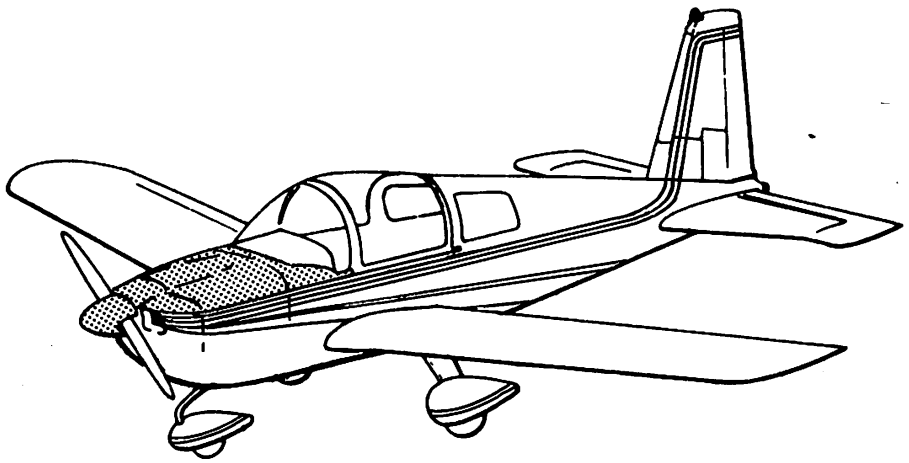
MAINTENANCE MANUAL AA-1C T-CAT & LYNX 1977/78 MODELS



GRUMMAN AMERICAN

ISSUED: DEC 15/1976
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GRUMMAN AMERICAN AVIATION CORPORATION
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LIST OF CHAPTERS

INTRODUCTION

GENERAL

The function of this Maintenance Manual is to acquaint maintenance personnel with the systems and their components of the AA-1C aircraft and to direct them in the proper procedures for maintaining the aircraft in an airworthy condition.

This manual contains information on installations made in the aircraft during manufacture and optional equipment only. However, information derived from applicable Single Engine Aircraft Service Kits, Service Bulletins, and Service Letters will be included in the manual as soon as possible after the issuance of these documents. Changes or installations made by the operator are not included in this manual.

The ability of maintenance personnel is recognized, and those procedures which are considered common to all aircraft have been either briefly referenced or omitted.

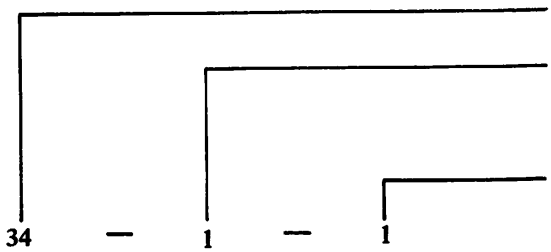
FORMAT

The chapter identification in this manual has been prepared in accordance with Air Transport Association (ATA) Specification No. 100. A functional breakdown is employed whereby all data pertaining to a given system, or component of a system, may be found in one chapter with a minimum of crossreferencing to other chapters.

The Electrical Power Chapter in this manual covers only the power sources and distribution equipment for the electrical system. There is not a chapter in this manual specifically designated for instruments. Details of individual branch electrical or instrument systems will be found in the applicable chapter.

IDENTIFICATION OF SUBJECT MATTER

A three-dash number system is employed to identify subject matter. The first dash number identifies the chapter, the second dash number the section, and the third dash number the component or sub-section of the section. The following example illustrates how the numbering system is used in the NAVIGATION Chapter:



Identifies NAVIGATION Chapter.

Identifies that section (group of related subjects) which provides coverage for the Flight Environment Data portion of the NAVIGATION Chapter.

Identifies a specific subject (component) of the Flight Environment Data. In this manual it is assigned to the Pitot and Static Pressure Systems.

The dash 0 (-0) is provided as a means for covering a complete system or sub-system. The chapter number followed by a zero (34-0) will segregate that material covering the complete system; the chapter-section numbers followed by a zero (34-1-0) is used for further details covering the sub-system or component.

PAGE NUMBER IDENTIFICATION

Page number blocks are used to separate the subject matter into the following categories:

General Coverage and Unit Description	Pages 1 through 100
Trouble Shooting	Pages 101 through 200
Maintenance Practices	(See Below)

Maintenance Practices include as applicable the following sub-topics: Servicing, Removal/Installation, Adjustment/Test, Inspection/Check, Cleaning/Painting, and Approved Repairs.

If all sub-topics, under Maintenance Practices are brief, they are combined into one topic. All such combined topics are numbered within page number block 201-300. Whenever individual sub-topics are so lengthy that a combination requires several pages, each sub-topic is treated as an individual topic. Page number blocks for this sub-topic arrangement are as follows:

Servicing	301 – 400
Removal/Installation	401 – 500
Adjustment/Test	501 – 600
Inspection/Check	601 – 700
Cleaning/Painting	701 – 800
Approved Repairs	801 – 900

Each new subject starts with page 1, 101, 201, etc., and continues through the page block assignment to the extent necessary. The first page of each block is placed on a right-hand page.

FIGURE IDENTIFICATION

Figures (illustrations) are numbered consecutively within each topic (subject) as follows:

Figures in Description –	1, 2, 3, 4, 5, etc.
Figures in Trouble Shooting –	101, 102, 103, etc.
Figures in Maintenance Practices –	
When not sub-divided –	201, 202, 203, etc.
When sub-divided –	
Servicing –	301, 302, 303, etc.
Removal/Installation –	401, 402, 403, etc.
Adjustment/Test –	501, 502, 503, etc.
Cleaning/Painting –	701, 702, 703, etc.
Approved Repairs –	801, 802, 803, etc.

INDEXING

Each chapter is prefaced with a table of contents identifying the subject matter within the chapter in the order of presentation. The table of contents is arranged with the following headings: DESCRIPTION; TROUBLE SHOOTING; and MAINTENANCE PRACTICES.

PART NUMBERS

This manual must not be used for identifying spare parts by number. Consult the Illustrated Parts Catalog for this information. Part numbers are used in this manual only as a means of identification when nomenclature alone is inadequate.

REVISIONS

Revisions to the original text are indicated by vertical lines in the left margin of the page, adjacent to the revised material.

The manual is provided with a "Log of Revisions" page for recording revisions by number and the dates on which they were inserted in the manual.

Each page revised or added to the initial manual will be identified by the date of revision at the bottom of the page. Pages issued with the original manual are identified with the issue date of the manual.

Each revision also contains a "List of Effective Pages". This list contains the chapter, page number, and date of each page which is effective since the issuance of the initial manual. This list is updated for each revision, with page changes indicated by the number of asterisks (*) placed adjacent to the page number as noted below:

* Pages revised by the current revision.
** Pages added by the current revision.
*** Pages deleted by the current revision.

CROSS REFERENCE

NAME, MODEL DESIGNATION AND EFFECTIVE SERIAL RANGES

Grumman American Aviation aircraft are certified under model number designations. For marketing purposes, each model is also given a name. The aircraft model number is used in this publication except where the name is necessary to differentiate between versions of the same basic model. The following table contains a listing of name, model years, model number, and serial range.

POPULAR NAME	MODEL YEAR	MODEL	SERIALS	
			BEGINNING	ENDING
T-CAT OR LYNX	1977	AA-1C	AA1C-0001	AA1C-0122
T-CAT OR LYNX	1978	AA-1C	AA1C-0123	AND SUBSQ

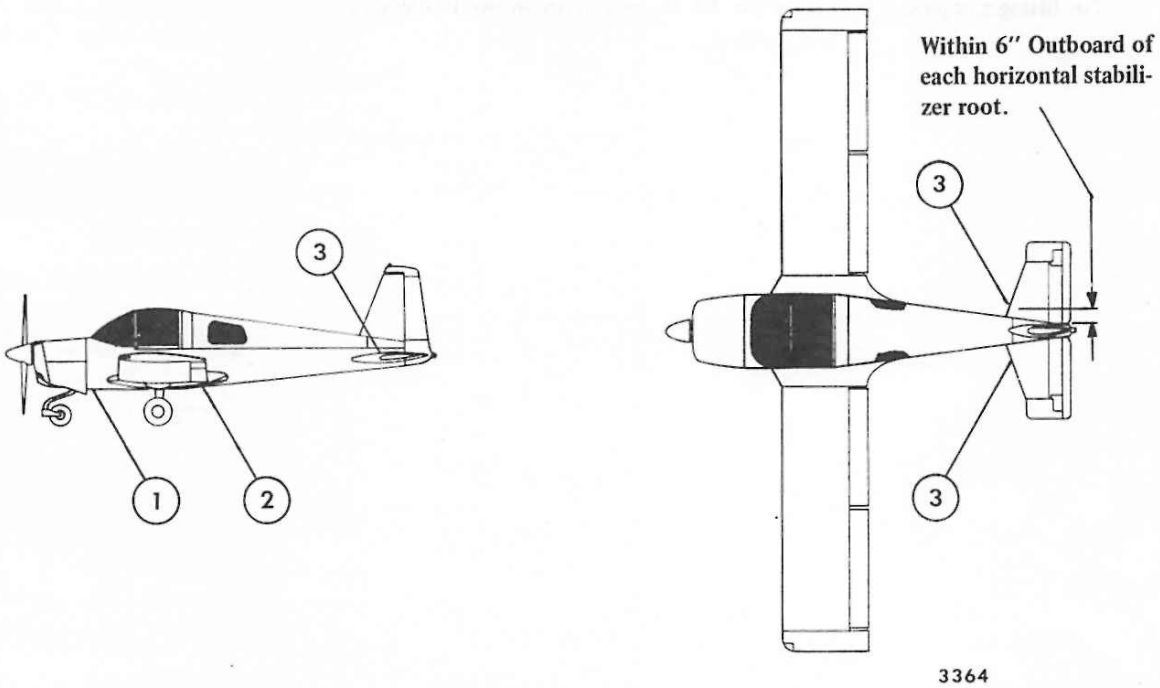
LIFTING AND JACKING POINTS

1. General

This section identifies and locates on illustrations those points that may be used when lifting or jacking of the aircraft is required and describes some of the various methods used.

2. Lifting and Jacking Points

The lifting and jacking points for the AA-1C aircraft are shown in Figure 1.



1. Front Lifting Point – Fuselage Station 51.
2. Aft Lifting Point – Fuselage Station 100.
3. Empennage Lifting Point – Within 6 in. of the horizontal stabilizer root.

Lifting and Jacking Points
Figure 1

PARKING

1. General

This section provides the procedures recommended to park the aircraft so that the likelihood of ground damage is minimized.

2. Parking Practices

CAUTION: WHEN CHOCKING WHEELS, ENSURE THAT THE CHOCKS USED ARE NOT LARGE ENOUGH TO COME IN CONTACT WITH THE WHEEL FAIRINGS. USE OF CHOCKS THAT ARE TOO LARGE MAY DAMAGE FAIRINGS.

When parking the aircraft, head into the wind and set the parking brakes. Do not set the parking brakes during cold weather when accumulated moisture may freeze the brakes, or when the brakes are overheated. Install the control wheel lock and chock the wheels. In severe weather and high wind conditions, moor the aircraft as outlined in Section 10-1-1, this Chapter.

NOTE: Install wheel chocks and release the parking brakes if the aircraft is to be left unattended. Changes in ambient temperatures can cause the brakes to release or to exert excessive system pressure.

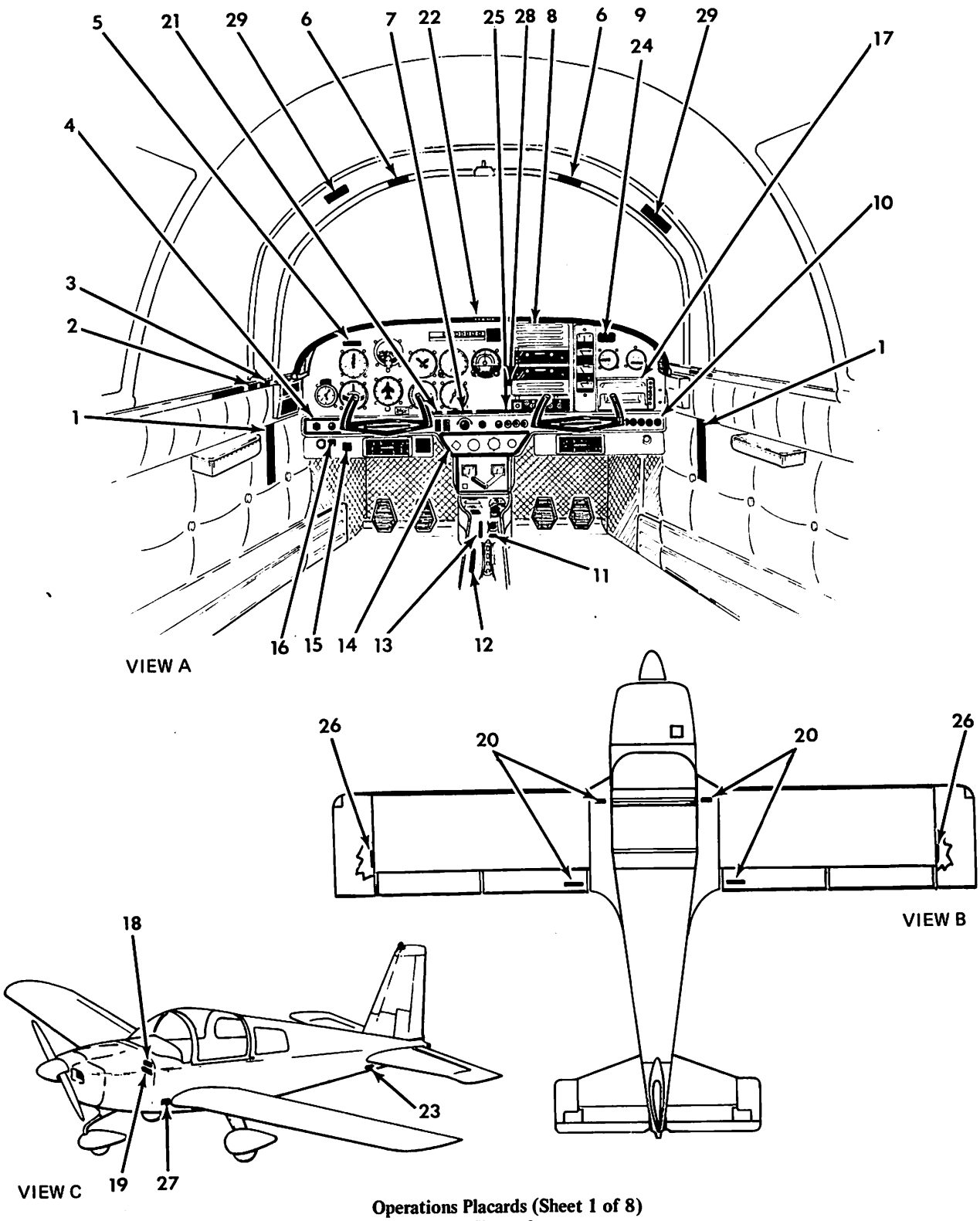
OPERATIONS PLACARDS

1. General

This section contains information relating to all placards aboard the AA-IC aircraft which provide the pilot, passenger, and maintenance personnel with aircraft operation data.

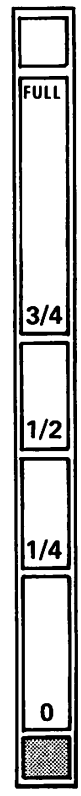
2. Placard Locations

The appearance, content and location of all operations placards are contained in Figure 1 and accompanying legend.

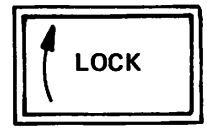


Operations Placards (Sheet 1 of 8)
Figure 2

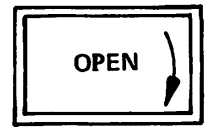
1. Located below left and right forward canopy rail corners (one gauge for each wing tank)



2. Located forward on left side of canopy rail

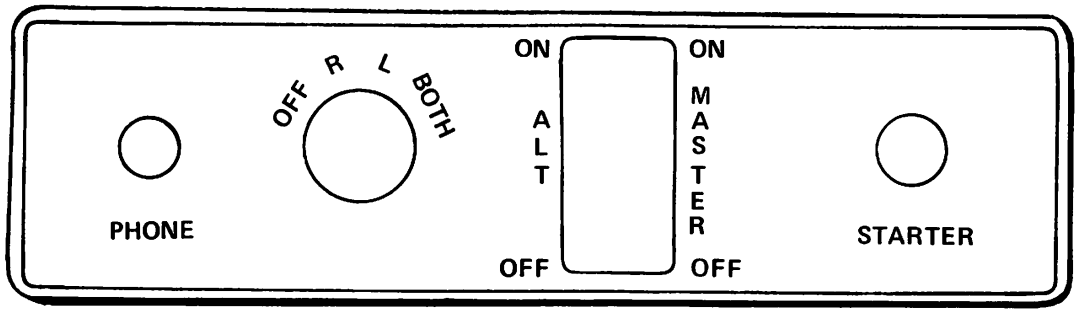


3. Located forward on left side of canopy rail



Operations Placards (Sheet 2 of 8)
Figure 2

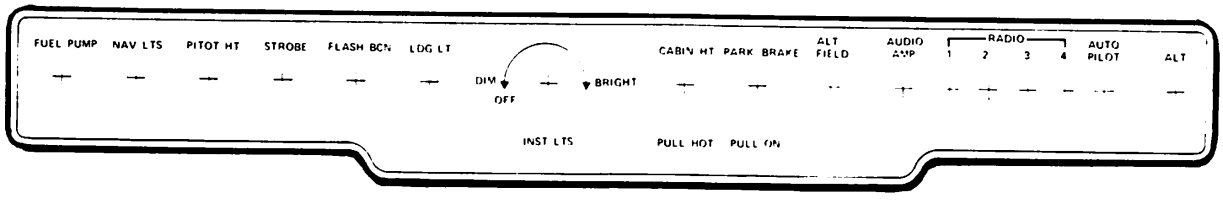
4. Located on lower left side of instrument panel.



