Basic setting (scan tool function 04)

Initiating "Basic Setting" function 04 does the following for ESP:

The steering angle sensor -G85- is zeroed using display group 001 ⇒ **page 01-243**

Before you can zero the sensor, you must have successfully carried out the "Login Procedure" function 11 using the VAG1551/1552 scan tool and the ABS control module -J104- must be coded ⇒ page 01-234 .

The hydraulic pump for traction control -V156- is activated using display group 002

Activation of the hydraulic pump for traction control -V156- does not require any preparations. It is used to bleed the hydraulic system ⇒ page 01-248 .

The ESP driving test is activated using display group 003

The ESP driving test is used to test the plausibility of the signals from the sensor for transverse acceleration, yaw sensor and pressure sensor ⇒ page 01-250 .

01-243

Steering angle sensor -G85-, zeroing procedure

- Now it is necessary to perform the zeroing procedure on the steering angle sensor -G85-.

- To initialize the steering angle sensor, turn the steering angle at least 10 degrees in either direction

- Move steering to zero position, maximum tolerance is ± 5 degrees.

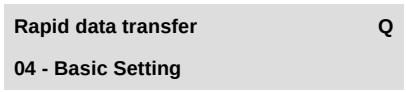
01-244

Note:

The diagnostic must not be exited and ignition must not be switched off between the procedures "Code control module" and "Steering angle sensor calibration". Otherwise, the entire procedure must be repeated.

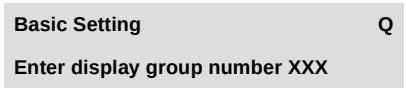
Rapid data transfer HELP **Select function XX**	Indicated on display: - Press the -1- button twice to select the function "login procedure".
Rapid data transfer Q **11 - Login procedure**	Indicated on display: - Press -Q- button to confirm input.
Login procedure Q **Enter code numbers XXXXX**	Indicated on display: - Select code number 40168. Press -Q- button to confirm input.
Rapid data transfer HELP **Select function XX**	Indicated on display: - Press buttons -0- and -4- to select function 04 "Basic Setting"

01-245



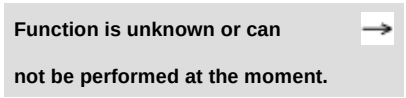
Indicated on display:

- Press -Q- button to confirm input.

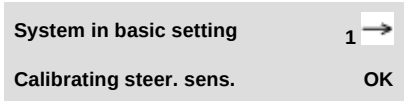


Indicated on display:

- Press buttons -0-, -0-, and -1-. Press -Q- button to confirm input.



If this appears in display, you have not successfully carried out the "Login Procedure".



Indicated on display:

- Check the zero position using "Read measuring value block" function 08, display group 5.

or:

01-246

System in basic setting	**1** →
Calibrating steer. sens.	**not OK**

Indicated on display:

- Check DTC Memory
- Erase DTC Memory
- Switch ignition off.
- Switch ignition on.
- Then repeat zeroing.
- Advance through program sequence by pressing the → button.

Rapid data transfer	**HELP**
Select function XX	

Indicated on display:

or:

01-247

System in basic setting	**1** →
Calibrating steer. sens.	**locked**

Indicated on display:

Steering wheel was not initialized, i.e. the steering wheel must be turned at least 10 degrees in either direction.

- Switch ignition off.
- Switch ignition on.
- Then repeat zeroing.
- Advance through program sequence by pressing the → button.

Rapid data transfer	**HELP**
Select function XX	

Indicated on display:

01-248

Hydraulic system, bleeding

The hydraulic pump for traction control -V156- is activated to bleed the hydraulic system.

⇒ *Repair manual, Brake System, Repair Group 47*

- Connect VAS5051 tester or VAG1551 scan tool and select the address word 03 "Brake Electronics".

Rapid data transfer **HELP**	
Select function XX	

Indicated on display:

- Press buttons -0- and -4- to select function 04 "Basic Setting"

Rapid data transfer **Q**	
04 - Basic Setting	

Indicated on display:

- Press -Q- button to confirm input.

01-249

Basic Setting	**Q**
Enter display group number XXX	

Indicated on display:

- Press buttons -0-, -0-, and -2-. Press -Q- button to confirm input.

System in basic setting	**2** →
Vent system	**OK**

Indicated on display:

Note:

The hydraulic pump for traction control -V156- is activated for ten (10) seconds.

- Press the → button to end the function.

Rapid data transfer	**HELP**
Select function XX	

Indicated on display:

01-250

ESP driving and system test

The ESP driving test is used to test the plausibility of the signals from the sensor for transverse acceleration, yaw sensor, and pressure sensor.

Road test vehicle

Some DTCs are only recognized by the On Board Diagnostic (OBD)while the vehicle is moving. You can check the entire system during a road test. During road test, drive at a speed of at least 60 km/h for 30 seconds. Check traffic conditions and perform an ABS regulated braking when appropriate. You will feel a pulsing in the brake pedal indicating the system is active.

Note:

Once the ESP driving test has been initiated, it cannot be aborted and must be performed completely. After exiting the diagnostic, the ABS/EDL and ASR/ESP lamps remain switched on in order to indicate that the test is active and that system function is not available yet. Warning, ABS and ESP not functioning!

01-251

WARNING!

While system is in diagnostic, the ABS/ESP/EBD is not active. Driving the vehicle after On Board Diagnostic (OBD) has detected a malfunction presents the risk of accident. The brake system will only be partially functional. Because brake pressure at the rear wheels is no longer regulated vie Electronic Brake Distribution (EBD), the rear wheels tend to brake excessively. This causes the rear of the vehicle to break loose.

When the use of test equipment is required during road tests, test equipment must always be secured to the rear seat and operated from there by a second person. If test and measuring equipment is operated from the passenger seat, the person seated there could be injured in the event of an accident involving deployment of the passenger-side airbag.

01-252

- Connect VAS5051 tester or VAG1551 scan tool and select the address word 03 "Brake Electronics" ⇒ page 01-4

Rapid data transfer **HELP**	
Select function XX	

Indicated on display:

- Press buttons -0- and -4- to select function 04 "Basic Setting"

Rapid data transfer **Q**	
04 - Basic Setting	

Indicated on display:

- Press -Q- button to confirm input.

