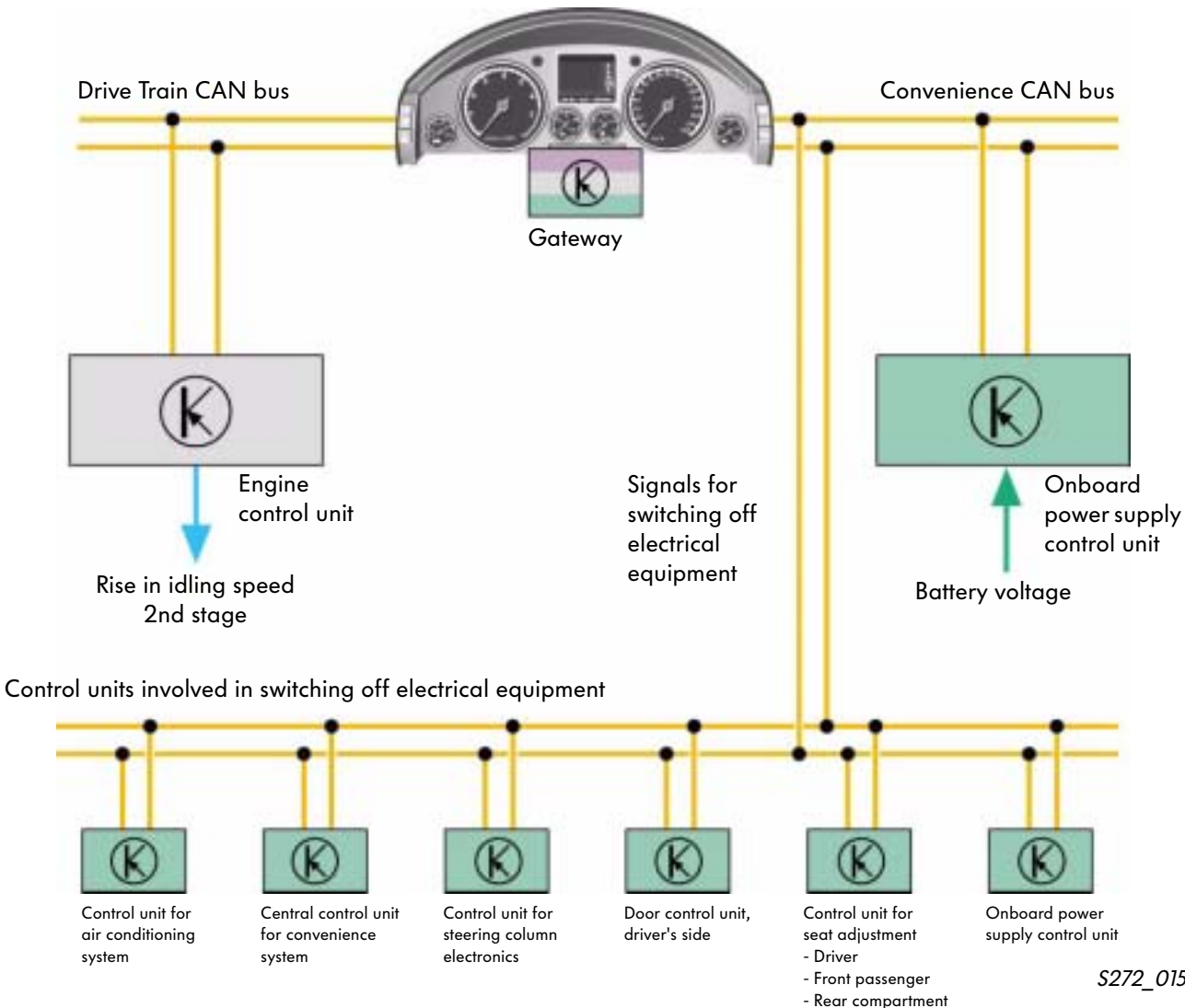


Onboard power supply management

Switching off convenience electrical equipment

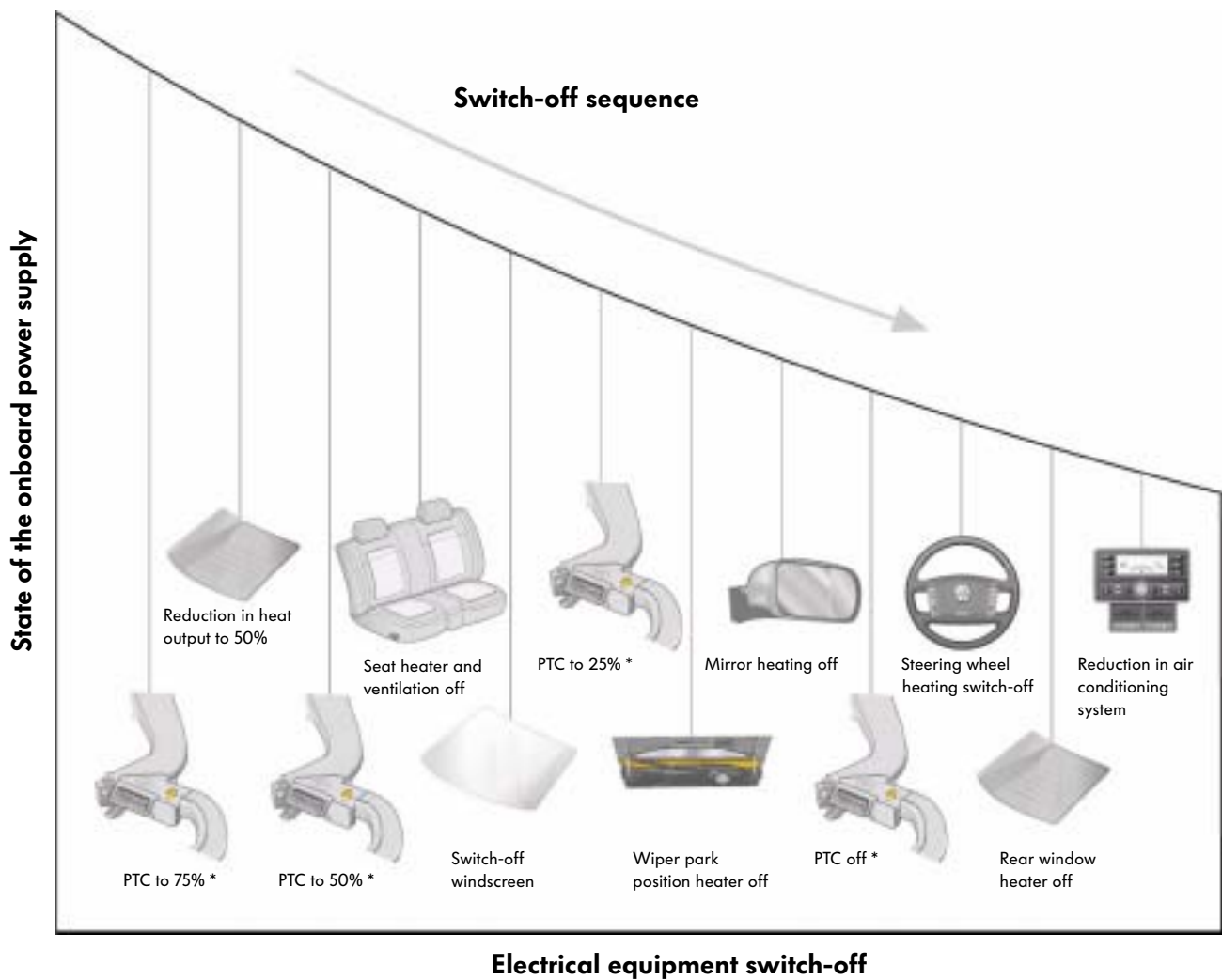
With the ignition on or active alternator (engine running), the onboard power supply control is classified by the onboard power supply control unit as very critical if the voltage of the onboard power supply battery is below 12.2 volts for a certain period dependent on the electrical equipment. The result is that convenience electrical equipment is switched off by priority by its control unit. If an item of electrical equipment is not switched on, it is skipped and the next item is switched off.



S272_015

If the state of the onboard power supply remains very critical after the convenience electrical equipment has been switched off, a second stage of the idle speed increase is initiated.

If this does not improve the state of the onboard power supply, the air conditioning system is also switched off.



