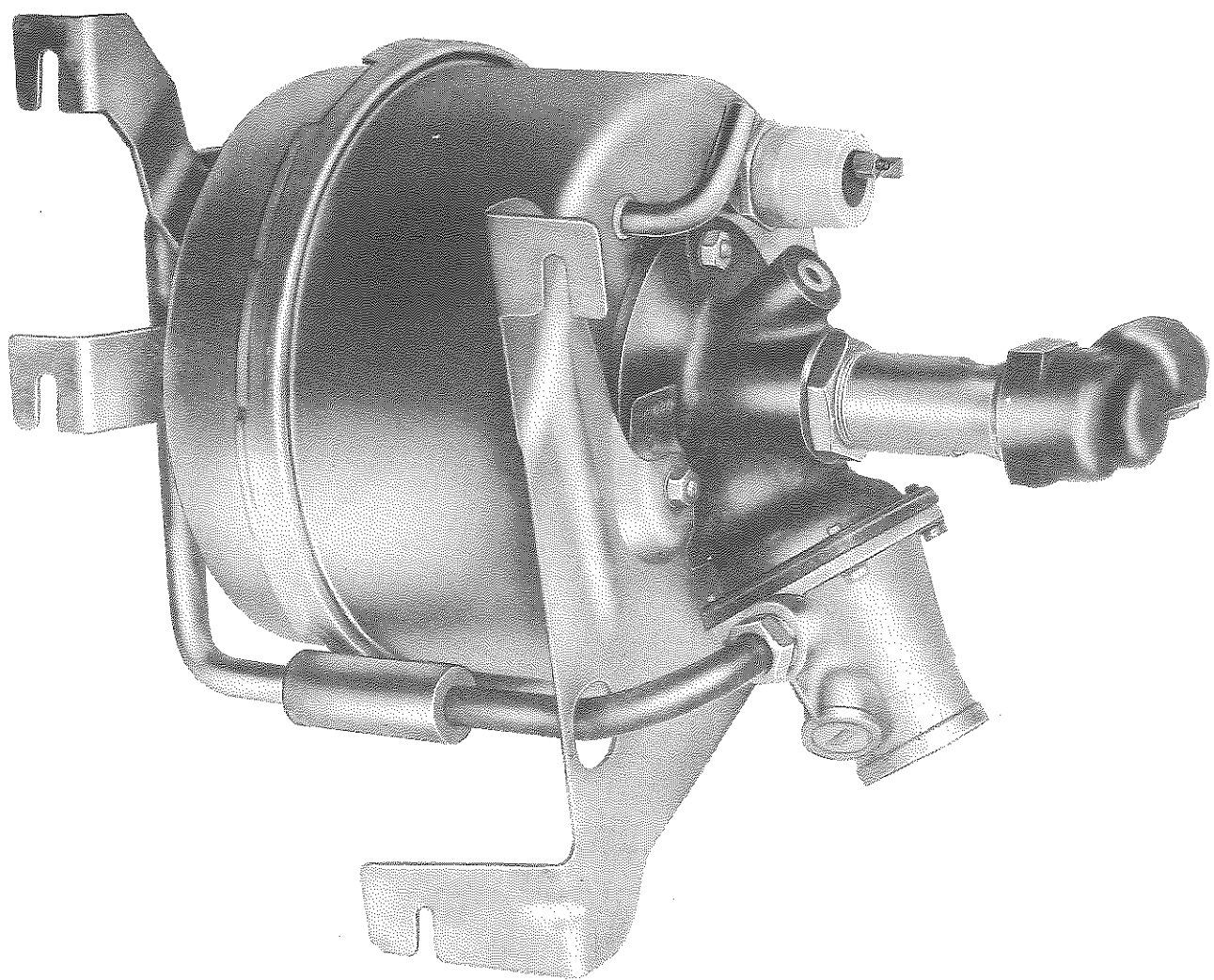


REPAIR PROCEDURE

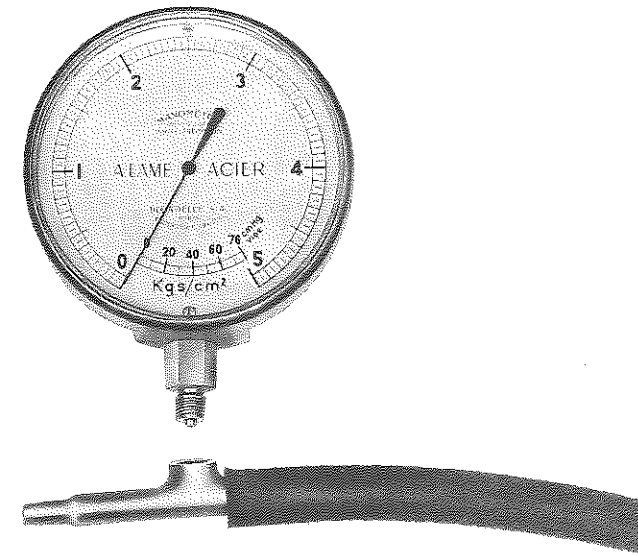
# HYDROVAC UNIT

PEUGEOT



HYDROVAC UNIT  
TESTING AND REPAIR EQUIPMENT

3

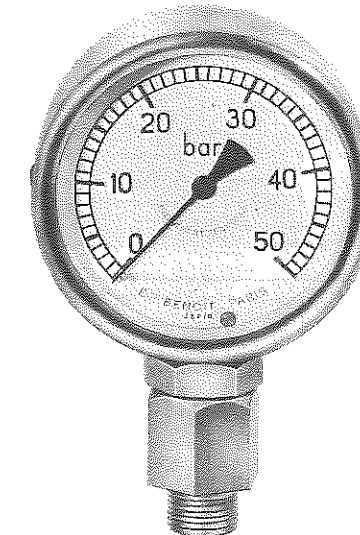


COMMERCIAL EQUIPMENT  
(Pressure/Vacuum testing equipment)

1 VACUUM GAUGE WITH FITTING

Characteristics :

Minimum measurement range : 0 to 70 cm.Hg (0 to 70 cm of mercury) of vacuum.

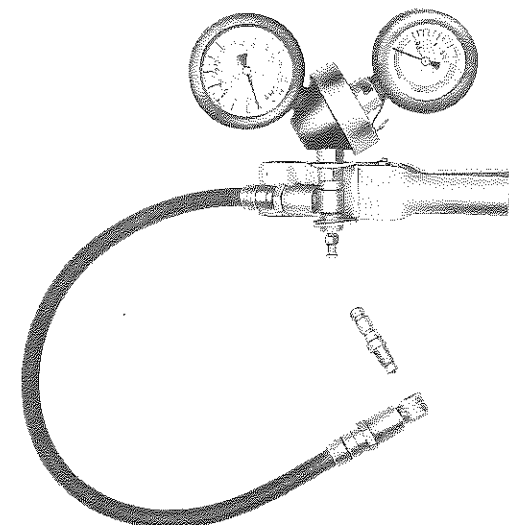


1 HYDRAULIC PRESSURE GAUGE - WITH FITTING

Characteristics :

Minimum calibrated range : 0 to 25 bars (0-358 p.s.i.)

