

T. O. 1L-10A-10

TECHNICAL MANUAL

**POWER PACKAGE BUILDUP
INSTRUCTIONS**

USAF SERIES

OV-10A

AIRCRAFT

PUBLISHED UNDER AUTHORITY OF THE SECRETARY OF THE AIR FORCE

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INTRODUCTION

This manual provides all essential information required by Air Force maintenance personnel to build up basic T76-G-10 (left) and T76-G-12 (right) turboprop engines into complete power packages for installation on OV-10A aircraft. Adjustments necessary to ensure proper installation of equipment are included in the buildup procedure, but in no case is this manual to be used as substitute for the maintenance, inspection, or overhaul manuals. The primary use of the manual is to aid buildup of a power package in the easiest and most logical manner.

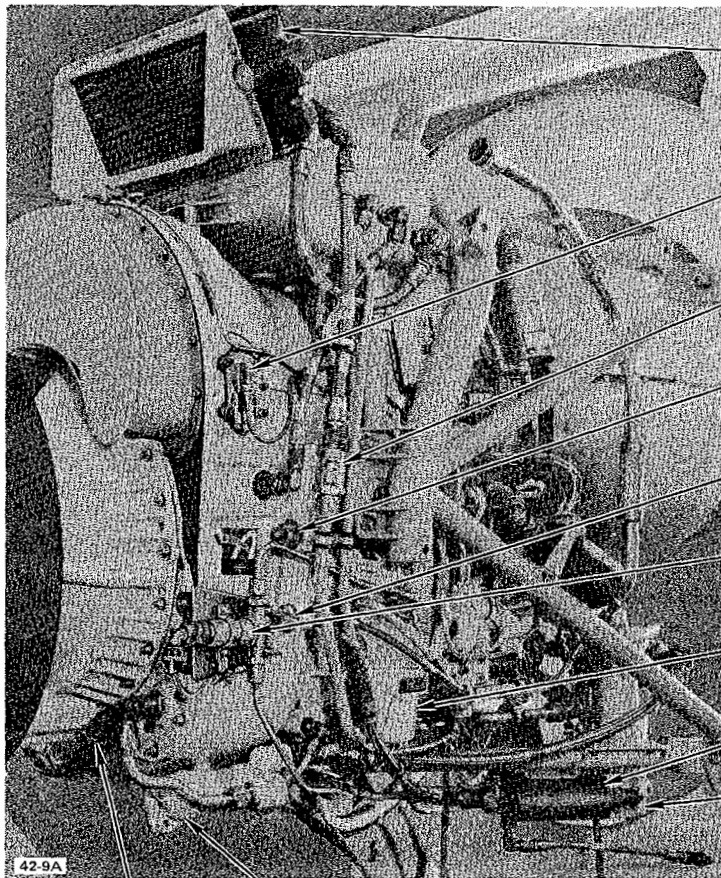
Section I - DESCRIPTION contains general information required for manual usage. Engine design improvement changes are also included in this section.

Section II - BUILDUP INSTRUCTIONS contains instructions and illustrations of the proper sequence for buildup of the basic engine from its removal from the shipping container to readiness for installation in the aircraft.

Section III - WIRING DIAGRAMS contains general wiring information and schematic wiring diagrams necessary to understand the function of each electrical component circuit installed on the power package and to trace each circuit for continuity.

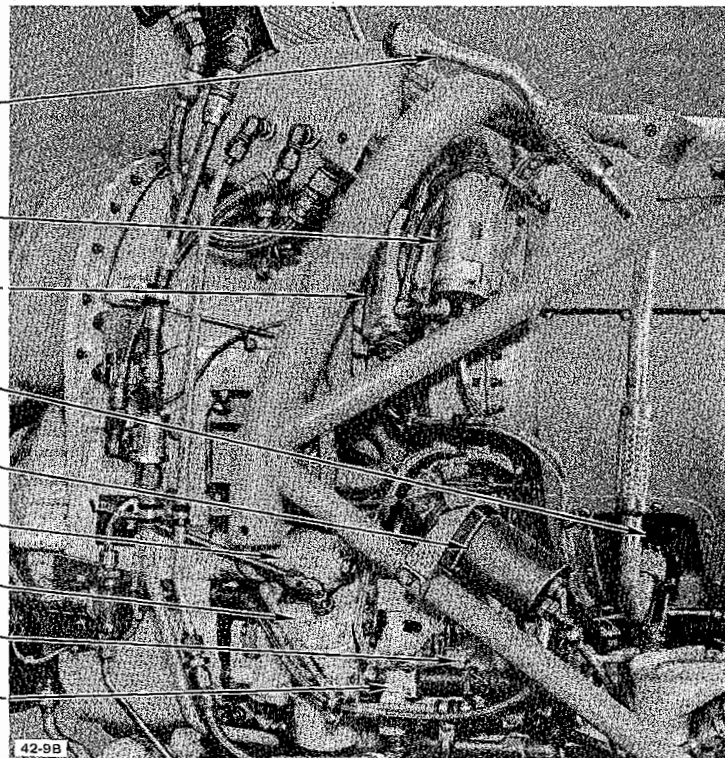
Section IV - GROUP ASSEMBLY PARTS LIST contains illustrations and accompanying list of parts required to build up two (left and right) power packages.

Section V - NUMERICAL INDEX is a list of part numbers included in Section IV. Each listing contains a part number, figure and index number of illustration, and parts list in which it is shown, and the quantity of that part required on the power package.



- AIR-OIL COOLER
- INLET TEMPERATURE SENSOR
- SCAVENGED OIL RETURN CHECK VALVE
- OIL PRESSURE REGULATOR
- OIL FILTER BY-PASS VALVE
- OIL TO FUEL HEATER LOCKOUT VALVE ②
- FUEL FILTER (HIGH PRESSURE)
- PROPELLER UNFEATHER PUMP
- FUEL FILTER (LOW PRESSURE)

- GEAR CASE VENT (SOLENOID) VALVE
- OIL TO FUEL HEATER ②



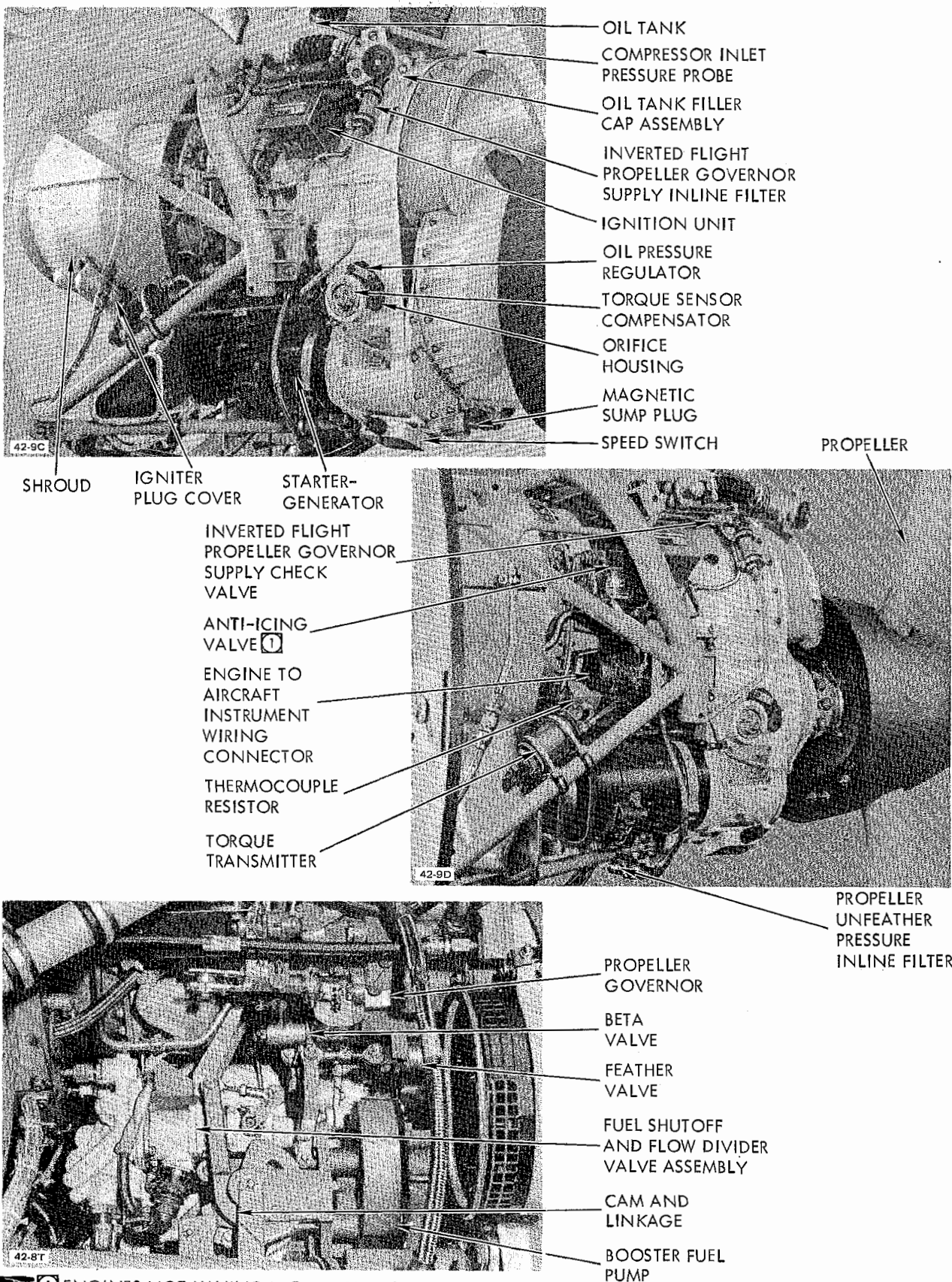
- HEAT AND VENT ENGINE BLEED AIR TUBE
- ① TIT TRANSDUCER
- ① TIT SIGNAL CONDITIONER
- ENGINE BLEED AIR SHUTOFF VALVE
- OIL PRESSURE TRANSMITTER
- OIL FILTER
- FUEL PUMP
- FUEL CONTROL ASSEMBLY
- START FUEL MODULE

① ENGINES NOT HAVING T.O. 2J-T76-527 INCORPORATED AND AIRCRAFT NOT HAVING T.O. 1L-10A-614 INCORPORATED

② ENGINES NOT HAVING T.O. 2J-T76-532 INCORPORATED

VA-10H-42-27D

Figure 1-1. Complete Power Package (Sheet 1)



① ENGINES NOT HAVING T.O. 2J-T76-531 INCORPORATED

VA-10H-42-28B

Figure 1-1. Complete Power Package (Sheet 2)

SECTION I
DESCRIPTION

1-1. LIST OF EFFECTIVE PAGES.

1-2. A list of Effective Pages immediately follows the title page. This page is identified by the letter "A" in the lower left corner. This listing provides the dates of the latest changes incorporated in the manual and the page numbers which are affected.

1-3. TABLE OF CONTENTS.

1-4. The Table of Contents lists the sections and major paragraphs covered.

1-5. ILLUSTRATION AND TABLE LISTS.

1-6. A list of illustrations and a list of tables are located following the Table of Contents. These lists contain the figure number or table number, title, and page number of all the illustrations and tables in the manual in order of appearance.

1-7. NUMBERING AND PARAGRAPHING.

1-8. Pages, paragraphs, figures, and tables are all numbered separately and consecutively within each section of the manual. The numbers are assigned a two-part number separated by a dash; the first represents the section number, and the second, the order of appearance within the section. Paragraphs are arranged in descending order from general to specific information. Table numbers and titles appear at the top of tables and figure numbers and titles appear below the illustrations.

1-9. MAINTENANCE PROCEDURES.

1-10. This information is provided to aid maintenance personnel to prepare for the task by providing the following data:

● Tools and Equipment List - Provides a listing of general, standard, and special tools and equipment

used in the procedure. Where possible, the Government standard number is given. When the manufacturer's part number is the only means of identification, the manufacturer's Federal Supply Code is added to the part number. Refer to the Federal Supply Code (Section IV) for manufacturer identification. Common handtools are not listed.

● Consumable Materials List - Provides a listing of consumable materials and expendable items used in the procedure. The nomenclature, material specification number, part number, and Government standard are used for identification.

● Quality Assurance - Steps which are underlined represent an inspection requirement. These quality assurance procedures must be properly completed for safe flight.

1-11. PUBLICATIONS LIST.

1-12. Maintenance instructions and parts breakdown are included in this manual, only to the extent of power package buildup. Separate manuals are issued and should be consulted for instructions and breakdown which apply to this aircraft and engine. Table I contains associated manuals which are applicable to this manual.

1-13. TIME COMPLIANCE TECHNICAL ORDERS.

1-14. Applicable time compliance technical orders affecting the OV-10A aircraft and this manual are listed in table II.

1-15. SPECIAL SUPPORT EQUIPMENT.

1-16. Table III contains all special support equipment required to perform the maintenance procedures in this manual.

1-17. CONSUMABLE MATERIALS LIST.

1-18. Consumable materials not included in pod package are listed in table IV.

Table I. Publications List

PUBLICATION NUMBER	PUBLICATION TITLE
T.O. 1L-10A-2-1	General Information and Servicing, Maintenance Instructions Manual
T.O. 1L-10A-2-2	Airframe Systems, Maintenance Instructions Manual
T.O. 1L-10A-2-3	Environmental Systems, Maintenance Instructions Manual

Table I. Publications List (Cont)

PUBLICATION NUMBER	PUBLICATION TITLE
T.O. 1L-10A-2-4	Power Plants and Fuel Systems, Maintenance Instructions Manual
T.O. 1L-10A-2-5	Avionics Systems, Maintenance Instructions Manual
T.O. 1L-10A-2-6	Armament Systems, Maintenance Instructions Manual
T.O. 1L-10A-2-7	Wiring Data, Maintenance Instructions Manual
T.O. 1L-10A-4	OV-10A, Illustrated Parts Breakdown
T.O. 2J-T76-4	Turboprop Aircraft Engine, Illustrated Parts Breakdown
T.O. 2J-T76-6	Turboprop Aircraft Engine, Maintenance Instructions Manual

Table II. Record of Applicable Time Compliance Technical Orders

T.O. NO.	DATE	TITLE/ECP	CATEGORY	CHANGE/ REVISION DATE	PARAGRAPH/ FIGURE
1L-10A-501		Turbine Inlet Temperature Indication System (ECP-OV-10A-63B)	Routine	10/1/68	/2-2, 3-1
1L-10A-531	8/12/68	Deactivation TIT System	Routine	4/1/69	/3-1, 4-2
1L-10A-547	11/8/68	Bleed Air Shutoff Valve Gaskets	Routine	4/1/69	/4-2
1L-10A-583		Engine Controls - Installation of Self-retaining Fasteners (ECP-OV-10A-283)	Routine	3/15/71	2-9/ /2-2
1L-10A-584	1/15/71	Installation of Engine Test Fittings T76 Engine OV-10A Aircraft (ECP-OV-10A-294)	Routine	3/1/70	/2-2, 4-2
1L-10A-590	9/26/69	Provide Clearance Between Engine Oil Coder Inlet Duct, Part No. 305-520012 and Oil Filler Bowl, Part No. 305-470017-OV-10A Aircraft	Routine	3/1/70	/4-2
1L-10A-593	11/6/70	Beta Valve, Replacement of (Refer to T.O. 3HA2-10-501) (ECP-OV-10A-285)	Urgent	9/1/70	/4-2
1L-10A-599	12/4/69	Oil Tank Assembly, Part No. 305-470002-301 - Rework	Urgent	3/1/70	/4-2
1L-10A-612	6/3/71	Installation of Propeller Reverse Blade Angle Stop (ECP-OV-10A-299)	Routine	12/1/71	/4-3
1L-10A-613	4/2/71	Replacement of Propeller Spinner Bushing (ECP-OV-10A-300)	Routine	3/15/71	/4-3
1L-10A-614		Relocation of TIT Indicating System Pressure Transducer and Signal Conditioner (ECP-OV-10A-301)	Routine	12/1/71	/1-1
1L-10A-615	2/12/71	Replacement of Engine Mount Truss (ECP-OV-10A-303)	Routine	1/1/71	/2-2
1L-10A-640		Installation of Oil Tank Assembly Support Bracket Bushings (ECP-OV-10A-302)	Routine	7/1/72	2-9/2-2, 4-2
2J-T76-527		Turbine Inlet Temperature Indicating System, Redesign and Relocating Components of (ECP-OV-10A-301)	Routine	12/1/71	/1-1, 3-1

Table II. Record of Applicable Time Compliance Technical Orders (Cont)

T.O. NO.	DATE	TITLE/ECP	CATEGORY	CHANGE/ REVISION DATE	PARAGRAPH/ FIGURE
3H1-19-502	4/2/71	Replacement of Propeller Spinner Bushing (ECP-OV-10A-300)	Routine	3/15/71	/4-3
3H1-19-503		Installation of 33LF-337/338 Propeller Reverse Blade Angle Stop (ECP-OV-10A-299)	Routine	12/1/71	/4-3
3HA4-3-520		Replacement of Propeller Governor Pressure Regulating Valve (ECP-OV-10A-321)	Routine	7/1/72	/4-2
3HA4-3-521		Replacement of Propeller Governor Bearing (ECP-OV-10A-329)	Routine	7/1/72	/4-2
3HA2-11-501		Self-Retaining Bolts in Throttle Control (ECP-OV-10A-283A)		7/1/72	/4-2

Table IIA. Record of Operational and Safety Supplements

T.O. NO.	DATE	OPERATIONAL/SAFETY SUPPLEMENT	CHANGE/ REVISION DATE	PARAGRAPH/ FIGURE
1L-10A-10S-4	1/7/70	Operational Supplement	11/15/71	/2-3, 2-4
1L-10A-10S-6	7/30/70	Operational Supplement	11/15/71	/2-2
1L-10A-10S-7	11/13/70	Operational Supplement	11/15/71	/2-2

Table III. Special Support Equipment

NOMENCLATURE	PART NO., MODEL, OR TYPE	REMARKS
Adapter assembly, engine complete	E13703 (89372)	Use component part E13741 when removing and installing engine with E13702 sling.
Adapter, engine transport	E13706 (89372)	Used in engine transportation.
Adapter, propeller flange torque wrench	T3378 (89372)	Used in removal and installation of propeller.

Table III. Special Support Equipment (Cont)

NOMENCLATURE	PART NO., MODEL, OR TYPE	REMARKS
Hoist assembly, engine "C" bar	E13707 (89372)	Used in removal and installation of engine without propeller. Used in removal of engine from shipping container.
Sling assembly, engine complete	E13702 (89372)	Used in removal and installation of engine.
Tube, ball bearing	GS11423 (73030)	Used in installing propeller ball bearings.
Work stand, complete engine work	E13704 (89372)	Used to support engine when removed from aircraft.
Wrench, beta tube	T3376 (89372)	Used in removal and installation of propeller.
Wrench, propeller dome nut	T3377 (89372)	Used in removal and installation of propeller.
Wrench, torque (0 - 200 pounds)	GGG-W686 Type I, Size 6	Used in torquing of attaching components.
Wrench, torque (0 - 600 pounds)	GGG-W686 Type I, Size 9	Used in torquing of attaching components.
Wrench, vibration isolator	T3394 (89372)	Used in installing and removing vibration isolator.
Protractor, NACA type	GS18217 (73030)	Used in adjusting propeller blade angle.
Yoke assembly, engine stand	E13741 (89372)	Used during engine maintenance.

Table IV. Consumable Materials List

NOMENCLATURE	SPECIFICATION OR PART NO. AND MANUFACTURER	FEDERAL STOCK NO.
Compound, anti-seize	MIL-C-16173	
Compound, corrosion preventative	MIL-T-5544	
Gasket	MS9134-01	
Gasket	MS9135-01	
Graphite, petrolated	MIL-C-5544	
Grease, molybdenum disulfide	LG-21164	
Kit, soft goods	305-890007	
Lockwire	MS20995N25	
Lockwire	MS20995F32	
Lockwire	MS20995F41	
Oil, lubricating	MIL-L-23699	
Packing	MS29512-04	
Packing	MS29512-08	
Packing	MS29512-12	
Packing	MS29513-214	
Packing	MS29561-011	
Packing	MS9241-010	
Packing	MS9241-011	
Packing	MS9241-037	
Packing	MS9241-041	
Packing	MS9241-121	
Packing	MS9241-160	

Table IV. Consumable Materials List (Cont)

NOMENCLATURE	SPECIFICATION OR PART NO. AND MANUFACTURER	FEDERAL STOCK NUMBER
Packing	NAS617-4	
Packing	NAS617-6	
Packing	NAS617-8	
Petrolatum	VV-P-236	
Petrolatum	W-P-236	
Pin, cotter	MS24665-011	
Pin, cotter	MS24665-130	
Pin, cotter	MS24665-132	
Pin, cotter	MS24665-134	
Tape, adhesive cork rubber	MIL-G-6841D	

SECTION II

BUILDUP INSTRUCTIONS

2-1. POWER PACKAGE BUILDUP.

2-2. This section illustrates the proper sequence and procedures for engine buildup, from removal of the engine from the shipping container through installation of propeller. The power package consists of a basic engine (T76-G-10 or T76-G-12) and an engine pod package (305-860007-1 or 305-860007-2).

refer to Section IV for
a complete listing of the engine pod package and the
quick engine change kit.

2-3. BUILDUP PRECAUTIONS.

2-4. The following buildup precautions will not be repeated in the buildup instructions but should be followed throughout the buildup of the engine.

- Ensure that dirt, hardware, tools, or other foreign material does not enter the intake or exhaust port of the engine.

- Do not remove packages or open packages until needed for installation.

- Visually inspect all packing and gaskets for cuts, nicks, and other flaws prior to installation. Packing or gaskets that have been damaged or altered shall never be used.

- Handle air, fuel, and oil lines carefully to avoid denting or scratching them. Be especially careful not to damage the threads of fittings and line coupling nuts.

- Caps or protective covers should not be removed from lines until immediately before installation. If lines are disconnected for any reason, they should be capped or covered until ready for reconnection. Also, all installed lines, ducts, and electrical connectors that terminate with open ends should be capped or covered to prevent the entrance of dirt and foreign objects.

- Do not twist hose assemblies when installing. A twisted hose under pressure may fail or loosen.

- Use correct size and type of clamps when securing various hoses, tubing, and wire bundles directly to the engine or to the engine via brackets. If wrong size or type of clamp is used, the item being secured may be damaged.

- All clamps, lines, and fittings are to be positioned as close to engine, without touching it, as possible. This is to obtain the smallest possible engine "envelope" size. Ensure that hoses, lines, and wire bundles are not positioned so as to be damaged by chafing.

2-5. DRILLING PROCEDURES AND PRECAUTIONS.

2-6. When it is necessary to drill new holes or enlarge existing holes on any power package part, the following should be observed:

- Where pilot holes are not provided, a center punch must be used to locate the center of the hole. The indentation made by the center punch will prevent the drill from "walking" and will ensure a centered hole.

- When it is necessary to drill holes larger than 1/4-inch diameter, drill several holes of increasing diameter until the desired diameter is reached.

- Ensure proper hole location before drilling to prevent ruining part.

- Do not drill holes while part is installed on engine. Remove part to work bench and use a proper clamping device.

2-7. PREPARING ENGINE FOR BUILDUP.

2-8. The engine must be removed from the shipping container and installed on engine stand (E13704) before starting buildup. The engine may be shipped in either a metal or wooden shipping container. See figure 2-1 for preparing engine for buildup instructions when engine is shipped in metal container and figure 2-1A when engine is shipped in wooden shipping container.

Tools and Equipment List

Stand Assembly, Complete Engine	E13704 (89372)
Hoist Assembly, "C" Bar Engine	E13707 (89372)

PREPARING ENGINE FOR BUILDUP

1. Remove engine records from container by removing four wing nuts and cover.

1A. Release air pressure from container.

2. Position shipping container under a suitable hoist capable of lifting 1000 pounds and having minimum clearance of 8 feet from top of shipping container to hoist.

Warning

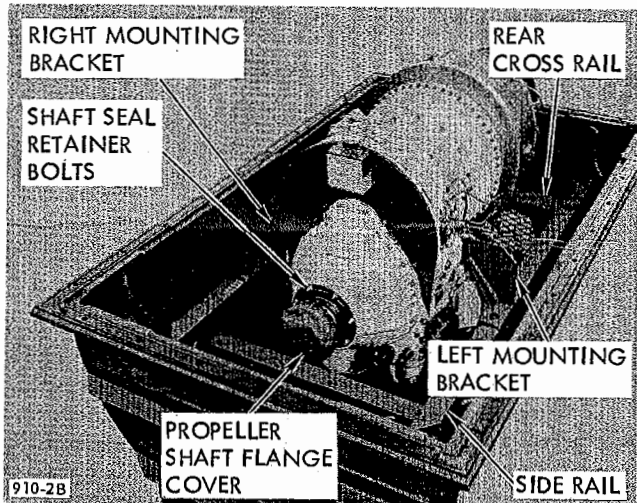
Release air pressure before opening container.

3. Remove container flange mating bolts and lift off upper half of container.

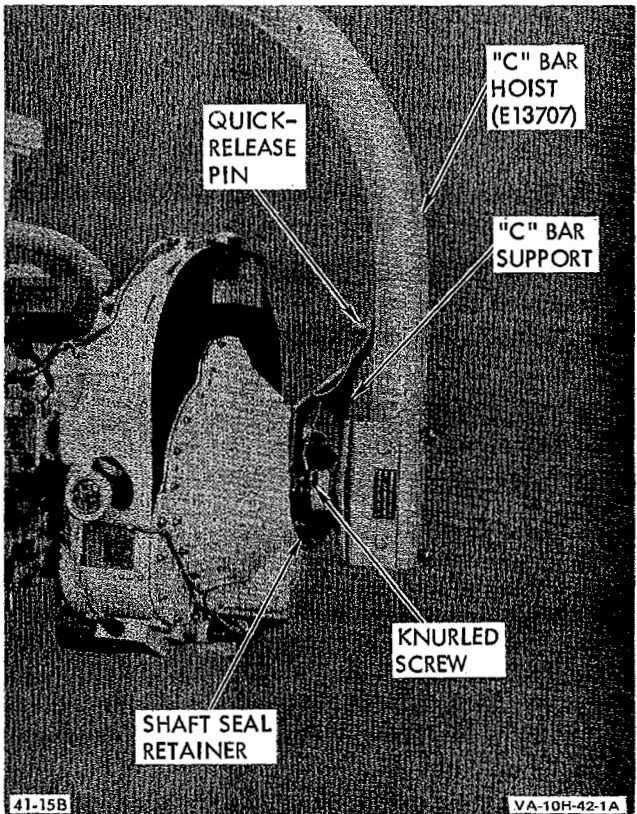
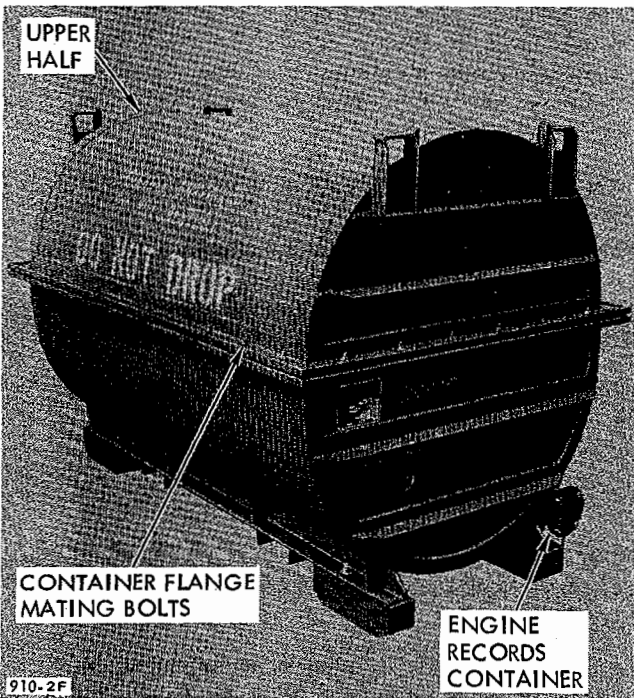
Caution

To prevent damage to engine, use care when removing upper half of container.

NOTE Two men, one at each end, can lift upper half of container.



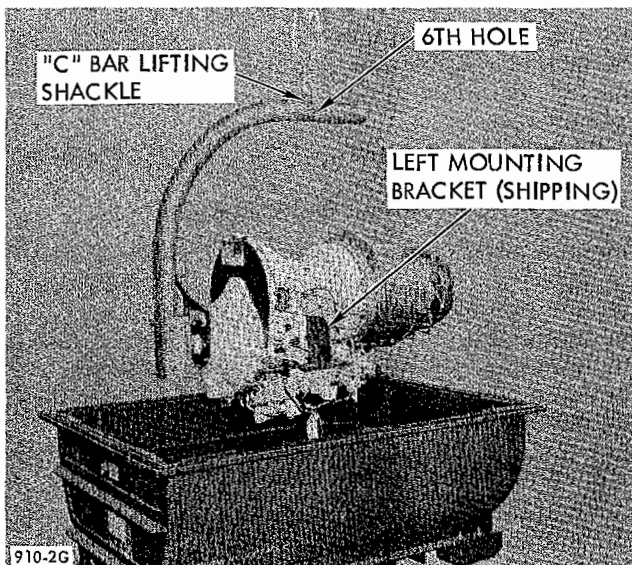
5. Attach the "C" bar hoist (E13707) to the propeller shaft flange vertically and secure with four captive bolts.
6. Position "C" bar support over two shaft seal retainer bolts and secure with captive knurled screw.
7. Position quick-release pin through support in to "C" bar.



4. Remove protective cover from propeller shaft flange.

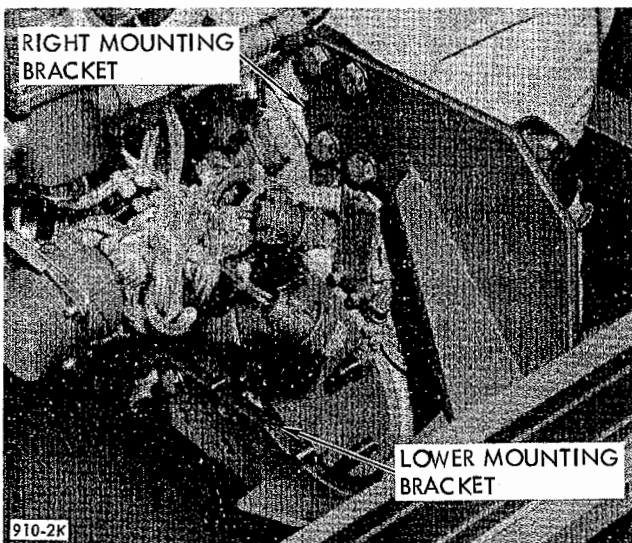
Figure 2-1. Preparing Engine for Buildup (Metal Shipping Container) (Sheet 1)

8. Ensure that "C" bar hoist lifting shackle is positioned at the sixth hole from end of the "C" bar. Attach "C" bar to lifting hoist.



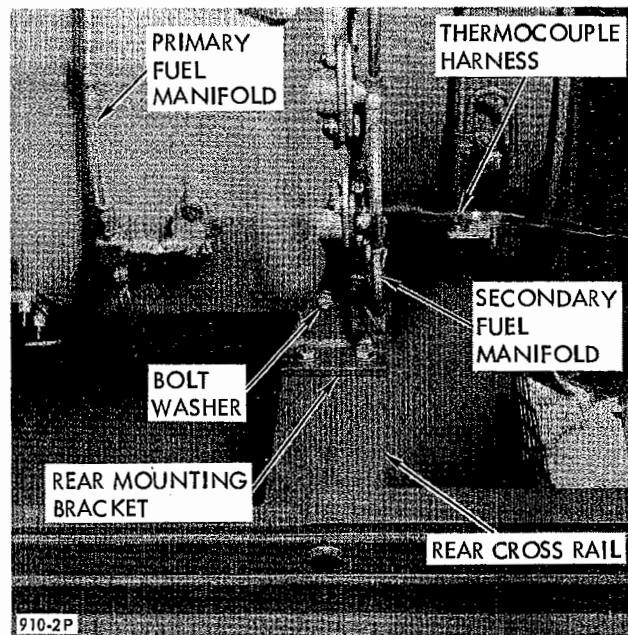
9. Remove the four bolts securing lower engine mount to lower mounting bracket.
10. Remove vertical bolts attaching left and right mounting brackets to side rails.

NOTE Do not remove mounting brackets from engine until the engine is lifted from the container.

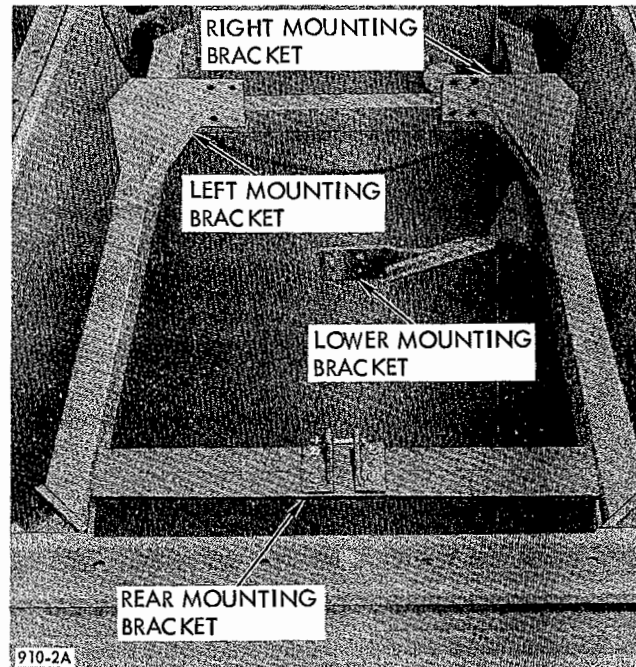


11. Lift engine until all weight is on the "C" bar and remove bolt, washer, and nut from rear mounting bracket.

Caution Use extreme care when removing bolt to prevent damage to secondary fuel manifold.



12. Carefully lift engine from container.
13. Remove left and right mounting brackets from the engine. Replace brackets in shipping container and bolt into place. Replace and secure upper half of container.



14. Install engine vibration isolators and engine mount truss; Refer to Engine Buildup.

Figure 2-1. Preparing Engine for Buildup (Metal Shipping Container) (Sheet 2)

2-9. ENGINE BUILDUP.

2-10. Engine buildup (figure 2-2) consists of installing the items contained in pod package [305-860007-1 (left) and 305-860007-2 (right)] onto basic T76-G-10 (left) and T76-G-12 (right).

NOTE Use parts kit (305-829007) engine change consumables for engine change buildup.

Tools and Equipment List

Adapter assembly engine complete	E13703
Adapter assembly, engine transport	E13706 (locally manufactured)
Hoist assembly, C-bar engine	E13707
Sling assembly, engine complete	E13702
Workstand, engine complete	E13704
Wrench, governor	T3379 (89372)
Wrench, torque (0 - 200 pounds)	GGG-W686, Type I, Size 6
Wrench, torque (0 - 600 pounds)	GGG-W686, Type I, Size 9
Yoke assembly, engine stand	E13741

Consumable Materials List

Lockwire (0.032-inch diameter steel)	MS20995F32
Lockwire (0.041-inch diameter steel)	MS20995F41
Petrolatum	VV-P-236
Grease, molybdenum disulfide	MIL-G-21164
Kit, soft goods	305-890007
Pin, cotter	MS24665-130
Pin, cotter	MS24665-132
Tape, adhesive cork rubber	MIL-G-6841D

2-11. PROPELLER BUILDUP.

2-12. The propeller buildup (figure 2-3) consists of installing the blades into the propeller barrel (hub). The propeller barrel (hub) and the propeller dome are received assembled. The propeller blades must be installed in matched sets of three.

NOTE The propeller assembly is a balanced and serialized matched unit. Do not exchange a part from one propeller assembly with a part of another propeller assembly.

Consumable Materials List

Lockwire (0.032-inch diameter steel)	MS20995F32
Oil, lubricating	MIL-L-7808G or MIL-L-23699
Petrolatum	VV-P-236
Pin, cotter	MS24665-134

2-13. INSTALLING PROPELLER. See figure 2-4 for propeller installation.

Tools and Equipment List

Wrench, beta tube spanner	T3376 (89372)
Wrench, propeller dome nut	T3377 (89372)
Adapter, propeller flange torque wrench	T3378 (89372)
Protractor, NACA Type	GS18217 (73030)

Consumable Materials List

Graphite, petrolated	MIL-C-5544
Lockwire (0.041-inch diameter steel)	MS20995F41
Oil, lubricating	MIL-L-23699
Pin, cotter	MS24665-134
Lockwire (0.032-inch diameter steel)	MS20995F32

2-14. TORQUE VALUES. The torque values listed in this manual are applicable directly to the bolt. If an adapter or an extension of any kind is used, the applicable torque value must be calculated. (This does not apply to handle extensions.) To calculate the torque value (reading on wrench dial), multiply the required torque times the lever length of the wrench and divide by the lever length of the wrench plus extension.

2-15. INSTALLING ENGINE IN SHIPPING CONTAINER.

2-16. The following procedures are for installing the engine in metal containers. The engine must be prepared for shipping prior to installation in the container; such preparation to include removal of engine pod package and covering of all ports and openings. The protective cover for the propeller shaft will be omitted and the "C" bar hoist installed. See figure 2-1 instructions 5, 6, 7, and 8 to install "C" bar hoist (E13707).

1. Position shipping container under a suitable hoist capable of lifting 1000 pounds and having minimum clearance of 8 feet from top of shipping container to hoist.

2. Remove top half of shipping container.

3. Remove left and right mounting brackets from shipping container. Install mounting brackets on engine. Remove nut, bolt, and washer from rear mounting bracket in container.

4. Ensure there are no obstructions in the container. Carefully lower the engine into the container.

5. Align holes for rear mounting bolt and install bolt, nut, and washer in rear mounting bracket.

Caution Use extreme care when installing rear mount bolt to prevent damage to secondary fuel manifold.

6. Install bolts attaching left and right mounting brackets to side rails of container.

7. Install four bolts securing lower engine mount to lower mounting bracket of container.

8. Remove "C" bar hoist (E13707) from propeller shaft.

9. Install protective cover on propeller shaft flange.

10. Position upper half of engine container and install container flange mating bolts, washers, and nuts. Torque nuts to 250 pound-inches.

NOTE Two men, one at each end, can lift upper half of container.

10A. Pressurize container to 5 psi.

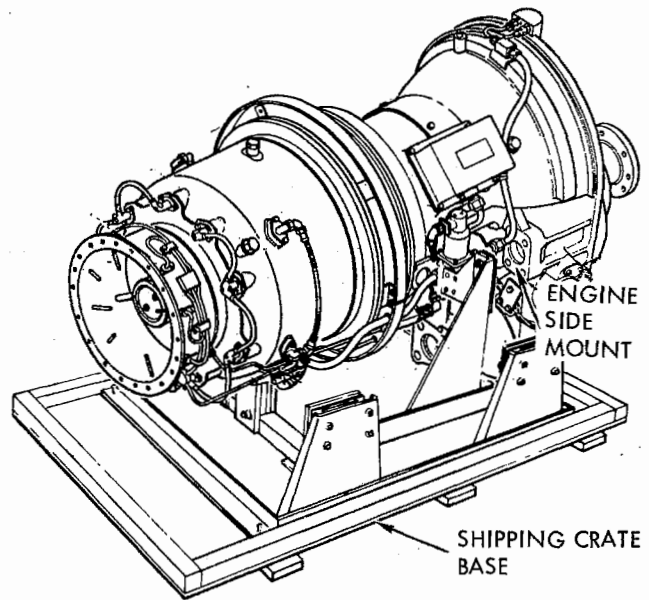
11. Place engine records in container provided and secure cover with four wing nuts.

PREPARING ENGINE FOR BUILDUP

1. Position shipping container under a suitable hoist capable of lifting 1000 pounds and having minimum clearance of 8 feet from top of shipping container to hoist.

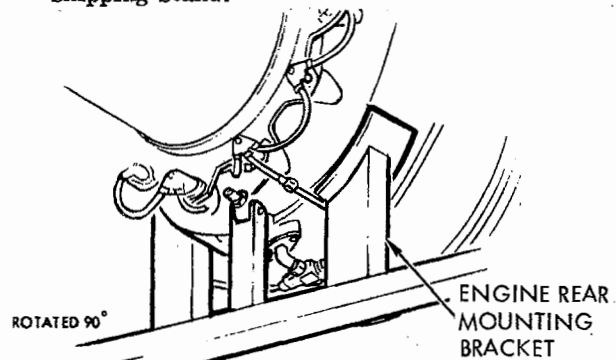
Caution To prevent damage to engine, use care when removing shipping lid.

2. Remove screws around lower edge of shipping crate. Remove steel bands and lift lid straight up. Cut away paper bag covering engine.
3. Remove protective cover from propeller shaft flange and attach "C" bar hoist (E13707) vertically. Attach with four captive bolts.
4. Position "C" bar support over two shaft seal retainer bolts and attach with captive knurled screw. Position quick-release pin through support into "C" bar.

