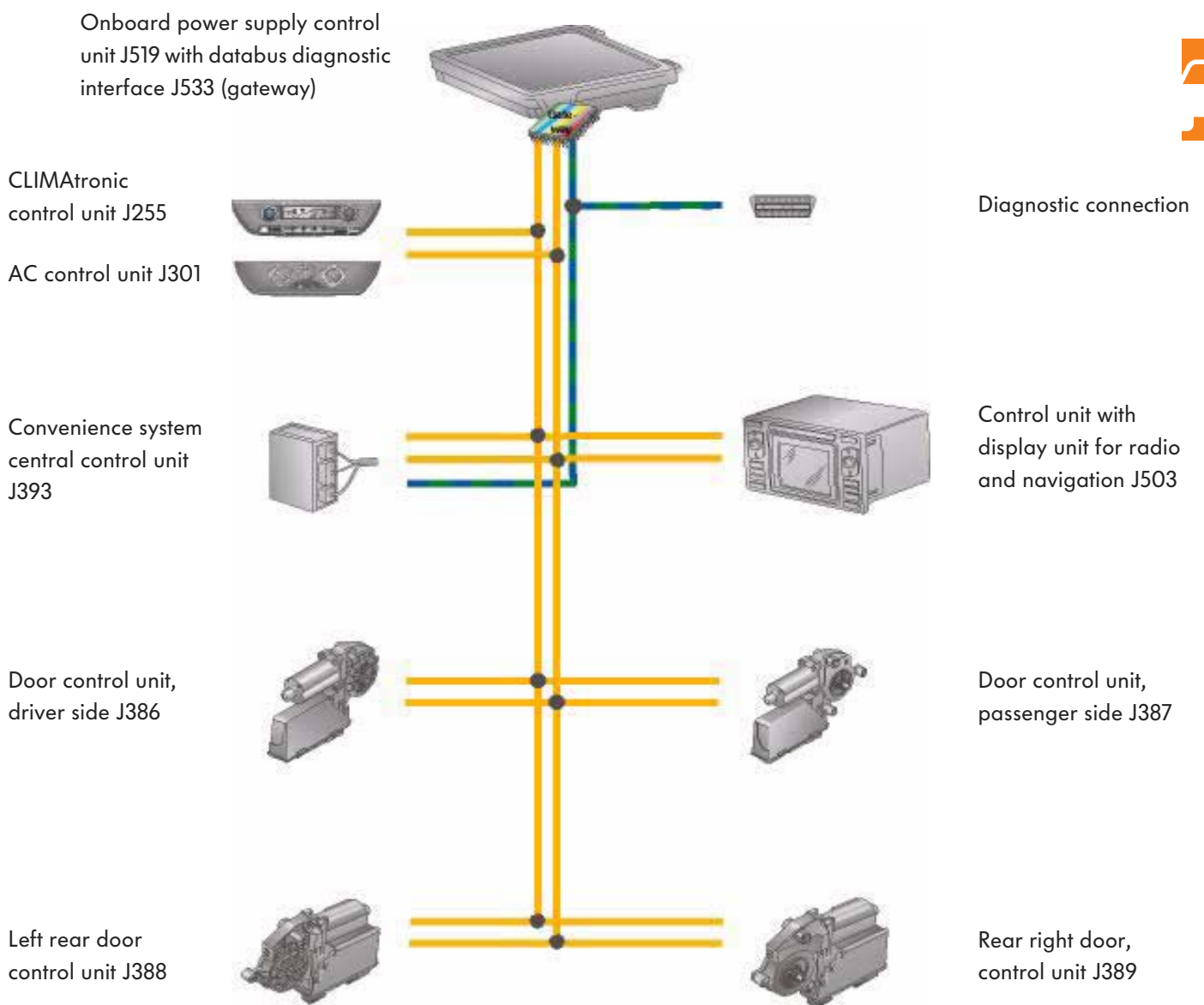


Convenience CAN databus

The convenience CAN databus operates with a transmission rate of 100 kBit/s.



265_024

CAN databus

Databus diagnostic interface J533

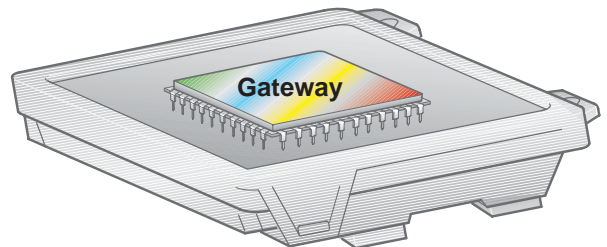
The databus diagnostic interface J533 (gateway) is integrated in the onboard power supply control unit J519.

The databus diagnostic interface J533 performs 2 tasks:

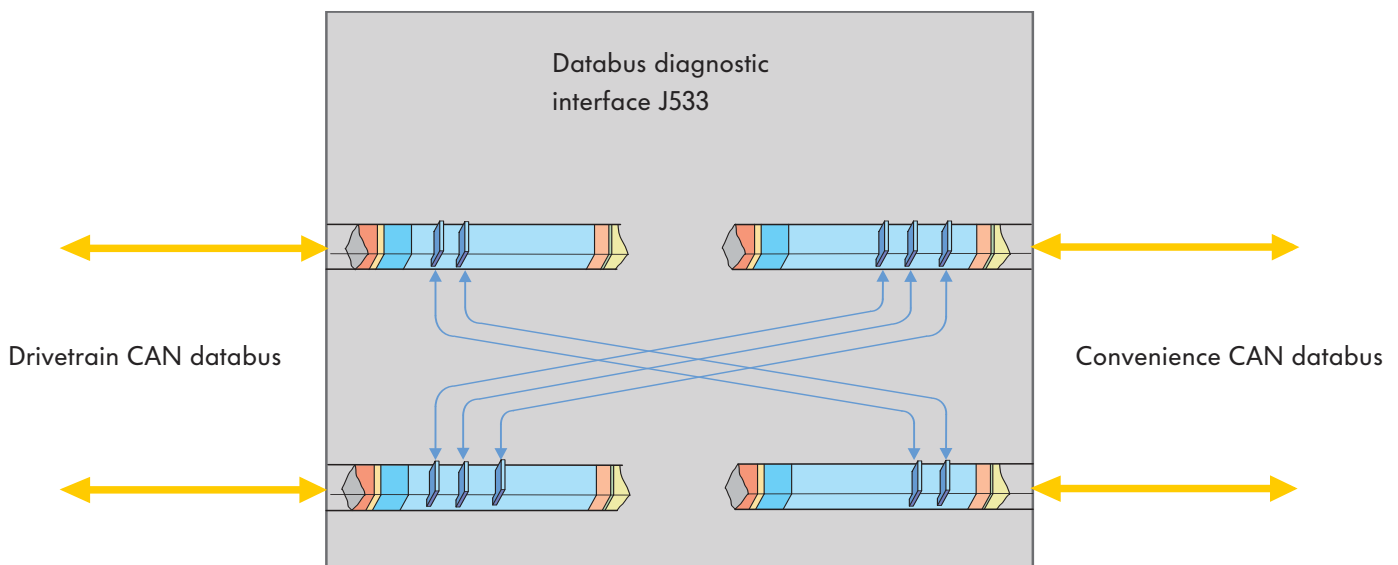
1st task

It is responsible for the data transfer between the two CAN databus systems

- drivetrain CAN databus and
- convenience CAN databus.



