

TECHNICAL MANUAL

**OPERATOR'S, AVIATION UNIT AND AVIATION
INTERMEDIATE MAINTENANCE MANUAL,
INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS**

**HOSE TESTER
AVITECH MODEL 321
NSN 4940-01-064-5057**

HEADQUARTERS, DEPARTMENT OF THE ARMY

13 FEBRUARY 1981

WARNING

Personnel performing operations, procedures and practices which are included or implied in this technical manual shall observe the following warnings. Disregard of these warnings and precautionary information can cause serious injury, death, or destruction of material

SOLVENTS. Use volatile solvents only in a well ventilated area. Avoid prolonged contact with the skin

HIGH PRESSURES. Because of the high pressures involved in testing, proper care must be taken to prevent damage, or injury to the operator, in case of rupture

Technical Manual

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HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C. 13 February 1981

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Intermediate Maintenance Manual, Including
Repair Parts and Special Tools Lists
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AVITECH MODEL 321
NSN 4940-01-064-5057

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual if you find any mistake or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U S. Army Troop Support & Aviation Materiel Readiness Command, ATTN: DRSTS-MTT, 4300 Goodfellow Boulevard, St. Louis, MO 63120. A reply will be furnished directly to you.

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CHAPTER 1

INTRODUCTION

SECTION I. GENERAL INFORMATION

1-1. General. This manual provides the information necessary to install, operate and maintain the Model 321 Hose Tester designed and built by Avitech Inc. The Hose Tester has been assigned P/N 321A, NSN 4940-01-064-5057.

1-2. Scope. The test unit is suitable for conducting proof pressure and leakage test on aircraft and missile hose assemblies which conform to MIL-H-8788, MIL-H-8790, and MILH-8795.

SECTION II. DESCRIPTION AND LEADING PARTICULARS

1-3. Description. The P/N 321A Hose Tester consists of a five and one-half gallon oil reservoir, an air-operated pump, pressure gages, control valves, and adaptors interconnected to supply, measure, and control the delivery of high pressure oil to the hose under test. At the completion of the test the oil is returned to the reservoir for reuse.

1-4 Air-Operated Pump. The pressure of the oil discharged from the pump is directly proportional to the input pressure of the operating air. In this case, the ratio is 150:1. A shop air supply of 50 standard cubic feet per minute (scfm) at a gage pressure of 100 pounds per square inch (psig) must be available to operate the pump.

The input air is filtered through an air filter built into the Hose Tester and the pressure controlled by a pressure regulator. The air then passes through a lubricator before being directed to the pump. The air actuates a piston in the pump which in turn raises the pressure of

the test oil to the desired level. The noise created by the air being exhausted from the pump is reduced to a reasonable level by a pneumatic muffler installed in the air exhaust port of the pump.

1-5. Reservoir. Test oil which conforms to MIL-H-5606 or MIL-H-82382 is stored in the five and one-half gallon aluminum reservoir. The 12-inch long x 9-inch wide x 12-inch high reservoir acts as a base for the Hose Tester, and all the other components are mounted to it. The reservoir is provided with a sight gage which shows the full level, and a fillvent strainer is mounted on the top surface. A 10-micron oil filter is installed within the reservoir on the oil supply line to the pump. The element of this filter is replaceable.

1-6. Instrumentation. The operating air pressure is measured by a 0 to 160 psi air gage connected in the air regulator outlet, prior to the lubricator. The test oil pressure

furnished by the pump is monitored by two oil gages mounted on a manifold attached to the pump outlet port. One gage with a scale marked from 0 to 15000 psi in 200 psi increments is used when high pressure testing is being performed. The other gage can be read in 50 psi increments to 3000 psi. This gage is protected from damage when high pressures exist in the manifold by a gage saver adjusted to 2800 + 100 psig. A sight gage installed in the oil return line allows the operator of the Hose Tester to observe the return flow of oil to the reservoir.

1-7. Controls. Two needle valves control the operation of the Hose Tester. One, installed in the line to the air input port of the pump, controls that input and

hence the pump operation. The air pressure in this line is adjusted by means of the air regulator. The other valve is installed in the oil return line to the reservoir. This valve is closed during a test to pressurize the hose. When the test is complete it is opened to allow the test oil to return to the reservoir.

1-8. Adaptors. Sixteen adaptor fittings are furnished with the Model 321 Hose Tester. These adaptors, which fit into the oil supply port of the gage manifold and the oil return port on the oil control valve, enable the tester to accommodate all hose assemblies MS28741-3 through MS28741-16 and MS28762-3 through MS28762-16. Racks for storing the adaptors are integral parts of the tester.

SECTION III. TEST EQUIPMENT, SPECIAL TOOLS AND MATERIALS

1-9. No special tools or test equipment are required to operate or service the Model 321 Hose Tester. Test oil must conform to

MIL-H-5606 or MIL-H-82382o Clean ,SAE-10 oil or lighter grade should be used in the lubricator unit.

CHAPTER 2

OPERATING INSTRUCTIONS

SECTION I. PREPARATION FOR TEST

2-1. Refer to Figure 2-1 and proceed as follows:

a. Check the oil level in the reservoir (5) by observation through sight gage (20). If the level is not observable, remove the top of the fill-vent (4) and replenish with oil conforming to MIL-H-5605 or MIL-H-82382. Then replace the top.

b. Check oil level in the air lubricator (8). If less than one-quarter full, fill with SAE-10 oil.

c. Check air filter (2) for contamination. If necessary clear the filter through the bottom bleed valve.

d. Make certain that the air control valve (9) is closed (turned fully clockwise), the pressure regulator (3) is set to zero (turned fully counterclockwise), and that sufficient shop air (50 scfm at 100 psi) is being supplied at the shop air connection (1).

e. Select the proper adaptors (14 and 19) for the hose to be tested and install them between the pressure manifold (18) and the oil return port on the oil control valve (13). Table 2-1 shows the proper adaptors for use with various hoses.

f. Make certain that oil control valve (13) is open (turned fully counterclockwise).

WARNING

Because of the high pressures involved in testing, proper care must be taken to prevent damage, or injury to the operator, in case of rupture.

g. Connect the hose to be tested to the adaptors installed in step 5. TABLE 2-1. ADAPTOR CHART

TABLE 2-1. ADAPTOR CHART

FLARED FITTING HOSE NUMBER	AVITECH ADAPTOR PART NUMBER	QTY. REQ'D FOR TEST	ADAPTOR WORKING PRESSURE, MAXIMUM
MS28741-3	ASC321-107-1	2	9000 PSI
MS28741-4	ASC321-107-2	2	9000 PSI
MS28741-5	ASC321-107-3	2	8000 PSI
MS28741-6	ASC321-107-4	2	8000 PSI
MS28741-8	ASC321-107-5	2	8000 PSI
MS28741-10	ASC321-107-6	2	6000 PSI

TABLE 2-1. ADAPTOR CHART (Con't)

FLARED FITTING HOSE NUMBER	AVITECH ADAPTOR PART NUMBER	QTY. REQ'D FOR TEST	ADAPTOR WORKING PRESSURE, MAXIMUM
MS28741-12	ASC321-107-6	2	6000 PSI
MS28741-12	ASC321-107-2 & ASC321-107-7	2 2	6000 PSI
MS28741-12	ASC321-107-2 & ASC321-107-8	2 2	5000 PSI
FLARELESS FITTING HOSE NUMBER			
MS28762-3	ASC321-107-9	2	12,000 PSI
MS28762-4	ASC321-107-10	2	12,000 PSI
MS28762-5	ASC321-107-11	2	10,500 PSI
MS28762-6	ASC321-107-12	2	10,500 PSI
MS28762-8	ASC321-107-13	3	10,500 PSI
MS28762-10	ASC321-107-2 & ASC321-107-14	2	9000 PSI
MS28762-12	ASC321-107-2 & ASC321-107-15	2	9000 PSI
MS28762-16	ASC321-107-2 & ASC321-107-16	2	7500 PSI

SECTION II. HOSE TESTING

2-2. Refer to Figure 2-1 and proceed as follows:

- a. After making sure that the test hose (21) connections are secure and the operator properly protected, open the air control valve (9) (turn fully counterclockwise).
- b. Slowly increase the air pressure to the pump (10) by adjusting the pressure regulator (3). Observe the air pressure increase on the air pressure gage (7).

- c. Allow the air-operated pump (10) to run a few moments to purge the test hose (21) of air. Observe the return flow of oil through sight gage (12).

- d. Close the oil control valve (13) and very slowly increase the air pressure by adjusting the pressure regulator (3) until the oil pressure as indicated on the oil pressure gages (15 and 16) is at the desired level, and is stable.

