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MALABAR

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AIRCRAFT MAINTENANCE & SUPPORT EQUIPMENT

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THIS INSTRUCTION MANUAL

OWNER'S MANUAL FOR MALABAR MODEL

8919

THREE STAGE FLY-AWAY HYDRAULIC AVIATION AXLE JACK

* GENERAL DESCRIPTION
* OPERATION
* SERVICE
* PARTS BREAKDOWN

For Service & Spare Parts, Please Contact:

Malabar International
220 W. Los Angeles Avenue
Simi Valley, California 93065
Phone: (805) 581-0116
Fax: (805) 584-1624
E-mail: sales@malabar.com
Web site: http://www.malabar.com

OVER 65 YEARS OF SERVICE & EXPERIENCE

GENERAL DESCRIPTION, OPERATION, SERVICE AND PARTS BREAKDOWN

MALABAR MODEL 8919
THREE STAGE FLY-AWAY
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	45 tons	(40.8 m. tons)
Side Load	15% of vertical load	
Low Height	7.00 inches	(178 mm)
Hydraulic Lift	12.00 inches	(305 mm)
Extension Screw	3.00 inches	(76 mm)
Total Extended Height	22.00 inches	(559 mm)
Oil Pressure at Rated Capacity	7650 psig	(538 kg/sq cm)
Safety Pop-off Valve set at	47.3 tons	(42.9 m. tons)
Proof Load	62.5 tons	(56.7 m. tons)
Reservoir Capacity	1.5 gallons	(5.7 liters)
Hydraulic Fluid	MIL-PRF-5606 or equivalent	
Approximate Jack Net Weight	195 lbs	(89 kg)
Total Handle Load (Wheeling)	50 lbs	(23 kg)

GENERAL DESCRIPTION:

The Malabar Fly-Away Axle Jack Model 8919 is a 45 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, air operated hydraulic pump with air relief valve and valve block & hand pump assembly. The jack can be wheeled by one person by placing hand pump handles over jack handles and inserting quick release pins. Lifting handles are also supplied for ease of lifting the jack by two people.

PROTECTING DEVICES:

1. A safety pop-off valve is incorporated in the jack (located in the valve block) to prevent lifting of loads in excess of 45 tons (40.8 m. tons).
2. The extension screw has a positive stop to prevent it from being extended beyond its safe thread engagement.
3. Air relief valve is incorporated in the jack (located next to the air valve) to prevent over pressurize the pneumatic system.

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 from the shipping container.
2. Remove dipstick from top of reservoir.
3. Fill jack reservoir with MIL-PRF-5606 hydraulic fluid or approved equivalent (reservoir capacity is approximately 1.5 gallons/5.7 liters). Jack plungers must be fully retracted before filling reservoir.
4. Loosen bleedhole plug and fill with MIL-PRF-5606 or approved equivalent. Re-tighten plug.
5. Open release valve located next to air pump and operate both hand pumps a few strokes to bleed all air trapped under hand pumps.
6. Close release valve and operate either hand pump to raise plungers approximately 1 inch.
7. Open release valve to retract plungers fully to bleed all air trapped under jack plungers. Close release valve.
8. Check reservoir fluid level using dipstick provided. Replace dipstick to top of reservoir.

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, reservoir, air pump and hand pumps.
4. Check hand pumps for proper operation.
5. Check wheels for proper operation.
6. Check reservoir fluid level with jack plungers fully retracted.

OPERATION:

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

CAUTION: DO NOT EXTEND EXTENSION SCREW AGAINST AIRCRAFT JACK 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 (3.00 inches maximum).
3. Close the release valve.

CAUTION: AIR RELIEF VALVE MUST BE INSTALLED AT ALL TIMES. IF AIR RELIEF VALVE IS REMOVED, IT IS POSSIBLE TO OVER PRESSURIZE THE PNEUMATIC SYSTEM WHICH COULD CAUSE EQUIPMENT FAILURE AND POSSIBLE BODILY INJURY.

4. Connect air supply (90-125 psig) to the 1/4 NPT air inlet at the air valve (A minimum of 17 scfm is required). Air relief valve must be properly installed. Do not attempt to remove air relief valve.
5. To prime air pump:
   a. Turn regulator knob fully clockwise to set at 10 psig.
   b. Close reservoir air vent.
   c. Operate air valve and push button valve simultaneously until air pump is primed and plungers start to raise.
   d. Release push button valve and open air vent one to two turns. Air vent must always be open during any phase of raising or lowering the load.
6. The jack is equipped with two hand pumps. One with 3/4 inch diameter pump plunger for rapid raising of jack plungers under low pressure and one with 7/16 inch diameter pump plunger for high pressure operation. The hand pumps can be operated by placing pump handle over the