265_065



265_018

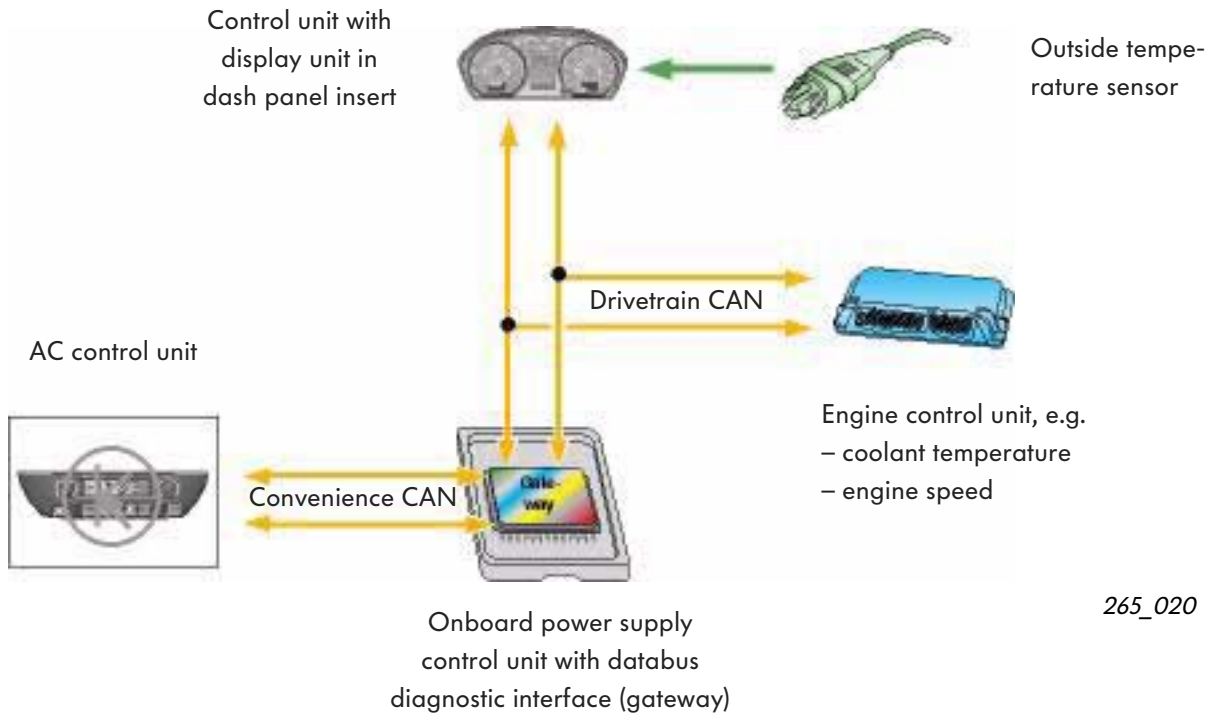
Direct communication between the systems is not possible because of the different transmission rates.

A link is required for exchanging information between the systems.

This link is achieved by means of the databus diagnostic interface J533.

The gateway receives the data arriving from a BUS system and relays the data to each other BUS system.

Example of data transfer between the CAN databus systems



Multiple use of information of different systems over the CAN is a feature of modern vehicle electrics.

For example, data messages from the drivetrain CAN are used in the convenience CAN for controlling the automatic air conditioning (Climatic). The AC control unit is connected to the convenience CAN.

The following example shows the information flow from the drivetrain CAN to the convenience CAN.

- The outside temperature is detected by the temperature sensor in the bumper and relayed to the control unit with display unit in the dash panel insert. This is connected to the drivetrain CAN.

- Specific engine characteristic data, e.g. coolant temperature, engine speed, are detected by the engine control unit and made available to the drivetrain CAN.

The messages from the drivetrain CAN are relayed over the convenience CAN in the databus diagnostic interface (gateway).

The AC control unit is now in a position to read these messages and to use them for controlling the air conditioning system.

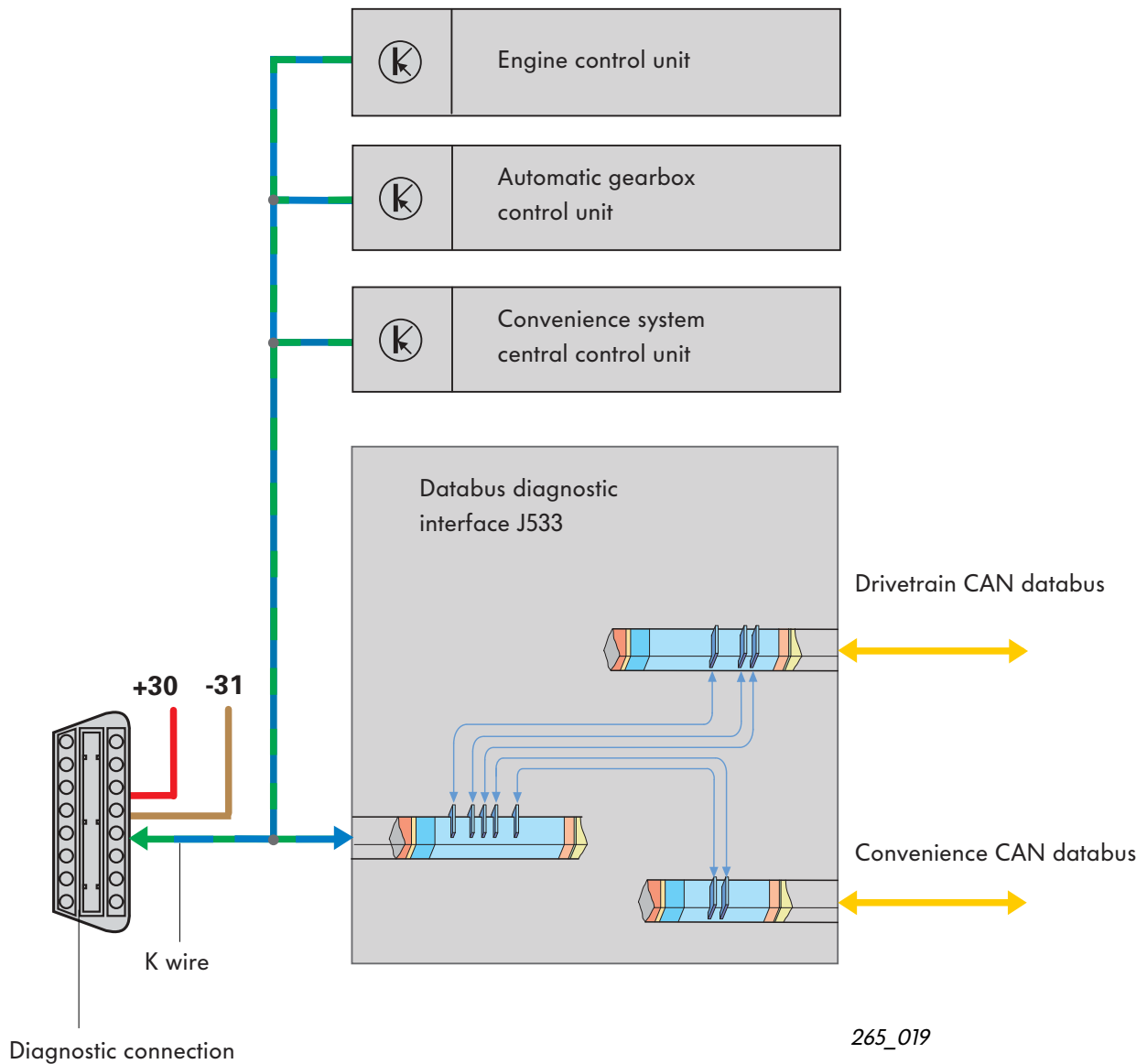


CAN databus

2nd task

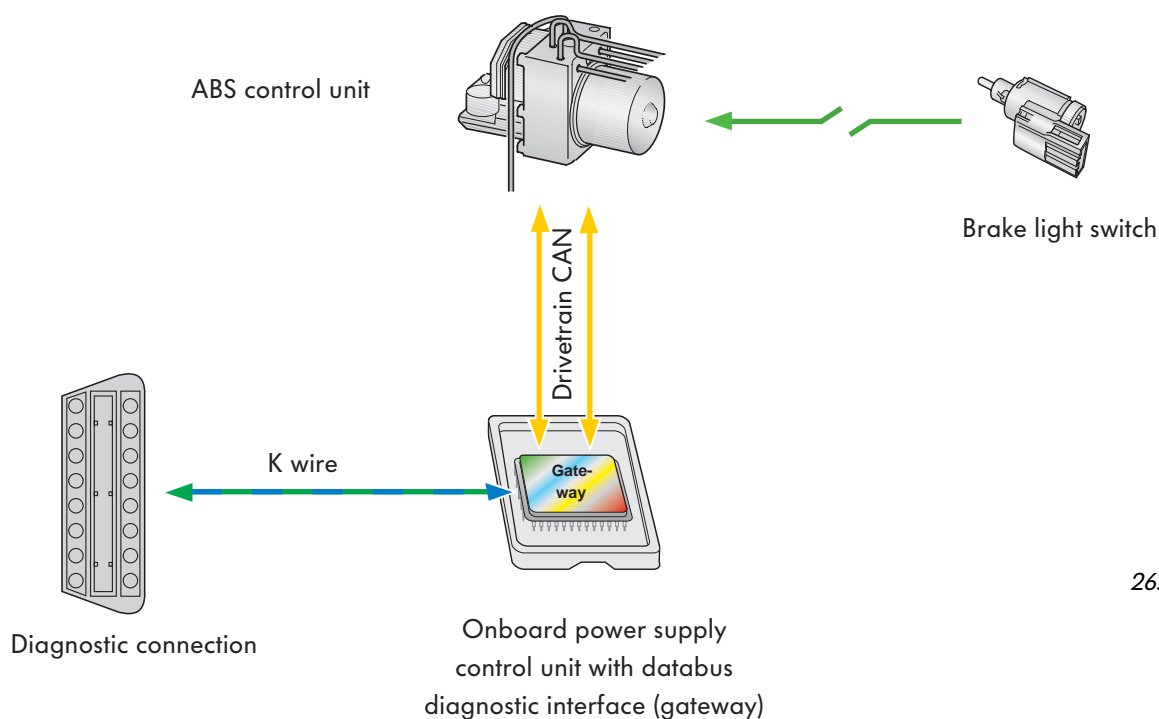
The databus diagnostic interface J533 receives diagnostic data from the drivetrain CAN databus and from the convenience CAN databus and relays it over the K wire, and vice versa. This makes it possible to use data from the Vehicle Diagnostic, Testing and Information System VAS 5051 for self-diagnosis.