- e. Close the air control valve (9) and

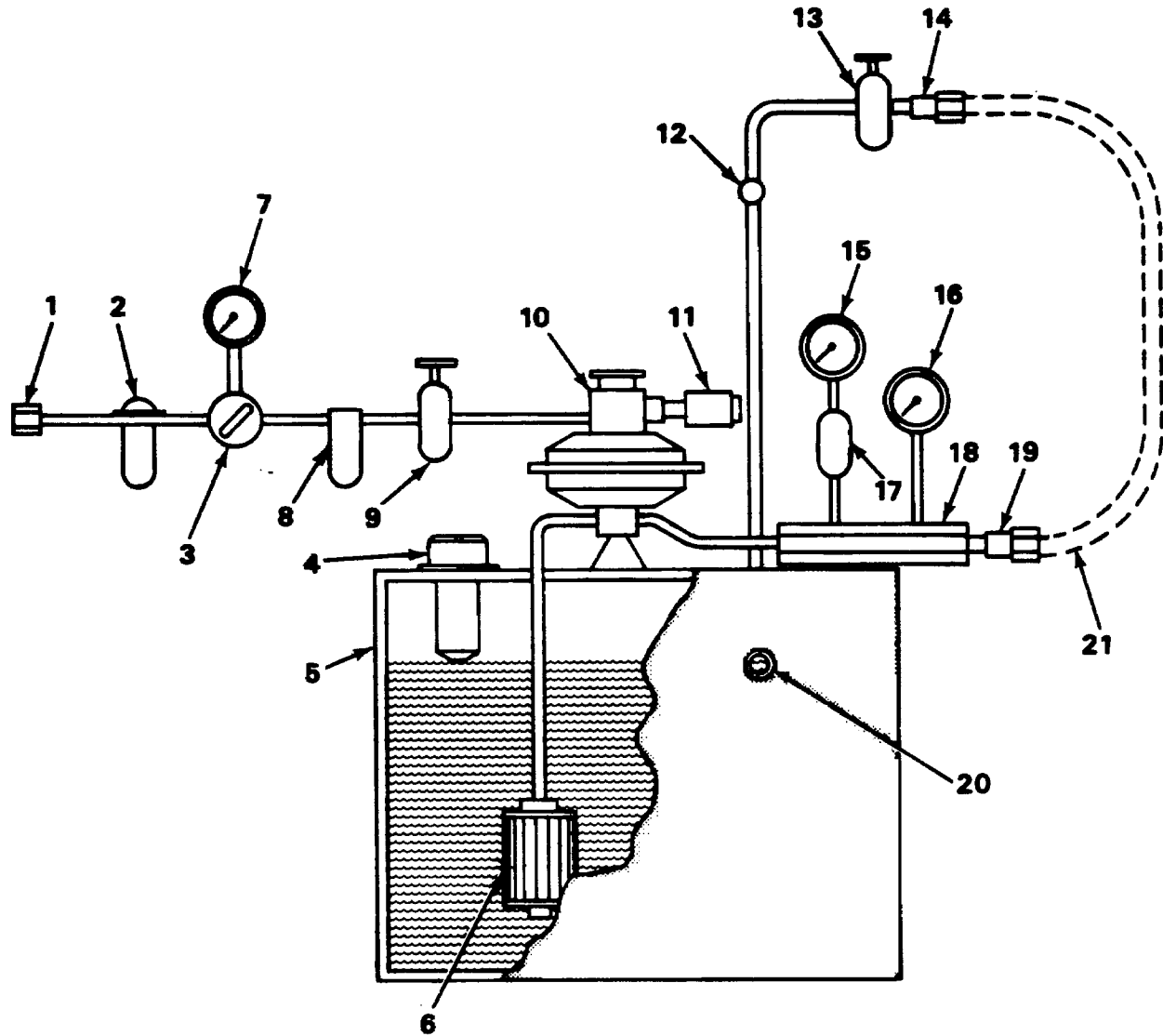


FIGURE 2-1. MODEL 321 HOSE TESTER
 COMPONENT RELATIONSHIP AND TEST CONNECTIONS
 COMPONENT RELATIONSHIP AND TEST CONNECTIONS

LEGEND

- | | |
|---------------------------------|------------------------------------|
| 1. Shop Air Connection, 100 PSI | 12. Sight Gage, Oil Return |
| 2. Air Filter | 13. Oil Control Valve |
| 3. Air Pressure Regulator | 14. Adaptor - Oil Return |
| 4. Fill-Vent Strainer | 15. Oil Pressure Gage, 0-3000 PSI |
| 5. Reservoir - 5.5 Gal. | 16. Oil Pressure Gage, 0-15000 PSI |
| 6. Oil Filter | 17. Gage Saver, 2800 PSI |
| 7. Air Pressure Gage, 0-160 PSI | 18. Oil Manifold |
| 8. Air Lubricator | 19. Adaptor - Oil Supply |
| 9. Air Control Valve | 20. Sight Gage, Oil Full Level |
| 10. Air-Operated Pump | 21. Hose Assembly Under Test |
| 11. Muffler - Air Discharge | |



1



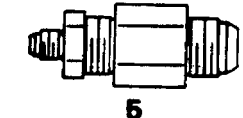
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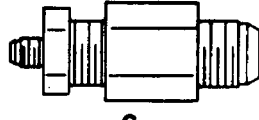
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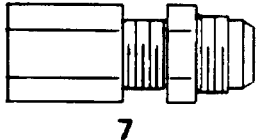
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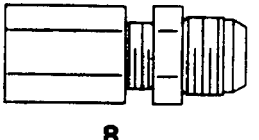
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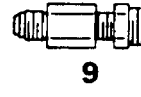
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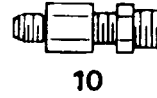
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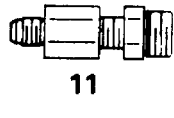
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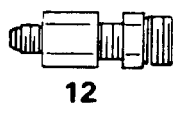
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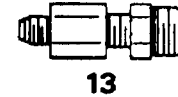
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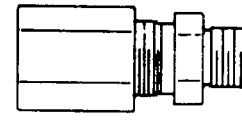
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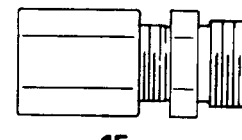
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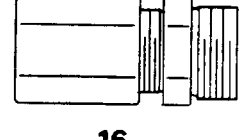
13



14



15



16

- 1 ASC321-107-1
- 2 ASC321-107-2
- 3 ASC321-107-3
- 4 ASC321-107-4
- 5 ASC321-107-5
- 6 ASC321-107-6
- 7 ASC321-107-7
- 8 ASC321-107-8
- 9 ASC321-107-9
- 10 ASC321-107-10
- 11 ASC321-107-11
- 12 ASC321-107-12
- 13 ASC321-107-13
- 14 ASC321-107-14
- 15 ASC321-107-15
- 16 ASC321-107-16

- Adaptor, 4 to 3, Flared (51314)
- Adaptor, 4 to 4, Flared (51314)
- Adaptor, 4 to 5, Flared (51314)
- Adaptor, 4 to 6, Flared (51314)
- Adaptor, 4 to 8, Flared (51314)
- Adaptor, 4 to 10, Flared (51314)
- Adaptor, 4 to 12, Flared (51314)
- Adaptor, 4 to 16, Flared (51314)
- Adaptor, 4 to 3, Flareless (51314)
- Adaptor, 4 to 4, Flareless (51314)
- Adaptor, 4 to 5, Flareless (51314)
- Adaptor, 4 to 6, Flareless (51314)
- Adaptor, 4 to 8, Flareless (51314)
- Adaptor, 4 to 10, Flareless (51314)
- Adaptor, 4 to 12, Flareless (51314)
- Adaptor, 4 to 16, Flareless (51314)

monitor the oil pressure gages (15 and 16). Slow continuously falling pressure is evidence of a leak.

NOTE

When the air control valve (9) is initially closed, the indicated pressure may drop as much as 10 percent due to the expansion of the hose.

f. After the desired test interval turn the pressure regulator (3) fully counter clockwise.

g. Open the oil control valve (13).

h. Detach the test hose (21) from the manifold adaptor (19).

i. Drain oil in the test hose (21) by raising the manifold end above the oil return port.

j. Disconnect the test hose (21) from the oil return adaptor (14).

CHAPTER 3

AVIATION UNIT MAINTENANCE INSTRUCTIONS

SECTION I. PREPARATION FOR INSTALLATION, STORAGE AND SHIPMENT

3-1. The Model 321 Hose Tester is packed for shipment in accordance with best commercial practice. It is blocked in a 275-pound test carton which is then sealed and marked per MIL-STD-129. The Hose Tester is shipped completely assembled, except for the 16 adaptors which are boxed separately and enclosed in the carton. When received at the installation site it should be removed from the container and carefully

inspected for damage which may have occurred during shipment. If any such damage is discovered, the manufacturer should be notified and a claim filed with the carrier. All units are carefully inspected prior to shipment. When storage or reshipment is required, packing materials and techniques equal to those used in the initial shipment must be utilized.

SECTION II. INSTALLATION

3-2. Refer to Figure 2-1 and proceed as follows:

a. The Hose Tester may be floor mounted, or raised to a convenient height by placing it on a work bench. If it is desirable to secure the unit in place, four mounting holes, which will accept 1/4 inch screws or bolts, are provided in the bottom flange of the reservoir (5, figure 2-1).

b. With the Hose Tester in place, a source of compressed air capable of supplying 50 scfm air at 100 psi must be connected to the air inlet port (1, figure 2-1) using standard shop techniques. A JIC-8 male flared fitting is provided for this purpose.

c. Remove the 16 adaptor fittings from their box and place them in the appropriate holes in the storage

racks at either side of the upper surface of the reservoir (5, figure 2-1).

d. Remove the top of the fill-vent strainer (4, figure 2-1) and fill the reservoir (5) with approximately five gallons of test oil which conforms to MIL-H-5606 or MIL-H-82382 until the oil level can be observed in the sight glass (20) on the side of the reservoir (5) and replace the top of the fill-vent strainer.

e. Fill the air lubricator (8) with SAE-10 oil.

f. Suitable arrangements must be made to protect the operator and equipment from harm should a hose rupture under test. Such safety shielding may vary from installation to installation, so no specific recommendations can be made.

SECTION III. INSPECTION AND SERVICING

3-3 Daily Inspection. The pressure gages and the sight gage on the Hose Tester (7, 12, 15 & 16, figure 2-1) should be checked daily for cracked glass and such damage repaired. The air filter (2) should be checked for contamination. If necessary, clear the air filter through the bottom bleed valve. Check the oil level in the air lubricator (8) and if less than one-quarter full, fill with SAE-10 oil. Check the oil level in the reservoir (5) through sight gage (20) and replenish if necessary. Check the pump and fittings for evidence of external leakage and repair as required.

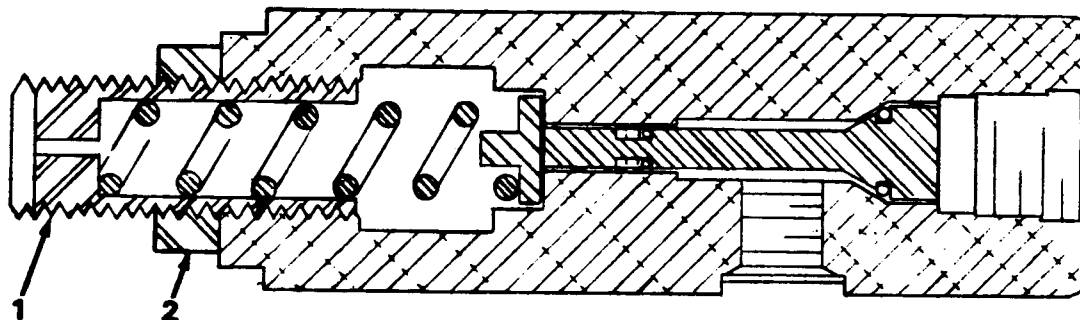
3-4. Periodic Inspection. The design and nature of the Model 321 Hose Tester is such that a periodic inspection need only be accomplished at six-month intervals. At this time the following components of the unit should be checked:

a. Oil Filter (6, figure 2-1). Check the oil filter for contamination. To gain access to the oil filter, the shop

air connection must be disconnected and the top cover of the reservoir removed. If replacement of the filter element is required, the gaskets which seal the top and bottom of the element must also be replaced.

b. Pressure Gages (7, 15 & 16). Remove the gages from the Hose Tester, and using a master gage to obtain a known pressure, apply a pressure equal to approximately half scale to each gage. If a gage indication is incorrect remove the glass cover and reset the pointer for the correct value. Gage accuracy is + 3 percent of full scale.

c. Gage Saver (17). Apply a known pressure, as read on oil pressure gage (16), to the unit and note the pressure at which it actuates. This pressure should be 2800 + 100 psig. If adjustment is necessary, refer to figure 3-1 and loosen the locknut (2) and rotate the adjustment screw (1) clockwise to increase the setting; counterclockwise to decrease.



