

Workshop Manual OCTAVIA

**1.9-ltr./81 kW (TDI) Engine,
Fuel Injection and Glow Plug System**

List of Supplements to OCTAVIA Workshop Manual

Edition: 01.04

1.9l/81 kW (TDI) Engine, Fuel Injection and Glow Plug System

Replaces List of Supplements - Edition: 10.03

Supplement	Edition	Subject	Article Number
	03.98	Basic Edition	S00.5122.50.20
1	02.99	Modifications to Fault Codes	S00.5122.51.20
2	02.01	Modifications to Vehicles 08.00 ►	S00.5122.52.20
3	01.02	Supplement to fault code	S00.5122.53.20
4	10.03	Readiness code, Supplement to Repair Group 01	S00.5122.54.20
5	01.04	Supplement to Repair Group 01	S00.5122.55.20
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* Repair operations ⇒ 1.9l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System, Vehicles for Model Year 98 (08.97 ➤)

✖ Repair operations ⇒ 1.9l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System, Vehicles for Model Year 98 (08.97 ➤), Hose layout plan ⇒ 1.9l/81 kW (TDI) Engine, Fuel Injection and Glow Plug System; Page 23-8

Self-Diagnosis

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 and as a volatile memory.

If malfunctions occur in the monitored sensors or components, they are stored in the fault memory with indication of the fault type.

Depending on the analysis, the engine control unit distinguishes the different fault information ⇒ Fault Table, page 01-8 and stores these faults until the fault memory contents is erased.

Faults, which occur only occasionally (sporadically), are displayed as „sporadic“ 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.

The stored faults can be read out with the vehicle system tester V.A.G 1552 or V.A.G 1551, if necessary read out with VAS 5051 ⇒ page 01-5.

After the fault(s) has(have) been removed the fault memory must be erased ⇒ page 01-6.

Notes:

- ◆ *The following description only relates to the vehicle system tester V.A.G 1552 using the current program card.*
- ◆ *If the display of the vehicle system tester reads „Information in the literature“ the required text is to be found in the fault table according to the fault code.*
- ◆ *The use of fault read-out scan tool V.A.G 1551 (using current program card) with integrated printer or VAS 5051 is similar. A minor deviation on the display read-out is possible.*

Technical data of self-diagnosis

Interrogating control unit version

The control unit version is displayed when you connect the vehicle system tester V.A.G 1552 and select the control unit for the engine electronics ⇒ page 01-2.

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

Please refer to the table below for the requirements when you wish to select the desired functions.

Function	Requirement	
	Engine off, ignition switched on	Engine idling
01 Interrogate control unit version	yes	yes
02 Interrogate fault memory	yes ¹⁾	yes
03 Final control diagnosis	yes	yes
04 Basic setting	no	yes
05 Erase fault memory	yes	yes
06 End output	yes	yes
07 Code control unit	yes	no
08 Read measured value block	yes	yes

¹⁾ Only if engine does not start (starter must be operated for at least 6 s).

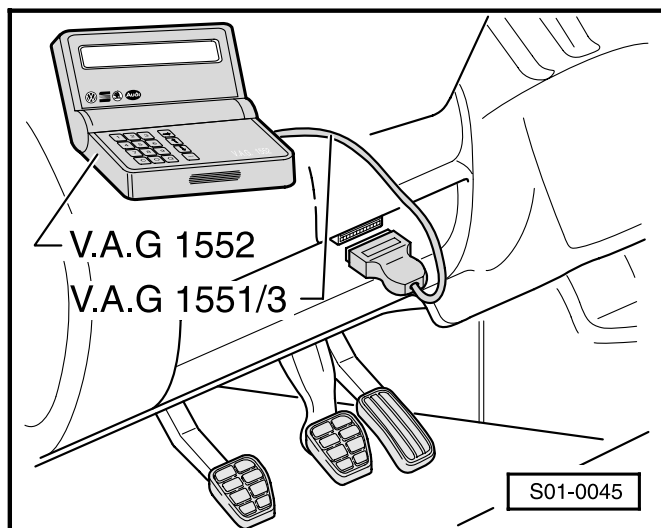
Connecting vehicle system tester V.A.G 1552 and selecting engine electronics control unit

Special tools, testers and aids required

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

Test conditions

- Battery voltage at least 11.5 V
- Fuse 12 o.k.
- Earth connections at gearbox and on left below battery o.k.



Procedure

- ◀ - Connect the vehicle system tester V.A.G 1552 with the cable V.A.G 1551/3.

After the vehicle system tester has been connected:

- Depending on the function you desire, you have to:
Switch on the ignition or start the engine
⇒ page 01-2, table of „Functions available“.

If the readouts which appear in the display are not those shown in the procedure, please refer to the following notes:

Notes:

- ◆ If „Fault in data transfer!“ appears because of an input error, unplug cable at the fault reader, plug in again and once again carry out the steps.

- ◀ ◆ If one of the following messages appears in the display, carry out fault finding according to the Fault Finding Programme Diagnosis Cable:

- ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations binder, or
- ⇒ Operating Instructions of Vehicle System Tester

Test of vehicle systems
Control unit does not answer!

HELP

Test of vehicle systems
Fault in communication build-up

HELP

Test of vehicle systems
K wire not switching to earth

HELP

Test of vehicle systems
K wire not switching to positive

HELP

Test of vehicle systems
Enter address word XX

HELP

Note:

Operate the vehicle system tester according to the readout which appears in the display.

- ◀ Readout in display:

- Press the keys 0 and 1 for the address word „Engine electronics“ and confirm the entry with the key Q.

038906018.. 1.9 I R4 EDC G00SG 1816 →
Coding 00002 WSC 01234

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

- ◆ 038906018.. Part no. of control unit part (for current control unit version - spare parts catalogue)
- ◆ 1.9 I Engine displacement
- ◆ R4 Engine displacement version (4 cyl. in-line engine)
- ◆ EDC Injection system (Electronic Diesel Control)
- ◆ G or no display Vehicle with or without cruise control system
- ◆ 00 Control unit mapping
- ◆ MG Manual gearbox
AG Automatic gearbox
- ◆ 1816 Data status (software version) of control unit
- ◆ Coding 00002 Coding variant of control unit
- ◆ WSC 01234 Workshop code from the vehicle system tester V.A.G 1552 with which the last coding was performed

List of all control units

Part no. of CU ¹⁾	Software version	Starting date
038906018AM	1816	► 08.98
038906018BR	2113	08.98 ► 04.99
038906018GN	2163	05.99 ► 07.00
038906012BA	2830	05.99 ► 07.00
038906012G	3314	08.00 ► 07.03
038906012CL	3316	08.00 ► 07.03
038906012HC	4923	08.03 ►

¹⁾ For current control unit version - spare parts catalogue

Notes:

If the control unit version displayed does not correspond to the vehicle, replace the control unit ⇒ 1.9 I/66 kW (TDI) Engine, Fuel Injection and Glow Plug System

Incorrect coding of the engine control unit results in:

- ◆ *poor driveability (jerking when changing gears, load alteration shock etc.)*
- ◆ *Increase in fuel consumption*
- ◆ *Increase in pollution*
- ◆ *Storage of non-existent faults in fault memory*

- ◆ *Functions not being performed*
- ◆ *Reduction in gearbox life*

If the coding does not match the corresponding version in the vehicle:

- Check coding of engine control unit ⇒ page 01-26, Coding engine control unit.
- Press → key.

Test of vehicle systems
Select function XX

HELP

◀ Readout in display:

- For the remaining procedure ⇒ Repair instructions.

Interrogating and erasing fault memory

Special tools, testers and aids required

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

Interrogating fault memory

- Connect vehicle system tester V.A.G 1552 and select engine electronics control unit (address word 01). The engine should be idling for this step.
(Connecting vehicle system tester and selecting engine electronics control unit ⇒ page 01-2).

Only if the engine does not start:

- Switch the ignition on.

Test of vehicle systems
Select function XX

HELP

◀ Readout in display:

- Enter 02 for the function „Interrogate fault memory“ and confirm the entry with the key Q.

X faults recognized!

◀ The number of stored faults or „No fault recognized!“ appears in the display.

If no fault is stored:

- Press → key.

Test of vehicle systems
Select function XX

HELP

◀ Readout in display:

- End output (function 06).

If one or several faults are stored:

- → Press key.

Fault number: 00542

→

◀ Read-out of fault number on display, e.g.:

- → Press key.

Needle lift sender -G80
Short-circuit to earth

→

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

- → Press key.

The stored faults are displayed in sequence.

- → Press key.

Vehicle system test
Select function XX

HELP

◀ Read-out on display:

- End output (function 06).
- Rectify fault by referring to the fault table
⇒ page 01-8.

Note:

When carrying out test and removal and installation operations, faults, such as connectors unplugged, 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 00 for the address word "Automatic check sequence" and confirm entry with Q key. The -V.A.G 1552- sends all known address words in sequence.

Erasing fault memory**Test condition**

- Rectifying fault

Note:

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

For vehicles 08.03 ►

Whenever the fault memory is erased, it is necessary to generate a readiness code ⇒ page 01-29.

- Connect vehicle system tester -V.A.G 1552- and select the engine electronics control unit (address word 01). The engine must be running in idle.
(Connect vehicle system and select engine electronics control unit ⇒ page 01-2).

Test of vehicle systems
Select function XX

HELP

◀ Readout in display:

- Enter 02 for the function „Interrogate fault memory“ and confirm the entry with the key Q.

X faults recognized!

◀ The number of stored faults appears in the display.

If one or several faults are stored:

The stored faults are displayed one after the other.

Test of vehicle systems
Select function XX

HELP

◀ After the stored faults have been displayed, the following readout appears:

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

Test of vehicle systems
Fault memory is erased!

→

◀ Readout in display:

Note:

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

- Press → key.
- Enter 06 for the function „End output“ and confirm the entry with the key Q.
- Conduct a road test. After this, once again interrogate the fault memory. There must not be any further faults displayed.

Fault table

Notes:

- ◆ For vehicles 08.98 ➤, different fault codes with the same or similar texts are displayed. The required text is to be selected in the fault table according to the fault code.
- ◆ If the display of the vehicle system tester reads „Information in the literature“ the required text is to be found in the fault table according to the fault code.
- ◆ The fault table is ordered according to the fault code on the left.
- ◆ Explanations concerning the types of faults (e.g. Interruption or short-circuit to earth):
 - ⇒ Operating instructions for vehicle system tester
 - ◆ If components are output as faulty:
First check all cables and connectors to these components as well as the earth connections according to the Current Flow Diagram. Replace the component only if this test does not reveal any fault. This applies in particular for faults that are output as „sporadically occurred“ (SP) faults.

Readout V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
old	new			
00513 Engine speed sender -G28 Implausible signal	16705	◆ Bent or loose sensor washer ◆ Distance to speed sender/ sensor rotor too great ◆ Metallic swarf on engine speed sender -G28 ◆ Line interruption of screening ◆ -G28 defective	◆ Poor starting ◆ Irregular engine running, misfiring ◆ Increased idling speed ◆ Glow period indicator light flashes ◆ Reduced performance ◆ No display on rev counter ◆ Engine does not start	- Remove noise insulation and check sensor washer - Check engine speed sensor ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System
No signal	16706	◆ -G28 defective ◆ Line interruption or short-circuit ◆ Line interruption of screening		
00519 Intake manifold sender -G71 Short-circuit to positive	17563	◆ Short-circuit to positive ◆ -G71 defective	◆ Poor performance	- Check intake manifold pressure -G71 ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System - Check intake system for leaks ⇒ page 23-27
Line interruption/ short-circuit to earth	17564	◆ Line interruption or short-circuit to earth ◆ -G71 defective		
Supply voltage	17565	◆ Line interruption or short-circuit		
	17566	◆ Line interruption or short-circuit		

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
00522 Coolant temperature sender -G62 Short circuit to earth	17663	♦ -G62 faulty ♦ Cable has short circuit to earth	♦ Black exhaust when starting ♦ Engine preheater does not operate ♦ Preglowing always operates for about 20 seconds	- Test coolant temperature sender ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
Open/short circuit to positive	17664	♦ -G62 faulty ♦ Open circuit in wiring or cable has short circuit to positive		
00527 Intake manifold temperature sender -G72 Short circuit to earth	17568	♦ -G72 faulty ♦ Cable has short circuit to earth	♦ Engine preheater does not operate	- Test intake manifold temperature sender ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
Open/short circuit to positive	17569	♦ -G72 faulty ♦ Open circuit in wiring or short circuit to positive		

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
00532 Supply voltage Implausible signal as appropriate Voltage supply tml. 15 Voltage too low	18008	♦ Control unit was connected when ignition on ♦ Open circuit in wiring or short circuit ♦ Voltage not present when ignition on (terminal 15) ♦ Diesel direct injection system control unit -J248 faulty ♦ Voltage supply relay terminal 30 (J322) faulty	♦ Engine does not start ♦ Engine stops	- Erase fault memory and continue checking vehicle - Test voltage supply of diesel direct injection system control unit ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System - Test voltage supply of terminal 15 ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System - Replace control unit ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System - Test voltage supply of diesel direct injection system control unit ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
00539 Fuel temperature sender -G81 Short circuit to earth	17570	♦ -G81 faulty ♦ Cable has short circuit to earth	♦ Reduced output ♦ Increased emission levels	- Test fuel temperature sender ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
Open/short circuit to positive	17571	♦ -G81 faulty ♦ Open circuit in wiring or short circuit to positive ♦ Connector for injection pump separated	♦ Several faults stored ♦ Engine stops	- Check plug connection for injection pump