The engine control unit, the automatic gearbox control unit and the convenience system central control unit have a separate K wire.



265_019

Example for data exchange for diagnosis



265_077

The following example shows the flow of information from the drivetrain CAN over the K wire.

- Because of a fault in the cable connection, the brake light switch does not supply any information to the ABS control unit.
- The ABS control unit is connected to the drivetrain CAN and thereupon sets a fault in its fault memory.

To enable the Vehicle Diagnostic, Testing and Information System VAS 5051 to process such diagnosis data, the databus diagnostic interface in the onboard power supply control unit relays the diagnostic information from the drivetrain CAN databus over the K wire. The data are not changed as a result of this; in other words, the information content transmitted over the K wire and the CAN databus is the same.

Special functions

Special functions in the event of a crash

The safety system of the Polo features automatic circuits which, in the event of a crash, contribute to minimizing the severity of an emergency situation.

The following actions are set in motion:

- central locking system is unlocked
- interior lights are switched on
- hazard warning lights system is switched on
- fuel supply is interrupted

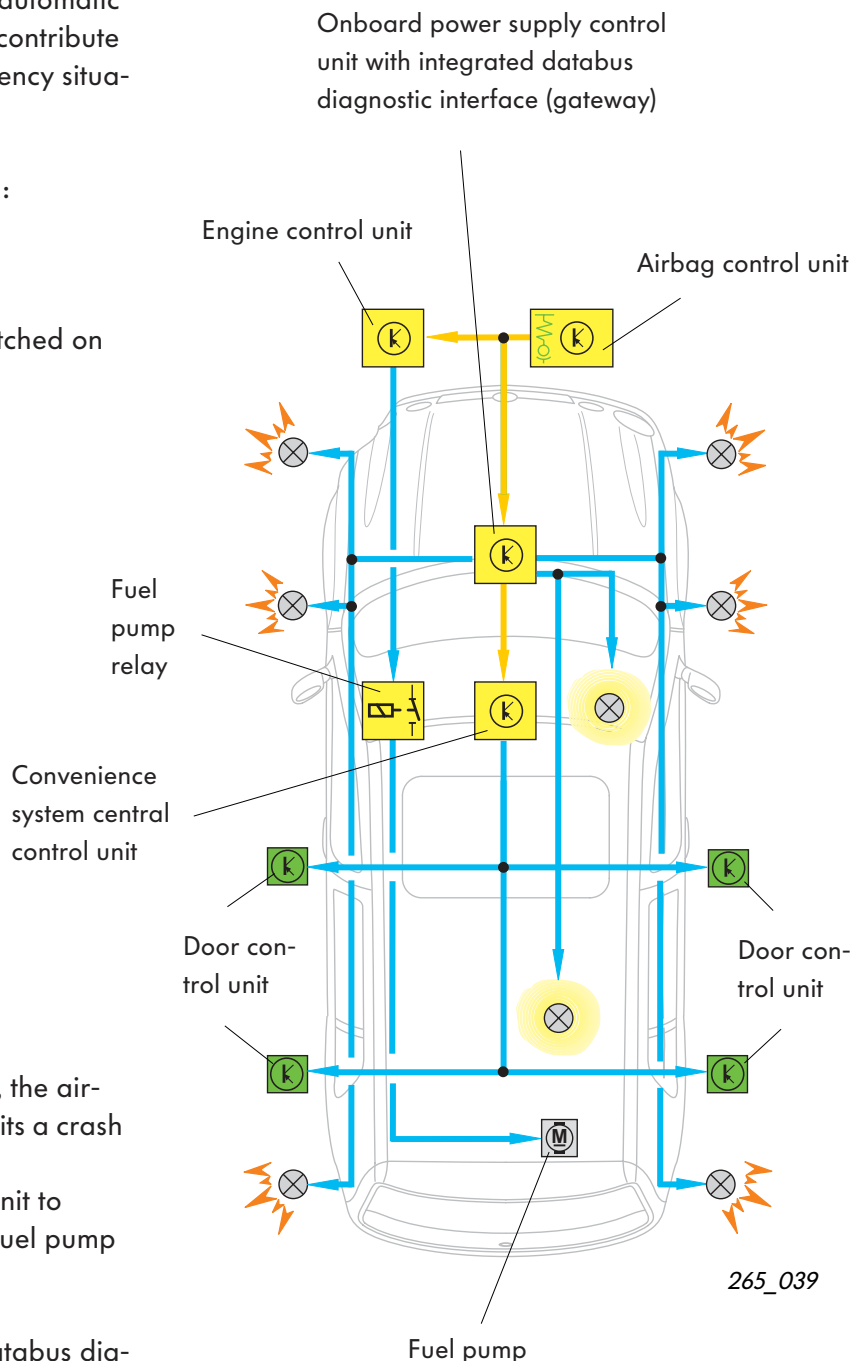


Operating principle

If the airbags are deployed in a crash, the airbag control unit simultaneously transmits a crash signal over the drivetrain CAN. This signal causes the engine control unit to switch off the fuel supply through the fuel pump relay.

The crash signal is relayed over the databus diagnostic interface (gateway) to the convenience CAN and the convenience system central control unit thereupon unlocks all the doors.

In addition, the onboard power supply control unit switches on the interior lights (if the switches are in the door contact position) and also the hazard warning lights.



Energy saving functions

Sleep mode

To minimize current consumption when the ignition is switched off, the control units which are connected to the CAN databus are switched into a sleep mode.

In the case of the drivetrain CAN databus, this is the normal situation after the ignition is switched off as data only require to be transmitted in the drivetrain CAN databus if the ignition is on. In the case of the convenience CAN databus, the sleep mode is activated after the ignition is switched off and provided the following conditions exist:

- hazard warning light system off
- function retention elapsed
- no transfer of diagnostic data
- exterior lights off

Wake-up mode

In the event that the control unit detects a wake-up command resulting from one of the actions listed below, it relays this to the other control units so that these control units are also activated.

In the case of the drivetrain CAN databus, the wake-up command is always relayed after the ignition is switched on.

In the case of the convenience CAN databus, the wake-up command is transmitted after the following actions:

- ignition switched on
- hazard warning light system active
- change in status of doors, tailgate, bonnet and ignition lock
- exterior lights on



Exception:

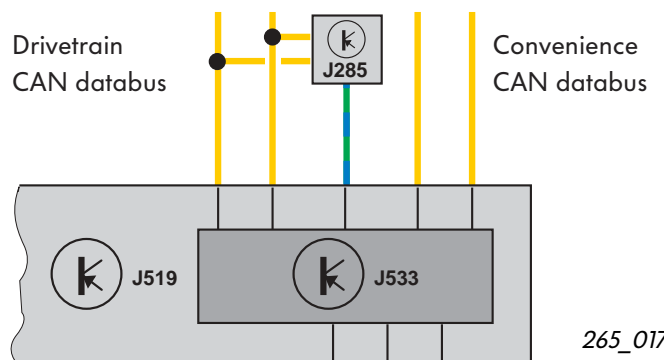
The control unit with display unit in the dash panel insert, which is connected to the drivetrain CAN databus, also requires data from the convenience CAN databus even when no supply voltage is present (ignition off). For this reason, either a direct convenience CAN connection or a cable connection (wake-up cable) to the onboard power supply control unit is required. This depends on the equipment version of the dash panel insert.

