TECHNICAL MANUAL

OVERHAUL with PARTS BREAKDOWN

HYDRO-MECHANICAL AVIATION JACK, SINGLE STAGE TYPE

12-3-14

(MALABAR)

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TO BE DISTRIBUTED IN ACCORDANCE WITH DA FORM 12-31 (QTY RQR BLOCK NO. 95) IN DIRECT AND GENERAL SUPPORT MAINTENANCE REQUIREMENTS FOR ALL FIXED WING AND ROTOR WING AIRCRAFT.

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SECTION I

INTRODUCTION

1-1. This is a basic handbook for the overhaul, repair, disassembly and reassembly of the 12-Ton hydro-mechanical fixed height tripod jack model 12-3-14. The handbook includes an exploded view of the jack and all its component parts, with an index and figure number assigned to each part in the parts list. There are two parts lists, one giving first the figure and index number, and the second a listing by numerical order.

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

SECTION II

2-1. SPECIAL TOOLS

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

SECTION III

3-1. TABLE OF LIMITS

3-2. The limiting factor in the model 12-3-14 tripod jack is its capacity. The jack is constructed to normally lift a load of 24,000 pounds with an overload factor of ten per cent 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.

SECTION IV

DISASSEMBLY, CLEANING AND INSPECTION

4-1. DISASSEMBLY

4-2. To disassemble the Jack, following the index numbers in Fig. 1.

a. To disassemble the hydraulic cylinder assembly plungers (1-5), (1-7), and (1-9) you first remove plug (1-70) and screen (1-71) from base (1-77) and drain oil from the reservoir. Then remove locknuts (1-1), (1-2), and (1-3) next, unscrew stop ring (1-4) from tripod head (1-30). After stop ring has been removed extend extension screw (1-25) and pull up. The plungers will rise out of cylinder (1-34). It is not necessary to remove stop rings (1-6) or (1-8) to pull plunger assembly. After plungers have been removed push plunger (1-9) from top thru plunger (1-7) and plunger (1-7) from top thru plunger (1-5). Inspect bore of plungers and cylinder for smoothness, wear, and scratches. Inspect “O” Rings (1-12), (1-16), and (1-20) for turned edges, cuts, and distortions. At the same time check (1-13), (1-17), and (1-21) Teflon back-up rings for turned edges, cuts, and distortions. Check bronze bearings (1-11), (1-15), and (l-19) for excessive wear. Should replacement of hear ings, "Q" rings or Teflon backup-rings be required, re move retaining rings (1-10), (1-14) or (1-18) and hearings, "O" rings and Teflon back-up rings can be removed from plunger ends. Replace in reverse order as shown in Fig. 1. Extension screw (1-25) does not have to be removed unless it is damaged. There is an “O” ring (1-35) between cylinder (1-34) and base (1-77) and unless cylinder has to be replaced do not remove.

b. Should cylinder (1-34) have to be removed for replacement or for replacement of "O" Ring (1-33) seal of reservoir (1-32). After removal of plunger assembly next, remove retaining rings (1-28) and tripod head pins (1-29). Unscrew nuts (1-26) and remove washer seals (1-27). Lift tripod head (1-30) from top of reservoir (1-32) and you can remove cylinder (1-34) from base (1-77).

c. Reassembly in reverse order of dissembly and when tightening down on the tripod head bolts, tighten evenly to assure proper seating of reservoir, cylinder and tripod head seals. Bolts (1-36) may have to be loosened on leg assembly (1-38) before pin (1-29) can be lined up. Retighten bolts (1-36) after pins (1-29) are secured.

d. To disassemble the pump assembly 55040 drain oil by removing plug (1-70) and screen (1-71). Remove cotter pin (1-43) and pin (1-44) from fulcrum (1-45) and pump piston (1-50). It its not necessary to remove more than one cotter pin and pin to remove pump. To replace pump cup (1-49) or packing (1-51) it is not necessary to remove complete pump. Unscrew packing gland (1-46) and remove packing (1-51) then pull plunger (1-50) free from pump body (1-52). To replace pump cup (1-49) unscrew nut (1-47) and remove pump cup and retainer (1-48) replacing with new pump cup, assemble in reverse order of disassembly. Replace packing (1-51) before inserting pump plunger into pump body. When removing and disassembly of complete pump always replace both gaskets (1-56) 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 (1-46) will in most cases stop the leakage.