*NOTE - This gauge should be installed at the control master-cylinder outlet and connected through a fitting, P/N 4609.06.*



1 TESTOMETER OR TESTARC

Originally installed on ARC 50 testers type C2C or C3C.

Can be bought separately from SALZER & Co.

Characteristics :

Includes both a high-pressure gauge and a special pressure gauge for measuring the residual pressure.

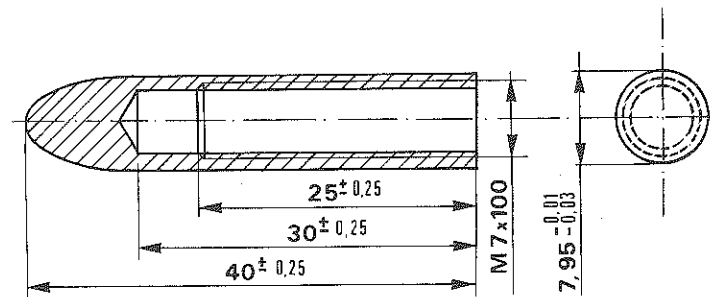
PEUGEOT



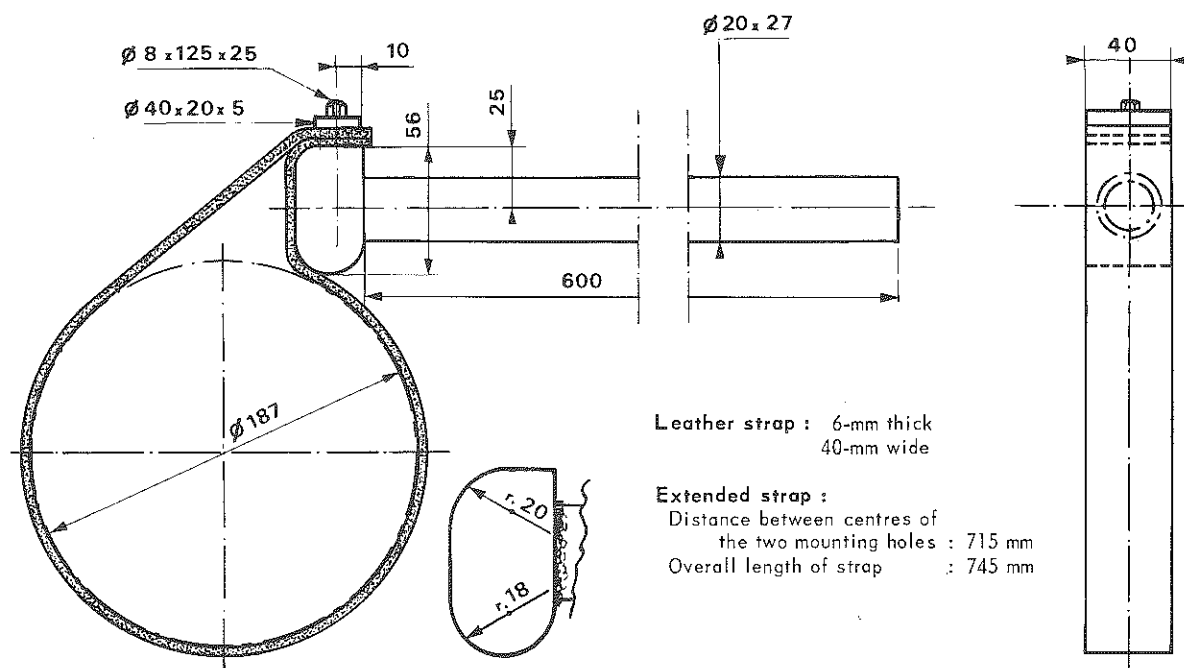
## HYDROVAC UNIT TESTING AND REPAIR EQUIPMENT

### TOOLS TO BE FABRICATED

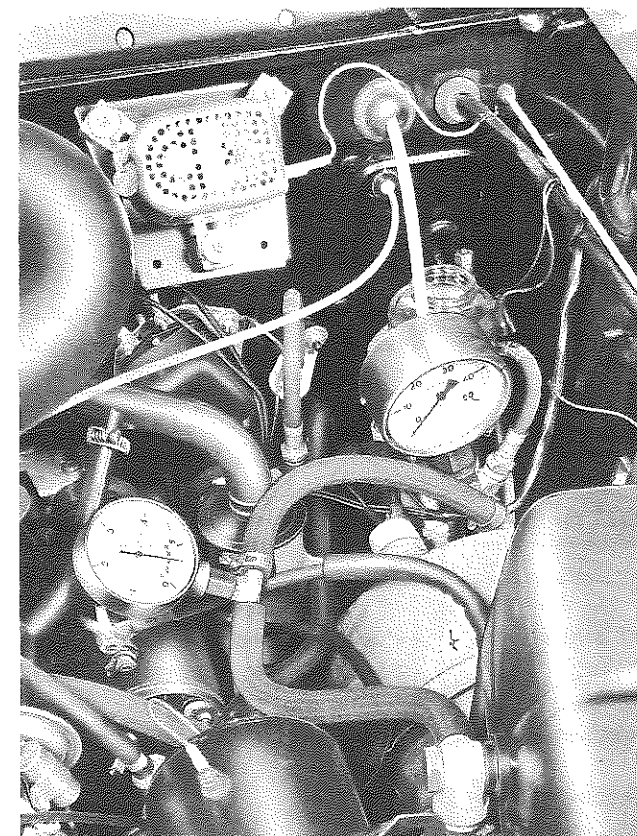
1 PROTECTOR, PUSH ROD CUP  
No. 0.0802



1 LEVER AND STRAP ASSEMBLY, AIR CYLINDER CAP REMOVING AND INSTALLING  
No. 0.0803



## HYDROVAC UNIT CHECKS ON CAR



Improper operation of the Hydrovac unit should not be suspected before the exact cause of the fault has been determined by means of the trouble-shooting chart.

Some parts, such as :

- residual pressure valve
  - vacuum valve
  - vacuum switch
- can be replaced without having to dismantle the Hydrovac unit completely.

### PRELIMINARY CHECKS

#### a - Leak in the vacuum system

- Connect the vacuum gauge between the vacuum reservoir and Hydrovac unit.
- Start the engine and bring the vacuum to over 500 mm of Hg.
- Bring the vacuum to 500 mm of Hg by depressing the brake pedal slightly several times in succession.
- Stop the engine

The vacuum should not decrease by more than 25 mm of Hg in 30 seconds. If this value is exceeded, the cause of the leak should be investigated; pay particular attention to the vacuum non-return valve, all hoses and connectors on the Hydrovac unit.

#### b - Residual pressure test

- Connect the «Testometer» to one of the front wheel brake cylinders, then depress and release the brake pedal.

The pressure should not fluctuate, and should be between 0.5 and 1.5 bars (7 and 21 p.s.i.). The residual pressure valve should be replaced if a leak is evidenced by the above test

#### c - Checking the pressure transmitted by the Hydrovac unit.

- Using the special connector, connect the hydraulic pressure gauge at the outlet of the control master-cylinder.
- Bring the vacuum to 500 mm of Hg.
- The input pressure should be between the limits stated in the table below when the output pressure at the Hydrovac unit reaches the values indicated below :

Input pressure	Output pressure
5.5 - 7.5 bars (79 - 107 p.s.i.)	40 bars (568 p.s.i.)
10 - 13 bars (143 - 185 p.s.i.)	79 bars (1123 p.s.i.)

