

T.O. 35A2-2-36-21

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TECHNICAL MANUAL  
OPERATION SERVICE  
WITH  
ILLUSTRATED PARTS BREAKDOWN

HYDRO-MECHANICAL AVIATION JACK  
12 TON

PART NUMBER 12-3-14

NSN 1730-00-912-3998

(COLUMBUS JACK)

(FMC 00994)

F41608-81-A062  
F41608-90-D-1819

(ATOS)

BASIC AND ALL CHANGES HAVE BEEN MERGED  
TO MAKE THIS A COMPLETE PUBLICATION

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Title .....		10			
A .....		10			
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2-1 .....		0			
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3-1 .....		3			
3-2 Blank.....		0			
4-1 - 4-2 .....		9			
4-2A.....		10			
4-2B Blank .....		6			
4-3 .....		0			
4-4 - 4-6 .....		2			
5-1 - 5-2 .....		0			
5-3 .....		8			
5-4 .....		5			

\*Zero in this column indicates an original page

**TABLE OF CONTENTS**

Section/Para	Page
I INTRODUCTION.....	1-1
1-1 Purpose and Function .....	1-1
1-3 Capabilities .....	1-1
1-5 List of Items Furnished .....	1-1
1-7 Intended Use.....	1-1
1-9 Leading Particulars.....	1-1
II PREPARATION FOR USE AND INSTALLATION INSTRUCTIONS.....	2-1
2-1 Unpacking.....	2-1
2-3 Installation.....	2-1
2-5 Bleeding Air from System.....	2-1
2-7 Draining Fluid .....	2-1
III OPERATING INSTRUCTIONS.....	3-1
3-1 Positioning .....	3-1
3-3 Lifting .....	3-1
3-5 Lowering.....	3-1
IV MAINTENANCE INSTRUCTIONS .....	4-1
4-1 Special Tools .....	4-1
4-3 Cleaning .....	4-1
4-5 Lubrication.....	4-1
4-7 Inspection.....	4-1
4-9 Disassembly, Repair, Replacement, and Reassembly.....	4-1
4-16 Troubleshooting .....	4-4
4-18 Testing.....	4-4
4-20 Preparation for Reshipment .....	4-4
4-22 Marking for Shipment and Storage .....	4-4
4-24 Storage .....	4-4
V ILLUSTRATED PARTS BREAKDOWN.....	5-1
5-1 General.....	5-1

**LIST OF ILLUSTRATIONS**

Figure	Title	Page
4-1	Hydro-Mechanical Aviation Jack, Single Stage Type (Modified).....	4-5
4-2	Hydro-Mechanical Aviation Jack, Single Stage Type (In Place).....	4-6
5-1	12 Ton Hydro-Mechanical Aviation Jack .....	5-2



SECTION 1  
INTRODUCTION

1-1. PURPOSE AND FUNCTION.

1-2. The 12-Ton Hydro-mechanical Aviation Jack Model 12-3-14 is manufactured by the Columbus Jack Corporation, 1000 S. Front Street, Columbus, Ohio 43206. The purpose and function of the jack is to lift a maximum weight of 24,000 pounds (12 tons).

1-3. CAPABILITIES.

1-4. The jack is constructed to normally lift a load of 24,000 pounds with an overload factor of ten percent on the safety by-pass valve, which is set at 26,000 pounds or 3,740 psi. The inner plunger has to be extended to measure load or psi.

1-5. LIST OF ITEMS FURNISHED.

1-6. The jack is furnished as a complete self contained unit.

1-7. INTENDED USE.

1-8. The jack provides the means for lifting loads up to 12 tons (24,000 pounds). At a maximum allowable load of 13 tons (26,000 pounds) the operating fluid is

by-passed within the jack by an automatic valve and the jack will not continue to lift.

1-9. LEADING PARTICULARS.

1-10. Leading particulars of the jack are listed in Table 1-1.

Table 1-1. Leading Particulars

Closed Height . . . . .	14 in.
Hydraulic Lift . . . . .	23 in.
Screw Extension . . . . .	3 in.
Extended Height . . . . .	40 in.
Capacity (Vertical) . . . . .	24,000 lbs.
Hydraulic Pressure . . . . .	3,400 psi.
Safety Valve Setting . . . . .	3,740 psi.
Capacity (Horizontal) . . . . .	3,600 lbs.



## SECTION 2

## PREPARATION FOR USE AND INSTALLATION INSTRUCTIONS

2-1. UNPACKING.

2-2. Remove the jack from the shipping container and check the equipment for completeness. Visually inspect for transit damage. If damage is detected, report damage in accordance with current regulations.

2-3. INSTALLATION.

2-4. Fill the reservoir with hydraulic fluid, Military Specification MIL-H-5606 through the air vent hole in reservoir until within 1/2-inch of filler hole bottom. For use in temperatures below -29°C (-20°F) use hydraulic fluid, Military Specification MIL-H-81019.

2-5. BLEEDING AIR FROM SYSTEM.

2-6. Open release valve one turn to open and operate jack pump for ten or twenty strokes to expell all trapped

air. Close release valve fully. Operate jack pump until rams are at maximum extension so that system will be completely filled with operating fluid.

2-7. DRAINING FLUID.

2-8. To drain fluid open release valve and collapse jack rams fully. Position an oil pan beneath the release valve. Remove release valve and drain all fluid from jack reservoir. After draining reinstall release valve. Fill jack reservoir with clean fluid. (Refer to paragraph 2-4).

## NOTE

Close vent assembly screw if jack is to be stored. Vent screw must remain open when jack is used.





SECTION 3  
OPERATING INSTRUCTIONS

3-1. POSITIONING.

3-2. Make sure that jack base rests on a firm, level foundation. If necessary, place a flat metal plate under jack base to provide a secure footing.

3-3. LIFTING.

3-4. Proceed as follows to lift vertical loads.

a. Close release valve fully. Unscrew vent assembly screw two turns.

**WARNING**

Do not attempt to lift loads exceeding 26,000 pounds with this jack.

b. Operate jack handle to partially lift rams.

c. Position jack under load and if necessary, partially unscrew extension screw to contact the load and to provide additional lift. Do not attempt to unscrew more than three inches. Operate handle to lift rams to contact the load if maximum extension screw lift is insufficient.

NOTE

Jack will settle on foot pads when load is applied to the ram.

d. After jack is firmly positioned under load, operate jack handle using long, smooth strokes until jack has lifted load.

e. Insure each ram lock is turned to lock the ram in position as the aircraft is lifted.

NOTE

If jack lifting stops before rams are fully extended, an overload is indicated, and relief valve is relieving fluid pressure. In this event, a jack with greater capacity must be used to lift the load.

