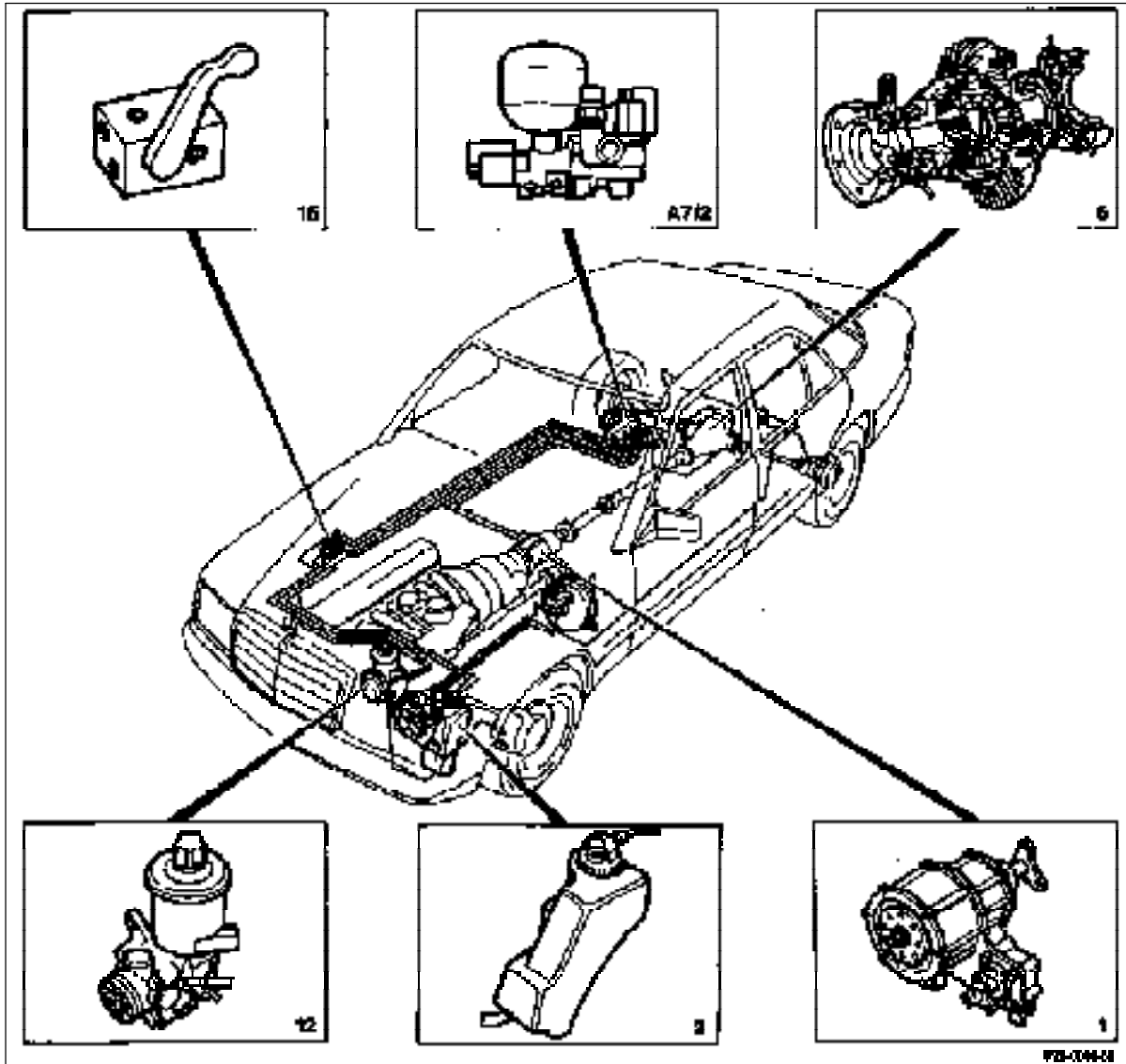
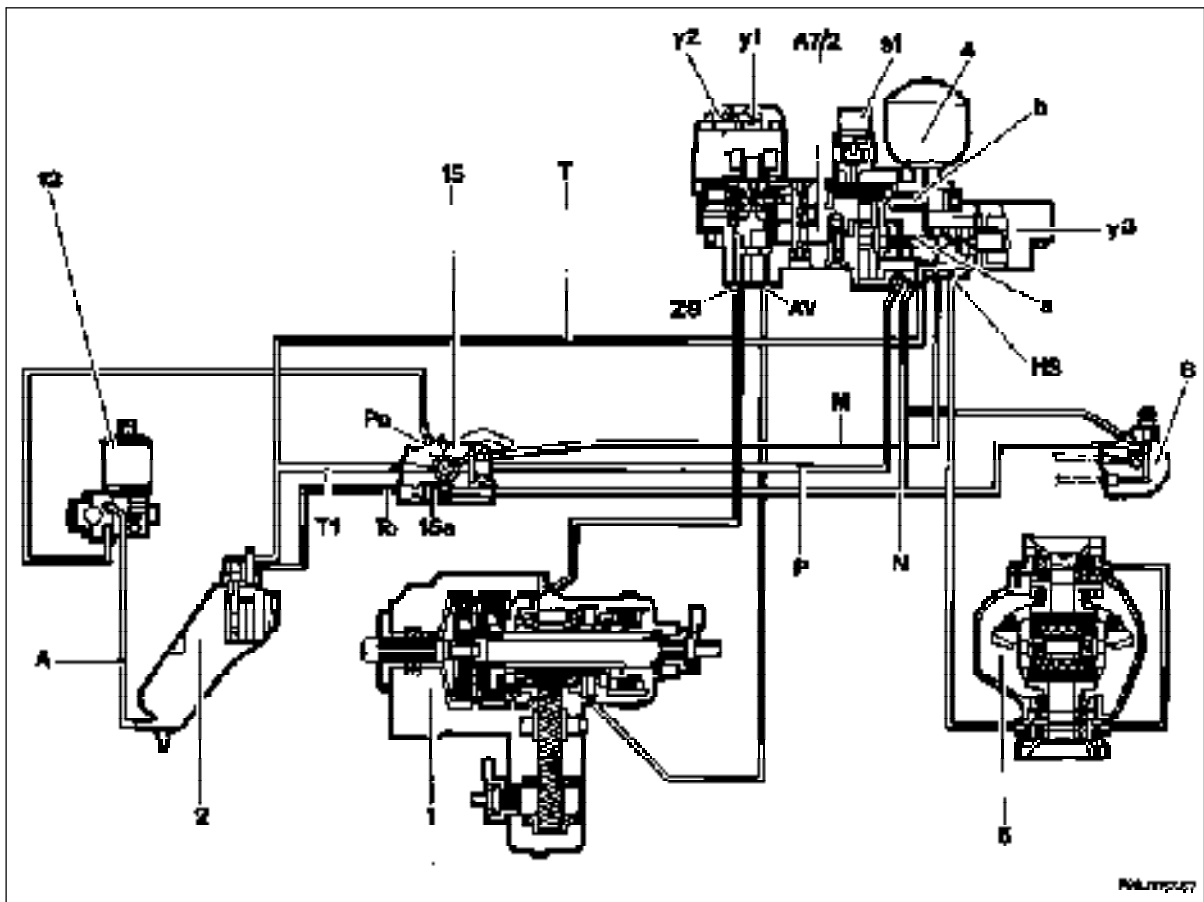