5. Located on instrument panel above airspeed indicator

6. Located on top back, left and right centers of windshield framing.

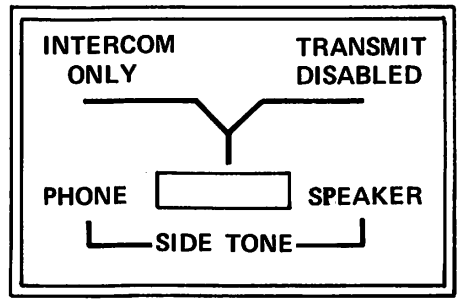
7. Located on lower center of instrument panel



8. Located on back of panel mounted "Escort model aircraft radio."

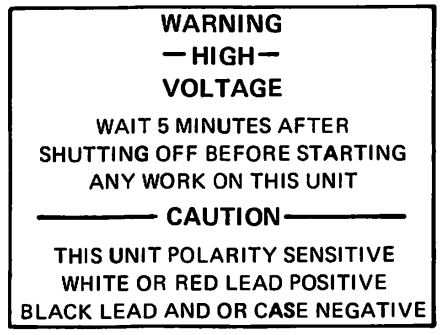
Operations Placards (Sheet 3 of 8)
Figure 2

24. Located on upper right side of instrument panel (optional equipment)

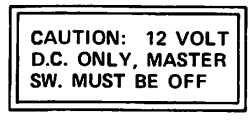


25. On instrument panel (optional equipment)

26. On wing outer ribs (optional equipment)

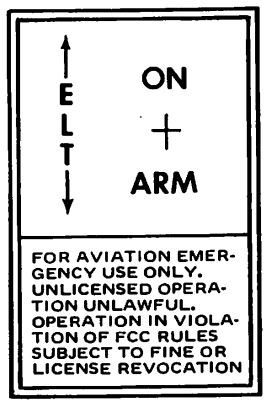


27. Adjacent to auxiliary power plug (optional equipment)

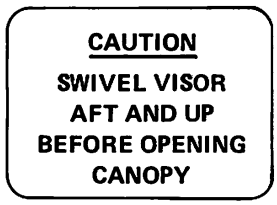


Operations Placards (Sheet 8 of 8)
Figure 2

28. Located near center of instrument panel



29. Located on sun visor.



16. FUEL SELECTOR VALVE AND FUEL CAP GASKET – Grease with MIL-G-6032A grease as required.
    FUEL TANKS – Fill with 100/130 grade aviation fuel as required, 100 Low Lead Aviation Fuel (Blue) is also approved.
17. FRESH AIR VENTS – Oil with MIL-L-7870 (Figure 2) oil as required.
18. FLAP DRIVE JACKSCREW – Grease with MIL-G-7711 (Figure 2) grease. Coat with a light film (Note 1.).
19. BRAKE RESERVOIRS – Fill to within 1/4 inch of top with MIL-H-5606 (Figure 2) hydraulic fluid, as required.
20. VACUUM SYSTEM FILTER – Replace filter at 400 hours or as required.
21. ENGINE AIR FILTER – Clean and service filter element every 50 hours. Replace when torn or damaged.
22. FUEL TANK DRAINS – Clear of water and sediment prior to first flight of day.
23. AUXILIARY FUEL PUMP FILTER – Clean filter element every 50 hours.
24. CARBURETOR FILTER – Drain carburetor bowl and clean filter every 100 hours.

NOTES:

1. Care should be taken to avoid grease contacting outer surface of nylon nut.
2. Acceptable substitute is powdered graphite (MIL-G-6711) (Figure 2).

Servicing Points (Sheet 2 of 2)
Figure 1

TRADE NAME	MANUFACTURER
MIL-G-21164 GREASE (Note 1)	
Aeroshell Grease 17 Braycote 664 PED 3350 Grease Royco 64 Grease TG-4727 Grease	Shell Oil Company Bray Oil Company Standard Oil Company Royal Lubricants Company Texaco Inc.
MIL-G-6711 GRAPHITE (Note 1)	
Graphite Graphite Graphite	Dixon Company Electrofilm Company Electro-Graph Company
MIL-H-5606 HYDRAULIC FLUID (Note 1)	
3125HVD Oil Brayco Micronic 756C PED-3337, -3335 Royco 756A & B XSL 7828 YT-283	Humble Oil & Refining Company Bray Oil Company Standard Oil Company Royal Lubricants Company Shell Oil Company Union Carbide
VV-P-236 PETROLATUM (Note 1)	
Braycode 236 Parmo 70 Royco 1R	Bray Oil Company Humble Oil & Refining Company Royal Lubricants Company
MIL-L-7870 OIL (Note 1)	
Brayco 363 Cosmolube 263 Enco Instrument Oil Low Temperature Oil 1692 Royco 363	Bray Oil Company E.F. Houghton Company Humble Oil & Refining Company Texaco Inc. Royal Lubricants Company
MIL-G-25760 GREASE (Note 1)	
Aeroshell Grease 16 Braycote 6605 Royco 60R Supermil ASU No. 06752 TG-4971 Grease	Shell Oil Company Bray Oil Company Royal Lubricants Company American Oil Company Texaco Inc.
MIL-G-7711 GREASE (Note 1)	
Aeroshell No. 6 Regal AFB 2	Shell Oil Company Texaco Inc.

Lubricants (Sheet 1 of 2)
Figure 2

TRADE NAME	MANUFACTURER
MIL-L-6082B STRAIGHT MINERAL OIL – ENGINE (Notes 1 and 2)	
Aeroshell Oil 65	Shell Oil Company
Aeroshell Oil 100	Shell Oil Company
Chevron Aviation Oil 65	Chevron Oil Company
Grade 1100	Chevron Oil Company
Avrex 101/1065	Mobil Oil Company
Avrex 101/1100	Mobil Oil Company
Conoco Aero Oil 1065	Continental Oil Company
Conoco Aero Oil 1100	Continental Oil Company
Chevron Aero Oil Grade 120	Standard Oil Company
RT-451	Mobil Oil Company
RM-173E	Mobil Oil Company
RM-180E	Mobil Oil Company
TX-6309	Texaco Inc.
Premium AD 120	Texaco Inc.
Premium AD 80	Texaco Inc.
Oil E-120	Exxon Company
Oil A-100	Exxon Company
Oil E-80	Exxon Company

Note 1: The vendor products listed in this chart have been selected as representative of the specification under which they appear. Other equivalent products conforming to the same specifications may be used.

Note 2: Oils conforming to the latest revision of Lycoming Service Instruction No. 1014 may be used.

Lubricants (Sheet 2 of 2)
Figure 2

1. Engine Upper Cowl
2. Rudder Tip
3. ELT Access Panel
4. Tailcone
5. Nose Gear Torque Tube Bolt Access Plugs
6. Engine Lower Cowl
7. Wing Tips
8. Wing Inboard Forward Access Plates
9. Landing Gear Root Fairings
10. Wing Inboard Aft Access Plates
11. Horizontal Stabilizer Root Fairing
12. Elevator Tips

Access Openings
Figure 3

D. Remove dipstick from engine and wipe oil from dipstick with a clean cloth or paper towel.

E. Return dipstick into filler spout and tighten finger tight.

F. Unscrew and remove dipstick. Check oil level on dipstick versus the markings stamped on the dipstick.

G. Wipe oil from dipstick with a clean cloth or paper towel and replace dipstick in filler spout. Tighten filler spout cap finger tight.

NOTE: When tightening the cap, ensure that it is secure. But do not overtighten, as this may damage the O-ring seal in the cap.

Replenish engine oil using oil of the following specifications:

MIL-L-6082B (Figure 2) Aviation Grade Straight Mineral oil shall be used to replenish oil supply during the first 25 hours of operation and at the first 25-hour oil change. Continue to use this grade of oil the first 50 hours of operation.

NOTE: The aircraft is delivered from the factory with corrosion preventive aircraft engine oil. This oil should be drained after the first 25 hours of engine operation.

MIL-L-22851 (Figure 2) Ashless Dispersant Oil: This specification oil shall be used after the first 50 hours of engine operation.

*Recommended Viscosity

Average Ambient Air Temperature	Mineral Grade	Ashless Dispersant
Above 16°C (60°F)	SAE 50	SAE 40 or SAE 50
−1°C (30°F) to 32°C 90°F	SAE 40	SAE 40
−18°C (0°F) to 21°C (70°F)	SAE 30	SAE 40 or SAE 30
Below −12°C (10°F)	SAE 20	SAE 30

*Refer to latest revision of Lycoming Service Instruction No. 1014 and other Lycoming publications for further information.

Replenish engine oil as follows:

A. Open oil access door.

B. Locate oil filler spout and unscrew cap.

C. Using a clean rag or paper towel wipe any oil or foreign material from the edges of the oil filler spout opening. Also wipe oil from the dipstick.

NOTE: When adding engine oil, ensure that no dirt or foreign material are on the edges of the oil filler spout, and the dipstick/cap is clean prior to reinstallation.

D. Pour oil of proper specification and viscosity into filler spout to achieve desired oil level.

NOTE: When adding engine oil during extremely cold weather, the change in viscosity due to extreme cold may cause the oil to pour very slowly. Keeping the oil in a heated building or warming it prior to use may expedite oil replenishment.

E. Replace oil filler spout cap/dipstick and tighten finger tight.

NOTE: Any oil spillage, particularly on exhaust manifolds, should be wiped clean prior to flight.

F. Close oil access door.

The AA-1C aircraft oil system capacities are as follows:

NOTE: The following quantities were measured at an ambient temperature of 70°F.

	U.S. Quarts	Liters	Imp. Quarts
*Total Engine Capacity	6.00	5.69	4.99
Minimum Safe Quantity	2.00	1.89	1.66

* Does not include one quart (undrainable) in oil cooler.

5. Brake Fluid Replenishing

Brake fluid replenishing is accomplished as follows:

NOTE: When replenishing brake fluid, ensure that the fluid used conforms to specification MIL-H-5606, (Figure 2) and that the fluid is uncontaminated.

A. Locate brake cylinder reservoirs as shown in Figure 12.

B. Using a clean rag or paper towel, wipe any accumulated dirt or other foreign material from area around filler plugs.

C. Remove filler plugs.

D. Using a syringe, hand pump, or other suitable means add brake fluid MIL-H-5606 (Figure 2) to the reservoirs through the filler ports until the level of fluid is one quarter inch from the top of the reservoir.

E. Replace filler plugs in reservoirs.

F. Check brake action.

G. If more fluid is required, repeat steps (B) through (F).

6. Tire Inflation

WARNING: WHEN INFLATING TIRES USE REGULATED AIR PRESSURE THROUGH VALVE STEMS. TIRE PRESSURES ARE AS FOLLOWS:

MAIN LANDING GEAR TIRES – 19 psig
NOSE LANDING GEAR TIRES – 22 psig

7. Battery Fluid Replenishing

WARNING: THE BATTERY CONTAINS A SULPHURIC ACID ELECTROLYTE SOLUTION. DO NOT ALLOW THE ELECTROLYTE TO COME INTO CONTACT WITH CLOTHES OR SKIN. ANY SPILLAGE SHOULD BE FLUSHED WITH WATER OR NEUTRALIZED WITH BAKING SODA IMMEDIATELY.

Replenish battery fluid as follows:

A. Remove top engine cowl.

B. Remove the two wing nuts (1) from the battery box (2) and remove the strap (3) and battery box cover (4) as shown in Figure 13.

SCHEDULED SERVICING

1. General

This section provides the procedures required to perform servicing that is required on a scheduled basis.

2. Engine Oil Servicing

The engine oil should be changed after the first 25 hours of operation. It should be replaced with straight mineral oil conforming to Specification No. MIL-L-6082B (Figure 2). This straight mineral oil should be used until a total of 50 hours has accumulated, then it should be drained and replaced with dispersant oil. The oil should be changed at least every 50 hours or 6 months whichever occurs first. At the time of each oil change, the engine oil strainers should be removed, cleaned, and inspected for metal particles.

Change engine oil as follows:

A. Remove upper engine cowl.

B. Remove lower engine cowl. (Not required if oil quick drain is installed.)

C. Locate engine oil drain plug (Figure 14) and cut safety wire securing plug.

NOTE: On aircraft equipped with a quick oil drain, do not cut safety wire at plug. Place hose over the quick drain and push the fitting up into its detent to drain the oil.

D. Place a suitable container under the oil drain.

E. Unscrew the drain plug and allow the oil to drain thoroughly.

F. Remove remaining safety wire from drain plug and safety wire hole on engine.

G. Using a clean rag or paper towel, wipe drain plug clean and clean area on engine around oil drain.

H. Reinstall drain plug and safety wire.

I. Remove, clean, and inspect engine oil strainers in accordance with Lycoming operating manual.

J. Replace strainers per Lycoming operating manual.

K. Unscrew and remove engine oil filler spout plug.

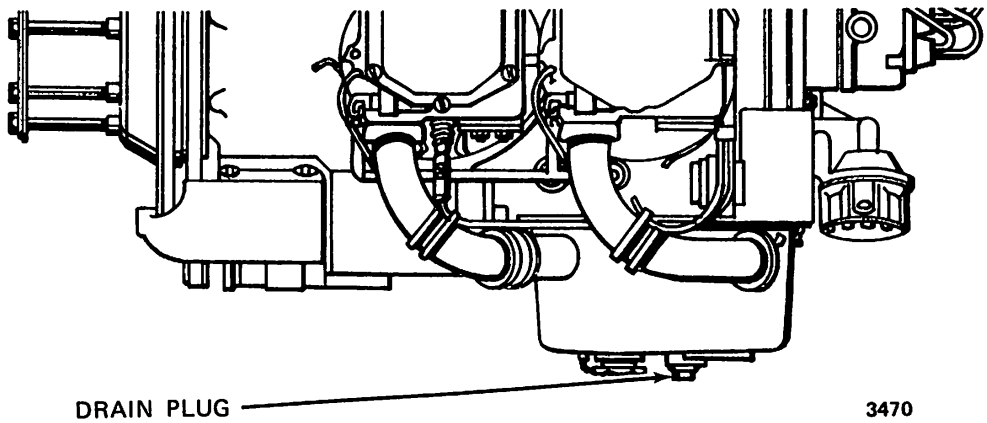
L. Pour six quarts of oil conforming to Specification No. MIL-L-6082B (Figure 2) or ashless dispersant aviation grade into oil filler spout.

M. Using a clean rag or paper towel, wipe oil from dipstick, and reinstall engine oil filler spout plug. Tighten finger tight.

N. Reinstall lower engine cowl.

O. Reinstall upper engine cowl.

P. Run engine, check for leaks, and recheck oil level.



Engine Oil Drain Plug
Figure 14

3. Engine Air Filter Servicing (See Figure 15.)

A. Remove upper and lower engine cowl.

B. Remove the screws attaching the adapter assembly, air filter and air box assembly together.

WARNING: USE SOLVENT IN A WELL VENTILATED AREA. AVOID BREATHING FUMES. KEEP AWAY FROM FLAMES.

C. Thoroughly wash the filter in petroleum solvent. Make certain all dirt is removed and filter is in serviceable condition. If filter has flocking worn from screen wire, replace filter.

D. Dry the filter at room temperature. Filter must be completely dry before proceeding with next step. If the filter is not dry, the solvent will prevent oil from adhering to the filter, thereby reducing the filter efficiency.

E. Immerse the filter in the grade oil called for on the filter. If none is called out, use engine preservative oil per MIL-L-21260 (Figure 2).

F. After removing the filter from the oil, allow it to drain thoroughly before installing in the aircraft.

G. Inspect the gasket between the air filter and air box. If damaged or otherwise defective, replace with a new gasket.

H. Position the air box assembly, filter, and adapter together and install the screws.

I. Install the lower and upper engine cowl.

4. Vacuum System Air Filter Servicing

The vacuum system air filter (Figure 17) is located beneath the instrument panel, and attached to the inside of the firewall near its center. The filter elements of both the air filter and the regulator should be checked periodically to ensure that they are not clogged by dirt or foreign material. If either of the filter elements are dirty and appear to be clogged, they should be replaced. The air filter element should be replaced by Part No. 1J7-1. The regulator filter element should be replaced by Part No. B3-5-1.

Replace the filter elements as follows:

NOTE: Never blow off filter with compressed air or attempt to wash element in any liquid or soak in oil.

D. Reinstall washer and nut.

E. Reconnect air filter to the firewall.

To replace regulator filter, remove old filter element and replace with new element.

7. Airframe Lubrication

Lubricate the airframe in accordance with Figure 1, this Chapter. During airframe lubrication observe the following precautions and procedures:

WARNING: USE CLEANING SOLVENT IN A WELL VENTILATED AREA. AVOID BREATHING FUMES. KEEP AWAY FROM FLAMES.

