Self-study programme 338

The Golf Plus 2005
The Golf Plus is based on the Golf’s successful history as the benchmark in the compact class, is positioned in the new segment of high-roof passenger cars and can therefore safely claim leadership in the Golf segment.

It is intended to continue to the "superior dynamics" positioning introduced by the Golf in 2004, extending this with characteristics such as spatial comfort, variability and functionality.

This self-study programme provides an overview of the structure of the Golf Plus. It informs you of the special body features, which engines and gearboxes are installed, which front and rear axles carry the Golf, how the electronics are structured and what changes have taken place in the convenience system.
In brief

The Golf Plus 2005

In addition to the technology familiar from the Golf, the Golf Plus is equipped with a few further special features. This includes its higher body, its rear lights in LED technology and also its split rear seat bench, which can be separately adjusted and moved.

- Extensive storage compartment concept
- 2C-Climatronic (2-zone climate control)
- Sensor for rain and light detection
- Modified bonnet
  Front area optimised to protect pedestrians
- Headlights in bi-xenon technology with cornering light function
- New headlights with three round elements
- Rear Seat Entertainment system
- 230V socket
- Body 95mm higher
- Rear lights in LED technology
- Variable load floor concept
- Split rear seat bench, can be separately moved and adjusted
- Seating level 80mm higher
In brief

Technical data
Exterior dimensions and weights

Exterior dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>4206 mm</td>
</tr>
<tr>
<td>Width</td>
<td>1759 mm</td>
</tr>
<tr>
<td>Height</td>
<td>1580 mm</td>
</tr>
<tr>
<td>Wheelbase</td>
<td>2578 mm</td>
</tr>
<tr>
<td>Front track</td>
<td>1541 mm</td>
</tr>
<tr>
<td>Rear track</td>
<td>1529 mm</td>
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</table>

Weights

<table>
<thead>
<tr>
<th>Weight Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permissible gross vehicle weight</td>
<td>1900 kg</td>
</tr>
<tr>
<td>Unladen weight without driver</td>
<td>1293 kg</td>
</tr>
<tr>
<td>Roof load</td>
<td>75 kg</td>
</tr>
<tr>
<td>Trailed load (braked)</td>
<td>1200 kg at 8% incline</td>
</tr>
<tr>
<td>Fuel tank capacity</td>
<td>55 l</td>
</tr>
<tr>
<td>Drag coefficient</td>
<td>0.32</td>
</tr>
</tbody>
</table>
Interior dimensions

Total interior length | 1740 mm
Luggage compartment volume | 425 - 505 l *
                        | 402 - 443 l **
Luggage compartment volume with rear seat backrest folded down | 1450 l *
                        | 1350 l **

Interior dimensions, front

<table>
<thead>
<tr>
<th>Interior dimensions, front</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Headroom</td>
<td>1007 mm</td>
</tr>
<tr>
<td>Elbow width</td>
<td>1468 mm</td>
</tr>
</tbody>
</table>

Interior dimensions, rear

<table>
<thead>
<tr>
<th>Interior dimensions, rear</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Headroom</td>
<td>976 mm</td>
</tr>
<tr>
<td>Elbow width</td>
<td>1452 mm</td>
</tr>
</tbody>
</table>

* - Without variable load floor
** - With variable load floor
The body structure

Its concept has been integrated from the tried-and-tested Golf 2004 and adapted to the requirements of the Golf Plus.

By consistently employing high- and ultra-high-strength panels, its strength has again been optimised without significantly increasing its weight.

Special characteristics

- The A-pillar has been modified to integrate the quarter light.
- The roof bow has been omitted thanks to the design of the side areas.
Steel grades in the Golf Plus

Steels are classified according to their tensile strength. The higher the steel grade, the higher the tensile strength, which is measured in Megapascals. The higher material properties are achieved by alloying and hardening the steel in different ways. The Golf Plus body is essentially comprised of five different steel grades.

Even this limited selection of body-in-white parts shows the considerable percentage of higher-strength panels in the Golf Plus.

- Normal plate grade up to 180 MPa
- High-strength plate grade 220 - 240 MPa
- Higher-strength plate grade 280 - 300 MPa
- Ultra-high-strength plate grade 320 - 420 MPa
- Ultra-high-strength, treated plate grade over 900 MPa

1 MPa = 1 Newton/mm²
The specified values refer to the yield strength.
Body

The storage compartments

Besides a multitude of storage compartments familiar from the Golf 2004, the Golf Plus additionally offers storage compartments in the centre console and drawers beneath the front seats.

In vehicles fitted with the Rear Seat Entertainment system, the DVD player is located in the storage compartment between the front seats beneath the armrest.
The roof console

The Golf Plus is optionally available with a large roof console. Three unfolding storage compartments are located in the front area. The rear area houses the fold-down monitor in vehicles fitted with the Rear Seat Entertainment system.

Glazing

The quarter light is bonded-in.
The load floor

The Golf Plus has a variable load floor. This means:

● The load floor is height-adjustable.
● The load floor can be removed.
● The length of the load floor adapts to the longitudinally-adjustable rear seat bench.

