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MALABAR

INTERNATIONAL

AIRCRAFT MAINTENANCE & SUPPORT EQUIPMENT

OWNER'S MANUAL FOR MALABAR MODEL

8966

***THREE STAGE
HYDRAULIC AVIATION AXLE JACK***

***READ
AND
SAVE***

**THIS
INSTRUCTION
MANUAL**

- * GENERAL DESCRIPTION
- * OPERATION
- * SERVICE
- * PARTS BREAKDOWN

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OVER 65 YEARS OF SERVICE & EXPERIENCE

GENERAL DESCRIPTION, OPERATION, SERVICE AND PARTS BREAKDOWN

MALABAR MODEL 8966 THREE STAGE HYDRAULIC AVIATION AXLE JACK

CAUTION: AIRCRAFT MANUFACTURER'S SPECIFICATIONS AND INSTRUCTIONS MUST BE FOLLOWED. IN THE EVENT OF CONTRADICTION BETWEEN AIRCRAFT MANUFACTURER'S SPECIFICATIONS AND MALABAR'S, AIRCRAFT MANUFACTURER'S SPECIFICATIONS WILL PREVAIL.

SPECIFICATIONS:

Rated Capacity-----	20 tons	(18.1 m. tons)
Side Load-----	15% of vertical load	
Low Height-----	5.00 inches	(127 mm)
Hydraulic Lift-----	8.25 inches	(210 mm)
Extension Screw-----	2.50 inches	(64 mm)
Total Extended Height-----	15.75 inches	(400 mm)
Oil Pressure at Rated Capacity-----	9083 psig	(639 kg/sq cm)
Safety Pop-off Valve set at-----	22.0 tons	(20 m. tons)
Proof Load-----	30.0 tons	(27.2 m. tons)
Reservoir Capacity-----	0.30 gallons	(1.15 liters)
Hydraulic Fluid-----	MIL-PRF-5606 or equivalent	
Approximate Jack Net Weight-----	35 lbs	(16.0 kg)

GENERAL DESCRIPTION:

The Malabar Axle Jack Model 8966 is a 20 ton capacity three stage telescoping hydraulic jack designed primarily for use in jacking main and/or nose landing gear of various aircraft. The jack consists of a three stage cylinder assembly, hydraulic reservoir and a two stage high/low pressure hand pump assembly to allow faster approach to the jack point. A lifting handle is also supplied for ease of lifting the jack.

PROTECTING DEVICES:

1. A safety pop-off valve is incorporated in the hand pump to prevent lifting of loads in excess of 20 tons (18.1 m. tons).
2. A low pressure relief valve is also incorporated in the hand pump to bypass the low pressure/high flow pump at approximately 200 psig.
3. A velocity fuse is incorporated in the jack to prevent rapid retraction of the plungers in the event of hydraulic hose rupture.
4. The extension screw has a positive stop to prevent it from being extended beyond its safe thread engagement.

PREPARATION FOR USE:

The jack is shipped fully assembled without hydraulic fluid. Before placing jack in operation, perform the following procedure:

1. Carefully remove jack and hand pump from the shipping container.
2. Open fillport on hand pump reservoir.
3. Fill hand pump reservoir with MIL-PRF-5606 hydraulic fluid or approved equivalent (reservoir capacity is approximately 0.30 gallons / 1.15 liters)
4. Close fillport and open air vent on hand pump reservoir a few turns.
5. Connect hose to hand pump.
6. Connect hose to jack. Jack plungers must be fully retracted.
7. Open release valve located on hand pump and operate hand pump a few strokes to bleed all air trapped under hand pumps.
8. Close release valve and operate either hand pump to raise plungers approximately 5 inches.
9. Open release valve to retract plungers fully to bleed all air trapped under jack plungers. Close release valve.

PRE-OPERATION INSPECTION:

Each time the jack is to be used, inspect the following:

1. Check jack structure for rigidity. Make sure all bolts are tightened.
2. Check hydraulic line connections for leaks. Tighten as required.
3. Check for hydraulic fluid leaks around the cylinder assembly and hand pump.
4. Check hand pump for proper operation.
5. Check reservoir fluid level with jack plungers fully retracted.