CAUTION: SYNTHETIC COMPOUNDS SUCH AS THOSE FOUND IN AIRCRAFT OILS AND GREASES CONTAIN ELEMENTS WHICH CAN SOFTEN PAINT, NATURAL RUBBER, NEOPRENE, AND SOME ELECTRICAL INSULATORS. IF THIS TYPE LUBRICANT IS SPILLED ON ANY OF THESE MATERIALS, WIPE IT OFF IMMEDIATELY AND THOROUGHLY WITH A CLEAN CLOTH.

A. Remove all foreign matter from joints, fittings, or bearing surfaces immediately before application of lubricant. Use a clean cloth saturated with cleaning solvent.

B. Apply lubricant sparingly to prevent accumulation of contaminants.

C. Main Gear and Nose Gear Bearings (See Figure 17).

WARNING: USE SOLVENT IN A WELL VENTILATED AREA. AVOID BREATHING FUMES. KEEP AWAY FROM FLAMES.

CAUTION: DO NOT SPIN BEARINGS WHEN DRYING WITH COMPRESSED AIR. WASH BEARINGS IN STODDARD SOLVENT (P.S.-661 OR EQUIVALENT) AND DRY WITH A CLEAN, SOFT CLOTH.

CAUTION: USE A CLEAN, LINT-FREE CLOTH TO CLEAN AND HANDLE BEARINGS. DO NOT USE A DIFFERENT TYPE GREASE IN WHEEL BEARINGS.

(1) Clean and repack wheel bearings every 100 hours or as required. Remove wheels (1) and bearings (2). Clean wheel bearings and felt seals (3) with Stoddard solvent (P.S.-661) or equivalent and dry with soft lint-free cloth.

(2) Inspect bearings (2) and races for wear or damage and replace if necessary.

NOTE: For adjustment of nose wheel and main landing gear bearings refer to Chapter 32.

(3) Repack bearings only with grease MIL-G-25760 (Figure 2) and lubricate felt seals with oil MIL-L-7870 (Figure 2) before installation.

D. Nose Gear Fork Assembly (See Figure 18)

WARNING: USE SOLVENT IN A WELL VENTILATED AREA. AVOID BREATHING FUMES. KEEP AWAY FROM FLAMES.

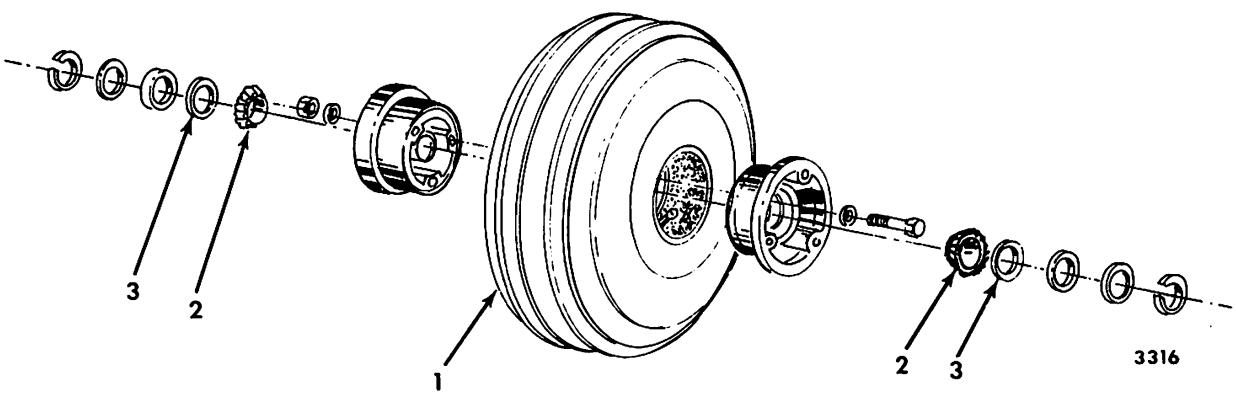
CAUTION: DO NOT HANDLE BEARINGS, BUSHINGS, OR SPRING DISC WASHERS WITH BARE HANDS. USE A CLEAN, LINT-FREE CLOTH. DO NOT USE A DIFFERENT TYPE GREASE IN BEARINGS ON THE SAME AIRCRAFT.

(1) Clean and grease the nose gear fork assembly, bushings, and spring discs every 100 hours. Remove nose gear fork assembly (1) from strut(2). Clean bushings (3), spring discs (4) and fork (1) with Stoddard solvent (P.S.-661) or equivalent and dry with a soft lint-free cloth.

(2) Inspect bushings (3), thrust bearing (5), and spring discs (4) for wear or damage and replace if necessary.

NOTE: For adjustment of nose gear fork assembly, refer to Chapter 32.

(3) Repack nose gear fork assembly, bushings, thrust bearing, and spring discs only with grease MIL-G-7711 (Figure 2) before installation.



Wheel Bearing Lubrication
Figure 17

E. T-Column Bearings

The T-Column needle and thrust bearings should be lubricated when evidence of binding occurs, or when the assembly must be disassembled for repair or replacement of parts. Lubricate the bearings as follows:

CAUTION: DO NOT HANDLE BEARINGS WITH BARE HANDS. USE CLEAN LINT-FREE CLOTH.

(1) Remove the needle and thrust bearings.

WARNING: USE SOLVENT IN A WELL VENTILATED AREA. AVOID BREATHING FUMES. KEEP AWAY FROM FLAMES.

(2) Clean the bearings and races with Stoddard solvent (P.S.-661) or equivalent and dry with soft lint-free cloth.

(3) Visually inspect bearings and races for wear or damage and replace if necessary.

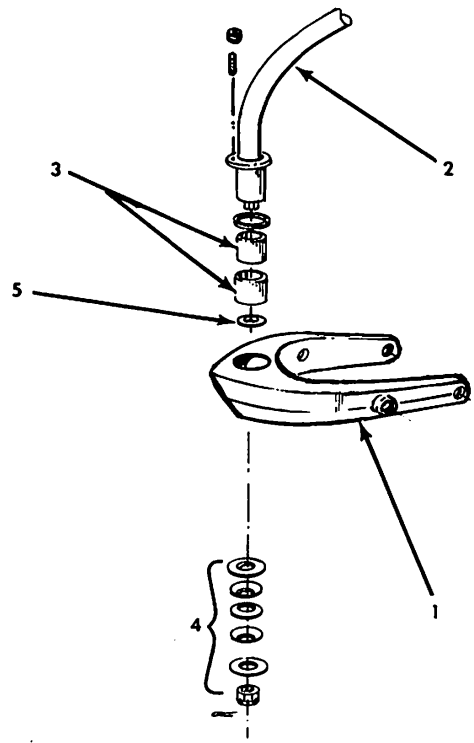
NOTE: For adjustment of T-Column refer to Chapter 27.

(4) Repack bearings only with MIL-G-7711 (Figure 2) grease before installation.

F. Trim Wheel Gears

(1) Use a clean lint-free cloth to wipe excess grease and foreign material from shaft.

(2) Apply a thin coating of MIL-G-7711 (Figure 2) grease to the shaft by hand.



Nose Gear Fork Assembly Servicing
Figure 18

G. Trim Actuator Shaft

(1) Use a clean lint-free cloth to wipe excess grease and foreign material from shaft.

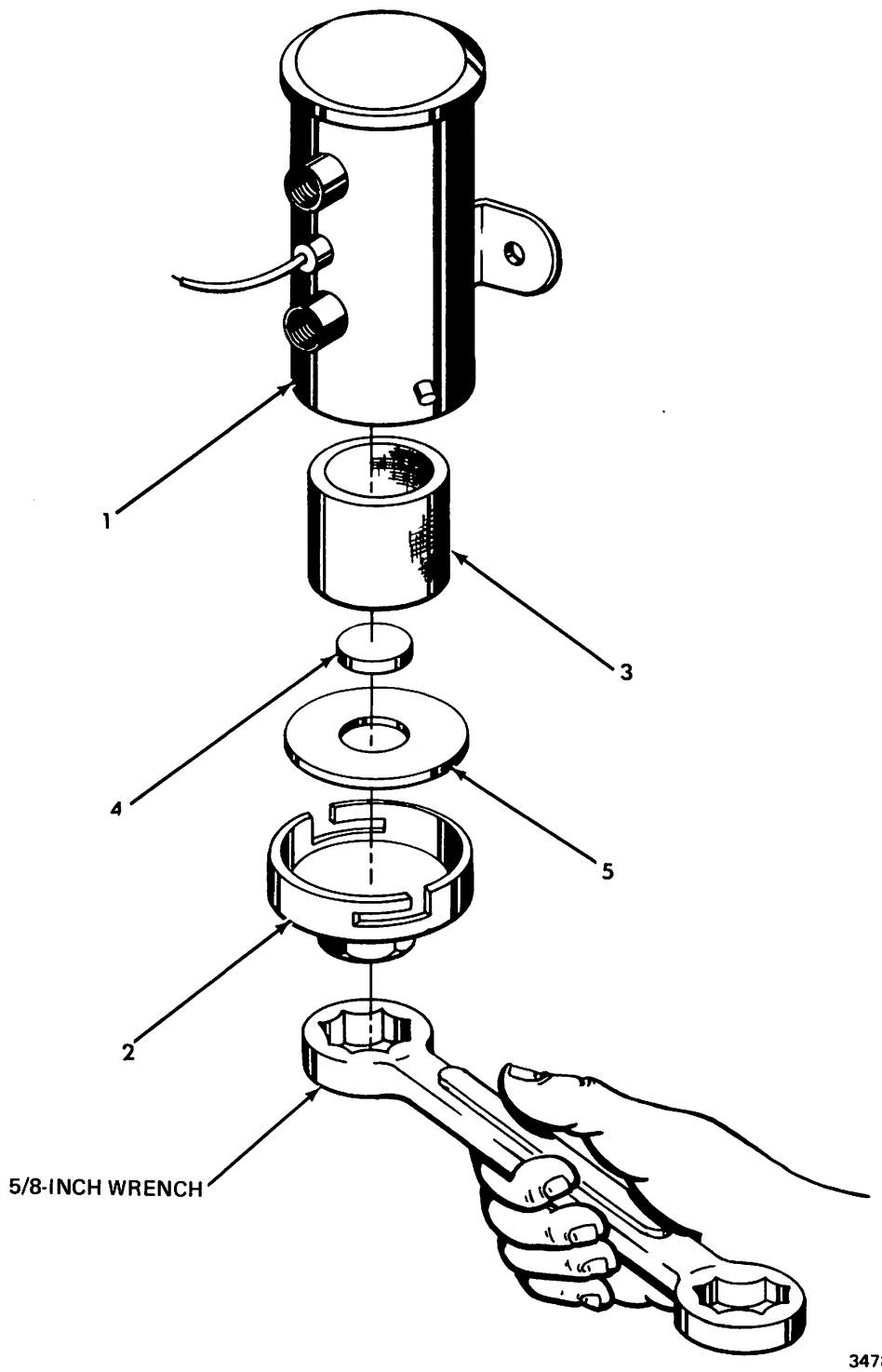
(2) Apply a thin coating of MIL-G-7711 (Figure 2) grease to the shaft by hand.

8. Auxiliary Fuel Pump Filter Servicing (See Figure 19.)

Clean the auxiliary fuel pump filter as follows:

WARNING: PRIOR TO REMOVING FILTER FROM FUEL PUMP, CLOSE AND LOCK CANOPY, OR OTHERWISE ENSURE THAT PUMP IS NOT ENERGIZED WHILE FILTER IS REMOVED. ENERGIZING PUMP WITH FILTER REMOVED WILL RESULT IN RAW FUEL BEING PUMPED INTO THE ENGINE COMPARTMENT.

A. Locate auxiliary fuel pump (1), cut safety wire and remove bottom cover (2) from pump (1) by turning it counterclockwise.



Auxiliary Fuel Pump Servicing
Figure 19

AIRFRAME STRUCTURAL REPAIR – DESCRIPTION

1. General

The information in this section should be used in conjunction with the AC 43.13-1 "Acceptable Methods, Techniques and Practices – Aircraft Inspection and Repair." Information contained herein is applicable to repair of damage where replacement of the damaged assembly is considered unnecessary. If some doubt exists relative to repair not specifically covered, consult the Grumman American Customer Service Department.

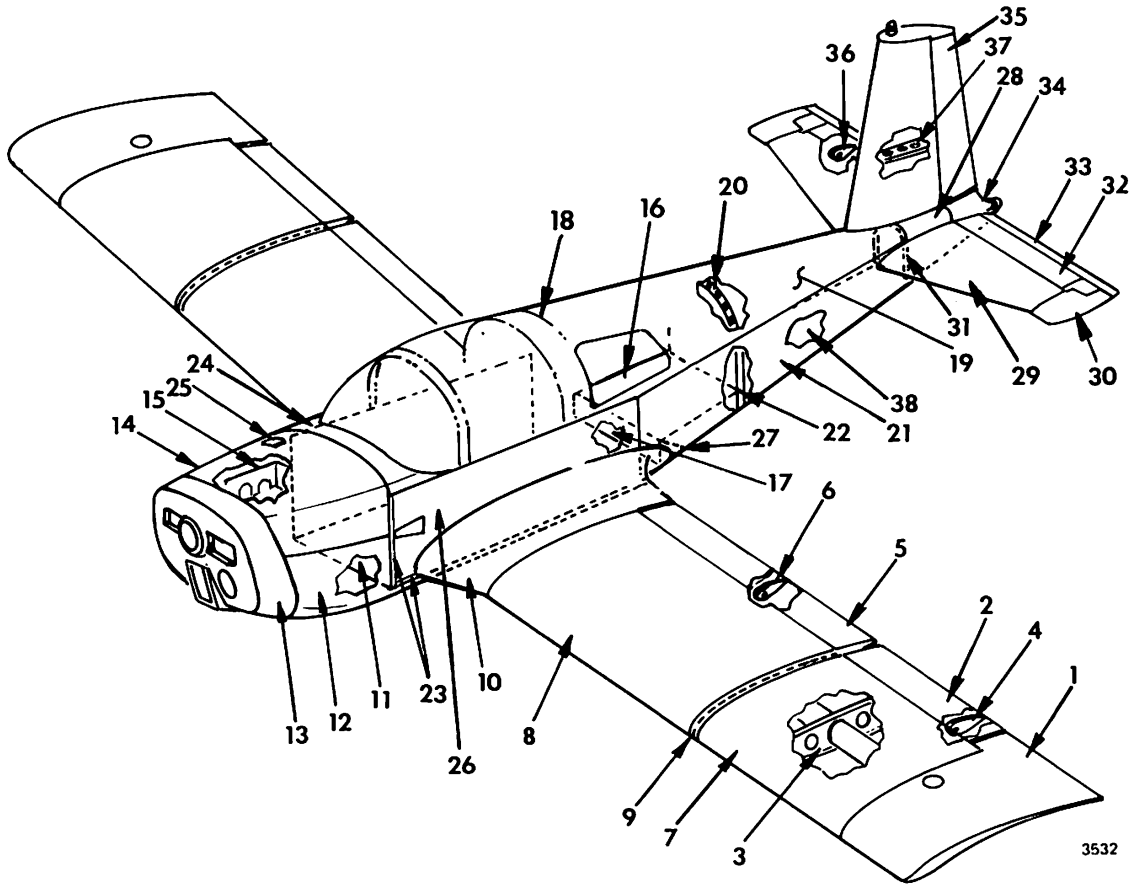
Field repairs of bonded structures can be made using rivets. Flush riveted repairs can be made in both sheet metal and honeycomb areas. These repairs are normally covered with an epoxy filler to maintain surface contour and smoothness.

2. Tools, Jigs, and Fixtures

Very few special tools are required for normal maintenance on the AA-1C. Standard shop tools (including a torque wrench and micrometer) are usually adequate. Required special tools, jigs, and fixtures can be procured through your authorized Grumman American Dealer or Distributor. Special tools are listed in Chapter 12.

3. Materials

Structural repairs should be accomplished using identical material to that being repaired (i.e., .032 2024-T3 Clad Aluminum). Figure 1 shows the various materials utilized and should be used in determining type of material for all repair work. If material shortages make substitution necessary, 2024-T3 in most cases can be substituted for any other aluminum alloys. However, it is important that the 2024-T3 aluminum contain an aluminum coating (designated as "Alclad") for corrosion protection.



