

# **MALABAR**

**INTERNATIONAL**

**AIRCRAFT MAINTENANCE & SUPPORT EQUIPMENT**

**OWNER'S MANUAL FOR MALABAR MODEL**

## **832R**

**THREE STAGE HYDRAULIC  
AVIATION AXLE JACK**

**S/N 929 AND UP**

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

**READ  
AND  
SAVE**

**THIS  
INSTRUCTION  
MANUAL**

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**OVER 65 YEARS OF SERVICE & EXPERIENCE**

**GENERAL DESCRIPTION, OPERATION, SERVICE AND PARTS BREAKDOWN**

**MALABAR MODEL 832R  
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-----	35 tons	(31.8 m. tons)
Low Height-----	7 inches	(178 mm)
Hydraulic Lift-----	12 inches	(305 mm)
Extension Screw-----	3 inches	(76 mm)
Total Extended Height-----	22 inches	(559 mm)
Oil Pressure at Rated Capacity-----	6770 psig	(476 kg/sq cm)
Safety Pop-off Valve set at-----	38.5 tons	(34.9 m. tons)
Proof Load-----	52.5 tons	(47.6 m. tons)
Floor Loading at Rated Capacity-----	651 psi	(46 kg/sq cm)
Reservoir Capacity-----	2 gallons	(7.6 liters)
Hydraulic Fluid-----	MIL-H-5606 or equivalent	
Maximum Towing Speed-----	5 mph	(8 km/h)
Approximate Jack Net Weight-----	360 lbs	(163 kg)

**GENERAL DESCRIPTION:**

The Malabar Axle Jack Model 832R is a 35 ton capacity three stage telescoping hydraulic jack designed primarily for use in jacking the landing gear of various aircraft. The jack consists of a three stage cylinder and base assembly, frame/reservoir assembly, valve block assembly, hand pump assembly, and the following optional equipment:

- \* Air pump
- \* Load gauge
- \* Air retract
- \* Rain hat

The jack is mounted on two swivel casters at the rear and a spring loaded wheel at the front to provide portability. The cylinder assembly is raised off the ground by the spring loaded wheel when it is under no load. The wheel retracts and the base of the cylinder assembly rests on the ground when load is applied. A tow handle readily connects to tow vehicle for ease of transport. The jack is rated at 5 mph (8 km/h) towing speed. Excessive speed may cause excessive wear and/or damage to the jack.

**PROTECTION 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 38.5 tons (34.9 m. tons).
2. The extension screw has a positive stop to prevent it from being extended beyond its safe thread engagement.
3. An optional load gauge can be installed in order to monitor the approximate load being raised.

## **PREPARATION FOR USE:**

1. The jack is shipped without hydraulic fluid in the reservoir. Do not operate air or hand pumps until reservoir is filled with hydraulic fluid MIL-H-5606 or approved equivalent. Remove filler cap and fill reservoir to mark on dipstick (reservoir capacity is approximately 2 gallons/7.6 liters). Plungers must be fully retracted before filling reservoir. Replace filler cap.
2. Open release valve and operate hand pumps a few strokes to bleed all air trapped under hand pumps.
3. Close release valve and operate hand pump to raise plungers approximately 1 inch.
4. 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, reservoir, air pump and hand pumps.
4. Check hand pumps for proper operation.
5. Check caster wheels for proper operation.
6. Check reservoir fluid level with jack plungers fully retracted.

## **OPERATION:**

1. Position the jack under the appropriate jacking pad of the aircraft.

***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 ship adapter is 1/2" to 1" from aircraft jacking pad or as far as the screw will travel (3 inches maximum).
3. Close the release valve located in front of the frame/reservoir assembly.

***CAUTION: ON JACK EQUIPPED WITH AIR PUMP, 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. On jack equipped with air pump, connect air supply (90-125 psig) to the 1/4 NPT air inlet located near the air valve (A minimum of 17 scfm is required for the air pump). Air relief valve must be properly installed. Do not attempt to remove air relief valve.
5. 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 the pump fulcrum and operating either the low or high pressure hand pump.
6. Operate air valve or either hand pump to raise plungers until the ship adapter contacts the jacking pad. Note: A small amount of fluid wetting is normal on manual hand pump plungers. Periodically clean to remove accumulated grease or foreign material.
7. Insure ship adapter and jacking pad are correctly mated.
8. To raise the load:
  - a. Operate the air valve or either hand pump as required.
  - b. Do not lift a load greater than the rated capacity of 35 tons (31.8 m. tons). The approximate load being lifted can be read in tons on the load gauge. Read load on lower stage scale when only outer plunger is extended. Read load on center stage scale when center plunger is extended.

Read load on upper stage scale when inner plunger is extended. Fluid pressure in psig may be read on outer scale for gauge calibration.

9. To lower the load:
  - a. Slowly open the release valve to lower the load. The speed of lowering is controlled by the amount the release valve is open. Note: Do not open release valve more than one and one-half turns counter-clockwise.
10. Fully lower jack plungers. Lower extension screw. Close release valve. Cover jack when not in use.

## **SERVICING:**

Servicing the jack consists primarily of the following:

1. When in use, the reservoir should be kept at the proper hydraulic fluid level. Check with plungers fully retracted.
2. Grease casters and wheel as required.
3. Lubricate hand pump pivot pins and tow handle linkage.
4. If the 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 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 AND SEALED AT THE FACTORY TO BY-PASS HYDRAULIC FLUID BACK TO THE RESERVOIR AT 5-10% ABOVE THE RATED CAPACITY OF 35 TONS. IF ADJUSTMENT IS REQUIRED, SEE PROCEDURE UNDER TESTING (SEE SHEET 4).***

When necessary to disassemble the jack, drain all hydraulic fluid from reservoir 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 of rust, pits and excessive wear.
3. Check extension screw, cylinder, plungers, etc., for corrosion, wear and condition of threads.
4. Verify that 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, scratches, deterioration and distortion.
6. Inspect stop ring for excessive scoring and/or wear.
7. Check hand pump oil screens by removing valve block and verifying 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.

## **OVERHAUL INSTRUCTIONS:**

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 832RPK) which contains all of the parts marked with (◆) is available and recommended to keep on hand at your facility

1. To disassemble cylinder assembly (figure 2A):
  - a. Unscrew stop ring (item 2) from base.

**CAUTION: PLUNGERS ARE FREE TO SLIDE OUT OF CYLINDER. DO NOT DROP PLUNGERS AND/OR CYLINDER.**

- b. Remove plunger assembly from base.
  - c. Remove snap ring (item 17) from center plunger (item 5).
  - d. Push assembly out of outer plunger (item 4).
  - e. Remove snap ring (item 16) from inner plunger (item 6).
  - f. Push assembly out of center plunger.
  - g. Loosen set screw (item 15)
  - h. Remove extension screw (item 13) and extension screw nut (item 14) from inner plunger.
  - i. Unscrew outer bearing (item 28) from outer plunger.
  - j. Unscrew center bearing (item 27) from center plunger.
  - k. Unscrew inner bearing (item 3) from inner plunger.
  - l. Remove and discard all O-rings and back-up rings from plungers.
  - m. To reassemble, install O-rings, back-up rings and bearings onto plungers. Lubricate all O-rings with MIL-H-5606 fluid or equivalent.
  - n. Slide extension screw and extension screw nut into inner plunger and tighten set screw.
  - o. Slide center plunger over inner plunger. Install snap ring to inner plunger.
  - p. Slide outer plunger over center plunger. Install snap ring to center plunger.
  - q. Slide plunger assembly into base.
  - r. Screw stop ring into base.
2. When necessary to disassemble the jack:
    - a. Replace all defective parts.
    - b. Clean all metal parts with clean solvent and dry with compressed air.
    - c. Lubricate all threads. Use teflon tape carefully on all pipe threads. Remove excess tape because it can clog valves and passages.
    - d. If ball valves, located in valve block, do not seat properly, they may be resealed 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 outer plunger fully and inner plungers partially. Make sure ship adapter and test adapter are correctly mated. Load test the jack at rated capacity of 35 tons. If the jack fails to operate properly, check for trouble as indicated in the Trouble Shooting Chart (see sheet 8). With plungers extended and supporting the capacity load, allow the jack to stand for 10 minutes. Any excess settling indicates leakage in the hand pump, 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 3, item 38).
2. Remove plug (figure 3, item 35). Close release valve (figure 1, item 10).
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 plungers against the test adapter. Make sure ship adapter and test adapter are correctly mated.
4. While operating the hand pump, adjust set screw (figure 3, item 29) until the safety pop-off valve bypasses hydraulic fluid back to the reservoir at 36.8 to 38.5 tons.
5. Replace plug (figure 3, item 35). Once more operate hand pump to verify correct setting.
6. Install new lead & wire seal (figure 3, item 38).
7. Open release valve to relieve pressure.