Hydraulic system

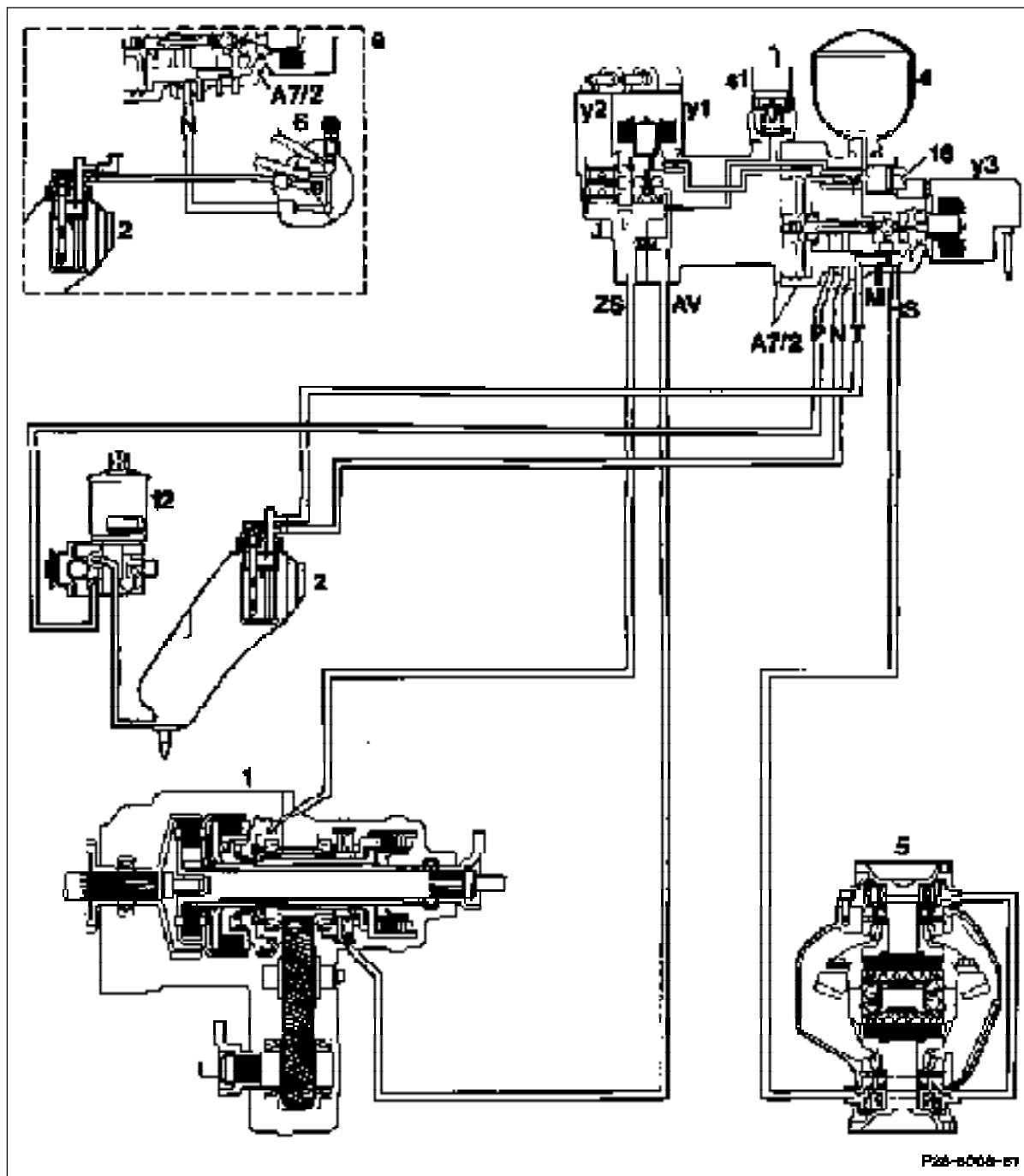


- |   |                        |      |                           |
|---|------------------------|------|---------------------------|
| 1 | Transfer case          | 12   | Oil pump                  |
| 2 | Oil reservoir          | 15   | Service valve             |
| 3 | Rear axle differential | A7/2 | 4MATIC valve control unit |



- 1 Transfer case
- 2 Oil reservoir
- 4 Pressure reservoir
- 5 Rear axle differential
- 6 Level controller
- 12 Pressure oil pump
- 15 Service valve
- 15a Pressure limiting valve (5 bar)
- A7/2 4MATIC valve control unit
- A7/2s1 Oil pressure switch (5 bar)
- A7/2y1 Front axle drive train valve
- A7/2y2 Center differential lock valve
- A7/2y3 Rear axle differential lock valve

- A Suction line of pressure oil pump
- AV Solenoid valve connection of front axle drive train
- HS Solenoid valve connection of rear axle differential lock
- M Return line to service valve
- N Return line to service valve with connection to level controller
- P Pressure line
- Po Connection of pressure line to service valve
- T Return line from 4MATIC valve control unit (2)
- T1 Return line from service valve
- To Return line from service valve
- ZS Solenoid valve connection of center differential lock
- a Accumulator charging valve
- b Pressure limiting valve



- 1 Transfer case
- 2 Oil reservoir
- 4 Pressure reservoir
- 5 Rear axle differential
- 6 Level controller
- 12 Pressure oil pump
- 16 Pressure relief plug
- A7/2 4MATIC valve control unit
- A7/2s1 Oil pressure switch
- A7/2y1 Front axle drive train valve

- A7/2y2 Center differential lock valve
- A7/2y3 Rear axle differential lock valve
- AV Front axle drive train
- HS Rear axle differential lock
- ZS Center differential lock
- M Measurement connection with sealing plug
- N Return to oil reservoir or level controller
- T Return to oil reservoir
- P Pressure oil
- a Location in the case of level control

