28-29

Camshaft adjustment system, checking

Required special tools and test equipment

- VAG1551 Scan Tool (ST) with VAG1551/3 adapter cable
- Multimeter US1119 (Fluke 83 or equivalent)
- VW1594 connector test kit

Function

The camshaft adjustment is dependent on engine speed and load. The electrical solenoid valves for camshaft adjustment (-N205- and -N208-) are switched to apply oil pressure to the mechanical camshaft adjusters, which adjusts the camshaft timing.

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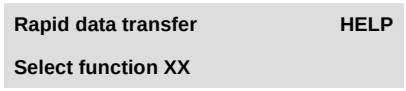
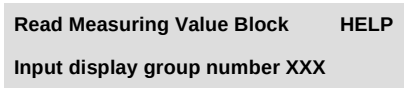
Camshaft adjustment function, checking

- Connect VAG1551/1552 Scan Tool (ST) and press buttons -0- and -1- to insert "Engine Electronics" address word 01 (engine running at idle) ⇒ page 01-8 .



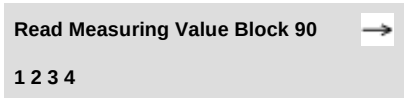
Indicated on display

- Press buttons -0- and -8- to select "Read Measuring Value Block" function 08, and press -Q- button to confirm input.



Indicated on display

- Press buttons -0-, -9- and -0- to input display group number 90 (090), and press -Q- button to confirm input.



Indicated on display (1-4 = display groups)

Notes:

Display field 2 indicates whether the engine control module has activated the camshaft adjustment.

- *"CS-ctrlOFF:" camshaft adjustment is not active.*
- *"CS-ctrlON:" camshaft adjustment is active (this can only be attained during a test drive)*

Display fields 3 and 4 show whether the camshaft adjustment did actually occur (via input from sensors):

- *Normal Position: -3.0° to 6.0° KW.*
- *Shifted position: 16.0° KW to 25.0° KW.*

28-31

Note:

If, during the test drive, display field 3 and/or 4 displays a value between 6.0° KW and 16.0° KW, the electrical valves for camshaft adjustment have switched the oil pressure to the respective mechanical camshaft adjuster, but it cannot attain the correct end position (e.g. due to sluggishness).

WARNING!

A second technician is required to operate the VAG1551 scan tool during the road test. Safety precautions ⇒ ***page 24-9*** ***.***

- Accelerate from rest in 1st gear (manual) or with selector lever in "2" position (automatic).

- Check specified values for camshaft adjustment (display fields 2-4)

28-32

	Display fields			
	1	2	3	4
Display group 90: Camshaft adjustment				
Display	xxx RPM	CS-ctrlOFF CS-ctrlON	± x,x ° KW	± x,x ° KW
Indicates	Engine speed (in 40 RPM steps)	Camshaft adjustment off/on	Response of camshaft adjustment Bank 1	Response of camshaft adjustment Bank 2
Work range	1000 - 5000 RPM	---	-3.0 to 25.0 ° KW	-3.0 to 25.0 ° KW
Specified Value	620 - 740 RPM (all-wheel drive) or 740 - 860 RPM (front-wheel drive)	CS-ctrlOFF	-3.0 to 6.0 ° KW (normal position)	-3.0 to 6.0 ° KW (normal position)
	....RPM (test drive)	CS-ctrlON	16.0 to 25.0 ° KW (shifted position)	16.0 to 25.0 ° KW (shifted position)

	---	If the specified values are not attained, check solenoid valves for camshaft adjustment ⇒ page 28-33 .

If specified values are attained:

- Press → button.

- Press buttons -0- and -6- to select "End Output" function 06, and press -Q- button to confirm input.

28-33

Valves for camshaft adjustment, checking

Note:

Installation location ⇒ *page 24-1*

- Connect VAG1551/1552 Scan Tool (ST) and press buttons -0- and -1- to insert "Engine Electronics" address word 01 (with engine running at idle) ⇒ page 01-8 .

Rapid data transfer HELP **Select function XX**	Indicated on display

- Press buttons -0- and -3- to select "Output Diagnostic Test Mode" function 03.

Rapid data transfer Q **03 - Output Diagnostic Test Mode**	Indicated on display

- Press -Q- button to confirm input.

Output Diagnostic Test Mode → **Camshaft adjustment 1**	Indicated on display

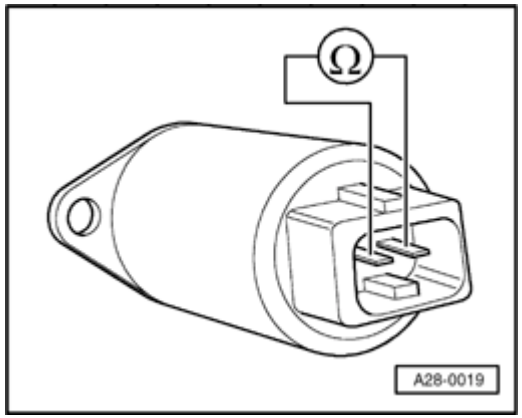
- Check using output DTM and activate camshaft adjustment ⇒ page 01-51 .

