Workshop Manual
OCTAVIA 1997 ➢

1.9 l/74 kW (TDI) Engine, Fuel Injection and Glow Plug System
Edition 03.01

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List of Supplements to Workshop Manual

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Supple-ment	Edition	Subject	Article Number
	03.01	Basic Edition	S00.5139.50.20
1	04.03	Modifications in Rep. Gr. 01 and 23	S00.5139.51.20
2	12.03	Modifications in Rep. Gr. 01 23 and 28	S00.5139.52.20

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01 – Self-diagnosis

01-1 Self-diagnosis I

Properties of the self-diagnosis

The control unit for the diesel direct injection system is equipped with a fault memory. The fault memory is designed as a permanent memory.

If malfunctions occur in the monitored sensors or components, they are stored in the fault memory with indication of the fault type. Fault table ⇒ Chap. 01-2.

Faults which occur only temporarily (sporadically) are displayed with the suffix „/SP“. Possible causes of sporadic faults are e.g. a loose contact or a momentary line interruption. If a sporadic fault no longer occurs after 50 engine starts, it is automatically erased.

If faults are detected that are likely to influence the driving behaviour, the glow period warning lamp -K29- flashes.

The stored faults can be read out with the vehicle system tester -V.A.G 1552-, -V.A.G 1551- or -VAS 5051- ⇒ **01-1** page 2.

After the fault(s) has(have) been removed the fault memory must be erased ⇒ **01-1** page 3.

Note

The following description only relates to vehicle system tester -V.A.G 1552- using the current program card. When not using the current program card or when using the fault read-out scan tool -V.A.G 1551- with integrated printer or using the vehicle diagnosis, measurement and information system -VAS 5051- a minor deviation in the display is possible.

Technical data of self-diagnosis

Interrogating control unit version

The control unit version is displayed once the vehicle system tester -V.A.G 1552 - is connected and the engine electronics control unit is selected ⇒ **01-1** page 2.

Available functions when using the vehicle system tester -V.A.G 1552-

The preconditions for selecting the desired functions are given in the following table.

Operation		Condition		
		Engine not running, ignition switched on	Engine idling	Normal driving
01	Interrogating control unit version	yes	yes	yes
02	Interrogating fault memory	yes[1)]	yes	yes
03	Actuator diagnosis	yes	yes	no
04	Basic setting	no	yes	no
05	Erasing fault memory	yes	yes	yes
06	Ending output	yes	yes	yes
07	Coding control unit	yes	no	no
08	Reading measured value block	yes	yes	yes
11	Login procedure	yes	no	no

1) Only perform with the ignition on, if the engine does not start.

Connecting vehicle system tester -V.A.G 1552- and selecting the control unit for engine electronics

Special tools, test and measuring equipment and auxiliary items required

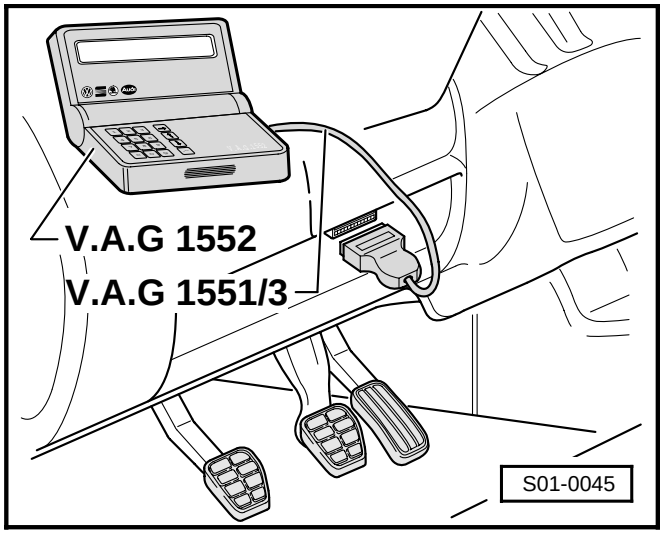
- Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-

Test conditions

- Battery voltage at least 11.5 volts
- Earth connection to engine and gearbox O.K.
- Fuses must be OK in compliance with the current flow diagram.

Procedure

– Connect vehicle system tester - V.A.G 1552- with cable ►



Once the vehicle system tester has been connected:

– Switch on ignition or start ⇒ **01-1** page 1 engine depending on the function desired.

Note

- *If „data transfer errors“ are displayed as a result of an incorrect entry, disconnect cable at vehicle system tester, connect it in again and repeat all the steps.*
- *If one of the following messages appears in the display, test the diagnostic cable ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations or ⇒ Operating Instructions of vehicle system tester.* ►

```
Vehicle system test                    HELP
The control unit does not respond
```

► `Vehicle system test HELP`
`Fault in communication set-up`

► `Vehicle system test HELP`
`K cable does not connect to earth`

► `Vehicle system test HELP`
`K cable does not connect to pos. term.`

– Operate the vehicle system tester by referring to the read-out on the display.

Readout on display:

► `Vehicle system test HELP`
`Enter address word XX`

– Enter address word 01 „Engine electronics“ and confirm entry with Q.

The control unit identification appears in the display, e.g.: ►

```
038906019R  1.9l R4  EDC G000SG  1053 ->
Coding 00003                    WSC XXXXX
```

- 038906019R = Part No. of control unit (for current control unit version refer to Parts List)
- 1.9 ltr. = engine displacement
- R4 = engine version (4 cyl. in-line engine)
- EDC = Injection system (Electronic Diesel Control)
- CC = Cruise control system activated (only on models with CCS)
- 000 = Control unit ID
- MG = Manual gearbox
- 1053 = Data status (Software version of the control unit)
- Coding 00003 = Coding version of control unit
- WSC XXXXX = Workshop identification

Note

- *If the control unit version displayed does not correspond to the vehicle, replace the control unit ⇒ Chapter 23-5.*
- *Incorrect coding of the engine control unit results in:*
- *Handling problems (jerky gear change, load change jolts etc.)*
- *Increase in fuel consumption*
- *Increase in pollution*
- *Storage of non-existent faults in fault memory*

Interrogating and erasing fault memory

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-

Interrogating fault memory

– Connect vehicle system tester -V.A.G 1552-. Start engine and select address word 01 „Engine electronics“ ⇒ **01-1** page 2.

Only if the engine does not start:

– Switch on ignition.
– Enter function 02 „Interrogate fault memory“ and confirm entry with the Q key.

The number of stored faults or „No fault recognised“ appears in the display.

```
X faults detected!
```

If no fault is stored:

– Enter function 06 „End output“ and confirm entry with Q.

If one or several faults are stored:

– Press →.

Readout on display, e.g.:

```
                                        ->
Fault number: 16685    P0301    044
```

– Press →.

Fault source and fault type appear in the display, e.g.:

```
Cylinder 1                              ->
Combustion misfiring detected
```

– Press →.

The stored faults are displayed in sequence.

– Enter function 06 „End output“ and confirm entry with Q.
– Rectify the faults displayed by referring to the fault table ⇒ Chapter 01-2.

Note

When carrying out testing and removal and installation operations faults such as connector unplugged or CAN bus faults, may also be detected by other control units. This is why, when the work is concluded, that it is necessary to interrogate and erase the fault memory on all control units. For this you must proceed as follows:

– Enter function 00 for „Automatic test sequence“ and confirm with Q.

The Vehicle system tester -V.A.G 1552- sends all the known address words one after the other.

Erasing fault memory

Test conditions

- Fault eliminated
- Fault memory interrogated ⇒ **01-1** page 3

Note

After fault elimination the fault memory must again be interrogated and subsequently erased.

– Enter function 05 „Erase fault memory“ and confirm entry with the Q key.

Readout on display:

```
Vehicle system test                     ->
Fault memory was erased
```

Note

If the ignition is switched off during „Interrogating fault memory“ and „Erasing fault memory“, the fault memory is not erased.

– Enter function 06 „End output“ and confirm entry with Q.
– Perform a test drive. Then, once again interrogate the fault memory. No fault must be displayed.

Actuator diagnosis

With the actuator diagnosis the following parts are activated in the sequence indicated:

1 - Exhaust gas recirculation valve -N18-

2 - AC compressor engagement

3 - Solenoid valve for charge pressure control -N75-

4 - Changeover valve for intake manifold flap -N239-

5 - Glow period warning lamp -K29-

6 - Radiator fan control

7 - Glow plug relay -J52-

8 - Low heat output relay -J359-

9 - High heat output relay -J360-

10 - Fault lamp

Note

- *Actuation of the individual control elements is limited to 30 seconds.*
- *If final control diagnosis is to be repeated wirthout starting the engine in-between, switch ignition off for about 20 seconds.*

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-

Test conditions

- Fuses must be OK in compliance with the current flow diagram.

Procedure

– Connect vehicle system tester -V.A.G 1552-. Start engine and select address word 01 „Engine electronics“ ⇒ **01-1** page 2.
– Enter function 03 „Final control diagnosis“.

Readout on display:

```
Actuator diagnosis                    ->
Exhaust gas recirculation valve -N18
```

The valve must click.

Note

The clicking of the valve cannot be heard because of the engine noise and can therefore only be checked.

If the valve does not click:

- Testing Exhaust gas recirculation valve -N18 - ⇒ Chap. 23-1.
- Press (→).

Readout on display:

```
Actuator diagnosis                    ->
AC compressor engagement
```

This test step is also activated on vehicles without AC system.

- Disregard display.
- Press (→).

Readout on display:

```
Actuator diagnosis                    ->
Charge press.control solenoid valve -N75
```

The valve must click.

Note

The clicking of the valve cannot be heard because of the engine noise and can therefore only be checked.

If the valve does not click:

- Test charge pressure control solenoid valve -N75 - ⇒ Chap. 23-1.
- Press (→).

Readout on display:

```
Actuator diagnosis                    ->
Intake manif.flap change-over valve-N239
```

The engine must stop.

If the engine does not stop:

- Switch off ignition.
- Inspecting Intake manifold flap change-over valve -N239- ⇒ Chap. 23-1.
- Continue final control diagnosis with the engine off and the ignition switched on.
- Press (→).

Readout on display:

```
Actuator diagnosis                    ->
Glow period warning lamp -K29
```

The warning light for glow period must flash.

If the warning light does not flash:

- Test glow period warning light - K29 - ⇒ Electrical System; Rep. Gr. 90.
- Press (→).

Readout on display:

```
Actuator diagnosis                    ->
Radiator fan control
```

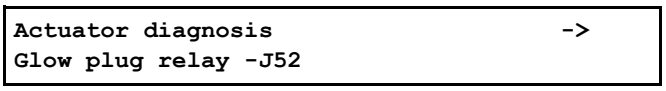
Radiator fan control unit -J293- switches the radiator fan on and off for 30 seconds.

If the fan does not run:

– Testing radiator fan -V7- and radiator fan control unit -J293- ⇒ Current Flow Diagrams, Fault Finding Electrics and Fitting Locations.

– Press (→).

Readout on display:



The relay must click.

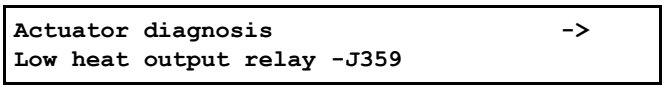
It is also possible to observe the relay switching on and off by the interior light becoming brighter and darker (caused by the high power consumption of glow plugs).

If the relay does not click:

– Test glow plug relay -J52- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

– Press (→).

Readout on display:



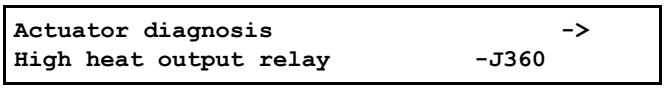
The relay must click.

If the relay does not click:

– Test low heat output relay -J359- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

– Press (→).

Readout on display:



The relay must click.

If the relay does not click:

– Test high heat output relay -J360 - ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

– Press (→).

Readout on display:

The fault lamp must flash.

If the fault lamp does not flash:

– Test fault lamp ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

– Press (→).

Readout on display:

– Enter function 06 „End output“ and confirm entry with (Q).