- | | |
|---------------------|---------------|
| 1. Adjustment Screw | ASC321-103-4 |
| 2. Lock-Nut | ASC321-103-92 |

Figure 3-1. Gage Saver Adjustment

d. Air Lubricator (8, figure 2-1). Through the sight dome on the air lubricator, time the injection of oil into the air stream. (Refer to figure 4-4.) It should be three drops per minute. The oil flow may be adjusted by rotating the adjusting screw; counterclockwise for more oil flow, clockwise for less.

e. Air Pressure Regulator (3). Remove the bottom plug and check for contamination. If contamination is visible, clean plug, body, and valve seat using solvent conforming to PD-680, Type II.

f. Air Filter (2). Remove rigid filter element, tap on hard surface, and blow off with air blow gun.

g. Air-Operated Pump (10). With a hose (21) connecting the output oil manifold (18) with the oil return port and adaptor fitting (14) conduct a series of tests at various air input pressures.

1. Set the air pressure regulator (3) and open the air control valve (9).

2. Compute the ratio of the air input pressure to the oil output pressure. (It should be approximately

150:1). Close the oil control valve (13) and allow the pump to build up a stable pressure.

3. Monitor the output pressure on the manifold oil pressure gages (15 & 16) and compare to that calculated in step b.

NOTE

A record of any deviation should be maintained so that any necessary adjustments to obtain the correct pressures during the hose test may be made.

NOTE

As the moving parts within the pump become worn, the ratio between the air input pressure and the oil output pressure will drop slightly. The operating air pressures should be revised accordingly.

4. Following this series of tests the Hose Tester may be shut down using the normal operating procedure.

CHAPTER 4

AVIATION INTERMEDIATE MAINTENANCE AND TROUBLESHOOTING

SECTION I. PREPARATION FOR STORAGE OR RESHIPMENT

4-1. When it is necessary to store or reship the Hose Tester the oil in the reservoir must be pumped out. The unit and its components should be wiped clean using a suitable solvent such as PD-680, Type II.

WARNING

Use volatile solvents only in a well ventilated area. Avoid prolonged contact with the skin.

Remove the adaptors from the racks on either side of the reservoir and package separately. The Hose Tester may be boxed in a cardboard carton with a burst strength of 275 pounds. It should be surrounded by suitable dungaree to ensure a stable position within the carton. The separately boxed adaptors should be enclosed in the carton before it is sealed. After sealing, the carton should be marked in accordance with MIL-STD-129.

SECTION II. MAINTENANCE PROCEDURES

4-2. The regular periodic inspection procedures presented in Section m of Chapter 3 are sufficient to determine that the Hose Tester is functioning properly. If during the course of these procedures, it is determined that a component is malfunctioning, it should be repaired as described in the following paragraphs.

4-3. Air Regulator. When the Air Regulator (figure 4-2) is not functioning correctly, the following maintenance action will correct the fault:

- a. Occasionally remove bottom plug and clean plug, body and valve seat.
- b. To Disassemble -shut off air to regulator and vent air line on both sides of regulator. Turn adjusting screw counterclockwise to relieve compression on the spring. Remove screws, cover, spring, and pressure disk. Diaphragm assembly can now be removed. By

removing bottom plug and spring, the valve can be removed from the bottom of the regulator.

- c. If Unit Will Not Regulate to Pressure Needed, or if Pressure Becomes Excessive -remove bottom plug, spring and valve. Clean and check O-ring, valve stem and valve seat for wear or damage. Replace worn or damaged parts. Install Repair Kit No. RRP-95-131 for complete overhaul.

- d. If Unit Leaks at Relief Port (A) -- Install proper repair kit as listed above.

- e. When Replacing Diaphragm Assembly -The RRP-96-213 Diaphragm Assembly includes a relieving disk seal (not shown) installed.

4-4. Air Lubricator. Should an Air Lubricator (figure 4-4) malfunction, take the following corrective action:

a. Given clean operating conditions, this unit will be trouble-free. Contaminants from dirty oil may collect on the siphon tube filter, requiring the filter to be washed in kerosene and blown off with an air blow gun.

b. If The Oil Delivery Rate Drops -the lubricator should be cleaned. Shut off the air supply and reduce the pressure in the unit to zero. Remove the adjusting screw and clean the needle and the seat in the body. Inspect and clean the passage from the needle seat down into the siphon tube adaptor. Remove the variable orifice screw and clean its air passage with a small wire. Check the bore that the screw fits into for contaminants and clean if necessary. Be sure the passageway from the sight dome cavity downward is open.

c. Drain off any contaminants which collect in the bottom of the bowl.

4-5. Air Operated Pump. If a Air Operated Pump malfunctions, refer to figure 4-5 and disassemble the pump following the index numbers in figure 4-5. Then take the following steps:

a. Inspection after Disassembly

1. Under a strong light and preferably under magnification, visually inspect all applicable parts for cracks, pitting, scoring, and corrosion.

2. Inspect all threads for chipped, crossed, or stripped threads.

3. Roll springs over a flat surface to check for wobble.

4. Inspect all tubing for kinks, breaks, or defective flares.

5. Inspect check valve seating surfaces for nicks, burrs or excessive wear.

6. Inspect check valves, spring, poppet and body bore for excessive wear or burrs.

7. Inspect air valve for excessive wear caused by detonate pins.

b. Assembly. Before starting reassemble operations, wash all metallic parts thoroughly in solvent similar to Federal Specification PD-680. Lubricate O-rings, backup rings and threads with hydraulic fluid, or petrolatum, Federal Specification VV-P-236. Proceed with assembly in the reverse of Index Numbers on Illustration (Figure 4-5).

1. Install inlet and outlet check valves (37 & 38). Do not tighten check valves excessively to preclude damaging O-ring.

2. Remove the piston from the body (31).

3. Assemble the drive piston (25) to the driven piston by threading it onto the threaded end of the driven piston until the shoulder on the driven piston bottoms in the drive piston counterbore. Install check nut (23) on the projecting threads of the driven piston and tighten down against the drive piston.

4. Install shifting nut (24) and shakeproof washer (8) on one end of connecting rod (22) with the top of the nut facing toward the center of the connecting rod. Screw nut (24) all the way up the connecting rod, covering all the threads.

5. Thread connecting rod (22) into the drive-driven piston subassembly until nut (24) bottoms against the face of check nut (23).

6. Install gasket (33) on body (31).

7. Assemble body (31) to bottom housing (34). Install nut (29) on body and tighten to retain the body and bottom housing in position. **DO NOT TIGHTEN DOWN NUT (29) AT THIS TIME.** Install elbow (3). Place air valve-housing on bottom housing (34). Line up air valve, air outlet and inlet ports with the fluid outlet and inlet check valves. Install tube assembly (1) on top elbow (3). Rotate bottom housing (34) until lower elbow (3) lines up with tube assembly (1). Remove tube assembly (1) and air valve from bottom housing.

8. Insert cylinder (27) in bottom housing (34).

9. Install the drive-driven piston assembly in the bottom housing, guiding the driven piston carefully into the body (31)

NOTE

Do not install O-ring and backup rings in the body (31) until the following adjustment has been completed.

10. Rotate the drive piston (25) slowly through 360 degrees, checking for binds between drive piston and cylinder, or driven piston and body (31). Remove binds by shifting the bottom housing on the body (31) as required to free the pistons. When the drive piston can be rotated through a full 360 degrees, without binding at any point, remove the drive-driven piston assembly, tighten nut (29) securely and tighten setscrews (28).

11. Install backup ring (35), O-ring (36), and second backup ring (35) in the seal groove in the body (31). Use extreme care when installing the O-ring and backup rings to avoid scratching the honed surface of the bore.

12. Install O-ring (26) on the drive piston (25).

13. Replace the drive-driven piston assembly carefully.

14. Install spring (21) on connecting rod (22).

15. Assemble the air-valve-housing securely to the bottom housing (34) with bolts (4) and nuts (15).

16. Install O-ring (12) on bolt (11). Position the air valve in the air valve housing, as shown on Illustrated Parts Breakdown (Figure 4-5) so that the top of the air valve is just below the two long ports in the air valve housing. Hold air valve in this position and install a detonate pin (14), a spring (13), and a bolt (11), in each of the four detonate holes in the air valve housing. Tighten each bolt (11) until it bottoms.

17. Operate the drive piston (25) and air valve to the UP position.

NOTE

In this operation and in the succeeding adjustment operations, the air valve may be operated up and down by applying air pressure (not over 10 psi) alternately to the tubing connection in the bottom housing (34), or the tubing connection in the air valve housing.

18. With the air valve and drive piston in the UP position, install spring (10) and nut (9) on connecting rod (22). Thread nut (9) down until the bottom face is flush with the top surface of the air valve.

NOTE

Check shifting operation; cycle pump several times. If the air valve does not shift properly, turn nut (9) down 1/2 turn; recheck operation.

19. Install shakeproof washer (8) and nut (7) on connecting rod (18). Hold nut (9) and tighten nut (7).

20. Install gasket (6) and cover (5) and attach with bolts (4).

21. Replace tubing assembly (1).

NOTE

Inspect tubing carefully for defective flares before installation.

22. Install into the circuit such as illustrated in figure 2-1 and operate in accordance with operating procedures outlined in Chapter 2.

SECTION III. TROUBLESHOOTING

4-4. The following table lists possible problems which may be encountered in the

operation of the Hose Tester and suggests remedial action.

TABLE 4-1. TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
No oil pressure	Low oil level in reservoir	Refill reservoir to sight gage level (use oil conforming to MIL-H-5606 or MIL-H-82383)
	Shop air supply interrupted	Check air source and ensure 50 scfm at 100 psig
	Air control valve (9, figure 2-1) partially closed	Open air control valve
	Air-operated pump (10) malfunction	Refer to Paragraph 4-5
Low oil pressure	Air pressure regulator (3) not set correctly	Reset air pressure regulator
	Air pressure gage (7) malfunction	Calibrate and adjust gage Replace gage

TABLE 4-1. TROUBLESHOOTING (Con't)

PROBLEM	POSSIBLE CAUSE	REMEDY
Low oil pressure (con't)	Air pressure regulator mal-function	Refer to Paragraph 4-3
	Air-operated pump	Refer to Paragraph 4-5
	Air filter (2) clogged	Clean or replace filter element. See figure 4-4
	Oil filter (6) clogged	Clean or replace filter element
Oil in exhaust air	Defective air pump	Refer to Paragraph 4-5
Air in oil system	Air leak at pump intake fittings	Tighten or replace fittings
	Reservoir fluid below suction	Refill reservoir outlet

SECTION IV. PARTS BREAKDOWN

4-5. Table 4-3 identifies the components and replaceable parts of the Hose Tester. The index numbers refer to figure 2-1. Component manufacturers are indicated parenthetically by code in the list. Codes are assigned in accordance with Cataloging Handbook H4-1. They are identified in Table 4-2.

