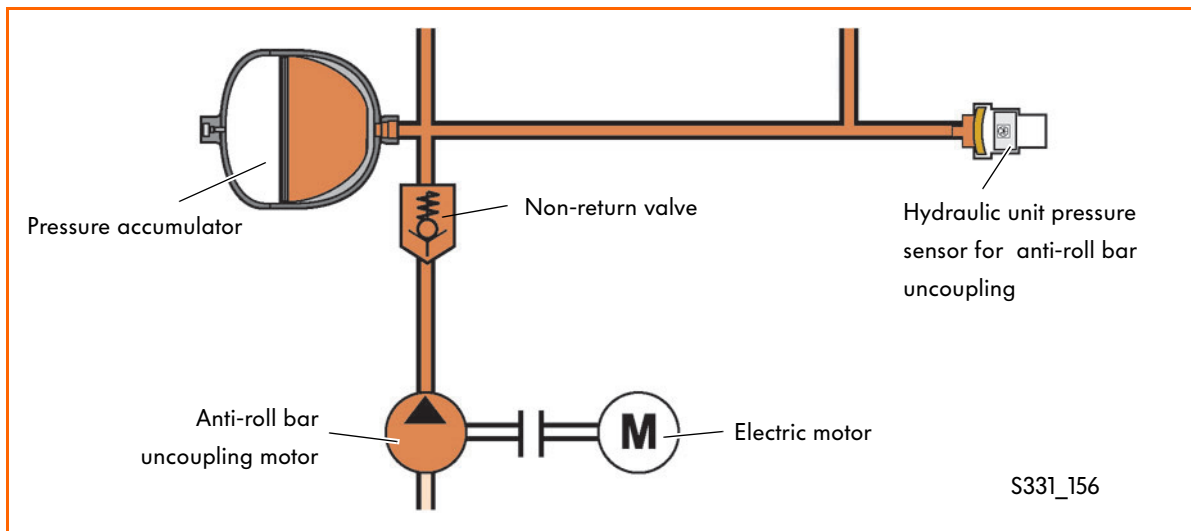


S331_116

How it works

When the hydraulic fluid is pumped into the pressure accumulator via the non-return valve, pressure in the system rises in relation to the volume of fluid pumped. The nitrogen gas is compressed and the volume of the gas chamber diminishes. The fluid volume rises at the same rate until the cut-off pressure is reached. Pressure in the accumulator is maintained by the non-return valve and is supplied to the anti-roll bars via a duct.



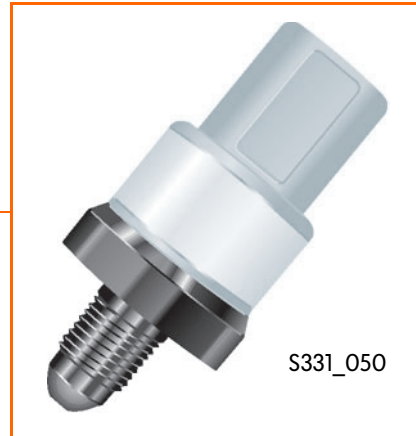
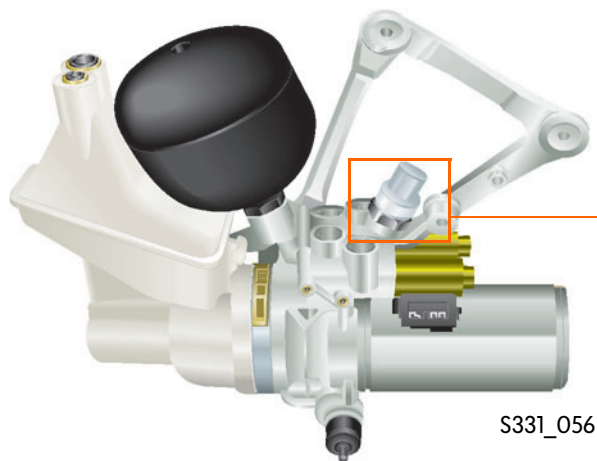
S331_156



To protect the pressure accumulator, pressure in the system must be over 70 bar during the coupling operation.

Design and function

Hydraulic unit pressure sensor for anti-roll bar uncoupling G486



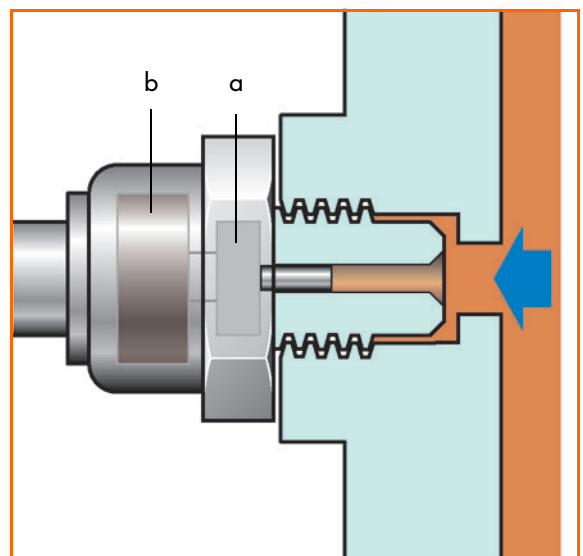
The hydraulic unit pressure sensor for anti-roll bar uncoupling monitors system pressure over a range of 0 bar to 250 bar.

The pressure accumulator is recharged if the pressure drops below a minimum of 90 bar when the anti-roll bars are uncoupled, or when the anti-roll bars are coupled and the gearbox is switched to "low".

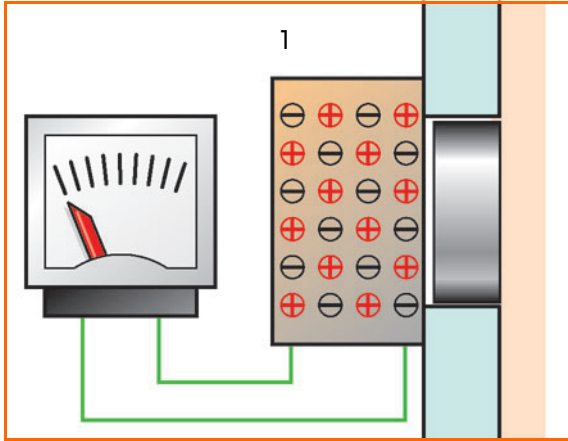


Design

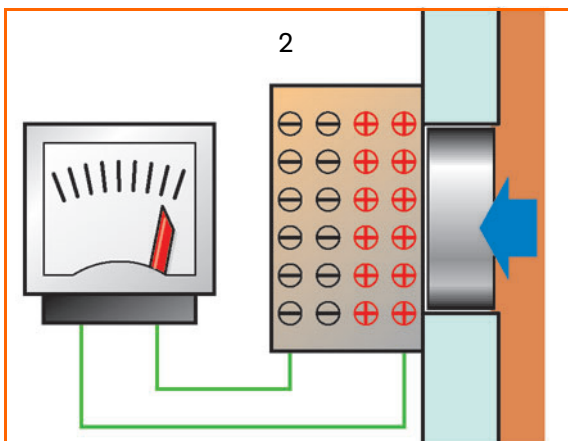
The sensor consists of the sensor electronics (b) and a piezoelectric element (a) which reacts to the hydraulic fluid pressure.