3-5. LOWERING.

3-6. Proceed as follows to lower the jack.

a. Allow vent assembly screw to remain open. Raise plungers to release ram locknuts, keeping locknuts, loosened as load descends. Open release valve slowly, using slotted end of handle, until jack begins to lower under load. The rate of load descent is proportionate to the degree of release valve opening.

NOTE

Do not open release valve more than two complete turns.

b. With release valve open, rams will lower under load until load supports itself. When load is removed, jack will raise up on wheels. Withdraw jack from load. Lower extension screw, and manually press rams flush with base cylinder.

c. Close and tighten release valve. If jack is to be stored, close vent assembly screw.



## SECTION IV

### MAINTENANCE INSTRUCTIONS

#### 4-1. SPECIAL TOOLS.

4-2. No special tools are needed to disassemble, repair or reassemble the model 12-3-14 tripod jack.

#### 4-3. CLEANING.

**WARNING**

- Perform all solvent cleaning operations in an approved cleaning cabinet or in a well ventilated area. Avoid prolonged breathing of vapors. Avoid eye and repeated skin contact. Keep solvents away from sparks and flames.
- Use approved personnel protective equipment (goggles/face shield) when using compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 15 psi. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

4-4. Wash all parts with dry cleaning solvent, Federal Specification P-D-680, Type II and dry thoroughly with compressed air. Protect all machined surfaces from dust, dirt and dampness.

#### 4-5. LUBRICATION.

4-6. No specific schedule of lubrication is required. All internal parts operate in system fluid, providing adequate internal lubrication. When extension screw, rams, rocker arm or link pins appear dry or in need of lubrication, wipe clean of accumulated dirt and grit, and apply a light film of lubricating oil, Specification MIL-L-7670. Wipe away excess oil with a clean, lint-free cloth.

#### 4-7. INSPECTION.

4-8. Each time the jack is to be used or is to be disassembled, inspect carefully as follows:

- a. Check oil level in reservoir.
- b. Check for oil leaks around base of jack, between reservoir and base.
- c. Check for oil leaks at top and bottom of pump, top of plungers.

d. Check cylinder and plungers after disassembly for scoring, rust and deterioration.

e. Functionally check ram locking nuts Figure 5-1, Indexes 3, 2, and 1 for removal by hand. If nut can be removed by hand extend ram and screw lock nuts down to gain access to ram top threads. Peen top ram threads such that lock nuts cannot be removed by hand.

#### 4-9. DISASSEMBLY, REPAIR, REPLACEMENT, AND REASSEMBLY.

4-10. REPLACEMENT OF PARTS. If parts of the 12-Ton tripod jack, Model 12-3-14 are worn, they should be replaced with new parts.

a. After disassembly, all “O” rings, Teflon back-up rings and reservoir gaskets should be replaced with new units, provided they show wear.

b. Replace any valve balls which are chipped or nicked.

c. If cylinder or plungers are scored or distorted, replace with new parts.

4-11. Disassemble and reassemble the jack in the order of key index numbers assigned to the exploded view illustration Figure 5-1. The following instructions cover those points that are not apparent.

4-12. HYDRAULIC CYLINDER ASSEMBLY. The hydraulic cylinder assembly is repaired in the following manner.

a. To disassemble the hydraulic cylinder assembly plungers, (5, 7 and 9, Figure 5-1) remove plug (70) and screen (71) from base (77) and drain oil from the reservoir. Then remove locknuts (1, 2 and 3), unscrew stop ring (4) from tripod head (30). After stop ring has been removed extend extension screw (25) and pull up. The plungers will rise out of cylinder (34). It is not necessary to remove stop rings (6 or 8) to pull plunger assembly. After plungers have been removed push plunger (9) from top thru plunger (7) and plunger (7) from top thru plunger (5).

b. Inspect bore of plungers and cylinder for smoothness, wear, and scratches. Inspect “O” rings (12, 16, and 20) for turned edges, cuts, and distortions. At the same time check (13, 17, and 21) Teflon back-up rings for turned edges, cuts, and distortions. Check bronze bearings (11, 15, and 19) for excessive wear.

c. Should replacement of bearings, "O" rings or Teflon back-up rings be required, remove retaining rings (10, 14 or 18) and bearings, "O" rings and Teflon back-up rings can be removed from plunger ends. Replace in reverse order as shown in Figure 5-1.

d. Extension screw (25) does not have to be removed unless it is damaged. There is an "O" ring (35) between cylinder (34) and base (77) and unless cylinder has to be replaced do not remove.

e. Should cylinder (34) have to be removed for replacement or for replacement of "O" ring (35) perform the following. After removal of plunger assembly remove retaining rings (28) and tripod head pins (29). Unscrew nuts (26) and remove washer seals (27). Lift tripod head (30) from top of reservoir (32) and remove cylinder (34) from base (77).

f. To reassemble the plungers (5, 7 and 9) within the cylinder (34) with all Teflon back-up rings, "O" rings and bearings on bottom of plungers secured by retaining rings, insert the inner plunger into the center plunger and these two plungers into the outer plunger. Replace locknuts (1, 2 and 3) on plunger threads. Lift complete assembly into cylinder (34) and push to jack base. Thread in stop ring (4) and fill jack with oil through tripod oil port.

**CAUTION**

When filling oil reservoir jack plungers must be in down position and release valve closed. Oil level is to the bottom of the tripod head and when too much oil is added it will overflow out positive aid vent hole between tripod lug ears directly opposite oil filler hole. When oil is at proper level no more overflow will occur.

g. Reassemble in reverse order of disassembly and when tightening down on the tripod head bolts, tighten evenly to assure proper seating of reservoir, cylinder and tripod head seals. Bolts (36) may have to be loosened on leg assembly (38) before pin (29) can be lined up. Retighten bolts (36) after pins (29) are secured.

4-13. PUMP ASSEMBLY. Disassemble pump assembly in the following manner.

a. Drain oil by removing plug (70) and screen (71). Remove cotter pin (43) and pin (44) from

fulcrum (45) and pump piston (50). It is not necessary to remove more than one cotter pin and pin to remove pump.

b. To replace pump cup (49) or packing (51) it is not necessary to remove complete pump. Unscrew packing gland (46) and remove packing (51) then pull plunger (50) free from pump body (52). To replace pump cup (49) unscrew nut (47) and remove pump cup and retainer (48) replacing with new pump cup, assemble in reverse order of disassembly. Replace packing (51) before inserting pump plunger into pump body.

c. When removing and disassembly of complete pump always replace both gaskets (56) or pump leakage may result. Check pump body bore for smoothness and freedom from nicks or scratches. Pump piston can show wear and not need to be replaced if pump body is not damaged. In pumping, should leakage appear around pump packing gland and plunger, the tightening of the gland packing (46) will in most cases stop the leakage.