end of pump fulcrum.
7. Operate air valve or either hand pump to raise plungers until the extension screw contacts the jacking pad.
8. Insure the extension screw and the jacking pad are correctly mated.
9. To raise the load:
   a. The load may now be raised by operating air valve or either hand pump.
   b. Do not lift a load greater than the rated capacity of 45 tons (40.8 m. tons).
   c. Do not attempt to raise jack plungers beyond the rated hydraulic lift (12.00 inches maximum).
   d. Avoid lifting with excessive side load on the jack.
   e. Keep the release valve closed at all times.
10. 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.
11. Close release valve after plungers are fully retracted.
12. Lower the extension screw by turning clockwise.
13. Close air vent. Air vent must always be closed during jack transport.
14. 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. Grease all wheels.
3. Lubricate hand pump link pins.
4. 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. A portion of the lift should be operated by the air pump (if so equipped) and a portion by the hand pumps.

DISASSEMBLY INSPECTION:

CAUTION: THE SAFETY POP-OFF VALVE, LOCATED IN THE VALVE BLOCK, SHOULD NOT BE REMOVED UNLESS ABSOLUTELY NECESSARY. THE VALVE IS SET TO BY-PASS HYDRAULIC FLUID BACK TO THE RESERVOIR AT 4-6% ABOVE THE RATED CAPACITY OF 45 TONS. IF ADJUSTMENT IS REQUIRED, SEE PROCEDURE UNDER TESTING (SEE SHEET 4).

When necessary to disassemble the jack, drain all hydraulic fluid from reservoir through plug at reservoir bottom 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 bearings for excessive scoring and/or wear.
7. Check oil screen located under the valve block for cleanliness.
8. Inspect valves and valve seats in the valve block for scratches, dents and proper seating of the balls.
9. Inspect all pivot pins for wear, cracks, pits or evidence of damage or pending damage.
10. 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 8919PK) 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 because it can clog valves and passages. If ball valves, located in the valve block, do not seat properly, they may need to be reseated by tapping the ball into the valve seat with a brass rod cupped at one end.

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 45 tons. If the jack fails to operate properly, check for trouble as indicated in the Trouble Shooting Chart (see sheet 7). 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.

If adjustment is required for the safety pop-off valve, perform the following procedure:

1. Cut, remove and discard lead & wire seal (figure 1A, item 23).
2. Remove plug (figure 3, item 35). Close release valve (figure 1B, item 7).
3. 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.
4. While operating the hand pump, adjust set screw (figure 3, item 29) until the safety pop-off valve by-passes hydraulic fluid back to the reservoir at 46.8 to 47.7 tons.
5. Replace plug (figure 3, item 35). Once more operate hand pump to verify correct setting.
6. Install new lead & wire seal.
7. Open release valve to relieve pressure.

SPECIAL TOOLS:

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

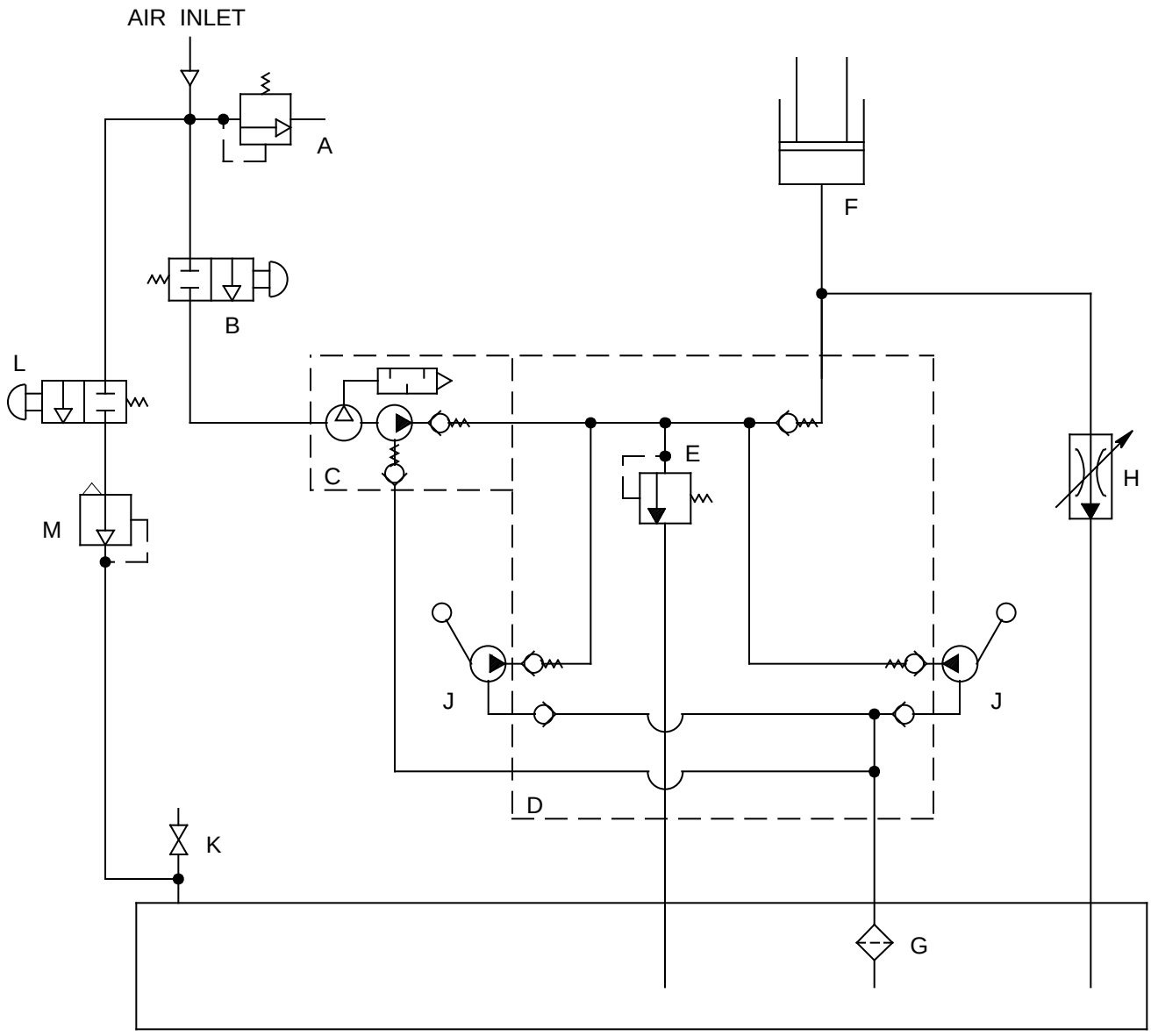
Part No.	*Description*	*Qty*
83220	Spanner wrench, stop ring	1
83224	Lifting tool, extension screw	1