  Valves 1 and 2 for camshaft adjustment, -N205- and -N208-, must click audibly.

If the valves do not click:

- Check as described in test procedures that follow.

28-34



Checking solenoid valves for camshaft adjustment electrically

- Disconnect harness connector from valve.

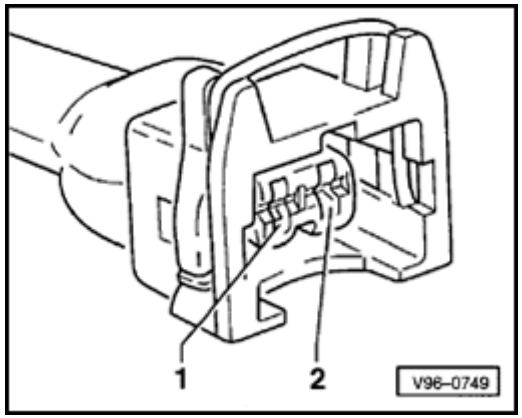
- Using multimeter with auxiliary wires from VAG1594, measure resistance across terminals on valve.

  Specified value: 10-18 ohms

If resistance is not as specified:

- Replace solenoid valve.

28-35



Checking voltage supply of valves for camshaft adjustment

- Disconnect harness connector from valve.

- Connect LED tester VAG1527 between engine ground and terminal 1 of connector (B+).
- Crank starter for several seconds (engine can start).

  LED in voltage tester must light up.

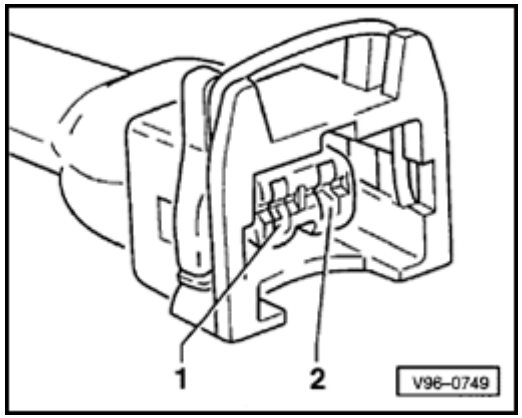
If LED does not light up, conduct the following tests:

- Check fuse for valves for camshaft adjustment.
- Check wiring from terminal 1 on 2-pin connector to fuse for continuity per wiring diagram.

⇒ *Electrical Wiring Diagrams, Troubleshooting & Component Locations binder*

- Check fuel pump relay and signal to relay ⇒ page 24-95 .

28-36



Checking signal to valves for camshaft adjustment

- Disconnect harness connector from valve.

- Connect LED tester VAG1527 between connector terminals 1 and 2.
- Check using output DTM and activate camshaft adjustment ⇒ page 01-51 .

  LED must flash.

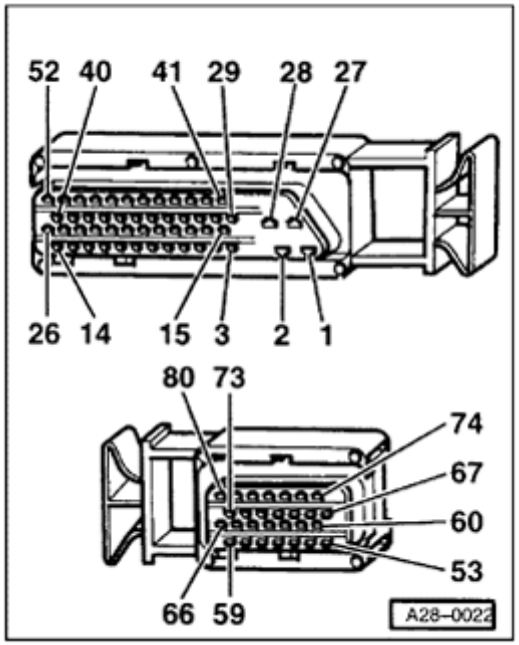
If LED does not flash or stays on continuously:

- Connect VAG1598/22 test box to Motronic ECM harness connector (⇒ page 01-67) and proceed as follows:

If LED does not flash:

- Check wiring from terminal 2 of connector for valve to terminal 55 of ECM/test box for continuity and short circuit to B+.

28-37



If LED stays lit constantly:

- Check wiring between valve connector terminal 2 and ECM/test box terminal 55 for short circuit to Ground.

  Specified value: max. 1 Ω.

If the wiring is OK:

- Replace Motronic ECM -J220- ⇒ page 01-68 .
- Carry out adaptation of throttle valve control module to ECM ⇒ page 24-150 .
- Check readiness code ⇒ page 01-70 . If Diagnostic Trouble Code (DTC) memory has been erased, or ECM was disconnected, generate new readiness code ⇒ page 01-73 .

If no malfunction has been found in any of the previous tests:

- Replace respective mechanical camshaft adjuster.

⇒ Repair Manual, 2.8 Liter V6 5V Engine Mechanical, Repair Group 15.