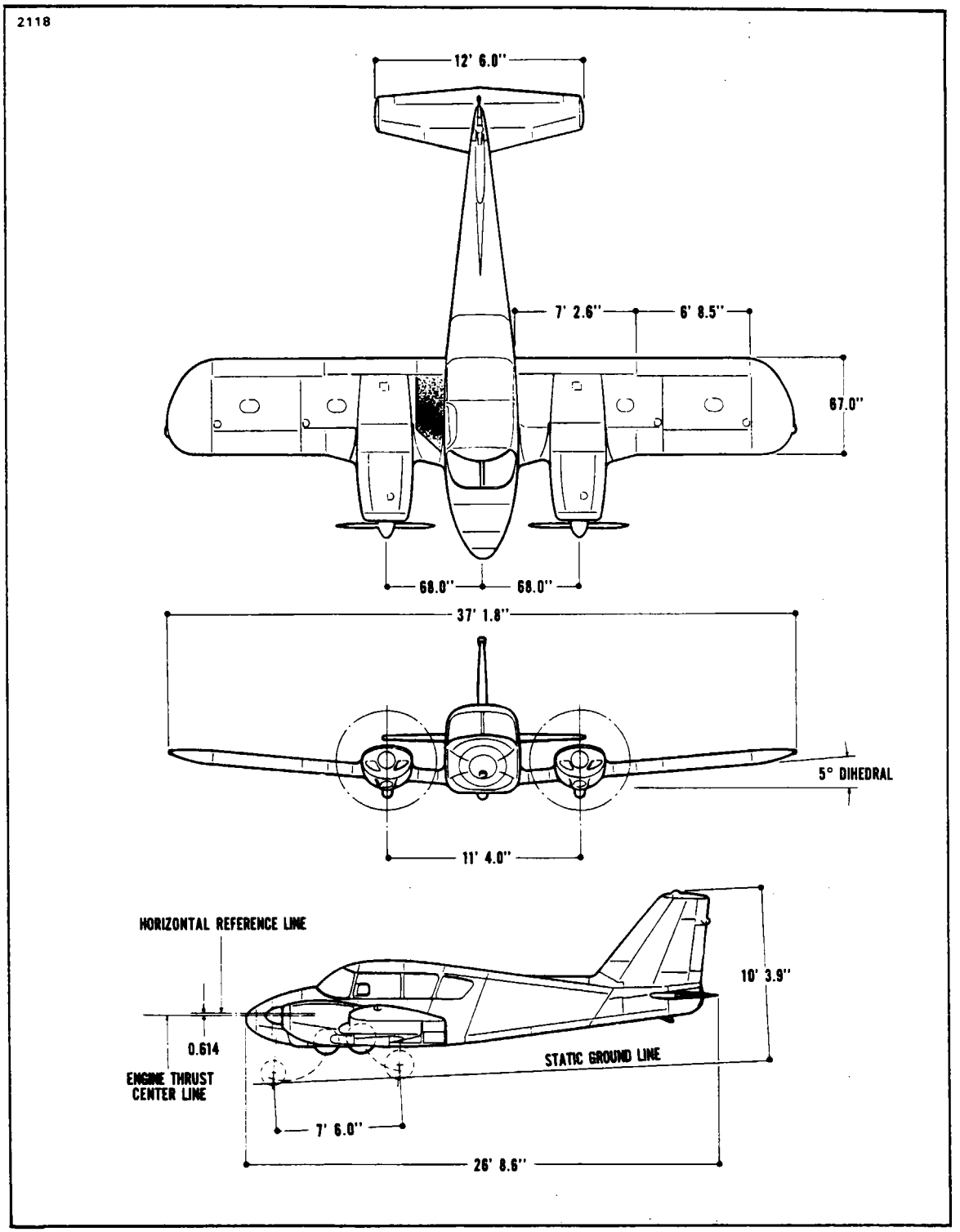

Figure 2-1. Three-View of PA-23-250 and PA-23-235

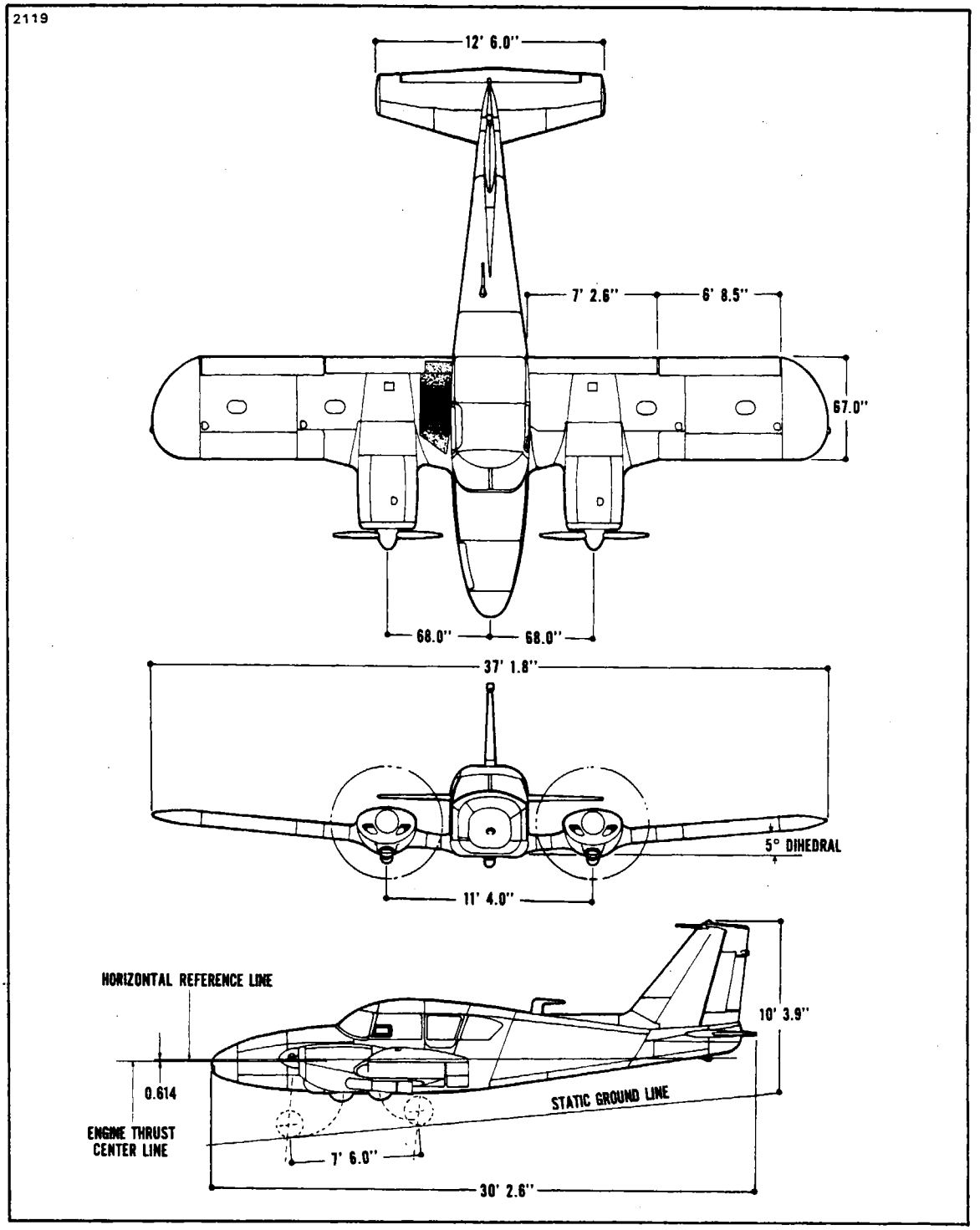

Figure 2-2. Three-View of PA-23-250 (six place)
Serial Nos. 27-2000 to 27-2504 incl.

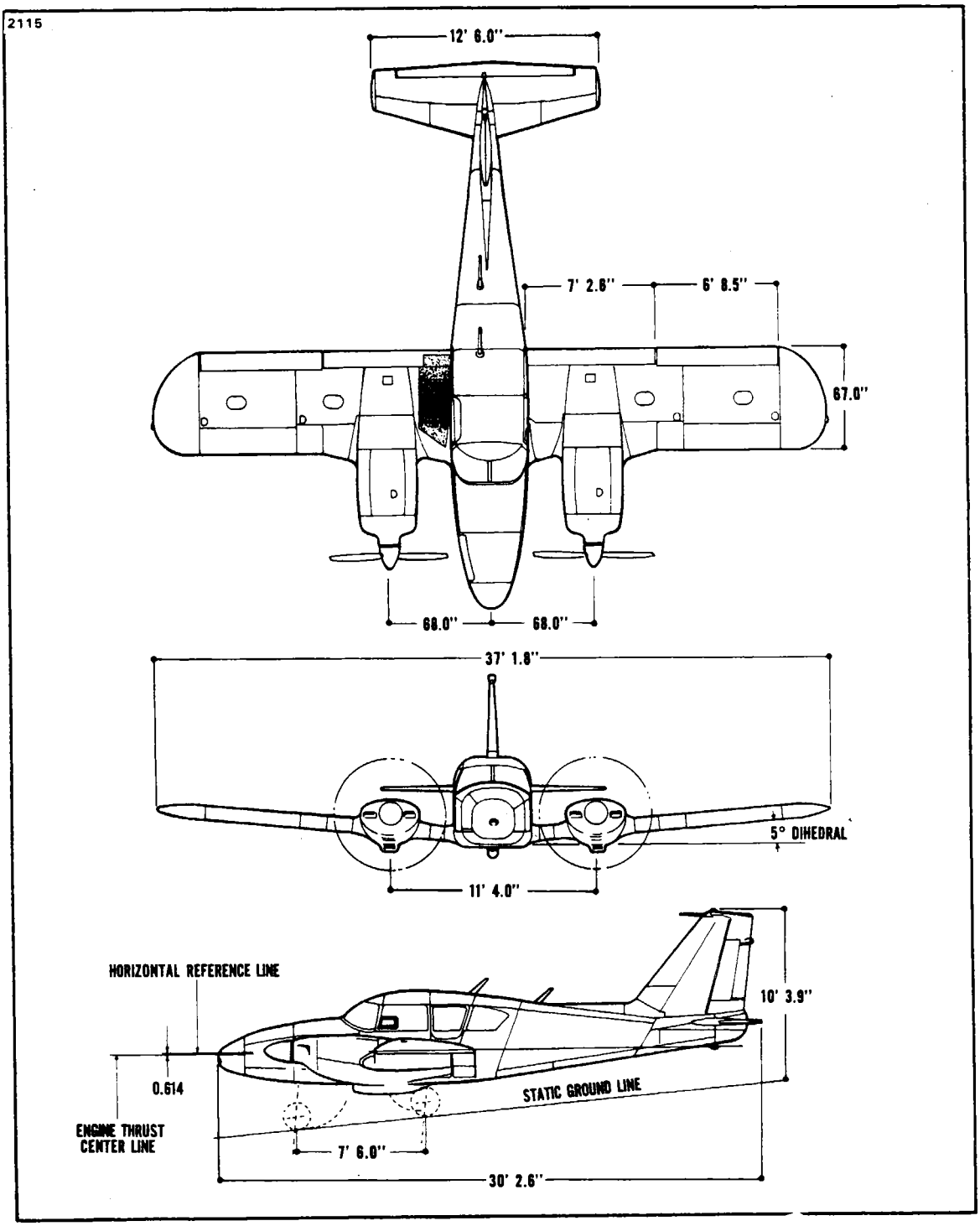

Figure 2-3. Three-View of PA-23-250 (six place)
Serial Nos. 27-2505 to 27-4573 incl.

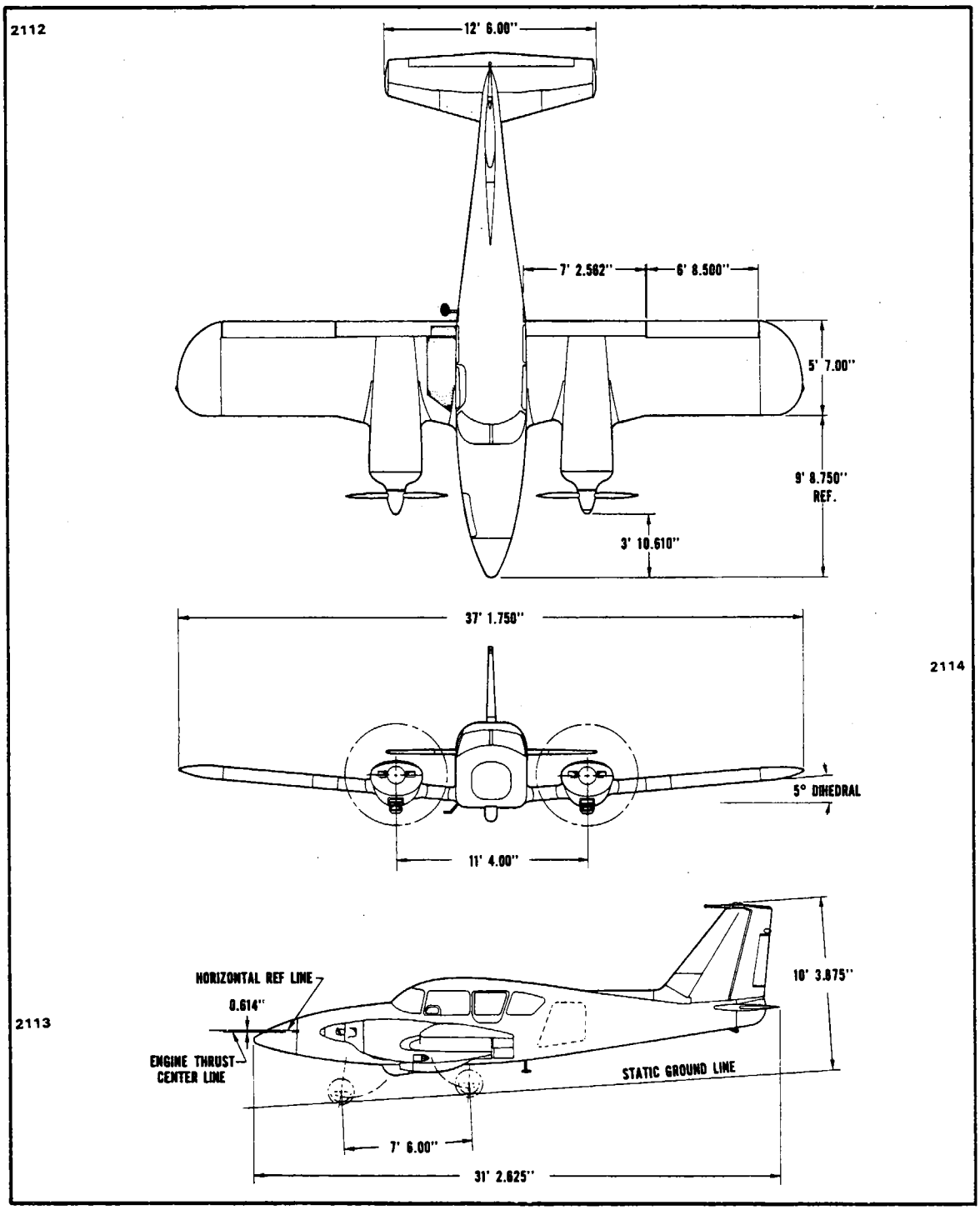

Figure 2-4. Three-View of PA-23-250 (six place)
Serial Nos. 27-4426 and 27-4574 to 27-7554168 incl.

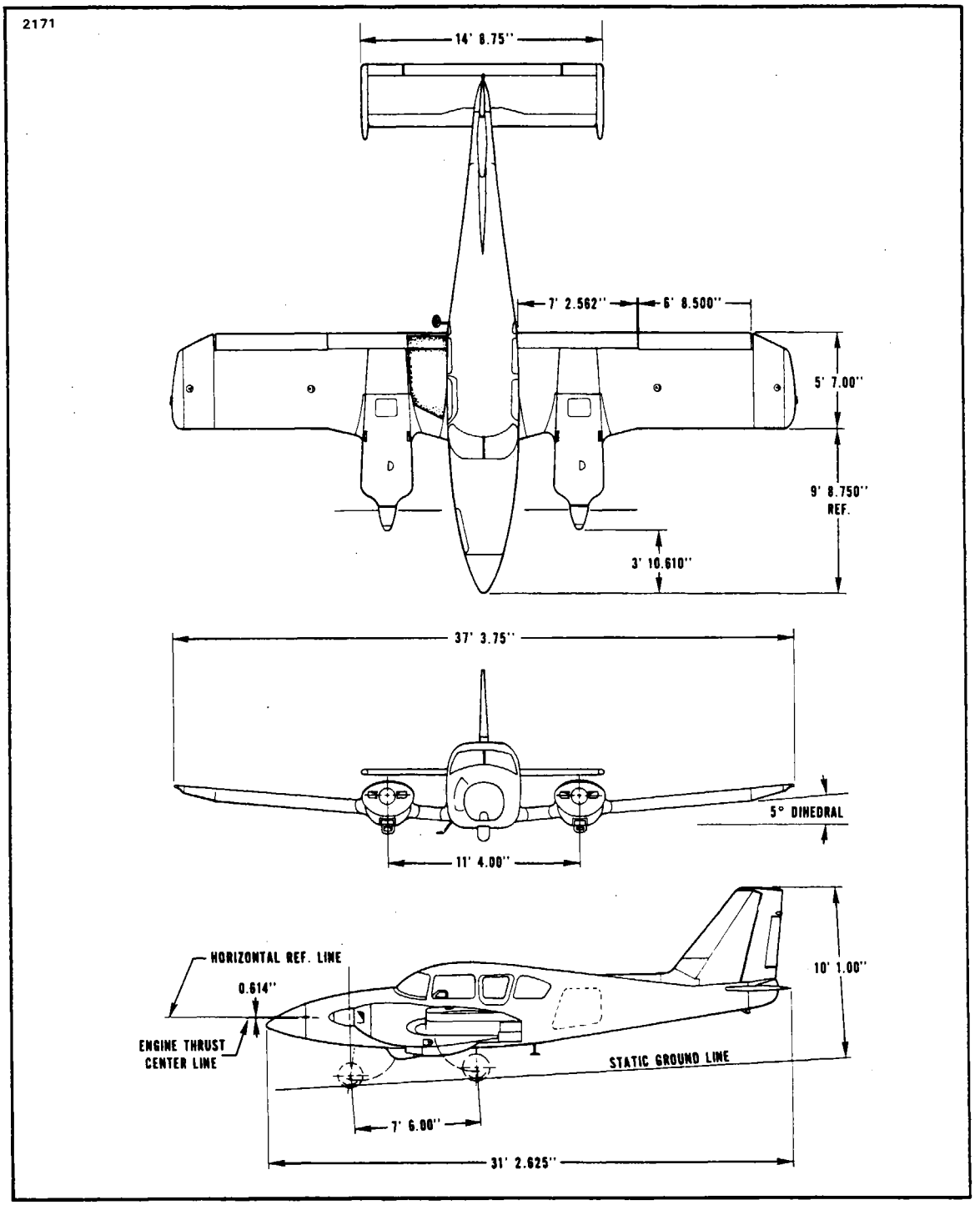

Figure 2-5. Three-View of PA-23-250 (six place)
Serial Nos. 27-7654001 to 27-7954121 incl.

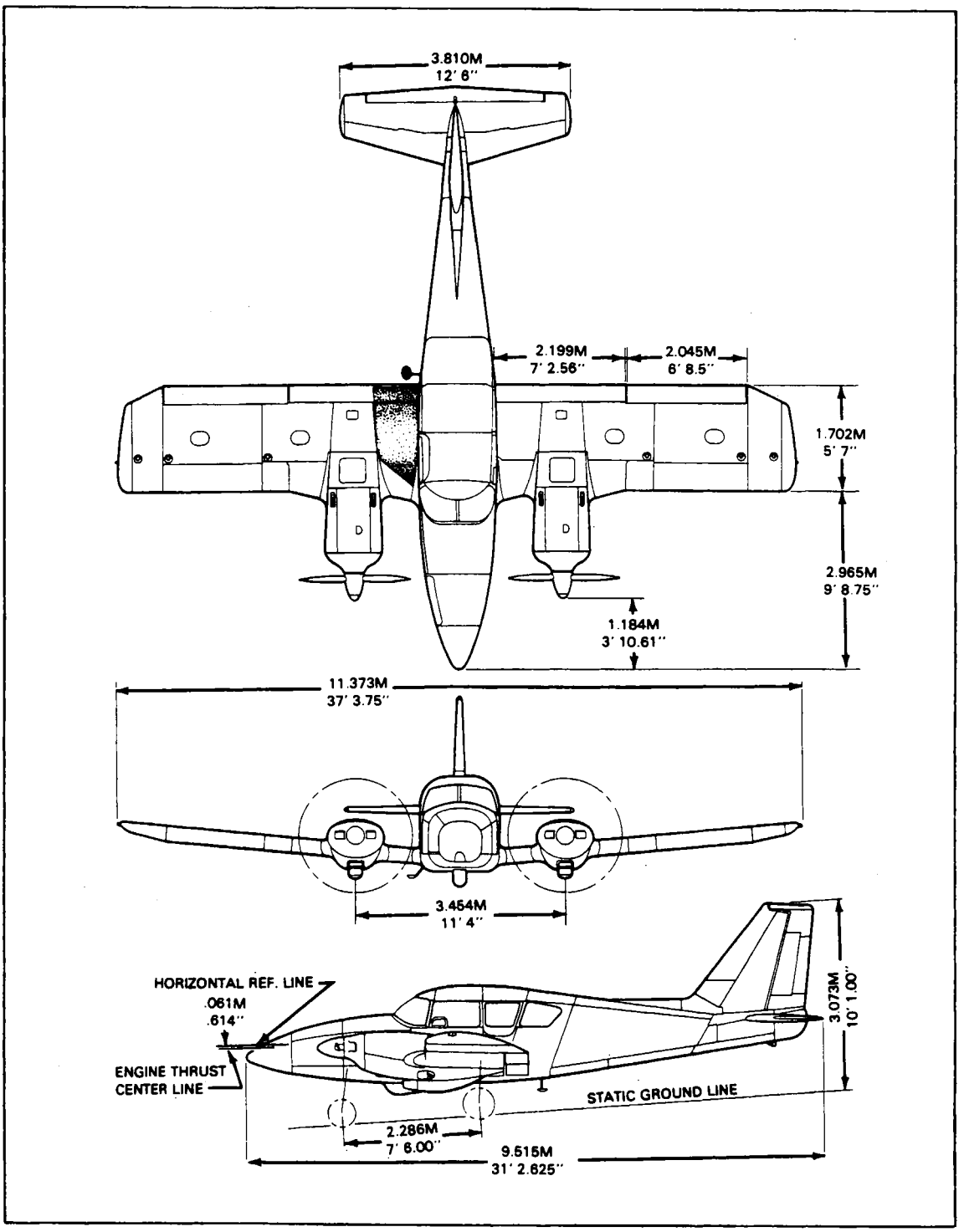

Figure 2-6. Three-View of PA-23-250 (six place)
Serial Nos. 27-8054001 and up

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TABLE II-I. LEADING PARTICULARS AND PRINCIPLE DIMENSIONS

MODEL	PA-23-250	PA-23-235
ENGINE		
Manufacturer	Avco-Lycoming	Avco-Lycoming
Model	O-540-A1B5, O-540-A1D5 or O-540-A3D5	O-540-B1A5
FAA Type Certificate	295	295
Rated Horsepower	250	235
Rated Speed:		
Full Throttle	2575 RPM	2575 RPM
Turbocharger Power Setting:(7)		
Turbo Cruise		
Oil S.A.E. Number	See Table II-V	See Table II-V
Oil Sump Capacity	12 U.S. quarts	12 U.S. quarts
Fuel, Aviation Grade, Minimum		
Octane	91/96	80/87(16)
Carburetor, Marvel-Schebler	MA-4-5	MA-4-5
Fuel Injector Bendix		
Magnetos, Scintilla:		
Right	S6LN-21(1)/S6LN-204(2)(3)	S6LN-204
Left	S6LN-21(1)/S6LN-200(2)(3)	S6LN-200
Magneto Timing	25 degrees BTC	25 degrees BTC
Magneto Point Clearance:		
Main	.018 ± .006	.018 ± .006
Retard	.018 ± .006	.018 ± .006
Retard Angle		
Spark Plugs, Shielded:		
Champion	REM-40E	EM-42E
AC	SR-88	S-88
Spark Plug Gap Setting(8)	.018 to .022	.018 to .022
Firing Order	1-4-5-2-3-6	1-4-5-2-3-6
Starter, Delco-Remy:		
14-Volt	1109688(1)/1109511(2)	1109511
28-Volt	1109696(3)	
Starter, Prestolite:		
14-Volt		
28-Volt		

REFER TO GRID 1B20 FOR FOOTNOTE LEGEND

TABLE II-I. LEADING PARTICULARS AND PRINCIPLE DIMENSIONS (cont)

MODEL	PA-23-250 (six place) Ser. Nos. 27-2000 to 27-2504 incl.	PA-23-250 (six place) Ser. Nos. 27-2505 and up	PA-23-250 (six place) Ser. Nos. 27-3944 and up
ENGINE			
Manufacturer	Avco-Lycoming	Avco-Lycoming	Avco-Lycoming
Model	O-540-A1D5 or IO-540-C1B5	IO-540-C4B5 or IO-540-J4A5	TIO-540-C1A
FAA Type Certificate	295(2)/ 1E4(4)	1E4	E14EA
Rated Horsepower	250	250	250
Rated Speed:			
Full Throttle	2575 RPM	2575 RPM(5)	2575 RPM
Turbocharger Power Setting:(7)			
Turbo Cruise		2400 RPM @ 28.5 in.(6)	2400 RPM @ 34.0 in.
Oil S.A.E. Number	See Table II-V	See Table II-V	See Table II-V
Oil Sump Capacity	12 U.S. quarts	12 U.S. quarts	12 U.S. quarts
Fuel, Aviation Grade, Minimum			
Octane	91/96	91/96(5), 100/130(6)	100/130
Carburetor, Marvel-Schebler	MA-4-5(2)		
Fuel Injector Bendix	RSA-5AD1(4)	RSA-5AD1	RSA-5AD1
Magnetos, Scintilla:			
Right	S6LN-204	S6LN-204(5)/ S6LN-1209(6)	S6LN-1209
Left	S6LN-200	S6LN-200(5)/ S6LN-1208(6)	S6LN-1208
Magneto Timing	25 degrees BTC	25 degrees BTC	25 degrees BTC
Magneto Point Clearance:			
Main	.018 ± .006	.018 ± .006(5)/ .016(6)	0.016
Retard	.018 ± .006	.018 ± .006(5)	
Retard Angle		37° 30'(6)	37° 30'
Spark Plugs, Shielded:			
Champion	REM-40E	REM-40E(5)/ REB-37N(6)	REB 37N
AC	SR-88	SR-88(5)/ AC171(6)	AC171
Spark Plug Gap Setting(8)	.018 to .022	.018 to .022(5), .015 to .021(6)	.015 to .021
Firing Order	1-4-5-2-3-6	1-4-5-2-3-6	1-4-5-2-3-6
Starter, Delco-Remy:			
14-Volt	1109511	1109511	
28-Volt			
Starter, Prestolite:			
14-Volt		MZ-4218	MZ-4218
28-Volt		MHB-4010	MHB-4010

REFER TO GRID 1B20 FOR FOOTNOTE LEGEND

TABLE II-I. LEADING PARTICULARS AND PRINCIPLE DIMENSIONS (cont)

MODEL	PA-23-250	PA-23-235	PA-23-250 (six place) Ser. Nos. 27-2000 to 27-2504 incl.
ENGINE (cont)			
Generator, Delco-Remy:			
14-Volt	1101915 (50 amp)(1) (2)	1101915 (50 amp)	1101915 (50 amp)
28-Volt	1101905 (25 amp)(3)		1105055 (50 amp)
Voltage Regulator, Delco-Remy:			
14-Volt	1119246 (50 amp)(1) (2)	1119246 (50 amp)	1119246
28-Volt	1118976 (25 amp)(3)		1119656
Paralleling Relay, Delco-Remy:			
14-Volt	1116887 (50 amp)(1) (2)	1116887 (50 amp)	1116887
28-Volt	1116902 (25 amp)(3)		1116902
Alternator, Delco-Remy:			
14-Volt			
28-Volt			
Voltage Regulator, Delco-Remy:			
14-Volt			
28-Volt			
Overvoltage Relay, Delco-Remy:			
14-Volt			
28-Volt			
Alternator, Prestolite:			
14-Volt			
28-Volt			
Voltage Regulator, Prestolite:			
14-Volt			
28-Volt			
Voltage Regulator, LAMAR:			
14-Volt			
28-Volt			
OverVoltage Relay, Prestolite:			
14-Volt			
28-Volt			
Fuel Pump Drive	Plunger type	Plunger type	Plunger type

REFER TO GRID 1B20 FOR FOOTNOTE LEGEND

TABLE II-I. LEADING PARTICULARS AND PRINCIPLE DIMENSIONS (cont)

MODEL	PA-23-250 (six place) Ser. Nos. 27-2505 and up	PA-23-250 (six place) Ser. Nos. 27-3944 and up
ENGINE (cont)		
Generator, Delco-Remy:		
14-Volt		
28-Volt		
Voltage Regulator, Delco-Remy:		
14-Volt		
28-Volt		
Paralleling Relay, Delco-Remy:		
14-Volt		
28-Volt		
Alternator, Delco-Remy:		
14-Volt	1100660 or 1100717 (70 amp)	
28-Volt	1100718 (50 amp)	
Voltage Regulator, Delco-Remy:		
14-Volt	9000590	
28-Volt	9000591	
Overvoltage Relay, Delco-Remy:		
14-Volt	1115831	
28-Volt	1115832	
Alternator, Prestolite:		
14-Volt	ALX 8403 (70 amp) 14V	ALX 8403 (70 amp) 14V
28-Volt	ALU 8403 (70 amp) 28V	ALU 8403 (70 amp) 28V
Voltage Regulator, Prestolite:		
14-Volt	VSF 7203-7A	VSF 7203-7A
28-Volt	VSF 7403	VSF 7403
Voltage Regulator, LAMAR:		
14-Volt		B-00286-1(17)
28-Volt		B-00288-1(18)
OverVoltage Relay, Prestolite:		
14-Volt	X 17621	X 17621
28-Volt	X 17620	X 17620
Fuel Pump Drive	Plunger type(5) Lear Siegler #RG-17980(6)	Lear Siegler #RG-17980

REFER TO GRID 1B20 FOR FOOTNOTE LEGEND

TABLE II-I. LEADING PARTICULARS AND PRINCIPLE DIMENSIONS (cont)

MODEL	PA-23-250	PA-23-235	PA-23-250 (six place) Ser. Nos. 27-2000 to 27-2504 incl.
PROPELLER			
Manufacturer	Hartzell	Hartzell	Hartzell
Type (2 blades)	Constant speed, full feathering	Constant speed, full feathering	Constant speed, full feathering
Hub, Model	HC-82XK-2C1 or HC-A2XK-2 or HC-A2VK-2	HC-A2XK-2 or HC-A2VK-2	HC-82XK-2C1 or HC-A2XK-2 or HC-A2VK-2
Blade, Model	8433-10 or 8433B-10	8433-10	8433-10 or 8433B-10
Diameter	74 in.	74 in.	74 in.
Diameter, Minimum	73 in.	73 in.	73 in.
Blade Angle, Low Pitch(9)	15.5 degrees	15.5 degrees	15.5 degrees
Blade Angle, High Pitch(9)	80 degrees (Feathered)	80 degrees (Feathered)	80 degrees (Feathered)
Governor Control	Hartzell	Hartzell	Hartzell
Governor Model	B-4	B-4	B-4

REFER TO GRID 1B20 FOR FOOTNOTE LEGEND

TABLE II-I. LEADING PARTICULARS AND PRINCIPLE DIMENSIONS (cont)

MODEL	PA-23-250 (six place) Ser. Nos. 27-2505 and up	PA-23-250 (six place) Ser. Nos. 27-3944 and up
PROPELLER		
Manufacturer	Hartzell	Hartzell
Type (2 blades)	Constant speed, full feathering	Constant speed, full feathering
Hub, Model	HC-E2YK-2RB or HC-E2YR-2RB(14)	HC-E2YR-2RB or HC-E2YK-2RB(14)
Blade, Model	8465-7R	8465-7R
Diameter	77 in.	77 in.
Diameter, Minimum	76 in.	76 in.
Blade Angle, Low Pitch(9)	14.5 degrees	15.2 degrees
Blade Angle, High Pitch(9)	80 degrees (Feathered)	80 degrees (Feathered)
Governor Control	Hartzell	Hartzell
Governor Model	F-6-5S or F-6-5A	F-6-5S or F-6-5A

REFER TO GRID 1B20 FOR FOOTNOTE LEGEND

TABLE II-I. LEADING PARTICULARS AND PRINCIPAL DIMENSIONS (cont.)