Electrical circuit

- J285 Control unit with display unit in dash panel insert
- J519 Onboard power supply control unit
- J533 Databus diagnostic interface

= CAN databus

= Wake-up cable



265_017

Convenience and safety electronics

The convenience system

is a decentralized design.
It consists of a central control unit and at least 2 door control units.



You can obtain further information on the interactions of the convenience system in Self-Study Programme 193. Only supplementary details are presented here.

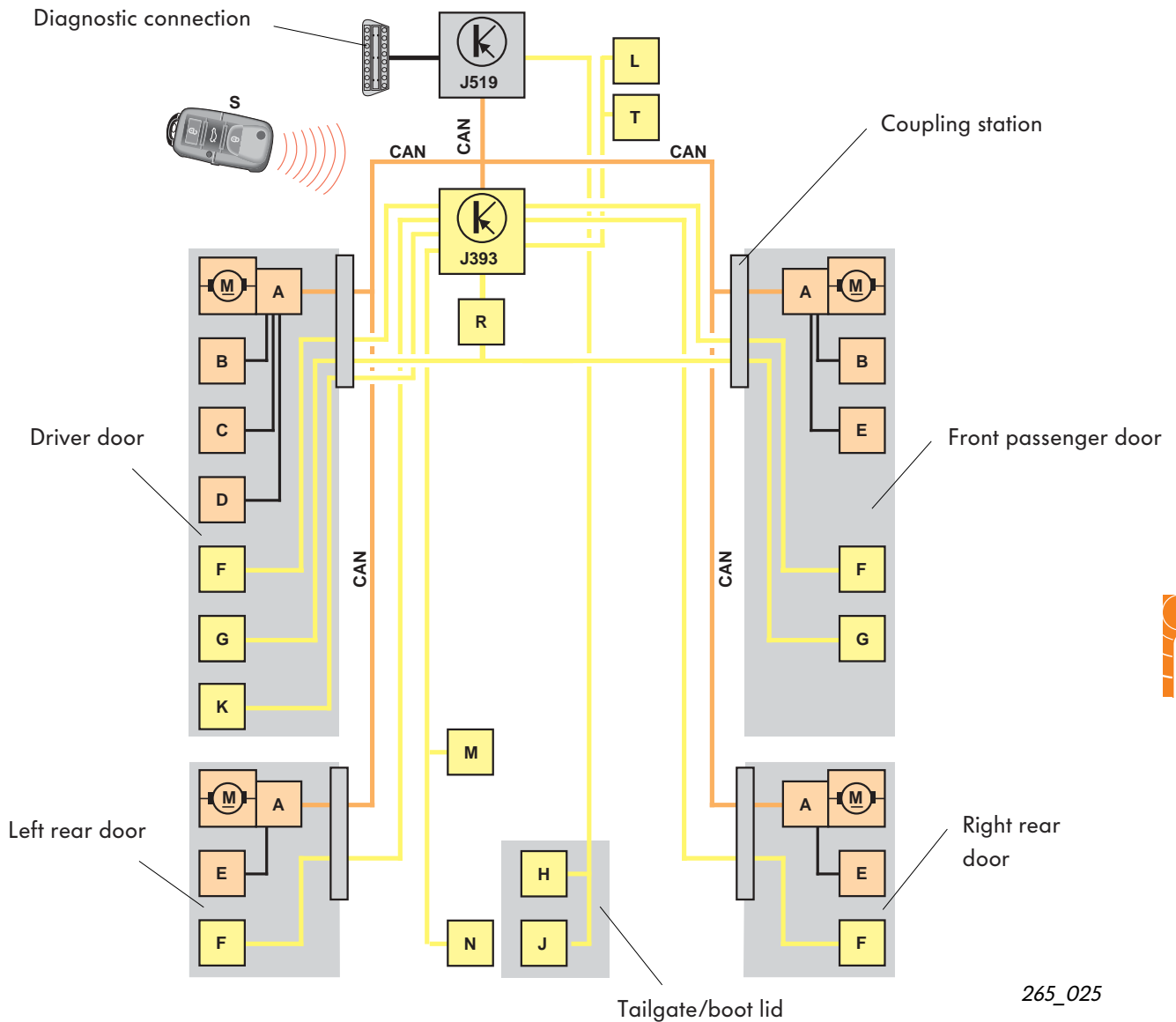
Functions of the central control unit

- Central locking of rear lock
- Convenience closing functions (power windows, sliding roof)
- Single door opening of driver door
- Central locking of doors
- Unlocking and locking of complete vehicle with interior push button (Lock-Unlock)
- Anti-theft alarm system which can be deactivated only with remote control
- Ultrasound interior monitoring with deactivate function
- Self-diagnosis
- Actuation of central locking warning lamp -SAFE-

Functions of the door control units

- Electrically adjustable exterior mirrors with fold-in function
- Power windows with excess force limiter and with gentle opening/closing to minimize noise

Overview of convenience system (schematic diagram)



265_025

J393	Convenience system central control unit	J	Tailgate push button
J519	Onboard power supply control unit	K	Central locking warning lamp -SAFE-
A	Door control unit	L	Interior monitor sensor unit
B	Electrically adjustable rear-view mirror	M	Interior monitor push button
C	Mirror and heater adjustment switch	N	Alarm horn
D	Driver door operating panel	R	Relay for warning lights, doors
E	Power window switch	S	Remote control
F	Central locking door lock	T	Sliding roof adjustment control unit
G	Entry warning lamp		
H	Tailgate/boot lid rotary tumbler switch		

Convenience and safety electronics

Remote control

Remote release of tailgate/boot lid

Models fitted with a remote control feature an additional push button for separate remote release of the tailgate/boot lid.

If the remote release push button is pressed, only the tailgate/boot lid is unlocked. If the tailgate/boot lid is not opened within two minutes, it is automatically relocked.

This function is coded in the onboard power supply control unit (refer also to Onboard power supply control unit page 21).



Remote release button for tailgate/boot lid

265_052

Single door opening of driver door

This function is intended for personal safety. If the remote control Unlock button is pressed briefly only once, only the driver door is unlocked. This is indicated by all the turn signal lights flashing briefly.

If the Unlock button is pressed a second time, all the locks of the car are unlocked.

If the car has been completely unlocked and no door or boot lid/tailgate is opened within 30 seconds, the car is locked again. This prevents the car being left unlocked unintentionally for a lengthy period.

This option is coded in the convenience system central control unit in the delivery state of the vehicle in conformity with the vehicle equipment.



Unlock button

265_066

Anti-theft alarm with interior monitoring

The anti-theft alarm

monitors the following areas

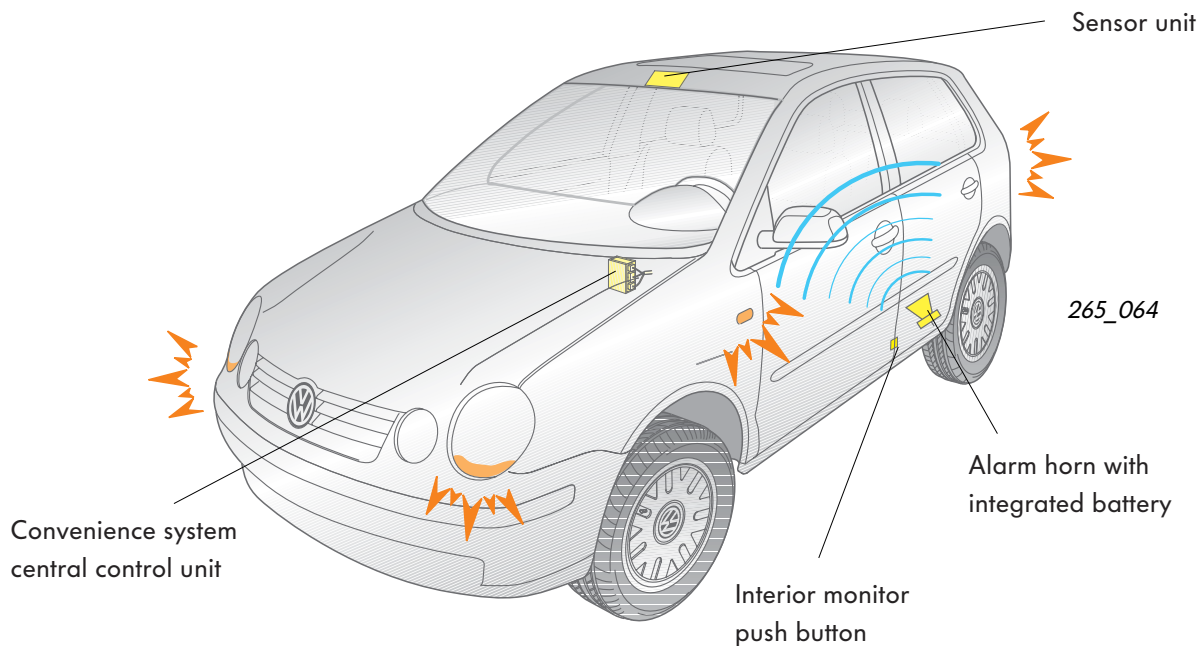
- doors,
- bonnet,
- boot lid/tailgate and
- ignition

for unauthorized opening or operation.

