

Job No.

Battery

Battery test, service, maintenance	54-005
A. Testing battery	
B. Charging battery	
C. Handling battery when laying up vehicle	
D. Batteries with overfill protection	


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A. Testing battery

Visual checkup	for external leaks		
Check acid level If the acid level must be corrected by adding distilled water, recharge battery afterwards up to gassing.	should reach up to mark. On batteries on which the fluid level cannot be seen, keep adding distilled water until water is no longer flowing off at overfill guard.		
Battery state of charge	Climatic condition	Density at 20 °C (kg/dm ³)	Procedure
charged	normal tropics	1.28*) 1.23")	—
half charged	normal tropics	1.20 1.16	recharging required
discharged	normal tropics	1.12 1.08	recharge immediately
*) Tolerance ± 0.01 kg/dm ³			
Test acid density in individual cells	Acid density should be the same in all cells.		

Example for defective batteries

a) Acid density in one cell deviates noticeable in downward directions.

1	2	3	4	5	6
1,28	1,28	1,28	1,28	1,16	1,286

Condition: Short-circuit in cell 5

b) Acid density deviates in two adjacent cells (e.g. 2 and 3) clearly from remaining measuring values in downward direction.

1	2	3	4	5	6
1,28	1,16	1,16	1,28	1,28	1,28

Condition: Leak in cell wall between cell 2 and 3.

The leaking cell wall and the connector operate as a conductor through which the cells are discharged.

Testing battery under load

(perform only if no fault has been found during previous tests)

This test is possible only at uniform acid density of cells and an acid density of at least 1.24 kg/dm³

Capacity	Ah	55	62	72	90	92
Load current (approx. 3-times capacity) ¹⁾	A	165	190	265	270	280
Minimum voltage ²⁾ after 10 s at acid density	V	9				10
	kg/dm ³	1.24				1.28

¹⁾ At 72 Ah higher.

²⁾ After 10 seconds the test voltage should attain a constant value. Slight deviations have no influence. If the voltage drops considerably or completely collapses, the battery is defective.

B. Charging battery

Batteries can be charged with DC only. For charging, the battery is separated from electric circuit of vehicle and connected to a charger:

Positive pole (+) of battery to positive pole of charger,

negative pole (–) of battery to negative pole of charger.

The charging current (A) should amount to 10 % of battery capacity, e.g. at 55 Ah a charging current of 5.5 A.

For recharging, higher currents may be employed up to start of gassing (2.4 V/cell).

Charge until acid density and charging voltage are no longer increasing within 2 hours. Note that the measuring value of the acid density changes by 0.01 per 15 °C temperature difference. If, for example, an acid temperature of 34 °C is measured, the simultaneously measured acid density should be increased by 0.01 to obtain the value referenced to 20 °C.

C. Handling battery when laying up vehicle

Prerequisite: Battery state of charge in order
Acid density min. 1.26 kg/dm³ (tropics 1.21 kg/dm³)

1. Disconnect negative terminal of battery.

This will prevent discharging by rest potential consumers or time clock.

2. Recharge battery after 3 months (acid density 1.28 kg/dm³, tropics 1.23 kg/dm³).

Attention!

Never leave battery standing about in discharged condition, since otherwise the plates will sulfate.

Sulfated plates will cause initial damage to battery and will lead to early breakdown.

Antifreeze in charged condition

		normal	tropics
charged		- 65	- 40
half-charged	in °C	- 30	- 13
discharged		- 12	- 6

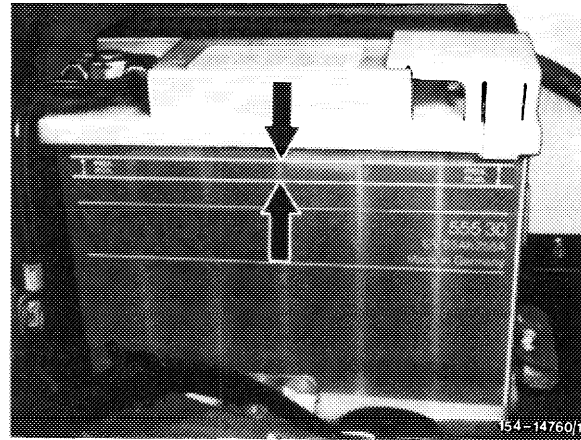
D. Batteries with overflow protection

These batteries are provided with rubber diaphragm elements and vent ducts in filter neck of battery cover. This will prevent an increase of fluid level above "max." mark when the batteries are filled.

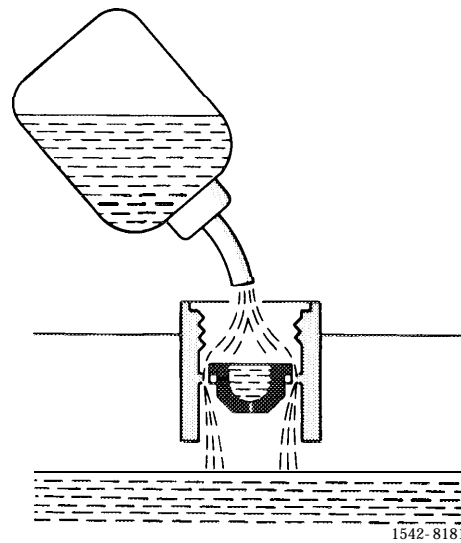
When refilling with distilled water, make sure that the diaphragm is not punched through or removed. Also make sure that on batteries with overflow protection no cell closing plug of former batteries without overflow protection is used. This type of cell closing plug has a vent bore at the top in cover.

Checking fluid level and adding distilled water

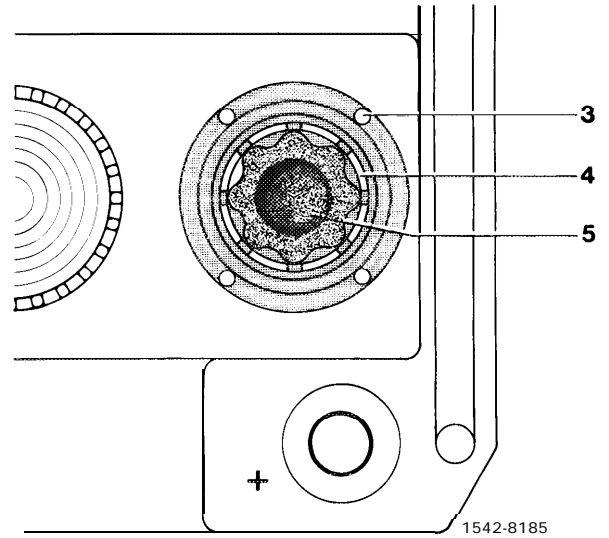
On batteries with overflow protection the fluid level is determined by means of the marks on outside of battery.



Refilling with distilled water

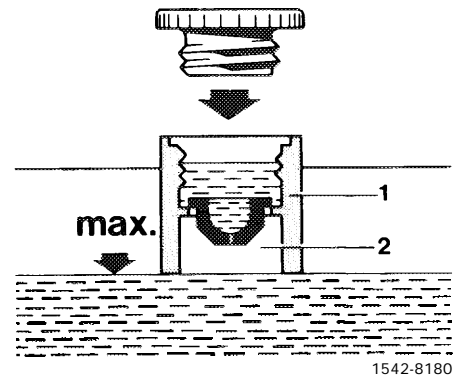


The distilled water flows through circularly located slots (4) into cell. The air displaced from cell flows through 4 vent bores (3) into the open air.



- 3 Vent bores
- 4 Filling in slots
- 5 Diaphragm

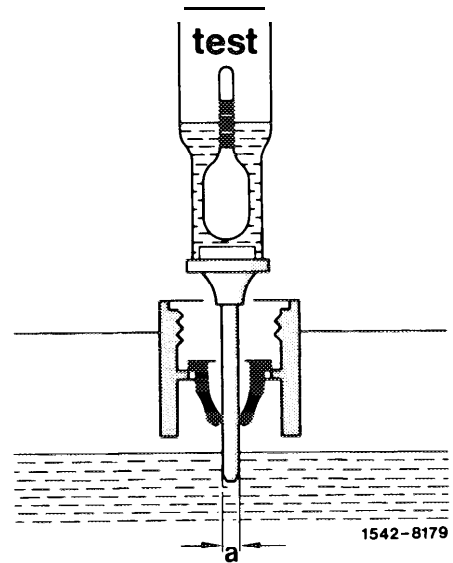
When the fluid level is at "max." mark it will simultaneously close the vent ducts. As a result, the air can no longer escape and an air cushion (2) is established in cell. This air cushion prevents that additional fluid can flow into cell from filler chamber. The battery is filled up to max. capacity.



- 1 Vent duct
- 2 Air cushion

Checking acid density

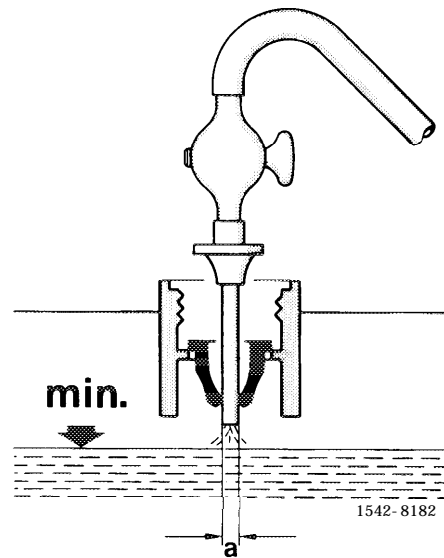
To check acid density, insert syphon through triple-slotted diaphragm and remove required quantity of fluid. Upon removal of syphon, the diaphragm will again be watertight.



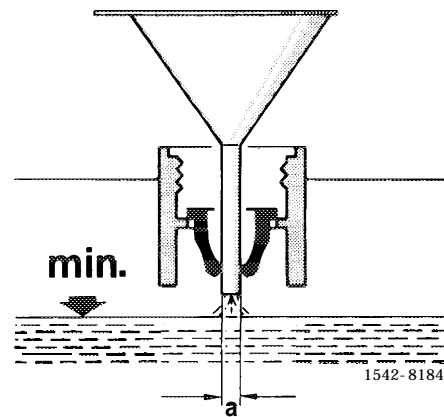
a = max. 9 mm

Initial filling of battery with acid

During initial filling with acid insert the filling device or a conventional funnel through diaphragm and fill battery up to "min" mark.

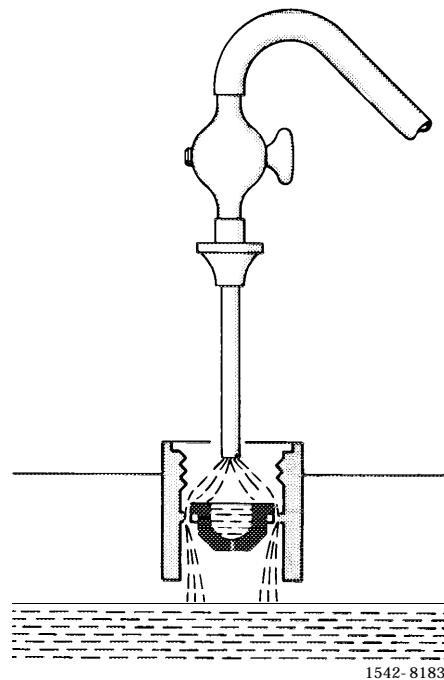


a = max. 9 mm



Continue filling in acid up to "max". mark through slots with diaphragm closed.

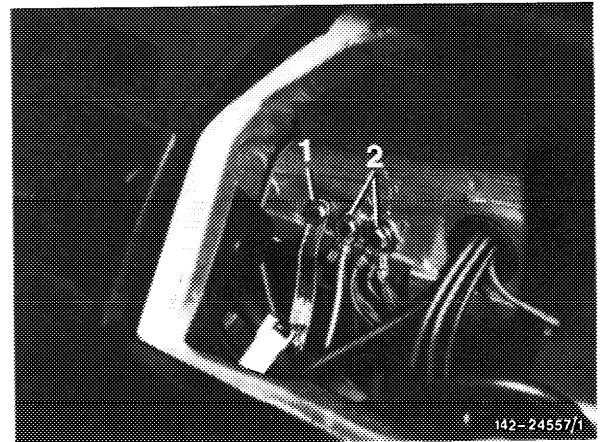
Note: If a battery with overfill protection is scrapped, remove rubber diaphragm for emptying.



Designation: W 1

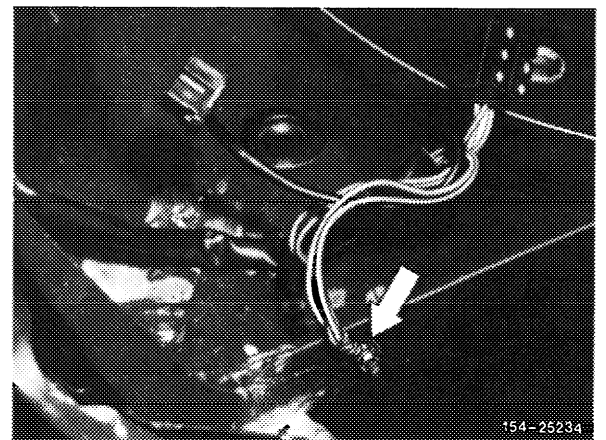
Layout: Main ground, behind instrument cluster.

1 Ground for central electrics
2 Ground of harnesses



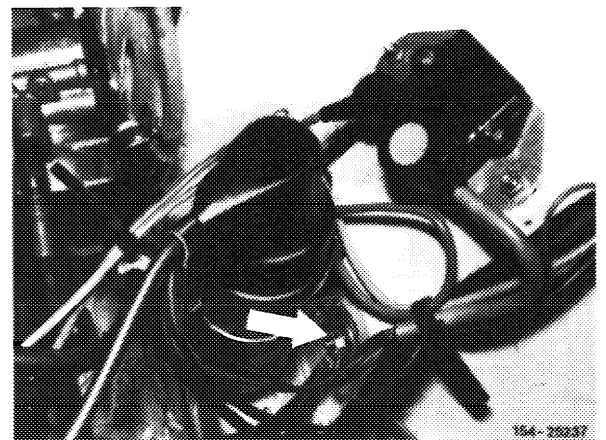
Designation: W 2

Layout: Ground, front right at lamp unit.



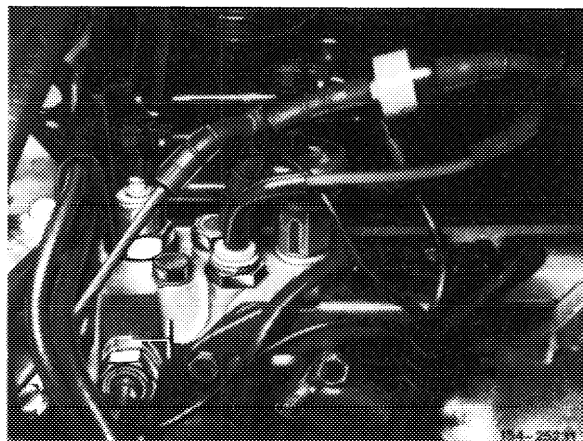
Designation: W 3

Layout: Ground, wheelhouse front left at ignition coil.



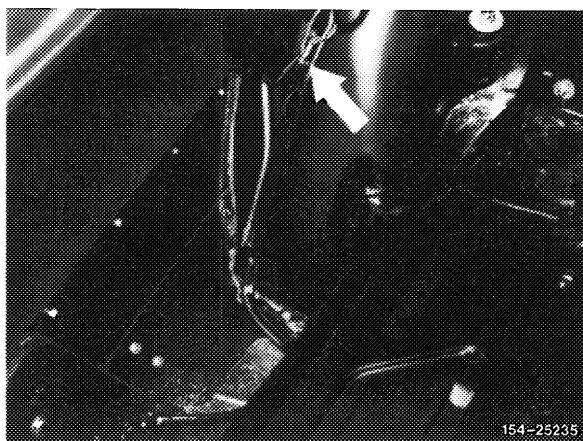
Designation: W 5

Layout: Ground above engine (instrument screwed into engine).



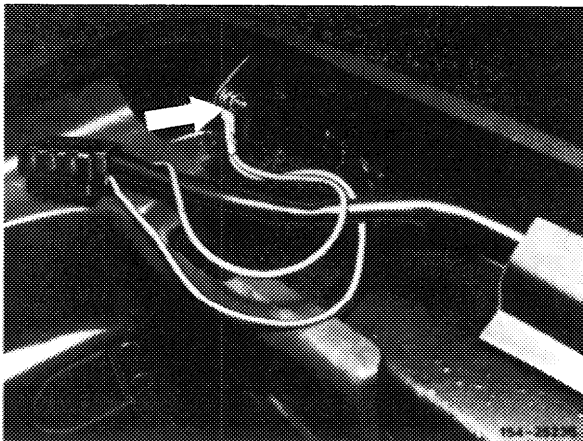
Designation: W 6

Layout: Ground, trunk on wheelhouse, left.



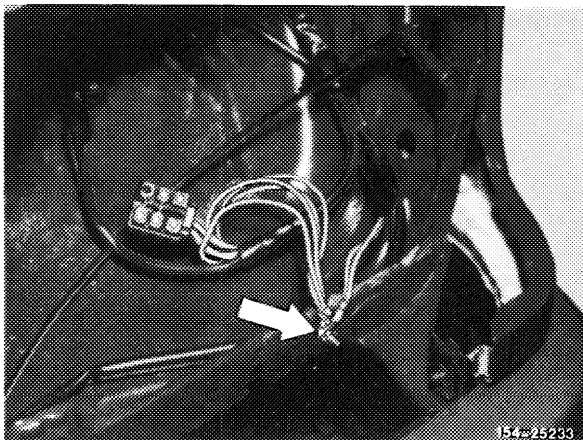
Designation: W 7

Layout: Ground, trunk at the right near tail lamp unit.



Designation: W 9

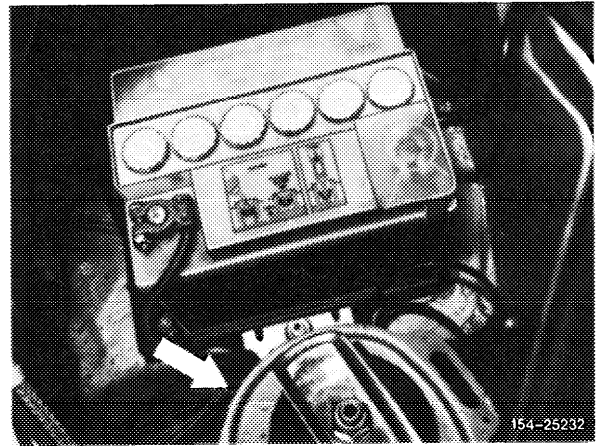
Layout: Ground, front left at lamp unit.



Lefthand steering vehicle

Designation: W 10

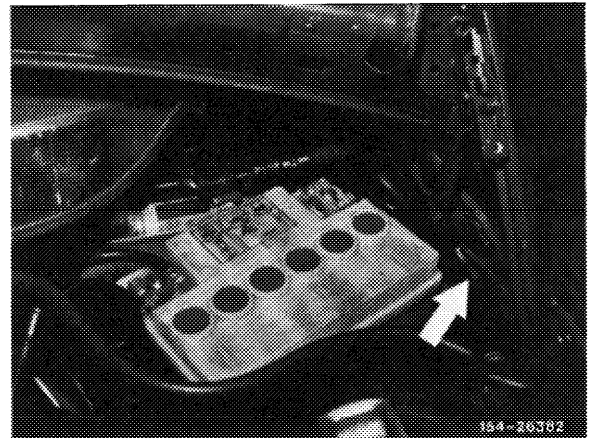
Layout: Ground, battery



Righthand steering vehicle

Designation: W 10

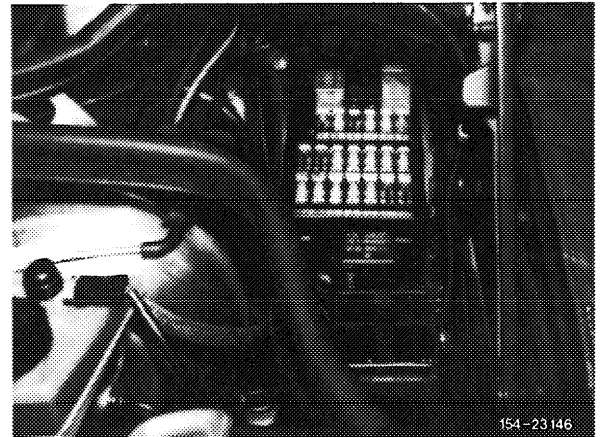
Layout: Ground, battery



A. Layout

The central electric system comprises the following components:

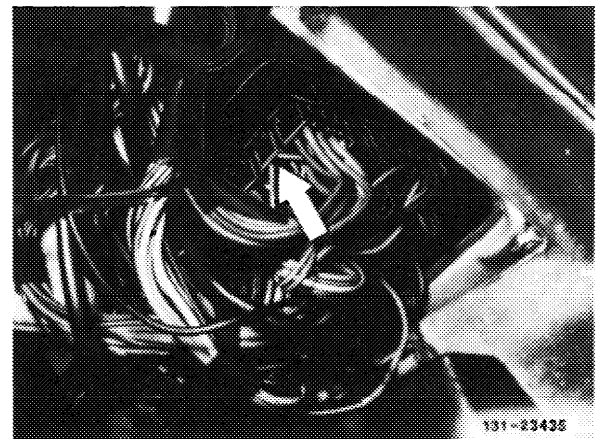
- Fuses
- Double contact with relay air conditioning
- Overvoltage protection
- Combination relay (turnsignal, heatable rear window, wiper)



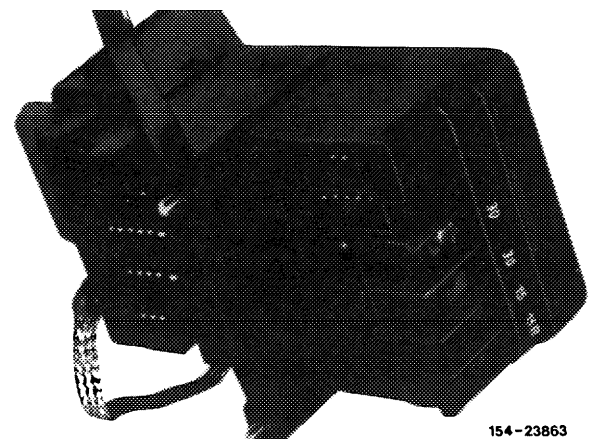
The central electric system permits subdivision of main harnesses used up to now into individual harnesses, e.g.:

- Harness for rotary light switch
- Harness for headlamp, left
- Harness for headlamp, right etc.

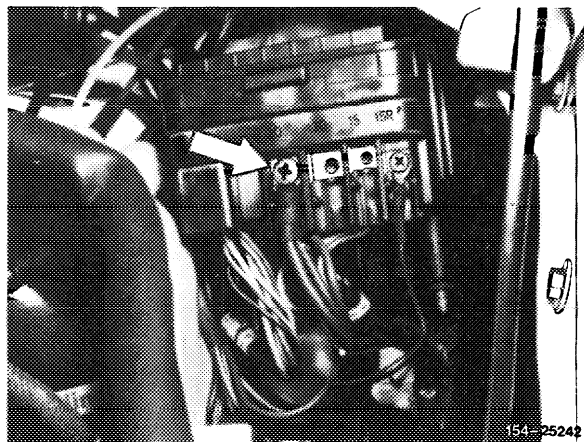
The individual harnesses are connected to central electric system by means of couplings.



The cast in switchplate connects the individual harnesses with each other.

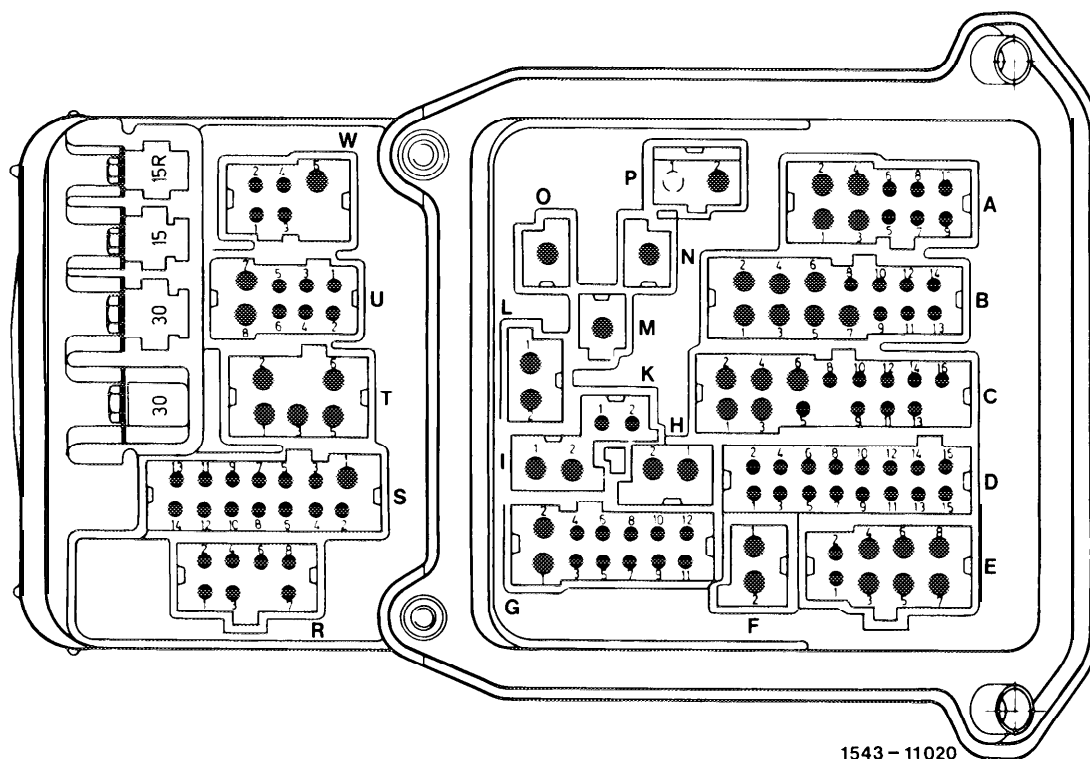


Feeding of terminal 30 proceeds on face of central electric system. In addition, there are other possible connections on terminal 30, 15 and 15 R.