Longitudinal adjustment

This is carried out by means of movable covers, which are locked along with the rear seats. When the rear seats are moved, the covers therefore move back and forth together with the seats. The covers slide beneath the load floor in this case.
Height adjustment

The load floor can be inserted at two heights.

Removing the load floor

In addition to the load floor, the transverse rail can also be removed. This results in maximum luggage compartment volume.
The seats

The front seats

The seat frames have been integrated from the Golf 2004. The higher fastening bracket results in a seating position which is higher than that in the Golf 2004. A front passenger seat with the through-loading option familiar from the Golf 2004 is also available as an optional extra.

The rear side of the seat backrests are fitted with folding tables for the rear passengers.
The rear seat bench

This is split into two. Both sections can be individually moved 160mm in the longitudinal direction. By pulling on the release straps, the inclination of these can be adjusted, the sections can be completely folded.

As an additional storage option, a multi-function box can be secured to the folding centre armrest.
Pedestrian protection

The bumper

To reduce the risk of injury to pedestrians, the bumper cross-member is covered with a foam part.
The pedestrian protection cross-member is located beneath the bumper cross-member.
This reduces the risk of injury to pedestrians’ legs.

The bonnet hinge

To ensure that the bonnet also yields in the hinge area in the event of an impact involving a pedestrian, the hinges have also been provided with nominal bending points.
The bonnet support

This area has also been optimised for pedestrian protection by using a bonnet support instead of a gas pressure spring.

In contrast to a gas pressure spring, the bonnet support is able to bend in the event of an impact.

The windscreen wiper shafts

The wiper shafts have also been revised to enhance pedestrian protection. In the event of an impact, the shafts slide into the mounting bracket and thereby reduce the risk of injury to the pedestrian.

Operating position

Situation following impact
The airbags

The airbag system familiar from the Golf 2004 is also fitted in the Golf Plus:

- Driver and front passenger airbag
- Side airbag in the front seats
- Head airbag for the front and rear passengers
- 3-point seat belts on all seats
- Seat belt pretensioner, belt tension limiter and seat occupied sensor for the front passengers.
- Active headrests on the front seats
- Seat belt prompt for the driver and front passenger
- Optional rear side airbag in the wheel housing trim in combination with rear seat belt pretensioner

The following crash sensors, which are already familiar from the Golf, are installed:

- Pressure sensors in the front doors
- Acceleration sensors in the area of the rear wheel housing
## Engines

### Engine-gearbox combinations

<table>
<thead>
<tr>
<th>Engine</th>
<th>Gearbox</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4l 55 kW SRE engine</td>
<td>0AF: 5-speed manual gearbox</td>
</tr>
<tr>
<td>1.4l 66 kW FSI engine</td>
<td>0AG: 6-speed manual gearbox</td>
</tr>
<tr>
<td>1.6l 75 kW engine</td>
<td>0A4: 5-speed manual gearbox</td>
</tr>
<tr>
<td>1.6l 85 kW FSI engine</td>
<td></td>
</tr>
<tr>
<td>2.0l 110 kW FSI engine</td>
<td></td>
</tr>
<tr>
<td>1.9l 66 kW TDI engine*</td>
<td></td>
</tr>
<tr>
<td>1.9l 77 kW TDI engine</td>
<td></td>
</tr>
<tr>
<td>2.0l 103 kW TDI engine</td>
<td></td>
</tr>
</tbody>
</table>

The engines and gearboxes marked with a * will be launched at a later point in time.
<table>
<thead>
<tr>
<th>02S: 6-speed manual gearbox</th>
<th>02Q: 6-speed manual gearbox</th>
<th>09G: 6-speed automatic gearbox</th>
<th>DSG 02E: 6-speed Direct-Shift Gearbox*</th>
</tr>
</thead>
<tbody>
<tr>
<td>√</td>
<td>√</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Engines

The 1.4l 55 kW engine

The 1.4l 55 kW engine is the entry-level engine for the Golf Plus. This has been taken over from the Golf 2004 and adapted to the package conditions in the Golf Plus.

Special characteristics

- Return-free fuel system
- Crankshaft sealing flange with magnetised sender wheel for engine speed
- Accelerator pedal module with contact-free accelerator pedal position sender
- Clutch module with contact-free clutch position sender
- Throttle valve control unit with contact-free throttle valve position angle senders
- Primary catalytic converter with ceramic substrate and reduced precious metal charge
- Main catalytic converter with reduced precious metal charge

Technical data

<table>
<thead>
<tr>
<th>Engine code</th>
<th>BCA</th>
</tr>
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<tbody>
<tr>
<td>Design type</td>
<td>4-cylinder in-line engine</td>
</tr>
<tr>
<td>Displacement [cm³]</td>
<td>1390</td>
</tr>
<tr>
<td>Bore [mm]</td>
<td>76.5</td>
</tr>
<tr>
<td>Stroke [mm]</td>
<td>75.6</td>
</tr>
<tr>
<td>Valves per cylinder</td>
<td>4</td>
</tr>
<tr>
<td>Compression ratio</td>
<td>10.5:1</td>
</tr>
<tr>
<td>Max. output</td>
<td>55kW at 5000 rpm</td>
</tr>
<tr>
<td>Max. torque</td>
<td>126Nm at 3800 rpm</td>
</tr>
<tr>
<td>Engine management system</td>
<td>Bosch Motronic ME 7.5.10</td>
</tr>
<tr>
<td>Fuel</td>
<td>Super unleaded RON 95 Normal unleaded RON 91 (with slightly reduced output)</td>
</tr>
<tr>
<td>Exhaust gas aftertreatment</td>
<td>Primary catalytic converter, main catalytic converter, lambda control</td>
</tr>
<tr>
<td>Exhaust emission standard</td>
<td>EU4</td>
</tr>
</tbody>
</table>