S331_104



S331_106



S331_108

How it works

The hydraulic fluid pressing on the piezoelectric element changes the charge distribution in the element.

Without the action of pressure, the charges have an even distribution (1). If pressure starts to act, the charges change their physical position (2). This generates an electrical voltage.

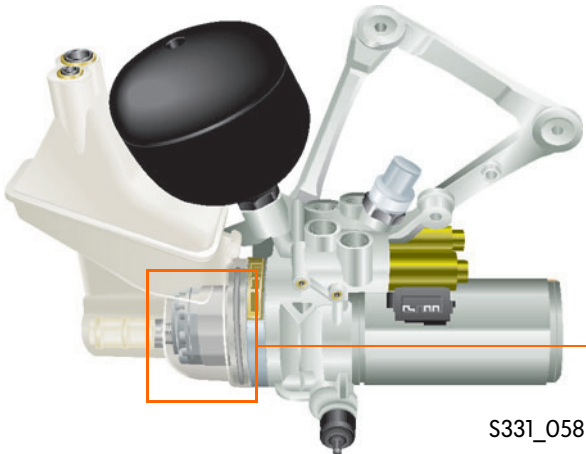
The higher the pressure, the more the charges are separated. The voltage rises. It is amplified by the electronic circuits and sent as a signal to the anti-roll bar control unit.

The voltage intensity is therefore directly proportional to the hydraulic pressure.

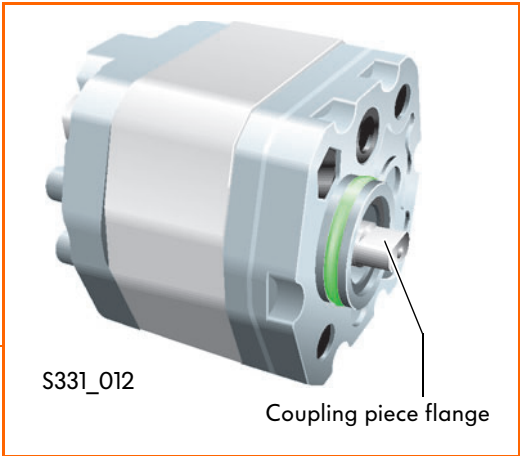


Design and function

Anti-roll bar uncoupling motor V326



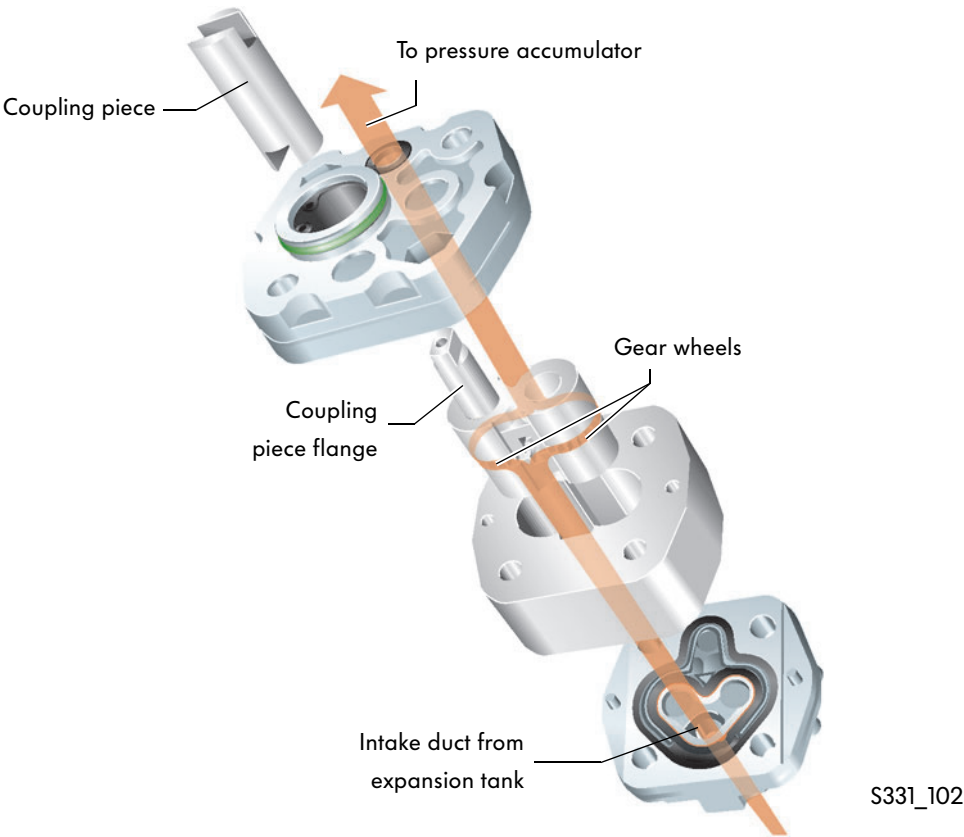
The anti-roll bar uncoupling motor is driven by the electric motor via the coupling piece.