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
00542	17653			
Needle lift sender -G80				
Short circuit to earth		♦ -G80 faulty ♦ Open circuit in wiring or short circuit	♦ Glow indicator lamp flashes ♦ Rough engine running ♦ Reduced output ♦ Increased emission levels	- Test needle lift sender ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
Implausible signal	17654	♦ Fuel supply (was) interrupted: tank has run empty, feed line or filter blocked, system drawing in air ♦ (Sporadic) open circuit in wiring to fuel cut-off valve ♦ Sender plate of engine speed sender bent or loose ♦ -G80 faulty ♦ Injection pump faulty	♦ Fault 00550 Commencement of injection control control difference may be stored ♦ Misfiring, jerking ♦ Engine stops ♦ Misfiring ♦ Misfiring at exactly 3000 rpm ♦ Misfiring, jerking (particularly at high revs) ♦ Fault 01268 quantity adjuster control difference stored ♦ Irregular engine running, misfiring ♦ No throttle response after overrun	- Check fuel system - Check cable connection and plug connection at injection pump - Take off oil pan and inspect sender plate - Replace needle lift sender - Replace injection pump
Open/short circuit to positive	17655	♦ -G80 faulty ♦ Sporadic open circuit in wiring (cable break)	♦ Glow indicator lamp flashes ♦ Misfiring, jerking ♦ Reduced output	- Test needle lift sender ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
00550 Commencement of injection control Control difference	17656	♦ Commencement of delivery not o.k.	♦ Poor performance at higher revs ♦ Engine difficult to start ♦ Increased emission levels	- Test and set commencement of injection ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
		♦ Adjustment travel of injection pump blocked (dirt, swarf)	♦ Poor performance at higher revs	- Test injection timing control range ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
		♦ Engine was stalled (within the last 50 starts)		- Erase fault memory, continue checking vehicle
		♦ Fuel feed (was) interrupted: tank has run empty, feed line or filter blocked, system drawing in air	♦ Fault 00542 Needle lift sender implausible signal may be stored	- Check fuel system
		♦ Open circuit in wiring to commencement of injection valve -N108	♦ Engine clatters when idling as commencement of injection constantly "advanced"	- Test commencement of injection valve ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
			♦ Several faults may be stored	- Test fuse
		♦ Commencement of injection valve -N108 worn	♦ No constant commencement of injection possible at "Basic setting" (display block 2 varies over more than 10 readouts) ♦ Irregular engine running, poor performance	- Replace commencement of injection valve

Readout V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
00553 Air mass meter -G70 Implausible signal	16485	♦ The engine was stalled (within the last 50 engine starts)		- Erase fault memory, observe vehicle again
		♦ Battery weak	♦ Reduced performance ♦ Air mass meter constantly display in measured value block	- Check battery
		♦ Sporadic line interruption (cable parting) of needle lift sender -G80	♦ Misfiring, jerking ♦ Possible fault 00542 needle lift sender, input open or Interruption/short-circuit to positive	- Check needle hub sender ⇒ 1.9l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System
		♦ Air filter blocked ♦ Incorrect vacuum piping of exhaust gas recirculation or mechanical exhaust gas recirculation valve constantly open ♦ Air mass meter defective	♦ Irregular engine running, Poor performance ♦ Poor performance, jerking	- Check intake system - Check vacuum piping ⇒ page 23-9 - Check air mass meter ⇒ page 23-10
	Line interruption/short-circuit to earth	17552	♦ -G70 defective ♦ Line interruption or short-circuit to earth	♦ Reduced performance ♦ Possible black smoke when accelerating from low engine speeds
Short-circuit to positive	17553	♦ -G70 defective ♦ Line interruption or short-circuit to positive		
Supply voltage	17554	♦ Line interruption or short circuit		
00575 Intake manifold pressure Control difference or Charge pressure Control difference	17958	♦ Hoses mixed up, not fitted, blocked, leaking ♦ Pressure unit of turbo-charger defective ♦ Charge pressure control solenoid valve -N75 defective	♦ Sudden decrease of performance ♦ Reduced performance	- Check charge pressure ⇒ page 23-4 - Check charge pressure hose ⇒ page 23-9

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
00625	16885	♦ Open circuit in wiring between speedometer sender -G22 and dash panel insert ♦ -G22 faulty ♦ Speedometer -G21 faulty ♦ Open circuit in wiring between dash panel insert and engine control unit	♦ CCS not operating ¹⁾ ♦ AC not operation ♦ Possible load change jolts ♦ Speed indication not correct	- Test vehicle speed signal ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System - Test speedometer sender ⇒ Electrical System; Repair Group 90
Speed signal implausible signal				
or				
Vehicle speed signal implausible signal				
Vehicle speed signal too large	17948			
00626	18024	♦ Short circuit to positive	♦ Glow period warning lamp not operating	- Test glow period warning light ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
Glow period warning light -K29				
short to positive				
open circuit/short to earth	18025	♦ Open circuit in wiring ♦ Bulb faulty	♦ Glow period warning lamp not operating	
		♦ Short circuit to earth	♦ Glow period warning lamp illuminated constantly	
00668	18009	♦ Diesel direct injection system relay -J322 jamming ♦ Diesel direct injection system relay -J322 faulty	♦ Engine does not start (safety shutoff)	- Test voltage supply of diesel direct injection system ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
El. voltage terminal 30				
implausible signal				
00671	-	♦ E45 faulty ♦ Open circuit or short circuit	♦ Cruise control system is switched off	- Test cruise control system ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
CCS switch -E45				
undefined switch status				

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
old	new			
00741 Brake pedal monitoring Implausible signal	-	♦ Switch incorrectly set ♦ Open circuit in wiring ♦ -F or -F47 faulty ♦ Fuse faulty ♦ Both brake lights faulty	♦ Preglow indicator lamp flashes ♦ Fuse or brake light faulty	- Test -F and -F47 and set ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System - Test fuse and brake light
00765 Modulating piston movement sender -G149	17762	♦ 10-pin connector for injection pump separated ♦ Injection pump faulty ♦ Open circuit in wiring or short circuit	♦ Several faults stored ♦ Engine stops ♦ Drivability problems ♦ Engine stops	- Inspect plug connection of injection pump - Test modulating piston movement sender ⇒ page 23-13
00777 Accelerator pedal position sender -G79 Signal too large	18039	♦ Open circuit in wiring ♦ -G79 faulty (idling switch)	♦ Speed governed to approx. 1100 rpm as safety measure ♦ No throttle response ♦ Preglow indicator light flashes ♦ Fast idling speed	- Test accelerator pedal position sender ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
Voltage supply	18040	♦ Open circuit in wiring or short circuit		
Implausible signal as appropriate	18047	♦ Open circuit in wiring ♦ -G79 faulty (idling switch)		
Accelerator pedal position sender 1/2 -G79+-G185 ¹⁾ Implausible signal				
Short circuit to positive	-	♦ Short circuit to positive ♦ -G79 faulty		

¹⁾ Incorrect fault text readout. The correct readout is:
Accelerator pedal position sender -G79

Readout V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
01028	-			- Check radiator fan signal ⇒ page 01-20, Actuator diagnosis
Blower relay -J323				
Line interrup- tion/short-circuit to earth		♦ Line interruption of ♦ Relay -J323 defective	♦ Delayed fan switch off	
Short-circuit to positive	-	♦ Short-circuit to earth ♦ Short-circuit to positive	♦ Radiator fan constantly on ♦ Delayed fan switch off	
01044	18020			
Engine control unit is wrongly coded		♦ Invalid control unit coding	♦ Glow period indicator light flashes	- Coding control unit ⇒ page 01-26
01117	17911			
Load signal for generator tml. DF				
Implausible sig- nal		♦ Line interruption or short- circuit ♦ Generator defective ♦ Voltage regulator defec- tive	♦ Engine preheating not op- erational	- Check wiring - Check generator ⇒ Binder: Current Flow Dia- grams, Electrical Fault Finding and Fitting Loca- tions
01180	-			
Engine/air condi- tioning compres- sor electrical con- nection				
Short-circuit to positive		♦ Short-circuit in the wiring	♦ Reduced vehicle accelera- tion, when the air condi- tioning system is switched on	- Testing signals from/to the air conditioning system ⇒ 1.9/66 kW (TDI) Engine, Fuel Injection and Glow Plug System

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
01193	19460	♦ Open circuit in wiring ♦ Low heating capacity relay -J359 faulty ♦ Short circuit to earth	♦ Engine preheating not operating ♦ Engine preheating constantly on	- Test cable connections ⇒ Current Flow Diagrams, Electrical Fault Finding, Fitting Locations binder - Test low heating capacity relay ⇒ page 01-20, Final control diagnosis
Low heating capacity relay -J359				
open circuit/short to earth				
short to positive	19459	♦ Short circuit to positive	♦ Engine preheating not operating	
01194	19462	♦ Open circuit in wiring ♦ High heating capacity relay -J360 faulty ♦ Short circuit to earth	♦ Engine preheating not operating ♦ Engine preheating constantly on	- Test cable connections ⇒ Current Flow Diagrams, Electrical Fault Finding, Fitting Locations binder - Test high heating capacity relay ⇒ page 01-20, Final control diagnosis
High heating capacity relay -J360				
open circuit/short to earth				
short to positive	19461	♦ Short circuit to positive	♦ Engine preheating not operating	
01237	17945	♦ -N109 faulty, leaking or jamming	♦ Reduced output ♦ Engine stops	- Test -N109 ⇒ page 01-20, Final control diagnosis
Fuel cutoff valve -N109				
malfunction (mechanical fault)	17946	♦ -N109 faulty ♦ Open circuit or short circuit to earth	♦ Engine stops	- Test cable connections ⇒ Current Flow Diagrams, Electrical Fault Finding, Fitting Locations binder
open circuit/short to earth				

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
01262 Charge pressure control solenoid valve -N75 Short circuit to positive	17954	♦ Short circuit to positive	♦ Reduced output ♦ Charge pressure too low	- Test charge pressure control solenoid valve ⇒ page 23-6
Short circuit to earth	17955	♦ Short circuit to earth	♦ Reduced output ♦ Charge pressure too high	
Open/short circuit to earth	17957	♦ Open circuit in wiring ♦ Solenoid valve faulty	♦ Reduced output ♦ Charge pressure too low	
01265 EGR valve -N18 Short circuit to positive	17810	♦ Short circuit to positive	♦ No exhaust gas recirculation	- Test EGR valve ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
Open/short circuit to earth	17849	♦ Open circuit in wiring ♦ Solenoid valve faulty	♦ No exhaust gas recirculation	
		♦ Short circuit to earth	♦ Excessive exhaust gas recirculation ♦ Reduced output, black exhaust	
01266 Glow plug relays -J52 Short circuit to positive	18026	♦ Short circuit to positive	♦ Glow plug system not operating	- Test glow plug relay -J52 ⇒ Current Flow Diagrams, Electrical Fault Finding and Fitting Locations binder
Open/short circuit to earth	18027	♦ Open circuit in wiring ♦ Relay faulty	♦ Glow plug system not operating	
		♦ Short circuit to earth	♦ Glow plug system constantly on	

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
old	new			
01268 Quantity adjuster -N146 Control difference (variation)	17969	♦ Injection pump faulty ♦ Open circuit in wiring or short circuit	♦ Poor drivability ♦ Engine switches off ♦ Glow plug indicator light flashes	- Test quantity adjuster -N146 ⇒ page 23-13 - Replace injection pump
Upper stop value	17970	♦ Quantity adjuster incorrectly set	♦ Jerking, poor output	
Lower stop value	17971	♦ Quantity adjuster incorrectly set	♦ Black exhaust ♦ Irregular idling	
01269 Commencement of injection valve -N108 Short to positive	17659	♦ Short circuit to positive	♦ Engine clatters when idling as commencement of injection constantly „advanced“	- Test commencement of injection valve ⇒ 1.9 I/66 kW (TDI) Engine, Fuel Injection and Glow Plug System - Test fuse - Test commencement of injection valve ⇒ 1.9 I/66 kW (TDI) Engine, Fuel Injection and Glow Plug System
Open/short circuit to earth	17660	♦ Open circuit in wiring (fuse) ♦ Valve faulty	♦ Engine clatters when idling as commencement of injection constantly „advanced“	
			♦ Several faults may be stored	
		♦ Short circuit to earth	♦ Poor performance as commencement of injection constantly „retarded“	
01282 Intake manifold flap changeover valve -N239 Open/short circuit to earth	19561	♦ Open circuit in wiring ♦ Intake manifold flap changeover valve faulty	♦ Hard jolt when engine stops	- Test intake manifold flap changeover valve ⇒ 1.9 I/66 kW (TDI) Engine, Fuel Injection and Glow Plug System
Short to positive	19560	♦ Short circuit to positive		

Readout V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
16500	-			
Coolant temperature sender -G62				
Implausible signal		◆ Sender for coolant temperature -G62 supplies implausible signal caused by loose contact or corrosion due to humidity in the connector ◆ Signal input in engine control unit defective (control unit defective) ◆ Coolant regulator defective (thermostat)	◆ Cold-start difficulties at very low temperatures ◆ Poor driveability during warm-up ◆ Increase in fuel consumption ◆ Increased emission levels	- Reading measured value block, display group 007 ⇒ page 01-48 - Check -G62 ⇒ 1.9l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System - Replacing engine control unit ⇒ 1.9l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System - Check coolant regulator ⇒ 1.9l/66 kW Engine, Mechanical Components; Repair Group 19; Removing and installing coolant regulator
16955	-			
Brake light switch -F				
Implausible signal		◆ Brake light defective ◆ Line interruption or short-circuit to positive or earth between brake light switch and engine control unit	◆ Brake light does not light up ◆ Engine speed fluctuations during braking	- Check brake light switch and brake pedal switch ⇒ 1.9l/66 kW TDI Engine, Fuel Injection and Glow Plug System
17811	-			
Exhaust gas recirculation system				
Control difference		◆ Exhaust gas recirculation valve -N18- defective ◆ Exhaust gas recirculation potentiometer -G212- defective	◆ Exhaust gas recirculation system not operational ◆ Mixture adaptation not operational	- Check exhaust gas recirculation solenoid valve ⇒ page 01-20, Actuator diagnosis - Check exhaust gas recirculation valve ⇒1.9/66 kW (TDI) Engine, Mechanical Components; Repair Group 26