P26-6006-07

## Function of hydraulic system

The hydraulic system comprises the following components:

- Oil reservoir (2)
- Pressure oil pump (12)
- Service valve (15, production up to 05/91)
- 4MATIC valve control unit (A7/2)

The pressure oil pump (12) delivers oil from the oil reservoir (2) to the connection Po on the service valve (15).

In the operating position of the service valve, the oil flows to the connection of the pressure line P on the 4MATIC valve control unit (A7/2).

The accumulator charging valve (a) holds the system pressure in the pressure reservoir (4) between approx. 25 and approx. 36 bar.

The front axle drive train (AV), center differential lock (ZS) and rear axle differential lock (HS) valves (A7/2y1, 2, 3) are controlled by the electronics. Via them, the multi-disk clutches in the transfer case (1) and the ring cylinders on the rear axle differential (ASD) (5) are subjected to system pressure.

Where:

A7/2y1	Front axle drive train valve
A7/2y2	Center differential lock valve
A7/2y3	Rear axle differential lock valve

If the accumulator (4) is full, the delivered oil flows back to the service valve (15) via line N from the 4MATIC valve control unit (A7/2). On vehicles with level control, the level controller (6) is connected to line N.

The pressure limiting valve (15a) in the service valve (15) ensures a residual pressure of approx. 5 bar in line N. In this way the contact pressure of the multi-disk clutch of the front axle drive train (AV) in the transfer case (1) of 1.3 bar can be prepared in any ready to operate condition.

The further return from the service valve (15) to the oil reservoir (2) takes place via the line To.

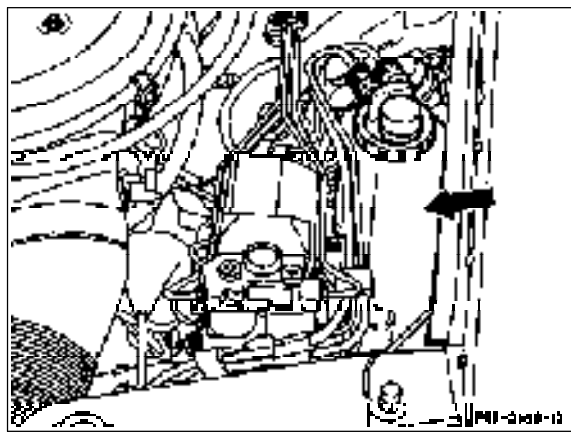
Oil from the 4MATIC valve control unit (A7/2) flows back via the return line T when:

- the pressure reduces in the multi-disk clutches,
- the pressure limiting valve (b) in the 4MATIC valve control unit (A7/2) opens.