01-2 Self-diagnosis II

Fault table

Note

- *The fault table is ordered according to the 5-digit fault code on the left.*
- *The SAE code which is displayed on the right next to the fault code (e.g. P0107) can be ignored (at present only valid for USA).*
- *Explanations regarding fault types (e.g. „open circuit or short-circuit to earth“) ⇒ Operating instructions for the vehicle system tester.*
- *If parts are output as faulty: First of all test all leads and plug connections to these components, as well as the earth connections according to current flow diagram. Only if no fault is detected here should the part be replaced. This applies in particular if faults are shown as „sporadic“ (SP).*
- *If „Info in literature“ appears in the display of the vehicle system tester - V.A.G 1552- look for the text required in the fault table under the fault code.*

Readout on -V.A.G 1552-		Rectifying fault
16485 Air mass meter -G70	Implausible signal	– Test air mass meter -G70 - ⇒ Chap. 01-4, display group 003
16684 Combustion misfiring detected		– Test compression ⇒ 1.9/74 kW (TDI) Engine, Mechanical Components; Rep. Gr. 15. – Check unit injector ⇒ Chap. 23-3
16685 Cyl. 1 combustion misfirings detected		
16686 Cyl. 2 combustion misfirings detected		
16687 Cyl. 3 combustion misfirings detected		
16688 Cyl. 4 combustion misfirings detected		
16705 Engine speed sender -G28	Implausible signal	– Inspecting Engine speed sender -G28- ⇒ Chap. 23-1
16706 Engine speed sender -G28	No signal	– Inspecting Engine speed sender -G28- ⇒ Chap. 23-1 – Check wiring according to current flow diagram ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations – Replace diesel direct injection system control unit -J248- ⇒ Chap. 23-5
16725 Camshaft pos. sensor => Sender -G40	Implausible signal	– Test camshaft position sensor -G40- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations – Remove open circuit in wiring or short circuit according to current flow diagram ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations – Test position of camshaft and sensor rotor ⇒ 1.9/74 kW (TDI) Engine, Mechanical Components; Rep. Gr. 15.
16885 Vehicle speed signal	Implausible signal	– Test vehicle speed signal ⇒ Chapter 23-6

Readout on -V.A.G 1552-		Rectifying fault
16944 Voltage supply	Implausible signal	– Test cables to diesel direct injection system control unit - J248- according to the current flow diagram ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations
16946 Voltage supply	Voltage too low	
16947 Voltage supply	Voltage too high	
16955 Brake light switch -F	Implausible signal	– Test brake light switch - F- and brake pedal switch -F47- ⇒ Chap. 01-4, display group 006
16989 Control unit defective		– Replace diesel direct injection system control unit -J248 - ⇒ Chap. 23-5
17552 Air mass meter -G70	Open circuit or short circuit to earth	– Test air mass meter -G70- ⇒ Chap. 01-4, display group 003 – Check wiring according to current flow diagram ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations – Replace diesel direct injection system control unit -J248- ⇒ Chap. 23-5
17553 Air mass meter -G70	Short circuit to positive	
17554 Air mass meter -G70	Voltage supply	
17563 Intake manifold pressure sender -G71	Short circuit to positive	– Test intake manifold pressure sender -G71- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations – Check wiring according to current flow diagram ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations – Replace diesel direct injection system control unit - J248 - ⇒ Chap. 23-5 – Test intake manifold pressure ⇒ Chap. 01-4, display group 010
17564 Intake manifold pressure sender -G71	Open circuit or short circuit to earth	
17565 Intake manifold pressure sender -G71	Voltage supply	
17568 Intake manifold temperature sender -G72	Short circuit to earth	– Test intake manifold temperature sender -G72- ⇒ Chap. 01-4, display group 007 – Check wiring according to current flow diagram ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations – Replace diesel direct injection system control unit -J248 - ⇒ Chap. 23-5
17569 Intake manifold temperature sender -G72	Open circuit/ Short circuit to positive	
17570 Fuel temperature sender -G81	Short circuit to earth	– Test fuel temperature sender -G81- ⇒ Chap. 01-4, display group 007 – Check wiring according to current flow diagram ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations – Replace diesel direct injection system control unit - J248 - ⇒ Chap. 23-5
17571 Fuel temperature sender -G81	Open circuit/ Short circuit to positive	
17663 Coolant temperature sender -G62		
17664 Coolant temperature sender -G62	Short circuit to earth	– Test coolant temperature sender -G62- ⇒ Chap. 01-4, display group 007 – Check wiring according to current flow diagram ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations – Replace diesel direct injection system control unit -J248 - ⇒ Chap. 23-5

Readout on -V.A.G 1552-		Rectifying fault
17668 Unit injector solenoid valve cyl. 1 -N240	Implausible signal	– Check unit injector ⇒ Chap. 23-3
17669 Unit injector solenoid valve cyl. 1 -N240	Regulating limit exceeded	
17670 Unit injector solenoid valve cyl. 1 -N240	Regulating limit not reached	– Check unit injector ⇒ Chap. 23-3 – Test fuel supply ⇒ 1.9/74 kW (TDI) Engine, Mechanical Components; Rep. Gr. 20
17671 Unit injector solenoid valve cyl. 2 -N241	Implausible signal	– Check unit injector ⇒ Chap. 23-3
17672 Unit injector solenoid valve cyl. 2 -N241	Regulating limit exceeded	
17673 Unit injector solenoid valve cyl. 2 -N241	Regulating limit not reached	– Check unit injector ⇒ Chap. 23-3 – Test fuel supply ⇒ 1.9/74 kW (TDI) Engine, Mechanical Components; Rep. Gr. 20
17674 Unit injector solenoid valve cyl. 3 -N242	Implausible signal	– Check unit injector ⇒ Chap. 23-3
17675 Unit injector solenoid valve cyl. 3 -N242	Regulating limit exceeded	
17676 Unit injector solenoid valve cyl. 3 -N242	Regulating limit not reached	– Check unit injector ⇒ Chap. 23-3 – Test fuel supply ⇒ 1.9/74 kW (TDI) Engine, Mechanical Components; Rep. Gr. 20
17677 Unit injector solenoid valve cyl. 4 -N243	Implausible signal	– Check unit injector ⇒ Chap. 23-3
17678 Unit injector solenoid valve cyl. 4 -N243	Regulating limit exceeded	
17679 Unit injector solenoid valve cyl. 4 -N243	Regulating limit not reached	– Check unit injector ⇒ Chap. 23-3 – Test fuel supply ⇒ 1.9/74 kW (TDI) Engine, Mechanical Components; Rep. Gr. 20
17795 Control unit defective		– Replace diesel direct injection system control unit -J248 - ⇒ Chap. 23-5
17810 Exhaust gas recirculation valve -N18	Short circuit to positive	– Test exhaust gas recirculation valve -N18- with final control diagnosis ⇒ Chap. 01-1 – Inspecting exhaust gas recirculation ⇒ Chap. 23-4
17849 Exhaust gas recirculation valve -N18	Open circuit or short circuit to earth	
17910 Fuel pump relay -J17	Short circuit to positive	– Testing fuel pump relay -J17- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations
17911 Load signal for alternator terminal DF	Implausible signal	– Test generator ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations and ⇒ Electrical System; Rep. Gr. 27 – Reading measured value block, display group 016 ⇒ Chap. 01-4

Readout on -V.A.G 1552-		Rectifying fault
17931 Crash signal from airbag CU	Implausible signal	– Test airbag system ⇒ Body Work; Rep. Gr. 01
17932 Fuel pump relay -J17	Open circuit or short circuit to earth	– Testing fuel pump relay -J17- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations
17948 Vehicle speed signal	Signal too high	– Test vehicle speed signal ⇒ Chapter 23-6 – Test CAN databus lines ⇒ Chapter 23-6 – Test dash panel insert ⇒ Electrical System; Rep. Gr. 90
17954 Charge pressure control solenoid valve -N75	Short circuit to positive	– Test charge pressure control solenoid valve -N75- with final control diagnosis ⇒ Chap. 01-1
17957 Charge pressure control solenoid valve -N75	Open circuit or short circuit to earth	
17958 Charge pressure	Control difference	– Test charge pressure control solenoid valve - N75- with final control diagnosis ⇒ Chap. 01-1 – Reading measured value block, display group 010 ⇒ Chap. 01-4 – Test charge pressure control ⇒ 1.9/74 kW (TDI) Engine, Mechanical Components; Rep. Gr. 21
17964 Charge pressure control	Regulating limit not reached	
17965 Charge pressure control	Regulating limit exceeded	
17977 Cruise control system switch -E45	Implausible signal	– Analyse measured value block, display groups 006 and 022 ⇒ Chap. 01-4 – Read out fault memory of the electrical system control unit ⇒ Electrical System; Rep. Gr. 90
17978 Engine control unit blocked[1)]		– Adapt diesel direct injection system control unit - J248- to electronic immobiliser ⇒ Electrical System; Rep. Gr. 96 – Test immobiliser ⇒ Electrical System; Rep. Gr. 96
18008 Voltage supply terminal 15	Voltage too low	– Test voltage supply for diesel direct injection system control unit -J248- ⇒ Chap. 23-5
18009 Voltage supply relay terminal 30 -J317[2)]	Implausible signal	– Test diesel direct injection system relay -J322- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations
18017 Crash disconnect activated		– Read out fault memory of airbag control unit ⇒ Body Work; Rep. Gr. 01 – Replace airbag control unit ⇒ Body Work; Rep. Gr. 69
18020 Engine control unit	Incorrectly coded	– Code diesel direct injection system control unit -J248- ⇒ Chap. 23-5
18024 Glow period warning lamp -K29	Short circuit to positive	– Test glow period warning lamp -K29- with final control diagnosis ⇒ Chap. 01-1
18025 Glow period warning lamp -K29	Open circuit or short circuit to earth	

Readout on -V.A.G 1552-		Rectifying fault
18026 Glow plug relay -J52	Short circuit to positive	– Test glow plug relay -J52 - with final control diagnosis ⇒ Chap. 01-1
18027 Glow plug relay -J52	Short circuit to earth	
18039 Accelerator pedal position sender -G79	Signal too high	– Test accelerator pedal position sender -G79- ⇒ Chap. 01-4, display group 002
18040 Accelerator pedal position sender -G79	Voltage supply	
18043 Data BUS drive	Missing message from air conditioning system CU	– Test CAN databus lines ⇒ Chapter 23-6 – Read out air conditioning system control unit fault memory ⇒ Heating, Air conditioning; Rep. Gr. 01
18044 Data BUS drive	Missing message from airbag CU	– Test CAN databus lines ⇒ Chapter 23-6 – Read out fault memory of airbag CU ⇒ Body Work; Rep. Gr. 01
18045 Data BUS drive	missing message form electron. CU	– Test CAN databus lines ⇒ Chapter 23-6 – Read out fault memory of electrical system control unit ⇒ Electrical System; Rep. Gr. 90
18047 1/2 for accelerator pedal position sender -G79+G185	Implausible signal	– Test accelerator pedal position sender -G79- ⇒ Chap. 01-4, display group 002 – Replace diesel direct injection system control unit -J248- ⇒ Chap. 23-5
18048 Control unit defective		– Replace diesel direct injection system control unit -J248 - ⇒ Chap. 23-5
18056 Data BUS drive	defective	– Test CAN databus lines ⇒ Chapter 23-6 – Read out fault memory of engine CU ⇒ Chapter 01-1
18057 Data BUS drive	Missing message from ABS CU	– Test CAN databus lines ⇒ Chapter 23-6 – Read out fault memory of ABS control unit ⇒ Chassis; Rep. Gr. 45
18058 Data BUS drive	Missing message from combiinstrument	– Test CAN databus lines ⇒ Chapter 23-6 – Read out fault memory of dash panel insert ⇒ Electrical System; Rep. Gr. 90
18062 Read out fault memory of combiinstrument		– Perform self-diagnosis of the dash panel insert ⇒ Electrical System; Rep. Gr. 01
18065 Air conditioning system inlet/outlet	Short circuit to positive	– Test AC compressor control with final control diagnosis ⇒ Chap. 01-1
18067 Radiator fan control 1		– Test radiator fan control with final control diagnosis ⇒ Chap. 01-1
18071 Actuation of unit injector solenoid valve	Short circuit to positive	– Check unit injector ⇒ Chap. 23-3
18072 Actuation of unit injector solenoid valve	Electrical fault in the circuit	
18073 Actuation of unit injector solenoid valve	Mechanical fault	– Replacing unit injector ⇒ Chap. 23-2

Readout on -V.A.G 1552-		Rectifying fault
18074 Unit injector solenoid valve cyl. 1 -N240	Electrical fault in the circuit	– Test unit injector ⇒ Chap. 23-3
18075 Unit injector solenoid valve cyl. 2 -N241		
18076 Unit injector solenoid valve cyl. 3 -N242		
18077 Unit injector solenoid valve cyl. 4 -N243		
18080 Radiator fan control 1	Open circuit or short circuit to earth	– Test actuation of radiator fan -V7- with final control diagnosis ⇒ Chap. 01-1
18090 Data BUS drive	implausible message from ABS CU	– Test CAN databus lines ⇒ Chapter 23-6 – Read out fault memory of ABS control unit ⇒ Chassis; Rep. Gr. 45
18097 Data BUS drive	Implausible message from electron. CU	– Test CAN databus lines ⇒ Chapter 23-6 – Read out fault memory of electrical system control unit ⇒ Electrical System; Rep. Gr. 90
19456 Glow period warning lamp -K29-	Missing message from combiinstrument	– Test CAN databus lines ⇒ Chapter 23-6
19458 Kick-down switch -F8-	Implausible signal	– Test accelerator pedal position sender -G79- ⇒ Chap. 01-4, display group 002
19459 Low heat output relay -J359	Short circuit to positive	– Test low heat output relay -J359- with final control diagnosis ⇒ Chap. 01-1
19461 High heat output relay -J360		– Test high heat output relay -J360- with final control diagnosis ⇒ Chap. 01-1
19463 Camshaft pos. sensor => Sender -G40	No signal	– Test camshaft position sensor -G40- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations – Test position of camshaft and sensor rotor ⇒ 1.9/74 kW (TDI) Engine, Mechanical Components; Rep. Gr. 15.
19464 Camshaft pos. sensor => Sender -G40	Signal outside tolerance	– Test camshaft position sensor -G40- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations – Remove open circuit in wiring or short circuit according to current flow diagram ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations – Test position of camshaft and sensor rotor ⇒ 1.9/74 kW (TDI) Engine, Mechanical Components; Rep. Gr. 15.