ITEM NO.	DESCRIPTION	MATERIAL	ITEM NO.	DESCRIPTION	MATERIAL
1	WING TIP	FIBERGLASS	20	BULKHEAD	.025" 2024-T42 ALCLAD
2	AILERON SKIN	.020" 2024–T3 ALCLAD	21	SKIN	.032" 2024-T3 ALCLAD
3	WING RIB	.025" 6061-T6	22	STIFFENER	.032" 2024-T3 ALCLAD
4	AILERON RIB	.50" HONEYCOMB	23	ANGLES	.025" 2024-T3 ALCLAD
5	FLAP SKIN	.020" 2024-T3 ALCLAD	24	SKIN	.025" 6061-T4
6	FLAP RIB	.050" HONEYCOMB	25	ACCESS DOOR	.063" 6061-T4
7	WING SKIN	.020" 2024-T3 ALCLAD	26	FUSELAGE PANELS	.50" HONEYCOMB
8	WING SKIN	.020" 2024-T3 ALCLAD	27	GUSSET	.040" 2024-T42 ALCLAD
9	DOUBLER	.020" 2024-T3 ALCLAD	28	COVER	.020" 2024-T3 ALCLAD
10	WING ROOT FAIRING	FIBERGLASS	29	STABILIZER SKIN	.020" 2024-T3 ALCLAD
11	FIREWALL	.018" ALUMINIZED STEEL	30	STABILIZER TIP	THERMO-PLASTIC
12	LOWER COWL	.040" 6061-T4	31	BULKHEAD	.090" 2024-T42 ALCLAD
13	NOSE COWL	FIBERGLASS	32	SKIN	.016" 2024-T3 ALCLAD
14	UPPER COWL	.032" 6061-T4	33	TRIM TAB SKIN	.016" 2024-T3 ALCLAD
15	BAFFLE	.032" 5052-H32	34	TAILCONE	THERMO-PLASTIC
16	BAGGAGE FLOOR	.032" 2024-T3 ALCLAD	35	SKIN	.016"2024-T3 ALCLAD
17	BULKHEAD	.50" HONEYCOMB	36	RIB	.50" HONEYCOMB
18	BULKHEAD	.032" 2024-T3 ALCLAD	37	STABILIZER RIB	.025"2024-T42 ALCLAD
19	SKIN	.020" 2024-T3 ALCLAD	38	BOTTOM SKIN	.025" 2024-T3 ALCLAD

Airframe Materials Chart
Figure 1

4. Service Kits

Service Kit No. SK-102A is a potting kit for honeycomb repair and includes Resin and REN RP-4032A Hardener with instructions for proper preparation and application. This kit is available through your authorized Grumman American Dealer or Distributor. Also available is Service Kit No. SK-125, which is a bondline repair kit and includes the materials (except distilled water, alcohol, and metal conditioner) for the repair of delaminated metal to metal bond joints. *REN RP-4032A is available through REN Plastics Inc., Lansing, Michigan 48909.

5. Sheet Metal Repairs (Riveted)

Damage to skin, ribs, and frame areas can generally be repaired using normal sheet metal repair techniques. These are covered in AC43.13-1. Several typical repairs are also discussed in Approved Repairs, Paragraphs 1 and 2. Complete fuselage sections can be replaced using standard rivet practices as discussed in Paragraphs 9, 10, and 13.

Local wing skin damage can be satisfactorily repaired using rivets. However, if extensive wing skin damage exists, it is recommended that the complete skin panel be replaced.

The Grumman American Customer Service Department should be contacted for additional information.

6. Honeycomb Panel Repairs – (Riveted)

Damage to honeycomb panels can be repaired by removal of the damaged section, sealing any exposed honeycomb core with PR1436GB-2 Inhibited Sealant and splicing in of new repair parts. The splice can be installed with rivets and can be made flush with the external surface if desired. Representative repairs for damaged honeycomb panels are discussed in Approved Repairs, Paragraph 3 through 8.

NOTE: PR1436GB-2 Inhibited Sealant is approved and is available through Products Research and Chemical Corporation, 2919 Empire Avenue, Burbank, California or through your authorized Grumman American Dealer or Distributor.

Critical honeycomb areas are those areas within 6 in. of the wing spar and within 4 in. of the engine mount, tail cone, and nose gear structure. Minor damage to one face sheet of a honeycomb panel which is confined to an area of 1.0 inch or less in diameter, and located in a non-critical area, can be repaired by smoothing sharp edges in the damaged area, sealing any exposed honeycomb core with PR1436GB-2 sealant and filling with an epoxy filler.

Minor damage to a critical area which is equal to or less than 1.0 inch in diameter can be repaired by removal of the damaged face sheet, sealing any exposed honeycomb core with PR1436GB-2 sealant, application of resin filler, and installation of a doubler plate. Service Kit No. SK-102 includes an acceptable resin filler with resin, hardener, and instructions for preparation and application. It is available through your authorized Grumman American Dealer or Distributor. A representative repair is discussed in Approved Repairs, Paragraph 3.

Damaged areas greater than 1.0 inch in diameter or including punctures through both face sheets will require removal of the damaged area and insertion of a honeycomb repair section. Typical repairs are discussed in Approved Repairs, Paragraph 4.

Extensive honeycomb panel damage, such as in the nose gear attachment area can be repaired by splicing in new honeycomb repair assemblies which are available through your authorized Grumman American dealer or distributor. Such a repair is discussed in Approved Repairs, Paragraphs 5 and 7.

When making honeycomb panel repairs which require splicing of the bonding strap angles located at the lower corners of the fuselage, the splice must be so designed to maintain the continuity of the angles from the original panel into the repair panel. This can be achieved with angles riveted over the bonding strap angles across the splice. This is discussed in Approved Repairs, Paragraph 5. The length of the external splice angle can be increased as required for appearance purposes.

All riveted honeycomb repairs must include some means of sealing the repair joint from external moisture. This protection is provided by PR1436GB-2 Inhibited Sealant. Epoxy filler may be used to smooth the repair prior to painting.

All honeycomb edges and repair faying surfaces should be coated with PR1436GB-2 sealant. Also, all rivets should be dipped in this sealant prior to installation. After completion of the repair, the repaired area should be coated with zinc chromate primer.

7. Repair of Formed Thermo-Plastic Parts

Repairs of punctures may be accomplished by cutting out the damaged area, removing the paint and installing an overlapping or flush patch of identical material. A doubler may be added behind the patch if additional strength is required.

The bonding agent can be Trichloroethane or a suitable substitute.

WARNING: WHEN USING TRICHLOROETHANE, ENSURE THAT THE WORKING AREA IS WELL-VENTILATED AND THAT PROTECTIVE EQUIPMENT (GLOVES, EYE PROTECTION) IS WORN. AVOID BREATHING FUMES. KEEP AWAY FROM FLAMES.

Cracks or voids may be repaired by applying a filler composed of solvent and material shavings. Upon completion of the repair, sand the area smooth and repaint.

Extensively damaged parts should be replaced.

8. Engine Mount Repair

Engine mount repairs should be accomplished in strict accordance with Part 43 of the Federal Aviation Regulations. Repair details for the repairs of damaged honeycomb in the areas adjacent to the two upper and lower engine mount extrusions are given in Approved Repairs, Paragraphs 6 and 7.

9. Control Surface Repair

After repair or repainting of any control surface, it is necessary to check the balance and adjust the mass balance weight as required to bring it within tolerance. (Refer to Chapter 27 for control system balancing and rigging.)

10. Bondline Damage and Repair

A. Types of Bondline Damage

(1) Physical Damage

The most common type of bondline damage is physical damage along the trailing edges of the flaps, ailerons, elevators and rudder. This is usually caused by persons stepping on the inboard trailing edges of the flaps and general "hangar rash" on the other control surfaces. This type of damage is usually readily visible in the form of joint separation. A typical bondline repair procedure is discussed in Approved Repairs, Paragraph 14.

(2) Corrosion Damage

A less common type of bondline damage is damage caused by metal corrosion. This type of damage is usually restricted to edges of unfilleted bondlines, such as the trailing edges of wings, rudders, elevators, and trim tabs, particularly if these edges are not well protected by paint. This type of damage is more likely in tropical and subtropical climates, particularly where an aircraft is located close to the coast.

ELECTRICAL POWER SUPPLY SYSTEM – DESCRIPTION/OPERATION

1. General

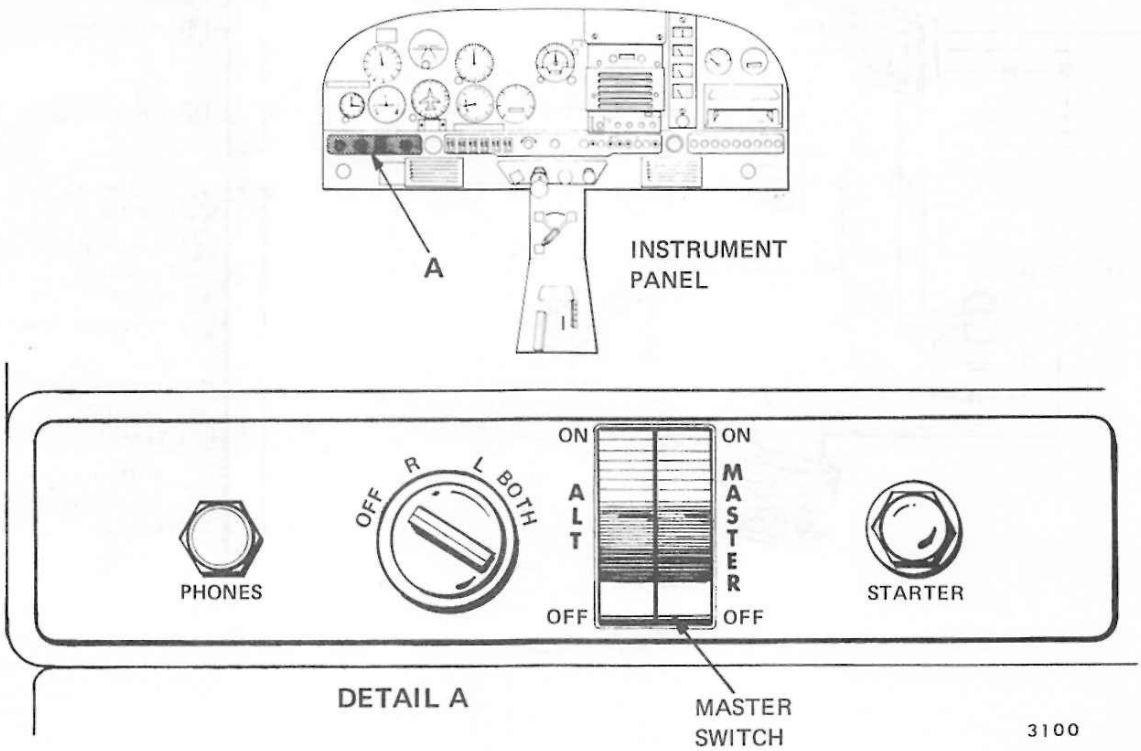
Power for the electrical system is provided by an alternator and/or battery. The alternator serves as the main component to power the electrical system and charge the battery during normal conditions. The battery is used for starting the engine and powering the electrical system when alternator power is not available (engine not running). The battery also powers the electrical system in case of alternator system failure.

A split rocker type master switch is used which performs two functions. The right side energizes the battery contactor and the left side supplies power to the voltage regulator. The battery contactor when energized, connects power to the electrical system and the starting system. The voltage regulator, receiving power from the battery via the alternator switch, energizes the alternator field. With the alternator field energized, the operating alternator will produce an output to the electrical system. The voltage regulator varies the output voltage of the alternator to meet the requirements of the electrical system loads. An ammeter is installed into the system to provide an indication of current flow from or to the battery.

An external power receptacle is offered as optional equipment to supplement the battery system for starting and ground operation.

Diodes are used in the aircraft electrical system across some contactors and switches (including the master switch) to dissipate back EMF and provide extended contactor life. These contactors and switches will function with defective diodes but contactor life will be shortened.

The negative side of the battery is connected to the aircraft structure (negative ground). This provides a ground for system through use of aircraft structure. The positive side of the battery is connected to the coil of the battery contactor. This contactor remains in a relaxed state until the master switch is placed to the ON position.

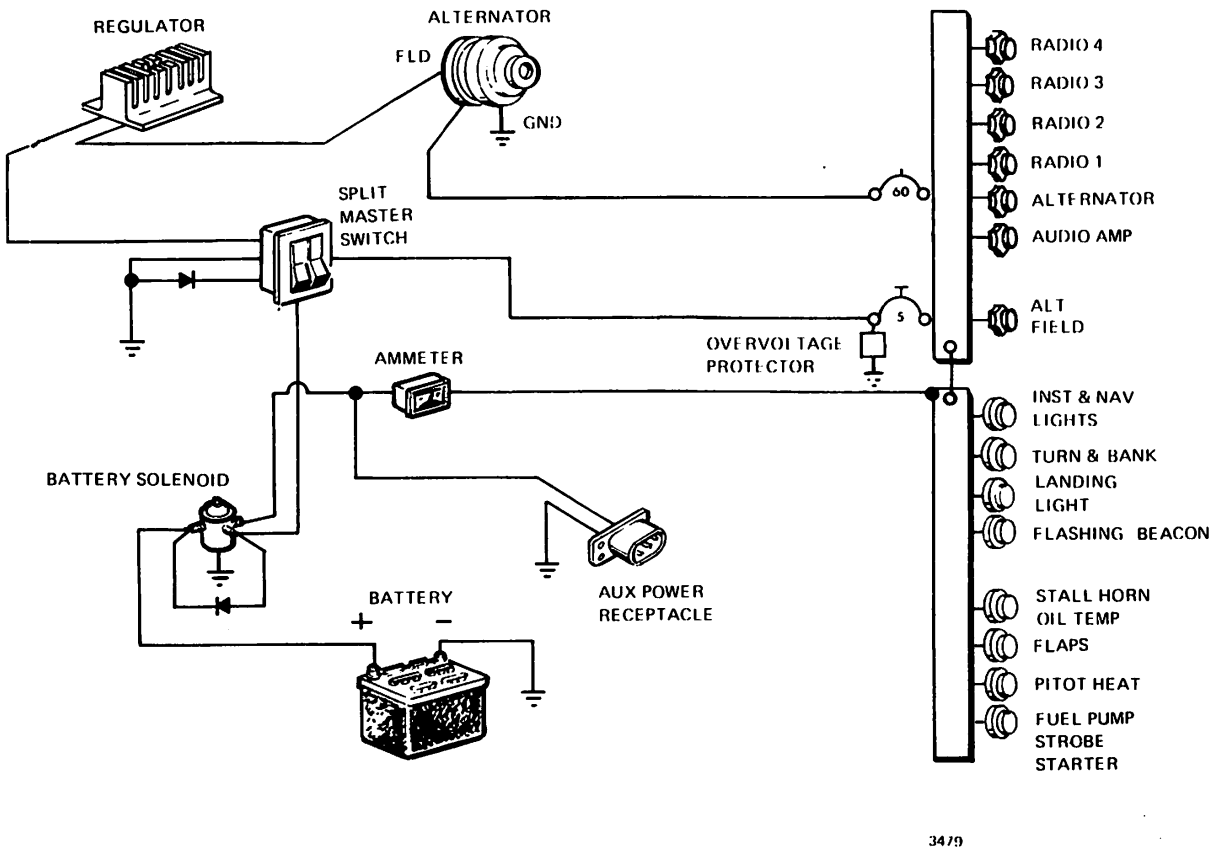


Master Switch
Figure 1

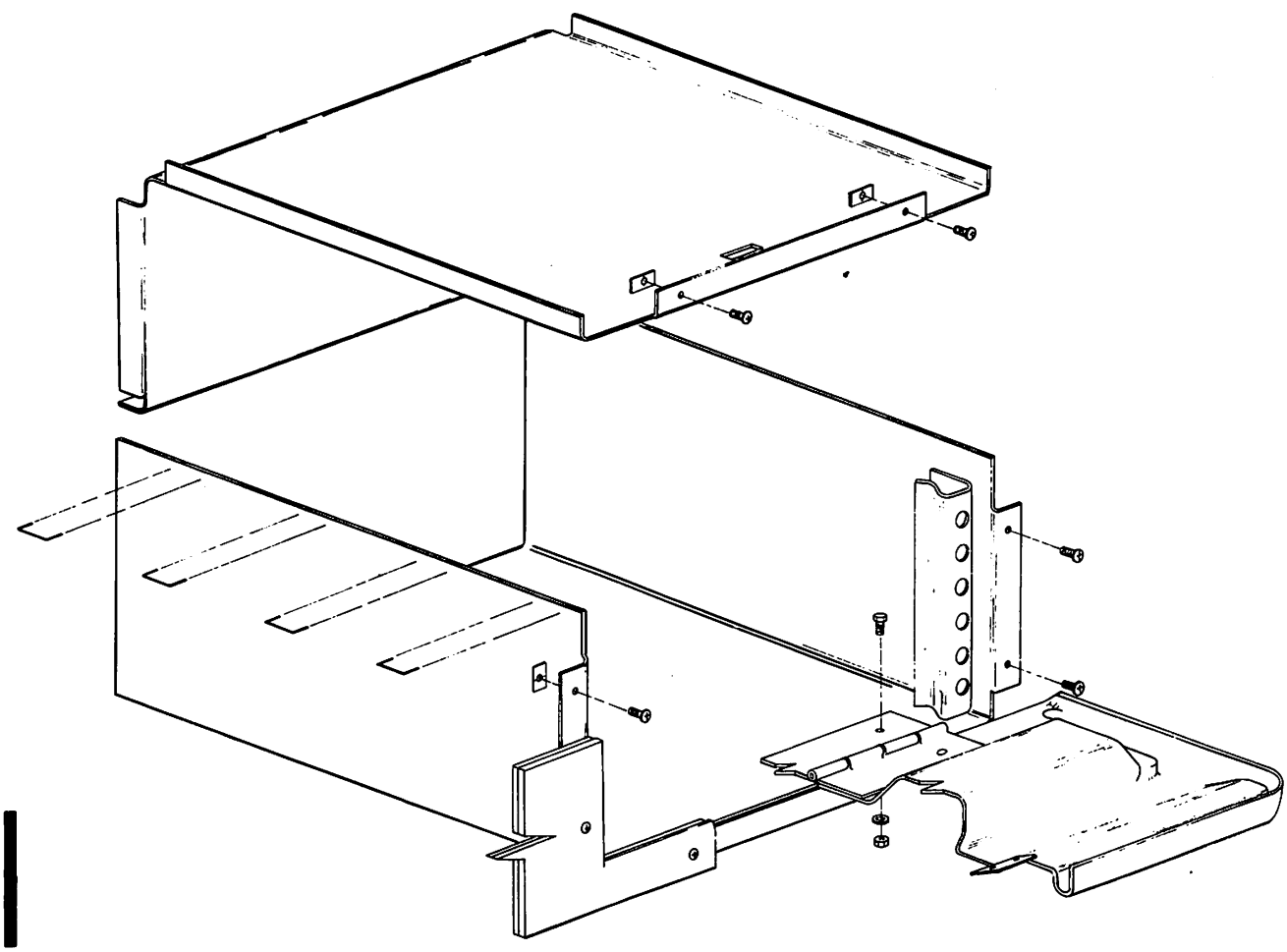
Placing the master side of the split master switch in the ON position provides a ground for the battery contactor energizing this contactor. With the battery contactor energized, a circuit exists from the battery through an ammeter to the bus bar.