Torque and output graph

![Torque and output graph](image-url)
The 1.6l 85 kW FSI engine

This engine originates from the Golf 2004. It differs from this only due to its switch to lambda 1 operation and super unleaded RON 95.

Special characteristics

Stratified charge and homogeneous lean operation have been omitted due to the switch to lambda 1 operation. This leads to the occurrence of less nitrogen oxide, and the omission of complex trapping and regeneration of this.

This leads to the following changes:

- The exhaust gas temperature sender has been omitted,
- instead of the NOx storage reduction catalytic converter, a three-way catalytic converter has been installed, and
- instead of the NOx sender, a transient lambda probe has been installed.

Technical data

<table>
<thead>
<tr>
<th>Engine code</th>
<th>BLF</th>
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<tbody>
<tr>
<td>Design type</td>
<td>4-cylinder in-line engine</td>
</tr>
<tr>
<td>Displacement [cm³]</td>
<td>1598</td>
</tr>
<tr>
<td>Bore [mm]</td>
<td>76.5</td>
</tr>
<tr>
<td>Stroke [mm]</td>
<td>86.9</td>
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<tr>
<td>Valves per cylinder</td>
<td>4</td>
</tr>
<tr>
<td>Compression ratio</td>
<td>12.1</td>
</tr>
<tr>
<td>Max. output</td>
<td>85kW at 6000 rpm</td>
</tr>
<tr>
<td>Max. torque</td>
<td>155Nm at 4000 rpm</td>
</tr>
<tr>
<td>Engine management system</td>
<td>Bosch Motronic MED 9.5.10</td>
</tr>
<tr>
<td>Fuel</td>
<td>Super unleaded with RON 95 (super plus RON 98 leads to an increase in torque in the medium engine speed range)</td>
</tr>
<tr>
<td>Exhaust gas aftertreatment</td>
<td>Primary catalytic converter, main catalytic converter, lambda control</td>
</tr>
<tr>
<td>Exhaust emission standard</td>
<td>EU4</td>
</tr>
</tbody>
</table>

Torque and output graph

The switch from super plus RON 98 to super unleaded RON 95 is achieved via ignition angle adjustment. Operation with RON 91 is not permitted, as ignition is retarded to the control limits in this case.

Information on the fuel system can be found in self-study programme No. 334 "The FSI engine fuel system".
The 1.9l 77 kW TDI engine

This engine originates from the Golf 2004.

Special characteristics

- Switchable exhaust gas recirculation cooler,
- Crankshaft sealing flange with integrated engine speed sender wheel,
- Accelerator pedal module with contact-free accelerator pedal position senders,
- Contact-free clutch pedal switch.

Technical data

<table>
<thead>
<tr>
<th>Engine code</th>
<th>BKC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design type</td>
<td>4-cylinder in-line engine</td>
</tr>
<tr>
<td>Displacement [cm³]</td>
<td>1896</td>
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<tr>
<td>Bore [mm]</td>
<td>79.5</td>
</tr>
<tr>
<td>Stroke [mm]</td>
<td>95.5</td>
</tr>
<tr>
<td>Valves per cylinder</td>
<td>2</td>
</tr>
<tr>
<td>Compression ratio</td>
<td>19:1</td>
</tr>
<tr>
<td>Max. output</td>
<td>77kW at 4000 rpm</td>
</tr>
<tr>
<td>Max. torque</td>
<td>250Nm at 1900 rpm</td>
</tr>
<tr>
<td>Engine management system</td>
<td>Bosch EDC 16 with unit injector system</td>
</tr>
<tr>
<td>Fuel</td>
<td>Diesel, at least 51 CN</td>
</tr>
<tr>
<td>Exhaust gas aftertreatment</td>
<td>Exhaust gas recirculation and oxidising catalytic converter</td>
</tr>
<tr>
<td>Exhaust emission standard</td>
<td>EU4</td>
</tr>
</tbody>
</table>

Torque and output graph
The 2.0l 103 kW TDI engine

This engine is identical to the 2.0l 103 kW TDI engine fitted in the Golf 2004.

Special characteristics

- 4-valve technology,
- Two camshafts, driven by toothed belts,
- New unit injectors which have been adapted to the 4-valve technology,
- Switchable exhaust gas recirculation cooler,
- Crankshaft sealing flange with integrated engine speed sender wheel,
- Accelerator pedal module with contact-free accelerator pedal position senders,
- Contact-free clutch pedal switch.