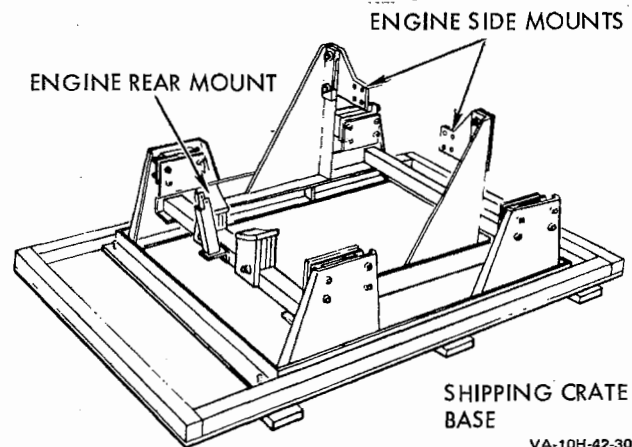


Caution Use extreme care when removing bolt from engine rear mount to prevent damage to secondary fuel manifold.

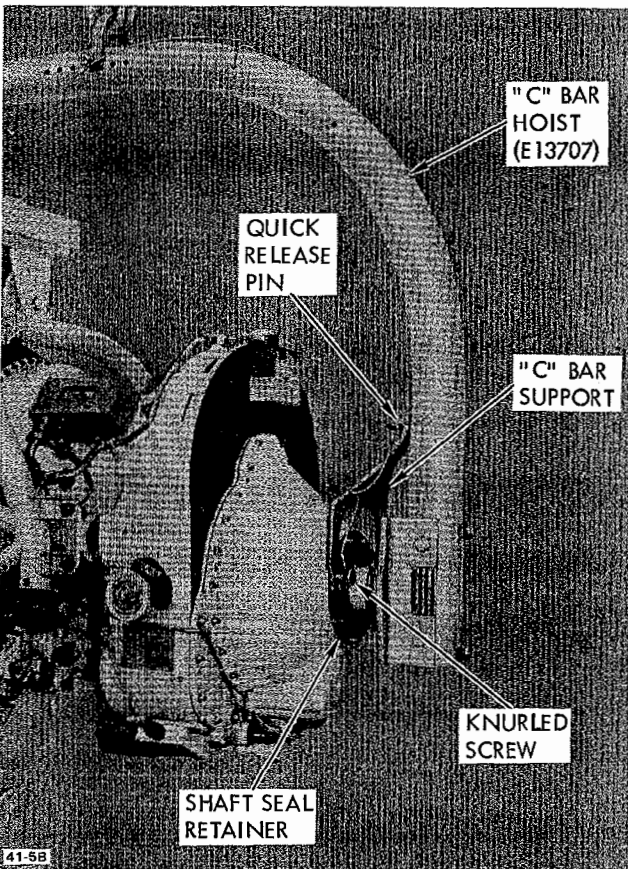
6. Remove bolt, washer, and nut from engine rear mounting bracket and carefully lift engine from shipping stand.



7. Replace lid on shipping crate base and attach with screws around lower edge.



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5. Lift engine until all weight is on "C" bar and remove eight bolts and washers (four on each side) from engine side mounts.

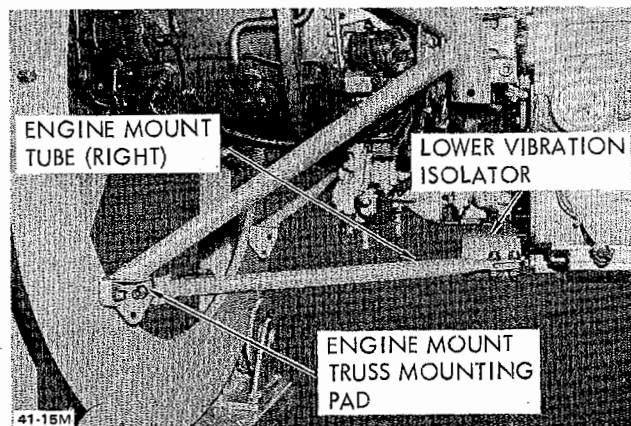
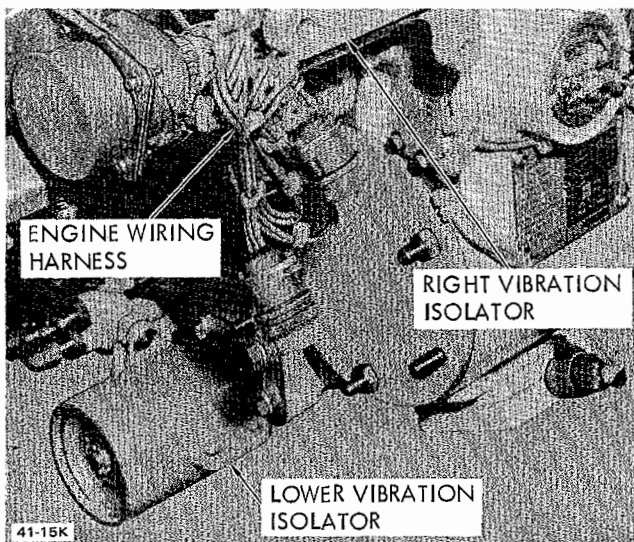
Figure 2-1A. Preparing Engine for Buildup (Wooden Shipping Container)

INSTALLING ENGINE VIBRATION ISOLATORS AND ENGINE MOUNT TRUSS

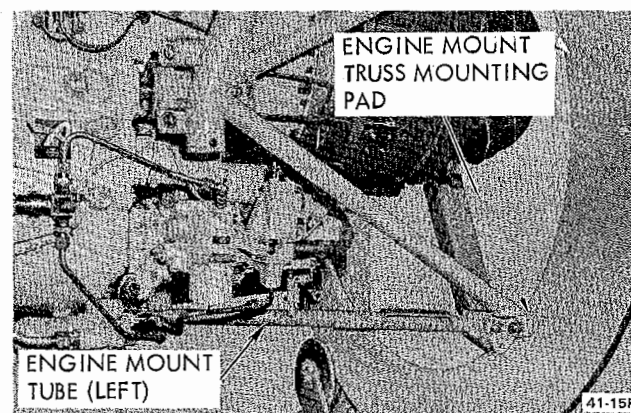
NOTE Prior to installing vibration isolators on engine mount pads, treat engine mount pad area (internal/externally) with light coat of corrosion preventative compound MIL-C-16173.

1. Position side and lower vibration isolators on-to engine mounting pads and secure with bolts and washers. Tighten bolts 525-550 inch-pounds torque. Secure with lockwire (MS20995 F32).

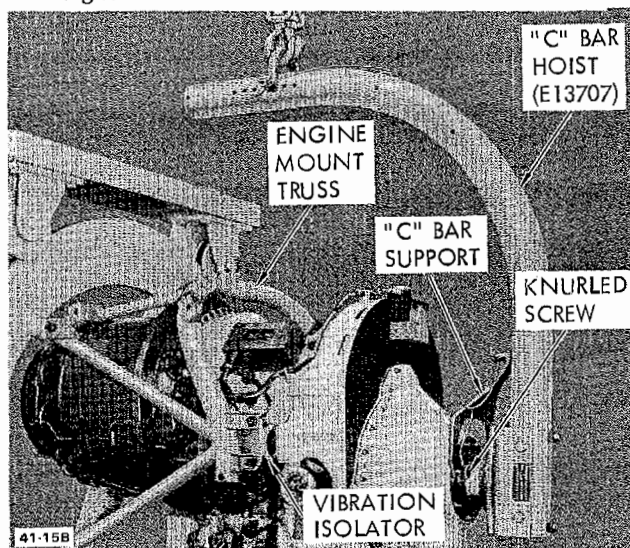
NOTE When installing right engine vibration isolator, use caution to prevent damage to engine wiring harness.



4. Position engine mount tubes from lower vibration isolator to engine mount truss lower mounting pad. Secure with bolts, washers, and nuts. Torque bolts to 325 (±25) inch-pounds.



5. Remove "C" bar hoist by removing knurled screw securing "C" bar support and four captive bolts securing hoist to propeller shaft flange.



6. Coat engine fuel pump and T₂ sensor exposed spacer/gasket areas with light coat of corrosion preventative compound MIL-C-16173.

NOTE An improved engine mount truss was installed on aircraft 68-3784 through 68-3831 during manufacture; however, these trusses through normal engine change activity, could be interspersed throughout the operational activities and the supply system. To determine the improved truss from the original one, the truss must be weighed. The original truss (305-319001) weighs approximately 13.2 pounds (aircraft not having T.O. 1L-10A-615 incorporated). The improved truss (305-319001-51) weighs approximately 16.7 pounds (aircraft having T.O. 1L-10A-615 incorporated).

2. Install engine mount truss to workstand (E13704).
3. Position engine into mount truss and attach side vibration isolators to mount truss with bolts, washers, and nuts. Tighten to 325 (±25) inch-pounds torque.

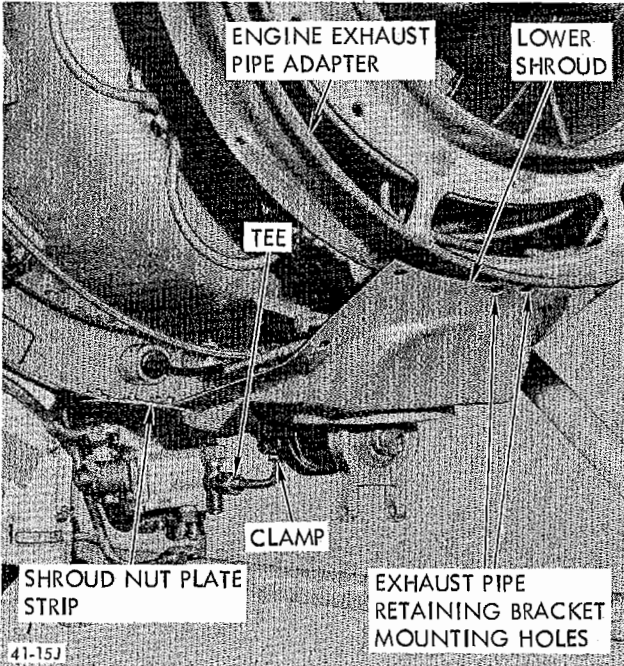
NOTE Position engine into mount with caution to prevent damage.

VA-10H-42-3D

Figure 2-2. Engine Buildup (Sheet 1)

INSTALLING COMBUSTION CHAMBER SHROUDS, SEALS, DRAIN LINES, AND ENGINE AFT VIBRATION ISOLATOR

1. Remove protective cover from engine exhaust pipe. Position exhaust pipe adapter onto engine exhaust pipe. The attaching holes in the two exhaust pipe retaining brackets must align with corresponding holes in the upper and lower shroud. Secure with bolts, washers, and nuts. Tighten 90 - 100-inch-pounds torque.



2. Install line assembly on combustion chambers forward drain valve.
3. Position lower engine shroud nut plate strip on forward shroud bulkhead.
4. Insert combustion chamber aft drain line assembly through lower shroud. Position lower shroud to engine and connect drain line to combustion chamber aft drain valve.
5. Install tee seals and clamps on combustion chamber forward and aft drain lines.
6. Attach seal to aft vibration isolator and position isolator through lower shroud. Secure with bolt, washer, and nut. Tighten 35 - 40-inch-pounds torque.
7. Remove protective cover from engine bleed air port, install gasket, and bleed air valve seal.

8. Position lower left shroud and align mounting holes in shroud with holes in bleed air valve seal. Insert attaching screws.

NOTE Do not tighten shroud screws until all shrouds have been installed and aligned.

9. Position upper and lower right shrouds on engine. Align mounting holes and insert screws and bolts.
10. Position top and bottom exhaust pipe retaining brackets onto exhaust pipe adapter. Insert two bolts and washers. Note bolts to be tightened when installing exhaust pipe assembly.
11. Tighten all screws attaching shrouds to engine.
12. Install cooling air inlet duct and ignition plug cover to lower right shroud. Attach with screws.

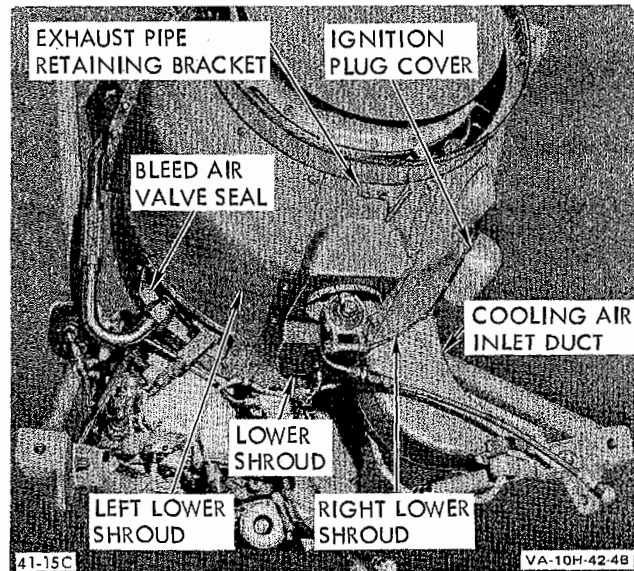
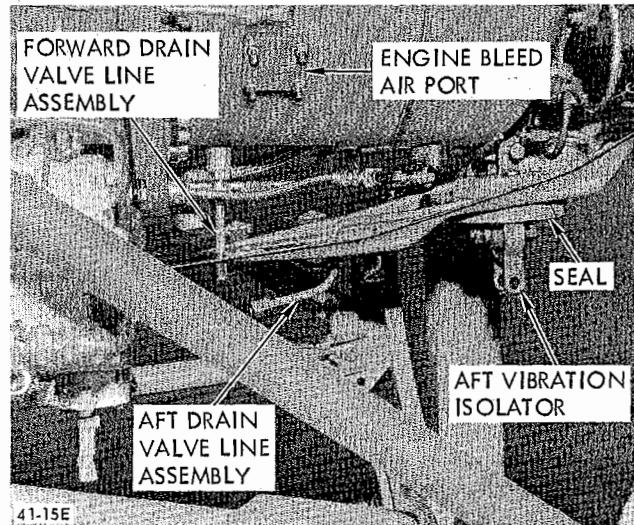


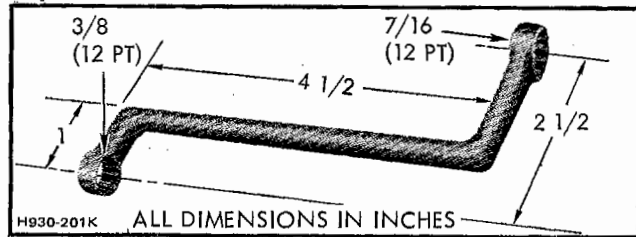
Figure 2-2. Engine Buildup (Sheet 2)

INSTALLING ENGINE BLEED AIR SHUTOFF VALVE AND DUCT

Caution The mounting studs are inserts (trade name Keenserts) which will snap off if extreme care is not exercised when removing or installing the nuts.

1. Position gasket (300-533367-3) over mounting studs and install bleed air shutoff valve. Apply anti-seize compound to studs and attach valve with four self-locking (MS20500-1032) nuts and four existing (AN960C10L) washers. Torque nuts from 25 to 30 inch-pounds.

NOTE Since the design of the valve prevents the use of a standard socket, an offset wrench must be fabricated to torque the valve mounting nuts. When an adapter or an extension is used, the torque value will change. Refer to paragraph 2-14.



2. Connect electrical plug of miscellaneous equipment electrical harness to shutoff valve. Safety with lockwire (MS20995F32).
3. Position bleed air duct up left side of engine under left leg of engine mount truss.
4. Connect engine bleed air duct to shutoff valve.

NOTE Use anti-seize compound on threads to ensure ease of removing duct for future maintenance.

INSTALLING SHROUD, COMBUSTION CHAMBER, AND FUEL MANIFOLD OVERBOARD DRAIN HOSES

1. Install union on shroud drain line and connect shroud overboard drain hose.
2. Connect combustion chamber overboard drain hose to combustion chamber drain tee.
3. Install packing (MS29512-04) and union into drain port of the fuel shutoff and flow divider valve assembly.
4. Connect primary and secondary nozzles manifold assemblies overboard drain hose to union installed in the fuel shutoff and flow divider valve assembly.

INSTALLING ENGINE MISCELLANEOUS EQUIPMENT ELECTRICAL HARNESS

1. Position receptacle onto bracket located on right leg of the engine mount truss. Attach with screws, washer, and nuts.
2. Route harness to a point just forward of the shroud cooling air duct and butterfly-clamp to the right leg of the engine mount truss.
3. From the engine mount truss, route harness to engine centerline and up left side of engine. Clamp as shown (five places) using engine shroud screws to attach harness to engine.

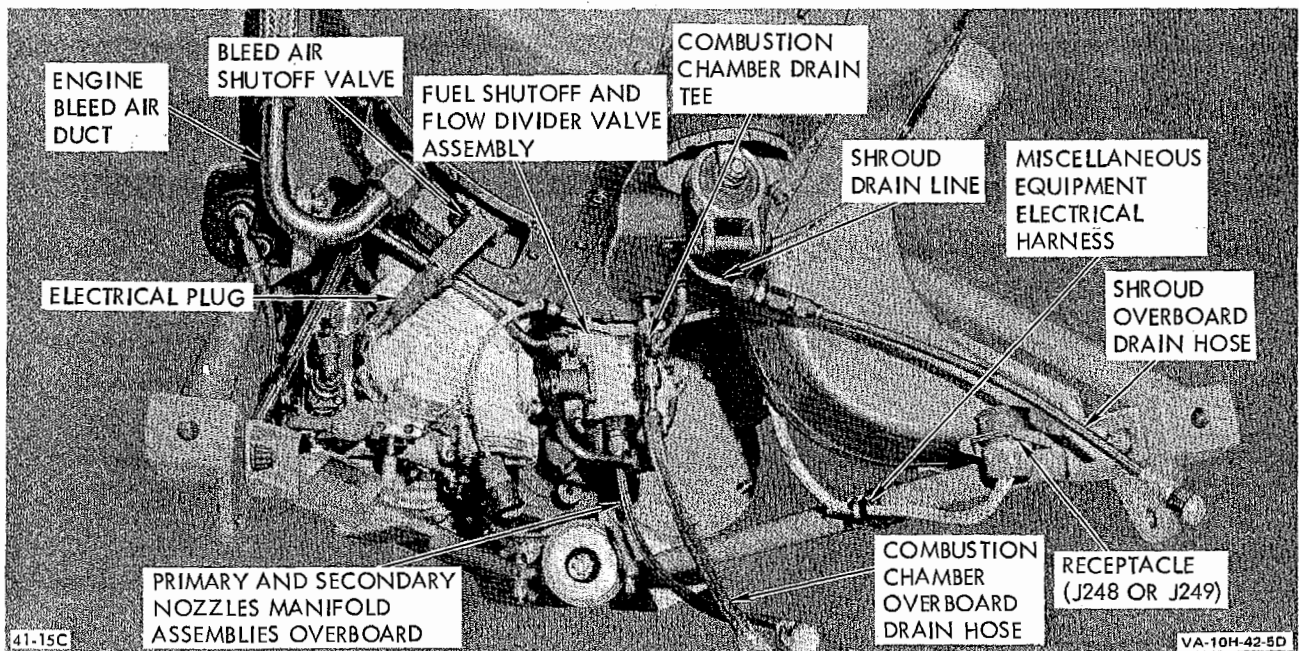
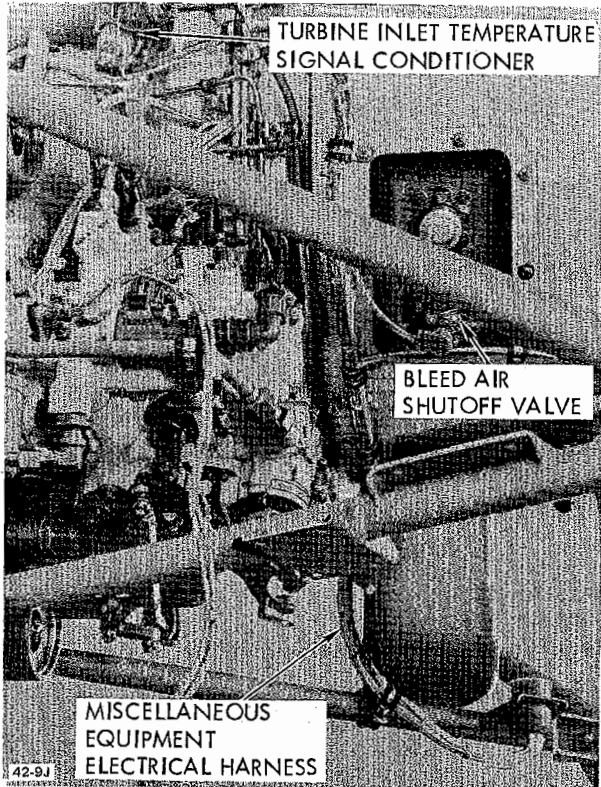


Figure 2-2. Engine Buildup (Sheet 3)

4. Route harness forward and butterfly-clamp to shielded wire going to turbine inlet temperature transducer (engines having T.O. 1L-10A-501 incorporated). Connect miscellaneous electrical harness plug to the turbine inlet temperature signal conditioner.

NOTE If turbine inlet temperature signal conditioner is not included (engines not having T.O. 1L-10A-501 incorporated), butterfly-clamp to upper engine mount truss and connect plug to turbine inlet temperature bypass assembly.



INSTALLING OIL PRESSURE TRANSMITTER

1. Attach oil pressure transmitter mounting bracket to lower left leg of engine mount truss in position as shown. Attach with screws, washers, and nuts.
2. On engines not having T.O. 1L-10A-584 incorporated, install packing (NAS617-4), nut, and elbow in pressure port of oil pressure transmitter.
- 2A. On engines having T.O. 1L-10A-584 incorporated, install packing (NAS617-4), nut, and fitting in pressure port. Install cap on upper port of fitting and safety with lockwire (MS20995F32). Attach chain of cap to fitting with lockwire.
- 2B. Position transmitter in mounting bracket and attach with screws, washers, and nuts.

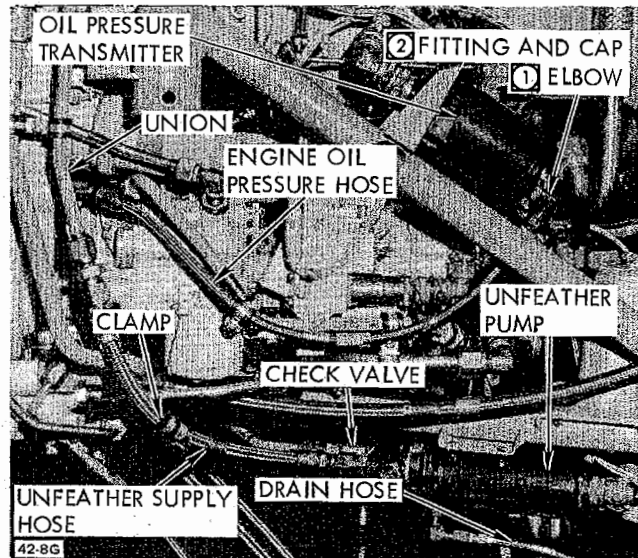
3. Remove plug from oil pressure port on engine gear case and install packing (NAS617-4) and union.
4. Connect 45-degree end of engine oil pressure hose to union in gear case.
- 4A. On engines not having T.O. 1L-10A-584 incorporated, connect straight end of engine oil pressure hose to elbow in pressure transmitter. On engines having T.O. 1L-10A-584 incorporated, connect straight end of engine oil pressure hose to lower port of fitting in pressure transmitter. Clamp hose as shown.
5. Connect electrical plug of miscellaneous equipment electrical harness to transmitter and safety with lockwire (MS20995F32).

INSTALLING UNFEATHER PUMP

1. Install packing (NAS617-6) and check valve in OUT port of pump.

NOTE Check valve to be installed with arrow pointing away from unfeather pump.

2. Install packing (NAS617-6) and union in IN port of pump. Connect 45-degree elbow end of unfeather supply hose to union.
3. Install packing (NAS617-4), nut, and elbow in drain port of pump. Connect pump drain hose to elbow in pump.
4. Install pump to bracket, located on engine mount tube (left), with bolts, washers, and nuts.
5. Connect electrical plug of miscellaneous equipment electrical harness to pump and safety with lockwire (MS20995F32).



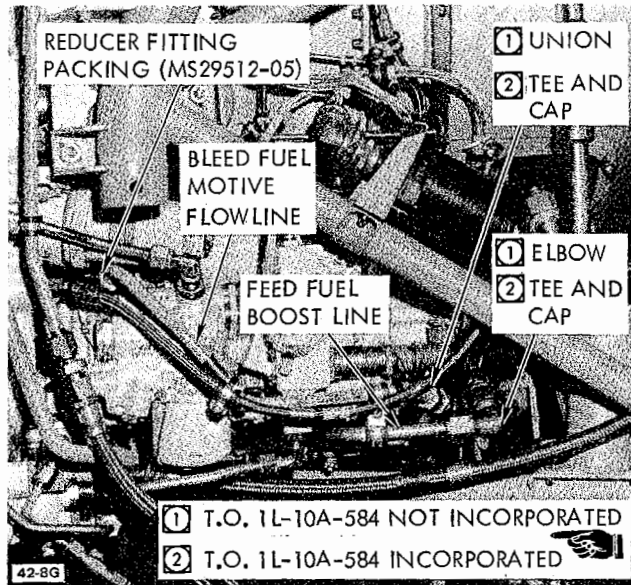
- ① T.O. 1L-10A-584 NOT INCORPORATED
- ② T.O. 1L-10A-584 INCORPORATED

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Figure 2-2. Engine Buildup (Sheet 4)

INSTALLING FEED FUEL BOOST LINE AND HOSE

1. Connect feed fuel boost line to union in outlet port of fuel booster pump. Route line as shown.



- 3B. Cap tee and safety cap with lockwire (MS20995 F32). Attach loose end of cap chain with lockwire (MS20995 F32) to tee.

4. Butterfly clamp motive flow line to engine oil pressure hose and to feed fuel boost line.
5. Clamp bleed fuel motive flow line to slip on engine.

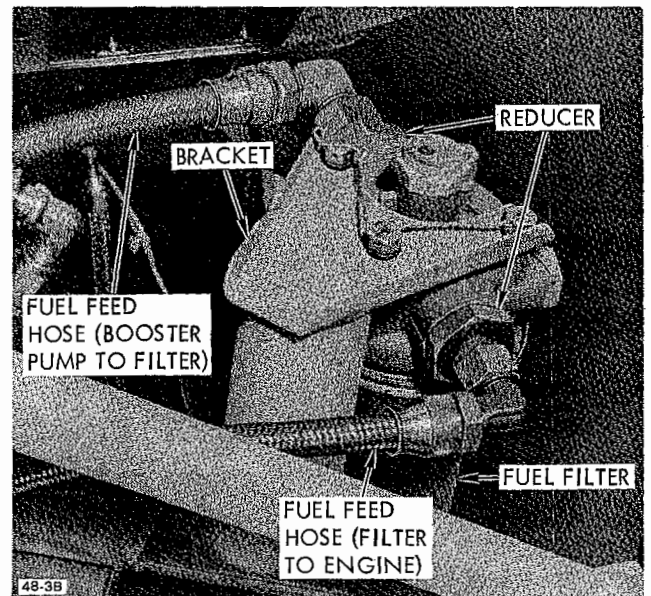
INSTALLING FUEL FILTER

1. Install reducers with packings (MS29512-12) in outlet and inlet port of filter.
2. Attach bracket to fuel filter with three bolts and washers. Safety with lockwire (MS20995 F32).
3. Attach bracket to fuel filter on mounting pad located on engine mount tube (left) with bolts, washers, and nuts.
4. Connect fuel feed hose assembly (filter to engine inlet) to reducer. Connect fuel feed hose assembly (booster pump to fuel filter) to reducer.

2. On engines not having T.O. 1L-10A-584 incorporated, install elbow on line and connect straight end of fuel feed hose to elbow.
- 2A. On engines having T.O. 1L-10A-584 incorporated, install tee on line with bulkhead end of tee pointing toward engine. Connect straight end of fuel feed hose to bulkhead end of tee.
- 2B. Cap tee and safety cap with lockwire (MS20995 F32). Attach loose end of cap drain with lockwire (MS20995 F32) to tee.

INSTALLING BLEED FUEL MOTIVE FLOW LINE

1. Remove plug from fuel control low-pressure bleed port of engine fuel pump and install reducer fitting and packing (MS29512-05).
2. Connect bleed fuel motive flow line to reducer fitting installed in engine fuel pump. Route line as shown.
3. On engines not having T.O. 1L-10A-584 incorporated, install union on motive flow line and connect motive flow hose to union.
- 3A. On engines having T.O. 1L-10A-584 incorporated, install tee, with side port of tee pointing up, on motive line and connect motive flow hose to tee.

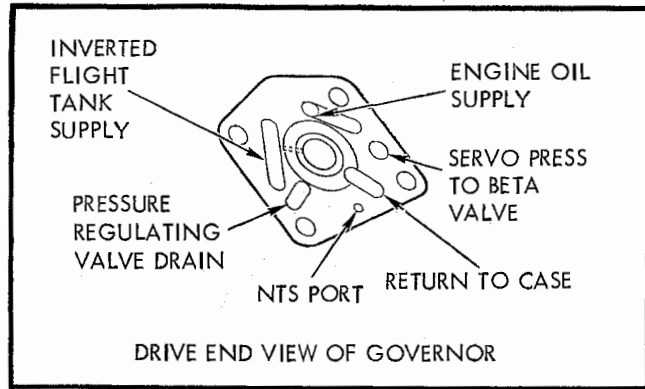
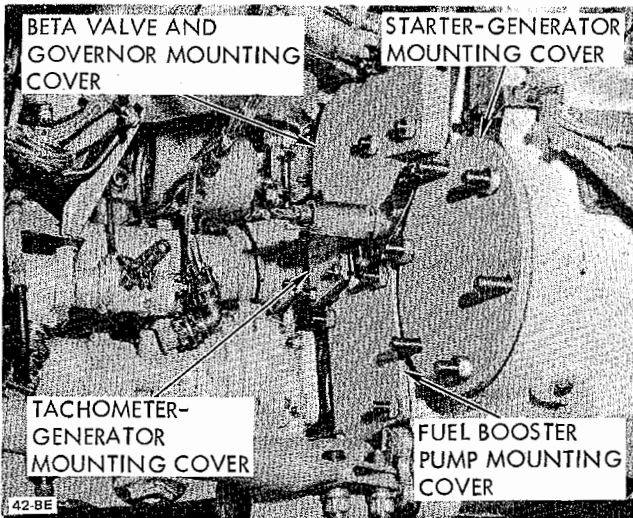


INSTALLING TACHOMETER-GENERATOR

1. Remove retaining nuts and gearbox mounting cover.

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Figure 2-2. Engine Buildup (Sheet 5)



2. Position gasket (MS9134-01) and tachometer-generator on engine gearbox with electrical receptacle facing upward. Attach with nuts and washers. Torque nuts to 20 inch-pounds.
3. Connect electrical plug and safety with lockwire (MS20995 F32).

- 1A. On engines not having T.O. 1L-10A-584 incorporated, remove plug from bias pressure port on top of Beta valve and install plug and packing (MS28775-010). Safety with lockwire (MS 20995 F32).
- 1B. On engines having T.O. 1L-10A-584 incorporated, remove plug from bias pressure port on top of Beta valve and install reducer fitting and packing (MS28775-010).

2. Lubricate packing (MS9241-041 and MS9241-011) with petrolatum (VV-P-236) and position on mounting surface of beta valve.

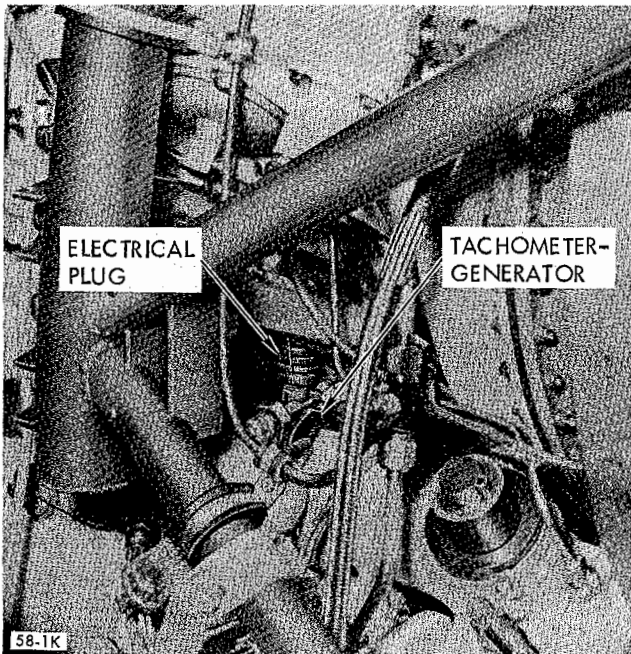
NOTE Lubricate beta valve spline before installing beta valve.

3. Install beta valve to engine gearbox with three bolts and washers. (Actuating arm must point downward.) Torque from 50 to 70 inch-pounds.
4. Install packing (MS9241-010) on both ends of the two governor beta housing oil transfer tubes.

Caution Check that tubes are clean and clear of foreign matter.

5. Insert the short oil transfer tube into the beta valve housing approximately 0.75 inch.
6. Remove plug from governor inverted flight oil supply port and install union and packing (NAS617-6).
7. Remove plug from unfeather pressure port of governor and install elbow, nut, washer, and packing (NAS617-6).
8. Insert the long oil transfer tube into the governor housing.

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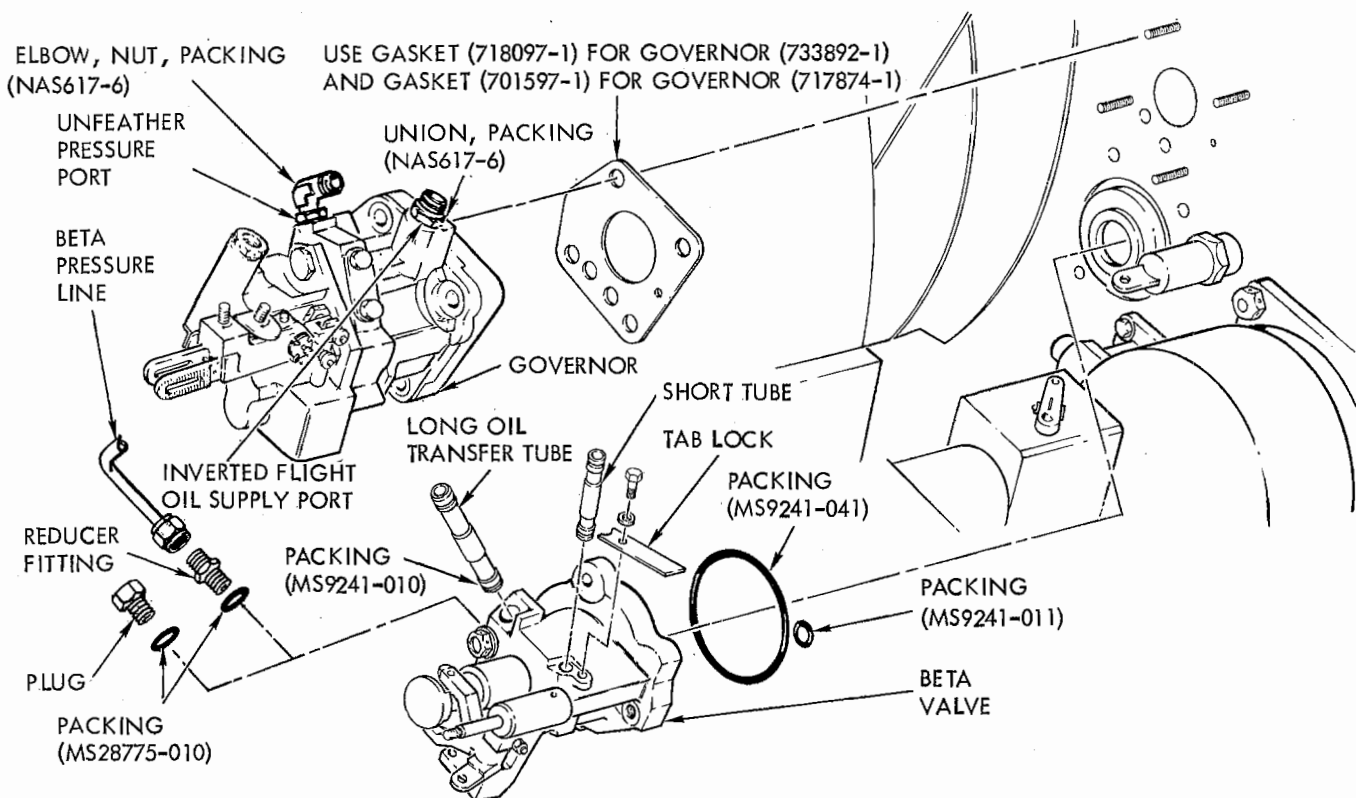


INSTALLING BETA VALVE AND GOVERNOR

NOTE Beta valve must be installed prior to governor.

1. Remove retaining nuts and gearbox mounting cover.

Figure 2-2. Engine Buildup (Sheet 6)



9. Position the governor pad gasket (718097-1) to conform with the mounting boss on the engine gearbox. Ensure that holes in gasket align with ports in governor and governor mounting pad on engine.

Caution Never attempt to remove or install the governor without first ensuring that the shorter oil transfer tube is retracted into the beta valve housing.

NOTE Lubricate the spline before installing the governor assembly.

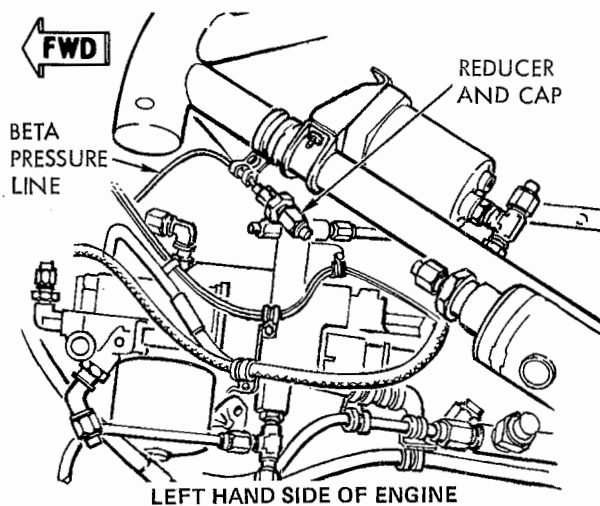
10. Slowly slide the governor assembly onto the gearbox mounting studs. Simultaneously, guide the longer oil transfer tube into the mating hole in the beta valve housing.
11. Use governor wrench (T3379) to install the four washers and nuts to retain the propeller governor. Tighten sufficiently to secure the governor and insure no leakage occurs.
12. Slide the shorter oil transfer tube from the beta valve housing into the governor housing.

NOTE If the short tube is not properly aligned for installation, loosen beta valve retaining screws and rotate the beta housing slightly.

13. Center the short tube between the housings and lock in position with the tab and screw. Safety

the screw to beta valve housing with lockwire (MS20995F32).

14. On engines having T.O. 1L-10A-584 incorporated, install Beta pressure line on to reducer fitting. Route line to left side of engine and butterfly clamp line to engine mount truss.



15. On engine having T.O. 1L-10A-584 incorporated, install reducer on Beta pressure line. Cap reducer and safety cap with lockwire (MS 20995F32). Attach loose end of cap chain with lockwire (MS20995F32) to clamp holding Beta pressure line.

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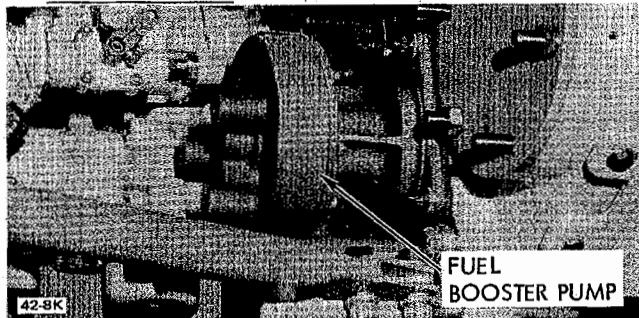
Figure 2-2. Engine Buildup (Sheet 6A)

INSTALLING FUEL BOOSTER PUMP

1. Install reducer and packing (MS29512-12) in inlet port of fuel booster pump.
2. Install union and packing (MS29512-08) in outlet port of fuel booster pump.
3. Remove retaining nuts and gearbox mounting cover.

NOTE Lubricate spline shaft of pump with grease (MIL-G-81322)

- Install plain (phenolic) washer (2W1P21-18-62) against pump flange and flat washer (LD 153-0011-0015) under nut.
- 3A. Treat engine fuel booster pump pad area and both sides of phenolic spacer with light coat corrosion preventative MIL-C-16173.
 4. Position gasket (MS9135-01), spacer (305-480318); and gasket (MS9135-01) over mounting studs and install fuel booster pump, as shown, with four nuts and eight washers. Torque nuts from 60 to 85 inch-pounds.



