PORSCHE

Service Information

2017 Technik Introduction

911 (991) Generation II

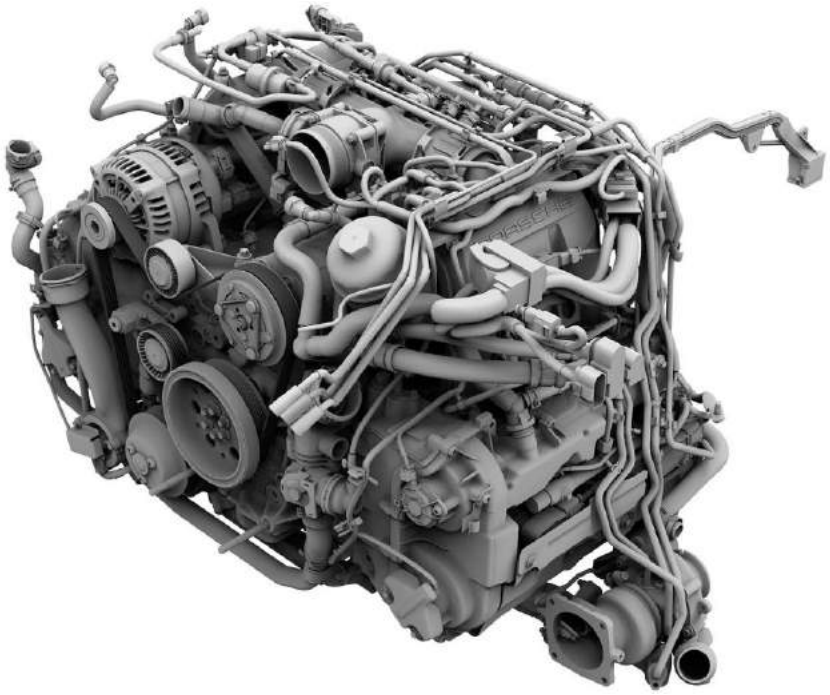
1 Engine

1.1 Overview

The new 911 Carrera and Carrera S for model year 2017 are fitted with completely redesigned bi-turbo flat-six engines.

With a displacement of 3.0 liter, both engines have a significantly higher torque across a wide engine speed range compared to their predecessor as well as a simultaneously reduced fuel consumption – in line with the core of our brand: Porsche Intelligent Performance.

The legendary sound of the flat-six engine has been retained.



Bi-turbo flat-six engine of the 911 Carrera model year 2017 1_01_16

The following development objectives for the new flat-six engines from the 9A2 generation were introduced based on the future requirements of our vehicles and our engines:

- Increased power and torque in combination with reduced displacement and therefore emission and fuel consumption values.
- New crankcase material and lighter add-on parts reduce the overall weight.
- Reduction in friction through new coating on the cylinder liners.
- Improvement in the power yield and responsiveness through the installation of camshaft adjusters on the intake and exhaust side.

It features seven main bearing journals, and a support bearing, and has 12 balancing weights. Main bearing 4 is designed as a thrust bearing. Axial play is determined by two thrust plates, which are inserted on the left and right of the bearing.

The main bearings are designed as plain bearings with a diameter of 63 mm. Main bearings 1/3/5/7/8 are smooth bearings, while main bearings 2/4/6 are grooved bearings.

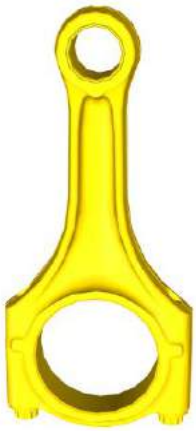
These grooved bearings supply oil to the lubrication points of the crankshaft bearings. The drive mechanism for the two drive chains for the camshafts and demand-controlled oil pump is located on the pulley side.

The stroke of the new generation of engines is 76.4 mm, almost identical to that of the predecessor engine. A reduced displacement is achieved through a smaller bore. The bore dimension on the new generation of engines is 91 mm compared to 97 mm and 102 mm of the previous models.

The engine on the 911 Carrera model year 2017 is therefore also of a short-stroke design to improve overall responsiveness and revving ability.

Connecting rod

The connecting rods of the 911 Carrera model year 2017 are forged, and cracked with a length of 138 mm. At 22 mm, the diameter of the connecting rod eye is unchanged compared to the predecessor.



Connecting rod of the 911 Carrera model year 2017 1_13_16

In the cylinder heads and the two exhaust turbochargers, the oil is extracted by a double gear-type extraction pump. The number of extraction pumps has been halved compared with the predecessor engine (two-in-one principle).

The failsafe control is integrated in the control valve.

Piston crown cooling

As with the predecessor model, the crankcase on the engine of the 911 Carrera model year 2017 incorporates spray nozzles for cooling the piston crowns. An upstream pressure valve ensures that the spray nozzles only open at higher loads and temperatures. This also reduces the drive power that the engine needs to generate in the lower to medium load range to drive the oil pump and helps increase the efficiency of the engine.

Oil level measurement

Oil level measurement on the 911 Carrera model year 2017 is performed in the same way as on the predecessor engine.

1.3.9 Cooling system

The cooling system of the 911 Carrera model year 2017 has been adapted to match the increase in power while, at the same time, the displacement has been reduced.

