Self Study Programme 612
For internal use only

Audi A3 ’13
Suspension

Audi
Service Training

Suspension system - overall concept

A major development goal for the suspension system of the Audi A3 was to achieve a high level of agility, sporty handling and high driving comfort without making any compromises on driving dynamics.
The interaction between all specially co-ordinated suspension components contributes to active safety. Even in its basic configuration, the A3 ’13 affords brand-typical driving and vibration comfort with a strong emphasis on sporty attributes. It thus offers a high level of driving enjoyment.
This has been achieved by employing the proven concept of the McPherson front suspension in combination with a newly developed torsion beam and four-link rear suspension. The torsion beam rear suspension is 15 kg lighter than an equivalent multilink rear suspension, in addition to having aerodynamic advantages. Use of the torsion beam suspension or the four-link suspension depends on engine version (power output).
The Audi A3 will also be available at a later date with all-wheel drive in combination with four-link rear suspension. An electronic damping control system based on the established Audi magnetic ride system will also be available as an option.

A weight-reduced electro-mechanical power steering system with speed-dependent steering assistance (Servotronic) is standard equipment in the Audi A3 ’13, as previously in the predecessor model. A variable steering ratio is achieved through the special geometry of the rack and pinion system. The range of newly developed steering wheels extends from the conventional four spoke steering wheel to the three-spoke multifunction sport steering wheel with leather trim and shift paddles. At 15 and 16 inches respectively, the wheel brakes (engine dependent) are larger than in the predecessor model and provide ample braking power relative to engine output.
The newly developed Continental MK100 ESP system was used for the first time on an Audi model.
adaptive cruise control (ACC) is available for the Audi A3 for the first time in this class of vehicle. The control characteristics of ACC, Servotronic and the electronic damper control system can be adapted to driver input using Audi drive select.

612_001

Contents

▸ The Self Study Programme teaches a basic knowledge of the design and functions of new models, new automotive components or new technologies.
It is not a Repair Manual! Figures are given for explanatory purposes only and refer to the data valid at the time of preparation of the SSP.
For further information about maintenance and repair work, always refer to the current technical literature.

Note

Reference

Suspension

Overview

The following suspension system versions will be offered for the Audi A3 ’13:

Dynamic suspension
The dynamic suspension system is standard in the Audi A3

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Sports suspension
The sports suspension is optional. In models with sports suspension, ride height is 15 mm lower than in models with the standard suspension. The sports suspension will be available at launch of the Audi A3.

612_002b

Heavy-duty suspension
The heavy-duty suspension is optionally available for specific markets with bad roads. The ride height is 15 mm higher than in the standard suspension system. The heavy-duty suspension system will become available at a later date.

612_002c

Suspension system with electronic damping control
This suspension system is also specially available as an option for models with engine outputs of 103 kW and higher. It is based on the Audi magnetic ride system currently used in other Audi models. This suspension system will also become available at a later date.

612_002d

Components of the Audi A3 ’13 suspension systems are also used by other Group brands. The production control numbers denoting the suspension type therefore deviate from those of suspension systems used exclusively by Audi. The production control numbers are explained in the Workshop Manual under Repair Group 44 "Wheels, tyres and suspension alignment".

Front suspension

A newly developed McPherson front suspension with wishbones and independent struts is used. The front suspension kinematics give the vehicle sporty and dynamic qualities (agile handling, excellent vibration and roll comfort, low roll angle and good dynamic stability).

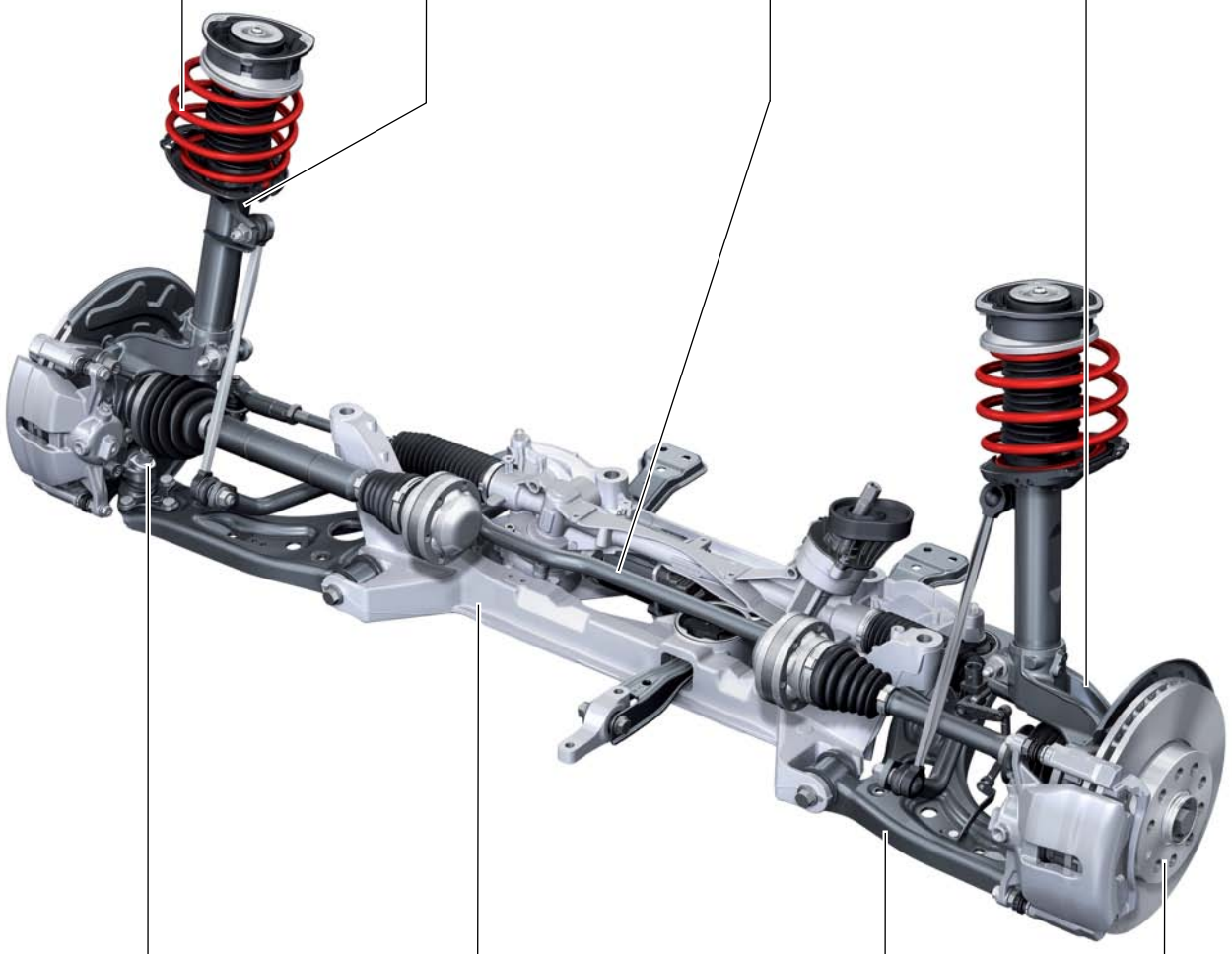
Steering forces are transmitted directly to the swivel bearings to provide immediate steering response.

Spring
– Steel spring with linear characteristic

Shock absorber
– Twin-tube shock absorber with additional polyurethane spring

Anti-roll bar
– Tubular anti-roll bars

Swivel bearing
– Two versions are available depending on engine output
– 15“ steel swivel bearing
– 16/17“ aluminium swivel bearing



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Joint
– Ball joint for connecting the wishbone and swivel bearing

Engine/gearbox mount
– Aluminium casting

Wishbone
– One-piece sheet steel design

Wheel bearing / wheel hub
– Third generation wheel bearing with integrated wheel hub

Rear suspension

Torsion beam suspension

A newly developed torsion beam suspension system is used for front wheel drive models with engine outputs of less than 85 kW. Two versions of the suspension system will be used for models with dynamic suspension and sports suspension. Torsion is produced by a downward-facing U profile. Due to the axle design, there is no need for an anti-roll bar.