Interior monitoring

operates as an ultrasound monitoring system and is used only in combination with the anti-theft alarm.

This system additionally monitors the interior of the car for any unauthorized attempt to enter the car.



An audible alarm is provided by the alarm horn of the anti-theft system and a visual alarm by the turn signal lights.

The system is safe against false alarm resulting from:

- knocking on the car roof or against the windows,
- movements of air caused by wind or vehicles passing, temperature changes such as interior of car heating up as a result of extreme sunlight penetration and
- noises of any type (e.g. horns, sirens and bells).



Convenience and safety electronics

Operating principle of interior monitor

The interior monitor is switched on automatically at the same time as the anti-theft alarm system is activated. The anti-theft alarm is activated and deactivated with the remote control after the car has been locked and unlocked.

The sensor unit consists of a transmitter module, a receiver module and the analysis electronics. The monitoring unit is positioned behind the front interior light in the headlining.

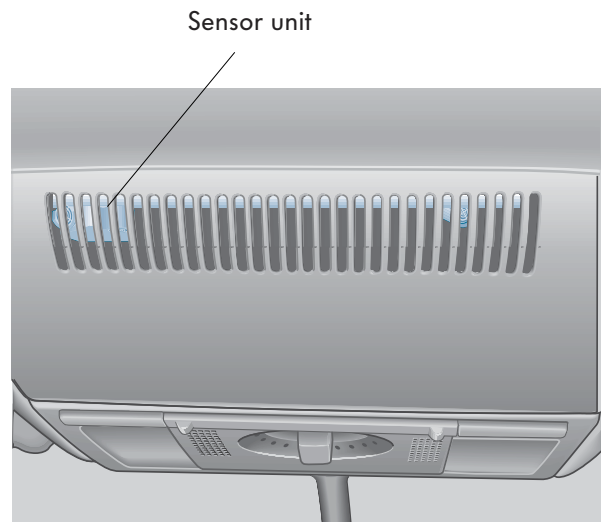
In the armed state, the transmitter module transmits ultrasound waves and receives their echo a short time later with the aid of the receiver module.

These ultrasound waves are not perceptible to the human ear.

The analysis electronics detect any irregularities in this ultrasound field and triggers the alarm through the convenience system central control unit.

The push button for the interior monitor is located in the bottom half of the left B-pillar. If the button is pressed (button lights up yellow) and the car is locked, the interior monitor is deactivated.

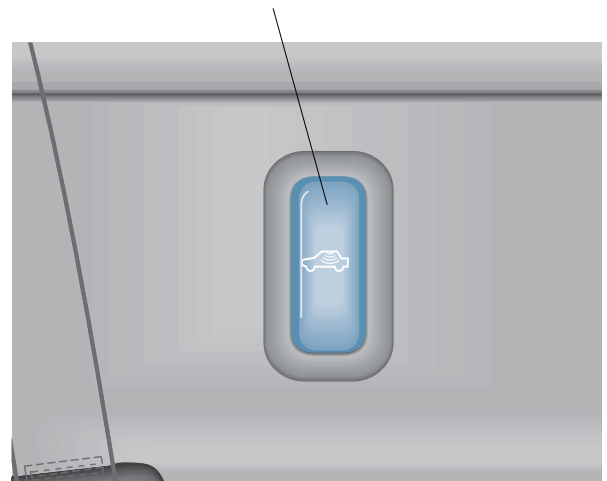
The interior monitor is activated again automatically when the car is next closed.



265_051



Push button for interior monitor



265_055

Sliding/tilting roof

Comfort position

The sliding roof features a comfort position. If the sliding roof adjustment switch in the front interior light is turned into this position, the sliding roof is not opened fully. Consequently, there is scarcely any wind noise inside the car when travelling at higher speeds with the roof set in this position.



The sliding roof adjustment switch cannot be replaced separately in the event of a repair. It is then necessary to replace the complete interior light.



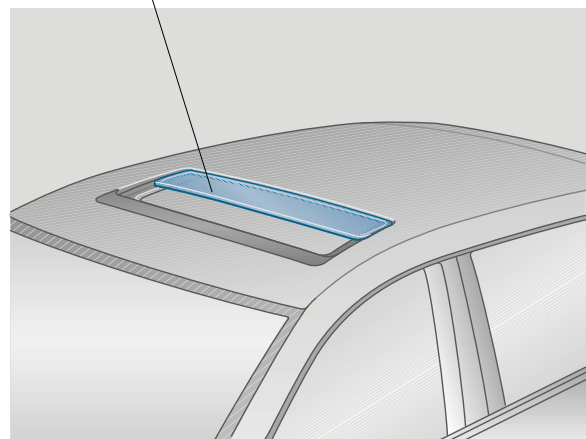
Comfort position

265_079

The sliding/tilting roof offers the following additional functions:

- Closing the sliding/tilting roof as part of the convenience closing function by operating the central locking system
- Function maintained for 10 minutes after ignition is switched off provided none of the front doors is opened
- Force limit if the sliding/tilting roof is obstructed because of difficult operation or because of an obstacle during the closing operation

Comfort position



265_080

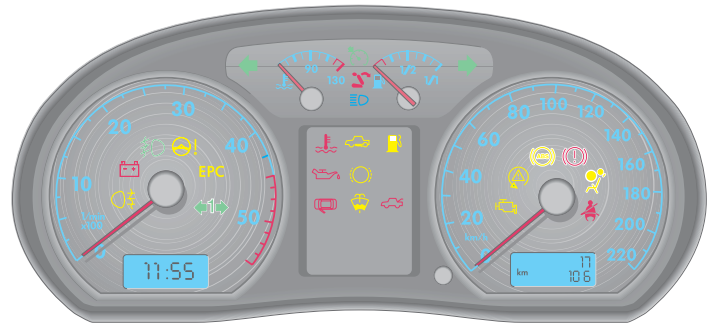


Dash panel insert

The dash panel insert

The following are integrated in the dash panel insert:

- Control unit with display unit in dash panel insert J285
- Immobiliser control unit J362
- Speedometer
- Rev counter
- Fuel gauge
- Coolant temperature display
- Warning lamps
- Multi-function display



265_026

All the warning lamps feature LEDs. No provision is made for repairs.
If necessary, the complete dash panel insert must be replaced.
All the information relating to the monitoring functions is processed in control unit J285 and transmitted to the warning lamps which causes them to light up, flash or show a steady light. Certain visual information is acoustically reinforced by a warning buzzer.



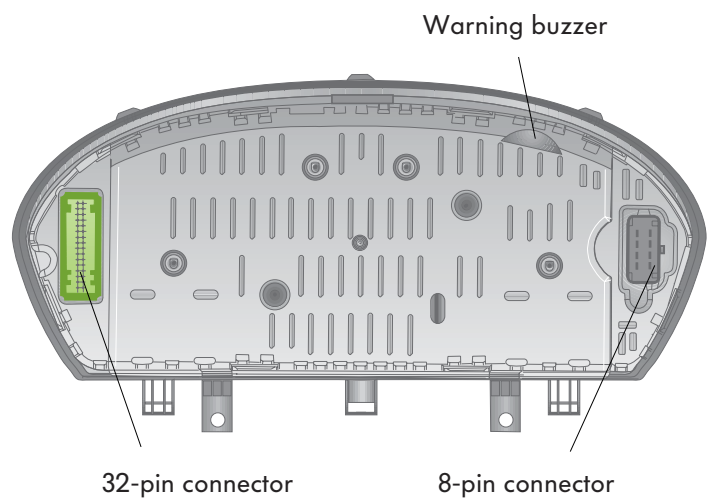
If the dash panel insert is replaced, it has to be adapted to the other systems of the car.
Refer to the instructions for this in the Workshop Manual.



