

## BRAKE SECTION

### GENERAL DESCRIPTION

Several improvements have been made in the brake system on 1955 Cadillac cars to prolong brake lining life and obtain better braking action.

On all 75 and 86 series commercial chassis, the length of the primary brake lining has been increased, providing greater braking area and longer lining life.

A 1/2" diameter control valve piston, Fig. 9-1, is used on the Power Brake in 1955, which ma-

terially reduces the pressure required on the pedal to obtain power assist in braking. Use of a softer master cylinder boot and pedal shaft seal at the toe-board has eliminated the necessity for a brake pedal retracting spring on cars with Power Brakes, which further reduces pedal apply effort.

The residual check valve, which was formerly in the master cylinder, is now located in the hydraulic cylinder end cap on the power brake assembly, Fig. 9-1.

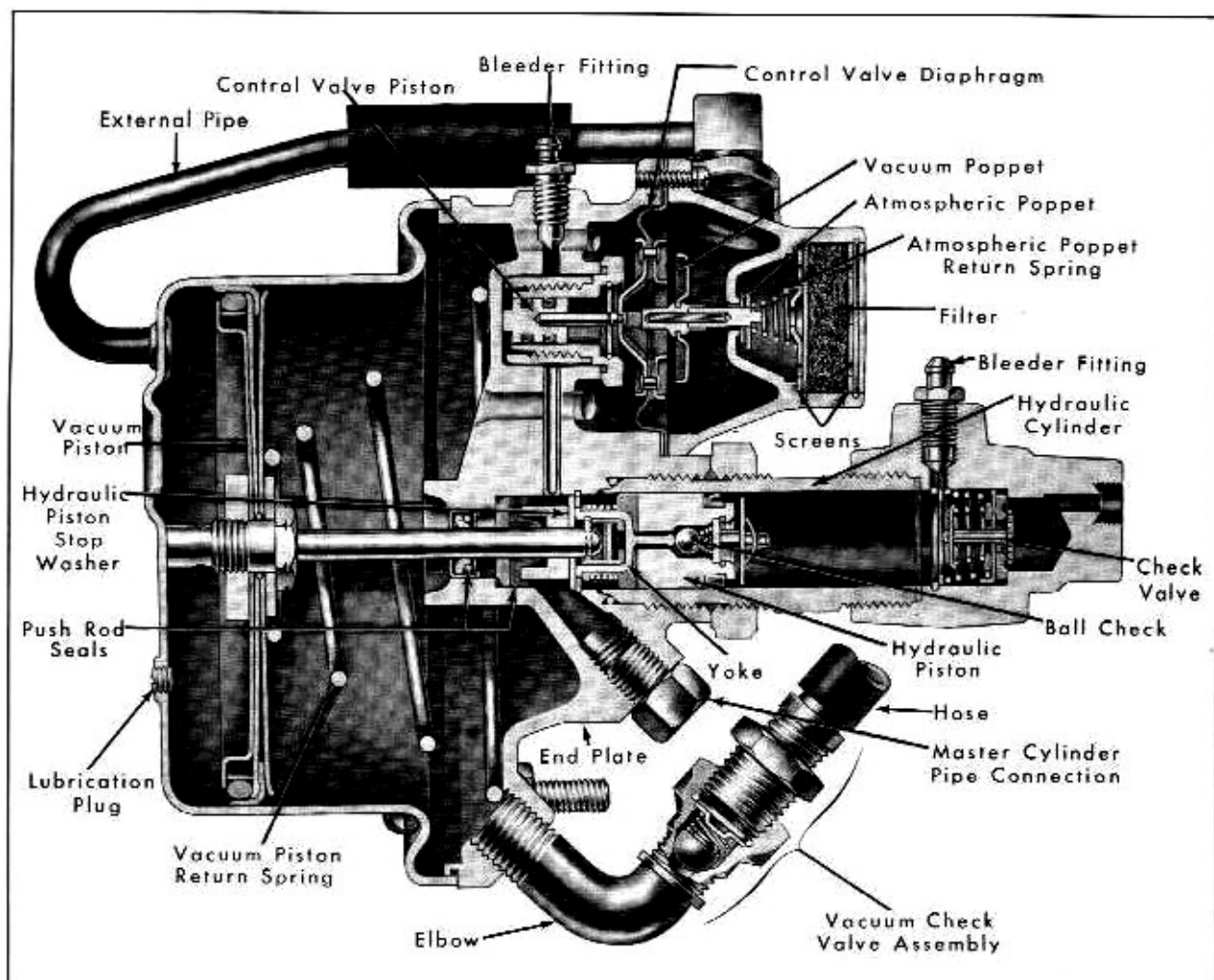


Fig. 9-1 Power Brake Cut-Away View

### SERVICE INFORMATION

#### (1) Removal of Power Brake Assembly

1. Disconnect brake lines at power cylinder end plate.
2. Loosen vacuum line hose clamp at check

valve and slide hose off of check valve.

