TECHNICAL MANUAL

INTERMEDIATE (FIELD), (DIRECT AND GENERAL SUPPORT) MAINTENANCE MANUAL

POWER UNIT, AVIATION, MULTI-OUTPUT GTED ELECTRICAL, HYDRAULIC, PNEUMATIC (AGPU) WHEEL MOUNTED, SELF-PROPELLED, TOWABLE

AC 400 Hz, 3 PH, 0.8 PF, 115/200V, 30 KW
DC 28 VDC 700 AMPS
PNEUMATIC 60 LBS/MIN. at 40 PSIG
HYDRAULIC 15 GPM AT 3300 PSIG

DOD MODEL	CLASS	HERTZ	NSN
MEP-360A	PRECISE	400	1730-01-144-1897

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1 DECEMBER 1986

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WASHINGTON, D.C., 29 February 1996

Intermediate (Field), (Direct and General Support)
Maintenance Manual

POWER UNIT, AVIATION, MULTI-OUTPUT GTED ELECTRICAL, HYDRAULIC, PNEUMATIC (AGPU) WHEEL MOUNTED, SELF-PROPELLED, TOWABLE

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AC 400Hz, 3PH, 0.8PF, 115/200V, 30KW
DC 28VDC 700 AMPS
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HYDRAULIC 15 GPM AT 3300 PSIG

DOD MODEL	CLASS	HERTZ	NSN
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POWER UNIT, AVIATION, MULTI-OUTPUT GTED ELECTRICSAL, HYDRAULIC, PNEUMATIC (AGPU) WHEEL MOUNTED, SELF-PROPELLED, TOWABLE

AC 400 Hz, 3PH, 0.8 PF, 115/200V, 30KW
DC 28VDC 700 AMPS
PNEUMATIC 60 LBS/MIN. AT 40 PSIG
HYDRAULIC 15 GPM AT 3300 PSIG

DOD MODEL	CLASS	HERTZ	NSN
MEP-360A	PRECISE	400	1730-01-144-1897

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MAINTENANCE MANUAL

POWER UNIT, AVIATION, MULTI-OUTPUT GTED
ELECTRICAL, HYDRAULIC, PNEUMATIC (AGPU)
WHEEL MOUNTED , SELF-PROPELLED, TOWABLE

AC 400Hz, 3PH, 0.8PF, 115/200V, 30KW
DC 28VDC 700 AMPS
PNEUMATIC 60 LBS/MIN. AT 40 PSIG
HYDRAULIC 15 GPM AT 3300 PSIG

DOD MODEL	CLASS	HERTZ	NSN
MEP-360A	PRECISE	400	1730-01-144-1897

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- - -	10-6.1/10-6.2
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Index 1 and Index 2	Index 1 and Index 2

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WARNING

All specific cautions and warnings contained in this manual shall be strictly adhered to. Otherwise, severe injury, death and/or damage to the equipment may result.

HIGH VOLTAGE

is produced when this AGPU is in operation.

DEATH

or severe burns may result if personnel fail to observe safety precautions. Do not operate the AGPU until the ground terminal stud has been connected to a suitable ground. Disconnect the battery connector before removing and installing components. Remove all rings, watches, and other jewelry when performing maintenance on this equipment. Loose fitting clothing should be secured to prevent it catching in moving parts. Do not attempt to service or otherwise make any adjustments, connections or reconnection of wires or cables until AGPU is shut-down and completely deenergized.

DANGEROUS GASES

Batteries generate explosive gas during charging: therefore, utilize extreme caution, do not smoke, or use open flame in the vicinity of the AGPU when servicing batteries.

Exhaust discharge contains noxious and deadly flames and is very hot. Do not operate AGPU in enclosed areas unless exhaust discharge is properly vented to the outside. Do not operate under overhangs, helicopter blades, or trees.

To avoid sparking between filler nozzle and fuel tank, always maintain metal to metal contact between filler nozzle and fuel tank when filling fuel tank.

Do not smoke or use open flame in the vicinity of the AGPU while fueling.

HYDRAULIC FLUID UNDER HIGH PRESSURE

is generated as a result of operation of the AGPU. Do not expose any part of the body to a high pressure leak in the hydraulic system. Never attempt to connect or disconnect hydraulic fittings under high pressure. Ensure that hoses are in good condition, not kinked, and securely connected to aircraft before applying hydraulic power. Wear gloves and eye protection (goggles or face shield) when operating hydraulic system.

EXTREMELY HOT AIR UNDER PRESSURE

Is generated by the AGPU pneumatic system. Allow pneumatic hose to cool before touching. Wear goggles and eve protection (goggles or face shield) when operating pneumatic system.

Never set PNEUMATIC POWER switch to ON unless pneumatic hose fitting is securely attached to aircraft. The hose will attempt to straighten out with power applied and whip around violently if not securely attached to aircraft.

NOISE

Operating noise level of the AGPU can cause hearing damage. Ear protectors, as recommended by the medical or safety officer, must be worn when working near the AGPU.

CLEANING SOLVENTS

When using solvents, clean parts in a well-ventilated area. Avoid inhalation of solvent fumes and prolonged exposure to skin to cleaning solvent. Wash exposed skin thoroughly. Dry cleaning solvent (Fed. Spec. P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F. to 138°F. (38°C. to 59°C.).

OPEN ACCESS DOORS

May be blown shut if AGPU is operated in close proximity of hovering or taxiing aircraft.

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. **SCOPE.** This manual contains instructions for intermediate (field), (direct and general support) maintenance of Multi-Output Aviation Power Unit MEP-360A, referred to as Aviation Ground Power Unit (AGPU), as allocated by the maintenance allocation chart. The contents of this manual will be followed in the event of conflict with any other document referenced herein.

1-2. **LIMITED APPLICABILITY.** Some portions of this publication are not applicable to all services. These portions are prefixed to indicate the services to which they pertain: (A) for Army, (F) for Air Force, (N) for Navy, and (MC) for Marine Corps. Portions not prefixed are applicable to all services.

1-3. **MAINTENANCE FORMS AND RECORDS.**

a. (A) Maintenance forms and records used by Army personnel are prescribed in DA PAM 738-751.

b. (F) Maintenance forms and records used by Air Force personnel are prescribed in AFM-66-1 and the applicable 00-20 Series Technical Orders.

c. (N) Navy users should refer to their service peculiar directives to determine applicable maintenance forms and records to be used.

d. (MC) Maintenance forms and records used by Marine Corps personnel are prescribed in TM 4700-15/1.

1-4. **REPORTING OF ERRORS.** Report of errors, omissions, and recommendations for improvement of this publication by the individual user is encouraged. Reports should be submitted as follows

a. (A) Army - DA Form 2028 directly to: Commander, ATCOM, ATTN: AMSAT-I-MP, 4300 Goodfellow Boulevard, St, Louis, MO 63120-1798.

b. (F) Air Force - AFTO Form 22 directly to: Commander, Sacramento Air Logistics Center, ATTN: MMEDT, McClellan Air Force Base, CA 95652, in accordance with TO-00-5-1.

c. (N) Navy - by letter directly to: Commanding Officer, U.S. Navy. Ships Parts Control Center, ATTN: Code 783, Mechanicsburg, PA 17055.

d. (MC) Marine Corps - NAVMC Form 10772 directly to: Commandant, Headquarters, U.S. Marine Corps, ATTN: Code LM-A-1, Washington, D.C, 20380. (Narrative manuals only)

e. (MC) Marine Corps - NAVMC Form 10772 directly to: Commanding General, ILS-ME/O DIV (Code 837), Marine Corps Logistical Base, Albany, GA 31704.

1-5. **LEVELS OF MAINTENANCE ACCOMPLISHMENT.**

a. (A,MC) Army and Marine Corps users shall refer to the Maintenance Allocation Chart for tasks and levels of maintenance to be performed.

b. (F) Air Force users shall accomplish maintenance at the user level

consistent with their capability in accordance with policies established in AFM 66-1.

c. (N) Navy users shall determine their maintenance levels in accordance with their service directives.

Section II. DESCRIPTION AND DATA

1-6. DESCRIPTION.

a. General. The Aviation Ground Power Unit (AGPU) MEP-360A is a gas turbine engine-driven, wheel mounted, self-propelled (up to 3 mph on flat surface), enclosed unit. The AGPU can be towed (20 mph maximum), and is air transportable.

The AGPU provides ac/dc electrical, hydraulic, and pneumatic power. Power is available individually, or in any combination. The AGPU provides the ground power requirements for aircraft such as the following:

AH-1 (Huey Cobra)
AH-64 (Apache)
C-12 (Huron)
CH-47 (Chinook)
OH-6 (Cayuse)
OH-58 (Kiowa)
OV-1 (Mohawk)
U-21 (UTE)
UH-1 (Iroquois)
UH-60 (Blackhawk)

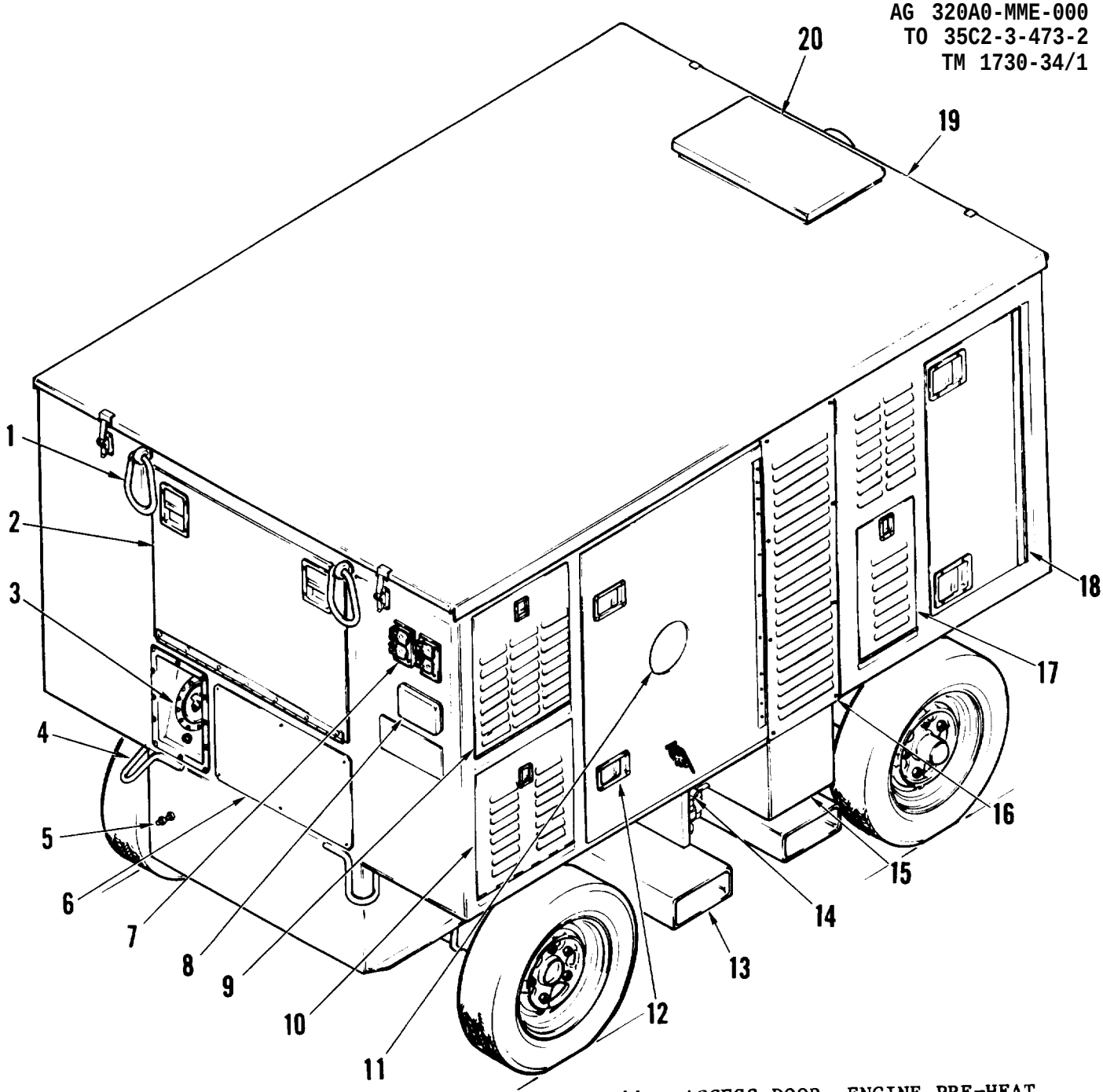
Control and regulation of the AGPU electrical and pneumatic systems is automatic. Electronic devices monitor and regulate electrical voltage, frequency, and current; as well as pneumatic outputs. Control of the hydraulic system is semi-automatic, in that the operator must set hydraulic pressure, and select operating modes.

b. Exterior Features. A view of the AGPU from the right rear is shown in figure 1-1. Figure 1-2 shows a view of the AGPU from the left front.

c. Engine/Gearcase. The gas turbine engine (GTE), figure 1-3, provides pneumatic power, and shaft power to drive an ac/dc generator and a hydraulic pump. The generator and pump are mounted on pads on the gearcase. Fuel for operation of the engine is supplied from an integral fuel tank or an external source. Selection of fuel source is controlled by a four-way valve, figure 1-1. Once started, the engine runs up to 100 percent governed speed of 58,737 rpm, and automatically maintains that speed until shutdown. Engine air intake is through an air cleaner/duct assembly, figure 1-4, to the engine. Engine exhaust is through an exhaust ejector, and out the roof through an exhaust flapper.

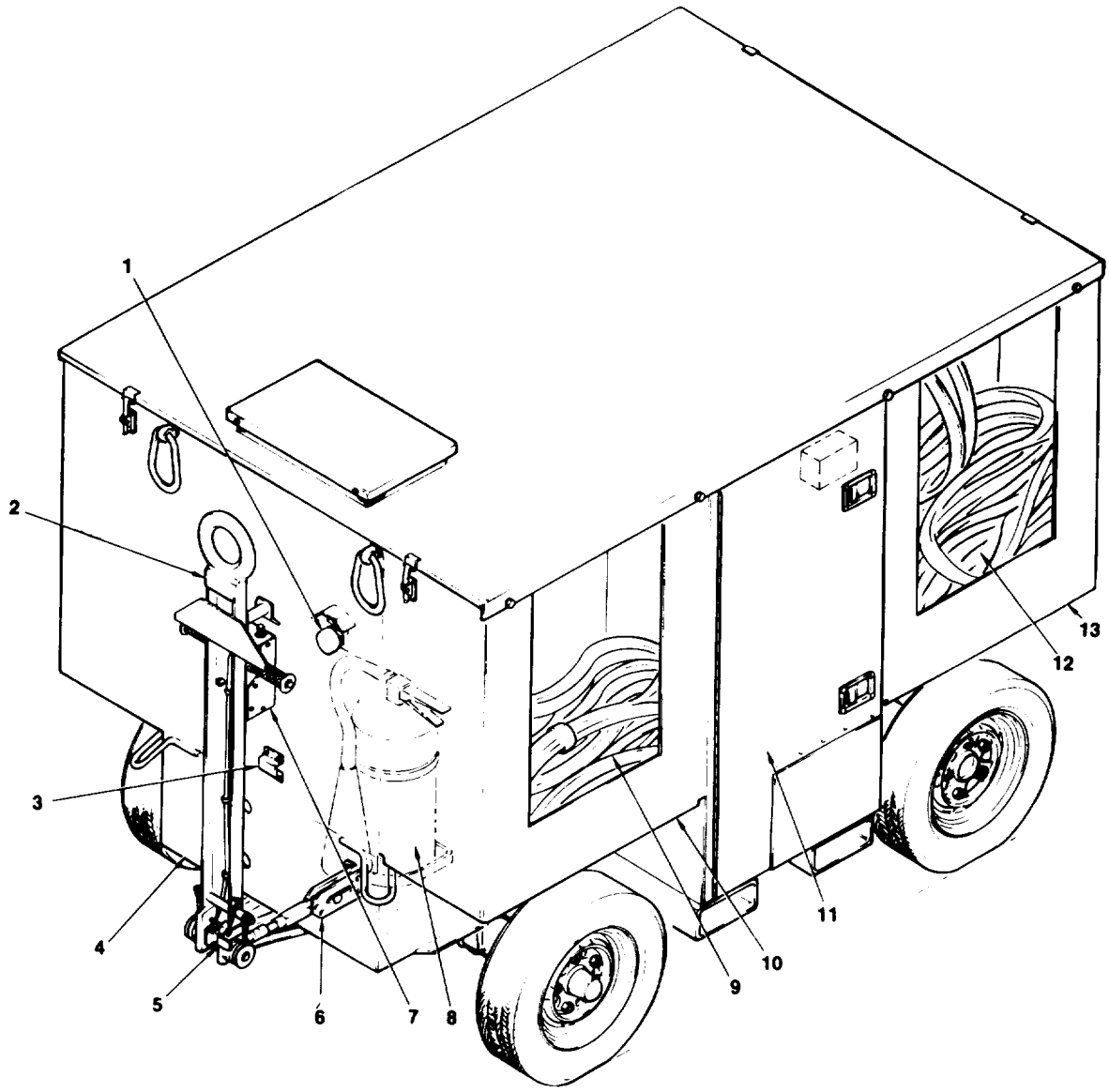
d. Generator. The generator (figure 1-3) is a self-cooled, continuous duty, ac/dc, self-excited, brushless unit. It includes a permanent magnet stator and rotor, an exciter stator and rotor, and a main dc rotating field and ac stator. The main ac stator incorporates three sets of three phase windings. One set of main stator windings provides the 115/200 vac output . The ac outputs of the other two windings are full-wave rectified to provide 28 vdc output.

The permanent magnet provides a three phase output whenever the generator is driven by the engine. When the engine reaches 95 percent speed, a relay connects the permanent magnet output to the generator control unit (GCU), located behind the control unit. The GCU rectifies this ac voltage to provide dc control voltage for the GCU and dc excitation voltage for the generator exciter field. The exciter provides a three phase output which varies in magnitude with the field excitation. The exciter



1. LIFTING EYE (4)
2. ACCESS DOOR, CONTROL PANEL
3. FUEL FILL
4. TIEDOWN (4)
5. GROUND STUD
6. ACCESS COVER, BATTERY CHARGER
7. CONVENIENCE OUTLETS (400 HZ)
8. SLAVE RECEPTACLE
9. ACCESS DOOR, ELECTRICAL TRAYS
10. ACCESS DOOR, BATTERY
11. ACCESS DOOR, ENGINE PRE-HEAT
12. ACCESS DOOR, ENGINE
13. FORKLIFT POCKET (2)
14. FOUR-WAY VALVE
15. COVER, AIR CLEANER EXHAUST
16. COVER, AIR INTAKE
17. ACCESS DOOR, HYD FILTERS
18. ACCESS DOOR, HYD CONTROL PANEL
19. ROOF
20. EXHAUST FLAPPER

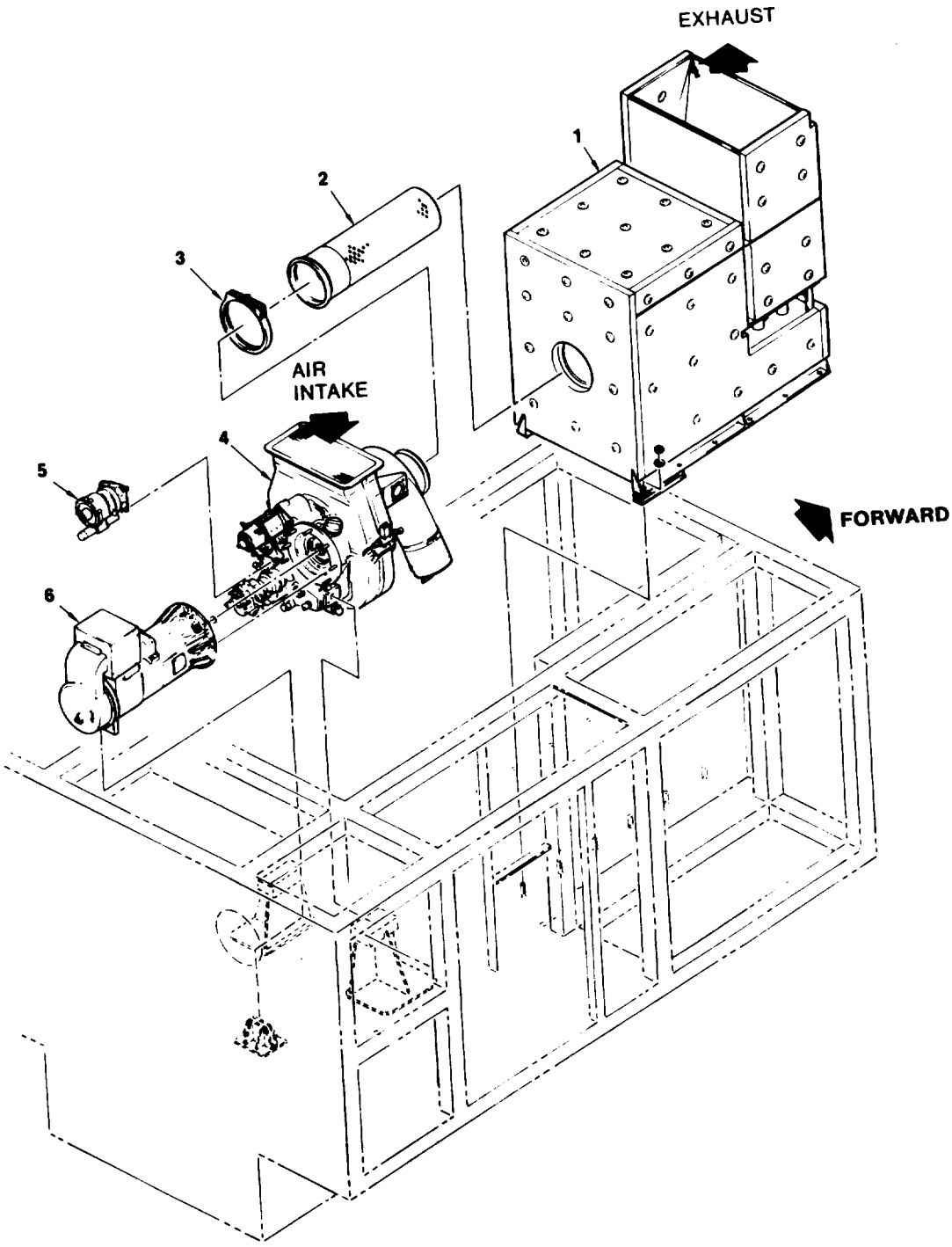
Figure 1-1. AGPU, Right Rear Three Quarter View



34-1-2

1. EMERGENCY STOP SWITCH
2. TOW BAR
3. DRAIN COVER, EXHAUST EJECTOR
4. FUEL TANK
5. TOW BAR LATCH
6. PARKING BRAKE
7. SPEED/DIRECTION CONTROL ASSY
8. FIRE EXTINGUISHER
9. AC CABLE
10. STORAGE COMPARTMENT
11. ACCESS DOOR, PNEUMATIC HOSE
12. DC CABLE
13. STORAGE COMPARTMENT

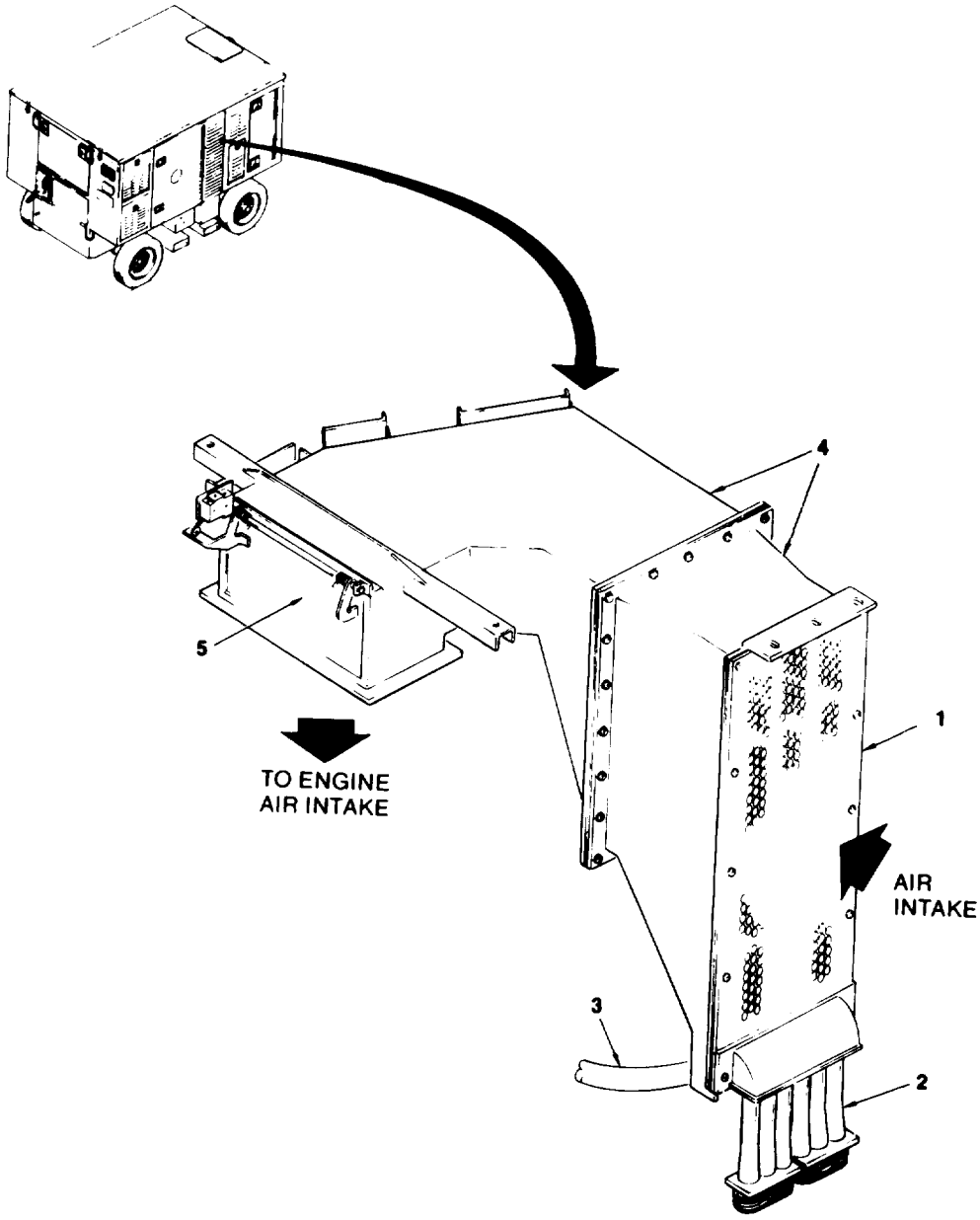
Figure 1-2. AGPU, Left Front Three Quarter View



34-1-3

1. EXHAUST EJECTOR
2. INLET TUBE
3. RING, COUPLING
4. GAS TURBINE ENGINE (GTE)
5. HYDRAULIC PUMP
6. GENERATOR

Figure 1-3. Engine, Generator, Hydraulic Pump and Exhaust Ejector

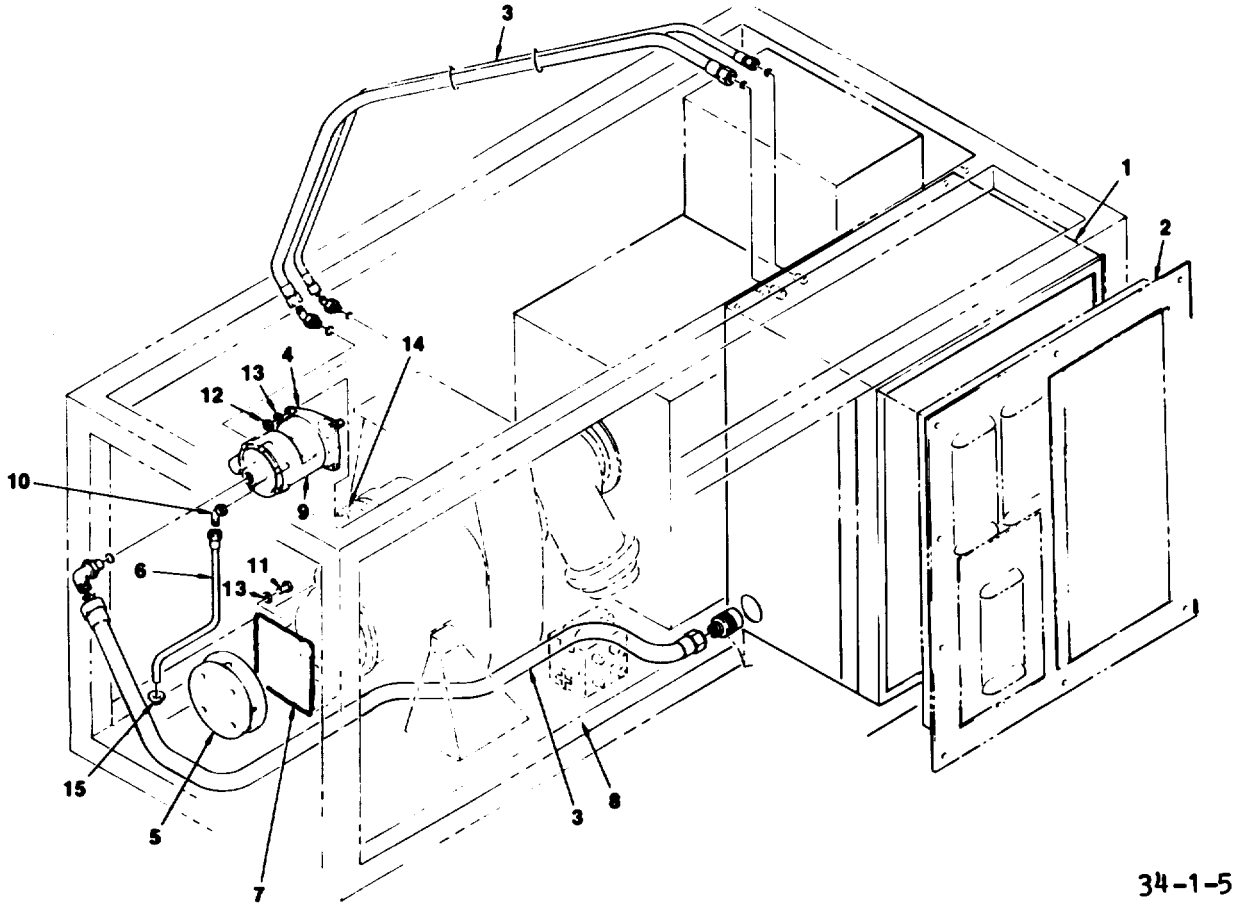


1. AIR CLEANER ASSEMBLY
2. SCAVENGE TUBES
3. BLEED AIR HOSE (FROM ENGINE)
4. AIR INTAKE DUCT ASSEMBLY
5. BYPASS DOOR

Figure 1-4. Engine Air Intake System

voltage is half-wave rectified and applied to the generator main dc rotating field. The magnitude of the three phase voltage generated in the main stator windings is a function of the ampere turns of the field windings which is, in turn, a function of the exciter field excitation. The GCU monitors the generator ac or dc output (depending upon which output is selected at the AGPU control panel) and controls the exciter field as required to keep the selected output within limits.

e. Hydraulic System. The hydraulic system, figure 1-5, consists of a hydraulic pump, interconnecting lines and hoses, and a hydraulic module. The hydraulic pump is mounted on an engine



1. HYDRAULIC MODULE
2. FRONT PANEL ASSEMBLY
3. HOSE
4. HYDRAULIC PUMP
5. SPACER
6. DRAIN TUBE
7. STORAGE BRACKET
8. ENGINE COMPARTMENT
9. ELECTRICAL CONNECTOR, P16
10. PUMP FITTING
11. BOLT
12. NUT
13. WASHER
14. GEARCASE PAD
15. GROMMET

Figure 1-5. Hydraulic Module, Pump, Lines and Hoses

gearcase pad, and is driven by the engine. The hydraulic pump output pressure is controlled by a switch on the hydraulic control panel. The hydraulic module controls the application of hydraulic fluid to an aircraft for power, filling, or flushing requirements. The hydraulic module contains a control panel, a reservoir, an accumulator, a cooler (heat exchanger), a manifold, filters (2), and hydraulic lines, fittings, and valves.

f. Propulsion System. The propulsion system, figure 1-6, provides suspension, steering, brakes, and drive power for the AGPU. A speed/direction control assembly mounted on a tow bar

1. TOW BAR
2. SPEED/DIRECTION CONTROL ASSEMBLY
3. BRAKE LEVER
4. FRONT AXLE ASSEMBLY
5. SPRING
6. TRACTION MOTOR
7. GEAR DRIVE
8. CHAIN DRIVE ASSEMBLY
9. CLUTCH ASSEMBLY
10. CLUTCH LEVER
11. REAR AXLE ASSEMBLY
12. CONTROLLER (LOCATED ON UPPER TRAY IN ELECTRICAL COMPARTMENT
13. ELECTRIC BRAKE

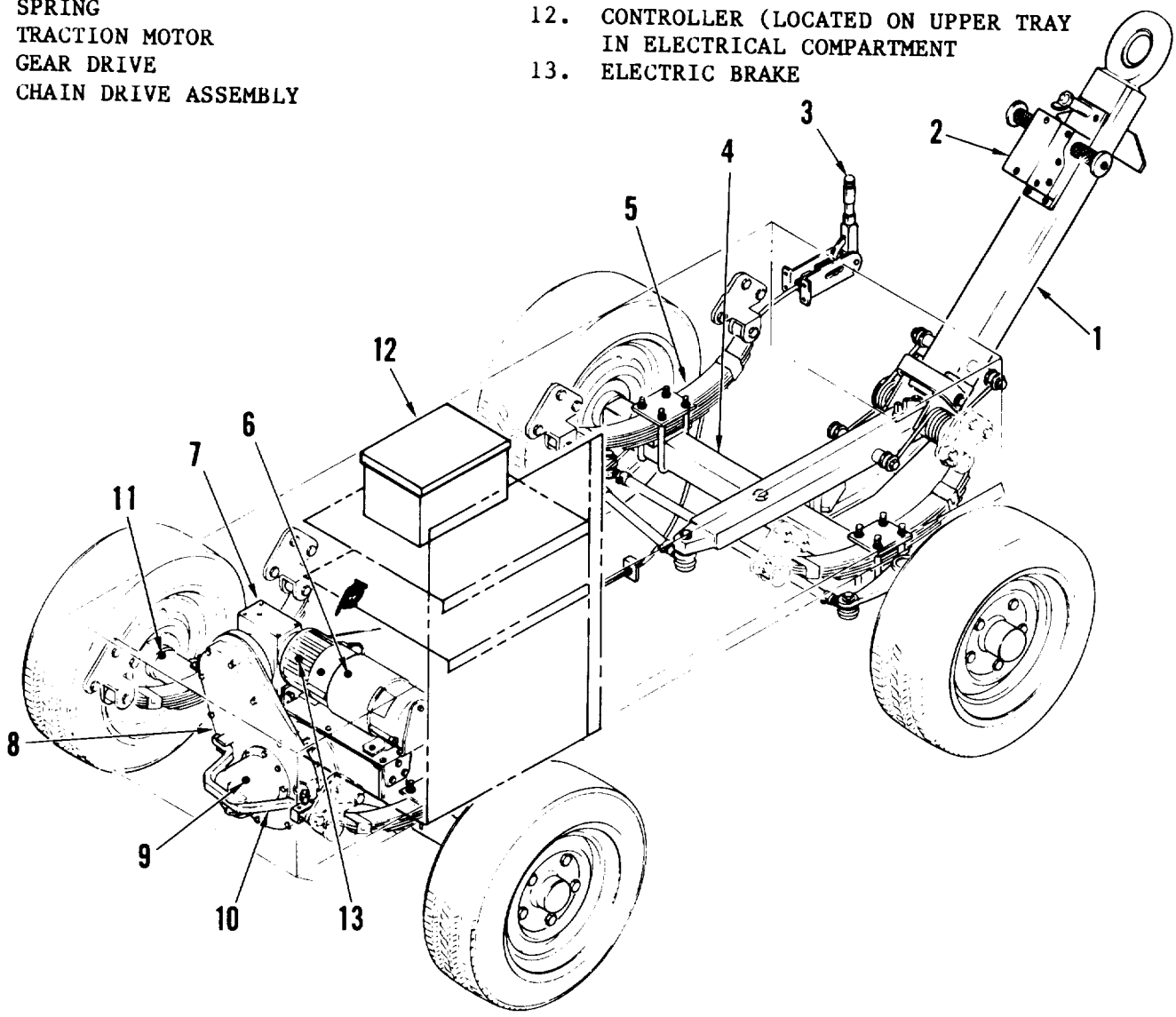


Figure 1-6. Propulsion System

allows the operator to control the forward/reverse directions and speed (up to 3 mph on flat surface) in self-propulsion mode. The tow bar is also used to steer the AGPU when using self-propulsion mode. Drive power is provided by a dc traction motor driving a conventional rear axle assembly. An electric brake is provided. The electric brake prevents the rear wheels turning with with the clutch engaged until electrical power is applied to the traction motor and electric brake. Application of dc drive power to the traction motor is controlled by a motor controller and relays located on the upper tray in the electrical compartment. The motor controller receives signals from the speed/direction control assembly. The drive train consists of a gear box, a chain drive, a manual clutch, and a rear axle assembly. A dead man switch on the speed/direction control assembly must be held in while operating the propulsion system. If the switch is released (intentionally or accidentally) during operation, power is removed from the traction motor and the electric brake. Removing electrical power applies the electric brake. Additionally, the speed/direction control assembly contains a mercury switch which deactivates the propulsion system when the tow bar is raised. Conventional drum brakes are provided on the rear wheels. The brakes are set by a lever on the front of the AGPU, which is connected to the brake assemblies by a cable assembly.

1-7. TABULATED DATA. Tabulated data is contained in table 1-1, and torque specifications in table 1-2.

1-8. DIFFERENCES BETWEEN SERIAL NUMBERS.

a. Battery Charger. Serial numbers 001, 002, 004, 005, and 009 have 20 amp battery chagers instead of the 50 amp battery chargers supplied with all other AGPUs.

b. Mounting Hardware. There are minor differences in component mounting hardward (screws, nuts, rivets) and frame and housing components (doors, panels, covers) between the AGPU serial numbers 001 through 020, and serial numbers 021 and on. These differences should be noted prior to any maintenance or repair actions.

Table 1-1. Tabulated Data

1. Aviation Ground Power Unit (AGPU).

Manufacturer:	Developmental Sciences - Astronics Div. of Lear Siegler, Inc. (FSCM 63631)
Model	MEP-360A NSN 1730-01-144-1897

Operating Environment Capabilities:

Temperature:	-65°F to 95°F (-54°C to 35°C) up to 10,000 feet (3048m) elevation
	-65°F to 107°F (-54°C to 42°C) up to 5,000 feet (1524m) elevation
	-65°F to 125°F (-54°C to 52°C) at sea level

Table 1-1. Tabulated Data (continued)

1. Aviation Ground Power Unit (AGPU) (continued)

AC voltage output: 400 Hertz, 3 phase, 0.8 power factor, 115/200V

AC power output:

30 KW continuous (45 KW for 30 seconds) with no DC

27.5 KW continuous with 50 amperes DC available from battery charger

4-wire output cable, 60 foot (18.3m)

DC power output:

28 vdc 700 amperes (1,000 amperes for 30 seconds) with no AC

28 vdc 50 amperes from battery charger with 27.5 KW AC available

2-wire output cable, 60-foot (18.3m)

Pneumatic output:

60 lb/minute at 40 psig (sea level) - Temperature 450°F (232°C)

26.5 lb/minute at 24 psi , 10,000 (3048m) feet altitude - Temperature 420°F (232°C)

3.5 inch (8.9 cm) diameter output hose, 30 foot length (9.1m)

Hydraulic output:

15 gpm at 500 to 3,300 psig

Hydraulic fluid or MIL-H-83282 or MIL-H-5606

30-foot (9.1m) pressure and return hoses

Aircraft Interface - single or dual connections

Operating Attitude: Up to 15 degrees from horizontal any azimuth

Noise Level: Less than 80 dBA at 23 foot (7 meter) radius

Capacities (Liquids):

Fuel Tank	65 gallons (246 liters)
Engine Oil Sump	2.3 quarts (2.2 liters)
Hydraulic System	9 gallons (34 liters)

Table 1-1. Tabulated Data (continued)

1. Aviation Ground Power Unit (AGPU) (continued)

Dimensions and Weights:

Overall length	90 inches (229 centimeters)
Overall width	58 inches (147 centimeters)
Overall height	60 inches (152 centimeters)
Weight empty	3550 pounds (1610 kilograms)
Weight filled (fluids)	4275 pounds (1939 kilograms)
Shipping weight	3620 pounds (1642 kilograms)
Cubage	181 cubic feet (5.1 cubic meters)

2. Engine.

Manufacturer:	Garrett Turbine Engine Co. (FSCM 99193)
Model:	GTCP36-50(H)
Type:	Gas Turbine Engine (GTE), Pneumatic and Shaft Power
Dry Weight:	130 pounds (59 kilograms)

Dimensions:

Height:	24.8 inches (63 centimeters)
Length:	32.8 inches (83.3 centimeters)
Width:	20.8 inches (52.8 centimeters)

Shaft Horsepower (sea level):

With bleed air:	46 shp minimum
Without bleed air:	62 shp minimum

Engine Speeds:

Nominal full-load governed speed: 58,737 rpm (100 percent)

Full-load governed speed limits: 58,167 to 59,034 rpm (99 to 100.5 percent)

Table 1-1. Tabulated Data (continued)

2. Engine (continued)

Gearcase output drive pads (clockwise rotation):

Generator drive pad:	8,000 rpm
Hydraulic pump drive pad:	8,000 rpm

Electrical system voltage: 28 vdc nominal

Lubrication system:

oil	MIL-L-23699 or MIL-L-7808
Capacity	2.3 U.S. quarts (2.2 liters)
Filter	Replaceable element

Starter motor:

Voltage	28 vdc nominal
Current	Approximately 800 ampere initial start to approximately 200 ampere at 60% GTE rotor speed

Automatic shutdown features:

Overspeed	110 ± 1 percent (64,587 rpm)
Overtemperature	1300°F (704°C) above 60% rotor speed 1255°F (679°C) at 100% speed
Overcurrent	4.0 ampere maximum
Low oil pressure (10 seconds above 95%)	31 psig minimum (normal 45 ± 10 psig)
High oil temperature (1 second delay)	275°F (135°C) maximum
Loss of EGT sensing	
Loss of rpm sensing	

Fuel:

MIL-T-562U Grade JP-4	-65°F (-54°C) to ✱ 135°F (57°C)

Table 1-1. Tabulated Data (continued)

2. Engine (continued)

MIL-T-5624 Grade JP-5, or MIL-T-83133 Grade JP-8	-40°F (-40°C) to 135°F (57°C)
Commercial Jet A	-40°F (-40°C) to 135°F (57°C)

* Sea level, l15°F (46°C) at 10,000 feet (3048m)

Emergency Fuel (25 hours maximum) Diesel MIL-G-5572 or VV-F-800

Fuel Consumption (approximate):

With bleed air	125 lb/br (19 gph)
Without bleed air	110 lb/hr (17 gph)

Exhaust Gas Temperature Limits:

Allowable below 60% rotor speed during start cycle	1600°F (871°C) for 30 seconds maximum 1600°F to 1800°F (871°C to 982°C) for 2 seconds maximum
Allowable above 60% rotor speed	1300°F (704°C) maximum
Allowable at 100% rotor speed	1255°F (679°C) maximum (1230 ± 25°F)

3. Battery.

Type:	Lead-acid MIL-B-83769D, or optional NiCad MS24498
Voltage:	24 vdc
Amp-Hours:	53

4. Battery Charger.

Manufacturer:	Leland Electrosystems, Inc. (FSCM 62624)
Model:	DSH831-1
Voltage:	Output selectable at 28.5, 30.5, or 32 vdc
output:	50 ampere nominal - battery 20 ampere nominal - control circuits

Table 1-1. Tabulated Data (continued)

5. Generator and Generator Control Unit (GCU).

Manufacturer:	Leland Electrosystems, Inc. (FSCM 62624)
Model:	AGH815-1 (Generator) CSV 3370-2 (Generator Control Unit)

Rating-continuous duty, single mode:

AC 30 KW, 3 phase, 400 Hertz, 115/200V
.8 power factor

DC 700 amperes, 28 vdc

Generator features:

Brushless ac or dc

Permanent magnet generator excitation

Two grease fittings (with overflow)

Shear shaft protection

Overtemperature sensor

6. Auxiliary Fuel Pump.

Manufacturer:	Weldon Tool Co. (FSCM 64560)
Model:	8850-4
Type:	Electric motor (28 vdc) driven, continuous duty, 3A max.
Output :	20 psi

7. Auxiliary Fuel Filter.

Manufacturer:	Fram Corporation (FSCM 60699)
Model:	FBM1110-PLM
Filtering:	10 micron
Element:	Replaceable cartridge (FRAM 151108)

Table 1-1. Tabulated Data (continued)

8. Air Cleaner.

Manufacturer:	Paul Land and Marine Corp. (FSCM 60047)
Model:	AE-A212-4
Type:	Inertial particle separator type, bleed air scavenged

9. Hydraulic Pump.

Manufacturer:	Garrett (FSCM 7021O)
Model:	4110612
Type:	Axial piston, variable displacement, pressure-compensated
output:	500 to 3300 psig at 15 gpm at aircraft interface (MIL-H-5440 Type II)

10. Hydraulic Module.

Manufacturer:	Pneudraulics Inc. (FSCM 06177)
Model:	06177-83-14631
Reservoir:	Vented through dryer. Nine gallon capacity.
Suction Fill System:	Four gpm from 55-gallon drum.
Filtration:	High pressure: 3 micron absolute at 20 gpm. Return: 10 micron at 20 gpm.

11. Running Gear.

Wheel mounted, pneumatic tires (P195/75R15, or equivalent)

Tire pressure 28 psig

Tow bar, pintle heights between 6 and 36 inches (15 to 91 cm) above ground

Tow speeds:

20 mph (32 kph) maximum on improved road surfaces
10 mph (16 kph) maximum on rough unimproved terrain

Table 1-1. Tabulated Data (continued)

11. Running Gear (continued)

Turning radius approximately 11 feet (3.4m)

Parking brake on rear wheels

Ground clearance 7 inches (18 cm) under axles

12. Propulsion.

28 vdc, 3 hp drive motor, 83-14501-01 (FSCM 63631) with electric brake, 304198-32 (FSCM 4Y298)

Variable speed 0 to 3 mph on level terrain

1/2 mph on 15 degree slope

Manual clutch

Twist-grip speed/direction control, spring loaded to off

Dead-man control

Table 1-2. Torque Specifications

Item	Torque Required	Paragraph
Hydraulic hose (AN-6) coupling nuts	210 to 230 inch-pounds	2-8
Hydraulic hose (AN-12) coupling nuts	900 to 1,000 inch-pounds	2-8
Hydraulic hose (AN-20) coupling nuts	1,520 to 1,680 inch-pounds	2-10
Generator mounting nuts	280 to 300 inch-pounds	5-2
Starter housing to end bell bolts	25 to 30 inch-pounds	7-2
Hydraulic pump mounting nuts	180 to 200 inch-pounds	8-4
Hydraulic tube fittings	135 to 150 inch-pounds	8-5
Hydraulic reservoir coupling nut	900 to 1,000 inch-pounds	8-8
Hydraulic tube fittings	450 to 500 inch-pounds	8-10

Table 1-2. Torque Specifications (continued)

Item	Torque Required	Paragraph
Hydraulic tube fittings	1,200 to 1,400 inch-pounds	8-12
Hydraulic tube fittings	1,200 to 1,400 inch-pounds	8-18
Hydraulic tube fittings	900 to 1,000 inch-pounds	8-18
Swivel nut	450 to 500 Inch-pounds	8-18
Hydraulic tube fittings	1,200 to 1,400 inch-pounds	8-18
Manual fill reducer	650 to 700 inch-pounds	8-18
Hydraulic tube fittings	450 to 500 inch-pounds	8-18
Hydraulic tube fittings	135 to 150 Inch-pounds	8-18
Engine housing scroll bolts	50 to 55 inch-pounds	9-12
Engine housing bolts	55 to 60 inch-pounds	9-12
Engine inlet screen nuts	20 to 25 inch-pounds	9-13
Engine hourmeter bracket bolts	30 to 35 Inch-pounds	9-13
Engine fuel nozzle bolts	45 to 55 inch-pounds	9-14
LCV adapter clamp nut	30 to 35 inch-pounds	9-15
Thermocouple bolts	30 to 35 inch-pounds	9-15
Speed sensor bolts	30 to 35 inch-pounds	9-15
Fuel solenoid bolts	30 to 35 inch-pounds	9-15
Hourmeter screws	30 to 35 inch-pounds	9-15
Ignition unit bolts	45 to 50 inch-pounds	9-15
Igniter plug	95 to 100 inch-pounds	9-15
Igniter plug leads	30 to 35 inch-pounds	9-15
Axle U-bolts	55 to 60 foot-pounds	10-2
Chain drive bolts	35 to 40 foot-pounds	10-5

Table 1-2. Torque Specifications (continued)

Item	Torque Required	Paragraph
Drive pinion shaft nut	45 to 50 foot-pounds	10-5
Drive chain adjustment nut	20 to 25 inch-pounds	10-5
Chain housing bolts	35 to 40 foot-pounds	10-15

CHAPTER 2

GENERAL MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

2-1. REPAIR PARTS. Repair parts and equipment are listed and Illustrated in the repair parts and special tools list manual, TM 55-1730-229-24P.

2-2. TOOLS AND EQUIPMENT. No special tools test and support equipment are required.

TABLE 2-1. Deleted.

Section II. TROUBLESHOOTING

2-3. INTRODUCTORY INFORMATION.

a. This section contains troubleshooting Information in table 2-2 for locating and correcting operating troubles which may develop in the AGPU hydraulic system and propulsion system. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which will help you to determine probable causes and corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or cannot be corrected by listed corrective actions, notify maintenance supervisor.

Table 2-2. Direct/General Support Troubleshooting

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

NOTE

FO numbers referenced in this table are contained in TM 55-1730-229-12.

1. REPLACE FILTER LIGHT STAYS ON AFTER FILTER ELEMENTS REPLACED.

Step 1. Set power switches off, shut down engine, and disconnect battery. Remove hydraulic module front panel assembly. Disconnect both leads from TB2-4 (see FO-9) and check continuity between TB3-1 and the loose ends of wire C117B16.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

a. If continuity, disassemble module and replace the high pressure filter (27, figure 8-14). Perform steps a. through ae. of paragraph 8-16. Reconnect wires to TB2-4.

b. If no continuity, do step 2.

Step 2. Check continuity between TB3-1 and the loose end of wire C117A16.

a. If continuity, disassemble module and replace the low pressure filter (22, figure 8-14). Perform steps a. through ad. of paragraph 8-16. Reconnect wires to TB2-4.

b. If no continuity, check for short between-REPLACE FILTER light and ground. The wires and connecting points are:

C123N16N	C123J16N	TB1-4	J1-I
C123M16N	C123G16N	C123B16N	P14-I
C123L16N	TB1-2	TB4-2	C2A20N
C123K16N	C123C16N	C123A16N	GND

2. CANNOT APPLY HYDRAULIC PRESSURE TO AIRCRAFT.

Step 1. Check dual manifold BYPASS/FLUSH valve position. If valve is open, close valve. If problem is not corrected, continue with step 2.

Step 2. Remove hydraulic module front panel assembly. With system operating in hydraulic mode, check for +24 vdc between TB2-3 and TB2-10 (ground) (see FO-9). Shut unit down and disconnect battery.

a. If +24 vdc was present, go to step 3.

b. If no voltage was present, check OUTPUT switch (paragraph 4-90, TM 55-1730-229-12) and wiring for open condition. The wires and connecting points are:

C119A16	S4
C127C16	TB1-10
C127B16	TB4-9
C127A16	J1-B
P14-B	E33C20
P8-J	J8-J
E33B20	

Replace switch or wiring as necessary and verify operation.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
2. CANNOT APPLY HYDRAULIC PRESSURE TO AIRCRAFT (continued)	
Step 3. Disconnect wire C119B20 from TB2-3. Check for continuity between TB2-10 and the loose end of wire C119B20.	
	a. If continuity, do step 4. Reconnect wire.
	b. If no continuity, disassemble module and replace solenoid valve (66, figure 8-14). Perform steps a. through w. of paragraph 8-16.
Step 4. Remove and clean dual manifold BYPASS/FLUSH valve (paragraph 8-14). Clean the dual manifold hole where valve fits. Inspect valve for nicks, scratches, or broken packing.	
	a. If valve is defective, replace valve and packing, and verify operation.
	b. If valve appears good, re-install valve using new packing, and verify operation. If malfunction still exists, shut down unit and do step 5.
Step 5. Remove and disassemble module by performing steps a. through x. of paragraph 8-16. Remove solenoid valve per paragraph 8-11 .c.(4). Clean clogged orifice and screen (15, 22, figure 8-10) between pilot valve and load valve. Replace pilot valve block (66, figure 8-14) per paragraph 8-11.c.(4). pressure test manifold (paragraph 8-21) Reassemble module and verify operation per paragraph 8-18, starting with step k.	
3. PUMP EMITS HIGH PITCH WHINE WITH LOSS OF PRESSURE AT HIGH PRESSURES.	
Step 1. Shut down complete unit and check RETURN BLEED valve:	
	a. Remove (paragraph 8-7a.) and clean valve, and clean the manifold where RETURN BLEED valve fits.
	b. Inspect valve cartridge for nicks, scratches, or broken packing. Replace valve if necessary.
	c. Replace valve packing.
	d. Re-install RETURN BLEED valve (paragraph 8-7.b.). Verify operation.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
3. PUMP EMITS HIGH PITCH WHINE WITH LOSS OF PRESSURE AT HIGH PRESSURES (continued)
Step 2. Check HIGH PRESSURE BLEED valve: a. Remove (paragraph 8-7a.) and clean valve, and clean the manifold where HIGH PRESSURE BLEED valve fits. b. Inspect valve cartridge for nicks, scratches or broken packing. Replace valve if necessary. c. Replace valve packing. d. Re-install HIGH PRESSURE BLEED valve (paragraph 8-7.b.). Verify operation.
4. PRESSURE GAUGE INDICATION DOES NOT DROP wHILE BLEEDING AIR.
Step 1. Shut down complete unit and check RETURN BLEED valve for clogged condition: a. Remove (paragraph 8-7.a.) and clean valve and clean the manifold where RETURN BLEED valve fits. b. Inspect valve cartridge for signs of blockage (i.e., lodged bits of packing). Replace valve cartridge if necessary. c. Replace valve packing. d. Re-install RETURN BLEED valve (paragraph 8-7.b.) and verify operation.
Step 2. Check HIGH PRESSURE BLEED valve for clogged condition: a. Remove (paragraph 8-7a.) and clean valve and clean the manifold where HIGH PRESSURE BLEED valve fits. b. Inspect valve cartridge for signs of blockage (i.e., lodged bits of packing). Replace valve cartridge if necessary. c* Replace valve packing. d. Re-install HIGH PRESSURE BLEED valve (paragraph 8-7.b.) and verify operation.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
5. HYDRAULIC FLUID RUNS OUT WHEN DRAIN CONNECTOR CAPS REMOVED.
Step 1. If leakage occurs when RESERVOIR DRAIN connector uncapped, check RESERVOIR DRAIN valve: a. Remove (paragraph 8-7.a.) and clean valve and clean the manifold where RESERVOIR DRAIN valve fits. b. Inspect valve cartridge for nicks, scratches or broken packing. Replace valve cartridge if necessary. c. Replace valve packing. d. Re-install RESERVOIR DRAIN valve (paragraph 8-7.b.) and verify operation.
Step 2. If leakage occurs when SYSTEM DRAIN connector uncapped, check SYSTEM DRAIN valve: a. Remove (paragraph 8-7.a.) and clean valve and clean the manifold where SYSTEM DRAIN valve fits. b. Inspect valve cartridge for nicks, scratches or broken packing. Replace valve cartridge if necessary. c. Replace valve packing. d. Re-install SYSTEM DRAIN valve (paragraph 8-7.b.) and verify operation.
6. RESERVOIR WON'T DRAIN.
Check RESERVOIR DRAIN valve for clogging: a. Remove (paragraph 8-7.a.) and clean valve and clean the manifold where RESERVOIR DRAIN valve fits. b. Inspect valve cartridge for signs of blockage (i.e., lodged bits of packing). Replace valve cartridge if necessary. c. Replace valve packing. d. Re-install RESERVOIR DRAIN valve (paragraph 8-7.b.) and verify operation.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
7. SYSTEM WON'T DRAIN. Check SYSTEM DRAIN valve for clogging:	a. Remove (paragraph 8-7.a.) and clean valve and clean the manifold where SYSTEM DRAIN valve fits. b. Inspect valve cartridge for signs of blockage (i.e., lodged bits of packing). Replace valve cartridge if necessary. c. Replace valve packing. d. Re-install SYSTEM DRAIN valve (paragraph 8-7.b.) and verify operation.
8. LOSS OF PRESSURE BEFORE AND AFTER OUTPUT SWITCH SET TO ON. PRESSURE (INCREASE/DECREASE) SWITCH NOT EFFECTIVE. Step 1. Shut down complete unit and check PRESSURE RELIEF valve adjustment:	a. Check jam nut and cartridge. If jam nut is loose, cartridge can back out leaving PRESSURE RELIEF valve completely open. b. Adjust valve and tighten jam nut as necessary.
Step 2. Check PRESSURE RELIEF valve condition:	a. Remove (paragraph 8-7.a.) and clean valve and clean the manifold where PRESSURE RELIEF valve fits. b. Inspect valve cartridge for nicks, scratches, or broken packing. Replace valve cartridge if necessary. c. Replace valve packing. d. Re-install PRESSURE RELIEF valve (paragraph 8-7.b.) and verify operation.
9. LOSS OF PRESSURE BEFORE AND AFTER OUTPUT SWITCH SET TO ON. PRESSURE SWITCH MAY BE PARTIALLY EFFECTIVE OR INEFFECTIVE. Problem could be in piston mechanism or swash plate of pump. Swash plate problems affect response to commands from PRESSURE (INCREASE/DECREASE) switch.	Replace hydraulic pump (paragraph 8-4).

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
10. MAXIMUM PRESSURE AT HYDRAULIC MODULE OUTPUT AT ALL TIMES. Shut down complete unit and check PRESSURE RELIEF valve for contamination, blockage or valve malfunction: a. Remove (paragraph 8-7.a.) and clean valve and clean the manifold hole where the PRESSURE RELIEF valve fits. b. Inspect valve cartridge for signs of blockage (i.e., lodged bits of packing). Replace valve cartridge if necessary. c. Replace valve packing. d. Re-install PRESSURE RELIEF valve (paragraph 8-7.b.) and verify operation.
11. OUTPUT PRESSURE GAUGE ALWAYS INDICATES ZERO. Shut down complete unit and check GAUGE SHUTOFF valve: a. Remove (paragraph 8-7.a.) and clean valve and clean manifold hole where GAUGE SHUTOFF valve fits. b. Inspect valve cartridge for signs of blockage (i.e., lodged bits of packing). Replace valve cartridge if necessary. c. Replace valve packing. d. Re-install GAUGE SHUTOFF valve (paragraph 8-7.b.) and verify operation.
12. HYDRAULIC SYSTEM PRESSURE CANNOT BE RELEASED AT END OF HYDRAULIC SERVICING OPERATION. Check HIGH PRESSURE BYPASS valve for blockage: a. Remove (paragraph 8-7.a.) and clean valve and clean manifold hole where HIGH PRESSURE BYPASS valve fits. b. Inspect valve cartridge for signs of blockage (i.e., lodged bits of packing). Replace valve cartridge if necessary.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
12. HYDRAULIC SYSTEM PRESSURE CANNOT BE RELEASED AT END OF HYDRAULIC SERVICING OPERATION (continued)	
	c. Replace valve packing.
	d. Re-install HIGH PRESSURE BYPASS valve (paragraph 8-7.b.) and verify operation.
13. AIRCRAFT INDICATOR SHOWS THAT NO BACK PRESSURE IS APPLIED WHEN RETURN BYPASS SELECTOR SET TO OFF.	
Step 1. Shut down complete unit and check RETURN BYPASS selector:	
	a. Remove (paragraph 8-7.a.) and clean selector and clean manifold hole where RETURN BYPASS selector fits.
	b. Inspect selector cartridge for nicks, scratches or broken packing. Replace selector cartridge if necessary.
	c. Replace selector packing.
	d. Re-install RETURN BYPASS selector (paragraph 8-7.b.) and verify operation.
Step 2. Check RETURN BYPASS relief valve:	
	a. Disassemble module according to the procedure of paragraph 8-16 steps a. through x.
	b. Remove RETURN BYPASS relief valve (1, figure 8-10) from top of main control manifold (15, figure 8-14).
	c. Clean manifold hole.
	d. Install new RETURN BYPASS relief valve (with new packing) in manifold.
	e. Pressure test manifold (paragraph 8-21).
	f. Reassemble module according to paragraph 8-18 starting with step k.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
14. AIRCRAFT RESERVOIRS OVERFLOW (ON AIRCRAFT SERVICED WITH RETURN BYPASS VALVE SET TO BYPASS).	
Shut down unit and check RETURN BYPASS selector for clogged condition:	a. Remove (paragraph 8-7.a.) and clean selector and clean manifold hole where RETURN BYPASS selector fits. b. Inspect selector cartridge for signs of blockage (i.e., lodged bits of packing). Replace selector cartridge if necessary. c. Replace selector packing. d. Re-install RETURN BYPASS selector (paragraph 8-7.b.) and verify operation.
15. PUMP EMITS HIGH PITCH WHINE ONLY WHEN SERVICING AIRCRAFT REQUIRING BACKPRESSURE AND WHEN THE RETURN BYPASS SELECTOR IS SET TO OFF.	
Shut down complete unit and check RETURN BYPASS relief valve for stuck condition:	a. Disassemble module according to the procedure of paragraph 8-16 steps a. through x. to gain access to main control manifold (item 15, figure 8-14) attachments. b. Remove RETURN BYPASS relief valve (1, figure 8-10) from top of main control manifold. c. Clean manifold hole. d. Install new RETURN BYPASS relief valve (with new packing) in manifold. e. pressure test manifold (paragraph 8-21). f. Reassemble module according to paragraph 8-18 starting with step k.
16. HYDRAULIC FLUID PRESENT IN VENT DRYER (RED FLUID IN DESICCANT AND BELOW VENT DRYER).	
	Shut down complete unit. Remove and replace 0.5 PSI check valve (paragraph 8-10).

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
17. WATER ACCUMULATION AT BOTTOM OF RESERVOIR (SHOWS AT BOTTOM OF RESERVOIR LEVEL GAUGE).	
Step 1. Check whether 0.5 PSI check valve is stuck closed by removing and replacing valve (paragraph 8-10).	
Step 2. Check whether 2 PSI relief valve is stuck open by removing and replacing valve (paragraph 8-10).	
18. AGPU RESERVOIR CANNOT OVERFLOW WHEN IT SHOULD.	Shut down complete unit. Remove and replace 2 PSI relief valve according to the procedures of paragraph 8-10.
19. AGPU RESERVOIR OVERFLOWS WHEN OPERATING IN THE AIRCRAFT MODE (RESERVOIR SELECTOR SET TO AIRCRAFT).	
Shut down complete unit and replace 100 PSI check valve (item 53, figure 8-15):	a. Disassemble module according to procedure of paragraph 8-16 steps a. through h. b. Remove 100 PSI check valve, copper seal, and packing. c. Install new 100 PSI check valve, copper seal and packing. d. Re-assemble module according to the procedures of paragraph 8-18 starting with step ae.
20. SYSTEM READY LIGHT STAYS OFF, FLUID TEMPERATURE OVER 70°F.	
Step 1. Ensure that SYSTEM READY lamp is good as shown by lamp test.	
Step 2. Shut down complete unit and replace temperature sensor TS1:	a. Disassemble module to gain access to the temperature sensor part (78, figure 8-14) of the return manifold. Use procedure of paragraph 8-16 steps a. through ah. b. Remove temperature sensor TS1 (12, figure 8-11) along with its associated packing. c. Ensure that TS1 hole in manifold is clean.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
20. SYSTEM READY LIGHT STAYS OFF, FLUID TEMPERATURE OVER 70°F (continued)	
	d. Install new temperature sensor TS1 with new packing.
	e. Pressure test manifold (paragraph 8-20).
	f. Reassemble module according to the procedure of paragraph 8-18 starting with step a.
21. SYSTEM READY LIGHT ON, FLUID TEMPERATURE BELOW 70°F.	
Shut down complete unit and replace temperature sensor TS1:	
	a. Disassemble module to gain access to the temperature sensor part (78, figure 8-14) of the return manifold. Use procedure of paragraph 8-16 steps a. through ah.
	b. Remove temperature sensor TS1 (12, figure 8-11) along with its associated packing.
	c. Ensure that TS1 hole in manifold is clean.
	d. Install new temperature sensor TS1 with new packing.
	e. Pressure test manifold (paragraph 8-20).
	f. Reassemble module according to the procedures of paragraph 8-18 starting with step a.
22. 160°F LIGHT STAYS OFF, FLUID TEMPERATURE OVER 160°F.	
Step 1. Ensure that 160°F lamp is good as shown by lamp test.	
Step 2. Shut down complete unit and replace temperature sensor TS2:	
	a. Disassemble module to gain access to the temperature sensor part (78, figure 8-14) of the return manifold. Use procedure of paragraph 8-16 steps a. through ah.
	b. Remove temperature sensor TS2 (11, figure 8-11) along with its associated packing.
	c. Ensure that TS2 hole in manifold is clean.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
22. 160°F LIGHT STAYS OFF, FLUID TEMPERATURE OVER 160°F (continued)	
	d. Install new temperature sensor TS2 with new packing.
	e. Pressure test manifold (paragraph 8-20).
	f. Reassemble module according to the procedure of paragraph 8-18 starting with step a.
23. 160°F LIGHT ON, FLUID TEMPERATURE BELOW 160°F.	
Shut down complete unit and replace temperature sensor TS2:	
	a. Disassemble module to gain access to the temperature sensor part (78, figure 8-14) of the return manifold. Use procedure of paragraph 8-16 steps a. through ah.
	b. Remove temperature sensor TS2 (11, figure 8-11) along with its associated packing.
	c. Ensure that TS2 hole in manifold is clean.
	d. Install new temperature sensor TS2 with new packing.
	e. Pressure test manifold (paragraph 8-20).
	f. Reassemble module according to the procedure of paragraph 8-18 starting with step a.
24. 240°F LIGHT STAYS OFF, FLUID TEMPERATURE OVER 240°F.	
Step 1. Ensure that 240°F lamp is good as shown by lamp test.	
Step 2. Shut down complete unit and replace temperature sensor TS3:	
	a. Disassemble module to gain access to the temperature sensor part (78, figure 8-14) of the return manifold. Use procedure of paragraph 8-16 steps a. through ah.
	b. Remove temperature sensor TS3 (10, figure 8-11) along with its associated packing.
	c. Ensure that TS3 hole in manifold is clean.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
24. 240°F LIGHT STAYS OFF, FLUID TEMPERATURE OVER 240°F (continued)	
	d. Install new temperature sensor TS3 with new packing. e. Pressure test manifold (paragraph 8-20). f. Reassemble module according to the procedure of paragraph 8-18 starting with step a.
25. 240°F LIGHT ON, FLUID TEMPERATURE BELOW 240°F.	
Shut down complete unit and replace temperature sensor TS3:	a. Disassemble module to gain access to temperature sensor part (78, figure 8-14) of the return manifold. Use procedure of paragraph 8-16 steps a. through ah. b. Remove temperature sensor TS3 (10, figure 8-11) along with its associated packing. c. Ensure that TS3 hole in manifold is clean. d. Install new temperature sensor TS3 with new packing. e. Pressure test module (paragraph 8-20). f. Reassemble module according to the procedure of paragraph 8-18 starting with step a.
26. HI TEMP LIGHT STAYS OFF, FLUID TEMPERATURE OVER 275°F.	
Step 1. Ensure that HI TEMP lamp is good as shown by lamp test.	
Step 2. Shut down complete unit and replace temperature sensor TS4:	a. Disassemble module to gain access to the temperature sensor part (78, figure 8-14) of the return manifold. Use procedure of paragraph 8-16 steps a. through ah. b. Remove temperature sensor TS4 (9, figure 8-11) along with its associated packing. c. Ensure that TS4 hole in manifold is clean.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
26. HI TEMP LIGHT STAYS OFF, FLUID TEMPERATURE OVER 275°F (continued)	
	d. Install new temperature sensor TS4 with new packing.
	e. Pressure test manifold (paragraph 8-20).
	f. Reassemble module according to the procedure of paragraph 8-18 starting with step a.
27. HI TEMP LIGHT ON, FLUID TEMPERATURE BELOW 275°F, HYDRAULIC MODULE OUTPUT CANNOT BE TURNED ON.	
Shut down complete unit and replace temperature sensor TS4:	
	a. Disassemble module to gain access to temperature sensor part (78, figure 8-14) of return manifold. Use procedure of paragraph 8-16 steps a. through ah.
	b. Remove temperature sensor TS4 (9, figure 8-11) along with its associated packing.
	c. Ensure that TS4 hole in manifold is clean.
	d. Install new temperature sensor TS4 with new packing.
	e. Pressure test manifold (paragraph 8-20).
	f. Reassemble module according to procedure of paragraph 8-18 starting with step a.
28. FLUID TEMPERATURE HIGH.	
Step 1. Shut down complete unit. Ensure that exterior of cooler (heat exchanger) is free of contamination:	
	a. Disassemble module to gain access to exterior of cooler (7, figure 8-15). Use procedure of paragraph 8-16 steps a., b., c., and g.
	b. Inspect cooler exterior. If contamination exists proceed to c. If contamination is not present, go to step 2.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

28. FLUID TEMPERATURE HIGH (continued)

CAUTION

Fins of cooler are fragile and easily bent. Use care when cleaning to prevent damage.

c. Clean contamination from cooler.

d. Reassemble module according to the procedure of paragraph 8-18 steps as. through av.

Step 2. Eliminate problem (which is caused by either internal contamination in cooler or having coolers internal check valve stuck in open position) by replacing cooler (7, figure 8-15):

a. Disassemble module to gain access to cooler. Use procedures of paragraph 8-16 steps a. through m.

b. Remove cooler and copper seals (paragraph 8-16, step n.).

c. Install new cooler with new copper seals (paragraph 8-18, step x.).

d. Reassemble module using the procedure of paragraph 8-18 starting with step y.

29. UNABLE TO DRAIN OR FILL AGPU FROM DUAL MANIFOLD.

Check dual manifold FILL/DRAIN valve:

a. Remove (paragraph 8-14) and clean FILL/DRAIN valve and clean dual manifold hole where valve fits.

b. Inspect valve cartridge for signs of blockage (i.e., lodged bits of packing).

c. Replace valve packing.

d. Re-install FILL/DRAIN valve (paragraph 8-14) and verify operation.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
30. PUMP EMITS HIGH PITCH WHINE AT HIGH PRESSURE SETTINGS, NO HYDRAULIC PRESSURE TO AIRCRAFT. Shut down complete unit and check HIGH PRESSURE BYPASS valve: a. Remove (paragraph 8-7a.) and clean valve and clean the manifold where HIGH PRESSURE BYPASS valve fits. b. Inspect valve cartridge for nicks, scratches, or broken packing. Replace valve cartridge if necessary. c. Replace valve packing. d. Re-install HIGH PRESSURE BYPASS valve (paragraph 8-7.b.) and verify operation.
31. PUMP EMITS HIGH PITCH WHINE BEFORE HYDRAULIC MODULE OUTPUT TURNED ON. Step 1. Shut down complete unit. Remove pump output check valve (53, figure 8-15) according to procedures of paragraph 8-10. step 2. Replace pump suction QD (item 34, figure 8-15) check valve: a. Disassemble module to gain access to pump suction QD. Use procedure of paragraph 8-16 steps a. through af. b. Remove QD and copper seal. c. Install new QD with new copper seal. d. Reassemble module using procedure of paragraph 8-18 starting with step b.
32. PUMP EMITS HIGH PITCH WHINE AFTER HYDRAULIC MODULE OUTPUT TURNED ON. Step 1. Shut down complete unit and replace module HIGH PRESSURE QD check valve (6, figure 8-19): a. Remove HIGH PRESSURE QD fitting. b. Clean manifold hole where QD fits. c. Install a new QD fitting with new packing.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

32. PUMP EMITS HIGH PITCH WHINE AFTER HYDRAULIC MODULE OUTPUT TURNED ON (continued)

Step 2. Replace module RETURN QD check valve (5, figure 8-19) or return line check valve (behind item 5 of figure 8-19):

a. Remove RETURN QD fitting and return line check valve.

b. Clean manifold hole where check valve fits.

c. Install a new QD fitting and return line check valve with new packing.

Step 3. Repair dual manifold according to the procedures of paragraph 8-14.

33. UNABLE TO PERFORM HOSE FLUID WARMUP AND HOSE AIR BLEED PROCEDURES.

Repair dual manifold according to the procedures of paragraph 8-14.

34. AGPU DOES NOT DRIVE WHEN SPEED/DIRECTION CONTROL ASSEMBLY HANDGRIPS ROTATED IN EITHER DIRECTION (CONDITIONS PROPER FOR OPERATION).

Step 1. Check if control panel DRIVE light is on when handgrips are rotated.

a. If DRIVE light is lit, continue with step 2.

b. If DRIVE light is not lit , refer to TM 55-1730-229-12, table 4-2, malfunction 71.

NOTE

Make sure battery voltage is up before performing drive motor test. Observe DC AMPS meter while performing test. If meter indication exceeds 300 amps after initial surge, set DRIVE switch off.

Step 1.1. Operate AGPU in alternate (battery) propulsion mode (see TM 55-1730-229-12, paragraph 2-10.b). Listen for audible click from electric brake. If there is no audible click:

a. Check diode CR16 for correct operation and installation. Replace as required.

MALFUNCTION
TEST OR INSPECTION
CORRECTION

34. AGPU DOES NOT DRIVE WHEN SPEED/DIRECTION CONTROL ASSEMBLY HANDGRIPS ROTATED IN EITRER DIRECTION (CONDITIONS PROPER FOR OPERATION) (continued)

b. Disconnect strain relief connection at electric brake. Check for continuity between motor speed controller 28 vdc input and electric brake positive. Check for continuity between electric' brake negative and TB4-9.

(1) If open circuit, check wiring connections for broken wiring. Repair as required.

(2) If continuity, replace electric brake.

WARNING

Rear of AGPU is to be supported on jack stands with wheels clear of ground for all tests listed for this malfunction.

Table 4-2. Direct/General SupportTroubleshooting (continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
34. AGPU DOES NOT DRIVE WHEN SPEED/DIRECTION CONTROL ASSEMBLY AHNDGRIPS ROTATED IN EITHER DIRECTION (CONDITIONS PROPER FOR OPERATION (continued)

step 2. Position AGPU on level surface and chock front wheels. Raise rear of AGPU body with a jack until rear wheels are approximately 2-1/2 inches above the surface. Support the AGPU with jack stands.

WARNING

Stand clear of rear wheels.

step 3. Operate AGPU in alternate (battery) propulsion mode (see TM 55-1730-229-12, paragraph 2-10.b). While an assistant operates the speed/direction control assembly, measure the dc voltage at terminals A1, A2, S1, and S2 of the traction motor (5, figure 10-3). Voltage should be +24 vdc between Al and dc ground when the speed/direction control handgrips are rotated for forward motion (FO-8) Voltage should be +24 vdc between A2 and ground when the handgrips are rotated for reverse motiom. The voltage between S1 and ground and S2 and ground should vary from 0 **to 24 vdc as the handgrips are rotated from zero to fully forward or reverse position.**

a **If voltages at motor terminals (A1 and A2) and field terminals (S1 and S2) were all normal, and DC AMPS meter reading is low (less than 50 amps when speed/direction** control assembly handgrips are rotated fully forward or reverse), do step 4.

b. If voltage-s at motor terminals and field terminals were all normal (or near normal) and DC AMPS reading was high (more than 300 amps after initial surge), go to step 5.

c. If the voltages at motor terminals (A1 and A2) and field terminals (Sl and S2) are all normal and DC AMPS meter shows no indicatkion when speed/diection control assembly handgrips are rotated fully forward or reverse, do, Step 4.1.

d. If voltages at motor terminals (A1 and A2) were normal but field voltage was low, go to step 7.

e. If voltages at field terminals (S1 and S2) were normal but no voltage was present at motor terminals, go to step 14.

f. If all voltages were missing set power switches off and disconnectbattery. Ckeck cable G11C2 between shunt R1 and relay K1, and cable G21A2N between motor speed control and ground stud (figure FO-8).

Table 4-2. **Direct/General Support Troubleshooting (continued)**

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
34. AGPU DOES NOT DRIVE WHEN SPEED/DIRECTION CONTROL ASSEMBLY HANDGRIPS ROTATED IN EITHER DIRECTION (CONDITIONS PROPER FOR OPERATION) (continued)
step 4. Set power switches off and disconnect battery. Inspect motor brushes. Replace brushes (paragraph 10-10) if required. Perform bench test. If new brushes do not correct problem, replace motor (paragraph 10-10), and perform operational check.
Step 4.1. Bench test traction motor. a. Remove traction motor (refer to TM 55-1730-229-34, paragraph 10-10). b. Clamp traction motor to a bench or install in an appropriate clamping device. c. Obtain a battery or other 24-28 vdc power supply. d. Connect a jumper wire from S1 to A2. Connect the negative lead from the power supply to S2. Connect the positive lead from the power supply to A1. Apply 24-28 vdc. Motor should run clockwise. Remove cables. e. Connect a jumper wire from S1 to A1. Connect the negative lead from the power supply to S2. Connect the positive lead from the power supply to A2. Apply 24-28 vdc. Motor should run counterclockwise. Remove cables. f. If motor does not operate properly, replace the motor. g. If the motor operates properly, install motor (refer to TM 55-1730-229-34, paragraph 10-10). Go to step 4.2.
Step 4.2. Check voltage adjustment on the motor controller. NOTE **Removal of the roof will allow easy access to the motor controller for the adjustment.** **NOTE** **Two people are required for the motor controller voltage adjustment check. One person to operate the speed/direction handgrip assembly and one to make the adjustment at the motor controller.** a. Insure the AGPU switches and traction motor are set to the alternate propulsion mode (see TM 55-1730-229-12. paragraph 2-10.b). b. Set the drive switch on and check that the drive lamp is illuminated.

Table 4-2. **Direct/General Support Troubleshooting (continued)**

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION	
34. AGPU DOES NOT DRIVE WHEN SPEED/DIRECTION CONTROL ASSEMBLY HANDGRIPS ROTATED IN EITHER DIRECTION (CONDITIONS PROPER FOR OPERATION) (continued)	
c. Release the tow bar and lower it to operating position. Press and hold the dead–man switch.	
d. Rotate the speed/direction handgrip assembly in the forward direction only enough to engage the forward relay (K1) on the upper tray. Hold the speed/direction handgrip assembly at this position to keep the relay engaged until the check is completed.	
e. Adjust the volts adjust trim pot on the motor controller in the direction of the arrow until you hear the traction motor start to whine. The motor should whine and attempt to crawl the AGPU forward. DO NOT ADJUST FURTHER.	
f. If the traction motor does not react to the adjustment replace the motor controller assembly (refer to TM 55-1730-229-12. paragraph 4-117).	
step 5. Set power switches off and disconnect battery. Inspect motor cables for possible shorts.	
a. Raplace or repair any shorted cables.	
b. If no shorted cables are found, do step 6.	
Step 6. Attempt to manually rotate rear wheels.	
& If rear wheels can be easily rotated, replace motor (paragraph 10-10).	
b. If rear wheels cannot be easily rotated, check brakes and chain drive systems.	
step 7. Check for +24 vdc at B+ terminal on motor speed controller on upper electrical tray (figure FO-8, TM 55-1730-229-12).	
a. If voltage is present do step 8.	
b. If voltage is not present, disconnect battery and check cable G11A2.	
step 8. With speed/direction control assembly handgrip rotated and deadman switch pressed check for +24 vdc at 28VDC IN terminal on motor speed controller.	
If voltage is present, go to step 12. If not, continue with step 9.	
step 9. With speed/direction control assembly handgrip rotated and deadman switch pressed check for +24 vdc at terminal 9 on speed/direction control assembly.	