The bus bar powers the electrical equipment and accessories furnished on the aircraft (excluding hourmeter, dome light, and clock). The energized contactor will also allow power from the battery to the starter solenoid.

Placing the ALT. side of the split master switch to the ON position will provide a circuit from the bus bar through a 5 amp ALT. FIELD circuit breaker to the voltage regulator. The voltage regulator will supply and regulate voltage to the alternator field. With the alternator operating (engine running) and the field energized, the alternator will develop electrical power. The alternator supplies power to the bus bar through a 60 amp ALT. circuit breaker. An overvoltage diode in the alternator field protects the aircraft electrical system against damage due to overvoltage. With alternator power available, the battery will be charged from the bus bar. The ammeter, which is in series with the battery and bus bar will indicate the current flow to or from the battery. When the battery reaches a state of full charge, the ammeter needle will be slightly right of center.



DC Power System
Figure 2



Glove Box
Figure 2

Any bearing with a cracked or separated flange must be replaced.

NOTE: Replacement of bearings is the same as for aileron bearings. Refer to Aileron Maintenance Section.

B. Maximum control surface torque tube wear is .030 in. wall thickness reduction. Wear greater than this requires replacement of the control surface. Service Kit No. SK-121, Control Surface Torque Tube Repair Kit, is available from the Grumman American Supply Operations Department for torque tubes that have not exceeded the maximum wear limits.

11. Rudder Control System Rigging (See Figure 206.)

A. Remove tailcone per Chapter 53.

B. Remove center console panels (Chapter 25) as required to gain access to rudder turnbuckles.

C. Using the rudder rigging fixture, position the rudder trailing edge 4° right of center. Figure 206 shows one method of securing rudder.

D. Loosen rudder cable turnbuckles.

E. Place a 7.50-inch wooden block between the left pilot rudder pedal and the firewall, as shown in Figure 206. Place a 7.75-inch wooden block behind the right rudder pedal and the firewall.

F. Slowly tighten each rudder turnbuckle until the corresponding wooden block falls from behind the rudder pedal.

G. Remove clamps and blocks from bellcrank and allow rudder pedal return springs to move rudder to neutral position. Rudder should be at 0° to 5° right rudder (4° optimum).

H. Safety rudder turnbuckles.

I. With rudder rigging fixture, check rudder travel limit for 25° ± 2° left and right.

J. Depress left rudder pedal to its stop, and adjust left control stop (Figure 207) as required until rigging fixture indicates 25° ± 2° rudder deflection to the left.

K. Hold control stop and tighten lock nut.

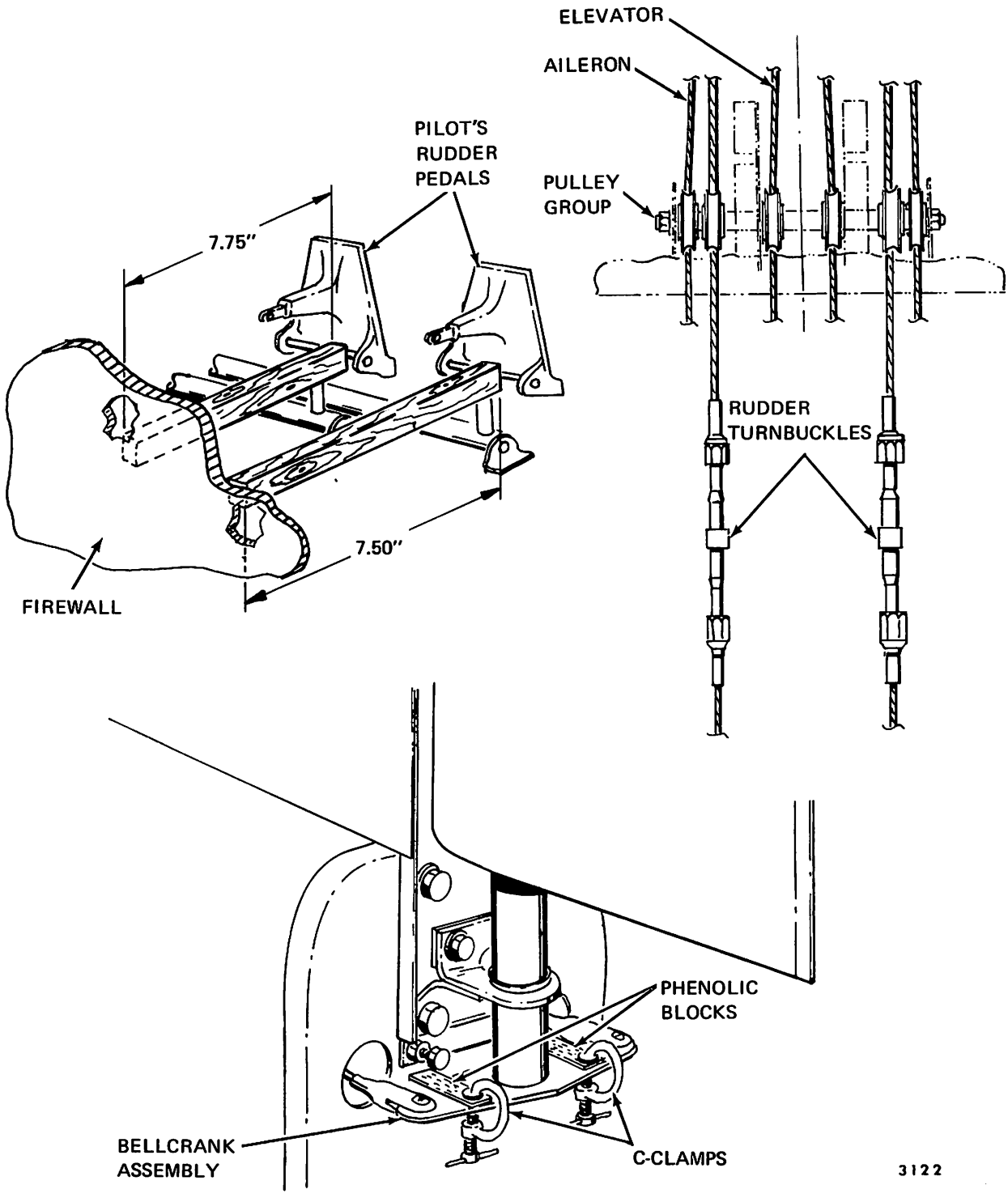
L. Repeat Steps J and K for the right-hand side.

M. Install tailcone per Chapter 53.

12. Cleaning and Painting

CAUTION: PAINTING ANY CONTROL SURFACE MAY CAUSE AN UNDERBALANCED CONDITION. CHECK RUDDER BALANCE AFTER PAINTING.

Refer to Chapter 20 for cleaning and painting instructions.

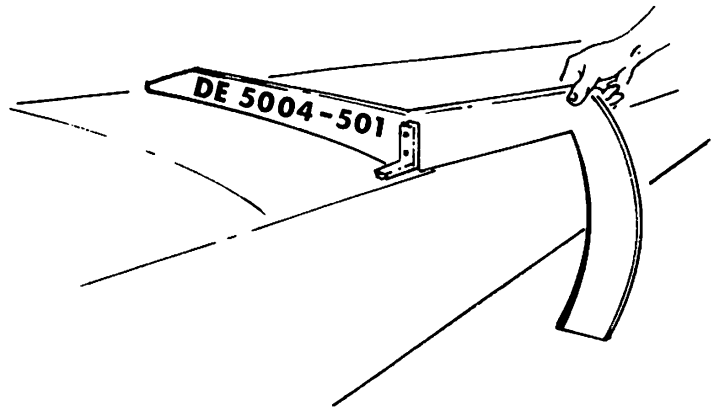


Rudder Control System Rigging
Figure 206

TROUBLE SHOOTING

1. Trouble Shooting Stall Warning System (See Figures 5 and 212.)

TROUBLE	PROBABLE CAUSE	REMEDY
Horn fails to sound when sensor switch is closed.	Set MASTER switch to ON. Check fuse.	Replace if defective.
	Make sure black lead of time delay controller is grounded.	Establish proper ground.
	Make sure yellow lead of time delay controller is grounded when stall sensor switch is closed.	Check wiring and switch. Repair or replace if defective.
	Make sure 12V is present on red lead of time delay controller within 1 second after stall sensor switch is closed.	If 12V is present, replace stall warning horn. If 12V is not present, replace time delay controller.
Horn remains on when sensor switch is open	Disconnect the stall switch sensor.	If horn stops, replace sensor. If not, reconnect sensor.
	Make sure yellow lead of time delay controller is not grounded.	If not, repair wiring between controller and switch. If yes, replace time delay controller.



Trim Tab Rigging Fixture
Figure 211

(6) Rotate flexible cable (19) by hand until the trim tab down throw is 15° ± 2° down.

(7) Position trim wheel (32) and follower pin on trim indicator (40) so that the follower pin is engaged in the innermost spiral groove of the trim wheel.

(8) With trim wheel (32) still disengaged from drive pinion gear (23), rotate trim wheel until follower pin on trim indicator (40) is resting against the stop at the innermost end of the spiral groove. Push trim wheel (32) in to engage pinion gears (23 and 34). Tighten nut (28) sufficiently to compress spring washer (29) as required to seat follower pin firmly at bottom of spiral groove and allow trim wheel to turn freely. Install cotter pin (27).

(9) Rotate trim wheel (32) until the trim tab is in the neutral (0°) position.

(10) Bend indicator wire on trim indicator bracket (40) to agree with "T.O." on trim indicator.

(11) Remove rigging fixture (Figure 211) and control lock or rigging fixture (Figure 205).

(12) Check trim system for freedom of movement.

(13) Install center console access panels (Chapter 25).

19. Stall Sensor Switch Removal (See Figure 212.)

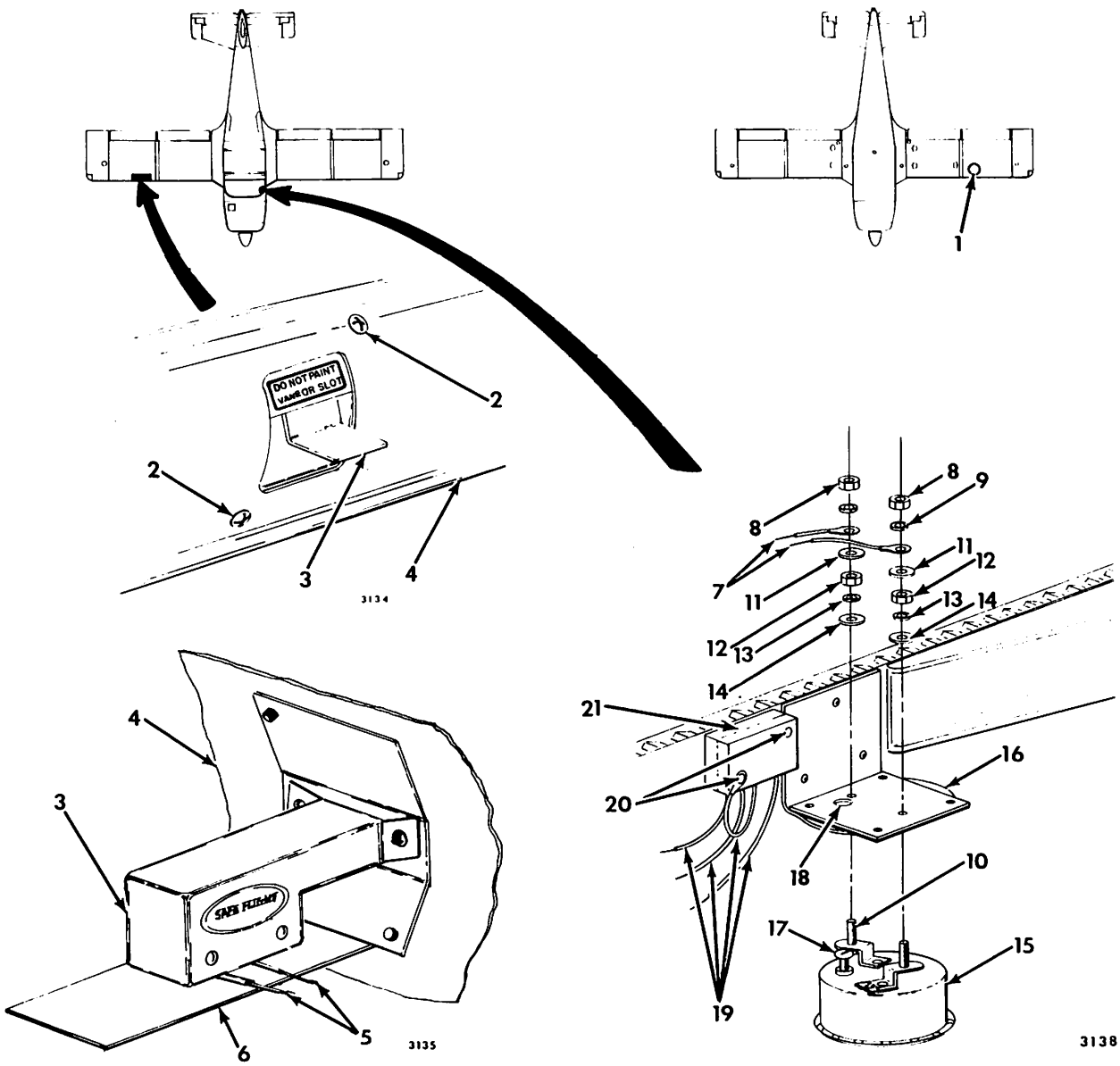
NOTE: The use of a template to locate switch is recommended to minimize flight test time after switch removal and installation.

A. Cut a template from cardboard or other suitable material to fit wing leading edge. Fit the template over the wing adjacent to the stall warning switch vane. Draw a line on the cardboard to indicate the normal position and angle of the stall warning switch vane. Remove access cover (1) from wing.

B. Remove screws (2) securing sensor switch (3) to wing (4).

C. Tag and disconnect wires (5), and remove sensor switch (3) from inside of wing (4).

D. Ensure that insulating strip (6) is not damaged.



1. Access Cover
2. Screw
3. Sensor Switch
4. Wing
5. Wires
6. Insulating Strip
7. Wires
8. Nut
9. Washer
10. Terminals
11. Washer
12. Nut
13. Washer
14. Washer
15. Stall Warning Horn
16. Mounting Bracket
17. Adjustment Screw
18. Access Hole
19. Wires
20. Screws
21. Controller

Stall Warning System Removal/Installation
Figure 212

20. Stall Sensor Switch Installation (See Figure 212.)

A. Check that insulation strip (6) is in position beneath switch terminal screws.

B. Connect wires (5) to sensor switch (3).

C. Position sensor switch (3) inside wing (4) and install screws (2). Fit template over wing leading edge and use as a guide to position stall warning switch vane. Tighten screws (2).

D. Install access cover (1).

E. Flight test and adjust stall warning system (Paragraph 25).

21. Stall Warning Horn Removal (See Figure 212.)

A. Tag wires (7).

B. Remove nuts (8), washers (9), and wires (7) from stall warning horn terminals (10).

C. Remove washers (11), nuts (12), and washers (13 and 14) from terminals (10).

D. Remove stall warning horn (15) from mounting bracket (16).

22. Stall Warning Horn Installation (See Figure 212.)

A. Position stall warning horn (15) so that its terminals (10) align with holes in mounting bracket (16) and so that adjustment screw (17) aligns with access hole (18) in mounting bracket.

B. Place washers (14), washers (13), and nuts (12) on terminals (10).

C. Tighten nuts (12) per Chapter 91.

D. Place washers (11), wires (7), washers (9) and nuts (8) on terminals (10). Torque to standard value. (See Chapter 91.)