Basic Setting **Q**	
Enter display group number XXX	

Indicated on display:

- Press buttons -0-, -0-, and -3-. Press -Q- button to confirm input.

System in basic setting **3** →	
System test activated **OK**	

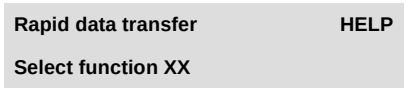
Indicated on display:

The ESP driving test is activated.

The ABS warning light -K47- and the traction control indicator light -K86- go on.

01-253

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



Indicated on display:

- Disconnect VAG 1551 scan tool.
- Start engine.
- Press the brake pedal hard (brake pressure higher than 35 bar) until the traction control indicator light -K86- turns off.

Note:

This completes the adjustment with the engine not running

- Perform the following road test:

WARNING!

Always follow the rules of the road and pay attention to traffic conditions as your first priority.

01-254

- Make a right or left turn. Then reverse the direction and continue driving until the ABS/EDL lamp turns off.

Note:

While driving around the curves, a yaw rate of around 10 °/sec must be obtained. A curve with a radius of 10 to 12 m and a speed of 15 to 20 km/h for around 4 sec. fulfills this requirement.

The ABS warning light -K47- must go out. This completes the ESP driving test and the system is OK.

If the ABS/ESP warning light -K47- remains lit, the test is not OK (system locked). Check DTC memory.

01-255

If the ABS warning light -K47- does not go out, the ESP driving test was not performed properly.

If the ABS warning light -K47- does not go out, and the traction control indicator light -K86- lights up again, there are malfunctions in the system; Check DTC memory ⇒ page 01-356

Note:

If the ESP driving test was interrupted, e.g.: by switching off the ignition, the entire test must be repeated.

01-256

Read Measuring Value Block (function 08)

The control module can transmit measured values to the VAS5051 tester and VAG1551 Scan Tool (ST). These measured values provide information about the operational status of the system and the sensors connected to it. In many cases the data supplied can be used to troubleshoot and repair malfunctions. The measured values provided by ESP are contained in six display groups, which can be accessed via their display group numbers.

- Connect the VAS5051 tester or VAG1551 Scan Tool (ST) and select the address word 03 "Brake Electronics".

01-257

Notes:

- *When the printer is switched on, the contents of the display will be printed out on the scan tool log.*
- *When reading the measuring value block, also check wiring and connectors for loose terminals.*

- Check the control module version ⇒ page 01-231 and press the →button.

Rapid data transfer	**HELP**
Select function XX	

Indicated on display:

- Press buttons -0- and -8- to select "Read measuring value block" function 08.

Rapid data transfer	**Q**
08 - Read measuring value block	

Indicated on display:

- Press -Q- button to confirm input.

Read measuring value block	**HELP**
Input display group number	**XXX**

Indicated on display:

- Press buttons -0-, -0- and -1-.
- Press -Q- button to confirm input.

01-258

Test table: display group 1

Notes:

- *Display fields 1 through 4 show the current wheel circumference speeds in km/h. These are calculated by the ABS control module -J104- on the basis of the signals received from the wheel speed sensors. If one of the display fields shows no reading, proceed as for DTCs 00283, 00285, 00287, 00290 "ABS Wheel Speed Sensor" DTC table ⇒ page 01-357 .*

- *In order to check whether wheel speed sensors are properly allocated to each wheel, the vehicle must be raised. On vehicles with manual transmission put the gear shift lever in neutral. On vehicles with automatic transmission move the selector lever to position "N". Turn appropriate wheel by hand. Remaining drive wheels must be secured against turning.*

- *When a vehicle is accelerated uniformly on a dry surface, the displayed value will increase continuously by whole numbers; e.g. 6 km/h, 7 km/h, 8 km/h ... . The difference between displayed values 1-4 should not be more than ± 1 km/h (error from out-of-round wheels). If the values jump, for instance from ...6km/h, 7 km/h, to 12 km/h...or if the difference between the displayed values is greater than ± 1 km/h, then check the installation of the wheel speed sensors and rotors.*

⇒ *Repair Manual, Brake System, Repair Group 45*

01-259

Test table: display group 1

Read measuring value block			1 →	◀ Indicated on display
1 to 19 [1)] km/h	1 to 19 [1)] km/h	1 to 19 [1)] km/h	1 to 19 [1)] km/h	
			Rear right wheel circumference speed	
		Rear left wheel circumference speed		
	Front right wheel circumference speed			
Front left wheel circumference speed				

[1)] OBD is terminated by ABS control module -J104- if road speed exceeds 19 km/h (12 mph). 1 km/h is the minimum speed that can be displayed (at 0 km/h, for example, the tester displays 1 km/h).

01-260

Note:

The display group numbers can be selected in sequence by pressing buttons <-1 and 3-> on the VAG1551 scan tool, or the arrow buttons ↑ and ↓ on the VAG1552 mobile scan tool or the arrow buttons ↑ and ↓ on the screen of the VAS5051 tester.

- Press -C- button to input display group number manually.

Read measuring value block

Enter display group number XXX

Indicated on display:

- Press buttons -0-, -0- and -2-.
- Press -Q- button to confirm input.

01-261

Test table: display group 2

<table>
<tr><td colspan="3">Read measuring value block</td><td>2 →</td><td>◀ Indicated on display</td></tr>
<tr><td>0 or operated</td><td>0 or operated</td><td>0 or operated</td><td>0 or operated</td><td></td></tr>
<tr><td></td><td></td><td></td><td colspan="2">Traction control button

♦ 0 → Traction control button not operated
♦ Traction control switch operated
- Check traction control button if there are deviations. Carry out "Electrical test", step 20.</td></tr>
<tr><td></td><td></td><td colspan="2">Parking brake

♦ 0 → Parking brake not engaged
♦ Parking brake engaged</td><td>- Check parking brake warning light switch -F9- if there are deviations. Carry out "Electrical test", step 27.</td></tr>
<tr><td></td><td colspan="3">Brake light switch:

♦ 0 → Brake pedal not depressed
♦ Brake pedal depressed</td><td>- Check brake light switch if there are deviations. DTC table ⇒ page 01-356 ; DTC "Brake light switch -F-"; DTC 00526.</td></tr>
<tr><td colspan="3">Brake test switch:

♦ 0 → Brake pedal not depressed
♦ Brake pedal depressed</td><td colspan="2">- The brake test signal precedes the brake light signal. Check brake light switch if there are deviations:DTC table ⇒ page 01-356 ; DTC "Brake light switch -F-"; DTC 00526.</td></tr>
</table>

01-262

Note:

The display group numbers can be selected in sequence by pressing buttons <-1 and 3-> on the VAG1551 scan tool, or the arrow buttons ↑ and ↓ on the VAG1552 mobile scan tool or the arrow buttons ↑ and ↓ on the screen of the VAS5051 tester.