Technical data

<table>
<thead>
<tr>
<th>Engine code</th>
<th>BKD</th>
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</thead>
<tbody>
<tr>
<td>Design type</td>
<td>4-cylinder in-line engine</td>
</tr>
<tr>
<td>Displacement [cm³]</td>
<td>1968</td>
</tr>
<tr>
<td>Bore [mm]</td>
<td>81</td>
</tr>
<tr>
<td>Stroke [mm]</td>
<td>95.5</td>
</tr>
<tr>
<td>Valves per cylinder</td>
<td>4</td>
</tr>
<tr>
<td>Compression ratio</td>
<td>18:1</td>
</tr>
<tr>
<td>Max. output</td>
<td>103 kW at 4000 rpm</td>
</tr>
<tr>
<td>Max. torque</td>
<td>320 Nm at 1750 rpm up to 2500 rpm</td>
</tr>
<tr>
<td>Engine management system</td>
<td>Bosch EDC 16 with unit injector system</td>
</tr>
<tr>
<td>Fuel</td>
<td>Diesel, at least 51 CN</td>
</tr>
<tr>
<td>Exhaust gas aftertreatment</td>
<td>Exhaust gas recirculation and oxidising catalytic converter</td>
</tr>
<tr>
<td>Exhaust emission standard</td>
<td>EU4</td>
</tr>
</tbody>
</table>

Torque and output graph

Further information on this engine can be found in self-study programme No. 316 "The 2.0l TDI engine".
Power transmission

The 6-speed Direct-Shift Gearbox 02E

Following its successful, initial launch in the Golf and Touran, the Direct-Shift Gearbox is now also being fitted in the Golf Plus.

The Direct-Shift Gearbox combines the advantages of a manual gearbox:

- High efficiency
  = low fuel consumption and
- Sportiness
  = short shift times

with the advantages of an automatic gearbox:

- High comfort
  = no manual clutch actuation or shifting

Thanks to its design, it meets both the requirements of sporty drivers and also the comfort requirements of drivers who prefer automatic gearboxes.

Special characteristics

- Six forward gears and one reverse gear,
- Standard and sports gearbox programmes,
- Tiptronic selector level and steering wheel switches,
- Mechatronics,
- Hill-holder function,
- Creep control,
- Pressure oil filter and oil cooler mounted on the gearbox,
- Maximum torque 350 Nm.

The design and function of the selector lever and ignition key removal lock correspond to those in the Golf.

Further information on the Direct-Shift Gearbox can be found in self-study programme No. 308
The 6-speed automatic gearbox 09G

The 6-speed automatic gearbox 09G is already very popular amongst customers in the Golf, Touran and New Beetle. It sets new standards in terms of dynamics and economy in the segment of transversely mounted stepped automatic gearboxes.

**Special characteristics**

- Low weight,
- High shifting comfort,
- Compact gearbox dimensions and
- High ratio between first and top gear.

The design and function of the selector lever and ignition key removal lock correspond to those in the current models.

Further information on these automatic gearboxes can be found in self-study programme No. 309
Overview of the Golf Plus running gear

With the exception of minor modifications, this is identical to that of the Golf 2004. The springs, the shock absorbers and the anti-roll bars have been adapted so that the Golf Plus also offers the ride comfort typical of a Volkswagen and guarantees a high level of vehicle dynamics.

To offer a high level of ergonomic comfort, the accelerator pedal inclination angle has been changed from 65° to 57°, and the upper section of the steering column has been shortened. The functions of the accelerator pedal and the steering column are identical to those in the Golf 2004.

- Front axle suspension struts with high transverse rigidity
- Continental Teves ESP MK60
- Brake assist system
- Electromechanical power steering system
Further information on the running gear can be found in self-study programme No. 321 "The Golf 2004 running gear".

- Four-link rear suspension
- Tyre pressure monitor (optional)
- Height and longitudinally-adjustable steering column adapted to the seating position
- Vertical accelerator pedal with inclination angle adapted to the seating position
Overview of networked electronic control units

When fitted with maximum equipment, the following electronic control module configuration can be found in the Golf Plus.

As in the Golf 2004, the diagnostic interface for data bus J553 acts as the interface between the different data buses. It also ensures that data exchange between data buses with different speeds is carried out in an optimal manner.

In addition to the conventional comfort, powertrain and infotainment CAN bus systems, internal communication between the vehicle module or sub-system components frequently takes place via separate CAN links. These bus links, which are dependent on the different manufacturers, may differ from the above mentioned links, which operate with high- and low-speed signal forms, not only in terms of their transmission protocols, but also physically. This different behaviour must be taken into consideration in the case of direct measurements on CAN systems and their electronic control units.

Legend
- CAN powertrain data bus
- CAN comfort data bus
- CAN infotainment data bus
- CAN sensor data bus
- CAN instrument cluster data bus
- CAN diagnostic data bus
The electrical system in the Golf Plus essentially corresponds to that fitted in the Golf 2004. Changes particularly refer to the exterior lights.

**The exterior lights**

**Special characteristics**

- Double round headlights with three round elements
- Split rear lights

**The headlights**

The double round headlights with dipped beam and main beam reflector are fitted with H7 bulbs as standard. The turn signals are equipped with a round reflector.