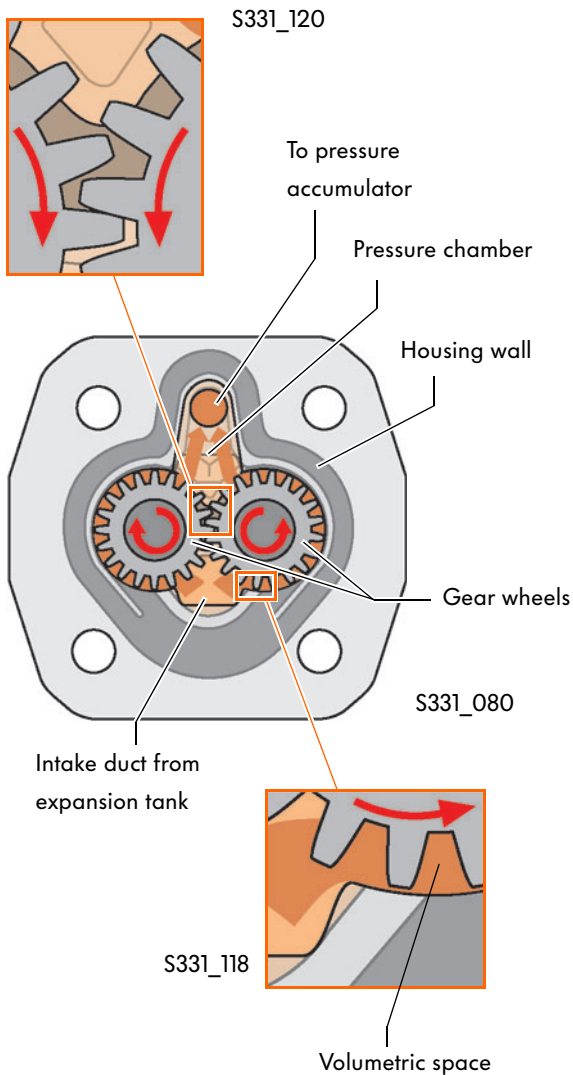


It draws hydraulic fluid out of the expansion tank and pumps it to the pressure accumulator via a non-return valve.



Oil flow in the pump





How it works

The anti-roll bar uncoupling motor is a gear pump. The opposing rotary motion of the two gear wheels pumps the hydraulic fluid along the outside of the housing wall.

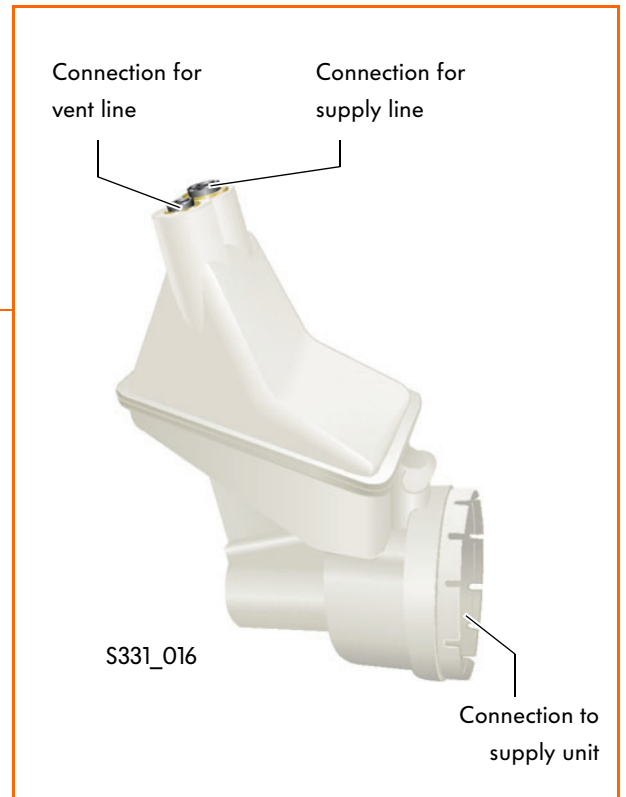
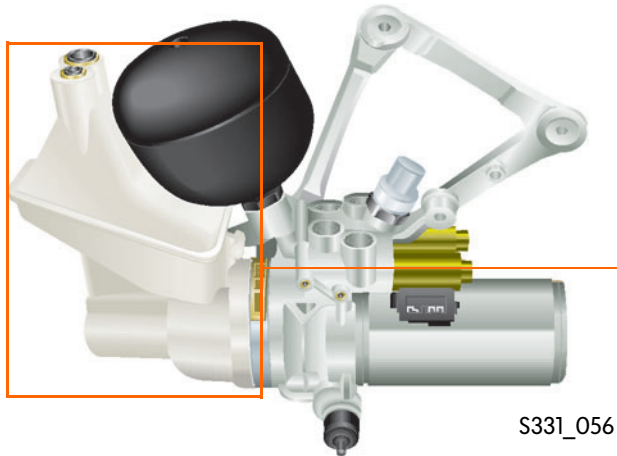
A definite volume of hydraulic fluid is taken in depending on the volumetric space between the teeth and the housing wall. This volume is then pumped in the direction of rotation of the gear wheel.

The two gear wheels intermesh in the middle. The volumetric space becomes smaller and the hydraulic fluid is pressed out of the volumetric space. Pressure then rises in the pressure chamber. When the pressure has risen sufficiently, the non-return valve opens and the hydraulic fluid is pumped to the pressure accumulator.



Design and function

Expansion tank

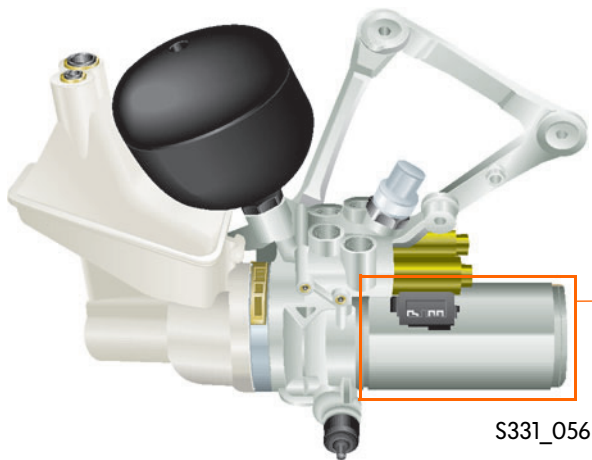


The expansion tank is inserted onto the supply unit and secured by a hose clamp. It is designed to prevent the pump from running dry in any driving situation.

There are two connections on top of the expansion tank: one is for the vent line and the other is for the supply line.

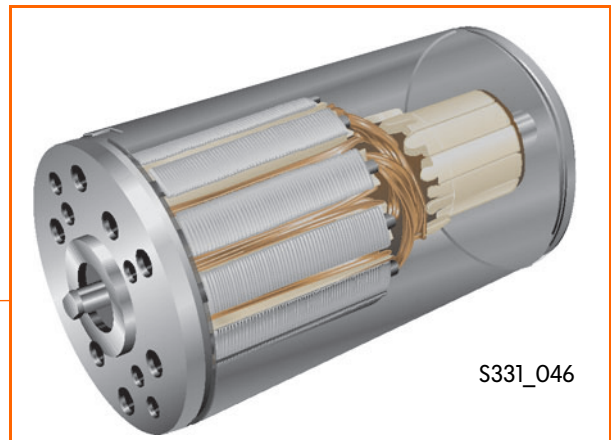
There is no min./max. marking. Oil level is checked through the supply line using a modified customary commercial plastic bottle (refer to the "Service " section on page 33).

Electric motor



S331_056

The electric motor is a direct-current motor with a permanent magnet. It is also termed a permanently excited collector motor.



S331_046

Due to its linear characteristic curves, it is an adaptable and readily controllable drive.