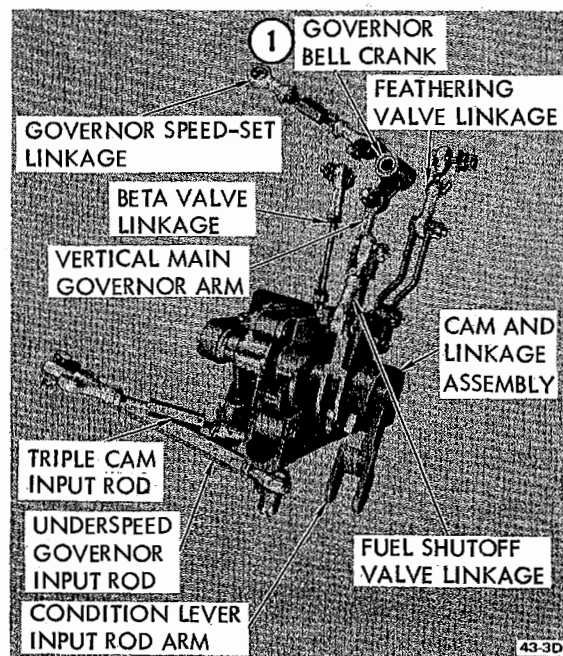
5. Connect inlet hose assembly to reducer in inlet port.
6. Connect (90-degree elbow end) outlet hose assembly to union in outlet port.
7. After installation apply a light coat corrosion preventative compound MIL-C-16173 to exposed spacer area.

INSTALLING AND RIGGING CAM AND LINKAGE ASSEMBLY

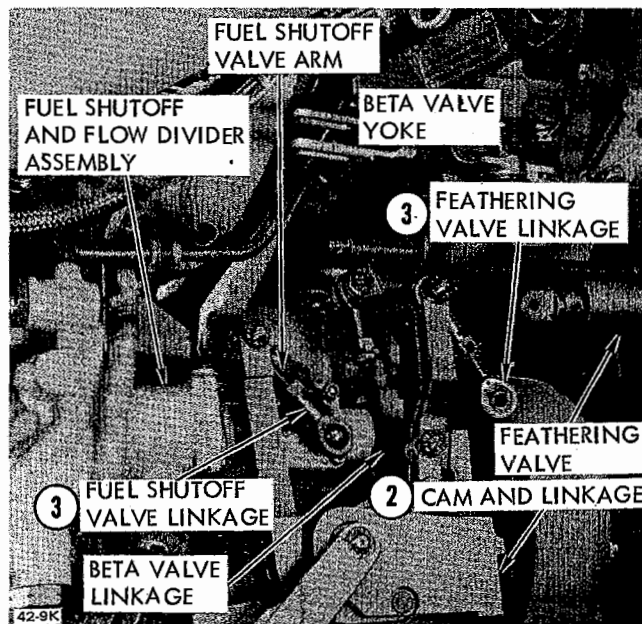
NOTE The fuel booster pump must be installed prior to cam and linkage assembly. Inspect rod end bearings for lubrication by positioning ball so that flat is outside of raceway. If not lubricated, pack flat full of grease MIL-G-23827 by hand. Turn ball back to original position within the raceway and remove excess grease with lint free cloth.

- Prior to installation of cam and linkage assembly, lubricate all rod end bearings with grease (MIL-G-28327).

1. Remove cotter pin, bolt, washers, and nut attaching governor bell crank to cam and linkage assembly. Remove cotter pin, bolt, washers, and nut attaching governor speed-set linkage to bell crank. Retain hardware for reinstallation.

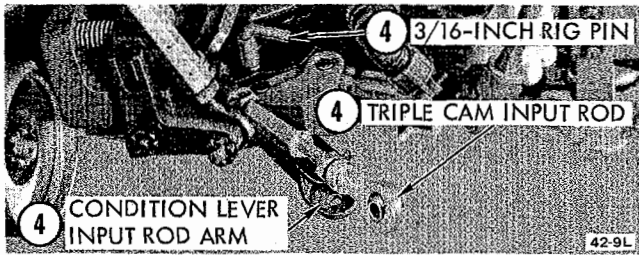


2. Position cam and linkage on booster pump. Ensure that both the beta valve linkage and vertical main governor arm are forward of the fuel shutoff and flow divider valve assembly. Align mounting holes and insert three bolts and washers.
3. Align fuel shutoff valve linkage and feathering valve linkage. Torque cam and linkage mounting bolts from 50 to 70 inch-pounds.



4. Place triple cam input rod in the FLIGHT IDLE position and the condition lever input rod arm in the TO/LAND position so that a 3/16-inch diameter rig pin can be inserted through the bushing in the triple cam, speed set cam, and the main linkage bracket.

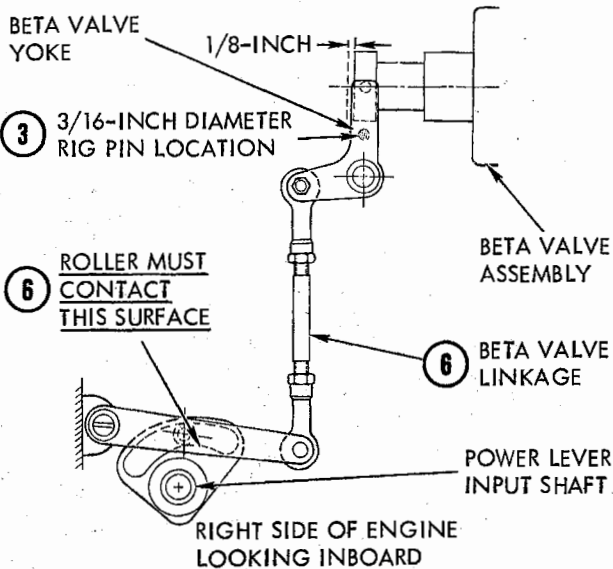
Figure 2-2. Engine Buildup (Sheet 7)



5. Insert a 3/16-inch diameter rig pin into beta valve yoke from left side.

Caution During rigging of the Beta valve assembly, the oil transfer sleeve and cap 711074-2, -4 or -5 is moved manually inboard to align the Beta valve positioning lever with its mating rod end of cam and linkage assembly. When accomplishing alignment, do not pull the sleeve and cap out of Beta valve more than 1/8 inch from its rigged, pin installed, position. Movement of sleeve and cap in excess of 1/8 inch allows the sleeve oil ports to pass over inner seal ring and felt strip which is used to keep sleeve clean. Damage may result to seal ring or cause fibers from the felt strip to be pulled across seal ring 69302-18 causing oil leakage.

- Prior to any movement of the power lever ensure all rigging pins have been removed to preclude damage to cam and linkage assembly.

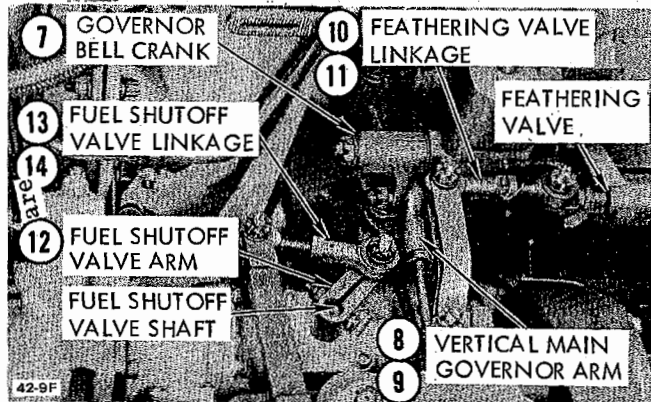


6. Connect beta valve linkage to beta valve yoke and adjust its length until the cam roller rides on the lower working surface of cam (lower surface of slot). Bend lock washer tabs and safety with lockwire (MS20995N25). Position linkage to yoke so that linkage is inboard and attach with bolt (with head of bolt outboard, insert bolt through yoke then linkage), washers, and castellated steel self-locking nut. Safety with cotter pin (MS24665-130).

NOTE Check inspection holes in rod ends for adequate thread engagement.

- Ensure that link is free of play.

7. Position governor bell crank (and speed-set linkage) onto beta valve so that the scribe marks align and attach with washer and nut. Safety with cotter pin (MS24665-132).
8. Connect vertical main governor arm to bell crank and attach with bolt (with head of bolt forward, insert bolt through vertical main governor arm then through bell crank), washers, and castellated steel self-locking nut removed in step 1. Safety with cotter pin (MS24665-130).
9. Rotate bell crank clockwise (looking forward) so that linkage is loaded and all play is removed. Adjust arm to align scribe lines on bell crank and beta valve housing. Scribe lines shall be aligned within 1/16 inch. Bend lock washer tabs and safety with lockwire (MS20995N32).
10. Adjust length of feathering valve linkage to align with mating hole in feather valve and to take up all play in feathering valve (lever will start to move). Check the inspection holes in feathering valve linkage for adequate thread engagement. Ensure that the feathering valve cam rollers ride on the working surface of the feathering cam. Bend lock washer tabs and safety with lockwire (MS20995N32).
11. Attach feathering valve linkage to feathering valve with bolt (with head of bolt toward center line of engine, insert bolt through linkage then through lever), washers, and castellated steel self-locking nut. Safety with cotter pin (MS24665-130).



12. Rotate engine fuel shutoff valve arm until arrow on lever points to AUTO (1:30 o'clock position when looking at lever). Ensure that scribe line on end of fuel shutoff valve shaft is horizontal on AUTO side and that retaining bolt is safety-wired to lever.
13. Adjust length of fuel shutoff valve linkage to align with mating hole in engine fuel shutoff valve arm. Check the inspection holes in fuel shutoff valve linkage for adequate thread engagement. Ensure that rod ends properly aligned and tighten nut and lockwasher, on fuel shutoff valve linkage, against rod end. Bend tabs on lockwasher to secure nut.

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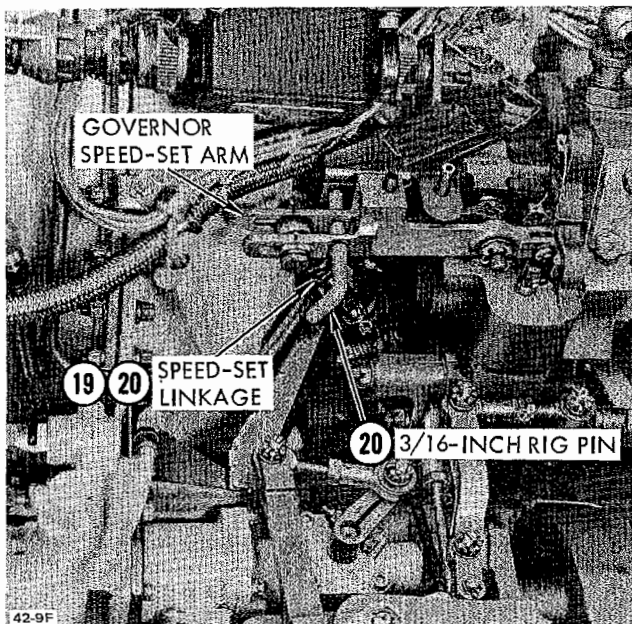
Figure 2-2. Engine Buildup (Sheet 8)

14. Attach fuel shutoff valve linkage to fuel shutoff valve arm with bolt (with head of bolt toward centerline of engine, insert bolt through linkage then through arm), washer, and nut. Safety with cotter pin (MS24665-130).
15. Rotate condition lever input rod arm 90 degrees forward to the FEATHER AND FUEL SHUT-OFF position.
16. Ensure that engine fuel shutoff valve lever remains at the closed position (indicated by the arrow on valve arm pointing to CLOSED). Ensure that engine feathering valve has been actuated and that all backlash is removed from system.

NOTE Feathering valve lever travel should be sufficient to see the scribe mark on the engine feathering valve plunger (feathering valve is open when scribe mark is visible).

17. Rotate condition lever to TO/LAND position and install 3/16-inch rig pin. See step 4.
18. Attach governor speed-set linkage to governor bell crank with bolt, washers, and castellated steel self-locking nut removed in step 1. Safety with cotter pins (MS24665-130).

NOTE With head of bolt forward, insert bolt through vertical arm of governor bell crank then through speed-set linkage. Thread shouldered washer onto bolt (shoulder towards rod end), then install washers and nut.



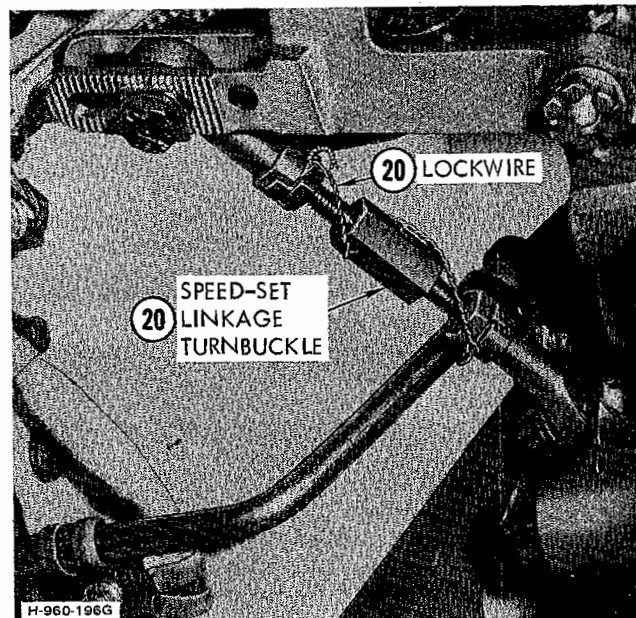
Caution Ensure that nut and cotter pin is installed.

19. Attach speed-set linkage to governor speed-set arm with bolt, washer, serrated plate, and nut. Position the serrated plate so that the serrations and scribe marks on the plate and governor speed-set arm are in alignment. Tighten nut and safety with cotter pin (MS24665-132).

NOTE With head of bolt down, insert bolt through washer, serrated plate, clevis of speed-set arm, speed-set linkage, clevis of speed-set arm, washers, and nut.

20. Adjust length of speed-set linkage (by turning turnbuckle) to permit free fit of 3/16-inch diameter rig pin in governor speed-set arm and bracket support plate. Check inspection holes in rod ends for adequate thread engagement. Tighten locknuts and bend one tab (with lockwire hole) of lock washer over locknuts, bend two tabs (without lockwire hole) over rod end. Safety turnbuckle to lock washers (unbent tab with lockwire hole) with lockwire (MS20995-F32).

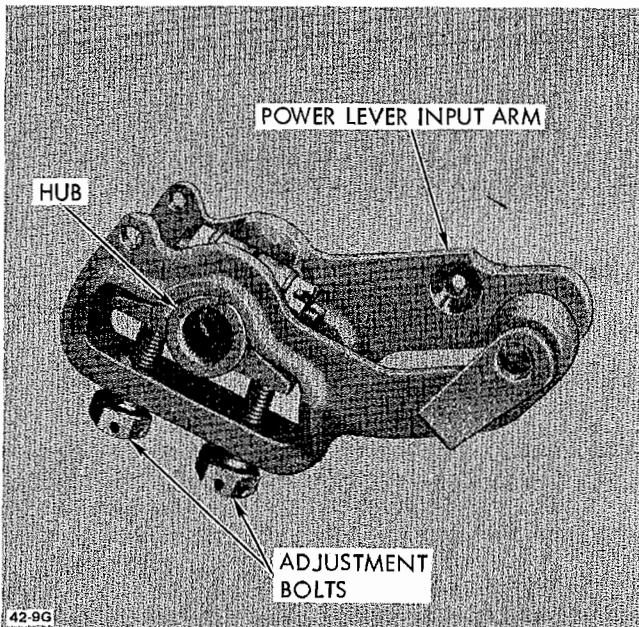
Caution The speed-set linkage turnbuckle must be safetied to prevent its turning.



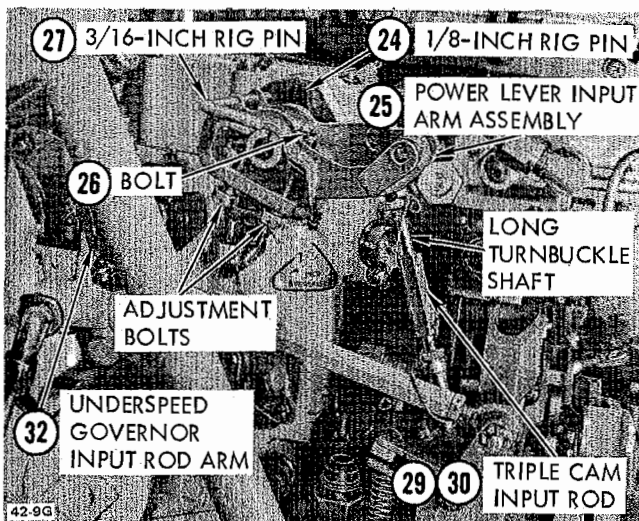
21. Remove 3/16-inch diameter rig pin from governor arm and bracket support plate.
22. Assemble power lever input arm assembly as follows. Place hub into power lever input arm so that locking hole in hub is through cutout in arm. Insert adjustment bolts into arm equally and tighten until arm rides in groove or hub.

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Figure 2-2. Engine Buildup (Sheet 9)



23. Rotate fuel metering valve shaft and assure travel is 120 degrees or greater.
24. Place fuel metering valve shaft in 60-degree position and install 1/8-inch diameter rig pin in metering valve pointer.



25. Install power lever input arm assembly on fuel metering valve shaft so that the 3/16-inch diameter rig pin hole in the input arm assembly will align with the 3/16-inch diameter rig pin hole in the fuel control body within one spline.

NOTE When properly installed, the arm of the power lever input arm assembly will be on the right side of engine.

26. Insert bolt through locking hole in hub of the power lever input arm assembly and attach with washer and castellated steel self-locking nut. Safety with cotter pin (MS24665-134).

27. Align rig pin holes in power lever input arm assembly and fuel control body, using adjustment bolts in the power lever input arm assembly. Install 3/16-inch diameter rig pin and safety adjustment bolts with lockwire (MS20995N25).
28. Remove 1/8-inch diameter rig pin from fuel control pointer.
29. With 3/16-inch diameter rig pins in the power lever input arm assembly (step 27) and in the cam and linkage assembly (step 4), adjust the triple cam input rod to align with mating countersink hole (located in mid-position of arm) in the power lever input arm assembly. Check the inspection holes in triple cam input rod for adequate thread engagement. Tighten locknuts and bend one tab (with lockwire hole) of lock washer over locknuts, bend two tabs (without lockwire hole) over rod end. Safety turnbuckle to lock washers (un-bent tab with lockwire hole) with lockwire (MS20995N32).

NOTE Ensure that the end of the triple cam input mod that connects to power lever arm assembly has the longer turnbuckle shaft.

30. Insert triple cam input rod attachment bolt through countersink hole of power lever input arm assembly then the triple cam input rod, clearance/retaining washer (small diameter face next to rod end), and nuts. Tighten castellated steel self-locking nut and safety with cotter pin (MS24665-134).
31. Remove rig pins from power lever input arm assembly (step 27), beta valve yoke (step 5) and cam and linkage assembly (step 4).
32. Install underspeed governor input rod arm onto splined underspeed governor input shaft of engine fuel control. The arm is to be installed so that the centerline of the 1/4-inch diameter bolt hole in arm is aligned within one spline with respect to the index pointer attached to the shaft. The shoulder-cut on the arm should face away from engine. Attach with bolt, spacer, and castellated steel self-locking nut. Safety with cotter pin (MS24665-130).
33. Position power lever input arm assembly to 0 degree and adjust underspeed governor input rod so that underspeed governor is positioned to it's MAX stop.
34. Cycle power lever input arm assembly from 0 degree to 120 degrees and back to 0 degree. Check that movement is smooth and without sign of binding.

NOTE Ensure that underspeed governor is positioned to it's MAX stop with power lever input arm assembly positioned to 0 degree.

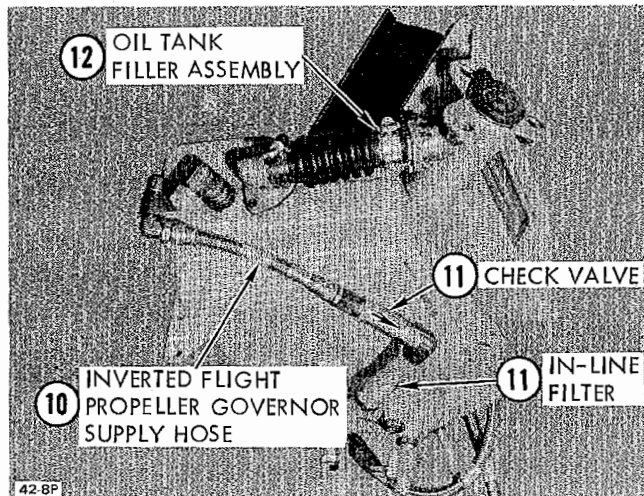
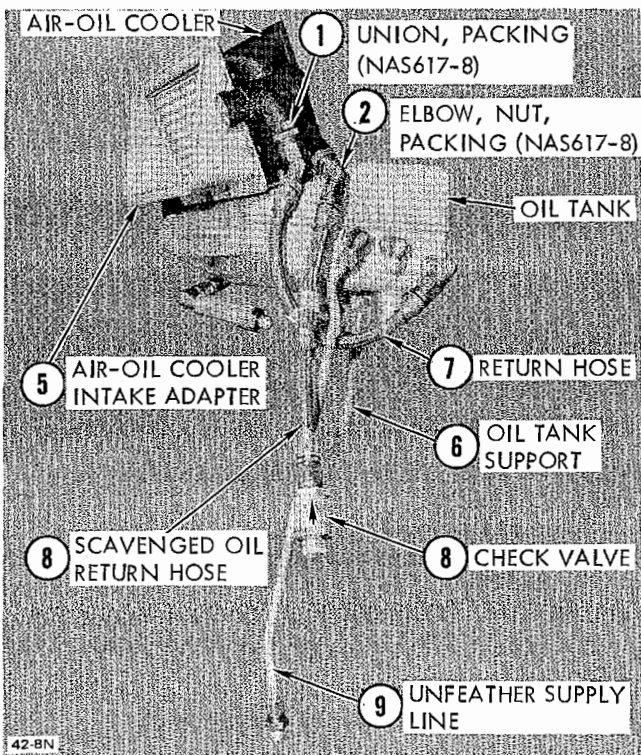
VA-10H-42-31A

Figure 2-2. Engine Buildup (Sheet 10)

AIR-OIL COOLER AND OIL TANK BUILDUP

1. Install union and packing (NAS617-8) in thermostatic valve outlet port on left side of air-oil cooler.
 2. Install elbow, nut, and packing (NAS617-8) in air-oil cooler inlet port.
 3. Position bolts through air-oil cooler bracket and attach bracket to oil tank with pins, washers, and cotter pins (MS24665-132).
- NOTE** A new air-oil cooler support bracket (305-470025) is installed when T.O. 1L-10A-640 is incorporated.
This replaces bracket (305-470023) and eliminates adjustment provisions and hole wear.
4. Position air-oil cooler onto bolts (installed step 3) so that the thermostatic valve is on the side opposite the filler cap assembly. Attach with nuts and washers.
 5. Position air-oil cooler intake adapter to air-oil cooler and attach with bolts, washers, and nuts.
 6. Attach oil tank support (rod end) to tank with bolt, washer, and nut.
 7. Connect 45-degree elbow end of air-oil cooler to oil tank return hose assembly to union in thermostatic valve outlet port. Connect other end of hose assembly to elbow in tank.
 8. Install check valve into (arrow pointing toward hose) scavenged oil return hose assembly. Connect other end of hose to elbow in thermostatic valve inlet port.

9. Connect unfeather supply line to elbow in oil tank. Install union in other end of line.
10. Connect inverted flight propeller governor supply hose assembly (90-degree elbow end) to elbow in oil tank.
11. Assemble check valve (arrow pointing toward elbow), elbow, and in-line filter together packing (NAS617-6) on each side of elbow. Connect check valve to inverted flight propeller governor supply hose assembly.
12. Position gasket (305-470015) and oil tank filler assembly onto oil tank mounting flange. Attach with bolts, washers, and nuts.



INSTALLING AIR-OIL COOLER AND OIL TANK

1. Position oil tank on engine and attach with bolts, washers, spacer, and shims.

NOTE The spacer and shims are used on the front mounting lug of the oil tank to ensure a clearance of 0.09 inch between tank and engine as shown.

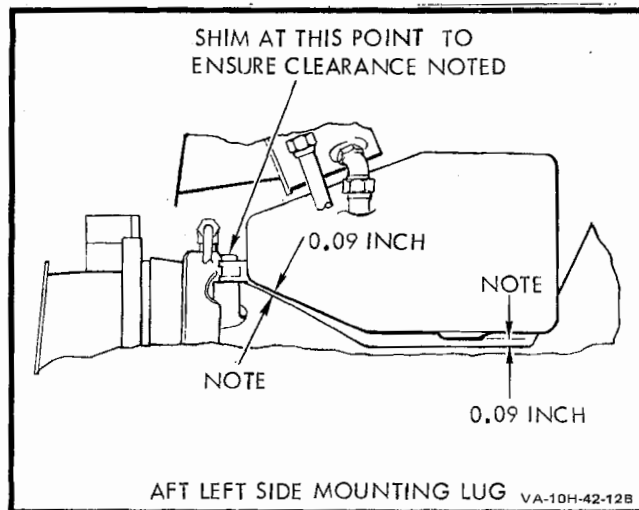
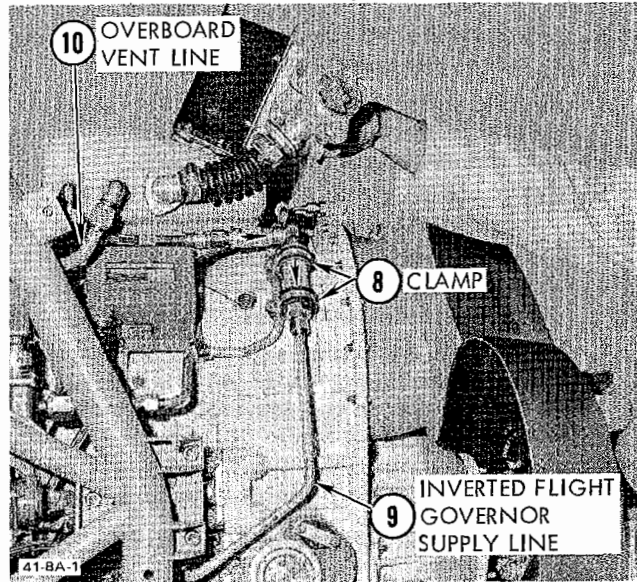


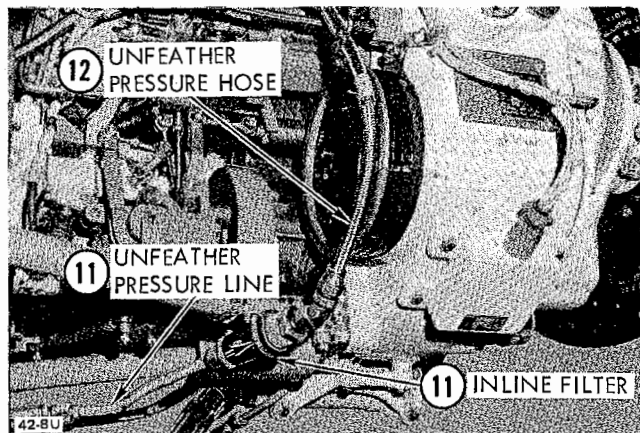
Figure 2-2. Engine Buildup (Sheet 11)

2. Attach oil tank support to upper left side of engine gearbox. Secure with bolt and washer.
3. Install elbow, nut, and packing (NAS617-6) in engine gearbox vent port.
4. Connect engine case vent hose assembly (45-degree elbow end) to elbow in tank. Connect other end to elbow in gearbox vent port. Butterfly-clamp to scavenged oil return hose assembly.
5. Install union and packing (NAS617-8) in outlet port of oil-to-fuel heater.
6. Connect scavenged oil return line to union in outlet port of oil-to-fuel heater. Connect other end to check valve in scavenged oil return hose assembly. Butterfly-clamp line to unfeather supply line.

10. Position overboard vent line under engine mount truss and connect to elbow in oil tank. Clamp line to clip installed under engine shroud screw. Install union in end of line and connect overboard vent hose assembly.



11. Assemble in-line filter to unfeather pressure line with arrow pointing away from line. Connect pressure line to check valve in pressure port of unfeathering pump and butterfly-clamp in-line filter to right side engine mount tube.
12. Connect unfeather pressure hose assembly (45-degree elbow end) to in-line filter. Connect other end to elbow in propeller governor.



OIL TANK AND LINES OBSTRUCTION AND PRESSURE CHECK

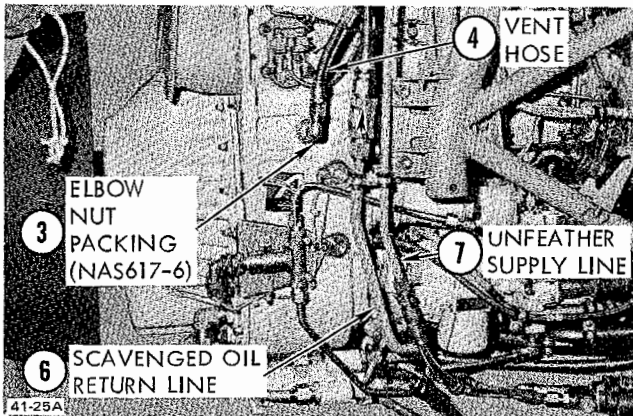
1. Disconnect engine case vent hose at elbow in gearbox vent port and cap vent hose.
2. Disconnect inverted flight governor supply line at union in governor, and cap supply line.
3. Disconnect unfeather supply hose at union in unfeather pump, and cap supply hose.

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NOTE T76 engines, Serial Nos. 500 and subsequent and engines having T.O. 2J-T76-532 incorporated are delivered without fuel/oil heater. Install oil line, Part No. 893238-1, in lieu of Part No. 305-478010-3, on engines without fuel/oil heater installed when T.O. 2J-T76-532 is not incorporated.

- Scavenge oil lines, Part No. 305-478010-3, not used will be shipped to Airesearch Mfg. Co., Phoenix, Arizona, Attn: E. E. Johnson, marked for "FUTURE FUEL/OIL HEATER RETROFIT PROGRAM."
- When fuel/oil heater is damaged or defective on T76 engines prior to Serial No. 500, removal of the heater and change of plumbing to configuration of engine Serial No. 500 and subsequent is authorized.

7. Connect unfeather supply hose assembly to union in unfeather supply line.



8. Clamp (two places) inverted flight governor supply in-line filter to inlet pressure probe line (PT2).
9. Connect inverted flight governor supply line to in-line filter. Connect other end of supply line to union in propeller governor.

Figure 2-2. Engine Buildup (Sheet 12)

4. Plug oil supply nipple on oil tank.
5. Disconnect scavenged oil return line at union in oil-to-fuel heater and connect a clean air supply source with a pressure regulator (set for 5.0 PSI), a shutoff valve and a pressure gage to the scavenged oil return line. On engines having T. O. 2J-T76-532 incorporated, the scavenged oil return line must be disconnected from tee fitting on forward engine housing.
6. Gradually open shutoff valve (up to 5.0 psi) to the scavenged oil return line until full airflow (no pressure buildup on gage) is felt discharging from the overboard vent hose. Close shutoff valve and cap overboard vent hose.

NOTE If pressure buildup is noted, check for obstructions. Check scavenged oil return line first then overboard vent hose.

7. Gradually open shutoff valve until pressure builds up to 5.0 psi. Close shutoff valve. The maximum permissible leakage of the system after 15 minutes is 0.3 psi.

NOTE If leakage is noted, check fittings for tightness.

8. After checking for leakage in step 7, uncap engine case vent hose. The trapped air pressure should relieve quickly. Open shutoff valve until full airflow (no pressure buildup on gage) is felt discharging from the uncapped hose. Close shutoff valve and recap engine case vent hose.

NOTE If pressure does not relieve quickly and/or pressure buildup is noted on gage, check for obstructions. Check engine case vent hose first.

9. Uncap inverted flight governor supply line and open shutoff valve until an airflow is felt discharging from the uncapped line. This flow is limited but should be obtained with a pressure of less than 3.0 psi. Close shutoff valve and recap inverted flight governor supply line.

NOTE If pressure buildup is more than 3.0 psi, check for obstructions. Check inverted flight governor supply line first then check valve and inline filter.

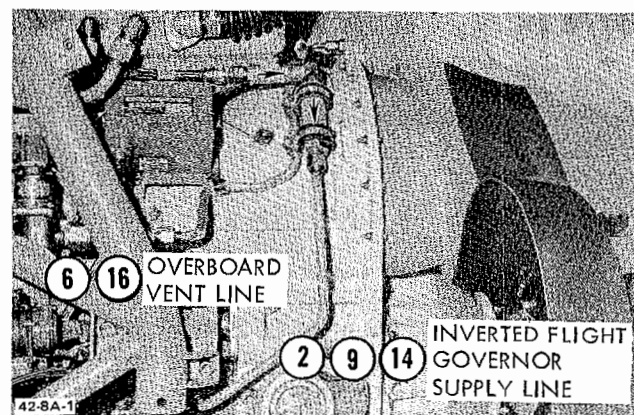
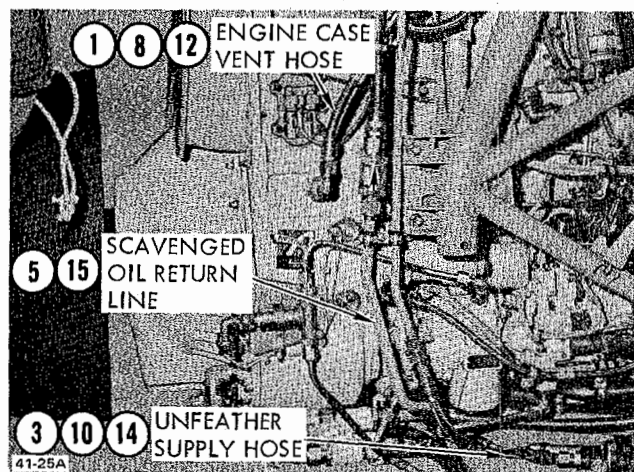
10. Uncap unfeather supply line and open shutoff valve until full airflow (no pressure buildup on gage) is felt discharging from the uncapped line. Close shutoff valve and recap unfeather supply line.

NOTE If pressure buildup is noted on gage, check for obstructions. Check unfeather supply line first.

11. Unplug oil supply nipple on oil tank and open shutoff valve until full airflow (no pressure buildup on gage) is felt discharging from the unplugged nipple. Close shutoff valve.

NOTE If pressure buildup is noted on gage, plug oil supply nipple and open oil filler cap. If full airflow is felt discharging from the opened oil filler cap and full airflow was found in steps 8, 9, and 10, replace oil tank.

12. Uncap engine case vent hose and connect vent hose to elbow in gearbox vent port.
13. Uncap inverted flight governor supply line and connect supply line to union in governor.
14. Uncap unfeather supply hose and connect supply hose to union in unfeathering pump.
15. Disconnect air supply source from scavenged oil return line and connect return line to union in oil-to-fuel heater or tee fitting on forward engine housing (engines having T. O. 2J-T76-532 incorporated).



16. Uncap overboard vent hose.

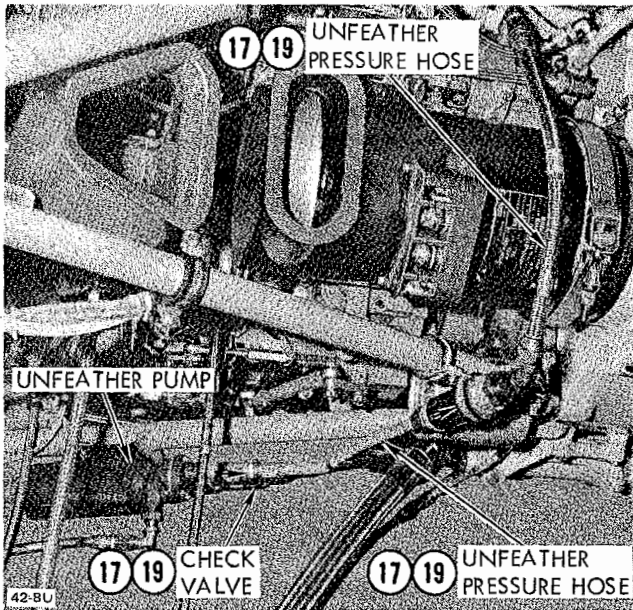
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Figure 2-2. Engine Buildup (Sheet 13)

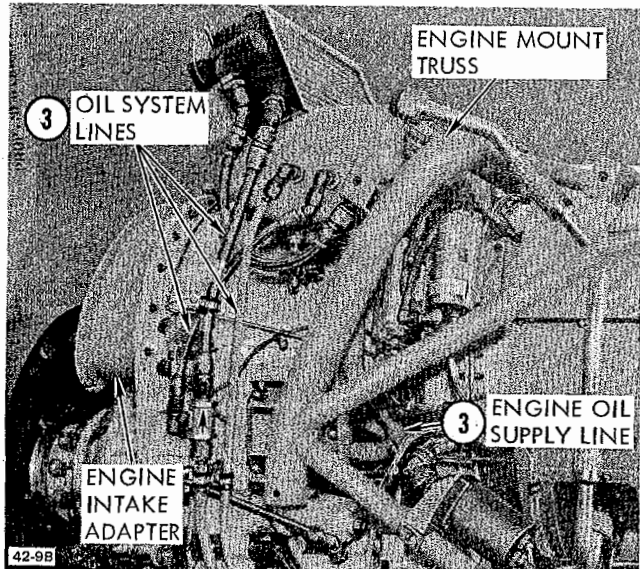
17. Disconnect unfeather pressure line, including check valve in outlet port, from the unfeather pump and the hose at the elbow in propeller governor. Connect the clean air supply source to check valve.
18. Open shutoff valve until an airflow is felt discharging from the unfeather pressure hose. This flow is limited but should be obtained with a pressure of less than 3.0 psi.

NOTE If pressure buildup is more than 3.0 psi, check for obstructions. Check unfeather pressure hose first, then in-line filter.

19. Disconnect the air supply from check valve. Connect unfeather pressure line, including check valve, to outlet port of unfeather pump. Connect unfeather pressure hose to elbow in propeller governor.



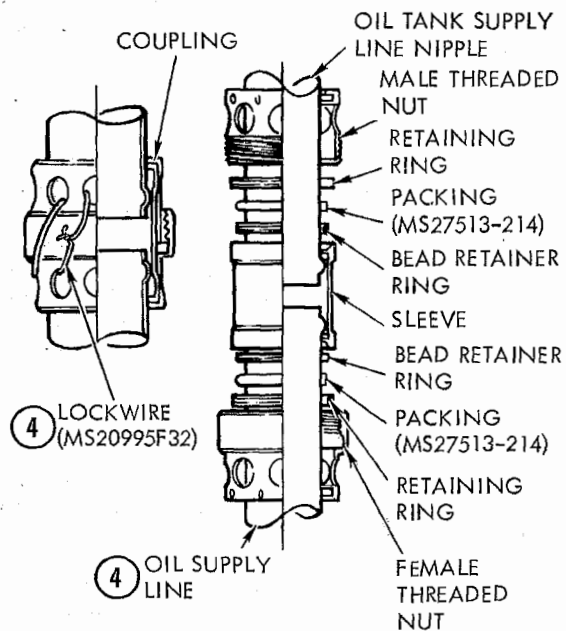
3. Holding the oil supply line at coupling end (lend in line up, mounting flange down), slip oil supply line between engine and oil system lines, engine mount truss. Position oil supply line onto mounting pad.



4. Align coupling end of oil supply line with supply line nipple on tank. Slide coupling sleeve over oil tank supply line nipple until sleeve covers tube bead. Slide both bead retaining rings and packings into sleeve. Slide retaining rings into position and hand-tighten coupling male thread nut into female thread nut. Safety with lockwire (MS20995F32).

INSTALLING ENGINE OIL SUPPLY LINE AND COUPLING

1. Disassemble oil supply line coupling. Position male threaded nut, retaining ring, packing (MS29513-214) and bead retainer ring onto tank supply line nipple. Position female threaded nut, retaining ring, sleeve, packing (MS29513-214) and bead retainer ring onto oil supply line.
2. Position engine oil supply line gasket (305-470012) on gearbox mounting pad.



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Figure 2-2. Engine Buildup (Sheet 14)

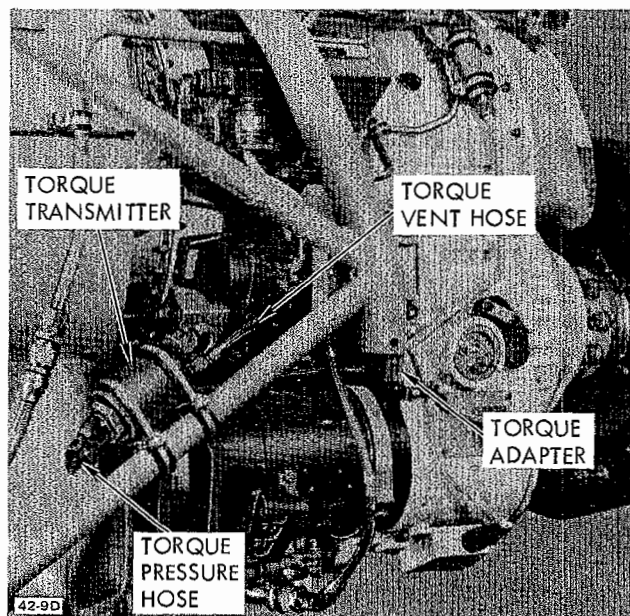
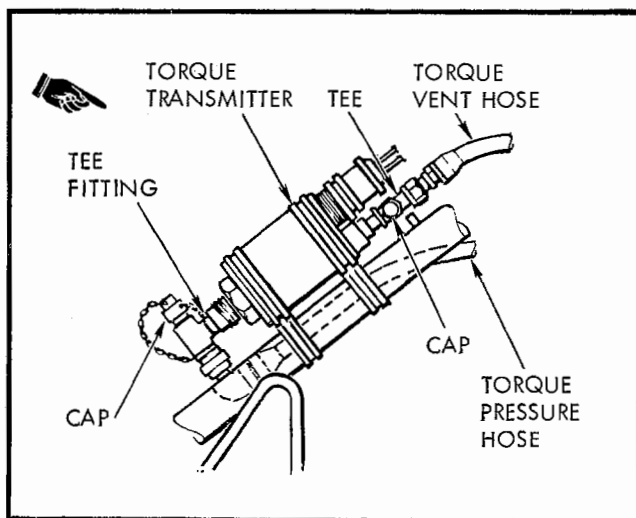
5. Install washers and nuts on oil supply line mounting studs and tighten.