The Hydrovac unit must be overhauled if the input and output hydraulic pressures are not as indicated above.

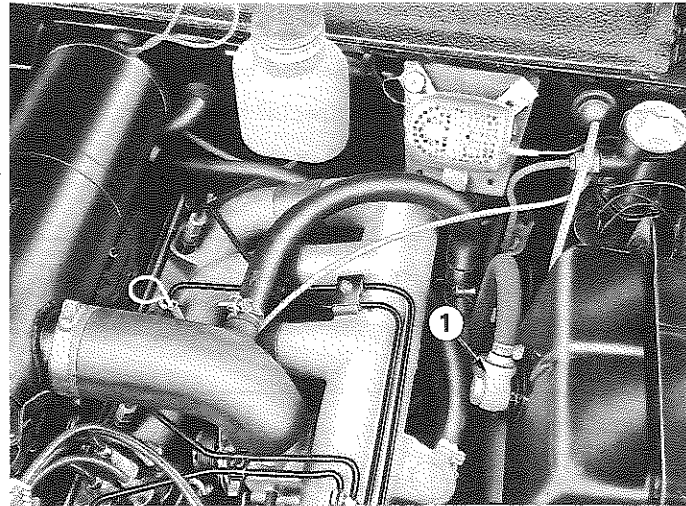


HYDROVAC UNIT TROUBLE-SHOOTING CHART		
Symptoms	Possible causes	Remedy
Warning light stays on.	<ul style="list-style-type: none"> <li>- No vacuum.</li> <li>- Low level warning light shorted</li> <li>- Loss of brake fluid.</li> <li>- Vacuum switch is incorrectly adjusted.</li> <li>- Non-return valve stuck on its seat</li> </ul>	<ul style="list-style-type: none"> <li>- Investigate for leak.</li> <li>- Check piping, hoses, check clamps for proper tightening.</li> <li>- Replace.</li> <li>- Investigate leak outside of, or in, brake system; replace or rebuild Hydrovac unit if no leak can be found.</li> <li>- Replace.</li> <li>- Apply special fluid (proceed as indicated on page 8).</li> </ul>
Warning light exceedingly long to go out.	<ul style="list-style-type: none"> <li>- Choke or enrichment control still in action.</li> <li>- Non-return valve stuck on its seat</li> <li>- Vacuum switch is incorrectly adjusted.</li> </ul>	<ul style="list-style-type: none"> <li>- Push back choke control.</li> <li>- Set enrichment control correctly.</li> <li>- Apply special fluid.</li> <li>- Replace.</li> </ul>
Warning light goes on when car is in motion, and goes out as soon as accelerator pedal is released.	<ul style="list-style-type: none"> <li>- Leak at non-return valve.</li> <li>- Air leak in vacuum system.</li> </ul>	<ul style="list-style-type: none"> <li>- Replace.</li> <li>- Investigate for leak.</li> </ul>
Deceleration is inadequate but warning light does not go on.	<ul style="list-style-type: none"> <li>- Brake shoes mis-adjusted.</li> <li>- Brake linings do not make adequate contact.</li> <li>- Air in hydraulic system.</li> <li>- Hydrovac unit is slow to operate.</li> <li>- Pressure switch mis-adjusted or burnt out bulb (preventing any indication of inadequate vacuum).</li> </ul>	<ul style="list-style-type: none"> <li>- Adjust brakes.</li> <li>- Set linings by braking several times in succession.</li> <li>- Bleed brake system.</li> <li>- Replace or repair.</li> <li>- Replace.</li> </ul>
Brakes do not release correctly.	<ul style="list-style-type: none"> <li>- Hydrovac unit piston does not return to rest position.</li> </ul>	<ul style="list-style-type: none"> <li>- Replace or repair Hydrovac unit.</li> </ul>
Brakes remain jammed	<ul style="list-style-type: none"> <li>- Expansion hole in master cylinder is plugged.</li> </ul>	<ul style="list-style-type: none"> <li>- Replace or repair master cylinder.</li> </ul>

HYDROVAC UNIT TROUBLE-SHOOTING CHART		
Symptoms	Possible causes	Remedy
Deceleration is inadequate; warning light goes on and brake pedal becomes hard to move.	<ul style="list-style-type: none"> <li>- Inadequate vacuum.</li> <li>- Non-return valve stuck on its seat</li> <li>- Leak at Hydrovac unit diaphragm or valve.</li> </ul>	<ul style="list-style-type: none"> <li>- Eliminate possible leaks in the vacuum system.</li> <li>- Set idle rpm to the correct value as recommended by the manufacturer.</li> <li>- Apply special fluid.</li> <li>- Replace or repair Hydrovac unit.</li> </ul>
Brake pedal is hard to actuate; pedal travel is very short causing inadequate deceleration; warning light does not go on.	<ul style="list-style-type: none"> <li>- Hydrovac unit is inoperative.</li> </ul>	<ul style="list-style-type: none"> <li>- Replace or repair Hydrovac unit.</li> </ul>
Pedal travel is excessive when previous brake application was carried out with car in forward motion.	<ul style="list-style-type: none"> <li>a - Every time the brakes are applied.</li> <li>- Incorrectly adjusted brake shoes</li> <li>- Air in the hydraulic system.</li> <li>b - Intermittently, or after extended stops</li> <li>- Leak at the residual pressure valve.</li> </ul>	<ul style="list-style-type: none"> <li>- Adjust brakes</li> <li>- Bleed brake system.</li> <li>- Replace.</li> </ul>
Pedal travel is excessive when driving normally or when manoeuvring, while previous brake application was carried out with car in reverse or after stopping on an upward grade.	<ul style="list-style-type: none"> <li>- Incorrectly adjusted brake shoes.</li> <li>- Air in the hydraulic system.</li> <li>- Front ends of front brake shoes drag on the pistons.</li> <li>- Return travel of front brake shoes is inadequate.</li> <li>- The pistons in the front wheel cylinders do not release correctly.</li> </ul>	<ul style="list-style-type: none"> <li>- Adjust brakes.</li> <li>- Bleed brake system.</li> <li>- Apply Molykote grease at contact points between front brake shoes and pistons.</li> <li>- Check return springs of brake shoes.</li> <li>- Look for the defective piston and for the cause of the failure; proceed as follows : <ul style="list-style-type: none"> <li>- Remove front wheel drums;</li> <li>- Using pliers, depress, and then release, pistons. The pistons must return to contact the brake shoe. If this is not the case, look for the defective part (cup, spring, etc...)</li> </ul> </li> <li>- Replace the defective cylinder.</li> </ul>
Unbalanced braking	<ul style="list-style-type: none"> <li>- Incorrectly adjusted brake shoes</li> <li>- Oil or grease on brake linings.</li> <li>- Dust inside brake drums.</li> <li>- Inadequate return travel of front brake shoes.</li> </ul>	<ul style="list-style-type: none"> <li>- Adjust brakes.</li> <li>- Replace linings and eliminate leak.</li> <li>- Clean brakes.</li> <li>- Check brake shoe inside and outside return springs.</li> </ul>