Anti-roll bar control unit J742

The fitting location for the control unit is in the luggage compartment under the spare wheel cover.

It is inserted on end in a moulded foam packing with the connector output pointing upwards.

The anti-roll bar control unit is connected to the vehicle's drivetrain CAN databus.

It evaluates the following signals:

- system pressure
- switching state of the anti-roll bar
- anti-roll bar uncoupling button signal



S331_010

It receives the following signals:

- road speed
- lateral acceleration
- gearbox mode (high or low)

The control unit sends a signal to the actuators depending on the result of evaluation.



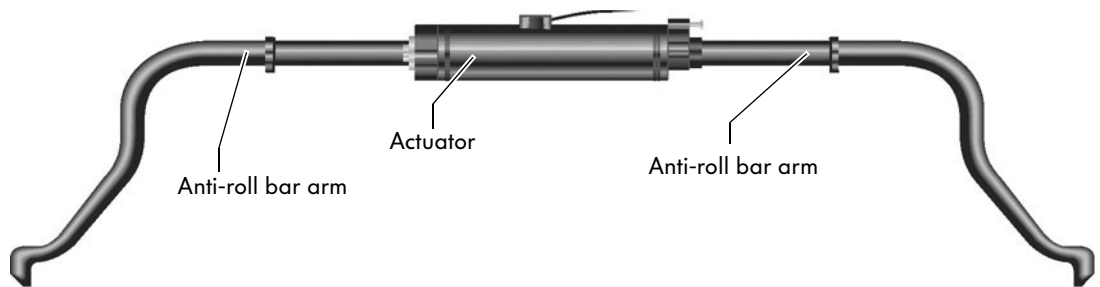
Design and function

Anti-roll bar

The key component of the variable anti-roll bar is the hydraulically operated actuator. It is positioned in the middle of the anti-roll bar.

The actuator contains a claw coupling which couples and uncouples the anti-roll bar arms.

