



# Brake-O-Matic



## Instruction Manual

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## **INFORMATION ON BRAKE FLUID**

Brake fluid in a hydraulic braking system is one of the most important components of a vehicle because the brake fluid is the only connection between the brake pedal and the brake cylinders. It is therefore remarkable that during a service, apart from the friction pads, the amount of brake fluid is checked. Brake fluid is hygroscopic and moisture from the air plus condensation are continuously being absorbed. This danger, caused when brake fluid contains moisture, was researched years ago by the U.S. Department of Transport, which laid down standards for brake fluid, the **DOT** norms.

The **DOT** standards refer to the boiling point of brake fluid and the following considerations were taken into account:

When, the brakes are used regularly such as when driving in congested traffic or driving with a heavily loaded vehicle, heat will be developed by friction and transferred to the brake fluid. This becomes dangerous when the temperature generated exceeds the boiling point of the fluid. The more moisture that has been absorbed by the brake fluid the lower its boiling point. Moisture in brake fluid can be compressed which gives a spongy feel to the brake pedal, also when overheated steam is formed creating air bubbles, further reducing brake efficiency.

The U.K. suffers from a high degree of humidity, it is therefore important to check the brake fluid regularly for the presence of moisture, or in other words determine the boiling point of the fluid.

Good braking is produced with fluid having a boiling point higher than 230°C. By absorbing moisture the boiling point is lowered and the minimum acceptable boiling temperature has been set at 150°C.

### **The condition of brake fluid can be categorised into three sections.**

Less than 3% of moisture and a boiling point higher than 175°C there is no danger of forming steam.

More than 3% moisture and a boiling point between 170°C and 150°C is where the situation becomes critical and it is advisable to change the fluid as soon as possible.

More than 4% moisture and the boiling point is below 150°C, the fluid has to be changed immediately because of the danger of brake failure.

## **BRAKE-O-MATIC/BRAK-CHEK REFRACTOMETER**

Road safety is a very important issue these days. The Government, Police and breakdown associations continuously comments on it, road safety organisations and the press regularly pay attention to it. Since this subject is receiving so much attention the question arises how can we respond to it. This can be achieved on the one hand by increasing road safety and on the other hand by servicing our own interests and that of our customers.

Our aim is to assist garage managers or dealers in providing and selling an extra service which will give an added dimension to the service package.

Every check list for the service and inspection of a vehicle includes “**Check brake fluid**”. Of course this point is never skipped and the mechanic will always make sure that there is sufficient brake fluid in the reservoir. Yet he rarely or never checks the condition of the brake fluid and nobody ever blamed him for it. Dealers of some cars change the brake fluid once a year because the manufacturer demands it, but the background and the reasons why are not necessarily known to the mechanics.

It is a definite plus that high-quality brake fluid is put into the braking system once a year. However, that does not guarantee that the fluid (which is not necessarily of the best quality) has not previously degenerated and contains too much moisture to be safe.

Those people who drive fast and brake often cannot afford to take any risks. At the race tracks brake fluid is changed after every race, definitely in the formula 1 races and for a good reason.

The fact that the brake fluid is highly hygroscopic and automatically degenerates when it absorbs moisture may be known to the mechanic, but until recently he simply did not have the practical and simple equipment to determine the quality of the brake fluid.

There is now a cheap and handy fluid tester on the market and every mechanic can benefit from the **BRAK-CHEK REFRACTOMETER**. This tester will immediately indicate whether or not the brake fluid is in good condition.

The **BRAK-CHEK REFRACTOMETER** is easy to use, durable and cost-effective. Simply place a couple of drops of fluid on the Brak-Check, point it towards a light source and look through the eyepiece. You will receive an instant reading of boiling point and % water content. When you are finished, remove the fluid with a clean cloth and you're ready for the next vehicle.



- **PORTABLE** – no batteries required.
- **WATERPROOF DESIGN** – Eliminates the possibility of condensation on the optics.
- **BRIGHTER, DIRECT READ SCALE** – scale reads boiling point and % water content.
- **QUALITY OPTICS** – the large depth of field eyepiece is easy to read even when repeatedly dropped from 1 metre height.
- **NO MESSY CLEANUP**
- **SMALL SAMPLE SIZE** – Measurements can be made on one or two drops from wheel cylinders or master cylinders

### **So much for the diagnosis!**

Once the mechanic has routinely established that the brake fluid in the system does not meet the quality standards, he can indicate to the customer by using the graph and report on brake fluid conditions, whether there is a need for the fluid to be changed..

### **Two important points.**

- \* **The customer can drive safely**
- \* **The garage manager can increase his sales of brake fluid.**

### **And now the remedy**

It is important to the garage manager that he receives a fee for his services and therefore he will need to change the brake fluid and bleed the system in as short a time as possible. He can do this by using the **BRAKE-O-MATIC**. It is an electric device which excludes air and therefore moisture. It has a large capacity holding tank of 15 Litres plus a reserve and forces the brake fluid into the system by pulsation. This guarantees optimal bleeding. The mechanic can work alone, he does not have to pump the brake pedal and the quick-connect coupling which is supplied with the device prevents brake fluid from being split.

We think that the combination **Brake-O-Matic/Brak-Chek Refractometer** can successfully be presented as a package dealing with brake service.

The **BRAKE-O-MATIC** is approved by BMW and MERCEDES BENZ. We take considerable pride in these approvals.

## SE14 Brake-O-Matic

Designed to change and bleed hydraulic brake and clutch systems. The unit hydraulically pulses, is electrically powered (240V, 110V, 12VDC), and does not use compressed air (which is a source of moisture) and was especially developed for ABS systems.