Readout on -V.A.G 1552-		Rectifying fault
19560 Intake manifold flap change-over valve - N239	Short circuit to positive	– Test intake manifold flap changeover valve -N239- with final control diagnosis ⇒ Chap. 01-1
19561 Intake manifold flap change-over valve - N239	Open circuit or short circuit to earth	
19586 Exhaust gas recirculation system	Regulating limit not reached	– Testing Exhaust gas recirculation valve -N18- ⇒ Chap. 23-1 – Inspecting exhaust gas recirculation ⇒ Chap. 23-4
19587 Exhaust gas recirculation system	Regulating limit exceeded	

1) When attempting to start with a non-adapted key a static fault is stored in the memory. If a subsequent start attempt occurs with an adpated key the fault is changed to a sporadic fault.

2) Relay for voltage supply terminal 30 -J317- is identical with relay for diesel direct injection system -J322-.

01-3 Self-diagnosis III

Readiness code

Reading readiness code

Operation

The readiness codes are two eight-digit numerical codes which indicate the status of the emission-relevant diagnoses.

If the diagnosis for a system was successfully performed (e.g. exhaust gas recirculation system), the relevant position of the numerical code is set from 1 to 0.

This diagnosis is performed at regular intervals during normal driving. If repairs have been done on a system relevant for the exhaust gas it is recommended to generate the readiness code as this guarantees that the systems operate according to the specifications. If a fault is detected during the diagnosis it is entered in the fault memory.

Readiness code is erased, i.e all relevant points will be set to 1, through deletion of the fault memory.

Generation of readiness code refers to the activation of the diagnostic functions such as diagnosis of fuel supply, diagnosis of other systems etc.

Procedure

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-

– Connect vehicle system tester -V.A.G 1552- and enter address word 01 „Engine electronics“ ⇒ Chap. 01-1.

– Select function 08 „Read measured value block“ and display group number 017.

Readout on display:

```
Reading measured value block        17   ->
00000000  00000110  10000000    00000000
```

Meaning of 8-digit numerical block for readiness code in display field 2

1	2	3	4	5	6	7	8	Meaning
							0	Ignore
						1		Ignore
					1			Ignore
				0				Ignore
			0					Ignore
		0						Diagnosis of other systems
	0							Diagnosis of fuel system
0								Ignore

Meaning of 8-digit numerical block for readiness code in display field 4								
1	2	3	4	5	6	7	8	Meaning
							0	Ignore
						0		Ignore
					0			Ignore
				0				Ignore
			0					Ignore
		0						Ignore
	0							Ignore
0								Diagnosis of exhaust gas recirculation system

– If the specified values are not reached, generate readiness code ⇒ **01-3** page 2.
– Press (→) key.
– Select function 06 „End output“ and switch ignition off.

Generating readiness code

Special tools, test and measuring equipment and auxiliary items required

♦ Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-

Test conditions

- All electrical consumers such as lights and rear window heater switched off
- Intake air temperature must be below 60°C ⇒ display group 007, display field 3
- Coolant temperature at least 83°C ⇒ display group 007, display block 4

Procedure

– Connect vehicle system tester -V.A.G 1552-. Select address word 01 „Engine electronics“ ⇒ Chapter 01-1.

Note

Certain work steps have to be carried out twice, in order to achieve the readiness code.

Work step 1: Interrogating fault memory

– Enter function (0) (2) „Interrogate fault memory“ and confirm entry with (Q).

The number of stored faults or „No fault recognised“ appears in the display. ➢

```
X faults detected                    →
```

If a fault is stored in the memory:

– Rectify the faults by referring to the fault table ⇒ Chapter 01-2.

If no fault is stored:

– Press →.

Work step 2: Erasing fault memory

– Select function 0 5 „Erase fault memory“ and confirm entry with Q.

Note

Readiness code is erased each time the fault memory is erased.

Readout on display:

```
Vehicle system test                    ->
The fault memory is erased
```

Note

If the ignition is switched off during „Interrogating fault memory“ and „Erasing fault memory“, the fault memory is not erased.

– Press →.

Work step 3: Switch off ignition

– Wait at least 5 seconds with ignition switched off.

Note

This point is important, because for certain diagnoses the castor of the control unit must be ended. Otherwise the readiness code cannot be generated.

Work step 4: Switch on ignition

– Wait at least 10 seconds with ignition switched on.

Charge pressure sender is adapted to atmospheric pressure sender.

Work step 5: 1. Test of fuel system and other systems

– Start engine.

– Select function 0 8 „Read measured value block“ and display group 001.

– Increase engine speed for 5 seconds to 2500 rpm and then run engine at idling speed.

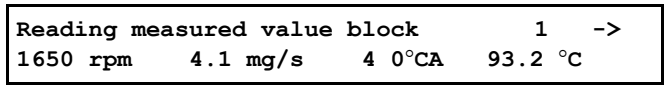
Readout on display:

```
Reading measured value block       1   ->
2500 rpm    4.6 mg/s    2 0°CA   94.2 °C
```

Work step 6: 1. Test of exhaust gas recirculation

– Increase engine speed to 1600 rpm up to 1700 rpm and maintain it for at least 10 seconds in this range.

Readout on display:



In this speed range, the exhaust gas recirculation is active and the control difference is checked. (Condition for generation of readiness code for exhaust gas recirculation).

Work step 7: Switch off ignition

– Wait at least 5 seconds with ignition switched off.

Work step 8: Switch on ignition

– Wait at least 10 seconds with ignition switched on.

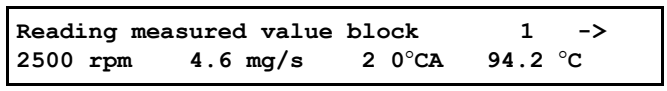
Work step 9: 2. Test of fuel system and other systems

– Start engine.

– Select function 0 8 „Read measured value block“ and display group 001.

– Increase engine speed for 5 seconds to 2500 rpm and then run engine at idling speed.

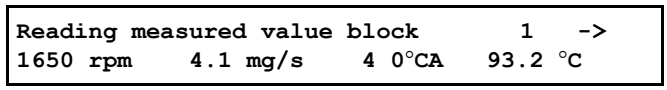
Readout on display:



Work step 10: 2. Test of exhaust gas recirculation

– Increase engine speed to 1600 rpm up to 1700 rpm and maintain it for at least 10 seconds in this range.

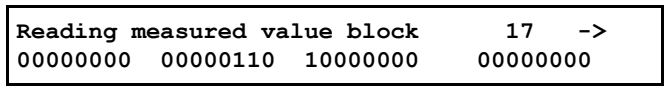
Readout on display:



– Press C.

– Enter 0 1 7 for display group 017 and read readiness code.

Readout on display:



Specification in display field 2: 00000110

Specification in display field 4: 00000000

– Press →.

– If the specified values are not reached, repeat procedure for generating readiness code ⇒ **01-3** page 2.

Work step 11: Interrogating fault memory

– Enter function 0 2 „Interrogate fault memory“ and confirm entry with Q.

The number of stored faults or „No fault recognised“ appears in the display.

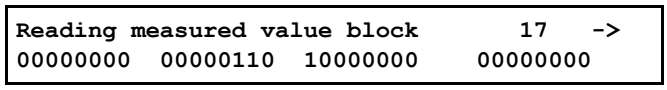
If a fault is stored in the memory:

– Rectify the faults by referring to the fault table ⇒ Chapter 01-2 and generate readiness code again ⇒ **01-3** page 2.

If no fault is stored:

– Press (→).

Readiness code was successfully generated, if no fault is stored after repeating the test procedure in the fault memory of the engine control unit and if the following appears in the channel 017.



01-4 Self-diagnosis IV

Reading measured value block

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-

Test conditions

- Coolant temperature must be at least 75 °C.
- All electrical consumers, e.g. lights and rear window heater, must be switched off.
- If vehicle is equipped with air conditioning, this must be switched off.

Procedure

– Connect vehicle system tester -V.A.G 1552-. Start engine and select the address word 01 „Engine electronics“ ⇒ Chapter 01-1.

– Enter function 08 „Read measured value block“ and confirm entry with Q.

– Enter display group ⇒ **01-4** page 1.

Display groups 001 to 022, engine idling

Display group 001 in idle (engine warm, coolant temperature not below 75 °C)

Read measured value block 1 →				< Readout on display		
xxx rpm	xx.x mg/s	x.xx °KW	xxx.x °C			
1	2	3	4	< Display field	Specification	Analysis
				Coolant temperature	75,0…110.0 °C	---
				Fuel delivery duration (set value)	5...8 °KW	---
				Injection rate	3,0…9.0 mg/s	⇒ **01-4** page 1
				Engine speed	800…950 rpm	---

Analysis: Display group 001, display field 2 - Injection rate

Readout on -V.A.G 1552-	Rectifying fault
below 3.0 mg/s	– Check unit injector ⇒ Chap. 23-3.
above 9.0 mg/s	– Warm up engine by running at high revs and repeat test. – Check unit injector ⇒ Chap. 23-3.

Display group 002 in idle (engine warm, coolant temperature not below 75 °C)

Read measured value block 2 →				< Readout on display		
xxx rpm	xxx.x %	x x x	xxx.x °C			
1	2	3	4	< Display field	Specification	Analysis
				Coolant temperature	75,0…110.0 °C	---
			Operating position		0 1 0	⇒ **01-4** page 2
		Accelerator pedal position			0,0 %	⇒ **01-4** page 2
	Engine speed				800…950 rpm	---

Analysis: Display group 002, display field 2 - Accelerator pedal position

Readout on -V.A.G 1552-	Rectifying fault
1…100,0 %	– Test accelerator pedal position sender -G79- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

Analysis: Display group 002, display field 3 - Operating position

Meaning, if display positions = 1			
X	**X**	**X**	**Operating position**
		1	Air conditioning switched on
	1		Idling switch closed (accelerator pedal not pressed)
1			Ignore

Display group 003 in idle (engine warm, coolant temperature not below 75 °C)

Read measured value block 3 →				< Readout on display		
xxx rpm	xxx mg/s	xxx mg/s	xxx %			
1	2	3	4	< Display field	Specification	Analysis
				On/off ratio (actuation) of exhaust gas recirculation valve	50…70 %	---
			drawn in air mass (actual value)		210...370 mg/s	⇒ **01-4** page 3
		drawn in air mass (nominal value)			230...350 mg/s	⇒ **01-4** page 3
	Engine speed				800…950 rpm	---

Analysis: Display group 003, display field 2 - inducted air mass (set value)

Readout on -V.A.G 1552-	Rectifying fault
above 350 mg/s	– Engine too cold, warm up engine by running at high revs and repeat test.

Analysis: Display group 003, display field 3 - inducted air mass (actual value)

Readout on -V.A.G 1552-	Rectifying fault
below 210 mg/s	– Test exhaust gas recirculation ⇒ Chap. 23-4. – Test intake system for leaks.
above 370 mg/s	– Warm up engine by running at high revs and repeat test. – Engine idles for too long, briefly blip throttle. – Test air mass meter -G70- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

Display group 004 in idle (engine warm, coolant temperature not below 75 °C)

Read measured value block 4 →

xxx rpm	xx.x ° b. TDC	xx.x °KW	xx.x °KW
1	2	3	4

< Readout on display

< Display field	Specification	Analysis
Synchronizing angle	-5…+4 °KW	⇒ **01-4** page 3
Fuel delivery duration (set value)	3,0…7.0 °KW	---
Commencement of injection (set value)	4° BTDC…1° ATDC	⇒ **01-4** page 3
Engine speed	800…950 rpm	---

Analysis: Display group 004, display field 2 - commencement of injection (set value)

Readout on -V.A.G 1552-	Rectifying fault
less than 4° BTDC	– Engine too cold, warm up engine by running at high revs and repeat test.

Analysis: Display group 004, display field 4 - Synchronizing angle

Readout on -V.A.G 1552-	Rectifying fault
above 4 °KW or under -5 °KW	– Test camshaft position sensor -G40- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations. – Check position of camshaft and sensor rotor ⇒ 1.9/74 (TDI) Engine, Mechanical Components; Rep. Gr. 15.

