

Service.



Self-study programme 307

The Touran Electrical system

Design and function



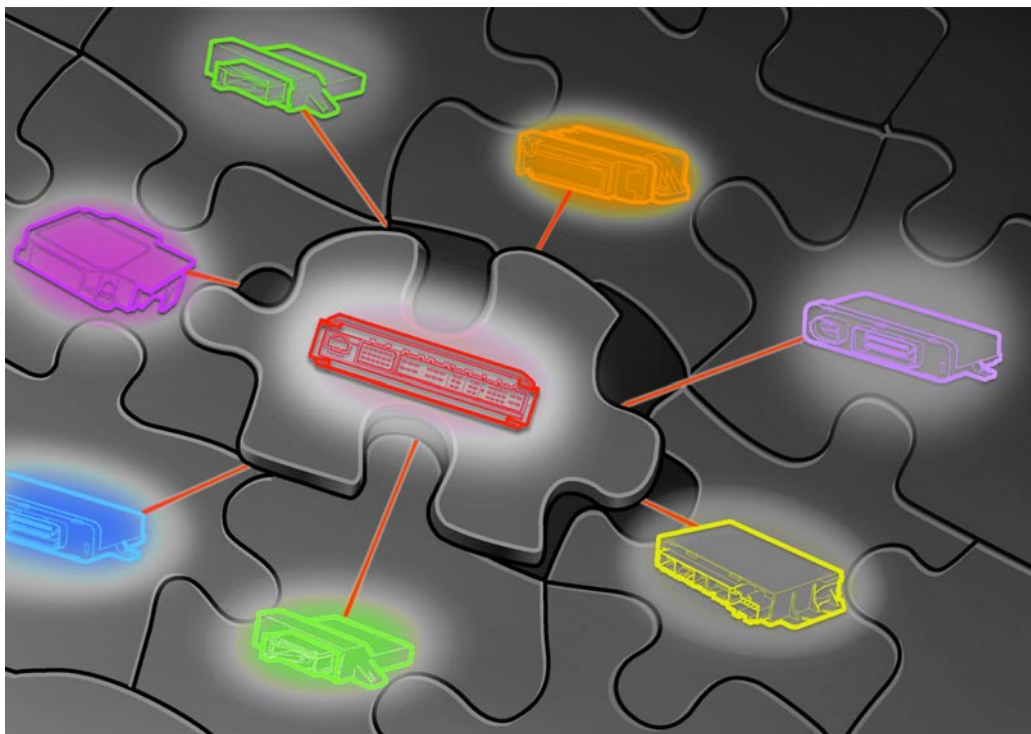
The networking technology, used until now only in luxury class vehicles, will be a feature in compact vans, such as the Volkswagen Touran.

The control units installed in this system also manage tasks that were previously carried out by relays and switches. In order that these tasks can be fulfilled efficiently, the units have to exchange a great deal of information (data) between each other. Such a high rate of data transfer would only be possible with a large number of cables if standard means were used, such as wiring connections.

To keep the number of wiring connections at a manageable level, Volkswagen favours the use of data bus connections on a wider scale.

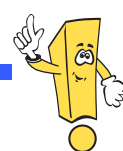
This self-study programme is designed to help you better understand the networking concept of the Volkswagen Touran.

It covers the allocation of control units to the various data bus systems, the fitting locations of relay slots, fuses and control units. Furthermore, it describes the various functions of and changes to the diagnosis system.



S307_050

NEW



Important Note



This self-study programme explains the design and function of new developments. The contents will not be updated.

For the latest testing, setting and repair instructions, please refer to the relevant workshop literature.

Contents



Introduction	4
LIN data bus	16
Onboard power supply	20
Data bus diagnosis interface	24
Onboard power supply control unit	28
Windscreen wiper system	38
Rear window wiper system	44
Dash panel insert	46
Immobiliser	50
Convenience and infotainment settings	54
Lighting	55
Service	56
Test yourself	58



Introduction

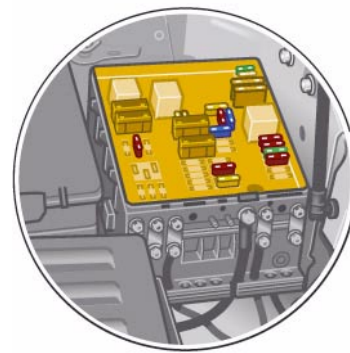


Fuse boxes and relay slots in vehicle's electrical system

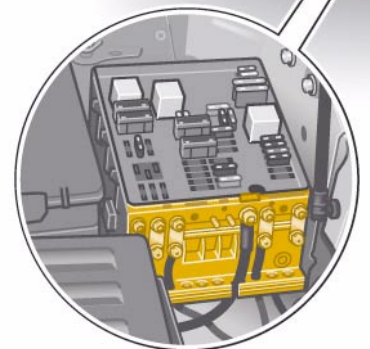
Fitting locations

The onboard power supply of the Touran is decentralised. For this reason, the fuse boxes and relay slots are installed at various locations in the vehicle.

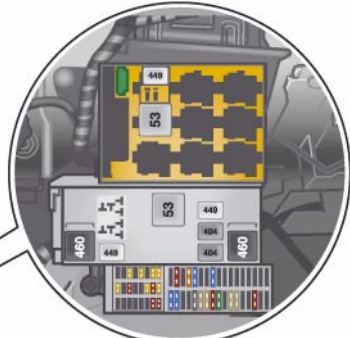
The adjacent diagram shows the various fitting locations.