The axle location bearings are highly rigid in the vehicle's transverse direction in order to ensure a rapid build-up of lateral traction. As the shock absorbers are in approximately the same positions as in the multilink suspension, only minor bodyshell modifications are required to accommodate vehicles with torsion beam and multilink suspension systems.

Shock absorber
– Twin-tube shock absorber with additional polyurethane spring

Steel springs
– Steel spring with linear characteristic

Wheel bearings
– Third generation wheel bearing with integrated wheel hub
– Bolted to the axle

Bearing pedestal
– Sheet-steel part
– Supports the rear axle at the bearing and is bolted to the vehicle body

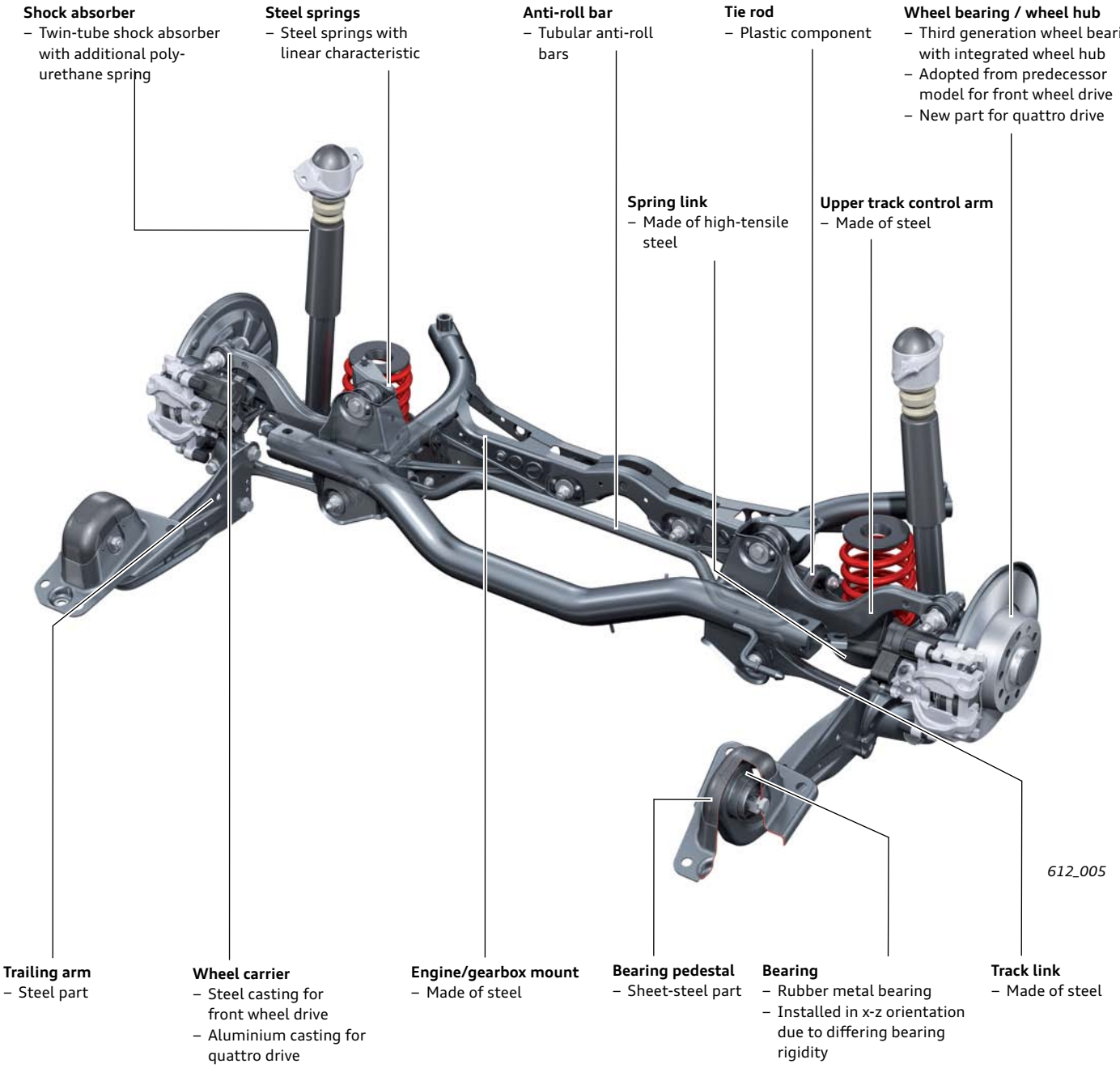
Torsion beam suspension
– Made of welded steel

Bearing
– Rubber-metal bearing
– Installed in x-z orientation due to differing bearing rigidity

Four-link suspension

A four-link suspension for quattro and front wheel drive is used on vehicles with engine outputs of 85 kW and upwards. The basis for the new development is the proven rear suspension from the predecessor model. The shock absorbers are now coupled to the spring link instead of to the wheel carrier. The anti-roll bars are also connected to the spring link.

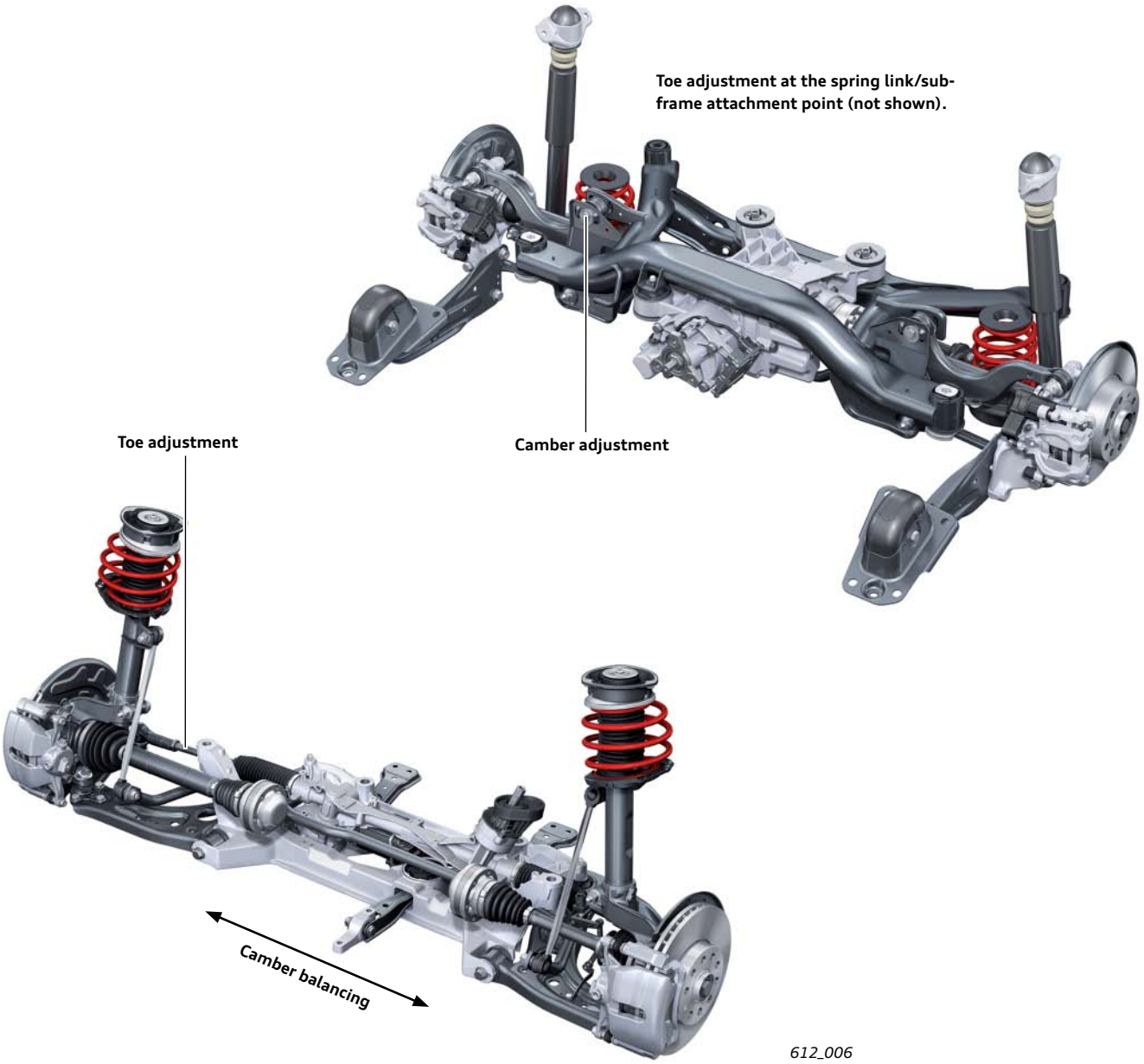
Spring travel has been increased in order to enhance comfort. Fuel tank filling has been optimised by repositioning the upper damper bearings. The weight of the axle has been significantly reduced by approx. 4.5 kg by paying close attention to lightweight design.