3. Remove three nuts and lockwashers from the cylinder mounting bracket and remove Power Brake assembly from car.

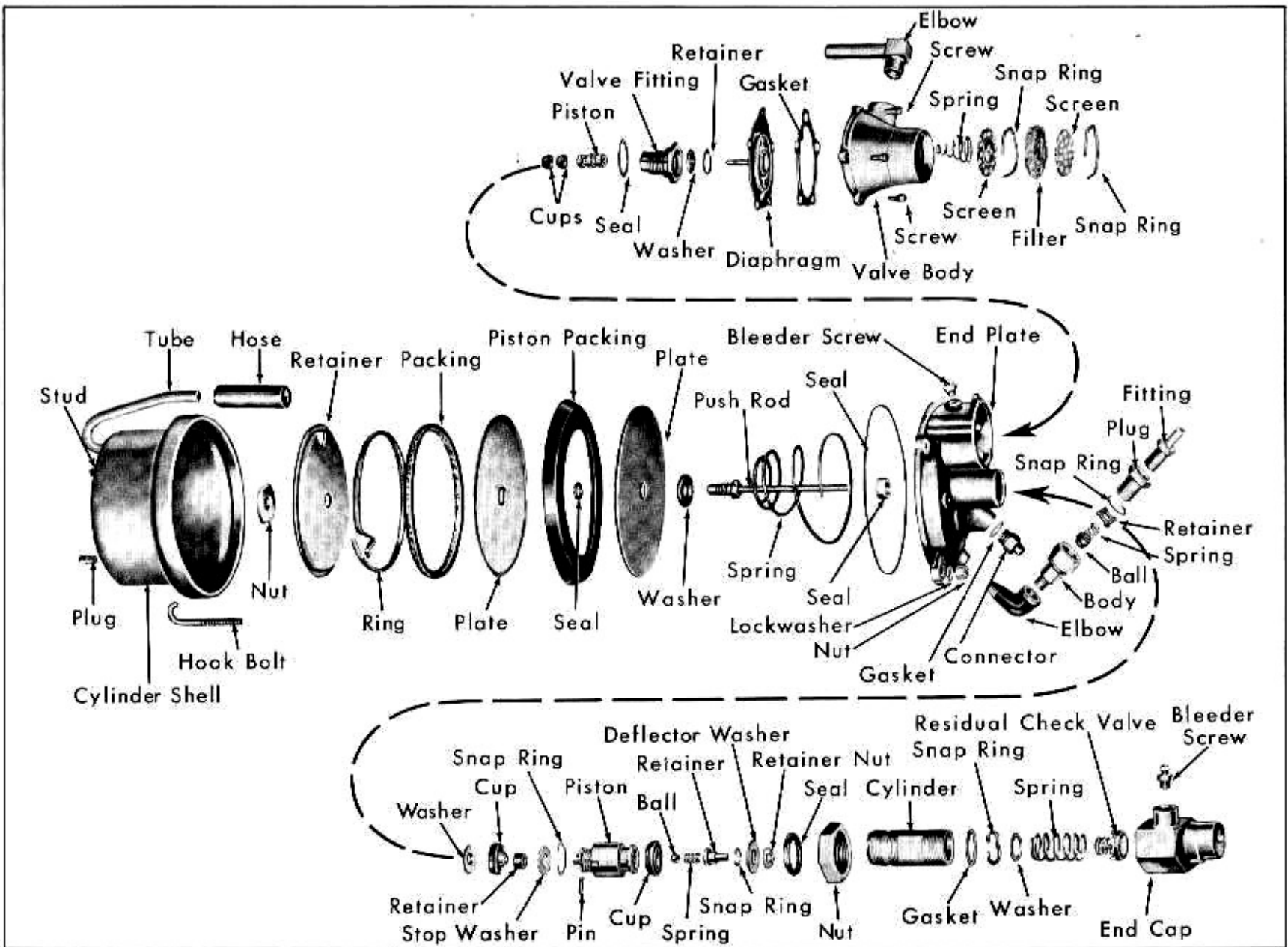


Fig. 9-2 Power Brake Disassembled

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**(2) Disassembly of Power Brake Assembly****a. Disassembly of Hydraulic Cylinder Assembly**

**NOTE:** When disassembling the Power Brake assembly, use care in handling parts to prevent their coming in contact with mineral oil or greases. Do not handle hydraulic cups and seals with greasy hands.

1. Loosen hydraulic cylinder nut and unscrew hydraulic cylinder assembly from the end plate, Fig. 9-2.
2. Hold the end cap in a vise and remove the hydraulic cylinder from the cap, using an open end wrench on the flat part of the cylinder.
3. Remove cylinder to end cap gasket. Remove the bleeder fitting from the end cap.
4. Remove the residual check valve snap ring. Remove spring seat, spring and residual check valve.
5. Loosen the four hook bolt nuts and remove cylinder shell, sliding the connector pipe out of the rubber hose.