- Press -C- button to input display group number manually.

Read measuring value block

Enter display group number XXX

Indicated on display:

- Press buttons -0-, -0- and -3-.
- Press -Q- button to confirm input.

01-263

Note:

For display group 3 (005):

- *To read the display fields for engine speed and current engine torque with the engine running, communication between the scan tool and the control module must be terminated via the "End Output" function ⇒ page 01-16 . Start the engine and reinitiate communication between the scan tool and the control module.*

Rapid data transfer Q **08 - Read measuring value block**	Indicated on display: - Press buttons -0- and -8- to select "Read measuring value block" function 08. - Press -Q- button to confirm input.
Read measuring value block **Enter display group number XXX**	Indicated on display: - Press buttons -0-, -0- and -3-. - Press -Q- button to confirm input.

01-264

Test table: display group 3

Read measuring value block			3 →	◀ Indicated on display
60 to 8000 1 RPM	0 to 630 Nm	0 to 630 Nm	0 to 100 %	

Throttle valve angle:

- If nothing is displayed, press -C- button, select function 02 and check DTC memory. Repair the malfunction with the help of the DTC table ⇒ page 01-356 .

Dissipation torque:

- If nothing is displayed, press -C- button, select function 02 and check DTC memory. Repair the malfunction with the help of the DTC table ⇒ page 01-356 .

Engine torque:

- If nothing is displayed, press -C- button, select function 02 and check DTC memory. Repair the malfunction with the help of the DTC table ⇒ page 01-356 .

Engine speed:

♦ Engine speed is displayed in increments of 60 RPM, starting at 60 RPM.

- If nothing is displayed, press -C- button, select function 02 and check DTC memory. Repair the malfunction with the help of the DTC table ⇒ page 01-356 .

Notes:

- *On Board Diagnostic (OBD) will be terminated by the ABS control module -J104- if road speed exceeds 19 km/h.*
- *The actual engine speed (MMI) is calculated by subtracting the dissipation torque from the engine torque.*

01-265

Note:

The display group numbers can be selected in sequence by pressing buttons <-1 and 3-> on the VAG1551 scan tool, or the arrow buttons ↑ and ↓ on the VAG1552 mobile scan tool or the arrow buttons ↑ and ↓ on the screen of the VAS5051 tester.

- Press -C- button to input display group number manually.

Read measuring value block

Enter display group number XXX

Indicated on display:

- Press buttons -0-, -0- and -4-.
- Press -Q- button to confirm input.

01-266

Note:

For test table display group 4:

- *Display group 4 is not occupied for control modules with no. 4B0 907 389 without index and cannot be selected for these control modules by pressing buttons <-1 and 3-> on the VAG1551 or by pressing the arrow buttons ↑ and ↓ on the VAG1552 or via manual input.*

If an attempt is made to select display group number 4:

Function is unknown or can →

not be performed at the moment.

Indicated on display:

- Press → button.

Rapid data transfer HELP

Select function XX

Indicated on display:

Bypass display group number 4 or you will be forced to exit the "Read measuring value block" function. Press the C-button to do this and then select display group number 3 or 5 directly.

01-267

Test table: display group 4

Read measuring value block			4 →	◀ Indicated on display
00:00 h or invalid	Off/on	not used	not used	

EDL shut-off

♦ Electronic Differential Lock (EDL) is deactivated at excessive brake temperature (only EDL).

Standing time (TIM):

♦ The standing time (TIM) is used to calculate how much the brakes have cooled while the ignition is off. The ABS control module -J104- receives the standing time signal from the instrument cluster.

- If nothing is displayed, press -C- button, select function 02 and check DTC memory. Repair the malfunction with the help of the DTC table ⇒ page 01-356 .

Invalid:

♦ Battery disconnected or completely discharged

♦ Open circuit in wire from ABS control module (w/EDL) -J104- to instrument cluster

Note:

On Board Diagnostic (OBD) will be terminated by the ABS control module -J104- if road speed exceeds 19 km/h.

01-268

Note:

The display group numbers can be selected in sequence by pressing buttons <-1 and 3-> on the VAG1551 scan tool, or the arrow buttons ↑ and ↓ on the VAG1552 mobile scan tool or the arrow buttons ↑ and ↓ on the screen of the VAS5051 tester.

- Press -C- button to input display group number manually.

Read measuring value block

Enter display group number XXX

Indicated on display:

- Press buttons -0-, -0- and -5-.
- Press -Q- button to confirm input.

01-269

Note:

For display group 5 (005):

- *To read the display fields for yaw rate and transverse acceleration while driving, communication between the scan tool and the control module must be terminated via the "End Output" function ⇒ page 01-16 . Start the engine and reinitiate communication between the scan tool and the control module.*

Rapid data transfer Q
08 - Read measuring value block

Indicated on display:

- Press buttons -0- and -8- to select "Read measuring value block" function 08.
- Press -Q- button to confirm input.

Read measuring value block
Enter display group number XXX

Indicated on display:

- Press buttons -0-, -0- and -5-.
- Press -Q- button to confirm input.

01-270

Test table: display group 5

Read measuring value block			5 →	◀ Indicated on display
- 720 ° ... +720 °	- 69 °/s ... + 69 °/s	- 41 bar ... +292 bar	- 25 m/s2 ... + 25 m/s2	

Transverse acceleration:

- Specification with vehicle at standstill: ± 0....0.7 m/s2
- Specification with steering wheel fully turned at a speed of 20 km/h: max. ± 6.0 m/s2; the value of the measured value increases steadily.
- Another test for the sensor is located ⇒ page 01-271 ; Fig. ⇒ 1 .

Brake pressure:

- Specification with brake pedal not depressed: ± 0....5 bar

Rotation rate:

- Specification with vehicle at standstill: ± 3 °/s
- Specification with steering wheel fully turned at a vehicle speed of 20 km/h: max. ± 65 °/s; the value of the measured value increases steadily.

