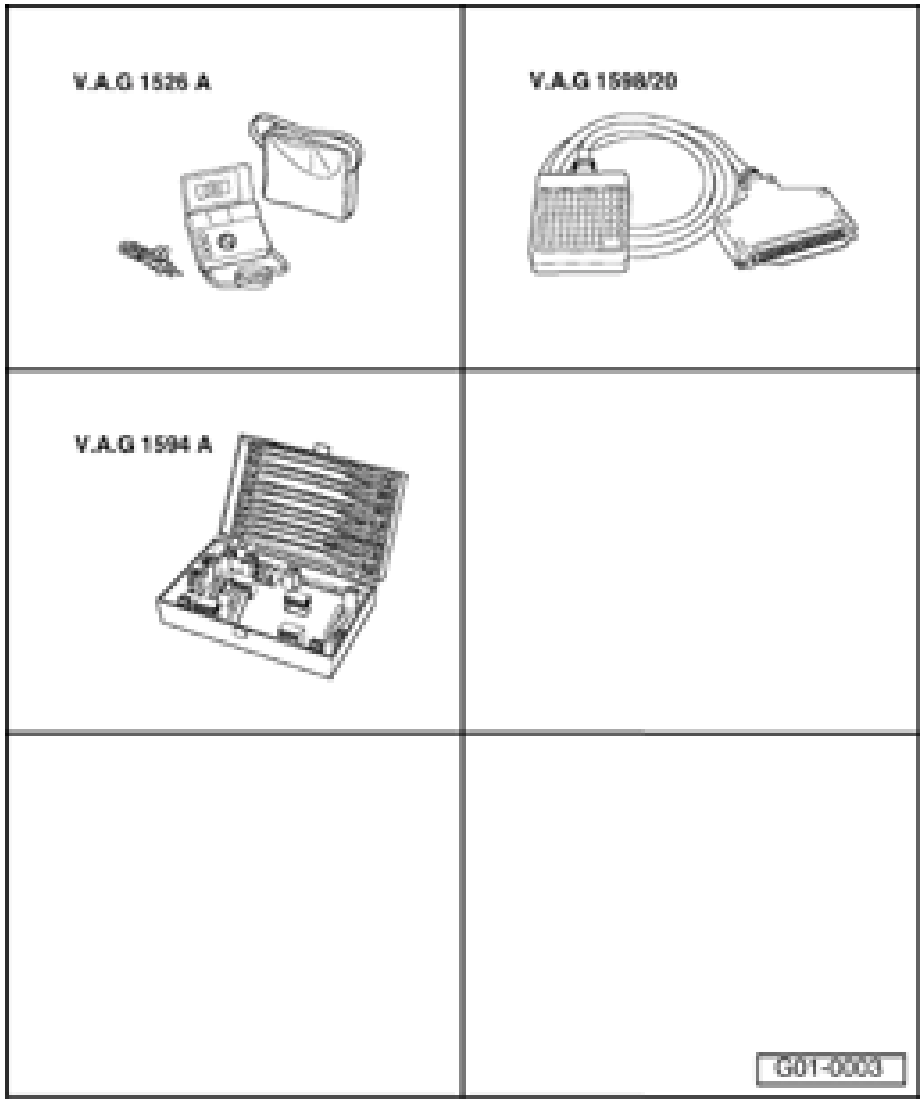
01-273



Electrical testing

Special tools and test equipment:

- VAG1526A multimeter
- VAG1598/20 test box
- VAG1594A connector test kit

01-274

Additional information

- Repair Manual, 5 Spd. Automatic Transmission 01V,
- Electrical Wiring Diagrams, Troubleshooting & Component Locations"

Notes:

- *Use VAG1526A multimeter for the test. The tables list which measures range needs to be selected before taking each measurement.*
- *The specified values are valid for an ambient temperature of 0 to 40° C (32 to 104° F).*
- *If the values obtained differ from the specified values, determine the malfunction using the applicable wiring diagram.*
- *If the measured values only deviate slightly from the specified values clean sockets and connectors of testers and repeat test. Before replacing a component, check wires and connections. If the specified values are below 10 Ω, repeat the resistance measurement on the component.*

- *Use VAG1598/20 adapter to connect test equipment.*

01-275

- *The contact numbers of the connector and the socket numbers of VAG 1598/20 test box match up ⇒ page 01-277 .*

- *To check the multi-function switch, it is not necessary to connect test box VAG 1598/20 because first the connectors for the multi-function switch are checked.*

CAUTION!

To avoid permanent damage of electronic components, select the appropriate measuring range on tester before connecting the measuring leads.

Test requirements

- Battery voltage OK

- Fuses for Transmission Control Module (TCM) OK

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*

- Fuses for component being tested OK. The fuse holder is behind a cover on the side of

the instrument cluster.

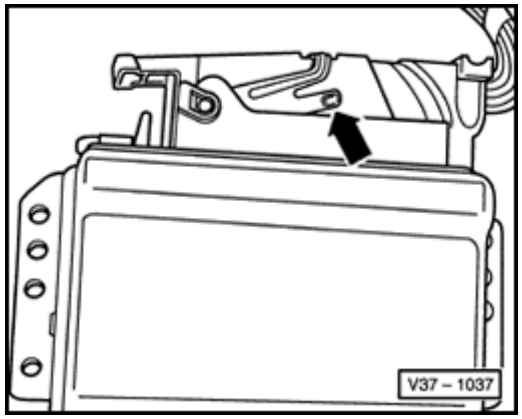
- Ground (GND) connections OK:

Check battery Ground (GND) strap and Ground (GND) strap between body and transmission.

Check Ground (GND) connections for Transmission Control Module (TCM).