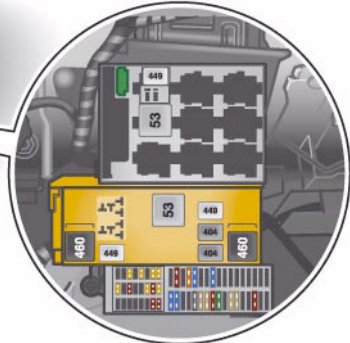
Electrics box on left in engine compartment



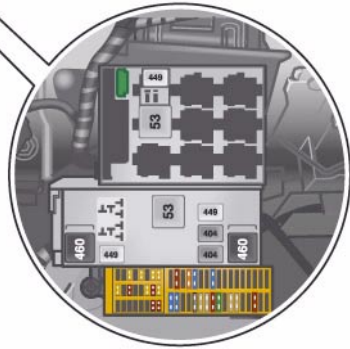
Back-up fuse box on left in engine compartment



Relay carrier on left under dash panel



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



Fuse box on left under dash panel

S307_001

Introduction

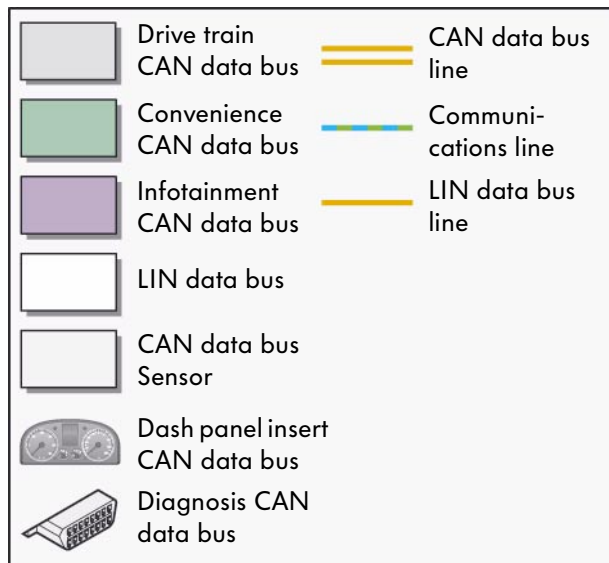
The networking concept

Overview of networked control units

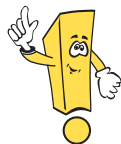
In order that data can be transferred between the control units, these are networked via various data bus systems.

The data bus diagnosis interface J533 (gateway) provides the interface for the data buses:

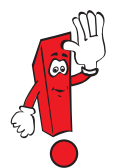
- Drive train CAN data bus
- Convenience CAN data bus
- Infotainment CAN data bus
- Dash panel insert CAN data bus
- Diagnosis CAN data bus