OPERATION:

AOG CAUTION: WHEN JACKING IN AOG CONDITIONS, ENSURE JACK REMAINS PLUMB AT ALL TIMES. IF JACK BEGINS TO BE SIDE LOADED (BENDING), STOP JACKING, BLOCK SUPPORT RIMS, RELIEVE LOAD ON JACK, AND REPOSITION JACK PLUMB DIRECTLY BELOW JACKING POINT. RESUME JACKING.

1. Position the jack on a level surface under the jacking pad of the aircraft axle.

CAUTION: DO NOT EXTEND EXTENSION SCREW AGAINST AIRCRAFT JACKING PAD WITH THE PLUNGERS FULLY RETRACTED.

2. Raise the extension screw by turning counterclockwise until the screw is 1/2" to 1" from aircraft axle jacking pad or as far as the screw will travel (2.5 inches maximum).
3. Close the release valve.
4. Operate hand pump to raise plungers until the extension screw contacts the jacking pad.
5. Ensure the extension screw and the jacking pad are correctly mated.
6. To raise the load:
 - a. The load may now be raised by operating the hand pump.
 - b. Do not lift a load greater than the rated capacity of 20 tons (18.1 m. tons).
 - c. Do not attempt to raise jack plungers beyond the rated hydraulic lift (8.25 inches maximum).
 - d. Avoid lifting with excessive side load on the jack.
 - e. Keep the release valve closed at all times.
7. To lower the load:
 - a. Slowly open the release valve to lower the load. The speed of lowering is controlled by the amount at which the release valve is open.
8. Close release valve after plungers are fully retracted.
9. Lower the extension screw by turning clockwise.

10. Close the air vent on hand pump reservoir prior to jack storage.
11. Cover jack when not in use to prevent entrance of contaminants and water into the cylinder.

SERVICING:

Servicing the jack consists primarily of the following:

1. When in use, the reservoir should be kept at the proper level with hydraulic fluid MIL-PRF-5606 or approved equivalent. Always check fluid level with jack plungers fully retracted.
2. Lubricate hand pump link pins.
3. If jack has been put into storage or has not been used, the plungers must be fully extended and retracted every 90 days to exercise the seals.

DISASSEMBLY INSPECTION:

CAUTION: THE SAFETY POP-OFF VALVE, LOCATED IN THE HAND PUMP, SHOULD NOT BE REMOVED UNLESS ABSOLUTELY NECESSARY. THE VALVE IS SET TO BY-PASS HYDRAULIC FLUID BACK TO THE RESERVOIR AT 5-10% ABOVE THE RATED CAPACITY OF 20 TONS.

When necessary to disassemble the jack, drain all hydraulic fluid from reservoir through plug at reservoir top and carefully inspect the following:

1. Inspect interior walls of jack cylinder, plungers and hand pump cylinders for smoothness and freedom from rust, nicks, scratches and excessive wear.
2. Inspect exterior walls of jack plungers for smoothness and freedom from rust, pits and excessive wear.
3. Check extension screw, cylinder, etc., for corrosion, wear and condition of threads.
4. Verify the extension screw has a positive stop to prevent it from being extended beyond its safe thread engagement.
5. Inspect packings, seals, gaskets and wipers in the cylinder assembly and hand pumps for cuts, wear, dirt, scratches, deterioration and distortion.
6. Inspect upper and lower bearing areas for excessive scoring and/or wear.
7. Inspect all pivot pins for wear, cracks, pits or evidence of damage or pending damage.
8. Inspect all areas for excessive dirt, oil, dust and chips.

REPAIR AND REPLACEMENT:

No definite time schedule can be established for the overhaul of the jack for replacement of the various moving parts. The number of times the jack is raised and lowered and the amount of load raised at each operation materially affect the life of the working parts. Do not overload the jack. Overloading is dangerous, will hasten the need for overhaul and may damage the jack. During overhaul, replace all parts that do not pass disassembly inspection requirements. Regardless of apparent condition, replace all parts marked with (◆) in the parts breakdown. A repair parts kit (P/N 8966PK) which contains all of the parts marked with (◆) is available and recommended to keep on hand at your facility. Coat all O-rings and back-up rings with hydraulic fluid MIL-PRF-5606 prior to assembly. Clean all metal parts with clean solvent and dry with compressed air. Lubricate all threads. Use Teflon tape carefully on all pipe threads. Remove excess tape as it can clog valves and passages.