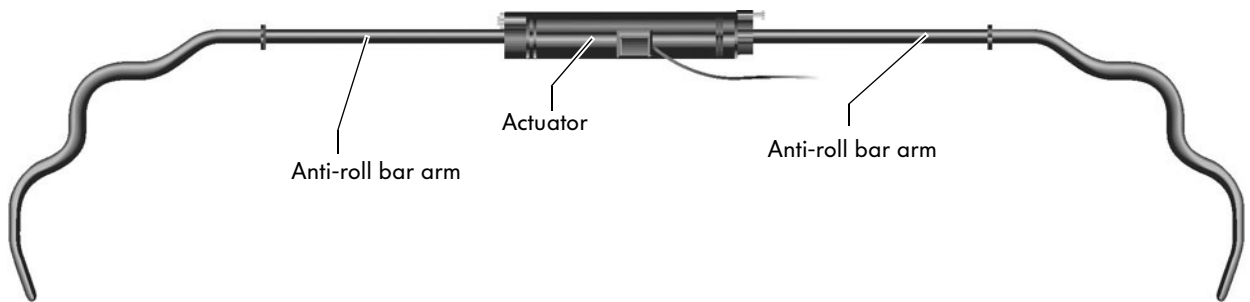
Front axle anti-roll bar



S331_084



Rear axle anti-roll bar

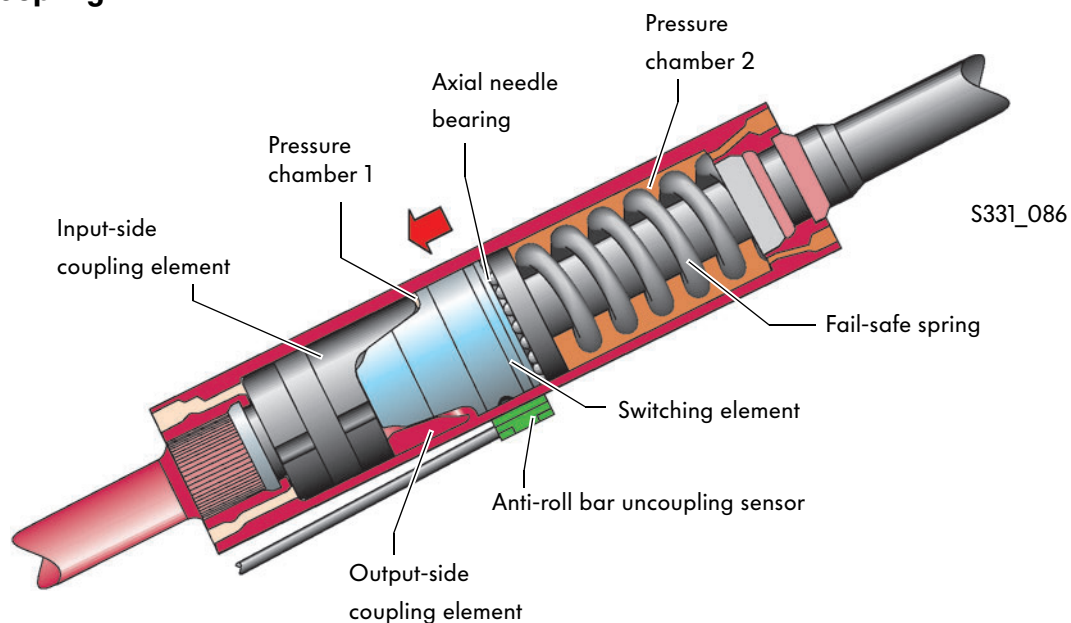


S331_082

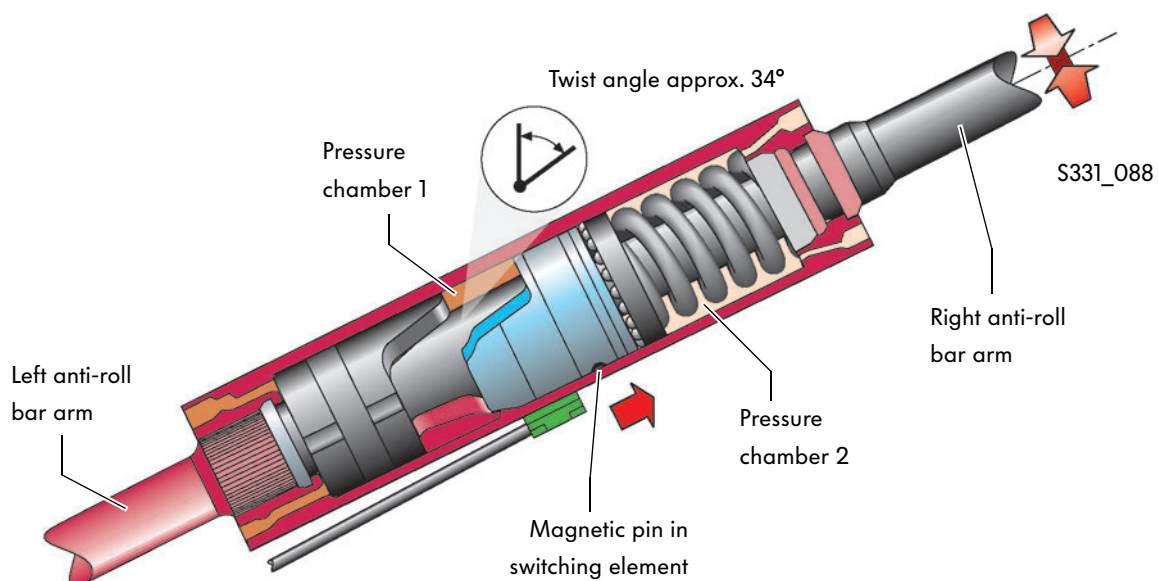
Claw coupling

The hydraulically operated claw coupling consists of input-side and output-side coupling elements, a switching element, a fail-safe spring and an anti-roll bar uncoupling sensor positioned on the housing.

Closed coupling

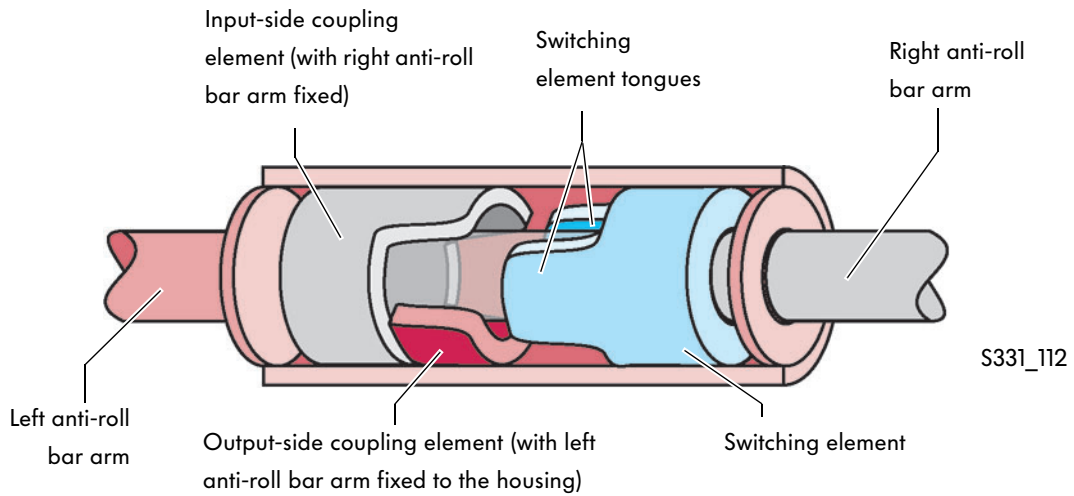


Open coupling



Design and function

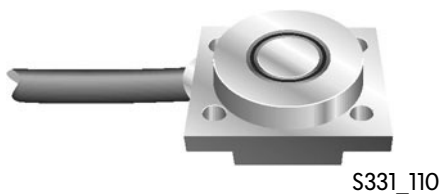
Switching element



The switching element is free to move along its axis. Its axial position is dependent on the pressure applied and in its closed position, the input-side and output-side coupling elements are fully interlocked.

The switching element does not retract completely and the two tongues overlap the coupling elements at all times. This allows a coupling operation in any driving situation. In the figure above, the two switching element tongues are depicted fully retracted from the coupling elements. This is purely to show the design of the switching element.

Anti-roll bar uncoupling sensors G484 and G485



The "anti-roll bar coupled" switching position is signalled when the anti-roll bar sensor contacts the magnetic pin. The anti-roll bar uncoupling sensor signal is required by the anti-roll bar control unit to monitor the system.

Fail-safe spring

The fail-safe spring is a coil spring which forces the anti-roll bar closed if there are faults in the hydraulic supply or electrical defects.

An axial needle bearing is fitted between the fail-safe spring and the switching element to minimise wear.

Anti-roll bar uncoupling button E484

The anti-roll bar uncoupling button is located centrally on the centre console. It sends the signal indicating the driver's command to couple or uncouple the anti-roll bars to the anti-roll bar control unit.

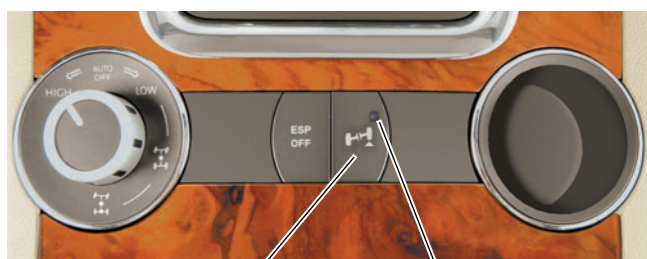
If the driver presses the button several times, the coupling or uncoupling operation is cancelled.

If the button is pressed for longer than 30 seconds, this is detected as a system fault. An entry is made in the control unit fault memory. The anti-roll bars remain coupled.

The anti-roll bar uncoupling button is fitted with an anti-roll bar uncoupling warning lamp.



Button on vehicle equipped with steel suspension



S331_033

Anti-roll bar
uncoupling button

Anti-roll bar uncoupling
warning lamp

Button on vehicle equipped with air suspension



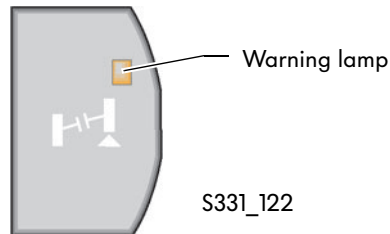
S331_013

Anti-roll bar
uncoupling button

Anti-roll bar uncoupling
warning lamp

Design and function

Anti-roll bar uncoupling warning lamp K221



The anti-roll bar uncoupling warning lamp K221 is located in the anti-roll bar uncoupling button E484.

If the anti-roll bars are uncoupled, the display appears continuously.