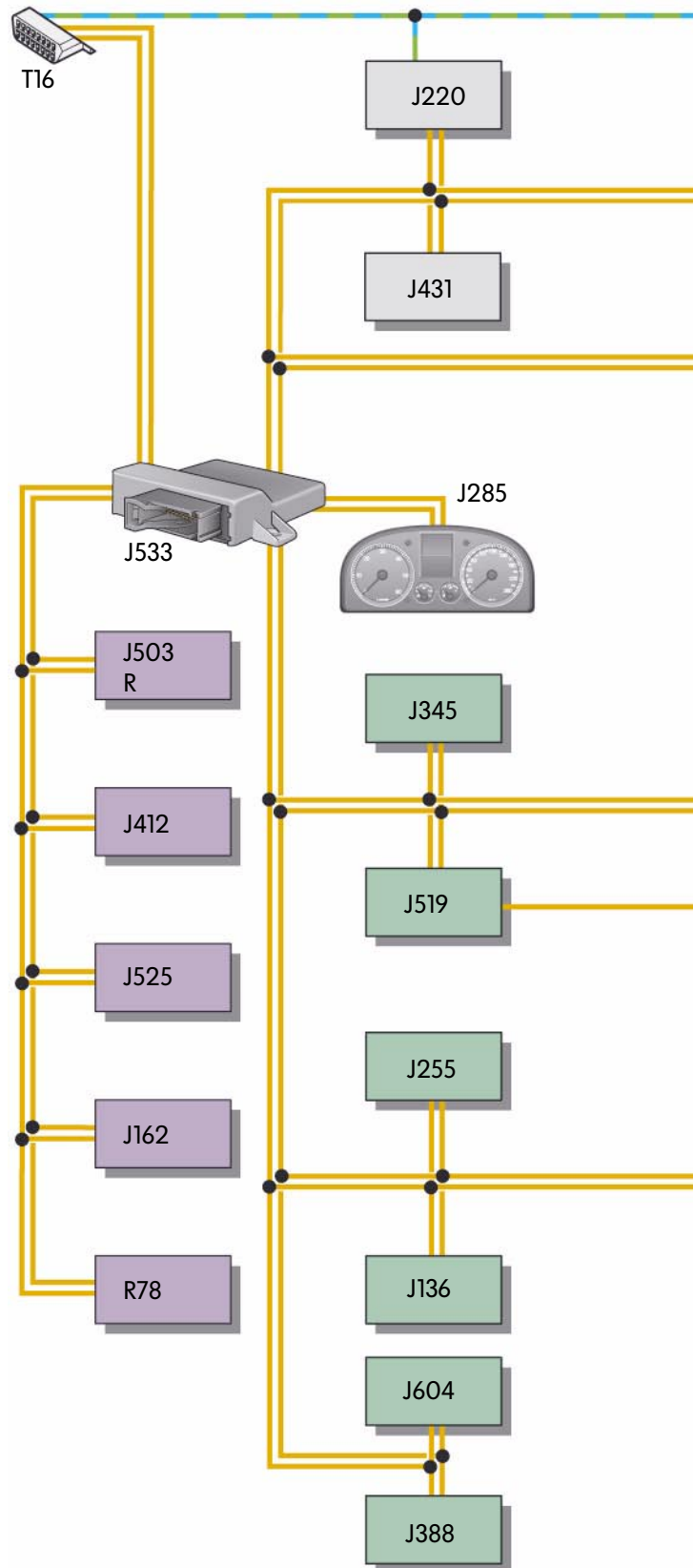
S307_049

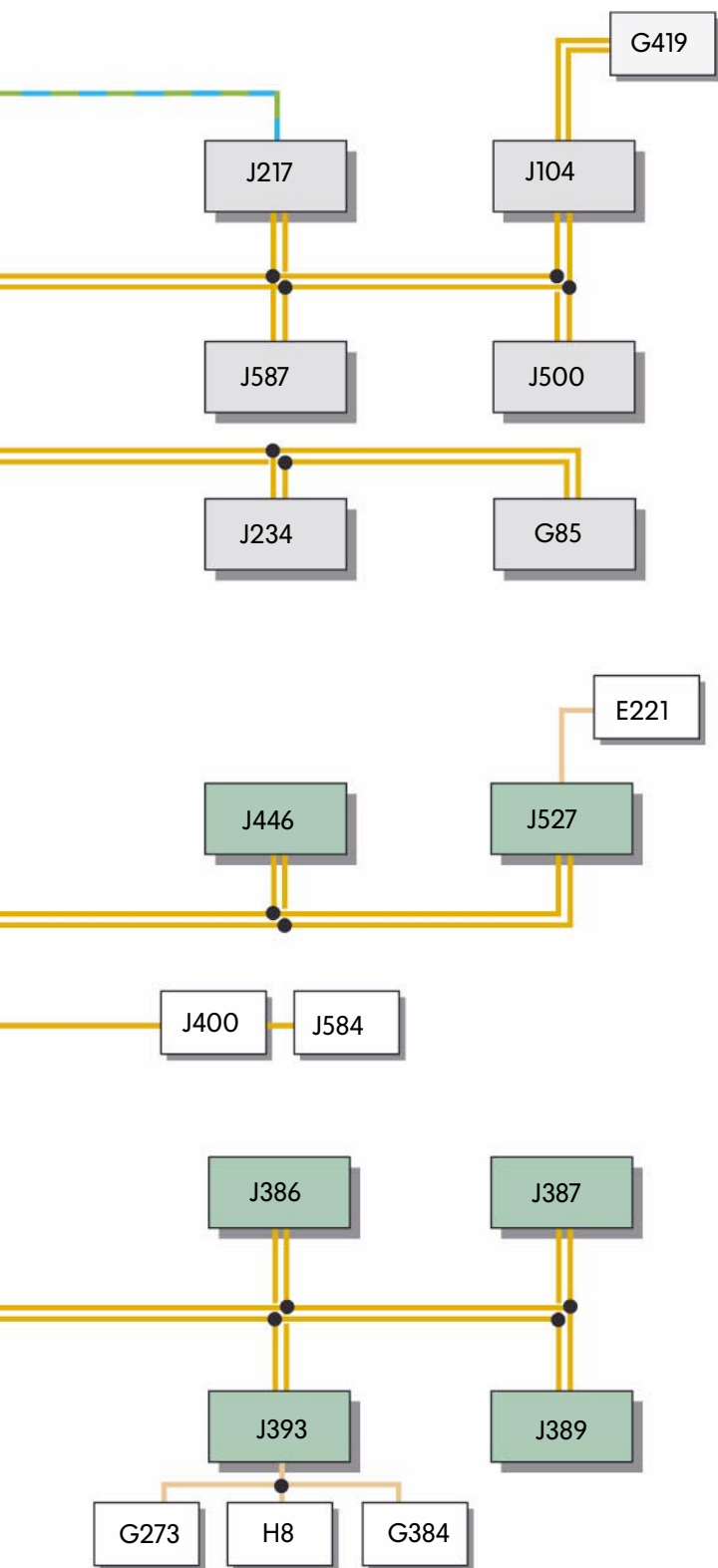


In addition to the CAN data bus, a number of electric components are networked via the LIN data bus.



The data protocols have been changed. Therefore, these control units cannot be exchanged with those of other vehicle models e.g. Touareg or Phaeton.





Key

- E221 Operating unit in steering wheel
- G85 Steering angle sender
- G273 Interior monitoring sensor
- G384 Vehicle inclination sensor
- G419 ESP sensor unit
- H8 Anti-theft alarm signal horn
- J104 ABS with EDL control unit
- J136 Seat adjustment control unit
- J162 Heating control unit
- J217 Autom. gearbox control unit
- J220 Motronic control unit
- J234 Airbag control unit
- J255 Climatronic control unit
- J285 Control unit with display in dash panel insert
- J345 Trailer detector control unit
- J386 Door control unit, driver side
- J387 Door control unit, front passenger side
- J388 Door control unit, rear left
- J389 Door control unit, rear right
- J393 Convenience system central control unit
- J400 Wiper motor control unit
- J412 Cellphone 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 power supply control unit
- J525 Digital sound package control unit
- J527 Steering column electronics control unit
- J533 data bus diagnosis interface
- J584 Wiper motor control unit front passenger side
- J587 Selector lever sensors control unit
- J604 Auxiliary air heater control unit
- R Radio
- R78 TV tuner
- T16 Diagnosis connection



Introduction

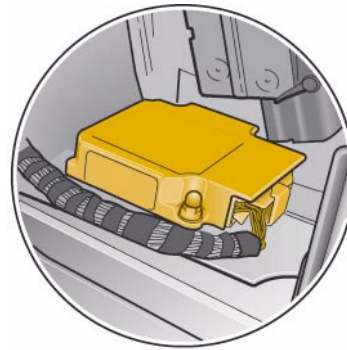


Control units in drive train CAN data bus

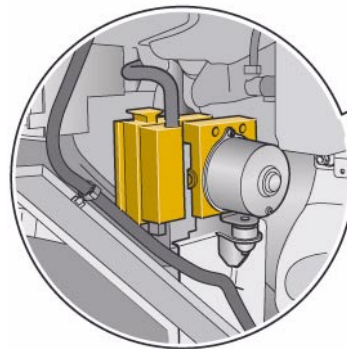
Control units and fitting locations

The adjacent diagram shows the control units that belong to the drive train CAN data bus and associated fitting locations.

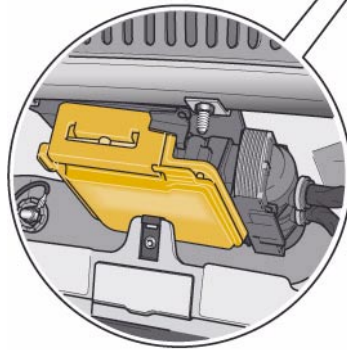
The data is transferred at a speed of 500 kbit/s. Transfer is made via the orange/black CAN high line and orange/brown CAN low line. To make data transfer more efficient, the CAN lines are entwined.



