

# Mechanical Gasoline Injection System with Metered Air Volume

## By-pass Air Control Valve



service

Training Booklet



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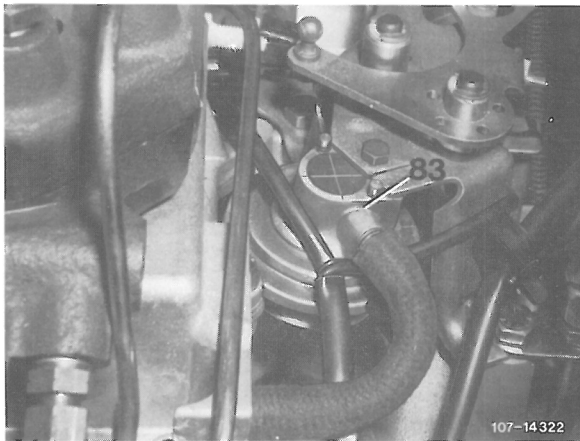
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### 5.7. By-pass air control valve

All vehicles with M 116 engine as well as vehicles with M 117 engine in Australia and Sweden version, model year 1978, have been equipped with a by-pass air control valve since September 1977.

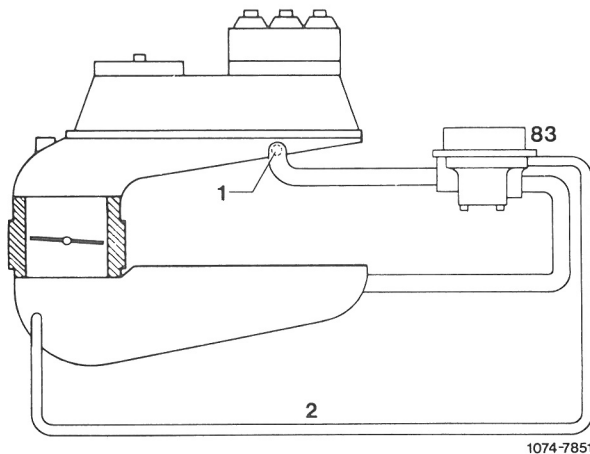
The by-pass air control valve enables the desired speed increase after cold start, and has a positive effect on the combustion when coasting (removal of HC-peaks).

The previous speed stabilization for idle speed with the M 116 (as described on page 07.3 / 2 / 10) becomes, therefore, obsolete.



The by-pass air control valve is located behind the mixture control unit, and is attached to the throttle linkage lever bracket.

Figure 28b



The by-pass air control valve is controlled by the intake manifold vacuum and connects the air intake cowling with the intake manifold.

Figure 28c

- 1 Intake air cowling connection
- 2 Vacuum line
- 83 By-pass air control valve

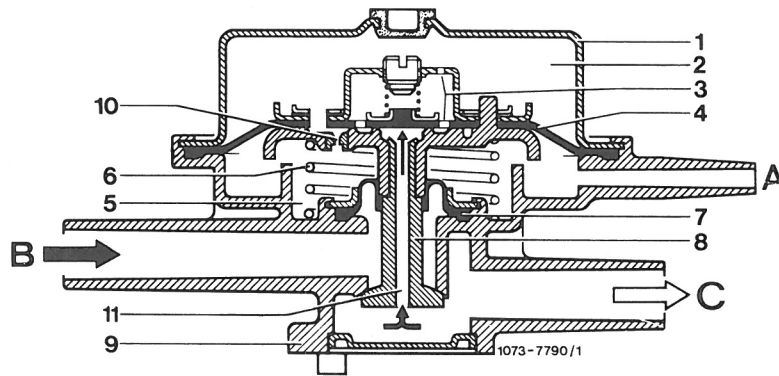


Figure 28d

- |                           |                                       |
|---------------------------|---------------------------------------|
| 1 Cover                   | 9 Housing                             |
| 2 Upper diaphragm chamber | 10 Restrictor orifice                 |
| 3 Venting bores           | 11 Venting bore                       |
| 4 Diaphragm               | 12 Pressure limiting valve            |
| 5 Lower diaphragm chamber | 13 Compression spring                 |
| 6 Compression spring      | A Intake manifold vacuum connection   |
| 7 Sealing diaphragm       | B Intake air cowling connection       |
| 8 Valve                   | C Connection to lower intake manifold |

#### 5.7.1. Description of operation

With the engine switched off and when driving, except after starting and when coasting, the valve is closed.