**The rear lights**

In the Golf Plus, the rear lights are split into two by the rear lid and are designed with multi-section round elements. The rear light elements in the body are designed in LED technology and contain the tail light, brake light and turn signal functions. The rear light elements in the rear lid are fitted with conventional bulbs and contain the rear fog light on the left-hand side and the reversing light on the right-hand side.

In pure tail light mode, the LED light elements are actuated with just 10-15% of their maximum power output in comparison with the brake light and turn signal function.

If individual, defective light-emitting diodes have to be repaired, the entire LED assembly has to be exchanged.
The inverter

As an optional extra, the Golf Plus can be equipped with a 230V/50Hz socket for the European market or a 115V/60Hz socket for North America. Depending on the model, the European socket is designed without an earthing contact.

The inverter has a continuous output of 150 W. For a short period of time of max. 2 minutes, maximum power of 300 W can be output. In the inverter, the 12 V DC low-voltage side and the 230 V AC side are galvanically separated from each other. The voltage of 230 V is only available when the engine is running in order to protect the battery.

When illuminated green, the two-colour LED indicates normal operating mode on current consumption. The LED’s flashing red indicates overload.

The inverter and the socket are comprised to form an assembly. This is located in the rear centre console instead of the cup holder. If the socket or the inverter is defective, the entire assembly is exchanged.

Repairs to 230 V systems must not be carried out in customer service workshops. If the socket or the inverter is defective, the entire assembly must therefore be exchanged.

Further information can be found in self-study programme 340 "The Passat 2006 – The electrical system".
Electrical system

Trailer detector control unit J345

This ensures that the trailer’s electrical components are integrated into the vehicle network.

Location

The trailer detector control unit is located behind the luggage compartment trim on the left-hand side panel.

Tasks

The trailer detector control unit determines whether a trailer is connected to the trailer socket, and makes this information available to other control units via the CAN data bus.

It controls the trailer’s lighting and also diagnoses the functional capability of the majority of trailer bulbs.

As a CAN subscriber, it reads all messages required for trailer operation, e.g. for the reversing light or turn signals, and processes these to actuate the trailer’s corresponding lighting components.

This also applies to equipment-dependent convenience electronics functions such as automatic headlight control or the Coming-Home lighting and safety functions such as the hazard warning lights in the event of emergency braking.
When retrofitting a trailer socket, the socket must no longer simply be connected to the rear lights. In this case, the onboard supply control unit is no longer able to carry out functions such as bulb diagnosis via the defined bulb load or dimmed light actuation, because it is unable to distinguish between the vehicle’s lights and a possible short-circuit in the relevant power circuit.

However, the trailer detector control unit also feeds messages into the CAN data bus, so that the affected control units can switch to trailer mode.

This information is required:

- At the onboard supply system control unit to actuate the rear fog light. This is switched off during trailer operation to reduce the dazzle effect to which the driver is exposed.
- At the ABS and ESP control unit to adapt the brake system control functions to trailer operation.
- At the parking aid control unit to deactivate the sensors for the rear sensing range.
- At the anti-theft alarm system to integrate the trailer into monitoring when the trailer line is connected. Since the microswitch in the trailer socket has been omitted, this is carried out via bulb sensing.

A trailer with LEDs in its turn signals and rear lights cannot be detected, because its power consumption is less than 5W. During trailer simulation, workshops must ensure that their test boxes provide this output value of 5W as consumers.
Electrical system

**Function**

Based on cold monitoring of the tail lights and turn signals, the trailer detector control unit determines whether a trailer is connected. This is carried out via bulb current sensing. The minimum load which has to be connected at the control unit outputs to achieve this is 5W per output.

The advantage of current sensing is that the bulbs can be monitored via the self-diagnosis function. If a bulb is defective, an entry is made in the control unit's fault memory. This remains there until trailer re-connection is detected. This means that, even without the trailer, a defective turn signal or rear light can be detected in the trailer electrics in the workshop.

**Self-diagnosis**

The trailer detector control unit monitors all components' inputs and outputs during vehicle operation and in the workshop, e.g. during a control element test. The reversing light and rear fog light are the exceptions, as neither of these were legally prescribed for trailers until recently.

The fault memory can contain five faults and is not equipped with "self-healing". This means that static and sporadic faults remain stored until a trailer is connected again. A fault may change its status from "static" to "sporadic" if a defective bulb is exchanged whilst the trailer is connected.
The windscreen wiper system

It is comprised of a contrarotating system with two motors and no mechanical link between the wipers. Due to the wiper system’s contratotation principle, the rain and light detector sensor has been located in a new position in the Golf Plus.

**Function**

The wiper switch position is transmitted directly to the steering column electronics control unit and then to the onboard supply control unit via the CAN comfort data bus.

Information on the activated wiper stage is transmitted by the onboard supply control unit, via the LIN data bus, to the wiper motor control unit, and from there to the front passenger side wiper motor control unit. Both control units are located directly at the wiper motors.

The wiper motor control unit controls the wiping processes and actuates the front passenger side wiper motor control unit in accordance with the master-slave principle.