Display group 006 in idle (engine warm, coolant temperature not below 75 °C)

Read measured value block 6 →				< Readout on display		
xxx km/h	xxx	xx.x %	xxx			
1	2	3	4	< Display field	Specification	Analysis
				Operating state of cruise control	xxx	⇒ **01-4** page 4
				Accelerator pedal position	0 %	⇒ **01-4** page 2
				Status of the brake and clutch pedal switch	000	⇒ **01-4** page 4
				Vehicle speed	0 km/h	---

Analysis: Display group 006, display field 2 - Status of brake and clutch pedal switch

Meaning, if display positions = 1			
X	**X**	**X**	**Operating position**
		1	Brake light switch -F- closed (brake pedal operated)
	1		Brake pedal switch -F47- opened (brake pedal operated)
1			Clutch pedal switch -F36- opened (clutch pedal operated)

Analysis: Display group 006, display field 4 - Operating condition of cruise control

Display	Operating position
0	Vehicle with cruise control system, cruise control system switched off
1	Vehicle with cruise control system, cruise control system switched on
255	Vehicle without cruise control system, or cruise control system function in engine control unit not activated

Display group 007 with ignition switched on (engine cool and standing)

Read measured value block 7 →				< Readout on display		
xxx.x °C	xxx %	xxx.x °C	xxx.x °C			
1	2	3	4	< Display field	Specification	Analysis
				Coolant temperature	approx. ambient temperature [1]	⇒ **01-4** page 5
				Intake manifold temperature	approx. ambient temperature [1]	⇒ **01-4** page 5
				Status of the fuel cooling	0 %	---
				Fuel temperature	approx. ambient temperature [1]	⇒ **01-4** page 5

[1] It is not possible to give a nominal value indication for temperatures. Once the engine has cooled down the temperatures of the fuel, intake manifold and coolant must approximately correspond with the ambient temperature. If there is a marked value difference check the relevant sender.

Analysis: Display group 007, display field 1 - Fuel temperature

Readout on -V.A.G 1552-	Rectifying fault
-5.4 °C	– Inspecting Fuel temperature sender -G81- ⇒ Chap. 23-1.

Analysis: Display group 007, display field 3 - Intake manifold temperature

Readout on -V.A.G 1552-	Rectifying fault
approx. 134.9 °C	– Inspecting Intake manifold temperature sender -G72 - ⇒ Chap. 23-1.

Analysis: Display group 007, display field 4 - Coolant temperature

Readout on -V.A.G 1552-	Rectifying fault
great deviation from ambient temperature	– Inspecting coolant temperature sender -G62- ⇒ Chap. 23-1. In the event of a fault the fuel temperature is displayed instead.

Display group 010 in idle (engine warm, coolant temperature not below 75 °C)

Read measured value block 10 →				< Readout on display		
xxx rpm	xxxx mbar	xxxx mbar	xxx %			
1	2	3	4	< Display field	Specification	Analysis
				Accelerator pedal position	0,0 %	⇒ **01-4** page 2
				Charge pressure (actual value)	900...1150 mbar	---
				Atmospheric pressure	900...1100 mbar	---
				drawn in air mass (actual value)	210...370 mg/s	⇒ **01-4** page 3

Display group 011 in idle (engine warm, coolant temperature not below 75 °C)

Read measured value block 11 →				< Readout on display		
xxx rpm	xxxx mbar	xxxx mbar	xxx %			
1	2	3	4	< Display field	Specification	Analysis
				On/off ratio (actuation) of solenoid valve for charge pressure control -N75-	20...50 %	---
				Charge pressure (actual value)	900...1150 mbar	---
				Charge pressure (specified value)	900...1100 mbar	---
				Engine speed	800…950 rpm	---

Display group 013 in idle (engine warm, coolant temperature not below 75 °C)

Read measured value block 13 →				< Readout on display		
x.xx mg/s	x.xx mg/s	x.xx mg/s	x.xx mg/s			
1	2	3	4	< Display field	Specification	Analysis
				Smooth running control - injected quantity cylinder 4	-2,80…+2.80 mg/s	⇒ **01-4** page 7
				Smooth running control - injected quantity cylinder 3	-2,80…+2.80 mg/s	⇒ **01-4** page 7
				Smooth running control - injected quantity cylinder 2	-2,80…+2.80 mg/s	⇒ **01-4** page 7
				Smooth running control - injected quantity cylinder 1	-2,80…+2.80 mg/s	⇒ **01-4** page 7

Analysis: Display group 013, display field 1 to 4 - idle smooth running control

- The injection system has an idle smoothness regulator. It is possible to detect differences in performance between individual cylinders (part tolerances, injector flow, compression etc.) and to compensate for these by selectively metering the quantity injected in the idling speed range.
- Differences are detected in the idling speed range on the basis of the signal supplied by the engine speed sender which supplies four signals to the control unit for each crankshaft revolution. If the signals have the same rhythm, the cylinder have the same output. If a cylinder has a lower output, the crankshaft will need more time for the next half crankshaft rotation. As opposed to this a high output cylinder will accelerate the crankshaft to such an extent that it will need less time.
- Once the control unit has identified a deviation, the relevant cylinder will immediately be supplied with a greater or smaller injection rate until the engine again runs „smoothly“.
- +… mg/s: The relevant cylinder has less output and is therefore supplied with more fuel.
- -… mg/s: The relevant cylinder has more output and is therefore supplied with less fuel.

Display group 016 in idle

Read measured value block 16 →				< Readout on display		
xxx %	xxxxxxxx	xx	xx.x V			
1	2	3	4	< Display field	Specification	Analysis
				Supply voltage of the engine control unit	13,5…14.5 V	⇒ **01-4** page 8
				Heating element control	xx	⇒ **01-4** page 8
				Auxiliary heating	1x00001	⇒ **01-4** page 7
				Generator capacity	5…95 %	---

Analysis: Display group 016, display field 2 - Auxiliary heating

Meaning, if display positions = 1								
X	X	X	X	X	X	X	X	**Additional heating deactivated, because:**
							1	Coolant temperature greater than 70…75 °C or intake air temperature greater than +5°C
						1		Generator defective
					1			Battery voltage below 9 V
				1				Engine speed less than 800 rpm
			1					Engine start within the last 10 seconds

Meaning, if display positions = 1								
X	X	X	X	X	X	X	X	Additional heating deactivated, because:
		1						Coolant temperature sender -G62 - or Intake manifold temperature sender -G72 - defective
	1							Ignore
1								Ignore

Analysis: Display group 016, display field 3 - Control of the heating elements

Meaning, if display positions = 1		
X	X	Operating position
	1	Low heat output relay -J359- switched on
1		High heat output relay -J360- switched on

Analysis: Display group 016, display field 4 - supply voltage of engine control unit

Readout on -V.A.G 1552-	Rectifying fault
less than 13.5 V	– Test generator and battery voltage, charge battery ⇒ Electrical System; Rep. Gr. 27. – Increase engine speed slightly for a few minutes and switch off additional consumers. – Test supply voltage of engine control unit ⇒ Chap. 23-5. – Rectify any current drain.
greater than 14.5 V	– Test voltage regulator, replace if necessary ⇒ Electrical System; Rep. Gr. 27. – Remove start aid cable or quick charger.

Display group 018 in idle

Read measured value block 18 →				< Readout on display		
xx	xx	xx	xx			
1	2	3	4	< Display field	Specification	Analysis
				Unit injector cyl. 4	0	⇒ **01-4** page 9
				Unit injector cyl. 3	0	⇒ **01-4** page 9
				Unit injector cyl. 2	0	⇒ **01-4** page 9
				Unit injector cyl. 1	0	⇒ **01-4** page 9

Analysis: Display group 018, display field 1 through 4 - Display of the conditon of the unit injectors

Readout on -V.A.G 1552-	Rectifying fault
If number instead of zero	– Check unit injector ⇒ Chap. 23-3. – Test fuel supply ⇒ 1.9/74 kW (TDI) Engine, Mechanical Components; Rep. Gr. 20.

Display group 022, engine idling

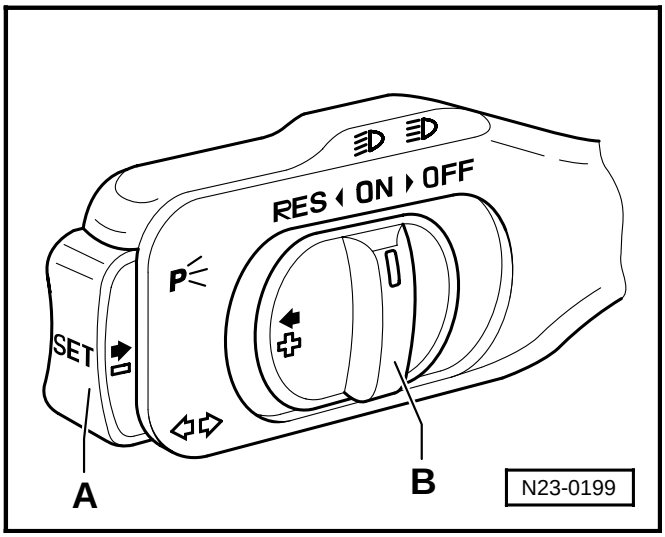
Read measured value block 22 →

x	xxxxxx	x	x	< Readout on display		
1	2	3	4	< Display field	Specification	Analysis
				Operating state of air conditioning	0	—
				Operating state of charge pressure control	0	—
				Operating state of cruise control	xxxxxx	⇒ **01-4** page 10
				Operating condition of the cruise control system	x	⇒ **01-4** page 9

Analysis: Display group 022, display field 1 - operating state of cruise control system

Operating condition of the cruise control system	
1	Vehicle with CCS - CCS switched off
9	Vehicle with CCS - CCS switched on
0	Vehicle without CCS, or CCS function in engine control unit not activated

Analysis: Display group 022, display field 2 - operating state of cruise control system ►



Cruise control	Display field 2
Switch B on „ON“	000011
Switch B on „RES“	001011
Switch A operated	000111
Switch B to „OFF“ before operating point	000001
Switch B to „OFF“ locks	000000
Brake pedal depressed	010011
Clutch pedal depressed	100011

Display groups 004 through 011 at full load

Note

- *Accelerate vehicle at full throttle before inspecting.*
- *The measured values must be read off or printed out once an engine speed of 3000 rpm is reached (2nd person required).*
- *Pay attention to safety precautions for test drives ⇒ Chapter 23-1.*

Display group 004 under full load (test drive in 2nd gear coolant temperature not below 75°C)

Read measured value block 4 →				< Readout on display		
xxx rpm	xx.x ° b. TDC	xx.x °KW	x.xx °KW			
1	2	3	4	< Display field	Specification	Analysis
				Synchronizing angle	-5...4 °KW	---
				Fuel delivery duration (set value)	19…23 °KW	---
				Commencement of injection (set value)	16° BTDC…23° BTDC	---
				Engine speed	2800…3200 rpm	---

Display group 008 under full load (test drive in 2nd gear coolant temperature not below 75°C)

Read measured value block 8 →				< Readout on display		
xxx rpm	xx.x mg/s	xx.x mg/s	xx.x mg/s			
1	2	3	4	< Display field	Specification	Analysis
				Injection rate limit based on drawn in air mass (smoke prevention)	44,0…52.0 mg/s	⇒ **01-4** page 11
				Injection rate limit based on engine speed (torque limit)	39,0…44.0 mg/s	⇒ **01-4** page 11
				Injection rate (driver's instruction)	42,0…52.0 mg/s	⇒ **01-4** page 11
				Engine speed	2800…3200 rpm	---

Analysis: Display group 008, display field 2 - Injection rate (driver's instruction)

Readout on -V.A.G 1552-	Rectifying fault
below 42.0 mg/s	– Repeat test at full throttle. – Test accelerator pedal position sender -G79- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

Analysis: Display group 008, display field 3 - Injection rate limit over engine speed

Readout on -V.A.G 1552-	Rectifying fault
below 39.0 mg/s	– Read off set value at 3000 rpm.

Analysis: Display group 008, display field 4 - Injection rate limit (smoke prevention)

Readout on -V.A.G 1552-	Rectifying fault
below 44.0 mg/s	– Test air mass meter -G70- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations. – Test exhaust gas recirculation ⇒ Chap. 23-4.

Display group 011 under full load (test drive in 2nd gear coolant temperature not below 75 °C)

Read measured value block 11 →				< Readout on display		
xxx rpm	xxxx mbar	xxxx mbar	xxx %			
1	2	3	4	< Display field	Specification	Analysis
				On/off ratio (actuation) of solenoid valve for charge pressure control -N75-	55...80%	⇒ **01-4** page 12
				Charge pressure (actual value)	1850...2250 mbar	⇒ **01-4** page 12
				Charge pressure (specified value)	1900...2100 mbar	---
				Engine speed	2800...3200 rpm	---

Analysis: Display group 011, display field 3 - Charge pressure (actual value)

Readout on -V.A.G 1552-	Possible cause of fault	Rectifying fault
below 1850 mbar	♦ Charge pressure control defective ♦ Leaking intake manifold ♦ Damaged turbocharger	– Inspecting charge pressure control ⇒ 1.9/ 74 TDI Engine, Mechanics; Rep. Gr. 21.

Analysis: Display group 011, display field 4 - On/off ratio (actuation) of solenoid valve for charge pressure control -N75-

Readout on -V.A.G 1552-	Possible cause of fault	Rectifying fault
below 55 %	♦ Charge pressure control defective	– Inspecting charge pressure control ⇒ 1.9/ 74 TDI Engine, Mechanics; Rep. Gr. 21.
above 80 %	♦ Charge pressure is not controlled	

Display group 125 - CAN databus

Display group 125 with ignition switched on

Read measured value block 125 →				< Readout on display		
	ABS 1	Combi 1	Airbag 1			
1	2	3	4	< Display field	Specification	Analysis
				Airbag control unit	Airbag 1	⇒ **01-4** page 13
				Dash panel insert CU	Combi 1	⇒ **01-4** page 13
				ABS control unit	ABS 1	⇒ **01-4** page 13
				not assigned	---	---

Analysis: Display group 125, display field 2, 3 or 4

Readout on -V.A.G 1552-	Rectifying fault
ABS 0 Combi 0 Airbag 0	– Test CAN databus ⇒ Chap. 23-6.

