

CAUTION

If the cups are put on the pistons without a conical cup sleeve, extreme care is required to prevent damage to the cups.

3. Hold the master cylinder with its closed end down. Lubricate all internal parts with VW brake cylinder paste (see 9.5 Brake Cylinder Paste) or with fresh brake fluid. Install the parts in the order shown earlier in Fig. 4-5 and Fig. 4-6.

NOTE

When you assemble a master cylinder used with the vacuum powered brake servo, lubricate the shaft of the pushrod piston with a light coat of silicone grease (provided in the repair kit). Also fill the annular grooves in the seal cups (Fig. 4-6) with silicone grease. The sealing lips of both seal cups should be toward the master cylinder.

4. Push the pistons into the cylinder against spring tension, then install the stop washer and locking, or, on 1971 and later models, the stop washer and circlip.
5. Install the stop screw and its seal. Torque to 0.5 to 1.0 mkg (3.5 to 7.0 ft. lb.).

CAUTION

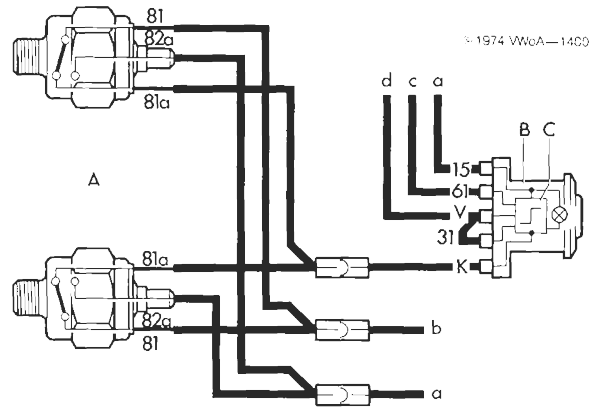
Be sure the stop screw hole is clear. If blocked by the piston, damage will result as the screw is installed.

6. On 1968 and early 1969 master cylinders with the separate warning device cylinder, install the internal parts using the same procedures used in installing parts in the main cylinder. Then install the plug.
7. Screw the brake light/warning light switches and residual pressure valves (where fitted) into the master cylinder. Torque to 2.0 mkg (14 ft. lb.).
8. Install the sealing plugs. On 1968 through 1970 models, install the rubber boot with the vent hole down.

4.4 Testing and Replacing Brake Light/Warning Light Switches

The brake light/warning light electrical circuit for 1972 and later vehicles is shown in Fig. 4-8. It contains all the connections found on earlier cars plus several additions and modifications. With this version, the functional check no longer requires that the light lens be pushed in by hand. The warning lamp lights up when the ignition is switched on and goes out in the same manner as the

generator and oil pressure warning lamps once the engine has started.



- | | |
|------------------------------------|--------------------------------------|
| A. Brake light switches | b. To brake lights |
| B. Dual circuit brake warning lamp | c. From regulator switch terminal 61 |
| C. Electronic switch | d. To ground |
| a. To terminal 15 | |

Fig. 4-8. Electrical diagram of brake light/warning light switches. Terminal V was discontinued in early 1973.

To test brake light switch contacts:

1. Check the brake light bulbs. Replace if necessary.
2. Disconnect the front brake wires from the front brake light/warning light switch (81 and 81a, black-red and black wires; see Fig. 4-8).
3. Switch the ignition on and depress the brake pedal. The brake lights should go on. If they do, reconnect the wires to the front switch and remove the rear brake wires (81 and 81a) from the other switch. Repeat the test. The brake lights should go on.
4. If the brake lights do not work in one of the tests, replace the defective switch (the one that remained connected during the test).

To replace switch:

1. Disconnect all wires from the defective switch.
2. Unscrew the switch from the master cylinder. Keep the sealing washer.
3. Install the sealing washer and the new switch. Torque to 2.0 mkg (14 ft. lb.). Then connect the wires as indicated in Fig. 4-8.