RECOMMENDED SPARE PARTS:

The following spare parts are recommended and available upon request.

Part No.	*Description*	*Qty*
8919PK	Repair parts kit	1
441-018	Air pump	1
441-037	Air drive seal kit, air pump	1
441-092	Hydraulic seal kit, air pump	1
421-006	Air valve	1
425-001	Air relief valve	1
421-047	Push button valve	1
421-048	Push button	1
473-094	Regulator	1
871403	Pump handle	2
85416	Release valve	1
370-001	Quick release pin with lanyard, 1/4 dia	2
55120	Air vent	1
868230	Dipstick	1
55997-2	Nameplate	1
55989-9	Placard, tonnage, 45 ton	1
55490	Placard, air vent	1
55998-1	Sticker, Malabar	2
55994	Sticker, fluid	1
492-119	Wheel	2
868207	Wheel axle	1
83217R	Stop ring	1
55001	Fulcrum	2
886659	Plunger, 7/16 dia	1
886658	Body, 7/16 dia	1
886657	Plunger, 13/16 dia	1
886656	Body, 13/16 dia	1
55155	Safety pop-off valve assembly	1

PNEUMATIC / HYDRAULIC DIAGRAM



A - AIR RELIEF VALVE
B - AIR VALVE
C - AIR PUMP
D - VALVE BLOCK
E - SAFETY POP-OFF VALVE
F - CYLINDER ASSEMBLY
G - OIL SCREEN
H - RELEASE VALVE
J - HAND PUMP
K - AIR VENT
L - PRIMING VALVE
M - PRIMING REGULATOR

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.