**Diagram**

![Diagram of wiper system](image)

- **D** - Ignition/starter switch
- **E** - Wiper switch
- **F266** - Bonnet contact switch
- **G397** - Rain and light detector sensor
- **J400** - Wiper motor control unit
- **J519** - Onboard supply control unit
- **J527** - Steering column electronics control unit
- **J533** - Data bus diagnostic interface
- **J584** - Front passenger side wiper motor control unit
- **a** - Ambient temperature signal via CAN instrument cluster data bus
- **b** - Vehicle speed signal via CAN powertrain data bus
Convenience electronics

Rain closing

The "rain closing" convenience function will be introduced for the first time in Volkswagen's Golf class along with the Golf Plus. This is a distributed function in which the onboard supply, convenience and door control units, the rain and light detector sensor and, depending on the equipment fitted, the sliding roof control unit work together.

Rain closing is initialised in the convenience control unit. To achieve this, the "rain closing" function must be switched on via the personalisation menu in the instrument cluster. It has to be re-activated each time after starting the engine, i.e. "terminal 15 on".
To avoid inadvertent deployment of the anti-theft alarm system the sensitivity of the interior motion sensors is reduced whilst rain closing is being carried out.

**Deactivation conditions**

The function is deactivated following:

- Successful execution of rain closing,
- “Ignition on” status detected,
- Expiry of the monitoring period.

**Function**

Once rain closing has been activated, the convenience system control unit transmits a corresponding message to the onboard supply control unit. Once this has detected that the ignition has been switched off, it sets the rain and light detector sensor to monitoring mode. This mode is set to 12 hours as default.

If the rain sensor detects precipitation, it informs the onboard supply control unit via the LIN data bus; in turn, the former informs the convenience control unit via the CAN data bus. Via separate CAN messages, this issues the command "close windows" to the door control units. In accordance with the EU Directive, the window drives' excess force limitation function is also retained in the case of rain closing.

The command for the sliding/tilting roof (STR) is transmitted via a separate line from the convenience control unit to the STR module.

Whilst the door control units confirm that the windows have been closed, the STR drive does not provide the convenience control unit with any feedback.
Rain and light detector sensor G397

Location

The rain and light detector sensor is located in the Golf Plus in such a way that it is positioned as high as possible, centrally, in the wiping overlap range of both wiper arms.

Task

The rain and light detector sensor only operates in automatic mode if the wiper lever is set to the "intermittent" position for rain detection and the light switch is set to the "automatic headlight control" position for light detection. The rain and light detector sensor then ensures, when rain is detected on the windscreen, that the wipers are actuated from zero to the maximum number of wiper cycles according to the quantity of precipitation, and that the headlights are switched on in twilight conditions.

The rain and light detector sensor independently adapts to the windshield’s tinting.

At wiper lever level 1, in which the wipers operate at a speed of 42 cycles per minute without rain sensing, the wiper speed can be independently increased up to 60 cycles per minute with rain sensing, depending on the quantity of precipitation.

The intermittent wiper regulator can be used to individually set the sensitivity of the rain detector. In vehicles without a rain detector, the regulator is used to set the length of the intervals.
The rain and light detector sensor is comprised of a combination of light-sensitive sensor elements and an LED. All components are mounted on a printed circuit board in the sensor housing. An optical element rounds off the sensor housing towards the windscreen. The optical element's task is to bundle and align the outgoing and incoming light. The entire sensor is secured to the windscreen using an adhesive film. The sensed area measures 300 mm$^2$.

The LED and a photo diode are used for rain detection, whilst an ambient light and a remote sensor are used for light detection.

The priority of both rain and light detection is subordinate to manual actuation of the relevant switch elements. This means that even if these assistance functions malfunction, manual activation of the wipers and driving lights always takes precedence.
Convenience electronics

Rain detection function

The sensor’s core elements are an LED and a photo diode. The sensor’s basic principle is that the light emerging from the LED is partially reflected by the surface of the windscreen and, bundled by the optical element, hits the photo diode.

The degree to which the diode’s light is reflected, and therefore the volume of light which hits the photo diode, changes if the windscreen is coated with water droplets or a film of water. The greater the coating, the less light is reflected due to light refraction. The photo diode’s output signal can therefore be used to calculate the quantity of precipitation.

The rain detector response time, i.e. the time which passes between the detection of precipitation and the emission of the output signal to the wipers, is less than 20 ms.
To distinguish between light conditions, the rain and light detector sensor is fitted with different light sensors. An ambient sensor detects the light conditions in the vehicle’s immediate vicinity and a remote sensor senses the light conditions at a distance of up to three vehicle lengths in front in the direction of travel.

The system detects a general decrease or increase in brightness and switches the driving lights on or off when the automatic headlight control function is activated.

From the difference between both sensors’ signals, the system is able to determine e.g. that the vehicle is entering a tunnel, thereby switching on the driving lights when the vehicle enters the tunnel at the latest. The system’s internal, logical link ensures that the driving lights are only switched off once the ambient light sensor has detected an adequate brightness value. If the rain detector is also active in addition to the light detector, correspondingly heavy precipitation also leads to activation of the driving lights.