e. To disassemble the release valve assembly 55100 unscrew stem (1-61), gland (1-62) and remove packing (1-63), washer (1-64) and ball (1-65). 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. 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 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 he damaged.

f. To disassemble the safety by-pass valve remove pipe plug (1-72) set screw (1-73), spring (1-74), spring guide (1-75) and ball (1-76). Check ball seat and clean and replace any worn parts. Reseat ball if necessary. To adjust safety by-pass valve it is necessary that jack inner plunger (1-9) be extended to register tonage or psi. Set safety by-pass valve by adjusting set screw (1-73) with a screw driver until jack will raise a load not to exceed 26,400 pounds or 3-740 psi, which is ten per cent 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.

h. All parts of the jack may be cleaned with cleaning solvent and dried with compressed air. Protect all machined surfaces from dust, dirt and dampness.

4-3. INSPECTION

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

a. Check oil level in reservoir (1-32).

b. For oil leaks around base of jack, between reservoir and base.

c. For oil leaks at top and bottom of pump, top of plungers.

d. After disassembly, check cylinder and plungers for scoring, rust and deterioration.

SECTION V

REPAIR AND REPLACEMENT

5-1. Repair and replacement of parts.

a. If parts of the 12-Ton tripod jack, Model 12-3-14 are worn, they should be replaced with new parts.

b. After disassembly, all “O” rings, Teflon backup rings and reservoir gaskets should be replaced with new units, provided they show wear.

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

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

SECTION VI

REASSEMBLY

6-1. Reassemble in, the reverse order of disassembly as outlined in Section IV and Figure 1.

a. To reassemble the jack, start with the base components, including the safety by-pass valve, oil screen and release valve.

b. Reassemble pump 55140 next as outlined in Section IV Paragraph d.

c. Reassemble cylinder, reservoir, and tripod head attaching legs to tripod head.

d. To reassemble the plungers (1-5), (1-7) and (l-9) within the cylinder (1-34) 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 (1-1), (1-2) and (1-3) on plunger threads. Lift complete assembly into cylinder (1-34) and push to jack base. Thread in stop ring (1-4) and fill jack with oil through tripod oil port (1-78).

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 filter hole. When oil is at proper level no more overflow will occur.

SECTION VII

TESTING AFTER OVERHAUL

7-1. Test the jack as follows:

a. Place the jack under its rated load of 12-Tons and test as stated in Section IV paragraph 4-2. If the jack fails to operate properly, check for trouble as indicated in the Trouble Shooting Chart, Section VIII.

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.