23. Time Delay Controller Removal (See Figure 212.)

A. Tag wires (19).

B. Remove screws (20).

C. Disconnect wires (19) and remove controller (21) from aircraft.

24. Time Delay Controller Installation (See Figure 212.)

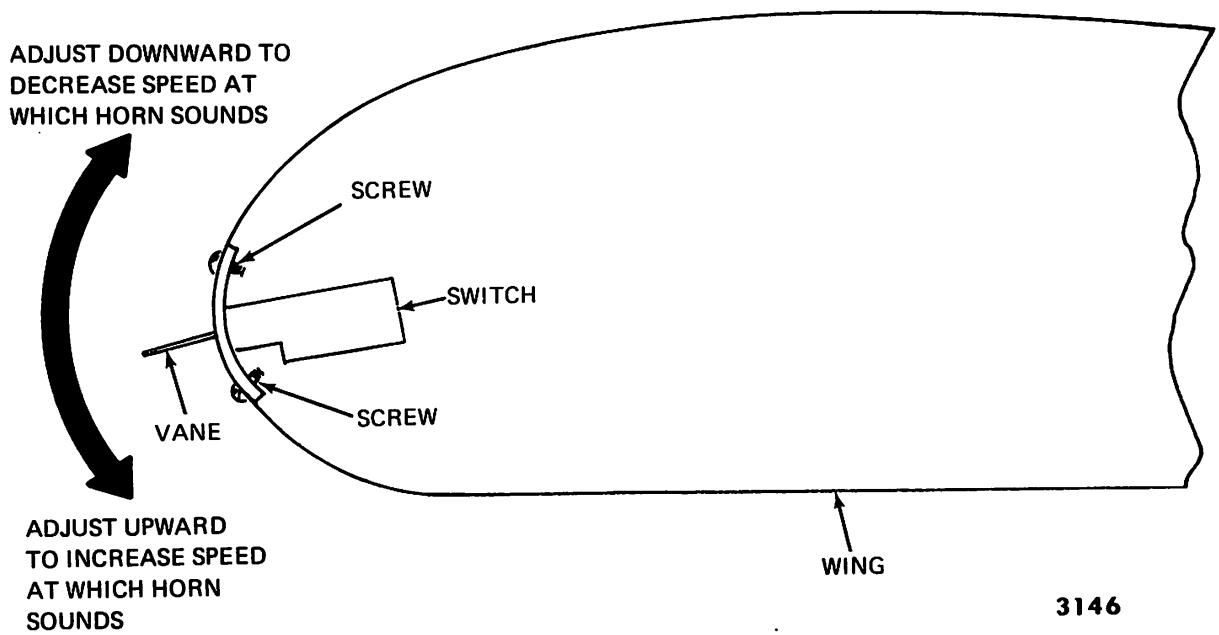
A. Connect wires (19).

B. Position controller (21) so that its holes align with mounting holes.

C. Secure with screws (20).

25. Stall Warning System Adjustment (See Figure 213.)

A. Flight test aircraft, noting speed at which stall warning system sounds, and speed at which stall occurs. Stall warning horn shall sound at 4 to 9 knots (5 to 10 mph) prior to stall.



Stall Sensor Switch Adjustment
Figure 213

B. If stall warning occurs at incorrect speed, adjust switch as follows:

(1) Remove stall sensor switch access panel (1, Figure 212).

(2) Loosen screws (2) securing sensor switch.

(3) Position switch downward to decrease speed at which horn sounds, or upward to increase speed.

(4) Tighten screws (2) and replace access panel (1).

(5) Repeat Steps A and B as necessary to obtain proper stall warning.

26. Stall Warning System Operational Check

NOTE: The following check gives only a system go, no-go check. It does not test for operation at proper airspeed.

A. Set master switch to ON.

B. Lift and hold vane on stall sensor switch. Stall warning horn shall sound within two seconds.

C. Release vane and set master switch to OFF.

NOSE LANDING GEAR – MAINTENANCE PRACTICES

1. Removal/Installation of Nose Landing Gear

A. Remove Nose Landing Gear Strut Assembly (See Figure 201.)

(1) Remove weight from the nose gear by either tying down the tail or placing a suitable support under forward fuselage. Remove shock absorbers as described in Part A of paragraph 3.

(2) Remove bolt (1, Figure 201) and spacer (2) from fork assembly (15).

(3) Remove cotter pin (3), nuts (4), washers (5), and withdraw axle rod (6) from nose wheel.

(4) Remove plugs (7), spacers (8), and axle (9).

NOTE: Some aircraft have nose wheel fairing installed as an optional item.

(5) Remove cotter pin (10), nut (11), washer (12), springs (13), washer (14), fork assembly (15) with fairing attached, thrust bearing (16), bushings (17), and O-ring (18). Remove two attaching bolts and remove fairing from fork assembly (15).

(6) Remove nut (19), washer (20), bolt (21), and slide strut (22) from the torque tube and yoke assembly.

B. Remove Nose Landing Gear Torque Tube and Yoke Assembly

NOTE: The torque tube and yoke assembly is located in the forward end of the fuselage. To gain access to the torque tube and yoke assembly some items of equipment must be removed from the cockpit area.

(1) Remove the seats (refer to Chapter 25).

(2) Remove left and right-hand forward console panels. The panels may be easily removed by grasping the forward edge at the firewall and bending the panels out 90 degrees and parallel with the firewall. Slide the panels forward far enough so that they slip out from behind the aft portion of the console.

(3) Remove the fresh air box assembly from the left side.

(4) Remove the upholstery side panels and fiberglass insulating material from the left and right-hand forward side panels.

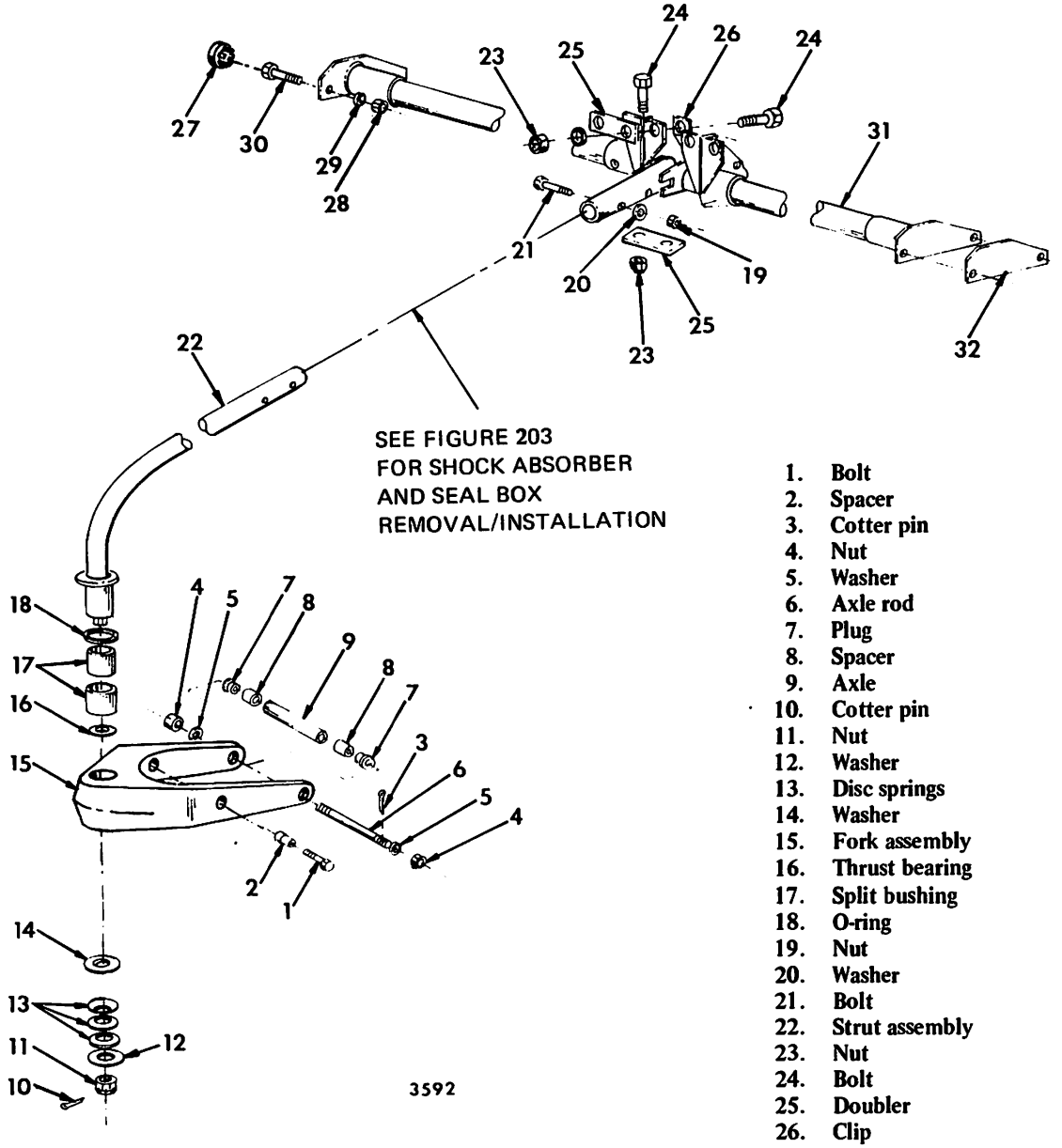
(5) Remove the lower cowling (refer to Chapter 71).

(6) Disconnect the rudder return springs by unbolting the eye bolts from the forward face of the firewall. Note that additional washers are used under the left-hand eye bolt for proper rudder pedal centering and rudder trim.

(7) Remove the nuts that secure the right forward rudder bar attach bracket to the floor. Lift the rudder bar up and aft to provide clearance for removing left brake cylinder attach bracket on co-pilot's side.

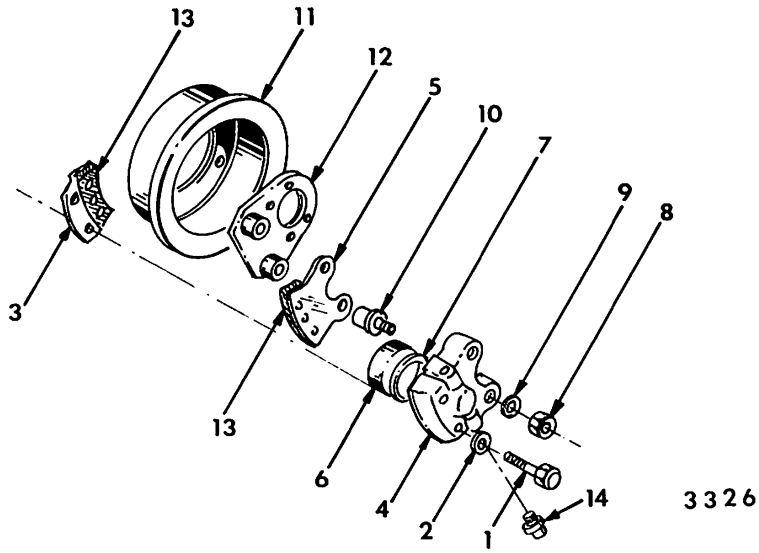
(8) Remove the nuts that attach the brake cylinder brackets to the floor. Lift brake cylinders free from the floor and allow pedals to rotate aft.

(9) Remove clevis pins from left and right brake cylinder attachments to rudder pedals on pilot's side.



1. Bolt
2. Spacer
3. Cotter pin
4. Nut
5. Washer
6. Axle rod
7. Plug
8. Spacer
9. Axle
10. Cotter pin
11. Nut
12. Washer
13. Disc springs
14. Washer
15. Fork assembly
16. Thrust bearing
17. Split bushing
18. O-ring
19. Nut
20. Washer
21. Bolt
22. Strut assembly
23. Nut
24. Bolt
25. Doubler
26. Clip
27. Plug button
28. Nut
29. Washer
30. Bolt
31. Torque tube and yoke assembly
32. Shim

Nose Landing Gear Assembly
Figure 201



1. Bolt
2. Washer
3. Backplate
4. Cylinder
5. Pressure Plate
6. Piston
7. O-ring
8. Nut
9. Washer
10. Anchor bolt
11. Brake Disc
12. Torque Plate
13. Lining
14. Bleed Fitting

Wheel Brake Assembly
Figure 203

B. Install Wheel Brake Assembly

NOTE: Keep brake lining (13) dry and completely free from hydraulic fluid. Install new O-ring (7) at reassembly.

(1) Lubricate piston (6), cylinder bore, and O-ring (7) with clean hydraulic fluid.

(2) If removed assemble anchor bolts (10) into cylinder (4) by driving bolts in with a soft mallet. Install washers (9) and nut (8).

(3) Assemble O-ring (7) on piston (6) and install in cylinder (4). Hold piston in cylinder until pressure plate (5) is installed.

(4) Slide pressure plate (5) onto anchor bolts (10).

(5) Insert anchor bolts (10) into torque plate assembly (12), and install washers (2), bolts (1), and backplate (3). Torque bolts (1) to 75-90 in. lb.

5. Bleeding Hydraulic Brake System

NOTE: When servicing the hydraulic brake system, use an approved hydraulic fluid conforming to MIL-H-5606. (see Chapter 12.)

(1) Remove vent plugs from master cylinders on pilot's side (Figure 1, Section 32-4-2) and replace with overflow lines. Immerse the free ends of the overflow lines in a can containing enough hydraulic fluid to cover the ends of the lines.

(2) Connect a clean hydraulic source to the brake assembly bleeder valve (14, Figure 203).

(3) Fill the system until the overflow line in the master cylinder being filled shows no more air bubbles. Remove the overflow lines.

(4) Remove the source of fluid and pressure and allow the fluid to drain back through the system until the fluid level is approximately 1/4-inch from the top of the reservoir in the master cylinder.

(5) Secure the bleeder valve and replace vent plugs.

NOTE: Do not fill the reservoir higher than 1/4-inch from top as this will result in spillage. Spilled fluid can be removed with imperial cleaner.

6. Cleaning Brake System Parts

WARNING: CLEANING SOLVENT (PS-661 OR EQUIVALENT) IS TOXIC AND FLAMMABLE. USE IN A WELL VENTILATED AREA. AVOID BREATHING FUMES AND KEEP AWAY FROM FLAMES.

Clean all parts with cleaning solvent, Federal Specification No. PS-661 or equivalent (See Chapter 12). Thorough cleaning is important to prevent brake malfunction.

7. Inspection of Brake System

A. Inspect Brake Cylinders

NOTE: Any part, damaged or worn beyond minor repair, must be replaced.

(1) After disassembly of brake cylinder, inspect all parts for wear, cracks, damage, or distortion.

(2) Inspect piston for deep scratches.

(3) Inspect bore of cylinder housing for deep scratches.

(4) Check valve spring (11, Figure 201) for a free length of 3/8 to 7/16-in.

(5) Check return spring (15, Figure 201) for a free length of 2-15/16 to 3-1/16-in.

(6) Check valve spring (14, Figure 202) for a free length of 3/8 to 7/16-in.

(7) Check return spring (20, Figure 202) for a free length of 2-3/8 to 2-1/2-in.

(8) Inspect brake linings for damage, deterioration, and excessive wear. New brake linings should be installed when linings are worn to less than 1/10-in.

(9) Inspect anchor bolts on wheel brake assembly for nicks or damage and sand nicks smooth with fine sandpaper.

(10) Inspect wheel brake disc for a minimum thickness of 0.205-in. If brake disc is below minimum thickness, install a new brake disc.

AIR TEMPERATURE GAUGE – MAINTENANCE PRACTICES

1. Removal/Installation of Air Temperature Gauge (See Figure 201.)

   A. Remove Air Temperature Gauge

      (1) Hold the gauge on the inside of the windshield.

      (2) From outside the aircraft, unscrew and remove hexagonal (sun screen) gauge cover.

      (3) Remove washers and tube adapter from outside of windshield.

      (4) Remove gauge, tube adapter, and washers from inside of windshield.

   B. Install Air Temperature Gauge

      (1) Assemble tube adapter and washers on gauge stem (Figure 201).

      (2) Apply one or two drops of Loctite sealant, grade EV to the gauge stem threads.

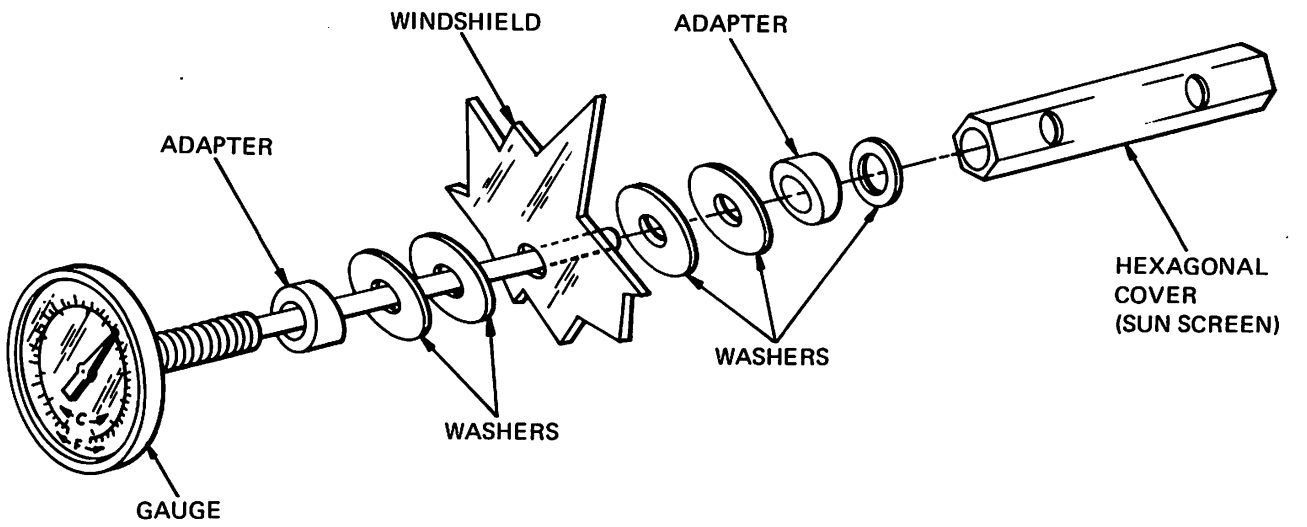
      (3) Insert gauge stem through mounting hole from inside the windshield.

      (4) Assemble tube adapter and washers on gauge stem on outside of windshield (see Figure 201).