The light detection function does not react to fog or underpasses. In these cases, the driving lights have to be switched on manually.
Radio and navigation

The radio systems in the Golf Plus

Radio R100

The R100 target group is major customers, e.g. vehicle fleet operators. This radio unit offers the following functions:

- Two loudspeaker channels (front only, 20 Watts each)
- RDS FM/AM European radio (AM without LW)
- Control system for external 6-fold CD-changer
- Telephone control system (hands-free)
- Speed-dependent volume control (GALA)
- Self-diagnosis with loudspeaker diagnosis
- Transport mode (current requirement reduction during transport and idle times)

Radio RCD 300

Radio RCD 300 is available as the standard radio system for private customers. It offers the following functions:

- Two or four loudspeaker channels (20 Watts each)
- RDS FM/AM European radio (AM without LW)
- Indication of the stored stations with RDS names in the display
- FM 2-tuner diversity
- Control via the multi-function steering wheel (MFL) and multi-function indicator (MFI)
- Integrated single-CD player,
- Control system for external 6-fold CD-changer
- Telephone control system (hands-free)
- GALA
- Self-diagnosis with loudspeaker diagnosis
- Transport mode
- Driving school function (possible indication of turn signal function and speed via the unit’s display)

Due to the change in installation position and reading angle in comparison with the Golf 2004, the displays for the radios fitted in the Golf Plus have been redesigned. This results in a different part number.
Radio RCD 500

This, or a higher-quality radio, is required to equip the Golf Plus with the digital sound package DSP. It offers the following functions:

- Four loudspeaker channels (20 Watts each)
- RDS FM/AM European radio (AM without LW)
- Indication of the stored stations with RDS names in the display
- FM 2-tuner phase diversity
- Control via the MFL and MFI
- Integrated single-CD player
- Control system for external 6-fold CD-changer
- Telephone control system (hands-free)
- GALA
- Traffic Information Memory (TIM)
- Vehicle model-specific sound adaptation
- Self-diagnosis with loudspeaker diagnosis
- Transport mode
- Optional connection of an external sound amplifier

Radio/navigation system MFD 2

A radio system with an integrated navigation system is also available for the Golf Plus. The operating sequences are similar to those of the radio/navigation system fitted in the Touareg. It offers the following functions, etc.:

- Multi-colour display (MFD)
- Dynamic guidance
- Four loudspeaker channels (20 Watts each)
- RDS FM/AM European radio (AM without LW)
- Indication of the stored stations with RDS names in the display
- External diversity changeover box
- Control via the MFL and MFI
- Control system for external 6-fold CD-changer
- Telephone control system (hands-free)
- GALA
- TIM
- Self-diagnosis with loudspeaker diagnosis
- Optional connection of an external sound amplifier

The cover frame has to be removed to remove or install a radio, in order to access the threaded connection located behind it.
Radio and navigation

The antenna concept

Four antenna equipment alternatives are currently available for the Golf Plus:

- Roof antenna and rear window with an antenna structure without connection option,
- Roof antenna and rear window with an antenna structure and one connection option,
- Roof antenna and rear window with two antenna structures and one connection option, and
- Roof antenna and rear window with two antenna structures and two connection options.

A rod or tri-band antenna may be fitted as the roof antenna.

**Roof antenna and rear window with an antenna structure without connection option**

If this equipment is fitted, e.g. radio R100 is connected to the roof antenna. As in the case of the variant "without radio", the integrated rear window antenna has no connection option, with the result that a telephone, navigation and telestart cannot be implemented with this version.

**Roof antenna and rear window with an antenna structure and one connection option**

Both antennae are used by one radio (as of RCD 300) to exploit the advantages of antenna diversity. This means that, thanks to an integrated diversity switch, the radio automatically uses the antenna with the stronger input signal. Telephone, navigation and telestart are not available in this case.
Roof antenna and rear window with two antenna structures and one connection option

The roof antenna is used for the telephone, navigation or telestart. The rear window antenna’s connection option is used for the radio, e.g. the R100.

Roof antenna and rear window with two antenna structures and two connection options

The roof antenna is used for the telephone, navigation and telestart. The two rear window antenna connections are used for the radio. No external diversity box is installed if the vehicle is equipped with radio RCD 300 or RCD 500. The GPS link to the roof antenna is also omitted in this case.

If the Golf Plus is supplied without preparation for antenna installation, a dummy antenna seals the antenna bore in the vehicle’s roof. Whilst the rear window is equipped with the integrated antenna structure, it does not offer any connection option.
Heater and air conditioner

Climate control

Three different systems are available in the Golf Plus:

- The manual heater and ventilation system,
- The semi-automatic heater and air conditioner "Climatic" and
- The heater and air conditioner "Climatronic".

An identically designed air conditioner unit, which has been adapted to the relevant vehicle equipment, is used for both air conditioners. The main difference is in the number and design of the air distribution flaps. For example, the 2C-Climatronic is fitted with an additional fresh air/air flow flap.

Depending on the vehicle's equipment, the heater and air conditioner control panels differ. Four different variants are available:

- With or without instant heat button for the auxiliary coolant heater and
- With or without potentiometer for the seat heating.