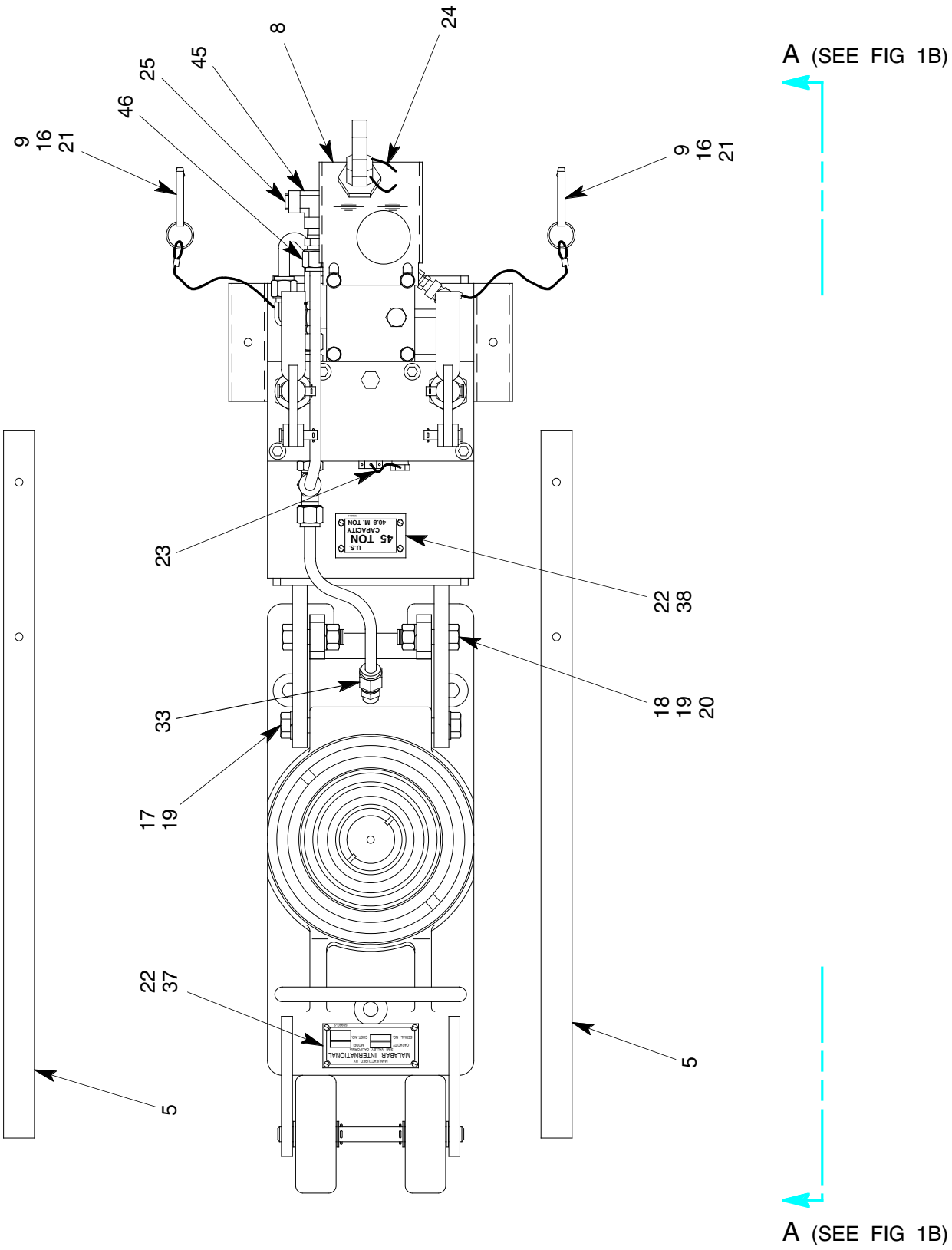


FIGURE 1A

MODEL 8919 45 TON FLY-AWAY AXLE JACK ASSEMBLY