## **SPECIAL TOOLS:**

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

<i>Part No.</i>	<i>Description</i>	<i>Qty</i>
83220	Spanner wrench, stop ring-----	1
730826	Spanner wrench, inner bearing-----	1
730827	Spanner wrench, center bearing-----	1
83221	Spanner wrench, outer bearing-----	1
83224	Lifting tool, extension screw-----	1

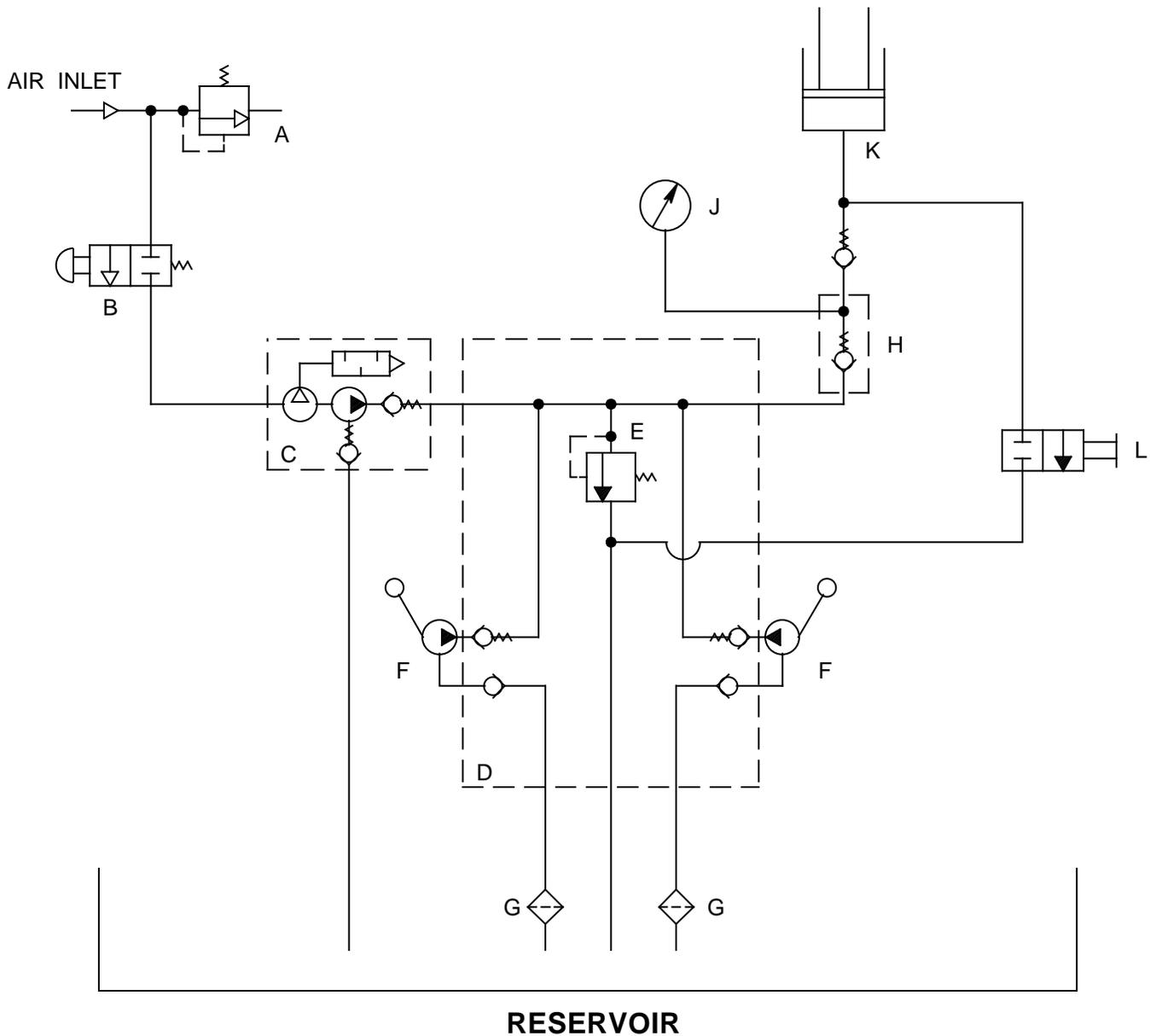
## **RECOMMENDED SPARE PARTS:**

The following spare parts are recommended and available upon request.

<i>Part No.</i>	<i>Description</i>	<i>Qty</i>
832RPK	Repair parts kit-----	1
83282R	Swivel caster-----	2
83565	Wheel-----	1
86399E	Valve block and hand pump assembly-----	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
86376	Pump handle-----	1
83295R	Hydraulic hose-----	1
83294R	Oil return line-----	1
86339	Breather cap & dipstick-----	1
83208R	Extension screw-----	1
83217R	Stop ring-----	1
83252R	Inner bearing-----	1
83232R	Center bearing-----	1
83212R	Outer bearing-----	1
55991-8	Placard, tonnage, 35 ton-----	1
55997-2	Nameplate-----	1
55998	Sticker, Malabar-----	1
55994	Sticker, fluid-----	1
75940	Sticker, towing-----	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
* 83275	Load gauge-----	1
* 86367	Cross check valve-----	1