FUEL SYSTEM			
Fuel Cells	Four(A)	Four(B)	Four + wing tip cells(C)
Capacity (each)	36 U.S. gals.	35 U.S. gals.	35 U.S. gals.
Wing Tip Cells (each)	—	—	20 U.S. gals.
Combined Cells (total) SEE NOTE	144 U.S. gals.	140 U.S. gals.	180 U.S. gals.

NOTE: Refer to Flight Manuals for unusable fuel per aircraft.
A. All aircraft up to serial nos. 27-7405476.
B. Aircraft with serial nos. 27-7554001 and up.
C. Aircraft with serial nos. 27-7654001 and up with optional wing tip fuel cells.

LANDING GEAR	
Type	Hydraulically Retractable
Shock Strut Type	Combination Air-Oil
Fluid Required (Struts, Hydraulic System and Brakes)	MIL-H-5606(19)
Strut Exposure (Static Load)	3 in.
Wheel Tread (from each tire center)	11 ft. 4 in.
Wheel Base	7 ft. 6 in.
Wheel, Nose	Cleveland 38501
Wheel, Main	Cleveland 3080B-1(10) , 3080D(11) , Cleveland 40-131(15)
Brake Disc	Cleveland 37-200-2 or 37-200A(11) , Cleveland 30-96(15)
Tire, Nose	600 x 6 - 4 Ply Rating or 600 x 6 - 6 Ply Rating
Tires, Main	700 x 6 - 8 Ply Rating
Tire Pressure, Nose	27 psi(20) , 32 psi(21)
Tire Pressure, Main	42 psi(12) , 46 psi(13)

CONTROL SURFACES AND CABLE TENSIONS

Refer to Section V, Table V-I, Grid No. 1H19.

REFER TO GRID 1B20 FOR FOOTNOTE LEGEND

FOOTNOTE LEGEND

(1) O-540-A1B5
(2) O-540-A1D5
(3) O-540-A3D5
(4) IO-540-C1B5
(5) IO-540-C4B5
(6) IO-540-J4A5
(7) TO DETERMINE FUEL CONSUMPTION FOR THESE POWER SETTINGS, REFER TO FUEL CONSUMPTION CHART IN OWNER'S HANDBOOK.
(8) SEE LYCOMING SERVICE INSTRUCTION NO. 1042.
(9) MEASURED AT 30 INCH RADIUS.
(10) SERIAL NOS. 27-1 TO 27-3737 INCL.
(11) SERIAL NOS. 27-3738 AND UP
(12) 4800 LBS. GROSS WT.
(13) 4995 LBS. AND 5200 LBS. GROSS WT.
(14) HC-E2YR-2RBS, HC-E2YK-2RBS, HC-E2YR-2RBF OR HC-E2YR-2RBSF CAN ALSO BE USED WITH THE IO-540-C4B5, TIO-540-C1A OR IO-540-J4A5 ENGINES.
(15) PA-23-250 "F" ONLY
(16) MINIMUM OCTANE: 80/87
SPECIFIED OCTANE: 80/87
ALTERNATE FUELS: REFER TO LYCOMING SERVICE LETTER NO. L185A WHEN USING OTHER THAN SPECIFIED OCTANE FUELS FOR ADDITIONAL INFORMATION AND SERVICE PROCEDURES.
(17) LAMAR 14-VOLT VOLTAGE REGULATOR B-00288-1 APPLIES TO AIRCRAFT WITH SERIAL NOS. 27-4794 TO 27-7405476 INCLUSIVE.
(18) LAMAR 28-VOLT VOLTAGE REGULATOR B-00286-1 APPLIES TO AIRCRAFT WITH SERIAL NOS. 27-4801 AND UP.
(19) SEE CONSUMABLE MATERIALS TABLE.
(20) PRESSURE FOR 600 x 6 - 4 PLY TIRE
(21) PRESSURE FOR 600 x 6 - 6 PLY TIRE

TABLE II-II. CONSUMABLE MATERIALS

Material	Specification or Brand Name	Manufacturer
Alcohol	MC200	*See Note 1
Cartridge, Engine Oil Filter	P/N AC6435683	A.C Spark Plug Division, General Motors Corp., Flint 2, Mich.
Cement	EC-678	Minnesota Mining Co. St. Paul, Minn.
Cement	EC-1300L	Minnesota Mining Co. St. Paul, Minn.
Cement	3230	Uniroyal Mishawaka, Ind. 46455
Cement	A-56-B	B.F. Goodrich Co. Akron, Ohio
Cement, Carbolene Neoprene	F-1	
Cleaner, Air Filter	D-1400	Donaldson Co., Inc. 1400 W. 94th St. Minneapolis, Minn. 55431
Cleaner, Plastic Window		*See Note 1
Cloth, Crocus	Federal Spec. P-C-458	*See Note 1
Compound, Anti-Seize	Fel-Pro High Temp.	Fel-Pro Inc. 7450 N. McCormick Blvd. Skokie, Ill.
Compound, Sealing	EC-801	Minnesota Mining Co. St. Paul, Minn.
Compound, Sloshing	1005-L, MIL-S-4383B	Products Research and Chemical Corp., Gloucester City, N.J.
Compound, Sloshing	444R	Coast Pro-Seal Co., Compton, Cal.
Fiberglass Paste Filler	Piper Kit 763 904	Piper Products

*Refer to Grid 1B24 for Notes.

TABLE II-II. CONSUMABLE MATERIALS

Material	Specification or Brand Name	Manufacturer
Film, Vinyl Chloride Copolymer	48 Gage, Type B	*See Note 1 Saran Wrap
Fluid, Anti-icing	MIL-F-566	
Fluid, Detector	Type CD-1 Solution	
Fluid, Hydraulic Petroleum Base	3126 Hydraulic Oil MIL-H-5605	Humble Refining Co. Box 2180 Houston, Texas 77001
Fluid, Hydraulic Petroleum Base	PED3337 MIL-H-5606	Standard Oil 225 Bush St. San Francisco, Calif. 94120
Flux, Welding	Type I, Type B	Solar
Flux, Welding	No. 16GH	Solar
Flux, Solder	709	*See Note 1 Kester Solder Co. 4201 Wrightwood Ave. Chicago, Ill. 60639
Fuel, Engine	See S/M 753-564 Page 1A24	*See Note 1
Grease	P/N 10-27165	Bendix Co. Sidney, N.Y. 13838
Grease, Aircraft	MIL-G-23827A	*See Note 2 Royal Lubricants Co., Box 298 East Hanover, N.J.
Grease, Aircraft	MIL-G-3545	*See Note 2 Royal Lubricants Co. Box 298 East Hanover, N.J
Grease, Aircraft	MIL-G-7711A	*See Note 2 Royal Lubricants Co., Box 298 East Hanover, N.J
Grease, Aircraft	MIL-G-81322	*See Note 2 Royal Lubricants Co., Box 298 East Hanover, N.J.

*Refer to Grid 1B24 for Notes.

TABLE II-II. CONSUMABLE MATERIALS

Material	Specification or Brand Name	Manufacturer
Grease, Aircraft	MIL-G-3278A	*See Note 2 Royal Lubricants Co., Box 298 East Hanover, N.J
Grease, Aircraft	MIL-G-21164C	*See Note 2 Royal Lubricants Co., Box 298 East Hanover, N.J.
Grease, Beacon	325	Exxon Co. Box 2180 Houston, Texas 77001
Grease, Lithium Soap Base	*1925 Molytex "O"	
Grease, Lubricating	Cosmolube G15 MIL-G-4343	E.F. Houghton and Co. 303 W. Lehigh Ave. Phila., PA 19133
Lubricant	No. 1960373	Delco-Remy P.O. Box 2439 Anderson, Ind. 46011
Lubricant	Lubriplate 777	Fiske Bros. Refining Co. 129 Lockwood St. Neward, N.J. 07105
Lubricant, Bearing	No. 2	Shell Oil Co. One Shell Plaza Houston, Texas 77002
Lubricant Krytox	No. 240 AB	
MEK	*3339 Federal Spec. TT-M-261	Uniroyal Mishawaka, Ind. 46455
Naptha	TT-N-95	*See Note 1
Oil	*10	
Oil, Breaker Felt Lube	10-86527	Bendix Electrical Components Div. Sidney, N.Y. 13838
Oil, Engine	MIL-L-6082	*See Note 1

*Refer to Grid 1B24 for Notes.

TABLE II-II. CONSUMABLE MATERIALS

Material	Specification or Brand Name	Manufacturer
Oil Lubricating, General Purpose Low Temp.	Caltex Low Temp. Oil, MIL-L-7870	Caltex Oil Products Co. New York, N.Y.
Oil, Preserving	1010, MIL-O-6081	*See Note 1
Oil, Turbo	Automotive Multigrade SAE-10W-30	*See Note 1
Permatex, Aviation		Permatex Co., Inc. Kansas City, Kansas
Rivet	AN426AD3-4	*See Note 1
Rivet	MS20470AD3	*See Note 1
Rod, Stainless Steel Welding	SAE Type 309	*See Note 1
Sealant, Ribbon Dope Thread	Permacel 412	Permacel New Brunswick, N.J. 08903
Sealer	#1126	3M Center St. Paul, Minn. 55101
Sealer	Parker Sealube	Parker Seals 10567 Jefferson Blvd. Culver City, Calif. 90230
Sealer	#1221-B-2	Product Research Co. Empire Ave. Burbank, Calif. 91504
Sealer, Bead	EC1055	3M Center St. Paul, Minn. 55101
Sealer, Permagum	#576.1	Presstite - Keystone Eng. Co., 3900 Chateau Ave. St. Louis, Mo.
Silicone Spray	SM-O-O-TH	Turco Products, Inc. 24600 South Main St. Wilmington, Calif. 90746
Solution, Stripper	M-S Stripper	Oakite Products, Inc. 50 Valley Rd. Berkley Heights, N.J. 07922

*Refer to Grid 1B24 for Notes

TABLE II-II. CONSUMABLE MATERIALS

Material	Specification or Brand Name	Manufacturer
Solvent	CRC 2-26	Corrosion Reaction Consultants, Inc. Phila. Pa.
Solvent, Cleaning	Turco 4217 MIL-T-7003	Turco Products Inc. 24600 South Main St. Wilmington, Calif. 90746
Solvent, Cleaning	Federal Sepc. P-S-661	
Solvent, Dry Cleaning	Federal Spec. P-D-680	*See Note 1 Mineral spirits
Tape, Moleskin		*See Note 1
Tape, Prestite	# 163	Presstite-Keystone Eng. Co., 3900 Chateau Ave. St. Louis, Mo.
Wax, Simonize		*See Note 1
Wire, Safety	MS20995-C32	*See Note 1
Wire, Safety	MS20995-F32	*See Note 1
Wire, Safety	MS20995-F20	*See Note 1
Wire, Safety	MS20995-C20	*See Note 1
Wire, Safety	MS-20995-C41	*See Note 1
Wire, Safety	MS-20995-NC32	*See Note 1
Rain Repellent	REPCON FSCM 50159	UNELKO Corporation 727 E. 110th Street Chicago, Illinois 60628

*NOTES: 1. Purchase locally.
2. Available in small quantities.

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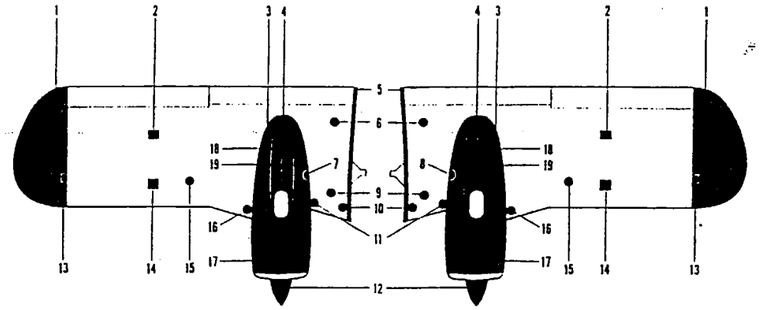
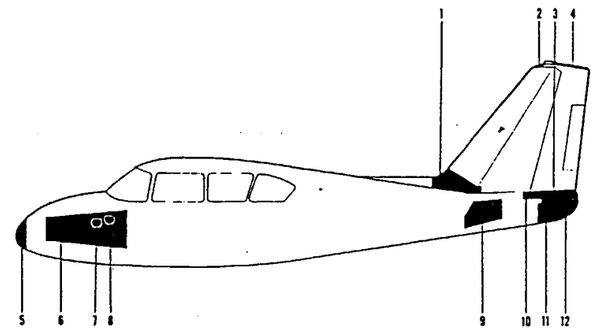


1. WING TIP
2. FUEL VENT LINE
3. FUEL CELL OUTLET LINE
4. FUEL SELECTOR, FUEL STRAINER
5. WIRING, CONTROL CABLES, LINE FITTINGS, WING ATTACHMENTS
6. INSPECTION
7. FUEL STRAINER
8. FUEL STRAINER
9. FUEL LINES, FUEL CONTROL CABLES, AILERON CABLES
10. DEICER LINES
11. FUEL LINES, FUEL CONTROL CABLES
12. PROPELLER
13. FUEL VENT LINE, TIP HINGE
14. AILERON BELLCRANK
15. AILERON CONTROL CABLES
16. PITOT LINE (LEFT WING ONLY), INSPECTION
17. ENGINE ACCESS, BOTTOM
18. LANDING GEAR
19. LANDING GEAR

SKETCH B

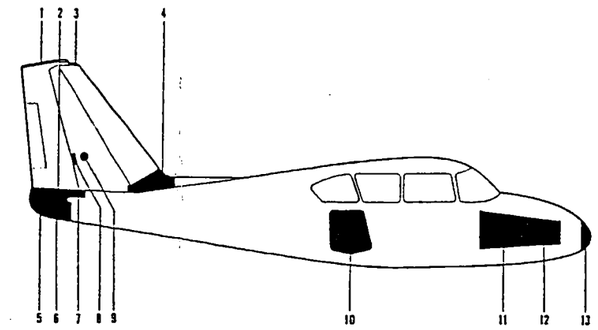
2123



1. TRIM INDICATOR WIRE, ANTENNA CONNECTOR
2. FIN RIB
3. STABILATOR TORQUE TUBE
4. ROTATING BEACON
5. LANDING LIGHT
6. HEATER, WIRING, MISC. FLUID AND AIR LINES
7. BRAKE RESERVOIR
8. POWERPAK FILLER TUBE
9. CONTROL CABLES AND PULLEYS
10. RUDDER HORN
11. STABILATOR TRIM MECHANISM
12. STABILATOR TRIM ROD

SKETCH C

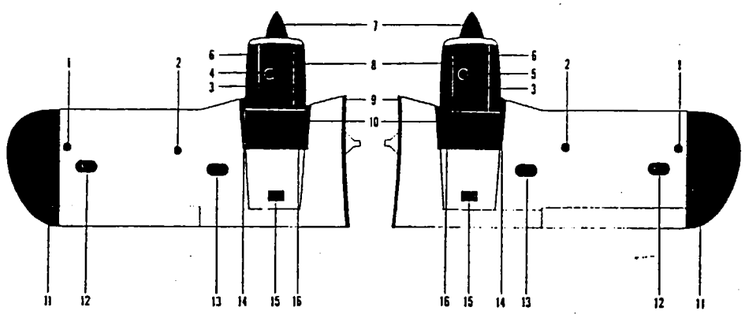
2124



1. ROTATING BEACON
2. STABILATOR TORQUE TUBE
3. FIN RIB
4. TRIM INDICATOR WIRE, ANTENNA CONNECTOR
5. STABILATOR TRIM ROD
6. STABILATOR TRIM MECHANISM
7. RUDDER HORN
8. RUDDER TRIM ROD
9. RUDDER TRIM DRUM
10. BAGGAGE AREA
11. RUDDER PEDALS, CONTROL CABLES, HYDRAULIC LINES, WIRING
12. BATTERY
13. LANDING LIGHT

SKETCH D

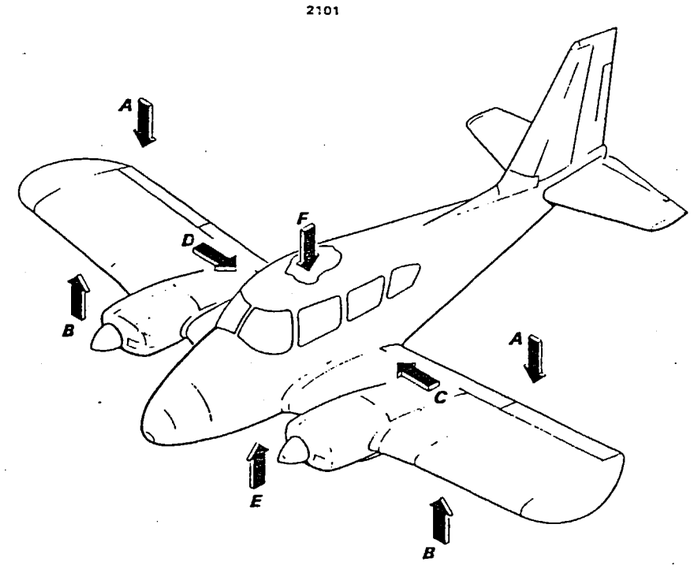
2121

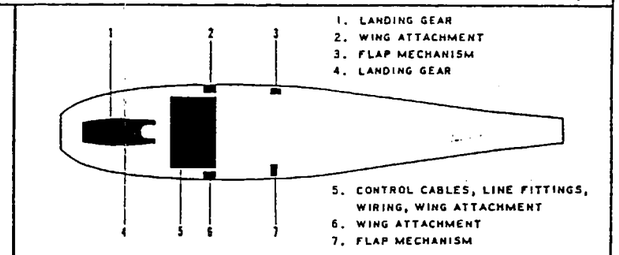


1. FUEL FILLER
2. FUEL FILLER
3. ENGINE ACCESS, TOP
4. OIL FILLER
5. OIL FILLER
6. ENGINE ACCESS, OUTBOARD
7. PROPELLER
8. ENGINE ACCESS, INBOARD
9. WIRING, CONTROL CABLES, LINE FITTINGS, WING ATTACHMENTS
10. NACELLE FAIRING
11. WING TIP
12. FUEL SENDER AND CELL
13. FUEL SENDER AND CELL
14. NACELLE FAIRING
15. ENGINE SUPPORT
16. ELECTRIC FUEL PUMP, VACUUM REGULATOR

SKETCH A

2101

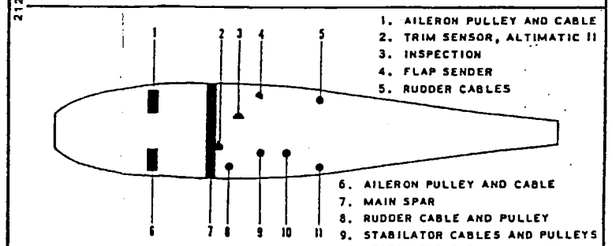




1. LANDING GEAR
2. WING ATTACHMENT
3. FLAP MECHANISM
4. LANDING GEAR
5. CONTROL CABLES, LINE FITTINGS, WIRING, WING ATTACHMENT
6. WING ATTACHMENT
7. FLAP MECHANISM

SKETCH E

2122

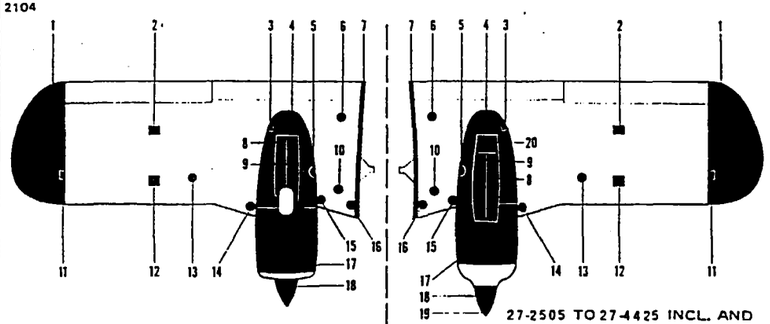


1. AILERON PULLEY AND CABLE
2. TRIM SENSOR, ALTIMATIC II
3. INSPECTION
4. FLAP SENDER
5. RUDDER CABLES
6. AILERON PULLEY AND CABLE
7. MAIN SPAR
8. RUDDER CABLE AND PULLEY
9. STABILATOR CABLES AND PULLEYS
10. STABILATOR CABLES AND PULLEYS
11. RUDDER CABLE AND PULLEY

SKETCH F

Figure 2-7. Access Plates and Panels
PA-23-250 and PA-23-235

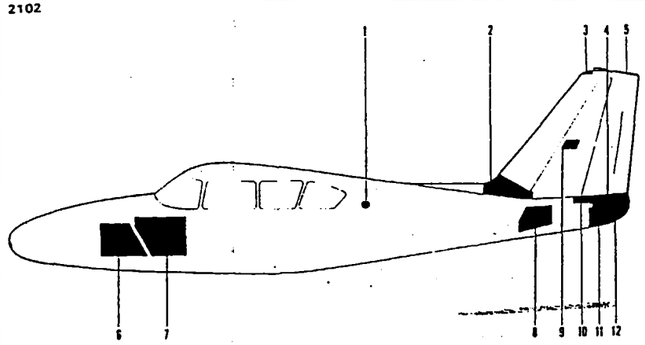
2104



1. WING TIP
2. FUEL VENT
3. FUEL CELL OUTLET LINE
4. FUEL SELECTOR, FUEL STRAINER AND FUEL DRAINS
5. FUEL STRAINER AND FUEL DRAINS
6. INSPECTION
7. WIRING, CONTROL CABLES, LINE FITTINGS AND WING ATTACHMENTS
8. LANDING GEAR
9. LANDING GEAR
10. FUEL LINES, FUEL CONTROL CABLES AND AILERON CABLES
11. WING TIP HINGE
12. AILERON BELLCRANK
13. AILERON CONTROL CABLES
14. PITOT LINE (LEFT WING ONLY), INSPECTION
15. ENGINE CONTROL CABLES, MISC. LINES
16. DEICER LINES
17. ENGINE ACCESS, BOTTOM
18. PROPELLER
19. PROPELLER RECHARGE VALVE
20. [illegible]

SKETCH B

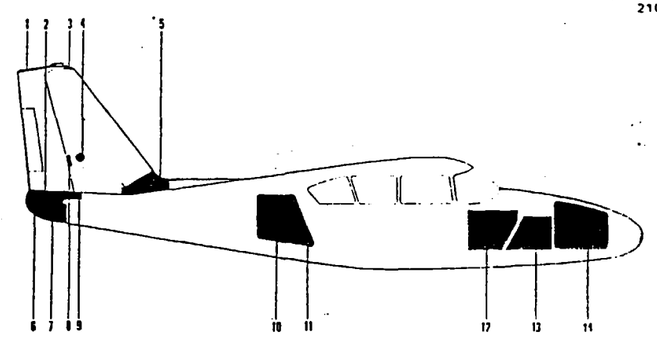
2102



1. OXYGEN FILLER
2. TRIM INDICATOR WIRE
3. FIN RIB
4. STABILATOR TORQUE TUBE
5. ROTATING BEACON
6. HEATER
7. BRAKE RESERVOIR AND POWER PACK FILLER TUBE
8. CONTROL CABLES AND PULLEYS
9. FLUX SENSOR, SERIAL NOS. 27-7505446, 27-7505456 AND UP.
10. RUDDER HORN
11. STABILATOR TRIM MECHANISM
12. STABILATOR TRIM ROD

SKETCH C

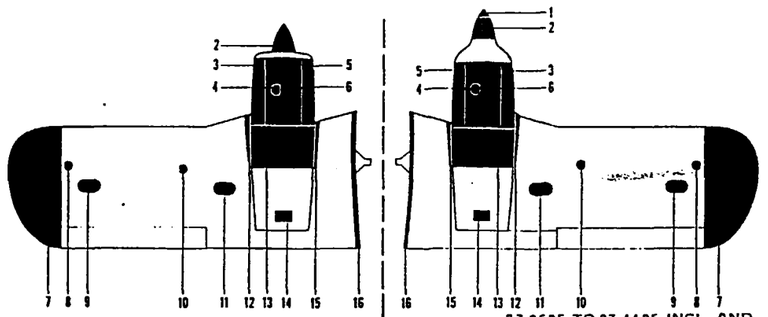
2103



1. ROTATING BEACON
2. STABILATOR TORQUE TUBE
3. FIN RIB
4. RUDDER TRIM DRUM
5. TRIM INDICATOR WIRE
6. STABILATOR TRIM ROD
7. STABILATOR TRIM MECHANISM
8. RUDDER TRIM ROD
9. RUDDER HORN
10. BAGGAGE DOOR, SERIAL NOS. 27-3000 TO 27-3050, 27-3052 TO 27-3152
11. BAGGAGE DOOR, SERIAL NOS. 27-3151 AND UP
12. RUDDER PEDALS, CONTROL CABLES AND HYDRAULIC LINES
13. BATTERY
14. BAGGAGE AREA, ELECTRONICS

