

The cruise control/Tempomat system is operational when the ignition is switched on. For actual operation, however, the vehicle speed should be above approx. 40 km/h. If the vehicle travels at the desired speed, a quick tipping against pushbutton switch in direction of "accelerating - stabilizing" or "decelerating - stabilizing" is enough to maintain this speed until the driver decides on a new speed or the system is switched off. To adapt this fixed speed e.g. to the traffic flow, the pushbutton switch must be kept in position of "accelerating - stabilizing" or "decelerating - stabilizing" until the desired speed is attained. On vehicles with a new control unit (phased-in starting 09/86) and identified by reference resistor, quick tipping of switch in direction of "accelerating - stabilizing" or "decelerating - stabilizing" will increase or reduce the speed by 1 km/h. In such a case, the vehicle is accelerated and controlled at  $0.7 \text{ m/s}^2$ . The new speed will be maintained when the switch is released. Quick tipping of the switch in the direction of "Off" or actuation of brake pedal or clutch pedal will switch off cruise control/Tempomat, and the regulating system will move into idle speed position.

Switching off by means of tipping switch will activate the actuator motor, which will move the regulating system into idle speed position.

On the other hand, when switching off by depressing the brake pedal or the clutch pedal, the power flow in the actuator is immediately interrupted by de-energizing the electromagnetic clutch and by a retracting spring disengaging a gear wheel of the actuator gear unit. The retracting springs pull the throttle control into the idle speed position. After switching off, the system remains operational until the ignition is switched off. If, upon operation of the brake or clutch or after switching off, the pushbutton switch is briefly tipped in the direction of "memory" at a vehicle speed above approx. 40 km/h, the vehicle automatically accelerates at  $1 \text{ m/s}^2$  to the last speed set during "stabilization". The speed set last is erased when the ignition is switched off.

If the set speed is exceeded by acceleration, e.g. when passing another vehicle, the vehicle will automatically return to the previously set speed when the accelerator pedal is released.

If the engine output is not enough for driving uphill, the set speed will drop. It will be built up again as soon as the gradient declines and the speed has not dropped to below 40 km/h or there has been no deceleration in the meantime.

If the engine brake effect is not enough when driving downhill, the set speed is exceeded and deceleration may be required. Without braking the set speed is built up again as soon as the gradient declines.



While driving with cruise control/Tempomat do not engage the selector lever position "N" of the automatic transmission, since otherwise the engine will be revving up.

### **Safety circuits**

The speed stored last in control unit will be cancelled when the ignition is switched off. When the ignition is switched on, the speed memory will be given the value of "0 km/h". This will make sure that when a drive is started again, e.g. after a change of driver, no unknown speed will be stored.

The speed is constantly monitored by the control unit. Each change of speed is picked up and evaluated. On control unit without reference resistor by means of a control stage (differentiating element), on control unit with reference resistor by means of a computer.

If a speed change is made by means of the tipping switch, the control stage (differentiating link) together with an operation amplifier or the computer in control unit will make sure that the specified values at switch positions "accelerating - stabilizing" of  $0.7 \text{ m/s}^2$  or at "memory" of  $1 \text{ m/s}^2$  are maintained.

When braking or clutching, the electromagnetic clutch in actuator is de-energized, the power flow is immediately interrupted, since a retracting spring will pull a gear wheel of actuator gear unit out of mesh. The retracting springs will pull the regulating linkage into idle speed position.

If, for example, with a defective stop lamp switch the vehicle is decelerated  $> 1.5 \text{ m/s}^2$ , this condition will be handled on control unit without reference resistor by the control stage (differentiating element) in control unit. The succeeding threshold value switch will activate the actuator motor which will move the regulating linkage into idle speed position. On control unit with reference resistor the deceleration is picked up by the computer and the power flow in actuator is interrupted both when braking or clutching, since the electromagnetic clutch in actuator is de-energized.

The period up to cutout depends on intensity of deceleration.

If for some reason or other the nominal speed is exceeded by more than approx. 6 km/h, the speed monitor will react immediately. The electromagnetic clutch in actuator is de-energized, the power flow in actuator is interrupted, the regulating linkage is moving into idle speed position. If the speed threshold is then less than approx. 6 km/h, e.g. the speed is now only 5 km/h more than the nominal speed, the electromagnetic clutch is again activated and the power flow in actuator is again established.