The connectors of the dash panel insert

8-pin connector
Link to voltage supply

32-pin connector
Link to onboard power supply

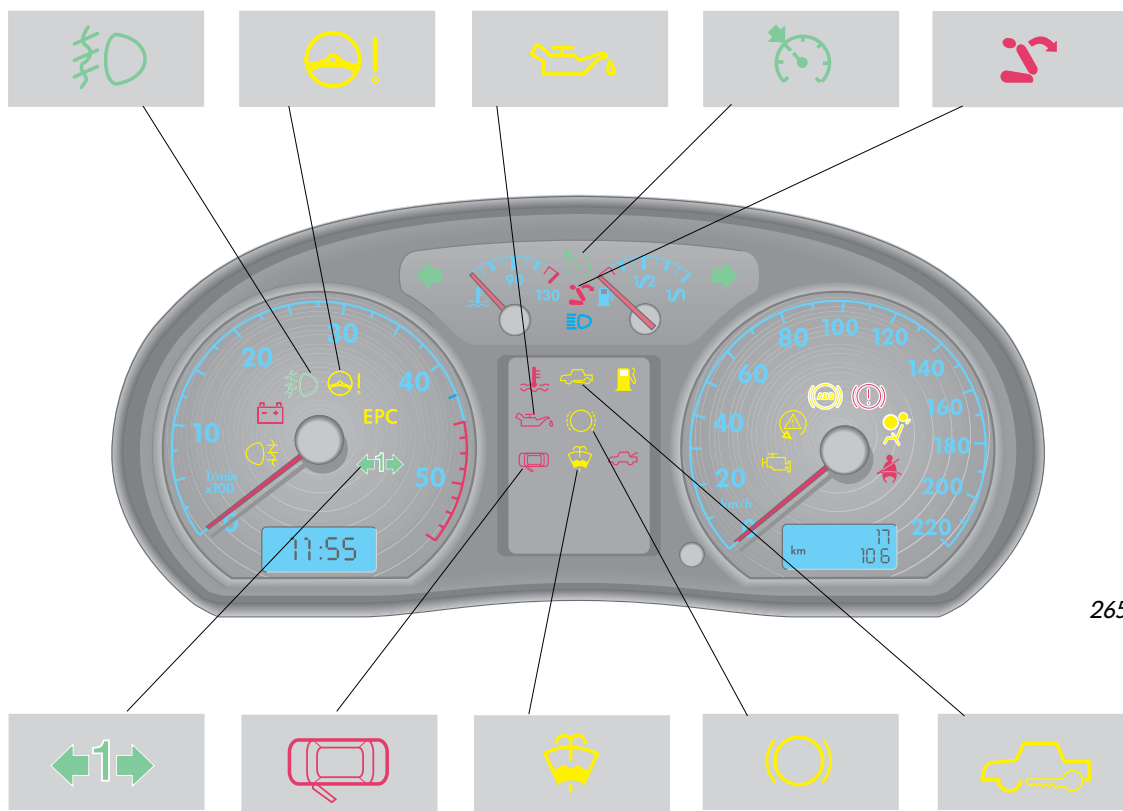


265_027

Display symbols

The number and the location of the warning lamps depend on the model and engine version. Warning lamps which are fitted only to certain models are marked with (*).

The symbols are only visible when the corresponding LEDs behind them are illuminated. The ignition must be switched on for this purpose. The table presents new warning lamps which have been added in the Polo Model Year 2002.









265_028

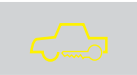






Display symbol	Designation	Type and meaning of indication
	Fog lights	come on when fog lights operating; switched on by pulling out light switch as far as first detent into side light or low beam position

Dash panel insert

Display symbol	Designation	Type and meaning of indication
	Electrically powered hydraulic steering	lights up for a short time after ignition switched on and goes out after engine started, lights up continuously if fault in steering system; car should be driven to nearest workshop *
	Engine oil level (too low)	lights up yellow if engine oil level is too low; check oil level and replenish if necessary; if bonnet remains open for more than 30 seconds, oil level warning is reset; if no oil has been replenished, warning is displayed again after about 100 km *
	Engine oil level (engine oil level sensor faulty)	flashes yellow, i.e. engine oil level sensor is faulty; audible signal sounds in addition; drive car to nearest workshop *
	Engine oil pressure	flashes red, i.e. engine oil pressure is too low; in addition an audible signal sounds 3 times at engine speeds of more than 1500 rpm; stop; switch engine off! Check oil level and replenish if necessary; if warning lamp continues flashing although oil is at correct level - do not drive car any further!
	Cruise control system	lights up if cruise control system operating *
	Rear seat backrest lock	lights up for about 20 seconds when ignition switched on if backrest of rear seat is not correctly locked; lights up and remains on if backrest is unlocked when driving *

* Models fitted with optional equipment

Display symbol	Designation	Type and meaning of indication
	Electronic immobiliser	lights up for about 3 seconds when ignition switched on; automatic scanning of data of car key performed during this time; if authorized key is detected, car can be started; an alarm activated by the anti-theft system is switched off; if a non-authorized key is detected, car cannot be started and the warning lamp switches to „continuous flashing mode“
	Brake pad wear indicator	lights up if minimum permissible brake pad thickness is reached; car must be driven to nearest workshop to have brake pads inspected or replaced
	Washer fluid level	lights up if insufficient fluid in windscreen washer reservoir; replenish windscreen washer fluid
	Door open	lights up if not all the doors are closed
	Trailer turn signal system	lights up if turn signal system switched on when towing a trailer. If a turn signal light at trailer or car is not operating, warning lamp does not flash.

* Models fitted with optional equipment



Lighting

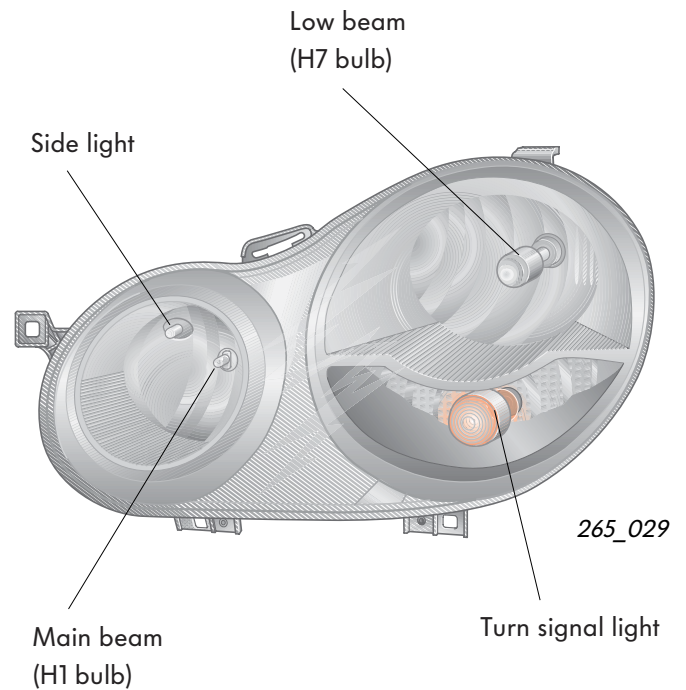
Headlights

The new headlights are designed as a twin unit and feature clear plastic lenses for the light beams.

The headlight unit has two reflectors. The reflector for main beam and side light is a single chamber, while the reflector for low beam and turn signal light is split into two chambers.

The bulb for the turn signal light is coloured yellow. The light beam is produced by the respective shape of the reflector chamber.

The fog lights are integrated not in the headlight unit but in the bumper.



Rear light units

The reflector is a single unit and is divided into four main chambers; the chamber for the tail light/rear fog light is once again divided internally.