154-25242

B. Association of harness couplings to coupling fields



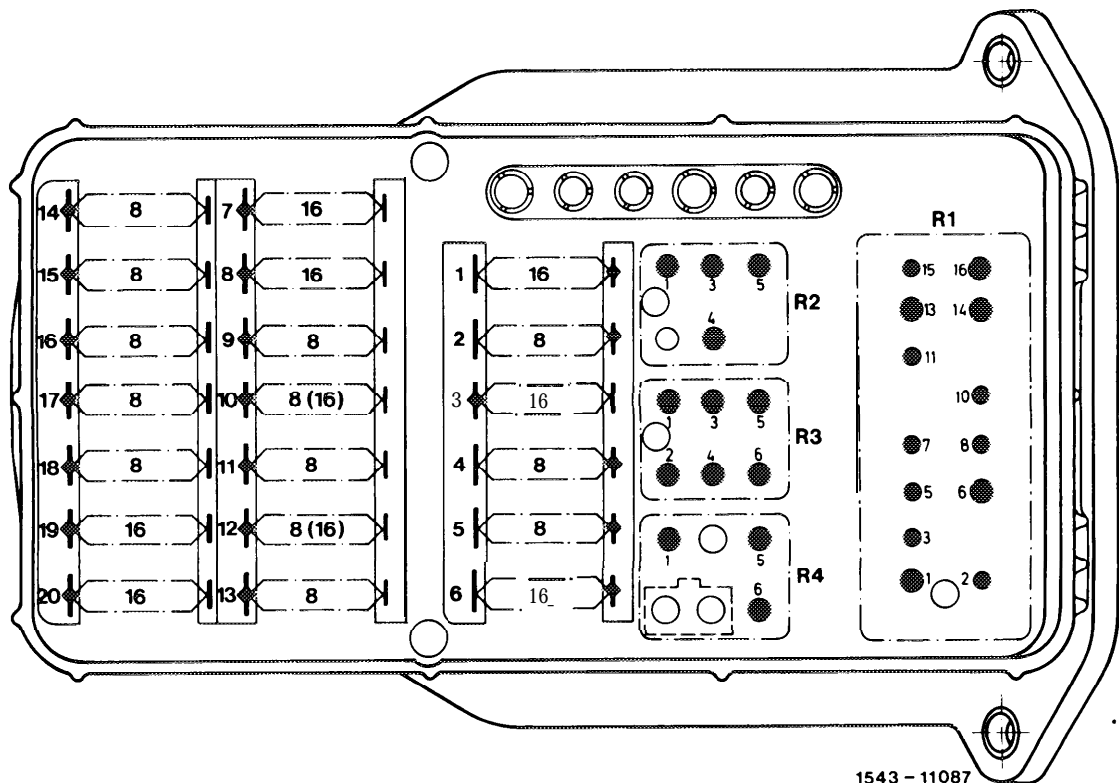
1543 - 11020

- | | | |
|-------------------------------|-----------------------------|----------------------------------|
| A Interior | H Vacant | P Relay overvoltage protection |
| B Turnsignal (flasher) switch | Electric window opener | R Headlamp, right |
| C Tail lamp units | K Door contact | S Headlamp, left |
| D Instrument cluster | Lug, terminal 15/30 | T Wiper motor |
| E Ignition starter switch | M ABS (USA vacant) | U Motor |
| F Coupling with diode | N Slide roof | W Air conditioning (engine side) |
| (USA coupling with bridge) | O Interior/air conditioning | |
| G Rotary light switch | | |

C. Layout of screw connections

Lines to	Cross section mm ²	Color	Engine version
Terminals 30, non-fused Cable connector engine	6	red	injection engine carburetor engine
Fuel pump relay	2.5	red	injection engine
Relay cutoff valve	0.75	red	carburetor engine
Relay intake manifold heater	2.5	red	carburetor engine
ABS (except USA) (special equipment):			
Relay return pump	4	red	
Relay magnetic valves	2.5	red	
Auxiliary heater (special equipment):			
Fuse element	2.5	red	
Terminal 15, non-fused			
ABS (except USA) (special equipment):			
Indicator lamp	0.75	black/red	
Terminal 15R , non-fused			
Airbag (special equipment):			
Indicator lamp	0.75	black	
Triggering unit			

D. Layout of fuses and relays



- R 1 Combination relay
(turnsignal, heatable rear window, wiper)
R2 Relay window opener
R3 Relay air conditioning
R4 Relay overvoltage protection

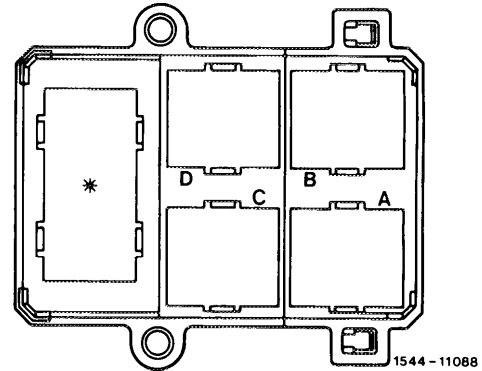
1543 - 11087

E. Layout of relays on relay holder

Note: The relay for heating intake manifold is marked in blue on face.

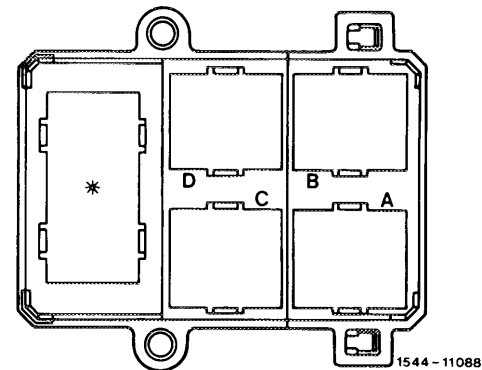
Standard version

- A Fuse element for auxiliary heater
- B Fuse element for seat adjustment
- C Relay for heating intake manifold
- D Relay for headlamp cleaning system
- Relay for fuel pump (injection engines only)



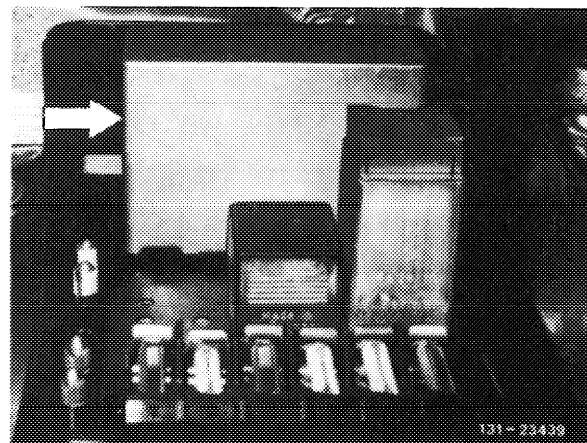
(USA)

- A Vacant
- B Fuse element for seat adjustment
- C Relay for auxiliary fan 2nd stage
- D Relay for comfort control, seat adjustment
- Vacant



F. Combination relay

The turnsignal flasher, the time relay of heatable rear window, as well as the interval rewiper electronics of windshield wiper are combined in one combination relay.



Note: The switched on heatable rear window is automatically switched off by combination relay below a battery voltage of approx. 11 volts.

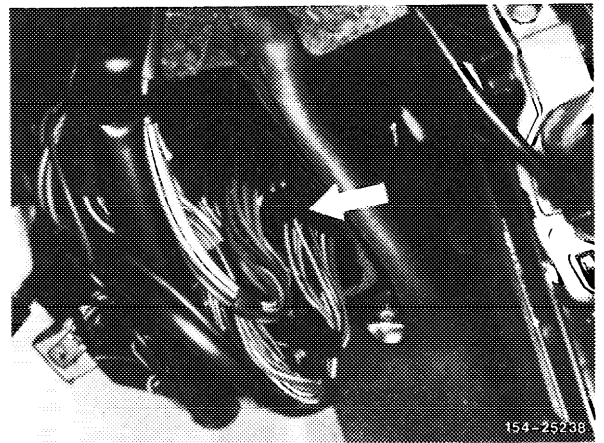
Switching off is indicated by flashing of indicator lamp in switch of heatable rear window.

When the voltage increases to above approx. 11 volts, the heatable rear window is again automatically switched on,

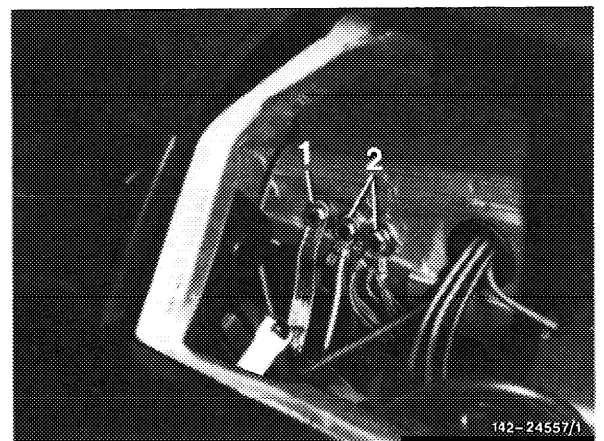
54-150 Central electrics, remove and install

Removal

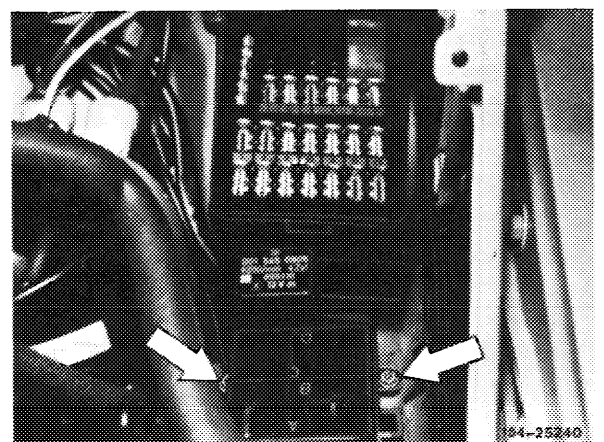
- 1 Disconnect negative terminal of battery.
- 2 Remove cover under instrument panel (68-150).
- 3 Pull couplings (arrow) in interior from central electrics.



- 4 Unscrew grounding strap (behind instrument cluster) (1).

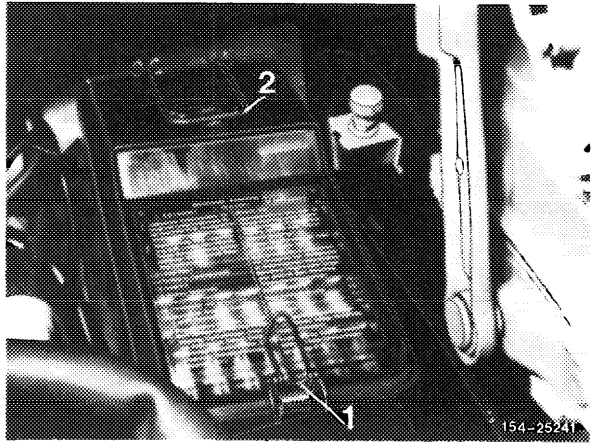


- 5 Remove relay holder (arrow).

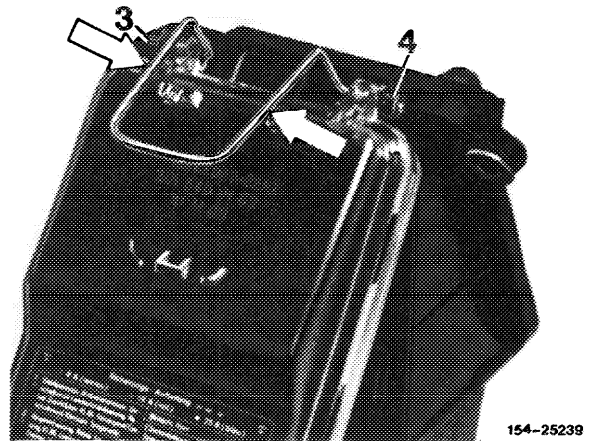


6 Open cover of central electrics on lock (1).

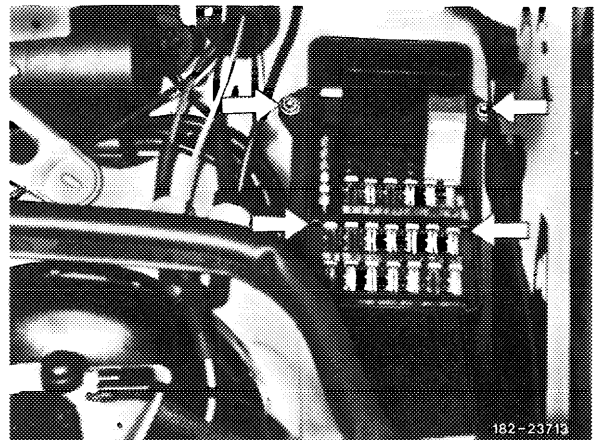
7 Unclip clamp (2).



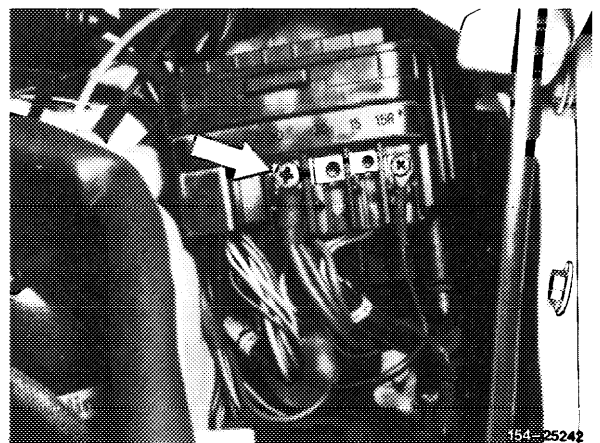
8 Compress clamp (2) (arrows), disengage at hinges at left (3) and right (4) and remove cover.



9 Unscrew fastening (arrows, 2 Phillips head screws at front and 2 nuts at the rear).

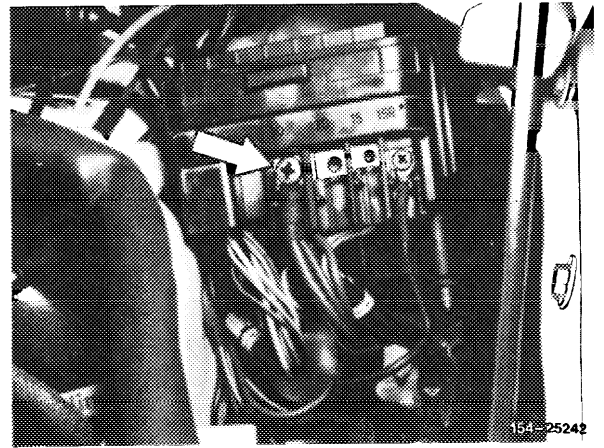


10 Pull central electric system forward and lift, unscrew lugs from lug (arrow), pull off couplings and remove central electric system in forward direction.



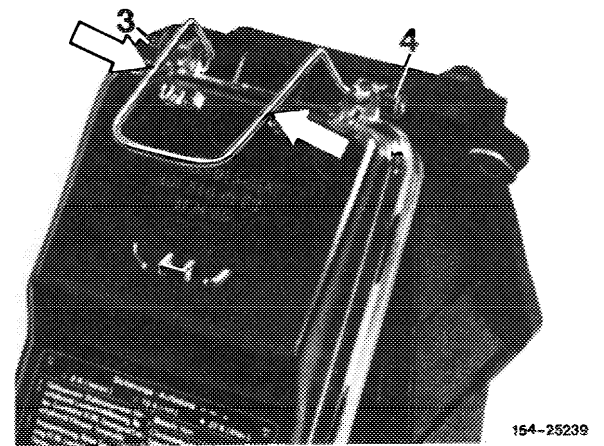
Installation

11 Move central electric system into installation position, plug on couplings and connect lines at lug (arrow) (for layout refer to 54-140).



12 Screw down central electric system, make sure that ground connecting strap is located in interior.

13 Mount cover on central electric system, engage clamp (arrows) in hinges at left (3) and at the right (4) and clip to cover.

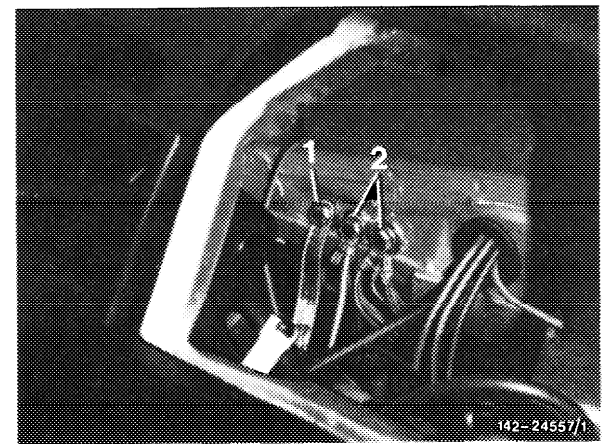


14 Mount relay holder.

15 Connect grounding strap.

16 Plug couplings on central electric system in interior range.

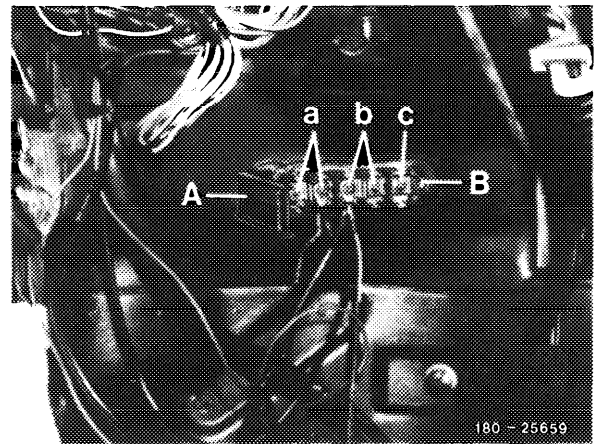
17 Connect negative terminals of battery and check electric system for function.



18 Install cover under instrument panel.

54-152 Electric connections of special equipment

The special equipment is connected to a 5-pole cable connector on lefthand side in legroom under lateral panelling.



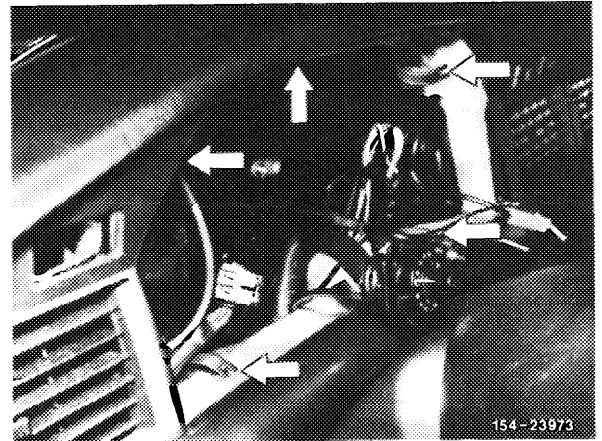
Layout of cable connector

a	b	c
Central electrics terminal 15 designation black	Central electrics terminal 30 designation red	Stop lamp switch terminal 54 designation yellow
Cruise control/tempomat Revolution counter Adjustable outside rear-view mirror Outside thermometer Exhaust gas/speed warning Seat heater front left Seat heater front right Burglar alarm system Switchover valve rpm increase (automatic transmission)	Headlamp flasher, Portugal Central locking system control unit Electronics, radio Rear compartment lamp Automatic antenna Burglar alarm system Exit lamp	Cruise control/tempomat Anti-locking system (ABS) Burglar alarm system

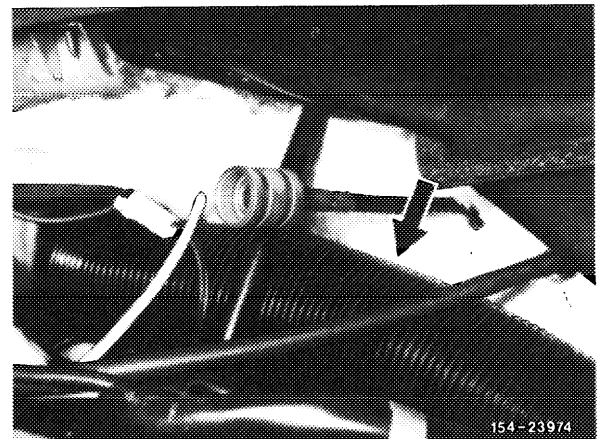
54-250 Removal and installation of instrument cluster

Note

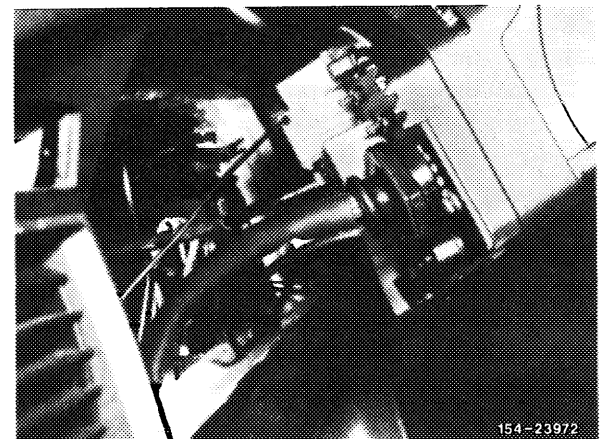
The instrument cluster is held in place by means of five spring clips located on instrument panel.



- 1 Remove cover under instrument panel, left.
- 2 Remove hose (arrow) toward lefthand lateral nozzle from below.
- 3 Unscrew tachometer shaft on instrument cluster from below.
- 4 Push out instrument cluster from the rear.



- 5 Disconnect electrical connections and line for oil pressure gauge, remove instrument cluster.



Installation

6 For installation proceed vice versa.

7 When installing instrument cluster, push uniformly into instrument panel.

Layout of 15-pole coupling of instrument cluster

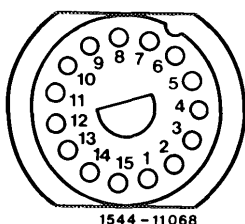
Model 201.022/024/122 1st version

Model 201.034 1st version

Model 201.023/024/034/122 2nd version

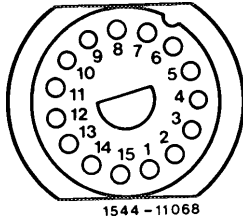
Note: 2nd version and model 201.034 1st version with engine oil, coolant and washing water level indicator.

Model 201.022/024/122 1st version



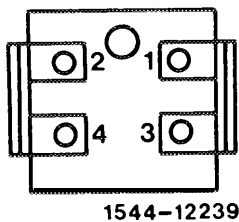
No.	Designation	Line cross section	Line colors
1	Ground	0.5	brown
2	Sensor fuel reserve indicator	0.5	blue/green
3	Indicator lamp high beam	0.5	white/blue
4	Vacant	—	—
5	Indicator lamp brake lining wear indicator	0.5	brown/red
6	Terminal 15, fused	0.5	black/blue
7	Terminal 15, non-fused	0.5	blue/red
8	Indicator lamp ignition terminal 61	0.5	blue
9	Indicator lamp brake fluid readout	0.5	brown/red/white
10	Indicator lamp preglow system (diesel vehicles only)	0.5	black
11	Turn signal (flasher) control, right	0.5	black/green
12	Turn signal (flasher) control, left	0.5	black/white
13	Instrument lights terminal K	0.5	grey/green/purple
14	Temperature sensor, coolant	0.5	green
15	Sensor fuel gauge	0.5	blue/black

Model 201.034 1st version



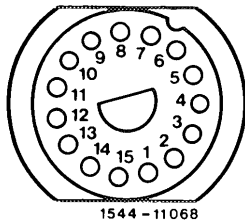
No.	Designation	Line cross section	Line colors
1	Ground	0.5	brown
2	Temperature sensor coolant	0.5	green
3	Sensor fuel indicator	0.5	blue/black
4	Sensor fuel reserve indicator	0.5	blue/green
5	Switch engine oil level indicator	0.5	brown/blue yellow
6	Fuse 9, terminal 15, oil temperature indicator/voltmeter/stop watch	0.5	black/blue
7	High beam checkup	0.5	white/blue
8	Terminal 15 unfused ignition starter switch	0.5	blue/red
9	Charge indicator terminal 61	0.5	blue
10	Contact sensor brake lining wear indicator	0.5	brown/red
11	Switch brake fluid checkup	0.5	brown/red white
12	Switch coolant level indicator	0.5	brown/green
13	Turn signal checkup right	0.5	black/green
14	Turn signal checkup left	0.5	black/white
15	Rotary light switch terminal K	0.5	grey/green purple

Layout of 4-pole coupling of instrument cluster 1st version



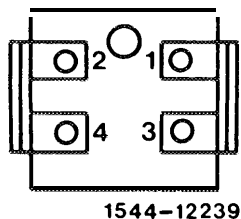
No.	Designation	Line cross section	Line colors
1	Tank washer water system	0.5	brown/blue white
2	Line connector terminal 58 d	0.5	grey/blue
3	Switch parking brake	0.75	brown/red white
4	Warning buzzer contact	0.75	brown/green

Model 201.022/024/034/122 2nd version



No.	Designation	Line cross section	Line colors
1	Ground	0.5	brown
2	Temperature sensor coolant	0.5	green
3	Immersion tube sensor fuel indicator	0.5	blue/black
4	Immersion tube sensor fuel reserve indicator	0.5	blue/green
5	Switch engine oil level indicator	0.5	brown/blue yellow
6	Fuse 9, terminal 15,	0.5	black/blue
	oil temperature indicator/voltmeter/stop watch	0.5	black/blue
7	High beam checkup	0.5	white/blue
8	Terminal 15 unfused ignition starter switch	0.5	blue/red
9	Charge indicator terminal 61	0.5	blue
10	Contact sensor brake lining wear indicator	0.5	brown/red
11	Switch brake fluid checkup	0.5	brown/red white
	Switch parking brake	0.5	brown/red white
12	Switch coolant level indicator	0.5	brown/green
13	Rotary light switch terminal K	0.5	grey/green
14	Turn signal checkup left	0.5	black/white
15	Turn signal checkup right	0.5	black/green

Layout of 4-pole coupling of instrument cluster 2nd version

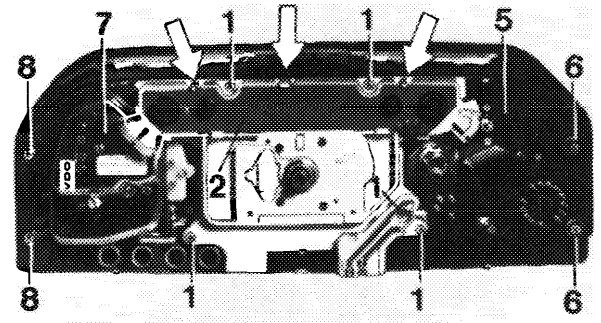


No.	Designation	Line cross section	Line colors
1	Tank washer water system	0.5	brown/blue white
2	Line connector terminal 58 d	0.5	grey/blue
3	Warning buzzer contact	0.75	brown/green
4	Oil pressure sensor	0.75	brown/white

54-25 1 Removal and installation of indicating instruments

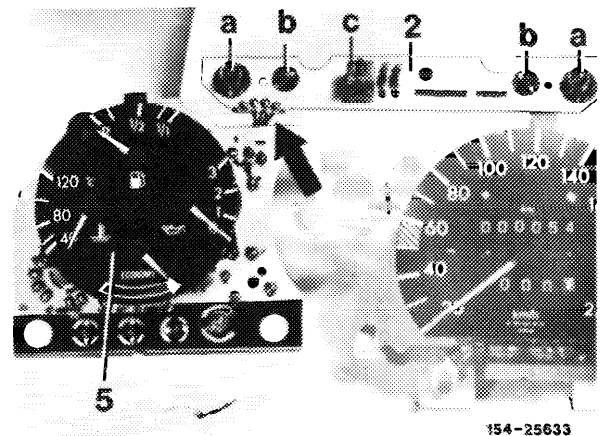
Removal

- 1 Remove instrument cluster (54-250).
- 2 Remove speedometer (54-253).
- 3 Unscrew screws (6) and remove indicating instruments (5).



154-25300

Note: The lamp carrier can be separately renewed (54-262).



154-25633

- 2 Lamp carrier
- 5 Indicating instruments
- a Instrument lamps
- b Optical turnsignal (flasher) control
- c Acoustic turnsignal (flasher) control

Installation

- 4 For installation proceed vice versa.

