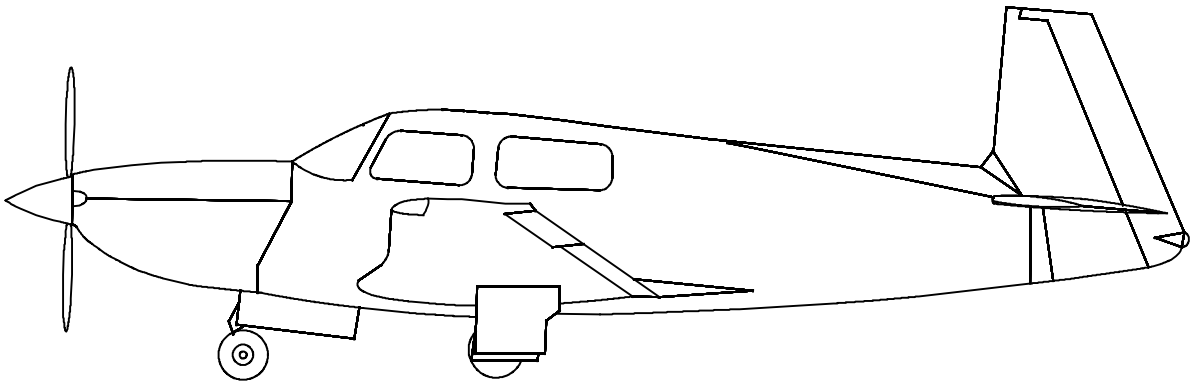
MOONEY
M20K

SERVICE AND MAINTENANCE MANUAL



MOONEY INTERNATIONAL CORPORATION

ISSUED: SEPTEMBER 1997 **P/N: MAN134**
REVISION B: MAY 2014

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MOONEY INTERNATIONAL CORPORATION *165 Al Mooney Road, Kerrville, Texas 78028 tel: 830-896-6000*

SERVICE AND MAINTENANCE MANUAL
LOG OF REVISIONS

The Log of Revisions pages are updated by Mooney International Corporation each time revisions are issued. The Log of Revisions contains a list of all revisions made to the service and maintenance manual since its original issue. By comparing the Log of Revisions to the Record of Incorporated Revisions, the user of this manual can verify that all applicable reversions are included.

Revision Status	Date FAA Approved
Original Issue	September 1997
Revision A	March 2000
Revision B	MAY 2014

Always destroy superceded pages when you insert the revised pages.

Revision/ Date	Affected Pages	Description of Revision
		Cover/Introduction
B	COVER	Revised Revision Date
		Chapter 4 AIRWORTHINESS:
B	4-EFFECTIVITY	Revised List of Effective Pages
B	4-CONTENTS	Revised Table of Contents
B	Page 5	Revised Airworthiness Limitation Data/Replacement Schedule
		Chapter 5 TIME LIMITS:
B	5-EFFECTIVITY	Revised List of Effective Pages
B	5-CONTENTS	Revised Table of Contents
B	Page 6	Revised Time Limit Components

NOTE:

A list of Effective Pages will appear at the beginning of each chapter.

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INTRODUCTION

This manual provides servicing and maintenance information for the Mooney Model M20K, Serial Numbers 25-0001 and ON. Maintenance actions that refer to a limited number of aircraft will be designated by serial number of applicable airplanes.

The format and contents of this manual are prepared in accordance with GENERAL AVIATION MANUFACTURER'S ASSOCIATION (GAMA) Specification No. 2. The manual is supplemented with wiring schematics for the various model year airplanes,as necessary. These are located in envelopes at the back of the manual texts pages.

NOTE

Revisions or re-issues of this manual are not automatically provided to manual holders. Holders of these and other Mooney Technical Publications should complete the information on the YELLOW CARDS located at the front of the Title Page and send to:

Mooney Aircraft Corporation

Attn : Service Parts Department.

Louis Schreiner Field

Kerrville, Texas., 78028, U.S.A.

Notification is sent to known manual holders when another manual is prepared to replace the subscription and advises that no more revisions will be sent out. The new manual will require a new subscription service. If additional Technical Publications are desired, contact the above department at Mooney Aircraft Corporation at (830) 896-6000, ext. 2092 or (830) 792-2092, fax (830) 896-3133.

Correspondence concerning maintenance or part numbers on an airplane should contain the aircraft model number and serial number. The serial number appears on the identification placard located on the aft end, left hand side of the tailcone below the horizontal stabilizer.

ASSIGNMENT OF SUBJECT MATERIAL

The content of this publication is organized at four levels:

Group

System/Chapter

Sub-system/Section

Unit/Subject

GROUP

These are primary divisions of the manual that enable broad separation of content, ie., Airframe systems VS Powerplant systems. These groups are identified by tabs.

SYSTEM/CHAPTER

The various groups contain major systems information such as flight controls, landing gear, etc. The systems are arranged numerically per GAMA recommended number assignment, It is suggested, for example,that "Fuel" be identified with the System/Chapter number "28". The sequence of numbers, CHAPTER, **28**-00-00, refers to the General information of the Fuel Systems.

SUB-SYSTEM/SECTION

The major systems of an aircraft are broken down into sub-systems. These sub-systems are identified by the second element of the sequence of numbers, SECTION, ie., 28-**20**-00. The element -20- indicates the distribution portion of the fuel system.

UNIT/SUBJECT

The individual units within a sub-system may be identified by a third element of the sequence of numbers, SUBJECT, ie.,28-20-**01**. This number is assigned by the manufacturer and may or may not be used depending upon the complexity of the maintenance action recommended.

APPLICATION OF NUMBERING SYSTEM

Mooney Aircraft Corporation is in the process of revising all applicable technical publications to the GAMA format. When this effort is completed any publication concerning maintenance of aircraft will conform to this basic numbering system. Any person wishing information concerning the Fuel Distribution System would refer to the pages identified as ,28-20-00, in any maintenance oriented publication. These pages will be numbered sequentially within each system breakdown in the current Mooney series of aircraft. As Mooney aircraft models become more complex the page numbers may be sequentially numbered within sub-systems.

The table of contents in the front of each System/Chapter will provide a list of sub-systems covered in the Chapter. For example:

28-**00** General

28-**10** Storage
(Tanks, vents, repair, etc.)

28-**20** Distribution
(Boost pumps, fuel lines, etc.)

28-**40** Indicating
(Sender Units, quantity gauges, etc.)

If there is a reason to distinguish between LEFT HAND or RIGHT HAND fuel quantity sending units then the number would be expanded to 28-40-01 (Left Hand) and 28-40-02 (Right Hand). This concept will apply to any expanded information throughout the publications.

SUPPLEMENTARY PUBLICATIONS

The following list of Manufacturers and/or publications can provide servicing and maintenance information on components of the Mooney 231, 252, TSE, or ENCORE Model M20K. No avionics equipment Manufacturers or publications are listed due to the many configurations that can be installed in the aircraft. These can be obtained from the repair stations for a particular avionics manufacturer.

Publications available from Mooney Aircraft Corporation are listed in the Parts Price List and are available through any Mooney Marketing/Service Center.

As publications on various components become available, they will be added to the list below.

VENDOR ADDRESSES or PUBLICATIONS

ENGINE

The following maintenance publications can be obtained through Teledyne Continental Motors (TCM) Aircraft Products Division distributors in your area or from TCM, P.O. Box 90, Mobile, AL. 36601, Tele.: (334) 438-3411.

OVERHAUL MANUAL - Form Number's X30596A, for TCM TSIO-360-GB, -LB,-MB series aircraft engines & X30596A for -SB series engines.

ILLUSTRATED PARTS CATALOG - Form Number's X30597A, for -GB, -LB, -MB series engines & X30597A/S2 for -SB engines.

OPERATORS MANUAL - Form Number's X30536 for TSIO-360-G,-GB series engines, X30571 for TSIO-360-LB series engines, X30584 for -MB series engines and X30671 for -SB series engines.

MAINTENANCE AND OPERATOR'S MANUAL - Form Number's X30584 for TSIO-360-MB series engine & X30672A for -SB engines.

SERVICE BULLETINS - Specify model of engine for which maintenance data is desired.

PROPELLER

McCauley Propellers - Obtain publications from McCauley Accessories Division, Cessna Aircraft Company, 3535 McCauley Drive, Vandalia, OH.,45377.

Service Manual - No. 780630 for McCauley C200 series constant speed propellers.

Hartzell Popellers - Obtain publications from Hartzell Propeller, Inc. 350 Washington Avenue, Piqua, OH., 45356.

Blade Specification - Manual No. 133-A.

Overhaul Instructions - Manual No. 113-B.

MAGNETO

Bendix Scintilla Magneto - Obtain Service data for Bendix Series 2000 or 3000 magnetos from Bendix Corporation, Electrical Components Division, Jacksonville, FL. 32245-7880.

Slick Magnetos - Obtain Service data for Slick magnetos from Slick Aircraft Products, Unison Indust., 530 Blackhawk Park Ave., Rockford, IL. 61104, (815) 965-7704.

TURBOCHARGER

Maintenance and Overhaul Manual Number G70 for the RAJAY/Rotomaster turbocharger can be obtained from RotoMaster, c/o Garrett Airesearch Aftermarket Div., 2511 So. Edison Way, Compton, CA, 90220-6035.

Maintenance and Overhaul data on Airesearch turbocharger, Model No. TA0401, is available from Garrett -Airesearch Industrial Div. (Allied-Signal), Los Angeles, CA.

SYSTEM/CHAPTER, SUB-SYSTEM/SECTION INDEX GUIDE

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	00	LEVELING
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27		**FLIGHT CONTROLS**
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	10	INSTRUMENT AND CONTROL PANELS
	20	ELECTRICAL AND ELECTRONICS EQUIPMENT RACKS
51		**STRUCTURES**
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AIRWORTHINESS LIMITATIONS

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CHAPTER 4
AIRWORTHINESS LIMITATIONS

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4-00-00 - AIRWORTHINESS LIMITATIONS - MODEL M20K (Normal Category) S/N's 25-2013 THROUGH 25-2032

The Airworthiness Limitations Section is FAA approved and specifies maintenance required under 14 CFR §§ 43.16 and 91.403 unless an alternative program has been FAA approved.

4-10-00 - COMPONENT REPLACEMENT

Replacement of components shall be accomplished not later than the specified period of operation for that component or, when noted, in accordance with Manufacturer's Continued Airworthiness Data or Airworthiness Directives.

4-10-01 - There are no items for this aircraft under 14 CFR §§ 43.16 and 91.403

ITEM	REPLACE TIME LIMITS

FAA Approved Section

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CHAPTER 5

TIME LIMITS, MAINTENANCE CHECKS

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CHAPTER 5
TIME LIMITS/MAINTENANCE CHECKS

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5-00-00

- GENERAL

AIRCRAFT DESCRIPTION. The M20K series of aircraft are four place high-performance turbocharged single-engine low-wing monoplanes. The all-metal airframe has a tubular-steel cabin frame covered with nonstructural aluminum skins, a semi-monocoque tailcone, and a full-cantilever laminar-flow wing. Control surfaces have structural spar construction with stressed skins riveted to the spars and ribs. Dual control wheels accompany the conventional flight controls. The pilot's rudder pedals have toe brakes linked to individual hydraulic cylinders that supply pressure to the hydraulic disc brakes on each main gear wheel. Removable co-pilot rudder pedals are standard equipment. The tricycle landing gear, having a steerable nose wheel controlled by rudder pedal action, is fully retractable. The wide-span trailing-edge wing flaps are electrically operated. For stabilizer trim, the entire empennage pivots vertically about its attaching points.

5-00-01 - LANDING GEAR SYSTEM

The electric landing gear system has a steerable nose wheel. Single disc self-adjusting hydraulic brakes are featured on the main gear. Gear position lights, a warning horn and a gear position indicator on the floorboard are standard equipment. Bungee springs that preload the the retraction mechanism in an over-center position lock the gear down. An air pressure actuated safety switch in the electrical system prevents electric gear retraction on takeoff until a safe flying speed is attained. A gear throttle warning horn sounds when the manifold pressure is less than a pre-set value with the landing gear up. The electric gear retraction system has a manual extension system connected to the gear actuator that permits manual lowering of the gear in the event of an electrical malfunction.

5-00-02 - FLIGHT CONTROL SYSTEMS

The dual flight control systems can be operated from either the pilot or co-pilot seat. All flight controls are conventional in operation, using pushpull tubes to link the control surfaces to the control wheels and rudder pedals. Formica guide blocks maintain control tube alignment and dampen vibration. An interconnect spring mechanism links the aileron and rudder systems to assist in control coordination. The standard co-pilot's rudder pedals are removable. The trim system sets the stabilizer angle of attack.

5-00-03 - WING FLAP SYSTEM

Wing flaps are electrically actuated and are controlled by a spring loaded "up-off-down" switch on the center console.

5-00-04 - ELECTRIC POWER SYSTEM

1. The master switch and power relay control the electrical power system, comprised of a 70 amp 14 volt alternator, a voltage regulator, and a 12 volt, 35 AMP HR battery (S/N 25-0001 thru 25-0999). Aircraft S/N 25-1000 and ON have a 70 AMP, 28 volt alternator and a 24 volt, 22 AMP HR battery). The alternator system has an overvoltage protective relay and an overvoltage annunciator light. Circuit breakers or circuit breaker switches protect the electrical wiring and equipment from overloads. Standard electrical equipment includes: 2-100 watt landing lights, navigation lights, interior lights, gear and stall warning system, an electrical fuel boost pump, an electric starter, an electric gear retraction system with manual extension override and an electrical flap system.

2. An optional standby generator (12V, 10 amp) is available to operate basic essential components in the event of main alternator failure on S/N 25-0613 thru 25-0999 aircraft. An optional second 70 ampere, belt driven alternator will be available on S/N 25-1000 and ON aircraft.

5-00-05 - INSTRUMENTS

All flight instruments are in the shock-mounted flight panel. Engine instruments are in the co-pilot's panel. The pitot system provides air pressure to operate the airspeed indicator. The instrument static pressure system has two static air pickup ports (one on each side of the tailcone) that open to the atmosphere. An alternate static source is provided on lower flight instrument panel. The instrument panel lighting system has manual dimming mechanisms.

5-00-06 - CABIN HEATING & VENTILATING SYSTEMS

The heater muff encasing the exhaust system is the cabin heat source. Hot air from the heater muff mixed with ambient air controls cabin temperature. Air routed from the main heater duct system to nozzles at the windshield base defrosts the windshield.

5-00-07 - FUEL SYSTEM

The fuel system has sealed, integral wing tanks in the forward, inboard section of each wing. Vents at the aft, outboard top corner of each tank vent through the lower wing surface. Fuel sump drains are at the lowest point in each tank. The electric fuel pump is in the bottom left forward section of the fuselage just aft of the firewall. The engine-driven fuel pump mounts on the engine crankcase. Two fuel quantity transmitters in each tank are wired to fuel quantity gauges in the engine cluster gauge. The master switch, left side of the pilot's panel, turns on the fuel quantity indicating systems. Visual sight gauges are available for partial fueling of wing tanks on aircraft 25-0001 and UP.

A low fuel warning annunciator light for each tank is activated when usable fuel quantity goes below 2 1/2 gallons.

5-10-00 - TIME LIMIT COMPONENTS

It is recommended that overhaul or replacement of components should be a accomplished not later than the specified period of operation for that component or in accordance with manufactures service data or airworthiness directives.

The specified overhaul time limits, if applicable to a component, do not constitute a guarantee that the component will reach that time limit without requiring maintenance.

NOTE:
"ON CONDITION" items are to be repaired, replaced or overhauled when inspection or performance reveals an unserviceable condition.

5-10-01 - TIME LIMIT COMPONENTS

ITEM	RECOMMENDED OVERHAUL, MAINTENANCE OR REPLACE TIME LIMITS
Landing Gear	
Actuator No-Back Spring	
- Avionic Products	Refer to MAC SB M20-282A
- Plessey (GEC)	Refer to MAC SI M20-92
- EATON p/n 102000-1, -2, -3, -4, -5, -7	Refer to MAC SI M20-92
All other Components	ON CONDITION
Powerplant	
Engine	Refer to Engine Manufacturer's Continued Airworthiness Data for specific Time Limits. Mooney has no special requirements over those found in the Manufacturer's Data.
Propeller	Refer to Propeller Manufacturer's Continued Airworthiness Data for specific Time Limits. Mooney has no special requirements over those found in the Manufacturer's Data.
Magnetos - Slick	At Engine Overhaul
- Bendix	At Engine Overhaul (Engine Manufacturer's TBO) or every 4 years (REF Continental SB-643 and Manual # X42003
Induction Air Filter	500 Hours
All other Components	ON CONDITION
Fuel & Oil System	
Fuel Selector Valve	500 Hours or ON CONDITION
Flexible Hoses, Rubber	7 Years or at Engine Overhaul, whichever occurs first
Flexible Hoses, Synthetic Rubber (TSO-C-53A)	ON CONDITION
Aeroquip 601 Fuel Hoses (if equipped)	24 Months
All other Components (includes Teflon Hoses)	ON CONDITION
Instruments	
Vacuum Regulator Garter Filter	100 Hours
Filters - Vacuum Pump	500 Hours or Annually
Filters - Vacuum Pump (except CV1J4)	ON CONDITION
Filters - Gyro Instruments	500 Hours or Annually
Other Components	ON CONDITION
Electrical System	
All Components	ON CONDITION
Flight Controls	
Speedbrakes (if equipped)	Refer to Precise Flight Installation Manual #08059B (Also See MAC chapter 27-96-00)
All Components	ON CONDITION
Miscellaneous Systems	
Vacuum Pump; Primary	500 Hours and at Engine Overhaul (Engine Manufacturer's TBO) or ON CONDITION
ELT Battery	Refer to ELT Manufacturer's Continued Airworthiness Data
Oxygen Cylinder (Composite)	15 years or 10,000 recharge cycles - Replace
All Other Components	ON CONDITION
Avionics	Refer to Avionics Manufacturer's Continued Airworthiness Data

NOTE
Components should be inspected and service at regular intervals per the servicing, lubrication and inspection chart of this manual.

5-20-00 - SCHEDULED INSPECTIONS

Inspection Intervals. Perform a 25, 50, or 100-hour inspection of the aircraft, components and engine at recommended intervals as outlined in the following paragraphs.

NOTE:
Aircraft operated in a salt air environment are considered high risk for corrosion damage, and should be cleaned and inspected at frequent intervals. Refer to AC 43-4.

5-20-01 - INSPECTION CHECK POINTS

The general points to be covered during inspection are grouped in accordance with the nature and function of the items discussed.

1. Moving Parts shall be inspected and checked as applicable for: proper operation, security of attachment, sealing, cleanliness, lubrication, servicing, safetying, adjustment, tension, travel, condition of hinges, binding, excessive wear, cracking, corrosion, deformation, and any other apparent damage.

2. Metal Parts shall be inspected, as applicable, for: security of attachment, condition of finish and/or sealant, distortion, fatigue cracks, welding cracks, corrosion, and any other apparent damage. The tubular frame structure should be inspected during each annual inspection for any signs of corrosion or damage.

3. Fuel, air, oil and hydraulic oil lines and hoses shall be inspected as applicable for: cracks, dents, kinks, deterioration, obstruction, chaffing, improper bend radius, and insecure installation. Replace or correct if any of these conditions exist. Hose clamp installations on fuel and hydraulic systems between systems or between systems and the engine shall be torqued to 25 inch pounds. Hose clamp installations on blast tubes, air ducts, drain and vent lines shall be torqued to 15 inch pounds.

4. Pipe Threads - Tightening and torque procedures. Lubricate pipe threads as follows:

Oxygen Lines - Use only MIL-T-5542 thread compound or Teflon thread seal tape on threads of valves, connectors, fittings, parts or assemblies which might come in contact with oxygen. The thread compound must be applied sparingly to the first three threads of the male fitting only. No compound is to be used on the coupling sleeves or on the outside of the tube flares. Extreme care should be exercised to prevent the contamination of the thread compound or Teflon tape with oil, grease or other lubricant.

Fuel, Hydraulic, Air, Oil Lines - Use "Permatex Anti-Seize" or equivalent on male fittings only. Apply lubricant, omitting the first two threads, sparingly and carefully.

Engine Fittings - Use only aircraft engine oil to lubricate fittings threaded directly to engine.

Vacuum Lines - No lubrication is to be used. Check manufacturers instructions when installing components. Refer to Section 37 for maintenance procedures on vacuum on vacuum system.

Tapered Threads - Use Teflon Threadseal Tape.

(1) Continue to tighten until fitting is correctly positioned but do not overrun or backoff.

(2) If leaks are detected, tighten one full turn more.

(3) If leaks persist, the parts should be disconnected and; rejected; replace with new components.

5. Bolts and nuts in critical areas shall be inspected for: fretting, wear, damage, stretch, proper torque, (Figure 5-2) and safetied.

TORQUE VALUES

FLARE NUT TORQUE VALUES- Tighten to minimum torque value for appropriate size as shown (Figure 5-1).

FLARE NUT TORQUE				
FITTING SIZE	ALUMINUM TUBING		STEEL TUBING	
	TORQUE - INCH POUNDS			
	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
-3	-	30	70	-
-4	40	65	50	90
-5	60	80	70	120
-6	75	125	90	150
-8	150	350	155	250
-10	200	350	300	400
-12	300	500	430	575
-16	500	700	550	750
-20	-	600	900	-
-24	-	600	900	-

FLARE NUT TORQUE
FIGURE 5-1

BOLT - NUT TORQUE VALUES

METRIC BOLTS, SCREWS & NUTS

Failure of threaded fasteners due to over-tightening can occur by bolt shank fracture or by stripping of the nut and/or bolts thread. A bolt or screw assembled with a nut of the appropriate class is intended to provide an assembly capable of being tightened to the bolt proof load without thread stripping occurring.
The torque value to be set for a particular size of screw
is dependent upon:

1) Material of the screw.
2) Parent material (steel, non-ferrous metal or plastic).
3) Whether the screw is untreated or plated.
4) Whether the screw is dry or lubricated.
5) The depth of the thread.

TIGHTENING TORQUES - Untreated Screw(Black Finish) ***Friction Coeficient 0.14***

NOMINAL DIAMETER (Coarse Thread)	**PROPERTY CLASS**			
	TORQUE Ma			
	5.6 Nm/ft.lb.	8.8 Nm/ft.lb.	10.9 Nm/ft.lb.	12.9 Nm/ft.lb.
M 3	0.60/0.44	1.37/1.01	1.92/1.42	2.30/1.70
M 4	1.37/1.01	3.10/2.29	4.40/3.25	5.25/3.87
M 5	2.70/1.99	6.15/4.54	8.65/6.38	10.4/7.6
M 6	4.6/3.3	10.5/7.7	15/11	18/13
M7	7.6/5.6	17.5/12.9	25/184	29/21.3
M8	11/.1	26/19	36/26	43/31
M10	22/16	51/37	72/53	87/64
M12	39/28	89/65	125/92	150/110
M14	62/45	141/103	198/146	240/177
M16	95/70	215/158	305/224	365/269
M18	130/95	295/217	420/309	500/368
M20	184/135	420/309	590/435	710/523
M22	250/184	570/420	800/590	960/708
M24	315/232	725/534	1020/752	1220/899
M27	470/346	1070/789	1510/1113	1810/1334
M30	635/468	1450/1069	2050/1511	2450/1806
M33	865/637	1970/1452	2770/2042	3330/2455
M36	1111/819	2530/1865	3560/2625	4280/3156
M39	1440/1062	3290/2426	4620/3407	5550/4093

TORQUE TABLES (CONTINUED) --- **METRIC**

NOMINAL DIAMETER **(Fine Thread)**	**PROPERTY CLASS**		
	TORQUE Ma		
	8.8 Nm/ft.lb.	10.9 Nm/ft.lb.	12.9 Nm/ft.lb.
M8 x 1	27/19	38/28	45/33
M10 x 1.25	52/38	73/53	88/64
M12 x 1.25	95/70	135/99	160/118
M14 x 1.5	150/110	210/154	250/184
M16 x 1.5	225/165	315/232	380/280
M18 x 1.5	325/239	460/339	550/405
M20 x 1.5	460/339	640/472	770/567
M22 x 1.5	610/449	860/634	1050/774
M24 x 2	780/575	1100/811	1300/958

TIGHTENING TORQUES - Electrically Zinc Plated Friction Coeficient 0.125

DIAMETER **(Coarse Thread)**	**PROPERTY CLASS**			
	TORQUE Ma			
	5.6 Nm/ft.lb.	8.8 Nm/ft.lb.	10.9 Nm/ft.lb.	12.9 Nm/ft.lb.
M3	0.56/0.41	1.28/0.94	1.80/1.33	2.15/1.59
M4	1.28/0.94	2.90/2.14	4.10/3.02	4.95/3.65
M5	2.50/1.84	5.75/4.24	8.10/5.97	9.70/7.15
M6	4.3/3.1	9.9/7.3	14/10.3	16.5/12.1
M7	7.1/5.2	16.5/12.1	23/16.9	27/19.9
M8	10.5/7.7	24/17.7	34/25	40/29
M10	21/15	48/35	67/49	81/59
M12	36/26	83/61	117/86.2	140/103
M14	58/42	132/97	185/136	220/162
M16	88/64	200/147	285/210	340/250
M18	121/89	25/202	390/287	470/346
M20	171/126	390/287	550/405	660/486
M22	230/169	530/390	745/549	890/656
M24	295/217	675/497	960/708	1140\840
M27	435/320	995/733	1400/1032	1680/1239
M30	590/435	1350/995	1900/1401	2280/1681
M33	800/590	1830/1349	2580/1902	3090/2278
M36	1030/759	2360/1740	3310/2441	3980/2935
M39	1340/988	3050/2249	4290/3163	5150/3798

METRIC --- TORQUE TABLES (CONTINUED)

NOMINAL DIAMETER (**Fine Thread)**	**PROPERTY CLASS** TORQUE Ma		
	8.8 Nm/ft.lb.	10.9 Nm/ft.lb.	12.9 Nm/ft.lb.
M8 x 1	25/18	35/25	42/30
M10 x 1.25	49/36	68/50	82/60
M12 x 1.25	88/64	125/92	150/110
M14 x 1.25	140/103	195/143	235/173
M16 x 1.5	210/154	295/217	350/258
M18 x 1.5	305/224	425/313	510/376
M20 x 1.5	425/313	600/442	720/531
M22 x 1.5	570/420	800/590	960/708
M24 x 2	720/531	1000/737	1200/885

METRIC CONVERSION FACTOR: One Nm(Newton Meter) = .7375 Foot Pound;
One Foot Pound = 1.355818 Nm

CAUTION
These torque values are derived from oil-free cadmium-plated threads.

AN/MS STANDARD BOLTS, NUTS TORQUE TABLES

Fine-Thread Series

NUT-BOLT SIZE	Tension-type AN( ) BOLTS AN-365/AN 310 NUTS	Shear-type AN( ) BOLTS AN-364/AN320 NUTS	TENSION-type NAS( ) BOLTS AN-365/AN-310 NUTS	SHEAR -type NAS( ) BOLTS AN-364/AN-320 NUTS
8-36	12-15	7-9		
10-32	20-25	12-15	25-30	15-20
1/4-28	50-70	30-40	80-100	50-60
5/16-24	100-140	60-85	120-145	70-90
3/8-24	160-190	95-110	200-250	120-150
7/16-20	450-500	270-300	520-630	300-400
1/2-20	480-690	290-410	770-950	450-550
9/16-18	800-1000	480-600	1100-1300	650-800
5/8-18	1100-1300	600-780	1250-1550	750-950
3/4-16	2300-2500	1300-1500	2650-3200	1600-1900
7/8-14	2500-3000	1500-1800	3550-4350	2100-2600
1-14	3700-5500	2200-3300	4500-5500	2700-3300
1 1/8-12	5000-7000	8000-4200	6000-7300	3600-4400
1 1/4-12	9000-11000	5400-6600	11000-13000	6600-8000

Coarse-Thread Series

8-32	12-15	7-9
10-24	20-25	12-15
1/4-20	40-50	25-30
5/16-18	80-90	48-55
3/8-16	160-185	95-100
7/16	235-255	140-155
1/2-13	400-480	240-290
9/16-12	500-700	300-420
5/8-11	700-900	420-540
3/4-10	1150-1600	700-950
7/8-9	2200-3000	1300-1800

Figure 5-2

Reference: Federal Aviation Agency Advisory Circular No. 43.13-1( )

Recommended Torque Values for Nut-Bolt combination (Units are inch-pounds)

1. Be sure nut and/or bolt threads are clean and dry(unless Mfg. states otherwise.

2. Run bolt down near contact with washer or bearing surface and check “friction drag torque” required to turn bolt/nut.

3. Measure torque required to turn bolt just before contact of bolt’s washer face to surface (“FRICTION DRAG TORQUE”). Add this “friction drag torque” to the recommended torque value from Figure 5-2. This value is considered “Final Torque Value”.

(FRICTION DRAG TORQUE + REC`MD TORQUE = FINAL TORQUE VALUE).

CAUTION
DO NOT REUSE LOCKNUTS IF THEY CAN BE RUN UP FINGER TIGHT.

5-20-01 - INSPECTION CHECK POINTS (con't.)

6. Electrical wiring shall be inspected as applicable for: loose, corroded, or broken terminals; chaffed, broken, or worn insulation; insecure installation; heat deterioration; and any other apparent damage.

7. Filters and screens shall be removed, cleaned and inspected for contamination or damage that would require replacement.

5-20-02 - AIRCRAFT FILE INSPECTION

Aircraft 100-hour and annual inspections cover, in addition to examining the aircraft proper, a review of the status of compliance with current Federal Aviation Regulations. This review includes inspection of the Airplane Flight Manual, Aircraft Log Book, Engine Log Book, Propeller Log Book, Registration Certificate, Airworthiness Certificate, Weight & Balance Record, TCM Service Information, Aircraft Radio Station License (if applicable), FAA Airworthiness Directives, and Mooney serivce documents.

5-20-03 - ENGINE FUNCTIONAL CHECK

Prior to a scheduled 100-hour or annual inspection, and/or 25 hours after installation of new or overhauled engine, wash down the engine and engine components. Then perform an engine runup in accord with procedure recommended in the Airplane Flight Manual. Make a record of all malfunctions and abnormalities. After the engine runup, complete a differential (hot engine) compression check. To verify correction of malfunctions and abnormalities, perform a second engine runup and a flight test after completing the inspection.

5-20-04 - FIRST 25-HOUR INSPECTION

The one time 25-hour inspection consists of a visual inspection of the propeller, engine, and aircraft general condition, including a preflight inspection as outlined in the Airplane Flight Manual. The inspection does not require removal of all access panels or disassembly of components; however, it should include completion of all lubrication & service requirements. The inspection should be extensive enough to detect any damage or maladjustment which might jeopardize flight safety. After the first 25 hours of new or overhauled engine operation, refer to paragraph 5-20-05 for the recommended engine inspection.

1. Visually inspect propeller, spinner, and engine cowling; open cowling.

2. Inspect and clean induction air filter if aircraft has been operating under dusty conditions. Check operation of alternate air door.

3. Inspect engine compartment for evidence of fuel, oil or exhaust leaks.

4. Inspect security and condition of equipment installed on engine.

5. Inspect fuselage, wing and empennage for external evidence of damage. Pay particular attention to scratches and dents.

6. Inspect windshields and windows for crazing, cracks, and scratches.

7. Check control systems for binding, excessive freeplay, and damage.

8. Inspect pitot and static systems for possible obstructions.

9. Inspect aircraft exterior for security of bolts, screws, etc.

10.Inspect and service battery.

5-20-05 - 50-HOUR INSPECTION

The 50-hour inspection includes all requirements for the 25-hour inspection, plus the necessary removal of inspection doors, panels, or fairings. After the first 25 hours of operating time, a new, remanufactured, or newly overhauled engine should be given a 50-hour inspection including replacement of the lubricating oil. Refer to TCM O/H Manual, X30596A, Section 5-20-00 for required inspections for engine.

1. Engine.

A. Drain engine oil sump.

B. Remove and clean suction oil strainer; reinstall strainer and plug. Safety wire strainer plug.

C. Remove and replace the full-flow oil filter cartridge.

D. Drain and clean fuel strainer.

E. Remove and clean fuel injector fuel strainer.

F. Service engine oil sump with proper type, grade, and amount of lubricating oil.

G. Inspect engine intake and exhaust systems for evidence of leakage and looseness.

H. Iinspect spark plug elbows and shielding nuts for security.

I. Inspect cylinders for evidence of overheating.

J.Iinspect turbocharger for security of clamps and attachments.

K. Inspect baffles for secure anchorage, close fit around cylinders, and freedom from cracks.

L. Check engine controls for full travel, freedom of movement, and security.

M. Visually inspect fuel and oil lines for security of connections and evidence of leakage or damage.

N. Visually inspect induction air system; check operation of alternate-air door (refer to paragraph 71-62-00).

2. Propeller.

A. Inspect propeller and spinner for general condition, looseness, and oil leakage.

B. Inspect blades for nicks and cracks. Repair prior to next flight.

3. Cabin.

A. Check brake and parking brake control systems for proper operation and fluid level.

B. Check trim system and indicator for free operation and travel.

C. Check cabin and baggage doors for damage, proper operation, and sealing.

D. Check cabin, instrument, position, anticollision, and landing lights.

E. Check fuel selector valve, gascolator, and boost pump for proper operation.

F. Check oxygen system (if installed).

4. Landing Gear.

A. Inspect tires for cuts, blisters, wear, and inflation.

B. Inspect shock discs for proper extension at aircraft static weight per Section 32-81-00.

C. Inspect hydraulic brakes for wear, warpage and proper installation.

5. Wings.

A. Inspect surfaces and tips for damage.

B. Inspect ailerons, aileron attachments, and bellcranks for damage and proper operation.

C. Inspect flaps and attachments for damage and proper operation.

D. Lubricate controls if necessary.

6. Fuselage and Empennage.

A. Inspect stabilizer, elevators, fin, and rudder for damage and proper attachment.

B. Lubricate controls if necessary.

7. See Section 5-20-07 for any repetitive 50 Hour Inspections and/or Component Service Guide.

5-20-06 - 100-HOUR INSPECTION (or ANNUAL) (Refer to Fig. 5-4)

The 100-hour (or annual) inspection is a thorough, searching inspection of the entire aircraft. Preparation for the inspection includes the thorough cleaning of aircraft exterior and engine compartment, removal of fuselage, wing, and empennage inspection doors, cover plates, and fairings at all systems attach, hinge, and bearing locations (including wing and empennage to fuselage mating points). Operating limit replacement and special testing of components is to be included at this interval when applicable. Comply with applicable FAA Directives, AD Notes, and applicable Mooney and Vendor mandatory Service Bulletins and Instructions. Check for aircraft conformance to FAA Specification 2A3. Recommended 100-hour and special inspection requirements are outlined in the following paragraphs. Refer to TCM O/H Manual, X30596A, Section 5-20-00, for engine inspections required. Refer to System Chapters of this S & M manual for specific maintenance procedures.

1. **ENGINE INSPECTION**. Prior to the inspection, remove the engine cowling and propeller spinner. Wash down the engine and engine compartment. Then perform an engine runup in accord with the procedure recommended in the TCM Maintenance and Operators Manual, Section VIII. To verify correction of malfunctions and abnormalities, perform a second runup and fight test after the 100-hour inspection engine set-up.

A. Complete a differential (hot engine) compression check: clean and gap or replace spark plugs if necessary.

B. Inspect engine for evidence of excessive fuel or oil leakage. Inspect oil cooler. Inspect oil & fuel hoses for condition & security.

C. Drain engine oil sump; remove, inspect, & clean oil suction screens; reinstall and safety. Remove full-flow oil filter cartridge; replace with new cartridge and safety. inspect crank case breather lines for obstruction. Safety wire oil filter installation.

D. Refill engine oil sump with the proper type, grade, and quantity of lubricating oil.

E. Inspect fuel injector and all fuel line connections for security and condition.

F. Remove, inspect and clean gascolator strainer, reinstall strainer. Inspect fuel lines and connections: pressure check fuel system with mixture control at IDLE CUTOFF and BOOST PUMP ON.

G. Inspect all air ducting and connections in the heating and induction air systems for leaks. Remove and clean induction air filter (replace at 500 Hrs). Leak check all exhaust manifold connections, engine exhaust manifolds and resonator connections (if equipped). Inspect turbocharger housing per TCM SB M83-3 (25-0001 thru 25-0999).

H. Inspect alternate air door and magnet for security and operation.

I. Check magnetos for grounding and synchronization; inspect magneto points for condition, clearance, and timing. Inspect distributor block for erosion and cracks. inspect cam follower felt for proper lubrication, and remove excessive oil from breaker compartment. Inspect magneto pressurization. Repair or replace components,if required, per Bendix SB No. 612 (@ 500 hrs) and Slick SL 1-84.

J. Inspect baffles for secure anchorage, cracks, holes, deformation, and for close fit around cylinders. Inspect cylinders for burned paint and cracked or broken fins. Inspect baffle sealant.

K. Check engine and propeller controls for free operation, proper lubrication, full travel, proper connection (security) of cable housing swage at head tube and security of attachment.

NOTE
Cablecraft control cables are lubricated for life of control cable. DO NOT remove seals or lubricate control cable.

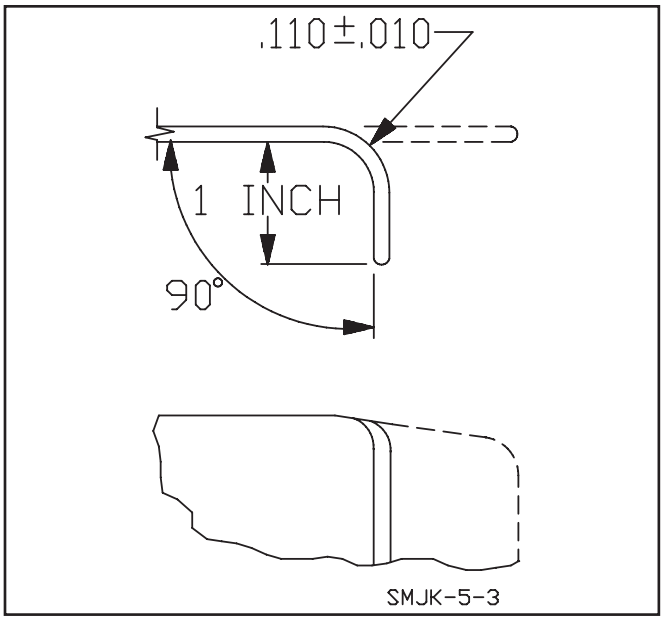
L. Inspect tubular engine mount for cracks, corrosion; inspect all bolts and rubber mounts for security and condition.

M. Inspect battery cables, electrical wiring, and ignition harness for condition, secure anchorage, loose terminals, and burned or chaffed insulation.

N. Check engine fuel pump pressure. (See T.C.M. Service info. and Section 71-00-50 for this procedure).

O. Inspect battery, battery box area, and vent system for condition, corrosion. inspect blast tube for obstruction. Flush battery box and battery case with soda if necessary.

P. Inspect accessory case, starter, alternator, standby generator (if installed) (S/N 25-0001 thru 25-0999) or No. 2 alternator (25-1000 and ON ,if



TYPICAL "Q" TIP BLADE - FIGURE 5-3

installed), vacuum pump, hose, firewall and fittings for security or damage.

Q. Inspect turbocharger for condition per T.C.M. Service Bulletin No.M83-3 or later information (Ref. AD 82-07-03).

R. Inspect turbocharger control components for damage and condition. Ref. TCM O/H Man. X30596A.

S. Inspect intercooler for damage or obstructions.

T. Inspect exhaust system for cracks, looseness and for evidence of leakage. Replace or repair damaged components.

U. Inspect exhaust stacks for burned areas, cracks, distortion and looseness.

V. Inspect exhaust couplings, seals, clamps and slip-joints for cracks, deformation, leaks and security.

W. Inspect studs, nuts, bolts, etc. for damage and proper torque.

X. Inspect and reinstall cowling. Check cowl flap(s) for operation , condition, proper opening and position indication (25-1000 thru 25-TBA).

Y. Inspect landing lights for security and condition. Light beams down 2 degrees maximum from level.

(S/N 25-0001 thru 25-1224)

2. PROPELLER INSPECTION.

A. Remove spinner (if not already removed).

B. Inspect security of propeller installation.

C. Inspect hub studs/nuts/bolts for proper torque, security and damage. Ref. Section 61-00-20, 5.

D. Inspect hub parts and blades for cracks and nicks. Repair prior to next flight.

E. Q-tip blade inspection and repair. The tip of the blade is formed at the factory with a bend of 90 degrees toward the blade face (aft). The material thickness in the radius of bend is closely controlled such that the cold bend allowance is not exceeded. A sketch of the “Q” tip is shown (Figure 5-3).

INSPECTION: Inspect “Q-Tip” for stone nicks and scratches using the same procedure as on the complete blade. Inspect for evidence of the bend being deformed by assuring that the bend edge is 90 degrees. Also inspect for deformed waviness of the bend. REPAIR: Material in the bend area (.110 plus or minus .010) may be removed for repair of nicks and scratches to a minimum blade thickness of .065. Correspondingly, reduce the very tip region, when required, to a minimum of .010 less than the resulting thickness of the bend area. The bend may be reduced in length for repair from the one inch dimension to approximately .75 inches. The 90 degree bend that has been deformed by 20 degrees or less may be straightened by using a rubber mallet and block assuring that no waviness or other damage results from the straightening process; inspect for cracks.

The chord length may be reduced for repair similar to the procedure of a standard blade assuring that all blades are the same so that the aerodynamic balance of the propeller will not be affected.

F. Check for loss of grease; lubricate per Mfgr’s. data.

G. Inspect anti-icing boots for security and defects.

H. Inspect spinner and bulkhead for cracks and condition.

I. inspect spinner bulkhead for correct interference fit with prop cylinder. (Use Teflon Tape to obtain correct fit.)

3. LANDING GEAR and RETRACTION SYSTEM INSPECTION.

A. Inspect tires for proper inflation, cuts, blisters, slippage, and heavy wear.

B. Inspect wheels for cracks, distortion, misalignment, corrosion, bolt failure. inspect condition of felt seals and bearings; repack bearings at 250 hour intervals.

C. Inspect brake pads & discs for warping and wear. Ref. Section 32-40-04.

D. Check hydraulic reservoir for proper fluid level.

E. Inspect hydraulic brake lines and hoses for leakage, dents, cracks chafing, kinks, and security of anchorage.

F. Check parking brake system for proper engagement and release.

G. Inspect shock disc gap, Main and Nose gear, per Section 32-81-00.

H. Inspect landing gear components for hard landing damage. Ref. Section 32-82-00.

Jack aircraft as recommended in paragraph 7-10-00 for the following inspections:

I. Inspect nose gear for cleanliness and damage. inspect nose gear retraction tube bungees for sheared or broken roll pins.

NOTE
Maximum allowable towing damage on leg assembly is 1/32 inch dent.

J. Inspect nose wheel steering mechanism for adjustment, alignment, corrosion, and lubrication.

K. Inspect main gear for cleanliness or damage.

L. Inspect landing gear retraction linkage, bellcranks, pivots, and bearings for wear, damage, distortion, misalignment, corrosion, cleanliness, and lubrication.

M. Inspect the landing gear actuator for security of mounting, cleanliness, and indication of overheating or damage. Inspect actuator motor operation and brush wear.

N. Perform landing gear operational check per Section 32-30-01.

4. **FUEL SYSTEM INSPECTION**.

A. Inspect fuel tank exterior for evidence of fuel seepage and stain.

B. Drain tank and inspect tank interior when seepage is evident.

C. Inspect fuel tank drains for leakage, sediment, and water contamination.

D. Inspect fuel-tank vents for obstruction.

E. Check fuel selector valve for proper tank selection, smooth operation, and leakage in OFF position.

F. Inspect gascolator for leakage; check sump for sediment, water or other contamination.

G. Inspect boost pump for leaks, security of mounting, adequate fuel pressure, switch operation, and condition of wiring and electrical connections.

(1) Check electric fuel boost pump for proper operation by “T” ing into the line between electric fuel pump and engine with a calibrated fuel pressure gauge.

(a) High boost operation should result in a 23.5 to 24.5 P.S.I. reading (mixture full RICH, throttle-IDLE).

(b) Low Boost pump pressure check - 6-8 P.S.I. See Section 24-37-00 for adjustment procedures.

H. Inspect fuel quantity gages and transmitters for security of mounting and condition of wiring and electrical connections.

I. Inspect fuel tank filler port for cleanliness, cap security, and condition of servicing placards. Inspect cap O’rings for condition and replace if needed.

5. **EXTERIOR INSPECTION**.

A. Thoroughly clean aircraft exterior

B. Inspect fuselage exterior surfaces for corrosion, damage, loose or popped rivets, dents, cans, scratches, cracks, and deteriorated paint.

C. Inspect windshields and windows for cracks, crazing, scratches, condition of seals, and security of installation.

D. Inspect wings, flaps, and ailerons for corrosion, damage, loose or popped rivets, dents, scratches, cracks, condition of attaching points, lubrication, freedom of operation, free-play, travel, and balance weight attachment.

E. Inspect speedbrake cartridges for damage and wear. Check for proper operation. Every 1000 hour inspections - see 27-96-02.

F. Inspect empennage for corrosion, damage, loose or popped rivets, free-play, dents, scratches, cracks, condition and lubrication of hinge points, attachment of balance weights, and freedom of operation.

G. Inspect cabin door and door frames for damage, corrosion, nicks, dents, hinge security, and lubrication.

H. Inspect cabin door lock mechanism for lubrication and proper engagement. See Section 52-11-00 for rigging procedures.

I. Inspect the baggage door and baggage compartment for damage, corrosion, warpage, hinge security, condition to door frame and door seals, condition and operation of door locking mechanism, and condition of cargo tiedowns.

J. Inspect ventilating system drain line for obstruction.

K. Inspect landing and taxi lights for security, condition and proper adjustment. See Section 33-43-00 for adjustment procedures.

L. Inspect Decal & Placards for condition & location.

M. Inspect exterior for signs of lightning strike. Inspect static wicks, wing timps, antennas, empennage extremeties (vertical & horizontal), and propeller tips and trailing edges fosr signs of burned/charred or other high voltage/arc damage.

6. **INTERIOR INSPECTION**.

A. Inspect seats, seat tracks, and upholstery for cleanliness and mounting security; check seats for condition and operation of position locks; inspect seat structure for cracks, deformation, corrosion, and mechanism lubrication.

B. Inspect safety belts, harnesses, and attaching brackets for cleanliness, condition, latch operation, and security of attachment.

C. Inspect for loose equipment that might restrict control movement.

D. Inspect Oxygen system (if installed). Refer to Chapter 35.

E. Inspect Placard & Decal for condition and location.

7. **INTERNAL INSPECTION**.

A. Open access panels and inspection doors, and remove fairings as required.

B. Inspect wing attaching bolts for proper torque and safetying and evidence of damage or corrosion.

C. Inspect forward side of firewall for damage.

D. Inspect tubular structure for corrosion or damage (interior panels may require removal). Reference Mooney Service Bulletin M20-208B or subsequent revisions.

E. Inspect wing ribs and stringers for cracks and evidence of damage or corrosion.

F. Inspect wing spars for damage, distortion, cracks, or corrosion.

G. Inspect wires, lines, and ducts for security, damage, interference, chaffing, and bonding.

NOTE
Seal all receptacles and plugs outside cabin environment with Dow Corning #4.

H. Inspect wing interior for foreign material, corrosion, and evidence of fuel leakage.

I. Inspect empennage attachment brackets and hardware for corrosion.

J. Inspect empennage attaching brackets and hardware for corrosion.

8. **FLIGHT CONTROL INSPECTION**.

A. Inspect control column and control wheels for full travel, proper rigging, free-play, binding, security of mounting, proper lubrication, and direction of control surface movement with relation to control movement.

CAUTION
All flight control components should be Inspected to verify that all moisture drain holes are free of obstructions.

B. Inspect elevator system for rigging, travel, stop adjustment, condition of bearings, bellcranks, and hinges, wear on downspring eyes, cable pulley and fittings, security of mounting, damage, corrosion, proper lubrication and proper relation to control movement.

C. Inspect aileron system for damage, corrosion, lubrication, rigging, travel, stop adjustment, condition of bellcranks & hinges, pivots and rod end bearings, and link bolt security.

D. Inspect rudder system for damage, corrosion, lubrication,rigging, condition of hinges, bellcranks, security of link bolts, rod end bearings, and proper relationship to control movement. Check for free movement of toe-brake pedals and proper rudder and nose wheel travel.

E. Inspect stabilizer trim control system for security and proper adjustment, shaft and stop nuts for proper rigging, trim control wheel for smooth operation, universal joints for free-play and good working order, actuator threads for lubrication, linkage for corrosion, and guide blocks for looseness or excessive wear.

F. Inspect flap system for rigging, travel, and stop adjustment; flap tubes, interconnects, bellcranks & hinges for corrosion, security, and lubrication.

NOTE
All control rigging checks should be made with the aircraft jacked and leveled and with the landing gear retracted.
NOTE
Some elevator trim tubes have poly tape wrapped at bulkhead penetrations. If tape shows signs of wear, rerap (1/2 lap) tube with 2" wide Y9265 polyurethane tape. Trim tubes, without tape, which show signs of abrading grommet should be wrapped. See SB M20-185.

MAX. TUBE WEAR - .007 in. per wall or .014 in. diameter reduction.

Inspect Speedbrake Cartridge every 1000 hours per the following:

G. Remove **Series 100** Speedbrake Cartridge from access cover beneath LH & RH side of wing & **Series 2000** from top side of LH & RH wing.

1. Visually Inspect doubler and mounting hardware for structrual integrity.

2. Visually Inspect for chafing on all moving parts.

3. Manually operate speed brake doors and feel for smooth operation [vacuum units only].

4. Inspect cable (on Vacuum Units) especially around pulleys for fraying.

H. Report any deficiences (if any) to Precise Flight, Inc.

I. Reinstall Speedbrake Cartridges, LH & RH side of wing.

9. **INSTRUMENT/ AVIONICS INSPECTION**.

A. Inspect all instrument wiring and plumbing for condition and proper connections.

B. Clean and inspect vacuum filter. Replace garter filter on vacuum regulator.

C. Inspect vacuum regulator at vacuum manifold. Check operation of high-and low-vacuum warning lights or vacuum gage. Inspect Stand-by Vacuum System in accordance with Section 37-40-00.

D. Inspect all instruments for proper pointer indication, range and limit markings, condition of indicator markings, cracked or loose glass, slippage marks, and security of installation.

E. Inspect compass for proper lighting, compensation, security of mounting, liquid leakage, and discoloration. Swing compass at annual inspection and after any new equipment has geen installed.

F. Inspect altimeter for scale error, discolored markings, proper pointer readings, setting knob freedom, and syncronization of barometric scale with reference markers.

G. Inspect flight panel for security of mounting, condition of shock mounts, freedom from interference with structure, and condition of ground straps.

H. Inspect Avionics Equipment for proper operation & security.

I. Inspect Avionics Antennas, wiring & shielding for obvious damage or defects.

J. Inspect pitot head for port obstruction; Inspect lines for cracks, dents, kinks, proper bend radius, and security of attachment. Drain system and check for leaks.

K. Inspect static ports for obstruction and aerodynamic smoothness at port installations. Inspect lines for bends, cracks, dents, kinks, and security of attachment. Drain system and check for leaks. Inspect alternate static pressure source located on left flight panel.

10. **ELECTRICAL FUNCTIONAL TEST**.

A. Check operation of navigation lights.

B. Check operation of landing lights.

C. Check operation of dome lights and cigar lighter.

D. Check operation of anticollision lights.

E. Check operation of instrument and placard lights. Check rheostat.

F. Check operation of pitot head heater.

G. Check operation of cluster gauge.

H. Check operation of fuel gauges.

I. Check operation of annunciator light press-to-test switch.

J. Check operation of ignition switch, and starter solenoid.

K. Flight check operation of landing gear position lights and warning horn.

L. Flight check operation of stall warning horn.

M. Check operation of "Prop De-Ice" (if installed). Push switch "ON", observe prop de-ice ammeter for: (1) needle in green arc (8 to 12 amps), and (2) fluctuation every 90 seconds as heating elements are switched. (S/N 25-0001 thru 25-0999). Observe ship ammeter on S/N 25-1000 thru 25-TBA for a flicker as each blade boot cycles.

N. Inspect battery & battery connection for proper installation and cleanliness.

11. **MISCELLANEOUS/OPTIONAL EQUIPMENT**

A. Inspect any installed equipment not covered by previous paragraphs for proper operation, attachment and obvious defects.

12. **POST INSPECTION FLIGHT TEST.**. Flight test the aircraft to verify correction of all malfunctions and abnormalities. Make proper entries in aircraft log book.

Wing access covers may vary to some degree between model year aircraft.

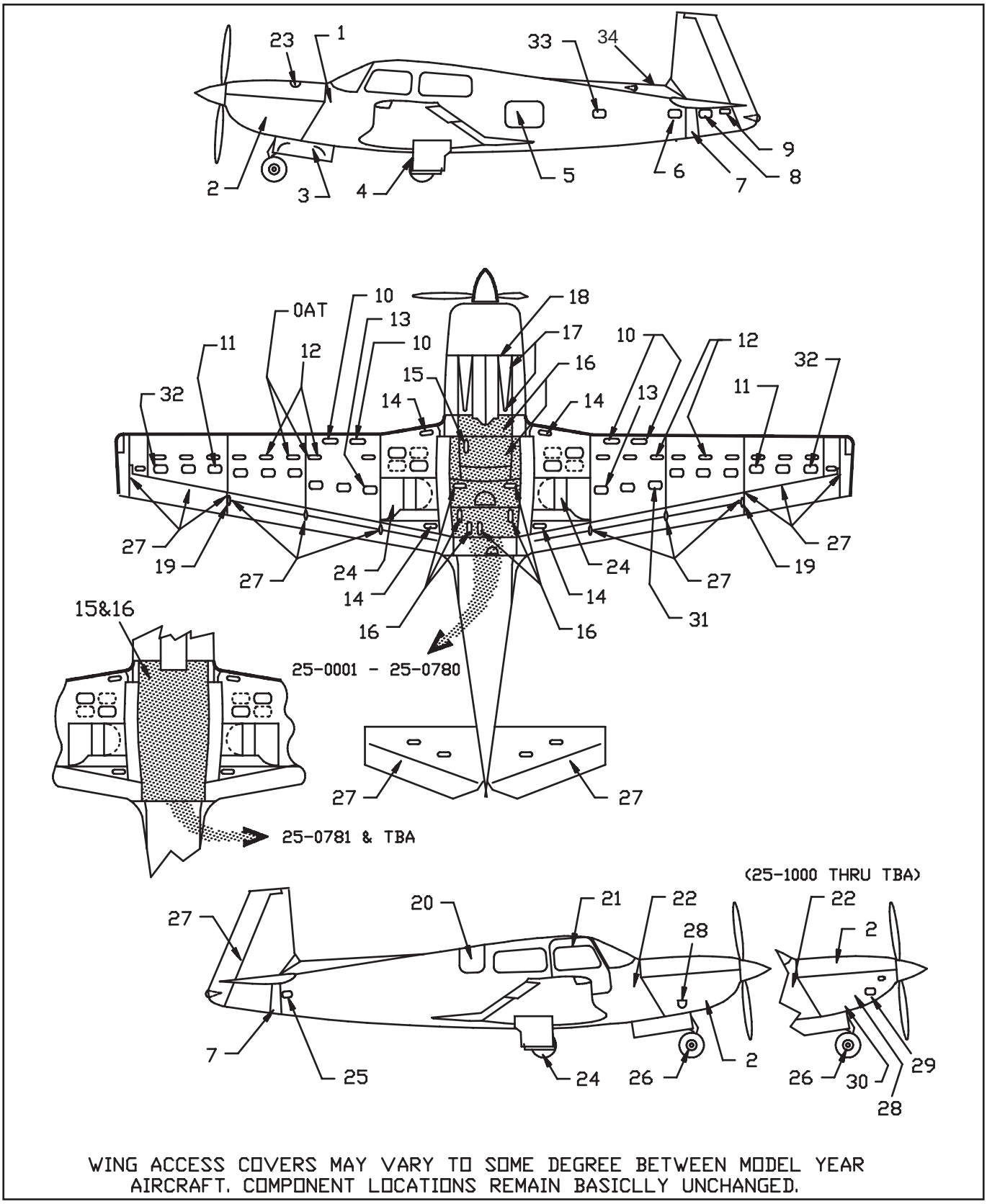
Component locations remain basically unchanged.

5-20-07

- ACCESS COVER IDENTIFICATION, LUBRICATION AND SERVICE GUIDE

ITEM NO.	ITEM DESCRIPTION	LUBRICATION SYMBOL*	INTERVAL (HRS)
1	Flight Instruments	♣	****
	Vacuum Regulator	♣	500 ***
	Turn Coordinator		
	Vacuum Filters—Replace at		500 ***
	Control System Adjustments:		
	Control Column Bearing Ball	y	100
	Rod End Bearings	y	100
	Universal Joints	Δ	100
	Bellcranks	Δ	100
2	Engine Cowling	♣	100
	Vacuum Pumps	♣	500
3	Nose Gear Grease Fittings	W	100
	Retraction Tube Rod End Bearings	y	100
	Bellcranks	Δ	100
	Bungees	Δ	100
	Gear Door Rod End Bearings	y	50
4	Main Gear Grease Fittings	W	100
	Main Ldg Gr Spring Link @ bolt	α	100
	Retraction Tube Rod End Bearings	y	100
	Bellcranks	Δ	100
	Bungees	Δ	100
	Gear Door Rod End Bearings	y	50
	Electric Gear Actuator Gear Box **	W	AR
	Electric Gear Actuator Ball Screw	ë	1000
5	Elevator & Rudder Controls:		
	Control Tube Rod End Bearings	y	100
	Bellcranks	Δ	100
	A/P electric pitch carrier bearing assembly	ê	100
	Battery	♣	100
	Stabilizer Trim Control Shaft:		
	Universal Joints	Δ	100
	Guide Blocks	α	100
	Hydraulic Reservoir	b	50
	Oxygen, High Pressure Fittings	ñ	50
	ELT Transmitter	♣	100
	Stand-by Vacuum Pump (if installed)	♣	100
6	Elevator & Rudder Controls:		
	Control Tube Rod End Bearings	y	100
		Δ	100

| ITEM NO. | ITEM DESCRIPTION | LUBRICATION SYMBOL* | INTERVAL (HRS) |



WING ACCESS COVERS MAY VARY TO SOME DEGREE BETWEEN MODEL YEAR AIRCRAFT. COMPONENT LOCATIONS REMAIN BASICLLY UNCHANGED.

ACCESS COVER ID, LUBRICATION & SERVICE GUIDE - FIGURE 5 - 4

NOTE

Access covers rrveted in place during production need not be removed for routine inspections.

ITEM NO.	ITEM DESCRIPTION	LUBRICATION SYMBOL*	INTERVAL (HRS)
6. (con't.)			
	Stabilizer Trim Jack Screw/Actuator	X	100
	Variable Downspring System	y	100
	Tail Strobe Light Power Supply	♣	100
7	Empennage Attach Points.	♣	100
	Stabilizer Trim Attach Point	♣	100
8	Elevator & Rudder controls:		
	Control Tube Rod End Bearings	y	100
9	Elevator & Rudder Controls:		
	Control Tube Rod End Bearings	y	100
10	Aileron Control Tube Guide Blocks	α	100
11	Aileron Controls:		
	Control Tube Rod End Bearings	y	100
	Bellcranks	Δ	100
12	Aileron Control Tube Guide Blocks	α	100
13	Main Gear Retraction	Δ	100
14	Wing Points	♣	100
	Control Tube Guide Blocks	α	100
15	Stabilizer Trim Screw & Stops.	X	100
	Trim Indicator Adjustment Point	♣	100
	Stabilizer Trim Chain & Gear	α	100
16	Elevator & Rudder Controls:		
	Control Tube Rod End Bearings	y	100
	Bellcranks	Δ	100
	Guide Blocks	α	100
	Flap Indicator Cable	Δ	100
	Electric Flap Actuator Gear Box	W	500
	Electric Flap Actuator Ball Screw	ë	100
17	Electric Boost Pump	♣	100
	Gascolator.	Δ	50
18	Control Systems:		
	Control Tube Rod End Bearings	y	100
	Control Yoke (Lower Section)	Δ	100
	Nose Gear Steering Link Rod End Bearings	y	100
	Rudder Pedal Cross Shaft	Δ	100
	Rudder-Aileron Bungee.	Δ	100
	Hydraulic Brake Cylinder Pedal Linkage	Δ	100
19	Aileron Control Tube Rod End Bearings	y	100
	Outboard Flap Stops	♣	100
20	Baggage Compartment Door:		
	Hinges	Δ	100
	Latches	D	100
	Seals	c	100
	Lock.	♦	100
21	Cabin Door:		
	Hinges	Δ	100
	Latches	D	100
	Seals	c	100
	Hold-Open Arm	β	100
	Lock.	♦	100

22	Engine Instruments	♣	100
	Radios	♣	100
23	Oil Dip Stick, Oil Filler Tube	Ñ	AR
24	Wheels & Brakes:		
	Wheel Bearings	Y	250
	Brake Pressure Plates Anchor Bolts & Guide Pins	y	50
	Shock Discs	♣	50
25	Elevator & Rudder Control Stops	♣	100
26	Nose Wheel:		
	Wheel Bearings	β	250
	Shock Absorber (May be deleted from aircraft)		100
	Shock Discs	♣	50
27	Control Surface Hinges	S	100
28	Assy/Exhaust Assy	♣	100
29	Air Induction Filter	♣	50
30	Cowl Flap Indicator Cable	♣	100
31	Remote Compass Flux Valve	♣	100
32	Strobelight Power Supply	♣	100
33	ELT (Batteries)	♣	100
34	ELT Antenna (under Dorsal Fin)	♣ (signal verification)	100

NOTES
* See page 20 of section for lubrication symbol legend.
** No periodic lubricant on Avionics Products #102000-2. If necessary to use Aeroshell 22, Mobil 28 or MIL-G-81322 ONLY.
*** Change garter filter on vacuum regulator every 100 hours. Change instrument filters at 500 hours, clean every 100 hours.
**** Change instrument filters at 500 hours, clean every 100 hours.

--- LUBRICATION SYMBOL LEGEND ---

SYMBOL	MIL. SPEC. NO.	DESCRIPTION
Δ =	MIL-L-7870	Low Temperature Oil (General Purpose)
W =	MIL-G-81322	Grease
β =	MIL-L-3545	Grease (High Temperature)
b =	MIL-H-5606	Hydraulic Fluid (Red)
α =		Graphite & MIL-G-3278 Grease or MIL-G-23827
♦ =		Powdered Graphite
y =		Teflon Spray (TRI-FLOW)
D =		Stick Lubricant (Door Ease or Equivalent)
X =		Aeroshell Grease NO. 7 (On jackscrew and inside Actuator Bearing Housing)
ë -		Lubriplate 630AA (10% by Volume Molybdenum Disulfide Mixture Permissible)
c -		Seal Dressing
♣ -		Inspect

--- LUBRICATION SYMBOL LEGEND ---
(con't.)

SYMBOL	MIL. SPEC. NO.	DESCRIPTION
ñ -		Tape, Tetrafluoroethylene (MIL-T-27730) Permacel Tape Corp., New Brunswick, NJ
Ñ -		TCM Spec. MHS-24( )
ê -	MIL-G-23827, MOBIL # 27	Grease

VISCOSITY REQUIREMENTS:

TSIO-360-GB, -LB or -MB Series Engines:

Above 30^{O} F Ambient, S.L 50 WT
Below 50^{O} F Ambient, S.L. 30 WT. or 10W30

TSIO-360-SB Series Engines:

Above 40^{O} F ambient, SL 50 or 20W65
Below 40^{O} F ambient, SL 30, 10W30, 15W50 or 20W50

Approved Oil:

Phillips Aviation Oil, Type A;
Aeroshell W; Conoco Aero S;

Texaco Aircraft Engine Oil - Premium AD;
Mobil Aero Oil;
Castrol Aero AD Oil; Pennzoil Aircraft Engine Oil; Sinclair Avoil;

Exxon Aviation Oil EE; BP Aero Oil; Delta Avoil;

Union Aircraft Engine Oil HD;

Gulfpride Aviation AD; Quaker State AD Aviation Engine Oil.

Multiviscosity Oils:

X/C Aviation Multiviscosity Oil SAE 20W -50;
Red Ram X/C Aviation Oil 20W - 50;
Aeroshell Oil W SAE 15W/50.

NOTE

Mooney Aircraft are delivered with the proper break-in oil; MIL-L-6082, MIL-C-6529C Type II or SAE 20W-50 Type I. This oil should be changed, after 25 hours or after oil consumption has stabilized, to oil conforming to

TCM Spec MHS-24(B) or subsequent revision.

For aircraft S/N 25-1000 & ON — Mooney Aircraft Corporation recommends using multiviscosity oil in these aircraft, both mineral & additive oil.

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CHAPTER 6

DIMENSIONS AND AREAS

CHAPTER 6

DIMENSIONS AND AREAS

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6-00-00 - DIMENSIONS AND AREAS 6-00-01 - AIRCRAFT SPECIFICATIONS

ENGINE	STANDARD	METRIC/OPT/MISC.
Engine Manufacturer	Teledyne Continental Motors (TCM)	
Engine Model	TSIO-360-GB(1), -GB(3), -GB(4)	25-0001 thru 25-0780
	TSIO-360-LB(1)	25-0781 thru 25-0999
	TSIO-360-MB1	25-1000 thru 25-1999
	TSIO-360-MB7 *	25-2000 thru 25-2012 *
	TSIO-360-SB	25-2013 thru 25-TBA *
No. Cylinders	6	
Rated Horsepower		
TSIO-360-GB, LB, MB Series	210 HP	
TSIO-360-SB Series	220 HP	
RPM		
-GB, -LB, -MB Series	2700	
-SB Series	2600	

* -MB7 engines may be retrofitted into -SB configuration when c/w Mooney Retrofit Kit is accomplished.

Min. Fuel Octane	100 or 100 LL.	
Fuel Capacity		
Total	** 80 U.S. Gal.	302.8 Liters
Useable	** 72 U.S. Gal.	264.5 Liters

** S/N 25-0447 and ON have total fuel of 78.6 U.S. Gals. (297.5 Liters) and useable of 75.6 U.S. Gals. (286.1 Liters).

Oil Specification	MHS-24(B) or later revision ***	
Oil Grade (Vicosity)		
(-GB, -LB, -MB Series)		
Above 30°F.	SAE 50 W,	
Below 50°F.	SAE 30 W or 20W-50.	
All temperatures	15W-50	
(-SB Series)		
Above 40°F.	50 or 50W 65	
Below 40°F.	30, 10W 30, 15W50 or 20W50	
Oil Capacity	8 qts.	7.57 Liters
Minimum Safe Oil Level	5 qts.	4.73 Liters
Oil Consumption Liters/BHP/hr		
Up to 75% Power	.0032	
Above 75% Power	.0048	

*** First 25 hours of operation - mineral (non-detergent) oil or equivalent corresponding to MIL-C-6529 Type II.

Maximum Operational Induction Air Temperature	280° F.	138° C.
Continous Operation Turbine Inlet Temperature	1650° F.	899° C.
Operational Limit Turbine Inlet Temperature		
(-GB, -LB) (25-0001 thru 25-0999)	1725° F.	941° C
(-MB) (25-1000 thru 25-2012) *	1700° F.	927° C
(-SB) (25-2013 thru 25- TBA) *	1650° F	900° C

Oil Pressure			
Normal Operation (-GB,-LB,-MB,-SB)	30-80 P.S.I.		25-0001 thru 25-TBA
Idle, Minimum-	10 P.S.I.		
Max. Allowable (cold oil) Ground Run	100 P.S.I.		
Oil Temperature Max. Allowable	**240°** F.		116°C.
Recommended Takeoff - Min	100° F.(above 40° F. OAT)	37.8° C. (above 4.5° C. OAT)	
	150° F.(below 40° F. OAT)	65.6° C. (below 4.5° C. OAT)	
Recommended Flight Operation - Cruise	160 - 180° F.	71.1 - 82.2° C.	
Recommended Operating Range	100° - 200° F	37.8 - 93.3° C.	

ENGINE (con't.)	STANDARD	METRIC/OPT/MISC
Cylinder Head Temperature (CHT)		
Max. Allowable	460° F.	237.8° C.
Recommended @ Cruise	360 - 440° F.	182.2 - 226.7° C.
Recommended MAX., Operational	420°F	215°C
Minimum - T/O & Descent	240°F	116°C
Turbocharger		
Turbocharger Mfg.	Roto-Master	25-0001 thru 25-0999
	Garrett-Airesearch	25-1000 & ON
Type	Exhaust Driven	
Turbo Charger Model (-GB, -LB)	TCM 640955	Roto-Master
Turbo Charger Model (-MB) *	TCM 649151-1	Garrett-Airesearch
Turbo Charger Model (-SB)	TEA0411	Garrett-Airesearch
Overboost Valve	TCM 641404-1	"GB" Engines
	TCM 643511-3	"LB" Engines
	TCM 649006-5	"MB" Engines
		"SB" Engines
Absolute Press. Relief Valve	TCM 643511-3	"MB" Engines
		"SB" Engines
Variable Absolute Press. Controller	TCM 640655-28	Used with Airesearch
		Turbocharger
Operational Pressure Ratio	2.3:1	

PROPELLER - (25-0001 thru 25-1999)		
Propeller Mfg.	**McCauley**	**Hartzell Q-Tip (Optional)**
Type	Constant Speed	Constant Speed
Model (25-0001 thru 25-0999)	2A34C216/90DHB-16E	BHC-J2YF-1BF/F8459A-11Q
(25-1000 thru 25-2012) *	2A34C221/90DHC-16E or -16EP	(25-0001 thru 25-2012) *
Pitch Angle (HIGH)		
(25-0001 thru 25-0999)	33.0 (+/-).5 Deg.	30 Deg to 32 Deg
(25-1000 thru 25-2012) *	38.0 (+/-).5 Deg.	36.5 (+/-) 1 Deg
Pitch Angle (LOW)	14.7 (+/-).2 Deg.	14.7 Deg (+/-).1 Deg
Diameter	74.0 Inches	73.0 Inches
Governor	McCauley	McCauley

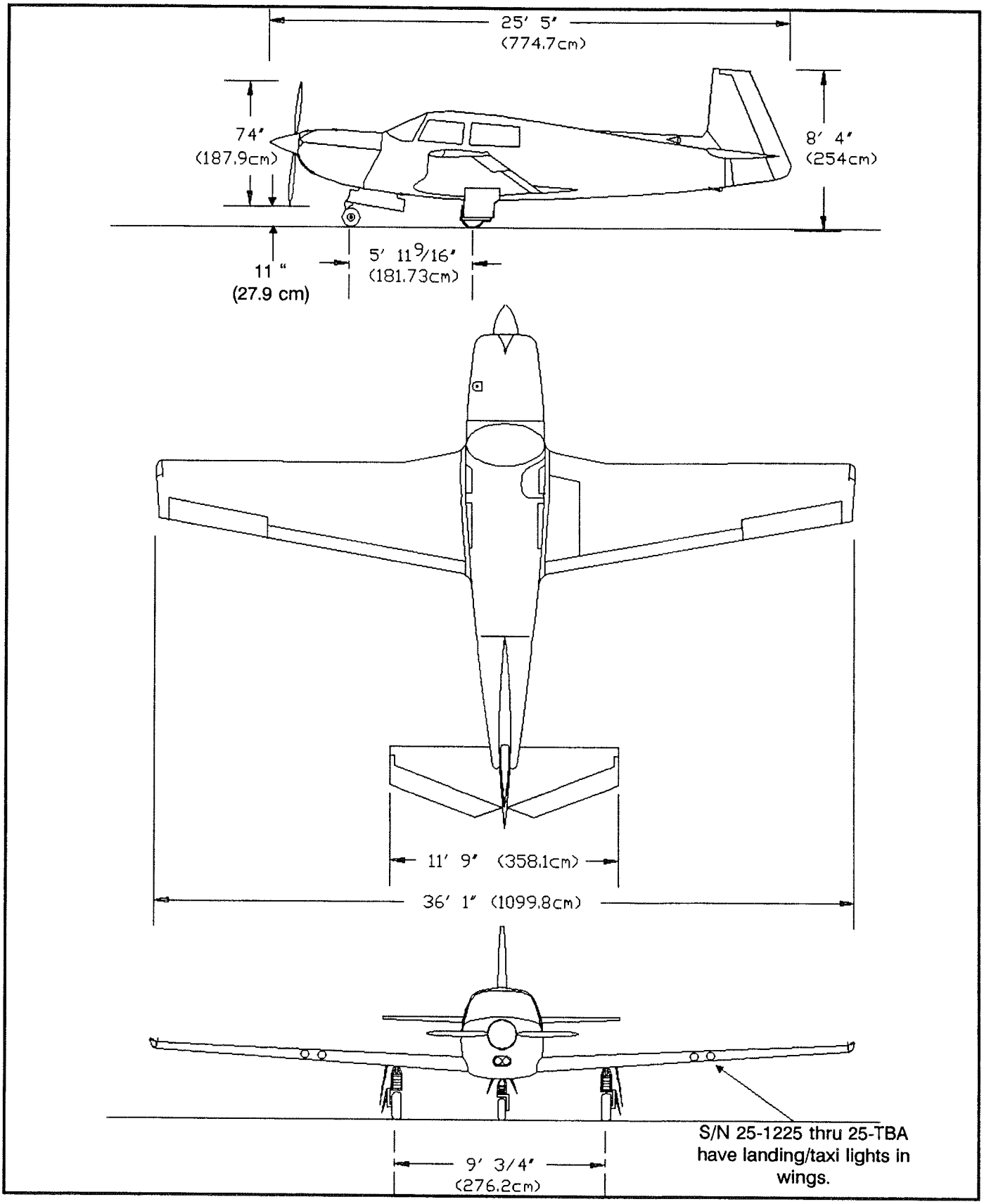
PROPELLER - (25-2000 thru 25-TBA)	
Propeller Mfg.	McCauley
Type	Constant Speed
Model	2A34C221/90DHC-16E or -16EP
Pitch Angle (HIGH)	
(25-2000 —25-2012) *	33.0 (+/-).5 Deg.
(25-2013 thru 25-TBA) *	38.0 (+/-).5 Deg.
Pitch Angle (LOW)	14.7 (+/-).2 Deg.
Diameter	74.0 Inches
Governor	McCauley

* -MB7 engines may be retrofitted into -SB configuration when Mooney Retrofit Kit is complied with.

AIRFRAME	STANDARD	METRIC/OPT/MISC
WEIGHTS & LOADINGS:		
A. Approximate Empty Weight		
(25-0001 thru 25-1999)	2000 lb.	907 kg.
(25-2000 thru 25-2012) *	2000 lb. *	907 kg. *
(25-2013 thru 25-TBA) *	2059 lb.	934 kg.
B. Gross Weight		
(25-0001 thru 25-1999)	2900 lb.	1315 kg.
(25-2000 thru 25-2012) *	2900 lb. *	1315 kg. *
(25-2013 thru 25-TBA) *	3130 lb.	1420 kg.
C. Useful Load		
(25-0001 thru 25-1999)	900 lb.	408 kg.
(25-2000 thru 25-TBA) *	1071 lb.	486 kg.
D. Wing Loading		
(25-0001 thru 25-1999)	16.59 lb./ft^2	80.98 kg/m^2
(25-2000 thru 25-2012) *	16.59 lb./ft^2 *	80.98 kg/m^2 *
(25-2013 thru 25-TBA) *	17.91 lb./ft^2 *	87.44 kg/m^2 *
E. Power Loading		
(25-0001 thru 25-1999)	13.8 lb/hp	6.3 kg/hp
(25-2000 thru 25-2012) *	13.8 lb/hp *	6.3 kg/hp *
(25-2013 thru 25-TBA) *	14.2 lb/hp *	6.45 kg/hp *

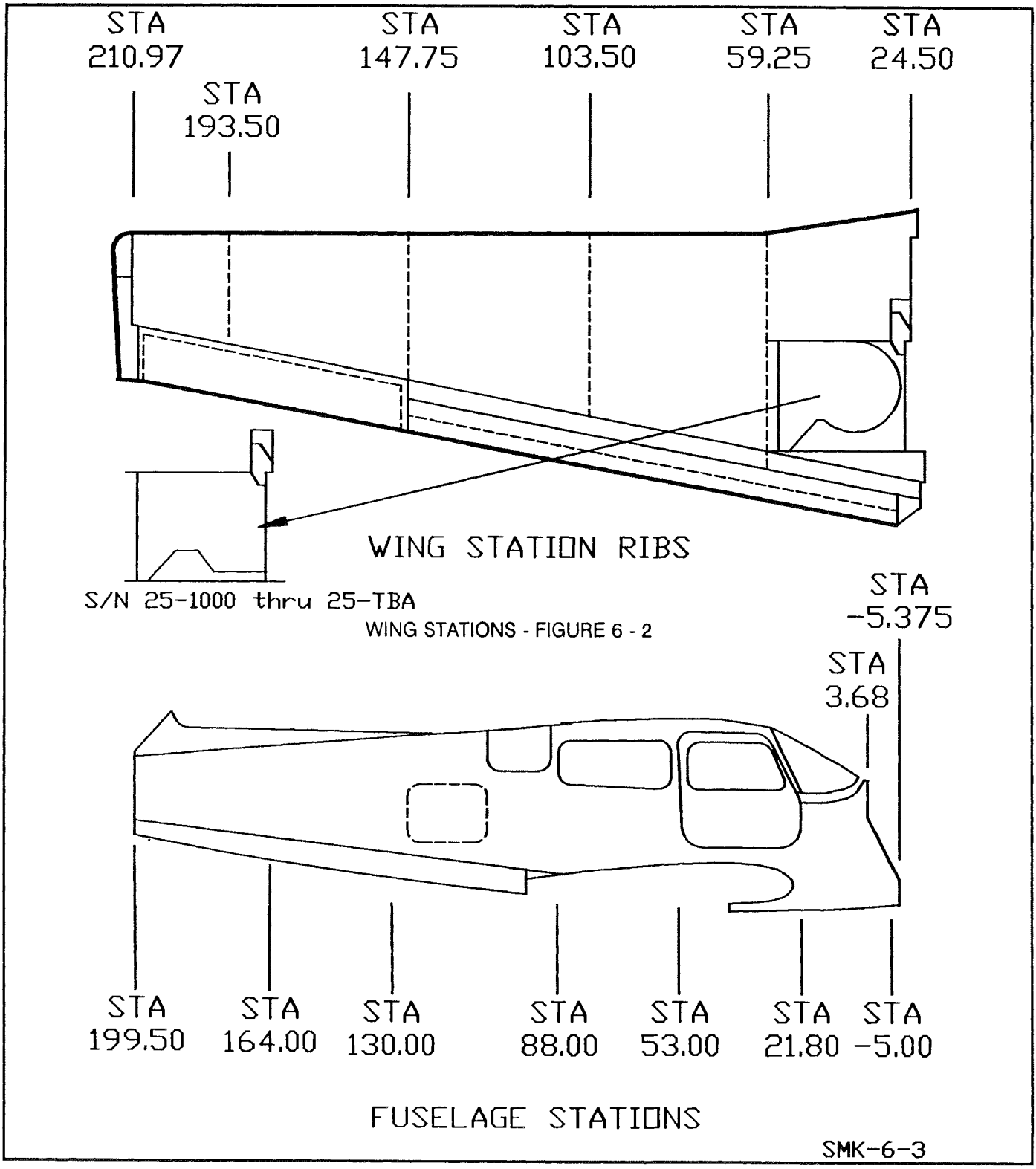
* 25-2000 thru 25-2012 may have Gross Weight increased when compliance with Mooney Gross Weight Retrofit Kit is accomplished.

WINGS:		
A. Airfoil At Wing Root	63_2215	
B. Airfoil At Wing Tip	64_1412	
C. Mean Aerodynamic Chord At Wing Sta.94.848	61 inches	154.94 cm
D. Center-of-Gravity Range	43.5 to 49.3 in.	110.5 to 125.2 cm
E. Geometric Twist (DEG)	1.5 Degree	
F. Incidence Angle (DEG) From Sta 20. to Wing Tip	2.5 Degree	
G. Dihedral angle (DEG)	5.5 Degree	
H. Aspect Ratio	7.448	
I. Taper Ratio (CS/CT)	2.271	
FUSELAGE:		
A. Cabin Dimensions:		
(1) Height	44.5"	113.03 cm
(2) Width	43.5"	110.49 cm
(3) Length	114"	289.56 cm
(4) Cabin Door Width	29"	73.66 cm
(5) Cabin Door Height	35"	88.9 cm
B. Baggage Campartment:		
(1) MAX.Loading	120 lbs	54.4 kg
(2) Baggage Space	17.0 Cu.Ft.(25-0001 thru 25-1224)	0.476 Cu. M.
	15.3 Cu.Ft.(25-1225 thru 25-TBA)	0.433 Cu. M
(3) Baggage Door Width	17"	43.2 cm
(4) Baggage Door Height	20.5"	52.1 cm
(5) Hat Rack Capacity	10 lbs	4.5 kg
C. Landing Gear:		
(1) Type	Tricycle Retractable	
(2) Operation	Electrical	
(3) Wheel Track	9' 2"	279.4 cm
(4) Wheel Base	5'11 9/16"	181.73 cm
(5) Tire Size—Nose	(6-Ply Rating) 5.00x5	
(6) Tire Size—Main	(6-Ply Rating) 6.00x6	
(7) Tire Pressure—Nose	49 lbs/sq. in.	
(8) Tire Pressure—Main	42 lbs/sq. in.	



DIMENSIONS - FIGURE 6 - 1

6-00-03 - AIRCRAFT STATIONS



WING STATIONS - FIGURE 6 - 2

FUSELAGE STATIONS - FIGURE 6 - 3

NOTE

The datum line station 0.0 is 5 inches aft of the nose gear trunnion pivot point. (Reference Figure 8-2.)

6-00-02 - AIRCRAFT DIMENSIONS

DIMENSIONS:

A. Wing Span	36'1"	10.998 meters
B. Fuselage Length	25'5"	7.747 meters
C. Tail Height	8'4"	2.54 meters
D. Stabilizer Span	11'9"	3.581 meters

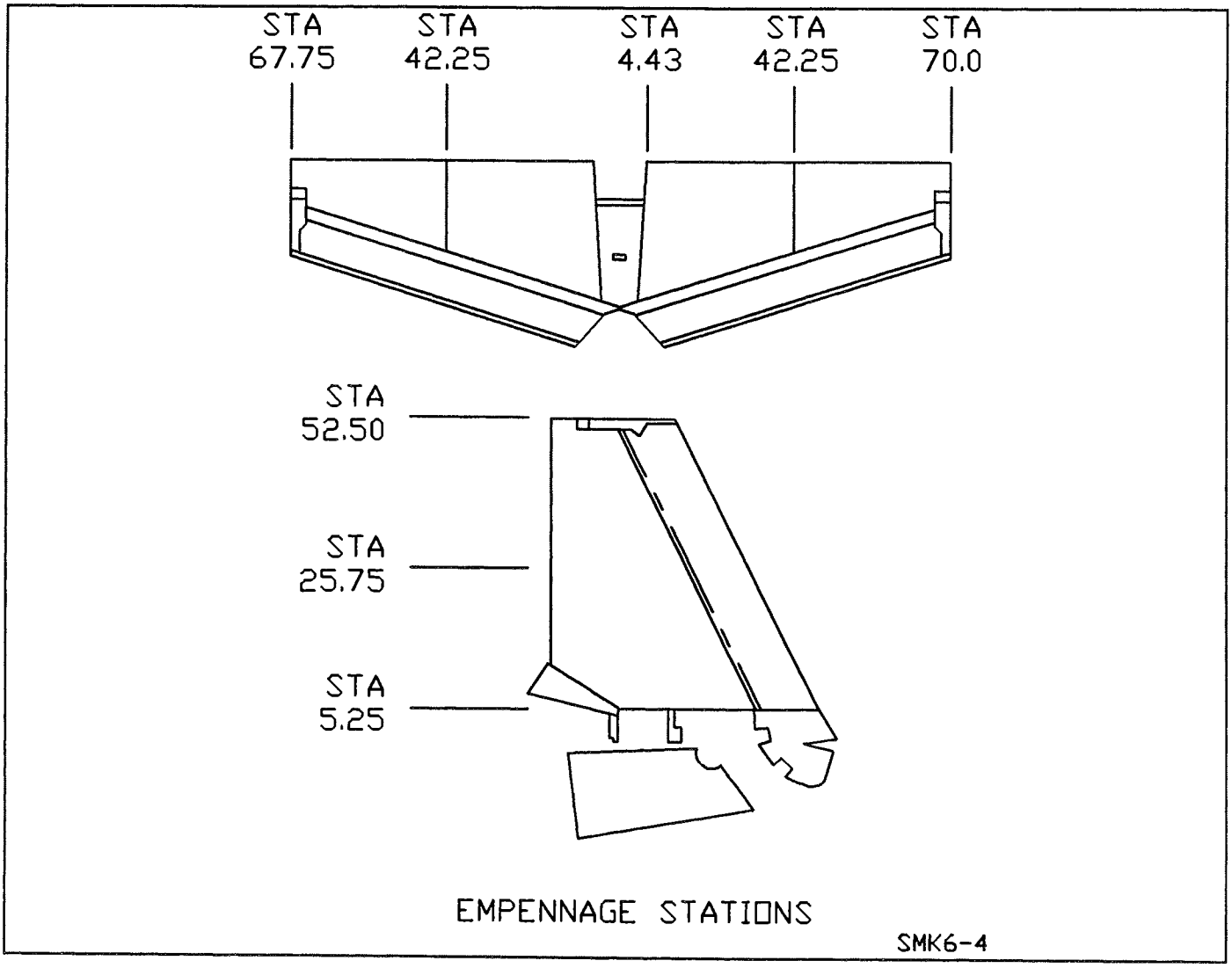
AREAS:

A. Wing	174.786 sq. ft.	16.24 sq. meters
B. Ailerons	11.4 sq. ft.	1.06 sq. meters
C. Flaps	17.9 sq. ft.	1.66 sq. meters
D. Vertical Fin	7.8 sq. ft.	0.73 sq. meters
E. Rudder	6.25 sq. ft.	0.52 sq. meters
F. Horizontal Stabilizer	21.42 sq. ft.	1.90 sq. meters
G. Elevators	13.0 sq. ft.	1.21 sq. meters

6-00-03 - AIRCRAFT STATIONS

NOTE

The datum line station 0.0 is 5 inches aft of the nose gear trunnion pivot point. (Reference Figure 8-2.)



EMPENNAGE STATIONS - FIGURE 6 - 4

CHAPTER 7

LIFTING AND SHORING

CHAPTER 7

LIFTING AND SHORING

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7-10-00 - JACKING

When it is necessary to raise the aircraft off the ground:

CAUTION

Do not raise the aircraft on jacks out of doors when wind velocity is over 10 MPH. Jacks should be on hard surface.

CAUTION

Do not place jack directly on propeller de-icing boots. Cushion with a layer of 3/8 inch thick hard rubber or equivalent.

1. Install jack points in tiedown mounting holes outboard of each main gear.
2. Use standard aircraft jacks at both wing hoist points (wing tiedown eyebolt receptacles) outboard of the main gears. While holding jack point in place, raise jack to firmly contact jack point.
3. Use a yoke-frame jack under propeller to lift the nose.
4. Raise aircraft, keeping wings as nearly level as possible.
5. Secure safety locks on each jack.

CAUTION

When lowering aircraft on jacks, bleed off pressure on all jacks simultaneously and evenly to keep aircraft level as it is lowered.

CAUTION

Individual wheels may be raised without raising the entire aircraft. Wheels not being raised should be chocked fore and aft.

NOTE

It is not recommended to use tail-tie down fitting during jacking process to lift nose wheel off ground.

CAUTION

Do not leave aircraft on jack for extended periods of time with a tailstand in place. The wing jack(s) may bleed down and place excessive loads on the front jack point and tailcone.

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CHAPTER 8

LEVELING AND WEIGHING

CHAPTER 8

LEVELING AND WEIGHING

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8-00-01	Weight and Balance	3

8-00-00 - LEVELING

Place a spirit level on the skin splice or leveling screws above the tailcone access door when leveling the aircraft longitudinally. Level the aircraft by increasing or decreasing air pressure in the nose wheel tire. Front seats must be in the full forward position when weighing. (Use skin splice S/N 25-0002 thru 25-0246 and leveling screws S/N 25-0001, 25-0247 & ON.)
(See Figure 8-2.)

8-00-01 - WEIGHT AND BALANCE

To weigh the aircraft select a level and draft free work area, then:

1. Check for installation of all equipment as listed in the Weight and Balance Record.
2. Charlie Weight Installation. The aircraft as delivered from the factory has the correct ballast added (if any) to compensate for installed equipment. If addition or deletion of equipment at a future time affect the weight and balance of the aircraft sufficiently to require ballast the proper Charlie Weight Installation shown (Figure 8-1) is to be used.

NOTE
See Pilot's Operating Handbook for Weight and Balance reference data.

3. Ground aircraft and drain fuel tanks per Section 12-10-02, 2.
4. Add unusable fuel to each tank, (see applicable Pilot's Operating Handbook for aircraft being serviced for proper quantity of unusable fuel).
5. Fill oil to capacity (8 quarts).
6. Position a 2000-pound capacity scale under each of the three wheels.
7. Level aircraft as described in Section 8-00-00 and center nose wheel.
8. Weigh the aircraft.
9. Find reference point by dropping a plumb-bob from center of nose gear trunion (retracting pivot axis) to the floor. Mark the point of intersection.
10. Locate centerline of the main wheel axles in the same manner.
11. Measure the horizontal distance from the reference point to main wheel axle center line. Measure horizontal distance from center line of nose wheel axle to center line of main wheel axles.

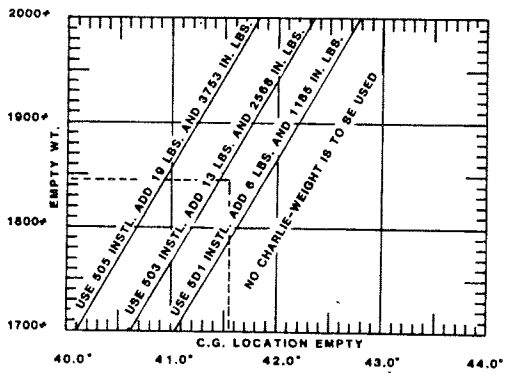
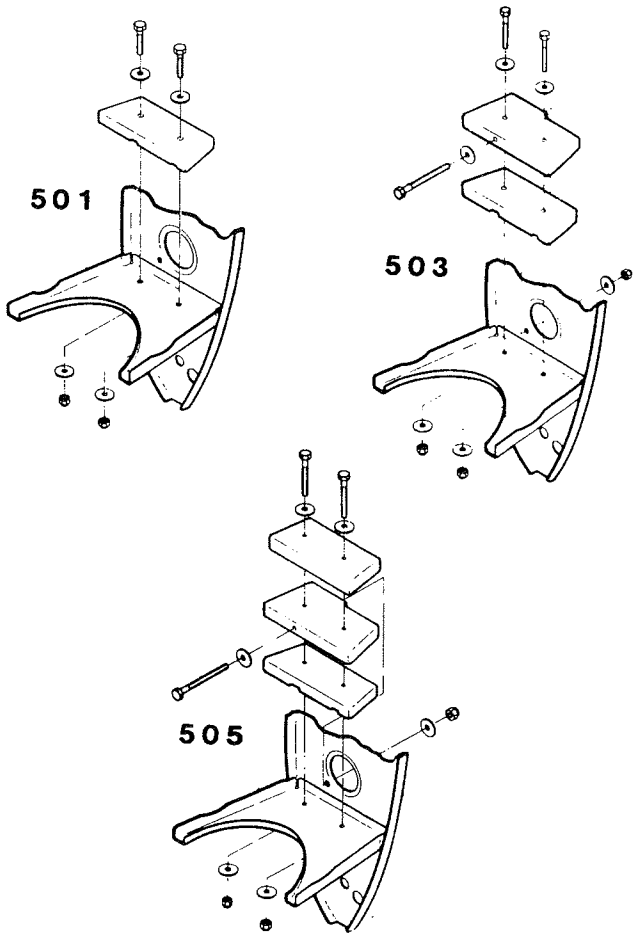


Chart A ⚠1

EXAMPLE: Airplane Empty ⚠1 Weighs 1845# with C.G. at 41.55" from chart, this airplane requires -501 Charlie Weight Installation. For licence calculate new WT., C.G. & Moment.

Airplane as Weighed	1845	x 41.55	=	76660
+ -501 Charlie Weight	+6		+	1185
Licenced Empty Weight	1851#	77845		77845
		1851		

Licenced Empty Weight C.G. Location = 42.06"



CHARLIE WEIGHT INSTALLATION - FIGURE 8 - 1

12. Record weights and measurements and compute the basic weight and CG as follows:

$L_{C/G} = L_{M/R} - 5 - L_M$

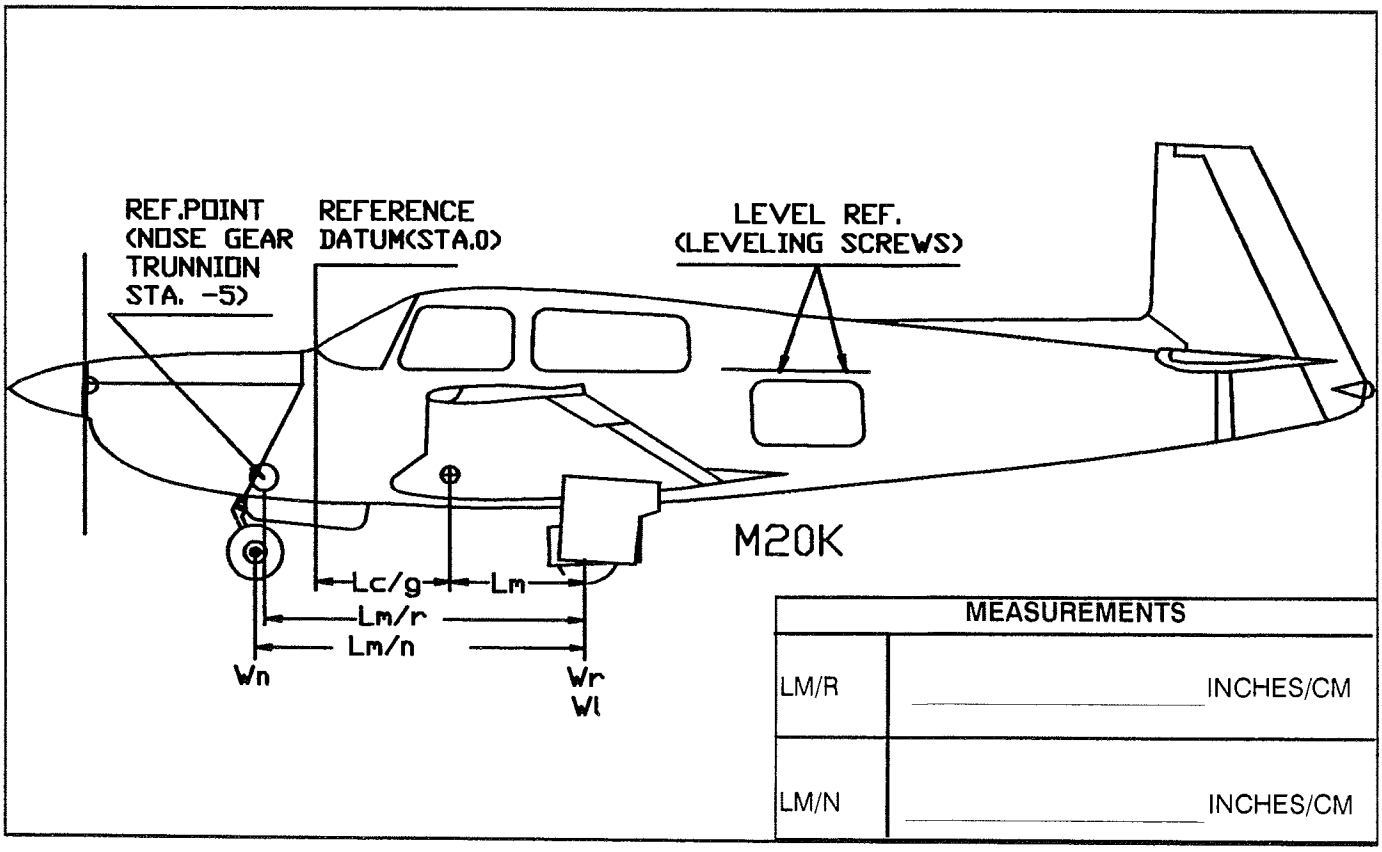
a. CG Forward of Main Wheels

_____ LBS	X	_____ IN.	÷	_____ LBS.	=	_____ IN.
Weight @ Nose (W_N)		Distance Between Main & Nose Wheel Axel Centers ($L_{M/N}$)		Total Weight of Aircraft (W_T)		CG Forward of Main Wheels (L_M)

b. CG Aft of Datum (Station 0)

_____ IN.	-	5 IN.	-	_____ IN.	=	_____ IN.
Distance from center Nose Gear Trunnion to Center of Main Wheel Axles (Horizontal) ($L_{M/R}$)		Distance from Nose Gear Trunnion to Datum (CONSTANT)		Result of computation Above (a.) (L_M)		CG (FUS STA) Distance Aft of Datum (Empty Weight CG) ($L_{C/G}$)

NOTE:
Empty weight includes unusable fuel and full oil (8 Qts.) and is computed with gear down and flaps up.



WEIGHT AND BALANCE DIAGRAM - FIGURE 8 - 2

CHAPTER 9

TOWING AND TAXIING

CHAPTER 9

TOWING AND TAXIING

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9-20-00	Taxiing	3
9-30-00	Emergency Procedures	3

9-00-00 - GROUND HANDLING

9-10-00 - TOWING

Use a towbar for moving the aircraft.The towbar attaches to the nose gear crossbar.One man can move the aircraft providing the ground surface is relatively smooth and the tires are properly inflated.When no towbar is available, or when assistance in moving the aircraft is required, push by hand:(1) on the wing leading edges, (2) on the wing tips, and (3) on the inboard portion of propeller blades adjacent to the propeller hub.Towing by tractor or other powered equipment is **NOT RECOMMENDED**.

CAUTION

Exercise care not to turn the nose wheel past its normal swivel angle of 14 degrees either side of center.Exceeding the turn limits shown on the turn indicator may cause structural damage.Maximum allowable damage to nose gear leg assembly is 1/32 inch dent.

9-20-00 - WARMUP AND TAXIING

Before attempting to warmup or taxi the aircraft, ground personnel should be checked out by qualified pilots or other responsible personnel.

1. Start and warmup engine.(Refer to AFM/POH Manual.)
2. Taxi forward a few feet and check brake effectiveness.
3. While taxiing, make shallow turns to test nose gear steering.
4. Check operation of gyro instruments and turn coordinator during turns.
5. Check engine instruments for sluggish response to engine control movements.

9-30-00 - EMERGENCY PROCEDURES

1. Engine Fire During Starting.
   A. Continue cranking engine with starter.
   B. Set mixture control at IDLE, CUTOFF.
   C. Turn fuel selector handle to OFF.
   D. Open throttle to FULL.
   E. Turn Master switch OFF
   F. Push cabin heat control to OFF.
   G. Close cowl flap/(s).
   H. If fire is not extinguished, proceed as follows:
      (1) Turn electrical switches OFF.
      (2) Discharge fire extinguisher into engine compartment through nose cowl openings and through cowl flap opening/(s).
      (3) Call for fire-fighting equipment.
2. Fuselage or Wheel Well Fire.In case of fire in wheel well (or in the cabin or fuselage area), turn all fuel, electrical, and ignition controls to the OFF position before evacuating the aircraft to extinguish the flames.
3. Electrical Fire.Circuit breakers (or circuit-breaker switches), that automatically interrupt the flow of power when an overload or short circuit occurs, protect all electrical circuits (except the ignition-starter circuits).In the event of an electrical fire, immediately turn off the master/alternator field switch.Make sure that only a fire extinguisher approved for electrical fires is used.

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CHAPTER 10

PARKING AND MOORING

CHAPTER 10

PARKING AND MOORING

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10-10-03	Return to Service	3
10-20-00	Mooring	3

10-00-00 - GENERAL

The parking brakes are set by applying the brakes and pulling out on the parking brake knob. Release the brakes by pushing in on the parking brake control knob.

NOTE

There is no need to depress the brake pedals to relieve the pressure in the lines during release of parking brake control.

There are three tiedown points on the aircraft, one on each wing outboard of main gear (tiedown rings are to be threaded into built in receptacles) and the tail skid/tiedown fitting on the aft end of the tailcone.

10-10-00 - PARKING

When parking the aircraft, place wheel chocks fore and aft of the main wheels. The parking brakes may be used for short-duration parking.

CAUTION

Do not set parking brakes when they are overheated or when cold weather could freeze moisture and slush accumulation in the brake mechanism.Do not set parking brakes when aircraft is tied down. For maximum protection, hangar the aircraft during severe weather and high winds.

10-10-01 - STORAGE (FLYABLE)

Outdoor storage requires adequate mooring and tiedown facilities. The following precautionary measures are recommended for keeping the aircraft serviceable and ready-to-fly.

1. Refer to paragraph 10-20-00 for mooring instructions.
2. Magneto switches.....OFF
3. Throttle.....CLOSED
4. Mixture.....IDLE CUTOFF
5. Rotate propeller 6 revolutions every seven days; STOP propeller 45 to 90 degrees from original position.
6. Keep fuel tanks filled at least one-half full to minimize moisture condensation. Keep battery fully charged.
7. Install protective covers over pitot head, engine cowl openings, static ports, etc.
8. Maintain a good wax finish on all exterior surfaces after 90 days.

10-10-02 - STORAGE (PROLONGED)

If the aircraft is to be stored for an extended period of time, the following steps are recommended for protection:

1. Refer to paragraph 10-20-00 for mooring instructions.
2. Tape or cover all openings.
3. Remove battery, charge fully, and store in a cool place.
4. Raise aircraft to remove weight from the tires, and block up the wheels.

CAUTION

If weight is not removed from tires, rotate wheels to a new position at least once each 30 days to prevent flat-spotting the tires.

5. See appropriate TCM Service Bulletin for engine preservation. Attach warning placards if preservation procedures make engine inoperable.

10-10-03 - RETURNING TO SERVICE

If the aircraft has been stored for an extended period of time, it is advisable to perform a 50-hour periodic inspection after completion of the following preliminary steps:

1. Remove blocks from wheels.Check tire inflation.
2. Check and install battery.
3. Remove tape and covers from openings.
4. Remove warning placards (if any).
5. Replace engine oil filter.
6. Clean engine oil suction and pressure screens.
7. Clean and check oil pressure relief valve.
8. Clean and check oil temperature bypass valve.
9. Fill engine sump with proper grade of lubricating oil.
10. Clean and reinstall engine air-inlet filter.
11. Check ignition harness.
12. Clean and regap spark plugs.
13. Check and clean fuel injector nozzles and screens.Drain oil from fuel injector.
14. Check fuel tank vents for obstruction, and drain sumps to remove moisture and sediment.
15. Complete 50-hour and preflight inspections.
16. See appropriate TCM Service Bulletin for servicing of the engine.

10-20-00 - MOORING

When mooring the aircraft out of doors:

1. Head aircraft into the wind.
2. Place chocks fore and aft of each main wheel.
3. Drive stakes in ground approximately three feet outboard of each main gear and to either side of tailskid.
4. Install tiedown rings in wing receptacles outboard of each main gear.Tie a 600-pound tensile strength rope to each wing tiedown ring and anchor to ground stake.Allow a little slack in each tiedown rope.
5. Tie the center of a rope to tail skid tiedown ring and anchor rope ends to ground stakes at either side of tail.
6. For additional security, attach a rope to the nose gear and anchor to a ground stake.
7. Lock controls by looping right front seat safety belt through the control wheel and drawing belt snug.

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CHAPTER 11

PLACARDS AND MARKINGS

CHAPTER 11

PLACARDS AND MARKINGS

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11-20/30-00	Placards, Exterior/Interior	3

11-00-00 - GENERAL

FAA required placards and markings.

NOTE

All placards should be inspected for proper location, readability and security during maintenance actions. When an airplane has been painted inspect all placards to assure that they are not obscured by paint.

11-10-00 - MARKINGS

The exterior paint schemes for the various model year aircraft are depicted in the M20K Illustrated Parts Catalog.

11-20/30-00 - PLACARDS, EXTERIOR/INTERIOR

All required placards and their locations, both interior and exterior, are listed in Section II of the FAA Approved Flight Manual and Pilot's Operating Handbook.

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CHAPTER 12

SERVICING

CHAPTER 12

SERVICING

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12-00-00 - SERVICING

12-00-01 - SERVICING INTERVALS

The specified intervals (refer to Chapter 5) are considered adequate to meet average requirements under normal operating conditions. It is advisable, however, to shorten service and maintenance intervals when operating under abnormal environmental conditions, such as extreme temperature ranges, dusty atmospheric conditions, high humidity and moisture, unimproved airport facilities, or unusual operating requirements.

12-10-00 - REPLENISHING

12-10-01 - FUEL TANKS

Keep fuel tanks at least half filled to minimize condensation and moisture accumulation in tanks. (Fuel capacity is given in Chapter 6.)

WARNING
Ground the aircraft and fuel service vehicle. Ground servicing nozzle to wing. Permit no smoking or open flame within 50 feet of aircraft or vehicle.

WARNING
Each fuel tank is vented to the atmosphere at its outboard aft corner; vent openings are on the lower wing surface. Check vents for obstruction before each flight.

12-10-02 - FUEL DRAINS

A fuel-drain valve is located in the aft inboard corner of each tank to provide for drainage of moisture and sediment. Use the small plastic cup furnished with the flyaway kit to drain the fuel sumps. Drain wing tank sumps and gascolator before the first flight of the day and after each fuel service to inspect for water and/or contamination. Continue draining until free of water or contamination.

WARNING
After servicing the aircraft with fuel, wait at least five minutes for moisture and sediment to settle before draining and checking both the fuel tank sumps and the fuel selector valve drain.

1. Fuel Selector Drain. The fuel gascolator is at the lowest point in the fuel system and has a drain valve operated by a control on the floor in the cabin. To drain the fuel selector valve:

A. Switch fuel selector valve handle to L and pull fuel drain valve control ring for 10 seconds.

B. Switch fuel selector valve handle to R and pull fuel drain valve control ring for 10 seconds.

C. After draining, be sure fuel drain valve control is returned to the closed position and the valve is not leaking outside the aircraft.

WARNING
During cold weather operation, frequently check fuel selector drain for ice formation by repeating procedures 1., A, B and C above.

NOTE
If conditions conducive to fuel system icing exist Isopropyl Alcohol may be added to fuel tanks (refer to TCM S.B. M80-17). It is extremely important to thoroughly BLEND the isopropyl alcohol in with the fuel supply in quantities not to exceed 3% of the total by volume.

2. Defueling. Fuel tanks may be drained by pumping fuel out with the electric fuel boost pump, siphoning fuel through the filler ports, or removing tank quick drain valves.

WARNING
Allow no smoking or open flame within 50 feet of the defueling area. Ground the aircraft and fuel container during all defueling operations.

A. To defuel the aircraft using fuel boost pump:

(1) Disconnect fuel line from electric boost pump outlet at the fitting forward of the firewall.

(2) Connect to output fitting a flexible line that will reach fuel receptacle.

(3) Turn fuel selector valve to the tank to be drained, and remove filler cap from fuel filler port.

(4) Turn on fuel boost pump until tank is empty. Repeat steps (3) and (4) to drain other tank.

(5) To completely drain fuel system also drain wing sumps and the fuel gascolator valve sump until fuel stops running.

NOTE
When defueling using removable tank quick drains it is only necessary to remove the drains and to operate the gascolator drain.

12-10-03 - ENGINE OIL

Check engine oil level after engine has been stopped long enough for oil to drain back into sump. The oil filler cap access door is located in the top cowling. Any lubricating oil, either straight mineral (MIL-L-6082) or compounded, (TCM Spec MHS-24 ( )) are acceptable for use after break-in period. Approved products and engine oil viscosity requirements are shown in Chapter 5-20-07.

CAUTION
The terms "detergent", "additive", and "compounded" used in this manual are intended to refer to a class of aviation engine lubricating oils to which certain substances have been added to improve them for aircraft use. These terms do not refer to such materials commonly known as "top cylinder lubricant", "dopes" and "carbon remover" which are sometimes added to fuel or oil. These products may damage the engine and therefore, should not be used. Under no circumstances should automotive oil be used, since such oils could cause engine damage.

Oil Recommendations for New-Engine or Newly Overhauled Engine Break-IN. New or newly overhauled engines should be operated on aviation grade straight mineral oil during the first 25 hours of operation or until oil consumption has stabilized.

The aircraft is delivered from Mooney with proper break-in oil (MIL-L-6082, MIL-L-6529C Type II, SAE 20W-50 Type I or 15W-50).

OIL FILTER - The oil filter should be changed at 50 hour intervals using TCM filter or approved equivalet. When changing from mineral oil to additive oil the filter should be changed regardless of the operation time. Check screens and filters for sludge or plugging every 10 hours when switching from mineral oil to ashless dispersant (additive) oil.

12-10-04 - OXYGEN SYSTEM (OPTIONAL)

The oxygen cylinder, when fully charged, contains approximately 76 cubic feet of aviators breathing oxygen (Specifications No. MIL-O-27210). Recharging of this oxygen cylinder should be accomplished by using the appropriate Scott recharging fittings to the pressure shown on (Figure 12-1), Pressure vs Temperature Table.

WARNING
Oil, grease or other lubricants in contact with oxygen create a serious fire hazard, and such contact must be avoided when handling oxygen equipment.

AMBIENT TEMPERATURE DEGREES F	FILLING PRESSURE PSIG	AMBIENT TEMPERATURE DEGREES F	FILLING PRESSURE PSIG
0	1650	50	1875
10	1700	60	1925
20	1725	70	1975
30	1775	80	2000
40	1825	90	2050

OXYGEN PRESSURE VS TEMPERATURE TABLE
FIGURE 12-1

NOTE
The oxygen cylinder should not be run down to less than 100 p.s.i. Below this pressure atmospheric contamination of the cylinder may occur, requiring valve removal and cylinder cleaning and inspection at an FAA approved repair stations.

NOTE
Refer to Section 35-00-00 for periodic bottle pressure check.

Any time fittings are disconnected on the oxygen system the threads should be treated with tetrafluoroethylene tape (MIL-T-17720). Prior to reconnection the system should be checked for leaks with leak testing compound (MIL-L-25567). If no leaks are found wipe the system clean and dry.

12-20-00 - SCHEDULED SERVICING

12-20-01 - INDUCTION AIR FILTER

The importance of keeping the induction air filter clean cannot be overemphasized. A clean filter promotes fuel economy and longer engine life. The dry-type filter can usually be washed six to eight times within 500 hours or one year before replacement is necessary.

To clean the dry-type induction air filter (25-0001 thru 25-0999):

1. Remove filter element.

2. Direct a jet of air against down or clean side of filter (opposite to normal airflow). Keep air nozzle at least two inches from filter element (25-0001 thru 25-0999). Direct a jet of air from inside of filter out (25-1000 thru 25-TBA). Cover entire filter area with air jet.

CAUTION
Do not use a compressor unit with a nozzle pressure greater than 100 p.s.i.

3. After cleaning, inspect filter and/or gasket for damage. Discard a ruptured filter or broken gasket.

NOTE
If filter shows an accumulation of carbon, soot, or oil, continue with cleaning steps 4 through 7.

4. Soak filter in nonsudsing detergent for 15 minutes; then agitate filter back and forth for two to five minutes to free filter element of deposits.

5. Rinse filter element with a stream of clean water until rinse water is clean.

6. Dry filter thoroughly. Do not use light or air above 180 deg. F. for filter drying.

7. Inspect for damage or ruptures by holding before a light. or by holding light bulb inside filter (25-1000 & ON). If damage is evident, replace filter with new one.

8. Check alternate air door for proper operation and sealing.

9. Reinstall filter in aircraft making sure of proper sealing and security.

12-20-02 - BATTERY

Service battery with distilled water to maintain electrolyte above plates. After adding water in freezing weather, charge battery long enough to mix electrolyte and water. Keep battery electrolyte above a specific gravity of 1.225 to avoid freezing. To service battery:

1. Remove battery box cover (if equipped). Check electrolyte and service battery as required.

CAUTION
Battery gases may be explosive.

2. Inspect battery box or battery mounting area for corrosion and spilled electrolyte. To clean cables, terminals, and battery box, use a solution of bicarbonate of soda and clean water to neutralize corrosion and spilled electrolyte.

CAUTION
When cleaning, do not allow bicarbonate of soda to enter battery cells - permanent damage will result if soda mixes with electrolyte.

3. Rinse battery with clean water, and wipe clean with a dry cloth.

4. To retard corrosion, coat terminals with petroleum jelly after cleaning and tightening them.

5. Inspect battery ram air and vent for obstruction, line kinks, etc.

12-20-03 - TIRES AND WHEELS

Keep the tires at recommended air pressure. (Refer to Chapter 6-00-01.

1. Inspect tires for wear, cuts, and bruises.

2. Inspect valve stems for evidence of tire slippage or pulling.

3. Inspect wheels for damage.

4. Inspect wheel bearings for condition and lubrication.

12-20-04 - BRAKE RESERVOIR

Frequently check the brake reservoir for proper fluid level. See Chapter 12-20-05 for locations.

CAUTION
Do not fill reservoir while parking brake is set.

Use only hydraulic fluid (red), per specification MIL-H-5606. Do not fill reservoir above two inches below filler port.

12-20-05 - HYDRAULIC BRAKE (Bleeding)

CAUTION
Fluid in the wheel cylinders may be under high pressure due to expansion. Therefore, be sure parking brakes are released prior to beginning hydraulic system servicing.

For best results, use a hydraulic pressure service unit (pressure pot) to back bleed the system through the wheel cylinder bleeder valves.

1. Remove hydraulic fluid reservoir filler plug, and install a suitable fitting for attaching a flexible drain line to a filler port.

2. Immerse open end of drain line in a hydraulic fluid container.

3. Attach pressurized hydraulic fluid service unit to wheel cylinder bleeder valve and open valve. Hydraulic service unit should be free of air prior to servicing aircraft system.

4. Feed fluid from service unit into brake system. Check for air bubbles at end of drain line immersed in fluid.

5. When fluid flow is clear of air bubbles, close wheel cylinder bleeder valve and remove service line.

NOTE
Brake pedal may need to be pulled back in order for fluid to bleed back into reservoir.

6. To bleed opposite brake, repeat steps 3 through 5.

7. Remove drain line from reservoir.

8. Lower fluid level in reservoir to two inches below filler port.

9. Reinstall filler plug.

10. Inspect brake linings for excessive wear and proper installation. Refer to Section 32-40-04 for Brake Removal and Inspection Procedures.

11. Depress brake pedals to check for sponginess. Resistance should be solid and even when brake pedals are depressed.

12-20-06 - CLEANING

Cleanliness is a major prerequisite to adequate inspection and maintenance of an aircraft. Cleanliness enhances the appearance of an aircraft and reduces the probability of corrosion.

1. **EXTERIOR**

A. Before washing aircraft exterior, cover brake discs, pitot head, and static ports.

B. Flush away loose dirt and mud.

C. Wash exterior with a mild aircraft detergent in cool water, and a soft cleaning cloth or chamois. Rinse away soap film.

CAUTION
Do not use so called "mild" household detergents to wash aircraft exterior. Such detergents may damage finish and corrode aluminum components.

CAUTION
Do not apply wax or use pre-wax cleaners during initial paint curing period. Use only mild aircraft detergent and cool water when washing exterior during the first 90 days after repainting.

D. To remove heavy oxidation film, use a pre-wax cleaner.

E. Apply an exterior-finish wax recommended for protection of urethane enamel. Apply a heavy coating of wax to leading edges of wings, empennage, and nose section to reduce drag and abrasion.

CAUTION

When fuel, hydraulic fluid, or other fluid containing dye is spilled on painted surfaces, remove it at once to prevent staining. Flush away spilled battery electrolyte immediately with water. Treat the area with bicarbonate of soda solution followed by thorough washing with a mild aircraft detergent solution.

2. **WINDSHIELDS, WINDOWS AND DOORS**

A. Flush windshield and windows with water prior to wiping. Never wipe while dry.

B. Remove grease or oil with a soft cloth saturated in kerosene.

CAUTION

Never use gasoline, benezene, carbon tetrachloride, acetone, fire extinguisher fluid, de-icer fluid, lacquer thinner, or household window cleaning sprays on windows or windshields. Such solvents will soften or craze the plexiglas surface.

C. Clean windows and windshields with an antistatic plexiglas cleaner.

D. Check door seals for damage that could cause leakage.

E. Check cabin and baggage door mechanism for good working order.

NOTE

Minor scratches or abrasions may be polished out by using plexiglas resurfacing kits, ie, Micro-Mesh, available from aircraft accessory suppliers.

3. **ENGINE COMPARTMENT**

Accumulation of dirt and oil within the engine compartment creates a fire hazard and hampers inspection.

A. Wash down engine cowling and engine compartment using a nonflammable solvent.

B. Dry engine cowling and engine compartment after washing.

4. **CABIN INTERIOR**

Use normal household cleaning practices for routine interior care.

A. Frequently vacuum seats, rugs, upholstery panels, and headliners to remove surface dust and dirt.

B. Clean leather or vinyl upholstery and panels with a mild aircraft detergent. Clean with a slight damp cloth, and dry with a soft cloth.

NOTE

Foam-type shampoos and cleaners for vinyl, leather, and plastic materials can be used to remove stains and to condition the entire interior. Spray-on dry cleaners are also recommended.

CAUTION

Never apply furniture polish to interior furnishings. Most polishes contain solvents harmful to vinyl. Do not use alcohol or strong solvents on interior plastics. When using commercial cleaning and finishing compounds, carefully follow the manufacturer's instructions. Never saturate fabrics with solution which could damage the backing and padding materials. To minimize wetting of carpets, keep foam as dry as possible and rub in circles. Use a vacuum cleaner to remove foam. Do not allow carpets to remain damp; dry them thoroughly.

CHAPTER 20

STANDARD PRACATICES - AIRFRAME

CHAPTER 20

STANDARD PRACTICES - AIRFRAME

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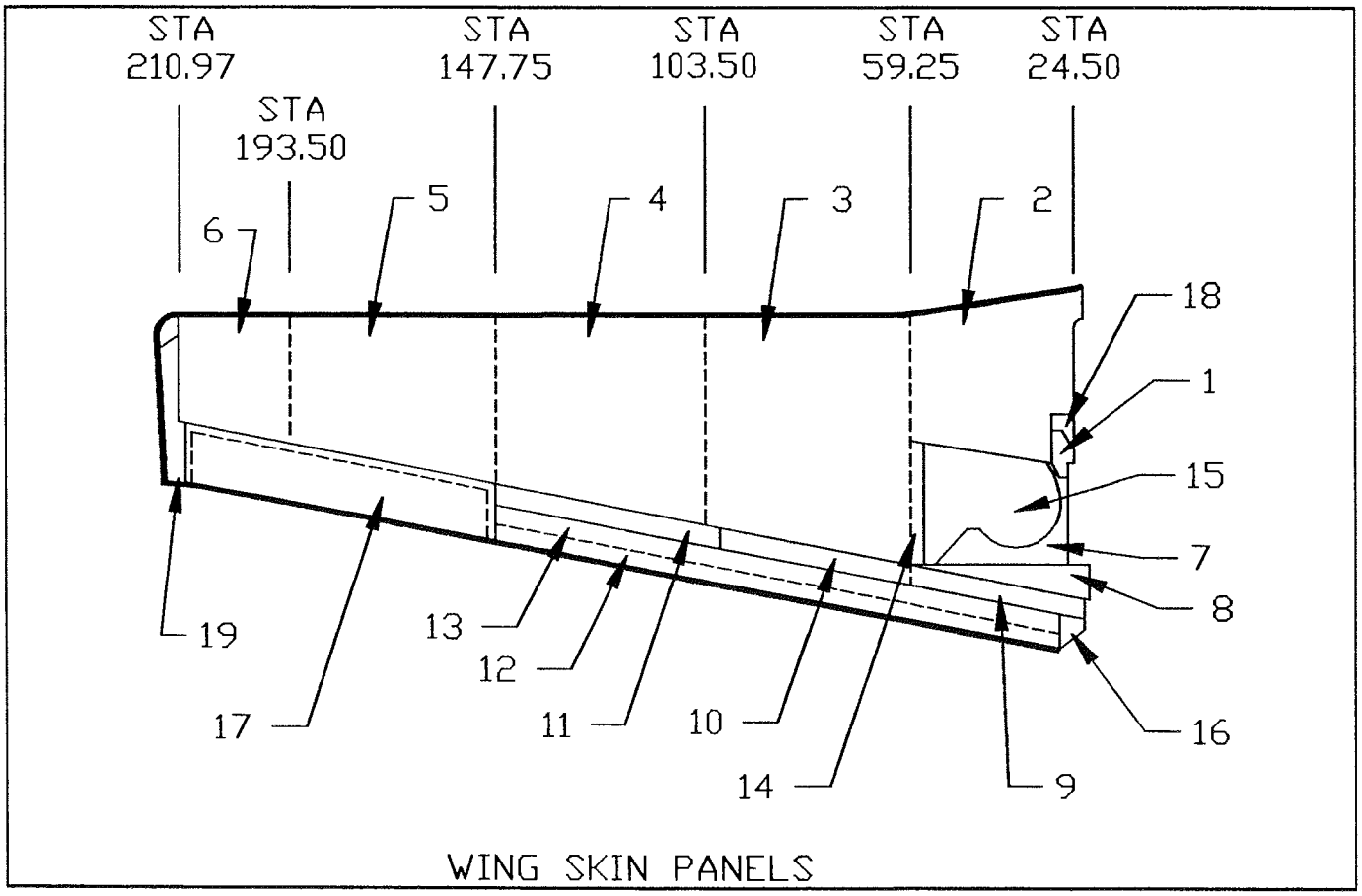
20-00-00 - GENERAL

This chapter of the manual discusses treatment of metal surfaces for corrosion control and the identification of skin panels for replacement purposes. Those who inspect or repair aircraft should consult FAR 43, Maintenance, Preventive Maintenance, Rebuilding and Alteration and Sub Parts A, D and E of FAR 65, Certification. Advisory Circular 43.13-1( ) outlines inspection and repair practices acceptable to the F.A.A. Administrator.

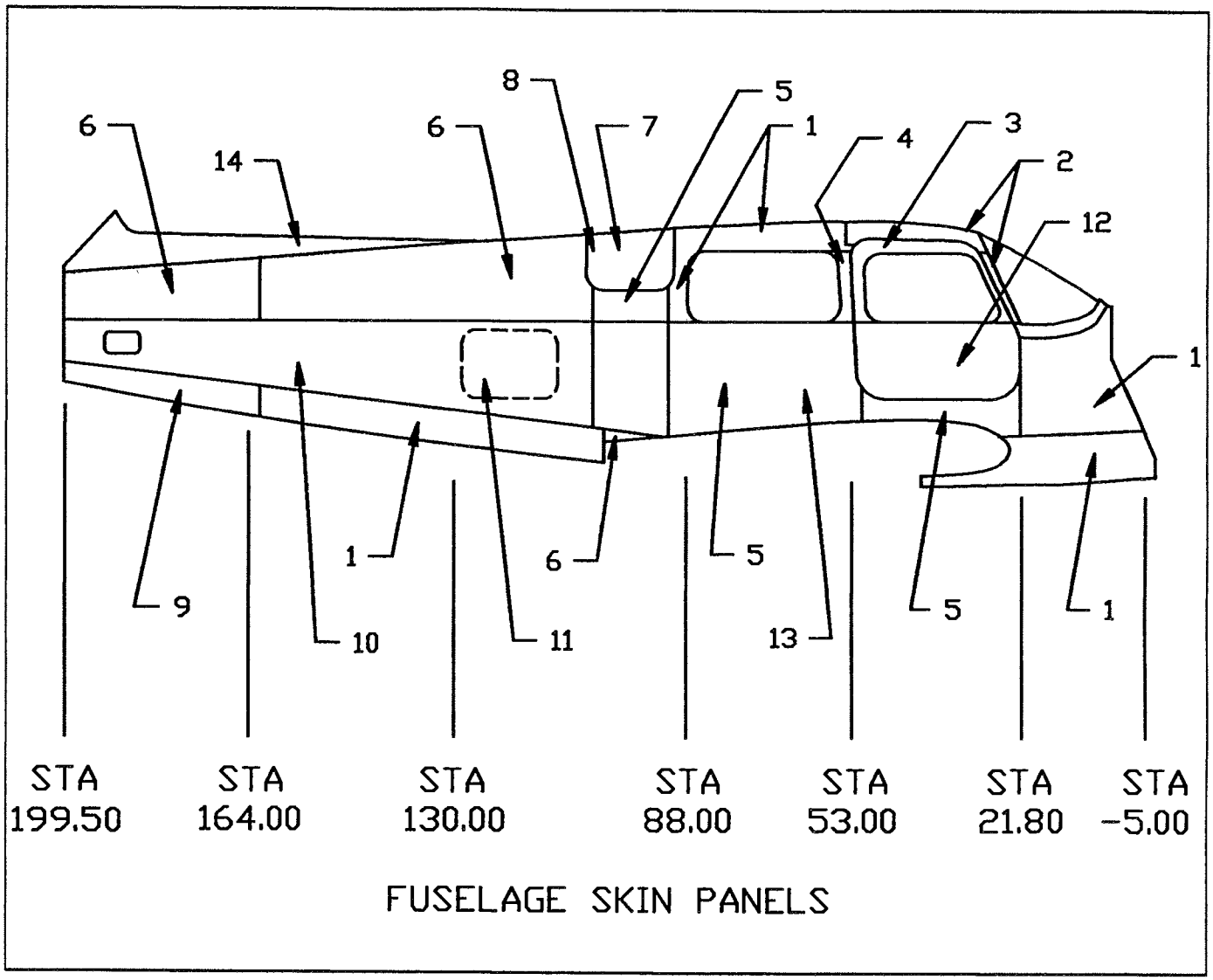
20-00-01 - SKIN SPECIFICATIONS



WING SKIN PANELS - FIGURE 20 - 1

INDEX NO.	SKIN THICKNESS	MATERIAL	INDEX NO.	SKIN THICKNESS	MATERIAL
1.	0.063	2024 T-3 CLAD	12.	0.025(c)	2024 T-3 CLAD
2.	0.050	2024 T-3 CLAD	13.	0.020(a)	2024 T-3 CLAD
3.	0.040	2024 T-3 CLAD	14.	0.032	2024 T-3 CLAD
4.	0.032	2024 T-3 CLAD	15.	0.040(b)	2024 T-3 CLAD
5.	0.025	2024 T-3 CLAD	16.	0.040(d)	2024 T-3 CLAD
6.	0.025	2024 T-3 CLAD	17.	0.016(a)	2024 T-3 CLAD
7.	0.032	2024 T-3 CLAD	18.	0.050(b)	2024 T-3 CLAD
8.	0.040	2024 T-3 CLAD	19.	Polyester Glass-Fiber Reinforced	
9.	0.025	2024 T-3 CLAD			
10.	0.025	2024 T-3 CLAD			
11.	0.025	2024 T-3 CLAD			

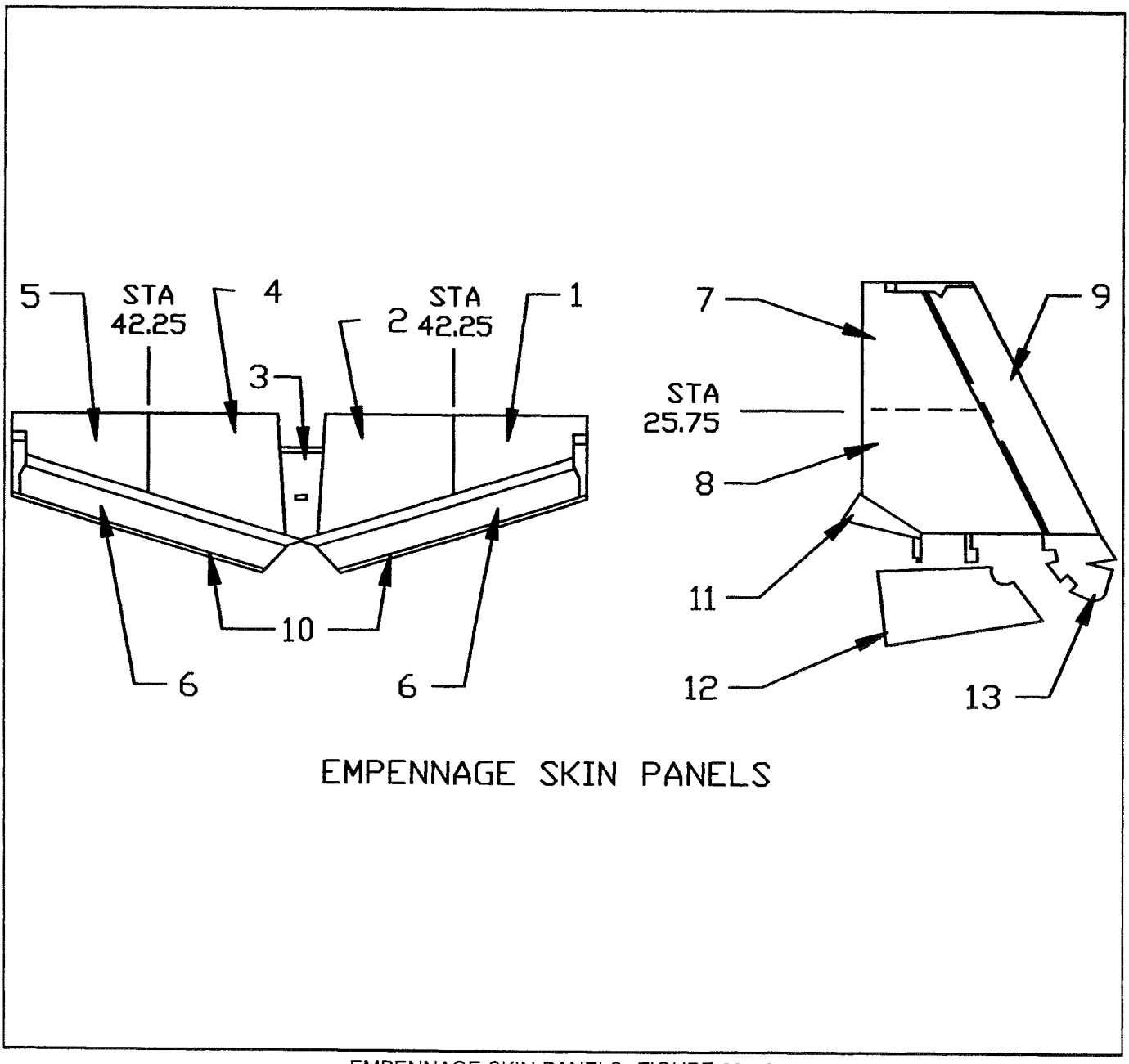
(a) Same thickness on top and bottom.
(b) Top of wing only.
(c) Top aft flap skin (hat section).
(d) Top inboard flap skin.



FUSELAGE SKIN PANELS FIGURE 20 - 2

INDEX NO.	SKIN THICKNESS	MATERIAL	INDEX NO.	SKIN THICKNESS	MATERIAL
1.	0.025	2024 T-3 CLAD	10.	0.032	2024 T-3 CLAD
2.	0.040(d)	2024 -0 CLAD	11.	0.032(a)	2024 T-3 CLAD
3.	0.025(c)(b)	2024 T-4 CLAD	12.	0.032	2024 T-3 CLAD
4.	0.025	2024 T-3 CLAD	13.	0.025(a)	2024 T-3 CLAD
5.	0.025(b)	2024 T-3 CLAD	14.	Polyester Glass-Fiber Reinforced	
6.	0.020	2024 T-3 CLAD			
7.	0.025	2024 T-3 CLAD			
8.	0.032(d)(e)	2024 -0 CLAD			
9.	0.025	2024 T-3 CLAD			

(a) Left side only.
(b) Right side only.
(c) 0.032 can be used.
(d) Heat treated to T-42 condition after forming.
(e) Shell.



EMPENNAGE SKIN PANELS

EMPENNAGE SKIN PANELS FIGURE 20 - 3

INDEX NO.	SKIN THICKNESS	MATERIAL	INDEX NO.	SKIN THICKNESS	MATERIAL
1.	0.025	2024 T-3 CLAD	8.	0.025	2024 T-3 CLAD
2.	0.025	2024 T-3 CLAD	9.	0.020	2024 T-3 CLAD
3.	0.025	2024 T-3 CLAD	10.	0.032	2024 T-3 CLAD
4.	0.025	2024 T-3 CLAD	11.	Polyester Glass-Fiber Reinforced.	
5.	0.025	2024 T-3 CLAD	12.	0.020	2024 T-3 CLAD
6.	0.020	2024 T-3 CLAD	13.	0.025(a)	2024 T-3 CLAD
7.	0.025	2024 T-3 CLAD			

(a) Heat treated to T-42 condition.

20-00-02 - CORROSION DETECTION & PREVENTION

Most metallic fabrication materials are susceptible to corrosion. Corrosion may occur on aircraft in any climate, but it will be a problem more often in climates where the aircraft is exposed to salt air or high humidity, or where there are industrial contaminants in the atmosphere. The aircraft should be inspected frequently to detect and correct corrosion before serious damage occurs.

Any form of corrosion should be removed at once. If it is necessary to remove paint, only an approved aircraft paint remover such as Eldorado PR-3400, (Eldorado Chemical Co., Inc., 6700 Lookout Road, P.O. Box 32101, San Antonio, TX. 78216) should be used. Paint removing substances left in metal crevices will cause further corrosion. Turco 2662C or 3002 will remove corrosion from aluminum and treat the metal surface in one application. This paragraph discusses corrosion types and their prevention along with suggested procedures for zinc chromating internal airframe surfaces.

1. Types of Corrosion - Aluminum

Corrosion normally appears in one or more of four forms. Each type of corrosion can be precluded or controlled by a preventative maintenance program.

A. Chemical Corrosion.

Chemical corrosion normally occurs where battery acid or exhaust gases come in contact with metal surfaces. A few simple precautions will prevent chemical corrosion.

(1) Be sure battery vent is free from obstruction at all times.

(2) Repaint all scratches and worn spots found in areas painted with acid-resistant paint.

(3) If acid is spilled on metal surfaces, flush entire area with sodium bicarbonate and water. The solution should be rinsed away at once and the area dried by driving all water from crevices with an air hose before wiping surface dry with a clean cloth.

(4) Frequently clean exhaust gas deposits from metal surfaces.

B. Local-Cell Corrosion.

On bare metal surfaces, in an early stage development, local-cell corrosion appears as a light, whitish powder deposit. Surface pits warn of advanced local-cell corrosion. On painted surfaces, the first indication of corrosion will be evidenced by paint blistering.

(1) Intergranular Corrosion - Selective attack along grain boundaries of metal alloys is referred to as intergranular corrosion. Aluminum alloys 2024 and 7075 are vulnerable to this type of attack. Aluminum extrusions may contain nonuniform areas, which in turn may result in galvanic attack along grain boundaries. This type of corrosion is difficult to detect in its original stages. When the attack is well advanced, the metal is usually blistered or delaminated. This is referred to as "exfoliation". It is very difficult to completely remove and stop this type of corrosion, and replacement of the affected part is recommended wherever possible.

C. Concentration Cell Corrosion

Corrosion forming under rivet heads, along faying surfaces, at skin to longeron contact surfaces and other similar areas is called concentration cell corrosion. Detection requires close inspection. Rivets must be removed and skin laps must be separated to remove concentration cell corrosion. Use aluminum wool soaked in solvent such as methyl-ethyl-ketone to scour corrosion deposits from the surface before painting both faying surfaces with zinc chromate primer and reassembling.

D. Galvanic Corrosion

Dissimilar metals, such as stainless steel and aluminum, in contact with each other sometimes develop galvanic corrosions. To remedy this form of corosion, separate the parts, remove the corrosion, and paint both surfaces with Zinc Chromate or epoxy-polymide primer before reassembling.

2. Corrosion Prevention

A. Thoroughly examine unpainted metal surfaces at inspections, and check corrosion when found. Carefully examine seams, lap joints, and crevices where moisture or dirt can collect. Areas exposed to exhaust gases require frequent inspection and cleaning.

B. Corrosion may attack metal even though the surface is painted. Inspect painted areas for a blistered or scaly appearance that warns of corrosion below the paint layer.

C. Use only liquid (non-alkaline) soap to wash the exterior airframe. Cover vent scoops when the aircraft is being washed. Rinse aircraft exterior after exposure to salt air or industrial fallout.

D. Since moisture promotes corrosion, thoroughly and frequently inspect areas where water is apt to collect. Use an air hose to drive water from crevices before wiping the exterior surface dry after washdown.

E. Hangar the aircraft when not in use.

F. If battery acid is spilled on any part of the aircraft, immediately wash the area with a solution of sodium bicarbonate in water. Rinse with water and dry with clean towels.

NOTE
FAA Advisory Circular 43-4 addresses corrosion problems.

3. Zinc Chromating (or Equivalent).

Zinc chromating or equivalent of internal airframe surfaces will not eliminate the necessity for periodic inspections. The most likely areas for corrosion to begin are in hidden crevices such as skin laps, under rivet heads or any opening where moisture can collect. Periodic inspection of these areas is most important so that any corrosion which may be present can be detected and treated in its very earliest stages.

When corrosion is detected, it should be treated as follows:

A. Remove all corrosion product (usually white or grey-white powder on aluminum) from the corroded area down to sound metal.

(1) If the base metal is aluminum, clean off the corrosion product by scrubbing with aluminum wool or a nonmetallic scouring pad such as the nylon pads made by the Carborundum Company, P.O. Box 277, Niagara Falls, N.Y. 14302.

(2) If the base metal is steel, remove the corrosion product with emery cloth (320 grit or finer) or steel wool.

(3) If the corrosion is too advanced to remove by the light mechanical cleaning methods of (1) and (2), refer to Advisory Circulars 43.13-1( ) and/or 43-4 for alternate methods of cleanup and repair.

(4) Chemical cleaning solutions should be used with extreme caution on both aluminum and steel parts. Such solutions are not recommended for use in areas where they cannot be easily and completely neutralized.

B. Wash all areas to be zinc chromated with a cleaning solvent such as methyl ethyl ketone (MEK), Turco T-657 (Turco Products, Inc., 6135 South Central Ave., Los Angeles, California), lacquer thinner, #3094 wash thinner (Pratt & Lambert, Inc., 25th and N.Y. Avenue, Wichita, Kansas) or similar solvents.

(1) To get a good clean surface for zinc chromate priming use a clean cloth or piece of cheesecloth and apply one of the solvents noted above. The surface should be wiped dry with a second piece of clean cloth. Do not allow the solvent to dry on the cleaned area as it will redeposit dissolved soil and grime upon evaporation.

CAUTION
Wipe solvents are generally flammable and toxic and should not be used without adequate ventilation and fire precautions.

C. Apply zinc chromate primer to cleaned area by spray or brush. Area needs to be painted within 24 hours of zinc chromate primer coat.

20-00-03 - PAINTING

The exterior is painted with urethane enamel. When exposed to humid salt air or to an atmosphere having corrosive fallout, the aircraft should be hangared when not in use.

1. Paint Repairs.

A. Materials.

(1) Aluminum wool, nylon scouring pads, 320 grit or finer emery cloth or steel wool.

(2) Tack rags.

(3) Wipe solvents such as: methyl ethyl ketone, T-657 —(Turco Products, Inc.); #3094 wash thinner —(Pratt & Lambert, Inc.); lacquer thinner or equivalent solvents.

(4) Body putty or aerodynamic filler such as: Flex-Bond —-(Taylor & Art Plastics); Flex —-(3M Co.);or Cuz polyester body filler #6372 —- (NAPA [Martin Senour Paints]).

(5) Compatible paints for the item (such as steel tubular structure or exterior skin) and for the year and model being repainted. (Refer to Mooney Parts Catalog).

(6) Thinners which are compatible with the paints being used both for paint thinning and for burn-down thinners.

B. Cleaning Procedures.

NOTE
Fiberglass components are attacked and deteriorated by products containing the following chemicals: Ketone, aliphatic esters, chlorinated hydrocarbons and slightly softened by aromatic hydrocarbons.

(1) Fuel Servicing Decal Removal:

(a) Cover the decal with a hot, wet towel for approximately 2 minutes.

(b) Lift one corner of the decal and slowly remove.

(2) Remove all old loose paint by one of the following methods:

(a) On aluminum - for uniformity of finish appearance, the entire skin panel should be prepared for repainting. If the paint is in very bad condition or if a filler is to be used, remove all of the paint by use of lacquer thinner, MEK or similar solvent. Careful application of paint stripper is acceptable. The solvent should be wiped on and wiped off before it evaporates. If the solvent is allowed to evaporate, it will redeposit the soils and paint that were being carried. Any scouring required should be done at this point. Scouring with nylon pads or aluminum wool may be done dry or wet with one of the wipe solvents listed above. After the old paint, grime, etc. has been loosened and removed, the scoured area should be wiped with a tack rag, and again cleaned with fresh wipe solvent. The part should now be ready for priming and painting.

(b) On steel - Remove all grease, grime, loose paint, etc. by wiping with a wipe solvent and rags. Do not allow the wipe solvent to evaporate. Wipe it dry! Steel parts may be cleaned to bare metal by sanding with emery cloth or steel wool. If the parts are removable, they can be cleaned by sandblasting. Regardless of the scouring method, all parts should be wiped with a tack rag and cleaned with fresh wipe solvent. The part should now be ready for priming and painting.

C. Priming and Painting.

(1) On aluminum - Cleaned and dried surfaces to be painted should be coated with a wash primer conforming to MIL-C-8514 or MIL-P-15328. Read and follow the manufacturer's instructions carefully. The wash primer should be applied to attain a dry film thickness of 0.3 to 0.4 mils (a transparent film). A good wash primer coating is a must since the top coating can be only as good as the primer coat. As a general rule the wash primer should dry from .05 to 1.5 hours but not more than 2 hours before application of the top or intermediate primer coat. When an intermediate epoxy primer coat is applied, it should be mixed very carefully per the manufacturer's instructions. It should be thinned per manufacturer's instructions and applied to a dry film thickness of 0.8 to 1.0 MILS. The intermediate primer should be allowed to dry a minimum of 0.5 to 1.5 hours depending upon the application temperature and relative humidity.
Follow manufacturer's instructions. The intermediate primer coat can be dry-scuffed lightly with No. 400 to No. 600 sandpaper prior to top coat application and give a higher gloss finish. As many coats of paint as desired may be applied. A higher gloss will be attained

if the surface is scuffed lightly and tack rag cleaned between each coat.

(2) On steel - The same general procedure used on aluminum can be applied to steel. However, MIL-P-8585 primer or epoxy primer is recommended for the steel coat. If epoxy primer is used, it should have a wash primer (MIL-C-8514) pre-treatment.

D. Painting.

(1) Apply three coats of white base and/or color finish allowing three to five minutes between coats depending upon weather conditions. Allow five to ten minutes between coats in cold, dry weather; in humid weather, allow fifteen minutes between coats.

(2) Use a small round watercolor brush trimmed to a point for application of undiluted touch-up paint to small scratches and bare spots. Do not thin acid resistant black paint or exterior finish touch-up paint for brush-on application.

NOTE

M20K aircraft are painted with urethane enamel. Inquiries concerning application of this finish should be directed to: Pratt & Lambert, P.O. Box 2153, Wichita, KS. 67201.

CAUTION

Any flight control surface that is to be repainted should be stripped of all paint prior to repainting. It is required that repainted control surfaces be removed and rebalanced prior to flight per paragraph 27-91-00.

NOTE

Never use abrasive polish compounds or harsh soaps and detergents on ureathane finishes. Once the surface gloss is damaged it cannot be restored by polishing.

CHAPTER 21

ENVIRONMENTAL SYSTEMS

CHAPTER 21

ENVIRONMENTAL SYSTEMS

LIST OF EFFECTIVE PAGES

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21-Effectivity/Contents	1/2BLANK	9-97
21-40-00	3	9-97
21-40-00	4	9-97

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21-00-00 - CABIN VENTILATION SYSTEM

The cabin environmental system consist of three ventilating systems that supply heated or fresh air as the pilot or passengers prefer. CABIN AIR, CABIN HEAT and OVERHEAD VENTILATION. The cabin air and heat system controls and vents are located on the console between the pilot and co-pilot seats. Individual fresh air outlets are located on each side of the cabin side panels just forward of the pilots and co-pilots knees. The overhead ventilation system consists of individual outlets (Wemac valves) located above each seat position. S/N 25-0247 and later aircraft have a regulator system with the control knob located above the pilots head. The systems are basically trouble free but inspection should be made at regular intervals to ensure proper operation.

21-40-00 - HEATING

Heat is supplied to the cabin through flexible hoses connected to a heat distribution box assembly and shroud assemblies located on the exhaust manifold on the engine. It is recommended that the condition of these items be checked each time the cowling is removed. This will provide a continuing check for the prevention of carbon monoxide in the cabin. Any deteriorated flexible ducts should be replaced. Heat shrouds should be inspected for cracks or other deteriorations and repaired or replaced promptly. Inspect the exhaust system for any leaks or cracks and replace or repair as needed.

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CHAPTER 24

ELECTRICAL POWER

CHAPTER 24

ELECTRICAL POWER

LIST OF EFFECTIVE PAGES

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CHAPTER 24

ELECTRICAL POWER

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24-00-00
- GENERAL

S/N 25-0001 thru 25-0999

A 14 volt, 70 AMP alternator utilizing a transistorized voltage regulator/overvoltage control supplies electrical power. An optional 12 volt, 10 amp. standby generator may be installed. A minimum of pilot effort is required to properly use this backup source of electricity. A 12 volt, 35 ampere-hour storage battery is installed in the tailcone. The alternator, during normal operation, supplies power in conjunction with the battery when the master switch is on. The circuit breaker panel is on the right subpanel. The electrical system is capable of supplying current for simultaneous operation of multiple radios, an anticollision beacon, and navigation lights. A shunt type ammeter mounts in the power plant instrument cluster.

S/N 25-1000 thru 25-TBA

A 28 volt, 70 AMP alternator utilizing a transistorized voltage regulator/over voltage control suupplies electrical power. An optional 28 volt, 70 AMP second alternator may be installed. A 24 volt, 22 AMP HR storage battery is installed in the tailcone. The alternator, during normal operation, supplies power in conjunction with the battery when the master switch and alternator field switch are ON. The circuit breaker panel is on the right subpanel. The electrical system is capable of supplying current for simultaneous operation of multiple radios, anticollision lights and navigation lights. On S/N 25-1000 thru 25-1224 a shunt type combination gauge gives alternator output and line load in % of rated capacity plus bus voltage. On S/N 25-1225 thru 25-TBA a shunt type ammeter is mounted in the power plant instrument cluster.

24-30-00 - D.C. GENERATION

24-31-01 - ALTERNATOR CHARGING SYSTEM MAINTENANCE

1. ALTERNATOR SYSTEM SERVICING.

(25-0001 thru 25-0999, 25-1225 thru 25-TBA)
When the ammeter shows a discharge at higher engine speeds, a charging system component (alternator, voltage regulator, circuit breaker, or wiring) is malfunctioning.

(25-1000 thru 25-1224)
When the loadmeter shows a higher % than the alternator output at higher RPM, a charging system component is malfunctioning. On-the-plane testing should indicate which component is faulty and needs to be removed from the aircraft for bench testing and repair or replacement.

The alternator charging system requires no special attention; however, improper maintenance procedures can damage the alternator and wiring. There are several precautions that must be observed when servicing the alternator system:

A. Be sure the master switch is off when repairing the alternator or voltage regulator.

B. When auxiliary power or a booster battery is used, be sure the cables are connected correctly—positive to positive and negative to negative. DO NOT by-pass the battery when using Auxiliary Power Source.

NOTE
It is recommended that the approved Auxiliary Power Cable be connected to the booster battery and the plug inserted into the auxiliary power receptacle, if equipped.

C. When the battery is removed from the aircraft for charging, be sure that the charger is correctly connected. Use the correct charging rate when charging battery, refer to Manufacturers procedures. It is possible to reverse the polarity of a battery by connecting a charger backwards.

D. Be sure to check battery polarity by using a voltmeter prior to reinstallation in the aircraft.

E. Do not leave the master switch ON when the aircraft is parked.

F. Use an auxiliary ground power unit when trouble shooting electrical accessory equipment or when performing electrical landing gear maintenance and retraction system testing.

2. ALTERNATOR SYSTEM INSPECTION.

A. Check alternator(s) circuit breaker(s) on the main circuit breaker panel. Reset breaker if open.

B. Check applicable alternator field circuit breaker on main circuit breaker panel. Reset if open.

C. Inspect battery for corroded cable connections; remove and clean cable if corrosion is found.

D. Check charging system wiring connectors to be sure they are clean and tight.

E. Inspect alternator(s), voltage regulator, and wiring for damage.

CAUTION
DO NOT ATTEMPT TO POLARIZE ALTERNATORS. Alternators are polarized every time Master Switch is turned ON.

3. ALTERNATOR(S) REMOVAL & INSTALLATION

A. Alternator(s) Removal.

Turn Master Switch OFF. Disconnect affected alternator witing.

Belt Driven Alternator

(1) Loosen and remove adjustment bolt from tension adjustment bracket.

(2) Remove drive belt from alternator pulley.

(3) Remove cooling air duct from alternator.

(4) Remove lower pivot point hardware and remove alternator from mounting bracket.

Main, Gear Driven, Lower Alternator

(1) Re-position any components to gain access to alternator.

(2) Remove mounting bolts.

NOTE
The main alternator is very difficult to remove. The lower engine/firewall mount bolts may require loosening, the upper bolts may require removal and the engine pivoted around the lower attach points.

(3) Position engine hoist to hold engine in position.

(4) Loosen lower engine mount/firewall bolts slightly so engine mount can pivot.

(5) Lower engine hoist to allow engine to pivot downward just enough to permit alternator to be removed.

(6) Remove cooling air duct and any wiring form alternator.

B. Alternator(s) Installation.

Main, Gear Driven, Lower Alternator

(1) Place new alternator into position on drive pad.

(2) Attach cooling air duct and wiring to alternator.

(3) Install mounting bolts into accessory case drive pads and secure alternator. Use standard torque table in CHAPTER 5.

(4) Raise engine hoist to position upper engine mount/firewall attach points and secure with engine mount bolts.

(5) Torque upper and lower engine mount/firewall bolts per SECTION 71-00-30.

(6) Reposition any components moved during alternator removal process.

Belt Driven Alternator

(1) Place new alternator on lower pivot attach point.

(2) Insert pivot point mounting hardware.

(3) Re-attach wiring and cooling air duct to alternator.

(4) Place drive belt over alternator pulley. Make sure both drive sheave and alternator pulley are properly aligned so belt will travel in straight line. Use Burrough Tool #8082. Reposition AN960-716 washers on bottom bolt and add TCM #649268 washers for alignment.

(5) Position alternator to obtain proper belt tension — 45 - 50 lbs..

(6) Tighten tension adjustment hardware to standard torque tables in CHAPTER 5.

(7) Run engine with alternator loaded, minimum of 20 minutes, maximum of 2.0 hours, then re-tension belt — 45 - 50 lbs.

4. STANDBY GENERATOR MAINTENANCE

(25-0001 thru 25-0999).

The standby generator brushes should be replaced at 150 to 200 hours of operation under load. The generator manufacturer recommends the brushes be replaced every 2000 hours of no load operation. Mooney Aircraft Corporation recommends the generator connections, brushes and general conditions be inspected every 100 hours and repaired if necessary. Refer to vendor overhaul manual for specific maintenance procedures. Minimum brush length is .700 inch overall. Replace with new brushes; minimum spring tension on new brushes should be 5 ounces.

24-31-02 - VOLTAGE REGULATOR MAINTENANCE

The battery charging rate depends upon the battery condition and the voltage regulator setting. With all equipment turned off and the engine running at 2000 RPM or faster, the normal battery charging rate will be 5 to 35 amperes.

1. Excessively High Charging Rate. Check the following:

A. Fly aircraft for 15 to 20 minutes; charging rate should slowly drop to 10 amperes or less. A very low battery will take longer to show a drop in charging current.

B. Measure voltage with a voltmeter connected to the bus. At 80^{o} F., voltage should be 13.75 to 14.0 (25-0001 thru 25-0999), (S/N 25-1000 & ON 27.5 to 28.0 volts). An excessively high voltage regulator setting will cause excessive battery heating and water loss.

2. Excessively Low Charging Rate. Check battery charging rate (normal rate is not to exceed four amperes). The regulator should not be considered defective because of a low charging rate until:

A. A voltmeter check indicates that voltage at the bus is below requirements.

B. A battery hydrometer check indicates that battery is not fully charged.

3. Hydrometer Reading. If battery electrolyte temperature is below 80^{o} F., subtract four points from hydrometer reading for every 10^{o} F. below 80^{o}

F. If battery acid temperature is above 80^{o} F., add four points to hydrometer reading for every 10^{o} F. above 80^{o} F.

EXAMPLE:
Hydrometer reading = 1.260
Battery electrolyte temperature = 30^{o} F.
$80^{o} - 30^{o} = 50^{o}$
5 x 4 = 20 points
Corrected reading 1.260 - 20 = 1.240

HYDROMETER READING	PERCENT OF CHARGE
1.280	100
1.250	75
1.220	50
1.190	25
1.130 or below	Very little useful capacity-discharged

"Hi" or Overvolt Adjustment at Regulator- BENCH ADJUSTMENT (ELECTRO DELTA).

Connect a variable voltage power supply to the regulator, positive (+) to pin "A" or "1" and negative to pin "C" or "3"(25-0001 thru 25-0999), positive to pin 5 & negative to pin 9 for 25-1000 & ON). Connect a voltmeter to the regulator (+) to pin "D" or "4" and (-) to pin "C" or "3" (25-0001 thru 25-0999), (pin 6 and pin 9 for 25-1000 % ON). Adjust voltage to 16 volts +/- .1 volt (25-0001 thru 25-0999),(28.7 volts for S/N 25-1000 & ON). Adjust trim pot (accessible through hole in case marked "OV") to relay trip point as indicated by voltage indication on test voltmeter. Decrease voltage until relay closes and note voltage. Readjust as necessary until a trip point of 16 +/- .1 volts is attained(25-0001 thru 25-0999); 31.8 (+/-).3 volts for 25-1000 & ON).

Regulator Adjustment (ELECTRO DELTA)

Connect an accurate voltmeter to the aircraft bus. Turn off all electrical equipment and start engine. Run engine at moderate RPM (1500-1800) until ammeter drops to low charge rate. Increase RPM to 2000 and adjust trim pot (accessible through hole in case marked "REG") for a voltage reading of between 13.75 and 14.0 volts (25-0001 thru 25-0999);(28.6 and 28.8 volts for 25-1000 thru 25-TBA). Increase throttle to full RPM and observe that voltage does not exceed 14 volts (25-0001 thru 25-0999);(30 volts for 25-1000 thru 25-TBA).

NOTE
Use bushings provided with replacement VR-415F voltage regulator to mount in location of old regulators.
NOTE
No field adjustment authorized for Mooney Voltage Regulator.
Max. Voltage for 14 Volt system: 14.2 +.2/-0.
Max. voltage for 28 volt sytem: 28.3 +.2/-0

24-32-00 - BATTERY MAINTENANCE

CAUTION - Battery gases are explosive.

1. Battery Removal.

A. Turn Master Switch - OFF.

B. Remove tailcone access cover and battery box lid.

C. Disconnect battery cables, negative lead first, remove battery from aircraft.

D. Install battery in reverse sequence of removal. Use a voltmeter to check battery polarity before installation.

2. Battery Cleaning and Corrosion Removal.

A. Mix one pound of baking soda in one gallon of water.

B. Wash battery box and flush battery with the mixture. Do not allow soda water to enter battery cells; permanent damage will result if soda mixes with electrolyte.

C. Rinse thoroughly with clear water and dry the area.

D. Test each cell with a temperature corrected hydrometer. Specific gravity should be 1.265 to 1.280 for a fully charged battery.

E. Check electrolyte level and maintain at split ring.

F. Clean battery terminals with emery cloth, reinstall and tighten cables. Coat terminals and connectors with petroleum jelly to retard corrosion.

24-33-00 - WARNING CIRCUITS

1. Landing gear position lights and warning horn. Red and green landing gear position lights are in the annunciator panel. The gear-down limit switch controls the green gear-down light. Both limit switches control the red gear unsafe light. The throttle control operates landing gear warning horn (intermittent tone) when the power setting is reduced below 12 IN. Hg. S/N 25-0001 thru 25-0780 with the gear up; and on 25-0781 thru 25-TBA when the throttle is retarded below 16" to 18" Hg. and the landing gear is still in the up position. Check gear warning system during flight for proper operation.

2. Prestall Warning Circuit. The prestall warning horn has a high frequency continuous tone that sounds when airspeed drops to 5 to 10 MPH IAS (4.3 to 8.7 KIAS) above stalling speed. A vane in the left wing leading edge actuates the prestall warning horn switch. (This vane is made of heat treated steel, and any attempt to adjust switch operation by bending the vane will damage the switch). Refer to Section 27-93-00 for adjustment procedures.

3. High and Low Vacuum Warning Circuit. A switch in the vacuum system controls the vacuum warning light on the annunciator panel. Vacuum below 4.25 IN. Hg. causes the vacuum warning light to flash. Vacuum above 5.5 IN. Hg. trips the high-vacuum switch causing the vacuum warning light to illuminate steadily.

4. Low Fuel Warning Circuit. The low fuel indicators will illuminate when a minimum of 2 1/2 gallons usable fuel remains in either left or right hand tank. When it becomes necessary to replace the annunciator panel for any reason other than "low fuel" warning malfunction, the following procedure should be used to set the "low fuel" warning circuits. The calibration transfer standard (I.A.I. P/N 500D0045 for S/N 25-0001 thru 25-1224) or I.A.I. P/N 9500324000 for S/N 25-1225 thru 25-TBA) is required for this procedure. Adapters can be ordered through Mooney Marketing or Service Centers. Refer to Figure 24-3 & -3A for location of adjustment screws.

A. Calibration Procedures using I.A.I.

P/N 500D0045 or P/N 9500324000.

(1) Remove glareshield, disconnect plug from rear of annunciator, remove annunciator front panel, and place "Norm-Cal" switch in "Cal" position.

(2) Plug model TS201/231-001 (P/N 500D0045) calibration transfer standard on rear of old annunciator and reconnect harness plug.

(3) Turn on master switch and turn right hand variable resistor on transfer standard slowly counter clockwise until right "low fuel" light just turns on. (If necessary turn variable resistor clockwise to extinguish "low fuel" light). (Do not adjust annunciator calibration screws). Repeat for left "low fuel".

(4) Turn off master switch and remove old annunciator assembly after disconnection of harness and transfer standard unit.

(5) Install new annunciator and connect calibration transfer standard to annunciator panel and harness plug. Remove front plate and legend on new annunciator panel to expose the Norm-Cal switch and the Left and Right trim potentiometers. (Switch must be in “Cal” position).

(6) Adjust left and right annunciator fuel calibration screws clockwise (not the adapter variable resistors) until “low fuel” lights just turn on. (If necessary turn annunciator calibration screw counter clockwise to extinguish “low fuel” light).

(7) Remove calibration transfer standard, reconnect plug to annunciator panel, set switch to “Normal” position, install annunciator front panel and install glareshield.

B. Alternate method for calibration without I.A.I. unit.

If calibration transfer standard, P/N 500D0045, is not available use the following method to calibrate “low fuel” warning:

(1) Remove glareshield and remove annunciator assembly.

(2) Install and connect new annunciator assembly leaving off front panel. (Set switch to “Cal”).

(3) Drain fuel from tanks and replace with unusable fuel plus 2 1/2 gallons in both tanks.

(4) Turn Master Switch ON; adjust calibration pots to position where “low fuel” lamps just turn on for left and right tanks.

(5) Turn Master Switch OFF; set annunciator “Cal” Switch to “Norm” position, install annunciator front and install glareshield.

(6) Refuel aircraft.

5. Alternate Air Light Warning Circuit - Annunciator Panel. The light illuminates on the annunciator panel when the alternate air door has opened for any reason.

6. Hi/Low Voltage Warning Circuit - Annunciator Panel. Remove annunciator top cover. Connect a voltmeter to the aircraft bus. Start engine and run at idle. Add load to bus until “Low Volt” light starts to flash. Adjust RPM to obtain a bus voltage of 12.5 volts (25-0001 thru 25-0999);(26.5 volts for 25-1000 thru 25-TBA). Adjust trim pot (located at center, rear of circuit board) till flashing light just comes on.

NOTE

It may be necessary to adjust trim pot to turn out light at 12.5 volts (25-0001 thru 25-0999);(26.5 volts for 25-1000 thru 25-TBA) first. Increase RPM. until light goes out and note voltage. Decrease RPM until light flashes on and note voltage. Light should come on at a voltage between 12.4 and 12.6 volts (25-0001 thru 25-0999);(26.4 and 26.6 volts for 25-1000 thru 25-TBA).

24-34-00 - POWER PLANT CIRCUITS

1. Starter-Ignition Circuit. The starter-ignition switch has five positions: OFF, R (right), L (left), BOTH, and START. In the OFF position both magnetos are grounded. At the R position the left magneto grounds. At the L position the right magneto grounds. At the BOTH position both magnetos are HOT and the ignition system is on. Turning the ignition switch to start and pushing in, closes the starter solenoid, engages the starter and allows the impulse coupling to automatically retard the magneto until the engine is also at its retard firing position. The spring action of the impulse coupling is then released to spin the rotating magnet and produce the spark to fire the engine. After the engine starts, the impulse coupling flyweights do not engage due to centrifugal action. The coupling then acts as a straight drive and the magneto fires at the normal firing position of the engine. The starter-ignition switch is spring loaded to return from START to the BOTH position when released.

CAUTION

Do not operate the starter in excess of 15 seconds or re-engage the starter without allowing it time to cool.

A. Low Battery Starting Procedures.

Batteries that have been discharged to the point where they will not turn the engine but have sufficient power remaining for other equipment; should NOT be jumped with another power source for two major reasons:

(1) The discharged aircraft battery is not airworthy because it will not have the necessary reserve capacity required to operate the aircraft electrical system and avionics in the event of the failure of the generating system during flight.

(2) Active material on the positive plate expands when the battery is discharged and the fast recharge from the higher potential source, battery, alternator, generator, rectifier, etc., will severely damage the battery. A slow charge is recommended prior to flight.

WARNING

Do not turn the propeller when the magnetos are not grounded. Ground the magneto points before removing switch wires or electrical connectors. All spark plug leads can be removed as an alternate safety measure.

2. Oil and Cylinder Head Temperature Gauge Circuits. Both the oil and cylinder head temperature indicators operate electrically. The oil temperature gauge circuit has a resistance bulb in the oil sump. Changes in resistance caused by changes in oil temperature alter current flow rate, thereby varying the magnetic field in the indicator coils. The cylinder head temperature indicator connects to a tip sensitive resistance bulb in a cylinder head,normally No. 5 cylinder. Increase or decrease in temperature causes an increase or decrease in bulb resistance, varying the magnetic field in the indicator coils.

3. The oil pressure instrument circuit contains an electrical instrument used as a reference, and a transducer which varies resistance with pressure.

4. Fuel Flow is indicated on either an electrical instrument using a pressure transducer which varies resistance with pressure or with an electrical instrument which counts electrical pulses produced by a turbine flow transducer.

24-35-00 - LIGHTING CIRCUITS

1. Navigation Lights. A circuit breaker switch on the flight panel controls the navigation lights. The GEAR DOWN, GREEN, annunciator light is dimmed when NAV Light switch is - ON.

2. Landing/Taxi Lights. A circuit breaker switch (25-0001 thru 25-0009) (split switch for 25-1000 thru 25-1230) on flight panel controls the landing/taxi lights in the lower engine nacelle (25-0001 thru 25-1224), in each wing leading edge (25-1225 thru 25-1230).

3. Cabin Lights. A three-position (Bright, Off, Dim) rocker switch adjacent to the door, in headliner, controls cabin forward interior lights.

CAUTION
On S/N 25-0001 thru 25-1224 this light switch is connected directly to the battery. The switch MUST BE TURNED OFF to keep from discharging the battery.

Aircraft S/N 25-1225 thru 25-1999 may have a door switch and timer mechanism that illuminate forward set of interior lights while cabin door is open. After door is closed, if rocker switch is left ON, forward interior lights will remain ON for approximately 2 minutes.

The rocker switch is connected through the MASTER switch on these aircraft and forward interior lights will go OFF when MASTER switch is turned OFF if door is closed.

4. Anti-Collision Lights. A circuit breaker switch controls the white anti-collision strobe lights.

5. Instrument and Radio Lights. Rheostats control glareshield, and radio lights. The flight panel instrument light rheostat controls the compass light. Lighting loads are controlled by transistors biased with manually controlled rheostats. The transistors can be checked by the following methods:

A. Connect ohmeter between the emitter and the collector - should be infinite ohms.

B. Short base to collector - should be a direct short, zero ohms.

NOTE
If readings are incorrect reverse the loads.
CAUTION
Care must be exercised to prevent shorting light wires when installing or replacing instruments. Shorted wires will cause blown fuses or burned out transistors in the control box.

6. Baggage Compartment Lights. A three-position (Bright, Off, Dim) rocker switch in headliner controls the aft interior lights.

CAUTION
On S/N 25-0001 thru 25-1224 this light switch is connected directly to the battery. The switch MUST BE TURNED OFF to keep from discharging the battery.

Aircraft S/N 25-1225 thru 25-1230 may have a door switch and timer mechanism that illuminate aft set of interior lights while baggage door is open. After door is closed, if rocker switch is left ON, aft interior lights will remain ON for approximately 2 minutes. The rocker switch is connected through the MASTER switch on these aircraft and interior lights will go out when the MASTER switch is turned OFF iif door is closed.