6. Compress the piston spring by pressing down on the end plate and install the Vacuum Piston Retaining Strap, Tool No. J-5650, under opposite hook bolts as shown in Fig. 9-3.
7. Remove the hydraulic piston assembly from the push rod by holding retaining spring back and removing the small pin.
8. Remove the Retaining Strap, while compress-

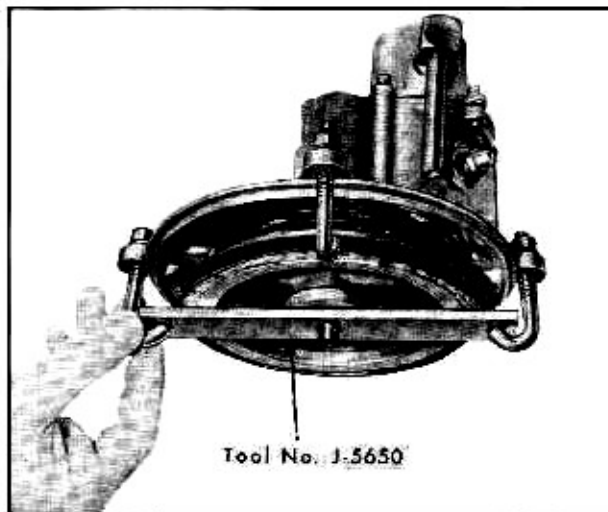


Fig. 9-3 Installing Retaining Strap

ing the return spring, then remove the vacuum piston with push rod and vacuum piston spring.

9. Remove deflector retainer nut and deflector washer from piston.
10. Remove snap ring, retainer, spring, and ball from piston.
11. Remove hydraulic piston cup from piston.
12. Remove the hydraulic cylinder end seal.
13. Remove the retaining ring and the hydraulic cylinder stop washer from the end plate.
14. Remove the seal retainer. Note that the counter-bored side is next to seal cup.
15. Remove seal and lower stop washer. Note that lip of cup seal is up.
16. Drive piston rod seal out with a flat end rod or drift.