PEUGEOT

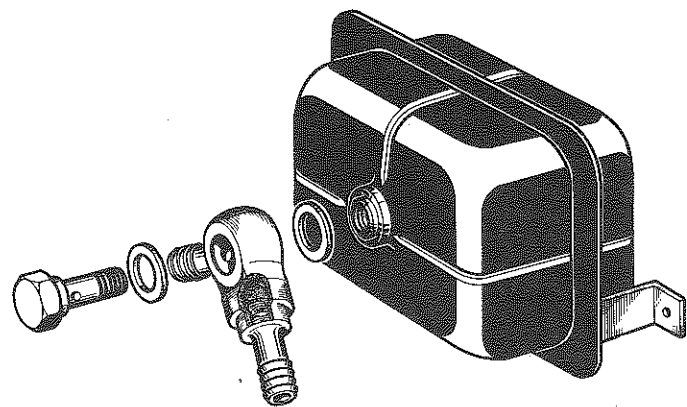
## HYDROVAC UNIT REMOVAL - RE-INSTALLATION



### REMOVAL

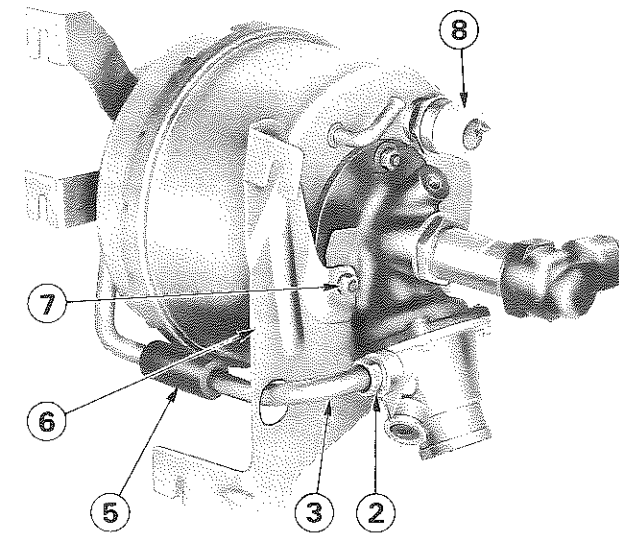
- Remove :
- Screw 1 from non-return valve holder;
- Vacuum pipe at Hydrovac unit;
- Vacuum reservoir;
- Master cylinder-to-Hydrovac unit hose;
- Hose linking Hydrovac unit to brake mains piping on dashboard.
- Disconnect wires at pressure switch.
- Remove Hydrovac unit mounting screws on left front wing valance.

### RE-INSTALLATION



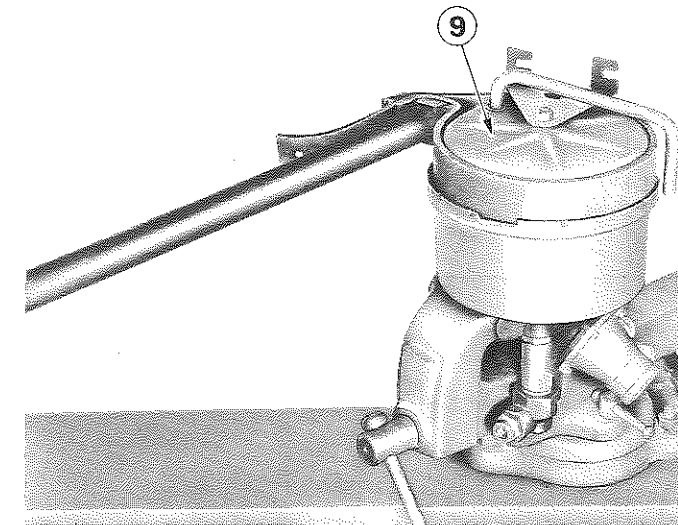
- Re-installation is a reversal of the removal procedure.
- Apply SI 200 silicone fluid, viscosity 50 Centistokes, on non-return valve, taking care not to drop fluid on connectors.
- Re-install non-return valve holder, using new gaskets.

## HYDROVAC UNIT DISASSEMBLY



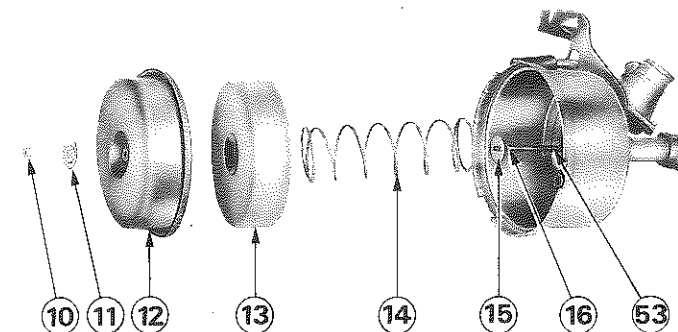
### Stripping

- Unscrew connector 2, remove pipe 3 together with its gasket.
- Remove rubber sleeve 5.
- Remove bracket 6 held by two nuts 7.
- Remove non-return valve holder together with its rubber gasket if these parts have been left on the Hydrovac unit.
- Unscrew pressure switch 8.



### Removing the air cylinder cap

- Clamp the Hydrovac unit in a vice fitted with soft jaws, making sure that the studs cannot come into contact with the vice.
- Scribe a line to mark the position of the air cylinder cap.
- Adjust strap assembly 0.0803 and rotate cylinder cap 9 to the left, i.e. counter-clockwise.
- Remove cylinder cap 9.

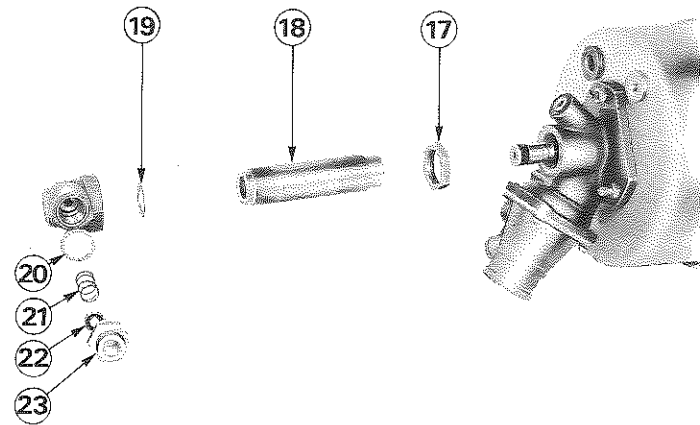


### Removing the diaphragm

- Remove nut 10 from rod, while exerting pressure on the diaphragm to prevent the parts from being ejected when the nut is freed from the rod.
- Remove :
- Cupped washer 11,
- Diaphragm 12,
- Air piston 13,
- Spring 14,
- Flat washer 15,
- Second nut 16.