If the service valve (15) is in the test position, oil flows from connection Po immediately to the oil reservoir (2) via line T1. Simultaneously the system pressure is reduced via lines M and To.

### Oil reservoir

The plastic oil reservoir (arrow) is located in the front left of the engine compartment.



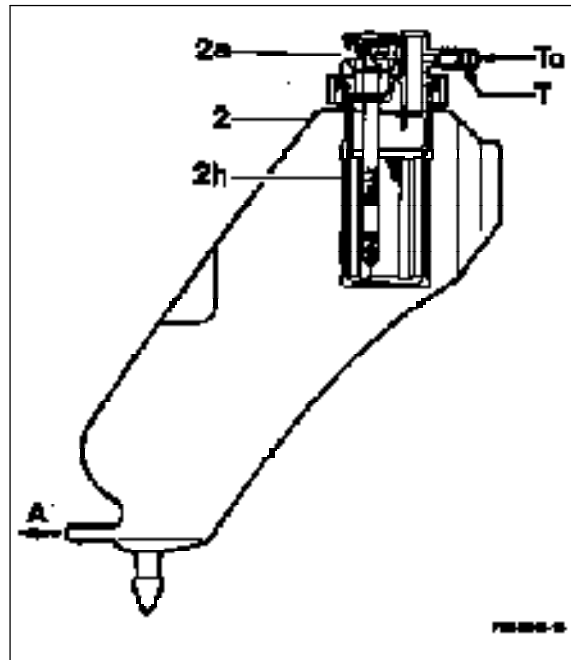
The oil reservoir (2) has connection pieces for:

- the suction line of pressure oil pump (A), and
- the return line from the service valve (To) and
- the return line from the 4MATIC valve control unit (A7/2) (T).

The returning oil is cleaned by the filter element (2h).

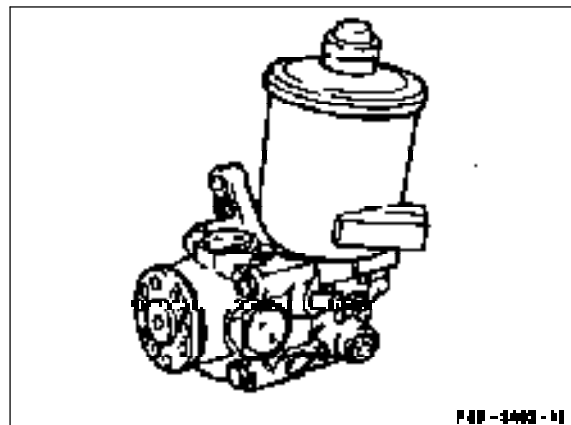
The sealing plug (2a) has an oil dipstick with "MIN" and "MAX" markings for the oil level check.

- 2a Sealing plug
- 2h Filter element
- A Suction line of pressure pump
- T Return line from the 4MATIC valve control unit (A7/2)
- To Return line from service valve



### Pressure oil pump

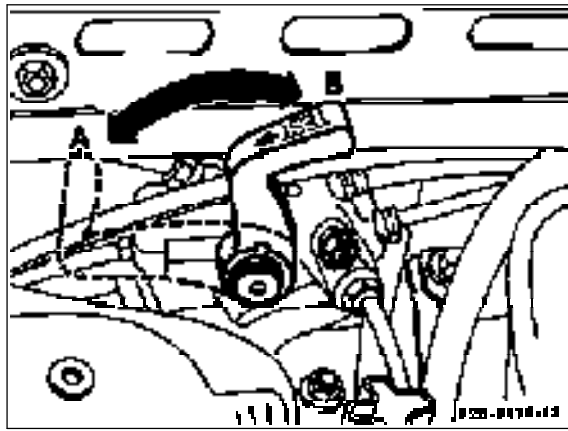
The engine drives the pressure oil pump. This supplies the hydraulic system with pressure oil.



### Service valve (up to transfer case no. 26 616)

The service valve is attached at the front right wheelhouse. The 4MATIC can be rendered inoperative with the service valve. By relocating the lever into test position (A) the complete hydraulic system is switched to a depressurized condition.

- A Test position
- B Operating position

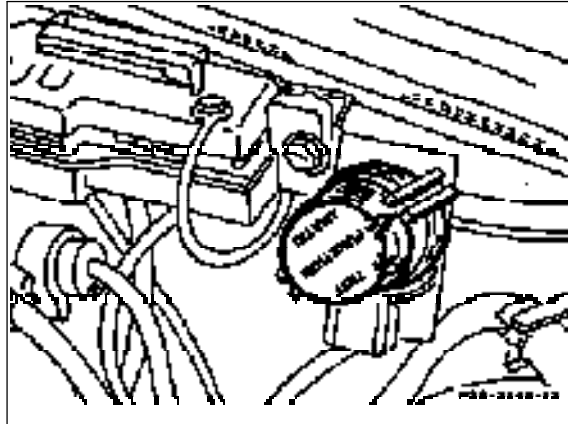


As of transfer case no. 26 617 the previous service valve for switching off the system has been replaced by an electrical normal operation/service selection switch (S7/3). The selection switch is located on the inside of the components compartment panel on the right.