3. Secure transmitter to lower right leg of engine mount truss with four clamps.

NOTE Wrap two pieces of adhesive cork rubber tape (MIL-G-6841D) (0.032 X 0.60 X 3.50 inches) around leg of engine mount truss before installing clamps around leg.

INSTALLING TORQUE TRANSMITTER AND TRANSMITTER ADAPTER

1. On engines not having T.O. 1L-10A-584 incorporated, remove protective plug from vent port of transmitter and install union and packing (NAS617-4).
2. On engines not having T.O. 1L-10A-584 incorporated, remove protective plug from pressure port of transmitter and install elbow, nut, and packing (NAS617-4). Position elbow as shown.
- 2A. On engines having T.O. 1L-10A-584 incorporated, remove protective plug from vent port of transmitter and install tee, nut, and packing (NAS617-4). Position tee as shown.
- 2B. On engines having T.O. 1L-10A-584 incorporated, remove protective plug from pressure port of transmitter and install tee fitting, nut, and packing (NAS617-4). Position tee as shown.
4. Remove retaining nuts and gearbox mounting cover.
5. Install two packings (MS29561-011) in adapter fitting recesses, attach adapter to engine gear case with three screws and safety with lockwire (MS20995F32).
6. Install two unions and packings (NAS617-4) in adapter fitting.
7. Connect vent (90-degree elbow end to union in adapter) and pressure (90-degree elbow end to elbow [engines not having T.O. 1L-10A-584] or tee fitting [engines having T.O. 1L-10A-584] in transmitter) hoses.
8. Connect electrical plug and safety with lockwire (MS20995F32).

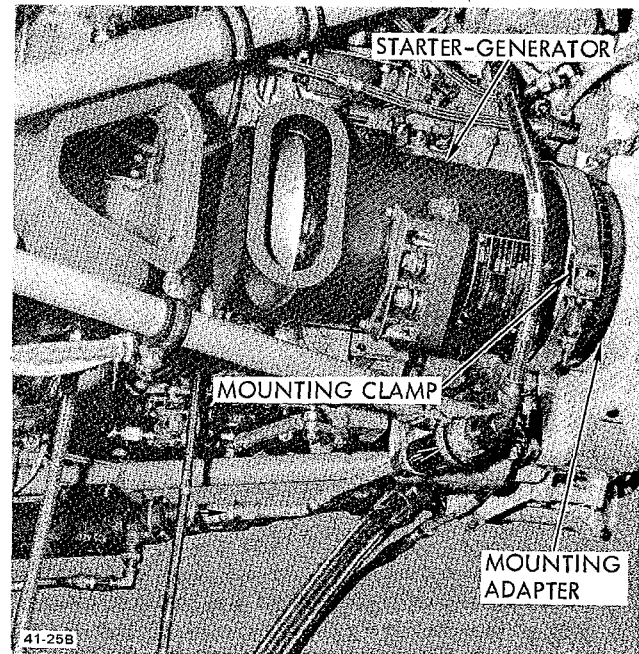
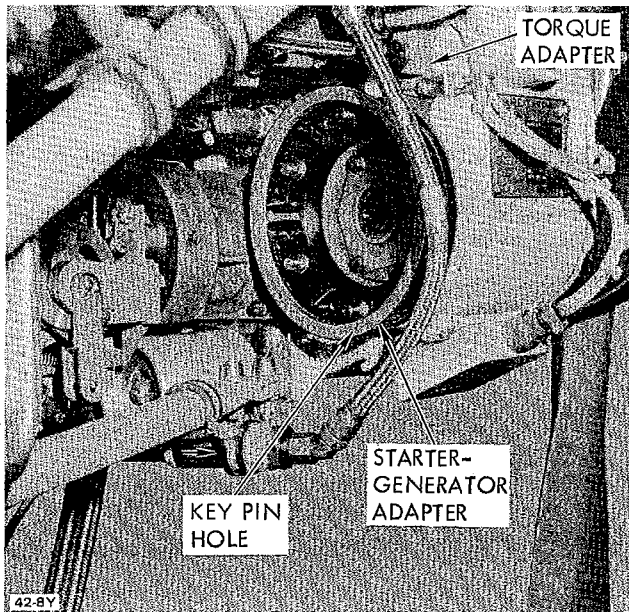


VA-10H-42-33C

Figure 2-2. Engine Buildup (Sheet 15)

INSTALLING STARTER - GENERATOR

1. Position starter-generator mounting adapter onto engine gearbox so that key pin hole is at the 5:30 o'clock position. Attach with six nuts and washers. Torque nuts from 160 to 190 inch-pounds.



NOTE Lubricate spline shaft of starter-generator with grease (MIL-G-21164).

2. Align splines of starter-generator shaft with drive gears and key pin with key pin hole and slide starter-generator against mounting adapter.
3. Install mounting clamp to mounting adapter and starter-generator flange. Tighten clamp and torque from 100 to 120 inch-pounds, back off to below 80 inch-pounds and retighten from 80 to 90 inch-pounds torque.

NOTE While tightening starter-generator mounting clamp, gently shake starter-generator to ensure close correct seat.

Figure 2-2. Engine Buildup (Sheet 16)

PROPELLER BUILD-UP

1. Install the chevron seal (714314-2) on the blade by stretching it over the blade butt. Allow 30 minutes for the seal to return to its original size.

NOTE A phenolic dowel or a cloth wrapped around the seal may be used to stretch the seal over the blade butt.

Caution While handling blades, do not drop or bang the blades on their drive pins.

2. Coat the blade shank with petrolatum (VV-P-236) and position split inner bearing race on shank.

NOTE The split inner bearing race is a serialized set. Ensure that the halves are matched before installing.

3. Position blade to align blade drive pins with leg of yoke.

NOTE Alignment can be determined by matching the blade position number with the position number on the barrel (hub).

4. Slide the blade into the barrel (hub) bore until the butt of the blade rests against the yoke.

Caution Do not hit blade drive pins on yoke.

5. Ensure that the blade drive pin is engaged with the legs of yoke.

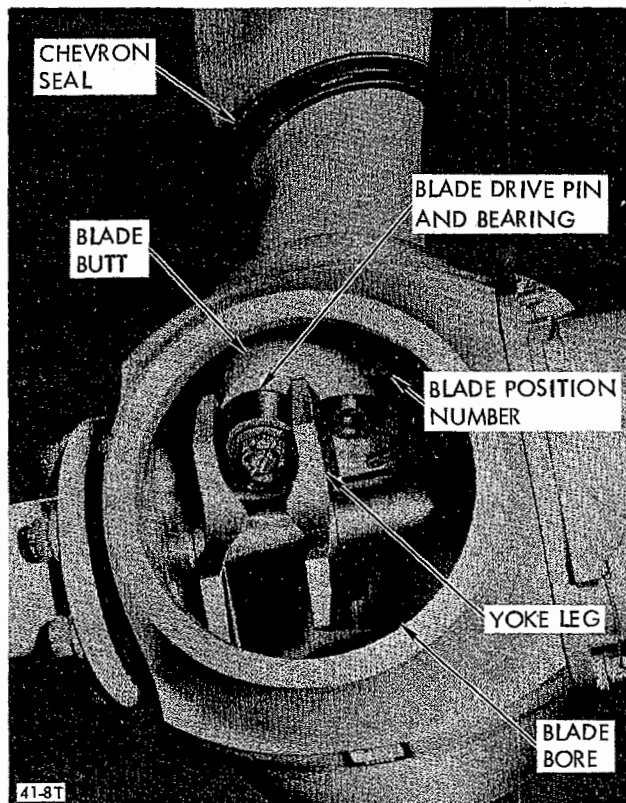
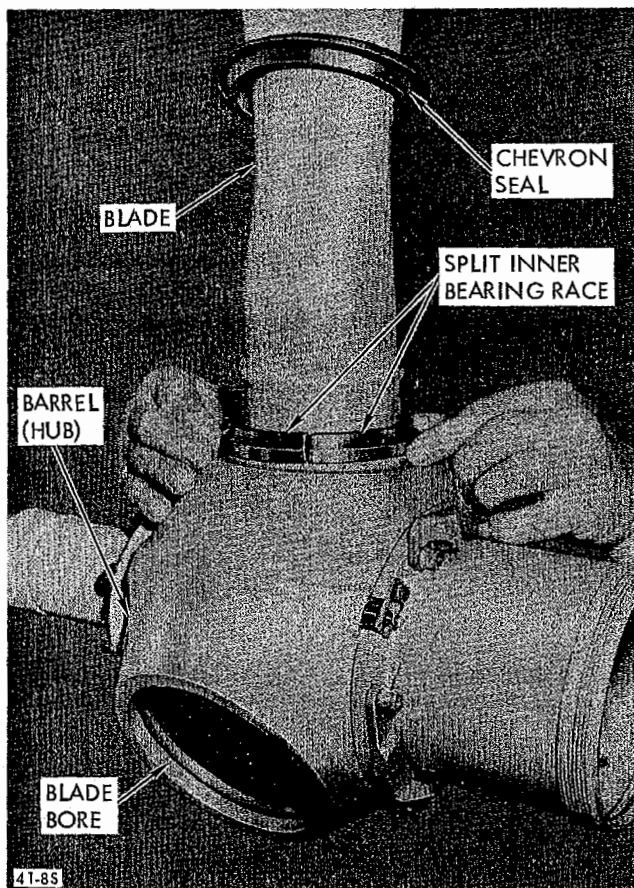


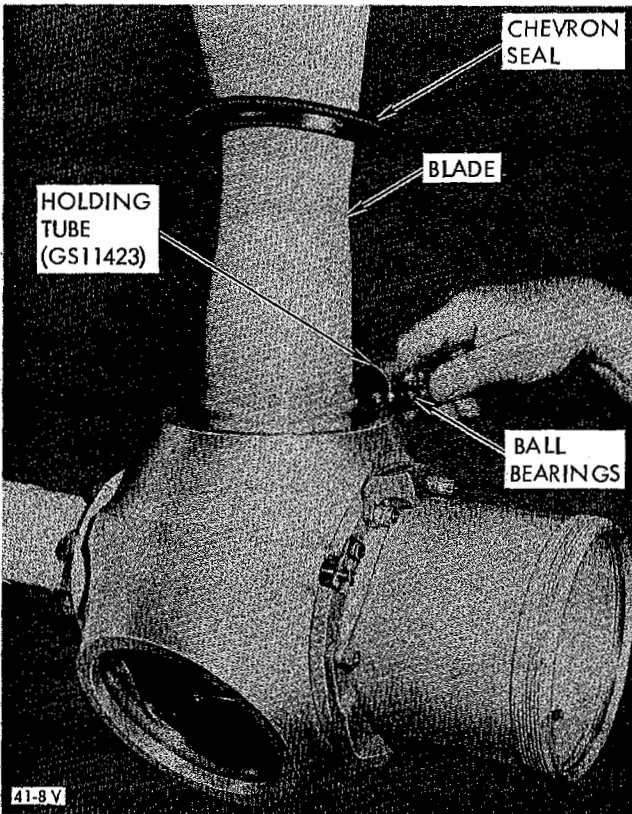
Figure 2-3. Propeller Buildup (Sheet 1)

VA-10H-42-15A

6. Hold the blade steady and insert one ball bearing to check clearance. If bearing drops through, change the angle of the blade until the bearing remains on the split inner bearing race.

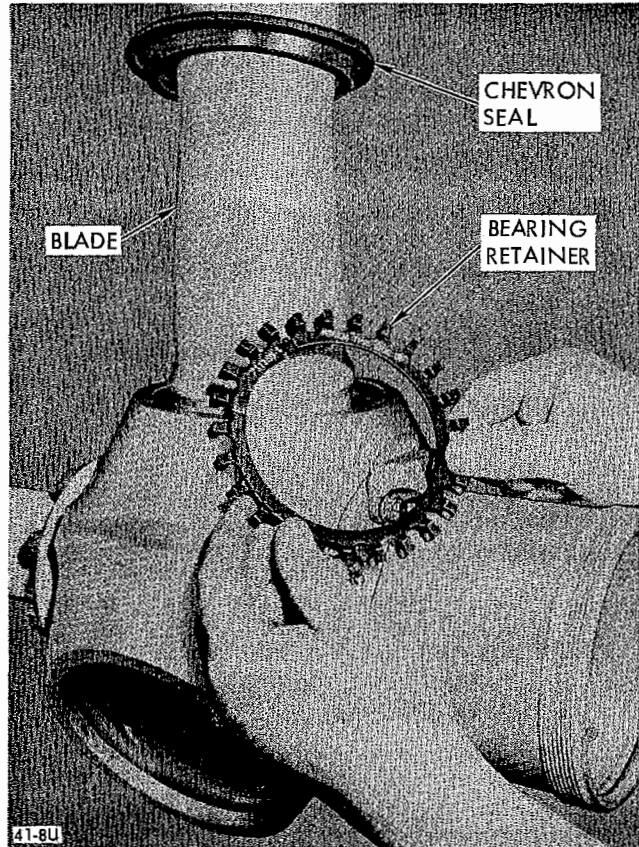
Caution Do not touch ball bearings with bare hands, use bearing holding tube (GS11423).

7. Insert the remaining 24 ball bearings.



8. Insert bearing retainer with side marked, **THIS SIDE UP**, toward blade tip. The split in the bearing race set must be positioned in line with the propeller blade chord line. This position when viewed from the butt end of the blade will be approximately 30 degrees clockwise from the blade drive pin center for left-hand propellers (-337), and approximately 30 degrees counterclockwise from the blade pin center for right-hand propellers (-338). Install ball bearings (25) into the barrel around the blade shank. Install ball bearings into their respective positions as the retainer is inserted.

Caution Ensure that 25 ball bearings are installed in retainer.



9. Pull blade outward (radially) until the ball bearings are solidly seated within the race and position forward section of counterweight around blade.

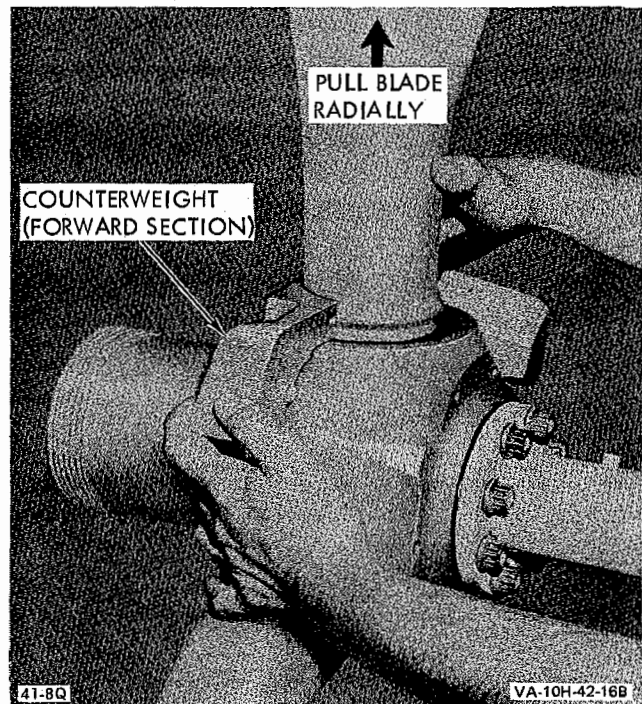


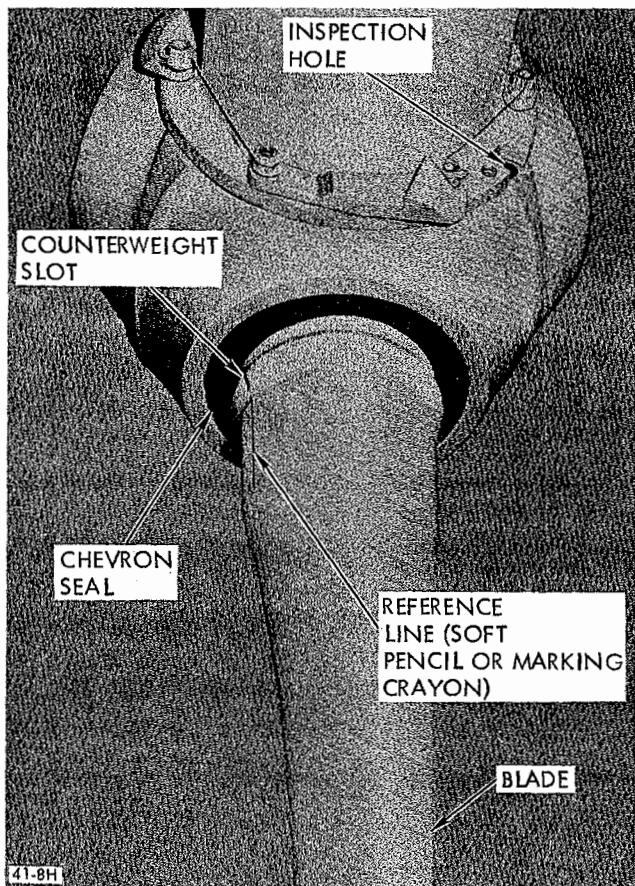
Figure 2-3. Propeller Buildup (Sheet 2)

10. Holding the forward section of the counterweight in position, rotate the propeller until blade is pointing downward. Remove the counterweight section.

11. Slip the chevron seal (714314-2) into the barrel (hub).

NOTE Avoid the use of any sharp or metallic instrument.

12. Draw a line parallel with the longitudinal axis of the blade to indicate the slot in the annular ridge. Marking shall be made using a soft pencil or marking crayon.



13. Position forward counterweight onto blade shaft (straddle the annular ridge) so that the headless straight pin of the counterweight aligns with the slot in the ridge.

NOTE The forward counterweight is identified by the propeller lock plunger.

14. Install aft counterweight (straddle the annular ridge and secure with bolts, washers, and castellated nuts). The longer of the two bolts goes through the weighted side.

NOTE The aft and forward counterweights are a matched serialized set and are indexed to the propeller blade to which they are attached. Ensure that the counterweights constitute a matched set and that the index matches the blade.

15. Torque the bolts from between 350 to 375 inch-pounds. Counterweights halves shall have a gap equal within 0.010 inch at the bolts. One additional flat washer (MS20002-6) may be added under each nut to engage cotter pin in the slots of the castellated nut.

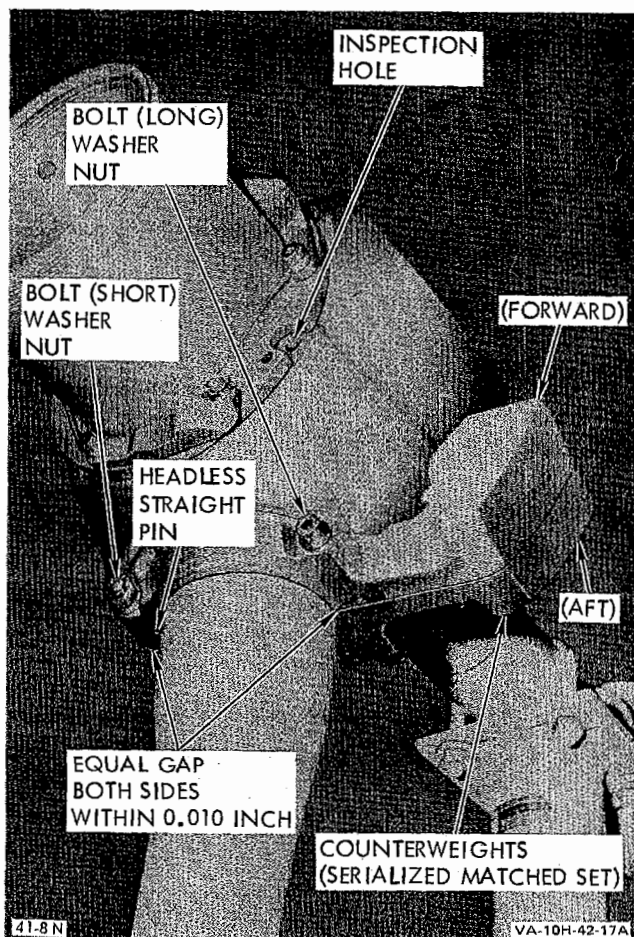
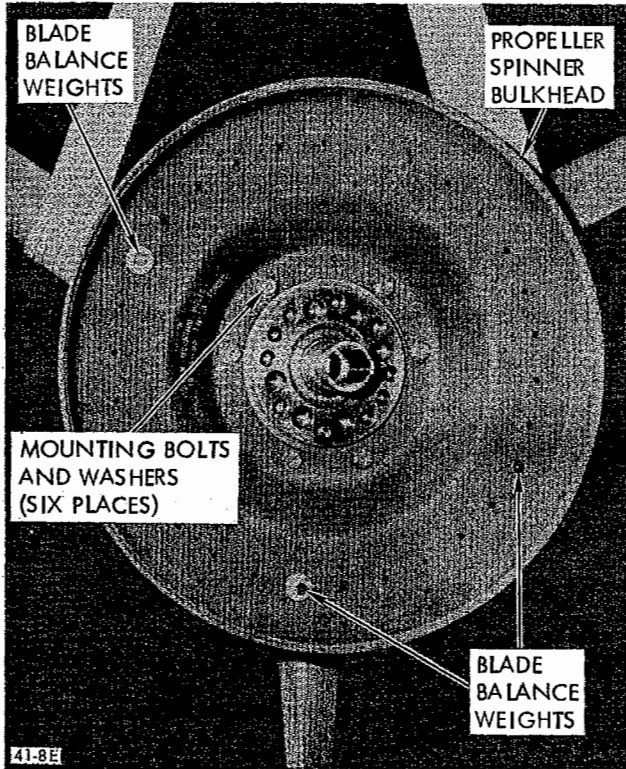


Figure 2-3. Propeller Buildup (Sheet 3)

16. Repeat steps 1 through 15 for each blade installed.
17. If propeller spinner bulkhead had been removed, position bulkhead so that symbol "1" on face of bulkhead aligns with symbol "1" on propeller hub.
18. Install six washers and bolts. Torque bolts from 65 to 85 inch-pounds and safety in pairs with MS20995F32 lockwire.

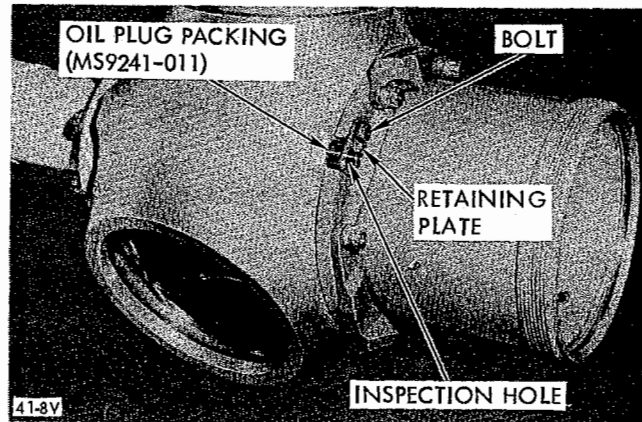


19. Rotate propeller until inspection hole, located on the front face of the propeller barrel (hub), is on top center.
20. Fill barrel (hub) with lubricating oil (MIL-H-6083B, Type 1) through inspection hole until oil drains out.



Do not mix oil MIL-L-23699 or MIL-L-7808 with lubricating oil, MIL-H-6083B, Type 1.

21. Install packing (MS9241-011) and oil plug, retaining plate and bolt. Tighten bolt to a torque of 5 to 30 inch-pounds and safety with lockwire (MS20995F32) to top of oil plug.



22. Align the mounting hole in the propeller spinner with the mounting stud in the propeller dome. Holding the open end of the spinner in a tight circumference, install the spinner, washer, and nut.

Caution The lip of the propeller spinner must be under the lip of the propeller bulkhead.

23. Tighten the retaining nut from 30 to 50 inch-pounds and secure with cotter pin (MS24665-134).

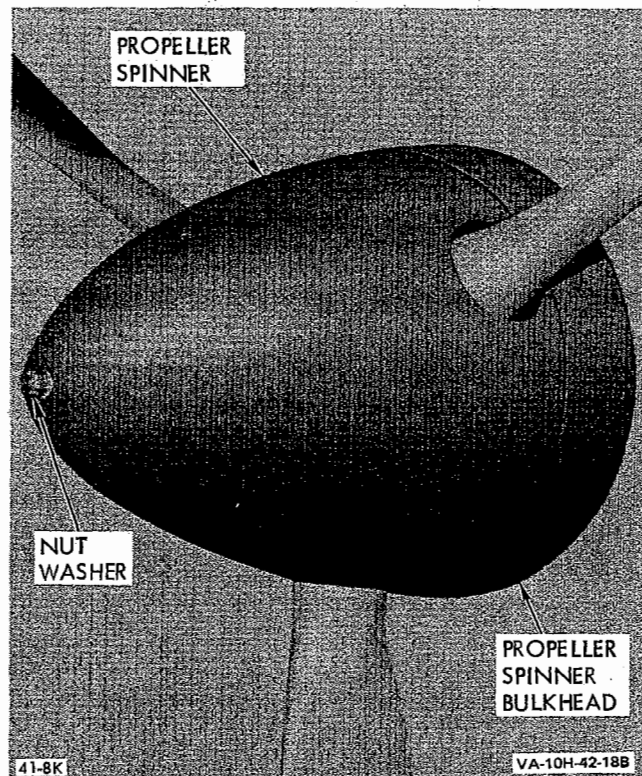
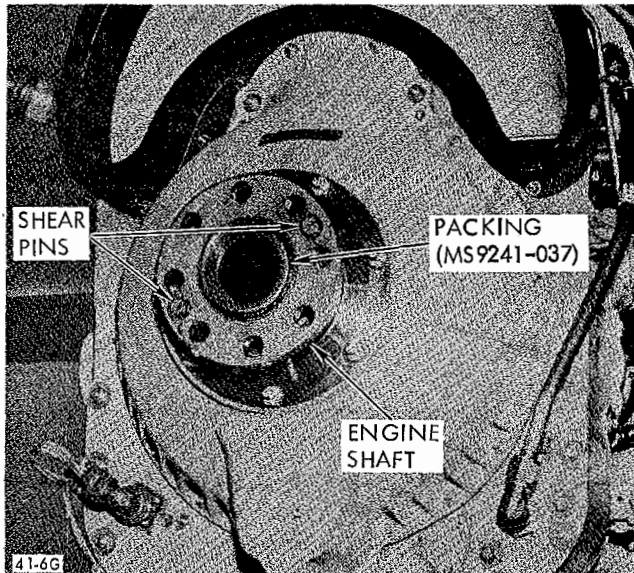


Figure 2-3. Propeller Buildup (Sheet 4)

INSTALLING PROPELLER

NOTE The beta valve and governor must be installed prior to propeller installation.

1. Secure sling assembly (NAS1212R20AA72) to top two blades of propeller and connect to hoist.
2. Check that spinner bulkhead is installed properly. The symbol "1" on bulkhead must align with symbol "1" on propeller hub.
3. Install packing (MS9241-037) on engine propeller shaft.
4. Align propeller with the two shear pins in engine shaft. This can be accomplished by rotating engine compressor.

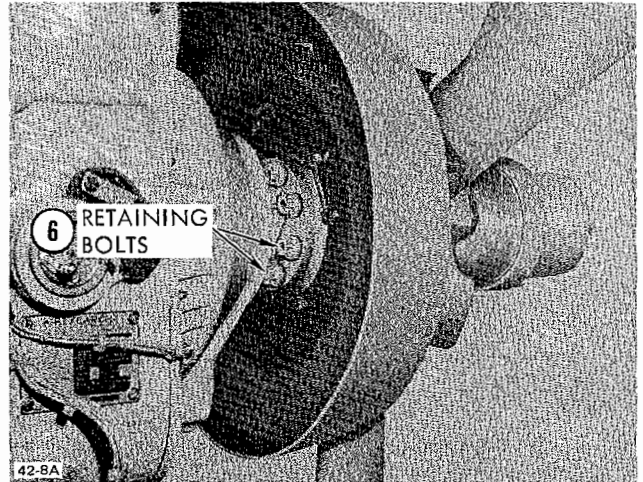


5. Lubricate the retaining bolts with Petrolated Graphite (MIL-C-5544) and install bolts and washers.

NOTE The washer countersink must be positioned next to the bolt head.

6. Torque the propeller retaining bolts from 1500 to 1700 inch-pounds and safety with lockwire (MS20995F32).

Caution When using the torque wrench adapter, torque the propeller retaining bolts from 750 to 850 inch pounds. The torque requirement is reduced due to the additional length of leverage.

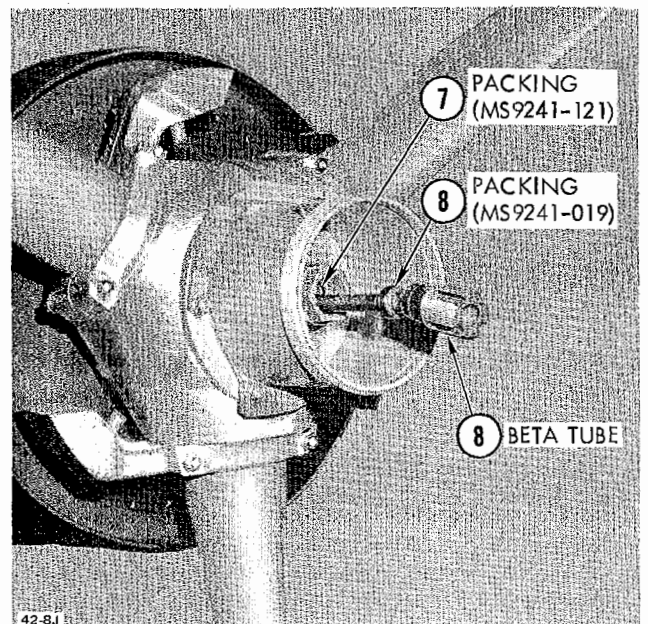


7. Install packing (MS9241-121) in propeller piston.

Caution Insert beta tube with care to prevent damage to oil seal inside engine propeller shaft.

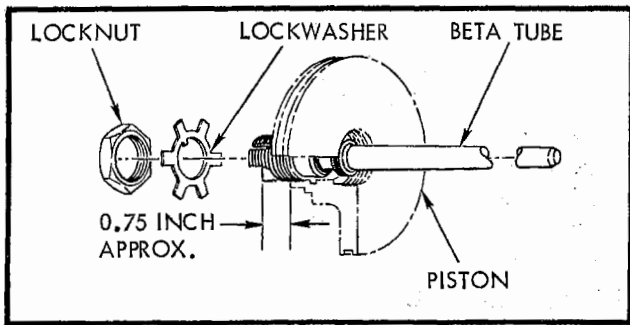
8. Insert beta tube, beveled end first, through hole in front face of propeller piston. Screw in adjusting screw until end face of adjusting screw projects 0.75 inch (3/4) from forward surface of piston extension.

NOTE Do not install lock washer on beta tube until after propeller blade angle adjustment.



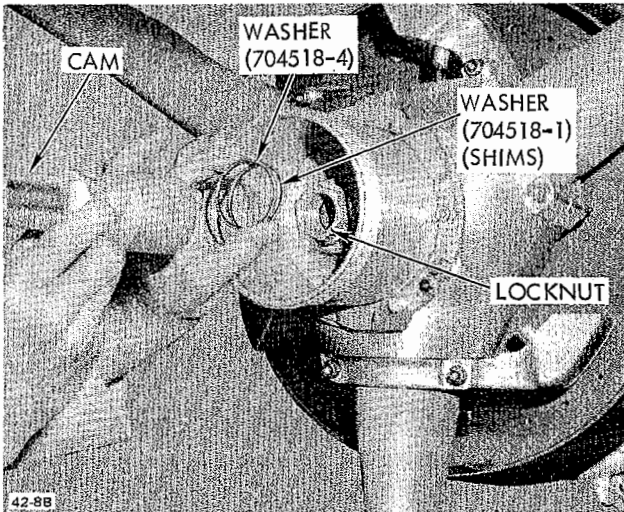
VA-10H-42-19C

Figure 2-4. Propeller Installation and Blade Angle Adjustment (Sheet 1)

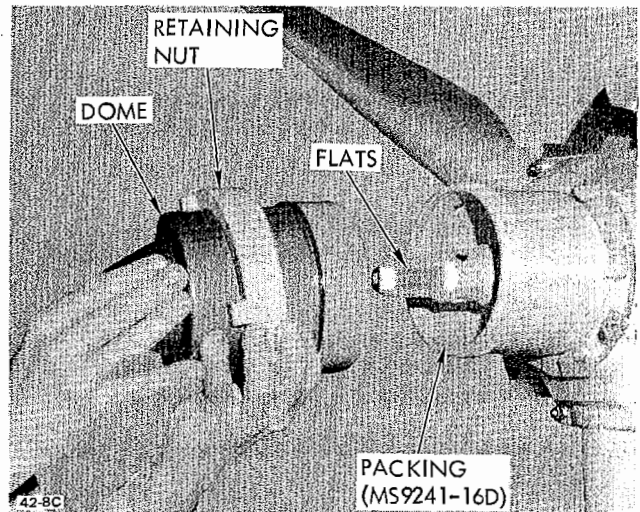


9. Install locknut on beta tube adjusting screw. Torque locknut from 40 to 70 inch-pounds.
10. Install washer (shims) (704518-1) and washer (704518-4) on piston extension.

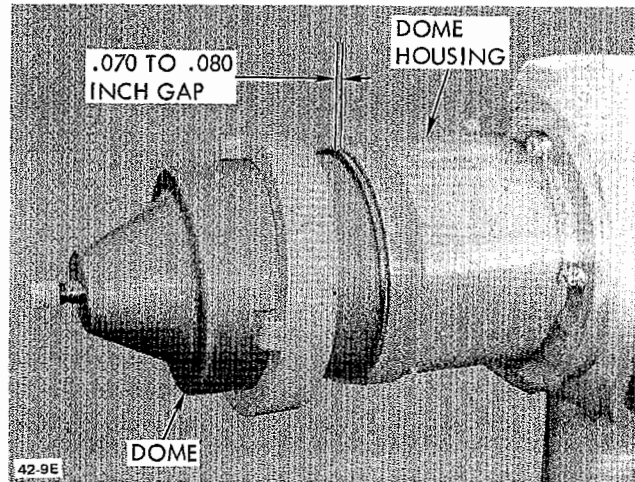
NOTE If serial number on dome and cam are the same as that on the propeller, the thickness of the washer stack is stenciled on the cam. If dome or cam serial number is different than that on propeller, perform step 15.



11. Install cam on piston extension.
12. Rotate propeller blades to the feather position.
13. Install packing (MS9241-160) in groove inside front end of dome housing.
14. Position dome so that the internal rollers in dome ride on the cam flats. Insert dome into housing until internal rollers contact cam.



15. If serial number on dome or cam is different, as noted in step 10, ensure that propeller blades are feathered and that internal rollers of dome contact cam. Measure gap between flange of dome and forward face of dome housing. Gap is to be 0.070 to 0.080 inch. Remove or add washers (shims) (704518-1) to obtain required gap.

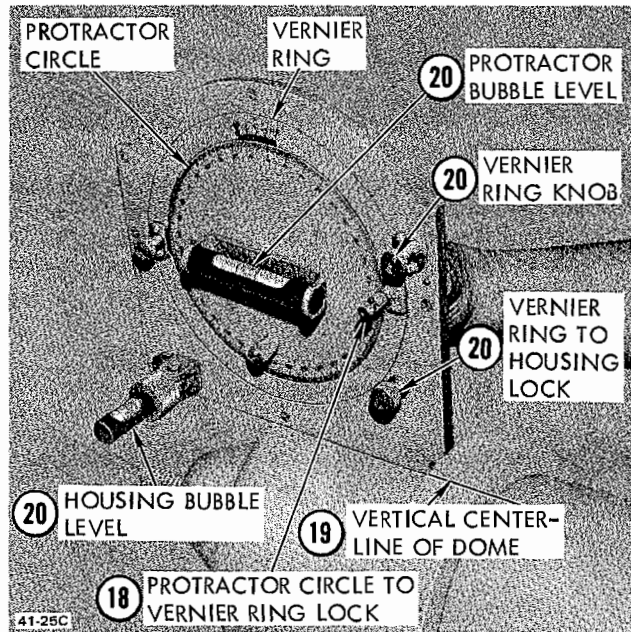


16. Tighten dome retaining nut until it bottoms solidly on dome extension and the dome extension bottoms on the dome housing.
 17. Service oil tank system with 2.25 gallons oil (MIL-L-23699 or MIL-L-7808G).
- NOTE** On initial fill the oil system capacity is 2.25 gallons. The oil tank capacity is 1.5 gallons.
18. Zero the NACA propeller blade angle protractor by matching the 0-degree mark on the protractor circle with the 0-degree mark on the vernier and lock the circle and ring together.

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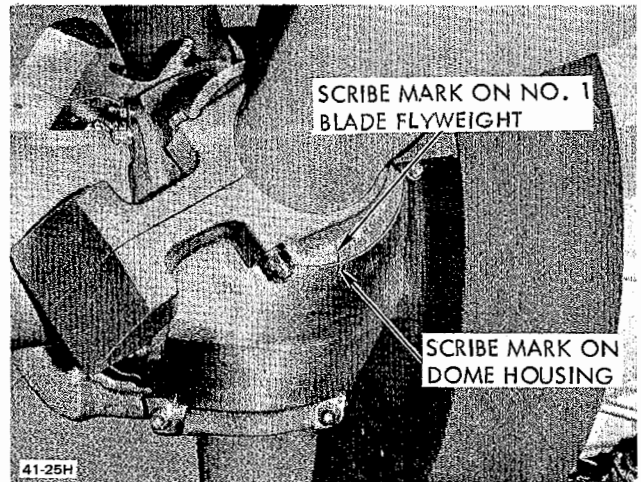
Figure 2-4. Propeller Installation and Blade Angle Adjustment (Sheet 2)

19. Position propeller so that No. 1 blade is horizontal (blade pointing out from fuselage of aircraft) and place protractor lengthwise on top vertical centerline of propeller dome.
20. Hold protractor so that bubble in level on housing is centered and rotate protractor circle/vernier ring (by turning vernier ring knob) until bubble in protractor level is centered. Lock vernier ring to housing.

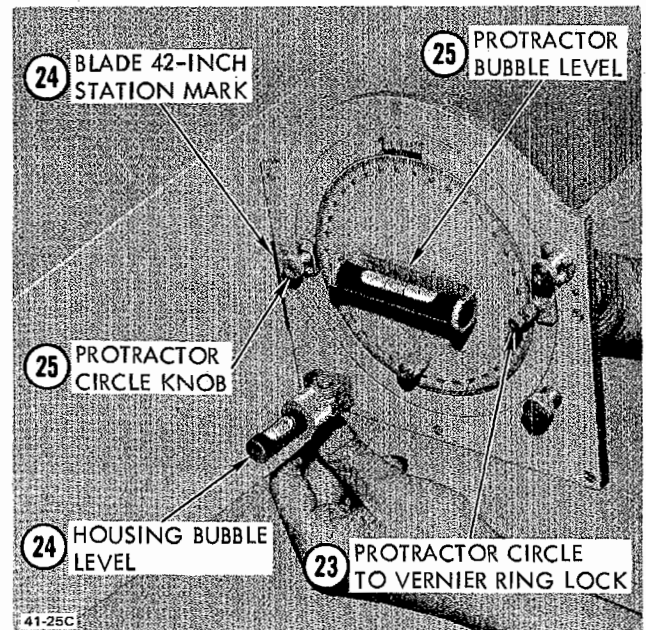


21. Place condition lever input rod arm (cam and linkage assembly) in normal flight position and the triple cam input rod (cam and linkage assembly) at full reverse (fuel control shaft pointer is at 0-degree).
22. Connect an external electrical supply source (28 volts dc) to unfeather pump. When propeller blades start to move, position triple cam input rod so that fuel control shaft pointer is at 60 degrees. When No. 1 blade stops rotating, disconnect external electrical supply source from unfeather pump.

NOTE Scribe mark on No. 1 blade flyweight should align with scribe mark on dome housing.



23. Unlock protractor circle from vernier ring.
24. The edge of the protractor that was forward when protractor was on dome is placed against aft side of No. 1 blade at the (red) 42-inch blade station mark and centered so that bubble in level on housing is centered.



25. Rotate protractor circle (by turning protractor circle knob) until bubble in protractor level is centered. Read blade angle as measured on protractor (number on protractor circle opposite zero on vernier ring). Blade angle is to be +4.7 to +5.0 degrees. If adjustment is required, feather propeller and remove dome, cam, washer, and washers (shims). Loosen beta tube locknut and turn beta tube adjusting screw clockwise to reduce blade angle or counterclockwise to increase blade angle.

VA-10H-42-34

Figure 2-4. Propeller Installation and Blade Angle Adjustment (Sheet 3)

NOTE One turn of the beta tube adjusting screw changes propeller blade angle by approximately 2.4 degrees.