\* Optional equipment – These parts required only when supplied with jack

# PNEUMATIC / HYDRAULIC DIAGRAM

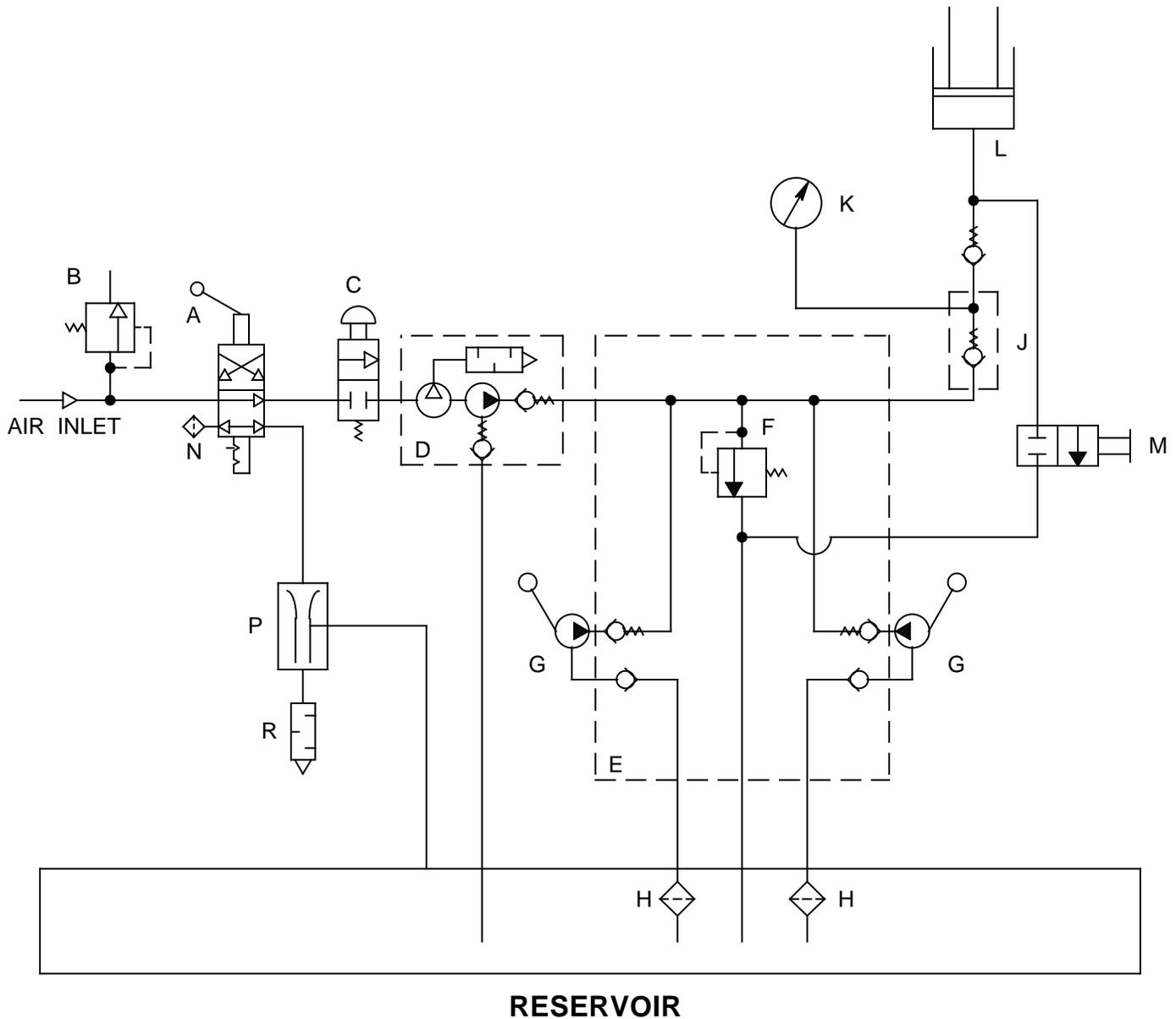


- A - AIR RELIEF VALVE
- B - AIR VALVE
- C - AIR PUMP
- D - VALVE BLOCK
- E - SAFETY POP-OFF VALVE
- F - HAND PUMP

- G - OIL SCREEN
- H - CROSS CHECK VALVE
- J - LOAD GAUGE
- K - CYLINDER ASSEMBLY
- L - RELEASE VALVE

# PNEUMATIC / HYDRAULIC DIAGRAM

(WITH AIR OPERATED VACUUM RETRACT KIT)



RESERVOIR

- A - FOUR-WAY VALVE
- B - AIR RELIEF VALVE
- C - AIR VALVE
- D - AIR PUMP
- E - VALVE BLOCK
- F - SAFETY POP-OFF VALVE
- G - HAND PUMP
- H - OIL SCREEN

- J - CROSS CHECK VALVE
- K - LOAD GAUGE
- L - CYLINDER ASSEMBLY
- M - RELEASE VALVE
- N - FILTER/BREATHING
- P - VACUUM PUMP
- R - MUFFLER

# ***TROUBLE SHOOTING CHART***

<b>TROUBLE</b>	<b>PROBABLE CAUSE</b>	<b>REMEDY</b>
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