Airbag control unit J234
under centre console



ABS with EDL control unit J104
under bulkhead in
engine compartment



Motronic control unit J220
under plenum chamber cover





Control unit for headlight range control J431 on left under dash panel, on tunnel support

data bus diagnosis interface J533 under dash panel, above relay carrier

Automatic gearbox control unit J217 in wheel housing

S307_003

Introduction



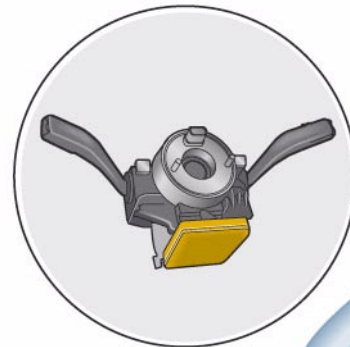
The control units in the drive train CAN data bus

Control units and fitting locations

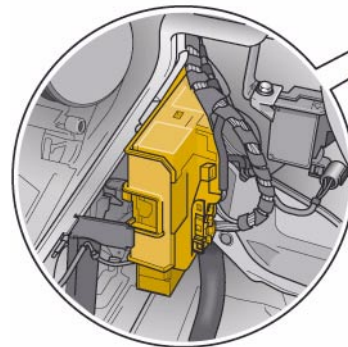
Shown in the diagram are the control units of the convenience CAN data bus and their fitting locations.

The speed of data transfer is 100 kbit/s.

The data is transferred via the orange/green CAN high line and orange/brown CAN low line. Both CAN lines are entwined together.



Steering column electronics control unit J527
on steering column switch



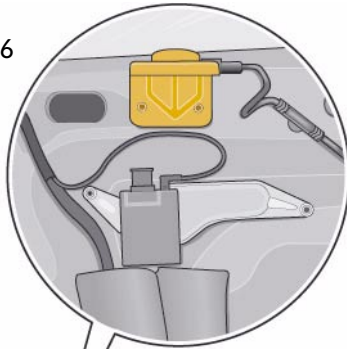
Convenience system central control unit
J393
on right under dash panel,
near centre console



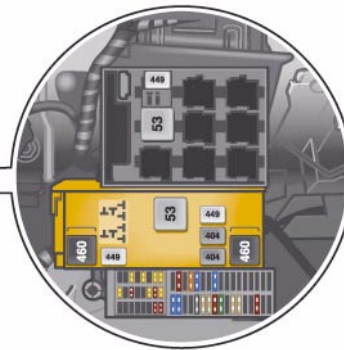
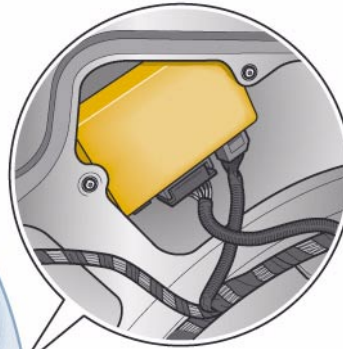
Climatronic control unit J255
in centre console



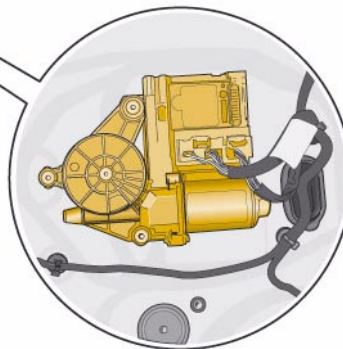
Parking aid control unit J446
in rear right side part



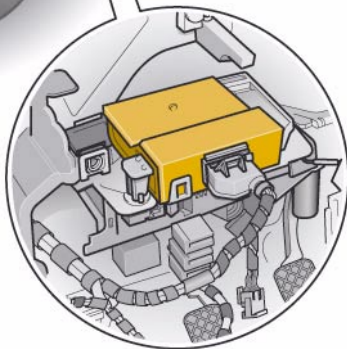
Trailer detector control unit J345
in rear right side part



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



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



data bus diagnosis interface J533
under dash panel,
above relay carrier

S307_004

Introduction



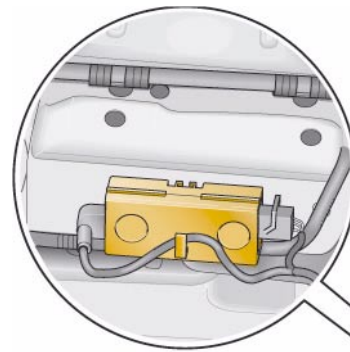
The control units in the infotainment CAN data bus

Control units and fitting locations

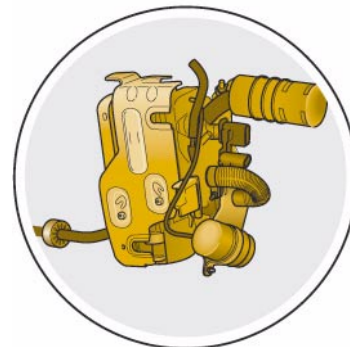
The control units of the CAN data bus and fitting locations are shown in the adjacent diagram.

The infotainment CAN data bus transfers data at a rate of 100 kbit/s. The CAN high line is orange/purple and the CAN low line is orange/brown.

Both CAN lines are entwined together.



Cellphone operating electronics control unit J412
on front right in footwell



Heater control unit J162
on front right under wing





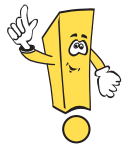
Control unit with display for radio and navigation J503 or Radio R in centre console

S307_005

Introduction



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



The dash panel insert CAN data bus and the diagnosis CAN data bus are new data bus connections in the Volkswagen Touran.

Dash panel insert CAN data bus

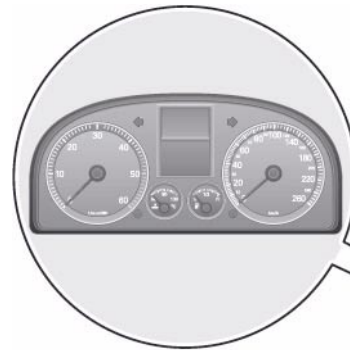
The data bus transfers data from the dash panel insert to the data bus diagnosis interface. The control unit with display unit in the dash panel insert and the data bus diagnosis interface are the only control units attached to this data bus.