The new encased vacuum-controlled coolant pump can deactivate coolant circulation prior to a cold start. This results in quicker heating of the engine to operating temperature.

As on the predecessor model, a center radiator provides additional cooling performance for extremely hot countries.

The 911 Carrera S model year 2017 is also fitted with a center radiator in conjunction with the PDK transmission.

Closure cap

The closure cap of the coolant expansion tank has been adopted from the predecessor.

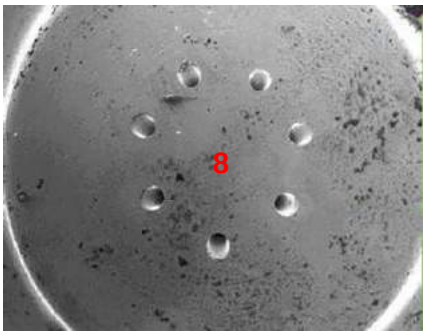
Once the lower section of the oil pan has been removed, the solenoid control valve can be removed without the need for an additional special tool.

Details of the thermal management system are described in group 2.

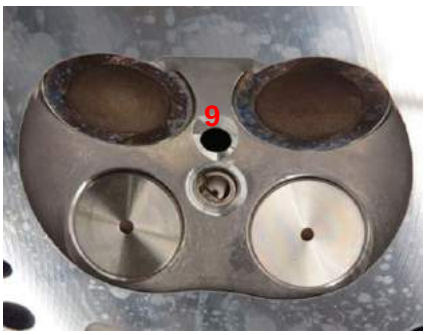
Injectors

The central position of the 7-hole injector in the cylinder head promotes a homogeneous, symmetrical fuel distribution in the cylinder.

Voltage boosters with flexible drivers are installed in the DME control unit for activation of the injectors.



7-hole injector 2_07_16

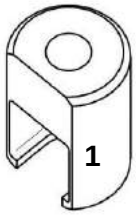


Injector position 2_08_16

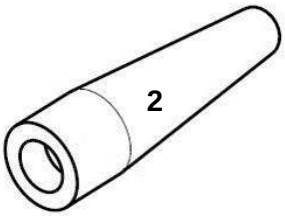
1 Electrical connection
2 O-ring (high-pressure side)
3 Holding-down device
4 Recess seal
5 Spacer ring
6 Circlip
7 Teflon sealing ring (to combustion chamber)
8 7-hole injector
9 Central injector position

Special tools

The following special tools are available for removing the injectors and fitting the teflon rings:



Extraction tool 2_09_16

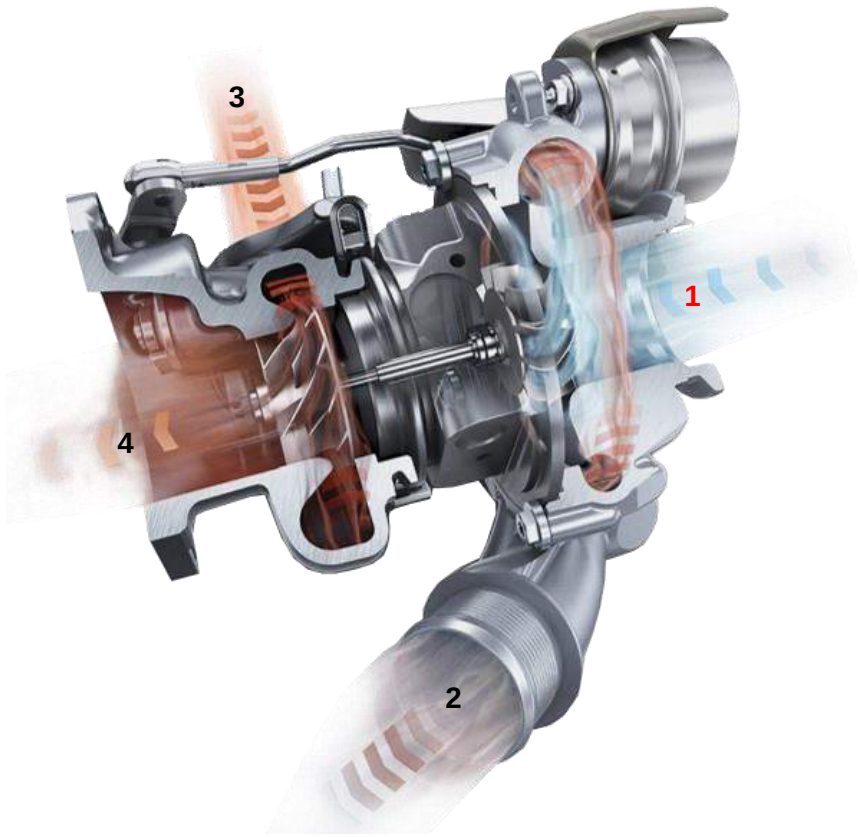


Assembly sleeve 2_10_16

1 Extraction tool for central injector T101-33
2 Assembly sleeve for teflon sealing rings T101-31

Fuel injector 2_11_16

During the load change at full-throttle acceleration, the responsiveness of the turbochargers and therefore of the engine has been improved. When the accelerator is released (vehicle in deceleration, fuel cut), the throttle valve is not closed. As a result, the boost pressure is not completely depleted and is available again following renewed actuation of the accelerator pedal for a further acceleration.