Steering angle:

-

Specified value when driving straight ahead (steering wheel in straight-ahead position) ± 5°.[1)]

[1)] If the steering angle sensor is OK, there will be an indication, even if the zeroing procedure was not performed.

Note:

On Board Diagnostic (OBD) will be terminated by the ABS control module -J104- if road speed exceeds 19 km/h.

If nothing is displayed, press -C- button, select function 02 and check DTC memory. Repair the malfunction with the help of the DTC table ⇒ page 01-356 .

01-271

Note:

The transverse acceleration sensor is very impact-sensitive, as is the combined sensor for yaw rate and transverse acceleration. If one of these sensors is dropped, do not reinstall it in vehicle under ANY circumstances. Instead, use a new sensor.

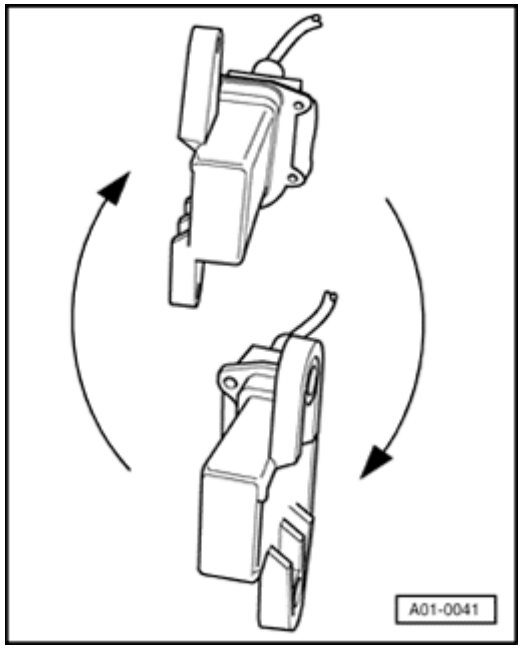


Fig. 1 Sensor for transverse acceleration -G200-

In order to test the sensor, or the combined sensor for yaw rate and transverse acceleration, the sensor must be removed. Remove rear seat bench. Unscrew control module for ultra-sound sensors -J347- and then the sensor. Leave the sensor connected and turn it 90° relative to installation position along its longitudinal axis.

01-272

After this, a value of either - 9,8 ± 1 m/s2 or + 9,8 ± 1 m/s2 will be indicated on the scan tool display in display group 5 (use the "Read measuring value block" function).

A plus in front of the number indicates the affect on the sensor while driving around a left-hand curve.

A minus in front of the number indicates the affect on the sensor while driving around a right-hand curve.

After reinstalling the sensor for transverse acceleration -G200- or the combined sensor for yaw rate and transverse acceleration, tighten the mounting bolts to 5 Nm. Tighten the mounting bolts for the control module for ultra-sound sensors -J347- to 2 Nm.

Note:

Due to an error in the test card 8.0 for the VAG1551 scan tool and the test card 5.0 for the VAG1552 scan tool, the display for Measuring Value Block 5, display group 4 is offset by one decimal point. This means, for example, that a transverse acceleration value of 9.81m/s2 is displayed simply as 0.98 m/s2 .

01-273

Note:

The display group numbers can be selected in sequence by pressing buttons <-1 and 3-> on the VAG1551 scan tool, or the arrow buttons ↑ and ↓ on the VAG1552 mobile scan tool or the arrow buttons ↑ and ↓ on the screen of the VAS5051 tester.

- Press -C- button to input display group number manually.

Read measuring value block

Enter display group number XXX

Indicated on display:

- Press buttons -0-, -0- and -6-.
- Press -Q- button to confirm input.

01-274

Test table: display group 6

Read measuring value block			6 →	◀ Indicated on display
0 volts to 18 volts	on or off	on or off	0 ... 131071	

Workshop code:

- The workshop code indicates the last workshop that executed the "Login Procedure" (function 11) under address word 03, "Brake electronics" ⇒ page 01-237 .
- If no code is displayed, the "Login Procedure" under address word 03 "Brake Electronics" has not been carried out yet.

Voltage at motor for ABS return flow pump:

- off → specified value, there is no voltage at the motor for the ABS return flow pump.
- on→ not permitted during "Read measuring value block", there is voltage at the motor for the ABS return flow pump.

- Carry out "Electrical test", steps 12, 23 and 24.

ABS solenoid valve relay:

- on → specified value, relay was activated by ABS control module -J104- during ignition on.
- off → not permitted during "Read measuring value block", the relay was not activated during "ignition on".

- Carry out "Electrical test", steps 11 and 22.

Supply voltage for ABS control module -J104- at terminal 1:

♦ Specification: 10.5 - 14.5 V

- If specified value is not obtained, carry out "Electrical test", step 21.

01-275

Note:

The display group numbers can be selected in sequence by pressing buttons <-1 and 3-> on the VAG1551 scan tool, or the arrow buttons ↑ and ↓ on the VAG1552 mobile scan tool or the arrow buttons ↑ and ↓ on the screen of the VAS5051 tester.

- Press -C- button to input display group number manually.

Read measuring value block

Enter display group number XXX

Indicated on display:

- Press buttons 1-, 2- and -5-.
- Press -Q- button to confirm input.

01-276

Note:

- *For test table display group 125:*
- *Display group 125 is not occupied for control modules with no. 4B0 907 389 and cannot be selected for these control modules by pressing buttons <-1 and 3-> on the VAG1551 or by pressing the arrow buttons ↑ and ↓ on the VAG1552 or via manual input.*

If an attempt is made to select display group number 125 despite this:

Function is unknown or can →

not be performed at the moment.

Indicated on display:

- Press → button.

Rapid data transfer HELP

Select function XX

Indicated on display:

01-277

Test table: display group 125

Read measuring value block			125 →	◀ Indicated on display
Steering angle 0 or 1	Engine 0 or 1	Transmission 0 or 1	not used	
		Transmission Control Module (TCM): (only for vehicles with automatic transmission) ♦ 0: No information received from the Transmission Control Module (TCM) via the CAN-bus. ♦ 1: Information is being received from the Transmission Control Module (TCM) via the CAN-bus.		
	Engine Control Module (ECM): ♦ 0: No information received from the Engine Control Module (ECM) via the CAN-bus. ♦ 1: Information is being received from the Engine Control Module (ECM) via the CAN-bus.			
Steering angle sensor: ♦ 0: No information received from the steering angle sensor via the CAN-bus.[1)] ♦ 1: Information is being received from the steering angle sensor via the CAN-bus.				