♦ PART OF REPAIR PARTS KIT

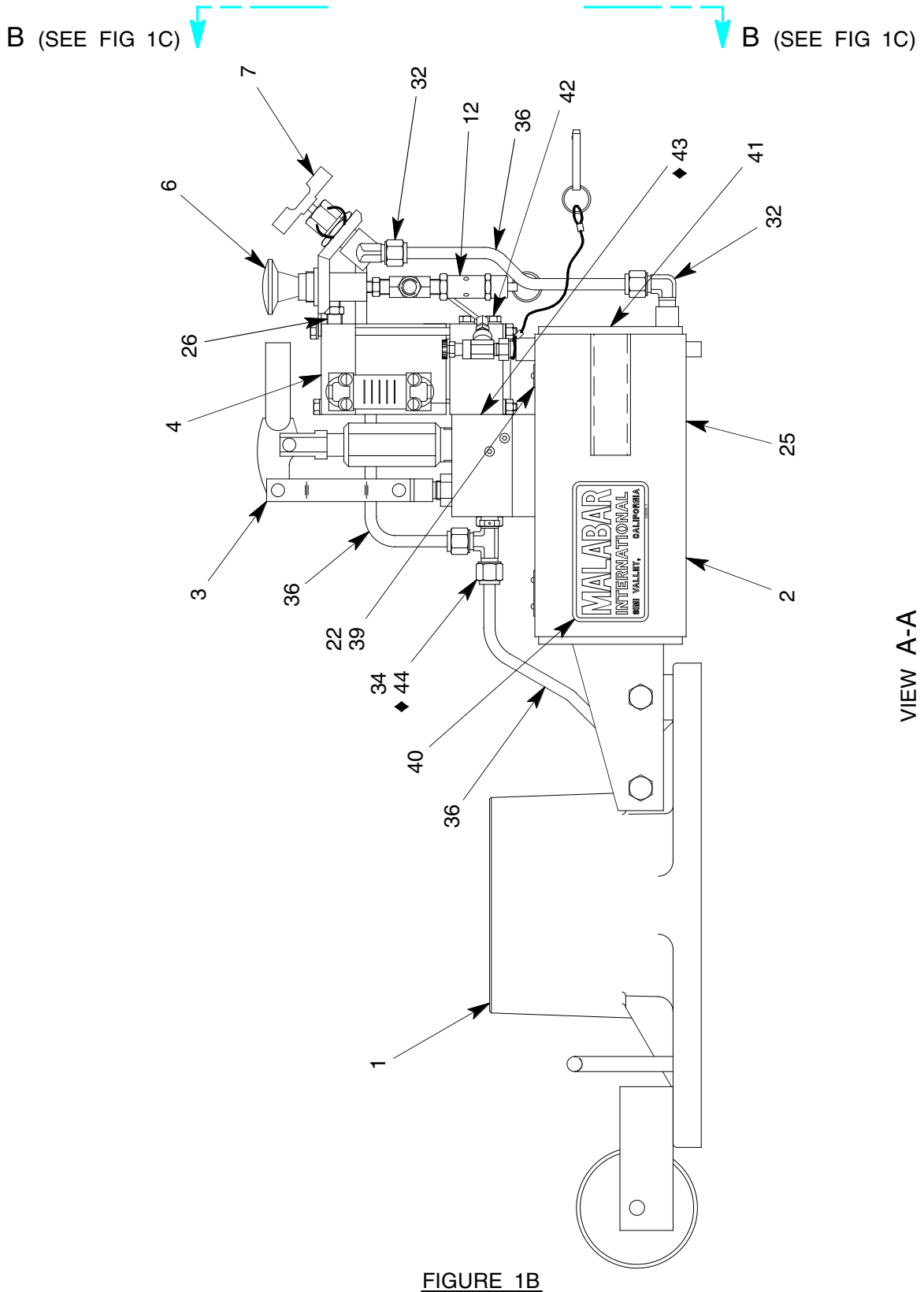
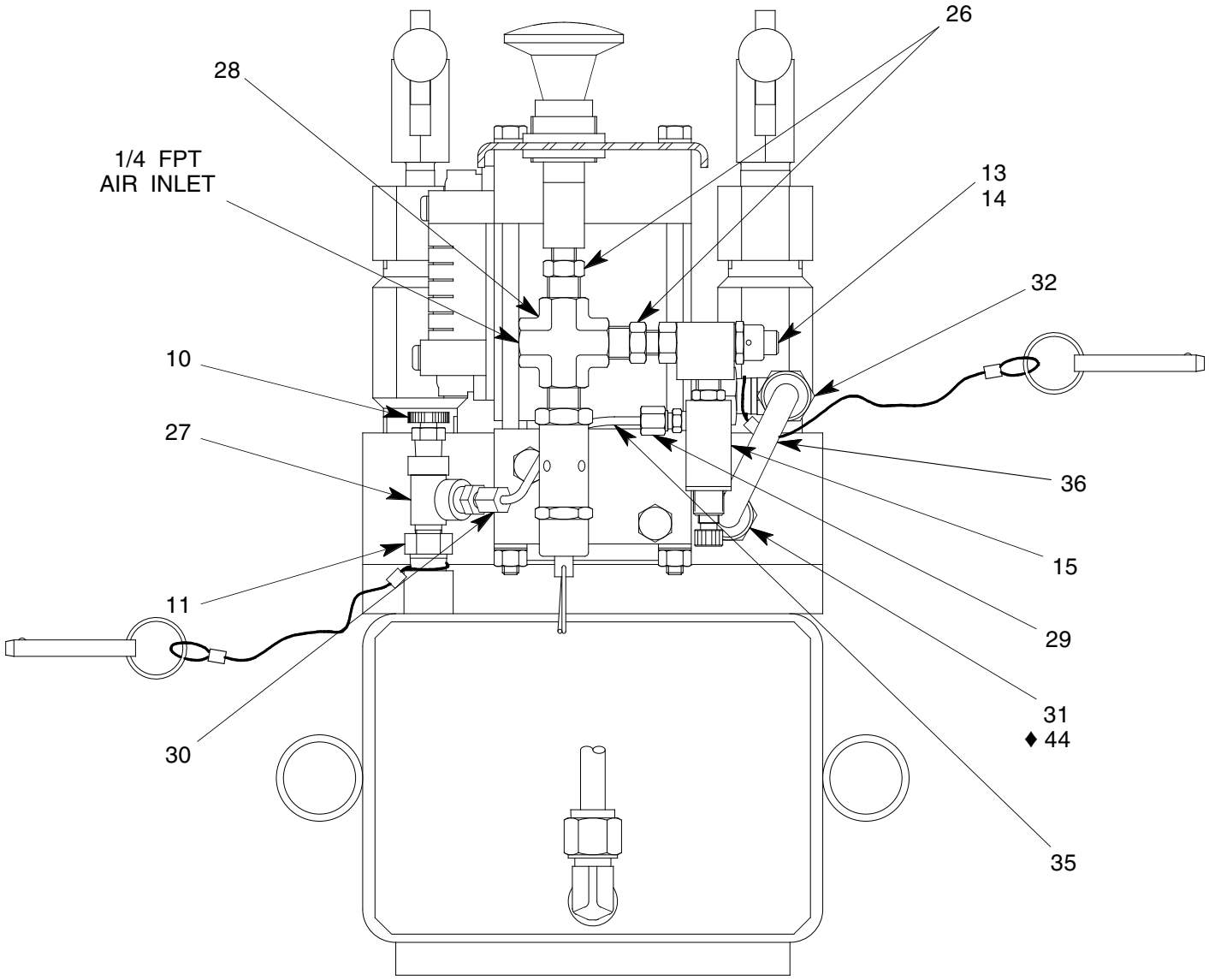