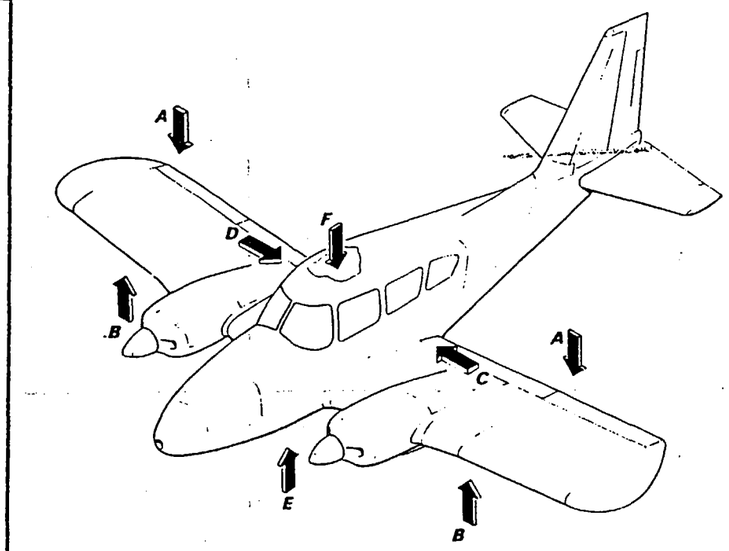
SKETCH D

2105



1. PROPELLER RECHARGE VALVE
2. PROPELLER
3. ENGINE ACCESS, OUTBOARD
4. OIL FILLER
5. ENGINE ACCESS, INBOARD
6. ENGINE ACCESS, TOP
7. WING TIP
8. FUEL FILLER
9. FUEL SENDER AND CELL
10. FUEL FILLER
11. FUEL SENDER AND CELL
12. NACELLE FAIRING
13. ELECTRIC FUEL PUMP, VACUUM REGULATOR, AILERON CONTROL CABLES, LANDING GEAR ACTUATING CYLINDER AND ROLL SERVO (LEFT NACELLE ONLY)
14. ENGINE SUPPORT
15. NACELLE FAIRING
16. WIRING, CONTROL CABLES, LINE FITTINGS AND WING ATTACHMENTS

SKETCH A



1. LANDING GEAR
2. AILERON PULLEY
3. CONTROL CABLES, LINE FITTINGS, WIRING AND WING ATTACHMENT
4. WING ATTACHMENT
5. FLAP MECHANISM
6. LANDING GEAR
7. HEATER DUCTS
8. WING ATTACHMENT
9. FLAP MECHANISM

SKETCH E

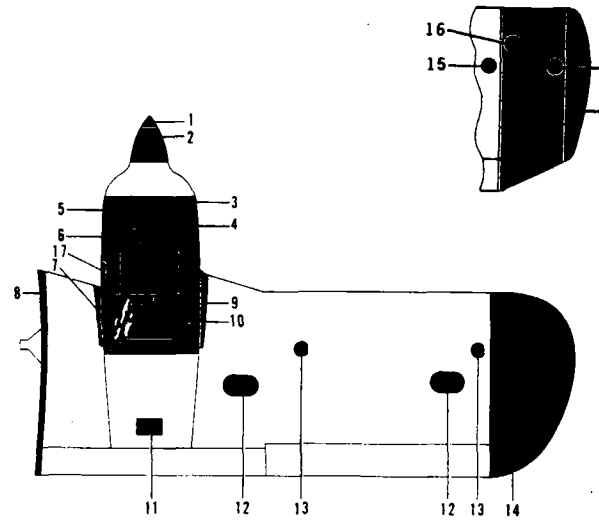
2100

1. AILERON PULLEY AND CABLE
2. TRIM SENSOR, ALTIMATIC II
3. INSPECTION
4. FLAP SENDER
5. RUDDER CABLES
6. AILERON PULLEY AND CABLE
7. MAIN SPAR
8. RUDDER CABLE AND PULLEY
9. STABILATOR CABLES AND PULLEYS
10. STABILATOR CABLES AND PULLEYS
11. RUDDER CABLE AND PULLEY
12. STABILATOR TRIM & FLAP INTERCONNECT CABLES & PULLEYS, SERIAL NOS. 27-7654001 AND UP

SKETCH F

Figure 2-8. Access Plates and Panels
PA-23-250 (six place)

A433

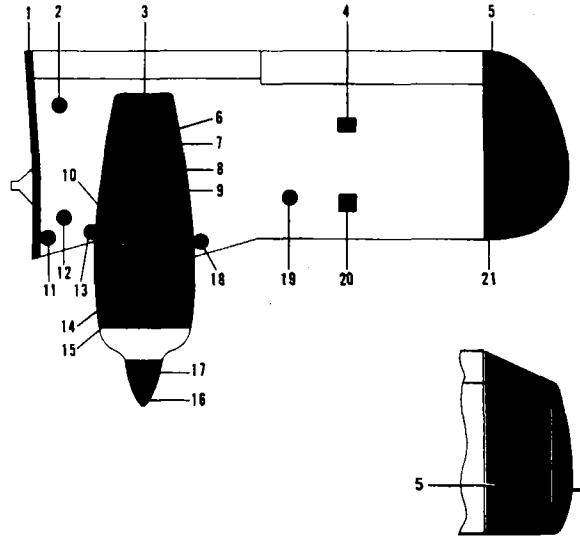


SERIAL NOS. 27-7654001 AND UP

1. PROPELLER RECHARGE VALVE
2. PROPELLER
3. ENGINE ACCESS, OUTBOARD
4. ENGINE ACCESS, TOP
5. ENGINE ACCESS, INBOARD
6. OIL FILTER
7. NACELLE FAIRING
8. WIRING, CONTROL CABLES, LINE FITTINGS, WING ATTACHMENTS
9. NACELLE FAIRING
10. ELECTRIC FUEL PUMP, VACUUM REGULATOR, AILERON CONTROL CABLES, LANDING GEAR ACTUATING CYLINDER, AND ROLL SERVO (LEFT NACELLE ONLY)
11. ENGINE SUPPORT
12. FUEL SENDER AND CELL
13. FUEL FILLER
14. WING TIP
15. FUEL FILLER OR ACCESS COVER
16. FUEL SENDER OR ACCESS COVER
17. OIL COOLER VENT

27-4426 AND 27-4574 AND UP

A434



1. WIRING, CONTROL CABLES, LINE FITTINGS, WING ATTACHMENTS
2. INSPECTION
3. FUEL SELECTOR, FUEL STRAINER, FUEL DRAINS
4. FUEL VENT
5. WING TIP
6. LANDING GEAR
7. FUEL CELL OUTLET LINE
8. LANDING GEAR
9. LANDING GEAR
10. FUEL STRAINER
11. DEICER LINES
12. FUEL LINES, FUEL CONTROL CABLES, AILERON CABLES
13. ENGINE CONTROL CABLES, MISC. LINES
14. ENGINE
15. ENGINE ACCESS, BOTTOM
16. PROPELLER RECHARGE VALVE
17. PROPELLER
18. PITOT LINE (LEFT WING ONLY), INSPECTION
19. AILERON CONTROL CABLES
20. AILERON BELLCRANK
21. WING TIP HINGE

SERIAL NOS. 27-7654001 AND UP

Figure 2-8. Access Plates and Panels PA-23-250 (six place) (cont.)
Serial Nos. 27-4426 and 27-4574 and up

2-4. WEIGHT AND BALANCE DATA. When figuring various weight and balance computations, the weight and empty weight center of gravity of the airplane may be found in the Weight and Balance Form of the Airplane Flight Manual.

2-5. SERIAL NUMBER PLATE. The Serial Number Plate for airplanes with Serial Numbers 27-1 to 27-3559 inclusive is located on the top of the tail stringer, underneath the rudder. The Serial Number Plate on airplanes with Serial Numbers 27-3560 and up is located on the bottom of the fuselage just forward of the tail skid. Airplane Serial Numbers will be used in this manual where model differences occur, and should be used when contacting the factory on service or warranty matters. M.A.A. plate is located under the rug in front of the co-pilot's seat.

2-6. ACCESS AND INSPECTION PROVISIONS. The access and inspection provisions for the airplane are shown in Figures 2-7 and 2-8. The component to be serviced or inspected through each opening is assigned an index number to identify it in illustration. All access plates and panels are secured by either metal fasteners or screws. To enter the aft section of the fuselage, remove the rear baggage compartment upholstery panel by removing the attaching screws.

CAUTION

Before entering the aft section of the fuselage, be sure the airplane is supported at the tail skid.

2-7. TOOLS AND TEST EQUIPMENT. Because of the simplicity and easy accessibility of components, few special tools outside normal shop tools will be required. Tools that are required may be fabricated from dimensions given in the section that pertains to a particular component or are listed in the back of the PA-23-250 Parts Catalog.

2-8. TORQUE REQUIREMENTS. The torque values given in Table II-III and Table II-IV are derived from oil-free cadmium-plated threads and are recommended for all airframe installation procedures when torquing is required, unless otherwise noted. Engine torque values are found in the latest revision of Avco-Lycoming Service Bulletin No. 268.

2-9. TORQUE WRENCHES. Torque wrenches should be checked daily and calibrated by means of weights and a measured lever arm to make sure that inaccuracies are not present. Checking one torque wrench against another is not sufficient and is not recommended. Some wrenches are quite sensitive as to the way they are supported during a tightening operation. Any instructions furnished by the manufacturer must be followed explicitly.

When it is necessary to use a special extension or adapter wrench together with a torque wrench, a simple mathematical equation must be worked out to arrrive at the correct torque reading. Following is the formula to be used: (Refer to Figure 2-9.)

T = Torque desired at the part.

A = Basic lever length from center of wrench shank to center of handle or stamped on wrench or listed for that model wrench.

B = Length of adapter extension, center of bolt to center of shank.

C = Scale reading needed to obtain desired torque (T).

$$\text{The formula: } C = \frac{A \times T}{A + B}$$

EXAMPLE

A bolt requires 30 foot-pound and a 3 inch adapter (one-quarter of a foot or .25') is needed to get at it. You want to know what scale reading it will take on a one-foot lever arm wrench to obtain the 30 foot-pounds at the bolt.

$$C = \frac{1 \times 30}{1 + .25} \text{ or } C = \frac{30}{1.25} = 24 \text{ ft.-lbs.}$$

Remember, the 3 inch adapter must be projecting 3 inches straight along the wrench axis. In general, avoid all complex assemblages or adapters and extensions of flex joints.

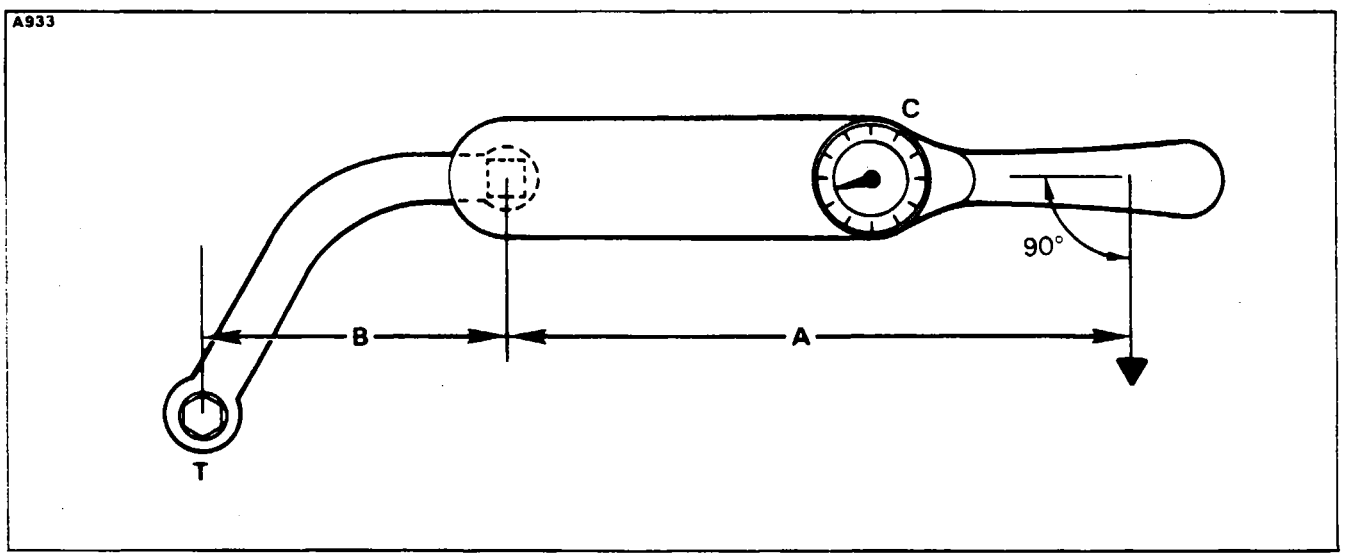


Figure 2-9. Torque Wrench Formula

CAUTION

Do not overtorque fittings.

NOTE

When flared fittings are being installed, ascertain that the male threads are properly lubricated. Torque the fittings in accordance with Table II-III.

TABLE II-III. FLARE FITTING TORQUES

TORQUE — INCH-POUND						
TUBING OD INCHES	ALUMINUM - ALLOY TUBING FLARE - AND 10061 OR AND 10078		STEEL TUBING FLARE AND 10061		HOSE END FITTING AND HOSE ASSEMBLIES	
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
1/8	— — —	— — —	— — —	— — —	— — —	— — —
3/16	— — —	— — —	90	100	70	100
1/4	40	65	135	150	70	120
5/16	60	80	180	200	85	180
3/8	75	125	270	300	100	250
1/2	150	250	450	500	210	420
5/8	200	350	650	700	300	480
3/4	300	500	900	1000	500	850
1	500	700	1200	1400	700	1150
1-1/4	600	900	— — —	— — —	— — —	— — —
1-1/2	600	900	— — —	— — —	— — —	— — —
1-3/4	— — —	— — —	— — —	— — —	— — —	— — —
2	— — —	— — —	— — —	— — —	— — —	— — —

TABLE II-IV. RECOMMENDED NUT TORQUES (INCH-POUNDS)

TORQUES: The importance of correct application can not be overemphasized. Undertorque can result in unnecessary wear of nuts and bolts as well as the parts they are holding together. When insufficient pressures are applied, uneven loads will be transmitted throughout the assembly which may result in excessive wear or premature failure due to fatigue. Overtorque can be equally damaging because of failure of a bolt or nut from overstressing the threaded areas. There are a few simple, but very important, procedures that should be followed to assure that the correct torque is applied:

1. Calibrate the torque wrench periodically to assure accuracy; and recheck frequently.
2. Ascertain that the bolt and nut threads are clean and dry (unless otherwise specified by the manufacturer).
3. Run nut down to near contact with the washer or bearing surface and check "friction drag torque" required to turn the nut.
4. Add the friction drag torque to the desired torque recommended by the manufacturer, or obtain desired torque as shown in Table II-IV. This is referred to as final torque which should register on the indicator or the setting for a snapover type wrench.

NOTE

For more details on torquing, refer to FAA Manual AC 43.13-1A

FRICTION DRAG TORQUES
COARSE AND FINE

BOLT SIZE	FRICTION DRAG TORQUE (IN.-LBS.)
10	18
1/4	30
5/16	60
3/8	80
7/16	100

	BOLTS Steel Tension	
	AN 3 thru AN 20 AN 42 thru AN 49 AN 73 thru AN 81 AN 173 thru AN 186 MS 20033 thru MS 20046 MS 20073 MS 20074 AN 509 NK9 MS 24694 AN 525 NK525 MS 27039	
	NUTS	
	Steel Tension	Steel Shear
	AN 310 AN 315 AN 363 AN 365 NAS 1021 MS 17825 MS 21045 MS 20365 MS 20500 NAS 679	AN 320 AN 364 NAS 1022 MS 17826 MS 20364

COARSE THREAD SERIES

Nut-bolt size	Torque Limits in-lbs		Torque Limits in-lbs	
	Min.	Max.	Min.	Max.
8 –32	12	15	7	9
10 –24	20	25	12	15
1/4–20	40	50	25	30
5/16–18	80	90	48	55
3/8–16	160	185	95	110
7/16–14	235	255	140	155
1/2–13	400	480	240	290
9/16–12	500	700	300	420
5/8–11	700	900	420	540
3/4–10	1,150	1,600	700	950
7/8– 9	2,200	3,000	1,300	1,800
1 –8	3,700	5,000	2,200	3,000
1-1/8–8	5,500	6,500	3,300	4,000
1-1/4–8	6,500	8,000	4,000	5,000

PPS 20018E

TABLE II-IV. RECOMMENDED NUT TORQUES (INCH-POUNDS) (cont.)

	BOLTS Steel Tension		BOLTS Steel Tension		BOLTS Aluminum	
	AN 3 thru AN 20 AN 42 thru AN 49 AN 73 thru AN 81 AN 173 thru AN 186 MS 20033 thru MS 20046 MS 20073 MS 20074 AN 509 NK9 MS 24694 AN 525 NK525 MS 27039		MS 20004 thru MS 20024 NAS 144 thru NAS 158 NAS 333 thru NAS 340 NAS 583 thru NAS 590 NAS 624 thru NAS 644 NAS 1303 thru NAS 1320 NAS 172 NAS 174 NAS 517	Steel shear bolt NAS 464	AN 3DD thru AN 20DD AN 173DD thru AN 186DD AN 509DD AN 525D MS 27039D MS 24694DD	
	NUTS		NUTS		NUTS	
	Steel Tension	Steel Shear	Steel Tension	Steel Shear	Alum. Tension	Alum. Shear
	AN 310 AN 315 AN 363 AN 365 NAS 1021 MS 17825 MS 21045 MS 20365 MS 20500 NAS 679	AN 320 AN 364 NAS 1022 MS 17826 MS 20364	AN 310 AN 315 AN 363 AN 365 MS 17825 MS 20365 MS 21045 NAS 1021 NAS 679 NAS 1291	AN 320 AN 364 NAS 1022 MS 17826 MS 20364	AN 365D AN 310D NAS 1021D	AN 320D AN 364D NAS 1022D

FINE THREAD SERIES

Nut-bolt size	Torque Limits in-lbs		Torque Limits in-lbs		Torque Limits in-lbs		Torque Limits in-lbs		Torque Limits in-lbs		Torque Limits in-lbs	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
8 -36	12	15	7	9					5	10	3	6
10 -32	20	25	12	15	25	30	15	20	10	15	5	10
1/4-28	50	70	30	40	80	100	50	60	30	45	15	30
5/16-24	100	140	60	85	120	145	70	90	40	65	25	40
3/8-24	160	190	95	110	200	250	120	150	75	110	45	70
7/16-20	450	500	270	300	520	630	300	400	180	280	110	170
1/2-20	480	690	290	410	770	950	450	550	280	410	160	260
9/16-18	800	1,000	480	600	1,100	1,300	650	800	380	580	230	360
5/8-18	1,100	1,300	660	780	1,250	1,550	750	950	550	670	270	420
3/4-16	2,300	2,500	1,300	1,500	2,650	3,200	1,600	1,900	950	1,250	560	880
7/8-14	2,500	3,000	1,500	1,800	3,550	4,350	2,100	2,690	1,250	1,900	750	1,200
1 -14	3,700	4,500	2,200	3,300	4,500	5,500	2,700	3,300	1,600	2,400	950	1,500
1-1/8-12	5,000	7,000	3,000	4,200	6,000	7,300	3,600	4,400	2,100	3,200	1,250	2,000
1-1/4-12	9,000	11,000	5,400	6,600	11,000	13,400	6,600	8,000	3,900	5,600	2,300	3,650

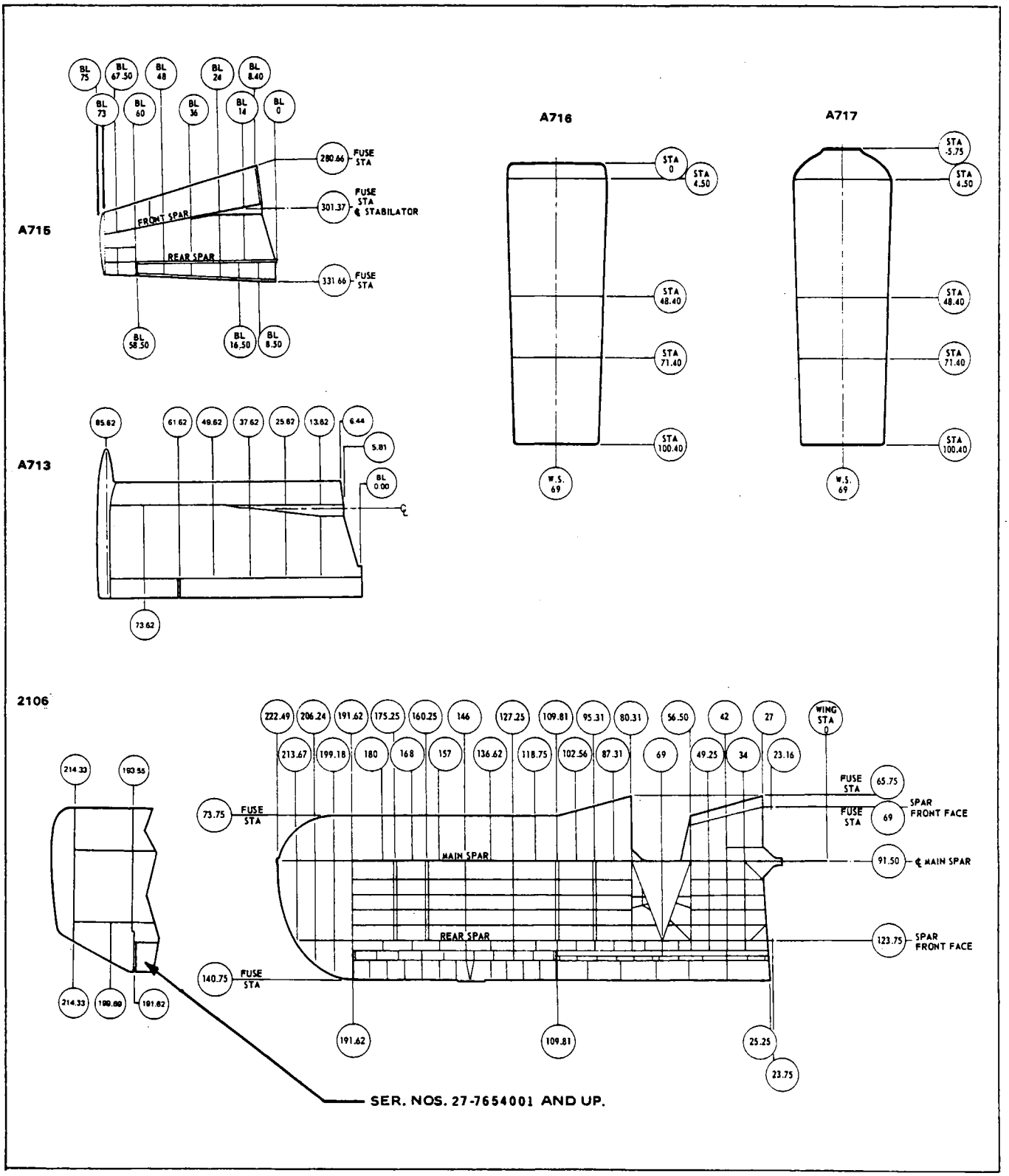


Figure 2-10. Station Reference Lines

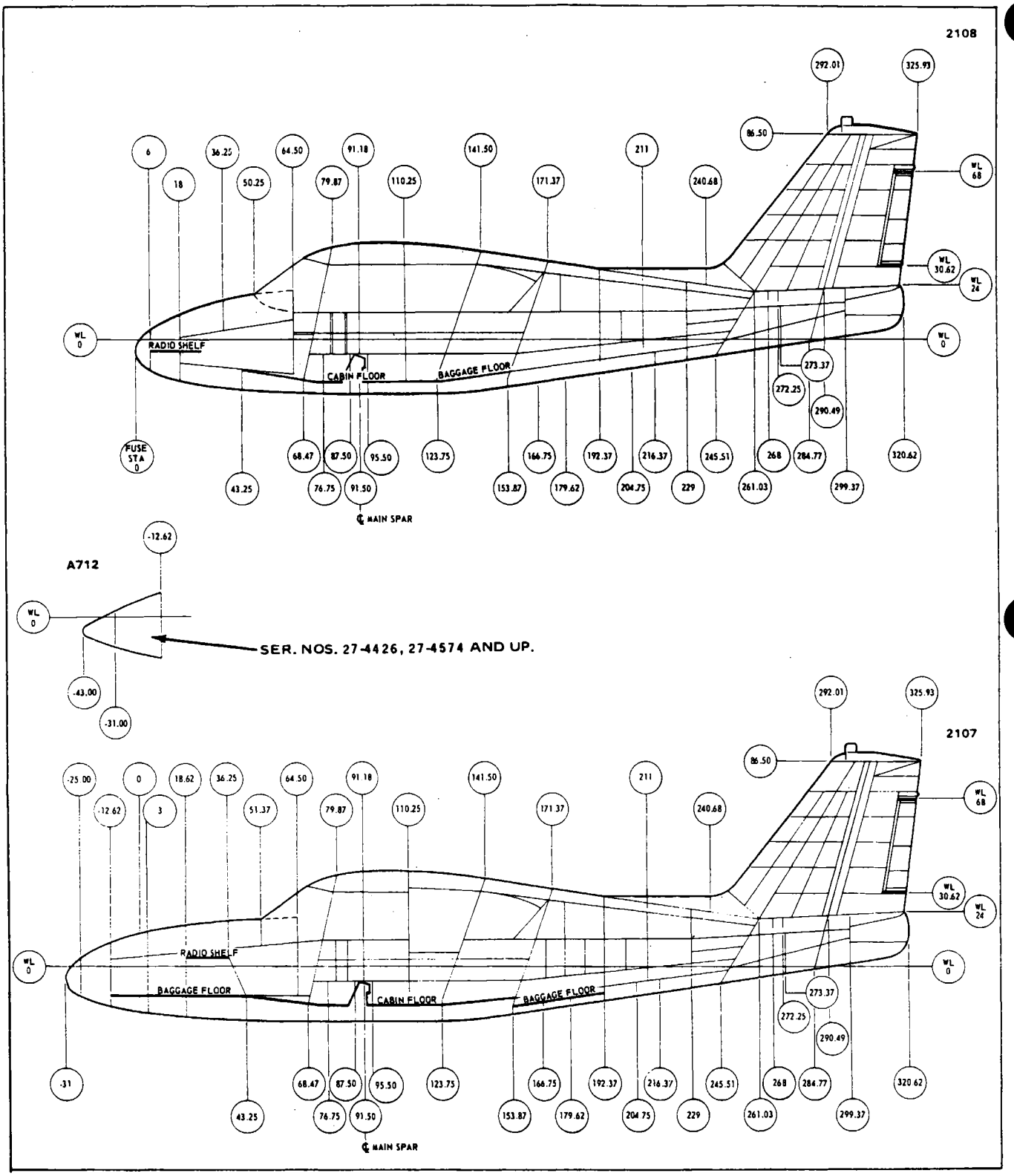


Figure 2-10. Station Reference Lines (cont.)

TABLE II-V. CONVERSION TABLES

1. These tables contain the various conversion data that may be useful when figuring capacities, lengths, temperatures, and various weights and measures from the English system values to the metric system values or back again.

2. The English system is in use by England and the United States. All other countries use the metric system.

3. Procedure for Converting Inches to Millimeters (Refer to Table II-V.)

   A. Example: Convert 1.5 inches to millimeters.

      (1) Read down inches column to 1. inches.
      (2) Read across top inch column to 0.5.
      (3) Read down and across to find millimeters to (1.5 inches is 38.10 millimeters).

4. Procedure for Converting Fahrenheit (°F) and Celsius (°C) (Centigrade) Temperature. (Refer to Table II-V.)

   A. Read number in middle column, if in degrees Celsuis (°C), read Fahrenheit equivalent in right-hand column. If in degrees Fahrenheit (°F), read Celsius equivalent in left-hand column.

      (1) 70°F = 21.1°C.
      (2) 30°C = 86.0°F.

TABLE II-V. CONVERSION TABLES (cont.)

CENTIGRADE—FAHRENHEIT CONVERSION TABLE

Example: To convert 20°C. to Fahrenheit, find 20 in the center column headed (F—C); then read 68.0° F. in the column (F) to the right. To convert 20° F. to Centigrade; find 20 in the center column and read -6.67° C. in the (C) column to the left.

C	F—C	F	C	F—C	F
-56.7	-70	-94.0	104.44	220	428.0
-51.1	-60	-76.0	110.00	230	446.0
-45.6	-50	-58.0	115.56	240	464.0
-40.0	-40	-40.0	121.11	250	482.0
-34.0	-30	-22.0	126.67	260	500.0
-38.9	-20	-4.0	132.22	270	518.0
-23.3	-10	14.0	137.78	280	536.0
-17.8	0	32.0	143.33	290	554.0
-12.22	10	50.0	148.89	300	572.0
-6.67	20	68.0	154.44	310	590.0
-1.11	30	86.0	160.00	320	608.0
4.44	40	104.0	165.56	330	626.0
10.00	50	122.0	171.11	340	644.0
15.56	60	140.0	176.67	350	662.0
21.11	70	158.0	182.22	360	680.0
26.67	80	176.0	187.78	370	698.0
32.22	90	194.0	193.33	380	716.0
27.78	100	212.0	198.89	390	734.0
43.33	110	230.0	204.44	400	752.0
38.89	120	248.0	210.00	410	770.0
54.44	130	266.0	215.56	420	788.0
60.00	140	284.0	221.11	430	806.0
65.56	150	302.0	226.67	440	824.0
71.00	160	320.0	232.22	450	842.0
76.67	170	338.0	257.78	460	860.0
82.22	180	356.0	243.33	470	878.0
87.78	190	374.0	248.89	480	896.0
93.33	200	392.0	254.44	490	914.0
98.89	210	410.0	260.00	500	932.0

TABLE II-V. CONVERSION TABLES (cont.)

