

Checking the Brake System

Job No.

42 — 2

In the interest of road safety particular attention should be given to the checking and maintenance of the brake system. For this reason the brake system should be checked at regular intervals as laid down in the Service Book Sheets.

A complete check includes:

1. Checking the brake fluid level

The fluid reservoir must be filled to 1—2 cm below the top edge.

Note: If from one service check to another, there should be any considerable loss of brake fluid, look for the cause and make the necessary repair. Proceed as outlined below (leak check, paragraph 2).

2. Leak check

When making a leak check depress the brake pedal and hold it in this position by means of a pedal jack (brake system pressure 60—80 atmospheres). Then check all pipe unions, the brake master cylinder, and the brake hoses for leaks.

An accurate leak check requires the use of Pressure Tester 000 589 12 27 or a similar pressure tester supplied for use with power bleeder equipment. Proceed as follows:

- a) Remove the bleeder screw from one brake wheel cylinder, screw on the pressure tester connector and connect up with the tester (Fig. 42 — 2/1).

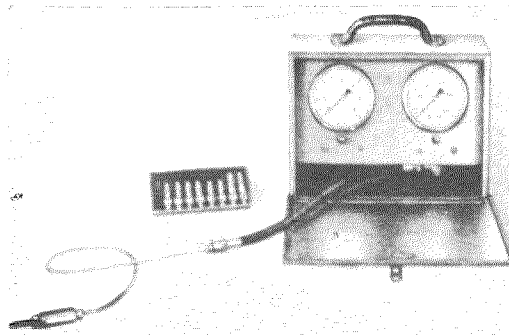


Fig. 42 — 2/1

- b) Then bleed the pressure tester in the usual way by means of the incorporated bleeding devices.
- c) Subject the brake system to a pressure of approx. 60—80 atmospheres by depressing the brake pedal and hold the brake pedal in this position by means of a pedal jack.

Over a period of 10 minutes this pressure in the brake lines must not decrease by more than 10 %.

If the pressure falls below this limit check the brake lines, the connections, the brake hoses, as well as the brake master cylinder and the brake wheel cylinders to find the cause.

Note: Where the car is fitted with an ATE power brake the leak may also be in the hydraulic part of the power brake. If the power brake is suspected of leakage unscrew the vacuum hose from the power brake. If the vacuum hose contains brake fluid, the power brake must be repaired or replaced.

Caution: Brake fluid seeping out of the power brake is drawn in by the engine from the vacuum hose. **Brake fluid and engine oil are, however, incompatible. For this reason the engine oil must be drained and the engine flushed out thoroughly.**

- d) After the high-pressure test, test the residual pressure by means of a second pressure gage. For this purpose release the pedal brake and read off the pressure registered by the pressure gage. A residual pressure of 0.4—0.8 atmospheres must remain constant for at least 10 minutes. If during this period the residual pressure decreases, inspect the check valve and its seat in the brake master cylinder and if necessary replace check valve and pressure spring.
- e) Check whether the stop light is in proper working order; it should switch on as soon as the pedal is depressed slightly.

3. Checking the Brake Line System

The lines and hoses must be checked to see whether they are in good condition and free from leaks. **After every 48 000 km remove the protective rail for the brake line and the fuel line. All lines that show damage by corrosion, rubbing or stones should be replaced.**

Wherever possible use galvanized brake lines for replacement. If galvanized brake lines are not available, the previous type non-galvanized lines can be installed, but they should be coated with varnish or an anti-corrosive wherever they are in contact with the protective rail.

Thoroughly clean the protective rail before reinstalling. If an excessive accumulation of dirt suggests that the car is being driven under difficult conditions the previous closed type protective rail (1) should be replaced by the new open type (2) (Fig. 42 — 2/2).