Readout V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
17931	-			
Crash signal of airbag CU				
Implausible signal		♦ Fault in airbag system	♦ Airbag warning light comes on	- Check airbag ⇒ Body Work; Repair Group 01
17964	-			
Charge pressure control				
Regulating limit not reached		♦ Fault in charge pressure control ♦ -N75 defective	♦ Incorrect driving behaviour ♦ Reduced performance	- Check charge pressure control solenoid valve -N75 ⇒ page 01-20, Actuator diagnosis - Check charge pressure control ⇒ 1.9l/66 kW (TDI) Engine, Mechanical Components; Repair Group 21
17965	-			
Charge pressure control				
Regulating limit exceeded		♦ Fault in charge pressure control ♦ -N75 defective	♦ Incorrect driving behaviour ♦ Reduced performance	- Check charge pressure control solenoid valve -N75 ⇒ page 01-20, Actuator diagnosis - Check charge pressure control ⇒ 1.9l/66 kW (TDI) Engine, Mechanical Components; Repair Group 21
17977	-			
CCS switch -E45				
Implausible signal		♦ CCS switch defective ♦ Line interruption	♦ Cruise control system not operational	- Check cruise control system ⇒ 1.9l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System - Reading measured value block 006 ⇒ page 01-43

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
17978	-	◆ Attempt at manipulation ◆ Attempt at starting with unauthorized key ◆ Engine control unit not adapted to immobiliser ◆ Short circuit in communication line ◆ Fault in immobiliser system ◆ Immobiliser control unit faulty/missing ◆ Engine control unit incorrectly coded	◆ Engine starts and cuts out again immediately	- Adapt engine electronics control unit to electronic immobiliser ⇒ Electrical System; Repair Group 90 - Test electronic immobiliser ⇒ Current Flow Diagrams, Electrical Fault Finding, Fitting Locations binder - Code engine electronics control unit ⇒ page 01-26
18044	-	◆ Datalines faulty ◆ Fault in airbag	◆ Poor driving characteristics	- Test databus ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System - Test airbag control unit ⇒ Body Fitting Work; Repair Group 01
18050	-	◆ Fault in airbag system	◆ Airbag warning light comes on	- Test airbag ⇒ Body Fitting Work; Repair Group 01

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
old	new			
18058 Drive train databus no message from instrument cluster	-	◆ Datalines faulty ◆ Incorrect or faulty dash panel insert ◆ Incorrect or faulty engine control unit	◆ Poor driving characteristics	- Test databus ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
18061 Read out fault memory of ABS control unit	-	◆ Fault in ABS control unit	◆ No vehicle dynamic control ◆ TCS not operating ◆ EBC not operating	- Test ABS control unit ⇒ Running Gear; Antilock Brake System
18062 Read out fault memory for instrument cluster	-	◆ Oil level/oil temperature sender -G266 faulty	◆ Oil level warning light comes on	- Test oil level/oil temperature sender -G266 ⇒ Current Flow Diagrams, Electrical Fault Finding, Fitting Locations binder
18065 AC input/output short to positive	-	◆ Short circuit in cable connection	◆ Reduced output	- Test air conditioning ⇒ page 01-20, Final control diagnosis
18067 Radiator fan control 1 short to positive	-	◆ Short circuit to positive	◆ Engine off fan running does not operate	- Test blower relay -J323 ⇒ page 01-20, Final control diagnosis

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
old	new			
18080	-	♦ Open circuit in wiring ♦ Relay faulty	♦ Engine off fan running not operating	- Test blower relay -J323 ⇒ page 01-20, Final control diagnosis
Radiator fan control 1			♦ Radiator fan constantly on	
18090	-	♦ Open circuit in datalines to ABS control unit	♦ No vehicle dynamic control ♦ TCS not operating ♦ EBC not operating	- Test databus ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
18259	18057	♦ Fault in datalines to ABS control unit	♦ No vehicle dynamic control	- Test datalines to engine control unit for open circuit or short circuit ⇒ Current Flow Diagrams, Electrical Fault Finding, Fitting Locations binder
Drive train databus		♦ Fault in ABS system		- Test ABS control unit ⇒ Running Gear; Antilock Brake System
18262	18056	♦ Fault in datalines to ABS control unit	♦ No vehicle dynamic control	- Test datalines to engine control unit for open circuit or short circuit ⇒ Current Flow Diagrams, Electrical Fault Finding, Fitting Locations binder
Drive train databus		♦ Fault in ABS system		- Test ABS control unit ⇒ Running Gear; Antilock Brake System

Readout on V.A.G 1552		Possible cause of fault	Possible effects	Rectifying fault
Fault number				
old	new			
65535	16989 17795 18048	◆ Internal error in control unit	◆ Poor driving characteristics ◆ Engine stops ◆ Glow period warning light flashes	- Replace control unit ⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System
Control unit defective				

Actuator diagnosis

Performing actuator diagnosis

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

1. Commencement of injection valve (N108)
2. Exhaust gas recirculation valve (N18)
3. AC compressor engagement
4. Fuel shut-off valve (N109)
5. Charge pressure control solenoid valve (N75)
6. Glow plug relay (J52)
7. Glow period warning lamp (K29)
8. Low heat output relay (J359)¹⁾
9. High heat output relay (J360)¹⁾
10. Blower relay (J323)
11. Fault lamp²⁾

¹⁾ Only for vehicles with special equipment

²⁾ For vehicles as of 08.03.

Test preconditions for vehicles with air conditioning

- Vehicle at room temperature (at least + 15 °C)
- Air conditioning switched on
- Lowest temperature and highest blower speed preselected

Special tools, aids and testers required

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

Procedure

- Connect vehicle system tester V.A.G 1552 and select engine electronics control unit (address word 01). The engine must be running in idle ⇒ page 01-2).

Vehicle system test
Select function XX

HELP

◀ Read-out on display:

Test of vehicle systems
03 - Final control diagnosis

Q

- Press keys 0 and 3 for the function „Final control diagnosis“.

◀ Readout in display:

- Confirm the entry with the key Q.

Final control diagnosis
Commencement of injection valve -N108

→

◀ Readout in display:

Actuation of the valve results in a clearly audible change in the combustion noise.

If no change in the combustion noise can be heard:

- Test injection timing control range
⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System

- Press the → key.

Final control diagnosis
EGR valve -N18

→

◀ Readout in display:

The valve should click.

Note:

The clicking of the valve cannot be heard because of the engine noise and should therefore be sensed by feeling.

If the valve does not click:

- Test EGR valve
⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System

- Press the → key.

Final control diagnosis
AC compressor cut-off

→

◀ Readout in display:

What is tested is the AC compressor cut-off.

The test step is also retrieved on models without air conditioning.

The AC compressor should stop within 5 seconds (visual inspection with electric torch), and then should run and stop again about every 5 seconds.

If the AC compressor is not switched off:

- Test AC compressor cut-off
⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System

Actuator diagnosis
Fuel shut-off valve -N109 →

- → Press key.

◀ Read-out on display:

The engine must stop.

If the engine does not stop:

- Switch off ignition.
- Unscrew fuel shut-off valve and remove possible swarf and dirt.
- Repeat actuator diagnosis, if the engine still does not stop, replace fuel shut-off valve.
- Continue actuator diagnosis with the engine off and the ignition switched on.

- → Press key.

Actuator diagnosis
Charge pressure control solenoid valve -N75 →

◀ Read-out on display:

The solenoid valve must click.

Note:

The clicking of the relay is difficult to hear and can therefore best be felt.

If the solenoid valve does not click:

- Check charge pressure control solenoid valve ⇒ page 23-6.
- → Press key.

Actuator diagnosis
Glow plug relay -J52 →

◀ Read-out on display:

The relay valve must click.

Because of the high consumption of the glow plugs, the activation and de-activation of the relays can be observed on the brightening and dimming of the interior lighting.

If the relay does not click:

- Check glow plug relay:
⇒ Binder: Current Flow Diagrams, Electrical Fault Finding and Fitting locations.
- → Press key.

Actuator diagnosis
Glow period warning lamp -K29 →

◀ Read-out on display:

The warning lamp must flash.

If the warning lamp does not flash:

- Check glow period warning lamp
⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System.

Actuator diagnosis
Low heat output relay -J359 →

- → Press key.

◀ Read-out on display:

The relay valve must click.

If the relay does not click:

- Check low heat output relay:
⇒ Binder: Current Flow Diagrams, Electrical Fault Finding and Fitting locations.

- → Press key.

Actuator diagnosis
High heat output relay -J360 →

◀ Read-out on display:

The relay valve must click.

If the relay does not click:

- Check low high heat output relay:
⇒ Binder: Current Flow Diagrams, Electrical Fault Finding and Fitting locations.

- → Press key.

Actuator diagnosis
Blower relay -J323 →

◀ Read-out on display:

The relay must click (approx. every 5 seconds). Simultaneously the radiator fan -V7 must start running.

If the relay does not click or the fan does not start running:

- Check blower radiator and radiator fan:
⇒ Binder: Current Flow Diagrams, Electrical Fault Finding and Fitting locations.

- → Press key.

Actuator diagnosis
Fault lamp →

◀ Read-out on display:

The fault lamp must flash.

If the fault lamp does not flash:

- Check fault lamp:
⇒ Binder: Current Flow Diagrams, Electrical Fault Finding and Fitting locations.

- → Press key.

Vehicle system test
Select function XX HELP

◀ Read-out on display:

- Enter 06 for the function „end output“ and confirm entry with key Q.
- Switch off ignition.

Basic setting

Test conditions

- Coolant temperature at least 80 °C
- Electrical components switched off (radiator fan must not cut in during the test)
- AC switched off

Special tools, testers and aids required

- ◆ Vehicle system tester V.A.G 1552 with cable V.A.G 1551/3

Procedure

- Connect vehicle system tester V.A.G 1552 and select the engine electronics control unit with the address word „01“. The engine should be idling for this step.
(Connecting vehicle system tester and selecting engine electronics control unit ⇒ page 01-2)

Test of vehicle systems
Select function XX

HELP

◀ Readout in display:

- Press the keys 0 and 4 for the function „Basic setting“ and confirm the entry with the key Q.

Basic setting
Enter display group number XXX

HELP

◀ Readout in display:

- Press the key 0 three times for display group „000“ and confirm the entry with the key Q.

System in basic setting									0	→
1	2	3	4	5	6	7	8	9	10	

◀ Readout in display:
(1...10 = display blocks)

Display group 000 at idling speed (engine warm, coolant temperature not below +80 °C)

This display group is used for the dynamic test of the commencement of injection. The commencement of injection valve (N108) is constantly actuated as a result of which the injection timing control is „retarded“.

System in basic setting									
42	46	0	20	90	201	64	153	127	83
0 → ◀ Readout in display:									
Ignore									
Fuel temperature: at approx. 40 °C (is not achieved of ambient temperature low; no specification)									
Ignore									
Coolant temperature: at approx. 90 °C									
Ignore									
Ignore									
Ignore									
Accelerator pedal position: 0									
Commencement of injection depends on fuel temperature									
Specifications:									
⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System, dynamic test and setting of commencement of injection									
Idling speed: 42...45									

Coding control unit

If the coding displayed does not match the vehicle, or if the control unit has been replaced, it is then necessary to code the control unit as follows.

Special tools, testers and aids required

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

Test procedure

- Connect vehicle system tester V.A.G 1552 and select engine electronics control unit (address word 01). The ignition must be switched on for this step.
(Connecting vehicle system tester and selecting engine electronics control unit ⇒ page 01-2).

Test of vehicle systems
Select function XX

HELP

◀ Readout in display:

- Enter 07 for the function „Code control unit“ and confirm entry with the key Q.

Code control unit
Enter code number XXXXX

Q
(0-32000)

◀ Readout in display:

- Enter the correct code number for this vehicle and confirm entry with the key Q.

Coding control units

Models ► 08.98		Models 08.98 ►	
Code number	Models fitted with	Code number	Models fitted with
00001	Automatic gearbox	00001	Automatic gearbox
00002	Manual gearbox	00002	Manual gearbox with activated CAN bus (models fitted with ABS)
		00005	Manual gearbox without CAN bus (models not fitted with ABS)

038906018.. 1.9l R4 EDC G00SG 1816 →
Coding 00002 WSC 01234

◀ The control unit identification appears in the display (example):

- Switch ignition off and on again.

Note:

The code entered is activated when the ignition is next switched on.

- Press → key.

Test of vehicle systems
Select function XX

HELP

◀ Readout in display:

Readiness code

Valid for vehicles 08.03 ►

Reading readiness code

Function

The readiness codes are two 8-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. After repairs have been carried out to an emission-relevant system, it is recommended to generate the readiness code in order to thus ensure that the systems operate properly. If a fault is detected during diagnosis, it is then stored in the fault memory.

The readiness code is erased through deletion of the fault memory, that is all relevant points will be set to 1.

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

Procedure

- ◆ Vehicle system tester -V.A.G 1552- with cable -V.A.G 1551/3, 3A, 3B or 3C-
- Connect vehicle system tester -V.A.G 1552- and enter address word 01 "Engine electronics", switch on ignition ⇒ page 01-2.
- Read function 08 "Reading measured value block" and select display group 017.

Reading measured value block 17 →			
00000000	00000110	10000000	00000000

◀ Read-out on display

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 supply
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 ⇒ page 01-29.
- → Press key.
- Enter function 06 "End output" and switch off ignition.

Generating readiness code

Special tools, aids and testers required

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

Test conditions

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

Procedure

- Connect vehicle system tester -V.A.G 1552- and enter address word 01 "Engine electronics", ignition switched on ⇒ page 01-2.

Note:

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

Work step 1: Interrogating fault memory

- Enter function 02 "Interrogating fault memory" and confirm entry with key Q.

X fault detected!



- ◀ The number of stored faults or "No fault detected" appears in the display.

If a fault is stored:

- Rectify fault by referring to the fault table
⇒ page 01-8.

If no fault is stored:

- → Press.

Work step 2: Erasing fault memory

Vehicle system test
Fault memory is erased



- ◀ - Enter function 05 "Erasing fault memory" and confirm entry with key Q.

Note:

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

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

- → Press.

Work step 3: Switching off ignition

- Wait at least 5 seconds with ignition OFF.

Note:

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

Work step 4: Switching on ignition

- Wait at least 10 seconds with ignition OFF.

Charge pressure sender is adapted with atmospheric charge pressure sender.

Work step 5: 1st test of fuel supply and other systems

- Start engine.
- Select function "Reading measured value block" and display group 001.