To switch off the system, the coding plug must be withdrawn and reinserted in "Test" position. The ASD/4MATIC warning lamp comes on and indicates that the system has been rendered inoperative.

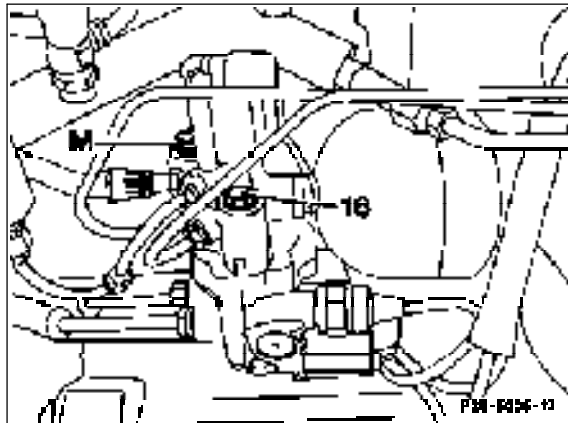


To insert the coding plug in the "function" position, switch off ignition, otherwise the ASD/4MATIC warning lamp does not go out.



As of transfer case no. 26 617 the accumulator pressure must be relieved at the pressure relief screw (16) to switch the hydraulic system to a depressurized condition.

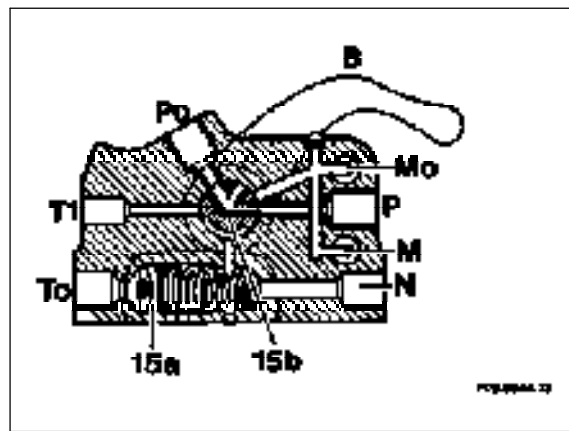
- M Measuring connection with sealing plug



In operating position (B) the pressure oil is supplied from connection (Po) through the rotary-disk valve (15b) and via the line (P) of the valve control unit.

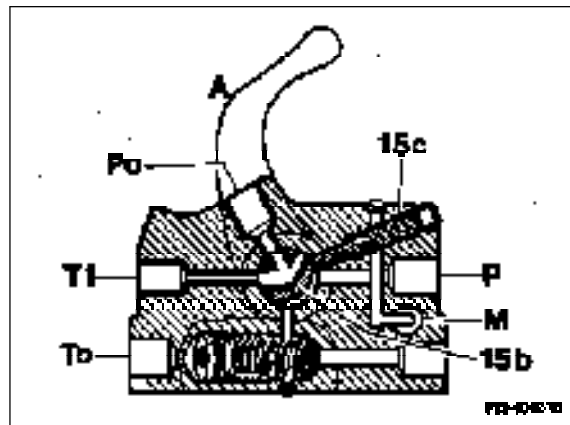
The pressure limiting valve (15a) holds a pressure of approx. 5 bar in the line (N).

The connection (Mo) is connected to the accumulator of the 4MATIC valve control unit (A7/2) via the lines P and M. Thus the system pressure (pressure at accumulator) can be checked by pressure testing at connection (Mo).



- 15a Pressure limiting valve (5 bar)
- 15b Rotary-disk valve
- M Return line from 4MATIC valve control unit (A7/2)
- Mo Measuring connection - system pressure
- N Return line from 4MATIC valve control unit (A7/2) and level controller
- P Pressure line to 4MATIC valve control unit (A7/2)
- Po Connection of pressure line from pressure oil pump
- T1 Return line to oil reservoir
- To Return line to oil reservoir

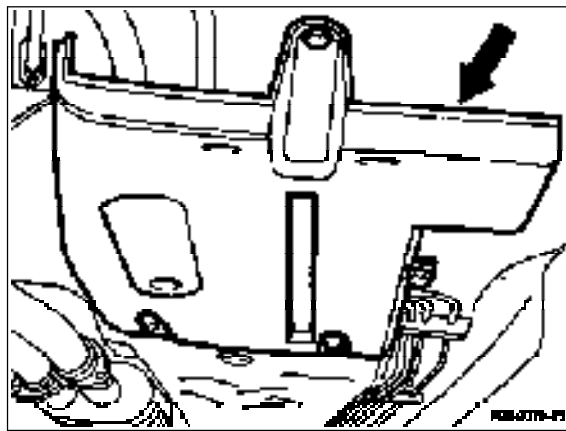
In test position (A) the rotary-disk valve (15b) connects the connection (Po) to the return line (T1). The pressure oil delivered from the pressure oil pump flows back directly into the oil reservoir via the service valve thus interrupting the pressure oil supply for the level control system. Simultaneously the pressure line (P) is connected to the return line (To) to the oil reservoir via a groove on the rotary-disk valve (15b). In the test position, the rotary-disk valve opens the check valve (15c), the contents of the accumulator flow through a ring gap on the rotary-disk valve (15b) into the return line (To) via the return line (M). Thus the pressure in the complete hydraulic system is reduced.