43791 Nicholson Division of
Datron Systems, Inc.
12 Oregon Street
Wilkes-Barres, Pa. 18702

51314 Avitech, Inc.
2 Highland Street
Port Chester, N. Y. 10573

61349 U.S. Gauge Div. of Amteck, Inc.
918 Clymer Ave.
P. O. Box 152
Sellersville, Pa. 18960

80110 Wilkerson Corporation
1663 W. Mansfield Ave.
Englewood, Colorado 80110

TABLE 4-2. VENDOR CODES

CODE

24346 Lube Devices, Inc.
Nagle Ave.
P. O. Box 450
Manitowoc, Wisconsin 54220

81321 Purolator, Inc.
970 New Brunswick Ave.
Rahway, New Jersey 07065

96906 Military Standards, Dept. Of
Defense

89307 Sprague Engineering Corp.
19300 S. Vermont Ave.
Gardena, California 90248

97576 Lenz Company
3305 Klepinger Road
P. O. Box 1044
Dayton, Ohio 45401

FIG. NO.	INDEX NO.	PART NUMBER	DESCRIPTION	QTY PER ASSY
2-1		4940-00-868-6991	Hose Tester, Hydraulic, Model 321 (51314)	REF
	2	F10-03-000	. Filter, Air (80110) (See figure 4-1 for breakdown)	1
	3	R10-03-000	. Regulator Air (80110) (See figure 4-2 for breakdown)	1
	4	FCS-537	. Strainer Fill-Vent (97576) (See figure 4-3 for breakdown)	1
	5	ASC321-101A	. Reservoir Aluminum 5.5 gal (51314)	1
	6	AN6236A-2	. Filter Suction No.30315-6 (81321)	1
		ASC321-114	. . Gasket Filter (51314).....	2
		A321-111-3	. . Retainer Filter (51314)	2
	7	46988	. Gage Air)-160 psi (61349)	1
	8	L10-03-000	. Lubricator Air (80110) (See figure 4-4 for breakdown)	1
	9	N507-3	. Valve Needle (24346).....	1
	10	S-216-C-150	. Pump Air-operated (89307) (See figure 4-5 for breakdown)	1
		144004	. Muffler (43791)	1
	12	LSP151-2	. Gage Sight (24346)	1
	13	ASC321-113	. Valve Needle (51314)	1
	14	(Part of Item 19)	. Adaptor Oil Return (51314).....	
	15	ASC321-105-1	. Gage Oil Pressure 0-3000 psi (51314).....	1
	16	ASC321-105-2	. Gage Oil Pressure 0-15000 psi (51314)	1
	17	ASC321-103	. Saver Gage 2800 psi (51314).....	1
	18	A321-104A	. Manifold Oil Supply (51314)	1
	19	ASC321-107-1	. Adaptor 4 to 3 Flared (51314).....	2
		ASC321-107-2	. Adaptor 4 to 4 Flared (51314).....	2
		ASC321-107-3	. Adaptor 4 to 5 Flared (51314).....	2
		ASC321-107-4	. Adaptor 4 to 6 Flared (51314).....	2
		ASC321-107-5	. Adaptor 4 to 8 Flared (51314).....	2
		ASC321-107-6	. Adaptor 4 to 10 Flared (51314).....	2
		ASC321-107-7	. Adaptor 4 to 12 Flared (51314).....	2
		ASC321-107-8	. Adaptor, 4 to 16, Flared (51314)	2

FIG. NO.	INDEX NO.	PART NUMBER	DESCRIPTION	QTY PER ASSY
			1 2 3 4 5	
2-1		ASC321-107-9	. Adaptor, 4 to 3, Flareless (51314)	2
		ASC321-107-10	. Adaptor, 4 to 4, Flareless (51314)	2
		ASC321-107-11	. Adaptor, 4 to 5, Flareless (51314)	2
		ASC321-107-12	. Adaptor, 4 to 6, Flareless (51314)	2
		ASC321-107-13	. Adaptor, 4 to 8, Flareless (51314)	2
		ASC321-107-14	. Adaptor, 4 to 10, Flareless (51314)	2
		ASC321-107-15	. Adaptor, 4 to 12, Flareless (51314)	2
		ASC321-107-16	. Adaptor, 4 to 16, Flareless (51314)	2
		MS9020-04	. O-Ring, No.4 (96906)	24
	20	LSP-101-4	. Gage, Level Sight (24346)	1
4-1		F10-03-000	Filter, Air	REF
	1	NNR	. Cover	1
	2	FRP-85157	. Element	1
	3	NNR	. Support	1
	4	NNR	. Baffle	1
	5	FRP-95-610	. Petcock Assy	1
	6	GRP-78-081	. O-ring	1
	7	FRP-95-847	. Bowl Assy, Transparent	1
		. (includes bowl, bowl guard and petcock)		
8	NNR Ring,	. Clamp	1	
4-2		R10-03-000	. Air Regulator	REF
	1	NNR Screw Assy,	. Adjusting	1
	2	GRP41-038	. Nut	1
	3	RRP49-027	. Range Disc	1
	4	GRP45-086	. Screw	4
	5	NNR	. Cover	1
	6	NNR Disk,	. Pressure	1
	7	RRP70-005	. Spring	1
	8	RRP96-213	. Diaphragm Assy	1
	9	NNR	. Body	1
	10	GRP43-002	. Plug, Pipe	1
	11	GRP78-023	. O-ring	1
	12	RRP96-214	. Valve	1
	13	GRP78-032	. O-ring	1
	14	RRP70-013	. Spring	1
	15	GRP78-069	. O-ring	1
16	NNR	. Bottom Plug	1	