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
34. AGPU DOES NOT DRIVE WHEN SPEED/DIRECTION CONTROL ASSEMBLY HANDGRIPS ROTATED IN EITHER DIRECTION (CONDITIONS PROPER FOR OPERATION) (continued)	
	a. If voltage is present, do step 10.
	b. If voltage is not present, the spring return switch S3 in speed/direction control assembly is defective. Disconnect battery and replace speed/direction control assembly (TM 55-1730-229-12, paragraph 4-118).
Step 10. With speed/direction control assembly handgrip rotated and deadman switch pressed, check for +24 vdc at terminal 2 on TB4.	
	a. If voltage is present, do step 11.
	b. If voltage is not present, deadman switch or associated wiring is defective. Disconnect battery and replace speed/direction control assembly (TM 55-1730-229-12, paragraph 4-118).
Step 11. Set power switches off and disconnect battery. Test DRIVE switch 1S3.	
	a. Replace switch if defective.
	b. If switch tests good, check thermal switch in motor, wiring between DRIVE switch terminal 6 and terminal 2 on TB4, and wiring between DRIVE switch terminal 5 and 28 VDC IN terminal on motor speed controller. Replace any defective wiring. If no defective wiring is found, the motor thermal switch is open. If motor is hot, wait for motor to cool. If switch does not close when motor cools down, replace motor (paragraph 10-10).
Step 12. Set power switches off and disconnect battery. Tag and disconnect wires G7B20, G8B20 and G9B20 from terminals 3, 4, and 5 on TB4. Measure resistance between TB4-3 and TB4-4 while rotating, speed/direction control assembly handgrip. Measure resistance between TB4-4 and TB4-5 while rotating handgrip in opposite direction. In both cases, normal resistance is 0 to 10K. Reconnect wires (G7B20, G8B20 and G9B20) to TB4 terminals 3, 4, and 5.	
	a. If resistance checks are normal, do step 13.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
34. AGPU DOES NOT DRIVE WHEN SPEED/DIRECTION CONTROL ASSEMBLY HANDGRIPS ROTATED IN EITHER DIRECTION (CONDITIONS PROPER FOR OPERATION) (continued)
b. If resistance checks are not normal, the potentiometer in the speed/direction control assembly or associated wiring is defective. Repair wiring, or replace speed/direction control assembly (TM 55-1730-229-12, paragraph 4-118).
Step 13. Check wires between TB4 and terminals 1, 2, and 3 on motor speed controller.
a. Replace any open wires.
b. If wiring is good, replace motor speed controller (TM 55-1730-229-12, paragraph 4-117).
Step 14. Press deadman switch and rotate speed/direction control assembly handgrip for forward motion. Measure voltages at TB4-6 (+24 vdc normal) and TB4-7 (0 vdc normal).
a. If both voltages are normal, do step 14.
b. If either voltage is not normal, speed/direction control assembly components (reverse switch S2, forward switch S1, or diode) or wires between switches and TB4 are defective. Disconnect battery. Check wiring and repair if defective. If wiring is good, check switches S1 and S2, and replace if defective. If voltage is still not normal, replace speed/direction control assembly (TM 55-1730-229-12, paragraph 4-118).
Step 15. Press deadman switch and rotate speed/direction control assembly handgrip for reverse motion. Measure voltages at TB4-6 (0 vdc normal) and TB4-7 (+24 vdc normal).
a. If both voltages are normal, do step 16.
b. If either voltage is not normal, speed/direction control assembly components (reverse switch S2. forward switch S1, or diode) or wires between switches and TB4 are defective. Disconnect battery. Check wiring and repair if defective. If wiring is good, check switches S1 and S2, and replace if defective. If voltage is still not normal, replace speed/direction control assembly (TM 55-1730-229-12, paragraph 4-118).

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION	CORRECTIVE ACTION
34. AGPU DOES NOT DRIVE WHEN SPEED/DIRECTION CONTROL ASSEMBLY HANDGRIPS ROTATED IN EITHER DIRECTION (CONDITIONS PROPER FOR OPERATION) (continued)	
Step 16. Disconnect battery. Check cable G10A2 (between upper tray relay 2K2 and motor speed controller), and wires G18B20N and G18C20N (between relay 2K2 and ground TB).	Replace or repair open cables or wires.
35. AGPU DRIVES IN FORWARD DIRECTION ONLY.	
Step 1. Set DRIVE switch off, disconnect cable from motor terminal A1 (figure FO-8). Set DRIVE SWITCH on. Press deadman switch and rotate speed/direction control assembly handgrip for reverse motion. Check for +24 vdc at TB4-7.	a. If voltage is present, do step 2. b. If voltage is not present, the reverse switch S2 in the speed/direction control assembly, or the wire between switch and TB4-7 is defective. Disconnect battery. Check wiring and repair if defective. If wiring is good, check reverse switch S2, and replace if defective. If voltage is still not present, replace speed/direction control assembly (TM 55-1730-229-12, paragraph 4-118).
Step 2. Set power switches off and disconnect battery. Check wires between TB4-7 and relay 2K2, and cable G12A2 on relay 2K2.	a. Replace any defective wires or cables. b. If all cables and wires are good, replace relay 2K2 (TM55-1730-229-12, paragraph 4-116).
36. AGPU DRIVES IN REVERSE DIRECTION ONLY.	
Step 1. Set DRIVE switch off and disconnect cable from motor terminal A2 (figure FO-8). Set DRIVE switch on. Press deadman switch and rotate speed/direction control assembly handgrip for forward motion. Check for +24 vdc at TB4-6.	a. If voltage is present, do step 2.

Table 2-2. Direct/General Support Troubleshooting (continued)

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
36. AGPU DRIVES IN REVERSE DIRECTION (continued)
b. If voltage is not present, the forward switch S1 in the speed/direction control assembly, or the wire between switch and TB4-6 is defective. Disconnect battery. Check wiring and repair if defective. If wiring is good, check forward switch S1, and replace if defective. If voltage is still not present, replace speed/direction control assembly (TM 55-1730-229-12, paragraph 4-118).
Step 2. Set power switches off and disconnect battery. Check wires between TB4-6 and relay 2K1, G18A20N between relays 2K1 and 2K2, and cable G13A2 on relay 2K1.
a. Replace any defective wires or cables.
b. If all cables and wires are good, replace relay 2K1. (TM 55-1730-229-12, paragraph 4-116).
37• AGPU DRIVES IN BOTH DIRECTIONS BUT MOTION IS JERKY.
Set power switches off and disconnect battery. Test diodes TB2-CR1 and CR2 (see TM 55-1730-229-12, table 4-2, malfunction 82).
a. Replace defective diodes.
b. If diodes are good, check wire between diodes and ground (figure FO-8).

Section III. GENERAL MAINTENANCE

2-4. GENERAL MAINTENANCE. This section provides or references non-standard maintenance procedures for repairs that would otherwise be repeated several times throughout the chapters.

2-5. GENERAL MAINTENANCE, FRAME AND HOUSING.

a. Cleaning. Cleaning of the frame and housing, and propulsion system components can be accomplished with soap and water, followed by a fresh water rinse and wipe down with clean cloths. Stubborn grease and grime may require cleaning with solvent P-D-680. Clean electrical components by vacuuming and/or wiping with a cloth dampened with isopropyl alcohol.

b. Welding. The frame and housing is constructed of 1010/20 steel; weld

per MIL-W-8611. The exhaust ejector is constructed of 304/321 SST; weld per MIL-STD-1261 Class I. Welding allowed on engine components is covered in chapter 9.

c. Riveted Assemblies. Riveted assemblies (door hinges, latches, and attaching hardware) may be replaced as follows:

(1) Drill out rivets using care not to enlarge holes.

(2) Clean area under riveted assembly to remove all signs of rust or corrosion.

(3) Touchup paint if required.

(4) Install assembly and rivet. Touchup paint as required.

d. Painting. Standard surface preparation and painting procedures per MIL-T-704 are used for the frame and housing, and propulsion system components. Whenever it becomes necessary to remove paint to bare metal it is necessary to clean and smooth the rough edges or remaining paint, treat the bare metal, and then paint the surfaces. Do not paint surfaces not previously painted, such as anodized or galvanized surfaces. Finish paint coat on frame and housing, and propulsion system components shall be lusterless forest green, type A per Fed-Std 595 and MIL-C-46168.

(1) Ensure surface is free of all rust or corrosion.

(2) Clean surface to be painted using solvent cleaner to ensure it is free from all oil and grease.

(3) Pretreat area to be painted with a wash primer MIL-P-15328 within 4 hours after cleaning. Allow to air dry.

(4) Apply primer coat MIL-P-53030, and allow to air dry.

(5) Apply final coat of lusterless forest green MIL-C-46168, and allow to air dry.

e. Corrosion Control.

CAUTION

Do not spray electrical connector pins and receptacle contacts with any corrosion preventive compound (CPC) other than MIL-C-81309 Type III. Otherwise, equipment malfunctions may occur, or connector may be bonded to receptacle.

(1) Electrical Connector Pins/ Contacts. Disconnect all electrical connectors and spray corrosion preventive compound (CPC) MIL-C-81309 Type III (NSN 8030-00-546-8637) on connector pins and mating receptacle contacts. Reconnect electrical connectors.

CAUTION

Do not spray CPC MIL-C-85054 Type I on electrical connector pins or contacts, components subject to heat (engine), or moving Parts such as door hinges.

(2) Electrical Terminals. Spray corrosion preventive compound (CPC MIL-C-85054 Type I (NSN 8030-01-041-1596) on following electrical terminals (after cleaning):

(a) Behind control panel - indicator lights, switches, and meters.

(b) Electrical compartment component terminals.

(c) Upper and lower tray component terminals.

2-6. GENERAL MAINTENANCE, ENGINE.

a. General Disassembly Instructions. Obvious steps or procedures necessary to disassemble the engine, such as removal of lockwire, attaching parts or simple components are omitted for the text. Removal of plumbing and electrical installation may be accomplished whenever parts are accessible.

NOTE

Do not disassemble tube assemblies, hose assemblies, wiring harness assemblies, rivet assemblies or staked or press-fit parts (except seals and bearings) or remove nameplates, modification plates, lubrication plates, decals, studs or their lockrings or thread inserts, unless specifically required in the text or necessary for replacement of a part. If disassembly or removal is necessary, proceed in a manner consistent with good shop practice.

(1) Protection of Engine from Entry of Foreign Particles. Extreme care shall be exercised to prevent dirt, dust or foreign particles from entering engine components and assemblies.

(a) Engine assemblies shall be protected during maintenance by covering areas and passages left open by component removal. Until the component is to be reinstalled, large openings shall be covered with tape and cardboard, small openings with tape or clean cloth and tube ends with caps or plugs. Openings of fuel and lubrication system components shall not be taped; plastic caps, plugs or similar coverings shall be used.

(b) If any foreign particle is dropped into an assembly while perfoming maintenance operations, the process shall be stopped until the foreign particle is located and removed.

(2) Lockwiring. Record the manner of lockwiring for duplication at reassembly.

(3) Shims and Shim Washers. During disassembly, thickness of all shims or shim washers removed from the engine may be recorded for reference at reassembly.

(4) Bearings. Minimize handling of the bearings and avoid contacting the bearings with bare hands. Keep the components of each bearing together and separate from all other bearing components. Inspect all bearings immediately after removal.

(5) Packings, Gaskets, and Self-Locking Nuts. Discard all removed packings, gaskets and self-locking nuts.

(6) Examination of Removed Parts During various stages of disassembly, examine all parts and assemblies for signs of scoring, chipping or other damaged. Note physical conditions which will not be apparent after cleaning: tag involved parts before they are cleaned and laid out for detail inspection.

(7) Controlling and Protecting Removed Parts. After disassembly, apply oil, MIL-L-7808 to steel parts. Cover all parts with clean paper or suitable coverings unless cleaning and inspection are to be accomplished immediately. Provide proper covering for support to protect shafts, gears, studs and projecting parts from damage. Place each part disassembled on a clean work bench in the order of removal in preparation for cleaning and inspection. Keep hardware and small parts together in trays.

(8) General Cleaning. Cleaning of unit components shall be accomplished in accordance with standard procedures. After cleaning, components shall be placed on clean paper-covered benches,

ports and orifices capped, plugged or sealed with recommended type of noncorrosive pressure sensitive tape and protected from dust or other contaminants by clean paper or plastic covers. Steel parts shall be sprayed with corrosion preventive oil and covered with clean paper or suitable coverings. To much emphasis cannot be placed on the necessity of maintaining the cleanliness of all components. When considerable time will elapse between cleaning and inspection or reassembly, cleaned parts shall be placed in clear nonhygroscopic plastic bags to prevent corrosion and contamination by dirt or dust.

NOTE

Removal of all heat discoloration from insulating compound on plenum assembly combustor cap and thermocouple cover assembly is not required during cleaning.

(9) Special Cleaning of Insulated Components. Clean thermocouple cap assembly, combustor cap, and plenum assembly as follows:

(a) Clean exterior insulated compound coating using a mild detergent and distilled or de-oxized water.

NOTE

Compressed air shall be regulated between 5 and 15 psig.

(b) Dry using a clean lint-free cloth or filtered, low pressure compressed air.

b. General Inspection Instructions. Full-tolerance dimensional limits are given for individual serviceable parts. Replace parts which do not meet these requirements. However, do not reject a part not complying with a requirement until it has been determined that such parts cannot be repaired to meet limits specified in this section.

Arrange all parts on an inspection table to assist in judgement of the condition of the unit as a whole, with ready reference to other component parts which may have been affected by a worn part. In this way, it will often be possible to determine the cause of any abnormal wear.

If inspection reveals it necessary to repair or replace a part, tag the part to indicate disposition. This will facilitate repair and assembly operations.

Parts which are normally replaced at each overhaul shall be given a cursory inspection, since damage to these parts may reflect malfunction of other components in the unit. This possibility shall be considered when any part has been damaged.

Use corrosion-control procedures on all steel parts after inspection unless the part is to be repaired immediately.

(1) Instruments. All micrometers, gages, indicators and other measuring instruments or test equipment shall be checked periodically and calibrated accurately in accordance with Specification MIL-STD-120 or with applicable manufacturers' recommendations.

(2) Inspection Records. Good shop practices include the compilation of complete and accurate inspection records. Such records not only expedite repair of the equipment, but ensure a complete and thorough overhaul. Inspection records shall be based upon the requirements outlined in this section. Parts requiring rework or replacement shall be so tagged and a notation of the disposition of these parts shall be entered on the inspection records. The

same method shall be followed for parts requiring special treatment such as magnetic or fluorescent inspections, painting, and cadmium plating.

(3) Visual Inspection. A visual inspection involves viewing the part for general appearance to determine conditions which cause deviation from normal wear. Whenever these conditions exist, the inspector shall refer to dimension inspection figures related to the damaged part and decide if rework is feasible. The part shall be tagged accordingly and disposed of in the manner utilized by the particular overhaul department. This disposition of the part shall then be noted on inspection records.

(4) Magnetic Particle Inspection. A magnetic particle inspection is necessary for all critical steel parts at each overhaul. This inspection shall be conducted in accordance with Specification MIL-L-6866, but only after a close visual inspection of a part has revealed no defects and a defect is suspected. This procedure will eliminate the time required to perform a magnetic inspection of obviously defective parts.

(5) Fluorescent Penetrant. A fluorescent penetrant method of inspection of all critical non-ferrous metal parts is required at each overhaul. This inspection shall be conducted in accordance with Specification MIL-I-6866, Type I, Method A, but only after a close visual inspection of the part has revealed no defects and a defect is suspected. Remove paint only from suspected area. This procedure will eliminate the time required to conduct fluorescent penetrant inspections of obviously defective parts.

(6) Dimensional Inspections of Gears and Splines. When measuring splines and gears, two measuring pins are set between the teeth of the spline or gear at points located 180 degrees apart. If the spline or gear has an odd number of teeth, the pins shall be located between teeth as near to the 180 degree position as possible.

c. General Repair Instructions.

NOTE

The repair procedures contained in this section provide instructions to restore repairable assemblies, subassemblies and parts to serviceable condition. Instructions include the application and operation of special tools and test equipment required to perform repair and replacement operations. Common procedures are omitted.

NOTE

The repair and replacement instructions do not cover non-repairable items. If inspection reveals defects or improper operation of non-repairable item, replace defective item.

(1) Cleaning and Corrosion Removal. Parts shall be cleaned, including the removal of corrosion, in accordance with instructions provided.

(2) Fusion Arc Welding. Welding shall be performed by personnel qualified to MIL-STD-1595.

(3) Aluminum Parts. Burrs, nicks, scratches and galling shall be smoothed out with abrasive cloth P-C-451 and oil. Bare spots shall be treated with aluminum touch-up solution as described in paragraph e. Reanodize aluminum parts if necessary, in accordance with MIL-A-8625.

(4) Steel Parts. Burrs and minor galling, pitting or scratches shall be smoothed out with crocus cloth P-C-458 or with a fine stone.

(5) Aluminum Touch-Up. Use standard shop procedures to restore and protect aluminum surfaces.

(6) Dry-Film Lubrication. Parts requiring dry-film lubrication shall be inspected for damage to the dry-film finish. If base metal is visible or if finish is chipped or scratched, the part shall be replaced or the dry-film surface restored in accordance with MIL-L-8937.

(7) Expanding Parts by Heat. When removing or installing tight fitting parts, it is sometimes necessary to heat the surrounding metal to facilitate the operation. The most desirable method to accomplish this is by oven heating to the proper temperature; heating the part with a torch is satisfactory if the torch is handled properly. A soft flamed gas torch should be used and flame applied over the entire area surrounding the part to be removed. The flame shall not be held too long in one spot. Except where otherwise specified, aluminum parts shall be kept below 320°F (160°C).

(8) Rubber Parts, Packings, Seals and Gaskets. Replace all packings with retainers, seals and gaskets (unless specifically directed not to be replaced in text) during repair regardless of condition.

(9) Prepare Surfaces for Painting. Prepare surfaces for painting as follows:

(a) Prepare parts for local brush or spray touch up as follows:

1. Clean parts in accordance with paragraph 2-6.a.(8).

2. Treat bare spots of aluminum parts with aluminum touch-up solution as described in paragraph (5).

(b) Prepare parts for complete repainting as follows:

1. Dip part in a stripping solution. Stripping solution (Kestrip E, Richardson Chemical Co., Allied Kelite Products Div., 400 Midland Ave., Highland Park, MI 48203 or equivalent) is satisfactory for this method. Where dipping is not desirable or feasible, a brush-on paint stripper may be used. Paint remover conforming to TT-R-251 is satisfactory for this method.

2. Clean thoroughly, wipe and dry part following stripping operation.

3. Treat bare spots on aluminum parts with aluminum touch-up solution as described in paragraph (3).

(c) Plug all holes and mask all surfaces not to be painted.

(10) Primer. Apply primer as follows:

(a) Prepare surfaces for painting in accordance with paragraph (9).

(b) Apply primer NSN 8010-00-148-7045 (FSCM 71191).

(c) Apply number of coats as required to meet thickness requirements as follows, then cure by air-drying for 15 to 30 minutes and bake for 1 hour at 150° to 175°F (66° to 79°C).

1. Apply full primer coat thickness between 0.0004 and 0.0006 inch to Type A anodic surfaces between 0.0004 and 0.0008 inch to nonporous surfaces of significant areas, such as flanges, mounting pads, register diameters, packing grooves, AN boss connections and other sprayable areas.

2. Apply wet coat to surfaces when dimensional tolerance is 0.0019 inch or less. Wet surfaces with primer using brush, swab, cloth or sponge. Continue to spread primer until uniform, thin film is left on surface.

3. Apply wet coat in inaccessible areas, such as passages, recessed areas and cavities that are not functionally significant. Apply primer by dip, fill and drain, slush or swab methods within thickness range between 0.000 and 0.001 inch. Spray method may be employed provided that thickness requirements are maintained. Skips and shadows shall not be accepted.

(11) Paint. Apply gloss white paint as follows:

(a) Apply primer in accordance with paragraph (10).

(b) Apply one color coat.

(c) Air-dry for 18 hours or bake at 175° to 225°F (79° to 107°C) for 1 hour.

(12) Replace Loose or Damaged Pins and Studs.

CAUTION

Exercise care not to damage basic part while removing pin or stud.

(a) Remove pin or stud from basic part.

WARNING

Use solvent in a well-ventilated area. Avoid excessive skin contact or prolonged inhalation of vapor. Do not use near open flame or in area where high temperatures prevail.

(b) Clean pin or stud hole with solvent P-D-680. Allow solvent to evaporate completely.

(c) Apply a thin coat of primer NSN 8010-00-148-7045 to sides of hole to receive a new pin or stud. Press pin into position as specified while primer is still wet. Wipe off excessive primer with cleaning solvent.

(d) Allow primer to cure for four to six hours at room temperature or bake for one hour at 82° to 135°C (1800 to 275°F).

(13) Replace Loose or Damaged Inserts or Bushings.

CAUTION

Exercise care not to damage basic part while removing bushing.

(a) Use long-nose pliers to remove inserts.

(b) Press bushings from housing.

WARNING

Use solvent in a well-ventilated area. Avoid excessive skin contact or prolonged inhalation of vapor. Do not use near open flame or in area where high temperatures prevail.

(c) Clean insert or bushing hole with solvent P-D-680. Allow solvent to evaporate completely.

(d) Apply a thin, even coat of primer NSN 8010-00-148-7045 to sides of hole to receive new insert of bushing.

(e) Install new insert of bushing into hole while primer is still wet. Insert shall be installed three-quarters to one and one-half turns below surface of countersink.

(f) Allow primer to cure four to six hours at room temperature or by baking for one hour at 82° to 135°C (180° to 275°F).

(14) Replace Loose, Worn, or Damaged Rosan Studs and Inserts.

(a) Replace studs as follows:

CAUTION

Exercise care not to damage assembly in which stud is installed.

1. Cut stud off near to surface of assembly and then file cut end flat. Center punch flat end of stud.

2. Using a slightly oversize drill bit, large enough to cut inner serrations of lock ring, remove enough of stud to remove serrations.

3. Drill a small hole into stud to accommodate an appropriate easy out.

CAUTION

Do not allow easy out to catch on lock ring.

4. Install easy out into stud and back stud out of assembly. Remainder of lock ring shall come out with stud .

5. Install new stud into assembly. Drive or press lock ring into position.

(b) Replace inserts as follows:

CAUTION

Exercise care not to damage assembly in which insert is installed.

1. Using a rotary mill of appropriate size, mill out lock ring until only a thin shell remains. Remove remainder of lock ring using a scribe or suitable tool.

2. Install an appropriate size easy out into insert and back insert out of assembly.

3. Using compressed air, blow out insert hole to remove debris.

4. Install new insert into assembly. Drive or press lock ring into position.

(15) Replace Damaged Keensert Studs.

NOTE

Studs less than 3/8-inch diameter do not have a pilot hole.

(a) Cut off stud just above mounting surface to expose pilot hole for removal drill.

CAUTION

Do not allow drill to touch housing or damage may result.

(b) Using pilot hole as a guide, drill out stud until only a thin shell remains.

NOTE

If threads of hole for stud are damaged, tap new threads in hole. one size larger than existing threads. Use new stud with matching threads. Threads on external portion of stud shall be the same as stud removed.

(c) Bend locking keys inward and break them off. Remove stud using an easy-out tool.

WARNING

Use solvent in a well-ventilated area. Avoid excessive skin contact or prolonged inhalation of vapor. Do not use near open flame or in area where high temperatures prevail.

(d) Clean components using cleaner (Dowclene) to remove all traces of grease or oil and the cleaner shall be allowed to evaporate before the next step.

(e) Apply a thin even coat of wet primer NSN 8010-00-148-7045 to the threaded hole to receive the stud. Application of primer shall be uniform and neat in appearance without bare spots or runs.

(f) Blind holes shall be coated to cover the adjacent walls with primer. The bottom need not be covered. Allow primer to dry 2 or 3 minutes before installing the stud.

2 Through holes in components shall be coated to cover all internal surfaces through to the adjacent painted surfaces. The end of the stud need not be covered.

(f) While the primer is still soft, stud shall be turned into threaded hole until step is 0.010 to 0.030 inch below machined surface. Using a punch, drive lock keys into keyways of stud until flush with step of stud.

NOTE

Surfaces adjacent to the locking device of the stud shall be touched up by wiping on a thin even wet coat of primer to seal scratches and insulate dissimilar metal surface. A thin even coat of primer shall be applied to the area around the studs to seal all surfaces from the joint in all directions.

(g) Allow primer to cure 4 to 6 hours at room temperature or for 1 hour at 82° to 135°C (180° to 275°F) prior to assembly usage.

Section IV. REMOVAL AND INSTALLATION OF MAJOR COMPONENTS

2-7. GENERAL. With the exception of propulsion system components and hydraulic pump, removal of major components must be accomplished in the following sequence. Installation sequence is in the reverse order.

a. Removal/installation of hydraulic module (paragraph 2-8).

b. Removal/installation of exhaust ejector (paragraph 2-9).

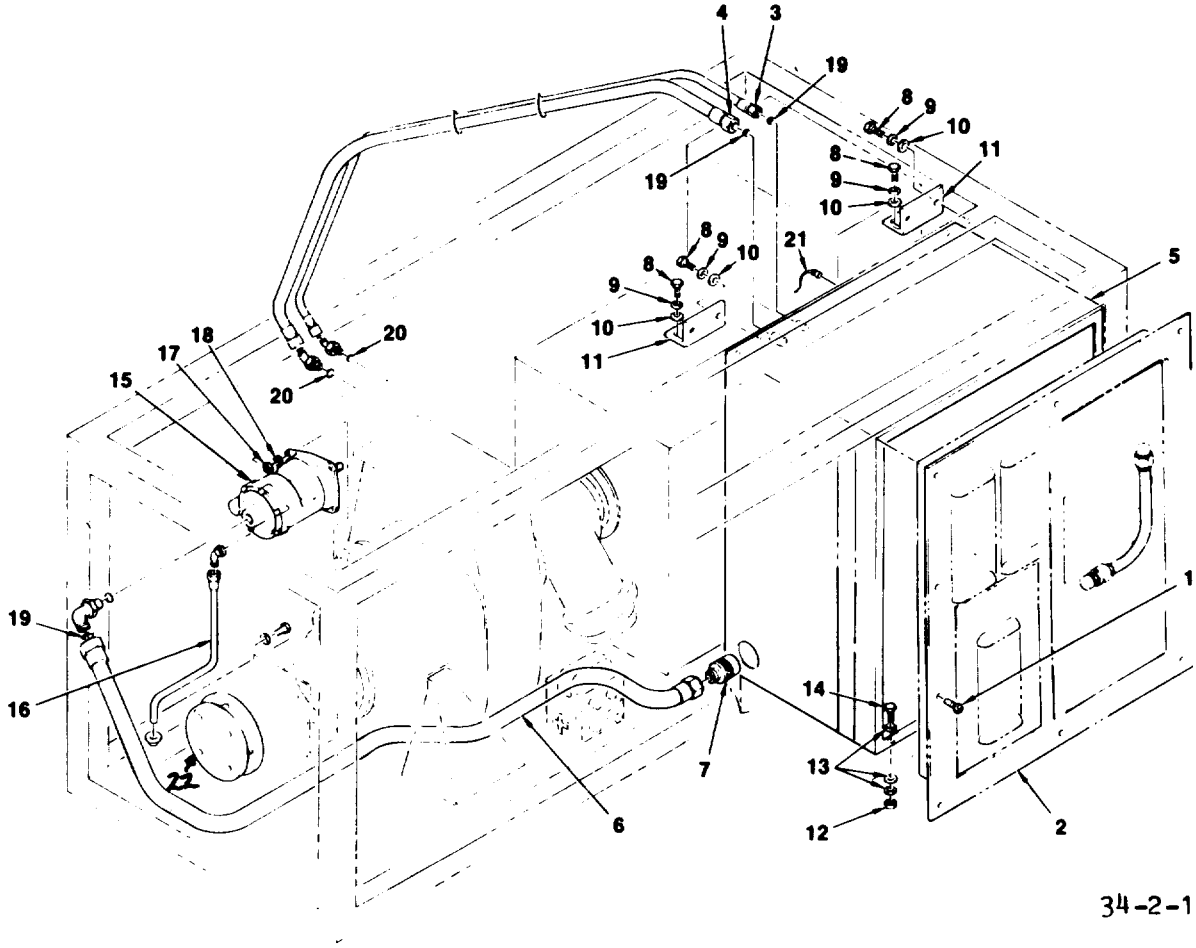
c. Removal/installation of engine/generator/hydraulic pump (paragraph 2-10) .

2-8. REMOVAL AND INSTALLATION OF HYDRAULIC MODULE.

a. Removal. (See figure 2-1.)

(1) Disconnect battery.

(2) Remove front panel (2) by removing 10 screws (1).



1. SCREW
2. FRONT PANEL
3. HOSE, HYDRAULIC (AN-6)
4. HOSE, HYDRAULIC (AN-12)
5. HYDRAULIC MODULE
6. HOSE, HYDRAULIC (AN-20)
7. FITTING, QUICK-DISCONNECT
8. CAPSCREW
9. WASHER, LOCK
10. WASHER, FLAT
11. BRACKET
12. NUT
13. WASHER
14. CAPSCREW
15. HYDRAULIC PUMP
16. DRAIN TUBE
17. NUT
18. WASHER
19. SEAL
20. SEAL
21. CONNECTOR P14
22. SPACER

Figure 2-1. Hydraulic Module Removal/Installation

(3) Remove AGPU roof. Refer to TM 55-1730-229-12, paragraph 4-16.

(4) At hydraulic module control panel:

(a) Set RESERVOIR selector to AGPU , refer to paragraph 2-7, TM 55-1730-229-12.

(b) Open GAUGE SHUTOFF valve 1/4 turn, refer to paragraph 2-7, TM 55-1730-229-72.

(c) Observe OUTPUT PRESSURE gauge for zero pressure. If any pressure is indicated, open HIGH PRESSURE BYPASS to relieve pressure in system.

NOTE

When disconnecting hydraulic hoses some hydraulic fluid spillage will occur. Be prepared to catch fluid when hoses are disconnected.

(5) Disconnect hydraulic hose connectors, (3) and (4) from hydraulic module (5). Remove and discard seals (19). Cover ends of hydraulic hoses and hydraulic module connectors with plastic caps or material to prevent contaminant entry.

(6) Disconnect hydraulic hose (6) and quick-disconnect (7) from hydraulic module (5). Cover end of hydraulic hose and hydraulic module connector with plastic caps or material to prevent contaminant entry.

(7) Disconnect electrical connector (P14) (21) from back of hydraulic module.

(8) Remove four capscrews (8) and washers (9, 10) from two brackets (11) that secure back of hydraulic module to AGPU frame.

(9) Remove nuts (12), capscrews (14), and washers (13) that secure front of hydraulic module to AGPU frame.

WARNING

The hydraulic module weighs approximately 220 pounds empty and 280 pounds when the reservoir is full. Use lifting equipment to prevent personnel injury.

(10) Slide hydraulic module forward onto lifting device. Lower module and place on blocks or transport to another work area.

b. Installation. (See figure 2-1.)

WARNING

The hydraulic module weighs approximately 220 pounds empty and 280 pounds when the reservoir is full. Use lifting equipment to prevent personnel injury.

(1) Position lifting device under hydraulic module and lift module up to level of AGPU floor.

(2) Slide hydraulic module into AGPU hydraulic module compartment.

(3) Install capscrews (14), washers (13), and nuts (12) to secure front of hydraulic module to AGPU frame.

(4) Install four capscrews (8) and washers (9, 10) through two brackets (11) that secure back of hydraulic module to AGPU frame.

(5) Remove protective covers from hydraulic hoses and connectors on hydraulic module.

(6) Install new seals (19) in end of hoses (3, 4). Connect hydraulic hoses (3, 4) to hydraulic module (5). Tighten hose (3) coupling nut to 200 to 230 inch-pounds of torque. Tighten hose (4) coupling nut to 900 to 1,000 inch-pounds of torque.

(7) Connect hydraulic hose (6) quick-disconnect (7) to hydraulic module (5).

(8) Connect electrical connector (P14) (21) at rear of hydraulic module.

(9) Position hydraulic module front panel (2) and secure with ten screws (l).

(10) Install AGPU roof. Refer to TM 55-1730-229-12, paragraph 4-16.

(11) Service hydraulic module as described in TM 55-1730-229-12.

(12) Reconnect battery cable to battery.

2-9. REMOVAL AND INSTALLATION OF EXHAUST EJECTOR.

a. Removal. (See figure 2-2.)

(1) Remove hydraulic module, paragraph 2-8.

(2) Loosen hose clamp (1) and disconnect pneumatic hose (2) from elbow (3).

(3) Remove nut (4) and elbow (3).

(4) Refer to figure 2-3. Remove screws (1) and washers (2) and remove drain tube cover (3). Remove ejector drain tube (4).

(5) Remove V-band coupling nut (6, figure 2-2), and slide V-band coupling (5) back toward engine (15).

(6) Remove exhaust access cover (3, figure 2-4) by removing twelve screws (1), and washers (2).

(7) Slide ejector inlet tube (7, figure 2-2) into exhaust ejector (11).

(8) Remove twelve nuts (8) and lockwashers (9) from studs (10).

CAUTION

Ensure that exhaust ejector clears AGPU frame and insulation when removing or installing. Insulation weld pins on exhaust ejector can shred housing insulation.

(9) Attach a rope or sling to lift points (14). Remove exhaust ejector by carefully lifting straight up.

b. Installation. (See figure 2-2.)

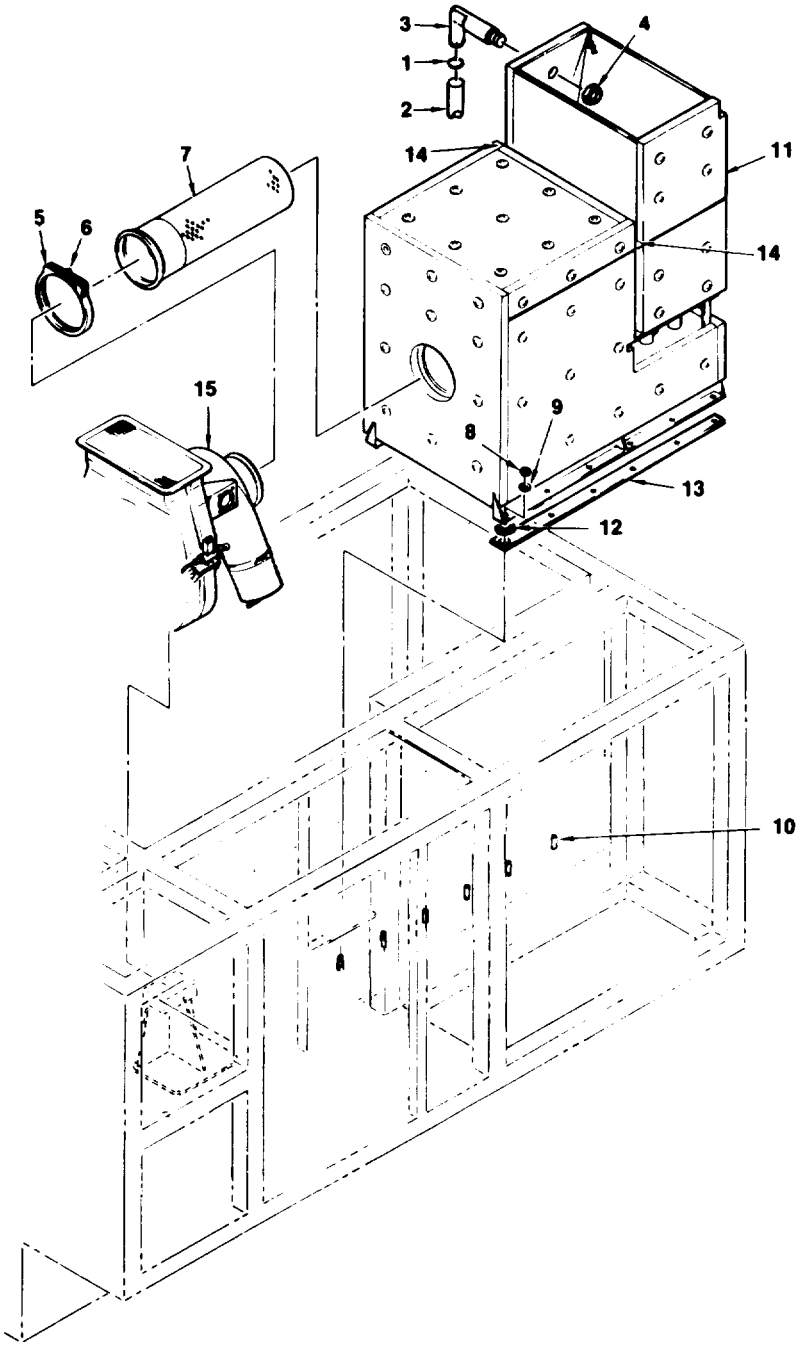
(1) Inspect installation area. Remove all signs of corrosion or rust. Touchup paint if required.

(2) Inspect two silicone rubber strips (13). Replace if torn. Ensure that two silicone rubber strips (13) and twelve washers (12) are in position over twelve studs (10).

CAUTION

Ensure that exhaust ejector clears AGPU frame and insulation when removing or installing. Insulation weld pins on exhaust ejector can shred housing insulation.

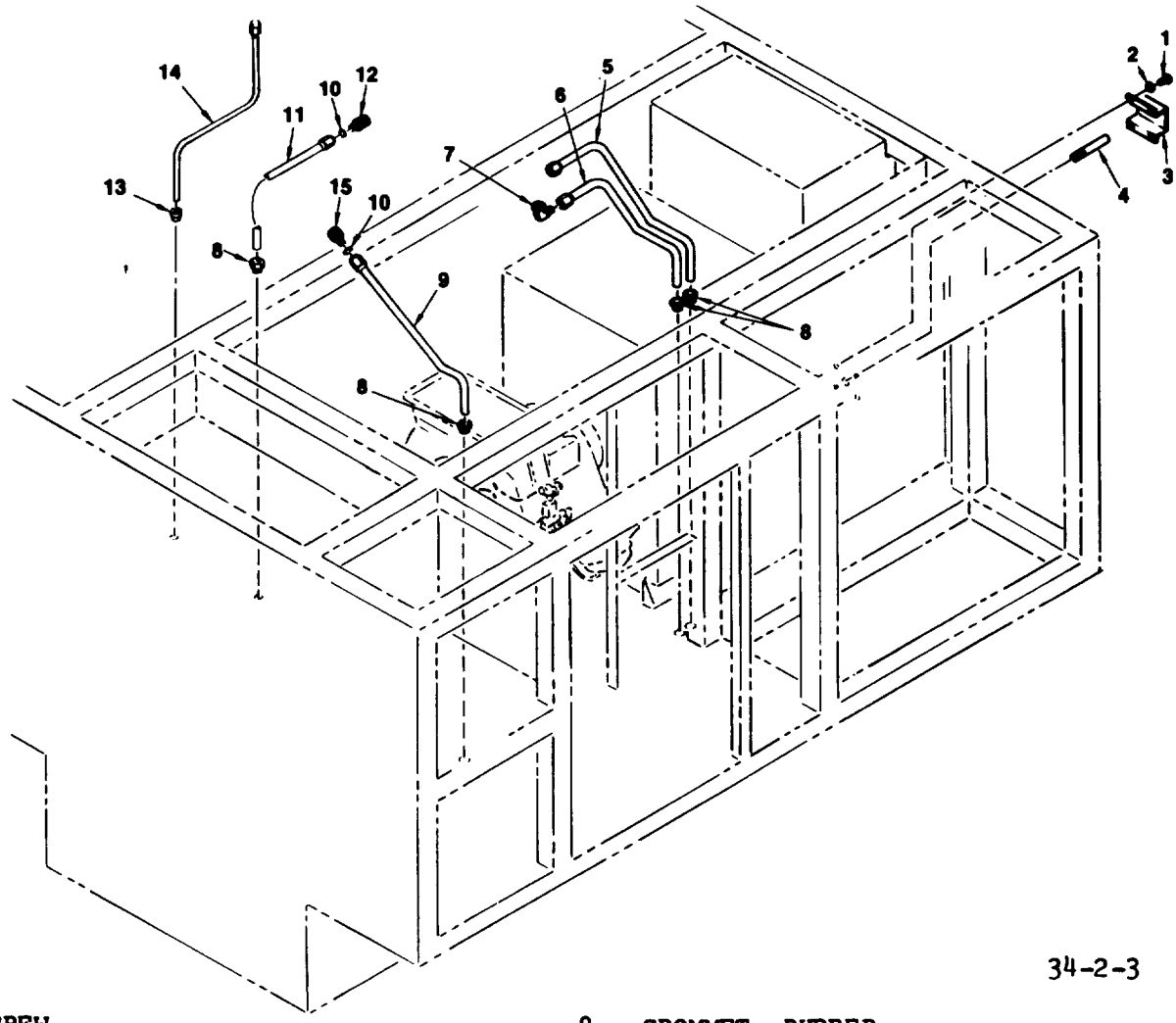
(3) Attach a rope or sling to lift points (14) and carefully lower exhaust ejector (11) into position on AGPU floor over studs (10).



34-2-2

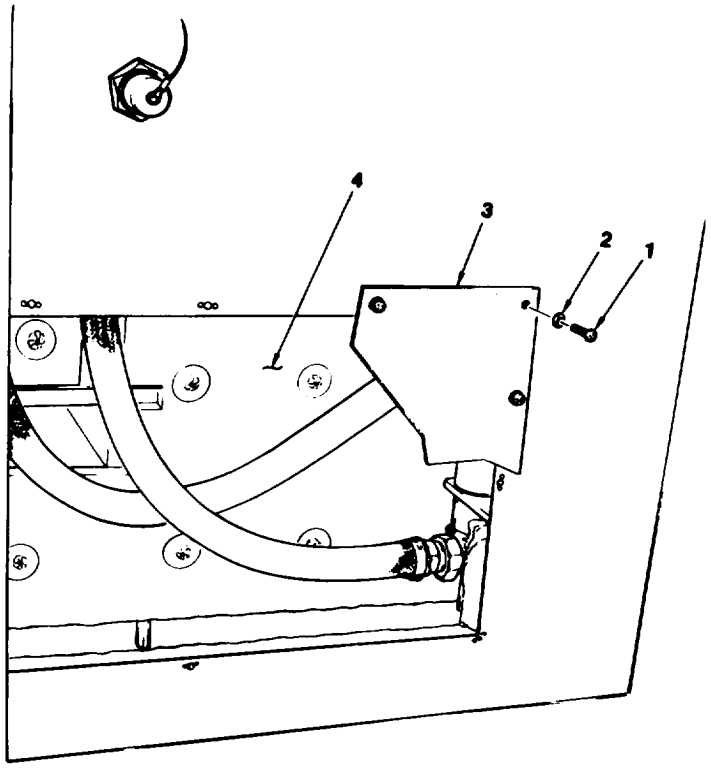
1. CLAMP, HOSE
2. HOSE
3. ELBOW
4. NUT
5. COUPLING, V-BAND
6. NUT
7. INLET TUBE
8. NUT
9. WASHER, LOCK
10. STUD
11. EXHAUST EJECTOR
12. WASHER, FLAT
13. STRIP, RUBBER
14. SLING/ROPE LIFT POINTS
15. ENGINE

Figure 2-2. Exhaust Ejector Removal/Installation



1. SCREW
2. WASHER
3. COVER, DRAIN TUBE
4. DRAIN TUBE, EXHAUST EJECTOR
5. DRAIN TUBE, TURBINE HOUSING
6. DRAIN TUBE, COMBUSTOR CAP
7. SWIVEL ELBOW (INSTL ON COMBUSTOR CAP)
8. GROMMET, RUBBER
9. DRAIN TUBE, FCU
10. PACKING
11. DRAIN TUBE, GEARCASE
12. HOSE FITTING
13. GROMMET, RUBBER
14. DRAIN TUBE, HYD PUMP
15. NIPPLE

Figure 2-3. Exhaust Ejector, Engine/Gearcase Drain Tubes Removal/Installation



1. SCREW
2. WASHER
3. ACCESS COVER, EXHAUST
4. EXHAUST EJECTOR

Figure 2-4. Exhaust Ejector Access

(4) Align inlet tube (7) with engine exhaust and install V-band coupling (5). Install nut (6) and tighten.

NOTE

Add or remove washers (12) if necessary to align exhaust ejector inlet tube with engine exhaust.

(5) Install twelve nuts (8) and lockwashers (9) and tighten on studs (10).

(6) Install ejector drain tube (4, figure 2-3). Replace cover (3) and install screws (1), and washers (2)-.

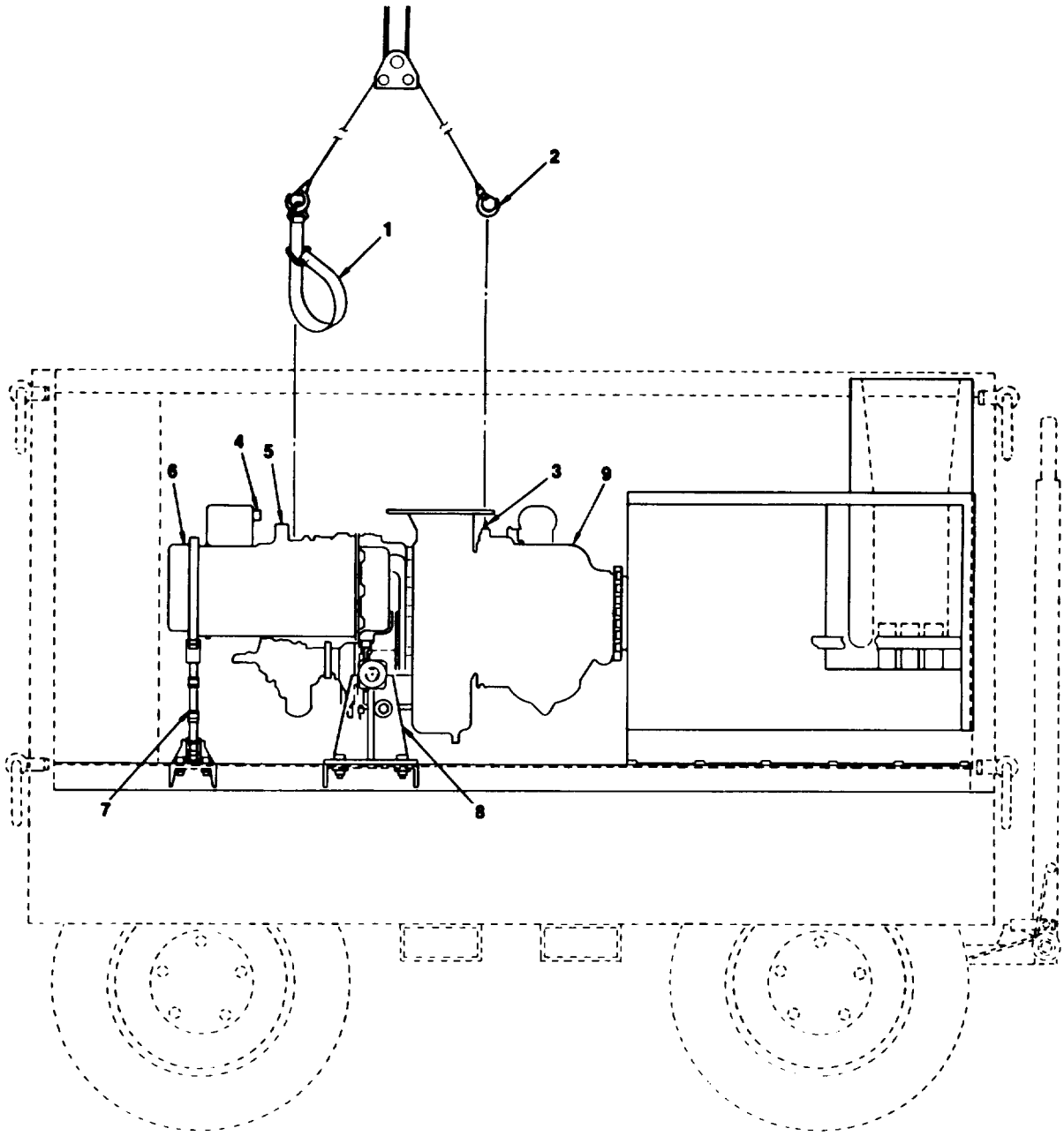
(7) Attach pneumatic hose (2, figure 2-2) to elbow (3) with hose clamp (l).

(8) Install elbow (3) on exhaust ejector and secure with nut (4).

(9) Replace exhaust access cover (3, figure 2-4) using twelve screws (1), and washers (2).

(10) Install hydraulic module, paragraph 2-8.

2-10. REMOVAL AND INSTALLATION OF ENGINE/GENERATOR/HYDRAULIC PUMP. Figure 2-5 shows an outline view of the engine and generator from the right side



1. LIFTING STRAP
2. LIFTING SLING
3. ENGINE LIFTING CABLE
4. GENERATOR ELECTRICAL CONNECTOR
5. GENERATOR TERMINAL BLOCK
6. GENERATOR
7. GENERATOR SUPPORT
8. RIGHT ENGINE MOUNT
9. ENGINE

Figure 2-5. Engine Installation (Outline View)

of the AGPU. Note that the generator (6) cannot be removed from the engine (9) without first removing the engine. The engine is supported at two points by right and left engine mounts (8). The generator is supported at the rear by an adjustable height generator support (7). This allows aligning the engine exhaust with the exhaust ejector inlet tube (see figure 2-2). Care must be taken when removing the engine/generator, since the lifting cable on the engine is forward of the combined engine/generator center of gravity. When lifting with a hoist, the rear of the generator must be supported since the generator will tip down .

NOTE

The hydraulic pump may be removed attached to engine, or it may be removed as a unit without removal of engine.

a. Removal.

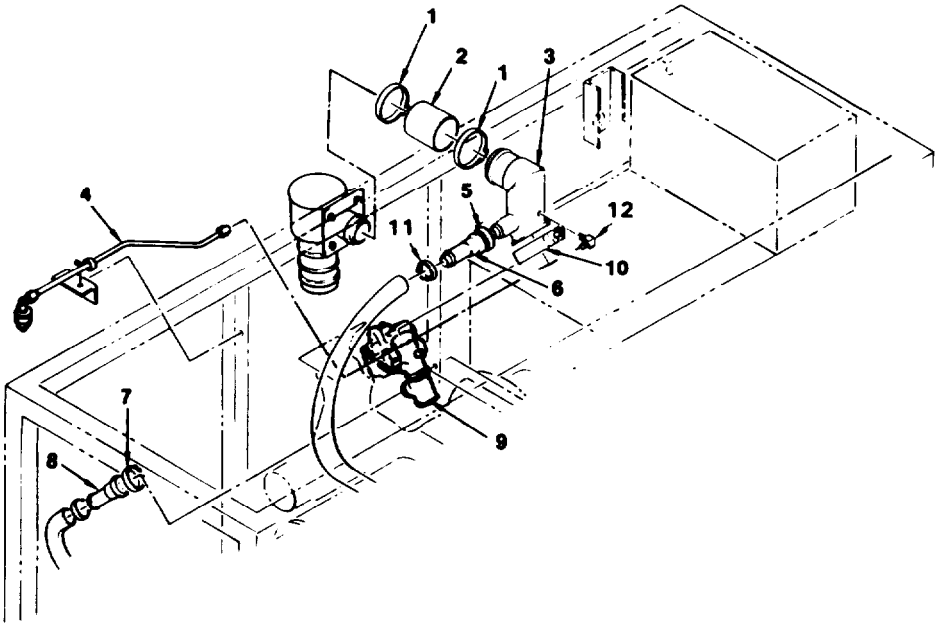
(1) Remove hydraulic module (paragraph 2-8), and exhaust ejector (paragraph 2-9).

(2) Remove inner air intake duct by performing steps (4) through (8) of paragraph 3-6a. Cover engine air intake with paper and tape.

(3) Disconnect pneumatic hoses/ fittings (see figure 2-6).

(a) Loosen hose clamps (1) and disconnect hose (2) from manifold (3).

(b) Disconnect tube assembly (4) from fitting on manifold (3). Slide tube assembly to the rear.



34-2-6

1. CLAMP
2. HOSE
3. MANIFOLD, LCV ADAPTER
4. TUBE ASSEMBLY
5. MARMON CLAMP
6. ADAPTER
7. MARMON CLAMP
8. ADAPTER
9. LCV ADAPTER
10. MARMON CLAMP
11. CLAMP
12. ELBOW

Figure 2-6. Pneumatic Hoses/Lines Removal/Installation

(c) Loosen marmon clamp (5) and disconnect adapter (6) with hose attached from fitting on manifold (3).

(d) Loosen marmon clamp (7) and disconnect adapter (8) with hose attached from LCV adapter (9).

(e) Loosen marmon clamp (10) and remove manifold (3) and clamp (10) from LCV adapter (9).

(4) Disconnect turbine housing, combustor cap, FCU, and gearcase drain tubes (see figure 2-3).

(a) Disconnect turbine housing drain tube (5) and remove tube from floor grommet.

(b) Disconnect combustor cap drain tube (6) and remove tube from floor grommet.

(c) Disconnect fuel control unit (FCU) drain tube (9) and nipple (15), and remove tube from floor grommet.

(d) Disconnect gearcase drain tube (11) and remove tube from floor grommet.

(5) Disconnect fuel hose and extension tube (see figure 2-7).

(a) Disconnect fuel hose (1) and nipple (3) from fitting on fuel control unit (FCU). Cap end of line to prevent contamination.

(b) Drain oil from gearcase (refer to TM 55-1730-229-12, paragraph 4-8). Remove extension tube (2) from gearcase. Remove cap from extension tube and install on gearcase. Retain extension tube for later reinstallation.

(6) Disconnect hydraulic pump hoses and lines.

(a) Remove hydraulic access cover (14, figure 2-8) by removing ten screws (12) and washers (13).

(b) Disconnect hoses (3, 4 and 6) from elbows installed on hydraulic pump. Cap hoses and elbows with plastic caps or material.

(c) Disconnect drain tube (16, figure 2-1) from elbow on hydraulic pump.

(d) Disconnect wiring harness connector (11, figure 2-8) from hydraulic pump electrical connector (10).

(7) Open control panel access door (6, figure 2-9). Remove four screws (7) securing panel (8), and lower control panel.

(8) Disconnect engine electrical connector.

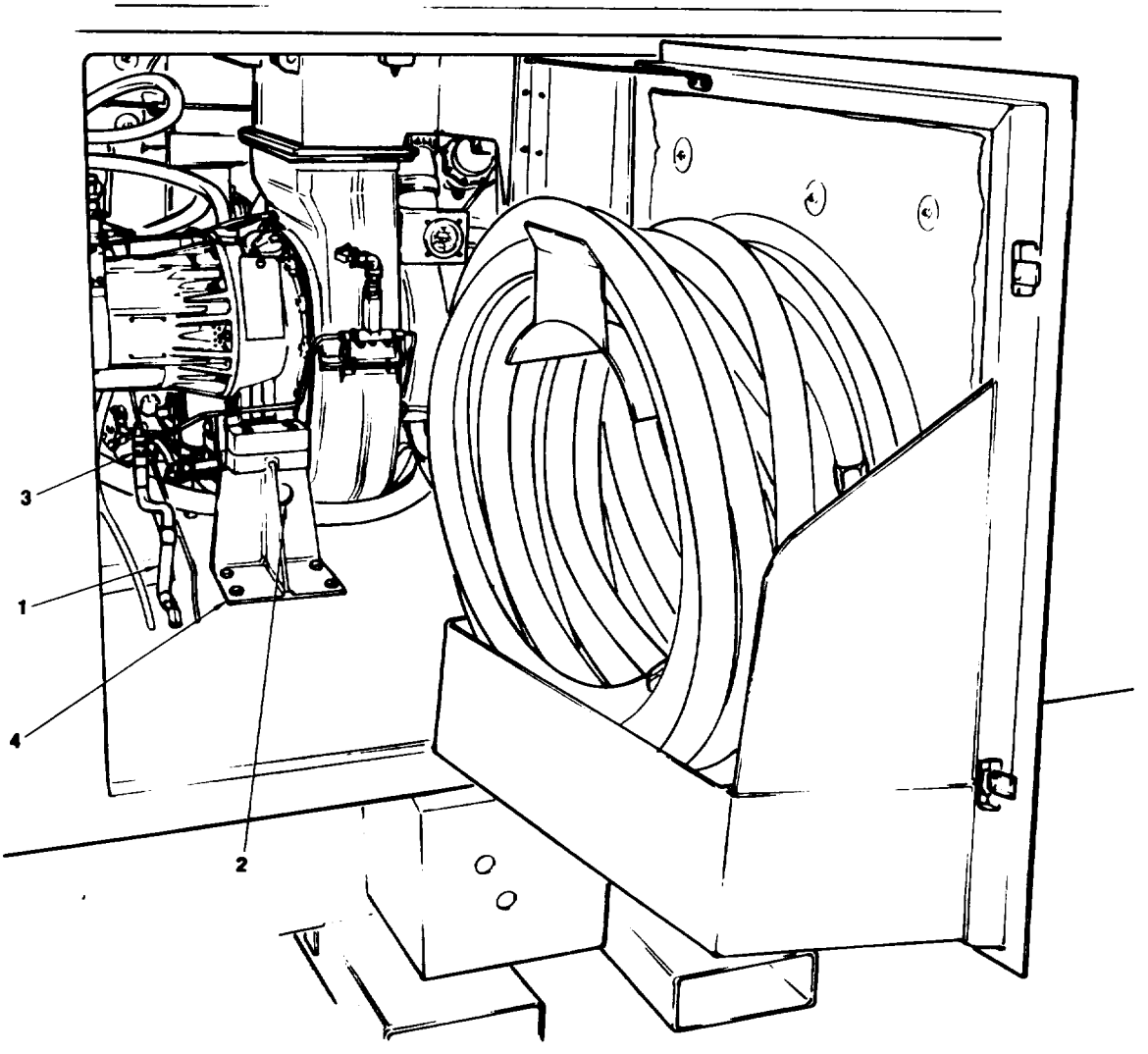
(a) Disconnect engine electrical connector P2 (1, figure 2-9) from ECU (2) connector J2.

(b) Free engine wiring harness (3) between ECU (2) and bulkhead hole (4) by cutting and removing cable ties (5).

NOTE

AGPU serial numbers 20 and below may require tagging and disconnecting wires running through same bulkhead hole as engine wiring harness before engine harness and connector can be pulled through hole.

(c) Carefully pull engine wiring harness (3) and connector (1) through bulkhead hole (4).



34-2-7

1. FUEL HOSE TO FCU
2. TUBE, EXTENSION
3. NIPPLE
4. RIGHT ENGINE MOUNT

Figure 2-7. Fuel Line and Extension Tube Removal/Installation

(d) Free engine wiring harness (3) between bulkhead hole and engine by cutting and removing cable ties.

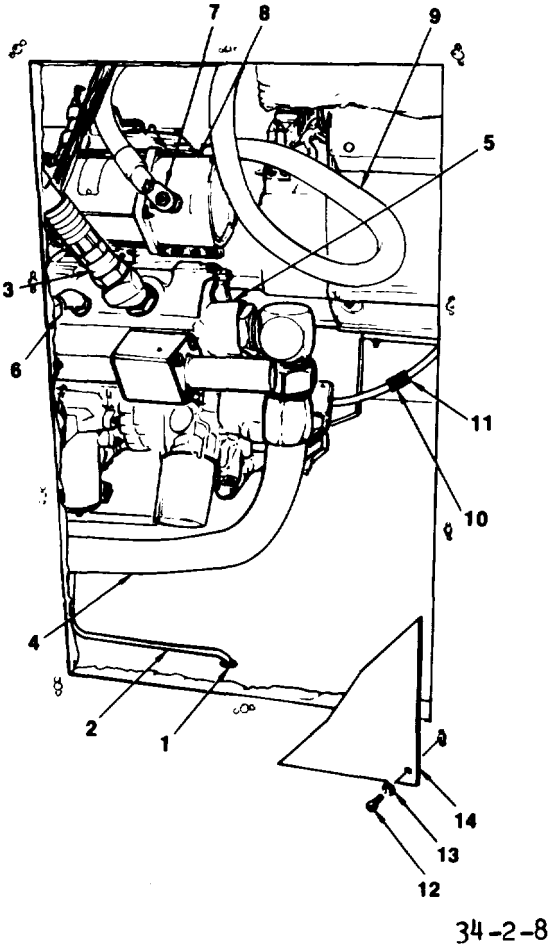
(e) Coil engine wiring harness and tape or tie to engine to prevent damage to harness during engine removal.

(9) Disconnect generator electrical connections.

(a) Disconnect wiring harness (2, figure 2-10) connector (1) from generator connector (3).

(b) Remove two screws (4) and washers (5) and remove cover (6) from DC terminal block (7).

(c) Tag and disconnect DC cable (11) by removing nut (8), lockwasher (9), and washer (10).



1. GROMMET
2. DRAIN TUBE, HYD SEAL
3. FLEX HOSE, PRESSURE (AN-12)
4. FLEX HOSE, SUCTION (AN-20)
5. HYDRAULIC PUMP
6. FLEX HOSE, CASE DRAIN (AN-6)
7. STARTER GROUND CABLE
8. STARTER ASSEMBLY
9. STARTER HOT CABLE
10. CONNECTOR, HYDRAULIC PUMP
11. CONNECTOR, WIRING HARNESS
12. SCREW
13. WASHER
14. ACCESS COVER, HYDRAULIC

Figure 2-8. Hydraulic Pump and Engine Access

(d) Tag and disconnect DC cable (16) by removing nut (13), lockwasher (14), and washer (15).

(e) Disconnect ground lug wire (29) by removing nut (28) and lockwasher (27).

(f) Remove two screws (24) and washers (25) and remove cover (30) from AC terminal block (18).

(g) Tag and remove six AC cables (23) by removing six nuts (20), lockwashers (21), and washers (22). Leave jumper (19) on terminal block.

(10) Tag and disconnect starter ground cable (7, figure 2-8) and hot cable (9).

(11) Remove engine/generator/hydraulic pump.

(a) Attach sling (2, figure 2-5) to engine lifting cable (3) and lifting strap (1) wrapped around generator.

NOTE

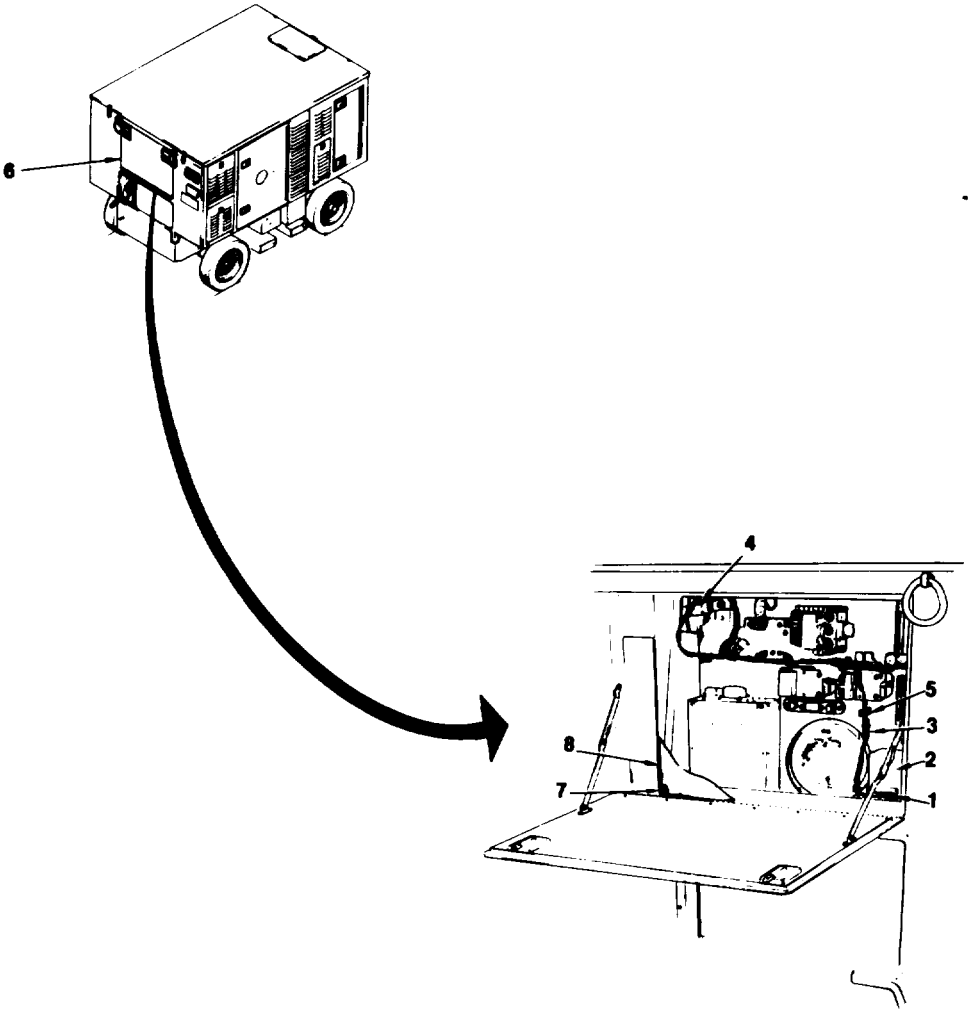
Record lockwiring method for later installation.

(b) Cut lockwires (1 , figure 2-11) and remove two capscrews (2) and washers (3) from generator.

(c) Cut lockwires (12) and remove four capscrews (13) and washers (14) from right engine mount. Remove mounting block (15), but leave Pin (17) in place.

(d) Cut lockwires (5, 8) and remove eight capscrews (6, 9) and washers (7, 10) from left engine mount. Remove mounting block (11), but leave pin (16) in place.

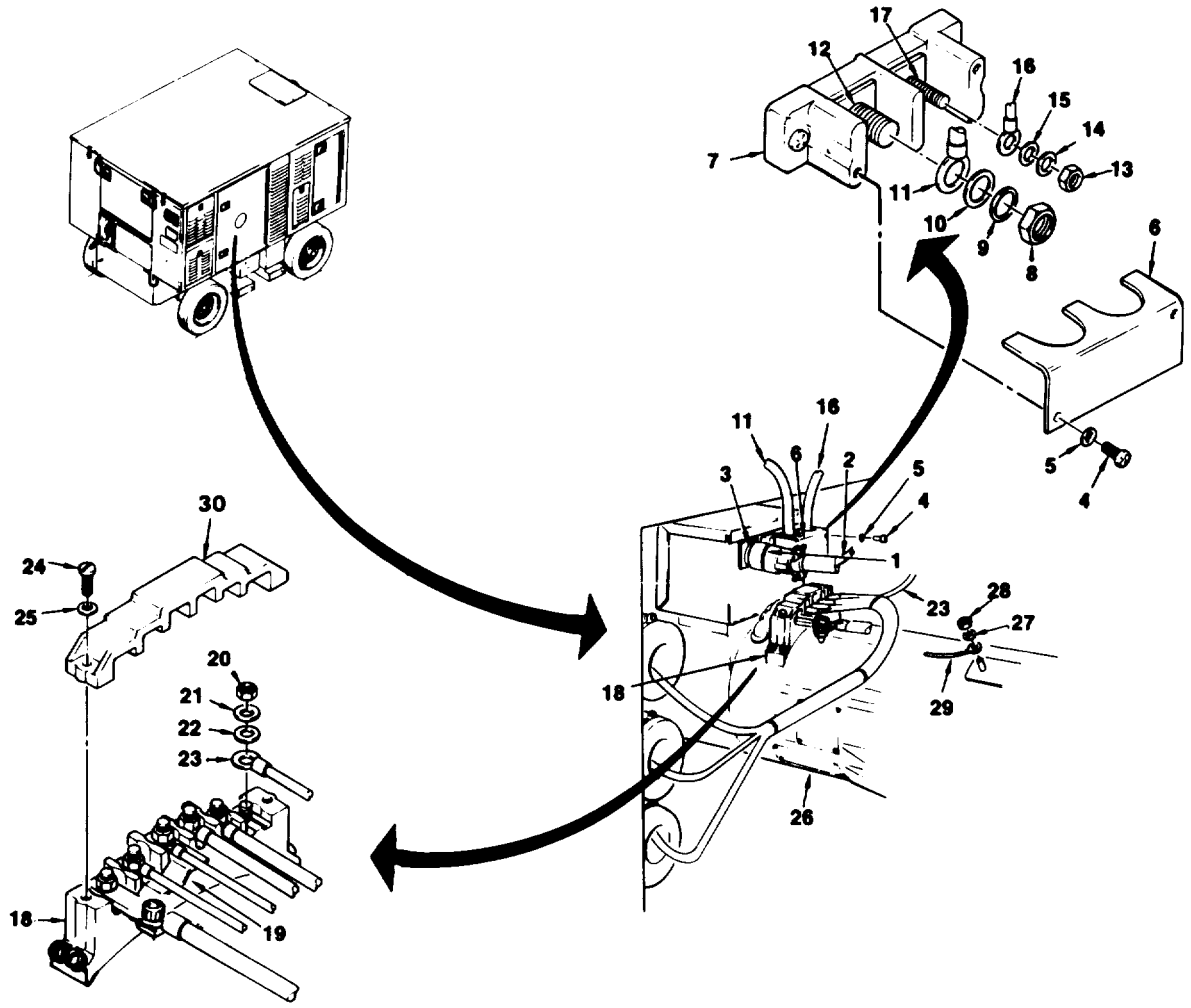
(e) Check that all lines, hoses, and cables have been disconnected from engine/generator/hydraulic pump, and that they are not in the way of engine removal. Tie back lines, hoses, and cables if required.



34-2-9

1. CONNECTOR, ENGINE
2. ECU
3. WIRING HARNESS, ENGINE
4. HOLE , BULKHEAD
5. CABLE TIES
6. ACCESS DOOR, CONTROL PANEL
7. SCREW
8. CONTROL PANEL

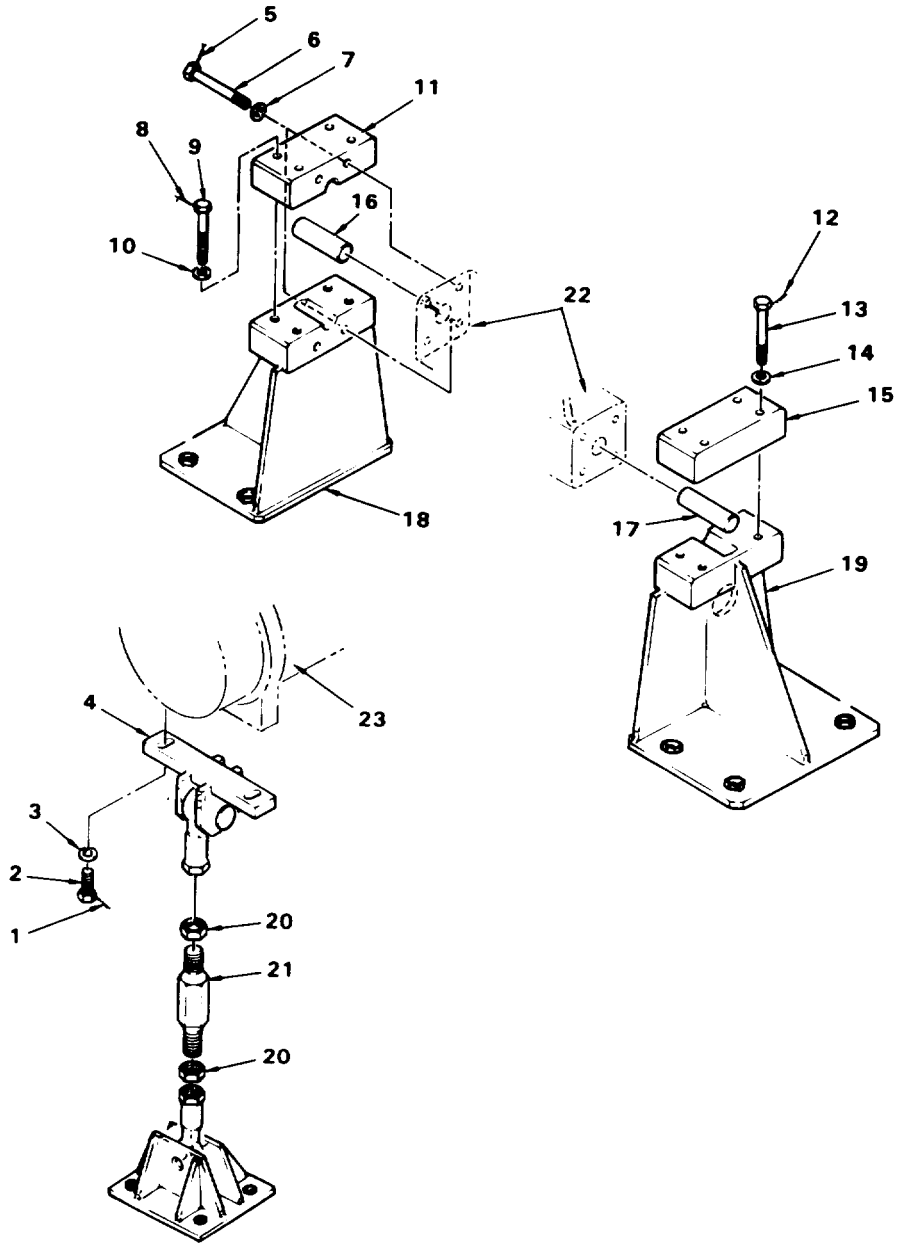
Figure 2-9. Engine Wiring Harness and Connector



34-2-10

1. CONNECTOR
2. WIRING HARNESS
3. CONNECTOR, GENERATOR
4. SCREW
5. WASHER
6. COVER
7. TERMINAL BLOCK, DC
8. NUT
9. WASHER, LOCK
10. WASHER, FLAT
11. CABLE, DC (+)
12. TERMINAL STUD (+)
13. NUT
14. WASHER, LOCK
15. WASHER, FLAT
16. CABLE, DC (-)
17. TERMINAL STUD (-)
18. TERMINAL BLOCK, AC
19. JUMPER
20. NUT
21. WASHER, LOCK
22. WASHER, FLAT
23. CABLE, AC
24. SCREW
25. WASHER
26. GENERATOR
27. WASHER, LOCK
28. NUT
29. GROUND WIRE AND LUG
30. COVER

Figure 2-10. Generator Connections



34-2-11

1.	LOCKWIRE	8.	LOCKWIRE	16.	PIN, LEFT
2.	CAPSCREW, HEX HEAD	9.	CAPSCREW, HEX HEAD	17.	PIN, RIGHT
3.	WASHER	10.	WASHER	18.	LEFT ENGINE MOUNT
4.	GENERATOR SUPPORT BRACKET	11.	MOUNTING BLOCK, LEFT	19.	RIGHT ENGINE MOUNT
5.	LOCKWIRE	12.	LOCKWIRE	20.	NUT
6.	CAPSCREW, HEX HEAD	13.	CAPSCREW, HEX HEAD	21.	ADJUSTER
7*	WASHER	14.	WASHER	22.	ENGINE MOUNTING PADS
		15.	MOUNTING BLOCK, RIGHT	23.	GENERATOR

Figure 2-11. Engine/Generator Mounts

WARNING

Do not put hands or fingers under rear of generator while lifting engine. Generator end may tip down when lifted.

(f) Carefully lift engine from mounts while guiding engine/generator. Remove pins (16, 17) from engine mounting pads.

(g) Move engine forward a few inches to clear housing and lift engine from AGPU.

(h) Install engine in maintenance stand.

(i) Check AGPU floor around engine Remove all signs of corrosion or rust. Touchup paint as required.

b. Installation.

(1) Install engine/generator/hydraulic pump (see figure 2-10).

(a) Attach sling (2, figure 2-5) to engine lifting cable (3), and lifting strap (1) wrapped around generator.

(b) Carefully lift engine from maintenance stand and position over AGPU.

(c) Carefully lower engine to a position just above engine mounts.

(d) Install pins (16, 17, figure 2-11) in engine mounting pads.

(e) Carefully lower engine until pins are seated in mounts (18, 19), and generator contacts support bracket (4).

(f) Install mounting blocks (11, 15).

(g) Install eight capscrews (9, 13) and washers (10, 14), but do not tighten at this time.

(h) Install two capscrews (2) and washers (3) into rear generator support and tighten.

(i) Install four capscrews (6) and washers (7) in left mounting block (11) and tighten.

(j) Tighten capscrews (9, 13) installed In step (g).

(k) If required, loosen two nuts (20) and turn adjuster (21) to level engine. Ensure that LCV adapter aligns with pneumatic hose fitting. Tighten nuts (20).

(1) Lockwire capscrews (2, 6, 9, and 13).

(2) Connect starter ground cable (7, figure 2-8) and hot cable (9).

(3) Connector generator electrical connections.

(a) Connect ground lug wire (29, figure 2-10) with lockwasher (27), and nut (28).

(b) Ensure that jumper (19) is installed as shown in figure 2-10.

(c) Install six AC cables (23) on AC terminal block (18) studs. Secure cables with washers (22), lockwashers (21), and nuts (20).

(d) Install cover (30) on AC terminal block (18) with two screws (24) and washers (25).

(e) Install DC cable (16) on DC terminal block (7) with washer (15), lockwasher (14), and nut (13).

(f) Install DC cable (11) on DC terminal block (7) with washer (10), lockwasher (9), and nut (8).

(g) Install cover (6) on DC terminal block (7) with two screws (4) and washers (5).

(h) Connect wiring harness (2) connector (1) to generator connector (3).

(4) Connect engine electrical connector.

(a) Carefully pull engine wiring harness connector (1, figure 2-9) and wiring harness (3) through bulkhead hole (4).

(b) Connect electrical connector P2 (1) to ECU (2) connector J2, and safety wire.

(c) Place wiring harness (3) in position along main harness bundle and tie to main harness bundle with cable ties (5) every six to eight inches.

(d) Loop excess slack in wiring harness (3) inside engine compartment and tie back with cable ties.

(e) Set control panel (8) in position and secure with four screws (7).

(5) Connect hydraulic pump hoses and lines (see figure 2-1).

(a) Connect hydraulic pump electrical connector (11, figure 2-8).

(b) Connect drain tube (16, figure 2-1) to elbow on hydraulic pump. Route end of tube through floor grommet.

(c) Install new seal (19) in the end of hose (6) and connect to elbow on hydraulic pump. Tighten hose (6) coupling nut to 1,520 to 1,680 inch-pounds of torque.

(d) Install new seal (20) in the end of hose (4) and connect to elbow on hydraulic pump. Tighten hose coupling nut to 900 to 1,000 inch-pounds of torque.

(e) Install new seal (20) in the end of hose (3) and connect to elbow on hydraulic pump. Tighten hose coupling nut to 200 to 230 inch-pounds of torque.

(f) Install hydraulic access cover (14, figure 2-8) using ten screws (12), and washers (13).

(6) Connect fuel hose and extension tube (see figure 2-7).

(a) Remove cap from oil drain and install extension tube (2). Install cap on extension tube.

(b) Connect fuel hose (1) to nipple (3) on fuel control unit (FCU).

(7) Connect turbine housing, combustor cap, FCU, and gearcase drain tubes (see figure 2-3).

(a) Connect gearcase drain tube (11) and route tube through floor grommet.

(b) Connect fuel control unit (FCU) drain tube (9) and route tube through floor grommet.

(c) Connect combustor cap drain tube (6) and route tube through floor grommet.

(d) Connect turbine housing drain tube (5) and route tube through floor grommet.

(8) Connect pneumatic hoses/fittings (see figure 2-6).

(a) Install manifold (3) on LCV adapter (9) and secure with marmon clamp (10).

(b) Install adapter (8) with hose attached to LCV adapter (9) and secure with marmon clamp (7).

(c) Install adapter (6) with hose attached to manifold (3) and secure with marmon clamp (5).

(d) Connect tube assembly (4) to fitting on manifold (3).

(e) Install hose clamps (1) and hose (2). Tighten hose clamps.

(9) Install exhaust ejector (paragraph 2-9.b.).

(10) Install inner air intake duct assembly by performing steps (5) through (10) of paragraph 3-6.c.

(11) Install hydraulic module (paragraph 2-8.b.).

CHAPTER 3

MAINTENANCE OF FRAME AND HOUSING

3-1. DESCRIPTION.

a. Frame and Housing Components. The frame and housing (figure 3-1) consists of a frame (one-piece welded), panels (welded to frame), lifting eyes, covers, access doors, roof assembly (figures 3-2 and 3-9) , exhaust ejector assembly (figure 3-10), air intake duct assembly (figure 3-11), and engine/ generator ❑ ount (figure 3-12).

b. Frame Construction. The frame is constructed of steel channel pieces welded together to form a unitized, one-piece assembly. Steel panels are welded to the frame assembly to form the housing. Four lifting eyes are attached to the frame assembly. A roof assembly is attached to the housing by two latches on each end of the roof. An exhaust flapper is attached to the roof, which Is opened by exhaust gas from the exhaust ejector when the engine is started.