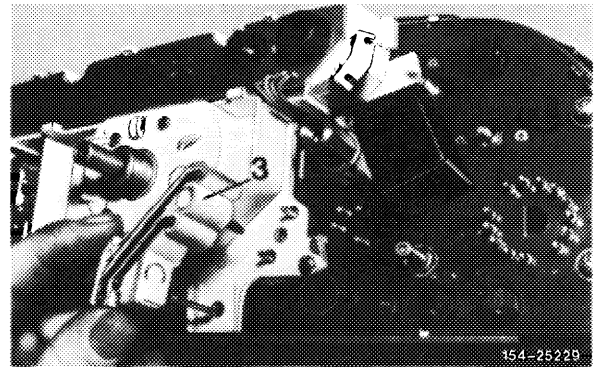
54-253 Removal and installation of speedometer

1 st version

Removal

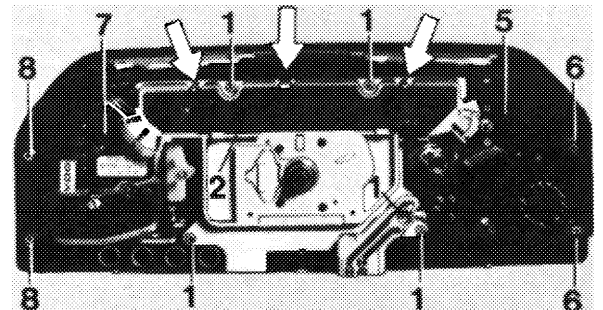
1 Remove instrument cluster (54–250).

2 Remove regulating resistance (3).



3 Unscrew screws (1).

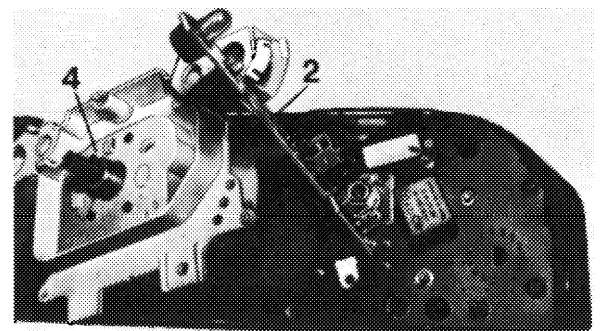
4 Unclip lamp carrier (2) (arrows).



5 Raise lamp carriers with acoustic turnsignal (flasher) control (2) laterally and remove speedometer (4).

Installation

6 For installation proceed vice versa.

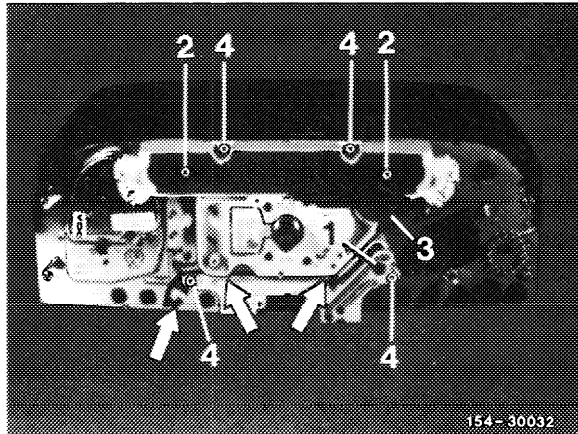


2nd version

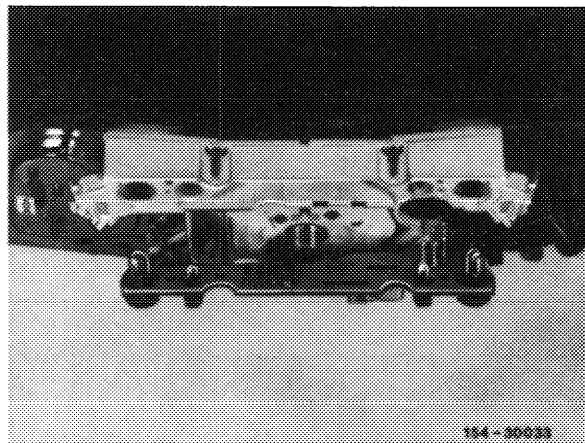
Removal

1 Instrument cluster removed (54–250).

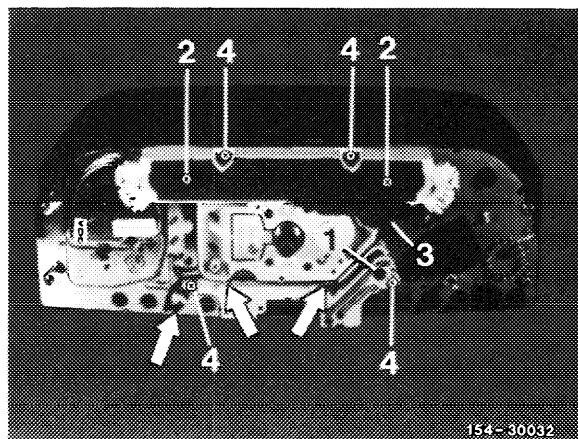
2 Remove rheostat (1).



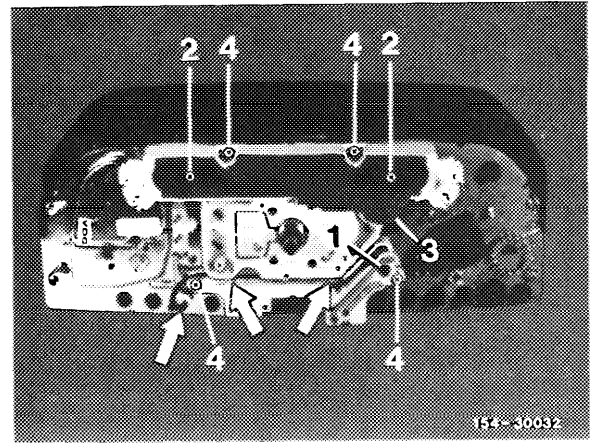
3 Remove lamp carrier. For this purpose, unscrew screws (2) and carefully pull off complete part.



4 Unclip check lamp for washer water level and line (arrows).



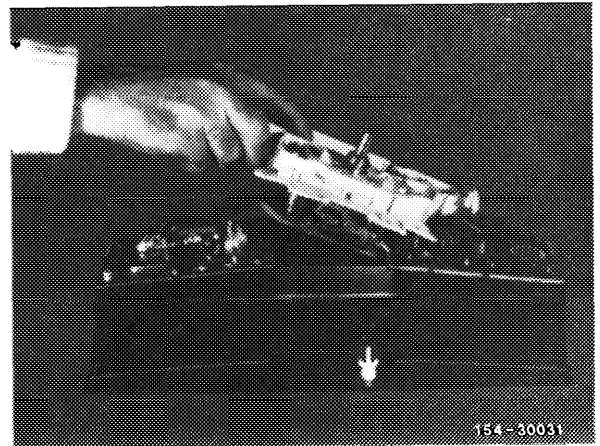
5 Unscrew screws (4).



Remove speedometer.

Installation

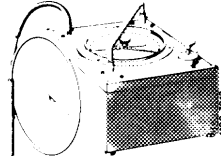
6 For installation proceed vice versa.



54-255 Checking indicator for economic driving (ECONOMY)

Special tools

Tester for vacuum 0-1000 mbar

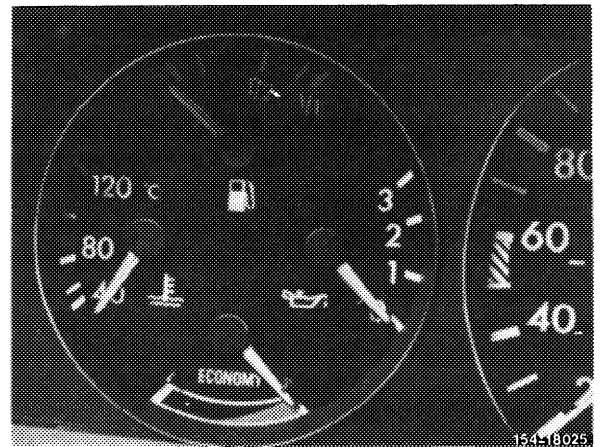


116589252100

Operation

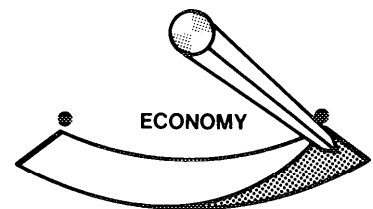
The indicator is connected to the intake manifold by way of a vacuum line and shows the momentary fuel consumption in dependence of intake manifold vacuum.

At a high intake manifold vacuum the needle is in black field of readout (fuel consumption low), under influence of falling intake manifold vacuum the needle moves into red field. The momentary fuel consumption increases.



With engine stopped, the needle is in red field against red stop pin.

Vacuum \leq 0.08 bar.

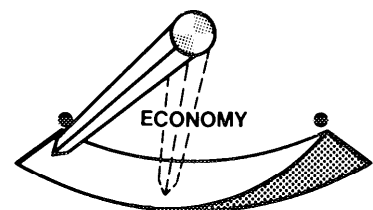


1544 - 10 868

Upon starting of engine the needle travels to the left and remains stopped in range of black indicating field depending on vacuum.

Needle against lefthand stop \geq 0.585 bar.

Needle at starting point of red field approx. 0.4 bar.



1544 - 10869

Note

If the needle stops at righthand stop in red field, there is a leak in vacuum line to indicator (connecting point, line) or the indicator is defective.

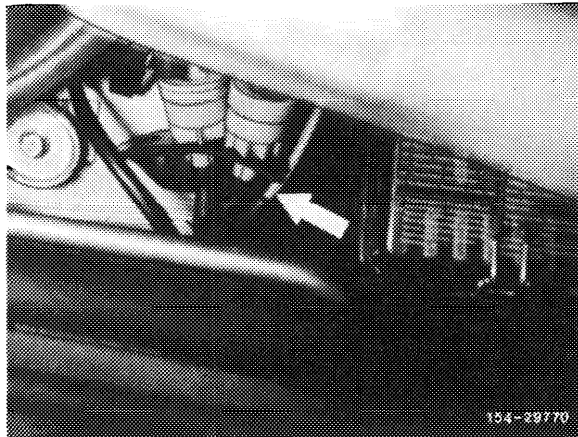
Renew vacuum line and/or indicator.

If the readout is very slow, the cause may be oil in vacuum line and/or in indicator. A defective diaphragm of vacuum control unit on automatic transmission may cause oil to flow into vacuum system, which will then lead to failure of indicator.

Checking

1 Pull vacuum line coming from intake manifold at distributor (arrow) and check vacuum at engine idle speed.

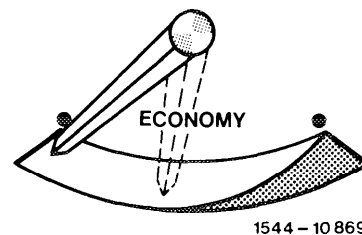
Nominal value: approx. 0.4-0.6 bar.



If nominal value is not attained, the vacuum line is dirty or leaking. Clean or renew vacuum line.

If the nominal value is attained, connect vacuum lines with each other, connect vacuum tester in-between. Run engine at idle.

Needle of indicator should be positioned as follows:



Vacuum \geq 0.585 bar at lefthand stop.

Vacuum approx. 0.4 bar at start of red field.

If so, there is a leak in vacuum system of beam range regulator and/or climate control.

Eliminate leaks.

If on vehicles with automatic transmission a vacuum control unit on transmission is found to be defective, oil may have entered the indicating instrument and its line. Clean line and renew indicator.

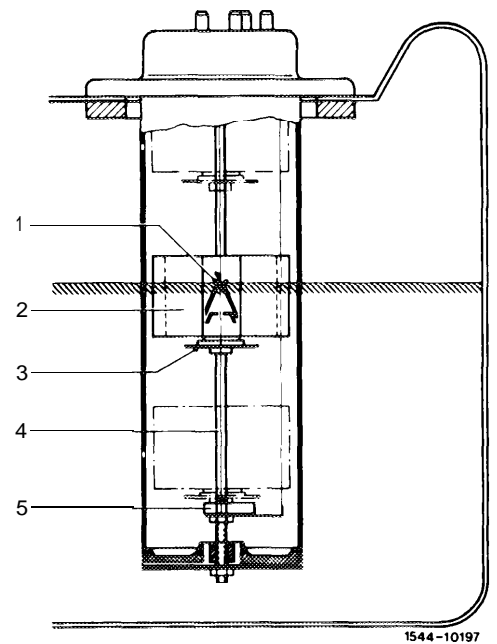
Electrical function

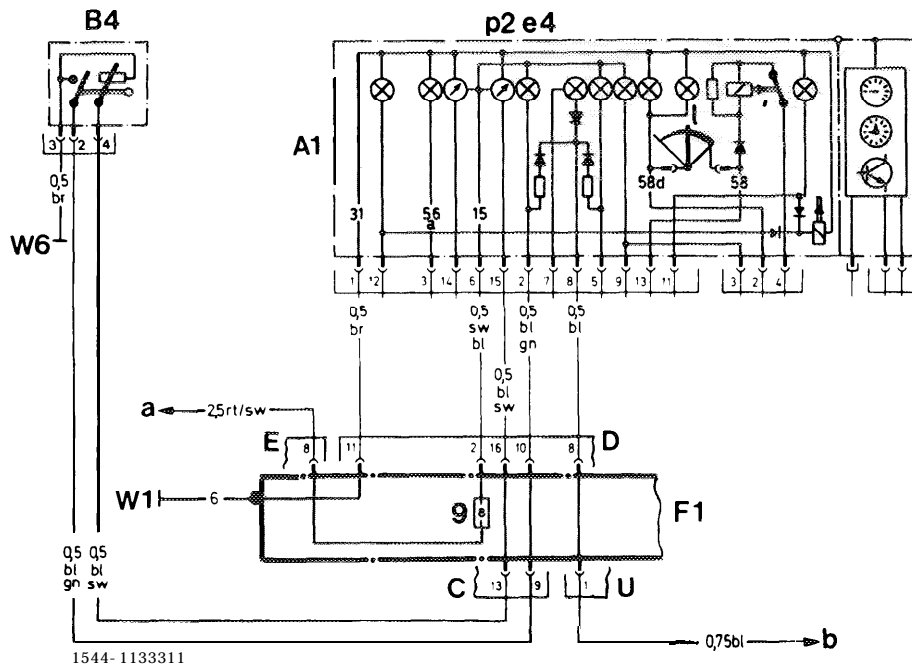
Under influence of decreasing fuel level, the sliding contact (1) on float (2) of immersion tube transmitter will increase the resistance value, The current will decrease and the indicator needle in instrument will then fall back.

If the fuel level drops still further, the reserve warning contact (5) in immersion tube transmitter, which connects the reserve warning lamp ground, is closed.

Transmitter (diagram)

- 1 Sliding contact
- 2 Float
- 3 Contact plate
- 4 Guide and contact rod
- 5 Reserve warning contact





Electric wiring diagram fuel gauge

- | | |
|--|---|
| <p>A1 Instrument cluster
 e4 Fuel reserve warning
 p2 Fuel gauge
 B4 Transmitter fuel gauge
 F1 Electrical center
 W1 Main ground (behind instrument cluster)
 W6 Ground, trunk on wheelhouse left</p> | <p>C 16-pole coupling (tail lamp unit harness)
 D 16-pole coupling (instrument cluster)
 E 8-pole coupling (ignition starter switch)
 U 8-pole coupling (engine harness)
 a To ignition starter switch S2/1 terminal 15
 b To line connector X35 terminal 30/61 (battery) terminal 61</p> |
|--|---|

Test values transmitter, fuel gauge

Resistance with float at top	$1.9 \pm 0.7 \Omega$
Resistance with float at bottom	$78.3 \pm 2.3 \Omega$

Note

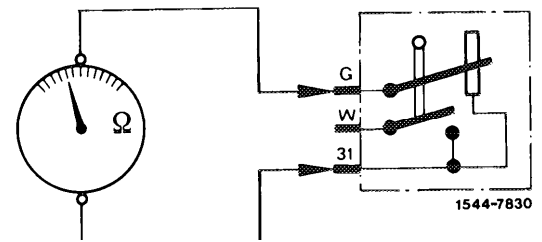
The reserve warning lamp lights up with ignition switched on (checking function). As soon as the engine starts running, the lamp goes out provided the fuel tank holds more than the fuel reserve.

During checking function, the reserve warning lamp will light up weaker, for reserve stronger.

Testing transmitter, fuel gauge (removed)

Connect ohmmeter to terminal G and terminal 31 (⊥) and measure resistance.

- a) In installation position (readout reserve, float below).
- b) 180° turn (readout full, float at top).



Testing reserve warning contact

Connect ohmmeter to terminal W and terminal 31 (⊥) and measure resistance.

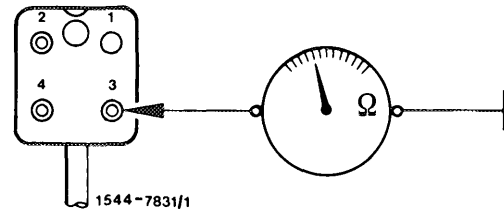
- a) Nominal value approx. 0Ω in installation position.
- b) Nominal value $\infty \Omega$ turned by 180°.

Testing harness

1 Pull coupling from transmitter of fuel gauge and measure resistance on jack 3 and vehicle ground.

Nominal value approx. 0Ω

(At test value $\infty \Omega$ the grounding line is interrupted),

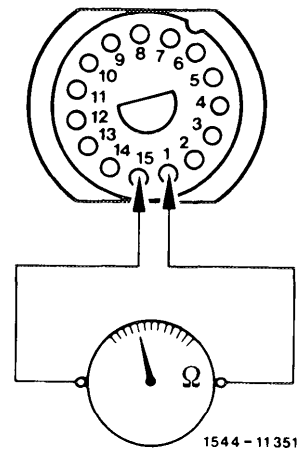


2 Measure resistance on terminal G and terminal 31 (⊥) on installed transmitter of fuel indicator. The value depends on fuel content.

Put coupling back on transmitter for fuel gauge.

3 Pull coupling from instrument cluster and measure resistance between jack 1 and jack 15.

Nominal value: the value measured under 2. If the value is attained, the harness is in order (slight deviation caused by length of line is possible).



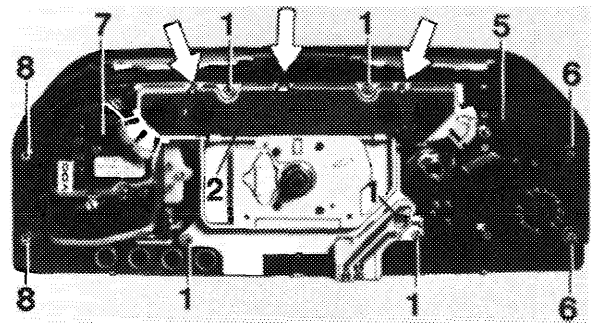
4 If the measured value is higher or at $\infty \Omega$, the harness couplings (on instrument cluster, on main harness/tail lamp unit harness or on fuel gauge transmitter) are having poor contact, a dry solder joint or a line is interrupted.

5 If no fault is found during tests, exchange indicating instrument.

54-258 Removal and installation of time clock/revolution counter

Removal

- 1 Remove instrument cluster (54-250).
- 2 Remove speedometer (54-253).
- 3 Unscrew screws (8) and remove time clock/revolution counter (7).



54-25233

Installation

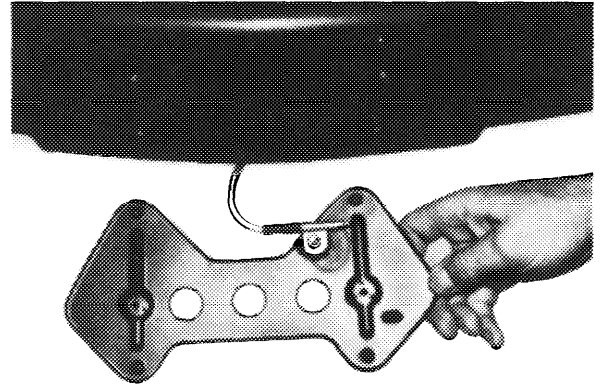
- 4 For installation proceed vice versa.

54-26 1 Testing electric outside temperature indicator

Test values

°C	Resistance (ohms)
0	9798 ± 98
20	3747 ± 71
40	1598 ± 40

Resistance values of temperature sensor in dependence of temperature.

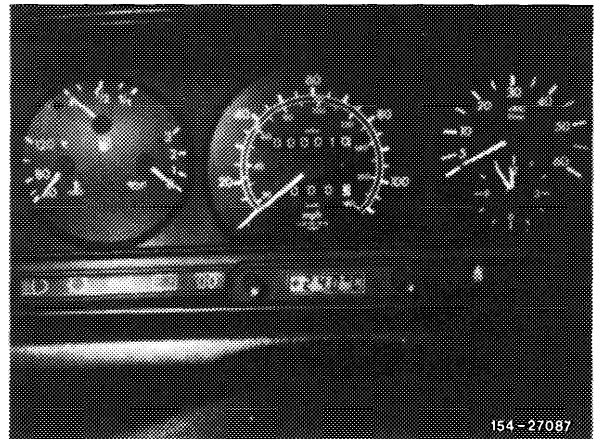


154-27085

Note

The temperature sensor is installed at front bumper behind licence plate.

The temperature indicator in instrument cluster is connected to voltage at key position "2". The temperature sensor activates the temperature readout according to outside temperature.



154-27087

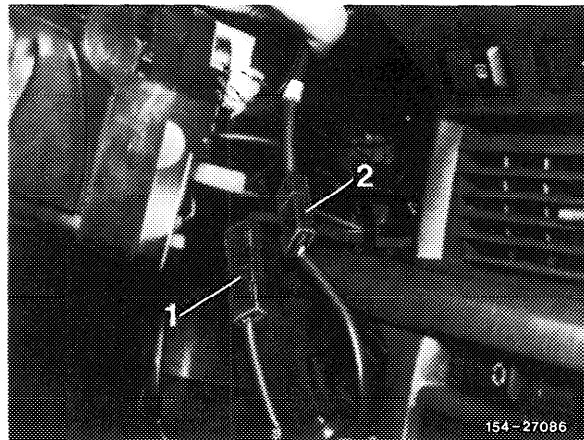
Testing

- 1 Remove cover under instrument panel at the left.
- 2 Separate **3-pole** plug connection of temperature indicator behind instrument cluster.
- 3 Move ignition starter or glow starter switch into position "2"
- 4 Test for battery voltage with voltmeter at **3-pole** coupling between lines 0.75 brown and 0.75 black/red.

If there is no voltage, repair interruption in line 0.75 black/red to cable connector interior or line 0.75 brown to main ground behind instrument cluster.

Plug connections

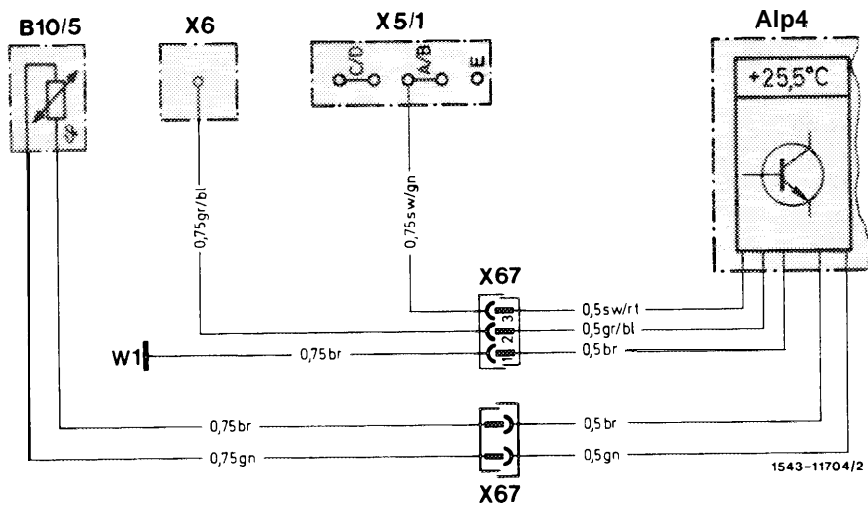
- 1 **2-pole**
- 2 **3-pole**



With voltage or ground connection indicated, separate **2-pole** plug connection of temperature indicator behind instrument cluster and measure resistance between the two line plugs brown and green toward temperature sensor (test values).

In the event of deviations from nominal value, renew temperature sensor together with electric line.

- 5 If electric lines, voltage supply and temperature sensor are in order, remove instrument cluster and renew outside temperature indicator.



Electric wiring diagram outside temperature indicator

- Alp4 Outside temperature indicator
- B10/5 Outside temperature sensor
- W1 Main ground (behind instrument cluster)
- x5/1 Line connector interior A/B terminal 15
- X6 Line connector terminal 58 d
- X67 Plug connections outside temperature indicator

54-262 Renewing lamp carrier with acoustic turn signal checkup

Note

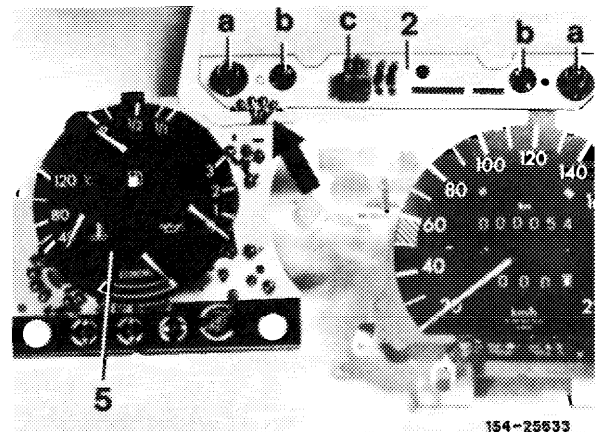
On lamp carriers of 1st and 2nd version the lines are soldered-on. On 3rd version, the lamp carrier is connected to the indicating instrument with a plug connection,

- 1 Remove instrument cluster (54-250).
- 2 Remove speedometer (54-253).
- 3 Remove indicating instruments (54-251).

1st and 2nd version

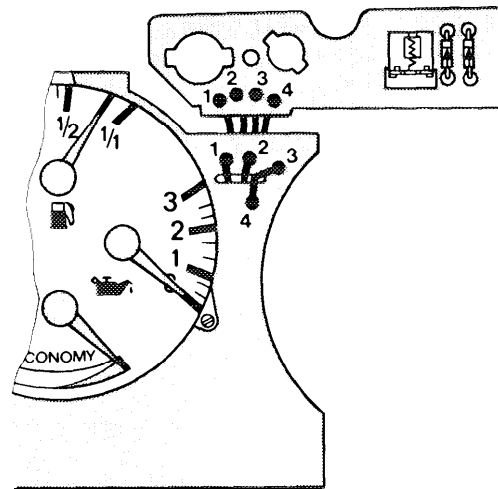
4 Unscrew bulbs from removed lamp carrier and unsolder electric lines.