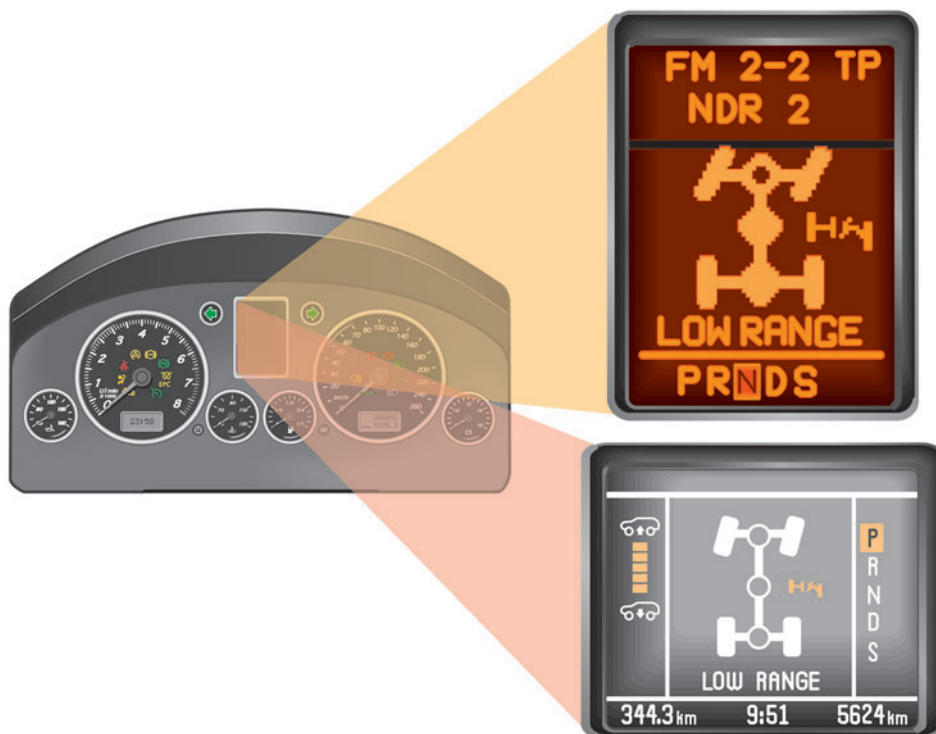
The warning lamp flashes during the coupling or uncoupling operation.

Displays in the dash panel insert

The current anti-roll bar switching state is displayed in the dash panel insert.

The symbols are different depending on the vehicle's equipment.

On the Highline dash panel insert, the symbols are displayed in pixel graphics; on the Premium equipment level, they appear on a TFT screen.



Highline
equipment
level

Premium
equipment
level

S331_163

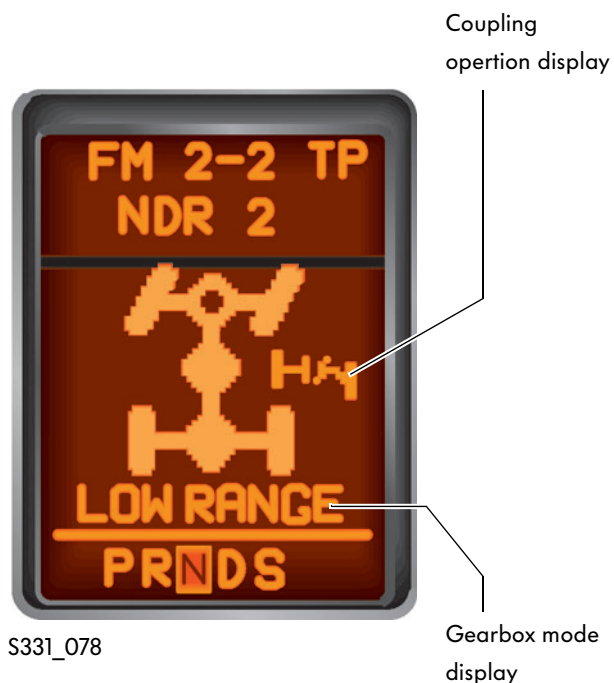
Uncoupling

The coupling operation display flashes for the entire duration of the operation. When the anti-roll bars are uncoupled, the coupling operation display is continuously lit.

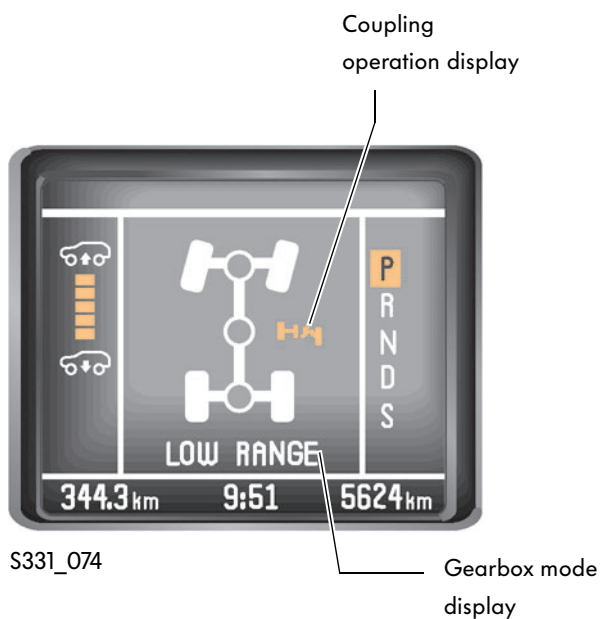
Coupling

The coupling operation display flashes for the entire duration of the operation. The display disappears only when the operation is completed and the anti-roll bars are coupled.