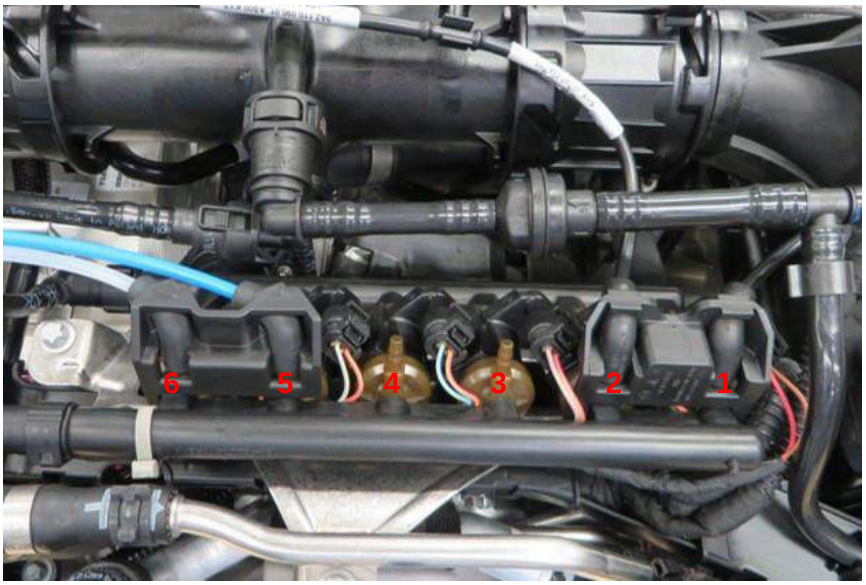


Cutaway view of turbocharger 2_26_16

1 Fresh air intake
2 Boost pressure to charge-air cooler
3 Exhaust gas inlet
4 Exhaust gas outlet to catalytic converter

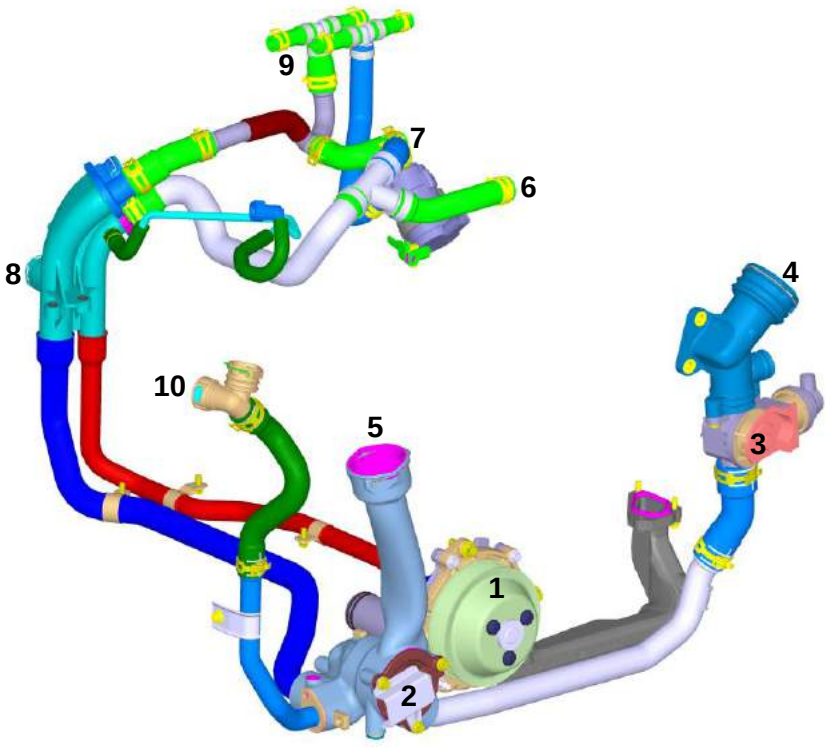
The valve block is provided with a central vacuum supply from the vacuum pump and also has a central vent line to the air cleaner.

Through the application of vacuum, the relevant actuators for the thermal management are closed and the coolant flow is stopped.