Diagnosis CAN data bus

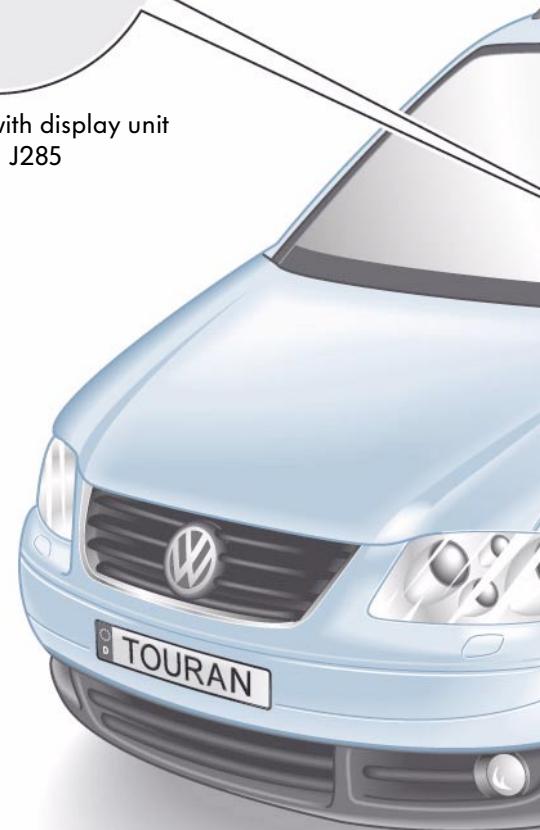
Data transfer between the diagnosis connection T16 and the data bus diagnosis interface is via the diagnosis CAN data bus.

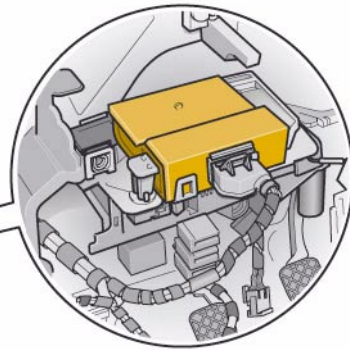
Rate of data transfer

The rate at which data is transferred is 500 kbit/s for both CAN data buses.

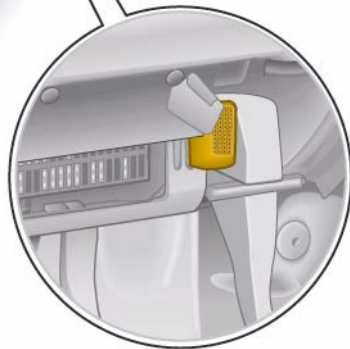


Control unit with display unit in dash panel J285





data bus diagnosis interface J533
under dash panel,
above relay carrier



T16 Diagnosis connection
on left in footwell

S307_006

LIN data bus

The LIN data bus as sub data bus system

General description

A sub data bus system connects control units with their electrical components. Among these components are, for example, control units, switches, sensors, actuators etc. This type of connection and data transfer is used in the Volkswagen Tou- ran for a number of systems.

As a sub data bus system, the LIN data bus has an advantage in cost. The designation LIN stands for local interconnect network, and it means that all the associated electrical components are within a set and limited area of the vehicle.

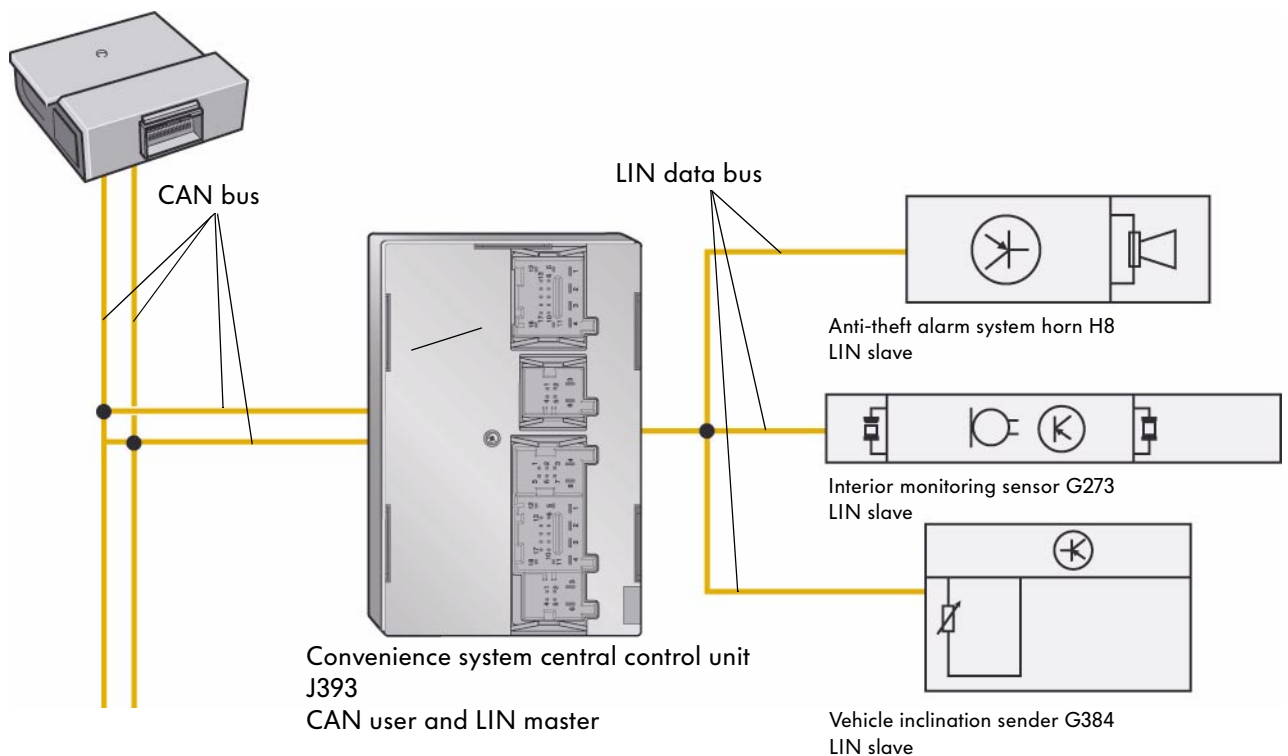
It is possible for a number of LIN data bus systems to be installed in a vehicle. They will each have different functions to perform.

A LIN data bus system consists of a master control unit and one or more slave control units.

The master control unit is also networked with other control units (apart from slave control units) in the vehicle via the CAN data bus. This permits the transfer of data to other LIN data bus systems and other CAN data bus control units.