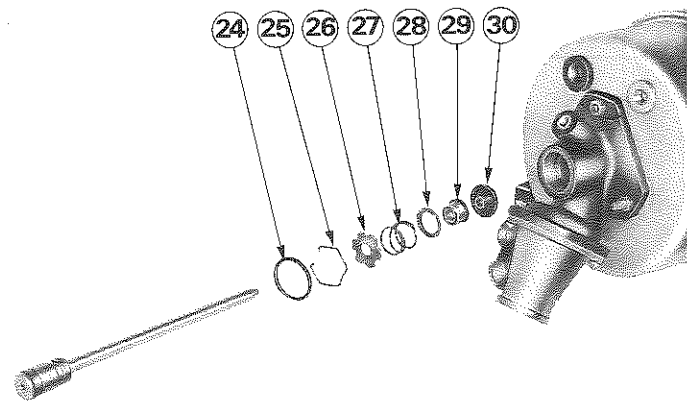
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### HYDROVAC UNIT DISASSEMBLY



#### Disassembling the slaved cylinder

- Loosen locknut 17 with a 36mm wrench while holding cylinder 18.
- Unscrew slaved cylinder 18.
- Hold the residual pressure valve body in a vice.
- Unscrew cylinder 18 from the valve assembly and recover copper gasket 19.
- Remove connector 23, copper gasket 20, valve 22 and spring 21.

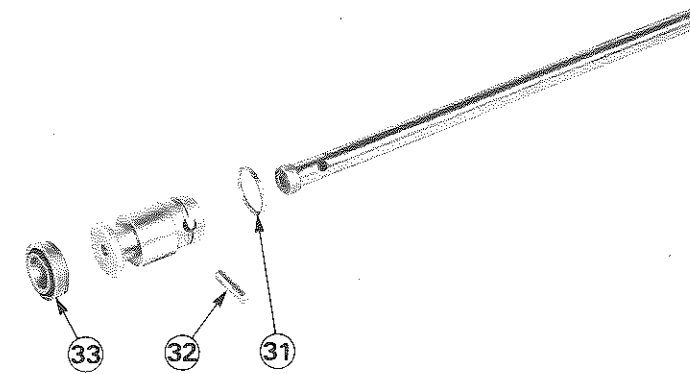


#### Disassembling the push rod and seals

- Screw protector 0.0802 onto the rod.
- Remove the rod and piston assembly.
- Remove slaved cylinder «0» seal ring 24, lock ring 25, external toothed washer 26, spring 27, flat washer 28, spring guide 29 and cup 30.

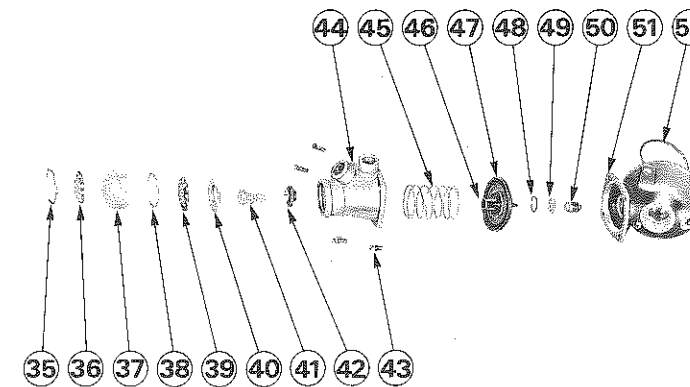
### HYDROVAC UNIT DISASSEMBLY

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#### Disassembling the high-pressure piston.

- Remove snap ring 31.
- Remove pin 32.
- Remove cup 33.



#### Disassembling the valve housing

- Remove lock-ring 35, strainer 36, filter 37, lock-ring 38, strainer 39, flat washer 40, spring 41, valve 42.
- Take out the four screws 43 together with their lockwashers.
- Remove valve housing 44, spring 45, cup 46 and diaphragm 47.
- Remove snap-ring 48, flat washer 49 and piston 50, using snap-ring pliers inserted in piston recess to take out piston.
- Remove flange 51 and recover gasket 52 installed between flange and air cylinder.

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## HYDROVAC UNIT CLEANING

- Clean all parts with alcohol.
- Blow dry all cleaned parts, using compressed air, and place them on a clean sheet of paper or on a lintless cloth.

The slightest trace of foreign matter during re-assembly always results in faulty operation of the Hydrovac unit, since this leads either to parts seizure, or to leaks.

### PRECAUTIONS :

The Hydrovac unit is a safety component and the utmost care is therefore required for all maintenance procedures involving this component.

Never re-install previously used cups, gaskets or seals, even if these parts seem to be in perfectly good condition.

A Hydrovac unit kit must always be available when rebuilding this component.

The slaved cylinder, and piston, the push rod, the valve piston and the corresponding bore in the flange must be perfectly smooth and free from scratches.

## HYDROVAC UNIT RE-ASSEMBLY

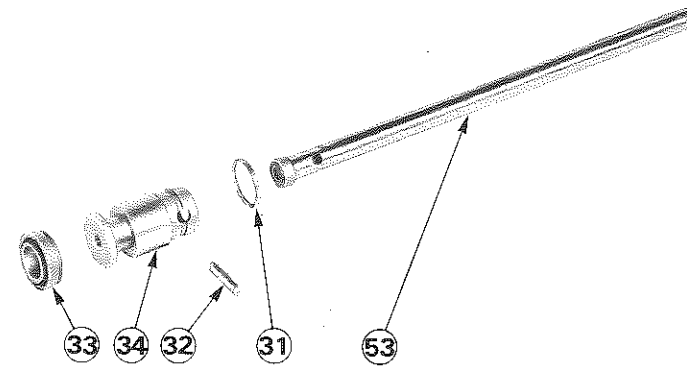
### Re-assembling the Hydrovac unit

- Soak all cups, gaskets and seals in Lockheed HD 43\* (starred) or 55 fluid.

### Assembling the piston on the push rod

The push rod and hydraulic piston must be assembled together before these parts are inserted into the flange.

- Install cup 33 on piston 34.
- Make sure that sealing surface at end of rod 53 is perfectly clean and bears correctly on piston 34.
- Insert push rod 53 inside piston 34.
- Install pin 32 and slide snap ring 31 into the corresponding groove of piston 34.
- Place protector 0.0802 over push rod.

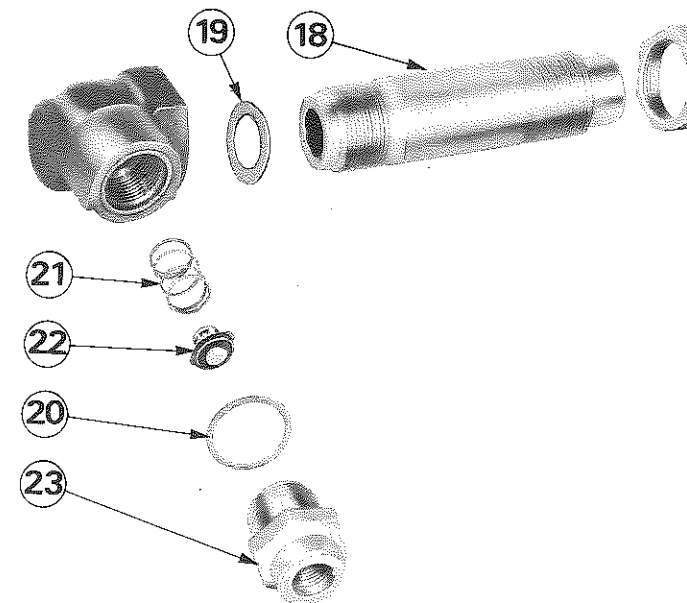


### Installing the residual pressure valve.

- Clamp the end fitting of the residual pressure valve in a vice fitted with soft jaws.
- Install spring 21, valve 22 (with rubber end turned upwards) and gasket 20.
- Install and torque connector 23 (torque to 13 m.kg or 94 ft.lbs).