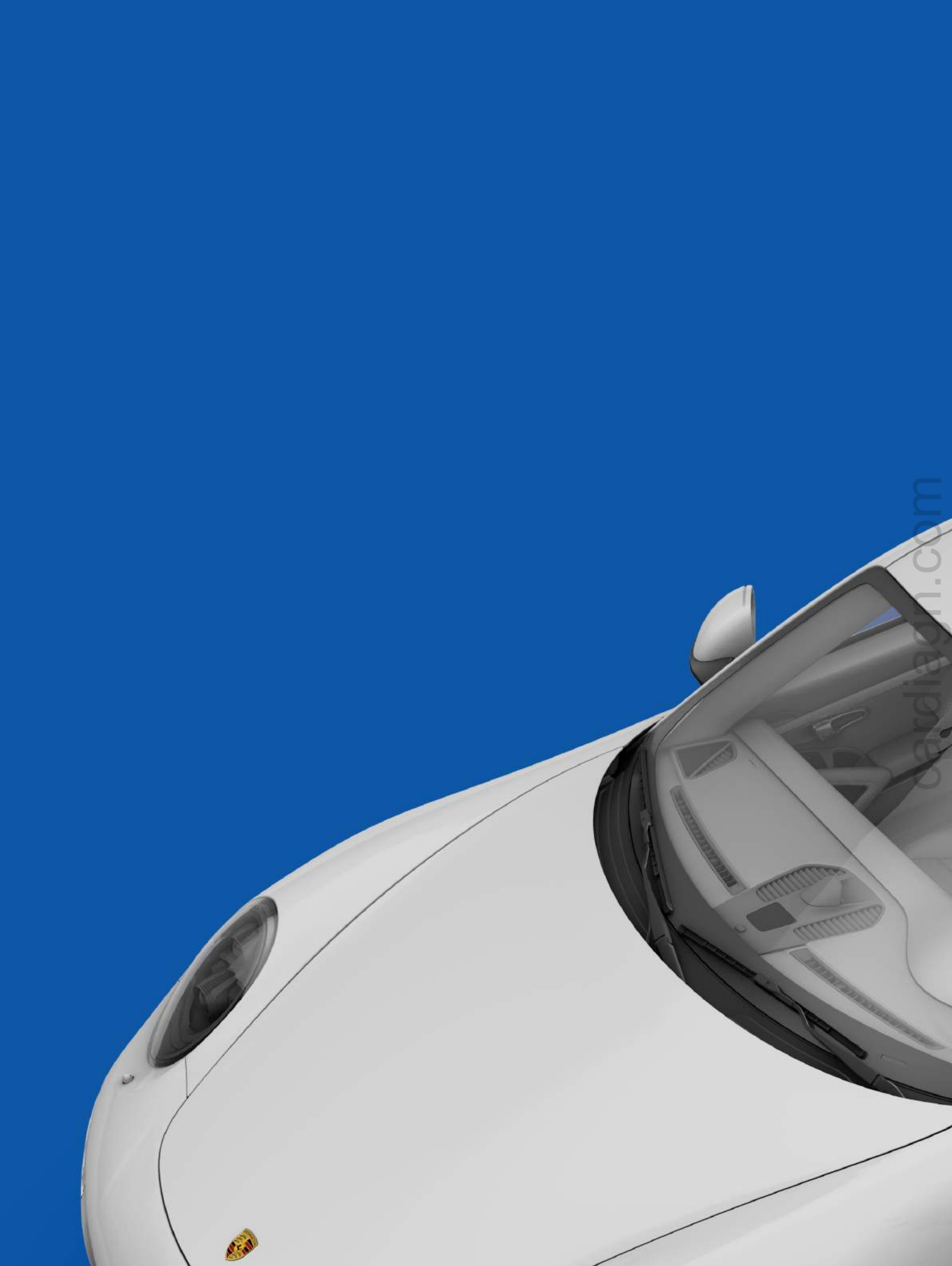
Valve block switching valves 2_49_16

1 Switchable water pump
2 Coolant shut-off valve
3 Transmission cooling
4 PDK clutch cooling
5 Heater valve
6 Sound symposer, right

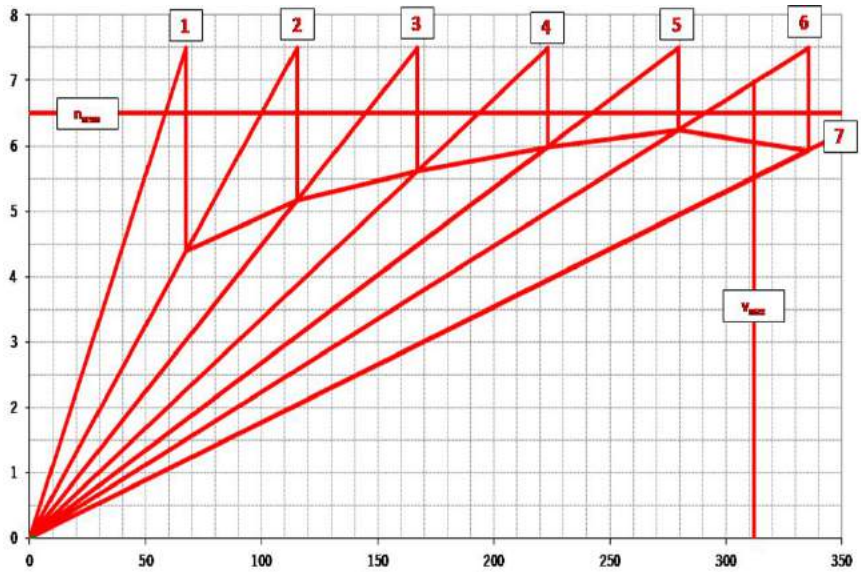


Thermal management components, engine-mounted components 2_50_16

1 Switchable coolant pump
2 Single-slider map-controlled thermostat
3 Coolant shut-off valve
4 Supply line to radiators
5 Return line from radiators
6 Engine oil heat exchanger supply line
7 Engine oil heat exchanger return line
8 Transmission heat exchanger supply/ return lines
9 Turbocharger cooling
10 Expansion tank connection