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations*

01-276



- For all test steps, switch ignition off, disconnect multi-pin connector for Transmission Control Module (TCM) -J217- (located in front of passenger seat under carpet in foot well ⇒ page 01-11) and connect VAG1598/20 adapter to wiring harness connector.
- If measuring values do not match specifications, follow instructions in right-hand column of test table (labelled "Corrective action") ⇒ page 01-11 .
- Always perform all steps indicated in the "Corrective action" column.
- Only perform test steps recommended in the DTC table (selective troubleshooting).

01-277

88-pin connector for Transmission Control Module (TCM) -J217- (sockets on VAG1598/20)

1- Solenoid valve 5 -N92-	18- Kick-down switch -F8- (not for E-gas and V6-TDI)
2- Shift lock solenoid -N110-	19- Control input to transmission from ABS control module
3- Vacant	20- Engine intervention (via ignition timing) [1)]
4- Solenoid valve 7 -N94-	21- ATF temperature sensor -G93-
5- Solenoid valve 4 -N91-	22- ATF temperature sensor -G93-
6- Ground (GND) for power consumers, term. 31	23- Sensor for transmission RPM -G182- (shielding)
7- Vacant	24- Vacant
8- Multi-function TR switch -F125-, L2	25- Selector lever display (not for Highline combi)
9- Multi-function TR switch -F125-, L4 supply voltage for cruise control system	26- Supply voltage (terminal 30) with or without fuses depending on model ⇒ wiring diagram
10- Brake light switch -F- (not for E-gas and V6-TDI)	27- Kick-down for air conditioning [1)]
11- Vacant	28- Ground (GND) for electronics (terminal 31)[4)]
12- Vacant	29- Solenoid valve 6 -N93-

13- Tiptronic recognition	30- Solenoid valve 1 -N88-
14- Transmission VSS -G38-	31- Vacant
15- Transmission VSS -G38- (shielding)	32- Solenoid valve 3 -N90-
16- Sensor for transmission RPM -G182-	33- Solenoid valve 2 -N89-
17- Signal for malfunction monitor (OBD II - request) 1) 2)	34- Ground (GND) for power consumers (terminal 31)

01-278

35- Fuel consumption signal (engine torque, actual) 1)	54- Supply voltage (terminal 15)
36- Multi-function TR switch -F125-, L1	55- Supply voltage (terminal 15)
37- Multi-function TR switch -F125-, L3	56- Vacant
38- Vacant	-
39- Vacant	-
40- Engine speed (RPM) signal 1)	-
41- Throttle position value (load signal) 1)	-
42- Transmission VSS -G38-	-
43- Vacant	-
44- Sensor for transmission RPM -G182-	- Terminals 57 - 83 are vacant
45- Vacant	-
46- Tiptronic upshift switch	-
47- Tiptronic downshift switch	-
48- Vacant	-
49- Vacant	84- Vacant
50- Vacant	85- CAN-bus 3)
51- Upshift/downshift signal (for engine torque reduction)	86- CAN-bus 3)

52-	Supply voltage for solenoid valves	87-	Vacant
53-	Supply voltage for solenoid valves	88-	K-wire for On Board Diagnostic (OBD)

01-279

1) Only for vehicles without a CAN-bus.

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 00; Code letters, engine/transmission applications, ratios, equipment*

2) Signal is transmitted to Transmission Control Module (TCM) via the Engine Control Module (ECM) and can only be checked in read measured value block ⇒ page 01-186 .

3) Only for vehicles with a CAN-bus. Further information for CAN-BUS on the CAN-bus ⇒ page 01-263

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 00; Code letters, engine/transmission applications, ratios, equipment*

4) Pin 28 at the control module is vacant for vehicles with 10-pin connector of multi-function switch -F125-.

01-280

List of test steps (88-pin connector)

- Only perform test steps for the relevant component, as listed in DTC and Read Measuring Value Block tables.

Item checked		Item checked	
Supply voltage for TCM -J217-	- Perform test steps 1 and 7	Solenoid valve 5 -N92- (Pressure control valve -2- -N216-)	- Perform test steps 13 and 8
Shift lock solenoid -N110-	- Perform steps 2, 6 and 16	Solenoid valve 6 -N93- (pressure control valve -3- -N217-)	- Perform test steps 14 and 8.
Brake light switch -F-	- Perform test step 3.	Solenoid valve 7 -N94- (pressure control valve -4- -N218-)	- Perform test steps 15 and 8.
Supply voltage for cruise control system	- Perform test step 4.	Transmission VSS -G38- (Sensor for transmission output RPM -G195-)	- Perform test step 18.
Kick-down switch -F8- (not for E-gas)	- Perform test steps 5 and 17	Sensor for transmission RPM -G182-	- Perform test step 19.
Multi-function TR switch (driving range sensor) -F125-	- ⇒ page 01-322	ATF temperature sensor -G93-	- Perform test step 20.
Solenoid valve 1 -N88-	- Perform test steps 8 and 9	Wiring connection to ECM[1)]	- Perform test steps 21, 22, 23, 24, and 25

[1)] Signal is transmitted to Transmission Control Module (TCM) via the Engine Control Module (ECM). Test is only for vehicles without CAN-bus.

Item checked		Item checked	
Solenoid valve 2 -N89-	- Perform test steps 10 and 8	Tiptronic switch -F189-	- Perform test steps 26 and 27
Solenoid valve 3 -N90-	- Perform test steps 11 and 8	CAN-bus 2)	- Perform test step 28 and check CAN-bus system ⇒ page 01-265 .
Solenoid valve 4 -N91- (Pressure control valve -1--N215-)	- Perform test steps 12 and 8		

2) Only for vehicles with CAN-bus

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 00; Code letters, engine/transmission applications, ratios, equipment*

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 00; Code letters, engine/transmission applications, ratios, equipment*

01-282

Electrical test table

Voltage measurement: Switch multimeter to 20 V measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
1	55 + 6 55 + 6 54 + 28 1)	Supply voltage for Transmission Control Module (TCM) -J217-	• Ignition switched on	approx.battery voltage	- Check wiring per wiring diagram. - Check wiring from terminals 6, 34 and 28 to Ground - Check wiring from terminals 54 and 55 to terminal 15 of central electric.
	54 + 55			0 V	
	26 + 6 26 + 34	Voltage of electr. system (term. 30) for TCM -J217-	• Ignition switched off	approx. battery voltage	- Check wiring per wiring diagram.
2	2 + 6	Shift lock solenoid -N110- 2)	• Ignition switched on	approx. battery voltage	- Check wiring per wiring diagram. - Test multi-function TR switch -F125- for short circuit. - Test shift lock solenoid -N110- for short circuit.