Suspension alignment and set-up

The left and right toe-in values on the front axle can be adjusted separately by changing the length of the track rods. The camber can be balanced (centred) within narrow limits by moving the subframe transversely.

Individual toe values and individual camber values can be adjusted on the four-link rear suspension. For design reasons, there are no adjustments on the torsion beam rear suspension.



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Brake system

Overview

The brake system of the Audi A3 ’13 is a logical progression from the brake system of its predecessor. At the start of production, 15 and 16 inch systems will be used on the front axle and a 15 inch system on the rear axle. The brake systems perform better than those of the predecessor model at comparable engine power output. Pistons with larger diameters are used on all models, creating sportier pedal feel. The electro-mechanical parking brake (EPB) is used for the first time in this class of vehicle. The brake servo and pedal assembly are new developments. The Audi A3 ’13 is the first Audi to be equipped with Continental's ESP MK100 brake system.

Front wheel brakes

Engine type	R4 1.2 TFSI 77 kW R4 1.4 TFSI 90 kW R4 1.6 TDI 77 kW R4 2.0 TDI 110 kW	R4 1.8 TFSI 132 kW R4 2.0 TDI 135 kW	R4 2.0 TFSI 206 kW
Minimum wheel size	15“	16“	17“
Brake type	PC57-25/14 15“ TRW	PC57-25/14 16“ TRW	C60-30/13 17“ TRW
Number of pistons	1	1	1
Piston diameter	57 mm	57 mm	60 mm
Brake disc diameter	288 mm	312 mm	340 mm

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Rear wheel brakes

Engine type	**R4 1.2 TFSI 77 kW** **R4 1.4 TFSI 90 kW** **R4 1.8 TFSI 132 kW** **R4 1.6 TDI 77 kW** **R4 2.0 TDI 110 kW** **R4 2.0 TDI 135 kW**	**R4 2.0 TFSI 206 kW**
Minimum wheel size	15“	17“
Brake type	FNc-M38-1510 TMD Continental	FNc-M42-1722 TMD Continental
Number of pistons	1	1
Piston diameter	38 mm	42 mm
Brake disc diameter	272 mm	310 mm

612_028

Brake servo, master brake cylinder, pedal assembly

10'' or 11'' single brake servos are used on left-hand drive models of the Audi A3. Their size is dependent on intake manifold pressure, and hence on engine type. For space reasons, a 7''/8'' tandem brake servo is used on right-hand drive models. Models with the top of the range 2.0 TFSI 206 kW engine, to be introduced at a later date, will receive an 8''/8'' brake servo. The brake servo is a new development. The brake servo is lighter than its predecessor. This weight reduction was achieved by using high tensile steel for the outer shells and revised contours.
Brake pressure build-up is based on a single rate characteristic.

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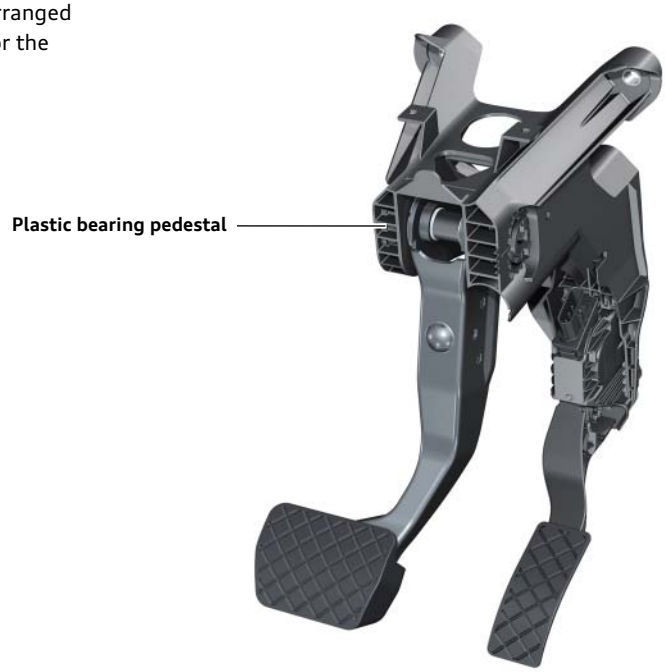
The pedal assembly is a new development. The pedals are arranged in suspension. A common plastic bearing pedestal is used for the accelerator and brake pedals in order to reduce weight.



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Electro-mechanical parking brake (EPB)

For the first time in this class of vehicle, the electro-mechanical parking brake (EPB) well known from other models is used in the Audi A3 '13. The system is supplied by Continental. This made it possible to integrate the control software into the ABS control unit J104, which likewise is sourced from Continental.

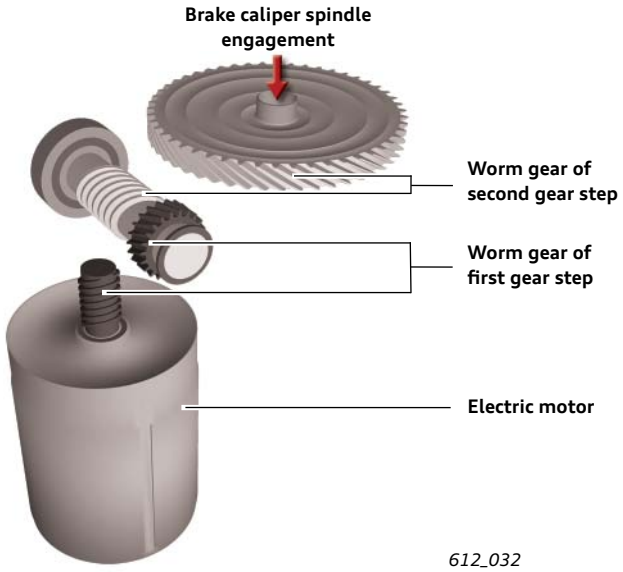
612_031

Design and function

Parking brake motors V282 and V283 are new developments with a modified design compared to the TRW components used previously in Audi models. Gear reduction is provided by a two-step worm drive. The required self-locking effect is produced in the second gear step. The brake caliper spindle is inserted into the spur gear of the second gear step when assembling the parking brake motor. The spindle and spur gear are connected by internal and external torx profiles. The spindle is a component part of the ball screw and is mounted in the brake caliper. It applies pressure to the inner face of the brake piston via the spindle nut.

The spur gear driven by the electric motor transmits the rotational movement to the spindle. The thrust element moves lengthways when the spindle rotates. Depending on the direction of rotation, the thrust element moves towards the base of the brake piston or in the opposite direction. As a result, the brake piston is pressed against the brake pad (braking position) or moved away by the brake pad (release position).

The brake and release operations are controlled in the same way as in the EPB systems used in other Audi models. Deactivation of the maximum clamping force of approx. 17.5 kN is controlled by applying up to approx. 12A of electrical current. A temperature model in the control unit calculates the cooling of the brake discs and pads when the vehicle is parked and, if necessary, tightens the parking brake up to three times by briefly activating the electric motors.