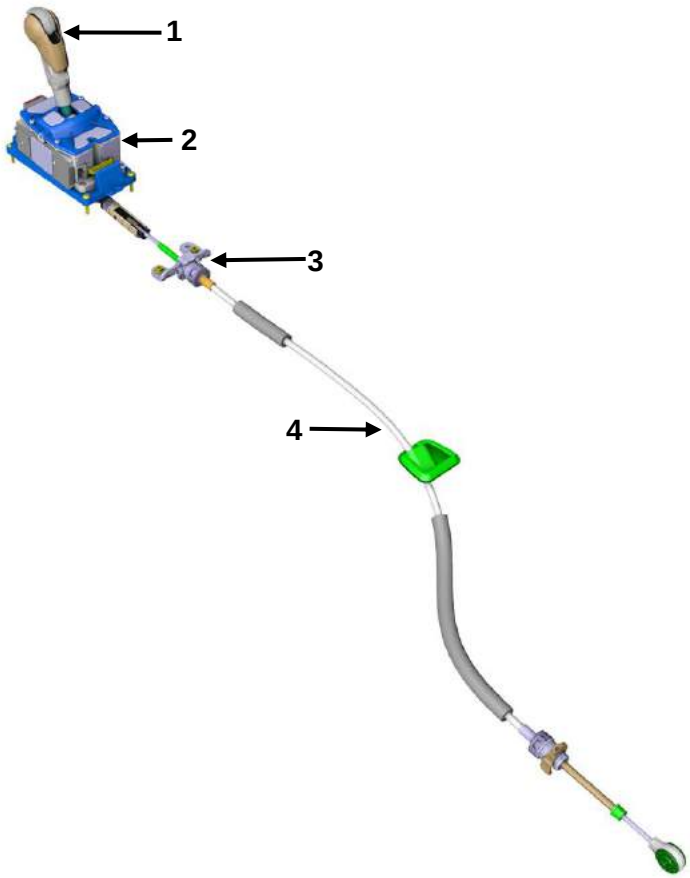
Gear ratio graph



Gear ratio graph PDK 3_10_16

3.3.2 Outer shift mechanism

Design



Selector lever and selector lever cable 3_11_16

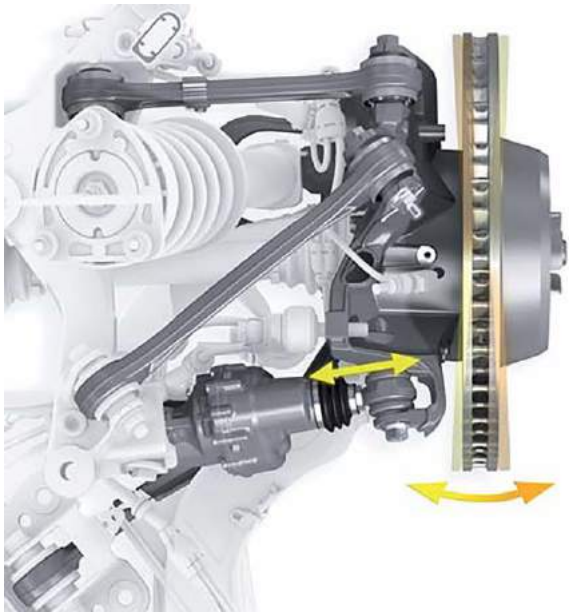
1 Selector knob in new design.
2 Selector support
3 Selector cable support bracket
4 Selector cable

4.2 Rear axle steering (RAS)

Rear axle steering is optional on the new 911 Carrera S models.

The system comprises two electromechanical actuators, which are installed in the left and right of the rear axle instead of the conventional toe control arms. Using these actuators, the system steers the rear axle of the new 911 Carrera models either in the opposite or same direction as the steering angle at the front axle with an interval of +2 degrees to -1.5 degrees, depending on the driving speed.

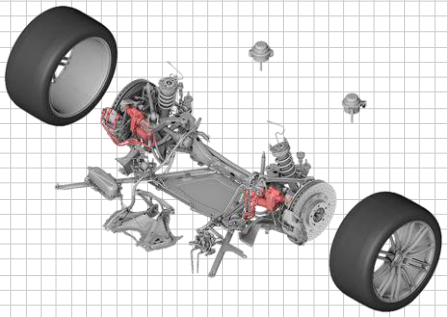
The steering angle at the rear axle therefore depends above all on the steering angle at the steering wheel, the driving situation and the driving speed.



Operating principle of rear axle steering 4_15_16

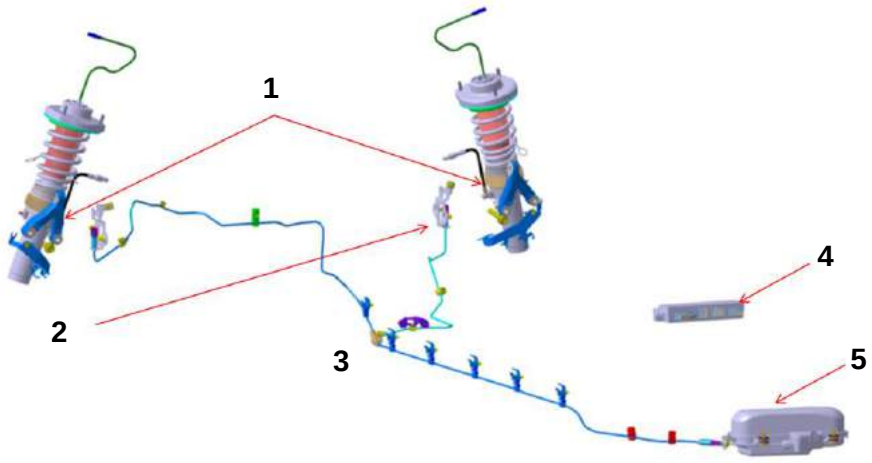
The maximum wheel angle movement of the rear axle on the 911 Carrera 2/4 S MY 2017 is 2.00° (max. 2.92° on the 911 Turbo and GT3). The adjustment ratio at the wheel [degrees] / spindle stroke [mm] is 1:4.6. This means that the spindle must be moved by 4.6 mm to adjust the wheel by one degree.