3-2. FRAME AND PANELS. The frame and panels are a welded one-piece unit. The frame and panels are constructed from 1010/1020 steel channel, angle, and sheet stock. Weld per MIL-STD-1261 CL1.

a. Repair cracks in channels and angles by welding.

b. Repair damaged panels by straightening and welding, or if severely damaged replace with new sheet stock (cut to size).

c. Clean and paint repaired area in accordance with paragraph 2-5.

d. Repair nut plates.

(1) Drill out rivets on damaged nut plate and remove nut plate.

(2) Clean and paint area under nut plate.

(3) Install new 10-32 (MS21076L3) nut plate or 6-32 (MS21076L6) nut plate with rivets (3/32 x .125/.250 grip).

e. Replace damaged or missing weld pins (to retain acoustic insulation).

(1) Remove self-locking washers retaining acoustic insulation and remove insulation section.

(2) If applicable, remove damaged weld pin.

(3) Install new weld pin (83-14851-04) using pin welder PW500 (Erico Jones) or equivalent.

(4) Touchup paint repaired area.

f. Replace damaged or missing acoustic insulation (see figure 3-1).

(1) Remove self-locking washers from weld pins.

(2) Remove damaged insulation section.

(3) Replace any missing or damaged weld pins.

(4) Clean and. paint area behind insulation section.

(5) Position replacement insulation section over weld pins and press into place.

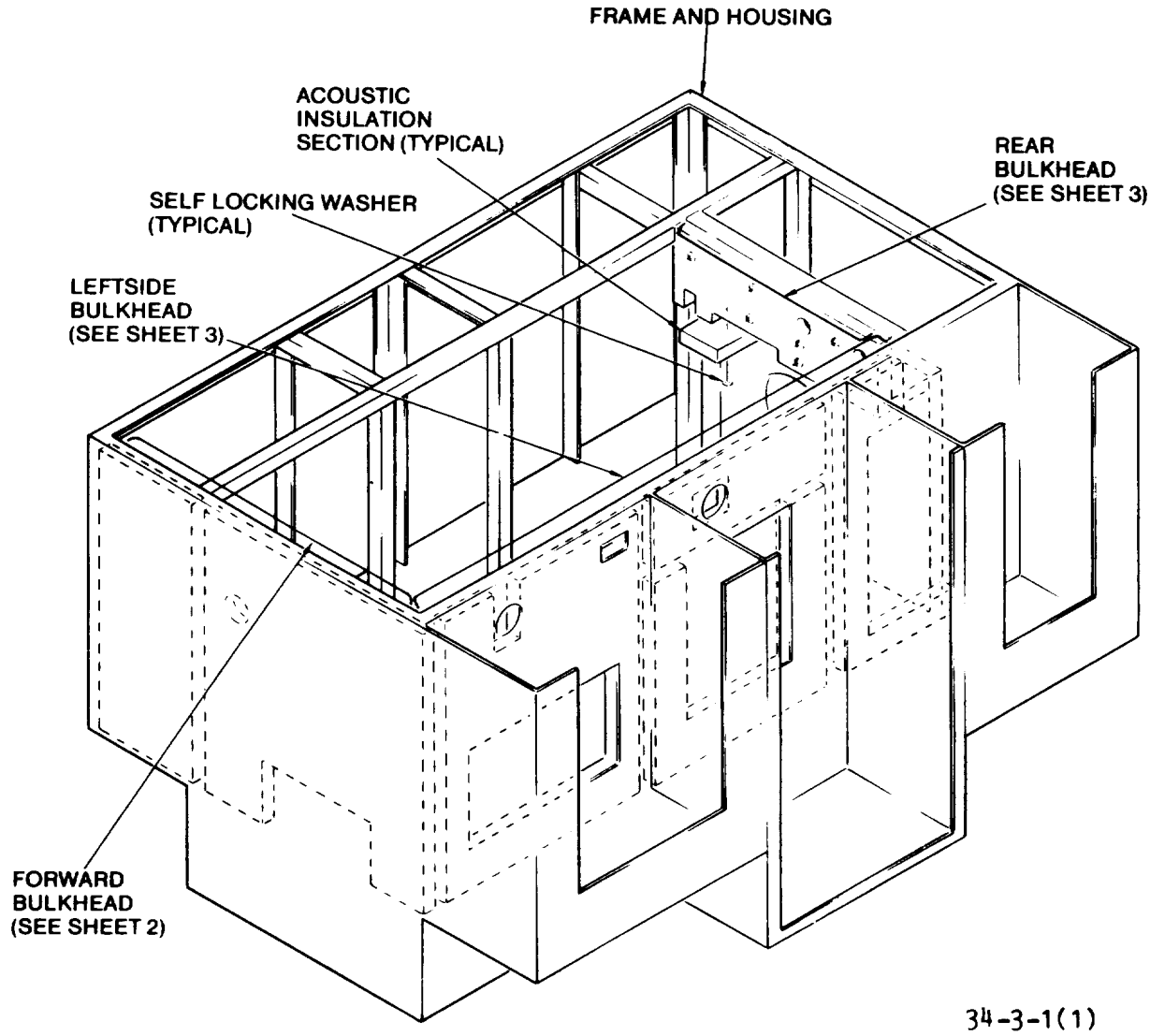


Figure 3-1. Acoustic Insulation, Frame and Housing (sheet 1 of 3)

NOTE

If replacement insulation section is not available, one can be cut from 1-1/2-inch thick John-Manville Linacoustic stock.

(6) Install self-locking washers (83-14852) on weld pins to hold insulation section in place.

g. Replace damaged roof seal.

(1) Remove damaged roof seal.

(2) Ensure that seal channel is free from rust or corrosion. Clean and touchup paint if required.

(3) Press new roof seal into channel.

3-3. COVERS.

a. Repair flat covers.

(1) Straighten and paint covers.

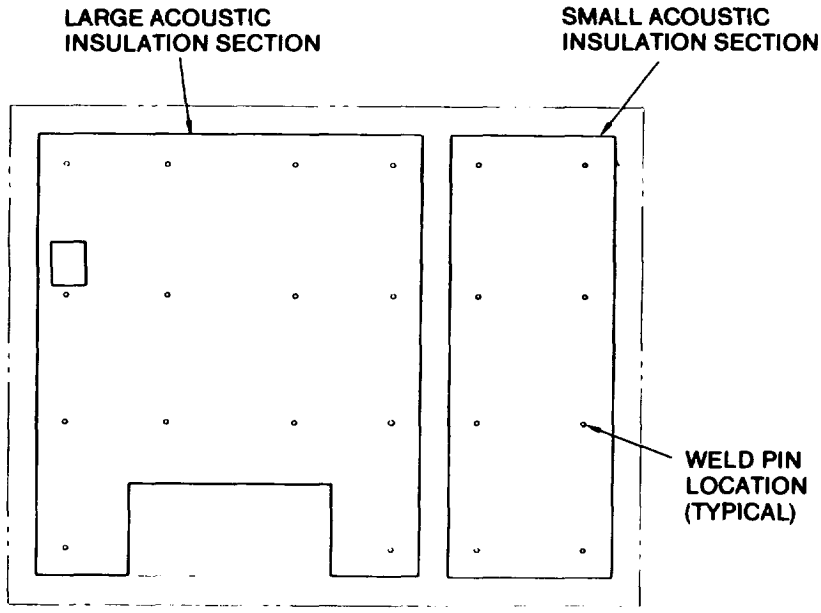


Figure 3-1. Acoustic Insulation, Frame and Housing (sheet 2 of 3)

(2) Replace acoustic insulation on back of covers as described in paragraph 3-2.f.

b. Repair roof (see figure 3-2).

(1) Replace exhaust flapper (9) by removing two screws (1), washers (2), spacers (3), and nuts (4).

(2) Adjust exhaust flapper so that it will not open over approximately 80 degrees by adjusting screws (10). Lock screws (10) in place by tightening nuts (11).

(3) Replace hinge bracket (5) by removing two screws (6), washers (7), and nuts (8).

(4) Replace exhaust stack (13) by drilling out 30 rivets (12), and installing new exhaust stack and rivets.

(5) Replace weld pins (17), acoustic insulation (16), and self-locking washers (15) as described in paragraph 3-2.f.

3-4. ACCESS DOORS. Figure 3-3 shows location of all access doors except the pneumatic hose access door which is located on the left side of the AGPU. Figures 3-4 through 3-9 illustrate access door details.

Panel Access Door. (See figure 3-4)

(1) Remove.

(a) Remove screws (1) securing hinge (6) to AGPU.

(b) Loosen two jam nuts (3) and remove screws (1), washers (2), and nuts (3) securing supports (4) to frame.

(2) Repair.

(a) Repair door (8) by straightening and painting.

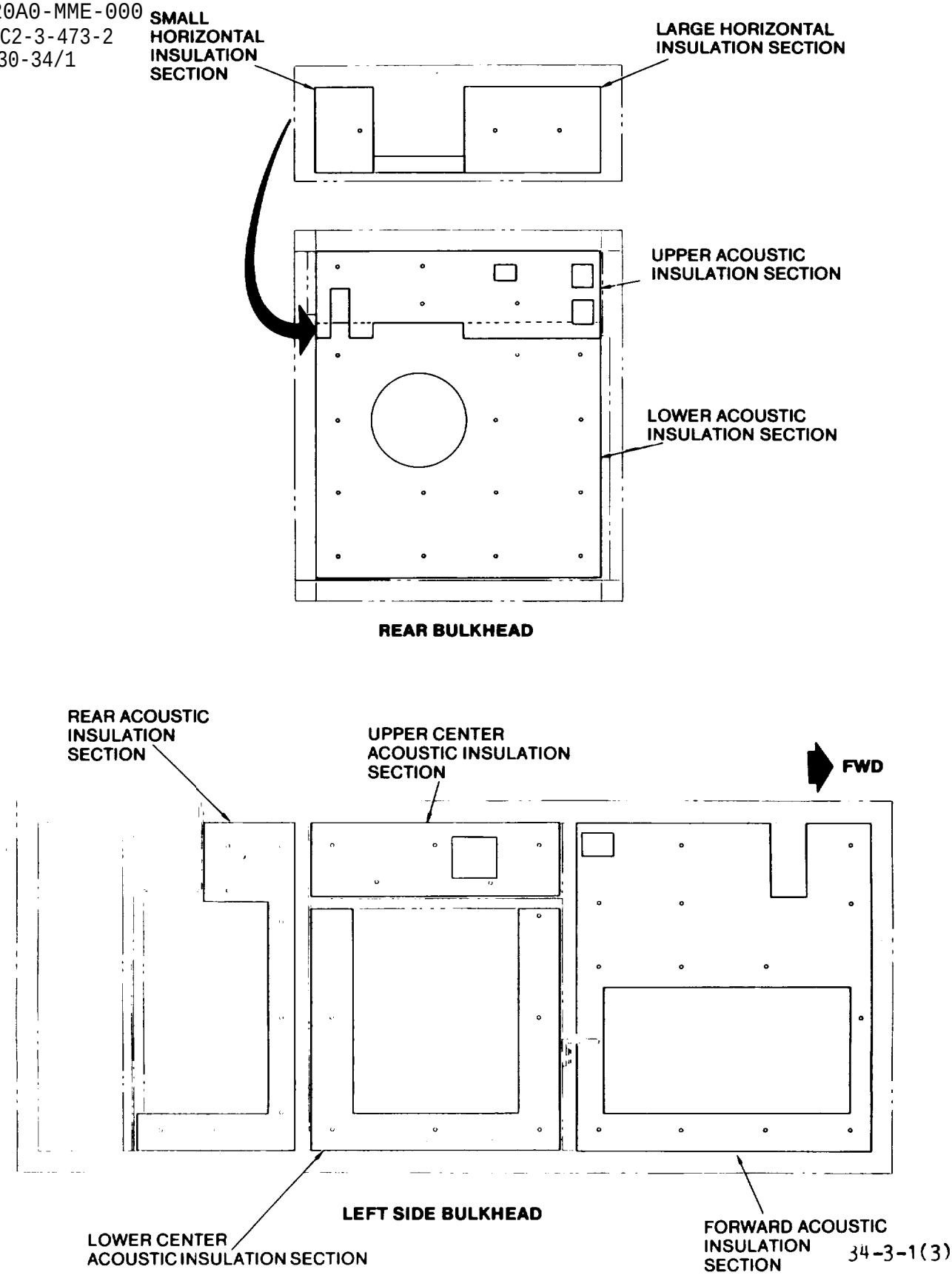
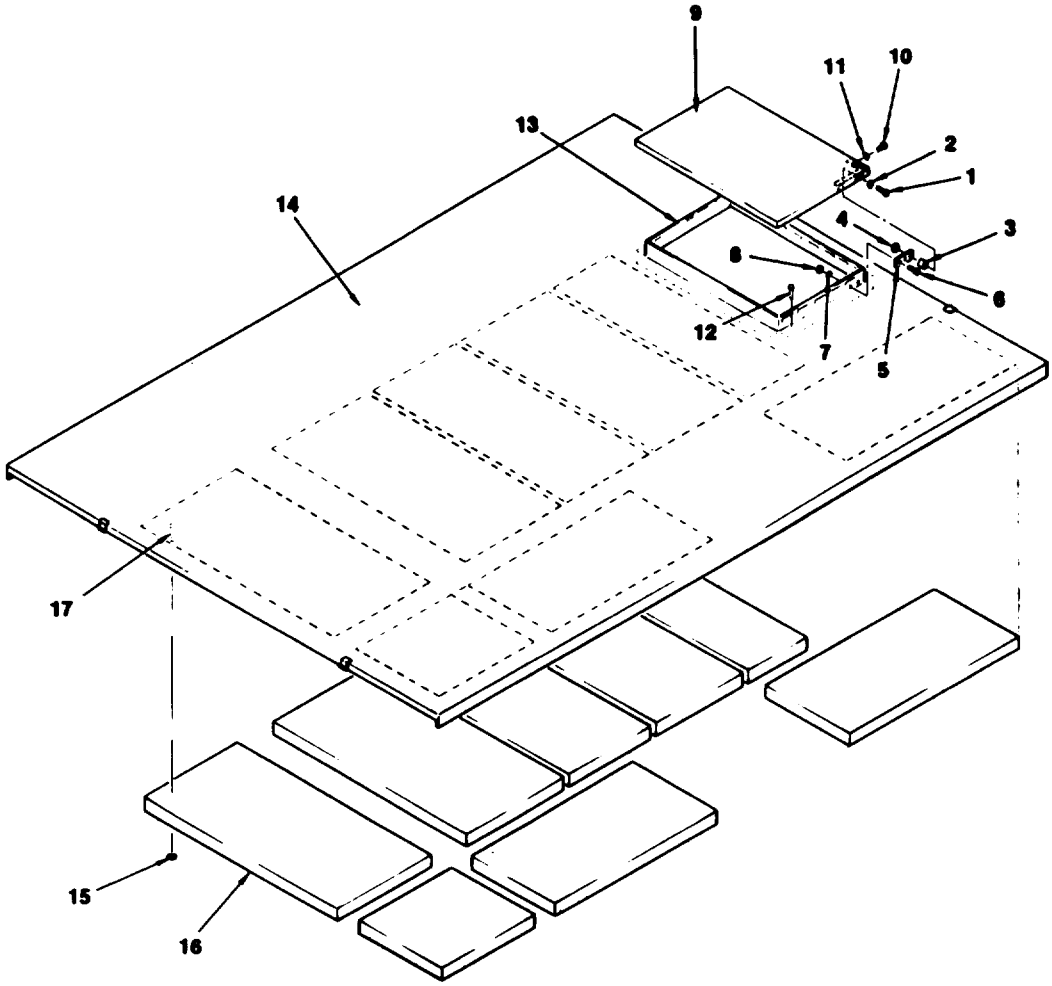


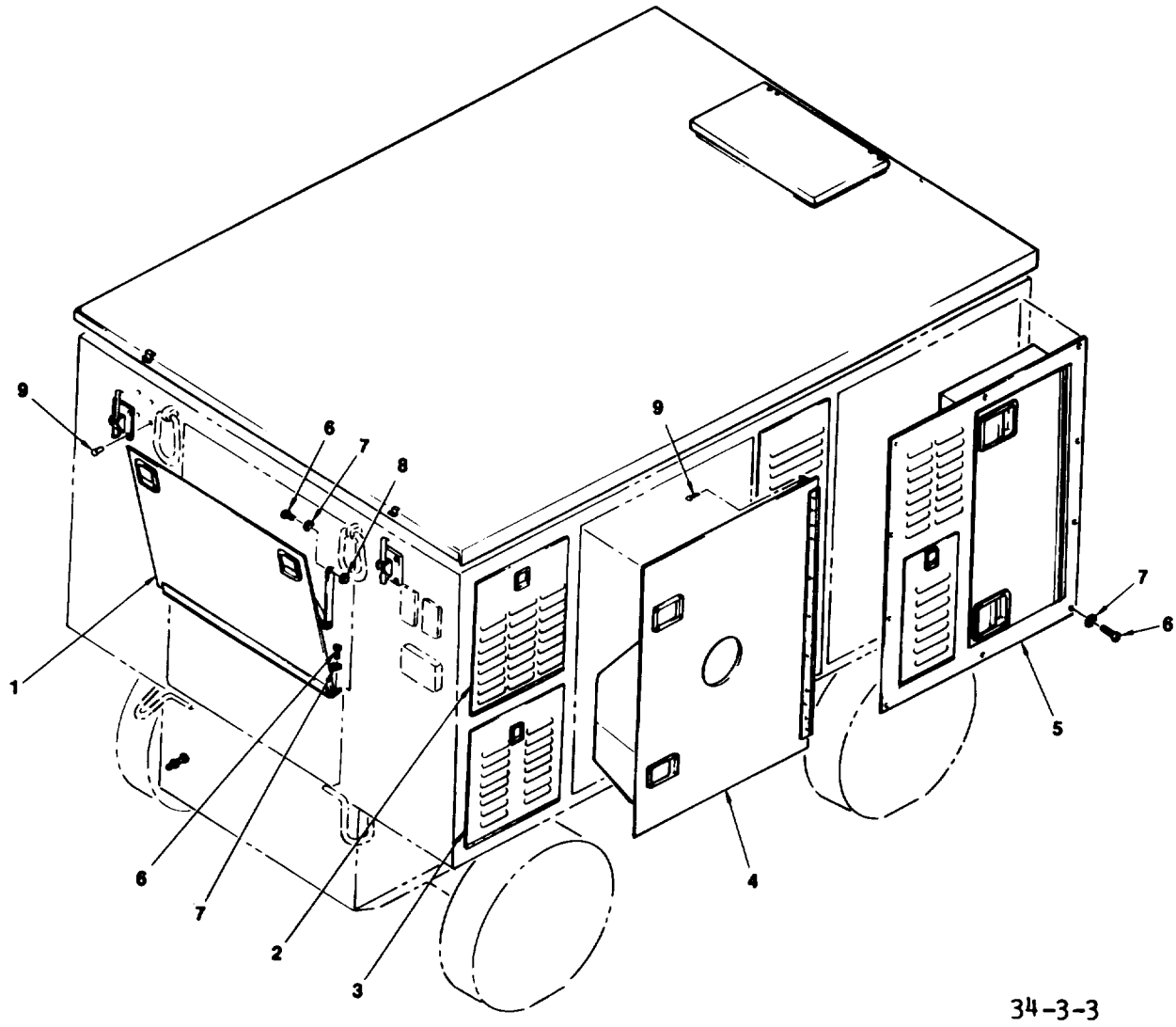
Figure 3-1. Acoustic Insulation, Frame and Housing (sheet 3 of 3)



34-3-2

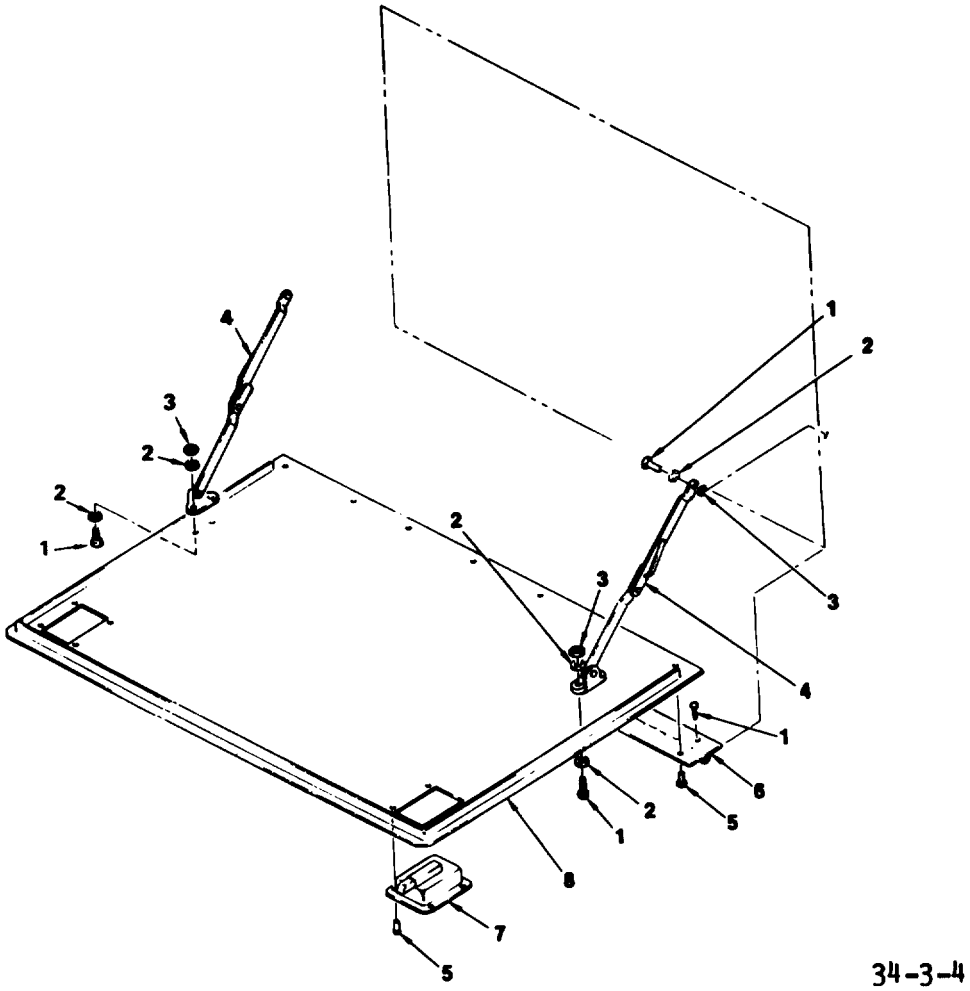
1. SCREW
2. WASHER
3. SPACER
4. NUT
5. BRACKET, HINGE
6. SCREW
7. WASHER
8. NUT
9. FLAPPER, EXHAUST
10. SCREW
11. NUT
12. RIVET
13. STACK, EXHAUST
14. ROOF
15. WASHER, SELF-LOCKING
16. INSULATION, ACOUSTIC
17. WELD PIN

Figure 3-2. Roof Assembly



1. ACCESS DOOR, CONTROL PANEL
2. ACCESS DOOR, ELECTRICAL TRAYS
3. ACCESS DOOR, BATTERY
4. ACCESS DOOR, ENGINE
5. FRONT PANEL, HYDRAULIC MODULE
6. SCREW
7. WASHER
8. NUT
9. RIVET

Figure 3-3. Location of Access Doors, Rear and Right Side



1. SCREW
2. WASHER
3. NUT
4. SUPPORT
5. RIVET
6. HINGE
7. LATCH
8. DOOR

Figure 3-4. Control Panel Access Door Assembly

(b) Replace latches (7) by drilling out rivets (5), and installing new latch. Rivet new latch.

(c) Replace hinge (6) by drilling out rivets (5), and installing new hinge. Rivet new hinge.

NOTE

If replacement hinge is not available, one can be fabricated from MS35825-3E hinge stock. Cut to length, and match drill rivet holes.

(3) Install.

(a) Position door and secure hinge (6) to AGPU using screws (1).

(b) Attach supports (4) to AGPU using screws (1), washers (2), and nuts (3).

b. Electrical Trays and Battery Compartment Access Doors. (See figures 3-5 and 3-6.)

(1) Remove. Drill out four rivets (1) and remove door.

(2) Repair.

(a) Repair doors by straightening and painting.

(b) Replace latch (5) by drilling out four rivets (4), and installing new latch. Rivet new latch.

(c) Replace hinge (2) by drilling out four rivets (1) and installing new hinge. Rivet new hinge.

NOTE

If replacement hinge is not available, one can be fabricated from MS35825-3E hinge stock. Cut to length, and match drill rivet holes.

(3) Install. Position door and secure with rivets.

c. Engine Access Door. (See figure 3-7.)

(1) Remove. Drill out twelve rivets (1) and remove door.

(2) Repair.

(a) Repair door panel (3), hose hanger (12), and tray (13) by straightening, welding, and painting.

(b) Replace latches (8) by drilling out four rivets (7), and installing new latch. Rivet new latch.

(c) Replace hinges (2) by drilling out twelve rivets (1), and installing new hinge. Rivet new hinge.

NOTE

If replacement hinge is not available, one can be fabricated from MS35825-3E hinge stock. Cut to length, and match drill rivet holes.

(d) Replace detent latch (9, 10) by drilling out two rivets (7), and installing new latch. Match drill holes for latch (9) to align with holes on latch (10) if required. Rivet new latch.

(e) Replace weld pins (4), acoustic insulation (5), and self-locking washers (6) as described in paragraph 3-2.f.

(3) Install. Position door and secure with rivets.

d. Hydraulic Module Front Panel Assembly. (See figure 3-8.)

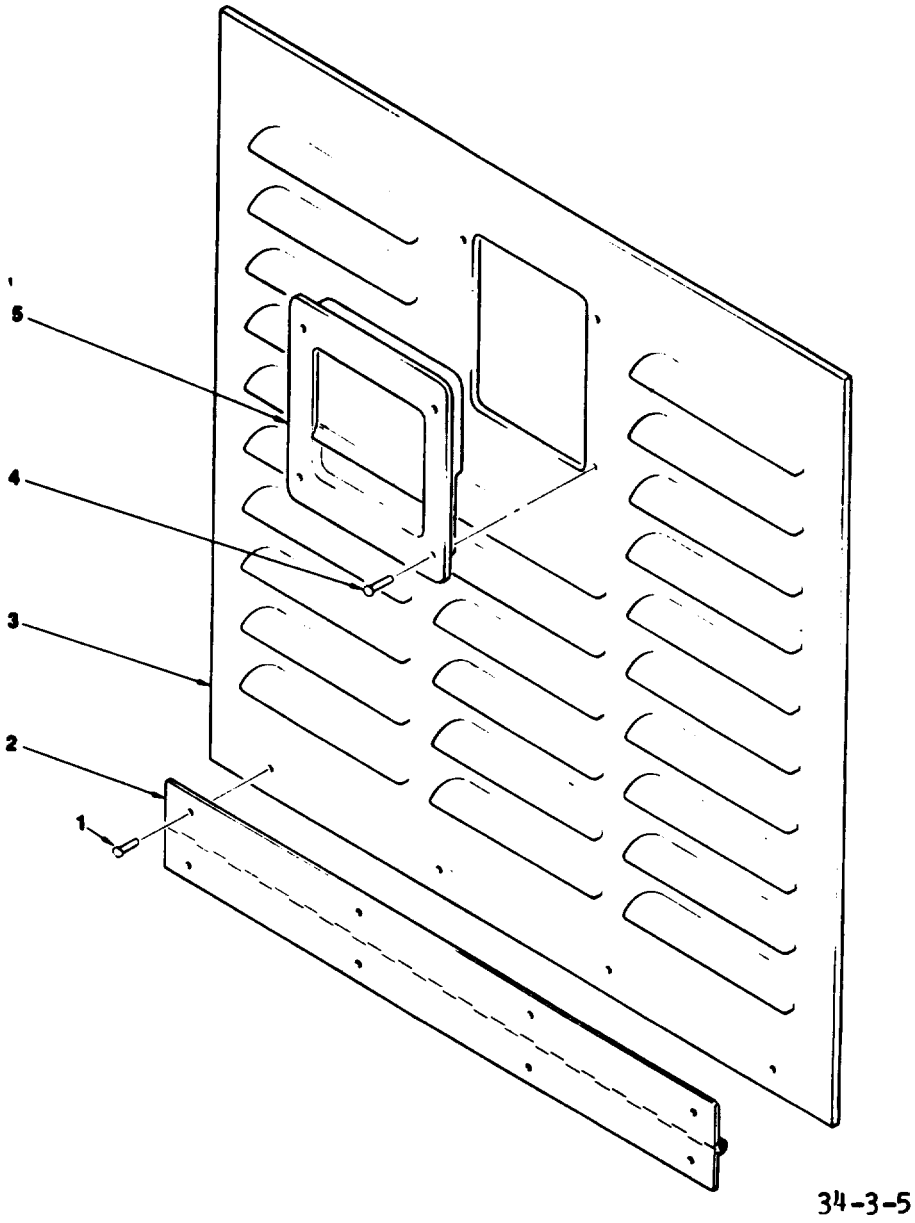
(1) Remove. Remove ten screws (1) and washers (2) and remove panel assembly.

(2) Repair.

(a) Repair front panel (10) and doors (7, 9) by straightening and painting.

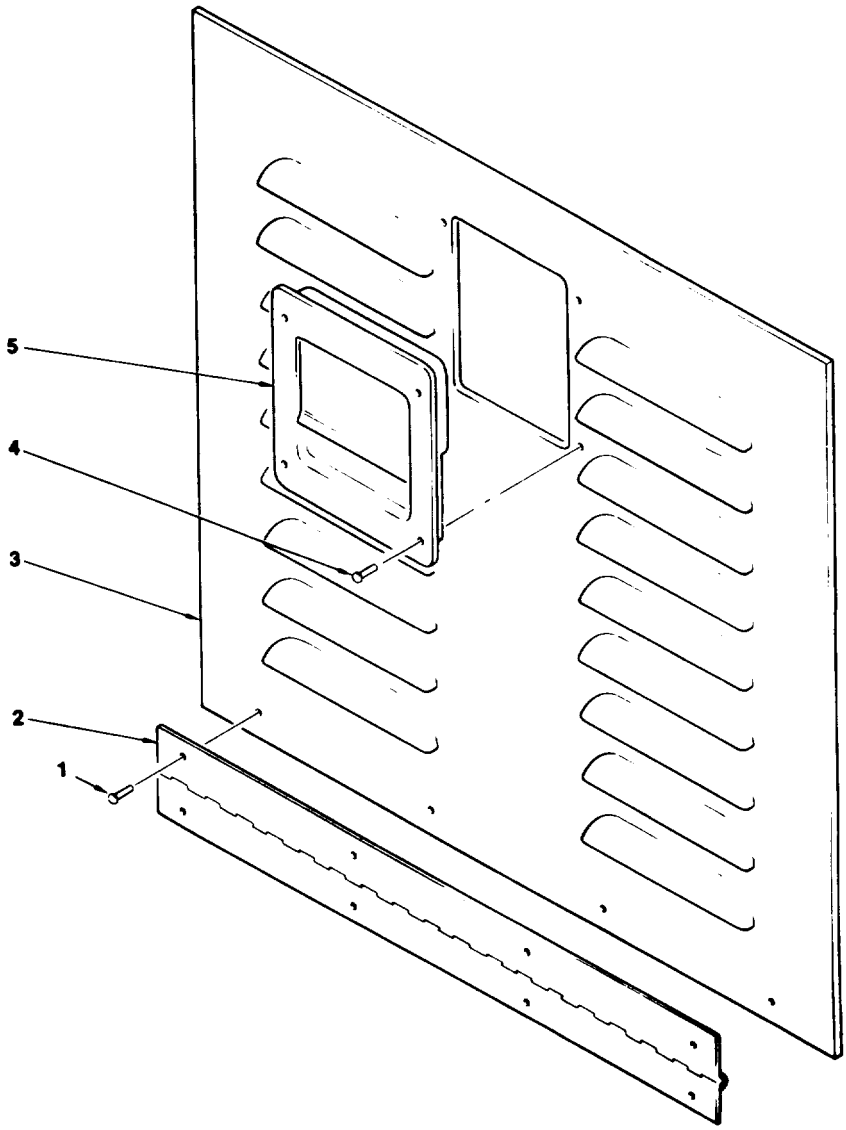
(b) Replace latches (8) by drilling out four rivets (3), and installing new latch. Rivet new latch.

(c) Replace hinges (4) by drilling out seven rivets (3), and installing new hinge. Rivet new hinge.



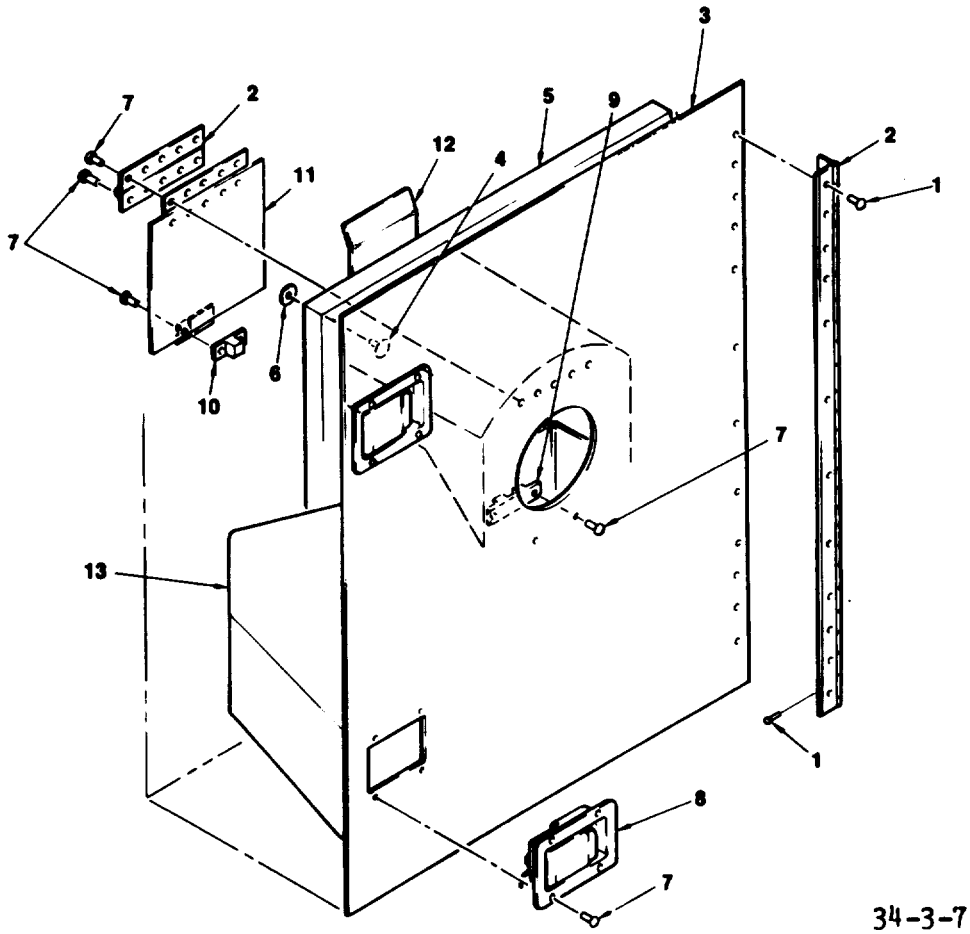
1. RIVET
2. HINGE
3. DOOR
4. RIVET
5. LATCH

Figure 3-5. Electrical Trays Access Door Assembly



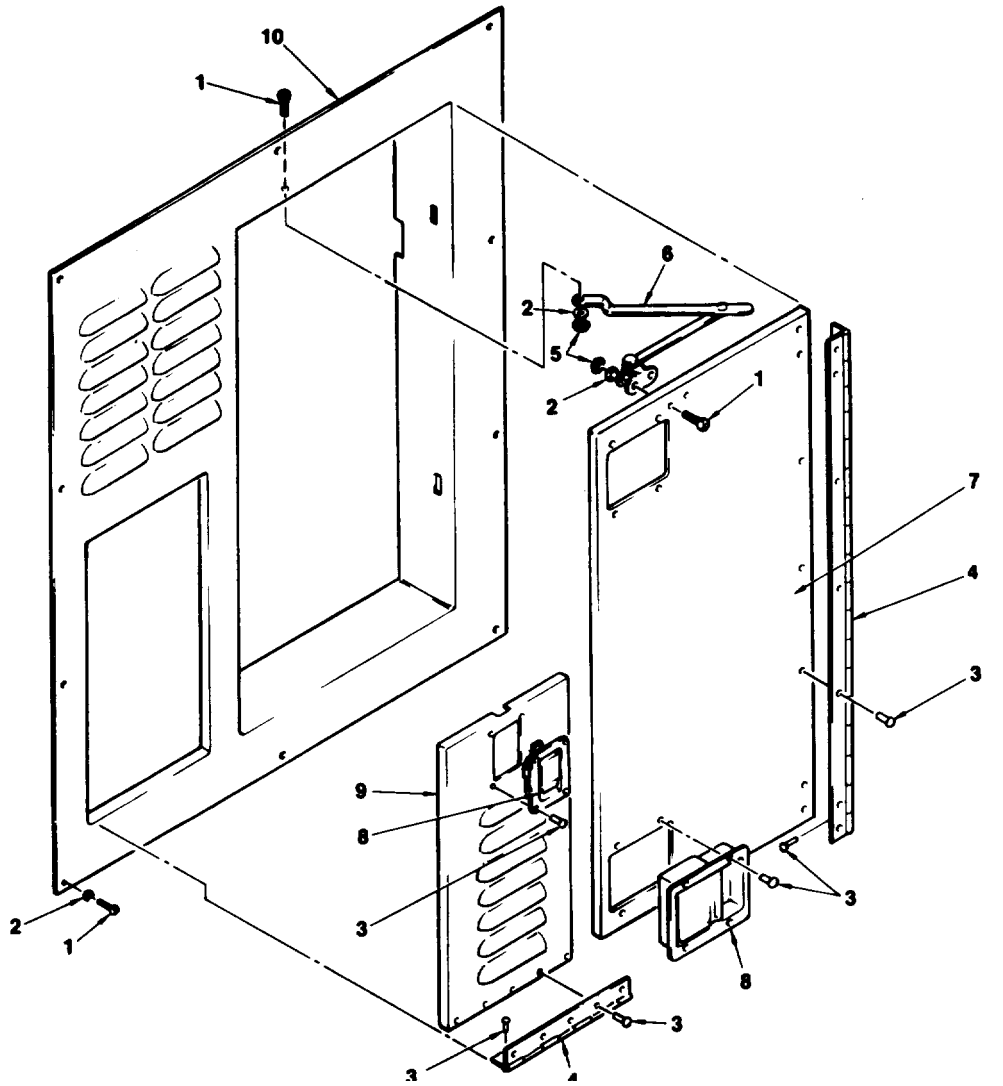
1. RIVET
2. HINGE
3. DOOR
4. RIVET
5. LATCH

Figure 3-6. Battery Compartment Access Door Assembly



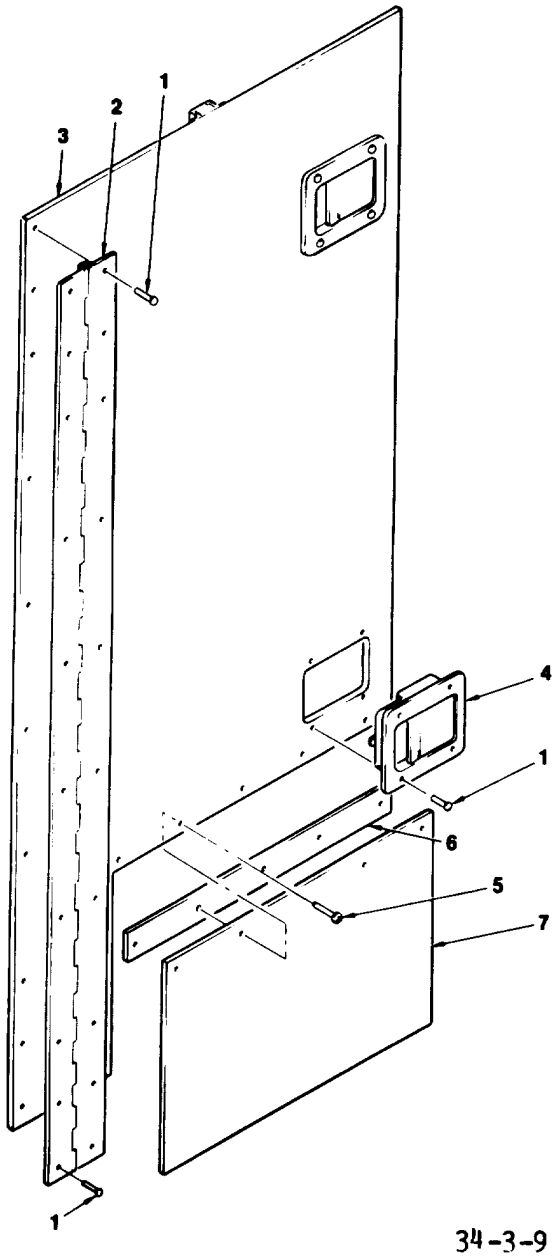
1. RIVET
2. HINGE
3. DOOR PANEL
4. WELD PIN
5. INSULATION, ACOUSTIC
6. WASHER, SELF-LOCKING
7. RIVET
8. LATCH
9. LATCH, DETENT (FEMALE)
10. LATCH, DETENT (MALE)
11. PANEL
12. HOSE HANGER
13. TRAY

Figure 3-7. Engine Access Door Assembly



1. SCREW
2. WASHER
3. RIVET
4. HINGE
5. NUT
6. LATCH STOP
7. ACCESS DOOR, LARGE
8. LATCH
9. ACCESS DOOR, SMALL
10. FRONT PANEL

Figure 3-8. Hydraulic Module Front Panel Assembly.



1. RIVET
2. HINGE
3. DOOR
4. LATCH
5. RIVET
6. STRIP, MOUNTING
7. FLAP

Figure 3-9. Pneumatic Hose Access Door Assembly

NOTE

If replacement hinge is not available, one can be fabricated from MS35825-3E hinge stock. Cut to length, and match drill rivet holes.

(3) Install. Position panel assembly and install with ten screws (1) and washers (2).

e. Pneumatic Hose Access Door. (See figure 3-9.)

(1) Remove. Drill out ten rivets (1) and remove door.

(2) Repair.

(a) Repair door (3) by straightening and painting.

(b) Replace latches (4) by drilling out four rivets (1), and installing new latch. Rivet new latch.

(c) Replace flap (7) by drilling out five rivets, and installing new flap (7). Rivet flap to door (3) and mounting strip (6) using five rivets (5).

(d) Replace hinge (2) by drilling out ten rivets (1), and installing new hinge. Rivet new hinge.

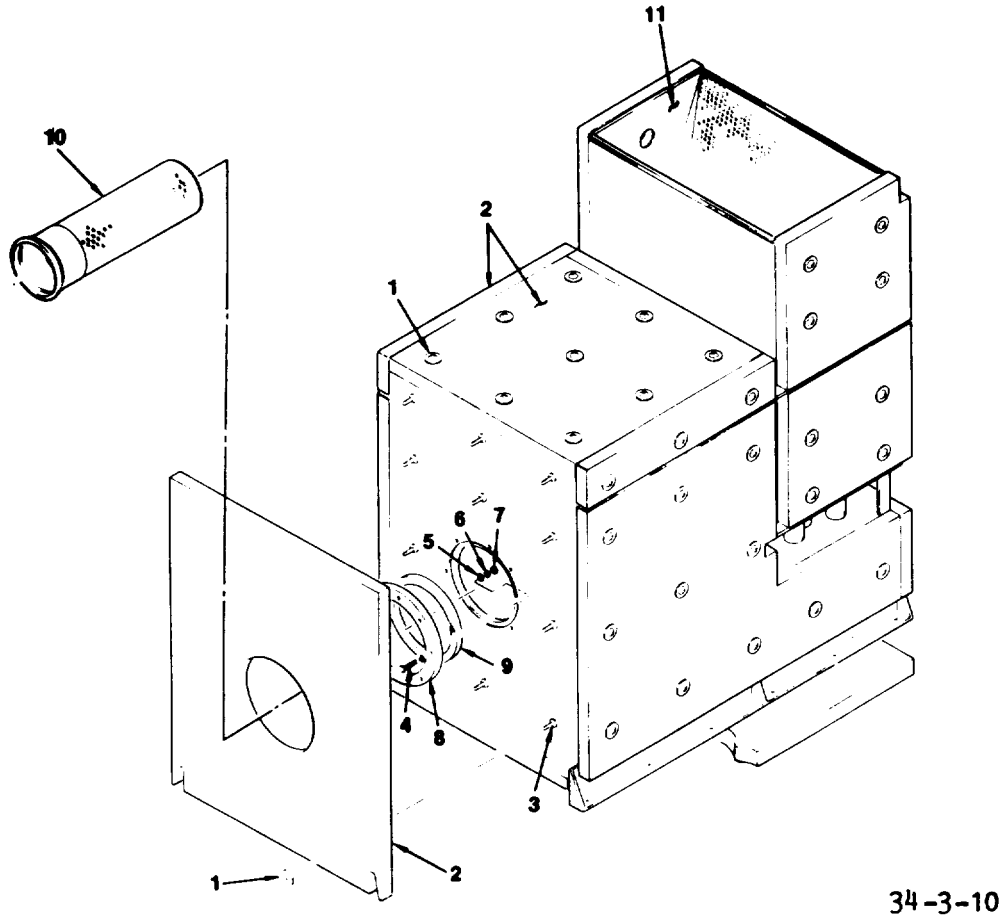
NOTE

If replacement hinge is not available, one can be fabricated from MS35825-3E hinge stock. Cut to length, and match drill rivet holes.

3-5. EXHAUST EJECTOR.

a. Inspect. (See figure 3-10.)

(1) Inspect ejector inlet tube (10) for cracks, or severe errosion (part of body worn away). Replace if damaged.



1. WASHER, SELF-LOCKING
2. INSULATION, THERMAL
3. WELD PIN
4. BOLT
5. WASHER, FLAT
6. WASHER, LOCK
7. NUT
8. COVER PLATE
9. SPACER
10. EJECTOR INLET TUBE
11. OUTLET

Figure 3-10. Exhaust Ejector

(2) Inspect exhaust ejector outlet for severe damage. Replace if part of interior surface is severely worn (holes in surface).

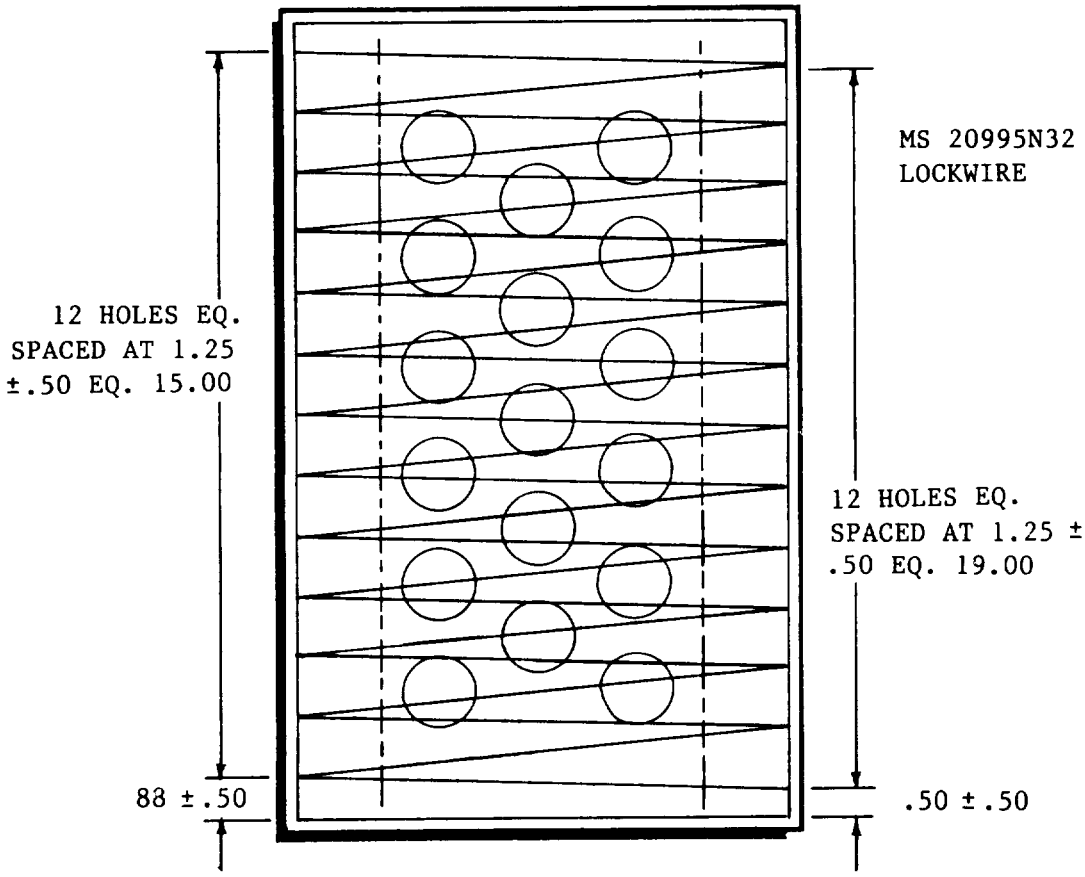
(3) Inspect thermal insulation (2) for splits or cracks through insulation. Replace if damaged. (Minor dents, gouges, or splits are acceptable.)

(4) Inspect thermal insulation (2) for signs of leaking exhaust gases (discoloration, burned insulation). Remove thermal insulation and inspect metal for holes or cracks. Replace exhaust ejector if metal is severely worn away. Repair if cracked.

b. Remove. Remove exhaust ejector (see paragraph 2-9).

c. Repair. (See figure 3-10.)

(1) Replace damaged or missing weld pins (3).



REF. TOP VIEW ZONE 5D

Figure 3-10A. Lockwire Threading, Exhaust Elector

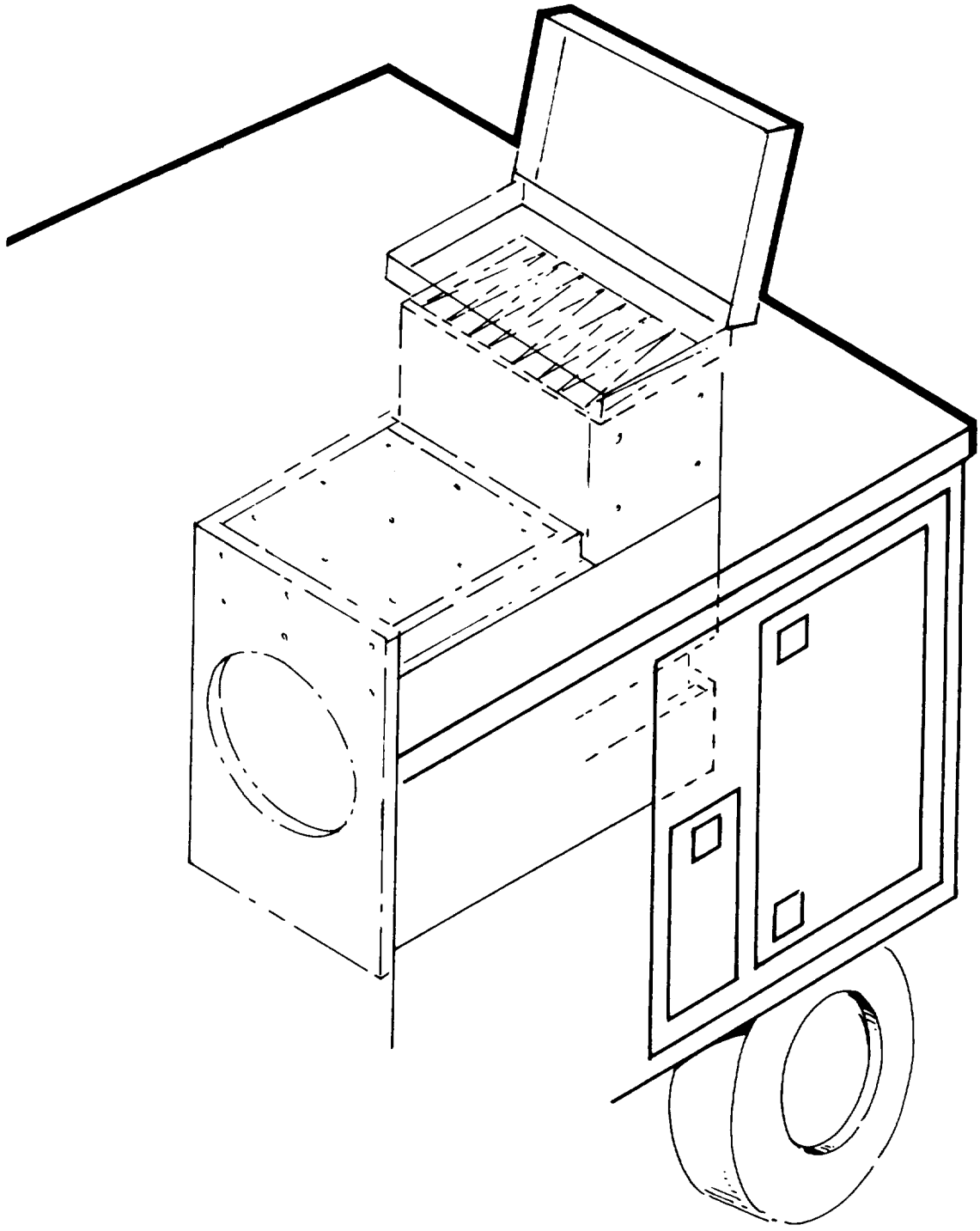


Figure 3-10B. Lockwire Installed, Exhaust Elector

(a) Remove self-locking washers (1) retaining thermal insulation (2) and remove insulation section.

(b) If applicable, remove damage weld pin.

(c) Install new weld pin (83-14851-04) using pin welder PW500 (Erico Jones) or equivalent.

NOTE

If replacement thermal insulation section is not available, one can be cut from 1-inch thick John Manville 103 thermal insulation.

(2) Replace damaged or missing thermal insulation.

(a) Remove self-locking washers (1) from weld pins (3).

(b) Remove damaged insulation (2).

(c) Replace any missing or damaged weld pins.

(d) Position replacement thermal insulation section over weld pins and press into place.

(3) Repair cracks or split welds in exhaust ejector housing by welding.

NOTE

Housing is constructed of 304 CRES (QQ-S-766). Weld in accordance with MIL-S-1261 Class I.

(4) When 9 or more exhaust ejector tubes are missing or damaged, replace exhaust ejector assembly or manufacture tubes from 304 seamless stainless steel tubing 1.375 OD x .035 wall x 4.15 in. length and install.

(5) Replace damaged cover plate (8) or spacer (9) by removing bolts (4), washers (5, 6), and nuts (7). Install replacement part and reassemble. Lockwire bolts after assembly.

d. Install. Install exhaust ejector (see paragraph 2-9)

e. Rework top of ejector as shown by threading MS20995N32 (Lockwire) through existing holes in perforated metal. Lace 3 to 4 passes across flue and tie off (Refer to figure 3-10A and 3-10B).

3-6. AIR INTAKE DUCT ASSEMBLY.

a. Remove (See figure 3-11).

(1) Remove roof. Refer to TM 55-1730-229-12, paragraph 4-16.

(2) Remove air cleaner assembly. Refer to TM 55-1730-229-12, paragraph 4-19.

(3) Tag and disconnect wires from bypass door switch (1).

(4) Remove two screws (2), washers (3), spacers (4), lockwashers (5) and nuts (6) from each end of inner duct (9) support.

(5) Remove twenty screws (7), and washers (8) securing inner duct (9) to rivnuts (17) on outer duct (16).

(6) Remove inner duct. (9).

(7) Inspect gaskets (10, 11) Replace if split or torn.

(8) Remove three screws (12), washers (13), lockwashers (14), and nuts (15) seeming top of outer duct (16) to frame.

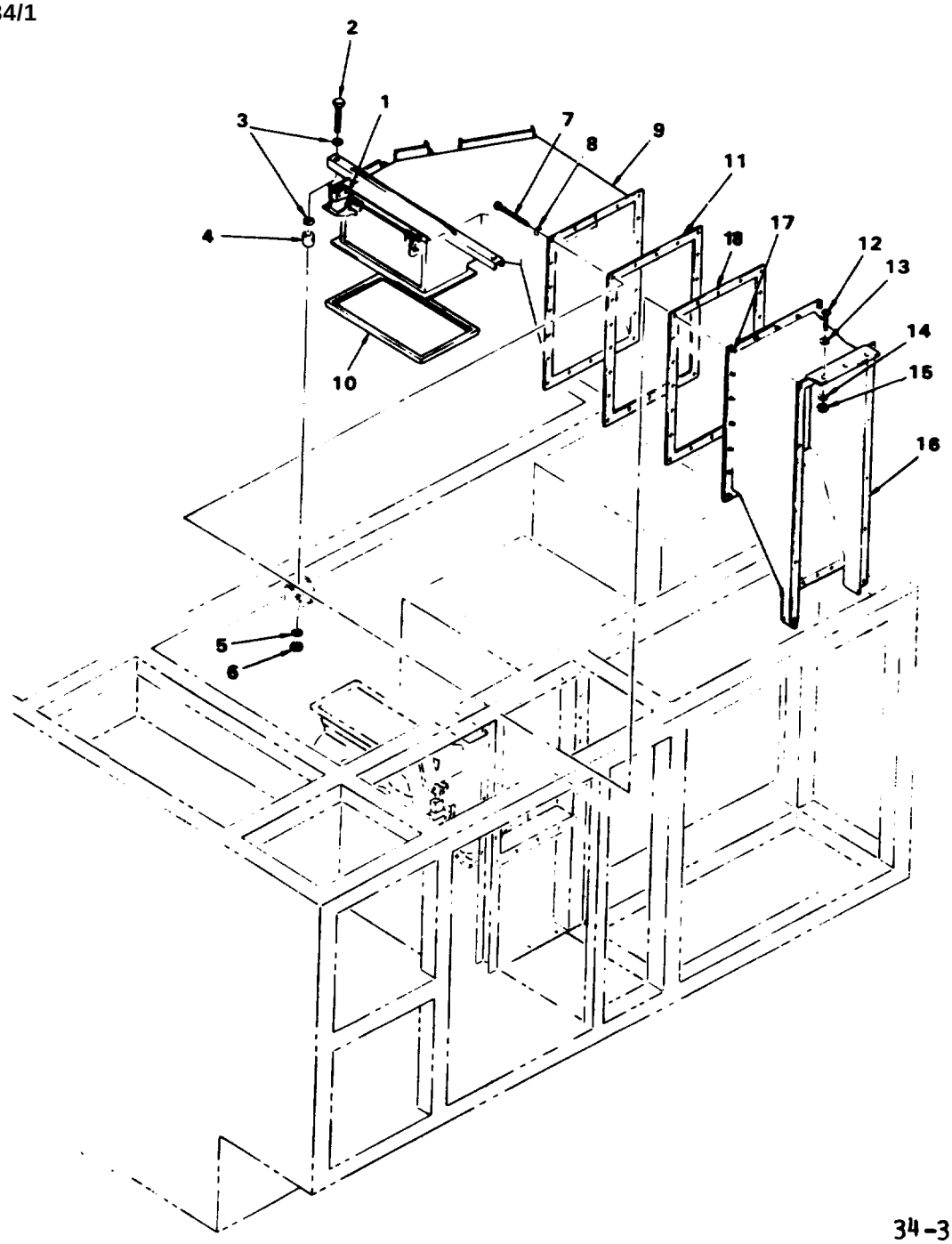
(9) Remove outs duct (16)

(10) Inspect gasket (18). Replace if split or torn

b. Repair.

(1) Repair dent in duct sections by straight ening.

(2) Repair splits a cracks by welding. Regalvanize after welding.



1. SWITCH, BYPASS DOOR
2. SCREW
3. WASHER, FLAT
4. SPACER
5. WASHER, LOCK
6. NUT
7. SCREW
8. WASHER, FLAT
9. DUCT, INNER
10. GASKET, ENGINE INTAKE
11. GASKET, INNER DUCT
12. SCREW
13. WASHER, FLAT
14. WASHER, LOCK
15. NUT
16. DUCT, OUTER
17. RIVNUTS
18. GASKET, OUTER DUCT

Figure 3-11 . Air Intake Duct Assembly

c. Install. (See figure 3-11.)

(1) Ensure that gasket (18) is properly positioned.

(2) Place outer duct (16) in position in frame.

(3) Install three screws (12), washers (13), lockwashers (14), and nuts (15) to secure top outer duct (16) to frame.

(4) Ensure that gaskets (10,11) are properly positioned.

(5) Place inner duct (9) in position in frame.

(6) Install twenty screws (7), and washers (8) to secure inner duct (9) to outer duct (16).

(7) Install two screws (2), washers (3), spacers (4), lockwashers (5), and nuts (6) to secure each end of inner duct (9) support.

(8) Connect wires to bypass door switch (1).

(9) Install air cleaner assembly. Refer to TM 55-1730-229-12, paragraph 4-19.

(10) Install roof. Refer to TM 55-1730-229-12, paragraph 4-16.

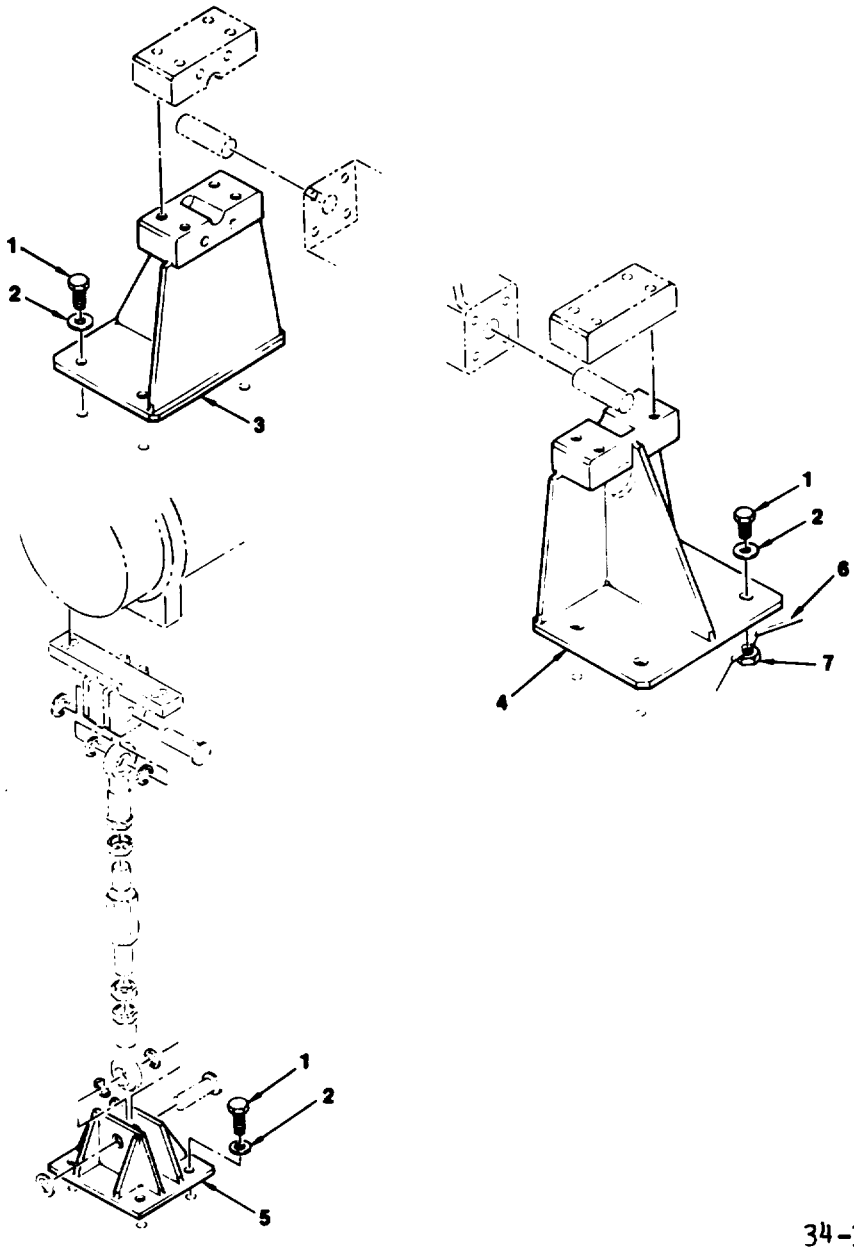
3-7. ENGINE/GENERATOR MOUNTS.

a. Remove. (See figure 3-12.)

(1) Remove engine/generator (see paragraph 2-10).

(2) Remove engine mounts (3, 4) or generator support (5) by removing bolts (1) and washers (2).

b. Install. (See figure 3-12.) Install engine mounts (3, 4) or generator support (5) by installing bolts (1) and washers (2).



1. BOLT
2. WASHER
3. ENGINE MOUNT, LEFT
4. ENGINE MOUNT, RIGHT
5. GENERATOR SUPPORT
6. FLOOR (CUTAWAY)
7. WELDED NUT

Figure 3-12. Engine/Generator Mounts

CHAPTER 4

MAINTENANCE OF DC ELECTRICAL AND CONTROL SYSTEM

4-1 DESCRIPTION. Refer to TM 55-1730-229-12 for a description of the dc electrical and control system.

4-2. BATTERY. Refer to TM 9-6140-200-1(A) and TO 36Y-4-1-194(F) for repair of lead acid type storage batteries. For maintenance of N1-Cad batteries, refer to TO 8D2-3-1(F).

4-3. WIRING HARNESS

WARNING

Remove all rings, watches and other jewelry when performing maintenance on this equipment.

a. Remove.

(1) Disconnect battery.

(2) Note routing of wiring harness to be replaced. Also note location of all harness clamps.

(3) Disconnect all wiring harness electrical connectors and ground terminals.

(4) Loosen and remove clamps and remove wiring harness.

b. Install.

(1) Perform corrosion control on electrical connectors as outlined in chapter 2.

(2) Position wiring harness and install harness clamps.

(3) Connect all wiring harness electrical connectors and ground terminals. Ensure that there is enough slack in harness so that wiring to connectors is not under strain.

(4) Connect battery.

CHAPTER 5

MAINTENANCE OF ELECTRICAL POWER GENERATION AND CONTROL SYSTEM

5-1. DESCRIPTION. Refer to TM 55-1730-229-12 for a description of the electrical power generation and control system.

5-2. GENERATOR ASSEMBLY.

a. Remove. (See figure 5-1.)

(1) Support rear of generator (3).

(2) Remove eight nuts (5) and washers (4).

(3) Remove generator from engine gearcase generator pad (6).

b. Install. (See figure 5-1.)

(1) Install new packing (1) on generator shaft (2).

(2) Apply a thin coat of grease 07639-LE1292 to splines on generator shaft and internal splines on gearcase drive.

(3) Align generator and install on engine gearcase generator pad (6).

(4) Install eight washers (4) and nuts (5).

(5) Tighten nuts (5) to 280 to 300 in-lbs of torque in opposing sequence.

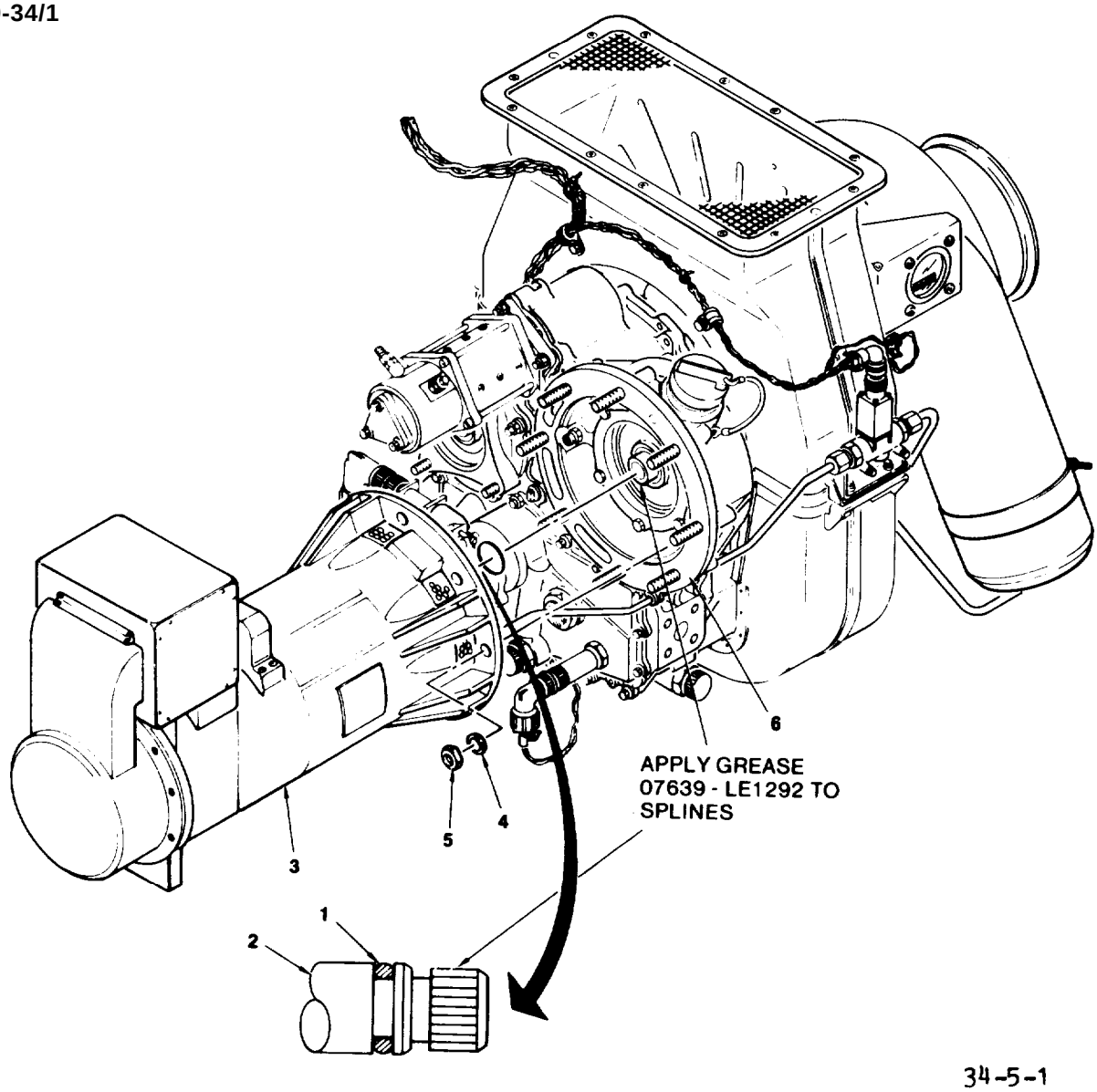
c. Repair. Replace damaged or clogged grease fittings as follows:

(1) Note alignment of fitting.

(2) Remove damaged fitting.

(3) Wrap threads on new fitting with teflon tape.

(4) Install new fitting and note alignment.



1. PACKING (MS28775-210)
2. SHAFT, GENERATOR
3. GENERATOR
4. WASHER
5. NUT, SELF-LOCKING
6. GEARCASE GEN PAD

Figure 5-1. Generator Removal/Installation

CHAPTER 6

MAINTENANCE OF FUEL SYSTEM

6-1. DESCRIPTION. Refer to TM 55-1730-229-12 for a description of the fuel system.

6-2. FUEL TANK.

a. Remove. (See figure 6-1.)

(1) Disconnect battery.

(2) Drain fuel tank.

(3) Raise front of AGPU and support with jack stands under frame.

(4) Refer to TM 55-1730-229-12, paragraph 4-115. Disconnect front and rear brake cables at brake adjustment fitting. Remove front brake cable mounting clamp from front fork lift beam.

(5) Remove front axle assembly (refer to paragraph 10-2).

CAUTION

Support forklift with jack stands before removing.

(6) Remove forklift tubes (17) by removing eight nuts (22), lockwashers (21), flat washers (19), bolts (18) and two spacers (20).

(7) Tag and disconnect wiring from fuel level sensor (1) and low fuel sensor (2).

(8) Disconnect fuel line (3) from elbow (4) on bottom of tank. Disconnect fuel line (3) from frame fitting and remove fuel line.

(9) Loosen hose clamps (5).

WARNING

Ensure that fuel tank is supported so it does not drop when straps are released.

(10) Loosen four jam nuts (7) and unscrew four turnbuckles (8) (turn clockwise) from frame stud and tank strap (9) studs. Carefully lower tank until there is clearance to disconnect vent hoses.

(11) Loosen hose clamps (10) and disconnect vent hoses (11) from elbows (12) at each top corner of tank.

(12) Lower fuel tank and remove hose section (6) from flange on fuel tank. Remove fuel tank (13).

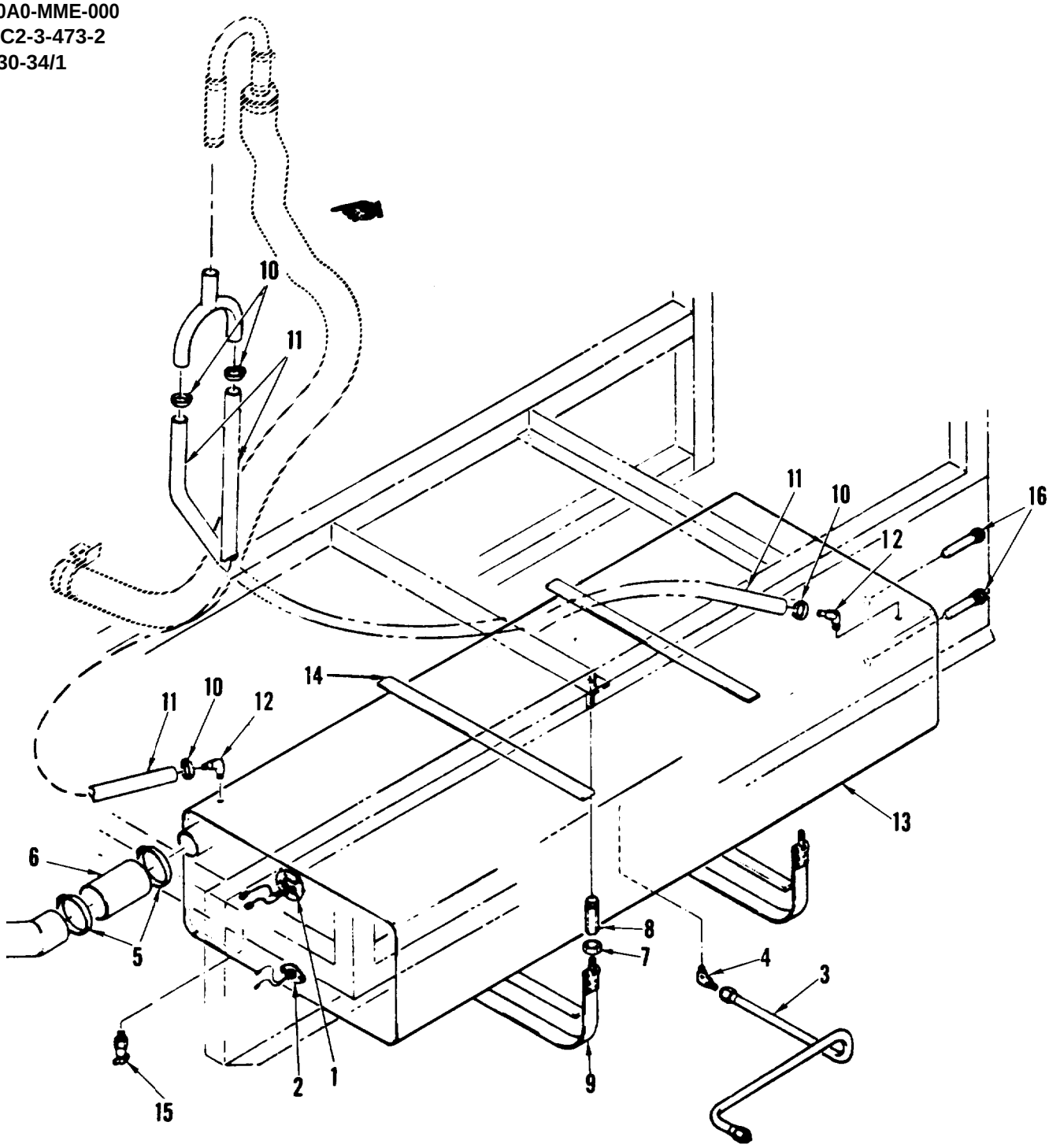
(13) Remove two cushions (14).

b. Repair. (See figure 6-1.)

(1) Clean tank to remove all signs of rust or corrosion. Repaint if required.

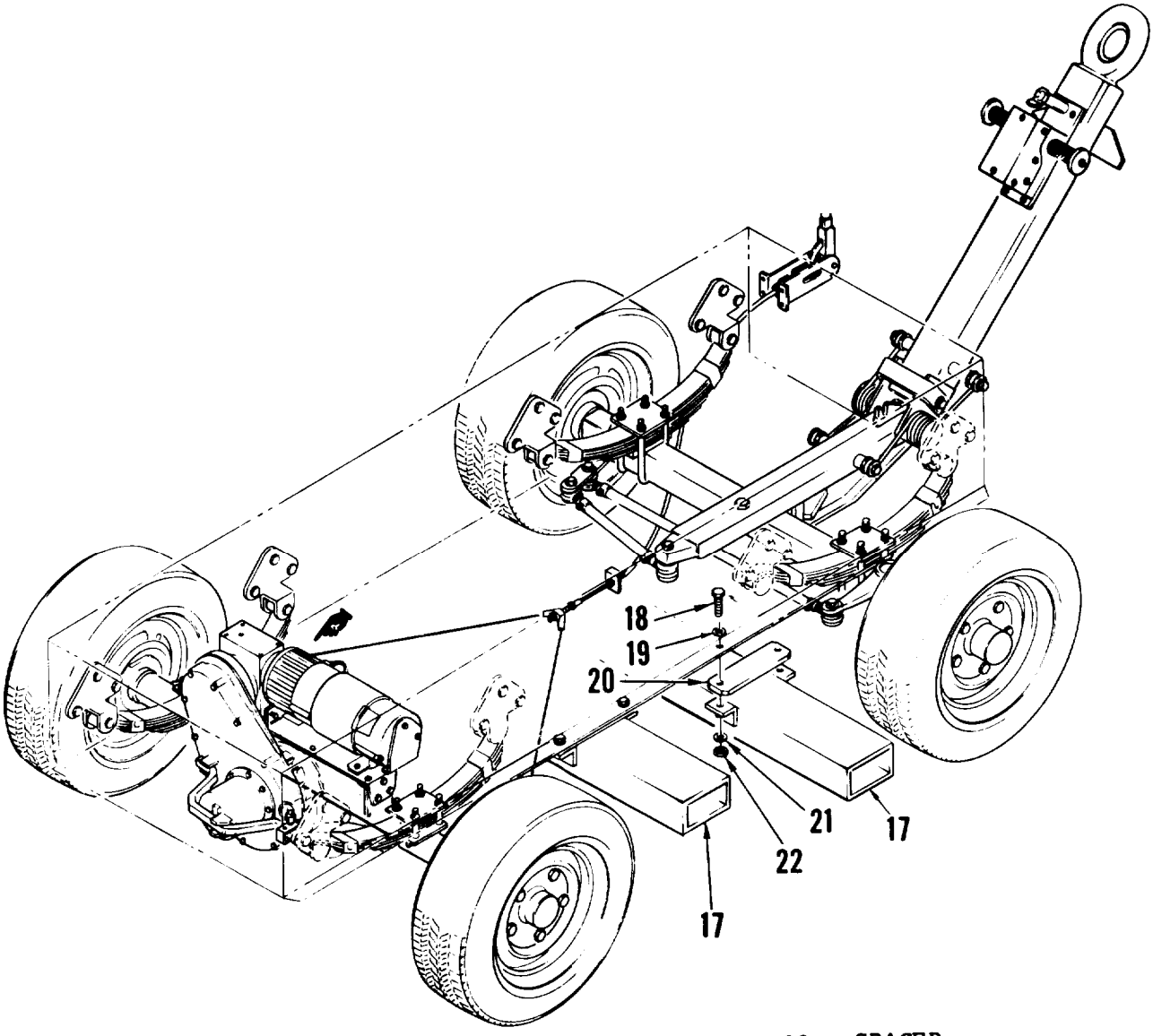
WARNING

If conditions require fuel tank repairs by welding or other methods involving heat or flame, take care to assure that all fumes are purged from the tank or fill tank with water before commencing the repair. If possible, tank should be filled with water prior to welding after being thoroughly purged of fumes. Applying heat or flame to a fuel tank containing residue, may result in a violent explosion, causing death or injury to maintenance personnel.