NNR - Not Normally Replaced

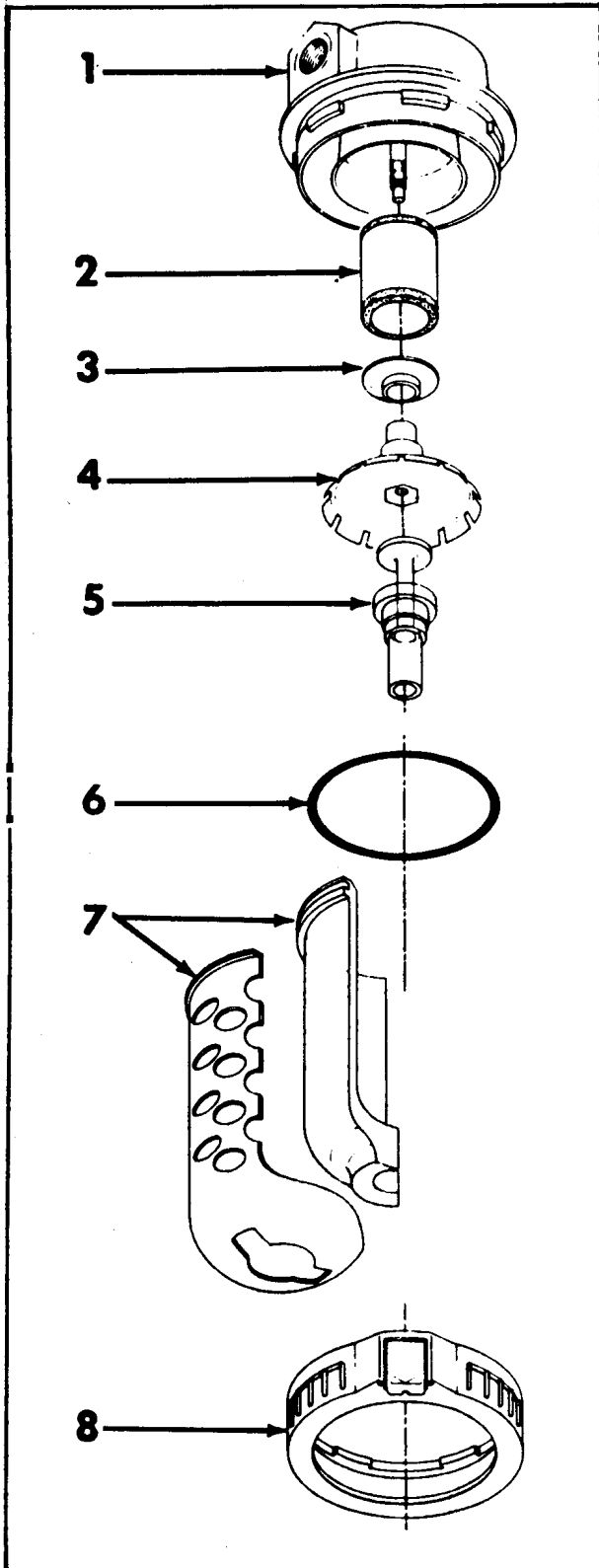


Figure 4-1. Air Filter

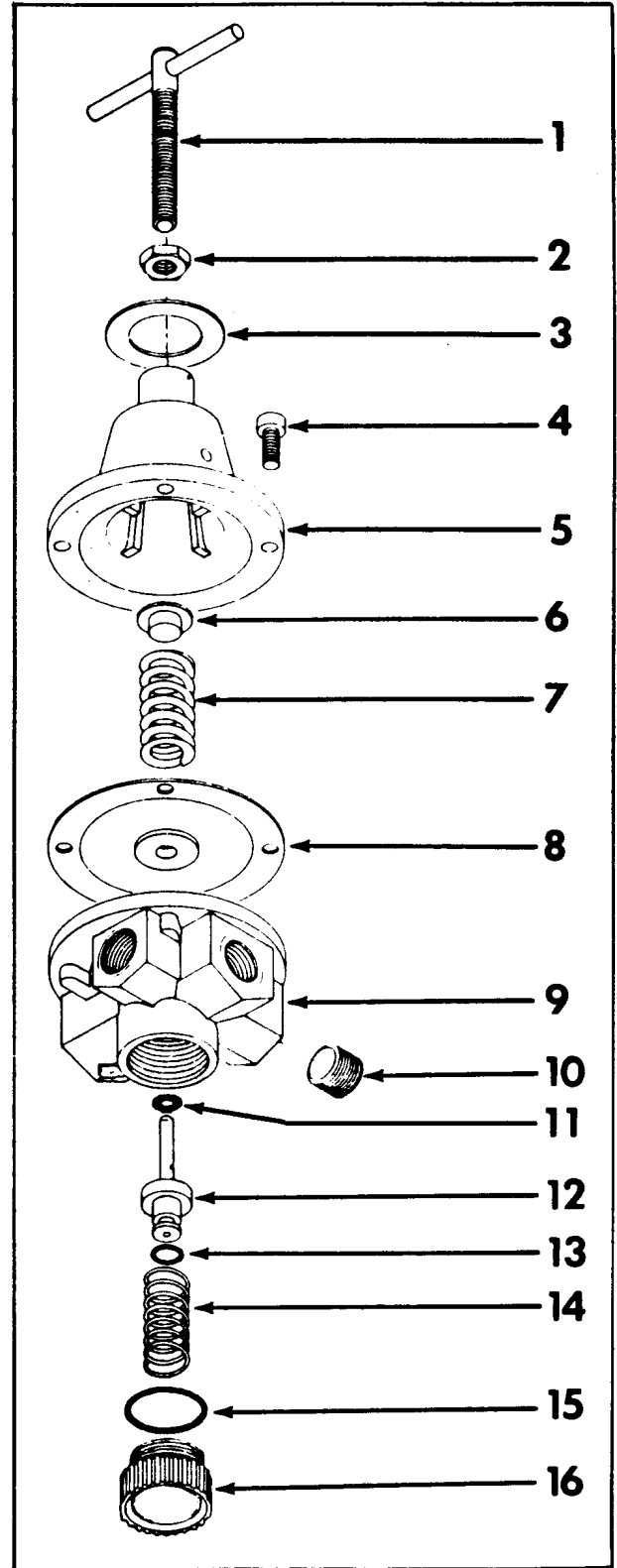


Figure 4-2. Air Regulator

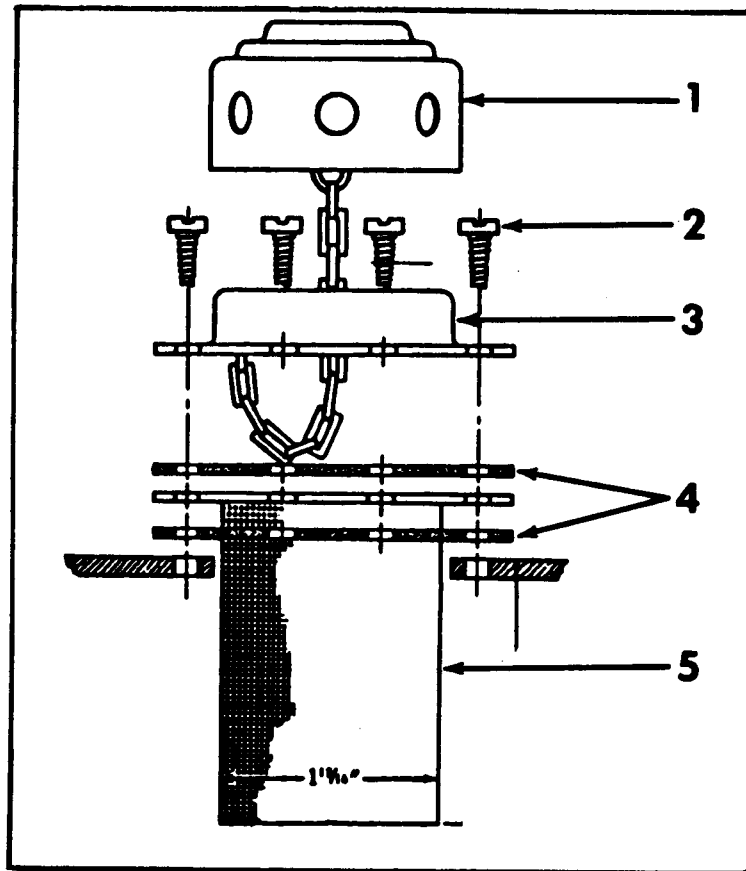


FIGURE 4-3. Fill-Vent Strainer

FIG. NO.	INDEX NO.	PART NUMBER	DESCRIPTION					QTY PER ASSY
			1	2	3	4	5	
4-3		FCS537						Strainer, Fill VentREF
	1	FCS537-3						. Cap, Filler 1
	2	FCS537-9						. Screw, 10-24 1
	3	FCS537-5						. Flange 1
	4	FCS537-8						. Gasket 2
	5	FCS537-7						. Strainer Screen 1
4-4		L10-03-000						Lubricator AssemblyREF
	1	LRP-16-111						. Plug, Fill 1
	2	GRP-16-032						. Sight Dome 1
	3	GRP-49-023						. Valve, Check 1
	4	LRP-30-576						. Screw, Adjusting..... 1
	5	GRP-78-003						. O-ring 1
	6	GRP-78-077						. O-ring 1

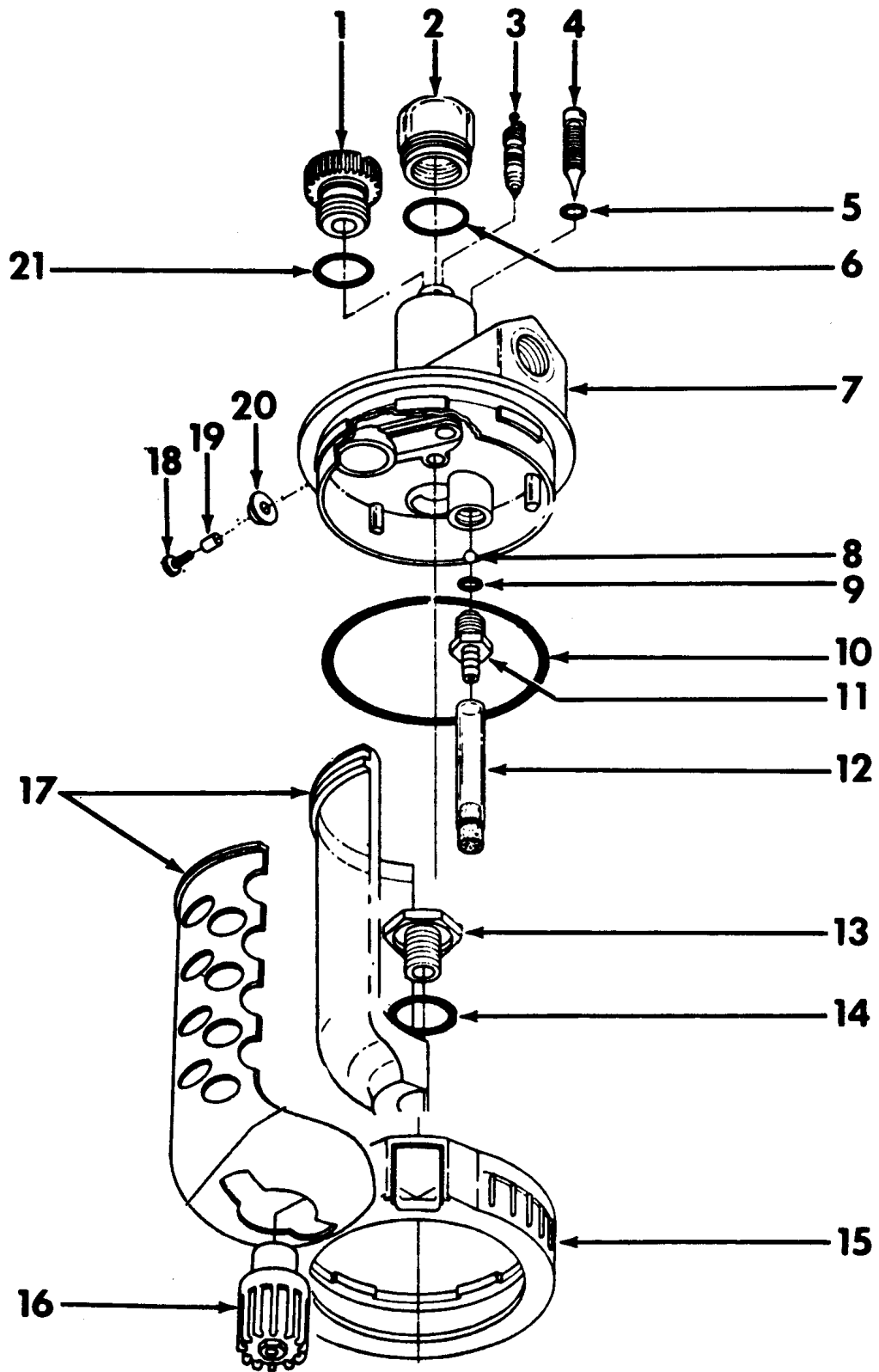


Figure 4-4. Air Lubricator

FIG. NO.	INDEX NO.	PART NUMBER	DESCRIPTION					QTY PER ASSY	
			1	2	3	4	5		
4-4	7	NNR	.	Body				1	
	8	LRP-40-004	.	Ball				1	
	9	GRP-78-003	.	O-ring				1	
	10	GRP-78-081	.	O-ring				1	
	11	LRP-30-415	.	Adaptor				1	
	12	LRP-15-005	.	Tube Assy, Siphon				1	
	13	NNR Screw,	.	Retainer				1	
	14	GRP-78-137	.	O-ring				1	
	15	NNR	.	Ring, Clamp				1	
	16	NNR	.	Knob				1	
	17	LRP-95-853	.	Bowl Assy, with Plastic Petcock and Bowl Guard				1	
	18	GRP-30-627	.	Screw				1	
	19	LRP-30-058	.	Tube, Spacer.....				1	
	20	LRP-79-053	.	Orifice, Variable				1	
	21	GRP-78-038	.	O-ring				1	
	4-5		S-216C-150 (SS)	.	Pump Assy				REF
		1	88501	.	Tube Assy				1
		2		.	No Item				
		3	MS20822-6D	.	Elbow, 90°, 1/4 pipe to 3/8 tube				2
		4	MS90725-3	.	Screw, Cap, 1/4-20 x 1/2 in lg stl, CD PL				16
		5	S-216-17	.	Cover				1
6		S-216-29	.	Gasket				1	
7		MS21045-4	.	Nut, Self-locking, 1/4-28, stl, CD PL				1	
8		MS35335-33	.	Washer, Lock, ext tooth, 1/4 in				2	
9		S-216-32	.	Nut				1	
10		S-216-21	.	Spring				1	
11		78238	.	Bolt, Detonate				4	
12		79552-5	.	O-ring				4	
13		S-216-24	.	Spring, Detonate				4	
14		82871	.	Pin, Detonate				4	
15	MS51967-2	.	Nut, Plain, 1/4-20, stl, CD PL				12		
	78237-12	.	Air Valve & Housing Assy				1		
			(Includes items 16 thru 20 as matched assy only. Supersedes all prior assys.) Also includes items 11 thru 14, available separately.						