### Installing the slaved cylinder

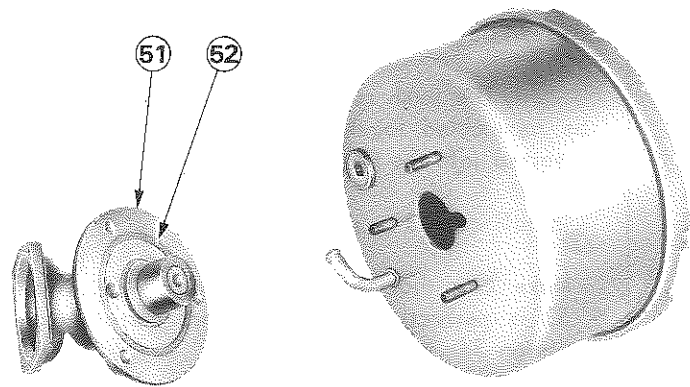
- Place gasket 19 in the residual pressure valve end fitting.
- Screw in slaved cylinder 18, placing the wrench on the flat sections (torque to 13 m.kg or 94 ft.lbs).





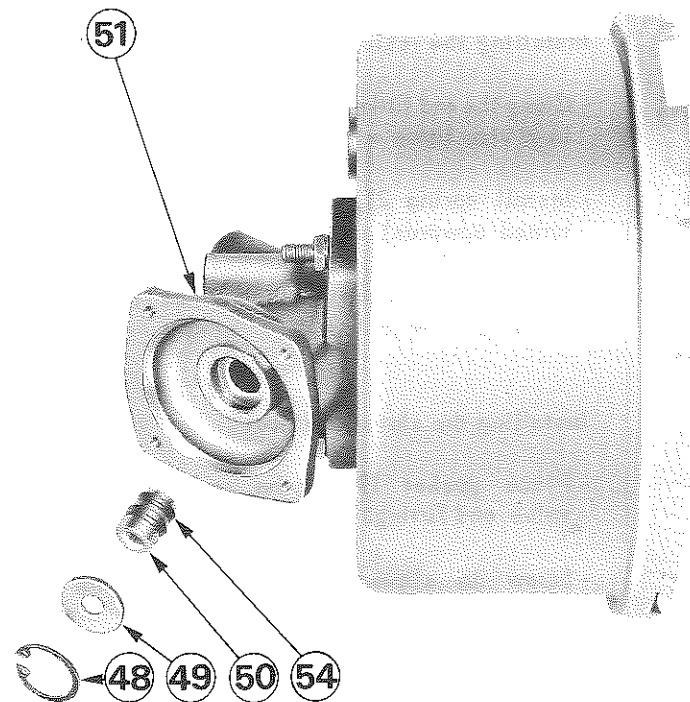
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### HYDROVAC UNIT RE-ASSEMBLY



#### Assembling the flange on the air cylinder

- Place gasket 52 into the groove of flange 51 and position the flange over the cylinder.
- Install three lockwashers and place two flat nuts on the longer studs, and one standard nut on the shorter stud.

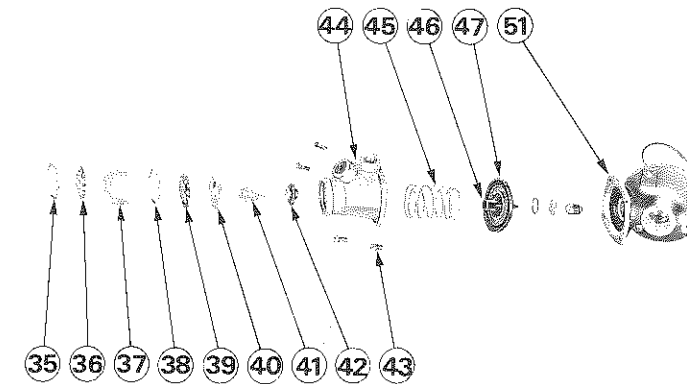


#### Assembling the valve piston

- Install both cups 54, taking care to turn their lips in the same direction, towards the head of piston 50.
- Slide piston 50 inside flange cylinder 51, taking care not to damage the lips of the cups.
- Install washer 49 and snap-ring 48.

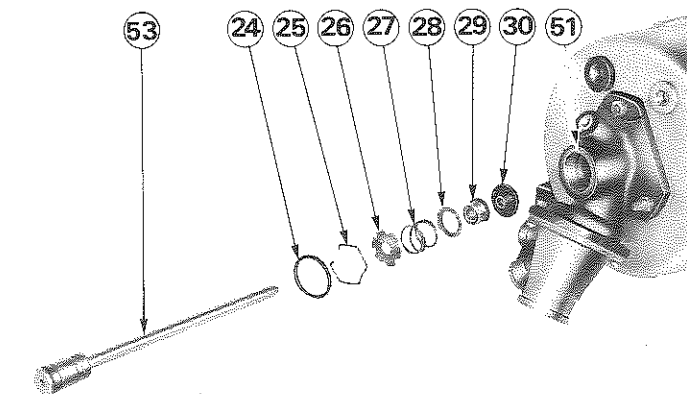
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### HYDROVAC UNIT RE-ASSEMBLY



#### Assembling the valve housing

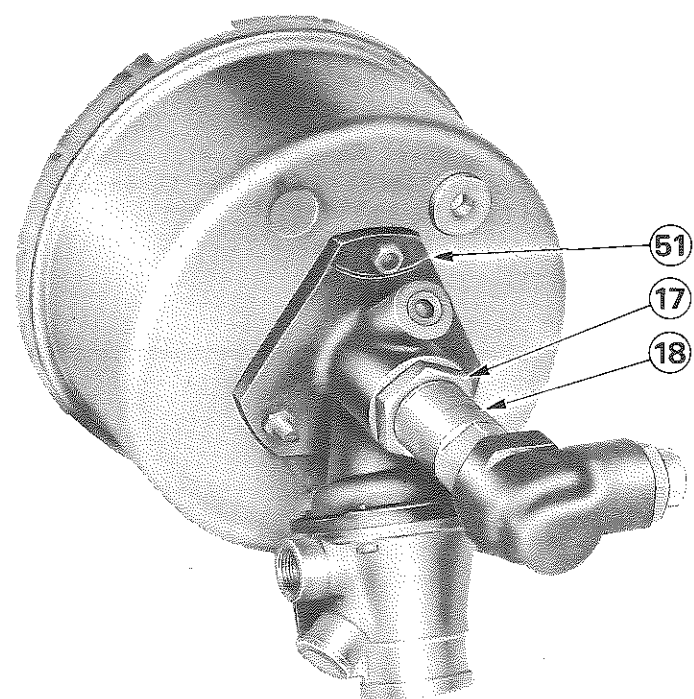
- Install diaphragm 47 (on the diaphragm support) and cup 46.
- Install this assembly on flange 51.
- Install spring 45.
- Place valve housing 44 on the flange, inserting the outer rib of diaphragm 47 into the circular groove of valve housing 44.
- Install four screws 43 equipped with lockwashers.
- Install valve 42, spring 41, washer 40, strainer 39, lock-ring 38, filter 37, strainer 36 and lock-ring 35.