					- Perform test steps 6 and 16

1) Pin 28 at the control module is vacant for vehicles with 10-pin connector of multi-function switch -F125-.

2) Solenoid for shift lock -N110- is also referred to as shift lock solenoid -N110-

01-283

Voltage measurement: switch multimeter to 20 V measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
3 [1)] not for E-gas engines	10 + 6 10 + 28[2)]	Brake light switch -F-	• Ignition switched on • Brake pedal not depressed	less than 1 V	- Check wiring per wiring diagram. - Replace and adjust brake light switch -F-. ⇒ *Repair Manual, Brake System, Repair Group 47*
			- Brake pedal depressed	approx. battery voltage	
4	9 + 6 9 + 28[2)]	Supply voltage for Cruise Control, Control Module -J213-	• Ignition switched on • Selector lever in D, 4 and 3	approx. battery voltage	- Check wiring from terminals 6 and 28 to Ground. - Check wiring from terminal 9 to terminal 15 of central electrics. - Check wiring to cruise control, control module -J213- - Check multi-function switch -F125- ⇒ page 01-322
			• Selector lever in P, R, N, and 2	less than 5 V	- Check fuse 31

1) This test cannot be performed on vehicles with E-gas. The signal is transmitted from brake light switch or brake test switch to Engine Control Module (ECM). The ECM then forwards the signal to the Transmission Control Module via the CAN-Bus.

2) Pin 28 at the control module is vacant for vehicles with 10-pin connector of multi-function switch -F125-.

01-284

Voltage measurement: switch multimeter to 20 V measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
5 [1)] not for E-gas engines	18 + 54	Kick-down switch -F8-	• Ignition switched on - Depress accelerator to kick-down	approx. battery voltage	- Check wiring per wiring diagram. - Adjust or replace accelerator pedal cable. ⇒ *Repair Manual, General, Engine, Repair Group 20* - Perform test step 17.

[1)] This test cannot be performed on vehicles with E-gas. The kick-down switch -F8- in this case is integrated in the Throttle Position (TP) Sensor (-G79-, -G185-).

01-285

Voltage measurement: switch multimeter to 20 V measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
6	2 + 54 2 +55	Shift Lock Solenoid -N110- [1)]	• Ignition switched off	14 to 28 Ω	- Check wiring per wiring diagram. - Check multi-function switch -F125- ⇒ Page 01-306 - Check Shift Lock Solenoid -N110- for short circuit - Perform test steps 2 and 16.

[1)] Solenoid for shift lock -N110- is also referred to as shift lock ⇒ solenoid -N110-

01-286

Resistance measurement: switch multimeter to 200 Ω measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
7	6 + 34 28 [1] + 34	Ground (GND) connection of Transmission Control Module (TCM) -J217-	• Ignition switched off	smaller than 1 Ω	- Check wiring per wiring diagram.
	34 + battery ground (GND)		•	smaller than 1 Ω	
8	52 + 53	Voltage supply to solenoid valves	• Ignition switched off	smaller than 1,5 Ω	- Check wiring per wiring diagram. - Perform test step 1 - Check wiring between TCM and 16-pin connector ⇒ page 01-302 . - Perform test step 1 - Check harness in transmission according to wiring diagram

[1] Pin 28 at the control module is vacant for vehicles with 10-pin connector of multi-function switch -F125-.

01-287

Resistance measurement: switch multimeter to 200 Ω measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
9	52 + 30	Solenoid Valve 1 -N88-	• Ignition switched off	25 to 35 Ω	- Check 16-pin connector to transmission for contact corrosion - Perform test step 8
	30 + 34			infinity Ω 1)	
10	52 + 33	Solenoid Valve 2 -N89-	• Ignition switched off	25 to 35 Ω	- Check wiring connection from 88-pin connector to 8-pin connector ⇒ page 01-302 - Check wiring harness in transmission according to wiring diagram, replace if necessary. - Remove and install valve body ⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 38*
	33 + 34			infinity Ω 1)	
11	52 + 32	Solenoid Valve 3 -N90-	• Ignition switched off	25 to 35 Ω	
	32 + 34			infinity Ω 1)	
12	52 + 5	Solenoid Valve 4 -N91-	• Ignition switched off	6 to 8 Ω	
	5 + 34			infinity Ω	

				1)	

1) Adjust VAG 1526 to highest resistance (Ω) range

01-288

Resistance measurement: switch multimeter to 200 Ω measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
13	52 + 1	Solenoid valve 5 -N92- 2)	• Ignition switched off	6 - 8 Ω	- Check for contact corrosion on 16-pin connector to transmission. - Perform test step 8. - Check wiring between 88-pin connector for TCM and 8-pin connector ⇒ page 01-302 . - Check wiring harness in transmission according to current wiring diagram; replace if necessary. - Remove and install valve body ⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 38*
	1 + 34			infinite Ω 1)	
14	52 + 29	Solenoid valve 6 -N93- 3)	• Ignition switched off	6 - 8 Ω	
	29 + 34			infinite Ω 1)	
15	52 + 4	Solenoid valve 7 -N94- 4)	• Ignition switched off	6 - 8 Ω	
	4 + 34			infinite Ω 1)	

1) Switch VAG1526 to highest resistance (Ω) measuring range.