**b. Disassembly of Vacuum Control Valve Assembly**

1. Remove control valve body screws and remove control valve assembly with diaphragm and gasket.
2. Remove diaphragm from control valve body.
3. Remove air intake filter snap ring and screen.
4. Remove filter.
5. Remove lower snap ring and screen with spring.
6. Remove hydraulic control valve fitting from end plate, using 1-1/8" socket wrench.
7. Push piston out of fitting and remove two cups from piston.
8. Remove seal from fitting.
9. Remove retainer ring and stop washer from fitting.

**c. Disassembly of Vacuum Piston**

1. Remove nut from threaded end of push rod.
2. Remove retainer plate, packing, and expander ring.
3. Remove small diameter piston plate with rubber seal ring.

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4. Remove leather packing, larger diameter piston plate, and washer from push rod.

### d. Disassembly of Check Valve

1. Remove check valve assembly from pipe elbow in end plate.
2. Remove plug from bushing.
3. Remove bushing from check valve assembly.
4. Remove snap ring, spring retainer, and spring with check ball.
5. Remove spring from check ball.

### (3) Cleaning and Inspection of Power Brake Parts

1. Thoroughly clean all parts to be reused.
2. Keep all hydraulic system parts away from mineral oils or greases.
3. After cleaning, wash hydraulic system parts in clean alcohol before assembly.
4. Use new rubber seals and cups when reassembling power brake. Do not attempt to reuse old seals or cups.

### (4) Assembly of Power Brake Assembly

#### a. Assembly of Vacuum Piston

1. Drill a 5/16" hole in a block of wood and place piston rod in hole with threaded end up.
2. Install flat washer and larger diameter piston plate (chamfered side of hole up) over threaded end of push rod.
3. Install rubber seal ring over shaft into chamfered hole in piston plate.
4. Install leather packing on piston plate with lip up.
5. Install smaller diameter piston plate over threaded end of push rod, with chamfered side of the hole down over rubber sealing ring. Outer diameter of plate will retain leather packing in position.
6. Install cotton wicking in position against inner face of lip of leather packing.
7. Install expander ring inside of cotton wicking,

with gripper points up and notch at loop end of expander ring under clip at opposite end of ring.

8. Install retainer plate with cut-out portion over loop of expander ring.

9. Install nut on push rod finger tight, then place hexagonal section of push rod in a vise and tighten nut securely, using care to be sure that retainer plate does not turn. Stake the nut to the shaft.

#### b. Assembly of Vacuum Control Valve

1. Install stop washer and retainer ring in control valve fitting.
2. Install two new rubber cups on valve piston with lip of cups toward small end of piston.
3. Install piston in valve fitting with hole in end of piston next to stop washer.
4. Install a new rubber seal gasket in groove under head of valve fitting and install fitting into end plate. Tighten fitting securely.
5. Install gasket on end plate.
6. Install vacuum diaphragm over gasket with shaft in hole in hydraulic valve piston.
7. Position vacuum control valve body over vacuum diaphragm.

NOTE: One side of valve body mounting flange is straight. This side should be positioned next to hydraulic cylinder boss on end plate.

8. Install and tighten five screws.
9. Install spring in vacuum control valve body with small end over raised area of poppet valve seat.
10. Install screen, with depression in larger end of poppet valve spring, and install snap ring.
11. Install filter, upper screen, and retainer.

#### c. Assembly of Hydraulic Cylinder

1. Install a new push rod leather seal into end plate with lip of seal toward hydraulic cylinder side of end plate.
2. Place end plate on bench and install stop washer with chamfered side down.
3. Install seal cup with lip up and seal retainer with counterbored side next to cup.

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4. Install stop washer next to retainer and install snap ring in groove.