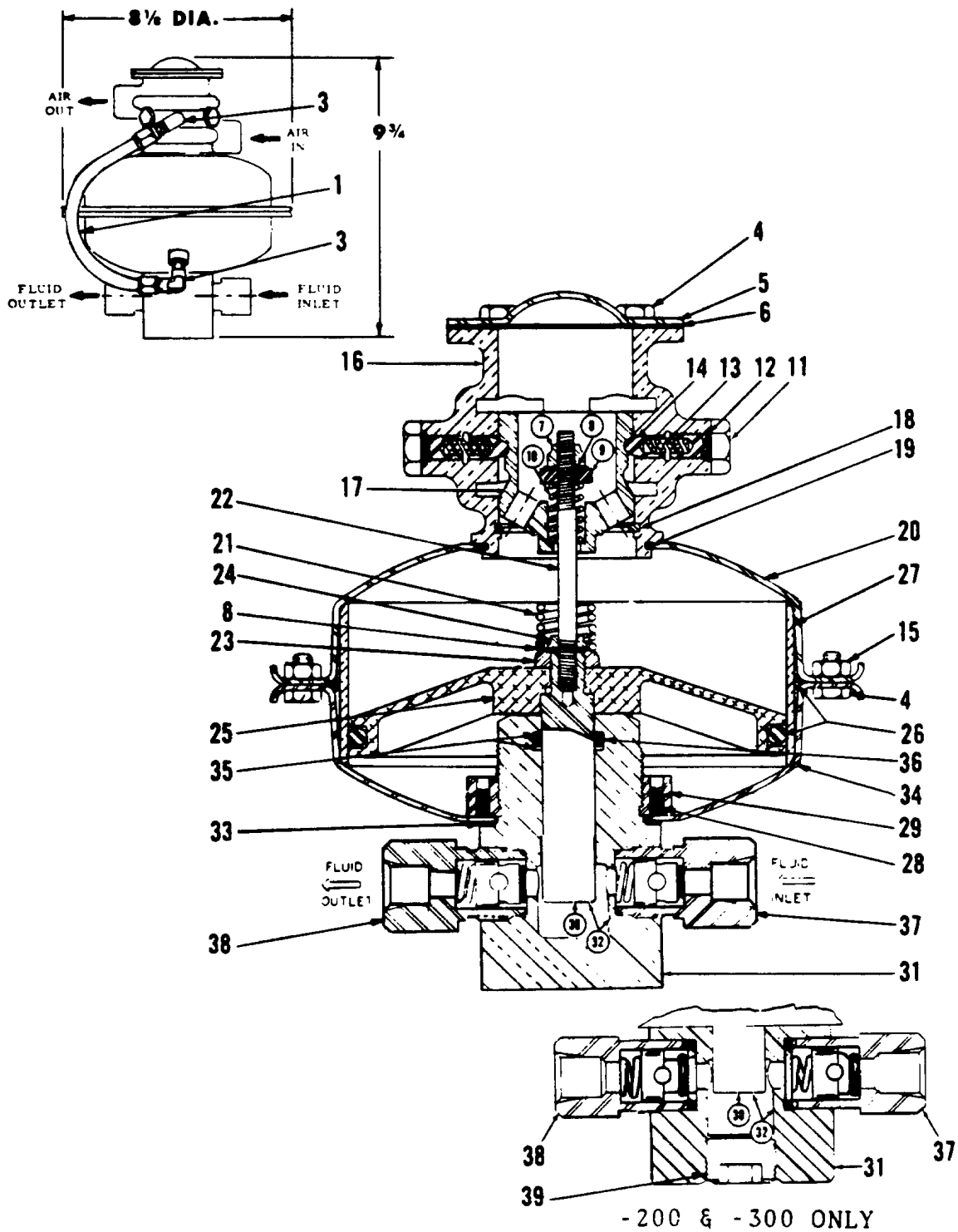


Figure 4-5. Air-Operated Pump

FIG. NO.	INDEX NO.	PART NUMBER	DESCRIPTION					QTY PER ASSY		
			1	2	3	4	5			
4-5	16	78216	. .					Body	NP	
	17	82873	. .					Air Valve	NP	
	18	S-216-56	. .					Stop	NP	
	19	S-216-51	. .					Gasket	NP	
	20	S-216-19	. .					Housing	NP	
	21	S-216-22	. .					Spring, Shifting	1	
	22	S-216-26	. .					Rod, Connecting	1	
	23	AN924-5	. .					Nut, Plain, 1/2-20, st., CD PL	1	
	24	78259	. .					Nut, Shifting	1	
	25	S-216-4	. .					Piston, Drive	1	
	26	79550-60	. .					O-ring, 70 shore (specify fluid type)	2	
	27	S-216-13	. .					Cylinder	1	
	28	MS51964-49	. .					Setscrew, 10-32NF2 x 1/4 in.....	2	
	29	Not Used on This Model								
	30	Not Used on This Model								
	31	Not Used on This Model								
	32	S-216-48-150	. .					Piston & Body Assy	1	
								Buy as matched assy only		
		77890-3	. .					SS Piston & Body Assy	1	
								Buy as matched assy		
	33	S-216-20	. .					Gasket	1	
	34	S-216-18	. .					Housing, Bottom	1	
	35	MS28782-10	. .					Ring, Backup	2	
	36	79550-10-1	. .					O-ring, 90 shore (specify fluid type)	1	
	37	82651	. .					Check Valve Assy, Inlet	1	
	38	82650	. .					Check Valve Assy, Outlet	1	
	39	Not Used on This Model								

APPENDIX A

REFERENCES

A - 1. Dictionaries of Terms and Abbreviations

- AR 310-25Dictionary of United States Army Terms
- AR 310-50Authorized Abbreviations and Brevity Codes

A - 2. Publication Indexes

- DA PAM 310-1Index of Administration Publications
- DA PAM 310-2.....Index of Blank Forms
- DA PAM 310-4.....Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, and Lubrication Orders

A - 3. Logistics and Storage

- TM 740-90-1Administrative Storage of Equipment
- TM 743-200-1Storage and Materials Handling

A - 4. Maintenance of Supplies and Equipment

- AR 750-1Army Material Maintenance Concepts and Policies
- TM 38-750.The Army Maintenance Management System (TAMMS)
- TM 43-0139Painting Operations Instructions for Field Use

A - 5. Other Publications

- AR 420-90Fire Prevention and Protection
- AR 55-38Reporting of Transportation Discrepancies in Shipments
- AR 700-58Packaging Improvement Report
- DA PAM 310-13Military Publications Posting and Filing
- TM-21-11First Aid for Soldiers
- TB 43-180Calibration Requirements for the Maintenance of Army Materiel
- TM 750-244-1-4.....Procedures for the Destruction of Aviation Ground Support Equipment (FSC 4920) to Prevent Enemy Use

APPENDIX B MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. Maintenance Allocation Chart.

a. This Maintenance Allocation Chart (MAC) assigns maintenance functions in accordance with the Three Levels of Maintenance concept for army aircraft. These maintenance levels: Aviation Unit Maintenance (AVUM), Aviation Intermediate Maintenance (AVIM) and Depot Maintenance are depicted on the MAC as

AVUM which corresponds to the O code in the Repair Parts and Special Tools List (RPSTL).

AVIM which corresponds to the F code in the Repair Parts and Special Tools List (RPSTL).

DEPOT which corresponds to the D code in the Repair Parts and Special Tools List (RPSTL).

b. The maintenance to be performed below depot and in the field is described as follows:

(1) Aviation Unit Maintenance (AVUM). AVUM activities will be staffed and equipped to perform high frequency "On Equipment" maintenance tasks required to retain or return equipment to a serviceable condition. The maintenance capability of the AVUM will be governed by the MAC and limited by the amount and complexity of support equipment, facilities required, and number of spaces and critical skills available. The range and quantity of authorized spare models/components will be consistent with the mobility requirements dictated by the air mobility concept. (Assignment of maintenance tasks to divisional company size aviation units will consider the overall maintenance capability of the division, the requirement to conserve personnel and equipment resources and air mobility requirements)

(a) Company Size Aviation Units. Perform those tasks which consist primarily of preventive maintenance and maintenance repair and replacement functions associated with sustaining a high

level of equipment operational readiness. Perform maintenance inspections and servicing to include daily, intermediate, periodic and special inspections as authorized by the MAC or higher headquarters. Identify the cause of equipment/system malfunctions using applicable technical manual troubleshooting instructions, Built-In-Test Equipment (BITE), installed instruments, or easy to use Test Measurement and Diagnostic Equipment (TMDE). Replace worn or damaged modules/components which do not require complex adjustments or system alignment and which can be removed/installed with available skills, tools and equipment. Perform operational and continuing checks and make minor repairs. Perform servicing, functional adjustments, and minor repair/replacement. Evacuate unserviceable models/components and end items beyond the repair capability of AVUM to the supporting AVIM

(b) Less than Company Size Aviation Units. Aviation elements organic to brigade, group, battalion headquarters normally small and have less than ten aircraft assigned. Maintenance tasks performed by the aircraft crew chief or assigned aircraft repairman will normally be limited to preventive maintenance, inspections, servicing, spot painting, stop drilling, minor adjustments, module/component fault diagnosis and replacement of selected modules/components. Repair functions will normally be accomplished by the supporting AVIM unit.

(2) Aviation Intermediate Maintenance (AVIM). AVIM provides mobile, responsive "One Stop" maintenance support. (Maintenance functions which are not conducive to sustaining air mobility will be assigned to depot maintenance)

Performs all maintenance functions authorized to be done at AVUM. Repair of equipment for return to user will emphasize support or operational readiness requirements. Authorized maintenance includes replacement and repair of modules/components and end items which can be accomplished efficiently with available skills, tools, and equipment Establishes the Direct Exchange (DX) program for AVUM units be repairing selected items for return to stock when such repairs cannot be accomplished at the AVUM level Inspects, troubleshoots, tests, diagnoses, repairs, adjusts, calibrates, and aligns system modules/components Module/component disassembly and repair will support the DX program and will normally be limited to tasks requiring cleaning and the replacement of seals, fittings and items of common hardware. Unserviceable repairable modules and end items which are beyond the capability of AVIM to repair will be evacuated to Depot Maintenance. This level will perform special inspections which exceed AVUM capability. Provides quick response maintenance support, on-the job training, and technical assistance through the use of mobile maintenance contact teams. Maintains authorized operational readiness float. Provides collections and classification services of serviceable/unserviceable material, Operates a cannibalization activity in accordance with AR 75050 (The aircraft maintenance company within the maintenance battalion of a division will perform AVIM functions consistent with air mobility requirements and conservation of personnel and equipment resources Additional intermediate maintenance support will be provided by the supporting non-divisional AVIM unit).