2) Solenoid Valve 5 -N92- is also called Pressure Valve 2 -N216-.

3) Solenoid Valve 6 -N92- is also called Pressure Valve 3 -N217-.

4) Solenoid Valve 7 -N92- is also called Pressure Valve 4 -N218-.

01-289

Resistance measurement: switch multimeter to 200 Ω measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
16	2 + 36	Shift lock solenoid -N110- 3)	• Ignition switched off - Selector lever in P	14 - 28 Ω	- Check wiring per wiring diagram. - Check Multi-function Transmission Range (TR) switch ⇒ page 01-306 - Perform test step 2 and 6 - Replace shift lock solenoid -N110-. ⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 37*
17 2) not for E-gas engines	18 + 34	Kick-down switch -F8-	• Ignition switched off • Accelerator pedal not depressed	infinite Ω 1)	- Check wiring per wiring diagram. - Adjust or replace accelerator pedal cable. ⇒ *Repair Manual, General, Engine, Repair Group 20*
			- Depress accelerator pedal to kick-down.	less than 1.5 Ω	

1) Switch VAG1526 to highest resistance (Ω) measuring range.

2) This test cannot be performed on vehicles with E-gas. The kick-down switch -F8- in this case is integrated in the Throttle Position (TP) Sensor (-G79-, -G185-).

3) Solenoid for shift lock -N110- is also referred to as shift lock solenoid -N110-

01-290

Resistance measurement: switch multimeter to 20 K Ω measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
18	14 + 42	Transmission VSS -G38- [2]	• Ignition switched off	min. 0.8 KΩ max. 1.2 KΩ	- Check wiring per wiring diagram.
	14 + 34 14 + 54 42 + 54 42 + 34			infinite Ω [1]	- Replace transmission VSS -G38-, ⇒ Fig. 10, Page 01-28 .
	15 + 34 15 + 54	Shielding for -G38-	• Ignition switched off	infinite Ω [1]	- Check wiring per wiring diagram.

[1] Switch VAG1526 to highest resistance (Ω) measuring range.

[2] Transmission Vehicle Speed Sensor (VSS) -G38- is also referred to as Sensor for Transmission Output RPM -G195-.

01-291

Resistance measurement: switch multimeter to 20 K Ω measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
19 Only for hydraulic control -E17- 2)	16 + 44	Sensor for transmission RPM -G182-	• Ignition switched off min.	0.23 KΩ	- Check wiring per wiring diagram.
			max.	0.30 KΩ	
	44 + 34 44 + 54 16 + 54 16 + 34			infinite Ω 1)	- Replace sensor for transmission RPM -G182- , ⇒ Fig. 11, Page 01-29 .
	23 + 34 23 + 54	Shielding for -G182-	• Ignition switched off	infinite Ω 1)	- Check wiring per wiring diagram.

1) Switch VAG1526 to highest resistance (Ω) measuring range.

2) This test step can only be performed on transmission with hydraulic control E17. For information regarding the transmission installed:

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 00; Code letters, engine/transmission applications, ratios, equipment*

01-292

Resistance measurement: switch multimeter to 2 M Ω measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
20	21 + 22	Transmission Fluid (ATF) Temperature sensor -G93-	• Ignition switched off • ATF temperature		- Check wiring between 88-pin connector on TCM and 8-pin connector ⇒ page 01-302 . - Check wiring harness in transmission; replace if necessary. ATF temperature sensor -G93- is integrated in wiring harness in transmission.
			approx. 20 ° C	approx. 0.83 K Ω 2)	
			approx. 60 ° C	approx. 1.28 K Ω 2)	
			approx. 120 ° C	approx. 1.88 K Ω 2)	
	21 + 34 22 + 28 3)		• Ignition switched off	infinite Ω 1)	- Remove and install valve body ⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 38*

	21 + 54 22 + 54			infinite Ω 1)	

1) Switch VAG1526 to highest resistance (Ω) measuring range.

2) Permissible tolerance: ± 0.1 KΩ

3) Pin 28 at the control module is vacant for vehicles with 10-pin connector of multi-function switch -F125-.

01-293

Resistance measurement: switch multimeter to 2 M Ω measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
21 A)	41 + 28 3) 41 + 34 41 + 55 41 + 26	Wiring to ECM (throttle signal)	• Ignition switched off • ECM disconnected	infinite Ω 1)	- Check wiring per wiring diagram.
	41 + xx 2)			less than 1.5 Ω	

1) Switch VAG1526 to highest resistance (Ω) measuring range.

2) Corresponding terminal assignment at Engine Control Module (ECM)

⇒ *Electrical wiring diagrams Troubleshooting & Component Locations*

A) Signal is transmitted to Transmission Control Module (TCM) via the Engine Control Module (ECM). Test is only for vehicles without CAN-Bus

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 00; Code letters, enginer/transmission allocation, ratios, equipment*

3) Pin 28 at the control module is vacant for vehicles with 10-pin connector of multi-function switch -F125-.

01-294

Resistance measurement: switch multimeter to 2 M Ω measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
22 A)	35 + 28 1) 35 + 34 35 + 55 35 + 26	Wiring to ECM (fuel consumption/load signal)	• Ignition switched off - ECM disconnected	more than 40 KΩ	- Check wiring per wiring diagram. - Disconnect connections to other components which also receive this signal and repeat measurement.
	35 + xx 2)			less than 1.5 Ω	- Check these components for short circuit if necessary (e.g. on-board computer).
			Change measuring range to 20 V	Measure Voltage	⇒ *Repair Manual, Electrical Equipment, Repair Group 01*
	35 + 34 35 + 28 1)		• Ignition switched on - ECM disconnected	Approx. 5 V	

1) Pin 28 at the control module is vacant for vehicles with 10-pin connector of multi-function switch -F125-.