7. Map Light. A push button switch on top of control wheel center section controls map light (S/N 25-0001 thru 25-1224. S/N 25-1225 thru 25-1230 have a switch/rheostat on control wheel to control light & brightness. The co-pilots map light is optional.

24-36-00 - LANDING GEAR CIRCUITS

1. Limit switches and relays operate the landing gear actuator, a 12 volt DC (25-0001 thru 25-0999) (24 volt for 25-1000 thru 25-TBA) reversible motor assembly. A landing gear air pressure safety switch, actuated by pitot air pressure, prevents landing gear retraction until a safe flying speed is attained. The landing gear control switch operates the actuator motor through the safety switch and relays. When the landing gear control switch is up and a safe flying speed has been attained, the safety switch closes to activate control relay, starting the actuator. As the gear reaches the up and locked position, a mechanical stop opens the up limit switch and the actuator stops. When the landing gear control switch is placed in the down position, the gear motor down-relay closes and the actuator starts. When the gear reaches the down-and-locked position, the mechanical stop opens the down limit switch and actuator stops. The gear-up limit switch controls the landing gear un-safe light. The red light comes on when gear is in transit. The green light comes on when the gear reaches down-and-locked position; the gear-down limit switch controls the green gear-down light.

2. Gear Safety By-Pass Switch. The gear will not retract if airspeed above the set limit has not been attained when gear handle is placed in the UP position. A warning horn will sound and both “GEAR DOWN” and “ GEAR UNSFE” lights will illuminate. Push and hold the red button switch beside the landing gear handle until the gear is up and both lights go out. Pull the circuit breaker “GEAR CONT” or “GEAR RELAY ” to stop warning horn. Reset circuit breaker prior to extending gear.

24-37-00 - FUEL SYSTEM CIRCUITS

The fuel system has an electric, auxiliary fuel pump. The fuel quantity indicating system is comprised of two transmitters in each fuel tank and two fuel quantity gauges (L & R) in the instrument panel.

1. Fuel Pump Circuits. A single auxiliary fuel pump is controlled by 3 switches for different functions:

A. Engine Prime - This switch, located on instrument panel above the throttle control, when depressed and held “ON” causes fuel to be vaporized and injected directly into the induction manifold and engine cylinders for starting.

B. Low Boost - This switch is located on instrument panel, lower left, near master switch and is used when switching fuel tanks and certain emergency situations.

(1) Low Boost Auxiliary fuel system adjustment — **S/N 25-0001 thru 25-0780**:

(a) Install a calibrated pressure gauge, tee into the fuel line between the electric fuel pump and the engine.

NOTE
The fuel line must remain connected to the engine with the pressure gauge "T"ed into the line.

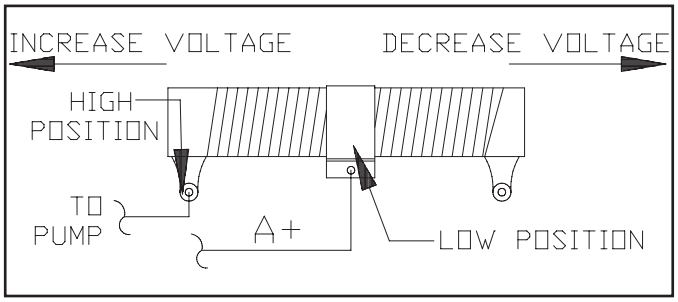
(b) Insure that the aircraft master switch is in the OFF position, mixture full rich, throttle at idle.

(c) Disconnect the electrical wire from the circuit protector. Connect the negative lead from an external power source to ground; connect the positive lead to the slide resistor HIGH POSITION. (Reference Figure 24-1.)

(d) Using a calibrated voltmeter, adjust the external power source to indicate 13.75 +/- .25 volts (25-0001 thru 25-0999) (28.6 +/- .25 for 25-1000 thru 25-TBA) direct current (VDC) at the auxiliary fuel pump. Note the voltage reading on the external power source voltmeter.

(e) The calibrated pressure gauge shall indicate 23.5 to 24.5 P.S.I.

(f) Connect the positive lead to the slide resistor LOW POSITION. Adjust the power supply voltage level to 13.75 +/- .25 volts (25-0001 thru 25-0999);(28.6 +/-.25 volts for 25-1000 thru 25-TBA). Adjust the slider on the variable resistor to obtain a pump pressure of 6 to 8 P.S.I. Secure the slider.



LOW BOOST PUMP ADJUSTING RESISTOR

S/N 25-0001 thru 25-0780
FIGURE 24-1

NOTE
Slide resistor located on console tubular structure adjacent to pilots right knee, behind riveted panel.

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(2) Low Boost Auxiliary Fuel System Adjustment — **S/N 25-0781 thru 25-TBA**.

(a) Install a calibrated pressure gauge in the fuel line between the electric fuel pump and the engine.

NOTE
The fuel line must remain connected to the engine with the pressure gauge "T"ed into the line.

(b) Set mixture control "FULL RICH" and throttle full OPEN.

(c) Connect a voltmeter to the aircraft bus.

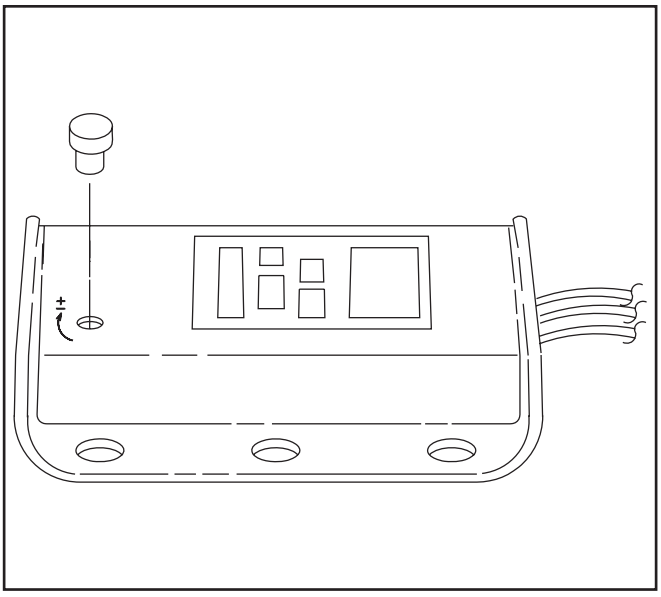
(d) Turn "MASTER" switch ON and assure that bus voltage is at least 12 volts(25-0001 thru 25-0999);(24 volts for 25-1000 & ON) minimum. An external power source may be connected to the aircraft system if voltage is less than 12 volts (25-0001 thru 25-0999); (24 volts for 25-1000 & ON).

(e) Turn "LO BOOST" switch - ON.

(f) Remove rubber plug from "Boost Pump Regulator" and adjust trim pot for a calibrated pressure gauge reading of 6 to 8 P.S.I. (Reference Figure 24-2.)

NOTE
Turn pot clockwise to increase pressure.

NOTE
Boost Pump Regulator located on top of power plant controls approximately 8 inches aft of the face of console where controls come through. Access to



LOW BOOST PUMP VOLTAGE REGULATOR

S/N 25-0781 thru 25-1230 FIGURE 24-2

rubber plug and adjustment is from top of panel after glareshield removal.

C. High Boost - This switch is located adjacent to low boost and is colored red. A protective cover is placed over it to prevent inadvertent activation. The switch can be held on for temporary use or the cover rotated and switch depressed for continuous use when engine driven pump has become inoperative.

2. Fuel Quantity Gauge Circuits. Fuel level changes vary fuel quantity transmitter resistance that operates the fuel quantity gauges. The master switch activates the fuel quantity indicating system. Refer to Section 28-43-00 for Adjustment Procedures.

24-38-00 - MISCELLANEOUS CIRCUITS

1. Turn Coordinator Circuit.

The turn coordinator is a flight instrument which operates from an electrical power source.

2. Heated Pitot Tube.

A circuit breaker switch controls the pitot tube heater.

3. Hour Meter (Optional).

The hour meter operates directly from the alternator “Aux.” terminal through a fused wire on S/N 25-0001 thru 25-0446. S/N 25-0447 and later models hour meter operates from the electric tachometer. A Hobbs meter may be installed as an option.

4. Cigar Lighter.

A cigar lighter is mounted in the right instrument panel.

5. Current Sensor (Monitor).

(Reference Figure 24-3)

CURRENT SENSOR - ADJUSTMENT

Effective S/N 25-2000 thru 25-TBA

A. Remove front cover from Annunciator.

B. Start engine and run at moderate speed until ammeter charge rate drops to near zero.

C. Turn all equipment OFF - avionics, lights, pitot heat, etc., so only the equipment connected to buss is operating (instruments only).

D. Turn Right Alternator field switch - OFF.

E. Adjust LH potentiometer clockwise until light illuminates; then counterclockwise until light is extinguished.

F. Turn Left Alternator OFF and turn Right Alternator ON.

G. Repeat Steps E & F with RH potentionmeter.

H. Turn both alternators ON; if either light illuminates, adjust apppropriate potentionmeter slightly counterclockwise until light is extinguished.

I. Replace cover and secure in original location.

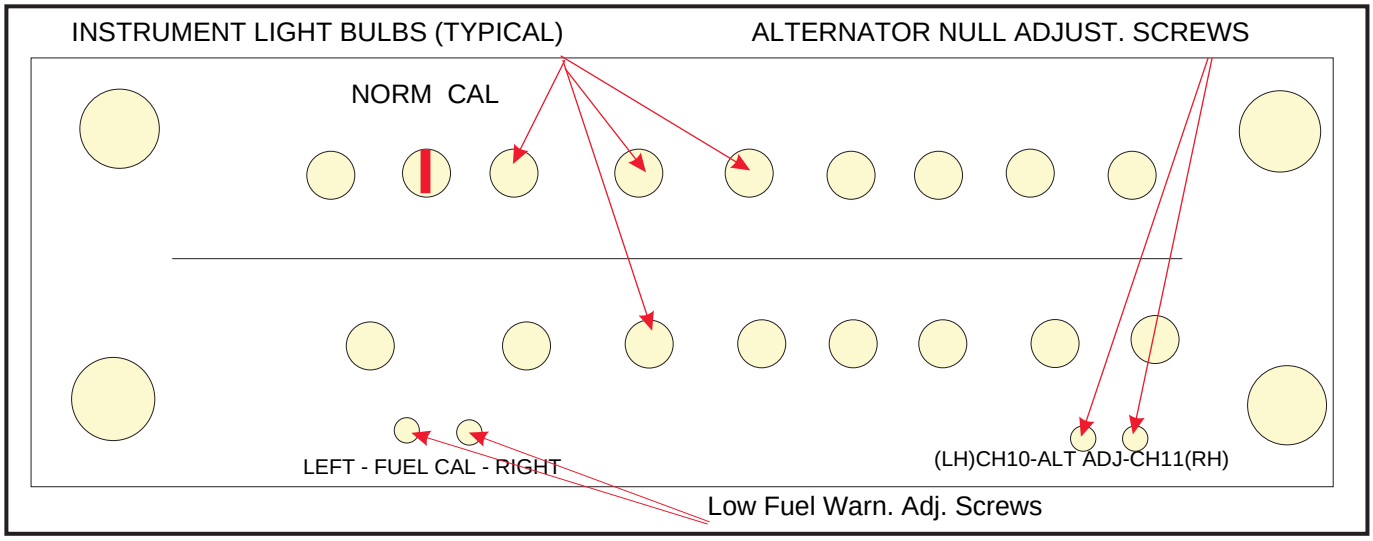


FIGURE 24-3 - CURRENT MONITOR ADJUSTMENT
S/N 25-2000 THRU 25-2017

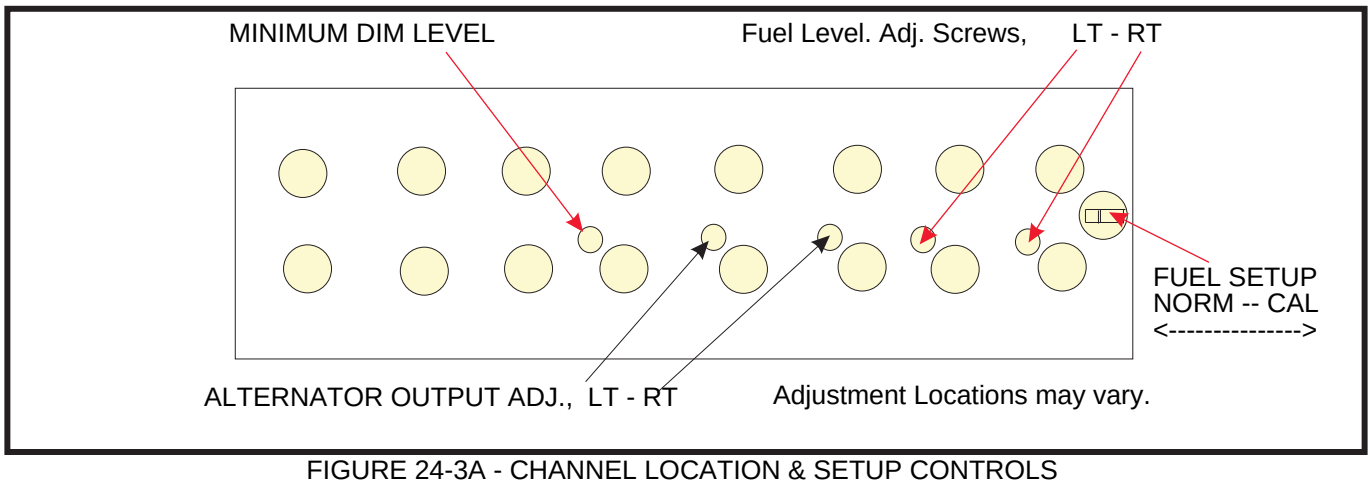


FIGURE 24-3A - CHANNEL LOCATION & SETUP CONTROLS
S/N 25-2018 THRU 25-TBA

24-39-00 - TROUBLE SHOOTING CHARTS

24-39-01 - ALTERNATOR TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Alternator over-charges battery; battery uses excessive water.	Regulator faulty.	Check bus voltage with engine running. Observe aircraft ammeter. Ammeter should indicate near zero after ten minutes of engine operation. Replace voltage regulator if defective.
ALT FIELD circuit breaker trips.	Circuit shorted in wiring.	Disconnect lead from pin A or 1 of regulator, * and reset circuit breaker. If circuit breaker trips, check wiring.

***** (25-0001 thru 25-0999; Pin 5 for 25-1000 thru 25-1230)

Repair as required. If breaker does not trip, replace regulator. Reconnect lead to regulator. Master switch to ON and check for 12V at pin A or 1 of regulator. ** Repair wiring if no voltage is present.

** (25-0001 thru 25-0999; Set alternator field & MASTER switch to ON & check for 24 volts at Pin 5 of regulator (25-1000 thru 25-1230)

ALT circuit breaker trips.	Short circuit in wiring.	Disconnect lead from + post of alternator, and reset ALT circuit breaker. If circuit breaker trips, check wiring between alternator and circuit breaker.
	Short circuit in alternator.	Reconnect lead to + post of alternator.

WARNING
ENSURE THAT MAGNETO SWITCH IS OFF WHEN TURNING PROPELLER.

Rotate propeller by hand to rotate alternator through 360 degrees of travel. If circuit breaker trips replace alternator.

Alternator will not keep battery charged.	Battery malfunction.	1. Start engine and adjust for 1500 RPM. Ammeter should indicate a heavy charge rate with all electrical equipment turned off. Rate should taper off in 1 - 3 minutes. A voltage check at the bus should indicate a reading of 13.75 to 14.0 volts.

*** If charge rate tapers off very quickly and voltage is normal, check battery for malfunction. If ammeter shows a low charge rate or any discharge rate, and voltage is low, proceed to step 3.

	Defective wiring.	2. Check voltage at A or 1 terminal of regulator with master switch ON. **** Meter should indicate bus voltage. If voltage is not present, check wiring between regulator and bus.

**** 25-0001 thru 25-0999; ...@terminal 5 for 25-1000 thru 25-1230, with Alt.Fld. & Master Switch - ON.

	Regulator faulty.	3. Remove connector from regulator and start engine.

***** 25-0001 thru 25-0999;pins 5 & 7 for 25-1000 thru 25-1230.

Momentarily jump A & B or 1 and 2 pins ***** together on the plug. Aircraft ammeter should show heavy rate of charge. If heavy charge rate is observed, replace regulator. If heavy rate is not observed, proceed to step 5.

CAUTION
Pull alternator field C/B. Start engine; while at idle RPM reset C/B. Slowly increase RPM while monitoring bus voltage. DO NOT EXCEED 14 volts,(25-0001/25-0999);28 volts for (25-1000 thru 25-TBA).

	Defective wiring regulator to alternator.	4. Check resistance from F2 terminal + of alternator to pin B or 2 ++ of reg.

		plug. Normal indication is a very low resistance. If reading indicates no, or poor continuity, repair or replace wiring from regulator to alternator.
+25-0001 thru 25-0999; field terminal for 25-1000 thru 25-1230.		
++25-0001 thru 25-0999; Pin 7 on 25-1000 thru 25-1230.		
	Defective alternator.	5. Check resistance from F2 to F1 term. +++ of alternator. Normal indication is 3 - 4 ohms. If resistance is high or low, repair or replace alternator.
+++ 25-0001 thru 25-0999; case to field, 25-1000 thru 25-TBA.		
		6. Check resistance from F2 terminal of alternators to alternator case. Normal indication is high. If resistance is low,repair or replace alt.25-0001—25-0999)

24-39-02 - GENERATOR TROUBLE SHOOTING. (For Standby Generator) (25-0001 thru 25-0999)

TROUBLE	PROBABLE CAUSE	REMEDY
Generator operating within rated speed range, but voltage output low.	Generator operating on residual.	Check for loose or high resistance connections; clean and tighten terminals.
	Loose or high-resistance electrical connections.	Clean and tighten all electrical connections.
	Excessively worn brushes.	When brush wears down to .700 inch, replace with a new one.Do not use abrasives of any description to seat brushes.
	Brushes binding in brush box.	Brushes should fit free without excessive side play in brush boxes. Clean binding brushes and brush boxes with a cloth moistened in Varsol or unleaded gasoline.
	Excessive brush side play in brush box.	Replace brushes.
	Brushes not properly seated.	Reseat brushes.
	Low brush spring tension.	Brush spring should bear centrally on top of brushes, insuring full brush contact with face of commutators.
	Dirty commutator.	Clean commutator with a cloth moistened in Varsol or unleaded gasoline.
	Scored or pitted commutator.	Turn down or replace commutator.
	Shorted or open armature cells.	Replace generator or armature.
	Improper voltage regulator operation.	Adjust or replace regulator.
Generator operating within rated speed range, but voltmeter indicates zero.	Wiring not properly connected.	See electrical system wiring diagram.
Generator operating within rated speed range, but voltage output is erratic.	Unstable voltage regulator operation. Same as listed with “Generator operating within rated speed range, but voltage output low.” above.	Replace voltage regulator. Use remedy for “Generator operating within rated speed range, but voltage output low.”above.
Excessive sparking at generator brushes.	Same cause as listed with “Generator operating within rated speed range, but voltage output low.” above.	Same remedies.
	Loose connections.	Tighten connections.
Burned-out in line fuse.	Defective wiring.	Check wiring for shorts and repairs.

24-39-03 - BATTERY TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Discharged battery.	Battery worn out.	Replace battery.
	Improper charging rate setting.	Reset charging rate.
	Excessive discharging.	Turn off some equipment when alternator is not charging. Decrease starter usage by using external power whenever possible.
	Standing too long.	Remove and recharge battery.
	Equipment accidentally left on.	Remove and recharge battery.
	Impure electrolyte.	Replace battery.
	Short circuit (ground) in wiring.	Check wiring.
	Low charging rate.	Adjust voltage regulator.
Cracked cell jars.	Loose hold-down bracket.	Replace battery and secure firmly.
	Frozen battery.	Replace battery.
Compound on top of battery melts.	Charging rate too high.	Reduce charging rate by adjusting voltage regulator.
Electrolyte runs out of vent plugs.	Too much water added to battery and charging rate too high.	Drain battery and keep at proper level; adjust voltage regulator.
Excessive corrosion inside container.	Spillage from overfilling.	Flush container with baking soda solution.
	Leaking or clogged vent lines.	Repair or clean vent lines.
	Charging rate too high.	Adjust voltage regulator.
Battery freezes.	Discharged battery.	Replace battery.
	Water added and battery not charged immediately.	Always recharge battery for 1/2 hour following addition of water in freezing weather.
Leaking battery case.	Frozen electrolyte.	Replace battery.
Reversed battery polarity.	Cables connected backwards on battery or charger.	Battery should be slowly discharged completely, then charged correctly and tested.
Excessive water consumption all cells.	Charging rate too high.	Correct charging rate.
Excessive water consumption one cell only.	Cracked jar.	Replace battery.

24-39-04 - STARTER TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Motor does not operate.	Low battery.	Check and recharge battery if necessary.
	Defective, improper, or loose wire connections.	Refer to electrical wiring diagram and check all wiring.
	Binding, worn improperly seated brushes; brushes have excessive side play.	Brushes should fit free in brush boxes without excessive side play. Clean binding brushes and brush boxes with a Varsol moistened cloth. A new brush should be run-in until at least 50 percent seated; however, if facilities are not available for running in brushes, seat brush by inserting a strip of No. .0000 sandpaper * between brush and commutator with sanded side next to brush. Pull sandpaper in

		direction of rotation, being careful to keep it in same contours as commutator.
	*** CAUTION Do not use coarse sandpaper or emery cloth.**	
		After seating, thoroughly clean brushes and commutator to prevent excessive wear. Keep motor bearing free from sand or metal particles.
	Dirty commutator.	If commutator is rough or dirty, smooth and polish with No. 0000 sandpaper. If too rough and pitted, remove commutator and turn down. Blow out all foreign material.
	Shorted, grounded, or open armature.	Remove and replace with an armature known to be in good working order.
	Grounded or open field circuit.	Test and repair circuit if possible or replace with new parts.
Slow cranking speed.	Worn, rough, or improperly lubricated motor or starter.	Disassemble, clean, inspect, and relubricate components, replacing ball bearing if worn.
	Same causes as listed with "Motor fails to operate."	Same remedies.
Excessive motor brush arcing.	Binding, worn, or improperly seated brush or brushes have excessive side play.	Repair as outlined above.
	Dirty, rough, pitted, or scored commutator.	Clean as outlined.
Excessive motor brush wear and arcing.	Rough or scored commutator.	Remove and turn down commutator on lathe.
	Armature assembly not concentric.	Reface commutator.

24-39-05 - ANNUNCIATOR TROUBLE SHOOTING (S/N 25-0001 thru 25-1224)

The following is a brief failure/cause analysis which pertains to the annunciator (IAI P/N 500D0061) on the Mooney M20K. Each cause is listed in probable order. All designator references are made from IAI drawings 710D0125A, 900D0134 and 900D0135.

1. The "gear-down" lamp will not light during "TEST" but will light with the gear-down.
   CR1 (Assy A2) open
2. The "gear-down" lamp will not light during "TEST" or with the landing gear down.
   Filament of DSI (Assy A2) open
3. The "gear-down" lamp is dim when the position lights are off.
   CR24 (Assy A1) open
4. The "gear-unsafe" lamp will not light during "TEST" but does light when the gear is in transit.
   CR3 (Assy A2) open
5. The "gear-unsafe" lamp will light during "TEST" but not when gear is in transit.
   CR2 (Assy A2) open
6. The "gear-unsafe" lamp will not light during "TEST" or when the gear is in transit.
   Filament of DS2 (Assy A2) open
   CR2 (Assy A2) and CR3 (Assy A2) open
7. The "left low fuel" lamp will not light during "TEST" or in a left low fuel situation.
   Filament of DS3 (Assy A2) open
   Q2 (Assy A1) defective
   U1 (Assy A1) defective
   Wire from P1-7 (Assy A1) to left fuel gauge open

(ANNUNCIATOR TROUBLE SHOOTING (S/N 25-0001 thru 25-1224) - con't.)

8. The "left low fuel" channel functions properly but the lamp is always dim.
   CR22 (Assy A2) open
9. The "left low fuel" lamp flickers on and off.
   S1 (Assy A1) is in "Cal" position instead of "Norm" position
   Intermittent ground on the wire from P1-7 (Assy A1) to the left fuel gauge
   C2 (Assy A1) defective
10. The "left low fuel" will not light during "TEST" only when the left fuel tank is full.
    R10 (Assy A1) should be replaced with a 47K, 1/4 watt, 5% resistor
11. The "right low fuel" lamp will not light during "TEST" or in a right low fuel situation.
    Filament of DS4 (Assy A2) open
    Q6 (Assy A1) defective
    U1 defective
    The wire from P1-8 to the right fuel gauge is open
12. The "right low fuel" channel functions properly but the lamp is always dim.
    CR23 (Assy A2) open
13. The "right low fuel" lamp flickers on and off during flight.
    S1 (Assy A1) is in "Cal" position instead of "Norm" position
    An intermittent ground on the wire from P1-8 (Assy A1) to the gauge
    C3 (Assy A1) defective
14. The "right low fuel" will not light during "TEST only when the right fuel tank is full.
    R10 (Assy A1) should be replaced with a 47K, 1/4 watt, 5% resistor
15. The "right low fuel" or the "left low fuel" lamps light before a low fuel situation has occured.
    Recalibrate the appropriate channel
    CR1 (Assy A1) open
16. Both the "left low fuel" and the "right low fuel" channels stay dim when they annunciate a low fuel situation or during "TEST".
    Q3 (Assy A1) defective
    Q5 (Assy A1) defective
    U2 (Assy A1) defective
    Q4 (Assy A1) defective
    CR22 (Assy A1) and CR23 (Assy A1) open
17. Neither the "left low fuel" nor the "right low fuel" lights during "TEST".
    CR1 (Assy A1) shorted
    U1 (Assy A1) defective
18. The "high low vac" lamp will not light during "TEST" but does annunciate a high or low vacuum situation.
    CR14 (Assy A1) open
19. The "high low vac" lamp will not light during "TEST" or in a high or low vacuum situation.
    Filament of DS5 (Assy A2) open
    Q7 (Assy A1) defective
20. The "high low vac" lamp will not light in a low vacuum situation but does light in a high vacuum situation.
    Q8 (Assy A1) defective
    CR12 and/or CR13 (Assy A1) open
21. In a low vacuum situation the "high low vac" lamp lights but does not flash.
    CR16 (Assy A1) open
    Q8 (Assy A1) defective
    U2 (Assy A1) defective
    CR1 (Assy A1) shorted
22. The "high low volts" lamp will not light during "TEST" or in a high or low voltage situation.
    Filament of DS6 (Assy A2) open
    Q10 (Assy A1) defective
    Q9 (Assy A1) defective
23. The "high low volts" lamp will not "TEST" but does annunciate a low or high voltage situation.
    CR20 (Assy A1) open
24. The "high low volts" lamp lights but does not flash in a low voltage situation.
    CR17 (Assy A1) open
    Q8 (Assy A1) defective
    U2 (Assy A1) defective

(ANNUNCIATOR TROUBLE SHOOTING (S/N 25-0001 thru 25-1224) - con't.)

25. The "high low volts" lamp will not light in a over voltage situation
    CR21 (Assy A1) open
26. The "high low volts" lamp flashes before a low voltage situation has occured.
    R42 (Assy A1) out of calibration
    U2 (Assy A1) defective
    CR1 (Assy A1) open
27. The "high low volt" will not light in a low voltage situation.
    R42 (Assy A1) out of calibration
    U2 (Assy A1) defective
    CR19 (Assy A1) open
    Q8 (Assy A1) defective
    CR1 (Assy A1) shorted
28. The "alt air" will not light during "TEST" or in normal operation.
    Filament of DS8 (Assy A2) open
    CR6 and CR7 (Assy A2) open
29. The "alt air" will not light during "TEST" but does in normal operation.
    CR7 (Assy A2) open
30. The "alt air" will light during "TEST" but not during normal operation.
    CR6 (Assy A2) open
31. The "area nav" is the only channel that lights during "TEST". "area nav" if used, effectivity 25-0001 thru 25-0717; "start power on" (effectivity 25-0718 thru 25-1224) have no "TEST" indication.
    Q1 (Assy A1) defective
    CR2 (Assy A1) open
32. Once dimmed the "low fuels" cannot be reset to bright by momentarily depressing the "TEST" switch.
    CR11 (Assy A1) open
33. Neither the "high low vac" or the "high low volts" will flash when low vacuum and/or low voltage occurs.
    Q8 (Assy A1) defective
    U2 (Assy A1) defective
    CR1 (Assy A1) not suppling +5 VDC
    C5 (Assy A1) defective
34. All the channels, except for "area nav", light up when the landing gear is extended.
    CR1 (Assy A2) shorted

24-39-06 -ANNUNCIATOR TROUBLE SHOOTING (S/N 25-1225 thru 25-TBA)

The following is a brief operational analysis which pertains to the I.A.I. annunciator on Mooney M20K, S/N 25-1225 thru 25-TBA.

1.0 GENERAL

This document is intended to be a guide to assist a service technician in understanding the theory and operation of International Avionics, Inc. (IAI) Part Numbers, 9500326000 & 9500326001 annunciators. It is not intended to serve as a bench service aid in that reference designators in various Figures are not consistent with those found in actual annunciators. Service literature is available from International Avionics, Incorporated (IAI), 1611 N. I-35, Suite 428, Carrollton, TX 75006, telephone number (214) 446-1185, to identify location of a particular component and exact manner in which components are interconnected.

The following paragraphs address nine (9) basic circuits which, used singularly or in multiple combinations, comprise the annunciators. These paragraphs are as follows:

Paragraph 2	Power Supply, with Test & Dim switches
Paragraph 3	Flasher
Paragraph 4	Landing Gear Indicators

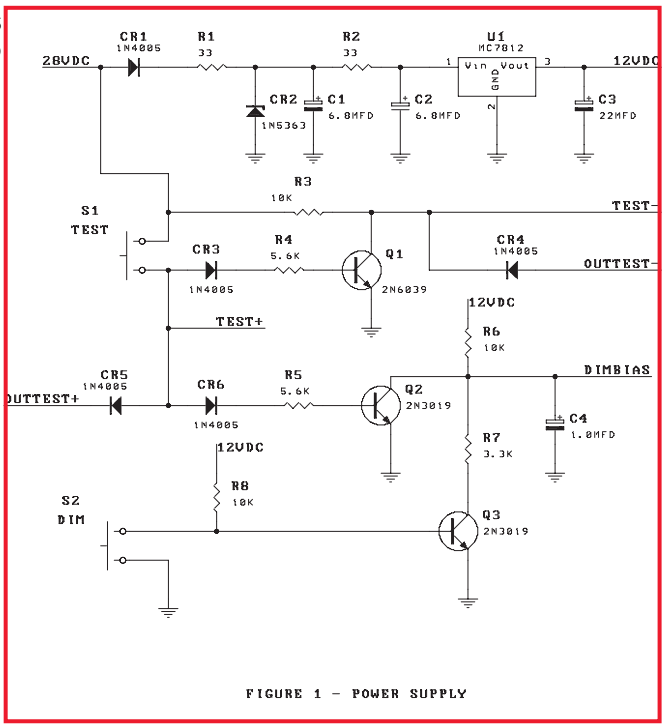


FIGURE 1 – POWER SUPPLY

Paragraph 5 Left and Right Low Fuel
Paragraph 6 Hi/Lo Vac
Paragraph 7 Left Alternator/Low Volts/Over Volt
Paragraph 8 Right Alternator/Over Volt
Paragraph 9 Typical Positive Apply W/Dim
Paragraph 10 Typical Positive Apply W/O/Dim.

2.0 POWER SUPPLY

The Power Supply, shown in Figure 1, provides 12 VDC, reverse voltage protection by means of CR1, spike and overvoltage filtering by means of the low pass network of R1, R2, C1 and C2 with spike clamping provided by CR2. The actual power supply is a 12 VDC, integrated circuit regulator. Output filtering is provided by C2. The Test Switch, S1, switches unfiltered aircraft 28 VDC to the internal test line, identified with the mnemonic TEST+. This signal, diode isolated by CR5, is also supplied as OUTTEST+. Additionally TEST+ is applied to the inverter to supply the internal test line, TEST-, and the diode isolated OUTTEST-. The dimmer circuit, applicable to certain channels, requires a bias source, DIMBIAS, with a magnitude of 12 VDC to dim the applicable ACTIVE

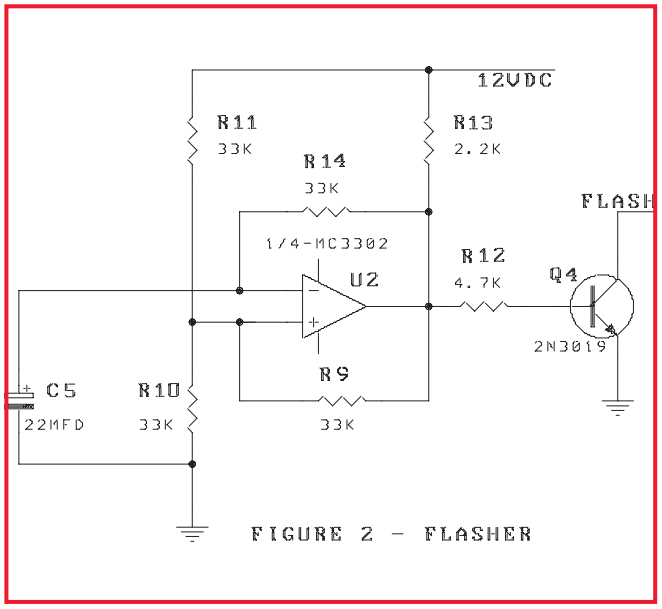


FIGURE 2 - FLASHER

channels, approximately 3 VDC to maintain the dim level of those channels previously dimmed, and near 0 VDC to reset the dimmed channels to a bright condition. The channels having the capability of being dimmed by the above circuitry are channels x, x, x, x, x, x, and x. Channel 1, Landing Gear, dims by means of a separate circuit and is discussed in Section 4.0 below. With both the Dim Switch and Test Switch relaxed, transistor Q3 is in saturation and Q2 is off, giving DIMBIAS a value of approximately 9 VDC. When the Dim Switch is depressed Q3 comes out of saturation and DIMBIAS rises to 12 VDC, and when the Test Switch is depressed Q2 saturates and DIMBIAS drops to near 0 VDC. In the event that both switches are depressed simultaneously, the 0 VDC value of DIMBIAS will prevail and the dimmed channels, with the exception of Channel 1, are reset to a bright condition.

3.0 FLASHER

The Flasher, shown in Figure 2, provides the circuit to flash the outputs of the left and right alternator warnings, the low voltage warning and the low vacuum warning. The flasher consists of an astable oscillator driving an NPN common emitter connected transistor, Q4. This allows the open collector of Q4, identified as FLASH, to sink the drive from the output amplifiers of the appropriate warning channels.

4.0 LANDING GEAR INDICATORS

The Landing Gear Indicators, shown in Figure 3, provide the status of the landing gear position, that is, whether the landing gear is Down or not and whether the landing gear is safe or unsafe, unsafe being in transit. The circuit shown is the identical circuit that has been used for many years in the IAI annunciators used on Mooney aircraft. The GEAR DOWN channel is dimmed for night operation; however, in the interest of reliability, the dimming circuit is separate from the dimming technique used on the other dimmed channels. The gear down signal, +28 VDC, is applied through isolation diode CR7, to the INPOS1 input and CH1RET is returned to the Nav Light bus. When +28 VDC is applied to INPOS1 and the Nav Lights are off, the impedance of this point is very low due to the low filament resistance of the Nav Light bulbs, and GEAR DOWN illuminates at near full brilliance. When the Nav Lights are on, however, CH1RET is also +28 VDC and CR9 switches this return path off, the return path for the GEAR DOWN lamp being through R15 to Ground and GEAR DOWN now illuminates at reduced brilliance. The GEAR UNSAFE channel accepts +28 VDC, INPOS2, through isolation diode CR10, illuminates at full brilliance and does not dim. A test signal, TEST+ is applied to both GEAR DOWN and GEAR UNSAFE through CR8 and CR11 respectively.

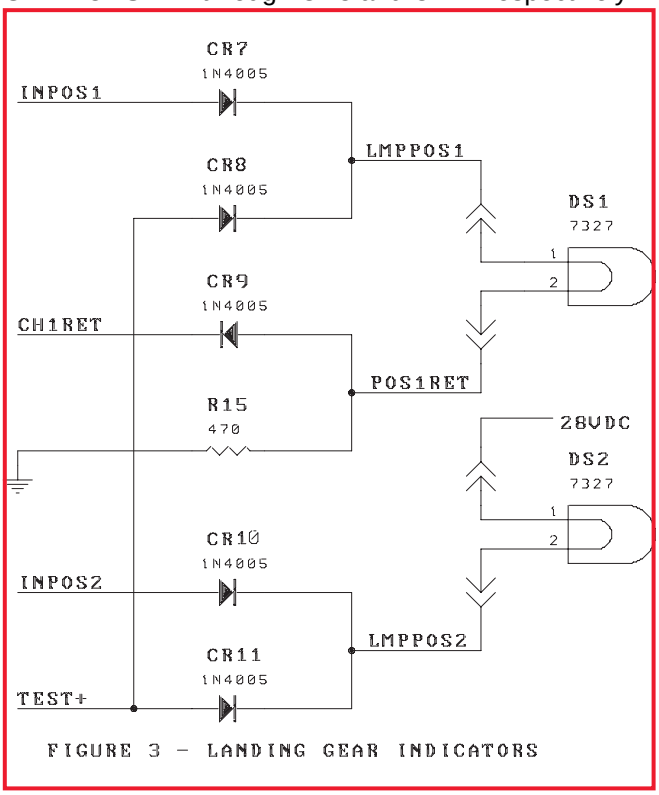


FIGURE 3 - LANDING GEAR INDICATORS

5.0 LEFT AND RIGHT LOW FUEL

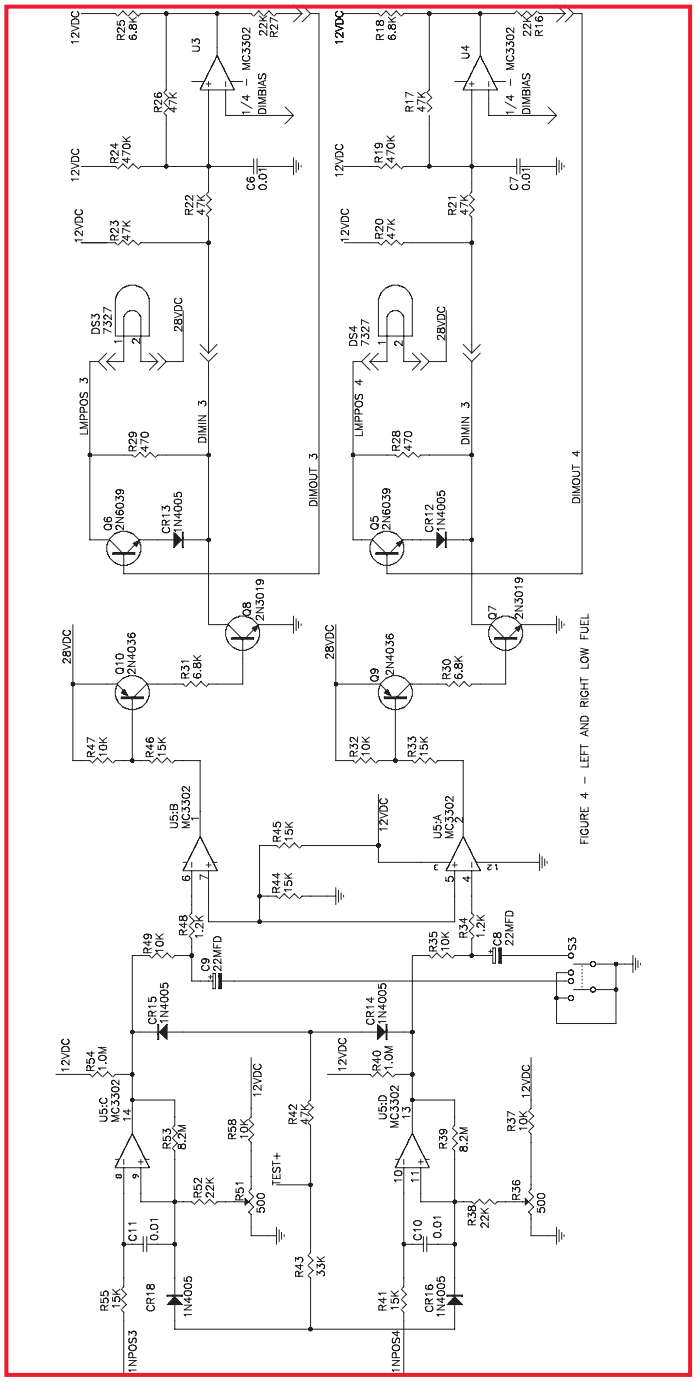


FIGURE 4 – LEFT AND RIGHT LOW FUEL

The Left and Right Low Fuel circuits are shown in Figure 4. The left and the right channels are similar, and only the left channel will be discussed herein. Signals from the junction of the left and right fuel transducers and the left and right fuel quantity gauges are applied, respectively, to each of the inputs INPOS3 and INPOS4. This signal is an analog signal that indicates the quantity of fuel measured, the typical low fuel point being on the order of 0.1 volt. The low fuel circuits can, however, annunciate an input up to approximately 0.7 volt. The input, INPOS3, is applied through an isolation resistor R55 to the inverting input of open collector comparator U5:C. The input is compared with the set point effected by the setting of R51, accessible through the front of the annunciator, and, when the input is less than the set point, the comparator's output is allowed to rise by means of the pull-up resistor R54 and the network R48, R49, and C9. Feedback resistor R53 provides a small amount of hysterisis to preclude oscillation at the transition point. The exponentially rising output of U5:C is applied to the inverting input of open collector comparator U5:B and is compared with a reference voltage of approximately 6 VDC. When U5:B switches its output to ground Q10 conducts and drives Q8 into saturation to light the L LOW FUEL channel lamp, DS3. The Q10 - Q8 network is required to provide the transition between the internal 12 VDC and aircraft +28 VDC. The delay provided by the charge of C9 through R48 and R49 provides filtering to preclude false annunciation in rough air. When the fuel level rises, due to sloshing in the tank and U5:C switches to a low output state, C9 is discharged rapidly through R49. The delay time of the charging network provides a delay in low fuel annunciation of approximately 20 seconds. A test of the functioning of the low fuel channel is accomplished by applying TEST+ through R43 - CR18 to the input of U5:C to switch U5:C and applying TEST+ through R42 - CR15 to accelerate the charging rate of the filter C9, thus reducing the delay to approximately 2 seconds. In order to calibrate the low fuel channel the set point, R51, is adjusted with the screwdriver adjustment accessible through the front of the annunciator while there is a preset number of gallons in the tank. The time delay must be removed from the circuit by moving S3, accessible through the front of the annunciator, from the NORMAL position to the CALIBRATE position. This opens the return for capacitor C9 and the indication on the L LOW FUEL channel will not be delayed. After calibration is accomplished, restore the time delay by moving S3 from the CALIBRATE position back to the NORMAL position. The position S3 can be determined without removing the front of the annunciator. When the TEST switch is depressed observe the indication of L LOW FUEL and R LOW FUEL. With S3 in the NORMAL position there is a delay of approximately 2 seconds in illumination, but with S3 in the CALIBRATE position there is no delay in illumination. Up to this point the circuits used to annunciate low fuel are the same circuits that have been used for many years in IAI annunciators used on Mooney aircraft. The method of dimming, however, has been changed and expanded from what has been used in the past. In the past only the low fuel channels dimmed, excluding GEAR DOWN discussed above, while now the dimming has been expanded to include additional 5 channels. From the perspective of the pilot the operation is the same, depress the DIM switch and active channels dim, depress the TEST switch and active dimmed channels return to bright. When a dimmed channel is extinguished and then reactivates it will reactivate bright. The method to accomplish this, however, is considerably different from the past. Each channel to be dimmed is driven by a transistor, in this case Q8 which returns the lamp to ground through two parallel paths. The path to provide a dim indication is through resistor R29 which reduces the brilliance of the lamp. In the bright mode R29 is shorted by Q6 and CR13 which provide a low impedance path to ground.

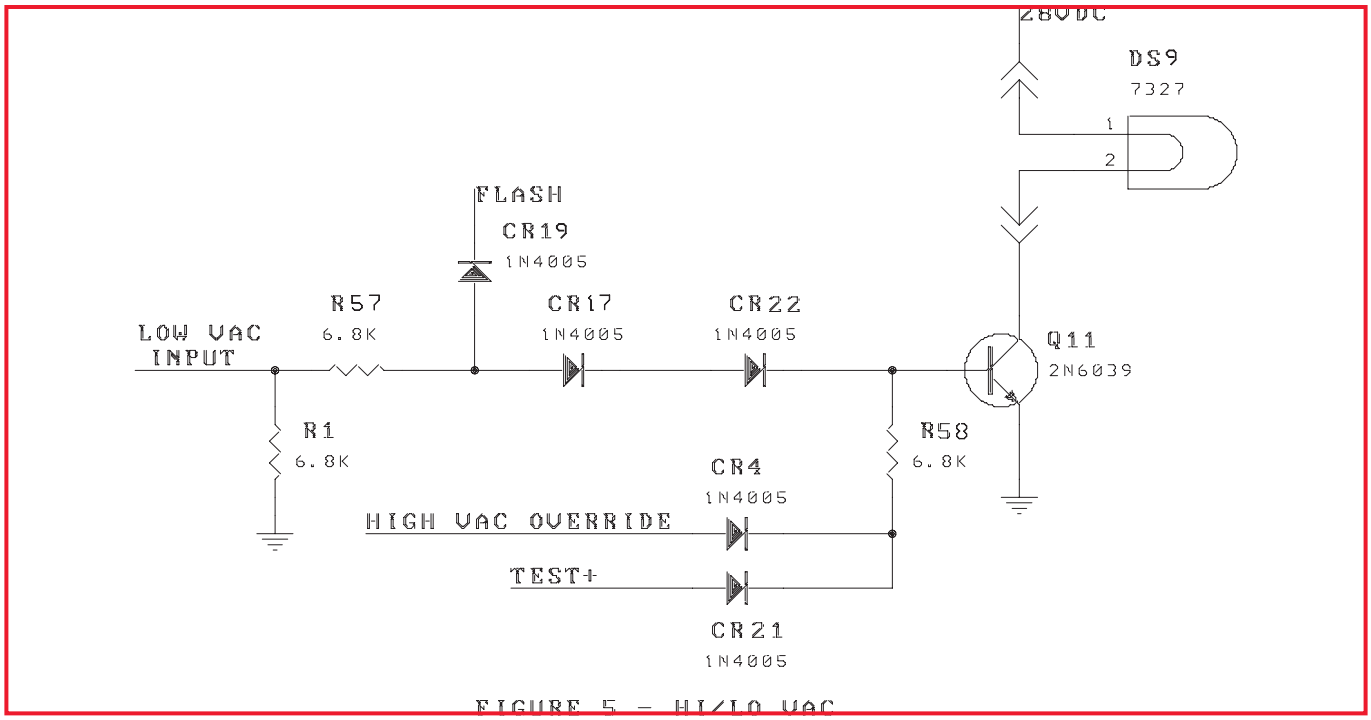


FIGURE 5 – HI/LO VAC

Transistor Q6 is controlled in conduction by a latch composed of U3 and its associated resistors R22, R23, R24, R25, R26 and R27 as well as the signals DIMBIAS and DIMIN3. If the channel is active DIMIN3 will be near ground and with DIMBIAS near 3 VDC, the output of U3 will be high, thus driving Q6 into conduction. When the DIM Switch is depressed momentarily, DIMBIAS goes high to 12 VDC and U3 switches its output low and latches through R26. This low output removes the drive from Q6 and DS3 dims. When the TEST Switch is depressed momentarily, DIMBIAS goes low and U3 switches its output high, latches through R26, and drives Q6 into conduction. When the channel deactivates, Q8 opens the return to ground and DIMIN3 rises which returns latch U3 to a high output state.

6.0 HI/LO VAC

The High/Low Vacuum circuits are shown in Figure 5. This channel is designed to accept two +28 VDC signals, one from a low vacuum sensor and one from a high vacuum sensor. When low vacuum is detected the annunciator will flash and when high vacuum is detected the annunciator will illuminate steady. A +28 VDC signal applied to LOW VAC INPUT will drive Q11 into conduction through the bias network R56, R57, CR17, and CR22, thus illuminating DS9.

The signal FLASH will, however, remove this drive signal as the flasher cycles, thus flashing DS9. A +28 VDC signal applied to HIGH VAC OVERRIDE will bypass the above network and drive Q11 into conduction regardless of the state of LOW VAC INPUT. Similarly TEST+ will drive Q11 into conduction regardless of the state of LOW VAC INPUT. The channel High/Low Vac does not dim.

7.0 LEFT ALTERNATOR /LOW VOLTS/ OVER VOLT

The Left Alternator/Low Volts/Over Volts circuits are shown in Figure 6. This channel is designed to accept three signals, the analog signal LAINPUT from a current sensor, the +28 VDC signal LOVERRIDE from the overvoltage tripped output on the left alternator regulator, and one signal derived internally that indicates that the aircraft bus voltage is less than 26.5 VDC. When low voltage is detected internally or when low current is detected the annunciator channel flashes, and when overvoltage tripped is detected the annunciator channel illuminates steady. Comparator

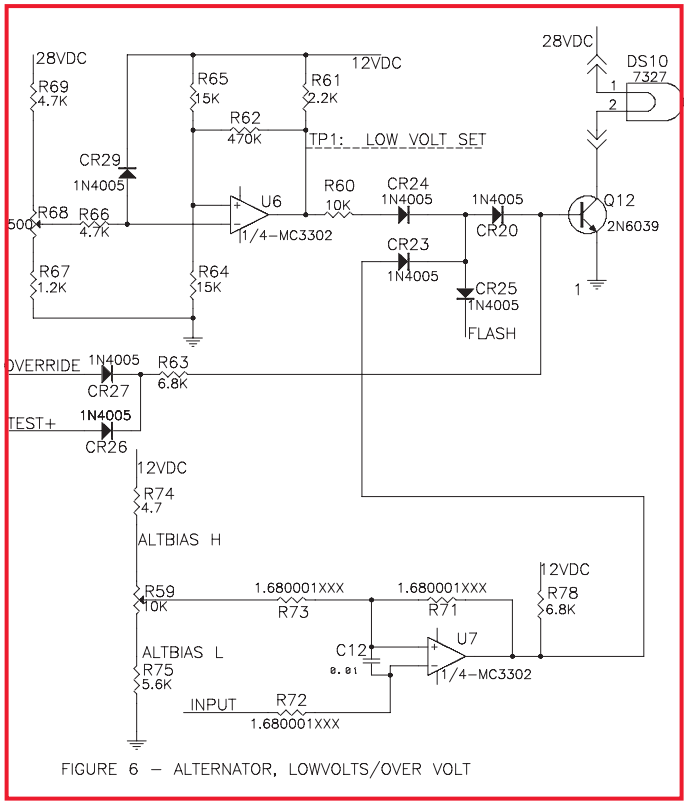


FIGURE 6 – ALTERNATOR, LOWVOLTS/OVER VOLT

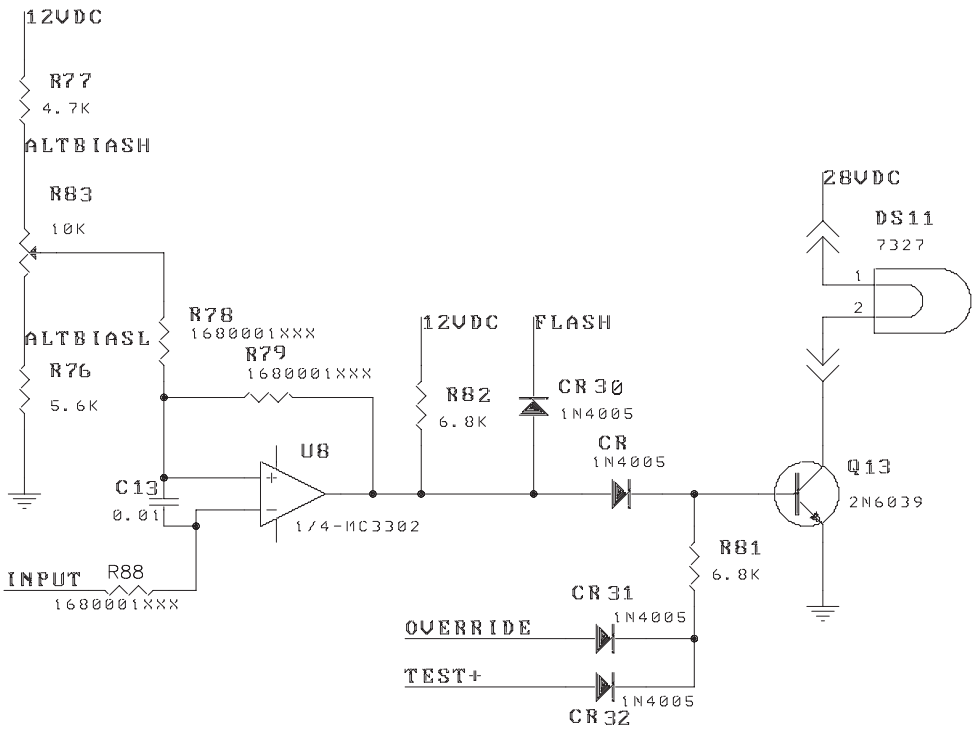


FIGURE 7 – RIGHT ALTERNATOR/OVER VOLT

U6 monitors the aircraft 28 VDC by comparing the voltage at the arm of R68 with the regulated voltage at the junction of R64 and R65. The output of U6, an open collector comparator is normally low. When low voltage is detected the output of U6 rises and drives Q12 into conduction through the bias network R60, CR24, and CR28, thus illuminating DS10. In a manner similar to the Hi/Lo Vac channel, the signal FLASH will remove this drive signal as the flasher cycles, thus flashing DS10. A +28 VDC signal applied to LOVERRIDE will bypass the above network and drive Q12 into conduction regardless of the state of the comparator U6. Similarly TEST+ will drive Q12 into conduction regardless of the state of the comparator U6. Comparator U7 monitors the output of a Hall Effect current sensor which measures the left alternator output current. The signal from the Hall Effect sensor is compared with a predetermined bias set by adjusting R59. It should be noted that the divider of R74, R59, and R75 actually consists of R74, R59 in parallel with R83 (see Figure 7), and R75. The points labeled ALTBIASH and ALTBIASL are common to both left and right alternator sense circuits. As LAINPUT is reduced in value below the voltage set by R59 the comparator U7 goes high and again drives Q12 into conduction through the bias network R70, CR23, and CR28, thus illuminating DS10, but the signal FLASH will remove this drive signal as the flasher cycles, thus flashing DS10. A +28 VDC signal applied to LOVERRIDE also drives Q12 into conduction regardless of the states of either comparator U6 or U7. Similarly TEST+ will drive Q12 into conduction regardless of the states of either comparator U6 or U7. The channel Left Alternator/Low Volts/Over Volt does not dim. The variable resistor R59 is accessible through the front of the annunciator on IAI Part Number 9500326001, while an equivalent variable resistor mounted external to the annunciator is required for the 9500326000 annunciator.

8.0 RIGHT ALTERNATOR/OVER VOLT

The Right Alternator/Over Volts circuits are shown in Figure 7. This channel is designed to accept two signals, the analog signal RAINPUT from a current sensor, and the +28 VDC signal ROVERRIDE from the overvoltage tripped output on the right alternator regulator. This circuit is an exact duplicate of and functions in a similar manner to the Left Alternator/Low Volts/Over Volts circuit with the single exception that this circuit does not detect low aircraft bus voltage. When low current is detected the annunciator channel flashes, and when overvoltage tripped is detected the annunciator channel illuminates steady. Comparator U8 monitors the output of a Hall Effect current sensor which measures the right alternator output current. The signal from the Hall Effect sensor is compared with a predetermined bias set by adjusting R83. It should again be noted that the divider of R74, R59, and R75 (see Fig 6) actually consists of R74, R59 in parallel with R83, and R75. The points labeled ALTBIASH and ALTBIASL are common to both left and right alternator sense circuits. As RAINPUT is reduced in value below the voltage set by R83 the comparator U8 goes high and drives Q13 into conduction through the bias network R82, and CR33, thus illuminating DS11, but the signal FLASH will remove this drive signal as the flasher cycles, thus flashing DS11. A +28 VDC signal applied to ROVERRIDE also drives Q13 into conduction regardless of the state of comparator U8. Similarly TEST+ will drive Q13 into conduction regardless of the state of comparator U8. The channel Right Alternator/Over Volt does not dim. The variable resistor R83 is accessible through the front of the annunciator on IAI Part Number 9500326001, while an

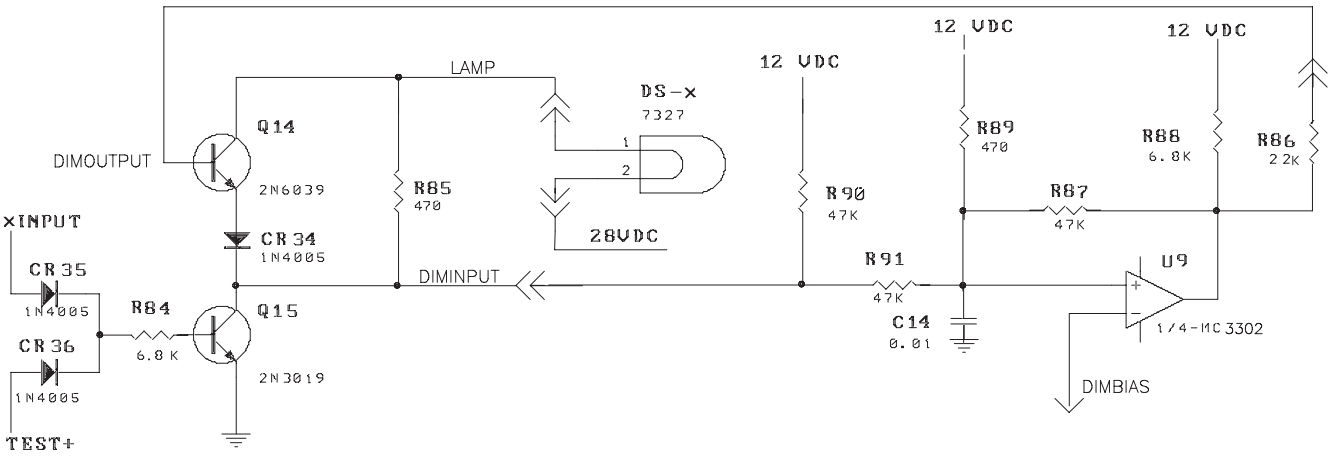


FIGURE 8 – TYPICAL POSITIVE APPLY W/DIM

equivalent variable resistor mounted external to the annunciator is required for the 9500326000 annunciator.

9.0 TYPICAL POSITIVE APPLY W/DIM

A typical Positive Apply, Dimmable circuit is shown in Figure 8. This channel is designed to accept a +28 VDC signal to illuminate an indicator channel and provide for dimming of that channel, as well. Dimming is accomplished in a manner similar to that described for low fuel channel above. The input, XINPUT, is applied through CR35 and R84 to drive Q15 into saturation and light DS-X. TEST+ is applied through CR36 and R84 to also drive Q15 into saturation and light DS-X. These 5 channels may be dimmed by depressing the DIM switch to dim the active channels. Depressing the TEST switch returns the active dimmed channels to bright. When a dimmed channel is extinguished and then reactivates it will reactivate bright. Each channel to be dimmed is driven by a transistor, in this case Q15 which returns the lamp to ground through two parallel paths. The path to provide a dim indication is through resistor R85 which reduces the brilliance of the lamp. In the bright mode R85 is shorted by Q14 and CR34 which provide a low impedance path to ground. Transistor Q14 is controlled in conduction by a latch composed of U9 and its associated resistors R86, R87, R88, R89, R90 and R91 as well as the signals DIMBIAS and DIMINPUT. If the channel is active DIMINPUT will be near ground and with DIMBIAS near 3 VDC, the output of U9 will be high, thus driving Q14 into conduction. When the DIM Switch is depressed momentarily, DIMBIAS goes high to 12 VDC and U9 switches its output low and latches through R87. This low output removes the drive from Q14 and DS-X dims. When the TEST Switch is depressed momentarily, DIMBIAS goes low and U9 switches its output high, latches through R87, and drives Q14 into conduction. When the channel deactivates, Q15 opens the return to ground and DIMINPUT rises which returns latch U9 to a high output state.

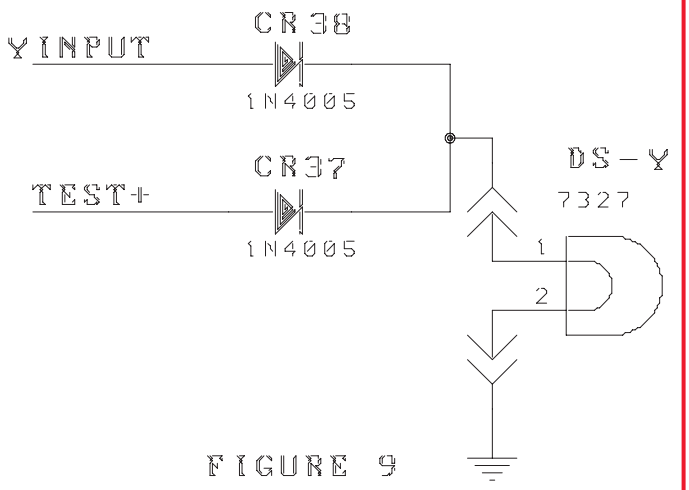


FIGURE 9
TYPICAL POSITIVE APPLY W/O/DIM

10.0 TYPICAL POSITIVE APPLY W/O/DIM

A typical Positive Apply, Non-Dimmable circuit is shown in Figure 9. This channel is designed to accept a +28 VDC signal to illuminate an indicator channel, but does not provide for dimming of that channel.

The input, YINPUT, is applied through CR38 to light DS-Y. TEST+ is applied through CR37 to also light DS-Y.

24-50-00 - ELECTRICAL LOAD DISTRIBUTION

24-51-00 - POWER DISTRIBUTION SYSTEM

The power bus distributes direct current power to the electrical system from the alternator and from the battery through the battery relay. The negative battery lead attaches to a structural ground on the airframe. Master Switch “ON” closes the relay and supplies power to the aircraft electrical system.

STANDBY GENERATOR - Optional - (25-0001 thru 25-0999) When alternator failure occurs, the alternator output and battery circuit breakers must be pulled to de-energize the control relay and connect the standby generator to the standby generator bus. This will allow limited equipment to be operated until aircraft can be landed and the alternator system repaired.

CAUTION

Do not reset a circuit breaker after it has tripped a second time. If necessary to do so to locate the malfunction, be alert for a possible electrical fire. Breakers are “Trip Free” type and cannot be held in the closed position.

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CHAPTER 27

FLIGHT CONTROLS

CHAPTER 27

FLIGHT CONTROLS

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CHAPTER 27

FLIGHT CONTROLS

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27-00-00 - GENERAL

The aircraft has dual flight controls and can be flown from either the pilot or co-pilot seat. Dual pairs of foot pedals control the rudder and nose wheel steering mechanisms. The co-pilot pedals are removable if dual brakes are not installed. Push pull tubes actuate the all-metal flight control surfaces. Rod-end bearings are used throughout the flight control systems. These bearings are simple and require little maintenance other than occasional lubrication. Specially designed aluminum-alloy extrusions, that permit flush skin attachment, form the leading edges of the rudder and elevators. Electrically actuated wing flap systems are installed on all models. Longitudinal pitch trim is achieved through a trim control system that pivots the entire empennage around the tailcone attachment points.

27-10-00 - AILERON SYSTEM

The ailerons are of all-metal construction with beveled trailing edges. Three hinges of machined, extruded aluminum attach the ailerons to the aft wing spar outboard of the wing flaps. The ailerons link to the control wheel through push-pull tubes and bellcranks. Lead counter-weights static balance the ailerons.

1. **Aileron Removal and Installation.**

A. Remove control tube attaching bolt, nut, and washer at aileron horn.

B. Remove bolts, nuts, and washers from the three attaching hinges.

C. Remove aileron by pulling it straight aft until hinges are clear; rotate inboard portion down and forward to allow aileron balance weights to clear wing tip.

D. Reinstall aileron in reverse sequence of removal.

E. Recheck bolts for security and safety.

2. **Aileron Rigging and Control Adjustment (S/N 25-0001 thru 25-0785).**

A. Use a straight edge (A), (Figure 27-1) to align control wheels in accordance with step B.

B. Adjust control tube (B) linking control wheel shaft (C) at rod ends (5). Clamp or otherwise secure control wheels in the level position until steps C thru E are completed.

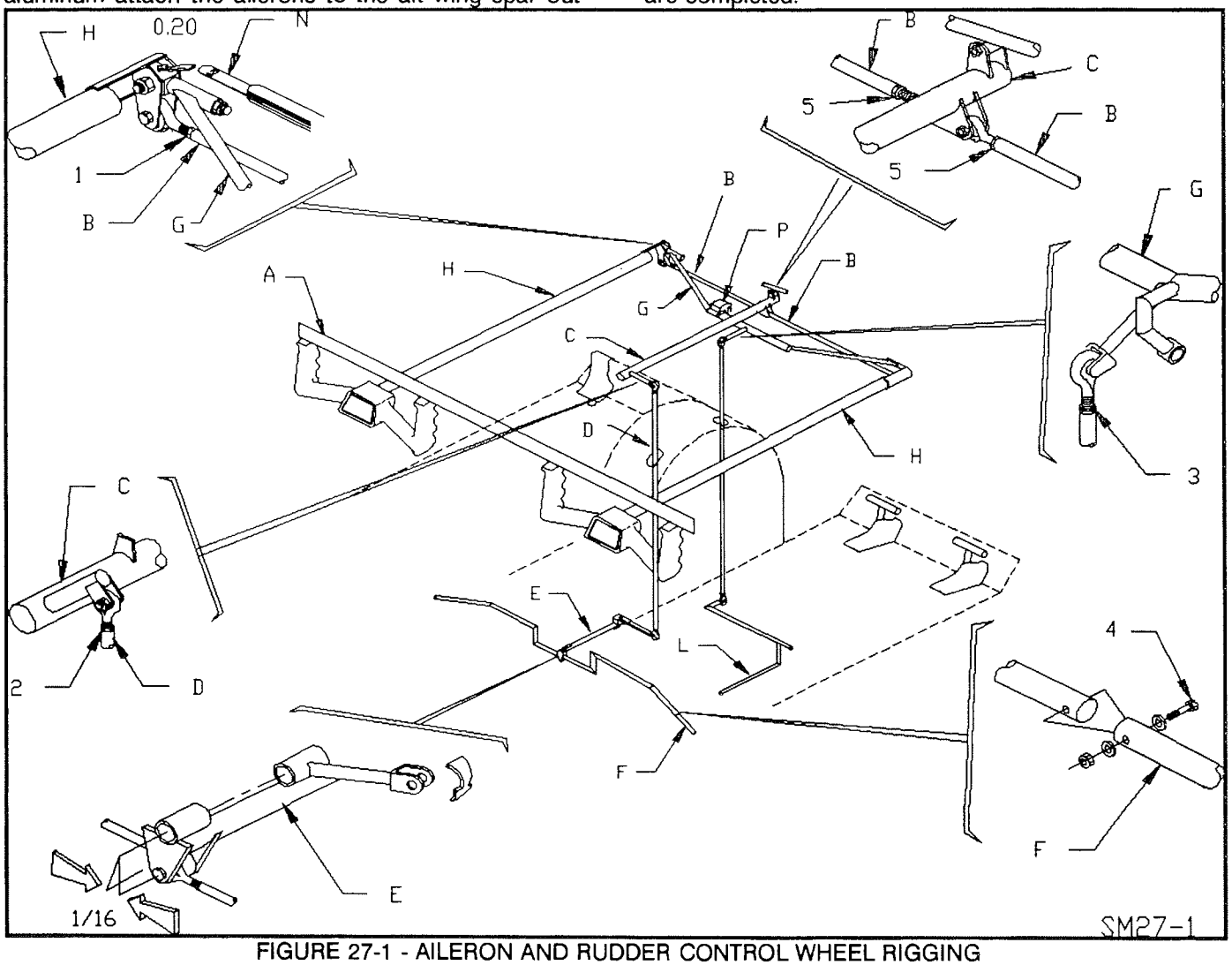

FIGURE 27-1 - AILERON AND RUDDER CONTROL WHEEL RIGGING

C. Adjust control tube (D) at rod end (2) so that aileron center bellcrank (E) is 1/16 inch left of center facing forward (FIGURE 27-1).

D. Adjust aileron control tubes (F) by removing bolt, nut and washer (4) (Figure 27-1) and loosening locknut (6) (Figure 27-2). The aileron control tube (F) can then be rotated clockwise or counterclockwise so that the center of the outboard hole (K), (Figure 27-2), is 4.3 inches from spar web (M). Replace bolt, nut and washer (4), (Figure 27-1), and recheck 4.3 inch dimension.

E. Adjust aileron push-pull tube (J) (FIGURE 27-2) at rod end (7) (FIGURE 27-2) so that aileron (in neutral position) is 0 degree to -2 degrees down (with no additional tolerance) as measured with travel board at wing station indicated on travel board GSE 030003. Loosen jam nut @ (7); disconnect control tube (J) @ aileron horn. Rotate (J) one revolution in desired direction to adjust aileron to proper setting.

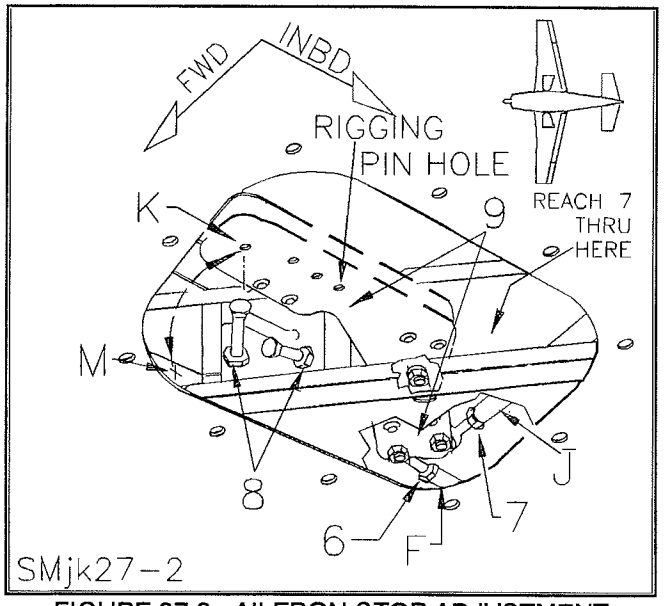

FIGURE 27-2 AILERON STOP ADJUSTMENT

NOTE
Wing station 147.75 is located at skin splice line between flap outboard end and aileron inboard end.

F. Remove clamps from control wheels, then adjust aileron stops (8), (Figure 27-2) so the down travel is 8 degrees +/- 1 degree. Aileron up travel may vary from 12-1/2 degrees to 14-1/2 degrees (with no additional tolerance).

NOTE
The above aileron rigging and adjustment instructions apply to both the left and right ailerons.

G. Rotate the left control wheel clockwise until the ailerons contact the aileron stops (8) (Figure 27-2). Adjust control tube (B) at rod ends (1) and (5) (FIGURE 27-1) by loosening the lock nut and turning tube clockwise or counterclockwise to attain .020 maximum clearance using feeler gauge (N), (Figure 27-1). Secure locknuts (1) and (5) and recheck .020 dimension. Repeat the operation on right control wheel by turning wheel counterclockwise until ailerons contact the stops, then proceed as described for the left control wheel. Rigging is now complete.

3. **Aileron Rigging (S/N 25-0786 & ON).**

A. Level control wheels - (Reference 27-10-00, 3, B procedures).

B. Install 3/16 dia. rig-pins at:

(1)Jackshaft (C) (Figure 27-1)

(2)Bellcrank (E) (Figure 27-1)

(3)Bellcranks (9) (Figure 27-2) (Both L.H. and R.H.)

C. Adjust control tubes (J) (Figure 27-2) (L.H. and R.H.) to position ailerons at 0 degrees to 2 degrees down.

D. Adjust remaining control tubes (F), (B), (D), (Figure 27-1) (L.H. and R.H., if applicable) in order to freely attach to the bellcranks and jackshaft.

E. Remove rig-pins.

F. Adjust aileron stops (Reference Figure 27-2) per paragraph 27-10-00, 3, F & G. Tolerances are specified in paragraph 27-10-00, 3, F.

27-20-00 - RUDDER AND STEERING SYSTEM

1. **Rudder.** The rudder attaches to the aft vertical fin spar at four hinge points. Push-pull tubes and bellcranks link the rudder to the rudder pedals.

2. **Rudder Removal and Installation.**

A. Detach rudder push-pull tube from rudder horn.

B. Remove attaching hardware at rudder hinges.

C. Remove rudder by pulling it straight aft.

D. Install rudder in reverse sequence of removal. Recheck attaching bolts for security and safety.

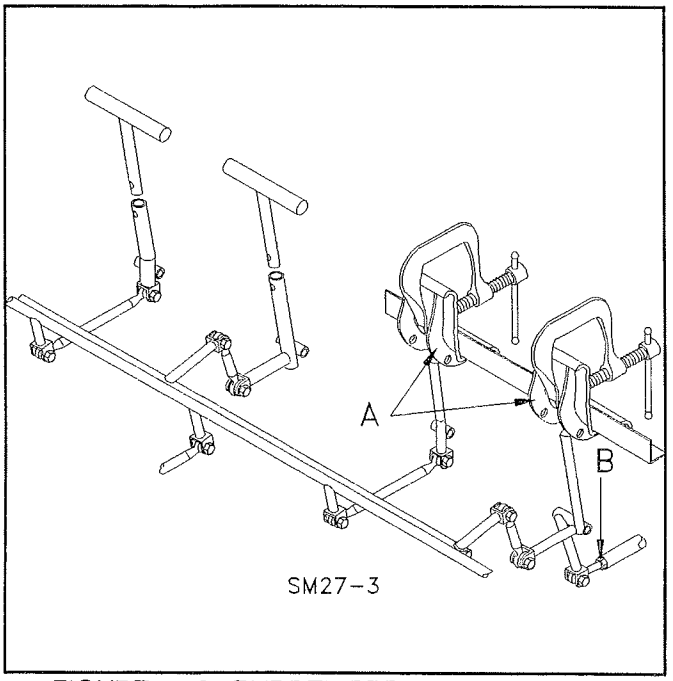

FIGURE 27-3 RUDDER PEDAL ADJUSTMENT

3. **Rudder Rigging and Adjustment.**

A. Raise aircraft nose. (A propeller yoke jack may be used.)

B. Set stabilizer trim control in neutral position (stabilizer parallel with aircraft center line).

C. Clamp pilots rudder pedals (A), (Figure 27-3), in neutral position.

D. Center nose wheel by removing nut, washer & bolt (1), (Figure 27-4), and adjusting steering linkage at (2). Bolt, nut and washer (5) and (6) must be installed as shown from rear to front.

E. Adjust control tube (C) at rear tailcone bulkhead bellcrank, (Figure 27-5), and set rudder, by adjusting control tube (D), (Figure 27-6), at rod end bearing (2), 1° to the right.

NOTE
Rudder bellcrank, aft tailcone, should be modified per SI-M20-44.

F. Unclamp rudder pedals.

G. Adjust rudder stops (M), (Figure 27-8), so that rudder travel is 23 degrees (+1/-0 degrees) right and left.

NOTE
On aircraft S/N 25-0824 & ON steering stops (3) should be adjusted so .020 clearance exists between adjustment stop (3) and gear truss assembly (4) (Figure 27-4) when rudder is at extreme left and right travel position.

H. After rudder stops are set, move rudder through full left/right travel to assure solid contact between stops and rudder stop limiter. Stop limiter (R) Fig. 27-8, may be bent to obtain clearances and travel requirements.

I. After setting stops, retighten all jam nuts, bolts and secure; recheck all travel limits.

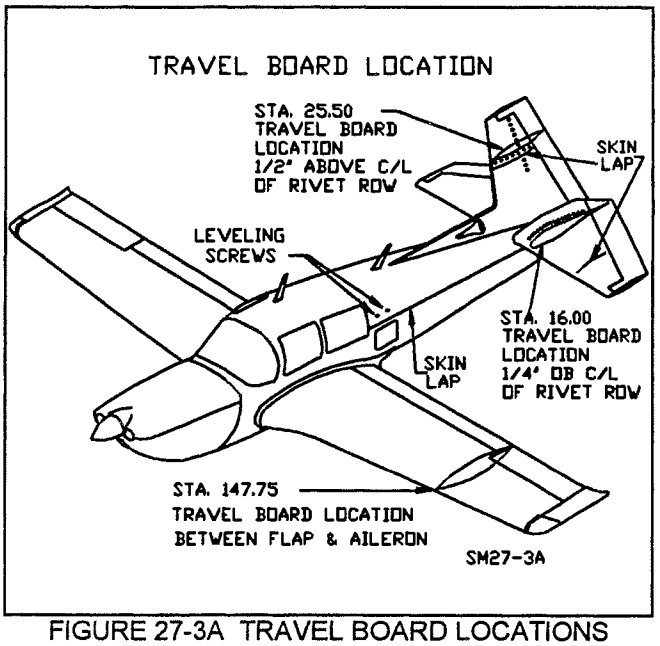

FIGURE 27-3A TRAVEL BOARD LOCATIONS

NOTE
Measure rudder travel with travel board on rivet line at station indicated on travel board GSE 030005, and with longitudinal trim (stabilizer) set in the 0 degree position. Sta. 26.50 is located 3/4 in. above skin splice on vertical fin.

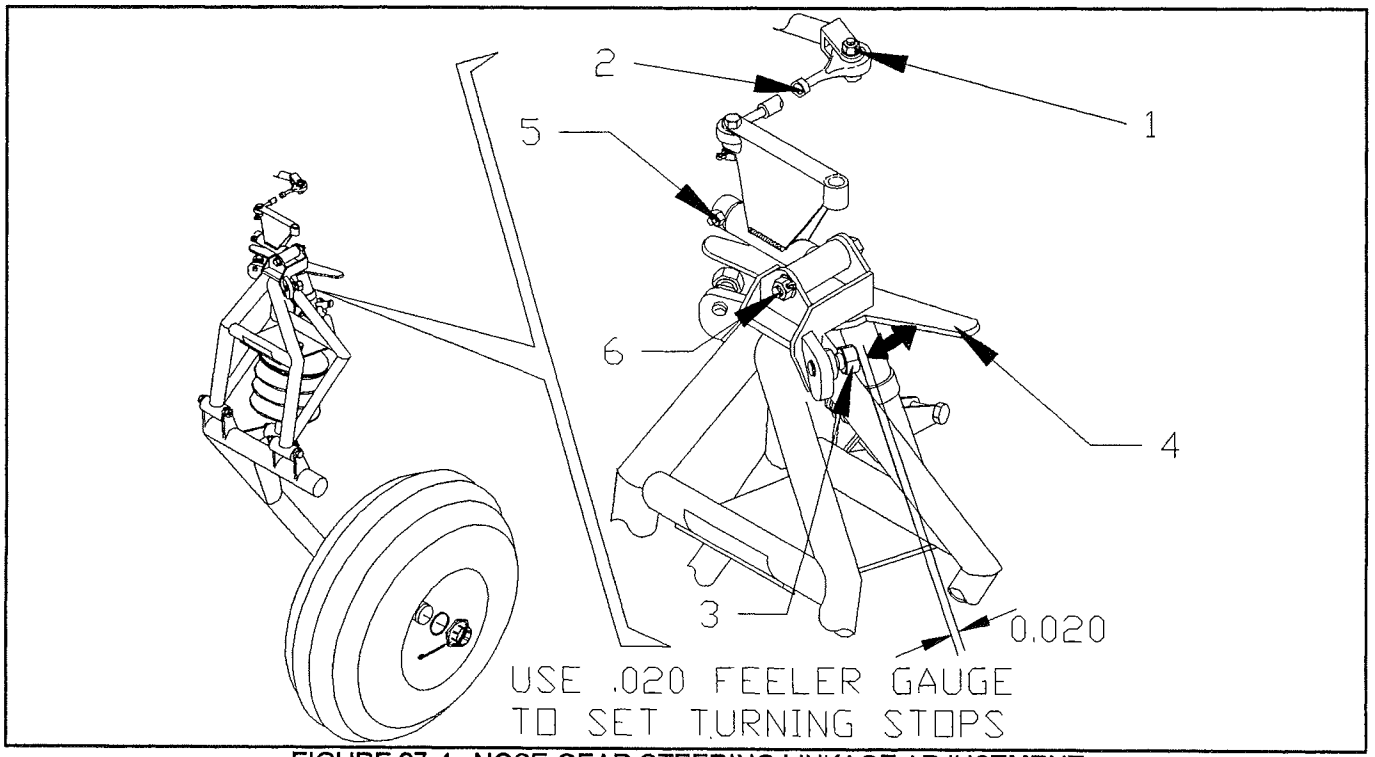

FIGURE 27-4 NOSE GEAR STEERING LINKAGE ADJUSTMENT

4. **Allowable Free-Play Limits at Rudder - Vertical.**

A. Maximum vertical movement allowed at rudder trailing edge **- .08 inches.**

(1) If excessive free-play exists check the following areas for wear:

(a) Trim screw jackshaft.

(b) Trim link connecting empennage to trimscrew.

(c) Bolts and brackets attaching empennage to tailcone.

5. **Rudder Torque Tube Removal.** The rudder torque tube should be inspected thoroughly and replaced if any damage is found. Remove shield from front of cabin floorboard that covers torque tube. Remove attaching hardware from hinges and rudder pedal control rods. Carefully remove torque tube by sliding out toward the right side of cabin and through cabin door.

NOTE

Control tube wear allowables. If any portion of the control tube exceeds .007 wear per wall or .014 in reduction in diameter, the tube must be replaced.

27-30-00 - ELEVATOR SYSTEM

Elevator construction is essentially the same as that of the ailerons. Both elevators attach to the stabilizer at four hinge points. Push-pull tubes and bellcranks link the elevators to the control yoke. Lead counterweights static balance the elevators. A lead bob-weight under the instrument panel refines aircraft handling in flight.

1. **Elevator Removal and Installation.**

A. Remove push-pull control tube by taking off all attaching bolts, nuts, and washer.

B. Remove bolts, nuts, and washers from the four attaching hinges.

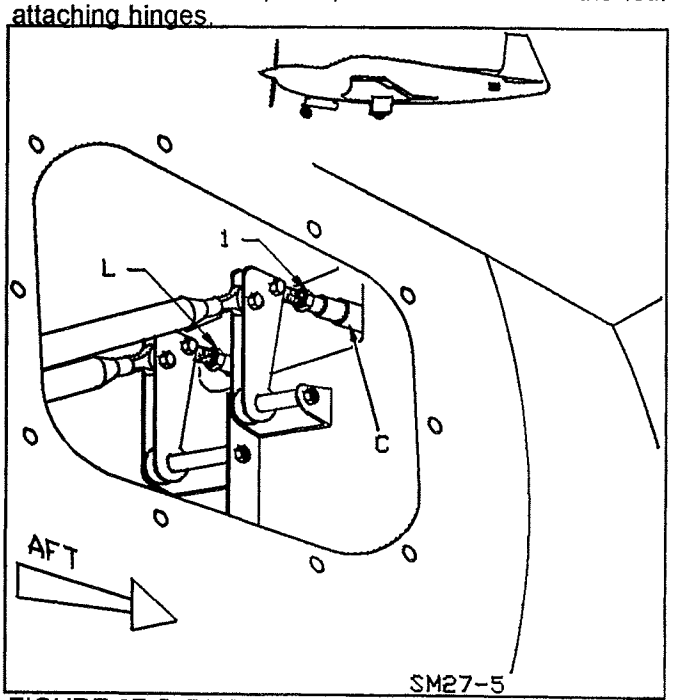

FIGURE 27-5 RUDDER & ELEVATOR ADJUSTMENT

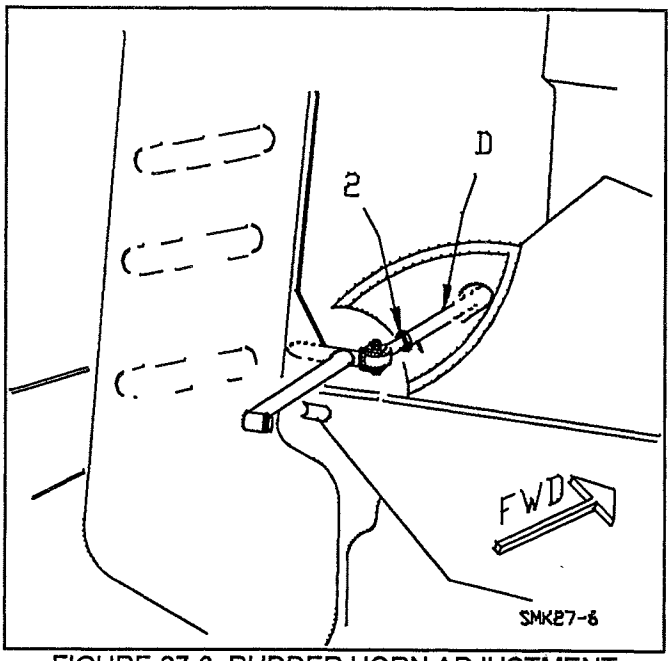

FIGURE 27-6 RUDDER HORN ADJUSTMENT

C. Remove elevator to the rear.

D. Install elevators in reverse sequence of removal. Recheck attaching bolts for security and safety. Set elevators (L & R) to be even with horizontal stabilizer. Adjust at 915007 HEIM bearings at elevator horns.

2. **Elevator Rigging and Adjustment**

A. Adjust rod end bearing (3), (Figure 27-1), at control yoke (G) for control shaft (H) clearance from firewall and control yoke and bob weight (P) clearance from fuselage structure.

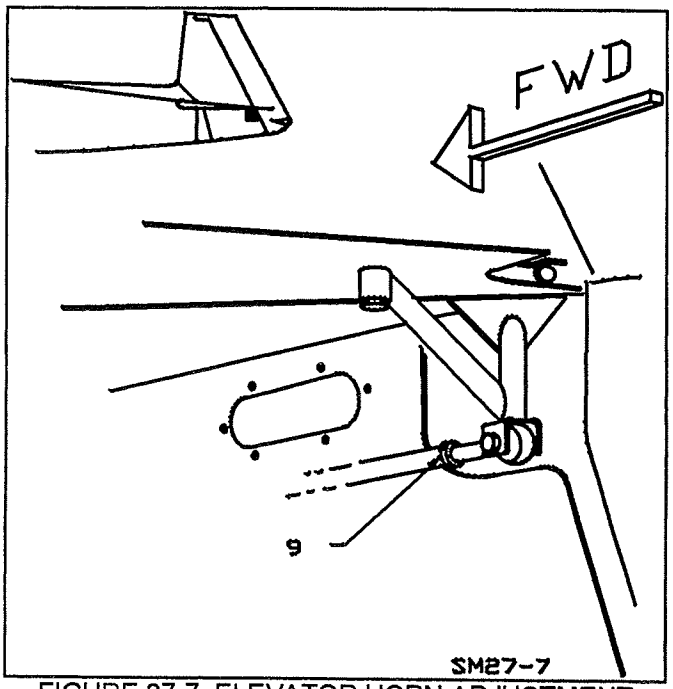

FIGURE 27-7 ELEVATOR HORN ADJUSTMENT

B. Level aircraft and set control column in neutral with stabilizer parallel to center line of aircraft.

NOTE
Adjust rod end bearings of control tube (L), (Figure 27-5), at rear tailcone bulkhead, at elevator horn rod end (9), (Figure 27-7) or as last resort at main spar adjustable rod end bearing to obtain additional elevator travel.

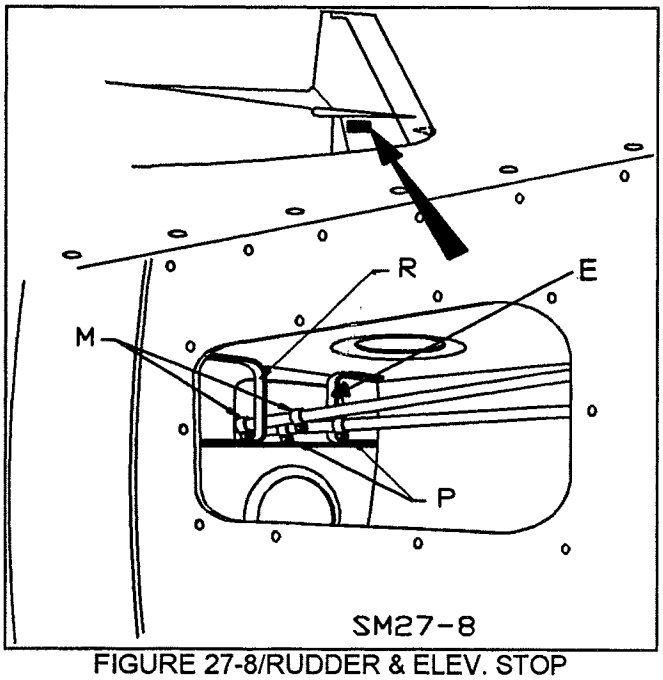

FIGURE 27-8/RUDDER & ELEV. STOP

NOTE
Measure elevator travel from 0 degrees stabilizer thrust line with travel board positioned at stabilizer station 16.00 as indicated on travel board P/N GSE 030004 and with stabilizer at 0 degrees. (See Figure 27-11 and Figure 27-3A for travel board placement.

C. Set stops (P), (Figure 27-8), in empennage stinger for elevator uptravel and downtravel of 20 degrees to 22 degrees.

NOTE
Elevator bellcrank, aft tailcone, should be modified per SI-M20-44.

D. After elevator stops are set, rotate elevators thru full range of travel to assure solid contact with stops and that nuts and bolt heads clear stop limiter (E). Stop limiter may be bent to obtain clearances and contact (**Figure 27-8**).

E. Rotate trim full down to check clearance of bellcrank at wing rear spar. Adjust rod end bearing at rear tailcone bulkhead if needed for clearance. Recheck elevator up and down travel.

F. Rotate trim full up; check that elevator up stops (P) make solid contact on elevator stop limiter (E).

G. Retighten all jam nuts, attach bolts and secure as necessary; recheck all control tube clearances and travel limits.

27-31-00 - VARIABLE DOWNSPRING SYSTEM

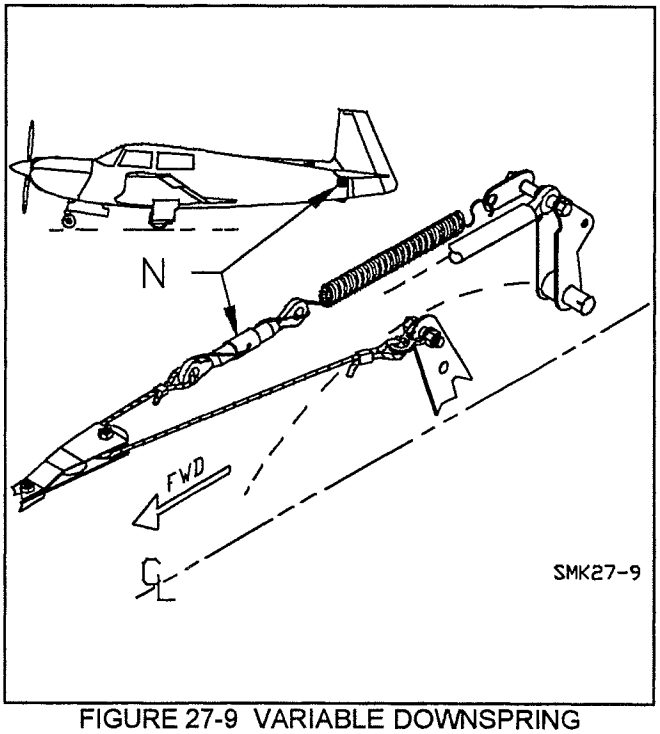

FIGURE 27-9 VARIABLE DOWNSPRING

A spring hooked into the elevator control system in the tailcone refines the feel of the elevator in flight. A bellcrank and cable tailors the spring tension appropriate to the trimmed position of the stabilizer.

NOTE
Negative stabilizer (- degrees) settings mean that stabilizer leading edge is moved down relative to the thrust line.

With stabilizer set at maximum positive setting and elevators FULL DOWN, adjust turnbuckle for a 14.0 to 16.0 Lb. tensiometer reading on cable (20 Lb. max permissable). Check for positive clearance between cable and pulley sheave.

A. Set stabilizer to maximum negative position and elevators full down.

B. Adjust turn buckle to remove slack in cable (Figure 27-9).

C. Retrim to maximum positive setting and check for clearance between cable end and pulley sheave. Tensionmeter reading should be 20 lb. maximum.

27-40-00 - STABILIZER TRIM SYSTEM

To provide pitch trim control, the entire empennage pivots around its main hinge points. The system consists of a manually operated actuator that operates a series of torque tubes and universal joints connected to a jack screw on the aft tailcone bulkhead.

NOTE

A "stepped stop nut", with a "jam nut", configuration has been incorporated. This configuration can be retrofitted to all M20K aircraft, if desired. This allows trim screw nut (F) (FIG 27-10) to contact stepped portion of these two nuts and not bind.

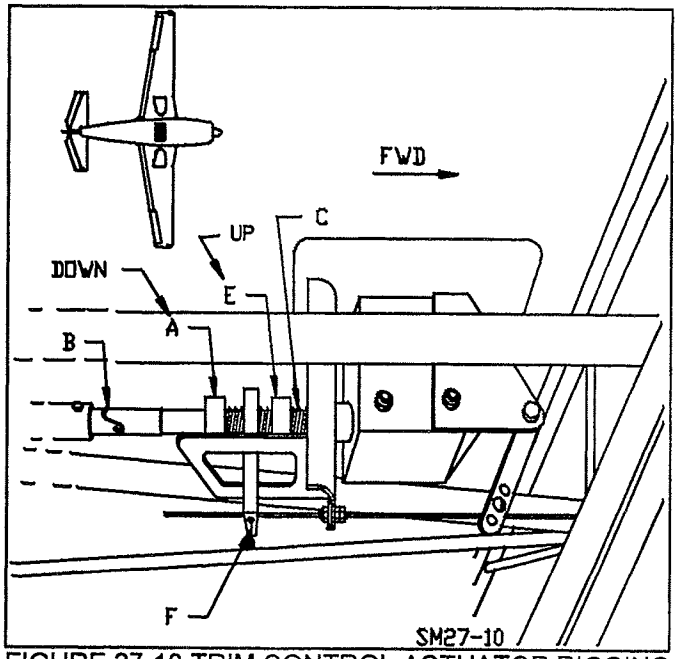

FIGURE 27-10 TRIM CONTROL ACTUATOR RIGGING

Basic rigging is identical to the procedures below except that stepped nut and jam nut require being torqued together with two wrenches prior to set screw in jam nut being tightened against threaded trim screw. Stepped nuts are required at the nose up (E) and the nose down positions (A) facing trim screw nut (F).

1. **Nose Down Stabilizer Trim Control Rigging and Adjustment.**

A. Loosen setscrew in stop (A) (Figure 27-10). Turn stop (A) clockwise or counterclockwise to align aft edge of stop (A) with last thread of trimscrew (C) (Figure 27-10). Tighten setscrew and turn trim control wheel to full NOSE DOWN position (trim screw nut (F) against stop (A).

B. Disconnect torque shaft (B) from trim screw (C), (Figure 27-10).

C. Turn disconnected torque shaft (B) clockwise or counterclockwise until horizontal stabilizer as measured, using the travel board, P/N 030004-503, and a bubble protractor as shown by (Figure 27-11), is within the following limits: (+3.8° to +4.2°).

NOTE

Positive (+ degrees) stabilizer degrees mean that stabilizer leading edge is moved up relative to thrust line.

D. Connect torque shaft (B) to trim screw (C) (Figure 27-10). NOSE DOWN stabilizer trim control rigging is now complete.

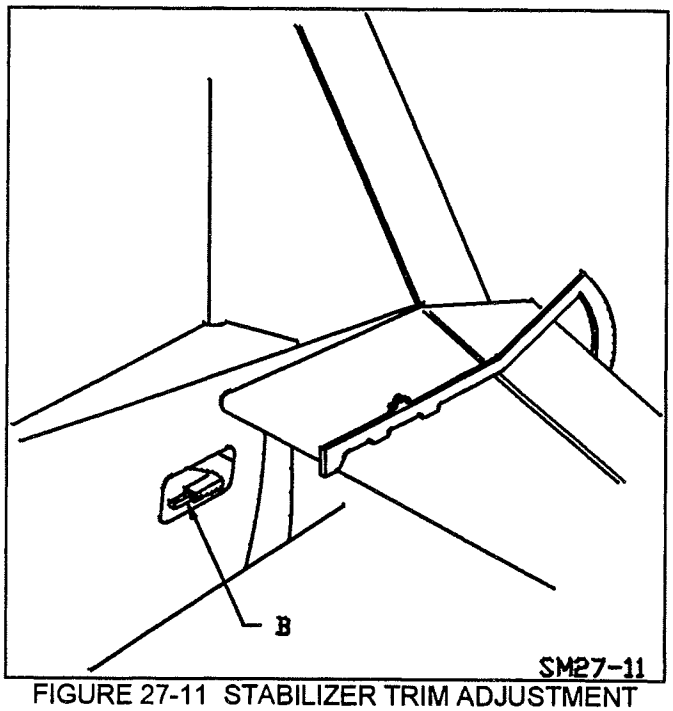

FIGURE 27-11 STABILIZER TRIM ADJUSTMENT

2. **Nose Up Stabilizer Trim Control Rigging and Adjustment.**

A. Loosen setscrew in stop (E) and turn stop on threaded shaft to move it toward the trim screw gear box. Turn trim control wheel toward NOSE UP position until horizontal stabilizer is within the following limits:(-6.5° to -7.0°).

NOTE

Negative stabilizer (-degree) settings mean that stabilizer leading edge is moved down relative to thrust line.

B. Rotate stop (E), (Figure 27-10) clockwise or counterclockwise to make contact with trim screw nut (F). Tighten setscrew. NOSE UP stabilizer trim control rigging is now complete.

3. **Stabilizer Trim Indicator Rigging.**

The indicator is geared to the trim control wheel and indicates stabilizer position relative to the aircraft thrust line. Set horizontal stabilizer to an angle of incidence of 0 degree 00 minutes to minus 0 degree 30 minutes. Adjust trim indicator cable at (F) (Figure 27-10) to set indicator in the cabin to the center of the takeoff range mark.

A. **Maximum Stabilizer Free Play Limits Allowed:**

(1) Fore and aft movement at stabilizer tip **- .12 inches.**

(2) Vertical movement at stabilizer tip **- .10 inches.**

NOTE

When removing trim screw from empennage use a block of wood cut to fit opening between tailcone and empennage to prop empennage up when trim screw is removed.

4. **Electric Trim.**

A. The clutch torque for the electric trim system should be checked and adjusted (by an Avionics Shop) for the following settings to operate the autopilot systems properly:

(1) KFC 200 - 21+/- 2 inch lbs.

(2) KAP 100 - 21+/- 2 inch lbs.

(3) KFC 150 - 21+/- 2 inch lbs.

(4) EDO AIRE - 18 inch lbs.

(5) S-TEC - 30 inch lbs.

5. **Stabilizer Trim Chain Adjustment.** (Reference Figure 27-12).

A. With the four mounting bolts (1) slack, adjust the two NAS428-3-4 bolts (2) to obtain maximum tension on chain without causing binding.

27-40-01 - Trim System Troubleshooting

BINDING	Check control tubes at bulkhead grommets for rub marks. Check Trim Actuator threads for galling/not lubricated, lube per Ch. 5.
ELECTRIC CLUTCH SLIPPING	Check BINDING symptoms above. Check for proper clutch settings. Confirm full bus voltage is available at trim motor.

NOTE

Maximum wear on trim tube, where it passes thru bulkhead grommets, is .007 inch per wall or .014 inch diameter.

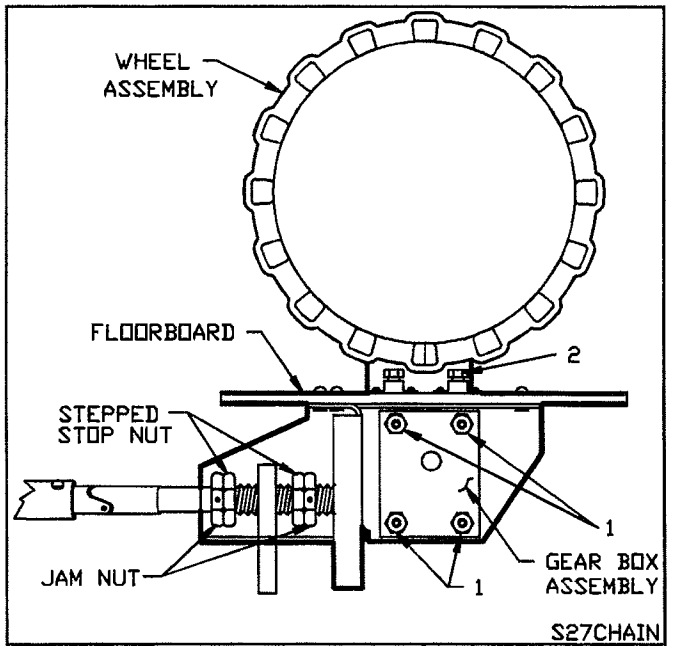

FIGURE 27-12 STABILIZER TRIM CHAIN ADJUSTMENT

27-50-00 - WING FLAP SYSTEM

Push-pull tubes and bellcranks interconnect the flaps. The flaps are operated by an electrical motor driven actuator (1) connected to a jack shaft (2). The jack shaft is connected to actuator bracket (3) (Figure 27-13) on each flap just outboard of hinges (4) by a push-pull rod end bearing (5) and hardware. Each flap pivots about four hinges. Travel is controlled by limit switches (6) and (7) and UP stops located at outboard hinges (Figure 27-13). Flap position is indicated in the cockpit through a cable link system (8) connected to the jack shaft actuator horn (9).

The flap switch (10) is self centering from the down position and located on the console adjacent to the flap position indicator. The flaps can be retracted

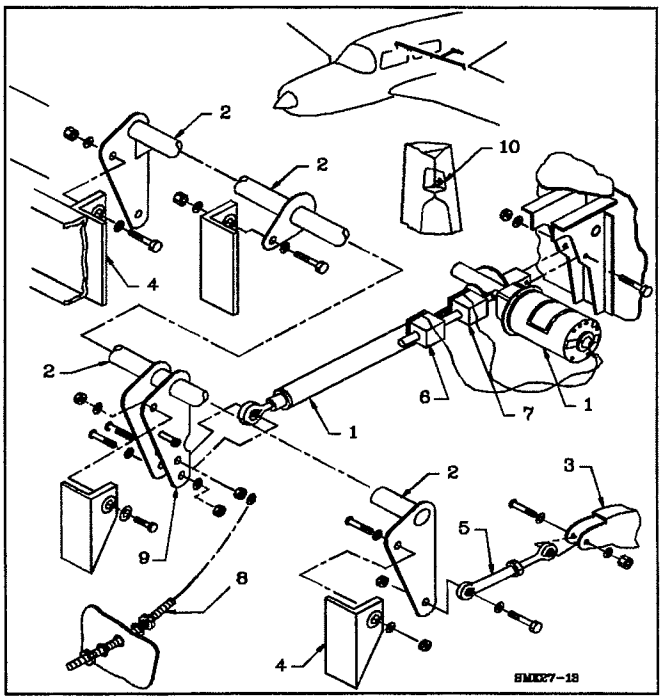

FIGURE 27-13/FLAP ACTUATOR ASSY. & INSTAL.

completely by placing the switch in the up position or to any setting between 0 and 33 degrees by holding in up position to setting desired and then centering to stop the actuator.

Lubricate the actuator gear box and ball screw at intervals with lubricants prescribed in Chapter 5.

1. **Wing Flap Removal and Installation.**

A. Remove wing flap hinge fairing to expose flap push-pull tube.

B. Remove bolt, nut, and washer from flap-actuating attachment.

C. Remove plastic fairings (4 ea.) from wing that covers flap hinges.

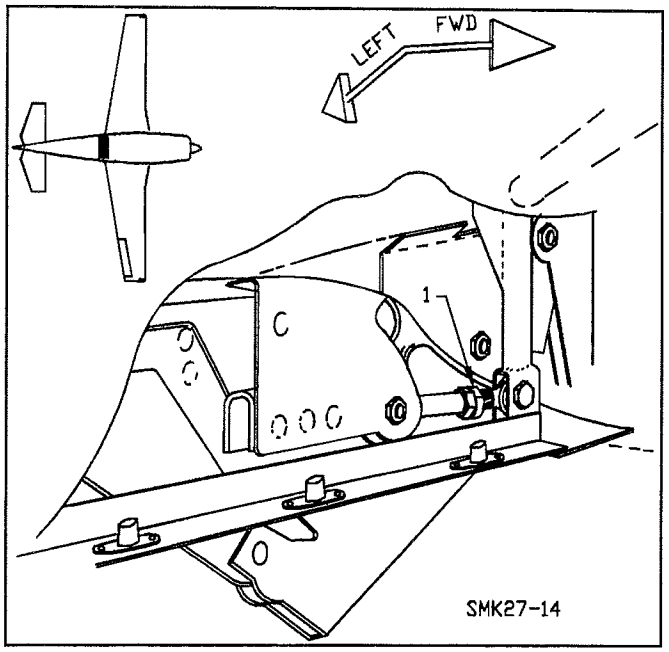

FIGURE 27-14 WING FLAP ADJUSTMENT

D. Remove bolts, nuts, and washers at flap hinge points.

E. Remove flap by pulling it down and aft.

F. Install wing flaps in reverse sequence of removal. Recheck security and safety of attaching bolts.

2. **Wing Flap Rigging and Adjustment.**

NOTE
Flap deflections are to be measured with travel board GSE 030003 at the station indicated on the travel board. (See Section 27-20-00,Fig. 27-3A)

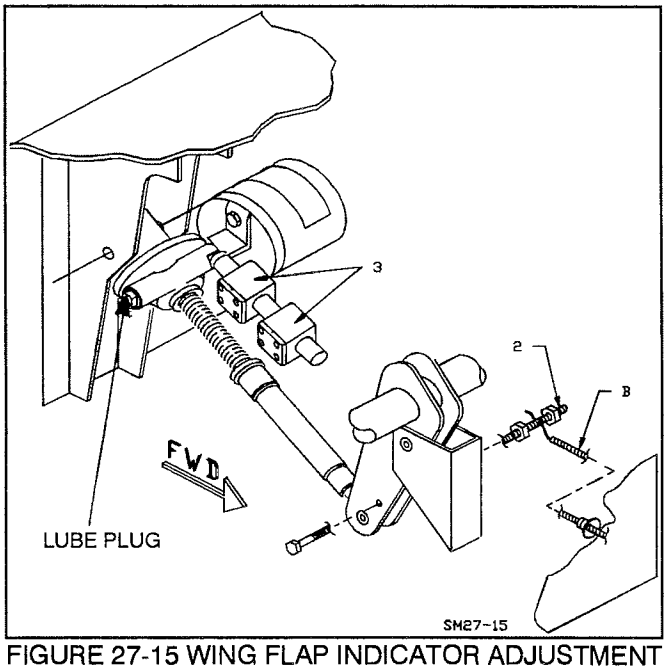

FIGURE 27-15 WING FLAP INDICATOR ADJUSTMENT

A. Adjust right and left inboard linkage at rod end bearing (1), (Figure 27-14) to obtain a flap deflection of 33 degrees (+0 degree/-2 degrees). Retract flaps to 0 degree (+/-2 degrees); set flap outboard travel stops (not illustrated) so that flaps align with ailerons in neutral position.

B. Retract flaps to 10 degrees (+/-) 1 degree, and set flap position indicator cable (B) at attachment screw (2), (Figure 27-15), to TAKEOFF position as shown on flap position indicator in cabin. This indicates the degree of flap deflection from 0 degree to 33 degree, with a 10 degree takeoff setting.

C. The limit switches, #3, (Figure 27-15) should be adjusted so that under flight loads the actuator over run will not allow the flaps to exceed either up or down positions.

27-60-00 - AILERON/RUDDER INTERCONNECT SYSTEM

1. With controls in neutral position, locate 110002-101 bracket, on aileron control tube, so that the end of 110002-005 bellcrank assembly will be 2.25 in. AFT of 310020 fuselage former.

2. Holding both rudder & aileron controls in neutral position, install springs, P/N 110003-007, on -005 bellcrank and 110002-025 & -027 brackets & position -025 & -027 brackets on rudder control tube so the installed length of each spring is 4.90 in. Clamp bracket in place & drill through brackets and into control tube for AN530-4R6 PK screws.

3. Make sure PK screws are in place to secure all three brackets.

27-90-00 - MISCELLANEOUS

27-91-00 - CONTROL SURFACE STATIC BALANCING

When repairing or repainting the control surfaces they must be re-balanced according to the following procedures.

CAUTION
All control surfaces should be stripped prior to repainting.

NOTE
Maximum and minimum static unbalance moments apply only to ailerons that have been painted.

27-92-00 - EQUIPMENT AND MATERIALS - STATIC BALANCING

The design of the balancing fixture is not critical providing the requirements of this section are met.

Obtain or otherwise fabricate two (2) knife edges and supports approximately one (1) foot in height such that they can be placed on a table and be stabilized to prevent tipping (See Fig. 27-16).

Fabricate or otherwise obtain a "control weight" and hanging string (Fig.27-16,item A) such that the total weight of the string and weight agrees exactly with the values listed for the control surface to be balanced.

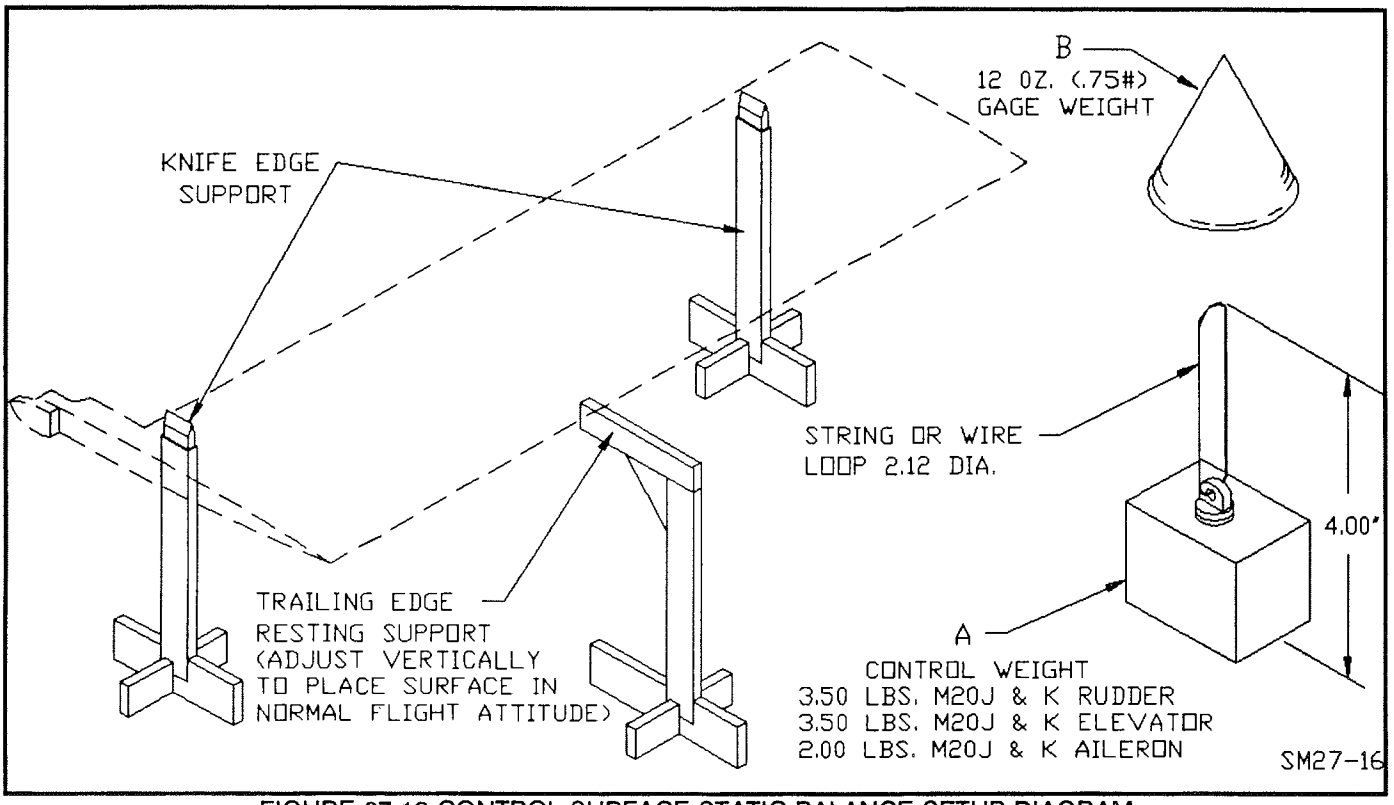

FIGURE 27-16 CONTROL SURFACE STATIC BALANCE SETUP DIAGRAM

NOTE
Accurate weight measurements can be obtained at any United States Post Office.

1. ELEVATOR: 3.50 LBS. @ 6.232 Arm
2. RUDDER: 3.50 LBS. @ 5.863 Arm
3. AILERON: 2.00 LBS. @ 5.590 Arm

Fabricate or otherwise obtain a "gauge weight", item B, Fig. 27-16, of exactly 12 oz. (.75 lb.)[28 oz. (1.75 lb.)for S/N 25-1000 thru 25-TBA] such that all three dimensions are approximately equal (cube, cylinder or pyramid). The size of the gauge weight is not critical as long as its weight in oz. is accurately known. However, if a 12 oz. gauge weight is used (28 oz. S/N 25-1000 thru 25-TBA), computation of moments will not be necessary and the dimensions in Table 27-18 may be used.

27-93-00 - GENERAL PROCEDURES - STATIC BALANCING

1. A line drawn through the hinge line support points must be level and perpendicular to the supporting knife edges.
2. The supporting knife edges must be horizontal and parallel to each other within the requirements of step 1. above.
3. The control surface must be supported in normal flight attitude with the hinge line level (except as specified in 27-93-01, 2.)
4. The area in which balancing operations are performed must be free of drafts or other air movement which might affect the balancing operation.
5. The balancing device must include a means to accurately measure the distance of the gauge weight from the hinge line.
6. Control surfaces must be rechecked for balance after any painting, stripping, repairs or alterations to any control surface.

27-93-01 - DETAIL PROCEDURES - STATIC BALANCING

1. Devise a bearing surface for supporting the control surface hinge line on the knife edges providing a friction free support.
2. Place surface on knife edges and level hinge line (flight control surfaces should be balanced inverted for greater sensitivity). Rest trailing edge on aft support and adjust aft support to put the surface in its normal (0 degree) chordwise flight attitude.
3. Place correct gauge weight (B) on top and near the trailing edge of the surface to hold surface down.
4. Suspend the control weight (A) from the balance horn in the following positions:

A. Rudder & Elevator: Suspend weight at the seam formed by the balance weight and balance horn ribs (See Figure 27-17).

B. Aileron: Loosen forward most balance weight bolt and suspend weight from shank of bolt (See Figure 27-17).

5. Gradually move gauge weight forward toward hinge line until the point is reached where the trailing edge tends to leave the trailing edge support.

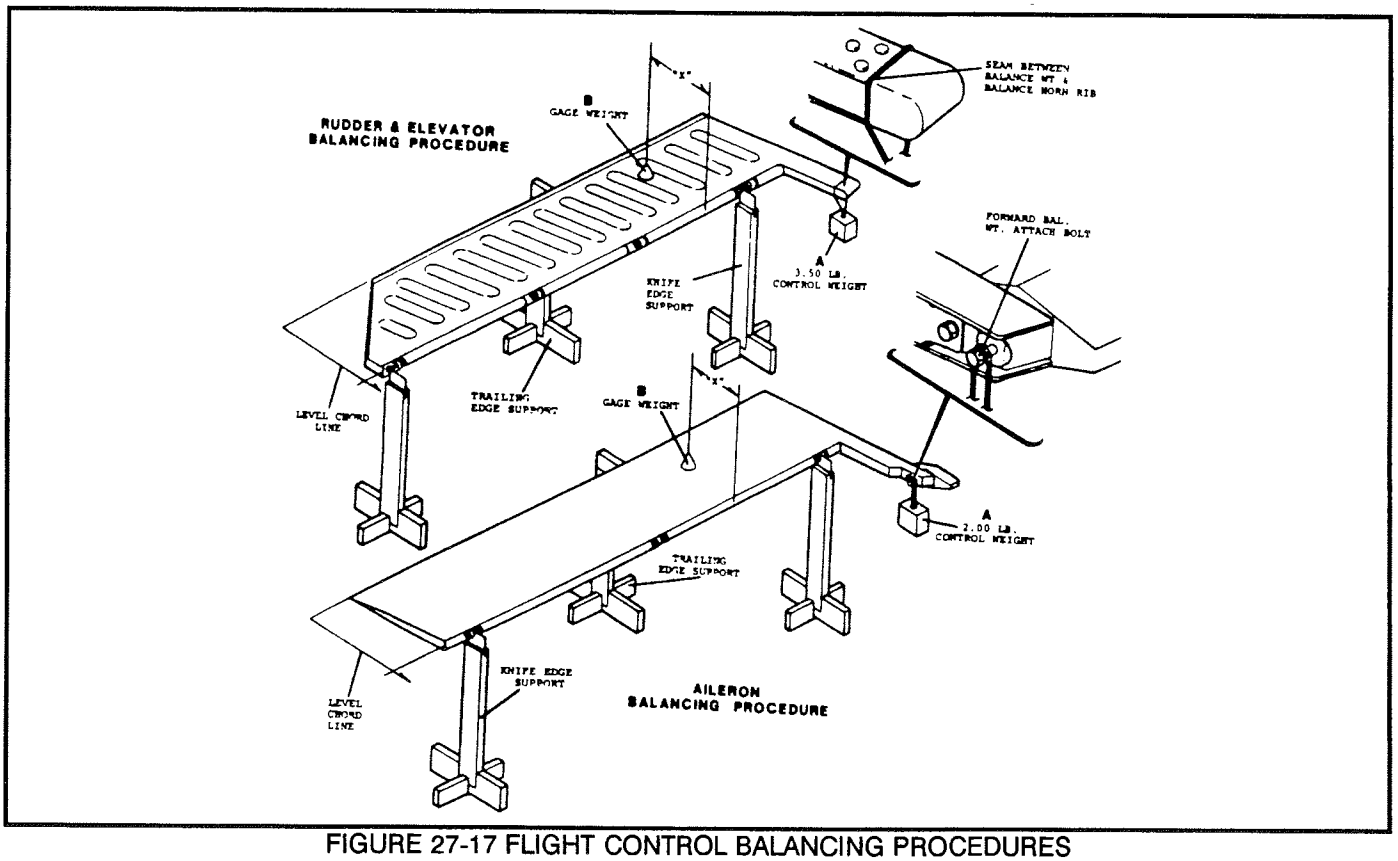

FIGURE 27-17 FLIGHT CONTROL BALANCING PROCEDURES

6. Accurately measure and record the distance "X" perpendicular from the hinge line to the center of the gauge weight. The gauge weight distance must be within the limits provided (Table 27-18).

7. If the gauge weight is forward of the distance limit the surface is underbalanced and weight must be added, and the balance rechecked.

8. If the gauge weight is aft of the distance limit the surface is overbalanced and weight must be removed, and the balance rechecked.

9. Table 27-19 provides the absolute balance limits used in developing the "X" distance limits.

NOTE

The "absolute limits" must be satisfied if a different balance procedure is used requiring calculation of balancing moments.

CONTROL SURFACE	CONTROL WEIGHT	LIMIT DESCRIPTION	GAUGE WEIGHT (12 oz)or (28 oz) DISTANCE LIMITS-Note 2
Elevators 430026-503 & -504	3.50 LB.	Underbalance	+6.76 in to
		Overbalance	+11.07 in.
Rudder 460043-BASIC & -505	3.50 LB.	Underbalance	+3.36 in. to
		Overbalance	+10.027 in.
Aileron 230015-505 & -506	2.00 LB.	Underbalance	+5.45 in. to
		Overbalance	+8.07 in.- Note 3

NOTE:

1. (+) Positive dimension indicates distance aft of hinge line.
2. Values in this column only applicable for gauge weight used in combination with specified control weight.
3. Value for aileron distance limit adjusted for C.G. of gauge weight on inclined surface (6.8 degree) maximum error when measuring top point of "cubic proportioned - right circular cone" gauge weight.

GAUGE WEIGHT DISTANCE LIMITS
(for balancing with specified control weight)
TABLE 27-18

AILERON EFFECTIVITIES	25-0001 thru 25-0875	25-0876thru 25-0889; 25-1000 thru 25-1133	25-1134 thru 25-1212	25-1213 thru 25-1230; 25-2000 thru 25-2012	25-2013 thru 25-TBA
ABSOLUTE BALANCE LIMITS- (in. Lb.) Note 1	+7.10 to +5.25	+6.23 to 0.00	+6.23 to 0.00	+5.30 to 0.00	+1.40 to -2.00
CONTROL WEIGHT MOMENT (in. lb.)	-11.18	-11.18	-11.18	-11.18	-11.18
BALANCE LIMITS W/ CONTROL WEIGHT (in. lb.)	-4.08 to -5.93	-4.95 to -11.18	-4.95 to -11.18	-5.88 to -11.18	-9.78 to -13.18
DISTANCE LIMITS - 28 OZ. WT. (INCHES)	+2.33 to +3.39	+2.83 to +6.39	+2.83 to +6.39	+3.36 to +6.39	+5.59 to +7.53

ELEVATOR & RUDDER EFFECTIVITIES	25-0001 thru 25-0889	25-1000 thru 25-1230; 25-2000 thru 25-2012	25-2013 thru 25-TBA
--ELEVATOR--			
ABSOLUTE BALANCE LIMITS (in. Lb.) Note 1	+16.75 to +14.00	+15.00 to +9.22	+11.00 to +8.50
CONTROL WEIGHT MOMENT (in. lb.)	-21.813	-21.813	-21.813
BALANCE LIMITS W/ CONTROL WEIGHT (in. lb.)	-5.06 to -7.81	-6.81 to -12.59	-10.81 to -13.31
DISTANCE LIMITS - 28 OZ WT. (INCHES)	+2.89 to +4.46	+3.89 to +7.20	+6.18 to +7.61
--RUDDER--			
ABSOLUTE BALANCE LIMITS (in. Lb.) Note 1	+18.00 to +13.00	+12.50 to +5.00	+9.10 to +5.00
CONTROL WEIGHT MOMENT (in. lb.)	-20.520	-20.520	-20.520
BALANCE LIMITS W/ CONTROL WEIGHT (in. lb.)	-2.52 to -7.52	-8.02 to-15.52	-11.42 to -15.52
DISTANCE LIMITS - 28 OZ WT. (INCHES)	+1.44 to +4.30	+4.58 to+8.87	+6.53 to +8.87

FIELD BALANCE LIMITS
TABLE 27-19

NOTES:
1. Type design data requirements.
2. Effective arm determined by balance test with calibrated gauge and control weights.
3. (+) Positive moments indicate T.E. Heavy condition.
4. (+) Positive dimensions indicate distance aft of hinge line.

COMPUTATION FIELD BALANCE LIMITS
TABLE 27-19

NOTE
If balance limits cannot be met with existing weight on any control surface a lighter or heavier weight can be obtained through a Mooney Service Center. This approach should be examined before reworking any repair or restripping and repainting the affected control surface.

27-94-00 - CONTROL SURFACE TRAILING EDGE

NOTE
Verify flight control rigging is correct before bending trailing edge.

1. **Trimming.** A special pair of widenose vicegrip pliers are to be used to bend the trailing edges as necessary (See Figure 27-20).

A. Aileron. To correct for a left wing-heavy condition, bend right aileron trailing edge down; to correct for a right wing-heavy condition, bend left aileron trailing edge down.

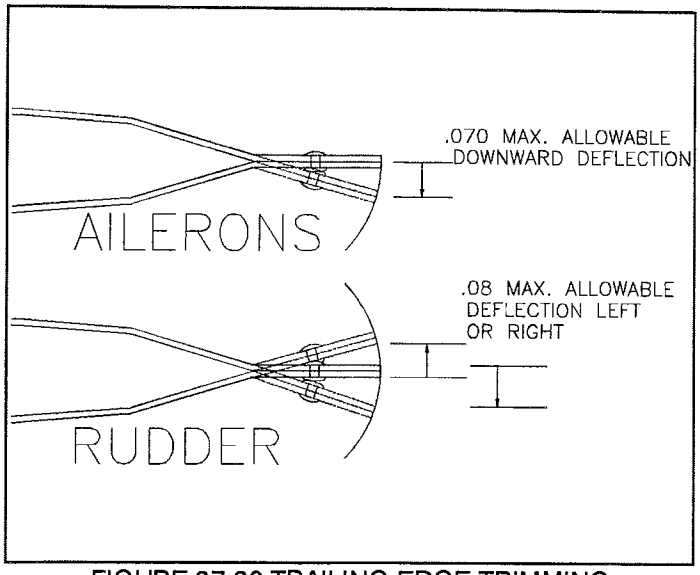

FIGURE 27-20 TRAILING EDGE TRIMMING

NOTE
The aileron trailing edge MUST NOT BE BENT UP under any circumstance. Any deformed rivets must be replaced after trimming aileron or rudder trailing edge.

B. Rudder. The rudder trailing edge may be trimmed right or left as required.

C. Elevator. A full span tab is built into each elevator trailing edge and is fixed 7 degrees (+/-) 1/2 degree trailing edge down. No further tolerance is allowed.

27-95-00 - STALL WARNING - MAINTENANCE PRACTICES

1. **Stall Warning Switch Removal.**

A. Remove the screws or rivets attaching the access cover aft of the switch on the lower wing surface.

B. Remove the two adjustment screws which hold the switch to the wing leading edge.

C. Disconnect the two wires from the switch.

2. **Stall Warning Switch Installation.**

A. Connect the electrical wires to the switch.

B. Position the switch in the opening of the lower wing leading edge, install the two adjustment screws.

C. Replace the access cover securely.

D. Adjust the switch. See STALL WARNING INDICATION SYSTEM ADJUSTMENT.

3. **Stall Warning Indicating System Adjustment** (Figure 27-21). (Adjustment locations may vary slightly)

The stall warning switch is adjusted when the airplane is test flown at the factory. Should it require readjusting, proceed as follows: Locate the switch installation on the under surface of the left wing leading edge and loosen the two phillips head screws, one on either side of the vane. If the stall warning has been activating too early, pull the vane back and down. If the stall warning has been activating too late, push the vane up and forward. Moving the vane with the phillips head screws loosened moves the entire unit up or down inside the wing, causing the switch to be closed earlier or later. Retighten the screws after making each adjustment.

NOTE
NEVER TRY TO ADJUST THE SWITCH BY BENDING THE VANE. This part has been heat treated and cannot be bent without damaging or breaking the vane or switch.

As a rule of thumb, moving the vane tip 1/4 inch will change the time the stall warning actuates by about 5 mph of indicated air speed. The only way to test the accuracy of the setting is to fly the airplane into a stall, noting the speed at which the warning horn comes on and the speed at which the full stall occurs. The stall must be made in various configurations, clean, gear and flaps down and power on and power off. It may be necessary to make several alternate adjustments and test flights before the desired setting can be reached. The stall warning should actuate at no less than 5 KTS. nor more than 10 KTS. preceding the stall and shall continue until the stall occurs in power off configuration. The rate of speed reduction shall not exceed one knot per second with the airplane trimmed to 1.5 times the stall speed. The switch setting should be checked and adjusted as necessary whenever a wing or wing leading edge is replaced or extensively repaired, or if a new switch is installed. The switch should require no adjustment in normal service.

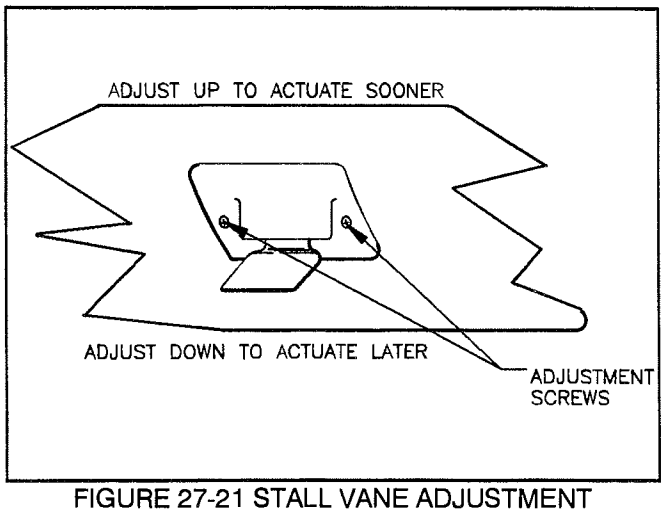

FIGURE 27-21 STALL VANE ADJUSTMENT

27-95-01 - TROUBLE SHOOTING - STALL WARNING SYSTEM

TROUBLE	PROBABLE CAUSE	REMEDY
Warning system inoperative.	Warning circuit breaker tripped.	If circuit breaker persist in tripping, check for grounded circuit.
	Open circuit.	Check for continuity.
	Defective warning horn switch.	Replace switch.
	Defective warning horn.	Replace horn.
Horn continues to blow.	Defective warning horn switch.	Replace switch.

27-96-00 - SPEED BRAKE SYSTEMS

A Speed Brake system is optional equipment and installed on some M20K aircraft. The manufacturer, Precise Flight, Inc. can provide detail parts and maintenance information for the cartridge assemblies. Some of the electrical circuitry, wiring, relays, circuit breakers, etc. are installed from Mooney drawings. Components for these are available through your Mooney Service Center. The relay for the electric Speed Brake System is located under the rear seat area, on the LH bulkhead. The schematic, located in the envelope, and the electrical parts list, Section 91, of this S & M cover the electrical system components identification.

27-96-01 - SPEED BRAKE CARTRIDGE, REMOVAL AND REPLACEMENT - SERIES 100 SYSTEMS [BOTTOM MOUNT SYSTEMS]

1. REMOVAL

A. Remove access panel from under side of wing, directly beneath the cartridge.

B. Disconnect either the vacuum line connection or the electrical connector on the cartridge.

C. Remove screw from bottom of wing just aft of cartridge holding mount strap to bottom of wing.

D. Remove screws from top of wing around top of cartridge slot.

E. Slide cartridge forward to start mount strap through bottom hole, slide cartridge out from bottom of wing.

2. INSTALLATION

A. Reverse removal procedures.

(1) Leave attachment screws loose until proper alignment of cartridge to slots in wing is verified.

(2) Tighten all screws.

(3) On vacuum units, adjust turnbuckle/cable connection so no slack is in cable and speed brakes just begin to extend from cartridge.

(4) Test operation of Speed Brakes on the ground to assure there is no binding either up or down.

Airloads on Speed Brakes can cause a slightly different alignment during deployment, therefore it is recommended that a **TEST FLIGHT** be done to test operation of Speed Brake System to verify proper operation. Readjust alignment of cartridge to wing slots until proper operation in flight is obtained.

27-96-02 - MAINTENANCE - SPEED BRAKE SYSTEM

- ELECTRICAL OR VACUUM SYSTEMS [SERIES 100 SYSTEMS]

1. EVERY 1000 HOURS:

A. Remove speedbrake cartridges in accordance with Section 27-96-01, 1.

(1) Visually inspect doubler and mounting hardware for structural integrity.

(2) Visually inspect for chafing on all moving parts.

(3) Manually operate speedbrakes and feel for smooth operation, both extending and retracting.

(4) Inspect cable (on vacuum units) especially around pulleys for fraying

(5) Inspect pulleys (on vacuum units) for any wear or damage.

B. Report any deficiencies (if any) to Precise Flight, Inc.

C. Reinstall speed brake cartridges into wing in accordance with Section 27-96-01, 2.

27-96-03 - TROUBLESHOOTING GUIDE [SERIES 100 SYSTEMS]

1. Cartridge Fails to Operate.

A. Check Circuit Breaker

B. Check cannon plugs for security.

C. Check cannon plug, P/N 01726, for correct wiring. reference Dwg. #000S018W, Precise Flight.

2. Cam Adjustment - Electrical Units

A. Check Speedbrake for squareness.

Turn aircraft electrical power OFF.

B. With 5/64 Allen wrench, loosen desired cam set screw so cam still has friction. (AFT cam is for retract position/FWD cam is for deployed position)

C. Adjust AFT cam to actuate microswitch 1/8 to 1/4 inch so microswitch clicks before door is fully retracted.

D. Adjust FWD cam to actuate microswitch so inside door edges are parallel when fully deployed.

E. Actuate speedbrakes electrically to check adjustments.

F. Tighten Set Screws.

27-96-04 - SERIES 2000 SPEED BRAKE SYSTEM [TOP MOUNT SYSTEM]

Series 2000 system is installed and removed from the top side of the wing.

1. REMOVAL

A. Remove Speedbrake screws from top side of wing and lift Speedbrake cartridges from wing.

B. Disconnect electrical plug.

C. Remove Speedbrake cartridge from wing

2. - 50 HOUR INSPECTION

A. Check Cap Strip Cover screws and Speedbrake top attachment screws for security, if loose, remove screws and apply Locktite 242, re-torque to 8 in. Lb.

B. Check drain tubes for debris.

3. -ANNUAL INSPECTION/MAINTENANCE

A. Remove Speedbrake per Step 1 above.

B. Remove Cover plate from Speedbrake cartridge.

C. Clean and Inspect unit for damage, corrosion, looseness & proper operation.

D. Lubricate worm & worm gear with Lubriplate.

E. Connect electrical plugs and reinstall cartridges into each wing. (See 2.A. above for Locktite and torque values)

4. - EACH 1000 HOURS

A. Remove Speedbrake per Step 1 above.

B. Return Speedbrake cartridges to Precise Flight Inc. for Clutch Spring and Drive Spring Replacement.

C. Reinstall when returned from Precise Flight, Inc.

(1) Reinstall cartridges into wing (See 3.E. above).

5. -EACH 5000 HOURS

A. Remove Speedbrake per Step 1 above.

B. Return Speedbrake cartridges to Precise Flight Inc. for Drive Assembly replacement.

C. Reinstall when returned from Precise Flight, Inc.

(1) Reinstall cartridges into wing (See 3.E. above).

CHAPTER 28

FUEL

CHAPTER 28

FUEL

LIST OF EFFECTIVE PAGES

CHAPTER SECTION SUBJECT	PAGE	DATE
28-Effectivity	1/2BLANK	3-00
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28-11-00	7	3-00
28-12-00	8	9-97
28-12-00	9	9-97
28-13-00	10	9-97
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CHAPTER 28

FUEL

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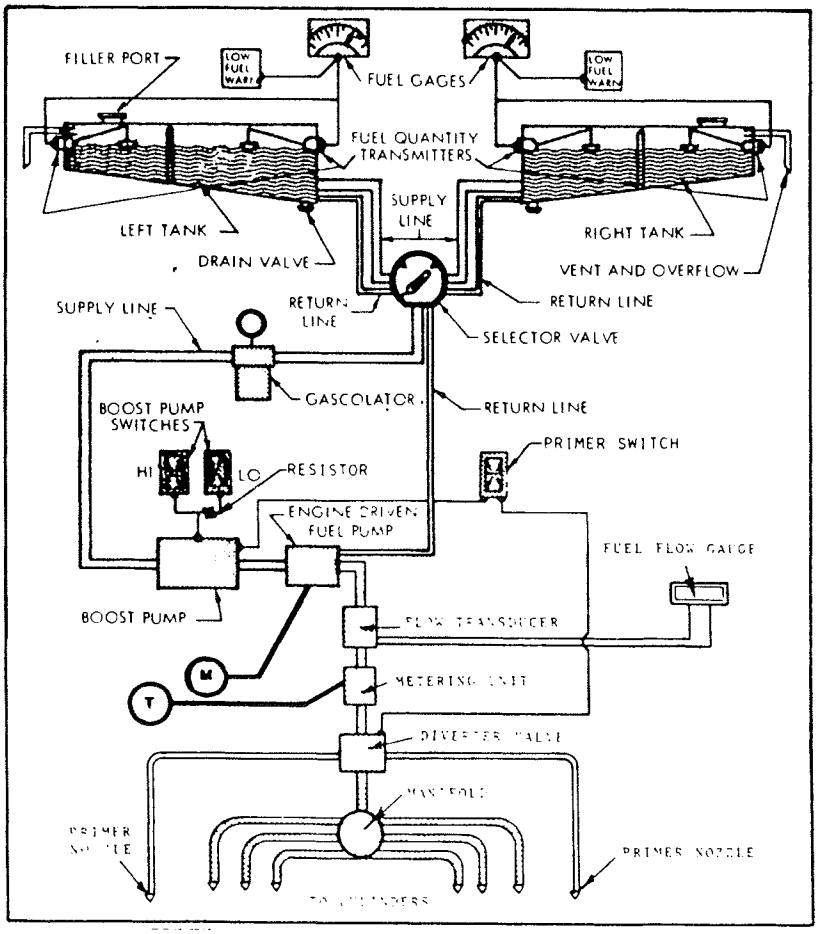
28-00-00 - GENERAL

Internally sealed, integral fuel tanks are in the forward inboard sections of the wings. Fuel feeds from either tank to a selector valve thru a gascolator, with a low-point drain, through the emergency pump to the engine-driven fuel pump and to the fuel injector system on the engine. Fuel quantity indicators are electrically operated with 2 transmitters located in each tank.

28-00-01 - FUEL FILLER CAP ASSEMBLY MAINTENANCE

Fuel filler port cap assemblies should be checked periodically for proper sealing and should be serviced occasionally to prevent hard to open or close conditions.

1. The o'ring seal (1) (Figure 28-2) around the cap assembly should be kept clean and free of dirt or grit that might cause abrasive action on seal or mating flange. Occasional lubrication with petroleum jelly or Tri-Flow will keep the o'ring soft and pliable.



FUEL SYSTEM FIGURE 28 - 1

2. The shaft (2) running through the center of the cap housing, that actuates the rotating lock plate (3) should be lubricated occasionally with Tri-Flow, or equivalent, to prevent binding while opening or closing the cap assembly. This should also lubricate the o'ring (4) that seals this shaft.

WARNING
Water can enter the fuel tank through a loose fitting or damaged cap. This should be corrected as soon as possible.

3. The sealing capability of each cap assembly should be checked periodically and at each annual inspection. This can be accomplished per the following procedures:

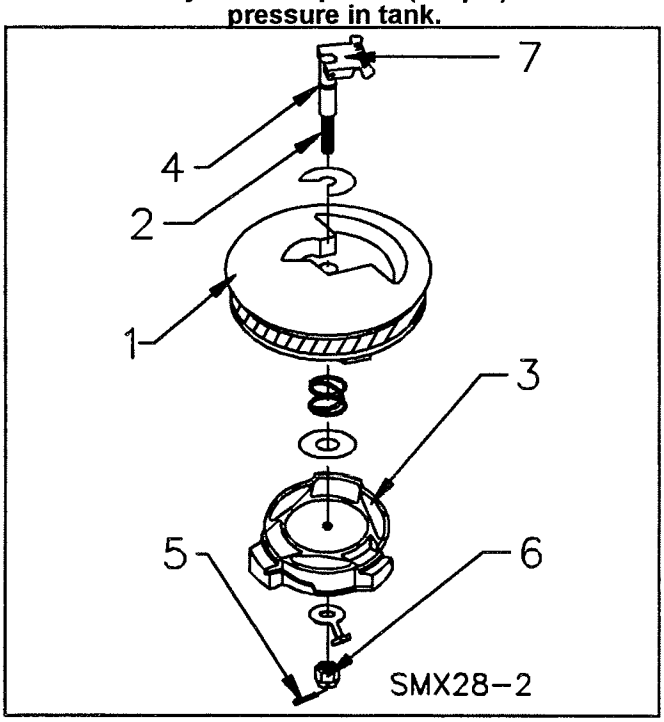
A. Remove cap assembly from wing filler port and inspect o'ring (1) for any damage or brittleness. Remove and replace if needed.

B. Adjust tension of shaft (2) and rotating lock plate (3) by removing cotter pin (5) from nut (6) on threaded portion of shaft (2). Tighten nut (6) so cap assembly handle (7) can be opened, turned and shut with hand pressure and still provide the necessary seal of cap assembly to keep water from entering fuel tank.

NOTE
Fuel selector should be in the OFF position before proceeding with paragraph C to pressurize the fuel tanks.

C. Connect rubber hose to each tanks vent line. Apply only one-half pound (1/2 psi) air pressure. Check for fuel cap leaks by soaping circumference of filler cap assembly and observing bubbles. Replace o'ring if bubbles are observed and adjustment of the nut does not stop the leak.

CAUTION
Use only one-half pound (0.5 psi) of air pressure in tank.



FUEL FILLER CAP ASSEMBLY MAINTENANCE
FIGURE 28 - 2

28-10-00 - STORAGE

28-11-00 - FUEL TANK FIELD REPAIR

This paragraph outlines the procedures recommended for repair of the integral fuel tanks. Tank repairs should not be attempted until these instructions are fully understood. Refer to Service Bulletin SB M20-230 during resealing of tanks.

CAUTION
S/N 25-0447 and later model aircraft have the fuel outlet relocated in the aft inboard section of the wing tanks. Damage to this outlet and screen can be done when removing the lower inboard access panel unless extreme caution is used during removal. Do not push the access panel upward inside the tank to break the sealant unless the outlet assembly has been removed from the tank.

1. Approved Materials.

A. Sealants.

WARNING
Sealants are safe only when handled with reasonable care. Avoid ingestion and all contact with the body, especially with open breaks in the skin. Wash hands before eating or smoking. If accelerator contacts the skin, flush area with warm water.

(1) Brushable sealant - PR1422-A-1/2 or A-2 or CS3204 A-1/2, A-2 or Pro-Seal 890-A (MIL-S-8802D Class A).

(2) Filleting Compound - PR1422 B-1/2, B-2 or CS3204 B-1/2, B-2 (MIL-S-8802D Class B).

(3) Removable access panel sealant - PR1403-G-B2 or PR 1428-B or CS3330-B.

(4) Protective sealant - PR1005-L or CS3600, (MIL-S-4383B).

B. Gloves - Polyethylene

C. Metal cleaning solvent - Turco 657 wipe solvent.

D. Cheese cloth.

E. Turco leak detector or bubble fluid.

F. Methyl ethyl keytone (MEK) (thinner for PR 1005-L).

NOTE
Approved materials may be obtained from your local Mooney Marketing or Service Center. Sealants may also be obtained from :

Products Research Co., 5454 San Fernando Road, Glendale, CA. 91209, Ph. (800) 423-2411;
or
Chem Seal Corp., 11120 Sherman Way, Sun Valley, CA. 91352;
or
Coast Pro-Seal 19451 Susana Rd., Compton, CA 90221.

2. Handling and Mixing Sealants.

A. Sealant Material Characteristics.

(1) Application life is the time that the mixed compound remains suitable for application. Application life ratings are always based on standard conditions of 75° F. and 50 percent relative humidity. For every 10° F. rise in temperature, application life and cure time is reduced by half; for every 10° F. drop in temperature, application life and cure time is doubled. High humidity at the time of mixing slightly reduces the sealant application life.

(2) Maximum unopened container life, with sealant at 80° F., is six months.

(3) Sealant application life, tack-free curing time, and curing rates are as follows:

(a) Brushable Type Sealants

CLASS A	Tack-Free Time (HOURS)	Cure Rate (HOURS)	Application Life (HOURS)
PR1422 A-1/2	10	30	1/2
PR1422 A-2	6	72	2
CS3204 A-1/2	8	30	1/2
CS3204 A-2	24	72	2
PRO-SEAL 890-A1/2	10	30	1/2
PRO-SEAL 890-A2	36	72	2

(b) Filleting Compound (and on wing walk access panel).

CLASS B	Tack-Free Time (HOURS)	Cure Rate (HOURS)	Application Life (HOURS)
PR1422 B-1/2	10	45	1/2
PR1422 B-2	36	72	2
CS3204 B-1/2	8	30	1/2
CS3204 B-2	24	72	2
CS3204 B-4	36	76	4

Follow procedures with sealant materials/kits to properly seal tanks.

(c) Access Door Sealant (except on wing walk access panel)

CLASS B	Tack-Free Time (HOURS)	Cure Rate (HOURS)	Application Life (HOURS)
CS-3330-B	8	16	2
PR1403-G-B2	10	48	2
PR1428-B	8	16	2

(d) Brushable Top Coat Protective Sealant

	Tack-Free Time (HOURS)	Cure Rate (HOURS)	Application Lifse (HOURS)
PR1005L	1/3	4	—
CS3600	—	—	—

Allow 24 hours cure time prior to refueling tanks. Air must be allowed to circulate through tank access covers.

B. Sealant Mixing

(1) For best results, use kits with proper proportions of base compound and accelerator.

(2) To avoid excessive air entrapment, slowly stir accelerator into base compound. Continue mixing for seven to ten minutes. Scrape sides and bottom of container to include all compound in mixture and to insure uniform blending. Scrape mixing paddle on edge of container to remove unmixed compound. Be sure to use all of the accelerator.

(3) Place a small amount of mixture on a clean strip of aluminum and spread sealant. Visually examine sealant film to determine whether accelerator is visible in particle form. If particles of accelerator are visible, continue mixing operation. If course particles of accelerator persist after mixing thoroughly, reject the mixed batch.

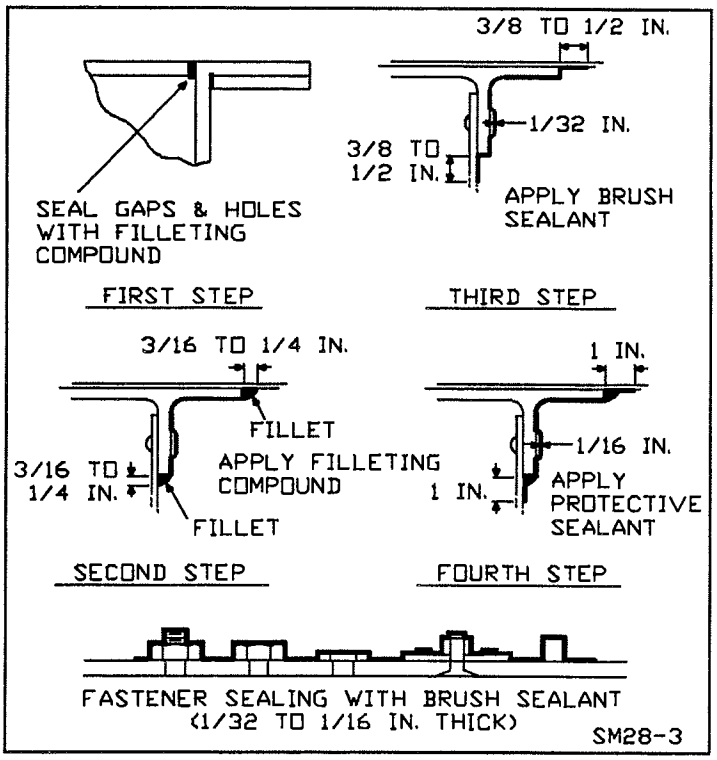
NOTE

Sealant in tube form have mixing instructions on each tube. Read and comply with these mixing instructions prior to sealant application.

3. Cleaning Surfaces to be Sealed.

A. Clean metal surfaces to be sealed with Turco 657 Wipe Solvent or Methyl Ethyl Keytone (MEK). Wipe surface dry with a clean cloth. Do not allow solvent to evaporate.

B. Allow cleaned surface to dry five to ten minutes before sealant application.



FUEL TANK SEALING FIGURE 28 - 3

NOTE
Apply sealant as soon as possible after cleaning. Store and handle parts in a manner that will prevent finger prints, dust, dirt, or other foreign substances from accumulating on surfaces to be sealed.

NOTE
Refer to Mooney SB M20-230 for proper application and drain holes to be left open.

4. Sealant Application. Old sealant must be removed. Use a sharp non-metallic scraper (Formica or lexan). When sealant has been removed clean area throughly and, reseal tank as follows:

A. Fillet Sealing.

(1) Be certain that the surface to be sealed is totally clean and free from oil, grime, finger prints, etc.

(2) Refer to (Figure 28-3) for typical fillet size.

(3) Join fillets laid on intersection joints to produce a continuous fillet.

(4) Seal all difficult and hard-to-reach areas first to preclude the possibility of their being overlooked or improperly sealed.

B. Filleting Compound Application.

(1) Use a spatula or an extrusion gun with a 1/8 - to 1/4 - inch nozzle opening for laying fillets at edges of all seams. When using an extrusion gun, hold gun perpendicular to seam so that ex ruded sealant will pack tightly.

(2) Use a spatula to pack sealant firmly in place while working out air pockets. Shape each fillet evenly.

C. Brush Sealing.

(1) Brush sealant (PR 1422-A-1/2, A-2 or CS3204 A-1/2, A-2) over all seams, rivets, nuts, and bolts. A one inch stiffbristle brush is recommended for sealant application. Force sealant into all gaps with brush strokes parallel to seams. Use a circular brush action to deposit an even coating of sealant around rivets, nuts, and bolts. Coating should be approximately 1/32-inch thick. Use considerable brush action to force sealant into all small crevices and to obtain good adhesion. Air pockets under the sealant, that will open up in the form of holes or voids soon after application, will result from improper application. To repair holes or voids, press sealant in place using a spatula.

(2) When the edge of a flange protrudes 0.040 inch or less, or where the seam cannot be clearly defined, apply two 1/32-inch brush coats. Allow the first coat to cure about four hours or until it becomes rubbery before applying the second coat. The second coat should overlap the edges of the first coat by about 1/4 inch.

D. Protective Sealant.

(1) Using short, even strokes, brush on a smooth and continuous coat of PR 1005-L over sealant. The protective sealant coat should extend one inch beyond edge of the filleting compound.

(2) Allow the first protective coat to cure 20 minutes at 75° F., or until tack-free; then apply a second brush coat of PR 1005-L. Make every effort to obtain a completely bubble-free, continuous top coat. DO NOT REBRUSH over areas, as doing so will only cause dragging and will break coating continuity.

E. Upper Wing Tank Access Panel Sealing.

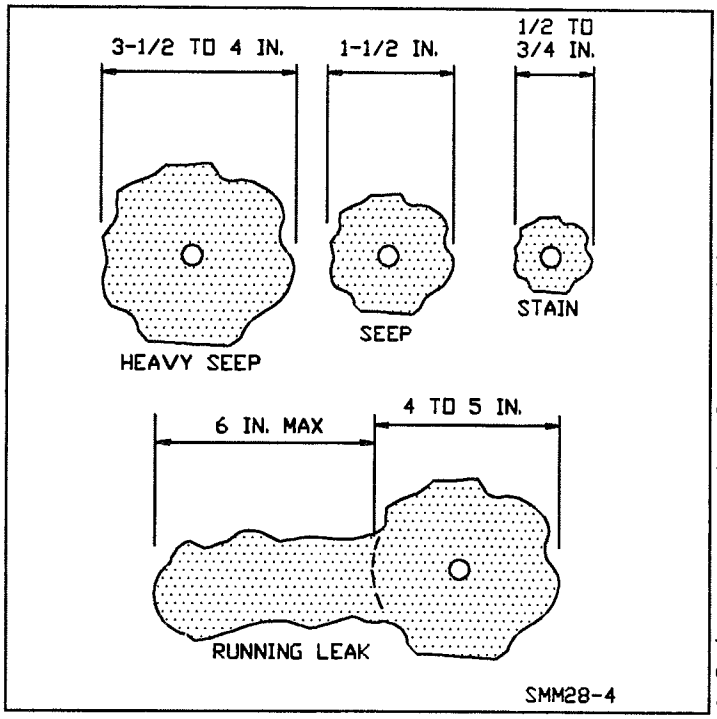
(1) Apply a coat of access door sealant (PR 1403-G-B2) to either faying surface using a short stiff bristle brush, spatula, or extrusion gun. If an extrusion gun is used, smooth the sealant with a brush or spatula. Cover the entire faying surface with a sealant coat of sufficient thickness (1/32 to 1/16 inch) to assure extrusion along the edges of the faying surface when the mating parts are assembled. Access panels in wing walk area should be sealed with PRC 1422, Class B filleting compound.

(2) Assemble parts immediately after application of sealant and tighten screws to obtain as near as possible a metal-to-metal contact.

(3) Remove the extruded sealant from the wing surface after installing the fasteners.

28-12-00 - FUEL TANK LEAK REPAIR

1. Leak Description. It is necessary to periodically inspect the fuel tanks. Inspection is particularly important in confined areas of the aircraft that are not exposed to the airstream. Identification and classification of fuel leaks that occur in both confined and open areas is necessary to differentiate between those leaks that require repair before flight and those which do not constitute a flight hazard. The size of the wetted area around a leak is an indication of the leak intensity. All fuel leaks must be recorded by describing the location and intensity of the leak in the aircraft log book.



FUEL LEAK CLASSIFICATION FIGURE 28 - 4

2. Classification of leaks as to Intensity and Location. (Refer to Figure 28-4).

A. Intensity Classification.

(1) Stain — A slow fuel leak that tends to evaporate as soon as it is exposed to air.

(2) Seep — A fuel leak that reappears shortly after area is wiped clean.

(3) Heavy Seep — A fuel leak that reappears immediately after area is wiped clean.

(4) Running Leak — A fuel leak that flows steadily.

Slow-to-heavy seeps occuring in open areas, such as wing surfaces exposed to the airstream, are leaks which do not constitute a flight hazard and need not be repaired prior to flight, providing the condition causing the leak cannot result in a leak of greater intensity during flight. Seeps considered permissible for flight must be frequently inspected to insure that no increase in intensity has occured.

A running leak and any leak in a confined area that is not exposed to the airstream should be repaired before the next flight.

3. Leak Detection.

A. External Leak Detection After Refueling. To be able to trace a leak from where it appears on an outer tank or wing skin to its true source inside the tank, the exact point where fuel is escaping from tank, must be determined.

(1) Use compressed air to blow and evaporate fuel from seams and crevices of leak area. Attempt to define exact point where fuel is escaping from tank.

(2) Small seep leaks can be traced with raw edges of torn paper. The fuzzy edge absorbs fluid and gives a good visual indication of fuel presence when brought in contact with suspected leak points.

(3) After tracing leak to its exterior source, mark location and drain fuel tank.

B. Internal Leak Detection. To make a permanent repair, it is mandatory that the true source of the interior leak be located. The fuel tank is a network of seams, and fuel may flow through or along a seam or from one seam to another. Fuel may channel a few inches or several feet to where it appears on external skin surface.

(1) Enter tank through inspection access panels and inspect sealant in general area of outside leak point. Look first for bare seams, rivets, and bolts in difficult-to-seal areas. Inspect sealant for blisters, pin holes, cracks, splits, and loss of adhesion. Mark all suspected flaws with masking tape.

(2) Test each suspected flaw from inside tank using compressed filtered air at 20 to 30 PSI. Hold air nozzle against flaw and closely check outside leak point for evidence of fuel.

(3) After testing each suspected flaw from inside tank as outlined above, and if no leak source can be discovered, apply soapless bubble fluid to exterior and again apply air pressure to flaws from inside tank.

(4) If above tests fail to locate leak source, apply air pressure (10 PSI MAX) to external leak point after removing all traces of fuel from tank and applying soapless bubble fluid to tank interior seams per Section 28-13-00.

4. Leak Repair.

A. Temporary Repair of Fastener Leaks. Generally, all leaks in enclosed areas and running leaks in open areas constitute a flight hazard. Fastener leaks of this category may be temporarily repaired by applying a sealant fillet over fastener head on fuel tank exterior. For a temporary repair to be satisfactory, structural integrity must be retained in leak area. To make a temporary fastener-leak repair:

(1) Remove enough fuel from tank to drop fuel level below leaking fasteners.

(2) Clean fastener head and adjacent surface with Turco 657 Wipe Solvent or MEK and dry thoroughly. Fastener head and adjacent metal must be entirely free from paint, dirt, and oil.

(3) Apply a 1/8 inch thick coat of PR 1422 (or CS3204) B-1/2 or B-2 over head and around fastener.

(4) Allow sealant to cure until firm and rubbery.

(5) Refill tank and examine repair periodically. If leak recurs, Sealant must be removed and area recleaned prior to making another temporary repair.

B. Permanent Leak repair. If leak source is found to be around a rivet or threaded fastener the repair procedure shall be to restrike rivet or retorque fastener to maximum permitted torque value. Any one rivet may be restruck only one time. If leak continues, replace the rivet.

(1) Repair any sealant damage due to restriking or retorqueing a fastener.

(2) Remove sealant in immediate area of leak source using a sharp non-metallic tool. A chisel-shaped formica tool is recommended. Scarf or

taper ends of existing sealant so that new sealant can form a continuous and smooth overlap.

(3) Thoroughly clean repair area using Turco 657 Wipe Solvent or MEK. Wash one small area at a time. To prevent redeposit of oil and dirt on surface, dry with a clean cloth before solvent evaporates. Always pour solvent onto wash cloth to prevent contamination of solvent supply; do not dip cloth into solvent.

(4) Thoroughly dry clean area by blowing filtered air over immediate area until there is no possibility of solvent or fuel entrapment under adjacent sealant.

(5) Apply sealant as required for repair (See Figure 28-3). Repaired fillets must be blended into existing fillets with a spatula or an appropriate tool.

(6) Allow all repaired sealant to cure tack-free and apply two brush coats of PR 1005-L to repair area (Refer to paragraph 28-11-00,4,D).

28-13-00 - SOAPLESS BUBBLE FLUID FORMULA PREPARATION FOR LEAK CHECK

1. Materials.

A. Three ounces of either sodium bichromate, potassium chromate, or potassium dichromate.

B. Three and one-quarter ounces Thickening Wax (Carbo Wax 1500).

C. Thirteen ounces Alkaryl Sufonate wetting agent.

D. Distilled water.

2. Solution Preparation.

A. Mix one of the compounds listed in item (A) above with one cup distilled water.

B. Mix item (B) above with one cup distilled water.

C. Mix item (C) above with four to four and one half gallons distilled water until wetting agent dissolves completely.

D. Mix the three ingredients (A), (B) and (C) together and add enough distilled water to make five gallons of solution.

NOTE
Amount of each ingredient may be reduced for a smaller quantity of solution. Solution life is about one week.

CAUTION
Soapless bubble fluid is slightly corrosive and must be completely removed by washing freely with water followed by scrubbing.

CAUTION
S/N 25-0447 and later model aircraft: When removing lower inboard access panels, caution should be exercised during removal so fuel outlet tubes will not be damaged or bent.

28-14-00 - FUEL ADDITIVES

Under certain conditions of temperature and humidity, water can be present in the fuel in sufficient quantities to create ice formations within the fuel system. To prevent this, add Anhydrous ISO-PROPYL Alcohol to the fuel supply in quantities not to exceed 3% of total fuel volume per tank. (Refer to TCM S.B. No. M82-8).

CAUTION
Ethylene glycol monomethyl ether (EGME) or other additives are not recommended due to potential deteriorating effects within the fuel system.

28-20-00 - DISTRIBUTION

The fuel system is comprised of two fuel pumps, an engine driven gear type pump and an electrically driven auxiliary boost pump. The boost pump is connected to three separate switches on the instrument panel. The LO boost is used to purge fuel vapor bubbles when operating at extreme high temperatures or extreme high altitudes, if necessary. The HI boost is used to provide sufficient fuel pressure to operate the engine at approximately 76% power in case of engine driven fuel pump malfunction.

On S/N **25-0001 thru 25-1225** the primer switch energizes a valve on the engine and turns on the boost pump to supply atomized fuel to the engine induction system for engine starting.

On S/N **25-1226 thru 25-TBA** the priming is accomplished by pressing the LO boost pump switch ON, with Mixture control in Idle-Cut- Off. Use the Prime vs Temperature chart in the M20K POH/AFM.

The engine driven pump incorporates a by-pass which allows excess fuel to return to the supplying tank through a separate return line.

28-21-00 - FUEL BOOST PUMP REMOVAL AND INSTALLATION

1. Auxiliary Electric Boost Pump Removal.

A. Remove electrical leads.

B. Turn fuel selector valve OFF.

C. Disconnect inlet and outlet fuel lines.

D. Remove fuel pump.

2. Reverse the removal procedure for reinstallation.

CAUTION
Do not run pump dry for more than 15 seconds.

3. Adjust voltage for low boost pump operation to not exceed 8 PSI fuel pressure. This voltage will vary with individual pumps. See Section 24-37-00 for adjustment procedures.

NOTE
8 PSI is maximum fuel pressure to be supplied to engine when engine fuel pump is operating in low mode. Install calibrated gauge in fuel line, with T-fitting between boost pump and engine driven fuel pump. See detailed instructions in chapter 24-37-00, paragraph 1. B. (1) and (2).

CAUTION
Mixture control should be in FULL RICH position to check operating pressure, however do not operate the boost pump for more than a few seconds to prevent excessive flooding of the engine.

NOTE
When the aircraft will not be flown for a period of time, refer to Sections 10-10-01,10-10-02 & 10-10-03.

28-22-00 - GASCOLATOR SCREEN CLEANING

Gascolator screen removal and cleaning;
(a) Remove belly skin just aft of nose wheel well,
(b) Turn selector valve to OFF position,
(c) Remove safety wire on bottom nut and remove nut,
(d) Remove sump and screen by pulling down,
(e) Clean screen and reverse removal process to reinstall. Take care not to damage O-rings,
(f) Lubricate O-rings with clean engine oil before installing,
(g) Torque 10 to 15 in. lbs.,
(h) Safety wire exactly as original installation.

28-23-00 - FUEL INJECTION SYSTEM

See TCM Fuel Injection Manual X30091 for service instructions.

28-24-00 - ENGINE PRIMING

A diverter valve is installed in the fuel injection system between the throttle body and the manifold valve. Operating the primer switch in the cockpit turns on the auxiliary fuel pump to the high boost position and activates the diverter valve. The diverter valve bypasses some of the fuel going to the manifold valve and directs the fuel to two atomizing nozzles in the forward end of the induction risers. See TCM engine overhaul manual for servicing instructions.

Use the Prime vs Temperature chart in the M20K POH/AFM (SECTION IV).

28-25-00 - FUEL SELECTOR VALVE REMOVAL & INSTALLATION

The fuel selector valve is located below the floor board just aft of the console.

1. Drain both fuel tanks.
2. Disconnect inlet lines at valve body.
3. Disconnect outlet line at valve body.
4. Remove handle above floorboard in fuel selector pan.
5. Remove screws that mount valve to the tubular structure.
6. Remove valve.
7. Reverse the removal procedure to install valve.
8. Leak check fuel system.

NOTE
It is recommended that the fuel selector valve be replaced each 500 houre of operation or if the valve becomes difficult to operate. (Anderson-Brass valve only)

28-30-00 - DUMP

The fuel tanks can be emptied for maintenance purposes by (1) removing the sump drains in the lower panel of each fuel tank and allowing fuel to drain into suitable container or (2) disconnect the fuel line at outlet of the electric fuel pump and use HI boost to transfer fuel from both tanks into a suitable storage container.

28-31-00 - FUEL SYSTEM DRAINS

Fuel drains are installed in the inboard corners of the wing tanks and at the gascolator, the lowest point in the fuel system. The engine manifold and engine-driven fuel pump drains join at a juncture on the right side of the engine. A single drain line dumps fuel overboard below the cowling at the left cowl flap opening. Tank drains are Tank drains are recessed and spring loaded. An O-ring at the lower flange seals the valve seat.

28-32-00 - FUEL VENTS

The fuel tanks are vented from the outboard upper edge. This vent is routed outboard thru the wing structure and on S/N **25-0001 thru 25-0446**, connect to an expansion tank located at W.S. 155.0. The expansion tank is vented overboard thru a NACA flush vent located on the lower wing surface. S/N 25-0447 and later model aircraft have the expansion tank removed and the fuel filler inlet relocated so expansion takes place in the tank and is vented overboard through a NACA vent on lower wing surface.

NOTE
It is important that the fuel tank vent tube protrude only enough to be flush with lower wing skins.

28-40-00 - INDICATING

28-41-00 - FUEL QUANTITY INDICATING TRANSMITTERS

The fuel quantity indicating system has two fuel quantity transmitters in each wing tank, one on I/B wing tank rib and one on O/B wing tank rib. The transmitters are electrically connected to the fuel gauges in the cluster gauge and work in series with each other.

1. Fuel Quantity Transmitter Removal.

Drain fuel from tank. Reference 28-30-00.

A. I/B Transmitter removal

(1) Remove Pilot or Co-Pilot seat as needed.
(2) Remove interior panel, LH or RH as needed.
(3) Locate & remove transmitter wires.
(4) Remove six screws attaching transmitter to rib doubler.
(5) Remove transmitter from rib.

B. O/B Transmitter removal

(1) Gain access through lower access cover outside of tank area.
(2) Locate & remove transmitter wires.
(3) Remove six screws attaching transmitter to rib doubler.
(4) Remove transmitter from rib.

2. For reinstallation, reverse the fuel quantity transmitter removal procedure.

A. A calibrated, certified torque application devise must be used to install the fuel quantity transmitters.

B. Snug each screw, then **TORQUE each screw to 20-25 INCH LBS. in a cross flange-random order.**

C. The torque and screw clamp load will naturally relax as the gasket flows to a normal condition.

NEVER RETORQUE JUST TO RESTORE THE 20-25 INCH LBS.

"DO NOT OVER TORQUE"
--- DO NOT RETORQUE UNLESS LEAKING ---

D. Excessive torque or retorquing may warp or distort the transmitter mounting flange and cause a malfunction.

E. Make certain wire from outboard transmitter goes under head of insulating sleeve against the inboard transmitter flange and not under the mounting screw head.

F. System voltage should NOT BE APPLIED to the transmitter terminal. The exicitation from the fuel quantity indicator must be current and voltage limited and incapable of causing ignition of fuel vapor if transmitter wire is inadvertently shorted to ground.

G. Care must be taken to insure that the bottom nut on the terminal stud is not disturbed when the electrical connection is made. This bottom terminal stud nut torque is factory set to provide the correct terminal stud seal preload.

