54–500 Cruise control operation

The cruise control system is ready for operation when the ignition is switched on. However, for actual operation, the vehicle speed should be above approx. 40 km/h (approx. 30 mph). As soon as the vehicle is running at the desired speed, touching switch for a short moment in direction of „Accel – Set" or „Decel – Set" will keep this speed constant until the driver engages a different speed or the system is switched off. To adapt this set speed e.g. to the prevailing traffic situation, hold pushbutton switch in direction of „Accel – Set" or „Decel – Set" until the desired speed is attained. On vehicles with new control unit (starting 1/87 phased-in), recognized by coding plug, touching switch in direction of „Accel – Set" or „Decel – Set" will increase or reduce speed by 1 km/h each time. Acceleration of the vehicle proceeds at control speed of 0.7 m/s^2. When the switch is released, the new speed will be maintained. When tipping switch in direction of „Off" for a short moment and stepping down on brake pedal or clutch pedal, the cruise control/Tempomat will be switched off and the regulating linkage will move into idle position.
When switching off with pushbutton switch, the actuator motor which moves the regulating linkage into idle position will be activated. On the other hand, when switching off by means of stepping down on brake pedal or clutch pedal the power flow in actuator is immediately interrupted since the electromagnetic clutch will be de-energized and a retracting spring will pull a gearwheel of actuator drive out of mesh. The retracting springs will pull the regulating linkage (throttle control) into idle speed position. Following disengagement, the system remains operational until the ignition is switched off. If upon actuation of brake or clutch after switching off the switch is quickly tipped in the direction of „Resume" at a vehicle speed above approx. 40 km/h, the vehicle will accelerate independently at 1 m/s^2 to the previously „set" speed. The previously set speed is cancelled when the ignition is switched off.

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

If the engine power is not enough when driving uphill, the set speed drops and will be automatically recovered when the gradient is easing off and the speed has not dropped to below approx. 40 km/h or when the brakes are not applied.

If the engine braking power is not enough when driving downhill, the set speed is exceeded and braking may be required. If there has been no braking, the set speed will return as soon as the gradient is easing off.

Attention!
While driving with cruise control, do not engage selector lever position „N" of automatic transmission, since this will lead to revving up of engine.

Safety circuits

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

The speed is constantly monitored by control unit. Any speed change is picked up and evaluated. On control unit without coding plug by means of a shift stage (differentiating element), on control unit with coding plug by means of a computer.

If a speed change is made by means of the pushbutton switch, a shift stage (differentiating element) together with an operation amplifier or the computer in control unit will make sure that the specified values of 0.7 m/s^2 at switch positions „Accel – Set" or at „Resume" of 1 m/s^2 are maintained.

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

If, e.g. with a defective stop lamp switch, the vehicle is decelerated > 1.5 m/s^2, the shift stage (differentiating element) in control unit will be engaged in control unit without coding plug. The subsequently connected threshold value switch controls the actuator motor, which will move the regulating linkage into idle speed position. On control unit with coding plug the deceleration is picked up by the computer and the power flow is interrupted in actuator the same as during braking or clutching, since the electromagnetic clutch in actuator will become de-energized.

The period up to cutout depends on extent 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. The electromagnetic clutch in actuator is de-energized, the power flow in actuator is interrupted, the regulating linkage moves into idle speed position. If the speed threshold subsequently moves to below approx. 6 km/h, and the speed e.g. amounts to only 5 km/h more than the nominal speed, the electromagnetic clutch is again activated and the power flow in actuator is re-established.

The operation of the electromagnetic clutch in actuator during each braking mode is monitored by the control unit. If the power flow in actuator with a defective clutch is not interrupted, the control unit will activate the actuator motor instead, which will then move the regulating linkage into idle speed position. This mode is recorded by the control unit and the system is made inoperational until the ignition is switched off. When the ignition is switched on again, the system operates normally, until it is again made inoperational during the next braking mode owing to a defective electromagnetic clutch.

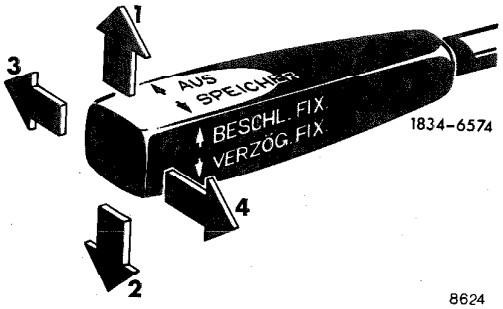
54–500 Cruise control operation

The cruise control/Tempomat comprises essentially four structural elements:
Switch, control unit, speedometer with cruise control/Tempomat connection and actuator.