2) Corresponding terminals at Engine Control Module (ECM).

⇒ *Electrical Wiring Diagrams & Component Locations*

A) Signal is transmitted to Transmission Control Module (TCM) via the Engine Control Module (ECM). Test is only for vehicles without CAN-Bus

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 00; Code letters, engine and transmission allocation, ratios, equipment*

01-295

Resistance measurement: switch multimeter to 2 M Ω measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
23 A)	40 + 28 3) 40 + 34	Wiring to ECM (engine RPM signal)	• Ignition switched off - ECM disconnected	15 - 80 KΩ	- Check wiring per wiring diagram. - Check on-board computer.
	40 + xx 2)			less than 1.5 Ω	⇒ *Repair Manual, Electrical Equipment, Repair Group 01*
24 A)	20 + 28 3) 20 + 34 20 + 55 20 + 26	Wiring to ECM (torque reduction)	• Ignition switched off - ECM disconnected	infinite Ω 1)	- Check wiring per wiring diagram.
	20 + xx 2)			less than 1.5 Ω	

1) Switch VAG1526 to highest resistance (Ω) measuring range.

2) Corresponding terminal assignment at Engine Control Module (ECM).

⇒ *Electrical Wiring Diagrams & Component Locations binder*

A) Signal is transmitted to Transmission Control Module (TCM) via the Engine Control Module (ECM). Test is only for vehicles without CAN-Bus

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 00; Code letters, aggregate allocation, ratios, equipment*

3) Pin 28 at the control module is vacant for vehicles with 10-pin connector of multi-function switch -F125-.

01-296

Resistance measurement: switch multimeter to 2 M Ω measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
25 A)	51 + 28 3) 51 + 34 51 + 55 51 + 26	Wiring to ECM (upshift/downshift signal)	• Ignition switched off - ECM disconnected	infinite Ω 1)	- Check wiring per wiring diagram.
	51 + xx 2)			less than 1.5 Ω	

1) Switch VAG1526 to highest resistance (Ω) measuring range.

2) Corresponding terminal assignment at Engine Control Module (ECM).

⇒ *Electrical Wiring Diagrams & Component Locations*

A) Signal is transmitted to Transmission Control Module (TCM) via the Engine Control Module (ECM). Test is only for vehicles without CAN-Bus

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 00; Code letters, aggregate allocation, ratios, equipment*

3) Pin 28 at the control module is vacant for vehicles with 10-pin connector of multi-function switch -F125-.

01-297

Voltage measurement: switch multimeter to 20 V measuring range					
Test step	**VAG 1598/20sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
26	13 + 34 13 + 6	Tiptronic switch -F189-	• Ignition switched on - Selector lever in D but not in tiptronic gate	approx. 10 V	- Check wiring according to wiring diagram.
			• Ignition switched on - Selector lever tiptronic gate	approx. 20 mV	- Check magnet on lateral gate cover [1)] - Repair shift mechanism, if necessary replace gate cover or circuit board with Tiptronic switch -F189 [1)] ⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 38* - Perform test step 29

[1)] The Tiptronic Switch -F189- receives its tiptronic gate recognition information or tiptronic up- and down-shift information via the large magnet which is mounted on the lateral gate cover of the gate cover. If the switch has become detached, the gate cover must be replaced.

01-298

Voltage measurement: switch multimeter to 20 V measuring range					
Test step	**VAG 1598/20sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
27	46 + 54 46 + 55	Tiptronic Switch - F189-	• Ignition switched off - Selector lever in Tiptronic gate	less than 1.5V	With the Tiptronic Switch the driver can manually select the desired driving range 2)
			• Ignition switched on - Selector lever in Tiptronic gate and up-shift switch actuated	approx. battery voltage	- Check wiring according to wiring diagram. If installed also check wiring to Tiptronic steering wheel
	46 + 34 46 + 6		• Ignition switched on - Selector lever in D - Selector lever in Tiptronic gate - Selector lever in Tiptronic gate and downshift switch activated	approx. 12V	- Check magnet on lateral gate cover 1) - Repair shift mechanism, if necessary replace gate cover or circuit board with Tiptronic switch - F189- 1) ⇒ *Repair Manual, T5 Spd. Automatic Transmission 01V, Repair Group 37*
Continued ▼			• Ignition switched on - Selector lever in	approx. 15mV	- Perform test step 28

			Tiptronic gate and up-shift switch activated		

01-299

Voltage measurement: switch multimeter to 20 V measuring range					
Test step	**VAG1598/20sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
27 cont'd	47 + 34 47 + 6	Tiptronic Switch -F189-	• Ignition switched on - Selector lever in D - Selector lever in Tiptronic gate - Selector lever in Tiptronic gate and up - shift switch activated	approx. 12V	With the Tiptronic Switch the driver can manually select the desired driving range 2) - Check wiring according to wiring diagram. If installed also check wiring to Tiptronic steering wheel
			• Ignition switched on - Selector lever in Tiptronic gate and down-shift switch activated	approx.15 mV	- Check magnet on lateral gate cover 1)
	46 + 54 47 + 55		• Ignition switched off - Selector lever in Tiptronic gate	less than 1.5V	- Repair shift mechanism, if necessary replace gate cover or circuit board with Tiptronic switch -F189- 1)
Continued ▼			• Ignition switched off - Selector lever in Tiptronic gate and	approx. battery voltage	⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 37*

			down-shift switch activated		- Perform test step 28

Notes and footnotes for test step 27 are on the next page.

01-300

1) The Tiptronic Switch -F189- receives its tiptronic gate recognition information or tiptronic up- and down-shift information via the large magnet which is mounted on the lateral gate cover of the gate cover. If the switch has become detached, the gate cover must be replaced.