4-14. RELEASE VALVE ASSEMBLY. Disassemble release valve assembly in the following manner.

a. Unscrew stem (61), gland (62) and remove packing (63), washer (64) and ball (65). Check stem ball contact end for excessive spreading due to overtightening of release valve. Check ball and ball seat for scratches and proper seating of ball in ball seat.

b. If the ball is not properly seated, a new seat may be formed by tapping the ball with a brass rod cupped on one end. Replace in reverse order of disassembly.

**CAUTION**

The safety by-pass valve assembly, Part No. 55155 should not be removed unless absolutely necessary. If the safety by-pass valve is not working, or is not adjusted properly, the jack may be damaged.

4-15. SAFETY BY-PASS VALVE. Disassemble safety by-pass valve in the following manner.

a. Remove pipe plug (72), set screw (73), spring (74), spring guide (75) and ball (76). Check ball seat and clean and replace any worn parts. Reseat ball if necessary by tapping the ball with a brass rod cupped on one end.

b. To adjust safety by-pass valve it is necessary that jack inner plunger (9) be extended to register tonage or psi.

c. Set safety by-pass valve by adjusting set screw (73) with a screwdriver until jack will raise a load not to exceed 26,400 pounds or 3,740 psi, which is ten percent above the normal capacity of the jack. Recheck safety by-pass valve by reloading jack several times to assure that by-pass is properly set.

4-15A. Jacks used in support of H53 Helicopter can be reworked to eliminate the interference between the jack and wheels. The rework will also allow the individual jacking the left main gear to be out from under the aircraft during the jacking operation. The rework is as follows:

a. Looking at the jack from the top, pick out the first caster bracket in a clock-wise direction from the pump. Heat this bracket close to the jack leg and bend the bracket toward the jack cylinder. Bend the bracket sufficient to preclude contact of the jack caster with the H53 tire when the jack is

positioned under the left main gear jacking point (Ref Fig. 5-2).

b. The man can be removed from under the aircraft during the left wheel jacking operation by extending the pump handle to 4 1/2 feet long using 1 inch OD pipe, NSN 4710-00-202-8207. Bend the handle 135 degrees with a 3 1/2 radius starting 4 inches from the pump end. This bend will allow jack operator to be positioned from under the aircraft.

c. On the pump (curved end) or the handle cut a 3/8 in. x 3/8 in. groove to facilitate mating with the pump rod. On the straight end of the handle cut a 3/8 inch deep x 3/16 inch wide groove to facilitate opening and closing the pump relief valve.

d. Weld a 1 inch pipe brace NSN 4710-00-202-8207 approximately 6 inches long across the bend in the pump handle. Clean all depainted areas and repaint in accordance with T.O. 35-1-3 (Ref Fig 5-1).



Table 4-1. Troubleshooting

Trouble	Probable Cause	Remedy
Jack will not raise.	Release valve open. (Oil passing back into reservoir).	Close valve firmly.
	Intake valve open. (Oil passing back into reservoir).	Pump rapidly to flush dirt off.
	Discharge valve open. (Oil passing back into pump chamber).	Pump rapidly to flush dirt off.
	Sticking intake valve.	Remove pump from jack base. Unscrew valve block. Clean or replace valve.
	Clogged screen. Lack of oil. Air under plunger.	Remove and clean. Refill. Check for leaks. Bleed air out by opening release valve. Pump rapidly a few times and close release valve.
Jack will not raise to full height.	Lack of oil.	Refill. Check for leaks.
	Sticking intake valve.	Remove pump from jack base. Unscrew valve block. Clean or replace ball valves. Retighten or repair.
Jack will not raise capacity load.	High pressure leaks. (At pump or release valve).	Reseat valve.
	Leaky release valve.	Reseat valve and clean valve block.
Jack raises and falls during each stroke.	Leaky discharge valve.	Tighten or replace ball valve or packing.
Jack will not hold up load.	Leaky release valve.	Reseat valve.
	Defective O-ring and back-up ring.	Remove plunger and replace O-ring and back-up ring.
Jack will not lower the load.	Damaged release valve.	Remove and replace parts as needed.
	Bent plunger.	Replace.
Jack will not close completely.	Air under plunger.	Bleed air out. Open release valve and pump and pump rapidly several times. Close valve.
Handle stroke only partly effective.	Air in pump chamber.	Open release valve and pump rapidly several times. Close valve.
	Sticking intake valve.	Remove pump and clean valve block.
	Clogged screen.	Remove and clean.

4-16. TROUBLESHOOTING.

4-17. Refer to Table 4-1 for troubleshooting.

4-18. TESTING.

4-19. Test jack in the following manner.

a. Place the jack under its rated load of 12-Tons. If the jack fails to operate properly, check for trouble as indicated in the Troubleshooting Table 4-1.

b. If the plungers fail to raise, check for oil leaks around base of jack, defective discharge valves, release valve open or defective. Check to see that air vent is not clogged. Check pump cup and "O" rings in both cylinders and plungers.

c. To check the safety by-pass valve, raise a load of 26,400 pounds. If safety by-pass is operating properly, any load in excess of 26,400 pounds will cause the oil to pass back into the reservoir. With the jack supporting a load of 24,000 pounds, permit the jack to stand for 30 minutes. Any settling in excess of 0.030 inch in this period of time is excessive and indicates oil leakage. Check for oil leaks and replace all defective parts, packings, ball valves or "O" rings as needed.

4-20. PREPARATION FOR RESHIPMENT.

4-21. Prepare the jack for shipment or storage in the following manner.

a. Drain operating fluid from jack as outlined in paragraph 2-7.

b. Flush and drain hydraulic system as outlined in paragraph 2-8, using preservative hydraulic fluid MIL-H-6083, except that the preservative hydraulic fluid shall be used in place of operating fluid.

c. Wipe oily residues from jack with a lint free cloth to prevent accumulation of dust and grit.

d. Plug air vent infiller plug to prevent entrance of foreign material.

4-22. MARKING FOR SHIPMENT AND STORAGE.

4-23. Interior and exterior containers shall be marked in accordance with Standard MIL-STD-129. The nomenclature shall be as follows:

HYDRO-MECHANICAL AVIATION JACK  
12 TON  
PART NUMBER 12-3-14  
FSN: 1730-912-3998

4-24. STORAGE.