LIN data bus system

data bus diagnosis interface J533



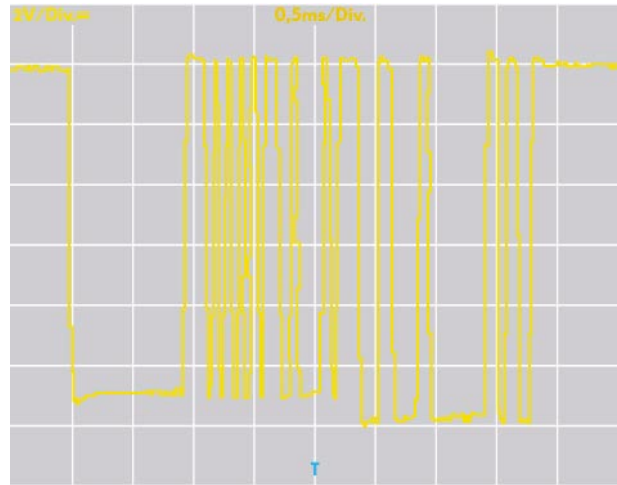
S307_007

Data transfer

The data is transferred at a speed of 1 kbit/s to 20 kbit/s.

The rate of data transfer is therefore a maximum of 20% of the rate for convenience or infotainment CAN data buses and is fixed in the software of the LIN master.

This transfer is made via data leads that are violet in basic colour with a white identification mark. The cross section of the wire is 0.35 mm². The LIN data bus is a single wire bus. The data lead is not screened.

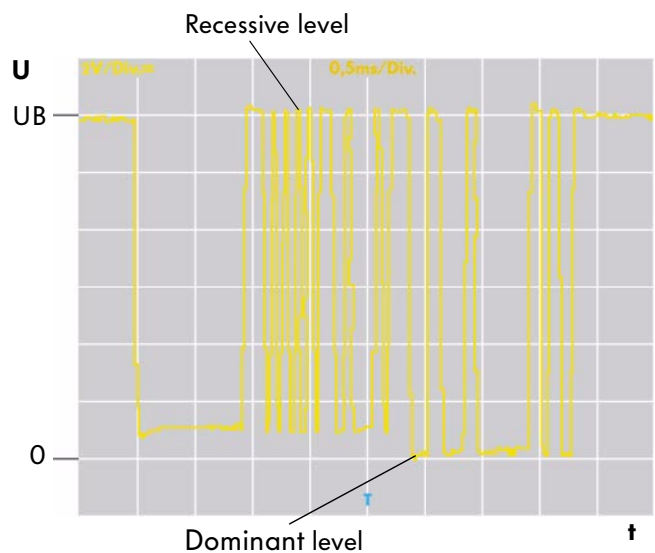


S307_008



Signal level

The signal level of the LIN data buses is either close to battery voltage (UB) (recessive level) or earth (0 Volt) (dominant level).



S307_009

LIN data bus

Master control unit

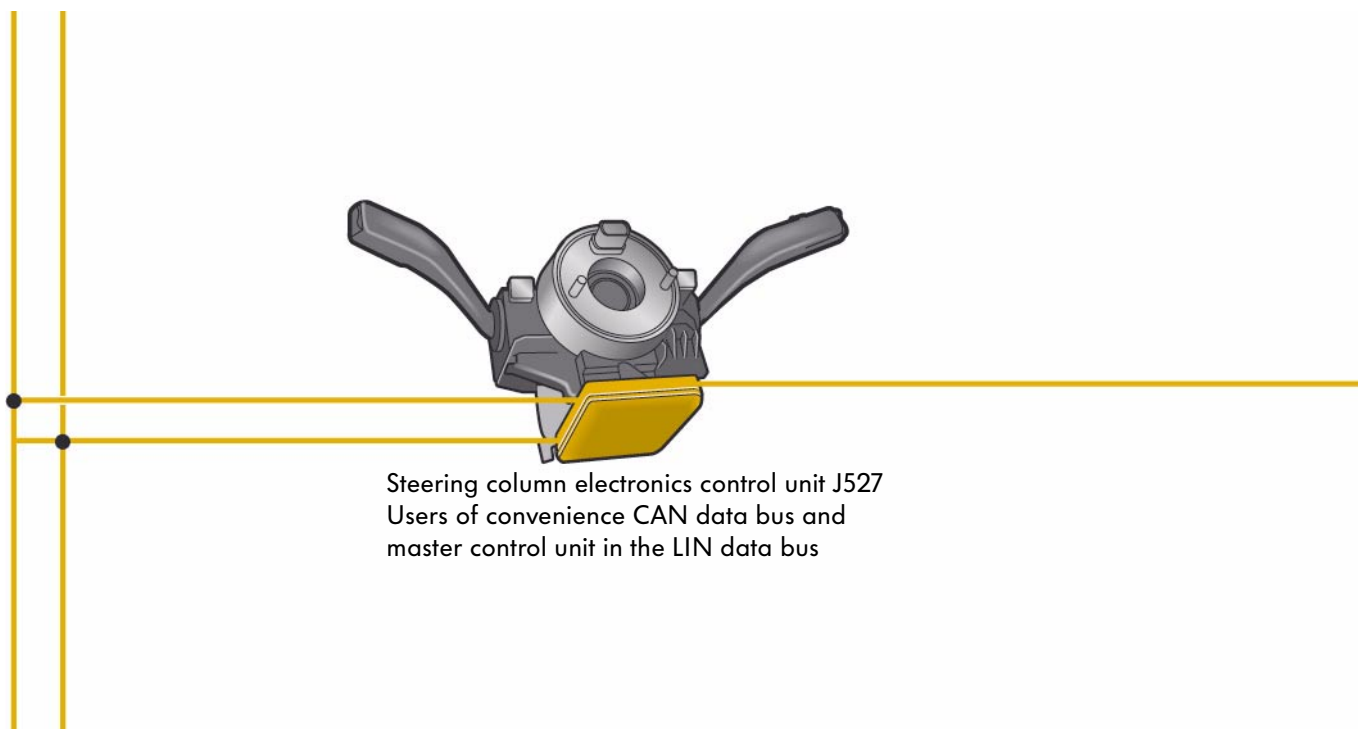
The control unit connected via the CAN data bus system performs the master functions in the LIN data bus system.

The transfer of data between master and slave is always initialised by the master. A slave is not capable of communicating independently.

