Self-study programme 319

The Golf 2004
Electrical system

Design and function
The most striking change compared with the previous model is the rear lighting of the Golf 2004.

The one-piece light unit, common on the previous model, has now been replaced by a two-piece light unit. This is comprised of a separate independent light element in the side part and a fixed element in the tailgate.

In this way, the car’s relationship to the prestige Volkswagen models is made evident.

A bright and high quality appearance is achieved by day and by night by means of round elements, comprised of several parts, located behind clear lenses.
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Introduction

Fuse boxes and relay slots in vehicle electrical system

Fitting locations

The onboard electrical system of the Golf 2004 is similar to that of the Touran. Golf 2004 and Touran vehicles are based on the same platform.

The onboard electrical system of the Golf 2004 is of the decentral design. Distribution of the fuse boxes and relay sockets in various locations facilitates quick and precise fault diagnosis.

Electrics box, on left in engine compartment

Pre-fuse box, on left in engine compartment
Fuse box, on left in dash panel

Relay carrier, on left beneath dash panel, above onboard power supply control unit

Relay carrier of onboard power supply control unit on left under dash panel

Fuse box, on left in dash panel
The networking concept

Overview of networked control units

In order that data can be transferred without conflict or interference between the individual control units, these are connected together in a network via various data bus systems.

The data bus diagnostic interface J533 (Gateway) provides an interface for the following data buses:

- Drivetrain CAN data bus
- Convenience CAN data bus
- Infotainment CAN data bus
- Dash panel insert CAN data bus
- Diagnosis CAN data bus

In addition to the CAN data bus, a number of electric components are networked via the LIN data bus.
Key

- **D** Ignition/starter switch
- **E221** Operating unit in steering wheel
- **G85** Steering angle sender
- **G273** Interior monitoring sensor
- **G384** Vehicle inclination sender
- **G397** Rain and light detector sensor
- **G419** ESP sensor unit
- **H8** Anti-theft alarm system horn
- **J104** ABS with EDL control unit
- **J136** Seat and steering column adjustment control unit with memory
- **J217** Automatic gearbox control unit
- **J220** Motronic control unit
- **J234** Airbag control unit
- **J255** Climatronic control unit
- **J285** Control unit with display in dash panel insert
- **J334** Immobiliser control unit
- **J345** Trailer detection control unit
- **J364** Auxiliary heater control unit
- **J386** Driver door control unit
- **J387** Front passenger door control unit
- **J388** Rear left door control unit
- **J389** Rear right door control unit
- **J393** Convenience system central control unit
- **J400** Wiper motor control unit
- **J412** Mobile telephone operating electronics control unit
- **J431** Headlight range control, control unit
- **J446** Parking aid control unit
- **J500** Power steering control unit
- **J503** Control unit with display for radio and navigation
- **J519** Onboard supply control unit
- **J525** Digital sound package control unit
- **J527** Steering column electronics control unit
- **J533** Data bus diagnostic interface
- **J587** Selector lever sensors control unit
- **J604** Auxiliary air heater control unit
- **J608** Special vehicle control unit
- **J743** Direct shift gearbox mechatronics
- **NOx** NOx sensor
- **R** Radio
- **R78** TV tuner
- **T16** 16-pin connector, diagnosis interface

* On direct shift gearboxes only
Control units in drivetrain CAN data bus

Control units and fitting locations

The adjacent illustration shows the control units of the drivetrain CAN data bus and associated fitting locations.

The data is transferred at a rate of 500 kbit/s. Transfer is made via the orange/black CAN high wire and orange/brown CAN low wire. To guarantee data transfer without conflict or interference, the CAN wires are twisted together.