TESTING:

Place jack in a load indicating test fixture. Make sure the test adapter is 3/4 inch male spherical radius. Operate hand pump to extend two outer plungers fully and inner plunger partially. Make sure the extension screw and the test adapter are correctly mated. Load test the jack at rated capacity of 20 tons. If the jack fails to operate properly, check for trouble as indicated in the Trouble Shooting Chart (see

sheet 6). With the plungers extended and supporting the capacity load, allow the jack to stand for 10 minutes. Any excess settling indicates leakage in the hand pumps, check valves or jack packing seals. Check for hydraulic fluid leaks and replace all defective parts.

SPECIAL TOOLS:

The following tools are necessary to disassemble/reassemble the cylinder assembly. These tools may be purchased upon request:

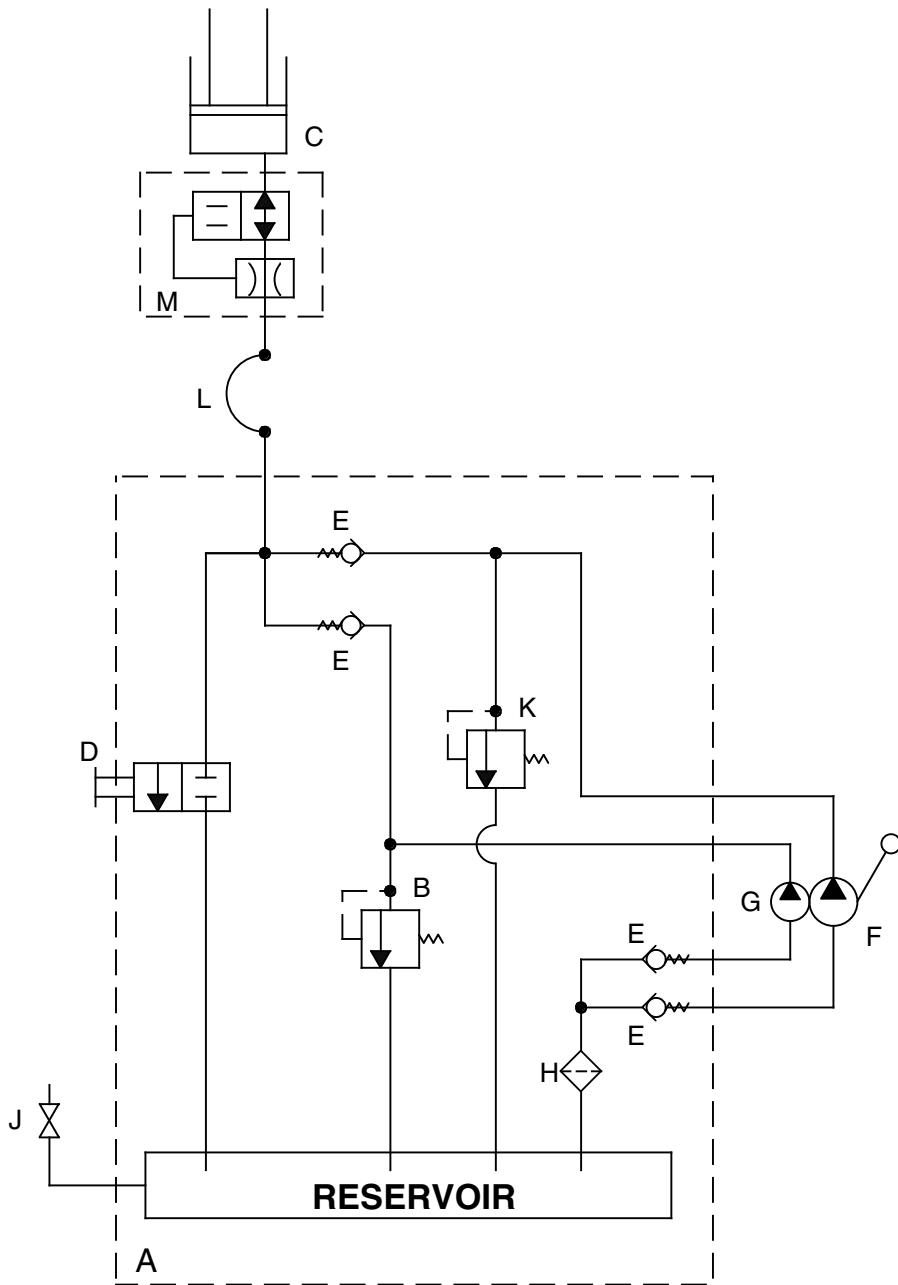
<u>Part No.</u>	<u>Description</u>	<u>Qty</u>
889090	Spanner wrench, stop ring-----	1

RECOMMENDED SPARE PARTS:

The following spare parts are recommended and available upon request.