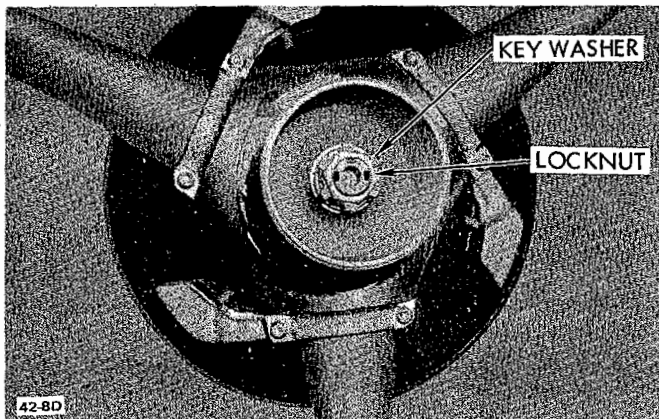
26. Repeat steps 9 thru 25 until blade angle is +4.7 to +5.0.

Caution When removing locknut from beta tube, do not allow beta tube adjusting screw to turn. If beta tube adjusting screw is turned, the blade angle must be re-checked.

27. After adjusting blade angle to proper setting, feather propeller and remove dome, cam, washer, washers (shims) and beta tube locknut.

Warning Before removing propeller dome extension, release spring tension by placing propellers in feather position.

28. Install key washer (701536-1) and nut on beta tube. Torque nut from 40 to 70 inch pounds. Bend tabs of key washer.

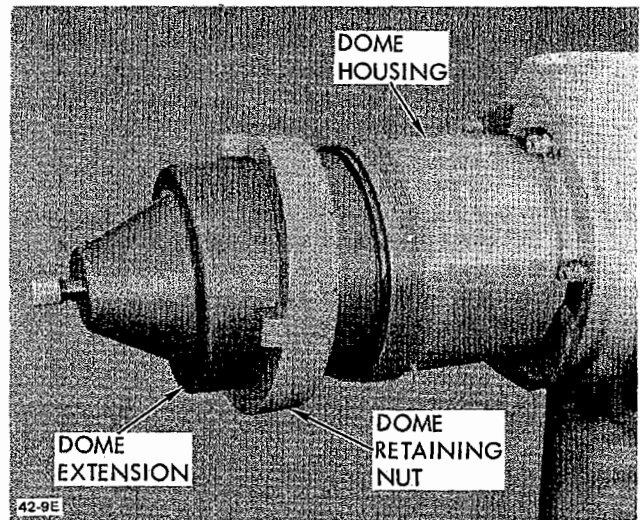


29. After making final adjustments and installing key washer, add 10 to 12 ounces of oil (MIL-H-6083B, Type 1), to dome extension and repeat steps 10 through 14.

CAUTION

Do not mix oil MIL-L-23699 or MIL-L-7808 with lubricating oil, MIL-H-6083B, Type 1.

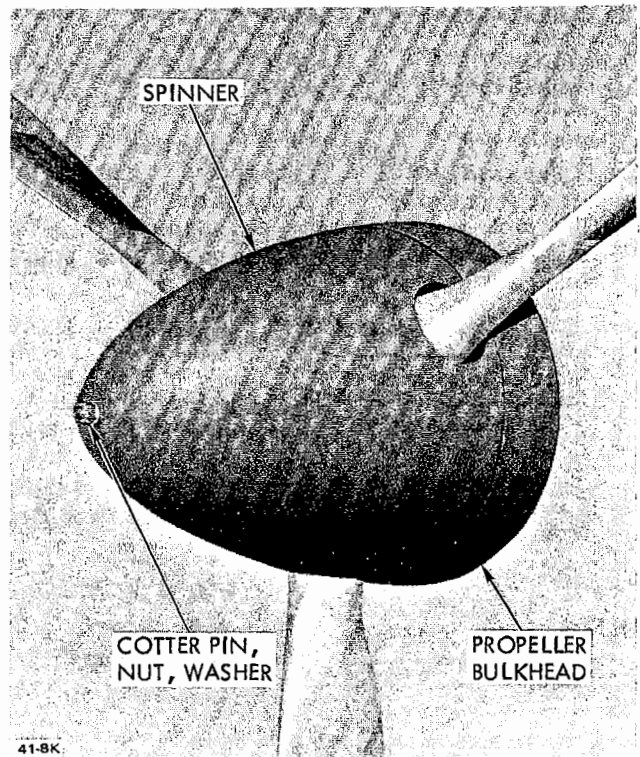
30. Tighten dome retaining nut until it bottoms solidly on dome extension and the dome extension bottoms on the dome housing. Safety the retaining nut to pin in dome shell with lockwire (MS20995F 32).



31. Align the mounting hole in the propeller spinner with the mounting stud in the propeller dome. Holding the open end of the spinner in a tight circumference, install the spinner, washer, and nut.

NOTE The land of the spinner must be under the lip of the propeller bulkhead.

32. Tighten the retaining nut 30 to 50 inch-pounds and secure with cotter pin (MS24665-134).



VA-10H-42-35C

Figure 2-4. Propeller Installation and Blade Angle Adjustment (Sheet 4)

SECTION III
WIRING DIAGRAMS

3-1. WIRING DIAGRAMS.

3-2. This section contains wiring diagrams (figures 3-1 and 3-2) and associated data for electrical equipment applicable to T76-G-10 and T76-G-12 turboprop aircraft engines. Circuits are shown from specific components to the engine disconnect plugs. These diagrams will aid in tracing circuits, in checking continuity, and in specific trouble shooting on inoperative or defective circuits. Wires are

identified by number exactly as they are on the engine.

3-3. EQUIPMENT IDENTIFICATION LIST.

3-4. Electrical components included in the wiring diagram are identified by an adjacent index number. All wiring diagram index numbers are listed in table V, along with their part number, manufacturer's Federal Supply Code, and description.

Table V. Equipment Identification

INDEX NO.	PART NUMBER	FEDERAL SUPPLY CODE	DESCRIPTION
J1	75-190028-21P	77820	Receptacle (harness to aircraft)
J248	MS3110P20-16S		Receptacle (No. 1 engine harness to aircraft)
J249	MS3110P20-16S		Receptacle (No. 2 engine harness to aircraft)
L100	V45000-11	96487	Bleed air shutoff valve (No. 1 engine)
L101	V45000-11	96487	Bleed air shutoff valve (No. 2 engine)
M2	MS28005-3		Oil pressure transmitter (No. 1 engine)
M3	MS28005-3		Oil pressure transmitter (No. 2 engine)
M5	7724-119D5-1	02987	Torque sensor transducer (No. 1 engine)
M7	7724-119D5-1	02987	Torque sensor transducer (No. 2 engine)
M10	AG34	90853	Generator-Tachometer (No. 1 engine)
M11	AG34	90853	Generator-Tachometer (No. 2 engine)
M19	310393	80293	Unfeathering pump (No. 1 engine)
M20	310398	80293	Unfeathering pump (No. 2 engine)
P1	695166-7	99193	Connector (harness to electronic speed switch)
P2	MS3108R10SL3S		Plug (harness to fuel shutoff valve)
P3	MS3108R10SL3S		Plug (harness to ignition unit)
P4	75-190612-3S	77820	Connect (harness to unfeather pump)
P5	75-190611-3S	77820	Connector (harness to tachometer-generator)
P6	75-190614-2S	77820	Connector (harness to torque sensor transducer)
P7	75-69814-2S	77820	Connector (harness to oil pressure transmitter)
P8	SG3108E10SL56S	77820	Connector (harness to exhaust gas thermocouple)
P9	MS3106R8S1S		Plug (harness to magnetic chip detector)
P10	75-69814-5S	77820	Connector (harness to anti-icing valve)
P11	75-190611-3S	77820	Connector (harness to oil vent solenoid valve)
P12	MS3108R10SL3S		Plug (harness to fuel enrichment solenoid)
P13	75-69811-4S	77820	Connect (harness to fuel heater lock out solenoid)
P14	223-626-9001	99193	Connector (harness to temperature sensing enrichment control)
P76	MS3116P8-4S		Plug (No. 1 engine harness to No. 1 engine bleed air shutoff valve)
P77	MS3116P8-4S		Plug (No. 2 engine harness to No. 2 engine bleed air shutoff valve)
P96	MS25183-10SL3S		Plug (No. 1 engine harness to No. 1 engine fuel pressure switch)
P97	MS25183-10SL3S		Plug (No. 2 engine harness to No. 2 engine fuel pressure switch)

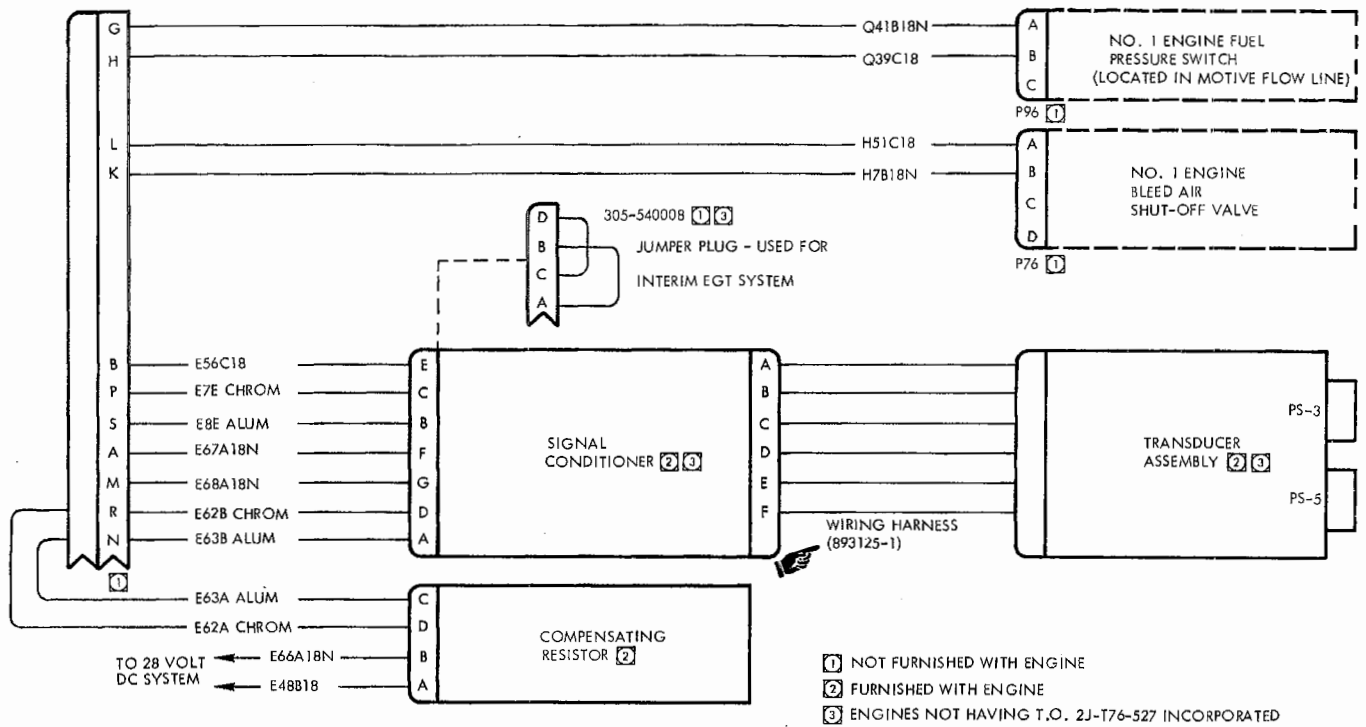
Table V. Equipment Identification (Cont)

INDEX NO.	PART NUMBER	FEDERAL SUPPLY CODE	DESCRIPTION
S83	P12M1	14314	Pressure switch (No. 1 engine fuel)
S84	P12M1	14314	Pressure switch (No. 2 engine fuel)
TL102	319974-1-1	99193	Solenoid valve (oil vent)
TL103	394286-2	99193	Solenoid valve (fuel shutoff)
TL104	868961-2	77820	Ignition unit (engine)
TL105	319980-4	99193	Solenoid valve (anti-icing) ¹
TL106	868560-1	99193	Regulator (fuel flow)
TL107	868558-1	99193	Solenoid valve (fuel heater lockout) ²
TL108	893456	15670	Solenoid valve (temperature sensing enrichment)
TS1	305438-2	99193	Switch (electronic speed)
TS2	867939-1	99193	Thermocouple (exhaust gas)
TS3	B7260W	99193	Detector (magnetic chip)

¹ Engines not having T.O. 2J-T76-531 incorporated

² Engines not having T.O. 2J-T76-532 incorporated

-161 HARNESS ASSEMBLY (LEFT ENGINE)



-171 HARNESS ASSEMBLY (RIGHT ENGINE)

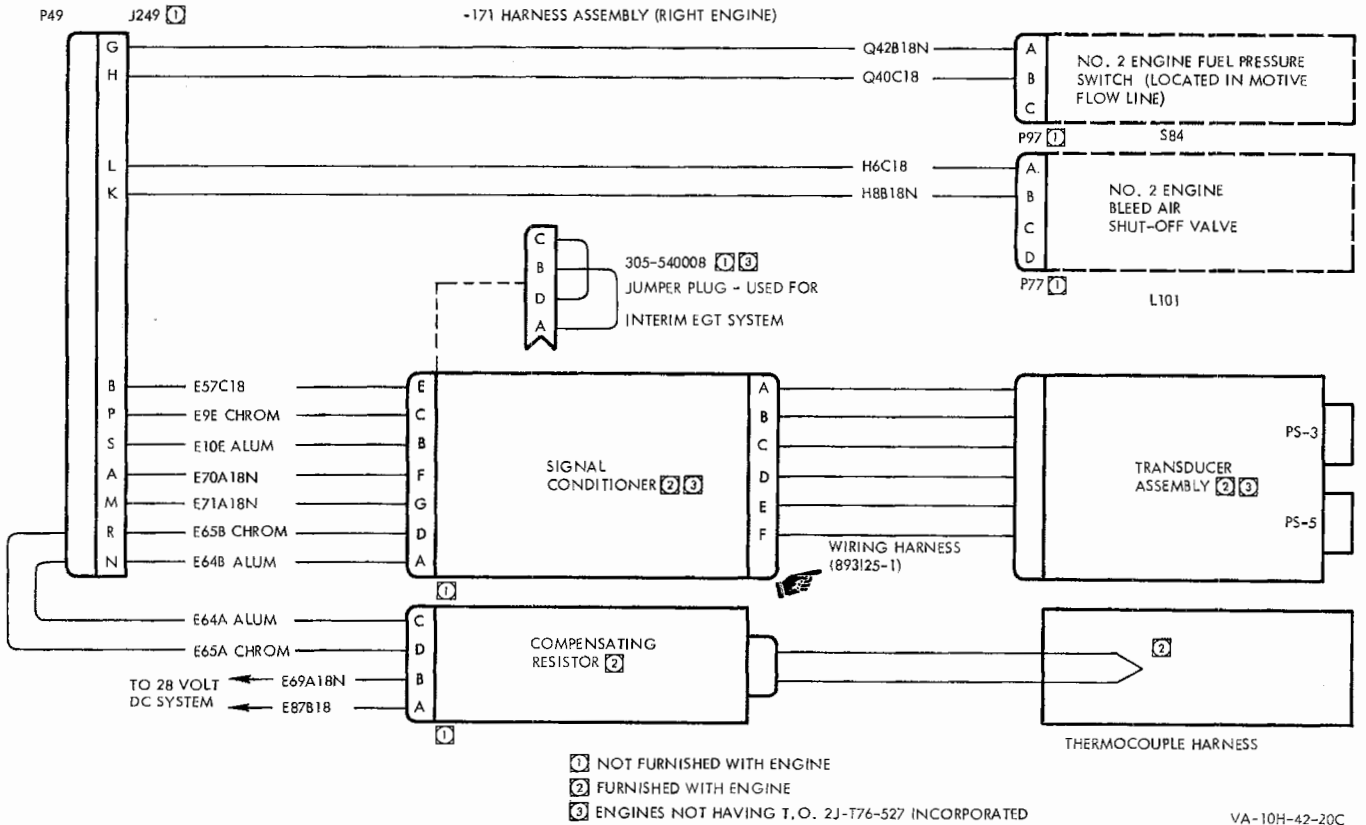


Figure 3-1. Engine Miscellaneous Wiring Diagram

SECTION IV
GROUP ASSEMBLY PARTS LIST

4-1. GROUP ASSEMBLY PARTS LIST.

4-2. This section is intended to be used by maintenance personnel for identification, stocking, and ordering up-to-date pod packages and quick engine change (QEC) kits for OV-10A aircraft. All items of the pod package are identified and illustrated in proper relationship to their next higher assembly. All items of the QEC kits are listed following the breakdown of the pod package.

4-3. USABLE ON CODE EXPLANATION.

4-4. Usable on coding is employed throughout this section to designate the effectivity of components and assemblies. These Usable On Codes, when decoded by use of the Master Code, indicate the Air Force aircraft serial numbers and pod package serial numbers on which the coded parts are used. The absence of Usable On Codes indicates use on all aircraft and pod packages.

NOTE Applicable Usable on Codes will be established and listed in subsequent changes to this manual.

4-5. FEDERAL SUPPLY CODE
FOR MANUFACTURERS.

4-6. The Federal Supply Code for Manufacturers is a numerical code published by the Office of the Assistant Secretary of Defense (Supply and Logistics). The code is employed to indicate the names, addresses, and related data of manufacturers who have produced or are currently producing items used by the Federal Government. The following listing of codes is arranged in numerical sequence and reflects the names and addresses of those manufacturers supplying items for the aircraft. Absence of a code or contractor's name and address in the description column of Section IV indicates the item is a North American Rockwell Corporation, Columbus Division (89372) part.

CODE MANUFACTURER

01288 . . . General Electric Co.
Direct Current Motor and
Generator Dept.
3001 East Lake Road
Erie, Pennsylvania 16501

CODE	MANUFACTURER
02987 . . .	Bendix Corporation, The Flight and Engine Instruments Division South Montrose, Pennsylvania 18843
03680 . . .	See 56878
14314 . . .	Precision Sensors, Inc. 789 Ellsworth Bridgeport, Connecticut 06605
14642 . . .	Bil-Jax, Inc. 125 Wyse Rd. Archbold, Ohio 43502
14963 . . .	Aero Tube and Connector Co. P.O. Box 241 Worthington, Ohio 43085
15670 . . .	Hydro-Electronics Corporation Milburn at Merrick Road Baldwin, New York 11510
21769 . . .	Fram Aerospace Division of Fram Corporation 750 School St. Pawtucket, Rhode Island 02862
34199 . . .	Kohler Company High St. Kohler, Wisconsin 53044
43999 . . .	North American Rockwell Corporation Los Angeles Division International Airport Los Angeles, California 90009
56878 . . .	Standard Pressed Steel Company P.O. Box 796 Jenkintown, Pennsylvania
59875 . . .	TRW, Inc. Accessories Division 23555 Euclid Ave. Cleveland, Ohio 44117
70210 . . .	AiResearch Mfg. Company 9851 Sepulveda Blvd. Los Angeles, California 90009

CODE	MANUFACTURER
73030 . . .	United Aircraft Corporation Hamilton Standard Division Bradley Field Windsor Locks, Connecticut 06096
76005 . . .	Lord Mfg. Company Division of Lord Corporation 1635 W. 12th Erie, Pennsylvania 16512
77820 . . .	Bendix Corporation, The Electrical Components Division Sherman Ave. Sidney, New York 13838
80293 . . .	Eastern Industries Division Laboratory for Electronics, Inc. Hamden, Connecticut
87738 . . .	Flex-Weld, Inc. 221 Main St. Bartlett, Illinois 60103
96142 . . .	Flexonics Division of Calumet and Hecla, Inc. 300 E. Devon Bartlett, Illinois 60103
96487 . . .	Valcor Engineering Corporation 365 Carnegie Ave. Kenilworth, New Jersey 07033
99193 . . .	AiResearch Mfg. Co. of Arizona 402 South 36th St. Phoenix, Arizona 85010

4-7. SOURCE CODE DATA EXPLANATION.

4-8. Policies, general information, and procedures for changing source and maintenance coding are contained in T.O. 00-25-195. Generally, the source codes and maintenance repair level codes, herein (see Source Code and Repair Code columns), were assigned by Air Force personnel when this equipment was purchased. Assignment of codes was influenced by (a) maintenance policies of the Air Force base self-sufficiency program, (b) predicted maintenance actions, (c) base facilities and capabilities, and (d) economic considerations.

4-9. SOURCE CODE DEFINITIONS.

CODE P SERIES - PARTS PROCURED AND UNDER INVENTORY STOCK CONTROL

CODE P Identifies parts which may be requisitioned and installed by any level of maintenance consistent with the activity's authorized scope of maintenance. Code "P" is applied to parts on which usage

is anticipated or known. Restricted (emergency) service manufacture of code "P" items is considered practical but may be accomplished only after confirmation of nonavailability from supply sources.

CODE PD Identifies parts which may be requisitioned and installed by AF activities authorized depot level maintenance only. Code "PD" is applied to parts on which usage is anticipated or known. Restricted (emergency) service manufacture of code "PD" parts is considered practical but may be accomplished only after confirmation of nonavailability from supply sources.

CODE P1 Identifies parts which may be requisitioned and installed by any maintenance level consistent with the activity's authorized scope of maintenance. Code "P1" is applied to parts on which usage is anticipated or known, and which service manufacture is considered impractical.

CODE P1D Identifies parts which may be requisitioned and installed by AF activities authorized depot level maintenance only. Code "P1D" is applied to parts on which usage is anticipated or known, and which service manufacture is considered impractical.

CODE P2 Identifies insurance-type spare parts which can be installed by any AF activity consistent with the activity's authorized scope of maintenance. This code is applied to such parts as are basically structural items of very limited usage, require special tools, templates, and/or jigs, and are very difficult, impractical, or uneconomical to manufacture by AF activities. These items are not subject to periodic replacement or wearout but may require infrequent replacement as a result of accidents or other unexpected occurrences. Delayed procurement items are included under this code.

CODE P2D Identifies insurance-type parts which may be installed by AF activities which are authorized depot level maintenance only. This code is applied to parts as described under code "P2" and to delayed procurement items.

CODE M SERIES - MANUFACTURE PARTS NOT PROCURED

CODE M Identifies parts, the manufacture and installation of which are within the capabilities of field maintenance activities,

and to which all of the following conditions apply:

- 1. Procurement is not justified because of low usage or peculiar storage and installation factors. Needs are to be met by local manufacture only as required.
- 2. Their manufacture does not require tools, equipment, or skills not normally authorized at field maintenance level.
- 3. Does not require test equipment not normally authorized at field maintenance level.
- 4. Does not require material not normally available in AF inventory.

CODE M1 Identifies parts which can be manufactured at activities authorized depot level maintenance facilities and to which all of the following conditions apply:

- 1. Procurement is not justified because of low usage or peculiar storage and installation factors. The needs of base activities are to be met by requisitioning from the geographical AMA, SSM AMA, or IM AMA.
- 2. Their manufacture is beyond capabilities of field maintenance activities as outlined previously.
- 3. Their manufacture does not require tools or equipment not normally authorized at all AMA's.

CODE A SERIES 1 - ASSEMBLE, ASSEMBLY NOT PROCURED

- 1. Code "A" identifies items capable of being assembled at any level of maintenance and is applied to assemblies of two or more parts, the majority of which are purchased and/or service manufactured.
- 2. Code "A1" identifies assemblies which can be assembled at AF activities authorized depot level maintenance only and is applied to assemblies described under "A" code.

CODE X SERIES 1 - PARTS CONSIDERED IMPRACTICAL FOR SERVICE MANUFACTURE

CODE X Applied to main structural members or similar parts, which, if required, would suggest extensive repair. The need for

a part or parts coded "X" (wing spars, center section structure, etc) should normally result in a recommendation to retire the article from service.

CODE X1 Identifies parts applicable at any level of maintenance consistent with the activity's authorized scope of maintenance and for which it is more feasible to obtain the next higher assembly; for example, an integral detail part such as a welded segment inseparable from its assembly; a part machined in a matched set; or a part of any assembly which, if required, would suggest extensive reconditioning of such assembly. In some cases, code "X1" may be used to indicate an integral detail part of an assembly which has no anticipated usage and as an assembly was source-coded "M" or "M1."

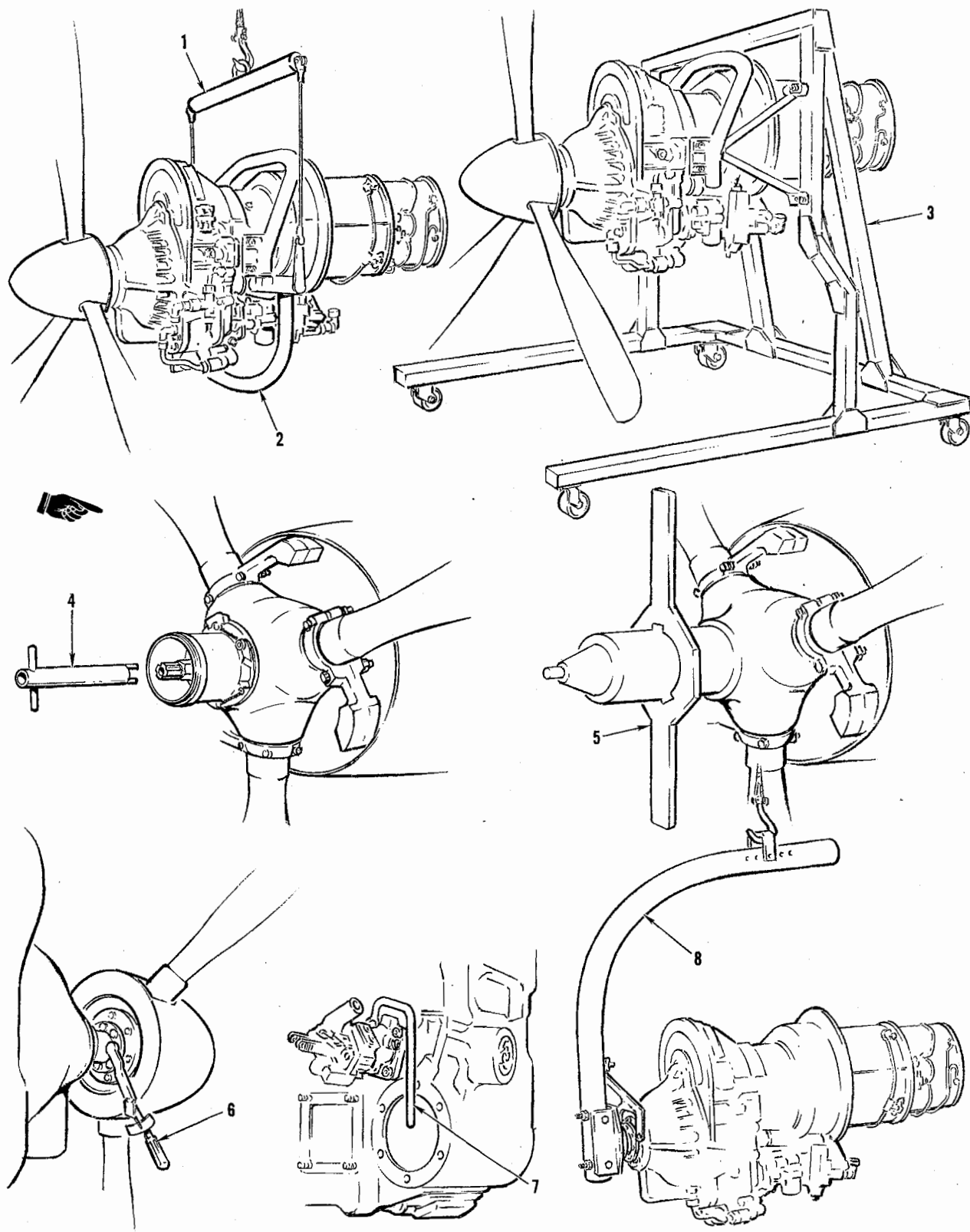
CODE X1D Identifies parts which are described under the "X1" code but which are applicable to AF activities authorized depot level maintenance only.

CODE X2 Identifies parts which are applicable to any level of maintenance consistent with the activity's authorized scope of maintenance, for which there is no anticipated usage, and which are impractical for service manufacture. This type of item will not be stocked. Such parts shall be obtained from reclamation or, if not available from this source, requisitioned through normal supply channels together with supporting justification for one-time procurement and immediate use. Repeated requests shall justify a change to a code "P1" or "P2," as applicable, if considered economical to procure and store such parts.

CODE X2D Identifies parts which are described under the "X2" code but which are applicable to AF activities authorized depot level maintenance only. Repeated requests for such parts shall justify a change to a "P1D" or "P2D" code, as applicable, if considered economical and feasible to procure and stock such parts.

CODE U - PARTS NOT PROCURED, MANUFACTURED, OR STOCKED

CODE U Applied to installation drawings, diagrams, instruction sheets, field service drawing numbers, and parts not otherwise of supply significance, including obsolete parts, which cannot be procured or service manufactured.



VA-10H-42-22A

Figure 4-1. Special Tools and Equipment (Sheet 1)

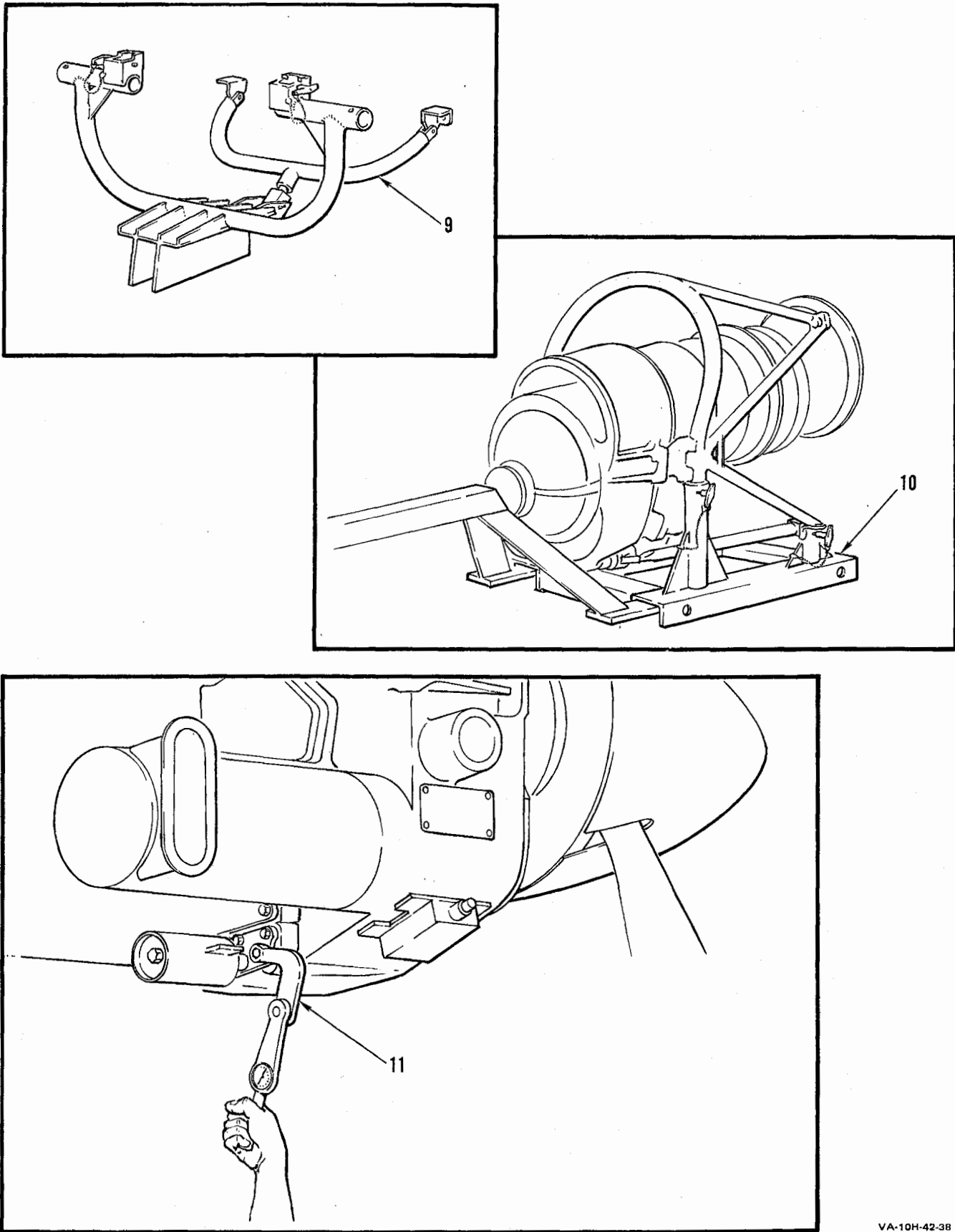
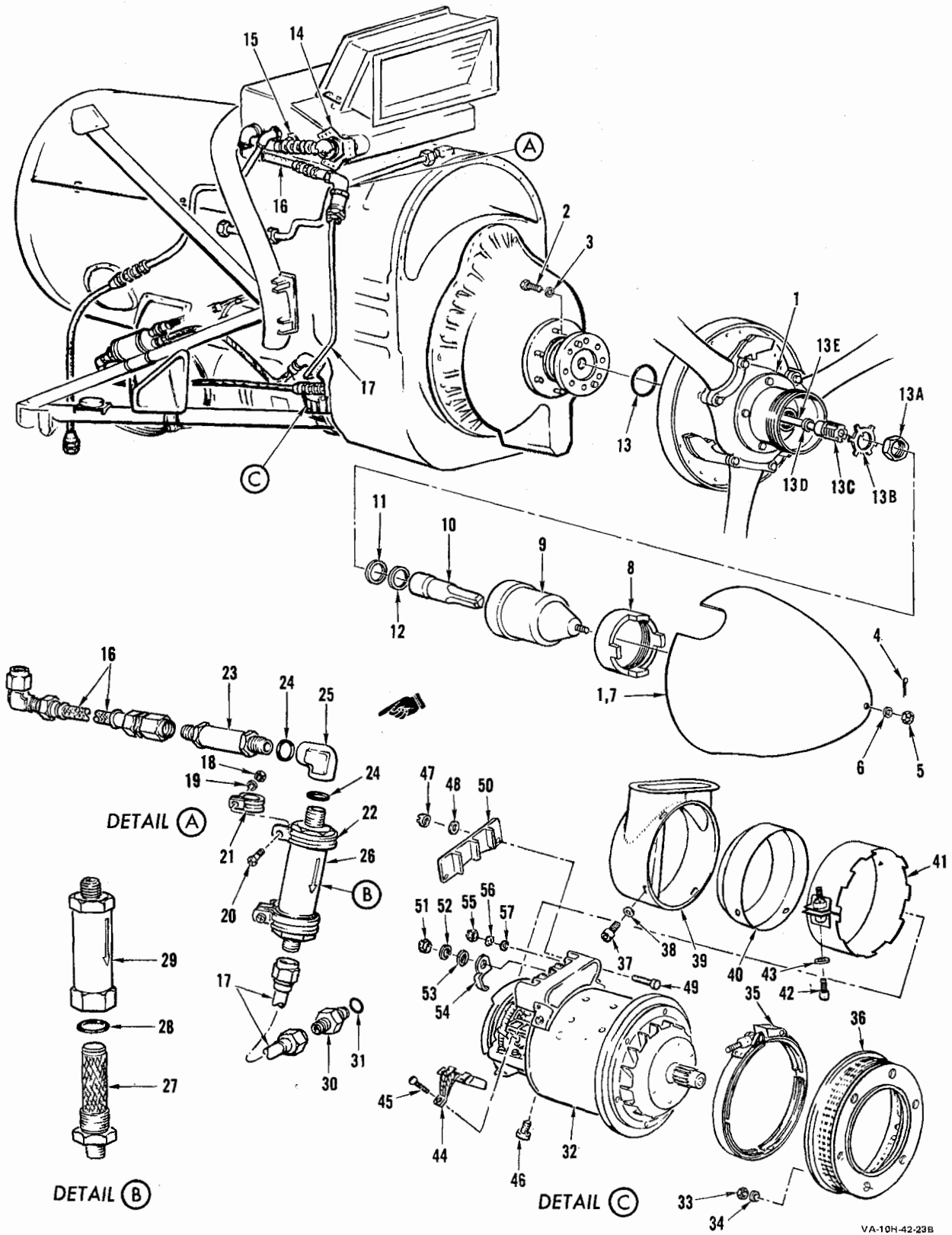


Figure 4-1. Special Tools and Equipment (Sheet 2)

VA-10H-42-38

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
4-1									SPECIAL TOOLS AND EQUIPMENT		
- 1	E13702								• SLING ASSEMBLY, ENGINE COMPLETE - - - - -	1	
- 2	E13741	*							• YOKE ASSEMBLY, ENGINE STAND - - - - -	1	
- 3	E13704								• STAND ASSEMBLY, COMPLETE ENGINE - - - - -	1	
- 4	T3376								• WRENCH, BETA TUBE SPANNER - - - - -	1	
- 5	T3377								• WRENCH, PROPELLER DOME NUT - - - - -	1	
- 6	T3378								• ADAPTER, PROPELLER FLANGE TORQUE WRENCH - - - - -	1	
- 7	T3379								• WRENCH, GOVERNOR - - - - -	1	
- 8	E13707								• HOIST ASSEMBLY, C BAR ENGINE - - - - -	1	
- 9	E13703								• ADAPTER ASSEMBLY, COMPLETE ENGINE - - - - -	1	
- 10	E13706								• ADAPTER, ENGINE TRANSPORT - - - - -	1	
- 11	T3394								• WRENCH, ENGINE VIBRATION ISOLATOR - - - - -	1	

* E13741 IS PART OF E13703 ENGINE ADAPTER



VA-10H-42-23B

Figure 4-2. Pod Package - Engine Accessories (Sheet 1)

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2									POD PACKAGE - ENGINE ACCESSORIES (SHEET 1)		
	305-860007- 1								POD PACKAGE, ENGINE (LH)	1	
	305-860007- 2								POD PACKAGE, ENGINE (RH)	1	
- 1	33LF337								PROPELLER ASSEMBLY (LH) (73030) (NR SPEC CONT DWG- HE320-5005-0001) (SEE FIGURE 3 FOR BREAKDOWN)	1	
	33LF338								PROPELLER ASSEMBLY (RH) (73030) (NR SPEC CONT DWG- HE320-5005-0002) (SEE FIGURE 3 FOR BREAKDOWN) (ATTACHING PARTS)	1	
- 2	LWB22-9H4								BOLT, DOUBLE HEX LIGHT WEIGHT, 220,000 PSI MINIMUM (03680) (NR SPEC CONT DWG HE111-0030-0904)	8	
- 3	MS20002C9								WASHER	8	
									-----*		
									PARTIAL BREAKDOWN		
- 4	MS24665-134	*1							PIN		REF
- 5	MS17825-8								NUT		REF
- 6	AN960C816L								WASHER		REF
- 7	717890-1	*5							SPINNER AND INSERT, PROPELLER (73030)		REF
	717890-2	*6							SPINNER AND INSERT, PROPELLER (73030)		REF
- 8	716926-3								NUT, DOME (73030)		REF
- 9	717892-3								DOME EXTENSION, PROPELLER (73030)		REF
- 10	717997-1								CAM, PROPELLER (73030)		REF
- 11	704518-4								WASHER, FLAT (2 MAXIMUM) (73030)		REF
- 12	704518-1								WASHER, FLAT (10 MAXIMUM) (73030)		REF
- 13	MS9241-037	*1							PACKING		REF
	717876-1	*3							BETA VALVE ASSEMBLY, PROPELLER (73030)(NR SPEC CONT- DWG HE320-5006-0003)(SEE SHEET 3 FOR ATTACHING PARTS)	1	
	717876-2	*4							BETA VALVE ASSEMBLY, PROPELLER (73030)(NR SPEC CONT DWG- HE320-5006-0027)(SEE SHEET 3 FOR ATTACHING PARTS)	1	
									PARTIAL BREAKDOWN		
- 13A	701537-1								NUT, RETAINING (73030)		REF
- 13B	701536-1	*1							WASHER, KEY (73030)		REF
- 13C	701530-2								SCREW, ADJUSTING (73030)		REF
- 13D	701531-2								COLLAR, TUBE OIL TRANSFER (73030)		REF
	MS9241-019								PACKING		REF
- 13E	711073-3								TUBE AND CAP, OIL TRANSFER (73030)		REF
- 14	305-470018								FILLER ASSEMBLY, OIL TANK (ATTACHING PARTS)	1	
	MS21042L3								NUT	3	
	LD153-0002-1203								WASHER, REDUCED OD (43999)	6	
	AN3-4A								BOLT	3	
									-----*		
- 15	305-470015	*1							GASKET, OIL TANK FILLER	1	
- 16	305-420006- 57								HOSE ASSY, PROPELLER GOVERNOR INVERTED FLIGHT OIL SUPPLY	1	
- 17	305-478009- 7								LINE, PROP GOVERNOR INVERTED FLIGHT OIL SUPPLY ASSY OF (ATTACHING PARTS)	1	
- 18	MS21042L3								NUT	2	
- 19	LD153-0002-1203								WASHER, REDUCED OD (43999)	2	
- 20	MS35207-263								SCREW	2	
- 21	MS21919H6								CLAMP	2	
- 22	MS21919DG16								CLAMP	2	
									-----*		
- 23	K1206-6-4								CHECK VALVE, ENGINE OIL SYSTEM (34199) (NR SPEC CONT DWG HE284-5055-0001)	1	
- 24	NAS617-6	*1							PACKING	2	
- 25	AN939D6								ELBOW	1	
- 26	11-10802								FILTER ASSEMBLY, IN-LINE (81873) (PROP GOVERNOR INVERTED OIL SUPPLY)(NR SPEC CONT DWG HE286-5003-0001)	1	
- 27	21-11247								ELEMENT ASSEMBLY, FILTER (81873)	1	
- 28	52-10249								SEAL, O-RING VITON (81873)	1	
- 29	52-10731								CASE, IN-LINE FILTER (81873)	1	
	52-10696								NAMEPLATE, IN-LINE FILTER (81873)	1	
- 30	AN815-6D								UNION	1	
- 31	NAS617-6	*1							PACKING	1	
- 32	305-420025								SEAL, ENGINE COMBUSTION CHAMBER DRAIN	2	
	2CM307B2A	*2							STARTER-GENERATOR (01288) (NR SPEC CONT DWG- HE469-5002-0033) (ATTACHING PARTS)	1	
- 33	MS21042L6								NUT	6	
- 34	LD153-0011-0017								WASHER, FLAT (43999)	6	
									-----*		
									PARTIAL BREAKDOWN		
- 35	368506256AAP1								CLAMP, VEE RING (01288)(ALTERNATE PART AVAILABLE)		REF
	MVT65343								CLAMP (98625)(ALTERNATE PART FOR 368506256AAP1)		REF
- 36	36C716569ABG1								ADAPTER ASSY, MOUNTING, FLANGE (01288)		REF
- 37	36A227601P6								SCREW (01288)		REF
- 38	AN960-6L								WASHER	1	
- 39	36D830310AAG1								COVER ASSY, AIR INLET (01288)		REF
- 40	36B506294ABG1								BAFFLE ASSY, AIR (01288)		REF
- 41	36B506276AAG1								COVER ASSY, BRUSH (01288)		REF
- 42	36A227603P14								SCREW		REF
- 43	AN960-10L								WASHER		REF