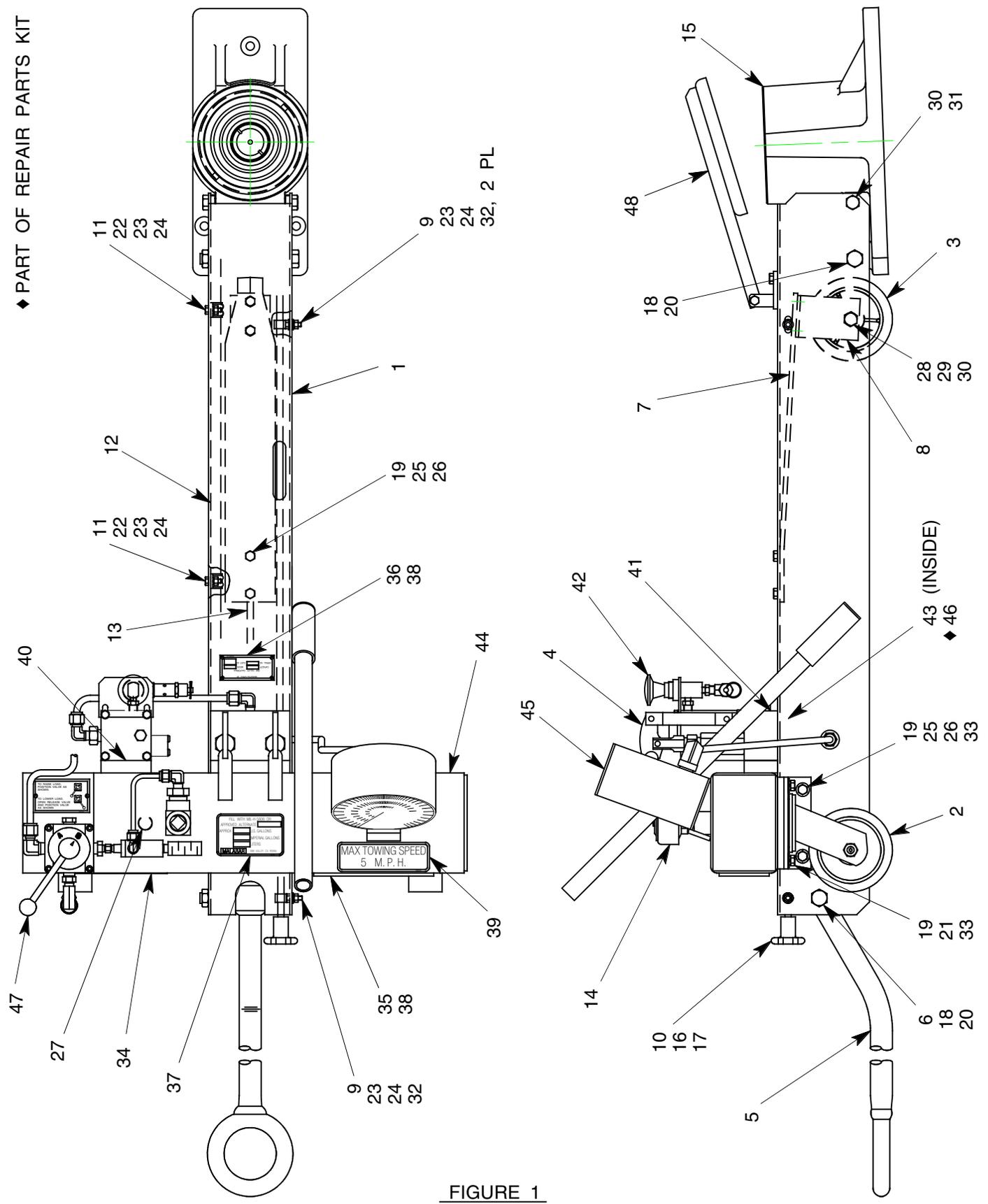


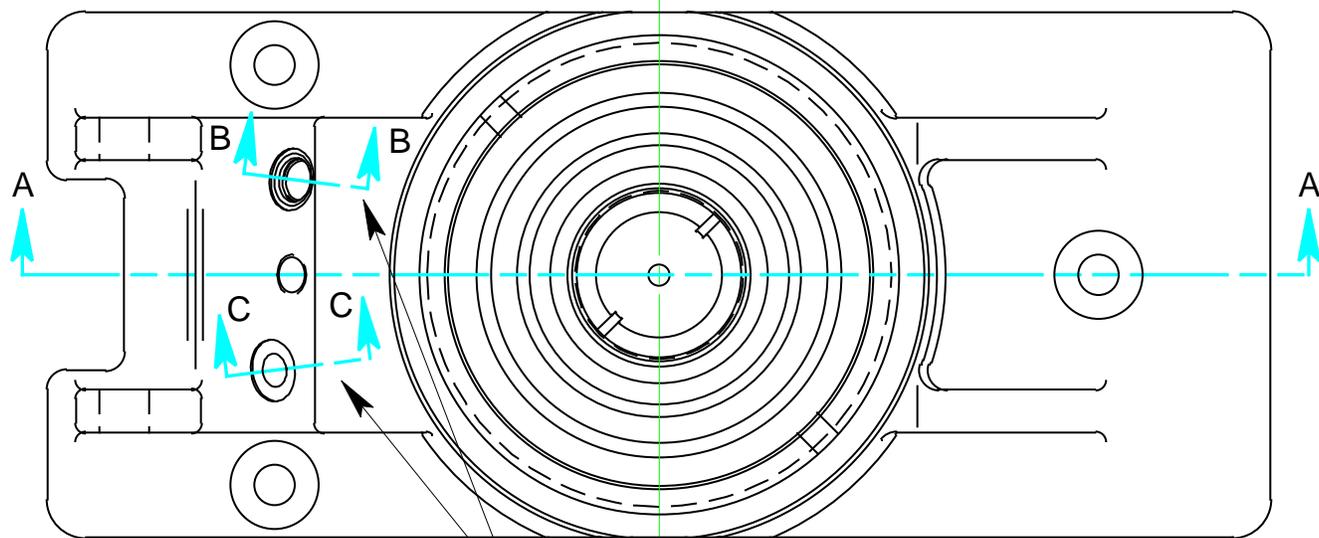
FIGURE 1

**MODEL 832R 35 TON AXLE JACK**

**MODEL 832R 35 TON AXLE JACK**

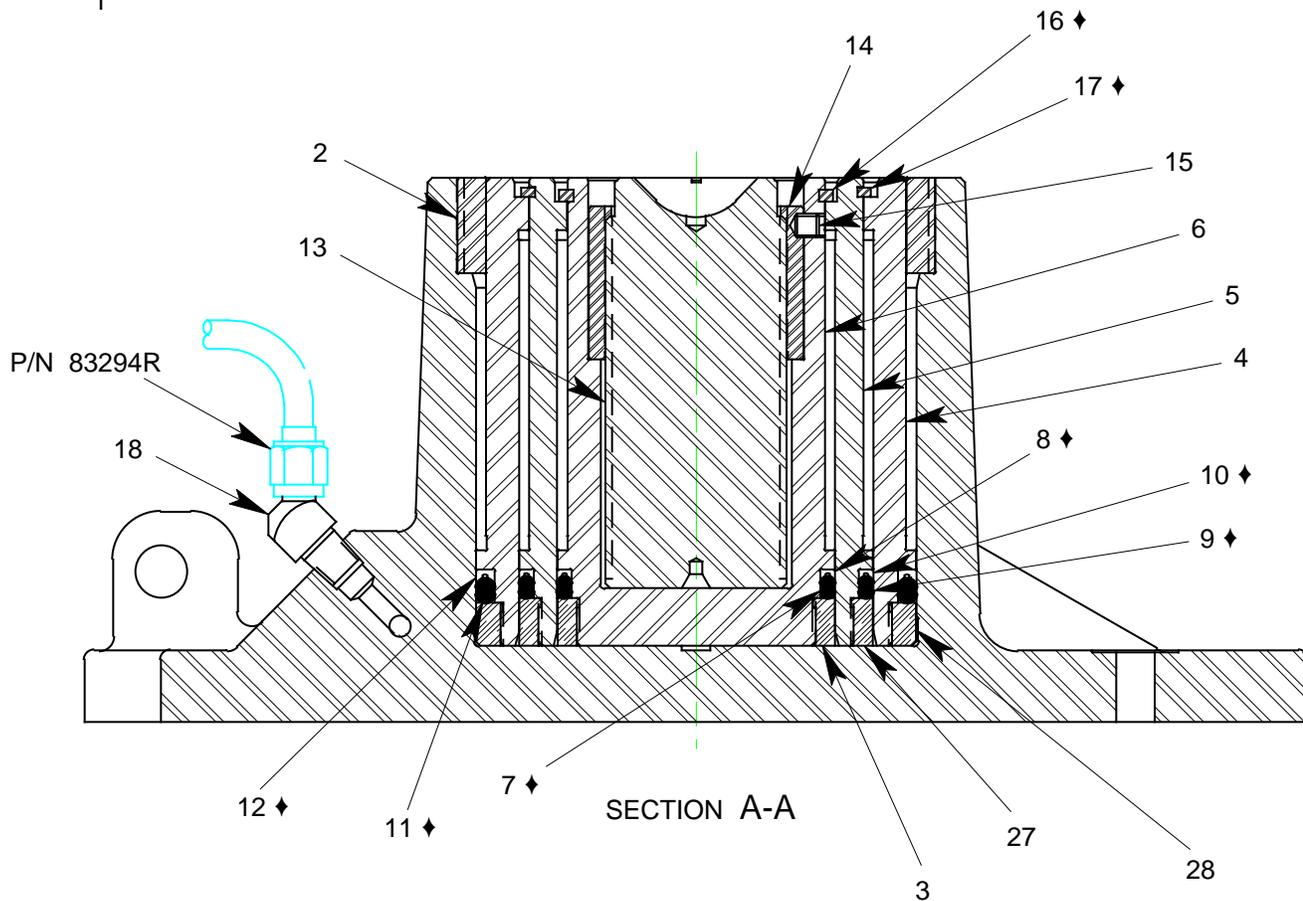
NO.	QTY	PART NO.	DESCRIPTION	NO.	QTY	PART NO.	DESCRIPTION
1	1	80215	FRAME				
2	2	83282R	SWIVEL CASTER				
3	1	83565	WHEEL				
4	1	86399E	VALVE BLOCK & HAND PUMP				
5	1	80204	TOW HANDLE				
6	1	80205	TOW HANDLE SPACER				
7	1	80208	LEAF SPRING				
8	1	80207	WHEEL BRACKET				
9	2	80206	SHAFT GUIDE				
10	1	83597	KNOB				
11	2	394-003	PIPE CLIP				
12	1	83295R	HOSE ASSEMBLY				
13	1	83294R	OIL RETURN LINE				
14	1	86339	BREATHING CAP & DIPSTICK				
15	1	83298	CYLINDER ASSEMBLY				
16	1	83596	SHAFT ASSEMBLY				
17	1	331-011	SHSS, 1/4-20 x 1/4 LG				
18	2	321-021	HHCS, 5/8-11 x 5 1/2 LG				
19	16	363-003	SPLIT LOCKWASHER, 3/8				
20	2	355-009	HEX LOCKNUT, THIN, 5/8-11				
21	8	321-042	HHCS, 3/8-16 x 3/4 LG				
22	2	321-036	HHCS, 1/4-20 x 3/4 LG				
23	4	363-001	SPLIT LOCKWASHER, 1/4				
24	4	351-001	HEX NUT, 1/4-20				
25	8	321-011	HHCS, 3/8-16 x 1" LG				
26	8	351-002	HEX NUT, 3/8-16				
27	1	717-007	PIPE PLUG, 3/8 NPT				
28	1	321-039	HHCS, 1/2-13 x 3" LG				
29	1	351-003	HEX NUT, 1/2-13				
30	3	363-004	SPLIT LOCKWASHER, 1/2				
31	2	321-072	HHCS, 1/2-20 x 1" LG				
32	3	362-001	FLAT WASHER, 1/4 SAE				
33	12	362-003	FLAT WASHER, 3/8 SAE				
34	1	55998	STICKER, MALABAR				
35	1	55991-8	PLACARD, TONNAGE, 35 TON				
36	1	55997-2	NAMEPLATE				
37	1	55994	STICKER, FLUID				
38	8	397-005	SELF TAPPING SCREW, #4				
39	1	75940	STICKER, TOWING				
40	1	717-006	PLUG, 1/4 NPT				
41	1	717-035	PLUG, HEX, 1/4 NPT				
42	1	80218	AIR PUMP KIT				
43	1	722-007	ELBOW, 45°, 3/8 37° x 3/8 SAE				
44	1	80216	RESERVOIR				
45	1	83519	LOAD GAUGE KIT				
46	1	MS28778-6	O-RING (PART OF ITEM 43)				
47	1	83260	AIR RETRACT KIT				
48	1	83247	RAIN HAT KIT				