4-25. Store in cool, dry location. Package in accordance with latest Air Force Regulations.



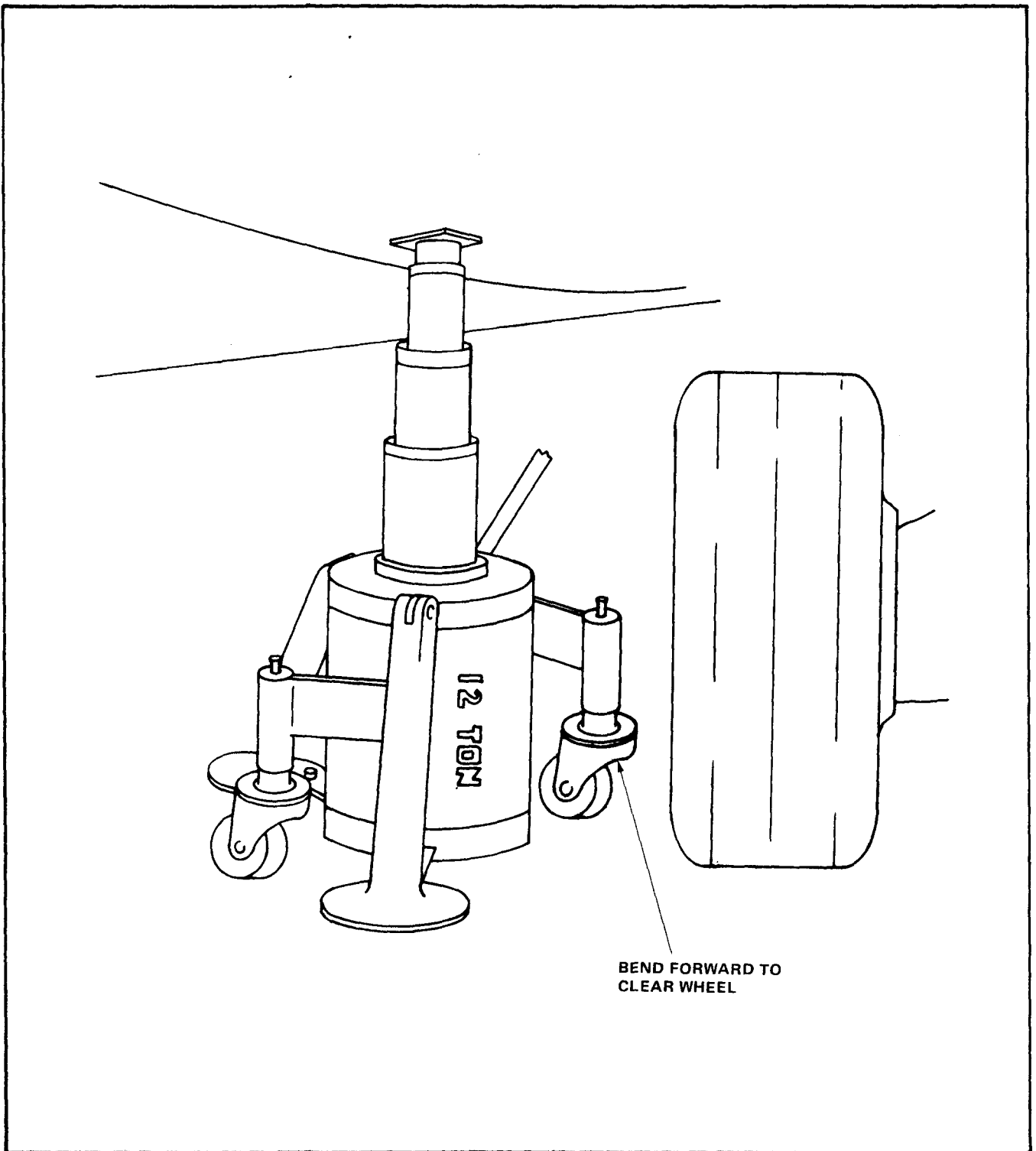


Figure 4-1. Hydro-Mechanical Aviation Jack, Single Stage Type (Modified)