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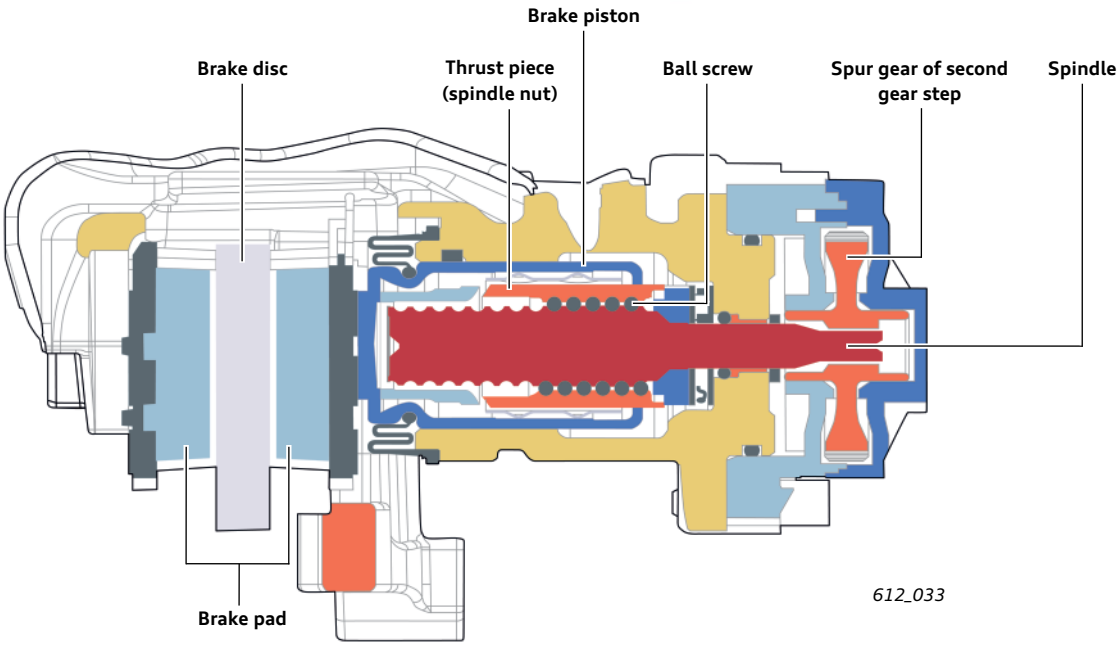
Brake piston in release position



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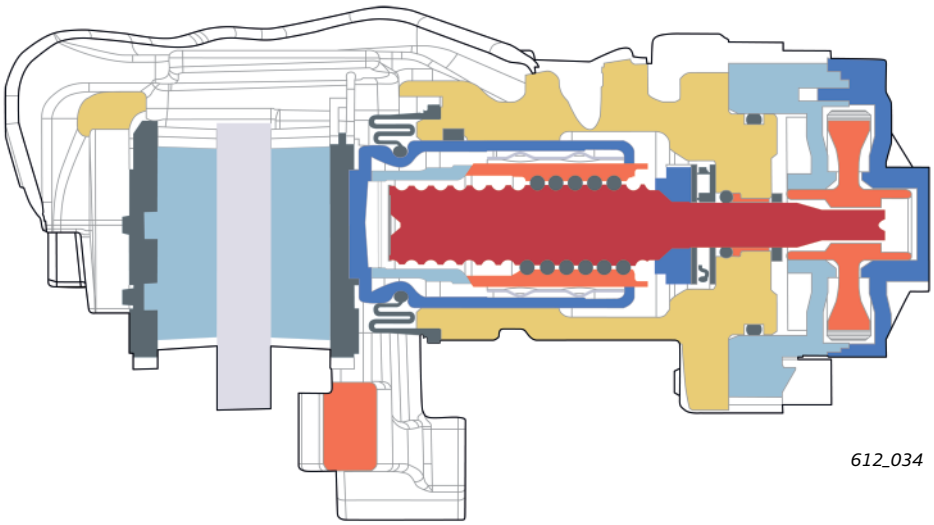
Brake piston in braking position



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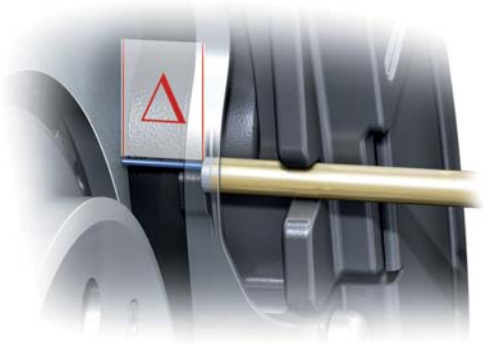
Service operations

In the Audi A3 ’13, the thickness of the outer brake pads on all wheels can also be checked using test pin T40139A.

The right wheel brakes of the front axle in the Audi A3 ’13 are fitted with a brake pad wear indicator. The contact is attached to inner brake pad on each of the brakes.



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Since the control software for the electro-mechanical parking brake is integrated in the ESP control unit in the Audi A3 ’13, the service functions of the EPB can also be accessed under diagnostic address 03. The address otherwise used for the EPB (053) is unassigned.

To replace the pads on the rear brakes, the corresponding function on the vehicle diagnostic tester must be activated. The parking brake is then opened as far as possible so that the brake pads can be replaced. After replacing the brake pads, the parking brake is closed and the required clearance between the brake pad and brake disc is set automatically.

When fitting the new brake pads, care must be taken to ensure that the locking pins on the back plates engage the brake piston pockets.

612_031

Note
Due to the modified design of the EPB parking brake motors, the self-locking effect is no longer provided by the spindle in the brake caliper, rather by the second gear step in the parking brake motor. As a consequence, the parking brake is released as soon as the parking brake motor is detached from the brake caliper. To prevent the vehicle from rolling away, it is important that it be secured before disassembling the parking brake motors.
The parking brake motors should only be removed on a level surface or hydraulic lift.

ESP overview

The Continental ESP MK 100 system is used in the Audi A3. This ESP system is a more advanced version of the ESP MK 60 system used in the predecessor model, both in terms of its hardware and software. The ESP unit is mounted on the right side member in the engine bay.
Two versions of the ESP system are used.

System components

Control unit J104

The yaw rate sender G202, the transverse acceleration sender G200 and the longitudinal acceleration sender G251 have been integrated in the ABS control unit J104. This eliminates the need for the ESP sensor unit G419 used in the predecessor model.

For the first time at Audi, the control software for the electro-mechanical parking brake has been integrated in the control unit.

Control unit performance has been improved compared to the MK 60. This has been achieved by using new electronic components and more advanced software.
The ESP communicates via the suspension CAN bus.

Hydraulic unit

Depending on whether the vehicle is equipped with ACC or not, two versions of the ESP system are used. A hydraulic unit with special noise reduction features and a reinforced pump are used on vehicles with ACC.

612_037

Continental ESP MK 100

Speed sensor G44-G47

Two active speed sensors are also used in the Audi A3 ’13. They are identical to the sensors used in the Audi Q3
, both in terms of their design and function. There are two rear axle sensor configurations. Active sensors with additional functions are used in models equipped with park assist and/or ACC. These sensors additionally record the direction of rotation of the wheels and the clearance between the sender wheel and sensor.

612_038

System functions

The Audi A3 ’13 has the same ESP system functions as its predecessor model.

A new feature is active brake pressure build-up for the optional ACC function and for Audi pre sense brake operations.
If the system registers a situation of impending vehicle instability by evaluating the relevant sensor signals, the brake system is "prefilled". A moderate build-up of brake pressure is initiated by activating the ESP pump. The aim is to eliminate the brake clearance in order to reduce the system reaction time during a subsequent braking manoeuvre.
The brakes are also prefilled if an emergency braking operation is initiated by the driver. During an emergency braking manoeuvre, drivers usually take their foot off the accelerator pedal very quickly and apply full braking. The movement of the accelerator pedal is evaluated in order to detect an emergency braking manoeuvre.

The Hill Start Assist function is optional with the Audi A3 ’13 for the first time in this model series.