◆ PART OF REPAIR PARTS KIT



SEE FIGURE 2B FOR  
SECTIONS B-B & C-C

1



SECTION A-A

FIGURE 2A

**83298 CYLINDER ASSEMBLY**

♦ PART OF REPAIR PARTS KIT

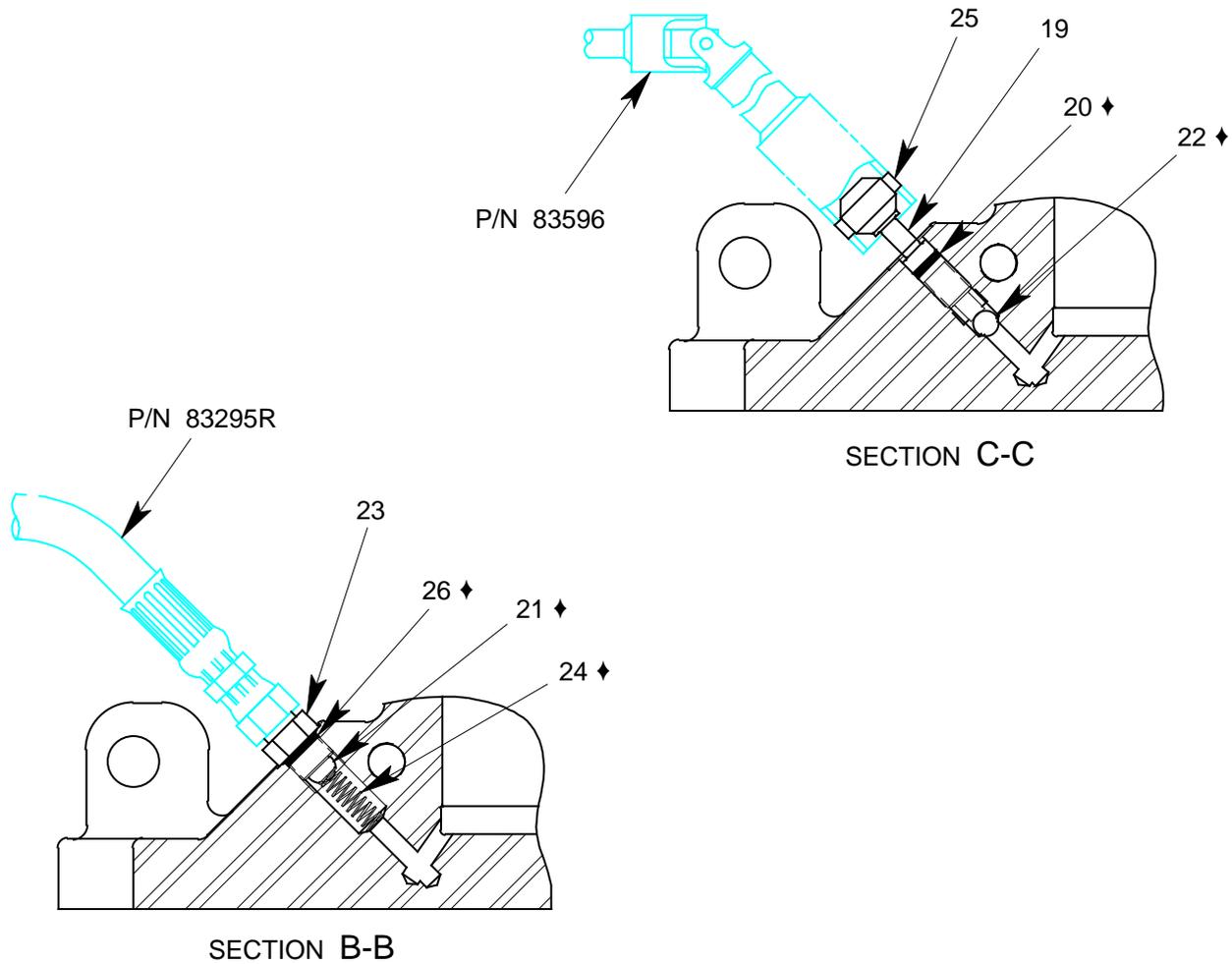


FIGURE 2B

**83298 CYLINDER ASSEMBLY**

NO.	QTY	PART NO.	DESCRIPTION	NO.	QTY	PART NO.	DESCRIPTION
1	1	83207R	BASE	15	1	331-004	SHSS, 5/16-24 x 5/16 LG
2	1	83217R	STOP RING	16	1	83214R	SNAP RING
3	1	83252R	INNER BEARING	17	1	83234R	SNAP RING
4	1	83210R	OUTER PLUNGER	18	1	722-009	ELBOW, 45°, 3/8 37° x 1/4 NPT
5	1	83230R	CENTER PLUNGER	19	1	101	STEM
6	1	83250R	INNER PLUNGER	20	1	55925-011	O-RING
7	1	55925-339	O-RING	21	1	412-001	CHROME STEEL BALL, 3/8
8	1	55902-42	BACKUP RING	22	1	412-002	CHROME STEEL BALL, 5/16
9	1	55925-347	O-RING	23	1	83514	FITTING, 3/8 37° x 3/8 SAE
10	1	55902-50	BACKUP RING	24	1	83515	SPRING
11	1	55925-431	O-RING	25	1	390-001	DRIVE PIN
12	1	55903-58	BACKUP RING	26	1	MS28778-6	O-RING (PART OF ITEM 23)
13	1	83208R	EXTENSION SCREW	27	1	83232R	CENTER BEARING
14	1	83209R	EXTENSION SCREW NUT	28	1	83212R	OUTER BEARING