Reading measured value block	1	→
2500/rpm	4.6 mg/h	2.0 °CA 94.2 °C

- ◀ - For 5 seconds increase the engine speed to 2500 rpm and then run engine at idling speed.

Work step 6: 1st test of exhaust gas recirculation

Reading measured value block	1	→
1650/rpm	4.1 mg/h	4.0 °CA 93.2 °C

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

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

Work step 7: Switching off ignition

- Wait at least 5 seconds with ignition OFF.

Work step 8: Switching on ignition

- Wait at least 10 seconds with ignition OFF.

Work step 9: 2nd test of fuel supply and other systems

- Start engine.
- Select function "Reading measured value block" and display group 001.

Reading measured value block	1	→
2500/rpm	4.6 mg/h	2.0 °CA 94.2 °C

- ◀ - For 5 seconds increase the engine speed to 2500 rpm and then run engine at idling speed.

Work step 10: 2nd test of exhaust gas recirculation

Reading measured value block	1	→
1650/rpm	4.1 mg/h	2.0 °CA
		93.2 °C

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

- Press C.

- Enter 017 for display group 017 and read readiness code.

Reading measured value block	17	→
00000000	00000110	10000000
		00000000

◀ Specified value in display field 2:
00000110

Specified value in display field 4:
00000000

- → Press.

- If the specified values are not reached, repeat procedure for generating readiness code ⇒ page 01-29.

Work step 11: Interrogating fault memory

- Enter function 02 "Interrogating fault memory" and confirm entry with key Q.

X fault detected!	→
-------------------	---

◀ The number of stored faults or "No fault detected" appears in the display.

If a fault is stored:

- Rectify fault by referring to the fault table ⇒ page 01-8 and re-generate the readiness code ⇒ page 01-29.

If no fault is stored:

- → Press.

Reading measured value block	17	→
00000000	00000110	10000000
		00000000

◀ Readiness code was successfully generated, if no fault is stored after two work sequences of the test procedure in the fault memory for the engine control unit and if the following display appears in the channel 017.

Measured value blocks

Reading measured value block

Test conditions

- Coolant temperature at least 80 °C
- Electrical consumers must be disconnected (the radiator cooling fan must be off during this test)
- Air conditioning switched off
- No fault in fault memory

Special tools, aids and testers required

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

Procedure

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

Vehicle system test
Select function XX

HELP

◀ Read-out on display:

- Enter 08 for the function „Read measured value block“ and confirm entry with the key Q.

Reading measured value block
Enter display group number XXX

HELP

◀ Read-out on display:

- Enter the desired display group number and confirm entry with the key Q.

Note:

Display group number 000 is an example to represent the sequence.

Reading measured value block							0	→	
1	2	3	4	5	6	7	8	9	10

◀ Read-out on display, e.g.:

- → Press key.

Vehicle system test
Select function XX

HELP

◀ Read-out on display:

- Enter 06 for the function „End output“ and confirm entry with the key Q.

Specified readouts for general vehicle check

Display group 000, engine idling (engine warm, coolant temperature not below +80 °C)
for models ► 04.99

Read measured value block										0	→	◀ Readout in display
42	50	0	20	90	201	64	153	127	83			
										Inducted air mass ¹⁾ : 69...111 o.k.		
										• if not to tolerance ⇒ page 01-47, display group 003		
										Fuel temperature: 91...201		
										Intake manifold temperature: 182...50		
										Coolant temperature: 80...35 o.k.		
										• > 80: warm up engine		
										Ambient air pressure: ignore		
										Charge pressure: ignore		
										Injected quantity: 11...45 o.k.		
										• if not to tolerance ⇒ page 01-36, display group 001		
										Accelerator pedal position: 0		
										Commencement of injection: 12...75 o.k.		
										• if not to tolerance ⇒ page 01-39, display group 004		
										Idling speed: 42...45 o.k.		
										• if not to tolerance ⇒ page 01-42, display group 002		

¹⁾ The measured values apply when the exhaust gas recirculation is switched on. The exhaust gas recirculation is switched off in the idling speed range after about 2 minutes; if necessary, briefly blip throttle or re-start engine.

**Display group 000, engine idling (engine warm, coolant temperature not below +80 °C)
for models 05.99 ➤**

Read measured value block										0	→	◀ Readout in display
42	50	0	20	90	201	64	153	127	83			
										Inducted air mass ¹⁾ : 69...110 o.k.		
										• if not to tolerance ⇒ page 01-47, display group 003		
										Fuel temperature: 91...201		
										Intake manifold temperature: 190...80		
										Coolant temperature: 80...35 o.k.		
										• > 80: warm up engine		
										Ambient air pressure: ignore		
										Charge pressure: ignore		
										Injected quantity: 15...45 o.k.		
										• if not to tolerance ⇒ page 01-37, display group 001		
										Accelerator pedal position: 0		
										Commencement of injection: 12...75 o.k.		
										• if not to tolerance ⇒ page 01-39, display group 004		
										Idling speed: 43...46 o.k.		
										• if not to tolerance ⇒ page 01-42, display group 002		

- ¹⁾ The measured values apply when the exhaust gas recirculation is switched on. The exhaust gas recirculation is switched off in the idling speed range after about 2 minutes; if necessary, briefly blip throttle or re-start engine.

Display group 000 at full throttle (road test in 3rd or 4th gear, coolant temperature not below +80 °C, engine speed 2900...3100 rpm) for models ► 04.99

Notes:

- ◆ Accelerate the vehicle at full throttle for the test.
- ◆ The measured values must be read off or printed out (second person required) once an engine speed of 3000 rpm has been reached.

Read measured value block										0	→	◀ Readout in display
186	225	255	186	186	201	64	138	175	255			
										Inducted air mass: > 255 o.k.		
										• < 255: ⇒ page 01-52, display group 010		
										Fuel temperature: 91...201 o.k.		
										Intake manifold temperature: 182...50 o.k.		
										Coolant temperature: 80...35 o.k.		
										• > 80: warm up engine		
										Ambient air pressure: 183...224 o.k.		
										Charge pressure: 179...215 o.k.		
										• if not to tolerance ⇒ page 01-54, display group 011		
										Injected quantity: 199...214 (full load injected quantity) o.k.		
										• 125: emergency injected quantity, system fault detected ⇒ page 01-5, Interrogating fault memory		
										Accelerator pedal: 255 (fully depressed)		
										Commencement of injection: 138...215 (dependent on engine speed)		
										• if not to tolerance ⇒ page 01-40, display group 004		
										Engine speed: 138...148		

Display group 000 at full throttle (road test in 3rd or 4th gear, coolant temperature not below +80 °C, engine speed 2900...3100 rpm) for models 05.99 ►

Notes:

- ◆ Accelerate the vehicle at full throttle for the test.
- ◆ The measured values must be read off or printed out (second person required) once an engine speed of 3000 rpm has been reached.

Read measured value block										0	→	◀ Readout in display
186	225	255	186	186	201	64	138	175	255			
										Inducted air mass: > 255 o.k.		
										• < 255: ⇒ page 01-53, display group 010		
										Fuel temperature: 91...201 o.k.		
										Intake manifold temperature: 190...35 o.k.		
										Coolant temperature: 80...35 o.k.		
										• > 80: warm up engine		
										Ambient air pressure: 183...224 o.k.		
										Charge pressure: 179...215 o.k.		
										• if not to tolerance ⇒ page 01-55, display group 011		
										Injected quantity: 199...214 (full throttle injected quantity) o.k.		
										• 125: emergency injected quantity, system fault detected ⇒ page 01-5, Interrogating fault memory		
										Accelerator pedal: 255 (fully depressed)		
										Commencement of injection: 137...215 (depending on engine speed)		
										• if not to tolerance ⇒ page 01-41, display group 004		
										Engine speed: 134...153		

Specified readouts for injection pump

Display group 001, engine idling (engine warm, coolant temperature not below +80 °C)
for models ► 04.99

Read measured value block				1	→	◀ Readout in display
900 rpm	5.6 mg/s	1.480 V	87.3 °C			
				Coolant temperature		
				• 80...110 °C o.k., < 80 °C: ⇒ warm up engine		
				Voltage of modulating piston movement sender -G149		
				• 1.450...1.950 V: o.k. • < 1.450 V: - Injection pump damaged ⇒ replace injection pump • > 1.950 V: - Engine load ⇒ switch off consumers - Engine too cold ⇒ warm up engine - Injection pump damaged ⇒ replace injection pump		
				Injected quantity		
				• 2.2...9.0 mg/s: o.k. • < 2.2 mg/s: - Injection pump damaged ⇒ replace injection pump • > 9.0 mg/s: - Engine load ⇒ switch off consumers - Engine too cold ⇒ warm up engine - Injection pump damaged ⇒ replace injection pump		
				Engine speed		
				• Models ► 04.99 = 875...950 rpm o.k. • Models 05.99 ► = 861...945 rpm o.k.		

**Display group 001, engine idling (engine warm, coolant temperature not below +80 °C)
for models 05.99 ➤**

Read measured value block				1	→	◀ Readout in display
900 rpm	5.6 mg/s	1.720 V	87.3 °C			
				Coolant temperature		
				• 80...110 °C o.k., < 80 °C: ⇒ warm up engine		
				Voltage of modulating piston movement sender -G149		
				• 1.30...2.10 V: o.k.		
				• < 1.30 V:		
				- Injection pump damaged ⇒ replace injection pump		
				• > 2.10 V:		
				- Engine load ⇒ switch off consumers		
				- Engine too cold ⇒ warm up engine		
				- Injection pump damaged ⇒ replace injection pump		
				Injected quantity		
				• 3.0...9.0 mg/s: o.k.		
				• < 3.0 mg/s:		
				- Injection pump damaged ⇒ replace injection pump		
				• > 9.0 mg/s:		
				- Engine load ⇒ switch off consumers		
				- Engine too cold ⇒ warm up engine		
				- Injection pump damaged ⇒ replace injection pump		
Engine speed ⇒ page 01-36; display group 001						

Display group 001, attempt at starting (if engine does not start) ¹⁾

Read measured value block		1	→	◀ Readout in display
230 rpm	37.4 mg/s	2.780 V	14.3 °C	
Coolant temperature				
Voltage of modulating piston movement sender -G149 (feedback of quantity adjuster to control unit regarding position of modulating piston)				
• Voltage rises in time jumps: o.k. (pump injecting) • < 1.000 V: quantity adjuster closed - Observe display block 2, only if specified injected quantity o.k. ⇒ replace injection pump				
Specified injected quantity (actuation of metering adjuster in injection pump by control unit)				
• Injected quantity rises in time jumps: o.k. (pump is actuated) • 0.0 mg/s, or constant quantity: system fault - Interrogate fault memory ⇒ page 01-5 - Test fuel supply ⇒ page 01-20, Final control diagnosis; Testing fuel shut-off valve				
Engine speed				

¹⁾ If the vehicle electrical voltage drops below 10.8 V during the attempt at starting, the vehicle system tester V.A.G 1552 interrupts the diagnosis.

Display group 019, ignition switched on

Read measured value block		19	→	◀ Readout in display
0.780 V	4.150 V			
No readout				
No readout				
Voltage of modulating piston movement sender at maximum stop of quantity adjuster				
• 4.150...4.740 V: o.k. • Not to tolerance: - Contact resistance in cable connection ⇒ test, page 23-13 - Quantity adjuster of injection pump incorrectly set ⇒ replace injection pump				
Voltage of modulating piston movement sender at minimum stop of quantity adjuster				
• 0.500...0.970 V: o.k. • Not to tolerance: - Contact resistance in cable connection ⇒ test, page 23-13 - Quantity adjuster of injection pump incorrectly set ⇒ replace injection pump				

Display group 004, engine idling (engine warm, coolant temperature not below +80 °C)

Read measured value block			4	→	◀ Readout in display
900 rpm	0.9° BTDC	0.9° BTDC	3 %		
			On/off ratio (actuation) of commencement of injection valve • 3...80 %		
			Momentary commencement of injection • 2° ATDC...3° BTDC o.k. • Later than 2° ATDC: commencement of injection blocked - Commencement of injection valve faulty ⇒ Final control diagnosis, page 01-20 - Injection pump stops extremely too late ⇒ Dynamically test commencement of injection and set ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System • Earlier than 3° BTDC: - Engine too cold ⇒ warm up engine - Commencement of injection valve faulty ⇒ Final control diagnosis, page 01-20 - Injection pump stops too soon ⇒ Dynamically test commencement of injection and set ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System		
			Specified commencement of injection requested by control unit • 2° ATDC...3° BTDC o.k. • Earlier than 3° BTDC: - Engine too cold ⇒ warm up engine		
Engine speed ⇒ page 01-36; display group 001					

Display group 004 at full throttle (road test in 3rd or 4th gear, coolant temperature not below +80 °C, engine speed 2900...3100 rpm) for models ► 04.99

Notes:

- ◆ Accelerate the vehicle at full throttle for the test.
- ◆ The measured values must be read off or printed out (second person required) once an engine speed of 3000 rpm has been reached.

Read measured value block				4	→	◀ Readout in display
3060 rpm	12.3° BTDC	12.1° BTDC	84 %			
				On/off ratio (actuation) of commencement of injection valve • 70...95 % o.k. • Not to tolerance: - Commencement of injection valve faulty ⇒ Final control diagnosis, page 01-20 - Dynamic test of commencement of injection and set ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System		
				Momentary commencement of injection • As specified commencement of injection in display block 2 (tolerance ± 5°) then o.k. • Not to tolerance: - Engine too cold ⇒ warm up engine - Commencement of injection valve faulty ⇒ Final control diagnosis, page 01-20 - Air in fuel supply ⇒ Inspect fuel supply for leaks - Injection pump stops too soon ⇒ Dynamic test of commencement of injection and set ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System		
				Specified commencement of injection requested by control unit • 8...14° BTDC o.k.		
Engine speed				• 2900...3100 rpm o.k.		

Display group 004 at full throttle (road test in 3rd or 4th gear, coolant temperature not below +80 °C, engine speed 2900...3100 rpm) for models 05.99 ►

Notes:

- ◆ Accelerate the vehicle at full throttle for the test.
- ◆ The measured values must be read off or printed out (second person required) once an engine speed of 3000 rpm has been reached.