B-2. Use of the Maintenance Allocation Chart.

a. The MAC assigns maintenance functions to the lowest level of maintenance based on past experience and the following consideration:

- (1) Skills available
- (2) Time required.
- (3) Tools and test equipment required and/or available

b. Only the lowest level of maintenance authorized to perform a maintenance function is indicated. If the lowest level of maintenance cannot perform all tasks of any single maintenance function (e.g., test, repair), then the higher maintenance level(s) than can accomplish additional tasks will also be indicated.

c. A maintenance functional assigned to a maintenance level will automatically be authorized to be performed at any higher maintenance level

d. A maintenance function that cannot be performed at the assigned level of maintenance for any reason may be evacuated to the next higher maintenance organization. Higher maintenance levels will perform the maintenance functions of lower maintenance levels when required or directed by the appropriate commander.

e. The assignment of a maintenance function will not be construed as authorization to carry the associated repair parts in stock. Authority to requisition, stock, or otherwise secure necessary repair parts will be as specified in the repair parts and special tools list appendix.

f. Normally there will be no deviation from the assigned level of maintenance. In cases of operational necessity, maintenance functions assigned to a maintenance level may, on a one-time basis and at the request of the lower maintenance level, be specifically authorized by the maintenance officer of the level of maintenance to which the function is assigned. The special tools, equipment, etc. required by the lower level of maintenance to perform this function will be furnished by the maintenance level to which the function is assigned. This transfer of a maintenance function to a lower maintenance level does not relieve the higher maintenance level of the responsibility of the function The higher level of maintenance will provide technical supervision and inspection of the function being performed at the lower level.

g. Organizational through depot maintenance of the US Army Electronics Command equipment will be performed by designated US Army Electronics Command personnel.

h. Changes to the MAC will be based on continuing evaluation and analysis by responsible technical personnel and on reports received from field activities.

B-3. Definitions.

a. Inspect. To determine serviceability of an item by comparing its physical, mechanical and electrical characteristics with established standards.

b. Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents and air.

d. Adjust. To rectify to the extent necessary to bring into proper operating range.

e. Align. To adjust specified variable elements of an item to bring to optimum performance.

f. Calibrate. To determine the corrections to be made in the reading of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument or test equipment being compared with the certified standard.

g. Install. To set up for use in an operational environment such as an emplacement, site or vehicle.

h. Replace. To replace unserviceable items with serviceable assemblies, subassemblies or parts.

i. Repair. To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening

j. Overhaul. To restore an item to a completely serviceable condition as prescribed by maintenance serviceability standards prepared and published for the specific item to be overhauled **k. Rebuild.** To restore an item to a standard as nearly as possible to the original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance technique of complete disassembly of the

item, inspection of all parts or components, repair or replacement of worn or unserviceable elements (items) using original manufacturing tolerances and specifications, and subsequent reassembly of the item.

B-4. Functional Groups.

Standard functional groupings are not considered feasible for aviation ground support equipment due to variation and complexity. Therefore, variations to functional groupings may occur.

B-5. Maintenance Categories and Work Times.

The maintenance categories (levels) AVUM, AVIM, and DEPOT are listed on the Maintenance Allocation Chart with individual columns that indicate the work times for maintenance functions at each maintenance level Work time presentations such as 0.1 indicate the average time it requires a maintenance level to perform a specified maintenance function. If a work time has not been established, the columnar presentation shall indicate "-". Maintenance levels higher than the level of maintenance indicated are authorized to perform the indicated function

B-6. Tools and Test Equipment (Section III).

Common tool sets (not individual tools), special tools, test and support equipment required to perform maintenance functions are listed alphabetically with a reference number to permit cross-referencing to column 5 in the MAC In addition, the maintenance category authorized to use the device is listed along with the item National Stock Number (NSN) and, if applicable, the tool number to aid in identifying the tool/device.

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS		TESTER, HYDRAULIC HOSE ASSEMBLY NSN 4940-01-064-5057					
(1)	(2)	(3)	(4)			(5)	(6)
GROUP NUMBER	COMPONENT ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY			TOOLS AND EQUIPMENT	REMARKS
			AVUM	AVIM	DEPOT		
00	Tester Hydraulic Hose Model 321A						
07	Hydraulic and Pneumatic System						
0701	Reservoir	Inspect Service Repair Replace	.2 .4	1.0 4.5		110 104	A
0702	Level Gauge (Sight)	Inspect Replace	.1	.5		110	
0703	Filter Element	Inspect Replace	.1 1.0			104	B
0704	Filter Gasket	Replace	.1			104	B
0705	Filter Retainer	Inspect Replace	.1 .5			110	
0706	Manifold	Replace		1.0		110	
0707	Valve	Repair Replace		1.5 1.0		110	
0708	Fill Vent & Strainer	Replace		1.0		110	
0709	Gauge (Oil)	Inspect	.1				A
	0-3000 PSI 0.15000 PSI	Adjust Replace		.5		104	
0710	Lines, Tubing, Fittings & Hose Assemblies	Inspect Replace	.1 .5			104	

MAINTENANCE ALLOCATION CHART (Cont)

NOMENCLATURE OF END ITEMS		TESTER, HYDRAULIC HOSE ASSEMBLY NSN 4940-01-064-5057					
(1)	(2)	(3)	(4)			(5)	(6)
GROUP NUMBER	COMPONENT ASSEMBLY	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY			TOOLS AND EQUIPMENT	REMARKS
			AVUM	AVIM	DEPOT		
0711	Filter (Air)	Inspect Service	.1 .5		104		E
0712	Regulator (Air)	Service Adjust Repair Replace	5 3 1.5 1.0		110 110		D
0713	Lubricator (Air)	Inspect Service Adjust Repair Replace	.2 .3 .1		104 104		E
				2.0 .5	110 104		
0714	Gauge Saver & Gauge	Inspect Adjust Repair Replace	.1 .3 1.0 .5	1.0	110 104		C
0715	Air Intensifier & Valve	Adjust Repair Replace	.2	3.0 1.0			
0716	Air Lines, Fittings & Hardware	Inspect Replace	.1 .3		104		

Section III. TOOL AND TEST EQUIPMENT REQUIREMENT

REF. NO.	MAINT CAT.	NOMEN.	NSN	TOOL NO.
100	0	Tool Set AVUM Set No. 1	4920-00-159-8727	SC492099CLA90
101	0	Tool Set AVUM Set No.2	4920-00-567-0476	SC492099CLA92
102	0	Tool Kit Acft Mech Gen	5180-00-323-4692	SC518099CLA01
103	0	Tool Kit Arfm Rpmn	5180-00-323-4876	SC518099CLA02
104	0	Tool Kit Hyd Rpmn	5180-00-323-4891	SC518099CLA03
105	0	Tool Kit Instr Rpmn	5180-00-323-4913	SC518099CLA05
106	0	Tool Kit Elec Rpmn	5180-00-323-4915	SC18099CLA06
107	0	Tool Kit Eng Rpmn	5180-00-323-4944	SC518099CLA07
108	0	Tool Kit Pwr Trn	5180-00-003-5267	SC518099CLA13
109	F	Shop Set AVIM Elec-Instr	4920-00-165-14	SC492099CLA91ELAM
110	F	Shop Set AVIM Hyd	4920-00-165-1454	SC492099CLA91HYAM
111	F	Shop Set AVIM Machine Shop	4920-00-405-9279	SC492099CLA91MAAM
112	F	Shop Set AVIM Pwr Trn	4920-00-001-4132	SC492099CLA91PTAM
113	AVIM	Shop Set AVIM Rtr Shop	4920-00-405-9270	SC492099CLA91ROAM
114	AVIM	Shop Set AVIM Sheet Metal	4920-00-166-5505	SC492099CLA91SMAM
115	AVIM	Shop Set AVIM Tool Crib	4920-00-472-4183	SC492099CLA91TCAM
116	AVIM	Shop Set AVIM Turbine Eng	4920-00-224-3684	492099CLA91ENTAM
117	AVIM	Shop Set AVIM Welding	4920-00-163-5093	492099CLA91WEAM

Section IV. REMARKS

TESTER, HYDRAULIC HOSE ASSEMBLY

Reference Code	Remarks
A	Check daily
B	Replace every 6 months
C	Check daily and adjust every 6 months
D	Clean and adjust per manual
E	Check daily for contamination, clean element every 6 months

APPENDIX C

REPAIR PARTS AND SPECIAL TOOLS LIST

(Current as of 18 December 1980)

Section I. INTRODUCTION

C-1. Scope.

This appendix lists spares and repair parts, special tools, test, measurement and diagnostic equipment (TMDE); and other special support equipment required for performance of Aviation Intermediate Maintenance (AVIM) and Depot maintenance of the Hydraulic Hose Tester, Model 321. It authorizes the requisitioning and issue of spares and repair parts as indicated by the source and maintenance codes

C-2. General.

This Repair Parts and Special Tools List is divided into the following sections:

a. Section II. Repair Parts List. A list of spares and repair parts authorized for use in the performance of maintenance. Parts list are composed of functional groups in numeric sequence, with the parts in each group listed in figure and item number sequence.

b. Section III. Special Tools List. Not Applicable.

c. Section IV. National Stock Number and Part Number Index. A lists, in National Item Identification Number (NIIN) sequence of all National Stock numbers (NSN) appearing in the listings, followed by a list, in alphanumeric sequence, of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance

C-3. Explanation of Columns.

a. Illustration. This column is divided as follows:

(1) Figure Number. Indicates the figure number of the illustration on which the item is shown

(2) Item Number. The number used to identify each item called out in the illustration.

b. Source, Maintenance and Recoverability) Codes (SMR).

(1) Source Code. Source codes indicate the manner of acquiring support items for maintenance, repair or overhaul of end items. Source codes are entered in the first and second positions of the Uniform SMR Code format as follows:

Code	Definition
PA	--- Item procured and stocked for anticipated or known usage
PB	--- Item procured and stocked for insurance purpose because essentially dictates that a minimum quantity be available in the supply systems.
PC	--- Item procured and stocked and which otherwise would be coded PA except that it is deteriorative in nature
XD	--- A support item that is not stocked. When required, item will be procured through normal supply channels.

NOTE

Cannibalization or salvage may be used as a source of supply for any items source coded above except aircraft support items as restricted by AR 700-42.