1. FUEL LEVEL SENSOR AND WIRING
2. LOW FUEL SENSOR AND WIRING
3. FUEL LINE
4. ELBOW
5. HOSE CLAMP
6. HOSE SECTION
7. JAM NUT
8. TURNBUCKLE
9. STRAP, TANK
10. HOSE CLAMP
11. VENT HOSE
12. ELBOW
13. FUEL TANK
14. CUSHION, TANK
15. DRAIN VALVE
16. CATEYE INDICATOR

Figure 6-1. Fuel Tank Removal (sheet 1 of 2)



17. FORKLIFT TUBES
18. BOLT
19. WASHER, FLAT
20. SPACER
21. WASHER, LOCK
22. NUT

Figure 6-1. Fuel Tank Removal (sheet 2 of 2)

(2) Repair small leaks by soldering. Large holes, tears, or leaks at seams require welding.

(3) Inspect elbows (4, 12) and drain valve (15). Replace if damaged.

(4) Inspect fuel level cateye indicators (16). Replace if damaged.

(5) At AGPU, inspect two vent hoses (11). Replace if split or torn.

c. Install. (See figure 6-1.)

(1) Position tank under AGPU. Place cushions (14) in position on top of tank. Position two tank straps (9), under tank.

(2) Raise rear of tank approximately ten inches and connect vent hoses (11) to elbows (12) at each top corner of tank. Install hose section (6) and two hose clamps (5). Install fuel hose section (6) on flange of fuel tank (13).

(3) Install jam nuts (7) on strap studs . Raise tank and secure to frame studs with four turnbuckles (8).

(4) Tighten four turnbuckles (8) securely; turn counterclockwise, and then tighten four jam nuts (7) to bottom of turnbuckles to prevent loosening of turnbuckles.

(5) Connect fuel line (3) from elbow (4) to fitting on frame.

(6) Connect wiring to fuel level sensor (1) and low fuel sensor (2).

(7) Place jack stands under unit and position forklift tubes (17) on jack stands. Install eight flat washers (19) on bolts (18). Install bolts and flat washers through frame lip, two spacers (20) and forklift tubes (17). Install eight lockwashers (21) and nuts (22). Tiqhten securely.

(8) Install front axle assembly (see paragraph 10-2).

(9) Connect front rear brake cables and mounting clamp. Refer to TM 55-1730229-12, paragraph 4-115.

6-3. Fuel Nozzle.

a. Remove. (See figure 6-2).

(1) Disconnect fuel line (1) from fuel nozzle (4).

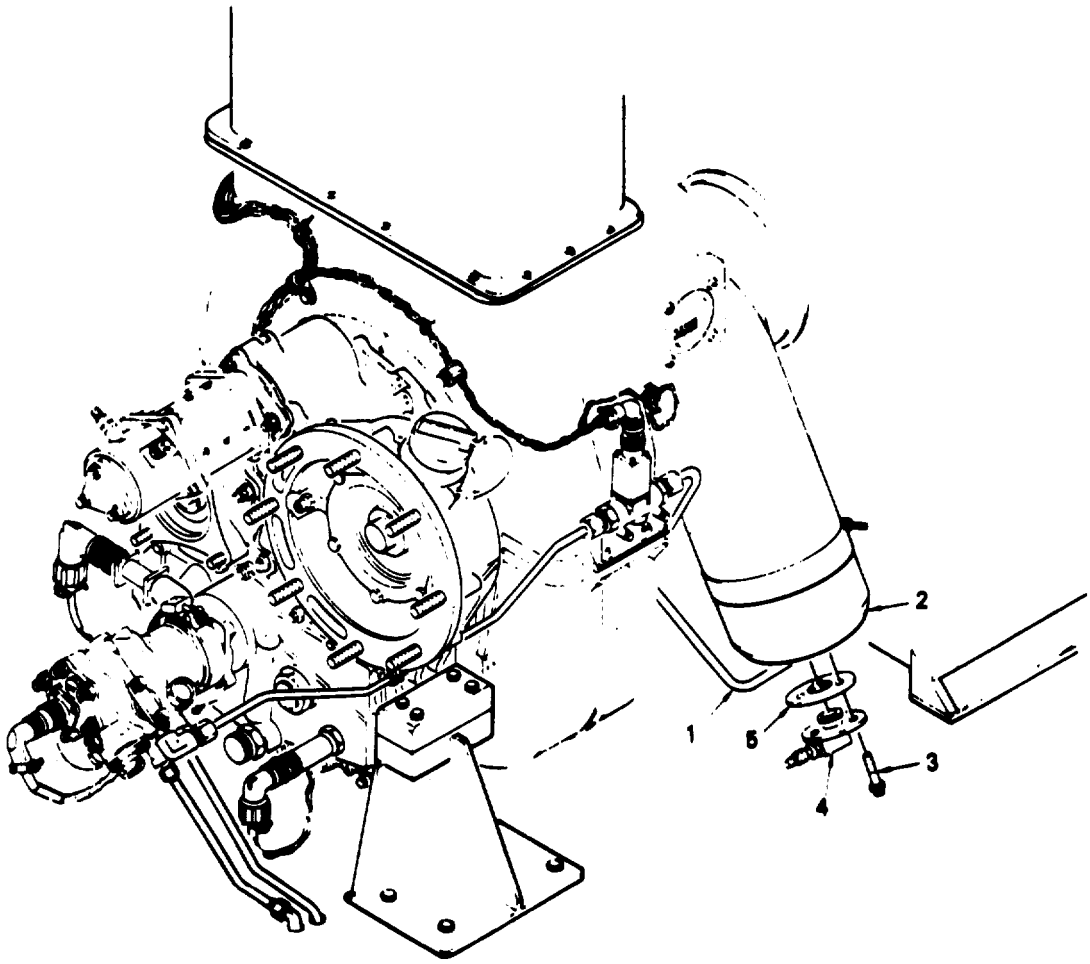
(2) Remove lock wire and remove three bolts (3), fuel nozzle (4), and gasket (5), from combustion chamber cap (2).

(3) Inspect gasket (5) for damage. No damage is allowed.

(4) inspect fuel nozzle inlet fitting for damaged threads, and inspect mounting flange for dents or deformation, No damage is allowed.

(5) Inspect nozzle face for burrs, nicks, or cracks. No damage is allowed.

(6) Inspect nozzle face and fuel passages for carbon deposits or blockage. Clean as outlined in paragraph b. if required.



1. FUEL LINE
2. COMBUSTIU CHAMBER CAP
3. BOLT
4. FUEL NOZZLE
5. GASKET

Figure 6-2. Fuel Nozzle

b. Clean.

(1) Position fuel nozzle with nozzle pointing downward, and apply low pressure air (approximately 30 psig) to inlet fitting.

CAUTION

Do not use steel brush to clean face of fuel nozzle. Alteration of fuel spray pattern may result.

(2) With air flowing through fuel nozzle, lightly brush carbon deposits from nozzle with a brass brush.

c. Install. (See figure 6-2.)

(1) Install gasket (5), fuel nozzle (4), and three bolts (3). Tighten bolts to 50 inch-pounds and lockwire.

(2) Reconnect fuel line (1) to fuel nozzle (4).

CHAPTER 7

MAINTENANCE OF IGNITION SYSTEM

7-1. DESCRIPTION. Refer to TM 55-1730-229-12 for a description of the ignition system.

7-2. STARTER ASSEMBLY.

a. Remove/Install. See TM 55-1730-229-12, paragraph 4-84.

b. Inspect/Replace Starter Brushes. (See figure 7-1.)

(1) Dimensionally check length of each brush. Length of each brush shall not be less than 0.31 inch. (Length of new brush is 0.51 inch.)

(2) Verify that brush assemblies are properly seated and that 75 percent of brush surfaces are contacting the commutator.

(3) If brush assemblies do not meet the requirements of steps (1) and (2), perform the following procedures.

(a) Loosen three screws (2) and remove the brush access cover assembly (1) by sliding off.

(b) Remove eight screws (3), lockwashers (4), flat washers (5) with wiring terminals (6, 7) from brush spring cap (8).

(c) Remove four brush spring caps (8), springs (9) and brushes (10).

(d) Scribe an alignment mark on end bell (13), and on housing and commutator assembly (17).

(e) Remove four bolts (11) and washers (12).

CAUTION

Do not scratch or score commutator surface during disassembly.

NOTE

Record configuration of shim washers (16) and preload washer (15) to reassemble to the original configuration.

(f) Remove mount end bell (13) and armature assembly (14) from the housing and commutator assembly (17).

(g) Remove shim washers (16) and preload washers (15).

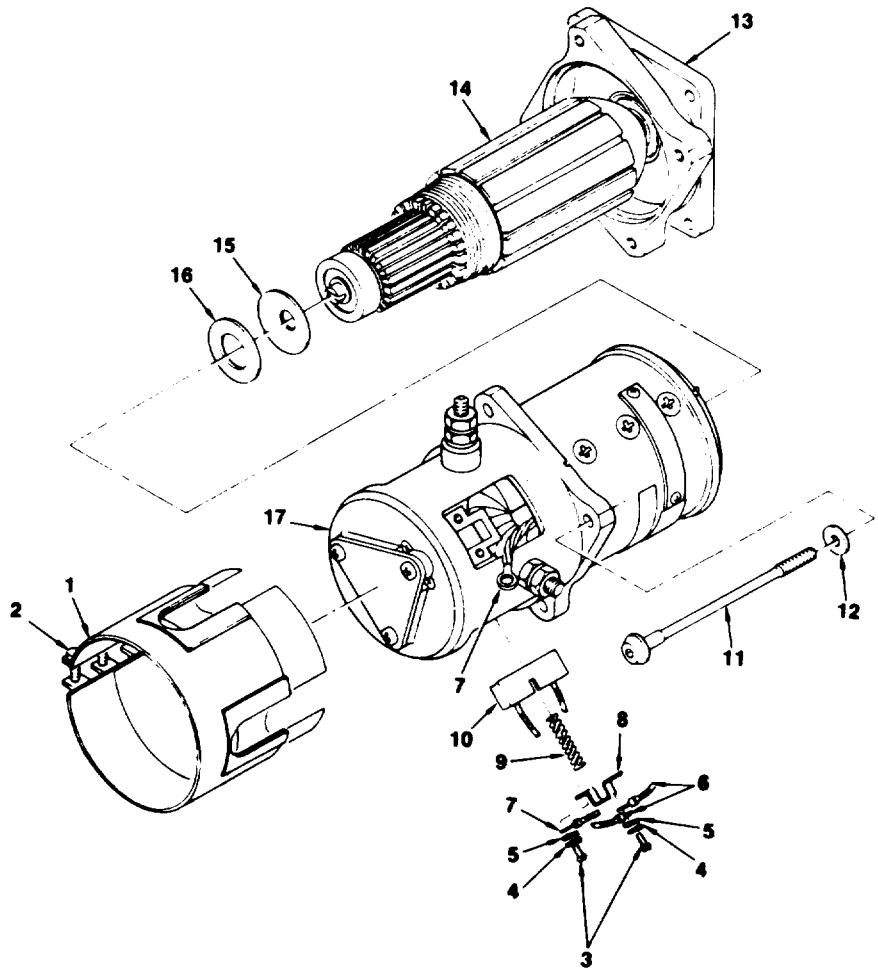
(h) Use low pressure air in a ventilated area to blow carbon dust from all parts of the disassembled starter motor.

(i) Install preloaded washer (15) and shim washer (16) to same thickness as recorded at disassembly to reassemble to original configuration.

(j) Reinstall mount end bell (13) and armature assembly (14) into the housing and commutator assembly (17), and align scribe marks.

(k) Reinstall four washers (12) and bolts (11). Tighten bolts (11) to 25 inch-pounds torque.

(l) Install four new brushes (10) into brush holders.



34-7-1

1. BRUSH ACCESS COVER ASSEMBLY
2. SCREW
3. SCREW
4. WASHER, LOCK
5. WASHER, FLAT
6. WIRE TERMINALS
7. WIRE TERMINAL
8. BRUSH SPRING CAP
9. SPRING (PN 47417-1)
10. BRUSH (PN 47407-1)
11. BOLT
12. WASHER
13. MOUNT END BELL
14. ARMATURE ASSEMBLY
15. PRELOAD WASHER
16. SHIM WASHER
17. HOUSING AND COMMUTATOR ASSEMBLY

Figure 7-1. Brush Removal/Replacement

(m) Reinstall four brush spring (9) and spring caps (8).

(n) Install wiring terminals (6, 7) on screws (3) with lockwashers (4) and flat washers (5), and secure brush spring cap (8) and assemble items to brush holders with screws (3).

(o) Reinstall brush access cover assembly (1), and tighten three screws (2).

CAUTION

The brush run-in is required to provide adequate contact area for current transfer from the brush to commutator. Insufficient contact area will result in localized heating and commutator and brush damage.

(p) Clamp the starter motor assembly to a stationary bench.

(q) Using low pressure (20-30 psig) air to cool the starter motor, seat the new brushes by running the starter motor with no-load at 6 to 8 VDC for two hours.

(r) Inspect brushes for a minimum of 75 percent of the contact surface touching the commutator after run-in.

(s) Remove brush access cover assembly (1) and using low pressure air (20-30 psig) blow the carbon dust from the commutator.

(t) Reinstall the brush access cover assembly (1).

CHAPTER 8

MAINTENANCE OF HYDRAULIC SYSTEM

Section I. DESCRIPTION OF HYDRAULIC SYSTEM

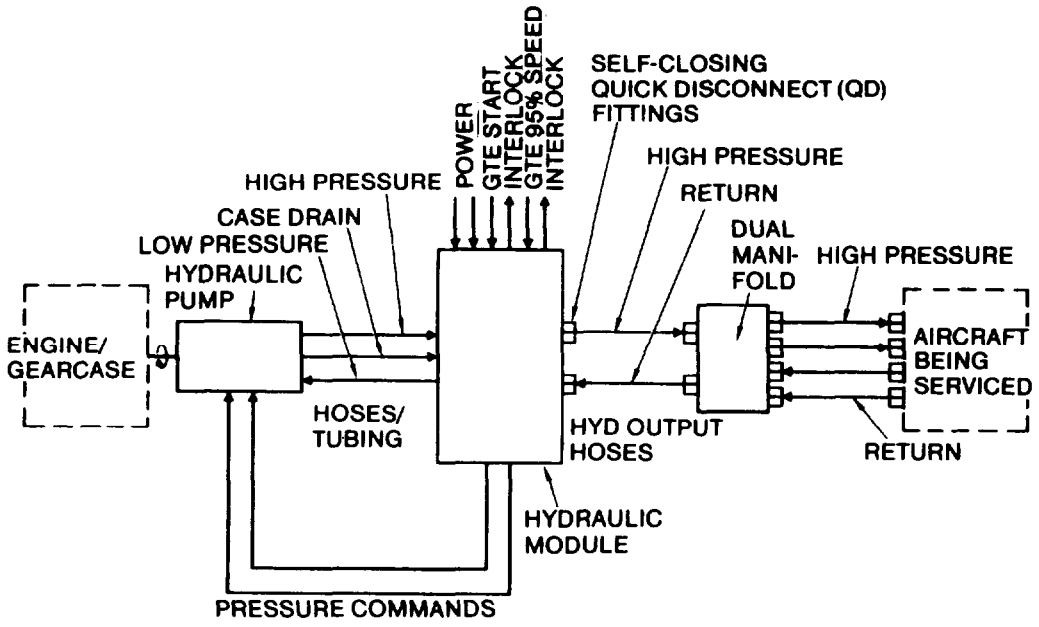
8-1. DESCRIPTION. The hydraulic system, figure 8-1, consists of: a hydraulic pump (mounted on engine gearcase), a hydraulic module, a dual manifold, and hydraulic hoses and lines. The hydraulic system provides adjustable high pressure hydraulic power up to 3,300 psig at 15 gpm to an aircraft. This hydraulic power can be used to drive aircraft hydraulic systems, fill aircraft reservoirs, or flush aircraft hydraulic systems. Output pressure to the aircraft is adjusted by the operator at the hydraulic module control panel. Hydraulic pressure, once set, remains constant regardless of the flow rate demanded by the aircraft (up to the maximum flow rate of 15 gpm). The hydraulic system uses fluid MIL-H-83282, or MIL-H-5606. Fluid MIL-H-83282 is limited to temperature ranges from -40°F to +125°F.

a. Hydraulic Pump. The hydraulic pump (with pressure compensation controls enclosed) bolts to the engine/gearcase pump mounting pad. The pump is driven by the engine/gearcase at approximately 8,000 rpm. For units not requiring hydraulic power, a spacer is provided to bolt between the engine/gearcase and pump. This spacer disconnects the pump from the drive gear. This eliminates unnecessary wear on pump, and reduces load on engine (since the pump must maintain a minimum 500 psig pressure for self-lubrication). The hydraulic system must never be operated without sufficient hydraulic fluid , or pump will be damaged. The pump receives a low pressure fluid from the hydraulic module reservoir and supplies high pressure hydraulic power. The pump is designed to allow hydraulic fluid to leak through the bearings for cooling and lubrication. This fluid is routed from the pump case drain back to the reservoir. The pump receives electrical commands, set by the operator, from the hydraulic module control panel for an increase or decrease of output fluid pressure.

b. Hydraulic Module. The hydraulic module, figure 8-2, contains all controls (fluid and electrical) for the hydraulic system. The module contains a nine-gallon reservoir with attachments for manual filling and draining, overflow, and removal of moisture from vent air that enters as fluid level changes. High pressure (3 micron) and return (10 micron) filters have throw-away elements. The filters have built-in electrical circuits that illuminate the CHANGE FILTER light on the control panel when the filter elements need changing. The accumulator (pressurized with nitrogen), heat exchanger, gauge, valves and plumbing complete the makeup of the hydraulic module.

c. Dual Manifold. A separate dual manifold, figure 8-3, is included in the hydraulic system to accommodate the need for dual outlet and return connections. The single input is branched to two equal output lines, and two returns are combined into a single return path. Valves and fluid ports are provided for filling and draining hoses.

d. Hoses and Lines. Plumbing between the pump and module consists of fixed tubing with sections of hose at the end near the pump. The hoses between the hydraulic module and dual manifold are 30 feet long. The output



NOTE: DUAL MANIFOLD NOT USED FOR SERVICING CH-47 CHINOOK AIRCRAFT. A SPECIAL HIGH PRESSURE OUTPUT HOSE AND A SINGLE RETURN ADAPTER HOSE WITH THE RETURN HYD OUTPUT HOSE ARE USED. 34-8-1

Figure 8-1. Hydraulic System, Simplified

(high pressure) hose is 1/2-inch diameter and the return (low pressure) hose is 3/4 inch diameter. The four (two output and two return) adapter hoses are five feet long.

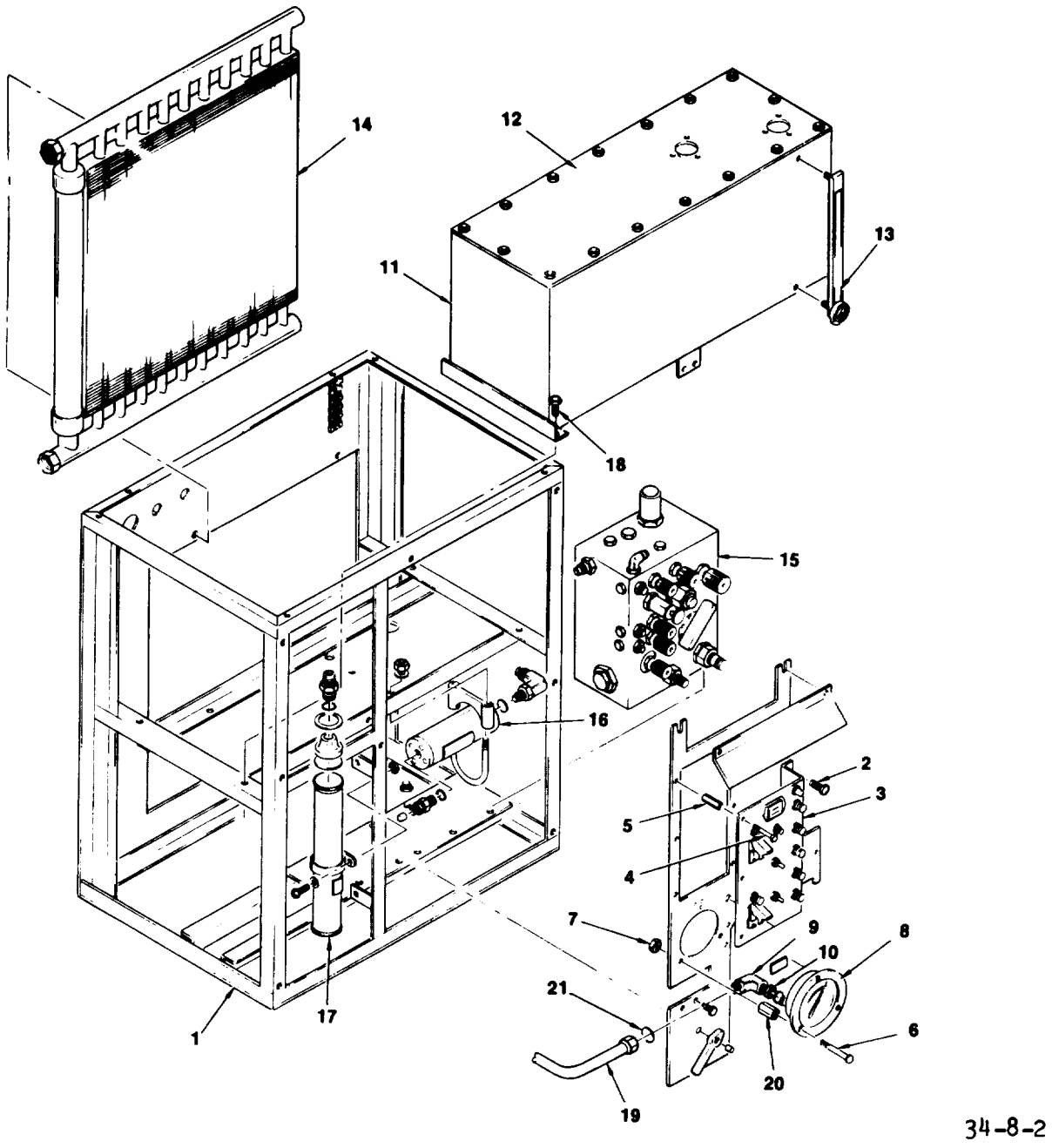
e. Hydraulic System Function. The most common hydraulic system operating mode is that of supplying hydraulic power to an aircraft. The hydraulic flow diagram for this mode is on foldout F0-10.

NOTE

Foldouts are contained in TM 55-1730-229-12.

(1) A schematic of the hydraulic system electrical controls and indicators is shown on figure FO-9. Hydraulic flow diagrams for other modes of operation are shown on figures FO-11 (servicing aircraft using aircraft reservoir), figure FO-12 (warming fluid in module), figure FO-13 (warming fluid in hoses), and figure FO-14 (bleeding air).

(2) As shown on figure FO-10, hydraulic fluid from the AGPU reservoir is routed through a reservoir selector valve and passes four temperature sensors to the hydraulic pump. The temperature sensors (TS1 through TS4 on figure FO-9) are set to close at various temperatures. The 70°F sensor (TS1) causes SYSTEM READY light DS5 to illuminate. This indicates that the hydraulic fluid is at the minimum temperature for operation. Sensors TS2 and TS3 illuminate 160°F and 240°F indicator lights. If hydraulic fluid reaches 275°F , TS4 activates to illuminate HI TEMP light. Activation of TS4 also interrupts the circuit to the load valve pilot solenoid, and shuts down hydraulic power to aircraft.



1. FRAME
2. SCREW
3. ELECTRICAL CONTROL PANEL
4. BOLT
5. STANDOFF
6. BOLT
7. NUT
8. GAUGE
9. ELBOW
10. JAM NUT
11. RESERVOIR
12. RESERVOIR TOP COVER
13. TEMP/LEVEL GAUGE
14. COOLER (HEAT EXCHANGER)
15. MANIFOLD
16. ACCUMULATOR
17. VENT DRYER
18. BOLT
19. GAUGE TUBE ASSEMBLY
20. STANDOFF
21. SEAL

Figure 8-2. Hydraulic Module Major Components

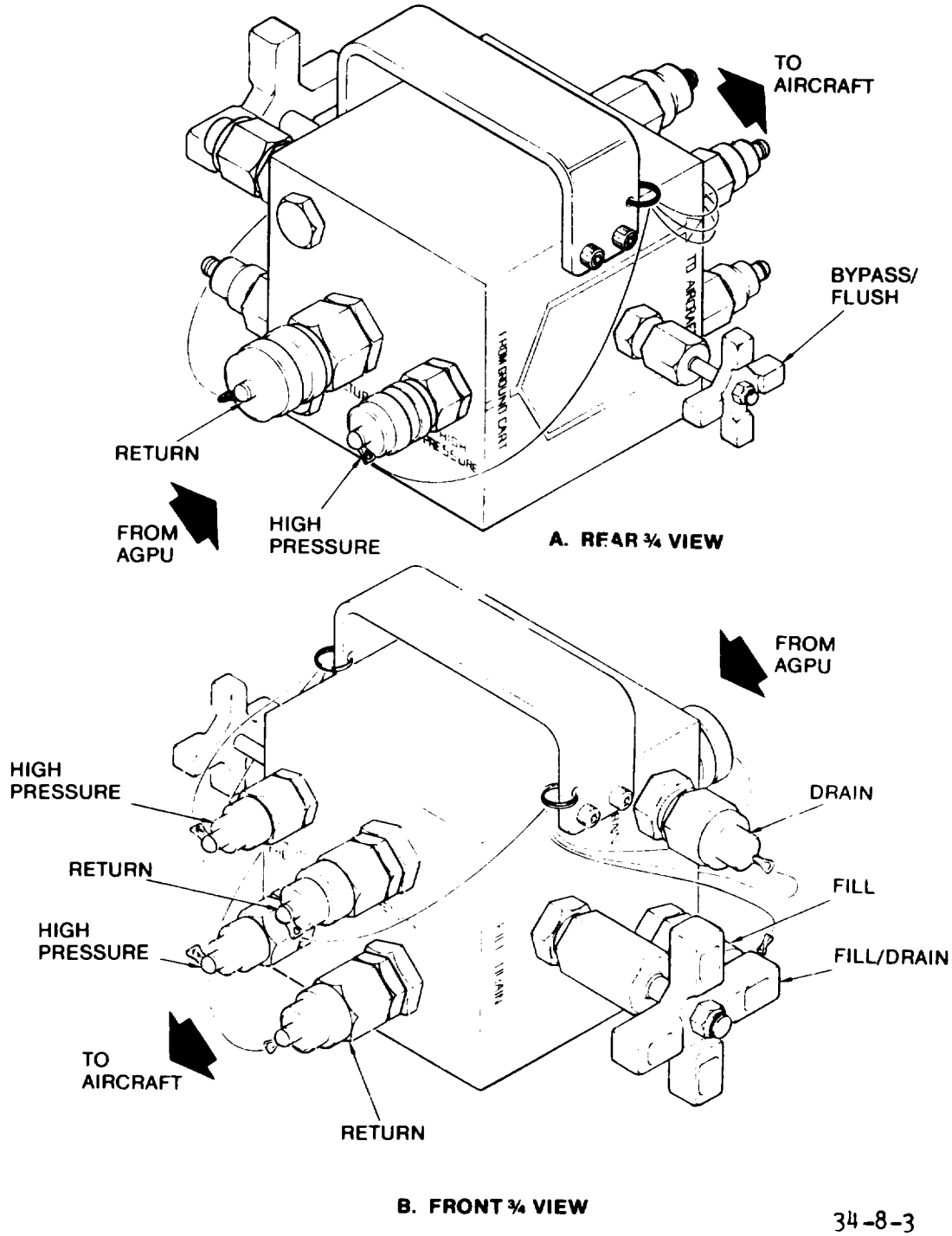


Figure 8-3. Hydraulic Dual Manifold

(3) The pump provides hydraulic pressure as commanded by the PRESSURE switch , figure FO-9. The two pressure command lines to the pump carry 28 vdc which positions the pressure adjustment mechanism inside the pump. When output connector pin G is at 28 vdc (pin H is the return) the pump mechanism operates to increase pressure. When the applied voltage is reversed on the pump input leads, the mechanism operates to decrease pressure. The PRESSURE switch is spring loaded to its unconnected center position. So the pump pressure mechanism remains in the last position it was set to by the operator unless power to the hydraulic module is turned off. When POWER switch S1 is set to OFF, output connector pin H is connected to 28 vdc and pin G becomes the return line. This causes the pump pressure mechanism to move to the position of minimum pressure (500 psig).

(4) Prior to servicing an aircraft the PRESSURE RELIEF valve (figure FO-10) is set to the maximum allowable pressure for that particular aircraft. If the operator increases the pump pressure beyond the allowable maximum, the PRESSURE RELIEF valve will open to prevent excess pressure.

(5) A high and low pressure filter is provided to remove any solid contamination in the hydraulic fluid. A switch is connected across each filter. If the filter gets dirty and the difference between input and output fluid pressure exceeds 50 psi the switch closes. As shown on figure FO-9, closure of either pressure switch PS1 or PS2 causes the REPLACE FILTER light to illuminate.

(6) The accumulator, figure FO-10, stores hydraulic pressure to accommodate brief changes in demand. The OUTPUT PRESSURE gauge provides the operator with an indication of pressure being applied. The HIGH PRESSURE BYPASS valve provides a path for circulation of hydraulic fluid when either the load valve is closed or when hoses to the aircraft (or dual manifold) are not connected. Restrictions in the HIGH PRESSURE BYPASS valve line and in the dual manifold bypass lihe provide a backpressure of 500 psi when the bypass valve is open. This back-pressure is required for proper pump operation. Application of hydraulic power to the aircraft is controlled by the load select valve. As shown in figure 8-4, operation of the load select valve involves three steps as follows:

(a). OUTPUT switch S4 is set to ON which applies 28 vdc to the pilot valve solenoid and OUTPUT ON indicator.

(b). Activation of the solenoid pushes the pilot valve against the spring allowing high pressure fluid to be applied to the load valve.

(c). Fluid pressure pushes the load valve against its spring allowing hydraulic system output to be applied to the aircraft.

(7) When the OUTPUT switch is set to OFF, the solenoid, pilot and load valves all return to their original positions and the fluid pressure trapped between the valves is released back to the reservoir. The output and return hoses are each 30 feet in length. The output hose is 1/2 inch in diameter and the return hose is 3/4 inch. Quick disconnects containing check valves on each end hold the fluid in the hose so it will not drain out between uses. Protective caps are attached to keep quick disconnect fittings clean when hoses are not in use.

(8) The dual manifold is provided because some aircraft require two high pressure and two return connections. This need is satisfied by dual connections on the manifold and the use of short (5 foot) adapter hoses. The dual manifold provides additional fill and

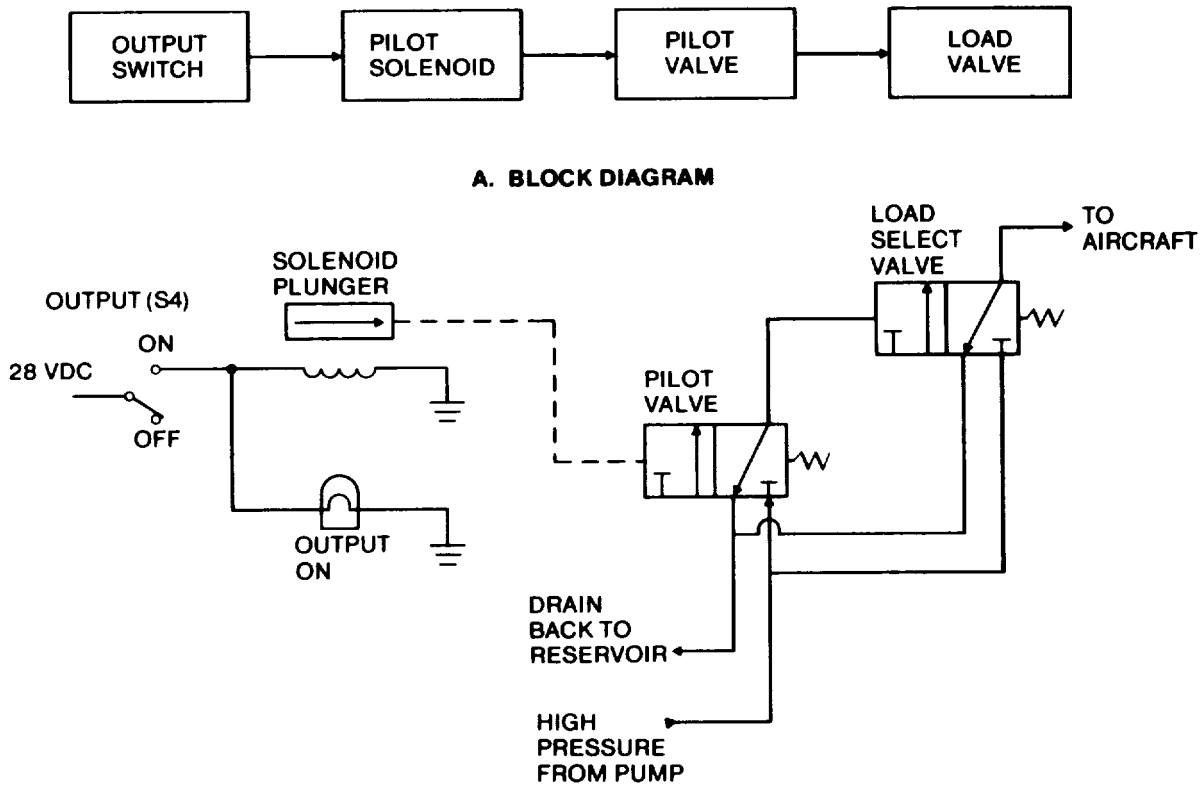


Figure 8-4. Load Valve Operation

drain ports and valves. Quick disconnects with check valves minimize fluid loss.

(9) Return line components include the RETURN BYPASS valve and heat exchanger. The RETURN BYPASS valve (when set to the OFF position) provides 65 psi of back-pressure to the aircraft. This is required for proper servicing of certain aircraft. In the BYPASS position, no back-pressure is provided. The heat exchanger cools the hydraulic fluid by transferring heat from the fluid to ambient air. The heat exchanger is located at the back of the hydraulic module allowing for escape of heated air. A 10 psi relief valve is parallel to the heat exchanger to prevent flow restrictions at maximum flow rates. This relief valve is inside the heat exchanger and not separately replaceable.

(10) Attachments to the hydraulic module reservoir permit filling and allow the system to vent. When filling the system with hydraulic fluid (at either the SYSTEM FILL, dual manifold FILL, or extra fill ports) the air in the reservoir is allowed to escape through the overflow channel. This is also true of excess hydraulic fluid in the reservoir. Air coming into the reservoir (when hydraulic fluid level drops) passes through the filter drier. This unit removes moisture and other contamination from the air before it enters the reservoir.

(11) Figure FO-11 shows the main flow path when hydraulic fluid is supplied by the reservoir in the aircraft being serviced. Figures FO-12 and FO-13 show how cold fluid is circulated through the system to warm it to operating temperature. Warming is accomplished by opening the HIGH PRESSURE BYPASS valve slightly--heat is generated by the friction of forcing the fluid through a small opening. Figure FO-14 shows the flow while bleeding air from the system. This same flow applies when filling or adding fluid to the system.

8-2. HYDRAULIC MODULE. Refer to chapter 2 for removal and installation of hydraulic module.

Section II. MAINTENANCE

8-3. INTRODUCTION. This section contains hydraulic system maintenance procedures. Certain maintenance procedures require disassembly and reassemble of the hydraulic module to gain access to the component being repaired. These disassembly and reassembly procedures are contained in Section III (Module Disassembly) and Section IV (Module Assembly). Steps in these sections are referenced for disassembly and reassembly procedures necessary to remove/ install components.

8-4. HYDRAULIC PUMP.

a. Remove. (See figure 8-5.)

Ensure hydraulic system is not under pressure before disconnecting hydraulic hoses.

(1) Perform steps (a) through (d) of step (6) in paragraph 2-10.a.

(2) Hold Pump (3) in position and remove four nuts (1, figure 8-5) and washers (2).

(3) Carefully remove pump (3) from gearcase drive pad (4).

b. Install. (See figure 8-5.)

(1) Lubricate splines on pump (3) shaft and internal splines on gearcase drive pad (4) with a thin coat of grease MIL-G-21164C.

(2) Carefully install pump (3) on studs on gearcase drive pad (4). Turn pump shaft slightly, if required, to engage splines on gearcase drive pad.

(3) Install washers (2) and nuts (1) and tighten to between 180 and 200 inch-pounds of torque. Torque fitting jam nuts as shown in figure 8-5A.

(4) Perform steps (a) through (d) of step (5) in paragraph 2-10.b.

8-5. HYDRAULIC PRESSURE GAUGE.

a. Remove. (See figure 8-2.)

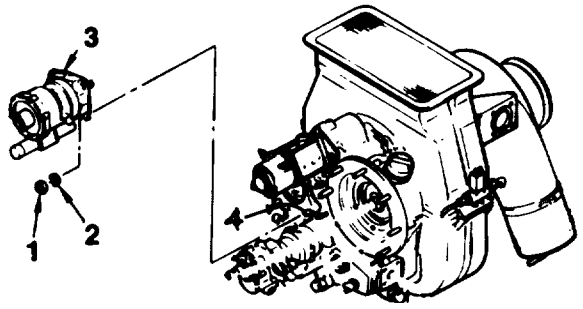
(1) Open GAUGE SHUTOFF valve 1/4 turn. This valve is on mai~n control manifold (15, figure 8-2).

(2) Observe pressure indication on OUTPUT PRESSURE gauge (8). It should read zero. If it does not, open HIGH PRESSURE BYPASS valve on manifold (15) slightly and observe that gauge pressure reduces to zero.

(3) Close HIGH PRESSURE BYPASS and GAUGE SHUTOFF valves on manifold (15).

(4) Remove module from unit as described in paragraph 2-8.a.

(5) Remove vent dryer as described in paragraph 4-92, TM 55-1730-229-12.



34-8-5

1. NUT
2. WASHER
3. HYDRAULIC PUMP
4. GEARCASE DRIVE PAD

Figure 8-5. Hydraulic Pump Removal/Installation

(6) Disconnect hydraulic tube (19, figure 8-2) connector from elbow (9) on back of OUTPUT PRESSURE gauge (8). Remove and discard copper seal (21).

(7) Remove bolts (6), nuts (7) and standoffs (20).

(8) Remove gauge (8).

(9) Match mark elbow's (9) position on back of gauge (8).

(10) Loosen jam nut (10) and remove elbow (9) from back of pressure gauge. Remove jam nut (10).

b. Install. (See figure 8-2.)

(1) Apply hydraulic fluid (MIL-H-5606 or MIL-H-83282) to both sets of threads of elbow (9).

(2) Install jam nut (10) on fitting on back of gauge (8).

(3) Screw elbow (9) onto gauge (8). Ensure that match marks are lined up when elbow is within one turn of being tight.

(4) Tighten elbow (9) with jam nut (10).

(5) Insert gauge into hole in hydraulic control panel and secure with bolts (6), nuts (7) and standoffs (20).

(6) Install a new 7C-4 copper seal on elbow (9).

(7) Fasten hydraulic tube connector (19) to elbow (9). Torque to between 135 and 150 inch-pounds.

(8) Reinstall vent dryer as described in paragraph 4-92, TM 55-1730-229-12.

8-6. SIGHT GLASSES.

NOTE

This procedure does not require that the module be removed from the unit.

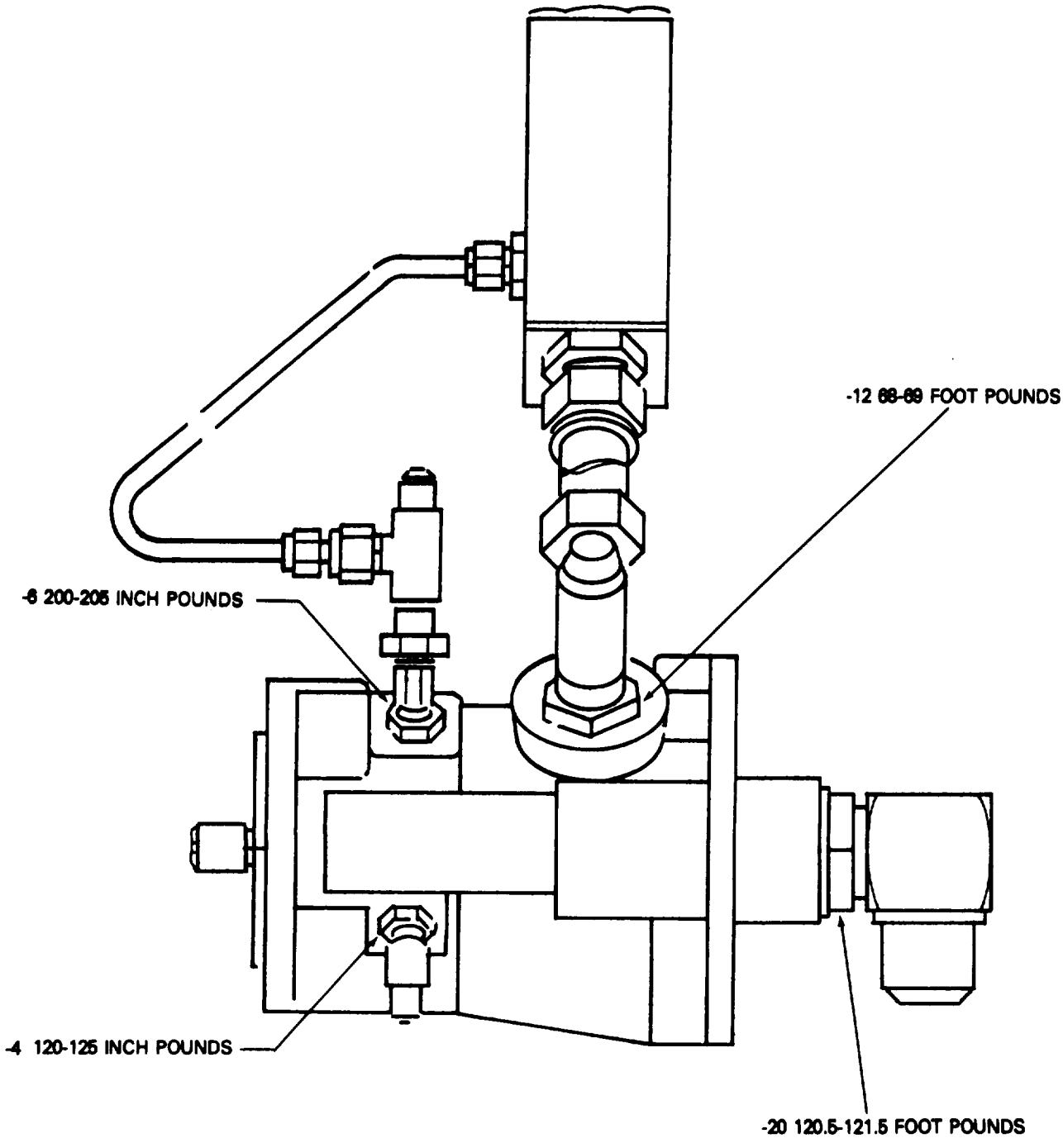


Figure 8-5A. Hydraulic Pump Torque Values

a. Remove.

(1) Open GAUGE SHUTOFF valve 1/4 turn. This valve is on manifold (15, figure 8-2) . See figure 2-15, TM 55-1730-229-12 for valve nomenclature.

(2) Observe pressure indication on OUTPUT PRESSURE gauge (8, figure 8-2). It should read zero. If it does not, open HIGH PRESSURE BYPASS valve on manifold (15) slightly and observe that gauge pressure reduces to zero.

(3) Close the RETURN BLEED valve on manifold (15) if the RETURN sight glass is to be replaced or the HIGH PRESSURE BLEED valve of the HIGH PRESSURE sight glass is to be replaced. These valves and sight glasses are on manifold (15).

(4) Turn either PRESSURE sight glass (1, figure 8-6) or RETURN sight glass (18) counterclockwise to remove it. Ensure that packing (2 or 18) also is removed. Discard packinq.

b. Install. (See figure 8-6.)

(1) Lubricate sight glass threads with MIL-H-5606 or MIL-H-83282.

(2) Install new packing (2 or 18).

(3) Install sight glass (1 or 17) into manifold.

8-7. MANIFOLD FRONT VALVES AND FITTINGS.

a. Remove Valves and Fittings. (See figure 8-6.)

(1) Removal of Cartridge Valves (3).

NOTE

This procedure does not require that the module be removed from unit.

(a) Open GAUGE SHUTOFF valve 1/4 turn. This valve is on manifold (15, figure 8-2).

(b) Observe pressure indication on OUTPUT PRESSURE gauge (8, figure 8-2) . It should read zero. If it does not, open HIGH PRESSURE BYPASS valve on manifold (15) slightly and observe that gauge pressure reduces to zero.

(c) Drain hydraulic fluid from reservoir as described in paragraph 3-9.d of TM 55-1730-229-12.

(d) Remove set screw (5, figure 8-6) from valve knob (7).

(e) Pry pin (6) from location in knob (7) opposite the set screw (5).

(f) Remove knob (7).

(g) Turn valve (3) counterclockwise to remove it. Remove packing (4 and 19). Discard packing.

(2) Removal of PRESSURE RELIEF Valve (20).

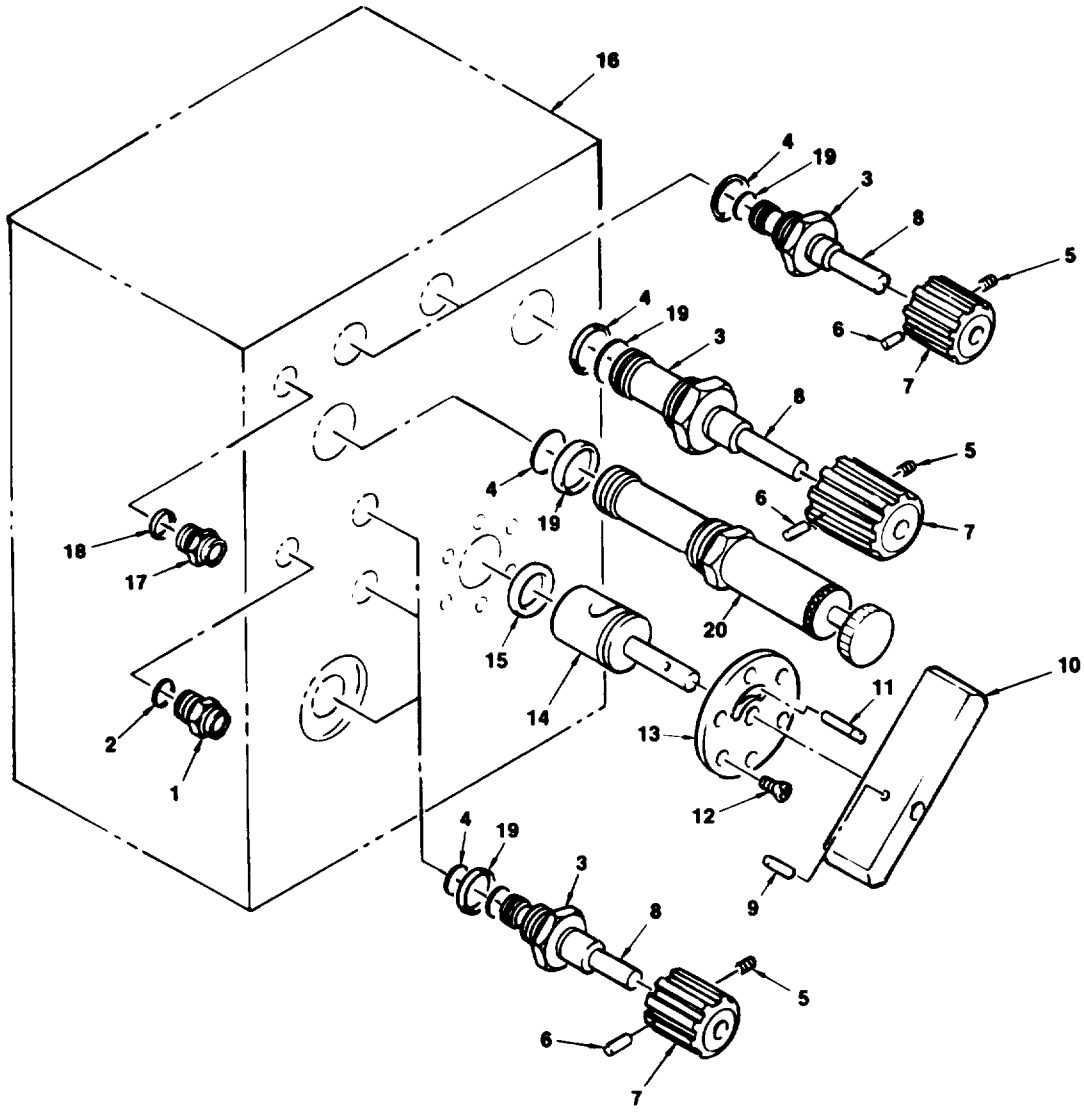
NOTE

This procedure does not require that the module be removed from the unit.

(a) Open GAUGE SHUTOFF valve on manifold 1/4 turn.

(b) Observe pressure indication on OUTPUT PRESSURE qauge (8, figure 8-2) . It should read zero. If it does not, open HIGH PRESSURE BYPASS valve on manifold (15) slightly and observe that qauge pressure reduces to zero.

(c) Drain hydraulic fluid from reservoir as described in paragraph 3-9.d of TM 55-1730-229-12.



34-8-6

PRESSURE SIGHT GLASS	8.	VALVE BODY	15.	PACKING
PACKING	9.	SET SCREW	16.	MANIFOLD
VALVE	10.	HANDLE	17.	RETURN SIGHT GLASS
PACKING	11.	PIN	18.	PACKING
SET SCREW	12.	SCREW	19.	PACKING
PIN	13.	FLANGE	20.	PRESSURE RELIEF VALVE
KNOB	14.	VALVE		

Figure 8-6. Hydraulic Manifold, Front Controls and Connectors

(d) Turn PRESSURE RELIEF valve (20, figure 8-6) counterclockwise to remove it.

(e) Remove and discard packing (4, 19).

(3) Removal of RETURN BYPASS Valve (14).

NOTE

This procedure does not require that the module be removed from unit.

(a) Open GAUGE SHUTOFF valve on manifold (15, figure 8-2) 1/4 turn.

(b) Observe pressure indication on OUTPUT PRESSURE gauge (8, figure 8-2) . It should read zero. If it does not, open HIGH PRESSURE BYPASS valve on manifold (15) slightly and observe that gauge pressure reduces to zero.

(c) Drain hydraulic fluid from reservoir as described in paragraph 3-9.d of TM 55-1730-229-12.

(d) Remove set screw (9, figure 8-6), handle (10), and pin (11) from RETURN BYPASS valve.

(e) Remove screws (12) and flange (13).

(f) Remove valve body (14) and packing (15). Discard packing.

b. Install Valves and Fittings. (See figure 8-6.)

(1) Replacement of Cartridge Valves (3).

(a) Inspect manifold hole and threads for nicks, scratches, or contamination.

(b) Lubricate manifold hole and valve threads with MIL-H-5605 or MIL-H-83282.

(c) Install new packings (4 and 19).

(d) Install valve body (8).

(e) Install knob (7), in (6), and setscrew (5) on valve body (8) .

(f) Refill reservoir as described in paragraph 3-9 of TM 55-1730-229-12.

(2) Replacement of PRESSURE RELIEF Valve (20).

(a) Inspect manifold hole and threads for nicks, scratches, or contamination.

(b) Lubricate manifold hole and valve threads with MIL-H-5606 or MIL-H-83282.

(c) Install new packings (4, 19).

(d) Install valve body (20).

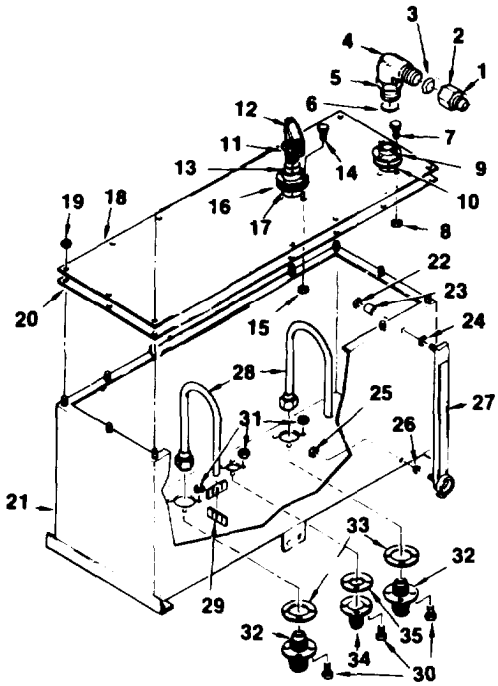
(e) Refill reservoir as described in paragraph 3-9 of TM 55-1730-229-12.

(3) Replacement of RETURN BYPASS Valve (14).

(a) Inspect manifold valve hole and mounting screw threaded holes for nicks, scratches, or contamination.

(b) Lubricate valve hole and threaded holes with a small amount of MIL-H-5606 or MIL-H-83282.

(c) Install new packing (15).



1.	COUPLING NUT	19.	NUT
2.	REDUCER	20.	GASKET
3.	SEAL	21.	RESERVOIR
4.	ELBOW	22.	NUT
5.	NUT	23.	SPACER
6.	PACKING	24.	PACKING
7.	BOLT	25.	NUT
8.	NUT	26.	PACKING
9.	FLANGE	27.	SIGHT GLASS/
10.	GASKET		TEMP GAUGE
11.	NUT, JAM	28.	TUBE ASSEMBLY
12.	TEE	29.	BAFFLE
13.	PACKING	30.	BOLT
14.	BOLT	31.	NUT
15.	NUT	32.	FITTING
16.	FLANGE	33.	GASKET
17.	GASKET	34.	FITTING
18.	TOP	35.	GASKET

Figure 8-7. Reservoir

(d) Insert valve (14) into hole in manifold.

(e) Install mounting flange (13), pin (11), and six screws (12).

(f) Install handle (10) and set screw (9).

(g) Fill reservoir as described in paragraph 3-9 of TM 55-1730-229-12.

8-8. RESERVOIR.

a. Remove. Remove reservoir (21, figure 8-7) by performing steps a. through s.(4) in paragraph 8-16.

b. Inspect. (See figure 8-7.)

(1) Inspect coupling ends of reducer (2), tee (12), and fittings (32 and 34) for scratches or gouges. Replace if damaged.

(2) Inspect tube assemblies (28) for cracks or deformation. Replace if damaged.

(3) Inspect sight glass/temperature gauge (27) for cracks or leaks. Replace if damaged.

(4) Inspect reservoir (21) interior for sludge or contamination. Clean as required.

(5) Inspect coupling nut (1) and elbow (4) for cracks and worn threads. Replace if damaged.

(6) Inspect flanges (9, 16) for cracks. Replace if damaged.

(7) Inspect top (18) for warpage and cleanliness of mating surfaces to reservoir (2).

(8) Inspect spacer (23) of temp gauge for burrs, scratches, and corrosion. Replace if damaged.

(9) Inspect baffle (29) for damage.

c. Repair. (See figure 8-7.)

(1) Replace reducer (2) by removing coupling nut (1). Remove and discard seal (3). Install new reducer (2) and seal (3), and tighten coupling nut (1) to between 900 and 1,000 inch-pounds of torque.

(2) Replace elbow (4) as follows:

(a) Remove coupling nut (1), reducer (2), and seal (3). Discard seal.

(b) Match mark elbow (4) to flange (9) and top (18) and loosen nut (5).

(c) Remove elbow (4) with packing (6). Discard packing.

(d) Install new elbow (4) with new packing (6), align to match mark, and tighten with jam nut (5).

(e) Install reducer (2) and new seal (3), and tighten coupling nut (1) to between 900 and 1,000 inch-pounds.

(3) Replace flange (9) as follows:

(a) Match mark elbow (4) to flange (9) and top (18). Loosen nut (5) and remove elbow (4) with reducer (2) attached. Discard packing (6)

(b) Remove four bolts (7) and nuts (8), and remove flange (9) and gasket (10). Discard gasket.

(c) Coat threads of bolts (7) with RTV 106.

(d) position (align match marks) flange (9) and new gasket (10) on top (18) and install bolts (7) and nuts (8).

(e) Install elbow (4) with new packing (6), align to match marks and tighten with jam nut (5).

(4) Replace tee (12) as follows:

(a) Match mark tee (12) to flange (16) and top (18).

(b) Loosen nut (11) and remove tee. Discard packing (13).

(c) Install tee (12) with new packing (13), align match marks, and tighten with jam nut (11).

(5) Replace flange (16) as follows :

(a) Match mark tee (12) to flange (16) and top (18).

(b) Loosen nut (11) and remove tee. Discard packing (13).

(c) Remove four bolts (14) and nuts (15), and remove flange (16) and gasket (17). Discard gasket.

(d) Coat threads of bolts (14) with RTV 106.

(e) Install flange (16) and new gasket (17) on top (18) and install bolts (14) and nuts (15).

(f) Install tee (12) with new packing (13), align to match marks, and tighten with jam nut (11).

(6) Replace sight glass/temperature gauge (27) as follows:

(a) Remove nut (22) and spacer (23). Remove nut (25).

(b) Remove gauge (27) from reservoir (21) and discard packings (24, 26).

(c) Install new packings (24 , 26) on gauge (27).

(d) Coat threads on top and bottom studs on gauge (27) with RTV 106.

(e) Install gauge in reservoir (21) using nut (25), and nut (22) and spacer (23).

(7) Replace tube assemblies (28) as follows:

(a) Loosen nut of tube assembly (28) and remove tube assembly.

(b) Install tube assembly (28). Ensure that end of left tube assembly is aligned with center of baffle (29).

(8) Replace fittings (32) as follows:

(a) Remove tube assembly (28).

(b) Remove four bolts (30) and nuts (31).

(c) Remove fitting (32) and gasket (33). Discard gasket.

(d) Coat threads of Four bolts (30) with RTV 106.

(e) position fitting (32) with new gasket (33) and install four bolts (30) and nuts (31).

(f) Install tube assembly (28). Ensure that end of left tube assembly is aligned with center of baffle (29).

(9) Replace fitting (34) as follows:

(a) Remove four bolts (30) and nuts (31).

(b) Remove fitting (34) and gasket (35). Discard Rasket.

(c) Coat threads of four bolts (30) with RTV 106.

(d) Position fitting (34) with new gasket (35) and install four bolts (30) and nuts (31).

d. Install. Install reservoir by performing steps o. through aj. and as. through av. in paragraph 8-18.

8-9. FILTER HEADS.

a. Remove. Remove filter heads (6 and 15, figure 8-8) by performing steps a. through ae.(4) in paragraph 8-16.

b. Inspect. (See figure 8-8.)

(1) Inspect internal threads on filter head (6, 15) body for damage. Replace filter head if damaged.

(2) Inspect coupling ends of fittings (7, 11) for scratches or gouges. Replace if damaged.

(3) Inspect coupling ends of elbow (2) and tee (17) for scratches or gouges. Replace if damaged.

(4) Inspect wires (21) to switch body for damaged insulation. Repair by splicing if damaged.

(5) Inspect adapters (4, 9, 13 and 19) for worn threads.

c. Repair. (See figure 8-8.)

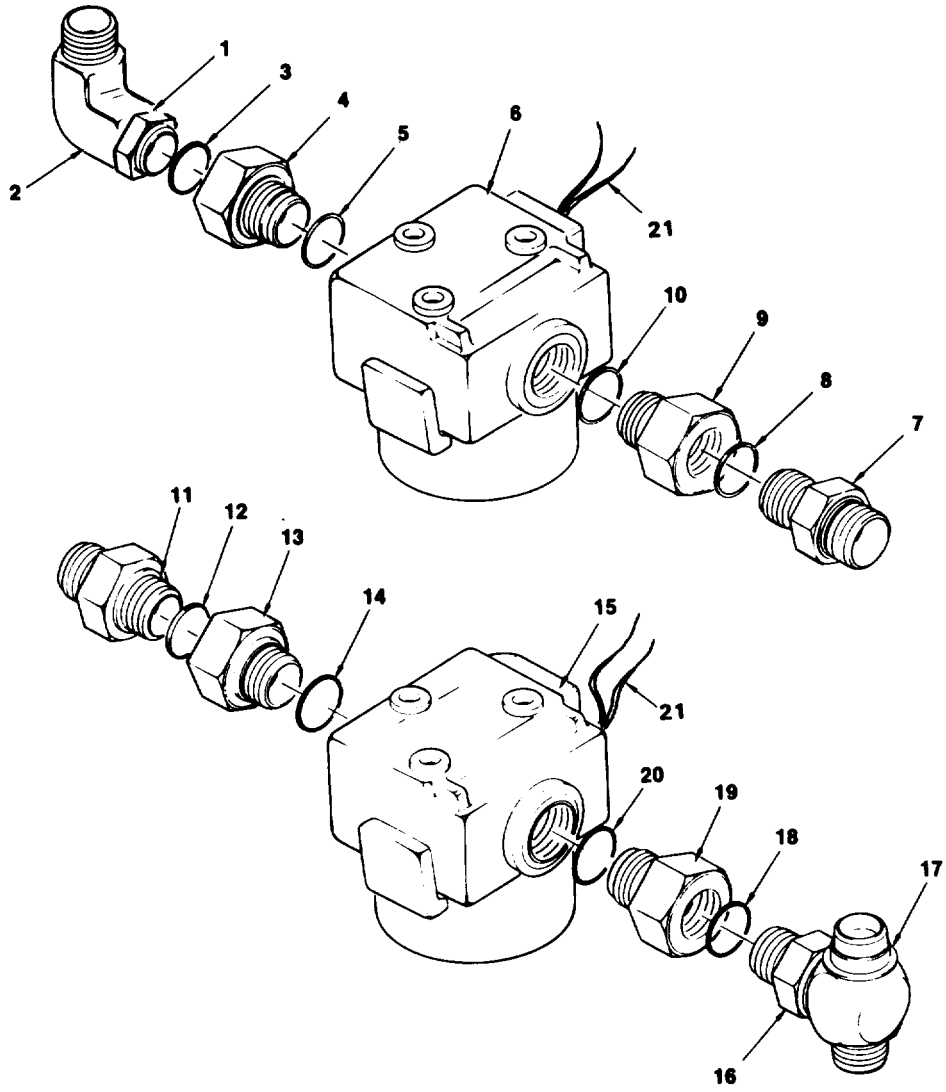
(1) Replace elbow (2) and adapter (4).

(a) Match mark elbow (2) and filter head (6). Loosen nut (1) and remove elbow (2) and packing (3). Discard packing.

(b) Remove adapter (4) and packing (5) from filter head (6). Discard packing.

(c) Install adapter (4) with new packing (5).

(d) Back off nut (1) as far as possible, install elbow (2) with new packing (3), align to match marks, and tighten elbow in position with nut (1).



1. NUT
2. ELBOW
3. PACKING
4. ADAPTER
5. PACKING
6. FILTER HEAD, HIGH PRESSURE
7. FITTING
8. PACKING
9. ADAPTER
10. PACKING
11. FITTING
12. PACKING
13. ADAPTER
14. PACKING
15. FILTER HEAD, RETURN
16. NUT
17. TEE
18. PACKING
19. ADAPTER
20. PACKING
21. WIRES

Figure 8-8. Filter Heads

(2) Replace fitting (7) and adapter (9).

(a) Remove fitting (7) and packing (8). Discard packing.

(b) Remove adapter (9) and packing (10). Discard packing.

(c) Install adapter (9) with new packing (10).

(d) Install fitting (7) with new packing (8).

(3) Replace fitting (11) and adapter (13).

(a) Remove fitting (11) and packing (12). Discard packing.

(b) Remove adapter (13) and packing (14). Discard packing.

(c) Install adapter (13) with new packing (14).

(d) Install fitting (11) with new packing (12).

(4) Replace tee (17) and adapter (19).

(a) Match mark tee (17) to filter head (15). Loosen nut (16) and remove tee (17) and packing (18). Discard packing.

(b) Remove adapter (19) and packing (20). Discard packing.

(c) Install adapter (19) with new packing (20).

(d) Back off nut (16) as far as possible, install tee (17) with new packing (18), align to match marks, and tighten tee (17) in position with nut (16).

d. Install. Install filter heads by performing steps c. and d. In paragraph 8-18.

8-10. CHECK VALVES.

a. Remove. Remove check valves and tube assemblies (figure 8-9) by performing steps a. through j. and m. In paragraph 8-16.

b. Inspect. (See figure 8-9.)

(1) Inspect check valves (3, 8, 13, and 18) for dents, cracks, or leaks. Replace if damaged.

(2) Inspect tube assemblies for cracks, deformation, or damaged coupling nuts. Replace damaged tube assemblies.

c. Repair. (See figure 8-9.)

(1) Replace 4000 psi (operating pressure) check valve (3) as follows:

(a) Loosen coupling nuts on tube assemblies (1, 4). Remove and discard seal (2, 5).

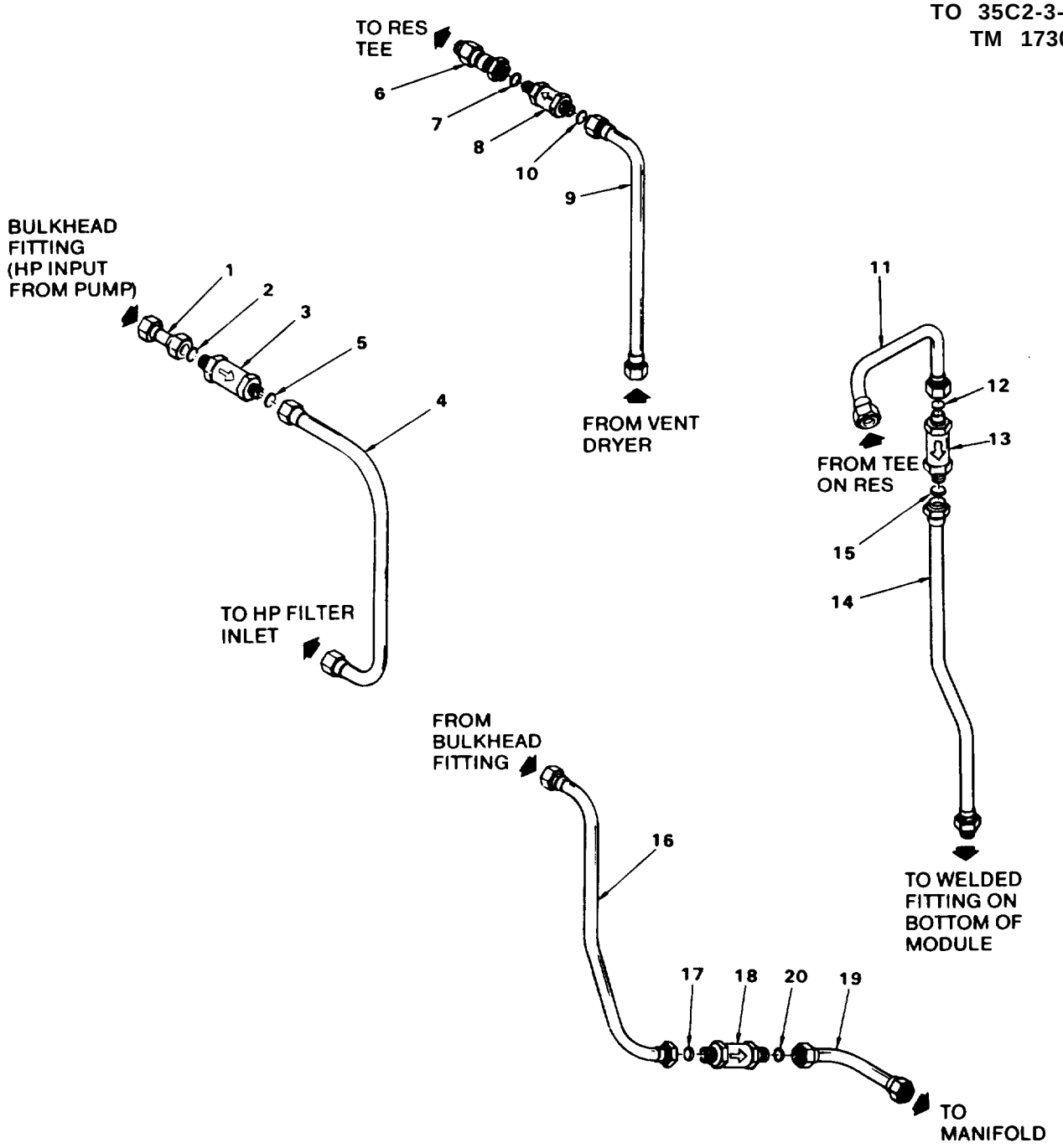
(b) Install tube assemblies (1, 4) with new 7C-10 seals (2, 5) on check valve (3). Ensure that check valve is installed properly in accordance with flow arrow.

(c) Tighten coupling nuts with 650 to 700 inch-pounds of torque.

(2) Replace 0.5 psi check valve (8) as follows:

(a) Loosen coupling nuts on tube assemblies (6, 9). Remove and discard seals (7, 10).

(b) Install tube assemblies (6, 9) with new 7C-8 seals (7, 10) on check



1. TUBE ASSEMBLY	7. SEAL	14. TUBE ASSEMBLY
2. SEAL	8. CHECK VALVE (0.5 PSI)	15. SEAL
3. CHECK VALVE (4000 PSI OPER)	9. TUBE ASSEMBLY	16. TUBE ASSEMBLY
	10. SEAL	17. SEAL
4. TUBE ASSEMBLY	11. TUBE ASSEMBLY	18. CHECK VALVE (2 PSI)
5. SEAL	12. SEAL	19. TUBE ASSEMBLY
6. TUBE ASSEMBLY	13. CHECK VALVE (6 PSI)	20. SEAL

Figure 8-9. Check Valves and Tube Assemblies

valve (8). Ensure that check valve is Installed properly in accordance with flow arrow.

(c) Tighten coupling nuts with 450 to 500 inch-pounds of torque.

(3) Replace 6 psi check valve (13) as follows:

(a) Match mark tube assemblies (11, 14).

(b) Loosen coupling nuts on tube assemblies (11, 14). Remove and discard seals (12, 15).

(c) Install tube assemblies (11, 14) with new 7C-8 seals (12, 15) on check valve (13). Align match marks and ensure that check valve is installed properly in accordance with flow arrow.

(d) Tighten coupling nuts with 450 to 500 inch-pounds of torque.

(4) Replace 2 psi check valve (18) as follows:

(a) Match mark tube assemblies (16, 19).

(b) Loosen coupling nuts on tube assemblies (16, 19). Remove and discard seals (17, 20).

(c) Install tube assemblies (16, 19) with new 7C-8 seals (17, 20) on check valve (18). Align match marks and ensure that check valve is installed properly in accordance with flow arrow.

(d) Tighten coupling nuts with 450 to 500 inch-pounds of torque.

d. Install. Install check valves and tube assemblies back into module by performing steps z., ac. through ag., ai., and as. through av. in paragraph 8-18.

8-11. MANIFOLD ASSEMBLY.

a. Remove. Remove manifold assembly (19, figure 8-10) by performing steps a. through x.(4) in paragraph 8-16.

b. Inspect. (See figure 8-10.)

(1) Inspect coupling ends of fittings (5, 7, 9, and 17) for scratches or gouges. Replace if damaged.

(2) Inspect coupling end of elbow (3) for scratches or gouges. Replace if damaged.

(3) Inspect relief valve (1) for leaks or dents. Replace if damaged.

(4) Inspect pilot solenoid valve (11) for broken wiring (12), dents, cracks, or leaks. Replace if damaged.

c. Repair. (See figure 8-10.)

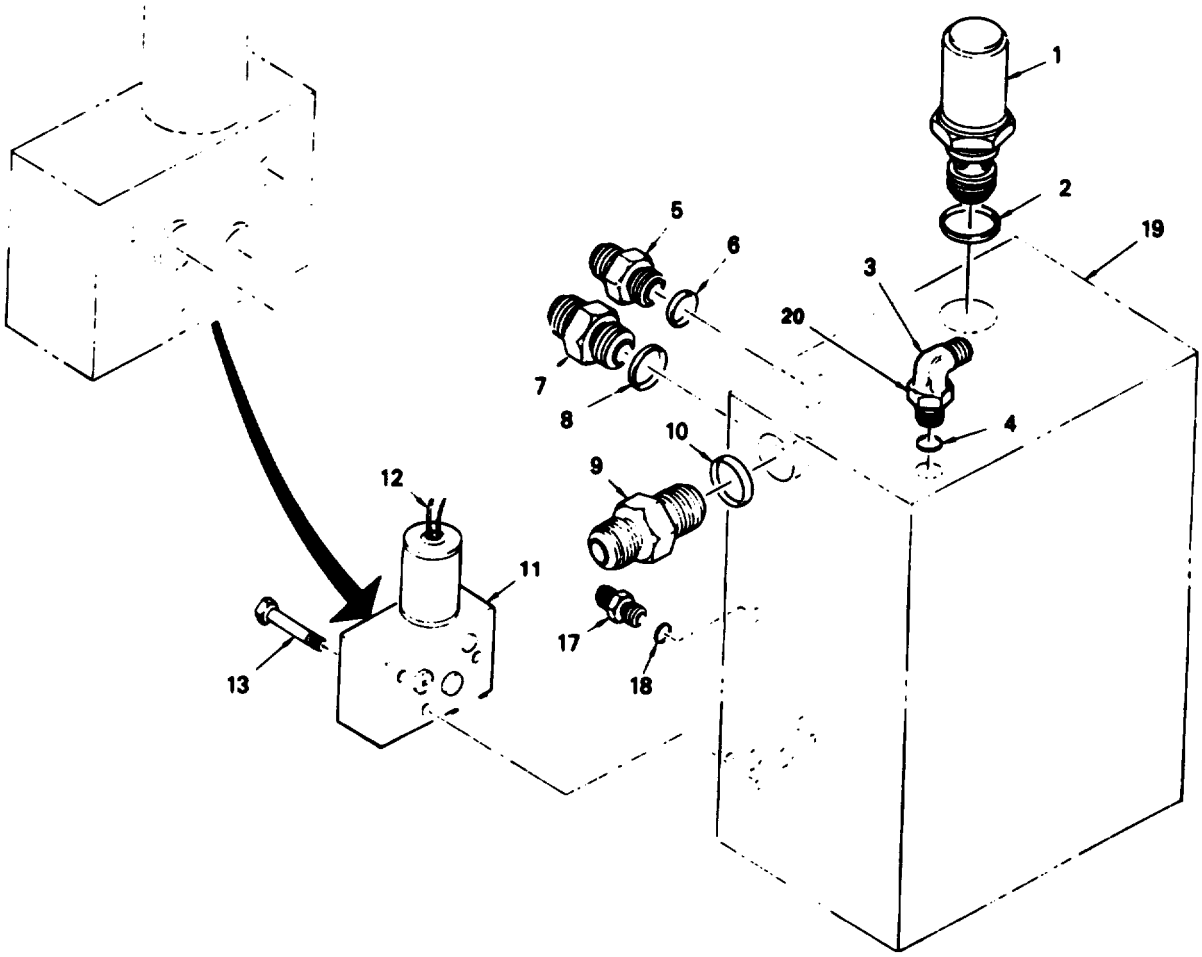
(1) Replace fittings (5, 7, 9, and 17) as follows:

(a) Remove fittings with packing. Discard packing.

(b) Install new fitting, with new packing (6, 8, 10, and 18).

(2) Match mark elbow (3) to manifold (19). Replace elbow (3) by loosening nut (20) and removing elbow with packing (4). Discard packing. Back off jam nut (20) as far as it will go, install elbow (3) with new packing (4), position elbow coupling end to match mark, and tighten with jam nut (20).

(3) Replace relief valve (1) by removing relief valve with packing (2). Discard packing. Install new relief valve (1) with new packing (2).



1. RELIEF VALVE
2. PACKING
3. ELBOW
4. PACKING
5. FITTING
6. PACKING
7. FITTING
8. PACKING
9. FITTING
10. PACKING
11. PILOT SOLENOID VALVE
12. WIRING
13. BOLT
14. DELETE
15. DELETE
16. DELETE
17. FITTING
18. PACKING
19. MANIFOLD
20. NUT
21. DELETE
22. DELETE
23. DELETE
24. DELETE
25. DELETE
26. DELETE

Figure 8-10. Manifold Assembly

(4) Replaoe pilot solenoid valve (11) as follows:

(a) Remove three bolts (13, figure 8-10) and remove valve (11).

(b) Unscrew solenoid assembly (1, figure 8-10A) out of the valve body and replace the gasket (2).

(c) Disengage pin (3) and spring (4) from the inner housing.

(d) Remove housing (5) from the valve inner port.

(e) Use a proper hydraulic set tool and carefully remove retainer (6), screen (7), balls (8) and pintle (9).

(f) Remove and discard rings (10 and 11).

(g) Inspect items removed for clogged screen and clogged ports, Clean screen; replace damaged items.

(h) Install new rings (10 and 11) on the housing and install pintle (9), balls (8), screen (7) and retainer (6).

(i) Install housing (5) into inner port.

(j) Engage spring (4) and pin (3).

(k) Install new gasket (2) on the solenoid assembly (1) and screw solenoid onto the valve (11, figure 8-10).

(l) After installing new packings (12 and 13, figure 8-10A), install the assembly onto the manifold (19, figure 8-10); secure with bolts (13).

d. Install. Test manifold as described In paragraph 8-21 and install manifold by performing steps in paragraph 8-18.

8-12. RETURN MANIFOLD ASSEMBLY.

a. Remove. Remove return manifold assembly from module by performing all steps of paragraph 8-16.

b. Inspect. (See figure 8-11.)

(1) Inspect coupling ends of fittings (1, 3, 15, 17 and 22) for scratches or gouges. Replace if damaged.

(2) Inspect coupling end of elbows (6, 21) and check valve (24) for scractches or gouges. Replace if damaged.

(3) Inspect sensors (9 through 12) for broken wires. Replace sensor if damaged.

(4) Inspect tube assembly (19). Replace If damaged.

c. Repair. (See figure 8-11.)

(1) Replace fittings (1, 3, 15, 17 and 22) as follows:

(a) Remove fittings with packing. Discard packing.

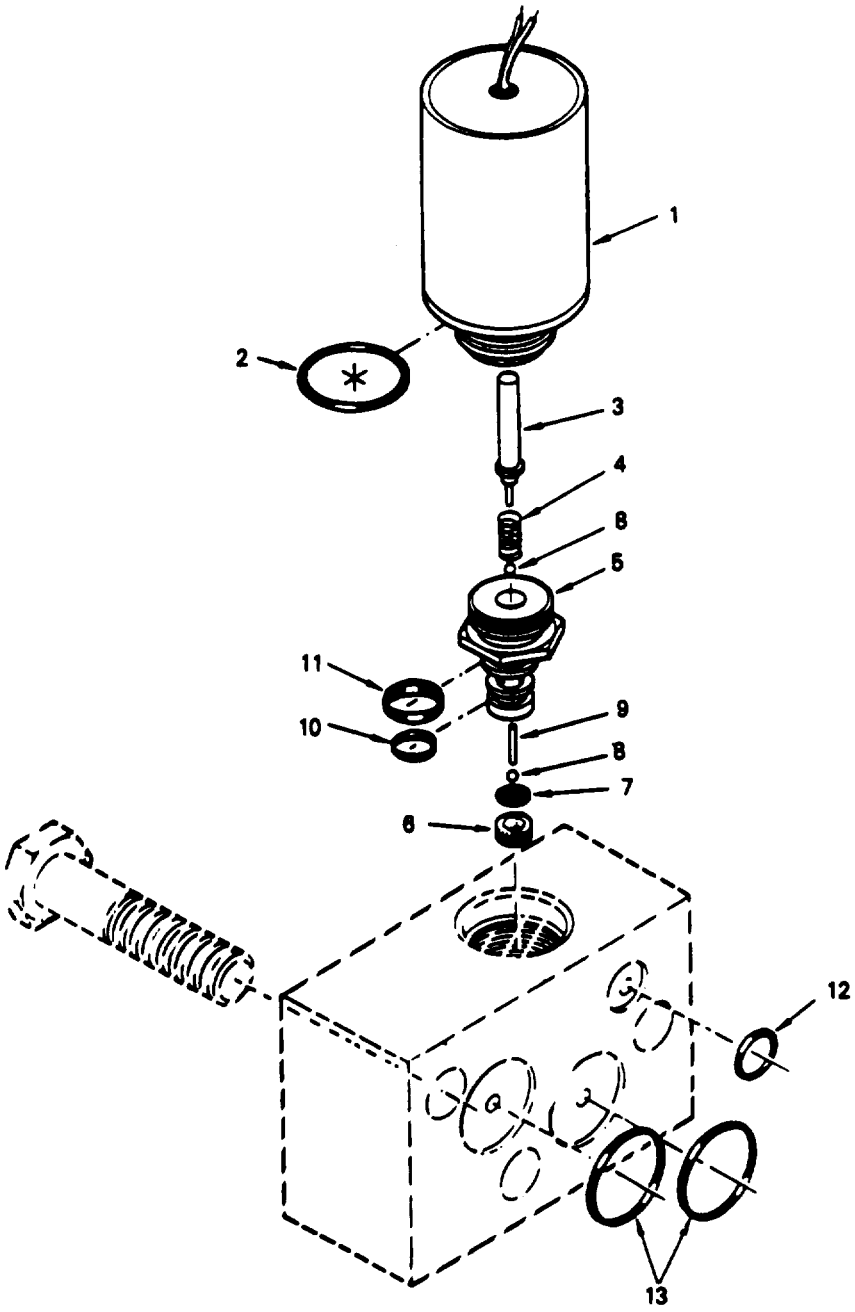
(b) Install new fitting., with new packing (2, 4, 16, 18 and 23).