H. Other nuts on the electrical terminals should be tightened as follows:

#6 - 6 in. lbs./ #8 - 12 in. Lbs./ #10 - 14 in. lbs.

28-42-00 - FUEL QUANTITY INDICATOR

Two fuel quantity gauges are in the instrument cluster gauge. These gauges indicate gallons of fuel remaining. Each gauge operates by the change in resistance of two transmitters located in the fuel tanks.

28-43-00 - FUEL QUANTITY ADJUSTMENT PROCEDURE

28-43-01 - FUEL TANK TRANSMITTER ADJUSTMENT (S/N 25-0001 thru 25-0446)

— AIRCRAFT MUST BE LEVEL —
—TO CALIBRATE FUEL GAUGES—

S/N 25-0001 thru 25-0446

1. Fuel tanks - EMPTY.

2. Add unusable fuel (3.7 Gal.). Indicator should read "E" to 1/2 needle width below "E". Inboard floats may be adjusted by holding arm near transmitter and bending outer arm, (do not bend by forcing arm against stops).

3. Add 2 1/2 to 3 gallons (part of additional 9 gal. required for 1/4 gauge reading). Adjust low fuel warning trimmer in annunciator panel so low fuel warning light just comes on (see Section 24-33-00, 4. A and B).

4. Continue calibration by adding fuel in 9 gal. increments, (-1, +2 gal.) for 1/4, 1/2, and 3/4 gauge readings. Gauge to read within 1/2 needle width. Outboard float may be adjusted if required for 1/2 and 3/4 gauge readings.

5. Finish filling tank until fuel just starts to spill over outer wing surface. Record total quantity less unusable fuel.

28-43-02 - FUEL TANK TRANSMITTER ADJUSTMENT (S/N 25-0447 thru 25-TBA)

S/N 25-0447 thru 25-TBA.

1. Fuel tanks-EMPTY.

2. Add unusable fuel (1.5 gal.). Indicator should read "E" to 1/2 needle width below "E".

3. Add 2 1/2 to 3 gallons (part of additional 9 gallons required for 1/4 gauge reading). Adjust low fuel warning trimmer in the annunciator panel so low fuel warning light just comes on (See Section 24-33-00, 4. A and B).

4. Add 6-6.5 gals. for 1/4 gauge reading. Continue adding fuel in 9 gallon increments for 1/2 and 3/4 gauge readings. Gauge to read within 1/2 needle width.

5. Finish filling tank until fuel just starts to spill over outer wing surface. Record total quantity less unusable fuel.

28-43-03 - FUEL QUANTITY GAUGE ADJUSTMENT

Cluster gauges installed on MID 1981 aircraft and any spare units installed on earlier aircraft have this adjustment.

1. Remove plastic plugs from holes in top left of cluster gauge case. With "unusable" fuel in tanks, adjust pot marked "null" so gauge reads "E". If intermediate or "F" indications are out of tolerance as tank is filled, adjust pot marked "gain" for correct calibration.

28-90-00 - MISCELLANEOUS

28-91-00 - TROUBLE SHOOTING — FUEL SYSTEM

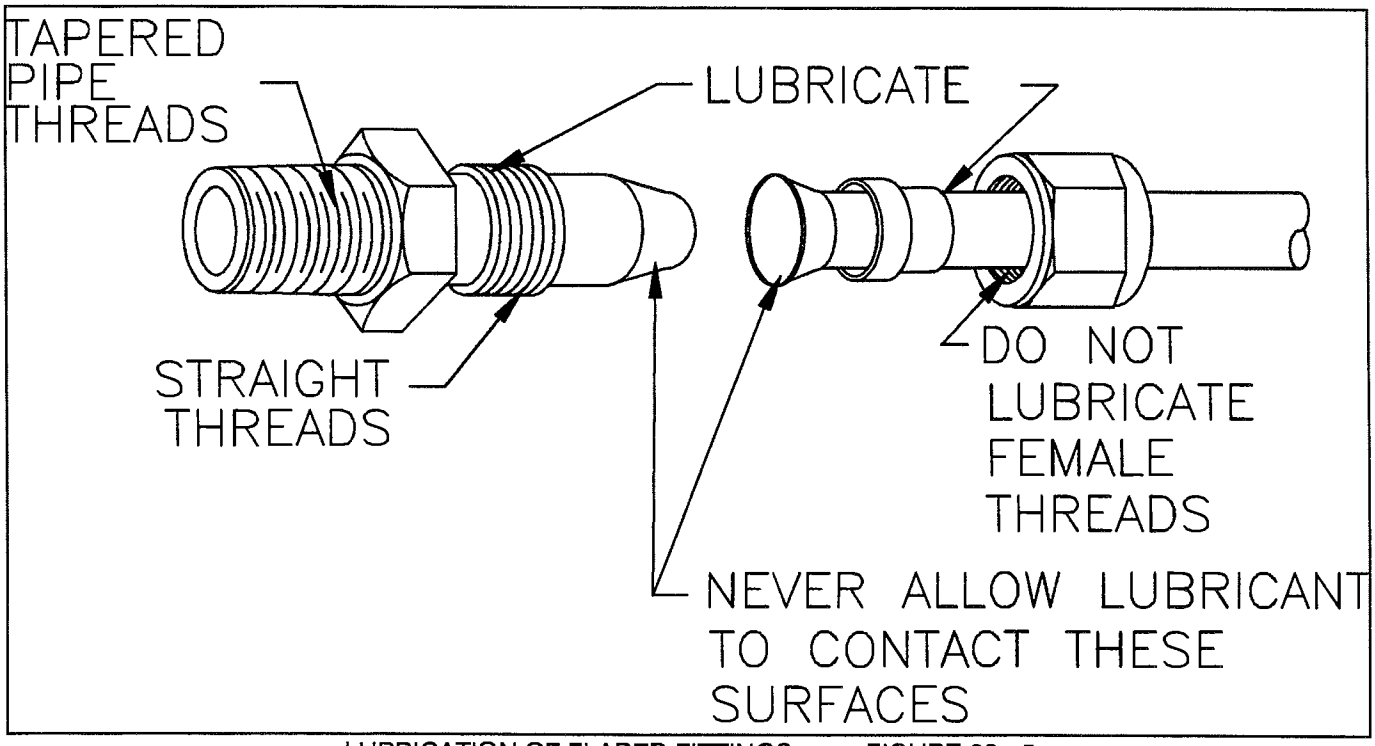
TROUBLE	PROBABLE CAUSE	REMEDY
Fuel gauge not indicating.	Broken wire.	Check and Repair.
	Faulty transmitting unit.	Replace and adjust.
	Open circuit breaker.	Check and reset.
Fuel gauge indicates full when tanks are not full.	Incomplete ground.	Check ground connection at transmitter.
	Broken wire.	Check and repair.

TROUBLE SHOOTING — FUEL SYSTEM (con't.)

TROUBLE	PROBABLE CAUSE	REMEDY
No fuel pressure indication (calibrated test gauges connected).	Tank empty.	Check and service tank.
	Defective fuel pump.	Check pump for proper pressure buildup. Check for obstruction in boost pump screen. Check engine fuel pump and check valve.
	Open fuel line.	Repair or replace line.
	Fuel selector in "OFF" position.	Select proper position.
Fuel pressure low or surging (calibrated test gauges connected.)	Obstruction in inlet side of pump. Faulty engine pump.	Check and clear fuel lines. Replace or rebuild pump. Check fuel lines and connection for leakage or damage.
	Fuel selector not in proper position.	Select proper position.
	Air leak in system.	Repair leak.

28-92-00 - FLARED FITTINGS

When installing flared fittings and hoses, make sure the threads are properly lubricated with VV-P-236 petrolatum per (Figure 28-5). When previously installed fittings are removed, they should be wiped clean and relubricated before they are reinstalled. Torque all fittings in accordance with flare fitting torque chart, Chapter 5, Figure 5-1.



LUBRICATION OF FLARED FITTINGS FIGURE 28 - 5

BLANK

CHAPTER 30

ICE PROTECTION

CHAPTER 30

ICE PROTECTION

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30-00-00 - GENERAL

The M20K aircraft incorporates an alternate air system that is designed to be opened manually (25-0001 thru 25-0780) or automatically (25-0781 thru 25-TBA) any time the air intake system becomes blocked. This system should be inspected to assure that no heated air is entering the induction system during routine engine operation. (See Section 71-62-00 for rigging instructions).

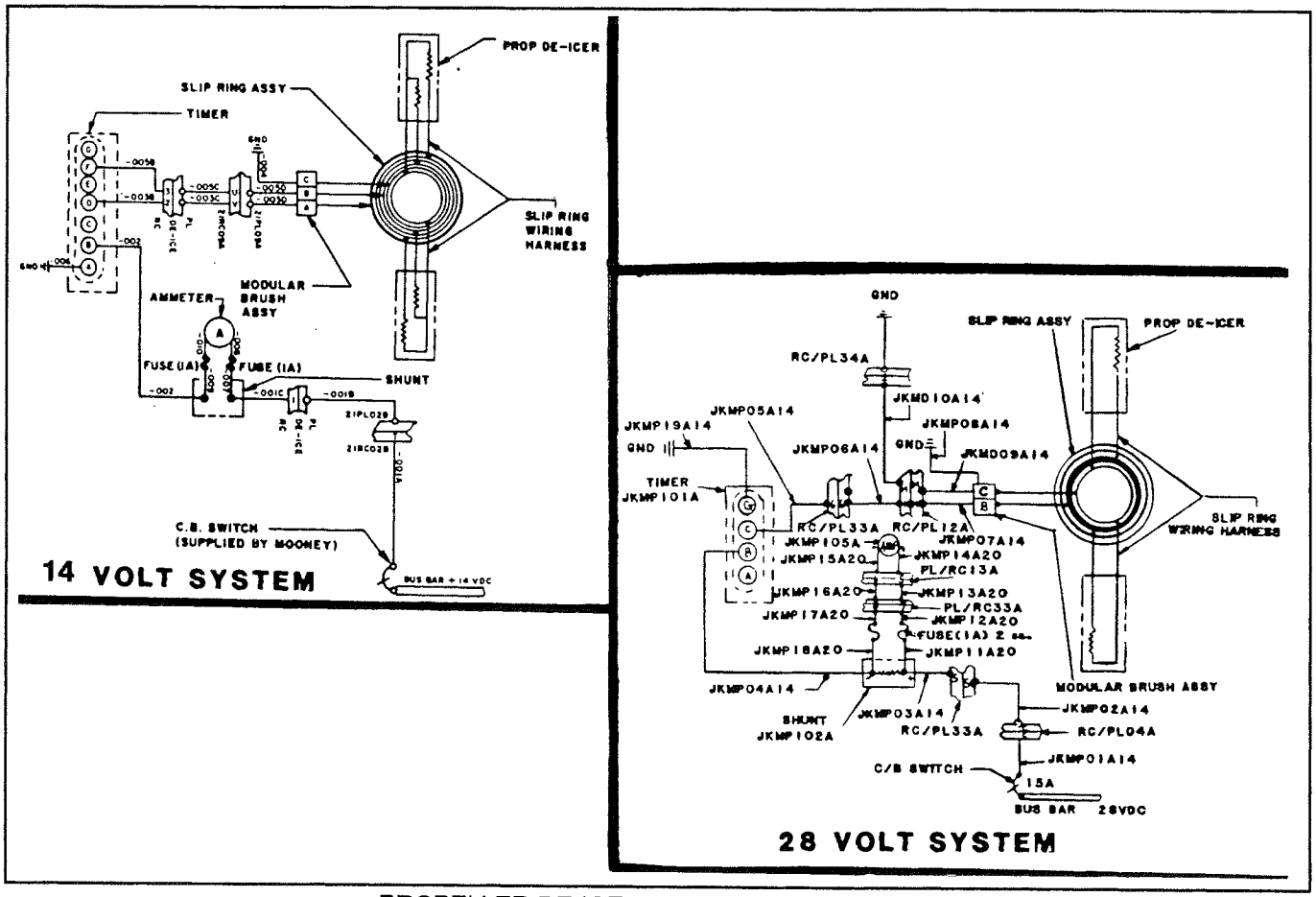
This aircraft includes as standard equipment a heated pitot tube assembly and may also include an optional electrically operated propeller de-ice system.

30-30-00 - PITOT, DESCRIPTION AND OPERATION

A standard heated pitot tube is located on the left wing at Wing Station No. 145. The pitot heat circuit breaker switch located on the panel in front of the pilots right knee supplies power to the pitot tube heating element. A BLUE light will illuminate on the annunciator panel when the Pitot Heat switch has been pushed ON and current is being drawn by the element. On some foreign aircraft a RED light will illuminate when the pitot heat element is NOT drawing any current and will be OFF when properly operating.

30-60-00 - PROPELLERS, DESCRIPTION AND OPERATION

Propeller ice removal is accomplished by optional electrically heated de-ice boots bonded to each propeller blade. The system uses the airplane's electrical power to heat the de-ice boots in cycles controlled by a timer. The ON/OFF switch is located on the switch panel in front of the pilots right knee. A current flow of 8 - 12 amps (12 Volt system) (8 amps - 24 Volt System) is depicted on the propeller de-ice ammeter located in front of the co-pilot at the top of the radio panel. On the 12 Volt aircraft, a deflection of the ammeter needle will be noticed approximately every 90 seconds; this is due to the cycling action of current flow to the circuits within the boot as controlled by the timer. On the 24 Volt system aircraft, S/N 25-1000 & ON, the ammeter will go full deflection each 90 seconds as the timer turns the de-ice boots ON/OFF/ON. S/N 25-1225 thru 25-TBA have a BLUE light, "PROP DE-ICE", on the annunciator panel. This light will illuminate at each cycle (every 90 seconds) the boots are drawing current (cycling ON/OFF/ON). The BUS LOAD meter will show an additional 8 amps each 90 second interval as the timer tums the de-ice boots ON/OFF/ON. This is normal operation. The timer is located on the circuit breaker panel side tray above the co-pilots right knee. Deicer boot replacement should be done per B.F. Goodrich Report # 59-728J which is supplied with the kits for replacement boots (**Fig. 30-1**).



PROPELLER DE-ICE SYSTEMS FIGURE 30 - 1

30-60-01 - PROPELLER DE-ICE

POWER REQUIREMENTS FOR 14 VOLT SYSTEM

TIME CYCLE	ELEMENT HEATED	TIME (IN SEC's)	LOAD (AMPS)
D	OUTBD	90	8 - 12
F	INBD	90	8 - 12
TOTAL CYCLE TIME = 3 MINUTES			
POWER REQUIREMENTS FOR 28 VOLT SYSTEM			
C	ON/OFF	90	8
TOTAL CYCLE TIME = 3 MINUTES			

RECOMMENDED WIRE SIZE CHART

LOCATION	AWG SIZE	MAX LENGTH
BUS BAR TO TIMER	#14	15'
TIMER TO GROUND	#18	5'
TIMER TO BRUSH MODULE BRUSH MODULE TO GROUND	#14	15'
SHUNT LEADS	#20	5'

30-61-00 - SERVICE GUIDE

INTRODUCTION

Whether in flight or during ground testing, the BUSS LOAD meter can be used to determine the general nature of most electrical problems. The Trouble Shooting Chart is based, primarily, on the use of the load meter and it is assumed that the user understands all normal operating modes of the system. (See Section IX of P.O.H.). Read all of the "Trouble" entries to locate the one matching the conditions of the system being checked. The "Probable Cause" and "Remedy" entries pertinent to each trouble are arranged in the recommended checking sequence. B.F. Goodrich maintenance Manual, Report No. 68-04-712B is recommended for complete maintenance actions.

30-61-01 - HELPFUL TIPS

1. The meter reading will be slightly lower when the system is operated on battery voltage than when the engine is running.

2. Use the "heat test" (30-64-00) and "load meter test" (30-62-00) to determine which De-Icers are not operating. Use wiring schematic to trace circuits.

3. Excess current reading on the BUS LOAD meter may indicate a power lead shorted to ground. Thus, when trouble of this nature is found, it is vital that the grounded power lead be located and corrected.

4. A considerable number of timers have been returned for repair which proved, on test, to be fully operable. Before concluding that the timer is faulty, test it per "De-Icer Timer Check" (30-63-00).

5. For insulation resistance tests, use a "megger" ("Meg" type insulation tester, James G. Biddle Company, Plymouth Meeting, PA.) or other tester having a 500 VDC, 1000 megohm capacity.

6. Defective wiring in propeller mounted components may be indicated by normal current readings in ground checkouts (propellers not rotating) but low current with propellers rotating at cruise RPM.

30-61-02 - TROUBLE SHOOTING CHART-PROPELLER DE-ICE

TROUBLE	PROBABLE CAUSE	REMEDY
Ammeter shows 0 current all phases of the timer cycle.	No power from aircraft.	If no voltage into circuit breaker, locate and correct open.

- TROUBLE SHOOTING CHART-PROPELLER DE-ICE (con't.)

TROUBLE	PROBABLE CAUSE	REMEDY
Ammeter shows 0 current all phases of the timer cycle.	Tripped circuit breaker.	Locate and correct short before resetting circuit breaker.
	Circuit breaker or switch faulty.	If no voltage at circuit breaker output with voltage at input and circuit breaker does not reset, replace circuit breaker. If voltage is OK at output, check switch in same manner. If voltage is OK at switch output, go to "Ammeter Faulty".
	Ammeter Faulty	Test ammeter per Section 30-62-00.
	Open ammeter to timer.	Disconnect harness at timer and check for appropriate voltage at hamess Pin B (12V); Terminal C (24V) to ground. If none, locate and correct open.
	Open timer to brush assembly.	Disconnect wire harness at brush assembly and check voltage to ground from pins or leads. (See de-icing system wiring schematic for power and ground lead and pin identification.) If low or no voltage, locate and correct open or high resistance in wire harness. Check continuity from appropriate pin or lead to ground; if high resistance is indicated, check ground wire for breakage and ground connections for correctness and tightness. Correct as required.
	Open in De-Icer, De-Icer wire hamess or slip ring assembly leads.	Disconnect De-Icer leads and check resistance per B.F. Goodrich, Report No. 59-728 If not OK, replace faulty De-Icer boot. If OK, check for (and repair) open in de-ice boot wiring hamess leads. See Section 5-4.5, B.F. Goodrich Report # 68-04-721B. Ohmmeter needle must not flicker when leads are stretched or flexed. Replace as required.
	Open on both ground brushes.	Remove brush block assembly and check both ground brushes for continuity between the brush and pigtail lead. If an open is found, repair brush block assembly. If OK, reinstall and check for proper face alignment and brush projection per B.F. Goodrich, Report No. 59-728.

- TROUBLE SHOOTING CHART-PROPELLER DE-ICE (con't.)

TROUBLE	PROBABLE CAUSE	REMEDY
Ammeter shows normal current part of cycle,zero current rest of cycle.	Open in wiring between timer and brush block assembly.	See "Open Timer to Brush Assembly" above.
	Open in De-Icer or de-ice boot wire harness.	See "Open in De-Icer" above.
	Timer faulty.	Test timer per Section 30-63-00.
	Faulty brush block assembly.	Check for broken brushes and test for opens.
Ammeter shows normal current part of cycle, low current rest of cycle.	Open circuit or high resistance in De-Icer or slip ring assembly leads.	See "Open in De-Icer" above.
	Inner and Outer De-Icer elements heating same phase (in series)	Locate and repair incorrect lead connections. See wiring schematic. (12 V aircraft only).
	High resistance in circuit with low current.	Check contact of brushes to slip rings per Section 30-66-00 or B.F. Goodrich Report # 68-04-714; correct as indicated; check wiring from timer to De-Icers for loose or corroded connections or partially broken wiring. Correct as required.
Ammeter shows low current over entire cycle.	Aircraft voltage low under normal operating conditions.	Check voltage into switch.
	Ammeter, Switch, or C/B faulty.	Check voltage up to and out of ammeter, switch and C/B. Test ammeter per Section 30-62-00 or B.F. Goodrich Report # 68-04 -712B. If low output is found through any of these items, replace defective component.
	High resistance up to timer.	Check for partially broken wire, or loose or corroded connection in wiring between aircraft supply and timer input. Correct as required.
	High contact resistance in timer.	Test timer per Section 4-2.4, B.F. Goodrich, Report No. 59-728.
	One De-Icer element (or wiring connections to De-Icer) in each cycle out.	Perform a heat test on each De-Icer per Section 30-64-00. Replace defective components.
Ammeter shows excess current over entire cycle.	Power lead shorted to ground.	Check power leads from ammeter to timer, then to De-Icers for evidence of damage or arcing. With de-icing system switch OFF and timer harness disconnected, check insulation resistance (use "Megger") to ground from timer harness Pin B (12V);

- TROUBLE SHOOTING CHART-PROPELLER DE-ICE (con't.)

TROUBLE	PROBABLE CAUSE	REMEDY
Ammeter shows excess current over entire cycle.	Power lead shorted to ground.	Terminal C (28V). Disconnect harness at brush assembly and repeat check for applicable brush assembly harness connections. (See Section 30-60-01). If ground is indicated, locate and correct.
	Ammeter faulty.	Test ammeter per Section 30-62-00.
Ammeter indicates normal current part of cycle, excess current remainder of cycle. (12V aircraft only)	Short to ground or short between adjacent circuits, timer to brush block.	Disconnect leads at brush block assembly & timer. With "Megger", check insulation resistance from power leads to groung and between adjacent circuits. If shorted or grounded, locate & repair.
	Short between slip rings.	Clean slip ring assembly with MEK.
	Short to ground or between adjacent circuits in brush block.	Electrically isolate brush assembly and test per Section 4-6, B.F. Goodrich Report # 68-04-712B.
	Short to propeller or short between two adjacent circuits-slip rings to De-Icers.	Isolate brush assembly. With "Megger", check insulation resistance from one rign of slip ring assembly to bare prop. Reading should be as least .5 Megohoms after one minute. If not OK, disconnect the slip ring leads one set at a time to trace short. If OK, disconnect slip ring leads and check insulation resistance between slip rings; reading should be at least .5 megohms after one minute. If not OK, clean assembly thoroughly with standard solvent and wipe clean with MEK and retest. Replace as required.
	Timer faulty.	Test timer per Section 30-63-00.
Ammeter does not cycle ("flicker") each 90 seconds.	Timer ground open; timer not cycling.	Disconnect harness at timer and check ground connection with ohmmeter from Pin A (12V) or Terminal G (24V).
	Timer contacts welded together (caused by short in electrical system).	Test timer per Section 30-63-00. If timer is faulty, repair or replace it, but insure that short causing original failure has been located and corrected.
Ammeter flickers between 90 second phase periods.(12V)	Loose connection between aircraft power supply and timer input.	Trace wiring from power source to timer input. Insure that good electrical contacts are made at each connection in the circuit.

- TROUBLE SHOOTING CHART-PROPELLER DE-ICE (con't.)

TROUBLE	PROBABLE CAUSE	REMEDY
Ammeter flickers between 90 second phase periods.(12V)	Loose or poor connection; timer to De-Icers.	If trouble occurs only part of cycle, determine which De-Icer is affected, check for rough or dirty slip rings causing brush to skip. Check circuits for loose or poor connections.
	Timer cycles erratically.	Test timer per Section 30-63-00.
Radio noise or interference with De-Icers on.	Brushes arcing.	Check brush alignment. Check for dirty or rough slip rings. If found, clean, machine or replace slip ring assembly. Check slip ring alignment.
	Loose connection.	See ammeter flickers between 90 second periods" above.
	Switch or circuit breaker faulty.	Place jumper wire across switch or circuit breaker; if radio noise disappears, replace switch or circuit breaker.
	Wiring too close to radio equipment or associated wiring.	Relocate De-Icer wiring at least 8" from radio equipment and wiring.
Cycling sequence not correct.	Crossed connections between timer and De-Icers.	Check system wiring against circuit diagram.
Rapid brush wear or frequent breakage.	Brush block out of alignment.	Check brush alignment. Correct as required.See section 3.3.3 of B.F. Goodrich, Report No. 68-04-714. Correct as necessary.
	Slip ring wobbles.	Check slip ring alignment with dial indicator per Section 30-69-00.
	Rough slip rings.	Re-machine/re-finish.
	Dirty slipring surfaces.	Clean slip rings with MEK.
	Brushes arcing.	Check brush alignment.

30-62-00 - AMMETER TEST

At some convenient point between bus bar and ammeter, connect a volt ohmmeter with an ammeter scale or a standard ammeter into the circuit and, with the De-Icer Switch ON, check the amperage being used by the De-Icer system. The reading of the standard ammeter should closely agree with the reading obtained from the De-Icer ammeter. Turn De-Icer Switch OFF and remove volt-ohmmeter or standard ammeter from circuit. If ammeter readings were significantly different and rest of de-icing system checks out satisfactorily, see Ammeter Checkout, Section 4-7 of B.F. Goodrich Report No. 68-04-712B.

30-63-00 - DE-ICER TIMER CHECK

Experience in the field has indicated that often the timer is considered defective when the source of the trouble lies elsewhere. For this reason, the tests should be performed before the timer is removed as defective.

1. With wiring harness disconnected from Terminal B at the timer and the de-=icer switch in the ON position, check voltage from Pin B (12V), [from wire from shunt (24V)] of the harness to ground. If no voltage is present, the timer is NOT at fault; however, if system voltage is present, check circuit from hamess plug Pin A (12V) [from Terminal G (24V)] to ground with an ohmmeter. If no circuit is indicated, the fault is in the ground lead rather than the timer. If ground connection is open, the timer step switch will not change position.

2. After ground and power circuits have been checked, connect a jumper wire between Pin B of the timer receptacle and Terminal B of the connector plug and from Pin A of the timer receptacle to ground. With the de-icing system switch ON, check voltage to ground from Pin B of the timer (12V). The voltmeter should indicate approximately 12 volts (or 24V) when the aircraft battery supply is used. Next, check DC voltage to ground from pins D and F (12V) [Pin C - 24V]; the points at which the system voltage is

impressed in sequence to cycle power to the propeller de-icers. Each of the pins should read 12 volts in sequence of cycle for S/N 25-0001 thru 25-0999 & 24 volts for S/N 25-1000 thru 25-TBA. Also refer to B.F. Goodrich, Report No. 59-728, section 4.2.4. for test criteria.

TIMING SEQUENCE	TIME ON	AREAS OF PROP DE-ICERS HEATED
Pin D	90 sec.	Outboard Section } -12V A/C only
Pin F	90 sec.	Inboard Section }12V A/C only
Pin C	90 sec.	Both Blades ON then OFF }24V A/C only

NOTE

The timer does not reposition itself to start at Pin D when the system is turned OFF, but will begin its cycling at the same position in which is was when last turned OFF. Cycling will then proceed as before. (25-0001 thru 25-0999)

After a voltage reading of 12 volts DC (25-0001 thru 25-0999) is obtained, hold voltmeter probe on the pin until the voltage drops to zero before moving the probe to the next pin in the sequence noted above. After the cycling sequence has been etablished, turn de-icing system switch OFF at the beginning of one of the "on-time" periods and record the letter of the pin at which the voltage supply is present to facilitate performance of the following test. (25-0001 thru 25-0999).

30-64-00 - HEAT TEST

Before this test can be performed, the jumper wire installed in paragraph 30-63-00, 2, for the timer test must be removed so that the connector plug can be replaced in timer receptacle (25-0001 thru 25-0999);' reconnect wire to Terminal B of timer for 25-1000 thru 25-TBA. Two men are required to perform this test, one in the pilot's compartment to monitor the ammeter while the other checks the De-Icer boots. The man in the pilot's compartment turns the De-Icer system circuit breaker switch ON while the man outside feels the De-Icer boots to see if they are heating properly. The man in the pilot's compartment observes ammeter for proper readings 8 - 12 amperes (12V) [(8 amps 24V)] throughout timing sequence. The ammeter needle should deflect every 90 seconds in response to the switching action of the timer. Each time this occurs, the man in the pilot's compartment must notify the man inspecting propeller De-Icer boots so that the latter can change position of his hands to check proper heating sequence of propeller De-Icer areas (12 volt A/C) If any irregularities are detected a continuity check should be performed on the wiring from timer to brush block holders and propeller De-icer terminal connections.

CAUTION

Stand clear of propeller, verify magnetos OFF. Use extreme caution during this procedure.

30-65-00 - CONTINUITY TEST

After removing the plug from the timer, use an ohmmeter to check continuity from:

1. Pin D (12V) of plug (Terminal C 24V) to the outboard terminal of one prop boot.

2. Pin F of plug (12V) to outboard terminal of one propeller boot.

3. Pin F of plug (12V) (Terminal G 24V) to airframe ground.

4. Ground terminal of one prop boot to ground.

30-66-00 - BRUSH TO SLIP RING RESISTANCE TEST

To check for incorrect resistance or the presence of a short or open circuit at the brush-to-slip ring contact, disconnect the hamess at timer and check resistance from each De-Icer circuit lead, (Pins D & F of harness plug, 12V) (Terminal C, 24V) to ground with a low range ohmmeter. If the resultant readings are not 1.55 to 1.78 ohms, disconnect De-Icer lead straps to measure heater resistance individually. Individual boot resistance should measure between 4.58 and 5.26 ohms. If readings in the first check are not within accepted limits but those in second check are, the trouble is probably in the brush-to-slip ring area. If readings in the second check are also off, the De-Icer concemed is damaged and must be replaced.

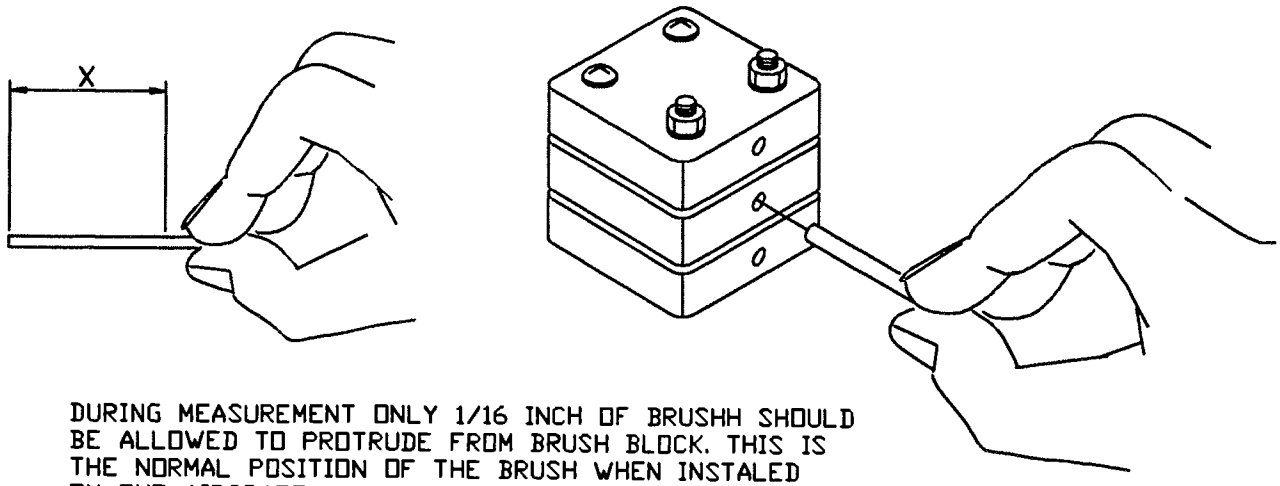
30-67-00 - BRUSH ASSEMBLY RESISTANCE CHECK

To check for an open circuit, a short, or high resistance in the brush assembly, measure resistance from face of the brush to its terminal studs with a low range ohmmeter. If this resistance measures over 0.013 ohms, locate and repair cause of excessive resistance. If resistance is infinite, locate and correct open circuit or ground, or else replace brush assembly. Check resistance between the three terminal studs. This resistance should not be less than 5 megohms.

30-68-00 - BRUSH REPLACEMENT

The propeller De-Icer brush module should be replaced when a minimum of 1/4 inch of brush ;material remains. It is good practice, however, to replace modules when 3/8 inch of brush still remains.

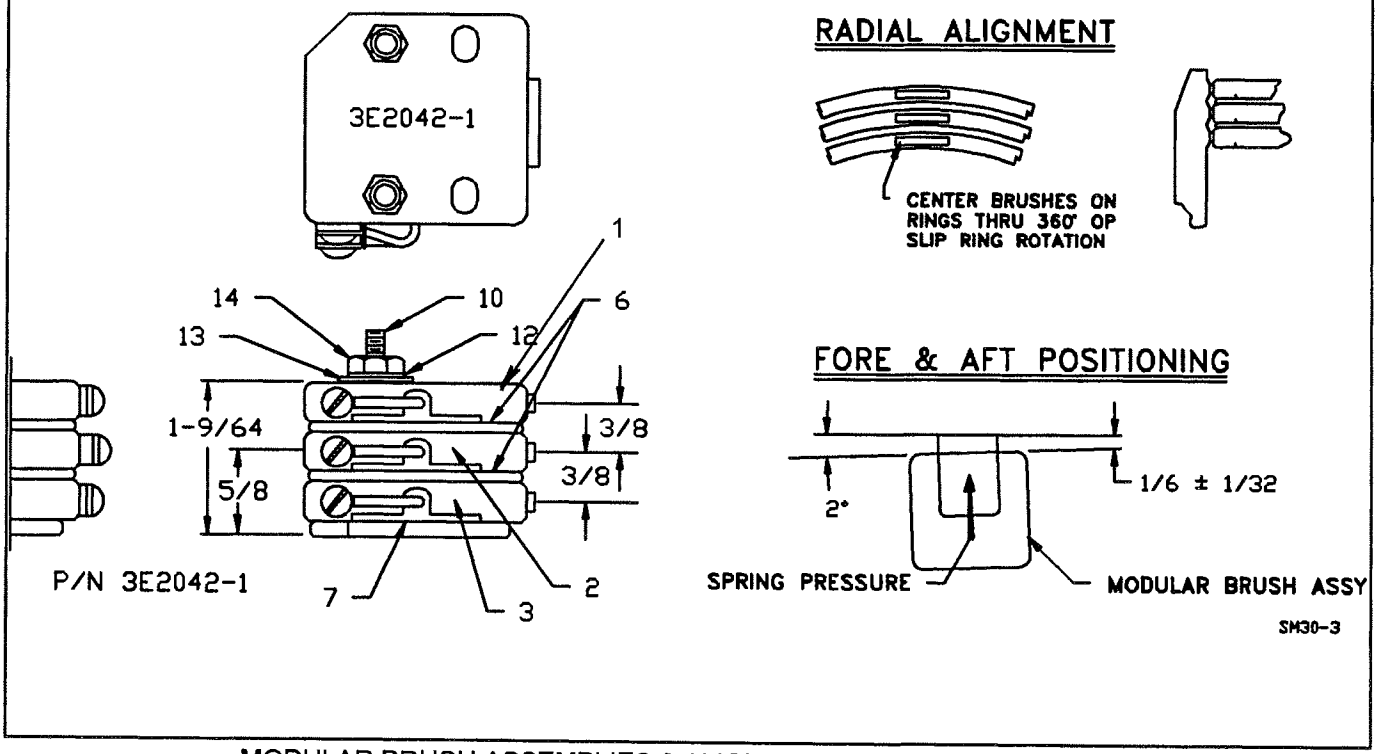
MODULAR BRUSH ASSEMBLIES	X-DIMENSION (IINCHES) MUST REPLACE
ALL MODULES HAVING BRUSHES WITH RODS	17/64
ALL MODULES HAVING BRUSHES WITHOUT RODS	1-7/64



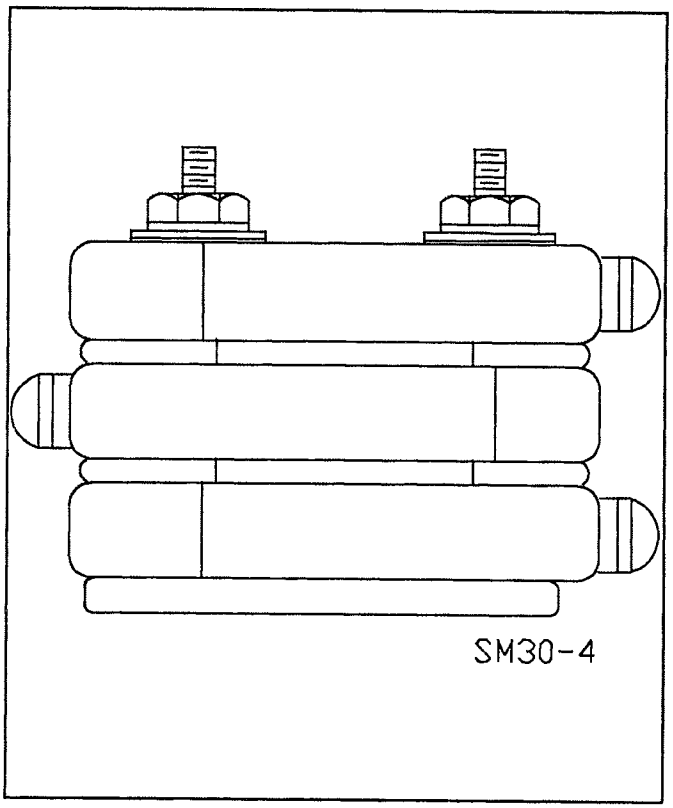
DURING MEASUREMENT ONLY 1/16 INCH OF BRUSHH SHOULD BE ALLOWED TO PROTRUDE FROM BRUSH BLOCK. THIS IS THE NORMAL POSITION OF THE BRUSH WHEN INSTALED ON THE AIRCRAFT.

SMM30-2

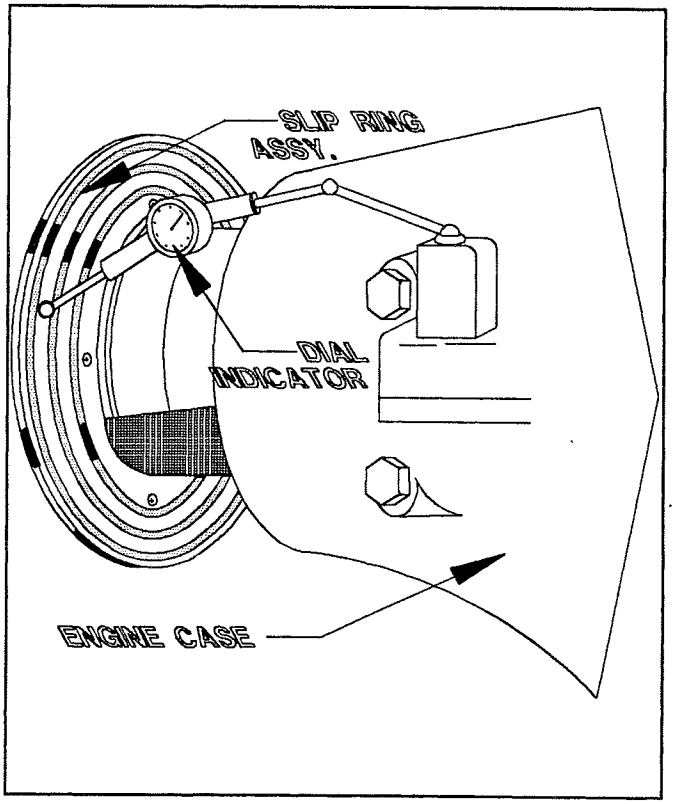
MEASURING BRUSH WEAR FIGURE 30-2



MODULAR BRUSH ASSEMBLIES & ALIGNMENT POSITIONS -3E2042-1



ALTERNATE MODULE STACKING ARRANGEMENT
FIGURE 30 - 4



ALIGNMENT OF SLIP RING FIGURE 30 - 5

30-68-01 - BRUSH REPLACEMENT/ALIGNMENT

1. Measure brush wear as shown (**Fig. 30-2**); X-dimension (inches) given indiates when modules MUST be replaced.

2. Brushes are not offered, individually, as replacements. When a brush wears out, the module containing it should be replaced as follows:

A. Dismount modular brush assembly from aircraft by removing attachng hardware, and disconnect engine wire harness.

B. Remove assembly screws and separate modules and spacers.

C. The part number of each module is etched into surface of plastic housing; replace with same part number module.

D. Restack modules and spacers as shown (**Figure 30-2**). Check A/B/C or A/B (24V) stacking arrangement and locatio of spacers. If there is interference between adjacent ring terminals, re-orient center module as shown. (**Figure 30-4**).

E. On 3E2042 series assemblies, make sure flat washer is positioned between star washer and housing. Make sure that assembly is square, then tighten screws.

F. Reconnect aircraft wire harness to applicable "A", "B", or "C" terminals of modules. Insure that adjacent ring terminals are not touching.

G. Install assembly on aircraft with attaching hardware removed.

H. Check assembly for proper alignment.

I. Refer to B.F. Goodrich Report No. 68-04-712(B) for complete maintenance informantion.

1. Brush Module Assy. 3E2011-1
2. Brush Module Assy. 3E2011-1
3. Brush Module Assy. 3E2011-1
6. Spacer 4E2218-3
7. Spacer 4E2218-1
10. Screw MS24693-S35 (6-32 x 1-3/8)
12. Washer AN960C6
13. Lockwasher MS35333-7
14. Nut MS35649-262

The above components make up a 3E2042-(x) stack.

Refer to B.F. Goodrich, Report No. 59-728, Section 6.5.2 for brush replacement and Section 3.3.3. & 3.3.4. for brush to slip ring alignment.

30-69-00 - ALIGNMENT OF SLIP RING

To check alignment of slip ring assembly, securely attach a dial indicator to the engine and place the pointer on a slip ring (**Figure 30-2**). Grasp the propeller blade and rotate it slowly, noting the deviation of the slip ring from a true plate as indicated on the gauge. Check that the total run-out does not exceed 0.008 inch total indicator reading (TIR).

CAUTION

Due to the loose fit of some propeller thrust bearings, a considerable error may be induced in the readings by pushing in or pulling out on the propeller while rotating it. Care must be taken to exert a uniform push or pull on the propeller to hold this error to a minimum.

CAUTION
Do not, under any circumstances, attempt to correct run-out of slip ri gs by shimming assembly or changing the torque of mounting screws or bolts.

If the slip ring run-out is within the limits specified, no corrective action is required. If it is not within the limits, check for dirt on the ring gear mou ting surfaces, clean, and recheck alignment. If run-out is still out of tolerance, return slip ring assembly to B.F. Goodrich Co.

30-70-00 - SERVICING/CLEANING

Thoroughly cleaning the slip ring area with MEK or standard engine degreaser on a routine basis is recommended. Keeping the brushes free of dirt, oil grease and carbon build-up will prevent those contaminants from being transferred to the slip ring.

CHAPTER 32

LANDING GEAR

CHAPTER 32

LANDING GEAR

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CHAPTER 32

LANDING GEAR

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32-00-00 - GENERAL

The landing gear is operated by an electrical motor driven actuator. The travel during the extend and retract cycle is controlled by down and up limit switches located beneath the floorboard under the pilots seat. Power is supplied to the actuator through a set of relays actuated by the gear selection switch. The gear selection switch is located at the top of the instrument panel in front of the pilot. The actuator worm gear barrel nut is connected to the retract bellcrank which is connected to push-pull retract tubes and bellcranks throughout the entire retraction system. An airspeed safety switch is mounted to the back of the airspeed indicator and incorporated into the landing gear electrical circuit to prevent landing gear retraction while on the ground until a safe takeoff speed is reached. A by-pass switch is installed adjacent to the gear selection switch in order to override the safety switch circuitry if the gear does not retract.

The gear legs are constructed of welded chrome-molybdenum tubular steel, heat treated for greater strength and wear resistance. Main gear attaching points have bushings installed in the gear mounting box attached to the wing spar. The steerable nose gear mounts to the cabin tubular steel frame.

NOTE
Heat treated components should NOT be repaired; replace them.

The main gear wheels have hydraulic disc brakes with a parking brake valve incorporated into the system.

Rubber discs in the gear leg assemblies absorb the shock of landing and taxiing.

MANUAL-EMERGENCY LANDING GEAR SYSTEM.

Emergency gear extension is available through a manual override system. This system is built into the actuator unit. The disengage controls are located aft and between the front seats.

LANDING GEAR WARNING SYSTEM.

The landing gear warning system provides the pilot with an audible warning that the landing gear is not down and locked when the throttle is retarded below 10 inches manifold pressure on S/N 25-0001 thru 25-0780. The warning system on aircraft S/N 25-0781 & ON is activated when the throttle is retarded below 16 to 18 inches MP. When the landing gear is down and locked the electrical circuit is opened and the intermittent horn is stopped. This warning switch is mounted on the throttle housing forward of the instrument panel and can be adjusted for the proper setting by loosening the screw and repositioning the switch.

BRAKE SYSTEM.

The brake system is hydraulically operated by depressing the brake pedals mounted on the pilots rudder pedals. (Dual brake system is optional for co-pilots). Individual wheel brakes are available by depressing either left or right pedal. Parking brakes are actuated by depressing both brake pedals and pulling the parking brake control cable knob. This cable actuates a lever on the parking brake valve and traps the hydraulic fluid from the valve to the wheel cylinders thus holding the pucks to the discs. Release the parking brakes by pushing the parking brake knob in. This releases hydraulic pressure at the wheel cylinders and therefore releases the brake discs.

32-10-00 - MAIN LANDING GEAR AND DOORS

32-10-01 - MAIN GEAR REMOVAL

1. Raise aircraft on jacks.

2. Partially retract gear as described in Section 32-60-01, para. 1.

3. Disconnect gear door links and brake lines. Cap all lines and fittings.

4. Remove gear door(s) and mud guard (if desired).

5. Detach main gear retracting tube (V), from retracting truss (G), and remove bolts (H) from retracting truss mounting block. (Ref. Figure 32-9)

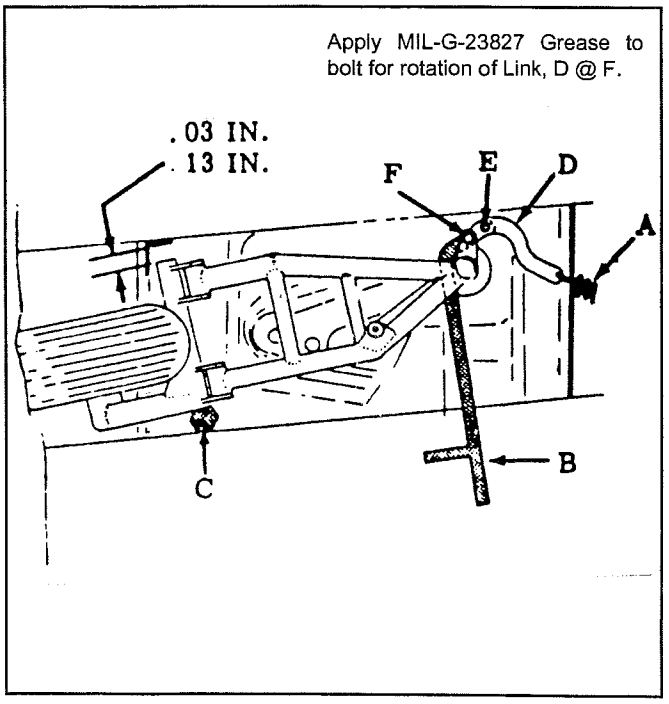
6. Remove small skin panel covering aft trunnion bearing (25-1000 thru 25-TBA).

NOTE
Steps 7 thru 9 apply to 25-0001 thru 25-0999 only.

7. Remove grease fittings from forward gear support trunnion-shaft bearing.

8. Retract gear by hand until a 2 inch thick wood block (C), (Figure 32-1), can be inserted, as shown, to hold gear in retracted position.

A. Remove cotter key and nut at (F) from spring connecting link (D), (Figure 32-1).



GEAR RETRACTION SPRING REMOVAL
FIGURE 32 - 1

B. Remove gear retraction spring (A) and link (D) at (F), (**Figure 32-1**), by attaching spring installation tool (B), P/N GSE 030012, (old P/N was 8186) using an AN3-12A bolt at (E) to relieve pressure at (F). Remove grease fitting prior to using tool.

9. Extend gear three to four inches from down-lock position and secure.

10. Remove six mounting bolts from rear gear trunnion shaft mounting block assembly at stub spar.

11. Slide out aft bearing block.

12. Slide front bearing block aft and remove.

13. Slide gear assembly aft until clear of front bearing, and carefully remove gear assembly from wing.

14. Identify all components removed, and DO NOT intermix right and left gear components.

15. DO NOT attempt to repair any heat treated component of main landing gear assembly.

32-10-02 - MAIN GEAR INSTALLATION

1. Lubricate wheel bearings, retraction linkage, and fore and aft trunnion bearings prior to installation (refer to Section 5-20-07 for recommended lubricants).

2. Installation of main gear is the exact reversal of the main gear removal procedure.

NOTE
Torque 510078-001,-003 or-005 bolts from 270 to 300 In. Lbs.

3. Check fore and aft movement of gear in bearing blocks. Maximum allowable movement is .020. Shim excess by inserting shims at rear block.

4. Temporarily attach gear door link rods to gear leg brackets.

5. Retract gear while checking for binding in door linkage and proper contact of gear door edges with wing. DO NOT make final gear door adjustments until gear has been rigged (Ref. 32-30-02).

32-10-03 - MAIN GEAR DOORS RIGGING

(25-0001 thru 25-0999)

NOTE
Gear system must be properly rigged prior to gear door rigging, see Section 32-30-02.

1. Raise aircraft on jacks.

2. Check main gear up against bumper pads.

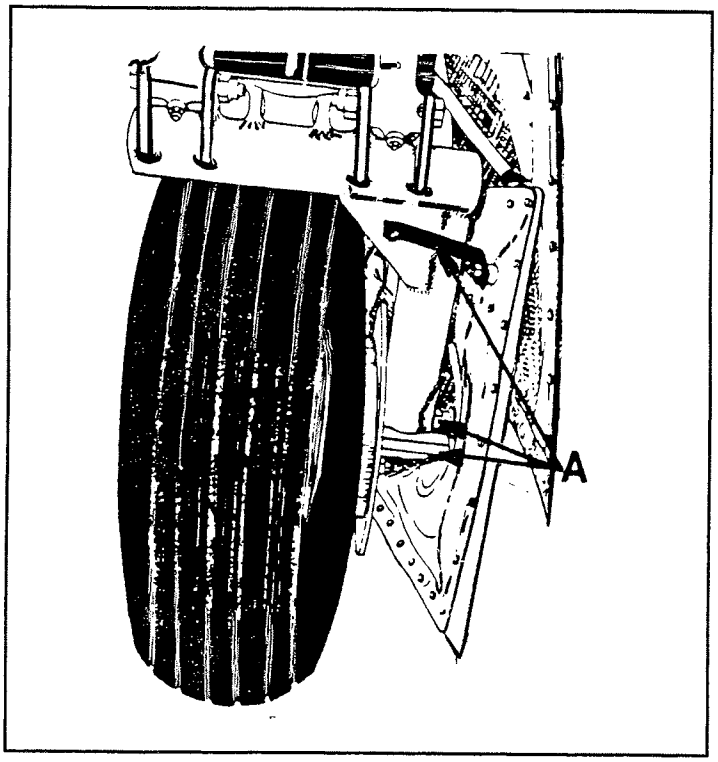
3. Normally once the doors are installed at the factory no further adjustment should be required. However, should the inboard doors be removed for any reason the following rigging procedure should be used when reinstalling them:

A. Disconnect outboard gear doors at the forward and aft linkages (B) (**Fig. 32-2A**).

B. Raise gear electrically to the full up position.

C. Forward leading edge and aft trailing edge of the inboard gear door should be tight against the wing skin and fair with the aft bubble fairing. Spacers (A) (**Figure 32-2**) should be added or removed as required to obtain a good fit with no binding or distortion with the gear in the UP position. AN960-10 washers may be used as spacers.

4. Reconnect outboard gear doors and check that the forward edge of outboard gear doors are faired with wing skin/wheel well opening and that there is no binding or distortion where links attach to door.



INBOARD GEAR DOOR ADJUSTMENT POINTS
(25-0001 thru 25-0999)
FIGURE 32 - 2

5. If adjustments are required, adjust outboard gear door rod ends (**Fig. 32-2A**) at forward or aft linkages as required. Extend gear to adjust links, then retract to check adjustment.

32-10-04 - MAIN GEAR DOORS RIGGING

(25-1000 thru 25-TBA)

NOTE
Gear system must be properly rigged prior to gear door rigging, see Section 32-30-02.

1. Raise aircraft on jacks.

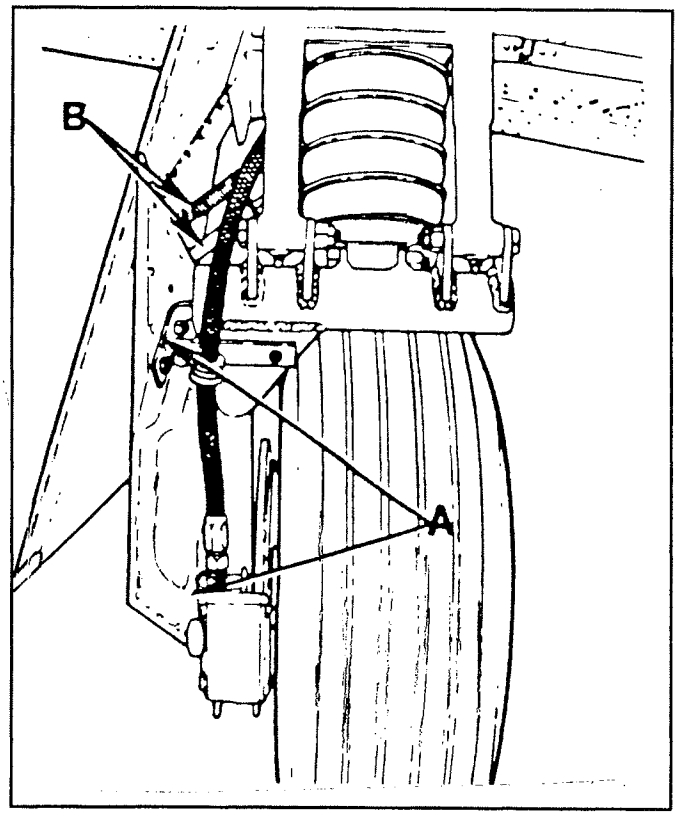
2. Normally once the doors are installed at the factory no further adjustment should be required. However, should the **MID-GEAR** doors be removed for any reason the following rigging procedures should be used when reinstalling them:

A. Disconnect outboard doors at forward and aft linkages (B) (**Fig.32-2A**).

B. Disconnect inboard doors at forward linkage and springs (A) (**Fig.32-2B**).

C. Raise gear electrically to the full UP position.

D. Forward leading edge and aft trailing edge of the Mid-Gear doors should be tight against wing skin.



MID-GEAR DOOR ADJUSTMENT POINTS

(25-1000 THRU 25-TBA)
FIGURE 32-2A

Spacers (A) (**Figure 32-2A**) should be added or removed as required to obtain a good fit with no bind

ing or distortion with the gear in the UP position . AN960-10 or AN970-3 washers may be used as spacers.

3. Reconnect outboard and Mid-Gear doors and check that doors are faired with wing skin/wheel well opening and that there is no binding or distortion where link attaches to door. Adjust linkage if required (**Fig. 32-2A**). Extend gear to adjust, then retract to check adjustment.

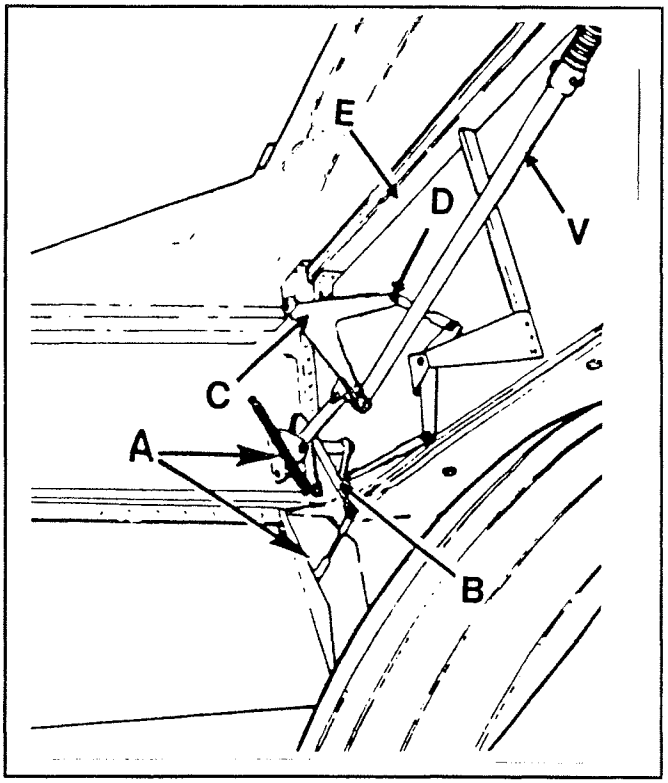
4. Check main gear overcenter preload torque for proper values. Re-rig entire landing gear system, if necessary.

32-10-05 - INBOARD DOOR RIGGING

(S/N 25-1000 thru 25-TBA)

1. Adjust inboard door link to close doors with "0" gap. Doors must be closed with gear extended and retracted. If door is not closed in both positions refer to landing gear rigging procedures in Section 32-30-02. Any adjustment to rod end on main retract tube (L) (**Fig. 32-5**) and rod end on retract tube (V) (**Fig. 32-9**) is at a 2 to 1 ratio, respectively; this adjustment will change rigging values. Re-check preload values.

EXAMPLE: If the inboard gear door is open a small amount when landing gear is down, but closed when



INBOARD GEAR DOOR RIGGING FIGURE 32-2B

gear is UP. - Adjust by turning retract tube (V) rod end IN 1/2 turn, and retract tube (L) (**Fig. 32-5**) rod end OUT 1 turn.

EXAMPLE: If the inboard gear door is closed with landing gear in the DOWN position, but open a small amount with landing gear in the UP position. - Adjust by turning retract tube (V) (**Fig.32-9**) rod end OUT 1/2 turn, and retract tube (L) (**Fig.32-5**) rod end IN 1 turn.

2. Tighten jamb nuts and reconnect springs on inboard gear door bellcrank (A) (**Fig.32-2B**).

NOTE
Do not rig doors shut more than necessary as this may result in higher actuator loads than necessary.

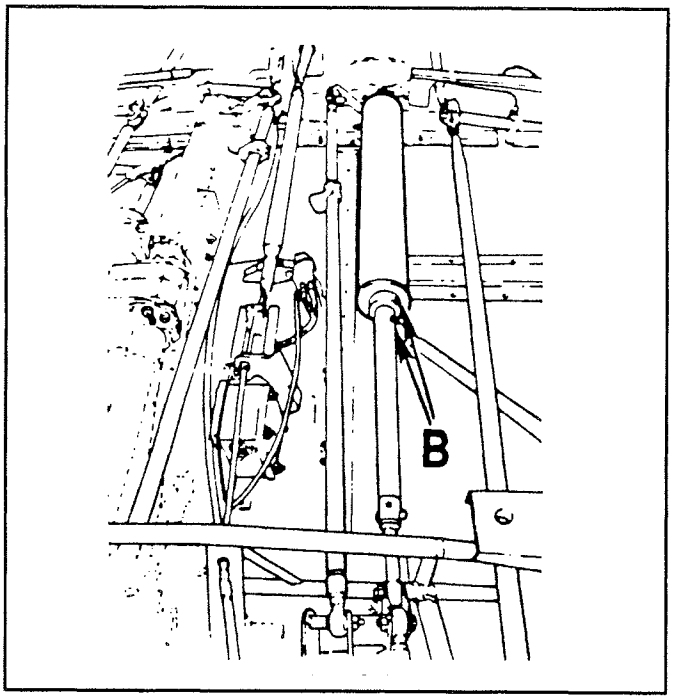
3. Adjust outboard door link to close all gap at leading edge of door. If the door is rigged too tight, the skin will be under stress (concave) at the point where the linkage is attached to the door. It could also cause the mid and inboard doors to gap open.

4. Cycle gear manually and electrically while inspecting for clearances. Recheck landing gear system rigging values.

5. Remove aircraft from jacks.

6. Retum aircraft to service.

NOTE
To remove INBOARD GEAR DOORS use a sharpened punch less than .093 dia. or a short piece of hinge pin to open the crimped hinge assembly pin hole.



ASSIST BUNGEE INSTALLATION FIGURE 32 - 2C

32-10-06 INSTALLING ASSIST BUNGEE (560213-501) (25-1000 thru 25-TBA)

1. Retract gear.

2. Pull gear down with emergency extension until main retract bellcrank and rod end bungee line up. Install AN3 bolt through Heim rod end bearing and AN4 bolt through block. Torque and safety.

CAUTION
Bump gear up, CAREFULLY, just to take load off the 3/16 in. installation pin at (B). Remove pin from (B) (Fig. 32-2C).

3. With bungee installed recheck preload per steps 30 thru 34 of Section 32-31-02..

32-20-00 - NOSE GEAR AND DOORS

32-20-01 - NOSE GEAR REMOVAL.

1. Raise aircraft on jacks per Section 7-10-00.

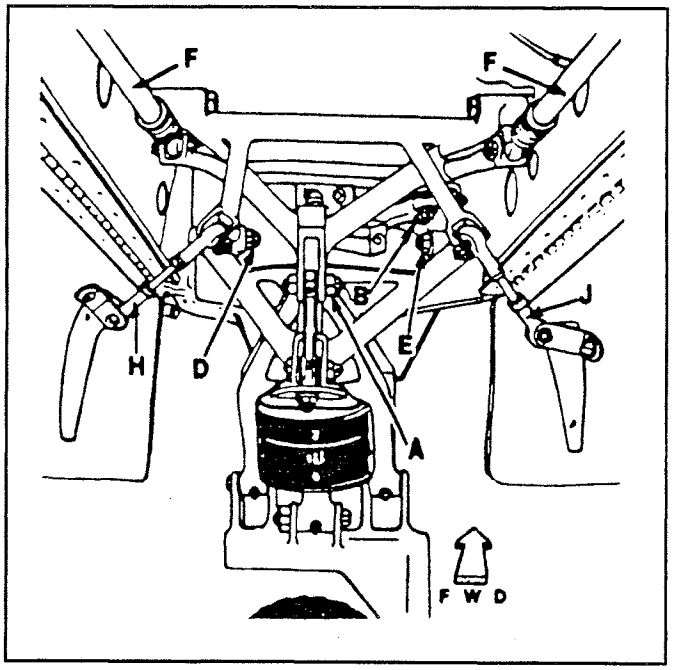
2. Remove exhaust cavity fairings.

3. Partially retract gear as described by Section 32-60-01.

4. Remove firewall nose gear box (if needed) to gain access to bolts.

5. Disconnect link (A) on nose gear truss assy. (**Figure 32-3**).

6. Disconnect nose gear steering horn link (B) (**Figure 32-3**).



NOSE GEAR RETRACTION TUBE ADJUSTMENT POINTS FIGURE 32 - 3

7. Remove left and right gear mounting bolts (D) and (E) (**Figure 32-3**) from tubular structure and nose gear truss assembly.

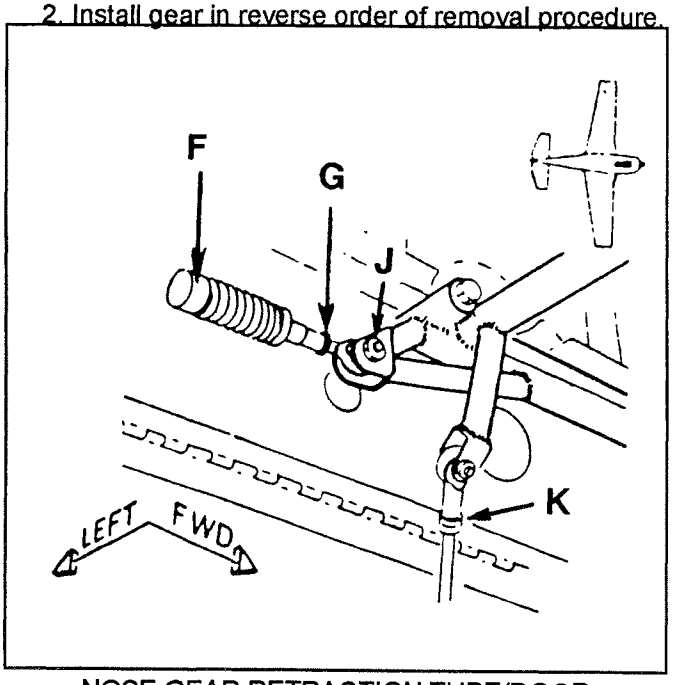
8. Carefully remove nose gear assembly.

9. DO NOT attempt to repair heat treated components of nose landing gear assembly.

32-20-02 - NOSE GEAR INSTALLATION

1. Lubricate wheel bearings, retraction linkage and left and right mount bearings.

2. Install gear in reverse order of removal procedure.



NOSE GEAR RETRACTION TUBE/DOOR ADJUSTMENT POINTS FIG 32 - 4

32-20-03 - NOSE GEAR DOOR RIGGING

1. Raise aircraft on jacks. (Refer to Section 7-10-00.)

NOTE
Gear system must be properly rigged prior to gear door rigging, see Section 32-30-02.

2. Adjust gear door link rods (H) and (J) (**Figure 32-3**) to obtain proper door fit when closed.

3. To increase or decrease nose gear-up travel in wheel well, adjust eccentrics on trunnion bearings (J), (**Figure 32-4**) as required.

CAUTION
Nose gear overcenter preload must be rechecked after any adjustment to nose wheel eccentrics.

4. Readjust nose gear door linkage as required after eccentrics have been moved. (**Figure 32-4**, K.)

32-30-00 - EXTENSION AND RETRACTION

32-30-01 - GEAR SYSTEM OPERATIONAL INSPECTION

1. Raise aircraft on jacks. (See Section 7-10-00).

2. With Master Switch ON and gear switch in UP position, apply pressure to pitot tube (see Section 32-60-01). Verify gear retraction occurs at 75 MPH +/- 5 MPH (65 +7/-4 KIAS). Allow gear to raise completely. Check for any tire interference as tire enters wheelwell.

3. Close throttle and confirm gear horn sounds.

4. Inspect gear doors for proper closing; lower gear.

5. With zero airspeed place gear switch in UP position. Gear horn should sound regardless of throttle position, both gear position lights and safety bypass switch will illuminate.

6. Push RED gear safety bypass switch and hold IN to partially retract gear. Pull "GEAR ACT" circuit breaker.

7. Check nose gear overcenter preload as follows:

A. Measure nose gear bungees (**Figure 32-6**).

B. Extend gear manually (See Section 32-30-04) stopping extension the moment the green Gear Down Light comes on. Gear switch in DOWN position.

C. Measure nose gear bungee springs (**Fig.32-6**). Deflection from zero load condition in (A) above must be .030 to .070 inches for each bungee.

D. If spring deflection is not within prescribed limits, adjust tube rod ends (**Figure 32-4** (F)) in increments of 1/2 turns as required.

8. Check main gear overcenter preload as follows:

A. Place rigging tool (T) P/N GSE 030007 (**Figure 32-9**) on retraction truss. Hold the tool stationary by placing thumb on rear end of tool (S) and press forward.

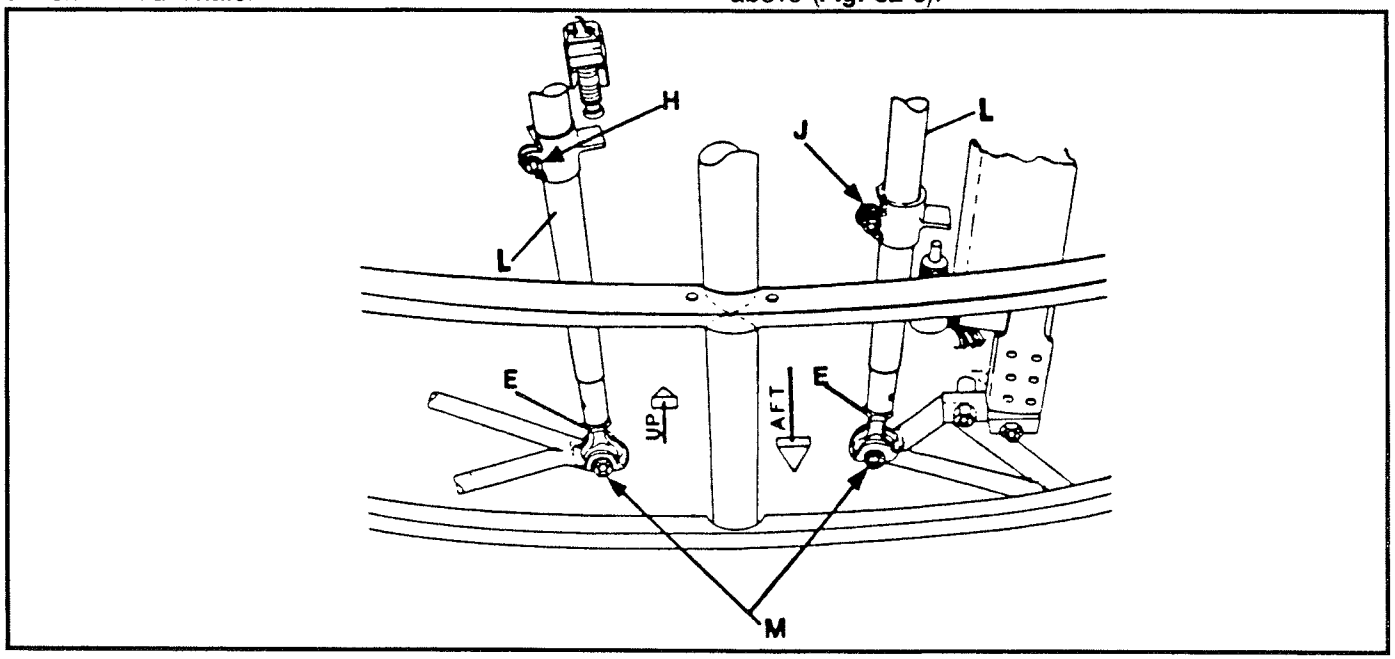
B. Hold 10" torque wrench (R) and place thumb on wing bottom; apply force until joint (4) breaks open slightly, insert shim stock (.005 .008 in. thickness) between link and truss at (P). Release force on wrench.

C. With fingers on torque wrench and thumb on wing bottom apply force on wrench while maintaining a pulling force on shim stock. Read torque value on wrench at the exact moment the shim stock pulls loose. Torque value should be 250 to 280 inch pounds.

D. Repeat on other main gear.

E. If preload is not within prescribed limits proceed to applicable S/N, Main Landing Gear Rigging procedures in Section 32-31-01or 32-31-02.

F. If main gear preload needs readjusting, the nose gear bungees should be rechecked per 7, (C) above (**Fig. 32-6**).



MAIN GEAR RETRACTION TUBE ADJUSTMENT POINTS FIGURE 32 - 5

NOTE
When gear overcenter preload check is completed, electrically extend the gear and check the nose gear tube bungee springs to assure they have not compressed completely resulting in no remaining deflection. This would indicate excessive preload or weak bungees.

32-30-02 - MAIN LANDING GEAR SYSTEM RIGGING

(S/N 25-0001 thru 25-0999)

1. Raise aircraft on jacks and remove 3 belly access panels located consecutively just aft of nose wheel well or the one piece belly access effective 25-0781 and later aircraft.

2. Disconnect main gear retraction tubes (L) (**Figure 32-5**) at inboard bellcranks (M). Loosen locknuts (E). Disconnect nose gear retraction tubes (F) (**Figure 32-3**) at main retraction bellcrank (A) (**Figure 32-10**). Loosen locknuts (G) (**Figure 32-4**). Disconnect actuator rod end at (N) from bellcrank (A) **Fig. 32-10**. Disconnect nose gear and main gear door links. Check gear for binding at pivot points while moving gear legs by hand. Lubricate retraction system as indicated in SECTION 5-20-07.

3. Position retraction bellcrank (A) **Figure 32-10**, so that center of forward hole in left outboard arm of the bellcrank is 1.56* IN. (approximately) from forward face of truss at Fuselage Station 33. (See **Figure 32-10.**)

NOTE
This is a starting point only. This dimension * may vary to permit retraction tubes to connect with zero preload.

4. With bellcrank (A), **Figure 32-10**, in position, turn barrel nut (D) on actuator until rod end aligns with hole in bellcrank at (N). Install connection bolt/hardware.

5. With bellcrank in position and landing gear fully extended, adjust main (L) (**Fig. 32-5**) and nose gear (F) (**Fig. 32-10**) retraction tubes so that tubes can be slipped in place with zero preload.

6. Disconnect electrical power from landing gear actuator by pulling actuator circuit breaker. Make sure landing gear warning light circuit breaker is pushed IN.

7. With bellcrank, retraction tubes, and the gear positioned as indicated in step 4, set down-limit switch striker arm (J) (**Fig.32-5**) so gear down limit switch is just closed and GREEN gear-down light is ON. Secure striker arm in position.

8. Reset actuator circuit breaker and partially retract gear (use master switch to control motor). Screw rod end (E) (**Fig.32-5**), on aft end of each main gear retracting tube, OUT two full turns, screw each nose gear retraction tube rod end (F) (**Fig.32-4**) IN one full tum, then slip attaching bolts back in place.

9. Check nose and main gear overcenter preload described in Section 32-30-01, steps 7 and 8. Adjust as instructed.

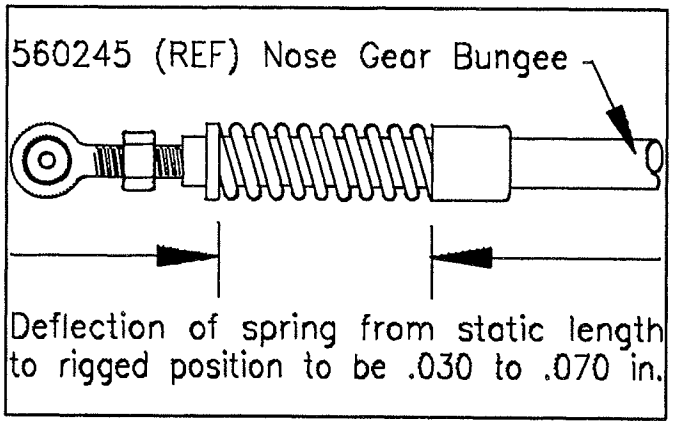
10. Complete operational check described in 32-30-01 steps 2, 3, 5 and 6.

11. When step 10 is complete, the retraction system is rigged for the gear-down-and-locked position with allowance for actuator overrun after cutoff.

12. Reset landing gear system circuit breaker and disengage manual system.

13. Leave all gear doors disconnected, and run gear-up electrically until main gears are .03 inches minimum from bumper pads. Position gear-up limit switch striker arm (H) (**Fig.32-5**) so switch is JUST closed, and RED gear unsafe light is OFF. Secure striker arm in position. The gear is now properly rigged in the gear-up position with allowance for actuator overrun after cutoff.

14. Electrically extend gear to down-and-locked position. Adjust gear doors (refer to Main Door and Nose Gear Door Rigging Procedures in Section 32-10-03, Main, and 32-20-03, Nose).



NOSE GEAR BUNGEE SPRING FIGURE 32 - 6

15. Adjust mechanical down stop on actuator housing and up stop per the following instructions and **Figure 32-7** and **Figure 32-8**.

- MECHANICAL DOWN STOP -

A. 560252-1 Fixed Stops, 560252-3 Fixed Stops, 560252-5 Fixed Stops, 560252-7 Fixed Stops — Use one DOWN STOP on each side as required (Pick up existing hdw).
560252-9 Adjustable Stop (use -11 shims)

B. With gear fully extended, select down stop of proper thickness to give .050 - .100 clearance at (B) between down-stop and end of barrel nut (C). (**Figure 32-7**).

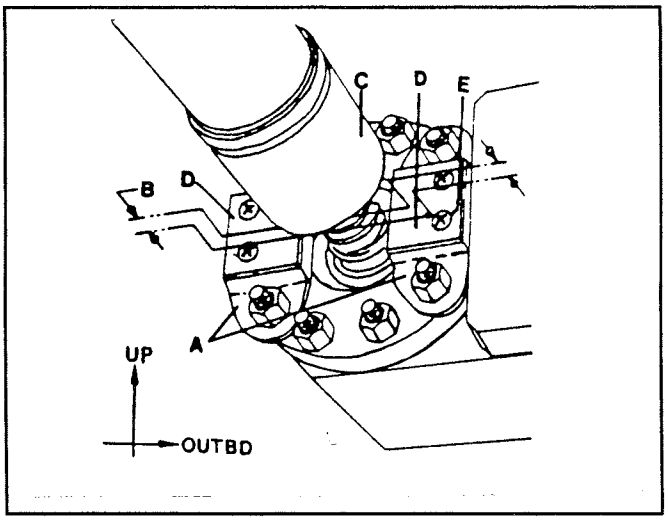
NOTE
Use 1 to 4 560252-11 shims with 560252-9 stop to achieve proper clearance as an alternate for 560252-1, -3, -5, or -7.

C. Actuator barrel nut.

D. 560252-11 shim (use with 560252-9 only, maximum of 4).

E. AN515-6R screw **
AN936A6 Lock Washer
(Typ. 2 plc.) (use with 560252-9 only).

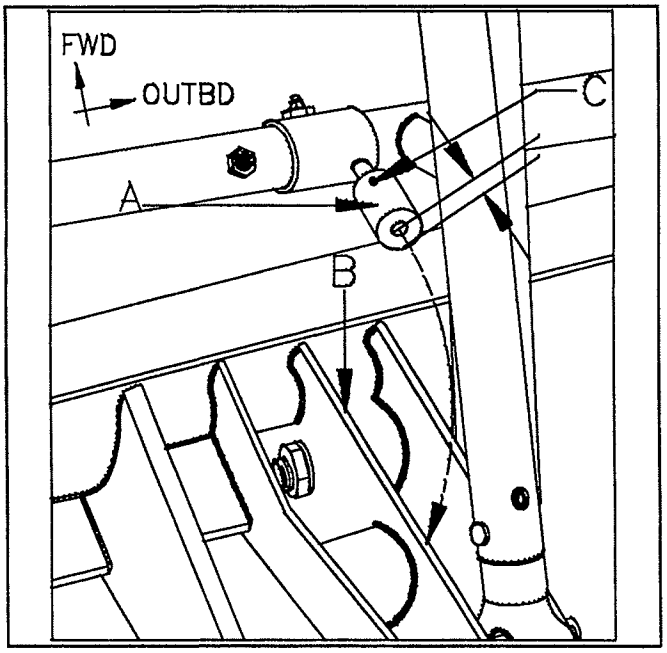
** Use .063 longer screws with each additional shim. (Secure screw with Blue Locktite #83-31 grade C).



MECHANICAL DOWN STOP FIGURE 32 - 7

- MECHANICAL UP STOP -

With gear fully retracted, adjust stop for .050 - .070 clearance between up stop (A) and retracting truss (B), then tighten set screw (C). (**Figure 32-8**)



MECHANICAL UP STOP FIGURE 32 - 8

NOTE

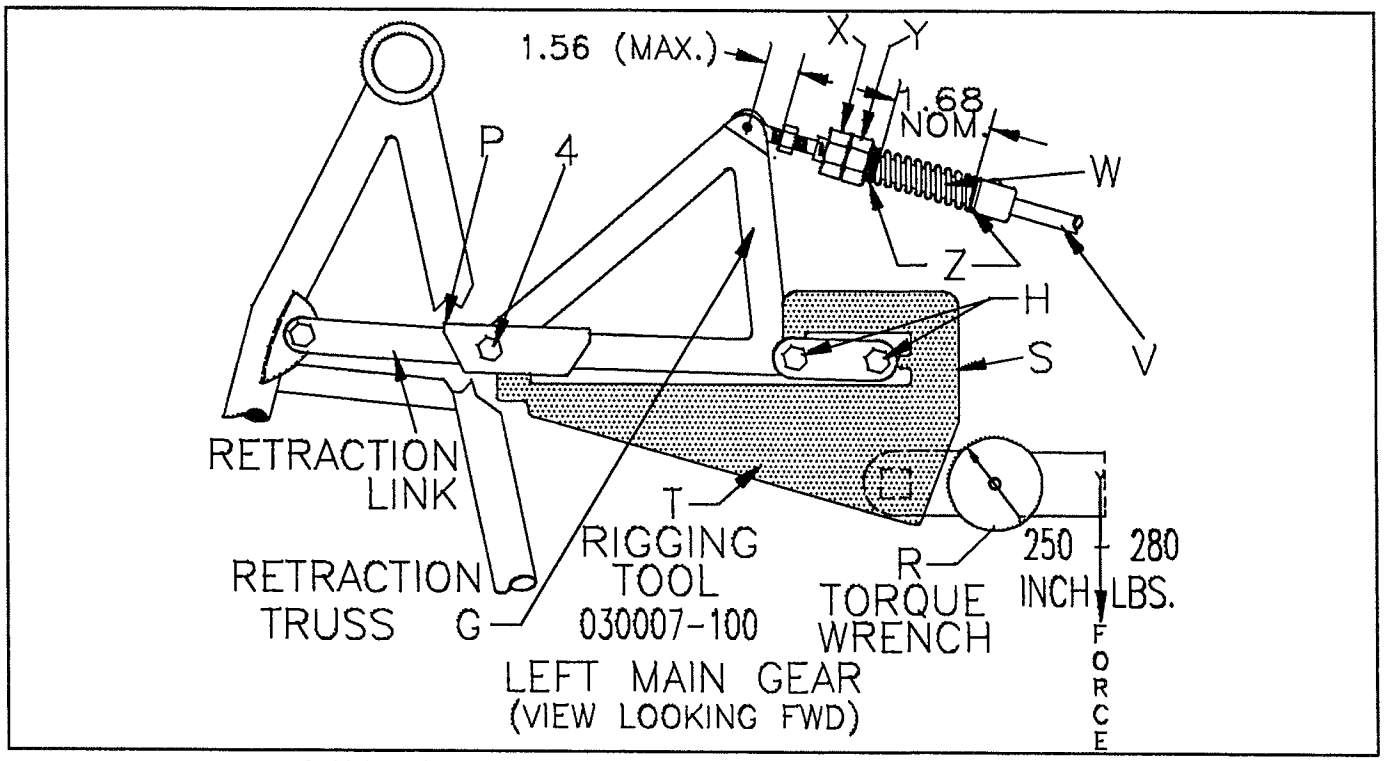
The main gear preload torque should not exceed 325 inch lb. (using the torque wrench/shim stock procedure) after electrical extension.

(S/N 25-1000 thru 25-TBA)

1. Raise aircraft on jacks and remove one piece fiberglass belly access panel.

2. **Assist Bungee Assy. (560213-501) Removal.** Retract landing gear until rigging pin holes (B) (**Fig. 32-2C**) lines up on bungee assy. and insert 3/16 in. pin. CAREFULLY BUMP the gear UP with the gear safety bypass switch until there is zero load on bungee assembly rod end at retraction bellcrank. Remove AN3 bolt and hardware at rod end and AN4 bolt/hardware at block and remove bungee assy.

3. Pull landing gear actuator circuit breaker OUT.



MAIN GEAR RIGGING TOOL APPLICATION FIGURE 32 - 9

4. Loosen jam nuts (E) on the main retraction tubes (L), **Fig.32-5**; disconnect tubes at inboard bellcranks (M).

5. In nose gear well loosen jam nuts (G), **Fig.32-4**, on nose gear retraction tubes (F), **Fig.32-3 and 32-4**.

6. At main retraction bellcrank (A), **Fig.32-10**, disconnect actuator barrel nut at (N), and nose gear retraction tubes (F).

7. On Avionics Products Actuator, verify dimension from rod end center to end of barrel nut housing on actuator; it should be 1.25 +.000/-.010. Adjust rod end bearing if necessary and secure with set screw and jam nut. Plessey Actuators are not adjustable.

8. Disconnect nose gear doors, outboard main gear doors, and inboard door links. On outboard main gear doors disconnect springs. On inboard door bellcranks, disconnect springs. Loosen jamb nut (X) on retraction tube (V) (**Fig.32-9**) and back off pressure on spring by loosening nut (Y). Disconnect retraction tube (V) from bellcrank (C) (**Fig. 32-2B**).

9. Position main retraction bellcrank (A) (**Fig.32-10**) so center of forward hole in left outboard arm of bellcrank is 1.56*** inches from forward face of fuselage truss at F.S. 33 (**Fig.32-10**, detail A).

NOTE

This dimension * may vary to permit connection of the retraction tubes with zero preload at bolt hole.**

10. With main retract bellcrank held in position, turn actuator barrel nut until rod end bearing aligns with hole in bellcrank; install connection bolt at (N), **Fig. 32-10**.

11. Position bellcrank (C) (**Fig. 32-2B**), so center of attach pin (D) on top leg is 1.35 inches from bottom side of spar cap (E). This will be the starting position when landing gear is in down and locked over center, with out any preload set.

12. Adjust retraction tube (V) (**Fig. 32-9**), at rod end, until it will connect to bellcrank (C) (**Fig. 32-2B**) with zero preload. Install connection bolt/hardware, leave loose.

13. Adjust rod end on retraction tube (L) (**Fig. 32-5**) so attach hole is aligned with inboard bellcrank at (M). Install connection bolt/hardware.

14. Disconnect retraction tube (V) at bellcrank (C) rod end; position disconnected gear full down and locked over center. **Both LH and RH landing gear should be in this configuration at this time.**

15. PUSH landing gear actuator C/B - IN.

16. Turn MASTER Switch - ON.

17. Extend main gear actuator to fully extended position. Make certain lugs on main retract bell crank do not contact fuselage tubes, floorboard or actuator barrel nut. If there is any contact, run actuator back up slightly.

18. There should be .050 to .100 inch clearance (B) obtained between actuator barrel (C) (**Fig.32-7**) and mechanical down stop (A). Shims (D) (**Fig. 32-7**) may be added to the mechanical downstop (A) (4 max).

19. Run actuator down and recheck retraction bellcrank clearance at F.S. 33.. Check clearance of bellcranks (M) (**Fig.32-5**) and center section.

20. Reconnect retraction tubes (V) (**Fig 32-9**). With main gear fully extended, if necessary, adjust main gear retraction tubes (L) (**Fig.32-5**) so they are connected with zero preload.

21. Adjust nut (Y) of retraction tube (V) (**Fig. 32-9**) until main gear is preloaded. Preload is correct when a "clean break" can be felt when pushing UP on retraction link (**Fig. 32-9**).

22. NOSE GEAR RETRACTION TUBES ARE TO REMAIN DISCONNECTED at main retraction bellcrank (A), **Fig.32-10**, during remainder of procedures.

23. Place landing gear switch in UP position.

24. PUSH RED gear safety by-pass switch IN intermittently to "BUMP UP" (retract) landing gear until left main tire just contacts bumper bracket which covers bulb stringer in wheel well. Make certain actuator barrel does not contact main retract bellcrank in the UP position.

25. Set UP limit switch paddle (striker arm) (H), **Fig.32-5**, so GEAR UP limit switch is just CLOSED and RED "GEAR UNSAFE" light is OFF. Secure striker arm in position.

26. Loosen set screw (C) **Fig. 32-8**. Adjust mechanical up-stop (A),**Fig. 32-8**, for a clearance of .050 to .070 inches at main retraction truss (B); tighten set screw (C).

27. Reinstall assist bungee per Section 32-10-06.

28. Using emergency gear extension, move gear down until GREEN gear down light **JUST** illuminates.

29. Turn Master switch OFF.

NOTE

The left main gear truss will probably lock over center first. Continue to slowly lower gear manually while monitoring comression of bungee spring on retraction tubes (V) Fig. 32-9. If spring coils are fully compressed, retract tube (V) must be removed from aircraft for modification: Dismantle bungee portion of tube (V); remove one space washer (Z) and reassemble. Re-install modified retraction tube and complete above overcenter requirement. The removal or addition of spacer washers may be required prior to obtaining final configuration for the retraction tube (V).

30. Place rigging tool (T) (**Fig.32-9**) P/N 030007-100 on retraction truss assembly (G). Hold tool stationary by pushing at point (S) toward main gear leg.

31. Place 10 inch torque wrench (R) on rigging tool (T) as shown in **Fig.32-9** and apply an unlocking force to retraction truss.

32. When joint at (4) breaks open slightly, insert shim stock (.005 to .008 in. thickness) between retraction link and truss at (P), then release force on torque wrench.

33. While applying a pulling force on the shim stock, exert an increasing unlocking force with torque wrench.

34. Read torque wrench value at the EXACT moment shim stock pulls loose.
35. Repeat steps 30 through 34 on other main landing gear leg.
36. Use adjusting nuts (Y) on retract tubes (V) to equalize breakaway torque values within 10.0 inch lbs. Adjust torque to 250 to 280 inch lbs.
37. Turn Master Switch ON.
38. RUN GEAR DOWN ELECTRICALLY AND CHECK THAT TORQUE VALUES DO NOT EXCEED 325 INCH POUNDS USING TORQUE WRENCH/SHIM STOCK METHOD.

LANDING GEAR WARNING ADJUSTMENT

1. Check that landing gear warning light circuit breaker is pushed IN.
2. Check that landing gear actuator circuit breaker is pulled OUT.
3. Turn Master switch - **ON**.
4. Set DOWN limit switch striker arm (J), **(Fig. 32-5)**, so gear down limit switch is just CLOSED and the GREEN GEAR DOWN light is ON. Secure striker arm in position.
5. Turn Master Switch - **OFF**.

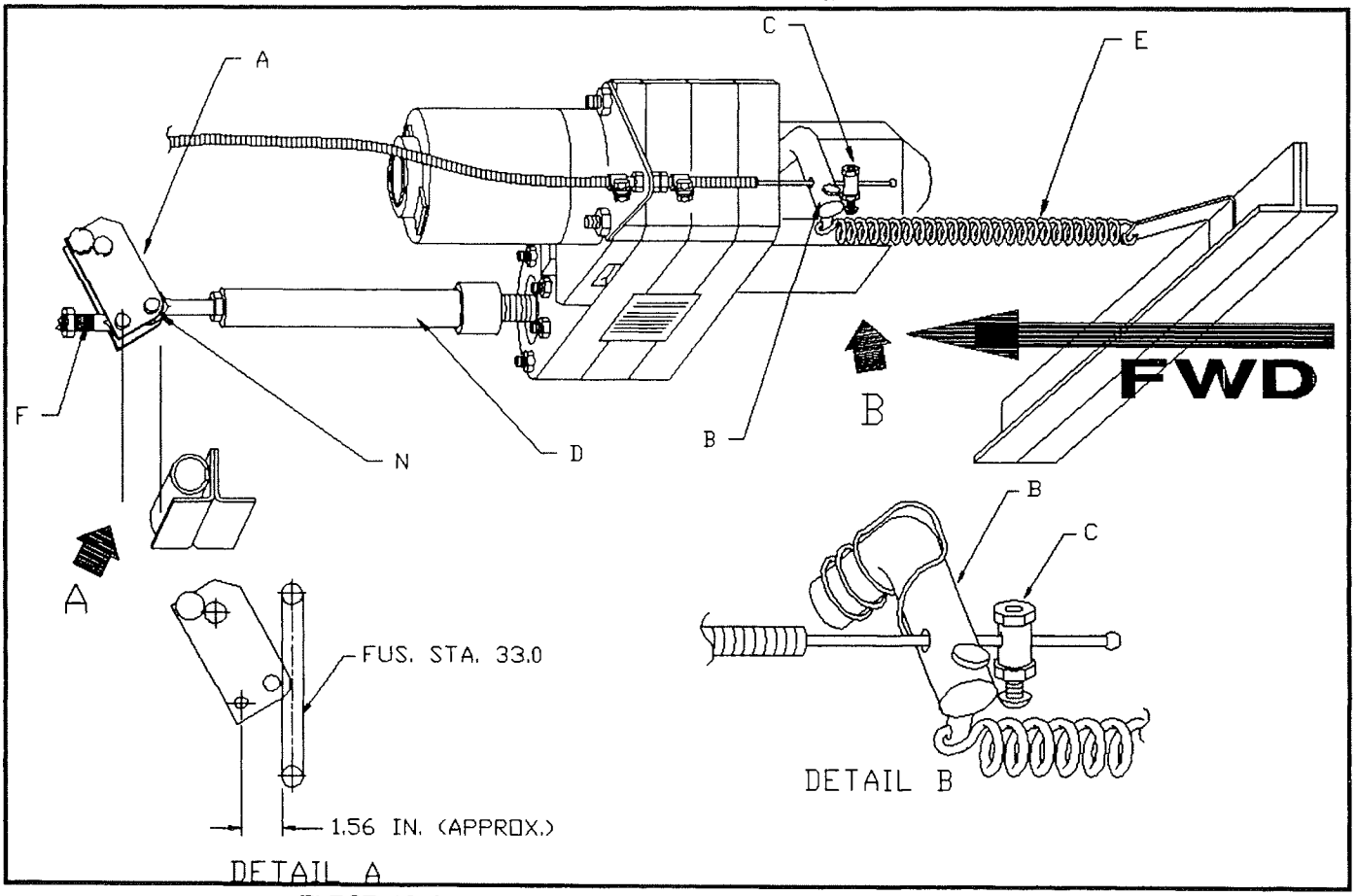
The main landing gear system is now rigged for the gear down and locked condition.

32-30-03 - NOSE LANDING GEAR RIGGING PROCEDURE (25-1000 thru 25-TBA)

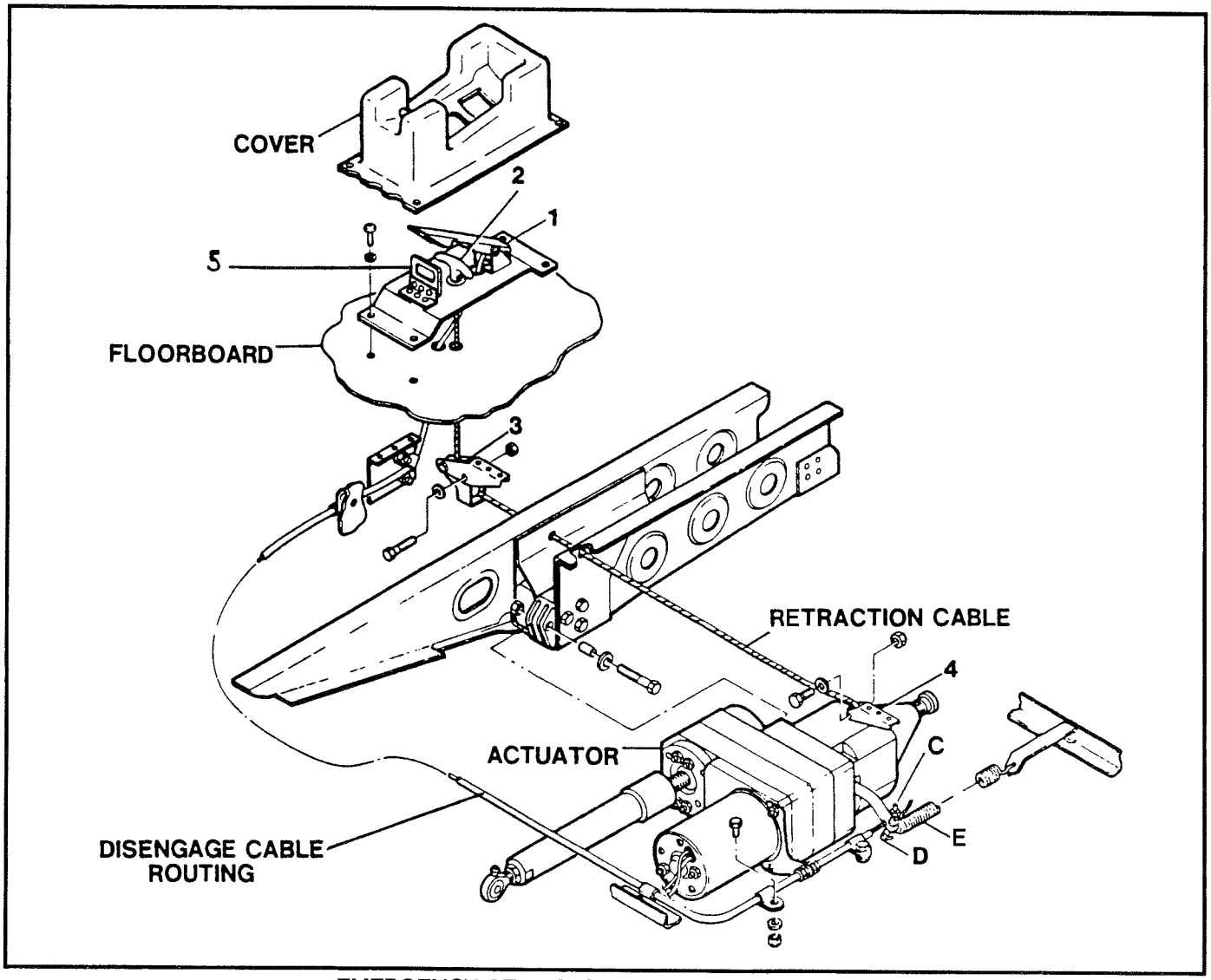
1. Check eccentric bushings (J), **Fig.32-4**, on gear truss assy. to be installed with bolt hole in upper forward position.
2. Adjust nose gear retraction tubes (F), **Fig. 32-3**, so they can be reconnected to main retraction bellcrank with zero preload.

NOTE
The eccentric bushings may require rotation to a new position in order to meet zero preload condition.

3. Measure nose gear bungees dimension (P), **Fig. 32-6**, and record for future reference.
4. Push landing gear actuator C/B - IN .
5. Place landing gear switch in UP position.
6. Turn Master Switch - ON.
7. Push RED GEAR SAFETY BYPASS SWITCH - IN; hold it IN to partially retract the landing gear; release switch.
8. Turn Master switch - OFF.
9. Pull landing gear actuator C/B - OUT.
10. Screw each nose gear retraction tube (F) **(Fig.32-3)** - IN (clockwise looking toward front of the aircraft) one (1) full turn, then re-attach to main retraction bellcrank.



ELECTRIC GEAR ACTUATOR ADJUSTMENTS FIGURE 32 - 10



EMERGENCY GEAR SYSTEM FIGURE 32 - 11

11. Place landing gear switch in DOWN position.

12. Push latch (5),**Fig. 32-11**, FORWARD on manual emergency controls (on floorboard).

13. Pull RED lever (1),**Fig. 32-11**, back and upward to engage manual emergency gear extension system.

14. Pull "T" handle (2) up (slowly until engaged) and return it to its original position. Continue this procedure, stopping when gear down light JUST illuminates.

15. Measure nose gear bungee assemblies dimension "P", as shown in **Fig. 32-6**. If springs have deflected less than .030 inches or more than .070 inches from the static dimension (as recorded in Step 2), adjust length of bungee assembly's to bring deflection within tolerance.

32-30-04 - EMERGENCY GEAR EXTENSION SYSTEM RIGGING.

Disengage rigging:

1. Insert cable thru hole in actuator disengage arm, (B) (**Figure 32-10**).

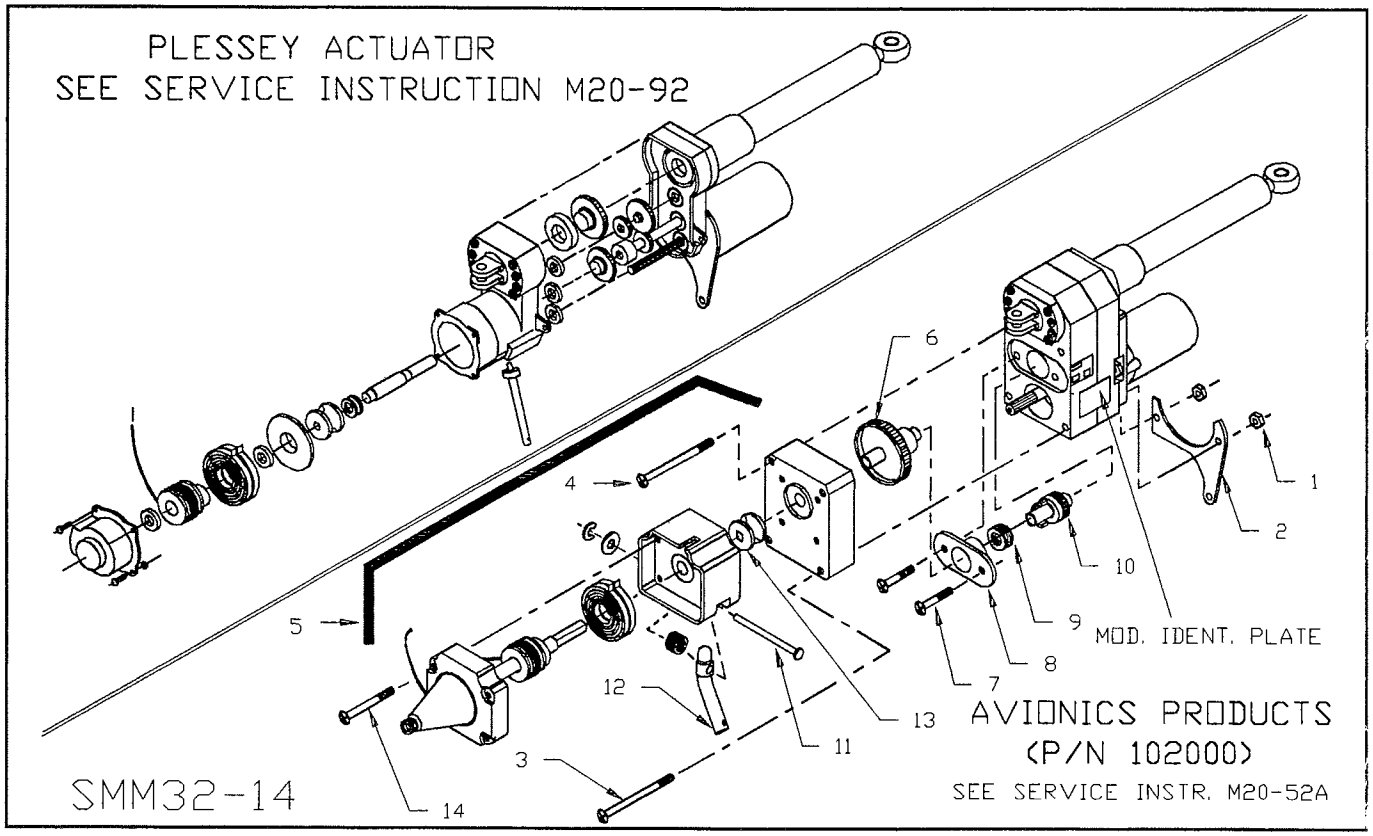
2. With RED lever (1) (**Fig. 32-11**) in full disengaged position (down and latched) push actuator disengage arm (B) (**Fig.32-10**) to full forward position and apply approximately 5 lbs. pull to cable to remove slack.

3. Install D222 wire stop, (C) tighten nut and connect spring (E) to clevis pin, (D).

4. Lift RED lever and pull "T" handle (2) (**Fig. 32-11**) aside; re-engage RED lever. Check manual extension system to verify that it is fully disengaged by pulling "T" handle; no resistance should be felt. Check cable routing through pulleys 3 and 4 (**Fig. 32-11**) if a resistance is felt to verify if it is cable routing or actuator resistance.

5. Move red lever to full UP position; pull "T" handle slowly to verify manual extension system is engaged. Resistance should be felt at once.

6. Replace "T" handle under RED lever and return RED lever to disengage position, (down and latched). Manual extension system is now rigged.



LDG ACTUATOR -- EXPLODED VIEW FIGURE 32 - 12

NOTE

Plessey actuators should be lubricated every 2000 cycles with MIL-G- 81322 grease. Run actuator to mechanical extended position. Fill tube cavity with grease thru MS15001-1 grease fitting until old grease is purged from screw assembly; remove old grease from and relubricate exposed screw threads. Run actuator to approximately 0.5 in. of mechanical retract and remove major excess grease extruded from the ball nut assembly.

SEE MOONEY SERVICE INSTRUCTION M20-92 FOR REPLACEMENT OF CLUTCH SPRING IN PLESSEY ACTUATOR.

32-30-05 - LANDING GEAR ACTUATOR, P/N 102000, CLUTCH SPRING REPLACEMENT, —KIT # A10-85.

Landing gear actuator clutch spring replacement is mandatory at each 1000 hours of aircraft operation. (Reference S.I. M20-52 for Avionics Products actuator.)

DISASSEMBLY (AVIONICS PRODUCTS)

1. Remove two nuts, item 1. Note position of cable support bracket, item 2, and remove **(Figure 32-12)**.

2. Remove manual extension system disengage cable from actuator disengage arm.

3. Remove two long screws, item 3.

4. Remove two short screws, item 4.

5. Remove recoiler assembly, item 5.

6. Remove gear assembly, item 6, from clutch housing, item 8, by rotating gear and pulling with slight to moderate pressure.

7. Remove two screws, item 7, and remove housing, item 8, clutch spring, item 9, and gear assembly, item 10 from actuator body.

8. Remove clutch spring, item 9, from housing using gear assembly, item 6, as removal tool. Insert, item 6, into spring from flanged end of housing; rotate CCW and pull slightly.

CAUTION

Use extreme care to prevent ball bearing from dropping out of recoiler assembly, avoid damage to gear and do not allow dirt to enter clutch housing bore.

After disassembly, clean clutch gear thoroughly. Discard removed screws (3) & (4).

9. See 32-30-06 procedure prior to reassembly if additional maintenance is necessary.

ASSEMBLY (AVIONICS PRODUCTS)

1. Lubricate gear and new clutch spring thoroughly with lube (MIL-G-81322) poly-lube.

2. Using gear to rotate spring, insert clutch spring into bore until fully seated.

NOTE
Be sure spring is all the way in and seated around cam.

3. Reinstall recoiler assembly; make sure to fully seat gear, bearing, and gear tang into manual drive slot of recoiler assembly.

4. Apply Loctite Grade A (Catalog Number 88-31, not supplied in kit) to four new screws supplied and install; take care to use the two longest screws in bottom holes of item 5.

NOTE
Torque to approximately 10 - 12 inch pounds.

5. Reinstall cable support bracket and retaining nuts.

6. Retest unit for proper electrical and mechanical operation.

7. Install modification plate adjacent to I.D. plate (first 1000 hours only). Mark first block of modification plate with the figure "1" using metal stamp or etching tool. Mark plate at each succeeding clutch spring replacement with the next consecutive number.

32-30-06 - LANDING GEAR ACTUATOR, P/N 102000-1, RECOILER SPRINGS/CABLE AND DRUM ASSEMBLY REPLACEMENT

1. Carefully separate pulley housing from recoiler assembly (5) by removing screws (14). Retain pulley on shaft.

2. Slide pulley drum and cable off shaft.

3. Remove two (2) recoiler springs, and two (2) of three (3) spring spacers leaving the third spacer in housing. Be certain that spacer is in place before installation of two (2) new recoiler springs and previously removed spacers.

4. Install new recoiler springs placing a spacer between each spring and over top spring. IMPORTANT - Recheck proper installation of springs.

NOTE
When looking at recoiler assembly with pulley shaft end toward you, the spring tabs in housing slot should curve to the right as shown (Figure 32-12).

5. Inspect cable for sheathing damage. Replace cable if sheathing is cut or stripped. Measure overall cable length prior to reassembly. Cable length should be 31 1/2" +/- 1/2" long.

6. Slide drum onto shaft; be certain that spring detent on drum engages both recoiler springs by slightly rocking drum end.

7. When full engagement is obtained, wrap cable around drum in a clockwise direction-leaving 2" to 5" of cable free of drum.

8. Align slot in pulley housing with cable and slide pulley housing over cable and drum assembly.

9. Holding housings together, pull properly aligned cable several times to ensure absence of binding conditions. Measure cable length from side of housing. At full extend, length of cable should be 29" minimum. In retracted position, cable length should be 5" to 8" long.

NOTE
Cable length in retract position may be adjusted shorter or longer by holding clutch with finger of one hand (to prevent shaft rotation), and then with the other hand, rotating pulley housing one (1) full turn CW (to shorten) or CCW (to lengthen). Retention of clutch with finger will not allow pretensioning of springs. Slight spring tension should be noted starting at 8" to 10".

10. Bronze clutch (13) should be inspected for damage or wear at slot where gear assemble engages during manual extension of landing gear.

11. If damaged or worn, remove pin (11) from disengage arm (12) and slide disengage arm out so bronze clutch (13) can be pulled from its driveshaft.

12. Replace bronze clutch and reassemble disengage arm into recoiler assembly.

13. Attach clutch recoiler assembly to actuator gear housing with four (4) screws removed in 32-30-05 (supplied in clutch spring kit).

32-30-07 - MANUAL EMERGENCY GEAR EXTENSION SYSTEM

The manual emergency gear extension system is used to extend the gear only. The controls are on the floorboard aft and between front seats. To manually extend the gear:

1. Pull landing gear actuator C/B.

2. Move landing gear control switch to DOWN position.

3. Push latch forward with right thumb.

4. Pull lever back and upward (engaging manual extension system).

5. Pull "T" handle UP (slowly to engage gears); return to original position; continue cycle until GREEN gear-down indicator light is illuminated and/or the lines on the visual gear position indicator on floorboard aft of console are aligned when viewed from directly above the indicator (this will normally take 12 to 20 pulls).

CAUTION
DO NOT operate landing gear electrically with manual extension system engaged.

CAUTION
DO NOT continue to pull T-Handle after GEAR DOWN light is ON. Actuator barrel nut may bind on Down Stops.

32-30-08 - FINAL CHECKS - 25-1000 thru 25-TBA

1. Raise and lower landing gear through five complete cycles, pausing after each cycle to check required tolerances and dimensions, and annunciator light indications. Make certain that no bungee springs are compressed to solid height and that nose gear tire clears top of wheel well a minimum of .25 in. when landing gear is retracted. Make adjustments per above procedures, as required, to correct any deficiencies.

2. Retorque all jam nuts.

3. Re-attach main and nose landing gear door links. Check to see that main and nose landing gear doors are still rigged per paragraph 32-10-04 and 32-20-03.

32-32-00 - TROUBLE SHOOTING - LANDING GEAR SYSTEM

TROUBLE	PROBABLE CAUSE	REMEDY
Incomplete retraction. Gear retracts to an intermediate position and stops short.	Bind in gear retraction system because gear is out of rig. Malfunction in gear electrical circuit, inoperative actuating motor, or weak battery.	Refer to landing gear rigging procedure. Examine all movable parts for proper lubrication and freedom from binding. Check for actuator worm gear binding and lubricate as needed. Any malfunction can cause the landing gear circuit breaker to trip: therefore check electric circuit for loose connection, broken wires or defective relay switches. Recharge battery if necessary.
	Oversized/Stretched tire will not go into wheelwell properly.	Replace tire with smaller diameter tire.
Gear will not retract at 70 to 80 MPH IAS.	Insufficient airspeed, pressure switch inoperative, circuit breaker tripped or actuator ball nut binding on mechanical DOWN STOPS.	Check pitot tube and line for obstructions. Examine pressure switch for proper adjustment and operation. Reset circuit breaker. Does gear retract using override - check system operation. Gear may have been extended manually & ball nut is jammed tight against STOPS on motor; use wrench on ballnut flat & move ballnut off STOPS.
Gear will not retract and gear act. C/B trips.	Manual engage handle in engaged position.	Disengage manual system.
Aircraft does not track or steer properly.	Nose wheel location improper.	See Section 32-50-02.
Gear will extend; green indicator-light (press-to-test) will not illuminate.	Lamp burned out in green indicator-light circuit. Down-limit switch is inoperative.	Replace burned out lamp. Check indicator-light circuit and/or down-limit switch.
Actuating motor extends gear to an intermediate position.	Same causes as listed with "Incomplete Retraction" above.	Same remedies as listed with "Incomplete Retraction" above.
Gear will extend manually, but green indicator light will not illuminate.	Gear switch is not in DOWN position. Lamp burned out in green indicator light.	Place gear switch in DOWN position. Replace burned out lamp.
Manual system will not lower gear.	Actuator internal clutch spring broken.	Replace spring.
	Manual engage arm improperly rigged.	Rig manual engage arm properly.

32-40-00 - WHEELS AND BRAKES

32-40-01 - MAIN WHEELS

The main wheels are standard brand, 6:00 x 6, six-ply rated tires with standard tubes.

To remove main wheels from aircraft:

1. Remove either IB or MID gear door.

A. Detach dust shield. Remove three screws and washers.

B. Remove 2 bolts from brake caliper.

C. Remove wheel by removing cotter key and nut from axle. (See **Figure 32-13.**)

D. Slide wheel off axle.

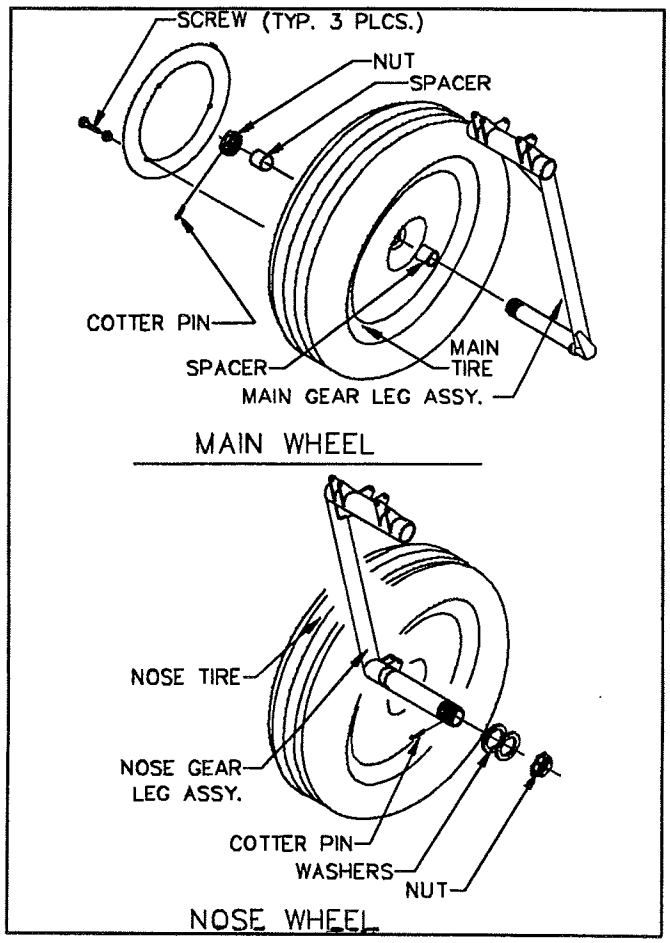
32-40-02 MAIN WHEEL DISASSEMBLY/ ASSEMBLY

1. Remove snap ring, (10) grease seal rings, (8) and felt seals (9), (See **Figure 32-14**).

2. Remove bearings (7).

3. Completely deflate tire.

WARNING
Do not loosen wheel half retaining nuts before tire is completely deflated. Failure to observe this warning may result in bodily injury.



LANDING GEAR WHEEL REMOVAL FIGURE 32 - 13

4. Remove nuts, washers, and wheel half retaining bolts, (5); separate halves, (3, 4) and remove tire and tube.

NOTE
Bearing cups are shrink fitted; do not remove them unless necessary for replacement.

5. Clean all wheel parts thoroughly in cleaning fluid (Federal Specification PS-661). Exercise special care in cleaning bearing cones and felt rings to insure thorough cleaning.

6. Inspect all parts for cracks, corrosion, or evidence or wear.

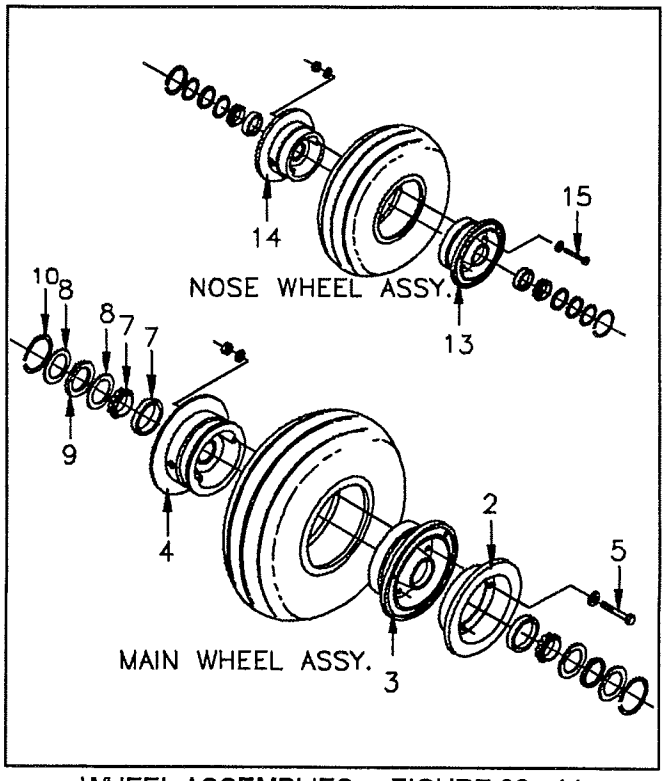
7. Inspect bearing cups and replace if cups are damaged or worn. If necessary to remove bearing cups, heat wheel in boiling water for at least 30 minutes. Remove cup by tapping evenly.
To install cup, heat wheel half again and then cool cup with dry ice. Position cup and tap lightly to insure proper seating.

8. Polish small burrs or nicks out of wheel halves with No. 400 grit sandpaper, clean thoroughly, and refinish protective coating as required.

9. Replace bearing cones that show signs of wear or bearing fretting.

10. Repack wheel bearings and lubricate seals with grease. Install bearings, grease seal rings, and felt seals in wheel halves. Secure with snap rings.

CAUTION
Spacer required to position brake disc .12 inches away from MLG leg assy. Refer to Figure 32-13.



WHEEL ASSEMBLIES FIGURE 32 - 14

11. Position tire & tube on one wheel half; then position other wheel half in tire.

12. Install brake disc (2), **Fig.32-14**, and wheel half retaining bolts, washers and nuts.

13. Tighten nuts evenly and torque to 150 inch pounds.

CAUTION
Uneven or improper torque may cause bolt or wheel failure.

14. Inflate tire to 42 PSI.

15. Install wheel assembly, washer, and axle nut. Tighten axle nut until bearing binds slightly, back nut off to nearest castellation, and install cotter pin.

NOTE
When properly installed, wheel will turn with a slight resistance.

16. Install dust shield and IB/MID gear door.

17. Reinstall brake caliper & safety.

NOTE
When ANY tire and/or wheel assembly is removed or replaced and re-installed, conduct at least 5 complete retraction/extension cycles to verify tires enter and exit wheelwells without interference. [Ref. AC 43.13-1( ), Chap.8, para. 332, a, (9)]

18. Remove aircraft from jacks.

32-40-03 - NOSE WHEEL DISASSEMBLY/ASSEMBLY

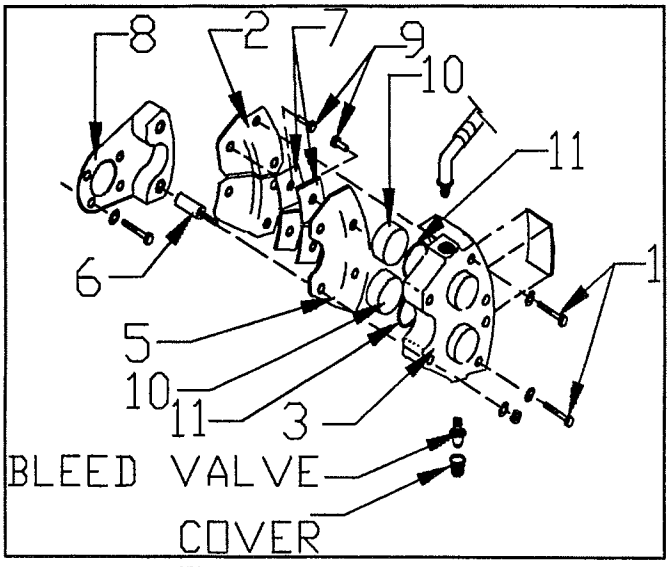
The nose wheel tire is a standard brand, 5:00 x 5, six-ply rated tire with standard tubes.

1. Nose wheel removal.

A. Remove cotter key, nut, and washer from axle. (**Figure 32-13**).

B. Remove nose wheel.

2. Installation is in reverse sequence of removal.



BRAKE ASSEMBLY FIGURE 32 - 15

3. Nose wheel disassembly.

A. Completely deflate tire by removing valve core.

B. Remove nuts, washers, and wheel half retaining bolts (15), **Fig. 32-14**.

C. Separate wheel halves, (13 and 14) and remove tire and tube. Refer to Section 32-40-02 steps 5 thru 10 for wheel inspection.

D. Reassemble nose wheel in reverse sequence of dissassembly. Tighten wheel half retaining bolt nuts evenly and torque to 90 inch-pounds. Inflate tire to 49 PSI.

NOTE
When ANY tire and/or wheel assembly is removed or replaced and re-installed, conduct at least 5 complete retraction/extension cycles to verify tires enter and exit wheelwells without interference. [Ref. AC 43.13-1( ), Chap.8, para. 332, a, (9)]

32-40-04 - BRAKE SYSTEM

1. BRAKE REMOVAL AND INSTALLATION

Lining inspection and/or replacement or cylinder repair.

A. Place aircraft on jacks.

B. Remove inboard/mid gear doors. Remove safety wire and two AN4H17A bolts (1) attaching back lining plate assembly (2) to brake cylinder assembly (**Figure 32-15**).

C. Visually inspect linings for wear and brake disc for warpage. Brake linings should be replaced when they are wom to a minimum thickness of 1/8 inch. If lining replacement is necessary proceed with steps D thru O. Otherwise reassemble in reverse sequence of disassembly.

CAUTION
Brake disc should be replaced if width is .205 in. or less.

D. Disconnect and cap hydraulic line (4) at brake cylinder assembly. Remove nuts from anchor bolts.

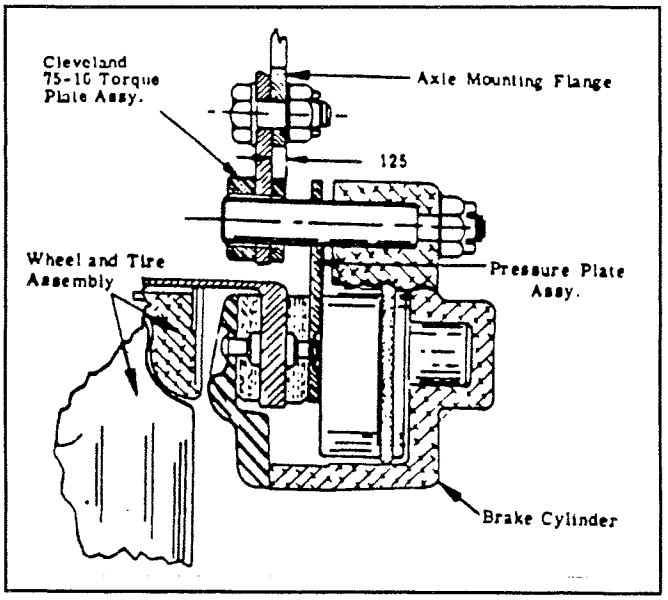
E. Remove pressure plate assembly (**Figure 32-15**) (5) sliding it off the anchor bolts (6). Note the condition of the anchor bolts. If they are nicked or gouged they should be sanded smooth to prevent binding with the pressure plate (5) or torque plate (8) . When anchor bolts are replaced they should be pressed out. New ones can be installed by tapping them in place with a soft hammer.

F. Drill out rivets (9) attaching linings (7) to back lining plate (2) and pressure plate (5). Remove piston assembly (10) and "O" ring (11). It is permissible to use compressed air applied to the brake line fitting to remove piston (10) from brake cylinder.

G. Clean parts in cleaning solvent (Federal Specification PS-661 or equivalent) and dry with oil-free compressed air.

H. Replace linings with Cleveland 66-30 linings using Cleveland #561-2 rivets. Rivets must be rolled to obtain proper fit between rivet shank and hole.

I. Inspect brake cylinder bore for scoring. A scored cylinder may cause "O" ring to leak or cause rapid



TORQUE PLATE ASSY-CORRECT RELATION TO BRAKE CYLINDER

wear of "O" ring. A scored brake cylinder should be replaced.

J. Replace AN6230-2 "O" ring (11) with a new one. Do not reuse old "O" ring.

K. Lubricate cylinder and piston with MIL-H-5606 red hydraulic fluid and assemble components with care to prevent damage to "O" ring.

FIGURE 32 - 16

L. Service and inspect main wheels as described in Section 32-40-02. Inspect torque plate assembly making sure the .125 thickness is toward brake cylinder assembly (outboard). If thicker .250 protrusion is outboard, remove torque plate from axle mounting flange and install as shown (**Figure 32-16**).

M. Reassembly brake cylinder assembly and back lining plate assembly onto the airplane in the reverse sequence of disassembly.

N. Bleed hydraulic system as described in Section 12-20-05.

O. Remove aircraft from jacks.

2. BRAKE PAD CONDITIONING (BREAK IN) PROCEDURES.

NOTE

Brake pad conditioning is required to properly cure the resins binding the asbestos lining composition together. Excessive heat created prior to conditioning will carburize the lining material and prevent the attainment of maximum braking coefficient.

Proper conditioning may be accomplished as follows:

A. Perform a minimum of six (6) light pedal effort braking applications and two (2) hard stops from 25 to 40 MPH (21 to 35 KIAS). Allow the brake discs to partially cool between stops.

The procedure will generate sufficient heat to cure resins in the lining, but will not cause the material to become carburized due to excessive heat.

3. MASTER CYLINDER - REMOVAL, DISASSEMBLY and REASSEMBLY

A. Remove left hand exhaust cavity.

B. Disconnect hydraulic cylinder from pedal linkage.

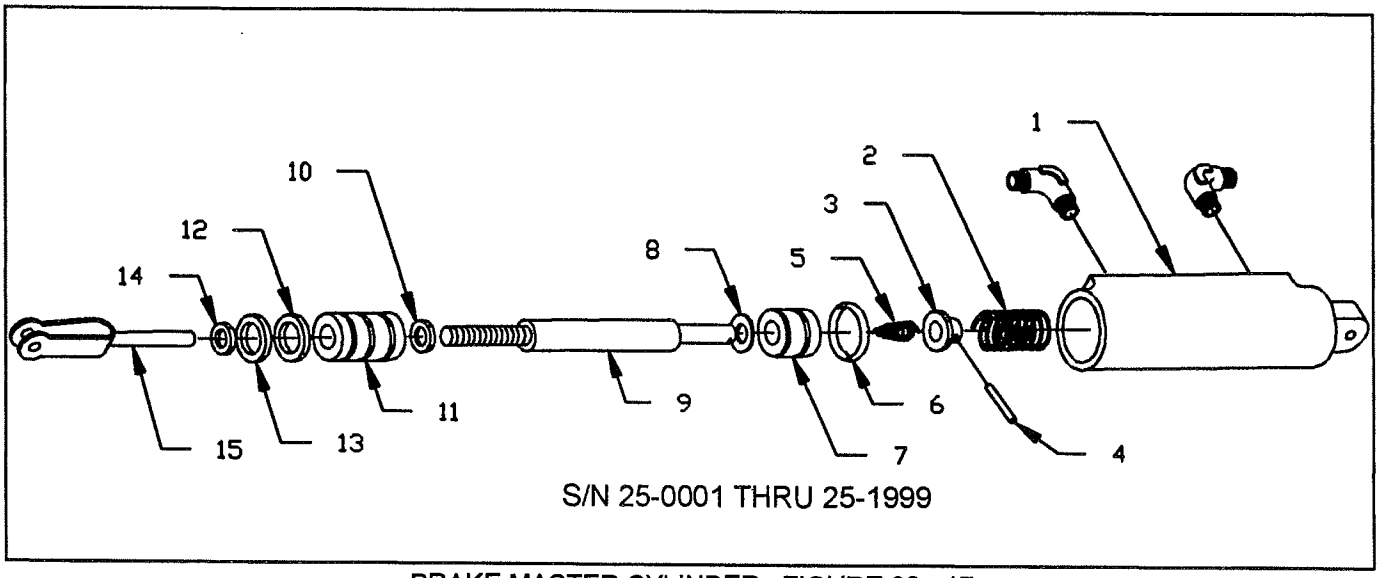
C. Disconnect and cap hydraulic lines.

D. Disconnect hydraulic cylinder from bracket and remove cylinder.

(S/N 25-0001 THRU 25-1999)

To disassemble small fluid capacity master cylinder: (Gerdes or Parker-Hannifin) (**Figure 32-17**).

(1) Unscrew and remove rod end clevis (15) and nut from piston rod (9).



S/N 25-0001 THRU 25-1999

BRAKE MASTER CYLINDER FIGURE 32 - 17

(2) Remove snap ring (13) and lift out complete piston rod assembly, item 3 thru 12.

(3) Remove spacer (11) and O-ring packings, (10 and 12) from piston and assembly.

(4) Disassemble piston rod assembly by removing roll pin (4), (spring guide (3) will be pushed out by spring (5) when roll pin is removed), spring (5) and piston (7).

(5) Remove O-ring packing (6) from piston.

(6) Remove stat-o-seal (8) from piston rod.

(7) Clean all parts with cleaning solvent (Federal Specification No. PS-661).

(8) Inspect cylinder for cracks, scoring, or grooves in bore.

(9) Inspect piston (7) for damage, check for nicks and scratches

(10) Inspect valve for damage.

(11) Inspect push rod for scoring, grooves, nicks and scratches.

(12) Inspect piston return springs (2) for permanent set and proper length (3.670 in. min., 4.05 in. max.).

(13) Replace all faulty parts and all O-rings.

(14) Reassemble in reverse sequence of disassembly. Immerse all parts in hydraulic brake fluid prior to reassembly.

(S/N 25-2000 THRU 25-TBA)

These aircraft have large capacity Master Cylinders.

To disassemble large fluid capacity master cylinder: (Parker-Hannifin) (**Figure 32-17A**).

(1) Unscrew and remove rod end clevis (17), nut (16) and washers (14 & 15) from piston rod (12).

(2) Remove snap ring (11) from cylinder housing assembly; lift out complete piston rod assembly, (items 2 thru 12). Spring (13) can be removed at this time.

(3) Remove snap ring (2) from end of piston rod assembly.

(4) Remove bushing (3) and spring (4) from end of piston rod.

(5) Remove piston assembly (5) and O-ring (7) from piston assembly and O-ring (6) from piston rod shaft.

(6) Remove end cap (8) and O-rings (9 [ID]) & (7 [OD]) from end cap assembly.

(7) Clean all parts with cleaning solvent (Federal Specification No. PS-661).

(8) Inspect cylinder for cracks, scoring, or grooves in bore.

(9) Inspect piston (5) for damage, check for nicks and scratches.

(10) Inspect end cap (8) for damage.

(11) Inspect push rod for scoring, grooves, nicks and scratches.

(12) Inspect spring (4) for free height - .500 in. +/-.030.

(13) Replace all faulty parts and all O-rings.

(14) Reassemble in reverse sequence of disassembly. Immerse all parts in hydraulic brake fluid prior to reassembly.

(15) Check piston rod and return spring (13) for proper compression during stroke (9 lbs. @ bottom -- to 32 lbs. @ 3/4 stroke)

F. Reinstall master cylinder in reverse sequence of removal.

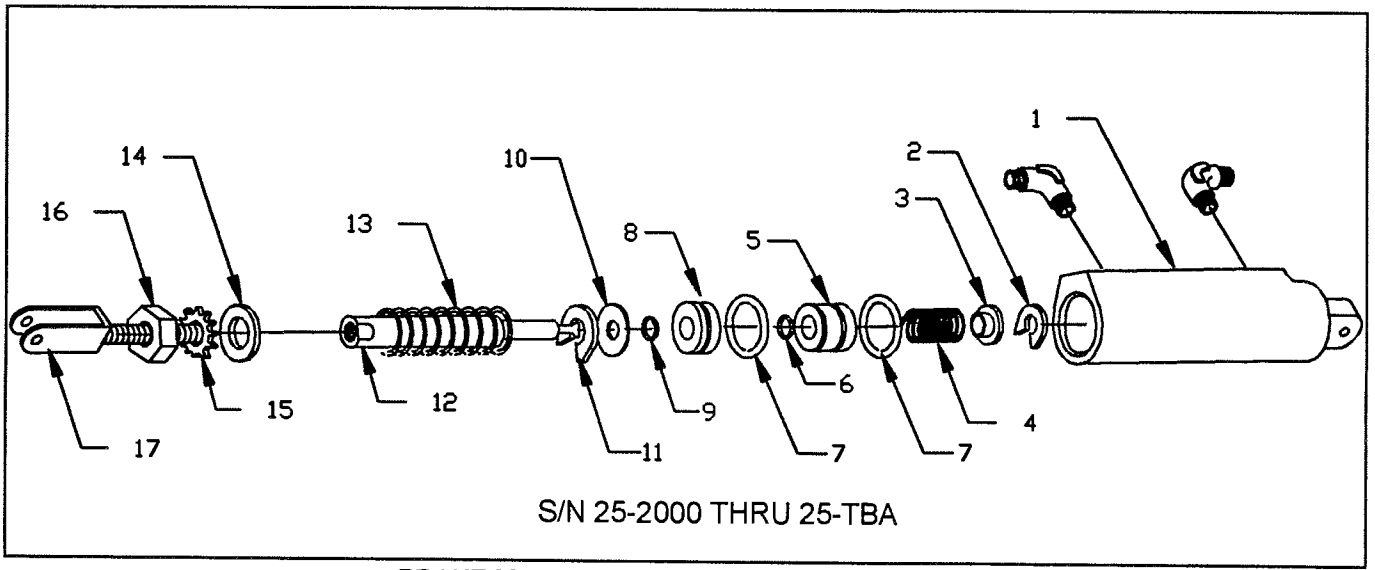
G. Bleed brake system (refer to Section 12-20-05).

4. **PARKING BRAKE VALVE**-REMOVAL, DISASSEMBLY and REASSEMBLY

- REMOVAL

A. Remove left hand exhaust cavity.

B. Disconnect parking brake control at parking brake valve arm.



S/N 25-2000 THRU 25-TBA

BRAKE MASTER CYLINDER FIGURE 32 - 17A

C. Disconnect and cap hydraulic lines.

D. Remove parking brake valve.

- DISASSEMBLY

Disassemble parking brake valve (Refer **Figure 32-18**).

A. Remove both fittings (1) from valve housing (7), springs (8) will come out with the fittings.

B. Remove poppet valves (2) and pins (3), from housing by bumping on table top.

C. Remove both fittings (4) from end of housing.

D. Remove snap ring (5) from end of camshaft assembly (6).

E. Carefully remove camshaft assembly (6) from housing.

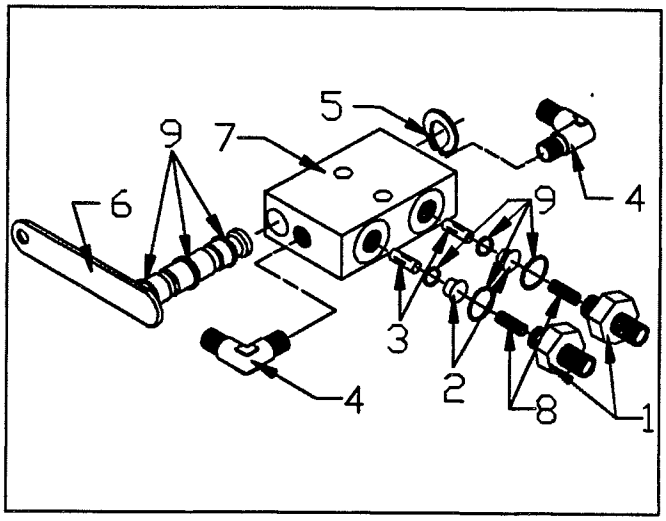
F. Inspect all components for damage, nicks, grooves, etc.

G. Clean all parts with cleaning solvent (Federal Specification No. PS-661).

H. Replace all O-rings (9).

- REASSEMBLY

A. Reassemble parking brake valve in reverse sequence of disassembly.



PARKING BRAKE VALVE FIGURE 32 -18

B. Connect valve assembly to hydraulic lines.

C. Bleed system and service hydraulic reservoir with hydraulic fluid as described in Section 12-20-05.

32-41-00 - TROUBLE SHOOTING - BRAKE SYSTEM

TROUBLE	PROBABLE CAUSE	REMEDY
Solid pedal and no brakes.	Brake lining worn beyond allowable limit.	Replace lining.
Spongy brake.	Air in system.	Bleed brake system.
Pressure will not hold.	Leak in brake system.	Visually check entire system for evidence of leaks.
Parking brake will not hold.	Air in system or leak in system (downstream of parking brake valve).	See remedies above.
	Defective parking brake valve.	Repair or replace the valve.
Brake grabs.	Warped or bent disc.	Replace disc.
	Foreign matter locking disc.	Clean disc and lining.
Brake pedal will not return to neutral position.	Master cylinder shaft or other linkage misaligned.	Check that shaft travels in straight line and not binding in linkage.

32-50-00 - STEERING

32-50-01 - NOSE GEAR STEERING SYSTEM

The nose gear steering system consists of a steering horn on gear leg linked to the rudder pedals by push-pull tubes and bellcranks. Gear retraction automatically disengages steering mechanism from nose wheel. (Section 27-20-00 outlines nose gear steering rigging.) A centering cam aligns nose wheel for entry into wheelwell.

NOTE

Check nose gear leg assy. for towing damage. Replace if any dent exceeds 1/32 inch (S/N 25-0001 thru 25-0823).

NOTE

Aircraft S/N 25-0824 & ON have twin limiter pads and adjustable stops (7),Fig. 32-19, installed on the nose gear leg assembly (A) that will prevent turning damage to leg assembly.

1. Every 100 hours remove cotter pin (1) (**Figure 32-19**) and retorque nut (2) to 450-500 inch lbs. Check holes in leg assembly where pivot bolt (3) is located for any wear. If holes are worn, replace leg assembly.

NOTE
Shock absorber (6) and related attaching hardware may be removed from all Mooney M20K aircraft if desired per Mooney drawing 940052.

CAUTION
Bolt, washer, nut (9) and (10) (Figure 32-19) must be installed as shown, from rear to front.

2. Rod end bearing (4) (**Figure 32-19**) should be inspected at least every 100 hours for any damage or bending.

3. Check steering horn assembly (5) collars and spacers for looseness. Replace any bushings or spacers that are worn.

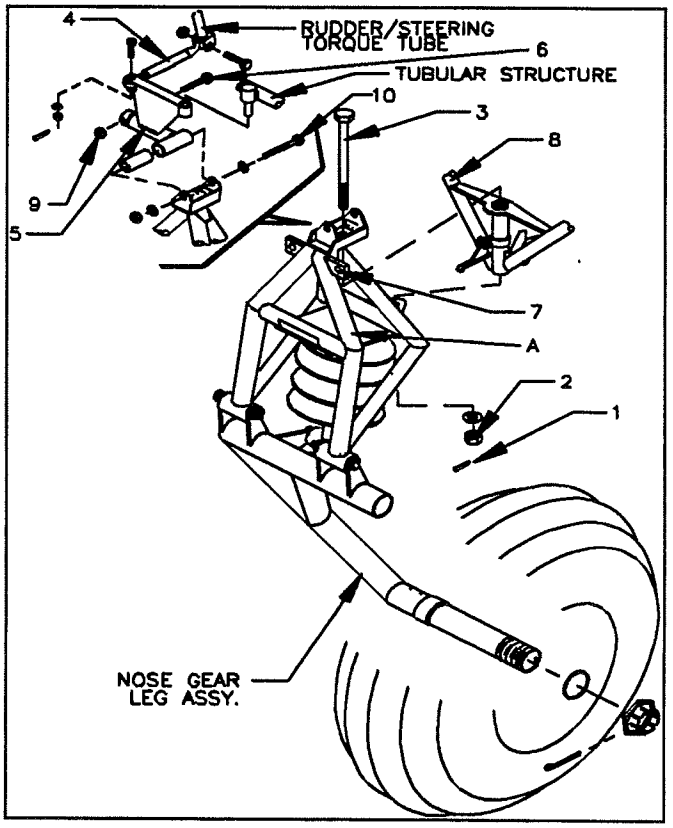
4. Adjust turn limiter stop bolts (7) to contact cross member (8) of truss assembly (.020 gap permissible) when rudder is at its extreme left and right travel position.

32-50-02 - NOSE GEAR STEERING AND TRACKING

1. Level aircraft as described in Chapter 5.

2. Center nose wheel.

3. Place plumb line over and forward of nose gear trunnion (see **Figure 32-20**) part number 540001-503.



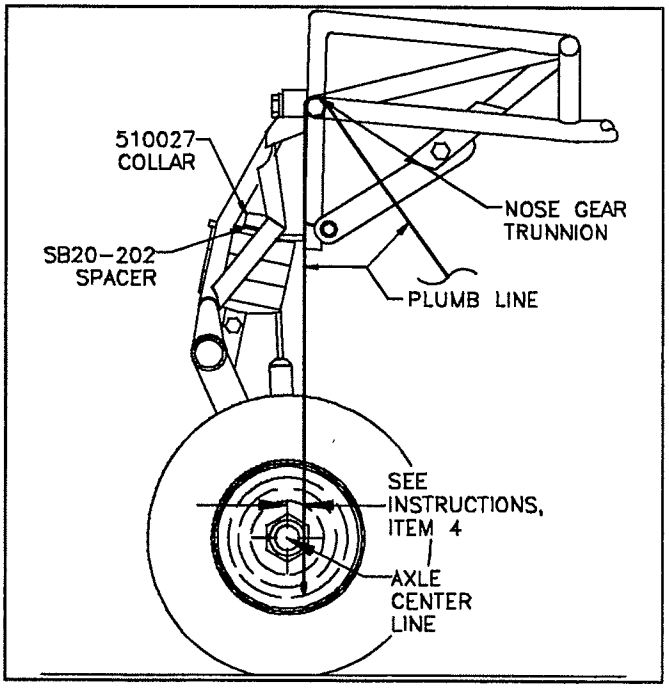
NOSE WHEEL STEERING FIGURE 32 - 19

4. Measure forward from aft edge of plumb line to axle center line. Modification relocating nose wheel should be accomplished if axle position, forward of plumb line, exceeds .06.

5. Add SB M20-202-3 spacer under collar to reposition the axle if required.

NOTE
Some collars have holes drilled off center and may be turned over to change axle position.

6. Run gear through up/down cycle. Check nose gear door and wheel well tire clearances. Re-rig if required.



NOSE WHEEL LOCATION FIGURE 32 - 20

32-60-00 - POSITION AND WARNING

32-60-01 - ELECTRIC GEAR SAFETY DEVICES

The gear switch operates the landing gear actuator relays. Pulling wheel-shaped knob out and moving it to upper detent raises gear. However, an airspeed safety switch, is incorporated in the electrical system to prevent landing gear retraction while on the ground. To allow gear retraction with aircraft on jacks; attach a 12-inch length of 3/8 inch pliable rubber hose (surgical tubing) over pitot head, and pinch open end with a larger cotter pin; roll tubing with cotter pin until compressed air within the twisted tube actuates airspeed pressure switch. Maintain pressure on switch until retraction is complete. To adjust airspeed switch refer to paragraph 32-60-03.

The up-limit switch will stop the gear in its retracted position. Moving control knob to its lower detent lowers landing gear. The down limit switch will stop gear actuating motor when proper force is exerted to hold landing gear in down-and-locked position. Refer to Section 32-30-02,7. for proper limit switch rigging. The gear down-and-locked position is indicated by:

1. Illumination of the GREEN gear down annunciator light. This "GEAR DN" annunciator light is dimmed when navigation lights are ON.

2. The warning horn will not sound with the throttle retarded below 1200 RPM (10 in. MP, S/N 25-0001 thru 25-0780) or (16 in. MP. S/N 25-0781 & ON).

3. The indicator marks will be aligned on the visual gear-position indicator.

CAUTION
When running gear up or down electrically DO NOT use circuit breaker as a switch.

Partial retraction or extension may be accomplished electrically as follows:

1. Place Master Switch in OFF position.

2. Move gear switch to GEAR UP or GEAR DOWN as desired.

3. Momentarily actuate master switch until gear is in desired position.

32-60-02 - LANDING GEAR WARNING SYSTEM

The landing gear warning system consists of:

1. Landing gear position lights: (GEAR DOWN-**WHITE** indicator light on floor and **GREEN** light on annunciator; GEAR IN TRANSIT - up or down - **RED** unsafe on annunciator; GEAR UP - **NO LIGHTS.**)

2. A warning horn in cabin is actuated by throttle control when gear control switch handle is up and throttle is less than 10 inches (25-0001 thru 25-0780) or 16 inches (25-0781 & ON) Manifold Pressure. Check warning horn for volume in flight periodically. Horn will sound if gear is not DOWN and LOCKED even if switch is in DOWN position or if airspeed is below 65 KIAS & gear switch is in UP position.

32-60-03 - AIRSPEED SAFETY SWITCH ADJUSTMENT

The airspeed safety switch, located inside cabin, is mounted behind airspeed indicator. The airspeed safety switch is incorporated into electrical system to prevent landing gear retraction while on the ground and at airspeeds below 75 +/- 5 MPH (65 +7/-4 KTS). Additionally the **RED** gear unsafe light comes on and warning horn sounds when gear control handle is placed in "GEAR UP" position below 75 +/- 5 MPH (65 +7/-4 KTS).

NOTE
Whitman-General switches can be adjusted using the following procedures:

1. Using a water manometer to measure pressure, gradually apply air pressure to inlet at cap.

2. Connect an ohmmeter between microswitch leads.

3. Gradually increase pressure to 2.775 inches of water until diaphram movement closes microswitch.

4. Slowly decrease pressure until microswitch opens.

5. Adjust knurled knob at rear of switch housing until switch closes at an increasing pressure of 2.775 + .384/- .359 in. water (75 +/- 5 MPH or 65 +7/-4 KTS).

6. Secure set screw and repeat step (5) five times.

V.E.P. manufactured switches are field adjustable. They should close at 2.8 +/- .4 inches water. Adjust slotted screw head on center of switch to obtain correct settings.

CAUTION
The airspeed safety switch is designed to operate within a specified range during increasing airspeed only. Due to hysteresis of the switch/diaphram assembly the switch MAY NOT deactivate the landing gear circuitry until approximately 57 MPH (49.5 KTS). This could allow the landing gear to retract if the gear switch is inadvertently placed in the UP position during the landing roll.

WARNING
Do not turn knurled knob on back of switch housing (Whitmal-General Switches) when disconnecting switch from electrical connections. This is airspeed adjustment knob.

CAUTION
During Static system checks, pressure compensation on the Pitot side of switch diaphram MUST be considered or switch diaphram may rupture.

NOTE
Refer to proper electrical schematic when replacing with switches from another manufacturer.

32-80-00 - MISCELLANEOUS

32-81-00 - LANDING GEAR SHOCK DISC INSPECTION

1. Aircraft with full fuel load and weight on landing gear.

A. **Main gear shock discs.**

(1) Check gap between retaining collar (A) (**Figure 32-21**) and top retaining plate (B). Allowable gap is 0.00 to 0.60 inches.

(2) Replace discs when gap exceeds tolerance. Use shock disc replacement tool (C), P/N GSE 030011, (old P/N ME 121), to remove and install main gear shock discs. Use removable pad from tool as a guide on top of shock link to align discs as they are being compressed.

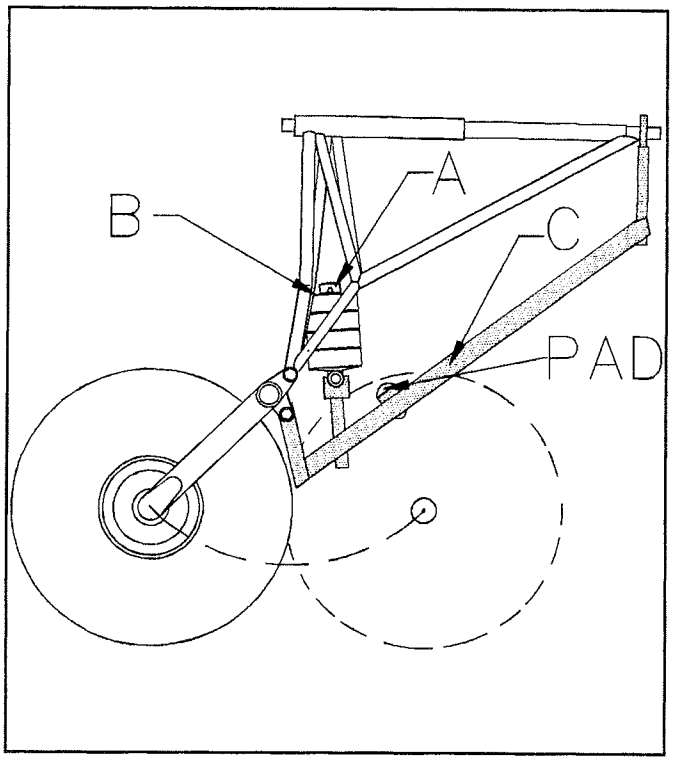
(3) Careful application of shock disc replacment tool is recommended during replacement of main gear shock disc to keep from damaging grease fittings.

NOTE
Shock disc retention collar should be installed with chamfer facing down and forward.

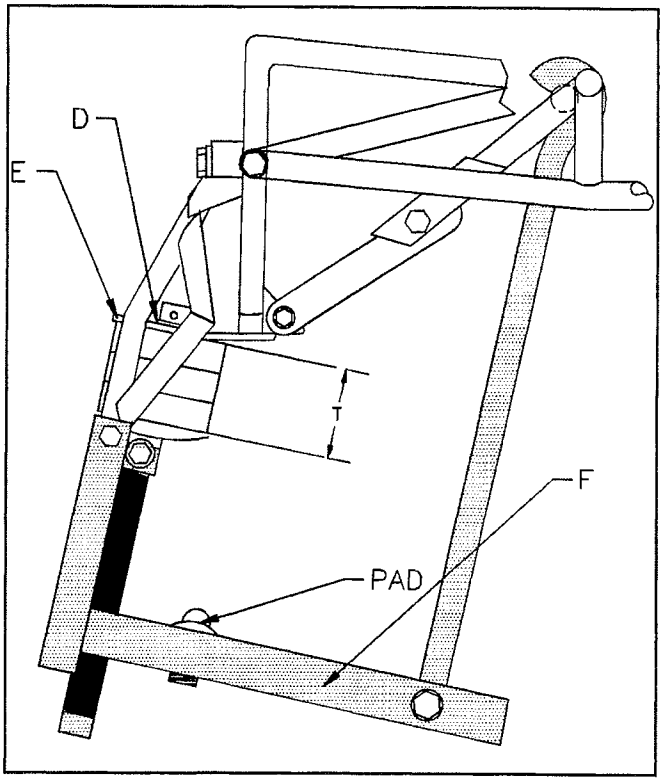
B. **Nose Gear Shock Discs.**

(1) Check for gap between retaining collar (D), (Figure 32-22) and top retaining plate (E). Top retaining plate must be in contact with retaining collar.

(2) Replace shock discs if gap is found. Use shock disc replacement tool (F), P/N GSE 030010, (old P/N ME120), to remove and install nose gear shock discs. Use removable pad from tool as a guide on top of shock link to align discs as they are being compressed.



MAIN GEAR SHOCK DISC REPLACEMENT TOOL
FIGURE 32 - 21



NOSE GEAR SHOCK DISC REPLACEMENT
FIGURE 32 - 22

NOTE
Dimension (T), (Figure 32-22), is critical to properly locate nose wheel position. The leg assemblies can vary, due to manufacturers tolerances, where the position for proper nose wheel rigging cannot be met without additional spacers (S) being used. The dimension (T) in a no load fully extended position should be a nominal 3.0 inches. Add spacers to either top or bottom of the shock discs as needed. See (Figure 32-20), paragraph 30-50-02, for proper steering/tracking rigging.

2. Raise aircraft on jacks - shocks fully extended.

A. Inspect nose and main gear shocks for evidence of gap between retaining collar and retaining plate. The disc preload must be great enough to maintain complete wheel extension during retraction.

B. Replace shock discs that have lost resilience.

C. Inspect retaining collar and bolt for deformation, wear, and cracks.

D. Replace defective bolt and collar.

CAUTION
Both collar and bolt must be replaced when one or the other is defective.

E. Inspect nose gear snubber (shock absorber) (if installed) for proper shock absorbing action. Replace snubber when effectiveness is impaired—the unit is sealed and cannot be repaired.

NOTE
Shock absorbers may be removed if desired per Mooney drawing number 940052.

NOTE
For Nose Gear Steering/Tracking see Section 32-50-02, (Figure 32-20).

32-82-00 - RECOMMENDED HARD LANDING INSPECTION

The following are areas recommended to be inspected when a "hard landing" has occured. Since a "hard landing" is a relative term, it is up to the owner/operator to advise maintenance personnel when the inspections are to be accomplished.

1. Mud Shield missing or damaged on either or both main landing gear.

2. Main landing gear shock bisquits condition, compressed or extruded rubber.

3. Tail skid damage or damage to bulkhead that attaches tail skid.

4. Propeller strike/marks or other visual damage.

5. Engine or engine mount damage.

6. Nose landing gear leg assembly damage near steering lugs.

7. Pilot/Co-Pilot's seat adjustment supports/tubes bent from excessive G-loads.

If any evidence of damage or abnormal visual observations are found, it is recommended that a thorough inspection of all the above areas be done and repairs be made as necessary. Contact FAA personnel for incident report requirements.

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CHAPTER 33

LIGHTS

CHAPTER 33

LIGHTS

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33-00-00 - GENERAL - DESCRIPTION AND OPERATION

High intensity strobe lights are standard equipment on M20K aircraft. The lights are located adjacent to the wing tip navigation lights and incorporated into the taillight assembly. Separate power supplies are utilized for each strobe light; these are located in each wing outboard section, mounted on inspection covers, and inside the tailcone adjacent to the left rear inspection cover. The system is actuated by a 10 amp circuit breaker/switch located on the instrument panel in front of the pilot.

Navigation lights are located on each wing tip and in rudder trailing edge (25-0001 thru 25-0999). S/N 25-1000 thru 25-TBA aircraft have the aft facing navigation light (clear) located on each wing tip trailing edge. The lights are activated by a 7.5 amp circuit breaker/switch located on the instrument panel in front of the pilot.

On S/N 25-0001 thru 25-1224, landing lights are located in lower engine cowling. Two 110,000 candle power sealed beam bulbs are incorporated and mounted in a housing designed to isolate the bulbs from engine heat and vibration. The lights are activated by a 25 amp circuit breaker/switch located on the instrument panel in front of the pilot.
ON 25-1225 thru 25-TBA, landing/taxi lights are located in leading edge of each wing. Two 110,000 candle power sealed beam bulbs are located in each wing. The lights are activate by two 25 amp split switches located on the pilots instrument panel. The switches are use to illuminate both landing and taxi or either one, as desired.

Two sets of interior lights are located on the overhead panel. The forward cabin overhead lights are located between the pilot and co-pilot seats and are actuated by a three position switch, (dim, off, bright) adjacent to the light near the co-pilots head. The passenger/ baggage compartment lights are located above the rear seats in the overhead panel and are activated by a similar three position switch located adjacent to the light. The rear cabin light switch is accessible from the baggage compartment door also.

CAUTION
These cabin lights are connected directly to the battery through their switches and will illuminate without the Master Switch ON.

S/N 25-1225 thru 25-1999 aircraft may have optional switches on both cabin door and baggage door frames that turn applicable interior lights ON when either door is opened. The forward cabin interior lights are connected to cabin door switch and the aft cabin/baggage interior lights are connected to baggage door switch.
Rocker switches, located overhead, between pilot and co-pilot, for cabin interior lights will turn selected set of lights ON, as desired. The rocker switch light circuits are routed through a timer and the Master Switch and will go OFF when Master Switch is turned OFF, with the rocker switch(es) left ON.
The lights will go OFF in approximately 90-120 seconds after door(s) are closed when Master is OFF and rocker switch(es) are left ON. Lights will go OFF when door(s) is(are) closed (timer delay) if Master Switch is ON or OFF and if light rocker switch(es) are OFF.

The light timer box is located on firewall diagonal tube ahead of pilot's right foot; it is a non-reparable unit.

CAUTION
LIGHTS WILL STAY "ON" IF DOORS ARE OPEN.

LAMP BULB REPLACEMENT CHART

APPLICATIONS	BULB PART NUMBER	
	14 VOLT	28 VOLT
Glareshield Lights	GE 330	GE 327
Post Lights	GE 330	GE 327
Map Light	GE 330	GE 327
Cabin Interior Lights	GE 1816	GE 1818
Trim & Flap Indicator		
(S/N 25-0002 thru 25-0575)	WI-7046	N/A
(S/N 25-0576 & ON)	GE 370	GE 327
Gear Down Light		
(Floorboard Indicator)	GE 327	GE 327
Tail Position Light (S.D.I.)	32-0228030-85 *	N/A
(WHELEN)	A508-14	W1290
Wing Tip Position Light (GRIMES)	A-7512-12	W1290
Landing Light (GE)	GE 4509	GE 4596
Recognition Light/Bulb Assy (WHELEN)	01-0770303-00	Same (use resistor)

* Use S.D.I. Tool No. 203541 to remove lamp.

33-20-00 - INTERIOR LIGHTS - MAINTENANCE PRACTICES

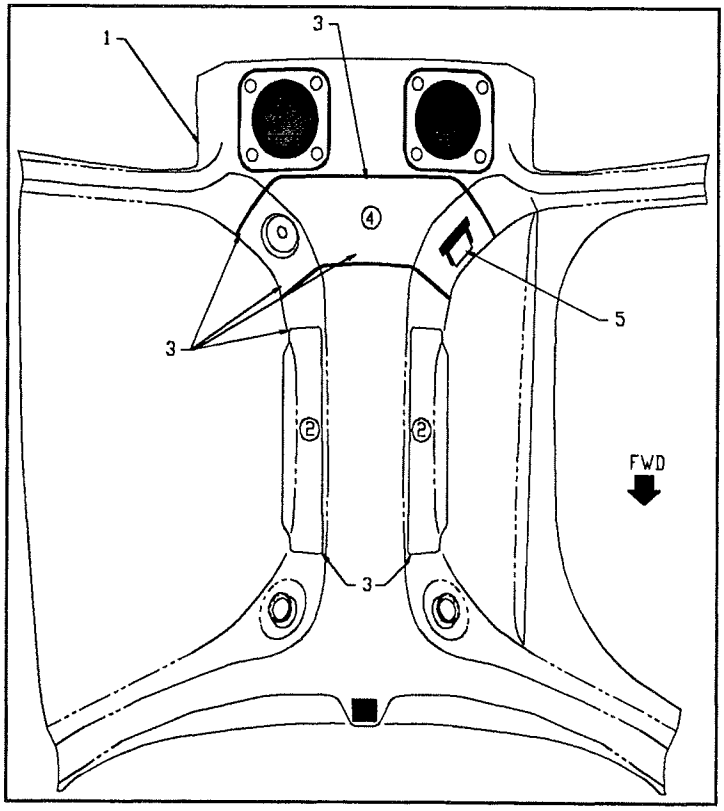
33-21-00 - CABIN LIGHTS - OVERHEAD LIGHTS

33-21-01 - LIGHT BULB REPLACEMENT (25-0001 thru 25-1999)

1. Remove the light cover panel (2) (**Figure 33-1**) from the headliner assembly (1) by removing screws (3).

NOTE
The front and rear light bulbs are replaced in the same manner.

2. Remove and replace the bulbs and check for proper operation.



INTERIOR LIGHTS FIGURE 33 - 1

(25-2000 THRU 25-TBA)
(Figure 33-1A)

1. Carefully slide smooth, flat sharp blade under lip of light assembly flange and pop light assembly out of mounting hole.

2. Disconnect blade terminals from light assembly.

3. Hold light assembly body and rotate bulb holder counter-clock-wise to remove.

4. Pull bulb from bulb holder, replace with new bulb. Reinstall bulb holder.

5. Re-assemble light assembly into mounting hole.

6. Check for proper operation.

33-21-02 - CABIN LIGHT SWITCH REPLACEMENT
(25-0001 THRU 25-1999)

1. Remove cover (4) from headliner assembly (1) by removing the screws (3) holding panel in place (**Figure 33-1**).

NOTE
S/N 25-0247 and ON have a butterfly shut-off valve for the overhead ventilation that must be freed from the panel prior to removal.

2. Switch (5) is a press and snap in fit and may require bending of spring tabs to release for removal.

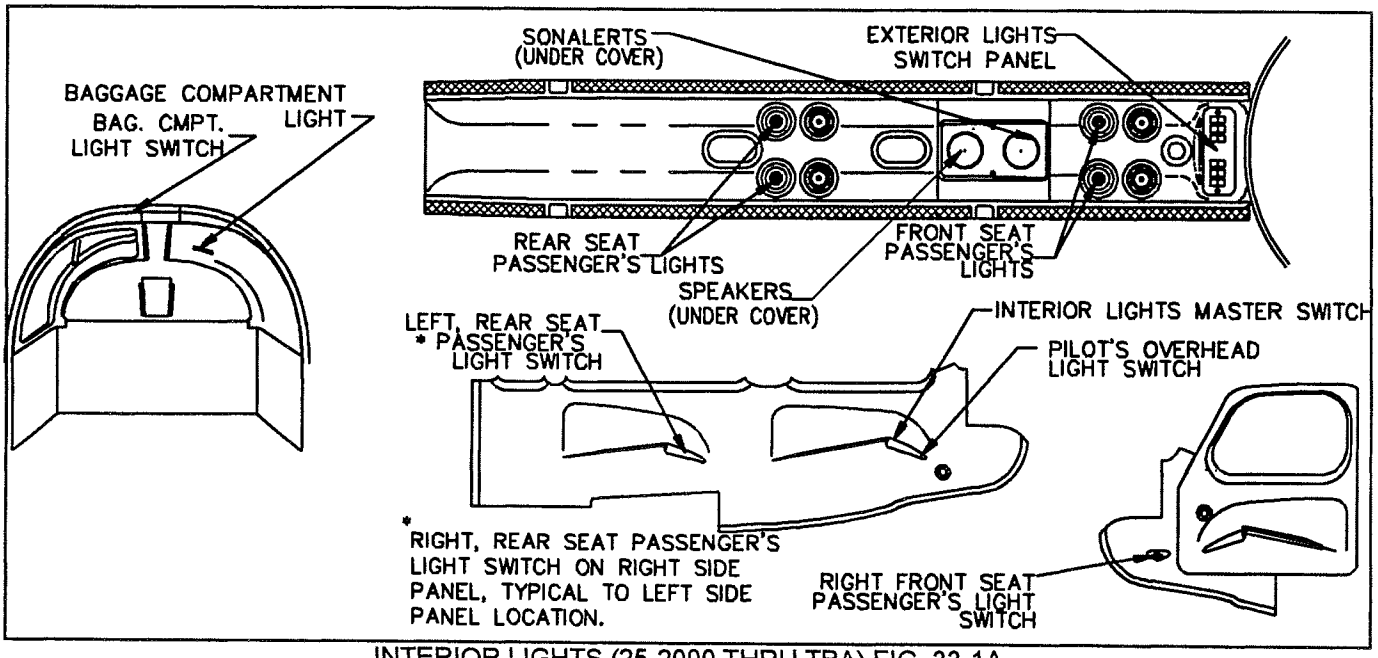
3. Disconnect wire connections and replace with new switch. Check for proper operation.

4. Reassemble panels, and ventilation control if applicable, to the headliner.

(25-2000 thru 25-TBA)

PILOT'S & REAR SEAT PASSENGER'S SWITCHES

1. Remove cover from arm rest assembly by removing 2 screws holding cover to arm rest.



INTERIOR LIGHTS (25-2000 THRU TBA) FIG. 33-1A

2. Switches are a snap-fit and may be removed by pressing snap tabs and pushing switch through cover.

3. Disconnect wire terminals and replace with new switch. Check for proper operation.

4. Reassemble switch assembly into cover by snapping in from top side. Re-install cover into arm rest, secure with 2 screws.

CO-PILOT'S SWITCH

1. Co-pilot's cabin light switch is located in front of cabin door hinge above co-pilot's right knee.

2. Remove 1 screw above switch. Remove door frme cap. Pull panel from velcro fastners to access switch.

3. Press snap tab & push from panel to remove.

4. Re-assemble in reverse sequence when maintenance action completed.

BAGGAGE COMPARTMENT SWITCH

1. Switch is located at rear of bagage door at front, top of hat rack opening. (**Figure 33-1A**).

2.Remove 1 screw inboard of switch. Pull door frame down slightly from velcro fastners to access baggage compartment light switch.

3. Press snap tabs and PUSH switch through panel.

4. Disconnect terminals; replace switch.

5. Re-assemble in reverse order.

33-22-00 - INSTRUMENT/FLIGHT PANEL AND GLARESHIELD LIGHTS

33-22-01 - LIGHT BULB REPLACEMENT

1. Instrument panel lights.

A. Internally lit instruments are not being considered in this information.

B. Post light bulbs are replaced by pulling hood straight out from post light base and then pulling bulb from this hooded portion.

C. Insert new bulb into hood and push hood back onto post light base.

D. Check for proper operation and hood orientation.

2. Glareshield lights.

A. Remove outer housing by unscrewing from light assembly base.

B. Remove bulb and insert new bulb.

C. Screw outer housing back onto base.

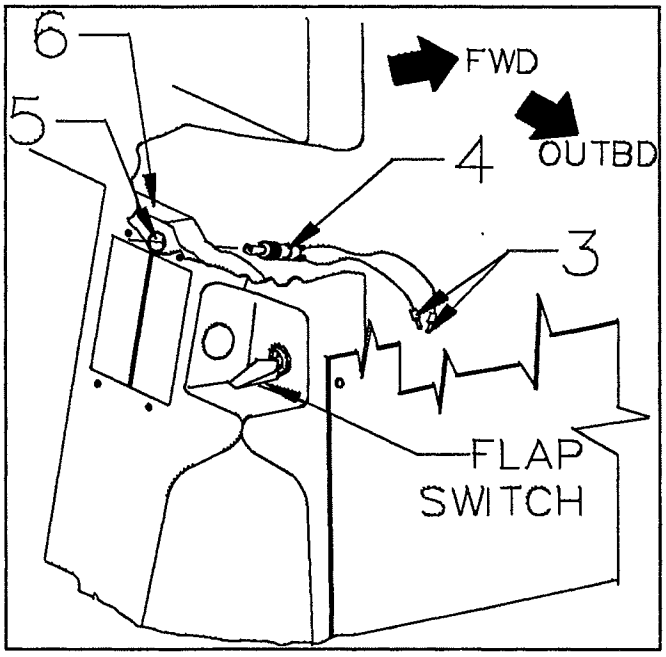
D. Check for proper operation.