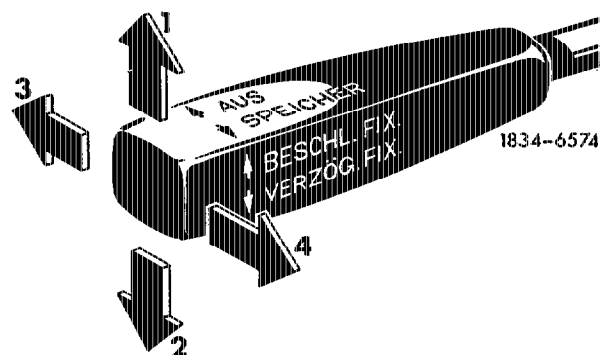
The function of the electromagnetic clutch in actuator is monitored by the control unit during each braking step. If the power flow in actuator is not interrupted when the clutch is defective, the control unit will activate the actuator motor instead, which will then move the regulating linkage into idle speed position. This procedure is registered by the control unit and the system is made inoperative until the ignition is switched off. When the ignition is again switched on, the system will operate normally until during the next braking step, under influence of the defective electromagnetic clutch, it is again made inoperative.

The control unit with reference resistor is protected against the input of double instructions. If, for example, a defective pushbutton switch is simultaneously putting-in the instructions "acceleration and memory", the control unit will switch off the system until it is unlocked by switching the ignition off and on.

The cruise control/Tempomat system comprises the following components which are connected with each other by an electric harness.

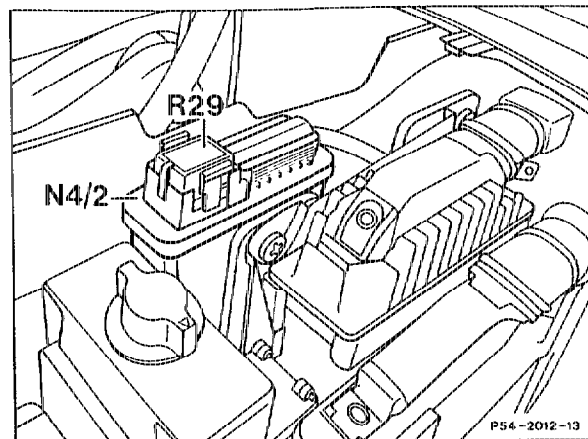
### Pushbutton switch

Position "1" or "2", tipping	= speed is stabilized.
Position "1", hold	= stabilized speed is increased.
Position "2", hold	= stabilized speed is reduced.
Position "3", tipping	= cruise control/Tempomat is switched off.
Position "4", tipping	= speed stabilized prior to switching off adjusts itself automatically at a speed above approx. 40 km/h.



### Cruise control amplifier

The Tempomat/cruise control (TPM) reference resistor amplifier (N4/2) compares the actual and the nominal speed. In the event of a departure from the nominal speed, the Tempomat/cruise control (TPM) reference resistor amplifier (N4/2) transmits corresponding control impulses to the Tempomat/cruise control (TPM) actuator (M16) until the actual and nominal speeds are again in accord.

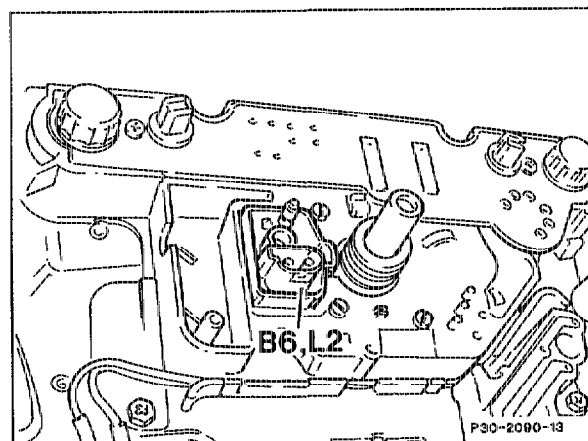


### Reference resistor

The Tempomat/cruise control reference resistor (R29) serves to adapt the Tempomat/cruise control (TPM) reference resistor amplifier (N4/2) to the various vehicle models.

### Road speed sensor

The cruise control amplifier receives the actual speed impulses from the Hall-effect speed sensor (B6) or inductive road speed sensor, transmission (L2) on the speedometer.

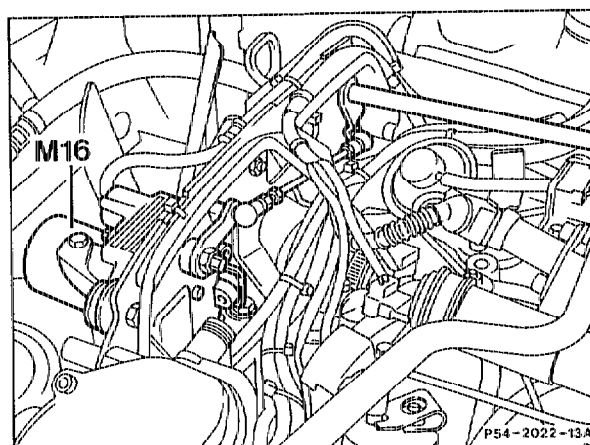


### Cruise control actuator

The Tempomat/cruise control (TPM) actuator (M16) receives its control impulses from the cruise control amplifier and actuates the throttle control by way of a connecting rod.