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2									POD PACKAGE - ENGINE ACCESSORIES (SHEET 1)		
- 44	36A222647AAG1	.	.	.	.	.	.	.	BRUSH, KIT (01288)	-	REF
- 45	36A222598AAP1	.	.	.	.	.	.	.	BRUSH ASSY, TWIN (01288)	-	REF
- 46	36A227602P10	.	.	.	.	.	.	.	SCREW (01288)	-	REF
- 47	36A227602P12	.	.	.	.	.	.	.	SCREW (01288)	-	REF
- 48	MS21043-06	.	.	.	.	.	.	.	NUT	-	REF
- 49	AN960-6L	.	.	.	.	.	.	.	WASHER	-	REF
- 50	36A222601P24	.	.	.	.	.	.	.	SCREW (01288)	-	REF
- 51	36A222610AAP1	.	.	.	.	.	.	.	COVER (01288)	-	REF
- 52	MS21043-6	.	.	.	.	.	.	.	NUT	-	REF
- 53	AN935-616L	.	.	.	.	.	.	.	WASHER	-	REF
- 54	AN960C616L	.	.	.	.	.	.	.	WASHER	-	REF
- 55	36B506278AAP1	.	.	.	.	.	.	.	TERMINAL, E (01288)	-	REF
- 56	MS21043-3	.	.	.	.	.	.	.	NUT	-	REF
- 57	AN935-10L	.	.	.	.	.	.	.	WASHER	-	REF
	AN960C10L	.	.	.	.	.	.	.	WASHER	-	REF

*1 ITEMS CONTAINED IN ENGINE CHANGE CONSUMABLE PARTS KIT 305-829007

*2 2CM307B2A SUPERSEDES 2CM307B1 (NR SPEC CDNT DWG HE469-5002-0013) OR 2CM307B2 (HE469-5002-0023) FOR FUTURE PROCUREMENT 2CM307B2A OR 2CM307B2 OR 2CM307B1 MAY BE USED INTERCHANGEABLY

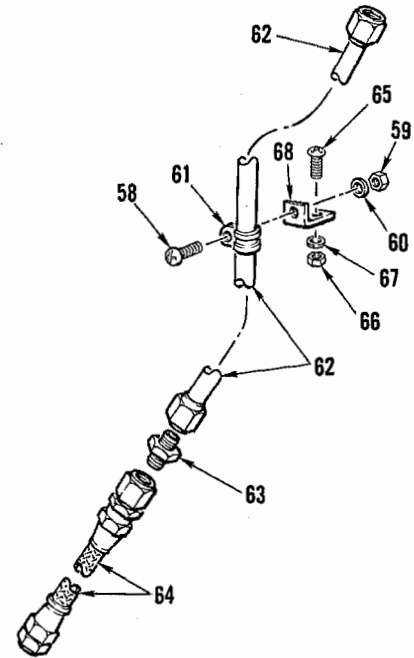
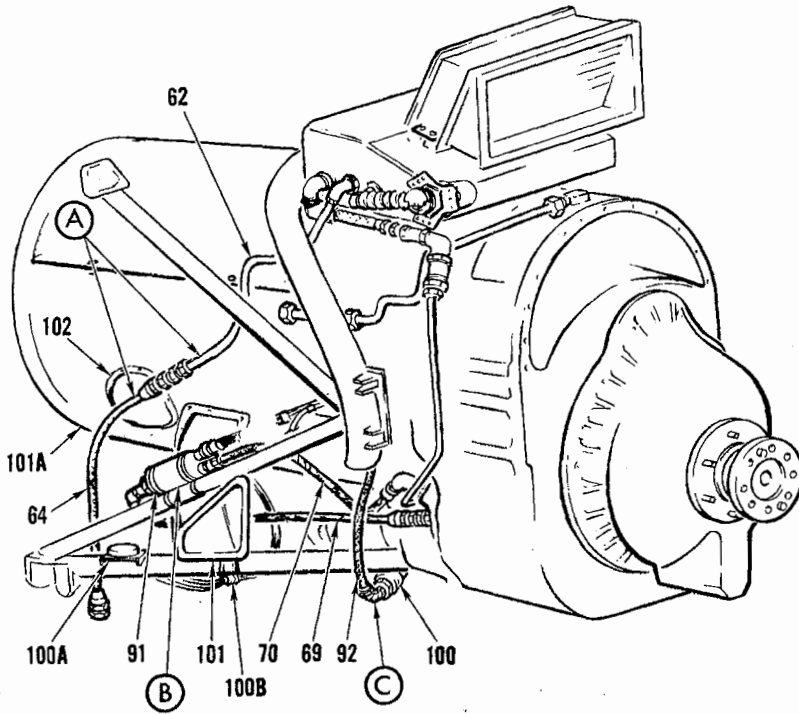
*3 APPLICABLE TO BETA VALVES NOT HAVING TO 3HA2-10-501 INCORPORATED.

*4 APPLICABLE TO BETA VALVES HAVING TO 3HA2-10-501 INCORPORATED.

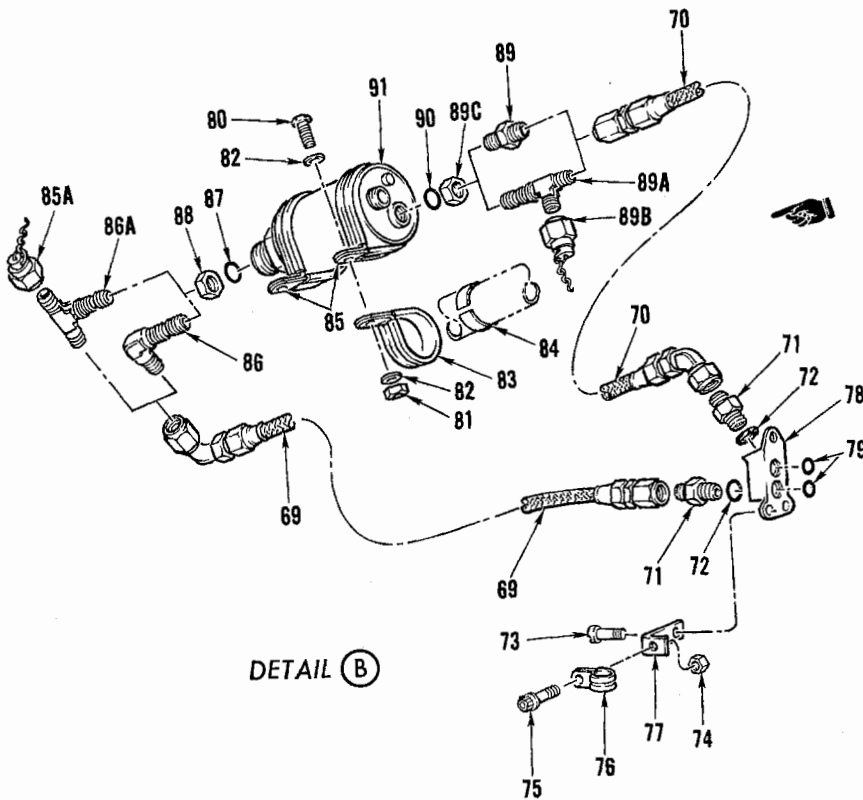
*5 APPLICABLE TO AIRCRAFT NOT HAVING T.O. 1L-10A-613 AND T.O. 3H1-19-502 INCORPORATED

*6 APPLICABLE TO AIRCRAFT HAVING T.O. 1L-10A-613 AND T.O. 3H1-19-501 INCORPORATED

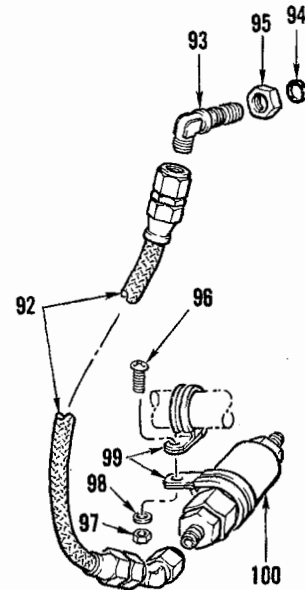
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DETAIL A



DETAIL B



DETAIL C

VA-10H-42-248

Figure 4-2. Pod Package - Engine Accessories (Sheet 2)

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2									POD PACKAGE - ENGINE ACCESSORIES (SHEET 2)		
- 58	MS35207-263	.	.	.	.	.	.	.	SCREW	1	*
- 59	MS21042L3	.	.	.	.	.	.	.	NUT	1	*
- 60	LD153-0002-1203	.	.	.	.	.	.	.	WASHER, REDUCED OD (43999)	1	*
- 61	MS21919DG8	.	.	.	.	.	.	.	CLAMP	1	*
- 62	305-478004- 5	.	.	.	.	.	.	.	LINE, OIL TANK VENT ASSEMBLY OF	1	*
- 63	AN815-8D	.	.	.	.	.	.	.	UNION	1	*
- 64	305-420006- 3	.	.	.	.	.	.	.	HOSE ASSEMBLY, OIL TANK VENT TO OVERBOARD	1	*
- 65	7S14-1032-6A	.	.	.	.	.	.	.	SCREW, ROUND HEAD CORR. RES. (43999)	1	*
- 66	MS21043-3	.	.	.	.	.	.	.	NUT	1	*
- 67	LD153-0010-0007	.	.	.	.	.	.	.	WASHER (43999)	1	*
- 68	2C16-3	.	.	.	.	.	.	.	CLIP, CONDUIT (89372)	1	*
- 69	305-420006- 11	.	.	.	.	.	.	.	HOSE ASSEMBLY, ENGINE TORQUE PRESSURE TO TRANSMITTER	1	*
- 70	305-420006- 13	.	.	.	.	.	.	.	HOSE ASSEMBLY, ENGINE TORQUE VENT TO TRANSMITTER	1	*
- 71	AN815-4D	.	.	.	.	.	.	.	UNION	2	*
- 72	NAS617-4	*1	.	.	.	.	.	.	PACKING	2	*
- 73	AN501A10-7	.	.	.	.	.	.	.	BOLT	3	*
- 74	LH8540-02K	.	.	.	.	.	.	.	NUT (72962) (SEE TO 2J-T76-4 FOR NHA)	REF	*
- 75	MS9489-05	.	.	.	.	.	.	.	BOLT (SEE TO 2J-T76-4 FOR NHA)	REF	*
- 76	TA1718555X	.	.	.	.	.	.	.	CLAMP (84971) (SEE TO 2J-T76-4 FOR NHA)	REF	*
- 77	S880882-1	.	.	.	.	.	.	.	BRACKET (99193) (SEE TO 2J-T76-4 FOR NHA)	REF	*
- 78	305-420005	.	.	.	.	.	.	.	FITTING, TORQUE TRANSMITTER ADAPTER	1	*
- 79	MS29561-011	*1	.	.	.	.	.	.	PACKING	2	*
- 80	MS35207-263	.	.	.	.	.	.	.	SCREW	2	*
- 81	MS21042L3	.	.	.	.	.	.	.	NUT	2	*
- 82	LD153-0002-1203	.	.	.	.	.	.	.	WASHER, REDUCED OD (43999)	4	*
- 83	MS21919DG19	.	.	.	.	.	.	.	CLAMP	2	*
- 84	300-318073- 71	*1	.	.	.	.	.	.	SEAL, TRANSMITTER CLAMPS, ANTI-ROTATION (MAKE FROM ADHESIVE CORK RUBBER TAPE MIL-G-6841D 0.032 X 0.60 X 3.50 INCH)	2	*
- 85	MS21919DG36	.	.	.	.	.	.	.	CLAMP	2	*
- 85A	305-420044- 3	*3	.	.	.	.	.	.	CAP ASSEMBLY, ENGINE PRESSURE ANALYZER (MAKE FROM- AN929A4C)	1	*
	5R10	*3	.	.	.	.	.	.	RING, CHAIN RETAINER (43999)	1	*
	NAS1455B1-4C	*3	.	.	.	.	.	.	CHAIN	1	*
- 86	21459	*2	.	.	.	.	.	.	ELBOW, 90° FLARED AND FLARELESS (17341) (NR SPEC CONT DWG HE273-0035-0001)	1	*
- 86A	305-420042	*3	.	.	.	.	.	.	FITTING, ENGINE TORQUE PRESSURE ANALYZER TEE (MAKE FROM- AN834-4C)	1	*
- 87	NAS617-4	*1	.	.	.	.	.	.	PACKING	1	*
- 88	AN924-4D	.	.	.	.	.	.	.	NUT	1	*
- 89	AN815-4D	*2	.	.	.	.	.	.	UNION	1	*
- 89A	AN804C4	*3	.	.	.	.	.	.	TEE	1	*
- 89B	305-420044- 3	*3	.	.	.	.	.	.	CAP ASSEMBLY, ENGINE PRESSURE ANALYZER (MAKE FROM- AN929A4C)	1	*
	5R10	*3	.	.	.	.	.	.	RING, CHAIN RETAINER (43999)	1	*
	NAS1455B1-4C	*3	.	.	.	.	.	.	CHAIN	1	*
- 89C	AN924-4C	*3	.	.	.	.	.	.	NUT	1	*
- 90	NAS617-4	*1	.	.	.	.	.	.	PACKING	1	*
- 91	7724-119F5-1	.	.	.	.	.	.	.	TRANSMITTER, PRESSURE OIL, 25-75 PSI, ENGINE TORQUE- SENSING (Q2987) (NR SPEC CONT DWG HE431-5003-0003)	1	*
- 92	305-420006- 55	.	.	.	.	.	.	.	HOSE ASSEMBLY, OIL FILTER TO PROPELLER GOVERNOR- (PROPELLER UN-FEATHER)	1	*
- 93	AN833-6D	.	.	.	.	.	.	.	ELBOW	1	*
- 94	NAS617-6	*1	.	.	.	.	.	.	PACKING	1	*
- 95	AN924-6D	.	.	.	.	.	.	.	NUT	1	*
- 96	MS35207-263	.	.	.	.	.	.	.	SCREW	1	*
- 97	MS21042L3	.	.	.	.	.	.	.	NUT	1	*
- 98	LD153-0002-1203	.	.	.	.	.	.	.	WASHER, FLAT (43999)	1	*
- 99	MS21919DG16	.	.	.	.	.	.	.	CLAMP	2	*
-100	11-10802	.	.	.	.	.	.	.	FILTER ASSEMBLY, IN-LINE (81873) (PROPELLER UN-FEATHER) (NR SPEC CONT DWG HE286-5003-0001) (SEE SHEET 1 FOR BREAKDOWN)	1	*
-100A	305-540002-161	.	.	.	.	.	.	.	WIRE HARNESS, MISCELLANEOUS ENGINE EQUIPMENT (LH)	1	*
	305-540002-171	.	.	.	.	.	.	.	WIRE HARNESS, MISCELLANEOUS ENGINE EQUIPMENT (RH) (ATTACHING PARTS)	1	*
	MS21042L3	.	.	.	.	.	.	.	NUT	4	*
	LD153-0002-1202	.	.	.	.	.	.	.	WASHER, REDUCED OD (43999)	8	*
	MS35207-278	.	.	.	.	.	.	.	SCREW	4	*
-100B	MS21042L3	.	.	.	.	.	.	.	NUT	1	*
	LD153-0002-1203	.	.	.	.	.	.	.	WASHER, REDUCED OD (43999)	2	*
	MS35207-263	.	.	.	.	.	.	.	SCREW	1	*
	MS21919WG5	.	.	.	.	.	.	.	CLAMP	1	*
	MS21919WG15	.	.	.	.	.	.	.	CLAMP	1	*

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2									POD PACKAGE - ENGINE ACCESSORIES (SHEET 2)		
-101	305-420115								. . DUCT, ENGINE SHROUD COOLING ASSEMBLY OF- - - - - (ATTACHING PARTS)	1	
	7S14-1032-6A								. . SCREW, ROUND HEAD, CORR RES (43999)- - - - -	7	
	LD153-0010-0007								. . WASHER, CORR RES STL (43999) - - - - -	7	
									-----*		
-101A	305-420030								. . SHROUD, ENGINE LOWER RIGHT ASSEMBLY OF - - - - - (ATTACHING PARTS)	1	
	7S14-1032-6A								. . SCREW, ROUND HEAD CORR RES (43999) - - - - -	16	
	LD153-0010-0007								. . WASHER, CORR RES STL (43999) - - - - -	14	
	MS21043-3								. . NUT- - - - -	7	
									-----*		
-102	305-420033								. . COVER, ENGINE IGNITOR PLUG - - - - - (ATTACHING PARTS)	1	
	7S14-1032-6A								. . SCREW, ROUND HEAD, CORR RES (43999)- - - - -	6	
	LD153-0010-0007								. . WASHER, CORR RES STL (43999) - - - - -	6	
									-----*		
									*1 ITEMS CONTAINED IN ENGINE CHANGE CONSUMABLE PARTS KIT		*
	305-829007										
									*2 ENGINES NOT HAVING TCTD1L-10A-584 INCORPORATED		*
									*3 ENGINES HAVING TCTO 1L-10A-584 INCORPORATED		*

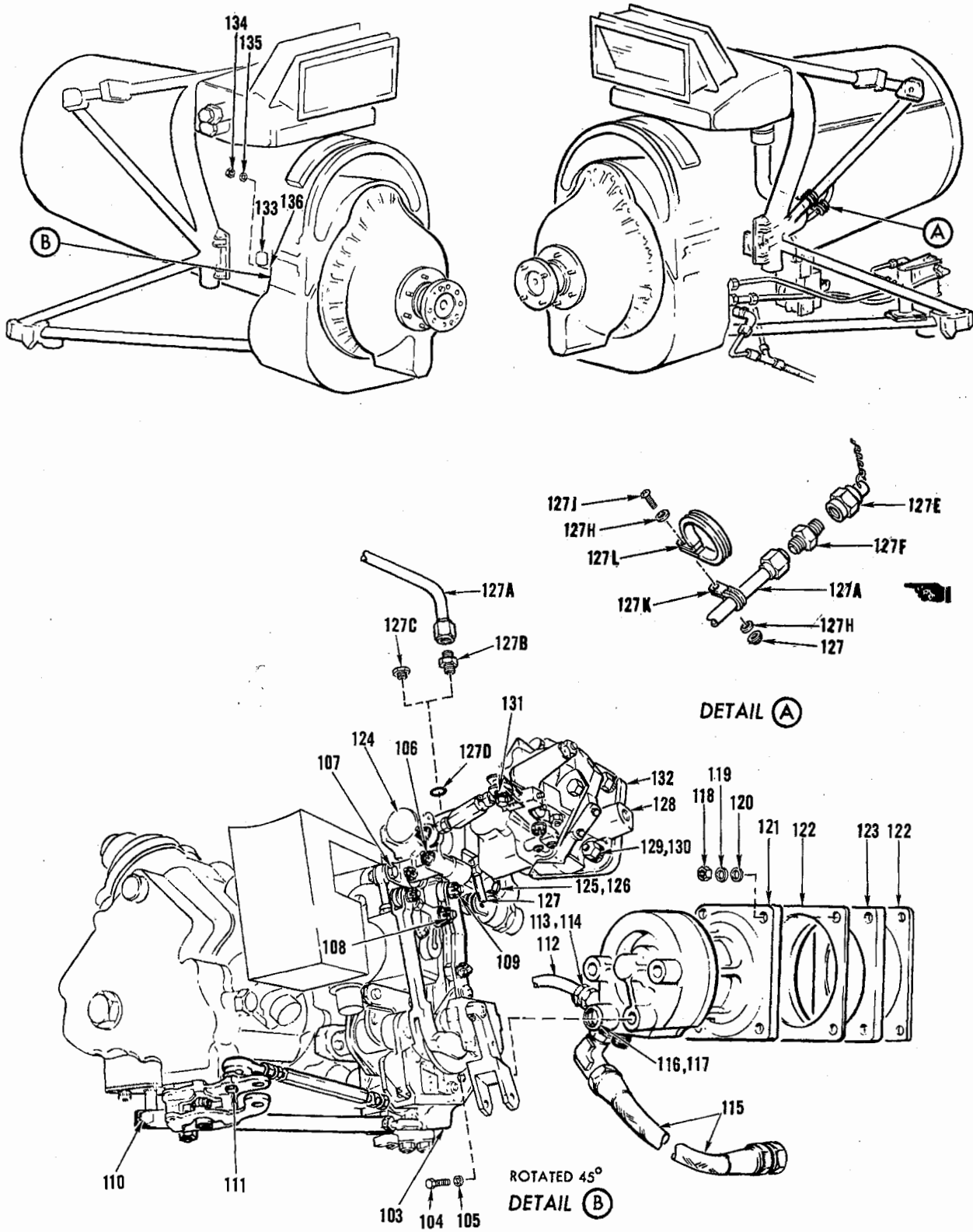


Figure 4-2. Pod Package - Engine Accessories (Sheet 3)

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2									POD PACKAGE - ENGINE ACCESSORIES (SHEET 3)		
-103	717875-1	.	.	.	.	.	.	.	CAM AND LINKAGE ASSEMBLY, PROPELLER(73030) (NR SPEC CONT DWG HE320-5006-0009) (SEE TO 3HA2-11-2 FOR COMPLETE BREAKDOWN)	1	
	717875-2	*11	.	.	.	.	.	.	CAM AND LINKAGE ASSEMBLY, PROPELLER (73030) (SEE T.O. 3HA2-11-2 FOR COMPLETE BREAKDOWN) (ATTACHING PARTS)	1	*
-104	NAS1351-4-10	.	.	.	.	.	.	.	BOLT - - - - -	3	
-105	LD153-0CC2-1204	.	.	.	.	.	.	.	WASHER, REDUCED OD (43999) - - - - -	3	
									-----*		
									PARTIAL BREAKDOWN		
-106	AN320C3	*6	.	.	.	.	.	.	NUT - - - - -	1	
	AN320C-4	*7	.	.	.	.	.	.	NUT - - - - -	1	
	AN960C1C	.	.	.	.	.	.	.	WASHER - - - - -	AR	
	AN960C1CL	.	.	.	.	.	.	.	WASHER - - - - -	AR	
-107	NAS464P3-8	.	.	.	.	.	.	.	BOLT - - - - -	1	
	592123-24	.	.	.	.	.	.	.	WASHER, FLAT (73030)- - - - -	1	
	AN960C1CL	.	.	.	.	.	.	.	WASHER - - - - -	1	
	AN320C-3	*6	.	.	.	.	.	.	NUT - - - - -	1	
	MS17826-3	*7	.	.	.	.	.	.	NUT - - - - -	1	
-108	NAS464P3-8	.	.	.	.	.	.	.	BOLT - - - - -	1	
	592123-24	.	.	.	.	.	.	.	WASHER, FLAT (73030)- - - - -	1	
	AN960C1CL	.	.	.	.	.	.	.	WASHER - - - - -	1	
	AN960C1C	.	.	.	.	.	.	.	WASHER - - - - -	1	
	AN320C3	*6	.	.	.	.	.	.	NUT - - - - -	1	
	MS17826-3	*7	.	.	.	.	.	.	NUT - - - - -	1	
-109	AN23-12	.	.	.	.	.	.	.	BOLT - - - - -	1	
	592123-24	.	.	.	.	.	.	.	WASHER, FLAT (73030)- - - - -	1	
	AN960C1CL	.	.	.	.	.	.	.	WASHER - - - - -	1	
	AN960C1C	.	.	.	.	.	.	.	WASHER - - - - -	1	
	AN320C3	*6	.	.	.	.	.	.	NUT - - - - -	1	
	MS17826-3	*7	.	.	.	.	.	.	NUT - - - - -	1	
-110	AN4C10	*6	.	.	.	.	.	.	BOLT - - - - -	1	
	MS18115-0410	*7	.	.	.	.	.	.	BOLT - - - - -	1	
	AN960C416L	*6	.	.	.	.	.	.	WASHER - - - - -	1	
	MS21126-4	*7	.	.	.	.	.	.	SPACER - - - - -	1	
	AN320C4	*6	.	.	.	.	.	.	NUT - - - - -	1	
	MS17826-4	*7	.	.	.	.	.	.	NUT - - - - -	1	
-111	NAS1203-13D	.	.	.	.	.	.	.	BOLT - - - - -	1	
	592162-4	.	.	.	.	.	.	.	WASHER, SHOULDERED STEEL (73030)- - - - -	1	
	AN320C3	*6	.	.	.	.	.	.	NUT - - - - -	1	
	MS17826-3	*7	.	.	.	.	.	.	NUT - - - - -	1	
-112	305-428CC1- 3	.	.	.	.	.	.	.	LINE, ENGINE FUEL BOOST PUMP SEAL ASSEMBLY OF (SEE SHEET 4 FOR CONTINUATION)	REF	
-113	AN815-4D	.	.	.	.	.	.	.	UNION - - - - -	1	
-114	MS29512-C4	.	.	.	.	.	.	.	PACKING - - - - -	1	
-115	305-420CC6- 27	.	.	.	.	.	.	.	HOSE ASSEMBLY, FUEL ENGINE FEED FUSELAGE STATION 181 TO-BOOST PUMP	1	
-116	AN919-23D	.	.	.	.	.	.	.	REDUCER - - - - -	1	
-117	MS29512-12	.	.	.	.	.	.	.	PACKING - - - - -	1	
-118	MS21042L5	.	.	.	.	.	.	.	NUT - - - - -	4	
-119	LD153-0C11-0015	.	.	.	.	.	.	.	WASHER, FLAT (43999) (UNDER NUT) - - - - -	4	
-120	2W1P21-18-62	.	.	.	.	.	.	.	WASHER, FLAT (43999) (AGAINST PUMP FLANGE) - - - - -	4	
-121	364800-1	.	.	.	.	.	.	.	PUMP, FUEL BOOSTER ENGINE DRIVEN (59875) (NR SPEC CONT DWG HE281-5003-0005) (SEE TO 6J10-4-72-2 FOR BREAKDOWN)	1	
-122	MS9135-01	*1	.	.	.	.	.	.	GASKET - - - - -	2	
-123	305-480218	.	.	.	.	.	.	.	SPACER, FUEL BOOST PUMP INSULATION - - - - -	1	
-124	717876-1	*4	.	.	.	.	.	.	BETA VALVE ASSEMBLY, PROPELLER(73030) (NR SPEC CONT- DWG HE320-5006-0003) (SEE TO 3HA2-10-2 FOR BREAKDOWN)	REF	
	717876-2	*5	.	.	.	.	.	.	BETA VALVE ASSEMBLY, PROPELLER(73030)(NR SPEC CONT DWG HE320-5006-0027) (SEE T.O. 3HA2-10-2 FOR BKON) (ATTACHING PARTS)	1	*
-125	AN4-11A	.	.	.	.	.	.	.	BOLT - - - - -	3	
-126	LD153-0C11-0C13	.	.	.	.	.	.	.	WASHER, FLAT (43999) - - - - -	3	
									-----*		
									PARTIAL BREAKDOWN		
-127	711092-1	.	.	.	.	.	.	.	BOLT, DRILLED HEXAGON HEAD (73030)- - - - -	REF	
	AN960-1CL	.	.	.	.	.	.	.	WASHER - - - - -	REF	
	701572-2	.	.	.	.	.	.	.	PLATE, RETAINER (73030) - - - - -	REF	
	701575-1	.	.	.	.	.	.	.	TUBE, TRANSFER (SHORT) (73030)- - - - -	REF	
	701592-1	.	.	.	.	.	.	.	TUBE, TRANSFER (LONG) (73030) - - - - -	REF	
	MS9241-C10	*1	.	.	.	.	.	.	PACKING (USED ON TRANSFER TUBES)- - - - -	REF	
	MS9241-C41	*1	.	.	.	.	.	.	PACKING - - - - -	REF	
	MS9241-C11	*1	.	.	.	.	.	.	PACKING - - - - -	REF	

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2									POD PACKAGE - ENGINE ACCESSORIES (SHEET 3)		
-127A	305-4280C7-	3							LINE ASSEMBLY, ENGINE PROP, BETA PRESSURE-	1	
-127B	305-420C43		*2						FITTING, BETA VALVE PRESSURE REDUCER	1	
-127C	AN814-2CL		*3						PLUG	1	
-127D	MS28775-C10		*1						PACKING-	1	
-127E	305-420C44-	3	*2						CAP ASSEMBLY, ENGINE PRESSURE ANALYZER (MAKE FROM- AN929A4C)	1	
	5R10		*2						RING, CHAIN RETAINER (43999)	1	
	NAS1455B1-4C		*2						CHAIN-	1	
-127F	AN919-2C		*2						REDUCER-	1	
-127G	MS21042L3		*2						NUT-	1	
-127H	LD153-0C11-CC11		*2						WASHER, FLAT (43999)	2	
-127J	MS35207-263		*2						SCREW-	1	
-127K	MS21919G3		*2						CLAMP-	1	
-127L	MS21919G17		*2						CLAMP-	1	
-128	733892-1		*9						GOVERNOR ASSEMBLY, PROPELLER (73030) (NR SPEC CONT DWG HE320-5006-0025) (SUPERSEDES 717874-1) (SEE T.O. 3HA4-3-62 FOR BREAKDOWN)	1	*
	733892-2		*8						GOVERNOR ASSEMBLY, PROPELLER (73030) (SEE- T.O. 3HA4-3-62 FOR BREAKDOWN)	1	*
	733892-3		*10						GOVERNOR ASSEMBLY, PROPELLER (73030) (SEE- T.O. 3HA4-3-62 FOR BREAKDOWN)	1	*
-129	LD153-0C11-CC15								WASHER, FLAT (43999)	4	
-130	MS21042L5								NUT-	4	
									---*---		
									PARTIAL BREAKDOWN		
-131	NAS464P3-10		*6						BOLT-	1	
	AN960C1CL		*6						WASHER-	2	
	717999-1								PLATE, SERRATED (73030)	1	
	AN320C3		*6						NUT	1	
-132	718C97-1		*1						GASKET, GOVERNOR (73030)-	1	
-133	AG34								GENERATOR-TACHOMETER (90853) (NR SPEC CONT DWG HE468-5001-0001) (ATTACHING PARTS)	1	
-134	MS21042L4								NUT-	4	
-135	LD153-0C02-1204								WASHER, REDUCED OD (43999)	4	
									---*---		
-136	MS9134-C1		*1						GASKET	1	
									*1 ITEMS CONTAINED IN ENGINE CHANGE CONSUMABLE PARTS KIT 305-829007		
									*2 ENGINES HAVING T.O. 1L-10A-584 INCORPORATED		
									*3 ENGINES NOT HAVING T.O. 1L-10A-584 INCORPORATED T.O. 3HA4-3-62 FOR BREAKDOWN)		*
									*4 APPLICABLE TO BETA VALVES NOT HAVING T.O. 3HA2-1C-501 INCORPORATED		*
									*5 APPLICABLE TO BETA VALVES HAVING T.O. 3HA2-1C-501		*
									*6 APPLICABLE TO ENGINE CONTROLS NOT HAVING T.O. 1L-10A-583 INCORPORATED		*
									*7 APPLICABLE TO ENGINE CONTROLS HAVING T.O. 1L-10A-583 INCORPORATED		*
									*8 PROPELLER GOVERNORS HAVING T.O. 3HA4-3-520 INCORPORATED		*
									*9 PROPELLER GOVERNORS NOT HAVING T.O. 3HA4-3-521 INCORPORATED		*
									*10 PROPELLER GOVERNORS HAVING T.O. 3HA4-3-521 INCORPORATED		*
									*11 CAM AND LINKAGE ASSEMBLIES HAVING T.O. 3HA2-11-501 INCORPORATED		*

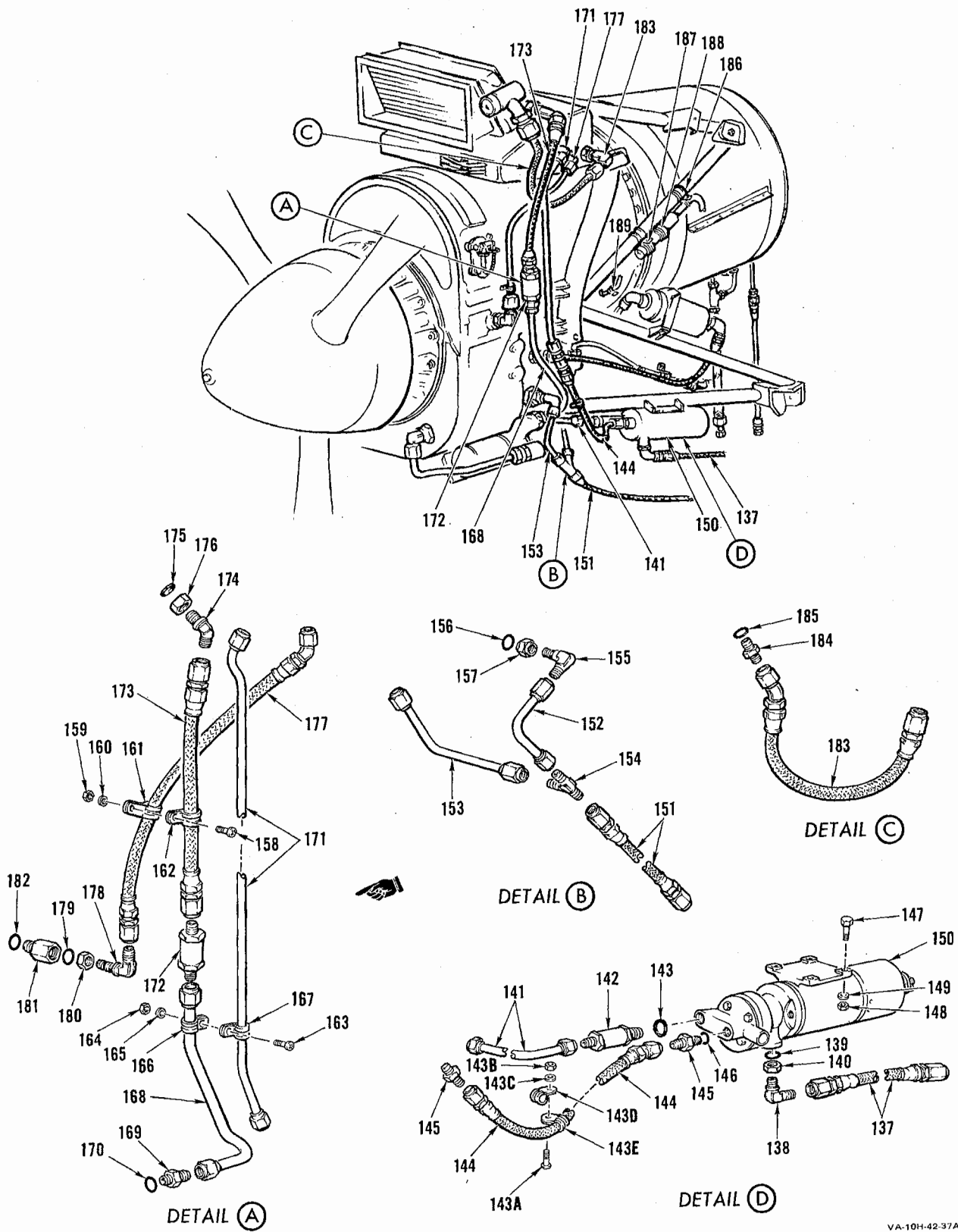


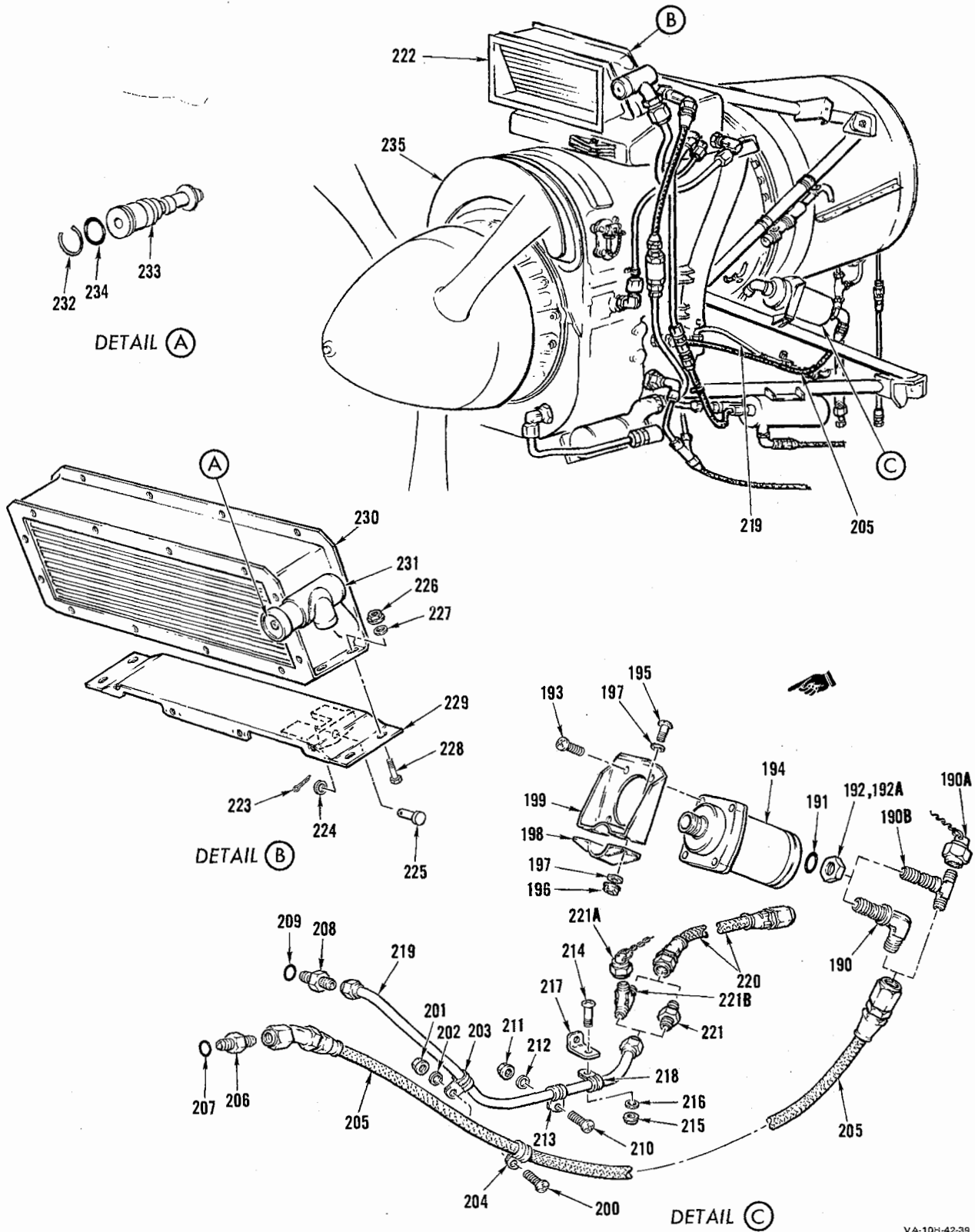
Figure 4-2. Pod Package - Engine Accessories (Sheet 4)