- 2 Lamp carrier
- 5 Indicating instruments
- a instrument lights
- b Optical turn signal checkup
- c Acoustic turn signal checkup



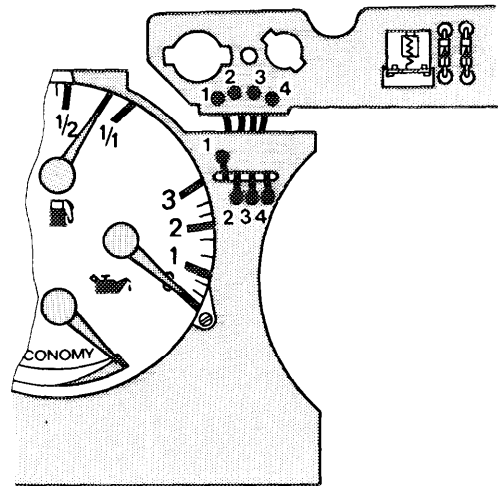
5 Solder new lamp carrier to the 4 lines of the indicating instrument. Make sure that only lines with the same numbers (depending on version) are connected to each other.

1st version
Indicating instrument with lamp carrier
(conductor board)



1544-12097

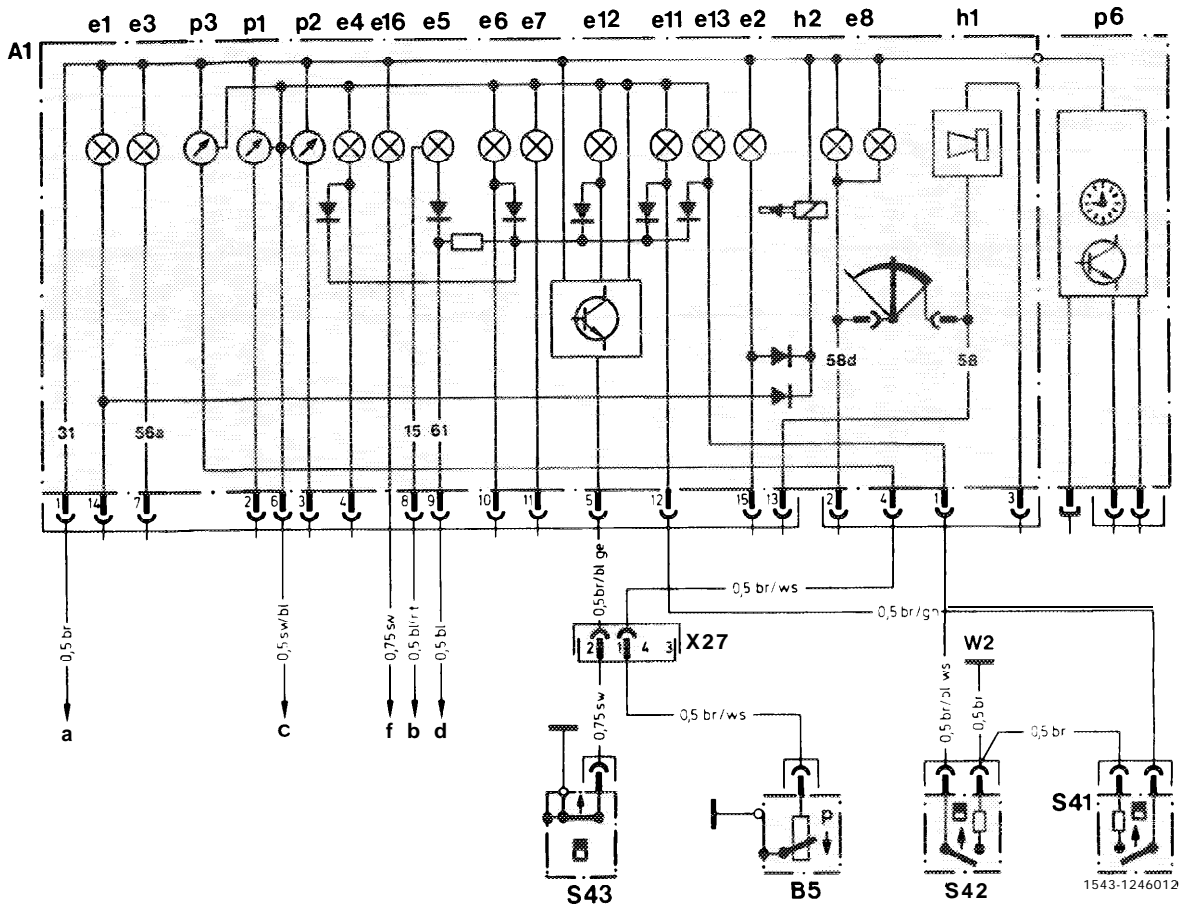
2nd version
Indicating instrument with lamp carrier
(conductor board)



1544-12097/1

6 Insert bulbs, assemble instrument cluster and mount back again on instrument panel.

7 Check electrical system for function.



Electric wiring diagram engine oil level indicator, coolant level indicator, washer water level indicator gasoline and diesel-engines-

- | | |
|---|--|
| <p>A1 Instrument cluster</p> <ul style="list-style-type: none"> e1 Turn signal checkup left e2 Turn signal checkup right e3 High beam checkup e4 Fuel reserve warning e5 Charge indicator e6 Checkup brake lining wear indicator e7 Checkup brake fluid and parking brake e8 Instrument lights e11 Checkup coolant level e12 Checkup oil level e13 Checkup washer water level e16 Preglow checkup h1 Warning buzzer h2 Turn signal checkup, acoustic p1 Temperature indicator, coolant p2 Fuel gauge p3 Oil pressure indicator p6 Electronic clock | <ul style="list-style-type: none"> B5 Transmitter oil pressure indicator s41 Switch coolant level checkup S42 Switch washer water level checkup s43 Switch oil level checkup w2 Ground, front right (near lamp unit) X27 Plug connection starter harness a Main ground behind instrument cluster b Electrical center coupling D jack terminal 15 unfused c Electrical center coupling D jack 2 terminal 15 fuse 9 d Electrical center coupling D jack 8 alternator terminal 61 Preglow time relay terminal La (diesel engine only) Ground connection points without designation—component directly on engine or body |
|---|--|

Test values

Resistance on washer water level indicator
at water level „max”

$\infty \Omega$

Resistance on washer water level indicator
at water level „min”

approx. 5Ω

Battery voltage

approx. 12 V

Conventional tool

Multimeter

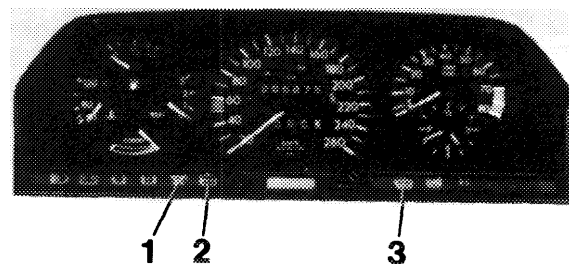
e.g. Sun, DMM-5

Note

The indicator lamp lights up with the ignition switched on (checking function) and goes out as soon as the engine is running.

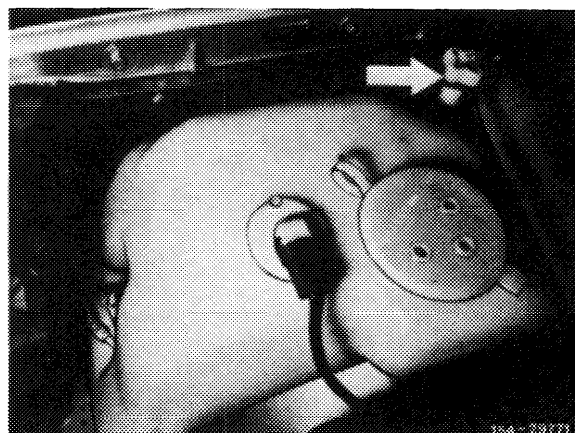
When checking function the indicator lamp lights up weakly, and brightly in the event of an interruption.

- 1 Engine oil level indication
- 2 Coolant level indication
- 3 Washer water level indication



154-28120/1

The washer water tank is fastened by means of a knurled nut.



154-28121

In the event of complaints, such as:

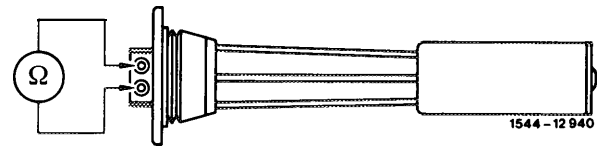
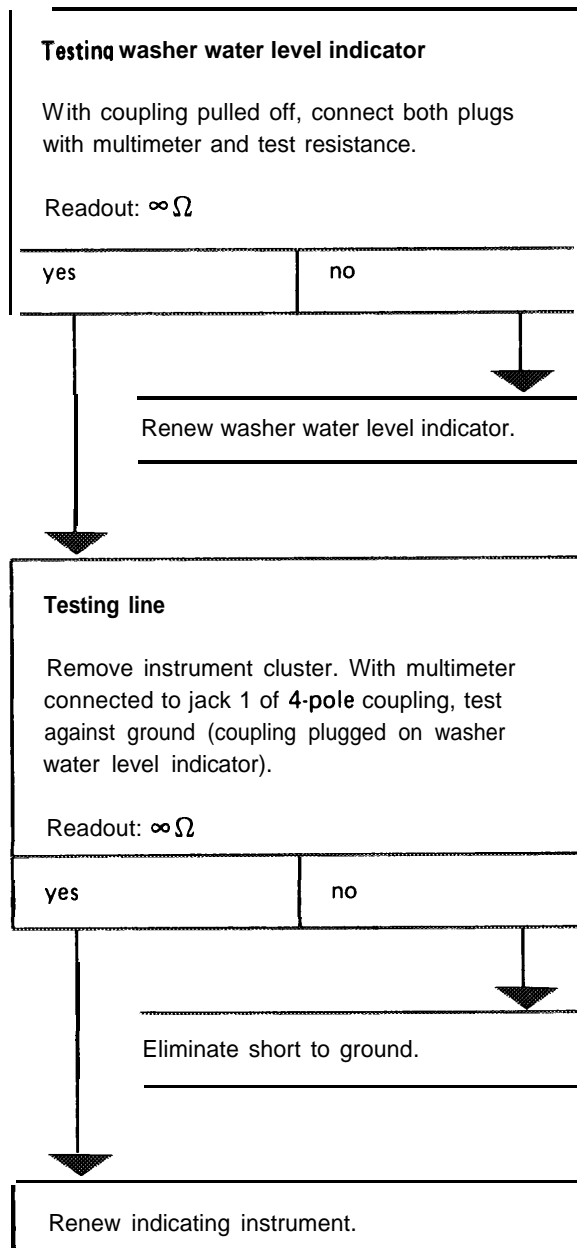
A. Indicator lamp constantly lighting up with engine running and correct washer water level.

B. Indicator lamp not lighting up in key position „2“.

C. Indicator lamp not lighting up with engine running and washer water level below „min“.

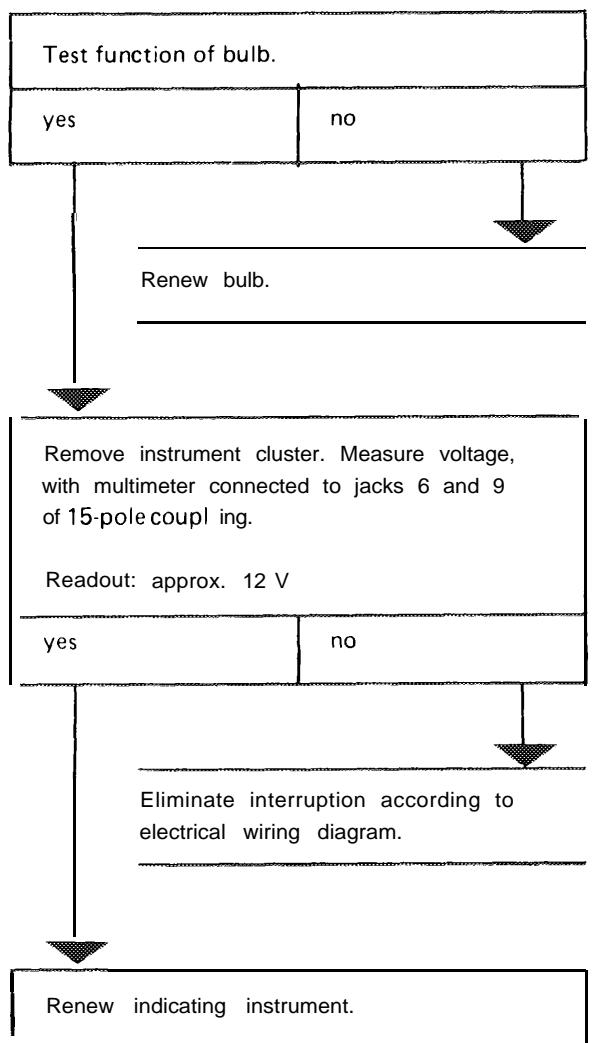
Testing

A. Indicator lamp constantly lighting up with engine running and correct washer water level

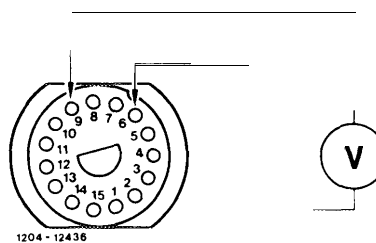


End of test.

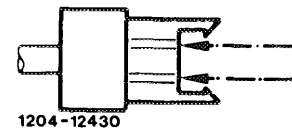
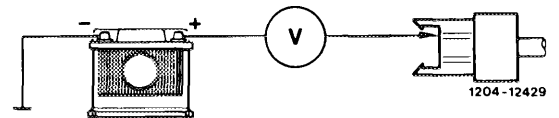
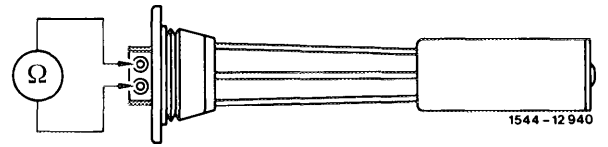
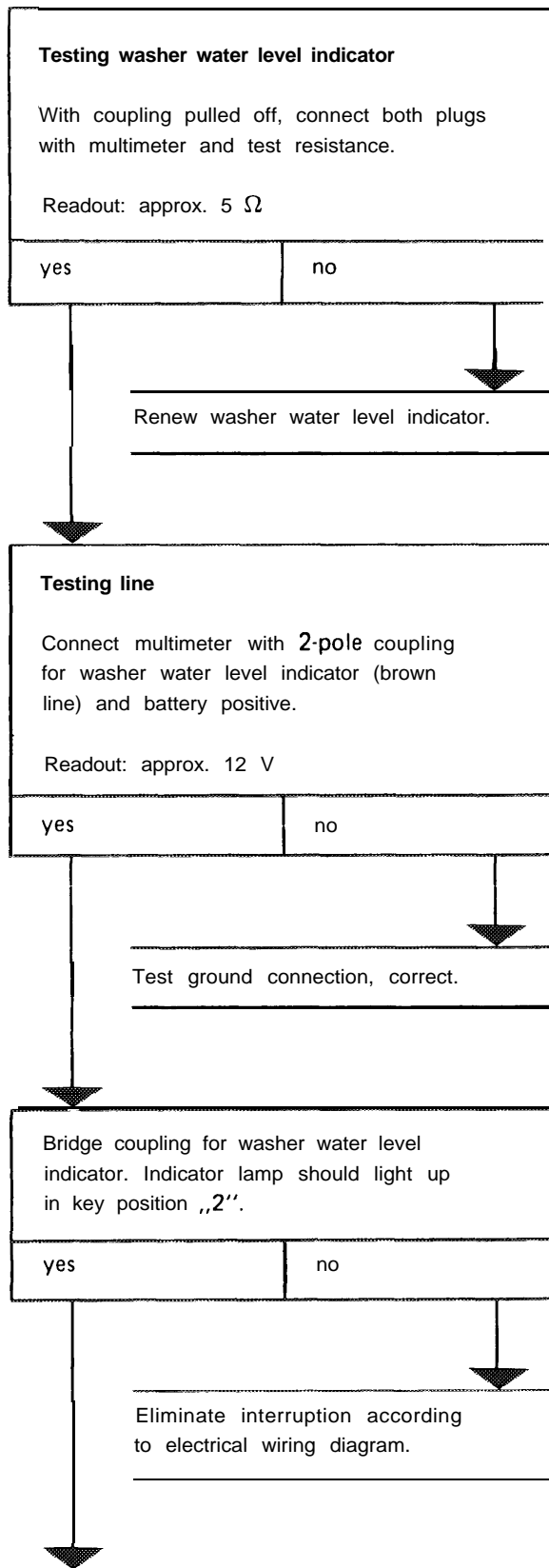
B. Indicator lamp not lighting up in key position „2“



End of test.



C. Indicator lamp not lighting up with engine running and washer water level below „min”
(section „B” in order)



Voltmeter

The voltmeter is connected to terminal 15 of 15-pole coupling of instrument cluster (jack 6). When the ignition is switched on, the voltage connected there is indicated.

Oil temperature indicator

The indicating instrument shows the oil temperature in oil filter housing by way of a transmitter.



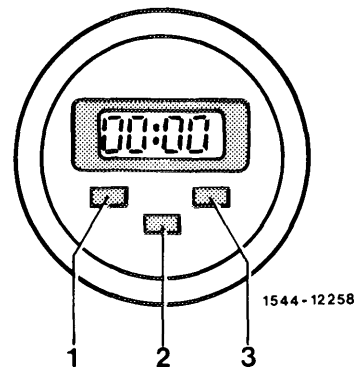
1 Voltmeter
2 Oil temperature indicator
3 Stop watch

154 - 28113

Stop watch

In key position „2“ the following functions can be called by means of the 3 buttons.

- 1 Button for measuring time
- 2 Button for measuring average speed on 1 km driving distance
- 3 Button for cancelling measured time



1544 - 12258

1. Measuring time

Pushing button 1 = start. The colon between digits will flash.

Pushing button 2 = stop. The stopped time is shown in display window.

Pushing button 3 = indication cancelled, or ignition off = indication cancelled.

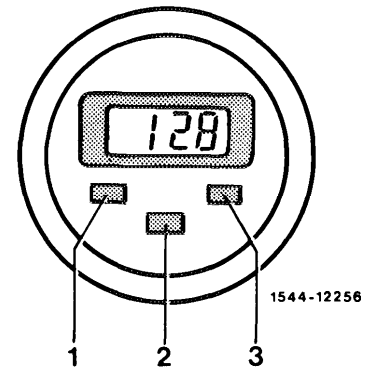
Time indication in display window:

From 00:00 to 59:99 = seconds and $\frac{1}{100}$ seconds.

After 1 minute from 01:00 to 59:59 = minutes and seconds.

After 1 hour from 01:00 to 09:59 = hours and minutes.

After 10 hours the time will again be measured in seconds and $\frac{1}{100}$ seconds.



2. Measuring average speed for driving distance of 1 km

Pushing button 2 = start. Colon in display window will flash.

Push button 2 again after driving 1 km = stop. The attained average speed is shown in display window.

Cancelling readout: push button 2 or switch off ignition.

3. Measuring average speed for driving distance of 1 km while measuring time

The average speed can also be measured while measuring time. This will not interrupt measuring of time.

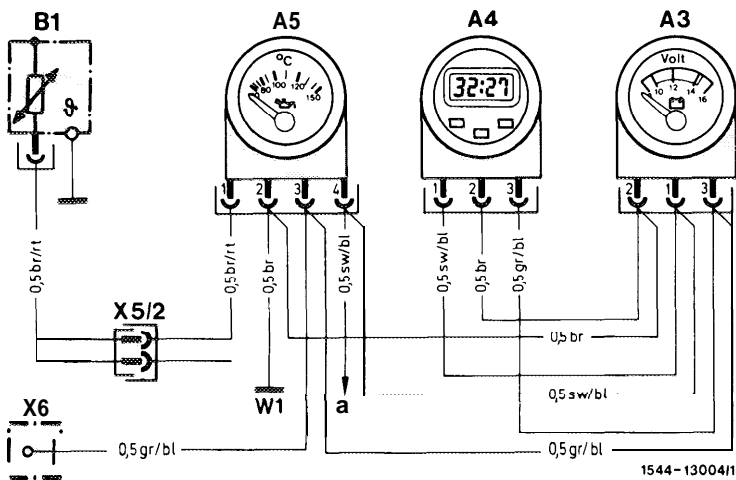
Pushing button 2 while measuring time = start, colon in display window will flash.

Pushing button 2 once again after driving 1 km = stop. Display window shows the attained average speed.

Pushing button 2 = display field shows the time running on.

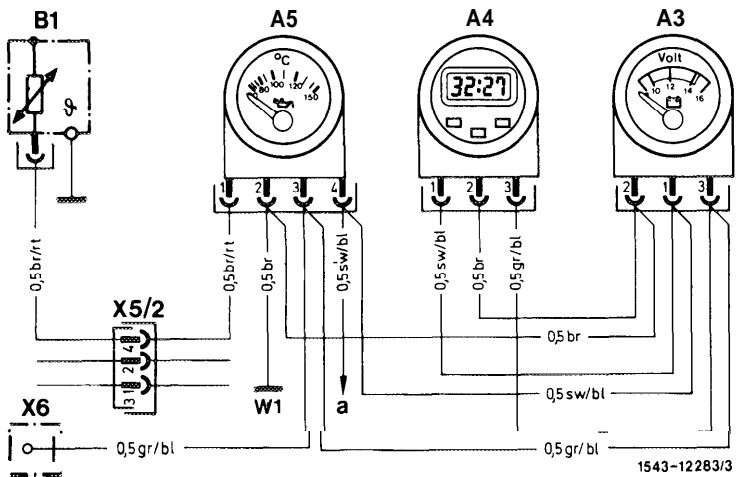
Cancelling readout: push button 2 or switch off ignition.

Wiring diagram auxiliary instruments Model 201.034



1 st version

- A3 Voltmeter
 - A4 Stop watch
 - A5 Oil temperature indicator
 - B1 Oil temperature transmitter
 - W1 Main ground (behind instrument cluster)
 - X6 Line connector terminal 58 d
 - X5/2 Line connector interior/starter
 - a To 15-pole coupling instrument cluster jack 6, terminal 15
- Grounding points without designation — component directly on engine or body



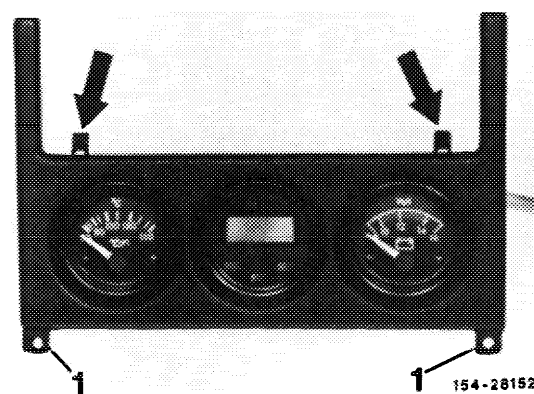
2nd version

- A3 Voltmeter
 - A4 Stop watch
 - A5 Oil temperature indicator
 - B1 Oil temperature transmitter
 - W1 Main ground (behind instrument cluster)
 - X6 Line connector terminal 58 d
 - X5/2 Line connector interior/starter
 - a To 15-pole coupling instrument cluster jack 6, terminal 15
- Grounding points without designation — component directly on engine or body

54-267 Removal and installation of auxiliary instruments

Removal

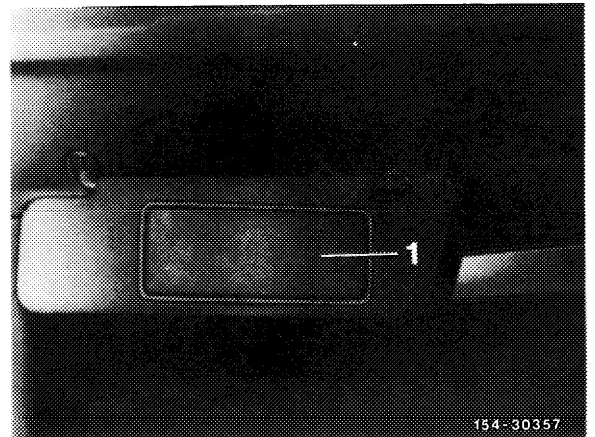
- 1 Remove ashtray with holder.
- 2 Unscrew both fastening screws (1) and pull out console in downward direction, so that the two locking points (arrows) of center console are released.
- 3 Pull the 3 couplings from individual instruments.



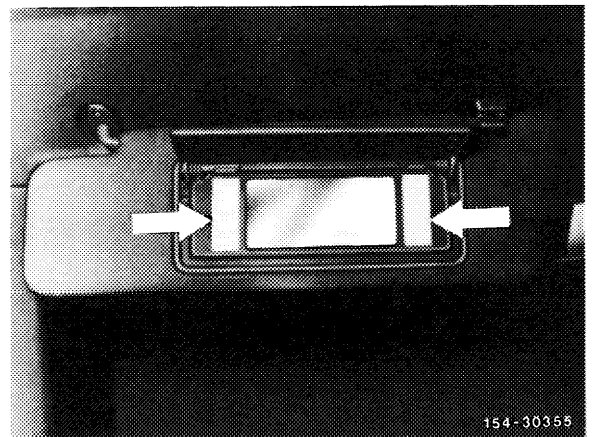
Installation

For installation proceed vice versa. Make sure that the longer electric line with 3-pole coupling is plugged on voltmeter.

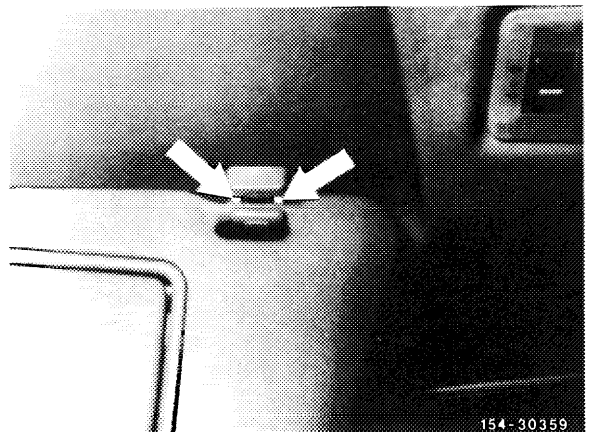
The mirror integrated in sun visor is provided with lights, which are switched on by swivelling the cover (1) in upward direction.



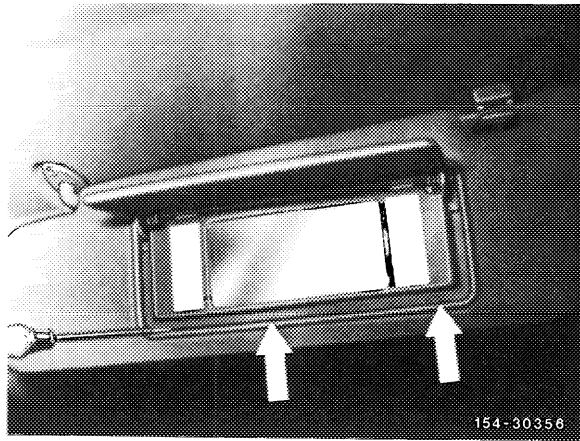
The lights are located at the left and right adjacent to mirror (arrows).



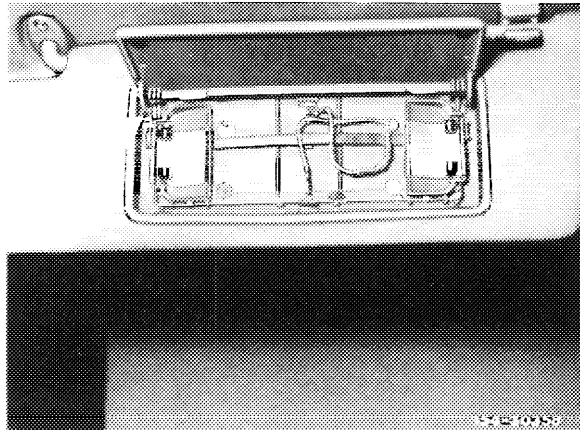
The voltage supply (positive and negative) for the lights comes from a pair of contacts (arrows) integrated in mounting bracket.