23 – Fuel preparation, injection

23-1 Diesel direct injection system

Safety measures

Observe the following points to prevent injury to persons and/or damage to the injection and ignition system:

- Disconnect and connect wires of the injection and preheating system and measuring device wires when the ignition is switched off.
- Enter the code of the radio set before disconnecting the battery.
- Always switch off the ignition before disconnecting and re-connecting the battery. Otherwise the engine control unit may be damaged.

If test and measuring devices are required during test drives observe the following:

- Always secure the test and measuring devices on the rear seat and have a second person operate them there. If the test and measuring equipment is operated from the front passenger seat, this can result in injuries to the persons sitting on that seat in the event of an accident which involves the front passenger airbag being deployed.

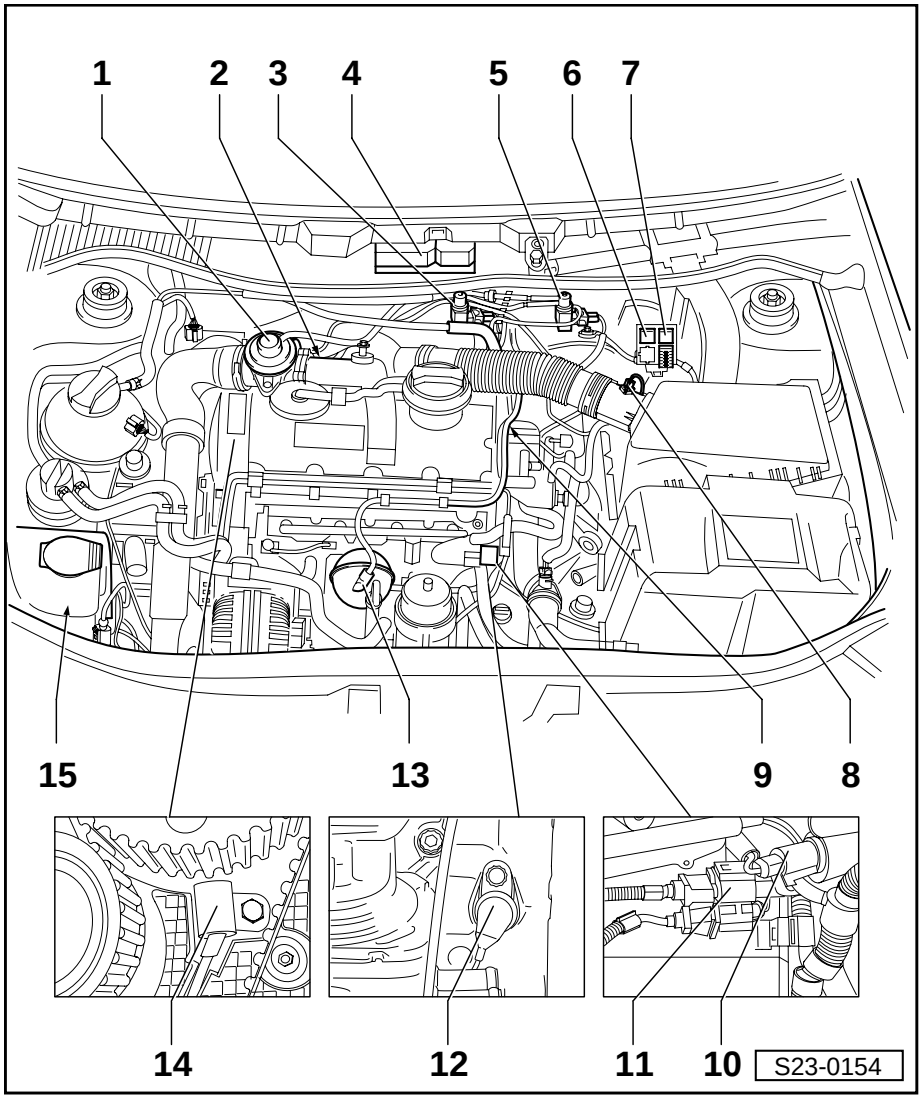
Rules of cleanliness

Pay careful attention to the following rules of cleanliness when working on the fuel supply or fuel injection systems:

- Thoroughly clean the connection points and their surroundings before releasing.
- Place removed parts on a clean surface and cover. Do not use fuzzy cloths!
- Carefully cover or close opened components if the repair is not completed immediately.
- Only install clean parts. Remove spare parts from their wrapping immediately before fitting. Do not use any parts which have been stored unwrapped (e.g. in tool boxes etc.).
- When the system is open: avoid working with compressed air. Avoid moving the vehicle.
- Also make sure no diesel fuel runs onto the coolant hoses. If this is the case clean the hoses immediately. Replace immediately any hoses which have suffered damage.

Overview of fitting location

Components A to F are not shown on the overview figure.



A - Diesel direct injection system relay -J322-
- ❑ on relay carrier ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations

B - Glow plug relay -J52-
- ❑ on relay carrier ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations

C - Fuel pump relay -J17-
- ❑ on relay carrier ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations

D - Accelerator pedal position sender -G79-
- ❑ in footwell on the accelerator pedal ⇒ Fig. 1 in **23-1** page 3

E - Brake light switch -F- and brake pedal switch -F47-
- ❑ in footwell on the brake pedal ⇒ Fig. 1 in **23-1** page 3

F - Clutch pedal switch -F36-
- ❑ in footwell at clutch pedal ⇒ Fig. 1 in **23-1** page 3

1 - Mechanical exhaust gas recirculation valve
- ❑ with throttle valve

2 - Changeover valve for intake manifold flap -N239-

3 - Exhaust gas recirculation solenoid valve -N18-
- ❑ desired resistance: 14...20 Ω

4 - Diesel direct injection system control unit -J248-

5 - Solenoid valve for charge pressure control -N75-
- ❑ desired resistance: 14...20 Ω

6 - Low heat output relay -J359-

7 - High heat output relay -J360-

8 - Air mass meter -G70-

9 - Sender for coolant temperature -G62-
- ❑ desired resistance ⇒ Fig. 2 in **23-1** page 3

10 - Fuel temperature sender -G81-
- ❑ desired resistance ⇒ Fig. 3 in **23-1** page 4

11 - Plug connection
- ❑ grey for engine speed sender -G28-
- ❑ black for camshaft position sensor - G40-

12 - Engine speed sender -G28-
- ❑ specified resistance between contacts 1 and 2: 450...550 Ω

13 - Vacuum unit

14 - Camshaft position sensor -G40-

15 - Air mass meter -G71- with intake air temperature sender -G72-

❑ specified resistance for intake air temperature sender -G72- ⇒ Fig. 2 in **23-1** page 3

Fig. 1: Components in footwell

1 - Clutch pedal switch -F36-
2 - Brake light switch -F- and brake pedal switch -F47-
3 - Accelerator pedal position sender -G79-

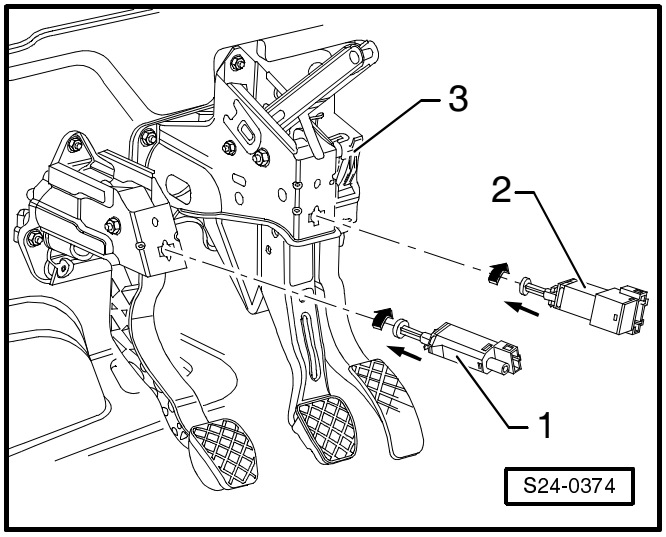


Fig. 2: Resistance of coolant temperature sender -G62- and of intake manifold temperature sender -G72-

The specification in field -A- applies to the temperature range 0 to 50 °C, specification in field -B- applies to the temperature range 50 to 100 °C.

Read out examples:

- The specification for a temperature of 30 °C is 1500 to 2000 Ω
- The specification for a temperature of 80 °C is 275 to 375 Ω

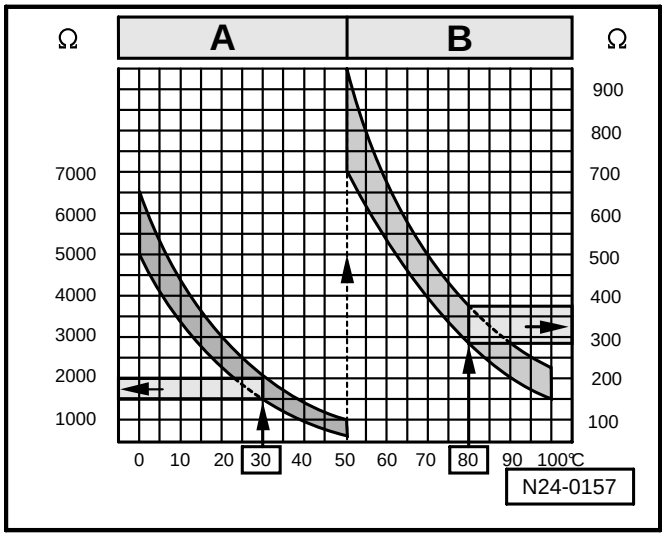
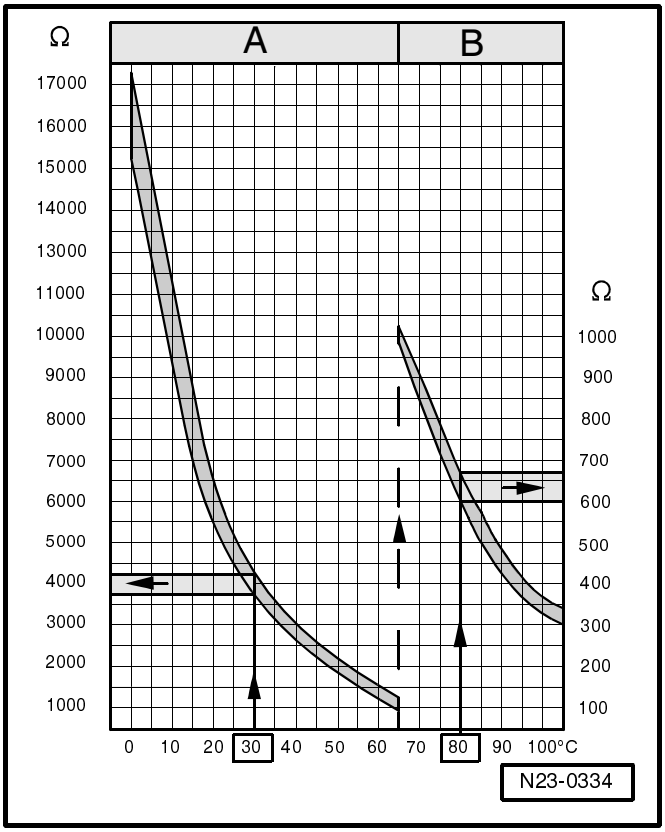


Fig. 3: Resistance of fuel temperature sender -G81- ►



The specification in field -A- applies to the temperature range 0 to 65 °C, specification in field -B- applies to the temperature range 65 to 100 °C.