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2									POD PACKAGE - ENGINE ACCESSORIES (SHEET 4)		
-137	305-420006- 25								HOSE ASSEMBLY, UN-FEATHERING PUMP SEAL DRAIN - - - - -	1	
-138	AN833-4D								ELBOW- - - - -	1	
-139	NAS617-4	*1							PACKING- - - - -	1	
-140	AN924-4D								NUT- - - - -	1	
-141	305-478012- 3								LINE ASSEMBLY, UN-FEATHERING PUMP TO FILTER- - - - -	1	
-142	K1206-6-4								CHECK VALVE, ENGINE OIL SYSTEM (34199) (NR SPEC CONT DWG HE284-5055-0001)	1	
-143	NAS617-6	*1							PACKING- - - - -	1	
-143A	MS35207-263								SCREW- - - - -	1	
-143B	MS21042L3								NUT- - - - -	1	
-143C	LD153-0002-1203								WASHER, REDUCED OD (43999) - - - - -	1	
-143D	MS21919DG5								CLAMP- - - - -	1	
-143E	MS21919DG7								CLAMP- - - - -	1	
-144	305-420006- 7								HOSE ASSEMBLY, OIL TANK TO UN-FEATHERING PUMP- - - - -	1	
-145	AN815-6D								UNION- - - - -	2	
-146	NAS617-6	*1							PACKING- - - - -	1	
-147	AN3-3A								BOLT - - - - -	4	
-148	MS21042L3								NUT- - - - -	4	
-149	LD153-0002-1203								WASHER, REDUCED OD (43999) - - - - -	4	
-150	310393								PUMP ASSEMBLY, UN-FEATHERING (80293) (NR SPEC- HE281-5002-0003) (SEE TO 3HA5-3-82)	1	
-151	305-420006- 21								HOSE ASSEMBLY, ENGINE BOOSTER PUMP SEAL DRAIN TO OVERBOARD DRAIN	1	
-152	305-428001- 3								LINE, ENGINE FUEL BOOST PUMP SEAL ASSY OF- - - - -	1	
-153	305-428002- 3								LINE, ENGINE FUEL PUMP SEAL DRAIN ASSY OF- - - - -	1	
-154	AN824-6D								TEE - - - - -	1	
-155	AN833-4D								ELBOW- - - - -	1	
-156	MS29512-04	*1							PACKING- - - - -	1	
-157	AN924-4D								NUT- - - - -	1	
-158	MS35207-263								SCREW- - - - -	1	
-159	MS21042L3								NUT- - - - -	1	
-160	LD153-0002-1203								WASHER, REDUCED OD (43999) - - - - -	1	
-161	MS21919DG7								CLAMP- - - - -	1	
-162	MS21919DG9								CLAMP- - - - -	1	
-163	MS35207-263								SCREW- - - - -	1	
-164	MS21042L3								NUT- - - - -	1	
-165	LD153-0002-1203								WASHER, REDUCED OD (43999) - - - - -	1	
-166	MS21919DG8								CLAMP- - - - -	1	
-167	MS21919DG6								CLAMP- - - - -	1	
-168	305-478010- 3	*3							LINE, ENGINE TO OIL COOLER ASSEMBLY OF - - - - -	1	*
-169	AN815-8D	*3							UNION- - - - -	1	*
-170	NAS617-8	*3							PACKING- - - - -	1	*
-171	305-478003- 5								LINE, PROPELLER UN-FEATHER OIL SUPPLY ASSEMBLY OF- - - - -	1	
-172	K1377-8-1								CHECK VALVE, ENGINE OIL SCAVENGE RETURN (34199) (NR SPEC CONT DWG HE284-5053-0001)	1	
-173	305-420006- 39								HOSE ASSEMBLY, ENGINE TO OIL COOLER- - - - -	1	
-174	AN837-8D								ELBOW- - - - -	1	
-175	NAS617-8	*1							PACKING- - - - -	1	
-176	AN924-8D								NUT- - - - -	1	
-177	305-420006- 49								HOSE ASSEMBLY, FROM OIL TANK TO ENGINE CRANKCASE VENT- - - - -	1	
-178	AN833-6D								ELBOW- - - - -	1	
-179	NAS617-6	*1							PACKING- - - - -	1	
-180	AN924-6A								NUT- - - - -	1	
-181	AN894D6-4								BUSHING- - - - -	1	
-182	NAS617-4								PACKING- - - - -	1	
-183	305-420006- 59								HOSE ASSEMBLY, FROM OIL COOLER TO OIL TANK - - - - -	1	
-184	AN815-8D								UNION- - - - -	1	
-185	NAS617-8								PACKING- - - - -	1	
-186	MS21042L3	*2							NUT- - - - -	1	
	LD153-0002-1203	*2							WASHER, REDUCED OD (43999) - - - - -	2	
	MS35207-263	*2							SCREW- - - - -	1	
	MS21919WG7	*2							CLAMP- - - - -	1	
	MS21919WG17	*2							CLAMP- - - - -	1	
	300-318073- 71	*2							STRIP, ANTI-ROTATION (MAKE FROM ADHESIVE RUBBER TAPE MIL-G-6841B 0.032 X 0.60 X 3.50 INCHES)	1	

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2									POD PACKAGE - ENGINE ACCESSORIES (SHEET 4)		
-187	MS21042L3	*2	.	.	NUT-	-	-	-	-	-	1
	LD153-0002-1203	*2	.	.	WASHER, REDUCED OD (43999)	-	-	-	-	-	2
	MS20073-03-10	*2	.	.	BOLT	-	-	-	-	-	1
	MS21919WG17	*2	.	.	CLAMP-	-	-	-	-	-	2
	300-318073- 71	*2	.	.	STRIP, ANTI-ROTATION (MAKE FROM ADHESIVE RUBBER TAPE	-	-	-	-	-	1
					MIL-G-6841B 0.032 X 0.60 X 3.50 INCHES)	-	-	-	-	-	
-188	305-540008	.	.	.	BY PASS ASSEMBLY, TURBINE INLET TEMPERATURE-	-	-	-	-	-	1
	MS3101A16S1P	.	.	.	CONNECTOR (MIL-C-50150)	-	-	-	-	-	2
-189	MS21042L3	.	.	.	NUT-	-	-	-	-	-	1
	LD153-0002-1203	.	.	.	WASHER, REDUCED OD (43999)	-	-	-	-	-	1
	MS35207-263	.	.	.	SCREW-	-	-	-	-	-	1
	MS21919WG5	.	.	.	CLAMP-	-	-	-	-	-	1
	MS21919DG4	.	.	.	CLAMP-	-	-	-	-	-	1
					*1 ITEMS CONTAINED IN ENGINE CHANGE CONSUMABLE PARTS KIT						
					305-829007						
					*2 ENGINES HAVING T.O. 1L-10A-531 INCORPORATED						
					*3 ENGINES NOT HAVING T.O. 2J-T76-532 INCORPORATED						*

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2									POD PACKAGE - ENGINE ACCESSORIES (SHEET 5)		
-190	21459	.	.	.	.	.	.	.	ELBOW, 90° FLARED AND FLARELESS, SPECIAL (17341) (NR SPEC CONT DWG HE273-0035-0001)	1	
-190A	305-420C44- 3	*1	.	.	.	.	.	.	CAP ASSEMBLY, ENGINE PRESSURE ANALYZER (MAKE FROM- AN929A4C)	1	
	5R10	*1	.	.	.	.	.	.	RING, CHAIN RETAINER (43999)	1	
	NAS1455B1-4C	*1	.	.	.	.	.	.	CHAIN-	1	
-190B	305-420C42	*1	.	.	.	.	.	.	FITTING, ENGINE TORQUE PRESSURE ANALYZER TEE (MAKE FROM- AN834-4C)	1	
-191	NAS617-4	*2	.	.	.	.	.	.	PACKING-	1	
-192	AN924-4D	*3	.	.	.	.	.	.	NUT-	1	
-192A	AN924-4C	*1	.	.	.	.	.	.	NUT-	1	
-193	MS35206-232	.	.	.	.	.	.	.	SCREW-	4	
-194	7707-2J5-1	.	.	.	.	.	.	.	TRANSMITTER, OIL, 0-200 PSI (02987) (NR SPEC CONT DWG- HE431-5004-0001)(SEE TO 5E12-15-3 FOR BREAKDOWN)	1	
-195	MS35207-263	.	.	.	.	.	.	.	SCREW-	2	
-196	MS21042L3	.	.	.	.	.	.	.	NUT-	2	
-197	LD153-0C02-1203	.	.	.	.	.	.	.	WASHER, REDUCED OD (43999)	4	
-198	300-470CC1-103	.	.	.	.	.	.	.	BRACKET, OIL PRESSURE TRANSMITTER ASSY OF-	1	
	300-470CC1- 23	.	.	.	.	.	.	.	STRIP (MAKE FROM ADHESIVE CORK RUBBER SHT MIL-T-6841-0.03 X 1.00 X 1.75)	1	
-199	300-470CC1-101	.	.	.	.	.	.	.	BRACKET, OIL PRESSURE TRANSMITTER ASSY OF-	1	
	300-470CC1- 25	.	.	.	.	.	.	.	STRIP (MAKE FROM ADHESIVE CORK RUBBER SHT MIL-T-6841-0.03 X 1.00 X 1.00 X 1.12)	1	
-200	MS35207-263	.	.	.	.	.	.	.	SCREW-	1	
-201	MS21042L3	.	.	.	.	.	.	.	NUT-	1	
-202	LD153-0CC2-1203	.	.	.	.	.	.	.	WASHER, REDUCED OD (43999)	1	
-203	MS21919DG6	.	.	.	.	.	.	.	CLAMP-	1	
-204	MS21919DG6	.	.	.	.	.	.	.	CLAMP-	1	
-205	305-420CC6- 15	.	.	.	.	.	.	.	HOSE ASSEMBLY, ENGINE TO OIL PRESSURE TRANSMITTER-	1	
-206	AN815-4D	.	.	.	.	.	.	.	UNION-	1	
-207	NAS617-4	*2	.	.	.	.	.	.	PACKING-	1	
-208	305-420C39	.	.	.	.	.	.	.	REDUCER, ENGINE BLEED MOTIVE FLOW-	1	
-209	MS29512-C5	*2	.	.	.	.	.	.	PACKING-	1	
-210	MS35207-263	.	.	.	.	.	.	.	SCREW-	1	
-211	MS21042L3	.	.	.	.	.	.	.	NUT-	1	
-212	LD153-0C02-1203	.	.	.	.	.	.	.	WASHER, REDUCED OD (43999)	1	
-213	MS21919DG6	.	.	.	.	.	.	.	CLAMP-	1	
-214	MS35207-263	.	.	.	.	.	.	.	SCREW-	1	
-215	MS21042L3	.	.	.	.	.	.	.	NUT-	1	
-216	LD153-0CC2-1203	.	.	.	.	.	.	.	WASHER, REDUCED OD (43999)	1	
-217	305-420C40	.	.	.	.	.	.	.	CLIP, ENGINE DRAIN LINE SUPPORT-	1	
-218	MS21919DG6	.	.	.	.	.	.	.	CLAMP-	1	
-219	305-428CC5- 3	.	.	.	.	.	.	.	LINE, FUEL MOTIVE FLOW ENGINE BLEED ASSEMBLY OF-	1	
-220	305-420CC6- 51	.	.	.	.	.	.	.	HOSE ASSEMBLY, FUEL MOTIVE FLOW ENGINE BLEED	1	
-221	AN815-6D	*3	.	.	.	.	.	.	UNION-	1	
-221A	305-420044- 5	*1	.	.	.	.	.	.	CAP ASSEMBLY, ENGINE PRESSURE ANALYZER (MAKE FROM- AN929A6C)	1	
	5R10	*1	.	.	.	.	.	.	RING, CHAIN RETAINER (43999)	1	
	NAS1455B1-4C	*1	.	.	.	.	.	.	CHAIN-	1	
-221B	AN824-6C	*1	.	.	.	.	.	.	UNION-	1	
-222	305-420C12	*4	.	.	.	.	.	.	ADAPTER, ENGINE OIL COOLER INLET DUCT-	1	
	305-420C12- 11	*5	.	.	.	.	.	.	ADAPTER, ENGINE OIL COOLER INLET DUCT- (ATTACHING PARTS)	1	
	MS21042L3	.	.	.	.	.	.	.	NUT-	10	
	LD153-0CC2-1203	.	.	.	.	.	.	.	WASHER, REDUCED OD (43999)	10	
	LD153-0C11-0011	.	.	.	.	.	.	.	WASHER, FLAT (43999)	10	
	MS35207-261	.	.	.	.	.	.	.	SCREW-	8	
	MS35207-262	.	.	.	.	.	.	.	SCREW-	2	

-223	MS24665-132	*2	.	.	.	.	.	.	PIN-	2	
-224	LD153-0C11-C013	.	.	.	.	.	.	.	WASHER, FLAT (43999)	2	
-225	MS2C392-3C21	.	.	.	.	.	.	.	PIN-	2	
-226	MS21042L4	.	.	.	.	.	.	.	NUT-	4	
-227	LD153-0C11-0C14	.	.	.	.	.	.	.	WASHER, FLAT (43999)	4	
-228	AN4-3A	.	.	.	.	.	.	.	BOLT -	4	
-229	305-470C23	.	.	.	.	.	.	.	BRACKET, OIL COOLER SUPPORT ASSEMBLY OF-	1	
	305-470C25	*6	BRACKET, OIL COOLER SUPPORT ASSEMBLY OF-	1	
	NAS1068A3	NUTPLATE-	2	

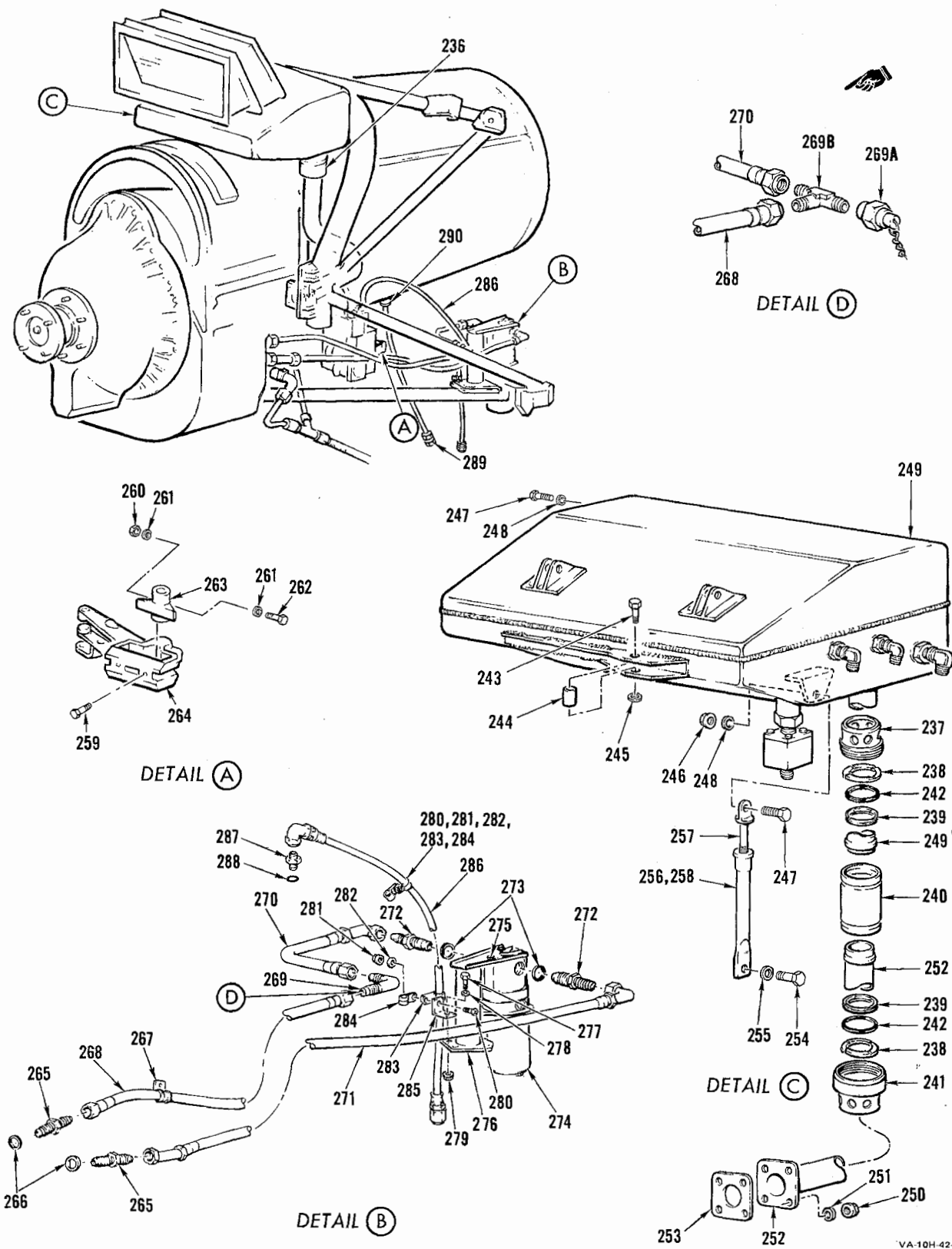


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Figure 4-2. Pod Package - Engine Accessories (Sheet 5)

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2									POD PACKAGE - ENGINE ACCESSORIES (SHEET 5)		
-230	157250-1-1	.	.	.	.	.	.	.	COOLER, ENGINE OIL (70210) (NR SPEC CONT DWG - - - - - HE280-5004-0001)	1	
-231	157249-1	.	.	.	.	.	.	.	COOLER ASSEMBLY (70210) - - - - -	1	
-232	RR121S	.	.	.	.	.	.	.	RING, RETAINING (807561) - - - - -	1	
-233	155941-1	.	.	.	.	.	.	.	THERMOSTAT (70210) - - - - -	1	
-234	S9026D212	.	.	.	.	.	.	.	O RING (70210) - - - - -	1	
-235	305-420C11	.	.	.	.	.	.	.	ADAPTER, ENGINE INLET AIR DUCT - - - - - (ATTACHING PARTS)	1	
	305-420C11- 3	.	.	.	.	.	.	.	SEAL-SYN RUBBER AMS3197(.18X8.00X18.00)- - - - -	1	
	305-420C11- 5	.	.	.	.	.	.	.	SEAL-SYN RUBBER AMS3197(.18X8.00X18.00)- - - - -	1	
	MS21042L3	.	.	.	.	.	.	.	NUT - - - - -	18	
	LD153-0CC2-1203	.	.	.	.	.	.	.	WASHER, REDUCED OD (43999) - - - - -	18	
	LD153-0C11-0C11	.	.	.	.	.	.	.	WASHER, FLAT (43999) - - - - -	12	
	MS35207-266	.	.	.	.	.	.	.	SCREW - - - - -	12	

- *1 ENGINES HAVING T.O. 1L-10A-584 INCORPORATED
- *2 ITEMS CONTAINED IN ENGINE CHANGE CONSUMABLE PARTS KIT 305-829007
- *3 ENGINES NOT HAVING T.O. 1L-10A-584 INCORPORATED
- *4 ENGINES NOT HAVING T.O. 1L-10A-590 INCORPORATED
- *5 ENGINES HAVING T.O. 1L-10A-590 INCORPORATED
- *6 ENGINES HAVING T.O. 1L-10A-640 INCORPORATED

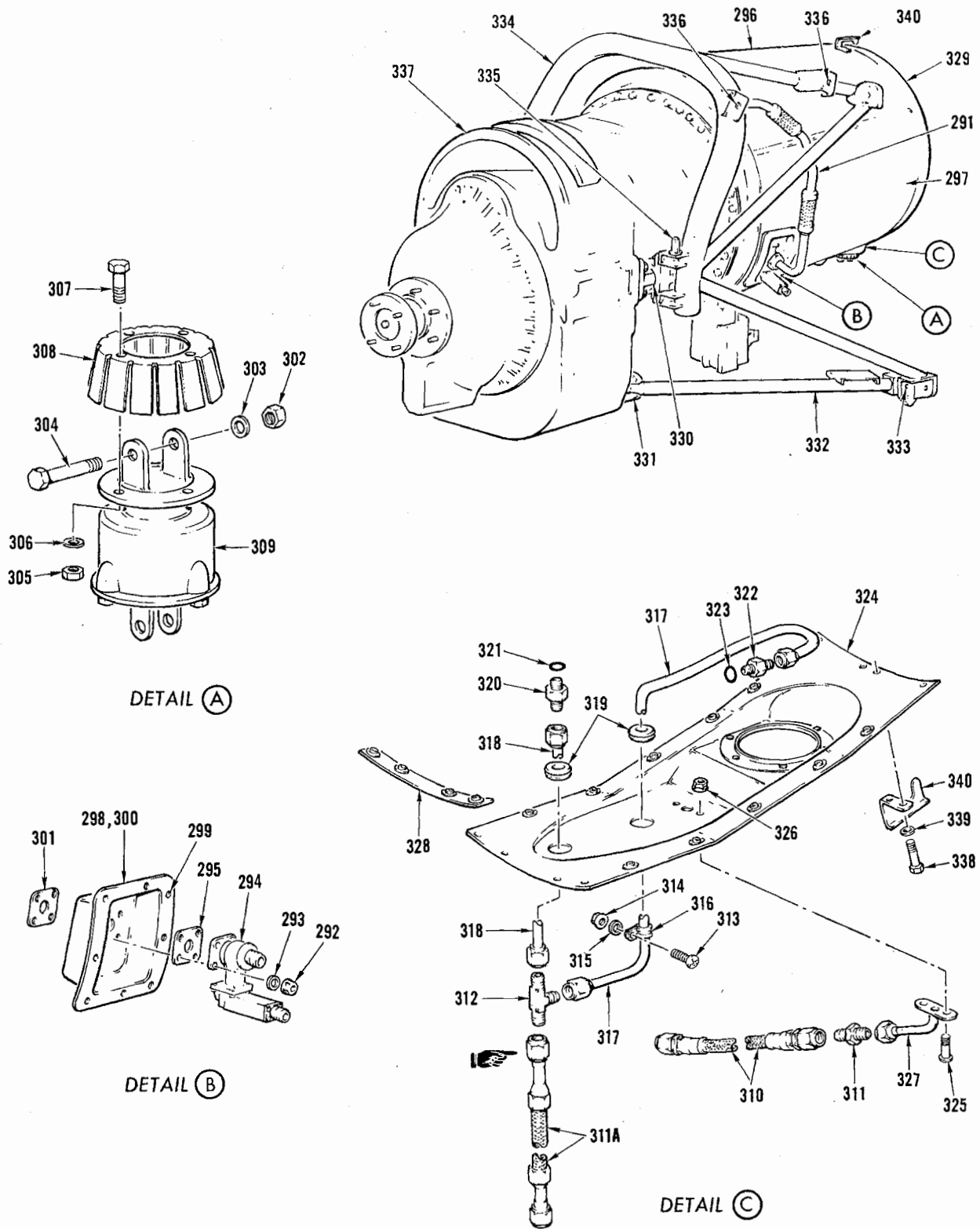


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Figure 4-2. Pod Package - Engine Accessories (Sheet 6)

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2									POD PACKAGE - ENGINE ACCESSORIES (SHEET 6)		
-236	LW340-16								COUPLING, TUBE-FLEXIBLE, RIGID TUBE CONNECTING (14963) - (NR SPEC CONT DWG HE144-0023-0002)	1	
-237	NO NUMBER								NUT, MALE THREADED (14963)	1	
-238	NO NUMBER								RING, RETAINING (PACKING) (14963)	2	
-239	NO NUMBER								RING, RETAINING (TUBE BEAD) (14963)	2	
-240	NO NUMBER								SLEEVE (14963)	1	
-241	NO NUMBER								NUT, FEMALE THREADED (14963)	1	
-242	MS29561-214	*1							PACKING	2	
-243	AN4-13A								BOLT	1	
-244	305-470C14								SPACER, GIL TANK SUPPORT (MAKE FROM 6C61-T6 AL TUBE - WW-T-700/6 0.500 DIA. 0.095 WALL 0.875 LCNG	1	
-245	LD153-0C11-0C13	*2							WASHER, FLAT (43999)		AR
	LD153-0C11-0C14	*2							WASHER, FLAT (43999)		AR
-246	MS21042L4								NUT	1	
-247	AN4-3A								BOLT	2	
-248	LD153-0C11-0C13								WASHER, FLAT (43999)	2	
-249	305-470CC2-301	*3							TANK ASSEMBLY, OIL	1	
	305-470CC2-351	*4							TANK ASSEMBLY, GIL	1	
	305-470CC2-401	*10							TANK ASSEMBLY, OIL	1	*
-250	MS21042L3								NUT	4	
-251	LD153-0CC2-1203								WASHER, REDUCED OD (43999)	4	
-252	305-478CC5								LINE, ENGINE OIL SUPPLY ASSEMBLY OF	1	
-253	305-470C12	*1							GASKET, ENGINE OIL SUPPLY LINE	1	
-254	AN4-3A								BOLT	1	
-255	LD153-0C11-0C13								WASHER, FLAT (43999)	1	
-256	305-470CC6								SUPPORT, GIL TANK ASSEMBLY OF	1	
-257	AN44-16								BOLT, EYE	1	
-258	305-470CC6- 21								TUBE ASSEMBLY, OIL TANK SUPPORT	1	
-259	NAS564-23								BOLT	2	
-260	AN320C4	*8							NUT	1	
	MS17826-4	*9							NUT	1	
	MS24665-134	*1							PIN	1	
-261	LD153-0C11-C013								WASHER, FLAT (43999)	2	
-262	NAS1104-10D								BOLT	1	
-263	305-437CE5- 3								HUB, ENGINE POWER CONTROL SYSTEM, INPUT ARM-	1	
-264	305-437C84- 3								ARM, ENGINE POWER CONTROL SYSTEM, INPUT-	1	
-265	AN815-8C								UNION-	2	
-266	MS29512-C8	*1							PACKING-	2	
-267	MS21919DG8								CLAMP-	1	
-268	305-428CC6- 3								LINE, FUEL ENGINE FEED BOOST PUMP TO FILTER-	1	
-269	AN821-8D	*5							ELBOW-	1	
-269A	305-420C44- 7	*6							CAP ASSEMBLY, ENGINE PRESSURE ANALYZER (MAKE FROM- AN929ABC)	1	
	5R10	*6							RING, CHAIN RETAINER (43999)	1	
	NAS1455B1-4C	*6							CHAIN-	1	
-269B	AN824-8C	*6							TEE-	1	
-270	305-420CC6- 53								HOSE ASSEMBLY, FUEL ENGINE FEED BOOST PUMP TO FILTER -	1	
-271	305-420CC6- 43								HOSE ASSEMBLY, FUEL ENGINE FEED FILTER TO ENGINE INLET -	1	
-272	AN919-19D								REDUCER-	2	
-273	MS29512-12								PACKING-	2	
-274	225246								FILTER ASSEMBLY, JET FUEL F503-7 (21769) (NR SPEC CONT DWG HE286-9002-0001) (SEE FIGURE 4-2A FOR BREAKDOWN) (ATTACHING PARTS)	1	
-275	MS2CC74-C5-04								BOLT	3	
	LD153-0C11-0C16								WASHER, FLAT (43999)	3	
-276	305-420CC7- 21	*7							BRACKET, FUEL FILTER SUPPORT ASSEMBLY OF	1	
	305-420CC7- 11	*7							BRACKET, FUEL FILTER SUPPORT ASSEMBLY OF (ATTACHING PARTS)	1	
-277	AN3-3A								BOLT	4	
-278	LD153-0CC2-1203								WASHER, REDUCED OD (43999)	4	
-279	MS21042L3								NUT	4	

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE	
2		POD PACKAGE - ENGINE ACCESSORIES (SHEET 6)										
-280	MS35207-263	.	.	SCREW	-	-	-	-	-	-	2	
-281	MS21042L3	.	.	NUT	-	-	-	-	-	-	2	
-282	LD153-0CC2-1203	.	.	WASHER, REDUCED OD (43999)	-	-	-	-	-	-	2	
-283	MS21919DG5	.	.	CLAMP	-	-	-	-	-	-	2	
-284	MS21919WG3	.	.	CLAMP	-	-	-	-	-	-	2	
-285	2C16-3	.	.	CLIP (43999)	-	-	-	-	-	-	1	
-286	305-420CC6- 23	.	.	HOSE ASSEMBLY, ENGINE FUEL CONTROL SEAL DRAIN	-	-	-	-	-	-	1	
-287	AN815-4D	.	.	UNION	-	-	-	-	-	-	1	
-288	MS29512-C4	*1	.	PACKING	-	-	-	-	-	-	1	
-289	305-420CC6- 19	.	.	HCSE ASSEMBLY, FUEL MANIFOLD TO OVERBOARD DRAIN	-	-	-	-	-	-	1	
-290	AN815-4D	.	.	UNION	-	-	-	-	-	-	1	
	MS29512-C4	*1	.	PACKING	-	-	-	-	-	-	1	
		*1 ITEMS CONTAINED IN ENGINE CHANGE CONSUMABLE PARTS KIT 305-829007										
		*2 USE LD153-0011-0013 AND OR LD153-0011-0014 TO SHIM OIL TANK										
		*3 ENGINES NOT HAVING T.O. 1L-10A-599 INCORPORATED										
		*4 ENGINES HAVING T.O. 1L-10A-599 INCORPORATED										
		*5 ENGINES NOT HAVING T.O. 1L-10A-584 INCORPORATED										
		*6 ENGINES HAVING T.O. 1L-10A-584 INCORPORATED										
		*7 305-420007-21 SUPERSEDES 305-420007-11 FOR FUTURE PROCUREMENT										
		*8 APPLICABLE TO ENGINE CONTROLS NOT HAVING T.O. 1L-10A-583 INCORPORATED										
		*9 APPLICABLE TO ENGINE CONTROLS HAVING T.O. 1L-10A-583 INCORPORATED										
		*10 ENGINES HAVING T.O. 1L-10A-640 INCORPORATED										

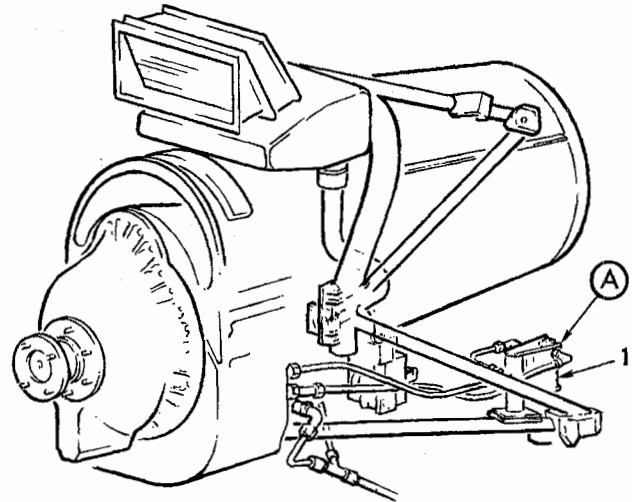
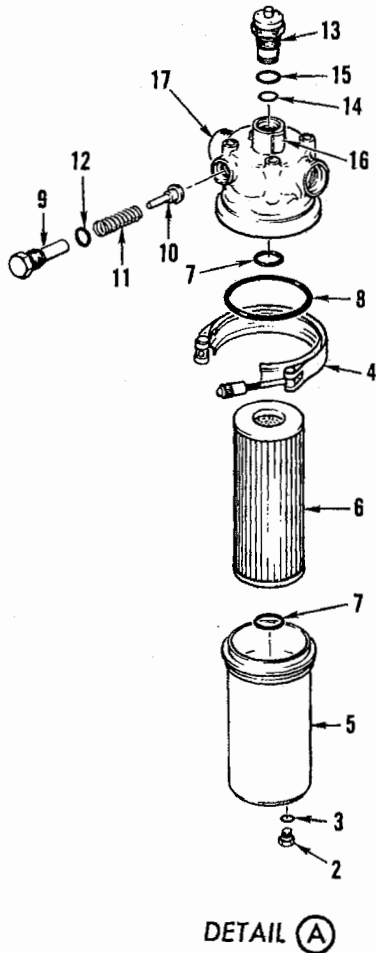


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Figure 4-2. Pod Package - Engine Accessories (Sheet 7)

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2		POD PACKAGE - ENGINE ACCESSORIES (SHEET 6)									
-280	MS35207-263	.	.	SCREW-	-	-	-	-	-	-	2
-281	MS21042L3	.	.	NUT-	-	-	-	-	-	-	2
-282	LD153-0CC2-1203	.	.	WASHER, REDUCED OD (43999)	-	-	-	-	-	-	2
-283	MS21919DG5	.	.	CLAMP-	-	-	-	-	-	-	2
-284	MS21919WG3	.	.	CLAMP-	-	-	-	-	-	-	2
-285	2C16-3	.	.	CLIP (43999)	-	-	-	-	-	-	1
-286	305-420CC6- 23	.	.	HOSE ASSEMBLY, ENGINE FUEL CONTROL SEAL DRAIN-	-	-	-	-	-	-	1
-287	AN815-4D	.	.	UNION-	-	-	-	-	-	-	1
-288	MS29512-C4	*1	.	PACKING-	-	-	-	-	-	-	1
-289	305-420CC6- 19	.	.	HOSE ASSEMBLY, FUEL MANIFOLD TO OVERBOARD DRAIN-	-	-	-	-	-	-	1
-290	AN815-4D	.	.	UNION-	-	-	-	-	-	-	1
	MS29512-C4	*1	.	PACKING-	-	-	-	-	-	-	1
		*1 ITEMS CONTAINED IN ENGINE CHANGE CONSUMABLE PARTS KIT 305-829007									
		*2 USE LD153-0011-0013 AND OR LD153-0011-0014 TO SHIM OIL TANK									
		*3 ENGINES NOT HAVING T.O. 1L-10A-599 INCORPORATED									
		*4 ENGINES HAVING T.O. 1L-10A-599 INCORPORATED									
		*5 ENGINES NOT HAVING T.O. 1L-10A-584 INCORPORATED									
		*6 ENGINES HAVING T.O. 1L-10A-584 INCORPORATED									
		*7 305-420007-21 SUPERSEDES 305-420007-11 FOR FUTURE PROCUREMENT									
		*8 APPLICABLE TO ENGINE CONTROLS NOT HAVING T.O. 1L-10A-583 INCORPORATED									
		*9 APPLICABLE TO ENGINE CONTROLS HAVING T.O. 1L-10A-583 INCORPORATED									
		*10 ENGINES HAVING T.O. 1L-10A-640 INCORPORATED									

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2									POD PACKAGE - ENGINE ACCESSORIES (SHEET 7)		
-329	305-420114	.	.	.	.	.	.	.	ADAPTER, ENGINE EXHAUST PIPE ASSEMBLY OF (ATTACHING PARTS)	1	
	MS20500-428	.	.	.	.	.	.	.	NUT (INSTALL ON FORWARD SIDE)	18	
	NAS501-4-4A	.	.	.	.	.	.	.	BOLT	18	
-330	LM821SA26	.	.	.	.	.	.	.	ISOLATOR, ENGINE MOUNT (76005) (NR SPEC CONT DWG HE196-5004-0011) (ATTACHING PARTS)	2	
	42FW624	.	.	.	.	.	.	.	NUT, SELF-LOCKING, DOUBLE HEXAGON, 180,000 PSI (03680) (NR SPEC CONT DWG HE114-0046-0006)	6	
	MS20002-6	.	.	.	.	.	.	.	WASHER	6	
	MS20002C6	.	.	.	.	.	.	.	WASHER	6	
	MS20006-12	.	.	.	.	.	.	.	BOLT	6	
-331	LM821SA27	.	.	.	.	.	.	.	ISOLATOR, ENGINE MOUNT (76005) (NR SPEC CONT DWG HE196-5004-0013)	1	
-332	305-319003- 1	.	.	.	.	.	.	.	TUBE, ENGINE MOUNT LOWER ASSEMBLY OF (LH)	1	
	305-319003- 2	.	.	.	.	.	.	.	TUBE, ENGINE MOUNT LOWER ASSEMBLY OF (RH) (ATTACHING PARTS)	1	
	42FW624	.	.	.	.	.	.	.	NUT, SELF-LOCKING, DOUBLE HEXAGON, 180,000 PSI (03680) (NR SPEC CONT DWG HE114-0046-0006)	4	
	MS20002-6	.	.	.	.	.	.	.	WASHER	4	
	MS20002C6	.	.	.	.	.	.	.	WASHER	4	
	MS20006-10	.	.	.	.	.	.	.	BOLT	4	
-333	LCN12M624	.	.	.	.	.	.	.	NUT, SELF-LOCKING CASTELLATED, STEEL (56878) (NR SPEC CONT DWG HE114-0104-0006)	2	
	MS24665-212	.	.	.	.	.	.	.	PIN	2	
	MS20002-6	.	.	.	.	.	.	.	WASHER	2	
	NAS1306-6D	.	.	.	.	.	.	.	BOLT	2	
-334	305-319001	*4	.	.	.	.	.	.	TRUSS, ENGINE MOUNT ASSEMBLY OF	1	*
	305-319001- 51	*5	.	.	.	.	.	.	TRUSS, ENGINE MOUNT ASSEMBLY OF	1	*
-335	MS21042L3	.	.	.	.	.	.	.	NUT	2	
	LD153-0010-0007	.	.	.	.	.	.	.	WASHER, CORR RES STEEL (43999)	2	
	AN4283	.	.	.	.	.	.	.	BOLT, EYE	2	
-336	FX10-1510-08	.	.	.	.	.	.	.	RECEPTACLE (11907) (NR SPEC CONT DWG HE128-0002-0007)	4	
-337	305-410001- 1	.	.	.	.	.	.	.	ENGINE ASSEMBLY (LH)	1	
	305-410001- 2	.	.	.	.	.	.	.	ENGINE ASSEMBLY (RH)	1	
	T76G10	.	.	.	.	.	.	.	ENGINE ASSEMBLY, TURBOPROP (LH)(GFAE) (99193) (SEE TO 2J-T76-4 FOR BREAKDOWN)	1	
	T76G12	.	.	.	.	.	.	.	ENGINE ASSEMBLY, TURBOPROP (RH)(GFAE) (99193) (SEE TO 2J-T76-4 FOR BREAKDOWN)	1	
	305-400001- 1	.	.	.	.	.	.	.	ENGINE INSTALLATION, MODEL T76G10 (LH)	REF	
	305-400001- 2	.	.	.	.	.	.	.	ENGINE INSTALLATION, MODEL T76G12 (RH)	REF	
-338	NAS501-3-3A	.	.	.	.	.	.	.	BOLT	REF	
-339	LD153-0010-0007	.	.	.	.	.	.	.	WASHER, CORR RES STL (43999)	REF	
-340	305-420113	.	.	.	.	.	.	.	BRACKET, ENGINE EXHAUST PIPE RETAINER	REF	
									*1 ENGINES HAVING T.O. 1L-10A-547 INCORPORATED		*
									*2 ENGINES NOT HAVING T.O. 1L-10A-547 INCORPORATED		*
									*3 ITEMS CONTAINED IN ENGINE CHANGE CONSUMABLE PARTS KIT 305-829007		
									*4 AIRCRAFT NOT HAVING T.O. 1L-10A-615 INCORPORATED		*
									*5 AIRCRAFT HAVING T.O. 1L-10A-615 INCORPORATED		*



VA-10G-42-42

Figure 4-2A. Pod Package - Low-Pressure Fuel Filter

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
2A-									PDD PACKAGE - LOW PRESSURE FUEL FILTER		
- 1	225246								FILTER ASSEMBLY, JET FUEL F503-7(21769) (NR SPEC CONT DWG HE286-9002-0001) (SEE FIG 4-2 FOR NHA)	REF	*
- 2	227768								PLUG (21769)	1	*
- 3	MS29512-2								PACKING	1	*
- 4	4562-350								CLAMP, V-BAND COUPLING (98625) (USE N430995-350 (94581)-AS ALTERNATE)	1	*
	N430995-350								CLAMP, V-BAND COUPLING (94581) (ALTERNATE FOR 4562-350 (98625))	1	*
- 5	227752								BOWL ASSEMBLY (21769)	1	*
- 6	133098								ELEMENT ASSEMBLY (21769) (USE 137242 (21769) AS ALTERNATE)	1	*
	137242								ELEMENT ASSEMBLY (21769) (ALTERNATE FOR 133098 (21769))	1	*
- 7	MS29513-24								PACKING	2	*
- 8	MS29513-237								PACKING	1	*
- 9	227766								GUIDE, VALVE (21769)	1	*
- 10	227755								VALVE (21769)	1	*
- 11	227742								SPRING (21769)	1	*
- 12	MS29512-8								PACKING	1	*
- 13	225257								INDICATOR, DELTA P (21769)	1	*
- 14	MS29513-15								PACKING	1	*
- 15	MS29512-10								PACKING	1	*
- 16	227767								NAMEPLATE (21769)	1	*
	AN535-00-33								SCREW	2	*
- 17	227751								BASE (21769)	1	*