Unclip mirror for exchanging bulbs.



The switch contact for switching on the lights is located on hinge of cover (arrow).



The warning unit comprises 3 **functions**:

1. Warning when safety belt is not put on
2. Warning when ignition key is not pulled off
3. Warning when light is not switched off

Operation

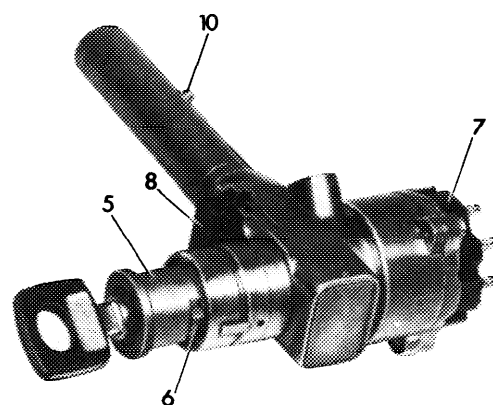
1. If with the ignition switched on and the driver's door closed (door contact switch left [7] opened) the safety belt is not put on by the driver, the warning buzzer will sound for 4-8 seconds. For this purpose, the electronic system of warning unit (2) is connected from terminal 10 via closed belt switch (terminal 9 of warning unit), positive to warning buzzer in warning unit.

When the safety belt is put on, the belt switch will interrupt the circuit and the warning buzzer is switched off.

The check lamp (1 r) connected in parallel with belt switch is operational up to end of respective time (4-8 seconds).

2. If with the driver's door open (door contact switch left [7] closed) the ignition key is not pulled off, the warning buzzer is positively activated by the electronic system via closed warning buzzer contact on ignition lock (5), terminal 5 on warning unit. The warning buzzer is switched off by pulling the ignition key off or after 4-8 seconds.
3. If the high beam, the low beam or the parking light are not switched off, with the ignition switched off, when the driver's door is opened, this will also be indicated by the warning buzzer.

The warning buzzer is positively activated by terminal K on rotary light switch via electronic system in warning buzzer (terminal 4). When the driver's door is opened, the electronic system is negatively activated via the closed door contact switch left (7) and the warning buzzer will sound off.



146-8645

54-500 Operation

The cruise control/Tempomat system is ready for use when the ignition is switched on. However, for actual operation, the vehicle speed should be above approx. 40 km/h. When the vehicle is running at the desired speed, touching of pushbutton switch for a short moment in direction of „accel— set” or „decel— set” serves to maintain this speed until the driver has set a new speed or switched off. To adapt the set speed e.g. to the traffic flow, hold pushbutton switch in direction of „accel— set” or „decel— set” until the desired speed is attained. On vehicles with new control unit (phased-in starting 9.86), recognized by coding plug, touching of pushbutton switch in direction of „accel— set” or „decel— set” will increase or reduce the speed by 1 km/h. The vehicle is accelerated at a controlled 0.7 m/s^2 . The new speed will be held after the pushbutton switch is released. The cruise control/Tempomat is switched off when touching the pushbutton switch for a short moment in direction of „Off”, when stepping down on brake pedal or on clutch pedal, the throttle control will move into idle speed position.

Switching off with pushbutton switch will activate the actuator motor, which moves the throttle control into idle speed position. On the other hand, when switching off by stepping down on brake pedal or clutch pedal, the power flow in actuator is immediately interrupted, the electromagnetic clutch will then be de-energized and a return spring will pull one gearwheel of actuator gear unit out of mesh. The return springs will pull the throttle control into idle speed position. After switching off, the system remains operational until the ignition is switched off. If upon actuation of brake or clutch or after switching off, the pushbutton switch is touched for a short moment in direction of „resume” at a vehicle speed above approx. 40 km/h, the vehicle will be automatically accelerated at 1 m/s^2 to the speed „set” last. The speed set last is cancelled when the ignition is switched off.

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

If the engine capacity is inadequate when driving uphill, the set speed will drop and will be automatically re-established as soon as the gradient has been overcome if the speed has not dropped below 40 km/h or the brakes have not been actuated in the meantime.

If engine braking effect is inadequate when driving downhill, the set speed is exceeded and the vehicle must be braked if necessary. If brakes were not actuated, the set speed will be automatically re-established as soon as the gradient is overcome.

Attention!

While driving with cruise control/Tempomat, the selector lever position “N” of the automatic transmission should not be engaged, since otherwise the engine will rev up.

Safety shifts

The speed set last in control unit will be cancelled when the ignition is switched off.

When the ignition is switched on, the value „0 km/h” is put into speed memory (Sp = Resume).

This will make sure that no unknown speed will be held in memory (resumed) when another trip is started, e.g. after changing the driver.

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

If a speed change is made with pushbutton switch, the shift step (differentiating link) together with an operation amplifier or the computer in control unit will make sure that the specified values are maintained at switch positions „accel— set” of 0.7 m/s^2 or at „resume” of 1 m/s^* .

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

If, for example, with a defective stop lamp switch, the vehicle is decelerated $> 1.5 \text{ m/s}^*$, these data will be picked up on control unit without coding plug by the shift step (differentiating link) in control unit. The subsequently connected threshold value switch will activate the actuator motor, which will move the regulating linkage into idle speed position. On control unit with coding plug the delay is picked up by the computer and the power flow in actuator is interrupted similar to procedure while braking or clutching, since the electromagnetic clutch in actuator will be de-energized.

The time interval up to cutout depends on extent of delay.

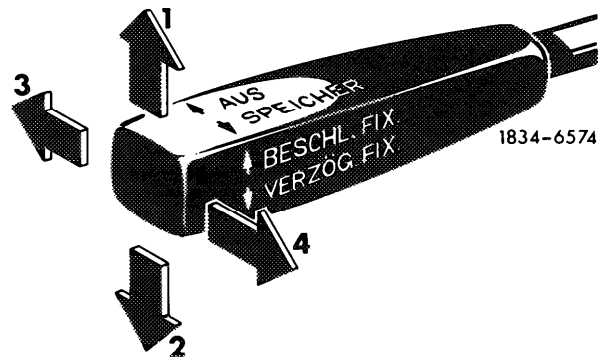
If the nominal speed is exceeded by more than approx. 6 km/h for any reason whatsoever, the speed monitoring unit will react. The electromagnetic clutch in actuator will be de-energized, the power flow in actuator is interrupted and the regulating linkage will move into idle speed position. If the speed is subsequently less than approx. 6 km/h, e.g. the speed is now only 5 km/h higher than the nominal speed, the electromagnetic clutch is again activated and the power flow in actuator is again established.

The operation of the electromagnetic clutch in actuator is monitored by the control unit (amplifier) each time the brakes are actuated. If the power flow in actuator is not interrupted in the event of a defective clutch, the control unit will activate the actuator motor which will then move the regulating linkage into idle speed position. This process is recorded by the control unit (amplifier) and the system will be made inoperative until the ignition is switched off. When the ignition is switched on again, the system will operate normally up to the next braking operation, when it will again be made inoperative under influence of defective electromagnetic clutch.

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

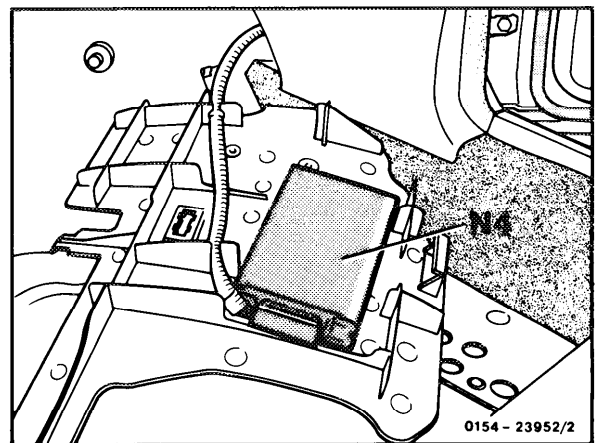
Pushbutton switch

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 re-established at a speed of above approx. 40 km/h (approx. 25 mph).



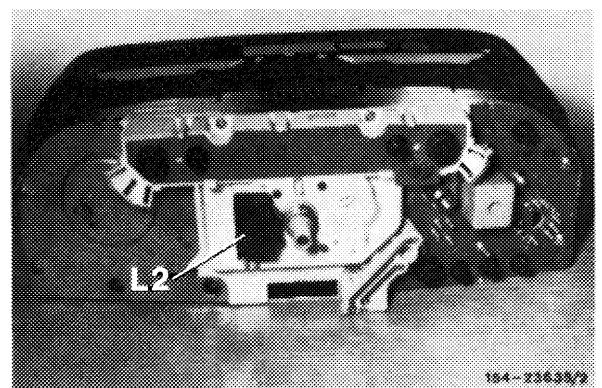
Control unit (amplifier)

The control unit (amplifier) (N4) compares the actual and the desired speed. In the event of a deviation from the desired speed, the control unit (amplifier) (N4) transmits the pertinent control signals to the actuator (M16) until the actual and the desired speed are again in agreement.



Transmitter

The control unit (amplifier) receives the actual speed signals from transmitter (L2) on speedometer.



Actuator

The actuator (**M 16**) receives its control signals from control unit (amplifier) and actuates the regulating linkage by way of a connecting rod. The actuator comprises an electric motor with gear unit, a one-way clutch, a potentiometer and an electromagnetic clutch.

The electric motor drives the output shaft provided with a one-way clutch by way of the gear unit.

The one-way clutch permits, e.g. with the speed set, acceleration with accelerator pedal for passing other vehicles without a need for actuating the cruise control/Tempomat.

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

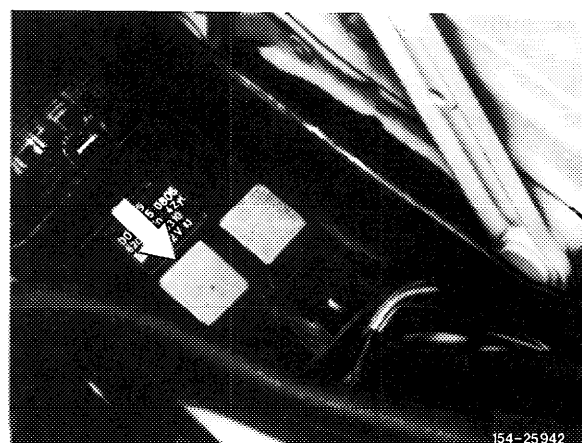
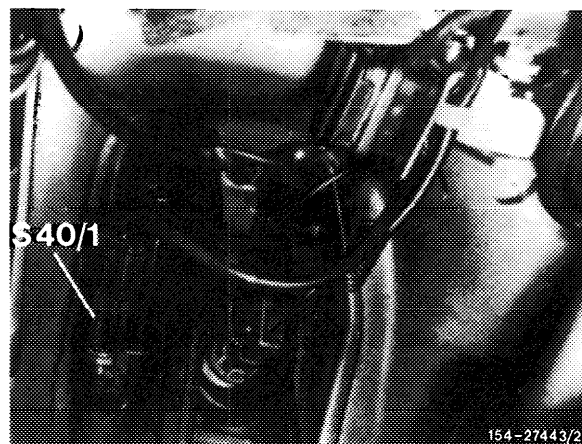
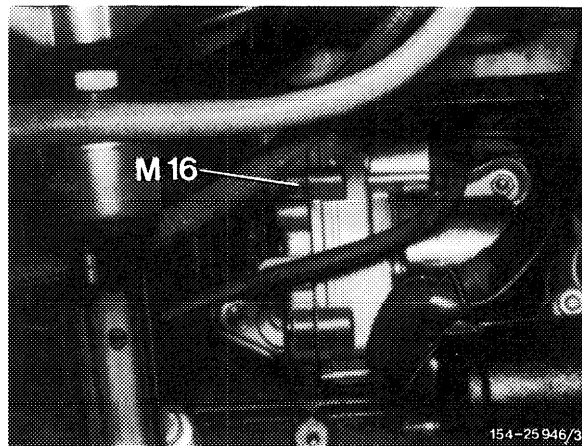
The electromagnetic clutch establishes the power flow between the electric motor and driven axle by engaging a gearwheel. It is engaged at the following switch positions: accel — set, decel — set and resume. The electromagnetic clutch is switched off by actuation of brake or clutch, but also when the system is switched off by means of pushbutton switch and when the regulating linkage has attained the idle speed position. When the electromagnetic clutch is switched off, the power flow is immediately interrupted by a return spring, which pulls a gearwheel out of mesh.

Switch on manual transmission actuated by clutch pedal

When stepping down on clutch pedal, the ground connection from stop lamps to control unit (amplifier) is interrupted by the switch (**S40/1**). The cruise control/Tempomat will then be switched off immediately similar to procedure while braking.

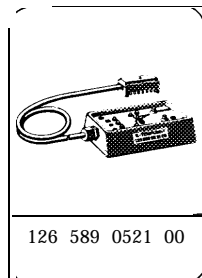
Relay on model 201.024 (standard version)

During operation of cruise control/Tempomat the relay will make the decel shutoff inoperational. The relay is painted yellow on surface for identification.



54-504 Testing with adapter

Special tool



Prerequisite for testing

Prior to testing with adapter, check battery voltage ($>11\text{ V}$), stop lamps and speed indicator for function. If required, recondition according to condition and test cruise control/Tempomat for function prior to test by means of adapter.

Test cruise control/Tempomat with adapter only. If other testing and measuring instruments are used, the cruise control/Tempomat may be destroyed. During this test, the cruise control/Tempomat is tested with the exception of the control unit.

Faults can be found by means of adapter only if the cruise control/Tempomat is continuously inoperational. Complaints such as periodical failure or poor control characteristics (e.g. shaking) cannot be tested by means of the adapter. In such cases, proceed according to programmed repairs.

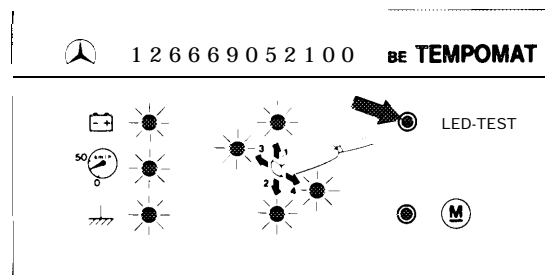
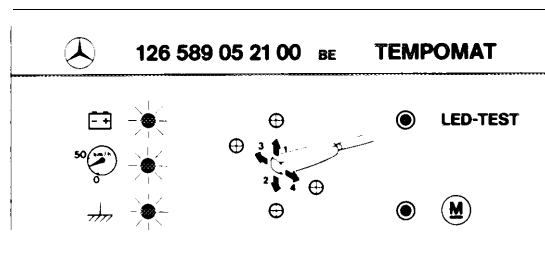
If testing with the adapter indicates a faulty component, check plug connections for good contacting prior to replacement. Plug sockets, for example, should not be widened. Widened plug sockets should be reshaped. Then check rejected component once again,

Preparing for test




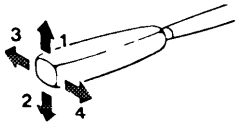




- 1 Expose control unit (amplifier) (refer to 54-565).
- 2 Pull 14-pole coupler from control unit (amplifier).
- 3 Connect test adapter to 14-pole coupler.

4 Switch on ignition. LED-readout of symbols for battery, km/h and ground will light up, provided no fault is indicated.

5 Push button "LED-TEST" of test adapter and check whether all LED-readouts are lighting up. If no LED-readout is lighting up, test connection of voltage supply and layout of 14-pole coupler (refer to wiring diagrams 54-580).



Survey test program

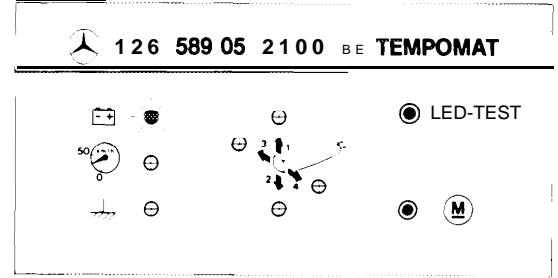
Test step	Actuation	Nominal readout	Possible cause for deviation from nominal readout
1		LED readout lights up 	Lines wrongly connected. Lines are interrupted.
		LED readout lights up on models with grounding bridge. 	Grounding bridge in 14-pole connector interrupted.
		LED readout may light up. 	Perform test step 6.
2	Actuate cruise control switch (positions 1-4) 	Pertinent LED readout lights up.	Lines interrupted. Switch defective.
3	Push push-button switch. 	Regulating linkage moves uniformly to full throttle position and stops.	Regulating linkage and accelerator pedal not moving: Connecting rod not connected to actuator or regulating linkage. Lines interrupted or wrongly connected. Switch on clutch pedal defective. Actuator defective. Regulating linkage and accelerator pedal constantly moving to and fro. Poor contacting of plug connection harness/actuator harness. Actuator defective.
4	Push push-button switch.  Regulating linkage in full throttle position. Step down on brake pedal. Then release pushbutton switch.	When operating brake pedal, regulating linkage will move immediately into idle speed position.	Regulating linkage hard to move. Actuator defective.
5 with manual transmission only	Push push-button switch.  Regulating linkage in full throttle position. Step down on clutch pedal. Then release pushbutton switch.	Regulating linkage will move immediately into idle speed position, when operating clutch pedal.	Lines shorted. Switch on clutch pedal defective.
6	Move vehicle, at least for 2 wheel turns	LED readout flashing 	Lines interrupted or wrongly connected. Sensor (transmitter) defective.

If no fault was found on previous tests:

1. Test blue line from connector actuator jack 5 to connector control unit jack 10 for short to ground by means of ohmmeter.
2. On control units with coding plug, test coding plug R29 (54–506).
3. Mount new control unit for tryout.

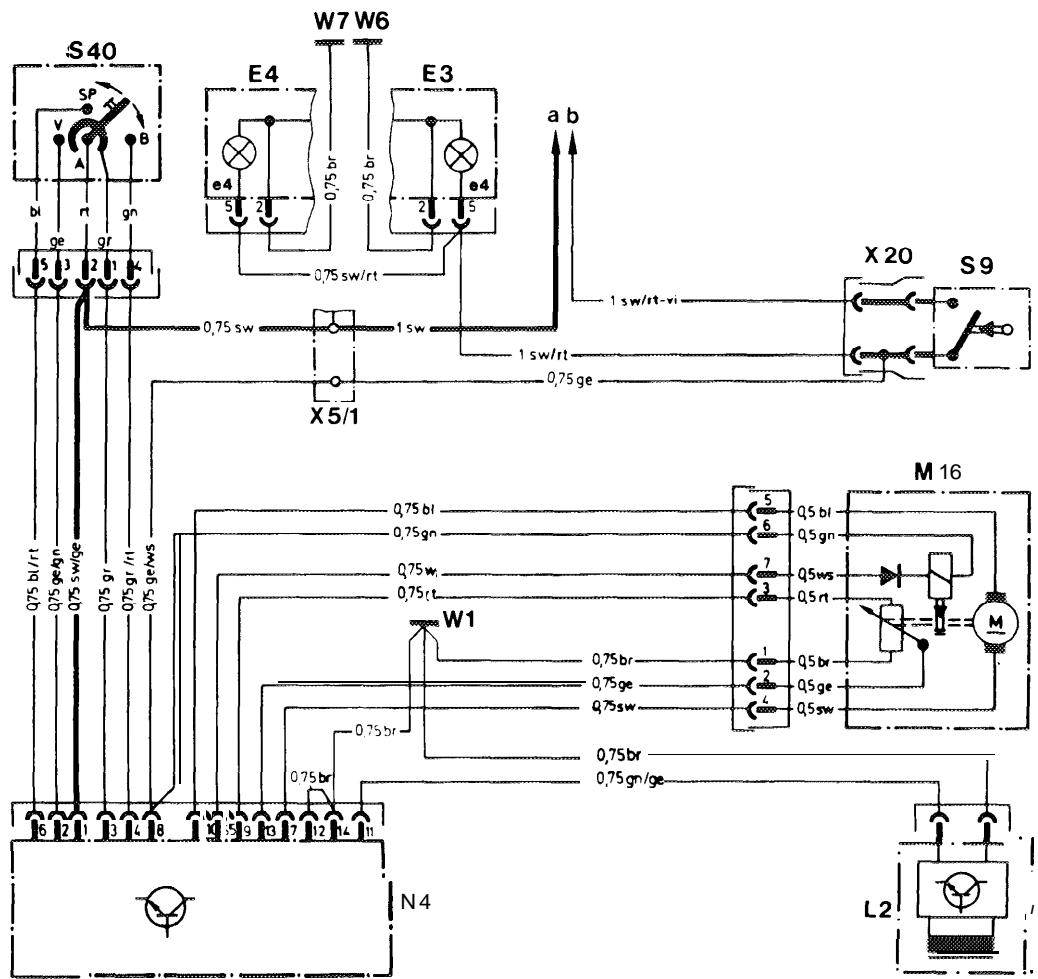
Test

Test voltage supply.	
LED-readout lights up	
yes	no



1543-9604

Test lines for correct connection and for passage.



*1543-11980/3

Example: 201.122 up to approx. 8.85
 N4 Control unit cruise control/Tempomat
 S40 Pushbutton switch cruise control/Tempomat
 a To central electrical system F 1, connecting field L assignment 1

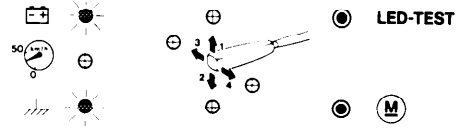
For vehicles with grounding bridge (refer to wiring diagram 54.8-580), test in 14-pole connector,

LED readout lights up
yes | no

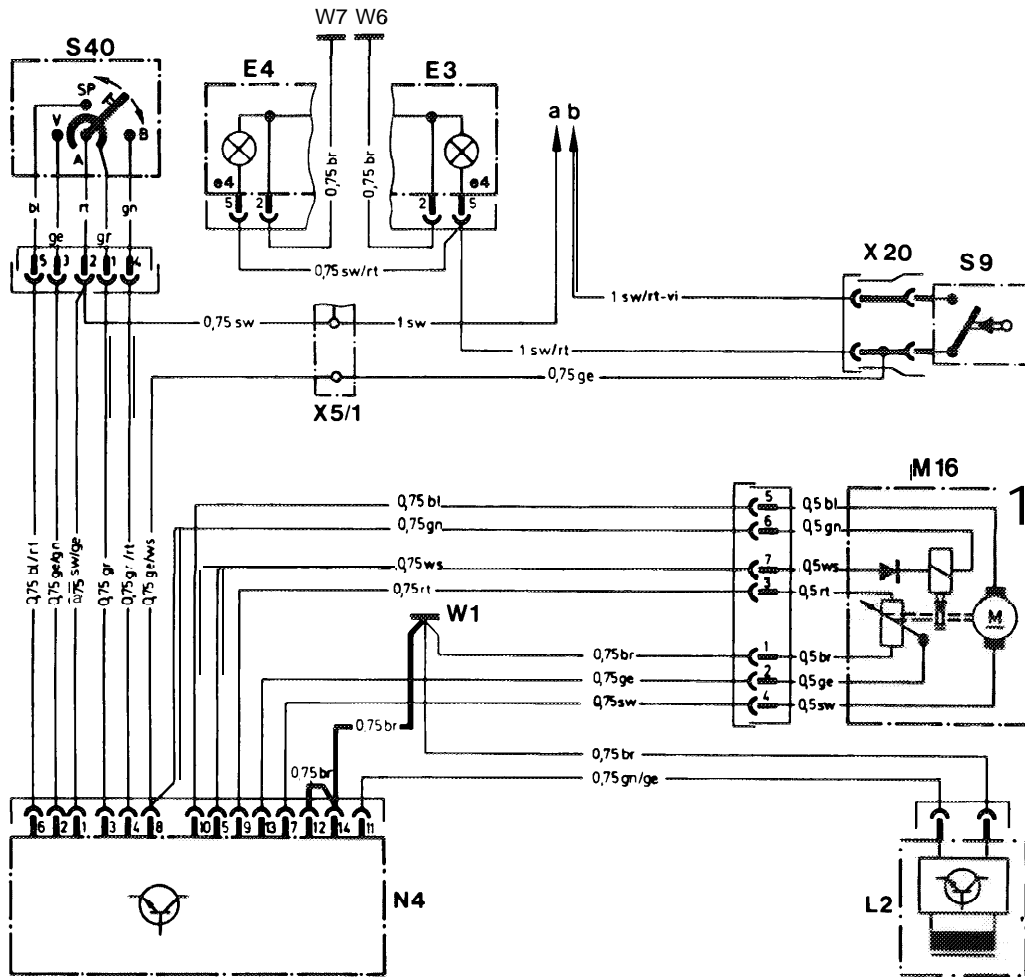
Recondition grounding bridge in 14-pole connector.



126 589 05 21 00 BE TEMPOMAT



1543-9606



1543-11979/3

Example: 201.122 up to approx. 8.85

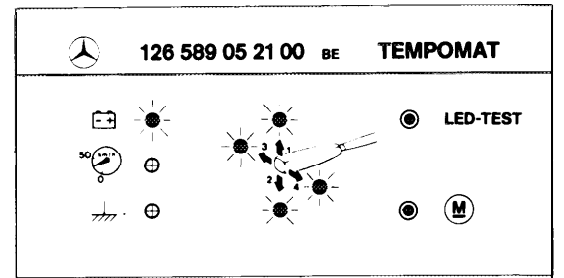
N4 Control unit cruise control/Tempomat
W1 Main ground (behind instrument cluster)

Test harness and pushbutton switch.