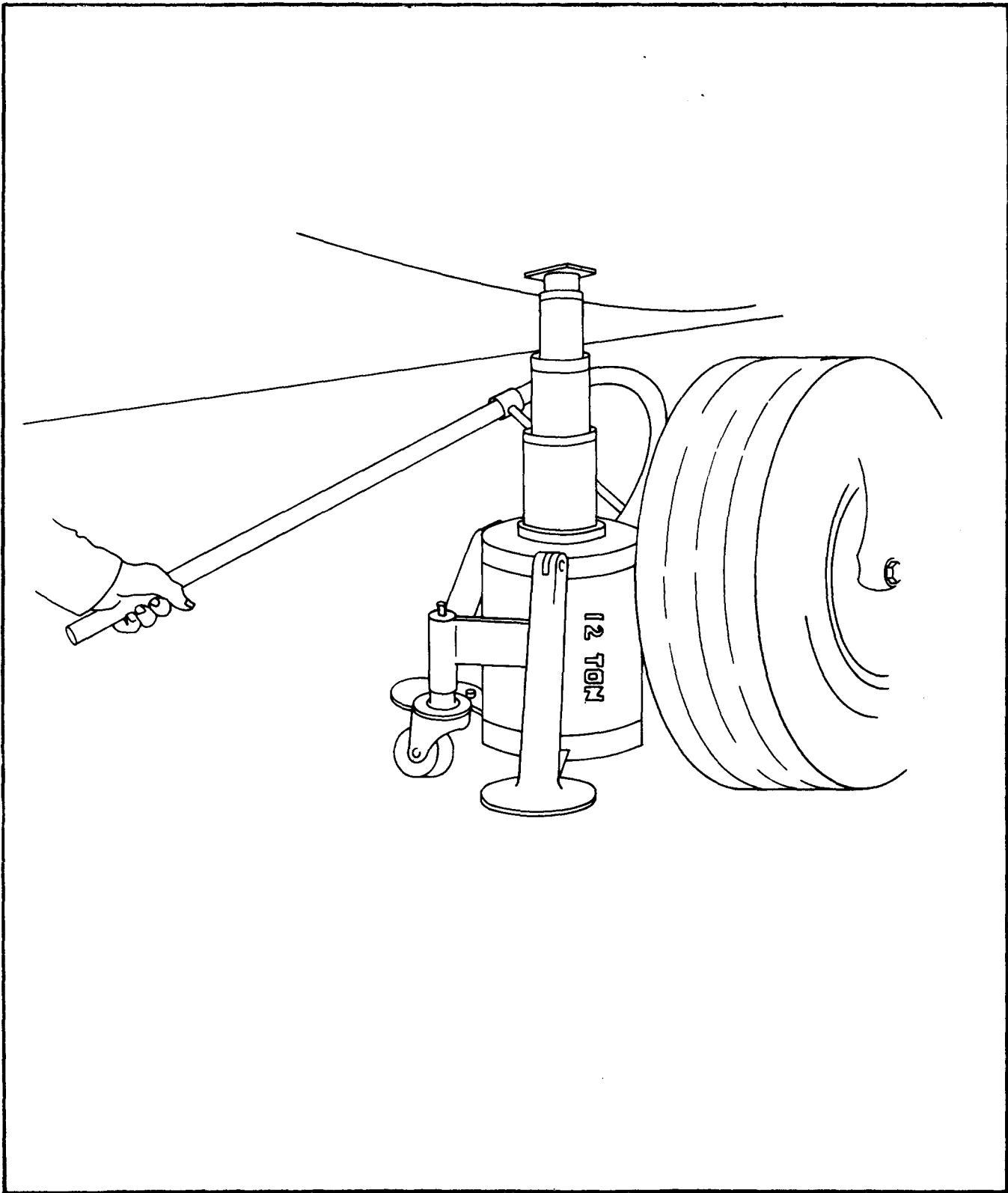


Figure 4-2. Hydro-Mechanical Aviation Jack, Single Stage Type (In Place)

SECTION 5

ILLUSTRATED PARTS BREAKDOWN

5-1. GENERAL.

5-2. This Illustrated Parts Breakdown lists the various assemblies, sub-assemblies and detailed parts.

The parts are listed in their sequence of disassembly. It also arranges and indents all parts in the order which indicate their relationship to the main assembly.