One motor revolution achieves a travel distance (spindle stroke) of 0.795 mm.



Rear axle steering 4_40_16

4.3.3 Hydraulic lift system

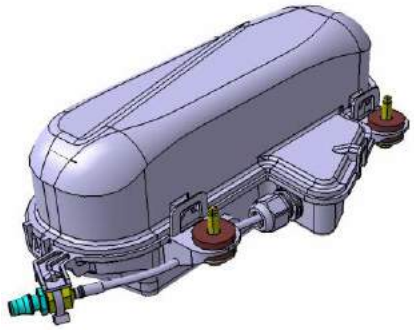


Overview of FA lift system 4_01_16

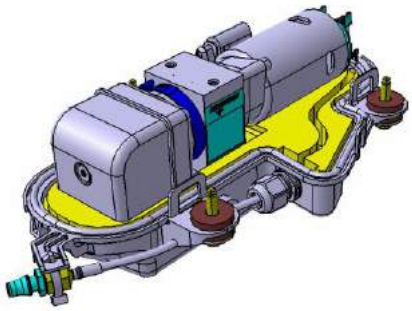
1 Spring strut with actuator
2 Wheel housing disconnection point
3 T-fitting
4 Control unit
5 Hydraulic unit

A hydraulically operated actuator located on the spring strut performs the lifting procedure. There is an actuator fitted to each spring strut on the front axle. The lifting function is actuated via a hydraulic pump. The hydraulic unit pumps fluid through a flexible pipe first. At the first disconnection point, the fluid is transferred to the rigid pipe that runs in the center tunnel up to the T-fitting for the front left and front right. The flow of fluid is split and directed along rigid and then flexible pipes to the FR and FL actuators in the spring struts.

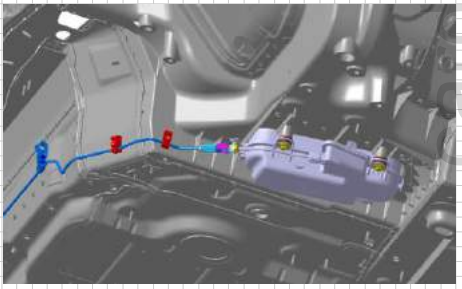
Hydraulic unit



Hydraulic unit with acoustic capsule 4_02_16



Hydraulic unit in foam 4_03_16



Hydraulic unit installation position 4_07_16

Teaching wheel set

- Vehicle is stationary for at least 5 minutes
- Installed tire type selected in the TPM menu
- Message: “System is learning above 16 mph (25 km/h)” (see Figure 4_51_16)
- Travelling at v > 16 mph (25 km/h)
- Ideally, drive without stopping until the pressures are displayed
- Learning time less than 2 minutes

The system only teaches the wheel electronics while the vehicle is moving. Stationary phases can extend the learning time significantly. Deviations from the teaching procedure described can lengthen the teaching time significantly. The teaching process is only completed UNSUCCESSFULLY if the message “Tire pressure monitoring fault” is displayed.