Among these master functions are:

- Data conversion of LIN data bus messages to the data format used by the CAN data buses, if and when these messages are required.
- The control of data transfer in the LIN data bus and monitoring of the data transfer rate.
- The transfer of diagnosis data to the LIN slave control unit.

Master control unit



Slave control unit

The slave function could be taken on by control units such as the multi-function steering wheel, actuators such as the anti-theft alarm horn or sensors such as the vehicle altitude sensor.

The electronics integrated in the slave control unit evaluate the driver's input via the operating unit buttons in the steering wheel, they convert the input into digital information e.g. "radio louder" and send it when required to the master control unit via the LIN data bus.

The sensors also have electronics that transfer the measured values digitally to the master control unit.



Slave control unit



Steering wheel operating unit E221
Slave control unit in LIN data bus

S307_010

Onboard power supply

The electrics box

Fitting location

The electrics box can be found on the left in the engine compartment.

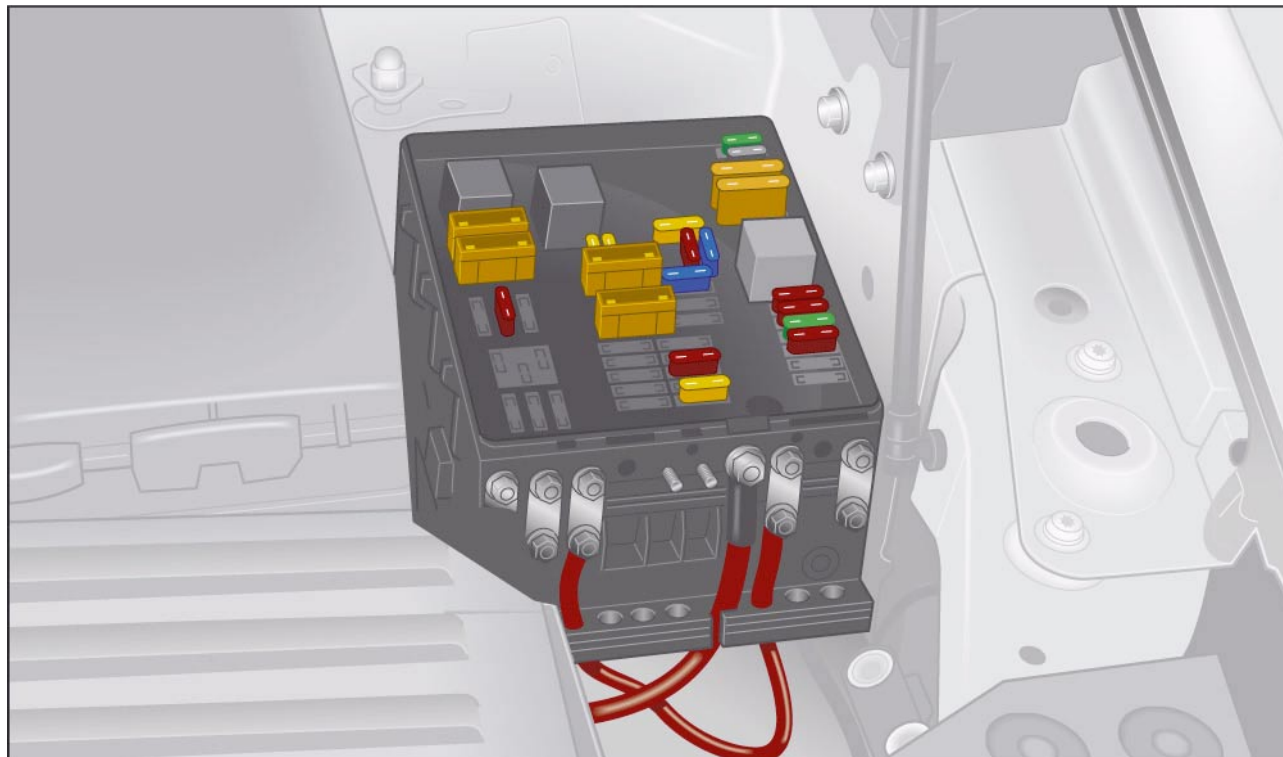
Description

All fuses and relays that safeguard or control components in the engine compartment, are housed in the electrics box (E box).

A wiring guide to the interior and back is therefore no longer necessary. Fault finding is simplified, safeguarding is adapted more effectively to the consumers and multiple assignment of fuses is largely avoided.



Electrics box

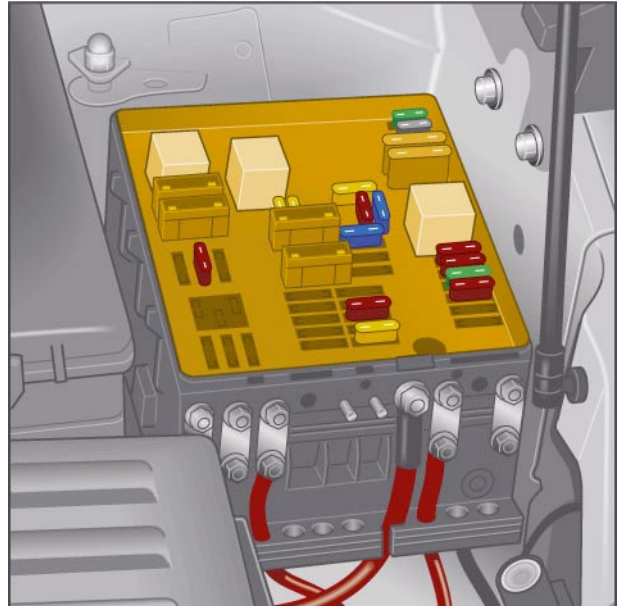


S307_012

Electrics box

In addition to the fuses for components in the engine compartment, the electrics box has the following relays:

- Power supply relay terminal 15 J329
- Power supply relay terminal 50 J682
- Glow plug relay J52
- Motronic power supply relay J271
- Power supply relay J317