(2) Match mark elbow (6) to manifold (14). Replace elbow (6) by loosening nut (7), and removing elbow with packing (8). Discard packing. Install new elbow (6) with new packing (8), and position elbow coupling end to match mark.

(3) Replace check valve (24) by removing check valve with packing (25). Discard packing. Install new check valve (24) with new packing (25).

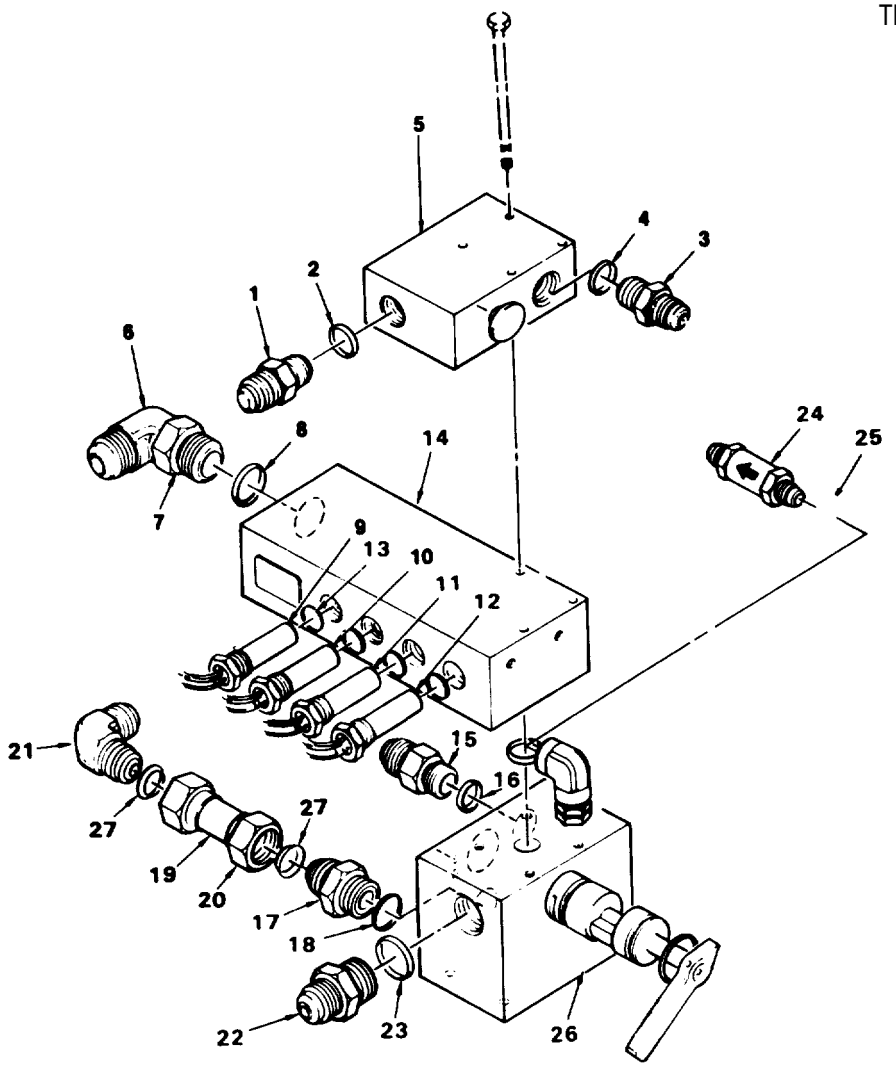
(4) Replace sensors (9, 10, 11, and 12) by removing sensor with packing (13). Discard packing. Install new sensor and new packing (13).

(5) Replace elbow (21) or tube assembly (19) by loosening coupling nuts (20). Install new seal (27) on end of tube assembly. Install new elbow (21) on tube assembly (19). Tighten coupling nuts (20) with between 1,200 to 1,400 inch-pounds of torque.



1. SOLENOID ASSEMBLY
2. GASKET
3. PIN
4. SPRING
5. HOUSING
6. RETAINER
7. SCREEN
8. BALL
9. PINTLE
10. RING
11. RING
12. PACKING
13. PACKING

Figure. 8-10A, Solenoid Valve, Disassembly and Reassembly



NOTE: ITEMS 5, 14, AND 26 SHOWN EXPLODED FOR CLARITY.

1. FITTING
2. PACKING
3. FITTING
4. PACKING
5. FILL MANIFOLD SUB-ASSEMBLY
6. ELBOW
7. NUT
8. PACKING
9. SENSOR, TEMP (275°F)
10. SENSOR, TEMP (240°F)
11. SENSOR, TEMP (160°F)
12. SENSOR, TEMP (170°F)
13. PACKING
14. SENSOR MANIFOLD SUBASSEMBLY
15. FITTING
16. PACKING
17. FITTING
18. PACKING
19. TUBE ASSEMBLY
20. COUPLING NUT
21. ELBOW
22. FITTING
23. PACKING
24. CHECK VALVE (100 PSI)
25. PACKING
26. SELECTOR MANIFOLD SUBASSEMBLY
27. SEAL

Figure 8-11. Return Manifold Assembly

(6) Replace fitting (17) by first loosening coupling nut (20) and removing tube assembly (19) with elbow (21). Remove fitting (17) with packing (18). Discard packing. Install new fitting with new packing (18). Install new seal (27) on end of assembly (19). Replace tube assembly (19) and tighten coupling nut (20) with between 1,200 and 1,400 inch-pounds of torque.

d. Install. Test return manifold as described in paragraph 8-20 and install return manifold assembly into module by performing all steps of paragraph 8-18.

8-13. FRAME.

a. Inspect. (See figure 8-2.)

(1) Remove hydraulic module from AGPU as described in paragraph 2-8.

(2) Inspect corners of frame (1) for cracked or broken welds.

(3) Inspect frame members for bending or other distortion.

(4) Inspect frame for corrosion.

b. Repair.

(1) Remove components and tubing from module by performing all steps of paragraph 8-16.

(2) Straighten frame members.

(3) Repair cracks by welding.

(4) Remove corrosion using wire brush.

(5) Touch-up paint as required.

(6) Install components and tubing removed in step (1) by performing all steps of paragraph 8-18.

8-14. HYDRAULIC DUAL MANIFOLD.

a. Disassembly. (See figure 8-12)

(1) Remove dust cap (1), open valves (2, 3) and drain all hydraulic fluid from dual manifold (4).

(2) Remove all dust caps (5, 6, 7, 8, 9) from quick disconnect fittings (10, 11, 12, 13, 14). Remove and discard packing (15, 16, 17, 18, 19, 20) from inside dust caps.

(3) Remove quick disconnect fitting (10).

(4) Remove and discard packing (21).

(5) Remove valve (2).

(6) Remove and discard packing (22, 23). Remove backup ring (24).

(7) Remove threaded fitting (25).

(8) Remove and discard packing (26).

(9) Remove two quick disconnect fittings (11).

(10) Remove and discard two packings (27).

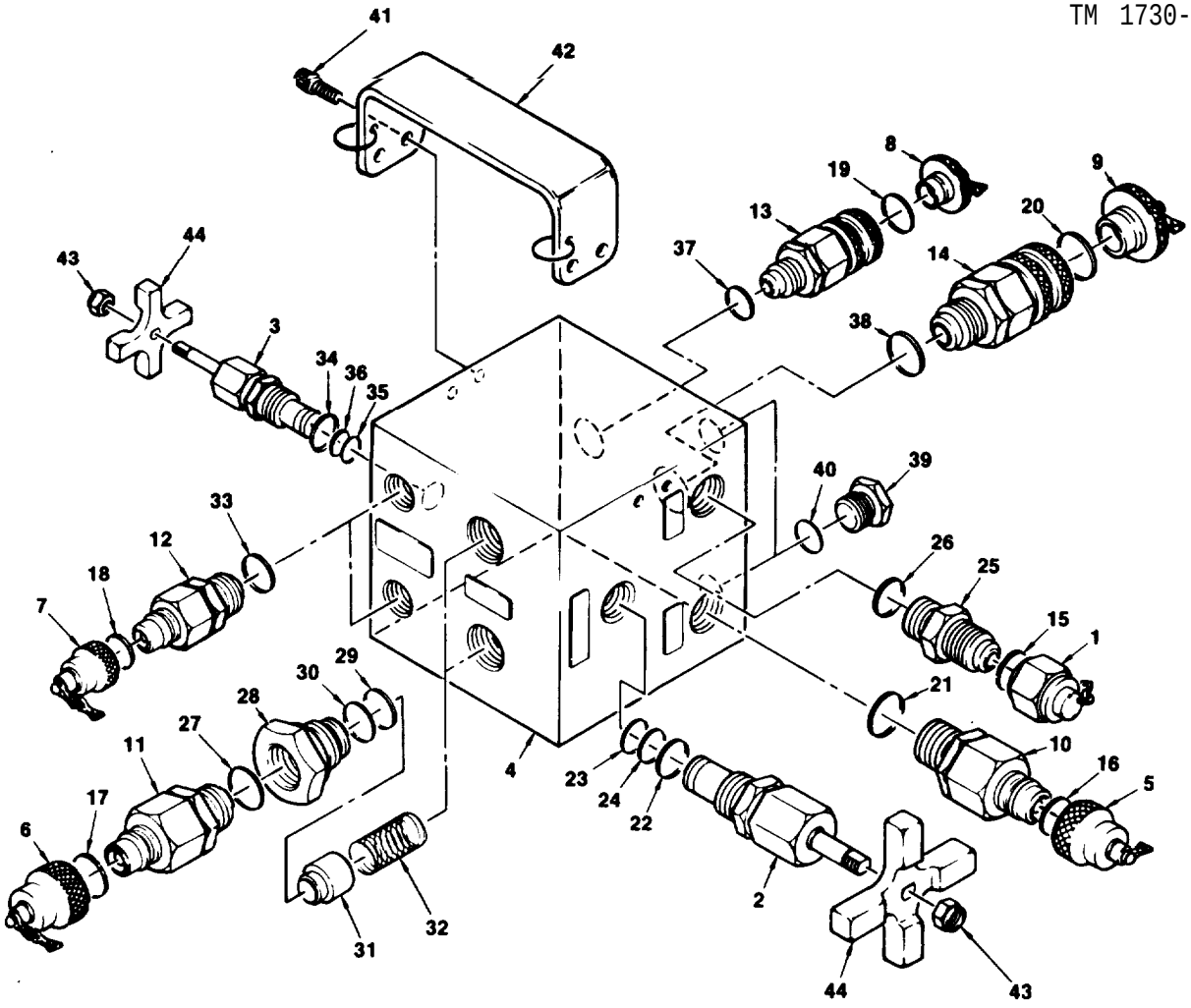
(11) Remove two fittings (28).

(12) Remove and discard two packings (29). Remove two backup rings (30).

(13) Remove two poppets (31) and springs (32).

(14) Remove two quick disconnect fittings (12).

(15) Remove and discard two packings (33).



34-8-12

1.	DUST CAP (THREADED)	14.	QUICK DISCONNECT FITTING	30.	BACKUP RING (2)
2.	VALVE	15.	PACKING	31.	POPPET (2)
3.	VALVE	16.	PACKING	32.	SPRING (2)
4.	DUAL MANIFOLD	17.	PACKING (2)	33.	PACKING (2)
5.	DUST CAP	18.	PACKING (2)	34.	PACKING
6.	DUST CAP (2)	19.	PACKING	35.	PACKING
7.	DUST CAP (2)	20.	PACKING	36.	BACKUP RING
8.	DUST CAP	21.	PACKING	37.	PACKING
9.	DUST CAP	22.	PACKING	38.	PACKING
10.	QUICK DISCONNECT FITTING	23.	PACKING	39.	PLUG (2)
11.	QUICK DISCONNECT FITTING (2)	24.	BACKUP RING	40.	PACKING (2)
12.	QUICK DISCONNECT FITTING (2)	25.	FITTING (THREADED)	41.	SCREW
13.	QUICK DISCONNECT FITTING	26.	PACKING	42.	HANDLE
		27.	PACKING (2)	43.	NUT
		28.	FITTING (2)	44.	HANDLE
		29.	PACKING (2)		

Figure 8-12. Hydraulic Dual Manifold

(16) Remove valve (3).

(17) Remove and discard packings (34, 35). Remove backup ring (36).

(18) Remove quick disconnect fittings (13).

(19) Remove and discard packing (37).

(20). Remove quick disconnect fitting (14).

(21) Remove and discard packing (38).

(22) Remove two plugs (39).

(23) Remove and discard two packings (40).

b. Inspect. (See figure 8-12.)

(1) Inspect valve bodies (2, 3), quick disconnect fittings (10, 11, 12, 13, 14), threaded fitting (25), and fitting (28) for nicks, scratches or cracks. If damage is found, replace.

(2) Inspect threaded holes in manifold for damage and contamination.

c. Assembly. (See figure 8-12.)

(1) Install a new packing (40) on each of two plugs (39).

(2) Install two plugs (39) into manifold (4).

(3) Install new packing (38) on quick disconnect fitting (14).

(4) Install quick disconnect fitting (14) into manifold (4).

(5) Install new packing (37) on quick disconnect fitting (13).

(6) Install quick disconnect fitting (13) into manifold (4).

(7) Install new packings (34, 35) and backup ring (36) on valve (3).

(8) Install valve (3) into manifold (4).

(9) Install a new packing (33) on each of two quick disconnect fittings (12).

(10) Install two quick disconnect fittings (12) into manifold (4).

(11) Install a new packing (27) on each of two quick disconnect fittings (11).

(12) Install a new packing (29) and a backup ring (30) on each of two fittings (28).

(13) Install two springs (32), poppets (31), fittings (28) and quick disconnect fittings (11) into manifold (4).

(14) Install new packing on threaded fitting (25).

(15) Install threaded fitting (25) into manifold (4).

(16) Install new packing (22, 23) and backup ring (24) on valve (2).

(17) Install valve (2) into manifold (4).

(18) Install new packing (21) on quick disconnect fitting (10).

(19) Install quick disconnect fitting (10) into manifold (4).

(20) Install new packings (15, 16, 17, 18, 19, 20) or on dust caps (1, 5, 6, 7, 8, 9).

(21) Install dust caps (1, 5, 6, 7, 8, 9) on or in fittings (25, 10, 11, 12, 13, 14).

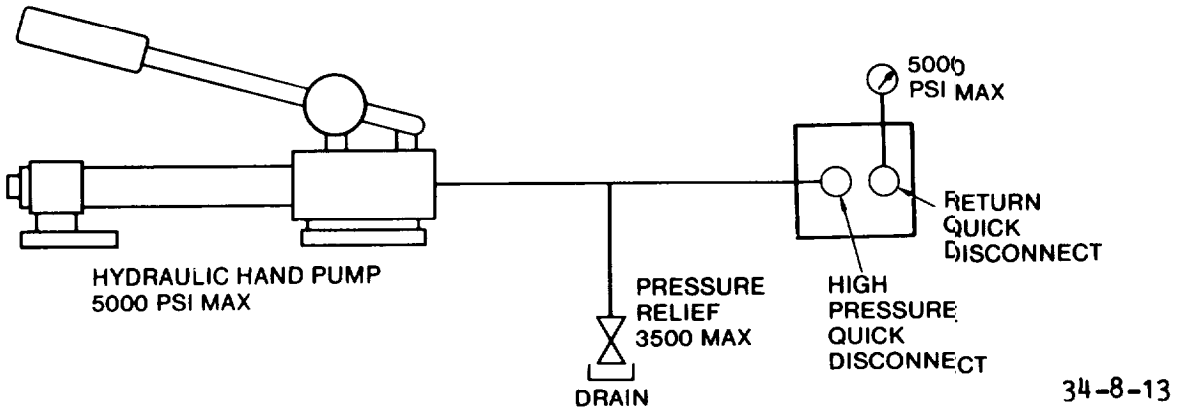


Figure 8-13. Dual Manifold Test Set-Up

d. Test. (See figure 8-13.)

(1) Connect hydraulic dual manifold to test set-up as shown in figure 8-13.

NOTE

The single input is branched to two equal output lines and two returns are combined into a single return path. Valves and fluid ports are provided for filling and draining hoses.

(2) Pressurize dual manifold with hand pump to 3,300 psi and let set for 1/2 hour with no change on gauge. Look for external leaks. If no leaks, remove drain port cap. Open drain/fill valve. Release pressure and disconnect test set-up.

Section III. MODULE DISASSEMBLY

8-15. INTRODUCTION. This section contains the procedure for total disassembly of the hydraulic module. To gain access to, remove, and re-install certain components the module must be totally disassembled. With some small variations, there is essentially only one possible sequence for disassembly (and re-assembly) of the module. If the prescribed sequence is not followed it will be difficult, if not impossible, to gain access to and torque hydraulic fittings during re-assembly.

8-16. DISASSEMBLY.

CAUTION

Always put plastic plugs into connectors and plastic caps over fittings upon disconnection. This protects threads and prevents contamination.

a. Drain fluid from hydraulic module as described in paragraph 3-9.d. of TM 55-1730-229-12.

b. Remove hydraulic module from unit as described in paragraph 2-8.0.a.

c. Place module in a container that will catch hydraulic fluid that is still trapped in tube assemblies and manifolds.

NOTE

In the procedure that follows, many hydraulic tube assemblies will be removed. To aid in reassembly label each tube with the figure and item number in the procedure. Also label ends as described (lower, forward, etc.) in the procedure.

d. Remove vent dryer (17, figure 8-14) from module as follows:

(1) Remove hydraulic tube (38, figure 8-15) connector and copper seal from top of vent dryer. Discard seal.

(2) Tilt vent dryer (17, figure 8-14) forward and lift up and out of module.

e. Remove low pressure filter bowl (19) and element (20) as follows:

(1) Turn bowl (19) counterclockwise until free of filter head assembly (22).

(2) Remove bowl packing (21).

(3) Remove filter element (20) and the packing (23) attached to the top of element from the filter head assembly (22).

(4) Label element (20) “LOW PRESSURE".

f. Remove high pressure filter bowl (24) and element (25) as follows:

(1) Turn bowl (24) counterclockwise until free of filter head assembly (27).

(2) Remove bowl packing (26).

(3) Remove filter element (25) and the packing (28) attached to the top of the element from the filter head assembly (27).

(4) Label element (25) "HIGH PRESSURE".

g. Remove top cover of hydraulic module by removing the three remaining screws (two along front edge and one center rear). All other screws for top cover were removed when module was taken from unit.

h. Remove tube assemblies (12 and 25, figure 8-15) as follows:

(1) Remove rear connector of tube assembly (12) from reducer (40). Remove and discard copper seal.

(2) Remove lower connector of tube assembly (25) from adapter (30). Remove and discard copper seal.

(3) Withdraw tube assemblies (with assembled components, 42, 46, 40 and 53) from module.

(4) Remove reducer (40) from bulkhead fitting (42). Remove and discard copper seal.

(5) Remove jam nut (46) from bulkhead fitting (42).

(6) Remove bulkhead fitting (42).

i. Remove tube assemblies (38 and 43) as follows:

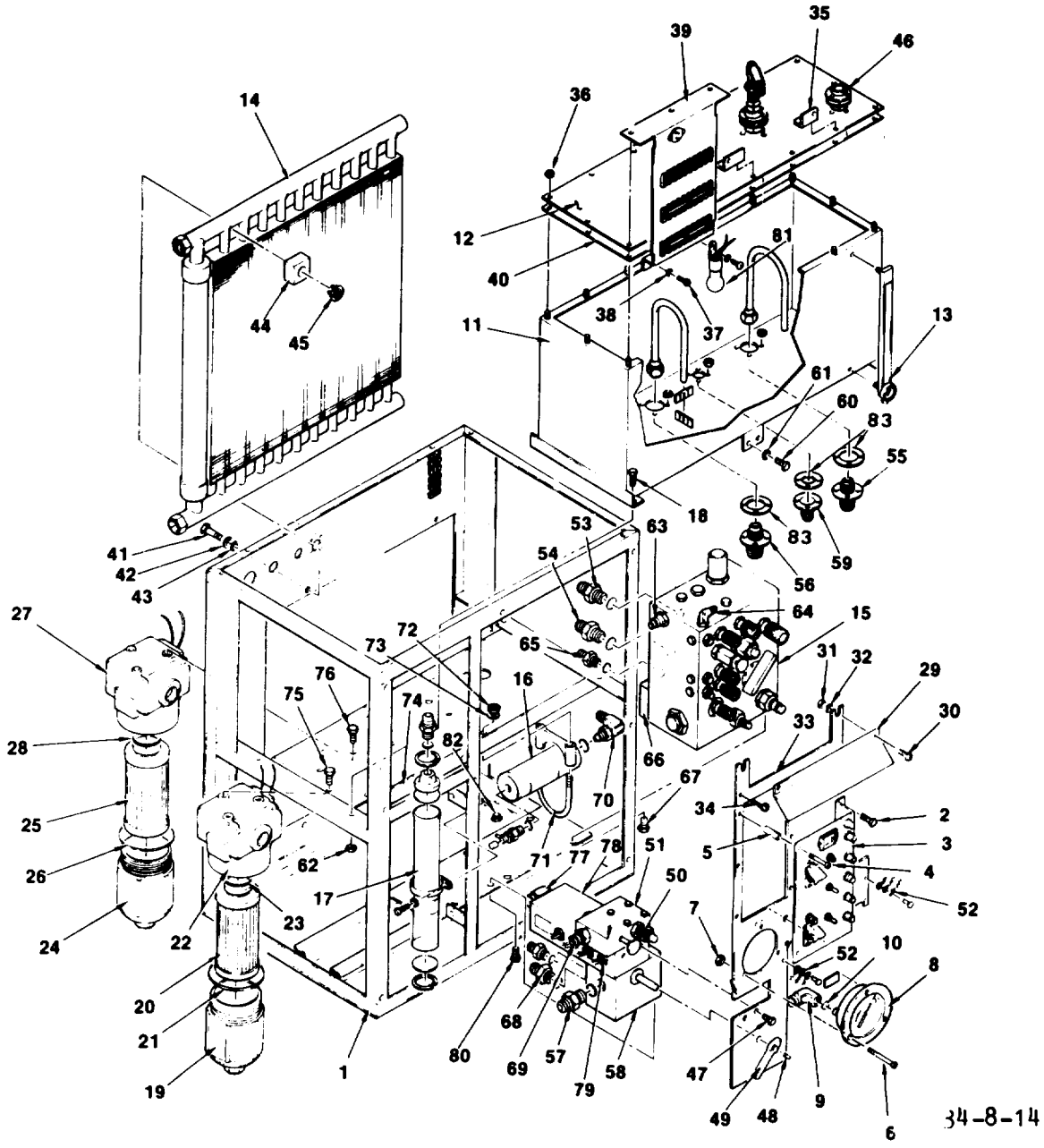


Figure 8-14. Hydraulic Module Components

LEGEND TO FIGURE 8-14

1. FRAME
2. SCREW
3. ELECTRICAL CONTROL PANEL
4. BOLT
5. STANDOFF
6. BOLT
7. NUT
8. GAUGE
9. ELBOW
10. PACKING
11. RESERVOIR
12. RESERVOIR TOP COVER
13. TEMP/LEVEL GAUGE
14. COOLER (HEAT EXCHANGER)
15. MANIFOLD
16. ACCUMULATOR
17. VENT DRYER
18. BOLT (4)
19. LOW PRESS. FILTER BOWL
20. LOW PRESS. FILTER ELEMENT
21. LOW PRESS. BOWL PACKING
22. LOW PRESS. FILTER HEAD ASSY
23. LOW PRESS. ELEMENT PACKING
24. HIGH PRESS. FILTER BOWL
25. HIGH PRESS. FILTER ELEMENT
26. HIGH PRESS. BOWL PACKING
27. HIGH PRESS. FILTER HEAD ASSY
28. HIGH PRESS. ELEMENT PACKING
29. RAIN SHIELD
30. BOLT (2)
31. NUT (2)
32. WASHER (2)
33. FRONT PANEL
34. BOLT (2)
35. BRACKET (2)
36. NUT
37. BOLT (3)
38. WASHER (3)
39. TERMINAL BOARD PANEL
40. GASKET
41. BOLT (6)
42. LOCKWASHER (6)
43. FLAT WASHER (6)
44. RUBBER MOUNT (6)
45. NUT (6)
46. BULKHEAD FITTING
47. BOLT (2)
48. SET SCREW
49. HANDLE
50. FILL CONTROLS
51. FILL MANIFOLD
52. DUST CAP CHAINS
53. FITTING (UPPER)
54. FITTING (LOWER)
55. BULKHEAD FITTING
56. BULKHEAD FITTING
57. FITTING
58. RESERVOIR SELECT MANIFOLD
59. BULKHEAD FITTING
60. BOLT (4)
61. WASHER (4)
62. NUT (4)
63. FITTING
64. FITTING
65. FITTING
66. LOAD VALVE SOLENOID
67. SCREW (6)
68. FITTING
69. FITTING
70. ELBOW
71. U-BOLT
72. NUT (4)
73. WASHER (4)
74. CRADLE BRACKETS (2)
75. BOLT (3)
76. BOLT (3)
77. ELBOW
78. TEMP SENSOR MANIFOLD
79. TEMPERATURE SENSOR (4)
80. SCREW (4)
81. UTILITY LAMP SOCKET
82. WELDED FITTING
83. GASKET

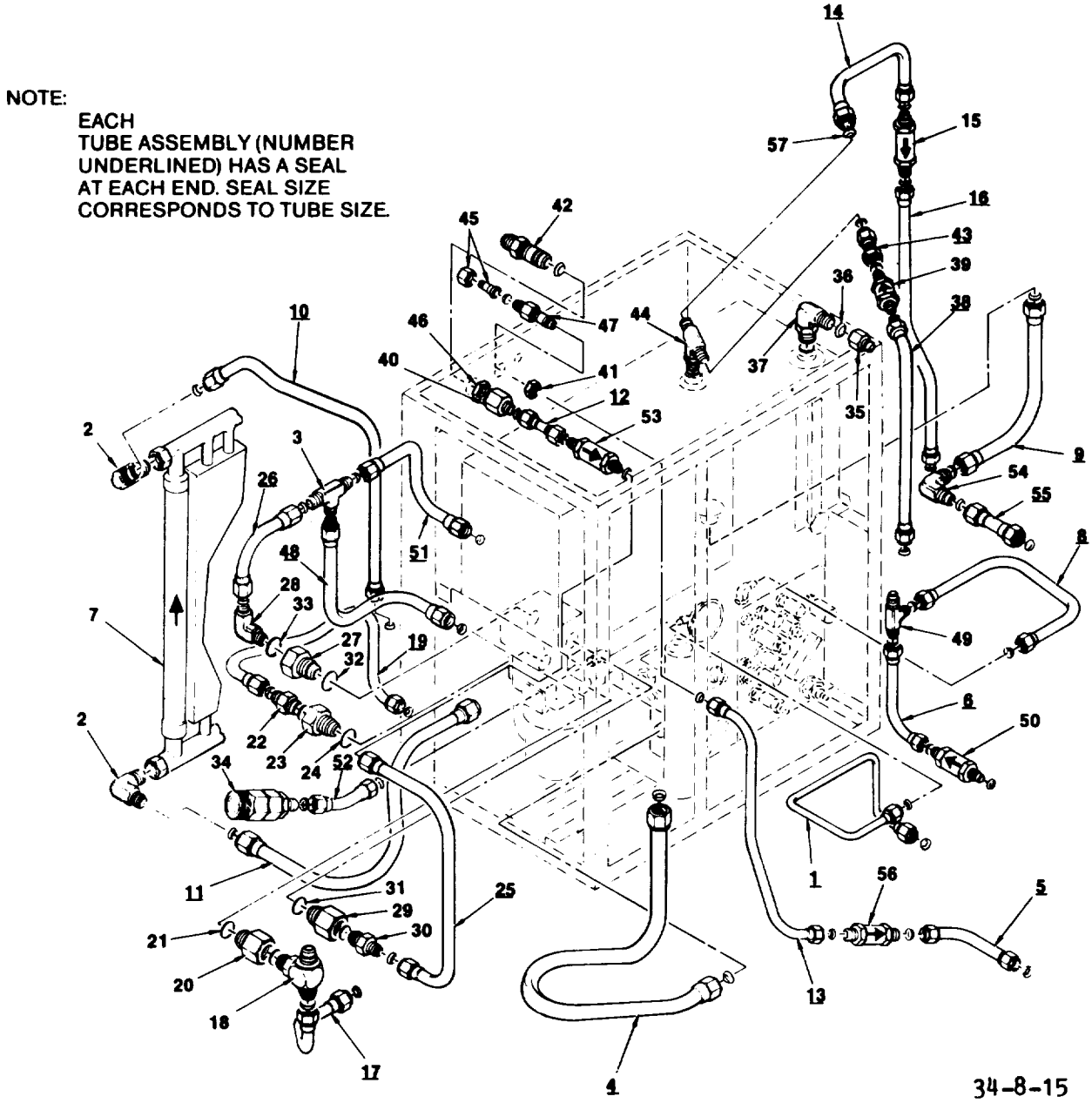


Figure 8-15. Hydraulic Module Plumbing

LEGEND TO FIGURE 8-15

1. TUBE ASSEMBLY
2. ELBOW
3. TEE
4. TUBE ASSEMBLY
5. TUBE ASSEMBLY
6. TUBE ASSEMBLY
7. COOLER
8. TUBE ASSEMBLY
9. TUBE ASSEMBLY
10. TUBE ASSEMBLY
11. TUBE ASSEMBLY
12. TUBE ASSEMBLY
13. TUBE ASSEMBLY
14. TUBE ASSEMBLY
15. CHECK VALVE
16. TUBE ASSEMBLY
17. TUBE ASSEMBLY
18. TEE
19. TUBE ASSEMBLY
20. ADAPTER
21. PACKING
22. ADAPTER
23. ADAPTER
24. PACKING
25. TUBE ASSEMBLY
26. TUBE ASSEMBLY
27. ADAPTER
28. ADAPTER
29. ADAPTER
30. ADAPTER
31. PACKING
32. PACKING
33. PACKING
34. QUICK DISCONNECT
35. REDUCER
36. PACKING
37. ELBOW
38. TUBE ASSEMBLY
39. CHECK VALVE
40. REDUCER
41. JAM NUT
42. BULKHEAD FITTING
43. TUBE ASSEMBLY
44. TEE
45. REDUCER
46. JAM NUT
47. BULKHEAD FITTING
48. TUBE ASSEMBLY
49. SWIVEL NUT TEE
50. CHECK VALVE
51. TUBE ASSEMBLY
52. TUBE ASSEMBLY
53. CHECK VALVE
54. ELBOW
55. TUBE ASSEMBLY
56. CHECK VALVE
57. SEAL, COPPER

(1) Note that bottom connector of tube assembly (38) is free since it was previously removed from the vent dryer.

(2) Remove rear connector of tube assembly (43) from tee (44) at top of reservoir. Remove and discard copper seal.

(3) Withdraw tube assemblies with check valve (39) , from module.

j. Remove tube assemblies (14 and 16) as follows:

NOTE

Do not remove tee connector (44) at this time. It need not be removed for this procedure and must be match marked if it ever is removed.

(1) Remove top connector of tube assembly (14) from tee (44) at top of reservoir. Remove and discard copper seal.

(2) Remove bottom connector of tube assembly (16) from fitting welded to baseplate of module. Remove and discard copper seal.

(3) Withdraw tube assemblies, with check valve (15) from module.

k. Remove tube assembly (10) as follows:

(1) Remove lower connector of tube assembly (10) from top of tee (18) at front of low pressure filter head assembly (22, figure 8-14). Remove and discard copper seal.

(2) Remove upper connector of tube assembly (10, figure 8-15) from elbow (2) at top of cooler (7). Remove and discard copper seal.

(3) Withdraw tube assembly (10) from module.

l. Remove reservoir top cover (12, figure 8-14) as follows:

(1) Loosen two nuts (31) on bolts (30) and slide rain shield (29) up and out of slots of front panel (33).

(2) Remove manual fill reducer (35, figure 8-15) from elbow (37) on top of reservoir. Remove and discard copper seal.

(3) Remove two bolts (34, figure 8-14) that secure front panel (33) to brackets (35) on top of reservoir.

(4) Remove two nuts (36) that secure brackets (35) to top of reservoir.

(5) Remove two brackets (35).

(6) Remove three bolts (37) and washers (38) that secure bottom of terminal board panel (39) to module frame (l).

(7) Remove three nuts (36) that secure top of terminal board panel (39) to top of reservoir.

(8) Carefully lift terminal board panel (39) over top of reservoir studs and pull panel forward just enough to clear reservoir cover (12). Wiring harness limits motion of terminal board panel. Clip wire ties as necessary when removing panel.

(9) Remove remaining eleven nuts (36) that hold top cover (12) on reservoir (11).

(10) Carefully pry top cover (12) off of reservoir (11) and withdraw top from module.

(11) Scrape reservoir gasket (40) off top edge of reservoir (11). Clean all gasket and gasket cement residue from reservoir (11).

m. Remove tube assemblies (5 and 13, figure 8-15) as follows:

(1) Remove top connector of tube assembly (13) from forward end of bulkhead fitting (47). Remove and discard copper seal.

(2) Remove reducer (45) from rear end of bulkhead fitting (47). Remove and discard copper seal.

(3) Remove jam nut (41) from bulkhead fitting (47).

(4) Withdraw bulkhead fitting (47) from module.

(5) Remove bottom connector of tube assembly (5) from fitting (53, figure 8-14). Remove and discard copper seal.

(6) Withdraw tube assemblies (5 and 13, figure 8-15), with assembled check valve (56), from module.

n. Remove cooler (14, figure 8-14) as follows:

(1) Remove lower end of tube assembly (11, figure 8-15) from elbow (2) at bottom of cooler. Remove and discard copper seal.

CAUTION

In the following step the support bolts for the cooler will be removed. Be sure to hold cooler up while removing the last of the six bolts.

(2) Remove six bolts (41, figure 8-14) with washers (42, 43) that support cooler (14) on back of module frame (1). The rubber mounts (44) and nuts (45) should stay with the cooler.

CAUTION

The cooler fins are fragile and bend easily. When withdrawing cooler from module many obstacles can bend the fins. Use extreme care when taking cooler from module.

(3) Lift cooler and withdraw from module frame through the top.

o. Remove tube assembly (48, figure 8-15) as follows:

(1) Remove upper connector of tube assembly (48) from tee (3). Remove and discard copper seal.

(2) Remove lower connector of tube assembly (48) from fitting (54, figure 8-14) on rear of main control manifold.

(3) Withdraw tube assembly (48, figure 8-15) from module.

. Loosen front panel (33, figure 8-14) from module frame (1) as follows:

(1) Remove two bolts (47) below the blue fill controls (50) on fill manifold (51).

(2) Remove setscrew (48) in RESERVOIR select valve handle (49).

(3) Remove RESERVOIR select valve handle (49).

(4) Remove all four dust caps that have chains (52) rivited to front panel (33).

(5) Remove forward connector of tube assembly (1, figure 8-15) from elbow (9, figure 8-14) and back of pressure gauge (8). Remove and discard copper seal.

(6) Carefully pull front panel forward and turn it to the left. Wiring harness limits motion of panel. Clip wire ties as necessary when turning panel.

g. Remove tube assembly (9, figure 8-15) as follows:

(1) Remove upper connector of tube assembly (9) from bulkhead fitting (55, figure 8-14) under reservoir (the fitting on the left when viewed from rear of module). Remove and discard copper seal.

(2) Remove lower connector of tube assembly (9, figure 8-15) from elbow (54). Remove and discard copper seal.

(3) Withdraw tube assembly (9) from module.

r. Remove tube assembly (4) as follows:

(1) Remove upper connector of tube assembly (4) from bulkhead fitting (56, figure 8-14) under reservoir (the fitting on the right when viewed from rear of module). Remove and discard copper seal.

(2) Remove lower connector of tube assembly (4, figure 8-15) from fitting (57, figure 8-14) on side of reservoir select manifold (58). Remove and discard copper seal.

(3) Withdraw tube assembly (4, figure 8-151 from module.

s. Remove reservoir (11, figure 8-14) from module frame (1) as follows:

(1) Back off swivel nut (on swivel nut tee 49, figure 8-15) as far back as it will go easily. It may not back off of all the threads of bulkhead fitting (59, figure 8-14) until reservoir is raised in a later step.

(2) Remove four bolts (60) and washers (61) that insert horizontally through module frame and into reservoir brackets at center front and center rear.

(3) Remove four bolts (18) and nuts (62) that insert vertically through reservoir flanges and module frame at each corner of reservoir.

(4) Gently pry end (on module's left side) of reservoir up out of frame. While prying, check that swivel nut on swivel nut tee (49, figure 8-15) is free of bulkhead fitting (59, figure 8-14). If connection is not free, finish backing off swivel nut.

CAUTION

Use extreme care in the following step not to damage threads of bulkhead fittings under reservoir.

(5) Withdraw reservoir out through the module's left side.

(6) Remove and discard copper seal on bulkhead fitting (59).

t. Remove tube assembly (11, figure 8-15) as follows:

(1) Remove upper connector of tube assembly (11) from fitting (63, figure 8-14) on main control manifold's right side.

(2) Withdraw tube assembly (11 , figure 8-15) from module.

u. Remove tube assembly (8, figure 8-15) as follows:

(1) Remove rear connector of tube assembly (8) from swivel nut tee (49). Remove and discard copper seal.

(2) Remove forward connector of tube assembly (8) from fitting (64, figure 8-14) on top of main control manifold (15). Remove and discard copper seal.

(3) Withdraw tube assembly (8, figure 8-15) from module.

v. Remove tube assembly (1, figure 8-15) as follows:

(1) Remove lower connector of tube assembly (1) from small fitting (65) figure 8-14) on back of main control manifold (15). Remove and discard copper seal.

(2) Withdraw tube assembly (1, figure 8-15) from module.

w. Remove load valve solenoid (66, figure 8-14) wires as follows:

(1) Trace wires (one black and one white) from solenoid (66) to terminal board panel (39). Clip wire ties between solenoid and terminal board so wires can he removed.

(2) Loosen screw and disconnect black lead from TB2-D2.

(3) Loosen screw and disconnect white lead from TB2-4.

(4) Pull load valve solenoid leads free of module harness.

x. Remove main control manifold (15, figure 8-14) from module as follows:

(1) Tilt module (about 30 degrees) to the right to gain access to the holes underneath - block module for support and to prevent slippage.

(2) Remove six socket head cap screws (67) that hold main control manifold (15) to module frame (1).

(3) Remove supports and restore module to normal position.

WARNING

Manifold weighs approximately 25 to 30 pounds. Take care to prevent injury to personnel or damage to manifold.

(4) Slide manifold (15) out of the module's left side.

y. Remove tube assembly (19, figure 8-15) as follows:

(1) Remove lower connector of tube assembly (19) from fitting (68, figure 8-14) on back of reservoir select manifold (58). Remove and discard copper seal.

(2) Remove upper connector of tube assembly (19, figure 8-15) from adapter (22) on rear of low pressure filter head assembly (22, figure 8-14). Remove and discard copper seal.

(3) Withdraw tube assembly (19, figure 8-15) from module.

z. Remove tube assembly (6, figure 8-15) as follows:

(1) Remove lower connector of tube assembly (6) from check valve (50). Remove and discard the copper seal.

(2) Remove tube assembly (6), with assembled swivel nut tee (49), from module.

aa. Remove tube assembly (17) as follows:

(1) Remove upper connector of tube assembly (17) from bottom of tee (18) on front of low pressure filter head assembly (22, figure 8-14). Remove and discard copper seal.

(2) Remove lower connector of tube assembly (17, figure 8-15) from fitting (69, figure 8-14) on side of fill manifold (51). Remove and discard copper seal.

(3) Withdraw tube assembly (17, figure 8-15) from module.

ab. Remove tube assemblies (26 and 51, figure 8-15), and assembled tee (3), as follows:

(1) Remove lower connector of tube assembly (51) from elbow (70, figure 8-14) on end of accumulator (16). Remove and discard copper seal.

(2) Remove lower connector of tube assembly (26, figure 8-15) from adapter (28) on back of high pressure filter head assembly (27, figure 8-14). Remove and discard copper seal.

ac. Remove accumulator (16, figure 8-14) as follows:

(1) Match mark accumulator (16) to u-bolt (71).

(2) Remove four nuts (72) and washers (73) to release u-bolts (71).

(3) Withdraw accumulator (16), two u-bolts (71) and two cradle brackets (74) from module.

ad. Remove low pressure filter head assembly (22, figure 8-14) as follows:

(1) Trace three blue wires from head assembly (22) to terminal board panel (39). Tag and disconnect leads from terminal board and clip wire ties as needed to free leads from module harness.

(2) support head assembly (22) to prevent drop and damage.

(3) Remove three bolts (75) that secure head assembly (22) to frame.

(4) Withdraw head assembly (22) from module.

ae. Remove high pressure filter head assembly (27, figure 8-14) as follows:

(1) Trace three blue wires from head assembly (27) to terminal board (39). Tag and disconnect leads from terminal board and clip wire ties as needed to free leads from module harness.

(2) Support head assembly (27) to prevent drop and damage.

(3) Remove three bolts (76) that secure head assembly (27) to frame.

(4) Withdraw head assembly (27) from manifold.

af. Remove tube assembly (52, figure 8-15) as follows:

(1) Remove connector of tube assembly (52) from elbow (77, figure 8-14) on back of the temperature sensor manifold (78). Remove and discard copper seal.

(2) Withdraw tube assembly (52, figure 8-15), with assembled quick disconnect (34), from module.

ag. Label (with terminal board and terminal designator) each wire between front panel (33, figure 8-14) and terminal board panel (39) and disconnect wires from terminal boards.

ah. Remove fill, temperature sensor, and reservoir select manifolds (51, 78, 58, figure 8-14) as follows:

(1) Trace each of the three wires from each of the four temperature sensors (79) to the terminal boards on panel (39). Clip wire ties as necessary to separate wire from module harness.

(2) Label each wire with the terminal board and terminal designator.

(3) Loosen the terminal board screw and remove each temperature sensor wire.

(4) Tilt module (about 30 degrees) to its right to gain access to holes underneath - block module for support and to prevent slippage.

(5) Remove four socket head capscrews (80) that hold reservoir select manifold (58) to module frame (l).

(6) Remove supports and restore module to normal position.

(7) Withdraw aassembled manifold group (51, 78, and 58) from module.

Section IV. MODULE ASSEMBLY

8-17. INTRODUCTION . This section contains the procedure for total re-assembly of the hydraulic module. The procedure starts with the hydraulic module frame with the rear terminal board and front-to-rear wiring harness. During re-assembly observe the tube assembly and tube end labels put on during disassembly.

8-18. ASSEMBLY.

CAUTION

When connecting hydraulic parts, ensure that protective caps, plugs, and coverings have been removed. Serious flow blockage can result from leaving these materials in the lines.

a. Install fill, temperature sensor, and reservoir select manifolds (51, 78, 58, figure 8-14) as follows:

(1) Tilt module frame (about 30 degrees) to its right to gain access to holes underneath - block module frame for support and to prevent slippage.

(2) place assembled manifold group (51, 78, 58) into bottom of module frame over fourth and fifth pair of bolt holes from module's right side.

(3) Install and tighten four socket head capscrews (80) that hold reservoir select manifold (58) to module frame (1).

(4) Remove supports and restore module to normal position.

b. Install tube assembly (52, figure 8-15) and quick disconnect (34) as follows:

(1) Insert tube assembly (52) and quick disconnect (34) into module with free end of tube asssembly (52) toward elbow (77, figure 8-14) on back of temperature sensor manifold (78).

(2) Install copper seal (7C-16) on elbow (77).

(3) Coat threads of elbow (77) and free end of tube assembly (52, figure 8-15) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(4) While holding quick disconnect (34) in line with suction hose opening in module, install tube assembly (52) on elbow (77, figure 8-14). Torque tube assembly (52, figure 8-15) to between 1,200 and 1,400 inch-pounds.

c. Install high pressure filter head assembly (27, figure 8-14) as follows:

(1) Insert head assembly (27) into module under the rear group of three holes in module frame horizontal shelf.

(2) Coat threads of three bolts (76) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Install and tighten three bolts (76) that secure head assembly (27) to frame.

d. Install low pressure filter head assembly (22) as follows:

(1) Insert head assembly (22) into module under the forward group of three holes in module frame horizontal shelf.

(2) Coat threads of three bolts (75) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Install and tighten three bolts (75) that secure head assembly (22) to frame.

e. Install accumulator (16, figure 8-14) as follows:

(1) Insert accumulator (16) under horizontal shelf of module frame with two cradle brackets (74) between accumulator and shelf.

(2) Insert two u-bolts (71) under accumulator and up through holes in module shelf.

(3) Install a flat washer (73) on each end of each u-bolt.

(4) Loosely install a nut (72) on each end of each u-bolt.

(5) Turn accumulator (16) to line Up match marks between accumulator and u-bolt.

(6) Tighten nuts (72) on u-bolts (71).

f. Install tube assemblies (26 and 51, figure 8-15), with assembled tee (3) as follows:

(1) Coat threads of fittings on both ends of tube assemblies with hydraulic fluid (MIL-H-5606 or MIL-H-83282) .

(2) Install a copper seal (7C-10) on elbow (70, figure 8-14).

(3) Install free (lower) end of tube assembly (51, figure 8-15) on accumulator elbow (70, figure 8-14). Tighten hand tight.

(4) Install a copper seal (7C-10) on adapter (28, figure 8-15) on back of high pressure filter head assembly (27, figure 8-14).

(5) Install free (lower) end of tube assembly (26, figure 8-15) on adapter (28) at rear of high pressure filter head assembly (27, figure 8-14). Tighten hand tight.

g. Install tube assembly (17, figure 8-15) as follows:

(1) Coat threads of fittings at both ends of tube assembly (17) with hydraulic fluid (MIL-H-5606 or MIL-H-83282) .

(2) Install new copper seal (7C-12) on bottom of tee (18) on front of low pressure filter head assembly (22, figure 8-14).

(3) Install tube assembly (17, figure 8-15) on bottom of tee (18) on front of low pressure filter. Tighten hand tight.

(4) Install new copper seal (7C-12) on fitting (69, figure 8-14) on side of fill manifold.

(5) Install tube assembly (17, figure 8-15) on fitting (69, figure 8-14) on side of fill manifold. Tighten hand tight.

(6) Torque connectors on both ends of tube assembly (17, figure 8-15) to between 900 and 1,000 inch-pounds.

h. If removed, install check valve (50, figure 8-15) on elbow on top of reservoir select manifold (58, figure 8-14) as follows:

(1) Inspect threads of both check valve and elbow for damage or contamination.

(2) Coat threads with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Install new packing on input end (tail of arrow) of check valve (50, figure 8-15).

(4) Install input end of check valve (50) into elbow.

(5) With wrench on large hex near input end of check valve (50) tighten connection.

i. Install tube assembly (6, figure 8-15), with assembled swivel nut tee (49) as follows:

(1) Coat threads of tube assembly and tee with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(2) Install new copper seal (7C-8) on output end (head of arrow) of check valve (50).

(3) Install free end of tube assembly (6) on check valve (50). Tighten hand tight.

j. Install tube assembly (19) as follows:

(1) Coat threads on both ends of tube assembly (19) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(2) Install new copper seal (7C-12) on open fitting (68, figure 8-14) (this is not the elbow) on rear of reservoir select manifold (58).

(3) Install end of tube assembly (19, figure 8-15) that has the longest horizontal section on fitting (68, figure 8-14) on rear of reservoir select manifold (58). Tighten hand tight.

(4) Install new copper seal (7C-12) on adapter (22, figure 8-15) on rear of low pressure filter head assembly (22, figure 8-14) .

(5) Install end of tube assembly (19, figure 8-15) on adapter (22) on rear of low pressure filter head assembly. Tighten hand tight.

(6) Torque connectors on both ends of tube assembly (19) to between 900 and 1,000 inch-pounds.

k. Install main control manifold (15, figure 8-14) in module frame (1) as follows:

WARNING

Manifold weighs approximately 25 to 30 pounds. Take care to prevent injury to personnel or damage to manifold.

(1) Slide manifold (15) into module's left side.

(2) Tilt module (about 30 degrees) to its right to gain access to holes underneath - block module for support and to prevent slippage.

(3) Install and tighten six socket head capscrews (67) that hold main control manifold (15) to module frame (1).

(4) Remove supports and restore module to normal position.

l. Install tube assembly (1, figure 8-15) as follows:

(1) Inspect threads of tube assembly (1) and of small fitting (65, figure 8-14) on back of main control manifold (15) for damage or contamination.

(2) Coat threads on both ends of tube assembly (1) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Install new copper seal (7C-4) on fitting (65, figure 8-14) on back of main control manifold (15).

(4) Insert tube assembly (1, figure 8-15) into module.

(5) Install lower connector of tube assembly (1) on fitting (65, figure 8-14) on back of main control manifold (15). Tighten hand tight.

m. Install tube assembly (8, figure 8-15) as follows:

(1) Inspect threads at both ends of tube assembly (8) and elbow fitting (64, figure 8-14) for damage and contamination.

(2) Coat threads of both ends of tube assembly (8, figure 8-15) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Install new copper seal (7C-8) on side port of swivel nut tee (49) and another on elbow fitting (64, figure 8-14).

(4) Insert tube assembly (8, figure 8-15) into module with longest leg near swivel nut tee (49) and shorter leg near elbow fitting (64, figure 8-14) on top of main control manifold (15).

(5) Install tube assembly (8, figure 8-15) connector on swivel nut tee (49). Tighten hand tight.

(6) Install tube assembly (8) connector on elbow fitting (64, figure 8-14) on top of main control manifold (15). Tighten hand tight.

n. Install tube assembly (11, figure 8-15) as follows:

(1) Inspect threads of both ends of tube assembly (11) and fitting (63, figure 8-14) on main control manifold's right side for damage or contamination.

(2) Coat threads of both ends of tube assembly (11) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Install new copper seal (7C-12) on fitting (63, figure 8-14) on main control manifold's right side.

(4) Insert tube assembly (11, figure 8-15) into module.

(5) Install tube assembly (11) connector on fitting (63, figure 8-14) on main control manifold's right side. Tighten hand tight.

o. Install reservoir (11) into module frame (1) as follows:

(1) Inspect threads on bulkhead fittings (55, 56, and 59) for damage and contamination.

CAUTION

Use extreme care in the following step not to damage threads of bulkhead fittings under reservoir.

(2) Carefully insert reservoir (11) into module through module left side.

(3) Install and tighten four bolts (18) and nuts (62) that insert vertically through reservoir flanges and module frame at each corner of reservoir.

(4) Install and tighten four bolts (60) and washers (61) that insert horizontally through module frame and into reservoir brackets at center front and center rear.

(5) Install new copper seal (7C-8) on center bulkhead fitting (59) under reservoir (11).

(6) Install nut of swivel tee (49, figure 8-15) on center bulkhead fitting (59, figure 8-14). Torque swivel nut to between 450 and 500 inch-pounds.

p. Torque tube assembly (8, figure 8-15) on elbow fitting (64, figure 8-14) on top of main control manifold (15) to between 450 and 500 inch-pounds.

q. Torque tube assembly (8, figure 8-15) connector on side of swivel nut tee (49) to between 450 and 500 inch-pounds.

CAUTION

In the following step the check valve must be held stationary. To torque the fitting on one end without holding valve can cause threads to strip.

r. Hold check valve (50) near the tube assembly (6) fitting and torque fitting on tube assembly (6) to between 450 and 500 inch-pounds.

s. Install tube assembly (4) as follows:

(1) Inspect threads on both ends of tube assembly (4) and on fitting (57, figure 8-14) on side of reservoir select manifold (58) for damage and contamination.

(2) Coat threads on both ends of tube assembly (4, figure 8-15) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Install a new copper seal (7C-16) on the bulkhead fitting (56, figure 8-14) and on the fitting (57) on side of reservoir select manifold (58).

(4) Insert tube assembly (4, figure 8-15) into module.

(5) Install tube assembly (4) upper connector on bulkhead fitting (56, figure 8-14) under reservoir. Tighten hand tight.

(6) Install lower connector of tube assembly (4, figure 8-15) on fitting (57, figure 8-14) on side of reservoir select manifold (58). Tighten hand tight.

(7) Torque connectors on both ends of tube assembly (4, figure 8-15) to between 1,200 and 1,400 inch-pounds.

t. Install tube assembly (9) as follows:

(1) Inspect threads on both ends of tube assembly (9) and on elbow (54) for damage and contamination.

(2) Coat threads on both ends of tube assembly (9) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Install a new copper seal (7C-16) on the bulkhead fitting (55, figure 8-14) and on the elbow (54, figure 8-15).

(4) Insert tube assembly (9, figure 8-15) into module.

(5) Install tube assembly (9) upper connector on bulkhead fitting (55, figure 8-14) under reservoir. Tighten hand tight.

(6) Install lower connector of tube assembly (9, figure 8-15) on elbow (54). Tighten hand tight.

(7) Torque connectors on both ends of tube assembly (9) to between 1,200 and 1,400 inch-pounds.

u. Install tube assembly (48) as follows:

(1) Inspect threads on both ends of tube assembly (48), bottom port of tee (3), and fitting (54, figure 8-14) on rear of main control manifold for damage and contamination.

(2) Coat threads on both ends of tube assembly (48, figure 8-15) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Install a new copper seal on bottom port of tee (3) and one on the fitting (54, figure 8-14) on rear of main control manifold.

(4) Insert tube assembly (48, figure 8-15) into module.

(5) Install upper connector of tube assembly (48) onto bottom port of tee (3). Tighten hand tight.

(6) Install lower connector of tube assembly (48) onto fitting (54, figure 8-14) on rear of main control manifold . Tighten hand tight.

(7) Torque both ends of tube assembly (48, figure 8-15) to between 450 and 500 inch-pounds.

v. Torque lower end of tube assembly (51) on accumulator elbow (70, figure 8-14) to between 450 and 500 inch-pounds.

w. Torque lower end of tube assembly (26, figure 8-15) on adapter (28) at rear of high pressure filter head assembly (27, figure 8-14) to between 450 and 500 inch-pounds.

x. Install (Heat Exchanger) cooler (14, figure 8-14) as follows:

CAUTION

The cooler fins are fragile and bend easily. When installing cooler in module, many obstacles can bend the fins. Use extreme care when inserting module in cooler.

(1) Position cooler (14) as shown in figure 8-14 ensuring that the flow arrow on side tube points up.

(2) Insert cooler (14) into module frame through the top.

(3) Install and tighten six bolts (41) with washers (42, 43) into rubber mounts (44) and nuts (45) to secure cooler (14) to module frame.

(4) Inspect threads on elbow (2, figure 8-15) on bottom of cooler for damage and contamination.

(5) Coat threads of elbow (2) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(6) Install new copper seal (7C-12) on elbow (2) on bottom of cooler.

(7) Install lower connector of tube assembly (11) onto elbow (2) at bottom of cooler. Torque to between 900 and 1,000 inch-pounds.

y. Torque upper connector of tube assembly (11) on fitting (63, figure 8-14) on main control manifold's right side to between 900 and 1,000 inch-pounds.

z. Install tube assemblies (5 and 13, figure 8-15), with assembled components (56, 41 , 47 and 45) as follows:

(1) Inspect threads on both ends of hydraulic line (5, 56, 13), bulkhead fitting (47), two piece reducer (45), and upper fitting (53, figure 8-14) on back of main control manifold for damage and contamination.

(2) Coat threads on ends of tube assemblies (5 and 13, figure 8-15) and on both ends of bulkhead fitting (47) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Insert bulkhead fitting (47) in hole in back of module closest to the electrical connector, long end of fitting goes forward.

(4) Install and tighten jam nut (41) on long end of bulkhead fitting (47) on inside of module.

(5) Install copper seal (7C-8) on short end of bulkhead fitting (47) on outside of module.

(6) Install two piece reducer (45) on short end of bulkhead fitting (47) on outside of module. Torque to between 450 and 500 inch-pounds.

(7) Install copper seals (7C-8) on long (inside module) end of bulkhead fitting (47) and on upper fitting (53, figure 8-14) on back of main control manifold.

(8) Insert hydraulic line (5, 56, 13, figure 8-15) into module with free end of tube assembly (13) near bulkhead connector (47) and free end of tube assembly (5) near back of main control manifold fitting.

(9) Install free end of tube assembly (13) on bulkhead fitting (47). Tighten hand tight.

(10) Install free end of tube assembly (5) on upper fitting (53, figure 8-14) on back of main control manifold. Tighten hand tight.

(11) Torque both ends of tube assemblies (5 and 13), which were installed in steps (9) and (10), to between 450 and 500 inch-pounds.

aa. Install reservoir top cover (12, figure 8-14) as follows:

(1) Inspect top flange of reservoir (11) and threads of studs for damage and contamination.

(2) Apply thin, uniform coating of RTV-109 on top flange of reservoir.

(3) Install a new gasket (40) on top flange of reservoir (11).

(4) Coat top of gasket (40) with RTV-109.

(5) Place reservoir top cover (12) into module and on reservoir with elbow fitting in top cover (12) near module's left side.

(6) Place two brackets (35) over second and fourth studs from forward-left corner of reservoir top.

(7) Install and tighten one nut (36) on stud sticking through each bracket (35).

(8) Place terminal board panel (39) flange over first three studs from forward-right corner of reservoir top.

(9) Install and tighten one nut (36) on each of the three studs sticking through panel (39) flange.

(10) Install and tighten one nut (36) on each of the remaining eleven studs that hold top cover (12) on reservoir (11).

(11) Install and tighten three bolts (37) with washers (38) through bottom of terminal board panel (39) and into frame (1). Ensure that the utility lamp socket (81) is secured under head of bolt closest to module center.

(12) Install a copper seal (7C-10) on elbow (37, figure 8-15) on top of reservoir.

(13) Coat threads of elbow (37) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(14) Install manual fill reducer (35) over seal (36) on elbow (37) on top. of reservoir. Torque manual fill reducer (35) to between 650 and 700 inch-pounds.

ab. Install tube assembly (10) as follows:

(1) Inspect threads at both ends of tube assembly (10), on elbow (2) at top of cooler (7), and on top of tee (18) on front of low pressure filter head (22, figure 8-14) for damage and contamination.

(2) Coat threads at both ends of tube assembly (10, figure 8-15) with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Install a copper seal (7C-12) on the elbow (2) at the top of cooler (7) and on top of tee (18) on low pressure filter.

(4) Insert tube assembly (10) into module.

(5) Install upper connector of tube assembly (10) on elbow (2) on top of cooler (7). Tighten hand tiqht.

(6) Install lower connector on tee (18) at front of low pressure filter. Tighten hand tight.

(7) Torque both connectors of tube assembly (10) to between 900 and 1,000 inch-pounds.

ac. Install tube assemblies (14 and 16) and assembled check valve (15) as follows:

(1) Inspect threads at ends of tube assemblies (14 and 16), on tee (44) on top of reservoir, and on welded fitting (82, figure 8-14) on bottom plate of module for damage and contamination.

(2) Coat threads on ends of tube assemblies (14 and 16, figure 8-15) with hydraulic fluid (MIL-H-5606 or MIL-H-83282) .

(3) Install a copper seal (7C-8) on rear end of tee (44) on top of reservoir.

(4) Install a copper seal (7C-8) on welded fitting (82, figure 8-14) on bottom plate of module.

(5) Insert tube assemblies and assembled check valve into module.

(6) Install the connector of the free end of tube assembly (14) on the rear end of tee (44) on top of reservoir. Tighten hand tight.

(7) Install the connector of the free end of tube assembly (16) on the welded fitting (82 , figure 8-14) on bottom plate of module. Tighten hand tight.

(8) Torque ends of tube assemblies to between 450 and 500 inch-pounds.

ad. Install tube assemblies (38 and 43) and assembled check valve (39) as follows:

(1) Inspect threads on ends of tube assemblies (38 and 43) and on front port of tee (44) on top of reservoir for damage and contamination.

(2) Coat threads of tube assemblies with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Install copper seal (7C-8) on forward port of tee (44) on top of reservoir.

(4) Insert tube assemblies and assembled check valve into module with upper connector near tee (44) on top of reservoir and lower connector near where

top of vent dryer (17, figure 8-14) will be (when installed).

(5) Install upper connector of tube assembly on tee (44) on top of reservoir. Torque to between 450 and 500 inch-pounds.

ae. Install tube assemblies (12 and 25, figure 8-15) with assembled components (42, 46, 40 and 53) as follows:

(1) Inspect threads on ends of tube assemblies (12 and 25), of bulkhead fitting (42), and of reducer (40) and the front of adapter (30) on front of high pressure filter (27, figure 8-14) for damage and contamination.

(2) Coat threads on ends of tube assemblies (12 and 25, figure 8-15) and on both ends of bulkhead fitting (42), with hydraulic fluid (MIL-H-5606 or MIL-H-83282).

(3) Insert (from rear of module) long end of bulkhead fitting (42) into remaining hole in rear of module.

(4) Install and tighten jam nut (46) on long end of bulkhead fitting (42) on inside of module.

(5) Install copper seal (7C-12) on long end of bulkhead fitting (42) on inside of module.

(6) Install reducer (40) on long end of bulkhead fitting (42) on inside of module.

(7) Install one copper seal (7C-10) on reducer (40) and one copper seal (7C-10) on adapter (30) on front of high pressure filter head (27, figure 8-14).

(8) Insert tube assemblies (12 and 25. figure 8-15) and assembled components into module.

(9) Install free end of tube assembly (12) on reducer (40). Tighten hand tight.

(10) Install free end of tube assembly (25) on adapter (30). Tighten hand tight.

(11) Torque ends of tube assemblies (12 and 25) to between 650 and 700 inch-pounds.

af. Reassemble high pressure filter as follows:

(1) Install packing (28, figure 8-14) on top of labeled HIGH PRESSURE filter element (25).

(2) Insert high pressure filter element (25) up into high pressure filter head assembly (27).

(3) Install packing (26) into recess in high pressure filter bowl (24).

(4) Install high pressure filter bowl (24) into high pressure head assembly (27).

ag. Reassemble low pressure filter as follows:

(1) Install packing (23) on top of labeled LOW PRESSURE filter element (20).

(2) Insert low pressure filter element (20) up into low pressure filter head assembly (22).

(3) Install packing (21) into recess in low pressure filter bowl (19).

(4) Install low pressure filter bowl (19) into low pressure head assembly (22).

ah. Install front panel (33, figure 8-14) on module frame (1) as follows:

(1) Position front panel (33) on front of module with wires directed toward terminal boards on panel (39).

(2) Install and tighten two bolts (47) below blue fill controls (50) on fill manifold (51).

(3) Install and tighten two bolts (34) through top of front panel (33) and into brackets (35) at top of reservoir.

(4) Put RESERVOIR select valve handle (49) over valve shaft.

(5) Insert setscrew (48) in RESERVOIR select valve handle (49).

(6) Install dust caps (that have chains (52) rivited to front panel (33) on SYSTEM FILL, SYSTEM DRAIN, HIGH PRESSURE, and RETURN connectors.

(7) Install new copper seal (7C-4) on elbow (9) on back of pressure gauge (8).

(8) Install free end of tube assembly (1, figure 8-15) on elbow (9, figure 8-14) on back of pressure gauge (8). Tighten hand tight.

(9) Torque both ends of tube assembly (1, figure 8-15) to between 135 and 150 inch-pounds.

ai. Install vent dryer (17, figure 8-14) as follows:

(1) Slide vent dryer (17) into dryer retaining clamp at front of module.

(2) Install a new copper seal (7C-8) on fitting on top of vent dryer.

(3) Install free end of tube assembly (38, figure 8-15) on vent dryer fitting. Torque to between 450 and 500 inch-pounds.

aj. Slide rain shield (29) bolts (30) down into slots in top of front panel (33). Tighten nuts (31).

ak. Observe tags installed during disassembly and connect wires from front panel (33) to terminal boards on panel (39) .

al. Route wires from temperature sensors (79) along wiring harness to terminal boards on panel (39).

am. Observe tags installed during disassembly and connect temperature sensor wires to terminal boards on panel (39).

an. Route wires from filter head assemblies (22, 27) along wiring harness to terminal boards on panel (39).

ao. Observe tags installed during disassembly and connect filter assembly pressure sensor wires to terminal boards on panel (39).

ap. Route wires from load valve solenoid (66) along wiring harness to terminal boards on panel (39).

aq. Observe tags installed during disassembly and connect load valve solenoid wires to terminal boards on panel (39).

ar. Install wire ties where needed to hold wiring harness together.

as. Install module top.

at. Fill module with hydraulic fluid as described in paragraph 3-9 of TM 55-1730-229-12.

au. If required, charge accumulator as follows:

(1) Connect a short pneumatic line between the supply shutoff valve (closed) on a 2,000 psi nitrogen bottle and one end of a tee connector.

(2) Connect a 0 to 2,000 psi gauge to side port of the tee connector.

(3) Connect a longer (6 feet minimum) pneumatic hose to the third port (open end) of the tee connector.

(4) Connect schrader valve connector (P/N 81063-06177) to free end of the longer pneumatic hose connected in step (3).

(5) Open the hydraulic module access door.

(6) Remove plastic screwcap from charging valve (MS28889-2) on end of accumulator (closest to filter assemblies).

(7) Connect the schrader valve connector (step 4) to the charging valve *on* the accumulator.

(8) Open the accumulator charging valve using a 3/4 inch open end wrench (turn counterclockwise to open).

(9) Observe the 0 to 2,000 psi gage. If indication is 500 ± 50 psig proceed to step 11. If pressure is low continue with step 10.

(10) While watching the 0 to 2,000 psi gauge for an indication of 500 psi, slowly open the supply shutoff valve on the nitrogen bottle. Close the supply shutoff valve when a 500 psi indication is obtained.

(11) Close the accumulator charging valve using a 3/4 inch open end wrench (turn clockwise to close).

(12) Disconnect shrader valve connector from the accumulator charging valve.

(13) Install plastic screwcap on accumulator charging valve.

(14) Close hydraulic module access door.

av. Pressure test module as described in paragraph 8-22.

aw. Install module in unit as described in paragraph 2-8.b.

Section V. TEST

8-19. INTRODUCTION. This section contains test procedures specified in this chapter for test after repair or reassembly.

8-20. RETURN MANIFOLD ASSEMBLY PRESSURE TEST.

a. Connect hydraulic fluid source to the fill port (figure 8-16) with the filter port open to the atmosphere. Depress fill valve to establish a fluid flow and bleed air. Cap the filter port, depress the fill valve and release.

b. Increase pressure to 150 psi and hold for two minutes. There shall be no external leakage or evidence of distortion.

c. Reduce the pressure to zero and uncap to filter port. Increase pressure at the fill port to 3 psi and observe leakage at the to filter port. Leakage shall not exceed 10 drops per q inute.

d. Connect fluid source to filter (figure 8-17) port. Cap the relief res. 1 and res. 2 ports. Bleed unit by cycling the reservoir selector to pass fluid out to suction port. Then cap the suction port.

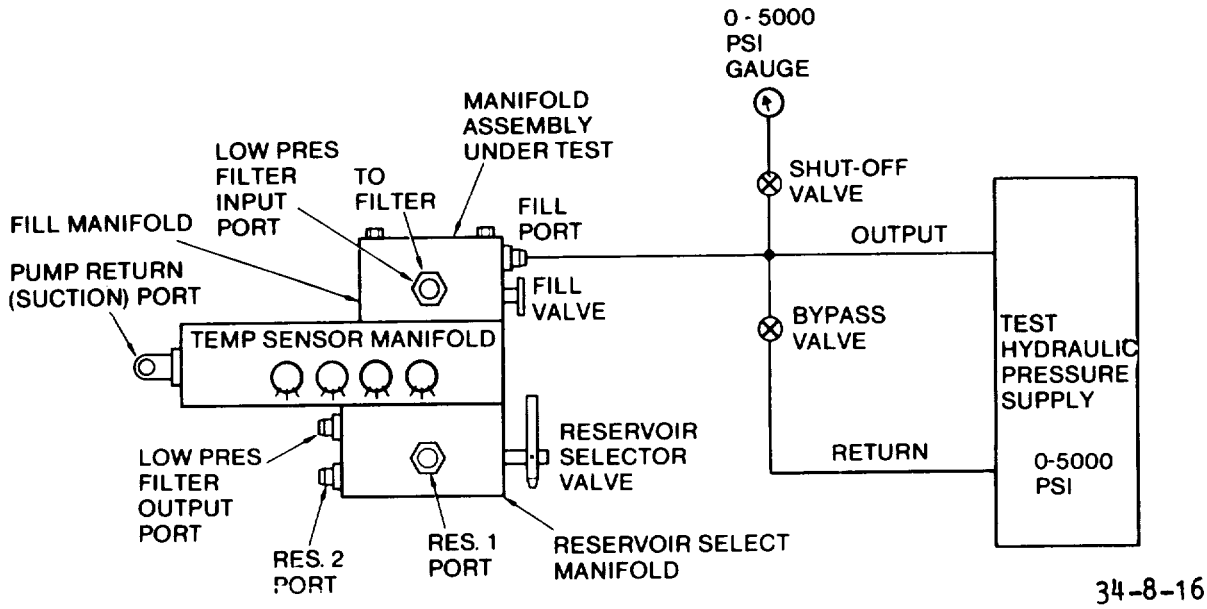
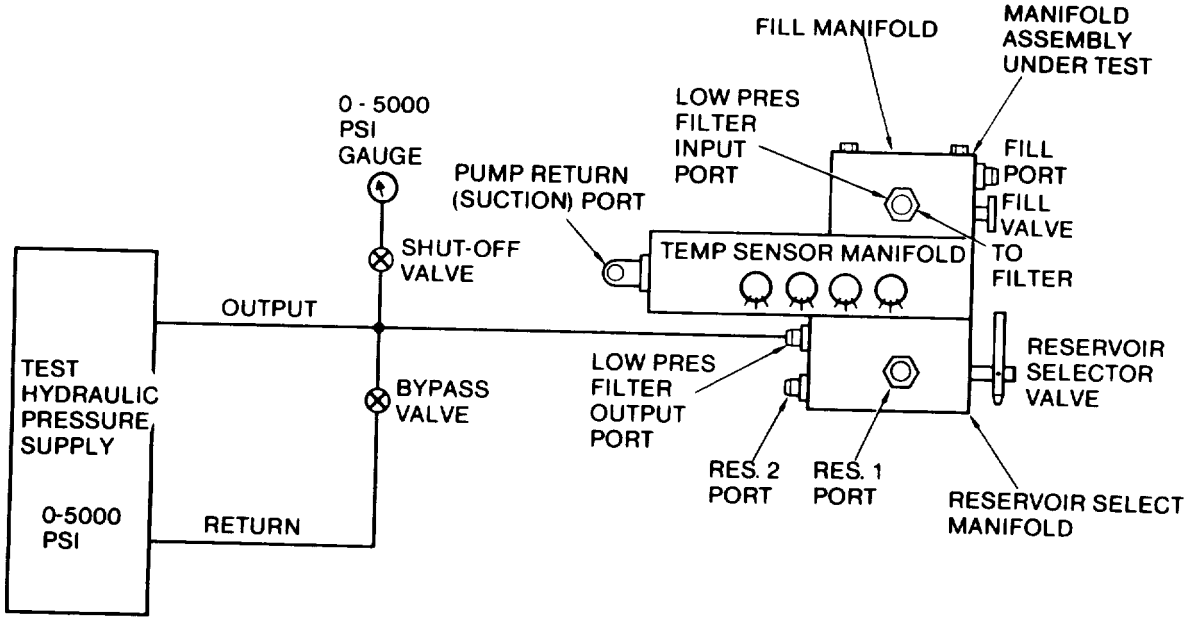


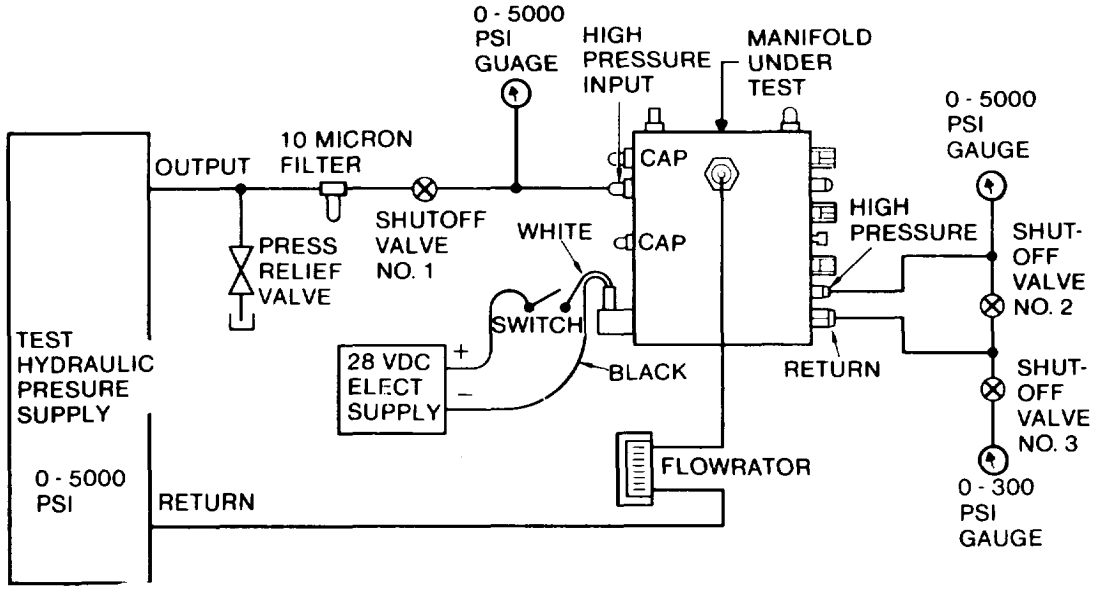
Figure 8-16. Fill Manifold Test Setup



NOTE: RELIEF PORT IS ON TOP OF RESERVOIR SELECT MANIFOLD ON FAR SIDE OF TEMP. SENSOR MANIFOLD.

34-8-17

Figure 8-17. Reservoir Selector Manifold Test Setup



34-8-18

Figure 8-18. Manifold Test Setup

e. Increase pressure to 150 psi and hold two minutes. There shall be no external leakage nor evidence of distortion.

f. Reduce the pressure to zero and uncap res. 1 port. Increase pressure at the filter port to 3 psi and observe leakage at the res. 1 port, with selector set to AIRCRAFT. Leakage shall not exceed 10 cc/min.

e. Set the selector to AGPU. Leakage shall not exceed 10 cc/rein.

h. Drain unit, drip dry, and cap ports.

8-21. MANIFOLD ASSEMBLY PRESSURE TEST.

a. Connect fluid source as shown in figure 8-18.

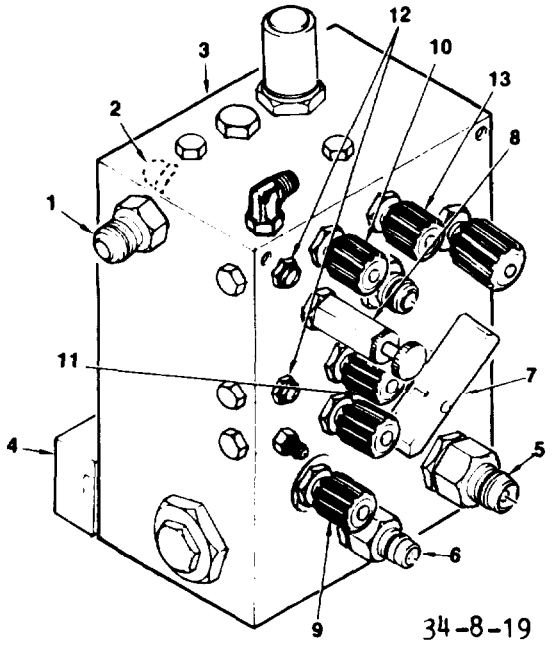
b. Open HIGH PRESSURE BLEED valve (11, figure 8-19) and RETURN BLEED valve (10) to remove air from system, and observe sight glasses. Close bleed valves.

c. With load valve solenoid (4) energized, and all shut-off valves closed, and relief valves set above 4500 psig, apply 4500 psig to inlet connection (2). Hold for two minutes. There shall be no evidence of external leakage, permanent deformation, or subsequent malfunction.

d. Repeat step c. with load valve (4) de-energized.

e. Open the HIGH PRESSURE BYPASS valve (9) and cap the return port (1). Apply 1500 psi to the inlet connection (2) and hold two minutes. There should be no evidence of external leakage, permanent deformation, or subsequent malfunction in the low pressure circuit.

f. Set PRESSURE RELIEF valve (8) at 3700 psi. Crack and reseat the PRESSURE RELIEF valve (8) a few times to observe function. Check unit for external leaks. Energize and reenergize the load valve (4) a minimum of three times and by observation verify 0.10 second minimum time delay.



1. RETURN PORT
2. INLET CONNECTION
3. MANIFOLD
4. LOAD VALVE SOLENOID
5. RETURN INLET
6. HIGH PRESSURE OUTLET
7. RETURN BYPASS SELECTOR
8. PRESSURE RELIEF VALVE
9. HIGH PRESSURE BYPASS VALVE
10. RETURN BLEED VALVE
11. HIGH PRESSURE BLEED VALVE
12. SIGHT GLASS
13. RESERVOIR DRAIN VALVE

Figure 8-19. Manifold Controls/ Fittings

g. Open the HIGH PRESSURE BYPASS valve (9). The pressure drop through the manifold at gauge connected to HIGH PRESSURE outlet (6) shall be a minimum of 500 psi.

h. With the flow at 12 gpm energize the load valve (4). Open shut-off valve no. 2 (figure 8-18) and check the back pressure. The difference between the back pressure in the RETURN port in the OFF and BYPASS positions of selector (7, figure 8-19) should be a minimum of 55 psi. Drain manifold and plug or cap all ports for storage or installation.

8-22. HYDRAULIC MODULE PRESSURE TEST.

Preparation for Hydraulic Test (See figure 8-20.)

(1) Set test pressure supply pump volume at 4 to 5 gpm.

(2) Set test pressure supply relief valve at 5000 psi.

(3) Precharge accumulator in the module being tested to 500 psi with nitrogen.

(4) Connect test circuit as shown in figure 8-20.

(5) Open return valve C.

(6) Open RESERVOIR DRAIN (13, figure 8-19) valve, and HIGH PRESSURE BYPASS (9) valve on the control panel.

(7) Set the RESERVOIR selector valve to AIRCRAFT position. Set the RETURN BYPASS (7) to BYPASS position.

(8) Start the test pressure supply pump.

(9) Open inlet valve A (figure 8-20) and circulate fluid through the module at 3 to 4 gpm. Open the HIGH PRESSURE BLEED valve (11, figure 8-19) and RETURN BLEED valve (10). Circulate fluid until no evidence of air is noted in the sight glasses (12) or flowrator.

(10) Close inlet valve A (figure 8-20) .

b. Low Pressure Leakage. (See figure 8-20.)