Read out examples:

- The specification for a temperature of 30 °C is 3790 to 4270 Ω
- The specification for a temperature of 80 °C is 600 to 660 Ω

Disassembling and assembling intake manifold

1 - Intake manifold

2 - O-ring
- ❑ replace

3 - Inlet connection
- ❑ with exhaust gas recirculation valve and intake manifold flap

4 - Mechanical exhaust gas recirculation valve

5 - Vacuum hose
- ❑ from vacuum pump

6 - Changeover valve for intake manifold flap -N239-
- ❑ desired resistance: 25...45 Ω

7 - 10 Nm

8 - 10 Nm

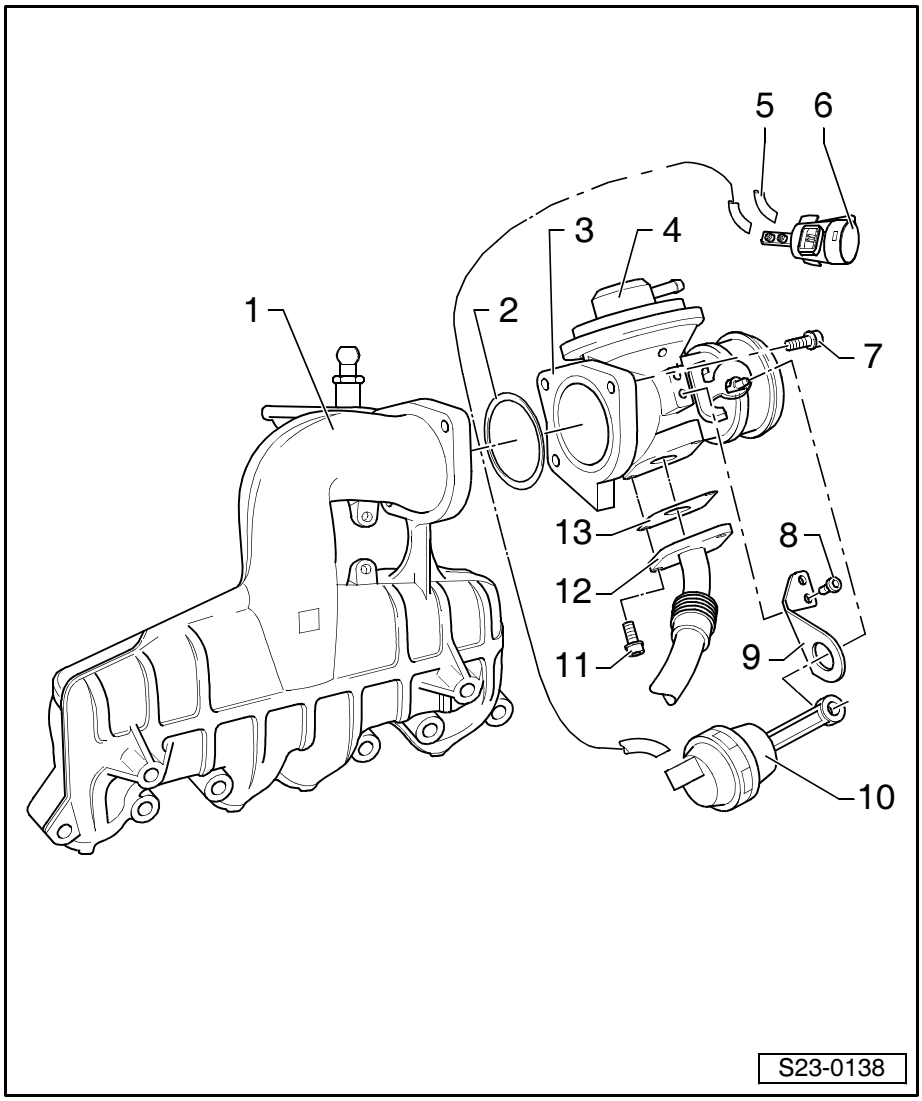
9 - Bracket

10 - Vacuum setting element

11 - 25 Nm

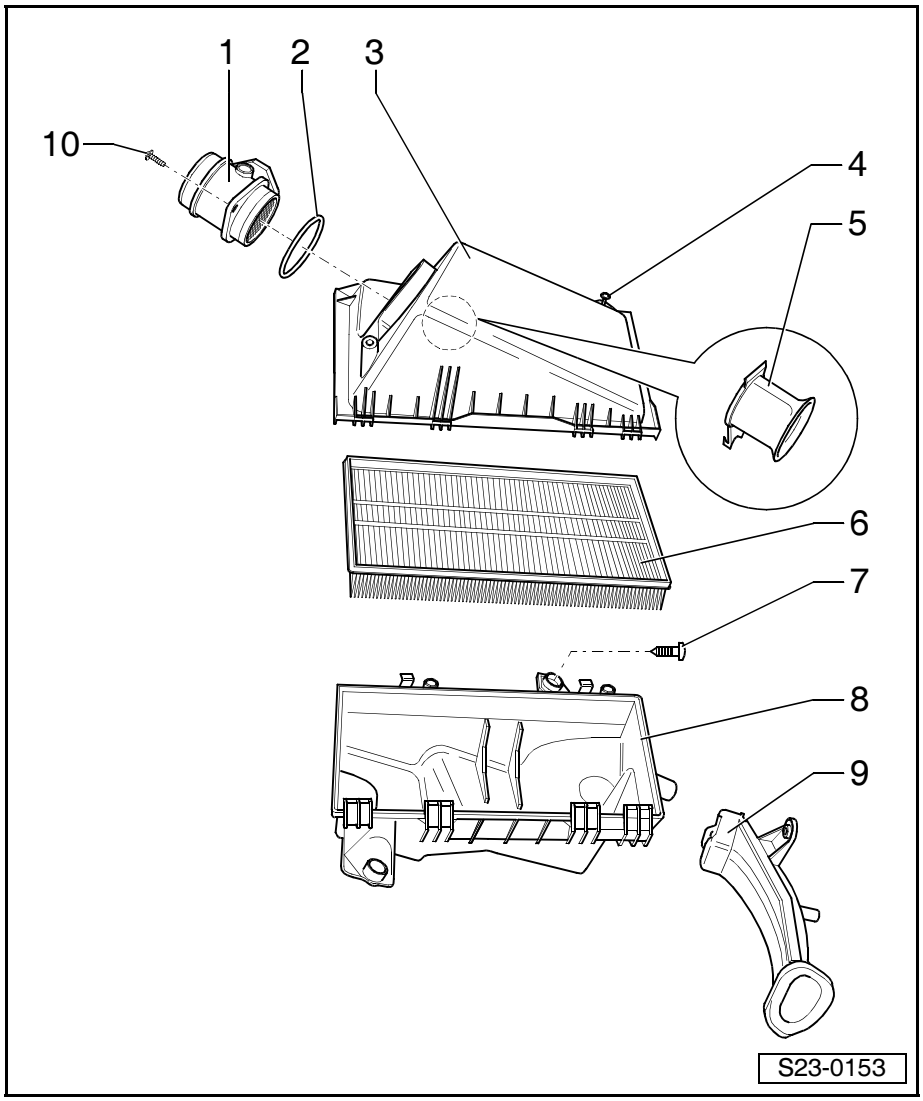
12 - Exhaust gas recirculation pipe
- ❑ to exhaust pipe

13 - Gasket
- ❑ replace



Disassembling and assembling the air filter

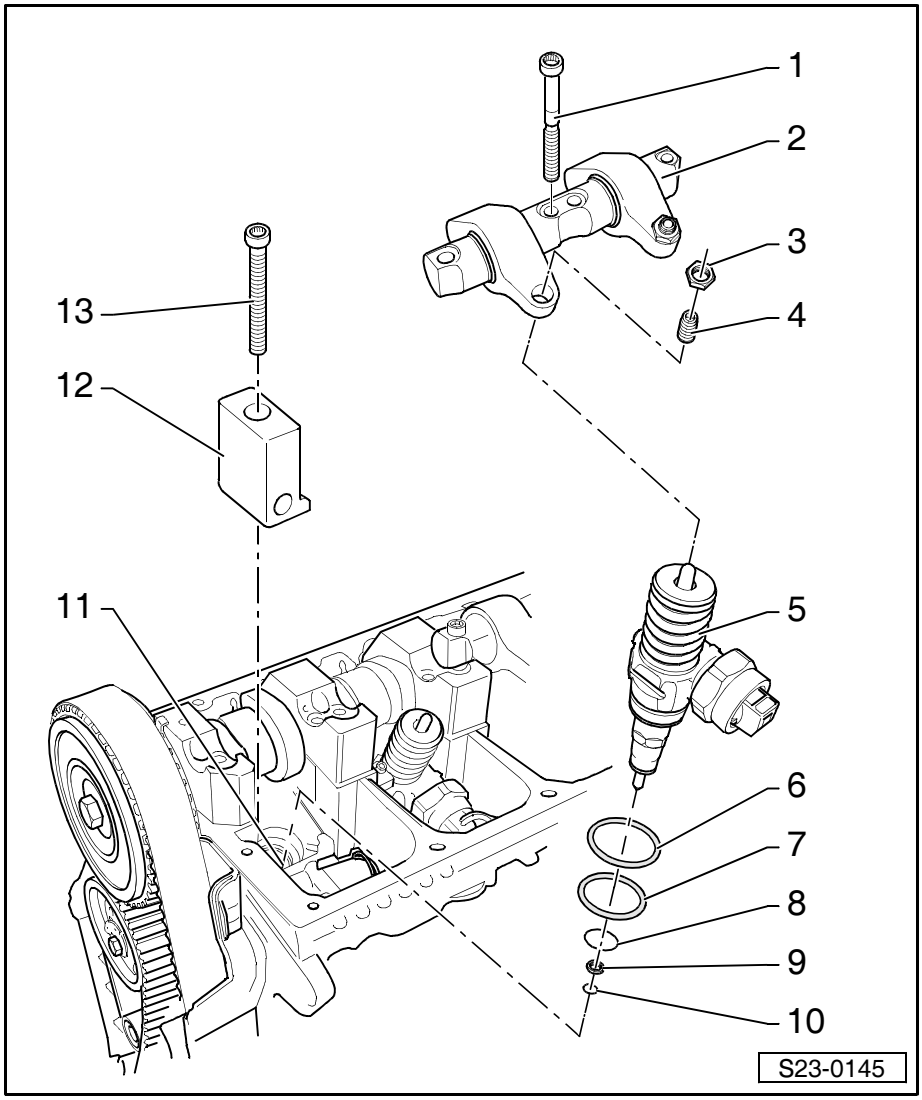
1 - Air mass meter -G70-
2 - Seal
3 - Air filter top part
4 - 6 Nm
5 - Air deflector
❑ in top part of air filter
6 - Filter insert
7 - 10 Nm
8 - Air filter bottom part
9 - Air deflector
10 - 6 Nm



23-2 Disassembling and assembling the unit injector

Summary of components

- Observe the rules for cleanliness ⇒ Chap. 23-1
- Always replace gaskets and O-rings



1 - 20 Nm + torque a further $^{1}/_{4}$ turn (90°)
- ❑ replace

2 - Valve-lever shaft
- ❑ with valve lever
- ❑ removing and installing ⇒ Fabia -1.9/74 TDI Engine, Fuel Injection System; Rep. Gr. 23

3 - Lock nut

4 - Adjusting screw

5 - Unit injector
- ❑ removing and installing ⇒ Fabia -1.9/74 TDI Engine, Fuel Injection System; Rep. Gr. 23
- ❑ inspecting ⇒ Chap. 23-3

6 - Top O-ring
- ❑ removing and installing ⇒ Fabia -1.9/74 TDI Engine, Fuel Injection System; Rep. Gr. 23

7 - Centre O-ring
- ❑ replacing ⇒ Fabia -1.9/74 TDI Engine, Fuel Injection System; Rep. Gr. 23

8 - Bottom O-ring
- ❑ replacing ⇒ Fabia -1.9/74 TDI Engine, Fuel Injection System; Rep. Gr. 23

9 - Gasket
- ❑ replace

10 - Circlip

11 - Cylinder head

12 - Clamping pad

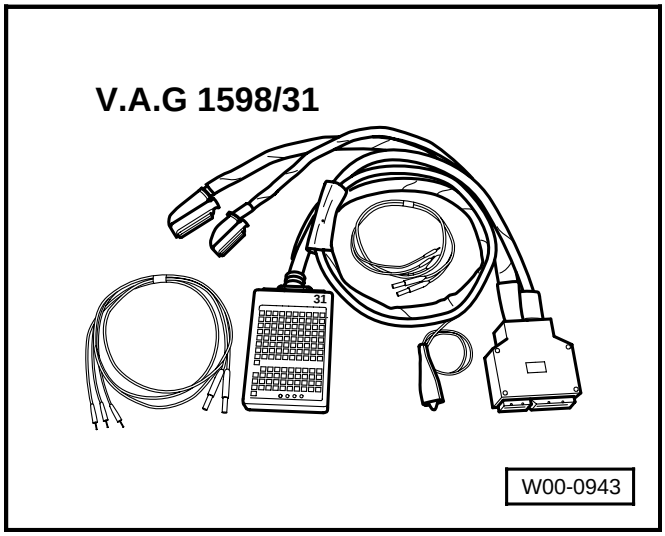
13 - 12 Nm + torque a further $^{3}/_{4}$ turn (270°)
- ❑ replace

23-3 Testing components

Testing lines and components with test box -V.A.G 1598/31-

Special tools, test and measuring equipment and auxiliary items required

- Test box -V.A.G 1598/31-



Note!

- *The test box -V.A.G 1598/31- is designed in such a way that it can be simultaneously connected to the wiring loom of the engine control unit and to the actual engine control unit.*
- *The advantage being that the electronic engine control remains fully operational with the test box connected (e.g. measuring signals while the engine is running).*
- *Whether the control unit is additionally connected to the test box or not, is indicated in the particular test procedure.*
- *For connecting measuring equipment (e.g. handheld multimeter -V.A.G 1526 A- etc.) always use the adapter cable set e.g. -V.A.G 1594 A- .*
- *The contact numbers of the connector of the control unit and the socket numbers of the test box -V.A.G 1598/31- are identical.*

Caution!