- 15b Rotary-disk valve
- 15c Check valve
- M Return line from 4MATIC valve control unit (A7/2)
- P Pressure line to 4MATIC valve control unit (A7/2)
- Po Connection of pressure line from pressure oil pump
- T1 Return line to oil reservoir
- To Return line to oil reservoir

#### 4MATIC valve control unit (A7/2)

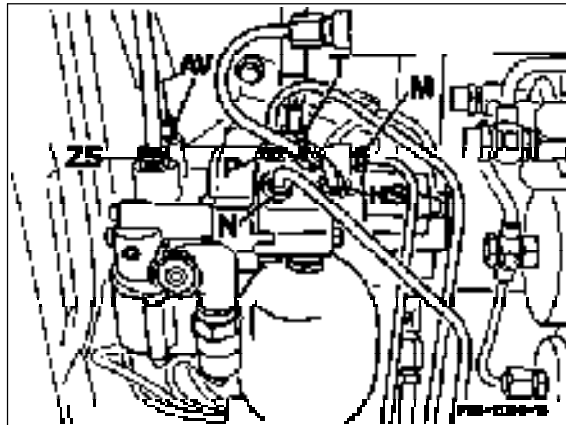
The 4MATIC valve control unit (A7/2) is located on the rear right of the frame floor under a plastic cover (arrow).



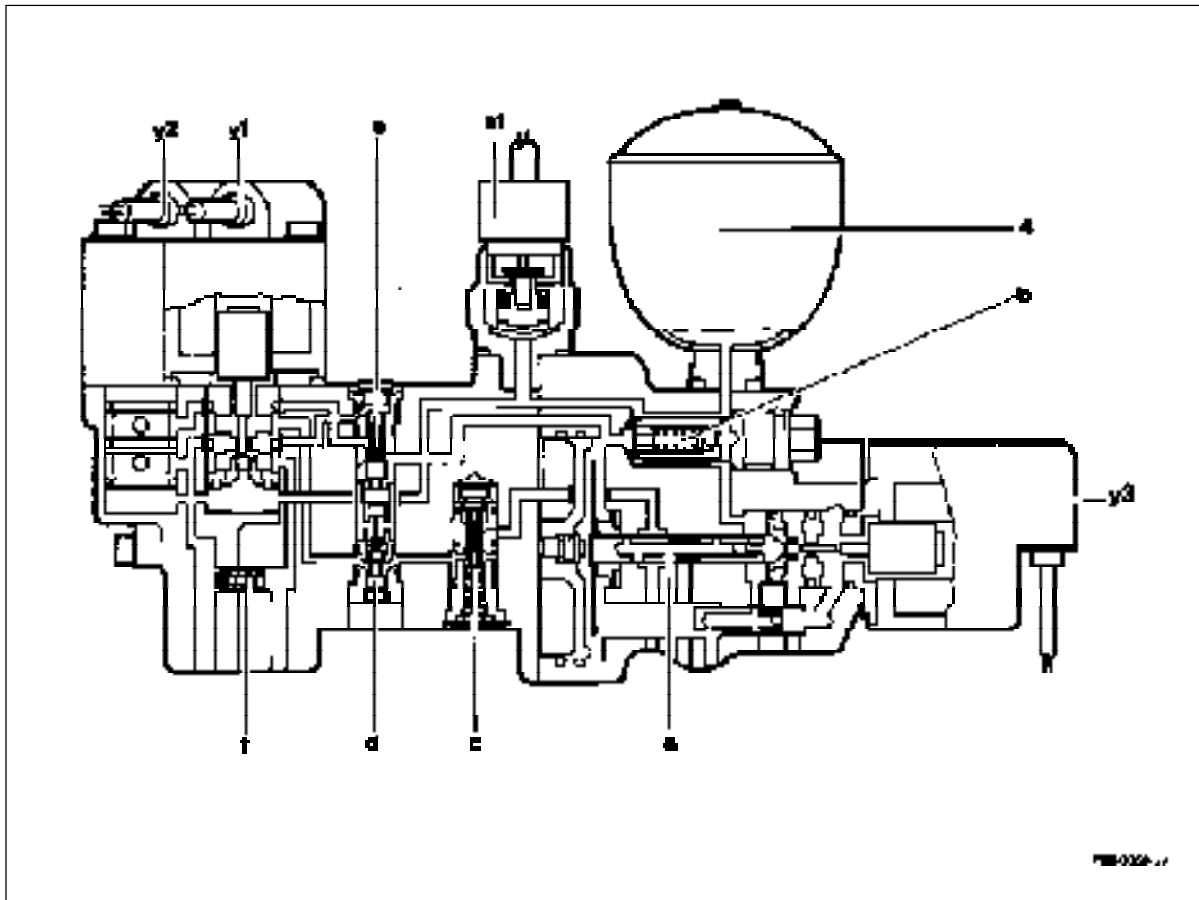
The connection points for the lines are identified by cast letters on the 4MATIC valve control unit (A7/2).