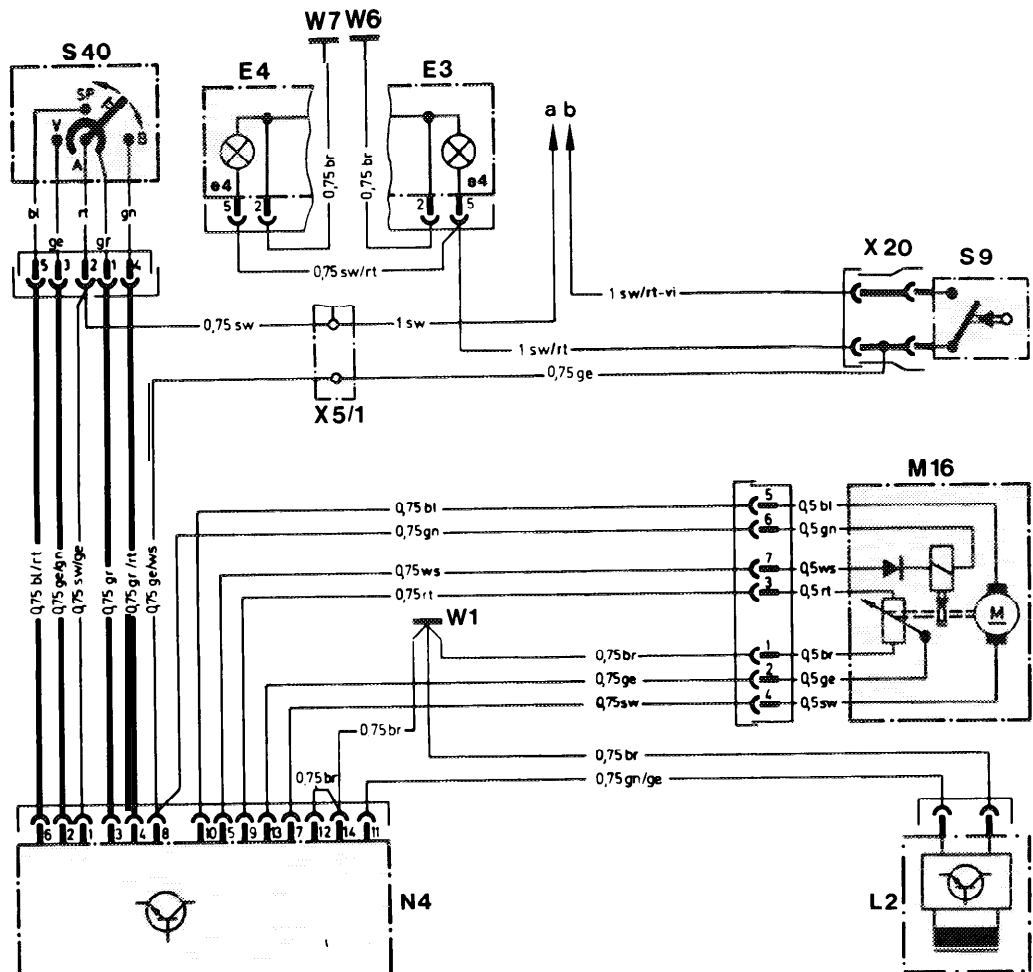
Switch position	LED-readout
Accel	1
Decel	2
Off	3
Resume	4

Respective LED-readout lights up

yes	no
-----	----



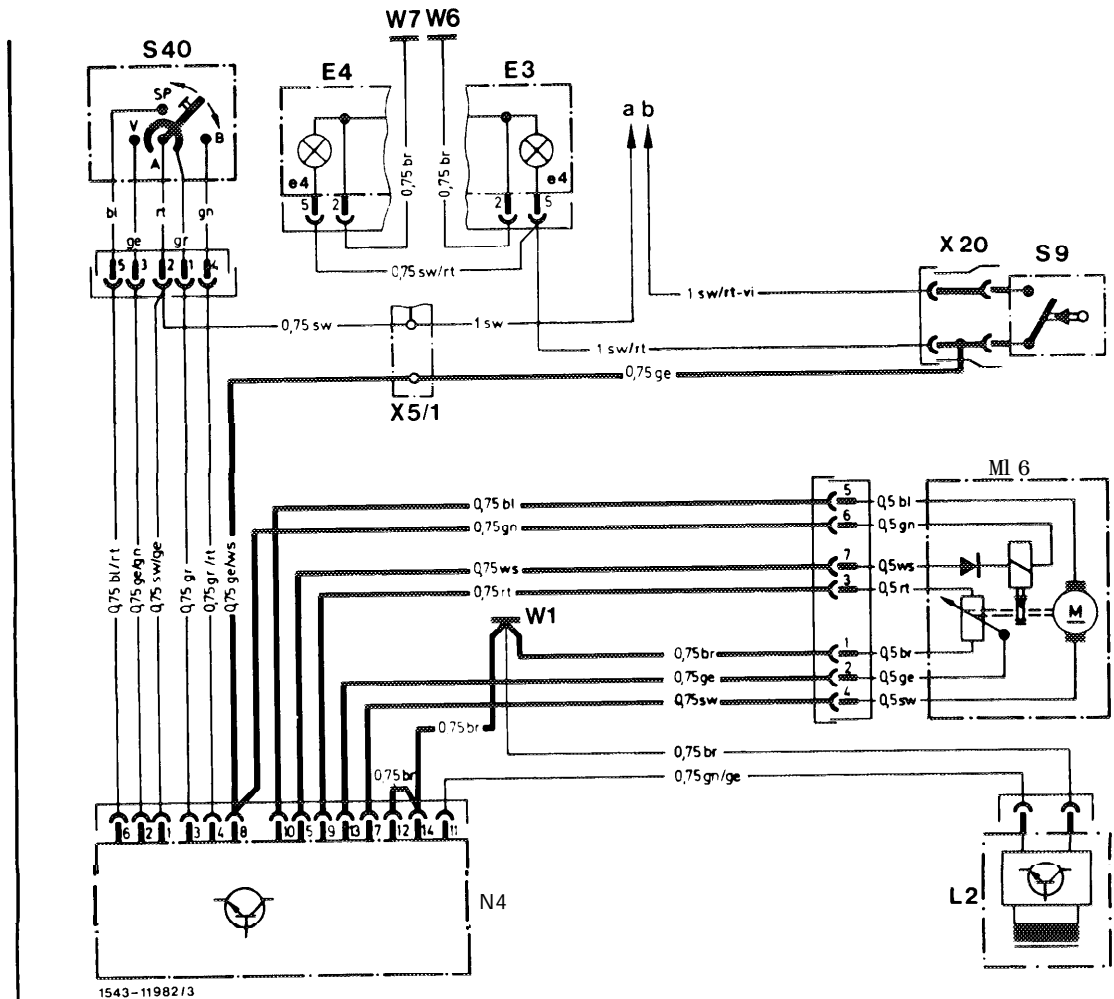
Test lines for correct connection and passage.
Renew switch.



1543-11981/3

Example: 201.122 up to approx. 8.85

N4 Control unit cruise control/Tempomat
S40 Pushbutton switch cruise control/Tempomat
B Accel
V Decel
A Off
SP Resume



1543-11982/3

Example: 201,122 up to approx. 8.85

- M16 Actuator cruise control/Tempomat
- N4 Control unit cruise control/Tempomat
- S9 Stop lamp switch
- W1 Main ground (behind instrument cluster)

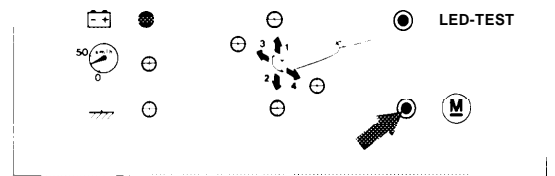
Test cruise control-cutout while braking.
 Pushbutton switch **M** is pushed.
 Throttle control and accelerator pedal are in full throttle position!
 Depress brake pedal.

Throttle control and accelerator pedal are immediately moving into idle speed position.
 Then release pushbutton switch.

yes	no
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Test throttle control for easy operation.
 Renew actuator.

126669052100 BE **TEMPOMAT**

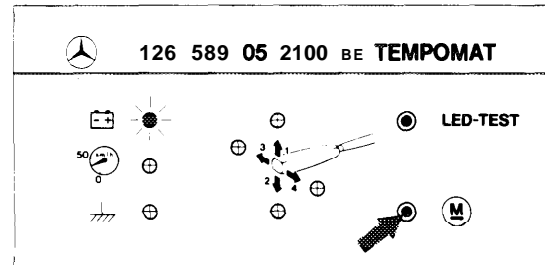


1543-9612

Test cruise control/Tempomat-cutout while declutching (with manual transmission only). Pushbutton switch **M** is pushed. Throttle control and accelerator pedal are in full throttle position! Depress clutch pedal.

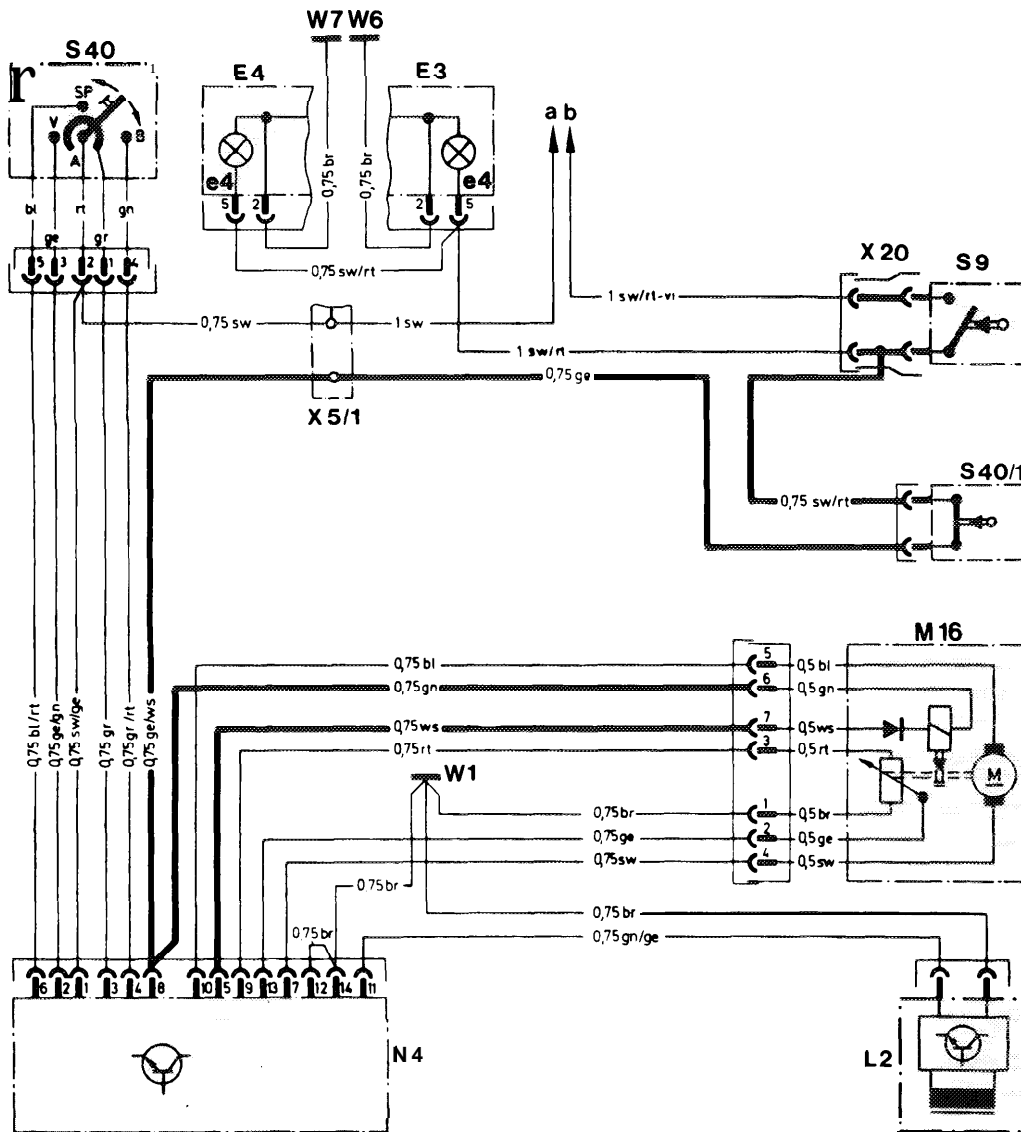
Throttle control and accelerator pedal are moving immediately into idle speed position. Then release pushbutton switch.

yes | no



1543-9612

Lines are shorted.
Switch on clutch pedal defective.



1543-13 283

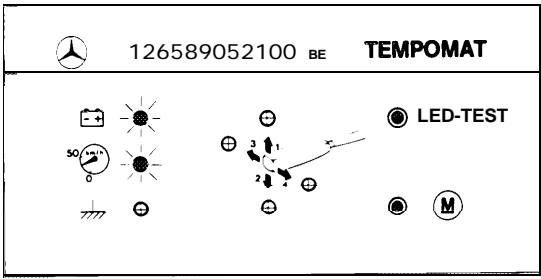
Example: 201.122 up to approx. 8.85

- M16 Actuator cruise control/Tempomat
- N4 Control unit cruise control/Tempomat
- S9 Stop lamp switch
- S40/1 Switch clutch pedal cruise control/Tempomat

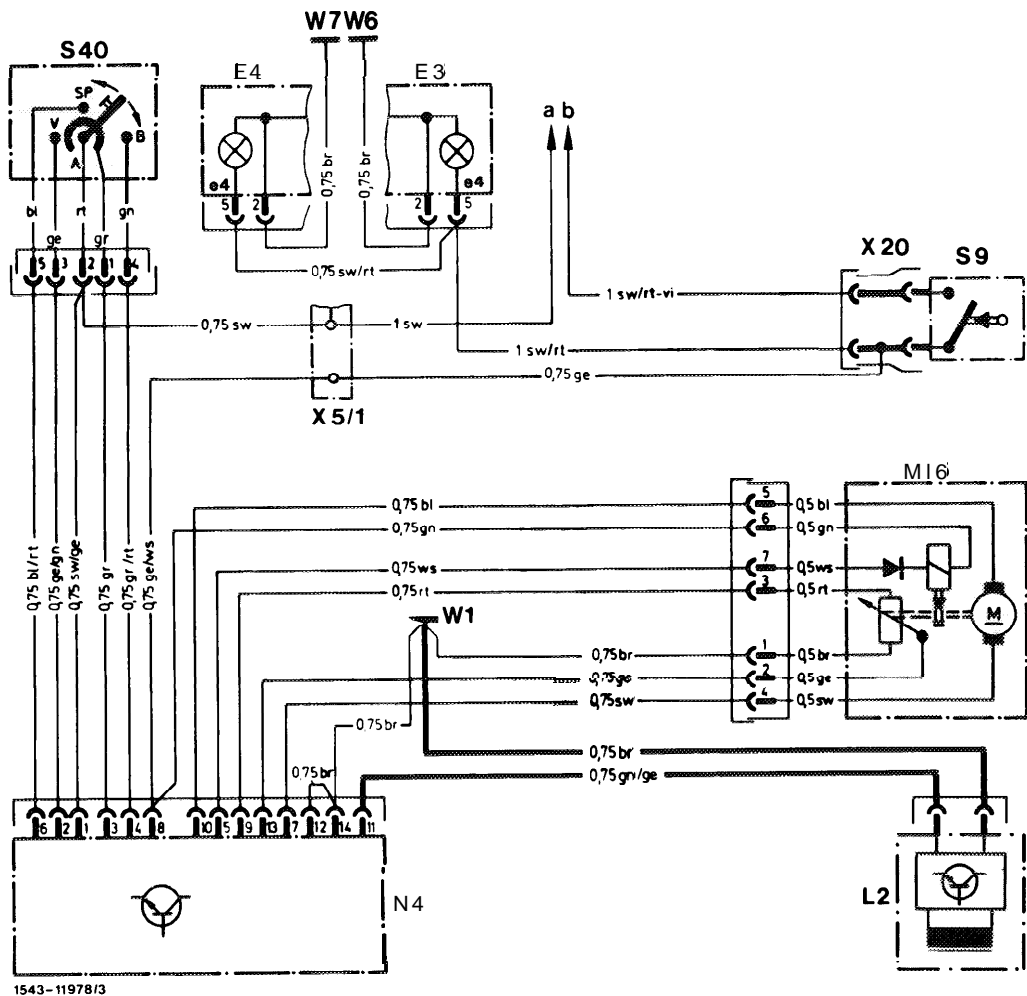
Test harness and transmitter (sensor) on speedometer, the speed readout must be in order.
 Move vehicle, for at least 2 turns of wheel.

LED readout flashes or lights up.

yes | no



- 1 On vehicles with Hall-effect speed sensor (starting approx. 9.85), test voltage supply (terminal 15) of Hall sensor on black line of 2-pole Hall sensor connector according to wiring diagram (54.8-580).
- 2 Test lines according to wiring diagram for short circuit and interruption.
- 3 Renew sensor.



Example: 201.122 up to approx. 8.85

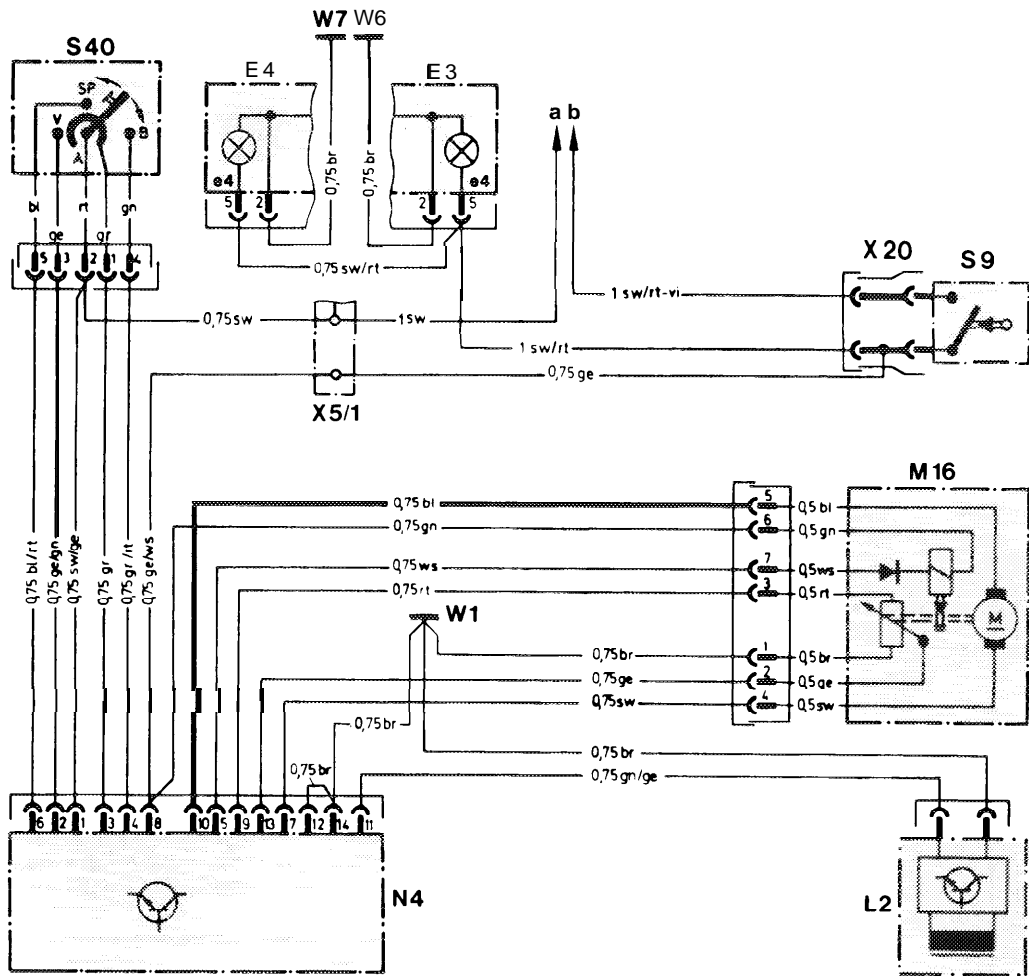
L2 Inductive transmitter speed
 N4 Control unit cruise control/Tempomat

Disconnect test adapter.

Test blue line from connector actuator jack 5 to connector control unit jack 10 with ohm-meter for short to ground.

Short to ground
 no | yes

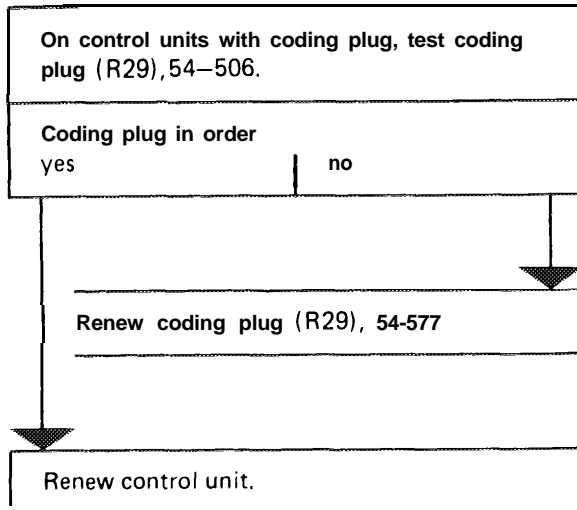
Recondition or renew blue line.



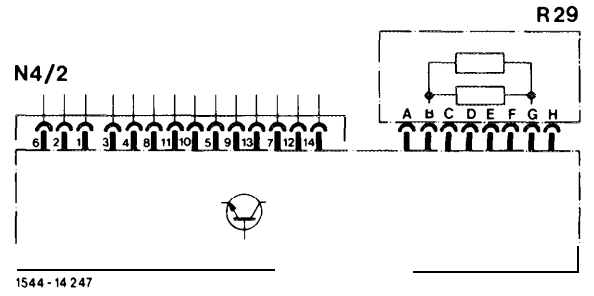
1543-14455

Example: 201.122 up to approx. 8.85

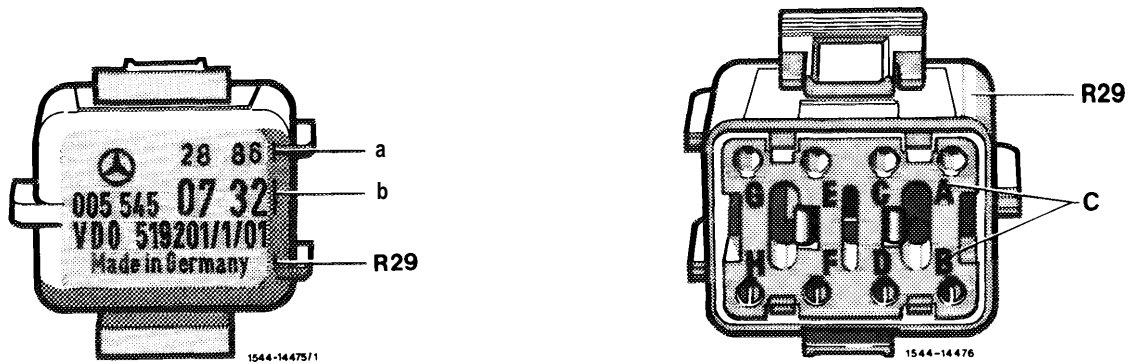
M16 Actuator cruise control/Tempomat
 N4 Control unit cruise control/Tempomat



End of test



54–506 Testing coding plug



Coding plug (R 29) Remove (54-577). Production date (a), part number (b), pin socket designation (c). On some coding plugs there is no pin socket designation A-G. These coding plugs must be tested as shown in illustration at the right.

Ohmmeter Connect (refer to Table).

Resistance values Test (refer to Table), renew coding plug (R 29) if values deviate.

Test table -- resistance values

Part number	Connection ohmmeter to pin socket designation						
	E-G kΩ	E-F kΩ	E-B kΩ	E-D Ω	D - H	D - C Ω	A - D Ω
005 545 11 32	667– 695	52.4– 55.2	*1960–2040	∞	2.88- 3.00	kΩ ∞	< 10
0055454232	98– 102	19.6– 20.4	592– 616	∞	3.18- 3.30	kΩ ∞	< 10
0065452532	980–1020	39.4– 41	1470–1530	∞	1.98– 2.02	kΩ < 10	∞
006 545 26 32	1470–1530	98 –102	*3570–3720	∞	325.4 –338.6	Ω ∞	< 10
006 545 61 32	980–1020	98 –102	*2940–3060	∞	3.92- 4.08	kΩ ∞	< 10

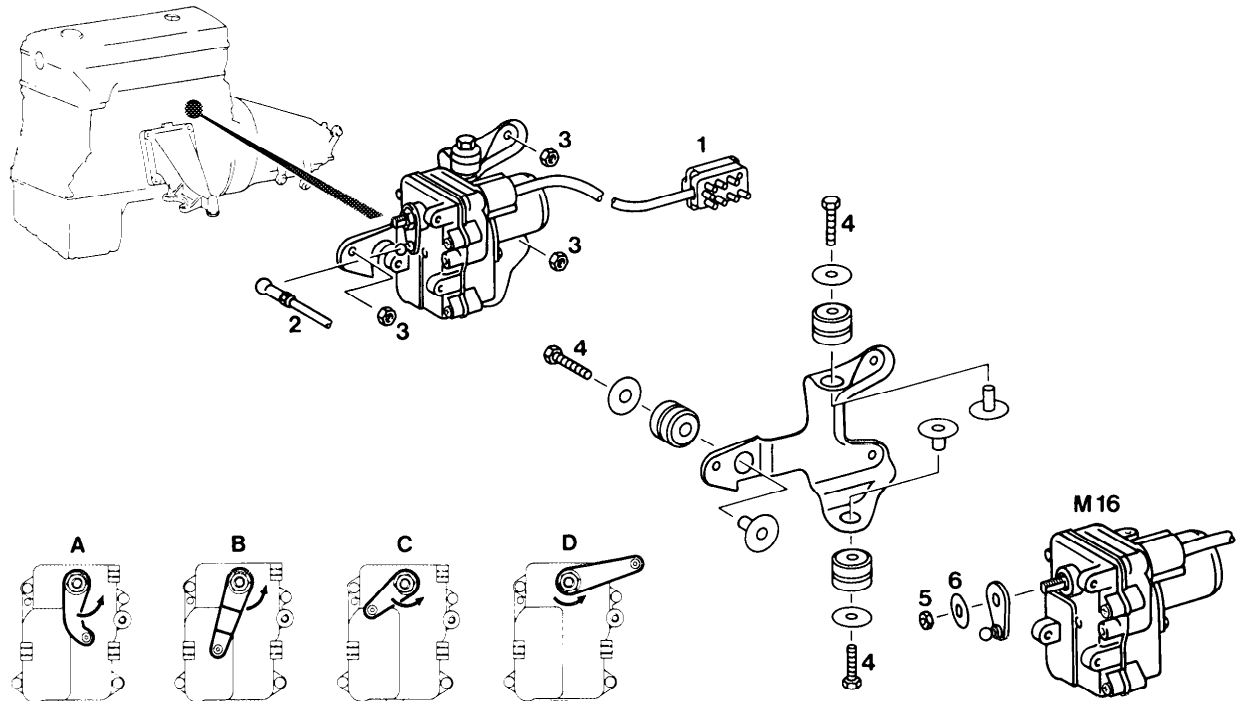
*This value cannot be measured with multimeter SUN DMM-5.