5. Place vacuum piston return spring over push rod with small end of spring next to vacuum piston and carefully guide push rod through seal in end plate.

6. Compress spring and use Vacuum Piston Retaining Strap, Tool No. J-5650, to hold end plate and cylinder together.

7. Install ball, spring, retainer, and snap ring in piston.

8. Dip hydraulic piston cup in Delco No. 11 brake fluid and install in groove with lip of cup toward check valve end of piston.

9. Install deflector washer and deflector retaining nut on piston.

10. Dip hydraulic piston in Delco No. 11 brake fluid and assemble piston on push rod. Install retaining pin in hole in piston and rod. When pin is in position, retaining spring will hold it in place.

11. Place end cap in a vise and install bleeder screw, end cap gasket, residual check valve, spring, spring seat and snap ring.

12. Thread hydraulic cylinder tube into end cap with milled flats next to end cap, and securely tighten cylinder.

13. Thread check nut on cylinder to limit of threads.

14. Install hydraulic cylinder end seal against shoulder in end plate.

15. Guide the lip of the piston cup into the cylinder carefully and thread cylinder into end plate until cylinder bottoms firmly against the end seal. Tighten cylinder until bleed screw on end cap is aligned with bleed screw in end plate and tighten

check nut securely.

16. Remove Piston Retaining Strap.

17. Place rubber ring gasket in groove on end plate.

18. Saturate the cotton wicking by dipping vacuum piston in Delco Shock Absorber Fluid, and allow excess oil to drain off. In addition, coat inside of cylinder shell lightly with Delco Shock Absorber Fluid.

19. Insert piston into cylinder shell by tipping piston and, with connector pipe lined up with hose, slide cylinder shell into position against end plate.

20. Attach hook bolts and tighten each bolt evenly until all bolts are uniformly tight.

### d. Assembly of Check Valve

1. Install end of spring over check ball.

2. Install spring retainer plate, with depression in plate in end of spring, and install snap ring.

3. Install plug in check valve body.

4. Install fitting in bushing.

5. Install vacuum check valve assembly in elbow on end plate.

## (5) Installation of Power Cylinder Assembly

1. Position Power Brake assembly on mounting bracket and install lockwashers and nuts.

2. Connect vacuum hose to check valve on Power Brake and tighten hose clamp.

3. Connect brake line fittings to end plate.

4. Bleed braking system.

## TORQUE TIGHTNESS

Location	Size	Ft. Lbs. Min.	Ft. Lbs. Max.
Brake fluid line connections . . . . .	Special	8	9
Hand brake cable clamps (at backing plate) . . . . .	5/16-24	10	13
Pedal clamp bolt . . . . .	3/8-16	20	25
Front backing plate to knuckle . . . . .	7/16-20	60	70
Brake backing plate to axle housing (except 86) . . . . .	3/8-24	35	40
Brake backing plate to axle housing (55-86 Series) . . . . .	7/16-20	55	60
Brake anchor pin . . . . .	Special	80	120