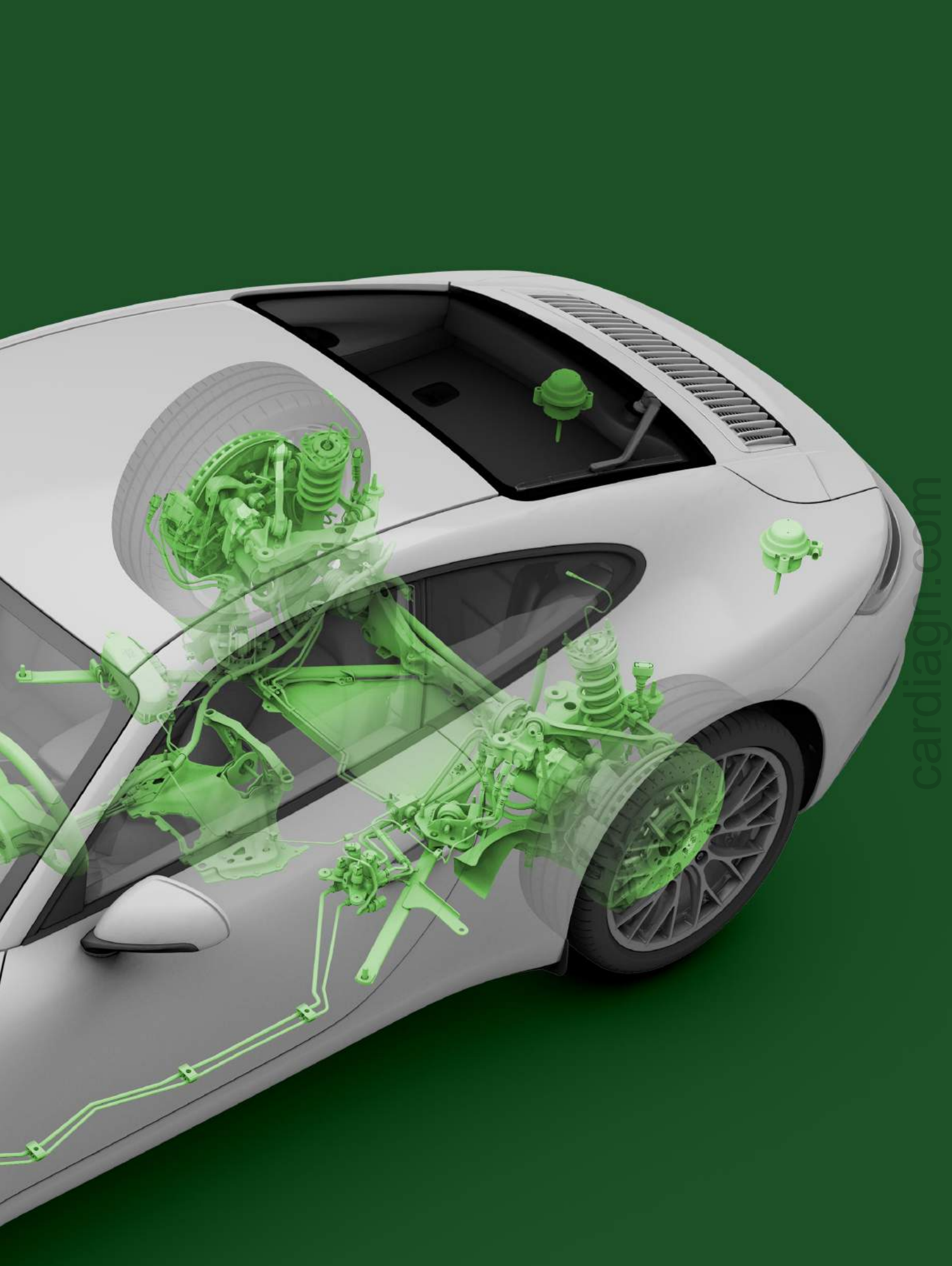
4_60_16

4_61_16

4_51_16

Message: “Wheel change detected”

- The system is able to automatically recognise a wheel change or a change of the wheel electronics.
  The message that appears on the instrument cluster: “Wheel change detected”
  Initiate the learning process for a new set of wheels according to the description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The xenon headlights no longer have a retaining plate, the main headlight housing is secured to the bodyshell directly by two screws and located in position by two pins. The basic shape of the fenders has not changed. Only one additional hole for inserting the clips that fasten the GSM and online antennas has been added in the area around the retaining plates.

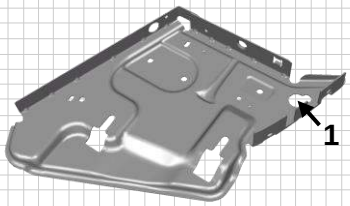
Repair

The front apron must be detached to remove the headlights. The unlocking key is no longer included in the tool kit. The bulbs for the additional high beam must be replaced in the workshop.

Doors

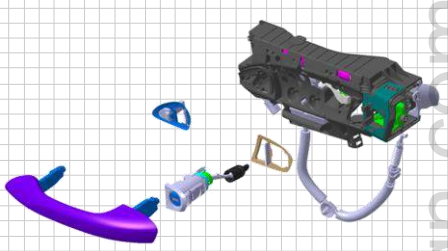
The door shape was adopted from the 911 models from model years 2012 – 2016. Because the finger plate has been omitted on the 911 models from model year 2017, the cut in the outer door panel has been modified in this area. The door handle is integrated directly in the door outer shell, which is deep drawn at this point.

Outer door panel 911 model year 2017



Headlight retaining plate 5_11_16

1 Hole for fastening clips



Outer door handle 911 model year 2016 5_12_16

5.2.2 Passive safety

Objective

The passive safety of a vehicle includes all measures that are taken to minimize the consequences of an accident. Various types of high-strength, higher-strength and ultra-high-strength steel as well as aluminum components are used for this purpose on the 911 models from model year 2017.

These materials are used in such a way in the vehicle that the impact created during an accident is routed through the bodyshell via defined load paths. The objective is to prevent any deformation or even destruction of the passenger compartment.

Repair

In the event of a repair, both the overall slat block and the actuator can be individually replaced.

6.4 Side view

In the side view, the new 911 Carrera models captivate through their unmistakable lines and the new wheel design. The 911 Carrera is equipped with the redesigned 19-inch Carrera wheels, while the 911 Carrera S features the redesigned 20-inch Carrera S wheels. The new door handles are a small but striking detail. They do not have a separate finger plate, which visually enhances the door.

Side view 6_08_16

6.4.1 Side skirts

The side skirts have been adopted one-to-one from the 911 models from model years 2012 – 2016.

6.4.2 Exterior mirrors

The exterior mirrors have been adopted one-to-one from the 911 models from model year 2012 – 2016. Both the basic mirror and the mirror with a V-shaped base are available.

7 Body – Interior equipment

7.1 Overview

The interior includes comfortable high-quality equipment typical of a 911 in a sophisticated layout.