Conventional tool

Multimeter	SUN or Thorn Emi	DMM - 5 Avometer 2003
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54-541 Removal and installation of actuator

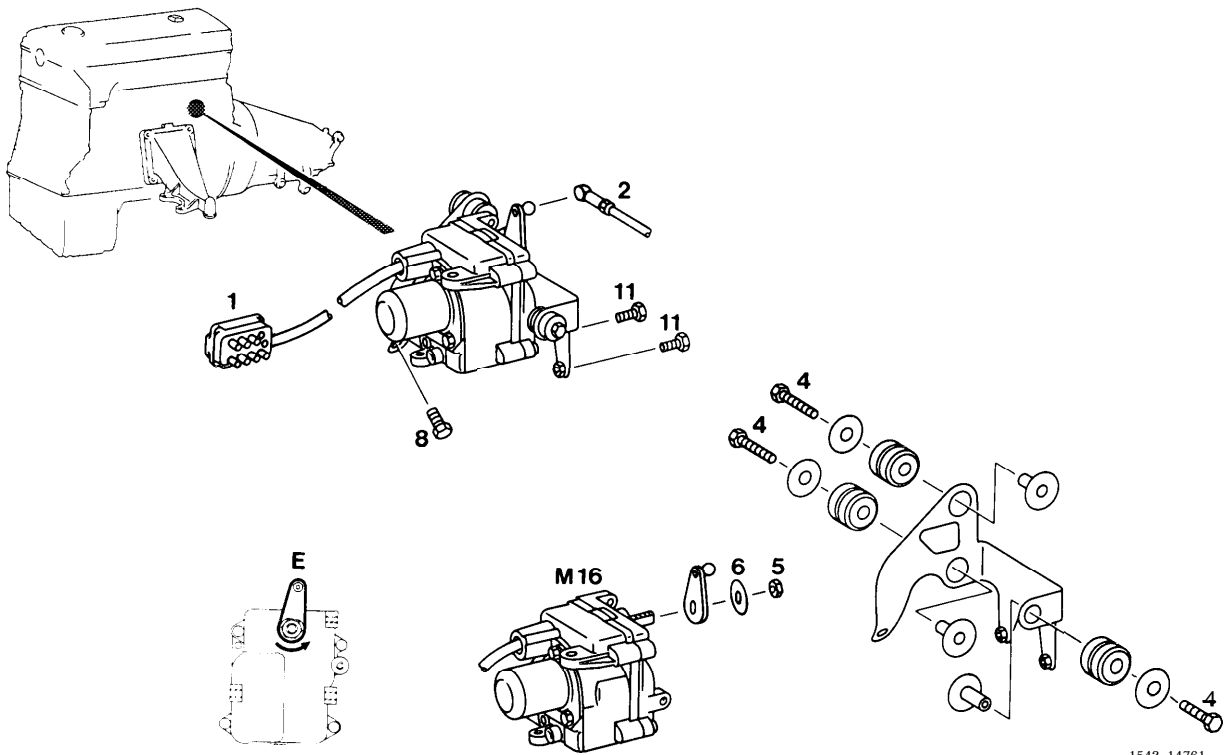
A. Engine 102



1542-14759

Battery	Disconnect
Air cleaner (except engines with Stromberg carburetor)	Remove
Engine compartment lining, below (on injection engines only)	Remove
Plug (1) on holder of diagnosis socket or on holder of hydraulic unit ABS	Pull from connector
Line of actuator (M16)	Expose
Connecting rod (2) on actuator (M16)	Disengage
Starter (on engine 102.983 only)	Remove
Fastening nuts (3)	Unscrew
Actuator (M16) with holder	Remove; on engines with injection system (except 102.983) remove ignition distributor cap and distributor finger, loosen distributor if required and turn clockwise toward engine or remove, set ignition following installation. On engine 102.983, extend actuator (M16) first at the two rear studs and remove with holder in downward direction.
Fastening screws (4) M6x28	Unscrew, 12 Nm
Lock washer (6)	Unlock
Fastening nut (5)	Unscrew, 10 Nm
Installation	In vice-versa sequence, while turning drive shaft of actuator (M16) opposite to direction of arrow against stop, lever (A Stromberg carburetor; B 2 E-E carburetor; C injection engines, except 102.983; D engine 102.983) mount and secure nut (5)
Function test	Perform on road

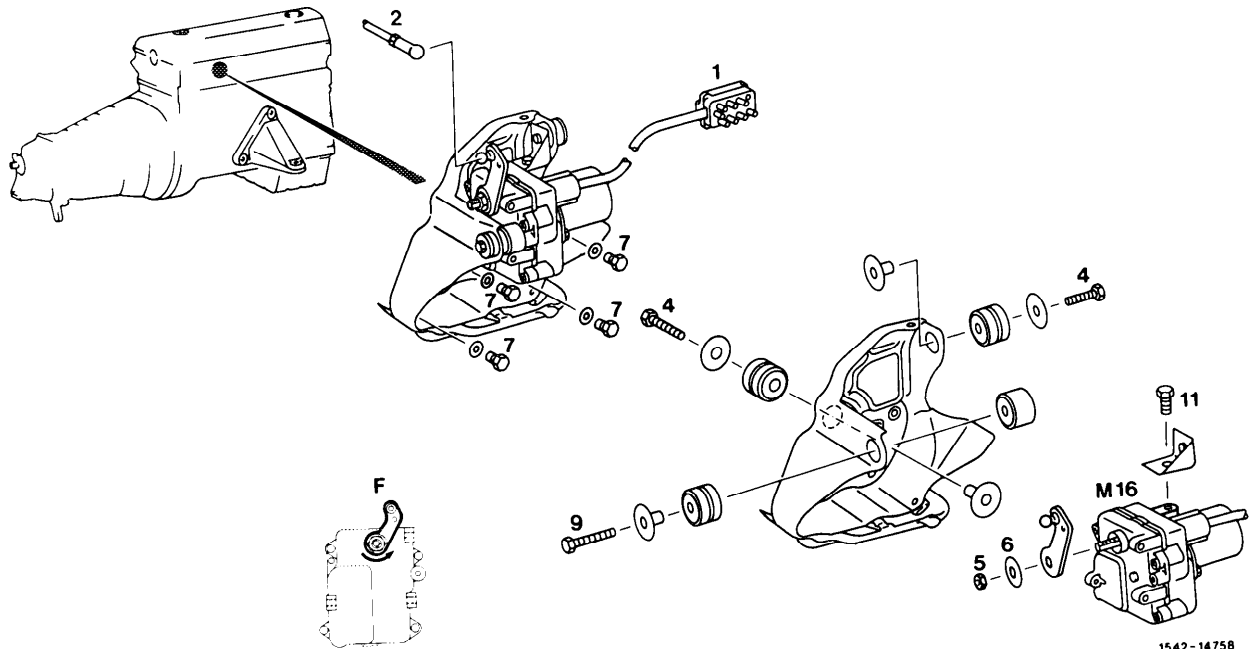
B. Engine 103



1542-14761

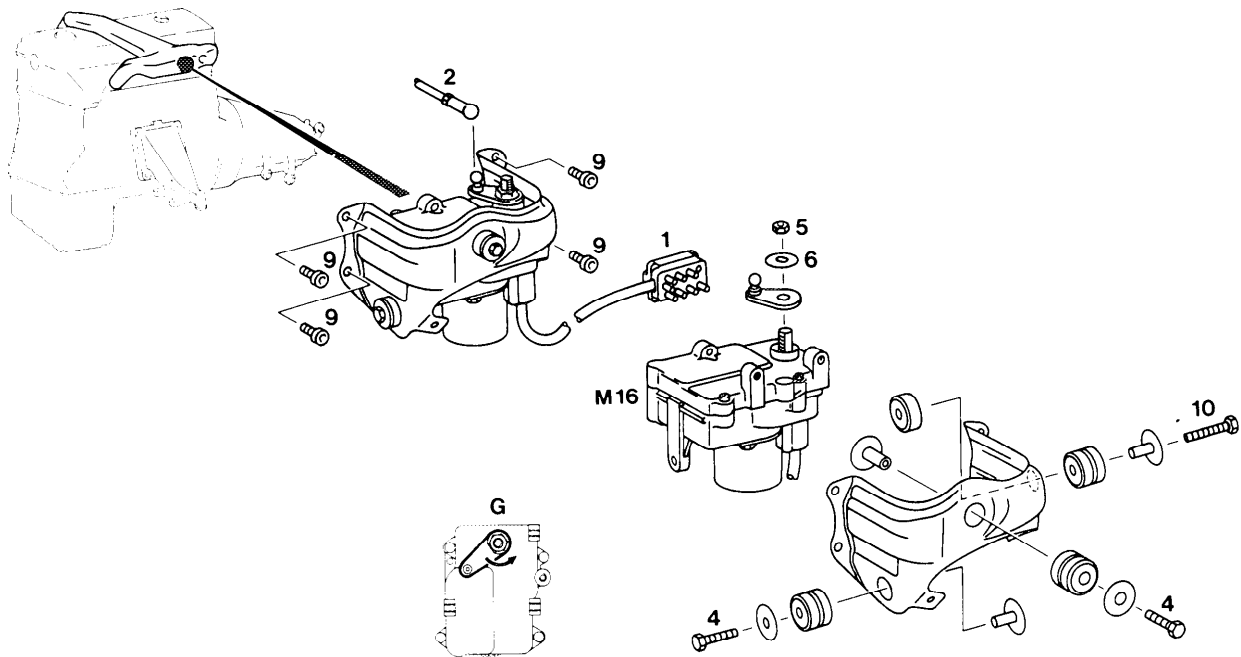
- Battery Disconnect
- Air cleaner Remove
- Engine compartment lining, below Remove
- Plug (1) model 124 on holder of diagnosis socket
or model 201 on holder of hydraulic unit ABS Pull from connector
- Line of actuator (M16) Expose
- Connecting rod (2) on actuator (M16) Disengage
- Fastening screws (11) M6x 12 and (8) M8x30 Unscrew
- Actuator (M16) with holder. Remove in downward direction. On model 124 with
refrigerant compressor, loosen fastening screws for
engine mounts and lift engine.
- Fastening screws (4)M6x28. Unscrew, 12 Nm
- Lock washer (6). Unlock
- Fastening nut (5). Unscrew, 10 Nm
- Installation In vice-versa sequence, while rotating drive shaft of
actuator (M16) opposite to direction of arrow against
stop. Mount lever (E) and secure nut (5)
- Function test Perform on road

C. Engines 601, 602.91 and 603.91



Battery	Disconnect
Plug (1) between coolant expansion tank and washer reservoir.	Pull from connector
Line of actuator (M16)	Expose
Connecting rod (2) on actuator (M16)	Disengage
Fastening screws for shielding plate on holder (1st version only)	Unscrew
Fastening screws (7) M6x18	Unscrew
Actuator (M16) with holder.	Remove
Fastening screws (4) M6x28	Unscrew, 12 Nm
Lock washer (6).	Unlock
Fastening nut (5)	Unscrew, 10 Nm
Installation.	In vice-versa sequence, while turning drive shaft of actuator (M16) opposite to direction of arrow against stop, mount lever (F) and secure nut (5).
Function test	Perform on road

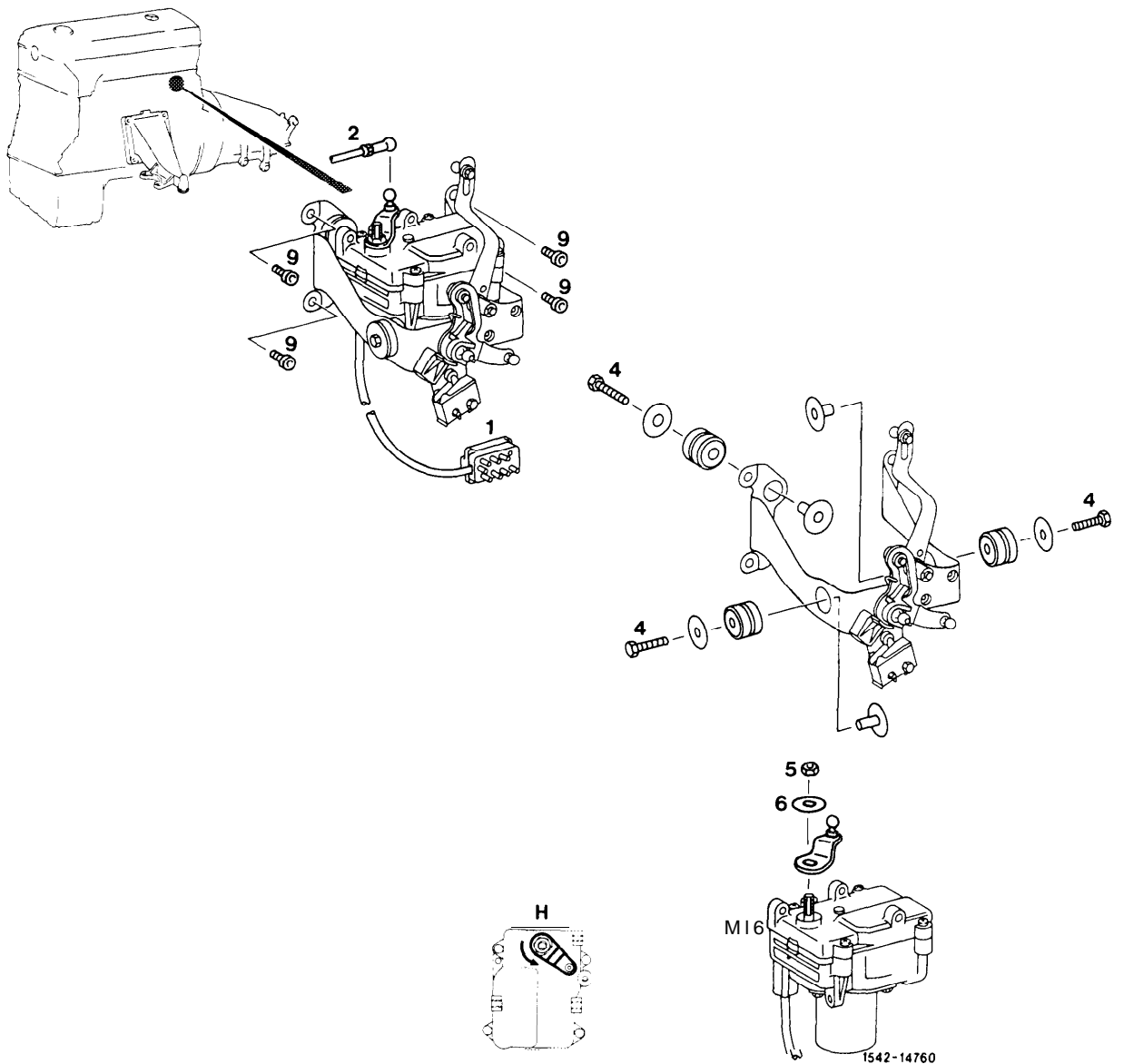
D. Engine 602.961



1542-14757

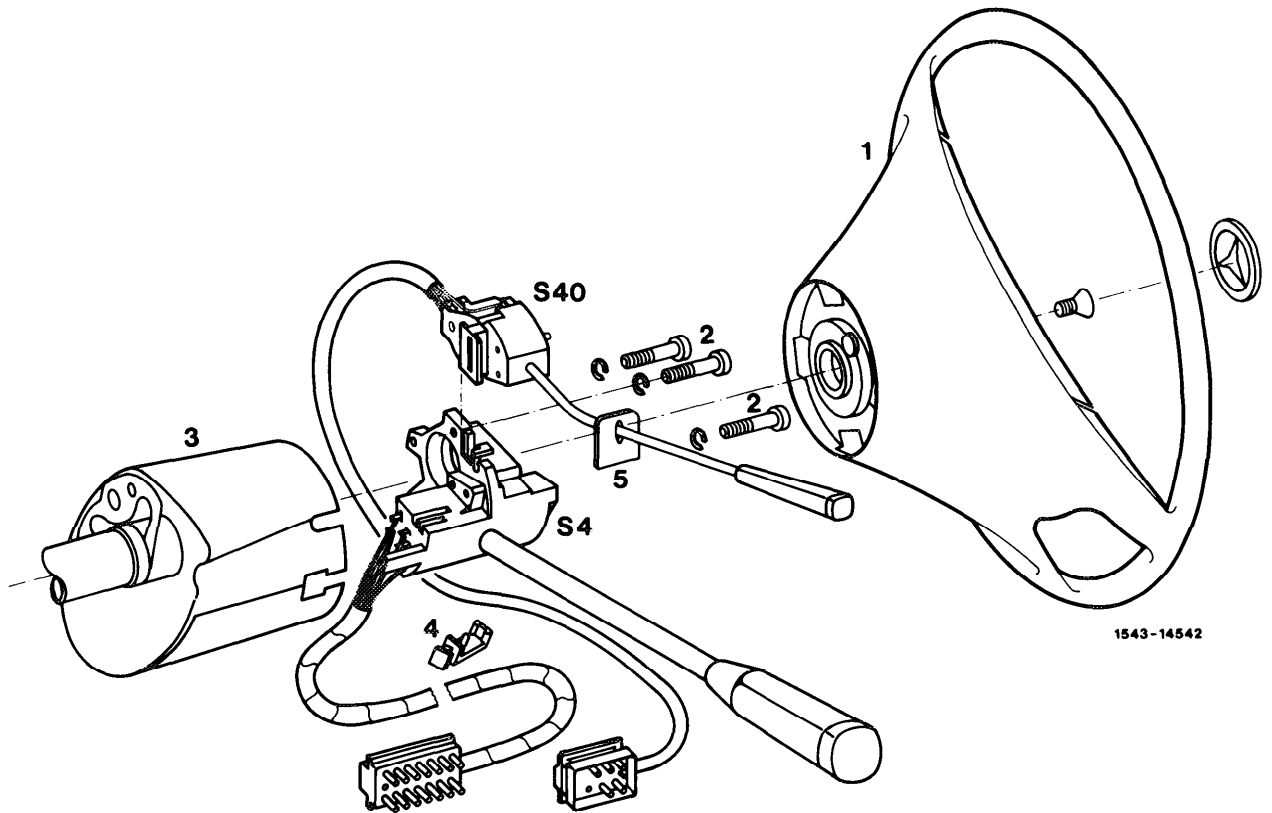
Battery	Disconnect
Plug (1) on holder for hydraulic unit ABS.	Pull from connector
Line of actuator (MI 6)	Expose
Connecting rod (2) on actuator (M16)	Disengage
Fastening screws (9)M6x18.....	Unscrew
Actuator (M16) with holder.....	Remove
Fastening screws (4)M6x28.....	Unscrew, 12 Nm
Lock washer (6).....	Unlock
Fastening nut (5).....	Unscrew, 10 Nm
Installation.	In vice-versa sequence, while turning drive shaft of actuator (M16) opposite to direction of arrow against stop, mount lever (G) and secure nut (5).
Function test	Perform on road

E. Engine 603.96



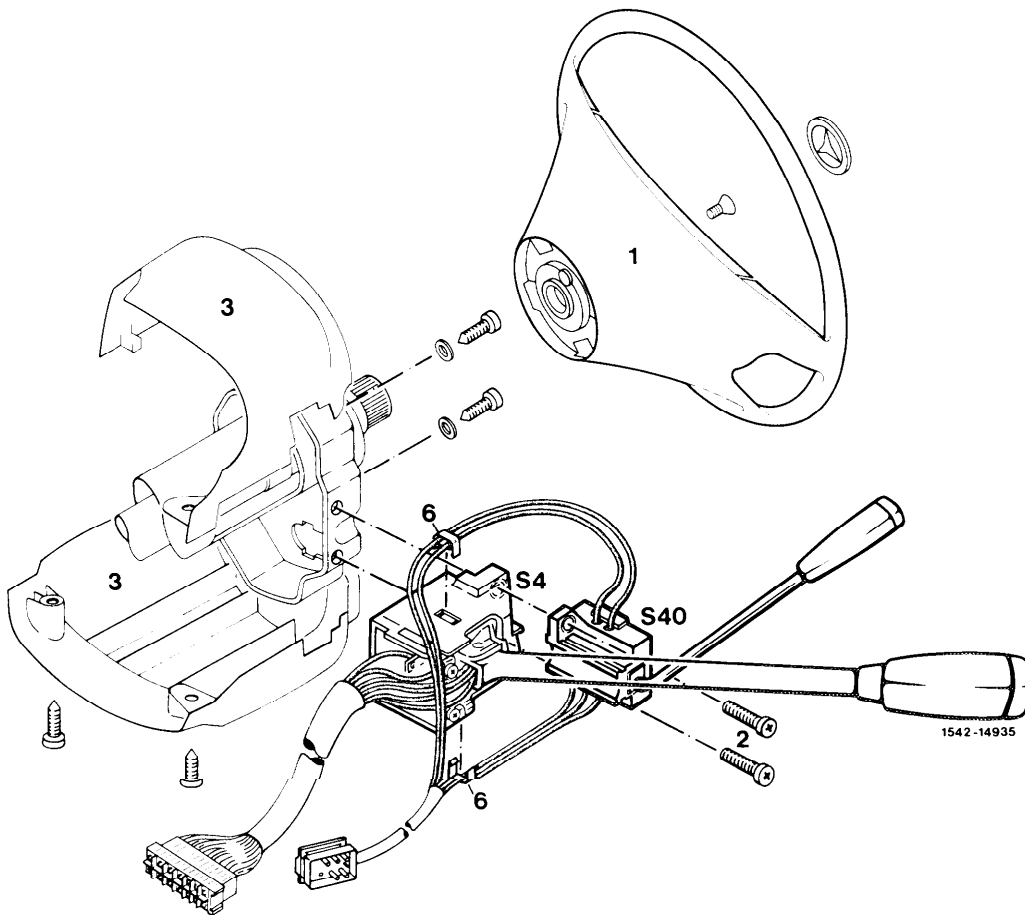
Battery	Disconnect
Air cleaner	Remove
Plug (1) on holder of diagnosis socket	Pull from connector
Line of actuator (M16)	Expose
Regulating linkage and control pressure cable control	Disengage
Connecting rod (2) on actuator (M16)	Disengage
Fastening screws (9) M6x18	Unscrew
Actuator (M16) with holder	Remove
Fastening screws (4) M6x28	Unscrew, 12 Nm
Lock washer (6)	Unlock
Fastening nut (5)	Unscrew, 10 Nm
Installation	In vice-versa sequence, while turning drive shaft of actuator (M16) opposite to direction of arrow against stop, mount lever (H) and secure nut (5).
Function test	Perform on road

A. Model 124 and 2nd version model 201 starting approx. middle of April 84



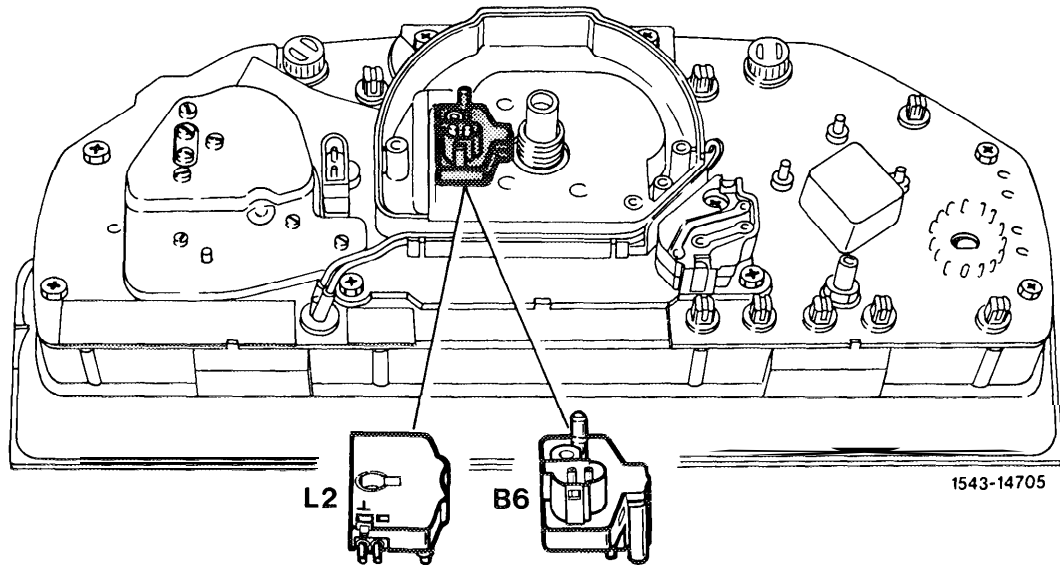
Battery	Disconnect
Cover at left under instrument panel	Remove (68-150)
Steering wheel (1)	Remove
Plug for switch(S40)	Pull off
Fastening screws (2)	Unscrew
Combination switch (S4) with switch (S40).	Pull out for approx. 5 cm
Line holder (4)	Remove from clips
Cruise control switch(S40)	Pull from combination switch (S4)
Cruise control switch(S40)	Remove, while pulling up steering column lining (3) on model 201
Rubber grommet (5).	Remove from cruise control switch(S40)
Installation	In vice-versa sequence
Function test	Perform on road

B. 1st version model 201 up to approx. middle of April 84



Battery	Disconnect
Cover at left under instrument panel	Remove (68– 150)
Plug for cruise control switch (S40)	Pull off
Steering wheel (1)	Remove
Steering column lining (3)	Remove
Clamps (6) on combination switch (S4)	Remove from clips
Fastening screws (2)	Unscrew
Cruise control switch (S40)	Remove
Installation	In vice-versa sequence
Function test	Perform on road

54-550 Removal and installation of transmitter

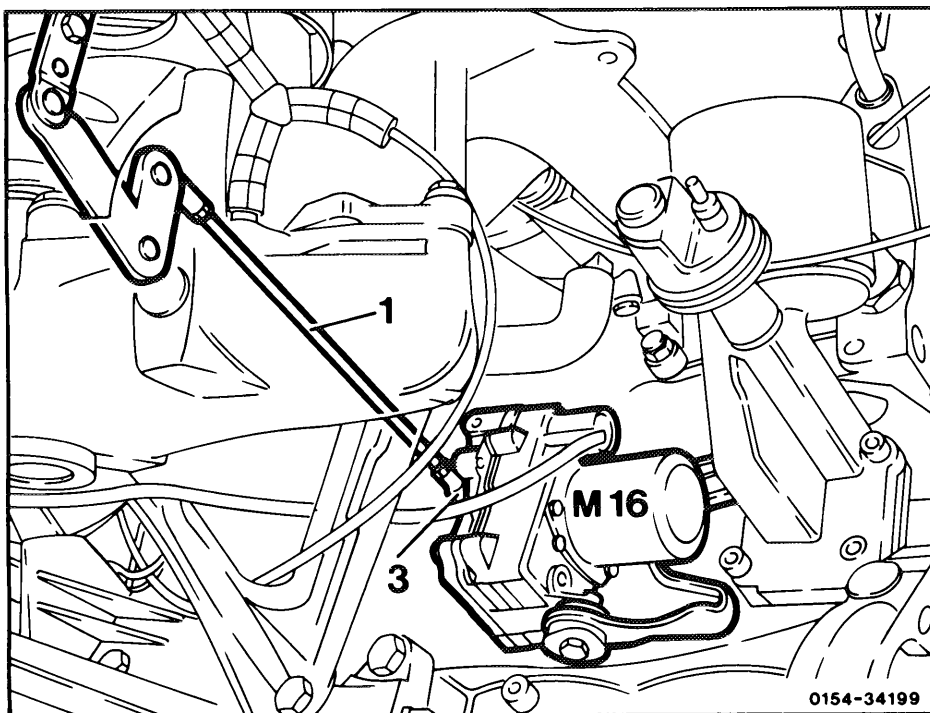


Instrument cluster	Remove (54-250)
Harness of transmitter.	Pull off
Fastening screw of transmitter	Unscrew and remove transmitter
Installation.	In vice-versa sequence
Function test	Perform on road