INCHES TO MILLIMETER

INCHES	0.0000	0.0001	0.0002	0.0003	0.0004	0.0005	0.0006	0.0007	0.0008	0.0009
					MILLIMETER					
0.000		0.0025	0.0050	0.0076	0.0101	0.0127	0.0152	0.0177	0.0203	0.0228
0.001	0.0254	0.0279	0.0304	0.0330	0.0355	0.0381	0.0406	0.0431	0.0457	0.0482
0.002	0.0508	0.0533	0.0558	0.0584	0.0609	0.0635	0.0660	0.0685	0.0711	0.0736
0.003	0.0762	0.0787	0.0812	0.0838	0.0863	0.0889	0.0914	0.0939	0.0965	0.0990
0.004	0.1016	0.1041	0.1066	0.1092	0.1117	0.1143	0.1168	0.1193	0.1219	0.1244
0.005	0.1270	0.1295	0.1320	0.1346	0.1371	0.1397	0.1422	0.1447	0.1473	0.1498
0.006	0.1524	0.1549	0.1574	0.1600	0.1625	0.1651	0.1676	0.1701	0.1727	0.1752
0.007	0.1778	0.1803	0.1828	0.1854	0.1879	0.1905	0.1930	0.1955	0.1981	0.2006
0.008	0.2032	0.2057	0.2082	0.2108	0.2133	0.2159	0.2184	0.2209	0.2235	0.2260
0.009	0.2286	0.2311	0.2336	0.2362	0.2387	0.2413	0.2438	0.2463	0.2489	0.2514

INCHES	0.000	0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009
					MILLIMETER					
0.00		0.025	0.050	0.076	0.101	0.127	0.152	0.177	0.203	0.228
0.01	0.254	0.279	0.304	0.330	0.355	0.381	0.406	0.431	0.457	0.482
0.02	0.508	0.533	0.558	0.584	0.609	0.635	0.660	0.685	0.711	0.736
0.03	0.762	0.787	0.812	0.838	0.863	0.889	0.914	0.939	0.965	0.990
0.04	1.016	1.041	1.066	1.092	1.117	1.143	1.168	1.193	1.219	1.244
0.05	1.270	1.295	1.320	1.346	1.371	1.397	1.422	1.447	1.473	1.498
0.06	1.524	1.549	1.574	1.600	1.625	1.651	1.676	1.701	1.727	1.752
0.07	1.778	1.803	1.828	1.854	1.879	1.905	1.930	1.955	1.981	2.006
0.08	2.032	2.057	2.082	2.108	2.133	2.159	2.184	2.209	2.235	2.260
0.09	2.286	2.311	2.336	2.362	2.387	2.413	2.438	2.463	2.489	2.514

INCHES	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
					MILLIMETER					
0.0		0.254	0.508	0.762	0.016	1.270	1.524	1.778	2.032	2.286
0.1	2.540	2.794	3.048	3.302	3.556	3.810	4.064	4.318	4.572	4.826
0.2	5.080	5.334	5.588	5.842	6.096	6.350	6.604	6.858	7.112	7.366
0.3	7.620	7.874	8.128	8.382	8.636	8.890	9.144	9.398	9.652	9.906
0.4	10.160	10.414	10.668	10.922	11.176	11.430	11.684	11.938	12.192	12.446
0.5	12.700	12.954	13.208	13.462	13.716	13.970	14.224	14.478	14.732	14.986
0.6	15.240	15.494	15.748	16.002	16.256	16.510	16.764	17.018	17.272	17.526
0.7	17.780	18.034	18.288	18.542	18.796	19.050	19.304	19.558	19.812	20.066
0.8	20.320	20.574	20.828	21.082	21.336	21.590	21.844	22.098	22.352	22.606
0.9	22.860	23.114	23.368	23.622	23.876	24.130	24.384	24.638	24.892	25.146

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TABLE II-V. CONVERSION TABLES (cont.)

MULTIPLY	BY	TO OBTAIN
CENTIMETERS	0.3937 0.03281	IN. FT.
CU. CENTIMETERS	0.001 0.06102 0.0002642	LITERS CU. IN. U.S. GAL.
CU. FT.	28.320 1.728 7.481 28.32	CU. CM. CU. IN. U.S. GAL. LITERS
CU. IN.	16.39 0.01639 0.004329 0.01732	CU. CM. LITERS U.S. GAL. QUARTS
CU. METERS	1000000 35.314 61.023 264.17 999.97	CU. CM. CU. FT. CU. IN. GAL. LITERS
FEET	0.3048 12.000 304.8 0.3333	METERS MILS. MM. YARDS
FT.-LB.	0.1383 0.001285 0.000000376	M-KG BTU KW-HR
FLUID OZ.	8 29.6	DRAM CU. CM.
GAL., IMPERIAL	277.4 1.201 4.546	CU. IN. U.S. GAL. LITERS
GAL., U.S. DRY	268.8 0.1556 1.164 4.405	CU. IN. CU. FT. U.S. GAL., LIQ. LITERS
GAL., U.S. LIQ.	231.0 0.1337 3.785 0.8327 128	CU. IN. CU. FT. LITERS IMPERIAL GAL. FLUID OZ.
IN.	2.540 .08333	CM. FT.
JOULES	0.000948 0.7376	BTU FT.-LB.

MULTIPLY	BY	TO OBTAIN
KILOGRAMS	2.205 35.27 1000	LB. OZ. GRAMS
LITERS	1000 61.03 0.03532 0.2642 0.22 1.057	CU. CM. CU. IN. CU. FT. U.S. GAL. IMPERIAL GAL. QUARTS
METERS	39.37 3.281 1000	IN. FT. MM.
METER-KILOGRAM	7.233 9.807	FT.-LB. JOULES
OUNCES, AVDP	0.0625 28.35 437.5	LB., AVDP GRAMS GRAINS
OUNCES, FLUID	29.57 1.805	CU. CM. CU. IN.
LB., AVDP	453.6 7000 16.0	GRAMS GRAINS OUNCES
SQUARE INCH	6.4516	SQ. CM.
POUND PER SQUARE INCH (PSI)	0.0703	KG-CM SQUARED
STATUTE MILE	1.609 0.8684	KILOMETER NAUTICAL MILE
NAUTICAL MILE	1.151	STATUTE MILE
QUART	.9463	LITER
MILLIMETER	1000	MICRON
MICRON	0.001 0.000039	MILLIMETER INCH
INCH POUNDS	11.521	METER GRAMS
INCH OUNCES	0.72	METER GRAMS
POUNDS	0.453	KILOGRAMS

TABLE II-VI. DECIMAL/MILLIMETER EQUIVALENTS OF DRILL SIZES

Decimal/Millimeter Equivalents of Drill Sizes From 1/2" to No. 80

Size	Decimal Equiv.	Millimeter Equiv.	Size	Decimal Equiv.	Millimeter Equiv.	Size	Decimal Equiv.	Millimeter Equiv.	Size	Decimal Equiv.	Millimeter Equiv.
1/2	0.500	12.7000	G	0.261	6.6294	5/32	0.1562	3.9687	51	0.067	1.7018
31/64	0.4843	12.3031	F	0.257	6.5278	23	0.154	3.9116	52	0.0635	1.6129
15/32	0.4687	11.9062	E-1/4	0.250	6.3500	24	0.152	3.8608	1/16	0.0625	1.5875
29/64	0.4531	11.5094	D	0.246	6.2484	25	0.1495	3.7973	53	0.0595	1.5113
7/16	0.4375	11.1125	C	0.242	6.1468	26	0.147	3.7338	54	0.055	1.397
27/64	0.4218	10.7156	B	0.238	6.0452	27	0.144	3.6576	55	0.052	1.3208
Z	0.413	10.4902	15/64	0.2343	5.9531	9/64	0.1406	3.5719	3/64	0.0468	1.1906
13/32	0.4062	10.3187	A	0.234	5.9436	28	0.1405	3.5687	56	0.0465	1.1811
Y	0.404	10.2616	1	0.228	5.7912	29	0.136	3.4544	57	0.043	1.0922
X	0.397	10.0838	2	0.221	5.6134	30	0.1285	3.2639	58	0.042	1.0668
25/64	0.3906	9.9212	7/32	0.2187	5.5562	1/8	0.125	3.1750	59	0.041	1.0414
W	0.386	9.8044	3	0.213	5.4102	31	0.120	3.048	60	0.040	1.016
V	0.377	9.5758	4	0.209	5.3086	32	0.116	2.9464	61	0.039	0.9906
3/8	0.375	9.5250	5	0.2055	5.2197	33	0.113	2.8702	62	0.038	0.9652
U	0.368	9.3472	6	0.204	5.1816	34	0.111	2.8194	63	0.037	0.9398
23/64	0.3593	9.1262	13/64	0.2031	5.1594	35	0.110	2.794	64	0.036	0.9144
T	0.358	9.1281	7	0.201	5.1054	7/64	0.1093	2.7781	65	0.035	0.899
S	0.346	8.7884	8	0.199	5.0546	36	0.1065	2.7051	66	0.033	0.8382
11/32	0.3437	8.7300	9	0.196	4.9784	37	0.104	2.6416	1/32	0.0312	0.7937
R	0.339	8.6106	10	0.1935	4.9149	38	0.1015	2.5781	67	0.032	0.8128
Q	0.332	8.4328	11	0.191	4.8514	39	0.0995	2.5273	68	0.031	0.7874
21/64	0.3281	8.3337	12	0.189	4.8006	40	0.098	2.4892	69	0.029	0.7366
P	0.323	8.2042	3/16	0.1875	4.7625	41	0.096	2.4384	70	0.028	0.7112
O	0.316	8.0264	13	0.185	4.699	3/32	0.0937	2.3812	71	0.026	0.6604
5/16	0.3125	7.9375	14	0.182	4.6228	42	0.0935	2.3749	72	0.025	0.635
N	0.302	7.6708	15	0.180	4.572	43	0.089	2.2606	73	0.024	0.6096
19/64	0.2968	7.5387	16	0.177	4.4958	44	0.086	2.1844	74	0.0229	0.58166
M	0.295	7.4930	17	0.173	4.3942	45	0.082	2.0828	75	0.021	0.5334
L	0.290	7.3660	11/64	0.1718	4.3656	46	0.081	2.0574	76	0.020	0.508
9/32	0.2812	7.1425	18	0.1695	4.3053	47	0.0785	1.9939	77	0.018	0.4572
K	0.281	7.1374	19	0.166	4.2164	5/64	0.0781	1.9844	1/64	0.0156	0.3969
J	0.277	7.0358	20	0.161	4.0894	48	0.076	1.9304	78	0.016	0.4064
I	0.272	6.9088	21	0.159	4.0386	49	0.073	1.8542	79	0.0145	0.3683
H	0.266	6.7564	22	0.157	3.9878	50	0.070	1.778	80	0.0135	0.3429
17/64	0.2656	6.7462									

DRILL SIZES AVAILABLE.

Drill may be obtained in regular sizes to a 4 inch diameter, and increase in 64ths of an inch. The regular metric drills vary from 2 to 76mm and increase in 0.5mm. variations.

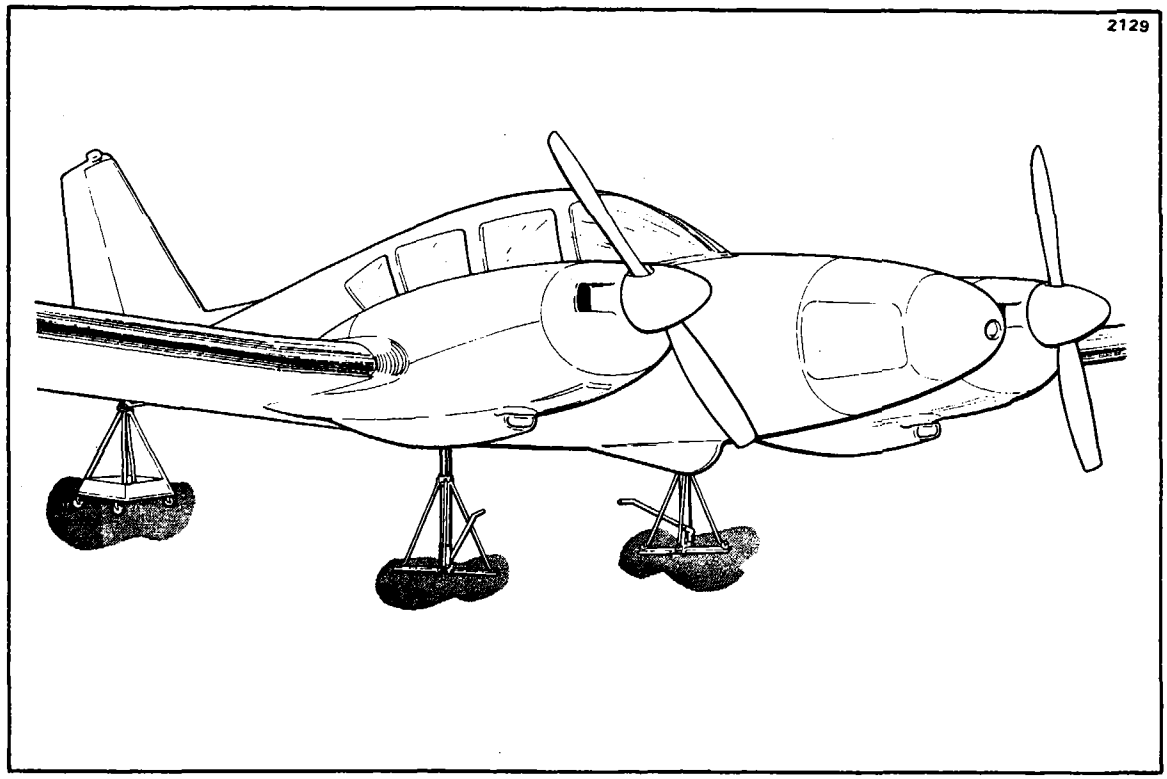


Figure 2-11. Jacking Arrangements

2-10. GROUND HANDLING.

2-11. INTRODUCTION TO GROUND HANDLING. Ground handling covers all essential information governing the handling of the airplane while on the ground. This includes jacking, weighing, leveling, mooring, parking, towing and taxiing. When the airplane is handled in the manner described in the following paragraphs, the chance of possible damage to the airplane and it's equipment will be prevented.

2-12. JACKING. The airplane is provided with a jacking pad on each main spar just outboard of the engine nacelle and a support position by making use of the tail skid. (Refer to Figure 2-11.) To jack the airplane, proceed as follows:

a. Place the jacks under the jack pads.

b. Attach the tail support to the tail skid. Place approximately 250 pounds of ballast on the support to hold the tail down.

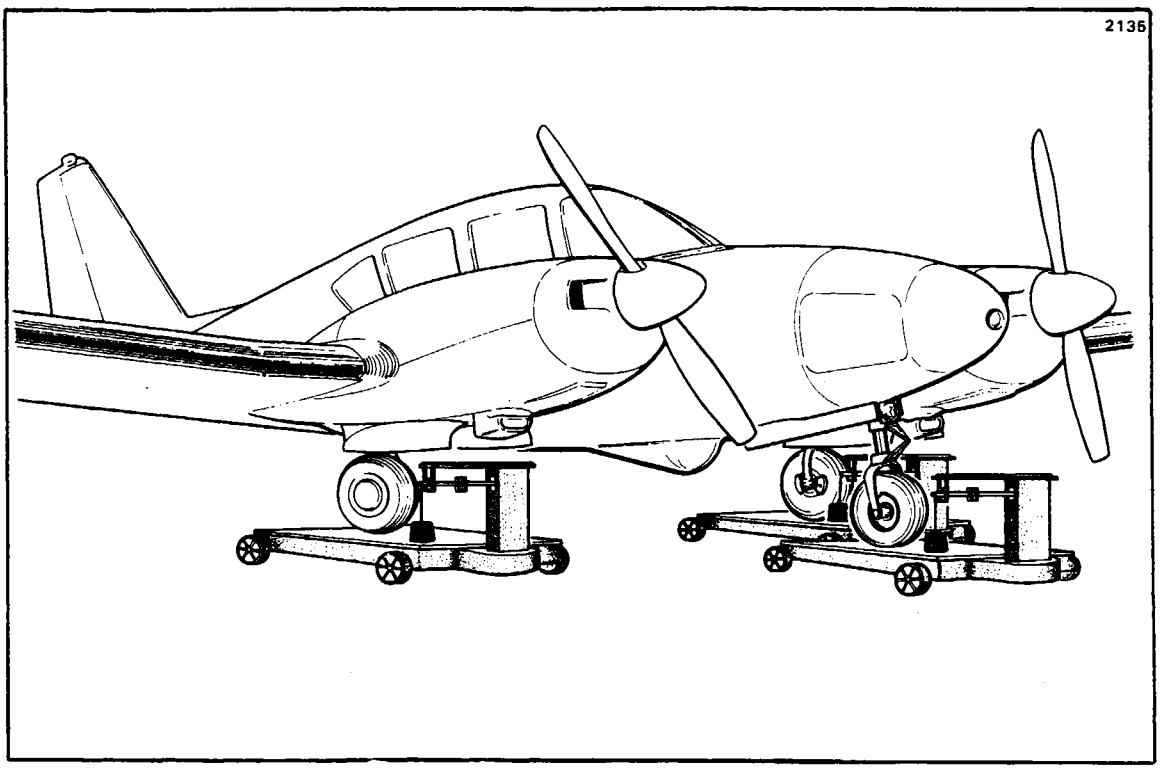


Figure 2-12. Weighing

CAUTION

Be sure to apply sufficient tail support ballast; otherwise the airplane will tip forward and fall on the fuselage nose section.

c. Raise the jacks evenly until all three wheels clear the floor.

2-13. WEIGHING. (Refer to Figure 2-12.)

a. Position a scale and ramp in front of each of the three landing gear wheels.

b. Secure the scales from rolling, and tow the airplane up on to the scales. (Refer to Towing, Paragraph 2.17.)

c. Remove the ramps so as not to interfere with the scales.

d. If the airplane is to be weighed for weight and balance computations, level the airplane per instructions given in paragraph 2-14.

e. The airplanes weight is obtained by adding the reading on each of the three scales.

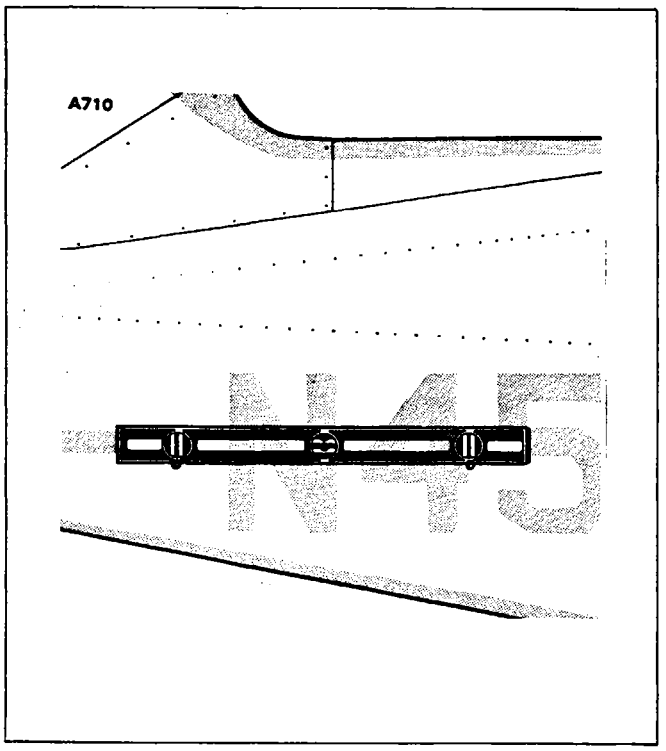


Figure 2-13. Longitudinal Leveling

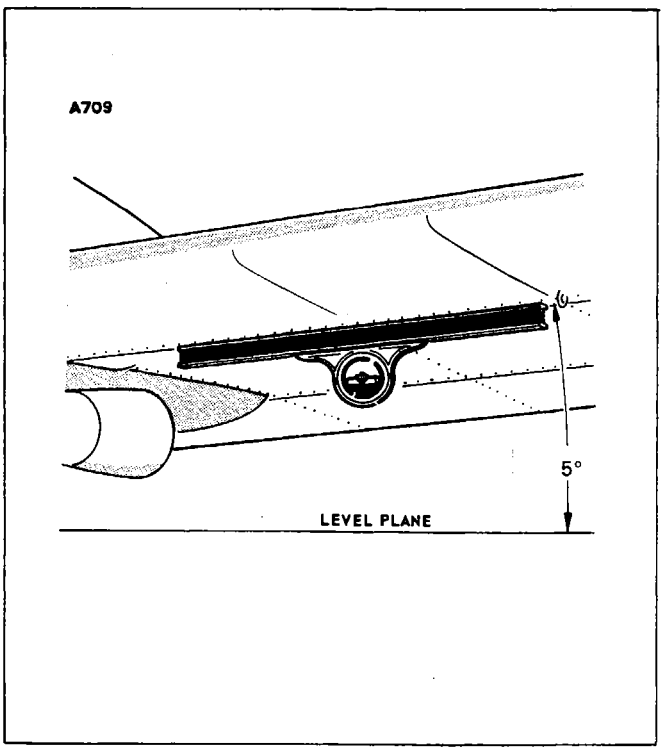


Figure 2-14. Lateral Leveling

2-14. LEVELING. All configurations of the airplane are provided with a means for longitudinal and lateral leveling. The airplane may be leveled while on jacks, during the weighing procedure while the wheels are on scales, or while the wheels are on the ground. To level the airplane for purpose of weighing or rigging, the following procedure should be used:

a. Level the airplane longitudinally as follows:

1. Ascertain that all tires are inflated to normal pressures.

2. Block the nose gear to obtain 2.50 inches of strut extrusion and the main gear to obtain 6.50 inches of strut extrusion.

3. Partially withdraw the two leveling screws located on the right side of the fuselage forward of the stabilator as shown in Figure 2-13.

4. Place a spirit level on the heads of the screws.

5. Level the airplane by inflating or deflating the nose wheel tire or adjusing the jacks until the bubble on the level is centered.

b. Level the airplane laterally as follows:

1. Ascertain that the landing gear is blocked to the specified strut extensions as stated in step a, 2.

2. Set a bubble protractor at five degrees and place it on a straightedge held along the front spar on the under surface of the wing as shown in Figure 2-14. Do not place the straightedge on any rivet heads.

3. Raise or lower the wing by inflating or deflating the main gear tires or adjusting either jack, until the bubble is centered indicating a five degree dihedral of the wing which will level the fuselage.

4. Check the opposite wing with the protractor to ascertain it also has a five degree dihedral.

2-15.. MOORING. The airplane is moored to insure its immovability, protection and security under various weather conditions. The following procedure gives the instructions for proper mooring of the airplane.

a. Head the airplane into the wind, if possible.

b. Block the wheels.

c. Insert control surface locks, if available.

d. Secure tie-down ropes to the wing tie-down rings and the tail skid at approximately 45 degree angles to the ground. When using rope constructed of non-synthetic material, leave sufficient slack to avoid damage to the airplane when the ropes contract due to moisture.

CAUTION

Use square or bowline knots. Do not use slip knots.

NOTE

Additional preparations for high winds include using tie-down ropes from the landing gear forks, and securing the rudder.

e. Install pitot tube cover, if available.

2-16.. PARKING. When parking the airplane, insure that it is sufficiently protected against adverse weather conditions and presents no danger to other aircraft. When parking the airplane for any length of time or overnight, it is recommended that it be moored as in paragraph 2-15.

a. To park the airplane, head it into the wind, if possible.

b. Set the parking brake by applying toe pressure against the top of the rudder pedals and at the same time pull out on the brake handle. To release the parking brake, apply toe pressure on the pedals and push in on the parking brake handle.

NOTE

Care should be taken when setting brakes that are overheated or during cold weather when accumulated moisture may freeze the brakes.

2-17. TOWING. The airplane may be moved by using the nose wheel steering bar that is stowed in the baggage area or power equipment that will not damage or cause excess strain to the nose gear steering assembly. Towing lugs are incorporated as part of the nose gear fork.

CAUTIONS

1. Do not tow airplane with control locks installed.
2. Observe turning limits to prevent strut damage.

CAUTION

When moving the aircraft forward by hand, avoid pushing on the trailing edge of the ailerons as this will cause the aileron contour to change resulting in an out-of-trim condition.

2-18. TAXIING. Before attempting to taxi the airplane, ground personnel should be checked out by a qualified pilot or other responsible person. Engine starting and shut-down procedures should be covered as well. When it is ascertained that the propeller back blast and taxi areas are clear, apply power to start the taxi roll and perform the following checks:

a. Taxi forward a few feet and apply brakes to determine their effectiveness.
b. Taxi with propeller set in low pitch, high RPM setting.
c. While taxiing, make slight turns to ascertain the effectiveness of steering.
d. Observe wing clearances when taxiing near buildings or other stationary objects. If possible, station a guide outside the airplane to observe.
e. When taxiing on uneven ground, look for holes and ruts.
f. Do not operate the engine at high RPM when running up or taxiing over ground containing loose stones, gravel or any loose material that may cause damage to the propeller blades.

2-19. EXTERNAL POWER RECEPTACLE.

2-20. OPERATION OF EXTERNAL POWER RECEPTACLE. The external power receptacle is located on the underside of the nose section forward of the landing gear. When using external power for starting insure that the master switch and all avionics switches are turned OFF. Reduce engines to idle before removing the external power unit. Turn master switch and avionics switches ON only after the external power unit has been disconnected!

2-21. CLEANING.

2-22. CLEANING ENGINE COMPARTMENT. Before cleaning the engine compartment, place a strip of tape on the magneto vents to prevent any solvent from entering these units.

a. Place a large pan under the engine to catch waste.

b. With the engine cowling removed, spray or brush the engine with solvent or a mixture of solvent and degreaser, as desired. It may be necessary to brush areas that were sprayed where heavy grease and dirt deposits have collected in order to clean them.

CAUTION

Do not spray solvent into the generator or alternator, starter and air intakes.

c. Allow the solvent to remain on the engine from 5 to 10 minutes, then rinse the engine clean with additional solvent and allow to dry.

CAUTION

Do not operate engine until excess solvent has evaporated or otherwise been removed.

d. Remove the protective covers from the magnetos.

e. Lubricate controls, bearing surfaces, etc., per Lubrication Chart.

2-23. CLEANING LANDING GEAR. Before cleaning the landing gear, place a plastic cover or similar material over the wheel and brake assembly.

a. Place a pan under the gear to catch waste.

b. Spray or brush the gear area with solvent or a mixture of solvent and degreaser, as desired. It may be necessary to brush areas that were sprayed where heavy grease and dirt deposits have collected in order to clean them.

c. Allow the solvent to remain on the gear from 5 to 10 minutes, then rinse the gear with additional solvent and allow to dry.

d. Remove the cover from the wheel and remove the catch pan.

e. Lubricate the gear per Lubrication Chart.

2-24. CLEANING EXTERIOR SURFACES. The airplane should be washed with a mild soap and water. Harsh abrasive or alkaline soaps or detergents used on painted or plastic surfaces could make scratches or cause corrosion of metal surfaces. Cover areas where cleaning solution could cause damage. To wash the airplane, the following procedure may be used:

a. Flush away loose dirt with water.
b. Apply cleaning solution with a rag, sponge or soft bristle brush.
c. To remove stubborn oil and grease, use a cloth dampened with naptha.
d. Where exhaust stains exist, allow solution to remain on the surface longer.
e. Any good automotive wax may be used to preserve the painted surfaces. Soft cleaning cloths or a chamois should be used to prevent scratches when cleaning or polishing. A heavier coating of wax on the leading surfaces will reduce the abrasion problems in these areas.

2-25. CLEANING WINDSHIELD AND WINDOWS.

a. Remove dirt, mud, etc., from exterior surface with clean water.
b. Wash with mild soap and warm water or an aircraft plastic cleaner. Use a soft cloth or sponge using a straight rubbing motion. Do not harshly rub surfaces.
c. Remove oil and grease with a cloth moistened with kerosene.

NOTE

Do not use gasoline, alcohol, benzene, carbon tetrachloride, thinner, acetone, or window cleaning sprays.

d. After cleaning plastic surfaces, apply a thin coat of hard polishing wax. Rub lightly with a soft cloth. Do not use a circular motion.
e. A severe scratch or mar in plastic can be removed by using jeweler's rouge to rub out the scratch. Smooth both sides and apply wax.
f. To improve visibility through windshield and windows during flights through rain, a rain repellent such as REPCON should be applied to the windshield and windows. The surfaces of the windshield and windows treated becomes so smooth that water beads up and readily flows off the surface. Apply this product in accordance with the manufacturer's instructions. (Refer to Table II-II. Consumable Materials, for Specifications and Manufacturer's address.)

2-26. CLEANING HEADLINER, SIDE PANELS AND SEATS.

a. Clean headliner, side panels and seats with a stiff bristle brush and vacuum where necessary.
b. Soiled upholstery, except leather, may be cleaned by using an approved air type cleaner or foam upholstery cleaner. Carefully follow the manufacturer's instructions. Avoid soaking or harsh rubbing.