Read measured value block				4	→	◀ Readout in display
3060 rpm	12,3° BTDC	12,1° BTDC	84 %			
				On/off ratio (actuation) of commencement of injection valve • 50...95 % o.k. • Not to tolerance: - Commencement of injection valve faulty ⇒ Final control diagnosis, page 01-20 - Dynamic test of commencement of injection and set ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System		
				Momentary commencement of injection • As specified commencement of injection in display block 2 (tolerance ± 5°) then o.k. • Not to tolerance: - Engine too cold ⇒ warm up engine - Commencement of injection valve faulty ⇒ Final control diagnosis, page 01-20 - Air in fuel supply ⇒ Inspect fuel supply for leaks - Injection pump stops too soon ⇒ Dynamic test of commencement of injection and set ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System		
				Specified commencement of injection requested by control unit • 8...14° BTDC o.k.		
Engine speed				• 2900...3100 rpm o.k.		

Specified readouts for engine idling

Display group 002, engine idling (engine warm, coolant temperature not below +80 °C)

Read measured value block				2	→	◀ Readout in display
900 rpm	0.0 %	0 1 0		88.4 °C		
				Coolant temperature		
				• 80...110 °C o.k. • < 80 °C: ⇒ warm up engine		
				Operating state ⇒ page 01-42, Table of operating states		
				Accelerator pedal position		
				• 0.0 % o.k. • > 0.0 %: accelerator pedal position sender incorrectly set or faulty		
				⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System		
				Engine speed ⇒ page 01-36; display group 001		

Analysis: display of engine operating state

Meaning if display positions = 1			
x	x	x	Engine operating state
		1	AC signal ⇒ switch off AC
	1		o.k.: (idling speed switch closed)
1			Idling speed increased: • if air conditioning switched on ⇒ switch off air conditioning • if accelerator and brake detected ⇒ test brake pedal switch • if coolant additional heater switched on ⇒ warm up engine

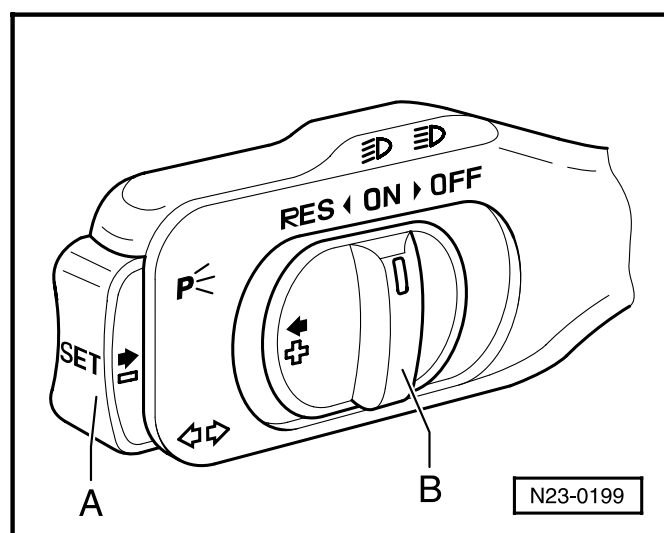
Display group 006, ignition switched on

Read measured value block	6	→	◀ Readout in display
0 km/h	0 0 0	0 0 0 0 0 0	0
CCS operating state ⇒ page 01-44, Table 3			
CCS operating state ⇒ page 01-43, Table 2			
Brake pedal monitor ⇒ page 01-43, Table 1: Brake pedal monitor			
Vehicle speed: ignore			

Analysis: Table 1; brake pedal monitor

Display block 2	Operating state of clutch pedal and brake pedal	x	x	x	Operating state of pedal switches with display positions = 1
000	Clutch pedal and brake pedal not depressed				Brake light switch -F closed
011	Brake pedal depressed (brake light switch)			1	
011	Brake pedal depressed (brake pedal switch)		1		Brake pedal switch -F47 opened
100	Clutch pedal depressed	1			Clutch pedal switch -F36 opened
111	Clutch pedal and brake pedal depressed				

Analysis: Table 2, operating unit of cruise control system (CCS)



Cruise control system	Display block 3
Switch B to „ON“	000011
Switch B to „RES“	001011
Switch A operated	000111
Switch B to „OFF“ before operating point	000001
Switch B to „OFF“, locked	000000
Brake pedal depressed	010011
Clutch pedal depressed	100011

Analysis: Table 3, CCS operating state

CCS operating state	
0	Model with CCS - CCS switched off
1	Model with CCS - CCS switched on
2 5 5	Model without CCS, CCS function may not be activated in engine control unit

Display group 016, engine idling

Read measured value block	16	→	◀ Readout in display
99.0 % 1 0 0 0 0 0 1 0 0	14.2 V		
			Supply voltage of control unit: ignore
			Actuation of heating elements ⇒ page 01-45, Table 2
			Additional heater ⇒ page 01-45, Table 1
			Generator load capacity: ignore

Analysis: Table 1; additional heater

Meaning of the digits in the 8-digit numerical block for additional heater:

Meaning if display readouts = 1								Additional heater switched off because:	
x	x	x	x	x	x	x	x		
							1	Coolant temperature greater than 70...80 °C ¹⁾ or intake air temperature greater than 5 °C	
							1	Alternator faulty	
					1			Battery voltage less than 9 V	
				1				Models ► 04.99 - engine speed less than 875 rpm Models 05.99 ► - engine speed less than 861 rpm	
			1					Engine start within the last 10 seconds	
		1						Coolant temperature sender (G62) or Intake manifold temperature sender (G72) faulty	
	1							Ignore	
1								Ignore	

¹⁾ If intake air temperature at engine start is 5 °C, additional heater is then switched off once a coolant temperature of 70 °C is reached. If the intake air temperature is -10 °C, however, additional heater is not switched off until coolant temperature is 80 °C.

Analysis: Table 2; actuation of heating elements

Meaning of the digits in the 2-digit numerical block for actuating the heating elements:

Meaning if display readouts = 1		
x	x	Actuation of heating elements
	1	Low heating capacity relay (J359), switched on
1		High heating capacity relay (J360), switched on

Display group 013, engine idling (engine warm, coolant temperature not less than +80 °C)

- ◆ The fuel injection system features a smooth idling speed control. It is possible to detect performance differences between the individual cylinders (parts tolerances, injector flow, compression, etc.) and to compensate for this in the idling speed range by selective metering of the quantity of fuel injected.
- ◆ Performance differences are detected in the idling speed range from the signal supplied by the engine speed sender, which supplies four signals for each crankshaft revolution to the control unit. If the signals are received in the same rhythm, all the cylinders are performing the same work. If one cylinder is weaker in performance, the crankshaft requires a longer time for the next half revolution. Conversely, a more powerful cylinder accelerates the crankshaft to such an extent that it requires a shorter time.
- ◆ If the control unit has detected a variation, the relevant cylinder is immediately supplied with a greater or smaller injected quantity until the engine is again running smoothly.
- ◆ +... mg/s: The relevant cylinder is weaker in performance and is therefore supplied with more fuel.
- ◆ - ... mg/s: The relevant cylinder is stronger in performance and is therefore supplied with less fuel.

Read measured value block				13	→	◀ Readout in display
0.82 mg/s	-0.12 mg/s	0.49 mg/s	-0.12 mg/s			
				Smooth running controller - injected quantity cylinder 4		
				• -2.0 mg/s...+2.0 mg/s o.k. • > + 2.0 mg/s: cylinder 4 weak • < -2.0 mg/s: cylinder 4 strong		
				Smooth running controller - injected quantity cylinder 3		
				• -2.0 mg/s...+2.0 mg/s o.k. • > + 2.0 mg/s: cylinder 3 weak • < -2.0 mg/s: cylinder 3 strong		
				Smooth running controller - injected quantity cylinder 2		
				• -2.0 mg/s...+2.0 mg/s o.k. • > + 2.0 mg/s: cylinder 2 weak • < -2.0 mg/s: cylinder 2 strong		
				Smooth running controller - injected quantity cylinder 1		
				• -2.0 mg/s...+2.0 mg/s o.k. • > + 2.0 mg/s: cylinder 1 weak • < -2.0 mg/s: cylinder 1 strong		

Specified readouts for exhaust gas recirculation

Display group 003, engine idling (engine warm, coolant temperature not less than +80 °C)

Read measured value block				3	→	◀ Readout in display
900 rpm	290 mg/s	308 mg/s	54 %			
				On/off ratio (actuation) of exhaust gas recirculation valve • 40...75 % o.k.		
				Inducted air mass • 230...370 mg/s o.k., must agree with display block 2 within tolerance of ± 20 mg/s • < 230 mg/s: - Unmetered air in intake area $\Rightarrow$ inspect intake system for leaks - Excess of exhaust gas recirculation $\Rightarrow$ test $\Rightarrow$ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System • > 370 mg/s: - Engine too cold $\Rightarrow$ warm up engine - Insufficient exhaust gas recirculation $\Rightarrow$ engine idling for 2 minutes, briefly blip throttle - Air mass meter faulty $\Rightarrow$ test, page 23-10 • Constant 550 mg/s: substitute value $\Rightarrow$ page 01-5, Interrogate fault memory		
				Specified air mass requested by control unit • 230...370 mg/s o.k. • > 370 mg/s: - Engine too cold $\Rightarrow$ warm up engine - Injected quantity too high $\Rightarrow$ specified readouts for injection pump - Intake manifold temperature very high $\Rightarrow$ no correction possible		
Engine speed $\Rightarrow$ page 01-36, display group 001						

Specified readouts for temperature senders

Display group 007, ignition on (engine not running and cooled down)

Read measured value block			7	→	◀ Readout in display
15.4 °C		15.9 °C	16.7 °C		
			Coolant temperature (at coolant temperature sender -G62)		
			• If open circuit in wiring, approximately fuel temperature is displayed as substitute value		
			Intake manifold temperature (at intake manifold temperature sender -G72)		
			• If open circuit in wiring, constant 136.8 °C is displayed as substitute value		
			No readout		
			Fuel temperature (at fuel temperature sender -G81)		
			• If open circuit in wiring, constant -5.4 °C is displayed as substitute value		

Notes:

- ◆ It is not possible to state specifications for the temperatures.
- ◆ Once engine has cooled down, the temperature readouts of fuel, intake manifold and coolant must automatically be approximately the same as the ambient temperature. If one of the readout differs noticeably, test the appropriate sender.

Specified readouts for vehicle performance

Display group 008 at full throttle (road test in 3rd or 4th gear, coolant temperature not below +80 °C, engine speed 2900...3100 rpm) for models ► 04.99

Notes:

- ◆ Accelerate the vehicle at full throttle for the test.
- ◆ The measured values must be read off or printed out (second person required) once an engine speed of 3000 rpm has been reached.

Read measured value block				8	→	◀ Readout in display
3090 rpm	42.4 mg/s	40.2 mg/s	41.7 mg/s			
				Injected quantity limit because of detected air mass 41...43 mg/s: o.k. • < 41 mg/s: - Detected air mass insufficient ⇒ Test air mass meter, page 23-10 - Excess of exhaust gas recirculation ⇒ test ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System		
				Injected quantity limit because of the engine speed (torque limit) 39.8...42.8 mg/s o.k. • < 39.8 mg/s: engine speed too high or too low (read off specification at 3000 rpm) • > 42.8 mg/s: injected quantity increase by „tuning“		
				Injected quantity request (accelerator pedal position) 42...44 mg/s o.k. • < 42 mg/s: - Accelerator pedal not fully depressed, accelerator pedal position sender -G79 incorrectly set or faulty ⇒ test ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System		
Engine speed 2900...3100 rpm o.k.						

Display group 008 at full throttle (road test in 3rd or 4th gear, coolant temperature not below +80 °C, engine speed 2900...3100 rpm) for models 05.99 ►

Notes:

- ◆ Accelerate the vehicle at full throttle for the test.
- ◆ The measured values must be read off or printed out (second person required) once an engine speed of 3000 rpm has been reached.

Read measured value block				8	→	◀ Readout in display
3090 rpm	42.4 mg/s	40.2 mg/s	41.7 mg/s			
				Injected quantity limit because of detected air mass 42...46 mg/s: o.k. • < 42 mg/s: - Detected air mass insufficient ⇒ Test air mass meter, page 23-10 - Excess of exhaust gas recirculation ⇒ test ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System		
				Injected quantity limit because of the engine speed (torque limit) 38.2...42.8 mg/s o.k. • < 38.2 mg/s: engine speed too high or too low (read off specification at 3000 rpm) • > 42.8 mg/s: injected quantity increase by „tuning“		
				Injected quantity request (accelerator pedal position) 42...46 mg/s o.k. • < 42 mg/s: - Accelerator pedal not fully depressed, accelerator pedal position sender -G79 incorrectly set or faulty ⇒ test ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System		
Engine speed 2900...3100 rpm o.k.						

Display group 009 at full throttle (road test with automatic gearbox, coolant temperature not below +80 °C) ¹⁾

Notes:

- ◆ Accelerate the vehicle at full throttle for the test.
- ◆ The measured values must be read off or printed out (second person required) once an engine speed of 3000 rpm has been reached.

Read measured value block				9	→	◀ Readout in display
3290 rpm	40.4 mg/s	51 mg/s	4.150 V			
				Voltage of modulating piston movement sender: ignore		
				Injected quantity limit by automatic gearbox during gearshift (torque limit) • < 51 mg/s: o.k.		
				Injected quantity (cruise control system active): ignore		
				Engine speed: ignore		

¹⁾ Not available at present.

Display group 010 at full throttle (road test in 3rd or 4th gear, coolant temperature not below +80 °C, engine speed 2900...3100 rpm) for models ► 04.99

Notes:

- ◆ Accelerate the vehicle at full throttle for the test.
- ◆ The measured values must be read off or printed out (second person required) once an engine speed of 3000 rpm has been reached.