◆ PART OF REPAIR PARTS KIT

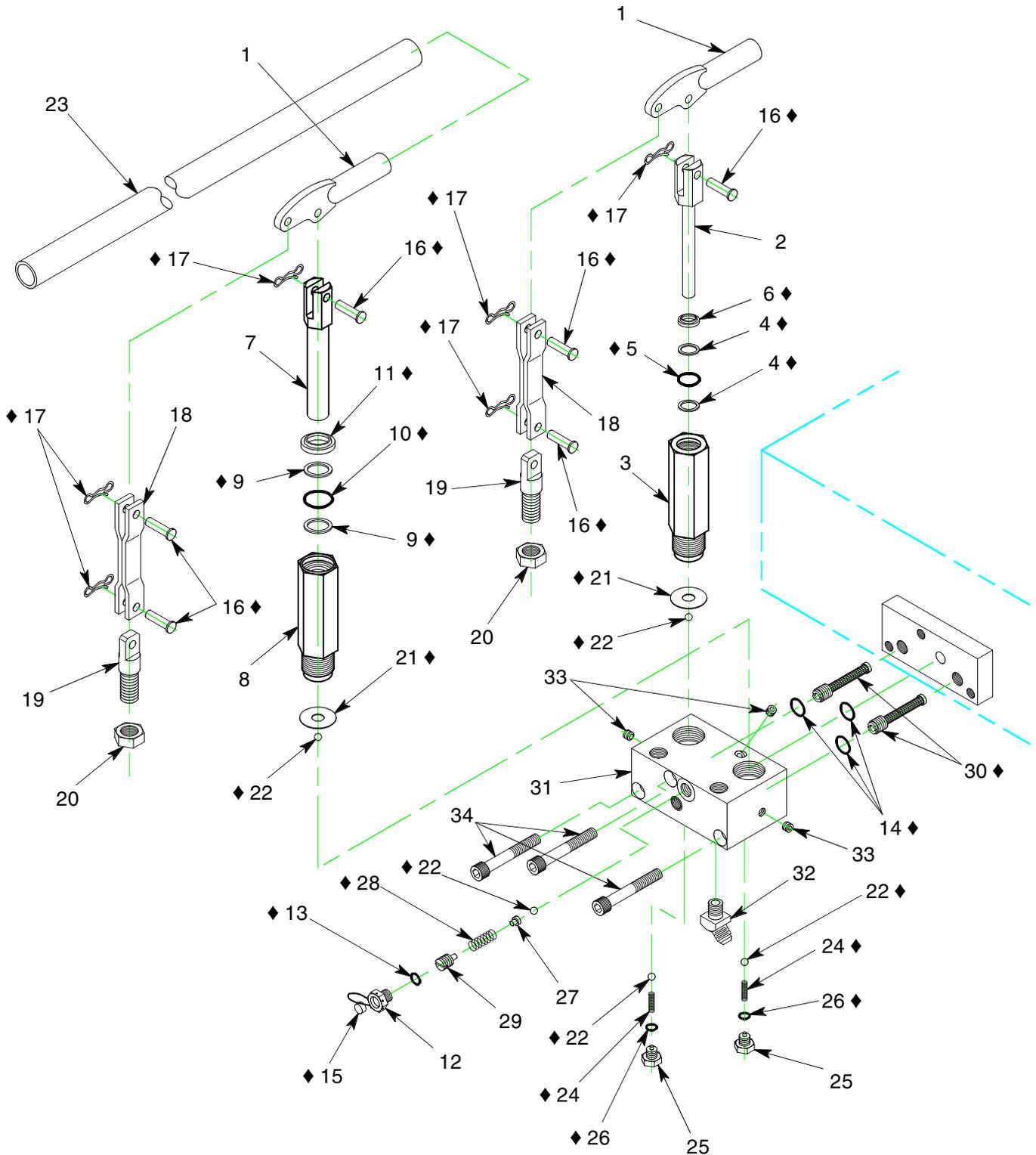


FIGURE 3

**86399E VALVE BLOCK & HAND PUMP ASSEMBLY**

## 86399E VALVE BLOCK & HAND PUMP ASSEMBLY

NO.	QTY	PART NO.	DESCRIPTION				
1	2	55001	FULCRUM				
2	1	886659	PLUNGER, 7/16 DIA				
3	1	886658	BODY, 7/16 DIA				
4	2	55922-9	BACK-UP RING				
5	1	55925-111	O-RING				
6	1	755-018	WIPER				
7	1	886657	PLUNGER, 13/16 DIA				
8	1	886656	BODY, 13/16 DIA				
9	2	55922-16	BACK-UP RING				
10	1	55925-211	O-RING				
11	1	755-019	WIPER				
12	1	717-046	PLUG				
13	1	55925-904	O-RING				
14	3	55925-113	O-RING				
15	1	390-022	LEAD & WIRE SEAL				
16	6	55002	FLAT HEAD PIN, 5/16 DIA				
17	6	372-028	BOW TIE COTTER				
18	2	55615	LINK				
19	2	55011	ANCHOR				
20	2	352-004	HEX JAM NUT, 5/8-18				
21	2	55024	GASKET				
22	5	412-004	STEEL BALL, 1/4 DIA				
23	1	86376	PUMP HANDLE				
24	2	55621	SPRING				
25	2	55620	PLUG				
26	2	55925-903	O-RING				
27	1	55153	GUIDE				
28	1	55154H	SPRING				
29	1	55148	SET SCREW				
30	2	55568	OIL SCREEN				
31	1	85425	VALVE BLOCK				
32	1	722-009	ELBOW, 45°, 3/8 37° x 1/4 MPT				
33	1	717-010	PLUG, HEX SOC, 1/16 NPT				
34	4	323-009	SHCS, 3/8-24 x 3" LG				