(2) Maintenance Code. Maintenance codes are assigned to indicate the levels of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the Uniform SMR Code format as follows:

(a) The maintenance code entered in the third position will indicate the lowest maintenance level authorized to remove, replace and use the support item. The maintenance code entered in the third position will indicate the following level of maintenance:

Code **Application/Explanation**

F --- Support item is removed, replaced, used at the Aviation Intermediate Maintenance level.

(b) The maintenance code entered in the fourth position indicates whether the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions) This position will contain one of the following maintenance codes:

Code **Application/Explanation**

F --- The lowest maintenance level capable of complete repair of the support item is the Aviation Intermediate Maintenance level.

Z --- Nonreparable No repair is authorized.

(3) Recoverability Code. Recoverability codes are assigned to support items to indicate the disposition action on unserviceable items The recoverability code is entered in the fifth position of the Uniform SMR Code format as follows.

Code	Definition
Z ---	Nonreparable item When unserviceable, condemn and dispose at the level indicated in position 3.
F ---	Reparable item. When uneconomically repairable, condemn and dispose at the Aviation Intermediate Maintenance level.

c. National Stock Number. Indicates the National stock number assigned to the item and which will be used for requisitioning purposes

d. Part Number. Indicates the primary number used by the manufacturer (individual, company, firm corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards and inspection requirements, to identify an item or range of items.

NOTE

When a stock numbered item is requisitioned, the item received may have a different part number than the part being replaced.

e. Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code listed m

SB 708-42 which is used to identify the manufacturer, distributor, or Government agency, etc.

f. Description. Indicates the Federal item name and, if required, a minimum description to identify the item.

g. Unit of Measure (U/M). Indicates the standard of the basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e g, ea., in, pr, etc.) When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned

h. Quantity Incorporated in Unit. Indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly A "V" appearing in this column in lieu of a quantity indicates that no specific quantity is applicable (e.g., shims, spacers, etc.)

C-4. Special Information. Not Applicable

C-5. How to Locate Repair Parts.

a. When National Stock Number or Part Number is Unknown:

(1) First. Find the illustration covering the assembly to which the item belongs.

(2) Second. Identify the item on the illustration and note the illustration figure and item number of the item.

(3) Third. Using the Repair Parts Listing, find the figure and item number noted on the illustration.

b. When National Stock Number or Part Number is known.

(1) First. Using the Index of National Stock Numbers and Part Numbers, find the pertinent National stock number or part number This index is in ascending NIIN sequence followed by a list of part numbers in alphanumeric sequence, cross-referenced to the illustration figure number and item number.

(2) Second. After finding the figure and item number, locate the figure and item number in the repair parts list.

C-6. Abbreviations. Not Applicable

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	FEDERAL STOCK NUMBER	PART NUMBER	FSM	DESCRIPTION USABLE ON CODE	U/M	QTY INC IN UNIT
SECTION II REPAIR PARTS LIST GROUP 07 HYDRAULIC HOSE TESTER ASSEMBLY								
2-1	2	XDFZ.		F10-03-000	98963	FILTER,AIR	EA	1
2-1	3	XDPZZ		R10-03-000	98963	REGULATOR,AIR PRESSURE	EA	1
2-1	4	XDFZZ		FCS537	97576	FILL-VENT AND STRAINER	EA	1
2-1	5	XDFZZ		ASC321-101	51314	RESERVOIR-ALUMINUM,5.5 GAL CAPACITY	EA	1
2-1	6	PBEZZ		AN6236A-2	88044	FILTER,FLUID,PRESSURE-OIL	EA	1
2-1	6	XDFZZ		ASC321-114	51314	GASKET-FILTER	EA	2
2-1	6	XDFZZ		ASC321-111-3	51314	RETAINER,FILTER	EA	2
2-1	7	XDFZZ		46988	61349	GAGE,PRESSURE,DIAL-AIR,0-160 PSI	EA	1
2-1	8			L10-03-000	98963	OILER-AIR LINE	EA	1
2-1	9	XDFZZ		N507-3	24346	VALVE,AIR CONTROL	EA	1
2-1	10	XDFZZ		S-216-C-150	89307	INTENSIFIER,AIR OPERATED	EA	1
2-1	11	PBFZZ		14404	43791	MUFFLER-AIR DISCHARGE	EA	1
2-1	12	XDFZZ		LSP151-2	24346	SIGBT GAGE-OIL RETURN	EA	1
2-1		XDFZZ		2093-4-45	06624	TEE,PIPE-1/4 IN.NPT-OIL CONTROL VALVE	EA	1
						TO OIL RETURN SIGHT GAGE		
2-1	13	XDFZZ		ASC321-113	51314	VALVE,OIL CONTROL	EA	1
2-1	15	XDFZZ		ASC321-105-1	51314	GAGE,PRESSURE,DIAL-OIL,0-3000 PSI	EA	1
2-1		XDFZZ		2089-4-4S	06624	ELBOW,PIPE-1/4 IN.NPT-GAGE SAVER	EA	1
						TO 0-3000 PSI GAGE		
2-1	16	XDFZZ		ASC321-105-2	51314	GAGE,PRESSURE,DIAL-OIL,0-15000 PSI	EA	1
2-1	17	XDFZZ		ASC321-103	51314	GAGE SAVER-2800 PSI	EA	1
2-1		XDFZZ		2083-6-4S	06624	NIPPLE,PIPE-3/8 IN.TO 1/4 INNP GAGE SAVER TO OIL	EA	1
2-1	18	XDFZZ		ASC321-104A	51314	MANIFOLD	EA	1
2-1	20	PBFZZ	6680-00-183-0672	LSP-101-4	24346	MANIFOLD-OIL SUPPLY	EA	1
						INDICATOR,SIGHT,LIQUID-OIL FULL LEEL	EA	1
GROUP 0716 HOSE ADAPTERS								
2-1	19	XDFZZ		ASC321-107-1	51314	ADAPTER-U/W HOSE ASSEMBLIES MS28741-3	EA	2
2-1	19	XDFZZ		ASC321-107.2	51314	ADAPTER-U/W NOSE ASSEMBLIES MS28741-4	EA	2
2-1	19	XDFZZ		ASC321-107-3	51314	ADAPTER-U/W HOSE ASSEMBLIES MS28741-5	EA	2
2-1	19	XDFZZ		ASC321-107-4	51314	ADAPTER-U/W HOSE ASSEMBLIES MS28741-6	EA	2
2-1	19	XDFZZ		ASC321-107-5	51314	ADAPTER-U/W ROSE ASSEMBLIES MS28741-8	EA	2
2-1	19	XDFZZ		ASC321-107-6	51314	ADAPTER-U/W HOSE ASSEMBLIES MS28741-10	EA	2
2-1	19	XDFZZ		ASC321-107-7	51314	ADAPTER-U/W ADAPTER ASC321-107-2 FOR HOSE	EA	2
						ASSEMBLIES MS28741-12		
2-1	19	XDFZZ		ASC321-107-8	51314	ADAPTER-U/W ADAPTER ASC321-107-2 FOR HOSE	EA	2
						ASSEMBLIES MS28741-16]		

(1) ILLUSTRATION		(2)	(3)	(4)	(5)	(6)	(7)	(8)
(a) FIG NO.	(b) ITEM NO.	SMR CODE	FEDERAL STOCK NUMBER	PART NUMBER	FSM	DESCRIPTION USABLE ON CODE	U/M	QTY INC IN UNIT
2-1	19	XDFZZ		ASC321-107-9	51314	ADAPTER-U/W HOSE ASSEMBLIES MS28762-3.....	EA	2
2-1	19	XDFZZ		ASC321-107-10	51314	ADAPTER-U/W HOSE ASSEMBLIES MS28762-4.....	EA	2
2-1	19	XDFZZ		ASC321-107-11	51314	ADAPTER-U/W HOSE ASSEMBLIES MS28762-5.....	EA	2
2-1	19	XDFZZ		ASC321-107-12	51314	ADAPTER-U/W HOSE ASSEMBLIES MS28762-6.....	EA	2
2-1	19	XDFZZ		ASC321-107-13	51314	ADAPTER-U/W HOSE ASSEMBLIES MS28762-8.....	EA	2
2-1	19	XDFZZ		ASC321-107-14	51314	ADAPTER-U/W ADAPTER ASC321-107-2 FOR HOSE ASSEMBLIES M528762-10	EA	2
2-1	19	XDFZZ		ASC321-107-15	51314	ADAPTER-U/W ADAPTER ASC321-107-2 FOR ROSE ASSEMBLIES MS28762-12	EA	2
2-1	19	XDFZZ		ASC321-107-16	51314	ADAPTER-U/W ADAPTER ASC321-107-2 FOR HOSE ASSEMBLIES MS28762-16	EA	2

SECTION IV. NATIONAL STOCK NUMBER AND PART NUMBER INDEX

STOCK NUMBER	FIGURE NO.	ITEM NO.
6680-00-183-0672	2-1	20

PART NUMBER	FSCM	FIG. NO.	ITEM NO.	PART NUMBER	FSCM	FIG. NO.	ITEM NO.
AN6236A-2	88044	2-1	6	ASC321-107-14	51314	2-1	19
ASC321-101	51314	2-1	5	ASC321-107-15	51314	2-1	19
ASC321-103	51314	2-1	17	ASC321-107-16	51314	2-1	19
ASC321-104A	51314	2-1	18	ASC321-111-3	51314	2-1	6
ASC321-105-1	51314	2-1	15	ASC321-113	51314	2-1	13
ASC321-105-2	51314	2-1	16	ASC321-114	51314	2-1	6
ASC321-107-1	51314	2-1	19	FCS537	97576	2-1	4
ASC321-107-2	51314	2-1	19	F10-03-000	98963	2-1	2
ASC321-107-3	51314	2-1	19	LSP-101-4	24346	2-1	20
ASC321-107-4	51314	2-1	19	LSP-151-2	24346	2-1	12
ASC321-107-5	51314	2-1	19	L10-03-000	98963	2-1	8
ASC321-107-6	51314	2-1	19	N507-3	24346	2-1	9
ASC321-107-7	51314	2-1	19	R10-03-000	98963	2-1	3
ASC321-107-8	51314	2-1	19	S-216-C-150	89307	2-1	10
ASC321-107-9	51314	2-1	19	14404	43791	2-1	11
ASC321-107-10	51314	2-1	19	2083-6-4S	06624	2-1	
ASC321-107-11	51314	2-1	19	2089-4-45	06624	2-1	
ASC321-107-12	51314	2-1	19	2093-4-45	06624	2-1	
ASC321-107-13	51314	2-1	19	46988	61349	2-1	7

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff


Official:

J. C. PENNINGTON
Major General, United States Army
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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 decagram = 10 grams = .35 ounce
 1 hectogram = 10 decagrams = 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

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
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
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