Highline display

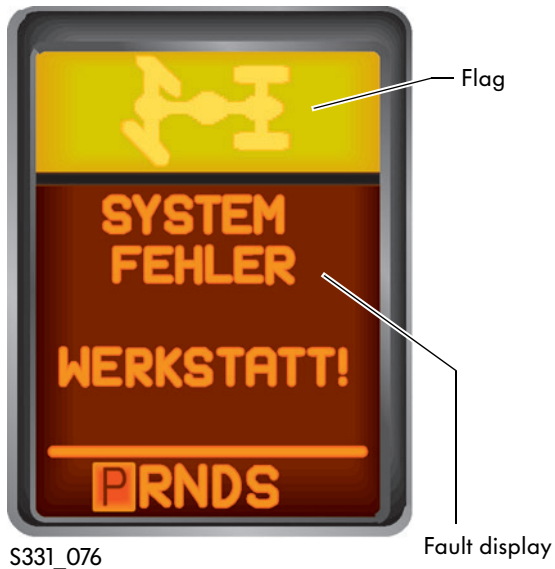


Premium display



Design and function

Highline display

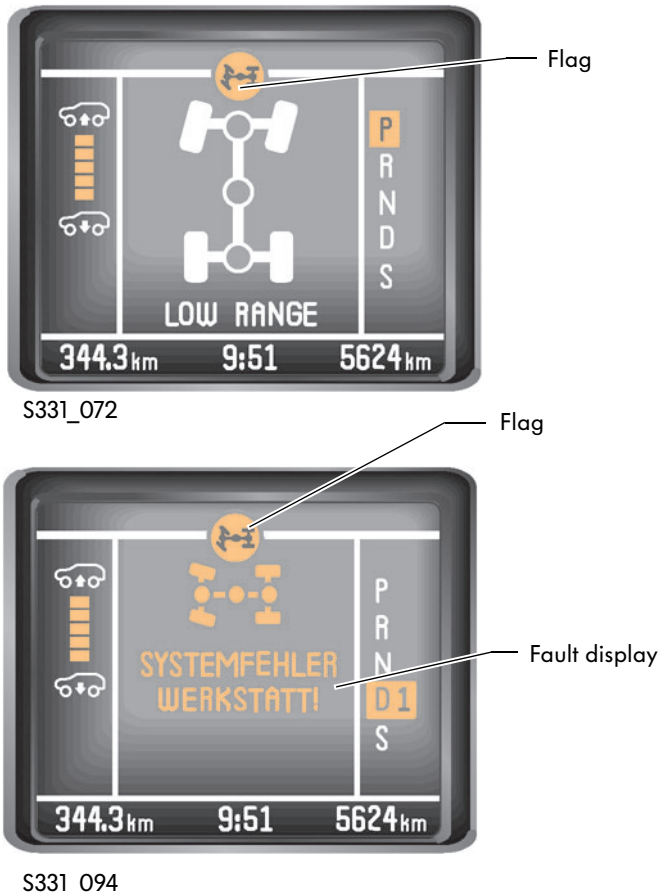


Fault display

If a fault occurs during the uncoupling or coupling operation, it is displayed by a flag. At the same time, the fault display "System fault workshop" appears.

It is no longer possible to uncouple the anti-roll bars. The vehicle can still be driven.

Premium display



System overview

Sensors

E484 Anti-roll bar uncoupling button

G484 Front axle anti-roll bar uncoupling sensor

G485 Rear axle anti-roll bar uncoupling sensor

G486 Hydraulic unit pressure sensor for anti-roll bar uncoupling

Actuators

K221 Anti-roll bar uncoupling warning lamp

N399 Front axle anti-roll bar uncoupling switch valve

N400 Rear axle anti-roll bar uncoupling switch valve

V326 Anti-roll bar uncoupling motor

J742 Anti-roll bar control unit

Drivetrain CAN data bus

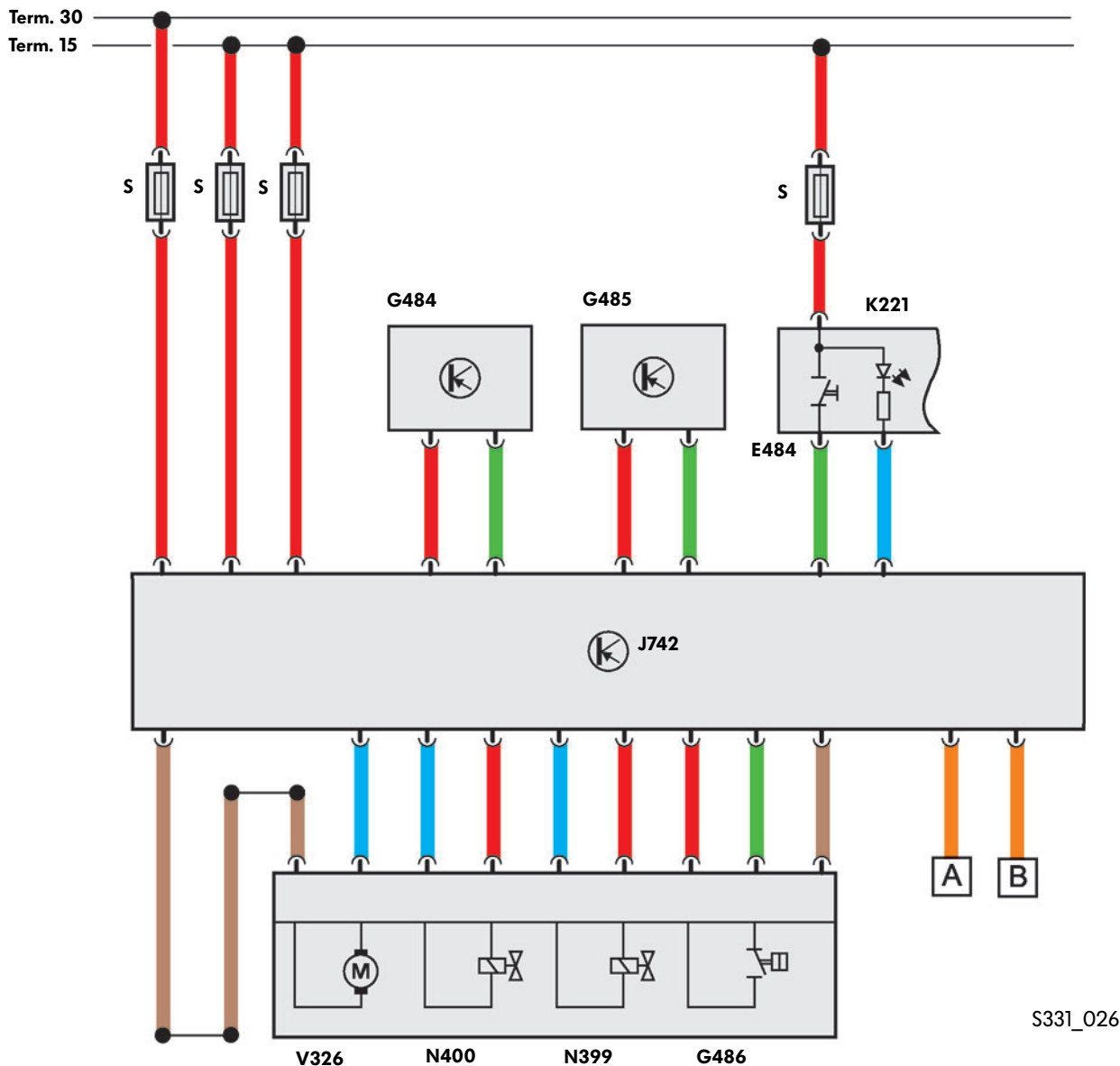
Gearbox mode, high or low
Road speed
Lateral acceleration

J285 Dash panel insert (gateway)