## BRAKES

## SPECIFICATIONS

Subject and Remarks	55-62, 60S	55-75	55-86
Braking area (Total in Square inches) . . . . .	222.8	233.7	233.7
Braking ratio -			
Front . . . . .	55.8%	55.8%	52.8%
Rear . . . . .	44.2%	44.2%	47.2%
Drums -			
(Left front drum has left hand threaded wheel studs.)			
Inside Diameter:			
Front . . . . .	11.995"-12.005"	11.995"-12.005"	11.955"-12.005"
Rear . . . . .	11.995"-12.005"	11.995"-12.005"	11.995"-12.005"
Out-of-round inside diam. not over -			
Front . . . . .	.007"	.007"	.007"
Rear . . . . .	.007"	.006"	.006"
Clearance between lining and drums . . . . .	.010" - top .015" - bottom	.010" - top .015" - bottom	.010" - top .015" - bottom
Remachined diameter not over . . . . .	12.060"	12.060"	12.060"
Lining - Primary -			
Length, width, thickness:*			
Front . . . . .	11.52x2-1/2x1/4	12.98x2-1/2x1/4	12.98x2-1/2x1/4
Rear . . . . .	11.52x2-1/2x1/4	12.98x2-1/2x1/4	12.98x2-1/2x1/4
Lining - Secondary -			
Length, width, thickness:			
Front . . . . .	12.98x2-1/2x1/4	12.98x2-1/2x1/4	12.98x2-1/2x1/4
Rear . . . . .	12.98x2-1/2x1/4	12.98x2-1/2x1/4	12.98x2-1/2x1/4
Type . . . . .	Moulded	Moulded	Moulded
Attached to shoes by . . . . .	Rivets	Rivets	Rivets
Wheel cylinder bore -			
Front . . . . .	1-1/8"	1-1/8"	1-1/8"
Rear . . . . .	1"	1"	1-1/16"
POWER BRAKE			
Type Used . . . . .	Bendix Hydrovac		
Vacuum Piston			
Diameter . . . . .	5-1/4"		
Length of Stroke . . . . .	1-1/2"		
Control Valve Piston Diameter . . . . .	1/2"		
Hydraulic Piston Diameter . . . . .	1"		
Hydraulic Piston Stroke . . . . .	1.325 min.		
* 1/2" wide circumferential groove 1/8" deep full length.			

# MAJOR REPAIR KIT FOR SERVICING BENDIX HYDROVAC

Single Piston Hydrovacs—373853, 374000, 374070, 374550, 374750, 374980, 375100, 376862.

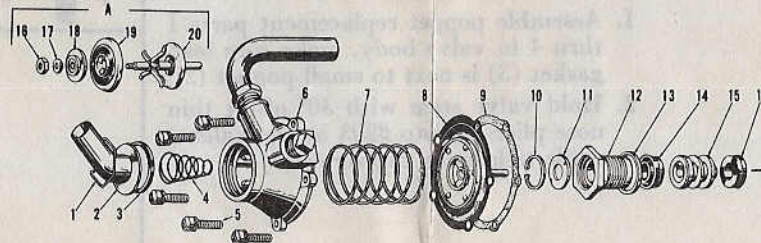
Guided Piston Hydrovacs—375278, 375279, 376710