A new function is the multicollision brake
The function reduces the danger of skidding and the danger of further collisions during an accident by automatically initiating a vehicle braking operation. The function is active during head-on, side and rear collisions if a predetermined deployment threshold is exceeded. The airbag control unit then "instructs" the ESP to brake the vehicle by means of a bus message. The ESP system then builds up brake pressure at all four wheel brakes.
A condition for activation of the function is that the vehicle is travelling at a speed of greater than 10 kph during the collision. Another condition is that the ESP system, the hydraulic brake system and the onboard power supply remain intact during the collision.

Automatic braking is deactivated during the following driver actions:

- The driver depresses the accelerator pedal.
- The driver brakes by applying a brake pressure higher than the brake pressure applied by the system.

If an ESP system fault has occurred, the multicollision brake will not be available.

Reference
The actions implemented by ESP for Audi pre sense are described in Self Study Programme SSP 609.

Operation and driver information

Sport mode is activated by briefly pressing the ESDP button (< 3s). The TCS function is simultaneously deactivated. Stabilising ESP inputs are not made until much higher wheel slip values, thus allowing a more sporty style of driving.

If the ESP button is pressed for longer than three seconds, TCS and ESP are deactivated.

612_014

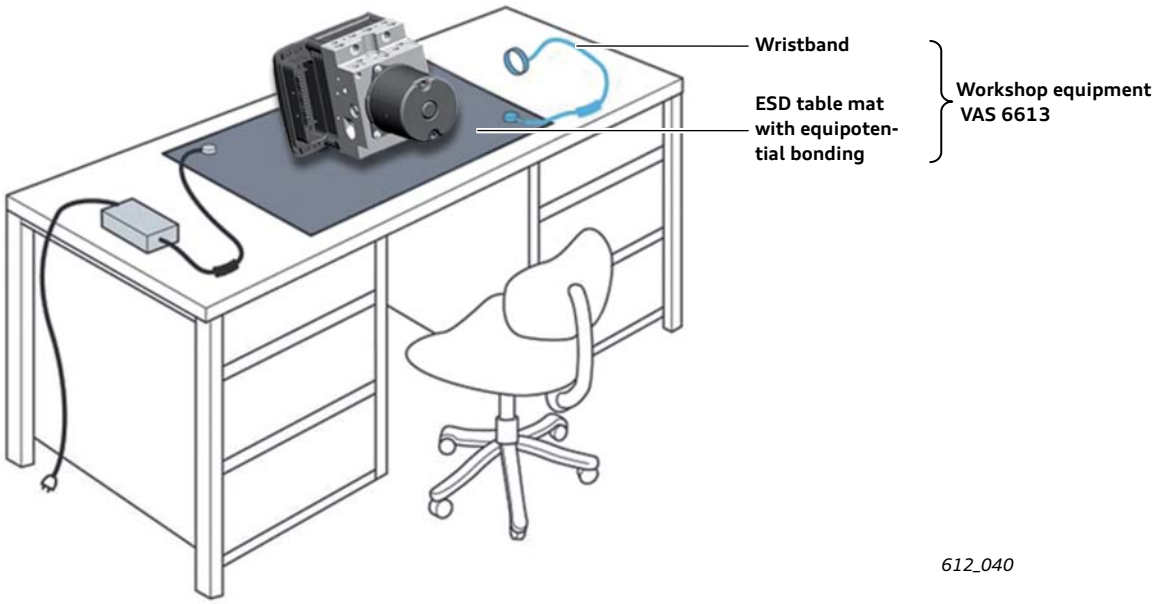
Service operations

The control unit and hydraulic unit can be separated in service workshops. The same condition applies here as to the predecessor model: control units can be replaced individually but the entire ESP unit must be replaced if hydaulic units are faulty.

After replacing a control unit, it must be encoded online. The steering angle sensor G85 must be calibrated and initialised (functional content of control unit J500).

Several basic settings must then be configured. At the same time, the brake pressure, longitudinal acceleration, transverse acceleration and yaw rate senders are calibrated. Since the control software for the electro-mechanical parking brake in the Audi A3 ’13 is a component part of the ABS control unit J104, a function check is performed on the EPB by twice opening and closing the parking brake. The ESP intake and isolating valves are subsequently calibrated, as previously in the predecessor model equipped with MK 60 EC.

Both the optional tyre pressure indicator and the optional trailer stabilisation system are enabled by subsequent adaptation. The concluding actuator diagnostics ensure that the hydraulic lines are correctly connected to the hydraulic unit and the ESP system is tested for proper function.



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Note
To avoid possibly damaging electronic components by electrostatic discharge, the control unit and hydraulic unit must always be removed/assembled using workshop equipment VAS 6613.

Steering system

Overview

The steering system concept has been adopted from the predecessor model for the Audi A3 ’13. This includes the electro-mechanical steering system, a mechanically adjustable steering column and an extensive range of steering wheel options.

A progressive steering system will be offered as an option in combination with the sports suspension at a later date.

A four-spoke steering wheel is standard equipment
Four-spoke steering wheels and a three-spoke sports wheel in various versions are optional.
(refer to page 21 for equipment availability structure)

Mechanically adjustable safety steering column with stepless adjustment
60 mm longitudinally
50 mm vertically

Electro-mechanical steering with Servotronic function is standard equipment

612_017

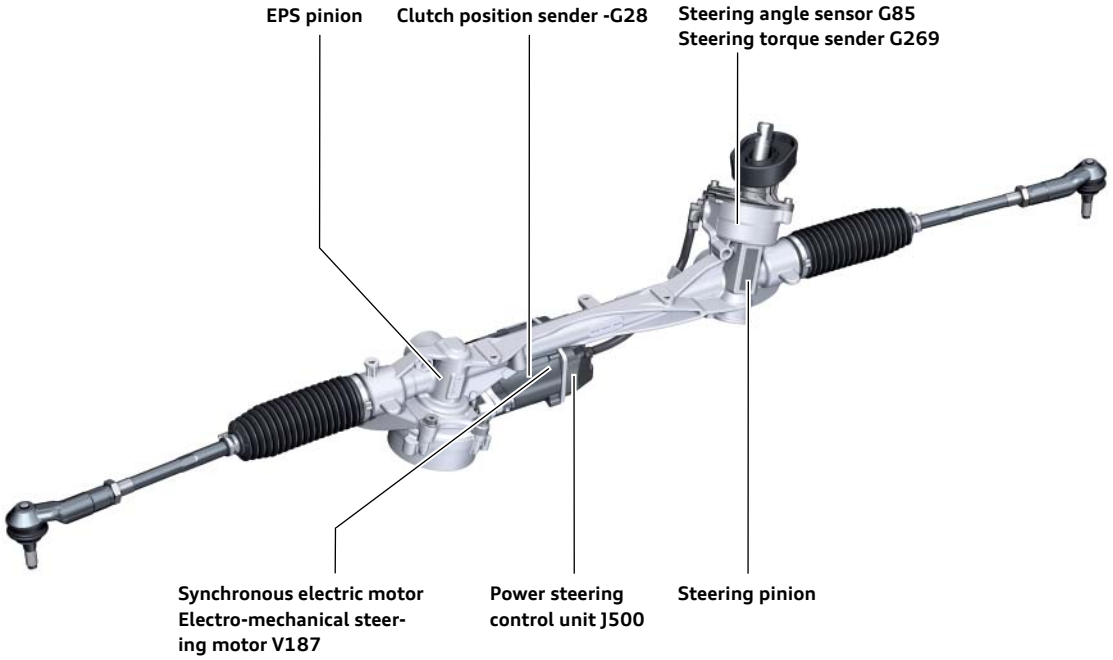
Electro-mechanical steering

Design and function

The functional principle of the steering system has been adopted unchanged from the predecessor model. Torque assistance is provided by a second steering pinion which is driven by an electric motor. A torque sensor determines the steering torque applied by the driver. The electronic control unit determines the required torque assistance in dependence on steering torque, vehicle speed, steering angle, steering speed and other input variables. A major modification compared to the predecessor model is the use of a synchronous motor in place of an asynchronous motor. By making this modification and by redesigning the geometry of the steering housing, the overall weight of the steering unit has been reduced by approximately 2.5 kg.