[1)] If the steering angle sensor is OK, it sends information, even if the zeroing procedure was not performed.

Note:

On Board Diagnostic (OBD) will be terminated by the ABS control module -J104- if road speed exceeds 19 km/h.

01-278

Output Diagnostic Test Mode (DTM) (function 03)

Output Diagnostic Test Mode (DTM) is used to check the function of actuators. Actuators are also called actors. These are components that the control module activates when it reacts to the signals sent by sensors, e.g. solenoid valves, relays and pump motors.

Note:

- *Output Diagnostic Test Mode (DTM) only functions on vehicles containing control modules with no. 8D0 407 389 A/D/E.*
- *For control modules with no. 4B0 907 389, output Diagnostic Test Mode (DTM) is not possible.*

Output Diagnostic Test Mode (DTM) can and must only be selected once after the ignition is switched on.

01-279

"Function of actuators" includes all functions and properties of an actuator under operating conditions. This means, for example:

An electrically operated hydraulic valves that opens and closes when activated by the control module.

The relay of an electrical motor when activated by the control module. The motor switches on and carry outs the task.

Before initiating the output Diagnostic Test Mode (DTM), make sure there are no electrical malfunctions in the system you wish to test. This will enable you to recognize any mechanical problems. Perform a guided troubleshooting before starting output Diagnostic Test Mode (DTM) ⇒ page 01-19 .

01-280

Are you sure there are no electrical malfunctions in the system? If you have made sure that there are no electrical malfunctions in the system, you will be able to identify any mechanical malfunctions in the individual actuators if the results of the output DTM are not as specified here. Replace the relevant part.

With the Bosch 5.3 ABS/ESP the output Diagnostic Test Mode (DTM) enables you to check the electrically actuated hydraulic valves and the pump motor in the hydraulic module. You can also check that the brake lines going to the four wheels are connected correctly.

01-281

Notes:

- *The vehicle must be raised until all wheels are free to turn. Ask a colleague to help. The colleague will have to check the wheels to determine whether they turn freely.*
- *You can stop the test sequence at any time by pressing the -C- button.*
- *To avoid overloading the components being checked, they are actuated during the test sequence for a period of 60 (or 90) seconds. The actuator test will be terminated if the "→ button" is not pressed within this period.*
- *The ABS warning light and the red "brake system malfunction" symbol blink during the test.*
- *Pressing the brake pedal repeatedly this relieves the vacuum in the brake booster. For this reason, the brake pedal must be pressed harder in order to achieve the same braking effect. Your work will be easier if you run the engine briefly. This will build up vacuum in the brake booster again.*

01-282

During the test, the individual test steps are shown in the second line of the VAG1551 scan tool display. The following abbreviations are used.

IV = Inlet valve

OV = Outlet valve

LF = Left Front

RF = Right Front

LR = Left Rear

RR = Right Rear

B+ = Battery Positive Voltage (B+) at valve

0V = 0 volts; No voltage at valve

Locked/free = Wheel condition; must be checked by second technician

Hydr-P = Hydraulic pump

01-283

- Connect VAS5051 tester or VAG1551 scan tool and select the address word 03 "Brake Electronics".

- Check the control module version ⇒ page 01-128 and press the →button.

Rapid data transfer **HELP**	
Select function XX	

Indicated on display:

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

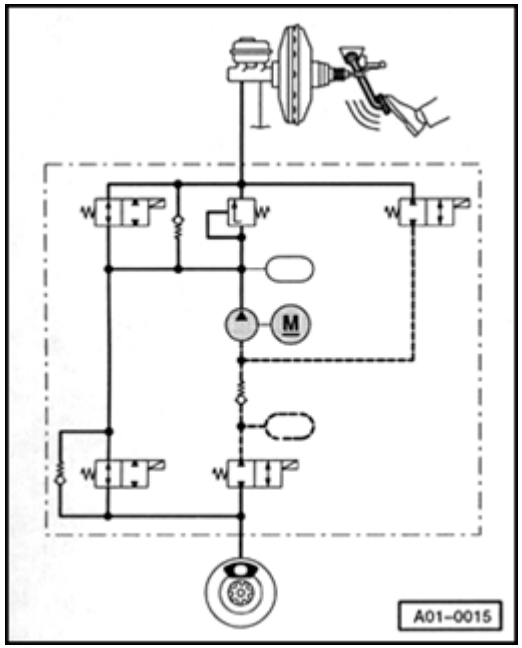
Rapid data transfer **Q**	
03 - Output Diagnostic Test Mode (DTM)	

Indicated on display:

- Press -Q- button to confirm input.

01-284

Output Diagnostic Test Mode (DTM) → ABS hydraulic pump -V64-



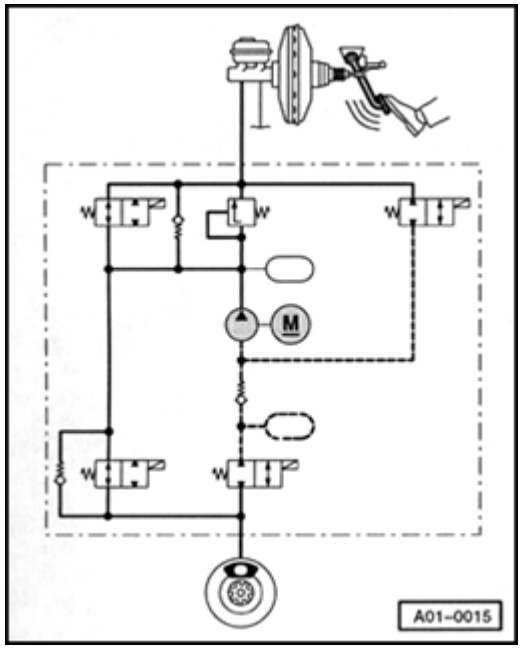
- Indicated on display:

  ABS hydraulic pump -V64- must start running. This is audible.

- When you put your foot on the brake pedal you can feel it vibrating. The brake pedal vibrates because the hydraulic pump generates pressure pulses in the brake lines. The pressure pulses generate oscillations. These are directed to the brake pedal and make it vibrate.