3. Trim/Flap Indicator Light.
(S/N 25-0001 THRU 25-0575 **Figure 33-2**)

A. Gain access to light assembly (1) (**Figure 33-2**) by reaching in over console side panel from co-pilots side of cabin.

B. Disconnect wires at knife disconnects (3) and carefully unscrew socket portion (4) from light assembly lens (5). The lens is glued to trim/flap indicator reflector (6).

C. Bulb will come out with socket portion of light assembly; bulb is bayonet type, push, twist and pull to remove. Insert new bulb.



TRIM/FLAP INDICATOR LIGHT FIGURE 33 - 2
(S/N 25-0001 THRU 25-0575

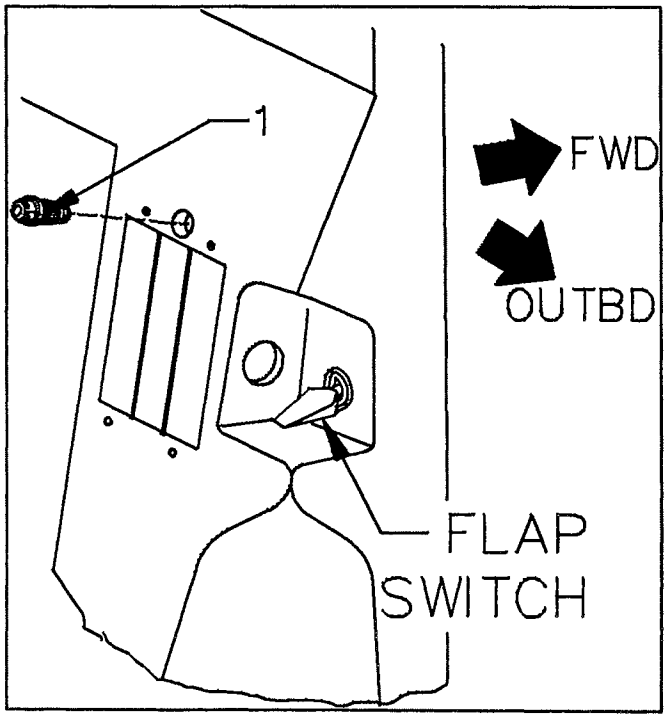
D. Carefully screw socket back into lens.

E. Connect the knife connections and ty-rap securely.

F. Check for proper operation.

4. Trim/Flap Indicator Light.
(S/N 25-0576 thru 25-1999 **Figure 33-3**).

A. Unscrew the black knurled button (1) (**Figure 33-3**) to gain access to bulb.



TRIM/FLAP INDICATOR LIGHT FIGURE 33 - 3
(S/N 25-0576 THRU 25-1999)

B. Bulb is a friction fit type in button; remove and replace with new bulb.

C. Replace knurled button with new bulb installed into console.

D. Check for proper operation.

5. Map Light

A. Place wrench on flat of exposed metal housing on bulb assembly from receptacle.

B. Screw on new bulb assembly and tighten.

33-23-00 - GEAR DOWN INDICATOR LIGHT (FLOORBOARD)

33-23-01 - LIGHT BULB REPLACEMENT

1. Remove lower belly panel to gain access to light assembly.

2. Remove and replace bulb.

3. Check for proper operation.

4. Reinstall belly panel.

33-40-00 - EXTERIOR LIGHTS - MAINTENANCE PRACTICES
33-40-01 - TROUBLE SHOOTING EXTERIOR LIGHTS

TROUBLE	PROBABLE CAUSE	REMEDY
	STROBE LIGHTS	
Lights inoperative.	Circuit breaker/switch tripped.	Check for short circuit. Reset C/B.
	Loose connection.	Check and tighten electrical connections.
	Battery defective.	Replace battery or use external power.
	Circuit breaker switch defective.	Check continuity through switch; replace if necessary.
	Faulty power supply.	Disconnect synch wires to identify faulty power supply.
One bulb does not light.	Bulb burned out.	Replace bulb.
	Power supply inoperative.	Replace.
	Fixture not grounded.	Check for good bonding between fixture and structure. Tighten mounting screws.
	Loose connection.	Check all connections in circuit.
	Defective fixture	Replace fixture.
	LANDING LIGHTS, NAVIGATION LIGHTS AND TAILLIGHT	
Lamp fails to light.	Circuit breaker/switch tripped.	Check for short circuit. Reset circuit breaker.
	Lamp burned out.	Replace lamp.
	Loose connection or defective wire.	Tighten connections and check wire circuit continuity. Replace or repair wire if necessary.
	Circuit breaker/switch defective.	Check continuity through switch. Replace if necessary.

33-41-00 - HIGH INTENSITY, STROBE LIGHTS - MAINTENANCE

The strobe light power supply requires a 14 VDC (25-0001 thru 25-0999) / 28 VDC (25-1000 thru 25-TBA) input across the red and black wires. Red is positive and black is negative, or common. The voltage for the strobe light is supplied through Pin 1 and 3 of the power supply connector with Pin 2 as the trigger pulse. The strobe light assembly is a potted assembly and cannot be repaired.

The power supplies may be synchronized by connecting each yellow wire together between all power supplies (Hoskins only).

TROUBLE SHOOTING AIDS

When no lights are flashing:

1. Check circuit breaker/switch.

2. To determine power supply or flashtube problems, first check the input voltage to the power supply. The red and black line should have 14 VDC (25-0001 thru 25-0999)/ 28 VDC (25-1000 thru 25-TBA). If no voltage is present check for shorted power leads or tripped circuit breaker. If input voltage is present, then disconnect the yellow sync wires. This will allow unaffected units to flash. Determine defective light and proceed to "one light not flashing" below.

When one light not flashing:

1. To determine power supply or flashtube problems, first check the input voltage to the power supply. The red and black line should have 14 VDC (25-0001 thru 25-0999)/ 28 VDC (25-1000 thru 25-TBA). If no voltage is present then check for shorted power leads, blown inline fuses, or circuit breaker. If input voltage is present, then disconnect the connector to the flashtube. 400-500VDC should be present across Pin 1 and 3 of the power supply. If not, the power supply has no output and is defective. Turn off master switch.

2. If voltage is present across Pin 1 and 3 of the power supply, connect a known good flashtube to the power supply. If good flashtube fails to operate, power supply is defective. If good flashtube operates, the flashtube is defective. Replace flashtube.

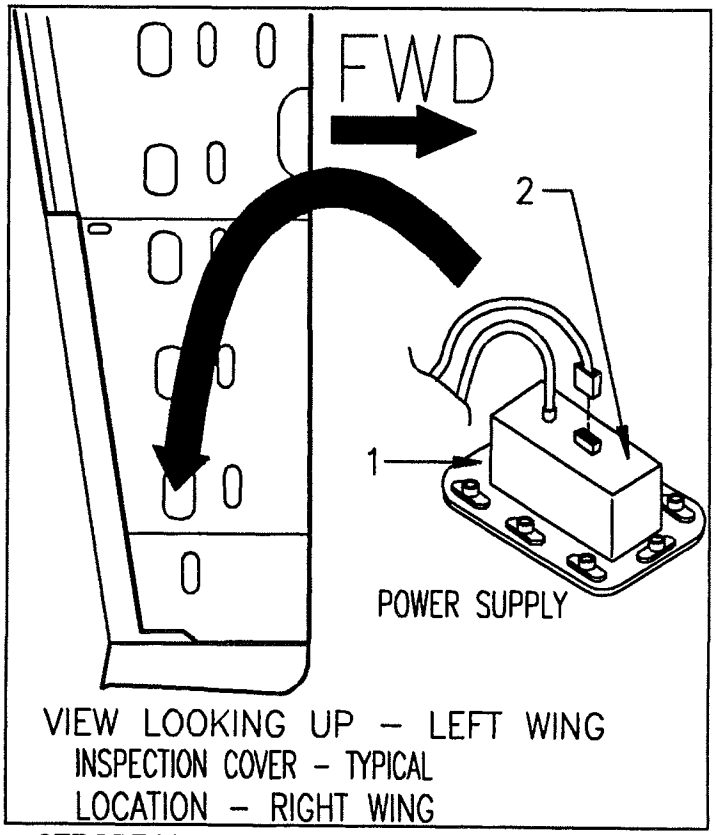
3. Be sure yellow sync wire is insulated and not grounded.

33-41-01 - POWER SUPPLY UNIT - REMOVAL OR REPLACEMENT

1. Wing tip strobe power supply.

A. Gain access to wing tip power supply through bottom inspection cover (1) near wing tip (See **Figure 33-4**). Power supply (2) is physically attached to this inspection cover.

B. Disconnect wiring connections between switch and power supply.



STROBE LIGHT POWER SUPPLY FIGURE 33 - 4

WARNING

High voltage is involved in the circuit between the power supply and strobe light assemblies. Although a bleed-off resistor is incorporated in the power supply circuit, turn the control switch for the strobe lights OFF and allow at least 20 minutes to elapse prior to disconnecting the cables at the power supply or strobe light assemblies before handling either of these units in any way. Failure to observe these precautions may result in physical injury from electrical shock.

C. Disconnect wiring hamess between power supply and strobe light. (See warning above).

D. Remove the screws securing the power supply to the inspection panel and remove the unit.

2. Tail strobe light power supply.
(S/N 25-0001 thru 25-0446).

A. Gain access to this unit through the empennage (stinger) inspection cover located on the left side of the airplane.

B. The power supply unit is mounted on the vertical bulkhead forward of the inspection access hole.

C. Steps B and C and warning of 33-41-01, 1, above apply for removal of this power supply unit also.

D. Remove the screws that secure the power supply to the vertical bulkhead and remove the unit.

3. Tail strobe light power supply.
(S/N 25-0447 thru 25-TBA).

A. Gain access to this unit through the inspection cover on the aft, left hand side of the tailcone. The power supply is physically mounted to this inspection cover.

B. Disconnect the wiring connections between the switch and the power supply.

C. Steps B thru D, and Warning of paragraph 33-41-01, 1, apply for removal of this power supply unit.

33-41-02 - POWER SUPPLY UNIT INSTALLATION

The installation of any of the power supplies is a reverse sequence of the removal procedures.

CAUTION

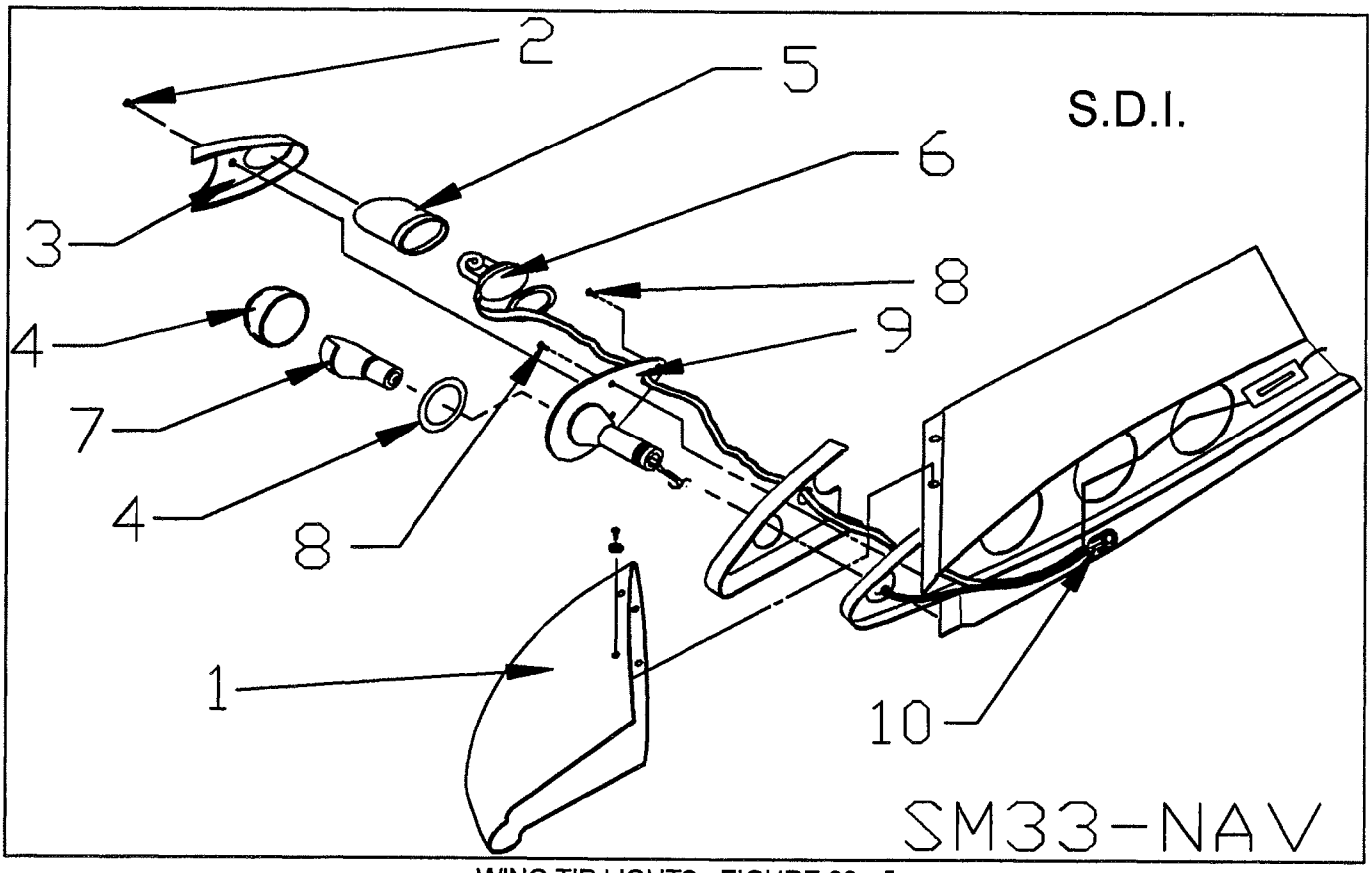
STROBE LIGHT WIRING - An incorrect hook-up of the wires at either the power input or between the strobe light assemblies and the power supply unit will cause a reversal of polarity that results in serious component damage and failure. Care must be taken to ensure that the red wire is connected to positive power and the black wire to ground.

33-41-03 - STROBE LIGHT REPLACEMENT

1. Wing tip strobe light.

A. Remove the wing tip lens (1) (**Figure 33-5**) to gain access to malfunctioning strobe light.

B. Remove the two screws holding the navigation/position light lens (2) and the one screw (3) below the flashtube assembly. This will allow the light assembly (4) and mounting plate (5) to be pulled away from tip rib.



WING TIP LIGHTS FIGURE 33 - 5

NOTE
The Whelen Strobe-Nav light assembly is installed slightly different but is removed and replaced in a similar manner.

C. Remove the two screws (6) from the back side of the mounting plate.

WARNING
High voltage is involved in the circuit between the power supply and strobe light assemblies. Although a bleed-off resistor is incorporated in the power supply circuit, turn the control switch for the strobe lights OFF and allow at least 20 minutes to elapse prior to disconnecting the cables at the power supply or strobe light assemblies and before handling either of these units in any way. Failure to observe these precautions may result in physical injury from electrical shock.

D. Disconnect the wiring harness plug and remove the flashtube assembly.

NOTE
On earlier aircraft the plug will not come through the wire routing holes. Remove the pins from the plug and pull individual wires through the holes to allow the flashtube assembly to come free.

E. The flashtube assembly must be replaced if determined to be bad; the flashtube is soldered in place and is not readily removeable from the assembly.

F. If required, the clear lens can be removed from the flashtube assembly by removing the two lens retaining screws (7), **Fig. 33-5**, and pulling the lens free for replacement or cleaning.

G. Install the new strobe light assembly in reverse sequence of removal.

2. Tail strobe/navigation light removal 12V, (25-0001 thru 25-0999) (See **Figure 33-6 A**). See **Figure 33-6 B** for S/N 25-1000 thru 25-TBA, 24V. Only a strobe light assembly is located on 24V aircraft. Removal is same as combination 12V NAV/STROBE light assembly.

A. To gain access to the wire harness and connections from the power supply rotate the round access cover (1) on the lower left side of the empennage stinger **(Figure 33-6 A).**

B. Disconnect strobe wiring hamess connector from strobe power supply harness and disconnect the connectors for taillight assembly.

C. Remove the connector plug (2) from the strobe light wiring harness leaving the pins connected to the individual wires.

D. Tie and tape a strong, small diameter cord, 4 to 5 feet long, to the entire wire hamess after plug has been removed.

E. Remove the two screws (3) that secure the strobe/taillight assembly to the rudder (4) and pull the light assembly out so it clears the mounting hole. The wire harness will be stretched tight at this point.

F. Carefully begin working the wire harness through the empennage and rudder bulkheads until the wire harness can be pulled through the light mounting hole in the rudder. The rubber grommets at each bulkhead will require removal from bulkhead but leave attached to wire harness. See (**Figure 33-6 A**) for this detail.

G. Pull light assembly and entire wire harness through mounting hole in rudder. *DO NOT PULL THE STRONG CORD ALL THE WAY THROUGH ACCESS PANEL HOLE*. You will need this to pull the new wire harness back in place during installation. Remove cord from wire harness.

H. Replace complete flashtube/base assembly (5) if strobe light portion is malfunctioning. The flashtube is not a replaceable component.

I. Place bulkhead grommets at relative positions on new harness, after plug (2) is removed from new harness.

J. Tie and tape cord to new harness and carefully begin to feed wire and grommets back to their positions.

K. Place all grommets in the bulkheads. Reinstall plug (2) on new harness and secure the strobe/navigation light assembly to the rudder.

L. Connect the completed harness and plug from the strobe light assembly to the harness socket from the strobe power supply.

M. Check for proper operation.

N. S/N 25-0781 and later aircraft have a new strobe light installation. There is sufficient wire available to pull this strobe light assembly out the rudder attach hole. See item (10) (**Figure 33-6 A**). Disconnect light assembly (11) from connector (12) and replace assembly if needed.

33-42-00 - NAVIGATION/POSITION LIGHTS

33-42-01 - POSITION LIGHT - REPLACEMENT/SERVICE

1. Wing tip position lights.

A. Remove the wing tip lens (1) (**Figure 33-5**).

B. Remove the two screws (2) holding the position light lens in place.

C. Pull the lens (red or green) from mounting plate (5) and remove the lamp (8).

D. Install new lamp into base.

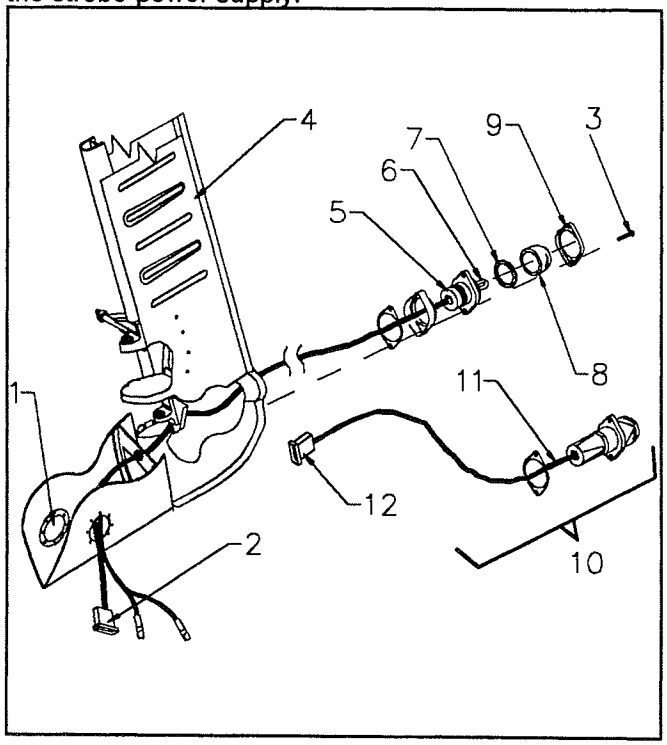
E. Reassemble the light assembly in reverse sequence.

2. Tail position light (25-0001 thru 25-0999).

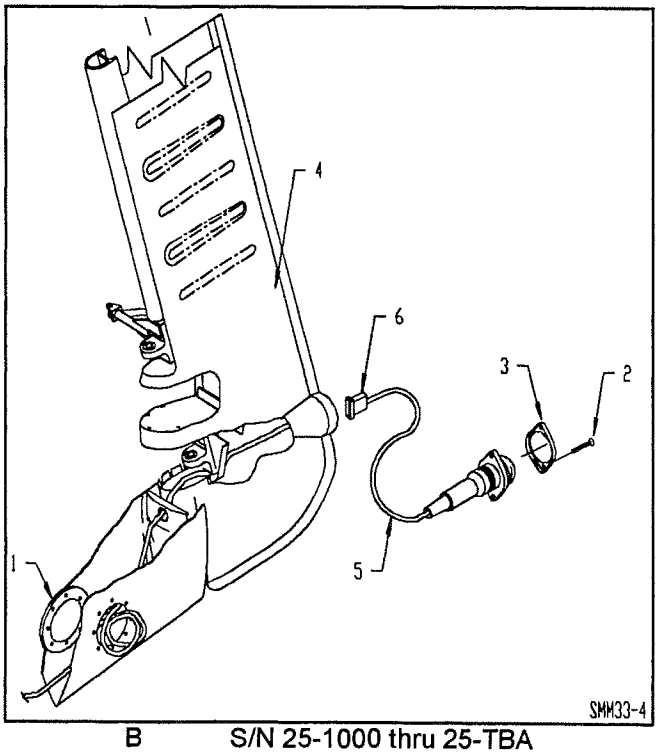
A. Remove two screws (3) (**Figure 33-6 A**) from the taillight housing that secures the light assembly (5) to the rudder (4).

B. Remove the clear lens (8), mounting ring (9) and gasket (7) to gain access to position light lamp (6).

C. Remove lamp (6) with S.D.I. special tool no. 203541 or equivalent.



A S/N 25-0001 THRU 25-0999



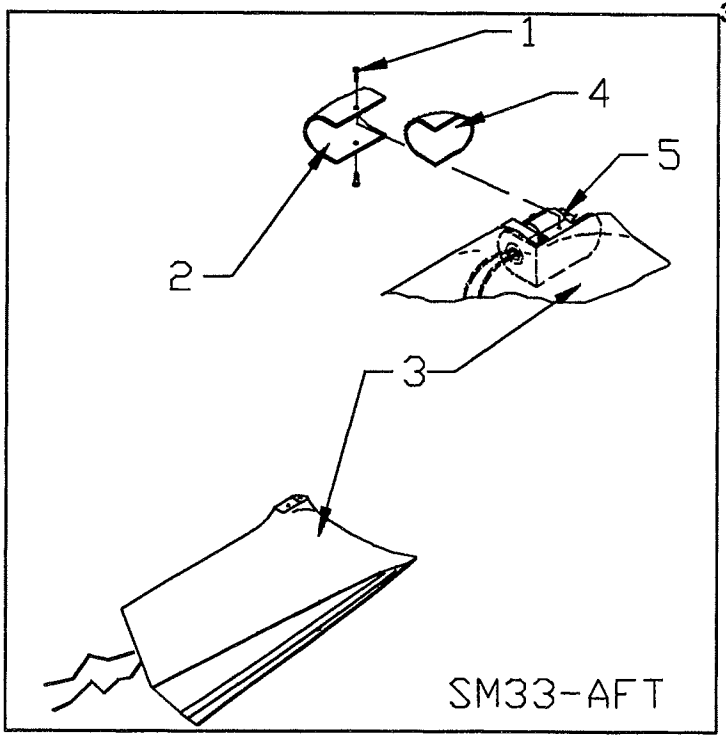
B S/N 25-1000 thru 25-TBA

TAIL LIGHT ASSEMBLY FIGURE 33-6

D. Replace with new lamp and reassemble taillight assembly in reverse sequence.

3. Aft Position Light (25-1000 thru 25-TBA)

A. Remove two screws that secure aluminum cover (1) to wing tip (2) **(FIG. 33-7)**.



WING TIP/AFT POSITION LIGHT FIGURE 33-7

B. Remove clear lens (3) & gasket to gain access to light bulb (4).

C. Pull light bulb (with special puller if needed).

D. Replace with new lamp & reassemble light assembly in reverse sequence of removal.

33-43-00 - LANDING/TAXI LIGHTS

33-43-01 - LANDING/TAXI LIGHT ADJUSTMENT PROCEDURES

1. Position aircraft to face a vertical wall with front of nose wheel 7 ft. 6 in. from wall. Position L/H & R/H main landing gear at exact distance from vertical wall, ie, parallel to wall.

2. Place four target crosses (+) on vertical wall at the following positions:

A. 36.5 inches up vertical wall from same ground plane aircraft is resting on.

B. 9.85 feet left and right of nose wheel center line.

C. 12.375 inches further outboard on both left & right side of Step B. target position.

3. Remove access cover behind each landing/taxi light location on wing lower surface.

4. Turn taxi lights ON, exit aircraft, turn adjusting screws until light beams are centered on outboard target crosses (+), left & right.

5. Repeat Step 4 for landing lights, except center light beams on inboard target crosses (+), left and right.

6. Turn lights OFF, re-install access covers.

CHAPTER 34

NAVIGATION AND PITOT STATIC

CHAPTER 34

NAVIGATION AND PITOT STATIC

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34-00-00 - GENERAL

All flight instruments are grouped on shock mounted panel directly in front of pilot. Flight instruments are operated by:

(1) filtered air drawn into an evacuated instrument case,

(2) barometric pressure or barometric impact air pressure differences,

(3) variations in electric current due to mechanically varied resistance,

(4) reference to the earths magnetic field

(5) aircraft electrical power.

The glareshield must be removed and plumbing disconnected on many flight instruments before they can be removed. Remove glareshield attaching screws, center post cover screws and carefully lift center post cover and glareshield from the panel. Disconnect glareshield lights.
Reinstall glareshield in reverse sequence.

34-10-00 - PITOT & STATIC AIR PRESSURE SYSTEM

Static pressure instruments are extremely sensitive to pressure changes; therefore, the pitot and static system must be kept free from moisture and obstructions. Drain the pitot and static systems after humid or wet weather. If instrument operation is erratic or inoperative after draining, perform the following:

1. Pitot system leak test. (Make sure Master switch is OFF and Gear Control is in DOWN position.)

A. Slip end of a short rubber hose over pitot tube.

B. Close open end of hose; slowly roll up hose until airspeed indicator reads 150 MPH (132 KIAS).

C. Clamp hose and hold for one minute.

D. If airspeed indicator falls more than 10 MPH (9 KIAS), within one minute, check system for leaks and tighten line fittings.

E. Repeat steps B, C, and D until obtaining less than a 10 MPH (9 KIAS)indicator reading drop.

CAUTION
Release air pressure slowly by unrolling rubber tubing, a sudden release of air pressure may damage airspeed indicator.

2. Pitot system hose inspections. After pitot system is checked for leaks, inspect hose sections for signs of deterioration. Check all tubing for brittleness, checks or cracks particularly at bends or connecting points. When new hose is installed, recheck system for leaks using PITOT SYSTEM LEAK TEST procedure.

3. Static system cleaning. Blow low air pressure (10-25 PSI). through the lines from the disconnected line at the airspeed indicator to the static ports. Cover each static port separately when blowing to insure that each line is clear. Instrument error or possible damage may result if even one port is clogged with dirt or foreign matter.

CAUTION
NEVER BLOW AIR through lines TOWARD the INSTRUMENT panel; to do so will seriously damage instruments. When blowing back through lines from the instrument panel, make sure that no air is blown into instruments.

4. Static system leak test. The static system should be checked for leaks in accordance with the instructions in Federal Aviation Regulation 91.171.

CAUTION
To avoid damaging either the airspeed indicator or the landing gear airspeed safety switch an equal pressure should be applied to pitot side of the indicator while leak testing the static system.

5. Alternate static source. An alternate static source valve is provided to change the static air source from outside aircraft to inside cabin. The valve is located on the lower panel immediately to the left of the pilots control column. Airspeed indicator and altimeter readings will be slightly affected when using the alternate static source.

34-10-01 - HEATED PITOT TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Tube does not heat or clear itself of ice with switch on.	Switch circuit breaker tripped.	Reset circuit breaker.
	Open circuit.	Repair.
	Excessive voltage drop between battery and pitot head.	Check voltage at pitot head.
	Heating element burned out.	Replace pitot head.

34-11-00 - AIRSPEED INDICATOR

Registers airpseed in miles per hour and/or knots. Air pressure difference between impact air, pitot tube, and static air (static ports on each side of the aircraft tailcone) operates the airspeed indicator. An electrically heated pitot head prevents ice obstruction in flight.

The airspeed indicator dial markings are as follows:

Radial Red Line	225 MPH/CAS (195 KCAS)
Yellow Arc	200-225 MPH/CAS (174-195 KCAS)
Green Arc	72-200 MPH/CAS (63-174 KCAS)
White Arc	66-125 MPH/CAS (58-109 KCAS)

NOTE

See Section 27-95-00 for stall warning systems.

34-11-01 - AIRSPEED INDICATOR TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Instrument pointer does not indicate properly.	Leak in instrument and seal case or in static lines lines.	Check for leak.
	Obstruction in pitot tube.	Clean out obstruction.
Instrument pointer oscillates.	Leak in instrument case or in pitot lines.	Check for leak and seal lines.

34-12-00 - VERTICAL SPEED INDICATOR

Converts barometric pressure changes within the static port lines to aircraft ascent or descent rate; readings are in feet per minute.

This instrument has a single needle and two adjoining scales that read from 0 to 2000 feet per minute, top side for ascent rate and bottom side for descent rate. The recessed, slotted screw at the lower left of the instrument case is used to "zero" the indicator when the aircraft is on the ground.

34-12-01 - RATE-OF-CLIMB INDICATOR TROUBLE SHOOTING. (VERTICAL SPEED INDICATOR).

TROUBLE	PROBABLE CAUSE	REMEDY
Pointer does not set on zero.	Aging of diaphragm.	Turn setting screw to reset pointer at zero. Tap instrument while resetting.
Pointer fails to respond.	Obstruction in static line. (Includes water)	Disconnect static line from instruments. Apply low pressure air (10-25 PSI max.) to instrument end of static line. Check both static ports for air flow. Depress static drain valve and check for water. Keep depressed until air is free of moisture. Reconnect static line to instruments and leak check.
Pointer oscillates.	Leaks in static line.	Disconnect all instruments connected to the static line. Check individual instruments and test installation for leaks.
	Defective mechanism.	Replace instrument.

34-13-00 - ALTIMETER

The altimeter operates by absolute pressure, and converts barometric pressure to altitude; reading is in feet above mean sea level. The altimeter has a fixed dial with three pointers to indicate hundreds, thousands, and tens of thousands of feet. Barometric pressure is sensed through the static vents. A knob adjusts a movable dial behind a small window in the face of the main dial to indicate local barometric pressure. This corrects the altimeter reading for prevailing conditions.

34-13-01 - ALTIMETER TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Excess scale error.	Improper calibration adjustment.	Replace instrument.
Excessive pointer oscillation.	Defective mechanism.	Replace instrument.
High reading.	Static pressure system leak.	Eliminate leak in static pressure system.
Setting knob is hard to turn.	Wrong lubricant or lack of lubrication.	Replace instrument.
Inner reference marker fails to move when setting knob is rotated.	Marker out of engagement.	Replacement instrument.
Setting knob set-screw is loose or missing.	Excessive vibration.	Tighten instrument screw if loose. Replace instrument if screw is missing.
Cracked or loose cover glass.	Excessive vibration.	Replace instrument.
Dull or discolored luminous markings.	Age.	Replace instrument.
Barometric scale and reference markers are out of synchronization with pointers.	Shift in mechanism.	Reset pointers.
Barometric scale and reference markers are out of synchronization.	Slippage of mating parts.	Replace instrument.

34-20-00 - DIRECTIONAL GYRO COMPASS

This vacuum-operated instrument indicates the heading reference.

The directional gyro rotor is air driven and rotates with its spin axis horizontal. The knob is used to reset basic directional heading. Vacuum pressure for satisfactory operation is 4.25 +/-.2 to 5.5 +0.0/-.2. The vacuum system filters should be changed each 500 hours or at one year intervals, whichever occurs first. (See Trouble Shooting Chart, for maintenance instructions.)

34-20-01 - DIRECTIONAL GYRO TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Excessive drift in either direction.	Dirty air filter (high vacuum indication).	Inspect filter. Replace if necessary.
	Excessive vibration.	Test with vibrometer. If vibration amplitude is more than .004 inch, examine shock mountings to see if connections are pulling on instrument.
	Insufficient vacuum. If vacuum indication is below 4.25 IN. Hg., check as follows:	Correct for insufficient vacuum as follows:
	1. Vacuum regulating valve improperly adjusted.	1. Adjust vacuum regulating valve.

DIRECTIONAL GYRO TROUBLE SHOOTING (con't.)

TROUBLE	PROBABLE CAUSE	REMEDY
	2. Pump failure.	2. Repair or replace pump.
	3. Vacuum line kinked, leaking, or too long for its diameter.	3. Locate and if defective replace or repair vacuum line. Check for collasped inner wall of flexible hose.
	Defective mechanism (worn or dirty pivots and bearings.)	Replace instrument.
Dial spins continuously in one direction.	Operating limits have been exceeded	Reset the instrument with the aircraft in level flight.
	Defective mechanism.	Replace instrument.

34-21-00 - TURN COORDINATOR

A gyro instrument that indicates control coordination and rate of turn. This instrument is electrically driven.

34-21-01 - TURN COORDINATOR TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Pointer fails to respond.	Foreign matter lodged in instrument.	Replace instrument.
	No electric current.	Check voltage at instrument.
Bar does not set level.	Gimbal and rotor assembly out of balance.	Replace instrument.
	Pitted or worn pivots or bearings.	Replace instrument.
In low temperature, bar fails to respond or responds sluggishly and with insufficient deflection.	Oil has become too thick.	Replace instrument.
	Insufficient bearing clearance.	Replace instrument.
Bar sluggish in returning to level and does not set level when stationary	Oil or dirt between damping pistons and cylinders.	Replace instrument.
	Excessive clearance between rotor and rotor pivots.	Replace instrument.

34-22-00 - MAGNETIC COMPASS

The magnetic compass dial, graduated in five-degree increments, is encased in a liquid filled glass and metal case. The unit mounts on the stainless steel windshield center post above the glareshield. The compass should be swung and compensated at each annual inspection and whenever new equipment is installed. To compensate for N-S deviation, adjust left screw; to compensate for E-W deviation, adjust right screw.

Degausing of the tubular structure may be required if compass cannot be compensated within limits. Carefully go over the entire steel structure with degauser to remove residual magnetism. Recommend Armature Growler to degause steel structure.

NOTE

Refer to S.B. M20-150A, Instruction III, for degausing procedures.

NOTE

Check for outside magnetic influences if excessive compensation is required.

34-22-01 - COMPASS TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Excessive card error.	Compass not properly compensated.	Compensate instrument.
	External magnetic interference.	Locate magnetic interference and eliminate if possible.
Excessive card oscillation.	Improper instrument mounting.	Align instrument.
	Insufficient liquid.	Replace instrument.
Sluggish card.	Weak card magnets.	Replace instrument.
	Excessive pivot friction or broken jewel.	Replace instrument.
	Instrument too heavily compensated.	Correct excess compensation.
Liquid leakage.	Loose bezel screws.	Tighten screws.
	Broken cover glass.	Replace instrument.
	Defective sealing gaskets.	Replace instrument.
Discolored luminous markings or discolored damping liquid.	Age	Replace instrument.
Defective light.	Burned out lamp or broken circuit.	Check lamp or wiring continuity.

34-23-00 - ARTIFICIAL HORIZON

The vacuum-powered artificial horizon gyro indicates aircraft attitude relative to straight and level flight.

Maintenance is similar to that required for the directional gyro compass.

34-23-01 - GYRO-HORIZON TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Horizon bar does not respond.	Dirty air filter (high vacuum indication).	Examine filter and clean or replace if necessary.
	Insufficient vacuum resulting from the following:	Correct insufficient vacuum as follows:
	1. Vacuum regulating valve improperly adjusted.	1. Adjust valve.
	2. Pump failure.	2. Repair or replace pump.
	3. Vacuum line kinked, leaking, or too long for its diameter.	3. Locate and repair. Check for collapsed inner wall of flexible hose.
Horizon bar does not settle.	Defective mechanism.	Replace instrument.
	Insufficient vacuum.	Correct for insufficient vacuum as outlined above.

GYRO-HORIZON TROUBLE SHOOTING (con't.)

TROUBLE	PROBABLE CAUSE	REMEDY
	Excessive vibration.	Test with vibrometer. If amplitude is more than .004 inch, examine installation to determine whether flexible hose connections are restricting movement of instrument.
	Shock mounted panel is contacting structures (inadequate clearance).	Examine shock mountings and replace if necessary.
Horizon bar oscillates or vibrates excessively.	Excessive vacuum resulting from the following: 1. Dirty air filter.	Correct for excessive vacuum as follows: 1. Examine filter and clean or replace if necessary.
	2. Vacuum regulating valve improperly adjusted.	2. Adjust valve.
	3. Defective mechanism.	3. Replace instrument.
	4. Excessive vibration.	4. Test with vibrometer. If amplitude is more than.004 inch, examine installation to determine whether flexible hose connections are restricting movement of instrument.
	5. Shock mounted panel is contacting structure (inadequate clearance).	5. Examine shock mountings and replace if necessary.

34-90-00 - MISCELLANEOUS INSTRUMENTS

34-90-01 - CLOCK

Various clock options are available. The clock is mounted in the left side of the instrument panel.

34-90-02 - OUTSIDE AIR TEMPERATURE

Provides the pilot with the free stream outside air temperature in degrees centigrade.

CHAPTER 35

OXYGEN

CHAPTER 35

OXYGEN

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35-00-02	Maintenance Practices	3

35-00-00 - GENERAL

The oxygen system is an optional installation for serial number 25-0001 thru 25-TBA. The system consists of a 76, (steel) 77.1 (composite) or a 115.7 (composite) cubic ft. cylinder located in the tailcone immediately aft of the baggage compartment bulkhead. A reducing valve and an altitude compensating valve are connected to the cylinder to regulate oxygen flow for a given altitude. Lines connected to the altitude compensating valve distribute aviators oxygen to pilot and passengers. The system is activated by either the control handle being pushed forward (S/N 25-0001 thru 25-0780) or the control knob rotated (25-0781 thru 25-TBA) to open the reducing valve. A gauge, located on the pilots arm rest adjacent to the control, indicates pressure of the cylinder. When cylinder is full, pressure will indicate 1850 P.S.I. at 21° C. (70° F.). The system is serviced through an access opening located aft of the baggage compartment door. Standard refill fittings are required to fill the cylinder with aviators oxygen. (Spec. No. MIL-O-27210).

The new interior dictated slight changes for the oxygen system outlets. Refer to **Figure 35-1A** for S/N 25-0001 thru 25-1999 and to **Figure 35-1B** for S/N 25-2000 thru 25-TBA configurations.

WARNING

Proper safety measures must be employed while oxygen system maintenance is being performed or a serious fire hazard will be created. Avoid making sparks and keep all burning cigarettes or fire away from the vicinity of oxygen. Make sure that your hands, tools, and clothing are clean, particularly with respect to oil or grease, for these will IGNITE upon contact with pure oxygen under pressure.

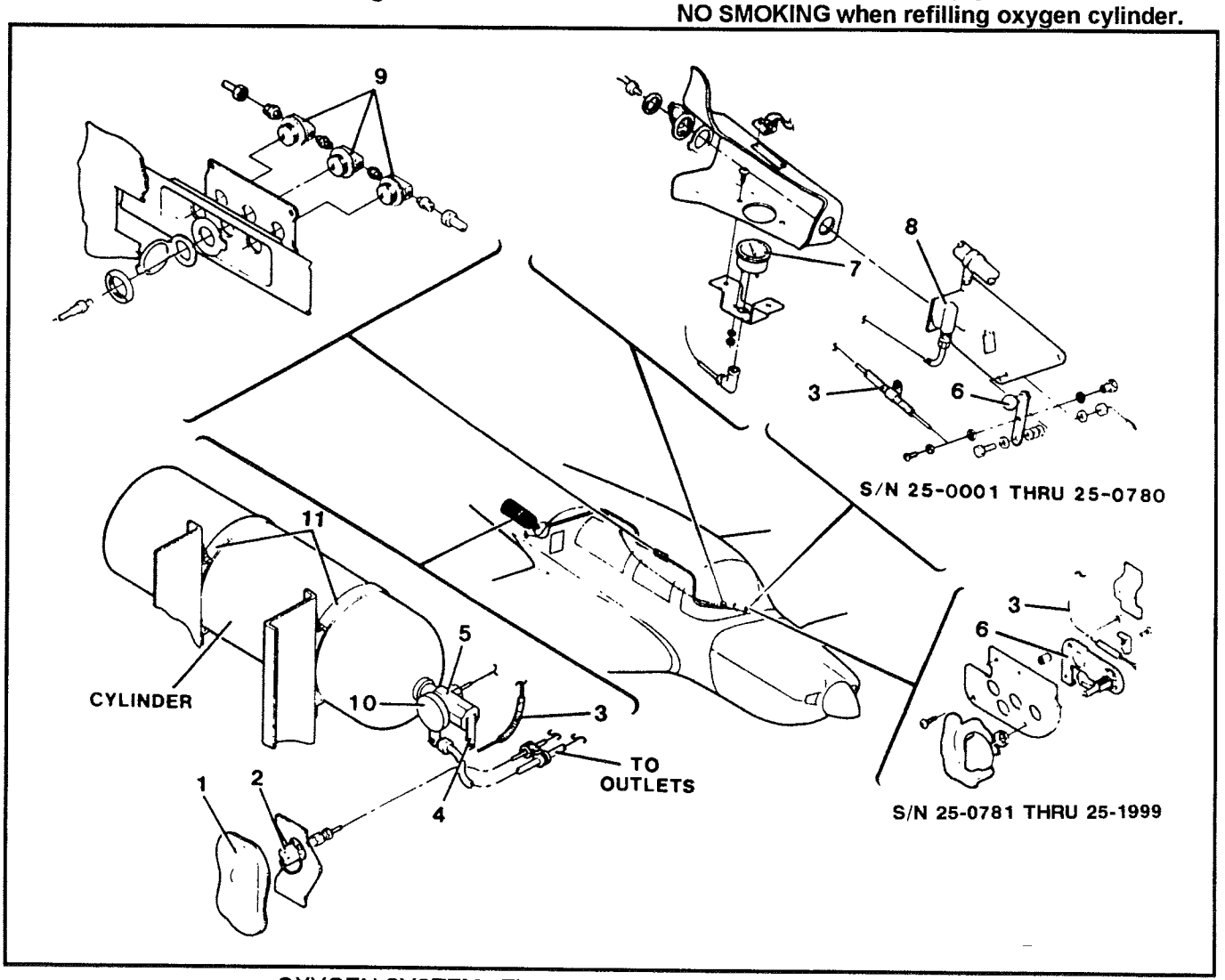
35-00-01 - RECHARGING PROCEDURES

WARNING

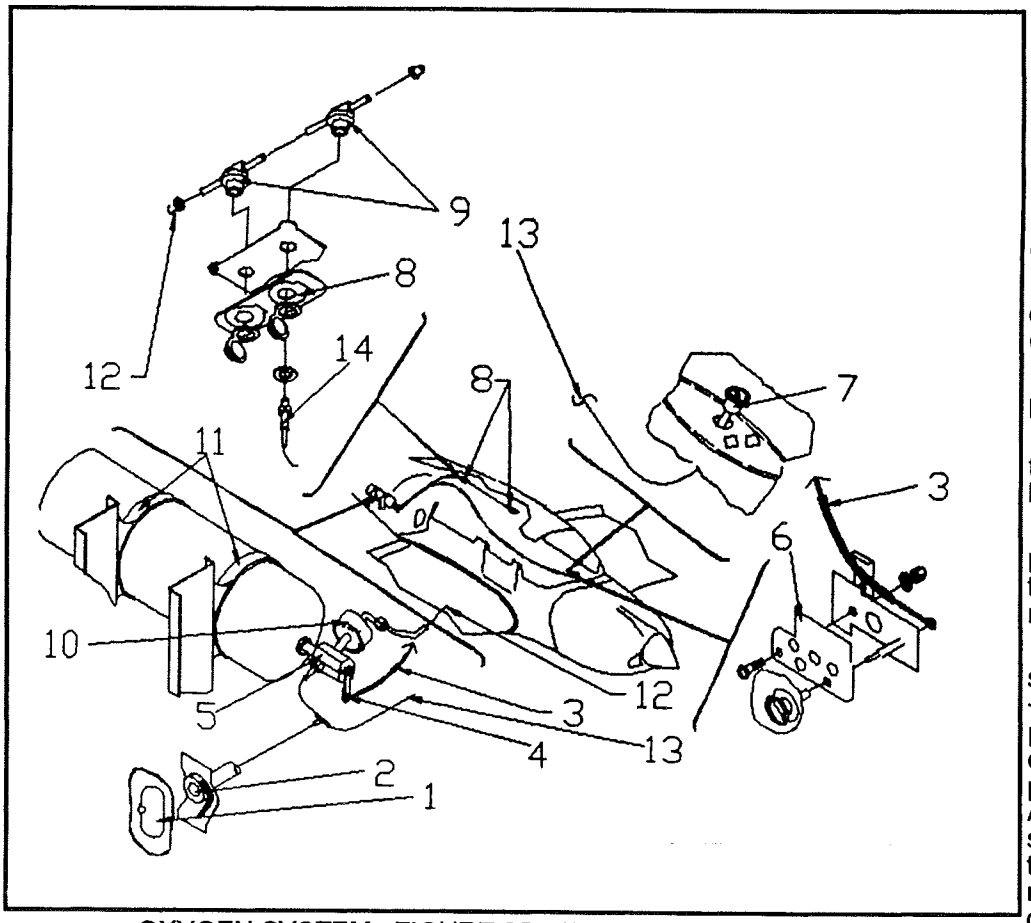
Oil, grease or other lubricants in contact with oxygen create a serious fire hazard; such contact must be avoided when handling oxygen equipment.

WARNING

NO SMOKING when refilling oxygen cylinder.



OXYGEN SYSTEM FIGURE 35 - 1A (25-0001 THRU 25-1999)



OXYGEN SYSTEM FIGURE 35 - 1B (25-2000 THRU 25-TBA)

1.The oxygen cylinder should not be used to less than 100 P.S.I.; contamination may occur to the cylinder and valve. The valve must be removed and the cylinder cleaned and inspected if this happens.

2. Refill the cylinder with aviators oxygen Specification No. MIL-O-27210, through the Oxygen Servicing Access Door (1) (**Figure 35-1A or-1B**). No special fittings are required for this servicing, however several types of standard oxygen fittings are in use and a compatible fitting for the Scott Recharging Valve (2) must be used.
Mooney P/N 870025-501 oxygen recharge hose assembly is recommended.

3. The cylinder contains 1850 P.S.I. at 21° C. (70° F.) when fully charged. Temperature has an affect on the correct charging pressure; See Section 12-10-04 and (**Figure 12-1**) for pressure vs. temperature charging pressure.

35-00-02 - MAINTENANCE PRACTICES

(Ref: AC 43.13-1(B), chap. 8, para. 363)

1. The control cable (3) is attached to an actuating arm (4) on reducing valve (5). This cable is routed through various bulkheads along left side panel to control (6) at pilots position. The control is a push-pull cable assembly that is activated by a control lever assembly for S/N 25-0001 thru 25-0780 and a rotating knob assembly for S/N 25-0781 thru 25-TBA. The supply gauge (7) located adjacent to this control indicates the pressure of oxygen available in system.

2. The pilot's & co-pilot's outlets (8) and passenger outlets (9) should be inspected for damage and cleanliness during servicing.

3. Inspect each individual oxygen mask, and fittings (14) for damage.

4. Oxygen system test procedures.

A. Remove oxygen line from regulator and plug the line.

B. Cap open regulator port with a clean plastic cap to prevent contamination of regulator.

C. Conduct low pressure system leak test using a 70 +/- 10 PSI oxygen supply plugged into one of the cabin outlets and a test gauge plugged into another outlet. Apply 70 +/- 10 PSI to the system; allow 2 minutes for the system to stabilize; remove oxygen supply. The drop in pressure after 15 minutes shall not exceed 5 PSIG.

D. Remove temporary plug and ensure that the cylinder is charged to capacity.

E. Conduct high pressure test using cylinder pressure. Using supply gauge on pilot's side wall, note cylinder pressure. There shall be no pressure loss after 30 minutes.

F. If leakage exists apply MIL-L-25567, leak test solution to suspected areas. After test, wipe clean and dry. Make necessary repairs and retest.

5. Oxygen system purging.

Offensive odors may be removed from oxygen system by purging. The system should also be purged any time the lines are left open and subject to contamination. Purging is accomplished by connecting a recharging cart into system and permitting oxygen to flow through lines and outlets until any offensive odors have been carried away.

WARNING
Avoid making sparks and keep all burning cigarettes or fire away from vicinity of airplane when outlets are in use. Inspect filler connection for cleanliness before attaching it to filler valve. Make sure that your hands, tools, and clothing are clean, particularly from grease and oil stains, for these contaminants will IGNITE upon contact with oxygen.

The following procedures are recommended to purge the system:

A. Connect a recharge cart to the filler valve (2). Set cart pressure regulator to deliver 50 PSI to system.

B. Plug an oxygen mask into each outlet (8) & (9) in cabin.

C. Open cabin door and place control knob (6) in half open position.

D. Allow system to purge for one hour. If offensive odor still lingers, continue purging system for an additional hour. If such odors still remain, replace supply cylinder. After system has been adequately purged, remove masks from outlets (8) & (9). Place control knob in closed position and service system as described in 35-00-01.

6. Oxygen cylinder removal.

The oxygen cylinder is located in tailcone, aft of baggage compartment bulkhead. Access to cylinder is obtained thru radio compartment access door or left side of aircraft behind left wing.

WARNING
Keep fire, cigarettes and sparks away from vicinity of oxygen cylinder. Oil and grease will IGNITE upon contact with oxygen under pressure.

A. Place pilots control lever/knob (6) in closed position.

B. Gain access to cylinder through large radio compartment door.

C. Slowly loosen supply line fittings at cylinder valve (5), (reference **Figure 35-1A or B**), to relieve any pressure that may exist in supply lines (12 & 13). After pressure is relieved, remove lines.

D. Disconnect control cable (3) from arm (4) on reducing valve (5).

E. Cap all open lines (12) & (13) and regulator openings (5) & (10) with clean metal caps.

F. Note relative position of regulator valves (5) & (10) and control arm (4) prior to removal.

G. Loosen clamps (11) retaining cylinder, while supporting cylinder.

H. Carefully remove cylinder and regulator from its position.

7. Oxygen cylinder installation.

A. Place new cylinder and regulators into position in clamps (11) and secure. New cylinder should be positioned with regulator valves and control arm in same position as removed cylinder assembly components.

B. Remove caps from lines (12) & (13); carefully inspect all connections for damage or any foreign substance before connection to new cylinder and valves.

C. Connect all lines (12) & (13) to proper fitting and connect control cable (3) to arm (4) on reducer valve (5).

D. Charge cylinder, if required, to correct pressure, see recharging table on **(Figure 35-2)**.

E. Place pilots contol lever/knob (6) to OPEN position.

F. Plug one oxygen mask (14) into pilots outlet (8) to check for proper system operation.

G. Repeat this checkout procedure for all outlets (8) & (9).

H. Test system for leaks per leak test check, paragraph 35-00-02, D.

H. Reinstall radio compartment access door in tailcone.

NOTE
Oxygen cylinders must be hydrostatic tested every 3 years in accordance with DOT Code of Federal Regulations, Title 49, chap. 1, para. 173.34.

NOTE
All oxygen cylinders must be replaced every 10,000 recharge cycles.

NOTE
Maximum life for composite oxygen cylinders is 15 years.

NOTE
Maximum life for light weight steel oxygen cylinders is 24 years.

Filling pressures will vary due to ambient temperature at filling area and the rise of temperature resulting from compression of oxygen. Because of this, merely filling to 1850 PSIG will not result in a properly filled cylinder. Fill to pressures indicated on **Figure 35-2** for ambient temperatures.

AMBIENT TEMPERATURE (° F)	FILLING PRESSURE PSIG	AMBIENT TEMPERATURE (° F)	FILLING PRESSURE PSIG
0	1650	50	1875
10	1700	60	1925
20	1725	70	1975
30	1775	80	2000
40	1825	90	2050

OXYGEN FILLING PRESSURES vs. TEMPERATURES - FIGURE 35-2

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VACUUM

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VACUUM

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37-00-00 - GENERAL

An engine driven dry air vacuum pump supplies suction for vacuum operated gyroscopic flight instruments: Dirctional Gyro and Artificial Horizon. The air is passed through several filters before entering instruments. A vacuum regulator valve is incorporated to maintain required operating vacuum throughout the engine power range. Idle RPM settings will normally not provide adequate vacuum to satisfactorily operate instruments.

A vacuum annunciator light will illuminate and flash when vacuum drops below the setting required to operate instruments.

A standby vacuum system kit is available for M20K aircraft. This kit can be installed by the factory or in the field. The standby vacuum system should be activated manually when "low vac" light flashes on regular engine driven system. Refer to Vendor Manual for standby vacuum system repair. Aircraft with optional radar installation use vacuum pump (outlet) pressure side to pressurize RTA compartment in right wing.

37-10-00 - DISTRIBUTION

37-11-00 - DRY AIR PUMP

A dry air pump (1) (**Figure 37-1**) requires no maintenance between replacement. Replacement is recommended at 500 hours & at engine overhaul.

NOTE

Always replace inoperative pump with new air pump.

37-11-01 - MAINTENANCE PRACTICES

Protection of pneumatic dry air pump when cleaning engine compartment is very important.

WARNING

Failure to protect dry air pump from contamination by engine cleaning solvents may result in failure of dry air pump within a short period of operation.

Prior to washing down engine compartment, the following precautions must be taken for better service life of pneumatic dry air pump.

1. Dry air pump coupling.

CAUTION

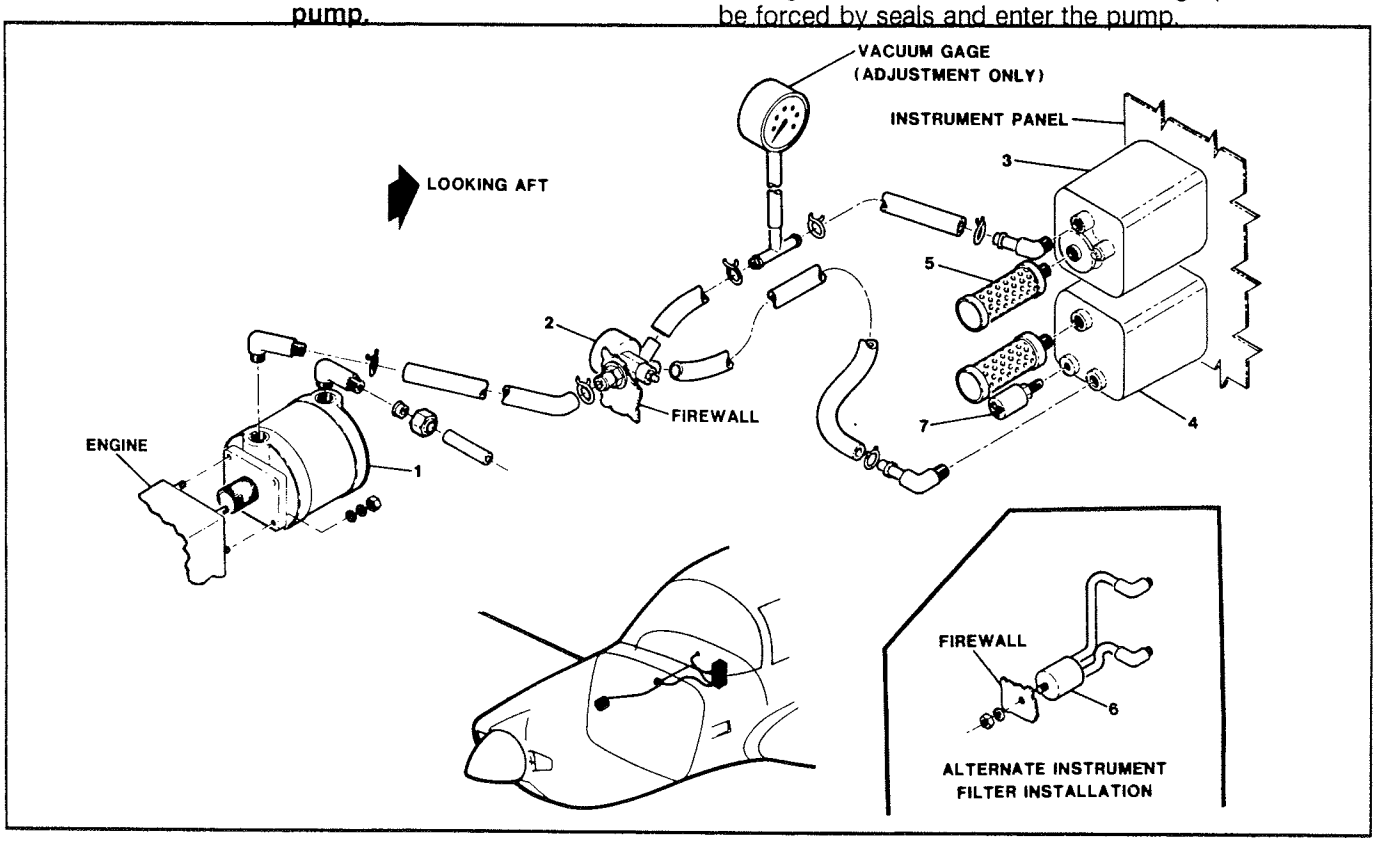
Do not blast air pump coupling area or other pneumatic system components with cleaning solvent under high pressure.

Protect coupling area between pump mounting flange and pump housing by wrapping a protective covering around that area during engine cleaning.

CAUTION

Do not allow protective covering around coupling or filters to become saturated with solvent.

The seals in front frame of housing behind coupling are designed to keep out foreign material such as dirt, dust and light fluid. However, fluid under high pressure can be forced by seals and enter the pump.



VACUUM SYSTEM FIGURE 37 - 1

2. Dry air pump fittings. Before washing engine off, check pump fittings for looseness of threaded fittings. Fluid can seep through loose threads and enter pump.

3. Dry air pump discharge hose (vacuum instrument system) Plug end of the hose or fitting and flag it with a red "Remove Before Running Engine" tag, then clean engine.

CAUTION
Remove plug prior to running engine.

37-11-02 - SERVICING

The dry air pump requires no servicing. The internal parts are self-lubricating and require NO ADDITIONAL lubricating.

37-11-03 - REMOVAL

1. Disconnect hoses from dry air pump.
2. Remove air pump from engine and discard old mounting gasket and locking hardware.
3. Remove fittings from pump. Retain fittings if they are serviceable; clean thoroughly before re-using. Discard twisted fittings and nuts with rounded corners.
4. Pad inspection. Check condition of AND 20000 pad seal. If seal shows any signs of oil leakage, replace seal. Replace seal if there is any doubt as to its serviceability.

37-11-04 - INSTALLATION OF NEW PUMP

CAUTION
Never install a pump that has been dropped.

1. Consult airframe manufacturer's current parts manual, Airborne's Application List, or PMA label on the pump box to verify that the pump is correct model for engine and/or system.
2. Place pump mounting flange in a jaw-protected vise, with drive coupling downward. Protect pump mounting flange with soft metal or wood.

CAUTION
Pump housing should never be placed directly in a vise, since clamping across center housing will cause an internal failure of carbon rotor.

3. Spray fitting thread with silicone and LET DRY. DO NOT use teflon tape, pipe dope or thread lube.
4. Install fittings in pump. Hand tighten.
5. Use only a box wrench to tighten fittings to desired position. DO NOT make more than one and one half (1 1/2) turns beyond hand-tight position.
6. Install new pump mounting gasket (supplied with new pump).
7. Always replace ALL locking washers when installing a new pump. Tighten all four (4) mounting nuts - 90 to 110 in. lbs.
8. Prior to reconnecting hoses, inspect inside of the hose carefully to make sure it is clean and free of all debris, oils or solvents. Use vacuum or air pressure to clean lines. Remove hoses from the aircraft if necessary. When hose clearance is tight, making it difficult to reinstall onto pump fitting, spray fitting at hose end with silicone. LET DRY, then install hose by pushing it straight on.

CAUTION
Do not wiggle hose from side to side. Wiggling could cause particles to be cut from hose ID. These particles would damage the pump.

CAUTION
Change all filters in the system. This must be done or pump warranty may be voided.

37-12-00 - VACUUM REGULATOR

The vacuum regulator (2) (Figure 37-1) is a spring-controlled diaphragm valve for regulating vacuum for aircraft pneumatic instrument system. The vacuum regulator is located on left firewall, inside cabin, just under glareshield. Adjust vacuum regulator valve according to Section 37-12-05.

37-12-01 - MAINTENANCE PRACTICES

Check general condition of regulator to insure it is secure and in airworthy condition.

37-12-02 - SERVICING

No servicing is required to the regulator other than filter replacement. See Section 37-13-00 for details.

37-12-03 - REMOVAL

1. Underneath instrument panel, remove both instrument lines from vacuum regulator; cap to prevent foreign objects from entering them.
2. Engine compartment, remove hose from vacuum regulator; cap to prevent foreign objects from entering.
3. Loosen and remove large nut at firewall on vacuum regulator.
4. Pull regulator aft to remove from aircraft.

37-12-04 - REINSTALL

1. Inside aircraft, insert vacuum regulator thru mounting hole in firewall.
2. Install large nut on regulator and tighten.
3. Engine compartment, install hose from pump to regulator and secure.
4. Inside aircraft, install both instrument lines to regulator and secure.

37-12-05 - ADJUSTMENT

1. Tee a calibrated vacuum gauge into system upstream of regulator, (see Figure 37-1).
2. Operate engine at a minimum of 1700 engine RPM. If vacuum regulator is not set at 4.75 +/- 0.25 In. Hg., then bend locking tab away from thumb adjustment screw. Turning screw in, will increase vacuum; turning screw out, will decrease vacuum. Set vacuum to read 4.75 +/- .25 In. Hg.

NOTE
After setting regulator, re-bend tab back to lock adjusting screw.

37-13-00 - FILTERS

All filters, except vacuum regulator filter are of paper-pleated material design. The vacuum regulator filter is a foam-garter design.

37-13-01 - MAINTENANCE PRACTICES

1. Air filter replacement intervals:
   A. Vacuum regulator filter (2) every 100 hours.
   B. Instrument filters (5) at least once a year(see Chapter 5-10-01)
2. All filters require routine inspection of condition of element and security of filter in system.
3. **All filters must be changed when a new pump is installed.**

37-13-02 - SERVICING

All filters require no service except routine inspections. Replace with new current configuration filters.
The alternate instrument filter installation (6) (Figure 37-1) should follow the same cleaning and replacement schedule.

37-13-03 - REMOVAL

1. Vacuum regulator garter filter is removed by stretching it over and off regulator frame.
2. Gyro instrument filters unscrew from the back of the instruments.

37-13-04 - INSTALLATION

1. Prior to installing a new vacuum regulator filter, check regulator to insure that it is clean from any foreign material.
2. Reinstall new filter in fitting and tighten.

CAUTION
Don't over tighten; overtightening will crack rear housing.

37-14-00 - HOSES

The hoses are of the aircraft MIL-H-type.

37-14-01 - MAINTENANCE PRACTICES

During engine cleaning, protect the discharge hose:
1. Plug end of hose and flag it with a red "Remove Before Running Engine" tag, then clean engine.

CAUTION
Remove plug prior to running engine.

Periodic check of all clamps for security is recommended.

37-14-02 - SERVICING

Inspect inside of hose carefully to make sure it is clean and free of all debris, oils or solvents. Use vacuum or air pressure to clean lines. Remove hoses from aircraft if necessary.

37-14-03 - REMOVAL

Replace old, hard, cracked or brittle hose, particularly on pump inlet. Sections of inner layers may separate, causing pump failure.

37-14-04 - REINSTALL

Where hose clearance is tight, making it difficult to reinstall it onto pump fitting, spray fitting at hose end with silicone. LET DRY, then install hose by pushing it straight on.

NOTE
Do not wiggle hose from side to side. Wiggling could cause particles to be cut from hose ID. These particles would damage the pump.

Make certain hoses are connected to correct fittings. Incorrect installation will cause damage to gyro system. Install clamps and secure.

37-20-00 - INDICATING

The indicating system contains a low vacuum light which illuminates (flashes) when vacuum is below 4.25 +/- .2 In. Hg. and a high vacuum light which illuminates (steady) when vacuum goes 5.5 (+.2-.0) In. Hg. or above.

37-21-00 - VACUUM SWITCH

The vacuum switch (7), Fig. 37-1, is located on either the Artificial Horizon (3) or Directional Gyro (4). The illuminating low and high light adjustments are done at switch, not on annunciator panel.

37-21-01 - DESCRIPTION

The switch is a low and high vacuum sensing adjustable unit.

37-21-02 - MAINTENANCE

Check for switch security in instrument and all wires secure at switch.

37-21-03 - REMOVAL

Disconnect wires and unscrew from aft instrument housing.

37-21-04 - REINSTALL

Install switch in housing and tighten. Reconnect wires.

CAUTION
Do not over tighten. Over tightening will cause cracking of aft instrument housing.

37-21-05 - ADJUSTMENT

1. Remove switch from instrument. Reinstall wires if removed. Attach poly-vinyl hose, "T" fitting and calibrated gauge to vacuum switch. Connect other end of hose to a vacuum source.
2. Turn aircraft power on. The "low vac" light should flash.
3. Apply vacuum and adjust source to 4.25 (+/- .2) In. Hg. Adjust Low setting screw (connector end of switch) to illuminate low vacuum circuit on annunciator panel.
4. Increase vacuum source to 5.5 (+.2-.0) In. Hg. Punch a small jewelers screw driver through poly-vinyl tube and into fitting where high setting screw is located and adjust until "HI/LOW VAC" light on annunciator is illuminated.

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5. After completion of switch adjustment, turn aircraft power - OFF.

6. Remove switch from hose and gauge.

7. Reinstall switch in Gyro. Reconnect wires.

CAUTION
Crossing electrical wires on vacuum switch will cause annunciator lights to act in reverse.

37-22-00 - VACUUM GAUGE ADJUSTMENT

SIGMA TEC VACUUM GAUGE INSTALLATIONS

It is necessary to calibrate the Sigma Tec vacuum gauge to the transducer whenever either is replaced; use the following procedures:

1. Remove gauge from cluster.

2. Remove two (2) screws from rear of gauge case and slide case from gauge.

3. Obtain or construct adaptor cable (See Figure 37-2 for schematic).

4. Connect plug end into connector in rear of case.

5. Connect socket end of adaptor cable into gauge connector. The 2 Pin connector is for the DVM.

6. Tee in a calibrated Vacuum Gauge down stream of vacuum regulator.

7. Apply vacuum to aircraft system. Use separate vacuum supply or stand-by vacuum pump.

8. With Digital Volt Meter (DVM) connected to 2 Pin connector on adapter harness, check excitation voltage for 10 VDC. Adjust R2 (vertical adjust screw on top right of C/B on gauge) if necessary

9. Adjust R4 (upper potentiometer in center of C/B, right screw) so gauge reads 3 in. Hg.

10. Set regulator for 5 in. Hg.; adjust R3 (lower potentiometer in center of C/B, left screw) so that gauge reads 5 in. Hg.

11. Repeat Steps 9. & 10. as needed to obtain values.

12. Remove adaptor cable; reassemble gauge to case.

13. Re-install assembled gauge unit into cluster case.

14. Adjust regulator for 4.8 in. Hg.

15. Verify aircraft instrument reads same as calibrated gauge.

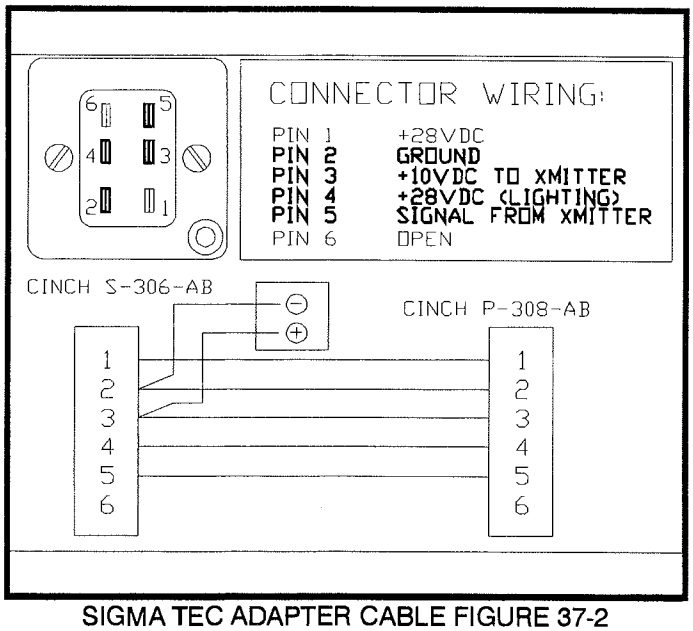
16. Remove Calibrated gauge after verification.

37-30-00 - DRY AIR PUMP REPAIR

It is not recommended that the Airborne Dry Air Pump be repaired. Remove the faulty pump and install a new pump and all new filters.

37-30-01 - COUPLING INSPECTION AND REPLACEMENT (FIGURE 37-3)

1. Remove vacuum pump from engine in accordance with maintenance manual, SECTION 37-11-03.



SIGMA TEC ADAPTER CABLE FIGURE 37-2

2. If coupling (1) has sheared, remove engine coupling drive gear (2) from engine gear housing and see SECTION 37-30-02 below.

3. Use a screwdriver or similar tool, remove pump drive coupling (1) from engine coupling drive gear (2) and pump drive gear (3) being careful not to damage drive pins.

4. Push new drive coupling (1) into place on coupling drive gear (3).

5. Push engine coupling drive gear (2) into place on pump drive coupling (1).

6. Turn by hand, check for rotation of pump.

7. Reinstall pump on engine and test run (refer to SECTION 37-11-04)

8. Make log book entry.

NOTE
After installation, if regulator valve requires adjustment refer to Section 37-12-05.

37-30-02 - DRY AIR PUMP INSPECTION

VACUUM PUMPS ARE A NON-REPAIRABLE UNIT. Remove malfunctioning pump and replace with new pump.

NOTE
After installation if regulator valve requires adjustment refer to Section 37-12-05.

37-40-00 - STAND BY VACUUM SYSTEM (OPTIONAL)

37-40-01 - SERVICING, STAND-BY VAC.

Refer to manufacturers service and maintenance data for the particular unit installed.

If no specific maintenance information is available from the manufacturer the following is recommended:

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1. Inspect to verify hoses and wires are clear of any obstruction or interference with other components that may chafe hoses or wires.

2. Inspect hose clamps on all fittings to verify tight and secure.

3. Every 100 hour/annual inspection - inspect set screws in motor/air pump coupling for tightness and security.

4. A dry air pump requires no maintenance between replacement. Replacement is recommended at 500 hours operating time. It is recommended that stand-by vacuum system operating time be documented.

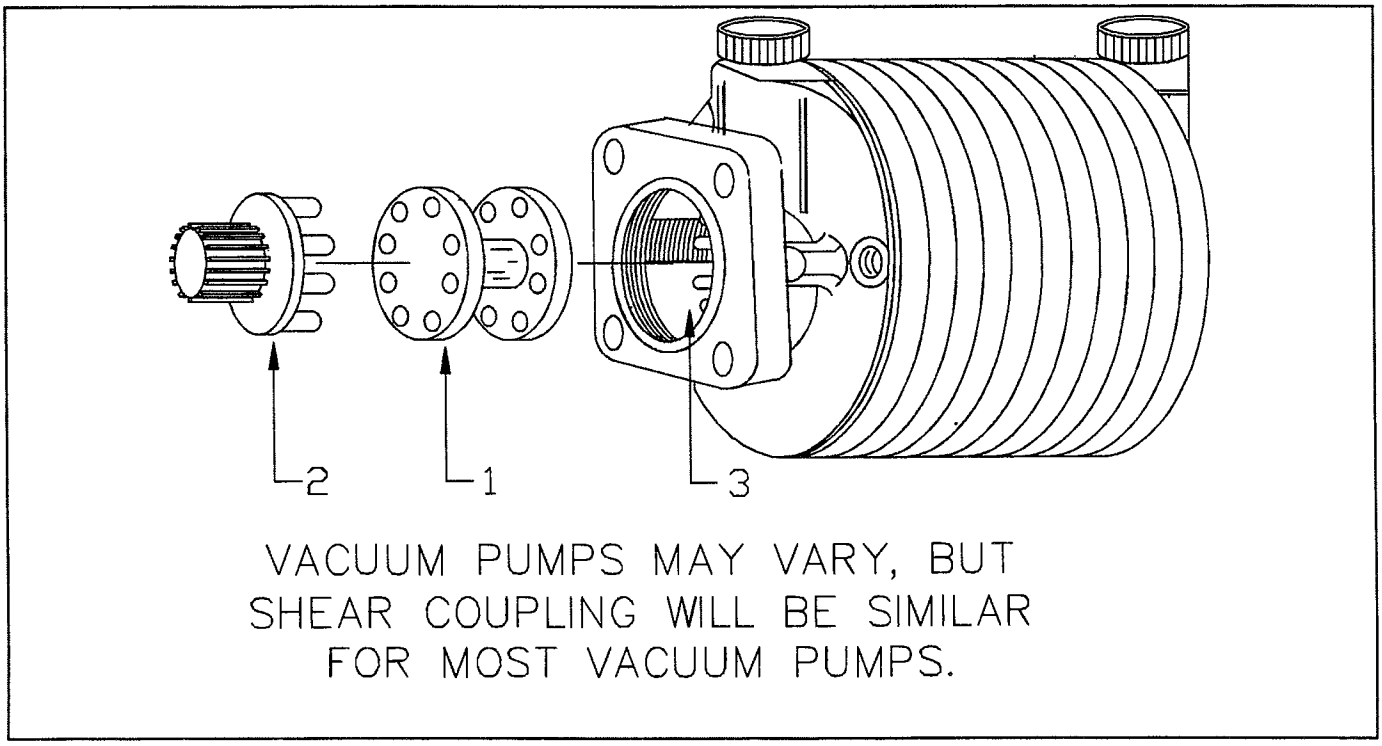
5. It is recommended that if the Stand-by Vacuum System is not used regularly, that every 90 days (approximately) the Stand-by Vacuum System should be turned on, in flight, for 20 - 30 minutes to get the pump and drive motor warm enough to dry out any condensation that may have accumulated. The exhaust port of the dry air pump is routed into the housing of the electric motor to assist in purging moisture and debris from the motor assembly.

37-41-00 - OPERATIONAL PROCEDURES

The Optional Stand-by Vacuum pump for the M20J is located in the tailcone. Its location is standard, but can vary slightly depending on optional equipment installed on aircraft.

The Stand-by pump is to be used only as needed when the main Vacuum pump malfunctions. The VAC annunciator light will illuminate (RED) either flashing (low vacuum) or steady (high vacuum) when this situation occurs. If annunciator light is flashing RED, push STBY VAC switch ON and annunciator light should extinguish as stand-by vacuum system takes over for all instrument operation.s. If annunciator is steady RED, monitor flight instruments with non-vacuum gauges and continue with flight if feasible, or land and have vacuum system inspected and repaired.

It is recommended that prior to aircraft engine start, the stand-by vacuum pump be turned ON to verify that the vacuum gauge (if equipped) indicates normal operating vacuum and that the gyros spin up and erect. When the engine starts the check valve closes and the stand-by vacuum pump system will not produce enough additional vacuum for any indication on the gauge (if equipped) to be noticeable.



DRY AIR PUMP COUPLING INSPECTION FIGURE 37 -3

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CHAPTER 39

ELECTRICAL PANELS AND COMPONENTS

CHAPTER 39

ELECTRICAL PANELS AND COMPONENTS

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CHAPTER 39

ELECTRICAL PANELS AND COMPONENTS

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39-00-00 - GENERAL

The instrument panel is divided into three basic groupings:

(1) Flight Instruments
(2) Avionics/Radio Panel
(3) Engine Instruments and Circuit Breaker Panel.

The flight instrument panel is shock mounted. The radio/avionics panel generally, has individual racks for the components and are of the quick removal type. The engine instruments and circuit breaker panel are located in a quick removal panel which is slanted toward the pilot.

The circuit breaker/switches for the standard and/or optional accessories and equipment are located at the bottom of the flight instrument panel on either side of the pilots control column.

The cluster gauge containing fuel quantity and engine operating gauges is located at the top of the flight instrument panel.

The annunciator is located at the top of the avionics panel.]The avionics panel has two configurations: Serial Numbers 25-0001 thru 25-0246 has a tubular structure configuration that will not accept the radar installation; Serial Number 25-0247 and ON aircraft have a relocated steel tubular structure that will allow the radar indicator to be installed.

The panel illustration depicted in Figure 39-1 shows phantom lines for some installations. Model year improvements, technical improvements or various avionics installations dictate which instrument will be installed in a given location.

See Section 91 for Electrical System Hardware Charts and Schematics.

39-10-00 - INSTRUMENT AND CONTROL PANELS

39-10-01 - FLIGHT INSTRUMENTS

1. Removal.

A. Remove screws attaching glareshield and cover plate; carefully lift glareshield to expose disconnects for glareshield lights. Disconnect wires and lift glareshield off.

B. Disconnect plumbing and/or electrical connections from flight instruments to be removed.

C. Disconnect and remove any post lights.

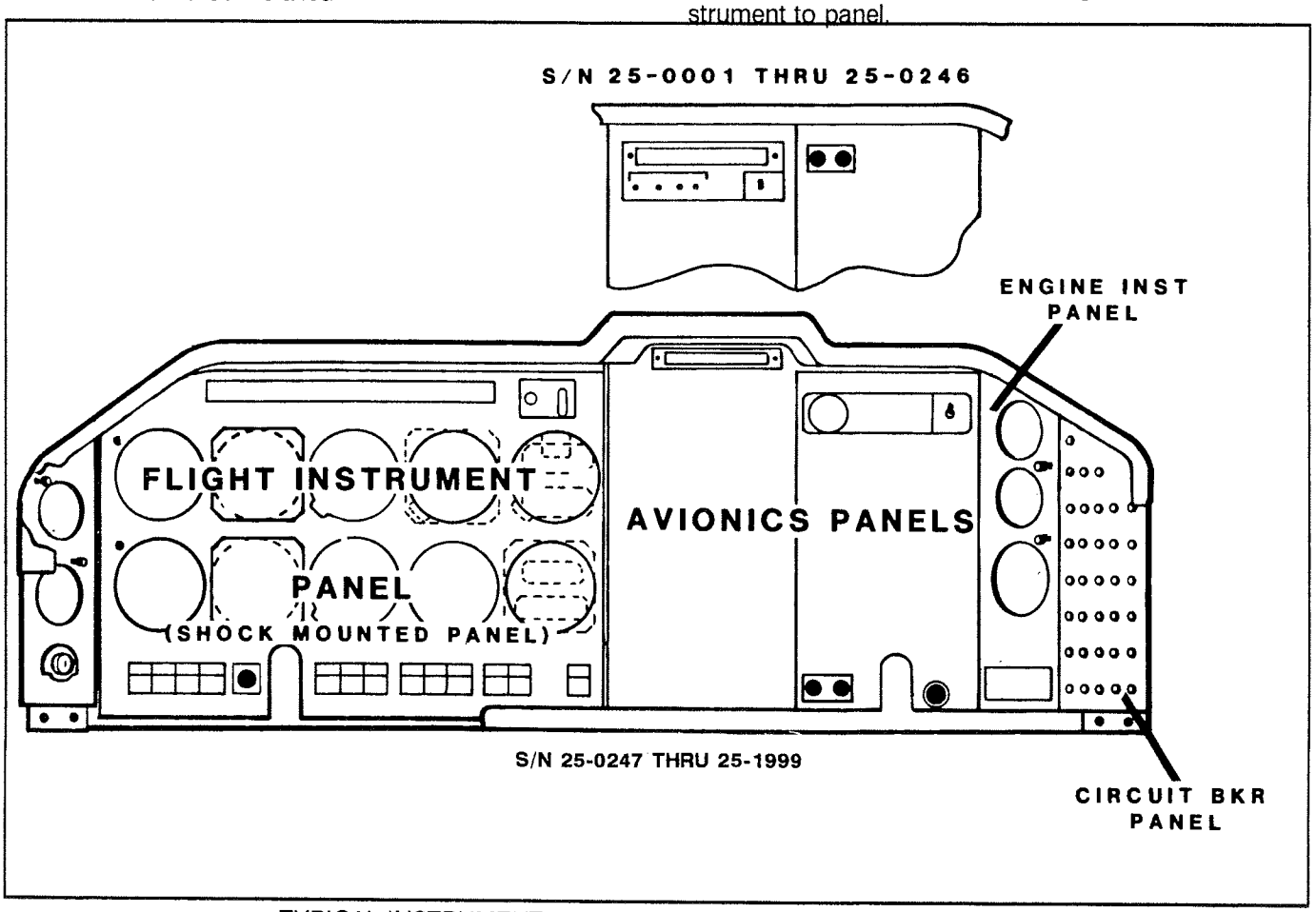
D. Remove mounting screws securing instrument to panel.

E. Remove instrument by sliding it aft from panel.

2. Installation.

A. Place instrument into proper location on panel.

B. Insert and secure mounting screws to hold instrument to panel.



TYPICAL INSTRUMENT AND CONTROL PANELS FIGURE 39 - 1

C. Connect post lights.

D. Connect all plumbing and/or electrical connections to instrument; perform pitot-static leak check.

E. Position glareshield so electrical connections can be made and secured.

F. Secure glareshield and cover plate with screws.

39-10-02 - AVIONICS EQUIPMENT

Each avionics package installed is basically a customized package to meet the requirements of the customer. Wiring harness, any associated plumbing or mechanical mechanisms required for a particular avionics installation are well secured to prevent any interference with other components. Removal of these avionics components will require evaluation of each installation to determine proper procedure or sequence to follow.

1. Removal.

Most individual avionics components are mounted in slide out chassis racks. Loosen screw on the face of component and slide unit straight aft to remove.

Some components are not mounted in slide out chassis. Removal of these units will require same sequence as removal of flight instruments in Section 39-10-01.

CAUTION

Radio panel must be stacked from the bottom to the top.

2. Installation. Install repaired or new unit in reverse sequence of removal.

39-10-03 - ENGINE INSTRUMENTS AND CIRCUIT BREAKERS

The engine instruments/circuit breaker panel is an assembly that can be pulled out as a unit for removal of any instrument or circuit breaker.

1. Removal.

A. Remove glareshield - refer to Section 39-10-01.

B. Remove two flat head screws on outside of airplane (B) (**Fig. 39-2**). These are located forward of cabin door hinge and above cabin air inlet scoop approximately 4 inches below windshield.

C. Remove two screws from face of panel at upper left corner (C) (Figure 39-2).

D. Remove two screws (D) from underneath, near the edge of panel face.

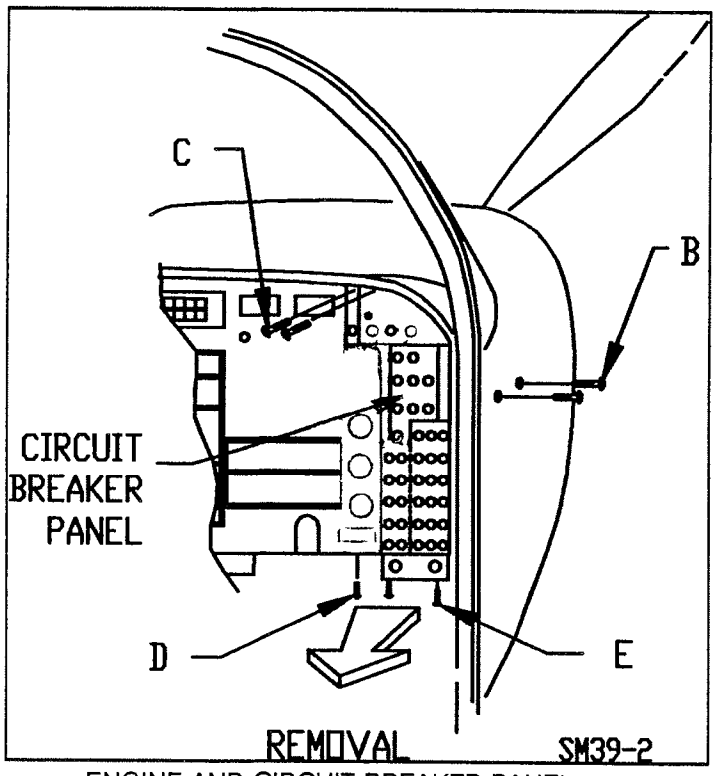
E. Remove NAS21919DG clamp (E) from steel structure cross brace, underneath panel forward section, see (Figure 39-2).

F. The panel should now be free to slide aft approximately 4-5 inches. This will allow access to plumbing and electrical connections.

G. Remove plumbing or electrical connections from instrument or component that will be removed.

NOTE

In some instances instruments, other than the one to be removed, must be temporarily removed or, at least, some wiring or plumbing disconnected to gain access to the desired unit.



ENGINE AND CIRCUIT BREAKER PANEL
FIGURE 39 - 2

H. Remove thin lexan glass insulation strip if required when removing components.

I. Remove instrument by removing any post lights and mounting screws which secure instrument to panel and pull forward. Remove circuit breakers by unscrewing nut from stem on each circuit breaker and push circuit breaker through panel.

2. Installation.

A. Installation of new instrument or circuit breaker into panel is accomplished in reverse sequence of removal.

B. Insert lexan insulator sheet in proper location to prevent any short circuits.

39-11-00 - FLIGHT INSTRUMENT PANEL

The flight instrument panel is a shock mounted panel containing various flight instruments for a particular installation group. These instruments vary slightly depending upon avionics package installed. The panel contains a row of circuit breaker/switches, along with the master switch, which control most of the systems of the airplane.

Access for maintenance of switches or related wiring is obtained by removing two attachment screws and pushing switch through panel. There is a common bus bar on some switches that will require loosening or removal for switch replacement.

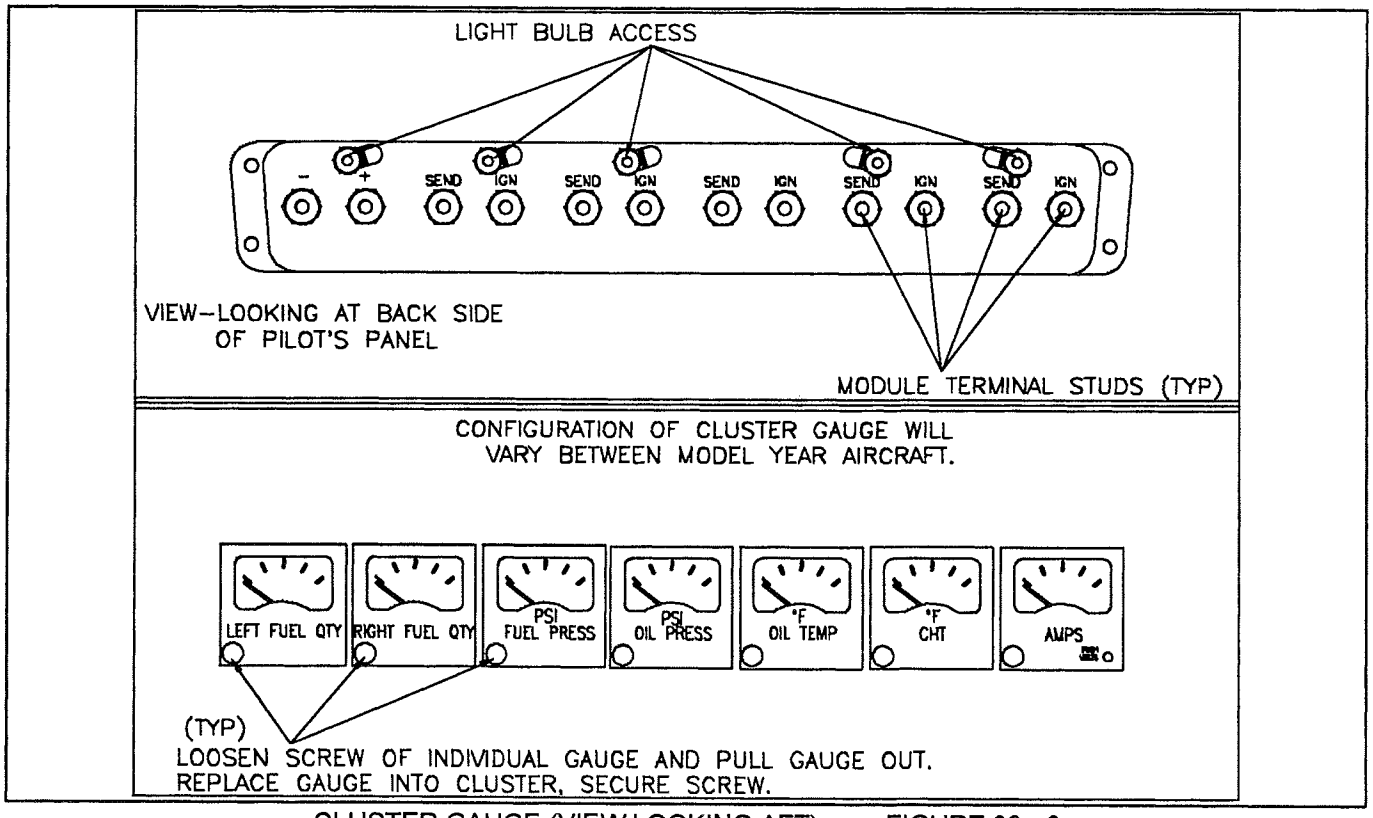
CAUTION

Care should be exercised when replacing wiring or switches to ensure proper alignment of terminal connections to prevent shorting between switches.

39-11-01 - CLUSTER GAUGE

The cluster gauge is located at the top of the flight panel. Access is obtained by removing glareshield per section 39-10-01. Cluster gauges have the capability of individual module replacement. The entire cluster gauge will require removal from panel to allow room to pull modules out.

To remove entire cluster gauge, the wiring harness can be disconnected at connector adjacent to cluster gauge unit. The nuts on terminal studs need to be removed so wire terminals can be pulled from studs to remove modules from cluster gauge chassis. Remove and replace defective module.



CLUSTER GAUGE (VIEW LOOKING AFT) FIGURE 39 - 3

TROUBLE SHOOTING GUIDE FOR CLUSTERS

PRESSURE INSTRUMENTS

GAUGE CONDITION	CHECK FOR THESE POSSIBILITIES
Gauge reads full scale with engine shut down.	Wire between sender and gauge disconnected or open. Faulty sender. Faulty gauge.
Gauge reads zero when engine is running.	Wire between sender and gauge grounded. Faulty sender. Faulty gauge.

TROUBLE SHOOTING GUIDE FOR CLUSTERS (con't.)

TEMPERATURE INSTRUMENTS

GAUGE CONDITION	CHECK FOR THESE POSSIBILITIES
Gauge reads full scale with engine cool or cold.	Wire between sender and gauge grounded. Defective gauge. Defective sender.
Gauge reads zero when engine is hot.	Wire between sender and gauge is open or disconnected. Defective gauge. Defective sender.

FUEL SYSTEM

GAUGE CONDITION	CHECK FOR THESE POSSIBILITIES
Gauge indicates tank empty.	Grounded wire between sender and gauge. Defective sender. Inoperative gauge.
Gauge indicates past full when tank is less than full.	Open sender lead. Open sender (open resistance element). Sender not properly grounded to airframe. Gauge off calibration. **Note:** Some clusters are equipped with fuel gauges that have trim pots and may need re-calibration.
Gauge indicates 1/2 when tank is full.	On dual sender systems, the isolated sender may be grounded. The lead between the isolated sender and the grounded sender is grounded. Either sender defective. Gauge out of calibration.

39-11-02 - LANDING GEAR SWITCH

The landing gear switch is a two position switch located at the top right side of the flight instrument panel. The wheel shaped knob must be pulled aft prior to raising or lowering the switch to activate the landing gear actuator.

1. The glareshield will require removal to gain access to switch for maintenance action (refer to Section 39-10-01).

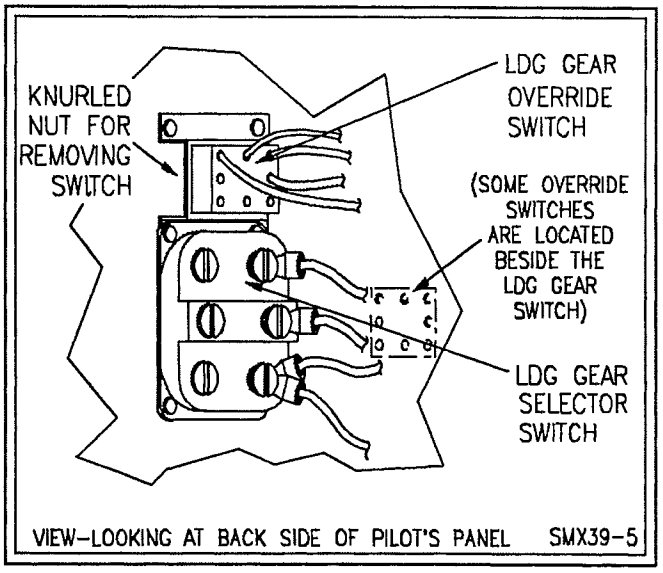
2. Remove wire connections from back of landing gear switch.

3. Turn wheel shaped knob counterclockwise to remove from stem.

4. Remove nut and washer from face of switch and push switch through panel.

39-11-03 - LANDING GEAR SAFETY OVERRIDE SWITCH

The landing gear safety override switch is located adjacent to landing gear switch. Proper operation of landing gear safety system will not allow gear to retract below 65 +7/-4 KIAS.



LANDING GEAR SWITCH & LANDING GEAR SAFETY OVERRIDE SWITCH

FIGURE 39-4

CAUTION
Activation of gear safety override switch while aircraft is on the ground may cause landing gear to retract.

1. The landing gear switch or cluster gauge will require removal to gain access for the removal of override switch.

2. Disconnect wire connectors, approximately 6 inches from switch, by cutting with wire cutters or opening knife disconnects.

3. Loosen nut on stem and hold nut located inside mounting bracket. The red lens may need to be removed to fully remove switch from panel and bracket.

4. The light bulb (GE 330, 12 volt); GE 327, 28 volt) can be replaced after glareshield is removed by bending a nail or similar rod (approximately 3/32" diameter) and pushing red lens off to front of panel. Use a small vacuum tube puller or soft nosed instrument to pull bulb from socket.

39-12-00 - AVIONICS/RADIO PANEL

The avionics/radio panel contains equipment installed per sales order by Mooney Aircraft and other equipment installed by other sources as the owner desires. The maintenance information contained in this Service and Maintenance Manual describes the Mooney factory installation only.

The avionics/radio components are removed and installed according to Section 39-10-02, 1 and 2.

39-12-01 - ANNUNCIATOR PANEL

The annunciator panel is located at the top of center-most avionics/radio panel and is not mounted with a slide in type chassis. Remove this component by removing two screws holding cover plate in position. Remove glareshield and disconnect electrical harness from back side of unit. Remove screws holding unit in place on panel and remove from back side of panel.

LOW FUEL WARNING CIRCUIT CALIBRATION. Refer to Section 24-33-00 paragraph 4.

39-12-02 - EMERGENCY LOCATOR TRANSMITTER (ELT) SWITCH

The remote ELT switch is located at the top of the avionics panel. The ELT is located in tailcone and is accessible by removing radio access panel on left side of aircraft fuselage. The ELT antenna is located on top of tailcone underneath fiberglass dorsal fin. The unit has a three position switch "ON", "OFF" and "ARM". The correct position of this switch is "ARM". The remote switch is connected in parallel to ELT circuit and will operate correctly either in "ARM" mode or "ON" mode. Normal operation is in "ARM" position. Place the remote switch in "ON" position and tune communication radio to 121.5 Mhz to verify that a warbling tone is heard. Place remote switch back to "ARM" position for normal operation.

CAUTION
Testing of ELT should be conducted only during first five (5) minutes after any hour and no longer than three (3) audible sweeps.

1. If warbling tone is not heard replacement of ELT battery or the unit may be necessary. Follow ELT manufactures instructions for battery replacement.

2. If ELT unit is found to be operating properly and system still will not work correctly through the remote ELT switch, repair or replacement of switch or wiring will be required.

A. To gain access to remote switch and wiring, removal of glareshield will be required (refer to section 39-10-01).

B. Remove switch retaining nut and washer and push switch through face of panel. Disconnect wires, remove and replace defective switch.

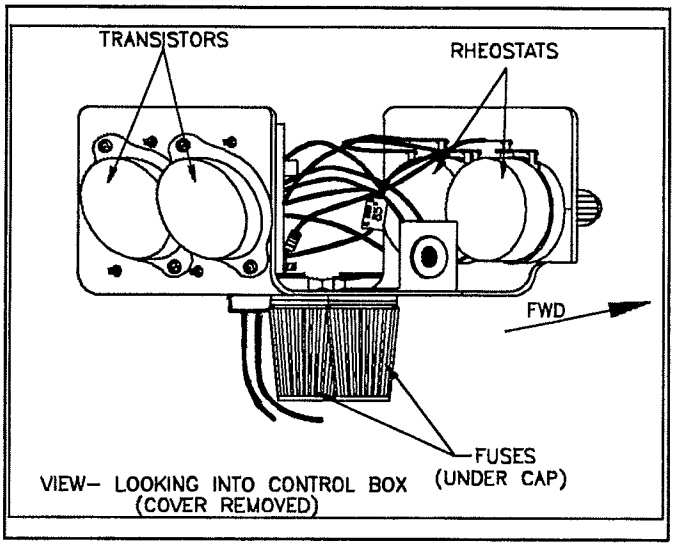
C. Reconnect wires and test switch for proper operation.

D. Reinstall glareshield.

NOTE
Other switches located in ELT placard area of avionics panel can be removed and replaced in similar manner.

39-12-03 - INSTRUMENT AND RADIO LIGHT CONTROL BOX

The control box for instrument, radio and glareshield lights consists of two variable rheostat switches, two transistors, two fuses and miscellaneous wiring contained in a metal box assembly. The light control box for S/N 25-0001 thru 25-0246 is located at the top of radio panel. The light control box for S/N 25-0247 and ON is located at the bottom of radio panel. The transistors installed in M20K aircraft, S/N 25-0001 thru 25-0279, P/N 2N2016, are no longer being manufactured. The replacement transistors are included in a spares modification kit, P/N 919003-907**, which includes a transistor, resistor, and instruction sheet describing modification procedures.
** The kit will **modify one circuit only**, two kits are required for both circuits. **



INSTRUMENT AND RADIO LIGHT CONTROL BOX
FIGURE 39 -5

S/N 25-0280 thru 25-0999 (12 Volt) have a different light control assembly using a different transistor and circuitry. (See **Figure 39-5**).

NOTE
A retrofit kit is available to use the latest light control assembly in older 12 volt aircraft (940013-511 Kit).

Check appropriate schematics for proper wiring.

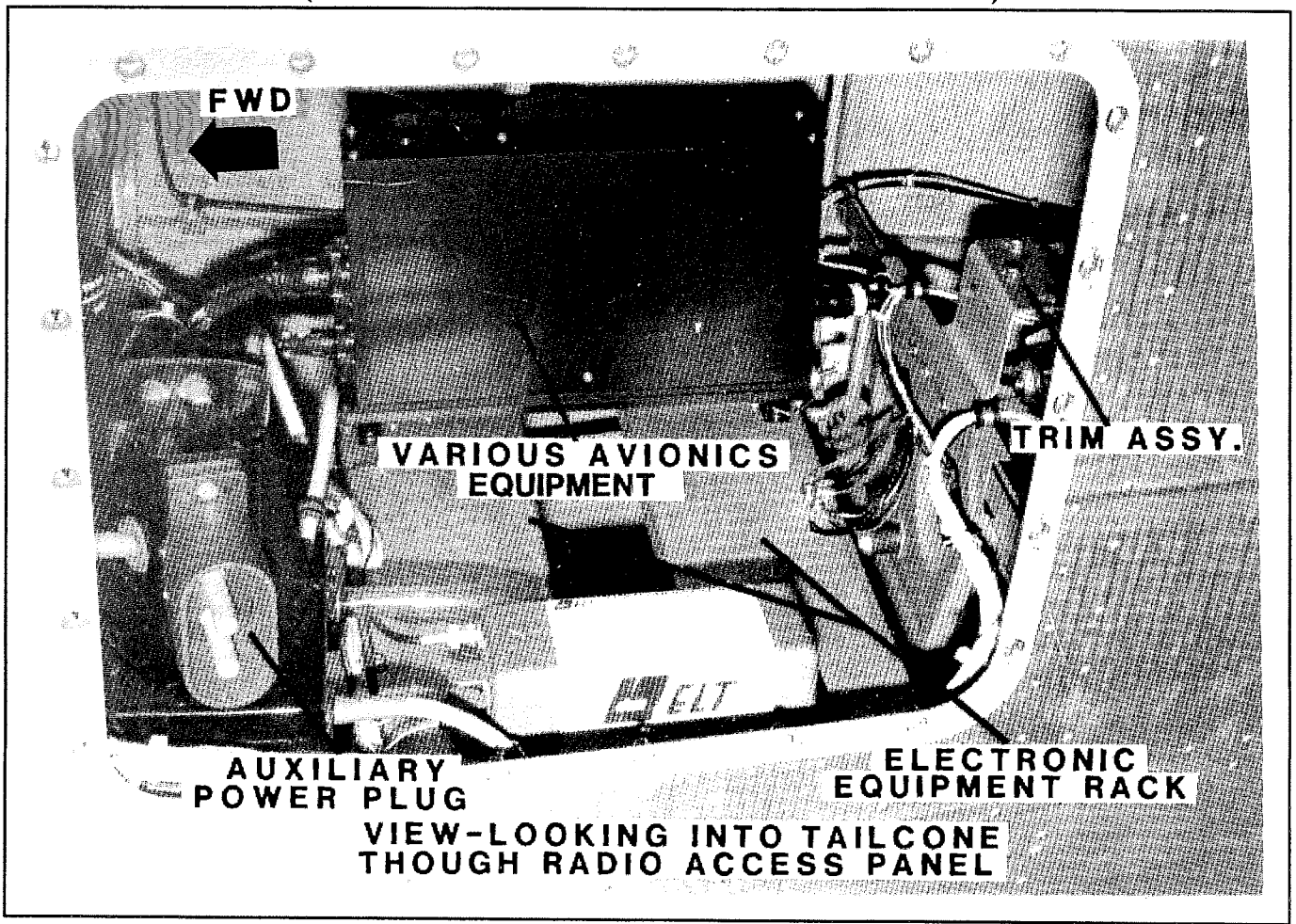
39-12-04 - CIGAR LIGHTER

The cigar lighter is located at the bottom of radio panel immediately to the right of co-pilots control column shaft. It is a standard cigar lighter similar to automotive type.

39-20-00 - ELECTRICAL/ELECTRONIC EQUIPMENT RACK

The electrical equipment rack for M20K aircraft is located in tailcone just aft of baggage compartment bulkhead. Access is gained through the large access door in tailcone, aft of the left wing trailing edge. The battery and battery box, auxiliary power plug receptacle (if installed), ELT and the various avionics black boxes are mounted on electrical equipment rack. (See Figure 39-6) (12 volt A/C only). 24 Volt A/C have the ELT mounted on an accessory rack further aft in tailcone.

(ILLUSTRATION REPRESENTS 12 VOLT CONFIGURATION)



ELECTRICAL/ELECTRONICS EQUIPMENT RACK FIGURE 39 - 6

CHAPTER 53

FUSELAGE

CHAPTER 51

STRUCTURES

CHAPTER 51

STRUCTURES

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CHAPTER 51

STRUCTURES

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51-00-00 - GENERAL

The Mooney M20K is an all metal, low wing airplane. The fuselage cabin area is constructed of a welded 4130 chrome-molybdenum steel tubular structure. The steel tubular structure is covered with non-structural aluminum skins fastened to the tubular structure by rivets, bolts and screws.

The tailcone is of semi-monocoque type construction and is fastened to the tubular structure with structural bolts.

The wing is a tapered, laminar flow, one piece wing. It is constructed with a one piece, full length main spar. The spar is constructed from tapered cap strips (7075 aluminum) bolted (huck bolts) to webs (2024 aluminum). Aluminum ribs connect the main spar to the aft stub spar and the rear spar. Extruded stringers run the full length of the wing, spaced chordwise for strength and skin reinforcement. The skins are stretch formed, wrap around, 2024-T3 aluminum ranging in thickness from .025 at the tip to .050 at the fuel tanks.

The completed wing assembly is mated to the fuselage tubular structure during final assembly at the Mooney facility. Removal of the wing from the fuselage structure is essential for most over land type transportation.

The empennage is of similar construction to the wing. A main spar spans the length of the stabilizer. Ribs connect the main spar to the stub and rear spar. A stretch formed skin wraps around the leading edge ribs and attaches to the rear spar on top and bottom.
The elevators are constructed of formed aluminum skins fastened to a spar extrusion at the leading edge and riveted together at the trailing edge.
The vertical stabilizer is constructed around a fabricated main spar assembly with ribs connecting the main and rear spar. A stretch formed, aluminum skin wraps around the leading edge ribs and is riveted to the rear spar on both sides.
The rudder is constructed of formed aluminum skins fastened to a spar extrusion at the leading edge and riveted together at the trailing edge.

A one piece composite belly skin covers the underside of the aircraft from the exhaust cavity aft to the tailcone.

The front seats are installed on rails which are attached to the floorboard and structure beneath the floorboard.

The M20K has a split type rear seat, using seat cushions in molded wells over the wing spars and individually reclining rear seat backs.

51-10-00 - STRUCTURAL REPAIR - GENERAL

This section outlines structural repair procedures for the M20K airplane. It is intended to supplement FAA Advisory AC 43.13-1( ) by showing repair methods specific to Mooney airplanes.

All structural repair must be: in compliance with AC 43.13-1( ), unless specific Mooney factory repairs are recommended, or with the specific approval of a Federal Aviation Administration representative which is the final authority in all repairs. This manual is for general guidance and has no authorized approval status. The PRODUCT SUPPORT DEPARTMENT, Mooney Aircraft Corporation, Kerrville, Texas, should be consulted for special repair procedures when repair of damaged structure is not covered by published instructions.

51-10-01 - FASTENER REPLACEMENT

1. HUCKBOLT INSTALLATION. The Huck Lockbolt is an interference fit fastener used in a rigid joint structure. A loose or slip fit Huckbolt is unacceptable. The recommended limits for Huckbolt holes are:

Huck Fastener	Pre-Drill Size	Drill Size	Hole Limits
2LPH-T5	No. 26 (.147 IN.)	No. 20 (.161 IN.)	.161 to .1635 IN.
ALPPH-T6	No. 18 (.1695 IN.)	No. 13 (.185 IN.)	.185 to .187 IN.
R3001-T6	No. 18 (.1695 IN.)	No. 13 (.185 IN.)	.185 to .187 IN.
2L426H-T5	No. 26 (.147 IN.)	No. 20 (.161 IN.)	.161 to .1635 IN.
R3007-T6	3/16 (.187 IN.)	No. 7 (.201 IN.)	.2005 to .2025 IN

When the Huckbolt is enlarged beyond the above limits but is straight and round, the hole may be considered acceptable, provided that the Huckbolt cannot be pressed into the hole, with normal hand pressure, to a depth more than 50 percent of the heaviest material being secured. Check enlarged hole size at both ends. Select Huckbolts to fit the oversize holes.

Oversize Huckbolt holes may be repaired by replacing 2LPH-T5 Huckbolts with ALPPH-T6 Huckbolts or with NAS 623-2 screws and NAS 1021 No. 8 Hex-lock nuts (or equivalent), provided the pitch distance is greater than .56 inches and the edge distance is greater than .33 inches. Huckbolts ALPPH-T6 and R3001-T6 may be replaced with R3007-T6 Huckbolts as necessary. Consult the Product Support Department, Mooney Aircraft, Corporation, Kerrville, Texas, for factory recommendations when the preceding instructions are inadequate to accomplish the repair.

To compensate for material thickness tolerances, Huckbolt length may be increased by one dash number from the prescribed length. When a Huckbolt pin of the proper length is not available, use a pin of the next longer length. To adjust the grip length, install a cadmium-plated steel washer .065 inch thick (or a combination of not more than two washers .065 inch and .032 inch thick) under the Huckbolt collar. The combined thickness of any two washers shall not exceed .098 inch. Huckbolts or conical Keystone Lock blind rivet heads may be cocked no more than .004 inch. Not more than 20 percent of the fasteners in any pattern, nor more than three fasteners in succession, may be cocked.

NOTE

Where access is limited or for replacement/repair the following substitution is permissible.

HUCKBOLT P/N	SUBSTITUTE P/N (VENDOR)	DESCRIPTION
NAS 1465 or R3001-T5	HL20-5 Pin (Hi-Shear) HL86-5 Collar Tension 160 KSI Ftu	Pin-Protruding
NAS 1466 or R3001-T6	HL20-6 Pin (Hi-Shear) HL86-6 Collar Tension 160 KSI Ftu	Pin-Protruding
NAS 1475 or R3014-T5	HL19-5 Pin (Hi-Shear) HL94-5 Collar Shear - 95 KSI Fsu	Pin-100 D. Flush
NAS 1476 or R3014-T6	HL19-6 Pin (Hi-Shear) HL94-5 Collar Shear - 95 KSI Fsu	Pin-100 D. Flush

PART NUMBER CODE
HL20 - 5 - 8

- 8 — Grip in 1/16ths" (8/16 = .500) MAX
- 5 — Nominal Dia. in 1/32nds" (5/32 = .156)
- 20 — Pin Part Number

2. RIVET REMOVAL AND REPLACEMENT.

A. REPLACEMENT-STANDARD SIZE RIVETS, HOLE OVERSIZE. This repair applies only to original aluminum alloy, steel, or monel rivets of 1/16, 3/32, 1/8, and 5/32 inch diameters. Such rivets may be replaced as noted and limited below and in the General Limitations, when the hole only is oversize.

(1) Protruding Head Joint. If the edge distance is a minimum of two times the diameter of the original rivet, it will be permissible to drill for and install the next standard size larger diameter rivet of the same type and material as the original rivet.

(2) Machine Countersink Joint, Method I. If the edge distance is a minimum of two times the diameter of the next standard size larger diameter rivet and the sheet thicknesses involved are within the limits specified for machine countersinking for the next standard size larger diameter rivet, it will be permissible to drill and countersink for and install the next size rivet of the same type and material as the original rivet. The following are limits for machine countersinking:

RIVET SIZE	MIN. GAUGE
3/32	.025
1/8	.032
5/32	.040

(3) Machine Countersink Joint, Method II. If the edge distance is a minimum of two times the diameter of the original rivet, it will be permissible to drill for and install the next standard size larger diameter rivet of the same type and material as the original rivet. Do not remachine the countersink. After installation, mill the excess head height flush with the surface.

(4) Dimpled Joint. If the edge distance is a minimum of two times the diameter of the original rivet, it will be permissible to drill for and install the next standard size larger diameter rivet of the same type and material as the original rivet. Do not redimple. After installation, mill the excess head height flush with the surface. This method is subject to the same limitations as paragraph 2, A (3).

B. REPLACEMENT-STANDARD SIZE RIVETS, HOLE AND COUNTERSINK OR DIMPLE OVERSIZE. This repair applies only to original countersunk head aluminum alloy rivets of 1/16, 3/32, 1/8, and 5/32 inch diameters. Such rivets may be replaced (as noted and limited below) when the hole and countersink or dimple is oversize.

(1) Machine Countersink Joint. If the edge distance is a minimum of two times the diameter of the next standard size larger diameter rivet and the countersink depth is not beyond the thickness of the countersunk sheet, it will be permissible to rework according to paragraph 2, A (3).

(2) Dimpled Joint. If edge distance is a minimum of two times the diameter of the next standard size diameter rivet and all the parts are dimpled, it will be permissible to rework the smaller dimples to a size to match the oversize dimple and install the next standard size larger diameter rivet of the same type and material as the original rivet. Dimples in 75S-T6 must be hot formed when reworked.

(3) Combined Countersink and Dimpled Joint. If the edge distance is a minimum of two times the diameter of the next standard size larger diameter rivet, it will be permissible to rework the smaller countersink or dimple to a size to match the oversize dimple or countersink and install the next standard size larger rivet according to paragraph 2, A (4). Dimples in 75S-T6 must be hot formed when reworked.

C. RIVET HEAD TOLERANCE.

(1) A rivet head will be considered open if .001 feeler gauge can be inserted between the head of the flush or protruding head rivet and the top skin. The top of a flush head rivet must not be below the skin in which it is installed by a dimension of more than .004.

D. RIVET HOLE TOLERANCE.

(1) An enlarged hole is defined as having an internal diametric dimension in any direction which exceeds the sum of the drill diameter normally used plus ten percent of the diameter of the rivet shank.

(2) The **following table** specifies the maximum acceptable diametric dimensions for the various rivet sizes that occur in multiple layer assemblies which are "drilled on assembly".

NOMINAL RIVET SIZE	MAX. ACCEPTABLE DRILL SIZE	DIAMETRIC DIMENSION
AN470AD3 or AN426AD3	#40 (.098 dia.)	108 in.
AN470AD4 or AN426AD4	#30 (.1285 dia.)	141 in.

(3) When a hole becomes enlarged beyond the acceptble diametric limit and the prescribed rivet cannot be used, the next larger diameter rivet may be used if (a) four-diameter (4D) rivet spacing is maintained and if (b) two-diameter (2D) edge distance is maintained.

3. BLIND RIVET INSTALLATION. Ordinarily, where rivet bucking is impossible, CherryLock (CR-2248 and CR-2249) rivets may be substituted for AD rivets to repair skins and structural members. However, consult the CUSTOMER SUPPORT Department or a representative of the Federal Aviation Administration before using blind-type or hollow rivets in primary structure.

CAUTION

The use of blind rivets normally require more frequent inspection of the area where used. Inspect for evidence of loosening of the rivet(s) or crack development that may cause deterioriation of structural integrity. Solid rivet replacement of blind rivets is recommended at earliest possible maintenance.

Check existing rivet hole size before installing blind rivets. When hole is marginal, use the next larger size rivet to assure firm attachment.

4. "AN"- BOLT, NUT AND WASHER INSTALLATION. To compensate for material thickness tolerances, the length of AN bolts may be increased or decreased by one dash number from prescribed length. AN960 regular washers and AN960L thin washers may be used interchangeably for proper bolt and nut installation.

One regular washer or one thin washer may be added to any bolt installation. Washers may be used under the bolthead and/or under the nut. AN365 and AN363 nuts may be used interchangeably. The AN363 nut is acceptable for higher operating temperature installations.

5. HI-SHEAR RIVET INSTALLATION. When a hi-shear rivet pin of the prescribed length is not available, the next longer length pin may be used with cadmium-plated steel washers to adjust the pin grip length. The combined washer thickness shall not exceed .096 inch.

6. MS20470-AD4 or MS20426-AD4 rivets may replace spotwelds, (1) per spot unless alternate fasteners are specified on engineering drawing. Head side and double flush requirements determined by form, fit & function of assembly.

51-11-00 - RESERVED

51-12-00 - FUSELAGE REPAIR

51-12-01 - TUBULAR STRUCTURE REPAIR

Check tubular structure at each annual inspection for corrosion and damage. Interior panels may require removal to gain access to areas which are difficult to inspect.

Refer to AC 43.13-1( ) for tubular frame repair procedures. Warped or bent tube members can often be straightened; however, all surrounding welds should be dye checked for cracks after tube straightening.

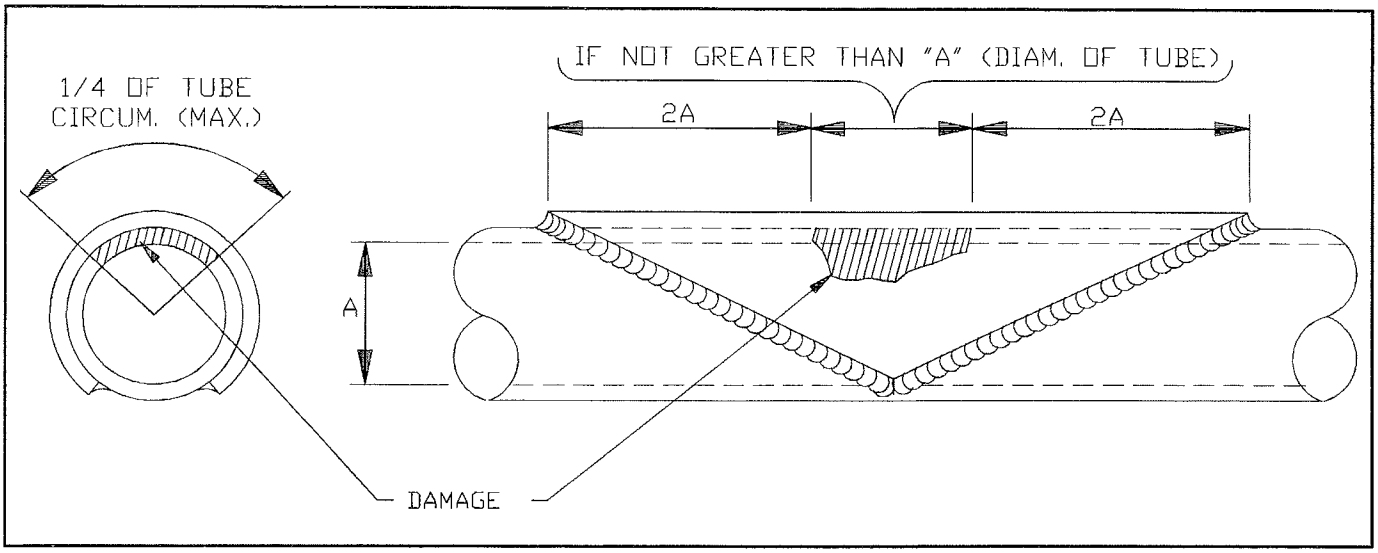
Use proper material when making weld repairs. Welding rod, meeting the requirement of specification MIL-R-5632, class 2, is recommended for oxyacetylene welding. Electrodes meeting the requirement of specification MIL-F-5632-A, class 2, MIL-E-23765/1C, Type MIL-70S-2, or AWS A5.18-69, class E70S-2 (Linde 65, Linde CMS-32, or Page AS-35) are recommended for unheat treated parts inert-gas shielded-arc welding (Heliarc). Use AISI 4130 condition N steel for replacement and repair of tubes, and for making repair sleeves. Replacing a member or subassembly is often advantageous and more feasible than repair. All detail tubes or assemblies needed for replacement can be purchased from SERVICE PARTS DEPARTMENT, Mooney Aircraft Corporation, Louis Schreiner Field, Kerrville, Texas 78028, U.S.A.

1. WELDED PATCH REPAIR OF LOCAL DAMAGE. Use a welded patch to repair dents, small holes, and cracks no longer than the outside diameter of the tube and covering a maximum of 1/4 of the tube circumference. Drill out the crack, smooth the hole edges, weld the hole or dent, and file the repaired surface smooth. Form a patch that will cover twice the diameter of the tube around the edge of the damaged area and twice the circumferential area of damage as shown in (**Figure 51-1**). Weld patch in place.

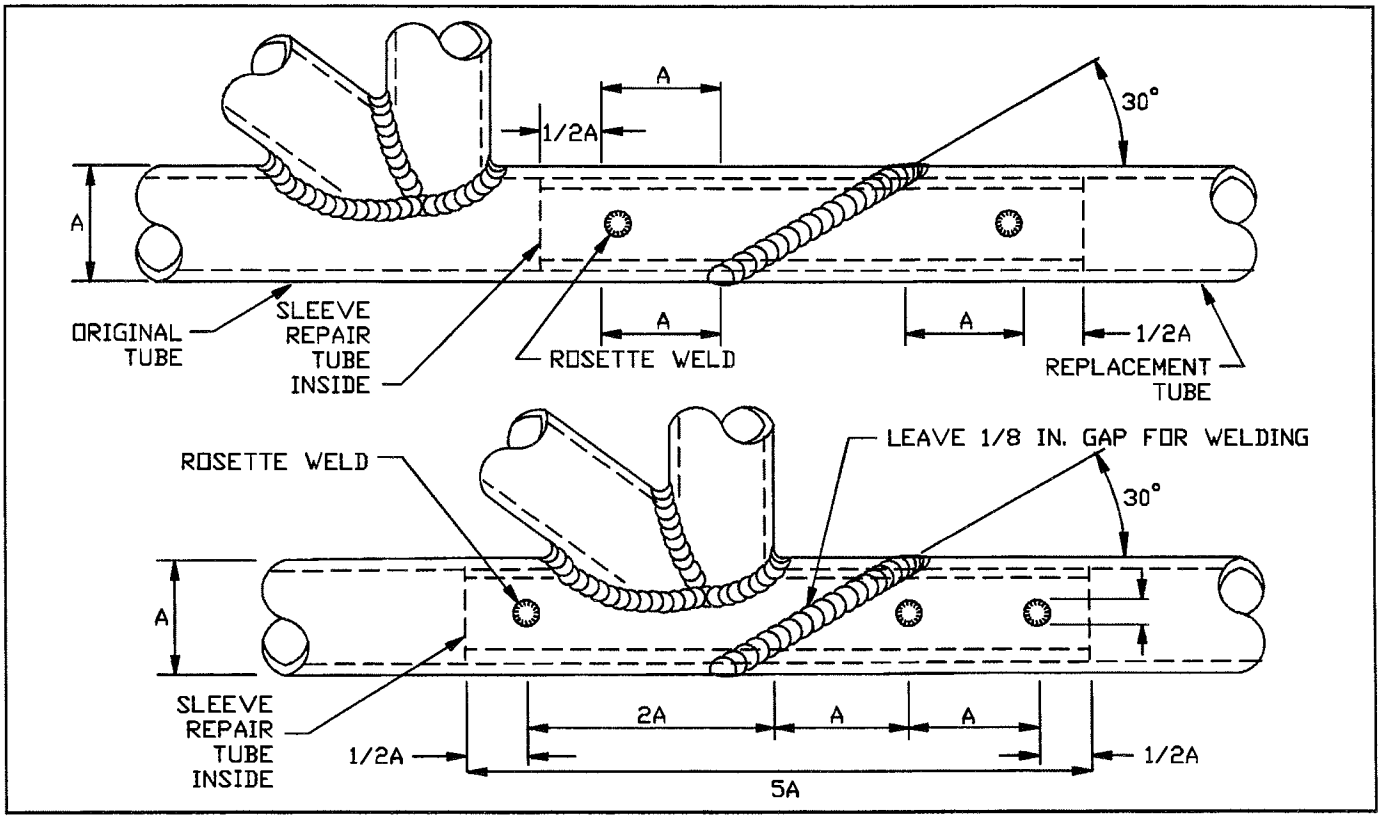
2. INNER SLEEVE SPLICING. Use an inner sleeve splice to partially replace a tube without increasing the outside diameter (see **Figure 51-2**).

A. Make a 30-degree cut to remove the damaged portion of the tube; then, remove the burr from the remaining end.

B. Cut a replacement tube of the same material (AISI 4130 steel, condition N), same diameter and the same wall thickness as the original tube.



WELDED PATCH -LOCAL DAMAGE REPAIR - FIGURE 51-1



INNER SLEEVE SPLICING - FIGURE 51-2

C. Select a tube with an outer diameter equal to the inner diameter of the tube to be repaired and with the same wall thickness.

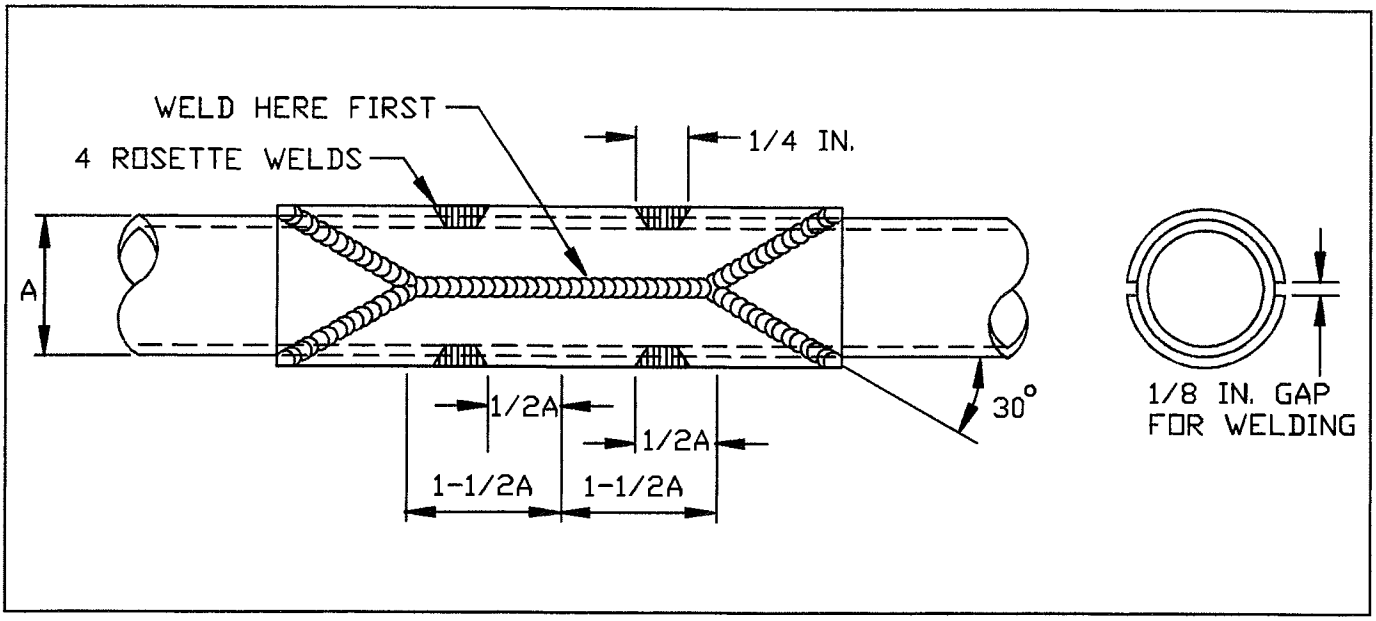
D. Cut tube to a length five times the outer diameter of the tube to be spliced.

E. Install inner sleeve in tube to be repaired so that its outer end is one and one-half of the original tube diameter from the nearest end of the diagonal cut; secure in position with a rosette weld on each side at one-half the original tube diameter from the inner-sleeve end.

F. Install replacement tube over the inner sleeve allowing a 1/8 inch gap for welding between the original and replacement tubes.

G. Weld the inner sleeve to the tube stubs through the 1/8 inch gap, forming an overlayed bead across the gap.

H. Rosette weld the replacement tube to the inner sleeve in two or more places.

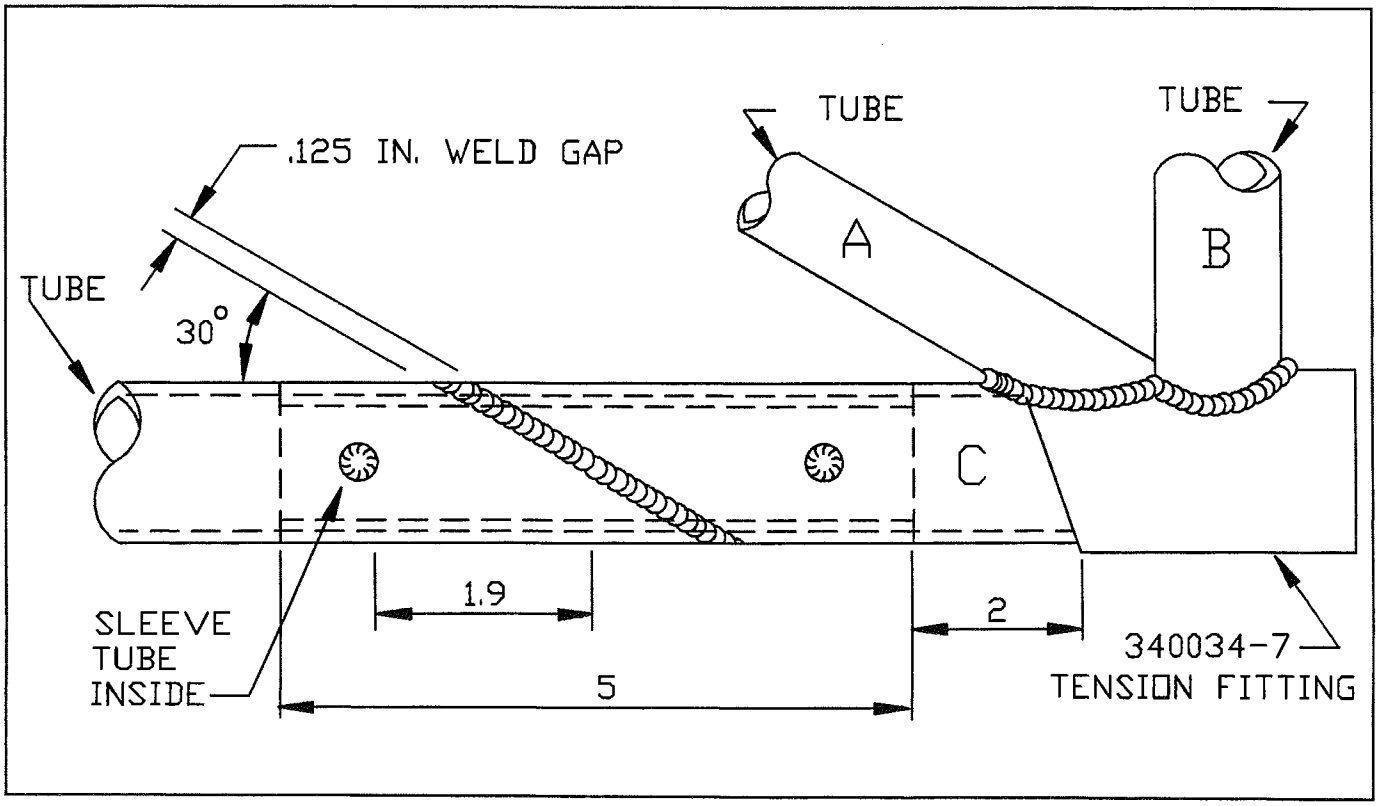


SPLIT-SLEEVE SPLICE - FIGURE 51-3

3. SPLIT-SLEEVE SPLICING. Use the split-sleeve splice to repair a damaged tube when the parts on each side of the damage cannot be separated to insert an inner sleeve (see **Figure 51-3**).

A. Form the split sleeve from steel tube or sheet steel when outside diameter of original tube is less than one inch.

B. Form the split sleeve from sheet steel when outside diameter of the original tube is one inch or more.



TENSION FITTING REPLACEMENT - FIGURE 51-4

C. Form the split sleeve from the same material (AISI 4130 steel, condition N) with at least the same gauge as the original tube.

D. Allow a 1/8 inch gap between sleeve halves for welding.

E. Weld parallel edges of sleeve to original tube through 1/8 inch gaps.

F. Weld center of each sleeve half to original tube with two rosette welds spaced one original tube diameter apart.

4. TENSION FITTING REPLACEMENT (See **Figure 51-4**).

A. Cut A and B tubes loose from tension fitting 340034-7, -8 at welds.

B. Cut C tube at a 30 degree angle seven inches from bottom of tension fitting.

C. Cut a replacement C tube at a 30 degree angle and at an appropriate length to position the tension fitting. Weld tension fitting in proper position.

D. Drill four 1/4 inch holes for rosette welds 1.9 inches from center of 30 degree cut.

E. Make an inner sleeve five inches long from 4130 steel tube, condition N, with outside diameter to match inside diameter of tube C and with a .085 inch wall thickness.

F. Insert the inner sleeve in C tube and weld in place as shown (**Figure 51-4**).

5. REPAIRS FOR WELDED ASSEMBLIES - General. This section does not apply to any control system tubing or assemblies, engine mounts or heat treated steel components (except as stated below).

A. Small holes up to a #20 drill may be closed by welding with the inert gas shielded arc method.

B. Nicks and drill marks that are no longer than 1/8" and do not exceed four percent of wall thickness in depth after cleanup may be smoothed out and reprimed. Nicks, holes, and cracks that will clean up with a #20 drill may be drilled and repaired per item A.

C. The repair of weld beads on heat-treated assemblies may be accomplished without reheat treatment within the following limits.

(1) The repair bead will not exceed .375 in length or 1/3 of total length of weld, whichever is the lesser.

(2) Only one repair per weld bead is allowed.

6. REPAIR OF SPOT WELDS. Failed spot welds on aluminum may be repaired by installing an AD470-4 rivet through the weld if the damaged area will clean up with a #30 drill.

7. DENTS. Small dents which do not exceed five percent of the diameter of the tube in depth and are no longer than one-half the tube diameter are acceptable.

51-12-02 - TAILCONE REPAIRS

1. LONGERON SPLICING. Use procedure outlined in AC 43.13-1( ) for repairing and splicing tailcone longerons. (**Figure 51-5**) shows acceptable methods for splicing longerons. Consult AC 43.13-1( ), Figures 2.28, 2.29 and 2.30 for fastener requirements.

2. TAILCONE STRUCTURAL SKIN REPAIR. Repair minor tailcone skin damage as shown in AC 43.13-1( ), Figure 2.24. The rivet pattern for stressed skin repairs shall be the same as the rivet pattern in the skin joint immediately forward of the damaged area. Replace severely damaged structural skin panels. Install new skin panels to exactly match the original skin installation.

3. NON-STRUCTURAL SKIN REPAIR. The skin covering the M20K aircraft tubular fuselage structure is considered nonstructural. Patches in nonstructural skin are not restricted as to size or shape; however, appearance and possible vibration damage should be considered. Either a flush patch, a plate patch, or a plug patch may be used.

51-12-03 - LANDING GEAR & RETACTION SYSTEM REPAIR

Replace any damaged landing gear or retraction system component with a new part. Repairing landing gear or retraction system components is not recommended. After installing new components, check gear and retraction system rigging as outlined in Section 32-20-02. Before returning the aircraft to service, perform a retraction test and operational check of the landing gear and retraction system per Section 32-30-01.

51-12-04 - FLIGHT CONTROL SYSTEM REPAIR

Replace any damaged primary control system component with a new part. Repairing primary control system components is not recommended. Use only new hardware when installing new parts. After installation of new parts, check control system travel and rigging as outlined in Chapter 27 Before returning the aircraft to service, flight test the aircraft for proper control system rigging.

51-13-00 - WING REPAIR

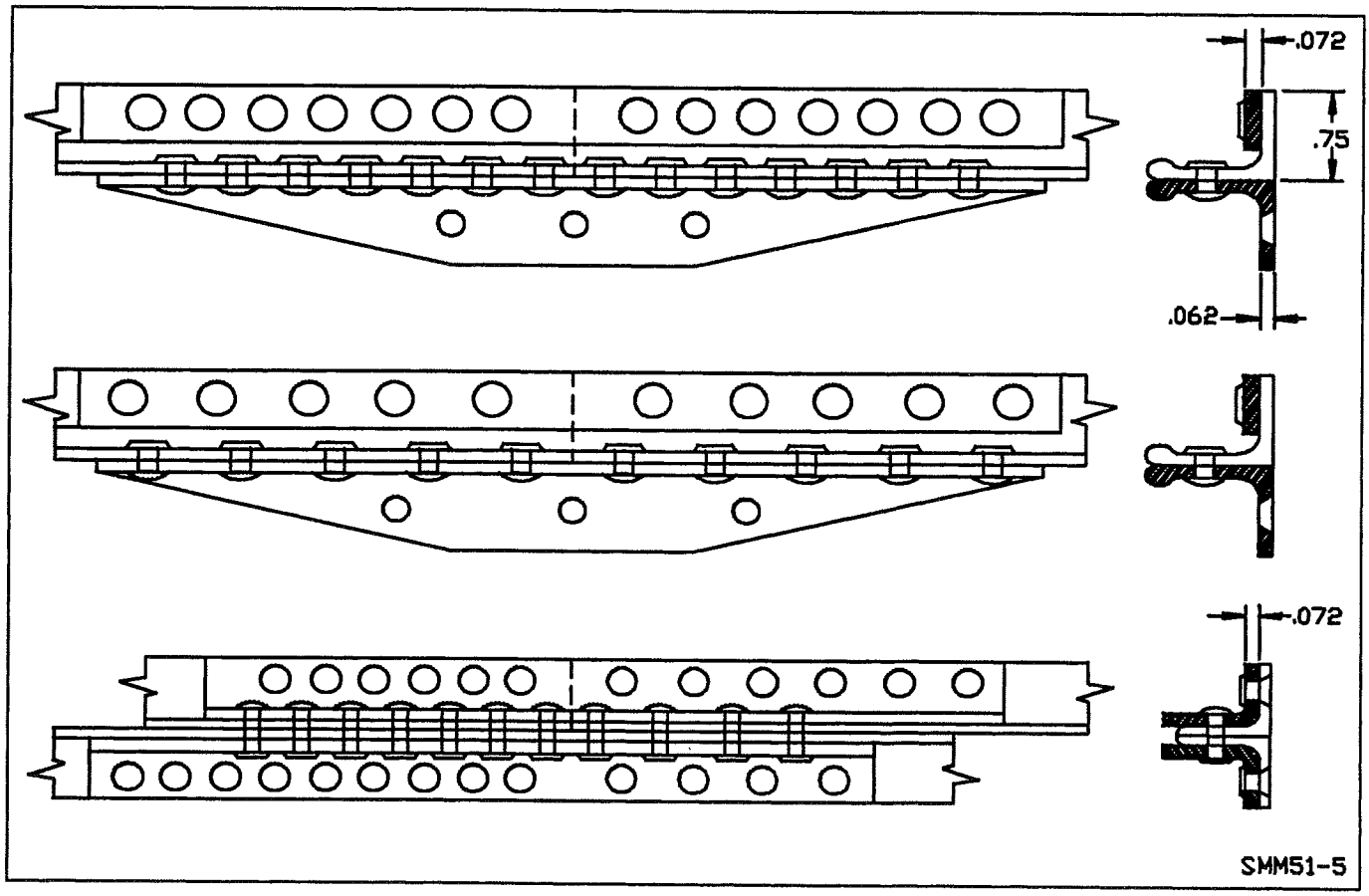
51-13-01 - STRINGER REPAIR

Stringer splicing may require drilling new holes and adding rivets between existing rivets to obtain the required total number of rivets. Add extra rivets where the distance between existing rivets is the greatest. The pitch and edge distance must conform to AC 43.13-1( ) requirements (see **Figure 51-6**).

51-13-02 - MAIN SPAR REPAIR

The spar caps inboard of STA 103 are made of 7075-T6 high-strength aluminum. Replacement of the spar cap is preferable to repair. However, if a spar cap repair is thought necessary, an exact description of the damage showing location and extent should be sent to the CUSTOMER SUPPORT DEPARTMENT, Mooney Aircraft Corporation, to obtain factory recommendations prior to beginning the repair.

1. SPAR CAP REPLACEMENT. To replace a spar cap, remove the skin covering the area to be repaired. Before removing a large area of wing skin, attach temporary jigs or holding fixtures to the wing to prevent wing warpage. When attaching a new spar cap, assure proper interference fit of the replaced huckbolts.



LONGERON SPLICING - FIGURE 51-5

During installation of the new spar cap, all holes damaged by improper drilling or reaming should be reamed to the hole size recommended for oversize huckbolt installation. When installing oversize huckbolts, consult the Huck Fastener Standards Manual for proper tolerances. Use proper length huckbolts. If the bolt is too long, the collar will not swage properly; if the bolt is too short, the shank will not completely fill the hole.

Repair scratches on spar caps that are not deeper than .003 inch by sanding with No. 400 abrasive paper. Remove no more than .005 inch of material. Inspect the sanded area; use dye penetrant to be sure that the scratch is completely removed. Clean and prime area where the protective coating has been removed.

2. SPAR CAP REPAIR. Spar caps outboard of STA 103 consist of sheet metal angles backed up with aluminum extrusions from STA 103 to near STA 150. Replace or repair damaged extrusions. Do not allow splices in a repaired extrusion to coincide with a spar-web splice when avoidable. Splice sheet-metal angles with an extrusion of equal area, picking up existing fasteners. Add extra fasteners to bring the minimum number of fasteners to six AD-5 rivets per side in the vertical flange, and nine AD-4 (or six AD-5) rivets per side in the horizontal flange. (See **Figure 51-7**).

RIVET CODE FOR STRUCTURAL REPAIRS

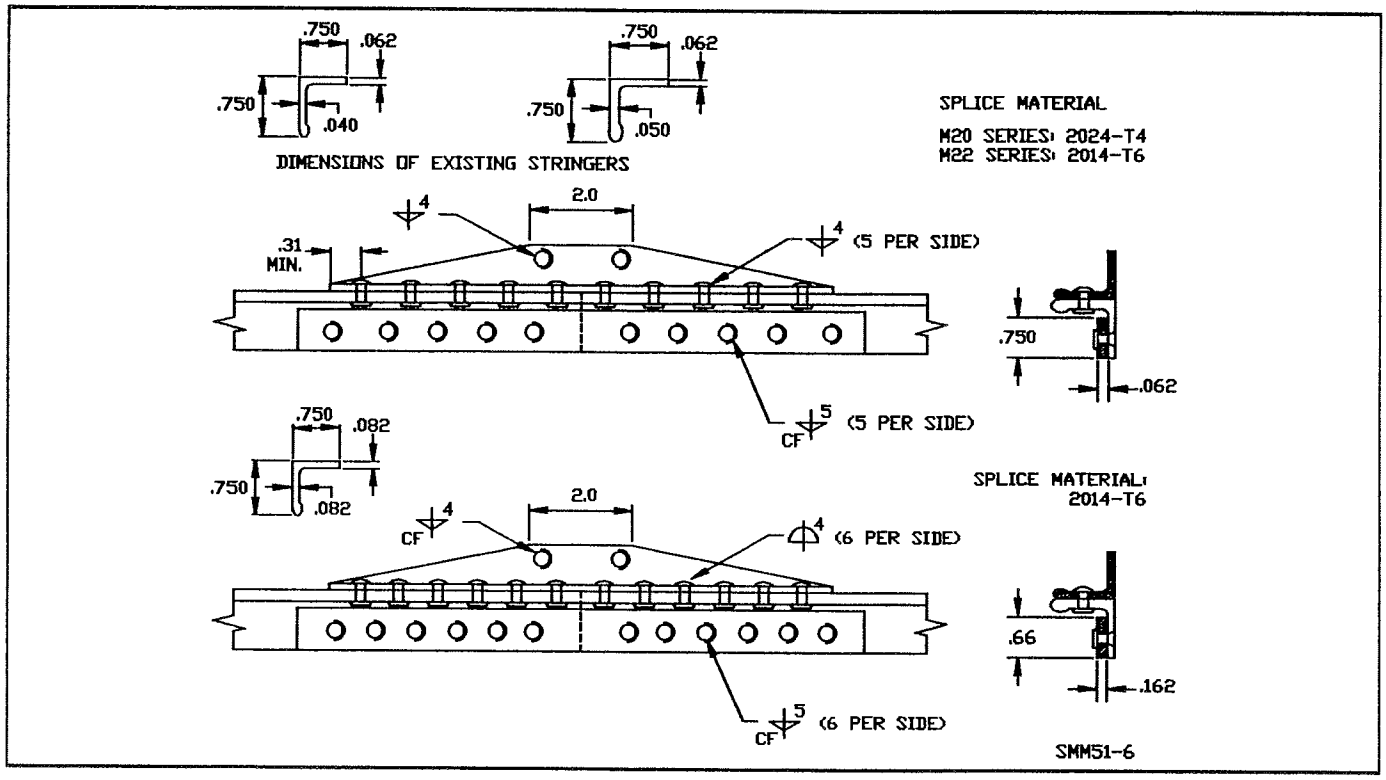
⌓ 4	MS20470AD4-xx
⌓ 5	MS20470AD5-xx
▽ 4	MS20426AD4-xx
▽ 5	MS20426AD5-xx
▽ BP	CR516-xx

3. SPAR WEB REPAIR. Repair all damage to spar webs in accordance with AC 43.13-( ). If there is extensive damage to a web that cannot be repaired as outlined in AC 43.13-( ), consult Mooney Aircraft Corporation, PRODUCT SUPPORT DEPARTMENT giving exact location and extent of damage.

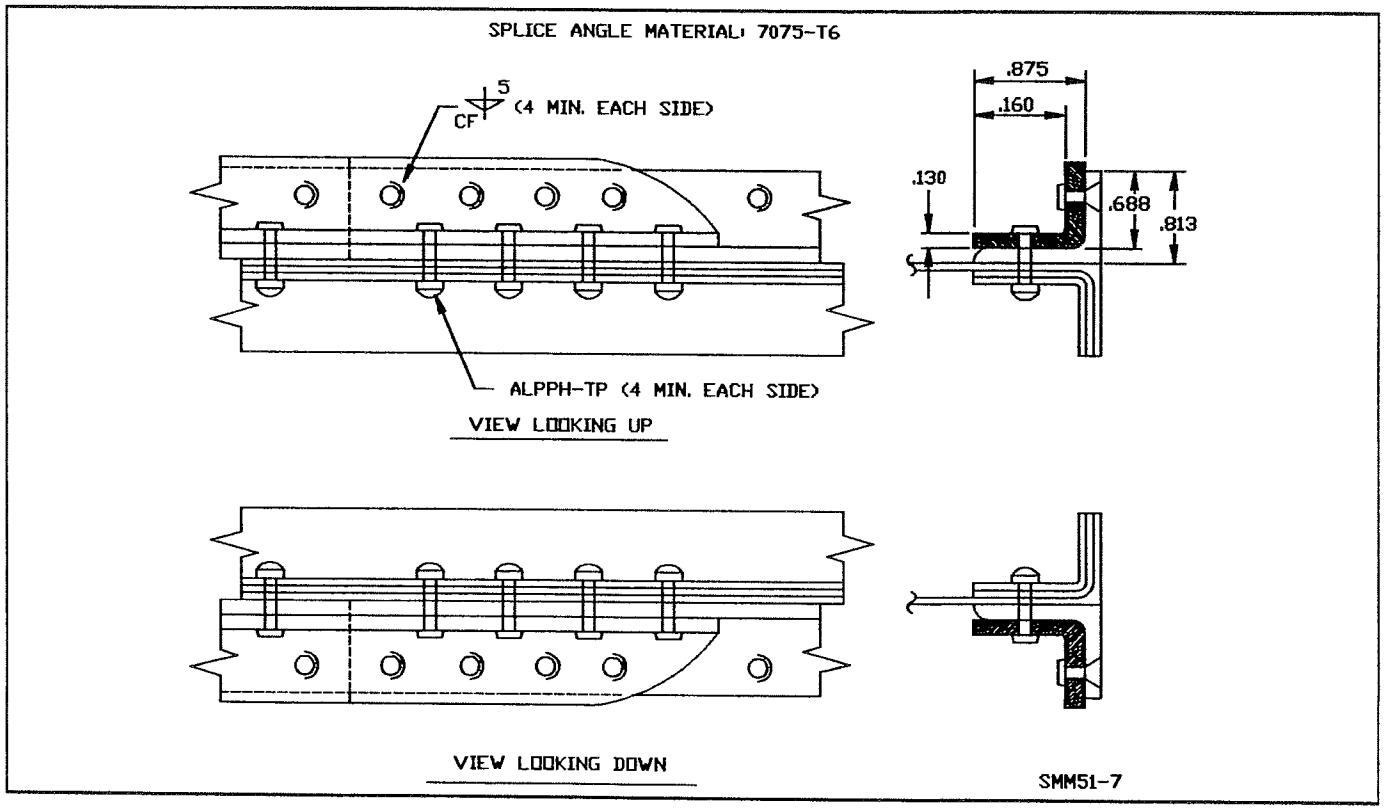
51-13-03 - STUB SPAR REPAIR
(Stub spar splice at wing STA 34.5 +/- 3.0) (See Figure 51-8).

1. Cut the stub spar halfway between existing rivets as required by the damage incurred.

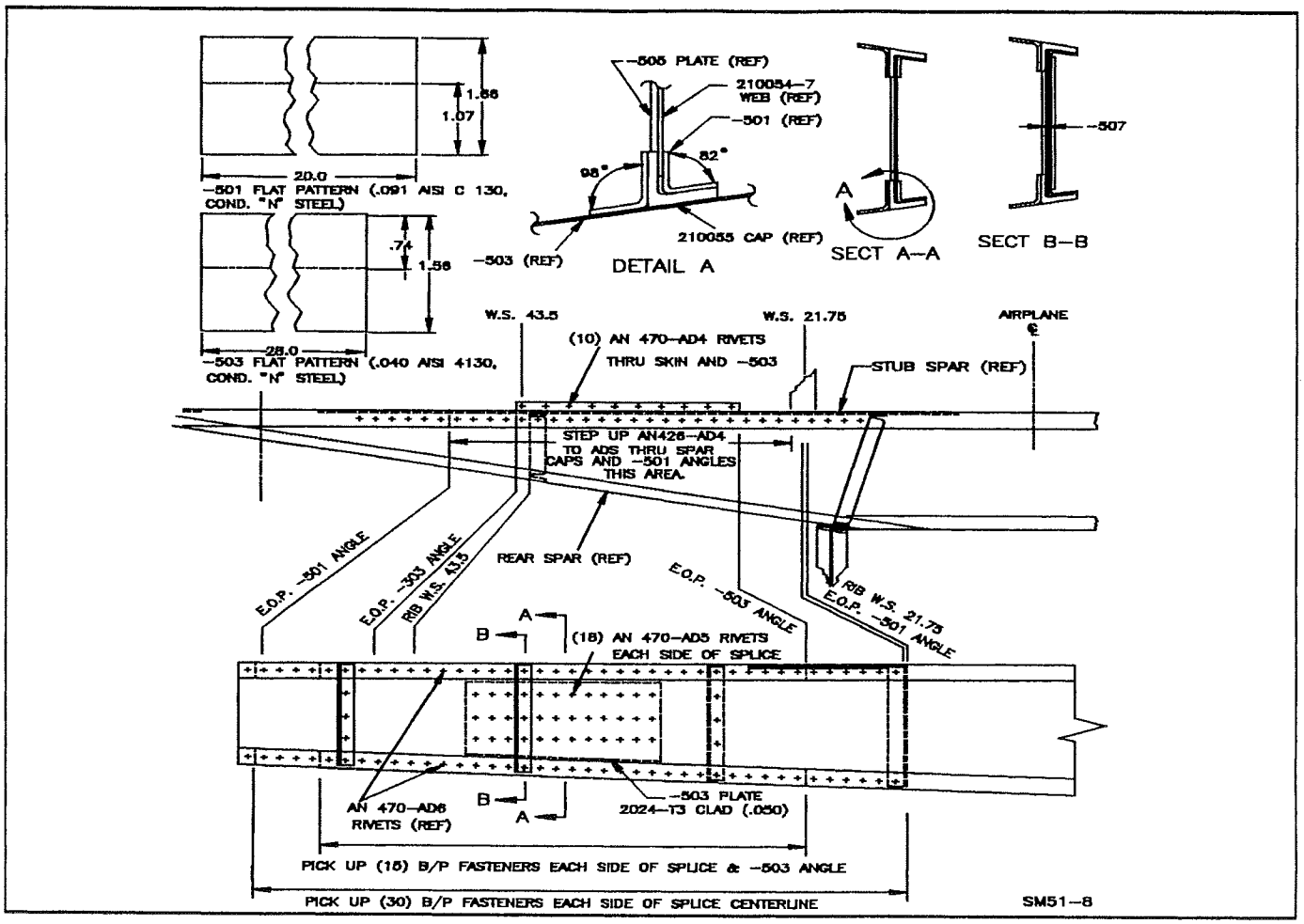
2. Smooth all rough or sharp edges, and prime area to be spliced.



STRINGER REPAIR - FIGURE 51-6



SPAR CAP REPAIR - FIGURE 51-7



STUB SPAR REPAIR - FIGURE 51-8

3. Locate new outboard section and trim splice to fit with a maximum gap of .020 inch.

4. Fabricate -501 angles to pick up 30 existing fastener holes (30 recommended, but 22 minimum), -503 angles to pick up 15 existing fastener holes (12 minimum), and -505 plate and -507 spacer. (See **Figure 51-8**). Prime angles, plate, and spacer. Rivet parts together using wet primer on all rivets.

51-13-04 - REAR SPAR REPAIR

The rear spar may be spliced between ribs in accordance with AC 43.13-1( ) (see **Figure 51-9**).

51-13-05 - RIB REPAIR

Replace ribs that are severely damaged. Minor damage may be repaired as shown (**Figure 51-10**).

51-13-06 - WING TIP REPAIR

To repair severe damage to the wing tip outboard of STA 193.5, it is advisable to replace the entire tip skin and rib.

1. Locate the new tip rib in the exact original tip rib position to prevent wing tip twisting. Use a temporary support or locator pins to maintain correct wing tip position.

2. Rivet new tip rib to main and rear spars.

3. Locate new skin, and drill rivet holes through skin to match existing holes in ribs and stringers.

4. Rivet skin to rib at STA 193.5.

5. Roll skin back on lower wing surface to gain access to stringers for rivet bucking. Rivet skin to upper stringers.

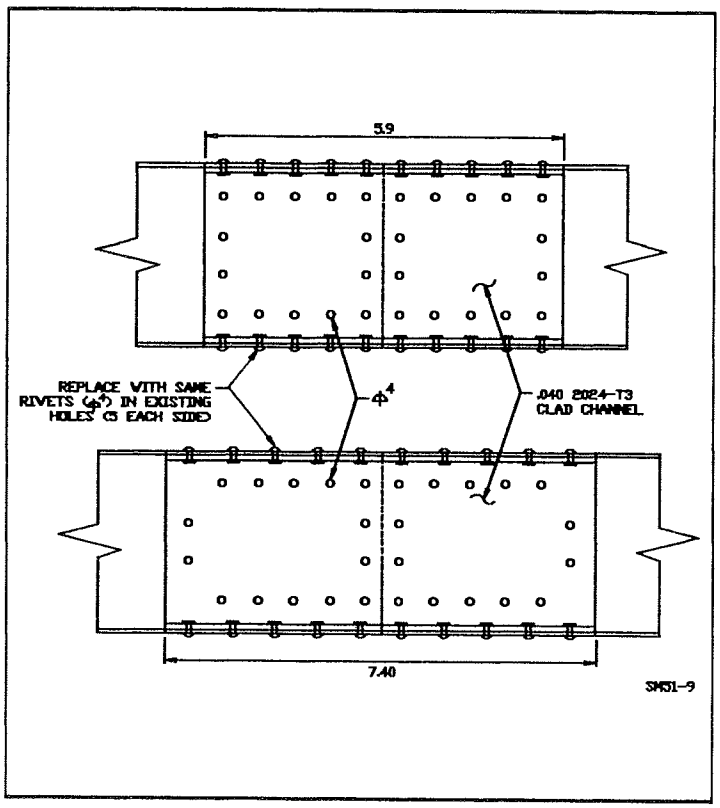
6. Rivet skin to tip rib starting at leading edge. Buck rivets as far back as possible.

7. Install cherrylock (CR-2248) blind rivets in places inaccessable for rivet bucking. Add one extra countersunk blind rivet between every other pair of cherrylock rivets.

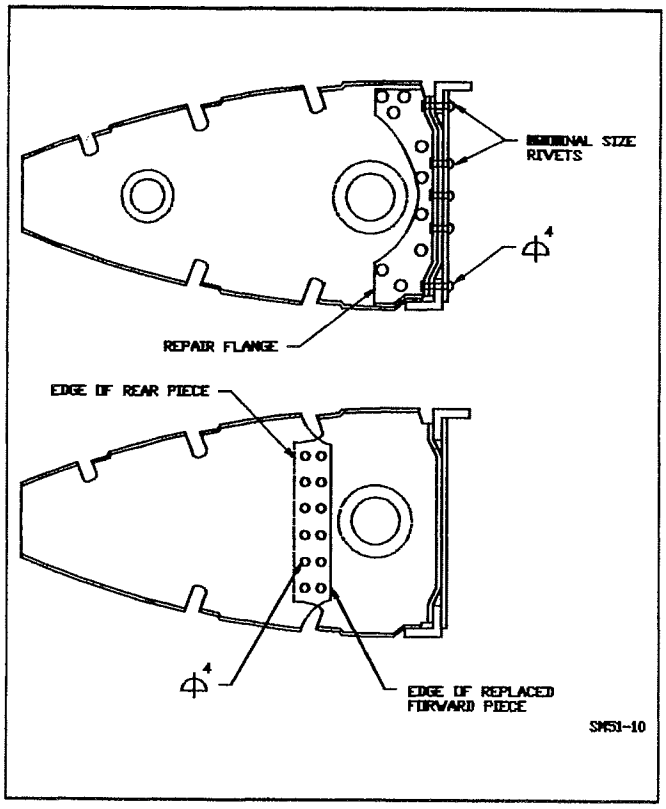
51-13-07 - WING SKIN PANEL REPAIR

Repair wing skin panels as prescribed in AC 43.13-1( ), unless an entire skin panel is to be replaced. Install new skin panels to exactly match the original skin installation. Preformed skin panels may be obtained from the Mooney Service and Marketing Centers.

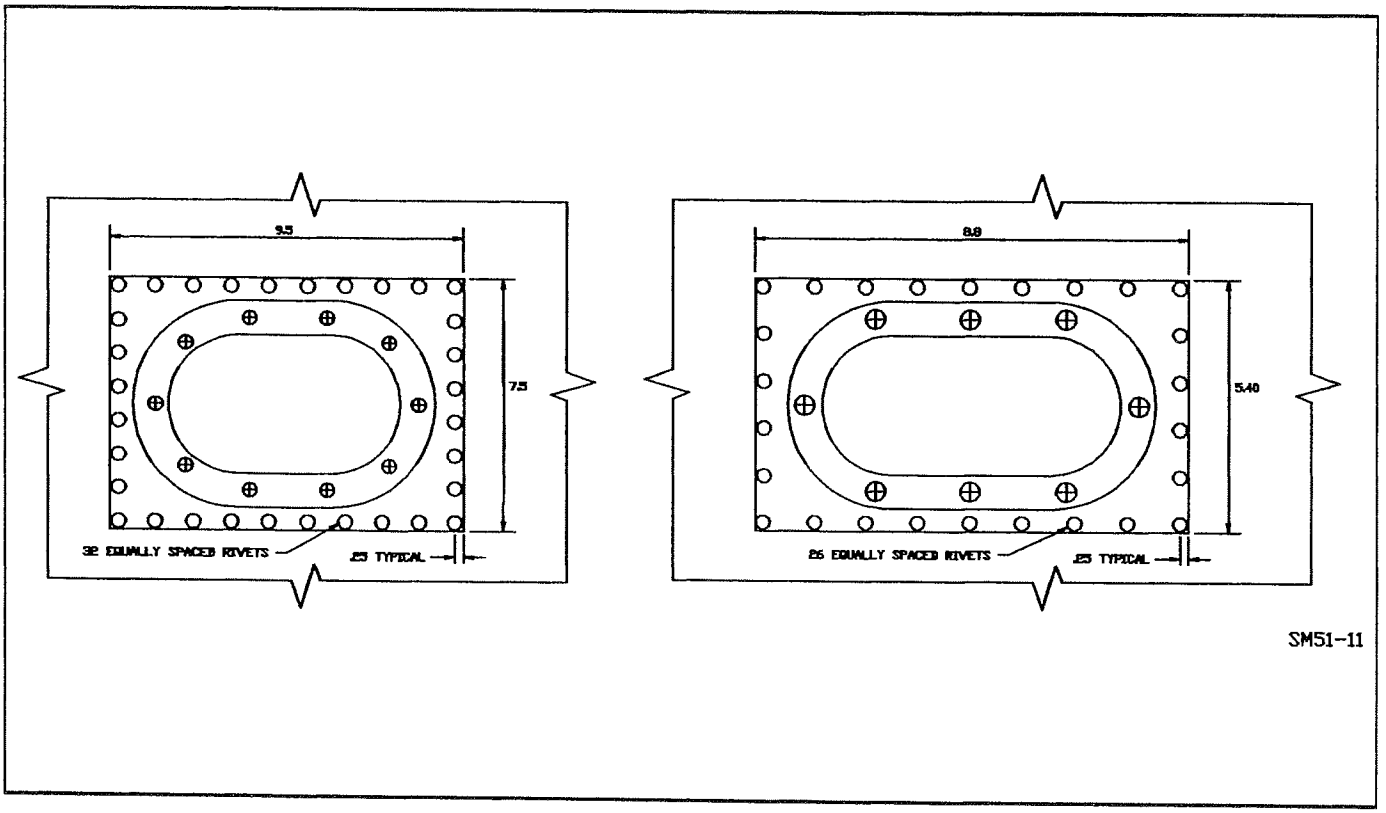
1. Damaged Dimple Repair Around Inspection Holes. Repair damaged dimples around inspection



REAR SPAR REPAIR - FIGURE 51-9



RIB REPAIR - FIGURE 51-10



ACCESS COVER REPAIR - FIGURE 51-11

holes when (a) there are three or more cracked adjacent dimples, (b) the crack in one or more of the dimples extends beyond the radius of the dimple into the skin, and (c) when there are four or more cracked dimples around an inspection hole (see **Figure 51-11**). To repair damaged dimples (a) cut a doubler from the same material and gauge as the skin to be repaired, (b) drill and countersink 100-degree fastener holes in the doubler to match dimpled fastener holes in skin, and (c) install doubler around inspection hole. Use AN426-AD4 rivets when material is .040 inch thick or greater. Drill holes using a No. 30 (.128 IN.) drill as shown in the above illustration. Use AN426-AD3 rivets when material is .032 inch thick or less. Drill holes using a No. 40 (.098 IN.) drill.

2. Repair of Cracks Wholly Within Dimple Radius. Surface cracks on inside (bearing) face of a dimple that do not extend through the material can be repaired by sanding out the crack. Cracks in dimples which do not extend beyond the dimple radius can be repaired by (a) stop drilling the crack with a No. 60 drill and (b) by adding rivets, the same size as those in the original pattern, to each side of the cracked dimple. Maintain four-diameter (4D) spacing and two-diameter(2D) edge distances. When original rivet pattern has rivets on only one or two sides of a dimple, only one or two rivets need be added (see **Figure 51-12**).

3. Repair of Cracks Extending Beyond Dimple Radius. Cracks that extend through the face of the dimple into the surrounding skin can be repaired as follows: (see **Figure 51-13**).

A. Stop drill crack with No. 60 bit.

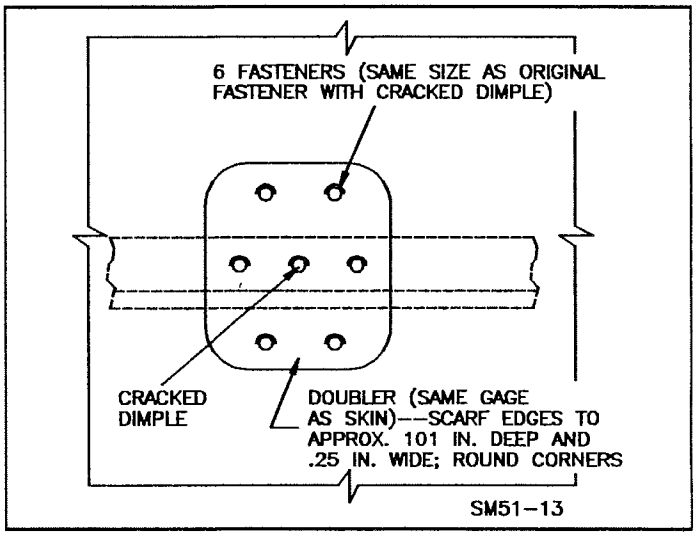
B. Cut a doubler from the same material as the skin to be repaired. Allow for six rivets at four-diameter rivet spacings with two-diameter edge distances in a circular pattern around the cracked dimple.

C. Round the corners of the doubler, and scarf the sandwiched edges to about .010 inch by .250 inch.

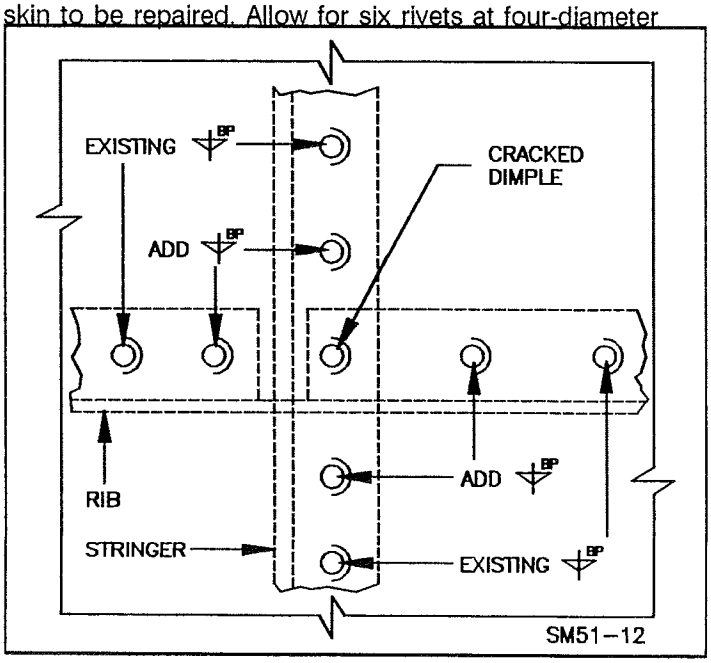
D. Drill holes for six rivets (same size as those in the original rivet pattern), and drill and countersink 100 degree dimples in doubler.E. Prime area to be repaired and install doubler with wet primer.

4. Repair of Circumferentially Cracked Dimples. Circumferentially cracked dimples (dimples with cracks that appear as an annular mark around the dimple) can be repaired by installing a conical washer.