#### Installing the push rod and slaved cylinder seals.

- Install cup 30, spring guide 29, washer 28, spring 27, external toothed washer 26 and lock-ring 25.
- Insert «O» seal ring 24 into its groove, in flange 51.
- Carefully engage rod 53 and piston assembly into flange 51.

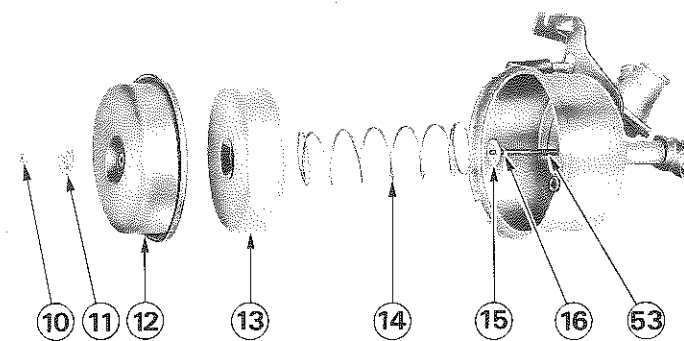
PEUGEOT



#### Assembling the slaved cylinder with the flange.

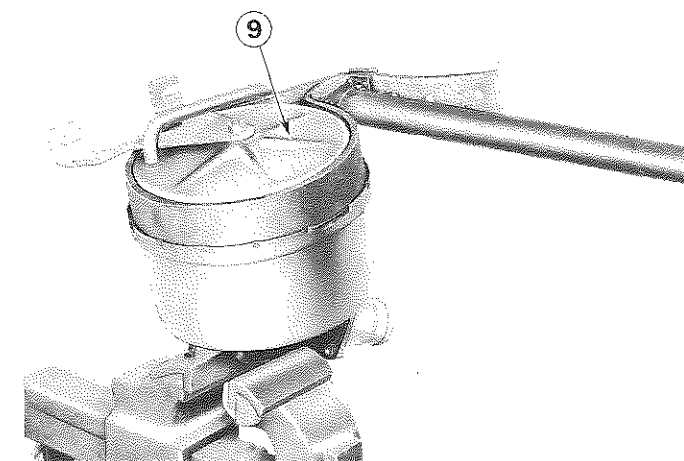
- Fully engage nut 17 on cylinder 18.
- Smear the end of the cylinder with Lockheed fluid.
- Insert the piston into cylinder 18 and carefully engage the cup, making sure the lips of the cup do not fold over.
- Screw in cylinder 18 fully over flange 51, then unscrew the flange until the outlet of the residual pressure valve end fitting is in a horizontal plane and turned to the right.
- Hold the cylinder by the flat sections and tighten lock-nut 17.

Torque to : 9 m.kg or 65.1 ft.lbs



#### Assembling the air cylinder diaphragm.

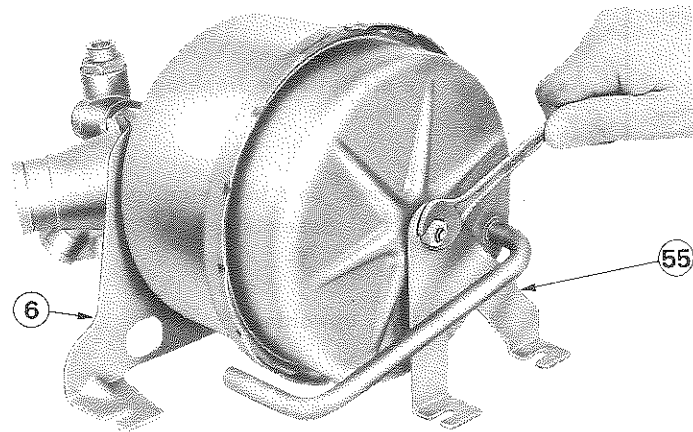
- Clamp the Hydrovac unit in a vice, proceeding as indicated for disassembly.
- Pull the rod fully upwards.
- Remove protector 0.0802.
- Install and secure lock-nut 16.
- Install flat washer 15 and spring 14.
- Proceeding carefully, wipe clean the edges of the air cylinder as well as diaphragm 12.
- Install rod 53, piston 13, diaphragm 12, cupped washer 11 and nut 10. Tighten this nut while holding the rod with a screwdriver.
- Lightly smear the diaphragm rib with talcum powder.



#### Assembling the air cylinder cap

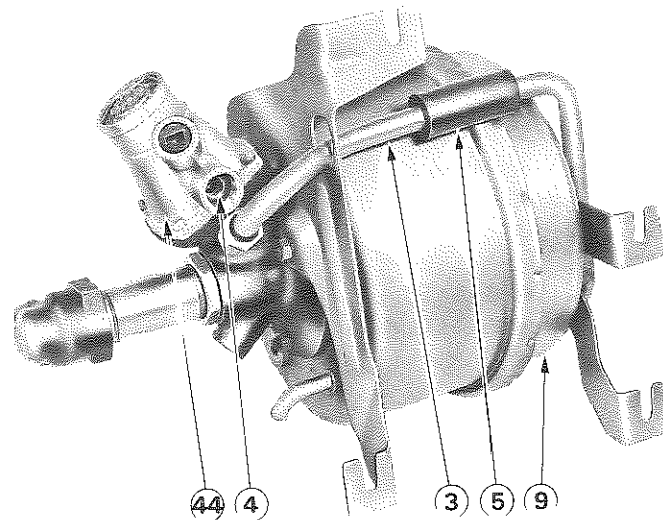
- Wipe clean the edge of cylinder cap 9.
- Mate the reference lines scribed during disassembly.
- Adjust the strap assembly on cylinder cap 9 and turn this cap to the right (clockwise) to engage the ribs under the corresponding ridges and lock the cylinder cap.

## HYDROVAC UNIT RE-ASSEMBLY



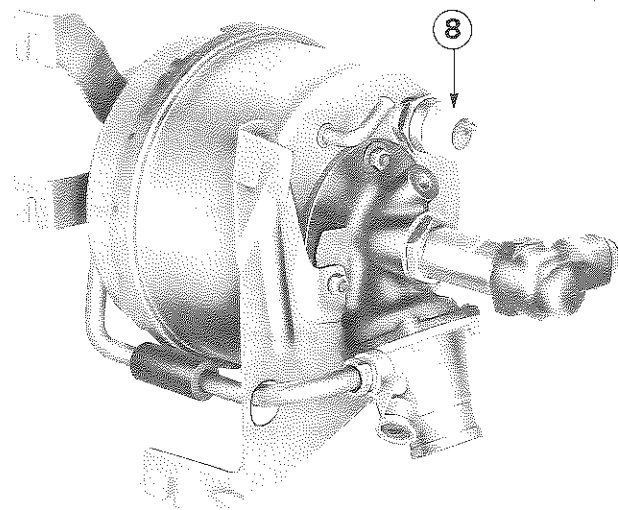
### Assembling the brackets

- Secure bracket 6 to the two longer studs.
- Install bracket 55 on the air cylinder cap.
- Place the assembly on a worktable so that all three slots are in the same plane, and tighten the cylinder cap nut.