(1) Close HIGH PRESSURE BLEED valve (11 , figure 8-19) and RETURN BLEED valve (10). Set RESERVOIR selector on module being tested to AGPU. Close

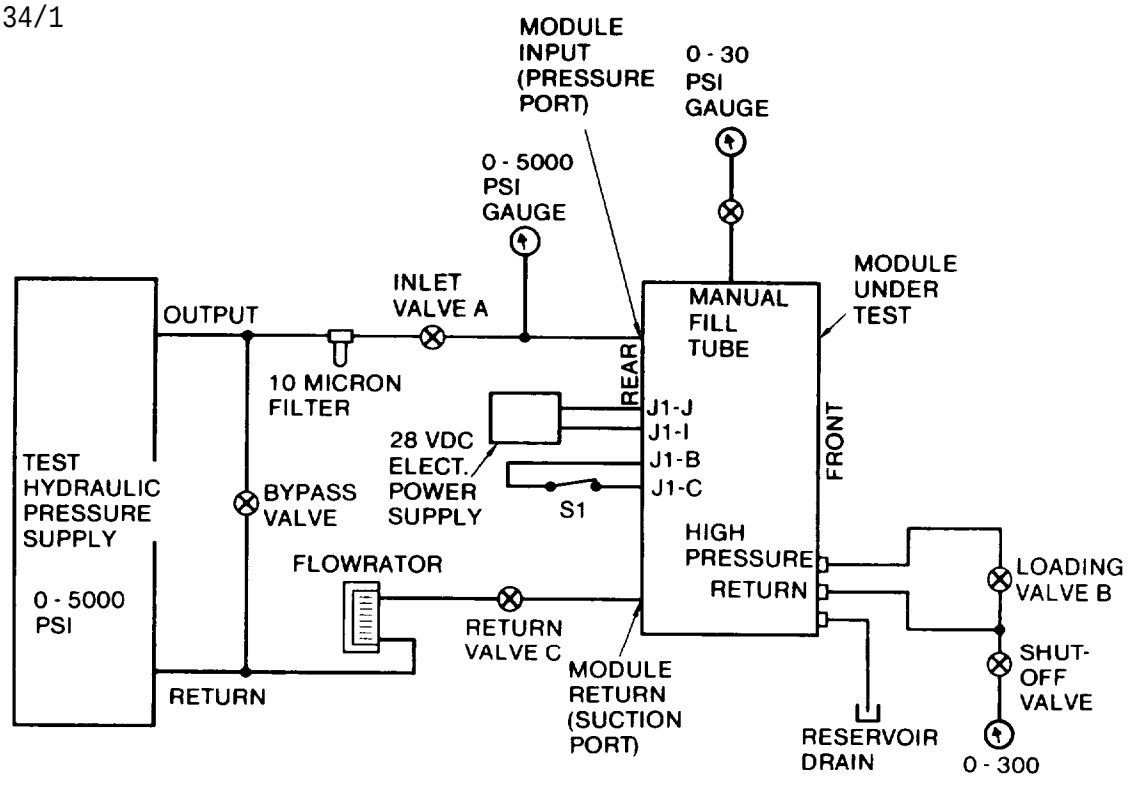


Figure 8-20. Hydraulic Module Test Setup

return valve C (figure 8-20). Close RESERVOIR DRAIN valve (13, figure 8-19).

(2) Establish a pressure of 5 psi minimum/9 psi maximum in the reservoir as follows. Open inlet valve A and observe the reservoir fluid level and 0-30 psi gauge. When the reservoir is approximately 1/3 to 1/2 full the 0-30 psi gauge will indicate 5 psi minimum. Close inlet valve A.

(3) Maintain pressure for five minutes and inspect unit for external leaks.

c. Return Proof and Leakage. (See figure 8-20.)

(1) Set RESERVOIR selector on module being tested to AIRCRAFT.

(2) Open RESERVOIR DRAIN valve (13, figure 8-19).

(3) Open inlet valve A (figure 8-20) and increase pressure to 90 psi.

(4) Maintain pressure for two minutes minimum and inspect unit for external leaks.

(5) Reduce pressure and close inlet valve A.

d. High Pressure Proof and Leakage. (See figure 8-20.)

(1) Open the return valve C.

(2) Close HIGH PRESSURE BYPASS valve (9, figure 8-19).

(3) Open inlet valve A (figure 8-20) and close bypass valve B.

(4) Adjust PRESSURE RELIEF valve (8, figure 8-19) on the module being tested to increase inlet pressure to 4800 psi.

(5) Maintain pressure for two minutes and inspect unit for external leaks. None are permitted.

(6) Reduce PRESSURE RELIEF valve (8) setting on the module being tested.

(7) Close inlet valve A (figure 8-20) .

e. High Pressure Operation. (See figure 8-20.)

(1) Open the inlet valve A and increase PRESSURE RELIEF valve (8, figure 8-19) setting to obtain 3,700 psi.

(2) Actuate the OUTPUT switch on module being tested.

(3) Open loading halve B (figure 8-20) until pressure reduces to 3500 psi.

(4) Cycle the module being tested two times utilizing the OUTPUT switch, observe actuation. Actuation should take 0.10 second minimum.

(5) Open switch S1 (figure 8-20). Verify that the OUTPUT switch will not actuate the module being tested. Close S1.

(6) Reduce PRESSURE RELIEF (8, figure 8-19) valve setting to obtain 750 psi and lock knob.

f. Back Pressure. (See figure 8-20.)

(1) Actuate the OUTPUT switch on module being tested.

(2) Open loading valve B (figure 8-20) until 600 psi inlet pressure is observed on the low pressure (0-300 psi) gauge.

(3) place the RETURN BYPASS selector (7, figure 8-19) to OFF. Observe the low pressure (0-300 psi) gauge. The pressure should increase a minimum of 55 psi.

(4) Reduce inlet pressure and close inlet valve A (figure 8-20).

g. Drain. Drain reservoir, disconnect all lines and fittings, replace all caps and plugs. Remove accumulator precharge.

CHAPTER 9

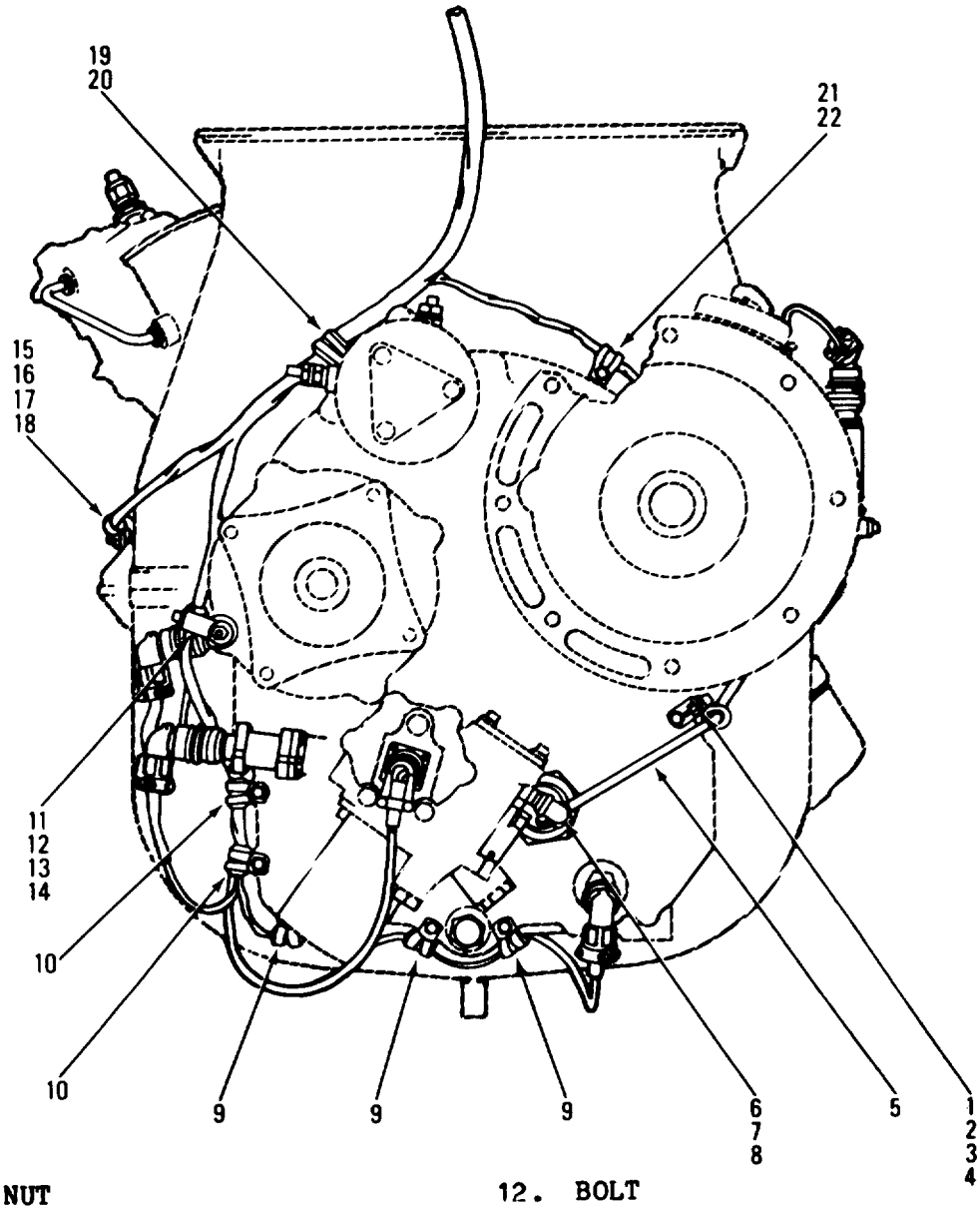
MAINTENANCE OF ENGINE

9-1. DESCRIPTION. Refer to TM 55- 9-2. Deleted.
1730-229-12 for a description of the
engine.

Section I. DISASSEMBLY, INSPECTION, AND REPAIR

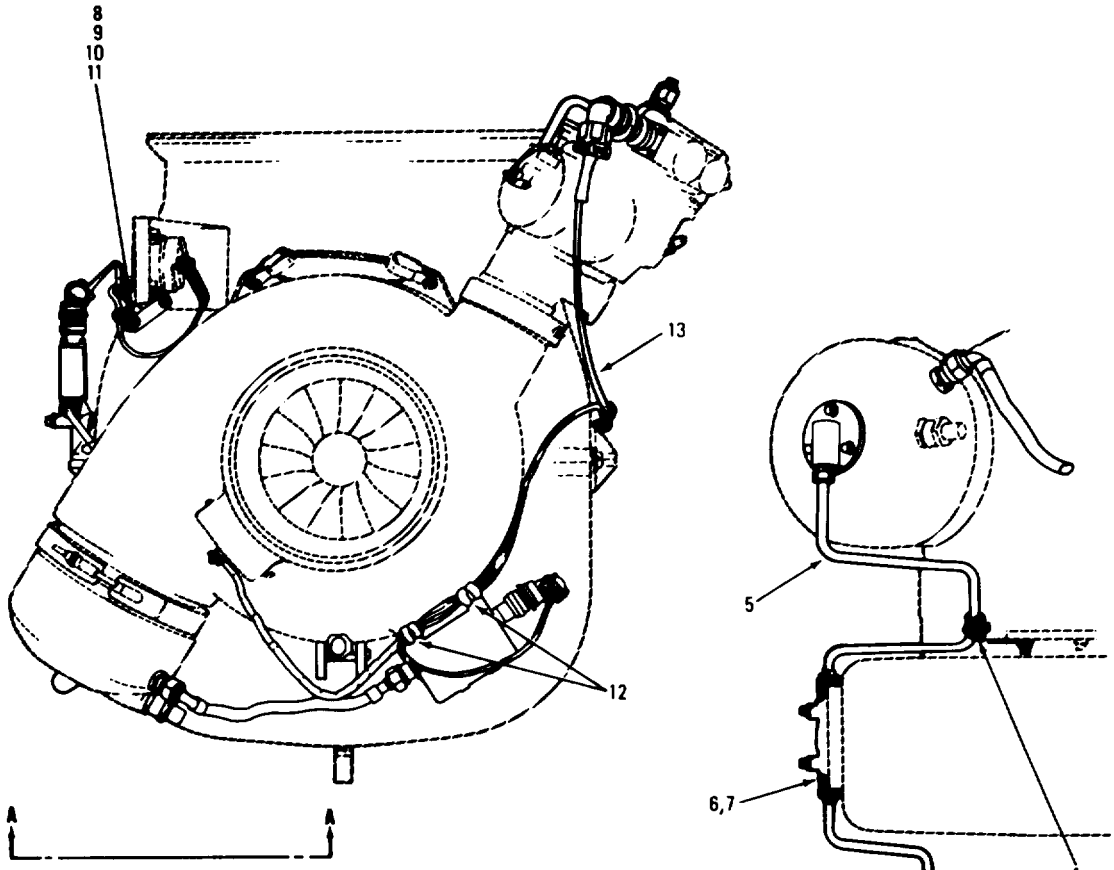
9-3. REMOVAL OF ENGINE FROM AGPU. **9-4. Deleted.**
Engine removal from AGPU is described in
section IV of paragraph 2-10.

All data on pages 9-2 through 9-20, including Figures 9-1 through 9-8 and Tables 9-1 through 9-3 are deleted.



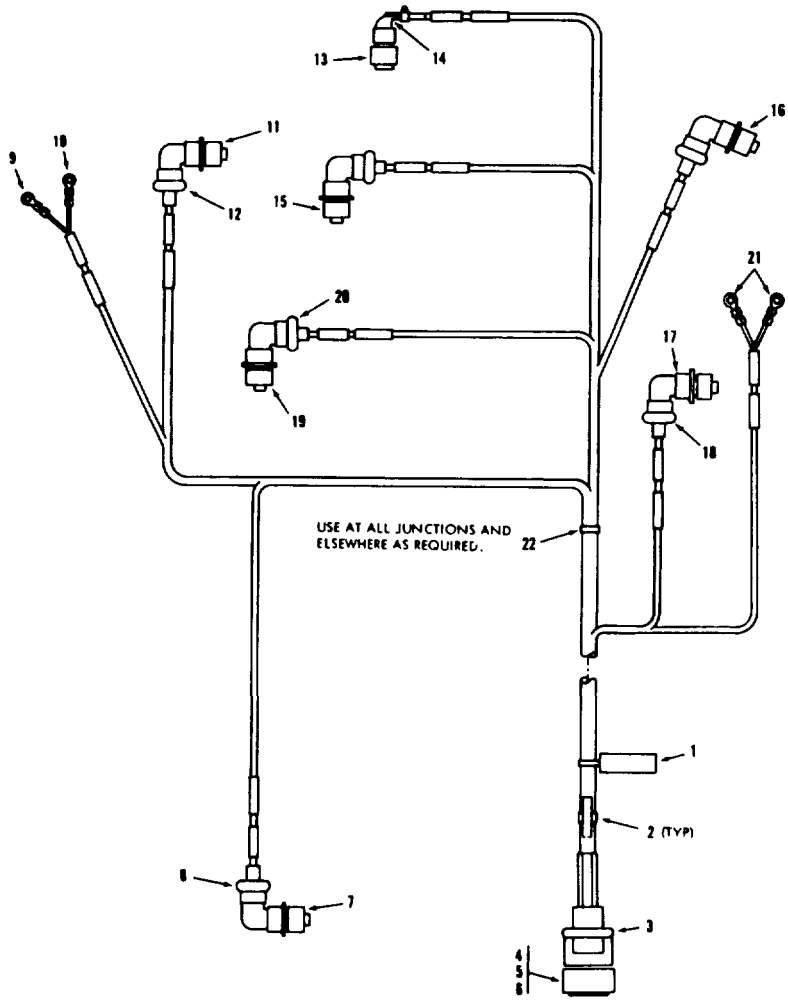
1. NUT
2. BOLT
3. CLAMP
4. BRACKET
5. TUBE ASSEMBLY
6. ELBOW
7. NUT
8. PACKING
9. CLAMP
10. CLAMP
11. NUT
12. BOLT
13. CLAMP
14. BRACKET, ANGLE
15. NUT
16. BOLT
17. CLAMP
18. BRACKET
19. BOLT
20. CLAMP
21. BOLT
22. CLAMP

Figure 9-1. Engine Plumbing and Wiring Harness Installation, Front View



1. NUT
2. BOLT
3. CLAMP
4. BRACKET
5. TUBE ASSEMBLY
6. UNION
7. PACKING
8. NUT
9. BOLT
10. CLAMP
11. BRACKET
12. CLAMP
13. HARNESS ASSEMBLY, WIRING

Figure 9-2. Engine Plumbing and Wiring Harness Installation, Rear View



34-9-3

1.	IDENTIFICATION STRAP	12.	BACKSHELL
2.	IDENTIFICATION STRAP	13.	CONNECTOR
3.	BACKSHELL	14.	BACKSHELL
4.	CONNECTOR	15.	CONNECTOR
5.	CONTACT	16.	CONNECTOR
6.	CONTACT	17.	CONNECTOR
7.	CONNECTOR	18.	BACKSHELL
8.	BACKSHELL	19.	CONNECTOR
9.	TERMINAL	20.	BACKSHELL
10.	TERMINAL	21.	TERMINAL
11.	CONNECTOR	22.	RETAINING STRAP

Figure 9-3. Wiring Harness Assembly

(2) Remove damaged wires as follows :

(a) Remove damaged wire from insulation sleeving.

(b) Measure the cut replacement wire.

(c) Insert replacement wire through insulation sleeving.

(3) Install connectors as follows:

(a) Connect wires and electrical cables to connector. Solder wires and electrical cables using silver solder in accordance with MIL-STD-454, Requirement 5 using solder in accordance with QQ-B-654, Grade V.

(b) Apply teflon tape (E125-10, Type B, Dodge Fluorgraph, Div. Oak Industries, McCaffrey St., Hoosisk Falls, NY 12090 or equivalent) to fill space inside clamp or connector.

(c) Slide back backshell and secure with connector plug screws.

9-6. ACCESSORY ITEMS REMOVAL AND INSPECTION.

a. Remove. (See figure 9-4.)

(1) Remove two check valves (1) and packing (2). Discard packing.

(2) Remove igniter plug lead (3), igniter plug (4), and washer (5).

(3) Disconnect connector P7 (8) from ignition unit (7).

(4) Remove four bolts (6) and remove ignition unit (7). Leave clamps (9) on wire harness (10).

(5) Tag and disconnect two wires (11) from hourmeter (12) by removing two screws (13), lockwashers (14), and washers (15).

(6) Remove four screws (16) and hourmeter (12).

(7) Disconnect fuel lines (17) from fuel solenoid (18), and elbow on fuel control unit (26).

(8) Disconnect connector (19) from fuel solenoid (18).

(9) Remove two bolts (20), washers (21), and remove fuel solenoid (18).

NOTE

Removal of speed sensor, steps (10) and (11), is not required unless new shim set is required (as indicated by TM 55-1730-229-12).

(10) Disconnect connector P6 (22) from speed sensor (23).

(11) Remove bolt (20), speed sensor (23), packing (24), and shim (25).

(12) Remove screw (27), washer (28) and remove fuel line (17) with clamp (29).

b. Inspection and Checks. Perform procedures contained in table 9-1.

c. Repair. Repair starter assembly as outlined in chapter 7.

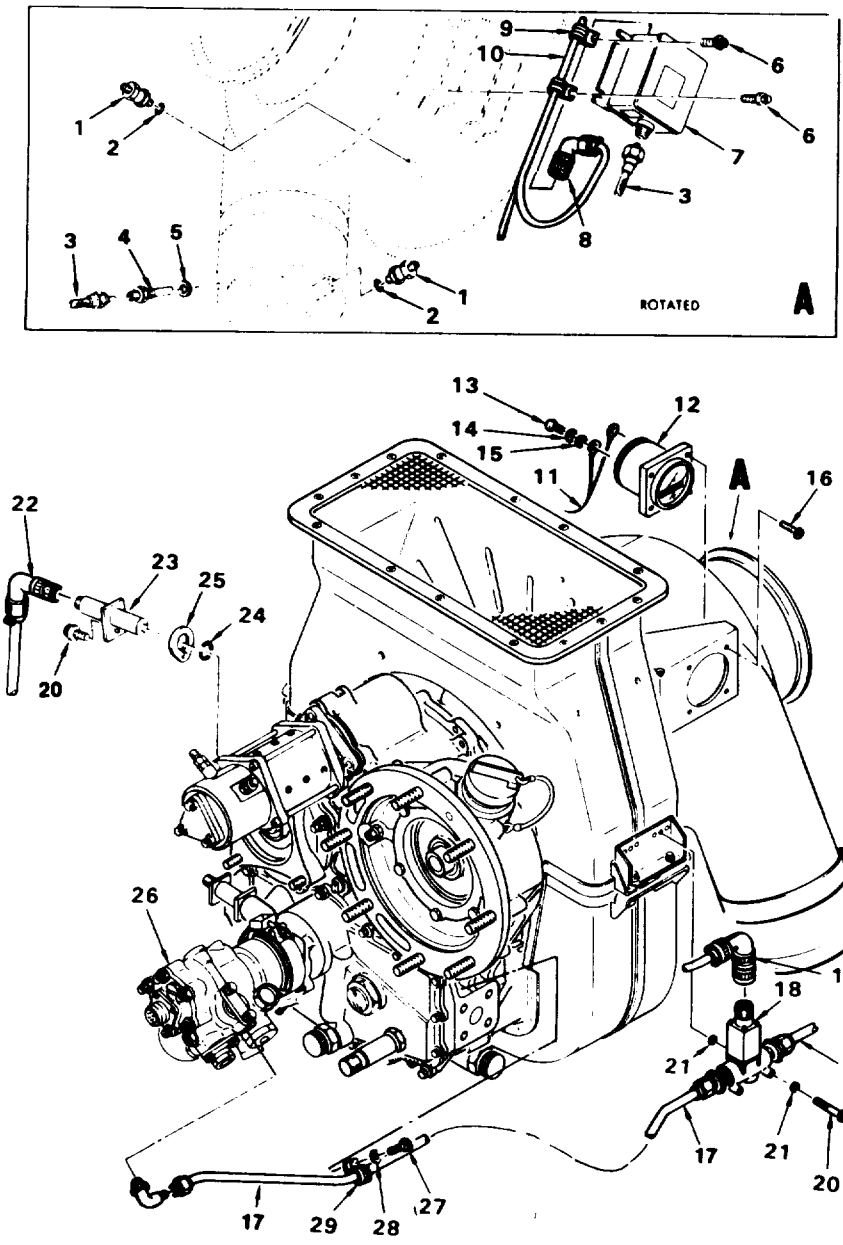
9-7. CONTROLS REMOVAL AND INSPECTION.

a. Remove. (See figure 9-5.)

(1) If identification plate (2) is damaged, remove screws (1) and identification plate (2).

(2) Tag and disconnect wires (8) from thermocouple (4) by removing nuts (5, 6).

(3) Remove bolts (3), thermocouple (4), and gasket (7). Discard gasket.



34-9-4

1.	CHECK VALVE	11.	WIRING HARNESS	20.	BOLT
2.	PACKING	12.	HOURMETER	21.	WASHER
3.	IGNITER PLUG LEAD	13.	SCREW	22.	CONNECTOR P6
4.	IGNITER PLUG	14.	WASHER, LOCK	23.	SPEED SENSOR
5.	WASHER	15.	WASHER	24.	PACKING
6.	BOLT	16.	SCREW	25.	SHIM
7.	IGNITION UNIT	17.	FUEL LINE	26.	FUEL CONTROL UNIT (FCU)
8.	CONNECTOR P7	18.	FUEL SOLENOID, SHUTDOWN	27.	SCREW
9.	CLAMP	19.	CONNECTOR	28.	WASHER
10.	WIRE HARNESS			29.	CLAMP

Figure 9-4. Accessory Items

Table 9-1. Electrical Assemblies Inspection/Check Procedures

Fig. 9-4 Item No.	Nomenclature	Inspect/Check	Requirements
3	Igniter Plug Lead	Visually check outer shielding for chafing.	No chafing on outer shielding allowed.
		Visually check for cracks or separation between shielding and terminal end.	No cracks or separation between shielding and terminal end allowed.
		Visually check connector nuts for cracks and damaged threads.	No cracks or damaged threads allowed.
4	Igniter Plug	Visually check ceramic insulator of igniter plug for cracks and chips.	No cracks or chips allowed.
		Visually check electrode for distortion and erosion.	No distortion allowed. Electrode shall not be less than 0.010 inch above ceramic insulator.
		Visually check connector for bent, broken and burned pins.	No bent, broken or burned pins allowed.
		Visually check igniter plug threads for damage.	No damage to threads allowed.
		Visually check igniter plug housing for cracks.	No cracks allowed.
7	Ignition Unit	Visually check case of ignition unit for dents and cracks.	No dents or cracks allowed.

Table 9-1. Electrical Assemblies Inspection/Check Procedures (continued)

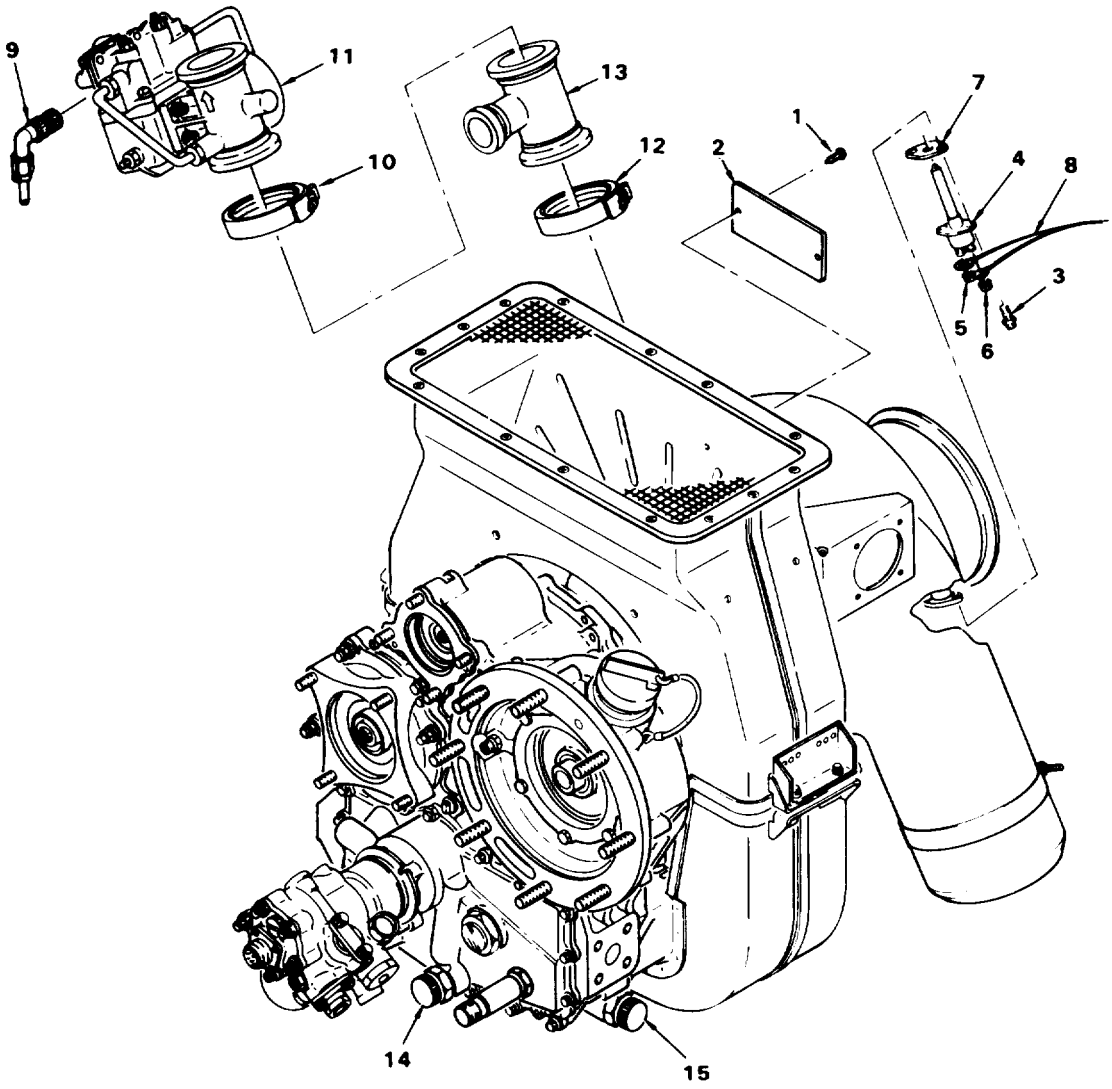
Fig. 9-4 Item No.	Nomenclature	Inspect/Check	Requirements
7	Ignition Unit (continued)	Visually check brackets on ignition unit for cracks.	No cracks allowed.
		Visually check electrical connectors for corrosion and bent, broken and burned pins.	No corrosion allowed. No damage to pins allowed.
		Visually check electrical connectors for stripped, galled and worn threads.	No stripped, galled or worn threads allowed.
23	Speed sensor	Visually check case for dents and cracks.	No dents or cracks allowed.
		Visually check connector for bent, broken and burned pins.	No bent, broken or burned pins allowed.
		Visually check mounting flange for cracks and distored bolt hole.	No cracks in mounting flange or distorted bolt hole allowed.
		Using multimeter check resistance between pins A and C.	Resistance shall be 20 ohms maximum.
		Using a Kelvin Bridge check resistance between case and pin B.	Resistance shall be 0.010 ohm maximum.

(4) Disconnect electrical connector (9) from load control valve (11).

(5) Loosen clamp (10), then remove load control valve (11) and clamp (10) from adapter (13).

(6) Loosen clamp (12), then remove adapter (13) and clamp (12) from engine.

b. Inspection and Checks. Perform procedures contained in table 9-2.



1. SCREW
2. IDENTIFICATION PLATE
3. BOLT
4. THERMOCOUPLE
5. NUT
6. NUT
7. GASKET
8. WIRING HARNESS, THERMOCOUPLE
9. CONNECTOR P5
10. CLAMP
11. LOAD CONTROL VALVE
12. CLAMP
13. ADAPTER
14. DRAIN PLUG, MAGNETIC
15. DRAIN PLUG, MAGNETIC (OVERFLOW TUBE)

Figure 9-5. Controls

Table 9-2. Controls Inspection/Check Procedures

Fig. 9-5 Item No.	Nomenclature	Inspect/Check	Requirements
4	Thermocouple	Visually check thermocouple for damage to threads on alumel and chromel terminal posts.	No damage to threads allowed.
		Visually check thermocouple for distorted flange tube and tube holes.	No distortion to flange tube or tube holes.
		Perform thermocouple loop resistance check as follows. (1) Connect one lead of Kelvin Bridge (Model 1699) to alumel post. (2) Connect other lead of Kelvin Bridge to chromel post .	Thermocouple loop resistance shall not exceed 1.0 ohm maximum at room temperature.
		Using multimeter check each thermocouple post to case resistance.	Thermocouple post to case resistance shall be 10K ohms minimum.
		Heat thermocouple to 1000°F (538°c).	Thermocouple temperature shall read within 8°F (5°C) on test equipment indicator.
11	Load Control Valve	Visually check for cracks or dents.	No cracks or dents allowed.
10,12	Clamp	Visually check clamp for cracks, distortion and damaged threads.	No cracks, distortion or damaged threads allowed.
13	Adapter	Visually check adapter for cracks.	No cracks allowed.

9-8. COMBUSTION SECTION DISASSEMBLY, INSPECTION, AND REPAIR.

a. Disassembly. (See figure 9-6.)

NOTE

Do not remove filler cap (1), wire rope (2), and splice (3) unless inspection reveals damage.

(1) Remove filler cap (1), wire rope (2), and splice (3).

(2) Disconnect fuel line (4) from fuel nozzle assembly (7).

(3) Loosen clamp (5), then remove combustor assembly.

(4) Remove bolts (6) , fuel nozzle assembly (7), and gasket (8) from combustion chamber cap (9), then separate combustion chamber cap (9) from combustion chamber (10). Discard gasket.

b. Inspection and Checks. Perform procedures in table 9-3.

(1) Check fuel nozzle assembly.

(2) Check combustion chamber in accordance with procedures in paragraph c.

c. Inspect Combustion Chamber. (See figure 9-7.)

(1) Check for cracks (1) in igniter grommet retain welds or retainer. No cracks allowed.

(2) Check for metal thinning (2). Repair if metal thinning below 0.016 inch due to corrosion or erosion is indicated.

(3) Check for cracks (3). Repair if cracks separated by less than 0.25 inch are indicated.

(4) Check for cracks (4) at tabs. No cracks allowed.

(5) Check for cracks (5) which could cause material breakaway. Repair if cracks are indicated.

(6) Check for distortion (6) of cooling ring. Cooling ring distortion greater than one-half of normal gap not allowed.

(7) Check for deformation (7). Deformation greater than 0.125 inch not allowed.

(8) Check for cracks (8) connecting any two holes. Repair if cracks are indicated.

(9) Dimensionally inspect Diameter A. Diameter A shall be 1.001 to 1.006 inches. Replace combustion chamber if not as specified.

(10) Check Surface B for flatness. Replace combustion chamber if Surface B is not flat within 0.003 inch.

(11) Replace/repair combustion chamber if inspection requirements are not met.

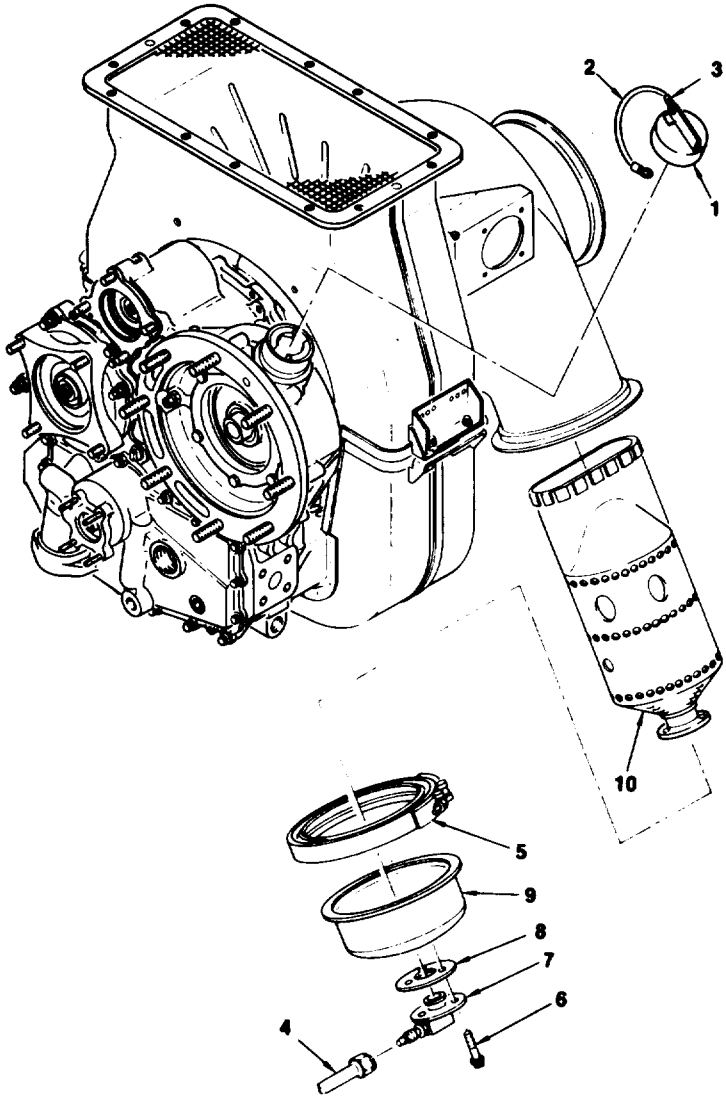
d. Repair (See figure 9-8.)

(1) Replace damaged spring ring (8) as follows:

(a) Hand grind weld as required to remove spring ring (8). Blend excess weld on duct half (9).

(b) Hand abrade weld area to cleanup.

(c) Clean area prior to welding with clean, lint-free cloth dampened with methanol O-M-232 or equivalent.



34-9-6

1. FILLER CAP
2. WIRE ROPE
3. SPLICE
4. FUEL LINE
5. CLAMP
6. BOLT
7. FUEL NOZZLE ASSEMBLY
8. GASKET
9. COMBUSTION CHAMBER CAP
10. COMBUSTION CHAMBER

Figure 9-6. Combustion Section Components

Table 9-3. Combustion Section Components Inspection/Check Procedures

Fig. 9-6 Item No.	Nomenclature	Inspect/Check	Requirements
1	Filler Cap	Visually check gasket material.	No deterioration or cuts allowed.
		Check attached cable for security.	Cable shall be secure.
		Visually check for galled, peened, crossed and stripped threads.	No galled, peened, crossed or stripped threads allowed.
5	Clamp	Visually check clamp for cracks, distortion and damaged threads.	No cracks, distortion or damaged threads allowed.
7	Fuel Nozzle Assembly	Visually check fuel nozzle assembly for burring, flattening, scratching of conical surface, or crossed or worn threads.	Replace fuel nozzle assembly, if damage is indicated.
9	Combustion Chamber Cap	Visually check insulation material for damage (bare metal visible).	No damage allowed. Refer to paragraph e. for repair.
		Visually check for cracks, dents, deformation and damaged threads.	No cracks, dents, deformation or damaged threads allowed.
		Perform flourescent penetrant inspection on inside surface or to outside surface if insulating material has been removed.	No cracks or damage allowed.
10	Combustion Chamber	Visually and dimensionally check combustion chamber.	Refer to paragraph c.

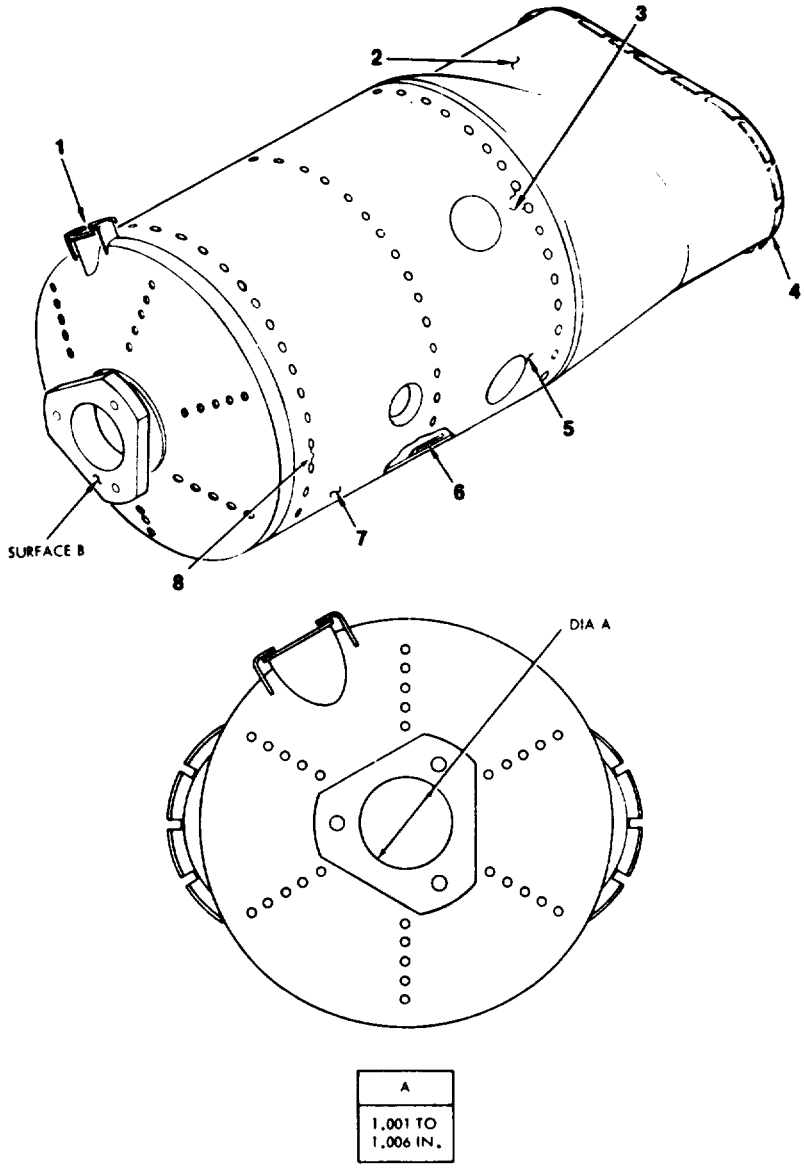
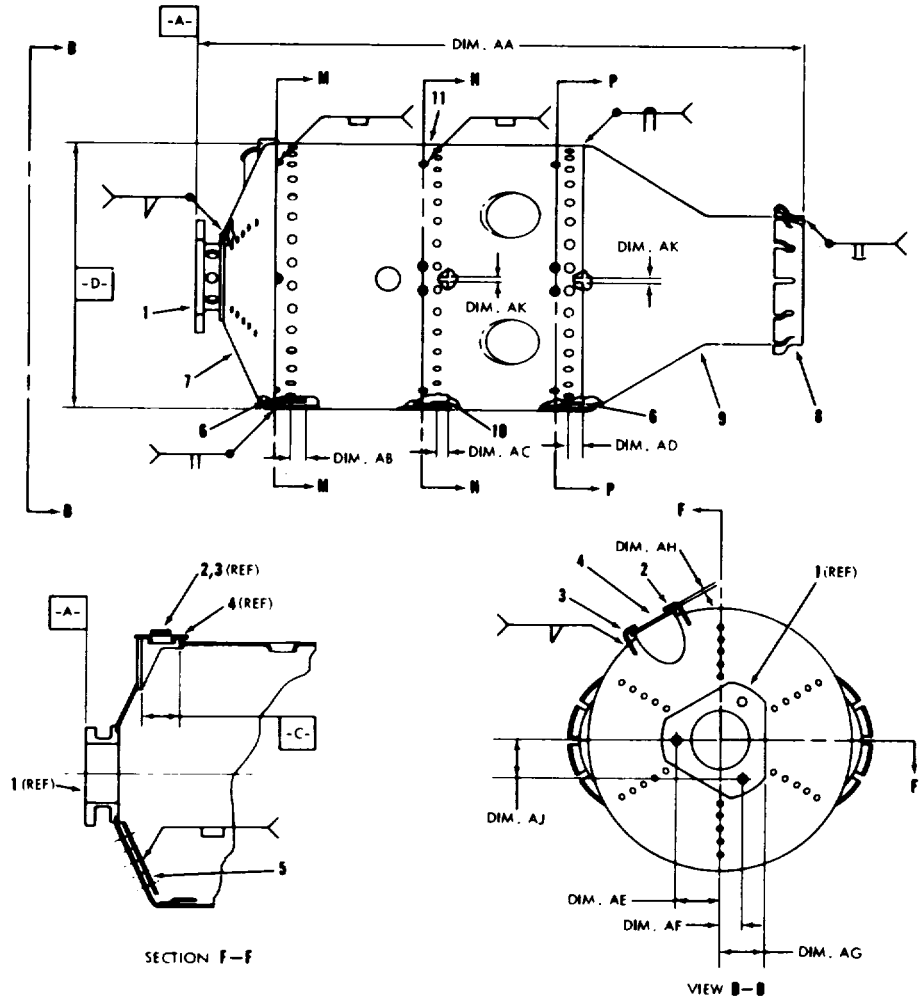


Figure 9-7. Inspection of Combustion Chamber



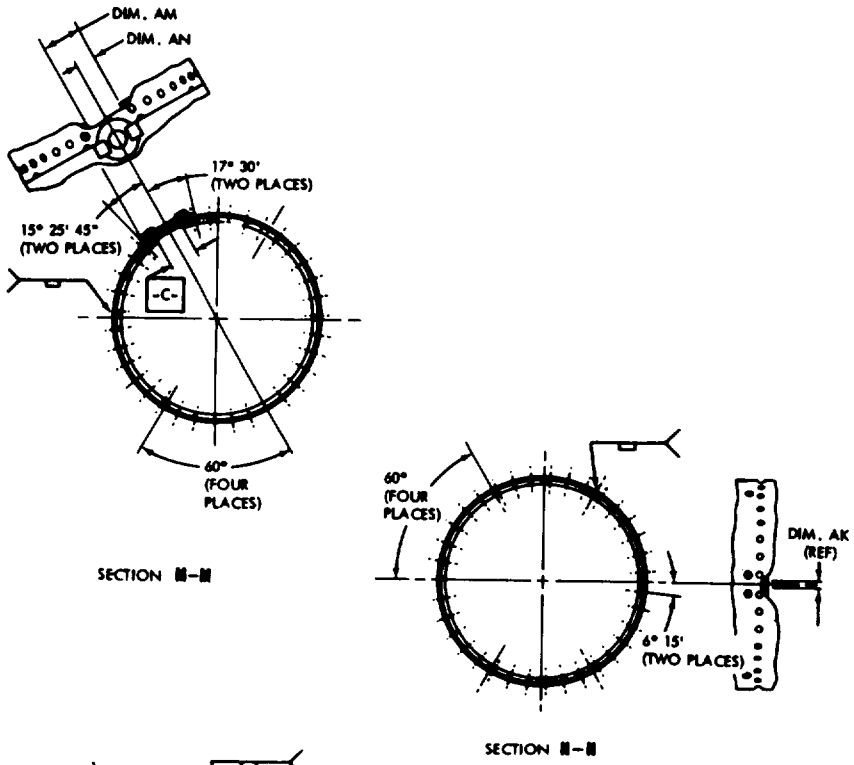
D	AA	AB	AC	AD	AE
4.49 TO 4.52 IN.	10.34 TO 10.42 IN.	0.22 TO 0.28 IN.	0.16 TO 0.22 IN.	0.22 TO 0.28 IN.	0.750 IN. TYP

AF	AG	AH	AJ	AK
0.375 IN. TYP	0.74 TO 0.78 IN.	0.005 TO 0.025 IN.	0.650 IN. TYP	0.06 IN. MAX

34-9-8(1)

1. FLANGE
2. RETAINER
3. RETAINER
4. SHIELD
5. TAB
6. COOLING RING
7. DOME
8. SPRING RING
9. DUCT HALF
10. COOLING RING
11. BODY

Figure 9-8. Repair of Combustion Chamber (sheet 1 of 2)



AK	AM	AN
0.06 IN. MAX	0.85 TO 0.91 IN.	0.42 TO 0.46 IN.

34-9-8(2)

Figure 9-8. Repair of Combustion Chamber (sheet 2 of 2)

(d) Position new spring ring (8) onto duct half (9). Corner flange weld spring ring (8) by fusion arc welding with gas backup using Hastelloy X filler rod (AMS5798).

(e) Perform fluorescent penetrant inspection in accordance with MIL-I-6866, Type I, Method A.

(2) Replace damaged flange (1) as follows:.

(a) Hand grind weld as required to remove flange (1). Blend excess weld on dome (7).

(b) Clean area prior to welding with clean, lint-free cloth dampened with methanol O-M-232 or equivalent.

(c) Position and secure flange (1) onto dome (7) as shown in section BB. Fillet weld flange (1) all around by fusion arc welding with gas backup using Hastelloy X filler rod (AMS5798).

(d) Perform fluorescent penetrant inspection in accordance with MIL-1-6866, Type I, Method A.

(3) Replace damaged cooling ring (6, 10) as follows:

(a) Hand machine weld to remove dome (7) or duct half (9) from body (11) as required for access to cooling ring (6 or 10).

(b) Locate and machine through welds as shown on sheets 1 and 2 to remove damaged cooling ring (6 or 10) as required.

(c) Deburr completely and hand grind to remove damaged cooling ring (6 or 10) and blend excess weld.

CAUTION

Regulate air pressure to keep erosion of base metal to a minimum.

Keep nozzle in motion to prevent blast from dwelling on one spot.

(d) Peen weld, area with glass beads (Screen No. 100-230 (130 grit) Class IV, Size AF or AG, Potters Industries, Inc., 600 Industrial Rd, Carlstadt, NJ 07072 or equivalent). Clean area of glass beads.

(e) Clean weld area with clean, lint-free cloth dampened with acetone 0-A-51C or methyl-ethyl-ketone (MEK) TT-M-261.

(f) Plug weld holes through body (11) at resistant spot welds using Hastelloy X filler rod (AMS5798) in accordance with MIL-W-6858.

(g) Hand finish to blend excess plug welds inside and outside of body (11).

(h) Place cooling ring (6 or 10) into body (11). Cut or size cooling ring (6 or 10) to fit assembly as shown on figure 9-8, sheet 2 of 2.

NOTE

No grinding of weld permitted.

(i) Install cooling ring (6 or 10) observing dimensions AB, AC or AD as required and plug weld cooling ring (6 or 10) to body (11) by fusion arc welding with gas backup using Hastelloy W filler rod (AMS5786) in accordance with MIL-W-6858. Weld shall not exceed 0.03 inch maximum above surface.

(j) Check for correct fit of cooling ring (6 or 10) as follows:

1. Check for gap between cooling ring (6 or 10) and body (11). Maximum gap of 0.010 inch is permissible.

2. Check forward cooling ring (6) for conformance to limits specified for dimensions AM and AN at section M-M.

3. Check cooling ring (10) and aft cooling ring (6) for maximum clearance gap as specified at dimension AK.

(k) Butt weld dome (7) or duct half (9) onto body (11) by fusion arc welding with gas backup using Hastelloy X filler rod (AMS5798) in accordance with MIL-W-6858. Melt weld through on duct half (9).

(l) Machine weld to 0.00 to 0.03 inch above surface.

(m) Perform fluorescent penetrant inspection in accordance with MIL-I-6866, Type I, Method A.

(4) Replace damaged shield (4) and retainers (2, 3) as follows:

(a) Hand grind weld as required to remove retainers (2, 3).

(b) Remove shield (4).

(c) Blend excess weld on dome (7).

(d) Clean area prior to welding with clean, lint-free cloth soaked with methanol 0-M-232 or equivalent.

(e) Install shield (4) into dome (7).

(f) Position retainers (2, 3) onto dome (7) as shown on section B-B and secure. Fillet weld retainers (2, 3) to dome (7) by fusion arc welding with gas backup using Hastelloy X filler rod (AMS5798) in accordance with MIL-W-6858.

(g) Check for true position to retainers (2, 3). Retainers shall be located within 0.040 inch of the true position established by datums D, A and C.

(h) Check shield (4) for freedom of movement. Shield shall have 0.005 to 0.025 inch movement as shown by dimension AH.

(i) Perform fluorescent penetrant inspection in accordance with MIL-I-6866, Type I, Method A.

(5) Replace damaged tab (5) as follows:

(a) Hand machine weld to remove dome (7) from body (11).

(b) Locate and machine through welds to remove damaged tab (5).

(c) Deburr and hand grind to remove excess weld.

(d) Clean area prior to welding with clean, lint-free cloth dampened with methanol 0-M-232 or equivalent.

(e) Position tab (5) onto dome (7) as shown in figure 9-8 section F-F, secure and plug weld to dome (7) by fusion arc welding with gas backup using Hastelloy X filler rod (AMS5798) in accordance with MIL-W-6858.

(f) Position and butt weld onto body (11) by fusion arc welding with gas backup using Hastelloy X filler rod (AMS5798) in accordance with MIL-W-6858.

(g) Machine weld to 0.00 to 0.03 inch above surface.

(6) Repair cracks as follows:

(a) Stop drill crack ends with number 60 drill to prevent progression of cracks.

NOTE

Ensure inside flow surfaces are free of excess weld.

(b) Fusion arc weld cracks using Hastelloy X weld rod (AMS5798) with gas backup in accordance with MIL-W-6858.

(7) Repair hot spot in combustion chamber as follows:

(a) Hand machine to remove hot spot.

(b) Fabricate flush patch from Hastelloy X (AMS5536) 0.032 inch stock.

(c) Deburr combustion chamber and flush patch.

(d) Clean weld areas with a stainless steel wire brush and wipe clean with acetone 0-A-51C or equivalent.

(e) Position and fusion arc weld patch with continuous weld using Hastelloy X filler rod (AMS5798) with gas backup in accordance with MIL-W-6858. Weld may extend 0.03 inch maximum above surface.

(f) Perform fluorescent penetrant inspection on all welded areas.

CAUTION

Regulate air pressure to keep erosion of base metal to a minimum. Keep nozzle in motion to prevent blast from dwelling on one spot.

(g) Peen all over to clean with glass beads Screen No. 100-230, 130 grit Class IV, Size AF or AG, (Potters Industries, Inc., 600 Industrial Rd, Carlstadt, NJ 07072 or equivalent) . Clean area of glass beads.

e. Repair Combustion Chamber Cap. Repair damaged insulation material on combustion chamber cap (9, figure 9-6) as follows:

(1) Cut away any loose material around damaged area.

(2) Thoroughly clean area with methyl-ethyl-ketone (MEK) TT-M-261 or equivalent. Dry with clean, lint-free cloth .

(3) Apply primer B (SS4155, General Electric Corp., Waterford, NJ 12188) by wiping, brushing or spraying to a thickness of 0.1 to 0.3 millimeter. Air-dry for 1 hour.

(4) Mix insulating compound (TBS-758A Resin and TBS758B Catalyst, General Electric Corp., Silicone Products Business Dept., Waterford, NJ 12188) as follows. Thoroughly mix 10 parts of resin and 1 part of catalyst. Addition of the catalyst should be held within ±10 percent of the specified amount. Mixed compound will have a 4 to 6 hour application life at 77°F (25°C) during which time the compound is most easily applied.

(5) Apply insulating compound as follows. Trowel compound onto cleaned area. Total thickness of insulation material after repair shall be 0.20 to 0.40 inch.

(6) Cure insulating compound as follows. Curing techniques can range from a simple passover with a hot air gun application to radiant heat sources. The selection of equipment for the heat generating source is dependent upon the configuration of auxiliary power unit when the compound is applied. Recommended cure conditions are; 5 minutes at 300°F (149°C) or 10 minutes at 280°F (138°C) or 1 hour at 250°F (121°C). Once the applied coating has

9-9. COMPRESSOR INLET DUCTS DISASSEMBLY, INSPECTION AND REPAIR.

a. Disassembly. (See figure 9-9.)

(1) Remove nuts (1), washers (2), screws (3), and inlet screen (4).

(2) Remove screws (5), washer (6), and nut (7) and remove clamp (8) from bracket (9). Leave clamp (8) on wiring harness (10).

(3) Remove bolts (11) and hourmeter bracket (12), along with bracket (9).

(4) Remove bolts (13), washers (14), and bracket (15).

(5) Remove screw (16), washer (17) and nut (18), securing clamp (19) to bracket.

(6) Remove fuel line (20) with clamp (19) attached.

(7) Remove screws (21) and washers (22) securing clamps (23) to upper duct (33). Leave clamps on wiring harness (24).

(8) Remove bolts (25), washers (26), and nuts (27) securing clamps (28) to brackets (32). Leave clamps (28) on wiring harness (29).

(9) Support ducts and remove bolts (30) and washers (31) along with brackets (32).

(10) Move wiring harnesses out away from inlet ducts.

(11) Separate and remove, upper duct (33) and lower duct (34) from engine.

NOTE

Do not disassemble lower duct (steps 12 and 13) unless required for repair.

(12) Remove rivets (35), seal retainer (36), and seal (37) from lower duct (34).

(13) Remove cap (38) from lower duct (34).

b. Inspection and Checks. Perform procedures in table 9-4.

c. Repair. Repair lower duct as follows.

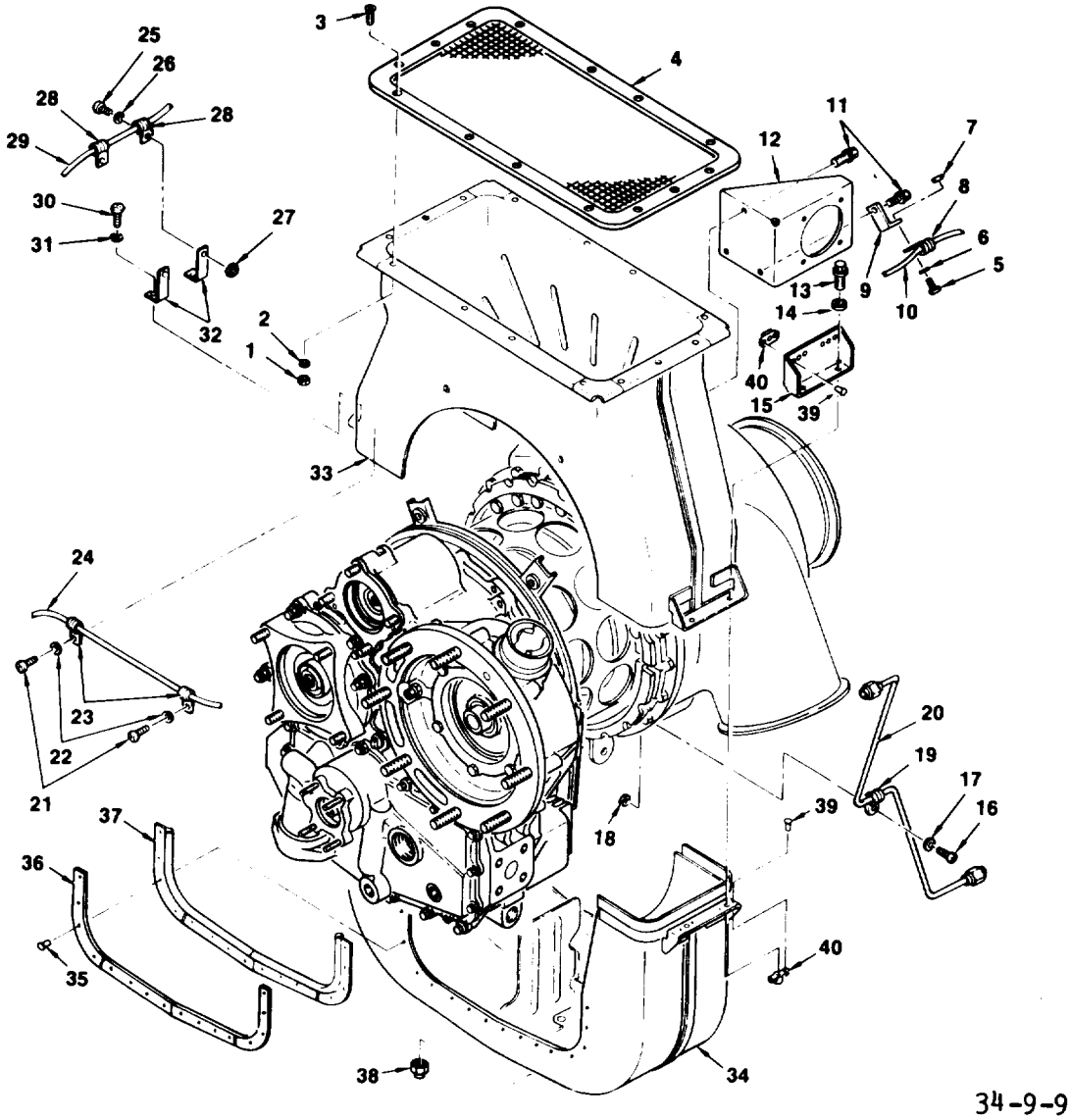
(1) Replace loose rivets and damaged hardware in accordance with MIL-STD-403 standard shop practices.

(2) Replace damaged seal (37) by removing rivets (35) securing seal retainer (36) and separate retainer, seal, and inlet duct.

(3) Fabricate new seal using old seal as pattern.

(4) Cement edges of new seal with sealing compound (RTV-732), place seal on duct and secure with seal retainer and rivets.

9-10. Deleted.



1.	NUT	15.	BRACKET	29.	WIRING HARNESS
2.	WASHER	16.	SCREW	30.	BOLT
3.	SCREW	17.	WASHER	31.	WASHER
4.	INLET SCREEN	18.	NUT	32.	BRACKET
5.	SCREW	19.	CLAMP	33.	UPPER DUCT
6.	WASHER	20.	FUEL LINE	34.	LOWER DUCT
7.	NUT	21.	SCREW	35.	RIVET
8.	CLAMP	22.	WASHER	36.	SEAL RETAINER
9.	BRACKET	23.	CLAMP	37.	SEAL
10.	WIRING HARNESS	24.	WIRING HARNESS	38.	CAP
11.	BOLT	25.	BOLT	39.	RIVET
12.	BRACKET, HOURMETER	26.	WASHER	40.	NUTPLATE
13.	BOLT	27.	NUT		
14.	WASHER	28.	CLAMP		

Figure 9-9. Compressor Inlet Ducts and Hourmeter Bracket

Table 9-4. Compressor Inlet Ducts and Hourmeter Bracket Inspection/Cheek Procedures

Fig. 9-9 Item No.	Nomenclature	Inspect/Check	Requirements
4	Inlet Screen	Visually check screen for cracks and damage.	No cracks or damage allowed.
9,12, 15,32	Bracket	Visually cheek bracket for cracks.	No cracks allowed.
33	Upper Duct	Visually check for damaged mount brackets.	No damage to mount brackets allowed.
		Visually check for cracks in duct.	No cracks in duct allowed.
33	Lower Duct	Visually check for loose rivets (39) and damaged nut plates (40).	No loose rivets or damaged nut plates allowed.
		Visually check seal (37) for security and deterioration.	Seal shall be secure, no deterioration allowed.
		Visually check for cracks in duct (34). Check drain fitting for damage.	No cracks or damage allowed.
		Visually check for loose rivets (35).	No loose rivets allowed.

All data on pages 9-24 through 9-37, including Figures 9-10 through 9-18 and Table 9-5 are deleted.

NOTE

Match mark retainer halves (13) and plenum (21) to housing (22) for aid during assembly.

(2) Remove bolts (11), washers (12) and retainer halves (13).

CAUTION

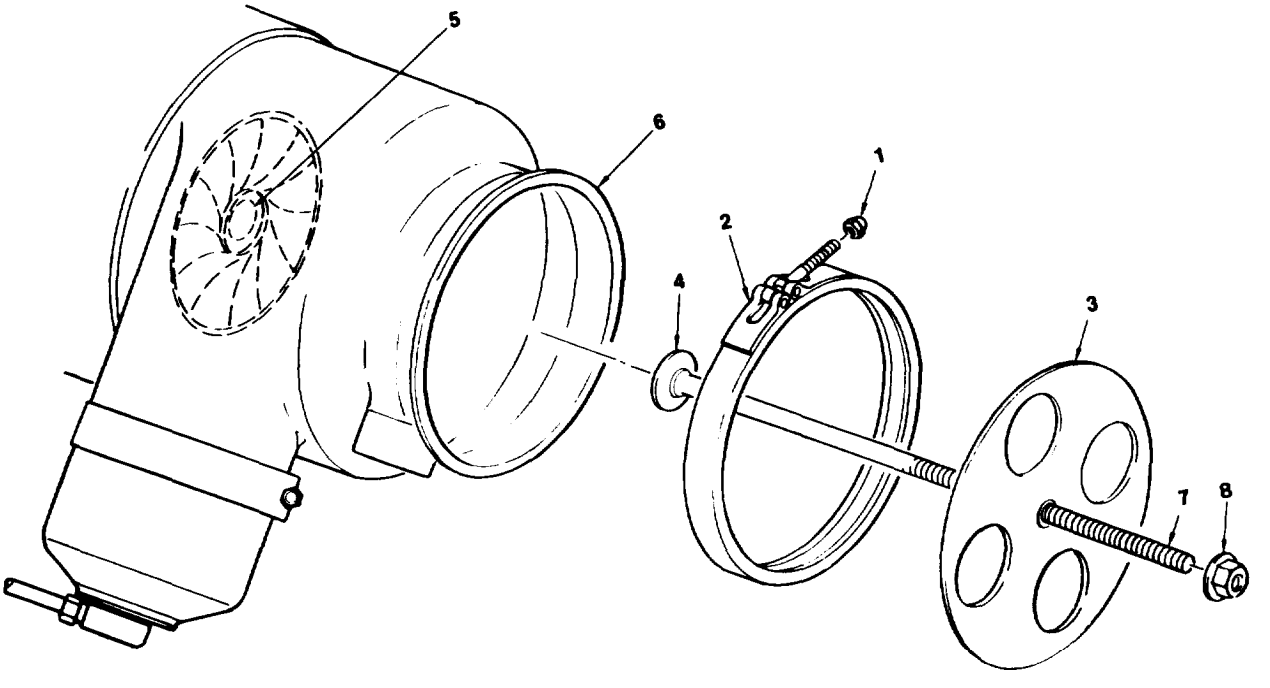
Turbine plenum must be supported during removal procedure if engine is not mounted with exhaust end up. Failure to support turbine plenum during removal could result in damage to turbine wheel.

(3) Loosen clamp nut (1, figure 9-11) on turbine plenum mechanical puller 293171-1 (3) and install puller with swivel pad (4) on end of shaft centered on turbine wheel (5). Install clamp (2) on engine exhaust flange (6) and tighten clamp nut (1). Turn nut (8) on puller shaft (7) until turbine plenum breaks loose. Remove puller.

(4) Carefully slide plenum off to clear turbine wheel (15, figure 9-10). Remove plenum from engine.

NOTE

Match mark turbine housing scroll (20, figure 9-10) to turbine plenum assembly (21) for aid during assembly.



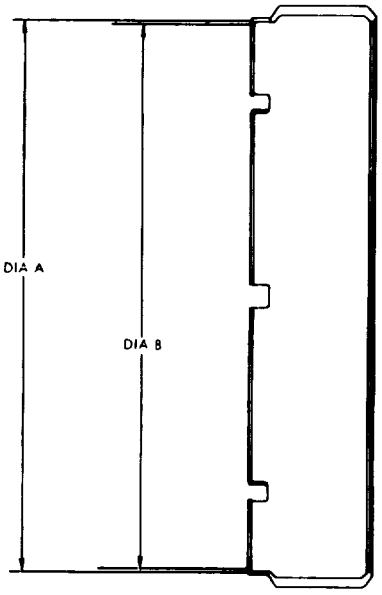
34-9-11

1. CLAMP, NUT
2. CLAMP
3. PULLER, TURBINE PLENUM
4. PAD, SWIVEL
5. TURBINE WHEEL
6. EXHAUST FLANGE
7. PULLER SHAFT
8. NUT

Figure 9-11. Installation of Turbine Plenum Puller

Table 9-5. Compressor and Turbine Assembly Inspection/Check Procedures

Fig. 9-10 Item No.	Nomenclature	Inspect/Check	Requirements
3	Lifting Lug	Visually check for cracks and elongated bolt or lift holes.	No cracks or elongated bolt or lift holes allowed.
6	Mount Bracket	Visually check for damage and security of pin.	Pin shall be secure. No damage allowed.
		Visually check bracket (6) for cracks and elongated bolt or mount holes.	No cracks or elongated bolt or mount holes allowed.
7	Containment Ring	Visually and dimensionally check containment ring.	Refer to paragraph c.
13	Retainer Half	Visually check for cracks and deformation of flange.	No cracks or deformation of flange allowed.
		Visually check for separation and cracks at welds.	No separation or cracks at weld allowed.
21	Turbine Plenum Assembly	Visually and dimensionally check turbine plenum assembly.	Refer to paragraph d.
20	Turbine Housing Scroll	Visually and dimensionally check turbine housing scroll.	Refer to paragraph e.
19	Turbine Nozzle	Visually and dimensionally check turbine nozzle.	Refer to paragraph f.



A	B
12.005 TO 12.015 IN.	11.890 TO 11.900 IN.

34-9-12

Figure 9-12. Inspection of Containment Ring

(5) Using 291984-1 scroll housing puller, separate turbine housing scroll (20) and assembled deflector assembly (17), turbine nozzle (19), shim (18), and shim (16) from turbine plenum assembly (21).

b. Inspection and Checks. Perform procedures in table 9-5.

c. Containment Ring Inspection. (See figure 9-12.)

(1) Visually check containment ring for cracks and deformation. No damage allowed.

(2) Dimensionally check Diameter A. Diameter A shall be 12.005 to 12.015 inches. Replace if not as specified.

(3) Dimensionally check Diameter B. Diameter B shall be 11.890 to 11.900 inches. Replace if not as specified.

(4) If damage is evident or suspected perform fluorescent penetrant inspection in accordance with MIL-I-6866. No cracks allowed.

(5) Replace containment ring if inspection requirements are not met.

d. Turbine Plenum Assembly Inspection. (See figure 9-13.)

(1) Check for damaged or missing plenum assembly nuts (1). Repair if damage is indicated.

(2) Visually check insulation material on plenum (2) for damage (bare metal visible). Repair if damage is indicated.

(3) Check for cracks in plenum (2). Repair if cracks are indicated.

(4) Check for distortion of exhaust pipe portion of plenum (2, figure 9-13). Replace turbine plenum assembly if distortion exceeds 0.125 inch.

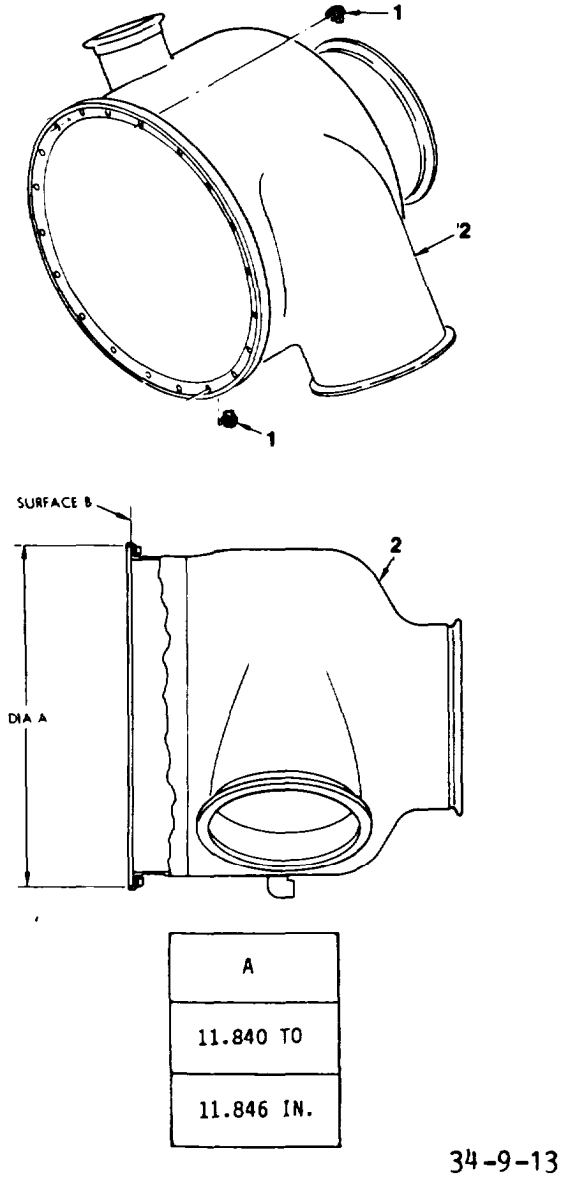
(5) Dimensionally inspect Diameter A. Diameter A shall be 11.840 to 11.846 inches.

(6) Check Diameter A (figure 9-12) for out of round. Diameter should be round within 0.010 inch.

(7) Check Surface B for flatness. Surface B shall be flat within 0.010 inch.

(8) Perform fluorescent penetrant inspection in accordance with MIL-I-6866. Refer to Repair if cracks are indicated.

(9) Replace/repair turbine plenum assembly if inspection requirements are not met.



1. PLENUM ASSEMBLY NUT 2. PLENUM

Figure 9-13. Inspection of Turbine Plenum Assembly

e. Turbine Housing Scroll Inspection. (See figure 9-14.)

(1) Check scroll for erosion with subsequent thinning (1). Replace scroll if erosion with subsequent metal thinning below twenty-five percent of stock thickness.

(2) Check for distortion of body surfaces (2). Replace scroll if distortion of surfaces exceeds 0.125 inch.

(3) Check for cracks in flange and body (3). Repair if cracks are indicated.

(4) Check flange for damage to threads (4). No damage to threads permitted. Replace turbine housing scroll if damage is indicated.

(5) Dimensionally check Diameter A. Diameter A shall be 9.430 to 9.440 inches.

(6) Dimensionally check Diameter B. Diameter B shall be 6.19 to 6.22 inches.

(7) Perform fluorescent penetrant inspection in accordance with MIL-I-6866. Refer to Repair if cracks are Indicated.

(8) Replace/repair turbine housing scroll if inspection requirements are not met.

f. Turbine Nozzle Inspection. (See figure 9-15.)

(1) Check for axial cracks (1) in shroud below vane ID. No cracks allowed.

(2) Check for cracks (2) in shroud. Cracks in shroud OD over to vane OD acceptable. Cracks extending inward from vane OD, replace nozzle.

(3) Check for scoring (3) on shroud contour. Scoring up to 0.030 inch deep acceptable. Scoring in excess of 0.030 inch deep, replace nozzle.

(4) Check leading edge of vane for erosion (4). Damage up to 0.125 inch deep, refer to Repair. Damage in excess of 0.125 inch deep, replace nozzle.

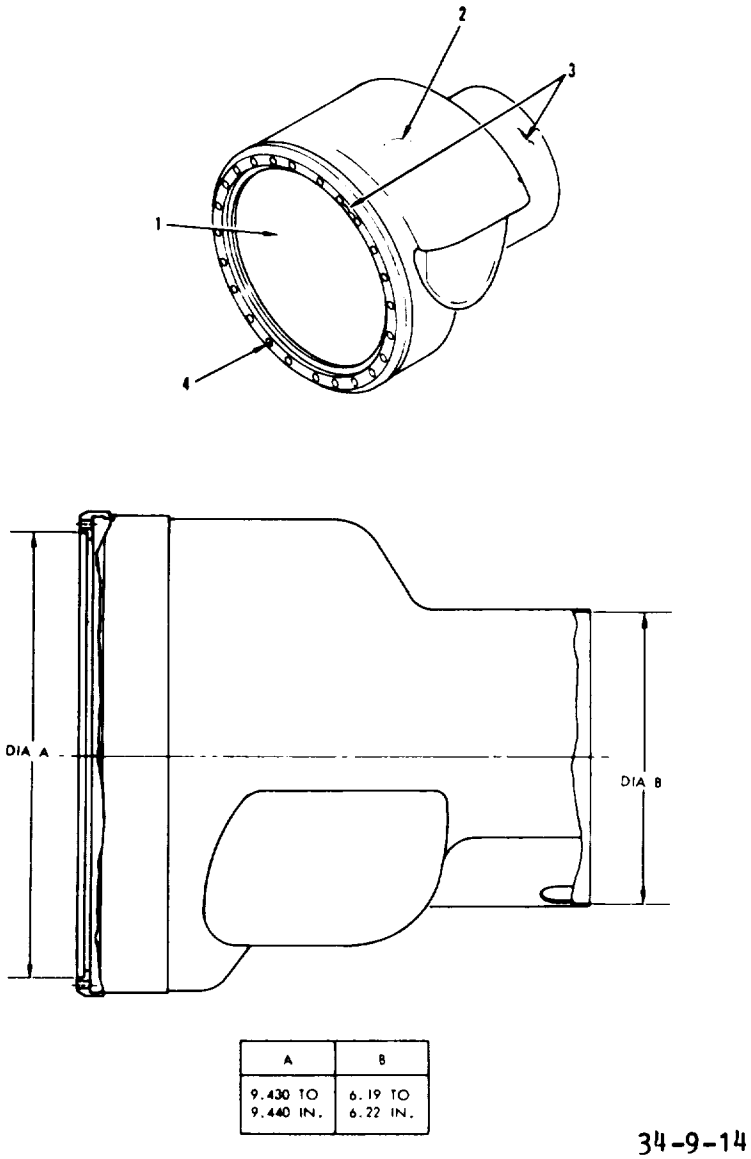
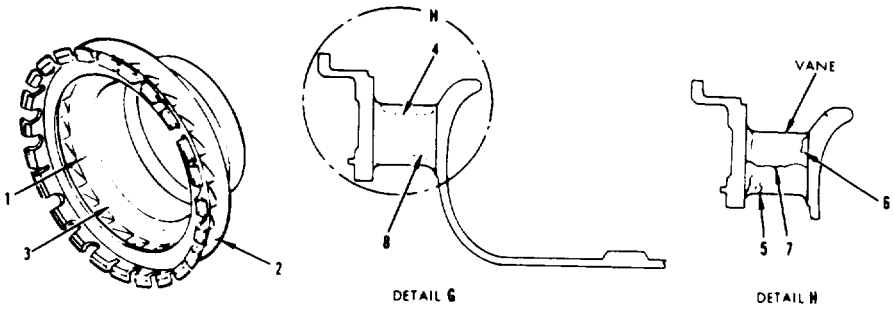
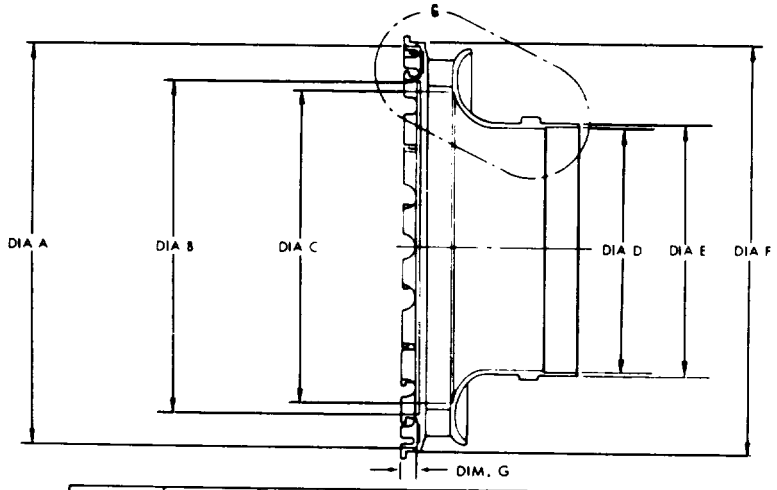


Figure 9-14. Inspection of Turbine Housing Scroll





A	B	C	D	E	F	G
8.903 TO 8.906 IN.	7.500 TO 7.510 IN.	7.075 TO 7.085 IN.	5.520 TO 5.526 IN.	5.632 TO 5.636 IN.	9.005 TO 9.010 IN.	0.320 TO 0.330 IN.

34-9-15

Figure 9-15. Inspection of Turbine Nozzle

(5) Check trailing edge of vanes for cracks (5). Cracks up to 0.500 inch in length on SIX adjacent vanes or ten non-adjacent vanes are acceptable. Cracks in excess of above limits or intersecting cracks, replace nozzle.

(6) Check for cracks (6) at leading edge of vanes. No cracks allowed.

(7) Check for axial cracks (7) in vanes. No cracks allowed.

(8) Check vane trailing edges for erosion (8) or feathering damaged. Damage up to 0.130 inch deep, refer to Repair. Damage in excess of 0.130 inch deep, replace nozzle.

(9) Perform fluorescent penetrant inspection in accordance with MIL-I-6866. No cracks allowed.

(10) Dimensionally check turbine nozzle for requirements as shown in figure 9-15.

(11) Replace turbine nozzle if inspection requirements are not met.

g. Repair Turbine Plenum Assembly. (See figure 9-16.)

(1) Straighten surface A face as follows:

(a) Cold straight surface A to best condition possible.

(b) Check flatness of surface A. If surface is not flat within 0.010 inch reject turbine plenum assembly.

(c) Perform fluorescent penetrant Inspection.

(2) Replace damaged nut (1) as follows:

(a) Remove damaged nut (1).

(b) Insert new nut into mounting flange.

(c) Restrain nut using a suitable dolly and flare shank with 30 to 60 degrees conical punch.

(3) Replace damaged nutplate (2) as follows:

(a) Machine weld to remove nutplate. Hand finish to blend remaining weld to existing surface.

(b) Clean area to be welded with clean, lint-free cloth dampened with methanol 0-M-232 or equivalent.

(c) position nutplate onto ignition unit bracket and retain with a 10/32 bolt for welding.

(d) Spot weld nutplate by fusion arc welding with gas backup using 347 filler rod (AMS5680).

(4) Replace damaged nutplate (3) as follows:

(a) Machine weld to remove nutplate from flange. Hand finish to blend remaining weld to existing surface.