A. Drill through dimple using a drill large enough to remove the damaged area.



DIMPLE CRACKS - FIGURE 51-13



DIMPLE CRACKS REPAIR - FIGURE 51-12

B. Install doubler as shown in **Figure 51-14**. Wet prime prior to assembly.

C. Countersink dimple hole in skin allowing the countersink to extend into substructure.

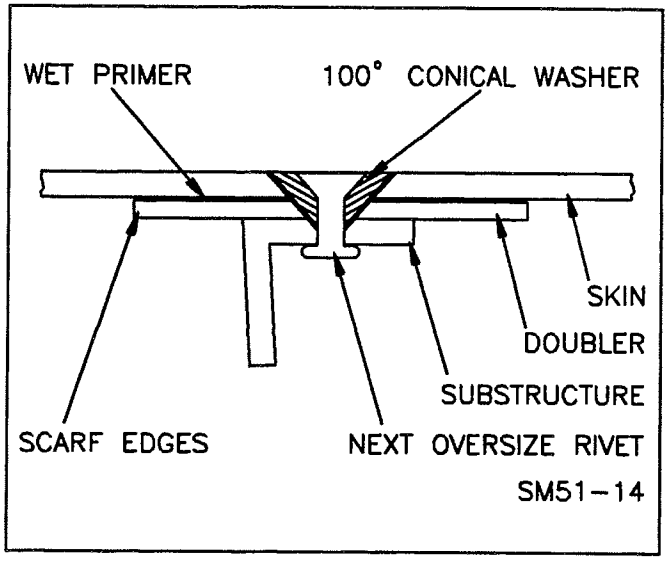
D. Install conical washer, use next oversize rivet size. Wet prime washer and adjacent skin and doubler surfaces prior to assembly.

E. Drill remainder of the hole to allow installation of next larger diameter rivet than the rivets in the original pattern.

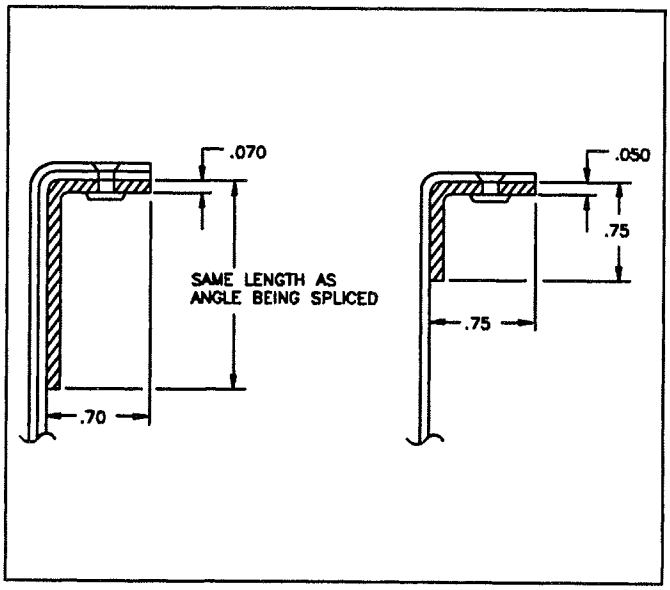
51-14-00 - HORIZONTAL STABILIZER & VERTICAL FIN REPAIR

51-14-01 - LEADING EDGE SKIN REPAIR

The horizontal stabilizer and vertical fin leading edge interiors are inaccessable near the tailcone. To repair damage in these areas, cut a standard (3.0 inches by 6.5 inches) access hole in the lower side of the stabilizer leading edge and close the access hole by installing inspection cover P/N 913000-501.



OVERSIZE HOLE - FIGURE 51-14



SPAR REPAIR (STA. 9.0 & OUTBD.) - FIGURE 51-15

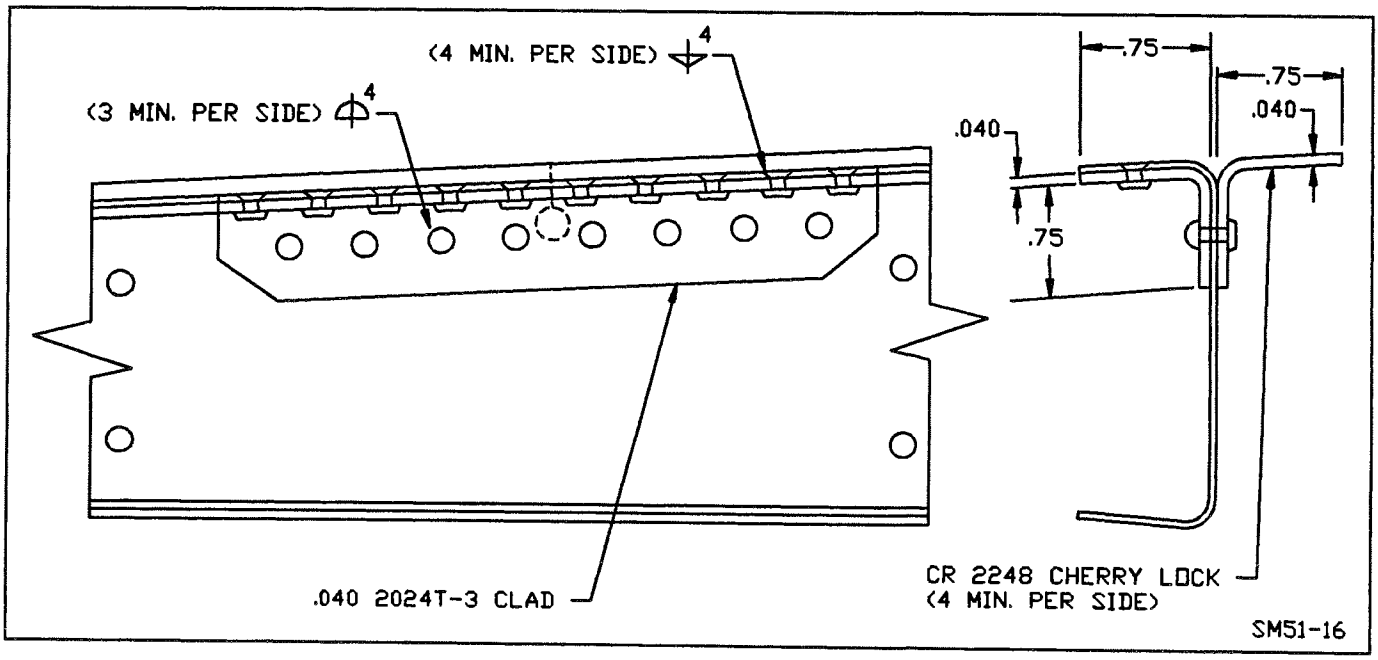
51-14-02 - MAIN SPAR REPAIR OUTBOARD OF STA. 9.00

Repair damage to the horizontal stabilizer main spar by straightening the damaged area and inspecting it carefully for cracks. If cracks are formed, stop drill or remove cracked area.

1. Repair damage between STA 9.00 and STA 34.0 on the spar upper flange, and between STA 9.00 and STA 40.0 on the spar lower flange with a splice angle formed from .070 AISI 4130 steel, condition N. The splice angle flanges must be as wide as the original spar flanges. The splice angle must be long enough to install 11 AD4 rivets through the skin and 11 rivets through the spar web on each side of the damaged area (see **Figure 51-15**).

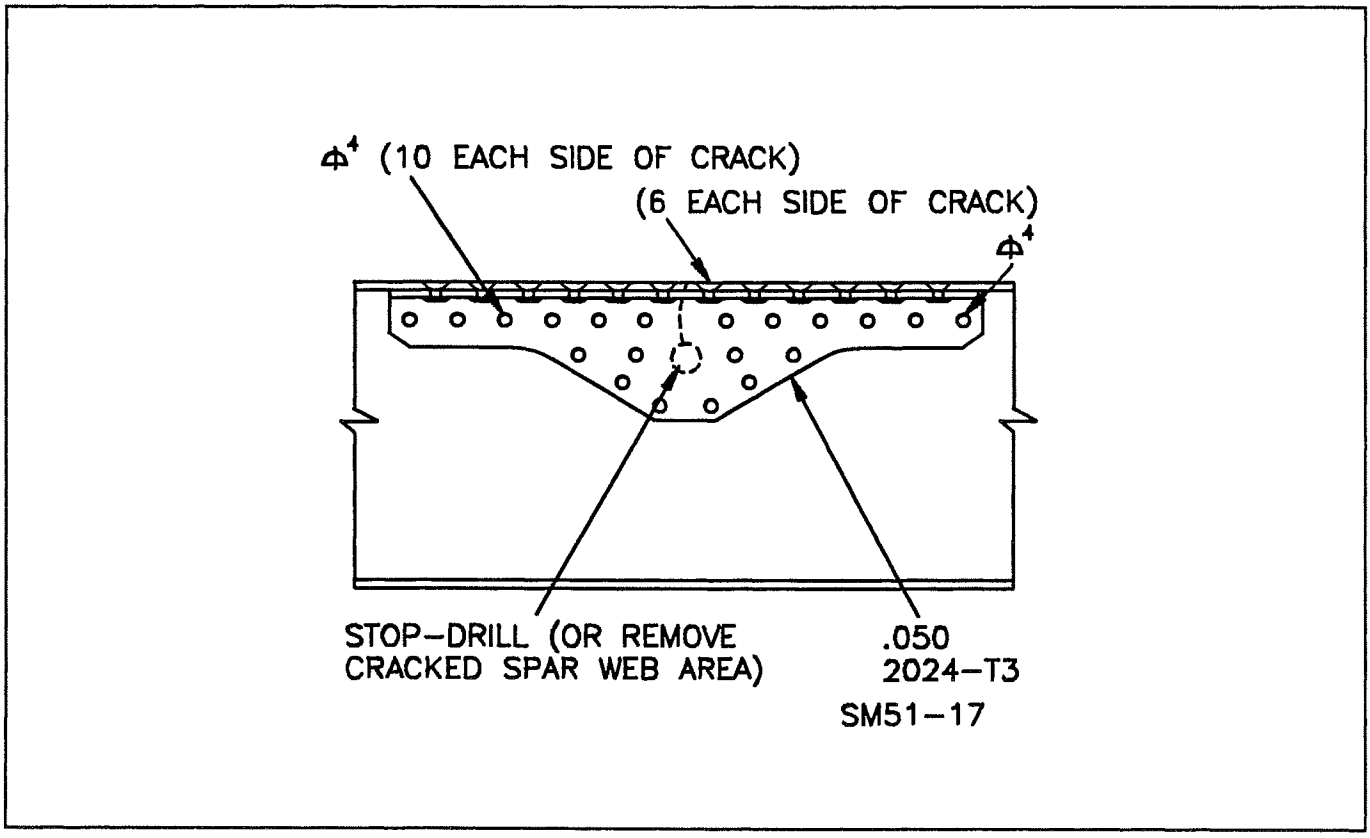
Prime splice angle before riveting it to spar. Pick up five existing rivet holes and drill six new holes between existing rivet holes in the skin at each side of the damaged area. Install 22 AD4 rivets through splice angle and skin, and 22 AD4 rivets through splice angle and spar web. (See **Figure 51-15**).

2. Repair main spar cap damage between STA 34 and STA 48.5 by forming a splice angle from 3/4 inch by 3/4 inch .050 2024-T3 sheet aluminum. Pick up five existing holes and drill six new rivet holes between existing holes in the skin on each side of damaged area. Install 11 AD4 rivets through angle and skin and 10 AD4 rivets through angle and web on each side of the damaged area. (See **Figure 51-15**).



SPAR REPAIR (STA. 48.5 APPROX.) - FIGURE 51-16

3. Repair main spar damage from STA 48.5 outboard by installing splice angles made from .040 2024-T3 material on both side of web using 12 AD4 rivets (6 through skin and 6 through web on each side of damaged area). Pick up three existing holes and drill three new holes between existing holes on each side of damaged area. (See **Figure 51-16**).



SPAR REPAIR (OUTBD. of STA. 34.0) - FIGURE 51-17

4. Repair main spar web damage outboard of STA 34.0, top flange, and STA 48.5, lower flange by forming a splice angle from .050 2024-T3 aluminum. The splice angle web flange should be cut to allow sufficient coverage of the damaged area of existing web and long enough to install 6 AD4 rivets on the flange on each side of the damaged area. Pick up 3 existing rivet holes on flange of spar and drill 3 new rivet holes between existing holes. Drill 10 rivet holes through splice angle and web on each side of the damaged web area. The damaged web should be stop drilled or cracked area removed prior to splice angle installation. Prime splice angle and deburr spar web and flange before installing splice (see **Figure 51-17**).

5. Spar webs outboard of STA 48.5 cracked more than 50% of the web height may be repaired (see **Figure 51-18**). Form a splice plate from .050 2024-T3 aluminum to fit the inside dimensions of the web and flange at the damaged area. Pick up 3 existing rivet holes on top and bottom flange on each side of damaged area and drill 2 new AD4 rivet holes between these existing holes. Pick up all rivet holes on web under splice plate and drill new rivet holes on equal spacing around the damaged area similar to that on **Figure 51-18** rivets on each side of damaged area.

51-14-03 - RIB REPAIR

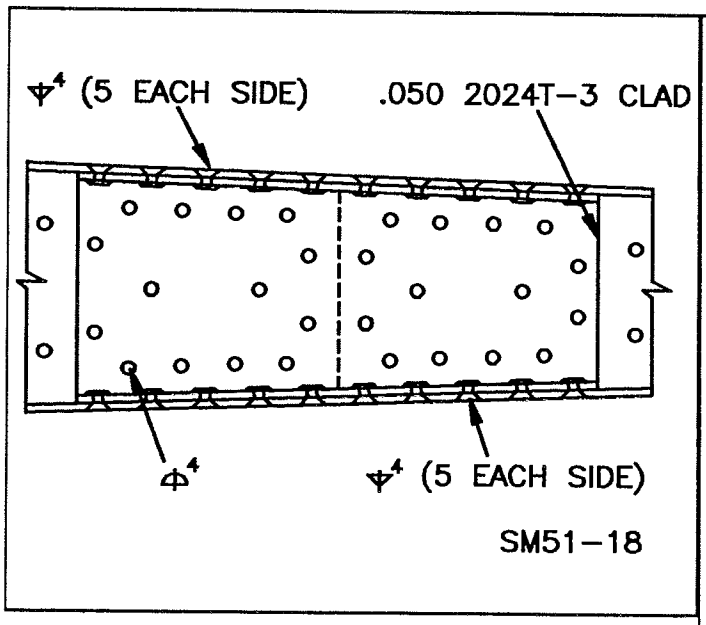
The repair of damaged stabilizer and fin ribs is not feasible in most cases. Damaged ribs should be replaced with new parts.

51-14-04 - REMATING HORIZONTAL STABILIZER TO STINGER

When stabilizer repair necessitates removal from the stinger, remating can be facilitated by using huckbolt substitution information contained in Section 51-10-01. When mating stabilizer to stinger use bent rivet swage set #5 (see **Figure 51-19**).

51-15-00 - FIBERGLASS LAMINATES, REPAIR PROCEDURES

Despite the fact that fiberglass laminates are designed to withstand considerable abuse, occasional repairs will be necessary. It is difficult to cover all the various repair techniques due to such limiting factors as accessibility and the extent of damage. The following outlines those steps which are used to make repairs of the more common type damage to a fiberglass laminate.



SPAR REPAIR - FIGURE 51-18

1. Materials used for repairs shall be as specified and compatible with the basic resin used in the fiberglass laminate.

Resin - Aerospace Adhesive EA934 Part A
Hysol Division
The Dexter Corporation

Catalyst - Aerospace Adhesive EA934 Part B
Hysol Division
The Dexter Corporation

Alternates:

Resin - Epoxical #606 Patching Adhesive Resin
United States Gypsum

Catalyst - Epoxical #606 Patching Adhesive Hardner
United States Gypsum

OR

Resin - Ren Epoxy CG 1304
Ren Plastics Co.
Lansing, Michigan

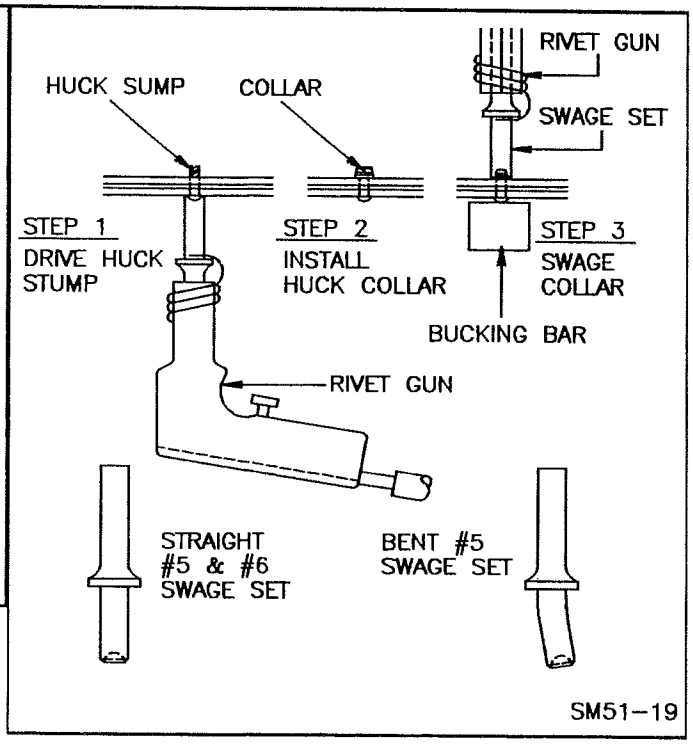
Catalyst - Ren Hardener CG 1304
Ren Plastics Co.
Lansing, Michigan

Fire retardation - Antimony Trioxide for fire retardation, 5% minimum; 10% maximum by Weight of Resin Content. Must be added to the base resin (cowling and air intake duct assemblies).

The manufacturer's bulletins shall be followed for all mixing ratios and preparation prior to application.

2. General.

A. The configuration of repairs are shown for flat surface areas; for simplicity; however, the same techniques can be used for contoured surfaces. Contoured repairs will require additional considerations and the proper shaping of the backup plates used for clamping the laminates together during the curing cycle.



REMATING HORIZONTAL STABILIZER TO STRINGER - FIGURE 51-19

B. The degree of laminate chamfer and size will vary based on accessibility, shape of part and the extent of damage.

51-15-01 - CRACKS, IN SURFACE AREAS

1. Stop drill all cracks per standard aircraft procedure.
2. Remove any loose particles and frayed fiberglass strands from the cracked portion.
3. Prepare surface for repair as shown in (**Figure 51-20, Figure 51-21, and Figure 51-22**).
4. Prior to continuing the repair, all surfaces in the area of the repair must be cleaned of all contaminates by wiping the area with a clean cloth saturated with Methyl-Ethyl Ketone.

CAUTION

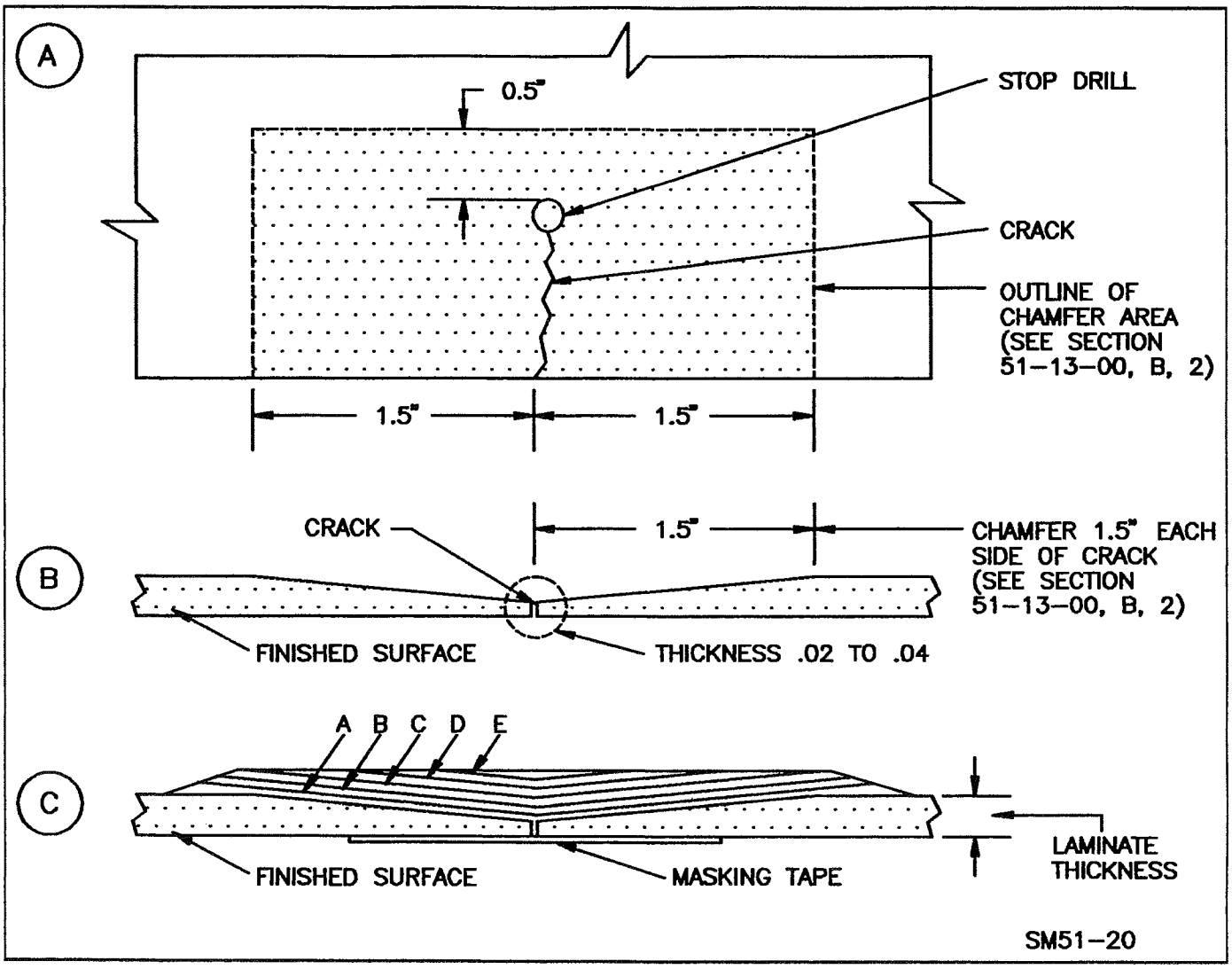
Methyl Ethyl Ketone (M.E.K.) is a flammable liquid and should be used with proper ventilation and the prescribed safety equipment.

CAUTION

Fiberglass components are attacked and deteriorated by the following products: Ketone, aliphatic esters, chlorinated hydrocarbons, and slightly softened by aromatic hydrocarbons.

51-15-02 - NON-STRUCTURAL REPAIR (FIGURE 51-20)

1. Apply masking tape over crack on finished surface side.



NON-STRUCTURAL REPAIR - FIGURE 51-20

2. Apply wet coat of catalyzed epoxy resin to chamfered surface.

3. Apply one layer of #181 fiberglass cloth saturated with catalyzed epoxy resin.

4. Add additional plys of #181 fiberglass cloth, saturated with epoxy resin to attain original laminate thickness.

5. Apply one additional ply of #181 cloth bridging the total repaired area and bond in place.

51-15-03 - COMMON STRUCTURAL LAMINATE REPAIR (METAL INSERT) (FIGURE 51-21)

1. Cut away laminate per sketch, roughen repair area with 240 sandpaper, clean repair area with M.E.K. - apply a wet coat of catalyzed epoxy resin to surfaces. Then IMMEDIATELY proceed with steps 2 thru 5.

2. Install chemically cleaned .025 T-3 aluminum straps, perforated with #40 holes approximately .35 on center all directions.

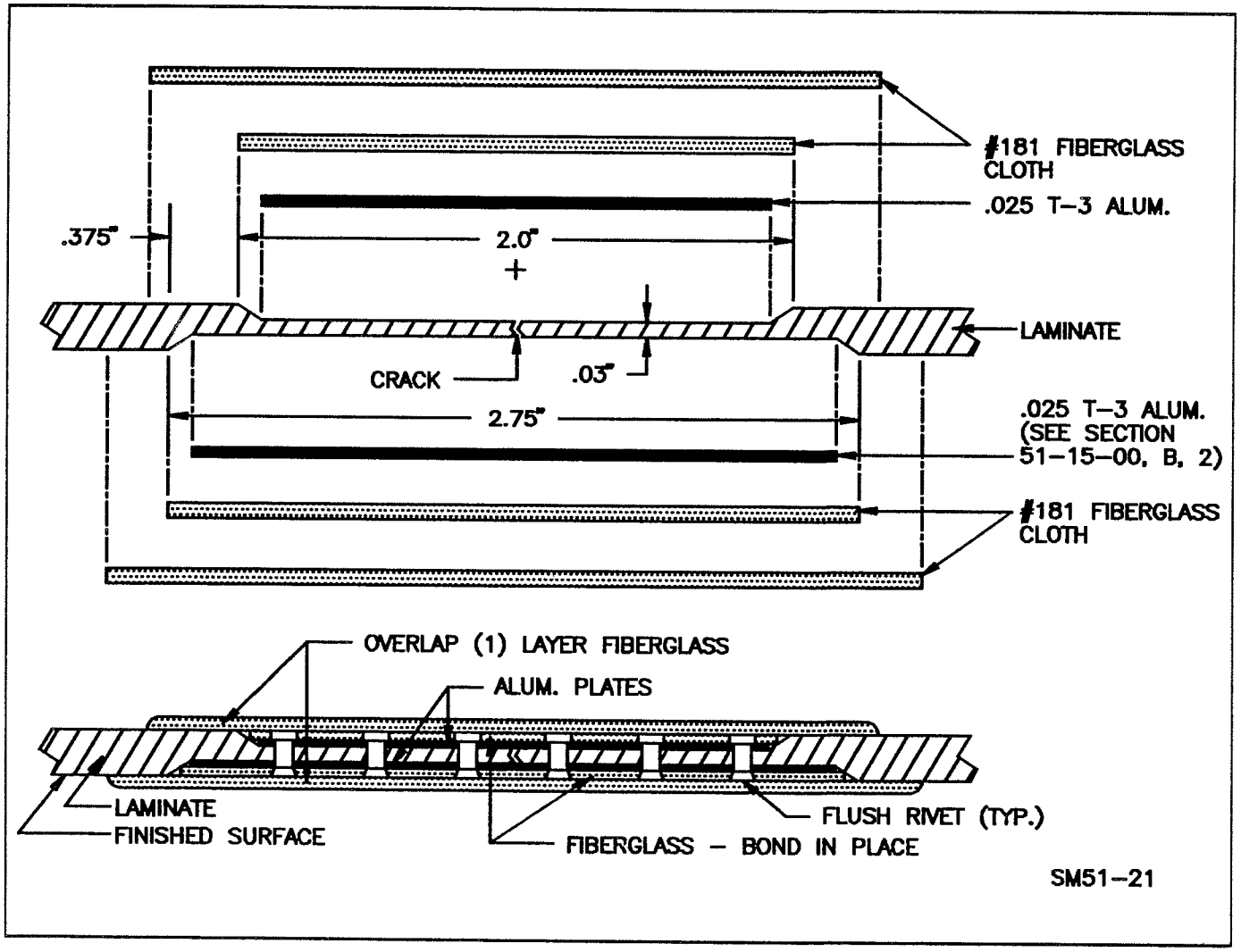
3. Apply wet coat of epoxy resin to aluminum straps and apply one or more layers of resin saturated #181 fiberglass cloth to equal the thickness of the original laminate.

4. Lay wax paper over both sides of the repaired area while still wet. This prevents adhesion to the pressure clamp application (paragraph 5).

5. Place rigid aluminum plates on both sides of repair area and clamp into place with "C" clamps. Permit laminated repair to cure.

6. After the fiberglass repair has cured, remove the clamps and install #3 AN426A rivets. Flush head to be on the finished surface side. The number of rivets and spacing will be determined by the size of the repair.

7. Apply one additional overlapping layer of #181 fiberglass cloth on the non-finished surface and bond in place. Should the opposite side be a non-finished surface, an additional layer of fiberglass should be applied to this side.



COMMON STRUCT. LAMINATE REPAIR-METAL INSERT - FIGURE 51-21

8. Upon completion of steps 1 thru 7, permit the repair to cure before attempting further treatment of appearance surfaces, if required.

9. Appearance surfaces will normally require the application of a filler-sealer coating. The appearance area is to be wiped clean, using a clean cloth saturated with M.E.K. prior to applying a filler-sealer coating.

10. Mix epoxy resin and catalyst per manufacturers specifications and apply to the appearance surface area. Care should be taken to assure as smooth as possible surface in this particular operation.
Permit this surfacing coat to cure prior to any additional applications or further rework.

11. Using #240 sandpaper, sand and blend the repaired area to match the surrounding surface. Steps 10 and 11 may be repeated to acquire a satisfactory surface finish.

51-15-04 - COMMON STRUCTURAL LAMINATE REPAIR (FIG. 51-22) (FIBERGLASS-RESIN COMBINATION)

1. Apply wet coat of catalyzed epoxy resin to chamfered surface.

2. Apply one layer of #181 fiberglass cloth saturated with catalyzed epoxy resin.

3. Add additional plys of #181 fiberglass cloth saturated with epoxy resin to attain original laminate thickness.

4. Apply one layer of #181 fiberglass cloth to the non-finished side of laminate, extending 1/2" each side of the chamfer and bond in place.

5. Lay wax paper over both sides of the repaired area while still wet. This prevents adhesion to the pressure clamp application (paragraph 6).

6. Place rigid aluminum plates on both sides of repair area and clamp into place with "C" clamps. Permit laminate repair to cure.

7. After fiberglass repair has cured, remove clamps and install #3 AN426 rivets. Flush head to be on finished surface side. The number of rivets and spacing will be determined by the size of the repair.

8. Upon completion of steps 1 thru 7, allow the repair to cure before attempting further treatment of the appearance surface.

9. Appearance surfaces will normally require the application of a filler-sealer coating. The appearance area is to be wiped clean, using a clean cloth saturated with M.E.K. prior to applying a filler-sealer coating.

10. Mix epoxy resin and catalyst per manufacturer's specifications and apply to the appearance surface area. Care should be taken to assure as smooth as possible surface in this particular operation.
Permit this surfacing coat to cure prior to any additional application or further rework.

11. Using #240 sandpaper, sand and blend repaired area to match surrounding surface. Steps 10 and 11 may be repeated to acquire a satisfactory surface finish.

51-15-05 - FIBERGLASS DELAMINATION REPAIR

1. Delamination or ply separation of a fiberglass product is usually a result of poor bonding of fiberglass layers. Generally, this condition is localized and can be readily repaired by carefully spreading apart the plys in the delamination, and removing loose particles by blowing clean compressed air into damaged area.

2. Proceed by inserting catalyzed epoxy resin into the delamination and then immediately clamp the delamination together. Permit the repair to cure a minimum of 8 hours before removing clamps.

3. Extensive delamination of a part will be reason for total rejection of the part and shall be scrapped per standard practices.

51-16-00 - MISCELLANEOUS

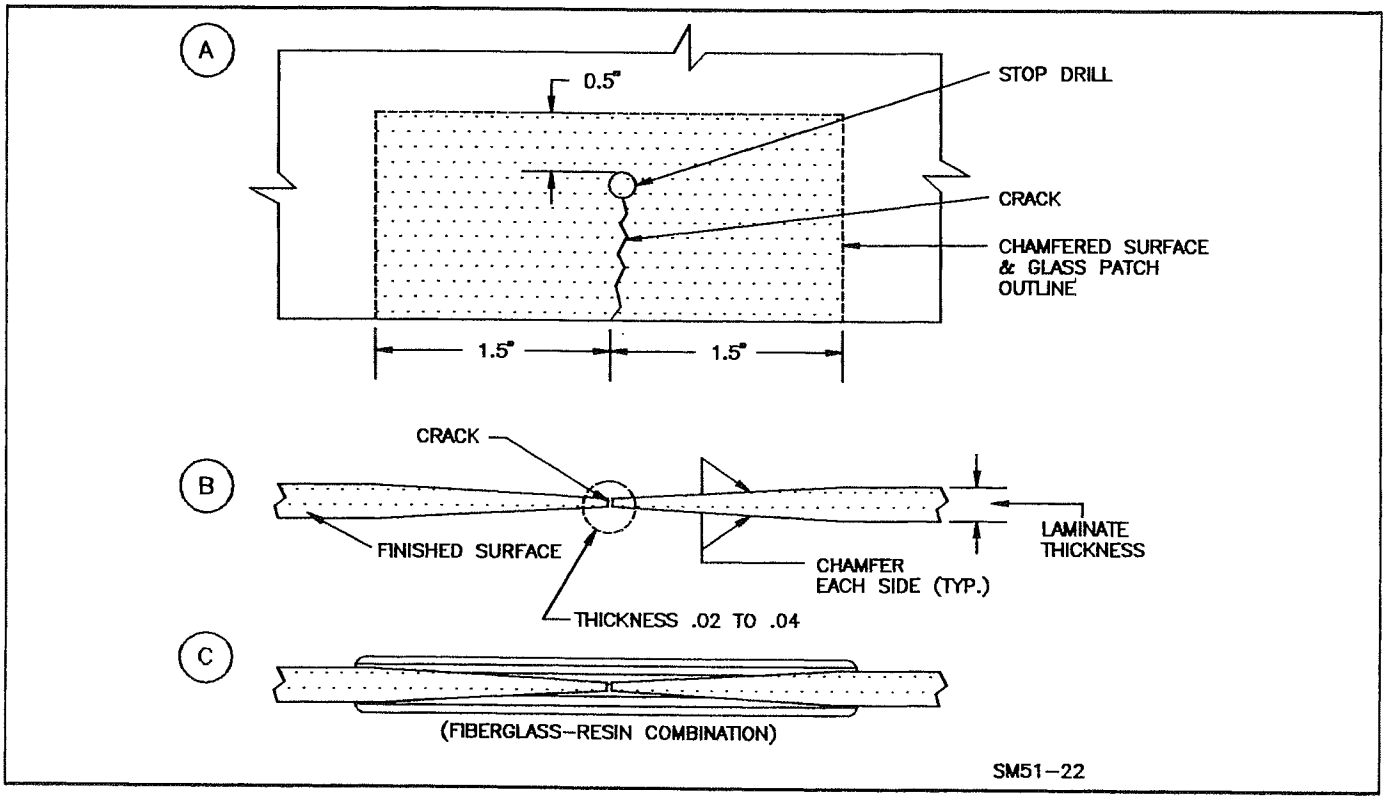
1. Protective Coatings.

A. Parts with protective coatings (such as Conversion Coated or zinc primer) on which the coating is scratched, spotfaced, drilled, or in any way removed must be recoated with zinc chromate primer.

EXAMPLE: Part is Conversion Coated as detail part. During replacement the part is spotfaced to receive bolt and washer. This part must be primed after spotfacing.

2. Low Pressure, Plastic, or Rubber Line Splices. Static system lines may be lengthened, shortened, or spliced to allow the replacement of sections of damaged lines. The fittings are called out in the Parts Catalog text pages following the illustration depicting the assembly or component in question.
If splices are made, the system must be checked for leaks.

3. Shortening and Lengthening of Tubing, Hoses, and Flexible Ducting. Mooney manufactured assemblies of plumbing, tubing, hoses, and flexible ducting may be modified to allow the use of longer parts of the same size and material to be cut and used as replacements. When the manufactured ends of flexible ducting are removed, the raw edge must be taped with 3M aluminum foil tape.



COMMON STRUCTURAL LAMINATE REPAIR-FIGERGLASS/RESIN-FIG.51-22

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CHAPTER 52

DOORS

CHAPTER 52

DOORS

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52-00-00 - GENERAL

The cabin door is constructed of an inner and outer aluminum shell fastened together by rivets. It is provided with a dual latching mechanism,

1) a lock pin extends into a mating receptacle in lower door frame and

2) a jaw type latch clamps a special designed nut in upper door frame to hold door securely in place. The door is hinged at the forward edge by an extruded aluminum hinge. The inner handle and the outer handle are interconnected by adjustable push pull tubes. This mechanism is spring loaded to an over center position in the latched position for positive security. Adjustment for each push pull tube is provided to accurately rig latching pin and jaw type latch. Adjustment to special nut at the top of door frame can be made for proper closure.

The baggage compartment door is constructed of an inner and outer aluminum shell fastened together by rivets. It has dual pin latches that extend into receptacle fittings on both sides of door frame when the exterior handle is closed **properly**.

The auxiliary exit handle is located on inside of baggage door. This handle can be operated only from the inside, even if outer handle is locked. A cam mechanism allows a clevis pin to bypass outer handle latch groove and open two latching pins which hold baggage door closed. (Refer to AFM/POH Section III for specific procedures to operate auxiliary exit handle.) This door is hinged at the top with an extruded piano type hinge.

A hold open arm is attached on both doors to assist in holding door open when desired.

A door lock is provided for both doors. A single key will operate either door lock. The interior panels require removal if door locks are to be removed and replaced.

52-10-00 - CABIN DOOR - MAINTENANCE PRACTICES

1. Removal. The cabin door may be removed to replace or repair door or to replace a damaged hinge.

A. Remove interior panel around door frame.

B. Remove hold open arm at door frame. Remove cotter pin and washers from hold open arm shaft. Pull shaft up from doubler plate and clear of door frame.

C. Remove eight (8) screws from outside the airplane that hold front portion of the hinge in place. There are also three (3) flush rivets that will require removal at this location.

D. Carefully drill center of rivet head with a 1/8th inch drill bit until head pops off and rivet stem can be punched out.

The original door assembly, with hinge attached, is assembled to door frame prior to installation of outer skin. The door is placed into position; the hinge is held in place on its mounting plate by sealant and locator rivets. (The number of locator rivets may vary). These rivets will be underneath outer skin. After removal of outer rivets and screws work a putty knife or a thin piece of aluminum between outer skin and hinge and between hinge and mounting plate from the inside in order to break sealant bond. During this procedure determination can be made where locator rivets are positioned. Locate these rivets from the inside and drill bucked heads carefully. **DO NOT DRILL THROUGH THE OUTER SKIN**. Attempt to move door and hinge aft and away from attach point after each rivet stem is drilled out. The door and hinge should come free when all sealant bond and rivets are removed.

NOTE

Some aircraft may have "AN" bolts instead of rivets.

2. Door Repair.

A. The door should be repaired, if applicable, according to standard procedures in AC 43.13-1( ).

B. Remove interior door panel, if necessary, to repair door assembly.

3. Installation.

The old door can be relocated by using existing holes. The mounting plate should be thoroughly cleaned of all sealant and foreign material before reinstallation of door.

A new door or hinge will require proper positioning of the door within door frame to obtain proper sealing.

A. Place door, with new hinge installed, into position (hinge placed between outer skin and mounting plate).

B. When door is properly positioned mark new hinge for mounting using existing holes, either from outer skin locations or from hinge mounting plate inside cabin.

C. Drill holes in new hinge carefully while door is held securely in place.

D. Remove door - deburr holes and clean shavings from area.

NOTE

The rivet holes originally used as locators do not have to be utilized when installing a new door or hinge if proper alignment can be obtained using another method.

E. Apply sealant, PR1403-G-B2, or equivalent, between outer skin and hinge support plate on tubular structure.

F. Reinstall door hinge to mounting plate using the eight (8) flat head screws removed earlier and three (3) flat head AD4 standard (AD5 oversize) rivets.

G. Adjust door latching mechanism so door closes and seals during flight. (See door rigging procedures paragraph 52-11-00).

H. Reinstall hold open arm with new cotter pin.

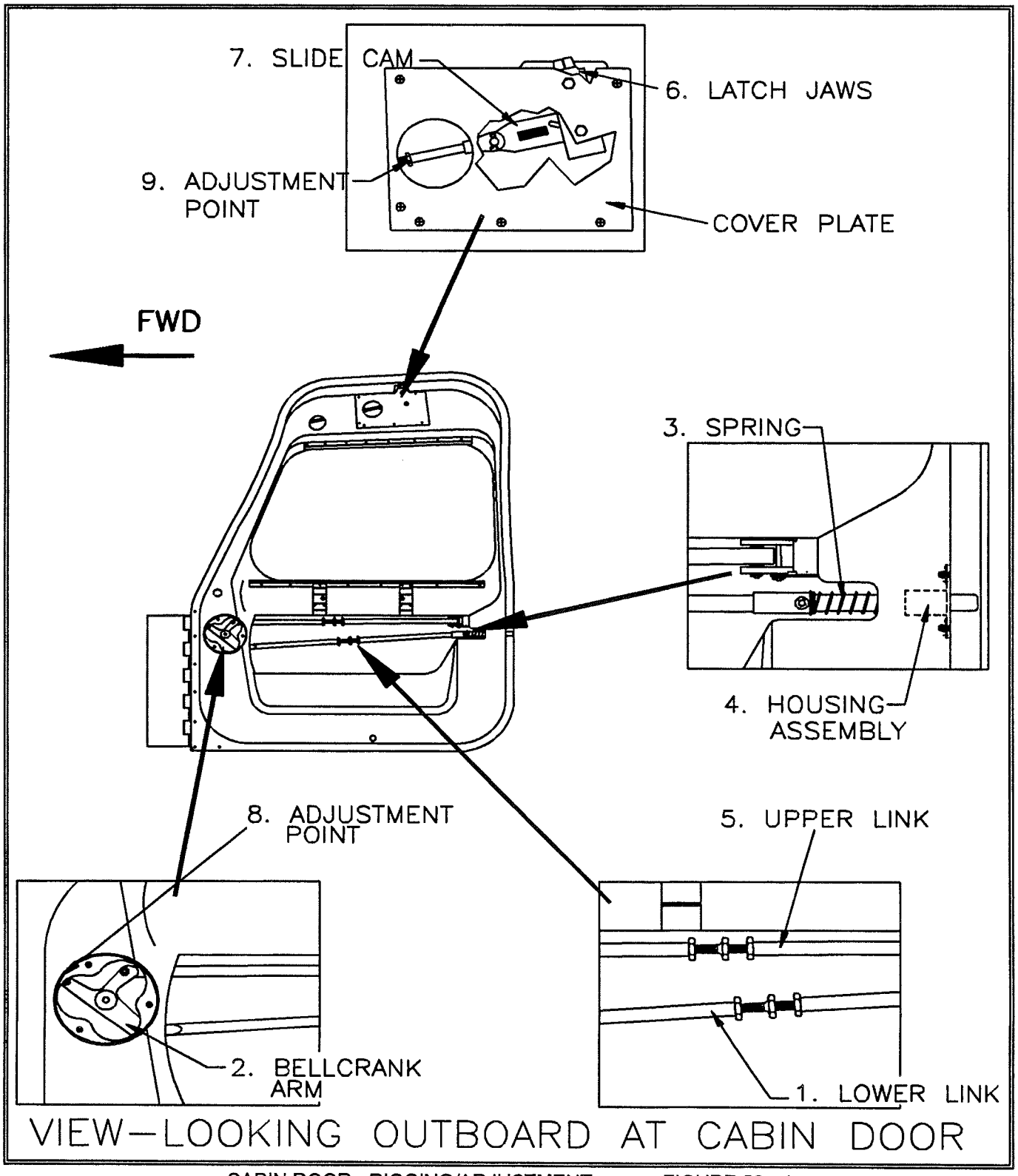
I. Reinstall interior panels and interior trim to door and cabin.

J. Paint door to match airplane.

52-11-00 - CABIN DOOR RIGGING/ADJUSTMENT PROCEDURES

The cabin door latching mechanism has several adjustment points that may be utilized to obtain proper rigging. (See **Figure 52-1**). Removal of interior door panel will be required to gain access to adjustment points.

1. Adjust cabin door linkage to satisfy requirements listed below.



CABIN DOOR - RIGGING/ADJUSTMENT FIGURE 52 - 1

A. Latching pin must contact striker plate, on door frame, full circumference of pin, when mechanism is in full latched position.

B. Latching pin must clear striker plate when opening or closing door with latching mechanism in full open position.

C. As lower link (1) and bellcrank arm (2), (Fig. 52-1) travel over center, spring (3), is to be compressed to 1.000 +/- .030.

NOTE

Washers may be added between spring and link or 310294-501 housing assembly (4) to comply with items B and C, (Figure 52-1).

D. Lower link (1) and bellcrank arm (2), in full locked position, should be overcenter a minimum of .3 inches, (Figure 52-1).

NOTE

It is not necessary that lower link (1) contact upper link (5), (Figure 52-1).

E. Outside handle is to be flush with outside skin when mechanism is in full latched position.

F. In full latched position, upper latch jaws (6) must be closed and latch slide cam (7) at end of its full travel. See adjustment points (8) and (9), (Figure 52-1).

G. In full open position upper latch jaws must be open and slide cam at end of its full travel.

NOTE

Slide cam (7) moves 1.13 in. from the full latched to full open position.

52-12-00 - CABIN DOOR SEAL

The cabin door seal is an extruded rubber seal filled with a soft foam. Unless deformed or torn, seal will provide adequate sealing around periphery of door during flight conditions.

1. Cabin door seal replacement.

A. The seal is held to inner door frame with adhesive.

B. Remove door inner trim panel to gain access to door seal.

C. Pull seal from door frame.

D. Clean area with lacquer thinner to help soften remaining adhesive. Remove excess adhesive.

CAUTION

Care should be exercised to keep lacquer thinner from dripping on wing or any other portion of airplane.

E. Coat cleaned door frame with adhesive (St. Clair #4587).

F. Coat bond area of new seal with adhesive (St. Clair #4587).

G. Let both applications dry until tacky.

H. Carefully place end of seal into position at bottom of door and continue around door until seal is firmly attached. Do not pull tight around corners. Cut off any excess seal.

I. When seal is properly attached, door should close with little effort.

NOTE

Door contour can be altered slightly to conform with cabin contour, if needed, for proper fit and sealing.

52-30-00 - BAGGAGE COMPARTMENT DOOR - MAINTENANCE PRACTICES

1. Removal.

Baggage compartment door may be removed to replace or repair door or to replace a damaged hinge.

A. Remove coat hanger and headliner panel located inside and directly under baggage door hinge area.

B. Pull insulation back to clear rivet shanks.

C. Center punch rivet heads holding hinge half to fuselage.

D. Carefully drill rivet heads and punch rivets from holes.

E. Work a putty knife or thin piece of aluminum between outer skin and hinge and inner skin frame and hinge to break sealant bond.

F. Remove hinge and baggage door assembly carefully.

G. Clean hinge and hinge mounting area thoroughly of all sealant or foreign material.

2. Repair.

The baggage door may be repaired per standard repair procedures in accordance with AC 43.13-1A. Repairs may be made to baggage door on airplane, if feasible.

NOTE

If repairs are to be made the interior trim panel may require removal.

3. Installation.

OLD HINGE

A. Place repaired baggage door **with old hinge** into position and cleco securely to assure fit of door; check latching operations.

B. Remove door - assure attachment area is clean of old sealant.

C. Apply sealant, PR 1403-G-B2 or equivalent, to hinge attachment area between outer skin and inner frame.

D. Reinstall door assembly with old hinge and cleco hinge for proper placement.

E. Install rivets (AD4 standard, AD5 oversize) in all holes.

NEW HINGE

A. Place old door assembly, **with new hinge**, or **new door assembly and new hinge,** into position and latch door in place.

NOTE

Hinge mounting area should be clean of old sealant and debris.

B. Push in on door assembly, at top, while door is in latched position to properly locate door and seal in door frame.

C. While door is held in place mark holes in new hinge using holes in outer skin as locators.

D. Verify correct position of door prior to drilling holes in new hinge.

E. Center punch all holes and carefully drill the two end holes. Fasten cleco's in these two holes and recheck door assembly fit, if satisfactory continue drilling all holes.

F. Remove door assembly. Deburr and clean area completely prior to reinstallation of door assembly.

G. Apply sealant (PR 1403-G-B2 or equivalent) to hinge mounting area between outer skin and door frame.

H. Reinstall door assembly and cleco securely in place.

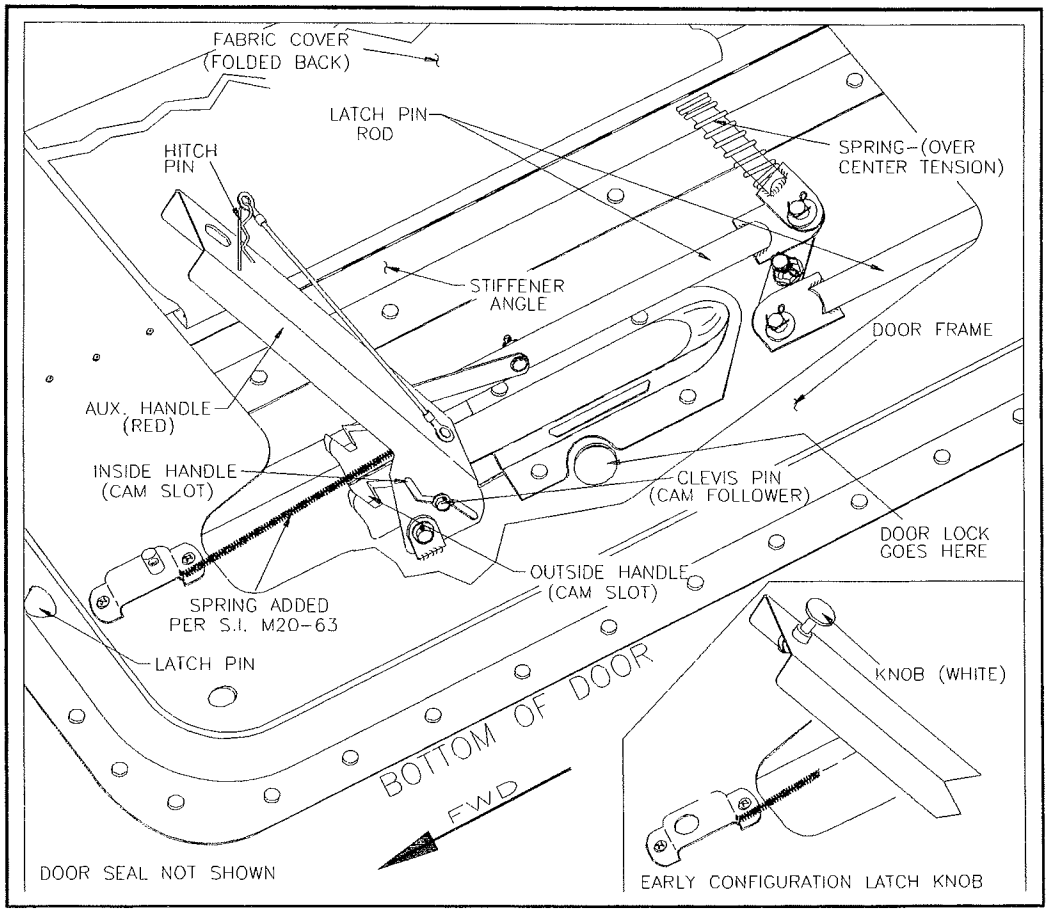
I. Install rivets, (AD4 standard, AD5 oversize) in all holes. Remove cleco's as rivets are being installed to keep door aligned.

52-31-00 - BAGGAGE COMPARTMENT DOOR - LATCHING MECHANISM

The baggage compartment door has a direct non-adjustable latching mechanism that inserts two pins into hard points in the door frame. This latching mechanism can be operated and locked from the outside.

An auxiliary exit mechanism is incorporated into this latching mechanism which allows the door to be opened, in an emergency, from the inside, even if outside handle is locked.

The outside handle has to be unlatched and fully opened and inside mechanism secured to correctly re-engage latching mechanism after use of inside auxiliary exit handle. See Figure 52-2 and POH/AFM to close.



BAGGAGE DOOR LATCHING MECHANISM
FIGURE 52 - 2

S/N 25-0001 thru 25-0754 were manufactured without a spring attached to clevis pin to assist in proper engagement of the latch pin linkage after operation of the inside handle. Mooney Service Instruction M20-63 dated April, 1983 adds this modification to these aircraft. This ensures a positive re-engagement of the clevis pin into the cam slot of outside handle for proper actuation of the outside latching mechanism.

Service Bulletin M20-239 (AD 88-25-11) has been issued to modify the baggage door latch also. It includes the modifications depicted in Mooney Service Instruction M20-63 and SI M20-82.
It is recommended that this be accomplished on all aircraft
(see Figure 52-2).

NOTE
Follow procedures in Pilots Operating Handbook and Airplane Flight Manual (POH/AFM) for re engagement of the mechanism for proper outside handle operation.

CHAPTER 53

FUSELAGE

CHAPTER 53

FUSELAGE

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53-00-00 GENERAL

The Mooney M20K forward fuselage is constructed from 4130 chrome molybdenum tubular steel. The tubular steel sub-assemblies are heliarc welded in fixtures, inspected and then assembled into the main cabin fixture and heliarc welded into a cabin enclosure. The assembled steel structure is sand blasted and painted with epoxy primer for corrosion protection. Earlier aircraft had the tubular structure dipped in zinc chromate primer after sand blasting.

The tailcone bulkheads, formers, etc., are formed from sheet aluminum on a hydro press or drop hammer at Mooney Aircraft Corporation. These components, along with stringers, clips, brackets, etc., are assembled together on a fixture and built into the aft fuselage assembly. All air ducts, control brackets, electrical harnesses and antennas are assembled into the tailcone during this manufacturing stage.

The forward cabin enclosure and the tailcone are mated and this fuselage assembly advances down the production line to the point of mating with the wing and the empennage assemblies.

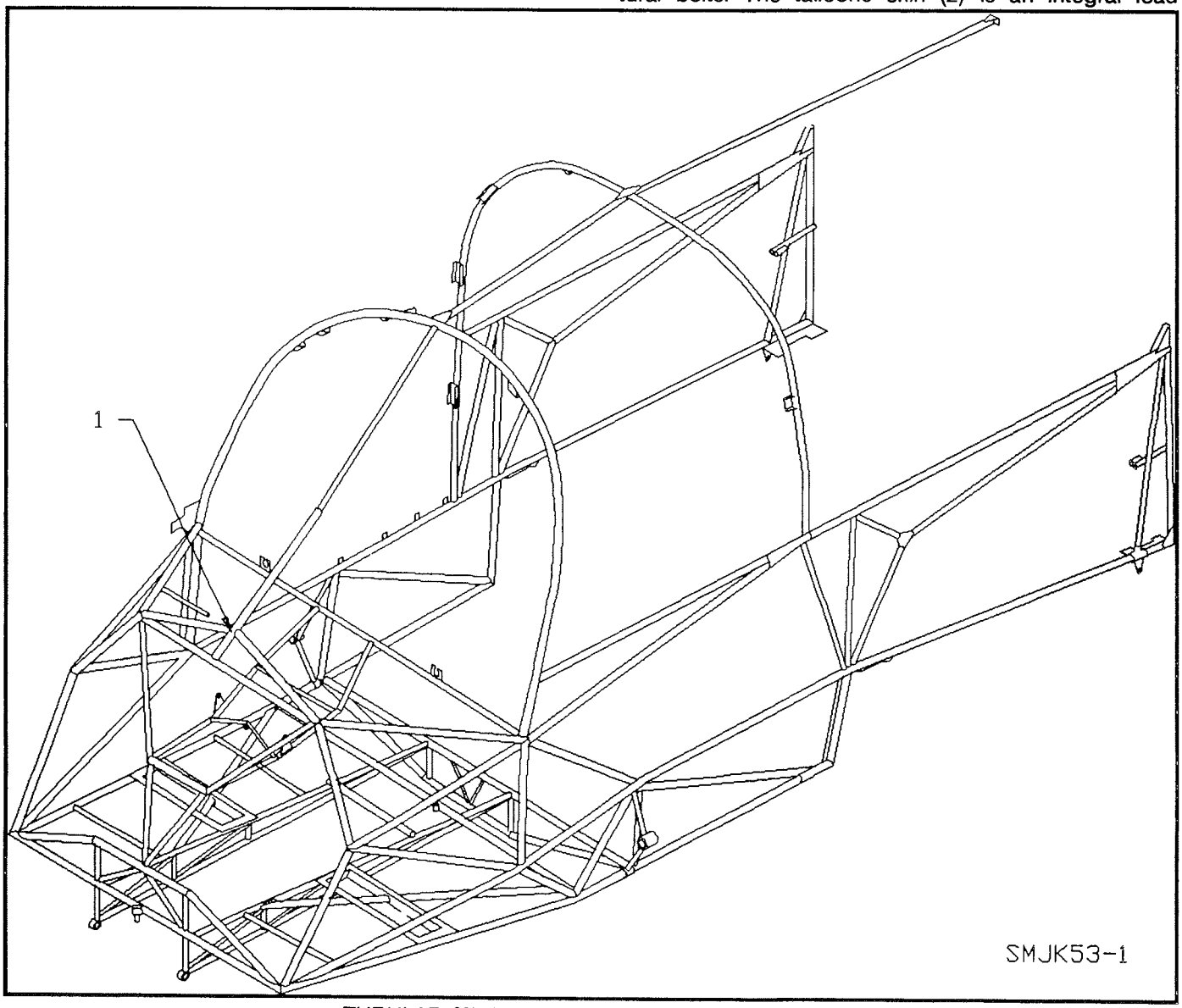
53-10-00 - MAIN FRAME

53-10-01 - TUBULAR STRUCTURE FRAME

The basic cabin enclosure is shown in (**Figure 53-1**). Serial No. 25-0002 thru 25-0246 have a windshield frame that will not accept the radar display unit. S/N 25-0001, 25-0247 thru 25-TBA have had the wishbone subassembly (1) changed to allow this unit to be installed.

53-10-02 - TAILCONE STRUCTURE

The tailcone is of semi-monocoque construction. The internal structure is shown on (Figure 53-2). The forward cabin structure (1) is bolted to tailcone with structural bolts. The tailcone skin (2) is an integral load

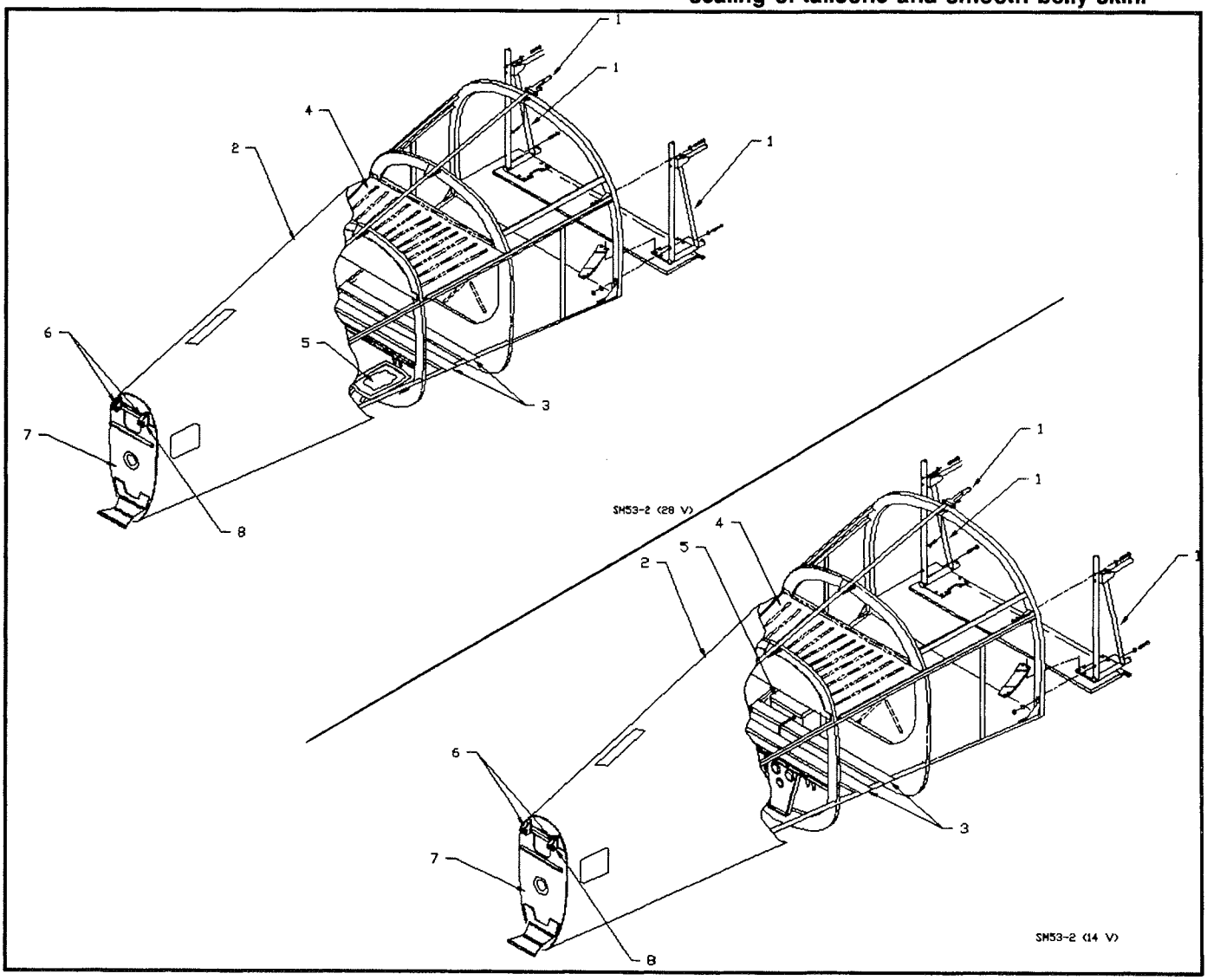


TUBULAR STRUCTURE FRAME FIGURE 53 - 1

bearing portion of the assembly. The avionics equipment shelf (3) spans the tailcone width to provide rigidity and space for avionics components. The battery box (5) and battery (12 volt) (battery only on 24 volt aircraft) are located in this area also. The hat rack shelf (4) provides rigidity as well as storage space.

The empennage attach points (6) are attached to rear bulkhead (7) with tabs (8) extended forward and attached to tailcone structure.

NOTE
Refer to Mooney Service Instruction M20-76 for sealing of tailcone and smooth belly skin.



TAILCONE STRUCTURE FIGURE 53 - 2

53-30-00 - PLATES/SKINS

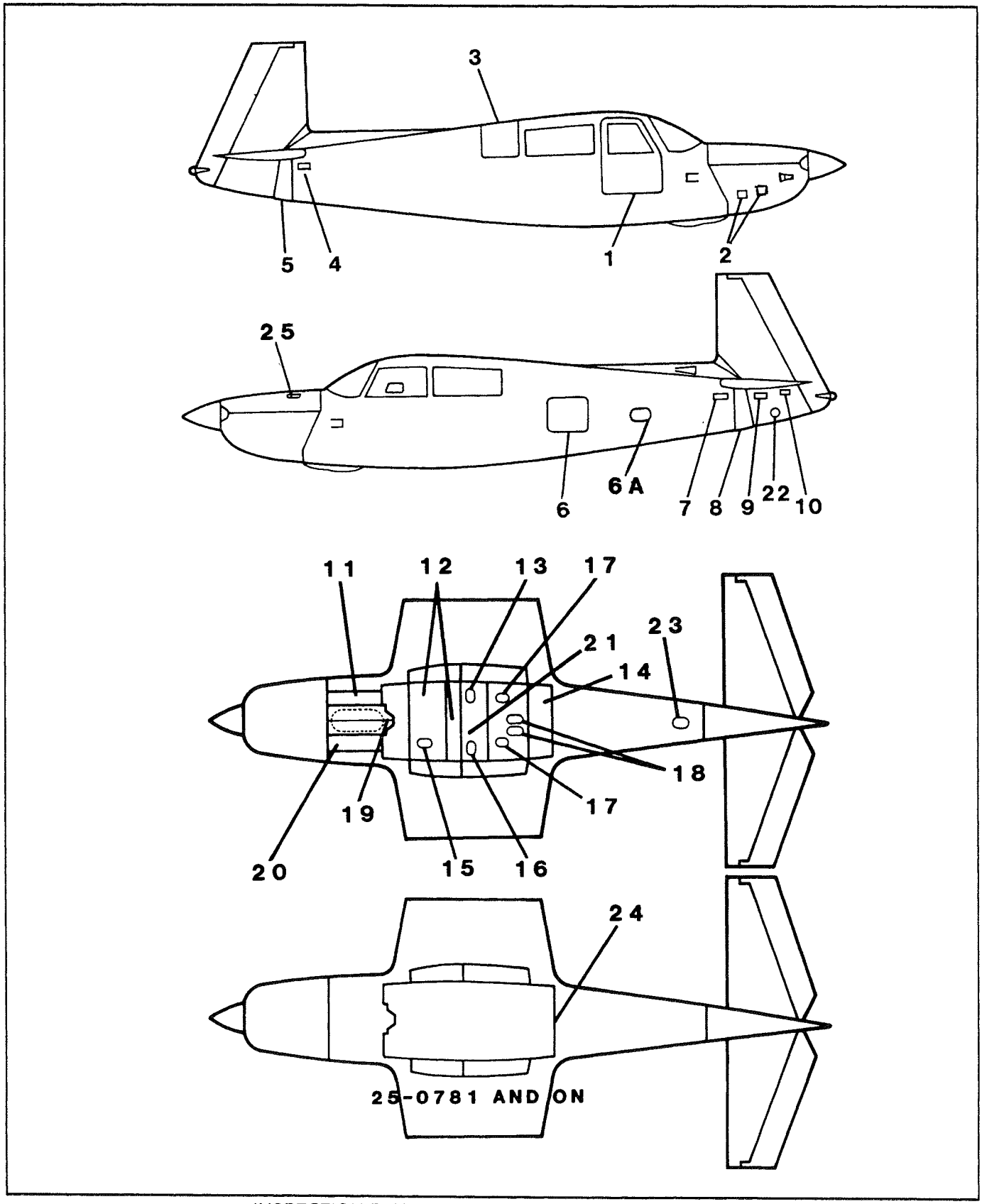
The fuselage tubular structure is covered with aluminum skins after mating to tailcone. The skins are riveted and bolted to support angles, formers and brackets. These skins are non structural coverings to form the outside contour of forward fuselage section.

The skins covering the tailcone are an integral part of the structure. Repair or replacement of these skins should be according to AC 43.13-1( ), Section 3.

The fuselage assembly and tailcone have panels, covers or doors at various locations to provide access to the interior for inspection or maintenance purposes. (See Figure 53-3).

The belly skins are removable to provide access to all components and control systems located below floorboard. See Figure 53-3 and the following table for component location and identification. S/N 25-0781 and later aircraft have a one piece fiberglass/composite belly skin.

NOTE
PR-1766 B2 sealant should be used for all fuselage skin lap joints to provide a good electrical ground plane.



INSPECTION PANEL AND COVERS FIGURE 53 - 3

TABLE FOR FIGURE 53-3 - COMPONENT IDENTIFICATION

1. Cabin Door.

2. Engine Compartment, Turbocharger.
3. Baggage Door.
4. Elevator/Rudder Control Stops.
5. Empennage Attachment.
6. Avionics Blackboxes,

6A Battery Access.
7. Stabilizer Trim Jack Screw.
8. Empennage Attachment.

9. Elevator/Rudder Controls, Rod End Bearings & Travel Stops

10. Rudder Controls, Elevators & Rudder Bellcranks.
11. Brake Master Cylinders, Rudder Torque Tube, Electric Fuel Pump.

12. Landing Gear Actuator, Gascolator, Fuel Selector Valve.
13. Landing Gear Retract Tubes, Flap Indicator Cable.
14. Electric Flap Actuator.
15. Stabilizer Trim Screw and Stops.

16, 17, 18. Elevator/Rudder/Aileron Control System, Bellcranks, Rod End Bearings.
19. Nose Wheel Steering System, Cowl Flap Controls.

20. Rudder Torque Tube.
21. Landing Gear Retraction Tubes.
22. Tail-Light Harness Connections.

23. Empennage Attachment, Trim Jack Screw.

24. All components (12-18, 21).
25.Oil access

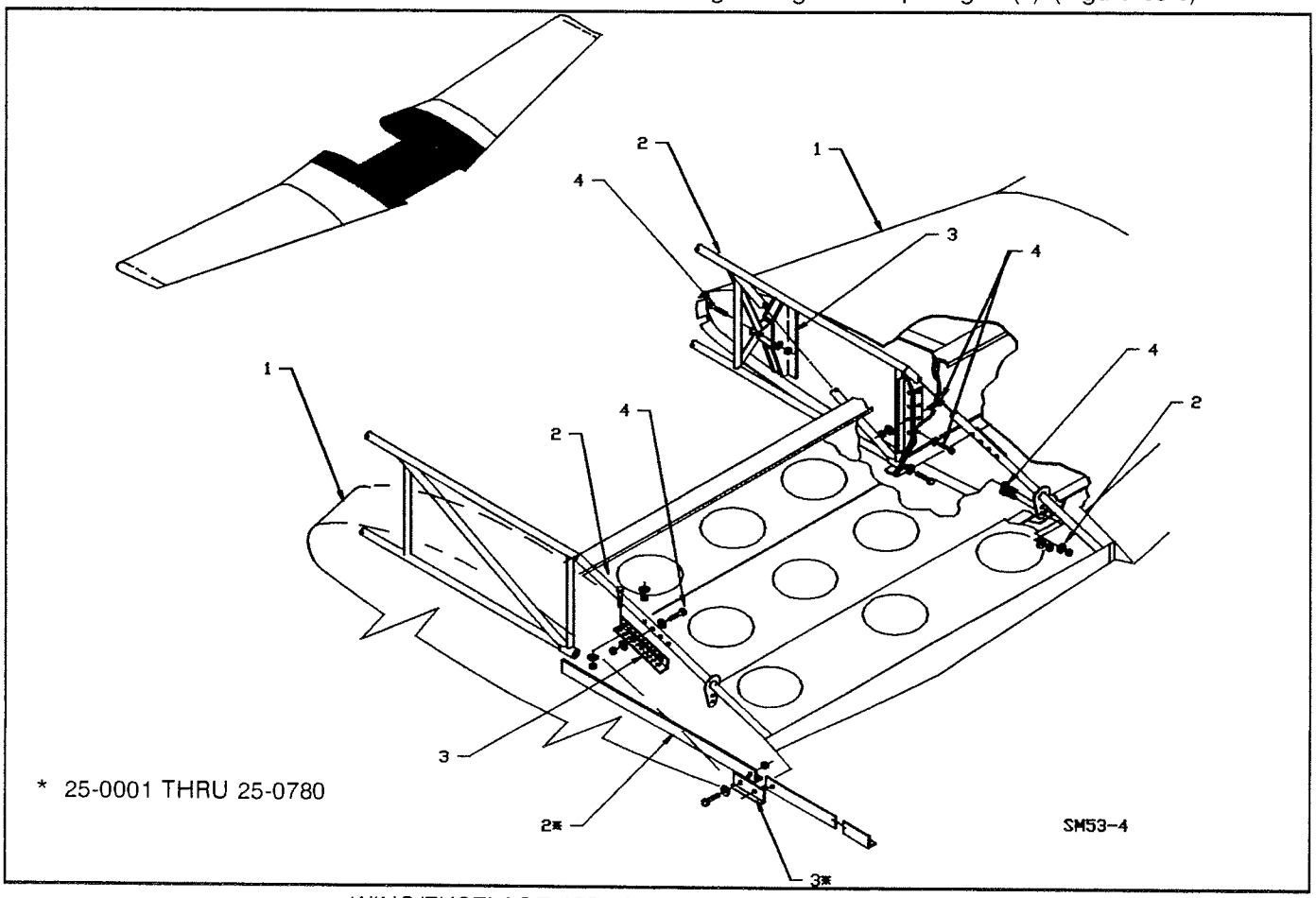
53-40-00 - ATTACH FITTINGS

53-40-01 - WING ATTACH FITTINGS

The wing assembly (1) is attached to fuselage assembly (2) using structural hardware (4); (see **Figure 53-4** for locations). Various type of fittings (3) are used to properly distribute the load between wing and fuselage.

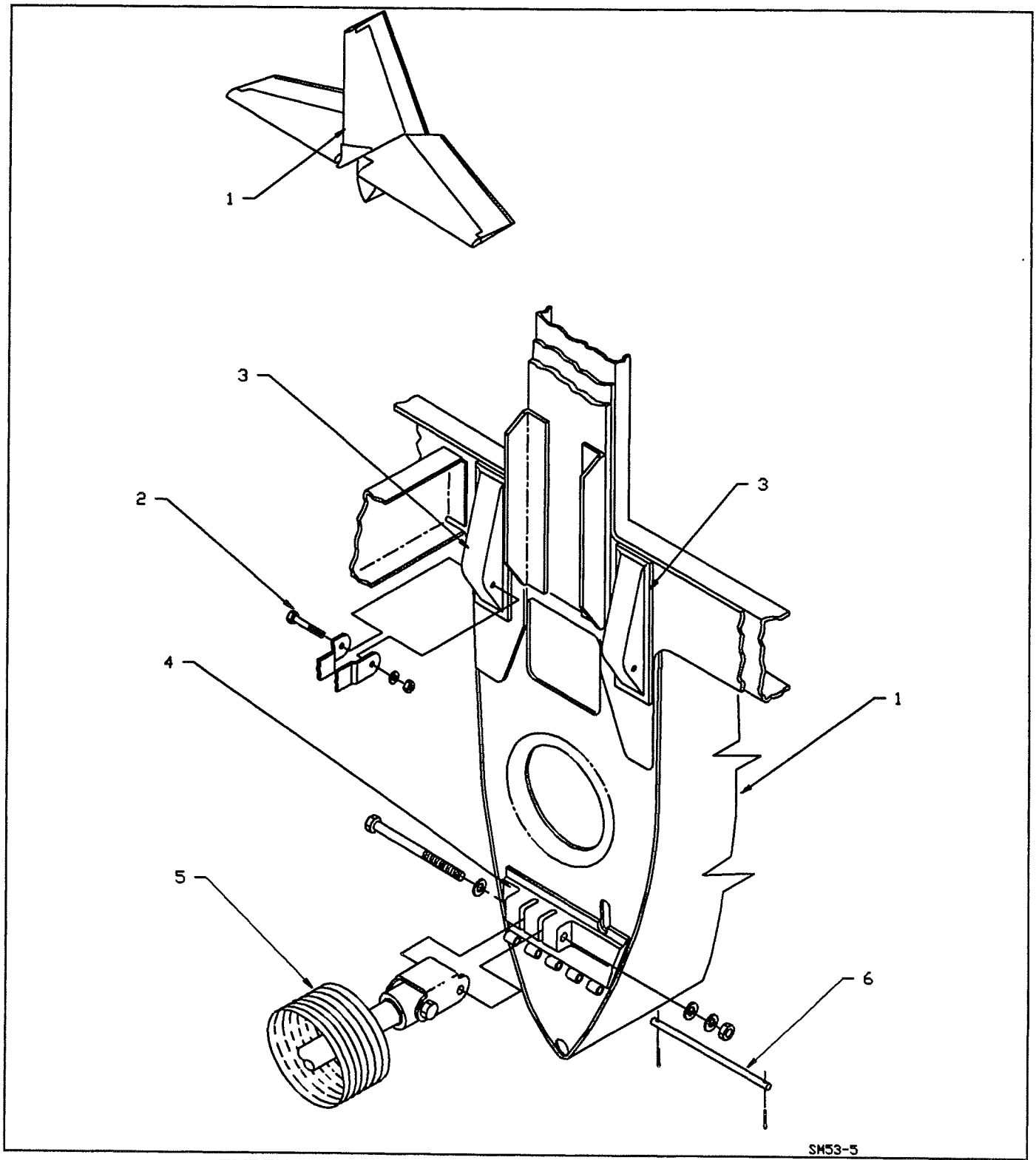
53-40-02 - EMPENNAGE ATTACH FITTINGS

The empennage assembly is manufactured as a unit (1), (**Figure 53-5**) with the vertical fin and horizontal stabilizer using common components. This unit attaches to tailcone/empennage attach points (1) (**Figure 53-6**), using two structural bolts (2) (Figure 53-5) passing through two top hinges (3) (Figure 53-5).

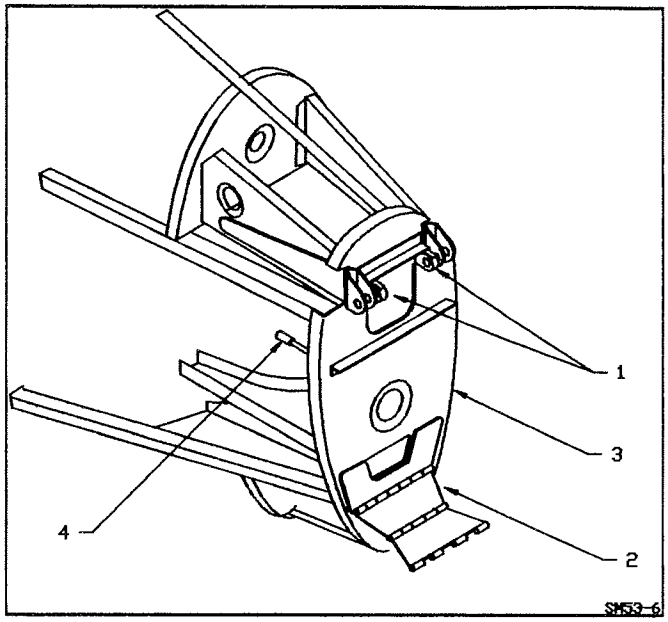


WING/FUSELAGE ATTACH FITTINGS FIGURE 53 - 4

The bottom attach point (4) (Figure 53-5) on the empennage assembly secures stabilizer trim jack screw (5) (Figure 53-5) and (4) (Figure 53-6). Lateral stability of empennage assembly is controlled with an articulated hinge assembly (2) (Figure 53-6) attached to rear bulkhead (3) (Figure 53-6) of tailcone. The hinge attach pin (6) (**Figure 53-5**) is held in place with a cotter pin at each end.



EMPENNAGE ASSEMBLY ATTACH FITTINGS FIGURE 53 - 5



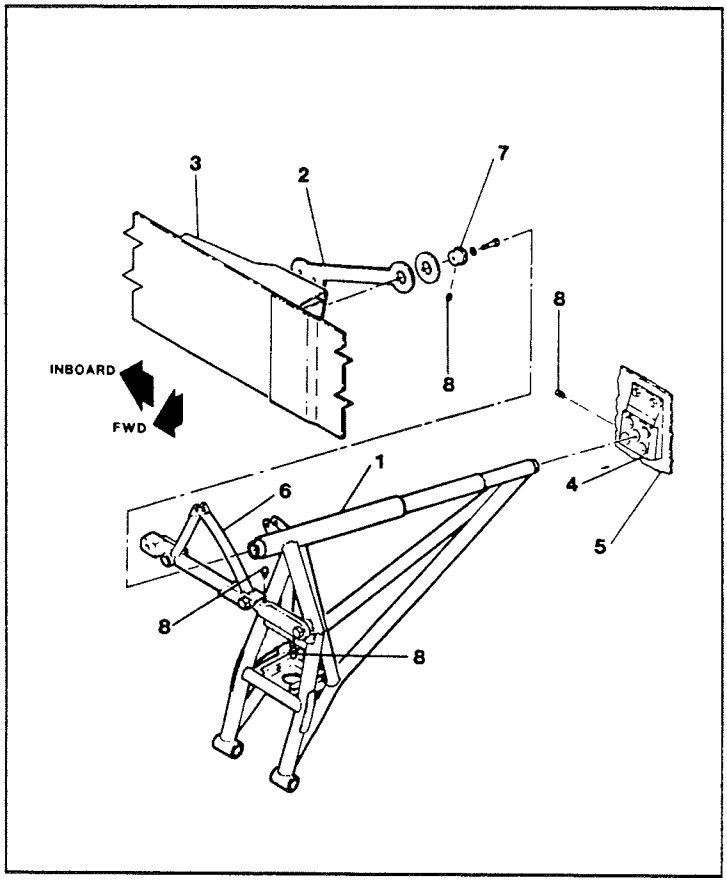
TAILCONE/EMPENNAGE ATTACH POINTS
FIGURE 53 - 6

53-40-03 - MAIN LANDING GEAR ATTACH POINTS

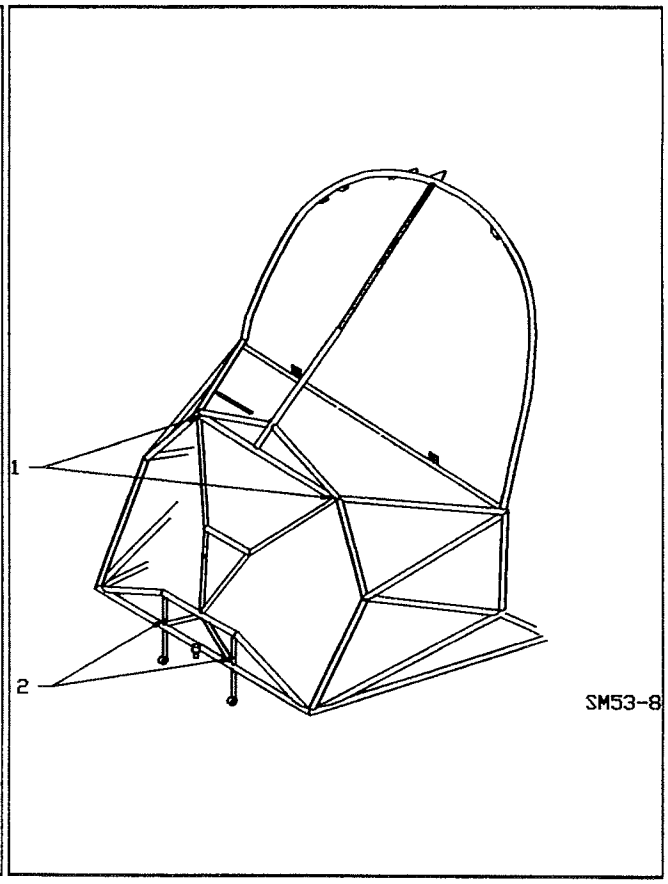
The main landing gear assembly is a welded heat treated, 4130 chrome molybdenum steel assembly. The leg assembly (1),Fig. 53-7, is supported at the forward end by the tension strap fitting (2) attached to the wing main spar assembly (3) (**Figure 53-7** insert) and provides one of the hard points for the main landing gear assembly. The leg assembly (1) is supported at the rear by a bracket (4) attached to the stub spar assembly (5). This is the rear hard point. The main landing gear truss assembly (6) also attaches to the tension strap fitting (2) on main spar. The brass bearing (7) (insert) should be inspected at any scheduled maintenance action for wear. Grease fittings (8) are installed at pivot points of main landing gear assembly for lubrication per Section 5. (Reference Figure 53-7).

53-40-04 - ENGINE MOUNT ATTACH POINTS

The engine mount is attached to hard points built into the forward portion of tubular structure.
The upper hard points (1) (**Figure 53-8**) are for NAS1304 bolts installed for tension loads. The lower hard points (2) are for fittings outside the firewall which allow a clevis on each side of the engine mount to be attached for shear loads. AN4 bolts are used for this application.



MAIN LANDING GEAR ASSEMBLY ATTACH POINTS
FIGURE 53 -7



ENGINE MOUNT ATTACH POINTS
FIGURE 53 - 8

CHAPTER 55

STABILIZERS

CHAPTER 55

STABILIZERS

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55-00-00 - GENERAL

The M20K empennage assembly is a variable incidence tail-plane consisting of a horizontal and vertical stabilizer built as a unit. (Refer to Chapter 53 for the attachment of empennage to fuselage.)

The horizontal and vertical stabilizer are constructed of formed sheet metal ribs attached to a forward and aft spar assembly covered with stretch formed skins. The horizontal stabilizer has a stub spar that spans a portion of the stabilizer.

The elevator and rudder are constructed from an extruded leading edge spar assembly covered with formed skins. The elevators have a fixed tab between the skins that run the full length of the trailing edge.

The elevators and the rudder have balance weights permanently installed for stabilization during flight.

55-10-00 - HORIZONTAL STABILIZER

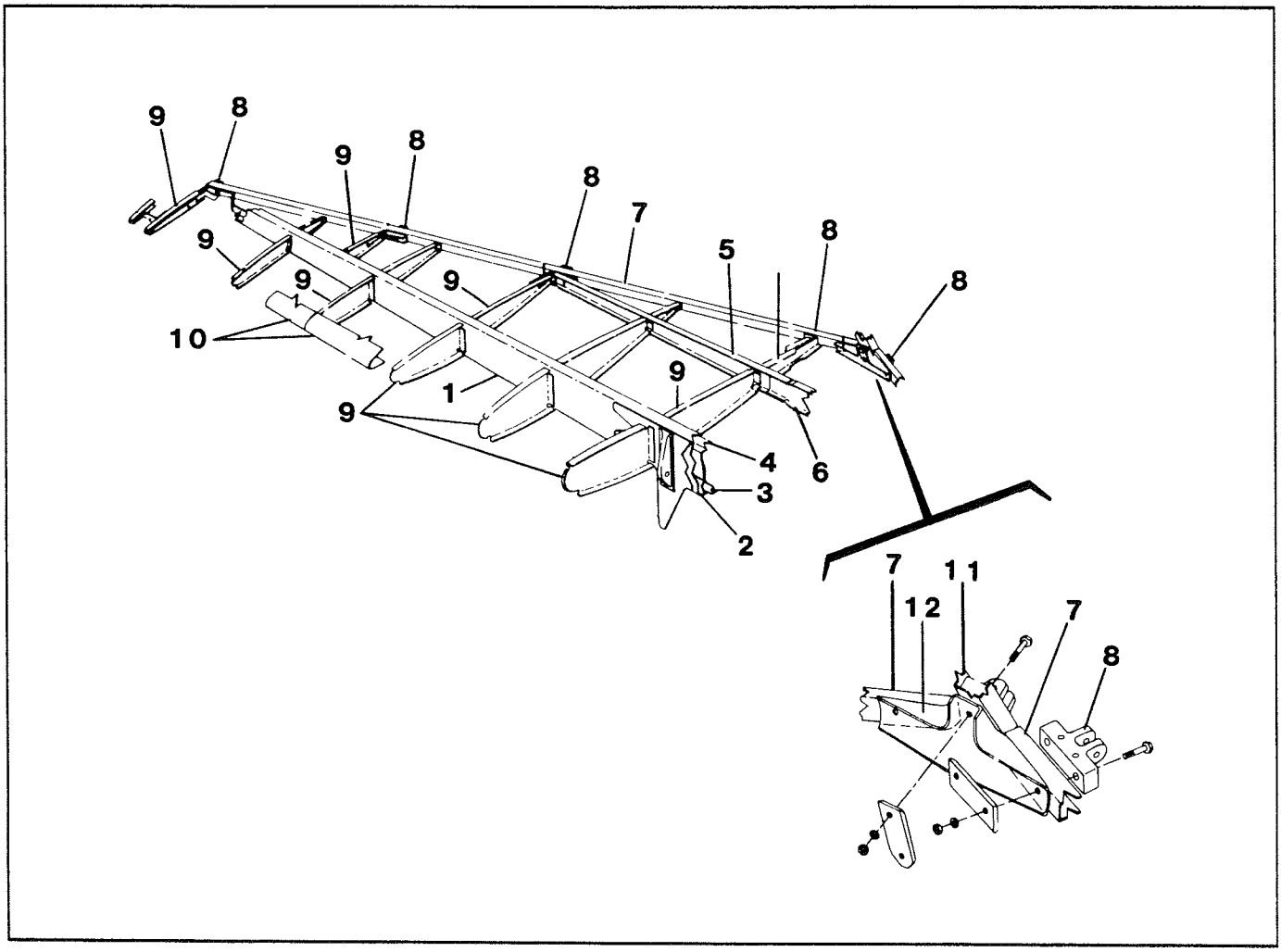
The main spar assembly (1) (Ref. **Fig. 55-1**) is formed from aluminum sheet into a channel. Angle doublers (2, 3 and 4) are formed and riveted to the spar through the web section. The stub spar (5) is a channel formed from aluminum sheet reinforced with a joggled channel (6) at the center section. The rear spar (7) is an extrusion attaching to aft end of ribs and contains hinge fittings (8) for the elevators.

The ribs (9) are assembled in sections to front and rear face of each spar assembly to form the air foil. Stretch formed skins (10) are fastened to ribs, spars and doublers to form the complete horizontal stabilizer structure.

The aft vertical fin spar (11) is attached to horizontal stabilizer structure through a bracket (12) which is fastened securely to stabilizer rear spar assembly (7). (Reference Figure 55-1).

55-10-01 - HORIZONTAL STABILIZER - REMOVAL

The fairing located on tailcone, covering gap between tailcone and empennage assembly, will require removal to gain access to empennage attaching hardware. Section 53-40-02 describes attaching points for empennage assembly. Refer to this section for the removal of empennage assembly from airplane.



HORIZONTAL STABILIZER FIGURE 55 - 1

55-10-02 - HORIZONTAL STABILIZER - INSTALLATION

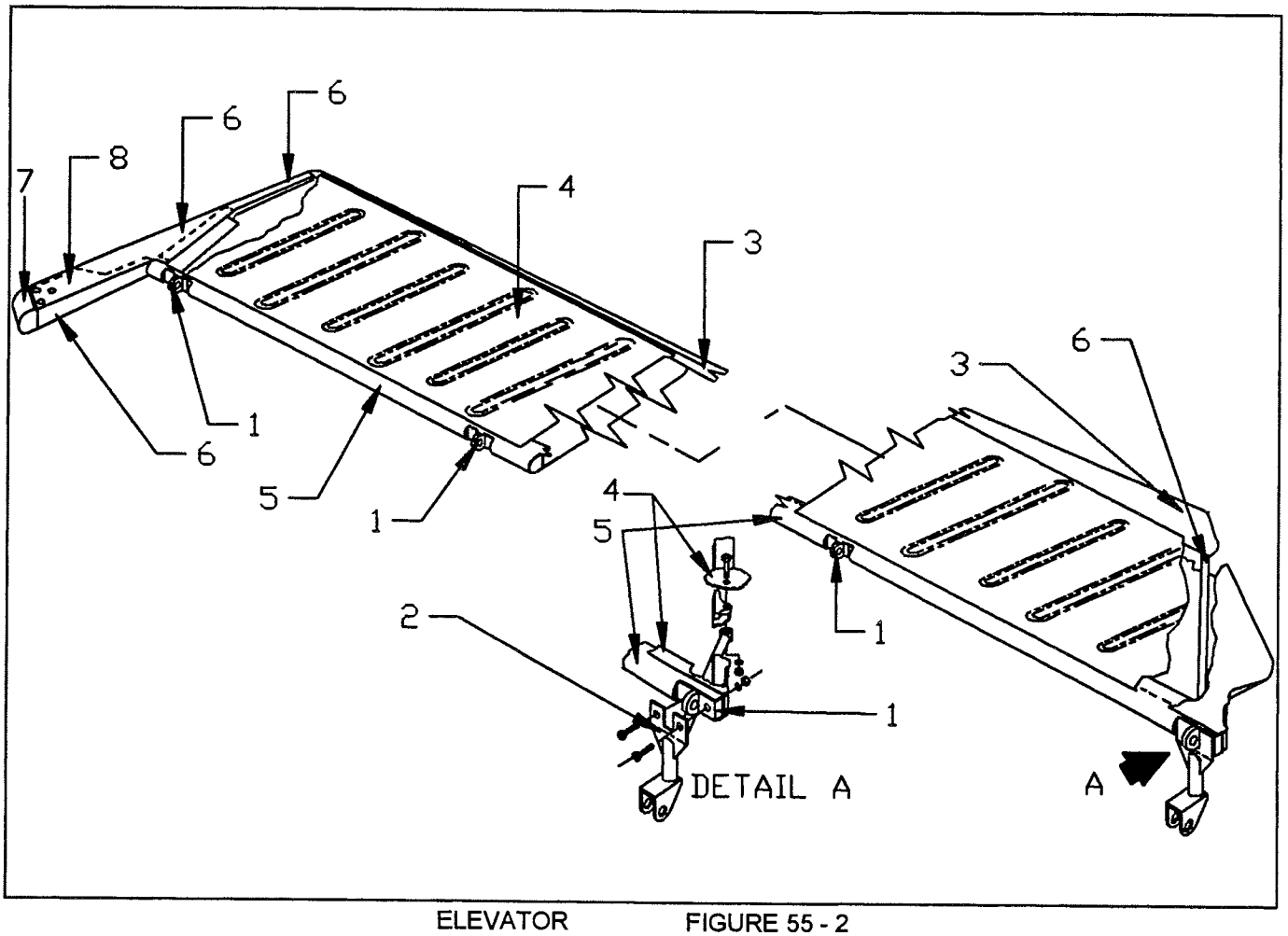
Refer to Section 53-40-02 for installation.

55-20-00 - ELEVATOR

The elevators on the M20K consist of a left and right hand assembly attached through ball bearing fittings (1) to rear spar of the horizontal stabilizer (reference **Figure 55-2**).

The elevator control horn (2) is connected to inboard leading edge of each elevator (R.H. and L.H.). Both control horns are then connected to elevator flight control bellcrank. The full length trim tab (3) may not be re-adjusted from factory installed configuration. This is factory set at 7° down.

The elevator skins (4) are stretch formed for upper and lower surface of elevator. There are no ribs in the elevator between inboard and outboard ribs.



ELEVATOR FIGURE 55 - 2

The skins are attached to leading edge extrusion (5) and ribs (6) with blind rivets. Each formed corrogation is matched on top and bottom skins and rivets are installed for strength and rigidity through each corrogation.

A lead balance weight (7) is installed in each elevator tip with iron rivets (8). (Reference **Figure 55-2**). See Section 27-91-00 for balancing procedures on the elevators.

55-20-01 - ELEVATOR - REMOVAL

Remove AN3 bolts from each control horn and push-pull tube bearing, then remove AN3 bolts and hardware from each hinge fitting on both elevators.

55-20-02 - ELEVATOR - INSTALLATION

CAUTION
Each new, repaired or repainted elevator should be checked for balance per Section 27-91-00.

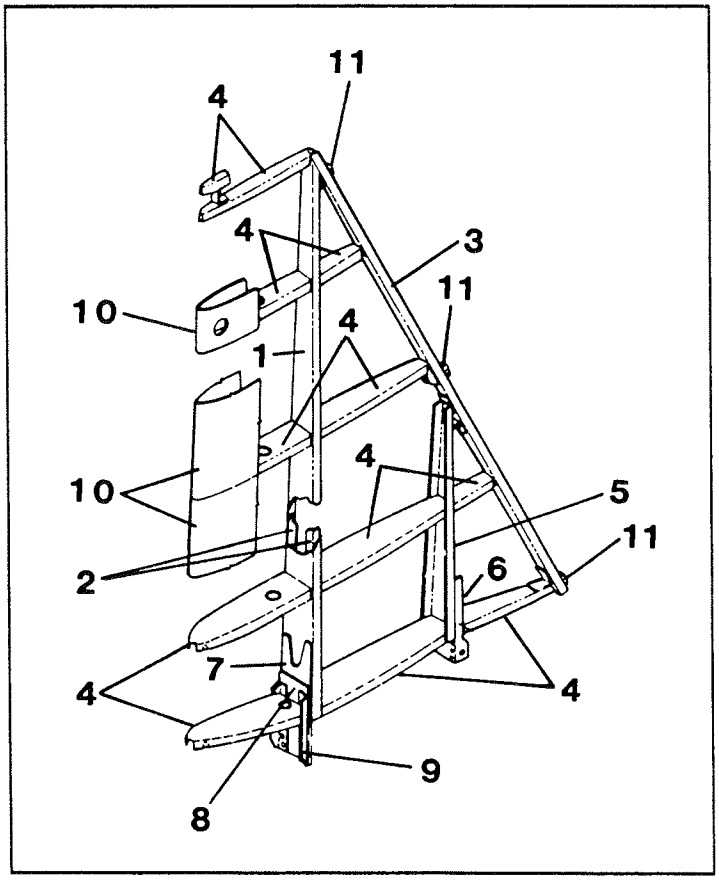
The elevators are installed in reverse order of removal. Nominal torque values for AN3 bolts are to be used (see section 5-20-01 for torque table.)

55-30-00 - VERTICAL STABILIZER

The main spar assembly (1) (Ref. **Fig. 55-3**) is formed from aluminum sheet. Formed angle doublers (2) are nested inside the main spar channel and riveted to the web. The rear spar (3) is an extrusion used to attach aft end of sectioned ribs (4). The stub spar (5) is also formed from sheet aluminum. A doubler channel (6) is attached to the vertical stabilizer stub and the stub spar of horizontal stabilizer. This attach channel is securely bolted to stinger bulkhead brackets. The main spar doublers and angles 7, 8 and 9 provide attach points for stinger and horizontal stabilizer spar. (Refer to **Figure 55-3**).

The skins (10) are stretch formed in 2 sections and riveted to ribs and spar.

The rudder attach fittings (11) are mounted to the rear spar extrusion.



VERTICAL STABILIZER ASSEMBLY FIGURE 55 - 3

55-30-01 - VERTICAL STABILIZER - REMOVAL

The vertical and horizontal stabilizer are removed as a unit with stinger assembly. Remove fairing located on tailcone which covers gap between tailcone and empennage. Section 53-40-02 describes attaching points for the complete empennage assembly. Refer to this section for removal of empennage assembly from airplane.

55-30-02 - VERTICAL STABILIZER - INSTALLATION

Refer to Section 53-40-02 for installation.

55-40-00 - RUDDER

The rudder on the M20K is constructed the same as the elevator with stretch formed skins (1) (Ref. Fig. 55-4) riveted to an extruded leading edge (2) and riveted together at the trailing edge. The rudder lower skins (3) are drop hammer formed left and right halves riveted to upper skins, a rib assembly (4) and at leading and trailing edge. A stiffener (5) is to support lower rudder ball bearing hinge fitting (6). A weather seal (7) is included in the assembly.

The rudder control horn (8) is attached with center hinge fitting (9) to the rear flange of front spar at the junction of the lower rib assembly (10). A brace arm on horn assembly is attached to a fitting (11) on lower rib (10).

The upper hinge fitting (12) is attached to the rear flange of front spar just under top rib assembly (13) and balance weight (14), (refer to **Figure 55-4**).

The balance weight (14) is installed with four iron rivets (15). See section 27-91-00 for balancing procedures on rudder.

55-40-01 - RUDDER - REMOVAL

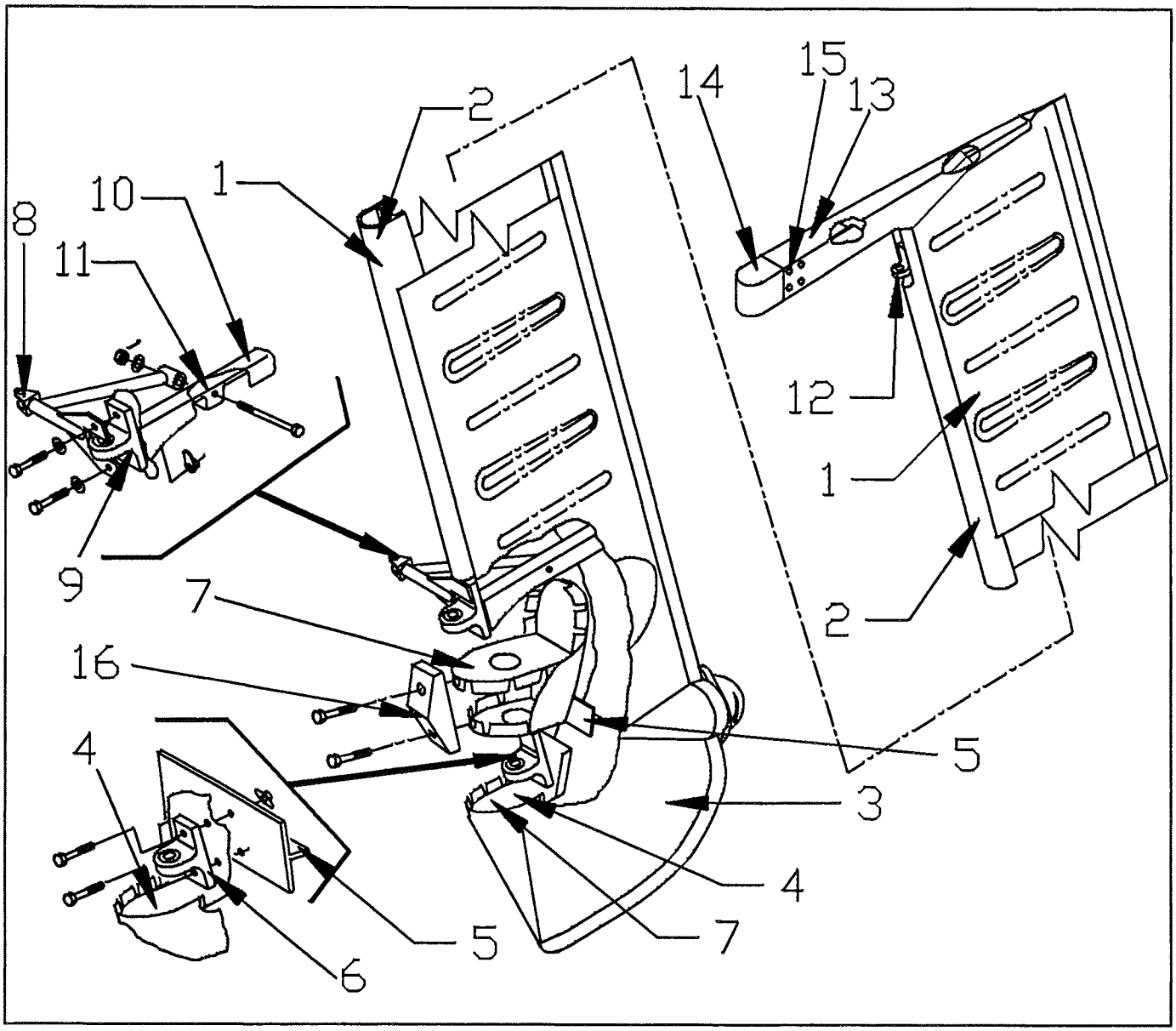
Remove AN3 bolt from control horn and push-pull tube bearing, then remove three AN3 bolts and hardware from each hinge fitting. Disconnect electrical connections per paragraph 33-41-03,2,A thru E.

55-40-02 - RUDDER INSTALLATION

CAUTION

Each new, repaired or repainted rudder should be checked for balance per section 27-91-00 prior to installation.

The rudder is installed in reverse order of removal. Nominal torque valves for AN3 bolts are to be used. (See Section 5-20-01 for torque table).



RUDDER ASSEMBLY FIGURE 55 - 4

CHAPTER 56

WINDOWS

CHAPTER 56

WINDOWS

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56-21-02	Windshield-Installation	4
56-22-00	Cabin Windows	5
56-22-01	Cabin Windows-Removal	5
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56-00-00 - GENERAL

The windshield for the M20K is .187 inch thick acrylic heat formed to contour. The pilots side window is also .187 inch thick acrylic with a hole cut out to accommodate the .312 inch thick storm window. The storm window is milled to fit the hole and to be flush with outside of pilots window surface when closed. The other three side windows are .125 inch thick acrylic. Serial Number 25-0001 thru 25-0612 and 25-0781 and ON have single pane side windows installed. Serial Number 25-0613 thru 25-0780 have a double panel cabin door window. The inner pane is a .060 inch thick acrylic fitted to clips and brackets on door frame.

All the windows are heated in an auto-clave to approximately 300° F and placed on a plaster mold to cool while maintaining the correct shape.

The windows are tinted for visual comfort, ultra-violet filteration and cooling effect for the cabin.

The windows are all sealed to the outside skin with sealant. Retainers and clips are used on the frame to hold windows in place.

56-00-01 - CLEANING ACRYLIC

A commercial cleaning solution manufactured for acrylic may be used to clean routine grit and grime from windows. Follow instructions on the commercial cleaner used.

If no commercial cleaner is available, the following procedures should be followed:

1. Flush windows with water prior to wiping with a clean, soft cloth soaked in kerosene.

CAUTION
Never wipe windows when dry.

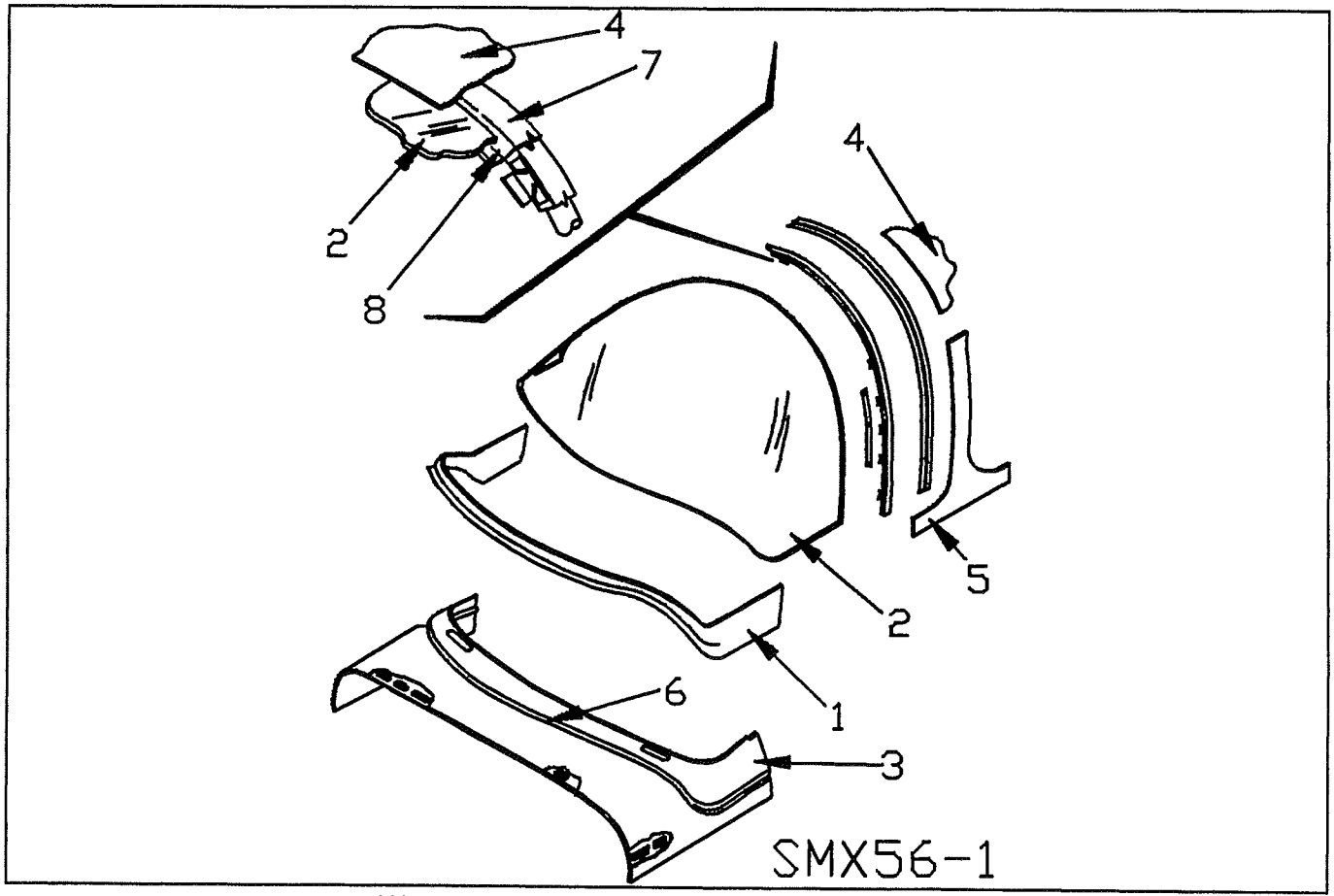
2. Flush with water after cleaning with kerosene.

CAUTION
Never use gasoline, benezene, carbon tetrachloride, acetone, lacquer thinner, deicer fluid, house hold cleaning fluid or any other questionable fluid to clean acrylic windows. These solvents will soften or craze the surface.

NOTE
Minor scratches or abrasions may be polished out by using acrylic resurfacing kits, ie., Micro-Mesh, available from aviation accessory suppliers.

56-20-00 - WINDSHIELD AND CABIN WINDOWS

The removal and installation of windshield and windows are accomplished in the following paragraphs.



WINDSHIELD INSTALLATION FIGURE 56 - 1

56-21-00 - WINDSHIELD

56-21-01 - WINDSHIELD - REMOVAL

The aluminum retainer (1) at bottom of windshield (2) must be removed by drilling out rivets attaching it to cowl deck (3), (reference **Figure 56-1**).
A putty knife or thin aluminum strip will be necessary to work underneath top skin (4) and side post skin (5) to break sealant bond between the acrylic and skins.

CAUTION
Exercise care during this operation to avoid scratching the acrylic. Considerable effort may be required to break bond.

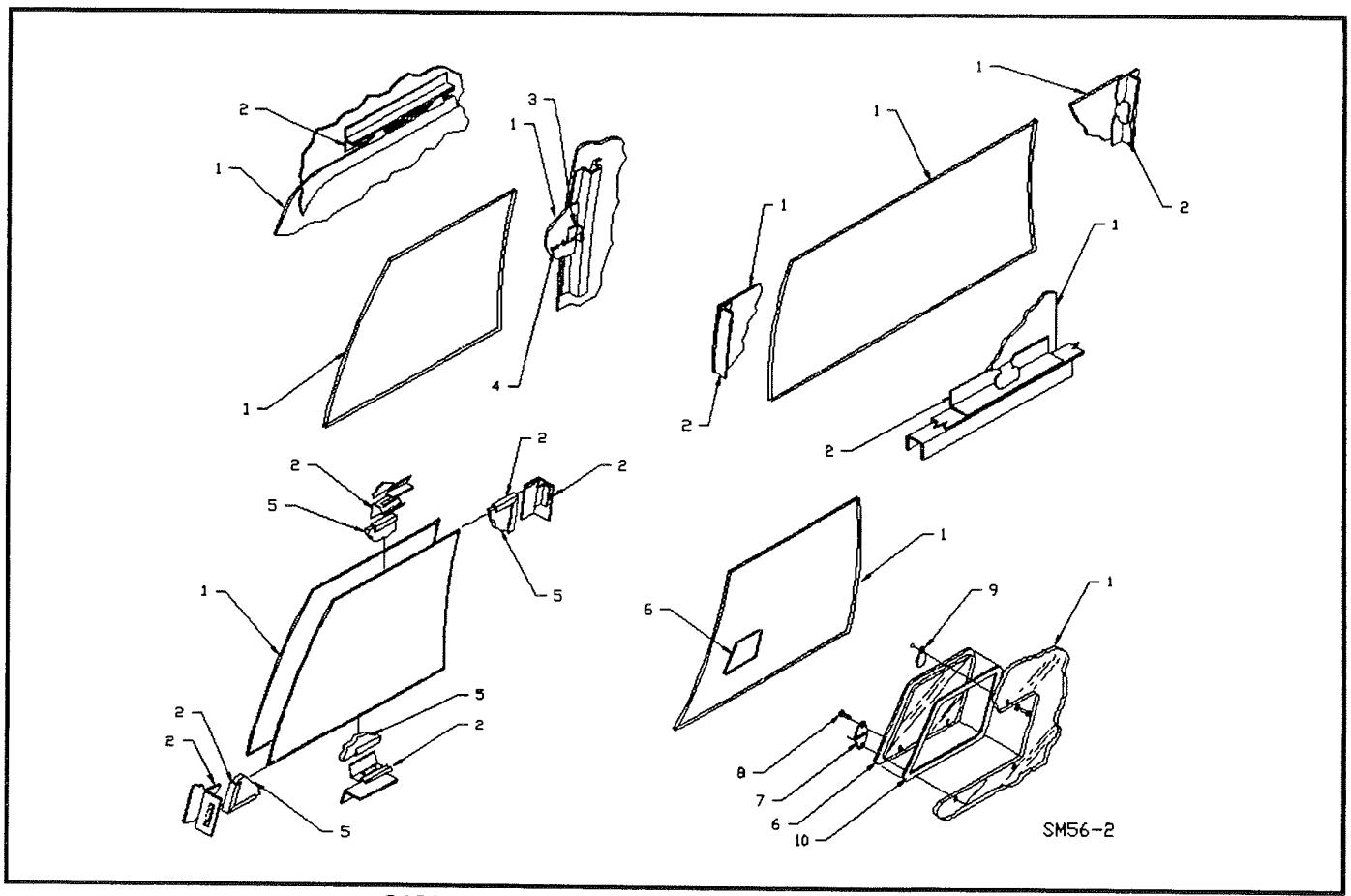
Carefully pull the windshield away from its location starting at lower portion and work it loose as the sealant bond is broken around edge of acrylic.
When windshield is removed all residual sealant must be removed prior to installation of replacement windshield. Careful scrapeing with putty knife and application of M.E.K. will assist in removing excess sealant.

56-21-02 - WINDSHIELD-INSTALLATION

When old sealant is removed brush M.E.K. or equivalent cleaning solvent in cavity (8) where new windshield will be located (refer to Fig. 56-1). Wipe solvent dry to prevent re-deposit of contaminates.

NOTE
Exercise care with application of these solvents. Damage may result if drops of solvents come in contact with either exterior paint, interior trim or plexiglass.

Apply sealant, PR1403-G-B2 or PRC1321-B-2, into cavity (8) until approximately half filled. Apply a bead of sealant along recessed joggle (6) of cowl deck (3), (reference Figure 56-1).
The new windshield being forced into cavity between outer skin (4) and interior retainer (7) will extrude excess sealant. After windshield is in place wipe excess sealant off with a damp clean cloth.
Prior to riveting aluminum retainer (1) into position coat retainer with a uniform thickness of either sealant. A positive bond will be made as retainer is riveted into place. Use CR1312-5-2 cherry rivets to reattach retainer (1) to cowl deck (3), (reference Figure 56-1).
After the sealant cures, excess may be removed with a sharp razor knife.
Check for water leaks.
Repaint retainer and rivets to match aircraft.



CABIN WINDOW INSTALLATION FIGURE 56 - 2

56-22-00 - CABIN WINDOWS

56-22-01 - CABIN WINDOWS - REMOVAL

Remove interior trim from window (1) to be replaced. Remove retainers (2) or clips (3) which hold window in position from inside, (reference **Figure 56-2**).

NOTE
Some retainers are held in place with screws (4) and some with rivets. Drill out rivets carefully.

The window will be bonded to outside skin with sealant. Considerable effort may be required to break bond between acrylic and outer skin. Care should be exercised to keep window from twisting and possibly cracking.
Remove window and clean all remaining sealant from skin. Use M.E.K. and a scraper to remove sealant.
Aircraft S/N 25-0613 thru 25-0780 have an inner (5) and outer window (1) installation on cabin door window. Removal is basically the same procedure as single window installations.

56-22-02 - CABIN WINDOWS - INSTALLATION

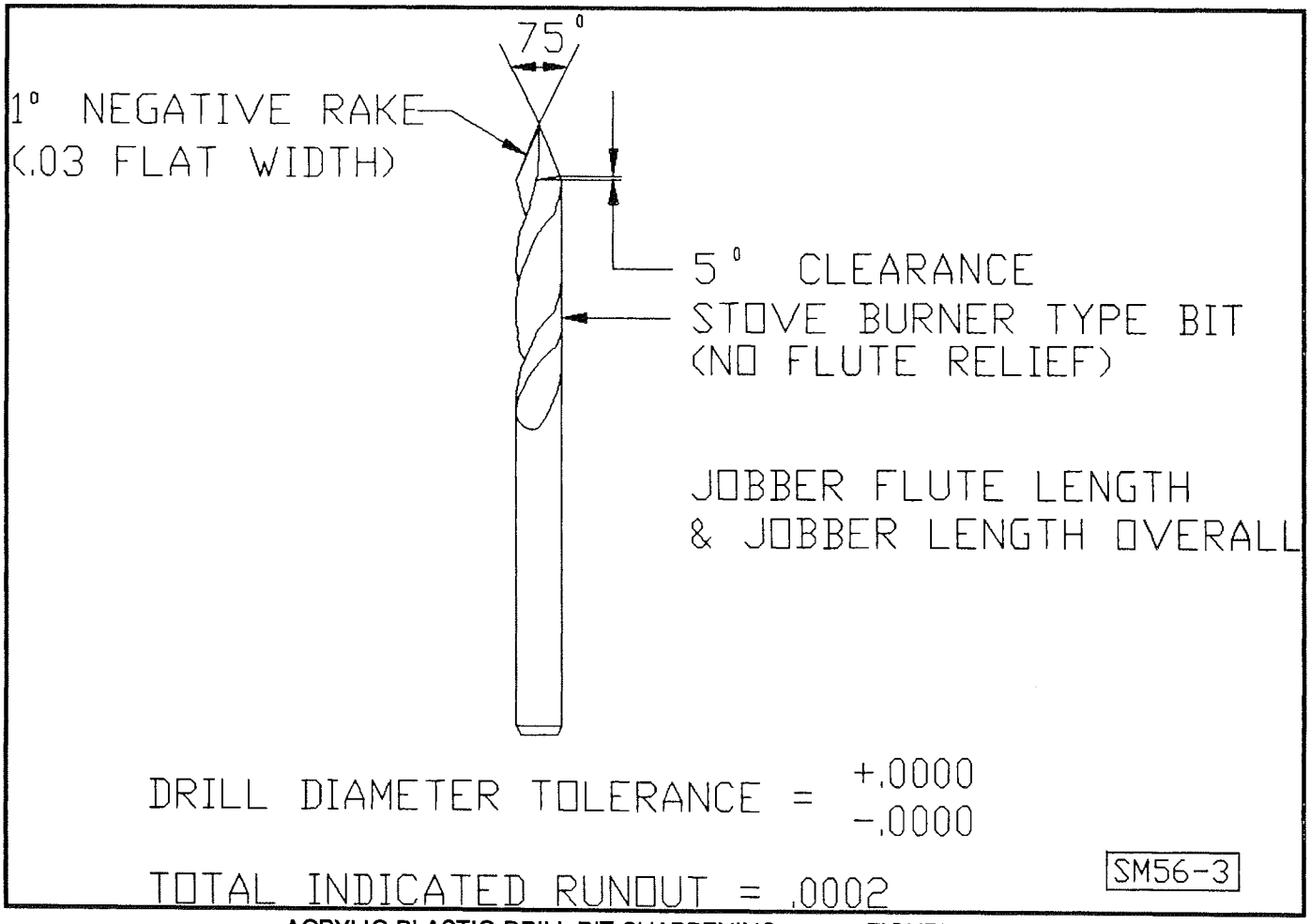
Remove all old sealant and clean skin area with M.E.K.
Place window (1) into position to assure proper fit. Trim if necessary (See Figure 56-2).
Apply a uniform thickness of PR1422-B2 or PR1403-G-B2 or PR1428-B sealant to the skin area where window (1) will be located.
Force window (1) into place with retainers (2) or clips (3) and secure with Avex 1601-410 blind rivets or existing screws and hardware (4). The sealant will be forced out as window is sealed to outside skin. Carefully wipe excess sealant off acrylic before it sets up. After sealant cures, excess can be cut off with a sharp razor knife, (reference Figure 56-2).
Check replaced window for leaks.
Reinstall interior trim panels.

56-23-00 - STORM WINDOW

The storm window (6) is mounted with two hinges (7), attaching hardware (8) and held closed by a latch (9). A gasket (10) is bonded to storm window for sealing purposes when closed, (reference Figure 56-2).

56-50-00 - ACRYLIC DRILLING

Drill bits for acrylic should be ground per (**Figure 56-3**). A slow turning drill bit with light pressures is desirable.



ACRYLIC PLASTIC DRILL BIT SHARPENING FIGURE 56 - 3

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CHAPTER 57

WINGS

CHAPTER 57

WINGS

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57-00-00 - GENERAL

The all metal wing is a one piece assembly attached to the fuselage at structural hard points with structural hardware. (See section 53-40-01). The full span main spar assembly is connected to the stub spar and rear spar assembly by ribs, doublers and skins. The main landing gear forward attach assembly is an integral part of the main spar and the rear fitting is bolted to the stub spar assembly. The spar caps are 7075-T6 aluminum and webs, ribs and doublers are 2024-T3, T4 or T42 aluminum. Repair of these components is covered in Section 51-13-00.

The wing tips are fabricated from fiberglass and house navigation and strobe lights.

The fuel is contained in wet wing type fuel cells between main spar and baffles forward of spar. The tanks are sealed during manufacturing with current technology sealant. (See Section 28 for fuel system details).

57-00-01 - WING REMOVAL AND INSTALLATION

Major subassemblies of wing may be removed individually, or wing may be removed as a unit. To remove a wing, a fuselage supporting cradle is needed.

1. Wing removal:

A. Remove wing-root fairings and bottom fuselage access panels.

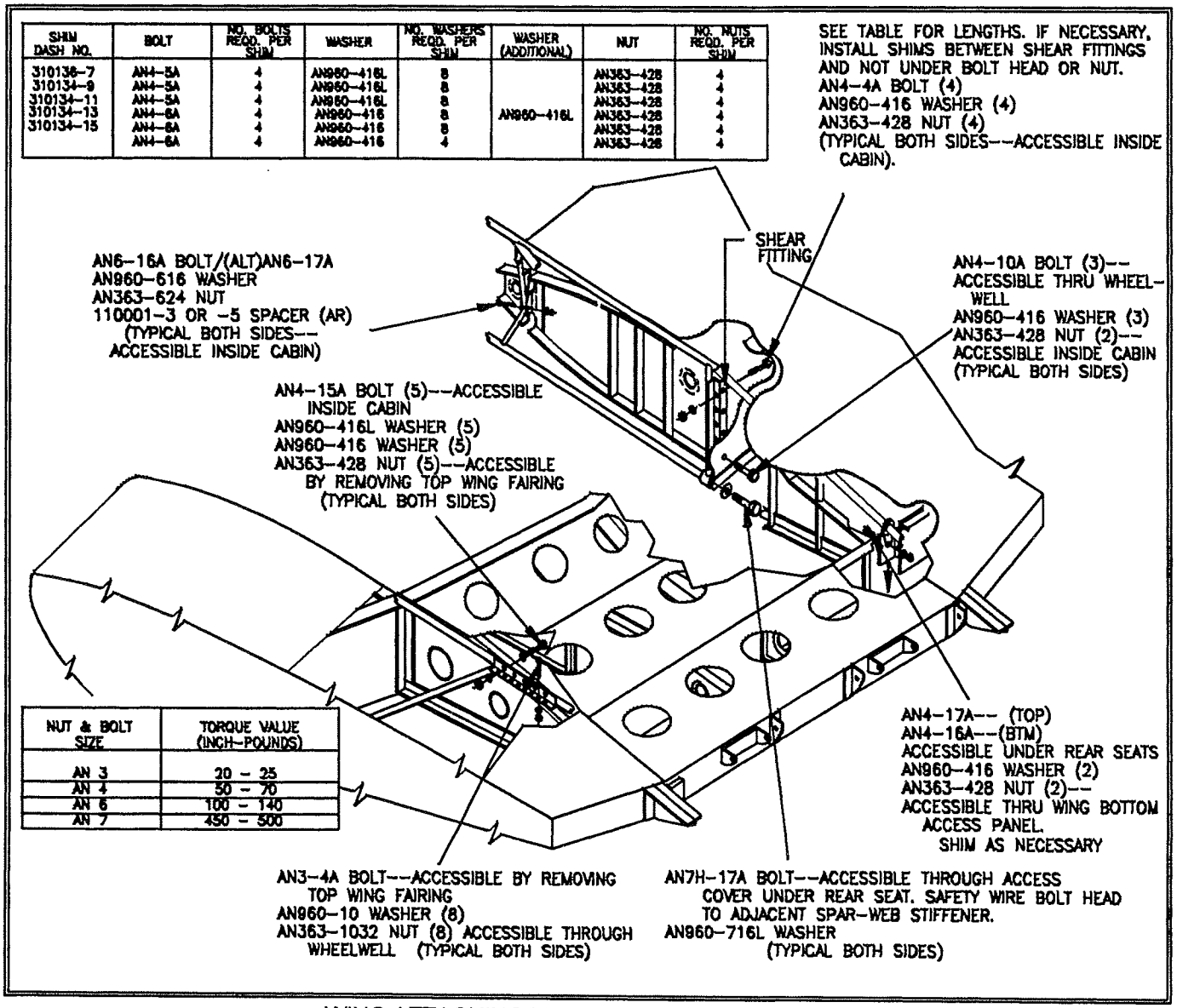
B. Drain all fuel from tanks.

C. Drain brake lines and reservoir. Disconnect hydraulic lines at wing main spar.

D. Remove front and rear seats. Remove two inspection plates under rear seat area.

E. Jack aircraft per Chapter 7-10-00.

F. Attach A-frame hoist to propeller, or support with a propeller jack.



SHIM DASH NO.	BOLT	NO. BOLTS REQD. PER SHIM	WASHER	NO. WASHERS REQD. PER SHIM	WASHER (ADDITIONAL)	NUT	NO. NUTS REQD. PER SHIM
310136-7	AN4-5A	4	AN960-416L	8		AN363-428	4
310134-9	AN4-5A	4	AN960-416L	8		AN363-428	4
310134-11	AN4-5A	4	AN960-416L	8		AN363-428	4
310134-13	AN4-6A	4	AN960-416	8	AN960-416L	AN363-428	4
310134-15	AN4-6A	4	AN960-416	8		AN363-428	4
	AN4-6A	4	AN960-416	4		AN363-428	4

NUT & BOLT SIZE	TORQUE VALUE (INCH-POUNDS)
AN 3	20 - 25
AN 4	50 - 70
AN 6	100 - 140
AN 7	450 - 500

WING ATTACHING HARDWARE FIGURE 57 - 1

G. Disconnect or remove the following:

(a) Two landing gear assist springs.

(b) Aileron control tubes at inboard bellcranks.

(c) Trim control tube at station 59.3 and 94.5.

(d) Main gear retraction tubes.

(e) Rudder control tubes.

(f) Elevator control tube.

(g) Elevator and rudder push-pull tubes.

(h) Floorboards at rear attach points.

(i) Belly skin stringer splice angles.

(j) Airspeed indicator line, pitot lines, and pitot heater wires (if installed).

(k) Hardware shown in (**Figure 57-1**).

CAUTION
Have a suitable cradle ready to carry fuselage before removing all mating hardware.

2. Wing installation:

Installation of the wing assembly is direct reversal of removal.

57-00-02 - STALL STRIP INSTALLATION

1. Adjust stall strips so that, during stall recovery, normal use of controls should prevent:

A. More than 15 degree roll.

B. More than 15 degree yaw.

C. More than 30 degree pitch below flight level.

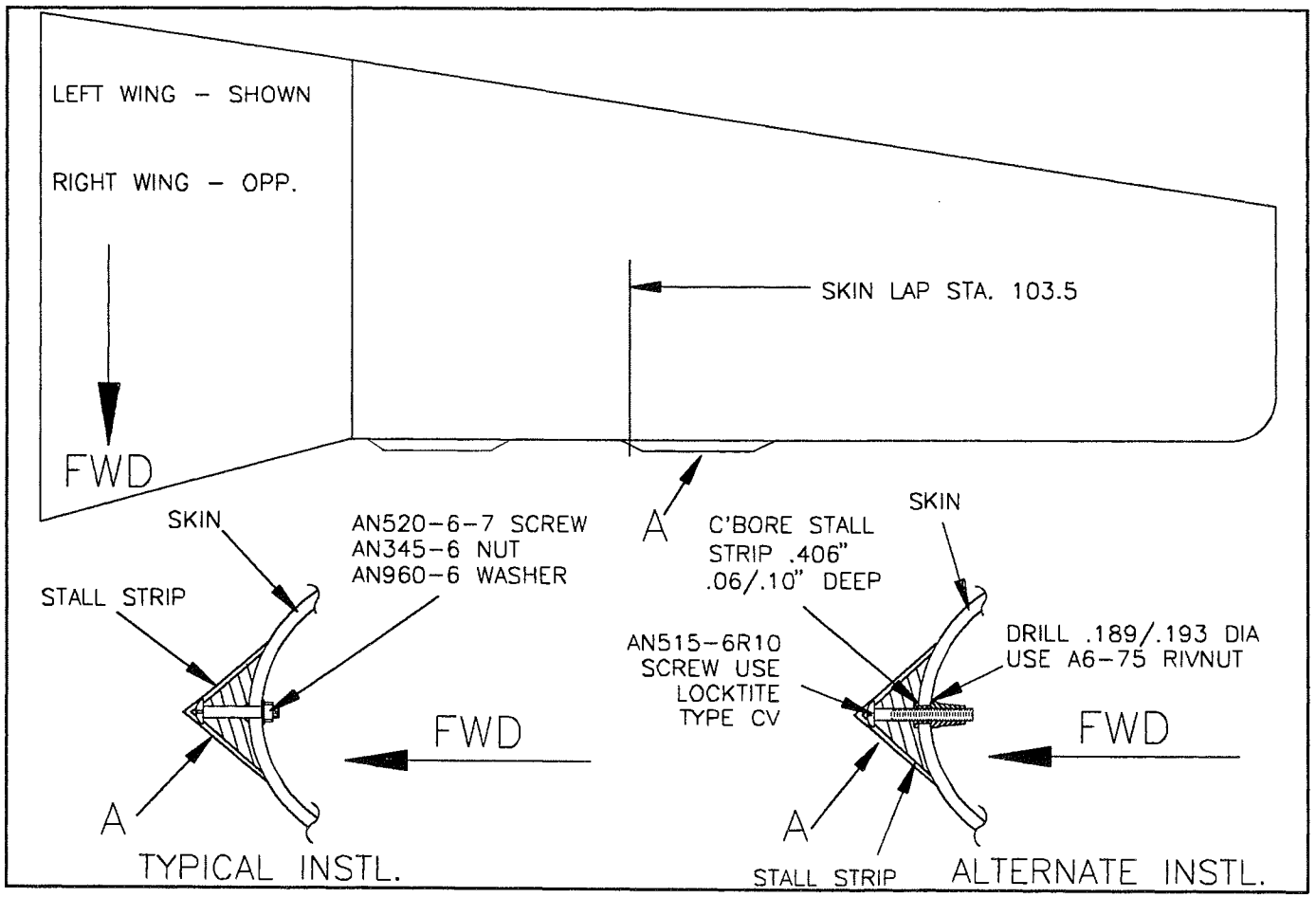
2. Place stall strips on leading edge at stations shown on Figure 57-2; attach securely with duct tape for test flights. Adjust stall strips until aircraft flies to criteria in paragraph 57-00-02, 1, A, B and C. Secure stall strip per installation instructions in (**Figure 57-2**).

57-10-00 - MAIN FRAME

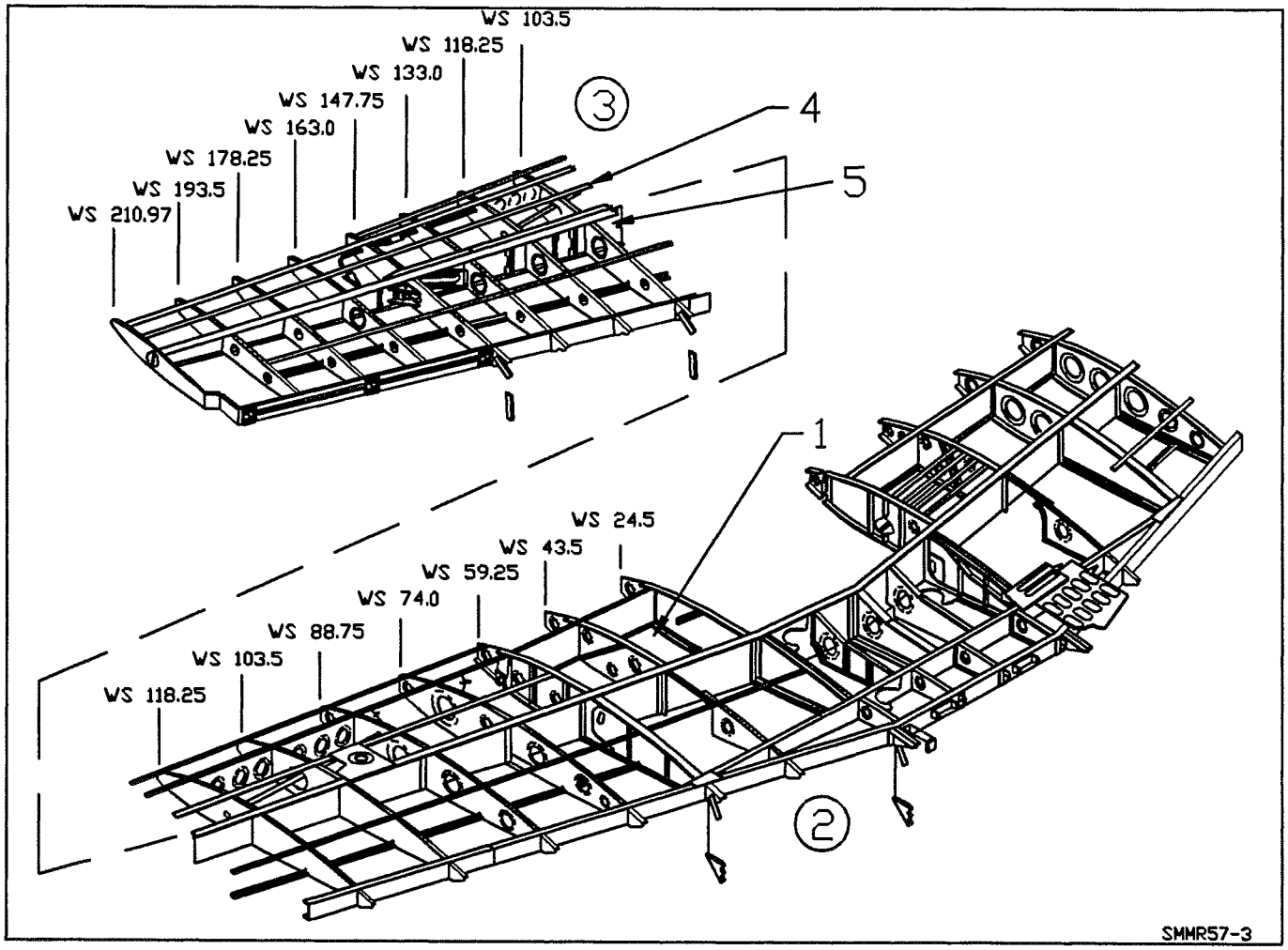
The integral fuel cells, shaded area (1) start at wing station 24.5 and continue to the rib at station 88.75 on both wings. (Reference **Figure 57-3**). Sealant is applied to all joints on ribs, spar and baffle plates. (See Section 28 for resealing procedures).

The wing is manufactured in three sections; the center section (2), the left outboard section (3) and an opposite right outboard section (not shown) (**Figure 57-3**). These three sections are then assembled into one full span wing assembly as the splice plates and overlapping skin is installed while on the fixture.

A spares outboard wing tip assembly is available which includes completed section from Wing Station 103.50 and outboard. The assembly includes the stringers (4) required to complete the splice to the old center section.



STALL STRIP INSTALLATION FIGURE 57 - 2



WING STRUCTURE FIGURE 57 - 3

57-20-00 - AUXILIARY STRUCTURES

57-20-01 - JACK POINTS

Jack points are located on under side of wing. The threaded wing tie down eyebolt fittings are designed to also accept the non-threaded jack points. These are located outboard of each main gear. See Chapter 7-10-00 for complete jacking procedures.

57-20-02 - FIBERGLASS WING TIPS

The M20K wing tips are non-structural fiberglass components. They are riveted to the upper and lower wing skins during final assembly of the wing structure.

1. Wing tip removal.

A. Remove navigation strobe light lens (1) by removing 4 screws and washers (2) that retain lens to wing tip (3) (see **Figure 57-4**).

B. Drill out rivets (4) holding tip to upper and lower wing skins (5). Remove all rivet shanks with a punch.

C. Carefully pull wing tip away from wing rib (6) and skins (5). Disconnect strobe and navigation light harnesses at quick disconnect plug (8) prior to completely removing tip.

NOTE
The strobe or navigation lights can be removed from wing tip either before or after its removal from wing.

2. Wing tip installation.

A. Place new or repaired wing tip in place.

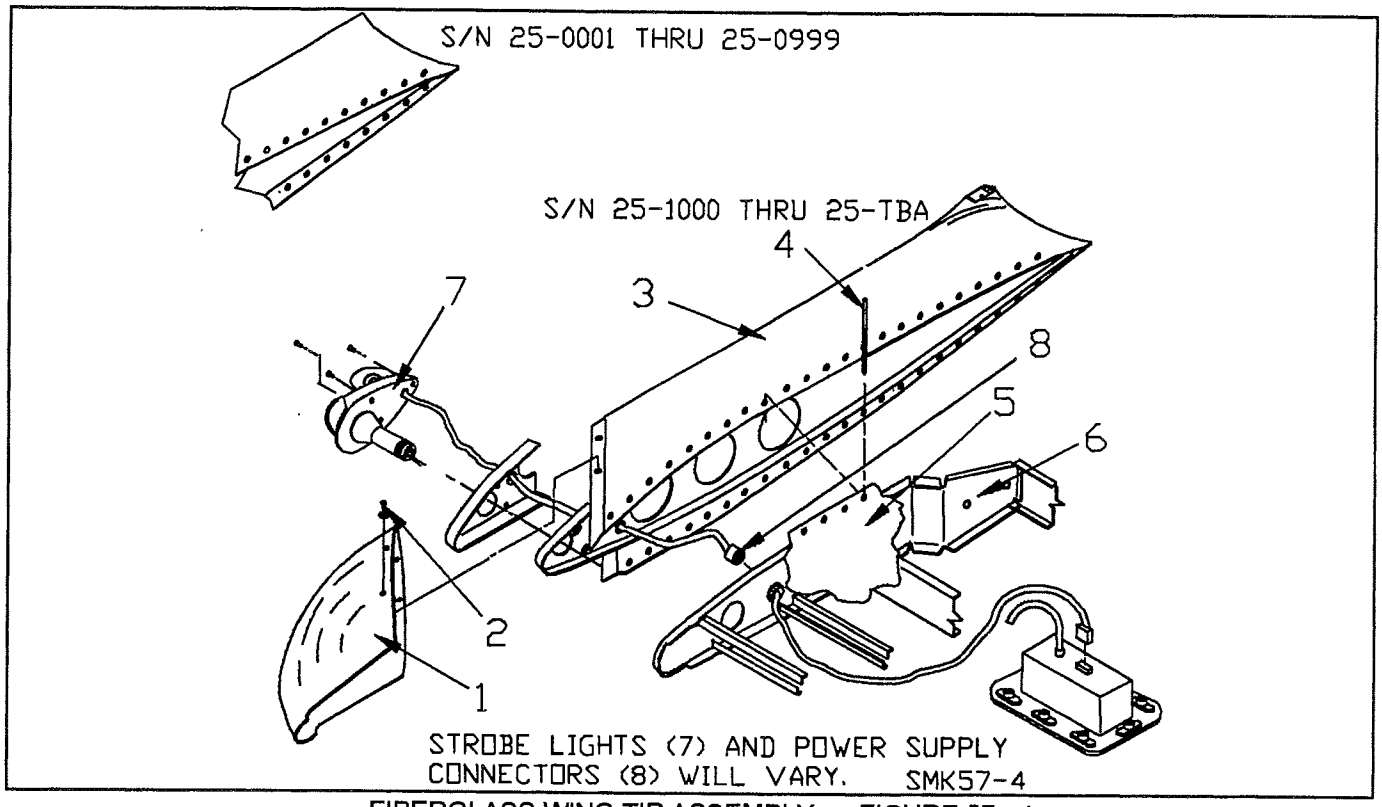
CAUTION
Be sure aileron and aileron balance weights are not restricted in movement - either direction.

B. Secure wing tip and drill holes to match wing skins. Cleco as holes are drilled into tip. When all holes are drilled remove wing tip assembly and deburr.

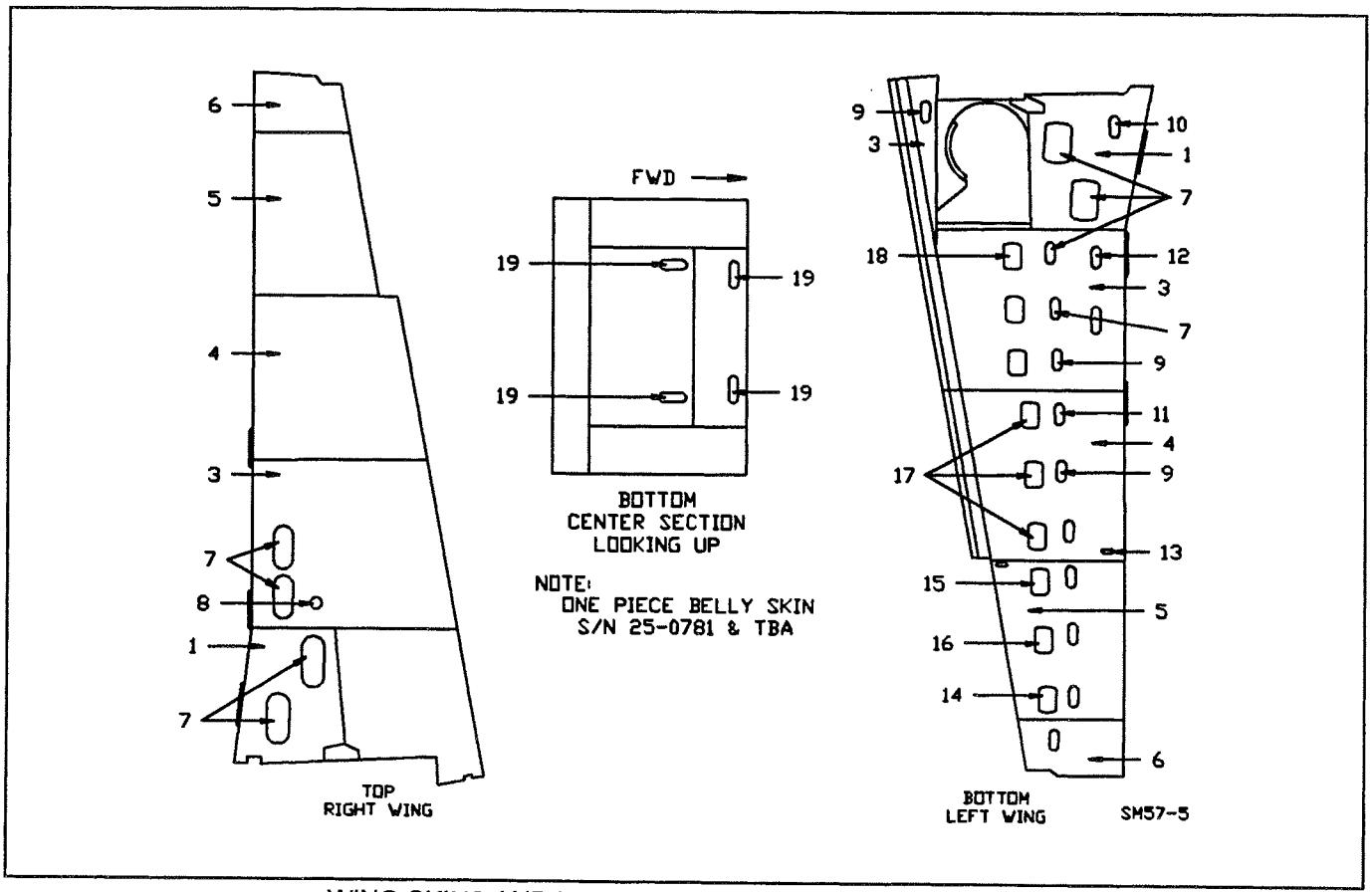
NOTE
Connect strobe and navigation light connectors prior to final attachment of tip.

C. Use Avex 1604-0412 blind rivets to attach wing tip to top and bottom skins.

D. Repaint to match aircraft.



FIBERGLASS WING TIP ASSEMBLY FIGURE 57 - 4



WING SKINS AND INSPECTION COVERS FIGURE 57 - 5

57-30-00 - PLATES - SKIN

Wing access and inspection covers shown in (**Figure 57-5**) provide maintenance access to components, plumbing and control bellcranks enclosed within wing. They are flush mounted covers and when installed continue the aerodynamic contour of wing.

LEGEND FOR FIGURE 57-5.

1. Wing skin - .050 thickness (Fuel Tank).
2. Wing skin - .040 thickness (Fuel Tank).
3. Wing skin - .040 thickness.
4. Wing skin - .032 thickness.
5. Wing skin - .025 thickness.
6. Wing skin - .025 thickness.
7. Fuel tank access.
8. Fuel tank filler.
9. Control tube guide blocks.
10. Wing - fuselage attach points.
11. OAT probe, right wing only.
12. Control tube guide blocks and flight timer.
13. Pitot post - left wing only.
14. Strobe light power supply.
15. Aileron bellcrank and control rods.
16. Auto pilot servos.
17. Gyro compass flux valve (one of these, depending on installed equipment), (left wing only).
18. Main landing gerar retraction spring.
19. Elevator and rudder controls - rod end bearings, bellcranks.

NOTE

Access covers on bottom of wing that require removal for inspection intervals are secured with screws. Any access covers that are riveted in place are required for manufacturing only and NOT for routine inspections.

57-40-00 - ATTACH FITTINGS

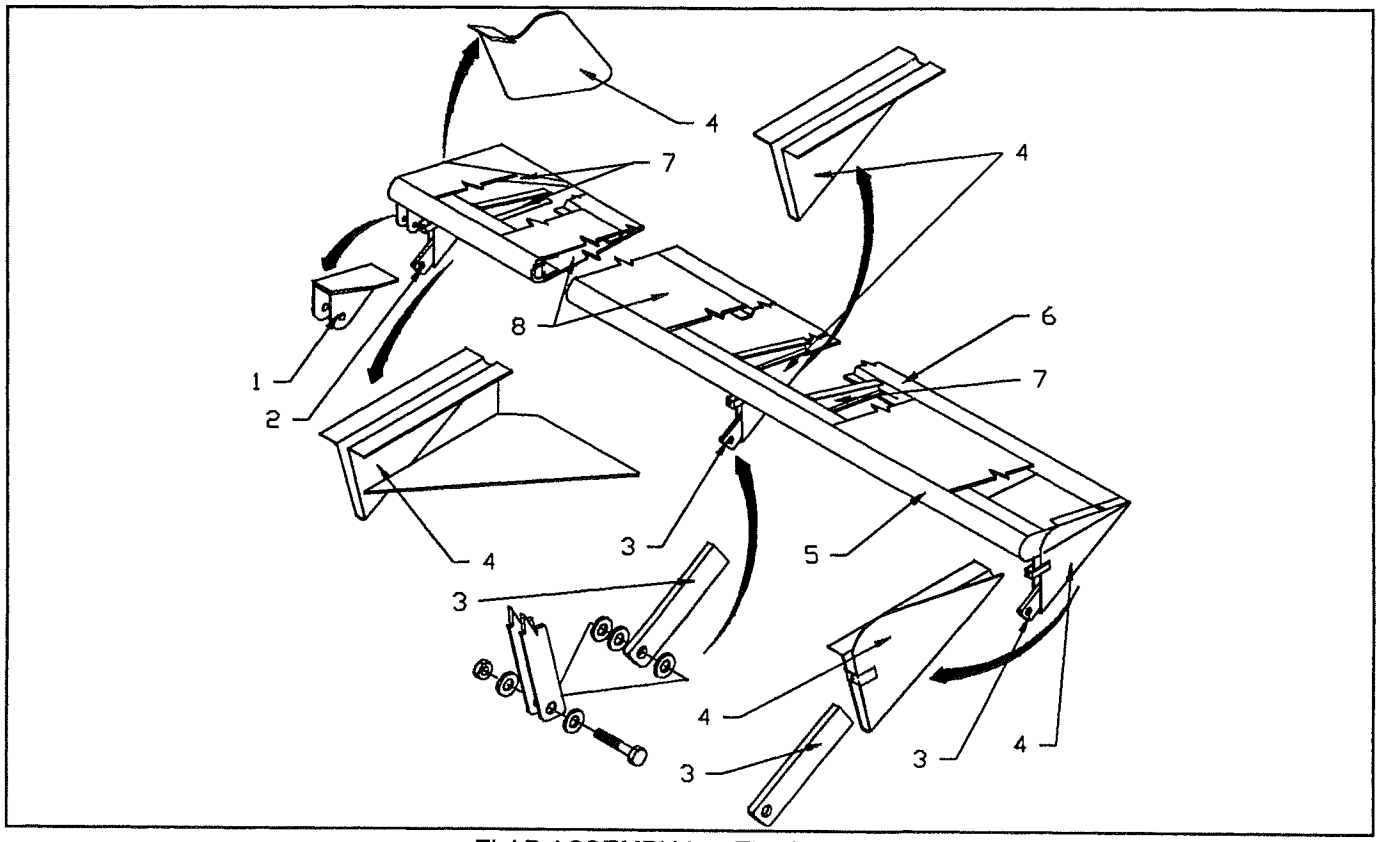
Refer to Section 57-00-01 for wing fuselage attachment.

57-50-00 - FLIGHT SURFACES

Refer to Section 27-90-00 for flight control surface's balancing procedures.

57-50-10 - FLAPS

Refer to Section 27-50-00 for maintenance and rigging procedures.



FLAP ASSEMBLY FIGURE 57 - 6

The flap actuator jack shaft is connected by a push-pull rod end bearing to actuator bracket (1) (**Figure 57-6**) located just inboard of inboard hinge (2).

All three hinges (2) and (3) are faired (4) to reduce drag (excluding 231 Lean Machines).

The internal structure of flaps consists of a leading edge extrusion (5), trailing edge stiffener (6), ribs (7) and top and bottom skins (8). These components are riveted together into a left hand and right hand assembly.

57-50-11 - FLAP REMOVAL AND INSTALLATION

Refer to Section 27-50-00 for removal and installation procedures.

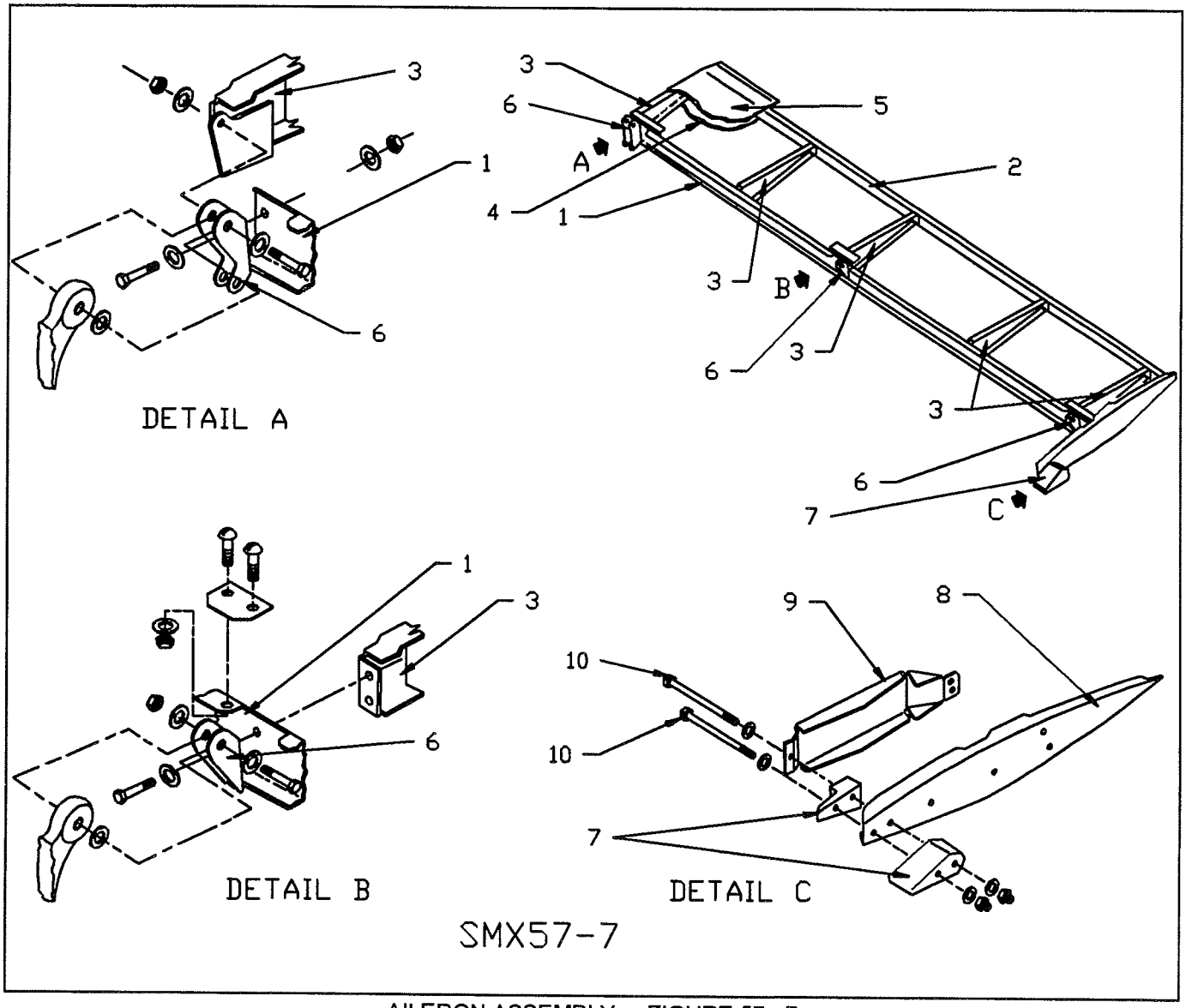
57-50-20 - AILERONS

Refer to Section 27-10-00 for maintenance and rigging procedures.

The ailerons are of all metal construction. The main spar (1), (**Figure 57-7**), is attached to the rear spar (2) through ribs (3). These components are riveted together and a top and bottom skin (4) and (5) riveted to this sub-assembly. To complete control surface, hinges (6) and balance weights (7) are installed. The weights (7) are bolted bolted (10) through an outboard rib (8) and bracket (9) on each aileron assembly.

57-50-21 - AILERON REMOVAL AND INSTALLATION

Refer to Section 27-10-00 for removal, installation & balancing procedures.



AILERON ASSEMBLY FIGURE 57 - 7

CHAPTER 61

PROPELLERS

CHAPTER 61

PROPELLERS

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61-00-00 - GENERAL

The propeller is a constant speed type which operates by oil pressure opposing natural centrifugal twisting moment of rotating blades and force of a spring (in McCauley propellers) to obtain correct pitch for the selected engine load. Engine lubricating oil is supplied to a power piston in propeller hub through the propeller shaft. The amount and pressure of oil supplied (0-300 PSI) is controlled by an engine driven governor. Govrnor oil pressure acting on a piston (and spring) increase propeller blade pitch, thus decreasing engine RPM. As governor oil pressure is reduced, centrifugal twisting moments and spring force on propeller blades decrease propeller blade pitch and increase RPM.

Propeller overhaul shall coincide with engine overhaul, but interval between overhauls shall not exceed 1500 hours (McCauley) or 2000 hours (Hartzell). Refer to propeller manufacturers' overhaul manual for complete maintenance action and time limits.

NOTE
Approved propeller shops ONLY are authorized for overhaul or major repairs to these propellers. Refer to Federal Aviation Regulations, Part 43, (FAR 43) and Federal Aviation Agency Advisory Circular No. 43.13 ( ) for the definition of major or minor repairs or alternations and who may accomplish them.

61-00-10 - SPINNER DOME AND PROPELLER REMOVAL

1. Spinner dome removal (if necessary).

NOTE
It is not necessary to remove spinner when removing propeller assembly.

A. Remove 14 screws and fiber washers (1) from aft spinner bulkhead assembly (2) and 4 screws (3) from each doubler plate (4). (Reference **Figure 61-1**).

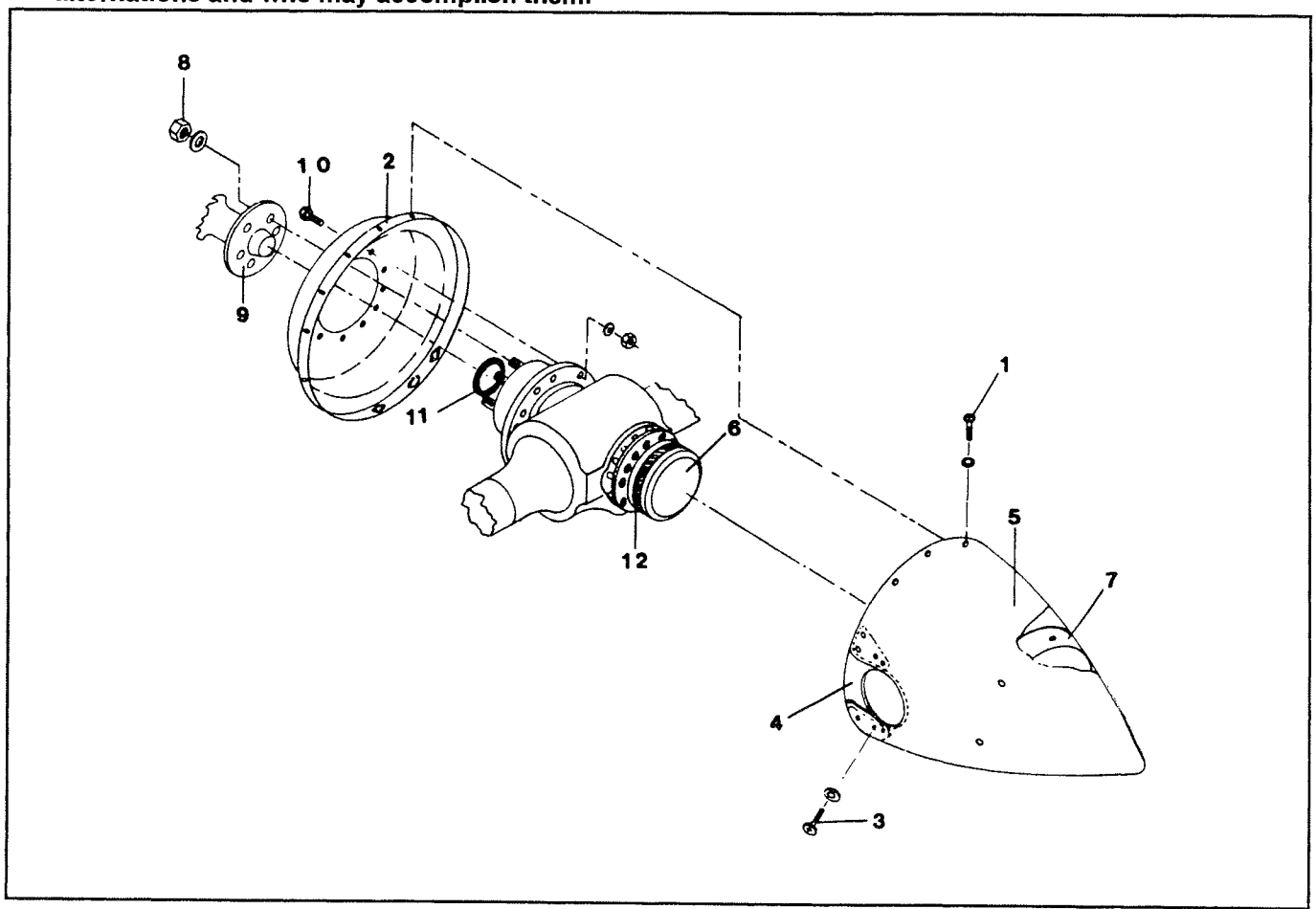
B. Pull doubler plates from behind propeller.

C. Carefully pull spinner dome (5) forward to clear propeller and hub (6).

NOTE
Forward spinner bulkhead (7) is riveted to spinner dome and need not be removed except for repair of spinner or bulkhead.

2. Propeller removal.

A. Loosen nuts (8) attaching propeller to engine crankshaft (9) propeller flange about 1/4 inch and pull propeller forward.



SPINNER DOME AND PROPELLER REMOVAL FIGURE 61 -1

NOTE
Nuts (8) will have to be backed off evenly so that the propeller may be pulled forward (approximately 1/4 inch at a time until all nuts are disengaged from the propeller studs. As the propeller is separated from the engine crankshaft, oil will drain from the propeller and engine crankshaft cavities.

B. Pull propeller from engine crankshaft (9). Use clean rags to cover cavity in crankshaft and hub.

C. If necessary to remove the aft spinner bulkhead (2) (**Figure 61-1**), the spinner dome (5) must be removed, refer to 61-00-10 (1). Remove bolts, washers and nuts (10) which attach bulkhead to propeller hub flange. Remove aft bulkhead from propeller flange.

61-00-20 - PROPELLER INSTALLATION

1. If aft spinner bulkhead was removed, re-install, using bolts, nuts and washers in the reverse order of removal.

2. Clean propeller hub cavity and mating surfaces of propeller hub.

3. Lightly lubricate a new O-Ring (11), (**Figure 61-1**), and the crankshaft pilot with clean engine oil and install O-Ring in the propeller hub.

CAUTION
Remove all rags or plugs placed in crankshaft or hub during propeller removal.

4. Align propeller mounting studs with proper holes in engine crankshaft flange and slide propeller carefully over crankshaft pilot until nuts (8) can be started on propeller studs.

NOTE
The guide pins in the propeller hub must be aligned with respective holes in the crankshaft flange.

5. Tighten nuts (8) evenly and work propeller aft on crankshaft flange. Tighten bolts to 55-65 ft. pounds on McCauley propeller, 60-70 ft. pounds on Hartzell propeller.

6. Install spinner dome making sure fiber washers are installed under all screw heads (1).

NOTE
The teflon tape (12) on hub (6) should be checked for smoothness of tape layers and that inner bulkheads (7) fits snug as spinner dome is being installed.

7. Conduct operational and leak check on propeller installation prior to flight.

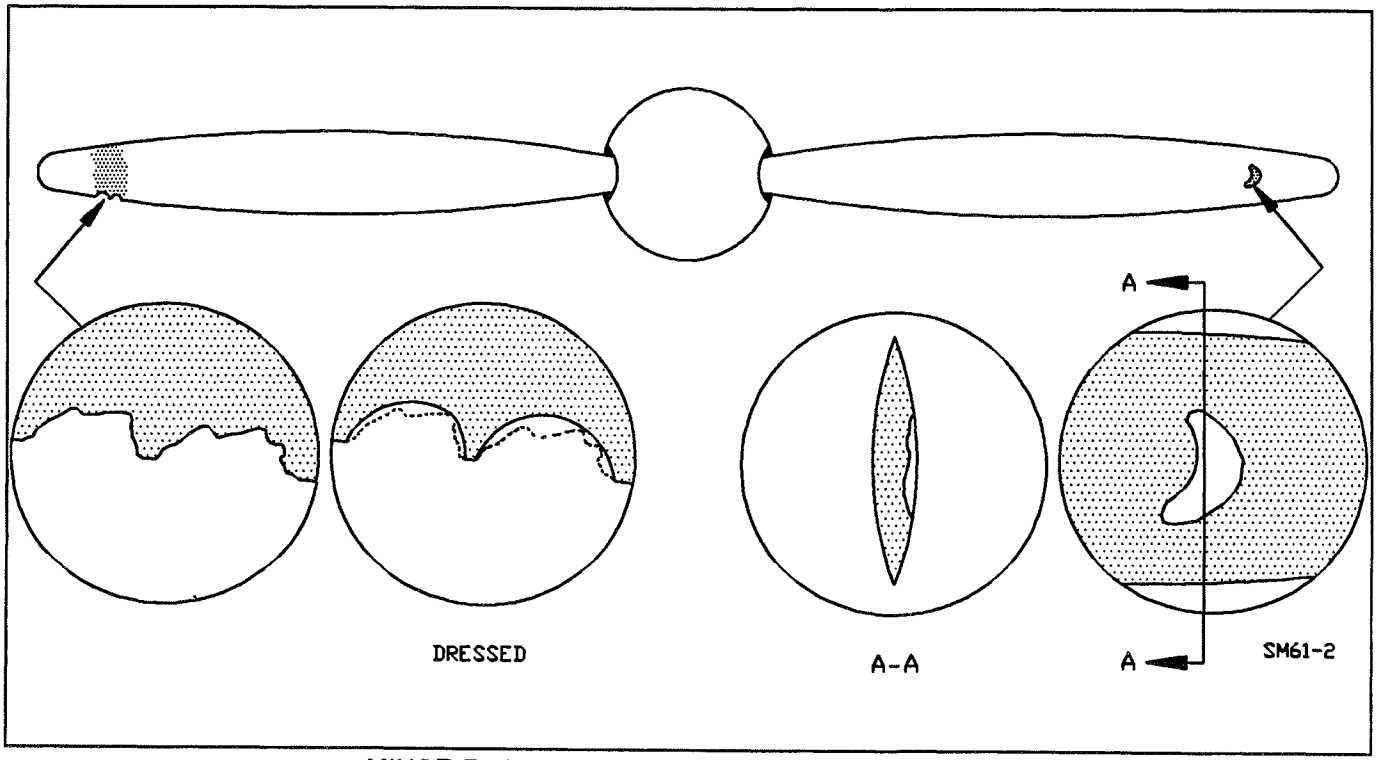
61-10-00 - PROPELLER ASSEMBLY

No external lubrication is required on the M20K propellers.

Preflight inspection should be accomplished prior to each flight to determine: if blades have been damaged, if any abnormal looseness is evident between hub and blades or if there is any evidence of oil leakage.

61-10-10 - MINOR PROPELLER BLADE REPAIR

1. Minor nicks, dents and gouges may be dressed out by approved personnel. Blend any nicks or gouges into the leading edge with smooth curves or generous radii as shown in (**Figure 61-2**). Repaint area to reduce corrosive action.



MINOR PROPELLER BLADE REPAIR FIGURE 61 - 2

61-20-00 - PROPELLER CONTROLLING

61-20-10 - PROPELLER GOVERNOR

CONTROL RIGGING

1. Disconnect propeller governor control rod.
   A. Remove cotter pin, nut, bolt and washers from rod end at propeller governor control arm.
   B. Disconnect control rod from governor control arm.
2. Adjust control arm spring to minimum tension which will return control arm to maximum RPM.
3. Push propeller control in cockpit full forward. Pull control back approximately 1/8 inch and lock in this position.
4. Place governor control arm against high RPM stop screw.
5. Adjust propeller control rod end to coincide with the governor arm position.
6. Attach control rod end to governor arm and replace cotter pin.
7. Operate the propeller control from cockpit to verify full travel of control arm in both directions, high RPM to minimum RPM stop.

NOTE

When propeller control rigging is complete, check controls in cockpit to be sure there is 1/8 inch cushion between control knob and adjustment nut on instrument panel. The control should not bottom out when pushed full forward.

CAUTION

Recheck safety wire, security and thread engagement on all engine controls after adjustment rigging or assembly.