CAUTION

Solvent cleaners require adequate ventilation.

c. Leather material should be cleaned with saddle soap or a mild soap and water.

2-27. CLEANING CARPETS. Use a small wisk broom or vacuum to remove dirt. For soiled spots, use a non-inflammable dry-cleaning fluid.

2-28. REPAINTING (Polythane Enamel). If it becomes necessary or desirable to repaint the aircraft, the following procedures will apply (PA-23-250 [Six Place] Aztec).

a. Wash the area to be painted thoroughly. It is not necessary to strip the previous coating, unless it is desired, use an appropriate stripper.

2-29. SCRATCH TOUCH UP ON ALUMINUM SURFACE.

a. "Feather-Edge" the surface with fine wet or dry paper (400-600 grit).
b. If gouges are deep, fill with polyester or epoxy filler. Sand lightly.
c. Apply a coat of Epoxy Primer (8951/8678). Dry overnight and sand lightly. (For Piper Part No. refer to Table II-VII.)
d. Apply a Polytane Enamel.

2-30. COATING PROCEDURE FOR NEW ALUMINUM PANEL-NON ALODIZED.

a. Thoroughly clean all contaminents from surface; solvent wash with industrial grade MEK or Titanine Ti-Two Cleaning Thinner.

NOTE

Deoxidiene 624 or equal is recommended but not absolutely required.

b. Apply V-48 Wash Primer.
c. Apply either Epoxy Primer (8951)/Epoxy Converter 8678 or Polytane (6351) Urethane Primer.
d. Topcoat with Polytane Enamel.

2-31. COATING PROCEDURE FOR ALODIZED ALUMINUM.

a. Thoroughly clean all contaminents from surface; solvent wash with industrial grade MEK or Titanine Ti-Two Cleaning Thinner.
b. Apply either Epoxy Primer/Converter, or Polytane Urethane Primer.
c. Topcoat with Polyuthane Enamel.

2-32. MIXING INSTRUCTIONS FOR PRIMERS AND TOPCOATS.

2-33. V-48 WASH PRIMER.

NOTE

Never use Polytane Enamel directly over V-48 without an intermediate primer.

a. Agitate the primer well.
b. While stirring slowly add 1 volume of catalyst to 4 volumes of Primer. DO NOT REVERSE THIS PROCEDURE.
c. Reduce the above mixture with 1/2 (by volume) of LT 327 Thinner.

2-34. EPOXY PRIMER.
a. Mix equal volumes of Epoxy Primer (8951) and Converter (8678). Allow mixture to stand at least 20 minutes before spraying.

NOTE

The pot life of the mixture is 16 hours at 70°-75° F. Approximate spreading rate is 400 Sq. Ft. per gallon of mixture (a).

b. Allow to dry overnight before sanding and recoating with Polytane Enamel.

2-35. POLYTANE 6351 PRIMER.
a. Mix 4 volumes of Primer (6351) with 1 volume of Polytane Catalyst (6352).
b. Reduce this mixture with LT-345 Polytane Reducer, approx. 50%.

NOTE

One gallon of mixed material will cover approximately 300 square feet. Pot life of mixed material is 6-8 hours at 75° F. Allow to dry overnight before light sanding and recoating with Polytane Enamel.

TABLE II-VII. PAINT MATERIALS

Piper Part No.	Titanine No.	Description
*	V-48	Wash Primer Kit
*	LT 327	Wash Primer Reducer
*	3022	Ti-Two Cleaning Solvent
170-139	8905-A	Epoxy Reducer
170-729	8951	Epoxy Primer
170-825	8678	Epoxy Converter
170-735	6351	Polytane Primer
179-141	6350	Polytane Reducer
170-807	6352	Polytane Catalyst
*No Piper number assigned.		

2-36. MIXING INSTRUCTIONS FOR POLYTANE ENAMEL.

2-37. POLYTANE ENAMEL ALL COLORS.

a. Mix 4 volumes of Polytane Enamel with 1 volume of Polytane (6352) Catalyst. Up to 10% of 6350 Polytane Reducer may be added to adjust viscosity for spray.

b. Spray a mist coat, allow 20 minutes setting time, follow with a full wet coat.

NOTE

Pot life of mixed material is 8 hours at 75° F. Allow Polytane Enamel to dry 10 hours minimum before taping. The universal mixing ratio of all colors makes it possible to intermix any combination of POLYTANE colors before catalyzing mixture. This is an aid to those wishing to mix their own special colors. For technical information, phone Titanine (201) 933-1000.

2-38. STANDARD PRACTICES - AIRFRAME. This general information pertains to standard aircraft hardware installation and removal practices. The information included will be very helpful if it is referred to on a regular basis.

For standard repair practices of a minor nature, refer to AC43.13.

If repairs dictate Non-Destructive Testing (N.D.T.) after repair such as welding, magniflux should be used on materials made from 4130 steel such as engine mounts and seat frames.

Testing and inspecting of aluminum castings and machined aluminum parts may be accomplished by the dye penetrant method.

Usually, a good visual inspection with 10X magnifying glass will show any damage or defect in a repair that is of a significant nature.

2-39. CHERRYLOCK RIVETS, REMOVAL. (Refer to Figure 2-15.) Should it be necessary to remove an installed cherrylock rivet, the following procedures are recommended.

a. In thick material remove the lock by driving out the rivet stem, using a tapered steel drift pin. (See View 1.)

NOTE

Do not drill completely through the rivet sleeve to remove a rivet as this will tend to enlarge the hole.

b. If the rivets have been installed in thin sheets, driving out the locked stem may damage the sheets. It is recommended that a small center drill be used to provide a guide for a larger drill on top of the rivet stem, and the tapered portion of the stem be drilled away to destroy the lock. (See Views 2 and 3.)

c. Pry the remainder of the locking collar out of the rivet head with the drift pin. (See View 3.)

d. Drill nearly through the head of the rivet, using a drill the same size as the rivet shank. (See View 4.)

e. Break off rivet head, using a drift pin as a pry. (See View 5.)

f. Drive out the remaining rivet shank with a pin having a diameter equal to the rivet shank. (See View 6.)

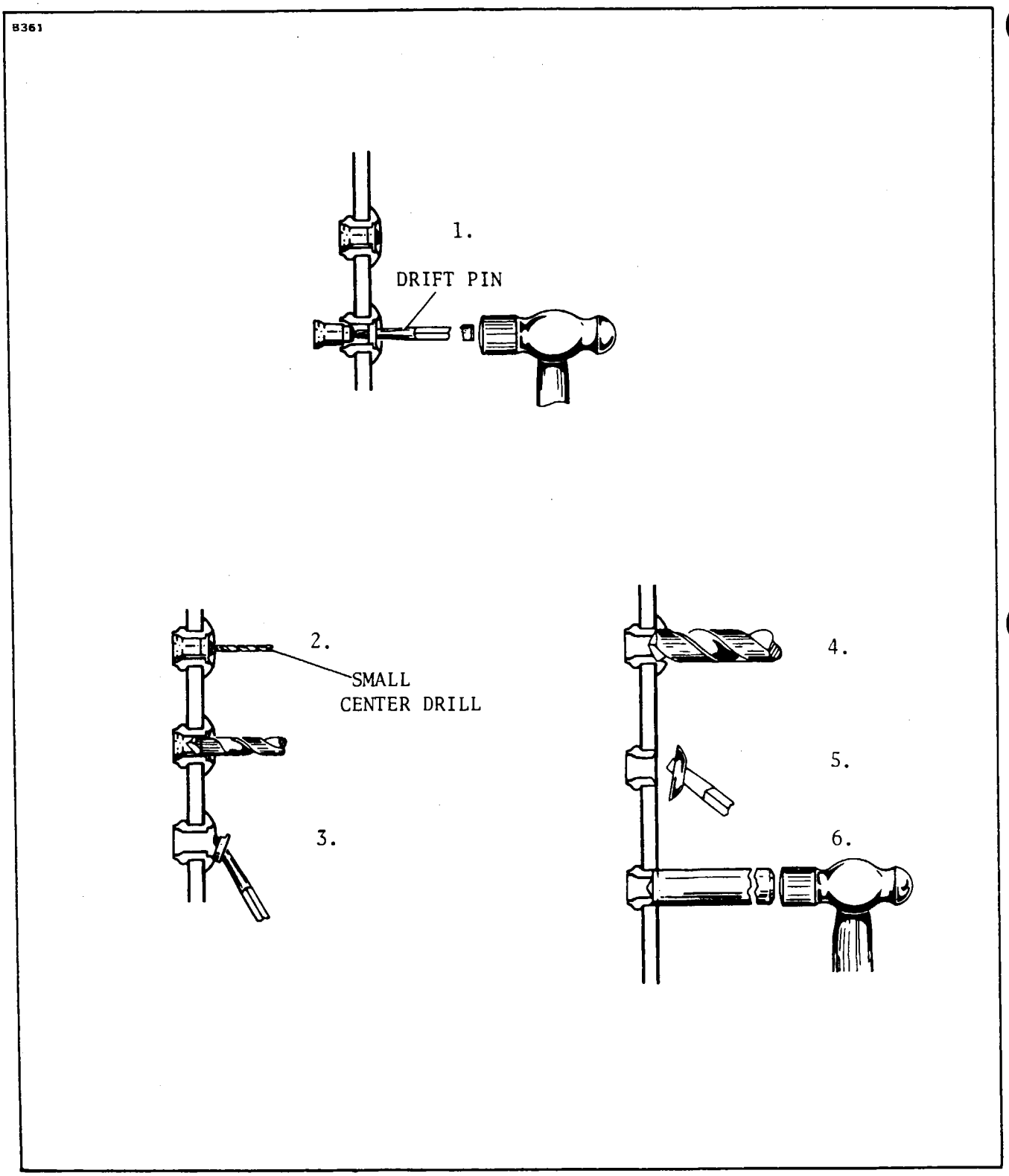


Figure 2-15. Cherrylock Rivet Removal

2-40. IDENTIFICATION OF FLUID LINES. (Refer to Figure 2-16.) Fluid lines in aircraft are often identified by markers made up of color codes, words, and geometric symbols. These markers identify each line's function, content, and primary hazard, as well as the direction of fluid flow.

In most instances, fluid lines are marked with 1-inch tape or decals. Paint is used on lines in engine compartments, where there is the possibility of tapes, decals or tags being drawn into the engine induction system.

In addition to the above-mentioned markings, certain lines may be further identified as to specific function within a system; for example, DRAIN, VENT, PRESSURE, or RETURN.

Lines conveying fuel may be marked FLAM; lines containing toxic materials are marked TOXIC in place of FLAM. Lines containing physically dangerous materials, such as oxygen, nitrogen, or freon, are marked PHDAN.

The aircraft and engine manufacturers are responsible for the original installation of identification markers, but the aviation mechanic is responsible for their replacement when it becomes necessary.

Generally, tapes and decals are placed on both ends of a line and at least once in each compartment through which the line runs. In addition, identification markers are placed immediately adjacent to each valve, regulator, filter or other accessory within a line. Where paint or tags are used, location requirements are the same as for tapes and decals.

2-41. FLARELESS TUBE ASSEMBLIES. (Refer to Figure 2-17.) Although the use of flareless tube fittings eliminates all tube flaring, another operation, referred to as presetting,is necessary prior to installation of a new flareless tube assembly which is performed as follows:

a. Cut the tube to the correct length, with the ends perfectly square. Deburr the inside and outside of the tube. Slip the nut, then the sleeve over the tube (Step a).

b. Lubricate the threads of the fitting and nut. See Figure 20-17 for proper lubricant to use, depending on the type system of the tubing assemblies are to be used on. Place the fitting in the vise (Step 2), and hold the tubing firmly and squarely on the seat in the fitting. (Tube must bottom firmly in the fitting.) Tighten the nut until the cutting edge of the sleeve grips the tube. This point is determined by slowly turning the tube back and forth while tightening the nut. When the tube no longer turns, the nut is ready for final tightening.

c. Final tightening depends upon the tubing. For aluminum allow tubing up to and including 1/2 inch outside diameter, tighten the nut from one to one and one-sixth turns. For steel tubing and aluminum alloy tubing over 1/2 outside diameter tighten from one and one-sixth to one and one-half turns.

After presetting the sleeve, disconnect the tubing from the fitting and check the following points (illustrated in Step c):

a. The tube should extend 3/32 to 1/8 inch beyond the sleeve pilot; otherwise blowoff may occur.

b. The sleeve pilot should contact the tube or have a maximum clearance of 0.005 inch for aluminum alloy tubing or 0.015 inch for steel tubing.

c. A slight collapse of the tube at the sleeve cut is permissable. No movement of the sleeve pilot, except rotation is permissible.

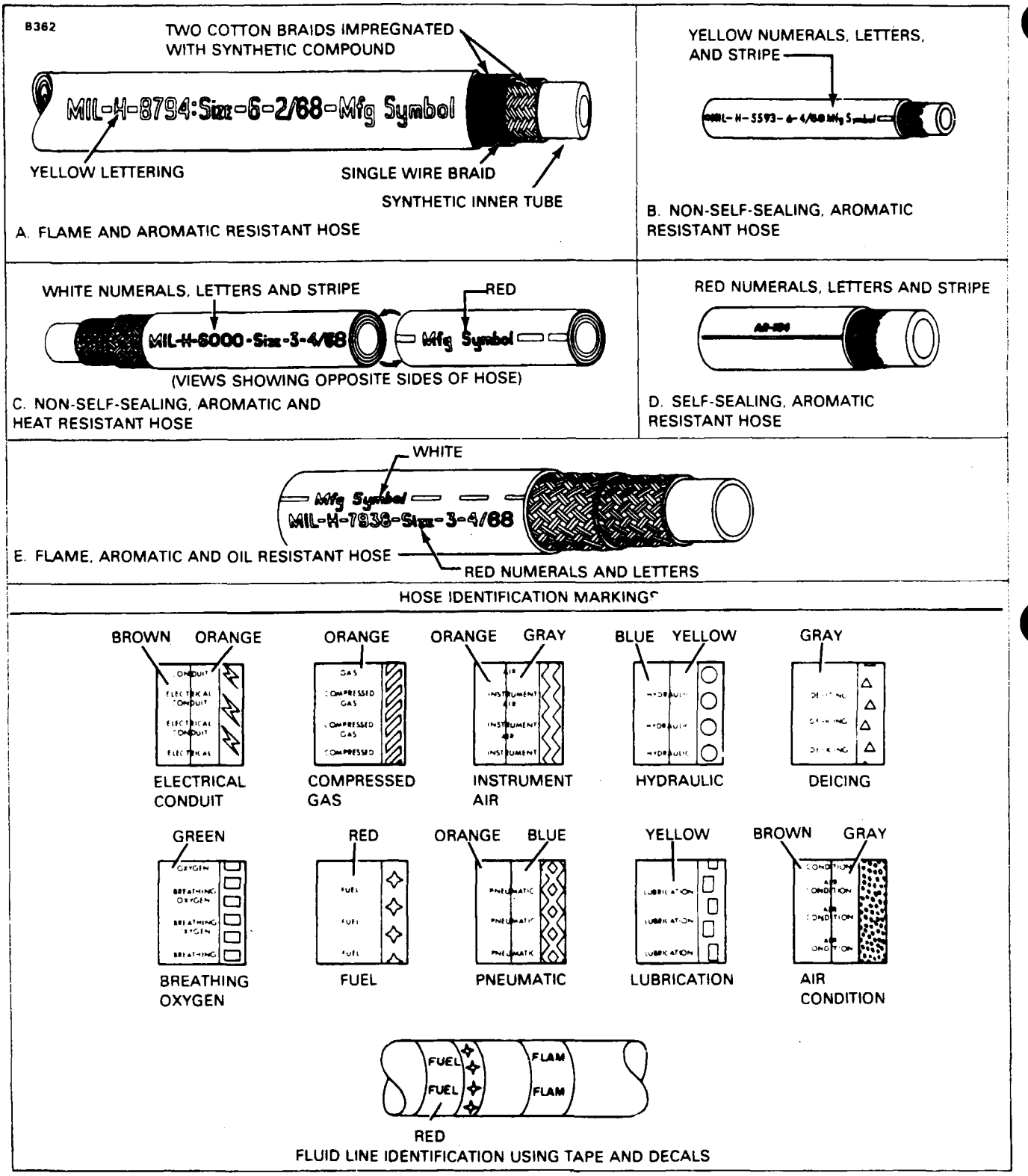


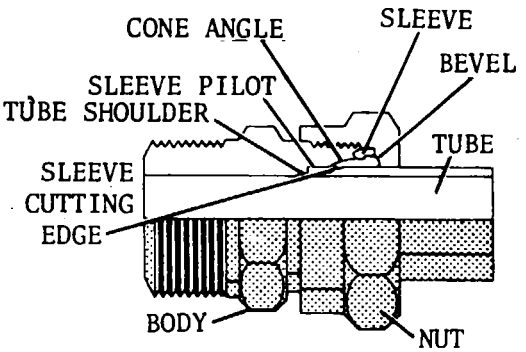
Figure 2-16. Hose/Line Markings

B363

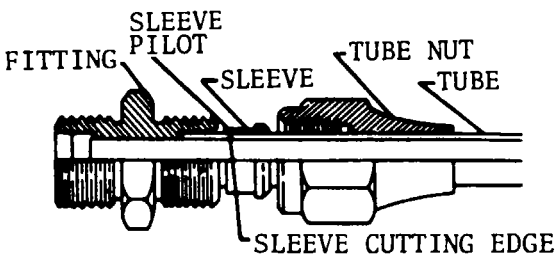
TUBING SYSTEM	LUBRICANT
HYDRAULIC	MIL-H-5606
FUEL	MIL-H-5606
OIL	System Oil
PNEUMATIC	MIL-L-4343
OXYGEN*	MIL-T-5542

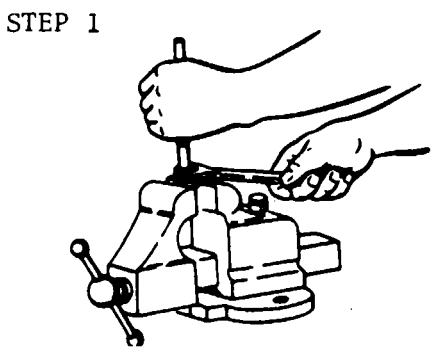
*CAUTION-DO NOT USE OIL OR GREASE

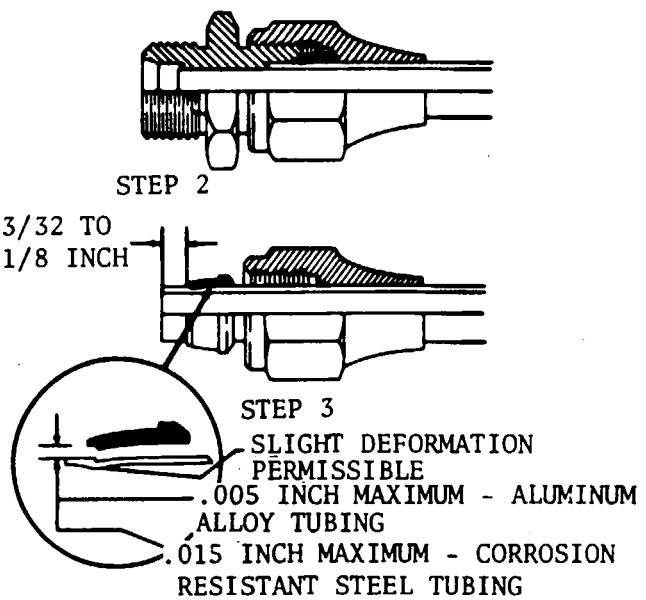
TUBING AND HOSE LUBRICANTS



FLARELESS-TUBE FITTING







PRESETTING FLARELESS-TUBE ASSEMBLY

Figure 2-17. Flareless Tube Fittings

2-42. SUPPORT CLAMPS. Support clamps are used to secure the various lines to the airframe or powerplant assemblies. Several types of support clamps are used for this purpose. The rubber cushioned and plain are the most commonly used clamps. The rubber cushioned clamp is used to secure lines subject to vibration; the cushioning prevents chafing of the tubing. The plain clamp is used to secure lines in areas not subject to vibration.

A teflon-cushioned clamp is used in areas where the deteriorating effect of Skydrol 500, hydraulic fluid (MIL-H-5606)or fuel is expected, however, because it is less resilient, it does not provide as good a vibration-damping effect as other cushion materials.

Use bonded clamps to secure metal hydraulic, fuel and oil lines in place. Unbonded clamps should be used only for securing wiring. Remove any paint or anodizing from the portion of the tube at the bonding clamp location. Make certain that clamps are of the correct size. Clamps or supporting clips smaller than the outside diameter of the hose may restrict the flow of the fluid through the hose.

All plumbing lines must be secured at specified intervals. The maximum distance between supports for rigid fluid tubing is shown in Figure 2-18.

TUBE OD (IN.)	DISTANCE BETWEEN SUPPORTS (IN.)	
	ALUMINUM ALLOY	STEEL
1/8	9-1/2	11-1/2
3/16	12	14
1/4	13-1/2	16
5/16	15	18
3/8	16-1/2	20
1/2	19	23
5/8	22	25-1/2
3/4	24	27-1/2
1	26-1/2	30

Figure 2-18. Maximum Distance Between Supports for Fluid Tubing

2-43. SERVICING.

2-44. INTRODUCTION TO SERVICING. Servicing the airplane includes the replenishment of fuel, oil, hydraulic fluid, tire pressures, lubrication requirements and other items required to completely service the airplane.

2-45. HYDRAULIC SYSTEM.

2-46. SERVICING HYDRAULIC SYSTEM. The hydraulic system, which consists of the landing gear and flap actuating system, powerpak and associated lines, should be checked and serviced every 100 hours. The powerpak should be filled with petroleum base hydraulic fluid, MIL-H-5606 and all hydraulic lines connections, and actuating rods should be kept clean of dirt by wiping with a clean shop rag. Detailed instructions for maintenance of the hydraulic system may be found in Section VI. (See CONSUMABLE MATERIALS CHART for name of fluid vendor.)

NOTE

Every precaution must be exercised in handling hydraulic fluid to prevent its contamination. Dirt or other foreign matter in the system may become lodged between the valves and seats of the powerpak and component parts in the various actuating cylinders, thus preventing the system from operating properly. It is recommended that the hydraulic fluid be filtered before using, whether it is new or used fluid. Use a small funnel, a piece of standard commercial filter paper and a container to hold the funnel and filtered oil.

2-47. POWERPAK RESERVOIR.

2-48. FILLING POWERPAK RESERVOIR (GRAVITY).

a. Open the access door or remove the left side panel on the nose to gain access to the hydraulic filler tube. (Refer to Figure 2-8.)

b. Place the airplane on jacks. (Refer to Jacking, Paragraph 2-12.)

c. Remove the cap of filler tube.

d. Place the landing gear selector lever in the UP position.

e. Using the hand pump, raise the landing gear. When the landing gear selector lever returns to neutral, place the wing flaps selector lever in the DOWN position and extend flaps.

f. Add fluid to the system through the filler tube (refer to Figures 2-19, 2-20 or 2-21) until fluid drips from the overflow located in the nose gear wheel well.

NOTE

Remember in Step e above, the landing gear is UP and the flaps are DOWN, so overflow fluid will first appear on the nose wheel tire.

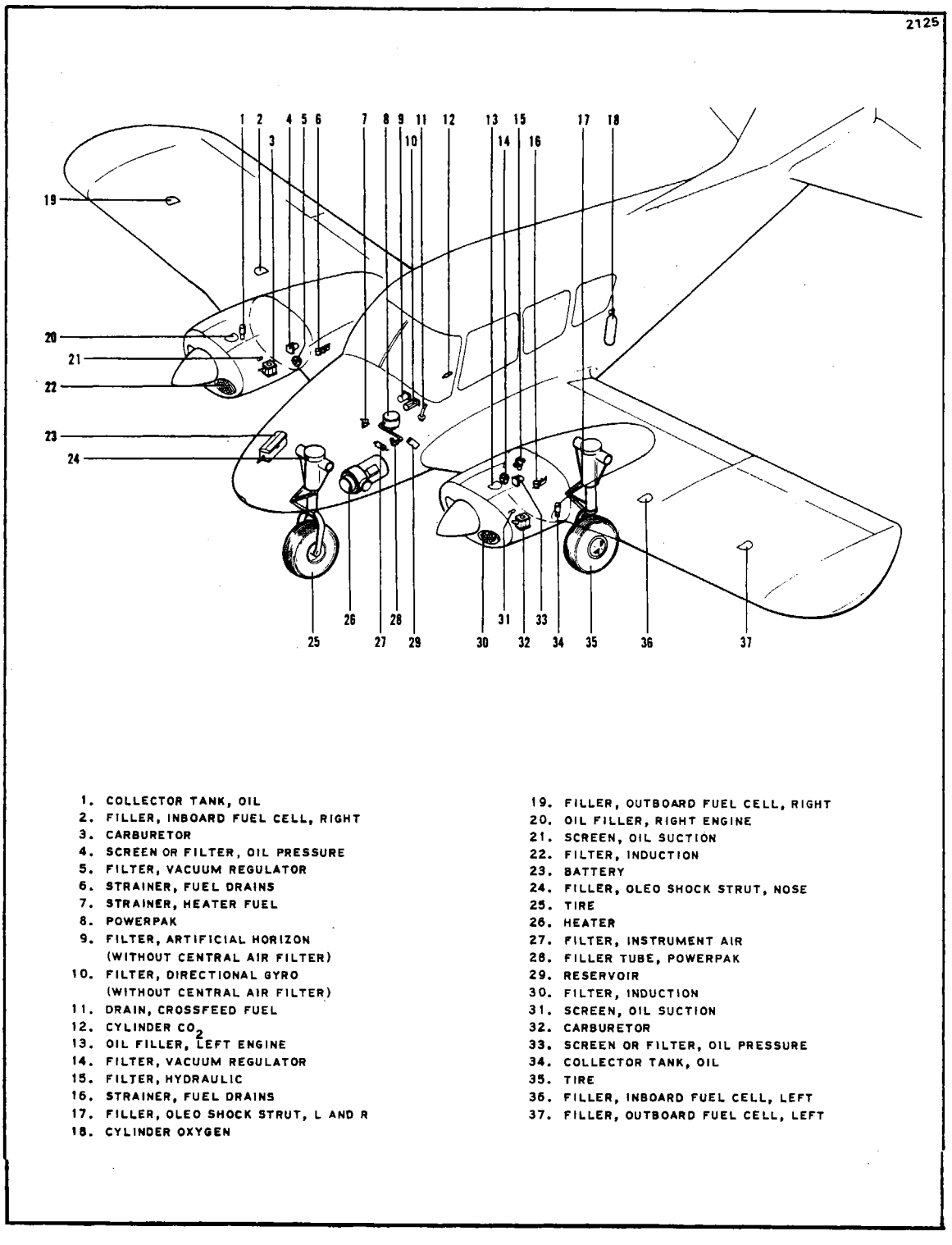
g. Swivel the elbow at the cap end of the filler tube until it points down. Hold the loose end of the filler tube down and let the excess fluid drain off.

h. Recap the filler tube and close the access door or install side panel.

i. Operate the landing gear and flaps through their complete cycle, UP and DOWN at least five times to insure that all air is bled from the system, as indicated by smooth operation of the landing gear and wing flaps.

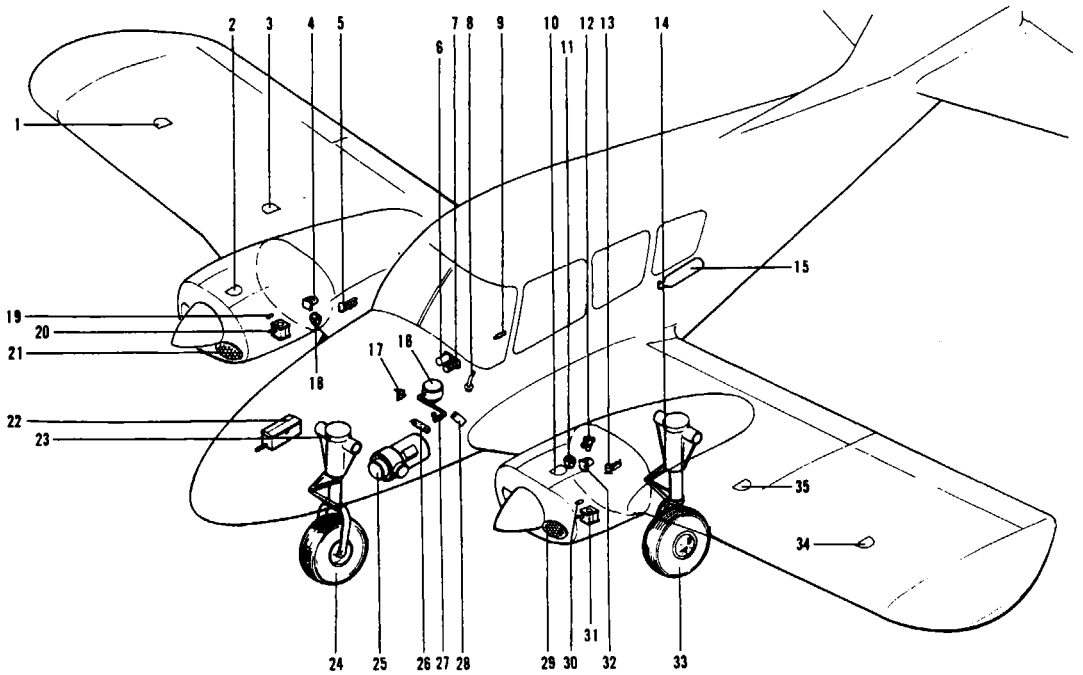
NOTE

As an added precaution, have a container ready to catch excessive fluid that will be exhausted through the overboard drain in the nose wheel well when recycling landing gear and flaps.