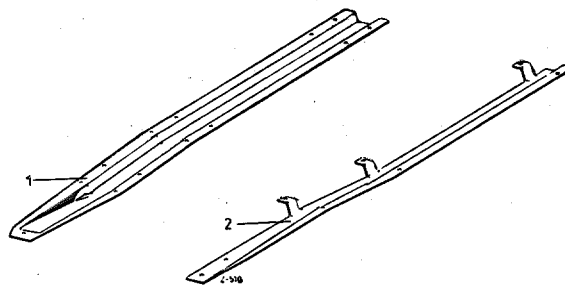


Fig. 42 — 2/2

- 1 Previous closed type
- 2 New open type

The open right side of the protective rail permits closer supervision of the lines and also makes it possible, when the chassis base panel is being hosed down, to flush out any dirt accumulations and to spray the line.

Check the brake hoses for rubbed spots. Replace all rubbed hoses, even if the condition is not very severe, and remove the cause of the rubbing. It is imperative that all brake hoses that have become hard, cracked, or swollen, should be replaced, even if they show no leaks.

Brake hoses must never be allowed to come into contact with varnish, grease, or mineral oil. — Particular care is required in spraying and greasing the car.

4. Checking Brake Linings and Brake Shoes

- a) Check brake lining thickness. Brake shoes whose linings are worn down to a thickness of approx. 1.5 mm must for safety reasons be replaced. The same applies to overheated or charred brake linings.

Brake linings with glazed surface spots must be smoothed down with emery cloth or, if necessary, re-ground.

- b) Check the shoe to drum clearance and the proper functioning of the automatic self-adjustment (For details, see Job No. 42 — 8 and Job No. 42 — 9).

5. Checking Rubber Boots

Check the rubber boots of the brake wheel cylinders for burnt spots. Slightly charred or brittle rubber boots must be replaced. Whenever replacement becomes necessary check whether abrasion dust has entered the cylinder; this dust solidifies inside the cylinder and adheres to the cylinder wall, which may cause the piston to stick.

6. Checking Brake Drums

Check the brake drums for cracks. Cracked brake drums should be replaced. Badly scored brake drums should be reconditioned (For details see Job No. 42 — 12).

7. Checking Brake Pedal Free Play

Check the free play of the pedal; it should be approx. 6—8 mm. This corresponds to a clearance between the push rod and the piston in the brake master cylinder of approx. 1 mm (for details, see Job No. 42 — 3, removal and installation of brake master cylinder).

8. Checking Hand Brake

Check the adjustment of the hand brake. It should be adjusted in such a way (wing nut at brake lever under engine hood) that it begins to operate effectively at the 3rd or 4th notch.

9. Checking Brake Retardation

If necessary check brake retardation by means of a suitable decelerometer. Brake retardation must come up to the values prescribed by law both for the service brake and the hand brake.

10. Checking the Vacuum on Cars Fitted with ATE Power Brake T 50.

In order to check the vacuum connect a vacuum gage with a range of 0—1 kg/cm² to the oil filler plug at the vacuum cylinder of the power brake or to a tee-piece fitted into the vacuum line.

Note: Recent models of the ATE power brake T 50 are provided with a special connection (plug and sealing ring) at the control valve tube to facilitate the fitting of the vacuum gage.

In order to produce a high degree of vacuum, race the engine several times and then allow the speed to drop to idling speed. When the engine is switched off, the vacuum should then be 0.6—0.8 kg/cm² and should not decrease visibly. If the vacuum decreases rapidly the leak may be at the gasket between the end plate and the vacuum cylinder, at the atmosphere poppet of the control valve, at the assembly cover gasket, or at the check valve.

If with the engine running the vacuum decreases or is too small, check the vacuum hose and its connections to the intake manifold and the power brake. At the pipe connection of the brake only copper gaskets and no fibre gaskets may be used. When retightening the tube connection always hold the valve body steady since otherwise the power brake thread may be damaged. The atmosphere poppet of the control valve can be checked by holding a completely flat rubber disk of 60 mm in diameter in front of the air filter. With running engine and actuation of the brake pedal this rubber disk will be drawn against the filter and be held there. If the rubber disk is drawn against the filter at running engine without pedal actuation this is evidence that the atmosphere poppet of the control valve is leaky and the valve cover assembly must be replaced.