NOTE

Vernier controls friction can be adjusted by loosening lock nut on back side of panel and either tighten nut on front of panel to increase friction or loosen the nut to decrease friction. Retighten lock nut on back side to secure cable to panel.

61-20-90 - PROPELLER GOVERNOR TROUBLE SHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Leakage:Between control shaft and head.	Damaged O-Ring.	Replace with new O-Ring.
Between head and body.	Damaged head and body gasket.	Replace gasket.
Between relief valve plug and body.	Damaged relief valve plug gasket.	Replace gasket.
Between body and base.	Damaged body and base gasket.	Replace gasket.
Between governor base and engine mounting pad.	Damaged governor mounting gasket.	Replace gasket.
	Loose governor attaching nuts.	Retighten nuts.
	Warped engine mounting pad.	Consult engine manual.
Inability to attain takeoff RPM during static ground run:	Wrong high-RPM governor setting.	Reset governor external high RPM adjustment screw.
	Incorrect system rigging.	Adjust control system.
	Low engine power.	Consult engine manual.
	Erroneous reading tachometer or manifold pressure gauge.	Calibrate or replace instruments.
	Sticky pilot valve.	Remove head and clean pilot valve with crocus cloth. Maintain sharp pilot valve land corners. Check for straightness of pilot valve; if bent, replace valve.
RPM will not stabilize:	Sludge in governor pilot valve or relief valve.	Disassemble and clean.
	Burrs on pilot valve lands.	Disassemble and clean with crocus cloth.

PROPELLER GOVERNOR TROUBLE SHOOTING (con't.)

TROUBLE	PROBABLE CAUSE	REMEDY
	Backlash in governor control system.	Rerig or adjust control system.
	Short control lever making fine speed adjustment impossible.	Rerig control system.
	Sticky relief valve.	Inspect for burrs, and clean.
	Erroneous reading tachometer.	Calibrate or replace instrument.
	Excessive oil leakage in engine transfer bearing.	Refer to engine manual.
	High propeller friction.	Refer to propeller overhaul manual.
	Governor function upset by malfunctioning engine.	Repair engine for smooth operation.
	Air trapped in propeller.	Cycle propeller from MIN to MAX pitch several times to purge air.
	Sticky pilot valve.	Remove head and pilot valve. Clean away sludge and varnish. Check speeder spring ends for proper settings.
	Bent pilot valve.	Remove head and replace pilot valve.
	Excessive internal leakage in governor.	Check rigging and make necessary part replacements.
Excessive over-speeding:	Wrong governor setting.	Reset governor. Use test rig if available.
	Too rapid throttle opening.	Advance throttle evenly and slowly.
	Damaged or wrong gasket between governor base and engine mounting pad.	Install correct new gasket.
	Sticky governor pilot or relief valve.	Disassemble, clean, and check for burrs.Replace bent pilot valves.
	Erroneous reading tachometer or manifold pressure gauge.	Calibrate or replace instrument.
Inability to attain positive high pitch:	High-RPM screw adjusted too far IN, causing restricted arm travel.	Remove control arm and rotate one serration clockwise. Back out high-RPM screw to required maximum RPM.(One turn equals 27 RPM.)
Surging:	Excessive propeller bladeseat friction.	Examine propeller hub for cause of friction.

61-40-00 - PROPELLER BALANCING

Balancing of the propeller by means of an approved system is recommended to provide smoother operation. The vendor system used should be an approved system and the procedures followed very carefully. The propeller may have been balanced with another vendor system previously and may require removal of old balance weights and /or other means of balancing.

Log book entries MUST be made when the propeller is dynamically or statically balanced.

CAUTION

Place weights, washers or whatever balance weights are specified at the locations specified by the balancing procedures. Be careful of placing weights on spinner dome.

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CHAPTER 71

POWERPLANT

CHAPTER 71

POWERPLANT

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CHAPTER 71

POWERPLANT

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71-00-00 - GENERAL

The M20K (S/N 25-0001 thru 25-0999) has a Teledyne Continental Motor (TCM) TSI0360-GB or -LB series engine installed. This six cylinder, 210 H.P., fuel injected engine has a Roto-Master (Rajay) turbocharger installed to give sea level power capability up to 15,000 feet density altitude and high altitude performance up to 24,000 feet.

The turbocharger fixed waste gate valve can be ground adjusted to obtain the proper critical altitude during engine set up.

Aircraft S/N 25-1000 thru 25-1999 have a TCM TSIO-360-MB, 210 HP engine installed. This installation utilizes an Airesearch variable wastegate turbocharger and a tuned induction system. Sea level power can be maintained up to 23,000 feet density altitude with a certified ceiling of 28,000 feet.

Production aircraft, S/N 25-2000 thru 25-2012 have a TCM TSIO-360-MB7, 210 HP engine installed. This installation is basically the same as the -MB installation. TCM standardized their P/N callout for engines with dual alternators. Retrofit to -SB configuration (see below) is possible at owners discretion.

Aircraft S/N 25-2013 thru 25-TBA have a TCM TSIO-360-SB, 220 HP engine installed. This engine configuration increases Manifold Pressure from 36 In. Hg. to 39 In. Hg. and reduces RPM from 2700 RPM to 2600 RPM. Sea level power can be maintained up to 20,000 feet density altitude with a certified ceiling of 25,000 feet.

71-00-10 - ENGINE REMOVAL

To assist in installation, identify and tag each part as it is removed. Plug or cap all lines, hoses, and fittings as they are disconnected.

1. Make sure that all cockpit switches are OFF.
2. Turn fuel selector valve OFF.
3. Remove engine cowling and baffles (See Section 71-10).
4. Disconnect battery ground cable.
5. Remove propeller (refer to Section 61-00-10).
6. Drain engine oil sump.
7. Disconnect the following:
   A. Vacuum line.
   B. Cabin heat ducts (at engine).
   C. Fuel vent lines (at firewall).
   D. Oil temperature bulb.
   E. Oil pressure line.
   F. Manifold pressure line.
   G. Cylinder head temperature bulb.
   H. Breather hose.
8. Disconnect the following control linkage:
   A. Throttle control.
   B. Propeller governor control.
   C. Mixture control.
9. Disconnect ignition switch wires from magnetos.
10. Disconnect primer wires from primer valve and fuel flow wires from fuel flow transducer.

WARNING
Ground magneto breaker points.

11. Disconnect engine ground strap.
12. Disconnect voltage regulator wires (optional).
13. Disconnect alternator and starter wires.
14. Disconnect heater muff and exhaust tail pipe.
15. Disconnect fuel line at engine fuel pump.
16. Disconnect turbocharger hose connections.
17. Shore up fuselage at tail skid using shoring stand to prevent tail from dropping after engine is removed.
18. Attach hoist to lifting eye at top of crankcase. Slightly lift engine to relieve weight from engine mounts. Remove engine mounting bolts.
19. Slowly raise engine. Be sure that all lines, hoses, and wires are free.

71-00-20 - ENGINE INSPECTION & REPAIR

For specific engine inspection and overhaul instructions, consult engine manufacturer's overhaul manual and service instructions.

71-00-30 - ENGINE INSTALLATION

Reverse the engine removal procedure for installation.

1. Engine installation torque values are as follows:
   A. Spark plugs-300 to 420 inch lbs.
   B. Hose clamps-15 to 25 inch lbs.
   C. Engine shock mount bolts-450 to 500 inch lbs.
   D. 1/4 inch upper engine mount to fuselage bolts-50 to 70 inch lbs.
   E. #10-32 lower engine mount attach block to fuselage-20 to 25 inch lbs; 1/4 inch lower mount bolt torque is 50-70 inch lbs.

NOTE
Reinstall shock mounts in same position as they were originally installed. Refer to paragraph 71-20-00 for sequence of assembly.

2. Re inspect to see that:
   A. Propeller and spinner are properly torqued.
   B. Engine mounting bolts are properly torqued.
   C. Engine controls are properly rigged and safetied. (Recheck rod-ends for proper threadgrip length.)
   D. Oil drain plugs are tightened and safetied.
   E. Oil sump is filled to eight quarts.
   F. Spark plugs are tight and ignition harness is properly installed.
   G. Magneto ground wires are properly installed and safetied.
   H. Oil temperature bulb is tight and safetied.
   I. Oil pressure relief valve plug is safetied.
   J. Cylinder head temperature connection is secure.
   K. Starter cable connection is secure.

L. Alternator and standby generator (if installed) wiring is secure.

M. Exhaust system is secure.

N. Vacuum lines and connections are secure.

O. Fuel connections are tight and pressure checked.

P. Manifold pressure lines are tight.

Q. Oil pressure lines are tight and pressure checked.

R. Fuel injection lines are tight and pressure checked.

S. Oil filter is installed and secure.

T. Induction manifolds are secure.

U. All lines, hoses, and wires are properly anchored.

V. Induction air filter is installed and secure.

W. Engine area is free of loose objects, tools, etc.

X. Cowling is installed and secure (See Section 71-11).

Y. Cowl flap control rods are connected.

71-00-40 - ENGINE GROUND OPERATION CHECKOUT

1. Prestarting procedure (with aircraft headed into wind):

A. Turn ignition switch OFF.

B. Check magneto ground connections.

C. Check engine oil level.

D. Check fuel quantity.

E. Operate all controls through full range to check for binding.

F. Check baffles and cowling for security.

G. Open cowl flaps; check operation. Single cowl flap on 25-1000 and ON.

H. Drain fuel sumps and gascolator; check for sediment and water.

I. Place wheel chocks and set parking brake.

2. Starting procedure:

A. Set propeller governor control: FULL FWD. (HIGH RPM).

B. Turn fuel valve ON.

C. Set mixture control: FULL RICH.

D. Open throttle FULL. Push primer for 3-5 seconds or use "HI BOOST" until positive indication of fuel flow is obtained. Retard to 1/4 open.

E. Clear propeller area.

F. Start engine. Check oil pressure. If no oil pressure is indicated within 30 seconds, shutdown engine and trouble shoot oil system. Refer to TCM maintenance publications for procedures.

G. Set throttle for idle at 900 to 1000 RPM for one minute; then, advance throttle slowly to 1200 RPM for engine warmup.

3. Ground run and warmup. Always head aircraft into the wind during warmup. Always select the high RPM blade-angle setting when ground running engine. Never idle for extended periods at low RPM (low RPM will foul spark plugs). Always operate with mixture control at FULL RICH, and maintain RPM in the 1000 to 1200 RPM range during warmup and ground run.

A. Warmup engine until temperature indications are normal. Monitor cylinder head and oil temperature instruments for overtemperature.

B. Check magnetos at 1800-2000 RPM with propeller at high RPM blade angle. Switch ignition-starter switch from BOTH to LEFT to check mag drop. Switch back to BOTH until RPM returns to normal. Switch from BOTH to RIGHT and check mag drop.Return switch to BOTH. Mag drop should not exceed 150 RPM on either magneto (drop should be within 50 RPM of each other). A smooth drop off past normal is usually a sign of too lean or too rich mixture. If no drop in RPM, check for open or broken P-leads.

71-00-50 - ENGINE SET UP PROCEDURE FOR TSIO-360-GB, -LB, -MB, -SB

It is recommended that the TS10-360-GB,-LB, -MB or -SB engine installed on Mooney M20K aircraft be set up according to the following instructions in conjunction with Teledyne Continental Motors Operator's Manual and appropriate Service Bulletins (TCM SB M89-10 and subsequent issues). There are several steps required to ensure proper setup of engine in all operating ranges.

1. Materials/Tools Required:

A. Ground support equipment kit P/N GSE 030027-501.

B. Miscellaneous hand tools. Required for adjustment and to disconnect or connect fittings and hoses.

C. Safety wire.

D. Ty-rap and installation tool.

E. Pressure gauge, with pressure source (sqeeze bulb) - for leak checks prior to connection of calibrated gauges to aircraft systems.

2. Procedures for Calibrated Gauges Connections.

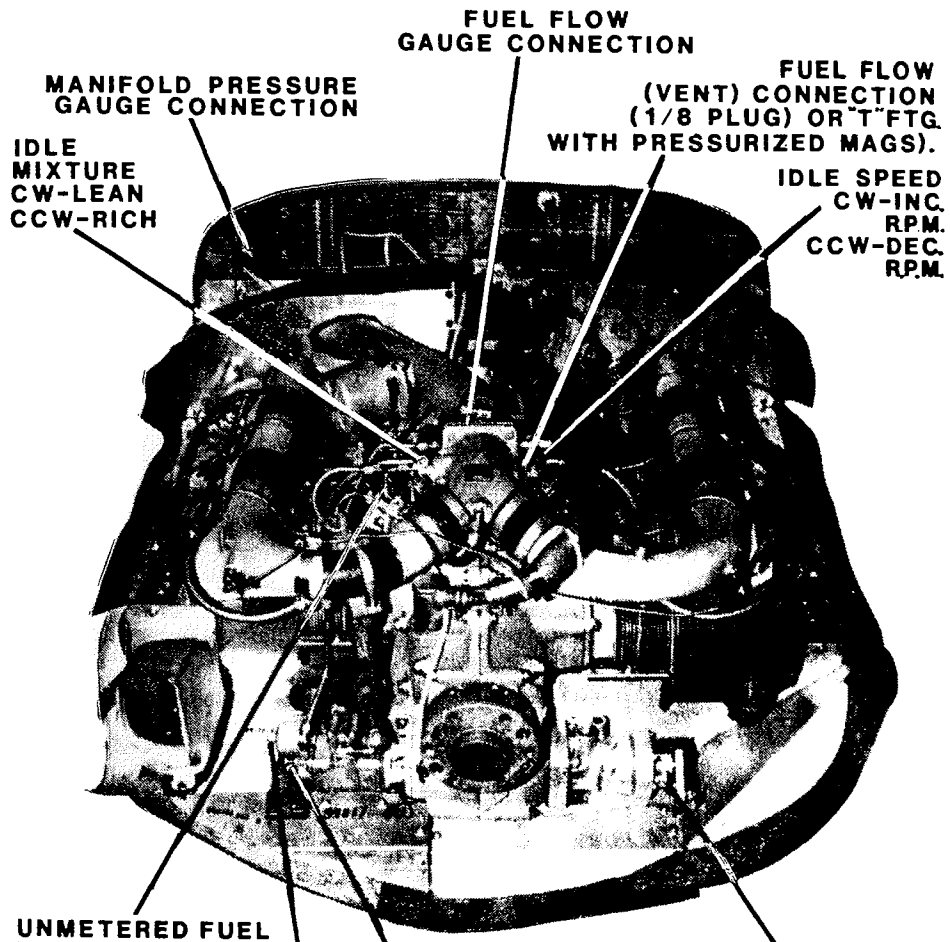
A. Reference **Figure 71-1** for location of connections on the TSIO-360-GB or -LB engine and **Figure 71-4B** for the -MB or -SB engine.

B. On aircraft S/N 25-0247 thru 25-0835 there are firewall fittings installed which can be used for routing test gauge lines into the cabin. S/N 25-0836 and ON have an access cover on footwell. This cover can be removed and a fitting adapter cover, P/N 050006-501, installed during engine set up to allow hoses to be routed during adjustment procedures. The adapter cover is available thru Mooney Service Centers as part of GSE 030027 kit of step 1, A.

C. Installation of Test Gauges

1. S/N 25-0001 thru 25-0999 - Remove cap from the unmetered fuel tee on the right side of the throttle body. S/N 25-1000 & ON - Disconnect the unmetered fuel line on right side of the throttle body. Install a tee and short length of hose to reconnect the line.

Install a 0 to 60 PSI calibrated pressure gauge using suitable length of hose.



ADJUSTMENT LOCATIONS FIGURE 71 - 1

2. Remove plug from deck reference port. Connect deck reference hose between this port and test fitting on right hand side of firewall. Connect another hose from cabin side of firewall fitting to the deck reference (fuel vent) port on test gauge.

3. Remove cap from manifold valve (flow divider). Connect fuel pressure hose between this port and fitting on right hand side of firewall. Connect another hose from cabin side of the fitting to pressure port on test gauge (metered fuel pressure gauge).

4. Install tee fitting between manifold pressure line and firewall fitting. Reconnect manifold pressure line to firewall fitting. Connect test hose from tee fitting to test fitting on right hand side of firewall. Connect another hose from cabin side of this fitting to manifold pressure port on test gauge (calibrated MP gauge).

NOTE

Back up the manifold pressure firewall connection with wrench to keep aircraft fitting from becoming loose when connecting or disconnecting fittings. This line is connected to manifold pressure port on calibrated gauge.

D. All connections should be leak checked with a pressure bulb and gauge prior to connecting any calibrated gauges to the required ports. Any pressure drop should be noted and leak repaired on either fuel or manifold pressure lines as necessary prior to installation.

E. When all hose connections are made for calibrated gauges, and ships gauges reconnected, a leak check with fuel boost pump on HIGH (throttle and mixture full forward) should be made. No leaks should be in evidence while engine is being run for adjustments.

F. When verification that no leaks are present the boost pump should be turned on HIGH again to purge the calibrated gauge hoses of air.

3. PROCEDURE FOR ENGINE ADJUSTMENTS. (Use the table, **Figure 71-2**B to record all data).

NOTE
The engine must be THOROUGHLY WARMED up for all tests.
CAUTION
Watch for rotating propeller during adjustment.

A. IDLE FUEL PRESSURE ADJUSTMENT.

Check and adjust idle fuel pressure as follows:

(1) Back off the idle speed adjusting screw two (2) tums (CCW).

(2) Start engine and warm up at 1500 to 1800 RPM until oil pressure is in the green arc, cylinder head temperature is in the lower one-quarter of the green arc, and oil temperature is 160° to 180° F.

(3) Maintain 700 +/- 25 RPM and set the idle fuel pressure to 6.5 +/- .25 PSI by adjusting the idle pump adjustment screw (see Figure 71-1) for -GB & -LB engines and Figure 71-4B for -MB & -SB engines) located on the pump body centerline.

B. IDLE MIXTURE

Check and adjust the idle mixture as follows:

(1) Operate engine at 1500 to 1800 RPM until cylinder head temperature is in the lower one-quarter of GREEN arc, and oil temperature is 160° to 180° F.

(2) Reduce engine speed and stabilize it at 700 +/- 25 RPM.

(3) Slowly, but positively, move mixture control from full rich to idle cut-off. Engine speed should increase 50 RPM (+/- 25 RPM) before beginning to drop toward zero.

(4) If engine speed increase is less than 25 RPM, adjust idle mixture adjustment to enrich the mixture. If engine speed increase is more than 75 RPM, adjust idle mixture (**Figure 71-1 for -GB & -LB** and **Figure 71-4B for -MB & -SB**) to lean mixture.

(5) Recheck as required to insure idle mixture is adjusted within limits specified above. (Recheck idle pressure per paragraph 3.A. (3) above.

C. IDLE SPEED

Check and adjust idle speed as follows:

(1) Operate engine at 1500 to 1800 RPM until cylinder head temperature is in lower one-quarter of GREEN arc, and oil temperature is 160° to 180° F.

(2) Reduce engine speed and stabilize it at 700 +/- 25 RPM.

(3) Adjust idle speed adjusting screw until contact is made with throttle arm stop. See **Figure 71-1 for -GB & -LB engine** and **Figure 71-4B for -MB & -SB engines).**

D. FULL POWER PERFORMANCE
S/N 25-0001 thru 25-0999

(**Ground check**). Check and adjust full power performance as follows:

(1) Set throttle for 39.8 to 40.0 In. Hg. manifold pressure and engine at 2700 +0/-25 RPM. Readjust the throttle as required to maintain 39.8 to 40.0 In. Hg. manifold pressure.

(2) Adjust fuel flow to 143 - 145 lbs. per hour (equivalent to 18.6 - 19.1 PSI) (NASA Standard Day) with mixture controls in the full rich position. Clockwise adjustment of the screw decreases fuel flow reading; one full turn will cause a 6.0 to 9.0 lb. per hr. change (use 6.0 lbs/gal/.). Record the difference in reading between the calibrated fuel flow gauge and the A/C gauge for future reference.

NOTE
Fuel flow will vary with temperature changes. Temperature variations from NASA STANDARD DAY temperature causes approximately .7 lbs./hr. fuel flow change with each 1° C. variation (minus if hotter, plus if colder).
NOTE
The fuel flow gauge used for -GB engine adjustment is different from the gauge to be used for the -LB, -MB and -SB engine adjustment; it is mandatory that use of the correct gauge (or corrected dial face) be used during adjustment procedures.

E. FULL POWER PERFORMANCE (-MB engine)
S/N 25-1000 thru 25-2012 *

(**Ground check**) Check and adjust full power performance as follows:

(1) Operate engine until oil temperature has reached a needle width past center of GREEN arc (approx. 180°. F.). Slowly, but positively advance throttle control to full power stop, ensure 2700 +/- 25 RPM, and note manifold pressure. Adjust manifold pressure adjustment to maintain 35.8 to 36.2 in. Hg. at 2700 RPM +/- 25. Clockwise adjustment decreases manifold pressure; one full turn equals approximately 1.0 in. Hg.(See **Figure 71-4B**).

(2) Adjust fuel flow to 130-135 lbs./hr.(NASA STD. DAY) with mixture control in full rich position. Clockwise adjustment of screw decreases fuel flow reading; one full turn will cause a 6.0 to 9.0 lb./hr. change. Record difference in reading between calibrated fuel flow gauge and aircraft gauge for future reference.

F. FULL POWER PERFORMANCE (-SB engine)
S/N 25-2013 thru 25-TBA *

* S/N 25-2001 thru 25-2012 may be retrofitted to -SB configuration by compliance with Mooney Retrofit Kit.

(**Ground check**) Check and adjust full power performance as follows:

(1) Operate engine until oil temperature has reached a needle width past center of GREEN arc (approx. 180°. F.). Slowly, but positively advance throttle control to full power stop, ensure 2600 +/- 25 RPM, and note manifold pressure. Adjust manifold pressure adjustment to maintain 38.8 to 39.2 in. Hg. at 2600 RPM +/- 25. Clockwise adjustment decreases manifold pressure; one full turn equals approximately 1.0 in. Hg.(See **Figure 71-4B**).

(2) Adjust fuel flow per Section 71-00-60, L. (2) with mixture control in full rich position. Clockwise adjustment of screw decreases fuel flow reading; one full turn will cause a 6.0 to 9.0 lb./hr. change. Record difference in reading between calibrated fuel flow gauge and aircraft gauge for future reference.

G. RECHECK. Recheck as follows:

(1) Recheck idle settings as specified in A, B and C above and adjust as required.

(2) Recheck 100 percent power fuel flow as specified in D for 25-0001 thru 25-0999 and E for 25-1000 & ON.

(3) Recheck full power manifold pressure as specified in E for 25-1000 & ON.

H. GROUND CRITICAL ADJUSTMENTS
S/N 25-0001 thru 25-0999

(1) Set altimeter to 29.92 inches and record pressure altitude. With engine operating at 2300 RPM, mixture control FULL RICH proceed as follows:

(2) Reduce engine speed to 2000 RPM with the propeller control.

(3) Set throttle FULL OPEN.

(4) Using propeller control, increase engine speed until 40 In. Hg. +/- .2 manifold pressure is obtained. Engine speed should be within ground critical limit band (**Figure 71-4**). If engine RPM is outside these limits readjust turbocharger by-pass valve. (One turn in equals approximately 100 RPM reduction). Safety wire before flight. (9 threads showing (fine thds.) is starting point if no reference is known)

I. CHECK AND ADJUST ENGINE CONTROL RIGGING as follows:

(1) Operate each control thru its full range of travel and check that it operates smoothly and contacts the stops at each end of travel.

(2) Check each control at instrument panel for .06 to .12 cushion with the control pushed full forward.

CAUTION
Do not force vernier controls by turning knob.

NOTE
Any vernier control which tends to creep can be tightened by loosening housing nut in back of panel and tightening face nut at pilot side of panel.

(3) Adjust controls by adjusting rod end on the forward end of the control. If additional adjustment is required the control arm may be repositioned to adjust the throttle or mixture. Additional adjustment may be obtained on the prop governor by removing the safety wire thru the six screws on the governor head and loosening those screws. After loosening the screws rotate governor head to obtain required adjustment.

(4) Tighten all screws and resafety.

J. PROPELLER RPM ADJUSTMENT. Run engine and verify that propeller governor will allow engine to operate at 2700 RPM. Adjust forward stop screw on governor head as required to obtain required RPM. Recheck control for required cushion after setting RPM.

K. FLIGHT CHECK
S/N 25-0001 thru 25-0999

The following checks shall be performed in flight:

(1) Set altimeter at 29.92 In. Hg. and record pressure altitude on data table, (**Figure 71-3**). Remove calibrated gauges prior to check flight. Aircraft is not approved for flight with these gauges installed. Reconnect the hoses, fittings, etc. required to connect the ships gauges. Utilize recorded delta for the fuel flow gauges during this flight check.

(2) With full rich mixture, throttle at 40.0 In. Hg., 2700 RPM and 96 +/- 2 knots IAS climb until 40.0 In. Hg. manifold pressure can no longer be maintained, this is termed critical altitude. Record pressure altitude, OAT and fuel flow each 2000 feet until critical altitude is reached. Fuel flow shall be 135 to 145 lb. per hour (23.0 to 24.7 GPH) during the entire climb at NASA Standard Day temperature.

ENGINE SET-UP DATA SHEET FIGURE 71 - 2

-- FOR MECHANIC'S USE DURING ENGINE SET-UP PROCEDURES --

DATA	DATE	DATE	DATE	DATE	DATE
IDLE PERFORMANCE					
U/M Fuel Press (** 6.25 +/- .25 PSI **) (@ 700 +/- RPM)					
Idle Mixture Rise (50 +/- 25 RPM) (@ 700 +/- RPM					
Idle Speed (700 +/- 25 RPM)					
FULL POWER PERFORMANCE					
MP (SHIP/TEST)					
RPM ** (+ 0 /-25)					
F/F SHIP					
* F/F TEST (** lbs./Hr)					
GROUND CRITICAL					
OAT					
PRESSURE ALT. (29.92 " Hg)					
DENSITY ALT.					
RPM					
FLIGHT CRITICAL					
OAT					
PRESSURE ALT. (29.92 "Hg)					
* F/F (SHIP/TEST) (** lbs./Hr)					
DENSITY ALT.					

* Use correct fuel flow gauge for -GB or -LB, or -MB or -SB engines.

CAUTION

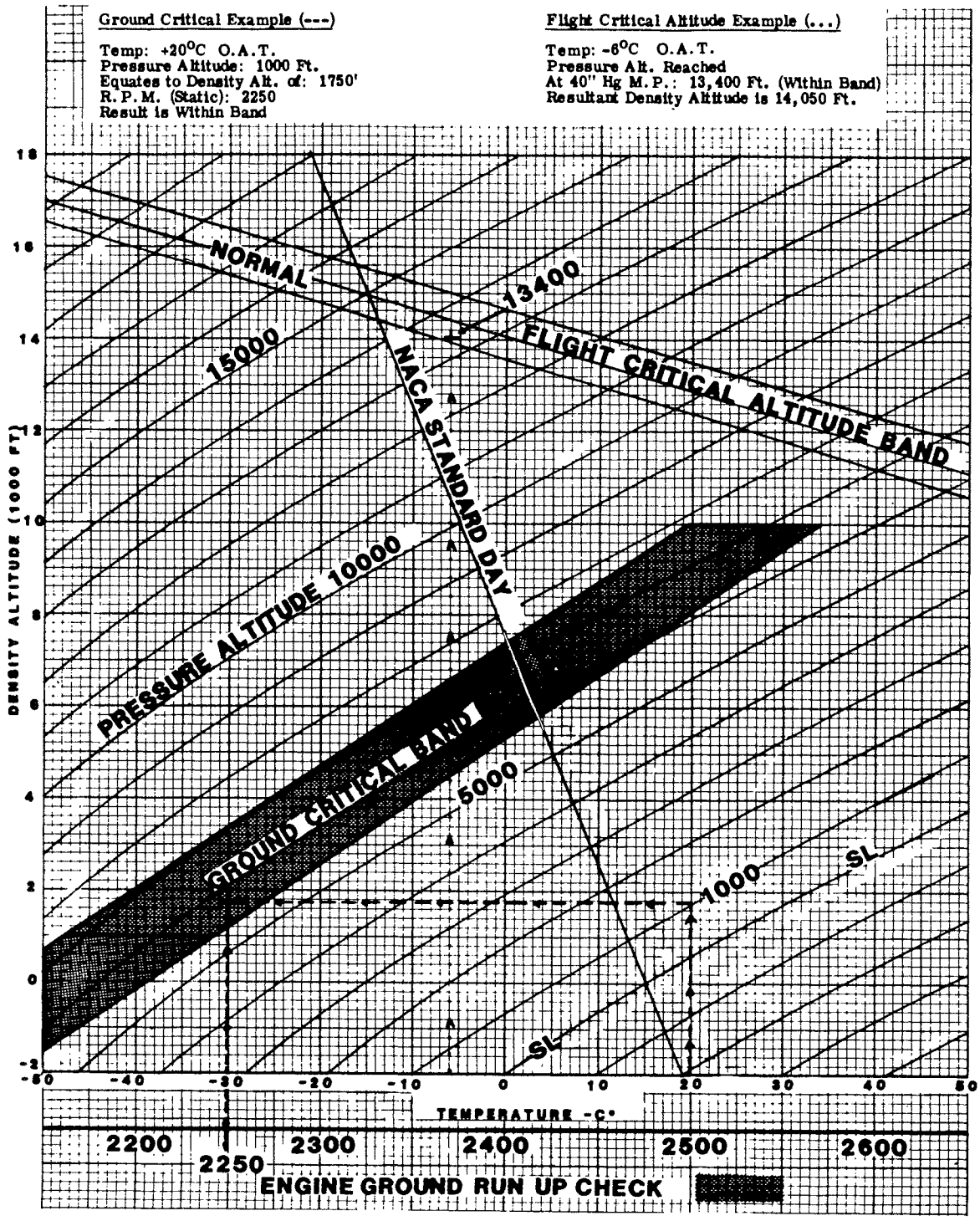
**** Use correct RPM, Fuel Flow and fuel flow gauge for: -GB or -LB or -MB or -SB engine.**
Refer to SECTION 71-00-50 for specific engine set up procedures.

FLIGHT CRITICAL DATA SHEET FIGURE 71 - 3

– FOR MECHANIC'S USE DURING ENGINE SET-UP PROCEDURES –

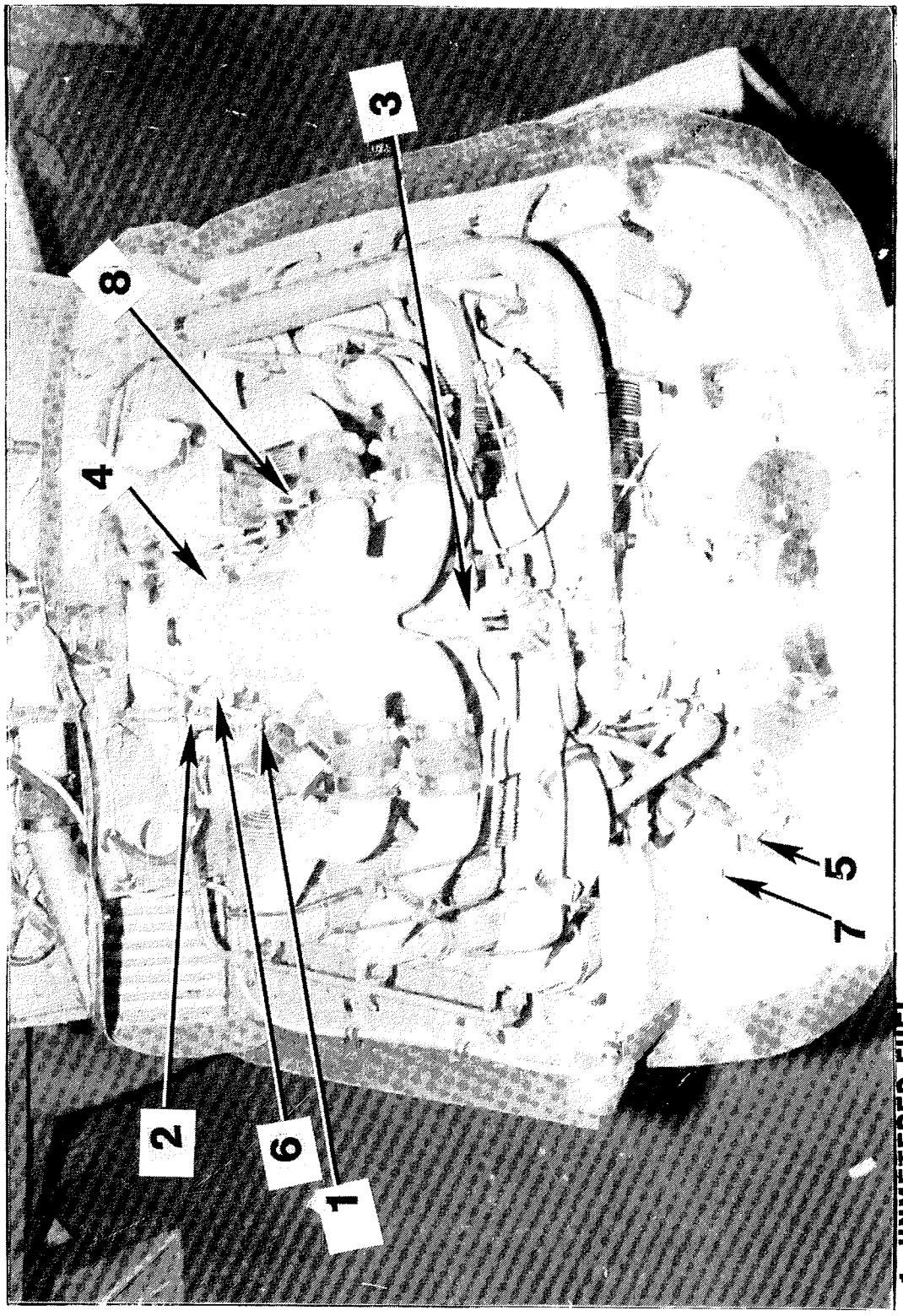
PRESSURE ALTITUDE	OAT	TIT	F/F F/F	MP MP	RPM RPM	CAL. INST. SHIP INST.	REMARKS

Temperature variations from NASA Standard Day temperature causes approximately .7 lbs. per hour fuel flow change with each 1 degree C. variation (minus if hotter, plus if colder). The critical altitude will vary on each flight depending on density altitude as shown on (Figure 71-4), +/- 500 feet tolerance.

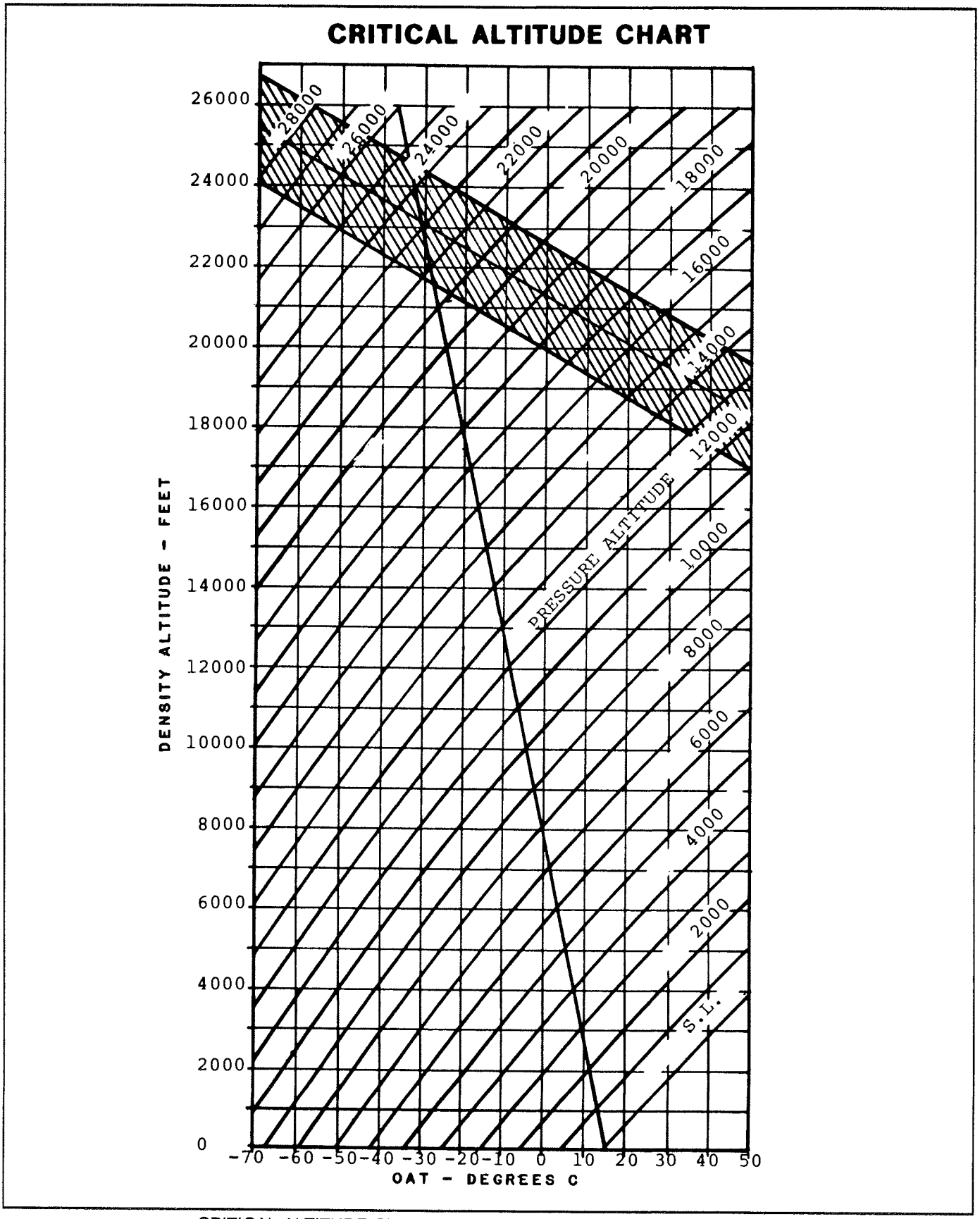


ENGINE RPM GROUND/FLIGHT CRITICAL CHECK CHART FIGURE 71 - 4

(TSIO-360-GB & -LB ENGINES)

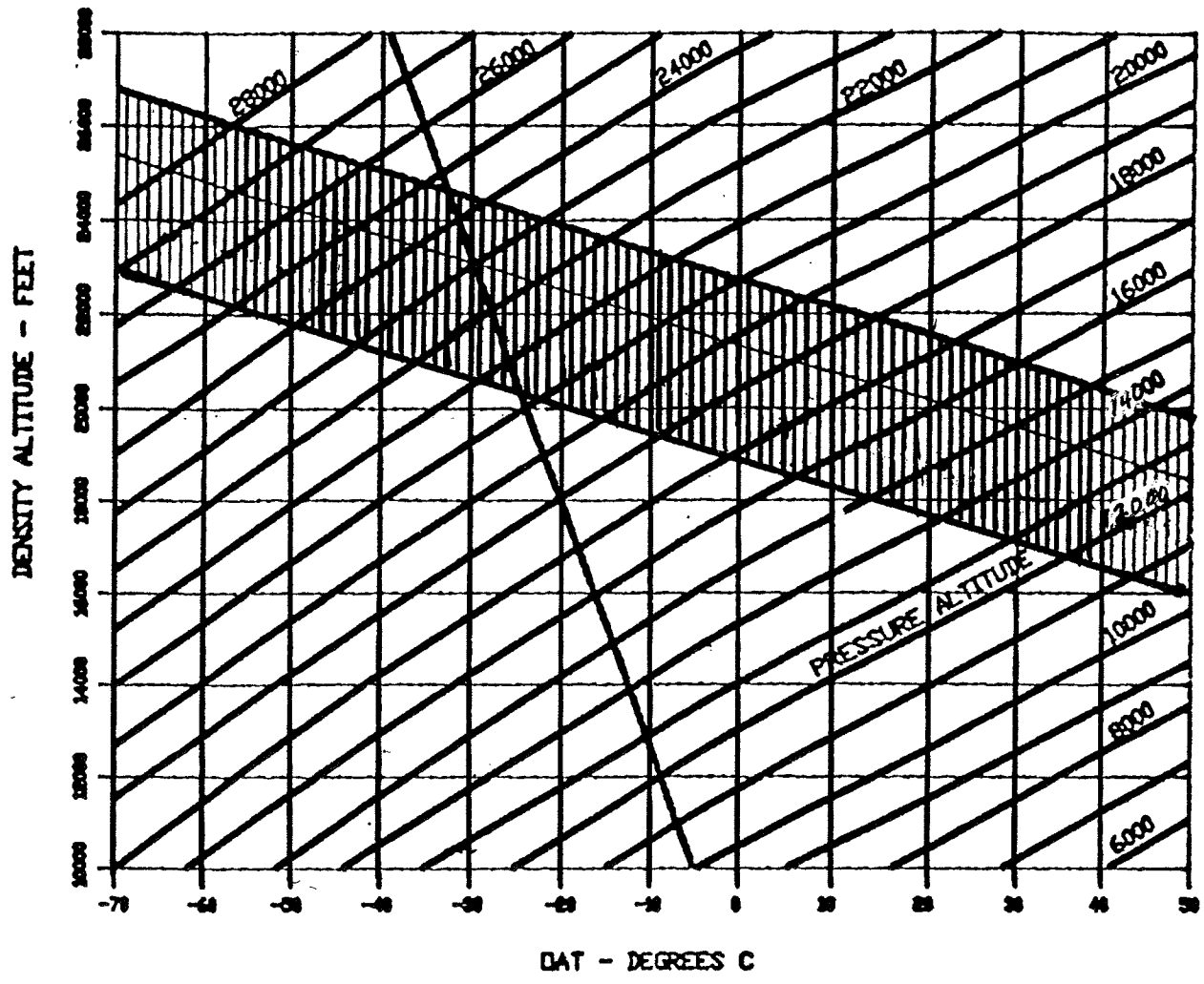


ADJUSTMENT LOCATIONS (TSIO-360-MB ENGINE) FIGURE 71 -4B



CRITICAL ALTITUDE CHART (TSI0-360-MB ENGINE) FIGURE 71 - 4C

CRITICAL ALTITUDE VARIATION WITH AMBIENT TEMPERATURE



1. Aircraft in climb configuration - 96 KIAS, 2600 RPM (+0/-50)
2. Record below: Pressure Altitude, OAT, and Fuel Flow when MAP decreases below 38" Hg. at full throttle.
3. Enter point on chart at Pressure Altitude and OAT. If point is within the depicted altitude band, critical altitude is within tolerance. If outside the altitude band, the engine will have to be retrimmed.

CRITICAL ALTITUDE REPORT

	FLT 1	FLT 2	FLT 3	FLT 4	FLT 5
Pressure Altitude (Feet)	_____	_____	_____	_____	_____
Outside Air Temp (C)	_____	_____	_____	_____	_____
Fuel Flow (GPH)	_____	_____	_____	_____	_____
Date	_____	_____	_____	_____	_____

Aircraft Serial Number _____

Aircraft Registration Number _____

CRITICAL ALTITUDE CHART (TSI0-360-SB ENGINE) FIGURE 71 - 4D

K. FLIGHT CHECK

S/N 25-0001 thru 25-0999 (con't.)

(3) If a discrepancy in critical altitude was noted, adjust the exhaust by-pass valve. (Turning the exhaust by-pass valve screw IN one full turn (CW) will increase the critical altitude approximately 1000 feet).

CAUTION

Adjustment in excess of one turn should not be made. If major adjustments are required to obtain published critical altitudes, troubleshoot engine as to exhaust leaks, turbo and engine condition. All adjustments are interrelated, engine must be at operating temperatures, and adjustments should be rechecked after final set-up to determine all values are as specified.

NOTE

If induction or exhaust system leak is suspected, 3 to 5 PSI can be applied to either system and check with soap solution.

Re-fly aircraft to verify critical altitude settings. Adjustments of critical altitude in excess of 500 feet may require retrimming of fuel flows at 100% power. All adjustments to fuel flow shall be made per paragraph 71-00-50, 3, A thru F. 3.).

(4) With full rich mixture, 2700 RPM, 96 knots IAS airspeed, and 1000 to 3000 feet pressure altitude, check the operation of the manifold pressure relief valve. Slowly advance the throttle to the wide open position. The manifold pressure should stabilize between 42.0 and 44.0 In. Hg., there should be no loss of power, and the fuel flow indication should be well over the red line. DO NOT EXCEED 40.0 In. Hg manifold pressure for more than TEN SECONDS.

L. FLIGHT CHECK

The following checks shall be performed in flight:

- S/N 25-1000 thru 25-TBA

(1) Set altimeter at 29.92 in. Hg. and record pressure altitude on data table (Figure 71-3). Remove calibrated gauges prior to check flight. Aircraft is not approved for flight with these gauges installed. Reconnect hoses, fittings, etc. required to connect the ships gauges. Utilize recorded delta for the fuel flow gauges during this flight.

- S/N 25-1000 thru 25-2012 (-MB ENGINE)

(2) With full rich mixture, full throttle (36.0 in. Hg.), 2700 RPM and 96 +/- 2 KIAS climb until 36.0 in. Hg. can no longer be maintained. This is termed critical altitude. Record pressure altitude OAT and fuel flow each 3000 ft. until critical altitude is reached. Fuel flow shall be 125 to 135 lbs./hr. (21.5 to 23.2 GPH) during the entire climb to critical altitude.

- S/N 25-2013 thru 25-TBA (-SB ENGINE)

(2) With full rich mixture, full throttle (39.0 in. Hg.), 2600 RPM and 96 +/- 2 KIAS climb until 39.0 in. Hg. can no longer be maintained. This is critical altitude. Record pressure altitude OAT and fuel flow each 3000 ft. until critical altitude is reached. Fuel flow shall be 151 to 157 lbs./hr. (25.5 to 26.5 GPH) during the entire climb to critical altitude.

CAUTION

Use correct fuel flow gauge for the -MB & -SB engine (same as -LB engine) versus -GB engine.

Temperature variations from NASA STD. DAY TEMPERATURES causes approx. .7 lbs./hr. fuel flow change with each 1° C. variation, minus if hotter, plus if colder. The critical altitude will vary on each flight depending on density altitude as shown on Figure 71-4C +/- 1500 ft. tolerance. If a discrepancy in critical altitude was noted, check the engine induction system for leakage or blockage or turbocharger for malfunction, until problem is found. indication should be well over the red line. DO NOT EXCEED 40.0 In. Hg.

M. CLEAN UP

After all flight checks and adjustments are complete, conduct a leak check of all connections. S/N 25-0001 thru 25-0999 safety wire the exhaust by-pass screw and check nut to the by-pass screw housing. Reconnect and secure the landing light wire connections on bottom cowl and reconnect the cowl flap rod ends.

N. FUEL BOOST PUMP LOW PRESSURE ADJUSTMENT.

See SECTION 28-21-00, 3. And 24-37-00,1,B,(1)&(2).

71-00-60 - FUEL INJECTION SYSTEM MAINTENANCE

For specific injection system inspection and overhaul instructions, consult engine manufacturer's overhaul manual and service instructions.

71-00-70 - STARTER SYSTEM MAINTENANCE

Inspect and service starter per TCM Service Instructions.

CAUTION

Do not operate starter in excess of 30 seconds; allow cooling time before re-engaging.

71-00-80 - ENGINE MIXTURE CONTROL RIGGING

1. Disconnect mixture control.

A. Remove cotter key.

B. Remove nut, bolt, and two washers from clevis and mixture control arm.

2. Reconnect mixture control.

A. Reverse disconnect procedure to reconnect mixture control.

3. Adjustment of mixture control arm.

A. Loosen locknut on control rod end and adjust control arm rod as required.

B. Check for full travel.

C. Check for proper thread grip.

D. Secure locknut.

71-00-90 - STARTER TROUBLE SHOOTING

See Section 24-39-04 for procedure. TCM MAINTENANCE AND OPERATORS MANUAL should be consulted.

71-10-00 - ENGINE COWLING

The engine cowling is in two sections. The lower cowl contains the landing lights (25-0001 thru 25-0999) and cowl flaps. The induction inlet ducts are also located on the lower cowl. The top cowl contains the oil filler access door. Quick-disconnect, 1/4 turn fasteners attach the induction duct panels to the cowl and the upper and lower cowling to the aircraft.

71-10-01 - ENGINE COWLING CLEANING, INSPECTION & REPAIR

Clean cowl by spraying with solvent (PS-661 or equivalent) and wiping clean. After cleaning, inspect cowling for dents, cracks and loose fasteners. Repair defects.

71-11-00 - COWLING REMOVAL

71-11-01 - TOP COWLING

1. Remove two screws from top cowling on inboard side of LH & RH engine cooling air intakes.

2. Remove one screw from both LH & RH side of top cowling, forward and outboard. Then unlatch seven cam locks on each side.

3. Unlatch seven cam locks on the aft edge of the top cowling just ahead of windshield.

4. Carefully lift top cowling off.

71-11-02 - BOTTOM COWLING

1. Disconnect landing light wiring connectors near firewall (S/N 25-0001 thru 25-1224).

A. Cut ty-raps securing insulating tubes over knife disconnects.

B. Slide insulating tubes up wire harness toward firewall.

C. Disconnect knife disconnects and slide insulating tube back over disconnect.

2. Disconnect both cowl flap control rod ends at quick disconnect fitting (1) (**Figure 71-5**) located on cowl flap brackets (S/N 25-0001 thru 25-1224).

NOTE
Reach up through cowl flap opening to disconnect cowl flap control rods.

3. Unlatch 2 cam locks located on bottom cowling between cowl flaps (S/N 25-0001 thru 25-0999).

4. Unlatch 8 remaining cam locks (4 on each side) on bottom cowling while supporting cowl.

NOTE
S/N 25-0001 thru 25-0999 have two cowl flaps. S/N 25-1000 thru 25-TBA have one center cowl flap. Camlock locations vary slightly from aircraft with two cowl flaps.

5. Carefully lower cowling clear of spinner and remove from aircraft.

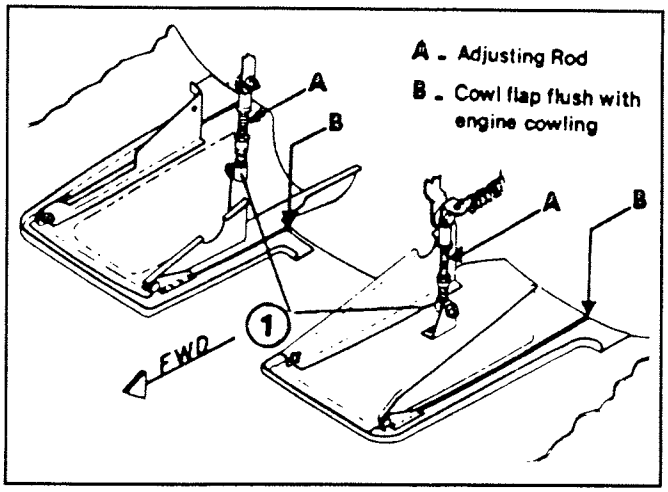
71-12-00 - COWLING INSTALLATION

NOTE
Check condition of tape on firewall flange where cowling will rest. Polyethylene tape, P/N 5421(UHMW) (3M), 1 inch wide is recommended. This will decrease streaking during wet weather operations.

71-12-01 - BOTTOM COWLING

1. The bottom cowling is installed "first" in reverse sequence of removal.

CAUTION
Be sure landing lights and cowl flaps are connected prior to installation of top cowling.



ENGINE COWL FLAP RIGGING (25-0001/25-0999)
FIGURE 71 - 5

71-12-02 - TOP COWLING

1. The top cowling is installed in reverse sequence of removal.

71-13-00 - ENGINE COWL FLAPS (25-0001 thru 25-0999)

The cowl flaps are activated OPEN and CLOSED by a scissors/idler arm mechanism connected to the cowl flaps. A push/pull knob on the console is used to open or close cowl flaps. Cowl flaps are either OPEN or CLOSED (two positions) while aircraft is on the ground; however, there is an intermediate "trail position" in flight. The cowl flaps will seek an aerodynamic position between CLOSED and OPEN when push/pull knob is pulled out. This can be used for cooling if needed during cruise.

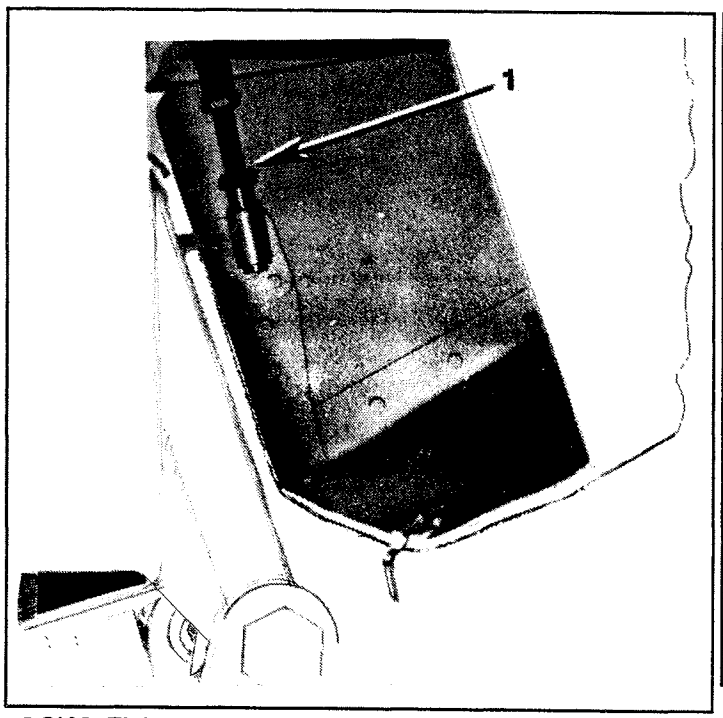
71-13-01 - COWL FLAP RIGGING (25-0001 thru 25-0999)

1. Adjust both the left and right cowl flaps so that in the closed position the outboard trailing edges are flush with the lower engine cowling, (Figure **71-5**). Maintain .06 - .12 in. "cushion" on cowl flap control at the instrument panel when cowl flaps are closed. The scissors should be in an overcenter position when cowl flaps are closed.

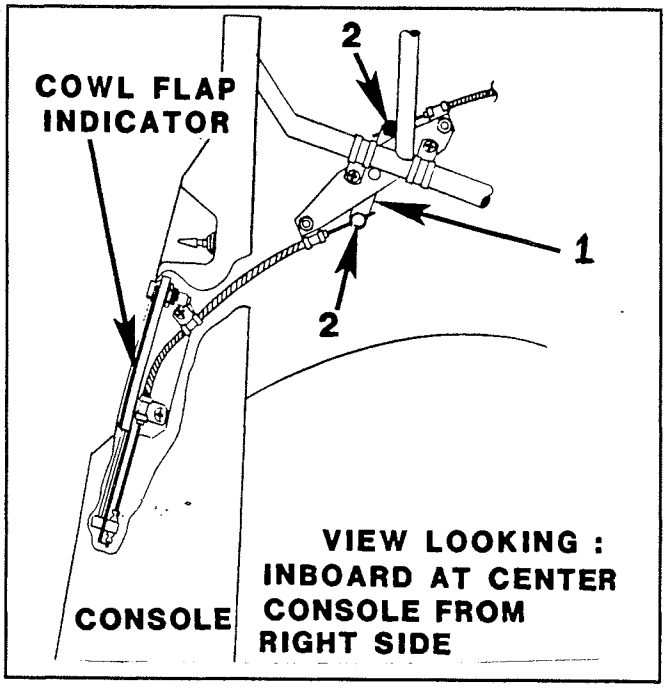
NOTE
For improved cooling during summer months and warm temperature operations, cowl flaps may be rigged to have a .25 max inch gap at "B" when at the closed position.

71-14-00 - ENGINE COWL FLAP (25-1000 thru 25-TBA)

The single cowl flap is activated OPEN and CLOSED by an idler arm connected by a push-pull rod to the actuator arm on a geared motor. A cowl flap switch, located on the cockpit console directly under the mixture control, activates the geared motor. The switch has three positions: center (OFF), up (CLOSED) and down (OPEN). The cowl flap may be positioned at any angle by selecting the switch either up or down until the desired position, as shown on the position indicator, has been reached. Then return switch to the center (OFF) position. Limit switches, which are not adjustable, prevent the cowl flap from exceeding the full open or full closed position.



COWL FLAP RIGGING (25-1000/25-TBA) FIGURE 71 - 6



COWL FLAP INDICATOR RIGGING (25-1000/25-TBA) FIGURE 71 - 7

71-14-01 - COWL FLAP RIGGING (25-1000 thru 25-TBA)

The cowl flap is rigged for a flush contour between the cowl flap trailing edge and cowling, when in the closed position (**Fig. 71-6**).

1. With cowl flap open, adjust 2 linkage rods (1), **Figure 71-6**, from idler arm to cowl flap to maximum length.

2. Close cowl flap. Measure distance between cowl flap trailing edge and cowling.

3. Open cowl flap. Readjust linkage rod, decreasing length by above measured amount.

4. Close cowl flap. Verify that cowl flap is not outside cowling contour nor that cowl flap is preloaded against nose gear box. Readjust as required.

71-15-00 COWL FLAP POSITION INDICATOR (25-1000 thru 25-1999)

A cowl flap position indicator is located on cockpit console directly under Flap Switch. Indicator is operated by a cable connected to the actuator arm and routed to a bellcrank arm located behind the console. This bellcrank arm is then connected by another cable to the indicator.

71-15-01 - INDICATOR ADJUSTMENT (25-1000 thru 25-1999)

1. Position actuator and indicator in down position.

2. Hold bellcrank arm (1) in position shown in **Fig.71-7; tighten both wire end clamps (2).**

3. Cycle cowl flap actuation system a minimum of five times to verify free movement of indicator. Adjust push-pull wires at bellcrank, as necessary for proper indicator travel.

4. Install cotter pins in pivot nuts.

71-16-00 - ENGINE COWL FLAP POSITION INDICATOR (25-2000 thru 25-TBA)

A cowl flap position indicator is located on the lower console adjacent to the cowl flap switch. This indicator is operated electrically through a potentiometer connected to cowl flap actuator shaft.

71-16-01 - COWL FLAP INDICATOR ADJUSTMENT

1. Position cowl flaps in closed position.

2. Adjust cowl flap potentiometer on aircraft, to illuminate top bar in display.

3. Position cowl flaps to OPEN position.

4. Adjust R1 on A/D board, if necessary, to illuminate bottom bar on display.

5. Repeat steps 2 through 4, until no further adjusment is required.

6. Cycle cowl flap system to verify proper movement of indicator.

71-20-00 - ENGINE MOUNTS

The M20K engine mount is a welded dyna-focal bed type mount assembly of chrome-moly, 4130 steel.

The shock mounts are installed in a specific sequence for proper dampening of engine and propeller power pulses. Effective production aircraft S/N 25-0781 and ON and for Spares replacement on prior aircraft, (a complete set required) the following sequence of assembly must be observed:

1. Assembly sequence for 600376-503, -505 and -507 installation.

2. All positions are looking from cockpit forward and down from top of engine.

3. All assembly sequences are from bottom to top of stack.

ENGINE MOUNT INSTALLATION/STACK-UP - 25-0781 thru 25-1999 & Spares Replacement 25-0001 & ON

LEFT FRONT (-507)		RIGHT FRONT (-505)	
Bolt	-AN7-46A	Bolt	-AN7-47A
Washer	-AN960-716L	Washer	-AN960-716
Heat Shield	-600394-1	Heat Shield	-600394-1
Lord Mount	-J9612-43	Lord Mount	-J9612-43
Engine Mount Sequenced in at this point (LH & RH)			
	* 600364-005 Spacer - Alt. to Y13748-532		
Spacer, Bolt	-J10931-2	Spacer, Bolt	-Y16440-2-497
Lord Mount	-J9612-42	Lord Mount	-J9612-44
Heat shield	-600394-3	Washer, Special	-Y13748-532 *
		Heat Shield	-600394-3
Engine is Sequenced in at this point (LH & RH)			
Washer	-AN960-716L	Washer	-AN960-716
Nut	-AN363-720	Nut	-AN363-720
LEFT REAR (-503)		RIGHT REAR (-503)	
Bolt	-AN7-47A	Bolt	-AN7-47A
Washer	-AN960-716	Washer	-AN960-716
Heat Shield	-600394-1	Heat Shield	-600394-1
Washer, Special	-Y13748-532 *	Washer, Special	-Y13748-532 *
Lord Mount	-J9612-44	Lord Mount	-J9612-44
Engine Mount Sequenced in at this point (LH & RH)			
Spacer, Bolt	-Y16440-2-497	Spacer, Bolt	-Y16440-2-497
Lord Mount	-J9612-43	Lord Mount	-J9612-43
Heat Shield	-600394-3	Heat Shield	-600394-3
Engine is Sequenced in at this point (LH & RH)			
Washer	-AN960-716	Washer	-AN960-716
Nut	-AN363-720	Nut	-AN363-720

TORQUE BOLTS TO 450 - 500 INCH LBS.
* 600364-005 Spacer - Alt. to Y13748-532

71-30-00 - FIRESEALS

Firewall fireseals and grommets, if removed and replaced for any reason, should be sealed after routing the cable or wire assembly from the engine compartment into the cockpit area. After installation cover cable or wire and grommet underneath the fireseal with Coast Pro-Seal 700 on engine side of firewall.

71-60-00 - AIR INTAKES

The engine cooling air intakes and exits are calculated for optimum cooling requirements and minimum drag. Normal engine operating temperatures are at the optimum to facilitate engine efficiency.

The engine induction air intake is a fiberglass, insulated, duct that picks up impact air at the right hand air intake and routes it through the air filter to the turbocharger housing and eventually to the engine **(25-0001 thru 25-0999).**

S/N 25-1000 thru 25-TBA aircraft induction air is provided through a NACA inlet & duct on the right hand side of the lower cowling. The cowling duct joins a flexible duct attached to the filter housing & routes induction air through the filter and turbocharger housing, then to the engine.

The air intake system includes an alternate air intake system that is manually operated on S/N 25-0001 thru 25-0780 and automatically operated on 25-0781 and on. A manual operation control is provided on the later aircraft also.

NOTE
Alternate induction air hose should be secured with clamps to avoid contact with engine mount. Reference M20K IPC Figure 71-00-00 & 71-60-00.

71-61-00 - AIR INTAKE DUCT REPLACEMENT - 25-0001 thru 25-0999

When the air induction duct must be replaced it is essential that the duct be positioned exactly as the original installation to prevent any interference with the cowling or the exhaust system. Reseal duct to baffle with Proseal 700 sealant.

71-62-00 - ALTERNATE AIR DOOR RIGGING

71-62-10 - S/N 25-0001 thru 25-0780 (Unless modified I/A/W SI M20-71).

1. Adjust actuating lever arm, riding in the door slot, to be in the detent of the slot when closed.

2. There should be 1/8 inch cushion between the control cable knob and the panel in the cabin at this position.

3. An electrical switch on the cockpit control activates the "Alt Air" annunciator light on A/C 25-0001 through 25-0780.

71-62-20 - S/N 25-0781 & LATER AIRCRAFT (Includes earlier A/C modified I/A/W SI M20-71) (REF. FIG. 71-8)

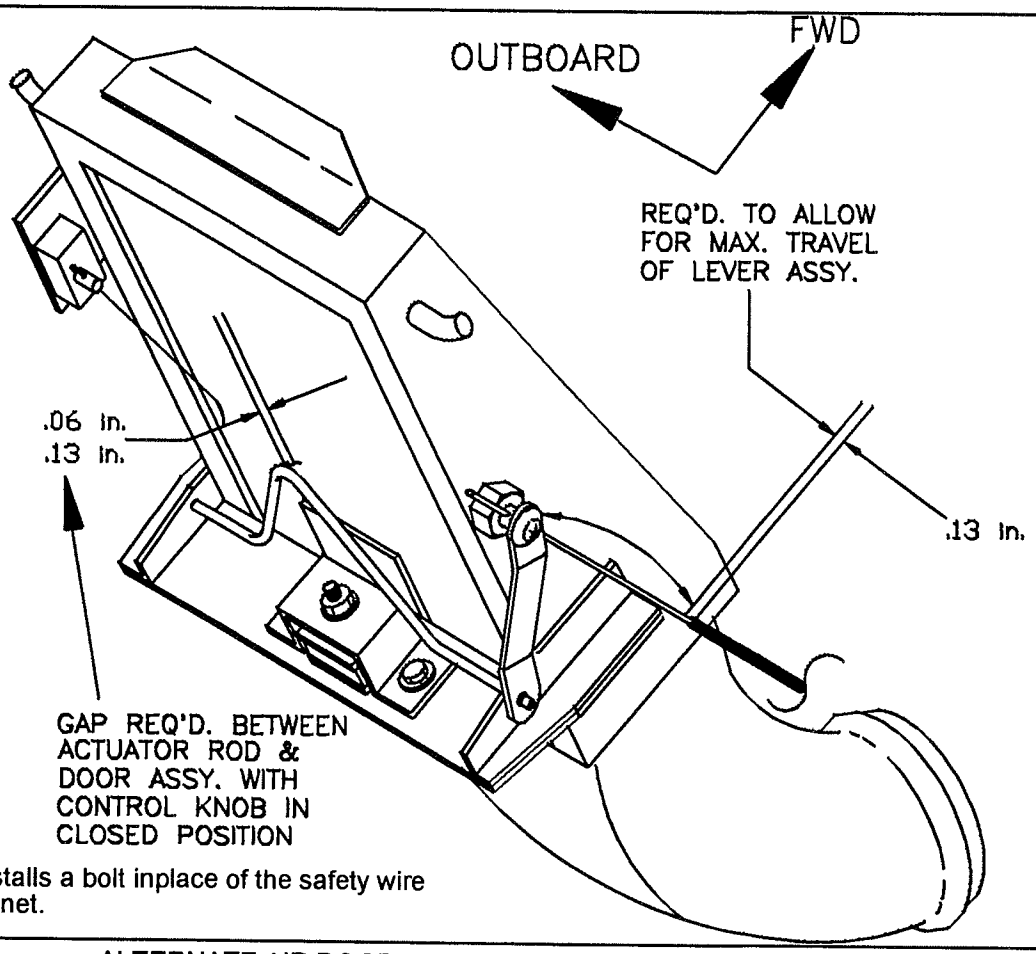
1. Clamp housing of altemate air intake control assembly at the bracket on alternate air box so housing extends only .13 inches beyond clamp. This will allow maximum travel of altemate air door lever assembly.

2. The altemate air lever assembly should be rigged so .06 to .13 gap remains when the alternate air box door is held closed with the magnetic catch assembly.

3. The annunciator light switch is mounted on the alternate air box and should be rigged to extinguish the light with bottom of door .25 in. (max.) from full closed.

4. Check opening force of door. It should take between 4.5 and 7.5 pounds to open the door. Take readings at approximate location of the magnetic catch assembly.

5. Comply with SI M20-83 to inspect and replace magnet.



SI M20-83 installs a bolt inplace of the safety wire to secure magnet.

ALTERNATE AIR DOOR RIGGING (25-0781/25-TBA) FIGURE 71 - 8

CHAPTER 72

ENGINE

CHAPTER 72

ENGINE

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72-00-00 - GENERAL

Refer to Teledyne Continental Motors (TCM) Maintenance and Operators Manual No. X30536 (-GB), Manual No. X30571 (-LB), or Manual No. X30584 (-MB), Manual No. X30671 (-SB) and Overhaul and Maintenance Manual No.'s X30030A (-GB, -LB, -MB) or X30672A (-SB) for detailed information.

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CHAPTER 73

ENGINE FUEL SYSTEMS

CHAPTER 73

ENGINE FUEL SYSTEMS

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73-31-06	Troubleshooting Tru-Flow 1 (Alcor) Fuel Management Systems	8
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73-00-00 - GENERAL

The engine and its accessories are certificated under Teledyne Continental Motors (TCM) Type Certificate. Refer to TCM Operators or Overhaul Manual for specific instructions.

73-30-00 - INDICATING

S/N 25-0001 thru 25-0612 have an analog readout style fuel flow indicator which receives its signal from a transducer (Mooney SI M20-48 describes adjustment of Aerosonic analog F/F gauge). S/N 25-0001 through S/N 25-0171 originally had a pressure transducer installed. SI M20-49 described a recommended modification to a turbine type transducer and matching indicator. This turbine transducer has been the production configuration since S/N 25-0172, however, the indicators have varied. S/N 25-0613 & ON, the standard indicator has been a digital readout type. Digital indicators have been optional equipment for all aircraft up to S/N 25-0613.

All aircraft should now have the turbine transducer installed per SI M20-49.

73-31-00 - FUEL FLOW SYSTEM - GENERAL SYSTEM DESCRIPTION

The Fuel Flow Totalizer system, utilizes the latest in microcomputer technology products. The fuel flow system is designed to maximize the efficiency of fuel system management by displaying the fuel consumption rate (fuel flow) of the engine and the precise amount of fuel the engine has consumed. This information may be displayed in one of the following formats, US Gallons, Pounds, Liters or Imperial Gallons (Alcor) depending on switch or contact arrangement, see (**Figure 73-1** and **73-2**).

The system consists of a panel mounted instrument and a fuel flow transducer which is installed in the aircraft engine fuel line.

The system is designed for use in all single engine fuel injected aircraft having no more than 60 GAL/HR continuous consumption or 78 GAL/HR Intermittent consumption. (Take off power).

73-31-01 - PANEL MOUNTED INSTRUMENT

The panel mounted instrument contains all system electronics and may be divided into groups.

1. FT-101 (HOSKINS) SYSTEM

A. DISPLAY - The display uses one mini lamp and four seven segment incandescent digits that are fully sunlight readable and dim automatically during night and low light flight conditions.

B. MICROPROCESSOR - The microprocessor contains a crystal controlled oscillator that controls all timing and computing functions for precise fuel flow and totalizing computations.

C. POWER SUPPLY - The power supply is a high speed switching regulator type for optimum efficiency and the lowest possible power drain on the aircraft electrical system.

D. MEMORY - the microprocessor continuously stores and updates the totalized fuel quantity in a random access memory chip. The Total Fuel Used quantity is retained during aircraft shut down by connecting the memory wire to the aircraft battery through a memory switch. The drain on the aircraft battery is small due to the low power MOS memory chip which uses only 0.7 milliamps at 12 VDC (13 milliamps at 24 VDC, FT101A).

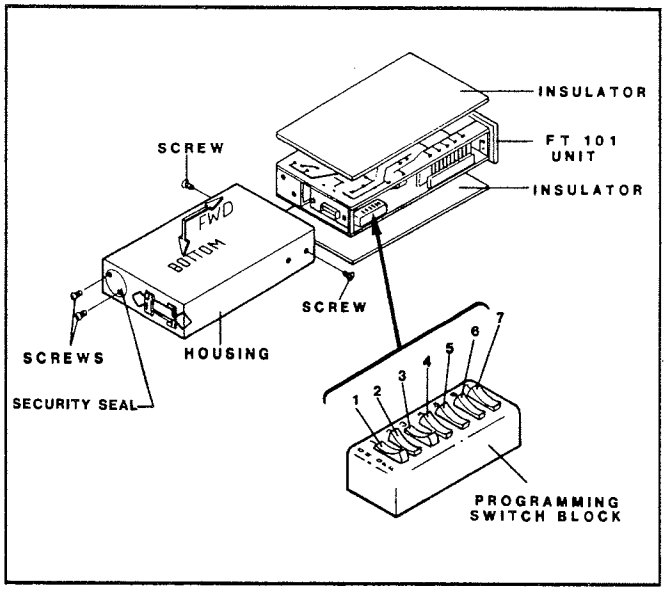
E. INTERNAL SWITCH ARRANGEMENT - The programming switch block (see Figure 73-2) located inside the **FT-101** panel mounted unit has several arrangements to change data readout if desired. Switches S1 and S2 (see Figure 73-1) should not be changed unless the transducer "K" factor of a replacement transducer differs from the original unit's "K" factor (see Section 73-31-02, 3, for "K" factor description).

Switches S3 thru S7 can be positioned in various arrangements to change full flow readout to gallons, pounds or liters as the situation may require, (see **Figure 73-1**).

FT-101 SWITCH ARRANGEMENT/ FT-101 TRUTH TABLES - FIGURE 73-1

K-FACTOR	SWITCH ARRANGEMENT	
	S1	S2
L	ON	ON
M	ON	OFF
H	OFF	ON
HH	OFF	OFF

FUNCTION	SWITCH ARRANGEMENT				
	S3	S4	S5	S6	S7
GALLONS	ON	OFF	OFF	NA	NA
POUNDS	OFF	ON	OFF	NA	NA
LITERS	OFF	OFF	ON	OFF	NA



FT-101 SWITCH ARRANGEMENT FIGURE 73 - 2

2. FT101A (HOSKINS) System
   A. Basically same as FT101.
   B. Refer to Hoskins Operators
   C. or Maintenance Manual
   D. for specific data.
   E. See **Figure 73-1A** for FT101A Switch arrangement.

3. TRU FLOW 1 (ALCOR) SYSTEM

A. DISPLAY - The unit features a liquid crystal display (LCD) to indicate fuel flow and total fuel used simultaneously. The display is backlighted and features automatic dimming through a photo cell sensor.

B. ELECTRONICS - The TRU FLOW 1 amplification system is located in the indicator away from the engine environment. The TRU FLOW 1 operates on a low power requirement and is protected against voltage surges.

C. MEMORY - The TRU FLOW 1 micropressor continously updates and stores the total fuel used quantity. The total fuel used quantity is retained during aircraft shutdown through a low power drain memory ciruit connected to the battery.

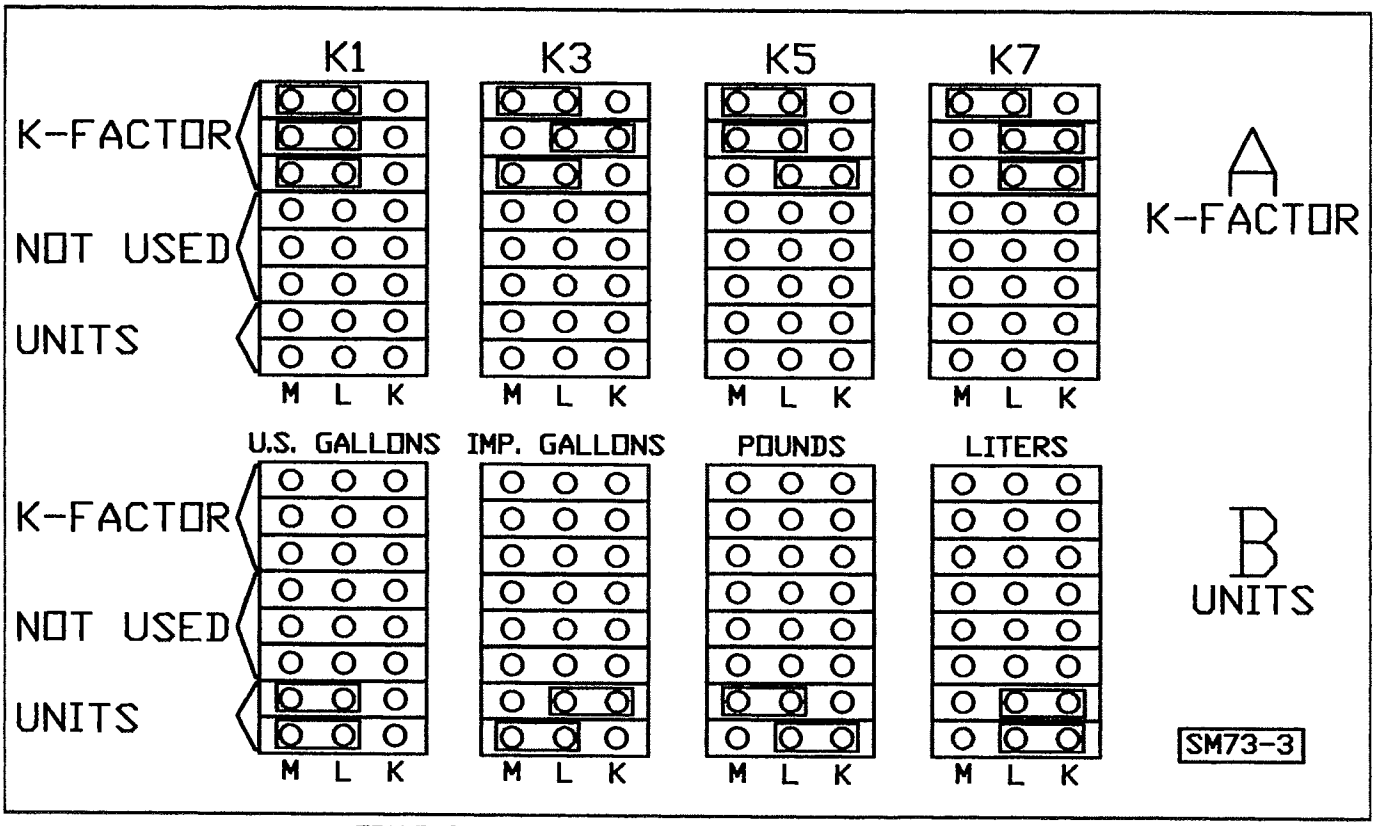
D. INTERNAL CONTACT ARRANGEMENT - The configuration selection block located inside the TRU FLOW 1 indicator has several arrangements to change data readout if desired. Jumpers should not be changed unless the K-factor of the transducer has changed due to replacement. (See Section 73-31-01,3, for K-factor description). Refer to Figure 73-3 for Alcor contact arrangement. To reconfigure the unit proceed as follows:

K-FACTOR ADJUSTMENT - FT101A -

SWITCH NUMBERS	S1	S2	S3	S4	S5	S6	S7
(1111) LOW LOW LOW	CLOSED	OPEN	OPEN	X	X	N	X
(2222) LOW LOW	OPEN	CLOSED	OPEN	X	X	O	X
(3333) LOW	CLOSED	CLOSED	OPEN	X	X	T	X
(4444) MEDIUM	OPEN	OPEN	CLOSED	X	X	U	X
(5555) HIGH	CLOSED	OPEN	CLOSED	X	X	S	X
(6666) HIGH HIGH	OPEN	CLOSED	CLOSED	X	X	E	X
(7777) HIGH HIGH HIGH	CLOSED	CLOSED	CLOSED	X	X	D	X

FUNCTIONS						
GALLONS	X	X	X	OPEN	OPEN	CLOSED
LITERS	X	X	X	CLOSED	OPEN	OPEN
POUNDS	X	X	X	OPEN	CLOSED	OPEN

FIGURE 73-1A FT101A SWITCH ARRANGEMENT



TRU-FLOW 1 JUMPER ARRANGEMENT - FIGURE 73 - 3

CAUTION

Some components in the indicator can be damaged by static electricity. Disassemble the indicator at a location away from static generating materials, such as styrofoam, plastic, wool, nylon(carpets), etc. Once disassembly of the indicator has started DO NOT LEAVE the indicator until it is reassembled to help eliminate the possibility of static discharge.

Step 1. Remove 4 screws, 2 on rear of indicator (which also removes connector latch) and 2 on side of indicator. Then remove electronic assembly by simultaneously pushing on rear connector and pulling on front bezel (front bezel may seperate from main assembly at this time, this is normal). BE CAREFUL NOT TO BEND THE BOARD CONNECTOR PINS.

Step 2. Remove front bezel assembly from main assembly by grasping edges of the boards and pulling them apart.

CAUTION

Do not bend the connector pins.

Step 3. Remove one of the 2 screws holding main assembly boards to standoff. Separate boards by grasping edges and pulling them apart. DO NOT BEND THE PINS.

Step 4. Locate the circuit board pictured and the "configuration selection block" (where the 5 configuration jumpers are located).

Step 5. Determine the K-factor to be selected to match the K-factor of the transducer. Should the need arise to match the K-factor with a SDI (Hoskins) transducer use one of the following K-factors:

HOSKINS TRANSDUCER (Flowscan) Code		ALCOR TRANSDUCER Code (K-FACTOR)
L	EQUATES TO	K7
M		K5
H		K3
HH		K1

Arrange the jumpers according to Figure 73-3, A.

Step 6. Determine the desired unit of measurement, there are four (the pounds measurement is not true pounds, but calculated from 5.85 times U.S. gallons, which is accurate only at 59 degrees F). Reposition the jumpers according to the examples in Figure 73-3,B.

Step 7. Print the K-factor and unit of measurement on the dot label located on the back of the indicator case.

Step 8. After repositioning the jumpers, reassemble the indicator in reverse order of disassembly. Be careful in lining up the board connector pins.

Step 9. After reassembly, power up indicator and check configuration to make certain that the proper changes were made.

Step 10. If fuel flow or quantity used totals do not match actual values contact the manufacturer for troubleshooting procedures.

NOTE

Reposition the jumpers by grasping with needle nose pliers or tweezers and pulling straight up to remove them, then reinsert to select the appropriate K-factor and units.

73-31-02 - FUEL FLOW TRANSDUCER

1. The turbine flow transducer, mounted in the engine fuel line, measures flow of fuel. The transducer is rated for a continuous operation to 60 gallons per hour. In addition, the transducer is accurate down to 0.6 gallons per hour.

2. The transducer supplies the Fuel Flow Totalizer with a pulse signal from a self contained opto-electronic pickup. A neutrally buoyant rotor spins with the liquid between V-jewel bearings. The rotor movement is sensed when notches in the rotor interrupt an infra-red light beam between a light emitting diode and a photo-transistor.

3. The transducer design is fail safe; complete rotor blockage cannot interrupt fuel flow. The transducer life expectancy is 1500 hours.

NOTE

Transducers are categorized by the number of pulses per second output for a given GPH flow rate ("K Factor)". This will be noted as: L, M, H, or HH scribed on the end of the serial no. For accurate readings, replacement transducers should have the same "K" factor as the units being replaced. Specify "K" factor code when ordering new transducers.

4. Fuel flow transducer removal.

A. Remove top and bottom cowling from aircraft. See Section 71-10-00 for procedures.

B. Cut and remove ty-raps from insulator sleeves on knife disconnects of electrical wires (1) (see Figure 73-4).

C. Slide insulation sleeving up on electrical wire harness.

D. Disconnect the knife disconnects.

E. Remove safety wire from firesleeve (2) around turbine transducer (3) and unwrap firesleeve to expose the transducer.

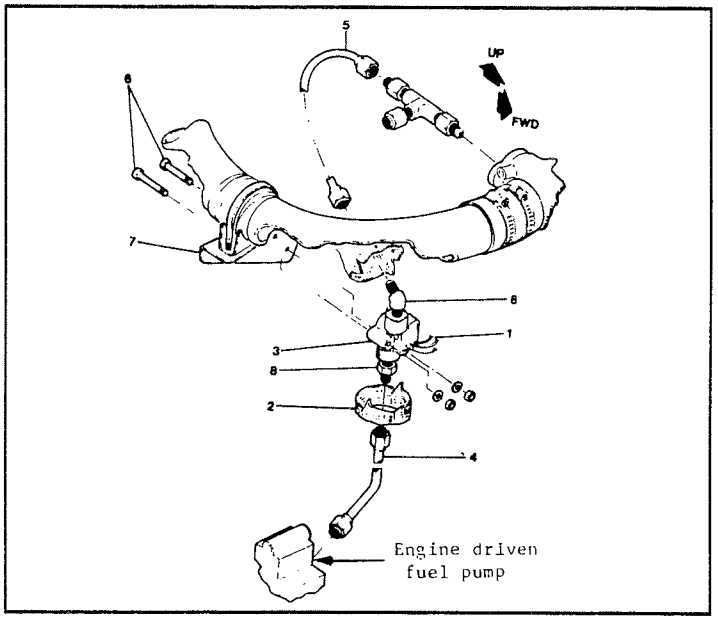
F. Loosen nuts on tubes (4) and (5) at fittings (8) prior to loosening nuts on attaching bolts (6).

G. Loosen and remove nuts, washers and bolts (6) from transducer and bracket (7).

H. Disconnect the flare nuts from transducer fittings (8).The transducer should now be free for removal. Note position of fittings (8) on old transducer (3).

I. Cap all lines to prevent contamination.

5. Fuel flow transducer (replacement) installation.



TURBINE FUEL FLOW TRANSDUCER - FIGURE 73 - 4

NOTE

The "K" factor of the replacement transducer should match the "K" factor of the replaced unit. Refer to "NOTE" following Section 73-31-02, paragraph 3 for detailed explanation.

A. Note the position of fittings (8) on old transducer (3) and place them in similar position on the new transducer.

B. Connect the nuts of lines (4) and (5) to fittings (8), leave them snug, not tight.

C. Connect the new transducer (3) to bracket (7) using bolts, washers and nuts (6).

CAUTION

Make sure the lines (4) and (5) are not being put into a bind or twist when securing the transducer to the bracket.

D. Tighten all fuel lines and bolts to secure the transducer.

E. Connect the knife disconnects and slide insulating sleeving over connections. Secure sleeving with ty-raps.

F. Leak check all fuel connections by pressurizing the fuel lines with hi-boost pump. Correct any leaks or discrepancies.

G. Wrap firesleeving (2) over transducer (3) and secure into position with safety wire.

NOTE

Installation of the new transducer may affect the engine fuel flow adjustment. It is recommended that the procedures of Section 71-00-50 be followed to assure engine is set up for proper operation.

H. When all adjustments have been made and all connections checked for security, install the cowling per Section 71-10-00.

73-31-03 - GENERAL OPERATING PROCEDURES

1. Turn aircraft master switch ON. When the aircraft electrical system is activated, the FT-101 display will flash zeros (000.0). This flashing is a reminder for the pilot to reset or check the fuel used by pressing either the RESET or USED/TEST button. Once the RESET or USED/TEST button is depressed, the display will stop flashing and read fuel flow.

The TRU FLOW 1 will display the configuration unit of measure and K-factor on the right hand side of display window (refer to Fig. 73-5).

After starting the aircraft engine, the FT-101 will continuously display fuel flow. Total Fuel Used may be displayed by pressing and holding the USED/TEST button on the right of the instrument. Total Fuel Used will be displayed as long as the USED/TEST button is depressed (or for 2 seconds), whichever comes first. This number may be reset to zero (0.0) by depressing and holding the RESET button for at least 1 second. The TRU FLOW 1 displays both functions simultaneously.

2. The totalizer function in either system may be used as a single flight totalizer or as a long term totalizer.Both methods are explained below.

A. SINGLE FLIGHT TOTALIZER. The aircraft should be topped with fuel before each flight so the total usable fuel will be known. Turn the aircraft MASTER switch ON. Push and hold the reset button, located on the left of either instrument, for at least 1 second. The RESET button has a one half second delay to prevent accidental reset.

On starting the engine, the FT-101 will begin displaying fuel flow. Total fuel used may be checked by depressing the USED/TEST button.

B. LONG TERM TOTALIZER. Turn the aircraft MASTER switch ON. On activating the aircraft electrical system, the FT-101 will flash zero (000.0) fuel flow. Depress and hold the USED/TEST button. The FT-101 will display the total fuel used from previous flights. DO NOT push the RESET button! On starting the engine, the FT-101 will display fuel flow and continue counting fuel used up to 999.9 gallons, 9999 pounds, or 9999 liters depending on the internal setting. The Alcor TRU-FLOW 1 will display fuel flow & total fuel used.

73-31-04 - TEST FUNCTION

A test function is provided in the FT-101, so the pilot may verify that all digits are functioning prior to each flight. To use the test function, depress and hold the USED/TEST button two times within one second and the FT-101 will display all eights (888.8).

73-31-05 - TROUBLESHOOTING SDI (Hoskins) FUEL MANAGEMENT SYSTEMS

Troubleshooting any Hoskins fuel management systems should be approached in a systematic manner. All problems can be put in one to five categories:

- Improper operation due to lack of knowledge about the system.
- Inoperative computer or main instrument.
- Inoperative transducer.
- Improper wiring.
- Improper transducer installation.

1. MEMORY LOSS -
   A. Loses memory when Master switch is turned OFF.
      (1) Check "Fuel Flow Memory" switch ON.
      (2) If switch is ON, check clock for operation.
      (3) If clock inoperative, replace fuse at battery.
      (4) If no problem found, remove connector from unit, check Pin 9 for bus voltage.
      (5) If voltage present, replace FT-101/101A.
   B. Memory scrambles when engine starts.

Exchange FT-101 for modified unit.

2. DOES NOT INDICATE
   A. No display.
      (1) Remove connector from indicator. Check Pin 1 of harness connector for bus voltage. Check Pin 8 for airframe ground. If OK, change indicator.
   B. Displays zeros (with engine running)
      (1) Remove cowling for access to transducer. Remove insulating sleeving from connections on all wires. Check BLACK wire for A/F ground. Check RED wire for bus voltage. Check WHITE wire for 2-3 volts with no fuel flow and increasing to near bus voltage at full flow.
      (2) If no increase in voltage is seen on WHITE wire as flow increases or if too high a voltage indication is seen with no flow, change transducer.
      (3) If RED wire does not have bus voltage, check wiring from transducer to Pin 3 of indicator.
      (4) If BLACK wire is not grounded, check wiring from transducer to Pin 6 of indicator.
3. ERRATIC INDICATIONS
   A. Check wiring for loose connections.
   B. Check wiring for intermittent shorts.
   C. Check transducer for foreign particles.
   D. If all checks OK, replace transducer.
4. INACCURATE READINGS
   A. Check transducer K-factor. The letter "L","M","H", or "HH" inscribed after the serial number.
   B. Remove indicator from instrument panel and case. Check switch settings and correct to match transducer.

NOTE
Each switch setting changes reading by approximately 2 %. If settings are OK, replace transducer.

CAUTION
Whenever transducer or indicator is replaced, care must be taken to set indicator switches to match transducer.

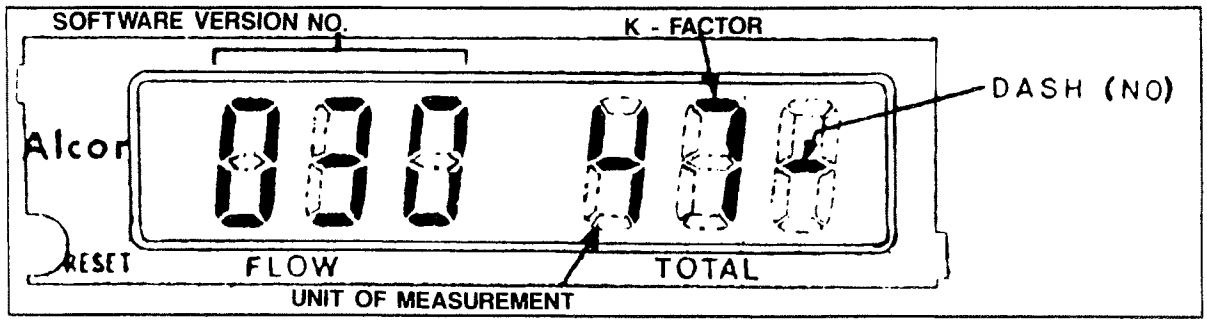
If after making these checks you still do not isolate the problem or do not find a problem, contact the Customer Service Department of Mooney Aircraft Company for further assistance.

73-50-00 DRUCK TRANSDUCER TEST PROCEDURES

Refer to Chapter 79-40-00.

73-31-06 - TROUBLESHOOTING - TRU- FLOW 1 (ALCOR) FUEL MANAGEMENT SYSTEM

If problem is determined to be in the indicator and all transducer and wiring checks have been made, contact Alcor, Inc., 10130 Jones-Maltsberger Road, PO Box 32516, San Antonio, Tx. 78284, telephone (830) 349-3771 for further assistance.



UNITS: 4 = U.S. GALLONS
3 = IMPERIAL GALLONS
2 = POUNDS (5.85 X U.S. GALLONS)
1 = LITERS

K-FACTORS ARE DISPLAYED AS ACTUAL K-FACTOR RANGE. ie., 1 = K1, 2 = K2, ETC.

TRU-FLOW 1 CONFIGURATION - FIGURE 73 - 5

CHAPTER 74

IGNITION

CHAPTER 74

IGNITION

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74-00-00 - GENERAL

The TS10360-GB,-LB,-MB or -SB series engines are equipped with either Bendix 25 Series magnetos, S/N 25-0001 through 25-0526, or Slick 6200 Series, S/N 25-0527 thru 25-TBA. Both magnetos incorporate an impulse coupling that retards the spark 30 degrees for starting. When the engine starts, counter weights hold the latch pawls away from stop pins. The magneto then will fire at its advanced firing position.

The magneto/starter switch combines both ignition and starting functions. Turn the key clockwise through R, L and BOTH to START position; push forward on key while in START and the starter relay is energized. Release of the key, after engine starts, will return the switch to the BOTH position where both magnetos are operative.

In the OFF position both magnetos are grounded. At the R position the left magneto is grounded and at the L position the right magneto is grounded.

NOTE

Mooney Service Instruction M20-59A (or later revisions) should be complied with for improved starting.

74-10-00 - ELECTRICAL POWER

74-10-01 - IGNITION SYSTEM TROUBLE SHOOTING

1. Hard starting.

   A. Assure that the impulse couplings are operating.

   B. Check magneto timing to engine.

2. Engine roughness.

   A. Install new spark plugs.

   B. Check plug leads for deterioration.

   C. Check magneto points for wear or improper setting.

3. Magneto drop out of limits.

   A. Check magneto-to-engine timing.

   B. Inspect and service magnetos per TCM Service Instruction.

   C. Check spark plugs and leads.

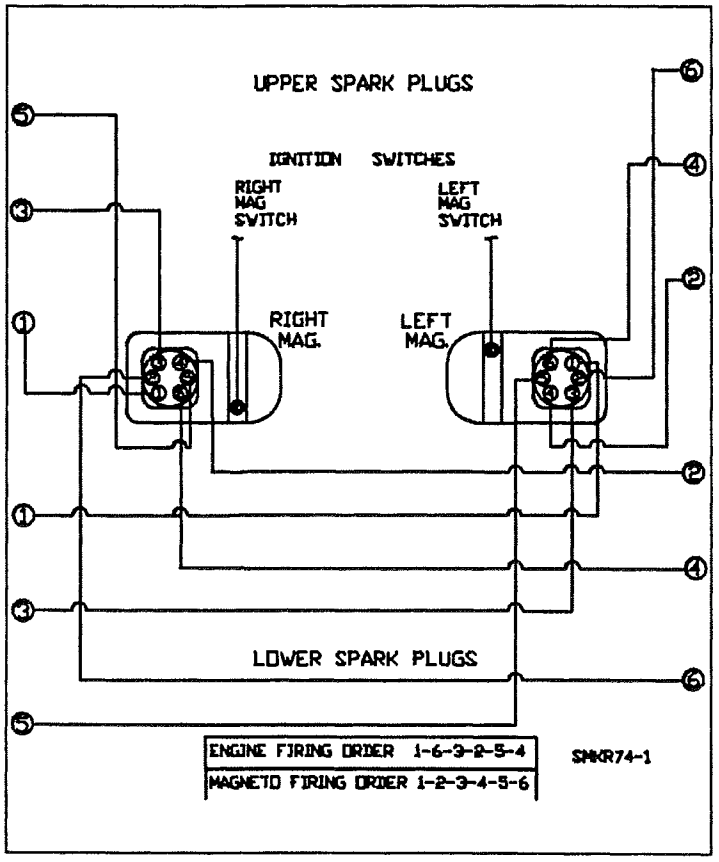
4. Check magneto pressurization hoses, connections and filter (if installed). (Filter not used with Bendix magnetos.)

NOTE

Aircraft which are flown at higher altitudes during normal flight operations require more frequent maintenance on ignition components than aircraft flown at lower altitudes. (Service ignition system per TCM Service Instructions.)

74-20-00 - ENGINE FIRING ORDER

Engine firing order is 1-6-3-2-5-4 (TS10-360-GB,-LB, -MB & -SB) (**Figure 74-1**). Observe the position of the No. 1 cable terminal in the magnetor outlet plate in relation to the magneto case. As viewed from the distributor end, the TS10-360-GB,-LB, -MB or -SB magneto rotor turns counterclockwise, passing in succession the terminals of spark plug cables in engine firing order. Cables are connected to the magnetos so that the right magneto fires the upper plugs on the right side and lower plugs on the left. The left magneto fires the upper plugs on the left and the lower plugs on the right. The magneto cases, spark plugs, cables and connections are shielded to prevent radio interference. See (**Figure 74-1**) for ignition wiring diagram.



IGNITION WIRING DIAGRAM - FIGURE 74 - 1

NOTE

TCM recommends all spark plugs be removed, inspected, cleaned, reagapped and reinstalled in the same cylinder but in a different spark plug hole every 100 hrs. Replace the spark plugs after 400 Hrs. of operation.

74-30-00 - SWITCHING

The Magneto/Starter switch is connected to the magneto grounding wires ("P" leads) of both magnetos. Turning this switch from "BOTH" to "OFF" or from "R" to "L" to "OFF" will ground out both or either magneto. (See Section 74-00-00 for grounding sequence.)

RELIABLIITY: With proper installation and compliance with prescribed maintenance procedures Slick or Bendix Magnetos should last the life of the engine before overhaul or replacement is required. (Refer to Slick Service Bulletin SB1-86A, March, 1987 or subsequent revision).

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CHAPTER 76

ENGINE CONTROLS

CHAPTER 76

ENGINE CONTROLS

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76-00-00 - ENGINE CONTROLS

76-10-00 - ENGINE CONTROLS RIGGING

See SECTION 71-00-50 for Engine Set-up adjustments

1. Examine the alignment of the accessory end (engine end) of the control, ensuring that the accessory unit operating arm does not cause binding or bending of the control cable, push rod, or swivel fitting.

2. Ensure that there is freedom of movement of rod-end fittings and clevis-fork fittings throughout their entire range of travel.

3. Ensure that any threaded shank has a least the minimum required tread engagement.

4. Rig engine controls in a manner leaving 1/16 to 1/8 inch of unused travel in the full throttle, full rich, or maximum RPM position. This is achieved by having the accessory unit control arm against its travel stop, while the engine control knob in the cockpit has 1/16 to 1/8 inch margin (cushion) before contacting its stop.

76-10-01 - INSPECTION & MAINTENANCE

INSPECTION - GENERAL

1. Inspect all engine control cables for proper routing security, and signs of damage caused by chafing and heat distress.

2. Inspect each control for full range of travel, and that no binding, excessive play, or limited travel caused by worn parts or improper installation is evident.

3. Apply simulated air loads by manually pressing on cowl flaps and alternate air controls to ensure that cables are not slipping in support clamps.

4. Replace all control cables, levers, link rods, and attaching hardware found damaged or worn beyond acceptable service limits.

LUBRICATION - GENERAL

During scheduled and unscheduled maintenance, the engine compartment is normally cleaned using a solvent and soap solution. This tends to remove lubrication from levers, linkages, and bushings. It is recommended that these areas be lubricated after engine compartment are cleaned during these maintenance activities.

1. Inspect the pivot points of the levers, linkages, bearings for dirt, wear, and corrosion. Replace components as necessary.

2. Direct cleaning of these components may be necessary to remove accumulated contamination and/or a build up of grease or oil. After cleaning with clean solvent/soap solution, dry each area using low pressure compressed air.

3. Lubrication of control cables should not be attempted without specific approval procedures by the manufacturer. If no lubrication procedures exist, the control should be permanently tagged.

CAUTION
Pressure lubrication SHOULD NOT BE performed on any control without an approved procedure.

4. In the absence of specific lubrication information , it is acceptable to apply LPS 2, Permatex "Maintain" Lubricant, or equivalent to each pivot point, including throttle shaft bushings.

5. When components such as link rods, or levers are to be replaced or reassembled, initial lubrication may be accomplished by using Shell number 5 grease, or LUBRIPLATE number 630AA, or equivalent.

MAINTENANCE - GENERAL

Attachment of components that have relative motion should be accomplished by using bolts drilled for cotter pins, using castellated nuts, cotter pins, and large secondary washer retention devices.

WARNING
Connections requiring torque fasteners should not exhibit any relative movement or motion between components.

1. Use proper tools and holding devices when installing, adjusting or removing controls and fittings. Avoid using torque and groove pliers or locking grip pliers. Failure to use the proper tools may result in crushed or bent engine control components.

INSTALLATION VERIFICATION

After proper installation, lubrication, and rigging have been accomplished, the following should be verified:

1. Each control should be able to maintain any necessary position without constant attention by the pilot or without tendency to creep due to control loads or vibration.

2. Each control should permit full limit of travel and have the required safety or locking device in place. There should be no binding of levers, linkages, control rods, or cables. There should be freedom of movement unrestricted by contact with other parts or components that are located in close proximity.

3. Verify that separation between engine controls and exhaust system components is consistent with the manufacturer's guidelines, or are secured as far away from each other as possible. Ensure that heat shields are installed in accordance with the manufacturer's instructions.

4. Check fuel system flow (after mixture control, shutoff valve, or selector valve linkage installation) and adjust, as required, in accordance with the engine/airplane manufacturer's applicable maintenance manual or service bulletin instructions.

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CHAPTER 77

ENGINE INDICATING

CHAPTER 77

ENGINE INDICATING

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77-00-00 - GENERAL

Engine indicating instruments and their sending units, transducers, probes, etc., must be operating properly to prevent engine damage.

It is recommended that all engine indicating components be checked at each 100 hour or annual inspection to verify proper operation. Calibrated instruments may be "Tee'd" into the particular systems for a comparison check between them and the aircraft's instruments.

77-00-01 - RANGES

Power plant instruments operate electrically through variations in resistance caused by pressure or temperature changes, by variations in current output caused by varying engine RPM or alternator output, or by pressure from engine induction system.

1.Ammeter.

A. Range—+70 to -70 AMPS.

B. Tolerance—1.2 AMPS.

2. Fuel flow gauge (except digital)

A. Green arc—5.5 to 25 GPH.

3. Oil temperature gauge.

A. Green arc—100 to 240° F

B. Red line—240° F

C. Tolerance—3° F.

4. Oil pressure gauge.

A. Green arc—30 to 80 PSI (-GB & -LB engines)

Green arc—30 to 60 PSI (-MB & -SB engine)

B. Yellow arc—10 to 30 PSI.

(1) Idle range—10 to 60 PSI.

(2) Starting & warmup range—90 to 100 PSI.

C. Red line—10 PSI MIN.(idle only), 100 PSI MAX.

NOTE

The oil pressure relief valve seat may be honed to improve low idle oil pressure.

5. Tachometer.

A. Green arc —1800 to 2700 (-GB, -LB, -MB)
1800 to 2600 (-SB)

B. Red line —2700 (-GB, -LB, -MB)
2600 (-SB)

6. Cylinder head temperature gauge (CHT).

A. Green arc—250 to 460° F.

B. Red line—460° F.

7. Turbine inlet temperature (TIT).

A. Green arc—1300 - 1650° F.

B. Red line—1650° F.

8. Compressor discharge temperature (CDT) (25-0001 thru 25-0999)

A. Green arc—100° F - 280° F.

B. Red line—280° F.

9. Manifold pressure gauge.

A. Normal range—
10 to 40 Inches Hg. (25-0001 thru 25-0999)
10 to 36 Inches Hg. (25-1000 thru 25-2012)*
10 to 39 Inches Hg. (25-2000 thru 25-TBA) (-SB) *

B. Red line—
40 Inches Hg. (25-0001 thru 25-0999)
36 Inches Hg. (25-1000 thru 25-2012) *
39 Inches Hg. (25-2000 thru 25-TBA) (-SB) *

* S/N 25-2000 thru 25-2012 may be retrofitted to -SB configuration by compliance with Mooney retrofit kit, if desired by owner.

77-10-00 - POWER INDICATING

77-10-01 - TACHOMETER

(25-0001 thru 25-0999)

The electric tachometer counts ignition pulses from the magneto to indicate engine speed in revolutions per minute (RPM). The tachometer is connected to the "L" and "R" terminals on the Magneto/Starter switch and senses the magneto impulses through this wire connection. Two 15K ohm resistors are in series between the "L" and "R" terminals. The junction of these two resistors forms the tachometer signal wire connection point These two resistors, located immediately adjacent to the Magneto/Starter switch inside the insulating sleeve, protect the magnetos from grounding out if a short develops in the tachometer.

(25-1000 thru 25-TBA)

The tachometer indicating system is a fully solid state electronic system that senses engine RPM by magneto rotation speed. A "Hall-effect" sensor is installed on the magneto bleed source. This sensor is excited by 12 volts DC provided by the tachometer indicator. The "Hall-effect" sensor incorporates a switching transistor that is actuated by north to south pole switching of the main rotor magnet within the magneto. The switch HIGH (+5 VDC) to switch LOW (GRD) creates a square wave frequency output from 0 to 75 HERTZ which is monitored by the electronic tachometer. Because the sensor does not rely on magneto output pulses for generating signals the magneto may be disabled and still maintain signal output from the hall effect sensor.

The electronic tachometer is a micro-processor controlled stepper motor. The micro-processor receives the square wave frequency signal from the Hall-effect sensor and computes the relative position of the pointer. The micro-processor then generates pulsed signals to drive the stepper to its pre-computed position. A DC activated solenoid engages the gear train drive to locate the pointer in its respective position. Upon loss of the +28 VDC input, the solenoid then deactivates and disengages the drive train, thus returning the pointer to below 500 RPM.

Power for the tachometer indicating system is provided to Pin A of the tachometer. Power requirement is 28 VDC with a typical current drain requirement of 250 milliamps.

TACHOMETER TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
No permanent or intermittent indicator reading.	C/B out (IGN/CIG LTR)	Reset C/B.
	Broken wire	Check & repair wiring.
	Faulty instrument.	Replace instrument.
Pointer Oscillates excessively.	Mag. timing too wide between mags.	Retime magnetos.
	Isolation resistors at mag. switch increased in resistance value.	Replace resistors.

77-10-02 - MANIFOLD PRESSURE

Manifold pressure is an indication of engine power affected primarily by throttle setting. The instrument is calibrated in inches of mercury (Hg) and indicates the pressure in the induction air manifold. The RED line of 40 inches Hg. (25-0001 thru 25-0999), 36 inches Hg (25-1000 thru 25-2012) (-MB)* or 39 inches Hg. (25-2013 thru 25-TBA) (-SB)* can be exceeded easily due to turbocharger pressure also being applied to the induction system. Manifold pressure varies somewhat with pitch attitude in flight and therefore small oscillations may occur in flight, particularly in turbulent air.

CAUTION

Do not over boost the engine during any normal operation. (Do not exceed 40 inches manifold pressure for 25-0001 thru 25-0999) (Do not exceed 36 inches manifold pressure for 25-1000 thru 25-2012 *) (Do not exceed 39 inches manifold pressure for 25-2013 thru 25-TBA *)

The waste gate bypass on the turbocharger (25-0001 thru 25-0999) is a ground adjustable system, (see Section 71-00-50) that must be adjusted properly.

* 25-2000 thru 25-2012 may be retrofitted to -SB configuration if desired by owner.

MANIFOLD PRESSURE TROUBLE SHOOTING.

TROUBLE	PROBABLE CAUSE	REMEDY
Excessive error at existing barometric pressure.	Pointer shifted.	Replace instrument.
Excessive error when engine is running.	Line leaking.	Tighten line connection.
Sluggish or jerky pointer movement.	Improper damping adjustment.	Adjust damping screw.
Broken or loose cover glass.	Vibration or excessive pressure.	Replace glass and reseat case.
Dull or discolored luminous markings.	Age.	Replace instrument.
Incorrect reading.	Moisture or oil in line.	Disconnect lines and purge with air.

77-10-03 - FUEL FLOW INDICATING SYSTEM

Refer to Section 73-30-00 for this data.

77-20-00 - TEMPERATURE INDICATING

77-20-01 - TIT/CDT INSTRUMENT

The turbine inlet temperature (TIT) instrument depicts the temperature of the exhaust gases as they enter the turbocharger. This temperature is controlled by power setting, RPM and the fuel air ratio entering the combustion chamber of the engine cylinders. The TIT should never exceed 1650° F. continuous operation.

The compressor discharge temperature (CDT) instrument depicts the temperature of air entering the air induction system to mix with the fuel for combustion. This temperature does not normally become critical except at high altitudes and high power settings (25-0001 thru 25-0999). Aircraft using a combination TIT/CDT gauge utilize a non-grounding TIT probe. An ohmmeter connected between either lead and the probe case should indicate high resistance. If zero or low resistance is indicated the probe has shorted and should be replaced.

NOTE

S/N 25-1000 thru 25-TBA do not use a CDT gauge.

77-20-02 - CYLINDER HEAD TEMPERATURE

The cylinder head temperature (CHT) instrument provides the operator with an indication of how hot or cool the cylinders are operating during flight. A resistance type temperature probe is installed in the number 5 cylinder (25-0001 thru 25-0999), (No. 3 cylinder for 25-1000 thru 25-TBA). An optional system provides a probe in each cylinder to provide monitoring or each cylinders temperature.

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CHAPTER 78

EXHAUST

CHAPTER 78

EXHAUST

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78-00-00 - GENERAL

The exhaust system's headers, exhaust pipes and turbocharger interface components are manufactured by Teledyne Continental Motors (TCM) as part of the certified TSIO-360 series engine. The turbocharger is manufactured by either Rotomaster or Garrett-Airesearch Corporation. (See SECTION 81)

Inspections for cracks, burns, damage, etc. are required during each maintenance activity and recommended before each flight.

78-10-00 - EXHAUST SYSTEM INSTALLATION

1. EXHAUST RISERS/PIPES TO ENGINE.

Exhaust components are certified with the engine by TCM. It is recommended that reference be made to TCM Overhaul Manual, No. X30596A, and TCM Illustrated Parts Catalog, No. X30597A for assembly and dissasembly of the exhaust system components.

78-30-00 - EXHAUST SYSTEM SERVICING

1. CLEANING

To properly inspect exhaust system, components must be clean and free of oil, grease, etc. Clean as follows:

A. Spray engine exhaust system components with a suitable solvent (Stoddard Solvent), allow to drain and wipe dry with clean cloth.

WARNING
Never use highly flammable solvents on engine exhaust systems.

WARNING
Never use a wire brush or abrasives to clean exhaust systems or mark on system with lead pencils.

2. VISUAL INSPECTION OF COMPLETE SYSTEM

A thorough inspection of engine exhaust system will detect any breaks or cracks causing leaks which might result in loss of efficiency, loss of engine power or engine compartment fire. Inspect per following procedures:

NOTE
This inspection should be conducted when engine is cool.

Remove all shrouds/shields to permit full visual inspection.

A. LOOK FOR LEAKS - Examine surfaces adjacent to exhaust system components for signs of exhaust soot. Look for gray, red or black gas stains at welds, clamps, flanges, etc. Inspect exhaust system for chaffing by cowling, engine mount, cables or any airframe components.

Inspect exhaust stacks for burned areas, cracks and looseness.

B. LOOSE CONNECTIONS - Inspect exhaust clamps for cracks, looseness and proper security.

CAUTION
DO NOT tighten both clamps of exhaust heat shield around exhaust pipes. Tighten ONE SIDE only securely. Leave other clamp slightly loose to allow exhaust pipe to float with temperature changes.

NOTE
During inspection, particular attention should be given to condition and security of flanges, spot welds, slip joints, and welded areas.

C. INTERNAL EROSION - Examine bends and low spots for thinning or pitting.

D. STANDOFFS (PINS) AND HEAT TRANSFER FINS - Look for missing or damaged heat transfer pins or fins. Look for holes at these locations.

E. METAL FATIGUE - Inspect all surfaces for bulging and distortion , and for groups of small cracks.

CAUTION
DO NOT mark any surface with lead pencils or any carbon-containing markers.

F. HIDDEN DAMAGE - Carefully inspect all internal surfaces that lie hidden under external gussets, stiffeners, etc. (A borescope is recommended)

G. INSTALLATION TIPS:

Install only correct parts.

DO NOT FORCE FIT any component.

Properly align connecting components.

Do not reuse gaskets.

Insure that attach bolts are properly torqued. Exhaust flange stud nuts are to be torqued in accordance with TCM Overhaul Manual, Torque Chart, SECTION 72, Figure 72-50-01A.

78-40-00 - PERIODIC REPLACEMENT COMPONENTS

It is recommended that all exhaust system risers, pipes, clamps and miscellaneous mounting hardware be replaced at engine overhaul time (2000 Hours). However, thorough inspection of all components should be made any time exhaust system is removed from engine for component replacement. The inspection should be made in the interest of preventive maintenance.

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CHAPTER 79

OIL

CHAPTER 79

OIL

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79-00-00 - GENERAL

The oil system is a wet sump, pressure type system. The engine sump has an 8 quart (U.S.) capacity. Servicing of the oil quantity is provided through an access door located on top of the engine cowling.

The aircraft is delivered with the proper non-detergent, mineral oil (MIL-C-6529 Type II). This oil should be changed at 25 hours or when oil consumption has stabilized. The replacement oil should conform to TCM Specification MHS-24( ). The routine oil change interval is 100 hours, however if operating in a dusty environment the interval should be more often.

NOTE

A new, remanufactured or newly overhauled engine should have the oil and filter changed at 50 hours of operation after changing to detergent oil, then begin the 100 hour oil change interval.

NOTE

Refer to Section 5-20-07 or to TCM TSI0-360-GB Operator's Manual Form No. X30536, Section VIII, Form No. X30571 for the -LB engine or Form No. X30584, Section VIII, for the -MB & -SB engine for approved oil products.

79-00-01 - OIL FILTER REMOVAL

The engine oil filter, TCM P/N 641583, should be replaced each 50 hours and at every oil change (refer to Figure 79-2 for location).

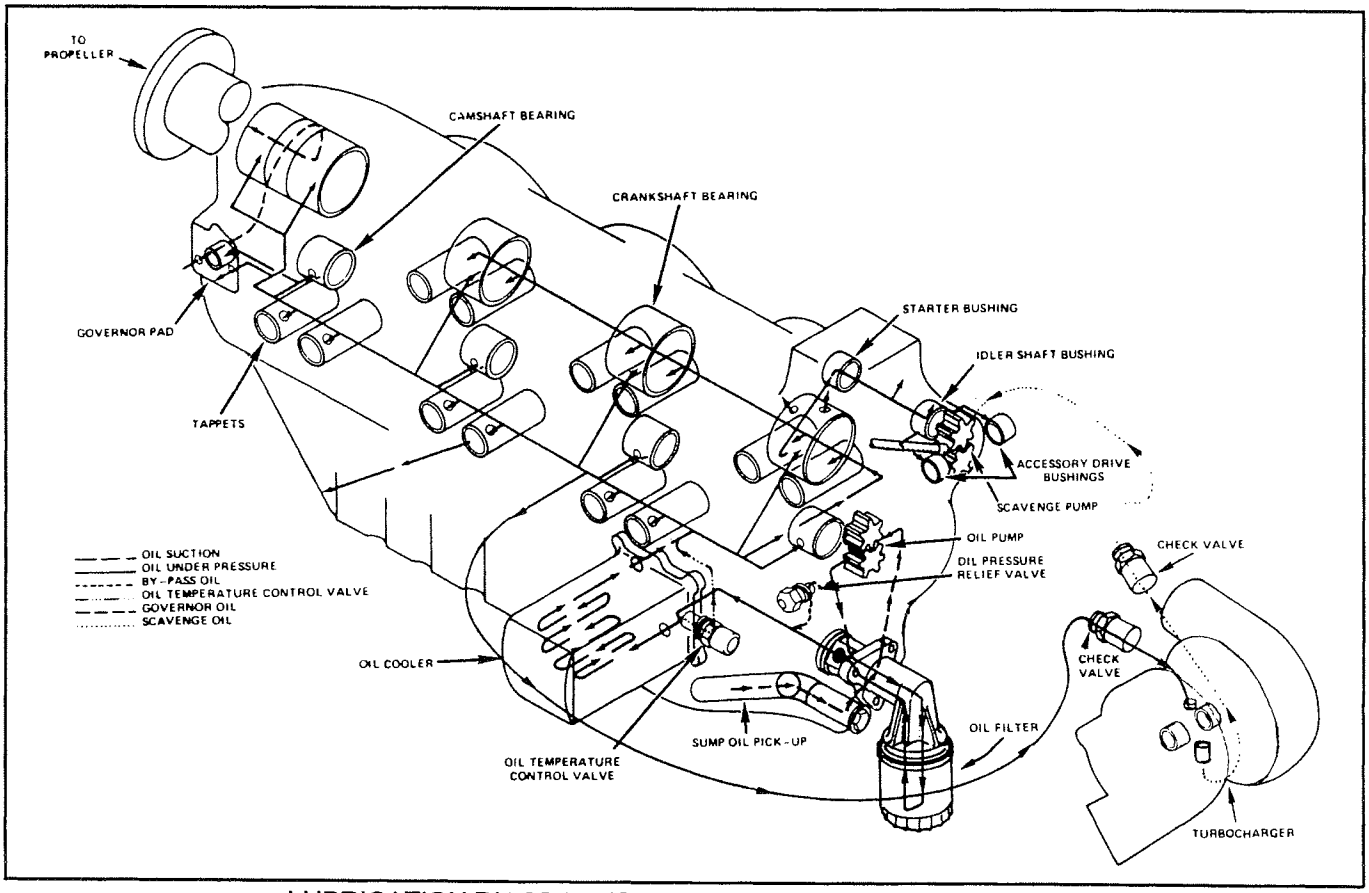
1. Remove top and bottom cowling (see Section 71-10-00).
2. Cut and remove safety wire on filter.
3. Loosen the spin off oil filter and remove.

79-00-02 - OIL FILTER INSTALLATION

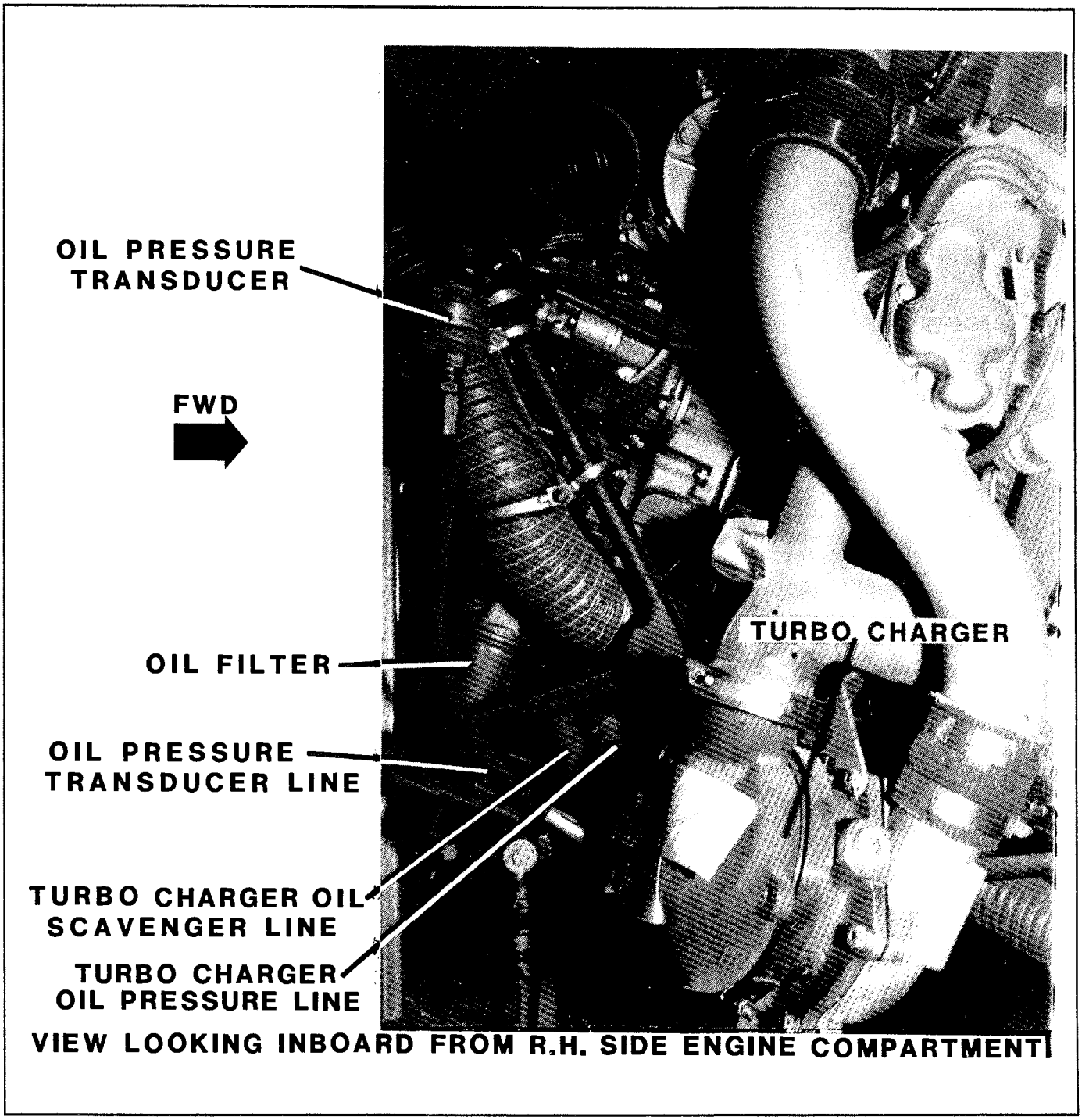
1. Position new filter on adapter.
2. Tighten per instructions on filter.
3. Safety wire filter.
4. Perform leak check prior to flight.
5. Reinstall lower and upper cowling (see Section 71-11-00).
6. Connect and secure all electrical and mechanical connections.

79-20-00 - DISTRIBUTION

The oil system on the TSI0-360-GB,-LB, -MB & -SB engine is internal within the engine except for turbocharger lubrication and oil pressure transducer plumbing. This portion of the system contains pressure hoses, fittings and check valves to route oil through the turbocharger back to the engine case for cooling; (refer to Figure 79-2, 79-3 and 79-4 for 25-0001 thru 25-0999 and Figure 79-5, 79-6 for 25-1000 thru 25-TBA).



LUBRICATION DIAGRAM (OIL SCHEMATIC) FIGURE 79 - 1



TURBOCHARGER OIL LUBRICATION SYSTEM - FIGURE 79 - 2

(25-0001 thru 25-0999)

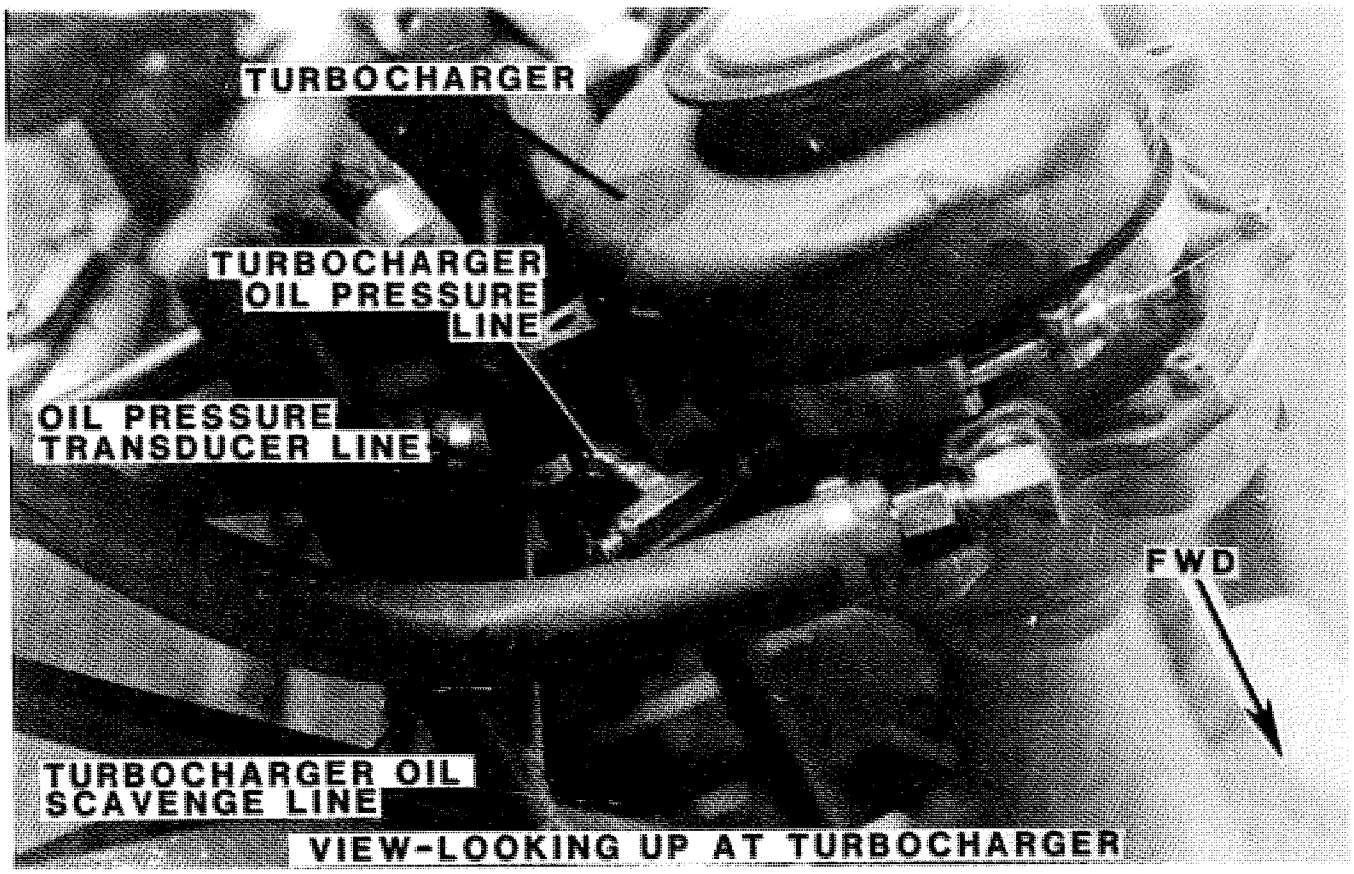
79-30-00 - INDICATING

79-30-01 - OIL PRESSURE

Oil pressure indicating is provided through a pressure transducer plumbed into the engine oil system, see (Figure 79-2). Pressure variations change the resistance within the transducer and this signal drives the oil pressure gauge located within the cluster gauge.

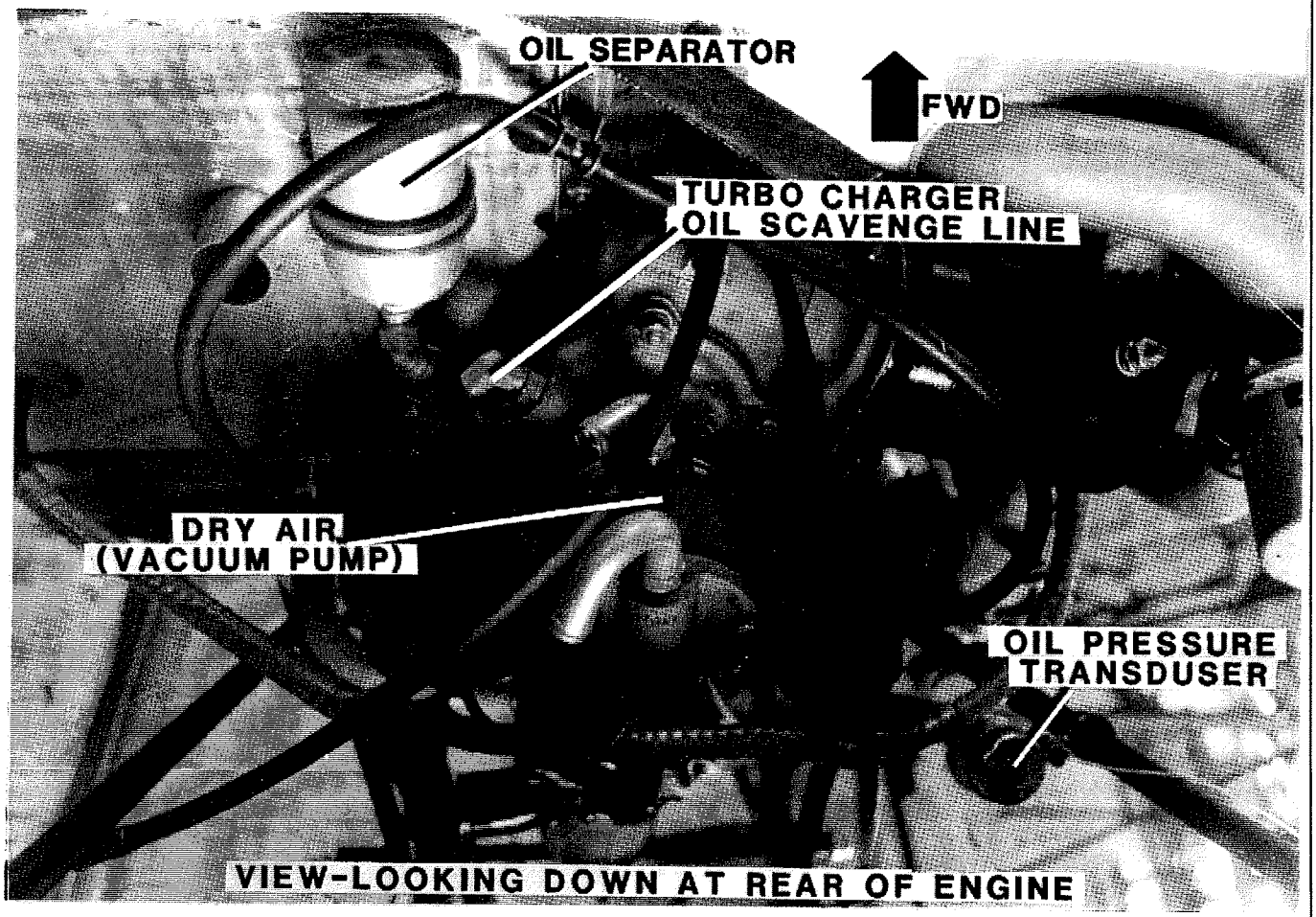
79-30-02 - OIL TEMPERATURE

The oil temperature gauge is an electric unit receiving its signal from a temperature bulb in the engine case, located between the oil cooler and the case. The probe resistance changes as the oil temperature changes and this varies the readout on the instrument.



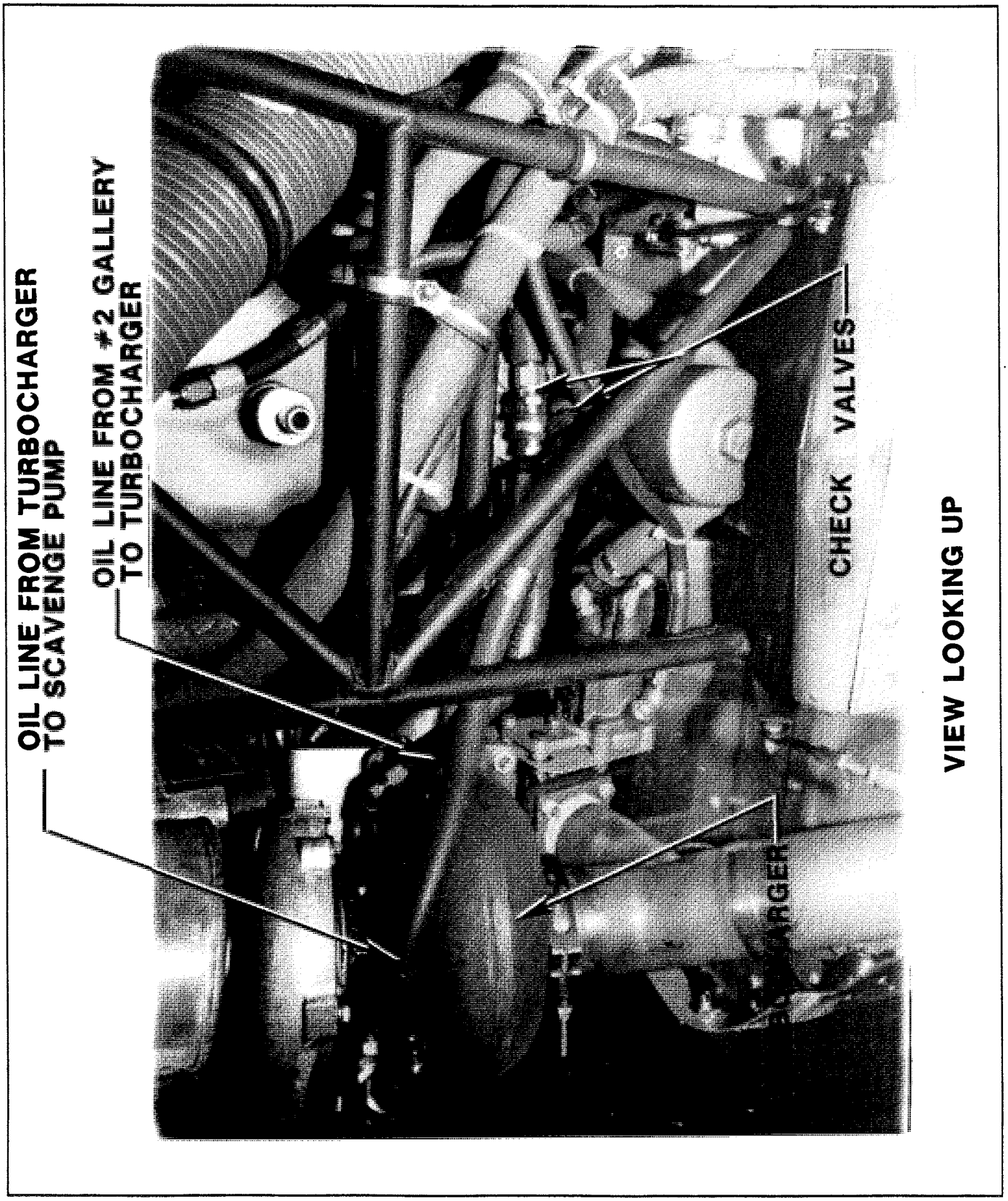
TURBOCHARGER OIL LUBRICATION SYSTEM - FIGURE 79 - 3

(25-0001 thru 25-0999)



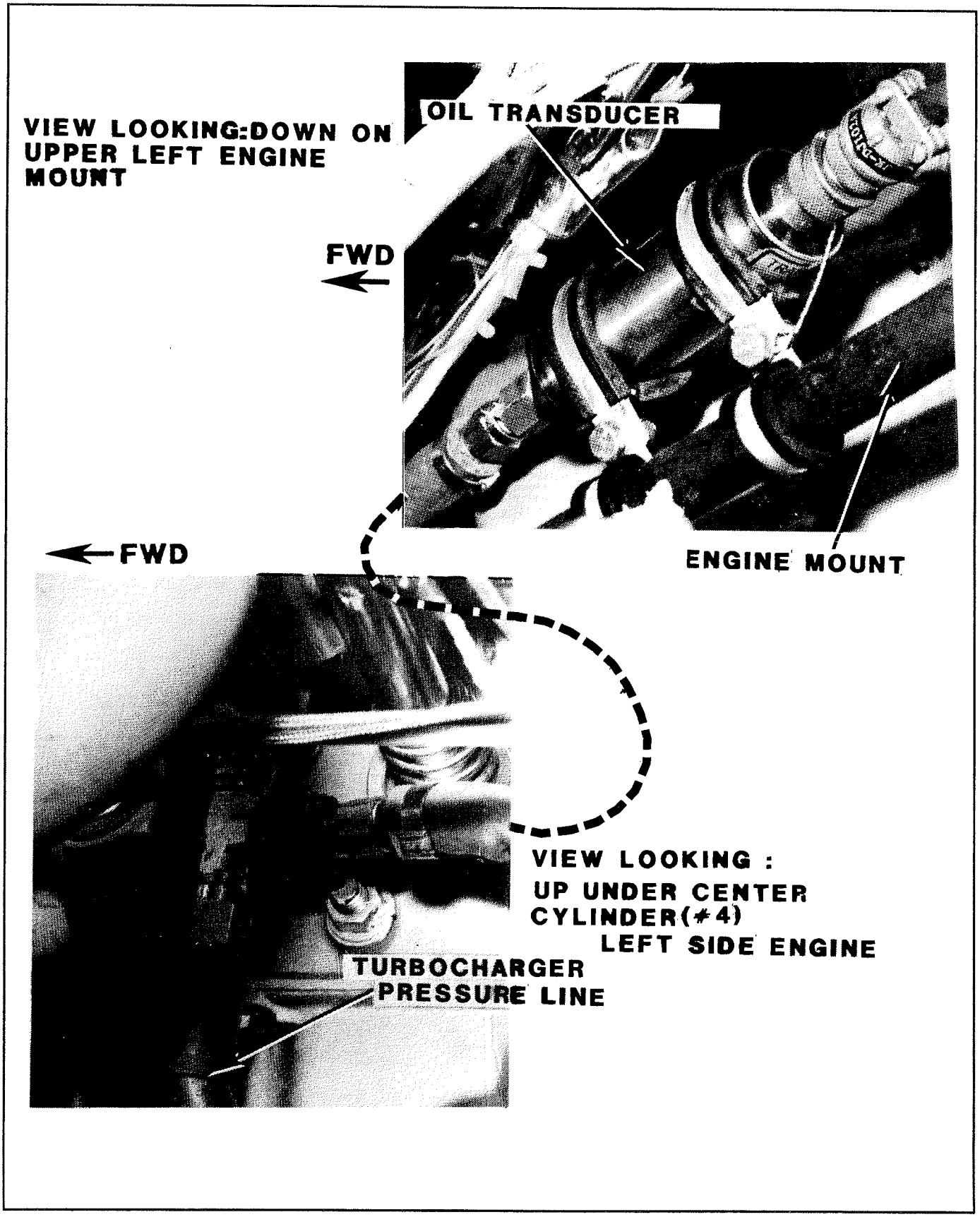
TURBOCHARGER OIL RETURN SYSTEM - FIGURE 79 - 4

(25-0001 thru 25-0999)



TURBOCHARGER OIL LUBRICATION SYSTEM - FIGURE 79 - 5

(25-1000 THRU 25-TBA)



TURBOCHARGER OIL LUBRICATION SYSTEM - FIGURE 79 - 6
(25-1000 thru 25-TBA)

79-40-00 - DRUCK TRANSDUCER TEST PROCEDURE

CAUTION
This unit is for troubleshooting only. DO NOT ATTEMPT TO CALIBRATE WITH THIS UNIT.

The Druck Transducer Test Box, GSE030036, can be used to simulate Fuel and Oil pressure in Mooney model M20K that have the Druck pressure transducer installed.
To use the unit for troubleshooting, the box is connected to the aircraft harness in the engine compartment, by disconnecting the appropriate Druck transducer electrical connector and connecting the test box in its place.

Turn on Aircraft Master Switch (insure engine gauge circuit breakers are in) and adjust box to approximate pressure desired. The engine gauge should read this approximate pressure.

If pressure reading is correct:

1. Verify Oil/Fuel pressure to Druck transducer with mechanical pressure gauge.

A. If correct—probable failure is Druck Transducer

B. If incorrect—troubleshoot oil/fuel system.

If pressure reads incorrectly, zero or pegged condition:

1. **Rochester** Gauge — 25-0001 thru 25-1224 (with Druck transducer installed).

A. Move transducer text box to connector on the input of the appropriate pressure amplifier (located behind instrument panel, right side). Check pressure reading on Rochester gauge to see if it approximately agrees with the text box. If it does, repair wire harness from pressure gauge amplifier, to the engine compartment. If pressure reading is incorrect go to step (1.,B.).

B. At the appropriate Rochester gauge WIPER lug read the following voltages to ground. (digital multimeter or 20K ohms/volt multimeter).

Oil————80 PSI——6.1 to 6.6 volts

2. **SIGMA TEK** Gauge — 25-1225 thru 25-TBA (with Druck transducer installed)

A. Check wiring for continuity between engine compartment connector and Sigma Tek cluster. If wiring is correct go to (2.,B.).

B. Probable failure is Sigma Tek gauge module on cluster, replace module.

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CHAPTER 80

STARTING

CHAPTER 80

STARTING

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80-00-00 - GENERAL

The airplane is equipped with a 12 volt starter (25-0001 thru 25-0999); 24 volt starter (25-1000 thru 25-TBA) supplied with the engine package. The starter is located on the accessory case at the rear of the engine. A 90 degree worm gear adapter provides the shaft rotation and alignment to engage the starter gear train.

When the ignition switch is placed in the "start" position, current is supplied through the main bus to energize the starter solenoid which in turn connects the battery to the starter.

80-00-01 - STARTER TROUBLESHOOTING

1. Refer to Section 24-39-04.

80-00-02 - STARTER MAINTENANCE

1. Inspect and service starter per TCM Service Instructions or Overhaul Manual.

2. Lubrication - No lubrication is required on the starter motor except at overhaul.

CAUTION
Do not clean the starter in any degreasing tank or grease dissolving solvents. Avoid excessive lubrication. Use only kerosene or Varsol.

80-00-03 - STARTER REMOVAL

1. Remove upper cowling (and lower if desired),(See SECTION 71-11-00).

2. Disconnect electrical wiring from starter terminals.

3. Remove nut and washer from studs on adapter mounting pad.

4. Remove starter and O'ring from adapter.

80-00-04 - STARTER INSTALLATION

1. Before installation, clean any rust corrosion or dirt from the mounting surface of the starter motor.

2. Check all ground straps connections for tightness.

3. Install new O'ring on starter flange.

4. Position starter on mounting pad.

5. Install attaching nuts and washers.

6. Torque nuts 220.0 to 260.0 inch lbs.

7. Connect electrical wiring to starter terminals.

8. Check starter mounting flange for oil leakage before cowling is installed.

9. Install cowling.

80-00-05 - STARTER BRUSHES

The starter brushes should slide freely in the holder and make full contact on the commutator. The brushes should be replaced when they have worn to 1/4 inch in length. Brush tension should be 32 to 40 ounces as measured with a spring scale hooked under the brush spring and pulled in a straight line opposite the force exerted by the spring. Read the tension just as the spring leaves the brush.

80-10-00 - CRANKING

The starter solenoid is located on the cabin side of the firewall. The solenoid is energized by placing the ignition/magneto switch in the start position. Battery current is then directed to the starter. Aircraft serial number 25-0613 thru 25-TBA are equipped with a "START POWER ON" annunciator light. This light illuminates when the starter switch is in start position or when the starter switch or starter solenoid has malfunctioned and the starter is engaged while the engine is running. This malfunction should be corrected before the engine is started again.

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CHAPTER 81

TURBINES

CHAPTER 81

TURBINES

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81-00-00 - GENERAL

TURBOCHARGER OPERATION

The turbocharger increases the power output and efficiency of the engine by supplying compressed air to the intake manifold. The engine exhaust is routed to turbine wheel of turbocharger assembly. The amount of exhaust gas passing over the turbine wheel is controlled by a waste gate assembly. Exhaust gas passing over the turbine wheel causes the compressor, mounted on the same shaft, to rotate. Ambient ram air, supplied through an air intake on right side of cowling, is filtered and routed to the compressor where it is compressed and delivered to engine. As engine power is increased, the flow of exhaust over turbine wheel also increases, resulting in a proportionate increase in the speed of the rotating assemblies and turbocharger output.

81-10-10 - TURBOCHARGER CONTROL SYSTEM — (ROTOMASTER)

(S/N 25-0001 thru 25-0999)

The turbocharger output is controlled by the throttle control in the cockpit indirectly during flight operations. The fixed waste gate assembly is a ground adjustable unit only (Ref. **Fig. 81-1**).

CAUTION
It is mandatory that the waste gate be properly adjusted prior to aircraft operation. See Section 71-00-50 for -GB or -LB Engine Setup Procedures.

TURBOCHARGER OVERBOOST PROTECTION (S/N 25-0001 thru 25-0999)

The -GB & -LB engine incorporate overboost protection through a pressure relief valve located between the compressor and throttle body. The relief valve will open to prevent excessive manifold pressure if the throttle is inadvertently opened beyond limits.

81-10-11 - Test Procedures

(See Section 71-00-51, 3, I, (3).

The overboost valve should open and allow the engine manifold pressure to stabilize between 42.0" and 44.0" Hg. if it is operating properly. If manifold pressure exceeds 44.0" Hg. during this test, the overboost valve should be replaced.

CAUTION
Do not exceed 40.0" Hg. for more than ten (10) seconds.

NOTE
Inspect turbocharger per TCM Service Bulletin No. M83-3 or later information (Ref. AD 82-07-03).

81-10-20 - TURBOCHARGER CONTROL SYSTEM — (AIRESEARCH)

(25-1000 thru 25-TBA)

The turbocharger output is controlled through coordinated action of the variable wastegate valve and absolute pressure controller system when set up properly. (See **Figure 81-2**).

CAUTION
It is mandatory that the turbocharger system be properly adjusted prior to operation. See Section 71-00-50 for -MB & -SB engine set up procedures.

TURBOCHARGER OVERBOOST PROTECTION (25-1000 thru 25-TBA)

The -MB & -SB engines incorporate overboost protection through a pressure relief valve located between the compressor and the throttle body. The relief valve will open to prevent excessive manifold pressure if a malfunction in the turbocharger regulation system occurs.

81-10-21 - Adjustment & Test Procedures

See Section 71-00-50.

S/N 25-1000 through 25-2012*

The overboost valve should open and allow the engine manifold pressure to stabilize between 37.0 & 38.0 inches Hg. if operating properly. If manifold pressure exceeds 38.0 inches Hg. during this check, the overboost valve should be replaced.

CAUTION
DO NOT exceed 38.0 Inches Hg. manifold pressure for more than ten (10) seconds.

S/N 25-2013 through 25-TBA *

The overboost valve should open and allow the engine manifold pressure to stabilize between 39.0 & 40.0 inches Hg. if operating properly. If manifold pressure exceeds 40.0 inches Hg. during this check, the overboost valve should be replaced.

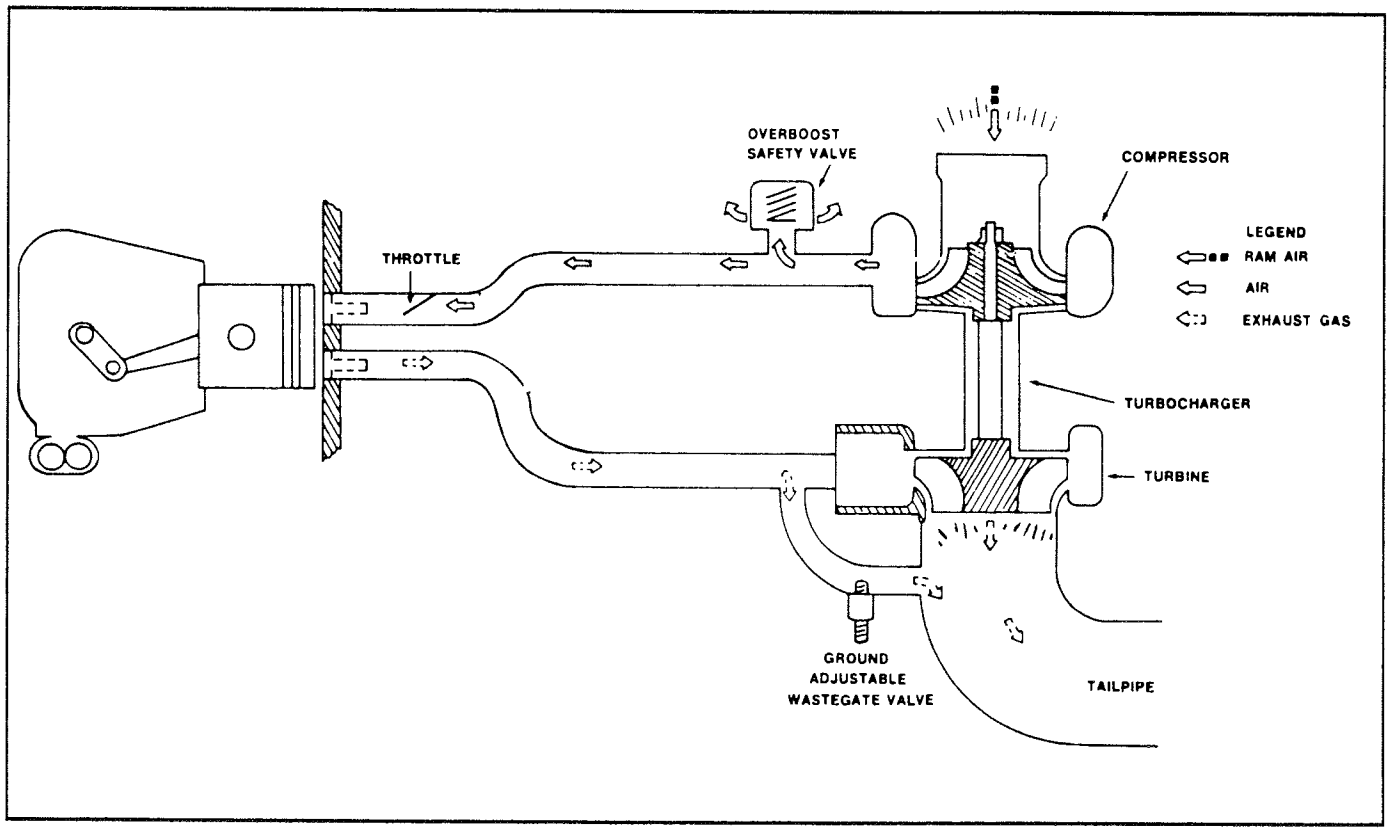
Refer to Airesearch and TCM Service and Maintenance Manuals for detailed maintenance data.

* S/N 25-2000 thru 25-2012 may be retrofitted to-SB engine configuration, if desired by owner, by complying with Mooney Aircraft Corporation retrofit drawing.

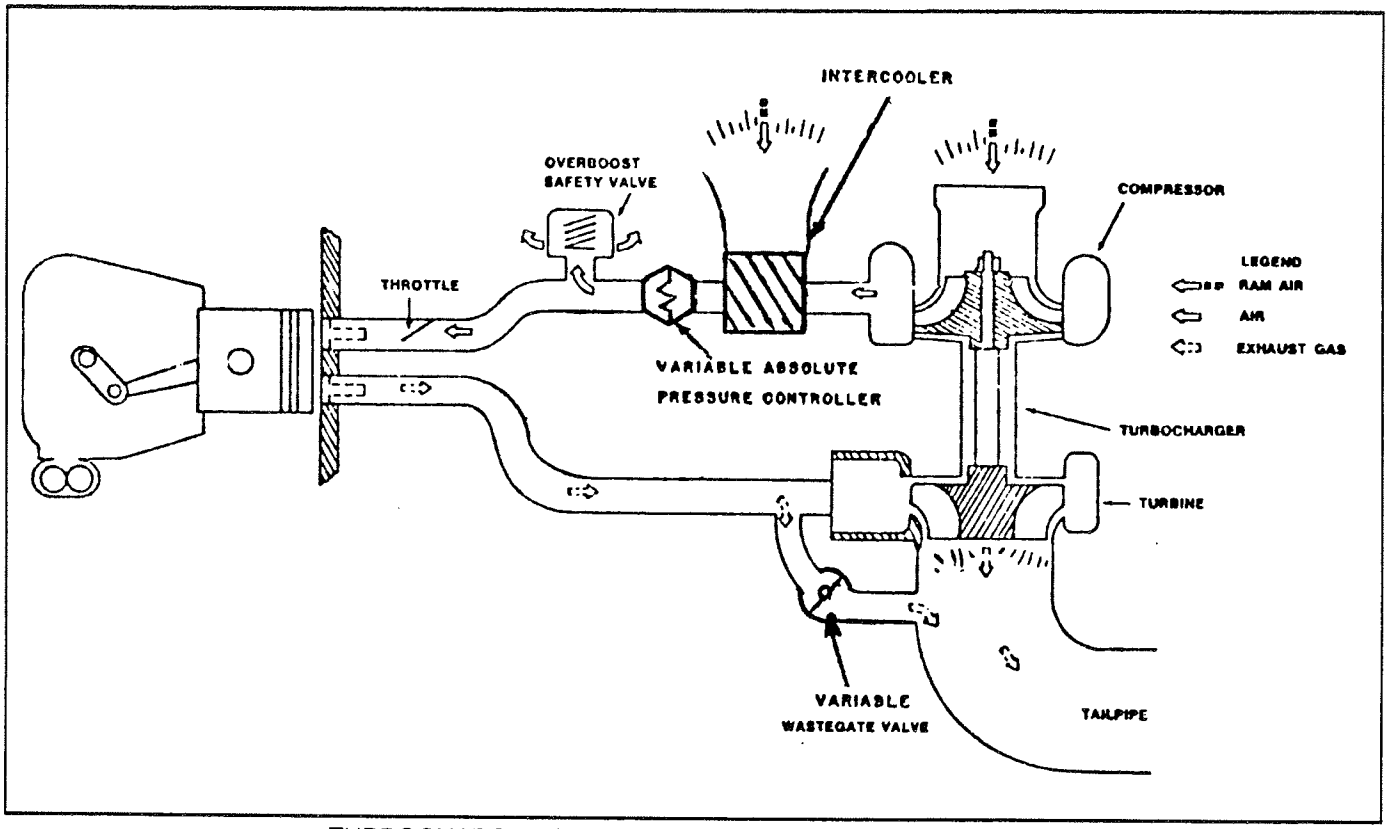
81-10-30 - ALTERNATE AIR SYSTEM - TURBOCHARGER OPERATION

The turbocharger system will continue to operate when the primary air source is obstructed. An engine alternate air system is provided (automatic system on S/N 25-0781 thru 25-TBA) to allow air from inside the cowling to pass through the compressor and into the engine. This air is warmer than primary air so less power will be available at normal throttle settings.

NOTE
Inspection of the induction system and turbocharger assembly should be conducted after any obstruction of the primary air source prior to the next engine operation.



TURBOCHARGER SYSTEM (25-0001/25-0999) - FIGURE 81-1



TURBOCHARGER SYSTEM (25-1000/25-TBA) - FIGURE 81-2

81-20-00 - TURBOCHARGER TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	REMEDY
Excessive noise or vibration.	Improper bearing lubrication.	Supply required oil pressure. Clean or replace oil line. If trouble continues, remove turbocharger and return to approved overhaul station for overhaul or repair.
	Leak in engine intake or exhaust manifold.	Tighten loose connections, or replace manifold gaskets as necessary.
Engine will not deliver rated power.	Clogged manifold system.	Clean all ducting.
	Foreign material lodged in compressor impeller or turbine.	Remove turbocharger and return to approved overhaul station for overhaul or repair.
	Excessive dirt buildup in compressor.	Service engine induction air filter and check for leakage. Remove turbocharger and return to approved overhaul station for overhaul or repair.
	Leak in engine intake of exhaust manifold.	Tighten loose connections, or replace manifold gaskets as necessary.
	Rotating assembly bearing seizure.	Remove turbocharger and return to approved overhaul station for overhaul or repair.
	Compressor blades chipped, bent or missing.	Remove turbocharger and return to approved overhaul station for overhaul or repair.
	Impeller binding or frozen.	Remove turbocharger and return to approved overhaul station for overhaul or repair.
Critical altitude lower than specified.	Waste gate not properly adjusted. (25-0001—25-0999)	Refer to Engine Set-Up Procedures, Section 71-00-50.
	Induction or exhaust system leaks.	Perform leak checks.
	Compressor blades chipped, bent or missing.	Remove turbocharger and return to approved overhaul station for overhaul or repair.
Engine surges or smokes.	Oil leaking into turbine wheel chamber.	Remove turbocharger and return to approved overhaul station for overhaul or repair.
	Clogged breather.	Check breather for restriction to air flow.

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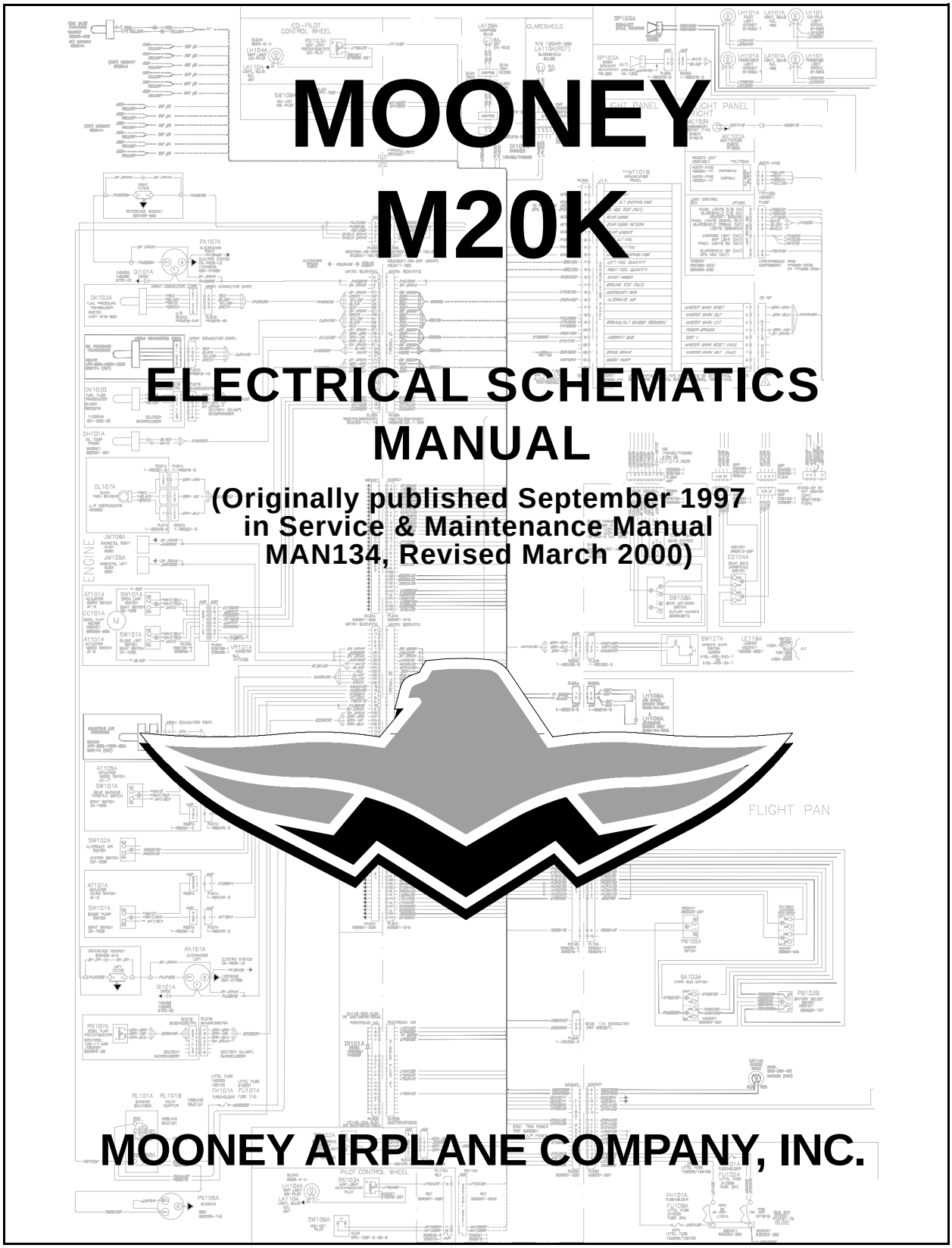

MOONEY M20K

ELECTRICAL SCHEMATICS MANUAL

(Originally published September 1997 in Service & Maintenance Manual MAN134, Revised March 2000)

MOONEY AIRPLANE COMPANY, INC.

ISSUED - JULY 2005 **P/N: MAN501**

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CHAPTER 91

ELECTRICAL WIRING PARTS LIST & DIAGRAMS (SCHEMATICS)

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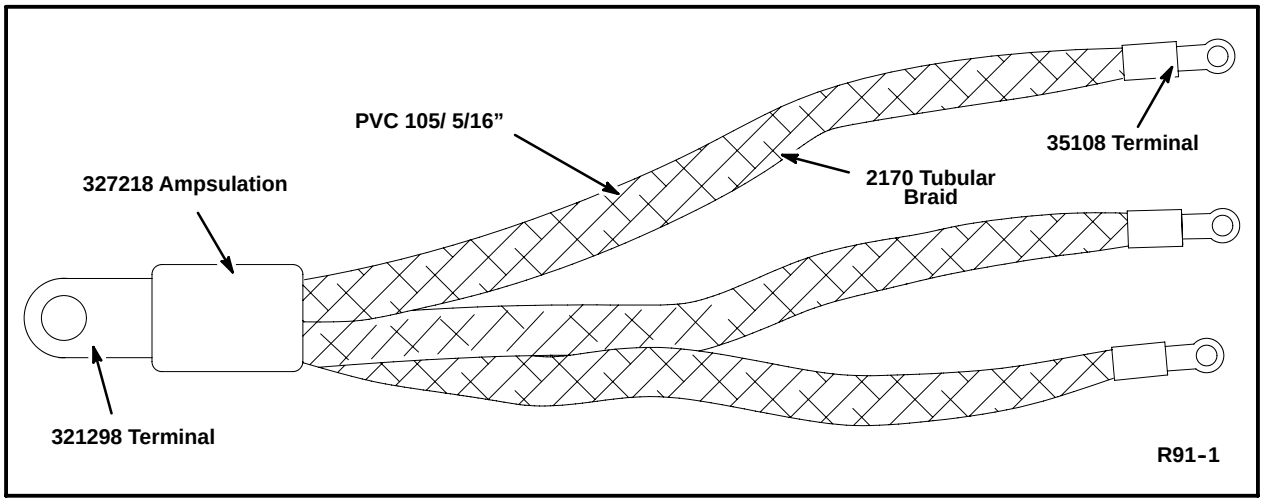
91-00-00 - GENERAL

The electrical system hardware lists and related schematics are sequenced in this section by serial number effectivity. The chapter is divided into the following sections:

- -Electrical Systems Schematic Notes
- -Wiring Identification System
- -Electrical System Hardware Charts (By Effectivity)
- -Electrical Schematics (By Effectivity)

91-00-01 - ELECTRICAL SYSTEMS SCHEMATICS NOTES

1. All electrical wiring, assemblies, and installtions must be in accord with FAR 43 and AC 43.13-1(*).
2. All splices must be “AMP” disconnect or equivalent.
3. All circuit breakers are trip-free.
4. All terminals are Spec. MS25036 (or equivalent or they must be soldered.)
5. All terminals must be preinsulated or must be insulated with “Ampsulation” (or equivalent).
6. Wires without dash numbers are furnished by the manufacturer and are included with the equipment.
7. The symbol “- -” indicates a knife disconnect.
8. Optional equipment may be installed as required.
9. Wires denoted by === === === symbols to be twisted counter clockwise with a minimum of three (3) wraps per foot.
10. “F” denotes ground through frame (no wires).
11. All knife disconnect splices to be insulated with PVC105 and securely string tied with airtex no. 417 cord.
12. All wire sizes are minimum sizes acceptable.
13. Use 913127 bus bars as necessary for various configuration changes and manufacture interconnecting bus using no. 2170 tubular braid covered with PVC105/5/16” (both Alpha Wire Co.) and terminated with AMP terminals of appropriate sizes.



EXAMPLE - 91-1

91-00-02 - WIRING IDENTIFICATION SYSTEM

Under the Mooney wiring system, a typical Wire Identification Number is **21PA03A18**. This 9-character number is composed of five functional groups, each of which communicates certain specific information. These functional groups are as follows:

21	- first two numerals (25-0001 thru 25-0999)	- Aircraft Type (12V)
	or	
JK	- first two numerals (25-1000 thru 25-1999)	- Aircraft Type (24V)
PA	- first two letters	- Circuit Function
03	- second set of numerals	- Wire Sequence
A	- single letter in the series	- Configuration
18	- last two numerals in the series	- Wire Size

CIRCUIT FUNCTION LEGEND

The Electrical Item numbers listed below refer to item number identification (the first two letter portion of the identification numbers) as listed on **drawing schematic 800330, 800350 and 800263 only**.

CB	Defroster Blower
CC	Cowl Flap
CD	PC Dump
CF	Wing Flaps - Electric
CT	Trim
CV	Stand-by Vacuum
DA	Instruments - Ammeter
DB	Instruments - Turn Coordinator
DC	Instruments - Cylinder Head Temperature
DD	Instruments - Outside Air Temperature
DE	Instruments - Carburetor Air Temperature
DF	Instruments - Fuel Quantity
DG	Instruments - Cluster Gauge
DH	Instruments - Oil Temperature
DJ	Instruments - Oil Pressure
DK	Instruments - Fuel Pressure
DL	Instruments - Tachometer
DM	Instruments - Hour Meter
DN	Instruments - Pressurization
DP	Instruments - Pitot Heat
DR	Instruments - Turbine Inlet Temperature
DS	Instruments - Compressor Discharge Temperature
DT	Instruments - Exhaust Gas Temperature
DU	Instruments - Manifold Pressure
DV	Fuel Flow
EG	Electric Gear - Gear Controls
EL	Lighting - Electroluminescence
ELT	Emergency Locator Transmitter
FON	Phones
JM	Ignition - Magneto
JV	Ignition - Vibrator
LB	Lighting - Rotating Beacon (Anticollision Light)
LC	Lighting - Cabin Lights
LL	Lighting - Landing Lights
LN	Lighting - Navigation Lights
LP	Lighting - Instrument & Placard Lights
LS	Lighting - Instrument & Strobe/Navigation Lights
LT	Lighting - Taxi Lights

CIRCUIT FUNCTION LEGEND (con't.)