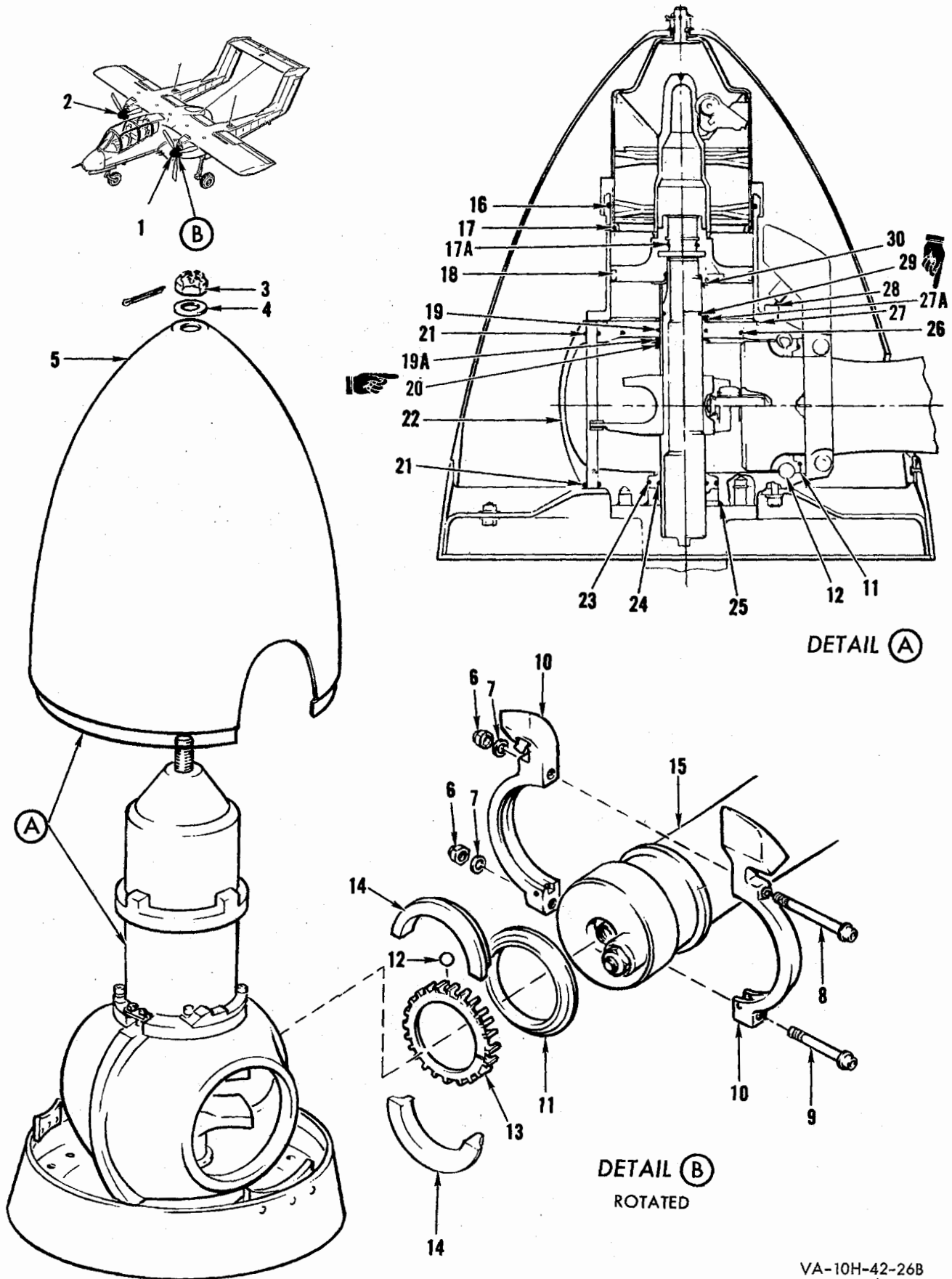


Figure 4-3. Pod Package - Variable Pitch Aircraft Propeller Assembly

VA-10H-42-26B

FIGURE AND INDEX NUMBER	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY.	USABLE ON CODE
3									PDU PACKAGE-VARIABLE PITCH AIRCRAFT PROPELLER ASSEMBLY		
- 1	33LF337								• PROPELLER, VARIABLE PITCH AIRCRAFT (73030) LH - - - - -	REF	
									(NR SPECIFICATION CONTROL DRAWING HE320-5005-0001)		
- 2	33LF338								• PROPELLER, VARIABLE PITCH AIRCRAFT (73030) RH - - - - -	REF	
									(NR SPECIFICATION CONTROL DRAWING HE320-5005-0002)		
									PARTIAL BREAKDOWN FOLLOWS		
- 3	MS24665-134								• PIN- - - - -	1	
	MS17825-8								• NUT- - - - -	1	
- 4	AN960C816L								• WASHER - - - - -	1	
- 5	717890-1								*3 • SPINNER (73030)- - - - -	1	
	717890-2								*4 • SPINNER (73030)- - - - -	1	
- 6	MS24665-302								• PIN- - - - -	6	
	MS17825-6								• NUT- - - - -	6	
- 7	MS20002-6								*1 • WASHER - - - - -	AR	
- 8	710086-2								• BOLT, MACHINE (73030)- - - - -	3	
- 9	710086-4								• BOLT, MACHINE (73030)- - - - -	3	
- 10	714253-5								*2 • COUNTERWEIGHT (73030) (USED ON 33LF337 ONLY) - - - - -	3	
	714253-4								*2 • COUNTERWEIGHT (73030) (USED ON 33LF338 ONLY) - - - - -	3	
- 11	714314-7								• SEAL, CHEVRON (73030)- - - - -	3	
- 12	69992A18								• BALL, CHROME ALLOY STEEL (73030) - - - - -	75	
- 13	711159-1								• RETAINER, BALL (73030) - - - - -	3	
- 14	716904-1								*2 • RACE, INNER SET BEARING (73030)- - - - -	3	
- 15	1015A0-102								• BLADE ASSEMBLY, PROPELLER (73030) (USED ON 33LF337 ONLY) - - - - -	3	
	1016A0-102								• BLADE ASSEMBLY, PROPELLER (73030) (USED ON 33LF338 ONLY) - - - - -	3	
- 16	MS9241-160								• PACKING- - - - -	1	
- 17	704522-1								• RING, RETAINING (73030)- - - - -	1	
- 17A	MS9241-121								• PACKING- - - - -	1	
- 18	718041-1								• PACKING, PERFORM (73030) - - - - -	1	
- 19	MS9241-130								• PACKING- - - - -	1	
- 19A	716893-2								*5 • STOP RING, REVERSE PITCH - - - - -	1	*
- 20	716893-45								• RING, STOP (73030)(AS REQUIRED TO OBTAIN BLADE ANGLE)- - - - -	AR	
	716893-47								• RING, STOP (73030)(AS REQUIRED TO OBTAIN BLADE ANGLE)- - - - -	AR	
	716893-48								• RING, STOP (73030)(AS REQUIRED TO OBTAIN BLADE ANGLE)- - - - -	AR	
- 21	MS9241-013								• PACKING- - - - -	2	
- 22	MS9244-01								• DECAL- - - - -	1	
- 23	MS9241-142								• PACKING- - - - -	1	
- 24	MS9241-130								• PACKING- - - - -	1	
- 25	MS9241-037								• PACKING- - - - -	1	
- 26	MS9241-156								• PACKING- - - - -	1	
- 27	MS9241-254								• PACKING- - - - -	1	
- 27A	716893-2								• STOP RING, FEATHER (0.044 THICK) - - - - -	AR	*
	716893-3								• STOP RING, FEATHER (0.064 THICK) - - - - -	AR	*
	716893-4								• STOP RING, FEATHER (0.084 THICK) - - - - -	AR	*
- 28	69363P75								• RING, RETAINING (73030)- - - - -	3	
- 29	MS9241-124								• PACKING- - - - -	1	
- 30	701517-1								• WASHER, LOCK (73030) - - - - -	1	

- *1 MAXIMUM OF TWO (2) WASHERS PERMITTED FOR EACH BOLT
- *2 MATCHED SET (SERIALIZED)
- *3 APPLICABLE TO AIRCRAFT NOT HAVING T.O. 1L-10A-613 AND T.O. 3H1-19-502 INCORPORATED
- *4 APPLICABLE TO AIRCRAFT HAVING T.O. 1L-10A-613 AND T.O. 3H1-19-502 INCORPORATED
- *5 APPLICABLE TO AIRCRAFT HAVING T.O. 1L-10A-612 AND T.O. 3H1-19-503 INCORPORATED

SECTION V
NUMERICAL INDEX

5-1. NUMERICAL INDEX.

5-2. The numerical index is an alpha/numerical list of part numbers included in Section IV. Each

listing contains a part number, figure and index number of illustration, and parts list in which it is shown, and the quantity of that part required on the power package. When known, the source and repair codes are also supplied.

PART NUMBER	FIGURE AND INDEX NUMBER	QUANTITY PER ARTICLE			REPAIR CODE	PART NUMBER	FIGURE AND INDEX NUMBER	QUANTITY PER ARTICLE			REPAIR CODE	PART NUMBER	FIGURE AND INDEX NUMBER	QUANTITY PER ARTICLE			REPAIR CODE	
		QUANTITY	PER	ARTICLE				QUANTITY	PER	ARTICLE				QUANTITY	PER	ARTICLE		
AG34	2 -133	2	P1	S	E13741	1 - 2	1				MS21043-06	2 - 47	1	P1	S			
AN23-12	2 -109	3	P1	S	FX10-1510-08	2 -336					MS21043-3	2 - 55	24	P1	S			
AN3-3A	2 -147	8	P1	S	K1206-6-4	2 - 23	2	P1	S			2 - 66						
	2 -277					2 -142						2 -101A						
AN3-4A	2 - 14	3	P1	S	K1377-8-1	2 -172	1	P1	S			2 -297						
AN320C3	2 -106	6	P1	S	LCN12M624	2 -333	2	P1	S			2 -326						
	2 -107				LD153-0002-1202	2 -100A	8	P1	S			2 - 51	1	P1	S			
	2 -108				LD153-0002-1203	2 - 14	69	P1	S									
	2 -109					2 - 19					MS21043-6							
	2 -111					2 - 60					MS21126-4	2 -110	2	P1	S			
	2 -131					2 - 82					MS21919DG16	2 - 22	4	P1	S			
AN320C4	2 -106	4	P1	S		2 - 98						2 - 99						
	2 -110					2 -100B					MS21919DG19	2 - 83	2	P1	S			
	2 -260					2 -143C					MS21919DG36	2 - 85	2	P1	S			
	2 -302					2 -149					MS21919DG4	2 -189	4	P1	S			
AN4-11A	2 -125	3	P1	S		2 -160						2 -316						
AN4-13A	2 -243	1	P1	S		2 -165					MS21919DG5	2 -143D	4	P1	S			
AN4-3A	2 -228	7	P1	S	LD153-0002-1204	2 -105	7	P1	S			2 -203						
	2 -247					2 -135					MS21919DG6	2 -283						
	2 -254				LD153-0010-0007	2 - 14	27	P1	S			2 -167	4	P1	S			
AN4C10	2 -110	1	P1	S		2 - 67						2 -204						
AN42B3	2 -335					2 -101						2 -213						
AN44-16	2 - 71					2 -101A					MS21919DG7	2 -218						
	2 - 71					2 -102						2 -143E	2	P1	S			
	2 -257					2 -297						2 -161						
AN501A10-7	2 - 73	3	P1	S		2 -306					MS21919DG8	2 - 61	3	P1	S			
AN535-00-33	2A- 16					2 -324						2 -166						
AN738D8						2 -328						2 -267						
AN804C4	2 - 89A	2	P1	S		2 -335					MS21919DG9	2 -162	1	P1	S			
AN814-2CL	2 -127C	1	P1	S	LD153-0010-0009	2 -303	3	P1	S			MS21919G17	2 -127L	1	P1	S		
AN815-4D	2 - 71	10	P1	S	LD153-0011-0011	2 -127H	24	P1	S			MS21919G3	2 -127K	1	P1	S		
	2 - 89					2 -222						MS21919H6	2 - 21	2	P1	S		
	2 -113					2 -235						MS21919WG15	2 -100B	1	P1	S		
	2 -206				LD153-0011-0013	2 -126	10	P1	S			MS21919WG17	2 -186	3	P1	S		
	2 -287					2 -224						MS21919WG3	2 -187					
	2 -290					2 -245						MS21919WG5	2 -284	1	P1	S		
	2 -311					2 -248						MS21919WG5	2 -100B	2	P1	S		
	2 -320					2 -255						2 -189						
	2 -322					2 -261					MS21919WG6	2 -186	1	P1	S			
AN815-40	2 - 30	3	P1	C	LD153-0011-0014	2 -227	4	P1	S			MS21919WG7						
AN815-6D	2 -145					2 -245						MS21919WG8						
	2 -221				LD153-0011-0015	2 -119	8	P1	S			MS24665-132						
	2 - 63	5	P1	S		2 -129						ALT FOR ABOVE P/N						
	2 -169				LD153-0011-0016	2 -275	3	P1	S			MS24665-130						
	2 -184				LD153-0011-0017	2 - 34	6	P1	S				2 -223	3	P1	S		
	2 -265				LH8540-02K	2 - 74						2 - 4	1	P1	S			
	2 -269	1	P1	S	LMB21SA16							2 -260						
	2 -312	2	P1	S	ALT FOR ABOVE P/N							3 - 3						
AN821-8D					LMB21SA28							MS24665-155	2 -302	1	P1	S		
AN824-4D						2 -309	1	P1	S			MS24665-212	2 -333	2	P1	S		
AN824-40						2 -330	2	P1	S			MS24665-302	3 - 6	6	P1	S		
AN824-6C	2 -221B	2	P1	S	LMB21SA26	2 -331	1	P1	S			MS28775-010	2 -127D	2	P1	S		
AN824-6D	2 -154				LMB21SA27	2 -236	1	P1	S			MS29512-04	2 -114	6	P1	S		
AN824-8C	2 -269B	2	P1	S	LUN340-16	2 - 2							2 -156					
AN833-4D	2 -138	2	P1	S	LWB22-9H4								2 -288					
	2 -155				LW322-3H04		8	P1	S				2 -290					
AN833-6D	2 - 93	2	P1	S	MS17825-6	3 - 6	6	P1	S				2 -321					
	2 -178				MS17825-8	2 - 5	1	P1	S				2 -323					
AN837-8D	2 -174	1	P1	S		3 - 3							2 -209	1	P1	S		
AN894D6-4	2 -181				MS17826-3	2 -107	10	P1	S				MS29512-C5	2 -266	2	P1	S	
AN919-19D	2 -272	2	P1	S		2 -108							MS29512-C8	2 -117	3	P1	S	
AN919-2C	2 -127F	2	P1	S		2 -109							MS29512-10	2A- 15	1	P1	S	
AN919-23D	2 -116	1	P1	S		2 -111							MS29512-12	2 -273				
AN924-4C	2 - 89C	4	P1	S	MS17826-4	2 -110							MS29512-2	2A- 3	1	P1	S	
	2 -192A					2 -260							MS29512-8	2A- 12	1	P1	S	
AN924-4D	2 - 88	4	P1	S									MS29513-15	2A- 14	1	P1	S	
	2 -140												MS29513-237	2A- 8	1	P1	S	
	2 -157				MS18115-0410	2 -110	2	P1	S				MS29513-24	2A- 7	2	P1	S	
	2 -192				MS20002-6	2 -330	12	P1	S				MS29561-011	2 - 79	2	P1	S	
	2 -180	2	P1	S		2 -332							MS29561-214	2 -242	2	P1	S	
AN924-6D	2 - 95	2	P1	S		3 - 7							MS3101A-16S-1P					
AN924-8D	2 -176	2	P1	S	MS20002C6	2 -330	14	P1	S				MS3101A16S1P	2 -188	1	P1	S	
AN935-10L	2 - 56	4	P1	S		2 -332							MS35206-232	2 -193	4	P1	S	
AN935-616L	2 - 52	1	P1	S	MS20002C9	2 - 3	8	P1	S				MS35207-261	2 -222	15	P1	S	
AN939D6	2 - 25	1	P1	S	MS20006-10	2 -332	4							2 -313				
AN960-10L	2 - 43	2	P1	S	MS20006-12	2 -330	6	P1	S					2 -222	2	P1	S	
	2 -127				MS20073-03-10	2 -187	1	P1	S					MS35207-262	2 - 20	19	P1	S
AN960-6L	2 - 38	2	P1	S	MS20074-05-04	2 -275	3	P1	S					MS35207-263	2 - 58			
	2 - 48				MS20392-3C21	2 -225	2	P1	S						2 - 80			
AN960C10	2 -106	3	P1	S	MS20500-1032	2 -292	8	P1	S						2 - 96			
	2 -108					2 -305									2 -100B			
	2 -109					2 -329									2 -127J			
AN960C10L	2 - 57	4	P1	S	MS20500-42B	2 - 14	18	P1	S						2 -143A			
	2 -106				MS21042L3	2 - 18	74	P1	S						2 -158			
	2 -107					2 - 59									2 -163			
	2 -108					2 - 81									2 -186			
	2 -109					2 - 97									2 -235	12	P1	
	2 -131					2 -100A									MS35207-278	4	P1	
	2 -293					2 -100B									MS91043-3	1	P1	
AN960C416L	2 -110	2	P1	S		2 -127G									MS9134-01	1	P1	
AN960C616L	2 - 53	1	P1	S		2 -143B												
AN960C816L	2 - 6	1	P1	S		2 -148												
	3 - 4				MS21042L4	2 -134	13	P1	S									
E13702	1 - 1	1				2 -226												

PART NUMBER	FIGURE AND INDEX NUMBER	QUANTITY PER ARTICLE	SOURCE CODE	REPAIR CODE	PART NUMBER	FIGURE AND INDEX NUMBER	QUANTITY PER ARTICLE	SOURCE CODE	REPAIR CODE	PART NUMBER	FIGURE AND INDEX NUMBER	QUANTITY PER ARTICLE	SOURCE CODE	REPAIR CODE
MS9241-019	2 - 13D				21-11247	2 - 27	4	P1	S	305-428007- 3	2 -127A	2	M	
MS9241-037	2 - 13	1	P1	S	21459	2 - 86	2	P1	S	305-437084- 3	2 -264			
	3 - 25					2 -190				305-437085- 3	2 -263	1	P1	S
MS9241-041	2 -127				225246	2 -274	1	P1	F	305-470002-301	2 -249	1	P1	S
MS9241-121	3 - 17A	1	P1	S		2A- 1				305-470002-351	2 -249	1	P1	F
MS9241-124	3 - 29	1	P1	S	225257	2A- 13	2	P1	S	305-470002-401	2 -249	1	P1	F
MS9241-130	3 - 19	2	P1	S	227742	2A- 11	4	P1	S	305-470006	2 -256	1	A	
	3 - 24				227751	2A- 17	2	X1		305-470006- 21	2 -258	1	P1	S
MS9241-142	3 - 23	1	P1	S	227752	2A- 5	2	P1	S	305-470012	2 -253	1	P1	S
MS9241-156	3 - 26	1	P1	S	227755	2A- 10	2	P1	S	305-470014	2 -244	1	M	
MS9241-160	3 - 16	1	P1	S	227766	2A- 9	2	P1	S	305-470015	2 - 15	1	M	
MS9241-254	3 - 27	1	P1	S	227767	2A- 16	2	X2		305-470018	2 - 14	1	A	
MS9244-01	3 - 22	1	P1	S	227768	2A- 2	2	P1	S	305-470023	2 -229	1	P1	S
MS9489-05	2 - 75	1	P1	S	227805		1			305-470025	2 -229	1	P1	S
MVT65343	2 - 35	2	P1	S	300-318073- 71	2 - 84	2	M		305-478003- 5	2 -171	1	A	
NAS1068A3	2 -229	1	P1	S		2 -186				305-478004- 5	2 - 62	1	P1	S
NAS1068C3	2 -328	1	P1	S		2 -187				305-478005	2 -252	1	P2	S
NAS1104-10D	2 -262	1	P1	S	300-420017		1			305-478009- 7	2 - 17	1	A	
NAS1203-110					300-420027	2 -328	2	M		305-478010- 3	2 -168	1	A	
					300-420027- 3	2 -328	2	M		305-478012- 3	2 -141	1	A	
					300-470001- 23	2 -198	2	M		305-480318	2 -123	1	M	
					300-470001- 25	2 -199	2	M		305-540002-161	2 -100A	1	A	
					300-470001-101	2 -199	1	P1		305-540002-171	2 -100A	1	A	
					300-470001-103	2 -198	1	P1		305-540008	2 -188	1	A	
					300-533367	2 -295	2	P1	S	305-860007- 1	2 -	1	P1	D
						2 -301				305-860007- 2	2 -	1	P1	D
						2 -295	3	P1	S	310393	2 -150	1	P1	D
						2 -301				33LF337	2 - 1	1	P1	D
						2 -334	1	P1	E		3 - 1			
NAS464P3-10	2 -131				305-319001	2 -334	1	P1	F	33LF338	2 - 1	1	P1	D
NAS464P3-8	2 -107				305-319001- 51	2 -332	1	P1	S		3 - 2			
	2 -108				305-319003- 1	2 -332	1	P1	S					
					305-319003- 2	2 -332	1	P1	S	36A222598AAP1	2 - 44	8	X1	
NAS464P3-11					305-400001- 1	2 -337	1	U		36A222601P24	2 - 49			
NAS501-3-3A	2 -338	1	P1	S	305-400001- 2	2 -337	1	U		36A222610AAP1	2 - 50	2	P1	S
NAS501-3-4A	2 -307	4	P1	S	305-410001- 1	2 -337	1	P1	D	36A222647AAG1	2 - 43	2	P1	S
NAS501-4-4A	2 -329	18	P1	S	305-410001- 2	2 -337	1	P1	D	36A227601P6	2 - 37	8	M	
NAS564-23	2 -259	2	P1	S	305-420001- 1					36A227602P10	2 - 45	8	M	
NAS617-4	2 - 82	8	P1	S	305-420001- 2					36A227602P12	2 - 46	12	M	
	2 - 77				305-420005	2 - 78	1	P1	S	36A227603P14	2 - 42	2	M	
	2 - 90				305-420006- 3	2 - 64	1	P1	S	368506256AAP1	2 - 35	1	P1	S
	2 -139				305-420006- 7	2 -144	1	P1	S	368506276AAG1	2 - 41	1	P1	S
	2 -182				305-420006- 9	2 -310	1	P1	S	368506278AAP1	2 - 54	1	P1	S
	2 -191				305-420006- 11	2 - 69	1	P1	S	368506294AABG1	2 - 40	2	X1	
	2 -207				305-420006- 13	2 - 70	1	P1	S	36C716569AABG1	2 - 36	2	P1	S
NAS617-6	2 - 24	8	P1	S	305-420006- 15	2 -205	1	P1	S	36O830310AAG1	2 - 39	2	P1	S
	2 - 31				305-420006- 19	2 -289	1	P1	S	364800-1	2 -121	1	P1	D
	2 - 94				305-420006- 21	2 -151	1	P1	S	42FW624	2 -330	4	P1	S
	2 -143				305-420006- 23	2 -286	1	P1	S		2 -332			
	2 -146				305-420006- 25	2 -137	1	P1	S	4562-350	2A- 4	2	P1	S
	2 -179				305-420006- 27	2 -115	1	P1	S	5R10	2 - 85A	28	P1	S
NAS617-8	2 -170	3	P1	S	305-420006- 39	2 -173	1	P1	S		2 - 89B			
	2 -175				305-420006- 43	2 -271	1	P1	S		2 -127E			
	2 -185				305-420006- 49	2 -177	1	P1	S		2 -190A			
NAS686C3K	2 -299				305-420006- 51	2 -220	1	A			2 -221A			
	2 -324				305-420006- 53	2 -270	1	A	S		2 -269A			
N430955-350					305-420006- 55	2 - 92	1	A		52-10249	2 - 28	4	P1	S
N430995-350	2A- 4				305-420006- 57	2 - 16	1	P1	S	52-10696	2 - 29			
PMC-5					305-420006- 59	2 -183	1	P1	S	52-10731	2 - 29			
RR1215	2 -232	2	P1	S	305-420007- 11	2 -276	1	P1	S	592123-24	2 -107	2	P1	S
S8808B2-1	2 - 77				305-420007- 21	2 -276	2	P1	S		2 -108			
S9026D212	2 -234	2	P1	S	305-420011	2 -235	1	P1	S		2 -109			
TAl71855X	2 - 76				305-420011- 3	2 -235	1	P1		592162-4	2 -111	1	P1	S
T3376	1 - 4	1			305-420011- 5	2 -235	1	P1		66629-4-22	2 -304	1	P1	S
T3377	1 - 5	1			305-420012	2 -222	1	A		69363P75	3 - 28	3	P1	S
T3378	1 - 6	1			305-420012- 11	2 -222				694079	2 -295			
T3379	1 - 7	1			305-420017	2 -327	1	M			2 -301			
T3394	1 - 11				305-420019	2 -296	1	P1	S	69992A18				
T76G10	2 -337				305-420021	2 -324	1	P1	F	ABOVE P/N DELETED				
T76G12	2 -337				305-420023	2 -308	1	P1	S	7S14-1032-5A	2 -325	8	P1	S
V45000-11	2 -294	1	P1	F	305-420025	2 - 32	2	P1	S	7S14-1032-6A	2 - 65	52	P1	S
07019						2 -319					2 -101			
ALT FOR ABOVE P/N					305-420029	2 -297	1	P1	S		2 -101A			
1805537					305-420030	2 -101A	1	P1	S		2 -102			
	2 -291	1	P1	S	305-420031	2 -298	1	P1	S		2 -296			
10-3529	2 -311A	1	P1	S	305-420031- 3	2 -300					2 -297			
1015A0-102	3 - 15	3	P1	D	305-420033	2 -102	1	P1	S		2 -298			
1016A0-102	3 - 15	3	P1	D	305-420039	2 -208	1	P1	S		2 -324			
11-10802	2 - 26	1	P1	F	305-420040	2 -217	1	M		7S14-1032-7A	2 -328	22	P1	S
	2 -100				305-420042	2 - 86A	4	P1	S	701517-1	3 - 30	1	P1	S
133098						2 -190B				701530-2	2 - 13C	2	P1	S
ALT FOR ABOVE P/N					305-420043	2 -1278	2	M		701531-2	2 - 13D	2	P1	S
137242	2A- 6	1	P1	S	305-420044- 3	2 - 85A	8	P1	S	701536-1	2 - 13B	2	P1	S
	2A- 6	1	P1	S		2 - 89B				701537-1	2 - 13A	1	P1	S
155941-1	2 -233	2	P1	S		2 -127E				701572-2	2 -127	2	P1	S
157249-1	2 -231	2	A		305-420044- 5	2 -190A				701575-1	2 -127	2	P1	S
157250-1-1	2 -230	1	P1	F	305-420044- 7	2 -221A	2	P1	S	701592-1	2 -127	2	P1	S
2CM307B1					305-420044- 7	2 -269A	2	P1	S	704518-1	2 - 12	20	P1	S
ABOVE P/N SUPSD BY					305-420113	2 -340	4	M		704518-4	2 - 11	4	P1	S
2CM307B2					305-420114	2 -329	1	P1	S	704522-1	3 - 17	1	P1	S
2CM307B2					305-420115	2 -101	1	P1	S	710007-21		1	X1	
ABOVE P/N SUPSD BY					305-428001- 3	2 -112	1	A		710086-2				

PART NUMBER	FIGURE AND INDEX NUMBER	QUANTITY PER ARTICLE	SOURCE CODE	REPAIR CODE	PART NUMBER	FIGURE AND INDEX NUMBER	QUANTITY PER ARTICLE	SOURCE CODE	REPAIR CODE	PART NUMBER	FIGURE AND INDEX NUMBER	QUANTITY PER ARTICLE	SOURCE CODE	REPAIR CODE
714253-4	3 - 10	3	P1	S										
714253-5	3 - 10	3	P1	S										
714314-7	3 - 11	3	P1	S										
716893-2	3 - 19A	19	P1	S										
	3 - 27A													
716893-3	3 - 27A	19	P1	S										
716893-4	3 - 27A	19	P1	S										
716893-45	3 - 20	19	P1	S										
716893-47	3 - 20	19	P1	S										
716893-48	3 - 20	19	P1	S										
716904-1	3 - 14	3	P1	S										
716926-3	2 - 8													
717874-1														
ABOVE P/N SUPSD BY														
733892-1														
717875-1	2 - 103	1	P1	S										
717875-2	2 - 103	1	P1	D										
717876-1	2 - 13													
	2 - 124													
717876-2	2 - 124													
717890-1	2 - 7	1	P1	F										
	3 - 5													
717890-2	2 - 7	1	P1	F										
	3 - 5													
717892-3	2 - 9	2	P2	F										
717997-1	2 - 10	2	P1	S										
717999-1	2 - 131	2	P1	S										
718041-1														
ABOVE P/N SUPSD BY														
718041-3														
718097-1	2 - 132	2	P1	S										
733892-1	2 - 128	1	P1	D										
733892-2	2 - 128	1	P1	D										
733892-3	2 - 128	1	P1	D										
7707-2J5-1	2 - 194	2	P1	O										
7724-119F5-1	2 - 29	1	P1	D										
	2 - 91													
868740-42	2 - 115		P1	D										
868740-44	2 - 115		P1	D										

PUBLICATIONS/TEST VEHICLE MAINTENANCE DATA INTERFACE

PURPOSE - To eliminate redundant effort/unnecessary costs and to ensure consistency, accuracy and timeliness of data, the Publications Group is tasked for the preparation of data to be utilized in-house by Flight Test and for Preliminary technical manuals. The data will be prepared as maintenance procedures and sign-off sheets for use by Flight Test personnel, and as validated source data for the formal technical manuals.

RESPONSIBILITIES

- A. Accumulation of raw data and preparation of rough draft descriptions, operational checks and maintenance sign-off work sheets will be performed by Publications Group writers assisted by Test Vehicle Maintenance Service Engineering personnel, as appropriate. This will be accomplished at the earliest possible date in the weapon program to ensure timely use by Flight Test personnel.
- B. Test Vehicle Maintenance sign-off work sheets will be prepared first and copies given to Flight Test Supervision.
- C. Each sign-off work sheet will be reproduced and utilized during actual maintenance of test vehicles. Deletions, additions and changes required will be marked-up on user's copy and made available to the Publications Group writers.
- D. Publications will update sign-off sheets as reflected from usage and improved procedures. Data will be utilized in preparation of required technical manuals.
- E. Publications will continue to generate additional data and to update existing data through receipt of comments from the in-house users.

PUBLICATIONS/TEST VEHICLE MAINTENANCE DATA INTERFACE (Cont'd)

Changed or added information will be distributed with suitable instructions for replacing and/or adding pages, etc. Engineering Flight Test supervision will sign approval of all maintenance information developed and used by Flight Test personnel.

PROCEDURE

1.0 Planning

- 1.1 Publications will coordinate with applicable Flight Test Service Engineering Supervision to determine quantity and titles of Maintenance sign-off sheets required.
- 1.2 A listing of sign-off sheets required will be prepared and will be segregated by system. List will be coordinated between Publications Writing and Test Vehicle Maintenance Supervision.
- 1.3 Additions or deletions to the list will be made as requested by Test Vehicle Maintenance Supervision.

2.0 Preparation

- 2.1 Writing Group will prepare sign-off sheets using format furnished by Test Vehicle Maintenance Group. Description and Operation paragraphs to be used in the technical manuals will be prepared for each system/component in conjunction with the preparation of the sign-off sheets for the particular system/component.
- 2.2 Test Vehicle Maintenance Group will provide inputs as appropriate including a preference for the order of completion.
- 2.3 As the Sign-off Sheets are completed, sufficient copies will be prepared and distributed in accordance with distribution list prepared by Test Vehicle Maintenance. Description and operation write-ups for the system/components will be distributed for information to be utilized for familiarization and training purposes.

PUBLICATIONS/TEST VEHICLE MAINTENANCE DATA INTERFACE (Cont'd)

3.0 Usage

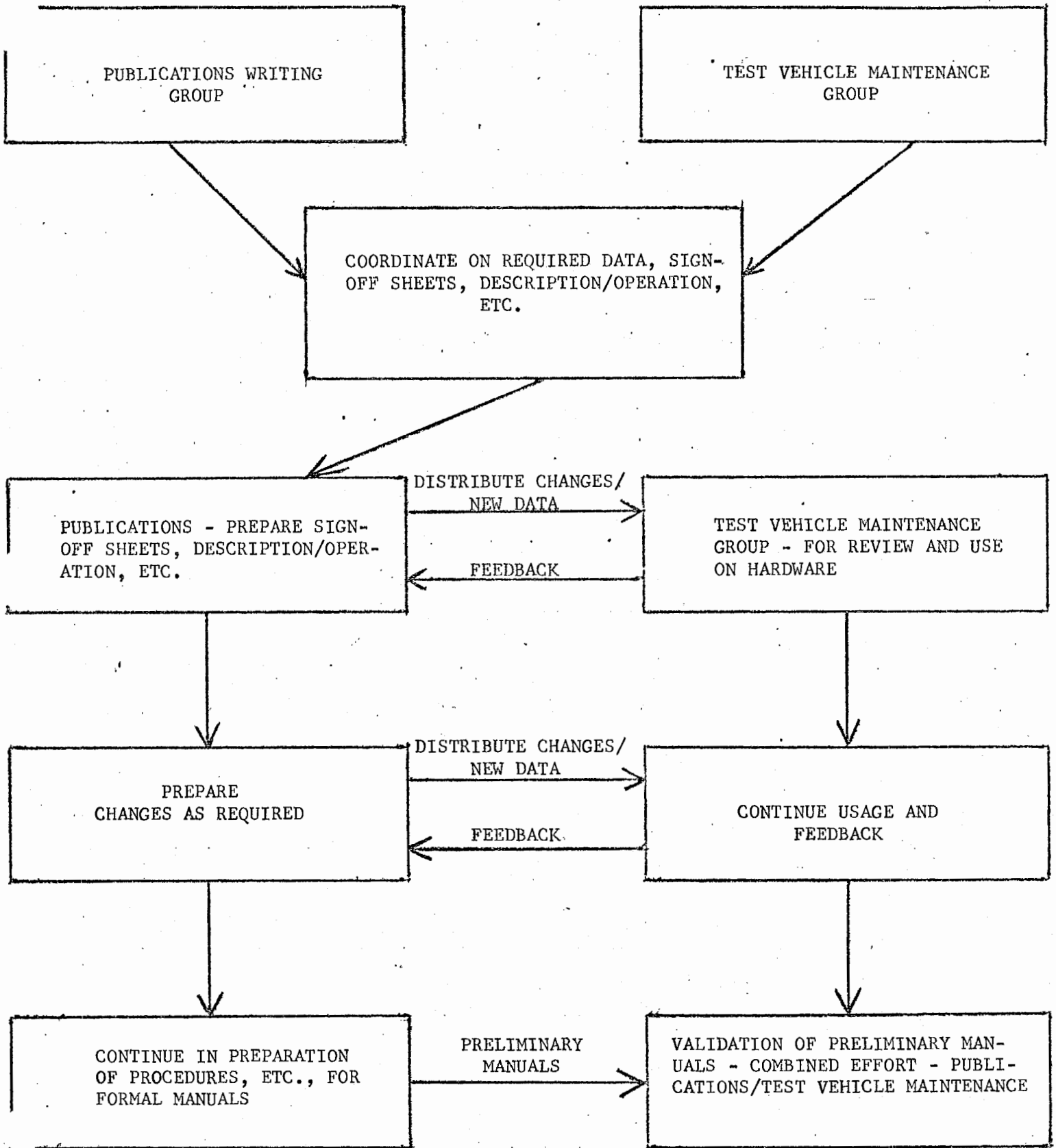
3.1 Test Vehicle Maintenance Group will utilize the sign-off sheets in their day-to-day maintenance of the Test Vehicles.

3.2 Additions, deletions and/or changes which are noted during the use of the sign-off sheets will be marked-up on the actual copy. Writing Group will be advised by submittal of a marked-up copy of the changes recommended.

4.0 Update

2.1 Writing Group will update sign-off sheets as required. Changed or added pages to the preliminary technical manuals will be dated and distributed per the distribution list.

DATA FLOW/FEEDBACK CHART



PROCEDURE FOR VALIDATION/VERIFICATION
OF TECHNICAL MANUALS

I. GENERAL

Validation/Verification serves as a "proof test" of the written procedures in the technical manuals.

Validation is the actual performance of the written procedure using Contractor personnel at the Contractor's Facility. Service conditions should be simulated as much as possible, i.e., use of tools, equipment, etc., which are the same as utilized by the Service.

Verification is the same as validation except that it is performed by the Customer, using Service personnel, tools, equipment, etc. The number of procedures actually verified will depend to a large degree on the accuracy and quality of the first few. If no errors are found, perhaps only a representative procedure from each system would be verified. On the other hand, if many errors/incomplete data are found, then, by contract, the Customer may go ahead and verify each and every procedure in the book. A few representative samples of procedures which are normally verified include:

Organizational

1. Power Plant Operational Check Out
2. Power Plant Removal and Installation
3. Flight Control Rigging
4. Control Surface Removal and Installation
5. Replacement of Wheel Brake Blocks
6. Electrical System Check Out and Trouble Shooting

PROCEDURE FOR VALIDATION/VERIFICATION OF TECHNICAL MANUALS (Cont'd)

Intermediate

1. Disassembly, Reassembly and Testing of a Typical Hydraulic Component.
2. Disassembly, Reassembly and Testing of a Typical Electrical System Component.
3. Disassembly, Reassembly and Testing of a Wheel Brake Assembly.

The above noted procedures are examples only and actual verification may be performed on many more than those listed. In order to keep the number to a bare minimum, the Contractor must show evidence of a complete and factual Validation Program which covers in detail all of the maintenance procedures. This gives the Customer assurance that procedures are complete and correct. The following procedure is recommended to ensure satisfactory completion of the Validation Program.

II. VALIDATION

1. A list of procedures requiring validation will be prepared by the Writing Group as early as possible in the Publications Program. Copies of the list will be furnished to the Test Vehicle Maintenance Group for the specific program. Additions, deletions and changes will be made to the list as required.
2. The Test Vehicle Maintenance Group will review the list each day and compare it to the known jobs which will be performed that day. Also, if a test vehicle is down for a period of time, any of the other procedures may be validated.

PROCEDURE FOR VALIDATION/VERIFICATION OF TECHNICAL MANUALS (Cont'd)

3. When a job is to be performed for which a procedure is available for validation, the Writing Group will be notified. The title of the procedure, location where work will be performed and approximate starting time will be provided.
4. The writing supervisor will advise the technical writer responsible for the procedure and arrange with Engineering Flight Test for attendance of the writer.
5. The writer will provide a copy of the latest procedure to the Test Vehicle Maintenance Engineer who is responsible for the particular system.
6. The work will be performed utilizing the procedure step-by-step. The writer will observe and make corrections as necessary.
8. Upon completion of the job, the mechanic and writer will advise the assigned Test Vehicle Maintenance Engineer and review the procedure as corrected.
9. The Test Vehicle Maintenance Engineer will certify the validity of the validated procedure by signing an appropriate statement on the master marked-up copy of the procedure.

CASTA

Complete Aircraft Self Test and Analysis

Background

Countless thousands of man hours are expended each year in testing and analyzing complex aircraft and the various systems which make up the total weapon system. The complexity of the various systems and the tremendous degree of interrelationship between systems causes them to be fantastically difficult to troubleshoot utilizing current tools, equipment and data. A few systems (primarily electronic) have built-in self-test capability. The read-out is merely a go/no-go indication.

Even fewer systems (again primarily electronic) have a built-in capability for fault isolation and indication. The average system, however, even in electronics, depends largely on a technicians ability to decipher the multitude of data presented to him and using his limited education and experience, expects him to determine where the fault is and just what must be done to cure the problem.

Deployment of future VTO aircraft in thin concentration over a world-wide area with work and storage space limitations dictates outstanding reliability and maintainability requirements.

With only a few aircraft assigned to each ship, they must be in an operationally "up" status on an ever-ready basis to meet their operational commitments.

Reliability and maintainability must be designed into the aircraft, its airframe systems and avionics systems. Simple, ruggedized, depend-

able equipment with replaceable throwaway components concept must be a design criteria to reduce the maintenance time to a minimum, since the maintenance space facilities, test equipment, maintenance personnel skills, etc., will be at a premium. Module or black box repair should be held at a minimum.

Considerations

The following should be considered:

1. System design might consider a compromise of avionics equipment operation on a continuous basis by deck edge plug-in power on a standby basis, versus normal operation during flight. (Reliability of operation might be improved and PAR, overhaul or replacement period of equipment might be shortened.)
2. Equipment might be designed with redundant capability (like No. 1 and No. 2 Hydraulic System or Dual Omni) to maintain complete capability by alternate path concept.
3. Equipment might be designed for retention of varying degrees of capability in event degradation causes partial failure in channels, modes, etc.
4. Built-in test capability to enable fault isolation rapidly and efficiently with capability to repair in flight.

With today's already existing, advanced technology, much better methods of system malfunction analysis are available. The following paragraphs outline the concept for one such system.

Concepts

The proposed system could consist of two subsystems, both of which constantly monitor all the other airborne systems. The first provides the

pilot with a "go" signal, prior to flight. This signal is received by the pilot on demand, and indicates that all systems are functioning within normal limits, all aircraft doors closed, gear down and locked, etc.

Built-in test capability on a V/STOL aircraft of limited size and payload would be of little value for in-flight trouble isolation, unless the trouble could be repaired. Therefore, plug-in circuit boards might be designed with the same circuit on each side, so that reversing the board will restore capability.

The second subsystem utilizes the sensing components of the first; however, it signals a problem when it occurs, not just on demand. The signal is displayed to the pilot and simultaneously is transmitted to the computer on board the mother ship or at the aircraft's base. The computer program is capable of analyzing the signal, determining whether the flight should be aborted, troubleshooting the affected system by analyses and indicating where the problem is, inflight equipment, tools and men required to repair on return, and as part of the inventory control, shows whether parts are available. This enables the maintenance crew to be standing by when the aircraft returns, with all the necessary items to fix the aircraft. A printout from the computer contains all the technical data required by the maintenance crew. This system reduces down-time, decreases maintenance man hours per flight hour and eliminates "guess" type trouble shooting practices which are in wide use today.

With limited size of crew, design of aircraft and systems should place emphasis on the crew being responsible for flying the reconnaissance and

armament platform and maintaining the aircraft equipment as directed by the surface ship combat information center (CIC). With computers, data link, display systems, etc., the surface vessel has a greater capability to assess the tactical situation and direct the tactical approach to be followed by the aircrew.