Read measured value block				10	→	◀ Readout in display
830 mg/s	1030 mbar	1850 mbar	100 %			
				Accelerator pedal position: 100 % o.k. • < 100 %: - Accelerator pedal not fully depressed - Accelerator pedal position sender -G79 incorrectly set or faulty ⇒ test ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System		
				Momentary charge pressure: 1850...2200 mbar o.k. Not to tolerance: - Charge pressure control faulty ⇒ page 01-54, display group 011 - Turbocharger faulty ⇒ test, page 23-4		
				Air pressure: no specification		
				Inducted air mass: 800...1000 mg/s o.k. • < 800 mg/s: - Engine speed too low or too high (specified speed 3000 rpm) - Charge pressure too low ⇒ check display block 3 - Unmetered air between air mass meter and turbocharger - Air mass meter faulty ⇒ test air mass meter, page 23-10 • Constant 550 mg/s: substitute value ⇒ Interrogate fault memory, page 01-5		

Display group 010 at full throttle (road test in 3rd or 4th gear, coolant temperature not below +80 °C, engine speed 2900...3100 rpm) for models 05.99 ►

Notes:

- ◆ Accelerate the vehicle at full throttle for the test.
- ◆ The measured values must be read off or printed out (second person required) once an engine speed of 3000 rpm has been reached.

Read measured value block				10	→	◀ Readout in display
830 mg/s	1030 mbar	1850 mbar	100 %			
				Accelerator pedal position: 100 % o.k. • < 100 %: - Accelerator pedal not fully depressed - Accelerator pedal position sender -G79 incorrectly set or faulty ⇒ test ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System		
				Momentary charge pressure: 1850...2200 mbar o.k. Not to tolerance: - Charge pressure control faulty ⇒ page 01-55, display group 011 - Turbocharger faulty ⇒ test, page 23-4		
				Air pressure: no specification		
				Inducted air mass: 800...1100 mg/s o.k. • < 800 mg/s: - Engine speed too low or too high (specified speed 3000 rpm) - Charge pressure too low ⇒ check display block 3 - Unmetered air between air mass meter and turbocharger - Air mass meter faulty ⇒ test air mass meter, page 23-10 • Constant 550 mg/s: substitute value ⇒ Interrogate fault memory, page 01-5		

Specified readouts for charge pressure control

Display group 011 at full throttle (road test in 3rd or 4th gear, coolant temperature not below +80 °C, engine speed 2900...3100 rpm) for models ► 04.99

Notes:

- ◆ Accelerate the vehicle at full throttle for the test.
- ◆ The measured values must be read off or printed out (second person required) once an engine speed of 3000 rpm has been reached.

Read measured value block				11	→	◀ Readout in display				
3040 rpm	1870 mbar	1850 mbar	68 %							
On/off ratio (actuation) of charge pressure control solenoid valve -N75 45...95 % o.k.										
Momentary charge pressure • 1850...2200 o.k., must agree with display block 2 within tolerance of ± 100 mbar • Insufficient charge pressure: - No charge pressure control ⇒ test, page 23-4 • Excessive charge pressure: - Pressure hose of charge pressure control dropped off or blocked, solenoid valve -N75 jamming ⇒ Test charge pressure, page 23-4 - Linkage at turbocharger rusted tight, pressure unit faulty ⇒ Test charge pressure, page 23-4										
Specified charge pressure requested by control unit • 1850...1950 mbar o.k. • > 1950 mbar charge pressure increase by „tuning“										
Engine speed 2900...3100 rpm o.k.										

Display group 011 at full throttle (road test in 3rd or 4th gear, coolant temperature not below +80 °C, engine speed 2900...3100 rpm) for models 05.99 ►

Notes:

- ◆ Accelerate the vehicle at full throttle for the test.
- ◆ The measured values must be read off or printed out (second person required) once an engine speed of 3000 rpm has been reached.

Read measured value block				11	→	◀ Readout in display
3040 rpm	1870 mbar	1850 mbar	68 %			
On/off ratio (actuation) of charge pressure control solenoid valve -N75 45...95 % o.k.						
Momentary charge pressure • 1850...2250 o.k., must agree with display block 2 within tolerance of ± 100 mbar • Insufficient charge pressure: - No charge pressure control ⇒ test, page 23-4 • Excessive charge pressure: - Pressure hose of charge pressure control dropped off or blocked, solenoid valve -N75 jamming ⇒ Test charge pressure, page 23-4 - Linkage at turbocharger rusted tight, pressure unit faulty ⇒ Test charge pressure, page 23-4						
Specified charge pressure requested by control unit • 1850...1950 mbar o.k. • > 1950 mbar charge pressure increase by „tuning“						
Engine speed 2900...3100 rpm o.k.						

Servicing diesel direct injection system

Safety precautions

Pay attention to the following points to avoid injuries to persons and/or damage to the fuel injection and glow plug system:

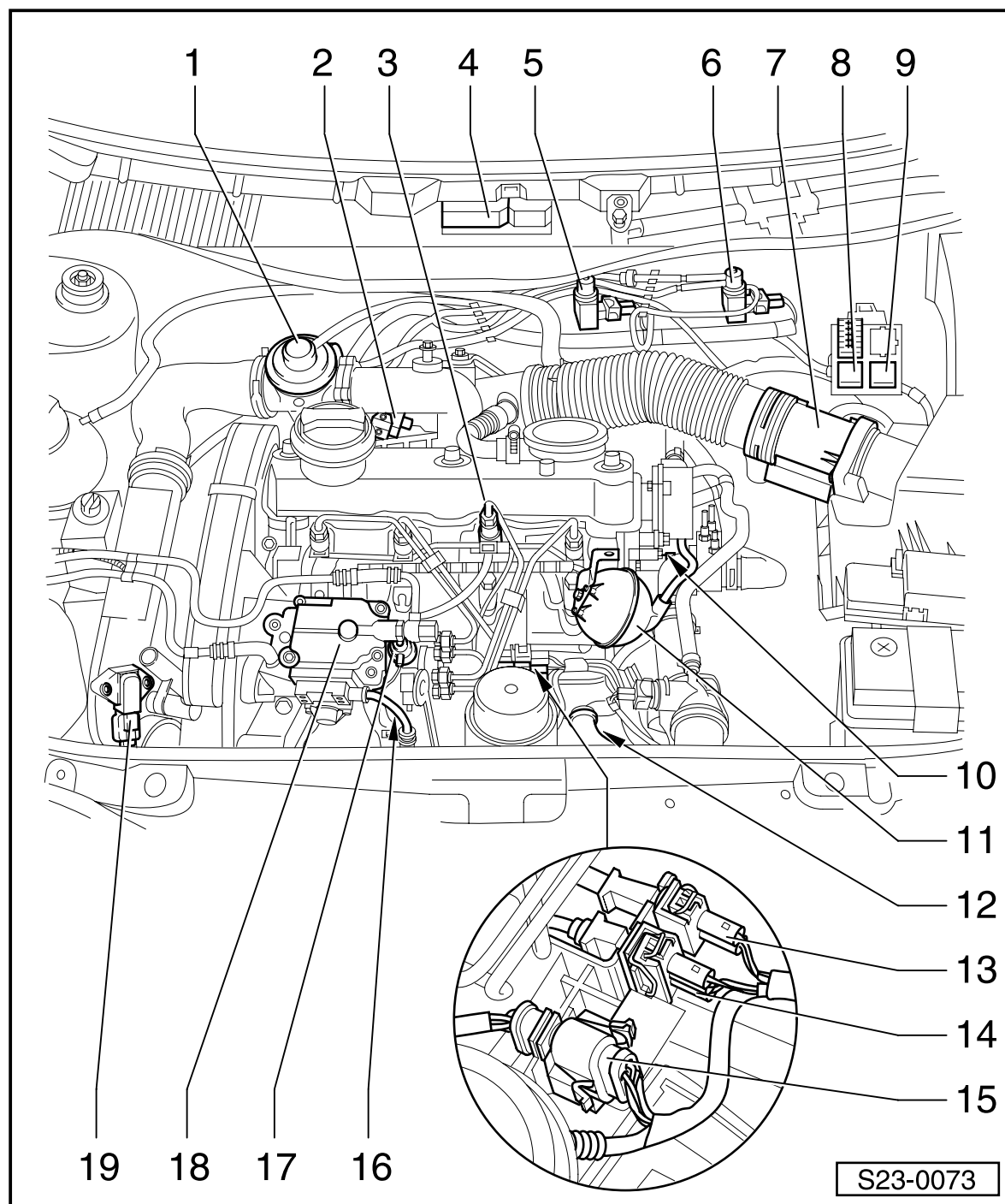
- ◆ Do not disconnect and connect lines or cables of the glow plug and fuel injection system - also not cables of test equipment - unless the ignition is switched off.
- ◆ To operate the engine at starting speed without it actually starting, e.g. for testing compression pressure, unplug the connectors at the injection pump.
- ◆ Before disconnecting the battery of a car fitted with a radio set with anti-theft code, determine the code.
- ◆ Always switch off the ignition before disconnecting and reconnecting the battery otherwise the diesel direct injection system control unit may be damaged.

Rules for cleanliness

Pay careful attention to the following „5 rules“ for cleanliness when carrying out work on the fuel supply and fuel injection system:

- ◆ Thoroughly clean connection points and the surrounding area before disconnecting.
- ◆ Place removed parts down on a clean surface and cover over. Do not use fluffing cloths!
- ◆ Carefully cover over or seal opened components if repairs are not carried out immediately.
- ◆ Install only clean parts:
Do not remove replacement parts from their wrapping until just before installing.
Do not use parts which have been stored unwrapped (e.g. in tool boxes etc.).
- ◆ If the system is open:
Avoid working with compressed air, if possible.
Avoid moving the vehicle, if possible.
- ◆ In addition, ensure that no diesel fuel flows onto the coolant hoses. If this happens, it is essential to immediately clean the hoses. Always replace hoses which have suffered damage from diesel fuel.

Summary of fitting locations



Components A to F are not shown in the general illustration.

A - Diesel direct injection system relay (J322)

- ◆ Electrical centre ⇒ page 23-3, Fig. 1

B - Glow plug relay (J52)

- ◆ Electrical centre ⇒ page 23-3, Fig. 1

C - Blower relay (J323)

- ◆ Electrical centre ⇒ page 23-3, Fig. 1

D - Accelerator pedal position sender (G79)

- ◆ In footwell at accelerator pedal
⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System

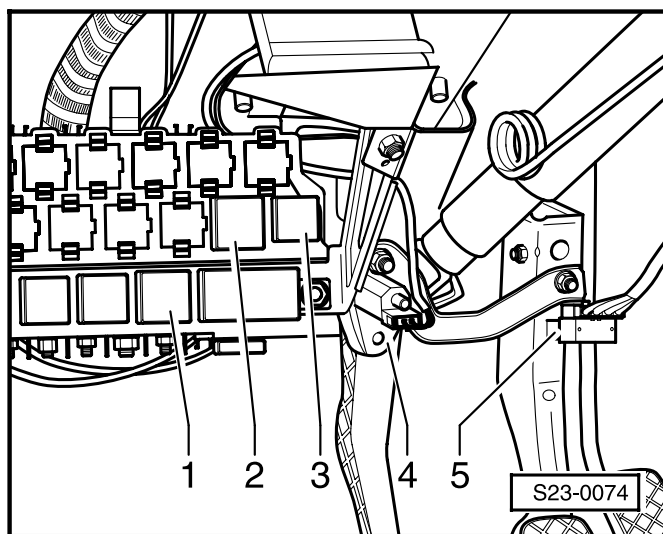
E - Brake light switch (F) and brake pedal switch (F47)

- ◆ Combined in a housing
- ◆ In footwell at brake pedal
⇒ page 23-3, Fig. 1

F - Clutch pedal switch (F36)

- ◆ In footwell at clutch pedal
⇒ page 23-3, Fig. 1

- 1 - Intake fitting**
 - ◆ With mechanical exhaust gas recirculation valve
 - ◆ With intake manifold flap
- 2 - Intake manifold flap changeover valve (N239)**
- 3 - Injection nozzle with needle lift sender (G80)**
- 4 - Diesel direct injection system control unit (J248)**
 - ◆ With altitude sender (F96)
- 5 - Electromagnetic EGR valve (N18)**
- 6 - Charge pressure control solenoid valve (N75)**
- 7 - Air mass meter (G70)**
- 8 - High heating capacity relay (J360)**
 - ◆ Only on models with optional equipment
- 9 - Low heating capacity relay (J359)**
 - ◆ Only on models with optional equipment
- 10 - Coolant temperature sender (G62)**
- 11 - Vacuum reservoir**
- 12 - Engine speed sender (G28)**
- 13 - Connector**
 - ◆ 2-pin
 - ◆ For needle lift sender (G80)
- 14 - Connector**
 - ◆ 3-pin
 - ◆ For engine speed sender (G28)
- 15 - Connector**
 - ◆ 10-pin
 - ◆ For fuel temperature sender (G81)
 - ◆ For quantity adjuster (N146)
 - ◆ For modulating piston movement sender (G149)
 - ◆ For commencement of injection valve (N108)
 - ◆ For fuel cut-off valve (N109)
- 16 - Commencement of injection valve (N108)**
- 17 - Fuel cut-off valve (N109)**
- 18 - Fuel metering control of injection pump**
 - ◆ With fuel temperature sender
 - ◆ With quantity adjuster (N146)
 - ◆ With modulating piston movement sender (G149)
- 19 - Intake manifold pressure sender (G71) and intake manifold temperature sender (G72)**



◀ Fig. 1 Components in footwell

- 1 - Glow plug relay (J52)
- 2 - Diesel direct injection system relay (J322)
- 3 - Blower relay (J323)
- 4 - Clutch pedal switch (F36)
- 5 - Brake light switch (F) and brake pedal switch (F47)

Testing charge pressure system

Testing charge pressure

Special tools, testers and aids required

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

Test conditions

- No fault in fault memory
- No leaks at inlet and exhaust side
- No fault at engine/fuel injection system (commencement of injection, injectors, compression)
- Engine oil temperature at least 80 °C

Test procedure

The charge pressure is read with the vehicle system tester V.A.G 1552 during a road test.

Warning!

Have V.A.G 1552 operated by a second person.