In vehicles equipet with manual transmission an additional switch is installed which is actuated by the clutch pedal.

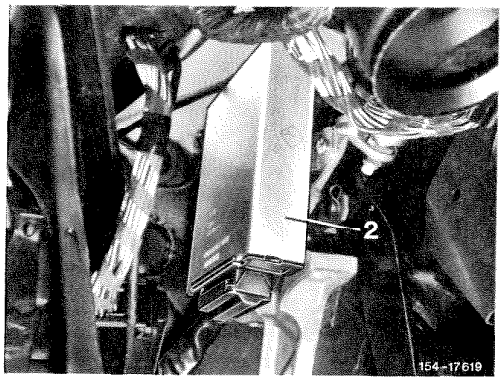
Switch

Position "1" or "2" touch = speed is set
Position "1" hold = set speed is increased.
Position "2" hold = set speed is reduced.
Position "3" touch = cruise control is switched off.
Position "4" touch = the speed set prior to switching-off is automatically recovered at a speed above approx. 40 km/h (30 mph).



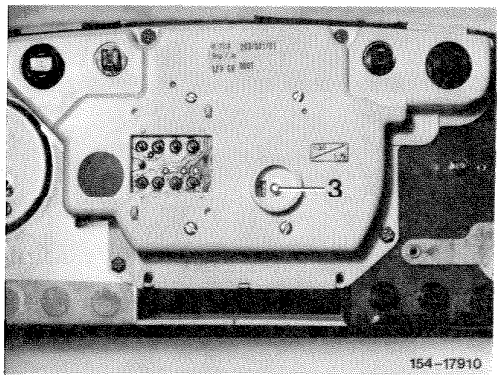
Control unit

The control unit (2) compares the actual speed and the selected speed. In the event of a deviation from the selected speed, the control unit (2) will send pertinent control signals to the actuator (4) until the actual speed and the selected speed are again in agreement.



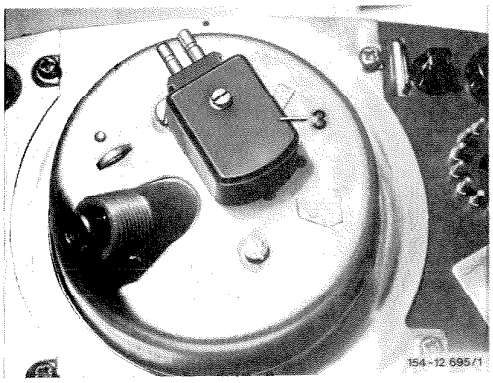
Electronic speedometer with cruise control/Tempomat connection

Control unit (2) receives the actual speed signals from cruise control/Tempomat connection (3) of speedometer.



Mechanical speedometer with sensor

The control unit is provided with the actual speed signals from sensor (3) of speedometer.



Actuator

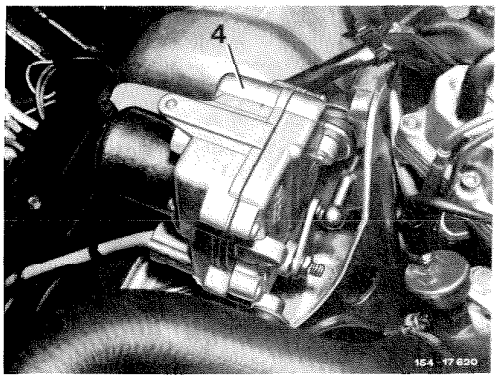
The actuator (4) receives its control signals from control unit (2) and actuates the regulating system by means of a connecting rod. The actuator comprises an electric motor with gear unit, a free-wheeling unit, a potentiometer and an electromagnetic clutch.

The electric motor drives the drive axle, which is provided with a free-wheeling unit, by way of the gear unit.

The free-wheeling unit permits, e.g. at set speed, acceleration by means of accelerator pedal for passing other vehicles, without actuating cruise control.

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

The electromagnetic clutch establishes the power flow between electric motor and output shaft. It is engaged at the following switch positions: Accel – Set. Decel – Set and Resume. 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 pushbutton switch and the regulating linkage has attained the idling position. When the electromagnetic clutch is switched off, the power flow is immediately interrupted by a retracting spring which pulls a gearwheel out of mesh.



Switch actuated by clutch pedal on manual transmission

When stepping down on clutch pedal, the switch (arrow) interrupts the ground connection from stop lamps to control unit. The cruise control will then be immediately switched off similar to braking.