The main element is the center console, which rises towards the front. It accommodates the driver and passenger into the vehicle even more effectively and offers outstanding ergonomics.

Seat systems

The front and rear seat systems for all models were adopted one-to-one from the 911 (991) models from model years 2012 to 2016.

Trim panels and storage

The trim panels, storage and luggage compartment were largely adopted from the 911 models from model years 2012 to 2016. Changes affect the following areas:

- Trim panels in rear passenger compartment due to modified belt attachment points
- Center console storage bin

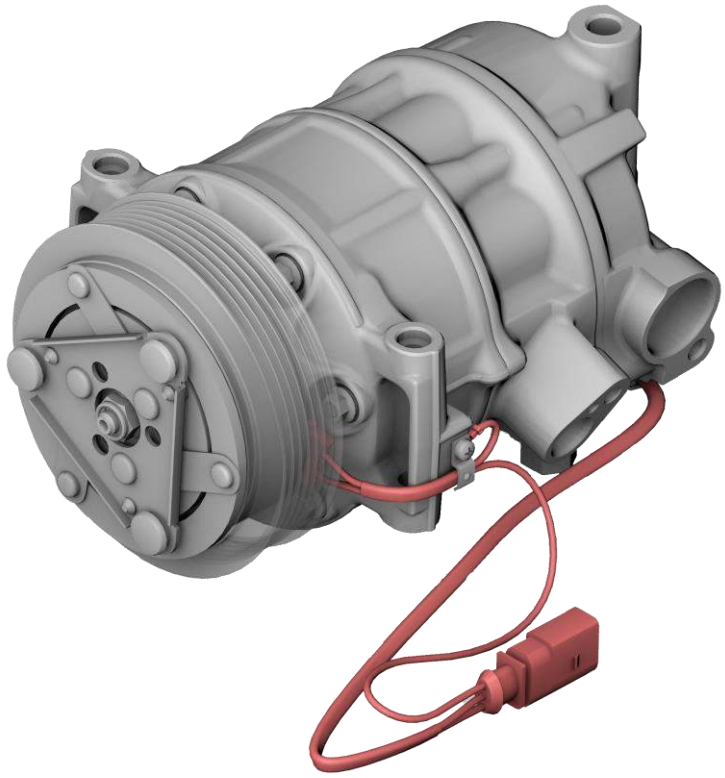
Passive safety systems

All passive safety systems were adopted from the 911 models from model years 2012 to 2016.

Operating and display concept

The operating concept is essentially the same as that of the 911 (991) models from model years 2012 to 2016.

8.2.3 Air-conditioning compressor



Compressor with magnetic clutch and control valve 8_07_16

The A/C compressor can be activated and deactivated via a magnetic clutch. The refrigerant delivery rate can be modified within the A/C compressor through actuation of the swash plate inside it.

Function

The magnetic clutch, like the control valve, is actuated by the OAU.

Control of the A/C compressor is performed as a function of the following main input variables:

- **DME**
  - Engine load: torque request by driver
- **BCM**
  - Load management: Alternator load and vehicle electrical system voltage
- **BKE (sensors)**
  - Evaporator temperature (target/actual)
  - Desired interior temperature
  - Actual interior temperature
  - Refrigerant pressure (HP)

The evaporator temperature is the main input variable used for control of the solenoid valve and consequently of the swash plate position.

Functions

- Xenon dipped beam
- Xenon high beam
- Auxiliary high beam
- 4-point LED daytime running lights

PDLS functions

- Cornering light
- Fog light function

9.3.4 Full-LED headlights (PDLS Plus)

The full-LED headlights have a very different appearance to the Bi-Xenon headlights. Instead of a cone-shaped light housing with a round projection lens and auxiliary headlight with visible reflector, the full-LED headlight consists of two tube-shaped light housings in a stepped configuration with a lens contour truncated at the top and bottom.

Design

09_13_16

9.6.3 Cruise control

The cruise control for the new 911 models now brakes actively when the preset speed is reduced on the control stalk or the vehicle exceeds the preset speed when travelling downhill.

9.7 Sport Chrono package

The Sport Chrono package is the first choice on the list of available options for increasing the driving performance and driving pleasure. It has again been significantly modified for the 911 Carrera 2017.

9.7.1 Mode switch (in conjunction with PDK)

The various driving modes are now no longer selected using buttons on the center console, but instead via a rotary selector switch known as the mode switch located in the redesigned steering wheel.

9_39_16

Mode switch 9_40_16

9.8.5 Playing media

Music and video files from a wide range of media sources can be played by pressing the Media button. For the first time, DVD video files can be played from DVD and USB/SD memory cards in the following formats:

- Windows Media Audio 9 and 10
- MPEG-2/-4, MPEG-1/-2
- ISO-MPEG4, DivX 3, 4 and 5; Xvid
- ISO-MPEG4, H.264 (MPEG4 AVC)
- Windows Media Video 9 (when vehicle is stationary)

9_65_16

9_66_16

Video playback

9.8.6 Antenna overview

The illustration below shows an overview of the most commonly used antennas in the 911 Carrera model year 2017. Further antennas are used for functions such as:

- Remote control (RC) in windshield (NF/HF)
- Keyless Entry Start System (KESSY) interior and exterior antennas
- Porsche Car Connect (PCC)/Porsche Vehicle Tracking System (PVTS) GSM/GPS