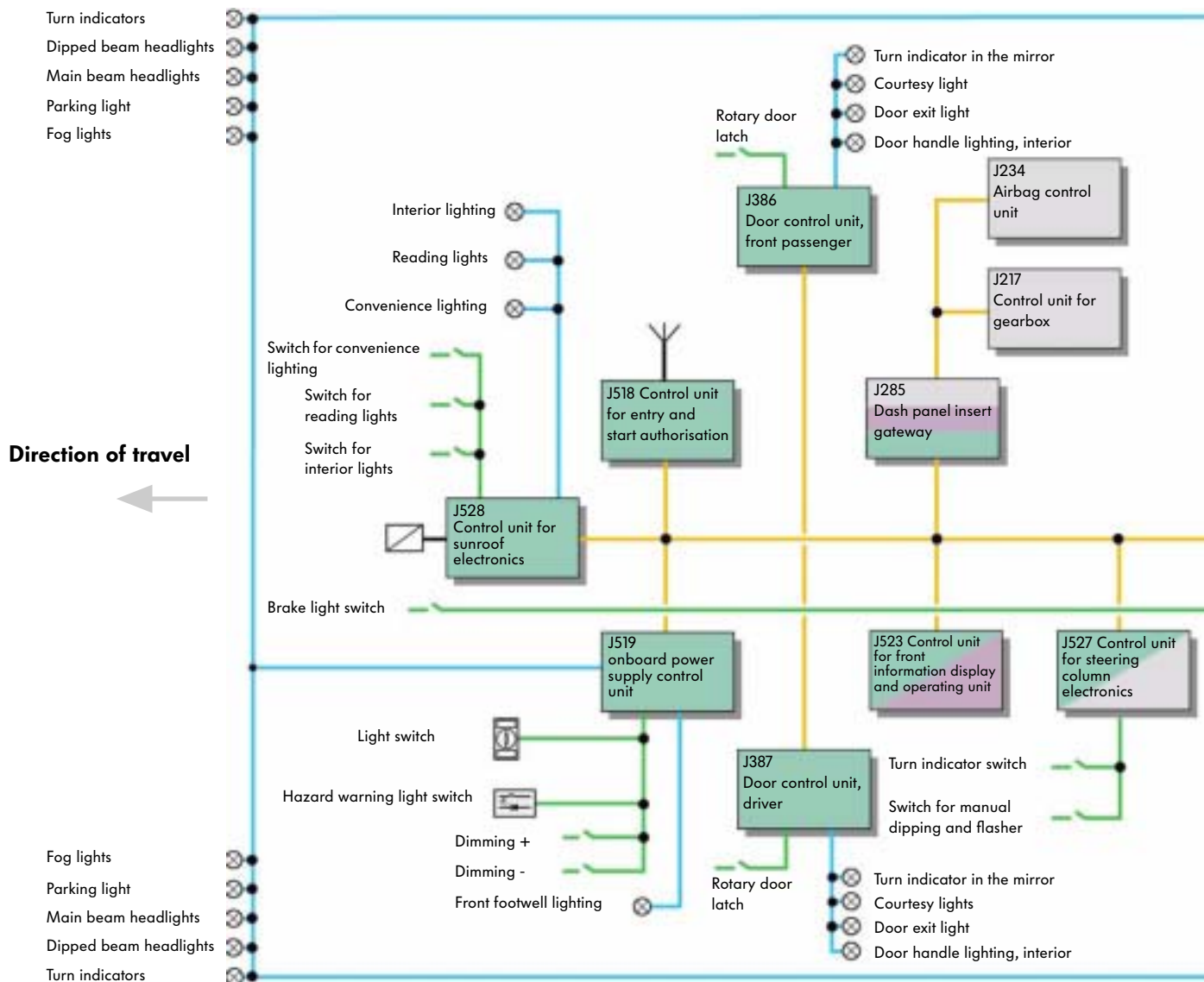
* PTC heating element in the rear footwell flaps