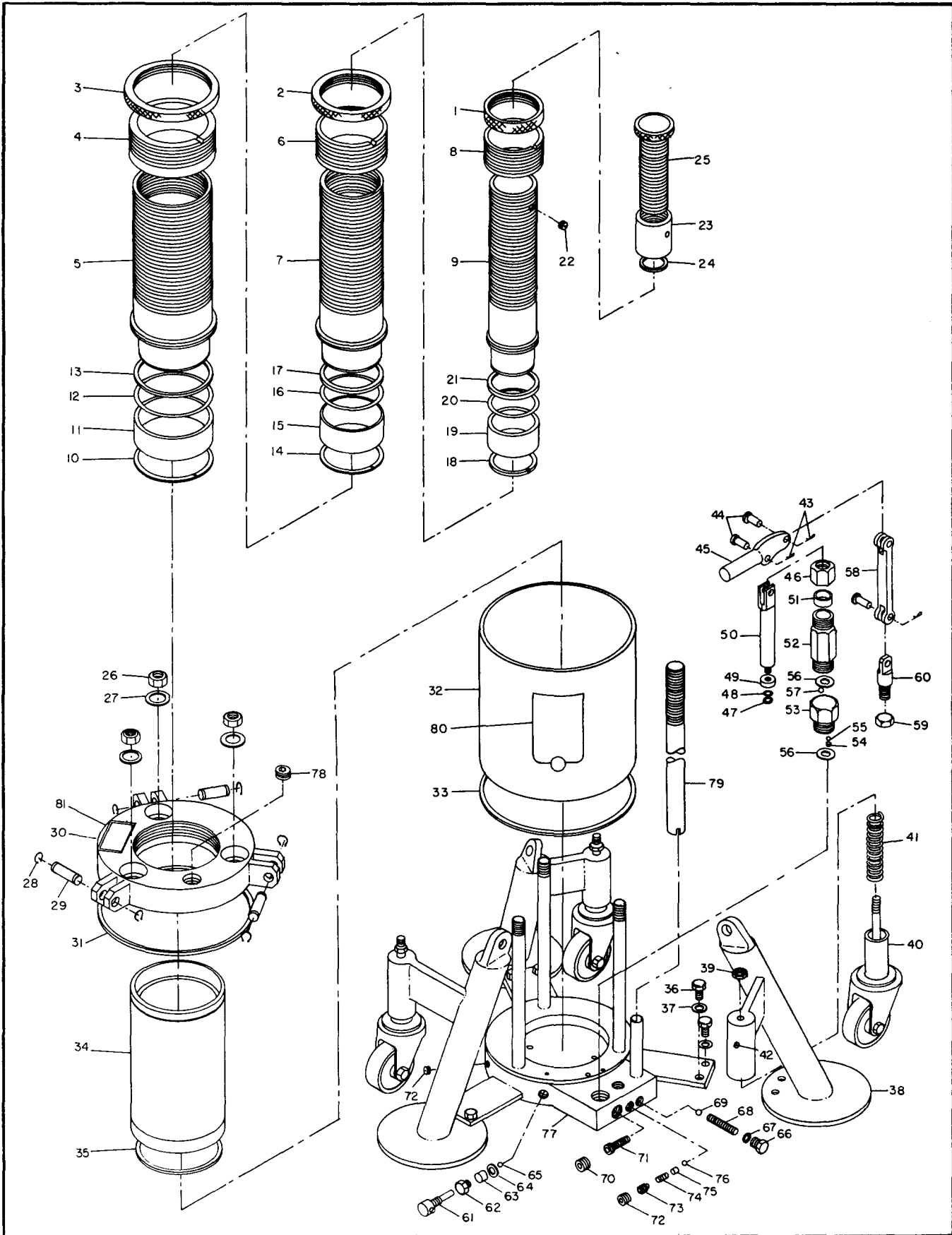


Figure 5-1. 12 Ton Hydro-Mechanical Aviation Jack

FIG & INDEX NO.	PART NUMBER	DESCRIPTION							UNITS PER ASSY	USABLE ON CODE
		1	2	3	4	5	6	7		
5-1	12-3-14	JACK, HYDRO-MECHANICAL AVIATION, 12-TON.....							1	
	12314-56	. LOCKNUT, INNER.....							1	
-2	12314-36	. LOCKNUT, CENTER.....							1	
-3	12314-16	. LOCKNUT, OUTER.....							1	
-4	12314-17	. STOP RING, OUTER.....							1	
-5	12314-10	. PLUNGER, OUTER.....							1	
-6	12314-37	. STOP RING, CENTER.....							1	
-7	12314-30	. PLUNGER, CENTER.....							1	
-8	12314-57	. STOP RING, INNER.....							1	
-9	12314-50	PLUNGER, INNER.....							1	
-10	12314-3-1	. RING, RETAINING.....							1	
-11	12314-12	. BEARING, OUTER.....							1	
-12	MS28775-348	. "O" RING, PACKING.....							1	
-13	49B6413-51	. RING, PACKING BACK-UP.....							1	
-14	12314-3-2	. RING, RETAINING.....							1	
-15	12314-32	. BEARING, CENTER.....							1	
-16	AN6227-44	. "O" RING, PACKING.....							1	
-17	49B6413-44	. RING, PACKING BACK-UP.....							1	
-18	12314-3-3	. RING, RETAINING.....							1	
-19	12314-52	. BEARING, INNER.....							1	
-20	AN6227-37	. "O" RING, PACKING.....							1	
-21	49B6413-37	. RING, PACKING BACK-UP.....							1	
-22	COML	. SCREW, SET 5/16-24 x 5/16 lg.....							1	
-23	12314-9	. NUT, EXTENSION SCREW.....							1	
-24	12314-3-4	. RING, RETAINING.....							1	
-25	12314-8	. SCREW, EXTENSION.....							1	
-26	COML	. NUT, 3/4-16 NF, hex, steel.....							3	
-27	12314-5	. WASHER, SEAL.....							3	
-28	MS16624-62	. RING, RETAINING.....							6	
-29	12314-75	. PIN, TRIPOD HEAD.....							3	
-30	12314-4	. HEAD, TRIPOD.....							1	
-31	12314-13	. GASKET, RESERVOIR, TOP.....							1	
-32	12314-2	. RESERVOIR.....							1	
-33	AN6230-47	. "O" RING, GASKET.....							1	
-34	12314-6	. CYLINDER.....							1	
-35	AN6230-31	. "O" RING, GASKET.....							1	
-36	COML	. BOLT, 3/8-16 NC x 3/4 lg., hex.....							6	
-37	COML	. LOCKWASHER, 3/8 dia., st'd.....							6	
-38	12314-55	. LEG, WELDED ASSEMBLY.....							3	
-39	COML	. NUT, 7/16-14, hex jam, steel.....							3	
-40	51531	. CASTER, SWIVEL ASSEMBLY.....							3	
-41	51597	. SPRING, CASTER.....							3	
-42	COML	. FITTING, GREASE, 1/4 dia. dr. ty.....							3	
	55040	. PUMP ASSEMBLY, 3/4 dia.....							1	
-43	COML	. PIN, COTTER, 3/32 x 3/4 lg.....							3	
-44	55002	. PIN, FLAT HEAD.....							3	
-45	55001	. FULCRUM.....							1	
-46	55045	. GLAND, PACKING.....							1	
-47	MS51967-2	. NUT, Plain hex, 1/4-20 NC.....							1	
-48	55049	. RETAINER, CUP.....							1	
-49	55048	. CUP, LEATHER.....							1	
-50	55047	. PLUNGER, PUMP.....							1	
-51	55044	. PACKING, PUMP.....							1	
-52	55046	. BODY, PUMP.....							1	
-53	55010	. BLOCK, VALVE PUMP.....							1	
-54	55295	. SPRING, VALVE PUMP.....							1	
-55	MS19059-9	. BALL, 7/32 dia. chr. steel.....							1	
-56	55024	. GASKET, PUMP.....							2	
-57	MS19059-10	. BALL, 1/4 dia. chr. steel.....							1	
-58	55012	. LINK, PUMP.....							1	
-59	COML	. NUT, 5/8-18 NF hex jam, steel.....							1	
-60	55011	. ANCHOR, LINK PUMP.....							1	

FIG & INDEX NO.	PART NUMBER	1	2	3	4	5	6	7	DESCRIPTION	UNITS PER ASSY	USABLE ON CODE
5-	55100	.	.	.	.	.	.	.	RELEASE VALVE ASSEMBLY .....	1	
-61	55101	.	.	.	.	.	.	.	STEM.....	1	
-62	55102	.	.	.	.	.	.	.	GLAND.....	1	
-63	55104	.	.	.	.	.	.	.	PACKING.....	1	
-64	55103	.	.	.	.	.	.	.	WASHER.....	1	
-65	COML	.	.	.	.	.	.	.	BALL, 1/4 dia., chr. steel.....	1	
-66	AN814-4	.	.	.	.	.	.	.	PLUG .....	1	
-67	AN6290-4	.	.	.	.	.	.	.	"O" RING, GASKET.....	1	
-68	72519	.	.	.	.	.	.	.	SPRING, BASE .....	1	
-69	COML	.	.	.	.	.	.	.	BALL, 5/16 dia. chr. steel.....	1	
-70	AN932-4	.	.	.	.	.	.	.	PLUG, PIPE, 3/8-18 NPT soc. head .....	1	
-71	55567	.	.	.	.	.	.	.	SCREEN, OIL .....	1	
-72	AN932-3	.	.	.	.	.	.	.	PLUG, 1/4-18 NPT soc. head.....	2	
	55155	.	.	.	.	.	.	.	SAFETY BY-PASS VALVE ASSEMBLY .....	1	
-73	55148	.	.	.	.	.	.	.	SCREW, SET .....	1	
-74	55154	.	.	.	.	.	.	.	SPRING.....	1	
-75	55153	.	.	.	.	.	.	.	GUIDE, SPRING .....	1	
-76	COML	.	.	.	.	.	.	.	BALL, 7/32 dia., chr. steel.....	1	
-77	12314-7	.	.	.	.	.	.	.	BASE, WELDED ASSEMBLY .....	1	
-78	COML	.	.	.	.	.	.	.	PLUG, PIPE, 1/2-14 NPT soc. head .....	1	
-79	61878	.	.	.	.	.	.	.	HANDLE, PUMP .....	1	
-80	55213	.	.	.	.	.	.	.	DECAL, INSTRUCTION.....	1	
-81	12314-96	.	.	.	.	.	.	.	NAMEPLATE .....	1	

T.O. 35A2-2-36-21

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TECHNICAL MANUAL  
OPERATION SERVICE  
WITH  
ILLUSTRATED PARTS BREAKDOWN

HYDRO-MECHANICAL AVIATION JACK  
12 TON

PART NUMBER 12-3-14

NSN 1730-00-912-3998

(COLUMBUS JACK)

(FMC 00994)

F41608-81-A062  
F41608-90-D-1819

(ATOS)

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Page No.	*Change No.	Page No.	*Change No.	Page No.	*Change No.
Title .....		10			
A .....		10			
i .....		9			
ii Blank.....		0			
1-1 .....		0			
1-2 Blank.....		0			
2-1 .....		0			
2-2 Blank.....		0			
3-1 .....		3			
3-2 Blank.....		0			
4-1 - 4-2 .....		9			
4-2A.....		10			
4-2B Blank .....		6			
4-3 .....		0			
4-4 - 4-6 .....		2			
5-1 - 5-2 .....		0			
5-3 .....		8			
5-4 .....		5			

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b. To adjust safety by-pass valve it is necessary that jack inner plunger (9) be extended to register tonage or psi.

c. Set safety by-pass valve by adjusting set screw (73) with a screwdriver until jack will raise a load not to exceed 26,400 pounds or 3,740 psi, which is ten percent above the normal capacity of the jack. Recheck safety by-pass valve by reloading jack several times to assure that by-pass is properly set.