The position of the electric motor's rotor is registered by a rotor speed sender built into the motor. This sender has the same functional principle as the sender used in the predecessor model. A temperature sensor integrated in the control unit measures the output stage temperature. If a predetermined limit is exceeded, power steering assistance is incrementally reduced. If a system fault is detected, power steering assistance is deactivated. System faults are indicated to the driver visually by a yellow or red indicator lamp and audibly by gong signals.

Reference
For detailed information on the design and function of the electro-mechanical steering system, refer to Self Study Programme 313.



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The following functions can be implemented through the option for driver-independent steering control:

- Park assist (optional, refer to SSP 600 for detailed information)
- DSR (driver steering recommendation): provides a steering impulse during braking operations on road surfaces with different coefficients of friction on the left and right hand sides of the vehicle in order to prompt the driver to make a direction-corrective steering input (refer to SSP 480 for detailed information)
- Speed-dependent power steering (Servotronic) is standard equipment
- Damping of road generated/external interference (e.g. straight-line correction in sidewinds)
- Avoidance of "hard" end stops by applying steering counter-torque at a steering wheel angle of 5° or less before end stops

Progressive steering

Progressive steering is provided by a variable steering ratio. A special rack gearing geometry is used to ensure that the steering ratio is variable as a function of steering angle.
A progressive steering system will be offered as an option in combination with the sports suspension at a later date.

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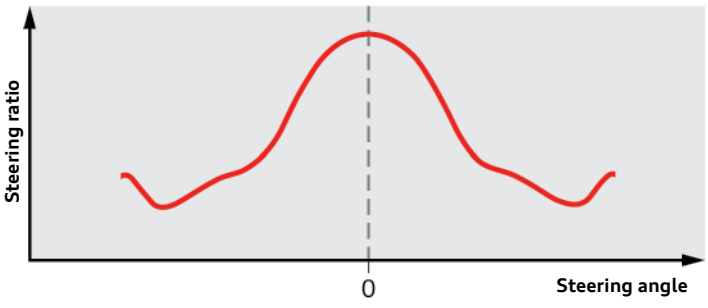

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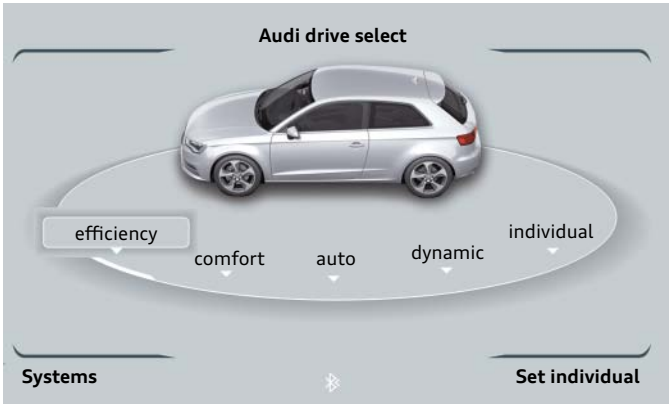
The steering ratio is at its highest when driving in a straight line and during minor steering inputs about the centre position. The immediate vehicle response to steering inputs conveys a sporty and direct steering feel to the driver.
At medium steering angles (e.g. when driving on winding country roads), the ratio is still large enough to create a dynamic steering feel and reduce the need for drivers to displace their hands on the steering wheel.
At large steering angles (e.g. in inner-city areas or when parking), the steering ratio is reduced to such an extent as to minimise steering effort for the driver.

Operation and displays

The drive can set the steering characteristic to between comfortable and sporty by selecting a drive setting in Audi drive select. Various characteristic maps, which can be activated depending on setting, are stored in the power steering control unit J500 for this purpose.



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612_011

The driver is provided with status information by a two-tone warning lamp. The driver information is supplemented by additional text on the centre display.

Service/diagnostic operations

The electro-mechanical steering system components described here have self-diagnostic capability.

1. Special system status indication

Yellow warning lamp active:
The yellow warning lamp is activated in the following cases:

- The end stops have not been programmed or the steering angle sensor G85 is not calibrated. In this case, the fault is registered in the event memory and power steering assistance is reduced to approximately 60 %. Calibrating the steering angle sensor deactivates the warning lamp again and automatically clears the event memory entry.
- A system malfunction has occurred: in these cases, an additional text message appears on the centre display and the fault is registered in the event memory. The vehicle can be driven to the nearest repair centre, but with reduced steering assistance.

612_023

Red warning lamp active:
The red warning lamp is activated in the following cases:

- A system test is run internally directly after switching on terminal 15, during which the warning lamp is briefly activated for test purposes. If the system is fault-free, the warning lamp goes out again after a few seconds. In vehicles with the optional advanced key, the yellow warning lamp for testing the electrical steering lock system is briefly activated before the red warning lamp.
- If the warning lamp is continuously lit, this means that a system fault has been detected. In these cases, an additional text message appears on the centre display and the fault is registered in the event memory. It is no longer possible to continue driving, as power steering assistance is no longer available.

612_024

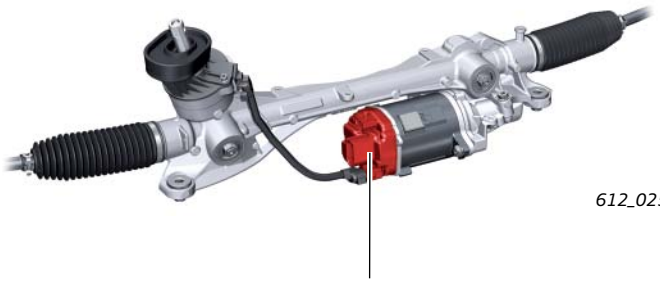
2. Removing, installing and replacing system components and follow-up work

There is no provision for the replacement of individual components. In the event of a fault, the complete steering unit must always be replaced.

After installation, a new control unit must be encoded online.

The steering angle sensor is calibrated before the control unit is encoded. The steering end stops are also stored during this calibration procedure.

The power steering map required for the vehicle is activated after the calibration is made. The characteristic maps are selected in dependence on front axle load and vehicle weight.



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Power steering control unit J500

Steering wheel range

Attraction	Ambiente	Ambition	S-Line
 4 spokes PUR	 4 spokes Leather	 3 spokes Leather	 3 spokes Leather
	 4 spokes Leather MuFu*	 3 spokes Leather MuFu*	 3 spokes Leather MuFu* Flattened
	 4 spokes Leather MuFu* Shift paddles	 3 spokes Leather MuFu* Shift paddles	 3 spokes Leather MuFu* Flattened shift paddles
		 3 spokes Leather MuFu* Flattened	
		 3 spokes Leather MuFu* Flattened shift paddles	