2) If the selector lever in the Tiptronic gate is pressed toward the rear (-) or on vehicles with Tiptronic sport steering wheel one of the minus (-) buttons on steering wheel is pressed, a manual shift-down can be performed (down-shift). If the selector lever in the Tiptronic gate is pressed toward the front (+) or on vehicles with Tiptronic sport steering wheel one of the plus (+) buttons on steering wheel is pressed, a manual up-shift-can be performed (up-shift).

01-301

Resistance measurement					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
28 A)	85 + 28 3) 85 + 34 86 + 28 3) 86 + 34	Wiring connection of TCM to ECM (CAN-bus)	• Ignition switched off • ECM disconnected	infinite Ω 1)	- Check wiring per wiring diagram.
	85 + xx 2) 86 + xx 2)			less than 1.5 Ω	Further information on CAN-bus ⇒ page 01-263

1) Switch VAG1526 to highest resistance (Ω) measuring range.

2) Applicable terminal assignment at Engine Control Module (ECM).

⇒ *Repair Manual, Fuel Injection & Ignition, Repair Group 24*

A) Testing only for vehicles with a CAN-bus

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 00; Code letters, engine/transmission applications, ratios, equipment*

3) Pin 28 at the control module is vacant for vehicles with 10-pin connector of multi-function switch -F125-.

01-302

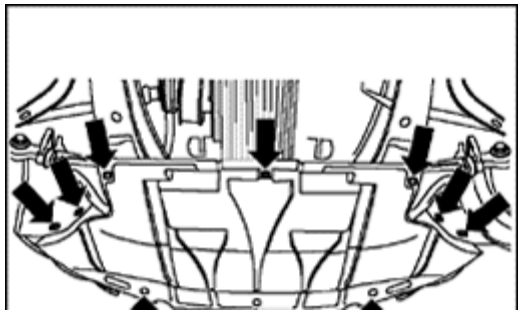
Wiring between transmission and 88-pin connector for Transmission Control Module (TCM) -J217-, testing

Perform if:

- Output Diagnostic Test Mode (DTM) or
- Electrical test indicates malfunctions in the transmission, the TCM -J217-, or in the corresponding wiring.

Test conditions

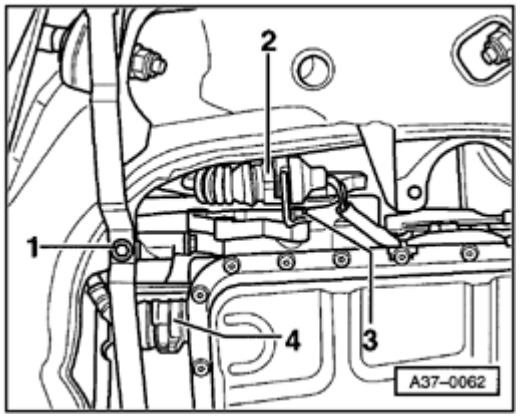
- Ignition switched off
- Connect VAG1598/20 adapter only to 88-pin connector of transmission wiring harness.
- Perform measurements with VAG1598/20 adapter on the outside of the vehicle



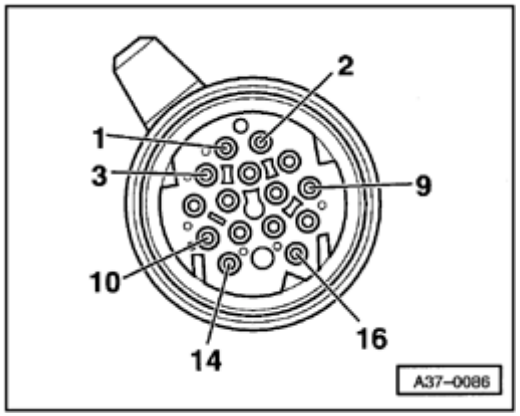
- Remove noise insulation panel.
- Remove bracket -1- for noise insulation panel.

01-303

Wiring to 16-pin connector on transmission, testing



- Turn 16-pin connector -4- on transmission to release bayonet catch.



- Use multimeter (Fluke 83 or equivalent) to test for continuity between terminals of 16-pin connector and sockets on VAG1598/20 adapter. Resistance specifications ⇒ table, page 01-304 .

01-304

Resistance specifications

Terminal on 16-pin connector	Socket on VAG1598/20 adapter	Specification	Corrective action
1	42	≤ 1.5 Ω	- Repair open circuit according to current wiring diagram. Check connectors for: - contact corrosion - ingress of water - leaks
2	5	≤ 1.5 Ω	
3	1	≤ 1.5 Ω	
4	32	≤ 1.5 Ω	
5	16	≤ 1.5 Ω	
6	44	≤ 1.5 Ω	
7	29	≤ 1.5 Ω	
8	30	≤ 1.5 Ω	
9	33	≤ 1.5 Ω	
10	14	≤ 1.5 Ω	
11	4	≤ 1.5 Ω	

12	52	≤ 1.5 Ω	
13	22	≤ 1.5 Ω	

01-305

Terminal on 16-pin connector	Socket on VAG1598/20 adapter	Specification	Corrective action
14	21	≤ 1.5 Ω	- Repair open circuit according to current wiring diagram. - Check connectors
15	Vacant		
16	53	≤ 1.5 Ω	

Notes:

- *If the readings in these tests match the specifications, check the wiring harness in the transmission.*

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 38; removing and installing valve body*

- *Only replace relevant solenoid valves if there are no faults found in the wiring harness in the transmission.*

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 38, valve body removing and installing*

01-306

Multi-function Transmission Range (TR) switch, checking

Note:

- *Check the measuring value block for the TR-switch display group number 004 ⇒ page 01-203 before checking the TR-switch.*

- *Be sure that selector lever cable is properly adjusted.*

Two different multi-function switches were used in production:

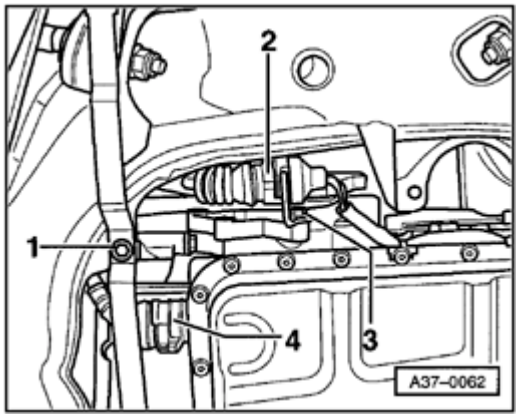
1. Multi-function switch with 8 - pin connector checking starting ⇒ page 01-308 .