4-15A. Jacks used in support of H53 Helicopter can be reworked to eliminate the interference between the jack and wheels. The rework will also allow the individual jacking the left main gear to be out from under the aircraft during the jacking operation. The rework is as follows:

a. Looking at the jack from the top, pick out the first caster bracket in a clock-wise direction from the pump. Heat this bracket close to the jack leg and bend the bracket toward the jack cylinder. Bend the bracket sufficient to preclude contact of the jack caster with the H53 tire when the jack is

positioned under the left main gear jacking point (Ref Fig. 5-2).

b. The man can be removed from under the aircraft during the left wheel jacking operation by extending the pump handle to 4 1/2 feet long using 1 inch OD pipe, NSN 4710-00-202-8207. Bend the handle 135 degrees with a 3 1/2 radius starting 4 inches from the pump end. This bend will allow jack operator to be positioned from under the aircraft.

c. On the pump (curved end) or the handle cut a 3/8 in. x 3/8 in. groove to facilitate mating with the pump rod. On the straight end of the handle cut a 3/8 inch deep x 3/16 inch wide groove to facilitate opening and closing the pump relief valve.

d. Weld a 1 inch pipe brace NSN 4710-00-202-8207 approximately 6 inches long across the bend in the pump handle. Clean all depainted areas and repaint in accordance with T.O. 35-1-3 (Ref Fig 5-1).



**T.O. 35A2-2-36-21**

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**TECHNICAL MANUAL**  
**OPERATION SERVICE**  
**WITH**  
**ILLUSTRATED PARTS BREAKDOWN**

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<b>4-2A</b> .....		<b>9</b>			
4-2B Blank .....		6			
4-3 .....		0			
4-4 - 4-6 .....		2			
5-1 - 5-2 .....		0			
5-3 .....		8			
5-4 .....		5			

\*Zero in this column indicates an original page

## TABLE OF CONTENTS

Section/Para	Page
I INTRODUCTION.....	1-1
1-1 Purpose and Function .....	1-1
1-3 Capabilities .....	1-1
1-5 List of Items Furnished .....	1-1
1-7 Intended Use.....	1-1
1-9 Leading Particulars.....	1-1
II PREPARATION FOR USE AND INSTALLATION INSTRUCTIONS.....	2-1
2-1 Unpacking.....	2-1
2-3 Installation.....	2-1
2-5 Bleeding Air from System.....	2-1
2-7 Draining Fluid .....	2-1
III OPERATING INSTRUCTIONS.....	3-1
3-1 Positioning .....	3-1
3-3 Lifting .....	3-1
3-5 Lowering.....	3-1
IV MAINTENANCE INSTRUCTIONS .....	4-1
4-1 Special Tools .....	4-1
4-3 Cleaning .....	4-1
4-5 Lubrication.....	4-1
4-7 Inspection.....	4-1
4-9 Disassembly, Repair, Replacement, and Reassembly.....	4-1
4-16 Troubleshooting .....	4-4
4-18 Testing.....	4-4
4-20 Preparation for Reshipment .....	4-4
4-22 Marking for Shipment and Storage .....	4-4
4-24 Storage .....	4-4
V ILLUSTRATED PARTS BREAKDOWN.....	5-1
5-1 General.....	5-1

## LIST OF ILLUSTRATIONS

Figure	Title	Page
4-1	Hydro-Mechanical Aviation Jack, Single Stage Type (Modified).....	4-5
4-2	Hydro-Mechanical Aviation Jack, Single Stage Type (In Place).....	4-6
5-1	12 Ton Hydro-Mechanical Aviation Jack .....	5-2



## SECTION IV

### MAINTENANCE INSTRUCTIONS

#### 4-1. SPECIAL TOOLS.

4-2. No special tools are needed to disassemble, repair or reassemble the model 12-3-14 tripod jack.

#### 4-3. CLEANING.

**WARNING**

- Perform all solvent cleaning operations in an approved cleaning cabinet or in a well ventilated area. Avoid prolonged breathing of vapors. Avoid eye and repeated skin contact. Keep solvents away from sparks and flames.
- Use approved personnel protective equipment (goggles/face shield) when using compressed air. Maximum allowable air pressure for cleaning operations is restricted to less than 15 psi. Provide protection from flying particles when using compressed air. Do not direct airstream towards self or other personnel.

4-4. Wash all parts with dry cleaning solvent, Federal Specification P-D-680, Type II and dry thoroughly with compressed air. Protect all machined surfaces from dust, dirt and dampness.

#### 4-5. LUBRICATION.

4-6. No specific schedule of lubrication is required. All internal parts operate in system fluid, providing adequate internal lubrication. When extension screw, rams, rocker arm or link pins appear dry or in need of lubrication, wipe clean of accumulated dirt and grit, and apply a light film of lubricating oil, Specification MIL-L-7670. Wipe away excess oil with a clean, lint-free cloth.

#### 4-7. INSPECTION.

4-8. Each time the jack is to be used or is to be disassembled, inspect carefully as follows:

- a. Check oil level in reservoir.
- b. Check for oil leaks around base of jack, between reservoir and base.
- c. Check for oil leaks at top and bottom of pump, top of plungers.

d. Check cylinder and plungers after disassembly for scoring, rust and deterioration.

e. Functionally check ram locking nuts Figure 5-1, Indexes 3, 2, and 1 for removal by hand. If nut can be removed by hand extend ram and screw lock nuts down to gain access to ram top threads. Peen top ram threads such that lock nuts cannot be removed by hand.

#### 4-9. DISASSEMBLY, REPAIR, REPLACEMENT, AND REASSEMBLY.

4-10. REPLACEMENT OF PARTS. If parts of the 12-Ton tripod jack, Model 12-3-14 are worn, they should be replaced with new parts.

a. After disassembly, all "O" rings, Teflon back-up rings and reservoir gaskets should be replaced with new units, provided they show wear.

b. Replace any valve balls which are chipped or nicked.

c. If cylinder or plungers are scored or distorted, replace with new parts.