S331_100



Function diagram



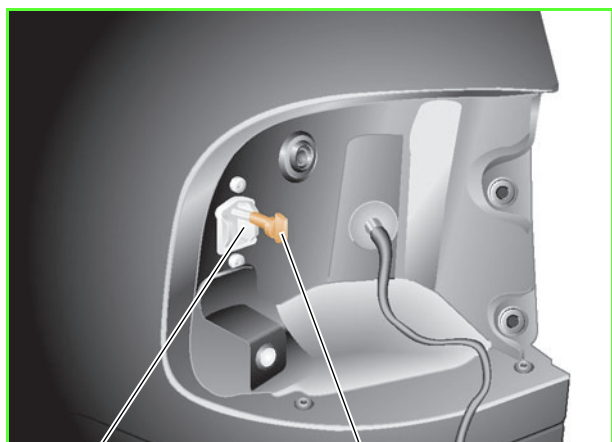
- A - Drivetrain CAN databus - Low
- B - Drivetrain CAN databus - High
- E484 Anti-roll bar uncoupling button
- G484 Front axle anti-roll bar uncoupling sensor
- G485 Rear axle anti-roll bar uncoupling sensor
- G486 Hydraulic unit pressure sensor for anti-roll bar uncoupling
- J742 Anti-roll bar control unit
- K221 Anti-roll bar uncoupling warning lamp

- N399 Front axle anti-roll bar uncoupling switch valve
- N400 Rear axle anti-roll bar uncoupling switch valve
- V326 Anti-roll bar uncoupling motor

Colour codes/key

- = Input signal
- = Output signal
- = Positive
- = Earth
- = Drivetrain CAN databus

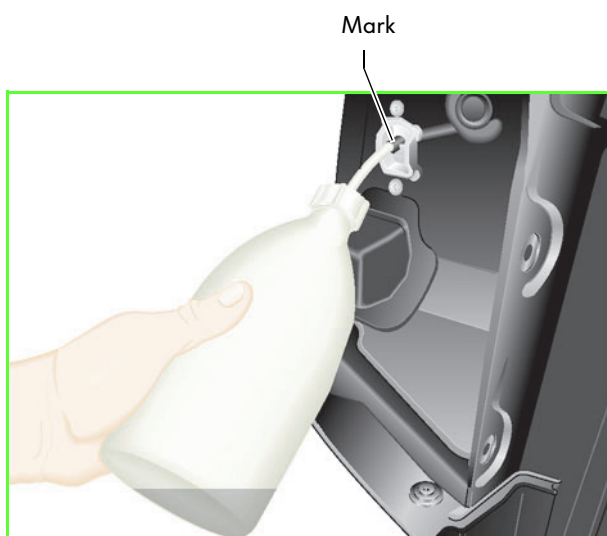
Checking the oil level



S331_136

The filler hole and plug for filling and checking the oil level is located behind the left-side tail-light.

Before the oil level can be checked, the left-side tail-lamp must be removed and the system must be depressurised, e.g. using the VAS 5051 Diagnosis Testing and Information System.



S331_138



S331_140

When checking the oil level or filling the system with oil, insert the plastic bottle hose into the filler hole up to the mark.



- The system may only be filled with central hydraulic system and power steering gear oil G002000.
- Please read the instructions in ELSA (Electronic Service Information System) for setting the mark, checking the oil level and filling the system with oil.



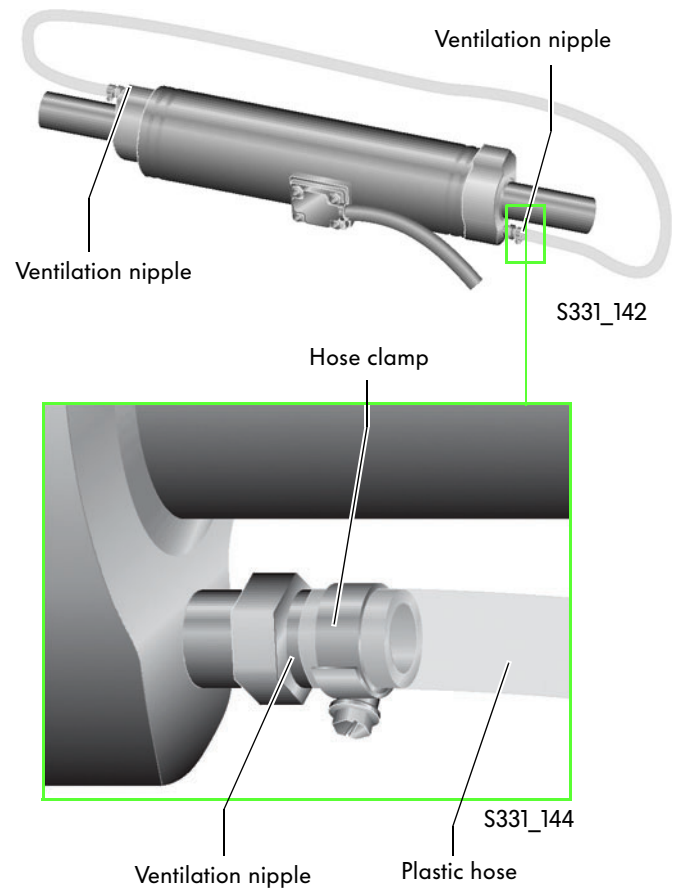
Venting the system

Before the system can be vented, it must be connected to the VAS 5051 Diagnosis Testing and Information System, for example, and depressurised.

Before venting, remove the dust caps and connect a transparent plastic hose to the ventilation nipple. As high pressures occur during the ventilation operation, the hose must be secured by a hose clamp.

Loosen the two ventilation nipples. The system can then be vented according to the instructions for using the VAS 5051 Diagnosis Testing and Information System.

After ventilation is completed, tighten the nipples and remove the plastic hose.



- Please read the instructions in the ELSA (Electronic Service Information System) carefully for venting the system and for the size of the plastic hose required.
- Please remember to check the oil level before and after the venting operations.
- When working on the running gear, e.g. removing a suspension strut or tightening bolts on rubber metal bearings, couple the anti-roll bars to prevent them from uncoupling due to inadvertent switching and injuring service personnel, and to avoid damaging the running gear.



Test your knowledge

1. How are anti-roll bars uncoupled on the Touareg?

- ☐ a) mechanically
- ☐ b) hydraulically

2. When can the driver carry out an uncoupling command?

- ☐ a) When the vehicle road speed is below 40 km/h and pressure in the pressure accumulator is below 70 bar to prevent destroying the gas bubble in the pressure accumulator.
- ☐ b) When the speed is above 50 km/h, lateral acceleration is greater than 0.7 g and the pump motor is running.
- ☐ c) When the vehicle road speed is below 40 km/h, lateral acceleration is less than 0.5 g and the control unit is not in fault mode.

3. The claw coupling consists of two coupling elements, a switching element, a fail-safe spring and an anti-roll bar uncoupling sensor. Why does the switching element not retract completely beyond the overlap of the tongues when the anti-roll bar is uncoupled?

- ☐ a) To allow coupling in every driving situation.
- ☐ b) To avoid exceeding the defined maximum torsional twist of 60 mm.
- ☐ c) So that the anti-roll uncoupling sensor can monitor the system in every situation.



1.) b; 2.) c; 3.) a

Answers



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000.2811.47.20 Technical status 09/04

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