MA	Miscellaneous – Auxiliary Power Plug
MB	Miscellaneous – Radio Circuits
MC	Miscellaneous – Cigar Lighter
MD	Miscellaneous – Clock Light
ME	Miscellaneous – Electric Clock
MIC	Miscellaneous – Microphone
MM	Miscellaneous – Marker Beacon
MP	Miscellaneous – Propeller De–Ice
MS	Miscellaneous – Radio Speaker
NF	Fuel – Fuel Pump
NP	Fuel – Primer
PA	Power – Alternator (output & Control)
PB	Power – Battery (Output & Control)
PG	Power – Generator (Output & Control)
PS	Power – Starter (input & Control)
SPK	Speaker
VB	Vent Air Blower
WA	Warning System – Alternator – Voltage Warning
WB	Warning – Engine Boost
WE	Warning System – Gear Position Warning (Electric)
WF	Warning System – Fuel Pressure
WL	Warning System – Landing Light
WM	Warning System – Gear Position Warning (Manual)
WN	Warning System – Pressurization
WS	Warning System – Stall Warning
WT	Warning System – Press–to–Test
WV	Warning System – Vacuum Warning
WW	Warning System – Alternate Air
WD	Warning System – Starter Power

CIRCUIT FUNCTION LEGEND

The Electrical Item numbers listed below refer to item number identification as listed on **drawing schematic 800383.**

AC	AIR CONDITIONER
AH	ARTIFICIAL HORIZON
AT	ACTUATOR, SWITCH
AV	AVIONICS
BR	CIRCUIT BREAKERS
BS	RELAY BASE
BU	BUS BARS
CA	CAPACITORS
CB	DEFROSTER BLOWER
CC	COWL FLAPS
CD	PC DUMP
CF	WING FLAPS
CL	CLAMPS
CR	RUDDER TRIM
CT	ELEVATOR TRIM
CV	STAND–BY VACUUM
DA	INSTRUMENTS – AMMETER
DB	INSTRUMENTS – TURN COORDINATOR
DC	INSTRUMENTS – CYLINDER HEAD TEMPERATURE
DD	INSTRUMENTS – OUTSIDE AIR TEMPERATURE
DE	INSTRUMENTS – CARBURETOR AIR TEMPERATURE
DF	INSTRUMENTS – FUEL QUANTITY
DG	INSTRUMENTS – ENGINE

DH	INSTRUMENTS – OIL TEMPERATURE
DI	DIODES
DJ	INSTRUMENTS – OIL PRESSURE
DK	INSTRUMENTS – FUEL PRESSURE
DL	INSTRUMENTS – TACHOMETER, ELECTRIC
DM	INSTRUMENTS – HOUR METER
DN	INSTRUMENTS – PRESSURIZATION
DP	INSTRUMENTS – PITOT HEAT
DR	INSTRUMENTS – TURBINE INLET TEMPERATURE
DS	INSTRUMENTS – COMPRESSOR DISCHARGE TEMPERATURE
DT	INSTRUMENTS – EXHAUST GAS TEMPERATURE
DU	INSTRUMENTS – MANIFOLD PRESSURE
DV	INSTRUMENTS – FUEL FLOW
DW	INSTRUMENTS – ENGINE VACUUM
EG	GEAR, ELECTRIC
EL	ELECTROLUMINESCENCE
ET	EMERGENCY LOCATOR BEACON
FA	ALT–EMER (FRENCH)
FH	FUSE HOLDERS
FN	PHONES
FU	FUSES
FW	ALT–EMER FIELD (FRENCH)
GD	GROUND
HS	HORIZNTAL SITUATION INDICATORO
JE	IGNITION, ELECTONIC
JM	IGNITION, MAGNETO
JV	IGNITION, VIKBRATOR
LA	LIGHT BULBS
LB	BEACON, ROTATING
LC	LIGHT, CABIN
LE	LENS, ANNUNCIATOR
LG	LIGHTS, LOGO
LH	LAMP HOLDER
LI	LIGHT, ICE
LL	LIGHT, LANDING
LN	LIGHTS, NAVIGATION
LP	LIGHTS, PANEL
LR	LIGHTS, RECOGNITION
LS	LIGHTS, STROBE
LT	LIGHTS, TAXI
MA	AUXILIARY POWER
MB	RADIO, MASTER
MC	CIGAR LIGHTER
ME	CLOCK, ELECTRIC
MH	MISCELLANEOUS, ANTI–ICE
MJ	MISCELLANEOUS, JUNCTION BOX
MK	MICROPHONE
MM	MISCELLANEOUS, MARKER BEACON
MO	PROP OVERSPEED
MP	PROP DE–ICE
MS	MISCELLANEOUS, RADIO–SPEAKER
MW	MISCELLANEOUS, RADIO–WARNING
NE	FURL ENRICHMENT
NF	FUEL PUMP
NP	FUEL PRIMER
NS	FUEL COLD START

PA	POWER, ALTERNATOR
PB	POWER, BATTERY
PG	POWER, GENERATIOR (OUTPUT & CONTROL)
PL	PLUGS
PS	POWER, START
RB	BLOWER, RADIO
RC	RECEPTACLES
RL	RELAYS
RS	RESISTORS
SA	STAND–BY ALTERNATOR
SB	SPEEDBRAKE
SP	SPEAKER
SW	SWITCHES
VB	VENT, AIR BLOWER
VC	VOLTAGE CONVERTER
VR	VARISTOR
WA	WARNING, ALTERNATOR
WB	WARNING, BOOST PUMP
WC	WARNING, PROP DE–ICE
WD	WARNING, POWER START
WE	WARNING, ELECTRIC GEAR
WF	WARNING, FUEL QUANTITY
WG	WARNING, TACHOMETER
WH	WARNING, CHIP DETECTOR
WK	WARNING, FUEL PRESSURE
WL	WARNING, CANOPY LOCK
WM	WARNING, MASTER
WN	WARNING, PRESSURIZATION
WP	WARNING, PITOT HEAT
WS	WARNING, STALL
WT	WARNING, ANNUNCITOR
WV	WARNING, VACUUM
WW	WARNING, ALTERNATE AIR
YD	YAW DAMPER

91-00-03 - ABBREVIATIONS - EQUIPMENT LIST

The abbreviations to the electrical system hardware charts are necessary due to space limitations in the fields of the computer.

Airspeed – A/S	Placard – Plcd
Alternate – Alt	Radio – Rad
Circuit Breaker – Ckt. Bkr. or C/B	Receptacle – Recpt
Console – Cnsl	Regulator – Regltr
Control – Cntrl	Remote – Rem
Coordinator – Coordtr	Resistor – Res
Cylinder – Cyl	Rheostat – Rheo
Down – Dn	Right – R
Electric – Elec	Safety – Sfty
Flight – Flt	Selector – Sel
Glareshield – Glrshld	Supply – Sply
Landing – Ldg	Switch – Sw
Left – L	Transducer – XDCR
Lights – Lts	Transmitter – XMTR
Panel – Pnl	Transistor – XSTR
Pilot – Plt	Warning – Wrn

91-20-00 - ELECTRICAL SYSTEM HARDWARE CHARTS

Refer to the Electrical Schematic (located in the envelopes at the back of this manual) that depicts the Serial Number configuration of the aircraft being serviced. The S/N's vs. Schematic's are shown below:

A/C SERIAL NUMBER	SCHEMATIC DRAWING NUMBER
(14 VOLT AIRCRAFT)	
25-00021 thru 25-0171	800330 F
25-0238 thru 25-0246	800330 F1
25-0001, 25-0247 thru 25-0298	800330 F2
25-0299 thru 25-0446	800330 F3
25-0447 thru 25-0612	800330 F4
25-0613 thru 25-0780	800330 F5
25-0781 thru 25-0841	800330 F6
25-0842 thru 25-0856	800330 F7
25-0857 thru 25-0999	800330 F8
(28 VOLT AIRCRAFT)	
25-1000 thru 24-1199	800350 K1 [REV. J] (2 SHEETS)
25-1200 thru 24-1224	800350 K2 [REV. AV] (2 SHEETS)
25-1225 thru 25-1999	800263 K1 [REV. E]
25-2000 SCHEMATIC NOT INCLUDED IN ENVELOPES	800383 K1
25-2001 thru 25-2012	800383 K2 [REV. F]
25-2013 thru 25-2025	800383 K3 [REV. G]
25-2026 thru 25-2032	800383 K4 [REV. H]

The Vendor and Part Number will be depicted where the applicable electrical equipment identifier is shown on the following hardware charts.

91-20-01 - ELECTRICAL SYSTEM HARDWARE CHART - 14 VOLT

SERIAL NUMBER's 25-0001 THRU 25-0999, MOONEY DRAWING NUMBER. 800330 (CP)

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
21	CB101A	C/B DEFROSTER BLOWER	KLIXON	7277-2-2	
21	CD01A	SOLENOID-PC DUMP	BRITTIAN	4085	
21	CD02A	SW-PILOTS DUMP	MICRO	111SM1-T	
21	CD02B	SW-PILOTS DUMP	C-H	SA31SDT12-2	
21	CD03A	SW-CO-PILOTS DUMP	MICRO	111SM1-T	
		SW-P.C. ON-OFF (ALT)	ALCO	MST215-N	
21	CF01B	C/B FLAP ACT	MERIDEN or EQUIV.	AHW4-15	
21	CF02A	RELAY-LEFT	MAGNECRAFT	W97CSX-1	
21	CF03A	RELAY-RT	MAGNECRAFT	W97CSX-1	
21	CF04A	ACTUATOR, FLAP	COMM. A/C PROD	D14500-36	
			MOONEY	(750105-501)	
21	CF05A	SWITCH, LIMIT, DOWN	MICRO	V3-1	
		ACTUATOR	MICRO	JV-5	
21	CF06A	SWITCH, LIMIT, UP	MICRO	V3-1	
		ACTUATOR	MICRO	JV-5	
21	CF07A	SWITCH, LIMIT, DOWN	MICRO	V3-1	
		ACTUATOR	MICRO	JV-5	
21	CF08A	SWITCH, LIMIT, UP	MICRO	V3-1	
		ACTUATOR	MICRO	JV-5	
21	CF09A	SWITCH, CONTROL	MICRO	2TL75-10	
21	CF09B	SWITCH, CONTROL, FLAP	C-H	8906K3149	
21	CT01A	C/B, ELECTRIC TRIM	MOONEY	930023-009	
21	CT01B	C/B, ELECTRIC TRIM	MOONEY	930023-109	
21	CT01D	C/B, ELECTRIC TRIM	MOONEY	930023-209	
21	DA01A	SHUNT	EMPRO or EQUIV.	MLA-60-50	
21	DA01B	SHUNT	STEWART-WARNER	SW-813489	
21	DA01C	SHUNT	EMPR0	MLA-60-100	
21	DA01D	SHUNT	EMPRO	MLA-70-100	
21	DA02A	FUSE	LITTEL	312010	
		RETAINER	LITTEL	155020	
21	DA02B	FUSE	McGRAW-EDISON	FM01-5A	
		RETAINER	McGRAW-EDISON	FHN42W	
21	DA03A	FUSE	LITTEL	311010	
		RETAINER	LITTEL	155202	
21	DA03B	FUSE	McGRAW-EDISON	FM01-5A	
		RETAINER	McGRAW-EDISON	FHN42W	
21	DA04A	AMMETER	MOONEY	640281-509	
		BULB	ROCHESTER	0153500003	
21	DB01A	C/B, TURN COORD	MERIDAN OR EQUIV	AHW4-2	
21	DB01B	C/B TURN COORD	KLIXON	7277-2-5	
21	DB02A	TURN CO-ORDINATOR	BRITTIAN	604-200-200	23/24
		TURN CO-ORDINATOR	AEROSONIC (ALT)	ANS50M	23/24
21	DB02B	TURN CO-ORDINATOR	AEROSONIC	ANS50ML	23/24
21	DB03A	PLUG, TURN COORD		MS3106A-10SL-3S	
		CLAMP		MS3057-4A /-4B	
L	DB50A	T/C	UNITED INST	9551B CODE N.541	
21	DC01A	PROBE, CYL HD TEMP	STEWART-WARNER	SW-333-B	
21	DC01B	PROBE, CHT	ROCHESTER	3080-00014	
			MOONEY	(880010-501)	
21	DC01C	PROBE, CHT	MOONEY	880010-503	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
21 DD01A	GAUGE, OUTSIDE AIR TEMP	GARWIN	22-295	
21 DD01B	GAUGE, OAT	INSTR.& FLT RES.	IFR-11A	
21 DDO1C	CAUGE, OAT/EGT	B&D INSTRUMENT	C203-005	
		MOONEY	880010-501	
21 DD01E	GAUGE, OAT/EGT(LIGHTED)	MOONEY	880001-505	
21 DD01F	GAUGE, OAT (LIGHTED)	MOONEY	880023-505	
21 DD02A	PLUG -GAUGE		MS3106A-14S-2S	
	CLAMP		MS3057-6B	
21 DD02C	PLUG,OAT/EGT	AMP	205838-1	
	CLAMP	AMP	206062-1	
21 DD02D	PLUG,OAT		MS3106A-14S-2S	
	CLAMP		MS3057-6A	
21 DD03A	PROBE, OAT		MS2803403	
21 DD03B	PROBE, OAT	WESTBERG	399W	
21 DD03C	PROBE, OAT	B&D INSTR	0203-100	
		MOONEY	880004-501	
21 DD04A	C/B, OAT/EGT	KLIXON	7277-2-2	
21 DE01A	GAUGE, CARB AIR TEMP	MOONEY	660014-005	
		GARWIN	22-995-04	
21 DE02A	PLUG, GAUGE		MS3106A-14S-1S	
	CLAMP		MS3057-6B	
21 DE02B	PLUG, GAUGE		MS3106B-14S12S	
	CLAMP		MS3057-6B	
21 DE03A	PROBE, CARB AIR TEMP	RICHTER AERO	B-5	
21 DF01A	XMTR, FUEL QTY, LT, IB	MOONEY	610242-001	
21 DF01B	XMTR, FUEL QTY, LT, IB	MOONEY	610242-003	
21 DF02A	XMTR, FUEL QTY, LT, OB	MOONEY	610243-003	
21 DF03A	XMTR, FUEL QTY, RT, IB	MOONEY	610242-001	
21 DF03B	XMTR, FUEL QTY, RT, IB	MOONEY	610242-003	
21 DF04A	XMTR, FUEL QTY, RT, OB	MOONEY	610243-001	
21 DG01A	C/B, CLUSTER GAUGE	MERIDEN	AHW4-2	
21 DG01B	C/B, CLUSTER GAUGE	KLIXON	7277-2-2	
21 DG02A	GAUGE, CLUSTER	MOONEY	640281-503	
	FUEL QTY, LH	MOONEY	640281-105	
	FUEL QTY, RH	MOONEY	640281-107	
	AMMETER	MOONEY	640281-115	
	OIL PRESS	MOONEY	640281-117	
	OIL TEMP	MOONEY	640281-149	
	CYL HEAD TEMP	MOONEY	640281-111	
21 DG02G	GAUGE, CLUSTER	MOONEY	640281-507	
	FUEL QTY, LH	MOONEY	640281-105	
	FUEL QTY, RH	MOONEY	640281-107	
	FUEL PRESS	MOONEY	640281-119	
21 DG02G	OIL PRESS	MOONEY	640281-121	
	OIL TEMP	MOONEY	640281-149	
	CYL HEAD TEMP	MOONEY	640281-511	
(ALT)	GAUGE, CLUSTER	MOONEY	640281-511	
	FUEL QTY, LH	MOONEY	640281-125	
	FUEL QTY, RH	MOONEY	640281-127	
	FUEL PRESS	MOONEY	640281-131	
	OIL PRESS	MOONEY	640281-129	
	OIL TEMP	MOONEY	640281-133	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		OIL TEMP (ALT)	MOONEY	640281-155	33
		CYL HEAD TEMP	MOONEY	640281-135	
		CYL HEAD TEMP (ALT)	MOONEY	640281-157	
21	DG02H	GAUGE, CLUSTER	MOONEY	640281-513	
		FUEL QTY, LH	MOONEY	640281-147	
		FUEL QTY, RH	MOONEY	640281-145	
		AMMETER	MOONEY	640281-137	
		OIL PRESS	MOONEY	640281-141	
		OIL TEMP	MOONEY	640281-139	
		CYL HEAD TEMP	MOONEY	640281-143	
	(ALT)	GAUGE, CLUSTER	MOONEY	640281-515	32
		FUEL QTY, LH	MOONEY	640281-153	
		FUEL QTY, RH	MOONEY	640281-151	
		AMMETER	MOONEY	640281-137	
		OIL PRESS	MOONEY	640281-141	
		OIL TEMP	MOONEY	640281-139	
		OIL TEMP (ALT)	MOONEY	640281-159	34
		CYL HEAD TEMP	MOONEY	640281-143	
		CYL HEAD TEMP (ALT)	MOONEY	640281-161	34
21	DG02J	GAUGE, CLUSTER	MOONEY	640281-519	
		FUEL QTY, LH	MOONEY	640281-163	
		FUEL QTY, RH	MOONEY	640281-165	
		FUEL PRESS	MOONEY	640281-171	
		OIL PRESS	MOONEY	640281-133	
		OIL TEMP	MOONEY	640281-155	
		CYL HEAD TEMP	MOONEY	640281-135	
21	DG02K	GAUGE, CLUSTER	MOONEY	640281-521	
		FUEL QTY, LH	MOONEY	640281-153	
		FUEL QTY, RH	MOONEY	640281-151	
		AMMETER	MOONEY	640281-137	
		OIL PRESS	MOONEY	640281-169	
		OIL TEMP	MOONEY	640281-139	
		CYL HEAD TEMP	MOONEY	40281-143	
21	DH01A	PROBE, OIL TEMP	STEWART-WARNER	362-CR	
21	DH01B	PROBE, OIL TEMP	ROCHESTER	3080-37	
			MOONEY	880009-501	
		WASHER		AN900-10	
		(ALT)		MS35769-11	
21	DJ01A	XDUCR, OIL PRESS	ROCHESTER	3080-37	
			MOONEY	880008-501	
21	DJ01B	XDCR, OIL PRESS	MOONEY	880046-501	
21	DJ02A	PLUG, XDCR, OIL PRESS		MS3106A10SL-3S	
		CLAMP		MS3057-4A/B	
21	DJ175A	XDCER, OIL PRESS	DRUCK	PDCR821-0662-100	
21	DJ177A	AMPLIFIER, OIL PRESS	IAI	950D0311-002	
21	DJ178A	PLUG, OIL PRESS, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	DJ179A	RECPT, OIL PRESS, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
21	DJ180A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	DJ181A	RECPT, 4 PIN	AMP	206153-1	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		CLAMP	AMP	206062-1	
21	DK01A	XDUCR, FUEL PRESS	ROCHESTER	3060-17	
			MOONEY	880007-501	
21	DK01C/D	XDUCR, F/F(OPT)	MOONEY	880030-501	
21	DK01D	XDUCR, FUEL PRESS	MOONEY	880045-501	
21	DK01E	XDUCR, FF	MOONEY	880030-503	
21	DK01F	XDUCR, FUEL FLOW	MOONEY	880030-505	
21	DK02B	GAUGE, FF/MP	MOONEY	880031-501	
		GAUGE,FF/MP,LIGHTED(OPT)	MOONEY	880031-503	
21	DK02D/E	GAUGE, FF (OPT)	MOONEY	880034-501	25
21	DK02F	GAUGE, (GALS/HR)	MOONEY	880034-513	
21	DK03A	PLUG, FF/MP GAUGE	BENDIX	PT06A-10-98S(SR)	
21	DK03B	PLUG, FF	BENDIX	PT06A-15-15S(SR)	
21	DK03C/D	PLUG, FF	ITT CANNON	DE-9S	
21	DK03E/F	PLUG, FF (OPT)	CANNON	DE-9S	
21	DK04A	C/B, FF	KLIXON	7277-2-2	
21	DK05A	SWITCH, MEMORY, FF (OPT)	ALCO	MST215N	
21	DK06A	PLUG, FF, XDCR		MS3106A10SL-3S	
		CLAMP		MS30507-4A	
21	DK175A	XDUCR, FUEL PRESS	DRUCK	PDCR821-0662-30	
21	DK176A	AMPLIFIER, FUEL PRESS	IAI	950D0311-031	
21	DK177A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	DK178A	RECPT, 4 PIN	AMP	260153-1	
		CLAMP	AMP	206062-1	
21	DK179A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	DK180A	RECPT, 4 PIN	AMP	260153-1	
		CLAMP	AMP	206062-1	
21	DL01A	TACH, ELEC	MOONEY	880002-501	3
21	DL01B	TACH, ELEC	MOONEY	880039-503	
21	DL01C	TACH, ELEC	MOONEY	880002-503	
21	DL01D	TACH, ELEC	MOONEY	880039-501	
21	DL01E	TACH, ELEC	MOONEY	880039-507	
21	DL01F	TACH, ELEC, (LIGHTED)	MOONEY	880039-505	
21	DL02A	PLUG, TACH		MS3106A-14S-5S	
		CLAMP		MS3057-6A	
21	DL03A	RESISTOR, L	OHMITE	OL1535	
21	DL04A	RESISTOR, L	OHMITE	OL1535	
21	DL05A	CABLE ASSY	MOONEY	880003-501	
21	DM01A/B	HOUR METER	MOONEY	880035-501	
21	DP01A	C/B, PITOT HEAT	MOONEY	930023-005	
21	DP01B	C/B, PITOT HEAT	MOONEY	930023-105	
21	DP01D	C/B, PITOT HEAT	MOONEY	930023-205	
21	DP02A	HEATED PITOT	AEL or EQUIV	425936	
21	DP02B	PITOT, HEATED	AERO INST	PH502-24	
			(ALT)	AN5812-1	
21	DP03B	PLUG, PITOT HEAT		AN3115-1	
		SOCKETS		AN3116-1	
21	DR01A	C/B, TIT/CDT	KLIXON	7277-2-2	
21	DR01B	GAUGE, TIT/CDT, LIGHTED	MOONEY	880000-503	
21	DR02A	PLUG, TIT/CDT INDICATOR	AMP	205838-1	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
21	DR03A	PROBE, TIT	MOONEY	880005-501	
21	DR04A	C/B, TIT/CDT	KLIXON	7277-2-2	
21	DS01A	PROBE, CDT	MOONEY	880006-501	
21	DT01A	PROBE, EGT	B&D INSTR	0204-100	
			MOONEY	880005-501	
21	EG01A	C/B, ELEC. GEAR	MERIDEN or EQUIV	AHW4-15	
21	EG01B	C/B, ELEC. GEAR	KLIXON	7277-2-15	
21	EG01C	C/B, ELEC. GEAR CONTROL	KLIXON	7277-2-5	
21	EG02A	SWITCH, CONTROL	MICRO	2TL149-3D	
21	EG02B	SWITCH, GEAR UP/DN	C-H	8906K2875	
21	EG03A	SWITCH, LIMIT	MICRO	DT-2R-A7	
		ACTUATOR	MICRO	MCD-2711	
21	EG04A	ACTUATOR, GEAR, ELEC	ITT	LA11C21101	
21	EG04B	ACTUATOR, GEAR, ELEC	DUKES	1057-00-1	
21	EG04C	ACUTATOR, GEAR, ELEC	DUKES	4196-00-1D	
21	EG04D	ACUTATOR, GEAR, ELEC	ITT	LA11C2115	
21	EG04E	ACUTATOR, GEAR, ELEC	ITT	LA11C2114	
21	EG04F	ACUTATOR, GEAR, ELEC	DUKES	1057-00-5E	
21	EG04G	ACUTATOR, GEAR, ELEC	AVIONICS PROD	102000-1	26
			MOONEY	560254-501	3
21	EG05A	RELAY, GEAR	RBM	70-111221	
21	EG05C	RELAY, GEAR UP	MAGNECRAFT	W97CSX-1	1
21	EG05D	RELAY, GEAR UP	C-H	6041H50A	1
21	EG05E	RELAY, GEAR UP	RBM	70311221	22
21	EG05F	RELAY, GEAR UP	C-H	6041H53	
			COLE-HERSEE	24401	22
21	EG06A	SQUAT SWITCH	MICRO	1CH1-6	
			MOONEY	800335-501	
21	EG06B	SWITCH, SAFETY, AIRSPEED	WHITMAN-GENERAL	SK75-IN-K3L	5
21	EG06C	SWITCH, SAFETY, AIRSPEED	MOONEY	880013-503	5
21	EG06D	SWITCH, SAFETY, AIRSPEED	MOONEY	880013-505	5
21	EG07A	SWITCH, DOWN LIMIT	MICRO	1CH1-6	
21	EGO8C	RELAY, GEAR DOWN	MAGNECRAFT	W97CSX-1	
21	EGO8D	RELAY, GEAR DOWN	C-H	6041H105A	
21	EGO8E	RELAY, GEAR DOWN	RBM	70-311221	22
21	EG08F	RELAY, GEAR DOWN	C-H	6041H105A	
21	EG09A	C/B, GEAR ACT	MECHANICAL PROD	700-01-25	
21	EG09B	C/B, GEAR ACT	KLIXON	7277-2-15	
21	EG10A	SWITCH, GEAR OVERIDE	C-H	SBIDDX492-2	
			LAMP	GE	388
21	EG11A	DIODE, GEAR UP RELAY	SARKES TARZIAN	F4	
21	EG12A	DIODE,GEAR DN RELAY	SARKES TARZIAN	F4	
21	EL01A	TRANSISTOR	RCA	2N2016	
21	EL02A	FUSE	McGRAW-EDISON	FM01-5A	
		HOLDER		FHN42W	
21	EL03A	RESISTOR	OHMITE	4599	
21	EL04A	RHEOSTAT/SW	ALLEN/BRADLEY	JS1N056P251MA	
21	EL06A	PLACARD, CB	MOONEY	150082-009	
21	EL07A	PLACARD, FUEL SEL	MOONEY	150082-011	
21	EL08A	PLACARD, ANNUN	MOONEY	150082-015	
21	EL09A	PLACARD, CK. LIST	MOONEY	150082-013	
21	ELT1A	ELT	DORNE & MARGOLIN	DM-ELT-6	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		(ALT)		DM-ELT -6M	
21	ELT1B	ELT, TRANSMITTER (OPT)	DORNE & MARGOLIN	DM-ELT-8	
21	ELT2A	SWITCH, REMOTE ELT	DORNE & MARGOLIN	DM-U65-1	
		(ALT)	C & K	7101K	
21	EW01B	C/B, GEAR WARNING	KLIXON	7277-2-2	
21	JM01A	SWITCH, MAGNETO	BENDIX-SCINTILLA	10-357290-17	
		PLACARD	BENDIX-SCINTILLA	I0-187-468	
21	JM01B	SWITCH, MAGNETO	BENDIX-SCINTILLA	10-357210-91	
21	JM02A	MAGNETO, LEFT	BENDIX-SCINTILLA	S4LN200	
21	JM02B	MAGNETO, DUAL	BENDIX-SCINTILLA	D4LN2021	
21	JM02C	MAGNETO, LEFT	BENDIX	10-79020-18	
21	JM02D	MAGNETO, LEFT	SLICK	6214	
21	JM02E	MAGNETO, LEFT	SLICK	6224	
21	JM03A	MAGNETO, RIGHT	BENDIX	S4LN204	
21	JM03C	MAGNETO, RIGHT	BENDIX	10-79020-18	
21	JM03D	MAGNETO, RIGHT	SLICK	6214	
21	JM03E	MAGNETO, RIGHT	SLICK	6224	
21	JV01A	STARTING VIBRATOR	BENDIX-SCINTILLA	10-176487-121	
21	LB01A	C/B, ROTATING BEACON	MOONEY	930023-003	
21	LB01B	C/B, ROTATING BCN (spares)	MOONEY	930023-103	28
21	LB01D	C/B, ROTATING BEACON	MOONEY	930023-203	
21	LB02A	LIGHT, ROTATING BEACON	WHELEN	WRML-12	
		ADAPTER	WHELEN	WRM-65	
21	LC01A	FUSEHOLDER, CLOCK, 5A	LITTEL FUSE	155020/155120	
		FUSE,(5A-3AG-SLO-BLO)	LITTEL FUSE	313005	
21	LC02A	LIGHT, CABIN, OVERHEAD	LUMINATOR	20145	
		BULB	GE	1003	
21	LC02B	LIGHT, CABIN, OVERHEAD	GRIMES	B-3550	
		BULB	GE	89	
21	LC03A	SWITCH, CABIN LIGHT	C-H	8144(BK-09)	
21	LC03B	SWITCH, CABIN LIGHT, FWD	CARLING	TILC64-1S-WH-FN	
21	LC03C	SWITCH, CABIN LIGHT, REAR	CARLING	TILC64-1S-WH-FN	
21	LC03D	SWITCH, CABIN LIGHT, FWD	CARLING	TILC64-1S-WH-FN	
21	LC03E	SWITCH, CABIN LIGHT, REAR	CARLING	TILC64-1S-WH-FN	
21	LC04A	RESISTOR, DIM, CABIN LT	OHMITE	4561	
		(10 OHM 5W)			
21	LC04B/C	RESISTOR, DIM., CABIN LT	DALE	RH-10-5 OHM	
21	LC07A	SWITCH, MAP LT, PILOTS	C-H	SA25SCT12-3	
		CAP		SW53AA2	
		FACE NUT		15-1049-3	
21	LC08A	LIGHT, MAP, PILOTS	SLOAN	855-S1-0-PE	
		BULB	GE	330	
21	LC09A	SW, MAP LT, CO-PILOT	C-H	SA25SCT12-3	
		CAP		SW53AA2	
		FACE NUT		15-1049-3	
21	LC10A	LIGHT, MAP, CO-PILOT	SLOAN	855-S1-0-PE	
		BULB	GE	330	
21	LC11A	LIGHT, CABIN, (F1-R)	H.H. SMITH	1930	9
		LAMP	GE	1816	
21	LC12A	LIGHT, CABIN, (F2-R)	H.H. SMITH	1930	9
		LAMP	GE	1816	
21	LC13A	LIGHT, CABIN, (F1-L)	H.H. SMITH	1930	9

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		LAMP	GE	1816	
21	LC14A	LIGHT, CABIN, (F2-L)	H.H. SMITH	1930	9
		LAMP	GE	1816	
21	LC15A	LIGHT, CABIN, (R1-R)	H.H. SMITH	1930	9
		LAMP	GE	1816	
21	LC16A	LIGHT, CABIN, (R2-R)	H.H. SMITH	1930	9
		LAMP	GE	1816	
21	LC17A	LIGHT, CABIN, (R1-L)	H.H. SMITH	1930	9
		LAMP	GE	1816	
21	LC18A	LIGHT, CABIN, (R2-L)	H.H. SMITH	1930	9
		LAMP	GE	1816	
21	LL01A	C/B, LDG LT	MERIDEN	AHW4-20	
21	LL01B	C/B, LDG LT	MOONEY	930023-15	
21	LL01C/D	C/B, LDG LT	MOONEY	930023-115/-215	28
21	LL02A	RELAY, LDG LT	MAGNECRAFT	W89CQX-2	
21	LL03A	LIGHT, LDG (BULB)	GE	4522	
21	LL03B/C	LIGHT, LDG (BULB)	GE	4509	
21	LL04A	SWITCH, LDG LT	C-H	SA25SCT12-3	
		CAP		SW53AA2	
		FACE NUT		15-1049-3	
21	LN01A	C/B, NAV LIGHTS	MOONEY	930023-001	
21	LN01B/D	C/B, POSITION LTS	MOONEY	930023-101/-201	28
21	LN02A	LIGHT, POSITION (RED)	GRIMES	A1285-R-12	
		BULB, POSITION (14V)		A7512-12	
			MOONEY	800022-501	
		BULB, POSITION (14V)		W1290-14	
21	LN02B	LIGHT, POSITION,(14V) (RED)	WHELEN	W1285-PR	
21	LN03A	LIGHT, POSITION,			
		TAIL (WHITE)	GRIMES	A2064-1777	
		BULB, 14V, TAIL LT.		203529	
		BULB, 14V, TAIL LT.	GRIMES	1777-266P-12.8V	
21	LN03B	LIGHT, POS, TAIL,			
		(14V) (VERT.MT)	WHELEN	A480A	
		BULB, POS., TAIL (14V)		A508-14	
21	LN04A	LIGHT, POS, (GREEN)	GRIMES	A1285-G-12	
		BULB, POSITION (14V)		A7512-12	
			MOONEY	880022-503	
		BULB, POSITION (14V)		W1290-14	
21	LN04B	LIGHT, POS, (GREEN)	WHELEN	W1285-PG	
			MOONEY	880022-503	
21	LP01A	C/B, PANEL LIGHTS	MERIDEN	AHW4-10	
21	LP01B	C/B, PANEL LIGHTS	KLIXON	7277-2-10	
21	LP01C/D	C/B, INSTR LTS	KLIXON	7277-2-10	
21	LP02A	C/B, PANEL LIGHTS	MERIDEN	AHW4-10	
21	LP03A	XSTR, INSTR LIGHTS	RCA	2N2016	8
21	LP03C	XSTR, RADIO LIGHTS	RCA	2N2016	8
21	LP03B	XSTR, (ALT LP03A/C)	DELCO	2N3079	
21	LP04A	XSTR, RADIO LIGHTS	RCA	2N2016	8
21	LP05A	XSTR, RADIO LIGHTS	RCA	2N2016	8
21	LP06A	RHEOSTAT/SWITCH	ALLEN/BRADLEY	JS1N056P251MA	
21	LP06B/C	RHEOSTAT/SWITCH, RADIO	ALLEN/BRADLEY	JS1N056P251MA	
21	LP07A	RHEOSTAT/SWITCH, RADIO	ALLEN/BRADLEY	JS1N056P251MA	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
21	LP08A	RHEOSTAT/SWITCH, RADIO	ALLEN/BRADLEY	JS1N056P251MA	
21	LP09A	SWITCH, RED/WHITE, LIGHT	MICRO	8H2011	
		ROCKER	MICRO	8Z0023	
21	LP10C	C/B, INSTR LIGHTS	KLIXON	7277-2-5	
21	LP13A	FUSE, INSTR LTS	McGRAW-EDISON	FM01-5A	
		HOLDER		FHN42W	9
21	LP14A	FUSE, INSTR LTS	McGRAW-EDISON	FM01-5A	
		HOLDER		FHN42W	9
21	LP15A	FUSE, INSTR LTS	McGRAW-EDISON	FM01-5A	
		HOLDER		FHN42W	9
21	LP16A	LAMPS (RED)	GE	1836R	
		HOLDER (4 EA)	H.H. SMITH	1930	9
21	LP17A	LAMPS (RED)	GE	1836R	
		HOLDER (7 EA)	H.H. SMITH	1930	9
21	LP18A	LAMPS (WHITE)	GE	1836	
		HOLDER (4 EA)	H.H. SMITH	1930	9
21	LP18B	LAMPS	GE	1816	
		HOLDER (10 EA)	H.H. SMITH	1930	9
21	LP18C	LAMPS	GE	1816	
		HOLDER (9 EA)	H.H. SMITH	1930	9
21	LP18D	LAMPS	GE	1816	
		HOLDER (10 EA)	H.H. SMITH	1930	9
21	LP18E	LIGHTS, GLARESHIELD	SLOAN	855S-9-1	
			MOONEY	130285-003	
		BULB (7 EA)	GE	330	
21	LP19A	LAMPS	GE	1836	
		HOLDER (6 EA)	H.H. SMITH	1930	9
21	LP20A	N# LIGHT (2 EA)	KORRY	250-650-5821-008	
		BULBS	GE	327	
21	LP21A	LIGHT, COMPASS	GE	330	
21	LP22A	LIGHT-CONSOLE	WESTERN IND CO.	501-61K-11K3BP	
		LAMP	WESTERN IND CO	WI-7046	
21	LP22B	LIGHT-CONSOLE	WESTERN IND CO	501-61K-11K3BP	
		LAMP	WESTERN IND CO	WI-7046	
21	LP22C	LIGHT HOLDER, FLAP&TRIM	DIALIGHT	270-1930-01710702	
		LAMP	GE	370	
21	LP24A	FUSE (5 AMP)(3AG-SLO-BLO)	LITTEL	313005	
		HOLDER	LITTEL	155020	
21	LP24B	FUSE, MAP LITE	LITTEL	313001	
		HOLDER	LITTEL	155020 or 155120	
21	LP25A	RESISTOR		100 OHM 2W	
21	LP25B	RESISTOR, INSTR LITES	OHMITE	4599	10
21	LP25C	RESISTOR, RADIO LITES	OHMITE	4599	10
21	LP25D	RESISTOR, INSTR LITES	DALE	RH-10-50 OHM	
		(24-0901THRU 24-0926)			
21	LP25E	RESISTOR, INSTR LITES	DALE	RH-10-50 OHM	
21	LP26A	LIGHT, POST, M/P	GRIMES	A-8970B1	
		LAMP	GE	330	
21	LP27A	LIGHT, POST,TACH	GRIMES	A-8970B1	
		LAMP	GE	330	
21	LP28A	LIGHT, POST, CLOCK	GRIMES	A-8970B1	
		LAMP	GE	330	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
21	LP29A	LIGHT, POST,OAT	GRIMES	A-8970B1	
		LAMP	GE	330	
21	LP30A	HOLDER, OXYGEN LIGHT	SLOAN	855S-0-U	
		LAMP	GE	330	
21	LP31A	BUSS, RADIO LIGHT	MOONEY	800233-000	
21	LP32A	POST LIGHT	GRIMES	A-8970B1	
21	LP33A	POST LIGHT	GRIMES	A-8970B1	
21	LP34A	POST LIGHT	GRIMES	A-8970B1	
21	LP35A	POST LIGHT	GRIMES	A-8970B1	
		LAMP	GE	330	
21	LP36A	LAMP, CLUSTER #1	G/E	330(AVIATION BLUE)	
21	LP37A	LAMP, CLUSTER #2	G/E	330(AVIATION BLUE)	
21	LP38A	LAMP, CLUSTER #3	G/E	330(AVIATION BLUE)	
21	LP39A	LAMP, CLUSTER #4	G/E	330(AVIATION BLUE)	
21	LP40A	LAMP, CLUSTER #5	G/E	330(AVIATION BLUE)	
21	LP41A	CONNECTOR, MALE	DEANS	DEA 90020	
21	LP42A	CONNECTOR, FEMALE	DEANS	DEA 90020	
21	LP43A	FUSE, (1A)	LITTEL	313001	
		HOLDER	LITTEL	155020 or 155120	
21	LP44A	CONNECTOR, PLUG	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	LP45A	CONNECTOR,	AMP	206153-1	
		CLAMP	AMP	206062-1	
21	LR01A	C/B RECOGNITION LIGHTS	MOONEY	930023-231	
21	LR02A	RECOG. LIGHT, LT	MOONEY	880044-001	
21	LR03A	PLUG, RECOG. LIGHT, LT	AMP	1-480318-0	
		SOCKETS	AMP	60619-1	
21	LR04A	RECOGNITION LIGHT, RT	MOONEY	880049-001	
21	LR05A	PLUG, RECOG. LIGHT, RT	AMP	1-480318-0	
		SOCKETS	AMP	60619-1	
21	LS01A	C/B, STROBE LIGHTS	MOONEY	930023-007	
21	LS01B/D	C/B, STROBE LIGHTS (ALT)	MOONEY	930023-107/-207	28
21	LS02A	PWR SUPPLY, STB, L/WG	WHELEN	A490, T14	31
21	LS02B	PWR SUPPLY, STB, L/WG	SDI	701295-3A	29, 32
			MOONEY	880018-501	29
21	LS02C	PWR SUPPLY, STB, L/WG	MOONEY	880028-507	30
21	LS02E	PWR SUPPLY, STB, L/WG	MOONEY	880028-505(ALT)	
21	LS02F	CABLE, PWR SUPPLY, L/WG	MOONEY	880017-503(ALT)	
21	LS03A	STROBE LITE(FLASHTUBE)	WHELEN	A429	31
21	LS03B	STROBE, LITE, L/WG	SDI	701303A	
		FLASHTUBE	MOONEY	880019-501	29
21	LS03B	STROBE LT, L/WG	SDI	702000-1	
			MOONEY	880021-501	34
21	LS03C	STROBE LT, L/WG	MOONEY	880038-501	30
21	LS03D	CABLE ASSY, STROBE, L/WG	SDI	702000-3	
			MOONEY	880017-501	29,34
21	LS03E	CABLE ASSY, STROBE, L/WG	MOONEY	880017-503	
21	LS04A	PWR SUPPLY,STROBE,R/WG	WHELEN	A490, T14	31
21	LS04B	P/S, STROBE, R/WG	SDI	701295-3A	
			MOONEY	880018-501	29, 34
21	LS04C	P/S, STROBE, R/WG	MOONEY	880028-507	30
21	LS04D	CABLE ASSY, R/WG	SDI	702000-3	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
			MOONEY	880017-501	29, 34
21	LS04E	P/S, STROBE,R/WG	MOONEY	880028-505(ALT)	
21	LS04F	CABLE, P/S, R/WG	MOONEY	880017-503(ALT)	
21	LS05A	FLASHTUBE, R/WG	WHELEN	A429	31
21	LS05B	STROBE, LITE, R/WG	SDI	702000-2	34
		FLASHTUBE	MOONEY	880019-501	29
			MOONEY	880021-502	34
21	LS05C	STROBE LT, R/WG	MOONEY	880038-502	30
21	LS06A	P/S, TAIL STROBE	MOONEY	880038-501	29,34
21	LS06B	P/S,TAIL STROBE	MOONEY	880028-507	30
21	LS06C	CABLE, TAIL STROBE	MOONEY	880017-505(ALT)	
21	LS06D	CABLE, TAIL LITE	MOONEY	880017-507	29
21	LS07A	STROBE, TAIL	MOONEY	880020-501	29, 34
21	LS07B	STROBE, TAIL	MOONEY	880041-501	30
21	LS08A	PLUG, TAIL STROBE	AMP	206708-1	30
21	LS09A	RECPT, TAIL STROBE P/S	AMP	1-480305-0	
		PINS (3 EA)	AMP	61118-1 OR 60629-1	
21	MA01A	AUX. PWR. RECEPTACLE		AN2552-3A	
21	MA02A	RELAY, AUX. PWR	C-H	6041H105A	
21	MA02B	RELAY	C-H	6041H105A	
21	MA03A	DIODE, AUX PWR RELAY	SARKES TARZIAN	10H3P	
21	MA04A	DIODE		1N2483	
21	MB01A	C/B, COM 1	MERIDEN	AHW4-	11
21	MB01B	C/B, COM 1	KLIXON	7277-2-	11
21	MB02A	C/B, NAV 1	MERIDEN	AHW4-	11
21	MB02B	C/B, NAV 1	KLIXON	7277-2-	11
21	MB03A	C/B, COM 2	MERIDEN	AHW4-	11
21	MB03B	C/B, COM 2	KLIXON	7277-2-	11
21	MB04A	C/B, NAV 2	MERIDEN	AHW4-	11
21	MB04B	C/B, NAV 2	KLIXON	7277-2-	11
21	MB05A	C/B, XPN1A	MERIDEN	AHW4-	11
21	MB05B	C/B, XPN	KLIXON	7277-2-	11
21	MB06A	C/B, AUD 1	MERIDEN	AHW4-	11
21	MB06B	C/B, AUD	KLIXON	7277-2-	11
21	MB07A	C/B, ADF 1A	MERIDEN	AHW4-	11
21	MB07B	C/B, ADF	KLIXON	7277-2-	11
21	MB08A	C/B, DME 1A	MERIDEN	AHW4-	11
21	MB08B	C/B, DME	KLIXON	7277-2-	11
21	MB09A	SPEAKER, MSO1A	MOONEY	810195	
21	MB09B	SPEAKER	ARA	6707001	
21	MB10A	JACK, MIC 1	SWITCHCRAFT	C-128	
		WASHERS	SWITCHCRAFT	S-102B, S-1029	
21	MB11A	JACK, MIC 2	SWITCHCRAFT	C-128	
		WASHERS	SWITCHCRAFT	S-102B, S-1029	
21	MB12A	MIC KEY, PILOTS	C-H	SA25SAT12-3	
		CAP	C-H	SW53AA2	
		FACE NUT	C-H	15-1049-3	
21	MB13A	MIC KEY, COPILOT	C-H	SA25SAT12-3	
		CAP	C-H	SW53AA2	
		FACE NUT	C-H	15-1049-3	
21	MB14A	JACK, FONE 1	SWITCHCRAFT	C-11	
21	MB15A	JACK, FONE 2	SWITCHCRAFT	C-11	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
21	MB16A/B	C/B, A/P	KLIXON	7277-2-	11
			MERIDEN	AHW4-	11
21	MB17A	SWITCH, RADIO MASTER	ALCO	MST215N	
21	MB18A/B	C/B, R-NAV	KLIXON	7277-2-	11
21	MB19A	C/B, HSI	KLIXON	7277-2-	11
21	MB20A	C/B, ENCODER	KLIXON	7277-2-	11
21	MB21A	C/B, FUEL FLOW	KLIXON	7277-2-	11
21	MB22A	C/B, TELEFONE	KLIXON	7277-2-	11
21	MB23A	C/B, VME	KLIXON	7277-2-	11
21	MB24A	C/B, TELEPHONE	KLIXON	7277-2-	11
21	MB25A	C/B, INVERTER	KLIXON	7277-2-	11
21	MB26A	C/B, RMI	KLIXON	7277-2-	11
21	MB27A	C/B, PROP DE-ICE	MOONEY	930023-023	
21	MB27B/D	C/B, PROP DE-ICE	MOONEY	930023-123/-223	11, 28
21	MB28A	C/B, WX RADAR	MOONEY	930023-021	
21	MB28B	C/B, WX RADAR	MOONEY	930023-121/-221	28
21	MB29A	BUSS, GRD 1	MOONEY	800233-000	
21	MB30A	BUSS, GRD 2	MOONEY	800233-000	
21	MB31A	BUSS, GRD 3	MOONEY	800233-000	
21	MB32A/B	C/B, WX RADAR, COLOR	MOONEY	930023-125/-225	28
21	MB33A	C/B, RADIO BLOWER	KLIXON	7277-2-	11
21	MB34A	RADIO BLOWER ASSY	KING	KA20	
21	MB35A	C/B, STEREO	KLIXON	7277-2-	11
21	MB36A	C/B, ALT. SERVO	KLIXON	7277-2-	11
21	MB37A	C/B, ALT SELECT	KLIXON	7277-2-	11
21	MB38A	C/B, CONVERTER	KI\LIXON	7277-2-	11
21	MB39A	C/B, LORAN	KLIXON	7277-2-	11
21	MB40A/D	C/B, STANDBY VACUUM	MOONEY	930023-127/-227	11,28
21	MB41A	C/B, STORMSCOPE	KLIXON	7277-2-	11
21	MC01A	CIGAR LIGHTER	MOONEY	800336-501	
21	MC01B	CIGAR LIGHTER	MOONEY	800336-503	
21	ME01A	CLOCK, ELECTRIC	BORG INSTR	CA-7212 or CA-7286	
21	ME01B	CLOCK (OPT)	BORG	CA7616	37
21	ME01C	CLOCK,LIGHTED)	MITCHELL	98470-1LW	37
21	NF01A	C/B, FUEL PUMP	MOONEY	930023-011	
21	NF01B	C/B, FUEL PUMP-LO	MOONEY	930023-117	28
21	NF01C	C/B, FUEL PUMP-LO	MOONEY	930023-111	
21	NF01D/F	C/B, FUEL PUMP-LO	MOONEY	930023-117/-217	
21	NF01E	C/B, BOOST PUMP	MOONEY	930023-211	
21	NF02A	FUEL PUMP	DUKES	4140-00-19A (R/B)	
				1499-00-19	
			MOONEY	610153-501	
21	NF02B	FUEL PUMP	DUKES	1499-00-19	
			MOONEY	610153-501	
21	NF03A	C/B, FUEL PUMP-HI	MOONEY	930023-019	
21	NF03B/D	C/B, FUEL PUMP-HI	MOONEY	930023-119/-219	28
21	NF04A	RESISTOR	CLARSTAT	VP-50-KA	12
21	NF04B	VOLT REG, AUX PUMP	ELECTRO-DELTA	VR-436	
		ALT	MOONEY	880047-505	
21	NF05A	RECPT, V/R	AMP	206153-1	
		CLAMP	AMP	206062-1	
21	NF06A	PLUG, V/R	AMP	206060-1	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		CLAMP	AMP	206062-1	
21	NF07A	RECPT, PUMP	AMP	206153-1	
		CLAMP	AMP	206062-1	
21	NF08A	PLUG, PUMP	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	NP01A	SWITCH	CARLING	T1GK6B-1F-WH-A	
21	NP02A	SOLENOID	CONTINENTAL	642200	
21	NP03A	FUSE/HOLDER	LITTEL	311010 or 312010	
21	PA01A	C/B, ALTERNATOR, FIELD	MERIDEN	AHW4-5	
21	PA01B	C/B, ALT FIELD	KLIXON	7277-2-5	
21	PA02A	ALTERNATOR	PRESTOLITE	ALY-8403 or 8420 or ALY6420LS OR ALY8420M	
21	PA02B	ALTERNATOR	FORD	DOFF-10300J	
21	PA02C	ALTERNATOR	LYCOMING	LW 15404	
21	PA02D	ALTERNATOR	CONTINENTAL	641669	
21	PA03A	FILTER	ELPAC	27-3-99-01021	
21	PA03B	FILTER	SPRAGUE	JN-14-1356A	
21	PA03C	FILTER	CAPTOR	A2637	
21	PA03D	FILTER	CAPTOR	A2638	
21	PA04A	C/B, ALT	MECH. PROD.	1648-001-70	
21	PA04B	C/B, ALT. OUTPUT	ETA	41-3-S14-LN2-70	
21	PA05A	CAPACITOR	SANGAMO	500-1041-01	
21	PA06A/B/C	VOLTAGE REG.	MOONEY	880016-501	38
		REPLACES OECO P/N 20082, & ELECTRO-DELTA P/N's VR414 & VR415		880270-505 (SPARES)	13
		ADAPTER CABLE	MOONEY	800331-721	
21	PA07A	PLUG, VOLT REG		MS3106A-18-4S	
		CLAMP		MS3057-10B	
21	PA07B	PLUG, VOLT REG	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PA08B	RECPT, VOLT REG	AMP	206153-1	
		CLAMP		206062-1	
21	PB01A	BATTERY	GILL	G-35(PS6-11)	17
21	PB01B	BATTERY	PRESTOLITE	R-35	
21	PB02A	RELAY,,BATTERY,MASTER	C-H	604IH231	
21	PB02B	RELAY, MASTER	C-H	6041H105A	
21	PB03A	C/B, AUX BUSS	MERIDEN	AHW1-50	
		(ALT)	MECHANICAL PROD	700-001-50	
21	PB03B	C/B, AUX POWER	ETA	41-3-S14-LN2-50	
21	PB04A	RELAY, RADIO	MAGNECRAFT	W89CQX-2	
21	PB04B	RELAY, RADIO MASTER	P & B	MB-4413	6
21	PB05A	SWITCH, MASTER	C-H	9811K828	
21	PB06A	C/B BUS, RADIO RELAY	MOONEY	930023-013	
21	PB06B/D	C/B, RADIO MASTER	MOONEY	930023-113/-213	28
21	PB07A	BUSS BAR, MAIN FLEX			14
21	PB07B	BUSS BAR, MAIN FLEX			14
21	PB07C	BUSS BAR, MAIN FLEX, #1			14
21	PB07D	BUSS BAR, MAIN FLEX, #2			14
21	PB07E	BUSS BAR, MAIN POWER	MOONEY		14
21	PB07F	BUSS BAR, MAIN POWER	MOONEY		14
21	PB07G	BUSS BAR, MAIN POWER	MOONEY		14
21	PB07H	BUSS BAR, MAIN #7	MOONEY		14

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
21 PB07J	BUSS BAR, MAIN POWER	MOONEY		14
21 PB07K	BUSS BAR	MOONEY		14
21 PB07L	BUSS BAR	MOONEY		14
21 PB08A	BUSS BAR, RADIO FLEX	MOONEY		14
21 PB09A	BUSS BAR, AUX	MOONEY	913127-009	
21 PB09B	BUSS BAR, AUX. #1	MOONEY	913127-003	
21 PB09C	BUSS BAR, AUX. #2	MOONEY	913127-003	
21 PB09D	BUSS BAR, CONN 1 & 2	MOONEY	913127-011	
21 PB09E	BUSS BAR, AUXI	MOONEY	913127-013	
21 PB09F/M	BUSS BAR, AUX	MOONEY	913127-023	
21 PB09G	BUSS BAR, AUX. #2	MOONEY	913127-025	
21 PB09H	BUSS BAR, AUX. #1	MOONEY	913127-027	
21 PB09J	BUSS BAR, AUX. #2	MOONEY	913127-029	
21 PB09K	BUSS BAR, AUX.	MOONEY	913127-113	40
21 PB09L	BUSS BAR, AUX. #2	MOONEY	913127-125	
21 PB10A	BUSS BAR MAIN #1	MOONEY	913127-005	
21 PB10B	BUSS BAR MAIN #1	MOONEY	913127-017	
21 PB10C	BUSS BAR MAIN #1	MOONEY	913127-019	
21 PB11A	BUSS BAR MAIN #2	MOONEY	913127-005	
21 PB11B	BUSS BAR MAIN #2	MOONEY	913127-019	
21 PB12A	BUSS BAR MAIN #3	MOONEY	913127-005	
21 PB12B	BUSS BAR RADIO #3	MOONEY	913127-019	
21 PB12C	BUSS BAR MAIN #3	MOONEY	913127-001	
21 PB12D	BUSS BAR RADIO #3	MOONEY	913127-003	
21 PB12E	BUSS BAR RADIO #3	MOONEY	913127-019	41
21 PB12F	BUSS BAR RADIO #2	MOONEY	913127-019	41
21 PB13A	BUSS BAR RADIO #1	MOONEY	913127-005	
21 PB13B	BUSS BAR RADIO #2	MOONEY	913127-019	
21 PB14A	BUSS BAR RADIO #2	MOONEY	913127-005	
21 PB14B	BUSS BAR RADIO #2	MOONEY	913127-019	
21 PB14C	BUSS BAR RADIO #3	MOONEY	913127-019	
21 PB15A	DIODE, RADIO MASTER	SARKES TARZIAN	F-4	
21 PB16A	BUSS BAR MAIN #1	MOONEY	913127-003	
21 PB20A	JUMPER			
21 PB21A	BUSS BAR, RADIO FLEX			15
21 PB21B	BUSS BAR, RAD, FLEX #2	MOONEY		14
21 PB21C	BUSS BAR, RAD, FLEX	MOONEY		15
21 PB21D	BUSS BAR	MOONEY		15
21 PB21E	BUSS BAR	MOONEY		15
21 PB22A	DIODE, MASTER RELAY	SARKES TARZIAN	F-4	
21 PB23A	DIODE, RADIO RELAY	SARKES TARZIAN	F-4	
21 PB24A	SHUNT, RADIO RELAY	KULKA	600RJ-2	
21 PB25A	SHUNT, RADIO RELAY	KULKA	600RJ-2	
21 PB26A	C/B, BATTERY POWER	E T A	41-3-S14-LN2-70	
21 PB27A	BUSS BAR, MAIN POWER	MOONEY	913127-031	
21 PB28A	DIODE	SARKES TARZIAN	F-4	
21 PB29A	BUSS BAR,RADIO #5	MOONEY	913127-001	
21 PB30A	BUSS BAR, RADIO #4	MOONEY	913127-001	
21 PB31A	BUSS BAR, MAIN PWR, #3	MOONEY	913127-003	
21 PB32A	BUSS BAR, RADIO #3	MOONEY	913127-005	
21 PB33A	BUSS BAR, RADIO #2	MOONEY	913127-019	
21 PB34A	BUSS BAR, MAIN PWR #3	MOONEY	913127-035	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
21 PB35A	BUSS BAR, MAIN PWR #3	MOONEY	913127-035	
21 PB36A	BUSS BAR, RADIO #1	MOONEY	913127-035	
21 PB37A	BUSS BAR, MAIN #1	MOONEY	913127-037	
21 PG01A	GENERATOR, STANDBY	ELECTRO MECH	8012	
21 PG02A	FUSE HOLDER	LITTEL	155020 or 155120	
	FUSE(15A SLO-BLO)	LITTEL	313015	
21 PG03A	PLUG, REGULATOR		MS3106A-18-1S	
	CLAMP		MS3057-10A or -10B	
21 PG04A	VOLTAGE REGULATOR	ELECTRO MECH	2073-2	
21 PG05A	C/B, STANDBY GEN	KLIXON	7277-2-15	
21 PG06A	RELAY, BUSS SWITCHING	LEACH	JD1B	
	SOCKET		50-1049-8309	
21 PG07A	RELAY, CONTROL	MAGNACRAFT	W67CSX-2	
	SOCKET		70-303	
21 PG08A	LIGHT, ON	WESTERN IND	501-61K-11K3BP	
	LAMP		WI-7046	
21 PG09A	LIGHT, O.V.	WESTERN IND	501-61K-11K3BP	
	LAMP		WI-7046	
21 PG10A	DIODE, ON LIGHT	SARKES TARZIAN	F-4	
21 PG11A	DIODE, O.V. LIGHT	SARKES TARZIAN	F-4	
21 PG12A	RECPTACLE	AMP	206153-1	
	CLAMP		206062-1	
21 PG13A	PLUG	AMP	206060-1	
21 PG14A	DIODE	SARKES TARZIAN	F-4	
21 PG15A	DIODE, RADIO RELAY	SARKES TARZIAN	F-4	
21 PG16A	RECEPTACLE	AMP	206705-2	
	CLAMP	AMP	206708-1	
	CLAMP	AMP	206062-1	
21 PL01A	PLUG, C/B PANEL	AMP	206037-1	
	CLAMP	AMP	206070-1	
21 PL02A	PLUG, FLT PNL #1	AMP	206037-1	
	CLAMP	AMP	206070-1	
21 PL02B	PLUG, FLT PNL #1	MOONEY	930021-505	
21 PL03A	PLUG, ELEC GEAR	AMP	206037-1	
	CLAMP	AMP	206070-1	
21 PL03B	PLUG, ELEC GEAR	MOONEY	930021-001	
21 PL04A	PLUG, L/ WING	MP	206037-1	
	CLAMP		206070-1	
21 PL04B	PLUG, L/ WING	MOONEY	930021-001	
21 PL05A	PLUG, L/ WG STUB	AMP	206037-1	
	CLAMP		206070-1	
21 PL05B	PLUG, L/ WG STUB	AMP	206708-1	
	CLAMP	AMP	206966-1	
21 PL05C	PLUG, L/ WG STUB	MOONEY	930021-001	
21 PL06A	PLUG, SQUAT SWITCH	AMP	206060-1	
	CLAMP	AMP	202062-1	
21 PL07A	PLUG,CONSOLE #1	AMP	206037-1	
	CLAMP	AMP	202070-1	
21 PL07B	PLUG,CONSOLE #1	AMP	206060-1	
	CLAMP	AMP	202062-1	
21 PL08A	PLUG, HEADLINER	AMP	206037-1	
	CLAMP		206070-1	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
21	PL08B	PLUG, HEADLINER	AMP	206708-1	
		CLAMP		206966-1	
21	PL09A	PLUG, FIREWALL		MS3106A-22-14S	19
		CLAMP		MS3057-12B	
21	PL10A	PLUG, L/ SIDE CABIN, MIDDLE	AMP	206060-1-001	
		CLAMP		206062-1	
21	PL11A	PLUG, FLT PNL #2	AMP	206037-1	
		CLAMP		206070-1	
21	PL11B	PLUG, FLT PNL #2	AMP	206708-1	
		CLAMP		206966-1	
21	PL12A	PLUG, GLARESHIELD	AMP	206037-1	
		CLAMP		206070-1	
21	PL12B	PLUG, ANNUNCIATOR PANEL	AMP	206060-1	
		CLAMP		206062-1	
21	PL13A	PLUG, FIREWALL JUNC. PNL	AMP	206037-1	
		CLAMP	AMP	206070-1	
21	PL13B	PLUG, ACCESS. PNL	AMP	206708-1	
		CLAMP	AMP	206966-1	
21	PL14A	PLUG, L/ SIDE CABIN	AMP	206037-1	
		CLAMP	AMP	206070-1	
21	PL14B	PLUG, L/ SIDE PANEL	MOONEY	930021-001	
21	PL15A	PLUG, ELEC. FLAPS	AMP	206037-1	
		CLAMP	AMP	206070-1	
21	PL16A	PLUG, CONSOLE #2	AMP	206037-1	
		CLAMP	AMP	206070-1	
		CLAMP	AMP	206966-1	
21	PL16B	PLUG, CONSOLE	AMP	206708-1	
		CLAMP	AMP	206966-1	
21	PL17A	PLUG, RELAY PANEL	AMP	206037-1	
		CLAMP	AMP	206070-1	
21	PL18A	PLUG, CLUSTER GAUGE	AMP	206037-1	
		CLAMP	AMP	206070-1	
21	PL18B	PLUG, CLUSTER GAUGE	AMP	206708-1	
		CLAMP	AMP	206966-1	
21	PL19A	PLUG, PILOT'S WHEEL	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL20A	PLUG, COPILOTS WHEEL	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL21A	PLUG, VAC WARN SW	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL22A	PLUG, RADIO PWR, C/B PNL	AMP	206070-1	
21	PL22B	PLUG, AUX PWR, C/B PNL	AMP	206037-2	
		CLAMP	AMP	206070-1	
21	PL23A	PLUG,RADIOPWR RELAY PNI	AMP	206037-2	
		CLAMP	AMP	206070-1	
21	PL24A	PLUG, CABIN TAIL CONE	AMP	206037-1	
		CLAMP	AMP	206070-1	
21	PL24B	PLUG, CABIN TAIL CONE	AMP	206708-1	
		CLAMP	AMP	206966-1	
21	PL24C	PLUG, CABIN, TAIL CONE	AMP	206037-1	
		CLAMP	AMP	206070-1	
21	PL25A	PLUG, R/ WG	AMP	206037-1	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		CLAMP	AMP	206070-1	
21	PL25B	PLUG, R/ WG	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL25C	PLUG, R/ WG	AMP	206708-1	
		CLAMP	AMP	206966-1	
21	PL25D	PLUG, R/ WG	MOONEY	930021-001	
		CLAMP	AMP	206966-1	
21	PL26A	PLUG, R/ WG STUB	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL26B	PLUG, R/ WG NAV	AMP	206708-1	
		CLAMP	AMP	206966-1	
21	PL26C	PLUG, R/ WG STUB	MOONEY	930021-001	
		CLAMP	AMP	206966-1	
21	PL27A	PLUG, TRIM POS. IND	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL28A	PLUG, PILOT'S TRIM	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL29A	PLUG, TAIL	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL29B	PLUG, EMPENNAGE	AMP	206708-1	
		CLAMP	AMP	206966-1	
21	PL30A	PLUG, RADIO, C/B PNL	AMP	206037-1	
		CLAMP	AMP	206070-1	
21	PL30B	PLUG, C/B PNL(OPT)	AMP	206708-1	
		CLAMP	AMP	206966-1	
21	PL30C	PLUG, C/B PNL(OPT)	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL31A	PLUG, RADIO PKG CABLE	AMP	206037-1	
		CLAMP	AMP	206070-1	
21	PL32A	PLUG, XSTRS, CONSOLE	AMP	206037-1	
		CLAMP	AMP	206070-1	
21	PL33A	PLUG, PWR, FLT PNL	AMP	206037-2	
		CLAMP	AMP	206070-1	
21	PL34A	PLUG, PANEL LT CONTROL	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL34B	PLUG, LT CONTROL	AMP	206708-1	
		CLAMP	AMP	206966-1	
21	PL35A	PLUG, GEAR CONTROL	AMP	206708-1	
		CLAMP	AMP	206966-1	
21	PL35B	PLUG, GEAR CONTROL	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL35C	PLUG, GEAR CONTROL #1	AMP	206705-2	
		CLAMP	AMP	206966-1	
21	PL35D	PLUG, GEAR CONTROL #2	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL36A	PLUG, GEAR OVERRIDE	AMP	205060-1	
		CLAMP	AMP	206062-1	
21	PL37A	PLUG, VAC WARN	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL38A	PLUG, ELT SWITCH	AMP	205060-1	
		CLAMP	AMP	206062-1	
21	PL39A	PLUG, OVERHEAD LITE	AMP	206060-1	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		CLAMP	AMP	206062-1	
21	PL40A	PLUG, EMERG FLD	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL41A	PLUG, GLARESHIELD	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL42A	PLUG, HOUR METER	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL43A	PLUG, FLT PNL	AMP	206708-1	
		CLAMP	AMP	206966-1	
21	PL44A	PLUG, GR SAFETY SW	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL45A	PLUG, FIREWALL #2		MS3106A-22-14S	
		CLAMP		MS3057-12B	
21	PL46A	PLUG, AVIONIC PWR	MOONEY	930021-501	
21	PL47A	PLUG, AUDIO INTERCN	AMP	205839-1	
		CLAMP	AMP	206070-1	
21	PL48A	PLUG, FLT PNL DIM	AMP	206037-1	
		CLAMP	AMP	205838-1	
		CLAMP	AMP	206062-1	
21	PL50A	PLUG, C/B DIM	AMP	206062-1	
		CLAMP	AMP	206062-1	
21	PL51A	PLUG, A/P TRIM SW RELAY	AMP	206037-1	
		CLAMP		206070-1	
21	PL52A	PLUG, A/P	AMP	206037-1	
		CLAMP		206070-1	
21	PL53A	PLUG, A/P GRND	AMP	206037-1	
		CLAMP		206070-1	
21	PL53B	PLUG, AVIONICS GRND	AMP	206839-3	
		CLAMP		206070-1	
21	PL53C	PLUG, MAIN CABLE GRND	AMP	206037-1	
		CLAMP		206070-1	
21	PL53D	PLUG, AVIONICS GRND #2	AMP	2067839-3	
		CLAMP		206070-1	
21	PL54A	PLUG, INT PWR	AMP	206708-1	
		CLAMP		206966-1	
21	PL55A	PLUG, COM/NAV POWER	AMP	206060-1	
		CLAMP	AMP	206062-1	
21	PL57A	PLUG, ROLL SERVO CABLE	AMP	206708-1	
		CLAMP		206966-1	
21	PL58A	PLUG, AZIMUTH CABLE	AMP	206708-1	
		CLAMP	AMP	206966-1	
21	PL59A	PLUG, AVIONICS DIM	AMP	206037-1	
		CLAMP		206070-1	
21	PL60A	PLUG, K-4/C-2 NAV REC/A/P	AMP	205839-3	
		CLAMP		206070-1	
21	PL61A	PLUG, K-14 NAV REC/A/P	AMP	205839-3	
		CLAMP		206070-1	
21	PL62A	PLUG, K-14 NAV REC/A/P	AMP	206037-1	
		CLAMP		206070-1	
21	PL63A	PLUG, A/P XFER	AMP	206037-1	
		CLAMP		206070-1	
21	PL64A	PLUG, K-2/K-3 NAV REC/A/P	AMP	205839-3	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		CLAMP		206070-1	
21	PL65A	PLUG, TRIM RELAY	AMP	205838-1	
		CLAMP		206062-1	
21	PL66A	PLUG, TRIM SW	AMP	205838-1	
		CLAMP		206062-1	
21	PL67A	PLUG, AZIMUTH	AMP	206708-1	
		CLAMP		206966-1	
21	PL68A	PLUG, ADF RMI	AMP	205838-1	
		CLAMP		206062-1	
21	PL69A	PLUG, TRIM RELAY	AMP	205838-1	
		CLAMP		206062-1	
21	PL670A	PLUG, TRIM PWR	AMP	206060-1	
		CLAMP		206062-1	
21	PL71A	PLUG, A/P RELAY	AMP	205839-3	
		CLAMP		206070-1	
21	PL72A	PLUG, VOR/GS TRANSFER	AMP	205838-1	
		CLAMP		206062-1	
21	PL73A	PLUG, MKR INVERTER	AMP	205838-1	
		CLAMP		206062-1	
21	PL74A	PLUG, NAV/REC A/P	AMP	205839-3	
		CLAMP		206070-1	
21	PL75A	PLUG. ADF/RMI		206037-1	
		CLAMP		206070-1	
21	PL76A	PLUG, GRND	AMP	205839-3	
		CLAMP		206070-1	
21	PL77A	PLUG, XPDR/ENCODER	AMP	20037-1	
		(KFC 200)			
		CLAMP	AMP	206070-1	
21	PL78A	PLUG, RADIO PKG CABLE		206037-1	
		CLAMP		206070-1	
21	PL79A	PLUG, NAV REC/A/P, K-4/C-2		205839-3	
		CLAMP		206070-1	
21	PS01A	C/B, IGN/TACH/CIG LIGHTER	MERIDEN	AHW4-10	
21	PS01B	C/B, IGN/TACH/CIG LIGHTER	KLIXON	7277-2-10	
21	PS02A	SWITCH, STARTER	MICRO	2D72	
		HOUSING	MICRO	2M1	
		SCREEN, DISPLAY	MICRO	2J5	
		RING, GUARD	MICRO	2K6	
21	PS03A/B	RELAY	C-H	6041H105A	
			R/B MOONEY	940020-501	22
21	PS04A	STARTER	PRESTOLITE	MZ4206	
		(ALT)	PRESTOLITE	MZ4218	
		(ALT)	PRESTOLITE	MZ4222	
21	PS04B	STARTER	PRESTOLITE	MCL-6501	39
		(ALT)	LYCOMING	LW15572	
21	PS05A	DIODE	SARKES TARZIAN	F-4	
21	PS06A	FUSE HOLDER	LITTEL	155020 or 155120	
		FUSE	LITTEL	313001	
21	RC01A	RECPT, C/B PNL	AMP	206036-3	
		CLAMP	AMP	206070-1	
21	RC01B	RECPT, C/B PNL	AMP	206151-1	
		CLAMP	AMP	206138-1	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
21 RC02A	RECPT, FLT PNL #1	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC02B	RECPT, FLT PNL #1	MOONEY	930021-506	
21 RC03A	RECPT, ELEC GEAR	AMP	206036-1	
	CLAMP	AMP	206070-1	
21 RC03B	RECPT, ELEC GEAR	MOONEY	930021-002	
21 RC04A	RECPT, L/ WING	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC04B	RECPT, L/ WING	MOONEY	930021-002	
21 RC05A	RECPT, L/ WING	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC05B	RECPT, L/ WING STUB	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC05C	RECPT, L/ WING STUB	MOONEY	930021-002	
21 RC06A	RECPT, SQUAT SWITCH	AMP	206153-1	
	CLAMP	AMP	206070-1	
21 RC07A	RECPT, CONSOLE #1	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC07B	RECPT, CONSOLE #1	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC08A	RECPT, HEADLINER	AMP	206036-3	19
	CLAMP	AMP	206070-1	
21 RC08B	RECPT, HEADLINGER	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC09A	RECPT, FIREWALL		MS3100A22-14P	19
	CLAMP		MS3057-12B	
21 RC10A	RECPT, L/ SIDE CABIN, MID	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC11A	RECPT, FLT PNL #2	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC11B	RECPT, FLT PNL #2	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC12A	RECPT, GLARESHIELD	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC13A	RECPT, FIREWALL JUNC PNL	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC13B	RECPT, ACCESS. PNT	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC14A	RECPT, L/ SIDE CABIN LOW	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC14B	RECPT, L/ SIDE PNL	MOONEY	930021-002	
21 RC14C	RECPT, L/ SIDE PNL	MOONEY	930021-502	
21 RC15A	RECPT, FLAPS, ELEC	AMP	206036-1	
	CLAMP	AMP	206070-1	
21 RC16A	RECPT, CONSOLE #2	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC16B	RECPT, CONSOLE	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC17A	RECPT, RELAY PNL	AMP	206036-1	
	CLAMP	AMP	206070-1	
21 RC18A	RECPT, CLUSTER GAUGE	AMP	206036-3	
	CLAMP	AMP	206070-1	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
21 RC18B	RECPT, CLUSTER GAUGE	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC19A	RECPT, PILOT'S WHEEL	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC20A	RECPT, COPILOT'S WHEEL	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC21A	RECPT, VAC WARN SW	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC22A	RECPT, RADIO PWR C/B PNL	AMP	206207-1	
	CLAMP	AMP	206070-1	
21 RC22B	RECPT, C/B PNL, AUX PWR	AMP	206036-2	
	CLAMP	AMP	206070-1	
21 RC23A	RECPT, RADIO PWR RLY PNL	AMP	206036-1	
	CLAMP	AMP	206070-1	
21 RC24A	RECPT, CABIN TAILCONE	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC24B	RECPT, CABIN TAILCONE	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC24C	RECPT, CABIN TAILCONE	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC25A	RECPT, R/ WING	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC25B	RECPT, R/ WING	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC25C	RECPT, R/ WING	AMP	206705-1	
	CLAMP	AMP	206070-1	
21 RC25D	RECPT, R/ WING	MOONEY	930021-002	
	CLAMP	AMP	2060966-1	
21 RC26A	RECPT, R/ WIGN STUB	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC26B	RECPT, R/ WING STUB	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC26C	RECPT, R/ WING STUB	MOONEY	930021-002	
	CLAMP	AMP	206966-1	
21 RC27A	RECPT, TRIM POS IND	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC28A	RECPT, PILOT'S TRIM	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC29A	RECPT, TAIL	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC29B	RECPT, TAIL	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC30A	RECPT, RADIOS, C/B PNL	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC30B	RECPT, C/B PNL	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC30C	RECPT, C/B PNL (OPT)	AMP	206060-1	
	CLAMP	AMP	206062-1	
21 RC31A	RECPT, RADIO PKG CABLE	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC32A	RECPT, TRANSISTORS, CONS	AMP	206036-3	
	CLAMP	AMP	206070-1	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
21 RC33A	RECPT, PWR FLT PNL	AMP	206207-1	
	CLAMP	AMP	206070-1	
21 RC34B	RECPT, PNL LT CONTROL	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC34B	RECPT, LIGHT CONTROL	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC35A	RECPT, GEAR CONTROL	AMP	206705-2	
	CLAMP	AMP	207008-	
21 RC35B	RECPT, GEAR CONTROL	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC35C	RECPT, GEAR CONTROL #1	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC35D	RECPT, GEAR CONTROL #2	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC37A	RECPT, VAC WARN	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC38A	RECPT, ELT, SW	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC39A	RECPT, O/H LIGHT, AFT	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC40A	RECPT, EMERG FLD	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC41A	RECPT, BLARESHIEDL	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC42A	RECPT, HOUR METER	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC43A	RECPT, FLT PNL	AMP	206705-2	
	CLAMP	AMP	206966-1	
21 RC43C	RECPT, GO AROUND/WX RADAR		206705-2	
	CLAMP	AMP	206966-1	
21 RC44A	RECPT, GR SAFETY SW	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC45A	RECPT, FIREWALL #2		MS3100A-22-14P	
	CLAMP		MS3057-12B	
21 RC46A	RECPT, AVIONICS PWR	MOONEY	930021-502	
21 RC47A	RECPT, AUDIO INTER	AMP	206152-1	
	CLAMP	AMP	206070-1	
21 RC48A	RECPT, FLT PNL GRND/DIM	AMP	206036-1	
	CLAMP	AMP	206070-1	
21 RC49A	RECPT, C/B GRND	AMP	206841-2	
	CLAMP	AMP	206062-1	
21 RC50A	RECPT, C/B DIM	AMP	206153-1	
	CLAMP	AMP	206062-1	
21 RC51A	RECPT, A/P TRIM SW RELAY	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC52A	RECPT, A/P PWR	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC53A	RECPT, A/P GRND	AMP	206036-3	
	CLAMP	AMP	206070-1	
21 RC53B	RECPT, AVIONICS GRND #1	AMP	206152-1	
	CLAMP	AMP	206070-1	
21 RC53C	RECPT, MAIN CABLE GRND	AMP	206036-3	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		CLAMP	AMP	206070-1	
21	RC53D	RECPT, AVIONICS GRND #2	AMP	206152-1	
		CLAMP	AMP	206070-1	
21	RC54A	RECPT, INTERFACE PWR	AMP	206705-2	
		CLAMP	AMP	206966-1	
21	RC55A	RECPT, COMM/NAV PWR	AMP	206153-1	
		CLAMP		206062-1	
21	RC57A	RECPT, ROLL SERVO CABLE	AMP	206705-2	
		CLAMP		206966-1	
21	RC58A	RECPT, AZIMUTH CABLE	AMP	206705-2	
		CLAMP	AMP	206966-1	
21	RC59A	RECPT, AVIONICS DIM	AMP	206036-3	
		CLAMP	AMP	206070-1	
21	RC59B	A/P DIM		206153-1	
		CLAMP	AMP	206062-1	
21	RC60A	RECPT, K-4/C-2,NAVREC/A/P		206152-1	
		CLAMP	AMP	206070-1	
21	RC61A	RECPT, K-14, NAVREC/A/P		206152-1	
		CLAMP	AMP	206070-1	
21	RC62A	RECPT, K-14, NAVREC/A/P		206036-3	
		CLAMP	AMP	206070-1	
21	RC63A	RECPT, A/P TRANSFER		206036-1	
		CLAMP	AMP	206070-1	
21	RC64A	RECPT, K-2/K-3, NAVREC/A/P		206152-1	
		CLAMP	AMP	206070-1	
21	RC65A	RECPT, TRIM RELAY		205841-2	
		CLAMP	AMP	206062-1	
21	RC66A	RECPT, TRIM SW		205841-2	
		CLAMP	AMP	206062-1	
21	RC67A	RECPT, AZIMUTH		206705-2	
		CLAMP	AMP	206966-1	
21	RC68A	RECPT, ADF/RMI		205841-2	
		CLAMP	AMP	206062-1	
21	RC69A	RECPT, TRIM RELAY		205841-2	
		CLAMP	AMP	206062-1	
21	RC70A	RECPT, TRIM PWR		206153-1	
		CLAMP	AMP	206062-1	
21	RC71A	RECPT, A/P RELAY		206152-1	
		CLAMP	AMP	206070-1	
21	RC72A	RECPT, VOR/GS TRANSFER		205841-1	
		CLAMP	AMP	206062-1	
21	RC73A	RECPT, MKR INVERTER		205841-1	
		CLAMP	AMP	206062-1	
21	RC74A	RECPT, NAVREC/A/P		206152-1	
		CLAMP	AMP	206070-1	
21	RC75A	RECPT, ADF/RMI		206036-3	
		CLAMP	AMP	206070-1	
21	RC76A	RECPT, GRND	AMP	206152-1	
		CLAMP	AMP	206070-1	
21	RC77A	RECPT, XDCR/ENCDR KFC-200	AMP	206036-2	
		CLAMP	AMP	206070-1	
21	RC78A	RECPT, RADIO PKG CABLE	AMP	206036-3	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		CLAMP	AMP	206070-1	
21	RC79A	RECPT, K-4/C-2 NAVREC/A/P	AMP	206152-1	
		CLAMP	AMP	206070-1	
21	WA01A	LIGHT, ALT WARN	KORRY	250-650-5821-003	
		BULB (2)	GE	330	
21	WA02A	RECTIFIER	SARKES TARZIAN	F-4	
21	WA03A	SWITCH, LO VOLT DET	ELECTRO DELTA	LV 14	
21	WA03B	SWITCH, LO VOLT DET	ELECTRO DELTA	LV-14F	
21	WE01A	C/B, GEAR WARN	MERIDEN	AHW4-2	
21	WE01B	C/B, GEAR WARN	KLIXON	7277-2-2	
21	WE02A	LIGHT, GEAR UNSAFE	KORRY	250-650-5821-006	
		BULB	GE	330	
21	WE03A	SWITCH, THROTTLE	MICRO	1SM1-T	
		ACTUATOR	MICRO	JS-221	
21	WE03B	SWITCH, THROTTLE	C-H	SS12ET10-102L3	
21	WE03C	SWITCH, THROTTLE	MICRO	V3-1	
		ACTUATOR	MICRO	JV-5	
21	WE04A	HORN, GEAR UP, WARN	MALLORY	SC628P	
21	WE05A	RECTIFIER	SARKES TARZIAN	F-4	
21	WE06A	LIGHT, GEAR POSITION	SLOAN	855S-0-U	
		BULB (1)	GE	327	
21	WE07A	LIGHT, GEAR DOWN	KORRY	250-650-5821-007	
		BULB (2)	GE	330	
21	WE08A	DIODE, GEAR UNSAFE	SARKES TARZIAN	F-4	
21	WE09A	DIODE, GEAR DOWN	SARKES TARZIAN	F-4	
21	WE10A	DIODE, GEAR HORN	SARKES TARZIAN	F-4	
21	WE11A	RESISTOR, DIM		(50 OHM -5 WATT)	
21	WE12A	DIODE, DIM	SARKES TARZIAN	F-4	
21	WF01A	LIGHT, LOW FUEL PRESS	KORRY	250-650-5821-004	
		BULB (2)	GE	330	
21	WF03A	RECTIFIER	SARKES TARZIAN	F-4	
21	WF04A	PLUG-SWITCH	AMPHENOL	126-223-1000	
21	WL01A	FUSEHOLDER	LITTEL	155020	
		FUSE	LITTEL	311011	
21	WL02A	LIGHT, LANDING IND	KORRY	250650-5821-005	
		BULBS (2)	GE	330	
21	WL03A	RECTIFIER	SARKES TARZIAN	F-4	
21	WS01A	C/B, STALL WARN HORN	MERIDEN	AHW4-2	
21	WS01B	C/B, STALL WARN HORN	KLIXON	7277-2-2	
21	WS02A	HORN, STALL WARNING	MALLORY	SC628	
21	WS03A	SWITCH, PRE-STALL WARN	SAFE FLIGHT	C46001	
21	WT01A	SWITCH, PRESS TO TEST	ALCO	MSP205R	
21	WT02A	C/B, ANNUNCIATOR	KLIXON	7277-2-2	
21	WT03A	ANNUNCIATOR	IAI	500D0024	
		LAMPS	CHICAGO MINIATURE	CM7-7330	
21	WT03B	ANNUNCIATOR	IAI	500D0038B	20
		LAMPS	CHICAGO MINIATURE	CM7-7330	
21	WT03F	ANNUNCIATOR	IAI	500D0038-007	20
		LAMPS	CHICAGO MINIATURE	CM7-7330	
21	WT03G	ANNUNCIATOR	MOONEY	880025-501	
		LAMPS (8)	CHICAGO MINIATURE	CM7-7330	
21	WT03H	ANNUNCIATOR	MOONEY	880025-515	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
21	WT03J	ANNUNCIATOR	MOONEY	880025-511	
		LAMPS	CHICAGO MINIATURE	CM7-7330	
21	WT03K	ANNUNCIATOR	MOONEY	880025-513	
21	WT04A	PLUG, ANNUNCIATOR	MOLEX	09-50-3121	
		PIN	MOLEX	08-50-106	
21	WV01A	C/B, VACUUM WARN	MERIDEN	AHW4-2	
21	WV01B	C/B, VACUUM WARN	KLIXON	7277-2-2	
21	WV02A	SWITCH, VACUUM WARN	MOONEY	880012-501	21
21	WV02B	SWITCH, VAC. WARN LO	WHITMAN GENERAL	P118V-IN-K5L-1	21
21	WV02C	SWITCH, VAC. WARN HI	WHITMAN GENERAL	P118V-IN-K4L-2	21
21	WV03A	LIGHT, LOW VAC	KORRY	250-650-5821-002	
		BULB (2)	GE	330	
21	WV04A	LIGHT, HIGH VAC	KORRY	250-650-5821-001	
		BULB (2)	GE	330	
21	WV04B	LIGHT, VAC	KORRY	250-650-5821-009	
		BULB (2)	GE	330	
21	WV05A	RECTIFIER, LO	SARKES TARZIAN	F-4	
21	WV06A	RECTIFIER, HI	SARKES TARZIAN	F-4	
21	WV07A	SWITCH, VAC LT, FLASHER	ELECTRO DELTA	FL1	
21	WW01A	SWITCH, RAM AIR	MICRO	V3-1	
		ACTUATOR	MICRO	JV-5	
21	WW01B	SWITCH, ALTERNATE AIR	CHERRY	E51-50B	
		LIGHT DIMMER SW	MOONEY	8800344	
		BOX RHEOSTAT	ALLEN-BRADLEY	JS1N056P02MA	
		TRANSISTOR	RCA	2N3055	
		TRANSISTOR (ALT)	RCA	2N3773	
		FUSE	McGRAW-EDISON	FM01-5A	
		RECEPTACLE	AMP	206705-2	

NOTES:

1. Switch 8906k2876 may be used by painting black handle with white epoxy paint.
2. Alternate for V3L–3 is V3–1 switch with JV–5 actuator.
3. 0506–505 is replacement for –004; S/N 18928 & UP are modified.
4. Or equivalent

Sprague	RB1535
Dale	MFS–1/2(15K)
TWX	1/2 W (15k)

5. Set for 75 MPH (+/–5.0) (65 +7/–4 KIAS) increasing actuation. (2.775 in. H_2O, +0.384/–0.358 in.)
6. Use with socket, 27E122; spring, 206176; stand–off, (2 ea) 21B212. (AN515–6R5 screw, AN936–A6 washer).
7. Alternate L110–1–N–K3L or Mooney P/N 880013–501.
8. Mounting Hardware

RCA		KC2B
Mica Insulating Wafer	H.H. Smith	6291
Nylon Shoulder Washer	H.H. Smith	2666
Solder Lug	H.H. Smith	1410–10
Metal Washer	H.H. Smith	1152
Nut	H.H. Smith	1367

9. Alternate Holders

Leecraft	07–05
Drake	4151–014

10. Alt. Resistors

Sprague	243E2015
Drake	VC5E–200

11. Maximum circuit breaker rating is shown, amperage of installed circuit breaker is determined by particular unit installed.
12. Alternate

Ohmite	0561
Mallory	5AV10

13. Replace VR414 & 20082 with 880016–501 & 800331–721 cable.
14. Manufacture using “Alpha Wire Co.” braid #2172 or #1233/2 (2 ea) & AMP terminals as necessary to connect the buss bars as shown on schematic. Cover braid with PVC 105/A tubing for insulation.
15. Same as 14 except use (1 ea) braid.
16. Ground tabs (“250” series)

”As required”	AMP	41478
	AMP	41480

17. Alternate

Prestolite	R35

18. Replace with MS3106A–22–14P when used in conjunction with MS3450KT22–14S.
19. Replace with MS3450KT22–14S receptacle & MS3417–22–N cable clamp or Matrix #9440KT22–14S.
20. MFG Chicago Minature Lamp Co.
21. Set switches with room temperature between 60^o F and 80^o F. Set low at 4.25 “ Hg. +/–0.25” and high at 5.50” Hg. +0.20/–0.00” increasing vacuum. Switches may not vary more than 0.50” Hg. between 0^o F and 110^o F.
22. Replace with 940020–501, (Cutler–Hammer solenoid P/N 6041H53).
23. Alternate Turn Coordinators:

Talley Corp. (w/out lights)	1394T100–7Z
United Instr.(w/out lights)	9100 Code No. 6

24. Alternate Turn & Bank:

Talley Corp. (w/out lights)	1234T100–7TZ
Talley Corp. (w/out lights)	1234T100–3TZ

25. Alternate Fuel Flow Gauges:

Mooney (Gals/hr – lighted)	880034–501
Mooney (liters/hr – lighted)	880034–503/–509
Mooney (Imperial gals/hr – lighted)	880034–511
Mooney (Pounds/hr)	880034–505

NOTES (con't.)

26. Alternate Landing Gear:
    Mooney 880037-501
27. Use buss bar 913127-029, -023 or -013 as required by installation of optional equipment.
28. Effective 25-0821 & ON (All are 930023-2xx C/B's). Effective 24-1464 & ON also.
29. Effective 25-0001 thru 25-0788 or 24-0024 thru 24-1037.
30. Effective 25-0789 & ON or 24-1426 & ON.
31. Effective 24-0001 thru 24-0023 (24-0024 thru 24-1037 use 21 LS02B, 21 LS03B, 21 LS04B & 21 LS05B)
32. Effective 25-0447 thru 25-0780 or 24-1038 thru 24-1425.
33. Standard on 24-1211 & ON.
34. Effective 25-0613 thru 25-0780.
35. Alternate Turn Coordinator (w/ lights):
    United Instr 9112-Code No. 9
    Astronautics 303990-113MSC
    Talley 1394T100-3Z
36. Use 1 ea. MS35334-21 or MS2898 (Alan-Bradley) internal tooth lockwasher with each light if not supplied by Sloan.
37. Alternate Clock (lighted):
    Mid-Continent MD-88L
    Mid-Continent MD-88L(ET)
    (w/ light tray) BA14-24-BW2
38. Alternate Voltage Regulator:
    Lamar B-00371-6.
39. Alternate Starter (21 PS04B):
    TCM 646238
40. Use buss bars 913127-123,-125 as required, by installation of Optional Equipment.
41. CUT TO SIZE

91-20-02 - ELECTRICAL SYSTEM HARDWARE CHART - 28 VOLT

SERIAL NUMBER's 25-1000 THRU 25-1224, MOONEY DRAWING NO. 800350 (AV-9)

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JKL CB101A	C/B DEFROSTER BLOWER	KLIXON	7277-2-2	
JKL CB102A	SWITCH, DEFROST BLOWER	CHERRY	E51-50B	
JKL CB103A	MOTOR, DEFROSTER BLOWER	MOONEY	640317-501	
JKL CB104A	RECPT, DEFROSTER BLOWER	AMP	1-408319-0	
	PINS	AMP	60620-1	
JKL CB105A	PLUG, DEFROSTER BLOWER	AMP	1-480318-0	
	SOCKETS	AMP	60619-1	
JK CC101A	C/B, COWL FLAP	KLIXON	7277-2-5	
JK CC102A	SWITCH, COWL FLAP	MICRO	12TW1-1	
	CAP, WHITE	MICRO	15PA90-4W	
K CC103A	ACTUATOR, COWL FLAP	MOONEY	880050-501	
JK CC104A	SWITCH,OPEN LIMIT	MICRO	1SE1-T	
	ACTUATOR	MICRO	JE-5	
JK CC105A	SWITCH, CLOSE LIMIT	MICRO	1SE1-T	
	ACTUATOR	MICRO	JE-5	
JK CC106A	RECPT, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK CC107A	PLUG, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JKL CF101A	C/B FLAP ACT	KLIXON	7277-2-5	
JKL CF102A	SWITCH, FLAP	C-H	8906K3149	
JKL CF103A	SWITCH, UP LIMIT	MICRO	V3-1	4
JKL CF104A	SWITCH, DOWN LIMIT	MICRO	V3-1	4
JK CF106A	SWITCH, TAKEOFF, UP	MICRO	V3-1	4
JK CF107A	SWITCH, TAKEOFF, DOWN	MICRO	V3-1	4
	ACTUATOR	MICRO	JV-5	4
JKL CF105A	ACTUATOR, FLAP	MOONEY	750105-501	
JK CF108A	RELAY, UP	MAGNACRAFT	W67RCSX-3	
JK CF109A	RELAY, DN	MAGNACRAFT	W67CSX-3	
	BASE	MAGNACRAFT	70-30	
JK CF11OA	SWITCH, FLAP	C-H	8906K4064	
	ALT)	MICRO	2TL149-12L	
	KNOB	MOONEY	917026-501	
JK CF111A/112A	DIODE		1N2483	
J CF113A	PLUG, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
J CF114A	RECPT, 4 PIN	AMP	206153-1	
	CLAMP	AMP	202062-1	
L CF150A	C/B TRIM/FLAP IND	KLIXON	7277-2-1	
L CF151A	INDICATOR,TRIM/FLAP	PENN AIRBORNE	9A1590	
L CF152A	PLUG, TRIM/FLAP IND	ITT	DA15S	
	CLAMP	ITT	DA51210-1	
	LOCK RETAINER	ITT	DA51220-1	
L CF153A	PLUG,FLAP POSITION, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
L CF154A	RECPT,FLAP POSITION, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
L CF155A	POTENTIOMETER, FLAP POS.	ALLEN-BRADLEY	WA2-G056S502UA	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
JKL	CT101A	C/B ELECTRIC TRIM	KLIXON	7277-2-3	5
JKL	CT101A	C/B ELECTRIC TRIM	KLIXON	7277-2-5	5
L	CT150A	POTENIOMETER, TRIM POS.	ALLEN-BRADLEY	WA2-G056S502UA	
L	CT151A	PLUG, TRIM POSITION, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
L	CT152A	RECPT,TRIM POSITION, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	CV101A	C/B, STBY VAC	MOONEY	930023-245	
JK	CV102A	CLUTCH, STBY VAC PUMP	AEROSAFE	S8112-472	
JK	CV103A	FUSE HOLDER	LITTEL	155020 or 155120	
		FUSE	LITTEL	313001	
JK	CV104A	ANNUNCIATOR	MOONEY	800346-501	
JK	CV105A	RELAY	MOONEY	830131-511	
JK	CV106A	DIODE	- - -	1N2483	
JK	CV107A	PLUG	AMP	1-480319-0	
		SOCKETS	AMP	60619-1	
JK	CV108A	RECPT, 2 PIN	AMP	1-480319-0	
		PINS	AMP	60620-1	
JK	CV109A	RECPT, 2 PIN	AMP	1-480319-0	
		PINS	AMP	60620-1	
JK	CV110A	PLUG, 2 PIN	AMP	1-480318-0	
		SOCKETS	AMP	60619-1	
JK	DA101A	LOADMETER (SINGLE)	B & D	0326-004	
JK	DA101B	LOADMETER (DUAL)	B & D	0326-003	
J	DA101D	AMMETER	MOONEY	640281-509	
		LIGHT BULB ASSY	ROCHESTER	0105S00004	
		BULB	GE	313	
JK	DA102A	CONN, AMMETER	S.E.C.	PW06B12-10S	
JK	DA102A	CONN, AMMETER (ALT)	BENDIX	PT06A-12-10S-SR	
JK	DA103A	SWITCH, PUSH, VOLTAGE	C-H	SA31SDT12-1	
		LIGHT BULB ASSY	ROCHESTER	0105S00003	
		(ALT)	ROCHESTER	0153500003	
		BULB	GE	313	
JK	DA104A	SHUNT, AMMETER (ALT'NR #1)	EMPRO	MLA-70A-50MV	
JK	DA104B	SHUNT, AMMETER (ALT'NR)	EMPRO	MLA-55A-50MV	
JK	DA105A	FUSEHOLDER (+ ALT # 1)	McGRAW-EDISON	FHN42W	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
JK	DA106A	FUSEHOLDER (- ALT # 1)	McGRAW-EDISON	FHN42W	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
JK	DA107A	SHUNT, AMMETER, LOAD	EMPRO	MLB-210A-50MV	
JK	DA107B	SHUNT, AMMETER, LOAD	EMPRO	MLB-165A-50MV	
JK	DA107C	SHUNT, AMMETER, LOAD	EMPRO	MLB-105A-50MV	
JK	DA107D	SHUNT, AMMETER, LOAD	EMPRO	MLA-60A-100MV	
JK	DA108A	FUSEHOLDER (-LOAD)	McGRAW-EDISON	FHN42W	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
JK	DA109A	FUSEHOLDER, (+LOAD)	McGRAW-EDISON	FHN42W	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
JK	DA110A	AMMETER, SHUNT (ALT #2)	EMPRO	MLA-70A-50MV	
		AMMETER, SHUNT (ALT.)	EMPRO	MLA-55A-50MV	
JK	DA111A	FUSEHOLDER (+ ALT. #2)	McGRAW-EDISON	FHN42W	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
JK	DA112A	FUSEHOLDER (- ALT. #2)	McGRAW-EDISON	FHN42W	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
L	DA150A	C/B VOLT/AMP IND, LT	KLIXON	7277-2-1	
L	DA151A	C/B VOLT/AMP IND, RT	KLIXON	7277-2-1	
L	DA152A	INDICATOR, VOLT/AMP, RT	PENN AIRBORNE	9A1570	
L	DA153A	PLUG, VOLT/AMP IND	ITT	DA15S	
		CLAMP	ITT	DA51210	
		LOCK RETAINER	ITT	DA51220-1	
L	DA154A	INDICATOR, VOLT/AMP, RT	PENN AIRBORNE	9A1570	
L	DA155A	PLUG, VOLT/AMP IND	ITT	DA15S	
		CLAMP	ITT	DA51210	
		LOCK RETAINER	ITT	DA51220-1	
L	DA156A	SHUNT, LEFT LOAD	EMPRO	MLA-105A	50MV
L	DA157A	SHUNT, LEFT ALTERNATOR	EMPRO	MLA-70A-50MV	
L	DA158A	SHUNT, RIGHT LOAD	EMPRO	MLA-105A	50MV
L	DA159A	SHUNT, RIGHT ALTERNATOR	EMPRO	MLA-70A-50MV	
L	DA160A	FUSEHOLDR,LT LOAD SHUNT(-)	McGRAW-EDISON	FHN42A	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
L	DA161A	FUSEHOLDR,LT LOAD SHUNT(+)	McGRAW-EDISON	FHN42A	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
L	DA162A	FUSEHOLDR,LT ALT SHUNT (+)	McGRAW-EDISON	FHN42A	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
L	DA163A	FUSEHOLDR,LT ALT SHUNT (-)	McGRAW-EDISON	FHN42A	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
L	DA164A	FUSEHLDR,RT LOAD SHUNT(+)	McGRAW-EDISON	FHN42A	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
L	DA165A	FUSEHLDR,RT LOAD SHUNT (-)	McGRAW-EDISON	FHN42A	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
L	DA166A	FUSEHLDR,RT ALT SHUNT (-)	McGRAW-EDISON	FHN42A	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
L	DA167A	FUSEHLDR,RT ALT SHUNT (+)	McGRAW-EDISON	FHN42A	
		FUSE, 5A	McGRAW-EDISON	FM01-5A	
JKL	DB101A	C/B TURN COORD	KLIXON	7277-2-2	
JK	DB102A	TURN CO-ORDINATOR	U.I.	9013CODE N.5	
JK	DB102B	TURN CO-ORDINATOR	ASTRONAUTICS	303990-028MSC	
JKL	DB103A	PLUG, TURN COORD		MS3106A-10SL-3S	
		CABLE CLAMP		MS3507-4A or-4B	
L	DB150A	TURN COORDINATOR	UI	9551B CODE N.541	
JK	DC101A	CYL HD TEMP PROBE	MOONEY	880010-503	
L	DC150A	C/B OIL TEMP/CHT	KLIXON	7277-2-1	
L	DC151A	CHT/OIL TEMP IND	PENN AIRBORNE	9A1630	
L	DC152A	PLUG, CHT/OIL TEMP	ITT	DB25S	
		CLAMP	ITT	DB51212	
		LOCK RETAINER	ITT	DB51221-1	
L	DC153A	SWITCH, CHT	GRAY HILL	71AD30-02-2-AJN	
		KNOB	RAYTHEON	50-3-1G	
L	DC154A	PLUG, CHT, 16 PIN	AMP	206037-1	
		CLAMP	AMP	206070-1	
L	DC155A	RECPT, CHT, 16 PIN	AMP	206036-3	
		CLAMP	AMP	206070-1	
L	DC156A	PROBE, CHT-CYL #1		MS24482-1 **	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
L	DC157A	PROBE, CHT-CYL #2		MS24482-1 **	
L	DC158A	PROBE, CHT-CYL #3		MS24482-1 **	
L	DC159A	PROBE, CHT-CYL #4		MS24482-1 **	
L	DC160A	PROBE, CHT-CYL #5		MS24482-1 **	
L	DC161A	PROBE, CHT-CYL #6		MS24482-1 **	
		** AN5546-1 (ALT) -EITHER REQUIRES AN4076-1 ADAPTER			
J	DD101A	C/B, OAT/EGT	KLIXON	7277-2-2	
J	DD102A	GAUGE, OAT/EGT	MOONEY	880001-507	
J	DD102B	GAUGE, OAT/EGT,4 PRBE (OPT)	B & D	0230-003	
J	DD103A	PLUG,, OAT/EGT	AMP	205838-1	
		CLAMP, CABLE	AMP	206062-1	
JKL	DD104A	PROBE, OAT	MOONEY	880004-501	
L	DD150A	C/B OAT IND	KLIXON	7277-2-1	
L	DD151A	INDICATOR, OAT	PENN AIRBORNE	9A1580	
L	DD152A	PLUG, OAT	ITT	DA15S	
		CLAMP	ITT	DA51210	
		LOCK RETAINER	ITT	DA51220-1	
J	DF101A	TRANSMTR,FUEL QTY, LT, I/B	MOONEY	610242-001	
J	DF103A	TRANSMTR,FUEL QTY, RT, I/B	MOONEY	610242-001	
JKL	DF102A	TRANSMTR,FUEL QTY,O/B, LT	MOONEY	610243-003	
JKL	DF104A	TRANSMTR,FUEL QTY,O/B, RT	MOONEY	610243-001	
KL	DF105A	TRANSMTR,FUEL QTY,I/B, LT	MOONEY	610242-003	
KL	DF106A	TRANSMTR,FUEL QTY,I/B, RT	MOONEY	610242-003	
L	DF150A	C/B FUEL QTY, LH/RH	KLIXON	7277-2-1	
L	DF151A	FUEL QTY IND, L/R	PENN AIRBORNE	9A1620-2	
L	DF152A	PLUG, FUEL QTY, L/R	ITT	DB25S	
		CLAMP	ITT	DB51212	
		LOCK RETAINER	ITT	DB51221-1	
JK	DG101A	C/B, CLUSTER GAUGE	KLIXON	7277-2-5	
J	DG102A	GAUGE, CLUSTER	MOONEY	640281-523	
K	DG103A	GAUGE, CLUSTER	MOONEY	640281-525	
L	DG150A	C/B INSTRUMENT DISPLAY	KLIXON	7277-2-1	
L	DG151A	INSTRUMENT DISPLAY	PENN AIRBORNE	9A1600-2	
L	DG152A	PLUG, INSTR. DISPLAY	ITT	DB25S	
		CLAMP	ITT	DB51212	
		LOCK RETAINER	ITT	DB51221-1	
L	DG153A	C/B INSTRUMENT PTT	KLIXON	7277-2-1	
L	DG154A	SWITCH, INSTRUMENT PTT	ALCOSWITCH	MPE106F	
		CAP, BLACK	ALCOSWITCH	C-22	
L	DG155A	PLUG, 9 PIN, PTT	AMP	206708-1	
		CLAMP	AMP	206966-1	
L	DG156A	RECPT, PTT, 9 PIN	AMP	206705-2	
		CLAMP	AMP	206966-1	
L	DG157A	PLUG, GRND #7, 28 PIN	AMP	205839-3	
		CLAMP	AMP	206070-1	
L	DG158A	RECPT, GRND #7, 28 PIN	AMP	206152-1	
		CLAMP	AMP	206070-1	
JK	DH101A	PROPE, OIL TEMP	MOONEY	880009-501	
		WASHER		AN900-10 or MS35769-11	
L	DH150A	PROBE, OIL TEMP	PORSCHE	933.606.002.00	
JK	DJ101A	XDUCR, OIL PRESS	MOONEY	880046-501	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
JK	DJ102A	PLUG, OIL PRESS		MS3106A10SL-3S	
		CLAMP, CABLE		MS3057-4A/B	
L	DJ150A	XDUCER, OIL PRESS	DRUCK	PDCR 821-0662 (100 PSIG)	
L	DJ151A	PLUG, OIL PRESS, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
L	DJ152A	RECPT, OIL PRESS, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	DJ175A	XDUCR, OIL PRESS	DRUCK	PDCR821-0662-100	
		(ALT)	KULITE	APT-154-1000-100PSIG	
JK	DJ176A	AMPLIFIER, OIL PRESS	IAI	950D0311-003	
JK	DJ178A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
JK	DJ179A	RECPT, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	DJ180A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
JK	DJ181A	RECPT, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
J	DK101A	XDUCR, FUEL PRESS	MOONEY	880045-501	
J	DK102A	PLUG, FUEL PRESS XDUCR		MS3106A10SL-3S	
L	DK150A	C/B FUEL/OIL PRESSURE	KLIXON	7277-2-1	
L	DK151A	INDICATOR, FUEL/OIL PRESS	PENN AIRBORNE	9A1640	
	LDK152A	PLUG, FUEL/OIL PRESS	ITT	DB25S	
		CLAMP	ITT	DB51212-1	
		LOCK RETAINER	ITT	DB51221-1	
L	DK153A	XDUCER, FUEL PRESS	DRUCK	PDCR 821-0062 (100 PSIG)	
L	DK154A	PLUG, FUEL PRESS, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
L	DK155A	RECPT, FUEL PRESS, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
J	DK175A	XDUCR, FUEL PRESS	DRUCK	PDCR821-0662-30	
		(ALT)	KULITE	APT-153-1000-30PSIG	
J	DK176A	AMPLIFIER, FUEL PRESS	IAI	950D0311-001	
J	DK177A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
J	DK178A	RECPT, 4 PIN	AMP	260153-1	
		CLAMP	AMP	206062-1	
J	DK179A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
J	DK180A	RECPT, 4 PIN	AMP	260153-1	
		CLAMP	AMP	206062-1	
J	DL101A	TACHOMETER (POINTS)	MOONEY	880039-511	
K	DL102A	TACHOMETER	MOONEY	880039-509	
K	DL102B	TACHOMETER	MOONEY	880039-513	
K	DL102C	TACH (RPLCMT FOR - DL102B)	MOONEY	880039-517	
			B & D	0520-006	
JK	DL103A	PLUG-TACH		MS3106A14S-5S	
K	DL103A	TACH SENSOR	B & D	0402-102	
		TACH SENSOR (ALT)	B & D	0402-104	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
JK	DL104A	RECPT, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	DL105A	PLUG	AMP	206060-1	
		CLAMP	AMP	206062-1	
J	DL107A	TACHOMETER	MOONEY	880039-507	
J	DL108A	TACH GENERATOR	MOONEY	880053-501	
			B & D	0400-004	
J	DL109A	CABLE ASSY	MOONEY	880003-501	
J	DL110A	TACHOMETER	MOONEY	880039-515	
			B & D	0520-003	
L	DL150A	DIODE, RPM/FUEL FLOW, LT		1N2483	
L	DL151A	DIODE, RPM/FUEL FLOW, RT		1N2483	
L	DL152A	INDICATOR, RPM/FUEL FLOW	PENN AIRBORNE	9A1610-2	
L	DL153A	PLUG, RPM/FUEL FLOW	ITT	DB25S	
		CLAMP	ITT	DB51212	
		LOCK RETAINER	ITT	DB51221-1	
L	DL157A	SENSOR, RPM #2, RT	PORSCHE	933.602.002.01	
L	DL158A	SENSOR, RPM #1, LT	PORSCHE	933.602.002.01	
	DM101A	HOUR METER	MOONEY	880035-507	
K	DM102A	HOUR METER	MOONEY	880035-505	
L	DM150A	HOUR METER	AIRPAX	K4205 ***	
		*** K4207 or KF4207 (ALT)			
L	DM151A	RECPT, HOUR METER, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
L	DM152A	PLUG, HOUR METER, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
JKL	DP101A	C/B, PITOT HEAT	MOONEY	930023-205	
JK	DP101A	C/B, PITOT HEAT (SPARES)	MOONEY	930023-241	
JKL	DP102A	PITOT, HEATED	AERO INST	PH502-24 ****	
		**** AN5812-1 (ALT)			
JKL	DP103A	PLUG, PITOT HEAT		AN3115-1	
		SOCKETS		AN3116-1	
JK	DP104A	BOARD ASSY	MOONEY	940002-001	
JK	DP104B	CURRENT MONITOR (SPARES)	MOONEY	800221-501	
JK	DP105A	FUSEHOLDER	LITTEL	155020 or 155120	
		FUSE, 1A	LITTEL	313001	
JK	DP106A	PLUG	AMP	1-480303-0	
		SOCKETS	AMP	60619-1	
JK	DP107A	RECPT	AMP	1-480305-0	
		PINS	AMP	60620-1	
JK	DP108A	LIGHT ASSY	MOONEY	800346-503	
L	DP150A	RELAY BOX, CURRENT DET.	MOONEY	800221-501	
L	DP150B	RELAY BOX, CURRENT DET.	MOONEY	800221-503	
L	DP151A	PLUG, CUR/DECT RELAY	AMP	206060-1	
		CLAMP	AMP	206062-1	
L	DP152A	FUSEHOLDER	LITTEL	155020 or 155120	
		FUSE, 5A-3AG-SLO-BLO	LITTEL	313005	
K	DR101A	C/B, TIT	KLIXON	7277-2-2	
K	DR102A	INDICATOR, TIT	MOONEY	880051-501	
K	DR102B	INDICATOR, TIT/EGT	MOONEY	880051-503	
K	DR103A	PLUG, TIT	AMP	205838-1	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		CLAMP	AMP	206062-1	
K	DR103B	PLUG, 28 PIN	AMP	205839-3	
		CLAMP	AMP	206070-1	
K	DR104A	PROBE, TIT	MOONEY	880005-501	
K	DR104A	PROVE, TIT (ALT)	MOONEY	880005-503	
K	DR104B	PROBE, TIT	MOONEY	880055-501	
J	DT101A	PROBE, EGT - CYL #1	MOONEY	880005-501	
		PROBE, EGT - CYL #1 (ALT)	MOONEY	880005-503	
		PROBE, EGT - CYL #1 (ALT)	MOONEY	660110-000	
K	DT101A	PROBE, EGT- CYL #1	MOONEY	880005-501	
		PROBE, EGT- CYL #1 (ALT)	MOONEY	880005-503	
K	DT102A	PROBE, EGT- CYL #2	MOONEY	880005-501	
		PROBE, EGT- CYL #2 (ALT)	MOONEY	880005-503	
K	DT103A	PROBE, EGT-CYL #3	MOONEY	880005-501	
		PROBE, EGT-CYL #3 (ALT)	MOONEY	880005-503	
K	DT104A	PROBE, EGT-CYL #4	MOONEY	880005-501	
		PROBE, EGT-CYL #4 (ALT)	MOONEY	880005-503	
K	DT105A	PROBE, EGT-CYL #5	MOONEY	880005-501	
		PROBE, EGT-CYL #5 (ALT)	MOONEY	880005-503	
K	DT106A	PROBE, EGT-CYL #6	MOONEY	880005-501	
		PROBE, EGT-CYL #6 (ALT)	MOONEY	880005-503	
JK	DV101A	C/B, FUEL FLOW	KLIXON	7277-2-2	
JK	DV102A	INDICATOR, FUEL FLOW	MOONEY	880034-501	
JK	DV102B	INDICATOR, FUEL FLOW(OPT)	MOONEY	880034-507	
JK	DV102C	INDICATOR, FUEL FLOW (OPT)	MOONEY	880034-513	
JK	DV103A	PLUG, FUEL FLOW	CANNON	DE-9S	
JK	DV104A	XDUCR, FUEL FLOW	MOONEY	880030-501	
JK	DV104A	XDUCR, FUEL FLOW (OPT)	MOONEY	880030-503	
JK	DV104C	XDUCR, FUEL FLOW (OPT)	MOONEY	880030-505	
JK	DV105A	SWITCH FURE FLOW MEMORY	C & K	7101K	
L	DV150A	XDUCER, FUEL FLOW	PORSCHE	933-110-377-02 (FUEL CONTROL)	
L	DV151A	PLUG	PORSCHE	933-612-403-00	
		CLAMP	PORSCHE	999-615-032-40	
		BOOT	PORSCHE	944-612-128-00	
		CONTACTS	PORSCHE	999-652-456-22	
L	DW150A	INDICATOR, VERTICAL SPEED	UI	7201-2 CODE C.146	
L	DW151A	PLUG, VSI, 3 PIN	BENDIX	PTO6E-8-3S	
L	DW151A	PLUG, V/S (ALT)	CANNON	KPTO6E-8-3S	
L	DW151A	PLUG, VSI (ALT)		MS3116-8-3S	
		CLAMP		MS3057-3A or -3B	
JKL	EG101A	C/B GEAR RELAY	KLIXON	7277-2-5	
JKL	EG102A	SWITCH, GEAR UP/DN	C-H	8906K2875	
JKL	EG103A	SWITCH, GEAR OVERIDE	C-H	SBIDDX492-2	
		LOCKING RING	C-H	29-761	
		LOCK WASHER	C-H	16-886	
		HEX NUT (2 EA)	C-H	15-966-6	
		LAMP (28 V)	GE	388	
JKL	EG104A	SW,GEAR SAFETY (A/SPEED)	MOONEY	880013-507	
JKL	EG105A	C/B, GEAR ACTUATOR	KLIXON	7277-2-15	
JKL	EG106A	SWITCH, GEAR UP LIMIT	MICRO SWITCH	DT-2R-A7	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
	ACTUATOR	MICRO SWITCH	MCD-2711	
JKL EG107A	SWITCH, GEAR DN LIMIT	MICRO SWITCH	ICHI-6	
JKL EG107A	SWITCH, GEAR DN LIMIT (ALT)	SAINT SWITCH,INC	ML1116	
JKL EG108A	RELAY, GEAR UP	C-H	604IH220	
JKL EG109A	RELAY, GEAR DOWN	C-H	604IH220	
JKL EG110A	ACTUATOR, LANDING GEAR	MOONEY	560254-503	
JKL EG110A	ACTUATOR, LDG. GR (ALT)	MOONEY	880037-507	
JKL EG111A	DIODE,GEAR UP RELAY		1N2483	
	LOCK RETAINER	ITT	DB51221-1	
JKL EG112A	DIODE, GEAR DOWN RELAY		1N2483	
JKL ELT101A	SWITCH, REMOTE ELT	D & M	DM-U65-1	
JKL ELT101A	SWITCH,REMOTE ELT (ALT)	C & K	7101K	
JKL ELT102A	ELT TRANSMITTER	D & M	DM-ELT-8	
L ELT150A	PLUG, ELT	AMP	206060-1	
	CLAMP	AMP	206062-1	
L ELT151A	RECPT, ELT	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK FON101A	PHONE-JACK	SWITCHCRAFT	C-11	
	WASHERS	SWITCHCRAFT	S-1028 & S-1029	
L JE150B	C/B IGNITION, LT	KLIXON	7277-2-7.5	
L JE151B	C/B IGNITION, RT	KLIXON	7277-2-7.5	
L JE152B	IGNITION BOX, LT	PORSCHE	933.602.007.07	
L JE153B	IGNITION BOX, RT	PORSCHE	933.602.007.07	
L JE154B	PLUG, IGN BOX, LT	CANNON	CA3106A-20A-48S-B-03	
L JE154B	PLUG, IGN BOX, LT (ALT)	CANNON-GERMANY	CA3106A-20A-48S-B-15	
L JE154B	PLUG, IGN BOX, LT (ALT)	PORSCHE	933.612.440.00	
	TINEL-LOCK ADAPTER	RAYCHEM	TXR18AB45-C2012AI	
	ADAPTER (ALT)	SUNBANK	S2900AA1912AI-S034-000	
	BOOT	RAYCHEM	202C621-51/16	
	BOOT (ALT/SUPPLEMENT)	RAYCHEM	202S142-25S	
L JE155B	PLUG, IGN BOX, RT (ALT)	CANNON-GERMANY	CA3106A-20A-48S-B-15	
L JE155B	PLUG, IGN BOX, RT (ALT)	PORSCHE	933.612.440.01	
	TINEL-LOCK ADAPTER	RAYCHEM	TXR18AB45-C2012AI	
	ADAPTER (ALT)	SUNBANK	S2900AA1912AI-S034-000	
	BOOT	RAYCHEM	202C621-51/164	
	BOOT (ALT/SUPPLEMENT)	RAYCHEM	202S142-25S	
L JE156B	PLUG, IGN BOX COIL, LT (ALT)	CANNON-GERMANY	CA3106E-10SL-3P-B-14	
L JE156B	PLUG, IGN BOX COIL, LT (ALT)	PORSCHE	933.612.409.01	
	TINEL-LOCK ADAPTER	RAYCHEM	TXR18AB00-C1104AI	
	ADAPTER (ALT)	SUNBANK	S2900AS0604AI-S034-000	
	ADAPTER (ALT)	SUNBANK	S2900AS1004AI-S034-000	
	COUPLING	SUNBANK	S3292	
	BOOT	RAYCHEM	202S121-25S	
L JE157B	PLUG, IGN BOX COIL, RT (ALT)	CANNON-GERMANY	CA3106E-10SL-3P-B-14	
L JE157B	PLUG, IGN BOX COIL, RT (ALT)	PORSCHE	933.612.409.01	
	TINEL-LOCK ADAPTER	RAYCHEM	TXR18ABOO-C1104AI	
	ADAPTER (ALT)	SUNBANK	S2900AS0504AI-S034-000	
	ADAPTER (ALT)	SUNBANK	S2900AS1004AI-S034-000	
	COUPLING	SUNBANK	S3292	
	BOOT	RAYCHEM	202S121-25S	
L JE162B	PLUG, IGN COIL, LT	CANNON-GERMANY	CA3106E-10SL-4S-B-14	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
L	JE162B	PLUG, IGN COIL, LT	PORSCHE	933.612.407.01	
		TINEL-LOCK ADAPTER	RAYCHEM	TXR18AB00-C1104AI	
		ADAPTER (ALT)	SUNBANK	S2900AS0504AI-S034-000	
		ADAPTER (ALT)	SUNBANK	S2900AS1004AI-S034-000	
		COUPLING	SUNBANK	S3292	
		BOOT	RAYCHEM	202S121-25S	
L	JE163B	PLUG, IGN COIL, RT	CANNON-GERMANY	CA3106E-10SL-4S-B-14	
L	JE163B	PLUG, IGN COIL, RT	PORSCHE	933.612.407.01	
		TINEL-LOCK ADAPTER	RAYCHEM	TXR18AB00-C1104AI	
		ADAPTER (ALT)	SUNBANK	S2900AS0504AI-S034-000	
		ADAPTER (ALT)	SUNBANK	S2900AS1004AI-S034-000	
		COUPLING	SUNBANK	S3292	
		BOOT	RAYCHEM	202S121-25S	
L	JE164A	IGNITION COIL, LT	PORSCHE	N/A	
L	JE165A	IGNITION COIL, RT	PORSCHE	N/A	
L	JE168A	SENSOR, TDC #1	PORSCHE	N/A	
L	JE169A	SENSOR, TDC #2	PORSCHE	N/A	
L	JE170C	RECPT, 3 PIN	CANNON-GERMANY	CA121001-633	
		RECPT, 3 PIN (ALT)	PORSCHE	933-612-411-00	
		ADAPTER	RACHEM	TXR18AB000-C1104AI	
		ADAPTER (ALT)	SUNBANK	S2900AS0604AI-S034-000	
		ADAPTER (ALT)	SUNBANK	S2900AS1004AI-S034-000	
		COUPLING	SUNBANK	S3292	
		BOOT	RAYCHEM	202S121-25S	
L	JE171C	PLUG, 3 PIN	CANNON-GERMANY	CA06EH10SL3PB14	
		PLUG, 3 PIN (ALT)	PORSCHE	933-612-412-00	
		ADAPTER	RACHEM	TXR18AB000-C1104AI	
		ADAPTER (ALT)	SUNBANK	S2900AS0604AI-S034-000	
		ADAPTER (ALT)	SUNBANK	S2900AS1004AI-S034-000	
		COUPLING	SUNBANK	S3292	
		BOOT	RAYCHEM	202S121-25S	
L	JE172B	RECEPT, IGN, COIL, LT, 4 PIN	CANNON	MS3100K-14S-2P	
		ADAPTER	RAYCHEM	TXR18AB000-C1404AI	
		ADAPTER (ALT)	SUNBANK	S2900AS1004AI-S034-000	
		BOOT	RAYCHEM	202S121-25S	
L	JE173B	PLUG, IGN, COIL, LT, 4 PIN	CANNON	MS3106E-14S-2S	
		ADAPTER	RAYCHEM	TXR18AB000-C1404AI	
		ADAPTER (ALT)	SUNBANK	S2900AS1004AI-S034-000	
		BOOT	RAYCHEM	202S121-25S	
L	JE174C	RECPT, 3 PIN	CANNON-GERMANY	CA121001-633	
		RECPT, 3 PIN (ALT)	PORSCHE	933-612-411-00	
		ADAPTER	RACHEM	TXR18AB000-C1104AI	
		ADAPTER (ALT)	SUNBANK	S2900AS0604AI-S034-000	
		ADAPTER (ALT)	SUNBANK	S2900AS1004AI-S034-000	
		COUPLING	SUNBANK	S3292	
		BOOT	RAYCHEM	202S121-25S	
L	JE175C	PLUG, 3 PIN	CANNON-GERMANY	CA06EH10SL3PB14	
		PLUG, 3 PIN (ALT)	PORSCHE	933-612-412-00	
		ADAPTER	RACHEM	TXR18AB000-C1104AI	
		ADAPTER (ALT)	SUNBANK	S2900AS0604AI-S034-000	
		ADAPTER (ALT)	SUNBANK	S2900AS1004AI-S034-000	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		COUPLING	SUNBANK	S3292	
		BOOT	RAYCHEM	202S121-25S	
L	JE176B	RECPT, IGN. COIL, RT, 4 PIN		MS3100K-14S-2P	
		ADAPTER	RAYCHEM	TXR18AB000-C1404AI	
		ADAPTER (ALT)	SUNBANK	S2900AS1004AI-S034-000	
		BOOT	RAYCHEM	202S121-25S	
L	JE177B	PLUG, (ALT)		MS3106E-14S-2S	
		ADAPTER	RAYCHEM	TXR18AB000-C1404AI	
		ADAPTER (ALT)	SUNBANK	S2900AS1004AI-S034-000	
		BOOT	RAYCHEM	202S121-25S	
L	JE178A	PLUG, 3 PIN	AMP	1-480303-0	
		SOCKET	AMP	60619-1	
L	JE179A	RECPT, C/B, 3 PIN	AMP	1-480305-0	
		PINS	AMP	60620-1	
L	JE180A	PLUG, 2 PIN	AMP	1-480318-0	
		SOCKET	AMP	60619-1	
L	JE181A	RECPT, C/B, 2 PIN	AMP	1-480319-0	
		PINS	AMP	60620-1	
L	JE182A	PLUG, TACH/FUEL FLOW	AMP	1-480318-0	
		SOCKET	AMP	60619-1	
L	JE183A	RECPT, TACH/FUEL FLOW	AMP	1-480319-0	
		PINS	AMP	60620-1	
JKL	JM101A	SWITCH, IGNITION	BENDIX-SCINTILLA	I0-357210-9	
		PLACARD	BENDIX-SCINTILLA	I0-187-468	
J	JM102A	MAGNETO	BENDIX-SCINTILLA	I0-682555-1	
J	JM102B	MAGNETO (ALT)	BENDIX-SCINTILLA	I0-682555-111	
K	JM103A	MAGNETO, RIGHT	BENDIX-SCINTILLA	I0-79020-120	
			TCM	640896-1	
K	JM103B	MAGNETO, RIGHT	SLICK	6224	
K	JM104A	MAGNENTO, LEFT	BENDIX-SCINTILLA	I0-79020-120	
			TCM	640896-1	
K	JM104B	MAGNETO, LEFT	SLICK	6224	
JK	LB101A	C/B, ROTATING BEACON	MOONEY	930023-203	
JK	LB101A	C/B, ROTATING BCN (SPARES)	MOONEY	930023-243	
JK	LB102A	LIGHT, ROTATING BCN	WHELEN	WRML-24	
		ADAPTER	WHELEN	WRM-65	
JKL	LB102B	LT, ROTATING BCN, RED (ALT)	WHELEN	90033-19	
JKL	LB102B	LT, ROTATING BCN, WTE (ALT)	WHELEN	90033-20	
JKL	LB103A	PLUG, 2 PIN	AMP	1-480318-0	
		SOCKET	AMP	60619-1	
JKL	LB104A	RECPT, 2 PIN	AMP	1-480319-0	
		PINS	AMP	60620-1	
JKL	LC101A	FUSEHOLDER, CLOCK, 5AMP	LITTEL	155020/155120	
		FUSE,(5A-3AG-SLO-BLO)	LITTEL	313005	
JKL	LC102A	SWITCH, CABIN LIGHT, FWD	CARLING	TILC64-IS-WH-FN	
JKL	LC103A	RESISTOR, CABIN LIGHT, FWD	DALE	RH-10-20 OHM	
JKL	LC104A	LIGHT, CABIN, FWD, LT	H.H. SMITH	1930	
		LAMP	GE	1818	
JKL	LC105A	LIGHT, CABIN, FWD, RT	H.H. SMITH	1930	
		LAMP	GE	1818	
JKL	LC106A	LIGHT, CABIN, FWD, LT	H.H. SMITH	1930	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		LAMP	GE	1818	
JKL	LC107A	LIGHT, CABIN, FWD, RT	H.H. SMITH	1930	
		LAMP	GE	1818	
JKL	LC108A	SWITCH, CABIN LIGHT, REAR	CARLING	TILC64-1S-WH-FN	
JKL	LC109A	RESISTOR, CABIN LIGHT SW	DALE	RH-10-20 OHM	
JKL	LC110A	LIGHT, CABIN, REAR, LT	H.H. SMITH	1930	
		LAMP	GE	1818	
JKL	LC111A	LIGHT, CABIN, REAR, RT	H.H. SMITH	1930	
		LAMP	GE	1818	
JKL	LC112A	LIGHT, CABIN, REAR, LT	H.H. SMITH	1930	
		LAMP	GE	1818	
JKL	LC113A	LIGHT, CABIN, REAR, RT	H.H. SMITH	1930	
		LAMP	GE	1818	
L	LC114A	LIGHT, CABIN, REAR, LT	H.H. SMITH	1930	
		LAMP	GE	1818	
L	LC115A	LIGHT, CABIN, REAR, RT	H.H. SMITH	1930	
		LAMP	GE	1818	
J	LL101A	SWITCH, LDG LT	MOONEY	930023-235	
J	LL102A	LANDING LIGHT	GE	4553	
JK	LL103A	RECPT, LDG LT	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	LL104A	PLUG, LDG LT	AMP	206060-1	
		CLAMP	AMP	206062-1	
K	LL105A	C/B, LDG LT, LEFT	KLIXON	7277-2-10	
K	LL106A	LIGHT, LDG, LEFT	GE	4596	
K	LL107A	C/B, LDG LT, RIGHT	KLIXON	7277-2-10	
K	LL108A	LIGHT, LDG, RIGHT	GE	4596	
K	LL109A	SWITCH, LDG LT	C-H	8143-K21-E13-M50	
L	LL150A	C/B, LANDING LIGHT, LEFT	KLIXON	7277-2-20	
		C/B, LDG LT, LEFT (ALT)	MECHANICAL PROD	4200-002-25	
L	LL151A	C/B LANDING LIGHT, RIGHT	KLIXON	7277-2-20	
		C/B, LDG LT, RIGHT (ALT)	MECHANICAL PROD	4200-002-25	
L	LL152A	SWITCH, LANDING LIGHT	C-H	8162-K22-E13-M50	
L	LL154A	LANDING LIGHT-RT WING	GE	4596	
L	LL155A	TAXI LIGHT-RT WING	GE	4596	
L	LL156A	SWITCH, TAXI LIGHT	C-H	8162-K22-E13-M50	
L	LL157A	TAXI LIGHT, LEFT WING	GE	4596	
L	LL158A	LANDING LIGHT, LEFT WING	GE	4596	
JKL	LN101A	C/B NAV LIGHTS	MOONEY	930023-201	
JKL	LN102A	LIGHT, TAIL, LT WING	MOONEY	800051-501	
		BULB, 28V	WHELEN	34-0228030-85	
JKL	LN103A	LIGHT, TAIL RT WING	MOONEY	800051-501	
JKL	LN104A	PLUG, TAIL LIGHT, RT WING	AMP	1-480318-0	
		SOCKETS	AMP	60619-1	
JKL	LN105A	RECPT, TAIL LIGHT RT WING	AMP	1-480319-0	
		PINS	AMP	60620-1	
JKL	LN106A	PLUG, TAIL NAV LIGHT	AMP	1-480318-0	
		SOCKETS	AMP	60619-1	
JKL	LN107A	RECPT, TAIL NAV LIGHT	AMP	1-480319-1	
		PINS	AMP	60620-1	
JKL	LP101A	C/B PANEL LIGHTS	KLIXON	7277-2-5	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JKL LP102A	C/B GLARESHIELD LIGHTS	KLIXON	7277-2-5	
JKL LP103A	LAMP, COMPASS LIGHT	GE	AVIATION RED 327 or 327	
JK LP104A	RECPT, COMPASS LT	DEANS	DEA90020MALE	
JKL LP105A	PLUG, COMPASS LIGHT	DEANS	DEA90020FEMALE	
JKL LP106A	LIGHTS, GLARESHIELD (14 EA)	GE	327	
JK LP107A	LIGHT HOLDER, TRIM/FLAP	DIALIGHT	270-1930-0171-702	
	LAMP	GE	327	
	LAMP (ALT)	GE	385	
JK LP108A	LIGHT, COWL FLAP	DIALIGHT	270-1930-0171-702	
	LAMP	GE	327	
JK LP109A	LIGHT, OXYGEN	SLOAN	855S-0-U	
JK LP109B	LIGHT, OXYGEN	SLOAN	855S-0-U	
	LAMP	GE	327	
JK LP110A	LIGHT, CLUSTER	GE	327	
JK LP111A	LIGHT, CLUSTER	GE	327	
JK LP112A	LIGHT, CLUSTER	GE	327	
JK LP113A	LIGHT, CLUSTER	GE	327	
JK LP114A	LIGHT, CLUSTER	GE	327	
JK LP115A	LIGHT TRAY, AMMETER	B & D	0221-128	
JK LP116A	LIGHT TRAY, TACHOMETER	B & D	0221-128	
JK LP118A	LIGHT TRAY, AIRSPEED	U.I.	BA28-BW3	
JK LP119A	LIGHT TRAY, TURN CO-ORD	U.I.	BA28-BW3	
JK LP120A	LIGHT TRAY, ALTIMETER	U.I.	BA28-BW3	
JK LP121A	LIGHT TRAY, VERTICAL SPEED	U.I.	BA28-BW3	
JK LP122A	LIGHT TRAY, ART. HORIZ.	SIGMA-TEC	IV-192-971	
JK LP123A	LIGHT TRAY, DIR. GYRO	SIGMA-TEC	IV-192-971	
K LP125A	LIGHT TRAY, TIT	B & D	0221-128	
JK LP126A	LIGHT TRAY, EGT/OAT	B & D	0221-128	
L LP150A	DIMMER CONTROL BOX	IAI	950D0307-000	
L LP151A	PLUG, DIMMER CONTROL BOX	ITT	DBM17W2S	
	CLAMP	ITT	DB51212	
	LOCK RETAINER	ITT	DB51221-1	
	RECPT (2 EA)	ITT	DM53744-7	
L LP152A	SWITCH, PANEL LGTS, DIMR	C & K	7105-JI-Z-Q	
L LP153A	SWITCH, G/SHIELD LGTS, DIM	C & K	7105-J1-Z-Q	
L LP154A	LIGHT, FLAP SWITCH	MOONEY	130285-003	
	LAMP	GE	327	
L LP155A	LIGHT, CONSOLE SWITCH, RT	MOONEY	130285-003	
	LAMP	GE	327	
L LP156A	RECPT, 9 PIN	AMP	206705-2	
	CLAMP	AMP	206966-1	
L LP157A	PLUG, 9 PIN	AMP	206708-1	
	CLAMP	AMP	206966-1	
L LP158A	LIGHT, CONSOLE SWITCH, LT	MOONEY	130285-003	
	LAMP	GE	327	
L LP159A	PLUG, 16 PIN	AMP	206037-1	
	CLAMP	AMP	206070-1	
L LP160A	RECEPT, DIMMER CTRL BOX	AMP	206036-3	
	CLAMP	AMP	206070-1	
JKL LR101A	C/B RECOGNITION LIGHTS	MOONEY	930023-231	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JKL LR102A	RECOGNITION LIGHT, LT WG	MOONEY	880049-501	
JKL LR103A	PLUG, RECOG. LIGHT, LT WG	AMP	1-480318-0	
	SOCKETS	AMP	60619-1	
JKL LR104A	RECOGNITION LIGHT, RT	MOONEY	880049-501	
JKL LR105A	PLUG, RECOG. LIGHT, RT	AMP	1-480318-0	
	SOCKETS	AMP	60619-1	
JKL LR106A	RECPT, RECOG.LIGHT, LEFT	AMP	1-480319-0	
	PINS	AMP	60620-1	
JKL LR107A	PLUG, RECOG. LIGHT, LEFT	AMP	1-480318-0	
	SOCKETS	AMP	60619-1	
JKL LR108A	RESISTOR, RECOG. LGHT, LT	DALE	RH-50-7.5 OHMS	
JKL LR109A	RECPT, RECOG. LIGHT, RT	AMP	1-480319-0	
	PINS	AMP	60620-1	
JKL LR110A	PLUG, RECOG. LIGHT, RT	AMP	1-480318-0	
	SOCKETS	AMP	60619-1	
JKL LR111A	RESISTOR, RECOG. LIGHT, RT	DALE	RH-50-7.5 OHMS	
JKL LS101A	C/B STROBE LIGHTS	MOONEY	930023-207	
JKL LS101A	C/B STROBE LIGHTS (ALT)	MOONEY	930023-237	
JKL LS102A	POWER SUPP, STROBE, LT WG	WHELEN	01-0770329-00	
JKL LS103A	RECPT, STROBE P/S, LT WG	AMP	1-480305-0	
JKL LS104A	RECPT, STROBE P/S,LT WG	AMP	1-480305-0	
JKL LS105A	PLUG, NAV/STROBE, LT WG	AMP	1-480303-0	
JKL LS106A	LIGHT, NAV/STROBE, LT WG	WHELEN	A650-PR-D-M	
JKL LS107A	STROBE PWR SUPPLY, RT WG	WHELEN	01-0770329-00	
JKL LS108A	RECPT, STROBE PWR SUP, RT	AMP	1-480305-0	
JKL LS109A	RECPT,STROBE LIGHT P/S, RT	AMP	1-480305-0	
JKL LS110A	PLUG,STROBE LIGHT, RT	AMP	1-480303-0	
JKL LS111A	NAV/STROBE LIGHT RT. WING	WHELEN	A650-PG-D-M	
JKL LS112A	POWER SUPPLY, TAIL STROBE	WHELEN	01-0770329-00	
JKL LS113A	RECPT, TAIL STROBE PWR SUP	AMP	1-480305-0	
JKL LS114A	RECPT, TAIL STROBE PWR SUP	AMP	1-480305-0	
JKL LS115A	PLUG, TAIL STROBE	AMP	206060-1	
	CLAMP	AMP	206062-1	
JKL LS116A	RECPT, TAIL STROBE	AMP	206153-1	
	CLAMP	AMP	206062-1	
JKL LS117A	PLUG, TAIL STROBE	AMP	1-480303-0	
JKL LS118A	STROBE LIGHT, TAIL	MOONEY	470013-501	
JK LS119A	RECPT	AMP	1-480305-0	
JK LS120A	RECPT	AMP	1-480305-0	
JK LS121A	RECPT	AMP	1-480305-0	
JKL MA101A	AUX. PWR. RECEPTACLE		AN2552-3A	
JKL MA102A	RELAY, AUX. PWR	C-H	6041H202	
	(ALT)	C-H	6041H202A	
JKL MA103A	DIODE, AUX PWR RELAY	SARKES TARZIAN	10H3P	
JK MA104A	DIODE		1N2483	
JKL MB101A	AVIONICS CONTROL RELAY	MAGNACRAFT	W67CSX-3	
	BASE	MAGNACRAFT	70-303	
J MB101B	DIODE		1N2483	
JK MB102A	DIODE		1N2483	
J MB102A	DIODE		1N2483	
JKL MB103A	DIODE		1N2483	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JK MB104A	RELAY, AVIONICS MASTER	P-B	MB4443	
	SOCKET	P-B	27E122	
	SPRING	P-B	20C176	
	STANDOFF	P-B	21B212	
JK MB104A	RELAY, AVIONICS MAST. (ALT)	P-B	MB4443-1	
JKL MB107A	SWITCH, AVIONICS MASTER	C & K	7101K	
J MB107B	SWITCH, MASTER, AVIONICS	MOONEY	930023-213	
JKL MB109A	C/B HSI	KLIXON	7277-2-XX(VARIES)	
JKL MB110A	C/B COM1	KLIXON	7277-2-XX(VARIES)	
JKL MB111A	C/B NAV1	KLIXON	7277-2-XX(VARIES)	
JKL MB112A	C/B AUDIO	KLIXON	7277-2-XX(VARIES)	
JKL MB113A	C/B PHONE	KLIXON	7277-2-XX(VARIES)	
JKL MB114A	C/B ADF	KLIXON	7277-2-XX(VARIES)	
JKL MB115A	C/B COM2	KLIXON	7277-2-XX(VARIES)	
JKL MB116A	C/B NAV2	KLIXON	7277-2-XX(VARIES)	
JKL MB117A	C/B TRANSPONDER	KLIXON	7277-2-XX(VARIES)	
JKL MB118A	C/B ENCODER	KLIXON	7277-2-XX(VARIES)	
JKL MB119A	C/B AUTOPILOT/TRIM	KLIXON	7277-2-XX(VARIES)	
JKL MB120A	C/B RADAR	KLIXON	7277-2-XX(VARIES)	
JKL MB121A	C/B DME	KLIXON	7277-2-XX(VARIES)	
JKL MB122A	C/B LORAN	KLIXON	7277-2-XX(VARIES)	
JKL MB123A	C/B STORMSCOPE	KLIXON	7277-2-XX(VARIES)	
JKL MB124A	C/B TELEPHONE	KLIXON	7277-2-XX(VARIES)	
JKL MB125A	C/B RMI	KLIXON	7277-2-XX(VARIES)	
JKL MB126A	C/B R/NAV	KLIXON	7277-2-XX(VARIES)	
JKL MB127A	C/B INVERTER	KLIXON	7277-2-XX(VARIES)	
JKL MB128A	C/B STEREO	KLIXON	7277-2-XX(VARIES)	
JKL MB129A	C/B PROP DE-ICE	MOONEY	930023-223	
JKL MB131A	BUS BAR #10	MOONEY	913127-019	
JKL MB132A	BUS BAR #11	MOONEY	913127-019	
JKL MB133A	BUS BAR #12	MOONEY	913127-019	
JKL MB134A	BUS BAR #13	MOONEY	913127-005	
JKL MB135A	C/B, YAW DAMPER	KLIXON	7277-2-7.5	
JKL MB136A	C/B, RADAR ALTIMETER	KLIXON	7277-2-7.5	
JKL MB137A	C/B, ARTIFICIAL HORIZON	KLIXON	7277-2-5	
L MB150A	AVIONICS BUS BAR #1	MOONEY	913127-73	
L MB151A	AVIONICS BUS BAR #2	MOONEY	913127-73	
L MB152A	AVIONICS BUS BAR #3	MOONEY	913127-73	
L MB153A	AVIONICS BUS BAR #4	MOONEY	913127-73	
L MB154A	AVIONICS BUS BAR #5	MOONEY	913127-73	
L MB155A	AVIONICS BUS BAR #6	MOONEY	913127-73	
L MB156A	AVIONICS BUS BAR #7	MOONEY	913127-73	
L MB157A	SHUNT	MOONEY	913127-049	
L MB158A	AVIONICS MASTER RELAY	AROMAT	HG4-DC24V	
	RECEPTACLE	AROMAT	HG4-SF	
L MB159A	DIODE		1N2483	
L MB160A	FUSE HOLDER	LITTEL	155020 or 155120	
	FUSE 1A	LITTEL	313001	
L MB162A	DIODE, STARTER SOLENOID, LT		1N2483	
L MB163A	DIODE, STARTER SOLENOID		1N2483	
L MB164A	ARTIFICIAL HORIZ	CASTLEBERRY	300-2BL	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
L	MB165A	PLUG, ART.HORIZ	AMPHENOL	126-222	
L	MB166A	C/B, AUTOPILOT ALERT	KLIXON	7277-2-XX(VARIES)	
JKL	MC101A	CIGAR LIGHTER	MOONEY	800336-503	
L	MC150A	C/B, CIGAR LIGHTER	KLIXON	7277-2-10	
JK	ME101A	CLOCK, ELECTRIC	MID-CONT.	MD-88L	
		LIGHT TRAY		BA28-24-BW2	
JK	ME101B	CLOCK, (OPT)	MID-CONT.	MD-88L (ET)	
		LIGHT TRAY		BA28-24-BW2	
L	ME150A	CLOCK, (ALT)	IAI	950D0312.000	
L	ME150B	CLOCK, CONTROL WHEEL	PORSCHE	944.641.213.00	
L	ME151A	RECPT, CONTROL WHEEL	AMP	206705-2	
		CLAMP	AMP	206966-1	
L	ME152A	PLUG, CONTROL WHEEL	AMP	206708-1	
		CLAMP	AMP	206966-1	
JK	MIC101A	JACK, MICROPHONE	SWITCHCRAFT	C-12B	
		WASHERS	SWITCHCRAFT	S-1028 or S-1029	
L	MIC102A	JACK, MIC, CONSOLE	SWITCHCRAFT	C-12B	
		WASHERS	SWITCHCRAFT	S-1028 or S-1029	
JK	MJ101A	JUNCTION BLOCK (GND)	BEAU	77014-52	
		JUMPER EDGE ON	BEAU	7233-16	
JK	MJ102A	JUNCTION BLOCK (GND)	BEAU	71106-52	
		JUMPER EDGE ON	BEAU	7233-8	
JK	MJ103A	JUNCTION BLOCK (DIM)	BEAU	71106-52	
		JUMPER EDGE ON	BEAU	7233-8	
JK	MP101A	TIMER	B.F. GOODRICH	3E1899-1	
JK	MP102A	SHUNT	B.F. GOODRICH	MS91586-1	
JK	MP103A	FUSE HOLDER	LITTEL	155020 or 155120	
		FUSE, 1A	LITTEL	313001	
JK	MP104A	FUSE HOLDER	LITTEL	155020 or 155120	
		FUSE, 1A	LITTEL	313001	
JK	MP105A	AMMETER	B.F. GOODRICH	3E1872-1	
JK	MP106A	SLIP-RING BLOCK	B.F. GOODRICH	3E2062-1	
L	MP150A	C/B-SW, PROP DE-ICE (15A)	ETA	930023-223	
L	MP151A	TIMER	B.F. GOODRICH	3E2311-4	
L	MP152A	SLIP RING, MOD BRUSH ASSY	B.F. GOODRICH	3E2062-1	
L	MP153	FUSEHOLDER	LITTEL	155020 or 155120	
		FUSE, 1A	LITTEL	313001	
L	MP154A	RELAY BOX, CURRENT	MOONEY	800221-505	
L	MP155A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
	MSxxx	SPEAKER	ARCHER	40-1197	
L	NE150A	C/B FUEL ENRICH	KLIXON	7277-2-1	
L	NE151A	SWITCH, ENRICHMENT	MICRO SWITCH	1SE1-T	
		ACTUATOR	MICRO SWITCH	JE-5	
L	NE153A	VALVE, SOLENOID, MIXTURE			
		ENRICHMENT	PORSCHE	933.606.012.00	
L	NE154A	DIODE, ENRICH SW.		1N2483	
L	NE155A	DIODE, ENRICH SW.		1N2483	
L	NE156A	DIODE, ENRICH SW.		1N2483	
JK	NF101A	C/B, FUEL PUMP	MOONEY	930023-211	
J	NF102A	PUMP, FUEL	WELDON	8163B	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
JK	NF103A	PLUG, FUEL PUMP	AMP	206060-1	
		CLAMP	AMP	206062-1	
JK	NF104A	RECPT, FUEL PUMP	AMP	206153-1	
		CLAMP	AMP	206062-1	
K	NF105A	C/B, HIGH BOOST, FUEL	MOONEY	930023-219	
K	NF106A	PUMP, FUEL	WELDON	10054B	
K	NF107A	C/B, LOW BOOST, FUEL	MOONEY	930023-217	
K	NF108A	REGULATOR, FUEL PUMP	ELECTRO-DELTA	VR536	
K	NF109A	RECPT.	AMP	206153-1	
		CLAMP	AMP	206062-1	
K	NF110A	PLUG	AMP	206060-1	
		CLAMP	AMP	206062-1	
L	NF150A	C/B FUEL PUMP, MAIN	KLIXON	7277-2-10	
L	NF151A	C/B FUEL PUMP, EMERGENCY	KLIXON	7277-2-10	
L	NF152A	SW., FUELPUMP,MAIN/BOOST	C-H	8162-K22-E13-M50	
		GUARD	MOONEY	930028-501	
L	NF153A	SWITCH,FUEL PUMP, EMER.	C-H	8142-K21-E7-T50	
		GUARD	MOONEY	930028-501	
L	NF154A	RECPT, FUEL PUMP	AMP	206060-1	
		CLAMP	AMP	206062-1	
L	NF155A	RECPT, FUEL PUMP	AMP	206153-1	
		CLAMP	AMP	206062-1	
L	NF156A	C/B, BOOST PUMP	KLIXON	7277-2-10	
L	NF157A	FUEL PUMP, BOOST	PORSCHE	933.620.001.00	
L	NF158A	PLUG	AMP	206060-1	
		CLAMP	AMP	206062-1	
L	NF159A	RECPT, FUEL PUMP	AMP	206153-1	
		CLAMP	AMP	206062-1	
L	NF160A	FUEL PUMP, MAIN	PORSCHE	933.620.001.00	
L	NF161A	FUEL PUMP, EMERGENCY	PORSCHE	933.620.001.00	
K	NP101A	FUSEHOLDER, PRIMER	LITTEL	155020 or 155120	
		FUSE, 10A,SLO-BLO	LITTEL	313010	
K	NP102A	SWITCH, PRIMER	CARLING	T1GK6B-1F-WH-A	
K	NP103A	DIFFUSER, PRIMER	CONTINENTAL	633862-2	
L	NS150A	SWITCH, COLD START/ENRICH	MOONEY	880052-511	
L	NS151A	NOZZLE, COLD START	PORSCHE	933.612.401.00	
		PLUG	PORSCHE	933.615.032.40	
		CLAMP	PORSCHE	999.615.032.40	
		BOOT	PORSCHE	944.612.128.00	
		CONTACTS	PORSCHE	999.652.456.22	
L	NS153A	DIODE, COLD START SW		1N2483	
JK	PA101A	C/B, ALTERNATOR #1	ETA	41-3-S34-LN2-041800	
JKL	PA102A	C/B, ALTERNATOR FIELD, #1	KLIXON	7277-2-5	
JK	PA103A	SWITCH, ALTERNATOR FIELD	C-H	8133K-21-E13-T52	
JK	PA104A	VOLTAGE REGULATOR, #1	ELECTRODELTA	VR-802	
JK	PA105A	RECPT, VOLTAGE REG.	AMP	206705-2	
		CLAMP	AMP	206966-1	
JK	PA106A	PLUG, VOLTAGE REG.	AMP	206708-2	
		CLAMP	AMP	206966-1	
K	PA107A	ALTERNATOR #1	CONTINENTAL	649280 or 646719	
		GEAR ASSY	CONTINENTAL	649123	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
JKL	PA108A	FILTER	MOONEY	880014-501	
JKL	PA109A	CAPACITOR	MALLORY	CGS302U-050R2C	
JK	PA110A	C/B, ALTERNATOR #2	ETA	41-3-S34-LN2-041800	
JKL	PA111A	C/B ALTERNATOR FIELD, #2	KLIXON	7277-2-5	
JK	PA112A	VOLTAGE REGULATOR, #2	ELECTRODELTA	VR-802	
JK	PA113A	RECPT, VOLTAGE REG.	AMP	206705-2	
		CLAMP	AMP	206966-1	
JK	PA114A	PLUG, VOLTAGE REG.	AMP	206708-2	
		CLAMP	AMP	206966-1	
K	PA115A	ALTERNATOR #2	CONTINENTAL	649283 or 649172	
JKL	PA116A	FILTER	MOONEY	880014-501	
JKL	PA117A	CAPACITOR	MALLORY	CGS302U-050R2C	
J	PA118A	ALTERNATOR #1 (RIGHT)	LYCOMING	LW-14367	
		ALTERNATOR (ALT)	PRESTOLITE	ALU-6421-LS	
J	PA119A	(#2 ALTERNATOR NOT USED AT THIS TIME)			
JK	PA120A	FUSEHOLDER	LITTEL	155020 or 155120	
		FUSE 5A	LITTEL	313005	
JK	PA121A	SWITCH, EMERGENCY, FIELD	C-H	SB1DDX492-2	
		LOCKING RING	C-H	29-761	
		LOCK WASHER	C-H	16-886	
		NUT, HEX	C-H	15-996-6	
		LAMP	GE	388	
JK	PA122A	DIODE	SARKES-TARZIAN	10H3P	
JK	PA123A	DIODE	SARKES-TARZIAN	10H3P	
JK	PA124A	SWITCH, ALTERNATOR FIELD	C-H	880052-503	
JK	PA125A	DIODE	SARKES-TARZIAN	10H3P	
JK	PA126A	DIODE	SARKES-TARZIAN	10H3P	
L	PA150A	ALTERNATOR, LT	PORSCHE	933.603.004.00	
L	PA151A	ALTERNATOR, RT	PORSCHE	933.603.004.00	
L	PA152A	OVERVOLTAGE CONTROL, LT	ELECTRO DELTA	OS-400	
L	PA153A	PLUG, OVERVOLTAGE CONTROL, LT	AMP	206708-1	
		CLAMP	AMP	206966-1	
L	PA154A	OVERVOLTAGE CONTROL, RT	ELECTRO DELTA	OS-400	
L	PA155A	PLUG, OVERVOLTAGE CONTROL, RT	AMP	206708-1	
		CLAMP	AMP	206966-1	
L	PA156A	SWITCH, OVERVOLTAGE RESET, LT	C-H	SB1DDX492-2	
		LOCKING RING	C-H	29-761	
		LOCKING WASHER	C-H	16-886	
		NUT, HEX (2 ea)	C-H	15-966-6	
		LAMP	GE	388	
L	PA157A	SWITCH, OVERVOLTAGE RESET, RT	C-H	SB1DDX492-2	
		LOCKING RING	C-H	29-761	
		LOCKING WASHER	C-H	16-886	
		NUT, HEX (2 ea)	C-H	15-966-6	
		LAMP	GE	388	
L	PA158A	C/B ALTERNATOR, LT	ETA	41-3-S14-LN2-70A	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		C/B ALTERNATOR, LT (ALT)	ETA	41-3-S34-LN2-70A	
L	PA159A	C/B ALTERNATOR, RT	ETA	41-3-S14-LN2-70A	
		C/B ALTERNATOR, RT (ALT)	ETA	41-3-S34-LN2-70A	
L	PA160A	RECPT, O/VOLTAGE CTRL, LT	AMP	206705-2	
		CLAMP	AMP	206966-1	
L	PA161A	RECPT,OVERVOLTAGE CTRL,RT	AMP	206705-1	
		CLAMP	AMP	206996-1	
JK	PB101A	BATTERY	GILL	G-242	
JKL	PB102A	RELAY,MASTER,BATTERY,LEFT	C-H	604IH202	
		(ALT)	C-H	6041H202A	
JKL	PB103A	DIODE,LEFT BATTERY RELAY		1N2483	
JK	PB104A	SWITCH, MASTER	C-H	880052-501	
JKL	PB105A	C/B BATTERY, LT (ALT)	ETA	41-3-S14-LN2-70A	
		C/B BATTERY, LT	ETA	41-3-S34-LN2-70A	
JKL	PB106A	C/B BUS, FLT PNL SWITCH (ALT)	ETA	41-3-S14-LN2-70A	
		C/B BUS, FLT PNL SW	ETA	41-3-S34-LN2-70A	
JK	PB107A	BUSS BAR #1	MOONEY	913127-005	
JK	PB108A	BUSS BAR #2	MOONEY	913127-039	
JK	PB109A	BUSS BAR #3	MOONEY	913127-001	
JK	PB110A	BUSS BAR #4	MOONEY	913127-019	
JK	PB111A	BUSS BAR #5	MOONEY	913127-019	
JK	PB112A	BUSS BAR #6	MOONEY	913127-239 *	

***BUSS BARS 913127-045,-213,-223 or -227 MAY BE USED, AS REQUIRED, BY CIRCUIT BREAKER INSTALLATION.**

K	PB113A	BUSS BAR #7	MOONEY	913127-129	
JK	PB114A	BUSS BAR #8	MOONEY	913127-041	
JK	PB115A	BUSS BAR #9	MOONEY	913127-043	
JK	PB116A	SHUNT	KULKA	600RJ-2	
L	PB150A	BATTERY, RIGHT	GILL	G-243	
L	PB151A	RELAY, BATTERY, RT	C-H	6041H202	
		(ALT)	C-H	6041H202A	
L	PB152A	DIODE, BATTERY RELAY, RT		1N2483	
L	PB153A	SWITCH, BATTERY, LT	MOONEY	880052-507	
L	PB154A	SWITCH, BATTERY, RT	MOONEY	880052-509	
L	PB155A	C/B BATTERY, RT	ETA	41-3-S14-LN2-70A	
L	PB155A	C/B BATTERY, RT (ALT)	ETA	41-3-S34-LN2-70A	
L	PB156A	BUSS BAR #1	MOONEY	913127-51	
L	PB157A	BUSS BAR #2	MOONEY	913127-51	
L	PB158A	BUSS BAR #3	MOONEY	913127-51	
L	PB159A	BUSS BAR #4	MOONEY	913127-51	
L	PB160A	BUSS BAR #5	MOONEY	913127-19	
L	PB161A	BUSS BAR #6	MOONEY	913127-19	
L	PB162A	BUSS BAR #7	MOONEY	913127-19	
L	PB163A	BUSS BAR #8	MOONEY	913127-19	
L	PB164A	BUSS BAR #9	MOONEY	913127-53	
L	PB165A	BUSS BAR #10	MOONEY	913127-53	
L	PB166A	BUSS BAR #11	MOONEY	913127-53	
L	PB167A	BUSS BAR #12	MOONEY	913127-TBA	
L	PB168A	C/B EMERG CROSSOVER	ETA	41-3-S14-LN2-50A	
L	PB168A	C/B EMERG CROSSOVER (ALT)	ETA	41-3-S34-LN2-50A	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		C/B COVER PLACARD	MOONEY	150080-802	
		GUARD	MOONEY	800232-503	
L	PB169A	SHUNT, AVIONICS RELAY	MOONEY	913127-047	
L	PB170A	BATTERY, LEFT	GILL	G-243	
L	PB171A	C/B LOAD, A/C, LT	ETA	41-3-S14-LN2-60A	
L	PB171A	C/B LOAD, A/C, LT(ALT)	ETA	41-3-S34-LN2-60A	
L	PB172A	C/B LOAD, A/C. RT	ETA	41-3-S14-LN2-60A	
L	PB172A	C/B LOAD, A/C RT (ALT)	ETA	41-3-S34-LN2-60A	
L	PB173A	BUSS BAR #13	MOONEY	913127-55	
L	PB174A	BUSS BAR #14	MOONEY	913127-57	
L	PB175A	BUSS BAR #15	MOONEY	913127-57	
L	PB176A	BUSS BAR #16	MOONEY	913127-59	
L	PB177A	BUSS BAR #17	MOONEY	913127-59	
L	PB178A	BUSS BAR #18	MOONEY	913127-61	
L	PB179A	BUSS BAR #19	MOONEY	913127-19	
L	PB180A	FUSEHOLDER, LEFT MASTER	LITTEL	155020 or 155120	
	PB180A	FUSE 5AMP	LITTEL	313005	
L	PB181A	MASTER RELAY	C-H	6041H202	
		(ALT)	C-H	6041H202A	
L	PB182A	DIODE		1N2483	
L	PB183A	MASTER SWITCH	MOONEY	880052-501	
L	PB184A	RELAY, A/H PWR	MAGNACRAFT	W389CX-3	
L	PB185A	DIODE		1N2483	
L	PB186A	FUSEHOLDER, A/H, RT	LITTEL	155020 or 155120	
	PB186A	FUSE, 5AMP	LITTEL	313005	
L	PB187A	FUSEHOLDER, MASTER, RT	LITTEL	155020 or 155120	
	PB187A	FUSE, 5AMP	LITTEL	313005	
L	PB188A	MASTR RELAY, ENG. BUS, RT	C-H	6041H202	
		(ALT)	C-H	6041H202A	
L	PB189A	DIODE		1N2483	
L	PB190A	MASTER SWITCH (OPT)	C-H	8133K-21-E13-T52	
L	PB191A	GRND/DIMMER BOX	MOONEY	800228-501	
JKL	PL01A	PLUG, C/B PANEL #1, 37 PIN	AMP	206150-1	
		CLAMP	AMP	206138-1	
JKL	PL02A	PLUG, CONSOLE #1, 16 PIN	AMP	205837-1	
		CLAMP	AMP	206070-1	
JKL	PL02B	PLUG, CONSOLE #1, 28 PIN	AMP	205839-3	
		CLAMP	AMP	206070-1	
JKL	PL03A	PLUG, LT SIDE PANEL, 20 PIN	MOONEY	930021-501	
JKL	PL04A	PLUG, FLT PNL #1, 26 PIN	MOONEY	930021-505	
JKL	PL03B	PLUG, LT SIDE PANEL, 26 PIN	MOONEY	930021-505	
JKL	PL04A	PLUG, FLT PNL #1, 26 PIN	MOONEY	930021-505	
JKL	PL05A	PLUG, A/S SWITCH #1, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
JKL	PL06A	PLUG, AUTOPILOT PWR, 16 PIN	AMP	206037-1	
		CLAMP	AMP	202070-1	
JKL	PL07A	PLUG, 16 PIN, CLUSTER GAUGE	AMP	206037-1	
JKL	PL08A	PLUG, FIREWALL #1, 19 PIN		MS3106A-22-14S	
		CLAMP		MS3057-12B	
JKL	PL09A	PLUG, RT.WG. 14 PIN	MOONEY	930021-001	
JKL	PL09B	PLUG, RT. WING, 20 PIN	MOONEY	930021-501	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JKL PL10A	PLUG, RT. WING STUB, 14 PIN	MOONEY	930021-001	
JKL PL11A	PLUG, LEFT WING, 14 PIN	MOONEY	930021-001	
JKL PL12B	PLUG, FIREWALL #2, 19 PIN		MS3106A-22-14S	
	CLAMP		MS3057-12B	
JK PL13A	PLUG, RT. RADIO PNL, 9 PIN	AMP	206708-1	
	CLAMP	AMP	206966-1	
JKL PL13B	PLUG, AVIONICS MASTR, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JKL PL14A	PLUG, HOUR, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JKL PL15A	PLUG, LT WING STUB, 14 PIN	MOONEY	930021-001	
JKL PL16A	PLUG, GEAR CONTROL, 9 PIN	AMP	206708-1	
	CLAMP	AMP	206966-1	
JKL PL17A	PLUG, ELECT GEAR, 14 PIN	MOONEY	930021-001	
JK PL18A	PLUG, DIMMER, 16 PIN	AMP	206037-1	
	CLAMP	AMP	206070-1	
JKL PL19A	PLUG, A/S SWITCH #2, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JKL PL20A	PLUG, TAILCONE, 16 PIN	AMP	206037-1	
	CLAMP	AMP	206070-1	
JKL PL21A	PLUG, HEADLINER, 9 PIN	AMP	206708-1	
	CLAMP	AMP	206966-1	
JKL PL22A	PLUG, OVERHEAD, RR, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JKL PL23A	PLUG, GRND #1, 16 PIN	AMP	206037-1	
	CLAMP	AMP	206070-1	
JKL PL24A	PLUG, GRND #2, 16 PIN	AMP	206037-1	
	CLAMP	AMP	206070-1	
JK PL25A	PLUG, LIGHT CONTROL, 9 PIN	AMP	206708-1	
	CLAMP	AMP	206966-1	
JK PL26A	PLUG, G/SHIELD HARN., 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JK PL27A	PLUG, FLT PNL #2, 16 PIN	AMP	206037-1	
	CLAMP	AMP	206070-1	
JKL PL27B	PLUG, FLT PNL #2, 20 PIN	MOONEY	930021-501	
JK PL28A	PLUG, AVIONICS PWR, 20 PIN	MOONEY	930021-501	
JK PL29A	PLUG, DIM, GND, 20 PIN	MOONEY	930021-501	
JK PL30A	PLUG, DIM, GND 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JK PL31A	PLUG, STANDBY VAC, 8 PIN	AMP	205838-1	
	CLAMP	AMP	206062-1	
JK PL32A	PLUG, GEAR RELAY, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JKL PL33A	PLUG, C/B PNL, 9 PIN	AMP	206708-1	
	CLAMP	AMP	206966-1	
JKL PL34A	PLUG, GRND BUSS, 9 PIN	AMP	206708-1	
	CLAMP	AMP	206966-1	
JKL PL34B	PLUG, GRND BUSS, 16 PIN	AMP	206037-1	
	CLAMP	AMP	206070-1	
JK PL35A	PLUG, FLT PNL #3, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
JK	PL36A	PLUG, CONSOLE # 2, 8 PIN	AMP	205838-1	
		CLAMP	AMP	206062-1	
JK	PL37A	PLUG, LT SIDE PNL, 8 PIN	AMP	206838-1	
		CLAMP	AMP	206062-1	
JK	PL38A	PLUG, FLAP RELAY, 8 PIN	AMP	205708-1	
		CLAMP	AMP	206062-1	
JK	PL39A	PLUG, FLAP MOTOR, 9 PIN	AMP	206708-1	
		CLAMP	AMP	206966-1	
K	PL40A	PLUG, THROTTLE SW, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
JKL	PL50A	PLUG, C/B PNL #2, 37 PIN	AMP	206150-1	
		FLANGE	AMP	207299-4	
JKL	PL51A	RECPT, IGNITION SW, 26 PIN	MOONEY	930021-505	
JKL	PL52A	PLUG, ALT/STARTER, F/W	CANNON	MS3106A2B-22S	
		CLAMP		MS305716	
JKL	PL55A	PLUG, EMPENNAGE, 9 PIN	AMP	206708-1	
		CLAMP	AMP	206966-1	
JKL	PL56A	PLUG, GRND #4, 9 PIN	AMP	206708-1	
		CLAMP	AMP	206966-1	
JKL	PL57A	PLUG,GRND #5, 14 PIN	MOONEY	930021-001	
JKL	PL58A	PLUG, DIM. #2, 16 PIN	AMP	206037-1	
		CLAMP	AMP	206070-1	
JKL	PL59A	PLUG, GRND #6, 26 PIN	MOONEY	930021-505	
JK	PL76A	PLUG, 9 PIN	AMP	206708-1	
		CLAMP	AMP	206966-1	
JK	PL77A	PLUG, 28 PIN	AMP	205839-3	
		CLAMP	AMP	206070-1	
L	PL152A	PLUG, GR/STALL WARN			
		HARNESS, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
JK	PS101A	C/B, IGN/TACH/CIG LIGHTER	KLIXON	7277-2-10	
JKL	PS102A	SOLENOID, STARTER,LT	C-H	6041H-202 or -202A	
JK	PS103A	FUSEHOLDER	LITTEL	155020 or 155120	
		FUSE, 1A	LITTEL	313001	
J	PS105A	STARTER	PRESTOLITE	MHB-4016	
		(ALT)	LYCOMING	LW15572	
K	PS106A	STARTER	TCM	646275	
		(ALT)	TCM	637847	
JKL	PS107A	DIODE, STARTER SOLENOID,LT		1N2483	
L	PS150A	DIODE, PWR START,LT		1N2483	
L	PS151A	DIODE, PWR START,RT		1N2483	
L	PS152A	SOLENOID, STARTER, RT	C-H	6041H-202 or -202A	
L	PS153A	DIODE, STARTER SOLENOID		1N2483	
L	PS154A	STARTER	PORSCHE	933.602.007.03	
JKL	RB101A	C/B RADIO BLOWER	KLIXON	7277-2-2	
JKL	RB102A	RADIO BLOWER	TRW	19A2790	
JKL	RB103A	FILTER ,RADIO BLOWER	ARCHER	273-103	
JKL	RB103A	FILTER, RAD. BLWR, (ALT)	SPRAGUE	5JX5104A	
JKL	RC01A	RECPT, C/B PNL #1, 37 PIN	AMP	206151-2	
JKL	RC02A	RECPT, CONSOLE #1, 16 PIN	AMP	206036-3	
		CLAMP	AMP	206070-1	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JKL RC02B	RECPT, CONSOLE #1, 28 PIN	AMP	206152-1	
	CLAMP	AMP	206070-1	
JKL RC03A	RECPT, LT SIDE PANEL, 20 PIN	MOONEY	930021-502	
JKL RC03B	RECPT, LT SIDE PANEL, 26 PIN	MOONEY	930021-506	
JKL RC04A	RECPT, FLT PNL #1, 26 PIN	MOONEY	930021-506	
JKL RC05A	RECPT, A/S SWITCH #1, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JKL RC06A	RECPT, A/P POWER, 16 PIN	AMP	206036-3	
	CLAMP		206070-1	
JKL RC07A	RECPT, CLUSTER GA., 16 PIN	AMP	206036-3	
	CLAMP		206070-1	
JKL RC08A	RECPT, FIREWALL #1, 19 PIN		MS3100A22-14P	
	CLAMP		MS3057-12B	
JKL RC08B	RECPT, FIREWALL #1, 19 PIN		MS3100K22-14P	
	(ALT)		MS3100KE22-14P	
	CLAMP		MS3057-12B or 12A	
JKL RC09A	RECPT, RT. WG, 14 PIN	MOONEY	930021-2	
JKL RC09B	RECPT, RT WING, 20 PIN	MOONEY	930021-502	
JKL RC10A	RECPT, RT. WING STUB, 14 PIN	MOONEY	930021-2	
JKL RC11A	RECPT, LT. WG., 14 PIN	MOONEY	930021-002	
JKL RC12A	RECPT, FIREWALL #2, 19 PIN		MS3100A22-14P	
	CLAMP		MS3057-12B	
JKL RC12B	RECPT, FIREWALL #2		MS3100K22-14P	
	(ALT)		MS3100KE22-14P	
	CLAMP		MS3057-12B or -12A	
JK RC13A	RECPT, RT.RADIO PNL, 9 PIN	AMP	206705-1	
	CLAMP	AMP	206966-1	
JKL RC13B	RECPT, AVIONICS MSTR, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK RC14A	RECPT, HOUR METER, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JKL RC15A	RECPT, LT WING STUB, 14 PIN	MOONEY	930021-002	
JKL RC16A	RECPT, GEAR CONTROL	AMP	206705-2	
	CLAMP	AMP	206966-1	
JKL RC17A	RECPT, ELECTRIC GEAR	MOONEY	930021-002	
JK RC18A	RECPT, DIMMER, 16 PIN	AMP	206036-3	
	CLAMP	AMP	206070-1	
JKL RC18B	RECPT, PNL LT DIM#1, 14 PIN	AMP	206044-1	
	CLAMP	AMP	206070-1	
JKL RC19A	RECPT, A/S SWITCH #2, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JKL RC20A	RECPT, TAILCONE, 16 PIN	AMP	206036-3	
	CLAMP	AMP	206070-1	
JK RC21A	RECPT, TAILCONE, 16 PIN	AMP	206036-3	
	CLAMP	AMP	206062-1	
JK RC22A	RECPT, O/H REAR, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK RC23A	RECPT, GRND #1, 16 PIN	AMP	206036-3	
	CLAMP	AMP	206070-1	
JK RC24A	RECPT, GRND #2, 16 PIN	AMP	206036-3	
	CLAMP	AMP	206070-1	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
JKL	RC26A	RECPT, COMPASS LT HARN,	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	RC27A	RECPT, FLT PNL #2,4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JKL	RC27B	RECPT, FLT PNL #2, 20 PIN	MOONEY	930021-502	
JK	RC28A	RECPT, AVIONICS PWR, 20 PIN	MOONEY	930021-502	
JK	RC29A	RECPT, DIM/GRND, 20 PIN	MOONEY	930021-502	
JK	RC30A	RECPT, DIM/GRND, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	RC31A	RECPT, STBY VAC, 8 PIN	AMP	205841-2	
		CLAMP	AMP	206062-1	
JK	RC31B	RECPT, STBY VAC, 8 PIN	AMP	205841-2	
		CLAMP	AMP	206062-1	
JKL	RC32A	RECPT, GEAR RELAY, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	RC33A	RECPT, C/B PNL #2, 9 PIN	AMP	206705-2	
		CLAMP	AMP	206966-1	
JKL	RC34B	RECPT, GRND BUSS, 16 PIN	AMP	206036-3	
		CLAMP	AMP	206966-1	
JK	RC35A	RECPT, FLT PNL #3, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	RC36A	RECPT, CONSOLE #2, 8 PIN	AMP	205841-2	
		CLAMP	AMP	206062-1	
JK	RC37A	RECPT, LT.SIDE PNL, 8 PIN	AMP	205841-2	
		CLAMP	AMP	206062-1	
JK	RC38A	RECPT, FLAY RELAY, 8 PIN	AMP	205841-2	
		CLAMP	AMP	206062-1	
JK	RC39A	RECPT, FLAP MOTOR, 9 PIN	AMP	206705-2	
		CLAMP	AMP	206966-1	
K	RC40A	RECPT, THROTTLE SW, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JKL	RC50A	RECPT, C/B PNL #2	AMP	206151-2	
		CLAMP	AMP	206138-1	
JKL	RC51A	RECPT, IGNITION SWITCH	MOONEY	930021-506	
JKL	RC52A	RECPT, ALT/STARTER	CANNON	MS3100K28-2P	
		(ALT)		MS3100KE28-2P	
JKL	RC55A	RECPT, EMPENNAGE, 9 PIN	AMP	206705-2	
		CLAMP		206966-1	
JKL	RC56A	RECPT, GRND RECPT. #4, 9 PIN	AMP	206705-2	
		CLAMP		206966-1	
JKL	RC57A	RECPT, GRND RECPT #5, 14 PIN	MOONEY	930021-002	
JKL	RC58A	RECPT, DIM RECPT. #2, 16 PIN	AMP	206036-3	
		CLAMP	AMP	206070-1	
L	RC58B	RECPT, PNL LT DIM #2, 14 PIN	AMP	206044-1	
		CLAMP	AMP	206070-1	
JKL	RC59A	RECPT, GRND RECPT #6, 26 PIN	MOONEY	930021-506	
JK	RC76A	RECPT, 9 PIN	AMP	206705-2	
		CLAMP	AMP	206966-1	
JK	RC77A	RECPT, 28 PIN	AMP	206152-1	
		CLAMP	AMP	206070-1	
L	RC150A	RECPT, ENGINE HARNESS, LT	CANNON-GERMANY	CA121006-518	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		CLAMP	CANNON-GERMANY	057-8557-000	
		FERRULE END RING	CANNON-GERMANY	304-8553-000	
		RECPT, ENG, LT F/WALL (ALT)	CANNON-GERMANY	CA121006-600	
L	RC150A	RECPT, ENG HARNESS,LT (ALT)	PORSCHE	933.612.415.00	
		CLAMP*	PORSCHE	933.612.417.00	
		ENDBELL*	PORSCHE	933.612.425.00	
		*** NOTE:ALTERNATE HIGH TEMPERATURE COMPONENTS FOR ITEMS:**			
L	RC151A	RECPT, ENGINE HARNESS, RT	CANNON-GERMANY	CA121006-518	
		CLAMP*	CANNON-GERMANY	057-8557-000	
		FERRULE END RING*	CANNON-GERMANY	304-8553-000	
L	RC151A	RECPT, ENGINE HARNESS, RT	PORSCHE	933.612.415.00	
		CLAMP*	PORSCHE	933.612.417.00	
		ENDBELL*	PORSCHE	933.612.425.00	
		*** NOTE: ALTERNATE HIGH TEMPERATURE COMPONENTS FOR ITEMS:**			
L	RC152A	RECPT, GR/STALL WARN			
		HARNESS, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JKL	SB101A	C/B, SPEED BRAKE	KLIXON	7277-2-2	
L	SPK101A	SPEAKER, CABIN	ARCHER	12-1703	
JK	WA101A	LIGHT, OVERVOLTAGE	WESTERN IND	501-61K-11K-3RP	
		CLAMP	WESTERN IND.	WI-7049	
JK	WA102A	DIODE		1N2483	
JK	WA103A	DIODE		1N2483	
L	WD150A	FUSEHOLDER, STARTER			
		SOLENOID	LITTEL	155020 or 155120	
	WD150A	FUSE, 1AMP	LITTEL	313001	
JKL	WE101A	C/B, GEAR WARN HORN	KLIXON	7277-2-2	
JKL	WE102A	LIGHT, GEAR DOWN	SLOAN	855S-O-U	
		BULB	GE	327	
JK	WE103A	SWITCH, THROTTLE	MICRO	V3-1	
		ACTUATOR	MICRO	JV-1	
JK	WE104A	HORN, GEAR WARNING	MALLORY	SC628P	
JKL	WE105A	DIODE		1N2483	
JKL	WE106A	DIODE		1M2483	
K	WE107A	SWITCH, THROTTLE	MICRO	1SE1-T	
		ACTUATOR	MICRO	JE-17	
L	WE150A	SWITCH, THROTTLE	MICRO-SWITCH	1SE1-T	
		ACTUATOR	MICRO-SWITCH	JE-5	
L	WE151A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
L	WE152A	RECPT, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JKL	WS101A	C/B STALL WARN HORN	KLIXON	7277-2-2	
JK	WS102A	HORN, STALL WARNING	MALLORY	SC628	
JKL	WS103A	SWITCH, STALL WARN	SAFE FLIGHT	C46001	
L	WS150A	ALERT, GR/STALL WARNING	IAI	950D-0309-000	
L	WS151A	PLUG,GR/STL WRN ALRT,25 PIN	ITT	DB25S	
		CLAMP	ITT	DB51212	
		LOCK RETAINER	ITT	DB1212-1	
L	WS152A	SPEAKER, GR/STALL WARN	ARCHER	40-1333C	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
L	WS153A	PLUG, INTER PHONE, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
L	WS154A	PLUG, MATE N LOCK, 2 PIN	AMP	1-480318-0	
		SOCKETS	AMP	60619-1	
L	WS155A	RECPT, MATE N LOCK, 2 PIN	AMP	1-480319-0	
		PINS	AMP	60620-1	
JK	WT101A	C/B, ANNUNCIATOR	KLIXON	7277-2-2	
J	WT102A	ANNUNCIATOR	MOONEY	880025-521	
		LAMPS	CHICAGO MINIATURE	CM7327	
K	WT103A	ANNUNCIATOR	MOONEY	880025-523	
		LAMPS	CHICAGO MINIATURE	CM7327	
JK	WT104A	PLUG, ANNUNCIATOR	MOLEX	09-50-3151	
		SOCKETS	MOLEX	08-50-0106	
L	WT150A	C/B, ANNUNCIATOR, LT	KLIXON	7277-2-1	
L	WT151A	C/B, ANNUNCIATOR, RT	KLIXON	7277-2-1	
L	WT153A	ANNUNCIATOR	IAI	950D0308-000	
		LAMPS	CHICAGO MINATURE	CM7327	
L	WT154A	PLUG, ANNUNCIATOR	ITT	DB25S	
		CLAMP	ITT	DB51212-1	
		LOCK RETAINER	ITT	DB51221-1	
JK	WV101A	C/B, VACUUM WARNING	KLIXON	7277-2-2	
JK	WV102A	SWITCH, VACUUM WARNING	MOONEY	880012-501	
JK	WV103A	RECPT, VAC WARN, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	WV104A	PLUG, VAC WARN, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
J	WW101A	SWITCH, RAM AIR	MICRO	V3-1	
		ACTUATOR	MICRO	JV-5	
K	WW102A	SWITCH, ALTERNATE AIR	CHERRY	E51-508	
L	WW150A	SWITCH, ALTERNATE AIR	CHERRY	E51-508	

NOTES:

1. Use 1 ea. MS35334-21 or MS2898 (Alan Bradley) internal tooth lockwasher with each light if not supplied by Sloan.
2. Maximum circuit breaker rating is shown, amperage of installed circuit breaker is determined by particular unit installed.
3. Buss bar may be shortened as required by circuit breaker installation.
4. Alternate for V3-1 switch w/ JV-5 actuator is V3L-3 assembly.
5. Varies with AutoPilot System installed.