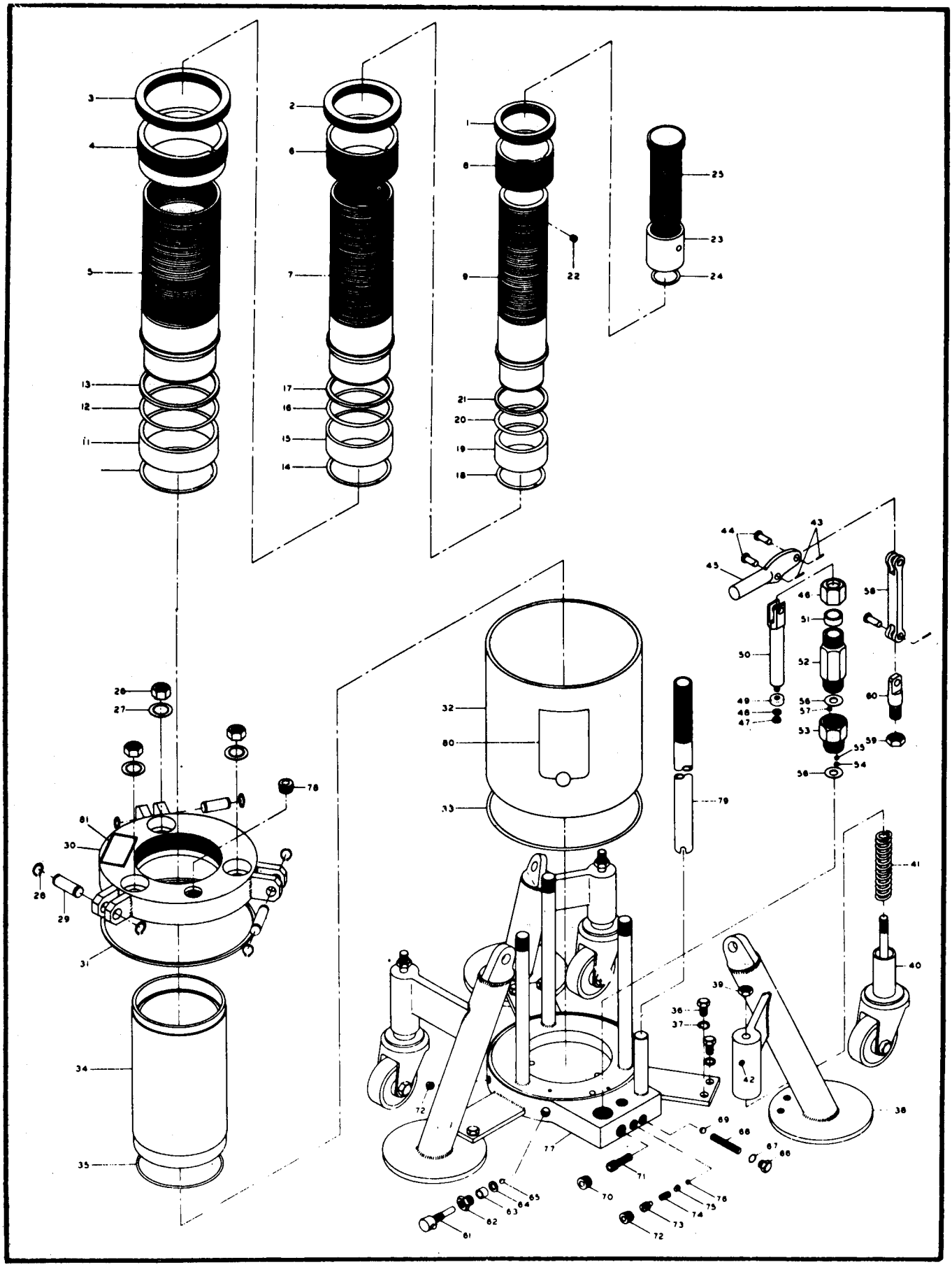

Figure 1. Hydro-Mechanical Aviation Jack, Single Stage Type.

FIG. & INDEX NO.	PART NO.	DESCRIPTION 1 2 3 4 5	UNITS PER ASSY	SOURCE CODE
3-	12-3-14	JACK ASSEMBLY, 12 ton	1	
-1	12314-56	LOCKNUT, inner	1	X2
-2	12314-36	LOCKNUT, center	1	X2
-3	12314-16	LOCKNUT, outer	1	X2
-4	12314-17	STOP RING, outer	1	X2
-5	12314-10	PLUNGER, outer	1	X2
-6	12314-37	STOP RING, center	1	X2
-7	12314-30	PLUNGER, center	1	X2
-8	12314-57	STOP RING, inner	1	X2
-9	12314-50	PLUNGER, inner	1	X2
-10	12314-3-1	RING, retaining	1	X2
-11	12314-12	BEARING, outer	1	X2
-12	AN6227-51	"O" RING, packing	1	
-13	49B6413-51	RING, packing back-up	1	
-14	12314-3-2	RING, retaining	1	X2
-15	12314-32	BEARING, center	1	X2
-16	AN6227-44	"O" RING, packing	1	
-17	49B6413-44	. RING, packing back-up	1	
-18	12314-3-3	. RING, retaining	1	X2
-19	12314-52	. BEARING, inner	1	X2
-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	X2
-24	12314-3-4	. RING, retaining	1	P1
-25	12314-8	. SCREW, extension	1	X2
-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	X2
-30	12314-4	. HEAD, tripod	1	X2
-31	12314-13	. GASKET, reservoir, top	1	
-32	12314-2	. RESERVOIR	1	X2
-33	AN6230-47	. "O" RING, gasket	1	
-34	12314-6	. CYLINDER	1	X2
-35	AN6230-27	. "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	X2
-39	COML	. NUT, 7/16-14, Hex Jam, Steel	3	
-40	51531	CASTER, SWIVEL ASSEMBLY	3	X2
-41	51597	. SPRING, caster	3	X2
-42	COML	. FITTING, grease, 1/4 dia. dr. ty.	3	
	55040	PUMP ASSEMBLY, 3/4 dia.	1	A
-43	COML	. . PIN, cotter 3/32 x 3/4 lg.	3	
-44	55002	. PIN, flat head	3	X2
-45	55001	. . FULCRUM	1	X2