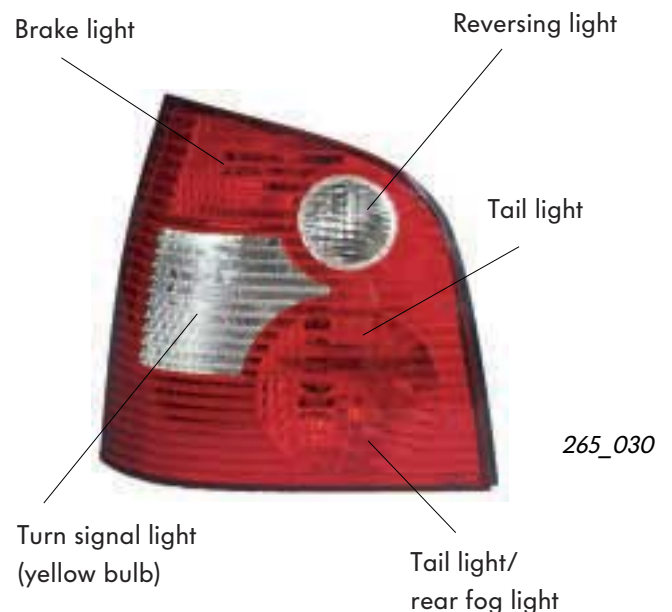
The upper half of the chamber includes a bulb for the tail light. The bottom half of the chamber includes a twin-filament bulb for the tail light/rear fog light.

When the lights are switched on, one filament of this twin-filament bulb is illuminated as a tail light together with the tail light in the top half of the chamber.

This provides enhanced safety in the event of one of the tail lights not operating.

When the rear fog light is switched on, the second filament of the twin-filament bulb is also illuminated.

Reflectors are integrated in the full area of the lens of the tail light cluster.



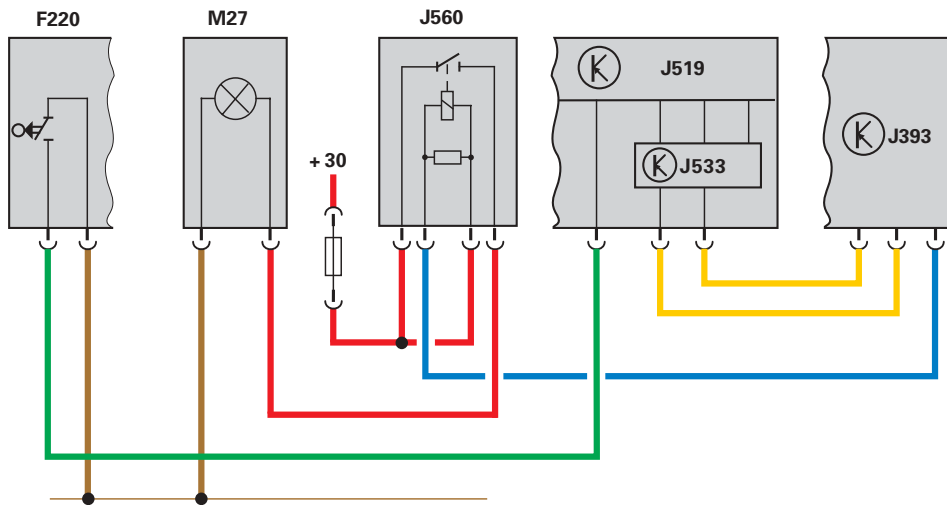
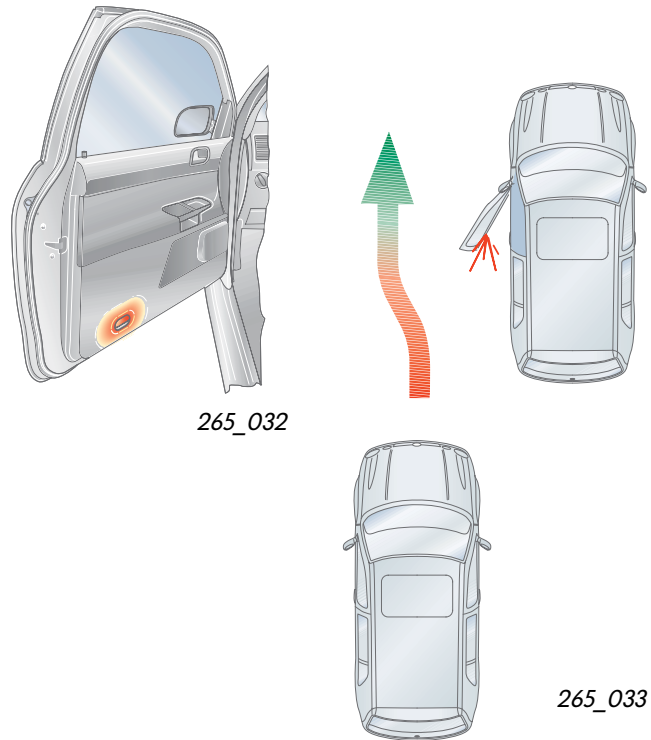
Entry warning lamp

The front doors are equipped with entry warning lamps.

The entry warning lamps offer a clear benefit in terms of safety when using the car in flowing traffic.

The entry warning lamp is switched on through the door contact switch in the lock unit in the door lock.

The convenience system central control unit J393 ensures that the entry warning lamp remains on only for 10 minutes when the car is parked with the doors open. This avoids the battery being discharged.



Electrical circuit (example of driver door)

- F220 Central locking lock unit, driver side
- J393 Convenience system central control unit
- J519 Onboard power supply control unit
- J533 Databus diagnostic interface
- J560 Relay for warning lamps, doors
- M27 Entry warning lamp - left door

Colour coding/Legend

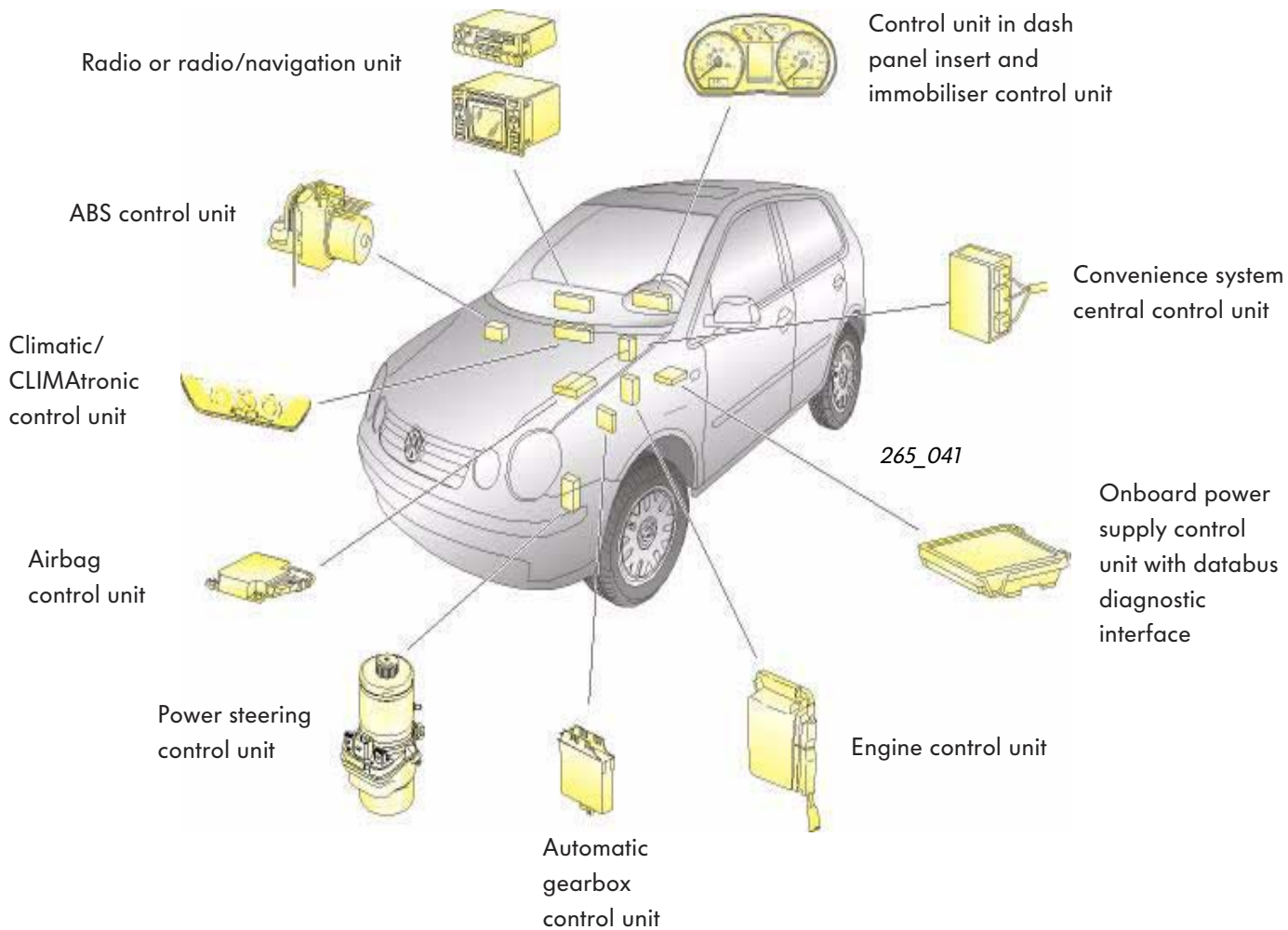
- █ = Input signal
- █ = Output signal
- █ = Positive
- █ = Earth
- █ = CAN databus