4-11. Disassemble and reassemble the jack in the order of key index numbers assigned to the exploded view illustration Figure 5-1. The following instructions cover those points that are not apparent.

4-12. HYDRAULIC CYLINDER ASSEMBLY. The hydraulic cylinder assembly is repaired in the following manner.

a. To disassemble the hydraulic cylinder assembly plungers, (5, 7 and 9, Figure 5-1) remove plug (70) and screen (71) from base (77) and drain oil from the reservoir. Then remove locknuts (1, 2 and 3), unscrew stop ring (4) from tripod head (30). After stop ring has been removed extend extension screw (25) and pull up. The plungers will rise out of cylinder (34). It is not necessary to remove stop rings (6 or 8) to pull plunger assembly. After plungers have been removed push plunger (9) from top thru plunger (7) and plunger (7) from top thru plunger (5).

b. Inspect bore of plungers and cylinder for smoothness, wear, and scratches. Inspect "O" rings (12, 16, and 20) for turned edges, cuts, and distortions. At the same time check (13, 17, and 21) Teflon back-up rings for turned edges, cuts, and distortions. Check bronze bearings (11, 15, and 19) for excessive wear.

c. Should replacement of bearings, “O” rings or Teflon back-up rings be required, remove retaining rings (10, 14 or 18) and bearings, “O” rings and Teflon back-up rings can be removed from plunger ends. Replace in reverse order as shown in Figure 5-1.

d. Extension screw (25) does not have to be removed unless it is damaged. There is an “O” ring (35) between cylinder (34) and base (77) and unless cylinder has to be replaced do not remove.

e. Should cylinder (34) have to be removed for replacement or for replacement of “O” ring (35) perform the following. After removal of plunger assembly remove retaining rings (28) and tripod head pins (29). Unscrew nuts (26) and remove washer seals (27). Lift tripod head (30) from top of reservoir (32) and remove cylinder (34) from base (77).

f. To reassemble the plungers (5, 7 and 9) within the cylinder (34) with all Teflon back-up rings, “O” rings and bearings on bottom of plungers secured by retaining rings, insert the inner plunger into the center plunger and these two plungers into the outer plunger. Replace locknuts (1, 2 and 3) on plunger threads. Lift complete assembly into cylinder (34) and push to jack base. Thread in stop ring (4) and fill jack with oil through tripod oil port.

**CAUTION**

When filling oil reservoir jack plungers must be in down position and release valve closed. Oil level is to the bottom of the tripod head and when too much oil is added it will overflow out positive aid vent hole between tripod lug ears directly opposite oil filler hole. When oil is at proper level no more overflow will occur.

g. Reassemble in reverse order of disassembly and when tightening down on the tripod head bolts, tighten evenly to assure proper seating of reservoir, cylinder and tripod head seals. Bolts (36) may have to be loosened on leg assembly (38) before pin (29) can be lined up. Retighten bolts (36) after pins (29) are secured.

4-13. PUMP ASSEMBLY. Disassemble pump assembly in the following manner.

a. Drain oil by removing plug (70) and screen (71). Remove cotter pin (43) and pin (44) from

fulcrum (45) and pump piston (50). It is not necessary to remove more than one cotter pin and pin to remove pump.

b. To replace pump cup (49) or packing (51) it is not necessary to remove complete pump. Unscrew packing gland (46) and remove packing (51) then pull plunger (50) free from pump body (52). To replace pump cup (49) unscrew nut (47) and remove pump cup and retainer (48) replacing with new pump cup, assemble in reverse order of disassembly. Replace packing (51) before inserting pump plunger into pump body.

c. When removing and disassembly of complete pump always replace both gaskets (56) or pump leakage may result. Check pump body bore for smoothness and freedom from nicks or scratches. Pump piston can show wear and not need to be replaced if pump body is not damaged. In pumping, should leakage appear around pump packing gland and plunger, the tightening of the gland packing (46) will in most cases stop the leakage.

4-14. RELEASE VALVE ASSEMBLY. Disassemble release valve assembly in the following manner.

a. Unscrew stem (61), gland (62) and remove packing (63), washer (64) and ball (65). Check stem ball contact end for excessive spreading due to overtightening of release valve. Check ball and ball seat for scratches and proper seating of ball in ball seat.

b. If the ball is not properly seated, a new seat may be formed by tapping the ball with a brass rod cupped on one end. Replace in reverse order of disassembly.

**CAUTION**

The safety by-pass valve assembly, Part No. 55155 should not be removed unless absolutely necessary. If the safety by-pass valve is not working, or is not adjusted properly, the jack may be damaged.

4-15. SAFETY BY-PASS VALVE. Disassemble safety by-pass valve in the following manner.

a. Remove pipe plug (72), set screw (73), spring (74), spring guide (75) and ball (76). Check ball seat and clean and replace any worn parts. Reseat ball if necessary by tapping the ball with a brass rod cupped on one end.



b. To adjust safety by-pass valve it is necessary that jack inner plunger (9) be extended to register tonage or psi.

c. Set safety by-pass valve by adjusting set screw (73) with a screwdriver until jack will raise a load not to exceed 26,400 pounds or 3,740 psi, which is ten percent above the normal capacity of the jack. Recheck safety by-pass valve by reloading jack several times to assure that by-pass is properly set.

4-15A. Jacks used in support of H53 Helicopter can be reworked to eliminate the interference between the jack and wheels. The rework will also allow the individual jacking the left main gear to be out from under the aircraft during the jacking operation. The rework is as follows:

a. Looking at the jack from the top, pick out the first caster bracket in a clock-wise direction from the pump. Heat this bracket close to the jack leg and bend the bracket toward the jack cylinder. Bend the bracket sufficient to preclude contact of the jack caster with the H53 tire when the jack is

positioned under the left main gear jacking point (Ref Fig. 5-2).

b. The man can be removed from under the aircraft during the left wheel jacking operation by extending the pump handle to 4 1/2 feet long using 1 inch OD pipe, NSN 4710-00-202-8207. Bend the handle 135 degrees with a 3 1/2 radius starting 4 inches from the pump end. This bend will allow jack operator to be positioned from under the aircraft.

c. On the pump (curved end) or the handle cut a 3/8 in. x 3/8 in. groove to facilitate mating with the pump rod. On the straight end of the handle cut a 3/8 inch deep x 3/16 inch wide groove to facilitate opening and closing the pump relief valve.

d. Weld a 1 inch pipe brace NSN 4710-00-202-8207 approximately 6 inches long across the bend in the pump handle. Clean all depainted areas and repaint in accordance with T.O. 35-1-3 (Ref Fig 5-3).