<u>Part No.</u>	<u>Description</u>	<u>Qty</u>
8966PK	Repair parts kit-----	1
55998-1	Sticker, Malabar-----	1
442-075	Hand pump, 2-speed-----	1
735-081	QD nipple, valved, 1/4 fpt-----	1
736-155	QD coupler, valved, 1/4 fpt-----	1

HYDRAULIC DIAGRAM



- A - PUMP ASSEMBLY
- B - SAFETY POP-OFF VALVE
- C - CYLINDER ASSEMBLY
- D - RELEASE VALVE
- E - CHECK VALVE
- F - LOW PRESSURE HAND PUMP

- G - HIGH PRESSURE HAND PUMP
- H - OIL SCREEN
- J - AIR VENT
- K - LOW PRESSURE RELIEF VALVE
- L - HYDRAULIC HOSE
- M - VELOCITY FUSE

TROUBLE SHOOTING CHART

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.	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. Re-tighten 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 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.
Handle raises without effort.	Leaky intake valve.	Remove pump and clean valve block.
Handle snaps back.	Sticking intake valve.	Open release valve. Pump rapidly several times. Close valve.
	Clogged screen.	Remove and clean.

◆ PART OF REPAIR PARTS KIT

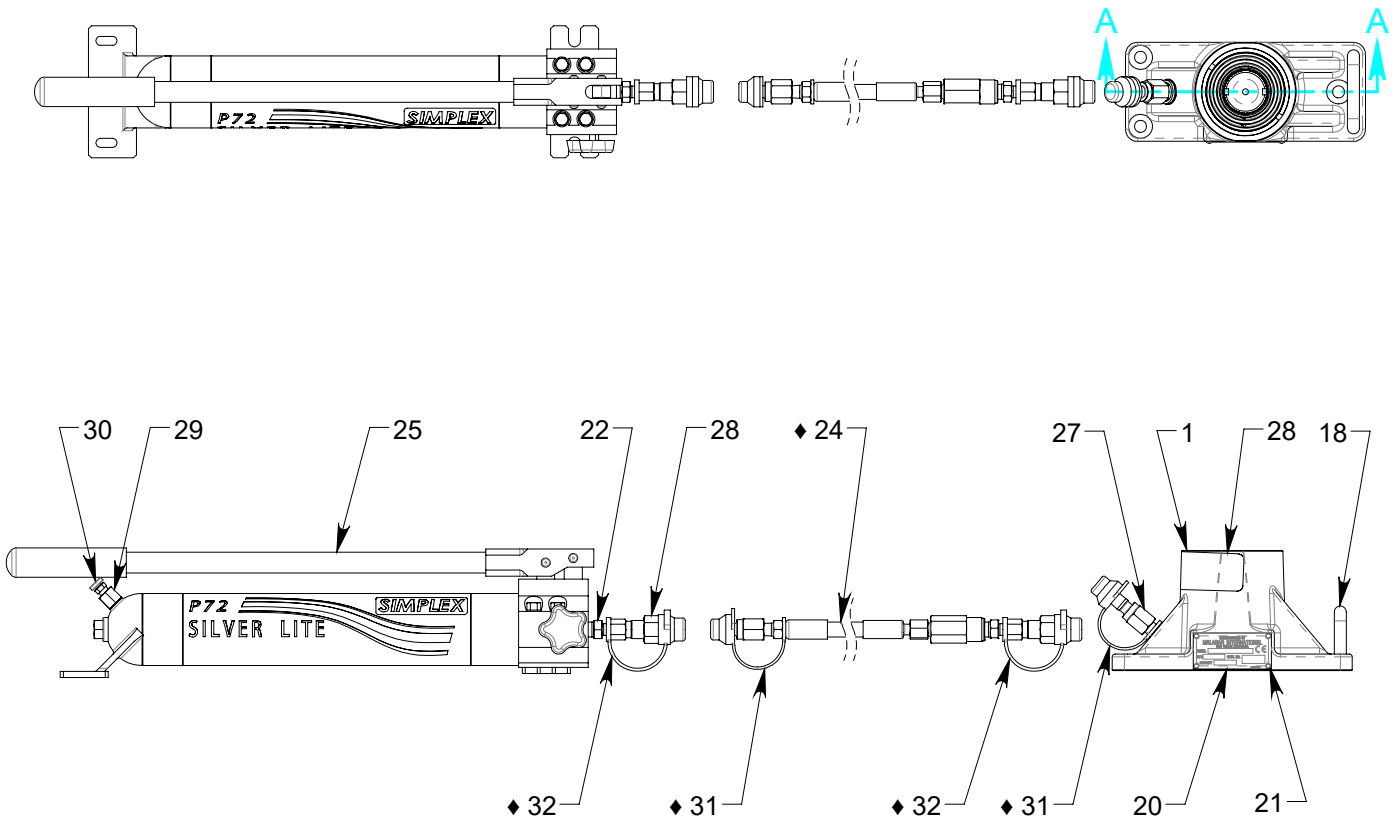


FIGURE 1A

896600 20 TON AXLE JACK ASSEMBLY

◆ PART OF REPAIR PARTS KIT

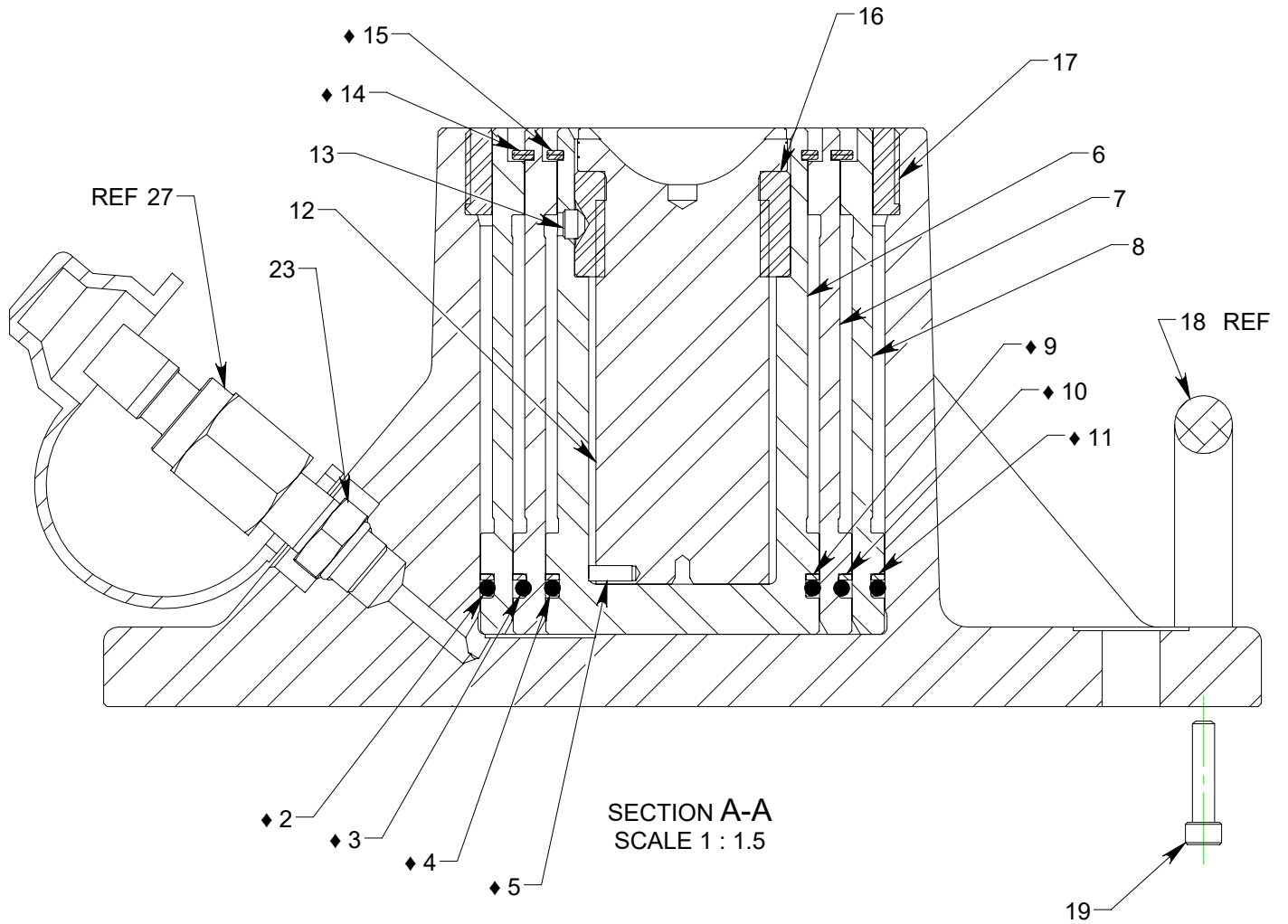


FIGURE 1B

896600 20 TON AXLE JACK ASSEMBLY

896600 20 TON AXLE JACK ASSEMBLY PARTS LIST

ITEM	QTY.	PART NO.	DESCRIPTION
1	1	896607	BASE
◆ 2	1	55925-236	O-RING
◆ 3	1	55925-231	O-RING
◆ 4	1	55925-227	O-RING
◆ 5	1	371-015	ROLL PIN, 1/8 DIA x 3/8 LG
6	1	889017	INNER PLUNGER
7	1	889016	MIDDLE PLUNGER
8	1	889015	OUTER PLUNGER
◆ 9	1	55920-227	BACKUP RING, TEFLON
◆ 10	1	889021	BACKUP RING, TEFLON
◆ 11	1	55920-236	BACKUP RING, TEFLON
12	1	889018	EXTENSION SCREW
13	1	331-014	SCPSS, 1/4-20 x 3/16 LG
◆ 14	1	55917-268	SNAP RING
◆ 15	1	55917-215	SNAP RING