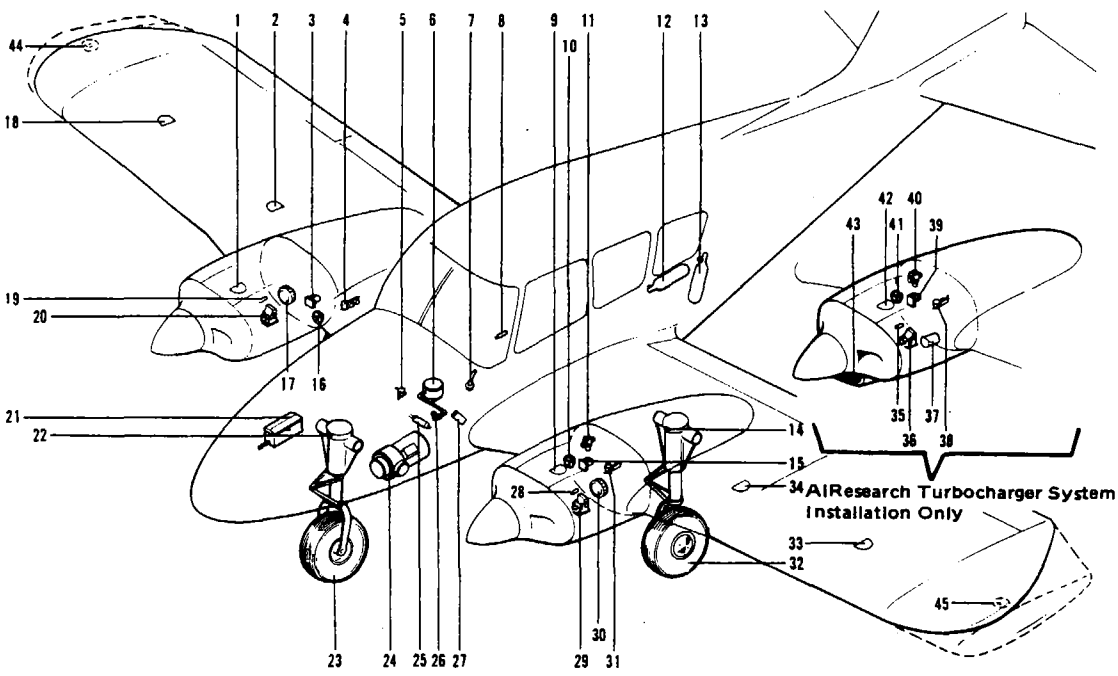
1. COLLECTOR TANK, OIL
2. FILLER, INBOARD FUEL CELL, RIGHT
3. CARBURETOR
4. SCREEN OR FILTER, OIL PRESSURE
5. FILTER, VACUUM REGULATOR
6. STRAINER, FUEL DRAINS
7. STRAINER, HEATER FUEL
8. POWERPAK
9. FILTER, ARTIFICIAL HORIZON (WITHOUT CENTRAL AIR FILTER)
10. FILTER, DIRECTIONAL GYRO (WITHOUT CENTRAL AIR FILTER)
11. DRAIN, CROSSFEED FUEL
12. CYLINDER CO_2
13. OIL FILLER, LEFT ENGINE
14. FILTER, VACUUM REGULATOR
15. FILTER, HYDRAULIC
16. STRAINER, FUEL DRAINS
17. FILLER, OLEO SHOCK STRUT, L AND R
18. CYLINDER OXYGEN
19. FILLER, OUTBOARD FUEL CELL, RIGHT
20. OIL FILLER, RIGHT ENGINE
21. SCREEN, OIL SUCTION
22. FILTER, INDUCTION
23. BATTERY
24. FILLER, OLEO SHOCK STRUT, NOSE
25. TIRE
26. HEATER
27. FILTER, INSTRUMENT AIR
28. FILLER TUBE, POWERPAK
29. RESERVOIR
30. FILTER, INDUCTION
31. SCREEN, OIL SUCTION
32. CARBURETOR
33. SCREEN OR FILTER, OIL PRESSURE
34. COLLECTOR TANK, OIL
35. TIRE
36. FILLER, INBOARD FUEL CELL, LEFT
37. FILLER, OUTBOARD FUEL CELL, LEFT

Figure 2-19. Service Points, PA-23-250 and PA-23-235



1. FILLER, OUTBOARD FUEL CELL, RIGHT
2. OIL FILLER, RIGHT ENGINE
3. FILLER, INBOARD FUEL CELL, RIGHT
4. SCREEN OR FILTER, OIL PRESSURE
5. STRAINER, FUEL DRAINS
6. FILTER, ARTIFICIAL HORIZON (WITHOUT CENTRAL AIR FILTER)
7. FILTER, DIRECTIONAL GYRO (WITHOUT CENTRAL AIR FILTER)
8. DRAIN, CROSSFEED FUEL
9. CYLINDER CO_2
10. OIL FILLER, LEFT ENGINE
11. FILTER, VACUUM REGULATOR
12. FILTER, HYDRAULIC
13. STRAINER, FUEL DRAINS
14. FILLER, OLEO SHOCK STRUT, L AND R
15. CYLINDER OXYGEN
16. POWERPAK RESERVOIR
17. STRAINER, HEATER FUEL
18. FILTER, VACUUM REGULATOR
19. SCREEN, OIL SUCTION
20. CARBURETOR OR FUEL INJECTOR
21. FILTER, INDUCTION
22. BATTERY
23. FILLER, OLEO SHOCK STRUT, NOSE
24. TIRE
25. HEATER
26. FILTER, INSTRUMENT AIR
27. FILLER TUBE, HYDRAULIC
28. RESERVOIR, BRAKE SYSTEM
29. FILTER, INDUCTION
30. SCREEN, OIL SUCTION
31. CARBURETOR OR FUEL INJECTOR
32. SCREEN OR FILTER, OIL PRESSURE
33. TIRE
34. FILLER, OUTBOARD FUEL CELL, LEFT
35. FILLER, INBOARD FUEL CELL, RIGHT

Figure 2-20. Service Points, PA-23-250 (six place)
Serial Nos. 27-2000 to 27-2504 incl.



1. OIL FILLER, RIGHT ENGINE
2. FILLER, INBOARD FUEL CELL, RIGHT
3. SCREEN OR FILTER, OIL PRESSURE
4. STRAINER, FUEL DRAINS
5. STRAINER, HEATER FUEL (SOUTH WIND HEATER ONLY)
6. POWERPAK RESERVOIR
7. DRAIN, CROSSFEED FUEL
8. CYLINDER CO_2
9. OIL FILLER, LEFT ENGINE
10. FILTER, VACUUM REGULATOR
11. FILTER, HYDRAULIC
12. OXYGEN CYLINDER, SERIAL NOS. 27-2505 TO 27-3049, 27-3051 TO 27-3153
13. OXYGEN CYLINDER, SERIAL NOS. 27-3050, 27-3153 AND UP
14. FILLER, OLEO SHOCK STRUT, L AND R
15. SCREEN OR FILTER, OIL PRESSURE
16. FILTER, VACUUM REGULATOR
17. FILTER, INDUCTION
18. FILLER, OUTBOARD FUEL CELL, RIGHT - WITHOUT TIP FUEL CELL
19. SCREEN, OIL SUCTION, RIGHT ENGINE
20. FUEL INJECTOR, RIGHT ENGINE
21. BATTERY
22. FILLER, OLEO SHOCK STRUT, NOSE
23. TIRE, NOSE
24. HEATER
25. FILTER, INSTRUMENT AIR
26. FILLER TUBE, POWERPAK
27. RESERVOIR, BRAKE SYSTEM
28. SCREEN, OIL SUCTION, LEFT ENGINE
29. FUEL INJECTOR, LEFT ENGINE
30. FILTER, INDUCTION
31. STRAINER, FUEL DRAINS
32. TIRE, L AND R
33. FILLER, OUTBOARD FUEL CELL, LEFT - WITHOUT TIP FUEL CELL
34. FILLER, INBOARD FUEL CELL, LEFT
35. SCREEN, OIL SUCTION
36. FUEL INJECTOR
37. OIL RESERVOIR
38. STRAINER, FUEL DRAINS
39. SCREEN OR FILTER, OIL PRESSURE
40. FILTER, HYDRAULIC
41. FILTER, VACUUM REGULATOR
42. OIL FILLER
43. FILTER, INDUCTION
44. WING TIP FUEL CELL FILLER - RIGHT - SERIAL NOS. 27-7654001 AND UP - OPTIONAL EQUIPMENT
45. WING TIP FUEL CELL FILLER - LEFT - SERIAL NOS. 27-7654001 AND UP - OPTIONAL EQUIPMENT

Figure 2-21. Service Points, PA-23-250 (six place)
Serial Nos. 27-2505 and up

2-49. FILLING POWERPAK RESERVOIR (PRESSURE).

a. Open the access door or remove the left side panel to gain access to the hydraulic filler tube. (Refer to Figure 2-8.)

b. Place the airplane on jacks. (Refer to Jacking, Paragraph 2-12.)

c. Remove the filler tube cap (refer to Figures 2-19, 2-20 or 2-21) and swivel the elbow down.

d. Disconnect the pressure and suction hydraulic lines from the engine driven hydraulic pump and connect these lines to the auxiliary fluid source.

e. Fill the hydraulic system by turning on the motor of the auxiliary fluid source. Fill until fluid overflows the filler tube.

NOTE

Do not cap the filler tube.

f. Turn off the motor of the auxiliary fluid source and operate both the landing gear and flaps at least twice, using the hand pump.

g. With the landing gear retracted and the flaps down start the motor of the auxiliary fluid source and refill the system until the fluid overflows the filler tube.

h. Close the line leading from the reservoir of the auxiliary fluid source to its motor. Start the motor and operate the landing gear and the flap system at least five times.

i. With the landing gear retracted and the flaps down, recheck the fluid level.

j. Extend the landing gear and raise the flaps. Disconnect the auxiliary fluid source and re-attach the lines to the engine driven pump.

k. Recap the filler tube and close the access door or install side panel.

2-50. LANDING GEAR SYSTEM.

2-51. SERVICING LANDING GEAR. The landing gear consisting of tires, brakes, oleo strut assembly, drag links, down locks and gear doors, should be visually inspected to determine proper strut extension, possible hydraulic fluid leakage, security and condition of all related components. Minor service is described in the following paragraphs and detailed service and overhaul instructions are listed in Section VII.

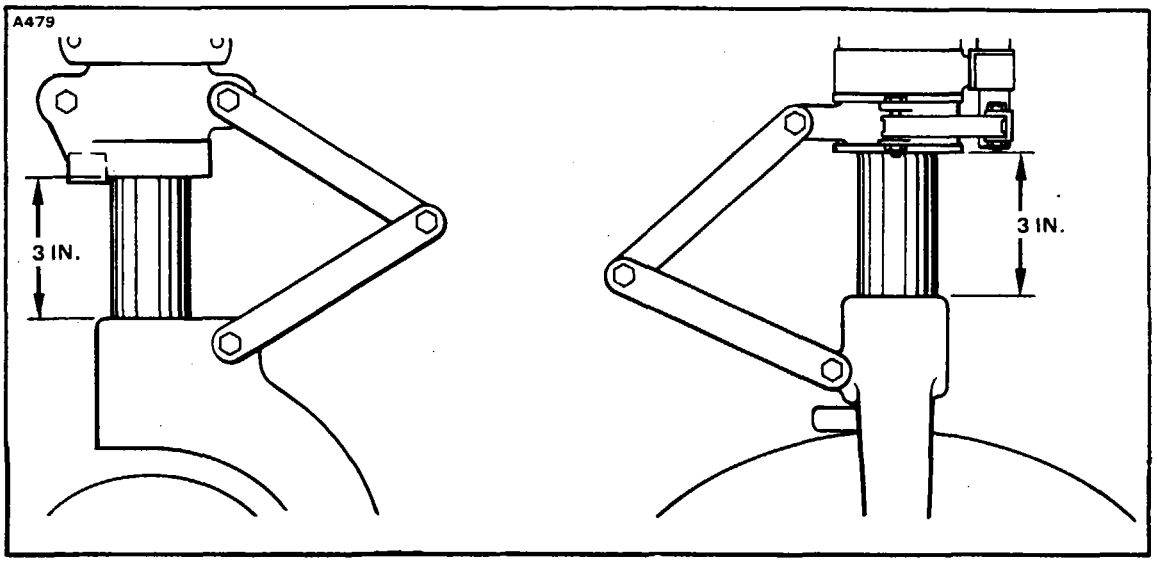


Figure 2-22. Servicing Landing Gear Oleo Struts

2-52. OLEO STRUTS.

2-53. SERVICING OLEO STRUTS. Air-oil shock struts are incorporated in each landing gear oleo assembly to absorb the shock resulting from the impact of the wheels on the runway during landing. To obtain proper oleo action, the nose and main gear oleo struts must have approximately 3.0 inches of piston tube exposed under normal static loads. (Refer to Figure 2-22.) If a strut has less than the required inches exposed, determine whether it needs air or oil by rocking the airplane. If the oleo strut oscillates with short strokes (approximately one inch) and the airplane settles to its normal position within one or two cycles after the rocking force is removed, the oleo strut requires inflating. Check the valve core and filler plug for air leaks, correct if required, and add air as described in paragraph 2-56. If the oleo strut oscillates with long strokes (approximately three inches) and the airplane continues to oscillate after the rocking force is removed, the oleo struts require fluid. Check the oleo for indications of oil leaks, correct if required and add fluid as described in paragraph 2-54. For repair procedures of the landing gear and/or struts, refer to Section VII.

WARNING

Do not release air by removing the strut valve core or filler plug. Depress the valve core pin until strut pressure has diminished.

NOTE

Struts may be serviced per placard on strut.

2-54. ADDING FLUID TO STRUTS. To add fluid to an oleo strut which is partly full, proceed as follows:

a. Place the airplane on jacks. (Refer to Jacking, Paragraph 2-12.)
b. Place a pan under the gear to catch spillage.
c. Release the air in the oleo strut by pressing in on the air valve core pin.
d. Remove the air valve (filler plug). Allow valve core to remain in valve.
e. Extend the strut to two inches from the fully compressed position and fill the strut through the filler opening with fluid as specified.
f. Slowly compress the strut to the fully compressed position allowing fluid to overflow.
g. With oleo strut in the compressed position, reinstall air valve and safety.
h. Inflate the oleo struts with air to the required extension per instructions in paragraph 2-56.

2-55. FILLING OLEO STRUTS. To fill an oleo strut which has been completely emptied because of repair, leakge, etc., proceed as follows:

a. Place the airplane on jacks. (Refer to Jacking, Paragraph 2-12.)
b. Place a pan under the gear to catch spillage.
c. Remove valve core from air valve.
d. Attach a clear plastic tube to the valve stem and place the other end of the tube in a container of hydraulic fluid as specified.

NOTE

An air-tight connection is necessary between the plastic tube and valve stem. Without such a connection, a small amount of air will be sucked into the oleo strut during each sequence, resulting in an inordinate amount of air bubbles and a prolonged filling operation.

e. Extend the oleo strut by pulling down on the wheel. Fluid will be sucked into the oleo strut. Compress and extend the oleo strut until it is full of fluid, and air bubbles cease to appear in the plastic tube.
f. Compress the oleo strut to within 1/4 inch of full compression, allowing the excess fluid to overflow. Reinstall the valve core.
g. Remove the airplane from the jacks.
h. Inflate the oleo struts per instructions given in paragraph 2-56.

2-56. INFLATING OLEO STRUTS. With the proper amount of fluid contained in the strut as described in paragraph 2-53, inflate the strut to the following pressures:

Tire	Tire Pressure (psi)	Strut Pressure (psi)
6.00 x 6 - 4 ply	27	132
6.00 x 6 - 6 ply	32	151
7.00 x 6 - 8 ply	46	
NOTE Strut pressure is with strut fully extended.		

2-57. BRAKE SYSTEM.

2-58. SERVICING BRAKE SYSTEM. The brake system incorporates a hydraulic fluid reservoir through which the brake system is periodically serviced. Fluid is drawn from the reservoir by the brake master cylinders to maintain the volume of fluid required for maximum braking efficiency. Spongy brake pedal action is often an indication that the brake fluid reservoir is running low on fluid. Instructions for filling the reservoir are given in paragraph 2-59. When found necessary to accomplish repairs to any of the brake system components, these instructions may be found in Section VII.

2-59. FILLING BRAKE CYLINDER RESERVOIR. The brake cylinder reservoir should be filled to the level marked on reservoir, with the fluid specified in Table II-I. The reservoir, located in the left side of the nose, shown in Figure 2-8 should be checked at every 100 hour inspection and replenished as necessary.

2-60. DRAINING BRAKE SYSTEM. To drain the brake system, connect a hose to the bleeder fitting on the bottom of the cylinder and place the other end of the line in a suitable container. Open the bleeder and slowly pump the desired brake pedal until fluid ceases to flow. To clean the brake system, flush with denatured alcohol.

2-61. TIRES.

2-62. SERVICING TIRES. The tires should be maintained at the pressure specified in Table II-I. When checking tire pressure, examine the tires for wear, cuts, bruises and slippage. (Refer to Card 2I16 Section 7, paragraphs 7-75 and 7-76 for suggestions on tire balancing. See Card 2J3, Figure 7-31 for information concerning construction of a tire balancer.)

2-63. POWER PLANT.

2-64. SERVICING POWER PLANT. The power plants should be visually inspected before each flight to determine possible fuel and oil leakage, and condition and security of all related components. Additional service information may be found in Section VIII or VIIIA.

2-65. INDUCTION AIR FILTER.

2-66. REMOVAL AND INSTALLATION OF AIR FILTER.

a. On PA-23-250, PA-23-235 and PA-23-250 (six place) airplanes with Serial Numbers 27-1 to 27-2504 inclusive, the air filter may be removed and installed by the following procedure:

1. Remove the scoop assembly from the bottom front of the nacelle.
2. Remove the air filter by turning the quick disconnect wing nut fasteners.
3. Install the air filter in reverse order of removal.

b. On PA-23-250 (six place) airplanes with Serial Number 27-2505 and up, that are not equipped with turbocharging units, the air filter may be removed and installed by the following procedure:

1. Remove the cover plate from the air filter box by turning the quick disconnect wing nut fasteners.
2. Remove the filter from the box.
3. Install the air filter.

c. On PA-23-250 (six place) airplanes with Serial Numbers 27-2505 and up, that are equipped with AiResearch turbocharging units, the air filter may be removed by the following procedure:

1. Loosen the quarter turn fasteners.
2. Lower the air scoop and remove the filter.
3. Install a new air filter or cleaned one in reverse order of removal.

d. On PA-23-250 (six place), Serial Nos. 27-3944 and up, that are equipped with Lycoming Turbocharging units, the air filter may be removed by the following procedure:

1. Remove the right and top engine access panels from the engine the filter is to be removed.
2. Remove the two machine screws from the securing brackets on both sides of the filter box and remove the filter.
3. Install a new air filter or a cleaned one in reverse order of removal.

2-67. SERVICE INSTRUCTIONS. The induction air filters should be cleaned every 50 hours or sooner depending upon operating conditions. Filters should be rejected for use if the paper filter material is torn or ruptured, or the housing is damaged. The filter gasket should have no tears and be securely positioned in place.

a. The cartridge type air filters should be cleaned by the following procedure:

1. Remove filter, inspect, and clean by tapping it against a hard surface to remove grit, sand and dirt. (Do not blow out with an air hose, soak in oil, or cleaning fluid.)

2. If the filter is found to be in good condition and is not obstructed after being properly cleaned, reinstall filter.

b. The panel type filter installed only on airplanes equipped with turbocharging units may be cleaned by one of two basic methods, the compressed air method and the washing method. The compressed air method is effective when the major contamination on the panel is dust. The washing method is effective on carbon, soot and oil laden filters. Accumulation of exhaust soot (fine carbon particles) collects on the filter and causes a rapid increase in restriction or short filter life. For best results, visually determine condition of filter and choose either method. This choise will also depend on the availability of the cleaning equipment.

1. The compressed air method of cleaning the filter is as follows:
   (a) With the filter removed, direct a jet of air against the downstream or clean air side of the filter (opposite to normal airflow).
   (b) Move the air jet up and down the pleats, moving air jet over the complete filter.
   (c) Nozzle pressure must not exceed 100 psi and be kept at least one inch away from filter. Take care that the paper is not ruptured by the nozzle or air jet.
2. The washing method of cleaning the filter is as follows:
   (a) If compressed air is available, blow the filter as given in (a).
   (b) The filter can be cleaned by washing in a good non-sudsing detergent or the filter manufacturer's cleaner D-1400. Mix two ounces of D-1400 to one gallon of water.
   (c) Soak filter in solution for 15 minutes, then move filter back and forth about two minutes to free filter of dirt deposits.
   (d) Rinse complete filter in a stream of water until rinse water is clear. (Maximum water pressure 40 psi.) A good thorough rinse is very important.
   (e) Dry filter thoroughly before re-using. Do not use light bulbs or extreme heat for drying.

2-68. PROPELLER.

2-69. SERVICING PROPELLER. The propeller blades, spinner and visible hub parts should be inspected frequently for damage, cracks and oil leakage. Propellers containing an air charge should be checked for proper air pressure as given in Table II-VIII below. The air charge should be free of moisture. Use dry nitrogen gas if available. Nicks should be removed from the leading edge of the blades in accordance with applicable FAA regulations. The blades should be checked that they turn freely on the hub pilot tube, by rocking the blades back and forth through the slight freedom allowed by the pitch change mechanism. Lubricate the propeller at 100 hour intervals according to the Lubrication Charts, Figures 2-25, 2-26 and 2-27. Additional Service Information for the propeller may be found in Section VIII or VIIIA.

A spring backup kit for HC-E2YK-2RB and HC-E2YR-2RB propellers is available to safeguard against an overspeed due to loss of the air charge. This spring produces sufficient force to control propeller rpm, within normal operating range, provided airspeed is reduced and power is applied slowly. Propellers which have this kit installed will have the letter "S" after the hub dash number (HC-E2YK-2RBS or HC-E2YR-2RBS). When servicing propellers make certain that the propellers have the proper air charge, according to the following charts.

TABLE II-VIII. CHAMBER PRESSURE REQUIREMENTS WITH TEMPERATURE

HC-E2YK-2RB or HC-E2YR-2RB			
Temp. °F	Press. (psi)	Temp. °F	Press. (psi)
100	188	30	165
90	185	20	162
80	182	10	159
70	178	0	154
60	175	-10	152
50	172	-30	146

HC-E2YK-2RBS, HC-E2YK-2RBSF or HC-E2YR-2RBS	
Temp. °F	Press. (psi)
100	74
70	70
40	66
10	62
-20	58

NOTE: Do not check pressure or charge with propeller in feather position.

2-70. FUEL SYSTEM.

2-71. SERVICING FUEL SYSTEM. At intervals of 50 hours or 90 days, whichever comes first, clean the screens and bowl in each fuel filter unit located between each bottom wing inboard gear door and fuselage. Remove and clean the filters in accordance with the instructions outlined in Section IX. Additional service information may also be found in Section IX. Inspection intervals of the various fuel system components may be found in Section III.

2-72. FILLING FUEL CELLS. Observe all required precautions for handling gasoline. Fill the fuel cells to the bottom of the filler neck with the fuel specified in Table II-I. Refer to Figure 2-8 for the location of the access panels for the fuel cells.

WARNING

When replacing a filler cap that is worn, ascertain that the cap is correct for the model in question. Early models have caps with vents. Later ones have caps without vents in them. See Figures 9-9 and 9-10 in Section 9.

2-73. DRAINING MOISTURE FROM FUEL SYSTEM.

a. Drain the crossfeed fuel valve by turning the crossfeed line drain control located on the front of the fuel panel selector control box which is between the two front seats.

b. The strainers and fuel line drains may be reached by opening the access panel located on the inboard sides of the main wheel wells. (Refer to Figure 2-8.) To drain, push up the easy drain valves.

2-74. DRAINING FUEL SYSTEM. Drain the bulk of the fuel from the system by pumping the fuel out of each cell through the filler opening with an electric fuel pump. Complete the draining by opening the crossfeed line drain control. Drain the inboard cells first; then move the fuel selectors to the outboard position, thus allowing the outboard cells to drain through the crossfeed line drain. For an alternate draining procedure, open the fuel line quick drain valves and the fuel strainer bowl drain valve or remove the fuel strainer bowl and allow the fuel to run out by gravity.

2-75. OXYGEN SYSTEM.

2-76. SERVICING OXYGEN SYSTEM. The oxygen for the breathing system is furnished from a stationary cylinder charged to a pressure of 1800 psi with a capacity of 48.3 cubic feet for (DOT 3AA 1800 classification), or 1850 psi with a capacity of 115 cubic feet for (DOT 3HT 1850 classification).

a. On PA-23-250 airplanes the oxygen bottle is installed in the aft cabin area on the left side where the fifth seat is normally installed. These cylinders are serviced at the cylinder regulator by removing the regulator outlet line.

b. On airplanes with Serial Numbers 27-2000 to 27-3049 and 27-3051 to 27-3153 inclusive, the oxygen is installed under the aft baggage compartment floor, on the right side. These airplanes are serviced through a remote charging valve located in the forward right side of the baggage compartment floor.

c. On airplanes with Serial Numbers 27-3050, 27-3154 to 27-3403 inclusive, except those modified by kit Piper No. 757050, the oxygen bottle is installed in a nearly vertical position on the left side of the aft baggage compartment. These airplanes are serviced at the cylinder regulator by removing the pressure gauge line at the cylinder regulator. The gauge line is copper and is the smaller of the two lines coming from the regulator.

NOTE

To refill the oxygen systems, an oxygen filler coupling, Part No. 757 810, is needed.

d. On airplanes with modification kit Piper No. 757050 and Serial Numbers 27-3404 and up, the oxygen bottle is located in a nearly vertical position on the left side of the aft baggage compartment. These airplanes are serviced from outside the airplane on the left side at station 193.38.

e. The plastic disposable mask and its components should be kept in its polifilm envelope, or a suitable container when not in use, so that they will be kept dust free and not distorted by heat or pressure for satisfactory service. Plastic disposable masks may be worn many times by the same person.

2-77. OXYGEN SYSTEM SAFETY PRECAUTIONS. The utmost care must be exercised in servicing, handling and inspection of the oxygen system. Comply with the following precautions:

a. Keep the oxygen regulators, cylinders, gauges, valves, fittings, masks and all other components of the oxygen system free of oil, grease, gasoline and all other readily combustible substances.

b. Do not allow foreign matter to enter the oxygen lines.

WARNING

The presence of foreign matter in the high pressure lines can cause an explosion. When coming in contact with oxygen equipment, keep hands, tools and clothing clean - hospital clean.

c. Never attempt to repair or repaint oxygen equipment.

d. Keep fire and heat away from oxygen equipment. Do not smoke while working with or near oxygen equipment and take care not to generate sparks with carelessly handled tools when working on the oxygen system.

e. Never allow electrical equipment to come in contact with the oxygen cylinder.

f. Use Ribbon Dope Thread Sealant (Permacel 412) on male ends of fittings only. Wrap thread in direction of thread spiral, beginning with the second thread on the fitting. Do not allow sealant to get into the lines. See Consumable Materials Chart.

TABLE II-IX. INDICATED OXYGEN CYLINDER PRESSURES VS. AMBIENT TEMPERATURE

Ambient Temperature - ° F	Indicated Cylinder Pressure - Psig
110	1980
100	1935
90	1890
80	1845
70	1800
60	1755
50	1710
40	1665

NOTE

These pressures are not exact, but sufficiently accurate for practical purposes for working pressures between 1800 and 2400 psig cylinders.

2-78. FILLING OXYGEN CYLINDER.

a. To fill the oxygen cylinder, remove the cap from the filler valve and attach the filler hose from the oxygen recharge unit to the filler valve. Ascertain that all fittings are free from oil, grease, dirt, etc. The oxygen cylinder must be removed to refill if there is no filler valve. Otherwise, the procedure is the same.

NOTE

If the airplane's oxygen cylinder pressure is below 50 psi, the system should be purged as described in Section XIV.

b. When using a recharge unit consisting of one supply cylinder, slowly open the valve of the supply unit and allow the oxygen to transfer until the service pressure for the cylinder is reached. Ambient temperature must be considered when filling oxygen cylinders. Refer to Table II-IX for the appropriate filling pressure for the prevailing ambient temperature.

c. When using a recharge unit consisting of two or more supply cylinders (cascade storage system), it is recommended that the following procedure be used:

1. Before opening any valves, check the pressure remaining in the airplane's oxygen cylinder. If it is still partly charged, note the pressure indicated on the cylinder gauge. Then open and close each valve on the cascade storage system and determine which cylinder has the lowest pressure. When found, if this cylinder has a pressure lower than the oxygen cylinder in the airplane, do not attempt using it for filling. Use the storage cylinder that has a pressure higher than the airplane's cylinder but lower than the others.