  The pressure pulses in the brake lines are not sufficient to lock the wheels.

01-285



The hydraulic circuit diagram shows a systematic representation of an ABS/EDL system. This will give a better understanding of the various test steps in the output Diagnostic Test Mode (DTM).

- shaded components are in action.
- Thin solid lines represent hydraulic lines or hoses that are not under pressure.
- Thick broken lines represent hydraulic lines or hoses working as suction lines.
- Thick solid lines represent hydraulic lines or hoses that are under pressure.

- Press → button.

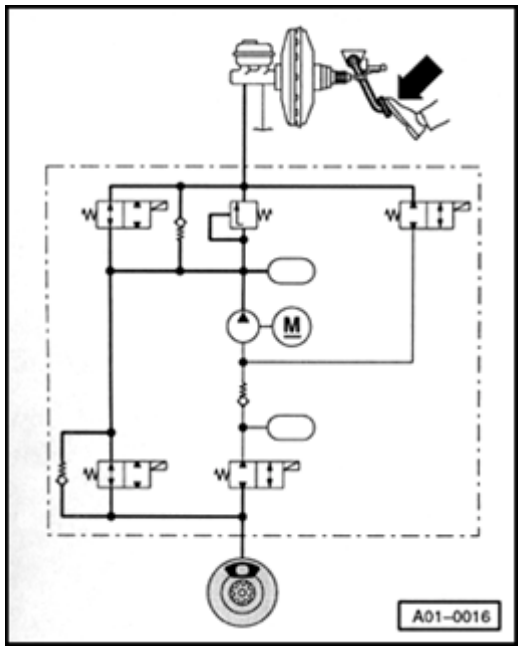
01-286

Output Diagnostic Test Mode (DTM) _ →

Operate brake

Output Diagnostic Test Mode (DTM) _ →

lfl: 0V Ofl: 0V fl wheel locked



➢ Indicated on display:

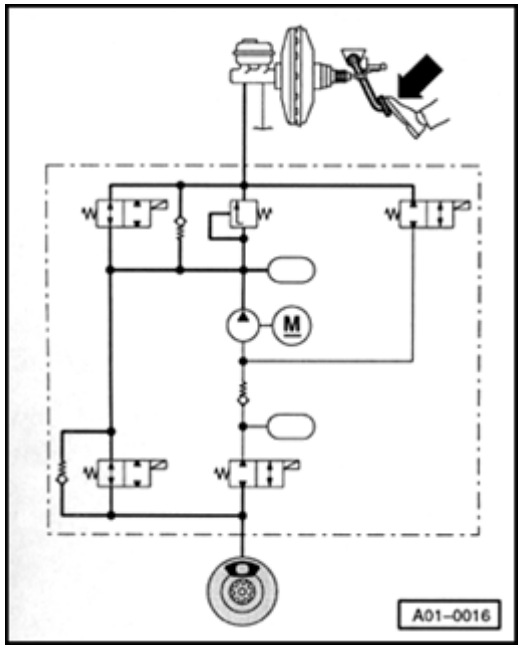
- Press → button.

➢ Indicated on display:

➢ When you press the brake pedal, brake fluid pressure will be built up in all four calipers. All four wheels lock.

Requirement for this: mechanical/hydraulic components of the brake system must be fully functional. This means that the master brake cylinder is able to build up pressure in all wheel cylinders and the hydraulic connections and lines are all sealed properly.

01-287



- If the wheels do not lock, visually inspect brake fluid reservoir, master brake cylinder, hydraulic unit, and calipers.

Concentrate on the left-front wheel first. The function of the control elements for this wheel is tested first.

Note:

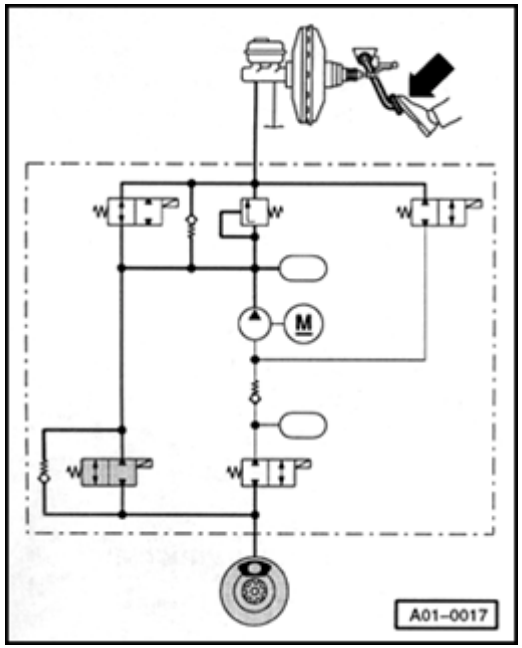
This test step in the output diagnostic test mode corresponds to the "pressure build-up" phase during ABS-controlled braking.

- Press → button.

01-288

Output Diagnostic Test Mode (DTM) _ →

Ifl: B+ Ofl: 0V fl wheel locked



➢ Indicated on display:

- Keep pressing brake pedal.

➢ Inlet valve is activated. It interrupts the brake line. However, fluid pressure is still maintained in the wheel cylinder. The left-front wheel remains locked.

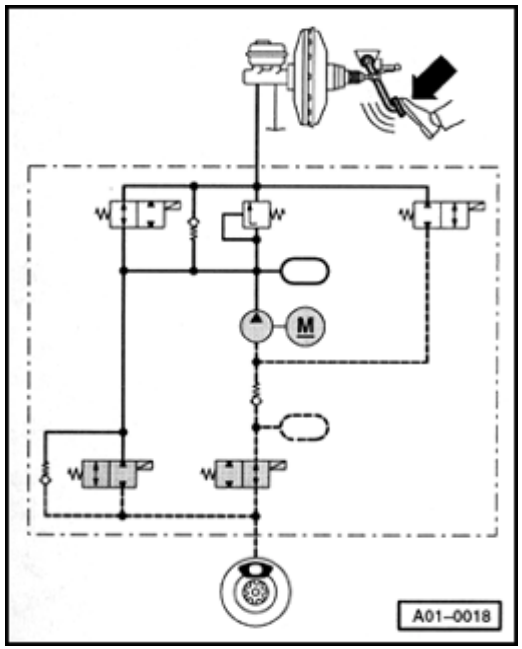
Note:

This test step in the output diagnostic test mode corresponds to the "maintain pressure" phase during ABS-controlled braking.