♦ PART OF REPAIR PARTS KIT

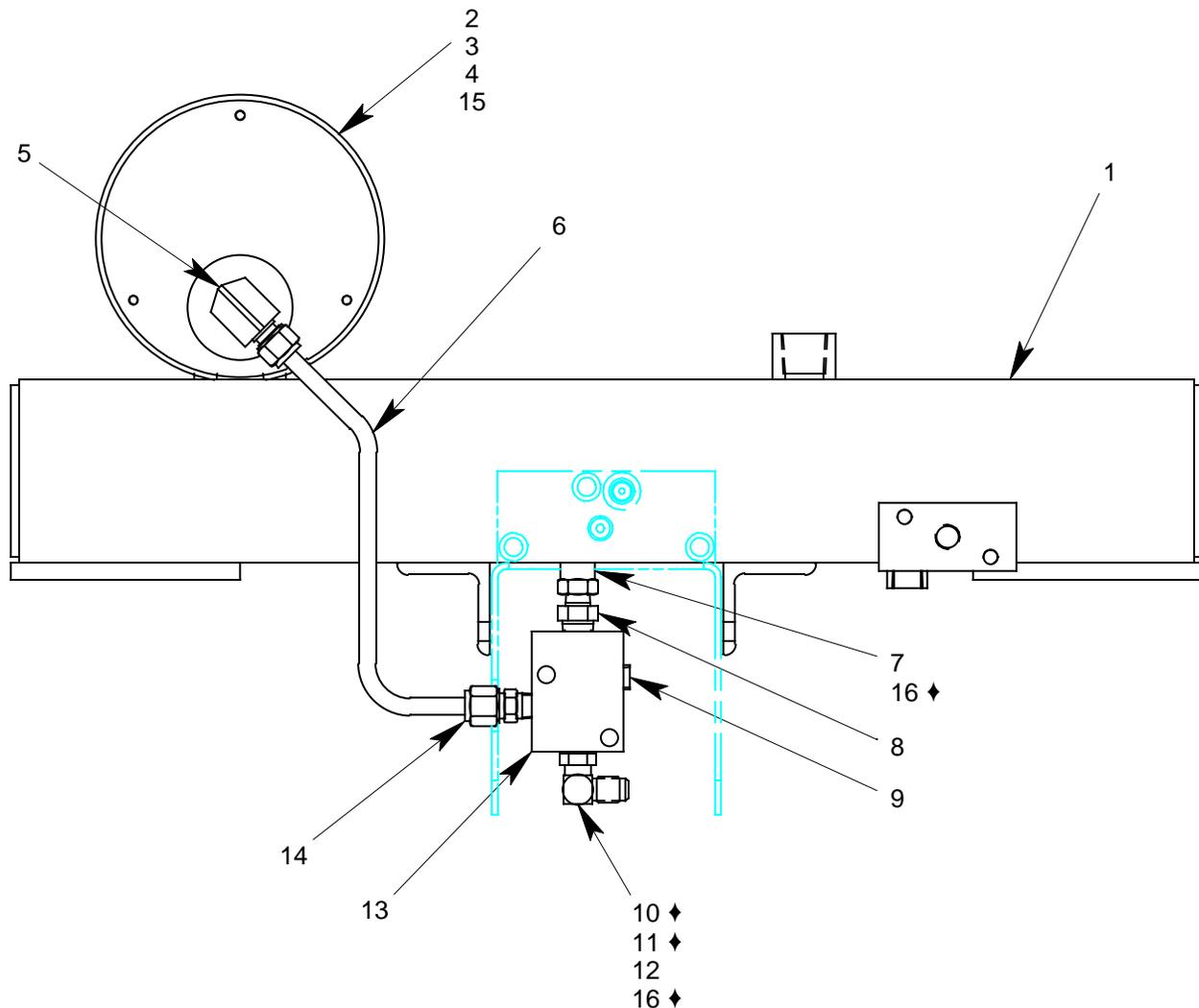


FIGURE 4

**83219 LOAD GAUGE KIT**

NO.	QTY	PART NO.	DESCRIPTION	NO.	QTY	PART NO.	DESCRIPTION
1	1	80209	RESERVOIR w / GAGE MOUNT	9	1	717-006	PLUG, 1/4 MPT
2	1	83275	GAUGE	10	1	412-001	BALL, 3/8 DIA
3	3	323-073	SHCS (MARSH GAUGE)	11	1	79367	SPRING
4	3	363-009	SPLIT LOCKWASHER, #10	12	1	722-003	ELBOW, 3/8 SAE x 3/8
5	1	722-025	ELBOW, 3/8 T x 1/2 FPT	13	1	86367	CROSS CHECK VALVE
6	1	732-010	TUBE, 3/8 O.D. x .065 WALL	14	1	721-009	CONN., 3/8 T x 1/4 MPT
7	1	751-001	ADAPTER, 3/8 SAE x 1/4 FPT	15	3	323-071	SHCS, (ASHCROFT GAUGE)
8	1	711-018	NIPPLE, 3/8 MPT x 1/4 MPT	16	2	MS28778-6	O-RING (FOR ITEMS 7 & 12)

♦ PART OF REPAIR PARTS KIT

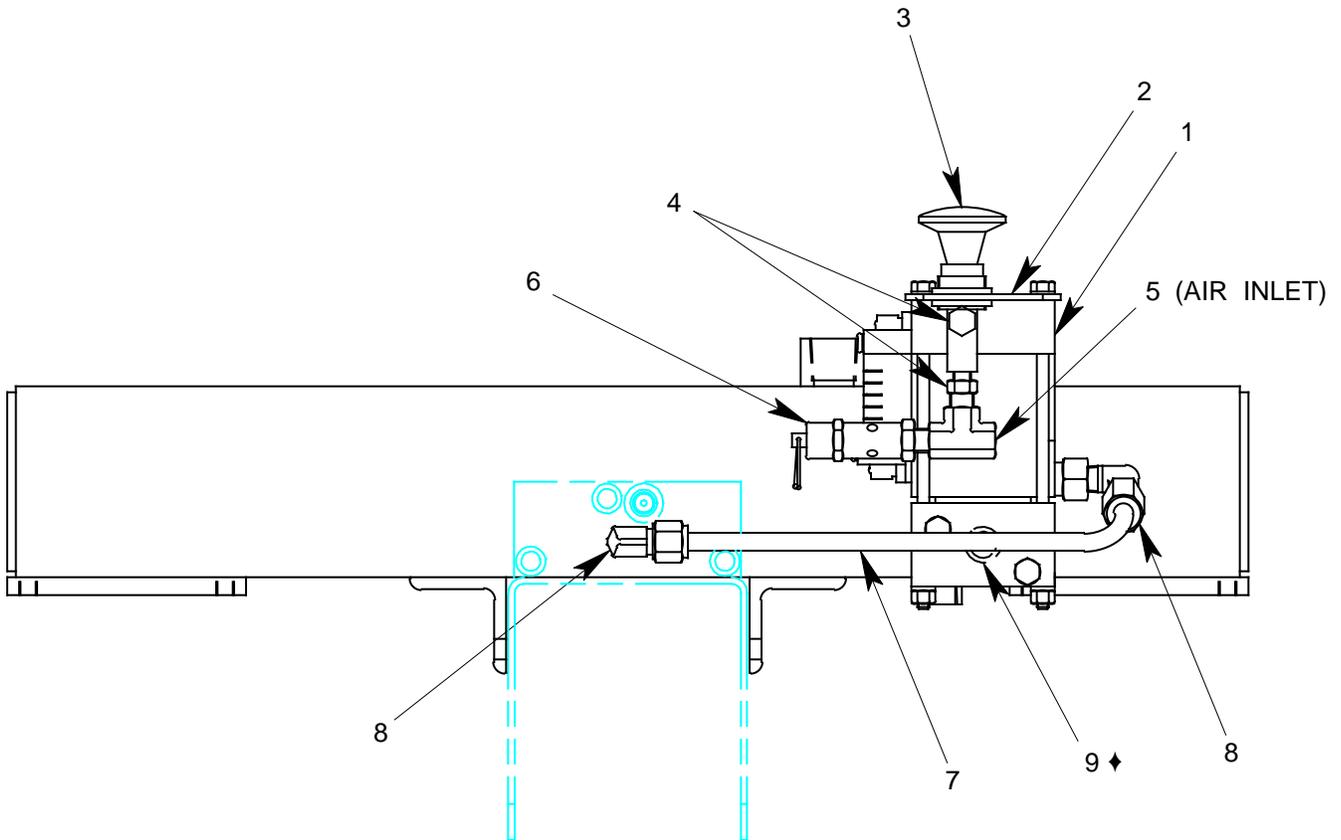


FIGURE 5

**80218 AIR PUMP KIT**

NO.	QTY	PART NO.	DESCRIPTION	NO.	QTY	PART NO.	DESCRIPTION
1	1	441-018	AIR PUMP	6	1	425-001	AIR RELIEF VALVE
2	1	72585	MOUNT PLATE	7	1	732-010	TUBE, 3/8 O.D. x .065 WALL
3	1	421-006	VALVE	8	2	722-014	ELBOW, 3/8 T x 1/4 MPT
4	2	711-024	NIPPLE, 1/4 MPT x 1/8 MPT	9	1	55925-016	O-RING
5	1	713-013	TEE, 1/4 FPT				