2. Open the valve on only the one storage cylinder with the lowest pressure. When the pressure indicated on the airplane's oxygen gauge and charging gauge has become equal, close the valve of the storage cylinder; then go to the storage cylinder with the next higher pressure and repeat the procedure.

3. If, after using the last storage cylinder, the airplane's oxygen system is still not fully charged, a full storage cylinder should be put in place of a cylinder with the lowest pressure and used in the same manner.

4. A good deal of oxygen will remain in the large cylinders used in the cascade system after filling only one of the cylinders, but such remaining oxygen will be at a pressure something less than the 1800 pounds, which is not sufficient pressure to completely refill another aircraft cylinder, although it will refill several smaller cylinders.

5. It is not economical, even on a three or four-cylinder cascade system, to begin recharging with oxygen at less than 300 psi pressure in the 300 cubic foot bank of cylinders. So, use 300 cubic foot cylinders down to approximately 300 psi; then return for refilling. In two-cylinder systems, use to approximately 600 psi; then return for refilling.

d. When the pressure gauge on the recharge unit or in the airplane reaches the appropriate service pressure, close the pressure regulator valve on the recharge unit. Disconnect the filler hose from the filler valve; replace the protective cap on the filler valve and close the access cover.

NOTE

Refer to Section XIV for detailed service instructions of oxygen system components.

2-79. LUBRICATION.

2-80. OIL SYSTEM (ENGINE).

2-81. SERVICING OIL SYSTEM. The engine oil level should be checked before each flight and oil changed after each 50 hours of engine operation. During oil change, the oil pressure and suction screen should be removed and cleaned. (Intervals between oil changes can be increased as much as 100% on engines equipped with full flow (cartridge type) oil filters, provided the element is replaced each 50 hours of operation and the specified octane fuel is used.) Should fuel other than the specified octane rating for the power plant be used, refer to latest Lycoming Service Letter No. L185 for additional information and recommended service procedures.

2-82. DRAINING OIL SUMP. To drain oil sump, provide a suitable container with a minimum capacity of 12 quarts. Remove the left side panel from the engine cowl and open the oil drain valve located on the forward left underside of the engine by pushing the arms of the drain up and turning counterclockwise. This will hold the drain in the open position. It is recommended the engine be warmed to operating temperature to insure complete draining of the old oil.

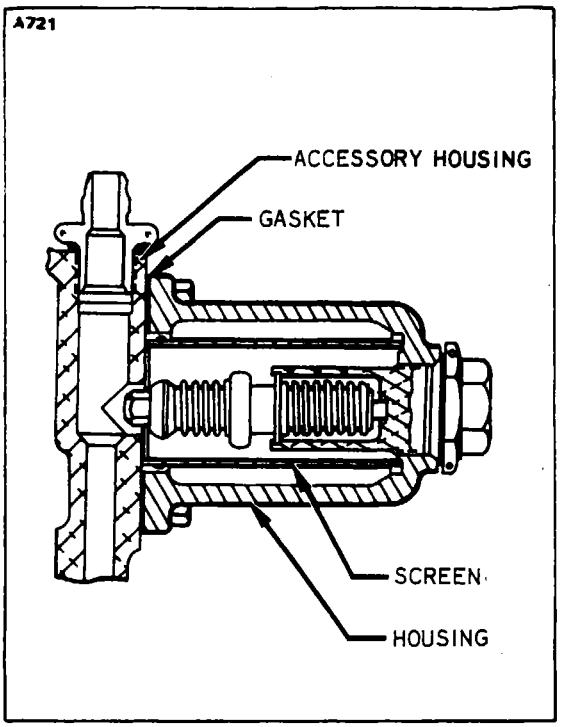


Figure 2-23. Oil Pressure Screen

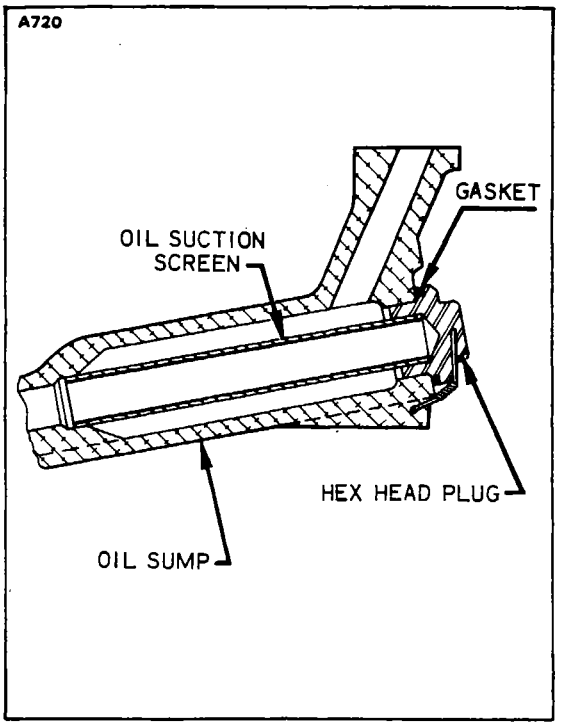


Figure 2-24. Oil Suction Screen

2-83. FILLING OIL SUMP. The oil sump should normally be filled with oil to the U.S. quart mark on the engine dipstick. The specified grade of oil may be found in Table II-X, the Lubrication Chart or on each engine oil filler access door. To service the engine with oil, open the quick release access door on top of the nacelle and remove the oil filler cap with dipstick.

2-84. OIL SCREEN (PRESSURE). (Refer to Figure 2-23.) On airplanes without full flow oil filters, the pressure screen located in a housing on the accessory case of the engine between the magnetos should be cleaned at each oil change to remove any accumulation of sludge and to examine for metal filings or chips. If metal particles are found in the screen, the engine should be examined for internal damage. The pressure screen is removed by disconnecting the temperature indicator wire and removing the four hex head bolts that secure the screen housing to the accessory case. Clean and inspect the screen. Reinstall by first ascertaining that the screen fits flush with the base of the housing. Install the screen and housing to the accessory case using a new gasket; torque the attaching bolts, 50 to 70 inch-pounds.

2-85. OIL FILTER, FULL FLOW.

a. The oil filter cartridge should be replaced after each fifty hours of engine operation; this is accomplished by removing the lockwire from the bolt-head at the end of the filter housing, loosening the bolt, and removing the filter assembly from the adapter. If the filter is a spin on type, simply turn it counterclockwise to remove.

b. Before discarding the filter cartridge, remove the outer perforated paper cover, and

using a sharp knife, cut through the folds of the element at both ends, close to the metal caps. Then, carefully unfold the pleated cartridge and examine the material trapped in the filter for evidence of internal engine damage such as chips or particles from bearings. In new or newly overhauled engines, some small particle of 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 justifies further examination to determine the cause. Champion cutter tool CT-470 (available from Champion Spark Plug Co., Toledo, Ohio 43601) may be used to cut open any spin-on type oil filter for inspection.

c. After the cartridge has been replaced, tighten the attaching bolt within 20 to 25 foot-pounds torque. Lockwire (MS-20995C-41) the bolt through the loops on the side of the housing to the drilled head of the thermostatic valve. Be sure the lockwire is replaced at both the attaching bolt head and the thermostatic oil cooler bypass valve. (Replacement filter element assembly, P/N AC6435683.)

d. To install a spin-on filter, lubricate the gasket of the filter with a thin coating of DOW Corning Compound (DC-4) and install on the adapter making sure that gasket is in place. Hand tighten the filter until the gasket just makes contact with the seating surface of the adapter and then turn an additional 3/4 to 7/8 of a turn with torque wrench until a torque of 18-20 foot-pounds is reached.

e. Run engine until warm. SHUT OFF ENGINE FIRST, then check filter for oil leaks.

2-86. OIL SCREEN (SUCTION). The suction screen located in the rear of the sump, should be cleaned at each oil change to remove any accumulation of sludge and to examine for metal filings or chips. If metal particles are found in the screen, the engine should be examined for internal damage. The screen is removed from the sump by cutting the safety wire and removing the hex head plug. Clean and inspect the screen and gasket, and replace the gasket if over-compressed. To eliminate damage to the screen, place it inside the recess in the hex head plug before inserting the assembly in the sump. Exercise care to permit screen to enter recess in sump as shown in Figure 2-24 before tightening plug. As above, any appearance of difficult threading of the plug is indicative of an incorrect installation and the process must be repeated. After installation, safety the hex head plug with MS-20995-C41.

2-87. RECOMMENDATIONS FOR CHANGING OIL. (Refer to latest revision of Lycoming Service Instruction No. 1014.)

a. In engines that have been operating on straight mineral oil for several hundred hours, a change to additive oil should be made with a degree of caution, since the cleaning action of some additive oils will tend to loosen sludge deposits and cause plugged oil passages. When an engine has been operating on straight mineral oil and is known to be in excessively dirty condition, the switch to additive or compounded oil should be deferred until after the engine is overhauled.

b. When changing from straight mineral oil to compounded oil, the following precautionary steps should be taken:

1. Do not add additive oil to straight mineral oil. Drain the straight mineral oil from the engine and fill with additive oil.

2. Do not operate the engine longer than five hours before the first oil change.

3. Check all oil screens for evidence of sludge or plugging. Change oil every 10 hours if sludge conditions are evident. Resume normal oil drain periods after sludge conditions improve.

2-88. LUBRICATION INSTRUCTIONS. Proper lubrication procedures are of immeasurable value both as a means of prolonging the service life of the airplane and as a means of reducing the frequency of extensive and expensive repairs. The periodic application of recommended lubricants to their relevent bearing surfaces, as detailed in the following paragraphs, together with the observance of cleanliness, will insure the maximum efficiency and utmost service of all moving parts. Lubrication instruction regarding the locations, time intervals, and type of lubricants used may be found in Lubrication Chart. To insure best possible results from the application of lubricants, the following precautions should be observed:

a. Use recommended lubricants. Where general purpose lubricating oil is specified, but unavailable, clean engine oil may be used as a satisfactory substitute. (See Consumable Materials Chart.)

b. Check the components to be lubricated for evidence of excessive wear and replace them as necessary.

c. Remove all excess lubricants from components in order to prevent the collection of dirt and sand in abrasive quantities capable of causing excessive wear or damage to bearing surfaces.

2-89. APPLICATION OF OIL. Whenever specific instructions for lubrication of mechanisms requiring lubrication are not available, observe the following precautions:

a. Apply oil sparingly, never more than enough to coat the bearing surfaces.

b. Since the cables are sufficiently coated by the manufacturer, additional protection for the prevention of corrosion is unnecessary.

c. Squeeze the magneto cam follower felts at regular inspection periods. If oil appears on fingers, do not add oil. If the felt is dry, moisten with Bendix Breaker Felt Lubricant 10-86527. (Bendix Electrical Components Division Sidney, N.Y. 13838.)

CAUTION

Be careful not to add to much oil, because the excess will be thrown off during operation and will cause pitting and burning of the magneto points.

2-90. APPLICATION OF GREASE. Care must be taken when lubricating bearings and bearing surfaces with a grease gun, to insure that gun is filled with new, clean grease of the grade specified for the particular application before apply lubricant to the grease fittings.

a. Where a reservoir is not provided around a bearing, apply the lubricant sparingly and wipe off any excess.

b. Remove wheel bearings from the wheel hub and clean thoroughly with a suitable solvent. When repacking with grease, be sure the lubricant enters the space between the rollers in the retainer ring. Do not pack the grease into the wheel hub.

c. Use extra care when greasing the Hartzell propeller hub to avoid blowing the clamp gaskets. Remove one grease fitting while applying grease to the other fitting and ensure that new grease comes out opposite fitting.

2-91. LUBRICATION CHART. Each part of the airplane to be lubricated, as depicted on the lubrication chart, is indicated by a frequency symbol which shows the time intervals between lubrications. Application symbols with the frequency symbols show how the lubrication is applied. A parts nomenclature key, referred to by a number adjacent to the frequency symbol, identifies the part to be lubricated. Within the frequency symbol is a code letter which identifies the type of lubricant to be used and a special instructions number which gives instruction for lubricating a particular component. (Refer to Table II-II for consumable materials.)

TABLE II-X. RECOMMENDED LUBRICATING OILS

Average Grade Oil	Average Ambient Air Temperature	Oil Inlet Temperatures	
		Desired	Maximum
SAE 50	Above 60° F (10° C)	180° F (80° C)	245° F (118° C)
SAE 40	30° F to 90° F (-1° C to 32° C)	180° F (82° C)	245° F (118° C)
SAE 30	0° F to 70° F (-17° C to 20° C)	170° F (77° C)	225° F (107° C)
SAE 20	Below 10° F (12° C)	160° F (71° C)	210° F (99° C)

TABLE II-XI. THREAD LUBRICANTS

TYPE OF LINE	TYPE OF LUBRICANT
Brakes	MIL-H-5606
Freon	TT-A-580 or MIL-T-5544, Anti-Seize Compound
Fuel	MIL-T-5544, Anti-Seize, Graphite Petrolatum
Landing Gear (Air Valve)	6PB Parker
Oil	MIL-G-6032, Lubricating Grease (Gasoline and Oil Resistant)
Pitot and Static	TT-A-580 (JAN-A-669), Anti-Seize Compound (White Lead Base)

NOTE

Lubricate engine fittings only with fluid contained in the particular lines.

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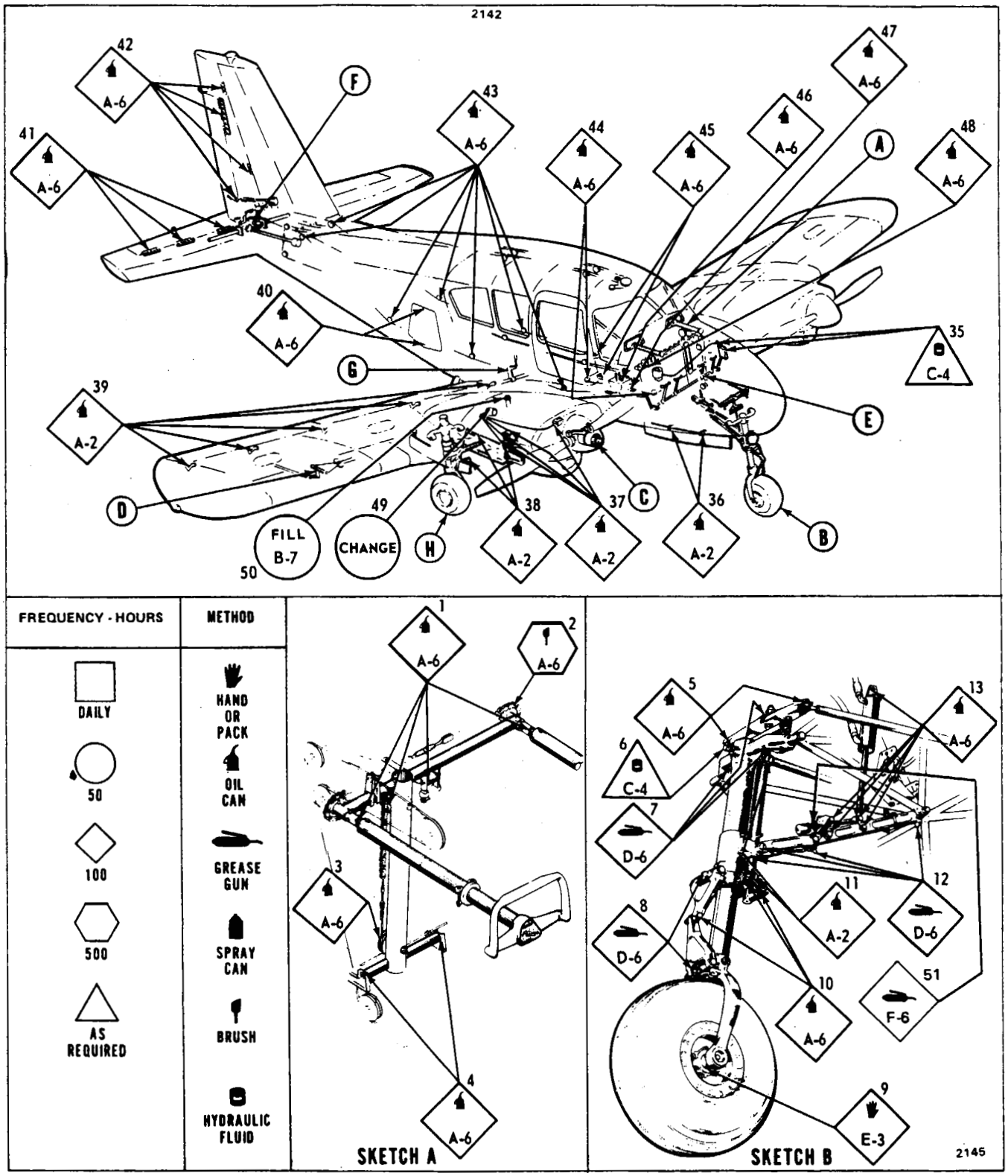


Figure 2-25. Lubrication Chart, PA-23-250 and PA-23-235

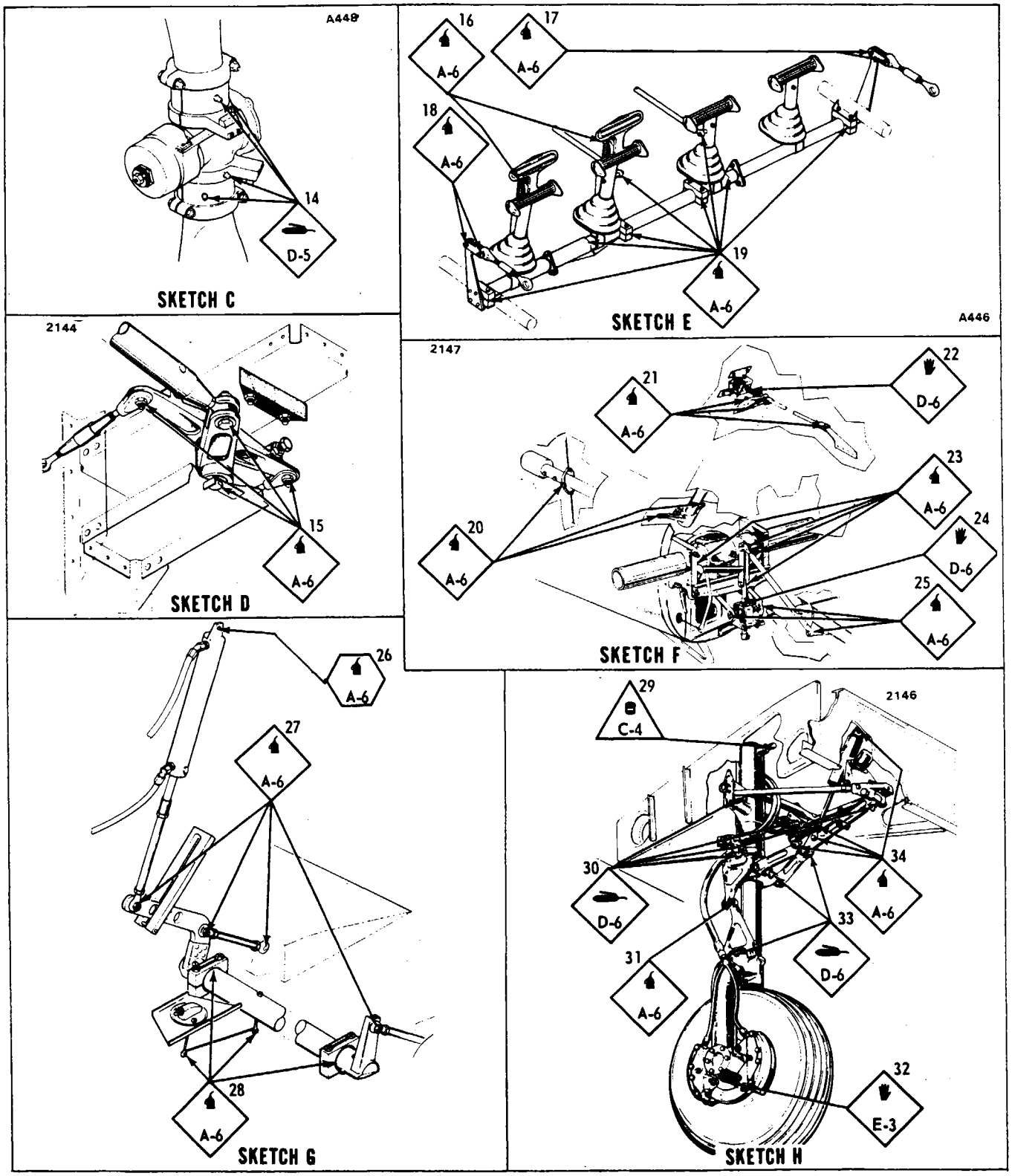
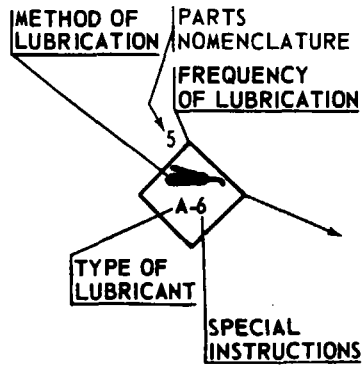


Figure 2-25. Lubrication Chart, PA-23-250 and PA-23-235 (cont.)

EXAMPLE



CAUTIONS

1. DO NOT USE HYDRAULIC FLUID WITH A CASTOR OIL OR ESTER BASE.
2. DO NOT OVER-LUBRICATE COCKPIT CONTROLS.
3. DO NOT APPLY LUBRICANT TO RUBBER PARTS.

NOTES

1. PILOT AND PASSENGER SEATS — LUBRICATE TRACK ROLLERS AND STOP PINS AS REQUIRED. (TYPE OF LUBRICANT: "A")
2. WHEEL BEARINGS REQUIRE CLEANING AND REPACKING AFTER EXPOSURE TO AN ABNORMAL QUANTITY OF WATER.
3. SEE LATEST REVISION OF LYCOMING SERVICE INSTRUCTIONS NO. 1014 FOR USE OF DETERGENT OIL.
4. SEE CONSUMABLE MATERIALS TABLE II-VII FOR LUBRICANT VENDORS.

PARTS NOMENCLATURE

1. UNIVERSAL, DOUBLE SPROCKET, GUIDE ROLLERS
2. AILERON CONTROL CHAIN
3. AILERON CONTROL CABLE PULLEY
4. CONTROL COLUMN BEARINGS
5. STEERING ROD END BEARINGS
6. OLEO AIRCHARGE VALVE
7. NOSE GEAR ATTACHMENT FITTINGS
8. TORQUE LINK ATTACHMENTS
9. WHEEL BEARINGS
10. TORQUE LINKS, STEERING LINK ENDS
11. STEERING TORQUE TUBE BEARING BLOCKS
12. DRAG LINKS
13. LATCH ATTACHMENT, ROD END BEARINGS
14. PROPELLER
15. AILERON BELLCRANK
16. BRAKE CYLINDERS
17. RUDDER CABLE ATTACHMENTS
18. RUDDER CABLE ATTACHMENTS
19. RUDDER TORQUE TUBE, BEARING BLOCKS
20. STABILATOR CABLE ATTACHMENTS, RUDDER BELLCRANK ATTACHMENTS
21. RUDDER TRIM ROD BEARINGS
22. RUDDER TRIM SCREW
23. STABILATOR TORQUE TUBE, TRIM LINKAGE
24. STABILATOR TRIM SCREW
25. TRIM LINKAGE
26. FLAP CYLINDER ATTACHMENT
27. ROD END BEARINGS
28. FLAP BEARING BLOCKS, SENDER LINKAGE
29. OLEO AIRCHARGE VALVE
30. MAIN GEAR ATTACHMENTS, DRAG LINKS, TORQUE LINKS
31. TORQUE LINKS
32. WHEEL BEARINGS
33. DRAG LINKS, TORQUE LINKS
34. CYLINDER ATTACHMENT, LATCH, RETRACTION LINKAGE
35. BRAKE RESERVOIR, POWER PACK FILLER
36. NOSE GEAR DOOR HINGES
37. ENGINE CONTROL CABLE ENDS
38. MAIN GEAR DOOR HINGES
39. AILERON AND FLAP HINGES
40. AFT BAGGAGE DOOR
41. STABILATOR TRIM HINGES
42. RUDDER, RUDDER TRIM HINGES AND TAB BOLTS
43. RUDDER PULLEYS
44. AILERON CONTROL CABLE PULLEYS
45. CABIN DOOR HINGES
46. FUEL CONTROL CABLES AND FUEL VALVES
47. SEAT TRACKS
48. ENGINE CONTROL QUADRANT
49. FULL FLOW OIL FILTER (CARTRIDGE TYPE ELEMENT)
50. ENGINE OIL FILLER TUBE
51. NOSE GEAR DOWNLOCK

Figure 2-25. Lubrication Chart, PA-23-250 and PA-23-235 (cont.)

TYPE OF LUBRICANTS

IDENTIFICATION LETTER	SPECIFICATION	LUBRICANT
A	MIL-L-7870	LUBRICATING OIL, GENERAL PURPOSE, LOW TEMPERATURE
B	MIL-L-6082	LUBRICATING OIL, AIRCRAFT RECIPROCATING ENGINE (PISTON) GRADE AS SPECIFIED SAE 50 ABOVE 60° F AIR TEMP. SAE 40 30° TO 90° F AIR TEMP. SAE 30 0° TO 70° F AIR TEMP. SAE 20 BELOW 10° F AIR TEMP.
C	MIL-H-5606	HYDRAULIC FLUID, PETROLEUM BASE
D	MIL-G-23827	GREASE, AIRCRAFT AND INSTRUMENT, GEAR AND ACTUATOR SCREW
E	MIL-G-3545	GREASE, AIRCRAFT, HIGH TEMPERATURE
F	MIL-G-7711A	GREASE, AIRCRAFT, GENERAL PURPOSE

SPECIAL INSTRUCTIONS

1. AIR FILTER - TO CLEAN FILTER, TAP GENTLY TO REMOVE DIRT PARTICLES. DO NOT BLOW OUT WITH COMPRESSED AIR OR USE OIL. REPLACE FILTER IF PUNCTURED OR DAMAGED.
2. BEARINGS AND BUSHINGS - CLEAN EXTERIOR WITH A DRY TYPE SOLVENT BEFORE LUBRICATING.
3. WHEEL BEARINGS - DISASSEMBLE AND CLEAN WITH A DRY TYPE SOLVENT. ASCERTAIN THAT GREASE IS PACKED BETWEEN THE BEARING ROLLER AND CONE. DO NOT PACK GREASE IN WHEEL HOUSING.
4. OLEO STRUTS, HYDRAULIC PUMP RESERVOIR AND BRAKE RESERVOIR - FILL PER INSTRUCTIONS ON UNIT OR CONTAINER, OR REFER TO SERVICE MANUAL, SECTION II.
5. PROPELLER - REMOVE ONE OF THE TWO GREASE FITTINGS FOR EACH BLADE. APPLY GREASE THROUGH FITTING UNTIL FRESH GREASE APPEARS AT HOLE OF REMOVED FITTING.
6. LUBRICATION POINTS - WIPE ALL LUBRICATION POINTS CLEAN OF OLD GREASE, OIL, DIRT, ETC., BEFORE LUBRICATING.
7. INTERVALS BETWEEN OIL CHANGES CAN BE INCREASED AS MUCH AS 100% ON ENGINES EQUIPPED WITH FULL FLOW (CARTRIDGE TYPE) OIL FILTERS - PROVIDED THE ELEMENT IS REPLACED EACH 50 HOURS OF OPERATION, AND THE SPECIFIED OCTANE FUEL IS USED. SHOULD FUEL OTHER THAN THE SPECIFIED OCTANE RATING FOR THE POWER PLANT BE USED, REFER TO LATEST REVISION OF LYCOMING SERVICE LETTER NO. L185 FOR ADDITIONAL INFORMATION AND RECOMMENDED SERVICE PROCEDURES.

Figure 2-25. Lubrication Chart, PA-23-250 and PA-23-235 (cont.)