- ABS with EDL control unit J104, on right of bulkhead in engine compartment
- Motronic control unit J220, under plenum chamber cover
- Airbag control unit J234, beneath centre console, on front of tunnel
Headlight range control, control unit J431, on right of glove compartment

Steering column electronics control unit J527, beneath steering column switch

Data bus diagnostic interface J533, beneath dash panel, above accelerator pedal

Automatic gearbox control unit J217, on left in wheel housing
The control units in the drivetrain CAN data bus

Control units and fitting locations

The adjacent illustration shows the control units of the convenience CAN data bus and associated fitting locations.

The speed of data transfer is 100 kbit/s.
The data is transferred via the orange/green CAN high wire and orange/brown CAN low wire.
To guarantee data transfer without conflict or interference, the CAN wires are twisted together.
Data bus diagnostic interface J533, beneath dash panel, above accelerator pedal

Onboard supply control unit J519, under dash panel on relay carrier

Door control units J386, J387, J388, J389, installed in doors

Parking aid control unit J446, in rear right side panel

Trailer detection control unit J345, in rear right side panel
The control units in the infotainment CAN data bus

Control units and fitting locations

The adjacent illustration shows the control units of the infotainment CAN data bus and associated fitting locations.

The infotainment CAN data bus transfers data at a rate of 100 kbit/s. The CAN high wire is orange/purple and the CAN low wire is orange/brown. To guarantee data transfer, the CAN wires are twisted together.

Mobile telephone operating electronics control unit J412, under right seat, beneath carpet covering on right sill panel

Auxiliary heater control unit J364, on front right beneath wing
Control unit with display for radio and navigation J503 or Radio R, in centre console

CD changer R41, in centre console, beneath front armrest
Introduction

The control units in the dash panel insert CAN data bus and in the diagnosis CAN data bus

Dash panel insert CAN data bus

Information is exchanged via the dash panel insert CAN data bus between the dash panel insert control unit and the data bus diagnostic interface. These are the only control units in this data bus system.

Diagnosis CAN data bus

The transfer of data between the diagnosis tester VAS 5051/5052 and the data bus diagnostic interface is via the diagnosis CAN data bus.

Rate of data transfer

The rate at which data is transferred is 500 kbit/s for both CAN data buses.
Data bus diagnostic interface J533, beneath dash panel, above accelerator pedal.

16-pin connector, diagnosis interface T16, on left beneath dash panel.
Local Interconnect Network (LIN) defines a local system in which all associated components within a specific area are located.

- The local sub-system is a cost effective version of CAN data bus.
- The defined consumer interface makes simple exchange of the connectors possible.
- Bus connection in crash area
- Bus connection in critical safety areas

Information is exchanged in the LIN data bus system via a master control unit and up to 16 slave control units. Communication is initiated only by the master. Slave control units cannot communicate independently.

Several independent LIN data buses can be installed in the vehicle with different functions. Information is exchanged between the individual bus systems via the master control units connected to the CAN data bus.

The LIN bus system

Key

E221 Operating unit in steering wheel
G273 Interior monitoring sensor
G384 Vehicle inclination sender
G397 Rain and light detector sensor
H8 Anti-theft alarm system horn
J393 Convenience system central control unit
J400 Wiper motor control unit
J519 Onboard power supply control unit
J527 Steering column electronics control unit
**Master control unit**

The control unit connected to the CAN data bus takes on the master functions of the LIN data bus system.

**Tasks**

- Conversion of local data bus messages to data format of CAN data bus
- Monitoring of data bus conversion and rate of data transfer
- Control of data transfer cycle
- Transfer of diagnosis data from slave control units

**Slave control unit**

In the LIN data bus system, individual control units, sensors or actuators can act as slave control units.

The electronics integrated in the control units evaluate the information, convert it into digital information and send it, once the request has been made, via the LIN data bus to the master control unit.

**Actuators** are assigned their tasks by a signal, which comes from the master control unit via the LIN data bus.

Following interrogation of the master control unit, the electronics integrated in the sensors send the actual status to the master control unit, in which a target/reference comparison is carried out.

The convenience system central control unit, illustrated, shows the wiring of the LIN and CAN data buses.