All temperature- and ventilation-relevant control elements and the air conditioner control unit are integrated into the control panel.
The vents are sub-divided. This doubles the number of vents in the upper area of the dash panel to eight, and enables more individual adjustment. Better air output is made possible thanks to the larger air duct cross-sections. The cross-sections of the rear footwell vents have also been increased. This also improves ventilation in this area.

The glove box is supplied with cooled air, which is diverted directly downstream of the evaporator.

The temperature-controlled storage compartment in the Highline centre console has room for two cans of drink. The temperature corresponds to the pre-set interior temperature.

In the Climatronic system, a diffusor offers indirect and draught-free ventilation.
In the Climatic system, the vehicle’s entire interior is comprised to form a single climatic zone.
The desired temperature is set at the left rotary switch.
The rotary switch is linked to a potentiometer, which passes the temperature command on to the Climatic control unit. The control unit then forwards a calculated flap position value to the temperature flap positioning motor.

Climatic is able to control the pre-set temperature by monitoring the vent and interior temperature.

The air distribution flaps are actuated via a flexible shaft in the Climatic system.
The air conditioner is switched on and off via the ECON button. In ECON mode, the additional heater is also switched off in vehicles fitted with diesel engines. The Climatic air conditioner unit is equipped with a combined fresh air/recirculated air flap.

Further information can be found in self-study programme No. 318 "The Golf 2004".
The 2C-Climatronic system

In the 2C-Climatronic system, the interior is subdivided into two climatic zones. This means that the temperatures desired on the driver and front passenger side can be set independently of each other. The climatic zones are separated by two temperature flaps inside the air conditioner unit.

All flaps, air distribution and the temperature are actuated via positioning motors with an integrated feedback potentiometer. Maintenance of the pre-set interior temperature and optimal air distribution is thereby controlled and monitored by the Climatronic control unit.

The 2C-Climatronic system can be operated in automatic or manual mode.

In addition to the Climatic system, 2C-Climatronic is fitted with a fresh air flow flap, which is closed as of 100 km/h as speed increases, in order to keep the volume of fresh air which is supplied constant.

One further function which is available is speed-dependent blower reduction, which reduces the air conditioner’s flow noises at low speed. In cooling mode, this is compensated by lowering the vent temperature and by raising the ventilation temperature in heating mode.

To prevent the windows from misting when the compressor is switched off and the windscreen wipers are switched on, the defrost flap is automatically opened further to conduct more air to the windscreen.
The Thermo Top V auxiliary coolant heater

The Golf Plus can be fitted with the optional Thermo Top V auxiliary coolant heater. This undertakes the following tasks:

- Acts as an auxiliary heater for heating the vehicle interior and defrosting the vehicle’s windows,
- Acts as stationary ventilation to lower the interior temperature when the vehicle is parked in the sun,
- Acts as an additional heater in vehicles with petrol or diesel engines (fitted as standard in diesel engines).

Structure

Special characteristics

- The auxiliary coolant heater control unit is integrated into the heater unit.
- The electrical contacts for the combustion air blower are inserted directly into the control unit.
- The auxiliary coolant heater is fitted with a second NTC temperature sensor for controlling and monitoring the water temperature.
- The combustion air enters the combustion chamber via a venturi nozzle and thereby draws in the fuel delivered by the metering pump from the fuel line.
The venturi nozzle

The intaken air is guided through a ceramic housing, which is shaped as a venturi nozzle. As a result of this, the air delivered by the combustion air blower is accelerated to approx. 50 m/s. The incoming fuel is therefore drawn from the fuel line and swirled.

The fuel pre-heater

The Thermo Top V system is fitted with a PTC element for pre-heating fuel; this enables the use of RME (rapeseed methyl ester). The fuel is heated directly prior to emerging from the fuel line. To do this, the PTC heater element is switched on for one minute at ambient temperatures of less than 5°C.
Heater and air conditioner

Activation of Thermo Top V

There are three ways of activating the Thermo Top V auxiliary coolant heater. The "heater" or "ventilation" functions can be set in the dash panel insert display.

1. Activation of the auxiliary coolant heater via the instant heat button on the control panel.

2. Programming the auxiliary coolant heater via the multi-function indicator (MFI) with the data display protocol (DDP). In this case, programming is carried out via the display in the dash panel insert in the "auxiliary heater" sub-option (personalisation).

3. The separate radio remote control can be used for switching on and off functions. An indicator lamp indicates whether the radio signal has been received by the auxiliary coolant heater.

The instant heat button in the control panel shows the status of the auxiliary coolant heater: if active, the yellow feedback LED lights up. If a programmed duty cycle for the auxiliary coolant heater is active, the feedback LED lights up for approx. 10 seconds after the ignition has been switched off.

Further information can be found in self-study programme No. 318 "The Golf 2004".
## Special tools

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<td>T 10311</td>
<td><img src="S338_137" alt="Wing underlay" /></td>
<td><strong>Wing underlay</strong>&lt;br&gt;The wing underlays are required when removing and installing the gearbox. They serve as underlays for support T 10222 A and its adapters T 10222 A/8.</td>
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