Networked functions

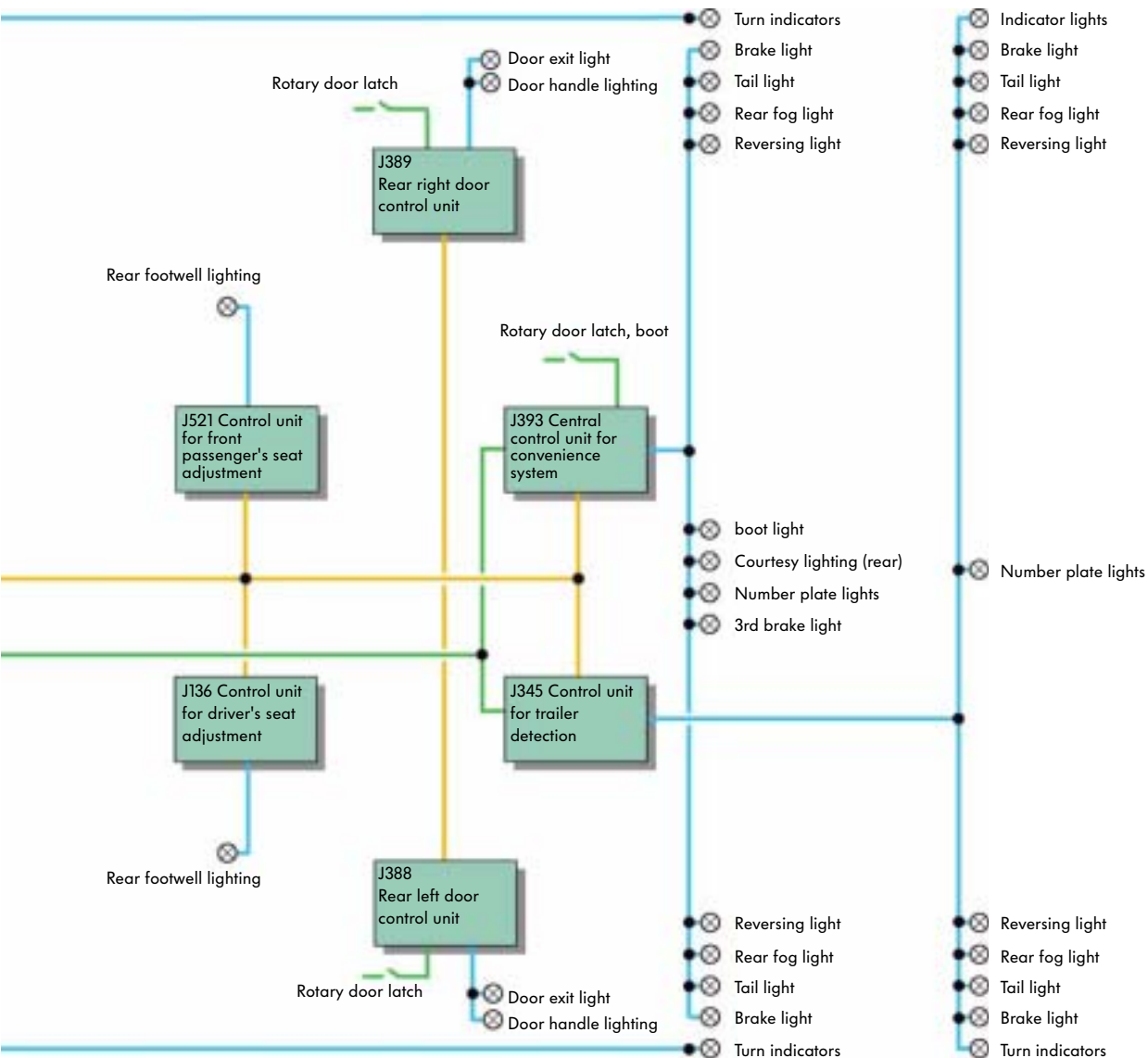
Networking system

On today's vehicles, activation and supply of the lighting system can no longer be implemented via conventional switches, relays and cable connections. Networked functions in these vehicles handle the corresponding functions.

Schematic diagram with control units involved in lighting control system and networking as an example



Activation signals are sent to control units via resistance-coded switches, and these either activate the electrical equipment themselves or send the activation signal via a databus system to the control unit in charge of activation. The supply of the electrical equipment is then via the control unit in charge.