      (5) Apply a small bead of Presstite soft putty around gauge stem between rubber washer and metal washer on outside of windshield.

      CAUTION: DO NOT OVERTIGHTEN OR STEM THREADS WILL SEPARATE FROM GAUGE CASE.

      (6) Install hexagonal cover (sun screen) on gauge stem and tighten snug tight, using hands only.



Air Temperature Gauge Installation
Figure 201

FUSELAGE – MAINTENANCE PRACTICES

1. Removal/Installation of Fuselage Detachable Components.

A. Remove Inboard Spar (See Figure 201.)

(1) Remove wings and wing roots. (Refer to Chapter 57.)

(2) Remove main landing gear. (Refer to Chapter 32.)

(3) Remove seats and upholstery as necessary to gain access to support brackets. (Refer to Chapter 25.)

(4) Remove trim console attach screw from inboard spar.

(5) Remove sealant from around spar at fuselage structure.

(6) Remove bolts that attach support brackets to spar on outside of fuselage structure.

(7) Remove bolts that attach support brackets to spar and that attach support brackets to fuselage, on inside of fuselage structure and remove support brackets.

(8) Slide inboard spar out of main fuselage structure.

B. Install Inboard Spar

(1) Slide inboard spar through main fuselage structure and line up bolt holes with bolt holes in lower support brackets.

(2) Install bolts, washers, and nuts that attach lower support brackets to inboard spar but do not tighten nuts.

(3) Position upper support brackets in place and secure to fuselage structure with bolts, screws, washers and nuts. Torque nuts to 60-70 in. lbs.

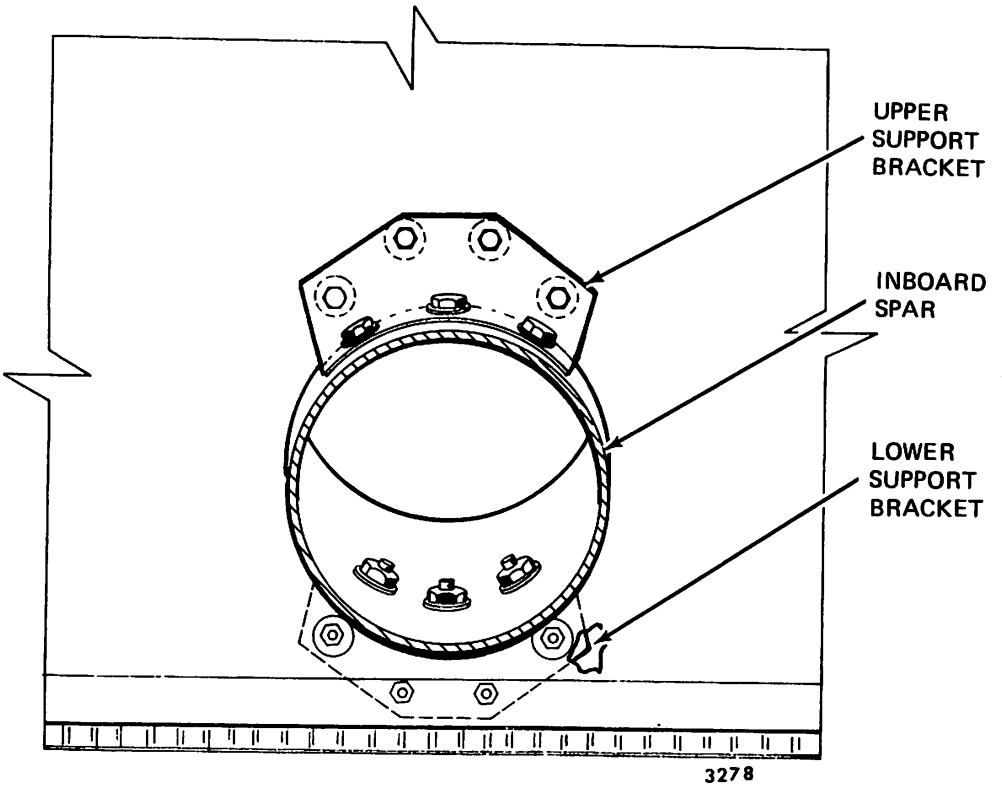
(4) Align holes in spar with holes in support bracket and install shims as required, bolts, washers and nuts. Torque all spar attaching bolts to 340-360 in. lbs.

(5) Apply presstite soft putty sealant around spar on outside of fuselage structure.

(6) Install seats and upholstery removed at spar removal. (Refer to Chapter 25.)

(7) Install main landing gear. (Refer to Chapter 32.)

(8) Install wing roots and wings. (Refer to Chapter 57.)



Inboard Spar Installation – Inside View
Figure 201

C. Remove Horizontal Stabilizer Fillet (See Figure 202.)

(1) Punch out mandrel in center of rivets with a small drift punch, then drill out rivet with a No. 30 drill.

(2) Remove fillet.

D. Install Horizontal Stabilizer Fillet

(1) Position fillet in place on fuselage.

(2) Install rivets.

E. Remove Tailcone (See Figure 203.)

(1) Remove screws that secure tailcone to aft fuselage.

(2) Slide tailcone back, disconnect tail light wires, and remove tailcone.

POWER PLANT – MAINTENANCE PRACTICES

1. General

Prior to performing maintenance on the power plant, ensure that all safety precautions (such as switches in OFF position, fire extinguishers available, and NO SMOKING rules) are enforced. The complete power plant should be inspected for cleanliness and general condition. More detailed and up-to-date maintenance information can be obtained from the Avco Lycoming Operator's Manual, Service Letters, Bulletins, and Service Instructions.

2. Cleaning Power Plant

WARNING: USE SOLVENTS IN A WELL VENTILATED AREA. AVOID BREATHING FUMES. KEEP AWAY FROM FLAMES.

Cleaning of the power plant can be accomplished with a suitable solvent and drying thoroughly. (Stoddard Solvent or equivalent).

NOTE: Use extreme care to prevent solvent entering the magnetos, alternators, starters, vacuum pump, and openings in the engine. Keep the amount of solvent contacting wiring to a minimum.

3. Removal/Installation of Power Plant

A. Remove Power Plant

CAUTION: PRIOR TO REMOVAL OF THE ENGINE, PLACE A SUPPORT UNDER THE TAIL OF THE AIRCRAFT TO PREVENT DAMAGE TO THE EMPENNAGE. TAG OR LABEL ALL WIRING AND CABLES PRIOR TO REMOVAL OF THE ENGINE FOR REFERENCE ON INSTALLATION.

(1) Remove the propeller and spinner (refer to Chapter 61).

(2) Remove the cowling (refer to 71-1-1).

(3) Disconnect the throttle, mixture, and carburetor heat controls.

(4) Disconnect the fuel and oil pressure lines.

(5) Disconnect the main fuel line at the inlet to the engine driven fuel pump.

(6) Disconnect the tachometer cable.

(7) Disconnect the vacuum pump hose at the pump.

(8) Disconnect the fuel primer lines.

(9) Disconnect bonding strap from engine.

(10) Disconnect all wiring from the engine.

(11) Disconnect the heater duct at the muffler.

(12) Disconnect oil cooler lines.

(13) Attach a suitable lifting device to engine and remove the engine mounting bolts.

B. Install Power Plant

NOTE: Inspect the engine rubber mounting bushings for wear and deterioration. Replace as required.

(1) Position the engine to the engine mount and install the mounting bolts. Torque mounting bolts to 200-250 in. lb.

(2) Connect the heater duct to the muffler.

(3) Connect all wiring to the engine.

(4) Connect the fuel primer lines.

(5) Connect the vacuum pump hose at the pump.

(6) Connect the tachometer cable.

(7) Connect the main fuel line at the inlet to the engine driven fuel pump.

(8) Connect the fuel and oil pressure lines.

(9) Connect the throttle, mixture, and carburetor heat controls.

(10) Connect the oil cooler lines.

(11) Connect bonding strap at top of engine.

NOTE: Refer to Chapter 73 for proper installation of the carburetor throttle control.

NOTE: Maintain a minimum 4-1/2 in. bend radius on all carburetor controls.

(12) Install the cowling (refer to 71-1-1).

(13) Install the propeller (refer to Chapter 61).

ENGINE MOUNT – MAINTENANCE PRACTICES

1. Removal/Installation of Engine Mount

   A. Remove Engine Mount (See Figure 201.)

      (1) Remove power plant (refer to subsection 71-0, Power Plant Removal).

      (2) Disconnect all wiring, ties, and clamps attached to engine mount.

      (3) Remove nuts, washers, and bolts securing mount to engine mount supports, and remove mount.

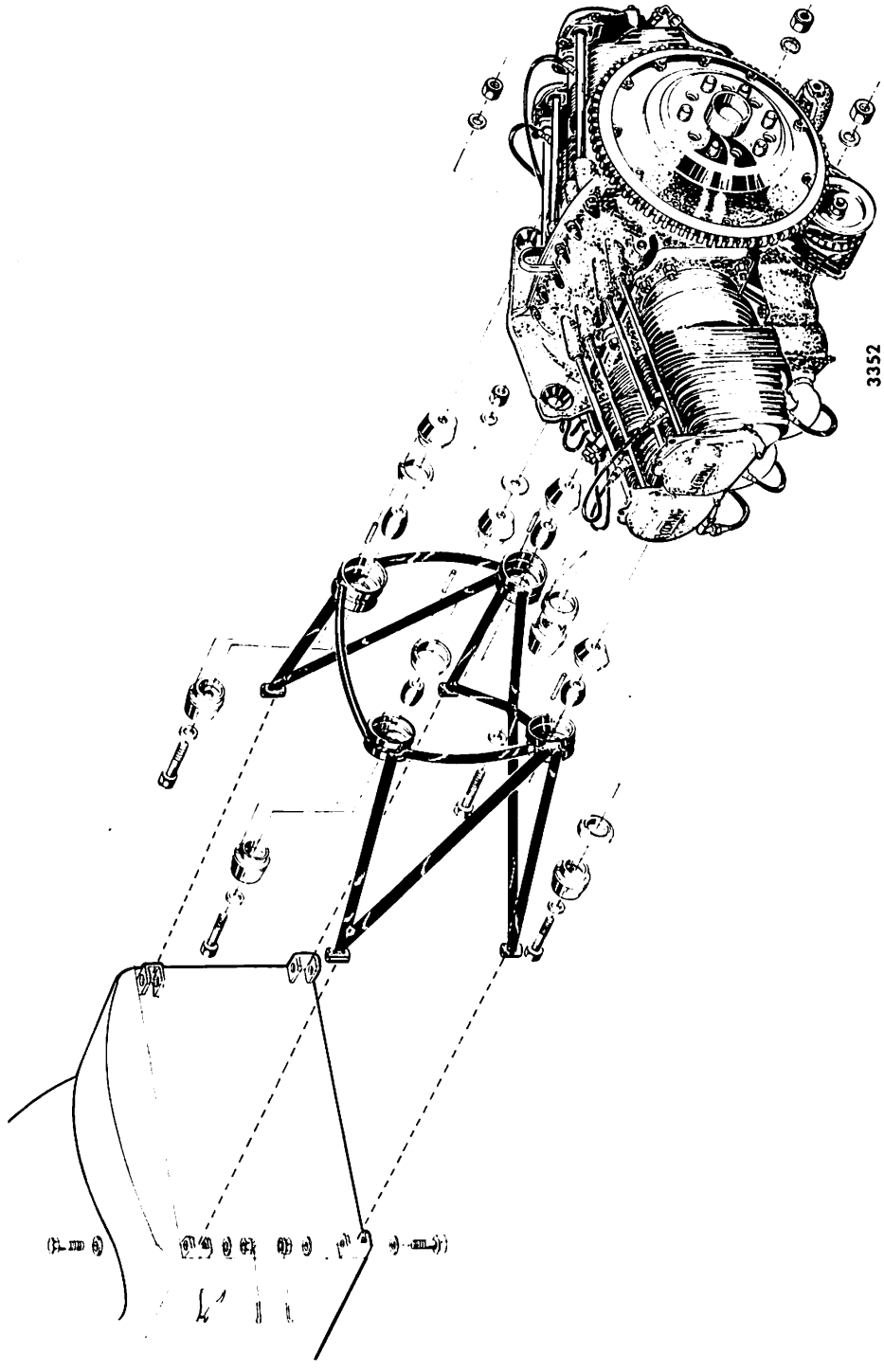
   B. Install Engine Mount (See Figure 201.)

      (1) If Lord mounts were disassembled or new ones are to be installed, position forward mounting so that hole in mounting aligns with locator pin in aft mounting.

      (2) Position engine mount to engine mount supports and install mounting bolts, washers, and nuts.

      (3) Connect clamps and ties to mount.

      (4) Install power plant as outlined in subsection 71-0.



Engine Mount Installation
Figure 201

AIR INDUCTION SYSTEM – MAINTENANCE PRACTICES

1. Removal/Installation of Air Induction System

A. Remove Induction System (See Figure 201.)

(1) Remove the lower cowl assembly (refer to Chapter 71).

(2) Loosen the clamp and disconnect the carburetor heat hose from the air box assembly.

(3) Disconnect the carburetor heat control from the air box assembly. (Refer to Chapter 30)

(4) Remove the bolts and lower the air box assembly from the carburetor.

B. Install Induction System (See Figure 201.)

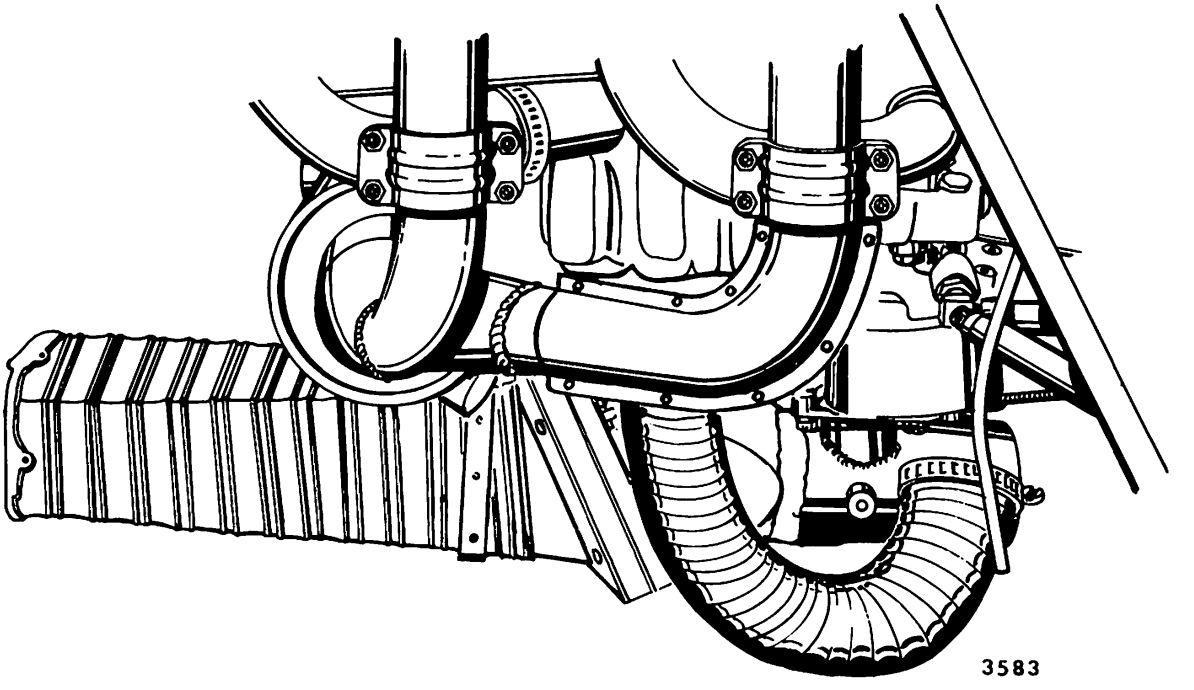
(1) Position the air box assembly to the carburetor and forward cowl and install the bolts.

(2) Connect the carburetor heat control to the air box assembly. (Refer to Chapter 30.)

(3) Install the carburetor heat inlet hose and clamp to the air box assembly.

(4) Install the lower cowl.

NOTE: Make sure the air duct is properly fitted over the scoop in the forward cowl. Failure to do this could result in an inadequate air supply to the carburetor.



Air Induction System
Figure 201

2. Filter Servicing

A. Remove, Service, and Install Filter

(1) Remove lower cowl. (Refer to Chapter 71.)

(2) Remove the screws attaching the adapter assembly, air filter and air box assembly together.

(3) Thoroughly wash the filter in petroleum solvent. Make certain all dirt is removed and filter is in serviceable condition. If filter has flocking worn from screen wire, replace.

(4) Dry the filter at room temperature. Filter must be completely dry before proceeding with next step. If the filter is not dry, the solvent will prevent oil from adhering to the filter, thereby reducing the filter efficiency.