- Connect vehicle system tester V.A.G 1552 and select engine electronics control unit ⇒ page 01-2.
- Read measured value block, display group 011, engine idling ⇒ page 01-54.
- Accelerate vehicle in 3rd gear at full throttle from about 1500 rpm.
- ◀ - Read off figure in display block 3 at about 3000 rpm and note.

Read measured value block	11 →
3000 rpm 1938 mbar 1978 mbar	69 %

Models ► 04.99

Specification in display block 3:
1850...2200 mbar

Models 05.99 ►

Specification in display block 3:
1850...2250 mbar

Continued for all models

If the charge pressure is not achieved, the following faults are possible:

- ◆ Hose of charge pressure control dropped off, leaking or blocked.
- ◆ Charge pressure control solenoid valve (N75) blocked or faulty.

- ◆ Operation (linkage, shaft) of the bypass valve stiff or stuck (bypass valve constantly open)
- ◆ Vacuum unit leaking
- ◆ Intake manifold pressure sender faulty
- ◆ Leak between turbocharger and intake manifold
- ◆ Turbocharger faulty (turbine blocked by foreign bodies)

If the charge pressure is not reached:

- Carry out final control diagnosis ⇒ Final control diagnosis, page 01-20.
- Carry out final control diagnosis and actuate the charge pressure control solenoid valve.

Final control diagnosis
Charge pressure control solenoid valve -N75

→

◀ Readout in display:

The solenoid valve should operate and, at the same time, the linkage of the vacuum unit of the charge pressure control at the turbocharger should move back and forward (at least 3...4 times so long as vacuum is present in the vacuum reservoir).

- End final control diagnosis.
- If the linkage moves and the charge pressure specifications are not achieved:
 - Test intake manifold pressure sender
⇒ 1.9-ltr./66 kW (TDI) Engine, Fuel Injection and Glow Plug System; Testing intake manifold pressure sender and altitude sender.
 - Replace turbocharger.
⇒ 1.9-ltr./66 kW (TDI) Engine, Mechanical Components; Repair Group 21; Removing and installing turbocharger

If the linkage does not move because the solenoid valve (N75) does not operate:

Test charge pressure control solenoid valve
⇒ page 23-6.

If the linkage does not move although the charge pressure control solenoid valve operates:

- Inspect vacuum hoses according to hose diagram $\Rightarrow$ page 23-9.
- Test charge pressure control pressure unit $\Rightarrow$ 1.9 l/66 kW (TDI) Engine - Mechanical Components; Repair Group 21; Testing operation of charge pressure control vacuum unit.

Testing charge pressure control solenoid valve (N75)

Special tools, testers and aids required

- ◆ Hand-held multimeter, e.g. V.A.G 1526 A
- ◆ Adapter cable set, e.g. V.A.G 1594 A
- ◆ Vehicle system tester V.A.G 1552 with cable V.A.G 1551/3, 3A, 3B or 3C
- ◆ Test box V.A.G 1598/22 or V.A.G 1598/31
- ◆ Diode test lamp, e.g. V.A.G 1527 B

Test procedure

- Connect vehicle system tester and select engine electronics control unit $\Rightarrow$ page 01-2.
- Select final control diagnosis and activate charge pressure control solenoid valve -N75 $\Rightarrow$ page 01-20.

If valve is not actuated (does not click):

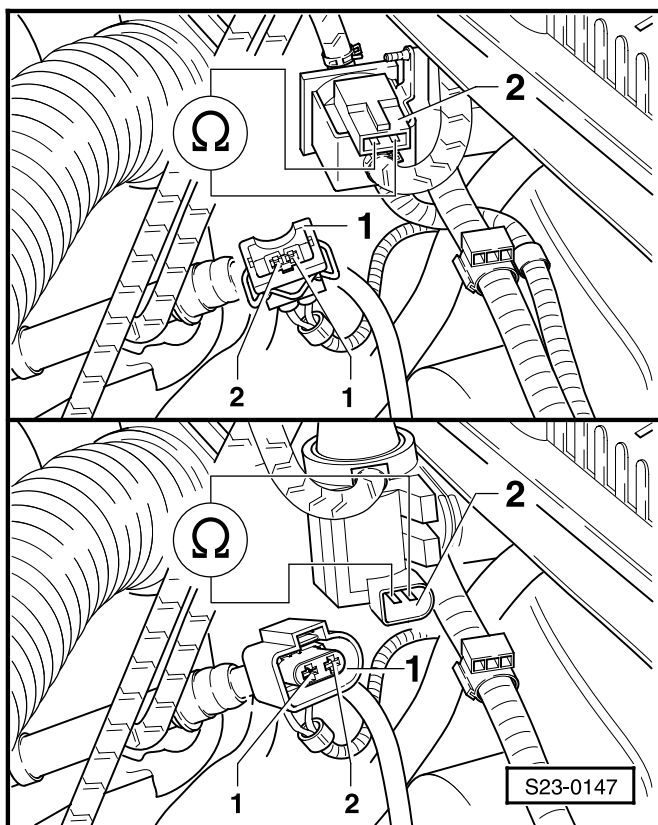
- ◀ - Unplug connector -1- of charge pressure control solenoid valve -N75 and connect diode test lamp between the contacts of the connector.

Diode test lamp must flash.

Diode test lamp flashes:

- End final control diagnosis.
- Switch ignition off.
- Connect multimeter for resistance measurement to valve -2-.

Specification: 14...20 Ω



If the specification is not achieved:

- Replace charge pressure control solenoid valve (N75).

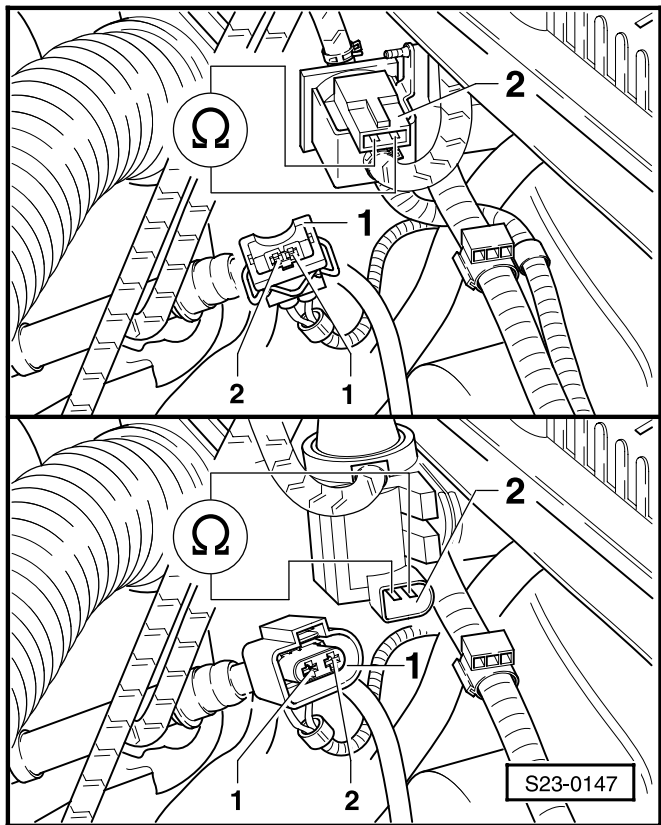
Diode test lamp does not flash:

- End final control diagnosis.
- Switch ignition off.
- Connect multimeter for voltage measurement to contact 1 of connector -1- and to earth.
- Switch ignition on.

Specification: approx. battery voltage

If the specification is not achieved:

- Switch ignition off.
 - Connect test box to wiring loom to engine control unit
- ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System.



For test box V.A.G 1598/22

◀ Test the following cable connections for short circuit to positive and to negative, and to open circuit (connector -1-).

2-pin connector at wiring loom, contact	Test box V.A.G 1598/22, socket
1	2, 28
2	15

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

For test box V.A.G 1598/31

◀ Test the following cable connections for short circuit to positive and to negative, and to open circuit (connector -1-).

2-pin connector at wiring loom, contact	Test box V.A.G 1598/31, socket
1	1, 2
2	62

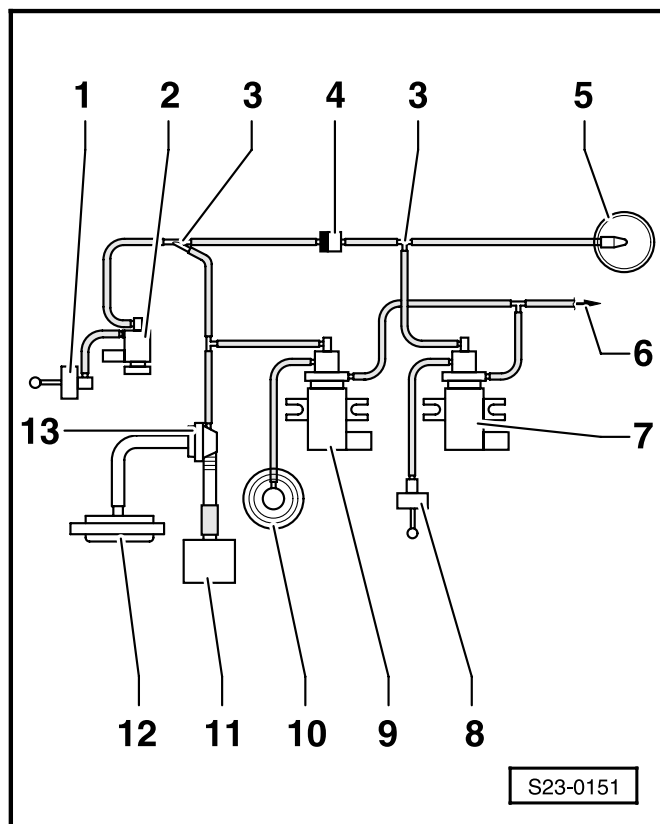
- Rectify any open circuit or short circuit in the wiring.

Continued for all models

If no fault is found in the wiring:

- Replace the diesel direct injection system control unit (J248)
⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System.

Hose diagram for charge pressure control, exhaust gas recirculation and intake manifold flap



1 - Vacuum positioning element for intake manifold flap

2 - Intake manifold flap changeover valve (N239)

3 - Branch

4 - Non-return valve

- ♦ White connection points toward charge pressure control solenoid valve -N75

5 - Vacuum unit

6 - To air filter

7 - Charge pressure control solenoid valve (N75)

8 - Pressure unit

- ♦ For charge pressure control valve
- ♦ Part of turbocharger, cannot be replaced separately

9 - Electromagnetic exhaust gas recirculation valve (N18)

10 - Mechanical exhaust gas recirculation valve

11 - Vacuum pump

12 - Brake servo unit

13 - Non-return valve

Testing air mass meter

The air mass meter is required by the control unit for calculating the permissible injected quantity and for controlling the exhaust gas recirculation. The smaller the signal supplied by the air mass meter, the less fuel may be injected.

Special tools, testers and aids required

- ◆ Vehicle system tester V.A.G 1552 with cable V.A.G 1551/3, 3A, 3B or 3C
- ◆ Hand-held multimeter, e.g. V.A.G 1526A
- ◆ Adapter cable set, e.g. V.A.G 1594 A
- ◆ Test box V.A.G 1598/22 or V.A.G 1598/31
- ◆ Current flow diagram

Test procedure

- Read measured value block, display group 010, engine idling ⇒ page 01-52.
- Check readout in display block 1.

Read measured value block	10	→
309 mg/s	1030 mbar	1011 mbar 0.0 %

◀ Specification: 230...370 mg/s

If the specification is not achieved:

- Check vacuum hoses of exhaust gas recirculation according to hose diagram ⇒ page 23-9.
- Test exhaust gas recirculation system
⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System.

If the specification is achieved:

- Accelerate vehicle in 3rd gear at full throttle from about 1500 rpm.

Warning!

Have V.A.G 1552 operated by a 2nd person.

- Check the readout in display block 4 at about 3000 rpm and note.

Read measured value block	10	→
830 mg/s 1030 mbar 1850 mbar	100 %	

◀ Specification in display block 4:
100 % (accelerator pedal position)

If the specification is not achieved:

- Repeat the test and accelerate vehicle at full throttle.

Read measured value block	10	→
830 mg/s 1030 mbar 1850 mbar	100 %	

◀ Specification in display block 3:
1850... 2200 mbar (charge pressure)

If the specification is not achieved:

- Test charge pressure ⇒ page 23-4.

Read measured value block	10	→
830 mg/s 1030 mbar 1850 mbar	100 %	

◀ Specification in display block 1:
> 800 mg/s (inducted air mass)

If the specification is not achieved:

- Test charge pressure ⇒ page 23-4.
- Replace air mass meter (G70).

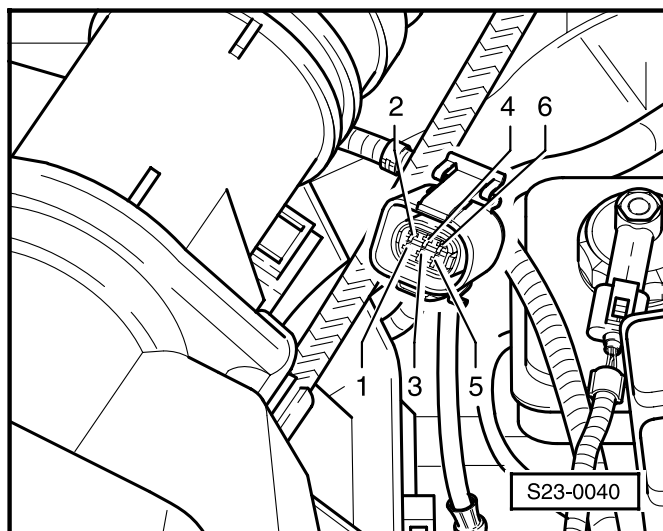
If the readout in display block 1 is a constant
550 mg/s (fixed substitute value):

- Switch ignition off.