NOTE

For additional information about the electrical circuits, consult the wiring diagrams in **ELECTRICAL SYSTEM**.



10 BRAKES AND WHEELS

To test brake warning light contact:

1. Check the socket and the light bulb. If necessary, replace them.
2. Switch the ignition on. The warning light should come on.

NOTE —

On pre-1972 models, it is necessary to push the light lens to test the light.

3. Open a bleeder valve in the front brake circuit. (See **9. Bleeding Brakes**).
4. Start the engine and depress the brake pedal. The brake warning light should come on.
5. Close the bleeder valve in the front brake circuit and open a bleeder valve in the rear brake circuit. Repeat the test described in Step 4.
6. Check the fluid level in the brake fluid reservoir. If necessary, add fluid.

CAUTION —

Use only new, unused brake fluid that meets SAE recommendation J 1703 and conforms to Motor Vehicle Safety Standard 116.

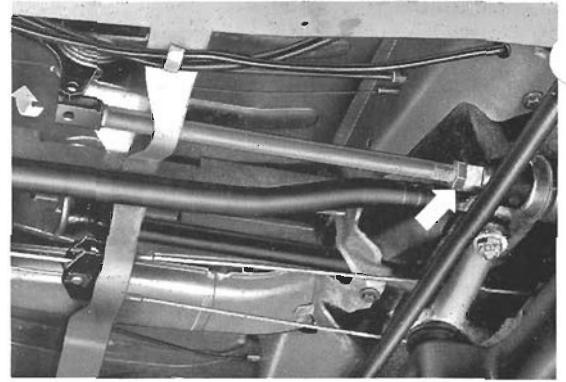
4.5 Removing, Repairing, and Installing Vacuum Powered Brake Servo

The master cylinder on 1971 and later vehicles is operated through a vacuum powered brake servo. The system fails safe, so if the servo ceases to function, the foot brakes can still be applied. However, the pedal pressure required will be somewhat greater than normal.

Before assuming that there is trouble in the master cylinder or the vacuum powered brake servo, check the vacuum hoses carefully. If they are disconnected from either the engine or the servo or if they are cracked and leaking, the servo will not operate.

To remove servo:

1. Thoroughly clean the master cylinder and the brake servo. Then remove the master cylinder as described in **4.2 Removing and Installing Master Cylinder**.
2. Disconnect the vacuum hoses from the brake servo.
3. Remove the cover plate that is beneath the pedal cluster. Then disconnect the air hose from the brake servo's air connection.
4. Loosen the locknut on the connecting rod (Fig. 4-9).
5. Remove the cotter pin from the clevis pin. Remove the clevis pin and disconnect the connecting rod clevis from the pedal lever.



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Fig. 4-9. Connecting rod removal. Loosen locknut at right-hand arrow. Disconnect the clevis from the pedal lever, then unscrew the connecting rod from the servo as indicated by left-hand arrow.

6. Unscrew the connecting rod from the brake servo as shown in Fig. 4-9.
7. Remove the four nuts that hold the brake servo on the bracket, then pull the servo out of the bracket to the rear.

CAUTION —

Prior to installation, it is necessary to replace the filter and damping ring, the rubber boot, and the sealing ring inside the air connection as described under the heading **Brake Servo Repairs**. These replacements are required to ensure that the brake servo will continue to give satisfactory service after it is installed.

Brake Servo Repairs

Brake Servo repairs are limited to the replacement of the filter and damping ring, the rubber boot, and the sealing ring inside the air connection. These parts should be replaced any time the brake servo is removed or when the brake servo's efficiency has been affected.

The vacuum powered brake servo is shown disassembled in Fig. 4-10. Replacements are available only for those parts mentioned above and no further disassembly should be attempted.

You must remove the vacuum powered brake servo from the vehicle and clean its outside thoroughly before disassembly. Do not use solvents to clean any of the internal parts. Doing so could damage the diaphragm or seals.

To disassemble:

1. Remove the retaining ring from the rubber boot.

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