## PARTS IDENTIFICATION

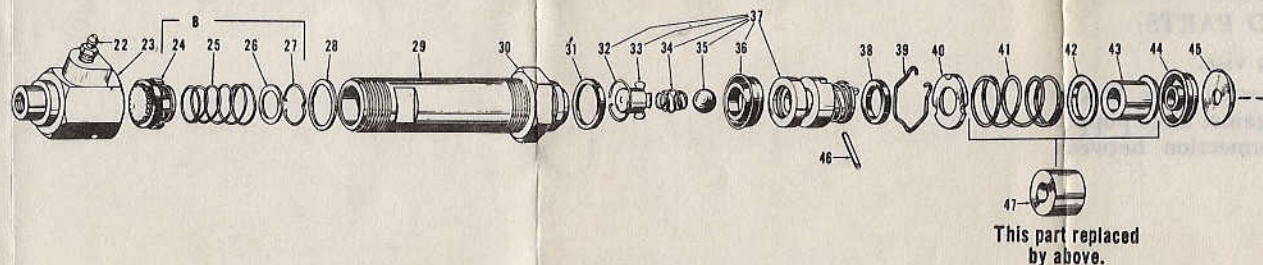
KEY NO.	PART NAME
1	SNAP RING—A.C. Tube & Cover
2	TUBE & COVER
3	GASKET—A.C. Tube & Cover
4	SPRING—Poppet Valve (Small)
5	SCREW & LOCKW.
6	HOUSING—Valve
7	SPRING—Valve Seat
8	DIAPHRAGM & PLATE
9	GASKET—Valve Body
10	RING—Retainer (Valve Piston Stop)
11	WASHER—Valve Piston Stop
12	FITTING—Hydraulic Valve Piston
13	SEAL—Hydraulic Valve Fitting
14	CUP—Hydraulic Valve Piston
15	PISTON—Hydraulic Valve
16	NUT—Valve Poppet
17	WASHER—Seal (Poppet Valve)
18	VALVE—Atmospheric Poppet (Small)
19	VALVE—Atmospheric Poppet (Large)
20	VACUUM POPPET & SHAFT
21	SEAL—End Plate (Rubber)
22	VALVE—Bleeder
23	CAP—End (Hydraulic Cyl. Tube)
24	VALVE—Residual Check
25	SPRING—Return (Residual Valve)
26	WASHER—Stop (Residual Valve)
27	SNAP RING (Residual Valve)
28	GASKET—Copper (End Cap)
29	CYLINDER—Tube
30	NUT—Check (Hyd. Cyl. Tube)
31	SEAL—Hydraulic Cyl. Tube Nut
32	SNAP RING (Hyd. Pis. Check Valve)
33	RETAINER—Ball (Hyd. Pis. Check Valve)
34	SPRING—Ret. (Hyd. Pis. Check Valve)
35	BALL (Hyd. Pis. Check Valve)
36	CUP—Hydraulic Piston
37	HYDRAULIC PISTON
38	SEAL—Rubber (Hyd. Cyl. End)
39	SNAP RING (Hyd. Pis. Stop Washer)
40	WASHER—Hyd. Pis. Stop
41	SPRING—Retainer (Push Rod)
42	WASHER—Expander (Push Rod)
43	RETAINER—Seal (Push Rod)
44	CUP—Hyd. Seal (Push Rod)
45	WASHER—Guide (Push Rod)
46	PIN—Retainer (Hyd. Pis.)
47	SPACER—Replace with parts (41), (42), & (43)

The Major Repair Kit contains the parts that are normally required for complete overhaul of a Hydrovac. For ease of installation the instructions are set up in Steps 1 through 5 with parts illustrated for identification and relationship to other parts in the Hydrovac. A complete Service Manual covering the Bendix Hydrovac is available upon request (See reverse side).

**STEP 1**—Clean all metal parts in Bendix Metalclene. After cleaning, wash all hydraulic system parts in clean alcohol before assembly. Inspect all parts for excessive wear or damage. Replace any questionable parts.



**STEP 2**—Assemble control valve parts 10 through 15, into end plate. Securely tighten fitting (12). On Hydrovacs with double atmosphere poppet, assemble group "A" parts in to housing (6) as a sub-assembly. For replacement of control valve poppets in other Hydrovacs, see reverse side. Attach remaining parts 1 through 9 to end plate.



**STEP 3**—Assemble new type stationary seal parts 39 through 45 into center bore of end plate. Discard stationary seal retainer (47). Assemble end seal (38) in against shoulder of end plate. Assemble hydraulic piston parts (32) through (37) as a sub-assembly. Assemble parts (23) through (31) as a sub-assembly. Securely tighten cylinder (29) into end cap (23). Note: Group "B" parts not used in all Hydrovacs.

**STEP 4**—Compress vacuum piston return spring so that push-rod projects from end plate. Hold spring compressed while attaching piston to push-rod with pin (46) and then guide cylinder over piston and thread cylinder into end plate. Align bleed screw in end cap with bleed screw in control valve and securely tighten check nut (30).

**STEP 5**—Release vacuum piston spring. Coat inside of vacuum cylinder with Bendix Vacuum Cylinder Oil and saturate cotton wicking and leather piston packing in oil. Place gasket (21) on end plate, insert vacuum piston in cylinder shell and assemble cylinder to end plate. Slide hose back in position on control tube. Note: If Hydrovac is to be stored for a prolonged period of time, it is recommended that stationary seal cup (44) be dipped in Bendix Assembly Fluid, Part No. 377854, before assembly into Hydrovac.