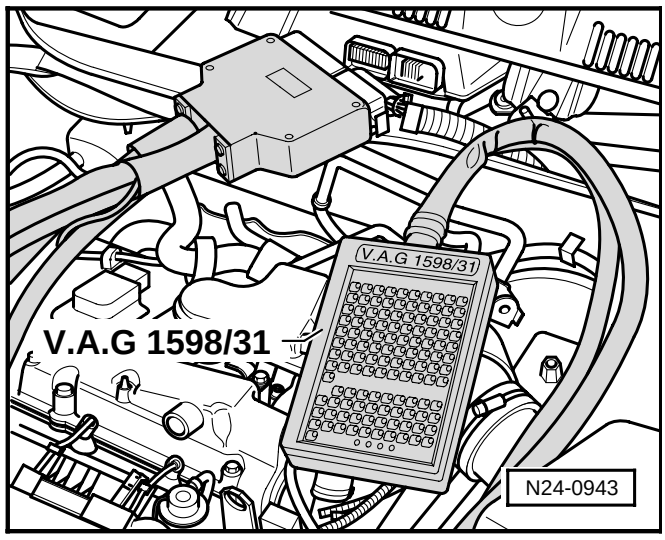
To avoid damaging the electronic components, switch on the relevant measuring range before connecting the measuring cables and comply with the test conditions.

– Switch off ignition.

– Unscrew windscreen wiper arms and remove cover of plenum chamber ⇒ Body Fitting Work, Repair Group 66.

– Release the connector catches and unplug the control unit connectors at the engine control unit.

– Connect test box -V.A.G 1598/31- to both connectors of wiring loom. Clamp earth clip to battery.



Testing unit injector valve

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester - V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-
- Handheld multimeter (e.g. -V.A.G 1526 A-)
- Adapter cable set (e.g. -V.A.G 1594 A-)
- Test box -V.A.G 1598/31-

Test sequence

– Connect vehicle system tester -V.A.G 1552-. Start engine (idling) and select address word 01 „Engine electronics“ ⇒ Chap. 01-1.

– Select function 08 „Read measured value block“ and display group number 018.

Readout on display:

```
Reading measured value block 18      ->
 0          0           0          0
```

Display field 1 = Cyl. 1; 2 = cyl. 2; 3 = cyl. 3; 4 = cyl. 4

If the control is operating properly, a „0“ must appear in all display fields.

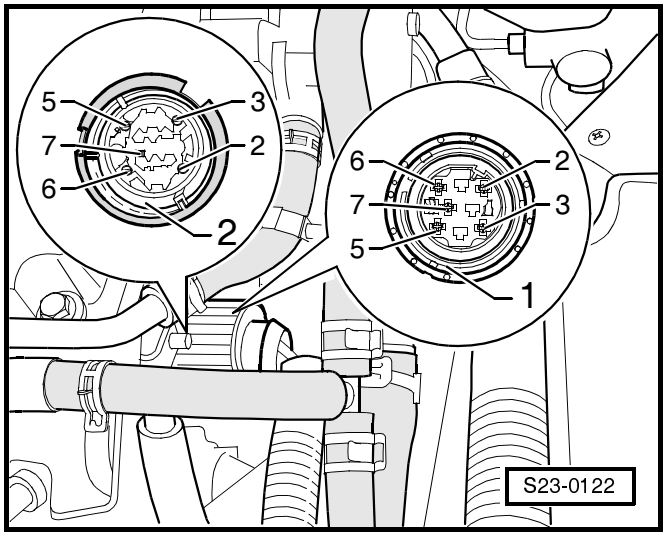
If a number is displayed instead of zero:

– Enter function 06 „End output“ and confirm entry with Q.

– Switch off ignition.

– Remove the engine trim panel.

– Unplug connector -1/2- for unit injector at cylinder head.



– Connect handheld multimeter for resistance measurement between the contacts of connector -2-:

Cylinder	Contact
1	7 + 5
2	7 + 3
3	7 + 2
4	7 + 6

Specified value: approx. 0.5 Ω

– Test the cables also for short circuit to each other.

Specified value: ∞ Ω

If the specified value is reached:

– Test cables to diesel direct injection system control unit -J248-:

– Connect test box -V.A.G 1598/31- to wiring loom to engine control unit ⇒ **23-3** page 1.

– Test cable connections for short circuit and for open circuit ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

If the wires are not found to be faulty:

– Replace diesel direct injection system control unit - J248- ⇒ Chap. 23-5.

If the nominal values are not reached:

– Remove top toothed belt guard and cylinder head cover.

– Use a screwdriver to carefully lever the connectors off all 4 unit injectors. Support the opposite side of the

connector with your finger in order to avoid twisting the connector.

– Test resistance of valve of unit injector between contacts at valves for unit injector.

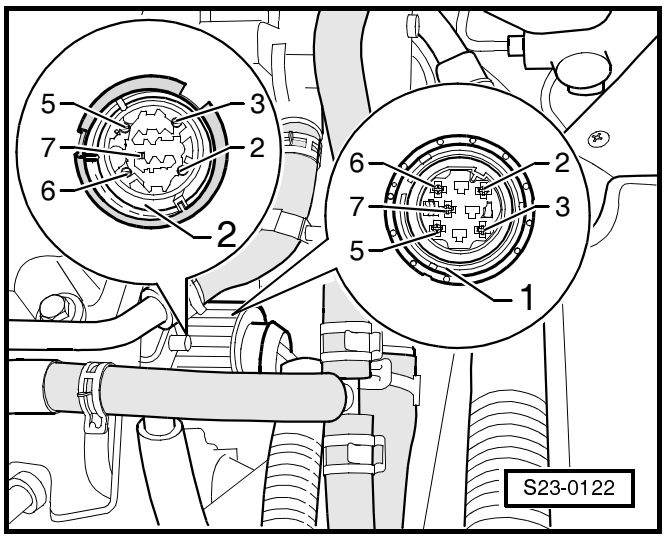
Specified value: approx. 0.5 Ω

If the specified value is not reached:

– Replace faulty unit injector.

If the specified value is reached:

– Test cables between the plug connection of unit injector and all 4 connectors for open circuit and short circuit.



Connector to unit injector	Plug connection -2- for unit injector; contact
Cylinder 1: Contact 2 (grey)	5
Cylinder 2: Contact 2 (red)	3
Cylinder 3: Contact 2 (yellow)	2
Cylinder 4: Contact 2 (white)	6
All cylinders contact 1 (brown)	7

– Rectify any open circuit in the wiring or short circuit.

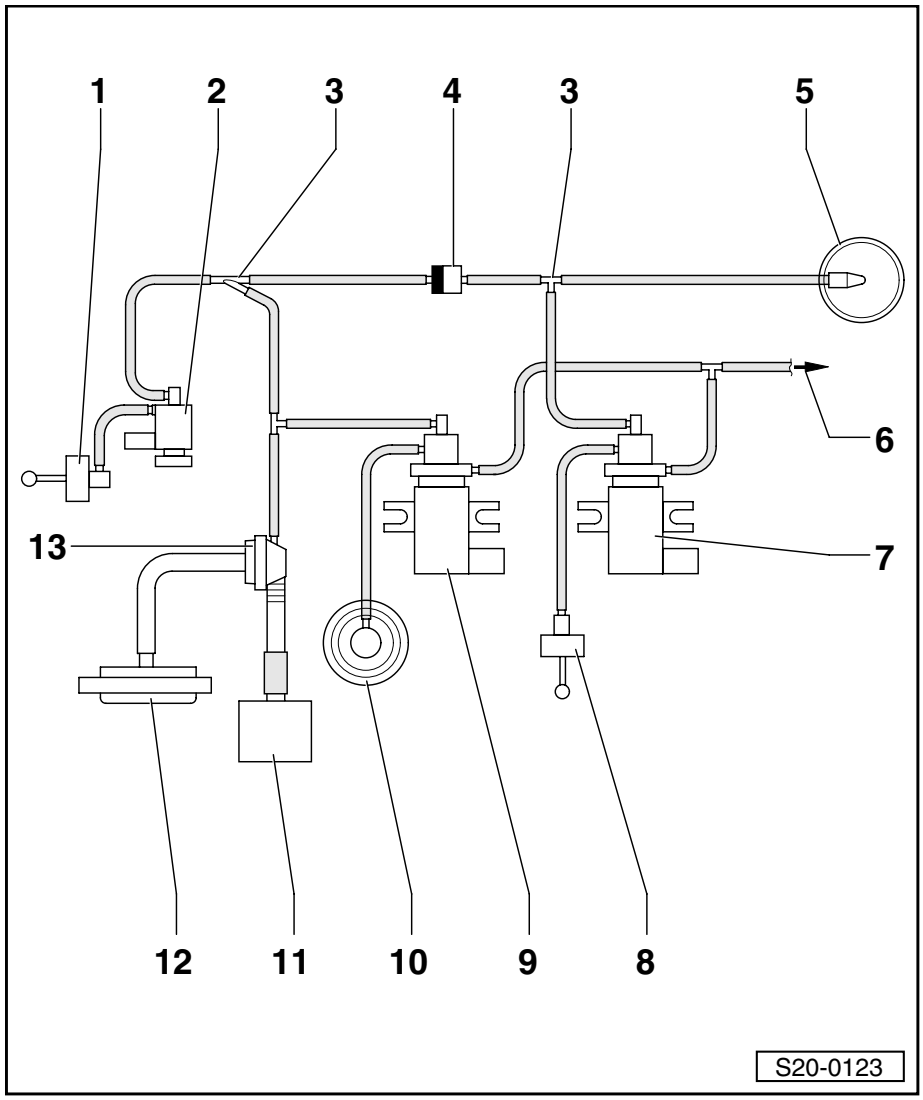
If the wires are not found to be faulty:

– Replace diesel direct injection system control unit - J248- ⇒ Chap. 23-5.

23-4 Testing exhaust gas recirculation

Connection diagram for vacuum hoses

- **1 - Vacuum unit**
  - ❑ for throttle valve
- **2 - Changeover valve for intake manifold flap -N239-**
  - ❑ desired resistance: 25...45 Ω
- **3 - Distributor part**
- **4 - Non-return valve**
  - ❑ For vehicles ➢ 03.02
  - ❑ white connection points to charge pressure control solenoid valve / to vacuum unit / to switchover valve
- **5 - Vacuum unit**
- **6 - To air filter**
- **7 - Solenoid valve for charge pressure control -N75-**
  - ❑ desired resistance: 14...20 Ω
- **8 - Vacuum setting element**
  - ❑ for charge pressure control
  - ❑ part of turbocharger, cannot be replaced separately
- **9 - Exhaust gas recirculation solenoid valve -N18-**
  - ❑ desired resistance: 14...20 Ω
- **10 - Mechanical exhaust gas recirculation valve**
- **11 - Tandem pump**
- **12 - Brake servo unit**
- **13 - Distributor part**
  - ❑ with non-return valve for brake servo unit



Testing exhaust gas recirculation

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-

Test sequence

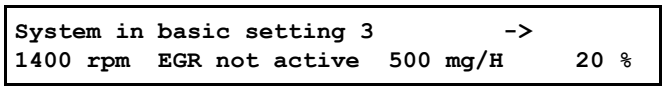
The exhaust gas recirculation function is checked in function 04 (basic setting). As a result of this procedure the exhaust gas recirculation valve is pulsed every 10 seconds, so that the extreme values for the exhaust gas recirculation (air mass meter) can be read off in measured value block 003 in display field 3.

– Connect vehicle system tester -V.A.G 1552-. Start engine and select address word 01 „Engine electronics“ ⇒ Chapter 01-1.
– Enter function 04 „basic setting“ and select display group number number 003.

Note

After selecting display group number 003 and confirming with Q, the idling speed is increased by the engine control unit in display field 1 to 1380…1420 rpm.

Readout on display:



The display in display field 2 must switch between EGR not active and EGR active every 10 seconds.

The readouts in display field 3 and 4 must vary within the following control range:

Note

If a constant value of 539 mg/H and higher is shown in display field 3, test the air mass meter.

EGR not active:

Specified value display field 3: 410…600 mg/stroke nominal value, display field 4: 18…22 %

EGR active:

Specified value display field 3: 160…310 mg/stroke nominal value, display field 4: 63…67 %

If the specified values are not reached:

– Test mechanical exhaust gas recirculation valve ⇒ 1.9 l/74 kW (TDI) Engine, Mechanical Components; Rep. Gr. 26.
– Inspect the connection diagram for the vacuum hoses ⇒ **23-4** page 1.
– Test exhaust gas recirculation valve -N18- ⇒ Chap. 01-1.

23-5 Engine control unit

Testing voltage supply for engine control unit

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-
- Hand multimeter (e.g. -V.A.G 1526 A-)
- Adapter cable set (e.g. -V.A.G 1594 C-)
- Test box -V.A.G 1598/31-

Test conditions

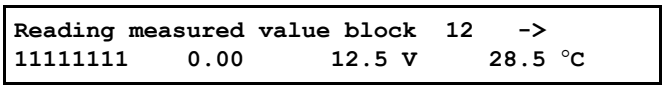
- Fuses o.k.
- Battery voltage at least 11.5 volts
- Generator o.k.

Test sequence

– Connect vehicle system tester -V.A.G 1552-. Switch ignition on and select address word 01 „Engine electronics“ ⇒ Chap. 01-1.

– Enter function 08 „read measured value block“ and select display group 012.

Readout on display:



– Read off value indicated in display field 3.

Specified value: approx. battery voltage (constant)

– Enter function 06 „End output“ and confirm entry with Q.