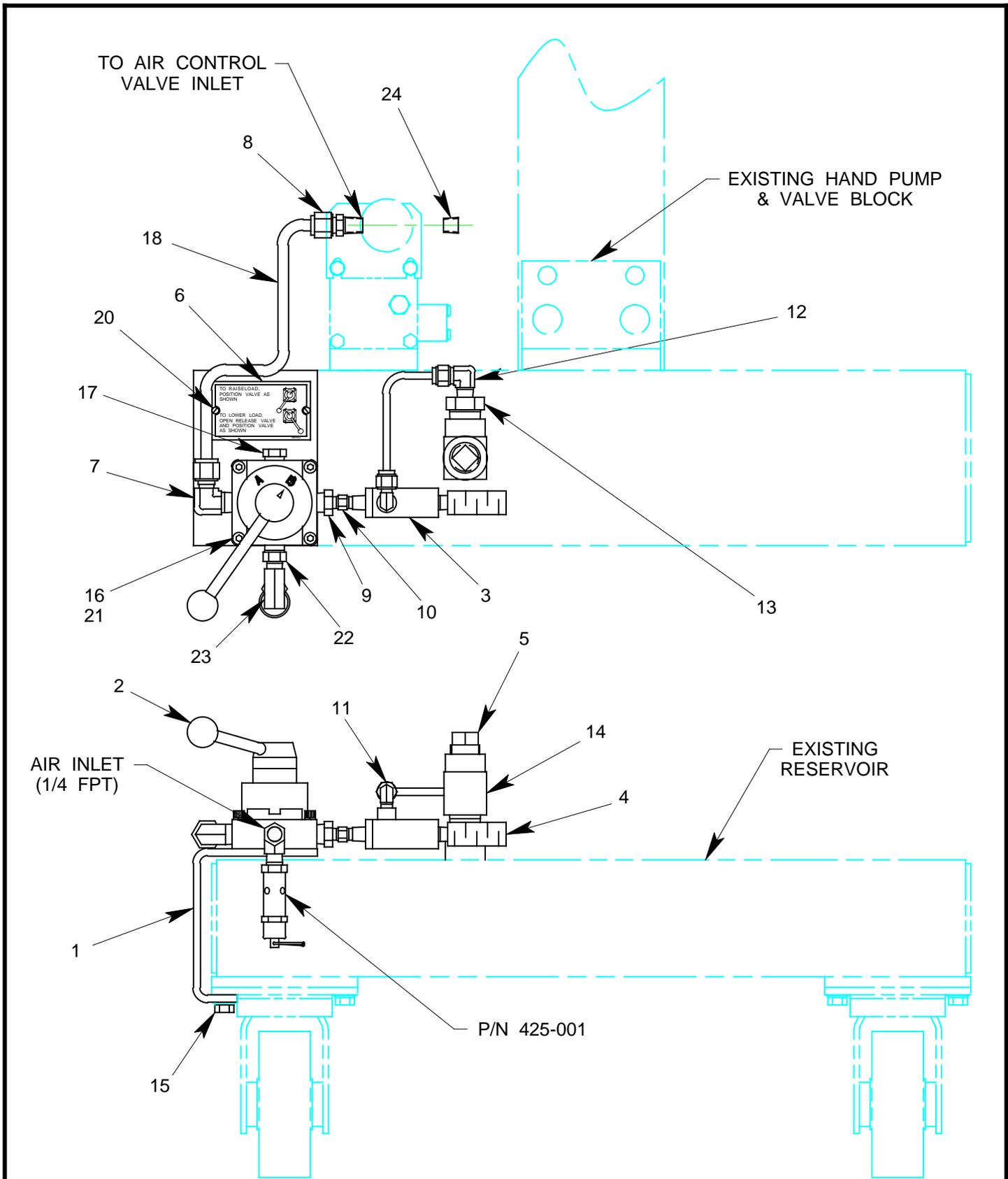


FIGURE 6

**83260 AIR OPERATED VACUUM RETRACT KIT**

## 83260 AIR OPERATED VACUUM RETRACT KIT

NO.	QTY	PART NO.	DESCRIPTION				
1	1	83261	MOUNTING PLATE				
2	1	86563	HAND VALVE				
3	1	490-021	AIR OPERATED VAC. PUMP				
4	1	472-003	MUFFLER, 1/4 FPT				
5	1	86564	DIPSTICK				
6	1	86562	PLACARD, INSTRUCTION				
7	1	722-010	ELBOW, 3/8 T x 3/8 MPT				
8	1	721-009	CONN., 3/8 T x 1/4 MPT				
9	1	714-016	REDUCER, 3/8 MPT x 1/8 FPT				
10	1	711-089	NIPPLE, BRASS, 1/8 MPT				
11	1	722-011	ELBOW, 1/4 T x 1/8 MPT				
12	1	722-021	ELBOW, 1/4 T x 1/4 MPT				
13	1	714-007	REDUCER, 3/4 MPT x 1/4 FPT				
14	1	713-030	STREET TEE, 3/4 NPT				
15	2	321-011	HHCS, 3/8-16 x 1" LG				
16	4	323-048	SHCS, 1/4-20 x 1 1/2 LG				
17	1	483-004	BREATHER, 3/8 MPT				
18	A/R	732-002	TUBE, 3/8 O.D. x .049 WALL				
19	A/R	732-003	TUBE, 1/4 O.D. x .035 WALL				
20	2	397-010	SELF TAPPING SCREW, #6				
21	4	363-014	SPLIT LOCKWASHER, 1/4				
22	1	711-030	NIPPLE, 3/8 MPT x 1/4 MPT				
23	1	713-013	TEE, BRASS, 1/4 FPT				
24	1	717-006	PLUG, 1/4 MPT				

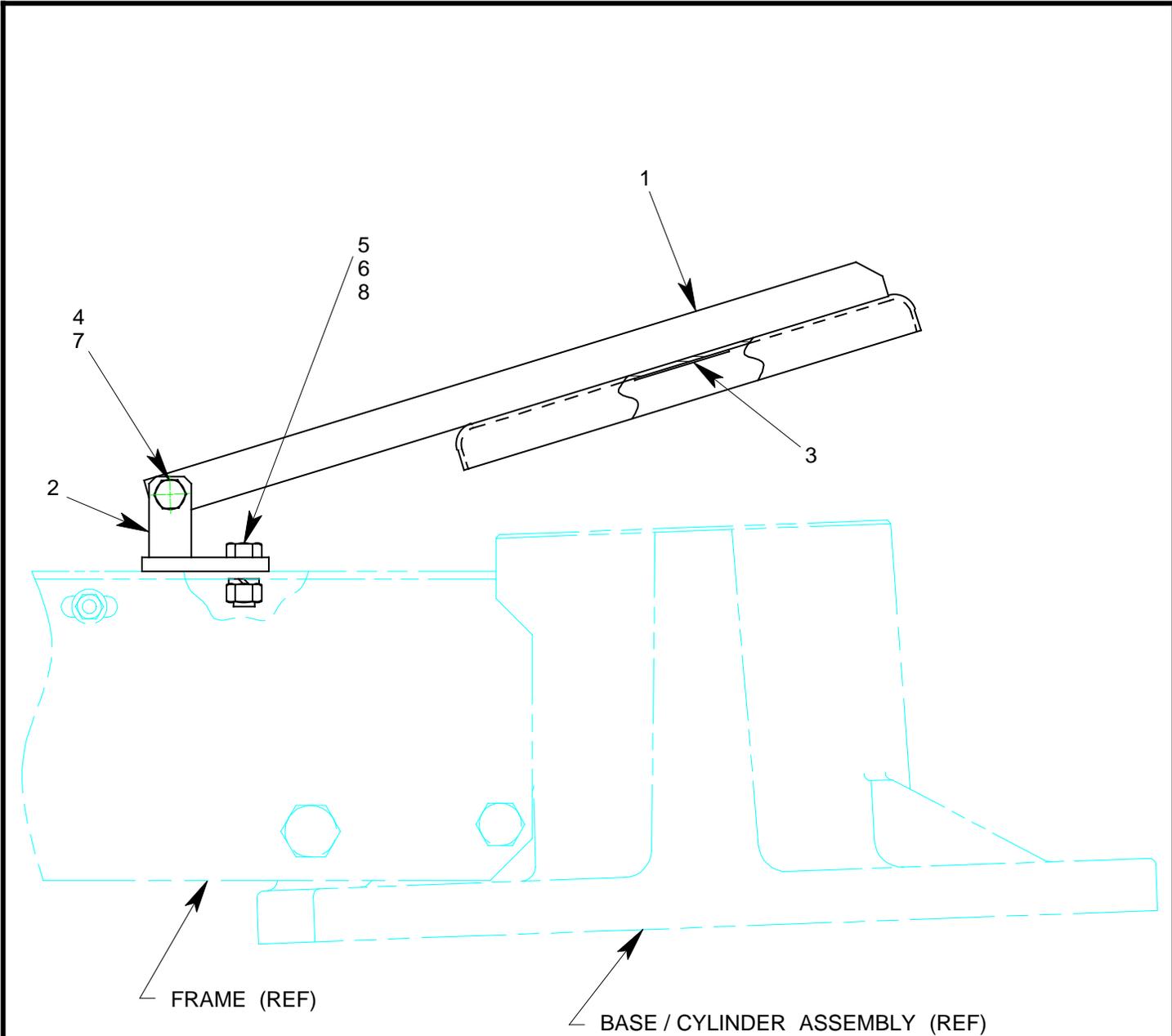


FIGURE 7

**83247 RAIN HAT KIT**

NO.	QTY	PART NO.	DESCRIPTION	NO.	QTY	PART NO.	DESCRIPTION
1	1	83245	RAIN HAT	5	2	321-056	HHCS, 3/8-16 x 7/8 LG
2	1	83246	RAIN HAT BRACKET	6	2	363-003	SPLIT LOCKWASHER, 3/8
3	1	75943	STICKER, CLOSE COVER	7	1	355-004	HEX LOCKNUT, 5/16-18
4	1	321-058	HHCS, 5/16-18 x 1 1/2 LG	8	2	351-002	HEX NUT, 3/8-16