S272_087

Networked functions

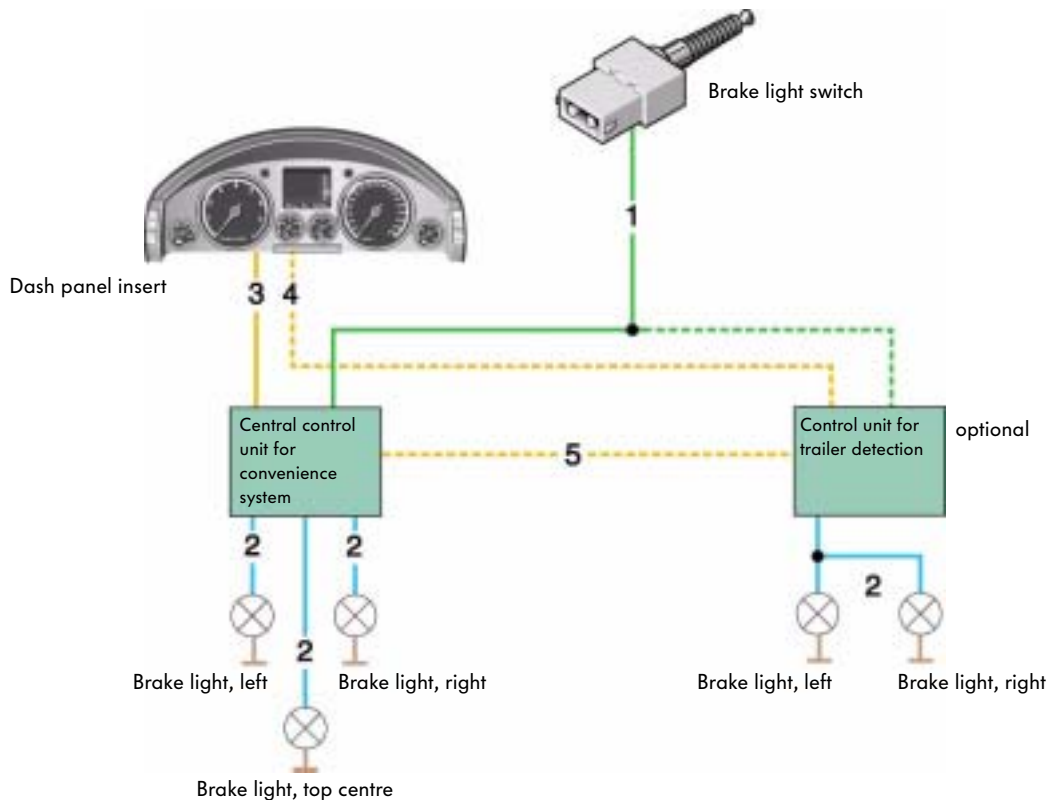
Brake light control

Control units involved

- Central control unit for convenience system
- Control unit for trailer detection (optional)
- Dash panel insert



By way of illustration, the CAN lines (orange) for the signals are represented individually. In reality, all the signals are sent via a CAN High and a CAN Low line.