- Press → button.

01-289

Output Diagnostic Test Mode (DTM) _ →		
lfl: B+	Ofl: B+	fl wheel free



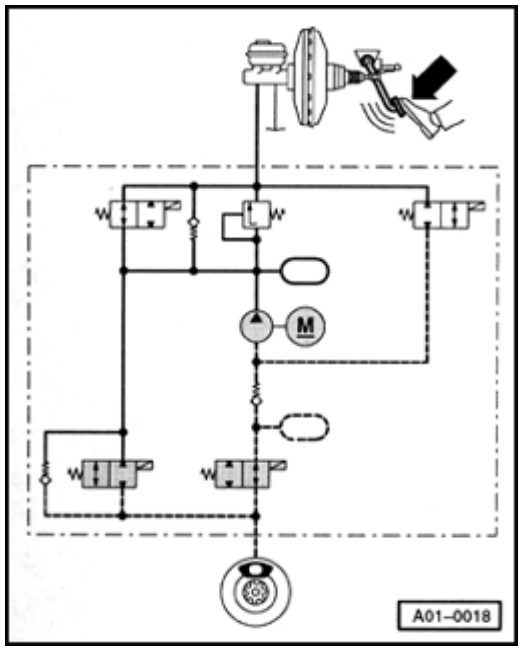
- Indicated on display:

- Keep pressing brake pedal. The inlet valve and the outlet valve for the left-front wheel are activated. The hydraulic pump starts running and reduces the fluid pressure in the caliper via the open outlet valve.

  The brake pedal must not give, and should press harder against your foot.

  You should now be able to turn the left-front wheel.

01-290



If you cannot turn the wheel, check whether the brake line for the left-front wheels is connected correctly.

If yes, this indicates a mechanical malfunction in one of the valves, providing there is no electrical malfunction in the system. Replace hydraulic control unit.

If the pedal gives under your foot, this means that the inlet valve or the check valve activated in parallel to the inlet valve is leaking. Replace hydraulic unit.

Note:

This test step in the output diagnostic test mode corresponds to the "pressure reduction" phase during ABS-controlled braking.

- Press → button.

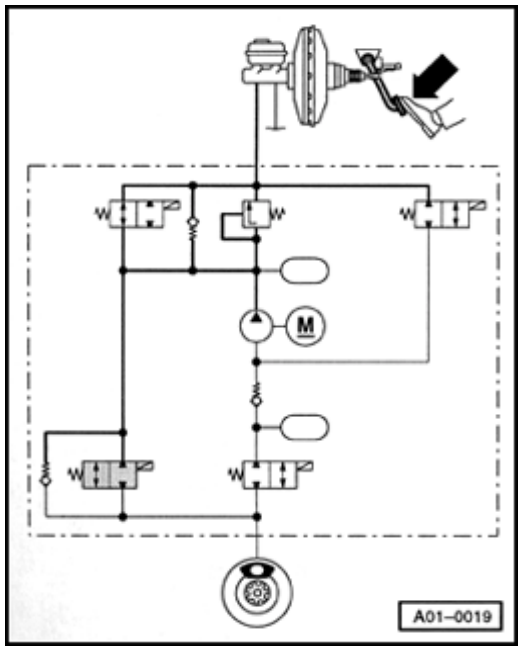
01-291

Output Diagnostic Test Mode (DTM) _ →		
Ifl: B+	Ofl: 0V	fl wheel free

➢ Indicated on display:

ABS hydraulic pump -V64- will stop running.

- Keep pressing brake pedal. Only the inlet valve is still activated and interrupts the brake line. If the inlet valve is not leaking, you should be able to turn the left-front wheel.



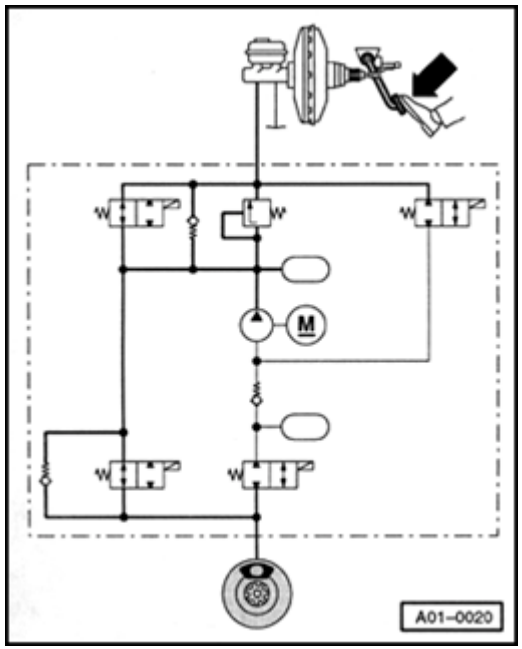
➢ If you cannot turn the wheel, this means that the inlet valve or the check valve activated in parallel to the inlet valve is leaking. Replace hydraulic control unit.

- Press → button.

01-292

Output Diagnostic Test Mode (DTM) _ →

Ifl: 0V Ofl: 0V fl wheel locked



➢ Indicated on display:

➢
- Keep pressing brake pedal. Inlet valve is no longer being activated. It is no longer interrupting the brake line. The brake pedal will give perceptibly under your foot. Fluid pressure is built again in the left-front caliper. The wheel will be locked.
- Press → button.

01-293

Output Diagnostic Test Mode (DTM) - →

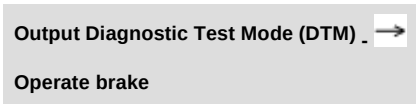
Release brake

Indicated on display:

- Press → button.

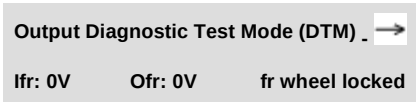
Continue output Diagnostic Test Mode (DTM) in order to check the front right, rear left, and rear right wheels in sequence. The test steps indicate the procedure for the front left wheel. They will therefore not be repeated in detail.

01-294



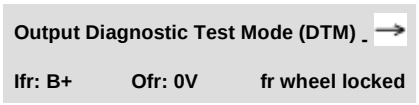
➢ Indicated on display:

- Press → button.