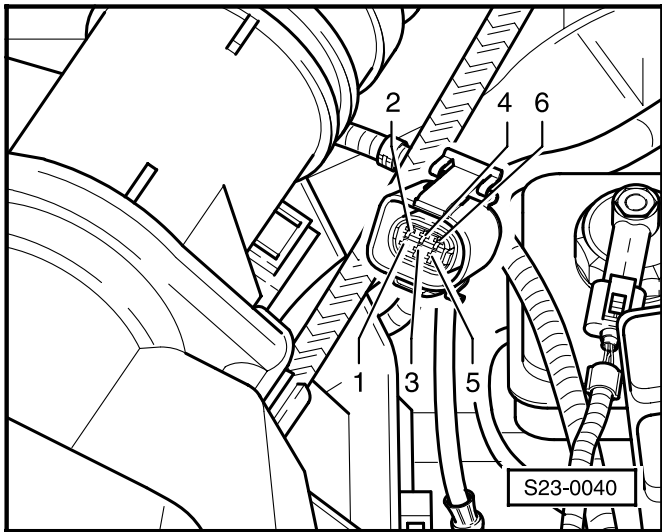
For test box V.A.G 1598/22

Models ► 07.98

- ◀
- Unplug connector at air mass meter (G70).
 - Switch ignition on.
 - Connect multimeter for voltage measurement to the following contacts of the connector:



6-pin connector at wiring loom, contact	Specification
3 + earth	approx. battery voltage
3 + 5	approx. battery voltage
1 + earth	approx. 5 V
1 + 5	approx. 5 V



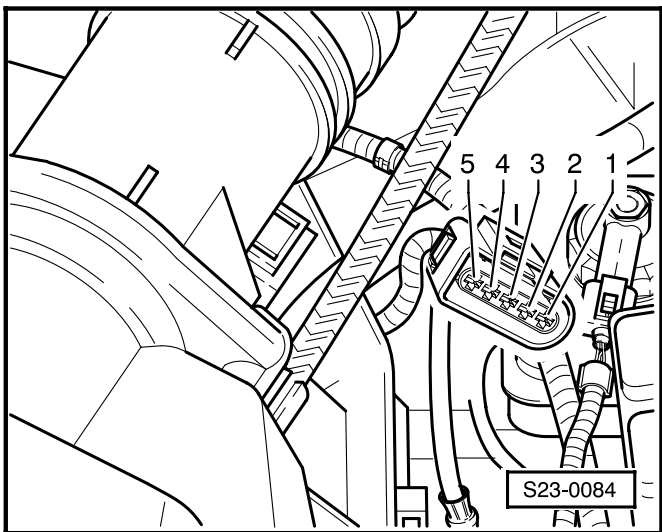
If the specifications are not achieved:

- Connect test box to wiring loom to engine control unit.
- ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System.

◀ Test the following cable connections for short circuit to positive and to negative and also for open circuit.

6-pin connector at wiring loom, contact	Test box V.A.G 1598/22, socket
1	50
2	25
3	2, 28
4	-
5	1, 27
6	52

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



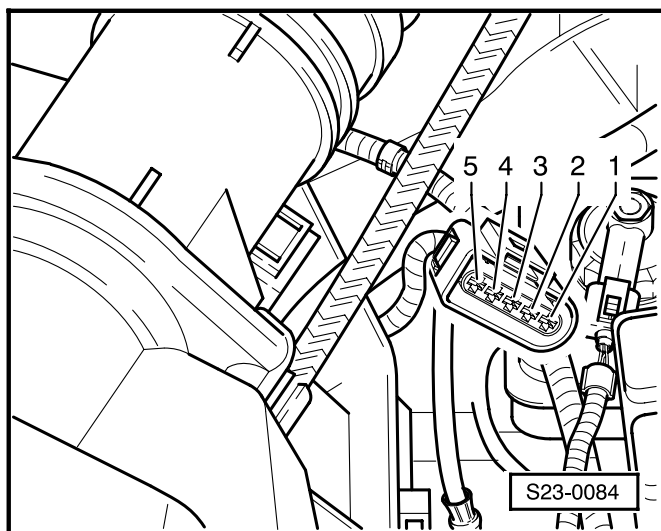
Models 08.98 ➤

- ◀ Unplug connector at air mass meter (G70).
- Switch ignition on.
- Connect multimeter for voltage measurement to the following contacts of the connector:

5-pin connector at wiring loom, contact	Specification
2 + earth	approx. battery voltage
2 + 3	approx. battery voltage
4 + earth	approx. 5 V
4 + 3	approx. 5 V

If the specifications are not achieved:

- Connect test box to wiring loom to engine control unit.
- ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System.

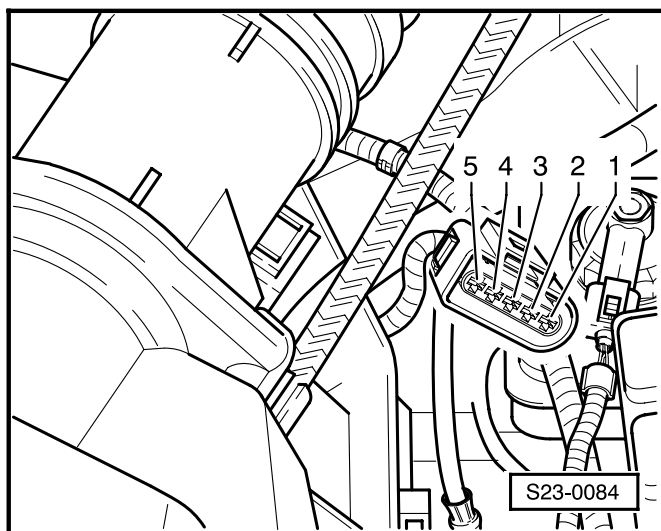


◀ Test the following cable connections for short circuit to positive and to negative and also for open circuit.

5-pin connector at wiring loom, contact	Test box V.A.G 1598/22, socket
1	-
2	2, 28
3	4
4	50
5	52

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

For test box V.A.G 1598/31

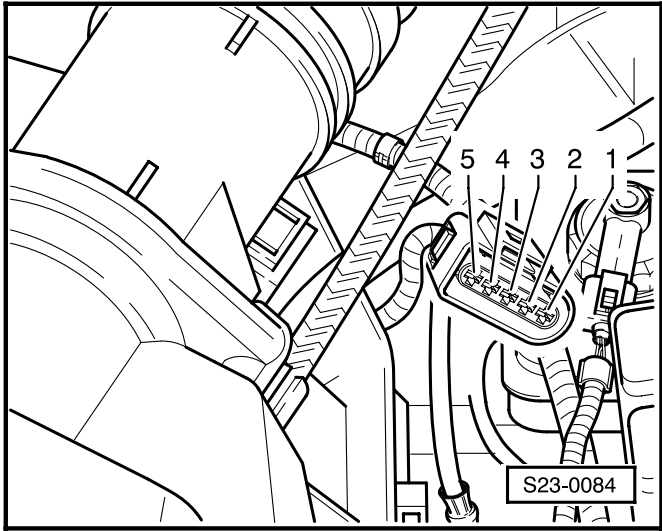


- ◀ Unplug connector at air mass meter (G70).
- Switch ignition on.
- Connect multimeter for voltage measurement to the following contacts of the connector:

5-pin connector at wiring loom, contact	Specification
2 + earth	approx. battery voltage
2 + 3	approx. battery voltage
4 + earth	approx. 5 V
4 + 3	approx. 5 V

If the specifications are not achieved:

- Connect test box to wiring loom to engine control unit.
- ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System.



◀ Test the following cable connections for short circuit to positive and to negative and also for open circuit.

5-pin connector at wiring loom, contact	Test box V.A.G 1598/31, socket
1	-
2	1, 2
3	49
4	30
5	68

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

Continued for all models

If no fault is found in the wiring:

- Replace the diesel direct injection system control unit (J248)
⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System.

Testing modulating piston movement sender and quantity adjuster

The quantity adjuster is an electromagnetic rotary positioner which is operated by the control unit. The eccentric shaft of the quantity adjuster moves the control sleeve along the high-pressure piston and in this way determines the quantity injected.

The modulating piston movement sender supplies the position of the control slide back to the control unit, in other words determines the quantity of fuel injected.

Special tools, testers and aids required

- ◆ Vehicle system tester V.A.G 1552 with cable V.A.G 1551/3, 3A, 3B or 3C
- ◆ Hand-held multimeter, e.g. V.A.G 1526A
- ◆ Adapter cable set, e.g. V.A.G 1594A
- ◆ Test box V.A.G 1598/22 or V.A.G 1598/31

Test procedure

- Read measured value block, display group 001, engine idling ⇒ page 01-36.

Read measured value block	1	→
900 rpm 5.6 mg/s 1.480 V	87.3 °C	

- ◀ - Check readout in display block 4 (coolant temperature).
Specification: at least 85 °C.

Do not continue with the test until the coolant temperature is reached.

- Switch off any additional components which are operating (air conditioning, rear window heater, lights, etc.).
- Check readout in display block 3 (voltage of modulating piston movement sender).

Models ► 04.99

Read measured value block	1	→
900 rpm 5.6 mg/s 1.480 V	87.3 °C	

- ◀ Specification: 1.450...1.950 V

Models 05.99 ►

Read measured value block	1	→
900 rpm 5.6 mg/s 1.720 V	87.3 °C	

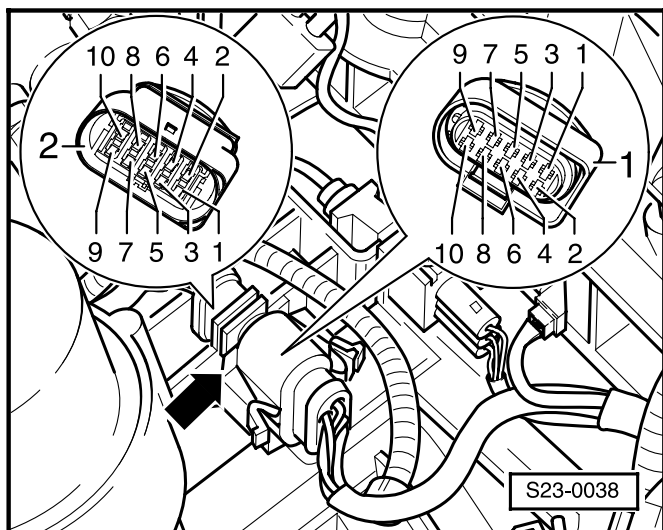
- ◀ Specification: 1.300...2.100 V

Continued for all models

If the specification is not achieved:

- Test modulating piston movement sender (G149) ⇒ page 23-14.

Electrical test of modulating piston movement sender (G149) and quantity adjuster (N146)



- Switch ignition off.
- ◀ - Separate plug connection -arrow- from injection pump.
- Connect multimeter for resistance measurement to the following contacts of the connector -2-.

Injection pump connector	Specification
1 + 2	4.9...7.5 Ω
3 + 2	4.9...7.5 Ω
6 + 5	0.5...2.5 Ω

If the specifications are not achieved:

- Replace injection pump.
- ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System.

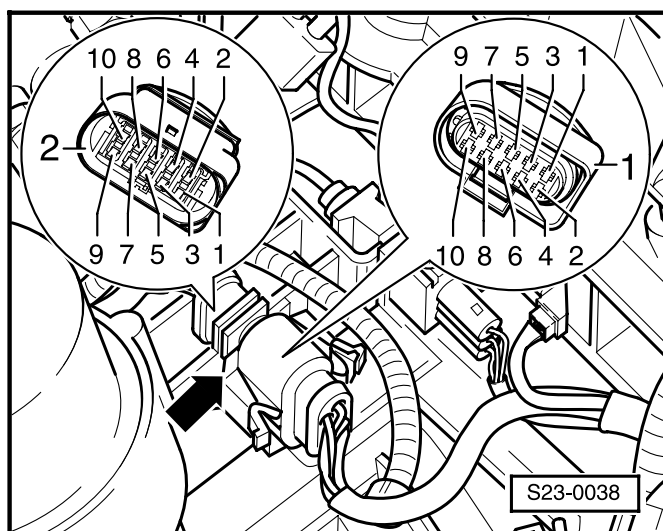
Testing voltage supply and cable connections

- Switch ignition off.
- Separate plug connection at injection pump.
- Switch ignition on.
- Connect multimeter for voltage measurement to the following contacts of connector -1- at the wiring loom.

10-pin connector at wiring loom, contact	Specification
1 + earth	approx. 2.5 V
3 + earth	approx. 2.5 V
5 + earth	approx. battery voltage

If the specifications are not achieved:

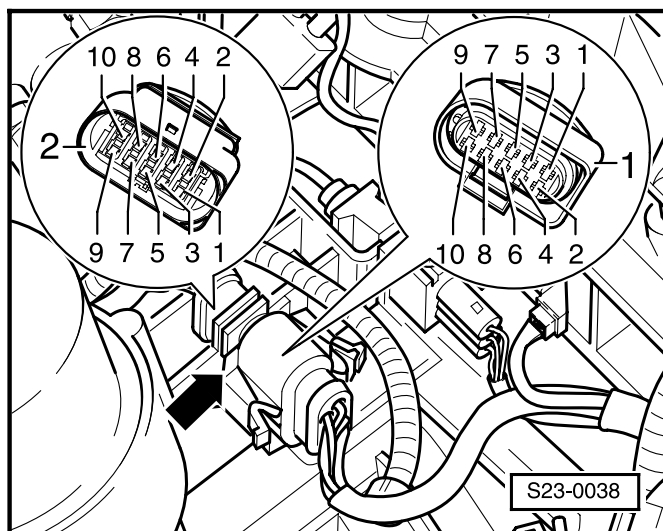
- Connect test box to the wiring loom to the engine control unit
- ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System.

**For test box V.A.G 1598/22**

◀ Test the following cable connections for short circuit to positive and to negative and also for open circuit (connector -1-).

10-pin connector at wiring loom, contact	Test box V.A.G 1598/22, socket
1	56
2	57
3	64
5	2, 28
6	59, 66, 80

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

**For test box V.A.G 1598/31**

◀ Test the following cable connections for short circuit to positive and to negative and also for open circuit (connector -1-).

10-pin connector at wiring loom, contact	Test box V.A.G 1598/31, socket
1	108
2	106
3	99
5	1, 2
6	121, 116

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

Continued for all models

If no fault is found in the wiring:

- Replace the diesel direct injection system control unit (J248)
- ⇒ 1.9 l/66 kW (TDI) Engine, Fuel Injection and Glow Plug System.