The actuator comprises an electric motor with gear unit, an overrunning clutch, a potentiometer and an electromagnetic clutch.

The electric motor drives the output shaft, which is provided with the overrunning clutch, by way of the gear unit.



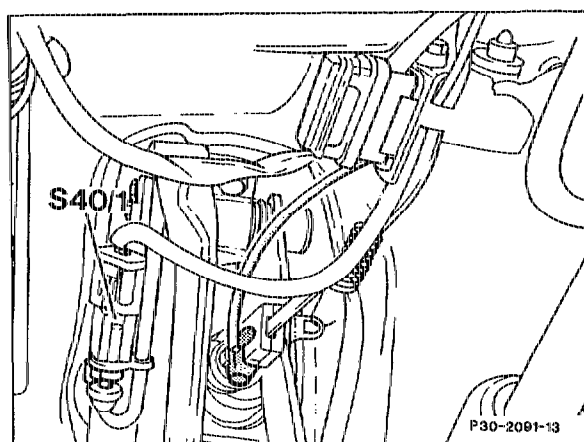
The overrunning clutch permits e.g. with set speed acceleration by means of accelerator pedal for passing other vehicles, without a need for operating the cruise control/Tempomat.

The potentiometer reports the position of the output shaft back to the control unit.

The electromagnetic clutch establishes the power flow between electric motor and output shaft by engaging a gear wheel. The clutch is engaged at the following switch positions: Accelerating - stabilizing, decelerating - stabilizing and memory. The electromagnetic clutch is switched off by actuating the brake or the clutch, but also when the system is switched off by means of the tipping switch (pushbutton switch) and when the regulating linkage has arrived at idling position. When the electromagnetic clutch is switched off, the power flow is immediately interrupted by means of a retracting spring, which pulls a gear wheel out of mesh.

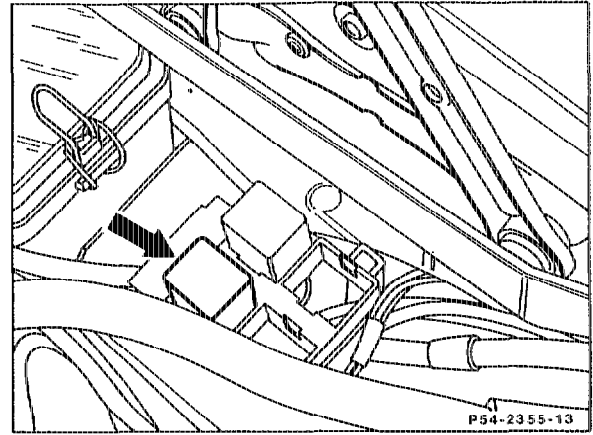
**On vehicles up to May 93 only  
Switch actuated by clutch pedal on vehicle  
with manual transmission**

When the clutch pedal is depressed, the clutch pedal switch, Tempomat/cruise control (TPM) (S40/1) will interrupt the ground connection from the stop lamps to the cruise control amplifier. This immediately switches off the cruise control, as during braking.



**Relay on model 201.024 (standard version)**

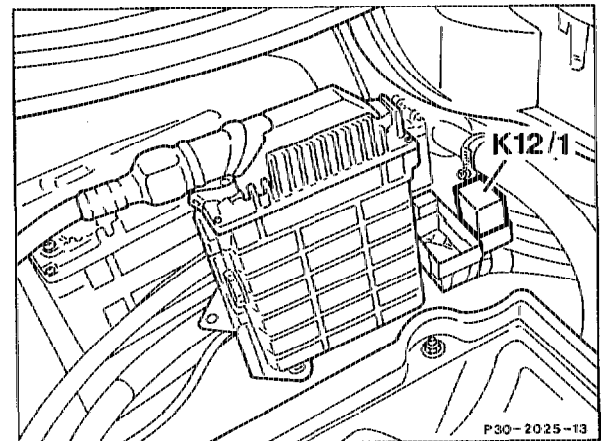
During operation of cruise control/Tempomat the relay will switch off the decel shutoff. It is painted yellow on surface for identification.



**Relay on models 124.128/133/193/333/393 and 201.128 as of approx. 09/89 up to approx. 06/91**

During operation of Tempomat/cruise control, the Tempomat/cruise control boost air cut-off relay (K12/1) switches off the boost air cut-off. The surface of the boost air cut-off relay is painted yellow for identification.

Layout model 124



Layout model 201