➢ Indicated on display:

- Press → button.

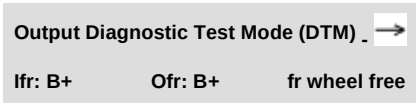


➢ Indicated on display:

- Press → button.

ABS hydraulic pump -V64- must start running.

The brake pedal must not give.

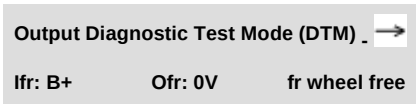


➢ Indicated on display:

- Press → button.

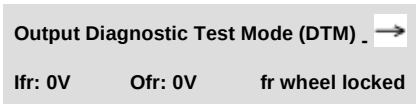
ABS hydraulic pump -V64- will stop running.

01-295

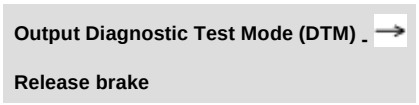


- Indicated on display:
- Press → button.

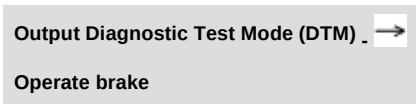
Brake pedal must give noticeably.



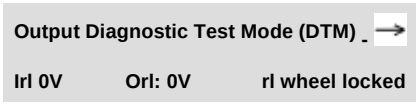
- Indicated on display:
- Press → button.



- Indicated on display:
- Press → button.

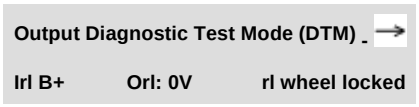


- Indicated on display:
- Press → button.



- Indicated on display:
- Press → button.

01-296

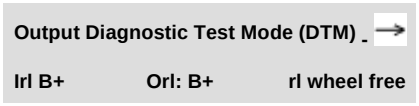


Indicated on display:

- Press → button.

ABS hydraulic pump -V64- must start running.

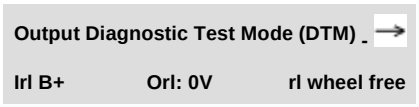
The brake pedal must not give.



Indicated on display:

- Press → button.

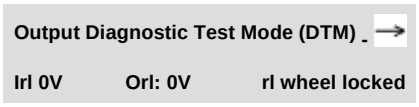
ABS hydraulic pump -V64- will stop running.



Indicated on display:

- Press → button.

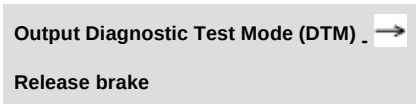
Brake pedal must give noticeably.



Indicated on display:

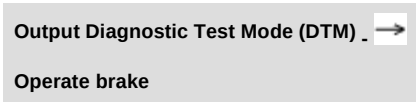
- Press → button.

01-297



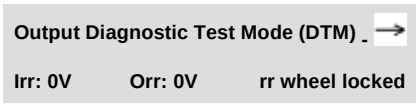
Indicated on display:

- Press → button.



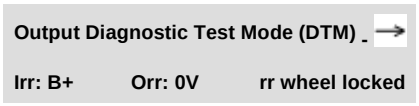
Indicated on display:

- Press → button.



Indicated on display:

- Press → button.



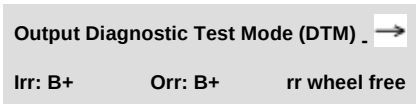
Indicated on display:

- Press → button.

ABS hydraulic pump -V64- must start running.

The brake pedal must not give.

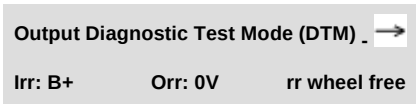
01-298



- Indicated on display:

- Press → button.

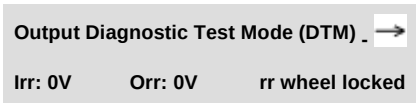
ABS hydraulic pump -V64- will stop running.



- Indicated on display:

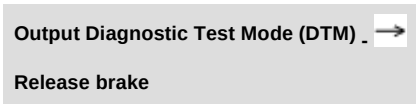
- Press → button.

Brake pedal must give noticeably.



- Indicated on display:

- Press → button.

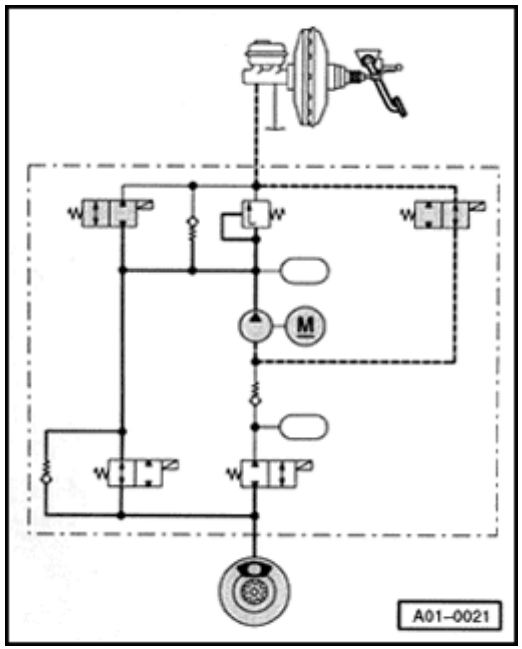


- Indicated on display:

- Press → button.

Output Diagnostic Test Mode (DTM) _ →

Irr: B+ Orr: B+ rr wheel free



➢ Indicated on display:

➢ The EDL change-over valve (left) and the EDL inlet valve are activated. ABS return flow pump -V39- runs for one second. It draws brake fluid from the brake fluid expansion tank via the EDL inlet valve. The hydraulic pump builds brake fluid pressure in the EDL regulated wheel cylinders. These wheels will then be locked.

If not, this indicates a mechanical malfunction in one of the valves, providing there is no electrical malfunction in the system. Replace hydraulic control unit.

- Press → button.

01-300

Output Diagnostic Test Mode (DTM) _ →

End

Indicated on display:

Note:

The output diagnostic test mode is completed. The ABS/EDL warning light and the red warning symbol for brake system go out.

- Press → button.

Rapid data transfer HELP

Select function XX

Indicated on display:

Note:

- *If the ABS/EDL warning light does not go out, this indicates a malfunction in the system. Observe test sequence exactly ⇒ page 01-17 .*

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