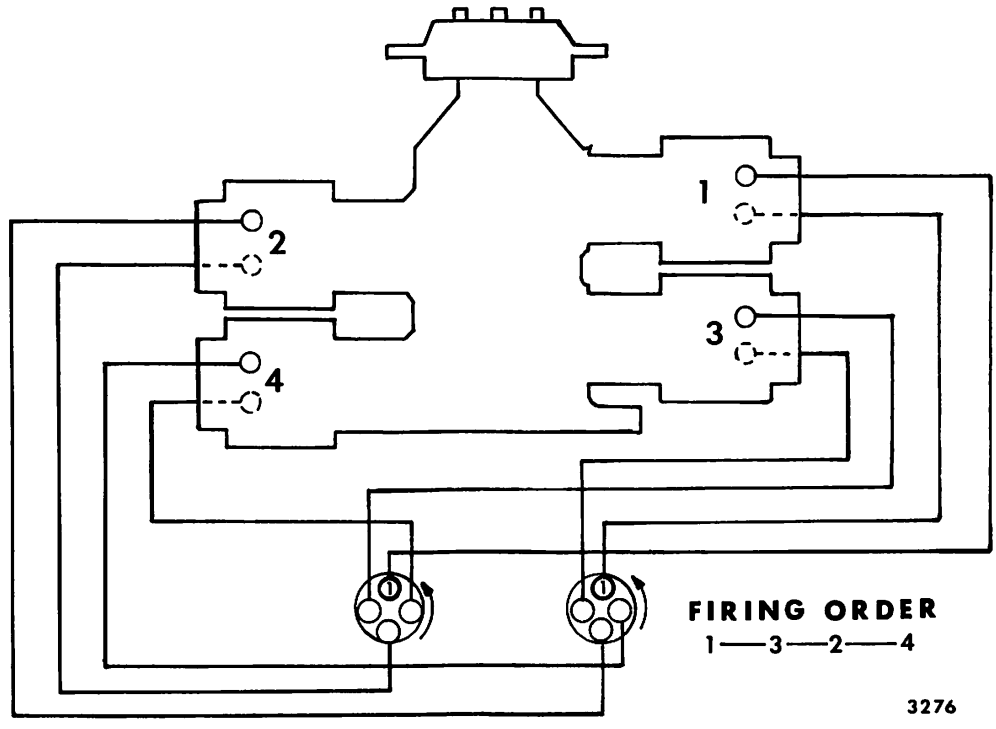
(5) Immerse the filter in the grade oil called for on the filter. If none is called out, use engine preservative oil MIL-L-21260 (Socony's "Avrex 901" or Esso's "Rust-Ban 626"). Refer to Table of Lubricants, Chapter 12.

(6) After removing the filter from the oil, allow it to drain thoroughly before installing in the aircraft.

(7) Inspect the gasket between the air filter and air box; if damaged or otherwise defective, replace with a new gasket.

(8) Position the air box assembly, filter, and adapter together and install the screws.

(9) Install lower cowl. (Refer to Chapter 71.)



Ignition System Schematic
Figure 202

(3) Remove the distributor cap assembly.

(4) Remove the mounting lugs and withdraw the magneto.

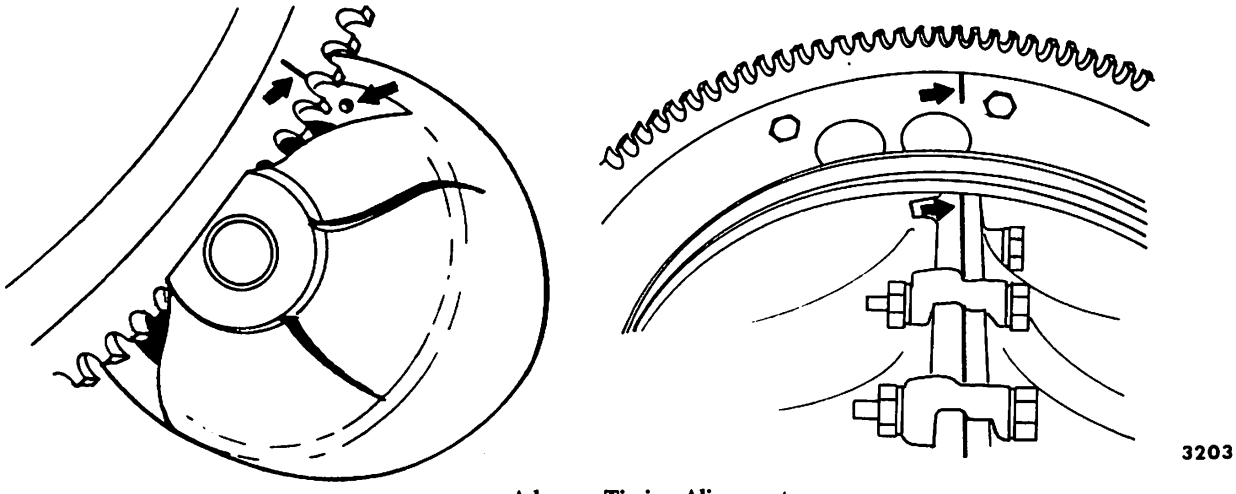
NOTE: Make a note of the approximate angle the magneto makes with the engine centerline as an aid in its subsequent installation.

F. Install Magneto

(1) Rotate the propeller in the normal direction of rotation until No. 1 cylinder enters its compression cycle.

NOTE: To determine if the No. 1 cylinder is in the compression cycle, remove the top plug from the No. 1 cylinder and place thumb over the port. As the piston approaches the end of the compression stroke, a positive pressure will try to force the thumb off the port.

(2) Continue turning the propeller in the normal direction of rotation until the 20° advanced timing mark on the forward face of the flywheel becomes aligned with the small hole drilled in the head of the starter casing. Alternate method is to align the 20° advance mark on the back of the flywheel with the crankcase parting line. At this point, the engine is ready to receive the magnetos. (See Figure 203.)



Advance Timing Alignment
Figure 203

(3) Remove the plug from the bottom of the magneto. (See Figure 204.)

NOTE: In order to rotate the magneto incorporating on impulse coupling, depress the pawl on the impulse coupling with the finger.

(4) Rotate the magneto shaft until a spark occurs from number one lead (hold screwdriver close to No. 1 lead while turning the shaft). As soon as the spark occurs, slowly reverse direction until the timing hole in the rotor is centered in the plug opening. (See Figure 204.)

NOTE: Failure to spark check the number one position leaves the possibility of the magneto being 180° out of phase. The timing hole appears in the plug opening twice for every complete firing cycle.

(5) Insert a pin (0.093" diameter) into the timing hole in order to keep the rotor in the timed position.

(6) Position the magneto into the crankcase at the approximate angle noted on removal. Be sure gasket is installed behind the magneto mounting flange.

(7) Install the attach clip over the magneto mounting flange and tighten the nut finger-tight.

NOTE: Install the magneto with the impulse coupling on the left side.

(8) Install the second magneto in the same manner as described in steps (3) through (7) above.

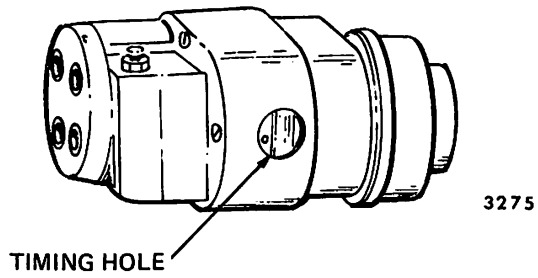
CAUTION: DO NOT ROTATE THE PROPELLER WITH THE PIN STILL INSTALLED IN THE MAGNETO TIMING HOLE.

(9) Final timing should be accomplished with a timing light. Using a battery powered timing light, attach the positive leads to the magneto ground terminal, and the negative leads to any unpainted portion of the engine.

(10) Remove the pins from the magnetos.

(11) Rotate the magneto in its mounting flange until the light comes on. Slowly turn the magneto in the opposite direction until the light goes off. Bring the magneto back slowly until the light just comes on.

NOTE: Some timing lights operate in the reverse manner as described above. The lights come on when the breaker points open. Check timing light instructions.



Magneto Timing Hole
Figure 204

(12) Repeat this process for the other magneto.

(13) Upon timing both magnetos, check to ascertain that both magnetos will fire simultaneously.

NOTE: To check the simultaneous firing of both magnetos, back off on the propeller a few degrees (timing light should go out). Bring the propeller back slowly in the direction of normal rotation until the 20° advanced timing mark aligns with the hole in the starter casing. At this point, both lights should go on simultaneously. When timing the magneto to the engine, a maximum tolerance of ± 2° is allowable.

(14) Tighten the magneto mounting nut and torque to 150 inch-pounds and install magneto ground wire and shielding terminal.

(15) When the magneto shows an excessive rpm loss or has reached a total of 900 hours, whichever comes first, the magneto should be returned to the magneto manufacturer for exchange. No attempt should be made to repair the magneto in the field since disassembly of the magneto will void its warranty.

NOTE: If the driveshaft nut has been removed from the magneto incorporating the impulse coupling, care should be exercised when reassembling, not to over tighten. The recommended torque is 156 inch-pounds. Torque may be increased to line up hole with slot in nut.

CHAPTER 80

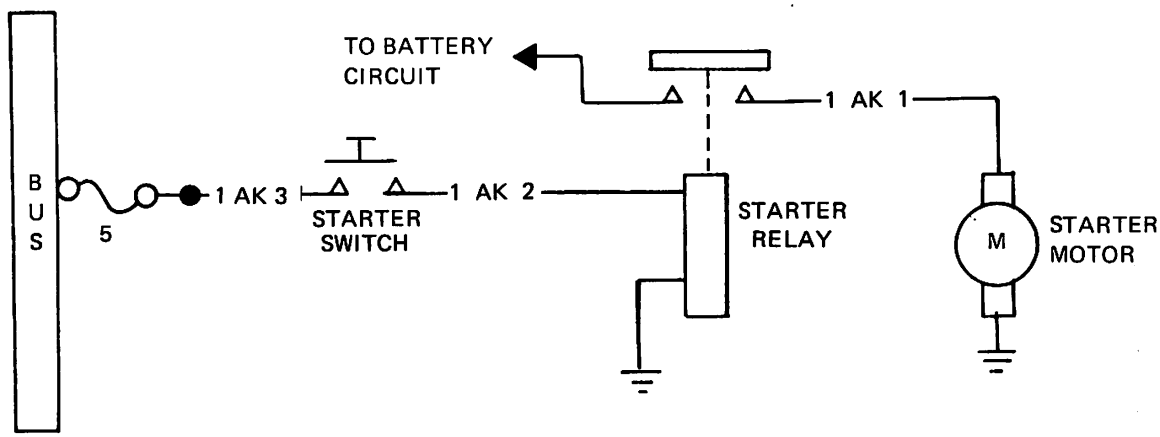
STARTING

TABLE OF CONTENTS

STARTING – DESCRIPTION/OPERATION

1. General

The starting system consists of the starter switch, starter relay, starter, a 5-amp fuse, and associated wiring necessary to effect the required connections. The starter switch is a pushbutton type switch located on the lower left-hand side of the instrument panel. The 5-amp fuse that protects the starter circuit is located at the extreme right-hand corner of the instrument panel. The same fuse also protects two other circuits and is decaled: FUEL PUMP, STROBE, STARTER. The starter relay is located on the front of the firewall and is connected directly to the starter switch (see Figure 1). The starter is mounted on the front of the engine and is secured with one mounting bolt and three mounting studs, nuts, and washers. When power is supplied to the starter, the starter Bendix gears engage the starter ring gear mounted on the front end of the crankshaft and turn the engine for starting. Power for starting is supplied from a 12-volt, 25-ampere hour, dry-charge type battery.



Starter Circuit
Figure 1

STARTING – TROUBLESHOOTING

1. Trouble Shooting the Starter

TROUBLE	PROBABLE CAUSE	REMEDY
Starter will not operate	Low Battery	Recharge or replace
	Blown fuse	Replace fuse
	Defective wiring	Check wiring with ohmmeter and repair as required.
	Defective Starter Relay	Replace relay
	Defective Starter Switch	With master switch off, conduct continuity test across starter switch. If circuit is open when button is depressed, replace switch.
	Defective Starter Motor	Repair or replace
Starter motor sluggish	Low Battery Dirty contacts on starter switch or starter relay	Recharge or replace Replace
	Defective Starter	Repair or replace
	Dirty commutator	Clean and turn down as required.
Starter noisy	Worn starter drive gear	Inspect starter drive gear and replace if necessary
	Worn or broken teeth on crankshaft ring gear	Inspect crankshaft, ring gear and replace if necessary.

STARTING – MAINTENANCE PRACTICES

1. Removal/Installation of Starting System Components

A. Remove Starter (See Figure 201.)

NOTE: Ensure that master switch is in OFF position.

(1) Remove cowl as necessary to gain access to starter (refer to Chapter 71).

(2) Disconnect starter cable and landing light ground wire.

(3) Remove bolt securing brace to alternator mount.

(4) Remove mounting bolt and three nuts on starter mounting studs and remove starter.

B. Install Starter

(1) Position starter on mounting studs and install nuts and mounting bolt.

(2) Position brace from alternator mount in place and install mounting bolt.

(3) Connect starter, cable and landing light ground wire.

(4) Install cowl.

C. Remove Starter Relay (See Figure 202.)

NOTE: Ensure that master switch is in OFF position.

(1) Remove upper cowl to gain access.

(2) Disconnect wiring from starter relay.

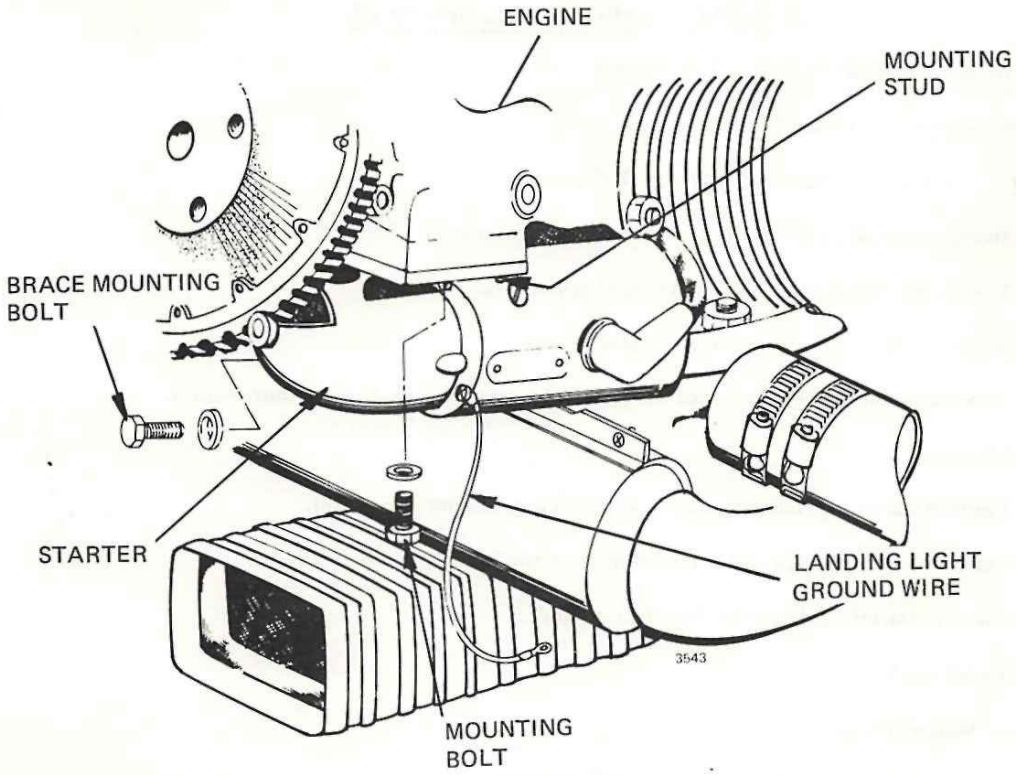
(3) Remove bolts, nuts, and washers securing starter relay to firewall and remove relay.

D. Install Starter Relay

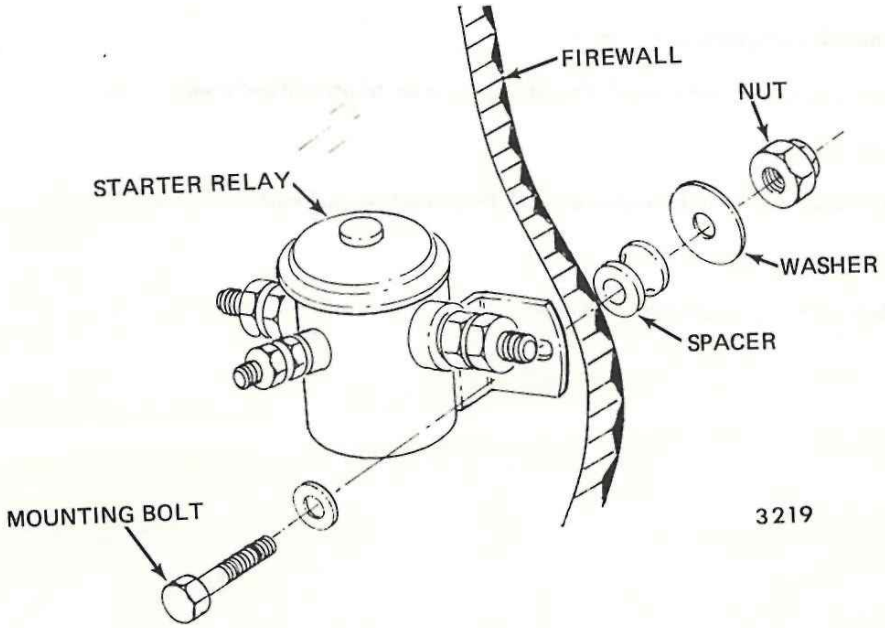
(1) Position starter relay to firewall and install bolts, washers, and nuts.

(2) Connect wiring to starter relay.

(3) Replace cowl and secure cowl fasteners.



Starter Removal/Installation
Figure 201



Starter Relay
Figure 202