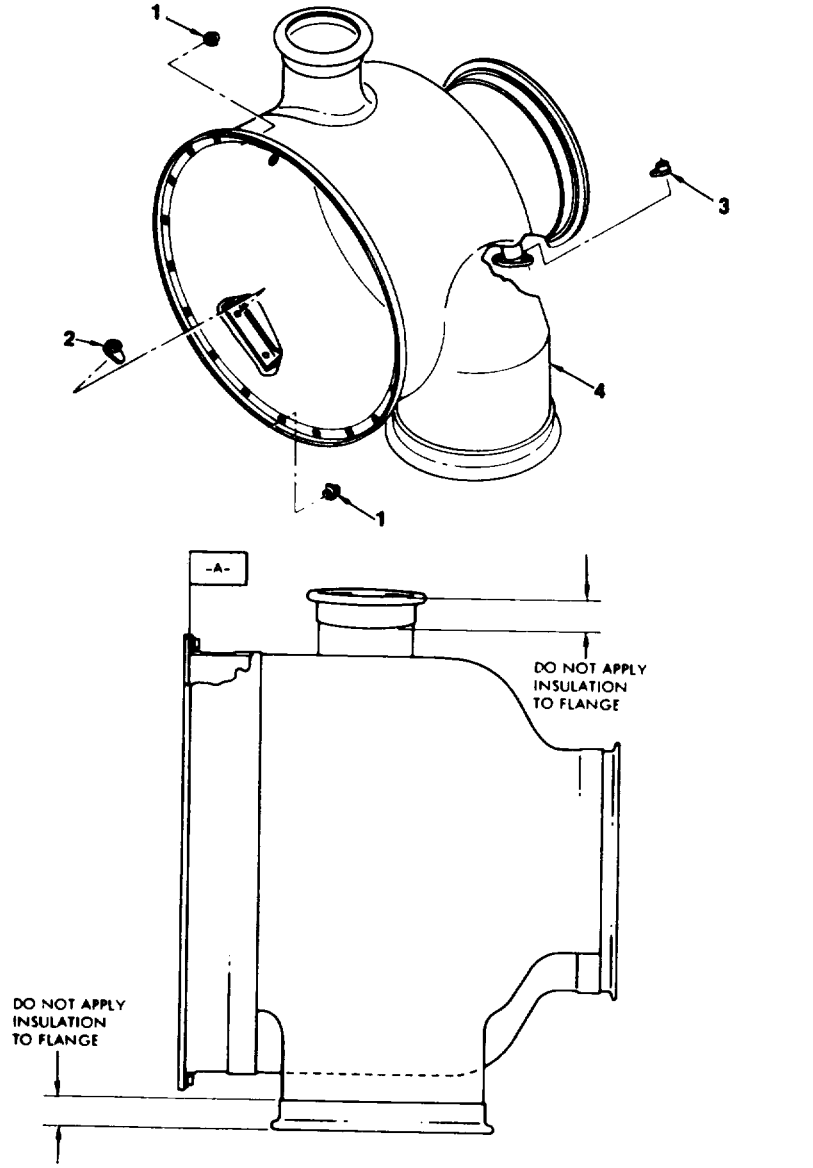
(b) Clean area to be welded with clean, lint-free cloth dampened with methanol 0-M-232 or equivalent.

(c) Position nutplate onto flange and retain with a 10/32 bolt for welding.

(d) Spot weld nutplate by fusion arc welding with gas backup and 347 filler rod (AMS5680).

(5) Repair cracks in plenum (4) as follows.

(a) Remove insulation material away from area to be repaired.



1. NUT
2. NUTPLATE
3. NUTPLATE
4. TURBINE PLENUM

Figure 9-16. Repair of Turbine Plenum Assembly

(b) Stop drill (0.125inch max) crack ends to prevent futher progression of cracks.

(c) Fusion arc weld cracks using Hastelloy X weld rod (AMS5798) with gas backup.

(d) Perform fluorescent penetrant inspection after repair in accordance with MIL-I-6866.No cracks permitted.

(e) Replace insulation material as required.

(6) Repair damaged insulating material on turbine plenum (4) as follows:

(a) Cut away any loose material around damaged area.

(b) Throughly clean area with methyl-ethyl-ketone MEK TT-M-261 or equivalent. Dry with clean, lint-free cloth.

(c) Apply primer (SS4155, General Electric Cap., Silicone Products Business Dept., Waterford, NJ 12188) by wiping, brushing a spraying to a thickness of 0.1 to 0.3 millimeter. Air-dry for 1 hour.

(d) Mix insulation compound (CAGE 64101, P/N V-657, General Electric cap., Silicone Products Business Dept., Waterford, NJ 12188) as follows. Thourghly mix 10 parts of resin and 1 part catalyst. Addition of the catalyst should be held within ± 10 percent of the specified amount. Mixed compound will have a 4 to 6 hours application life at 77°F (25°C) during which time the compound is most easily applied.

(e) Apply insulating compound as follows. Trowel compound onto cleaned area. Total thickness of insulation material after repair shall be 0.20 to 0.40 inch.

(f) Cure insulating compound as follows. Curing techniques can range from a simple pass-over with a hot air gun application to radiant heat sources. The selection of equipment for the heat configuration of auxiliary power unit when the compound is applied. Recommended cure conditions are; 5 minutes at 300°F (149°C) or 10 minutes at 280°F (138°C) or for 1 hour at 250°F (121°C). Once the applied coating has achieved the temperature required, complete foaming and cure will be completed. A surface tack will indicate incomplete cure and additional time at temperature is required.

h. Repair Turbine Housing Scroll. (See figure 9-17.)

(1) Repair cracks in flange or body (1) as follows:

(a) Stop drill crack at both ends to prevent progression of crack.

(b) Hand abrade to clean up area around crack.

WARNING

Use solvent in a well-ventilated area. Avoid excessive skin contact or prolonged inhalation of vapor. Do not use near open flame or in area where high temperatures prevail.

NOTE

Compressed air shall be regulated between 5 and 15 psig.

(c) Clean turbine housing scroll with solvent P-D-680, Type II or equivalent. Dry with clean, lint-free cloth a filtered, low pressure compressed air.

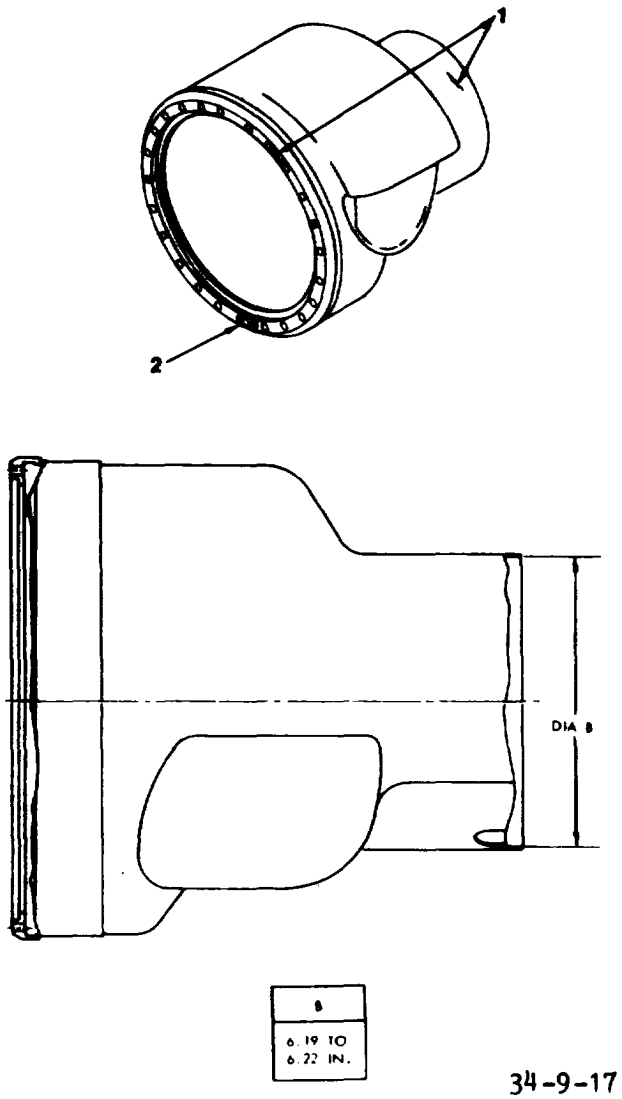


Figure 9-17. Repair of Turbine Housing Scroll

(d) Fusion arc weld cracks using Hastelloy X filler rod (AFS4798) with gas backup.

(e) Hand finish to blend weld to existing surface.

(f) perform fluorescent penetrant inspection of weld area.

(2) Repair rub damage in inlet flange as follows:

(a) Hand abrade to clean up area.

WARNING

Use solvent in a well-ventilated area. Avoid excessive skin contact or prolonged inhalation of vapor. Do not use near open flame or in area where high temperatures prevail.

NOTE

Compressed air shall be regulated between 5 and 15 psig.

(b) Clean turbine housing scroll using solvent P-D-680, Type II or equivalent. Dry with clean, lint-free cloth or filtered, low pressure compressed air.

(c) puddle weld to fill rub area by fusion arc weld using Hastelloy X filler rod (AMS5798) with gas backup.

(d) Hand finish to blend weld to flange surface.

(e) perform fluorescent penetrant inspection.

(3) Straighten and correct diameter B out of roundness as follows:

(a) Cold straight diameter B to correct out of roundness to within 0.030 inch. Use care to prevent metal thinning.

(b) Perform fluorescent penetrant inspection.

i. Repair Turbine Nozzle. (See figure 9-10, item 19.)

(1) Hand finish to remove cracks or feathering not more than 0.060 inch deep on trailing *edge* of vanes. Rework of one or more vanes may be preformed without reworking all vanes. Remove an identical amount of material from all vanes when cracks or feathering require material removal 0.060 to 0.130 inch deep.

(2) Repair erosion of vane leading edge that is less than 0.125 inch deep by blending and fairing to blade contour.

(3) Repair radial shroud rub less than 0.030 inch deep by blending with adjacent surface using abrasive cloth P-C-451.

(4) Clean entire area with glass beads (Screen No. 100-230) (130 grit, Class IV, Size AF or AG).

Section II. ASSEMBLY

9-11. GENERAL INSTRUCTIONS. This section provides procedures for the assembly of the engine after a detailed hot section inspection. The engine is a precision unit. Maintenance practices employed during assembly shall conform to the highest precision shop standard. Fits and tolerances shall be maintained.

a. Protection of Components. Extreme care shall be exercised to prevent dirt, dust or foreign particles from entering the unit. If any foreign particle is dropped into the unit during assembly, assembly shall be stopped until the foreign particle is located and removed, even if this may cause considerable disassembly. For added protection, large openings shall be covered with tape and cardboard, small openings with tape or a clean cloth. Open tube ends shall be capped or plugged. Openings on fuel system components shall not be taped; caps, plugs or similar coverings shall be used. If the unit is to be left for even a short period in a partially disassembled state, all openings shall be covered.

NOTE

Materials and compounds used in assembly may be substituted with equivalent products.

b. Cleaning. If any parts are coated with corrosion-preventive compound, all traces of this compound and any accumulated foreign matter shall be removed. All parts shall be thoroughly clean before assembly. All parts and surfaces shall be wiped with a clean lint-free cloth.

c. Special Measurements. When special measurements for shimming or fitting are made on parts or on assembled parts prior to their installation in the next higher assembly, these parts shall be tagged as measured components of the higher assembly and kept with that assembly. If damage or other reason causes replacement of a measured component, all measurements which include that part shall be repeated using the new part.

d. Use of Force. Extreme force shall never be used in assembly of the engine. If difficulty is encountered, the unit shall be disassembled and inspected for burrs or other interferences.

e. Safety Fastening Methods. Certain attaching parts are locked using lockwire. Duplicate lockwiring as noted during disassembly. Lockwiring shall conform to MS 33540. Unless otherwise specified, use lockwire MS 20995C32.

9-12. HOT SECTION ASSEMBLY.

a. Refer to figure 9-18. Install shim (16) over turbine wheel (15) on labyrinth seal (14). Ensure that shim (16) is centered on seal (14), and shim surface fits flat with contour on seal.

WARNING

Use 1, 1, 1-trichloroethane in a well-ventilated area. Avoid excessive skin contact or prolonged inhalation of vapor. Do not use near open flame or in area where high temperatures prevail.

b. Clean mating flange on housing (22) with 1, 1, 1-trichloroethane (MIL-T-81533) and allow to air dry. Apply a thin even coat of compound (MIL-A-46146, Type II) to mating flange with finger and allow to air dry for ten minutes.

c. Install deflector (17) and align notches with bolt holes.

CAUTION

Ensure that six alignment pins are in place on diffuser assembly. A loose pin can damage turbine wheel when engine is run.

d. Install shim (18). Ensure that six pins on diffuser assembly, located between turbine wheel (15) and housing (22), engage notches in shim (18). Ensure that shim is aligned with bolt holes.

e. Install turbine nozzle (19). Ensure that six pins on diffuser assembly engage notches in nozzle (19).

f. Run a 10-32 tap through threaded holes on turbine housing scroll (20) prior to assembly to remove carbon buildup.

g. Using match marks applied during disassembly for alignment, Install turbine housing scroll (20) and retainer halves (13). Apply a coat of high temperature compound (Fel-Pro C5-A) to threads of bolt (11). Install bolts (11) and washers (12). Tighten bolts in opposing sequence to a torque value of 50 Inch-pounds. Recheck torque several times. Check for proper assembly by attempting to turn turbine wheel (wheel should turn freely with no binding). Lockwire bolts.

h. Install containment ring (7) over turbine housing scroll and temporarily position over housing (22).

WARNING

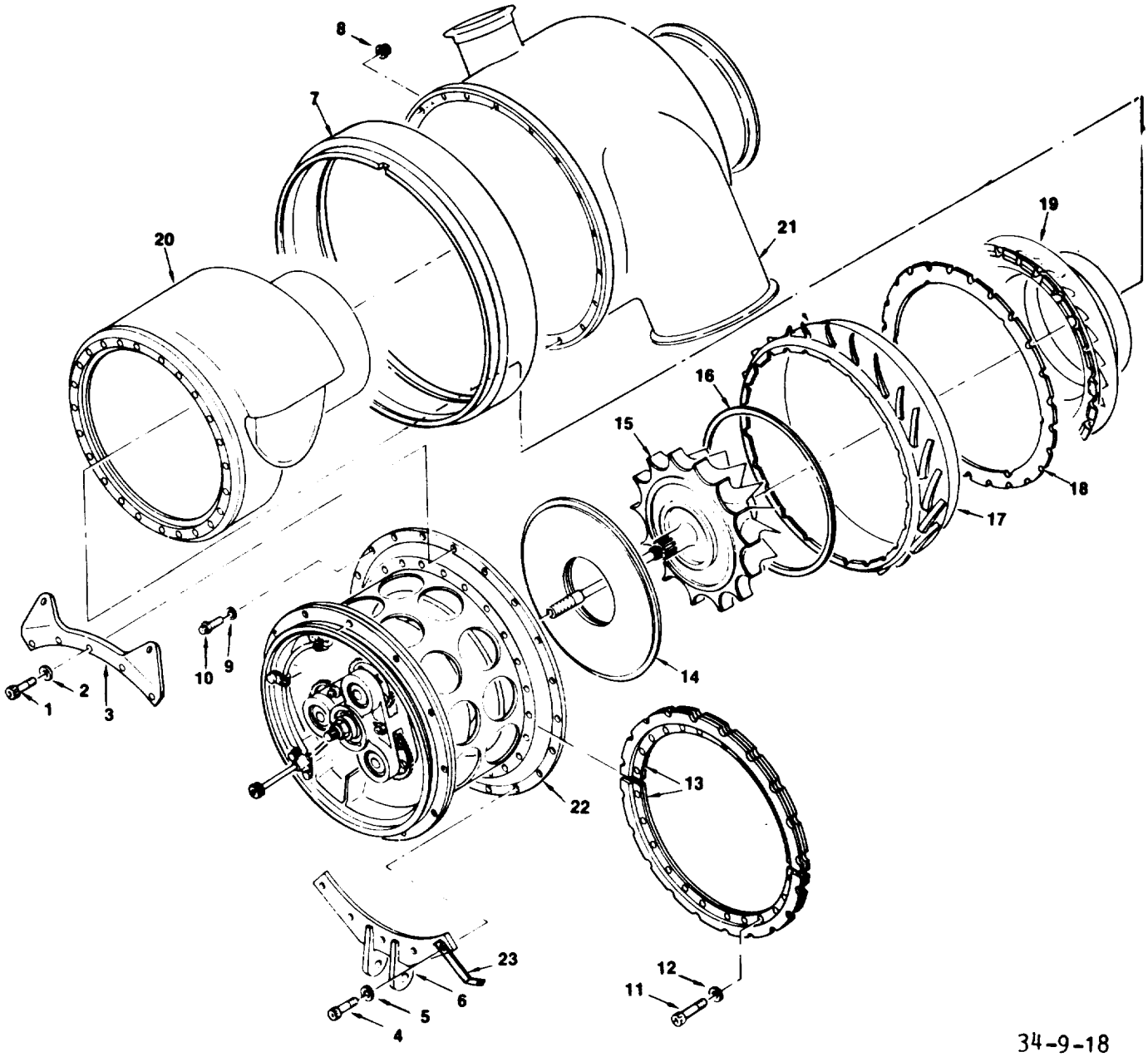
Use 1, 1, 1-trichloroethane in a well-ventilated area. Avoid excessive skin contact or prolonged inhalation of vapor. Do not use near open flame or in area where high temperatures prevail.

i. Clean mating flange of turbine plenum assembly (21) with 1, 1, 1-trichloroethane (MIL-T-81533) and allow to dry. Apply a thin coat of compound (MIL-A-46146, Type II) to mating flange and allow to air dry for ten minutes.

j. Using match marks applied during disassembly for alignment, install turbine plenum assembly (21). Secure with bolts (10), washers (9) and nuts (8).

k. Slide containment ring (7) onto turbine plenum assembly (21).

l. Remove assembled components from 291978-1 maintenance stand adapter. Install lifting lug (3) and mounting bracket (6) and secure with bolts (1, 4) and washers (2, 5). Install fuel line bracket (23) as shown in figure 9-18. Tighten bolts (1, 4, 10) to a torque value of 60 inch-pounds.



1. BOLT
2. WASHER
3. LIFTING LUG
4. BOLT
5. WASHER
6. MOUNT BRACKET
7. CONTAINMENT RING
8. NUT
9. WASHER
10. BOLT
11. BOLT
12. WASHER
13. RETAINER HALVES
14. LABYRINTH SEAL
15. TURBINE wHEEL
16. SHIM
17. DEFLECTOR
18. SHIM
19. TURBINE NOZZLE
20. TURBINE HOUSING SCROLL
21. TURBINE PLENUM ASSEMBLY
22. HOUSING
23. BRACKET, FUEL LINE

Figure 9-18. Assembly of Compressor and Turbine

9-13. COMPRESSOR INLET DUCTS ASSEMBLY.

a. Refer to figure 9-19. Install cap (1) on lower duct (2). Lookwire cap.

b. If lower duct has been disassembled, assemble as follows. Position seal (3) and seal retainer (4) to lower duct (2) and secure with rivets (5).

c. Position lower duct (2) and upper duct (38) to engine. Position bracket (6) to upper duct (38) and secure to lower duct (2) with bolts (7) and washers (8). Ensure that ducts are located in slots on retainer and gearcase. Torque bolts to 35 Inch-pounds.

d. Install brackets (9), washers (10), and bolts (11). Torque bolts to 35 inch-pounds.

e. Install wiring harness (12) and clamps (13) on brackets (9) using bolts (14), washers (15), and nuts (16).

f. Install inlet screen (17) on upper duct and secure with screws (18), washers (19), and nuts (20). Torque nuts (20) to 25 inch-pounds.

g. Install wiring harness (21) clamps (22) on upper duct (38) using screws (23) and washers (24).

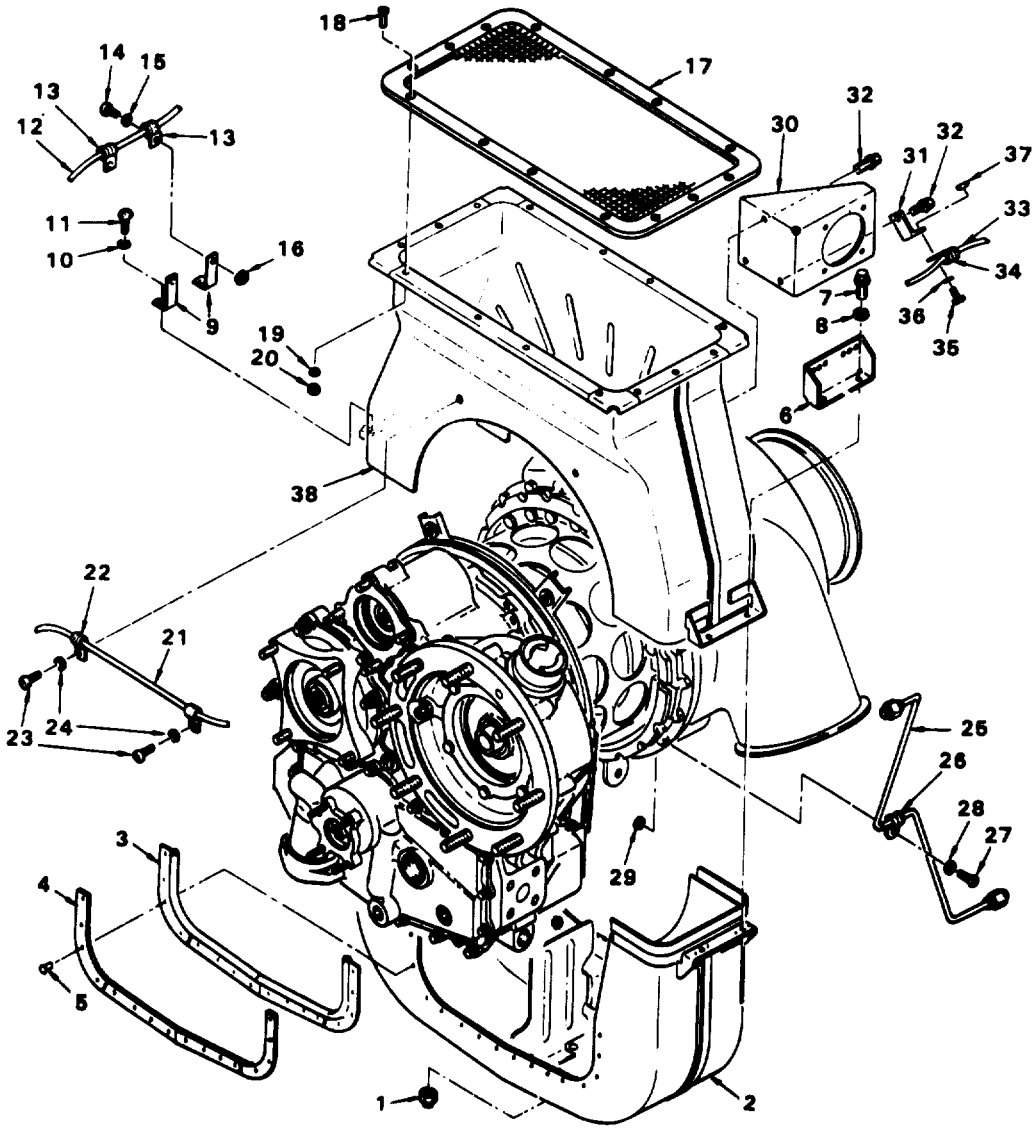
h. Install fuel line (25) and clamp (26) to bracket (23, figure 9-18) using screw (27, figure 9-19), washer (28), and nut (29).

i. Install hourmeter bracket (30) and bracket (31) using bolts (32). Torque bolts to 35 inch-pounds.

j. Install wiring harness (33) and clamp (34) on bracket (31) using screw (35), washer (36), and nut (37).

9-14. Deleted.

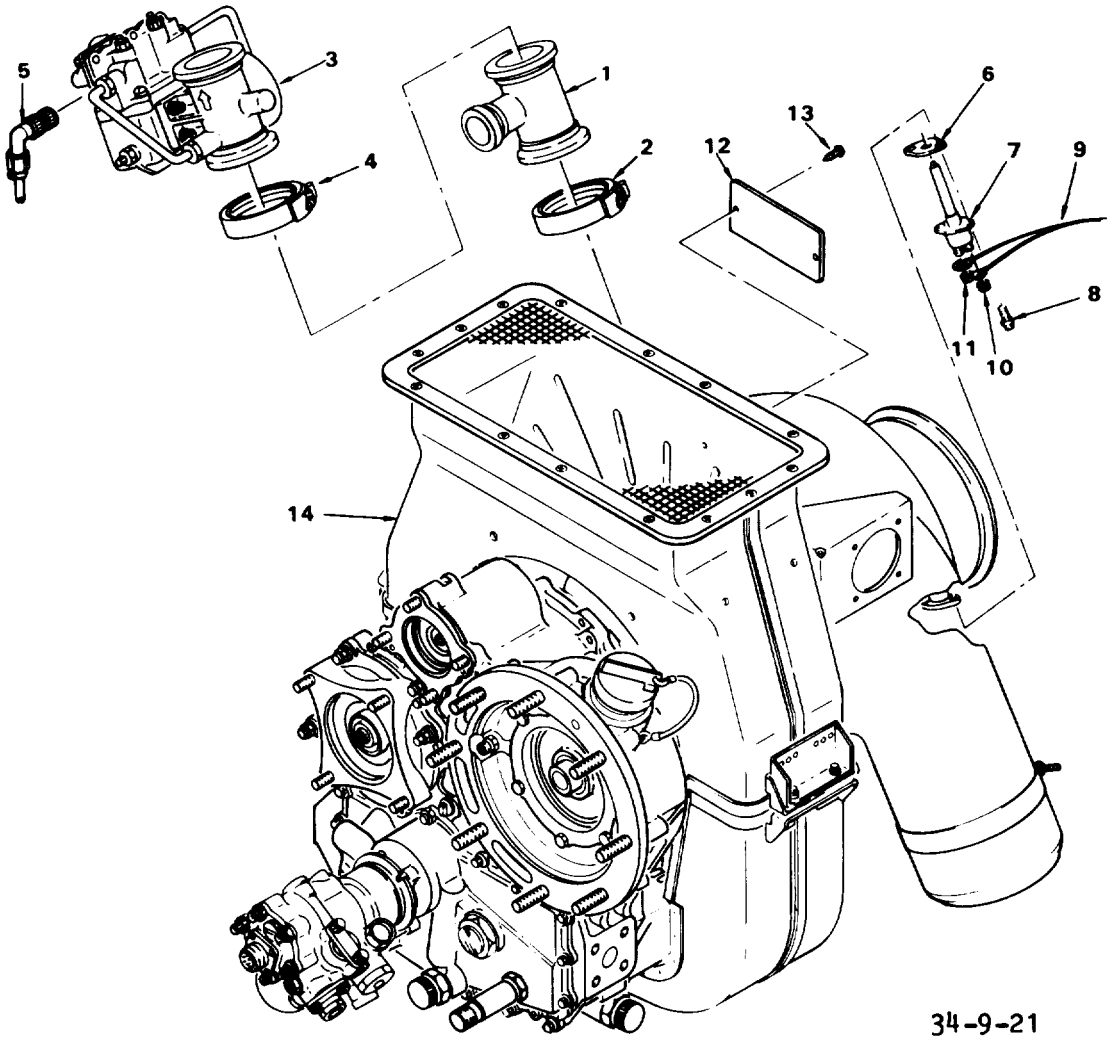
9-15. Deleted.



1. CAP
2. LOWER DUCT
3. SEAL
4. SEAL RETAINER
5. RIVET
6. BRACKET
7. BOLT
8. WASHER
9. BRACKET
10. WASHER
11. BOLT
12. WIRING HARNESS
13. CLAMP
14. BOLT
15. WASHER
16. NUT
17. SCREEN
18. SCREW
19. WASHER
20. NUT
21. WIRING HARNESS
22. CLAMP
23. SCREW
24. WASHER
25. FUEL LINE
26. CLAMP
27. SCREW
28. WASHER
29. NUT
30. BRACKET, HOURMETER
31. BRACKET
32. BOLT
33. WIRING HARNESS
34. CLAMP
35. SCREW
36. WASHER
37. NUT
38. UPPER DUCT

Figure 9-19. Assembly of Compressor Inlet Ducts

All data on pages 9-40 through 9-46, including Figures 9-20 through 9-26 are deleted.



1. ADAPTER
2. CLAMP
3. LOAD CONTROL VALVE
4. CLAMP
5. CONNECTOR (P5)
6. GASKET
7. THERMOCOUPLE
8. BOLT
9. WIRING HARNESS
10. NUT
11. NUT
12. IDENTIFICATION PLATE
13. SCREW
14. ENGINE

Figure 9-21. Installation of Controls

(5) Install gasket (6) and thermocouple (7) and secure using bolts (8). Torque bolts to 35 inch-pounds.

(6) Connect wiring harness (9) terminals to thermocouple (7) and secure with nuts (10, 11).

(7) If removed, install identification plate (12) and secure with screws (13).

b. Install Accessory Items. (See figure 9-22.)

(1) Determine shim (1) requirements for speed sensor (2) as follows:

(a) Using a micrometer, measure and record dimension A, figure 9-23.

(b) Using a micrometer, measure and record dimension B.

(c) Subtract dimension A from dimension B and record the difference as dimension C.

(d) Add 0.015 inch to dimension C and record as dimension D.

(e) Dimension D is the required shim thickness and has an allowable tolerance of ±0.003 inch.

(f) peel laminations from shim (1, figure 9-22) to the required thickness of step (e).

(2) Install shim (1) and packing (3) on speed sensor (2).

(3) Install speed sensor (2) with assembled items into gearcase and secure with bolt (4). Torque bolt to 35 inch-pounds.

(4) Connect wiring harness connector P6 (5) to speed sensor (2) and lockwire.

(5) Apply a light coat of anti-seize compound (Liqui-moly, Grade NV) to threads of bolts (6).

(6) Install fuel solenoid (8) onto duct bracket and secure with washers (7) and bolts (6). Torque bolts to 35 inch-pounds.

(7) Connect wiring harness connector (9) to fuel solenoid (8).

(8) Connect fuel line (10) to fuel solenoid (8).

(9) Install fuel line (11) with bracket (12), using screw (13) and washer (14) to secure bracket (12) to gearcase.

(10) Connect fuel line (11) to fuel solenoid (8) and fuel control unit (15).

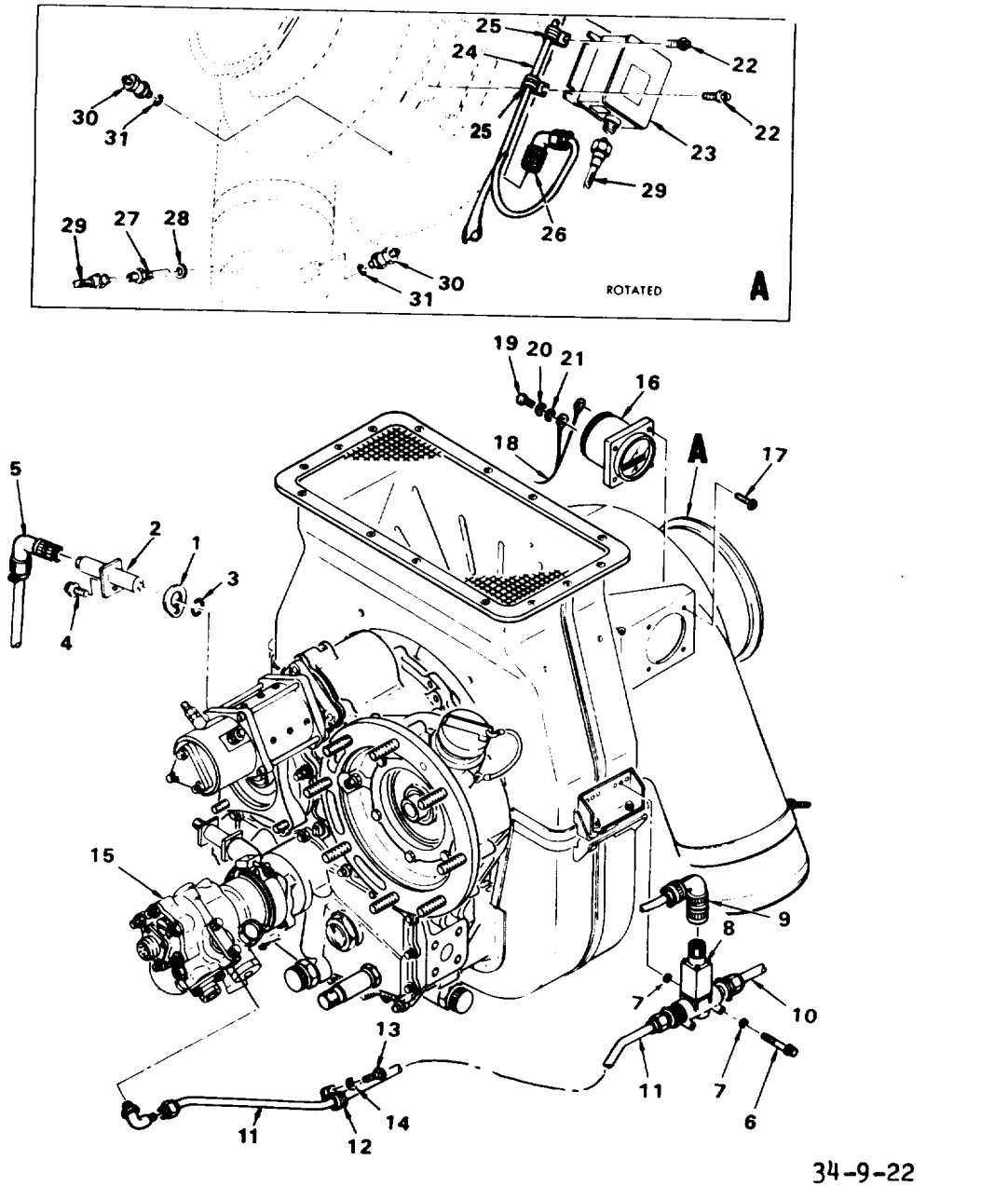
(11) Install hourmeter (16) and secure with screws (17). Torque screws to 35 inch-pounds.

(12) Install wiring harness (18) lugs on hourmeter (16) using screws (19), lockwashers (20) and washers (21).

(13) Coat threads of bolts (22) with high temperature compound (Fel Pro C5-A).

(14) Install ignition unit (23) and wiring harness (24) clamps (25) on plenum and secure with bolts (22). Torque bolts to 50 inch-pounds.

(15) Connect wiring harness connector P7 (26) to ignition unit (23) and lockwire.



1. SHIM
2. SPEED SENSOR
3. PACKING
4. BOLT
5. CONNECTOR P6
6. BOLT
7. WASHER
8. FUEL SOLENOID
9. CONNECTOR
10. FUEL LINE
11. FUEL LINE
12. BRACKET
13. SCREW
14. WASHER
15. FUEL CONTROL UNIT
16. HOURMETER
17. SCREW
18. WIRING HARNESS
19. SCREW
20. WASHER, LOCK
21. WASHER
22. BOLT
23. IGNITION UNIT
24. WIRING HARNESS
25. CLAMP
26. CONNECTOR P7
27. IGNITER PLUG
28. WASHER
29. IGNITER PLUG LEAD
30. CHECK VALVE
31. PACKING

Figure 9-22. Installation of Accessory Items

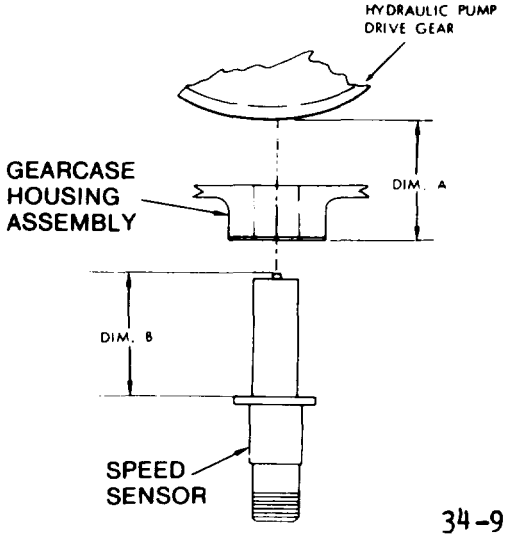


Figure 9-23. Determining Shimming for Speed Sensor

(16) Coat threads of igniter plug (27) with high temperature compound (Fel Pro C5-A).

(17) Install igniter plug (27) with washer (28). Torque igniter plug to 100 inch-pounds.

(18) Connect igniter plug lead (29) to ignition unit (23) and igniter plug (27). Torque both ends of igniter plug lead to 35 inch-pounds.

(19) Install two check valves (30) with new packings (31).

Section III. SCHEDULED 500 HOUR HOT SECTION INSPECTION

9-16. HOT SECTION INSPECTION (ENGINE INSTALLED).

The following procedure can be performed with the engine installed in the AGPU.

a. Disassembly. Perform steps in paragraph 9-8.a.

b. Inspection and Repair.

(1) Perform inspection steps in paragraphs 9-8.b. and 9-8.c.

(2) perform applicable repair steps in paragraphs 9-8.d. and 9-8.e.

(3) Refer to figure 9-24. Using fiberscope (FS-100 or equivalent), visually inspect the following areas by observation through combustion chamber opening in turbine plenum:

(a) Inspect turbine housing scroll combustion chamber port for cracks, distortion, and heavy fretting and wear marks. If damage is indicated, perform procedures in paragraph 9-17.

(b) Inspect scroll flange (which seals against nozzle forward surface above vanes) for cracks or distortion. If damage is indicated, perform procedures in paragraph 9-17.

(c) Inspect turbine nozzle vane leading edges for cracks, erosion, and FOD. If damage is indicated, perform procedures in paragraph 9-17.

c. Assembly. Perform steps in paragraph 9-14.

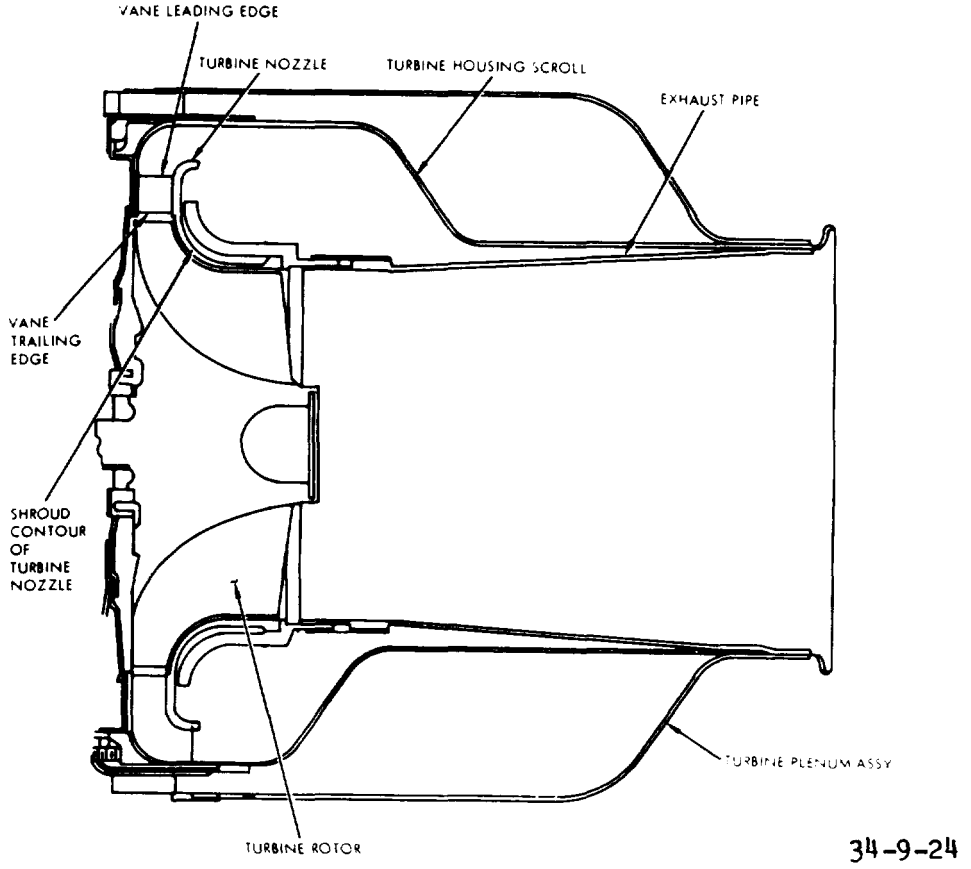


Figure 9-24. Hot Section Inspection Points

Section IV. SCHEDULED 1500 HOUR DETAILED HOT SECTION INSPECTION

9-17. DETAILED HOT SECTION INSPECTION (ENGINE REMOVED).

The following procedure is performed with the engine removed from AGPU, and installed on maintenance stand.

a. Disassembly, Inspection, and Repair.

(1) Perform procedures in paragraphs 9-6 through 9-10.

(2) Inspect Deflector, figure 9-25, as follows:

(a) Check vane surfaces (1) for nicks, dents, or cracks. No damage allowed.

(b) Check body (2) for dents or cracks. No damage allowed.

(c) If damage is evident or suspected remove engine from service

(3) Inspect turbine rotor, figure 9-26, as follows:

(a) Visually inspect each turbine rotor blade for cracks in trailing edge. No cracks allowed.

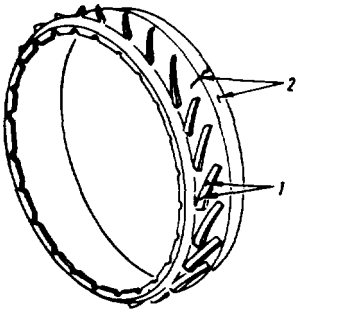


Figure 9-25. Inspection of Deflector

(b) Visually inspect turbine rotor blade ends, blade contour and hub area for cracks. No cracks allowed.

(c) Visually inspect blade tips for damage.

1. Blades that are bent due to foreign object damage shall not exceed a maximum bend of 15 degrees. (See Detail 1.)

2. Blade tips that are bent because of erosion shall not exceed a maximum bend of 90 degrees. (See Detail 2.)

3. Blade tips with pieces missing because of erosion shall not exceed 0.25 inch maximum depth each blade. (See Detail 3.)

(d) Visually check for rub marks on backface of turbine rotor. No damage allowed.

(e) Visually check for cracks in saddle area between blades. No cracks are allowed.

c. Assembly. Perform procedures in paragraphs 9-11 through 9-15.

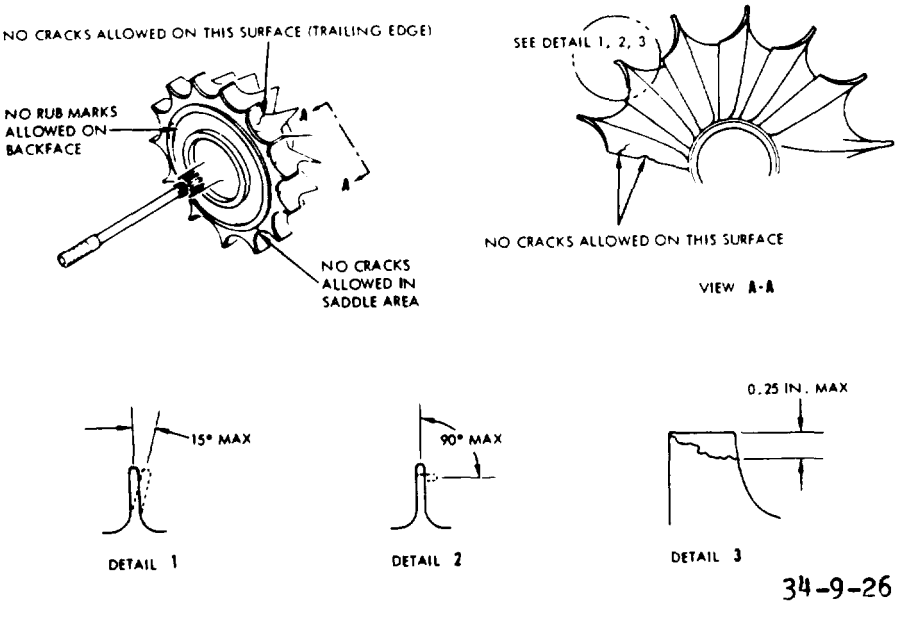


Figure 9-26. Inspection of Turbine Rotor

CHAPTER 10

MAINTENANCE OF PROPULSION SYSTEM

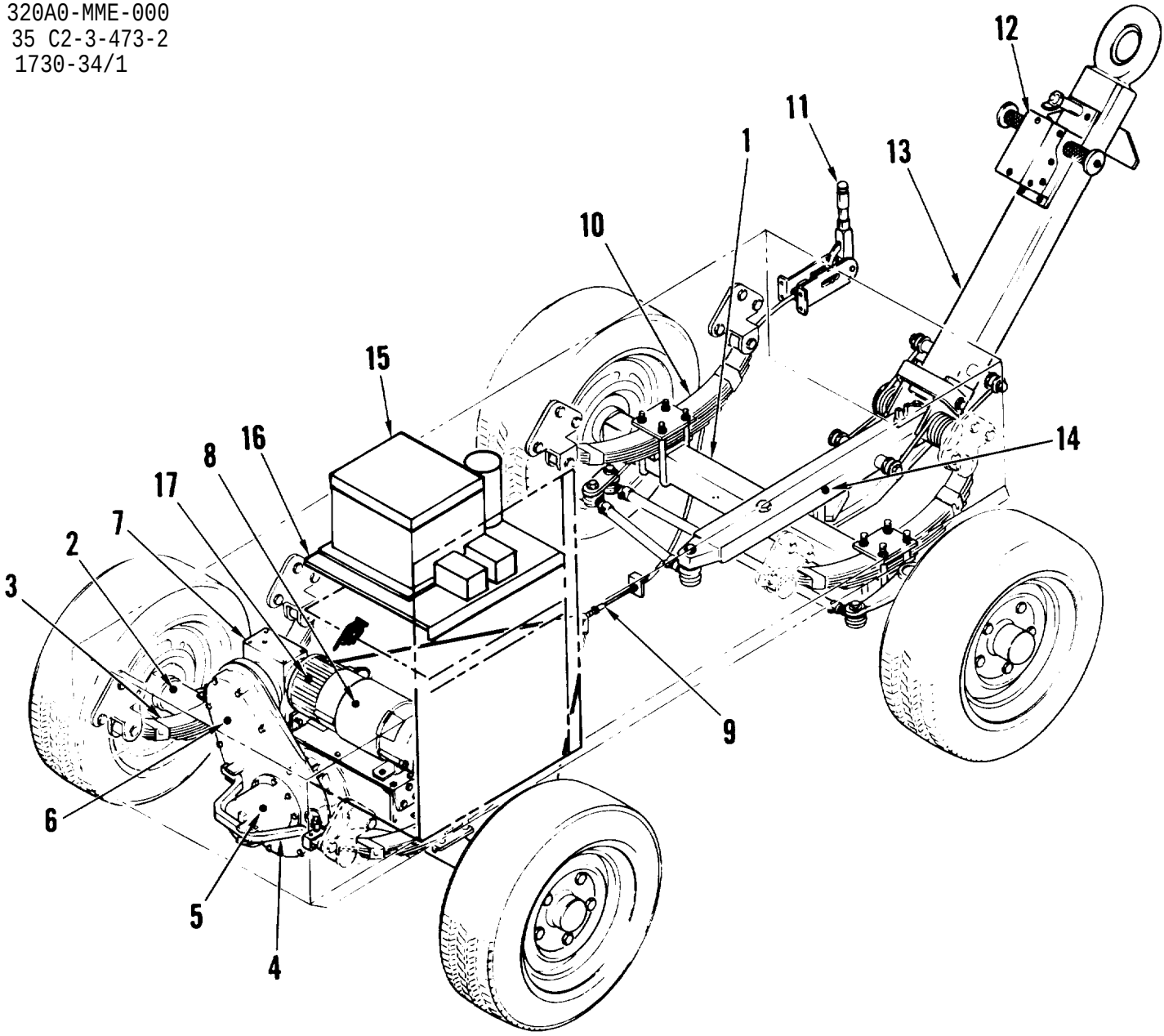
10-1. GENERAL. The propulsion system, figure 10-1, consists of the following major components/assemblies:

Front axle assembly
Tow bar assembly
Speed/direction control assembly
Motor controller
Traction motor
Gear drive assembly
Chain drive assembly
Clutch assembly
Rear axle assembly
Brake assembly

a. Front Axle Assembly/Tow Bar Assembly. (See figure 10-2.) The front axle is a solid-beam, kingpin type assembly. It is composed of a center axle beam, two kingpin supported spindle assemblies mounting roller bearing wheel hubs/wheels/tires, tow bar assembly, tie-rod assembly, and a tow bar mounted speed/direction control assembly. The front axle assembly supports the AGPU by two multi-leaf springs that allow approximately 3 inches of suspension travel. The tow bar assembly provides AGPU steering/towing and allows the unit to turn in a diameter of approximately 21 feet. The axle assembly provides approximately 12 inches of ground clearance.

b. Rear Axle Assembly. (See figure 10-3.) The rear axle is a solid banjo-housing hypoid assembly containing a differential gear assembly with a 4.88:1 drive ratio. The drive pinion is straddle-mounted in two opposed tapered roller bearing supports. The pinion shaft and gear are assembled in a pinion retainer that is bolted to the carrier housing. Two carrier and differential cases are used to accommodate the two bearings and differential pinion gears. The ring gear is bolted to the differential case with 7/16 x 2-inch bolts. Right and left axle shafts are not interchangeable since the right shaft is shorter than the left. The axle assembly provides AGPU drive and braking capabilities. The axle assembly is mounted to the AGPU by two leaf springs that are identical to the springs used on the front axle. The springs allow approximately 3 inches of suspension travel. The rear axle provides approximately 7 inches of ground clearance at lowest point. The rear axle flanged input shaft mates to the remainder of the drive system, consisting of the chain drive and gear drive assemblies and the traction motor. Braking is accomplished by rear wheel mounted drum-type brake assemblies that are actuated by an operator controlled lever and cable assembly.

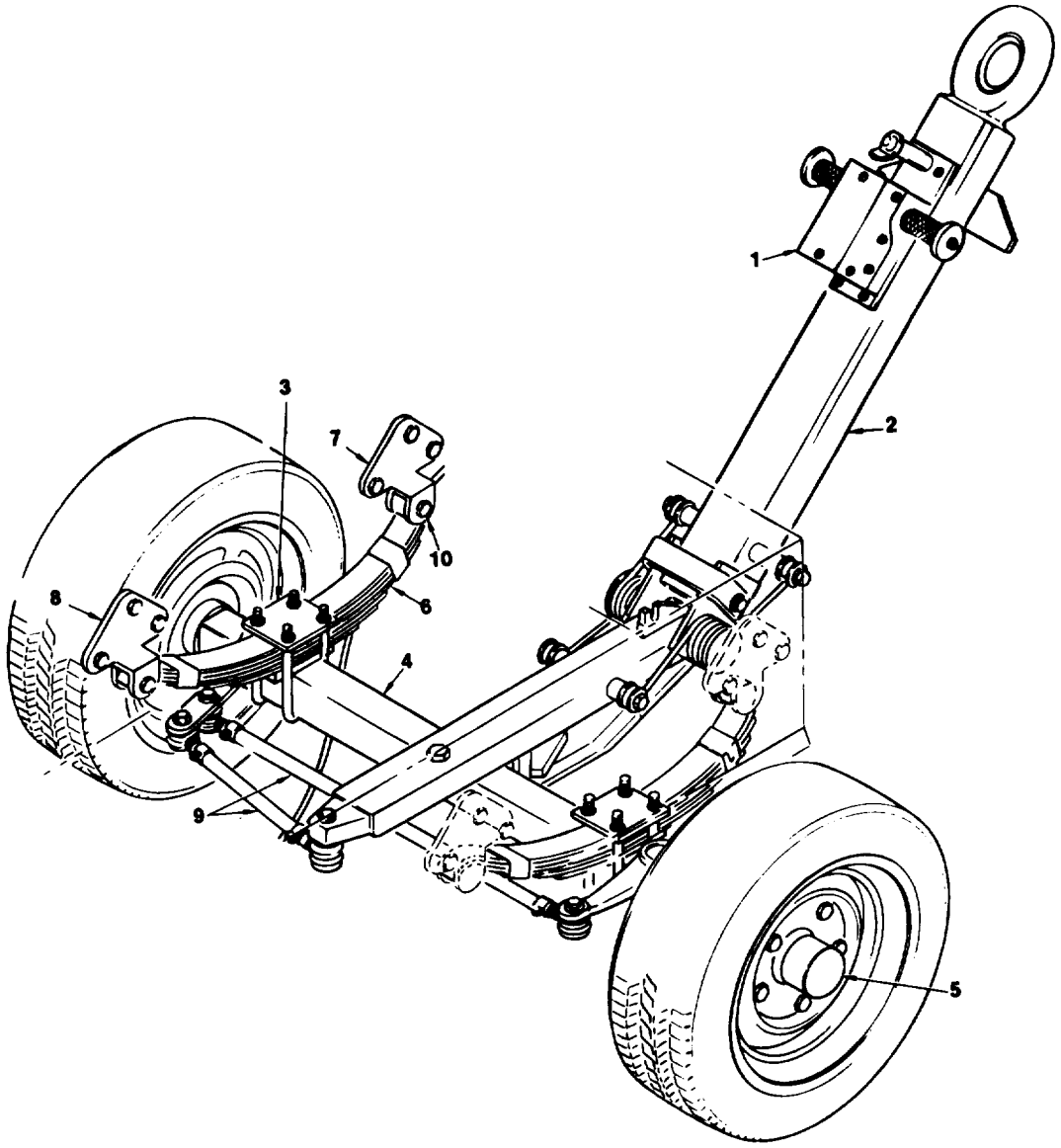
b.1. Electric Brake. (See figure 10-4.) The electric brake consists of a rotor between two friction disks. A spring-loaded flapper applies pressure to the brake assembly braking the rotor between the friction disks. When 28 vdc is applied to the brake coil, a magnetic field lifts the flapper against spring pressure compressing the springs and releasing the electric brake.



1. FRONT AXLE
2. REAR AXLE
3. REAR LEAF SPRING
4. CLUTCH LEVER
5. CLUTCH HOUSING
6. CHAIN DRIVE HOUSING
7. GEAR CASE
8. TRACTION MOTOR
9. BRAKE CABLE
10. FRONT LEAF SPRING
11. BRAKE LEVER
12. SPEED/DIRECTION CONTROL ASSEMBLY
13. TOW BAR
14. TONGUE
15. MOTOR CONTROLLER
16. UPPER ELECTRICAL TRAY
17. ELECTRIC BRAKE

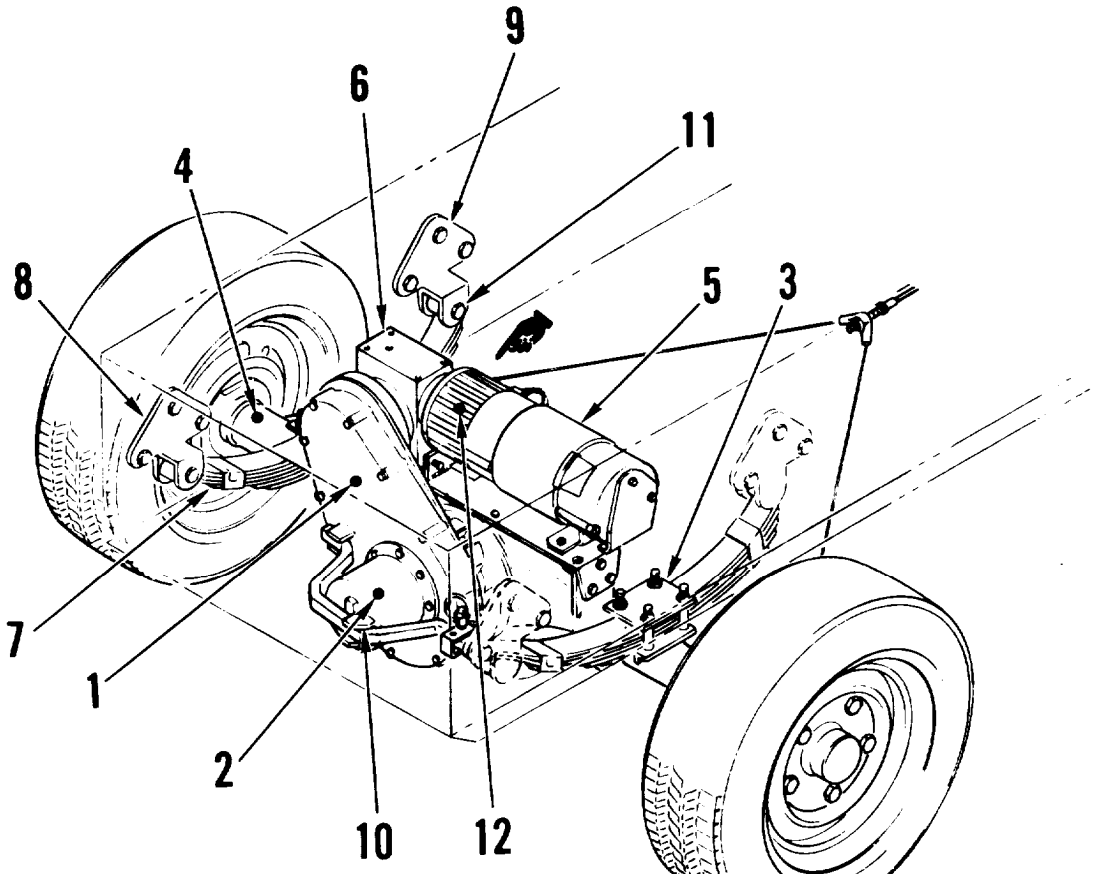
Figure 10-1. Propulsion System

c. Traction Motor/Gear Drive. (See figure 10-4.) The traction motor provides propulsion power to maneuver the AGPU. The motor will drive the AGPU in forward and reverse at a speed of 3 miles per hour on flat ground and at 1/2 mile per hour on a 15 degree slope. The motor is a high torque, 28 vdc unit that operates at a maximum speed of 5,000 rpm. The motor mounts to the electric brake assembly by a standard NEMA "C" face and transfers power via a 3/4 inch diameter keyed output shaft. Motor control is accomplished by voltage changes that are determined by the motor controller. The motor controller responds to operator manipulation of the speed/direction controls. The motor is protected from overheating by a thermal switch which disconnects the input power to the motor.



1. SPEED/DIRECTION CONTROL ASSEMBLY
2. TOW BAR
3. SPRING MOUNTING HARDWARE
4. FRONT AXLE
5. HUB
6. SPRING
7. FRONT HANGER
8. REAR HANGER
9. TIE RODS
10. SPRING HANGER MOUNTING BOLT

Figure 10-2. Front Axle/Tow Bar Assembly

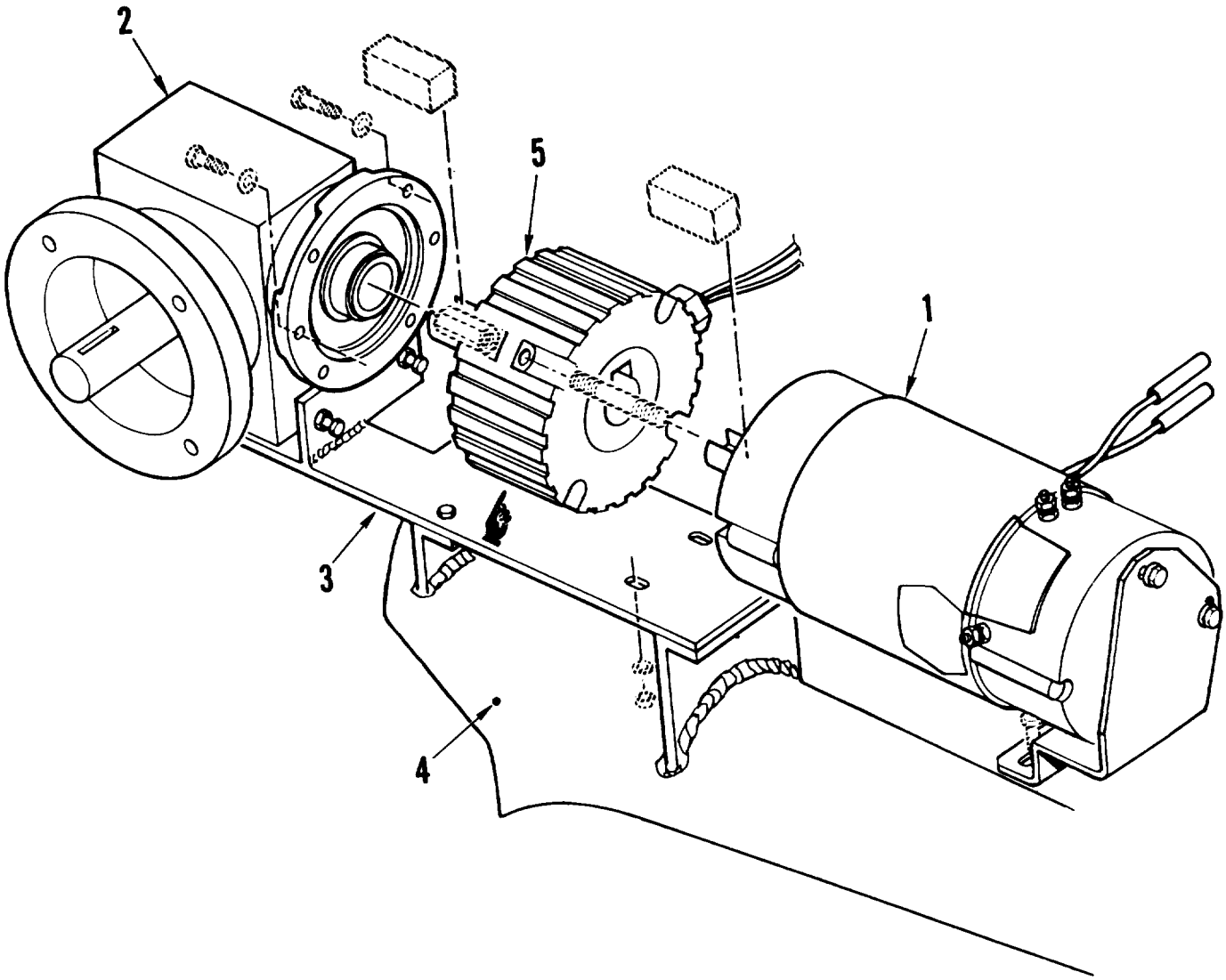


1. CHAIN DRIVE HOUSING
2. CLUTCH HOUSING
3. SPRING MOUNTING HARDWARE
4. REAR AXLE
5. TRACTION MOTOR
6. GEAR DRIVE ASSEMBLY
7. SPRING
8. REAR HANGER
9. FRONT HANGER
10. ENGAGED/DISENGAGED MICROSWITCH
11. SPRING HANGER MOUNTING BOLT
12. ELECTRIC BRAKE

Figure 10-3. Rear Axle Assembly

d. Chain Drive Assembly. (See figure 10-3.) The chain drive assembly mounts on the AGPU rear axle and transfers traction motor/gear drive energy through the clutch assembly to the rear axle differential. The chain is a silent running, 98 pitch, double roller-link type chain. It is driven by a 20 tooth , key-mounted sprocket gear connected to the gear drive assembly. The chain drives an 81 tooth circular sprocket gear that is connected to the rear axle differential by the manipulation of the clutch lever. The chain drive ratio is 5.4:1. The entire chain drive assembly is contained in a cast aluminum housing that is secured to the gearbox adapter plate. The chain is lubricated by running in an oil bath contained in the lower portion of the chain housing.

e. Clutch Assembly. (See figure 10-3.) The clutch assembly is a lever operated, mechanical device used to transfer traction motor/chain drive energy directly to the AGPU rear axle. The clutch mating device consists of a shifter cup and hub assembly that drives



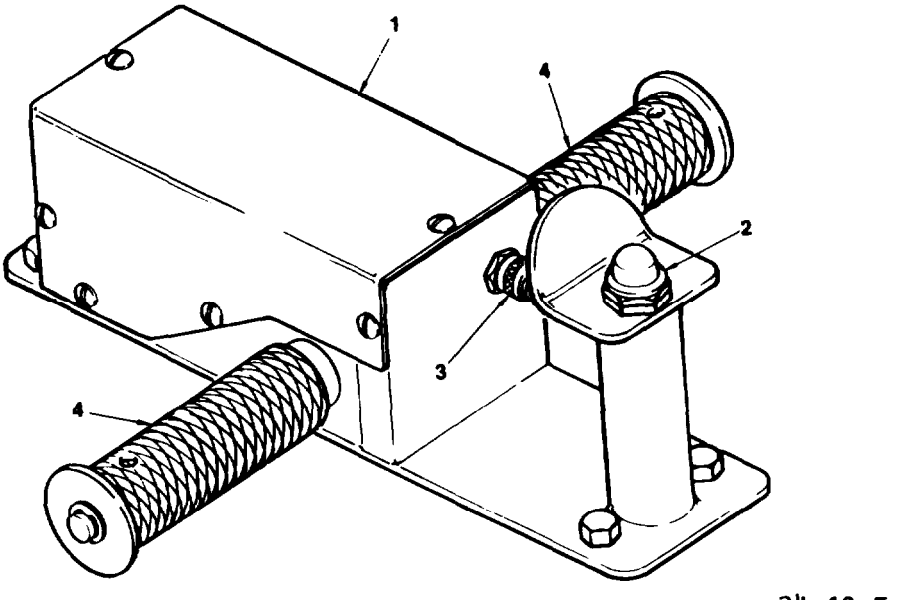
1. TRACTION MOTOR
2. GEAR DRIVE
3. SUPPORT PLATE
4. REAR AXLE
5. ELECTRIC BRAKE

Figure 10-4. Traction Motor/Drive Gear

the rear axle pinion gear via a geared sleeve. The clutch assembly is operator controlled by an engagement lever mounted directly to the clutch housing. A clutch q ounted microswitch activates an indicator light mounted on the speed/direction control assembly. The light indicates the status of the clutch lever engagement. An external adjustment turnbuckle is provided on the clutch housing to allow engaged/disengaged adjustments.

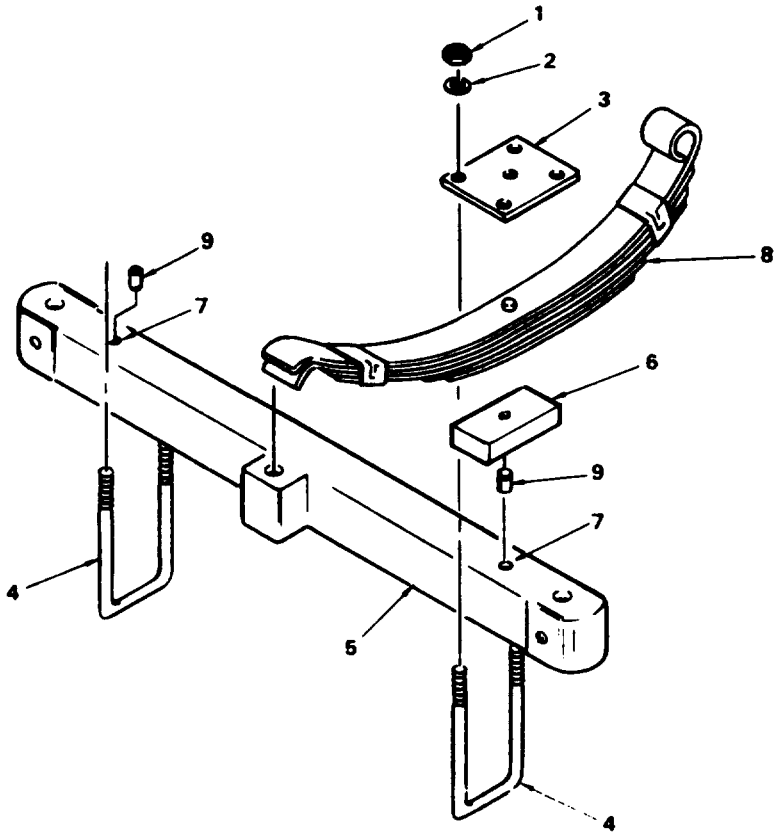
f. Motor Controller. (See figure 10-1.) The motor controller and the forward and reverse relays are mounted on the upper tray in the electrical compartment. The motor controller receives +28 vdc from the control panel and control signals from the speed/direction control unit. It sends dc drive voltage to the traction motor armature and speed control signals to the traction motor field windings. The control signals from the speed/direction control assembly consist of forward or reverse relay activation signals from internal micro switches and variable speed control signals from the internal variable resistors. Both sets of signals are selected by the twist grips.

g. Speed/Direction Control Assembly. (See figure 10-5) The speed/direction control assembly provides both the direction (forward and reverse) and the speed commands to the AGPU propulsion motor. The assembly q ounts on the tow bar, close to the lunette eye. It is connected to the motor by a wiring harness that runs under the tow bar and is protected by the tow bar channel. Forward and reverse selection as well as speed are determined by the position of



1. SPEED/DIRECTION CONTROL ASSEMBLY
2. DEADMAN SWITCH
3. DO NOT TOW INDICATOR LIGHT
4. TWIST GRIP

Figure 10-5. Tow Bar Controls



1. MOUNTING NUT
2. WASHER
3. PLATE, UPPER
4. U-BOLT
5. FRONT AXLE (BEAM)
6. SPACER
7. ALIGNMENT HOLE
8. SPRING
9. ALIGNMENT PIN

Figure 10-6. Front Spring Assembly

the control twist grips. The grips have a motorcycle type accelerator that can be actuated from either side of the tow bar. The grips are spring loaded to a neutral, no-propulsion position. The grips rotate in either direction, one way controlling forward direction and speed, and the other way reverse direction and speed. The controller contains an emergency dead-man switch that must be depressed to operate the speed/direction controls. Release of the switch disconnects all power to the traction motor. A mercury switch is in the same line as the dead-man switch. The mercury switch opens the power system supply when the tow bar is raised to approximately 60 degrees or more from horizontal. The assembly also incorporates an indicator light with a press-to-test feature that is illuminated when the propulsion motor clutch is engaged.

h. Brake Assembly. The AGPU uses rear-wheel brakes that are controlled by an operator-activated mechanical lever connected to the brakes on a cable. The brakes are standard, automotive-type drum units using replaceable brake shoes.

10-1.1. WHEELS AND TIRES.

a. Remove wheel assy, refer to, TM 55-1730-229-12.

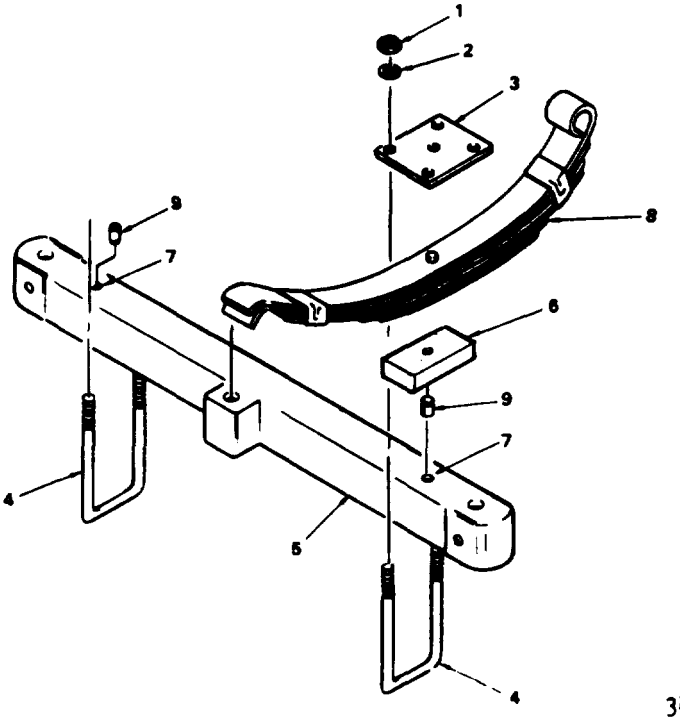
b. Replace damaged tire, wheel and valve.

c. Install wheel assy refer to TM 55-1730-229-12.

10-2. FRONT AXLE ASSEMBLY.

a. Remove. (See figure 10-6.)

(1) position AGPU on level surface. Place chocks against rear wheels and apply parking brake.



1. MOUNTING NUT
2. WASHER
3. PLATE, UPPER
4. U-BOLT
5. FRONT AXLE (BEAM)
6. SPACER
7. ALIGNMENT HOLE
8. SPRING
9. ALIGNMENT PIN

Figure 10-6. Front Spring Assembly

(2) Disconnect battery.

(3) Remove speed/direction control in accordance with paragraph 4-118, TM 55-1730-229-12.

(4) Remove tow bar assembly in accordance with paragraph 4-113, TM 55-1730-229-12.

(5) Raise the front of the AGPU body with a floor jack until the front wheels are approximately 2-1/2 inches above the ground. Support the AGPU with jack stands.

(6) Remove front wheels in accordance with paragraph 4-112, TM 55-1730-229-12.

(7) Place two jack stands under axle beam (5) to support axle when U-bolts are removed.

(8) Remove nuts (1), lockwashers (2), U-bolts (4) , mounting plates (3), spacers (6), and alignment pin (9).

(9) Lower and remove front axle beam (5).

b. Disassembly. (See figures 10-7 and 10-8.)

(1) Remove dust cap (8, figure 10-7).

(2) Remove cotter pin (7), nut (6), washer (5) , and outer bearing (2).

(3) Slide hub assembly (4) off of spindle (9).

(4) Remove grease seal (10) and inner bearing (3).

(5) Remove outer race (11) and inner race (12).

(6) If lug bolts are damaged perform the following:

(a) Removal. press lug bolts (1) and hub assembly (4).

(b) Installation. Press new lug bolts (1) into hub assembly (4).

(7) Remove four grease fittings (1, figure 10-8) from tie rod ends (2, 3, 4 and 5).

(8) Remove four cotter pins (6) and nuts (7) from tie rod ends (2, 3, 4 and 5). Mark tie rod and tie rod ends so they are matched when installed.

(9) Remove tie rods (8 and 9) from spindle (10). Remove tie rod (9) from spindle (11). Remove tie rod (8) from tongue (12).

(10) Remove tongue (12) from axle (13) by removing cotter pin (14), nut (15) and bolt (16).

(11) Remove tie rod ends (2, 3, 4 and 5) by removing nut (17), lockwasher (18), and bolts (19) from clamps (20).

(12) Remove grease fittings (21) from spindles (10 and 11).

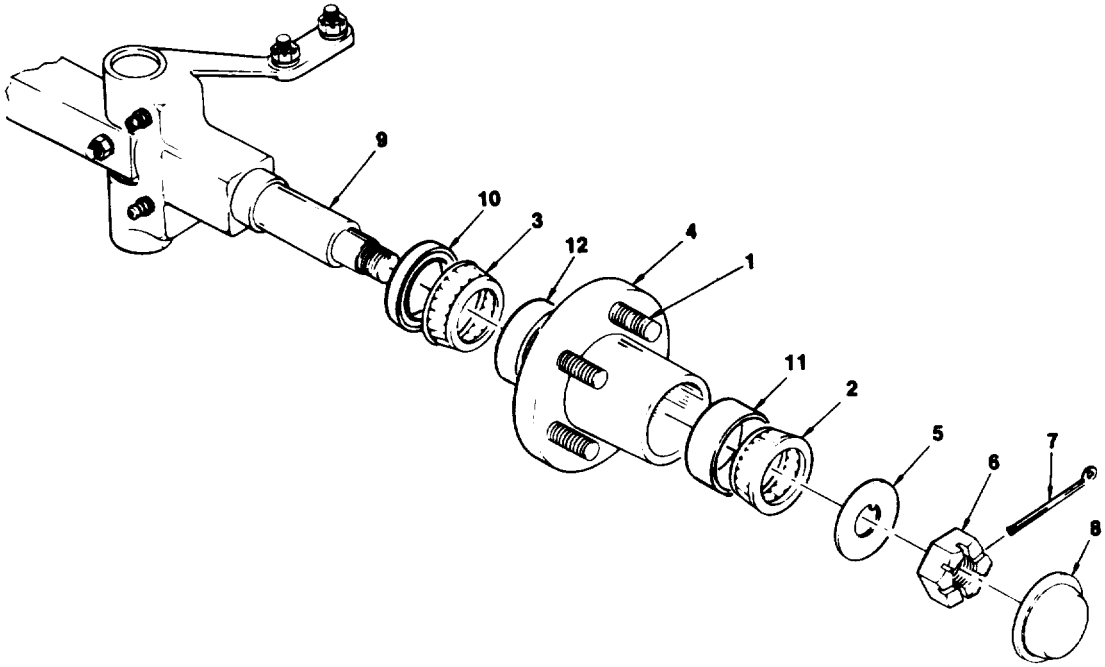
(13) Remove tapered pins (22) from axle (13) by removing nuts (24) and flat washers (23).

(14) Remove the top expansion plugs (25) from the two spindles (10, 11) by drilling a 3/8 inch hole in each of the plugs. Pry plugs out.

(15) press king pins (26) from axle (13) and spindles (10 and 11). This will also remove the two bottom expansion plugs (27).

(16) Remove two shims (28) and bearings (29) from each spindle (10 and 11).

(17) press top and bottom bushings (30) from spindle (10 and 11).



34-10-7

1. LUG BOLT
2. WHEEL BEARING, OUTER
3. WHEEL BEARING, INNER
4. HUB
5. WASHER
6. NUT
7. COTTER PIN
8. DUST CAP
9. SPINDLE
10. SEAL, GREASE
11. BEARING RACE, OUTER
12. BEARING RACE, INNER

Figure 10-7. Spindle and Hub

(18) Remove guide pins (31) from axle (13).

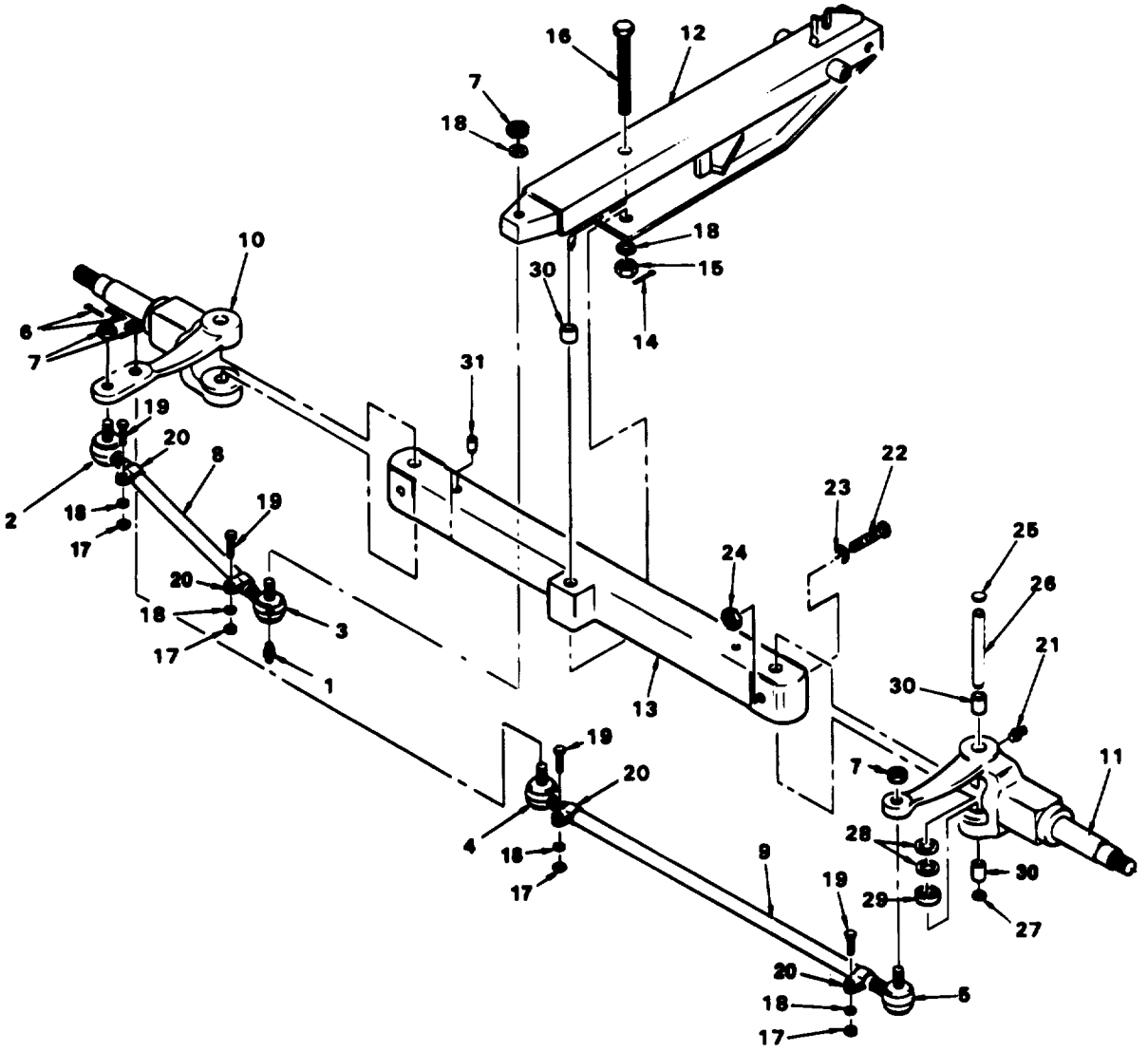
c. Cleaning.

WARNING

Cleaning solvent P-D-680 is flammable and should not be used near an open flame. Fire extinguishers should be provided when these materials are in use. In addition, these materials evaporate quickly and have a drying effect on the skin. If used without gloves, they may cause cracks in the skin and, irritation or inflammation. Use only in well ventilated places. The use of diesel fuel oil, gasoline, or benzine (benzol) for cleaning is strictly prohibited.