FIGURE 1B

MODEL 8919 45 TON FLY-AWAY AXLE JACK ASSEMBLY

♦ PART OF REPAIR PARTS KIT



VIEW B-B

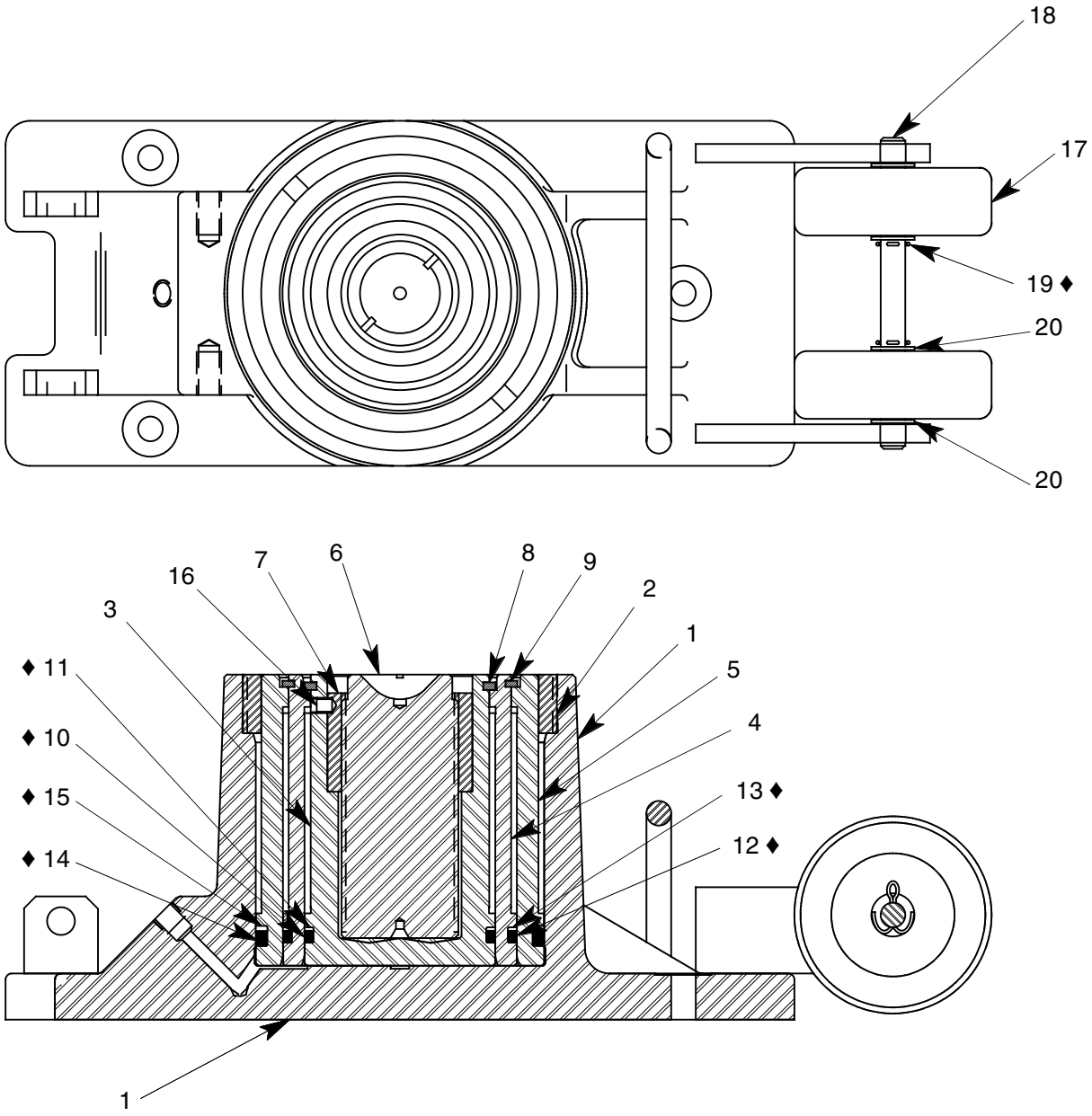
FIGURE 1C

MODEL 8919 45 TON FLY-AWAY AXLE JACK ASSEMBLY

MODEL 8919 45 TON FLY-AWAY AXLE JACK ASSEMBLY

NO.	QTY	PART NO.	DESCRIPTION
1	1	891999	CYLINDER ASSY
2	1	878202	RESERVOIR
3	1	878035A	VALVE BLOCK & HAND PUMP
4	1	441-018	AIR PUMP
5	2	871403	PUMP HANDLE
6	1	421-006	AIR VALVE
7	1	85416	RELEASE VALVE
8	1	878041	MOUNT PLATE
9	2	370-060	QUICK RELEASE PIN, 1/4 DIA
10	1	55120	AIR VENT ASSEMBLY
11	1	868230	DIPSTICK ASSEMBLY
12	1	425-001	AIR RELIEF VALVE
13	1	421-047	PUSH BUTTON VALVE
14	1	421-048	PUSH BUTTON
15	1	473-094	REGULATOR, 0-10 PSIG
16	AR	491-027	LANYARD, .048 DIA, 20"
17	2	321-015	HHCS, 1/2-13 x 1 1/4 LG
18	2	321-006	HHCS, 1/2-13 x 1 3/4 LG
19	4	363-004	SPLIT LOCKWASHER, 1/2
20	2	351-003	HEX NUT, 1/2-13
21	4	491-028	SLEEVE KRIMP
22	10	397-005	SELF TAPPING SCREW, #4
23	1	390-022	LEAD & WIRE SEAL
24	AR	491-044	SAFETY LOCK WIRE, .025 DIA
25	2	717-006	PLUG, 1/4 MPT
26	3	711-024	NIPPLE, 1/8 MPT x 1/4 MPT
27	1	713-047	TEE, STREET, 1/8 NPT
28	1	715-002	CROSS, 1/8 FPT
29	1	721-148	CONN., 1/8 T x 1/8 MPT
30	1	721-147	CONN., 1/8 T x 10-32 O-RING