The pressure ratio in the two diaphragm chambers (2 and 5) is equalized by the restrictor orifice (10). The contact pressure of the compression spring (6) keeps the valve closed.



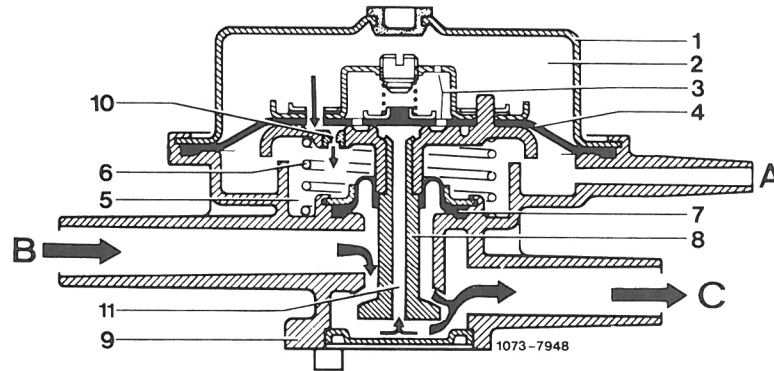


Figure 28e

- Air supply after starting

After starting the engine, a high vacuum is briefly built up in the lower diaphragm chamber (5), which overcomes the contact force of the compression spring (6).

The valve (8) is forced down, allowing by-pass air from the intake air cowling to pass to the intake manifold.

This increases the idle speed for a short time. This measure serves to stabilize idling after the start.

As soon as the vacuum in the two diaphragm chambers (2 and 5) has been equalized by the restrictor orifice (10), the valve (8) is forced up by the compression spring (6) and closed.

- Air supply when coasting

Owing to the equalized pressure ratio in the upper and lower diaphragm chambers during cruising, the compression spring (6) keeps the valve (8) closed.

During coasting, the vacuum in the lower diaphragm chamber (5) builds up faster than it can be equalized with the upper diaphragm chamber (2) via the restrictor orifice (10).

The force of the high vacuum overcomes the contact force of the compression spring (6).

The valve (8) is forced down, and the by-pass air from the air cowling can flow into the intake manifold. The inflow of air during coasting, by by-passing the throttle valve, produces a more stable combustion and thus a reduction of hydrocarbon contents in the exhaust gas.

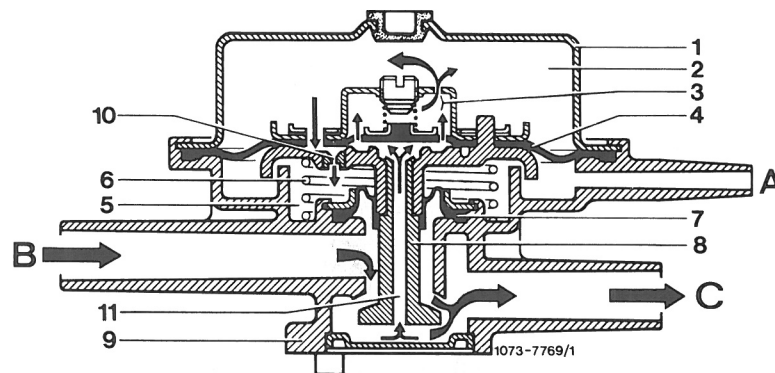


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| 8 Valve                   | C Connection to lower intake manifold |

In order to prevent early switching-off of the by-pass air during coasting, a pressure limiting valve (12) has been installed.

As from a certain vacuum, the pressure limiting valve limits pressure equalization between the lower and upper diaphragm chambers.

The vacuum which builds up rapidly in the lower diaphragm chamber, is delayed by the restrictor orifice in reaching the upper diaphragm chamber.

There, the vacuum acts also on the diaphragm of the pressure limiting valve, causing it to be opened against the compression spring (13).

Atmospheric air now flows into the upper diaphragm chamber via the hollow valve (8), thus preventing further pressure equalization.



The remaining pressure differential keeps the valve (8) open.

The pressure limiting valve (12) closes only when the vacuum acting from the intake manifold falls below a certain value.

The pressure ratio between lower and upper diaphragm chamber is now being equalized, causing the valve (8) to close also.

#### 5.7.2. Checking the by-pass air control valve

With engine running, remove vacuum line at the by-pass air control valve and refit immediately.

After a short time (approx. 2 - 3 seconds) the speed should increase. If not, the by-pass air control valve is defective.