RESERVED

91-20-03 - ELECTRICAL SYSTEM HARDWARE CHART - 28 VOLT

S/N's 25-1225 THRU 25-1999 - MOONEY DRAWING NO. 800263 (E7)

**** - ACTUAL USAGE DETERMINED BY MASTER SCHEMATICS - ****

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JK CB101A	C/B, DEFROSTER BLOWER	KLIXON	7277-2-5	
JK CB102A	SWITCH, BLOWER MOTOR	CHERRY	E51-50B	
JK CB103A	MOTOR, BLOWER	MOONEY	640317-501	
JK CB103B	MOTOR, BLOWER	MOONEY	640317-503	
JK CB104A	PLUG, 2 PIN	AMP	1-480318-0	
	SOCKET	AMP	60619-1	
JK CB105A	RECEPTACLE, 2 PIN	AMP	1-480319-0	
	PIN	AMP	60620-1	
JK CC101A	C/B, COWL FLAP	KLIXON	7277-2-5	
JK CC102A	SWITCH, COWL FLAP	MICRO	12TW1-1	
JK CC103A	ACTUATOR, COWL FLAP	MOONEY	880050-501	
JK CC103B	ACTUATOR, COWL FLAY	MOONEY	880050-505	
JK CC104A	SWITCH, OPEN LIMIT	MICRO	1SE1-T	
	ACTUATOR	MICRO	JE-5	
JK CC105A	SWITCH, CLOSED LIMIT	MICRO	1SE1-T	
	ACTUATOR	MICRO	JE-5	
JK CC106A	PLUG, 9 PIN	AMP	206708-1	
	CLAMP	AMP	206966-1	
JK CC107A	RECEPTACLE, 9 PIN	AMP	206705-2	
	CLAMP	AMP	206966-1	
JK CC108A	VARISTOR	GE	V47ZA05	
JK CF101A	C/B, FLAP ACTUATOR	KLIXON	7277-2-5	
JK CF103A	SWITCH, UP LIMIT	MICRO	V3-1	
	ACTUATOR	MICRO	JV-5	
JK CF104A	SWITCH, DOWN LIMIT	MICRO	V3-1	
	ACTUATOR	MICRO	JV-5	
JK CF105A	ACTUATOR, FLAP	MOONEY	750105-501	
JK CF108A	SWITCH, FLAP	C-H	8906K3149	
JK CV101A	C/B, STAND-BY VACUUM	MOONEY	930023-233	
JK CV102A	CURRENT MONITOR,STBYVAC	MOONEY	800221-505	
JK CV103A	PLUG, 9 PIN	AMP	206708-1	
	CLAMP	AMP	206966-1	
JK CV104A	PLUG, 2 PIN	AMP	1-480318-0	
	SOCKET	AMP	60619-1	
JK CV105A	RECEPTACLE, 2 PIN	AMP	1-480319-0	
	PIN	AMP	60620-1	
JK CV106A	PUMP, VACUUM	AEROSAFE	820904-2	
JK DA101A	SHUNT, LOAD	EMPRO	MLA-70A-100MV	
JK DA102A	FUSEHOLDER	McGRAW EDISON	FHN42W	
JK DA103A	FUSEHOLDER	McGRAW EDISON	FM01-5A	
JK DB101A	C/B, TURN COORDINATOR	KLIXON	7277-2-2	
JK DB102A	TURN COORDINATOR	UNITED INSTR.	9013 CODE N.5	
	TURN COORDINATOR (ALT)	ASTRONAUTICS	303990-028MSC	
	TURN COORDINATOR (ALT)	ELECTRO GYRO	1394T100-3Z	
	TURN COORDINATOR (ALT)	UI.	9114 CODE N.21	
JK DB103A	PLUG		MS3106A-10SL-3S	
	CABLE CLAMP		MS3507-4A	
	(ALT)		MS3507-4B	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
JK	DC101A	PROBE, CHT, (CYL. #3)		MS24482-1	1
		(ALT)		AN5546-1	1
JK	DD101A	C/B, EGT/OAT	KLIXON	7277-2-2	
J	DD102A	GAUGE, EGT/OAT	MOONEY	880001-507	
J	DD102B	GAUGE (4 PROBE)	MOONEY	880001-509	
J	DD103A	PLUG, 8 PIN	AMP	205838-1	
		CLAMP	AMP	206062-1	
JK	DD104A	PROBE, OAT	MOONEY	880004-501	
JK	DD105A	PLUG, 2 PIN	AMP	1-480318-0	
		SOCKET	AMP	60619-1	
JK	DD106A	RECEPTACLE, 2 PIN	AMP	1-480319-0	
		PIN	AMP	60620-1	
JK	DF101A	TRANSMTR, LT IN/BD, FUEL	MOONEY	610242-003	
JK	DF102A	TRANSMTR, LT OUT/BD, FUEL	MOONEY	610243-003	
JK	DF103A	TRANSMTR, RT IN/BD, FUEL	MOONEY	610242-003	
JK	DF104A	TRANSMTR, RT OUT/BD, FUEL	MOONEY	610243-001	
JK	DG101A	C/B, INSTR. MODULE #1	KLIXON	7277-2-1	
J	DG103A	MODULE, INSTR.	MOONEY	880059-507	
JK	DG104A	PLUG, 28 PIN	AMP	205839-3	
		CLAMP	AMP	206070-1	
K	DG105A	MODULE, INSTRUMENT	MOONEY	880059-509	
J	DH101A	PROBE, OIL TEMP	MOONEY	880061-501	
		(ALT)	LEWIS ENGRG	56B3A9	
K	DH101A	PROBE, OIL TEMP		MS28034-1	
K	DH102A	PLUG, 2 PIN		MS3108A-12S-3S	
		CLAMP		MS3057-4A	
JK	DJ101A	TRANSDUCER, OIL PRESS	DRUCK	PDCR821-0662-100	
		(ALT)	KULITE	APT-154-1000-100PSIG	
JK	DJ102A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
JK	DJ103A	RECEPTACLE, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	DK101A	TRANSDUCER, FUEL PRESS	DRUCK	PDCR821-0662-30	
		(ALT)	KULITE	APT-153-1000-30PSIG	
JK	DK102A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
JK	DK103A	RECEPTACLE, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
J	DL101A	TACHOMETER	MOONEY	880039-515	
		(ALT)	B & D	0520-003	
K	DL101A	TACHOMETER	MOONEY	880039-517	
		(ALT)	B & D	0520-006	
JK	DL102A	PLUG, 5 PIN		MS3106A-14S-5S	
		CLAMP		MS3057-6A/B	
J	DL103A	SENSOR, TACH	B & D	0400-004	
K	DL103A	SENSOR, TACH	B & D	0402-102	
		(ALT)	B & D	0402-104	
JK	DL104A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
JK	DL105A	RECEPTACLE, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
J	DM101A	HOUR METER	MOONEY	880035-507	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
K	DM101A	HOUR METER	MOONEY	880035-505	
JK	DM102A	RECEPTACLE, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	DM103A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
J	DM104A	FUSEHOLDER	LITTEL	155020	
		(ALT)	LITTEL	155120	
		FUSE (5A-3AG-SLO-BLO)	LITTEL	313005	
JK	DP101A	C/B, PITOT HEAT	MOONEY	930023-205	
JK	DP102A	PITOT, HEATED	AERO INSTR	PH502-24	
		(ALT)		AN5812-1	
JK	DP103A	PLUG		AN3115-1	
		SOCKET		AN3116-1	
JK	DP104A	PLUG, 2 PIN	AMP	1-480318-0	
		SOCKET	AMP	60619-1	
JK	DP105A	RECEPTACLE, 2 PIN	AMP	1-480319-0	
		PIN	AMP	60620-1	
K	DR101A	C/B, TIT	KLIXON	7277-2-2	
K	DR102A	TIT INDICATOR	MOONEY	880051-501	
K	DR102B	TIT/EGT INDICATOR (6 PROBE)	MOONEY	880051-503	
K	DR103A	PLUG, 8 PIN	AMP	205838-1	
		CLAMP	AMP	206062-1	
K	DR103B	PLUG, 28 PIN	AMP	205839-503	
		CLAMP	AMP	206070-1	
K	DR104A	PROBE, TIT	MOONEY	880055-501	
JK	DT101A	PROBE, EGT, (CYL #1)	MOONEY	880005-503	
		(ALT)	MOONEY	880005-501	
J	DT101A	(ALT)	MOONEY	660110-000	
JK	DT102A	PROBE, EGT (CYL #2)	MOONEY	880005-503	
		(ALT)	MOONEY	880005-501	
J	DT102A	(ALT)	MOONEY	660110-000	
JK	DT103A	PROBE, EGT (CYL #3)	MOONEY	880005-503	
		(ALT)	MOONEY	880005-501	
J	DT103A	(ALT)	MOONEY	660110-000	
JK	DT104A	PROBE, EGT (CYL #4)	MOONEY	880005-503	
		(ALT)	MOONEY	880005-501	
J	DT104A	(ALT)	MOONEY	660110-000	
J	DT105A	EGT INDICATOR	MOONEY	660109-003	
		LEAD WIRE)	ALCOR	01-005-78	
K	DT101A	PROBE, EGT (CYL #1)	MOONEY	880005-503	
		(ALT)	MOONEY	880005-501	
K	DT102A	PROBE, EGT (CYL #2)	MOONEY	880005-503	
		(ALT)	MOONEY	880005-501	
K	DT103A	PROBE, EGT (CYL #3)	MOONEY	880005-503	
		(ALT)	MOONEY	880005-501	
K	DT104A	PROBE, EGT (CYL #4)	MOONEY	880005-503	
		(ALT)	MOONEY	880005-501	
K	DT105A	PROBE, EGT (CYL #5)	MOONEY	880005-503	
		(ALT)	MOONEY	880005-501	
K	DT106A	PROBE, EGT (CYL #6)	MOONEY	880005-503	
		(ALT)	MOONEY	880005-501	
JK	DV101A	C/B, FUEL FLOW	KLIXON	7277-2-1	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JK DV102A	INDICATOR, FUEL FLOW	MOONEY	880034-501	
JK DV102A	(ALT)	MOONEY	880034-503	
	(ALT)	MOONEY	880034-505	
	(ALT) INDICATOR, F/F (GAL)	SHADIN	912021	
	(ALT) (LBS)	SHADIN	912023	
JK DV102B	INDICATOR, F/F (OPT) (GAL)	SHADIN	912041	4
	(ALT) (LBS)	SHADIN	912043	4
	(ALT) (LITER)	SHADIN	912047	4
	(ALT) (GAL)	SHADIN	912081	5
	(ALT) (LBS)	SHADIN	912083	5
	(ALT) (LITER)	SHADIN	912087	5
JK DV103A	PLUG, 9 PIN	ITT CANNON	DE-9S	2
	CLAMP	ITT CANNON	DE-24657	2
	LATCH ASSY (2 ea)	ITT CANNON	DE-51224-1	2
JK DV103B	PLUG, 9 PIN	ITT CANNON	DE-9S	3
	CLAMP	ITT CANNON	DE-24657	3
	LATCH ASSY (2 ea)	ITT CANNON	D-110278	3
JK DV104A	TRANSDUCER, FUEL FLOW	MOONEY	880030-501	
	(ALT)	MOONEY	880030-503	
JK DV104B	TRANSDUCER, FUEL FLOW	FLOSCAN	680501B	
JK DV105A	PLUG, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JK DV106A	RECEPTACLE, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK DV107A	SWITCH, FUEL FLOW	C & K	7101K	
JK DV108A	PLUG, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JK DV109A	RECEPTACLE, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK DW101A	VERTICAL SPEED INDICATOR	U.I.	7000 CODE C.83	
JK EG101A	C/B, GEAR RELAYS	KLIXON	7277-2-2	
JK EG102A	SWITCH, GEAR UP/DOWN	C-H	8906K2875	
JK EG103A	SWITCH, GEAR OVERRIDE	C-H	SB1DDX492-2	
	RING, LOCKING	C-H	29-761	
	WASHER, LOCK	C-H	16-886	
	NUT, HEX (2 ea)	C-H	15-966-6	
	LAMP (28V)	GE	334	
	LAMP (14V)	GE	336	
	SWITCH (ALT)	NKK CORP	DBL2141-3BL	
	BUTTON	NKK CORP	AT406	
	LOCKING RING	NKK CORP	AT406	
	LOCK WASHER	NKK CORP	AT508	
	NUT, HEX (2 EA)	NKK CORP	AT503	
	LAMP (28V)	NKK CORP	AT604-28	
JK EG104A	SW, AIRSPEED, GEAR SAFETY	MOONEY	880013-507	
JK EG105A	C/B, GEAR ACTUATOR	KLIXON	7277-2-7.5	
JK EG106A	SWITCH, GEAR UP LIMIT	MICRO	DT-2R-A7	
	ACTUATOR	MICRO	MCD-2711	
JK EG107A	SW, GEAR DOWN LIMIT	MICRO	1CH116-6	
JK EG107B	SW, GEAR DOWN LIMIT (ALT)	SAINT	ML1116	
JK EG108A	PLUG, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
JK	EG109A	RECEPTACLE, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
JK	EG110A	RELAY, GEAR UP	C-H	6041H220	
JK	EG111A	DIODE		1N2483	
JK	EG112A	RELAY, GEAR DOWN	C-H	6041H220	
JK	EG113A	DIODE		1N2483	
JK	EG114A	ACTUATOR, GEAR	MOONEY	560254-503	
		(ALT)	MOONEY	880037-507	
JK	ELT101A	TRANSMITTER, ELT	ARTEX	ELT110-4	
JK	ELT101B	TRANSMITTER, ELT	D & M	DM-ELT-8	
JK	ELT102A	RECEPTACLE, 12 PIN	MOLEX	03-06-2122	
		PIN	MOLEX	02-062103	
JK	ELT103A	SWITCH, REMOTE	ARTEX	110-416	
JK	ELT103B	SWITCH, REMOTE	C & K	7101K	
JK	ELT104A	PLUG, 9 PIN	MOLEX	03-06-2092	
		SOCKET	MOLEX	02-06-1103	
JK	ELT105A	PLUG, 8 PIN	AMP	205838-1	
		CLAMP	AMP	206062-1	
JK	ELT106A	RECEPTACLE, 8 PIN	AMP	205841-2	
		CLAMP	AMP	206062-1	
JK	ELT107A	PLUG, 8 PIN	AMP	205838-1	
		CLAMP	AMP	206062-1	
JK	ELT108A	RECEPTACLE, 8 PIN	AMP	205841-2	
		CLAMP	AMP	206062-1	
JK	FON101A	PHONE JACK	SWITCHCRAFT	C-11	
		WASHERS	SWITCHCRAFT	S-1028	
		WASHERS (ALT)	SWITCHCRAFT	S-1029	
JK	JM101A	SWITCH, MAGNETO	BENDIX/SCINTILLA	10-357210-9	
		PLACARD	BENDIX/SCINTILLA	10-187-468	
J	JM102A	MAGNETO	BENDIX/SCINTILLA	D-4LN2021	
K	JM102A	MAGNETO, LEFT	SLICK	6224	
K	JM102B	MAGNETO, LEFT	BENDIX/SCINTILLA	646979-1	
		CONNECTOR	BENDIX/SCINTILLA	10-382698	
K	JM103A	MAGNETO, RIGHT	SLICK	6224	
K	JM103B	MAGNETO, RIGHT	BENDIX/SCINTILLA	646979-1	
		CONNECTOR	BENDIX/SCINTILLA	10-382698	
JK	LB101A	C/B, BEACON, FLASHING	MOONEY	930023-243	
JK	LB102A	LIGHT, BEACON	WHELEN	WRLM-24	
		ADAPTER	WHELEN	WRM-65	
JK	LB102A	LGT,ANTI-COLLISION(WH)(ALT)	WHELEN	90033-20	
JK	LB102B	LGT,ANTI-COLLISION(RED)(ALT)	WHELEN	90033-19	
JK	LB103A	PLUG, 3 PIN	AMP	1-380303-0	
		SOCKET	AMP	60619-1	
JK	LB104A	RECEPTACLE, 3 PIN	AMP	1-480305-0	
		PIN	AMP	60620-1	
JK	LC101A	FUSEHOLDER	LITTEL	155020	
		(ALT)	LITTEL	155120	
		FUSE, 5A-3AG-SLO-BLO	LITTEL	313005	
JK	LC102A	SWITCH, CABIN LIGHT, FRONT	CARLING	TILC64-1S-WH-FN	
JK	LC103A	RESISTOR, DIM. (20 OHM 10W)	DALE	RH-10-20 OHM	
JK	LC104A	LAMP HOLDER	H H SMITH	1930	
		LAMP	GE	1818	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JK LC105A	LAMP HOLDER	H H SMITH	1930	
	LAMP	GE	1818	
JK LC106A	LAMP HOLDER	H H SMITH	1930	
	LAMP	GE	1818	
JK LC107A	LAMP HOLDER	H H SMITH	1930	
	LAMP	GE	1818	
JK LC108A	SWITCH, CABIN LIGHT, REAR	CARLING	TILC64-1S-WH-FN	
JK LC109A	RESISTOR, DIM. (20 OHM 10W)	DALE	RH-10-20 OHM	
JK LC110A	LAMP HOLDER	H H SMITH	1930	
	LAMP	GE	1818	
JK LC111A	LAMP HOLDER	H H SMITH	1930	
	LAMP	GE	1818	
JK LC112A	LAMP HOLDER	H H SMITH	1930	
	LAMP	GE	1818	
JK LC113A	LAMP HOLDER	H H SMITH	1930	
	LAMP	GE	1818	
JK LC117A	PLUG, 9 PIN	ITT CANNON	DE-9S	
	CLAMP		DE24657	
	LATCH		DE51224-1	
JK LC118A	MODULE, AUTO OFF LIGHT	MOONEY	800268-501	
JK LC118B	RECEPTACLE, 9 PIN		DE-9P	
	CLAMP		DE24657	
	RING, LOCKING		206514-1	
JK LC119A	DIODE		1N2483	
	(ALT)		1N5060	
	(ALT)	GE	3720-GE	
JK LC120A	DIODE		1N2483	
	(ALT)		1N5060	
	(ALT)	GE	3720-GE	
JK LC121A	PLUG, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JK LC122A	RECEPTACLE, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK LC123A	SWITCH, CABIN DOOR	NEWARK	89F5544	
JK LC124A	RECEPTACLE, 2 PIN	AMP	1-480319-0	
	PIN	AMP	60620-1	
JK LC125A	PLUG, 2 PIN	AMP	1-480318-0	
	SOCKET	AMP	60619-1	
JK LC126A	SWITCH, BAGGAGE DOOR	NEWARK	89F5544	
JK LC127	RECEPTACLE, 2 PIN	AMP	1-480319-0	
	PIN	AMP	60620-1	
JK LC128A	PLUG, 2 PIN	AMP	1-480318-0	
	SOCKET	AMP	60619-1	
JK LL101A	C/B, LANDING LIGHT	KLIXON	7277-2-25	
JK LL101A	C/B, LANDING LIGHT	MOONEY	930023-215	
JK LL102A	SWITCH, LANDING LIGHT	MOONEY	880052-521	
JK LL103A	LIGHT, LANDING, RIGHT	GE	4596	
JK LL104A	LIGHT, LANDING, LEFT	GE	4596	
JK LL105A	LIGHT, LANDING (COWL)	GE	4553	
JK LN101A	C/B, NAV LIGHT	MOONEY	930023-201	
JK LN102A	LGT ASSY, NAV, TAIL (LT WING)	MOONEY	800051-501	
	BULB	WHELEN	34-022-8030-85	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JK LN103A	LGT ASSY, NAV, TAIL (RT WING)	MOONEY	800051-501	
	BULB	WHELEN	34-022-8030-85	
JK LN104A	PLUG, 9 PIN (RT WING)	AMP	206708-1	
	CLAMP	AMP	206062-1	
JK LN105A	RECEPTACLE, 9 PIN (RT WING)	AMP	206705-1	
	CLAMP	AMP	206062-1	
JK LN106A	PLUG, 9 PIN (LT WING)	AMP	206708-1	
	CLAMP	AMP	206062-1	
JK LN107A	RECEPTACLE, 9 PIN (LT WING)	AMP	206705-1	
	CLAMP	AMP	206062-1	
JK LP101A	C/B, GLARESHIELD LIGHTS	KLIXON	7277-2-5	
JK LP102A	C/B, PANEL LIGHTS	KLIXON	7277-2-5	
JK LP103A	DIMMER CONTROL BOX	MOONEY	800049-501	
JK LP104A	PLUG, 9 PIN	AMP	206708-1	
	CLAMP	AMP	206966-1	
JK LP105A	LIGHT, CONSOLE	DIALIGHT	270-1930-0171-702	
	LAMP (28V)	GE	327	
	LAMP (ALT)	GE	385	
JK LP106A	LIGHT, CONSOLE	DIALIGHT	270-1930-0171-702	
	LAMP (28V)	GE	327	
	LAMP (ALT)	GE	385	
JK LP107A	PLUG, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JK LP108A	RECEPTACLE, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK LP109A	RECEPTACLE, COMPASS LGT	DEANS	DEA90020MALEHALF	
JK LP110A	PLUG, COMPASS LIGHT	DEANS	DEA90020FEMALEHALF	
JK LP111A	LAMP, COMPASS LIGHT (28V)	GE	327	
	(ALT)	GE	327 (AVIATION RED)	
JK LP112A	LAMPS, GL/SHLD LGTS (14 ea)	GE	327	
JK LP113A	LIGHT, OXYGEN	SLOAN	855S-0-U	6
	LAMP (28V)	GE	327	
JK LP114A	LIGHT, OXYGEN	SLOAN	855S-0-U	6
	LAMP (28V)	GE	327	
JK LP115A	PLUG, 2 PIN	AMP	1-480318-0	
	SOCKET	AMP	60619-1	
JK LP116A	RECEPTACLE, 2 PIN	AMP	1-480319-0	
	PIN	AMP	60620-1	
JK LP117A	PLUG, 2 PIN	AMP	1-480318-0	
	SOCKET	AMP	60619-1	
JK LP118A	RECEPTACLE, 2 PIN	AMP	1-480319-0	
	PIN	AMP	60620-1	
JK LP119A	PLUG, 2 PIN	AMP	1-480318-0	
	SOCKET	AMP	60619-1	
JK LP120A	RECEPTACLE, 2 PIN	AMP	1-480319-0	
	PIN	AMP	60620-1	
JK LP121A	POST LIGHT	WHELEN	A350CN1W-BK-SH14	
	LAMP (14V)	GE	330	
JK LP122A	POST LIGHT	WHELEN	A350CN1W-BK-SH14	
	LAMP (14V)	GE	330	
JK LP123A	LIGHTING TRAY (RPM)	B & D	0221-128	
JK LP124A	LIGHTING TRAY (M/P)	UI	BA28-24-BW3	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JK LP125A	LIGHTING TRAP (TIT/EGT)	B & D	0221-128	
JK LP126A	PLUG, 20 PIN	MOONEY	930022-501	
JK LP127A	RECEPTACLE, 20 PIN	MOONEY	930021-502	
JK LP130A	RHEOSTAT, MAP LGT (500 OHM)	NEWARK	09F981	
	KNOB	NEWARK	57F2368	
JK LP133A	RHEOSTAT, MAP LGT (500 OHM)	NEWARK	09F981	
	KNOB	NEWARK	57F2368	
JK LP134A	MAP LIGHT	SLOAN	855S-0-U	6
JK LP134A	LAMP (28V)	GE	327	
	LAMP (14V)	GE	330	
JK LP135A	MAP LIGHT	SLOAN	855S-0-U	6
	LAMP (28V)	GE	327	
	LAMP (14V)	GE	330	
JK LP136A	POST LIGHT	WHELEN	A350CN1W-BK-SH28	
	LAMP (28V)	GE	327	
JK LP137A	POST LIGHT	WHELEN	A350CN1W-BK-SH14	
	LAMP (14V)	GE	330	
JK LR101A	C/B, RECOGNITION LIGHTS	MOONEY	930023-231	
JK LR102A	LIGHT, RECOGNITION, LW	MOONEY	880049-501	
JK LR103A	PLUG, 2 PIN	AMP	1-480318-0	
	SOCKET	AMP	60619-1	
JK LR104A	RESISTOR	DALE	RH50-7.5 OHM	
JK LR105A	RECEPTACLE, 2 PIN	AMP	1-480319-0	
	PIN	AMP	60620-1	
JK LR106A	PLUG, 2 PIN	AMP	1-480318-0	
	SOCKET	AMP	60619-1	
JK LR107A	LIGHT, RECOGNITION, RW	MOONEY	880049-501	
JK LR108A	PLUG, 2 PIN	AMP	1-480318-0	
	SOCKET	AMP	60619-1	
JK LR109A	RESISTOR	DALE	RH50-7.5 OHM	
JK LR110A	RECEPTACLE, 2 PIN	AMP	1-480319-0	
	PIN	AMP	60620-1	
JK LR111A	PLUG, 2 PIN	AMP	1-480318-0	
	SOCKET	AMP	60619-1	
JK LS101A	C/B, STROBE LIGHT	MOONEY	930023-237	
JK LS102A	POWER SUPPLY, LT WING	WHELEN	01-0770329-00	
JK LS103A	RECEPTACLE, POWER SUPPLY	AMP	1-480305-0	
	PIN	AMP	60620-1	
JK LS104A	RECEPTACLE, POWER SUPPLY	AMP	1-480305-0	
	PIN	AMP	60620-1	
JK LS105A	PLUG, STROBE LIGHT ASSY	AMP	1-480303-0	
	SOCKET	AMP	60619-1	
JK LS106A	STROBE/NAV LIGHT, LT WING	WHELEN	A650-PR-D-M-28	
JK LS107A	POWER SUPPLY, LT WING	WHELEN	01-0770329-00	
JK LS108A	RECEPTACLE, POWER SUPPLY	AMP	1-480305-0	
	PIN	AMP	60620-1	
JK LS109A	RECEPTACLE, POWER SUPPLY	AMP	480305-0	
	PIN	AMP	60620-1	
JK LS110A	PLUG, STROBE LIGHT ASSY	AMP	1-480303-0	
	SOCKET	AMP	60619-1	
JK LS111A	STROBE/NAV LIGHT, RT WING	WHELEN	A650-PR-D-M-28	
JK LS112A	POWER SUPPLY, TAIL	WHELEN	01-0770329-00	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JK LS113A	RECEPTACLE, POWER SUPPLY	AMP	1-480305-0	
	PIN	AMP	60620-1	
JK LS114A	RECEPTACLE, POWER SUPPLY	AMP	1-480305-0	
	PIN	AMP	60620-1	
JK LS115A	PLUG, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JK LS116A	RECEPTACLE, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK LS117A	PLUG, STROBE LIGHT ASSY	AMP	1-480303-0	
	SOCKET	AMP	60619-1	
JK LS118A	LIGHT ASSY, TAIL STROBE	MOONEY	470013-501	
JK LS119A	RECEPTACLE, 3 PIN	AMP	1-480305-0	
	PIN	AMP	60620-1	
JK LS120A	RECEPTACLE, 3 PIN	AMP	1-480305-0	
	PIN	AMP	60620-1	
JK LS121A	RECEPTACLE, 3 PIN	AMP	1-480305-0	
	PIN	AMP	60620-1	
JK LT101A	C/B, TAXI LIGHT	KLIXON	7277-2-25	
JK LT102A	SWITCH, TAXI LIGHT	MOONEY	880052-523	
JK LT103A	BULB, TAXI, R/W (28V)	GE	4596	
JK LT104A	BULB, TAXI, L/W (28V)	GE	4596	
JK MA101A	RECEPTACLE, AUX POWER		AN2552-3A	
JK MA102A	RELAY, AUX POWER	C-H	6041H202	
	(ALT)	C-H	6041H202A	
JK MA103A	DIODE	SARKES-TARZIAN	10H3P	
JK MA104A	DIODE		1N2483	
	(ALT)		1N5060	
	(ALT)	GE	3720-GE	
JK MB101A	C/B, AVIONICS MASTER	MOONEY	930023-213	
JK MB102A	RELAY, AVIONICS MASTER	KISSLING	26.64.01	
JK MB103A	DIODE		1N2483	
	(ALT)		1N5060	
	(ALT)	GE	3720-GE	
JK MB104A	AVIONICS BUS BAR #1	MOONEY	913127-67	
JK MB105A	AVIONICS BUS BAR #2	MOONEY	913127-67	
JK MB106A	AVIONICS BUS BAR #3	MOONEY	913127-87	
JK MB107A	C/B, INTERCOM	KLIXON	7277-2-7.5	7
JK MB108A	C/B, COM 1	KLIXON	7277-2-10	7
JK MB109A	C/B, NAV 1	KLIXON	7277-2-7.5	7
JK MB110A	C/B, AUDIO	KLIXON	7277-2-7.5	7
JK MB111A	C/B, PHONE	KLIXON	7277-2-7.5	7
JK MB112A	C/B, ADF	KLIXON	7277-2-7.5	7
JK MB113A	C/B, COM 2	KLIXON	7277-2-10	7
JK MB114A	C/B, NAV 2	KLIXON	7277-2-7.5	7
JK MB115A	C/B, TRANSPONDER	KLIXON	7277-2-7.5	7
JK MB116A	C/B, ENCODER	KLIXON	7277-2-7.5	7
JK MB117A	C/B, STERO	KLIXON	7277-2-7.5	7
JK MB118A	C/B, DME	KLIXON	7277-2-7.5	7
JK MB119A	C/B, R/NAV	KLIXON	7277-2-7.5	7
JK MB120A	C/B, STORMSCOPE	KLIXON	7277-2-7.5	7
JK MB121A	C/B, LORAN	KLIXON	7277-2-7.5	7
JK MB122A	C/B, RMI	KLIXON	7277-2-7.5	7

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
JK	MB123A	C/B, AUTOPILOT/TRIM	KLIXON	7277-2-10-	7
JK	MB124A	C/B, A/P ALERT	KLIXON	7277-2-7.5	7
JK	MB125A	C/B, INVERTER	KLIXON	7277-2-7.5	7
JK	MB126A	C/B, ART. HORIZ.	KLIXON	7277-2-2	7
JK	MB127A	C/B, HSI	KLIXON	7277-2-2	7
JK	MB128A	C/B, YAW DAMP.	KLIXON	7277-2-7.5	7
JK	MB129A	C/B, TELEPHONE	KLIXON	7277-2-7.5	7
JK	MB130A	C/B, VME	KLIXON	7277-2-7.5	7
JK	MB131A	C/B, RADIO ALT.	KLIXON	7277-2-7.5	7
JK	MC102A	CIGAR LIGHTER	MOONEY	800336-503	
JK	MC102A	(ALT)	CASCO	208292	
JK	ME101A	CLOCK	MID-CONT	MD-88L	
		(OPT)	MID-CONT.	MD-88L (ET)	
		LIGHT TRAY	MID-CONT.	BA28-24-BW2	
JK	MIC101A	JACK, MICROPHONE	SWITCHCRAFT	C-12B	
		WASHERS	SWITCHCRAFT	S-1028	
		WASHERS (ALT)	SWITCHCRAFT	S-1029	
JK	MIC102A	SWITCH, MIC KEY, PILOT	C-H	SA1RV20	
JK	MIC103A	SWITCH, MIC KEY, CO-PILOT	C-H	SA1RV20	
JK	MP101A	C/B, PROP DE-ICE	MOONEY	930023-223	
JK	MP102A	TIMER, PROP DE-ICE	B.F. GOODRICH	3E1899-1	
JK	MP103A	MONITOR,CUR.,PROP DE-ICE	MOONEY	800221-505	
JK	MP104A	PLUG, 9 PIN	AMP	206708-1	
		CLAMP	AMP	206966-1	
JK	MP105A	TERMINAL BLOCK	McCAULEY	C-40521	
J	NF101A	C/B, BOOST PUMP	MOONEY	930023-211	
J	NF102A	PUMP, FUEL BOOST	WELDON	8163B	
		(ALT)	WELDON	A8163B	
K	NF102A	PUMP, BOOST	WELDON	10054B	
JK	NF103A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
JK	NF104A	RECEPTACLE, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
K	NF105A	C/B, HI BOOST PUMP	MOONEY	930023-219	
K	NF107A	C/B, LO BOOST PUMP	MOONEY	930023-217	
K	NF108A	REGULATOR, FUEL PUMP	ELECTRO-DELTA	VR-536	
K	NF108B	REGULATOR, FUEL PUMP	AMER. PROD	DGB-1	
K	NF109A	RECEPTACLE, 4 PIN	AMP	206153-1	
		CLAMP	AMP	206062-1	
K	NF110A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
K	NP101A	FUSEHLDR, PRIMER, DIFFUSER	LITTEL	155020	
		(ALT)	LITTEL	155120	
		FUSE (10A SLO BLO)	LITTEL	313010	
K	NP102A	SWITCH, PRIMER	CARLING	TIGK6B-IF-WH-A	
K	NP103A	PRIMER, DIFFUSER	TCM	633862-2	
K	NP104A	DIODE		1N2483	
		(ALT)		1N5060	
		(ALT)	GE	3720-GE	
JK	PA101A	C/B, ALTERNATOR, RT	ETA	41-3-S34-LN2-041800	
JK	PA102A	C/B, FIELD, RT. ALT	KLIXON	7277-2-5	
JK	PA103A	SWITCH, ALT. FLD.(OPT)	MOONEY	880052-525	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
K	PA103B	SWITCH, ALT. FLD. (STD)	MOONEY	880052-503	
JK	PA104A	VOLTAGE REGULATOR	MOONEY	880270-501	
		(ALT)	AUXILEC	VR-802	
		(ALT)	AM PROD	DGR-2	
JK	PA105A	RECEPTACLE, 9 PIN	AMP	206708-1	
		CLAMP	AMP	206966-1	
JK	PA106A	PLUG, 9 PIN	AMP	206705-2	
		CLAMP	AMP	206966-1	
J	PA107A	ALTERNATOR (STD)	LYCOMING	LW-14367	
		(ALT)	PRESTOLITE	ALU-6421-LS	
K	PA107A	ALTERNATOR (STD)	TCM	649280	
		(ALT)	TCM	649172	
		GEAR ASSY	TCM	649123	
JK	PA108A	FILTER	MOONEY	880014-501	
JK	PA109A	CAPACITOR	MALLORY	CGS302U-050R2C	
		(ALT)	MALLORY	CGS292U-050R3C	
K	PA110A	C/B	ETA	41-3-S34-LN2-041800	
K	PA111A	C/B	KLIXON	7277-2-5	
K	PA112A	VOLTAGE REGULATOR (DUAL)	ELECTRODELTA	VR-802	10
		(ALT)(DUAL)	AM. PROD/PREC.FLT	DGR-2	10
K	PA112A	REGULATOR, DUAL ALT.	MOONEY	800270-503	10
K	PA113A	RECEPTACLE, 9 PIN	AMP	206708-1	
		CLAMP	AMP	206966-1	
K	PA114A	PLUG, 9 PIN	AMP	206705-2	
		CLAMP	AMP	206966-1	
K	PA115A	ALTERNATOR (OPT)	TCM	649280	
		(ALT)	TCM	649172	
		GEAR ASSY	TCM	649123	
K	PA116A	FILTER	MOONEY	880014-501	
K	PA117A	CAPACITOR	MALLORY	CGS302U-050R2C	
		(ALT)	MALLORY	CGS292U-050R3C	
JK	PA118A	SENSOR, CURRENT	MICRO	CSLA1GE	
		ELEMENT, SENSOR	MICRO	SS-37126	
K	PA119A	SENSOR, CURRENT	MICRO	CSLA1GE	
		ELEMENT, SENSOR	MICRO	SS-37126	
JK	PA120A	PLUG, 9 PIN	AMP	206705-2	
		CLAMP	AMP	206966-1	
JK	PA121A	RECEPTACLE, 9 PIN	AMP	206708-1	
		CLAMP	AMP	206966-1	
K	PA122A	ADPT'R, ANALOG, CUR. SENSR	MOONEY	810088-504	
JK	PA122A	PLUG, 16 PIN	AMP	206037-1	
		CLAMP	AMP	206070-1	
JK	PA123A	RECEPTACLE, 16 PIN	AMP	206036-3	
		CLAMP	AMP	206070-1	
JK	PA124A	DIODE		1N2483	
		(ALT)		1N5060	
		(ALT)	GE	3720-GE	
JK	PB101A	BATTERY	GILL	G-243	
JK	PB102A	RELAY, BATTERY	C-H	6041H202	
		(ALT)	C-H	6041H202A	
JK	PB103A	DIODE		1N2483	
		(ALT)		1N5060	

CODE		DESCRIPTION	VENDOR	PART NO.	NOTES
		(ALT	GE	3720-GE	
JK	PB104A	SWITCH, MASTER	MOONEY	880052-501	
JK	PB105A	C/B, BATTERY	ETA	41-3-S34-LN2-041800	
JK	PB106A	C/B	ETA	41-3-S34-LN2-40A	
JK	PB107A	BUS BAR #1	MOONEY	913127-89	
JK	PB108A	BUS BAR #2	MOONEY	913127-75	
JK	PB109A	BUS BAR #3	MOONEY	913127-75	
JK	PB110A	BUS BAR #4	MOONEY	913127-77	
JK	PB111A	BUS BAR #5	MOONEY	913127-77	
JK	PB112A	BUS BAR #6	MOONEY	913127-73	
JK	PB113A	BUS BAR #7	MOONEY	913127-81	
JK	PB114A	BUS BAR #8	MOONEY	913127-77	
JK	PB115A	BUS BAR #9	MOONEY	913127-75	
JK	PB116A	BUS BAR #10	MOONEY	913127-83	
JK	PB117A	BUS BAR #11	MOONEY	913127-59	
JK	PB120A	GROUND/DIMMER BOX	MOONEY	800228-501	
J	PB121A	PLUG, 3 PIN	AMP	206037-2	
		CLAMP	AMP	206070-1	
J	PB122A	RECEPTACLE, 3 PIN	AMP	206207-1	
		CLAMP	AMP	206070-1	
JK	PL201A	PLUG, 37 PIN	AMP	206150-1	
		CLAMP	AMP	206138-1	
JK	PL203A	PLUG,	AMP	206037-1	
		CLAMP	AMP	206070-1	
JK	PL204A	PLUG, 26 PIN	MOONEY	930021-505	
JK	PL205A	PLUG, 28 PIN	AMP	205839-3	
		CLAMP	AMP	206070-1	
JK	PL206A	PLUG, 20 PIN	MOONEY	930021-501	
JK	PL207A	PLUG, 20 PIN	MOONEY	930021-501	
JK	PL208A	PLUG, 14 PIN	MOONEY	930021-001	
JK	PL209A	PLUG, 9 PIN	AMP	206708-1	
		CLAMP	AMP	206966-1	
JK	PL210A	PLUG, 9 PIN	AMP	206708-1	
		CLAMP	AMP	206966-1	
JK	PL211A	PLUG, 34 PIN	MOONEY	930021-507	
JK	PL212A	PLUG, 14 PIN	MOONEY	930021-001	
JK	PL216A	PLUG, 16 PIN	AMP	206037-1	
		CLAMP	AMP	206070-1	
JK	PL217A	PLUG, 16 PIN	AMP	206037-1	
		CLAMP	AMP	206070-1	
JK	PL218A	PLUG, 16 PIN	AMP	206037-1	
		CLAMP	AMP	206070-1	
JK	PL219A	PLUG, 28 PIN	AMP	205839-3	
		CLAMP	AMP	206070-1	
JK	PL220A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
JK	PL221A	PLUG, 4 PIN	AMP	206060-1	
		CLAMP	AMP	206062-1	
JK	PL222A	PLUG, 9 PIN	AMP	206708-1	
		CLAMP	AMP	206966-2	
JK	PL222B	PLUG, 16 PIN	AMP	206037-1	
		CLAMP	AMP	206070-1	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JK PL225A	PLUG, 32 PIN	MAT/SCI	M83723/86R2232N	8
	CLAMP	MAT/SCI	M85049/52-1-22N	
	SOCKET	MAT/SCI	5100-001-0012	
	SOCKET	MAT/SCI	5100-001-0020	
JK PL226A	PLUG, 32 PIN	MAT/SCI	M83723/86R2232N	8
	CLAMP	MAT/SCI	M85049/52-1-22N	
	SOCKET	MAT/SCI	5100-001-0012	
	SOCKET	MAT/SCI	5100-001-0020	
JK PL227A	PLUG, 6 PIN	MAT/SCI	MS3106A-28-22S	8
	CLAMP	MAT/SCI	MS3057-16B	
	(ALT)	MAT/SCI	MS3057-16A	
	SOCKET	MAT/SCI	5100-001-0012	
	SOCKET	MAT/SCI	5100-001-0020	
JK PL228A	PLUG, 20 PIN	MOONEY	930021-501	
JK PL229A	PLUG, 16 PIN	AMP	206037-1	
	CLAMP	AMP	206070-1	
JK PL230A	PLUG, 14 PIN	MOONEY	930021-001	
JK PL231A	PLUG, 16 PIN	AMP	206037-1	
	CLAMP	AMP	206070-1	
JK PL232A	PLUG, 14 PIN	MOONEY	930021-001	
JK PL233A	PLUG, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JK PS101A	C/B, STARTER SOLENOID	KLIXON	7277-2-5	
JK PS102A	SOLENOID, STARTER	C-H	6041H202	
	(ALT)	C-H	6041H202A	
JK PS103A	DIODE		1N2483	
	(ALT)		1N5060	
	(ALT)	GE	3720-GE	
J PS104A	STARTER	PRESTOLITE	MHB-4016	
	(ALT)	LYCOMING	LW-15572	
K PS104A	STARTER	TCM	646275	
	(ALT)	TCM	637847	
JK RB101A	C/B, RADIO BLOWER	KLIXON	7277-2-5	
JK RB102A	BLOWER, RADIO	TRW	19A2790	
JK RB102B	BLOWER, RADIO	BENDIX-KING	KA0033-01	
JK RB103A	FILTER, NOISE	ARCHER	273-103	
	(ALT)	SPRAGUE	5JX5104A	
JK RB104A	PLUG, 2 PIN	MOLEX	03-06-1023	
	SOCKET	MOLEX	02-06-1103	
JK RC201A	RECEPTACLE, 37 PIN	AMP	206151-2	
JK RC203A	RECEPTACLE, 3 PIN	AMP	206036-2	
	CLAMP	AMP	206070-1	
JK RC204A	RECEPTACLE, 26 PIN	MOONEY	930021-506	
JK RC205A	RECEPTACLE, 28 PIN	AMP	206152-1	
	CLAMP	AMP	206070-1	
JK RC206A	RECEPTACLE, 20 PIN	MOONEY	930021-502	
JK RC207A	RECEPTACLE, 20 PIN	MOONEY	930021-502	
JK RC208A	RECEPTACLE, 14 PIN	MOONEY	930021-002	
JK RC209A	RECEPTACLE, 9 PIN	AMP	206705-2	
	CLAMP	AMP	206966-1	
JK RC210A	RECEPTACLE, 9 PIN	AMP	206705-2	
	CLAMP	AMP	206966-1	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JK RC211A	RECEPTACLE, 34 PIN	MOONEY	930021-508	
JK RC212A	RECEPTACLE, 14 PIN	MOONEY	930021-002	
JK RC214A	RECEPTACLE, 14 PIN	AMP	206044-1	
	CLAMP	AMP	206070-1	
JK RC215A	RECEPTACLE, 14 PIN	AMP	206044-1	
	CLAMP	AMP	206070-1	
JK RC220A	RECEPTACLE, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK RC221A	RECEPTACLE, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK RC222A	RECEPTACLE, 4 PIN	AMP	206708-1	
	CLAMP	AMP	206966-1	
JK RC222B	RECEPTACLE, 9 PIN	AMP	206037-1	
	CLAMP	AMP	206070-1	
JK RC225A	RECEPTACLE, 32 PIN	MAT/SCI	M83723/83K2232N	
	CLAMP	MAT/SCI	M85049/52-1-22N	
	PIN	MAT/SCI	5000-054-0020	
	PIN	MAT/SCI	5000-054-0012	
	BOOT	MAT/SCI	MS3420-14	
	(ALT)	MAT/SCI	MS3420-16	
JK RC226A	RECEPTACLE, 32 PIN	MAT/SCI	M83723/83K2232N	
	CLAMP	MAT/SCI	M85049/52-1-22N	
	PIN	MAT/SCI	5000-054-0020	
	PIN	MAT/SCI	5000-054-0012	
	BOOT	MAT/SCI	MS3420-14	
	(ALT)	MAT/SCI	MS3420-16	
JK RC227A	RECEPTACLE, 6 PIN		MS3100K-28-2P	
	(ALT)		MS3100KE-28-2P	
	CLAMP		MS3057-16B	
	(ALT)		MS3057-16A	
JK RC230A	RECEPTACLE, 14 PIN	MOONEY	930021-002	
JK RC231A	RECEPTACLE, 16 PIN	AMP	206036-1	
	CLAMP	AMP	206070-1	
JK RC232A	RECEPTACLE, 14 PIN	MOONEY	930021-002	
JK RC233A	RECEPTACLE, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JK RC277A	RECEPTACLE, AUDIO	AMP	206152-1	
	CLAMP	AMP	206070-1	
JK SB101A	C/B, SPEED BRAKE	KLIXON	7277-2-3	
JK SB102A	SWITCH, SPEED BRAKE	PRECISE FLT	01265	
JK SB103A	PLUG, 3 PIN	AMP	1-380303-0	
	SOCKET	AMP	60619-1	
JK SB104A	RECEPTACLE, 3 PIN	AMP	1-380305-0	
	PIN	AMP	60620-1	
JK SB105A	RELAY, SPEED BRAKE	PRECISE FLT	01384	
JK SB106A	DIODE		1N2483	
	(ALT)		1N5060	
	(ALT)	GE	3720-GE	
JK SB107A	PLUG, 4 PIN	AMP	206060-1	
	(ALT)	AMP	206062-1	
JK SB108A	RECEPTACLE, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JK SB109A	PLUG, 8 PIN	AMPM	205838-1	
	CLAMP	AMP	206062-1	
JK SB110A	RECEPTACLE, 8 PIN	AMP	205841-2	
	CLAMP	AMP	206062-1	
JK SB111A	MOTOR, LEFT	PRECISE FLT	01532	
JK SB112A	SWITCH, DEPLOY LIMIT	PRECISE FLT	01505	
JK SB113A	SWITCH, RETRACT LIMIT	PRECISE FLT	01505	
JK SB114A	SOLENOID, CLUTCH	PRECISE FLT	01678	
JK SB115A	PLUG, 8 PIN	AMP	205838-1	
	CLAMP	AMP	206062-	
JK SB116A	RECEPTACLE, 8 PIN	AMP	205841-2	
	CLAMP	AMP	206062-1	
JK SB117A	PLUG, 8 PIN	AMP	205838-1	
	CLAMP	AMP	206062-1	
JK SB118A	RECEPTACLE, 8 PIN	AMP	205841-2	
	CLAMP	AMP	206062-1	
JK SB119A	MOTOR, RIGHT	PRECISE FLT	01532	
JK SB120A	SWITCH, DEPLOY LIMIT	PRECISE FLT	01505	
JK SB121A	SWITCH, RETRACT LIMIT	PRECISE FLT	01505	
JK SB122A	SOLENOID, CLUTCH	PRECISE FLT	01678	
JK SB123A	PLUG, 8 PIN	AMP	205838-1	
	CLAMP	AMP	206062-1	
JK SB124A	RECEPTACLE, 8 PIN	AMP	205841-2	
	CLAMP	AMP	206062-1	
JK SPK101A	SPEAKER, CABIN	ARCHER	12-1703	
JK SPK102A	PLUG, 2 PIN	AMP	1-480318-0	
	SOCKET	AMP	60619-1	
JK SPK103A	RECEPTACLE, 2 PIN	AMP	1-480319-0	
	PIN	AMP	60620-1	
JK WD101A	FUSEHOLDER	LITTEL	155020	
	(ALT)	LITTEL	155120	
	FUSE, 1A	LITTEL	313001	
JK WE101A	C/B, GEAR WARNING	KLIXON	7277-2-1	
JK WE102A	LIGHT, GEAR DOWN	SLOAN	855S-0-U	
	BULB	GE	327	
J WE103A	SWITCH, THROTTLE	MICRO	V3-1	
	ACTUATOR	MICRO	JV-5	
K WE103A	SWITCH, THROTTLE	MICRO	1SE1-T	
	ACTUATOR	MICRO	JE-17	
JK WE104A	HORN, GEAR WARNING	MALLORY	SC628P	
JK WE105A	DIODE		1N2483	
	(ALT)		1N5060	
	(ALT)	GE	3720-GE	
JK WE106A	DIODE		1N2483	
	(ALT)		1N5060	
	(ALT)	GE	3720-GE	
JK WE107A	RESISTOR	ALLEN BRADLEY	RC42GF102J1K OHM2W	
JK WE108A	PLUG, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JK WE109A	RECEPTACLE, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK WP101A	MONITOR, CUR., PITOT HEAT	MOONEY	800221-505	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
JK WP102A	PLUG, 9 PIN	AMP	206705-2	
	CLAMP	AMP	206966-1	
JK WP106A	FUSEHOLDER	LITTEL	155020	
	(ALT)	LITTEL	155120	
	FUSE (5A)	LITTEL	313005	
JK WS101A	C/B, STALL WARNING	KLIXON	7277-2-1	
JK WS102A	HORN, STALL WARN	MALLORY	SC628	
JK WS103A	RESISTOR	ALLEN BRADLEY	RC42GF102J1K OHM2W	
JK WS104A	SWITCH, STALL WARN	SAFE FLIGHT	C46001	
	(ALT)	MICRO SWITCH	V3-2451-D8	9
	(ALT)	MOONEY	800364-507	
JK WT101A	C/B	KLIXON	7277-2-2	
J WT102A	ANNUNCIATOR	MOONEY	880048-501	
	(ALT)(USA)	MOONEY	880048-601	
	(ALT)(FRANCE)	MOONEY	880048-603	
K WT102A	ANNUNCIATOR	MOONEY	880048-501	
	(ALT) LEGEND (USA)	MOONEY	880048-605	
	(ALT) LEGEND (FRANCE)	MOONEY	880048-607	
JK WT103A	PLUG, 37 PIN		DC-37S	
	CLAMP, RT ANGLE		DC19977-3	
	LOCK RETAINER		DC51222-1	
JK WT104A	ANNUNCIATOR (ATS)	MOONEY	880025-521	
	BULB	CHICAGO MINATURE	CM-7327	
JK WV101A	C/B, VACUUM WARN	KLIXON	7277-2-2	
JK WV102A	SWITCH, VACUUM WARN	MOONEY	880012-501	
JK WV103A	RECEPTACLE, 4 PIN	AMP	206153-1	
	CLAMP	AMP	206062-1	
JK WV104A	PLUG, 4 PIN	AMP	206060-1	
	CLAMP	AMP	206062-1	
JK WW101A	SWITCH, ALTERNATE AIR	CHERRY	E51-50B	

NOTES:

1. USE AN4076-1 ADAPTER.
2. USE WITH FT101/FT101A FUEL FLOW SYSTEM.
3. USE WITH SHADIN FUEL FLOW SYSTEM.
4. SHADIN MODEL NO. INTERFACE WITH II MORROW APOLLO, ARNAV AND NORTHSTAR LORAN SYSTEMS.
5. SHADIN MODEL NO. INTERFACE WITH BENDIX/KING KLN88.
6. USE 1 EACH MS35334-21 OR M2898 (ALAN BRADLEY) INTERNAL TOOTH LOCKWASHER WITH EACH LIGHT IF NOT SUPPLIED BY SLOAN.
7. MAXIMUM CIRCUIT BREAKER RATING IS SHOWN. AMPERAGE OF INSTALLED CIRCUIT BREAKER IS DETERMINED BY PARTICULAR UNIT INSTALLED.
8. USE MS3420 OR AN3420-14 OR -16 BOOT WITH CONNECTOR.
9. PART OF 800336-501 INSTALLATION.
10. 800270-503 REPLACES SINGLE UNIT VOLTAGE REGULATORS (2 EA) FOR DUAL ALTERNATOR INSTALLATIONS.

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S/N 25-2001 THRU 22-2012 -- SCHEMATIC DRAWING NO's. 800383 [PG 5.1.2.] [K2] [REV. F]
S/N 25-2013 THRU 25-2025 -- SCHEMATIC DRAWING NO's. 800383 [PG 5.1.3.] [K3] [REV. G]
S/N 25-2026 THRU 25-2032 -- SCHEMATIC DRAWING NO's. 800383 [PG 5.1.4.] [K4] [REV. H]

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
AC101A	SWITCH, AIR COND.	MOONEY	880067-501	
AC102A	COMPRESSOR, AIR COND	MOONEY	770028-501	
AC103A	BLOWER, EVAP., FRONT	MOONEY	770002-501	
AC103B	BLOWER, EVAP., REAR	MOONEY	770002-503	
AC104A	BLOWER, CONDENSER	MOONEY	770016-501	
AC105A	SWITCH, AIR COND. PRES	MOONEY	770029-501	
AC106A	CONNECTOR, AIR COND	CORY COMP.	CSLT-21PA	
	/CONTACTS	CORY COMP.	CB017-5S	
ACT1/AT101A	ACTUATOR	MICRO SWITCH	JE-5	
ACT2/AT102A	ACTUATOR	MICRO SWITCH	JV-5	
ACT3/AT103A	ACTUATOR	MICRO SWITCH	JV-26	
ACT4/AT104A	ACTUATOR	MICRO SWITCH	MCD-2711	
ACT5/AT105A	ACTUATOR	MICRO SWITCH	JE-17	
ACT6/AT106A	ACTUATOR	MICRO SWITCH	JV-82	
AIR101A	SWITCH, A/C	MOONEY	880067-501	
AIR102A	COMPRESSOR, A/C	MOONEY	770028-1	
AIR103A	EVAP. BLWR (FRT)	MOONEY	770002-501	
AIR103B	EVAP. BLWR, (REAR)	MOONEY	770002-503	
AIR104A	CONDENSER BLWR	MOONEY	770016-501	
AIR105A	SWITCH, A/C PRESS.	MOONEY	770029-501	
BL1	BULB	GE	1818	
	/HOLDER FOR BL1	HH SMITH	1930	
BL2	BULB	GE	1816	
	/HOLDER FOR BL2	HH SMITH	1930	
BL3	BULB (NAV-T/L)	WHELEN	34-022-8030-85	
BL4	BULB (NAV-T/L)	WHELEN	34-021-2030-85	
BL5	BULB (CONSOLE)	GE	327	
	(ALT)	GE	385	
BL6	BULB (COMPASS)	GE	327(AV RED)	
BL7	BULB (POST LIGHT)	GE	330	
BL8	BULB (ANNUNCIATOR)	CHI. MIN.	CM7-7730	
BL9	BULB (ANNUNCIATOR)	CHI. MIN.	CM7-7327	
BR1	CIRCUIT BREAKER (1A)	KLIXON	7277-2-1	
BR2	CIRCUIT BREAKER (2A)	KLIXON	7277-2-2	
BR3	CIRCUIT BREAKER (3A)	KLIXON	7277-2-3	
BR5	CIRCUIT BREAKER (5A)	KLIXON	7277-2-5	
BR7.5	CIRCUIT BREAKER (7.5A)	KLIXON	7277-2-7.5	
BR10	CIRCUIT BREAKER (10A)	KLIXON	7277-2-10	
BR15	CIRCUIT BREAKER (15A)	KLIXON	7277-2-15	
BR20	CIRCUIT BREAKER (20A)	MECH PROD	4200-002-20	
BR25	CIRCUIT BREAKER (25A)	MECH PROD	4200-002-25	
	(ALT)	ETA	483-G533-J1M1-B2S0Z-25A	
BR30	CIRCUIT BREAKER (30)	MECH PROD	700-001-30	
BR35	CIRCUIT BREAKER (35A)	ETA	41-2-S14-LN2-35A	
BR40	CIRCUIT BREAKER (40A)	ETA	41-3-S34-LN2-40A	
BR50	CIRCUIT BREAKER (50A)	ETA	41-2-S34-LN2-50A	
BR70	CIRCUIT BREAKER (70A)	ETA	41-3-S14-LN2-70A	
BRSW3	C/B-SWITCH	KLIXON	7270-5-3	
BRSW7.5	C/B-SWITCH	KLIXON	7270-5-7.5	
BRSW8	C/B-SWITCH	KLIXON	7270-5-8	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
BRSW10	C/B-SWITCH	KLIXON	7270-5-10	
BRSW15	C/B-SWITCH	KLIXON	7270-5-15	
BRSW25	C/B-SWITCH	KLIXON	7270-5-25	
BS1/BS101A	RELAY, BASE	MAGNACRAFT	70-303	
BU2A/BUS2A	BUSS BAR (2 PLC)	MOONEY	913127-033	
BU2B/BUS2B	BUSS BAR (2 PLC)	MOONEY	913127-097	
BU2C/BUS2C	BUSS BAR ( )	MOONEY	913127-099	
BU2D	BUSS BAR (2 PLC)	MOONEY	913127-075	
BU2E	BUSS BAR (2 PLC)	MOONEY	913127-065	
BU3A/BUS3A	BUSS BAR (3 PLC)	MOONEY	913127-087	
BU3B/BUS3B	BUSS BAR (3 PLC)	MOONEY	913127-059	
BU3C/BUS3C	BUSS BAR (3 PLC)	MOONEY	913127-073	
BU4A/BUS4A	BUSS BAR (4 PLC)	MOONEY	913127-069	
BU4B/BUS4B	BUSS BAR (4 PLC)	MOONEY	913127-089	
BU4C/BUS4C	BUSS BAR (4 PLC)	MOONEY	913127-005	
BU4D	BUSS BAR (4 PLC)	MOONEY	913127-053	
BU5A/BUS5A	BUSS BAR (5 PLC)	MOONEY	913127-093	
BU5B/BUS5B	BUSS BAR (5 PLC)	MOONEY	913127-077	
BU5C/BUS5C	BUSS BAR (5 PLC)	MOONEY	913127-085	
BU5D/BUS5D	BUSS BAR (5 PLC)	MOONEY	913127-019	
BU6A/BUS6A	BUSS BAR (6 PLC)	MOONEY	913127-035	
BU6B/BUS6B	BUSS BAR (6 PLC)	MOONEY	913127-079	
BU7A/BUS7A	BUSS BAR (7 PLC)	MOONEY	913127-081	
BU8A/BUS8A	BUSS BAR (8 PLC)	MOONEY	913127-095	
BUS8B	BUSS BAR (8 PLC)	MOONEY	913127-083	
BW3	SWITCH-C/B (3A)	KLIXON	7270-5-3	
BW7.5	SWITCH-C/B (7.5A)	KLIXON	7270-5-7.5	
BW10	SWITCH-C/B (10A)	KLIXON	7270-5-10	
BW15	SWITCH-C/B (15A)	KLIXON	7270-5-15	
BW25	SWITCH-C/B (25A)	KLIXON	7270-5-25	
C1/CA101A	CAPACITOR	MALLORY	CGS302V-050R2C	
CA102A	CAPACITOR (1000 PF)	NEWARK	18F2711 TYPE 5GAD10	
CAP1	CAP, WHITE	MICRO SW	15PA90-8W	
CAP2	CAP, BLACK	ALCO SW	C-22	
CAP3	CAP, DUST	MATRIX SCIENCE.	M83723/60-122RC	
CB101A	BLOWER, DEFROST	MOONEY	640317-503	
CC101A	MOTOR, COWL FLAP	MOONEY	880050-505	
CC102A	INDICATOR, COWL FLAP	MOONEY	880242-505	
CC103A	SWITCH, COWL FLAP	MOONEY	880052-517	
CC103B	SWITCH, COWL FLAP (M20J)	MICRO-SWITCH	12TW1-10	
CC103C	SWITCH, COWL FLAP	MOONEY	880052-129	
CF101A	ACTUATOR, FLAP	MOONEY	750105-501	
CF102A	INDICATOR, TRIM/FLAP	MOONEY	800242-501	
CF103A	RELAY BOX,TRIM/FLAP ASSY	MOONEY	800376-501	
CF104A	INDICATOR, TRIM/FLAP	MOONEY	800391-502	
CF108A	SWITCH, FLAP	C-H	8906K3149	
CL03A	CLAMP, 3/14/16/28 PIN	AMP	206070-1	
CL03B	CLAMP, 3 PIN	AMP	M85049-41-4A	
CL03C	CLAMP, 3 PIN		MS3057-4A	
	(ALT)		MS3057-4B	
CL04A	CLAMP, 4/8 PIN	AMP	206062-1	
CL04D	CLAMP, 4 PIN	BENDIX	10-101971-8-3	
CL05A	CLAMP, 5 PIN		MS3057-6A/B	
CL05B	CLAMP, 5 PIN	DEUTSCH	BVDSREC02SR	
CL06A	CLAMP, 6 PIN		MS3057-16A/B	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
CL07A	CLAMP, 7 PIN		MS3057-12B	
	/SLEEVE		MS3420	
CL09A	CLAMP, 9 PIN, LT. CONT. BOX	AMP	206966-1	
CL09B	CLAMP, 9 PIN	AMP	P/O 126-222	
CL09C	CLAMP, 9 PIN		DE-24657	
	/LOCK RETAINER		DE-51224-1	
	/LOCK RETAINER (ALT)		D110278	
	/LOCK RETAINER (ALT)		D-20419-16	
CL09D	CLAMP, 9 PIN		DE19977-5	
	/LOCK, RETAINER		DE51224-1	
CL15A	CLAMP, 15 PIN		DA51210-1	
	/LOCK, RETAINER		DA51220-1	
CL15B	CLAMP, 15 PIN		DA19977-1	
CL17A	CLAMP, 17 PIN		DB51212	
	/LOCK, RETAINER		DB51221-1	
CL25A	CLAMP, 25 PIN		DB51212	
	/LOCK, RETAINER		DB51221-1	
CL25B	CLAMP, 25 PIN		DB19977-2	
	/LOCK, RETAINER		DB51221-1	
CL25C	CLAMP, 25 PIN		DB24659	
	/LOCK, RETAINER		D20418-2	
CL32A	CLAMP, 32 PIN		M85049/52-1-22N	
CL32B	CLAMP, BOOT		MS3420-14	
	(ALT)		MS3420-16	
CL37A	CLAMP, 37 PIN		206138-1	
CL37B	CLAMP, 37 PIN		DC19977-3	
	/LOCK, RETAINER		DC51222-1	
CM1/CM101A	CURRENT MONITOR	MOONEY	800221-505	
CR101A	SWITCH, RUDDER TRIM (WHT)	MOONEY	880052-519	
CR101B	SWITCH, RUDDER TRIM (BLK)	MOONEY	880052-119	
CR102A	MOTOR, RUDDER TRIM	MOONEY	880050-503	
CR103A	INDICATOR, RUDDER TRIM	MOONEY	800242-503	
CT101A	SWITCH, ELEV TRIM	MOONEY	930023-233	
CT102A	INDICATOR, ELEV TRIM	MOONEY	800242-519	
CT103A	MOTOR, ELEV TRIM	S-TEC	01165-0-T14	
CT104A	INTERFACE, TRIM	MOONEY	800313-501	
CT105A	INDICATOR, ELEV. TRIM	MOONEY	800391-501	
CV101A	C/B-SW, STAND-BY VAC,WHT	MOONEY	930023-233 (15A)	
CV101B	C/B-SW, STAND-BY VAC,BLK	MOONEY	930023-333	
CV102A	PUMP, STAND-BY VACUUM	AEROSAFE	820904-2	
CV103A	PUMP, STAND-BY VACUUM	AEROSAFE	820904-1	
CV104A	C/B-SW, STAND-BY VAC,WHT	MOONEY	930023-247 (3A)	
CV104B	C/B-SW, STAND-BY VAC,BLK	MOONEY	930023-347	
CV105A	CLUTCH/PUMP, STD-BY VAC	AIRBORNE	28C214-CW-2	
D1	DIODE		1N2483	
	(ALT)		1N5060	
	(ALT)	GE	3720GE	
D2	DIODE	SARKES-TARZ.	10H3P	
	(ALT)	ECG	5854	
	(ALT)	NTE	5854	
D4	DIODE BRIDGE	FAGOR	FB5001	
D5	DIODE BRIDGE	FAGOR	FB5006	
DA101A	AMMETER SHUNT	EMPRO	MLA-70A-100MV	
	(ALT)	JANCO	8406-70	
DA101B	AMMETER SHUNT	EMPRO	MLA-150A-100MV	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
	(ALT)	JANCO	8406-150	
DB101A	TURN COORDINATOR	UNITED INST.	9013 CODE N.5	
	(ALT)	ASTRONAUTICS	303990-028MSC	
	(ALT)	ELECT. GYRO	1394T100-3Z	
	(ALT)	UNITED INST.	9114 CODE N.21	
DB102A	TURN COORDINATOR	UNITED INST.	9112 CODE N.9	
DC101A	PROBE, CYLINDER #1		MS24482-1	
	(ALT)		AN5546-1*	
	* USE AN4076-1 ADAPTER.			
	(ALT)	NORWICH	102-00007	
DD101A	INDICATOR, O.A.T.	MOONEY	880059-159	
DD102A	O.A.T. PROBE	MOONEY	880004-501	
DD103A	SOCKET, 4 PIN	CINCH-JONES	S--304-CCT	
DF101A	FUEL XMTR, LH/RH I/B	MOONEY	610242-003	
DF102A	FUEL XMTR, LH O/B	MOONEY	610243-003	
DF103A	FUEL XMTR, RH O/B	MOONEY	610243-001	
DF104A	FUEL XMTR, LH/RH O/B	MOONEY	610242-005	
DF105A	TRANSMITTER, FUEL	AVAQ SYST.	9450563001	
DF106A	ARM, FLOAT, RH, I/B	AVAQ SYST	9400563102	
DF107A	ARM, FLOAT, RH, O/B	AVAQ SYST	9400563104	
DF108A	ARM, FLOAT, LH, I/B	AVAQ SYST	9400563101	
DF109A	ARM, FLOAT, LH, O/B	AVAQ SYST	9400563103	
DF110A	TRANSDUCER	AVAQ SYST	9450563002	
DF111A	PROCESSOR	AVAQ SYST	9450563003	
DG101A	IND., INSTRUMENT MOD	MOONEY	880059-507	
DG102A	IND., INSTRUMENT MOD	MOONEY	880059-511	
DG103A	IND., INSTRUMENT MOD #2	MOONEY	880059-513	
DG104A	IND., INSTRUMENT MOD #1	MOONEY	880059-505	
DG105A	IND., INSTRUMENT MOD	MOONEY	880059-517	
DG106A	IND., INSTRUMENT MOD #1	MOONEY	880059-519	
DG107A	IND., INSTRUMENT MOD	MOONEY	880059-523	
DG108A	IND., INSTRUMENT MOD #2	MOONEY	880059-525	
DG109A	IND., INSTRUMENT MOD	MOONEY	880059-521	
DG110A	D/A CLUSTER	MOONEY	880093-501	
DG111A	D/A CLUSTER	MOONEY	880093-503	
DG112A	DIGITAL CLUSTER	MOONEY	880093-505	
DG113A	DIGITAL CLUSTER	MOONEY	880093-507	
DG114A	D/A CLUSTER	MOONEY	880093-509	
DH101A	PROBE, OIL TEMP	MOONEY	880061-501	
DH102A	PROBE, OIL TEMP		MS28034-1	
DI101A	DIODE		1N2483/1N5060	
	(ALT)	GE	3720-GE	
DI102A	DIODE	SARKES TARZ	10H3P	
	(ALT)	ECG	5854	
	(ALT)	NTE	5854	
DI104A	DIODE BRIDGE	FAGOR	FB5001	
DI105A	DIODE BRIDGE	FAGOR	FB5006	
DJ101A	TRANSDUCER, O/P (M20J)	DRUCK	PDCR 821-0662-100	
	(ALT) (M20J)	KULITE	APT-154-1000-100PSIG	
	(ALT)	PATRIOT	KA21-014-100G	
DJ101B	TRANSDUCER, O/P (M20M)	KULITE	APT-201-1000-100G	
DK101A	TRANSDUCER, F/P	DRUCK	PDCR-821-0662-30	
	(ALT)	KULITE	APT-153-1000-30PSIG	
DK102A	TRANSDUCER, F/P	DRUCK	PDCR-920-U143-50 PSID	
	(ALT)	KULITE	APT-155-1000-50D	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
	(ALT)	PATRIOT	KA21-016-50G	
DL101A	IND., TACH	MOONEY	880039-515	
	(OPTIONAL)	B&D	0520-003	
DL102A	SENSOR, TACH	B&D	0400-004	
DL103A	IND., TACH	MOONEY	880039-517	
	(OPTIONAL)	B & D	0520-006	
DL104A	TACH SENSOR	B & D	(SLICK MAGS) 0402-102	
DL104B	TACH SENSOR	B & D	(BENDIX MAGS) 0402-104	
DL104C	TACH SENSOR (ALT. DL104B)	B & D	0406-004	3
DL104D	TACH SENSOR (ALT. DL104A)	B & D	0406-003	3
DL105A	INDICATOR, TACHOMETER	MOONEY	880039-519	
DL106A	INDICATOR, TACHOMETER	MOONEY	880039-523	
DL107A	SENSOR, TACH	J-P INSTR.	(SLICK MAGS) 420809	
DL108A	SENSOR, TACH	J-P INSTR.	(BENDIX MAGS) 420807	
DM101A	HOUR METER	MOONEY	880035-507	
DM102A	HOUR METER	MOONEY	880035-505	
DM103A	HOUR METER	HOBBS	15006	
	(ALT)	DATCON	SG-70	
DM104A	HOUR METER	HOBBS	85000	
	(ALT)	HOBBS	15000	
DP101A	C/B, PITOT HEAT	MOONEY	930023-205	
DP101B	C/B, PITOT HEAT	MOONEY	930023-305	
DP101C	C/B, PITOT HEAT	MOONEY	930023-353	
DP102A	HEATED PITOT	AERO INSTR	PH502-24	
	(ALT)		AN5812-1	
DP103A	PITOT, HEATED	AERO INSTR	PH502-12	
	(ALT)		AN5812	
DP104A	PLUG, 2 PIN		AN3115-1	
DP105A	SOCKET		AN3116-1	
DR101A	PROBE, TIT	MOONEY	880055-503	
DR101B	PROBE, TIT	MOONEY	880055-505	
DT101A	IND., EGT	ALCOR	46361	
DT101B	IND., EGT	ALCOR	OEM-46161	
DT102A	SWITCH, EGT,(4 POSITION)	ALCOR	OEM-80825	
DT103A	PROBE, EGT	MOONEY	880005-505	
	/ALTERNATE	ALCOR	86255	
DT104A	TRAY, LIGHT (28VDC)	ALCOR	41338	
DT105A	TRAY, LIGHT (14V)	ALCOR	41337	
DU105A	TRANSDUCER, MAP	KULITE	APTE-251-1000-25A	
	(ALT)	PATRIOT	KA21-015-25A	
DV101A	INDICATOR, FUEL FLOW	MOONEY	880034-501	
	INDICATOR, FUEL FLOW (OPT)	MOONEY	880034-503	
	INDICATOR, FUEL FLOW (OPT)	MOONEY	880034-505	
DV101B	INDICATOR, F/F (GALS)	SHADIN	912021	
	INDICATOR, F/F (LBS) (OPT)	SHADIN	912023	
	INDICATOR, F/F (GALS)(OPT)	SHADIN	912041	1
	INDICATOR, F/F (LBS)(OPT)	SHADIN	912043	1
	INDICATOR, F/F (LITERS)(OPT)	SHADIN	912047	1
	INDICATOR, F/F (GALS)(OPT)	SHADIN	912081	2
DV102A	TRANSDUCER, FUEL FLOW	MOONEY	880030-501	
	(OPTIONAL)	MOONEY	880030-503	
DV102B	TRANSDUCER, F/F	SHADIN	680501B	
EG101A	ACTUATOR, LDG GR	MOONEY	880037-507	
	(ALT)	MOONEY	560254-503	
	(ALT)	MOONEY	560254-507	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
EG102A	ACTUATOR, LDG GR	MOONEY	880037-501	
	(ALT)	MOONEY	560254-501	
EG103A	ACTUATOR, LDG GR	MOONEY	560254-505	
EG104A	SWITCH, LDG GR. A/S SAFETY	MOONEY	880013-507	
ET101A/ELT101A	SWITCH, ELT PANEL	ARTEX	110-416	
ET102A/ELT102A	TRANSMITTER, ELT	ARTEX	453-0150	
ET103A	CABLE ASSY, REMOTE	AMERI-KING	4500041	
ET104A	REMOTE UNIT ASSY	AMERI-KING	450004	
	REMOTE UNIT ASSY	AMERI-KING	450004-1V/1H	
ET105A	ELT ASSY, MAIN	AMERI-KING	AK-450	
F1/FU101A	FUSE, 1 AMP	LITTEL	313001	
F2/FU102A	FUSE, 5 AMP-3AG-SLO-BLO	LITTEL	313005	
F3/FU103A	FUSE, 10 AMP SLO-BLO	LITTEL	313010	
F4/FU104A	FUSE, 5 AMP	McGRAW-EDISON	FM01-5A	
FU105A	FUSE, .50 AMP	McGRAW-EDISON	FM01-.50A	
FU106A	FUSE, 2 AMP	LITTEL	313002	
FH1/FH101A	HOLDER, FUSE	LITTEL	155020	
	(ALT)	LITTEL	155120	
FH2/FH102A	HOLDER, FUSE	McGRAW-EDISON	FHN42W	
FN101A/FON1	PHONE JACK	SWITCHCRAFT	C-11	
	/WASHER	SWITCHCRAFT	S-1028	
	/WASHER	SWITCHCRAFT	S-1029	
FN102A/FON2	PHONE JACK	SWITCHCRAFT	C-112B	
	/WASHER	SWITCHCRAFT	S-1028	
	/WASHER	SWITCHCRAFT	S-1029	
FU101A	SEE F1/FU101A SERIES LISTING ON PREVIOUS PAGE			
JE101A	IGNITION CONTROL	LASAR (SLICK)	CD-1001-02	
JE102A	CABLE	LASAR (SLICK)	CH1001-XX	
JE103A	MAGNETO, LEFT	SLICK (LAZAR)	CD-4771	
JE104A	MAGNETO, RIGHT	SLICK (LAZAR)	CD-4770	
JM101A	SWITCH, MAGNETO	BENDIX	10-357210-9	
	/PLACARD	BENDIX	10-187-468	
	/TERMINAL LUG	BENDIX	10-126656	
JM101B	SWITCH, MAG. (W/CONN.)	JANCO	97-2273-1	
JM102A	MAGNETO	BENDIX	D4LN-2021	
	(ALT)	BENDIX	D4LN-3000	
	(ALT)	LYCOMING	LW-682555-11	
JM103A	PLUG, MAGNETO	BENDIX	10-382698	
JM104A	MAGNETO	SLICK	6244	
JM105A	MAGNETO, LEFT	SLICK	6261	
JM106A	MAGNETO, RIGHT	SLICK	6260	
JM107A	SWITCH, IGNITION	TCM	10-357240-1	
JM108A	MAGNETO, LH	SLICK	6393	
JM109A	MAGNETO, RH	SLICK	6350	
JM110A	IGNITION, PULSAR	MOONEY	800315-501	
JM111A	MAGNETO, L & R	BENDIX	S6RN-25-10	
	(ALT)	TCM/BENDIX	10-79020-10	
JM112A	MAGNETO, LH	SLICK (LASAR)	CD-4771	
JM112A	MAGNETO, RH	SLICK (LASAR)	CD-4770	
JM MAGNETO, LH		SLICK	4372 (Rev.C)	
JM MAGNETO, RH		SLICK	4370 (Rev.C)	
JM113A	MAGNETO, L & R	TCM	640896-1	
	(ALT)	BENDIX	10-79020-120	
L1	BULB, 28V	GE	464-T-3 ¼	
L2/LA102A	BULB, 14V	GE	168-T-3 1/4	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
L3/LA103A	BULB	GE	385	
L4/LA104A	BULB, 14V	GE	330	
L5/LA105A	BULB	CHI. MINI.	CM7-7330	
L6/LA106A	BULB	CHI. MINI.	CM7-7327	
L7/LA107A	BULB	GE	370	
L8/LA108A	BULB	GE	1816	
L9/LA109A	BULB	GE	327 (AV RED)	
L10/LA110A	BULB, 28V	GE	327	
L11/LA111A	BULB	GE	1818	
L12/LA112A	BULB	GE	1495	
LA101A	BULB, 28V	GE	400	
LA113A	BULB	GE	4596	
LA114A	BULB	PAC. PREC.	P28028	
LA115A	BULB	MOUSER ELEC.	351-5003	
LB101A	C/B, BEACON, ROTATING	MOONEY	930023-243	
LB101B	C/B, BEACON, ROTATING	MOONEY	930023-343	
LB102A	LIGHT, ROTATING BEACON	WHELEN	WRML-24	
	/ADAPTER	WHELEN	WRML-65	
LB102B	LGHT, ANTI-COLLISION (RED)	WHELEN	90033-19	
LB102C	LGHT, ANTI-COLLISION (WHITE)	WHELEN	90033-20	
LC101A	LIGHT CONTROL BOX	MOONEY	800268-509	
LE107A	ANNUNC. LENS (USA)	MOONEY	880048-633 (M20J)	
LE108A	ANNUNC., LENS (FRANCE)	MOONEY	880048-635 (M20J)	
LE109A	ANNUNC. LENS (USA)	MOONEY	880048-625 (M20R)	
LE110A	ANNUNC. LENS (FRANCE)	MOONEY	880048-627 (M20R)	
LE111A	ANNUNC. LENS (USA)	MOONEY	880048-629 (M20R)	
LE112A	ANNUNC. LENS (FRANCE)	MOONEY	880048-631 (M20R)	
LE113A	ANNUNC. LENS (USA)	MOONEY	880048-605 (M20K)	
LE114A	ANNUNC. LENS (FRANCE)	MOONEY	880048-607 (M20K)	
LE115A	LENS	MOONEY	880089-001 (M20K)	
LE116A	LENS	SLOAN	855-SE-C	
LE117A	LENS	MOONEY	880089-003 (M20J)	
LE119A	LENS, MASTER WARN	MOONEY	150080-6097	
LENS1/LE101A	ANNUNC. LENS (USA)	MOONEY	880048-613 (M20J)	
LENS2/LE102A	ANNUNCIATOR LENS (FRANCE)	MOONEY	880048-615 (M20J)	
LENS3/LE103A	ANNUNCIATOR LENS (USA)	MOONEY	880048-617 (M20K, M20M)	
LENS4/LE104A	ANNUNCIATOR LENS (FRANCE)	MOONEY	880048-619 (M20K, M20M)	
LENS5/LE105A	ANNUNCIATOR LENS	MOONEY	880048-621 (M20T)	
LENS6/LE106A	ANNUNCIATOR LENS	MOONEY	880048-623 (M20T)	
LG101A	C/B, LOGO LIGHT	MOONEY	930023-357	
LG102A	LIGHT, LOGO	WHELEN	A730-1-28	
LH1/LH101A	LAMP HOLDER	MOONEY	914083-1	
LH2/LH102A	LAMP, HOLDER	DIALIGHT	270-1930-0171-702	
LH3/LH103A	LAMP HOLDER	WHELEN	A-350-CN-CL-BK-SH-28	
LH4/LH104A	LAMP HOLDER	SLOAN	855S-O-U	
	/WASHER, LOCK, INT. TOOTH		MS35334-21	
	/WASHER, LOCK, INT. TOOTH	ALLEN BRADLEY	M2898	
LH5/LH105A	LAMP HOLDER	INSTRUMENTS	0211-128	
LH6/LH106A	LAMP HOLDER	INSTRUMENTS	BA28-24-BW3	
LH7/LH107A	LAMP HOLDER	SIGMA TEC	1V-192-971	
LH8/LH108A	LAMP HOLDER	HH SMITH	1930	
	(ALT)	LEECRAFT	7-05	
	(ALT)	ALLIED	931-3103)	
	(ALT)	SPC	LSL-11-128U	
	(ALT)	NEWARK	81N2561)	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
LH9/LH109A	LAMP HOLDER	HH SMITH	1925	
LH10/LH110A	LAMP HOLDER	WHELEN	01-0770437-00	
LH11/LH111A	LAMP HOLDER, CABIN UTILITY	TEK-LITE	LC-28-5	
	(ALT)		MS1745-51A	
LH12/LH112A	LAMP HOLDER, BAGGAGE LT	WHELEN	01-077-0142-04	
LH113A	LAMP HOLDER	MOUSER ELECT	351-0003	
LL101A	SWITCH, LANDING LT	MOONEY	880052-521	
LL101B	SWITCH, LANDING LT	MOONEY	880052-121	
LL102A	LIGHT, TAXI/LDG, LH/RH (28V)	GE	4596	
LL103A	LIGHT, TAXI/LDG, LH/RH (14V)	GE	4509	
LN101A	C/B, NAV LIGHTS	MOONEY	930023-251	
LN101B	C/B, NAV LIGHTS	MOONEY	930023-351	
LN102A	LIGHT ASSY,,NAV-TAIL (WING)	MOONEY	800051-501	
LN102B	LIGHT ASSY, NAV-TAIL (WING)	MOONEY	800051-509	
LP101A	DIMMER CTRL BOX(28V/14V)	MOONEY (ELEC)	800299-501	
LP102A	DIMMER CTRL BOX(28V)	MOONEY	800299-503	
LP103A	DIMMER CTRL BOX(14V)	MOONEY	800299-505	
LP104A	PANEL,SW.,O/H LITE ASSY	MOONEY	150085-005	
LP105A	INVERTER, PLACARD (O/H)	ERG	LPS28-3-3P	
LR101A	C/B, RECOGNITION LIGHT	MOONEY	930023-231	
LR101B	C/B, RECOGNITION LIGHT	MOONEY	930023-331	
LR102A	RECOGNITION LIGHT	MOONEY	880049-501	
LS101A	C/B, STROBE LIGHT	MOONEY	930023-237	
LS101B	C/B, LIGHTS, STROBE	MOONEY	930023-337	
LS102A	POWER SUPPLY, STROBE	WHELEN	01-0770329-00	
LS102B	POWER SUPPLY, STROBE	WHELEN	01-0770329-01	
LS103A	STROBE/NAV LTE ASSY(LH/WG)	WHELEN	01-0770054-12	
LS104A	STROBE/NAV LTE ASSY(RH/WG)	WHELEN	01-0770054-13	
LS105A	STROBE/TAIL LIGHT ASSY	MOONEY	470013-501	
LS106A	POWER SUPPLY (TAIL)	WHELEN	A413A-HDA-DF28	
	LIGHT, STROBE (DUAL)	WHELEN	A413A-HDA-CF	
LT101A	SWITCH, TAXI LIGHT	MOONEY	880052-523	
LT101B	SWITCH, TAXI LIGHT	MOONEY	880052-123	
LT102A	TAXI LIGHT LT/RT	G.E.	4596	
MA101A	RECEPTACLE, AUX POWER		AN2552-3A	
	(ALT)		MS3506-1	
MB101A	C/B-SWITCH, AVIONICS MSTR	MOONEY	930023-213	
MB101B	C/B-SWITCH, RADIO MASTER	MOONEY	930023-313	
MC101A	CIGAR LIGHTER	MOONEY	800336-503	
MC102A	CAP & TETHER	CASCO	216550	
MC103A	LIGHTER, SOCKET	CASCO	216510	
	/WITH WIRE	CASCO	200402	
ME101A	CLOCK	MID-CONT	MD-89	
	(ALT)	PORSCHE	944.641.213.00	
ME102A	CONN, 4 PIN	MID-CONT	6016177	
	/WITH PINS	MID-CONT	6016125	
	CONN, 4 PIN (OPT)	PORSCHE	944.612.217.00	
	/WITH PINS	PORSCHE	999.652.351.12	
MIC1/MK101A	JACK, MICROPHONE	SWITCHCRAFT	C-12B	
	/WASHERS	SWITCHCRAFT	S-1028	
	/WASHERS	SWITCHCRAFT	S-1029	
MP101A	C/B-SW, PROP DE-ICE	MOONEY	930023-245	
MP101B	C/B-SW., PROP. DE-ICE	MOONEY	930023-345	
MP102A	TIMER, PROP DE-ICE	B.F. GOODRICH	3E1899-1	
MP102B	TIMER, PROP DE-ICE	McCAULEY	B-45018	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
MP103A	TERMINAL BLOCK	McCAULEY	C-40521	
NF101A	C/B-SW, LOW-BOOST PUMP	MOONEY	930023-211	
NF101B	C/B-SW., BOOST PUMP	MOONEY	930023-311	
NF102A	PUMP, BOOST	WELDON	A8163B	
	(ALT)	WELDON	8163B	
NF103A	PUMP, BOOST	WELDON	8163A	
	(ALT)	WELDON	A8163A	
NF104A	PUMP, BOOST	WELDON	10054B	
NF105A	PUMP, BOOST	WELDON	A10051D	
NF106A	PUMP, BOOST	WELDON	A8152-B	
NF108A	REGLTR, FUEL BOOST PUMP	MASSEY	VR536	
NF108B	REGLTR, FUEL BOOST PUMP	MOONEY	800270-523A	
NF109A	C/B-SW, HI-BOOST PUMP	MOONEY	930023-219	
NF110A	GUARD ASSEMBLY	MOONEY	930028-501	
PA101A	REGULATOR, VOLTAGE	MOONEY	800270-501/A	
	(ALT)	AMERICAN PROD	DGR-2	
	(ALT)	ELECTRODELTA	VR-802	
PA102A	SWITCH, ALT FLD (DUAL)	MOONEY	880052-525	
PA103A	SWITCH, ALT FLD (SINGLE)	MOONEY	880052-503	
PA104A	ALTERNATOR	LYCOMING	LW-14367	
	(ALT)	PRESTOLITE	ALU-6421-LS	
PA105A	ALTERNATOR	LYCOMING	LW-15404	
	(ALT)	PRESTOLITE	ALY-8420	
PA106A	ALTERNATOR, RH	TCM	649280	
	(ALT)	TCM	649719	
	/GEAR ASSEMBLY	TCM	649123	
PA107A	ALTERNATOR	ELECT. SYST.	ES 4009-LS	
	/INSTALL KIT (REF 600180)	LYCOMING	05K-21065	
PA108A	FILTER	MOONEY	880014-501	
	(ALT)	MOONEY	800307-501	
PA109A	SENSOR, CURRENT	MICRO SW	CSLA1GE	
PA110A	REGULATOR, VOLTAGE	MOONEY	800270-503	
PA111A	SENSOR, CURRENT (110 A)	KLIXON	7235-1-110	
PA111B	SENSOR, CURRENT (175 A)	KLIXON	7236-1-175	
PA112A	ALTERNATOR (100A)	TCM	649304	
PA113A	MONITOR, CURRENT	MOONEY	800287-501	
PA114A	ALTERNATOR, LH	TCM	649172	
	(ALT)	TCM	649283	
PB101A	BATTERY	GILL	G-243	
PB102A	SWITCH, MASTER	MOONEY	880052-501	
PB102B	SWITCH, MASTER	MOONEY	880052-101	
PB103A	SWITCH, BATTERY -- 1/2	MOONEY	880052-527	
PB103B	SWITCH, BATTERY -- 1/2	MOONEY	880052-127	
PB105A	BATTERY, MAINT. FREE	CONCORDE	RG24-11M	
PB105B	BATTERY, MAINT. FREE	CONCORDE	RG24-15	
PL01A	PLUB, 1 PIN	AMP	1-480349-0	
PL02A	PLUG, 2 PIN	AMP	1-480318-0	
PL02B	PLUG, 2 PIN	MOLEX	03-06-1023	
PL02C	PLUG, 2 PIN (FEMALE)	DEAN	7022	4
PL02D	PLUG, 2 PIN		MS3106A24-9S	
PL03A	PLUG, 3 PIN	AMP	1-380303-0	
PL03B	PLUG, 3 PIN	AMP	206037-2	
PL03C	PLUG, 3 PIN		MS3106A10SL-3S	
PL03D	PLUG, 3 PIN		MS3106A28-6P	
PL03E	PLUG, 3 PIN	ARRAY CONN.	PWF06F08-33A	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
	SOCKET (ALUMEL)	CDI	01-2020-245	
	SOCKET (CHROMEL)	CDI	01-2020-244	
PL04A	PLUG, 4 PIN	AMP	206060-1	
PL04B	PLUG, 4 PIN		MS3106A32-17S	
PL04C	PLUG, 4 PIN	AMP	1-480424-0	
PL04D	PLUG, 4 PIN	ARRAY CONN.	PW06F8-4S	
PL05A	PLUG, 5 PIN		MS3106A14S-5S	
PL05B	PLUG, 5 PIN	DEUTSCH	BVD06EO205SN	
PL06A	PLUG, 6 PIN	MATRIX SCIENCE	MS3106A28-22S	
PL07A	PLUG, 7 PIN		MS3106A20-15S	
	(ALT)		MS3106R20-15S	
PL08A	PLUG, 8 PIN	AMP	205838-1	
PL09A	PLUG, 9 PIN	AMP	206708-1	
PL09B	PLUG, 9 PIN	AMPHENOL	126-222	
PL09C	PLUG, 9 PIN		DE-9S	
PL09D	PLUG, 9 PIN	MOLEX	03-06-2092	
PL09E	PLUG, 9 PIN	AMP	206485-1	
PL14A	PLUG, 14 PIN	MOONEY	930021-1	
PL14B	PLUG, 14 PIN	MOONEY	930021-513	
PL14C	PLUG, 14 PIN	AMP	206043-3	
PL15A	PLUG, 15 PIN		DA15S	
PL16A	PLUG, 16 PIN	AMP	206037-1	
PL17A	PLUG, 17 PIN		DBM17W2S	
PL20A	PLUG, 20 PIN	MOONEY	930021-501	
PL20B	PLUG, 20 PIN	POSITRONICS	CC148-003-0.00	
PL20C	PLUG, 20 PIN	POSITRONICS	CC149-003-0.00	
PL25A	PLUG, 25 PIN		DB25S	
PL25B	PLUG, 15 PIN	AMP	205208-1	
PL25C	PLUG, 25 PIN	POSITRONICS	MD25F20JVL0	
PL26A	PLUG, 26 PIN	MOONEY	930021-505	
PL28A	PLUG, 28 PIN	AMP	205839-3	
PL32A	PLUG, 32 PIN****	MATRIX SCIENCE	M83723/86R2232N	
****USE MS3420-14 OR -16 BOOT WITH CONNECTOR.				
PL34A	PLUG, 34 PIN	MOONEY	930021-507	
PL34B	PLUG, 34 PIN	MOONEY	930021-515	
PL37A	PLUG, 37 PIN	AMP	206150-1	
PL37B	PLUG, 37 PIN		DC37S	
PL104A	PLUG, 104 PIN	POSITRONICS	GMCT104F0TH000	
PS101A	C/B, STARTER SOLENOID	KLIXON	7277-2-10	
PS102A	C/B, STARTER SOLENOID	KLIXON	7277-2-5	
PS103A	STARTER	PRESTOLITE	MHB-4016	
	(ALT)	LYCOMING	LW-15572	
PS104A	STARTER	TCM	646275	
	(ALT)	TCM	637847	
PS105A	STARTER	B & C SPEC.	BSC206-149	
RB101A	BLOWER, RADIO	KING	071-4037-01	
R1/RS101A	RESISTOR (20 OHM/10W)	DALE	RH-10-20 OHM	
R2/RS102A	RESISTOR (5 OHM/10W)	DALE	RH-10-5 OHM	
R3/RS103A	RESISTOR,MAPLGHT (500 OHM)	MOONEY	919029-501	
R4/RS104A	RESISTOR (100 OHM)	NEWARK	09F976	
R5RS105A	RESISTOR (7.5 OHM)	DALE	RH-50-7.5 OHM	
R6/RS106A	RESISTOR (1K OHM/2W)	ALLEN-BRAD.	RC42-GF102J	
R7/RS107A	RESISTOR (5K OHM)	ALLEN-BRAD.	WA2-G056S502UA	
	(ALT)	SPECTROL	149-11-502	5
	(ALT)	BOURNS	3862C-282-502A	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
	(ALT)	NEWARK	12F9905R 5.0K	
R8/RS108A	RESISTOR (150 OHM/3W)	CLAROSTAT	VC3D	
	(ALT)	OHMITE	23J	
R9/RS109A	RESISTOR (3.9K OHM/ 1/2W)	OHMITE	N/A	
R10/RS110A	RESISTOR (3.0K OHM/ 1/2W)	OHMITE	N/A	
R11/RS111A	RESISTOR (1 OHM/25W)	DALE	RH-25-1 OHM	
R12/RS112A	RESISTOR (70 OHM/10W)	DALE	RH-10-70 OHM	
R13	RESISTOR (10.0K OHM/1W)	OHMITE	N/A	
RS113A	RESISTOR (15.0K OHM/1/4W)	OHMITE	N/A	
RS114A	RESISTOR, DUAL (5.0K OHM)	ALLIED	753-8059	
RS115A	RESISTOR (1.6K OHM/1/2W)	OHMITE	N/A	
RS116A	RESISTOR (1.0K OHM/1/8W)	OHMITE	N/A	
RB101A	BLOWER, RADIO	KING	071-4037-01	
RC01A	RECEPTACLE, 1 PIN	AMP	1-480351-0	
RC02A	RECEPTACLE, 2 PIN	AMP	1-480319-0	
RC02C	RECEPTACLE, 2 PIN (MALE)	DEAN	7021	4
RC02D	RECEPTACLE, 2 PIN		MS3100-24-9P	
RC03A	RECEPTACLE, 3 PIN	AMP	1-480305-0	
RC03B	RECEPTACLE, 3 PIN	AMP	206036-2	
RC03C	RECEPTACLE, 3 PIN	AMP	206207-1	
RC03D	RECEPTACLE, 3 PIN		MS3100-28-6S	
RC04A	RECEPTACLE, 4 PIN	AMP	206153-1	
RC04B	RECEPTACLE, 4 PIN		MS3100-32-17P	
RC04C	RECEPTACLE, 4 PIN	AMP	1-480426-0	
RC05B	RECEPTACLE, 5 PIN	DEUTSCH	BVD04E0205PN	
RC06A	RECEPTACLE, 6 PIN	MATRIX SCIENCE	MS3100C-28-22P	
RC08A	RECEPTACLE, 8 PIN	AMP	205841-2	
RC09A	RECEPTACLE, 9 PIN	AMP	206705-2	
RC09B	RECEPTACLE, 9 PIN	AMP	206705-1	
RC09C	RECEPTACLE, 9 PIN		DE9P	
RC09E	RECEPTACLE, 9 PIN	AMP	205486-1	
RC12A	RECEPTACLE, 12 PIN	MOLEX	03-06-2122	
RC14A	RECEPTACLE, 14 PIN	MOONEY	930021-2	
RC14B	RECEPTACLE, 14 PIN	AMP	203540-1	
	(ALT)	POSITRONIC	G14000H000-1265.0	
RC14C	RECEPTACLE, 14 PIN	AMP	206044-1	
RC15A	RECEPTACLE, 15 PIN		DA15P	
RC16A	RECEPTACLE, 16 PIN	AMP	206037-1	
RC16B	RECEPTACLE, 16 PIN	AMP	206036-1	
RC20A	RECEPTACLE, 20 PIN	MOONEY	930021-502	
RC20B	RECEPTACLE, 20 PIN	POSITRONICS	GMCT20M0T0000	
RC26B	RECEPTACLE, 26 PIN	MOONEY	930021-506	
RC28A	RECEPTACLE, 28 PIN	AMP	206152-1	
RC32A	RECEPTACLE, 32 PIN	MATRIX SCIENCE	M83723/83K2232N	
RC34A	RECEPTACLE, 34 PIN	MOONEY	930021-508	
RC34B	RECEPTACLE, 34 PIN	AMP	204814-1	
	(ALT)	POSITRONICS	SK2114	
RC37A	RECEPTACLE, 37 PIN	AMP	206151-1	
RC104A	RECEPTACLE, 104 PIN	POSITRONICS	GMCT104M0000Z0	
RL1/RL101A	RELAY, BATT. (28V/200A)(OBS)	C-H	6041H-202	
	(ALT) (OBS)	C-H	6041H-202A	
	(ALT)	KISSLING	26.57.01	
	(ALT (PREFERRED))	KISSLING	26.57.02	
RL2/RL102A	RELAY, BATT. (14V/200A)	C-H	6041H-105A	
RL3/RL103A	RELAY	KISSLING	26.64.01	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
RL4/RL104A	RELAY	KISSLING	26.64.21	
RL5/RL105A	RELAY, LDG. (28V/50A)	C-H	6041H-220	
	(ALT)	KISSLING	26.72.03	
	/BRACKET (2 EA)	MOONEY	800375-001	
RL6/RL106A	RELAY (28V/100A)	C-H	6041H-53	
RL7/RL107A	RELAY, (14V/200A)	C-H	6041H-105R	
RL8RL108A	RELAY	MAGNACRAFT	W67RCSX-3	
RL9/RL109A	RELAY	KISSLING	28.08.01	
RL10/RL110A	RELAY	P & B	VF4-15-H11	
	SOCKET	P & B	VCF4-1002	
	TERMINAL	P & B	26A1348C	
RS101A	SEE R1/RS101A LISTINGS ON PREVIOUS PAGE SERIES			
SA101A	ALTERNATOR, STAND-BY	B & C	BC410-1	
	HOUSING, CONNECTOR	B & C	12-003	
	TERMINAL (1/4")	B & C	14-026	
SA102A	CONTROLLER, STBY. ALT.	B & C	BC203-2	
SA103A	SW, STD-BY ALT/EMER.BUS	MOONEY	880052-531	
SB101A	C/B, SPEEDBRAKE	KLIXON	7277-2-3	
SB102A	SWITCH, S/B,CNTRL WHL	PRECISE FLT	0126	
SB103A	RELAY, SPEEDBRAKE	PRECISE FLT	01384	
SB104A	DIODE		1N2483/1N5060	
	(ALT)	GE	3720-GE	
SB105A	MOTOR, SPEEDBRAKE	PRECISE FLT	01532	
SB106A	SWITCH, SPEEDBRAKE	PRECISE FLT	01505	
SB107A	SOLENOID, CLUTCH	PRECISE FLT	01678	
SB108A	INTERFACE, SPEEDBRAKE	MOONEY	800314-501	
SPK1/SP101A	SPEAKER, ALERT	ARCHER	40-1333C	
SPK2/SP102A	SPEAKER, CABIN	ARCHER	40-1325	
	(ALT)	BLAUPUNKT	PCx352	6
SPK3	SONALERT	MALLORY	SC628	
SW1/SW101A	SWITCH	MICRO	1SE1-T	7
	(ALT)	SAINT	ZS-1009	
SW2/SW102A	SWITCH, DEF. BLWR.	CHERRY	E51-50B	
SW3/SW103A	SWITCH, LIMIT, RUD.TRIM	MICRO	V3-1	
SW4/SW104A	SWITCH, UP LIMIT, LDG	MICRO	DT-2R-47	
	(ALT)	SAINT	ML-1409	
SW5/SW105A	SWITCH, DN LIMIT, LDG	OTTO	P6-24014	
	(ALT)	MICRO	1CH116-6	
SW6/SW106A	SWITCH, CABIN LTS	CARLING	RC911-VBBOW	
SW7/SW107A	SWITCH	MOONEY	880013-507	
SW8/SW108A	SWITCH, LDG	C-H	8906K2875	
SW9/SW109A	SWITCH, MIC-KEY	ALCO	MPE-106F-C-22-9	
	(ALT)	C-H	SA1RV20	
SW10/SW110A	SWITCH, CHT	GRAYHILL	71AD30-02-2-AJN	
SW11/SW111A	SWITCH, FLAP	C-H	8906K4731	
SW12/SW112A	SWITCH, CABIN LTS(MASTER)	CARLING	RA911-VBBOW	
SW13/SE113A	SWITCH (ALT)	MICRO	12TW1-10	
	/CAP, WHITE	MICRO	15PA90-8W	
	(ALT)		MS27753-38	
SW14/SW114A	SWITCH, F/F MEM.	C & K	7101K	
SW15/SW115A	SWITCH, LDG, OVERRIDE	NKK	DLB241-W01-L3C/ AT506M/AT503MB	
	/BUTTON/LOCK RING/LOCK WASHER/HEX NUT (2 EA) (NKK)			
	(ALT) SWITCH	C-H	SB1DDX492-2	
	/LOCK RING	C-H	29-761	

CODE	DESCRIPTION	VENDOR	PART NO.	NOTES
	/LOCK WASHER	C-H	16-886	
	/HEX NUT (2 EA)	C-H	15-966-6	
	(ALT) SWITCH	TSCHUDIN	504102	
	/LENS	TSCHUDIN	464115	
	/BULB	TSCHUDIN	590002	
SW16/SW116A	SWITCH, VAC. HI/LO	MOONEY	880012-501	
SW17/SW117A	SWITCH	CARLING	TILC64-1S-WHFN	
SW18/SW118A	SWITCH	MOONEY	880062-501	
SW19/SW119A	SWITCH	CARLING	TIGM64-1S-WHFN	
SW20/SW120A	SWITCH		MS35058-22	
SW21/SW121A	SWITCH, MIKE KEY	CROUZET	83-450-001	
SW22/SW122A	SWITCH, SPDBRK	CROUZET	83-452-504	
SW23/SW123A	SWITCH	ALCO	MPE106F	
SW124A	SWITCH	T.B.D.	T.B.D.	
SW25/SW125A	SWITCH	NKK	MB2085SB1W01-EA	
SW126/SW126A	SWITCH	EATON	1501-11E	
SW127A	SWITCH, MASTER WARN	OMRON	A3BA-7011-1	
	SW., WITH LENS	OMRON	A3BA-520R	
	SW., WITH LEGEND	OMRON	A3BA-5202	
	SW., WITH BULB	OMRON	A3B-028	
VC101A	VLTGE CONVERTER, 28V-14V	TERRA	MLC28-5	
	(ALT)	TERRA	C28-5	
VR1/VR101A	VARISTOR	GE	V47ZA05	
WM101A	MASTER WARNING	MICRO SWITCH	DSK-104-GYR	
WM102A	MASTER WARNING	MICRO SWITCH	DSB-11-RRRR-LR2	
WS101A	ALERT, STALL WRN/LDGR WRN	IAI	950D309-000	
	(ALT)	IAI	950D519-000	
WS103A	SWITCH, STALL WARNING	MOONEY	800364-509	
WT101A	ANNUNCIATOR	MOONEY	880048-501	
WT101B	ANNUNCIATOR	MOONEY	880090-XXX	8
WT102A	ANNUNCIATOR	MOONEY	880048-503	
WT103A	ANNUNCIATOR	MOONEY	880048-507	
WT104A	ANNUNCIATOR	MOONEY	880048-509	

NOTES:

1. SHADIN MODEL NO. INTERFACE WITH II MORROW APOLLO, ARNAV AND NORTHSTAR LORAN SYSTEMS.
2. SHADIN MODEL NO. INTERFACE WITH BENDIX/KING KLN-88 OR KLN90 SERIES.
3. B & D TACH SENSOR'S P/N 0406-004 IS 9/16 " DIAMETER FOR BENDIX MAGNETOS. 0406-003 IS 11/16 " DIAMETER FOR SLICK MAGNETOS.
4. PL02C & RC02C MAY BE PURCHASED FROM DEAN AS P/N 7020.
5. SEAL BACK OF POTENTIOMETER WITH DOW CORNING #738 ELECTRICAL SEALANT AFTER WIRES ARE SOLDERED TO TERMINAL. (MOONEY CODE #225905)
6. NOTE 3 USE TO REPLACE ARCHER 40-1325 FOR SPARES.
7. SEAL BACK OF SWITCH WITH DOW CORNING #738 ELECTRICAL SEALANT AFTER WIRES ARE SOLDERED TO TERMINALS (MOONEY CODE #225905) WHEN USED AS "THROTTLE SWITCH GEAR WARNING".
8. ANNUNCIATOR P/N WILL BE DETERMINED BY OPTIONS INSTALLED, SEE 880090 FOR DETAILS.

91-30-00 - ELECTRICAL SYSTEM SCHEMATICS

[SEE ENVELOPES]

CAUTION:

USE SCHEMATIC APPLICABLE TO SERIAL NUMBER OF AIRCRAFT BEING SERVICED.

ENVELOPE A

**ENCLOSED IN THIS ENVELOPE
ELECTRICAL SCHEMATICS
FOR**

MOONEY AIRPLANE COMPANY, INC.
M20K

SCHEMATIC (NO) (REV)	M20K S/N EFFECTIVITY	RELATED S&M MANUAL (P/N MAN194) PAGES
800330 (F) (BB)	25-0002 thru 25-0171	91-20-01, Page 9 thru 34
800330 (F1) (BC)	25-0172 thru 25-0246	91-20-01, Page 9 thru 34
800330 (F2) (BD)	25-0001, 25-0247 thru 25-0298	91-20-01, Page 9 thru 34

CAUTION
Be certain that the Serial Number of the aircraft being serviced agrees with the Serial Number effectivity of the schematic being used.

TO MAKE THE SCHEMATICS MORE READABLE, THEY WILL NOW BE PRINTED IN A LARGER SCALE AND THE NUMBER OF SCHEMATICS IN A SINGLE ENVELOPE WILL HAVE TO BE REDUCED. THEREFORE, ADDITIONAL ENVELOPES ARE BEING DISTRIBUTED FOR THE APPROPRIATE S & M MANUALS.

IT IS REQUESTED THAT THE SCHEMATICS SHOWN ON THE FRONT OF EACH ENVELOPE BE PLACED INTO THAT ENVELOPE.

NOTE:
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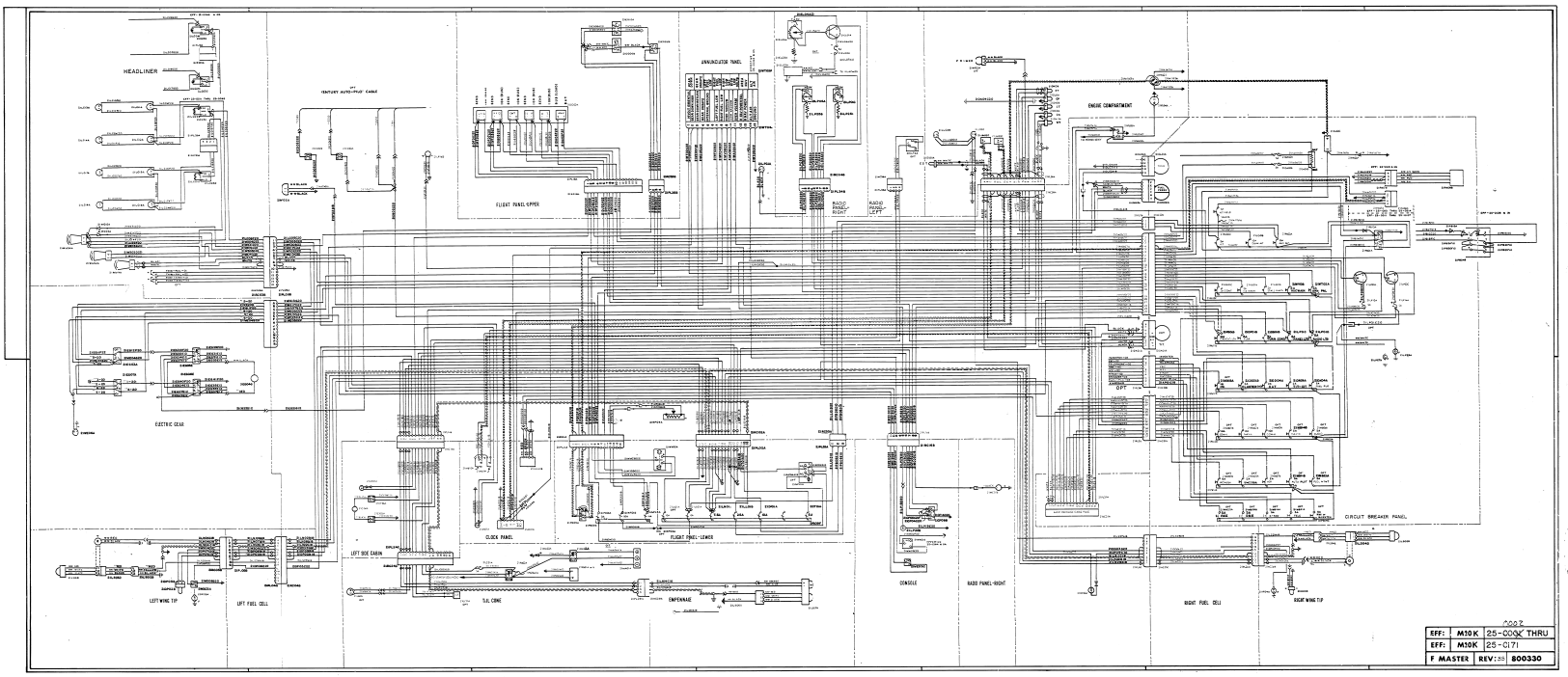
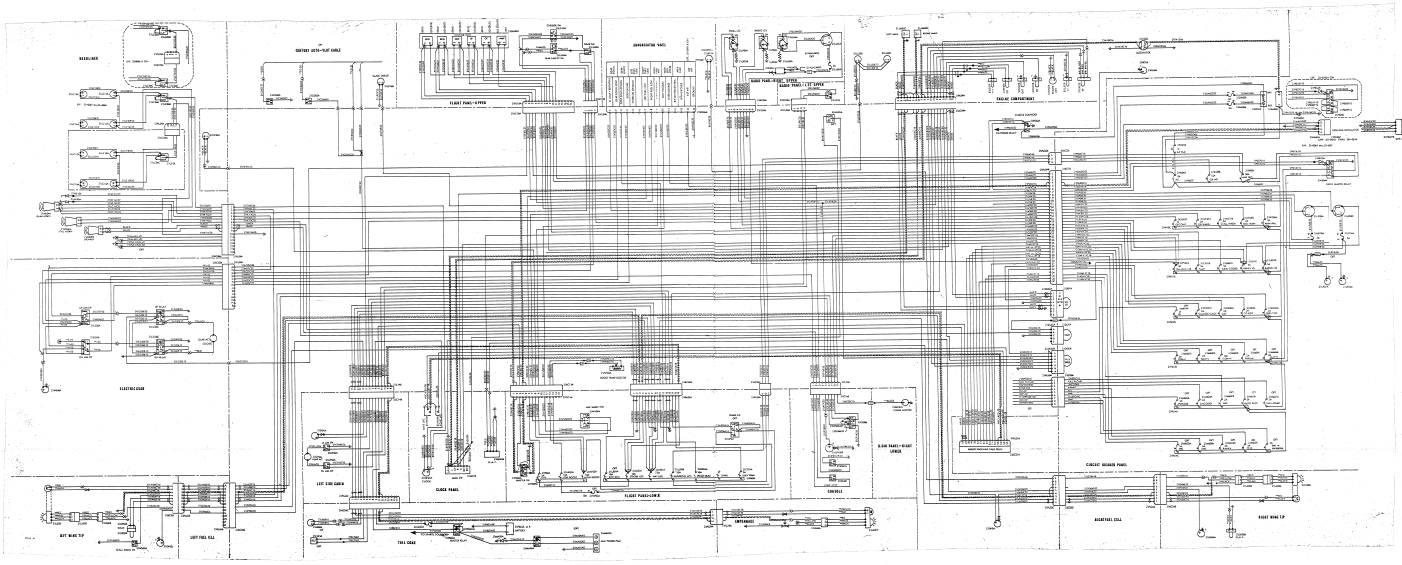
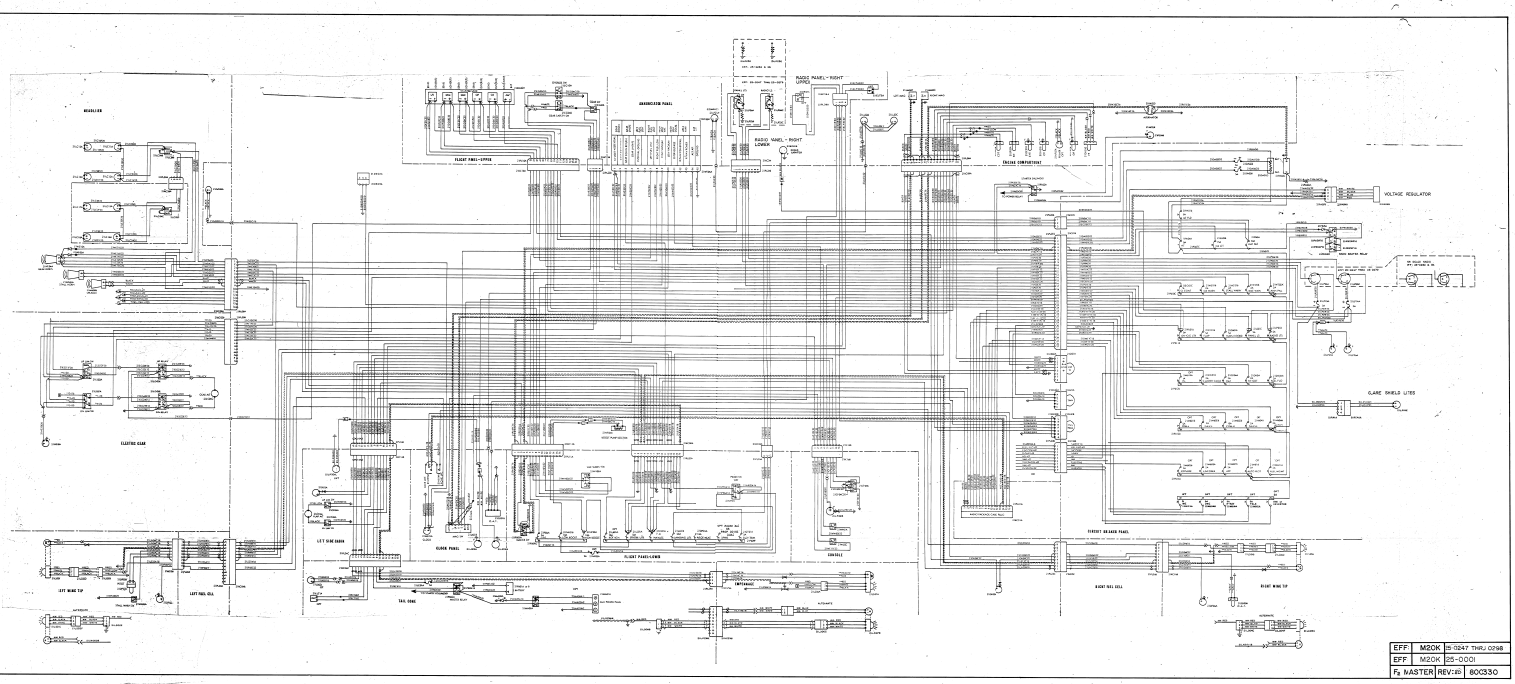


^002

EFF:	M10K	25-0002 THRU
EFF:	M10K	25-0171
F MASTER	REV:	800330



EFF:	M20K	25-072 THRU 25-0246	
EFF:			
FI MASTER	REV: 46	80C330	



EFF	M20K	S-0247 THRU 0298
EFF	M20K	25-0001
F_S MASTER	REV:#5	80C330

ENVELOPE B

**ENCLOSED IN THIS ENVELOPE
ELECTRICAL SCHEMATICS
FOR**

MOONEY AIRPLANE COMPANY, INC.
M20K

SCHEMATIC (NO) (REV)	M20K S/N EFFECTIVITY	RELATED S&M MANUAL (P/N MAN194) PAGES
800330 (F3) (B)	25-0299 thru 25-0446	91-20-01, Page 9 thru 34
800330 (F4) (BK)	25-0447 thru 25-0612	91-20-01, Page 9 thru 34
800330 (F5)	25-0613 thru 25-0780	91-20-01, Page 9 thru 34

CAUTION
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NOTE:
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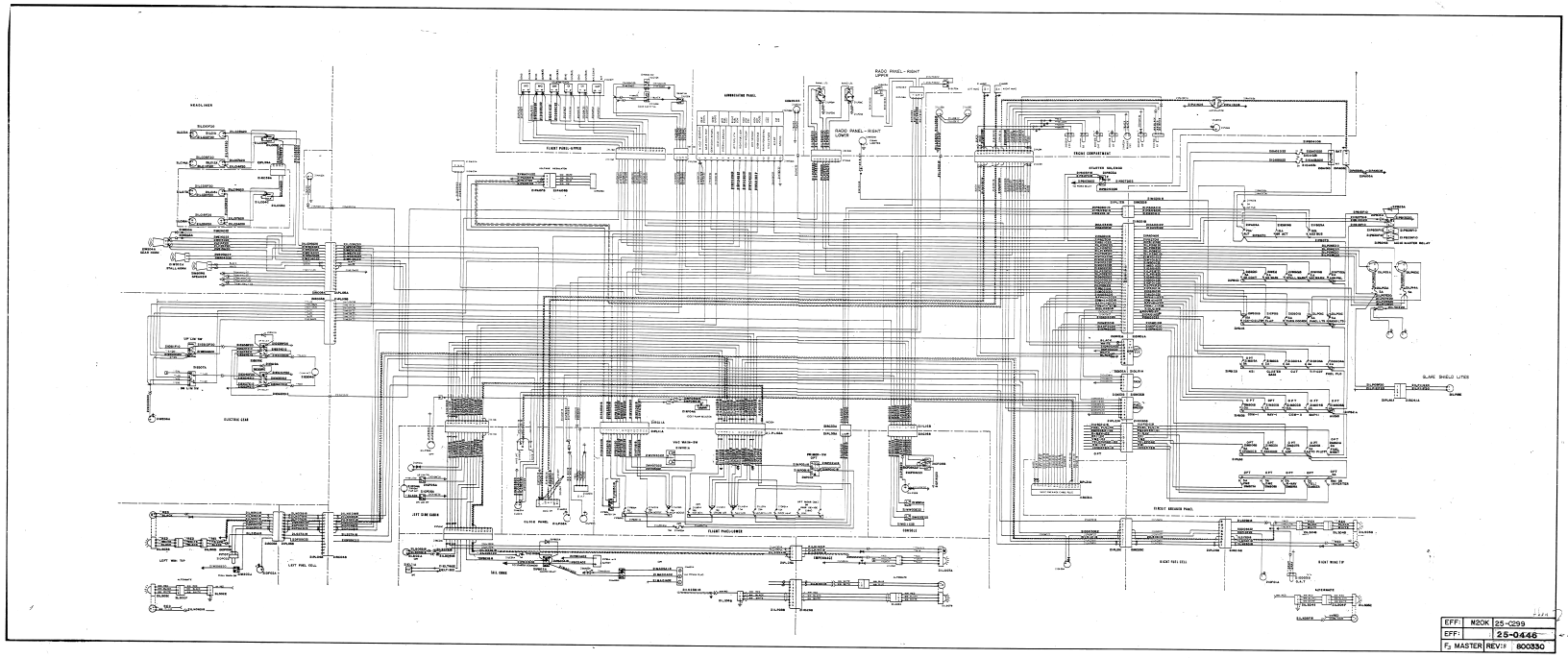
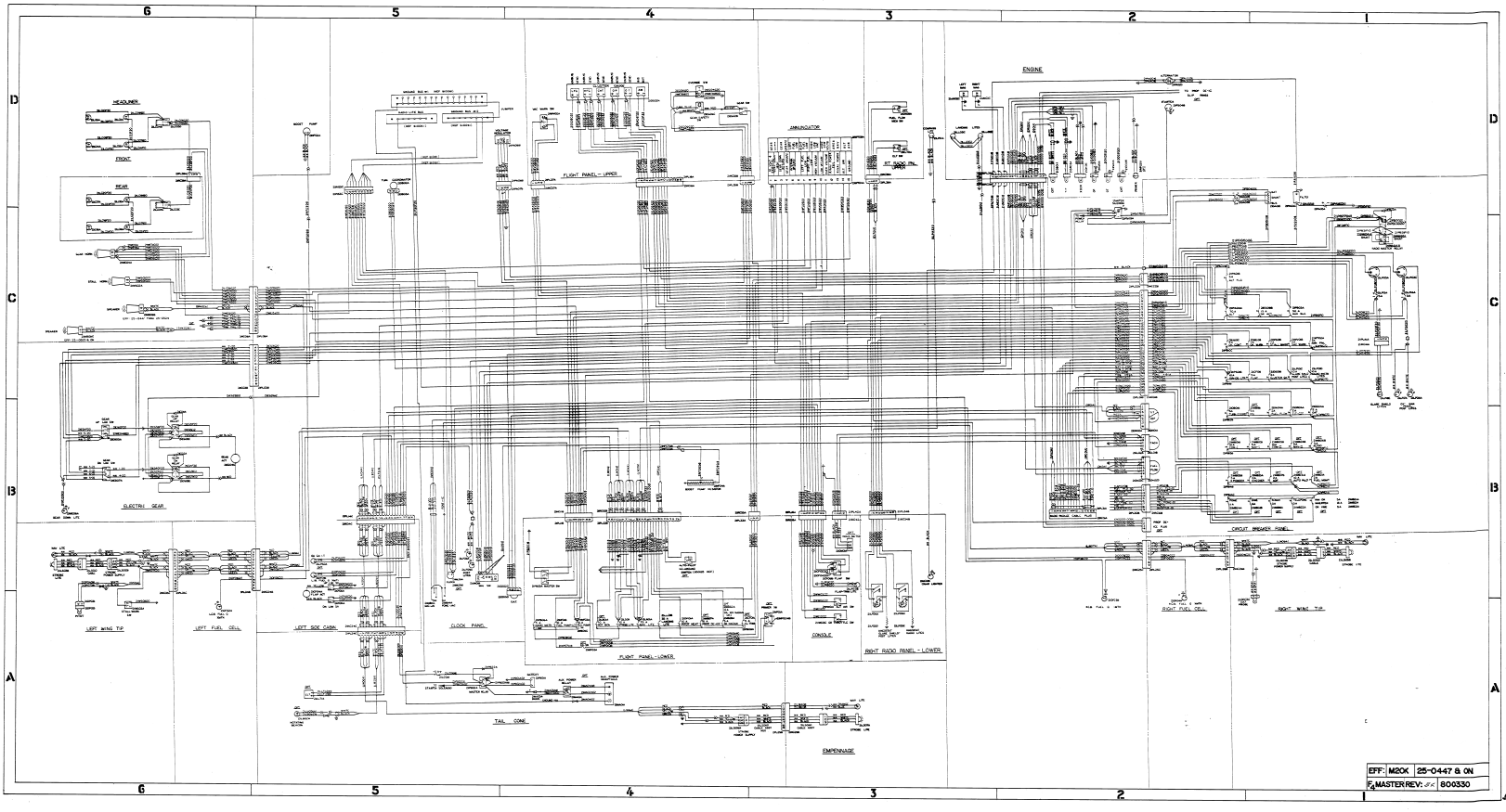
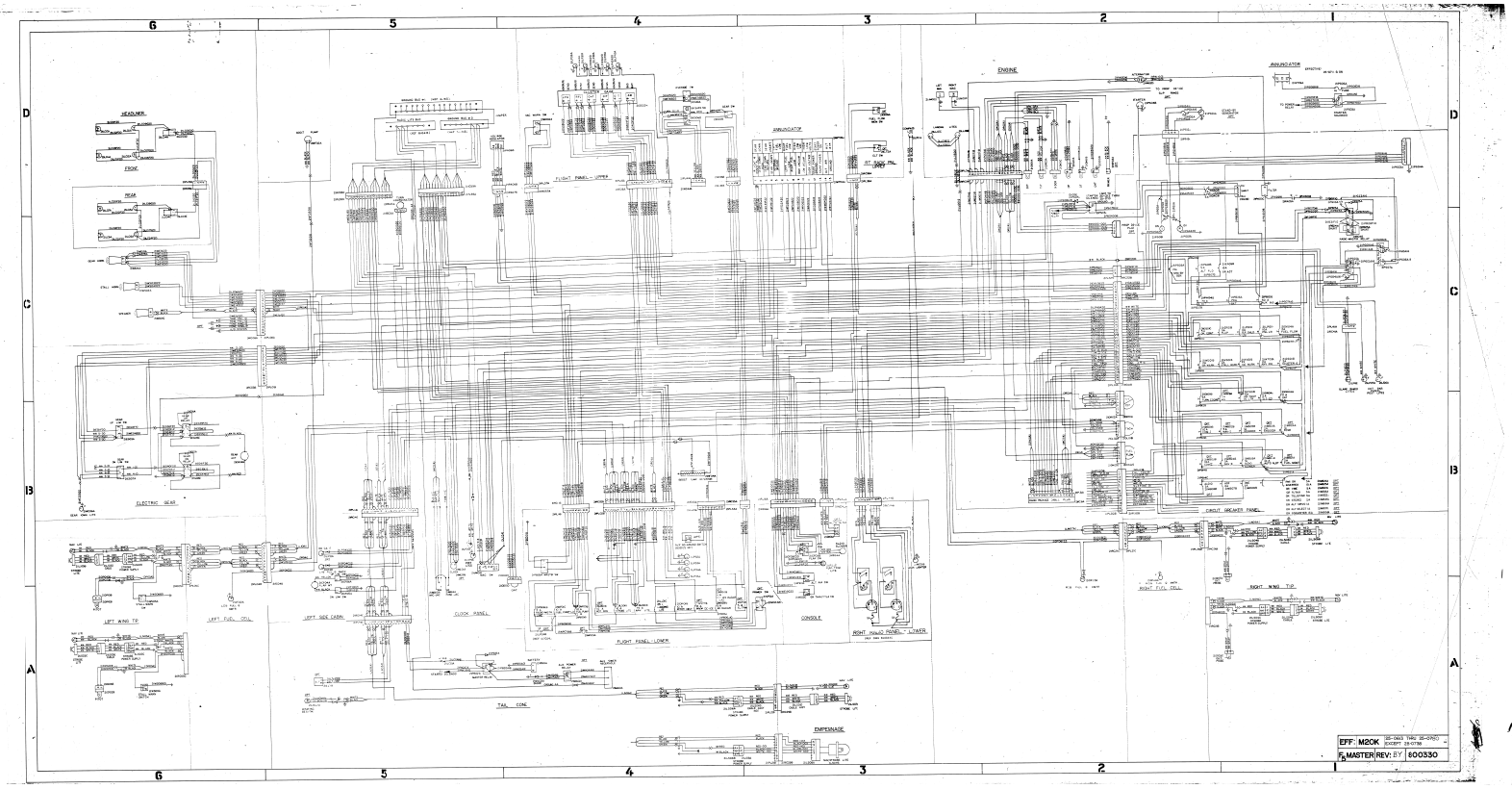


EFF:	M20K	25-099
EFF:		25-0446
F_3 MASTER	REV:H	800330



EFF: M20K 25-0447 & ON

MASTER REV: JFX 800330


HEADLINER
FRONT
REAR
ELECTRIC GEAR
LEFT WING TIP
LEFT FUEL CELL
LEFT SIDE CABIN
CLOCK PANEL
FLIGHT PANEL - UPPER
FLIGHT PANEL - LOWER
ANNUNCIATOR
CONSOLE
RIGHT PANEL PANEL - LOWER
TAIL CONE
EMPENNAGE
ENGINE
ANNUNCIATOR
CIRCUIT BREAKER PANEL
RIGHT FUEL CELL
RIGHT WING TIP
EFF: M20K (25-0003 THRU 25-0700) (EXCEPT 25-0738)
MASTER REV: EY 600330

ENVELOPE C

**ENCLOSED IN THIS ENVELOPE
ELECTRICAL SCHEMATICS
FOR**

MOONEY AIRPLANE COMPANY, INC.
M20K

SCHEMATIC (NO) (REV)	M20K S/N EFFECTIVITY	RELATED S&M MANUAL (P/N MAN194) PAGES
800330 (F6) (CF)	25-0781 thru 25-0841	91-20-01, Page 9 thru 34
800330 (F7) (CJ)	25-0842 thru 25-0856	91-20-01, Page 9 thru 34
800330 (F8) (CK)	25-0857 thru 25-0999	91-20-01, Page 9 thru 34

CAUTION
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NOTE:
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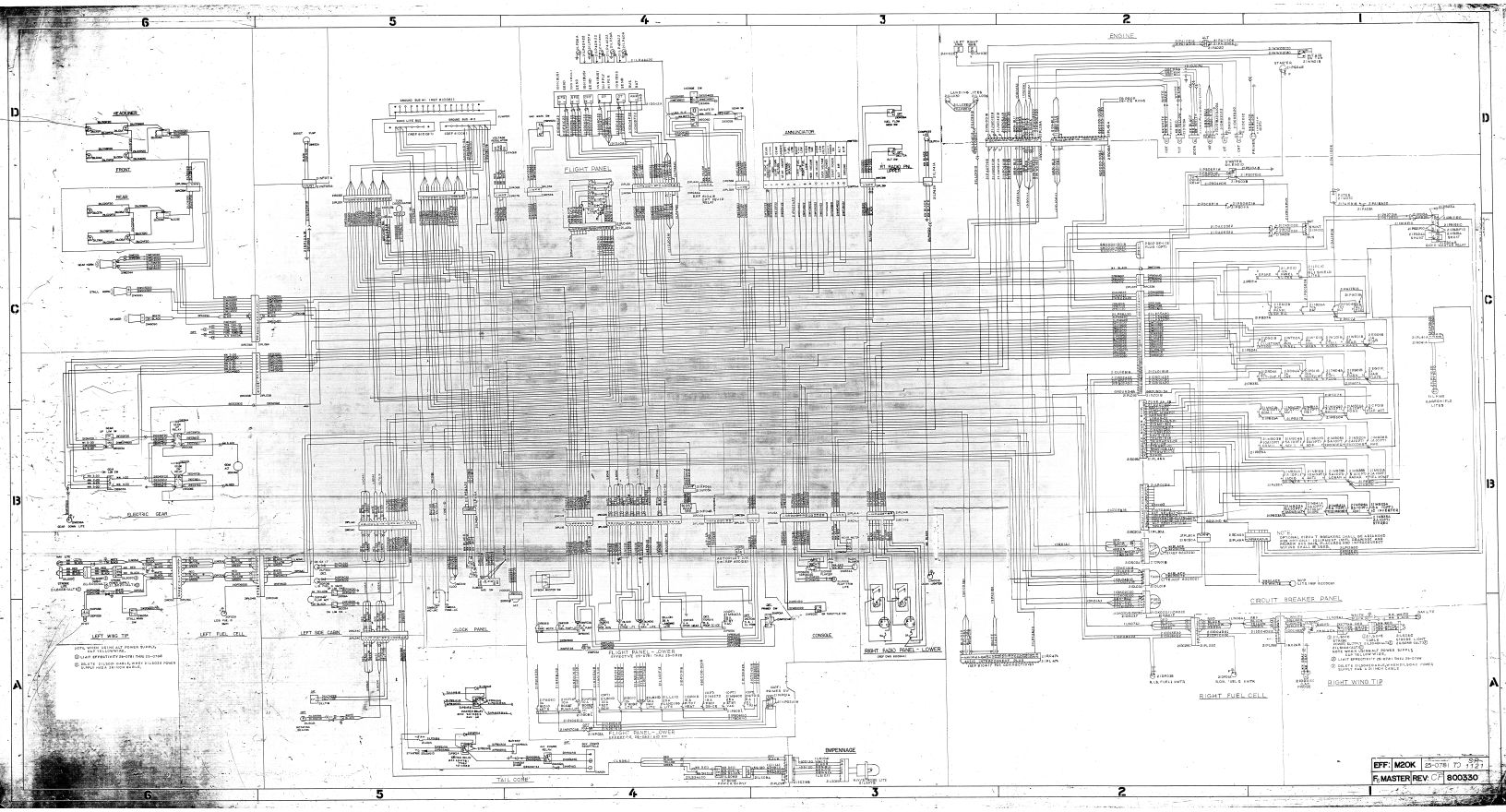
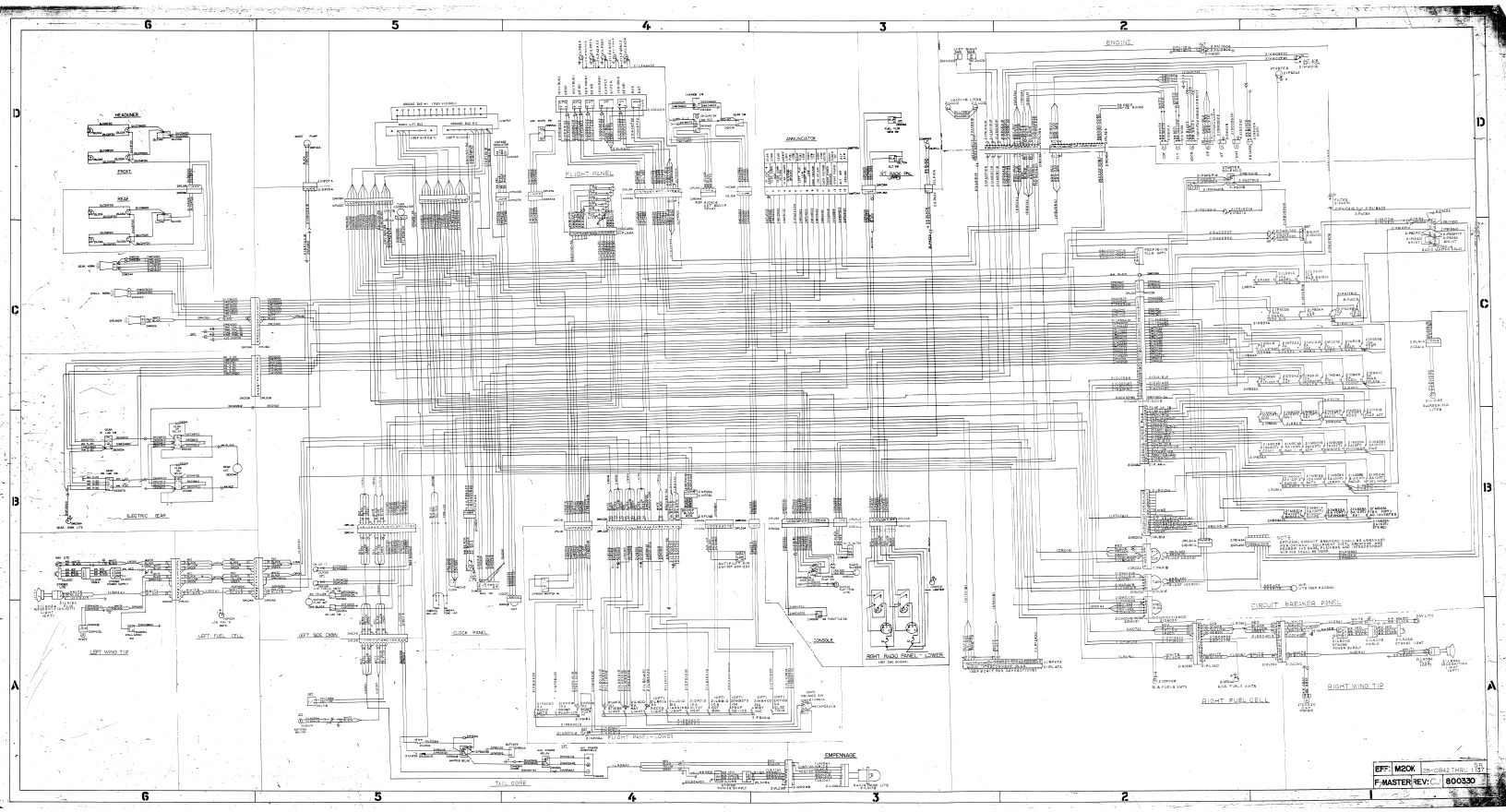
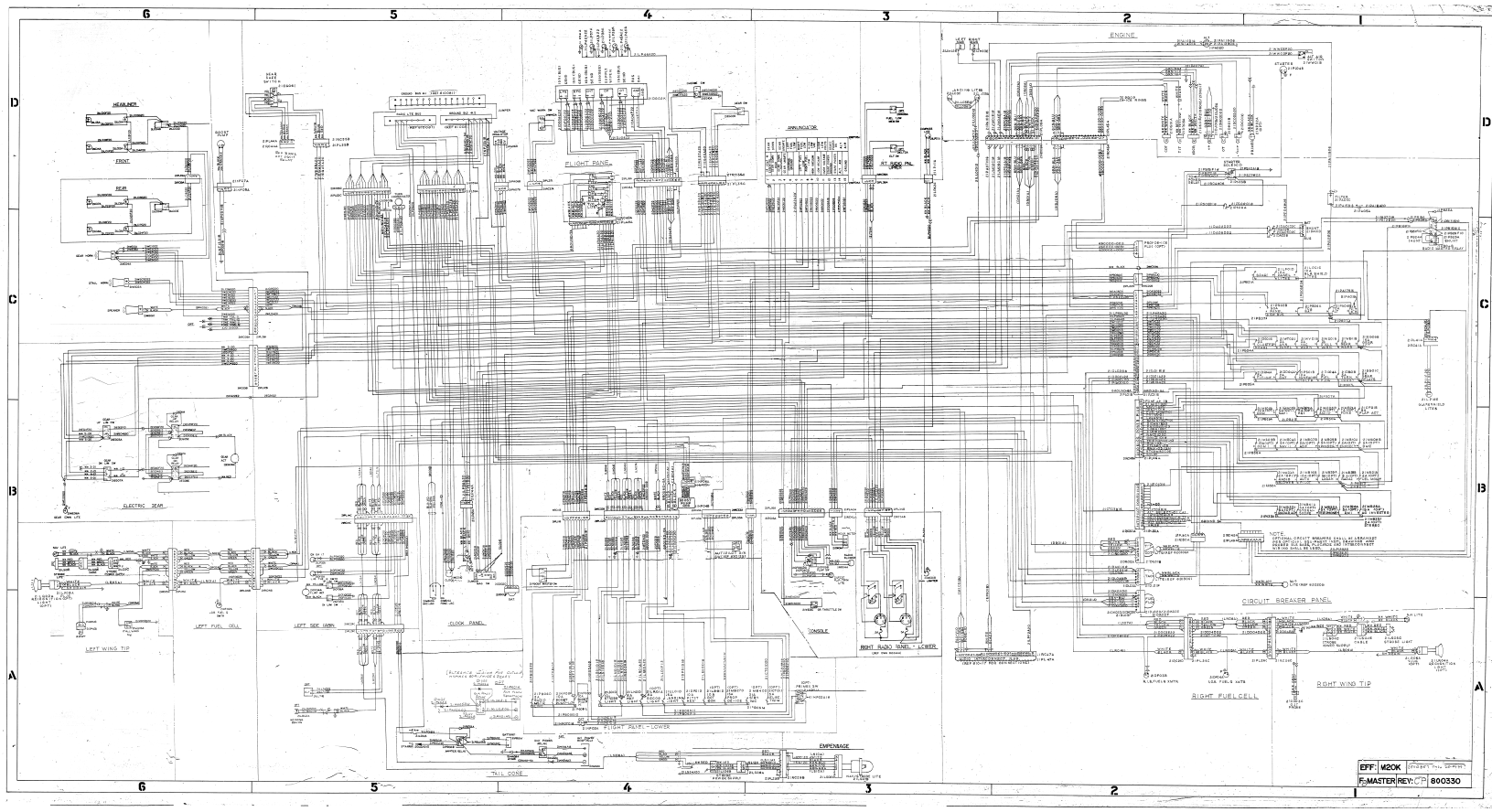


EFF: M20K 25-0781 TO 1121 02
F, MASTER REV. CF 800330


ENGINE
HEADLINER
FRONT
REAR
FLIGHT PANEL
ANNUNCIATOR
ELECTRIC GEAR
LEFT WING TIP
LEFT FUEL CELL
LEFT SIDE CABIN
CLOCK PANEL
CONSOLE
RIGHT RADIO PANEL - LOWER
FLIGHT PANEL - LOWER
TAIL CONE
EMPENNAGE
CIRCUIT BREAKER PANEL
RIGHT FUEL CELL
RIGHT WING TIP
NOTE
EFF. M20K 25-0842 THRU 25-0843
F-MASTER REV: CJ 800330


ENGINE
HEADLINER
FRONT
REAR
FLIGHT PANEL
ANNUNCIATOR
ELECTRIC GEAR
LEFT WING TIP
LEFT FUEL CELL
LEFT SIDE LAMPS
CLOCK PANEL
CONSOLE
RIGHT RADIO PANEL - LOWER
FLIGHT PANEL - LOWER
TAIL CONE
EMPENNAGE
CIRCUIT BREAKER PANEL
RIGHT FUEL CELL
RIGHT WING TIP
NOTE:
EFF. M20K
F.MASTER REV: CP 800330

ENVELOPE D

**ENCLOSED IN THIS ENVELOPE
ELECTRICAL SCHEMATICS
FOR**

MOONEY AIRPLANE COMPANY, INC.
M20K

SCHEMATIC (NO) (REV)	M20K S/N EFFECTIVITY	RELATED S&M MANUAL (P/N MAN194) PAGES
800350 (K1) (J) SHEET 1 OF 2	25-1000 thru 25-1199	91-20-02, Page 35 thru 60
800350 (K1) (J) SHEET 2 OF 2	25-1000 thru 25-1199	91-20-02, Page 35 thru 60

CAUTION
Be certain that the Serial Number of the aircraft being serviced agrees with the Serial Number effectivity of the schematic being used.

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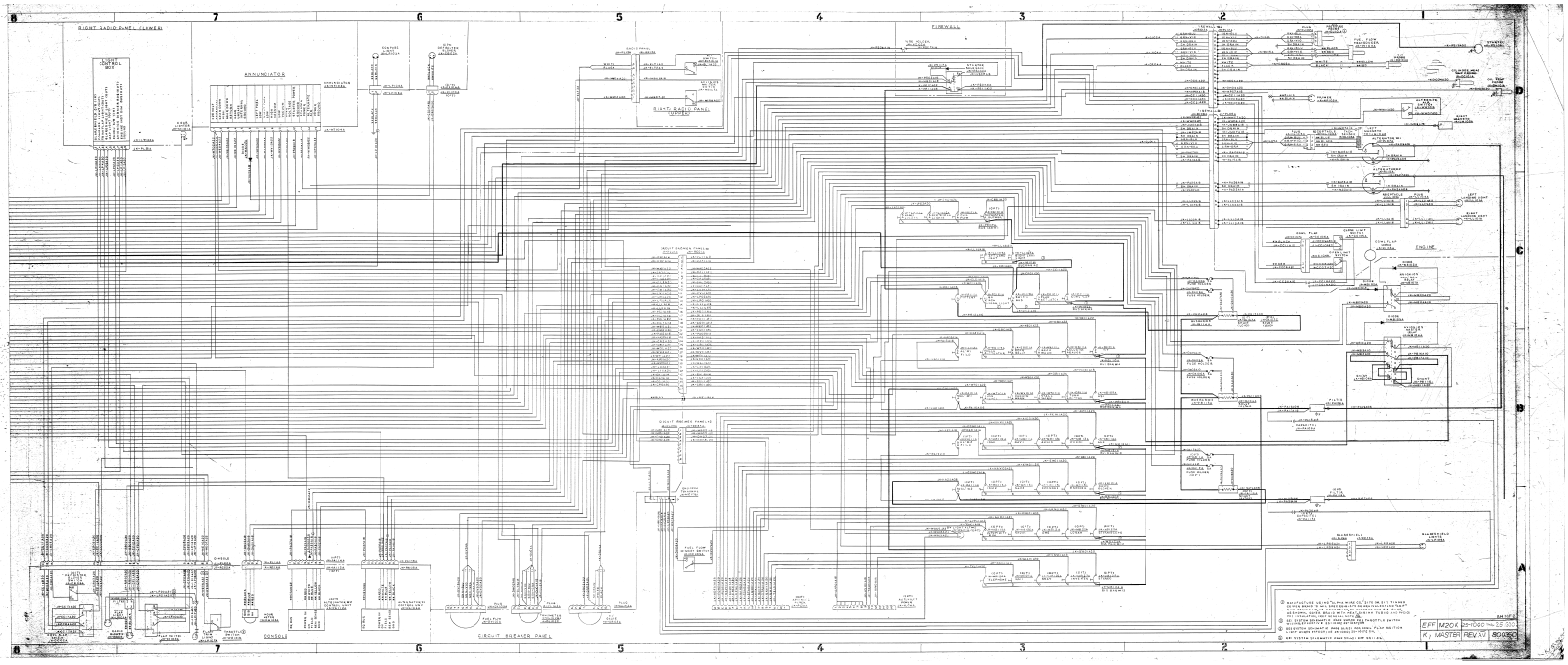
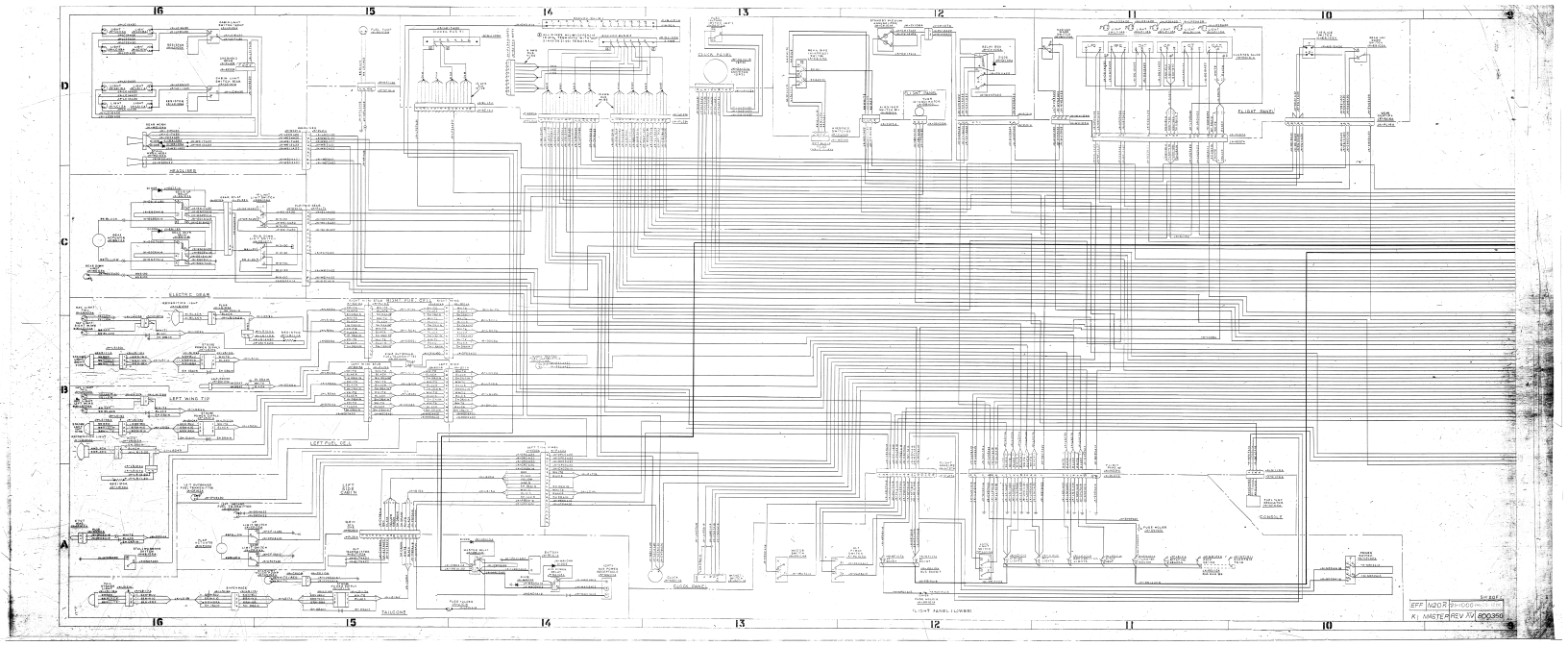

RIGHT RADIO PANEL (LOWER)
ANNUNCIATOR
FIREWALL
RIGHT RADIO PANEL
CONSOLE
CIRCUIT BREAKER PANEL
ENGINE
EFF M20K 35-1100 THRU 35-1200
K, MASTER REV VI 8/03/90


16
15
14
13
12
11
10
D
C
B
A
HORIZONTAL STABILIZER
ELECTRIC GEAR
LEFT WING TIP
LEFT FUEL CELL
TAILCONE
FLIGHT PANEL (LOWER)
EFF M20R RH-1000-111A
K1 MASTER REV IV 800350

ENVELOPE E

**ENCLOSED IN THIS ENVELOPE
ELECTRICAL SCHEMATICS
FOR**

MOONEY AIRPLANE COMPANY, INC.
M20K

SCHEMATIC (NO) (REV)	M20K S/N EFFECTIVITY	RELATED S&M MANUAL (P/N MAN194) PAGES
800350 (K2) (AV) Sheet 1 of 2	25-1200 thru 25-1224	91-20-02, Page 35 thru 60
800350 (K2) (AV) Sheet 2 of 2	25-1200 thru 25-1224	91-20-02, Page 35 thru 60
800263 (K1) (E)	25-1225 thru 25-1999	91-20-04, Page 61 thru 76

CAUTION
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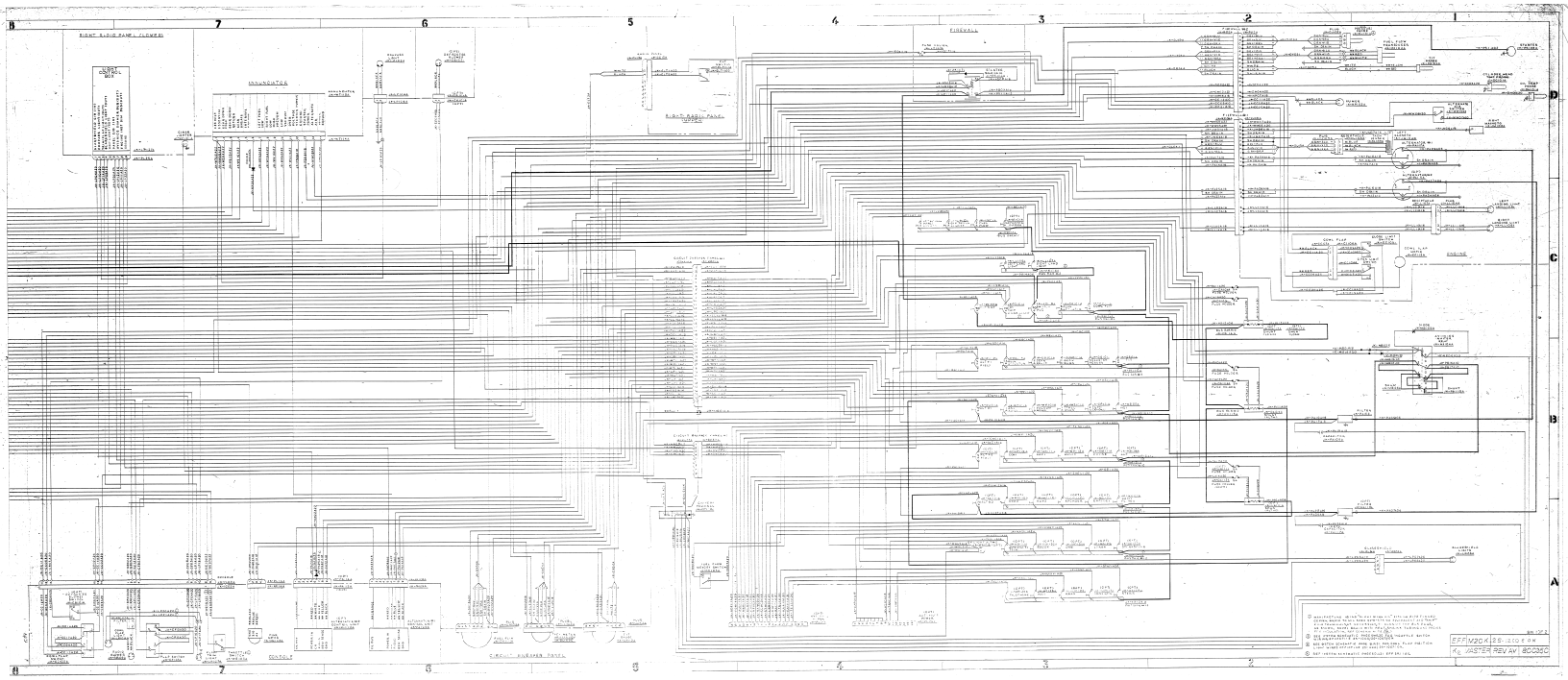
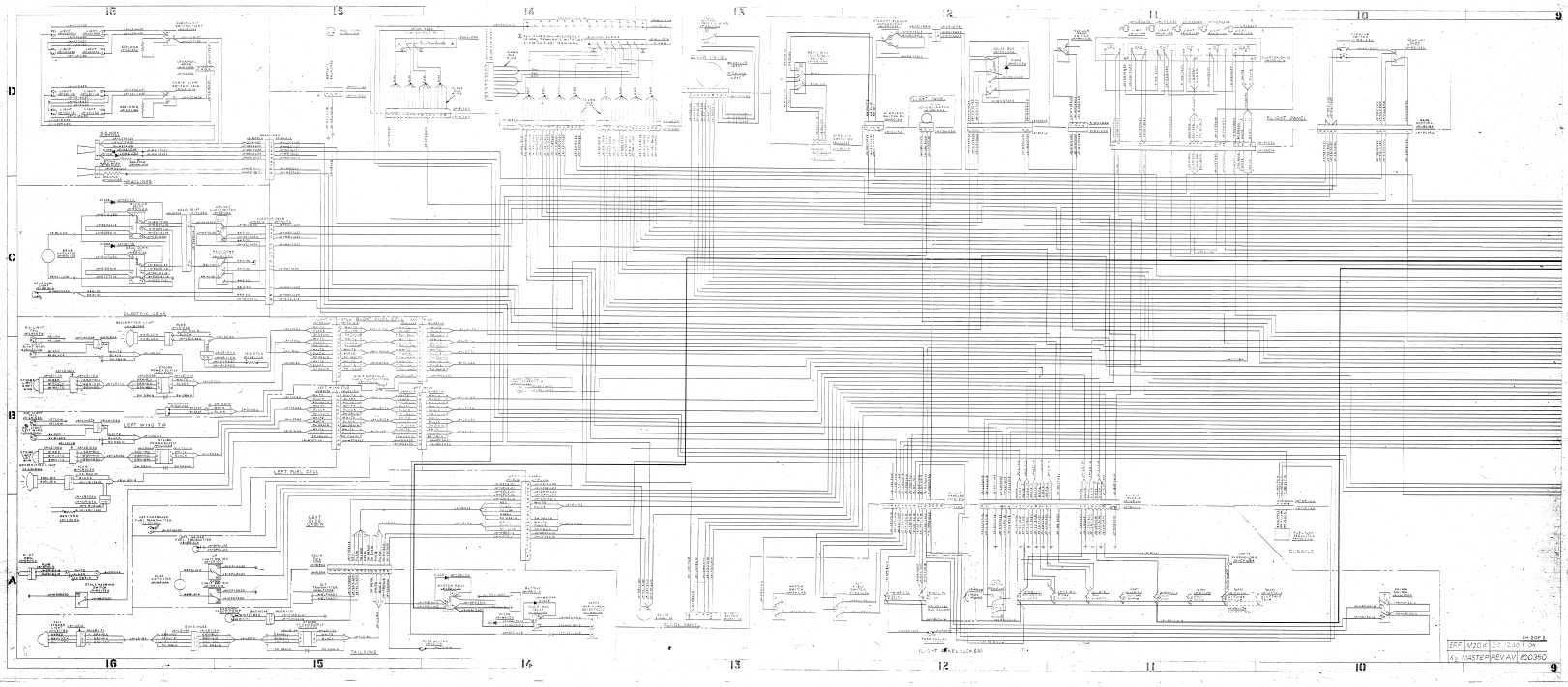

RIGHT RADIO PANEL (LOWER)
INVERTER
FIREWALL
LEFT RADIO PANEL
CIRCUIT BREAKER PANEL
CONTROL
ENGINE
EFFM20K&S-1101 E-W
MASTER REVISION: 80.0000


16
15
14
13
12
11
10
9
D
C
B
A
LEFT WING TIP
LEFT FUEL CELL
ELECTRIC GEAR
TAILCONE
FLIGHT PANEL
FLIGHT PANEL (LOWER)
SH 2 OF 2
ZFF M20K ZF 13301 ON
KS MASTER REV AV 20030

KEA E \19\96 12H I 70 I 172SAM 1K 96SS08

ENVELOPE F

**ENCLOSED IN THIS ENVELOPE
ELECTRICAL SCHEMATICS
FOR**

MOONEY AIRPLANE COMPANY, INC.
M20K

SCHEMATIC (NO) (REV)	M20K S/N EFFECTIVITY	RELATED S&M MANUAL (P/N MAN194) PAGES
800383 (K2) (F)	25-2001 thru 25-2012	91-20-04, Page 77 thru 89
800383 (K3) (G)	25-2013 thru 25-2025	91-20-04, Page 77 thru 89

CAUTION
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SHEET 1 TO 1 YEAR 7
800388 SATSAM SCHEMATIC (KS)
10\13\01

WIRING DIAGRAM
800383
SHEET 1 OF 1 REV C
05\15\08

ENVELOPE G

**ENCLOSED IN THIS ENVELOPE
ELECTRICAL SCHEMATICS
FOR**

MOONEY AIRPLANE COMPANY, INC.
M20K

SCHEMATIC (NO) (REV)	M20K S/N EFFECTIVITY	RELATED S&M MANUAL (P/N MAN194) PAGES
800383 (K4) (H)	25-2026 thru 25-2032	91-20-04, Page 77 thru 89

CAUTION
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SHEET 1 TO 1 YEAR 4

800388 SCHEMATIC WIRING

80\81\00 (K4)