### Technical features

- The entire brake system can be filled and bled from one point.
- The brake system can be filled without foam or air bubbles forming and at the same time the bleed nipple removes all air from the system.
- Especially suitable for anti-lock systems.
- It is not necessary to bleed separately after filling
- The tube is not under pressure when removing it and no brake fluid is spilt.
- Tank capacity 15 litres with reserve.
- Warning Buzzer for brake fluid level.
- Equipment automatically shuts down when the tank capacity falls below 1 litre.
- Pressure can set between 0 and 2.2 bar. The machine is handy and can be easily moved around in the workshop.
- Recommended by leading automobile manufacturers.

One Man Operation for hydraulic brake systems and clutches of cars and trucks.

### **Assessing the test results: BRAKE FLUID**

Given the fact that the brake fluid is the only connection between the brake pedal and the brake cylinders it is of the utmost importance that the brake fluid cannot be compressed.

Unfortunately brake fluid is highly hygroscopic and easily absorbs moisture. The development of extremely high temperatures during frequent braking will transform the water into steam at temperatures higher than 100°C so that can easily be compressed. This will cause highly reduced or total absence of braking capacity.

### **The philosophy:**

The mechanic who is servicing the vehicle can check the condition of the brake fluid without the customer even asking for it.

He records the results of the test with a red line as can be seen on the accompanying test report.

He includes the test report with the invoice for servicing.

If the brake fluid is in good condition he provides the customer with a service free of charge. If the test is negative however, the customer will certainly return, which is the goal the manager wished to reach. He will have provided and extra service.

**BRAKE-O-MATIC**  
**Brake and Clutch Hydraulic**  
**Service Unit**  
**OPERATING INSTRUCTIONS FOR SE14 MODEL**

The operation of the **BRAKE-O-MATIC Brake and Clutch bleeding system** is so simple to use that workshop personnel do not require special training.

**PREPARATION OF THE UNIT**

1.     Unpack the unit and check the following standard items.
  - \*     Motor/tank body on wheels
  - \*     Electric cable with plug assembly
  - \*     Hose assembly with quick connect coupler body(female)
  - \*     1 chrome plated tow bar to be screwed onto the tank
  - \*     1 adapter assembly screw type 42.3mm with a short hose and a quick coupler plug(male)
  - \*     1 plastic bottle with plastic pipe for draining brake fluid from bleed nipples
  
2.     Unscrew the holding tank filler cap and fill with at least 5 Ltr's of brake fluid.

**CAUTION: Carefully pour the brake fluid into the filling neck, pouring too quickly will cause the fluid to overflow.**

3.     Push the coupler plug of the adapter assembly into the coupler body at the end of the hose.
  
4.     Connect the unit to an appropriate power supply.
  
5.     Keep the adapter over a waste fluid container.
  
6.     Open the pressure regulator valve. Push the blue pump 'on'/ 'off' button. You will now start flushing and bleeding the hose assembly. Allow the unit to release at least ¼ Ltr of brake fluid from the nipple. This operation will relieve the hose assembly from any possible contamination.
  
7.     Switch the unit off. Now place the nipple of the adapter assembly over the filling neck of the tank and start the pump again. You will now release the brake fluid back into the reservoir, continue this operation until no more air bubbles can be seen and you get a steady stream of brake fluid flowing out of the nipple.
  
8.     Switch the pump off. You can now add a further 10 Ltr's of brake fluid to the holding tank, up to a maximum of 15 Ltr's. The Brake-O-Matic is now ready for use.

## **GENERAL OPERATING INSTRUCTIONS**

1. Screw the appropriate adapter assembly to the brake fluid reservoir of the vehicle (as shown below).



2. Hook up the hose by connecting the quick connect coupler body to the plug of the adapter assembly.
3. Open the pressure regulator valve.
4. Switch the unit on and watch the pressure gauge build up pressure, you can adjust the pressure to the appropriate level by turning the pressure regulator valve (normally factory set).
5. You can now bleed all the wheel brake cylinders by unscrewing the bleed nipples in turn and catching the outrunning brake fluid in the plastic bottle provided. Continue to bleed the cylinders until all air bubbles have gone and the new fluid appears.

## **LEAKAGE TEST**

Connect the unit to the brake fluid reservoir of the vehicle as described above. Switch the pump on, open the pressure regulator valve and let the unit build up to the maximum pressure of 2-2.2 bar. Now close the valve entirely and switch the unit off. The system now remains under pressure. If the pressure holds steady the system under test has no leaks. If the pressure starts to fall, check for possible leaks.

## **TEST THE WHEEL BRAKE CYLINDERS FOR MOBILITY**

Lift the vehicle off the floor. Rotate each of the wheels by hand and check if they move freely. Pressurise the system as described above. Rotate the wheels again and you should now notice a certain amount of friction. If one or more of the wheels still rotate freely, it means that a brake cylinder is stuck and should be cleaned. After letting off the pressure, you can check if the wheels rotate freely again because the wheel brake cylinders can get stuck either way.

## **INDICATORS**

Less than 1 Ltr. The unit will switch off automatically a buzzer will sound.

## **IMPORTANT**

After completing the work, switch the motor off and open the pressure regulator valve in order to release the pressure in the filling hose. With the pressure off, you can now safely disconnect the hose without the danger of aggressive brake fluid getting in touch with the paint or other parts of the vehicle.

## **CAUTION**

Never disconnect the hose when the pump is running or when the pressure regulator valve is closed.