* multifunction steering wheels

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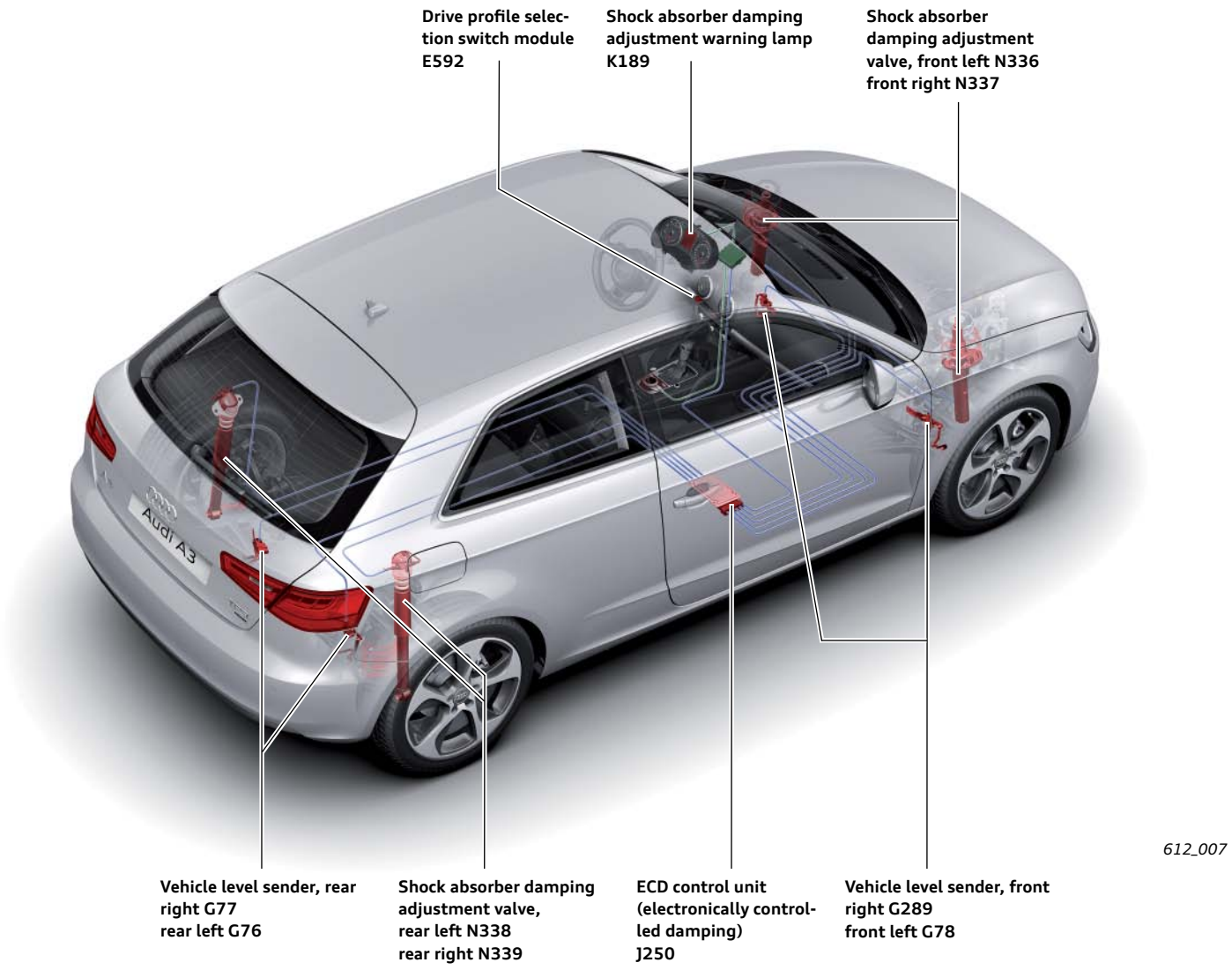
Audi magnetic ride

Overview

The Audi magnetic ride electronic damping control system is available as an additional suspension option for Audi A3´13. The system is a new development.

The system is operated using Audi drive select. Three different suspension set-ups ranging from sporty to comfortable can be selected.



Design and function

The system has the same functional principle as the systems currently being used in the Audi A3, TT and R8 models. Refer to Self Study Programme 381 for detailed information.

The system components and the key new design and functional features are described below.

Shock absorber damping adjustment valve N336-339

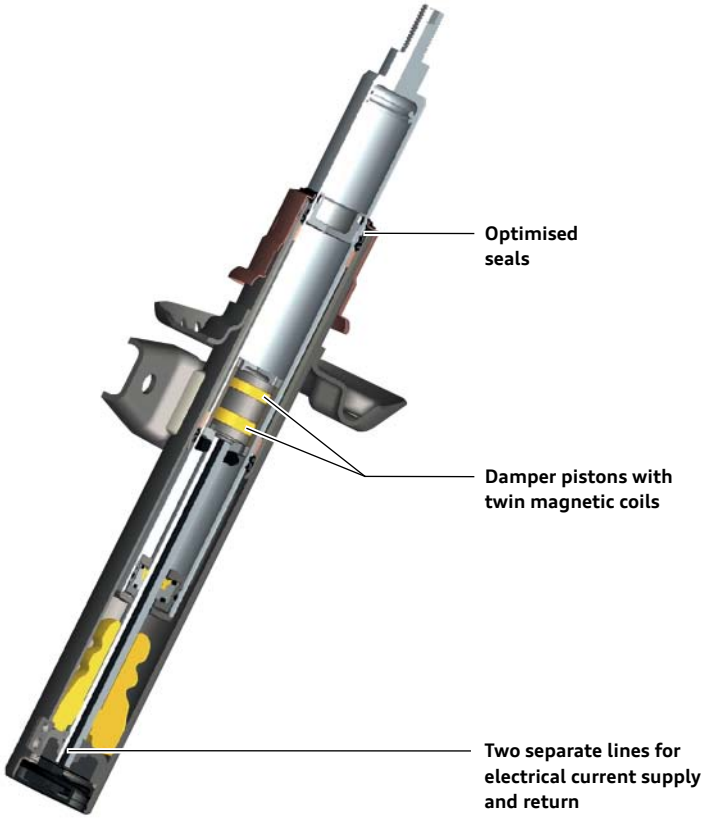
As with the systems used on current Audi models, single-tube shock absorbers are also used in the Audi A3 ’13. The shock absorbers essentially differ from those of the predecessor model in respect of the new features listed below.

The damper pistons have two separate magnetic coils. These allow the same magnetic flow to be achieved using smaller iron cross-sections, thereby reducing eddy current losses. This improves the magnetic properties of the coils and thus allows damping forces to be built up more quickly. The result is enhanced comfort thanks to optimised response.

Single-conductor technology was used in the shock absorbers on the predecessor model. Electric current was fed to the magnetic coil in the piston through a wire, while the piston and piston rod acted as the current return line (ground line). Twin-conductor technology is used in the Audi A3 ’13, i.e. the ground line is a separate conductor. This eliminates the need for extensive electrical insulation and simplifies system diagnostics.

The damper seal has also been improved. The result is better low temperature stability and resistance to ingress of dirt from the exterior.

The diameter of the rear axle shock absorbers has been reduced to 36 mm from 46 mm compared to the predecessor model, thereby saving weight.



612_008

ECD control unit (electronically controlled damping) J250

The control unit has also been uprated. Processing power (speed) has been increased by using a new processor. Th einternal memory has been substantially expanded. A new security concept has been adopted to enhance system diagnostics.

The frequency of the pulse width modulated signal used to activate the shock absorbers has been increased to 31 kHz. This reduces the variation in magnetic forces and damping forces and thereby improves acoustics. The damper is not activated when the vehicle is stationary (speed signal = 0).

Faster force reduction and more precise and comfortable control are achieved by a new switching concept for the deactivation path. In addition, various new requirements were met, such as a reduction in static current consumption.

The control unit is installed under the front right seat.

612_009

Vehicle level senders G76-78, G289

Four vehicle level senders are also used in the Audi A3 ’13. They have the same functional as the senders of the Audi A4 ’08. They were adapted to the installation space available in the A3 by making geometric modifications.

612_010

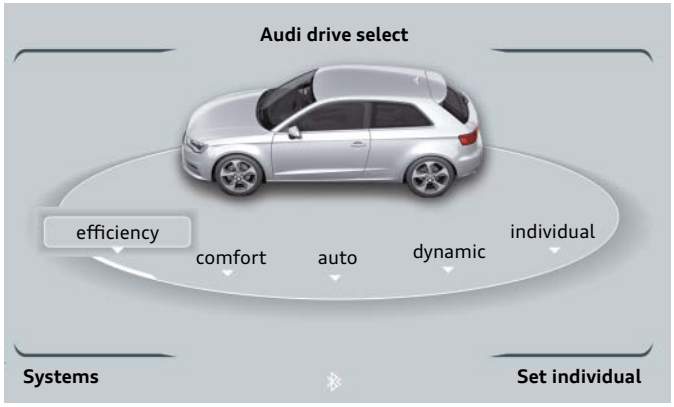
Operation and driver information

System settings are made by the driver using Audi drive select by pressing the corresponding button in the toolbar. The first push of the button displays the mode currently set in the driver information system (DIS). This display remains active for six seconds. If the button is pressed again during this time, the next mode is selected in the following order:

- efficiency - comfort - auto - dynamic - individual - efficiency

In vehicles with the MMI® navigation system, settings can optionally be made in the CAR menu using the turn-push button. In vehicles with the multifunction steering wheel, the freely programmable button can used as an operating element for Audi drive select.