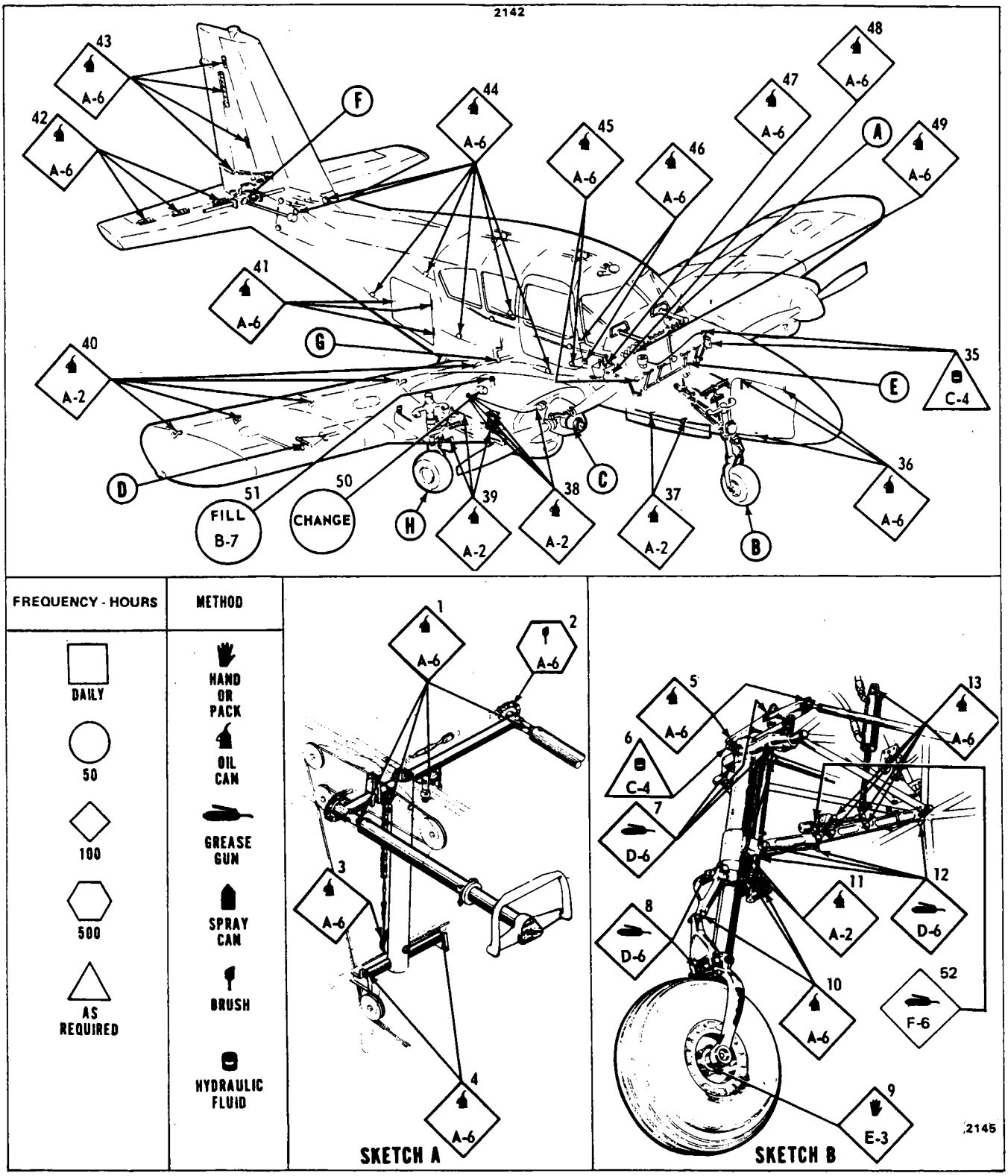


Figure 2-26. Lubrication Chart, PA-23-250 (six place), Serial Nos. 27-2000 to 27-2504 incl.

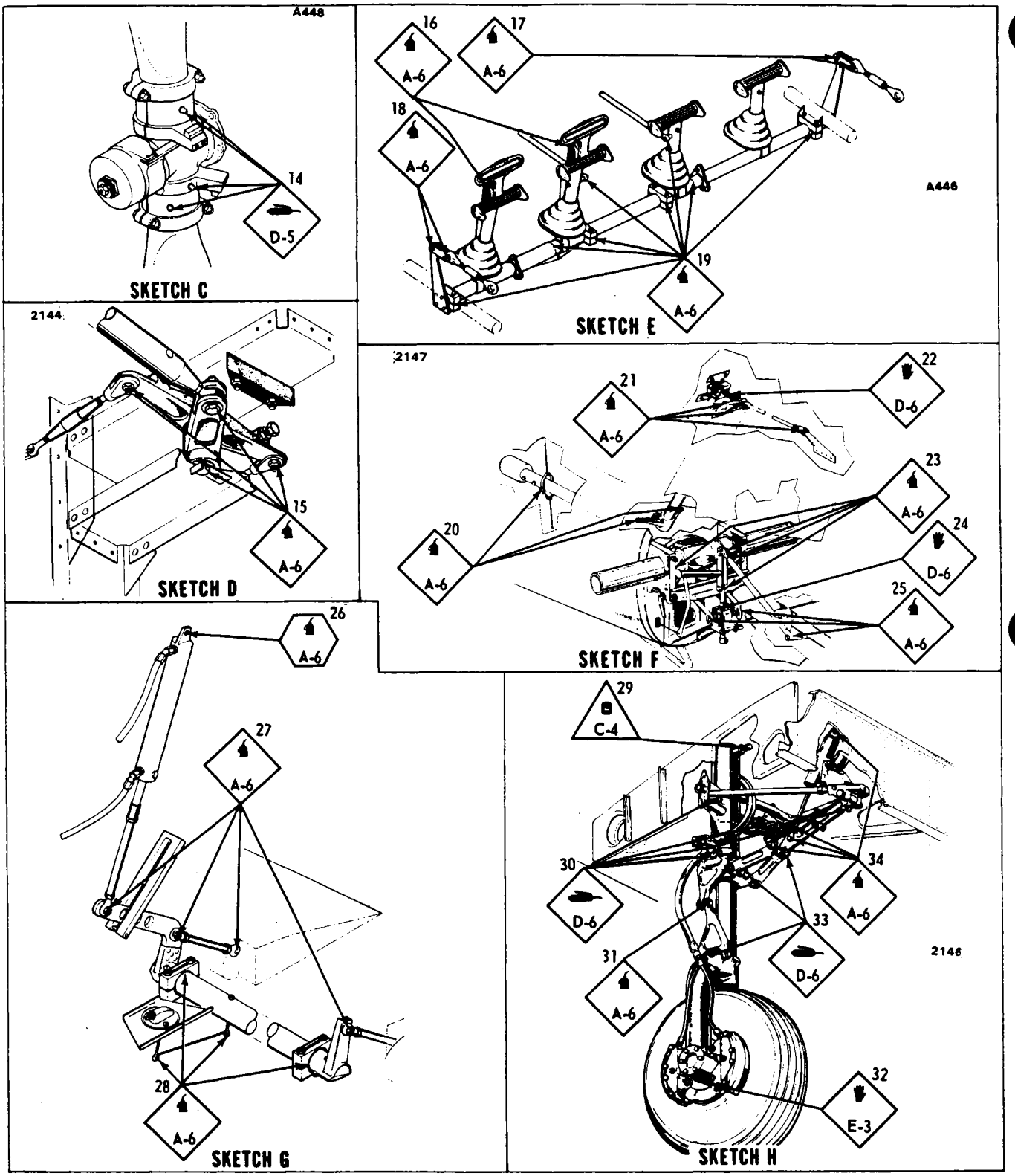
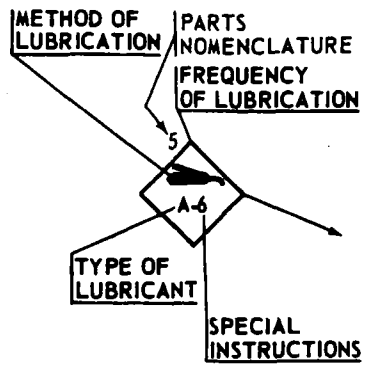


Figure 2-26. Lubrication Chart, PA-23-250 (six place), Serial Nos. 27-2000 to 27-2504 incl. (cont.)

EXAMPLE



CAUTIONS

1. DO NOT USE HYDRAULIC FLUID WITH A CASTOR OIL OR ESTER BASE.
2. DO NOT OVER-LUBRICATE COCKPIT CONTROLS.
3. DO NOT APPLY LUBRICANT TO RUBBER PARTS.

NOTES

1. PILOT AND PASSENGER SEATS - LUBRICATE TRACK ROLLERS AND STOP PINS AS REQUIRED. (TYPE OF LUBRICANT: "A")
2. WHEEL BEARINGS REQUIRE CLEANING AND REPACKING AFTER EXPOSURE TO AN ABNORMAL QUANTITY OF WATER.
3. SEE LATEST REVISION OF LYCOMING SERVICE INSTRUCTIONS NO. 1014 FOR USE OF DETERGENT OIL.
4. SEE CONSUMABLE MATERIALS TABLE II-VII FOR LUBRICANT VENDORS.

PARTS NOMENCLATURE

1. UNIVERSAL, DOUBLE SPROCKET, GUIDE ROLLERS
2. AILERON CONTROL CHAIN
3. AILERON CONTROL CABLE PULLEY
4. CONTROL COLUMN BEARINGS
5. STEERING ROD END BEARINGS
6. OLEO AIRCHARGE VALVE
7. NOSE GEAR ATTACHMENT FITTINGS
8. TORQUE LINK ATTACHMENTS
9. WHEEL BEARINGS
10. TORQUE LINKS, STEERING LINK ENDS
11. STEERING TORQUE TUBE BEARING BLOCKS
12. DRAG LINKS
13. LATCH ATTACHMENT, ROD END BEARINGS
14. PROPELLER
15. AILERON BELLCRANK
16. BRAKE CYLINDERS
17. RUDDER CABLE ATTACHMENTS
18. RUDDER CABLE ATTACHMENTS
19. RUDDER TORQUE TUBE, BEARING BLOCKS
20. STABILATOR CABLE ATTACHMENTS, RUDDER BELLCRANK ATTACHMENTS
21. RUDDER TRIM ROD BEARINGS
22. RUDDER TRIM SCREW
23. STABILATOR TORQUE TUBE, TRIM LINKAGE
24. STABILATOR TRIM SCREW
25. TRIM LINKAGE
26. FLAP CYLINDER ATTACHMENT
27. ROD END BEARINGS
28. FLAP BEARING BLOCKS, SENDER LINKAGE
29. OLEO AIRCHARGE VALVE
30. MAIN GEAR ATTACHMENTS, DRAG LINKS, TORQUE LINKS
31. TORQUE LINKS
32. WHEEL BEARINGS
33. DRAG LINKS, TORQUE LINKS
34. CYLINDER ATTACHMENT, LATCH, RETRACTION LINKAGE
35. BRAKE RESERVOIR, POWER PACK FILLER
36. NOSE BAGGAGE DOOR
37. NOSE GEAR DOOR HINGES
38. ENGINE CONTROL CABLE ENDS
39. MAIN GEAR DOOR HINGES
40. AILERON AND FLAP HINGES
41. AFT BAGGAGE DOOR
42. STABILATOR TRIM HINGES
43. RUDDER, RUDDER TRIM HINGES AND TAB BOLTS
44. RUDDER PULLEYS
45. AILERON CONTROL CABLE PULLEYS
46. CABIN DOOR HINGES
47. FUEL CONTROL CABLES AND FUEL VALVES
48. SEAT TRACKS
49. ENGINE CONTROL QUADRANT
50. FULL FLOW OIL FILTER (CARTRIDGE TYPE ELEMENT)
51. ENGINE OIL FILLER TUBE
52. NOSE GEAR DOWNLOCK

Figure 2-26. Lubrication Chart, PA-23-250 (six place), Serial Nos. 27-2000 to 27-2504 incl. (cont.)

TYPE OF LUBRICANTS

IDENTIFICATION LETTER	SPECIFICATION	LUBRICANT
A	MIL-L-7870	LUBRICATING OIL, GENERAL PURPOSE, LOW TEMPERATURE
B	MIL-L-6082	LUBRICATING OIL, AIRCRAFT RECIPROCATING ENGINE (PISTON) GRADE AS SPECIFIED SAE 50 ABOVE 60° F AIR TEMP. SAE 40 30° TO 90° F AIR TEMP. SAE 30 0° TO 70° F AIR TEMP. SAE 20 BELOW 10° F AIR TEMP.
C	MIL-H-5606	HYDRAULIC FLUID, PETROLEUM BASE
D	MIL-G-23827	GREASE, AIRCRAFT AND INSTRUMENT, GEAR AND ACTUATOR SCREW
E	MIL-G-3545	GREASE, AIRCRAFT, HIGH TEMPERATURE
F	MIL-G-7711A	GREASE, AIRCRAFT, GENERAL PURPOSE

SPECIAL INSTRUCTIONS

1. AIR FILTER – TO CLEAN FILTER, TAP GENTLY TO REMOVE DIRT PARTICLES. DO NOT BLOW OUT WITH COMPRESSED AIR OR USE OIL. REPLACE FILTER IF PUNCTURED OR DAMAGED.
2. BEARINGS AND BUSHINGS – CLEAN EXTERIOR WITH A DRY TYPE SOLVENT BEFORE LUBRICATING.
3. WHEEL BEARINGS – DISASSEMBLE AND CLEAN WITH A DRY TYPE SOLVENT. ASCERTAIN THAT GREASE IS PACKED BETWEEN THE BEARING ROLLER AND CONE. DO NOT PACK GREASE IN WHEEL HOUSING.
4. OLEO STRUTS, HYDRAULIC PUMP RESERVOIR AND BRAKE RESERVOIR – FILL PER INSTRUCTIONS ON UNIT OR CONTAINER, OR REFER TO SERVICE MANUAL, SECTION II.
5. PROPELLER – REMOVE ONE OF THE TWO GREASE FITTINGS FOR EACH BLADE. APPLY GREASE THROUGH FITTING UNTIL FRESH GREASE APPEARS AT HOLE OF REMOVED FITTING.
6. LUBRICATION POINTS – WIPE ALL LUBRICATION POINTS CLEAN OF OLD GREASE, OIL, DIRT, ETC. BEFORE LUBRICATING.
7. INTERVALS BETWEEN OIL CHANGES CAN BE INCREASED AS MUCH AS 100% ON ENGINES EQUIPPED WITH FULL FLOW (CARTRIDGE TYPE) OIL FILTERS – PROVIDED THE ELEMENT IS REPLACED EACH 50 HOURS OF OPERATION.

Figure 2-26. Lubrication Chart, PA-23-250 (six place), Serial Nos. 27-2000 to 27-2504 incl. (cont.)

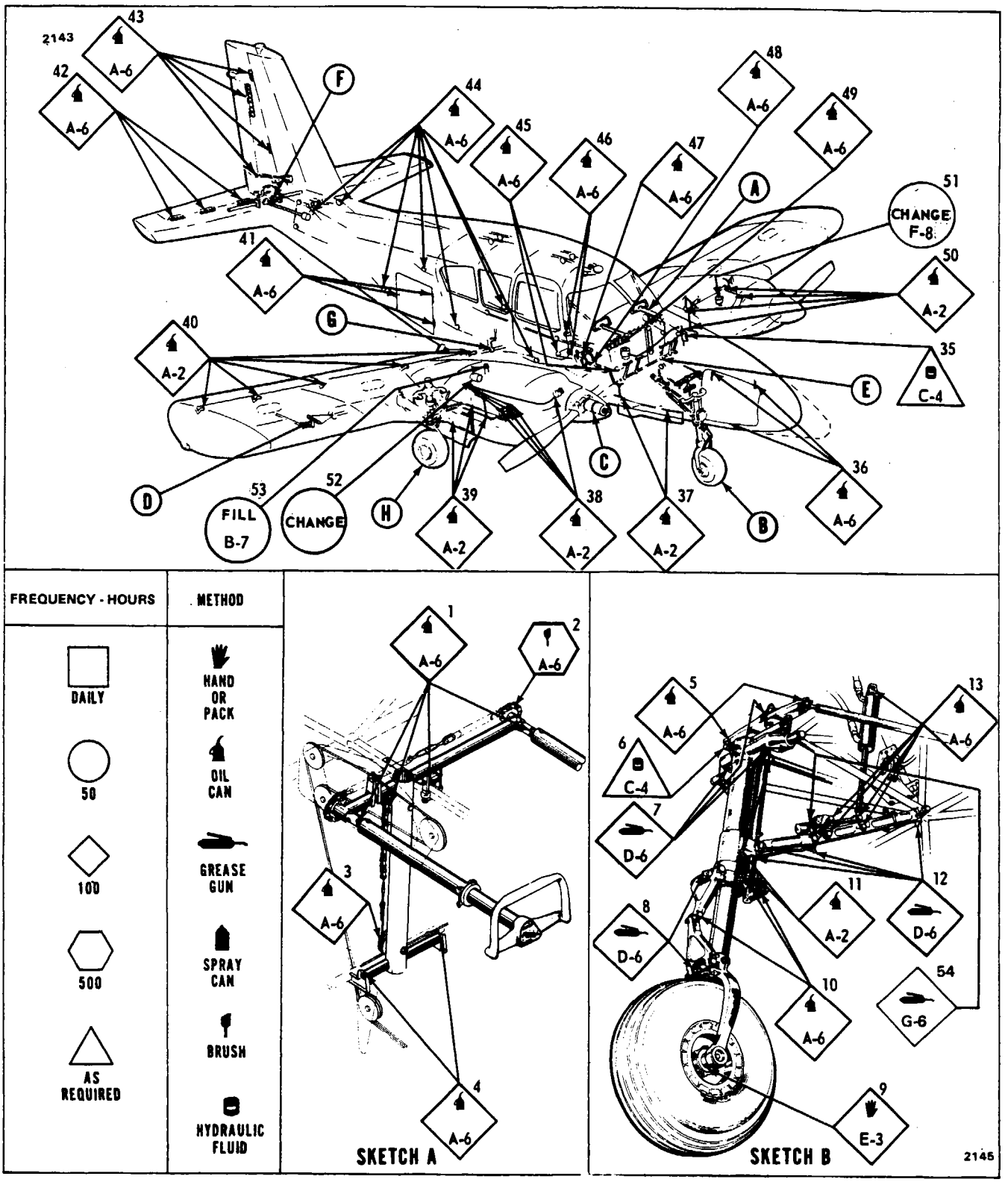


Figure 2-27. Lubrication Chart, PA-23-250 (six place), Serial Nos. 27-2505 and up

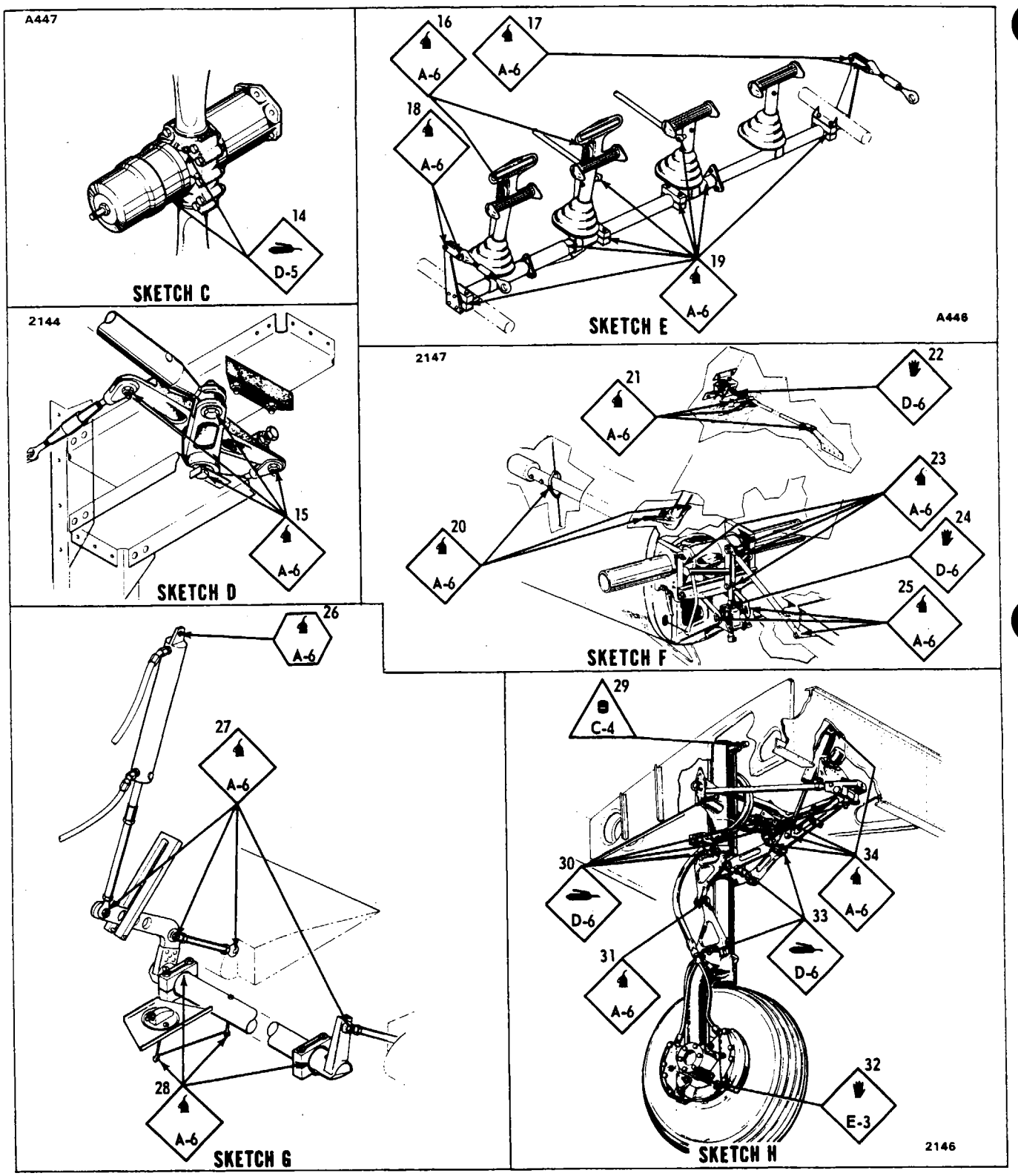
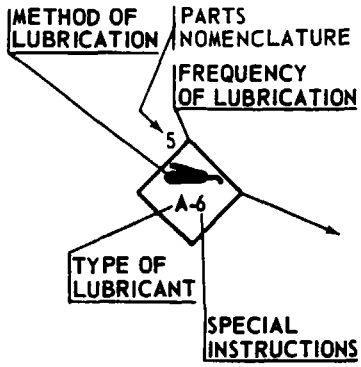


Figure 2-27. Lubrication Chart, PA-23-250 (six place), Serial Nos. 27-2505 and up (cont.)

EXAMPLE



CAUTIONS

1. DO NOT USE HYDRAULIC FLUID WITH A CASTOR OIL OR ESTER BASE.
2. DO NOT OVER-LUBRICATE COCKPIT CONTROLS.
3. DO NOT APPLY LUBRICANT TO RUBBER PARTS.

NOTES

1. PILOT AND PASSENGER SEATS - LUBRICATE TRACK ROLLERS AND STOP PINS AS REQUIRED. (TYPE OF LUBRICANT: "A")
2. WHEEL BEARINGS REQUIRE CLEANING AND REPACKING AFTER EXPOSURE TO AN ABNORMAL QUANTITY OF WATER.
3. FUEL SELECTOR VALVE - LUBRICATE SELECTOR VALVE AS REQUIRED, REFER TO LATEST REVISION OF PIPER SERVICE LETTER NO. 351.
4. SEE LATEST REVISION OF LYCOMING SERVICE INSTRUCTIONS NO. 1014 FOR USE OF DETERGENT OIL.
5. SEE CONSUMABLE MATERIALS TABLE II-VII FOR LUBRICANT VENDORS.

PARTS NOMENCLATURE

1. UNIVERSAL, DOUBLE SPROCKET, GUIDE ROLLERS
2. AILERON CONTROL CHAIN
3. AILERON CONTROL CABLE PULLEY
4. CONTROL COLUMN BEARINGS
5. STEERING ROD END BEARINGS
6. OLEO AIRCHARGE VALVE
7. NOSE GEAR ATTACHMENT FITTINGS
8. TORQUE LINK ATTACHMENTS
9. WHEEL BEARINGS
10. TORQUE LINKS, STEERING LINK ENDS
11. STEERING TORQUE TUBE BEARING BLOCKS
12. DRAG LINKS
13. LATCH ATTACHMENT, ROD END BEARINGS
14. PROPELLER
15. AILERON BELLCRANK
16. BRAKE CYLINDERS
17. RUDDER CABLE ATTACHMENTS
18. RUDDER CABLE ATTACHMENTS
19. RUDDER TORQUE TUBE, BEARING BLOCKS
20. STABILATOR CABLE ATTACHMENTS, RUDDER BELLCRANK ATTACHMENTS
21. RUDDER TRIM ROD BEARINGS
22. RUDDER TRIM SCREW
23. STABILATOR TORQUE TUBE, TRIM LINKAGE
24. STABILATOR TRIM SCREW
25. TRIM LINKAGE
26. FLAP CYLINDER ATTACHMENT
27. ROD END BEARINGS
28. FLAP BEARING BLOCKS, SENDER LINKAGE
29. OLEO AIRCHARGE VALVE
30. MAIN GEAR ATTACHMENTS, DRAG LINKS, TORQUE LINKS
31. TORQUE LINKS
32. WHEEL BEARINGS
33. DRAG LINKS, TORQUE LINKS
34. CYLINDER ATTACHMENT, LATCH, RETRACTION LINKAGE
35. BRAKE RESERVOIR, POWER PACK FILLER
36. NOSE BAGGAGE DOOR
37. NOSE GEAR DOOR HINGES
38. ENGINE CONTROL CABLE ENDS
39. MAIN GEAR DOOR HINGES
40. AILERON AND FLAP HINGES
41. AFT BAGGAGE DOOR
42. STABILATOR TRIM HINGES
43. RUDDER, RUDDER TRIM HINGES AND TAB BOLTS
44. RUDDER PULLEYS
45. AILERON CONTROL CABLE PULLEYS
46. CABIN DOOR HINGES
47. FUEL CONTROL CABLES AND FUEL VALVES
48. SEAT TRACKS
49. ENGINE CONTROL QUADRANT
50. COWL FLAP LINKAGE
51. TURBO OIL SUMP AIRESEARCH TURBOCHARGED ENGINES ONLY
52. FULL FLOW OIL FILTER (CARTRIDGE TYPE ELEMENT)
53. ENGINE OIL FILLER TUBE
54. NOSE GEAR DOWNLOCK

Figure 2-27. Lubrication Chart, PA-23-250 (six place), Serial Nos. 27-2505 and up (cont.)

TYPE OF LUBRICANTS

IDENTIFICATION LETTER	SPECIFICATION	LUBRICANT
A	MIL-L-7870	LUBRICATING OIL, GENERAL PURPOSE, LOW TEMPERATURE
B	MIL-L-6082	LUBRICATING OIL, AIRCRAFT RECIPROCATING ENGINE (PISTON) GRADE AS SPECIFIED SAE 50 ABOVE 60° F AIR TEMP. SAE 40 30° TO 90° F AIR TEMP. SAE 30 0° TO 70° F AIR TEMP. SAE 20 BELOW 10° F AIR TEMP.
C	MIL-H-5606	HYDRAULIC FLUID, PETROLEUM BASE
D	MIL-G-23827	GREASE, AIRCRAFT AND INSTRUMENT, GEAR AND ACTUATOR SCREW
E	MIL-G-3545	GREASE, AIRCRAFT, HIGH TEMPERATURE
F		LUBRICATING OIL, 10W30
G	MIL-G-7711A	GREASE, AIRCRAFT, GENERAL PURPOSE

SPECIAL INSTRUCTIONS

1. AIR FILTER,STANDARD – TO CLEAN FILTER, TAP GENTLY TO REMOVE DIRT PARTICLES. DO NOT BLOW OUT WITH COMPRESSED AIR OR USE OIL. REPLACE FILTER IF PUNCTURED OR DAMAGED. AIR FILTER, TURBOCHARGED – TO CLEAN FILTER, BLOW OUT WITH COMPRESSED AIR FROM GASKET SIDE OR WASH IN WARM WATER AND MILD DETERGENT, AND DRY. DO NOT USE OIL.
2. BEARINGS AND BUSHINGS – CLEAN EXTERIOR WITH A DRY TYPE SOLVENT BEFORE LUBRICATING.
3. WHEEL BEARINGS – DISASSEMBLE AND CLEAN WITH A DRY TYPE SOLVENT. ASCERTAIN THAT GREASE IS PACKED BETWEEN THE BEARING ROLLER AND CONE. DO NOT PACK GREASE IN WHEEL HOUSING.
4. OLEO STRUTS, HYDRAULIC PUMP RESERVOIR AND BRAKE RESERVOIR – FILL PER INSTRUCTIONS ON UNIT OR CONTAINER, OR REFER TO SERVICE MANUAL, SECTION II.
5. PROPELLER – REMOVE ONE OF THE TWO GREASE FITTINGS FOR EACH BLADE. APPLY GREASE THROUGH FITTING UNTIL FRESH GREASE APPEARS AT HOLE OF REMOVED FITTING.
6. LUBRICATION POINTS – WIPE ALL LUBRICATION POINTS CLEAN OF OLD GREASE, OIL, DIRT, ETC. BEFORE LUBRICATING.
7. INTERVALS BETWEEN OIL CHANGES CAN BE INCREASED AS MUCH AS 100% ON ENGINES EQUIPPED WITH FULL FLOW (CARTRIDGE TYPE) OIL FILTERS – PROVIDED THE ELEMENT IS REPLACED EACH 50 HOURS OF OPERATION.
8. AIRESEARCH TURBOCHARGED ENGINES ONLY — DRAIN AND REFILL TURBO OIL SUMP (2.6 QUARTS) AS INDICATED WITH AUTOMOTIVE MULTIGRADE SAE 10W 30.
(SERIAL NUMBERS 27-2505 TO 27-4221 INCLUSIVE)

Figure 2-27. Lubrication Chart, PA-23-250 (six place). Serial Nos. 27-2505 and up (cont.)