### Installing the air pipe and pressure switch

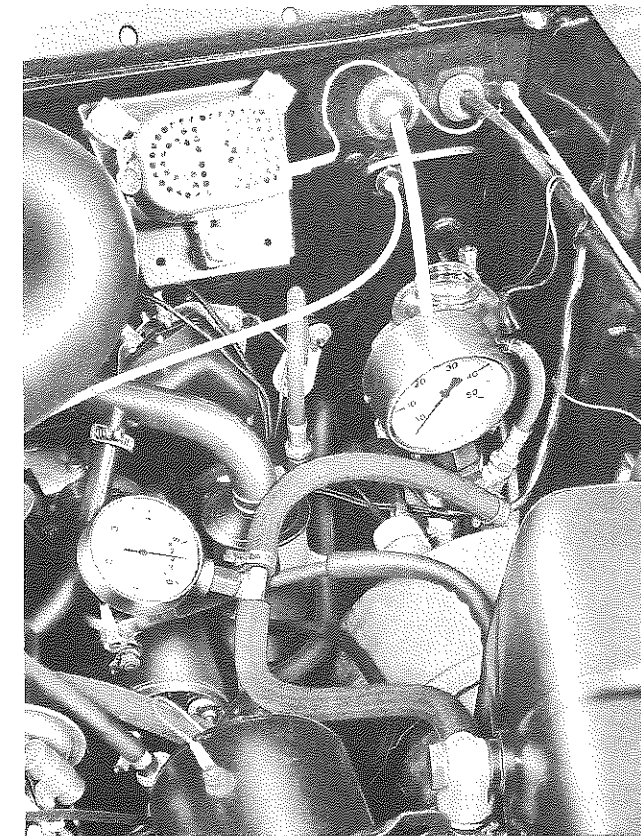
- Engage sleeve 5 on pipe 3 over a length of 25mm.
- Install gasket 4 in valve housing 44.
- Slip sleeve 5 over the tube from cylinder cap 9.
- Install and tighten the connector.  
(Torque to 1.5 m.kg or 10.8 ft.lbs)
- Lightly smear the threads of pressure switch 8 with sealing compound («Plastex» or similar) and torque to 2 m.kg (14.5 ft.lbs), using a 32-mm wrench.



**NOTE** - Proceed as follows if the Hydrovac unit is equipped with a non-return valve holder:

- Install the gasket with the larger flange facing outwards.
- Apply silicone fluid (refer to page 8).
- Manually engage the valve holder in the gasket, but never apply oil or grease on this gasket.

## HYDROVAC UNIT RE-INSTALLATION FOR TESTING PURPOSES



- Temporarily re-install the Hydrovac unit on the car, with the hydraulic system outlet turned upwards, and connect as follows :

- Link the Hydrovac unit to the master cylinder, using the existing hose, and mount the 25 bars (356 p.s.i.) pressure gauge on the connector.

- Connect the output of the Hydrovac unit to the brake mains piping.

- Connect the vacuum connector to the engine at the vacuum reservoir non-return valve.

- Install the vacuum gauge between the non-return valve and Hydrovac unit.

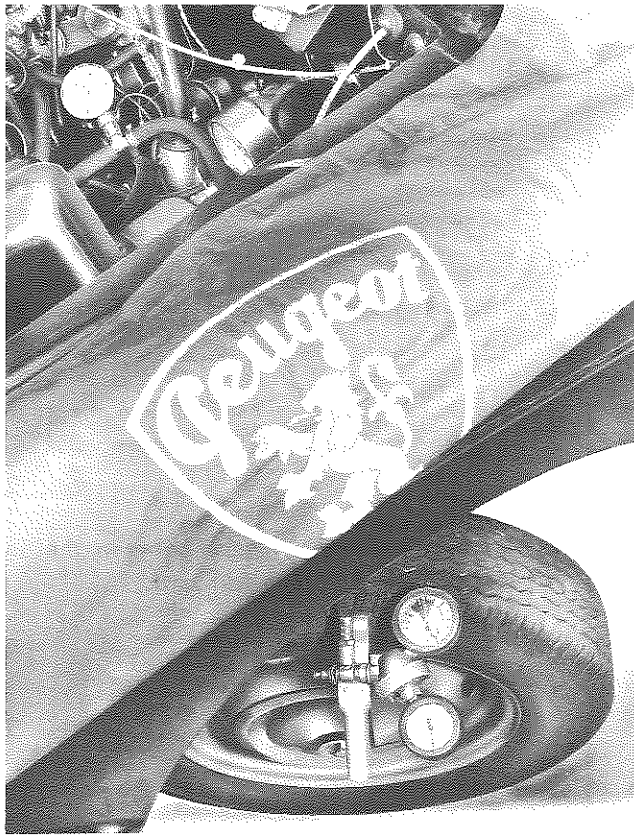
- Bleed the hydraulic system.

- Connect the «Testometer» to the L.H. front wheel.

- Adjust the brake shoes.



## HYDROVAC UNIT TESTING



### TESTING

- Start the engine.
- Accelerate the engine several times in succession to bring the vacuum to the maximum value.

Note the vacuum indicated by the gauge when the warning light goes out. The pressure switch must be replaced if the vacuum is not between 310 and 415 g/sq.cm or 230 and 305 mm Hg.

#### 1 - Checking the pressure transmitted by the Hydrovac unit.

- Bring the vacuum to 500 mm Hg.
- Depress the brake pedal progressively.

The input pressure indicated by the pressure gauge should be between the limits stated in Table below when the output pressure at the Hydrovac unit reaches the values listed below :

Input pressure	Output pressure
5.5-7.5 bars (79-107 p.s.i.)	40 bars (568 p.s.i.)
10-13 bars (143-185 p.s.i.)	79 bars (1123 p.s.i.)

**NOTE** - Improper operation of the Hydrovac unit, caused by seizure of internal parts, is evidenced if the pressure values noted are not within the above limits for a vacuum of 500 mm Hg minimum.

- Stop the engine.

#### 2 - Leak test

- Depress the pedal once only and hold the input pressure to 20 bars (284 p.s.i.). Use a pedal pusher.
- Note down the vacuum indicated by the gauge, as well as the Hydrovac unit output pressure.

Make sure the following conditions are fulfilled for one full minute :

- The brake pedal must not go down.
- The vacuum must not decrease.
- No leak of brake fluid must appear.

If any one of the above conditions is not fulfilled, investigate the cause of the fault before finally re-installing the Hydrovac unit on the car and bleeding the brake system.