2. Multi-function switch with 10 - pin connector checking starting ⇒ page 01-319 .

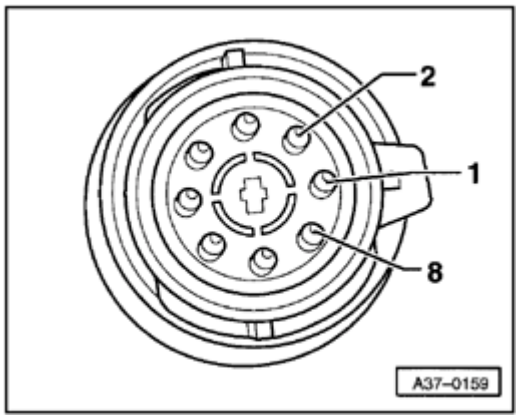
01-307

Multi-function Transmission Range (TR) switch -F125- (8-pin connector), testing

1. Function test



- Release spring catch securing 8-pin connector -2- to connector on wiring to multi-function TR switch.
- Unclip connector to multi-function TR switch from retainer or remove retainer together with connector from transmission to gain better access to the pins in the connector.



- Pin assignment for 8 - pin connector of Multi-function (TR) switch - F125-
- Use multi-meter VAG 1526A or Vehicle Diagnosis, Measuring and Information System VAS 5051.

01-308

Transmission with Multi-function Transmission Range (TR) switch -F125- with 8 - pin connector, checking

Resistance measurement: switch multimeter to 2 M Ω measuring range					
Test step	**Connector pins at F 125**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
1	1 + 7 1 + 6	Multi-function TR switch - F126-	• Ignition switched off - Selector lever in P, R, N, D, 4, 3, and 2	infinitive Ω 1)	- Check connector on multi-function TR switch for corrosion, water ingress or loose connection
	1 + 2		• Ignition switched off - Selector lever in P, N, and D	smaller than 2 Ω	- If necessary adjust selector lever cable ⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 37*
			- Selector lever in R, 4, 3, and 2	infinitive Ω 1)	
	1 + 3		• Ignition switched off - Selector lever in R, N, and 4	smaller than 2 Ω	
Continue ▼			• Ignition switched off	infinitive Ω 1)	- Replace multi-function TR switch ⇒ *Repair Manual, 5 Spd. Automatic*

			- Selector lever in P, D, 3, and 2		*Transmission 01V, Repair Group 38*

1) Switch VAG1526 to highest resistance (Ω) measuring range.

01-309

Transmission with Multi-function Transmission Range (TR) switch -F125- with 8 - pin connector, checking

Resistance measurement: switch multimeter to 2 M Ω measuring range					
Test step	**Connector pins at F 125**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
Continued 1	1 + 4		• Ignition switched off - Selector lever in N, D, 4, and 2	infinitive Ω 1)	- Check connector on multi-function TR switch for corrosion, water ingress or loose connection
	1 + 5		- Selector lever in P, R, and 3	infinitive Ω 1)	- If necessary adjust selector lever cable
			• Ignition switched off - Selector lever in D, 4, and 3	smaller than 2 Ω	⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 37*
Continue	1 + 8		- Selector lever in P, R, N, and 2	infinitive Ω 1)	- Replace multi-function TR switch
			• Ignition switched off - Selector lever in R	smaller than 2 Ω	
			- Selector lever in P,	infinitive Ω	

▼			N, D, 4, 3, and 2	1)	⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 38*

1) Switch VAG1526 to highest resistance (Ω) measuring range.

01-310

Transmission with Multi-function Transmission Range (TR) switch -F125- with 8 - pin connector, checking

Resistance measurement: switch multimeter to 2 M Ω measuring range					
Test step	**Connector pins at F 125**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
Continued to 1	6 + 7	Part No. signal of Multi-function TR switch	• Ignition switched off - Selector lever in R, D, 4, 3, and 2	infinitive Ω 1)	- Replace multi-function TR switch ⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V, Repair Group 38*
			• Ignition switched off - Selector lever in P, and N	less than 2 Ω	The Part No. signal for the Engine Control Module (ECM) is being checked

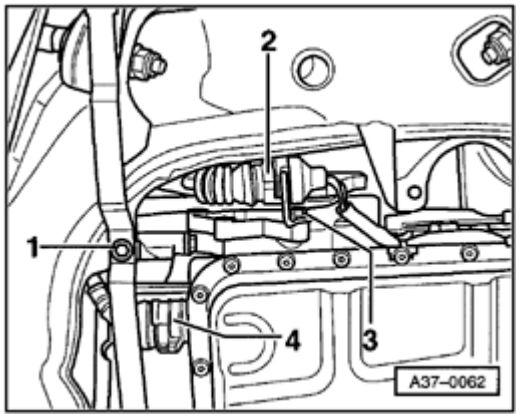
1) Switch VAG1526 to highest resistance (Ω) measuring range.