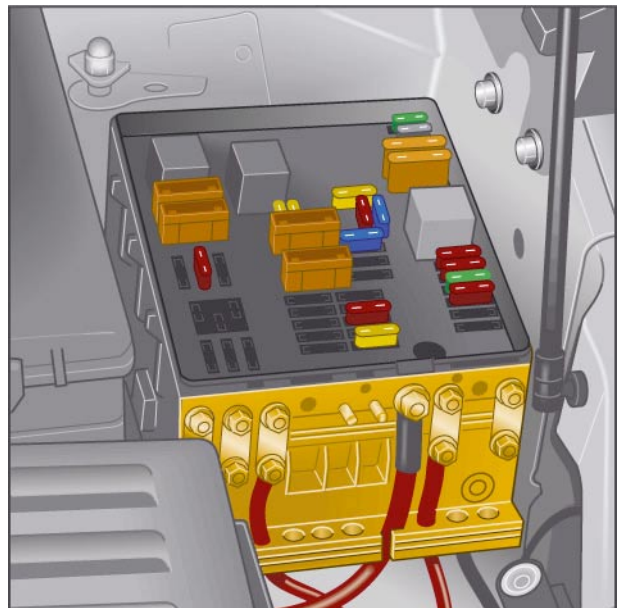
S307_052



Back-up fuse box

The back-up fuse box houses fuses for the following:

- alternator,
- electro-mechanical power steering,
- radiator fan,
- auxiliary heater.



S307_053

Onboard power supply

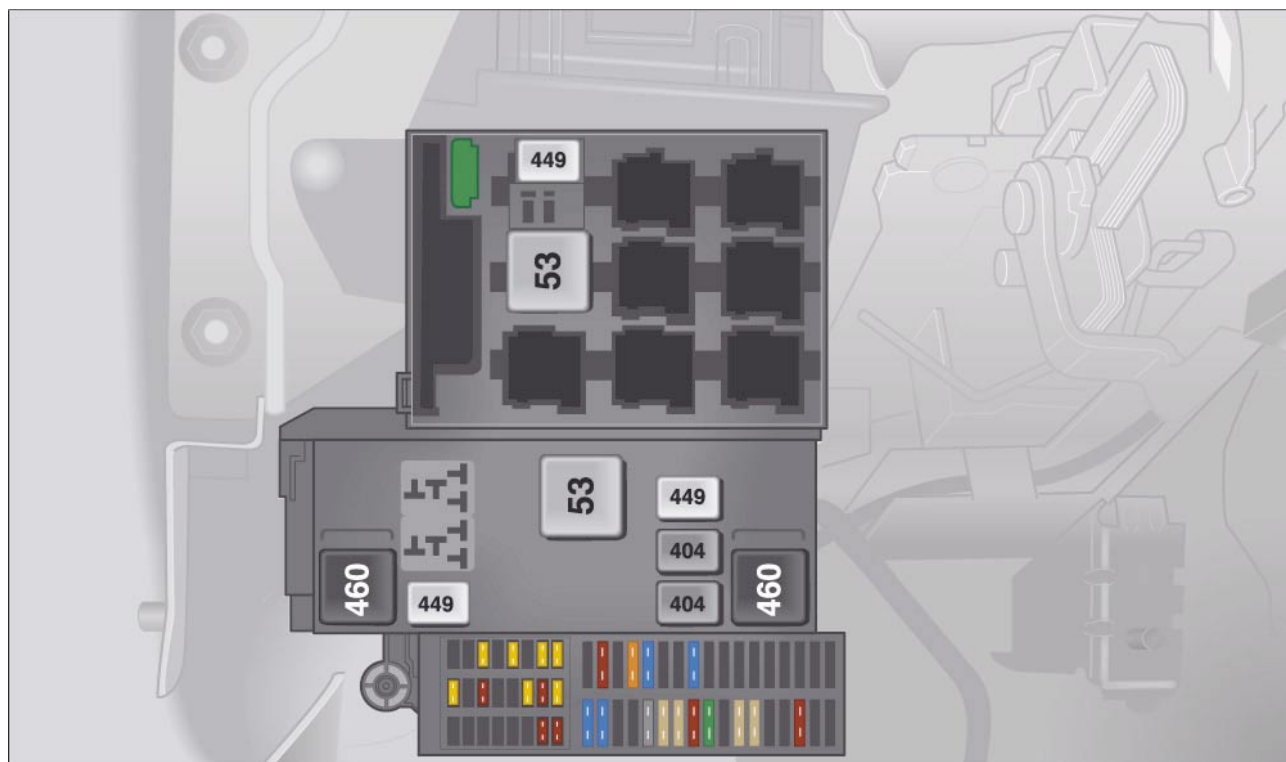
The relay carrier and the fuse box in the interior

Fitting location

In the interior, on the left under the dash panel, you can find the relay carrier, the relay carrier on the onboard power supply control unit and the fuse box.



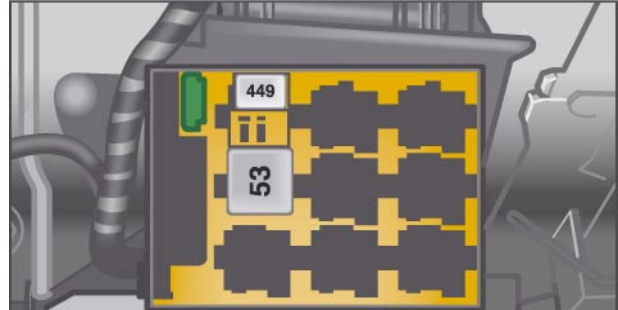
Relay carrier and fuse box in interior



S307_013

Relay carrier

The relay carrier accommodates additional relays and fuses from optional extras in the vehicle.



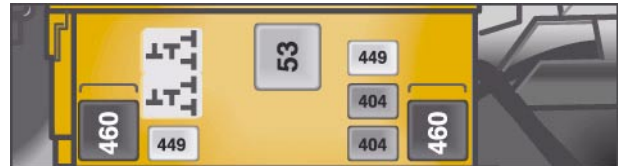
S307_054



Relay carrier on onboard power supply control unit

The following relays can be found on the onboard power supply control unit relay carrier.

- Power supply relay terminal 30G
- Heated rear window relay J9
- Horn relay J413
- Double washer pump relay 1 (front) J729
- Double washer pump relay 2 (rear) J730
- X contact relief relay J59



S307_055

Fuse box

Included in the fuse box are the fuses for the electrical components in the vehicle.



S307_056



For the latest terminal assignment details about the fuse box, please refer to ELSA.