16	1	889019	EXTENSION SCREW NUT
17	1	889020	STOP RING
18	1	494-038	HANDLE
19	2	323-071	SHCS, 10-32 x 7/8 LG
20	1	55997-2	NAME PLATE
21	4	393-004	DRIVE SCREW, #2 x 3/16 LG
22	1	711-018	NIPPLE, 3/8 MPT x 1/4 MPT
23	1	721-166	CONNECTOR, 1/4 M NPT x 3/8 M SAE, SS
◆ 24	1	896610	HOSE ASSEMBLY
25	1	442-075	HAND PUMP, 2-SPEED
26	1	55998-1	STICKER, MALABAR
27	1	735-081	QD NIPPLE, VALVED, 1/4 FPT
28	1	736-155	QD COUPLER, VALVED, 1/4 FPT
29	1	751-051	ADAPTER, 3/8 SAE x 1/8 FPT
30	1	55120	AIR VENT AND OIL PLUG ASSEMBLY
◆ 31	2	735-071	DUST CAP
◆ 32	2	735-073	DUST CAP

◆ PART OF REPAIR PARTS KIT

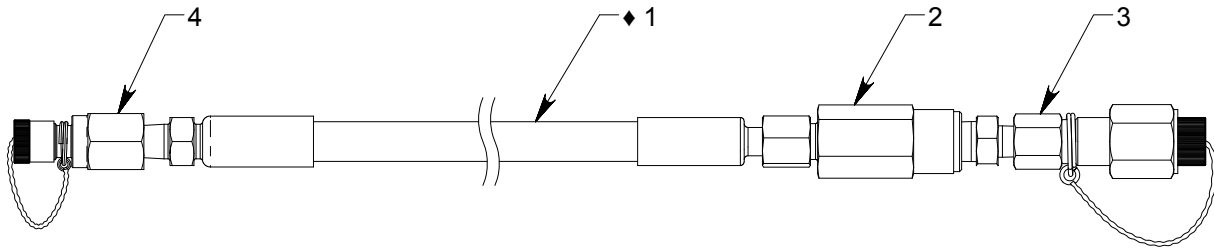


FIGURE 1A

896610 HOSE ASSEMBLY

ITEM	QTY.	PART NO.	DESCRIPTION	ITEM	QTY.	PART NO.	DESCRIPTION
◆ 1	1	896611	HYDRAULIC PRESSURE HOSE	3	1	736-155	QD COUPLER, VALVED, 1/4 FPT
2	1	86328	VELOCITY FUSE ASSEMBLY	4	1	735-081	QD NIPPLE, VALVED, 1/4 FPT