31	1	721-005	CONN., 3/8 T x 3/8 SAE
32	3	722-014	ELBOW, 3/8 T x 1/4 MPT
33	1	722-022	ELBOW, 45°, 3/8 T x 1/4 MPT
34	1	723-014	TEE, RUN, 3/8 T x 3/8 SAE
35	AR	999-024	TUBE, 1/8 O.D. x 12" LG
36	AR	732-010	TUBE, 3/8 O.D. x .065 WALL
37	1	55997-2	NAMEPLATE
38	1	55989-9	PLACARD, TONNAGE, 45 TON
39	1	55490	PLACARD, AIR VENT
40	2	55998-1	STICKER, MALABAR
41	1	55994	STICKER, FLUID
42	2	321-068	HHCS, 5/16-24 x 3 1/2 LG
43	1	55925-016	O-RING
44	2	MS28778-6	O-RING (PART OF ITEMS 31 & 34)
45	1	713-012	TEE, 1/4 MPT x 1/4 FPT x 1/4 FPT
46	1	721-009	CONN., 3/8 T x 1/4 MPT

NO.	QTY	PART NO.	DESCRIPTION



♦ PART OF REPAIR PARTS KIT

FIGURE 2

891999 CYLINDER ASSEMBLY

NO.	QTY	PART NO.	DESCRIPTION	NO.	QTY	PART NO.	DESCRIPTION
1	1	891901	BASE	11	1	55929-341	BACK-UP RING
2	1	884217	STOP RING	12	1	55925-348	O-RING
3	1	884250	INNER PLUNGER	13	1	55920-348	BACK-UP RING
4	1	884230	CENTER PLUNGER	14	1	55925-432	O-RING
5	1	884210	OUTER PLUNGER	15	1	55920-432	BACK-UP RING
6	1	884208	EXTENSION SCREW	16	1	331-004	SHSS, 5/16-24 x 5/16 LG
7	1	884209	EXTENSION SCREW NUT	17	2	492-119	WHEEL
8	1	884214	SNAP RING	18	1	868207	WHEEL AXLE
9	1	884234	SNAP RING	19	2	372-023	COTTER PIN, 1/8 X 1" LG
10	1	55925-341	O-RING	20	4	361-005	FLAT WASHER, 1/2