612_011



612_012

612_013

Service operations

Audi magnetic ride has self-diagnostic capability. If system faults are detected, the warning lamp in the instrument cluster and the text output in the centre display are activated. The damping control system is modified accordingly or deactivated completely depending on the severity of the fault. ESP is activated automatically when required.

The control unit in the Audi A3 ’13 can be accessed after moving the front right seat back as far as it will go. It is located under a cover on the carpet.

The control unit is encoded online when writing the data record. After encoding has been completed, the "Program default suspension height" function can be executed using the diagnostic tester.

The "Program default suspension height" function must always be executed after replacement/reinstallation

- of the control unit.
- of a shock absorber or multiple shock absorbers
- of a vehicle level sender or multiple senders

612_015

The shock absorber test mode is detected automatically on a shock absorber test bench based on vehicle speed (<7 kph) and the frequency of the excited shock absorber. In Test mode, the shock absorbers are activated by applying a constant current of approximately 1 ampere.

612_016

Adaptive cruise control (ACC)

Overview

ACC is available as an option for the first time in this class of Audi vehicle. The customer can choose between two options:

- The ACC option includes a system which operates over a speed range from 30 kph to 150 kph in models with manual transmission and from 0 kph to 150 kph in models with automatic transmission.
- The optional "driver assistance package" includes an ACC system which operates over an extended speed range from 30 kph or 0 kph to 200 kph. This equipment package also includes the front camera for driver assistance systems R242.

612_041

Design and function

There is no difference between both systems in terms of their design and general functioning. As previously in the Audi A4 ’08, A5 and Q5 models, radar sensors with four transmitter and receiver units are also used in the Audi A3 ’13. The ACC system in the Audi A3 ’13 generally functions in the same way as the system currently used in the above-mentioned Audi models. Added functions are described below.

As in the A6 ’11, A7 Sportback and A8 ’10 models, the Audi A3 ’13 also has the stop-and-go function if equipped with automatic transmission.

The prewarning and braking intervention functions featured in current Audi models under the designation "braking guard" are now included in Audi pre sense.

A new safety function implemented for the first time in the Audi A3 ’13 automatically brakes the vehicle in the event of an impending collision at low speeds of below 30 kph. This function is also included in Audi pre sense. The measurement data obtained by the ACC system provides the basis for the identification of collision hazards. The software in the ACC control unit determines whether a collision hazard exists or not.

612_042

Operation and driver information

The control options and elements are the same as for the systems currently being used in other Audi models. As before, the key operating functions can be executed using the ACC stalk.

The prewarning function, now implemented in Audi pre sense, or the overall Audi pre sense function can be deactivated in models equipped with MMI. For detailed information on Audi pre sense refer to Self Study Programme SSP 609.

612_043

Service and diagnostic operations

The service and diagnostic operations are also identical to those of the system in the current Audi A4. Refer to SSP 458 for detailed information.

Wheels and tyres

Overview

Attraction	 1	 2	 8
Ambiente	 3	 5	 9
Ambition	 4	 6	 10
S-line	 12	 7	 11
	Standard wheels	**Optional wheels**	**Winter wheels**
	6.5J x 16 ET 46 (1) Steel wheel 205/55 R 16 **7.0J x 16 ET 48 (3) Light alloy wheel 205/55 R 16** **7.5J x 17 ET 51 (4) Light alloy wheel 225/45 R 17** **7.5J x 18 ET 51 (12) Light alloy wheel 225/40 R 18**	**6.5J x 16 ET 46 (2) Light alloy wheel 205/55 R 16** **7.0J x 17 ET 51 (5) Light alloy wheel 225/45 R 17** **7.5J x 17 ET 51 (6) Light alloy wheel 225/45 R 17** **7.5J x 18 ET 51 (7) Light alloy wheel 225/40 R 18**	**6.5J x 16 ET 48 (8) Steel wheel/snow chain compatible 205/55 R 16** **7.0J x 16 ET 48 (9) Light alloy wheel 205/55 R 16** **6.0J x 17 ET 48 (10) Light alloy wheel/ snow chain compatible 205/50 R 17** **7.5J x 18 ET 51 (11) Flow-form wheel 225/40 R 18**

612_044

17-inch run-flat tyres (AOE) are optionally available as winter and summer tyres.

Both winter wheels offered are snow chain compatible. The "Tire Mobility System" is standard equipment; a minispare wheel is optional.

Tyre pressure indicator

The Audi A3 ’13 is also offered with the well-known second-generation tyre pressure indicator. This system is identical to the systems currently in use on other Audi models in terms of its design, function, operation, driver information, service operations and diagnostics.

612_045

Test your knowledge

In all of the following questions, one or more answers may be correct.

Question 1: Which suspension system is standard in the Audi A3 ’13?

- ☐ a) The dynamic suspension
- ☐ b) The sports suspension
- ☐ c) The suspension system with electronic damping control
- ☐ d) The heavy-duty suspension system

Question 2: Which of the following statements is correct?

- ☐ a) The rear suspension of the Audi A3 ’13 is a double-wishbone suspension.
- ☐ b) A torsion beam axle is used for front wheel drive models of the Audi A3 ’13 with engine outputs of less than 85 kW.
- ☐ c) A multilink axle is used for the rear axle on all Audi A3 ’13 models.
- ☐ d) Only torsion beam axles are used as rear axles for the Audi A3 ’13.

Question 3: What is the key new feature of the electro-mechanical parking brake (EPB) implemented in the Audi A3´13?

- ☐ a) Two parking motors are used for the first time.
- ☐ b) The control software is integrated in the ACC control unit.
- ☐ c) The parking motors are attached to the brake calipers by clips and are no longer bolted.
- ☐ d) The control software is integrated in the ABS control unit J104.

Question 4: Can the ABS control unit J104 be replaced separately in the Audi A3 ’13 and, if so, on what condition?

- ☐ a) No, the control unit cannot be separated from the hydraulic unit.
- ☐ b) Yes, this is possible. No special requirements apply.
- ☐ c) Yes, this is possible. It is important that workshop equipment VAS 6613 be used in order to prevent electrostatic discharge.
- ☐ d) This is only possible in the case of the ESP system for vehicles equipped with ACC.

Question 5: Which suspension modification is required in order to implement the park assist system?

- ☐ a) Two active sensors with extended functions are used on the rear axle.
- ☐ b) No modifications are required.
- ☐ c) The vehicle must additionally be equipped with ACC.
- ☐ d) An uprated ESP hydraulic unit is required.

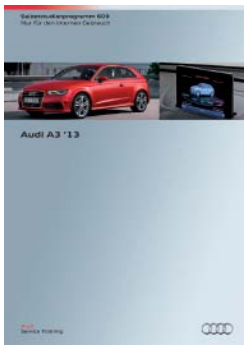
Question 6: Which of the following statements regarding the Audi magnetic ride system in the Audi A3 ’13 is correct?

- ☐ a) The system currently being used in the Audi TT is also used unchanged on the Audi A3 ’13.
- ☐ b) The for the Audi A3 ’13 uses a conventional damper control system, and not Audi magnetic ride.
- ☐ c) The system currently being used in the Audi R8 is also used unchanged on the Audi A3 ’13.
- ☐ d) A more advanced system is used. Specifically the shock absorbers and the control unit have been developed.

Solutions: 1) a; 2) b; 3) d; 4) c; 5) a; 6) d

Self Study Programmes

For further information about the technology in the Audi A3 ’13, refer to the following Self Study Programmes.



SSP 609 Audi A3 ’13
Order number: A12.5S00.93.00

SSP 610 Audi A3 ’13
Onboard power supply and networking
Order number: A12.5S00.94.00

SSP 611 Audi A3 ’13
Vehicle Electronics and Driver Assistance Systems
Order number: A12.5S00.95.00

AUDI AG
D-85045 Ingolstadt
Technical status 04/12

Printed in Germany
A12.5S00.96.20