(1) Use solvent P-D-680 to clean or wash grease or oil from all parts of the axle assembly. See lubrication order for cleaning and preservation of bearings.

(2) After cleaning, apply a light grade oil to all polished metal surfaces to prevent rusting.



1. GREASE FITTING	12. TONGUE	23. WASHER
2. TIE ROD R/H	13. AXLE	24. NUT
3. TIE ROD L/H	14. COTTER PIN	25. PLUG
4. TIE ROD R/H	15. NUT	26. KING PIN
5. TIE ROD L/H	16. BOLT	27. PLUG
6. COTTER PIN	17. NUT	28. SHIMS
7. NUT	18. WASHER	29. BEARING
8. TIE ROD 14-1/2 INCH	19. BOLT	30. BUSHING
9. TIE ROD 31 INCH	20. CLAMP	31. PIN, GUIDE
10. SPINDLE L/H	21. GREASE FITTING	
11. SPINDLE R/H	22. PIN, TAPER	

Figure 10-8. Front Axle Assembly

(3) Before installing new parts, remove any preservative materials such as rust-preventive compound or protective grease.

d. Inspection and Repair.

(1) Axle Beam. Check axle beam for damage. Replace beam if twisted, distorted or cracked. Inspect beam for worn or damaged king pin mounting holes and tongue pivot mounting hole. Excessive wear or damage to mounting holes will require axle beam replacement. Smooth machined surfaces that are nicked or burred with a fine file and stone.

(2) Spindles. Check for distortion or damage. Inspect spindles for cracks around tie-rod mounting holes, king pin holes, grease fittings and hub mounting shaft. Cheek for damaged wheel bearing mounting surfaces. Cheek spindle for thread damage. Replace spindle assembly if cracked or if bearing surfaces are damaged. Repair thread damage by running a thread cutting die down the old threads,

(3) Tie-Rods. Inspect tie-rods for bends or damage. Check inner threads and expansion slots for damage. Slight bends may be straightened with a hydraulic press. Severely bent or kinked tie-rods must be replaced. Damaged threads may be repaired by running a thread cutting tap down the old threads. The expansion slots must show uniform distance for their entire length. Adjustments may be made by closing the slot with a hydraulic press or soft-faced mallet or by opening with a large screwdriver blade. Check tie-rod ends for damaged seals, damaged zerk fittings, and damaged stud threads. A good tie-rod end will have no play in the mounting stud. If the stud can be rooked back and forth easily with little resistance, the tie-rod end must be replaced.

(4) Hubs. Inspect hubs for cracks or damage. Cheek the inner bearing mounting surfaces for damage or signs of overheating. Cheek lug bolts for proper mounting and damaged threads. Cheek dust cap mounting surface for physical damage. Cheek wheel bearings for physical damage. Replace the hub if cracked or If bearing surfaces are damaged beyond repair. Minor damage may be repaired by carefully cleaning and polishing the machined surface with fine emery paper or a fine stone. The wheel bearings must seat accurately in the hub without binding or twisting. Any loose lug bolts must be pressed into the hub until the bolt heads are flush with the hub flange. The dust cap recess must be clean and undamaged. Smooth the area with a fine file or stone to remove burrs and nicks. Wheel bearings and bearing races must show no signs of wear, galling, chipping, cracking, or overheating. Replace faulty bearings. See the lubrication order for proper wheel bearing lubrication procedures.

e. Assembly. (See figures 10-7 and 10-8.)

(1) Align holes in two bushings (30, figure 10-8) with hole in spindle (10 and 11), press into place.

(2) Lubricate king pin (26) and spindle axle beam king pin mounting holes. (See table 3-1 of TM 55-1730-229-12 for lubrication instructions.)

(3) With grease slot toward bearing, align the king pin (26) with the spindle and axle beam king pin holes.

(4) Press the king pin (26) half way through the spindle (10 and 11) axle beam (13).

(5) Install two shims (28) and bearing (29) between spindle and axle beam king pin holes.

(6) Press the king pin (26) through until there is equal distance from either end of king pin to lip of spindle (10 and 11).

(7) Install tapered pin (22) into axle (13) so that the flat surface of the tapered pin is facing the king pin and recessed so that washer (23) and nut (24) can be installed. Tighten nut securely.

(8) place an expansion plug (25) over both spindle (10 and 11) king pin holes and tap into place.

(9) Install two grease fittings (21). Lubricate spindle grease fittings in accordance with Lubrication Order (TM 55-1730-229-12).

(10) Thread tie rod ends (2, 3, 4 and 5) into tie rods (8 and 9). Adjust tie rod length by moving the ends into the tie rods until the rods are the same length as when removed.

(11) Assemble the tie rods to the axle assembly by placing the tie rod end studs (4 and 5) of the 31-inch tie rod (9) up through the spindle mounting hole of the right-hand spindle (11) and through the inner spindle mounting hole of the left-hand spindle (10). Tighten nut (7), then back off the nut to the next spot where the slots in the nut are lined up with the cotter pin hole In the spindle. Install a new cotter pin (6) and bend the ends of the cotter pin back to lay close to the nut. The remaining tie rod end will be connected to the tongue (12) when the two units are reassembled.

(12) Install tie rod end, clamp (20), bolt (19), lockwasher (18) and nut (17).

(13) Install tongue (12) on to axle (13) and secure with bolt (16), nut (15), and cotter pin (14). Make sure tongue moves freely.

(14) Connect 14-1/2 inch tie rod (8) to tongue (12) with nut (7) and cotter pin (6).

(15) Install four grease fittings (1) into four tie rods (2, 3, 4 and 5).

(16) Lubricate wheel bearings in accordance with instructions contained in the Lubrication Order (TM 55-1730-229-12).

(17) Install outer race (11, figure 10-7) and Inner race (12).

(18) Install inner bearing (3).

(19) Install grease seal (10) Into hub assembly (4). Slide the hub assembly (4) onto the spindle (9) until the grease seal (10) seats.

(20) Hold the hub in position while installing the outer wheel bearing (2) over the spindle shaft. Slide the outer bearing (2) into the hub assembly (4) as far as it will go.

(21) place the flat washer (5) over the spindle shaft and against outer wheel bearing (2). Thread the spindle nut (6) onto the shaft fingertight. Then, while turning the hub (4), tighten the nut slowly with a wrench until the hub assembly (4) begins to bind.

(22) Back off the nut (6) to the next spot where the slots in the nut are lined up with the cotter pin hole in the spindle. Install a new cotter pin (7) and bend the ends of the cotter pin back to lay close to the nut. This procedure adjusts the tapered roller bearings for zero end-play with no preload.

(23) Place dust cap (8) on end of hub assembly (4). Tap in place.

f. Install. (See figure 10-6.)

(1) Position axle beam (5) under AGPU body with floor jack.

(2) Raise axle beam (5) within two inches (2") of spring (8). Support axle beam (5) with two jack stands, leaving floor jack in position.

(3) Install alignment pin (9) into alignment hole (7) on axle beam (5).

(4) Position spacer (6) on axle beam (5) so that center hole in spacer is aligned with pin (9).

(5) Raise axle beam (5) with floor jack until alignment pin on bottom of spring (8) engages spacer's (6) alignment hole.

(6) Position upper plate (3) on top of spring (8).

(7) Install U-bolts (4) around axle beam (5) and through holes in upper plate (3). Install lockwashers (2) and nuts (1) on U-bolts (4). Torque U-bolts to 60 foot-pounds.

(8) Install wheels in accordance with paragraph 4-112, TM 55-1730-229-12.

(9) Raise AGPU, remove jack stands, lower AGPU.

(10) Install tow bar in accordance with paragraph 4-113, TM 55-1730-229-12.

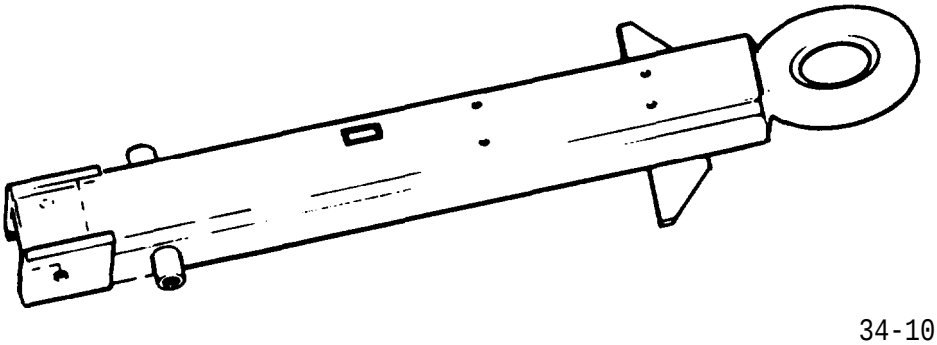
(11) Install speed/direction control assembly in accordance with paragraph 4-118, TM 55-1730-229-12.

10-3. TOW BAR ASSEMBLY. Inspect and repair tow bar, figure 10-9, as follows:

(1) Remove speed/direction control assembly in accordance with paragraph 4-118, TM 55-1730-229-12.

(2) Remove tow bar assembly in accordance with paragraph 4-113, TM 55-1730-229-12.

(3) Tow Bar Beam. Check the beam for physical damage. Dents, bends or twists may be repaired using a hydraulic arbor press or heavy clamps and hammers. Inspect lunette eye for proper alignment and secure welds. Minor lunette eye misalignment may be corrected by placing the tow bar beam In a heavy vice and twisting the eye with a large bar inserted through the eye. Major misalign-q ent may require heating of the entire lunette eye. Reweld the tube joints if necessary. Inspect the tow bar pivot bolt alignment. Correct by bending the beam in a hydraulic press. Excessive wear of the pivot bolt mounting holes requires replacement of the tow bar beam.



34-10-9

Figure 10-9. Tow Bar Beam

(4) Install tow bar assembly in accordance with paragraph 4-113, TM 55-1730-229-12.

(5) Install speed/direction control in accordance with paragraph 4-118, TM 55-1730-229-12.

10-4. GEAR DRIVE ASSEMBLY.

a. Remove. (See figure 10-10.)

(1) Remove rear axle assembly (paragraph 10-8).

(2) Remove electric brake (paragraph 10-10.1).

(3) Remove chain drive assembly (paragraph 10-5).

(4) Remove screws (1), lockwashers (2) and plain washers (3) securing gear drive assembly (4) to motor mounting plate (5). Remove gear drive assembly.

b. Install. (See figure 10-10.)

(1) Mount gear drive assembly (4) on motor mounting plate (5). Secure with plain washers (3), lockwashers (2) and screws (1).

(2) Install electric brake (para-(paragraph 10-10.1).

(3) Install chain drive assembly (paragraph 10-5).

(4) Install rear axle assembly (paragraph 10-8).

10-5. CHAIN DRIVE ASSEMBLY.

a. Remove. (See figure 10-11.)

(i) Remove rear axle assembly (paragraph 10-8).

(2) Remove clutch drive assembly (paragraph 10-6).

(3) Drain chain case oil reservoir.

(4) Remove eight mounting bolts (1), lockwashers (2), flat washers (3), three mounting nuts (4) and lockwashers (5), flat washers (6), securing chain case (7) to gearbox adapter plate (8). Remove chain case cover. Remove gasket (9).

b. Disassembly. (See figure 10-11.)

(1) Loosen four mounting bolts (11). Do not remove mounting bolts.

(2) Loosen two jam nuts (13) and remove bolts (14).

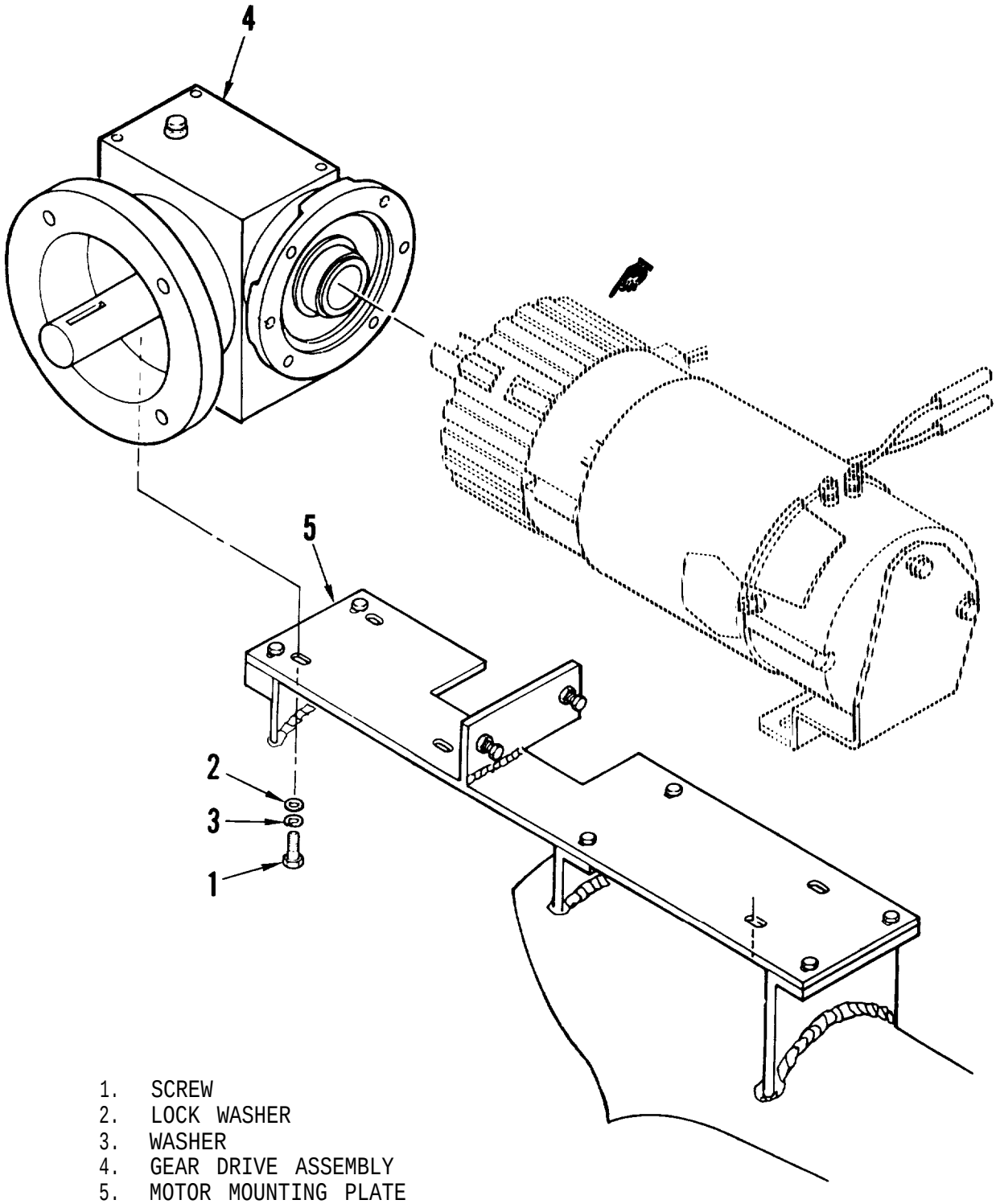
(3) Loosen three bolts (15) from gear drive case (16), and two bolts (17) from motor back plate mount. Do not remove bolts.

(4) Slide gear drive case (16) to release chain tension. When chain is released, remove the chain (10) from around the two sprocket gears (18, 19).

(5) Remove nut (20), nut (21), flat washers (22), from drive sleeve (23). Remove 81 tooth sprocket gear (18), spacer (24).

(6) Remove the four upper gearbox adapter plates mount bolts (11) and washers (12). Remove the five lower mount bolts (25) and washers (26). Remove gearbox adapter plate (8) and gasket (27).

(7) Loosen allen set screw (28) from front collar (29) and remove collar. Remove 20 tooth sprocket gear (19). Remove woodruff key (30). Loosen allen set screw (28) from rear collar (29). Remove collar. Remove metal gasket (31).



1. SCREW
2. LOCK WASHER
3. WASHER
4. GEAR DRIVE ASSEMBLY
5. MOTOR MOUNTING PLATE

Figure 10-10. Gear Drive Mounting

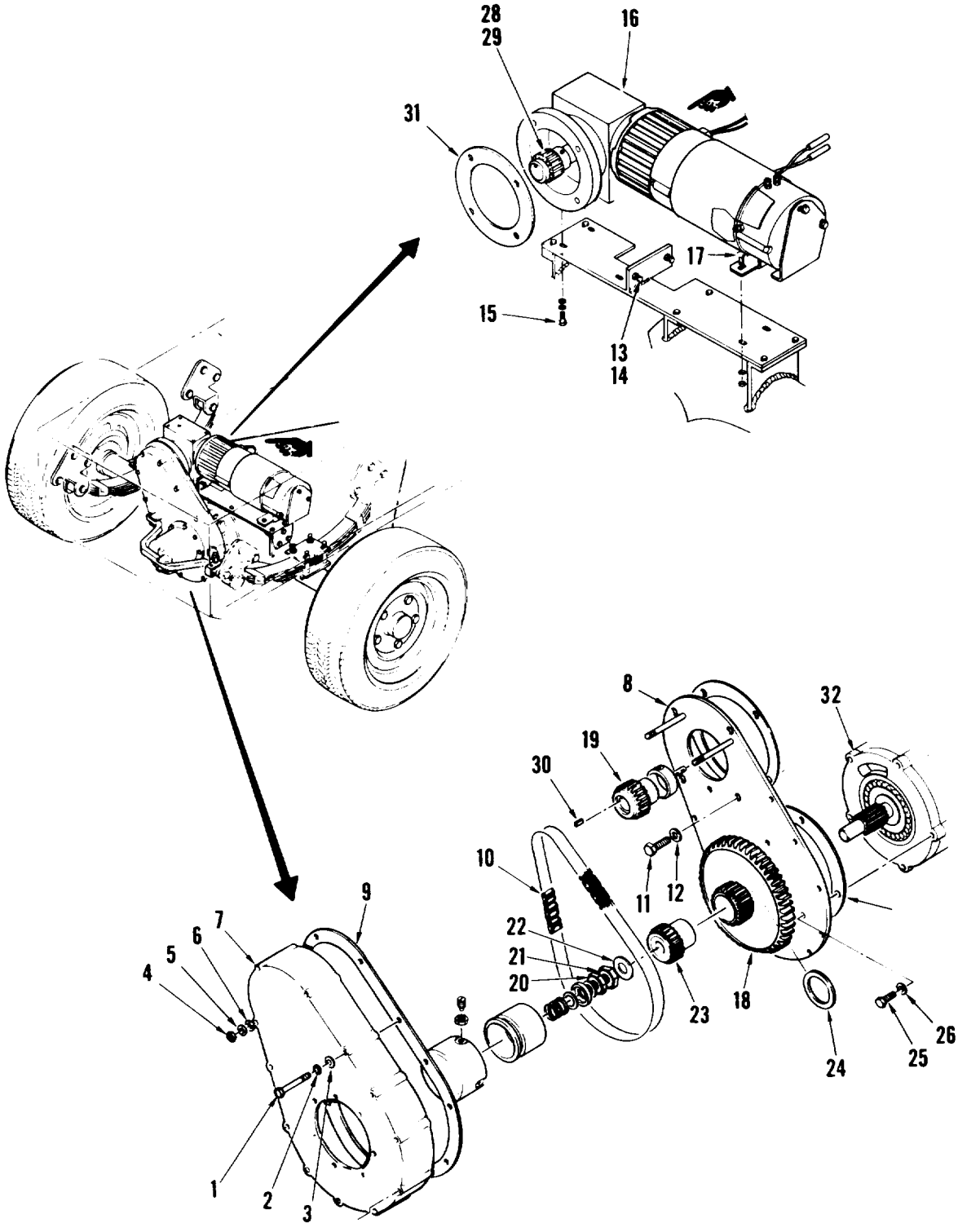


Figure 10-11. Traction Motor, Gear Drive, and Chain Drive Assembly

LEGEND FOR FIGURE 10-11:

1. BOLT
2. WASHER, LOCK
3. WASHER, FLAT
4. NUT
5. WASHER, LOCK
6. WASHER, FLAT
7. CHAIN CASE
8. ADAPTER PLATE
9. GASKET
10. DRIVE CHAIN
11. BOLT
12. WASHER, FLAT
13. NUT, JAM
14. BOLT
15. BOLT
16. GEARDRIVE CASE
17. BOLT
18. GEAR, 81 TOOTH
19. GEAR, 20 TOOTH
20. NUT, JAM
21. NUT
22. WASHER, FLAT
23. DRIVE SLEEVE
24. SPACER
25. BOLT
26. WASHER, LOCK
27. GASKET
28. ALLEN SET SCREW
29. COLLAR, FRONT/REAR
30. KEY, WOODRUFF
31. GASKET
32. PINION DRIVE

c. Cleaning.

WARNING

Cleaning solvent P-D-680 is flammable and should not be used near an open flame. Fire extinguishers should be provided when these materials are in use. In addition, these materials evaporate quickly and have a drying effect on the skin. If used without gloves, they may cause cracks in the skin and irritation or inflammation. Use only in well ventilated places. The use of diesel fuel oil, gasoline, or benzine (benzol) for cleaning is strictly prohibited.

(1) Use solvent P-D-680 to clean or wash grease and oil from all parts of the chain drive assembly. Remove any traces of the housing gasket that remains on the housing or the adapter plate.

(2) Before installing new parts, remove any preservative materials such as rust-preventive compound or protective grease.

d. Inspectlon and Repair.

(1) Inspect the 20-tooth and 81-tooth gears for physical damage. The gear teeth should be free of chips, burrs, and broken teeth. Minor flaws may be removed with a fine file and stone. Major defects will require gear replacement. Check the gears for cracks. Lay the 81-tooth gear on a flat surface and check for twists or distortion. Check the inside of the driven sleeve mounting hole. The inside surface should be clean and smooth. Minor flaws may be removed with fine emery paper. Check the 20-tooth gear keyway for cracks, chips, or burrs. Minor flaws may be repaired with a fine file and stone.

(2) Carefully inspect the chain for broken or damaged links. Lay the chain on edge on a flat surface and check for twists or distortion. Replace the chain if damaged. All links should move freely with no binding or catching.

(3) Inspect the housing for physical damage. Check for dents, cracks, sharp edges or worn mounting holes. Minor housing damage may be repaired using normal metal-working methods. Major damage will require housing replacement. Inspect the housing mating surface by laying the housing on a flat, true surface and checking for gaps. Check the threads inside the drain and fill holes. Minor thread damage may be repaired by running the correct tap down the threads.

e. Assembly. (See figure 10-11.)

(1) position metal gasket (31) on gear drive ease (16) using sealer on both sides of metal gasket.

(2) Position gasket (27) on pinion drive plate (32) using sealer on both sides of gasket.

(3) Position gear box adapter plate (8) on gear drive ease (16) and adapter plate (32), Install four upper gear box adapter plate mount bolts (11) and flat washer (12). Do not tighten bolts (11), Install five lower mount bolts (25) and lookwashers (26). Torque five bottom mount bolts to 35-40 foot-pounds. Install spacer (24) on to rear drive shaft.

(4) Install rear collar (29), allen set screw (28) and woodruff key (30) on shaft of drive ease (16). Do not tighten allen set screw.

(5) Position gears (18 and 19) inside of drive chain (10). Install gears and drive chain onto gear drive case shaft (16).

(6) Install front collar (29) and allen set screw (28) onto shaft of gear drive ease (16). Flush mount front collar and tighten allen set screw. Position rear collar (29) against sprocket gear and tighten allen set screw (28).

(7) Position drive sleeve (23) on - drive pinion shaft. Install flat washer (22) and nut (21). Torque nut to 45-50 foot-pounds. Install jam nut (20).

(8) Adjust chain tension by sliding the gear drive case (16) to tighten the drive chain (10). The chain should be as tight as possible, using hand pressure. Install two jam nuts (13) and bolts (14) onto gear drive case (16). Secure the chain by torquing the adjusting bolts (14) to 25 Inch-pounds, tighten jam nuts (13). Tighten three gear drive ease mount bolts (15), and two motor mount bolts (17). Torque four mount bolts (11) to 35-40 foot-pounds. Install safety wire.

NOTE

If new chain is installed, it should be installed loosely and run-in for about 20 minutes at a low speed to remove any burrs and to seat the chain to the sprocket gears. After run-in, tighten the chain as outlined above.

(9) Position new gasket (9), using sealer on both sides of gaskets, onto gear box adapter plate (8). Position chain ease (7) against gear box adapter plate gasket and secure the ease to the adapter plate using flat washers (6), lockwashers (5), nuts (4), and flat washers (3), lockwashers (2), and bolts (1).

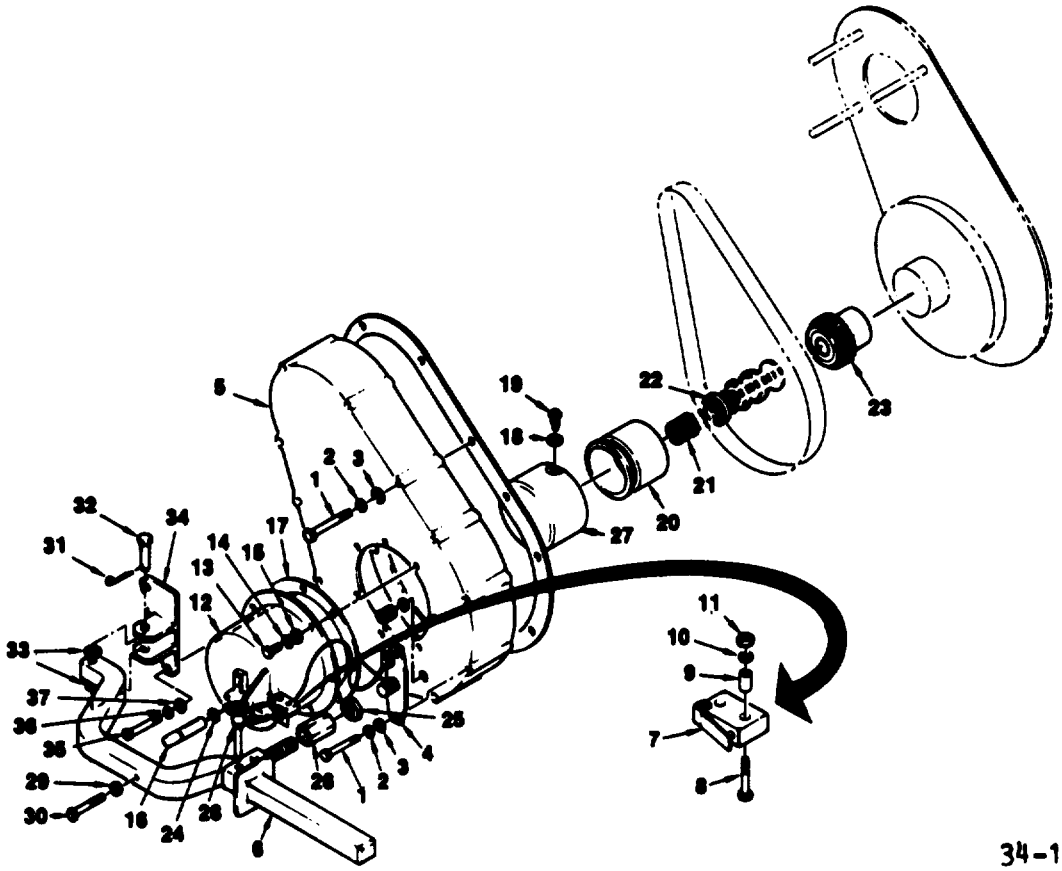
(10) Install clutch drive assembly (paragraph 10-6).

(11) Install rear axle assembly (paragraph 10-8).

(12) Fill chain ease oil reservoir in accordance with lube order.

10-6. CLUTCH ASSEMBLY.

a. Remove. (See figure 10-12.)



1. BOLT
2. WASHER, FLAT
3. WASHER, LOCK
4. MOUNTING BRACKET
5. CHAIN DRIVE HOUSING
6. CLUTCH LEVER, PUSH/PULL
7. MICROSWITCH
8. SCREW
9. SPACER
10. WASHER, FLAT
11. NUT
12. CLUTCH HOUSING
13. BOLT
14. WASHER, FLAT
15. WASHER, LOCK
16. PUSH-ROD
17. GASKET
18. NUT, JAM
19. SCREW, SET
20. HUB, SHIFTER
21. SPRING
22. BUSHING, SPRING
23. GEAR DRIVE SLEEVE
24. PACKING, SPRING
25. NUT, JAM
26. TURNBUCKLE
27. SHIFTER CUP
28. PIN, LOCK
29. NUT, JAM
30. BOLT
31. PIN, COTTER
32. PIN
33. WASHER
34. BRACKET
35. BOLT
36. WASHER, LOCK
37. WASHER, FLAT

Figure 10-12. Clutch Assembly

(1) Disconnect battery (paragraph 4-25, TM 55-1730-229-12).

(2) Remove bolt (30) and jam nut (29).

(3) Remove two bolts (1), flat washers (2), and lockwashers (3) that secure the turnbuckle mounting bracket (4) to the right side of the chain drive housing (5). Remove the mounting bracket. Swing the push/pull lever (6), with turnbuckle attached, out and away from the clutch housing (12). Remove loop clamp securing microswitch lead.

(4) Remove the two phillips head screws (8), spacers (9), flat washers (10), and nuts (11) that secure the engage/disengage microswitch (7). Remove the microswitch and pull the wiring harness away from the clutch housing area.

(5) Remove the seven bolts (13), flat washers (14), and lockwashers (15) that secure the clutch housing (12) to the chain case housing (5). Remove the clutch housing (12) and gasket (17). Remove the push rod (16) from the housing. Remove packing (24) and discard.

(6) Hold the outer clutch shifter cup (27) and loosen the three jam nuts (18) and set screws (19) that secure the shifter cup (27) to the shifter hub (20). Slowly remove the shifter cup from around the shifter hub until the spring pressure is released. Remove the shifter cup, drive engage spring (21), and spring bushing (22).

(7) Remove the shifter hub (20) by pulling the hub straight off the drive sleeve gear (23).

b. Cleaning.

WARNING

Cleaning solvent is flammable and should not be used near an open flame. Fire extinguishers should be provided when these materials are in use. In addition, these materials evaporate quickly and have a drying effect on the skin. If used without gloves, they may cause cracks in the skin and irritation or inflammation. Use only in well ventilated places. The use of diesel fuel oil, gasoline, or benzine (benzol) for cleaning is strictly prohibited.

(1) Use solvent P-D-680 to clean or wash grease or oil from all parts of the clutch assembly.

(2) Before installing new parts, remove any preservative materials such as rust-preventive compound or protective grease.

c. Inspection and Repair. (See figure 10-12.)

(1) Inspect the shifter hub (20) for damage. Internal splines must be free of large chips or broken teeth. Check for cracks in the hub housing. The engagement groove in the front of the hub must be free of gouges or burrs that could hinder proper operation. Use a fine file and stone to smooth minor nicks and burrs. Major damage will require hub replacement.

(2) Inspect the shifter cup (27) for damage. The clutch mating surface must be smooth and free of distortion. The threaded set screw holes must be clean and undamaged. Minor thread damage may be repaired by running the proper size tap down the threads. Check for cracks in the cup housing. Use a fine file and stone to smooth minor nicks and burrs. Major damage will require hub replacement. Mate the cup and hub assemblies by hand and press them together while turning to check for smooth operation. The two assemblies should operate smoothly without catching or binding.

(3) Check the drive engage spring (21) for cracks or nicks. Correct spring length is two inches. If old spring is shorter or damaged, replace spring.

(4) Check the clutch housing (12) for damage. Check switch housing casting for bends or cracks. Mating surface of housing should be flat and true. Minor housing damaged may be repaired with a fine file and stone. Major damage will require housing replacement. Check push rod (16) operation. Rod should slide easily through the push rod hole. The packing groove should be clean and undamaged. Replace push rod if damaged. Scratches on galling Inside the push rod hole may be repaired by polishing the hole with a rolled up piece of fine emery paper.

(5) Inspect the clutch lever (6) and Its mounting hardware for physical damage. Lever should be free of dents, chips, and bends. The pivot hole and mounting hardware should allow smooth operation when the lever is moved back and forth from the engaged and disengaged positions. The turnbuckle assembly should operate freely with no binding or catching. The threads should be clean and free from damage. Replace any damaged turnbuckle components. Inspect the clutch lever locking pin (28) for proper operation. The top-mounted pushbutton should operate smoothly and release the pin retainers completely. Replace the pin if defective. Check microswitch (7) operation with an ohmmeter. Replace the switch if faulty. Inspect switch housing for cracks and other damage. Replace switch if damaged.

d. Install. (See figure 10-12.)

(1) Place the shifter hub (20) over the driven sleeve (23) so that the gear teeth mesh. Press in on the hub until the hub gears disengage from the driven sleeve gears. Install the spring bushing (22) over the end of the differential drive shaft so that it Is against the shaft hex hut.

(2) Position the drive engage spring (21) inside the shifter cup (27) and carefully install the shifter cup ever the shifter hub (20). Make certain that the drive spring Is centered inside the shifter cup during the assembly. Maintain pressure on the shifter cup with one hand while inserting the set screws (19) through the shifter cup with the other hand. Turn the set screws *In* until hand-tight. Place a jam nut (18) on each set screw and tighten.

(3) Lightly lubricate a new push rod (16) packing (24). Insert the push rod into the clutch housing mounting hole. Place a new gasket (17) against the clutch housing q ating surface. Place the housing (12) in position against the chain case housing (5) and secure it with seven bolts (13), flat washers (14), and lockwashers (15).

(4) Install the engaged/disengaged microswitch (7) to the clutch housing (12) with two small phillips head screws (8), spacers (9), flat washers (10) and nuts (11). Secure microswitch lead by installing loop clamp.

(5) Swing the clutch lever (6) back into its normal operating position and place the mounting bracket (4) against the chain case. Secure the bracket with two bolts (l), flat washers (2) and lockwashers (3).

(6) Adjust Push/Pull Clutch Lever (6) by turning Jam Nut (25) counterclockwise to loosen, then turn turnbuckle (26) clockwise until there is 1/4 inch clearance between clutch lever (6) and clutch housing (12). Tighten jam nut (25) by turning clockwise and torque to 10 foot pounds. If a clicking noise is heard during testing of the drive system, loosen jam nut (25) and adjust clutch turnbuckle counterclockwise until there is no clicking noise. Tighten and retorque jam nut (25) to 10 foot pounds.

(7) Install jam nut (29) and bolt (30) onto clutch lever (6) until bolt (30) is flush with back side of clutch lever. Remove locking pin (28), place the clutch lever In the tow position by pushing inward, install locking pin (28). With tow bar about half way down, adjust bolt (30) inward or clockwise until tow bar DO NOT TOW light goes out. Remove locking pin (28), pull clutch outward and install locking pin. With tow bar about half way down, check tow bar DO NOT TOW light is on. Tighten jam nut (29) and torque to 160-190 inch pounds.

10-7. REAR AXLE REPLACEMENT.

a. Remove. (See figure 10-13.)

(1) Remove wheels and tires in accordance with paragraph 4-112, TM 55-1730-229-12.

(2) Remove brake drum and brakes in accordanoe with paragraph 4-115, TM 55-1730-229-12 .

(3) Remove four look nuts (6) securing axle retainer plate (7).

(4) Remove axle (3) from housing (4).

(5) Remove gasket (8) from axle (3).

(6) Remove seal (1) from housing (4).

(7) Remove backing plate (10) and bolts (5).

b. Bearing Replacement. (See figure 10-13.)

(1) Using arbor press, press bearings (2) and bearing retainers (9) free of axle (3).

(2) Remove axle retainer plate (7) from axle (3).

(3) Inspect axle shaft for damage, warping, cracks or spline damage.

(4) Install axle retainer plate (7) with concave side toward axle spline.

(5) Using arbor press, press bearing (2) and retainers (9) onto axle (3).

(6) Lubricate bearing (2).

c. Install. (See figure 10-13.)

(1) Install seal (1) into housing (4).

(2) Install gasket (8) onto axle (3).

(3) Install backing plate (10) and bolts (5) onto housing (4). Ensure backing plate stud (11) is on the top.

(4) Install axle (3) with bearing (2) and axle retaining plate (7) into housing (4).

(5) Slide axle retaining plate (7) over bolts (5). Install lock nuts (6).

(6) Install brake shoes and brake drum in accordance with paragraph 4-115, TM 55-1730-229-12 .

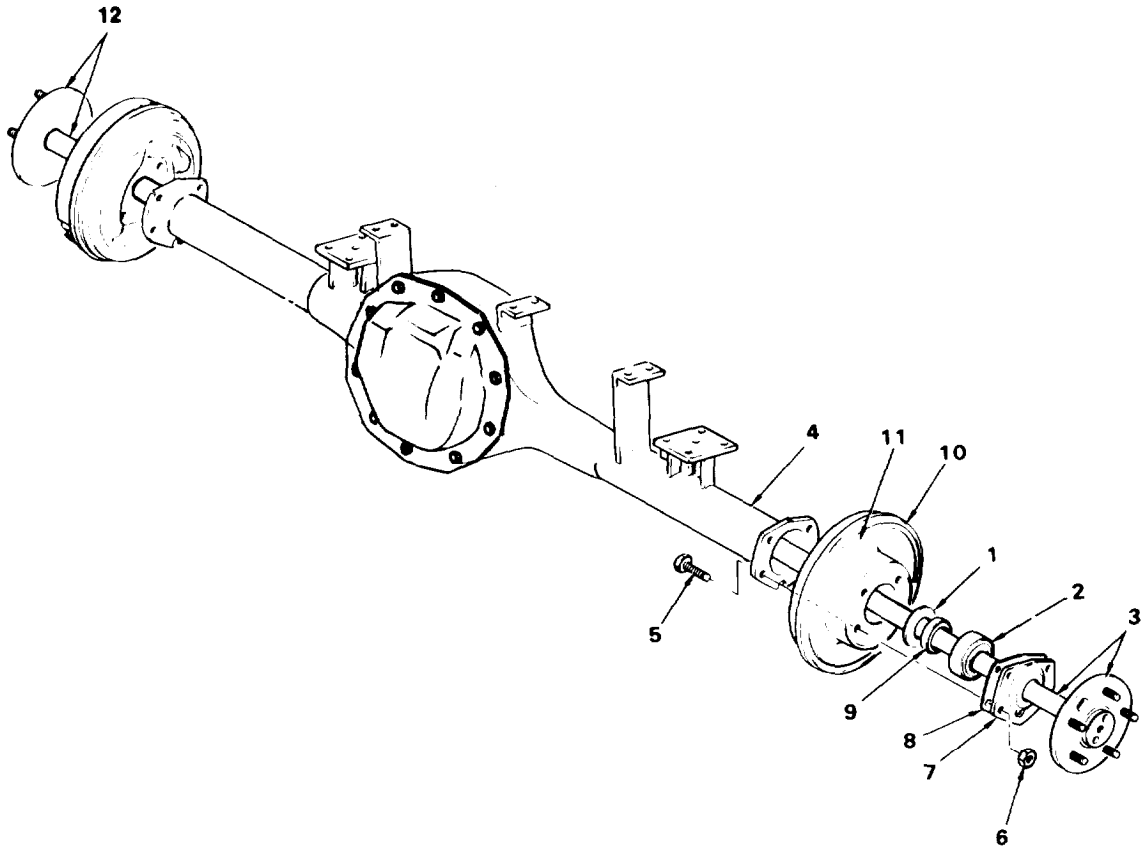
(7) Install wheels and tires in accordance with paragraph 4-112, TM 55-1730-229-12.

10-8. REAR AXLE ASSEMBLY.

a. Remove. (See figure 10-14.)

(l) Position AGPU on level surface. Place chocks against front wheels.

(2) Disconnect battery.



1. SEAL	5. BOLT	9. BEARING RETAINER
2. BEARING	6. LOCKNUT	10. BACKING PLATE
3. AXLE (R/H)	7. AXLE RETAINER PLATE	11. BACKING PLATE STUD
4. HOUSING	8. GASKET	12. AXLE (L/H)

Figure 10-13. Rear Axle Replacement

(3) Support the weight of the AGPU using a suitable hoist and sling attached to rear lifting eyes. Do not raise rear wheels clear of ground.

(4) Disconnect parking brake in accordance with TM 55-1730-229-12, paragraph 4-114.

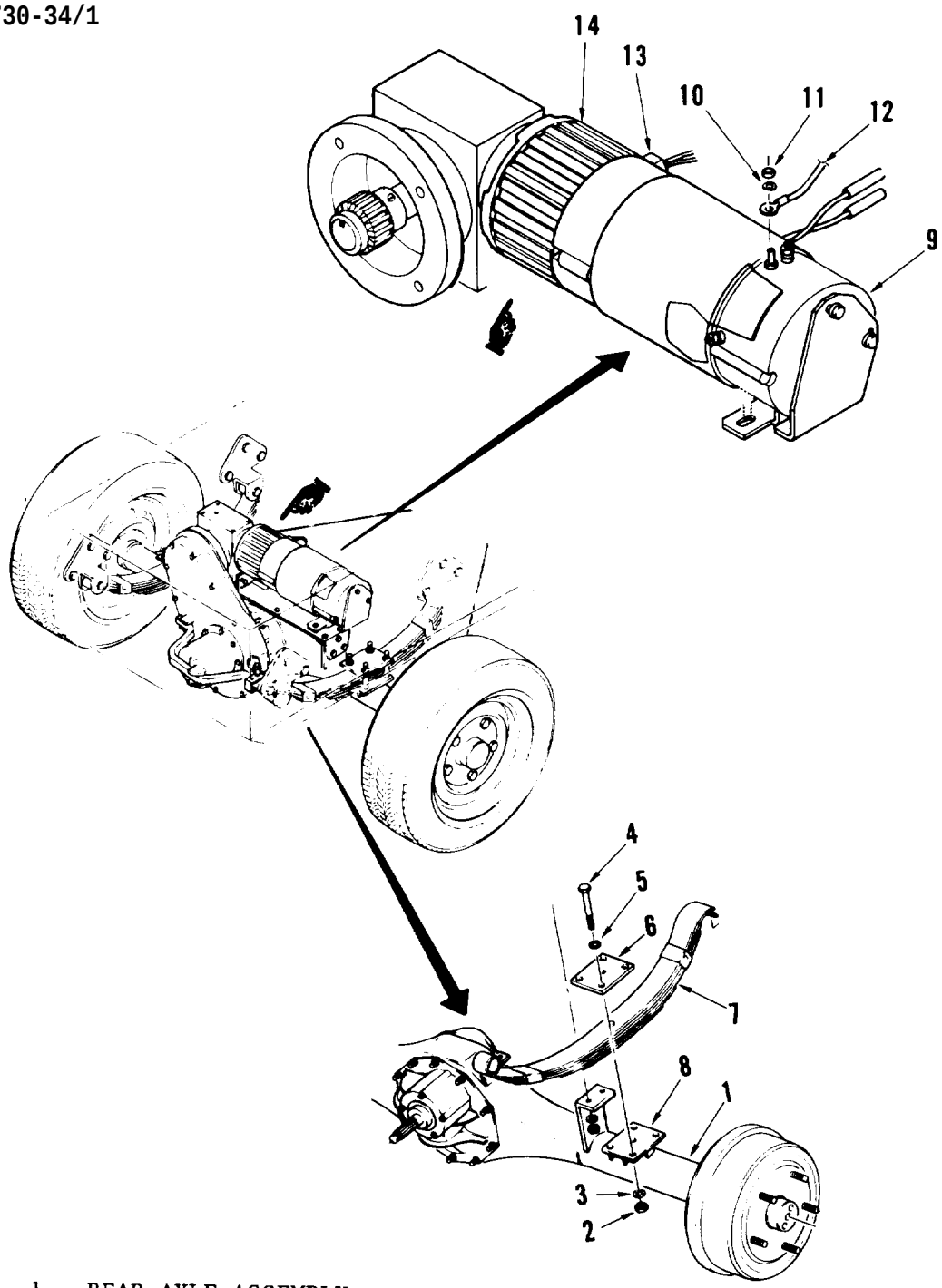
(5) Remove clutch assembly engage/disengage microswitch in accordance with paragraph 10-6. Reinstall clutch lever.

(6) Disconnect and tag four wires (11) from traction motor (8) by removing nuts (10) and lockwashers (9). Cut two hardwires at butt splices.

(7) Cut the hardwires to electric brake (12).

WARNING

The rear axle assembly is top heavy and will rotate on wheel bearings when removed. To prevent injury to personnel or damage to equipment, ensure rear axle assembly is fully supported during the the following procedures.



1. REAR AXLE ASSEMBLY
2. NUT
3. WASHER
4. BOLT
5. PLATE
6. SPRING
7. PAD, MOUNTING
8. TRACTION MOTOR
9. WASHER, LOCK
10. NUT
11. WIRING
12. ELECTRIC BRAKE
13. STRAIN RELIEF CONNECTOR

Figure 10-14. Rear Axle Assembly

(8) Remove nuts (2, figure 10-14) and washers (3).

(9) Remove bolts (4) and plate (5).

(10) Place a suitable length of 4 x 2 between motor mounting plate and rear axle assembly. Ensure load is not applied to clutch lever (6, figure 10-12).

(11) Ensuring that rear axle assembly is fully supported and not obstructed, slowly raise rear of AGPU until sufficient clearance is obtained for removal of rear axle assembly.

(12) While continuing to support rear axle assembly, remove rear axle assembly and support on 4 x 2 with clutch lever uppermost.

(13) Position supports under fork lift beams.

b. Install. (See figure 10-14.)

WARNING

The rear axle assembly is top heavy and will rotate on wheel bearings when removed. 'To prevent injury to personnel or damage to equipment, ensure rear axle assembly is fully supported during the following procedures.

(1) Ensuring there is no obstruction, position rear axle assembly under AGPU aligning mounting pad (7) with rear springs.

(2) Remove supports and slowly lower AGPU and ensure spring center bolts engage center hole in mounting pad (7).

(3) Install plates (5) ensuring center hole in plate engages spring center bolt. Secure rear axle assembly by installing bolts (4), washers (3) and nuts (2).

(4) Remove support fitted in paragraph a. (10).

(5) Connect two hardwires to electric brake with butt splices.

NOTE

In connecting electric brake, observance of polarity is not required.

(6) Connect four wires (11) to traction motor (8) by installing lockwashers (9) and nuts (10). Remove tags. Connect two hardwires with butt splices.

(7) Install clutch assembly engage/disengage microswitch in accordance with paragraph 10-6.

(8) Connect parking brake in accordance with TM 55-1730-229-12, paragraph 4-114.

(9) Connect battery.

(10) Apply power to the drive system in the alternate propulsion mode (TM 55-1730-229-34). Functionally check electric brake by pressing dead-man switch and listening for an audible click from electric brake.

10-9. SPRING ASSEMBLY, FRONT/REAR.

a. Remove Front Spring Assemby. (See figure 10-15.)

(1) Position AGPU on level surface. Chock rear wheels.

(2) Remove front wheels in accordwith paragraph 4-112, TM 55-1730-229-12.

WARNING

Support front axle with two jack stands to prevent injury to personnel when front springs are removed. If front springs are removed with two bar Installed, then tow bar must be secured in the down position.

(3) Remove four nuts (3) and lockwashers (4) from two U-bolts (5) securing front axle (1) to springs (2). Remove upper plate (6). Lower axle to clear springs.

(4) Remove six lock nuts (7), flat washers (8), and bolts (9). Remove spring (2).

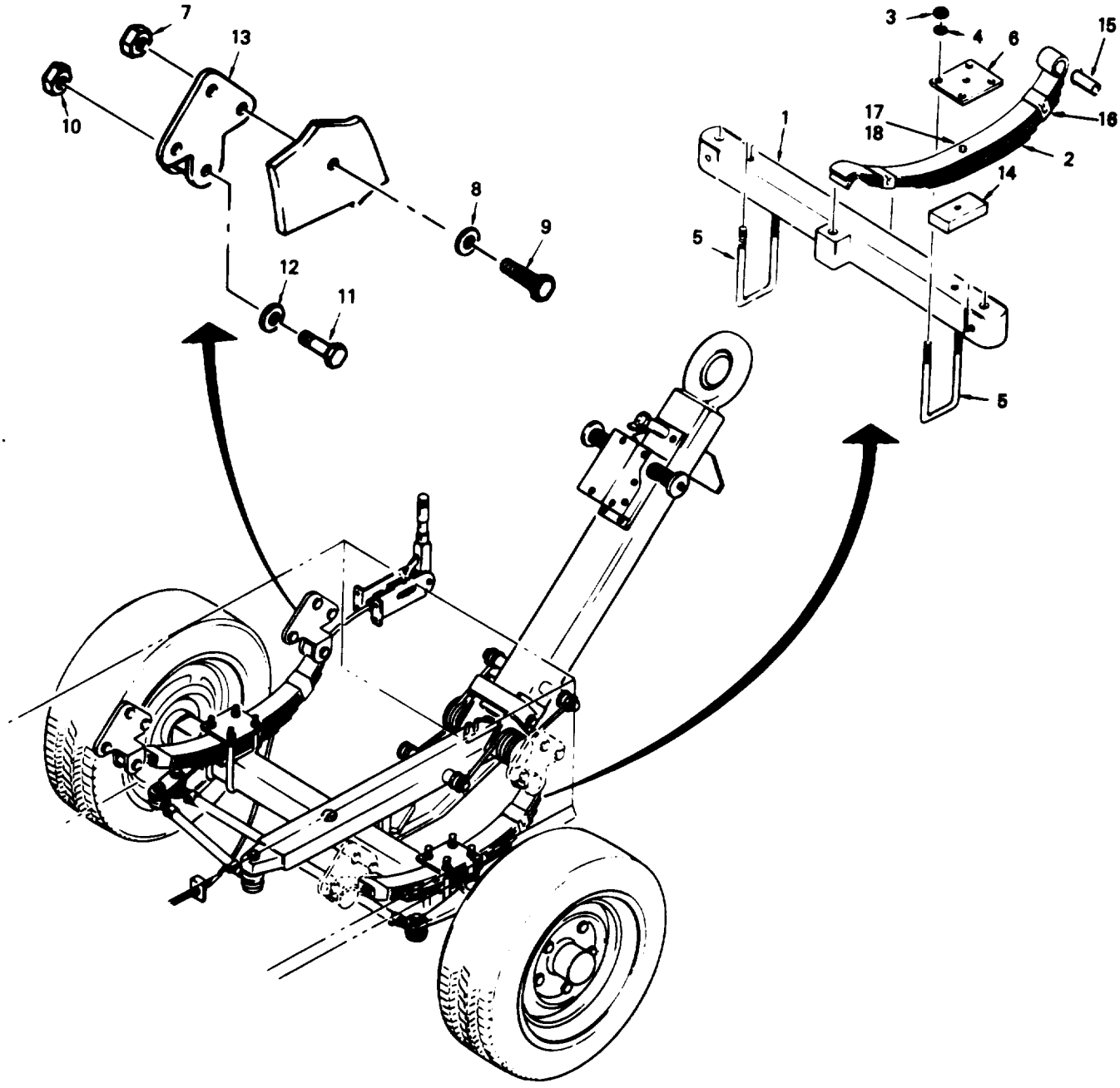
(5) Remove lock nuts (10), bolts (11) and flat washers (12) to remove hangers (13) from spring (2).

(6) Gently tap bushings (15) out of springs, pry retainer clips (16) off springs and remove center nuts (17) and bolts (18) holding spring leafs together.

b. Install Front Spring Assembly. (See figure 10-15.)

(1) Secure spring leafs with bolts (18) and nuts (17). Install retainer clips (16) and bushings (15).

(2) Install front springs (2) onto hangers (13) by installing flat washers (12), bolts (11) and lock nuts (10).



1. FRONT AXLE
2. SPRING, FRONT
3. NUT
4. WASHER, LOCK
5. U-BOLT
6. PLATE,UPER
7. NUT. LOCK
8. WASHER, FLAT
9. BOLT
10. NUT, LOCK
11. BOLT
12. WASHER, FLAT
13. HANGER
14. SPACER
15. BUSHING
16. RETAINER CLIP
17. NUT
18. BOLT

Figure 10-15. Front Axle and Spring Assembly

(3) Position front springs (2) and hangers (13) under AGPU and install six flat washers (8) and bolts (9) through AGPU housing and hangers. Install six look nuts (7).

(4) Position front axle (1) under AGPU body. Raise axle until alignment pin on bottom of spring (2) engages alignment hole on spacer (14).

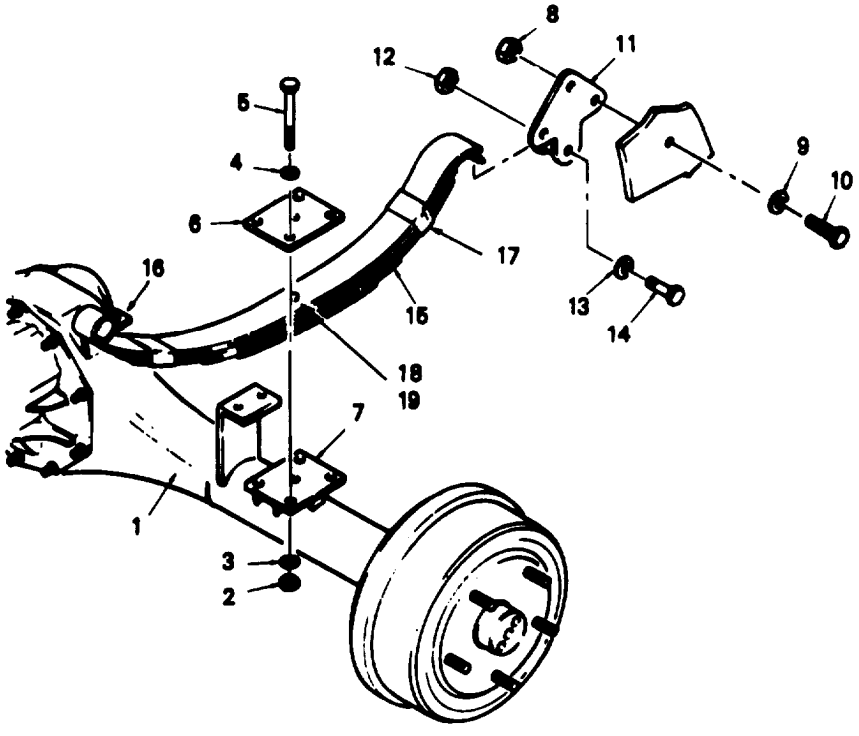
(5) position upper plates (6) on top of springs (2). Install four lockwashers (4) and nuts (3) on U-bolts (5).

(6) Install front wheels in accordance with paragraph 4-112, TM 55-1730-229-12.

c. Remove Rear Spring Assembly. (See figure 10-16.)

(1) Position AGPU on level surface. Chock front wheels.

(2) Remove rear wheels in accordance with paragraph 4-112, TM 55-1730-229-12.



1. REAR AXLE ASSEMBLY
2. NUT,LOCK
3. WASHER,FLAT
4. WASHER,LOCK
5. BOLT
6. PLATE,UPPER
7. AXLE MOUNTING PAD
8. NUT,LOCK
9. WASHER,FLAT
10. BOLT
11. HANGER
12. LOCKNUT
13. WASHER
14. BOLT
15. SPRING
16. BUSHING
17. RETAINER CLIP
18. NUT
19. BOLT

Figure 10-16. Rear Axle Housing and Spring Assembly

(3) Support rear axle assembly (1), remove eight mounting lock nuts (2) , lock washers (3), flat washers (4) and bolts (5). Lower axle to clear springs (15). Remove upper plate (6).

(4) Remove six locknuts (8), flat washers (9) and bolts (10). Remove spring (15).

(5) Remove lock nuts (12), bolts (14) and flat washers (13) to remove hangers (11) from spring (15).

(6) Tap bushings (16) gently from leaf spring loops, work retainer clips (17) off springs and then remove center nuts (18) and bolts (19).

d. Install Rear Spring Assembly. (See figure 10-16.)

(1) install bolts (19) thru spring leafs and secure with nuts (18); then, install retainer clips (17) and bushings (16).

(2) Install rear spring (15) onto hangers (11) by installing two flat washers (13), bolts (14), and locknuts (12).

(3) Position rear spring (15) and hangers (11) under AGPU and install six flat washers (9) and bolts (10) through AGPU housing and hangers, install six locknuts (8).

(4) Position rear axle assembly (1) under AGPU body. Raise axle assembly until alignment pin on bottom of spring (15) engages alignment hole on axle mounting pad (7).

(5) Position upper plates (6) on top of springs (15). Install eight flat washers (4) and bolts (5). Install eight lock washers (3) and lock nuts (2).

(6) Install rear wheels in accordance with paragraph 4-112, TM 55-1730-229-12.

10-10. TRACTION MOTOR.

a. Repair. (See figure 10-17.)

(1) Remove rear axle assembly (paragraph 10-8).

(2) Remove brush cover (1) and inpsect the traction motor armature brushes.

(3) If brushes are broken or excessively worn, replace them by lifting the pressure spring (3) and pulling the brush out of the brush holder (4).

(4) Loosen the screw (5) that connects the brush wire to the brush holder (4).

(5) Install new armature brushes (2) by lifting the pressure spring (3) and inserting the brush into the brush holder.

(6) Connect the brush wire to the brush holder (4) with screw (5). Replace the brush cover (1).

b. Remove.

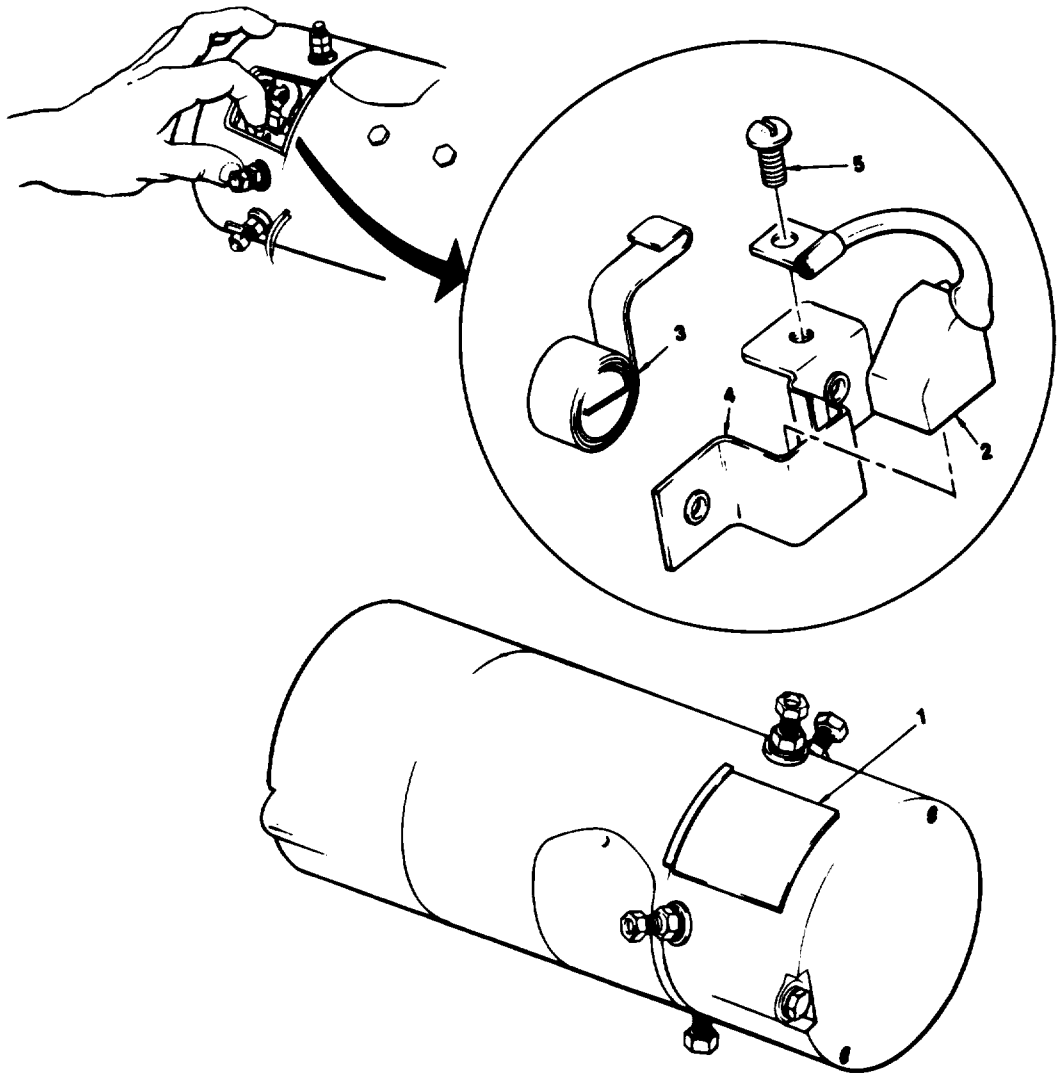
(1) Remove rear axle assembly (paragraph 10-8).

(2) Remove lock nuts (2), washers (3) and cap screws (4) securing motor support bracket (5) to motor mounting plate (6).

(3) While supporting traction motor (l), unscrew turnbuckles (7) using a socket wrench.

(4) Remove traction motor (1) and motor support bracket (5) as an assembled unit from electric brake (8). Remove and retain square drive key (9).

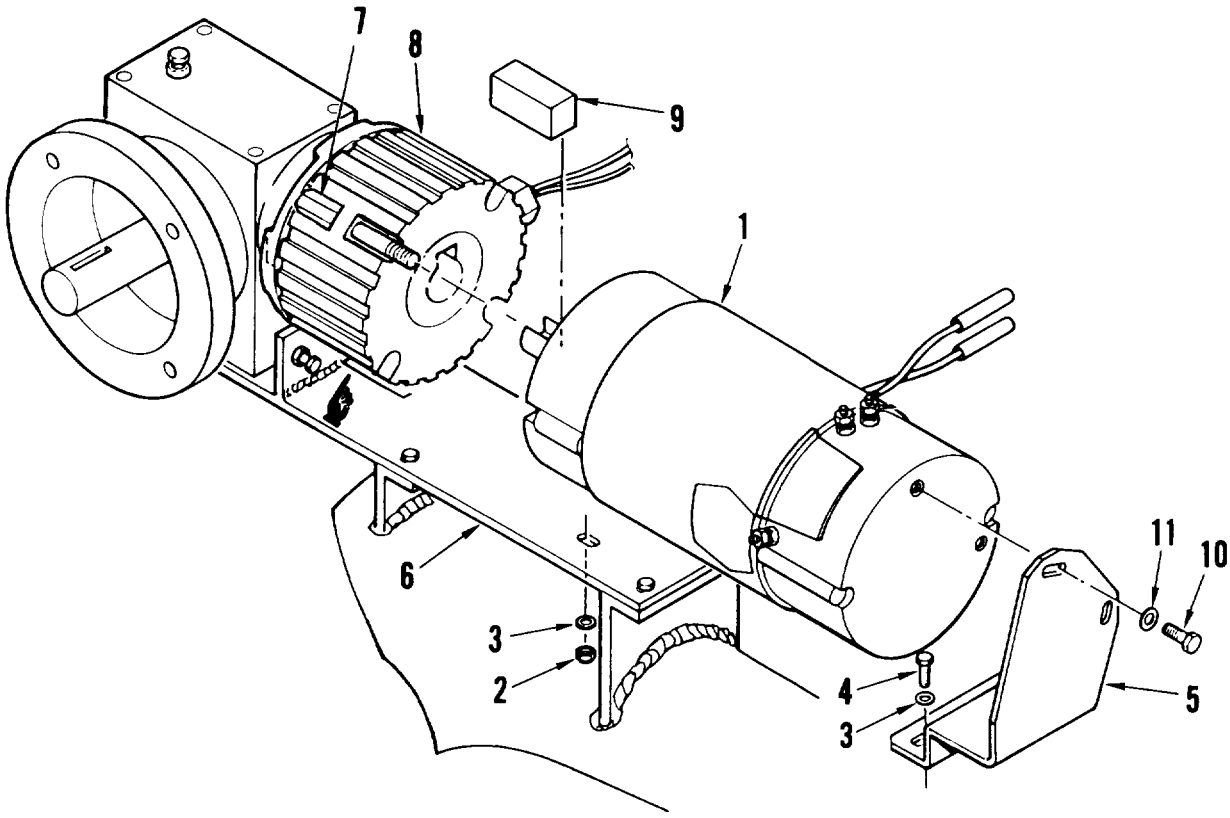
(5) Remove cap screws (10) and washers (11) securing traction motor (1) and motor support bracket (5). Remove motor support bracket.



34-10-17

1. BRUSH COVER
2. ARMATURE BRUSH
3. PRESSURE SPRING
4. BRUSH HOLDER
5. SCREW

Figure 10-17. Traction Motor Brush Replacement



1. TRACTION MOTOR
2. LOCK NUT
3. WASHER
4. CAPSCREW
5. MOTOR SUPPORT PLATE
6. MOTOR MOUNT PLATE
7. TURNBUCKLE
8. ELECTRIC BRAKE
9. DRIVE KEY
10. CAPSCREW
11. WASHER

Figure 10-18. Traction Motor Mounting

c. Install.

(1) Locate square key (9) in keyway of traction motor (1) driveshaft.

(2) Position driveshaft in electric brake (8). If required, rotate traction motor (1) to ensure electrical connectors S1 and A2 are uppermost and mounting holes align.

(3) Tighten turnbuckles (7) evenly using a socket wrench ensuring that there will be no damage to traction motor (1) or electric brake (8).

(4) Locate motor support bracket (5) on traction motor (1). Secure with washers (11) and cap screws (10). safety wire cap screws using lockwire, part number MS20995NC32.

(5) Secure motor support bracket (5) to motor mounting plate (6) with cap screws (4), washers (3) and lock nuts (2).

(6) Install rear axle assembly (paragraph 10-8).

(7) Apply power to the drive system in the alternate propulsion mode (TM 55-1730-229-12). Functionally check electric brake by pressing dead-man switch and listening for an audible click from electric brake.

10-11. ELECTRIC BRAKE.

a. Removal. (See figure 10-19.)

NOTE

In the following step it is not necessary to remove the motor support bracket from the traction motor.

(1) Remove traction motor paragraph 10-10.b.).

(2) Remove three cap screws (1), cap screw (2) and washers (3) securing electric brake (4) to worm gear reducer gearbox (5). Remove electric brake (4). Remove and retain square drive key (6).

1. CAP SCREW
2. CAP SCREW
3. WASHER
4. ELECTRIC BRAKE
5. WORM GEAR REDUCER GEARBOX
6. DRIVE KEY
7. STRAIN RELIEF

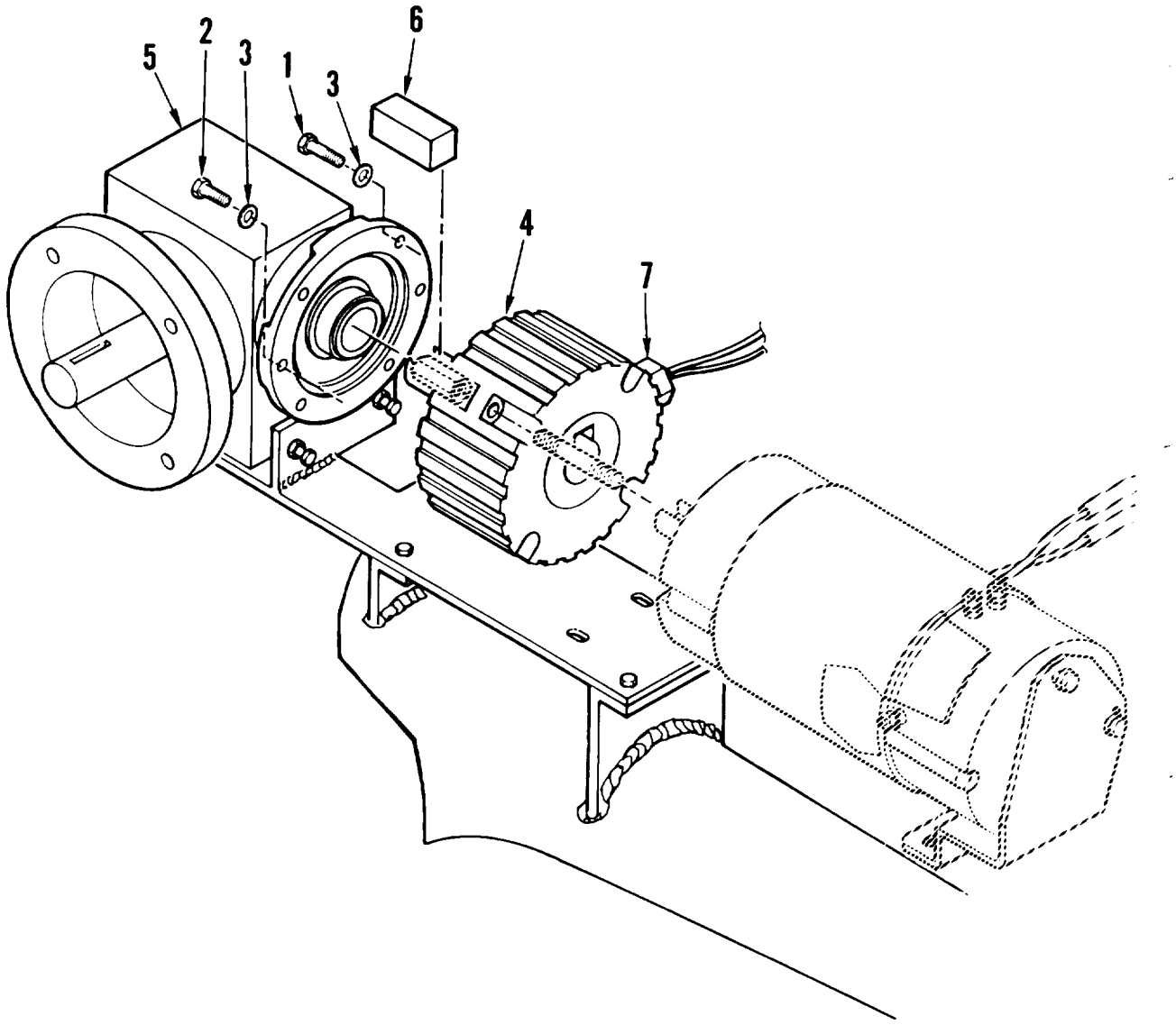


Figure 10-19. Electric Brake - Removal and Installation

b. Installation. (See figure 10-19.)

(1) Locate square drive key (6) in keyway of electric brake (4) driveshaft.

(2) Position driveshaft in worm gear reducer gearbox (5). Rotate electric brake (4) to ensure strain relief (7) is positioned facing toward AGPU tow bar and mounting holes are aligned.

(3) Secure electric brake (4) to worm gear reducer gearbox (5) with washers (3), three cap screws (1) and cap screw (2). Safety wire cap screws using lockwire, part number MS20995NC32.

(4) Apply power to the drive system in the alternate propulsion q ode (TM 55-1730-229-12). Functionally check electric brake by pressing dead-man switch and listening for an audible click from electric brake.

(5) Install traction motor (paragraph 10-10.c.).

CHAPTER 11

AGPU TEST AND INSPECTION AFTER REPAIR OR OVERHAUL

Section I. GENERAL REQUIREMENTS

11-1. RESPONSIBILITY FOR TEST AND INSPECTION AFTER REPAIR AND OVERHAUL. The activity performing the repair or overhaul is responsible for the performance of all applicable tests and inspections specified herein. Activities performing maintenance on any portion of the AGPU must perform those tests and inspections required by the applicable component or system repair instruction.

Section II. INSPECTION

11-2. INSPECTION REQUIREMENTS. The extent of inspection required before test and after repair is dependent upon the extent of the repair accomplished. It may also be affected by the known general condition of the AGPU, the total operating time accumulated, and the length of time since the AGPU has been operated. In any event, the Inspection shall be thorough enough to enable detection of obvious discrepancies. Particular attention must be given to conditions that would endanger personnel or equipment during test or operation.

11-3. INSPECTION PROCEDURES. Perform the following specific inspections that are applicable.

a. Inspect all components, particularly those in the area of repair, for tightness of attaching parts, electrical connections, and fuel or hydraulic line connections.

b. Perform the W (weekly), and M (monthly) operator PMCS contained in table 3-2, TM 55-1730-229-12.

c. Perform applicable organizational PMCS contained in table 4-1 of TM 55-1730-229-12.

Section III. OPERATIONAL TESTS

11-4. AGPU FUNCTIONAL PERFORMANCE OPERATING TESTS.

a. Perform the B (before) operator PMCS contained in table 3-2 of TM 55-1730-229-12.

b. Perform the Prestart Procedures contained in chapter 2 of TM 55-1730-229-12.

c. Perform the Start Procedures contained in chapter 2 of TM 55-1730-229-12. Observe the following precautions:

(1) If operation limits tabulated in table 11-1 are exceeded, or if seizing, unusual noise, smoke, fuel or oil leakage. or other obvious malfunction is observed, shut down engine immediately and correct the cause of trouble.

NOTE

The use of hot section components will be extended by operating the engine at no-load governed speed for at least one minute prior to application of a bleed-air load.

NOTE

The use of hot section components will be extended by operating the engine at or below the maximum exhaust gas temperature limit.

(2) Ensure that engine operates at or below maximum exhaust gas temperature limit of 1255°F (680°C) during load operations.

NOTE

When loads are removed and engine is to be shut down, the customary three-minute "cool-down" run at no-load used on other gas turbine engines is not desired for the AGPU engine and will detrimentally affect the life of hot section components.

d. Perform the D (during) operator PMCS contained in table 3-2 of TM 55-1730-229-12 during performance tests outlined in paragraphs e. through i.

e. Perform AC Mode Operation procedures contained in chapter 2 of TM 55-1730-229-12.

f. Perform DC Mode Operation procedures contained in chapter 2 of TM 55-1730-229-12.

g. Perform Bleed Air (Pneumatic) System Operation procedures contained in chapter 2 of TM 55-1730-229-12.

h. Perform Hydraulic System Operation procedures contained in chapter 2 of TM 55-1730-229-12.

i. Perform Propulsion System Operation procedures contained in chapter 2 of TM 55-1730-229-12.

j. Perform Removing AGPU From Operation and Placing AGPU in Shutdown Status procedures contained in chapter 2 of TM 55-1730-229-12.

k. Perform the A (after) operator PMCS contained in table 3-2 of TM 55-1730-229-12.

Table 11-1. Engine Operating Limits

Observation	Condition	Limit Requirements
	CAUTION Shut down engine if indicated values exceed or persist at these limits.	
Pressure:		
Oil	Governed speed	45 +10/-10 psig
	Steady-state	+5/-5 psig max fluctuation

Table 11-1. Engine Operating Limits (continued)

Observation	Condition	Limit Requirements
Speed:		
Rotor	Full-load governed speed	100 percent (58,667 rpm)
	Full governed speed limits	99 to 100.5 percent (58,167 to 59,034 rpm)
Temperature:		
Inlet Air		125°F (52°C) max
Oil		275°F (135°C) max

CAUTION

Exhaust gas temperature during normal engine operation should not exceed maximum limit. Engine operation at exhaust gas temperatures above maximum limit is evidence of engine malfunction and possible distress, and appropriate corrective action should be taken to restore normal operation.

Exhaust Gas	During engine starting below 60 percent rpm:	
	Exhaust gas temperature(s) (EGT's) above 1600°F (870°C) to maximum of 1785°F (974°C) are allowed for a period of 10 seconds maximum.	
	Between 60 percent rpm and 95 percent rpm:	
	Stabilized operation (Loss of RPM acceleration) which indicates a "hung start" condition and/or EGT's above 1600°F (870°C) should not be allowed to exceed a period of 10 seconds maximum.	
	APU governed speed operation:	
	Maximum EGT during governed speed operation is 1350°F (732°C) (red line).	
	Operation above 1255°F (679°C) (yellow band) should be minimized and is intended for emergency operation only. If governed speed operation above 1255°F (679°C) is encountered, the reason for overtemperature operation should be corrected through maintenance actions.	

Table 11-1. Engine Operating Limits (continued)

Observation	Condition	Limit Requirements
Leakage:		
Fuel	From accessory drain only. Fuel leakage from combustor and plenum drain valves is permitted only after a false start or blowout.	1 drop per minute max
Oil	From output shaft seal	5 cc per hour max
Duty Cycle:		
Starter Motor	Battery Starts - Using AGPU battery or an external power source which limits current output to 800 amps maximum (soft-start).	Six consecutive normal starts at ten minute intervals, after which one hour off time shall be required for additional starts.
	Battery Cranking - Using AGPU battery or an external power source which limits current output to 800 amps maximum (soft-cranking).	Three consecutive 30 second cranking cycles and then 20 minutes off time.

APPENDIX A

REFERENCES

A-1. This appendix contains a list of reference manuals that may be used in conjunction with this TM in the operation and maintenance of the AGPU. Those manuals not coded are applicable for use by all services. The manual are coded (A) for Army use, (F) Air Force use, (N) Nav use, and (MC) Marine Corps use.

1. FIRE PROTECTION

TB 5-4200-200-10 (A)	Hand Portable Fire Extinguishers Approved for Army Use
TB MED 251	Noise and Conservation of Hearing

2. LUBRICATION

C9100-IL	Petroleum, Petroleum Base Products and Related Materials
C6800-IL	chemicals and Chemical Products
LO 55-1730-229-12 (A)	Lubrication Order

3. PAINTING

T.O. 35-1-3 (F)	Painting and Marking of USAF Aerospace Ground Equipment
TM 43-0139 (A)	Painting Instructions for Field use
TM 1-1500-204-23 (Series)	General Aicraft Maintenance Manual

4. RADIO SUPPRESSION

TM 11-483 (A)	Radio Interference Suppression
T.O. 31-1-141-13 (F)	Basic Electronic Technology

5. MAINTENANCE

DA PAM 738-751 (A)	Functional Users Manual for the Army Maintenance Management System - TAMMS (A)
TM 9-6140-200-1(A)	Maintenance of Storage Batteries; Lead Acid Type
T.O. 36Y-4-1-194 (F)	
T.O. 8D2-3-1 (F)	Maintenance of NI-CAD Batteries
T.O. 00-25-225 (F)	Repair of External Power Cables; Aerospace Ground Equipment
T.O. 00-25-234 (F)	General Shop Practice Requirements for the Repair, Maintenance, and Test of Electronic Equipment
NAVWEPS 01-1A-505 (N)	Installation Practices for Aircraft Electric and Electronic Wiring
T.O. 1-1A-14 (F)	
TM 55-1500-323-25 (A)	

5. MAINTENANCE (Continued)

T.O. 36-1-7	Operation in Cold Weather Areas
T.O. 36Y32-1-142 (F)	Organizational Care, Maintenance and Repair of Pneumatic tires and Inner Tubes
TM 9-2610-200-20 (A)	
TM 55-1730-229-24P (A)	Organizational, Intermediate (Field) (Direct Support and General Support) and Depot Maintenance Repair Parts and Special Tools List
T.O. 35C2-3-473-4 (F)	
AC 320A0-IPB-000 (N)	
TM 1730-24P/3 (MC)	
TM 55-1730-229-12 (A)	Operator and Organizational Maintenance Manual
T.O. 35C2-3-473-1 (F)	
AC 320A0-00M-000 (N)	
TM 1730-12/1 (MC)	
TB 750-126	Use of Material Condition Tags and Labels on Army Aeronautical and Air Delivery Equipment

6. SHIPMENT AND STORAGE

TM 38-230 (A)	Preservation, Packaging and Packing of Military Supplies and Equipment
TM 1-1500-204-23 (Series)	General Aircraft Maintenance Manual
T.O. 35-1-4 (F)	Processing and Inspection of Aerospace Ground Equipment for Storage and Shipment

7. DESTRUCTON TO PREVENT ENEMY USE

TM 750-244-3 (A)	Procedures for Destruction of Equipment to Prevent Enemy Use

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AG 320A0-MME-000
TO 35C2-3-473-2
TM 1730-34/1

By Order of the Secretaries of the Army and the Air Force:

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General, United States Army
Chief of Staff

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Logistics Command

DISTRIBUTION :

To be distributed in accordance with DA Form 12-31, -10, CL and AVUM Maintenance requirements for All Fixed and Rotary Wing Aircraft.

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Key West, FL 33040

DATE SENT
10 Jun 79

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-1430-550-34-1	7 Sep 72 .	Unit of Radar Set AN/MPQ-50 Tested at the HFC

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
9-19		9-5	
21-2	step 1C	21-2	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

"B" Ready Relay K11 is shown with two #9 contacts. That contact which is wired to pin 8 of relay K16 should be changed to contact #10.

Reads: Multimeter B indicates 600 K ohms to 9000 K ohms.

Change to read: Multimeter B indicates 600 K ohms minimum.

Reason: Circuit being checked could measure infinity. Multimeter can read above 9000 K ohms and still be correct.

SAMPLE

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER
SP4 J.T. Brown, Jr.

SIGN HERE
SP4 James Brown, Jr.

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN : 060921-000