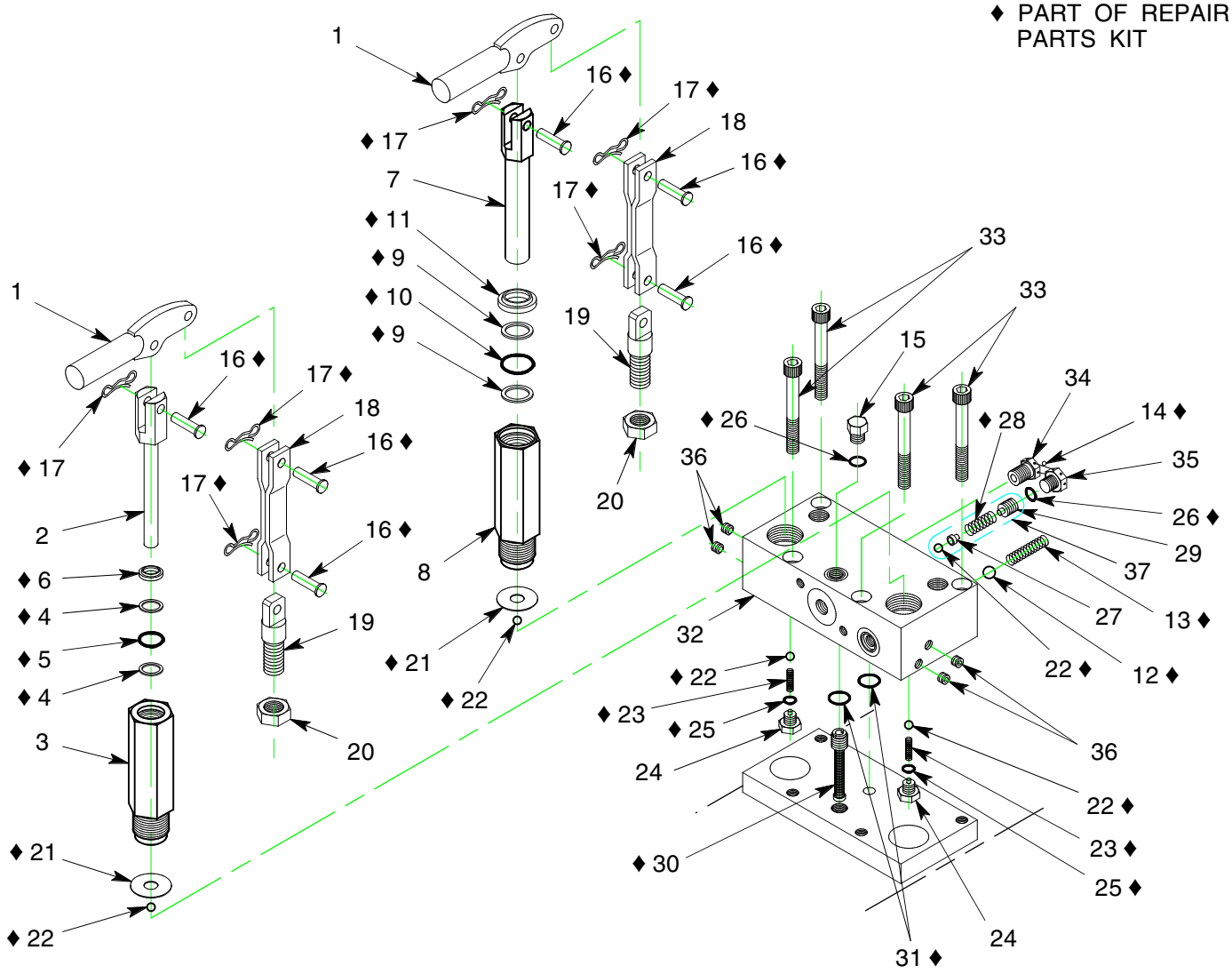


FIGURE 3

878035A VALVE BLOCK & HAND PUMP ASSEMBLY

NO.	QTY	PART NO.	DESCRIPTION	NO.	QTY	PART NO.	DESCRIPTION
1	2	55001	FULCRUM	20	2	352-004	HEX JAM NUT, 5/8-18
2	1	886659	PLUNGER, 7/16 DIA	21	2	55024	GASKET
3	1	886658	BODY, 7/16 DIA	22	5	412-004	STEEL BALL, 1/4 DIA
4	2	55922-9	BACK-UP RING	23	2	55621	SPRING
5	1	55925-111	O-RING	24	2	55620	PLUG, 3/16 SAE O-RING
6	1	755-018	WIPER	25	2	55925-903	O-RING
7	1	886657	PLUNGER, 13/16 DIA	26	2	55925-904	O-RING
8	1	886656	BODY, 13/16 DIA	27	1	55153	GUIDE
9	2	55922-16	BACK-UP RING	28	1	55154H	SPRING
10	1	55925-211	O-RING	29	1	55148	SET SCREW
11	1	755-019	WIPER	30	1	55568	OIL SCREEN
12	1	412-001	BALL, 3/8 DIA	31	2	55925-113	O-RING
13	1	79367	SPRING	32	1	878015	VALVE BLOCK
14	1	390-022	LEAD & WIRE SEAL	33	4	323-066	SHCS, 3/8-24 x 2" LG
15	1	717-001	PLUG, 1/4 SAE O-RING	34	1	717-035	PLUG, HEX HD, 1/4 MPT
16	6	55002	FLAT HEAD PIN, 5/16 DIA	35	1	717-046	PLUG, 1/4 SAE O-RING
17	6	372-028	BOW TIE COTTER	36	1	717-001	PLUG, 1/16 MPT
18	2	55615	LINK	37	1	55155	SAFETY POP-OFF VALVE ASSY
19	2	55011	ANCHOR				