265_034



Self-diagnosis

Control units in the Polo with self-diagnosis capability



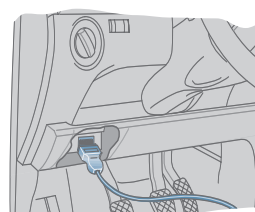
For diagnosis please use the up-to-date workshop literature and the Vehicle Diagnostic, Testing and Information System VAS 5051 or the Vehicle Diagnostic and Service Information System VAS 5052.



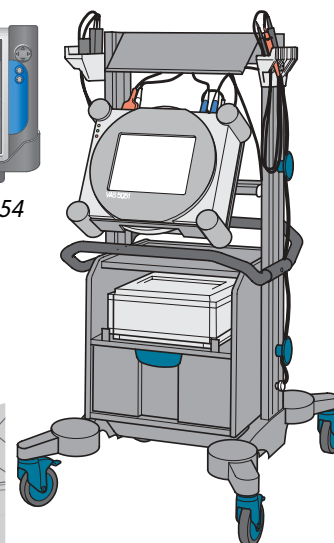
The connection for the diagnostic units is located between the storage compartment in the dash panel cover on the driver side.



265_054



265_043



265_042

Test your knowledge

Which answers are correct?

Sometimes only one.

But perhaps also more than one – or all of them!

1. The onboard power supply control unit ...
 - A. replaces the convenience system central control unit.
 - B. is the central monitoring and control unit of the onboard power supply.
 - C. controls the power demand of the onboard power supply.

2. The databus diagnostic interface ...
 - A. transmits the diagnostic data of the K wire over the CAN and vice versa.
 - B. monitors the function of the onboard power supply control unit.
 - C. is the connection point of the CAN databus systems.

3. There are two CAN databus systems in the onboard power supply operating ...
 - A. each on their own.
 - B. together through the connections of the compact connectors.
 - C. together through the gateway in the onboard power supply control unit.

4. The tasks of the compact connector in the bulkhead consist of ...
 - A. connecting the „engine compartment“ and „interior“ sections of the wiring looms.
 - B. facilitating service work.
 - C. creating installation space.

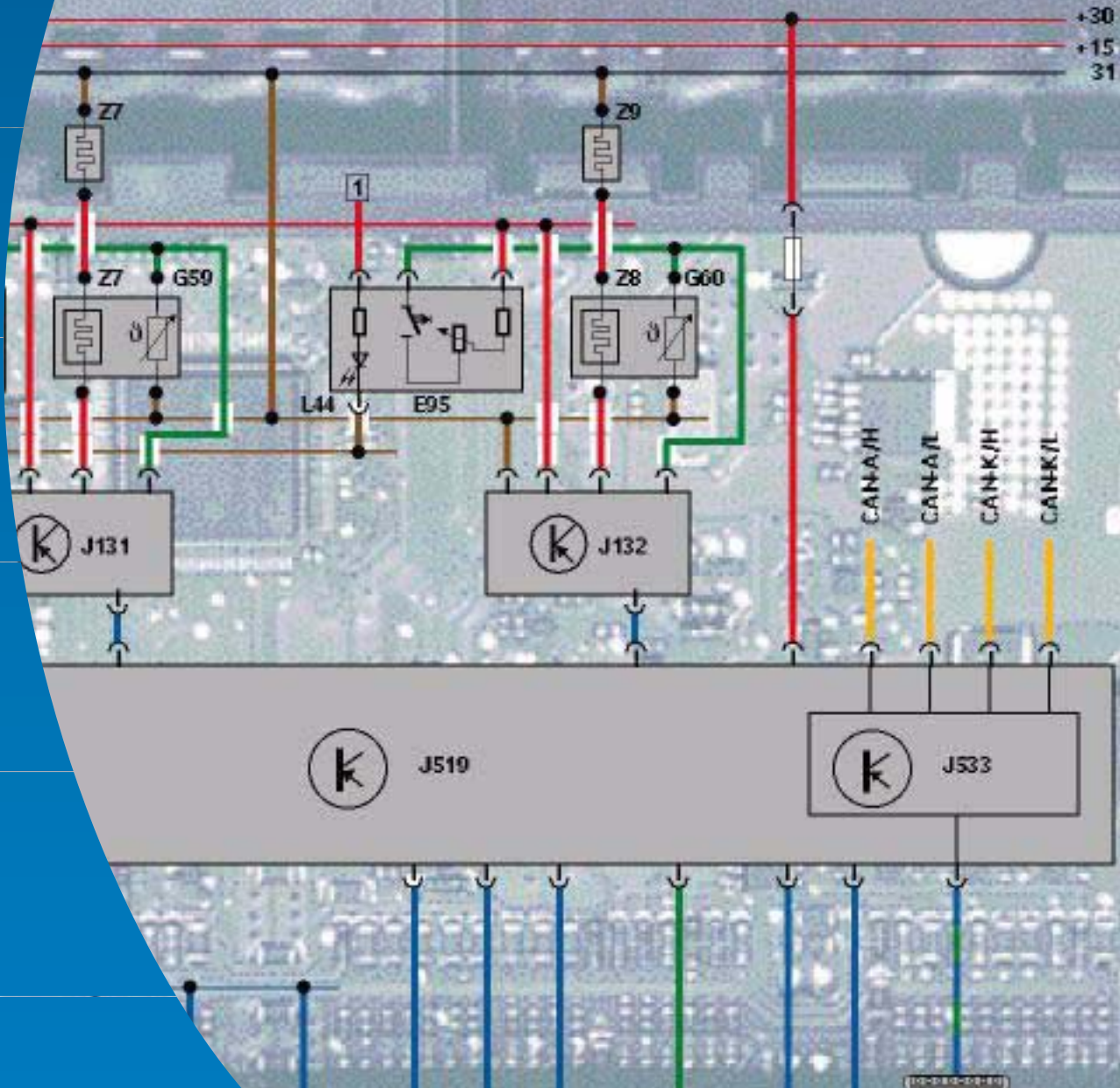
5. The code numbers are ...
 - A. secret numbers for the operation of the immobiliser.
 - B. count numbers transmitted to the control units.
 - C. values for coding control units in accordance with the vehicle equipment.



-
6. The drivetrain CAN databus operates with...
- A. a transmission rate of 500 kBit/s.
 - B. a transmission rate of 100 kBit/s.
 - C. a transmission rate of 50 kBit/s.
7. The wake-up function is designed to ...
- A. wake up the driver out of the „sleep state“.
 - B. wake up the control units connected to the CAN databus systems out of the „sleep state“.
 - C. control the fuel pump supply.
8. The entry warning lamp is switched off automatically at a certain time if a door is open ...
- A. by the onboard power supply control unit.
 - B. by the databus diagnostic interface.
 - C. by the convenience system central control unit.
9. The following conditions must be met in order to create the „sleep state“ ...
- A. ignition „Off“.
 - B. warning light system „Off“.
 - C. exterior light „Off“.
10. The interior monitoring system includes ...
- A. alarm horn.
 - B. signal horn control.
 - C. sensor unit.




Answers: 1. B.; 2. A, C.; 3. A, C.; 4. A, B, C.; 5. C.; 6. A.; 7. B.; 8. C.; 9. A, B, C.; 10. A, C.



For internal use only © VOLKSWAGEN AG, Wolfsburg

All rights reserved. Technical data subject to change without notice

140.2810.84.20 Corresponds to technical state 10/01

 This paper was produced from chlorine-free chemical pulp.