Where:

- AV - Front axle drive train
- ZS - Center differential lock
- HS - Rear axle differential lock
- M - Measuring connection (service valve)
- N - Return via service valve/level controller
- T - Return to oil reservoir
- P - Pressure oil

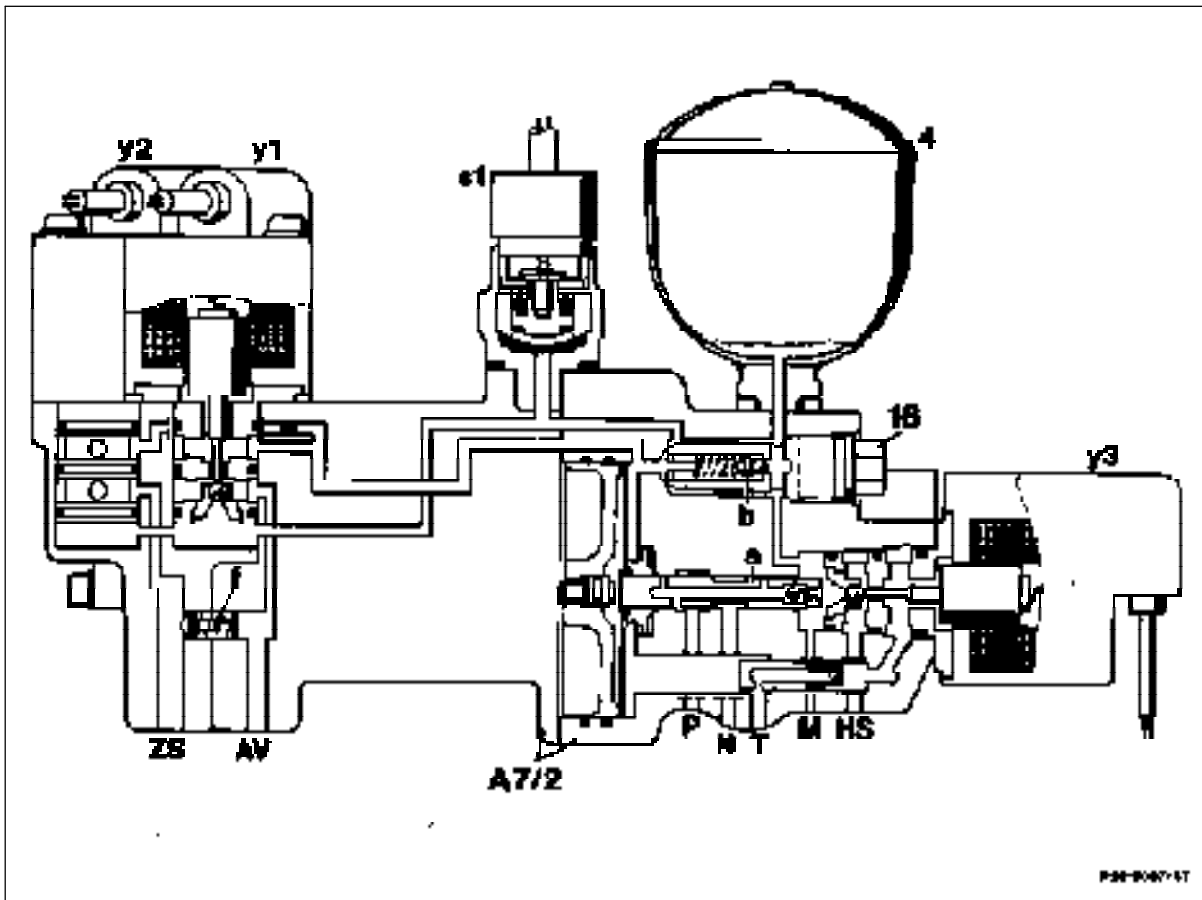






- 4 Accumulator
- s1 Oil pressure switch (5 bar)
- y1 Front axle drive train valve
- y2 Center differential lock valve
- y3 Rear axle differential lock valve

- a Accumulator charging valve
- b Pressure limiting valve
- c Oil flow limiting valve
- d Pressure regulator
- e Pressure-dependent orifice
- f Check valve



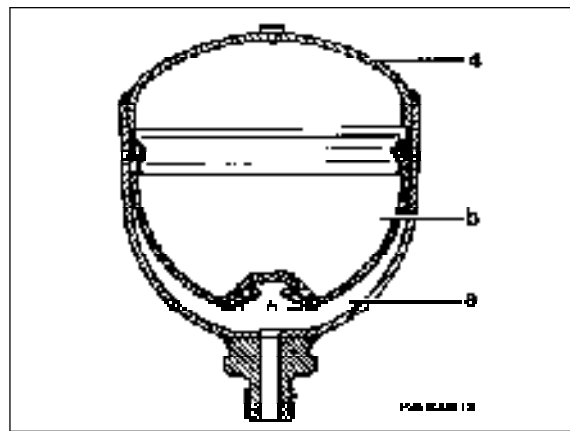
- |        |                                   |    |   |
|--------|-----------------------------------|----|---|
| 4      | Accumulator                       | ZS | Center differential lock                    |
| 16     | Pressure relief plug              | M  | Measuring connection with sealing plug      |
| A7/2   | 4MATIC valve control unit         | N  | Return to oil reservoir or level controller |
| A7/2s1 | Oil pressure switch               | T  | Return to oil reservoir                     |
| A7/2y1 | Front axle drive train valve      | P  | Pressure oil                                |
| A7/2y2 | Center differential lock valve    | a  | Accumulator charging valve                  |
| A7/2y3 | Rear axle differential lock valve | b  | Pressure limiting valve                     |
| AV     | Front axle drive train            | f  | Check valve                                 |
| HS     | Rear axle differential lock       |    |   |

The measuring connection (M) which was previously located on the service valve is now on the 4MATIC valve control unit (A7/2).