Note:

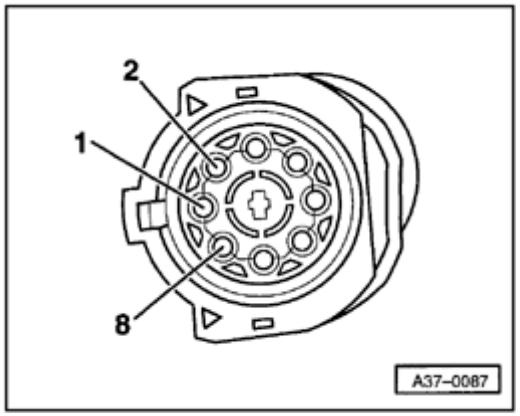
- *If function check was OK, check voltage supply to Multi-function TR switch -F125-* ⇒ *page 01-311*

01-311

2. Multi-function Transmission Range (TR) switch -F125- (8-pin connector), testing



- Release spring catch securing 8-pin connector -2- to connector on wiring to Multi-function TR switch.
- Check at connector with spring clips (cavities) to Transmission Control Module (TCM)



- Pin assignment for 8 - pin connector of multi-function (TR) switch - F125- (to TCM)
- Use multi-meter VAG 1526A or Vehicle Diagnosis, Measuring and Information System VAS 5051

Voltage measurement: switch multimeter to 20 V measuring range

Cavity in connector	Test condition	Specified value
1 + 6	Ignition switched on	Approx. battery voltage

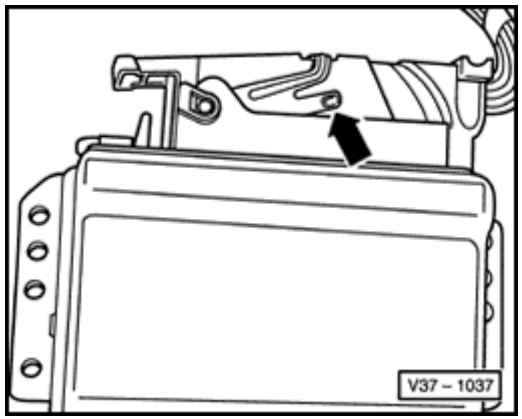
01-312

- If the specified value is not read, check fuses and wiring connectors according to wiring diagram and make necessary repairs.

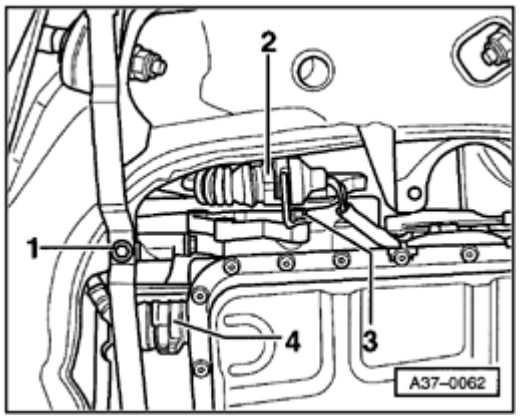
Note:

If the check results and the voltage supply to the Multi-function TR switch were OK, check wiring connections from Transmission Control Module (TCM) -J217- to Multi-function Transmission Range (TR) switch ⇒ *page 01-316*

3. Wiring from Transmission Control Module (TCM) -J217- to Multi-function Transmission Range (TR) switch -F125- (8-pin connector), checking



- Switch off ignition.
- Disconnect connector from TCM -J217-, located in front of right seat under the cover in the footwell ⇒ page 01-20 .
- Connect test box VAG 1598/20 to harness connector.



- Connect both 8-pin connectors -2- to multi-function switch -F125- as shown in the illustration.
- Use multi-meter VAG 1526A or Vehicle Diagnosis, Measuring and Information System VAS 5051

01-314

Transmission with Multi-function Transmission Range (TR) switch -F125- with 8 - pin connector, checking

Voltage measurement: switch multimeter to 20 V measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
1	36 + 34 36 + 6	Multi-function Transmission Range (TR) switch -F125-	• Ignition switched on - Selector lever in P, N, and D	Approx. 12 V	- Check connector at multi-function switch for corrosion - Check wiring per wiring diagram
			- Selector lever in R, 4, 3, and 2	Less than 1 V	- Check fuses - Check voltage supply to -F125- ⇒ page 01-311 .
	8 + 34 8 + 6		• Ignition switched on - Selector lever in R, N, and 4	Approx. 12 V	- Check wiring from 88-pin control module to 8-pin connector ⇒ page 01-319 .
			- Selector lever in P, D, 3, and 2	Less than 1 V	
	37 + 34 37 + 6		- Selector lever in N, D, 4, and 2	Approx. 12 V	

			- Selector lever in P, R, and 3	Less than 1 V	
	9 + 34 9 + 6		- Selector lever in D, 4, and 3	Approx. 12 V	
			- Selector lever in P, R, N, and 2	Less than 1 V	

01-315

Transmission with Multi-function Transmission Range (TR) switch -F125- with 8 - pin connector, checking

Resistance measurement: switch multimeter to 2 M Ω measuring range					
Test step	**VAG 1598/20 sockets**	**Test of**	• Test conditions - Additional steps	**Specified value**	**Corrective action**
2	36 + 8	Multi-function Transmission Range (TR) switch -F125	• Ignition switched off - Selector lever in N	less than 26 Ω	- Check connector at multi-function switch for corrosion
			- Selector lever in P, R, D, 4, 3, and 2	infinitive Ω [1)]	- Check wiring from 88-pin control module to 8-pin connector ⇒ page 01-319 .
	37 + 9		• Ignition switched off - Selector lever in D and 4	less than 26 Ω	- Perform test steps 6 and 27.
			- Fuse 31 removed [2)] - Selector lever in P, R, N, 3 and 2	infinitive Ω [1)]	
	37 + 36		• Ignition switched off	less than 26 Ω	

			- Selector lever in N, and D		