Note

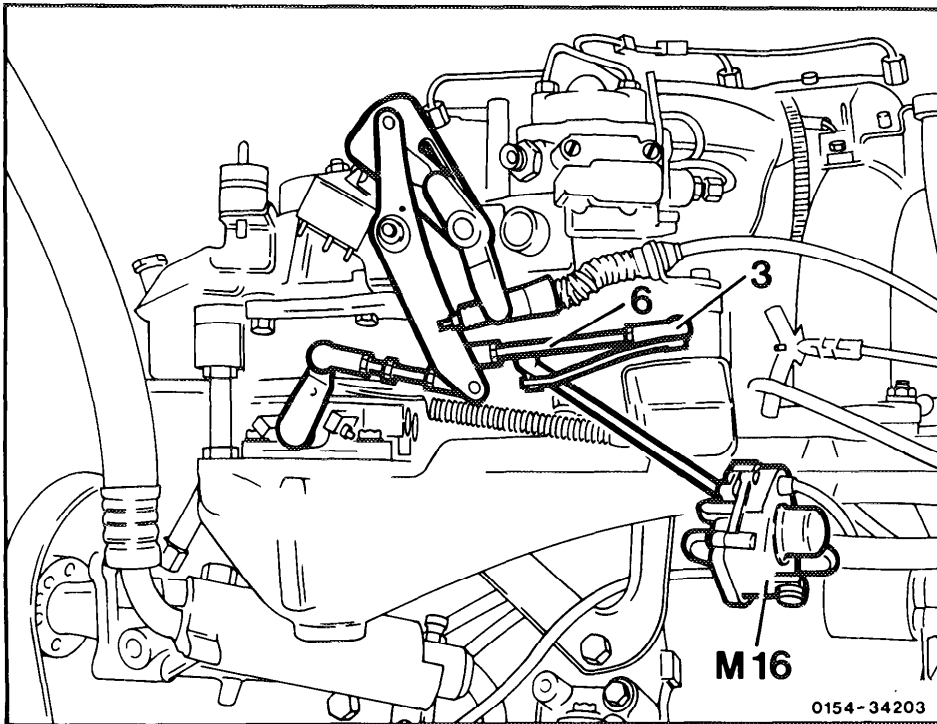
Model 124 and model 201 as of approx. 1985
Hall sensor road speed (B6)
Model 201 up to 1984 inductive transmitter,
road speed (L2)

C. Engine 102 with injection system, except engine 102.983



Connecting rod (1)	Disengage at actuator (M16)
Throttle control	Move into idle speed position
Lever of actuator (M16)	Push toward engine into idle speed position
Connecting rod (1)	Set approx. 1 mm or 1 turn shorter
Connecting rod (1)	Engage
Ball socket (3)	Lock

D. Engine 102.983



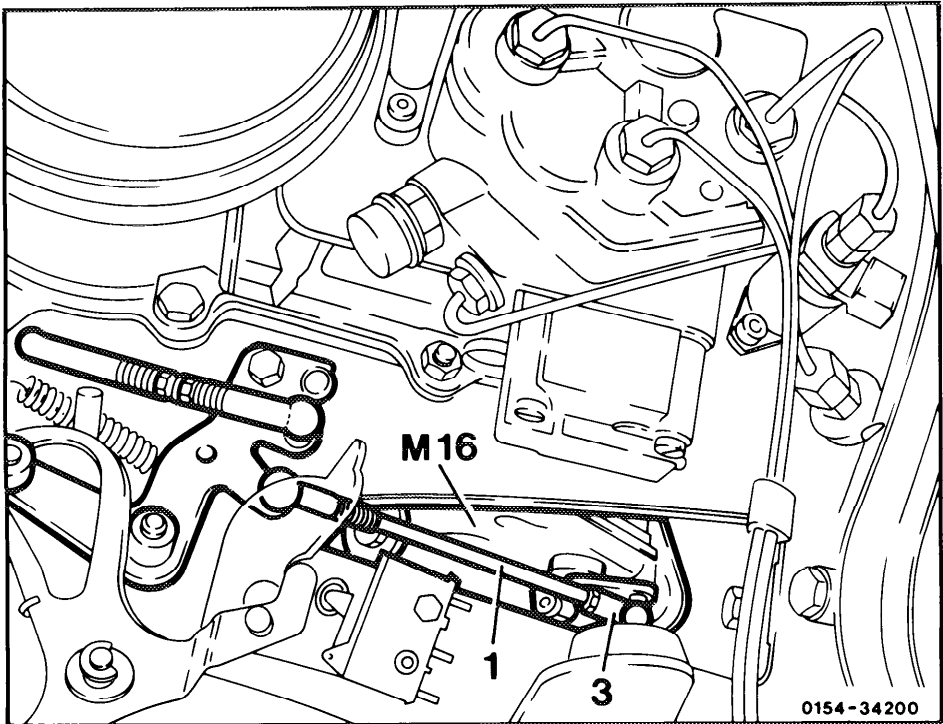
1st version up to approx. 30.06.86 (round rod)

- Connecting rod (6) Disengage at transfer lever
- Throttle control Move into idle speed position
- Connecting rod (6). , Set approx. 1 mm or 1 turn shorter
- Connecting rod (6).Engage
- Ball socket (3). Lock

2nd version starting approx. 01.07.86 (profiled rod)

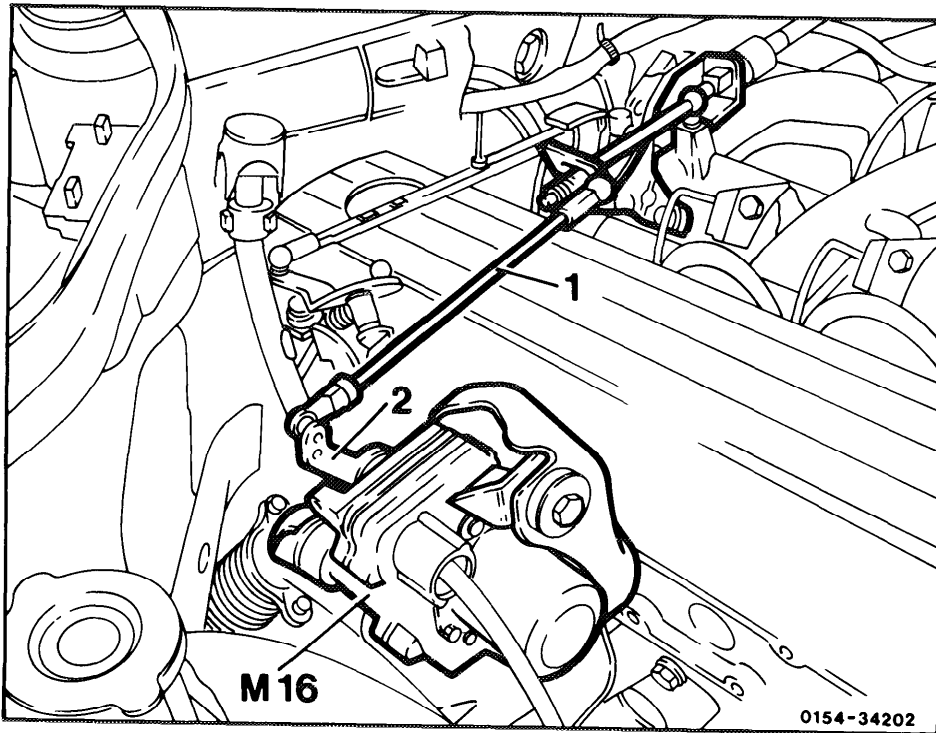
- Hex. head screw Loosen on profiled rod (6)
- Throttle control , Move into idle speed position
- Lever of actuator Lift approx. 1 mm from idle speed position
- Hex. head screw , Tighten in this position

E. Engine 103



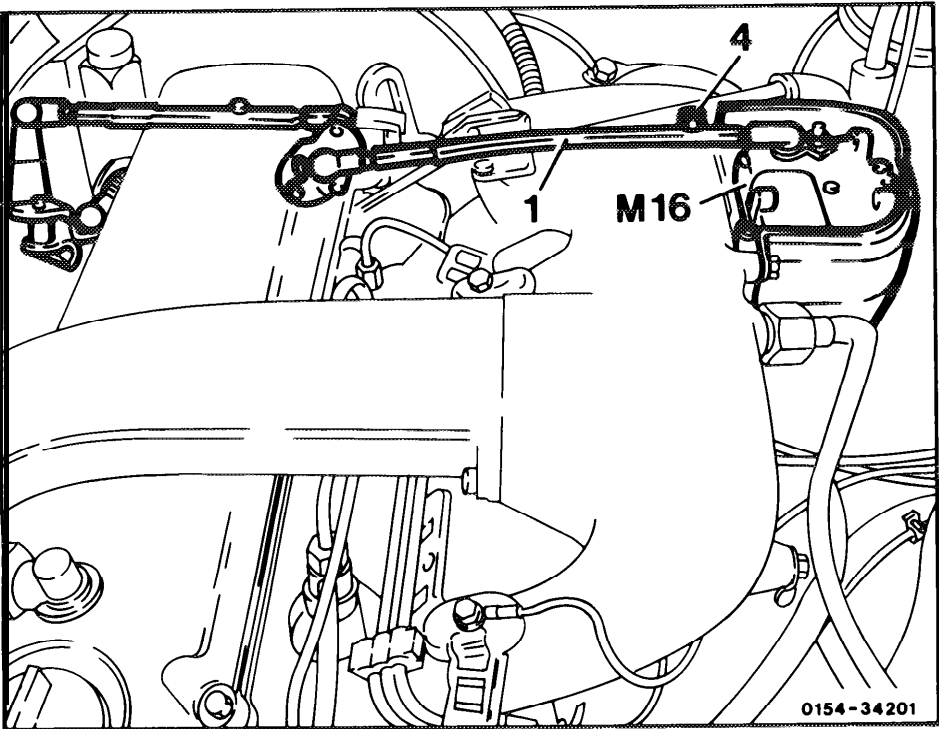
Air cleaner	Remove
Connecting rod (1)	Disengage at throttle control
Throttle control	Move into idle speed position
Lever of actuator (M16) ..	Force into idle speed position with connecting rod (1)
Connecting rod (1)	Adjust approx. 1 mm or 1 turn shorter
Connecting rod (1)	Engage
Ball head (3)	Lock
Air cleaner	Mount

F. Engines 601, 602.912 and 603.912



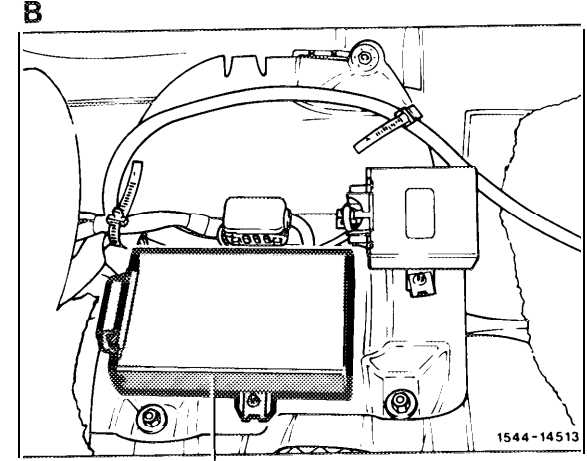
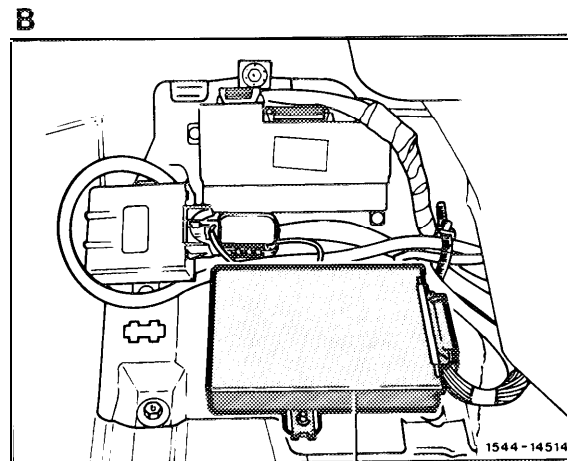
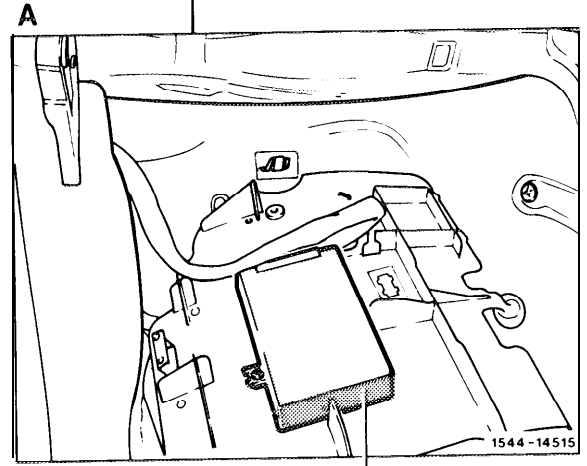
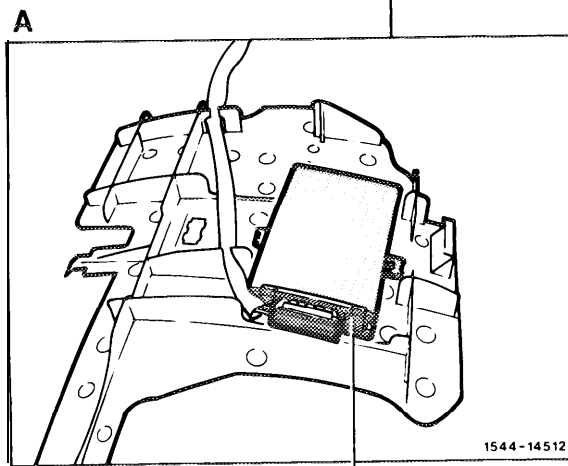
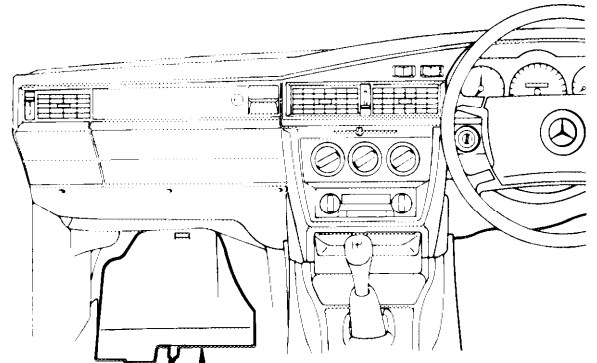
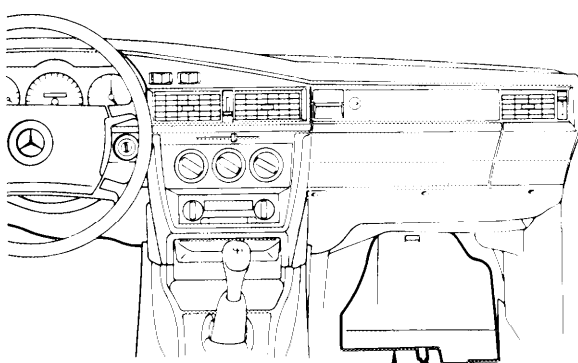
- | | |
|---------------------------------------|---|
| Connecting rod (1) | Disengage on actuator (M16) |
| Throttle control | Move into idle speed position |
| Lever (2) of actuator (M16) | Force away from engine in idle speed position |
| Connecting rod (1) | Adjust approx. 0.5 mm or 1 turn shorter |
| Connecting rod (1) | Engage |

G. Engine 602.961



- Hex. head screw (4) Loosen at profiled rod (1)
- Throttle control Move into idle speed position
- Lever of actuator (M 16). Force toward engine into idle speed position
- Profiled rod (1) Adjust approx. 0.5 mm longer
- Hex. head screw (4) Tighten in this position

B. Model 201



1542-14540

1544-14513

- Floor mat front right or left. Remove
- Legrest. Remove
- Connector of harness on control unit N4 Pull off
- Control unit N4 Unscrew from legrest (version A)
- Fastening plate for control units Remove (version B)
- Control unit N4. Unscrew from fastening plate (version B)

A = 1 st version
 B = 2nd version

Installation In vice-versa sequence. On defective control unit be sure to check adjustment of connecting rod (refer to Note)

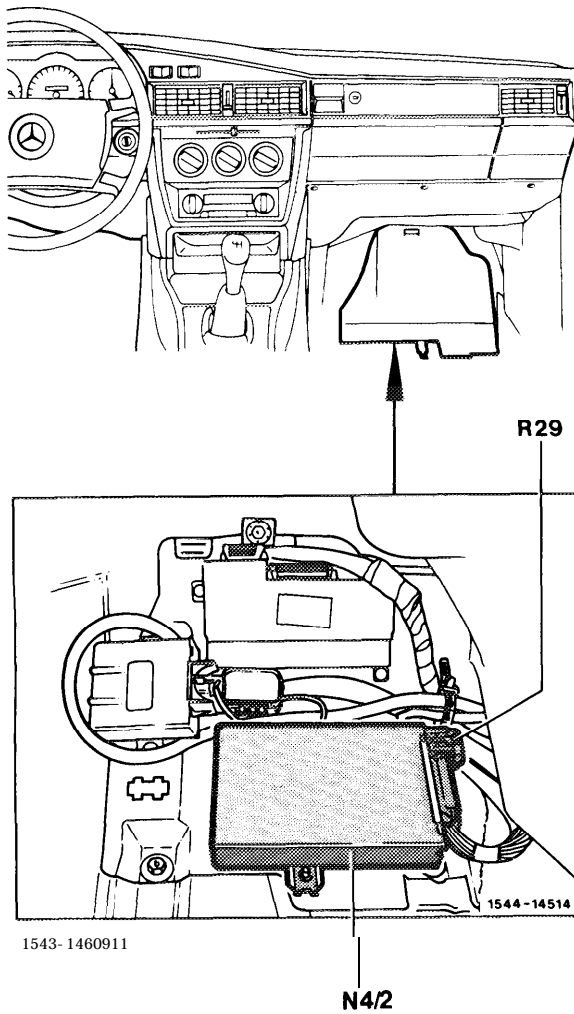
Function test Perform on road

Note

A new control unit with coding plug is installed on models **201.029/128**. The other models are phased-in.

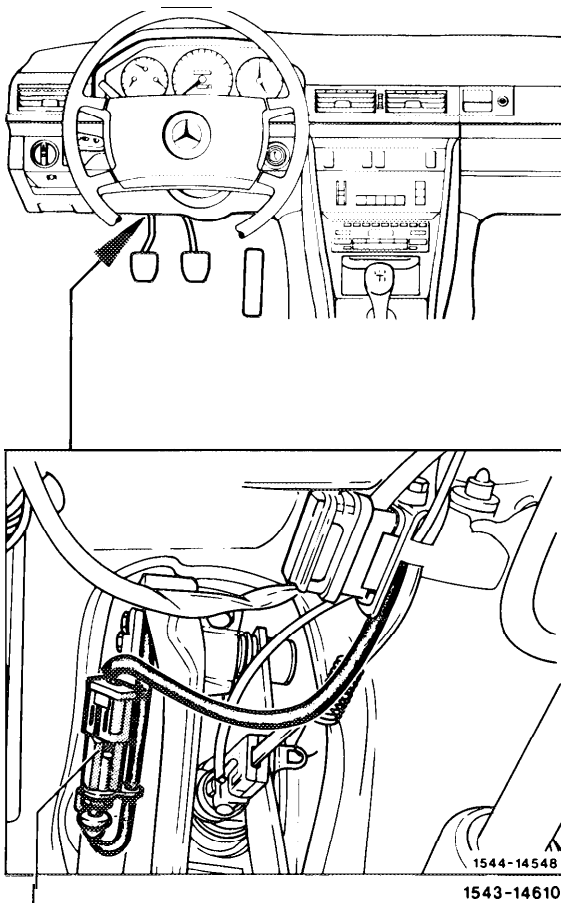
The new control unit with coding plug has no influence on wiring and thereby also not on wiring diagrams.

Model 201



Floor mat front	Remove
Legrest	Remove
Coding plug (R29)	Pull from control unit (N4/2)
Installation	In vice-versa sequence
Function test	Perform on road

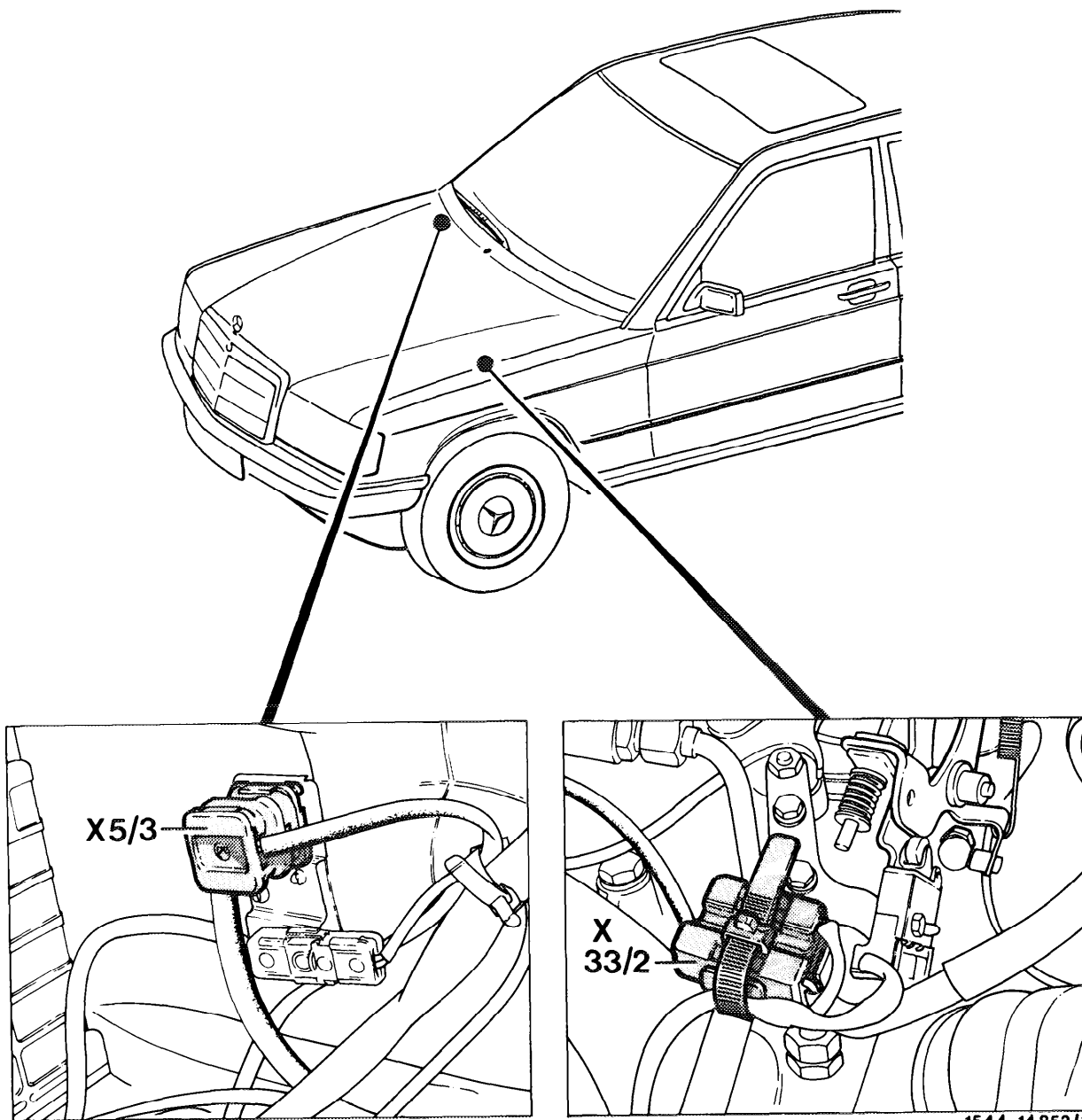
54-575 Removal and installation of switch on clutch pedal



S40/1

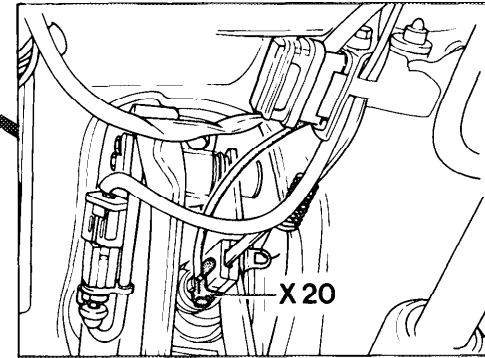
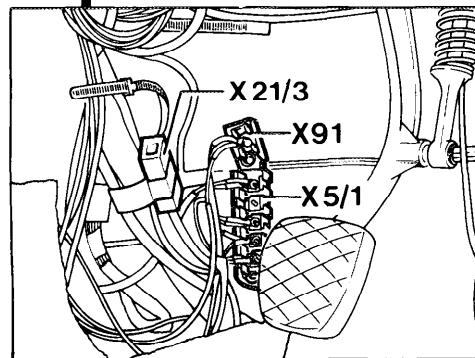
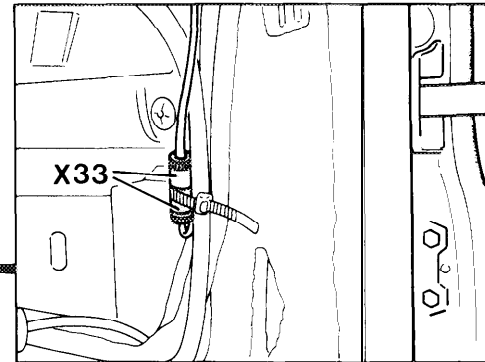
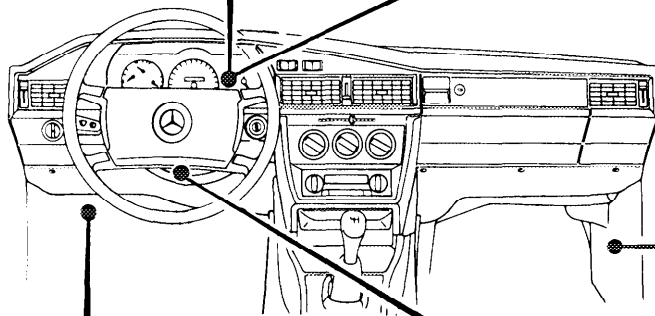
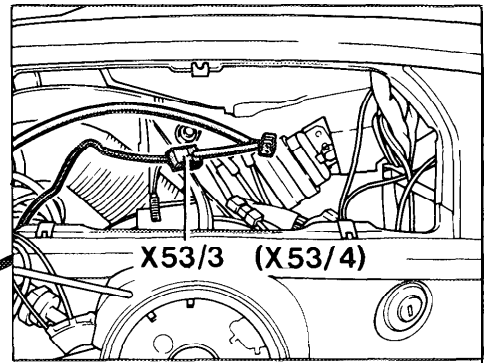
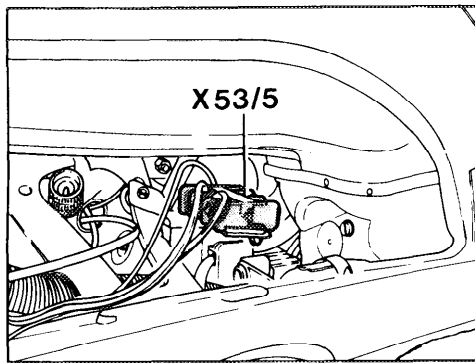
- Cover at left or right under instrument panel Remove (68-I 50)
- Connector of switch (S40/1) Pull off
- Switch (S40/1) Loosen and remove
- Installation In vice-versa sequence
- Function test Perform on road

B. Model 201



1544-14 852/1

X5/3 Plug connection interior/compressor harness
X33/2 or 3311 Plug connection CIS-E/cruise control 2-pole



1543-14 854/1

- x5/1 Cable connector interior
- x20 Plug connection stop lamp switch
- X21/3 Cable connector stop lamp switch/cruise control/Tempomat 1 -pole
- x33 Plug connection CIS-E/cruise control 1 -pole
- x53/3 Plug connection Hall sensor/EGR 1 -pole
- x53/4 Plug connection inductive transmitter/EG R2-pole
- x53/5 Multiple plug connection/Hall sensor (only if stop lamp signal is required for several special requests)
- x91 Cable connector clutch pedal/cruise control 1 -pole

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