### Accumulator (4)

System pressure is stored in the accumulator (4). The accumulator volume is approx. 350 cm<sup>3</sup>. There is a pressure of approx. 21 bar in the gas compartment filled with nitrogen (b). At a system pressure (25 to 36 bar) this results in a working volume of approx. 40 cm<sup>3</sup> in the oil compartment (a).

- 4 Accumulator
- a Oil compartment
- b Gas compartment



### Oil pressure switch (A7/2s1)

If the pressure drops below 5 bar, the oil pressure switch (A7/2s1) switches ground to 4MATIC control unit (N30/3), which switches off the 4MATIC. This is indicated when the 4MATIC warning lamp (A1e24) comes on.

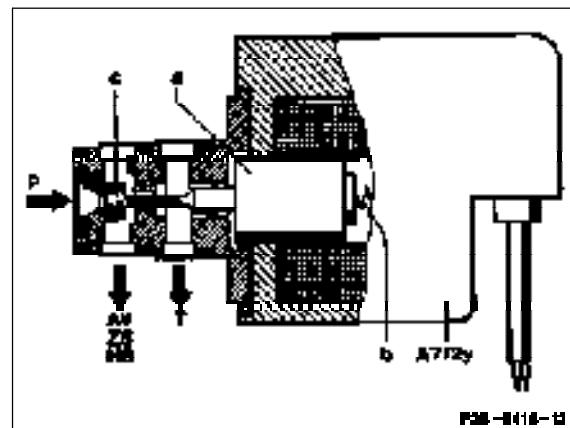
### Solenoid valves - AV, ZS, HS (A7/2y 1, 2, 3)

The 3 solenoid valves are located in the 4MATIC valve control unit (A7/2).

They act as 2-way valves. If there is no voltage at the solenoid valve (A7/2y), the hydraulic line from the respective multi-disk clutch (AV, ZS and HS) is connected to the oil reservoir by the return line (T). The oil pressure in the clutch is reduced.

If the solenoid valve is supplied with voltage when the system engages, the magnet core (a) is moved against the force of the spring (b). The system pressure opens the ball valve (c) and acts on the multi-disk clutch, and simultaneously the return line (T) is sealed by the ball valve.

If the solenoid valve is switched off, the spring force presses the magnet core (a) back into its initial position, thus the ball valve opens the return line (T) and seals the supply line from the accumulator (P).



- |            |  |
|------------|--|
| A7/2y      | Solenoid valve                                       |
| AV, HS, ZS | Hydraulic line from the respective multi-disk clutch |
| P          | Supply line from pressure reservoir                  |
| T          | Return   |
| a          | Magnet core  |
| b          | Spring   |
| c          | Ball valve   |

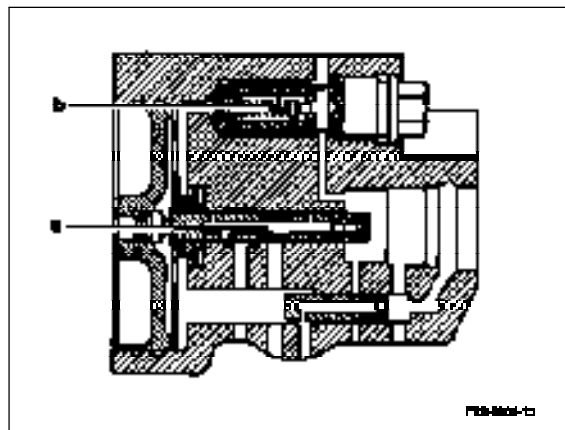
### Accumulator charging valve (a)

The accumulator charging valve (a) controls the pressure in the accumulator between approx. 25 and 36 bar.

### Pressure limiting valve (b)

The pressure limiting valve (b) prevents the accumulator pressure rising above 38 bar.

- a Accumulator charging valve
- b Pressure limiting valve



### Oil flow limiting valve and pressure regulator (production up to 05/91)

The multi-disk stack of the multi-disk clutch for the front axle drive train (AV) is pre-loaded with the contact pressure of 1.3 bar. In this way a rapid and gentle engagement of shift stage 1 is achieved.

### Pressure-dependent orifice (production up to 05/91)

The pressure-dependent orifice allows a rapid but at the same time gentle power transmission through the multi-disk clutch of the central locking differential.

It modulates the shift pressure as a function of system pressure.

Above 22 bar: rapid pressure reduction.

Below 22 bar: slow pressure reduction.

### Check valve

The check valve fulfils a safety function. If no pressure builds up in the multi-disk clutch of the front axle drive train (AV), the check valve prevents a pressure build up in the multi-disk clutch of the center differential lock (ZS). This prevents an interruption of the power flow and overspeeding of the engine.

### Testing hydraulic system

Refer to Diagnosis Manual Chassis Volume 2 - 8.1, 4MATIC.