If the value displayed fluctuates or if the battery voltage is not reached:

– Switch off ignition.

– Connect test box -V.A.G 1598/31- to the wiring loom of the engine control unit ⇒ Chap. 23-3.

– Connect handheld multimeter as follows:

Test box - V.A.G 1598/ 31-, bush	Specification
1, 2 + 4, 5	approx. 0 V
37 + 4, 5	approx. 0 V

– Switch on ignition.

– Measure once again the voltage between the bushes.

Test box - V.A.G 1598/ 31-, bush	Specification
1, 2 + 4, 5	approx. battery voltage
37 + 4, 5	approx. battery voltage

If the specified values are not reached:

– Test diesel direct injection system relay - J322-.

Replacing diesel direct injection system control unit -J248-

Special tools, test and measuring equipment and auxiliary items required

♦ Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-

Procedure

– Connect vehicle system tester -V.A.G 1552-. Switch ignition on and select address word 01 „Engine electronics“ ⇒ Chap. 01-1.

The vehicle system tester -V.A.G 1552 - displays the control unit identification, e. g.:

```
038906019R  1.91 R4  EDC G000SG  1053 ->
Coding 00003                    WSC XXXXX
```

– Note Part No. of control unit and coding.

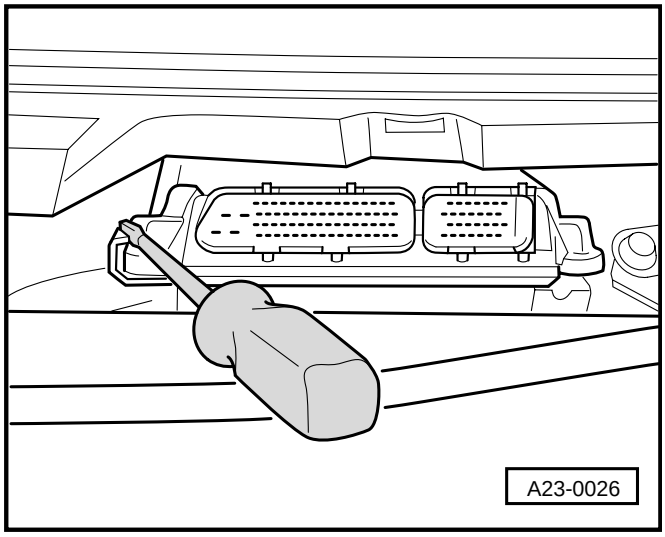
– Enter function 06 „End output“ and confirm entry with Q.

– Switch off ignition.

– Remove the cooling water tank cover ⇒ Body Work; Rep. Gr. 66.

– Release the connector catches and unplug the connectors of the diesel direct injection control unit - J248-.

– Use a screwdriver to push the catch of the fixture to the side and pull out the engine control unit forward.



– Insert new engine control unit.

After installing the diesel direct injection system control unit -J248-, it is then necessary to carry out the following steps:

– Perform coding of diesel direct injection system control unit -J248- ⇒ **23-5** page 3.

– Adapt new diesel direct injection system control unit -J248- to immobiliser control unit ⇒ Electrical System; Rep. Gr. 96.

– On vehicles fitted with CCS: Activate CCS ⇒ **23-5** page 4.

– Interrogate fault memory of new engine control unit and erase fault memory, rectify any faults present ⇒ Chap. 01-1.

For vehicles from 08.03

– Generate readiness code ⇒ Chapter 01-3.

For all vehicles

– Perform a test drive.

Note

Pay attention to safety precautions during the test drive ⇒ Chap. 23-1.

– Once again interrogate the fault memory of the diesel direct injection system control unit - J248-.

Coding diesel direct injection system control unit -J248-

If the code displayed does not match the vehicle or if the diesel direct injection system control unit -J248- has been replaced, it is then necessary to code the control unit as follows.

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-

Procedure

– Connect vehicle system tester -V.A.G 1552-. Switch ignition on and select address word 01 „Engine electronics“ ⇒ Chap. 01-1.

– Enter function 07 „Code control unit“.

Readout on display:

```
Coding control unit
Enter code number   xxxxx (0 -32767)
```

– Enter code number by referring to table of codes and confirm entry with Q.

Table of codes:

Control unit identification	Variant	Code number
038 906 019 R 038 906 019 FJ 038 906 019 DL 038 906 019 KH	Manual gearbox for 4x4 models	00003

The vehicle system tester -V.A.G 1552 - displays the control unit identification, e. g.:

```
038906019R  1.9l R4  EDC G000SG  1053 ->
Coding 00003                    WSC XXXXX
```

– Enter function 06 „End output“ and confirm entry with Q.

– Switch ignition off and on again.

Note

The entered coding is activated by switching the ignition on and off again.

Activating and deactivating cruise control system (CCS)

Special tools, test and measuring equipment and auxiliary items required

- Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B oder 3C-

Test condition

- No fault in fault memory, interrogating fault memory ⇒ Chap. 01-1

Procedure

– Connect vehicle system tester -V.A.G 1552-. Switch ignition on and select address word 01 „Engine electronics“ ⇒ Chap. 01-1.

Readout on display, e.g.:

```
038906019R  1.9l R4  EDC G000SG  1053 ->
Coding 00003                    WSC XXXXX
```

If „G000SG“ is displayed, the cruise control system is active

Readout on display:

```
038906019R  1.9l R4  EDC  000SG  1053 ->
Coding 00003                    WSC XXXXX
```

If „000SG“ is displayed, the cruise control system is not active

– Press (→).

– Select function 11 „login procedure“.

Readout on display:

```
Login procedure
Enter code number  XXXXX
```

– Enter code number as specified in table.

Code number	Cruise control system (CCS)
11463	Activate CCS
16167	Deactivate CCS

– Confirm the entry with (Q).

– Enter function 06 „End output“ and confirm entry with (Q).

After the CCS is activated, conduct a test drive as an operational check.

23-6 Testing auxiliary signals

Testing CAN databus

Operation

Two CAN databus circuits with different priority are integrated in the electrical system of the vehicle:

- Drive CAN databus
- Convenience CAN databus

Information regarding which control unit is connected to the drive CAN databus, and which is connected to the convenience CAN databus ⇒ Electrical System; Rep. Gr. 90.

These control units are interlinked over a databus line (CAN_High and CAN_Low) and exchange information (messages). Both the engine control unit and the other control units detect missing information on the data BUS as faults.

Other information: ⇒ Self-study Programme No. 24; CAN Databus, ⇒ Electrical System; Rep. Gr. 90

Special tools, test and measuring equipment and auxiliary items required

- Handheld multimeter (e.g. -V.A.G 1526 A-)
- Adapter cable set (e.g. -V.A.G 1594 A-)
- Test box -V.A.G 1598/31-

Test conditions

- A fault of the diesel direct injection system control unit -J248- was detected in the line. For example fault code 18055,18057 or 18097.
- Coding of all control units O.K.

Test sequence

– Switch off ignition.

– Unscrew windscreen wiper arms and remove cover of plenum chamber ⇒ Body Fitting Work; Rep. Gr. 66.

– Unlock connectors of diesel direct injection system control unit -J248- and unplug.

– Connect test box -V.A.G 1598/31 - to diesel direct injection system control unit -J248-. Wiring loom to control unit is not connected for this step ⇒ Chap. 23-3.

– Test the central terminating resistor in the diesel direct injection system control unit -J248-.

– Measure resistance between test box sockets 6 + 7.

Specified value: 60…72 Ω

If the resistance is not within the specified range:

– Replace diesel direct injection system control unit - J248- ⇒ Chap. 23-5.

If the resistance is within the specified range:

– Rectify fault in the CAN databus lines, or in the CAN databus lines of other control units ⇒ Electrical System; Rep. Gr. 90.

Testing the speed signal

Vehicle speed signal is generated by the vehicle speed sender -G22- and processed in the dash panel insert. The produced signal enters at contact 20 of the engine control unit.

Special tools, test and measuring equipment and auxiliary items required

- Diode test lamp (e.g. -V.A.G 1527 B-)
- Adapter cable set (e.g. -V.A.G 1594 A-)
- Test box -V.A.G 1598/31-

Test condition

- Operation and indication of speedometer is o.k., ⇒ Electrical System; Rep. Gr. 90
- Battery voltage o.k.

Test sequence

– Connect the test box -V.A.G 1598/22 - to the wiring loom of the engine control unit ⇒ Chap. 23-3.

– Connect diode test lamp between sockets 4/5 + 20 of test box -V.A.G 1598/31-.

– Switch on ignition.

– Raise vehicle until the front left wheel is clear of the ground.

– Rotate front left wheel by hand and observe the diode test lamp.

Diode test lamp must flash.

If it does not flash:

– Test the following cable connections for open circuit and for short circuit to earth and to positive:

Test box - V.A.G 1598/ 31-, socket	of dash panel insert, contact
20	⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations

– Rectify any open circuit in the wiring or short circuit.

28 – Glow Plug System

28-1 Testing preheating system

Check for proper operation

Special tools, test and measuring equipment and aids required

- Hand multimeter (e.g. -V.A.G 1526 A-)
- Current flow diagram

Test conditions

- Battery voltage at least 11.5 volts
- Diesel direct injection system control unit -J248 - O.K.
- Fuses in fuse holder on battery are O.K.

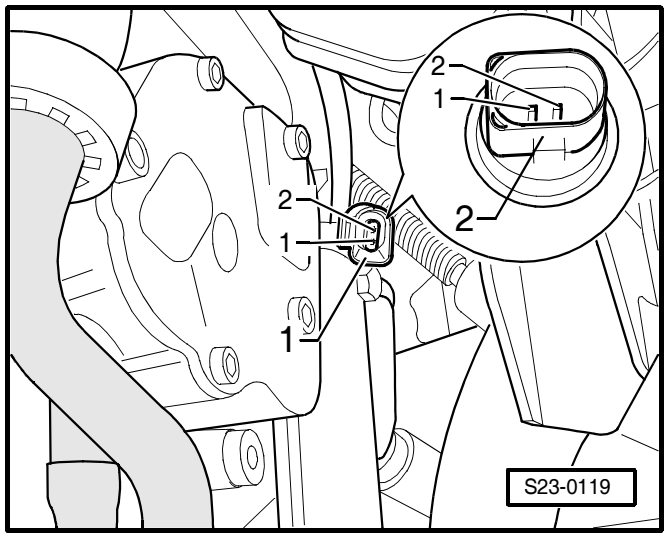
Test sequence

– Switch off ignition.

– Remove engine cover.

To do so remove the front and rear engine cover upwards with a sudden motion.

– Disconnect plug -1- from Coolant temperature sender (-G62-) -2-. ►



Note

By disconnecting the plug from the coolant temperature sender, engine condition „cold" is simulated and when the ignition is switched on a corresponding preheating process is performed.

– Remove glow plug connectors from the glow plugs.

– Connect Hand multimeter for voltage measurement to a glow plug connector and engine mass.

– Switch on ignition. The approx. battery voltage must be displayed for approximately 20 seconds.

If no voltage is present:

– If necessary eliminate wire interruption or short-circuit. ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations.

During the simulated preheating process the glow period warning lamp -K29- must light up.

If the warning lamp does not light up:

– Testing Glow period warning lamp - K29 - ⇒ Current Flow Diagrams, Fault Finding Electrics and Fitting Locations.

Checking glow plugs

Special tools, test and measuring equipment and aids required

- Diode test lamp (e.g. -V.A.G 1527 B-)
- Flexible-head wrench for glow plugs (e.g. -3220-)

Test condition

- Battery voltage at least 11.5 volts

Test sequence

– Switch off ignition.

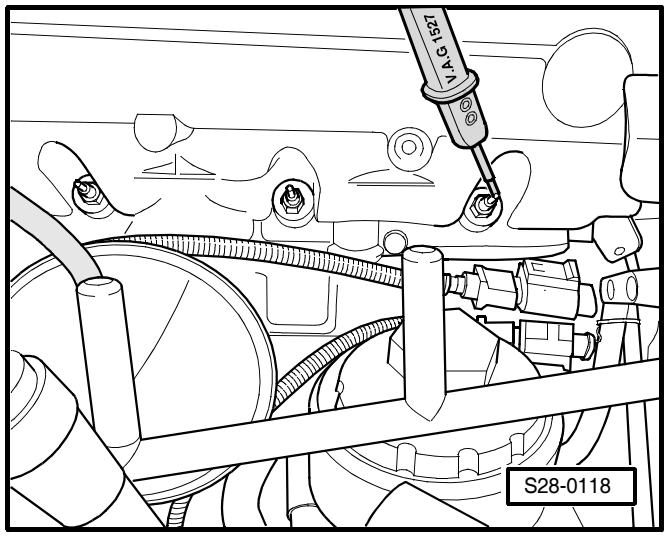
– Remove engine cover.

To do so remove the front and rear engine cover upwards with a sudden motion.

– Remove glow plug connectors from the glow plugs.

– Connect the wire of the diode test lamp to battery positive (+).

– Apply test prod of the diode test lamp to each glow plug in turn.



If the diode lights up: Glow plug is O.K.

If the diode does not light up:

– Replace glow plug.

– If necessary remove and install glow plugs with flexible-head wrench (e.g. -3220-).

Tightening torque: 15 Nm