FIG. & INDEX NO.	PART NO.	DESCRIPTION 1 2 3 4 5	UNITS PER ASSY	SOURCE CODE
3-46	55045	. . GLAND, packing	1	P1
-47	COML	. . NUT, ¼-20 NC fin. Hex nut	1	
-48	55049	. . RETAINER, cup	1	
-49	55048	. . CUP, leather	1	X2
-50	55047	. . PLUNGER, pump	1	X2
-51	55044	. . PACKING, pump	1	X2
-52	55046	. . BODY, pump	1	X2
-53	55010	. . BLOCK, valve pump	1	P1
-54	55295	. SPRING, valve pump	1	X2
-55	COML	. . BALL, 7/32 dia. CHR. STEEL	1	
-56	55024	. . GASKET, pump	2	P1
-57	COML	. . BALL, ¼ dia. Chr. Steel	1	
-58	55012	. . LINK, pump	1	X2
-59	COML	. . NUT, ⅝-18 NF Hex Jam, St.	1	
-60	55011	. . ANCHOR, link pump	1	X2
	55100	. RELEASE VALVE ASSEMBLY		
-61	55101	. . STEM	1	X2
-62	55102	. . GLAND	1	X2
-63	55104	. . PACKING	1	X2
-64	55103	. . WASHER	1	X2
-65	COML	. . BALL, ¼ dia. Chr. Steel	1	
-66	AN814-4	. PLUG	1	
-67	AN6290-4	. "O" RING, gasket	1	X2
-68	72519	. SPRING, base	1	X2
-69	COML	. BALL, 5/16 dia. Chr. Steel	1	
-70	COML	. PLUG, pipe ⅜-18 NPT Soc. Hd.	1	
-71	55567	. SCREEN, oil	1	X2
-72	COML	. PLUG, ¼-18 NPT Soc. Head	2	
	55155	. SAFETY BY-PASS VALVE ASSEMBLY		
-73	55148	. . SCREW, set	1	X2
-74	55154	. . SPRING	1	X2
-75	55153	. . GUIDE, spring	1	X2
-76	COML	. BALL, 7/32 dia, Chr. Steel	1	
-77	12314-7	. BASE, welded assembly	1	X2
-78	COML	. PLUG, pipe ½-14 NPT Soc. Head	1	
-79	61878	HANDLE, pump	1	
-80	55213	. DECAL, instruction	1	
-81	12314-96	NAMEPLATE	1	

SOURCE CODE DEFINITION.

CODE "X2" identifies parts applicable at any level of maintenance consistent with the Command's authorized scope of maintenance, usage of which is not anticipated and which are impracticable for service manufacture. This type of item will not be stocked. Such parts shall be obtained from reclamation, or requisitioned through normal supply channels with supporting justification for one-time procurement and immediate issue. Repeated requests shall justify a change to a "P1" or "P2" code. as applicable, if considered economical to procure and stock such parts.

SECTION VIII. TROUBLE SHOOTING CHART

TROUBLE	PROBABLE CAUSE	REMEDY
Jack will not raise	Release valve open. (Oil passing hack 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.	Remove and clean.
	Lack of oil. Air under plunger.	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 upload	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 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.

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