S272_062

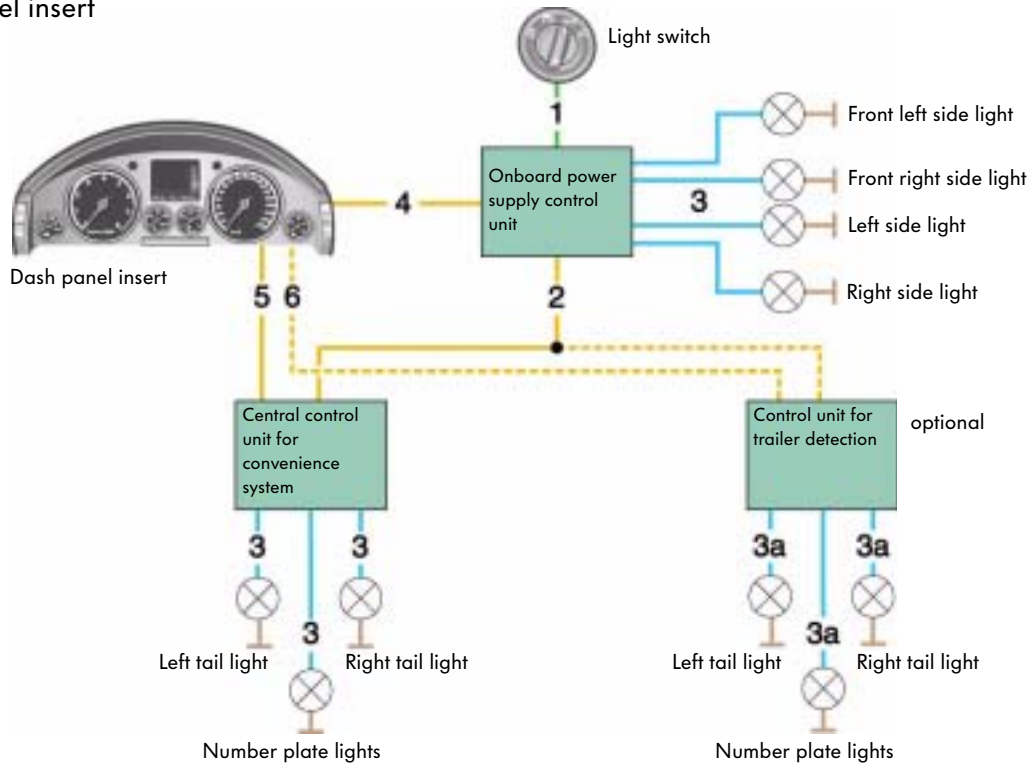
Signals

- 1 Activation of the central control unit for the convenience system and the control unit for trailer detection via the brake light switch with an analogue voltage
- 2 Power current to the brake light from central control unit for convenience system or control unit for trailer detection
- 3 Fault message from central control unit for convenience system to the dash panel insert via Convenience CAN bus; if the brake light is defective, a fault message appears in the display
- 4 Fault message from control unit for trailer detection to the dash panel insert via Convenience CAN bus; if the brake light is defective, a fault message appears in the display
- 5 Safety signal. If the activation signal from the brake light switch to the control unit for trailer detection is missing, information is provided through the central control unit for convenience system

Control of side lights and tail lights

Control units involved

- Onboard power supply control unit
- Central control unit for convenience system
- Control unit for trailer detection (optional)
- Dash panel insert



S272_045

Signals

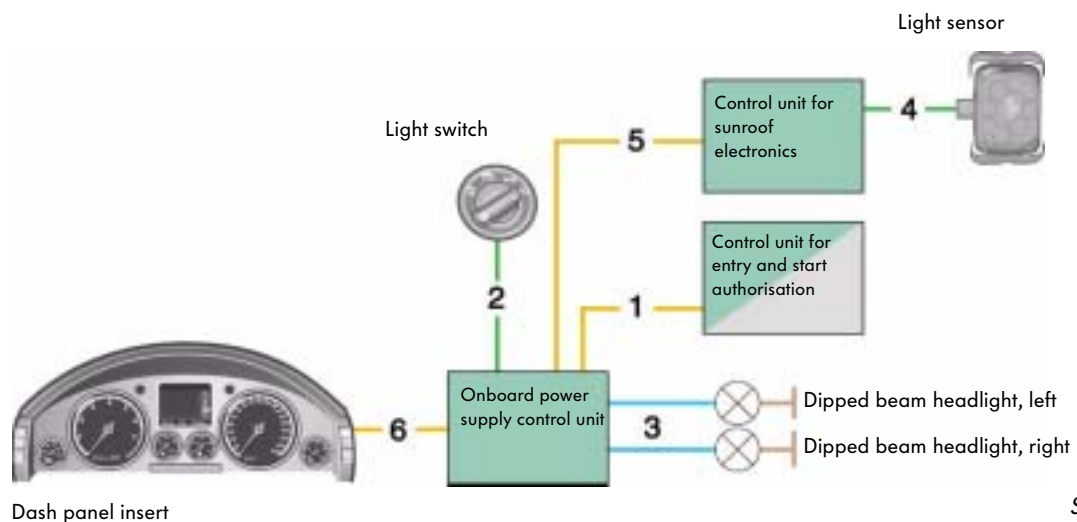
- 1 Activation of the onboard power supply control unit by the light switch with an analogue voltage
- 2 Activation signal from the onboard power supply control unit to the central control unit for convenience system and control unit for trailer detection via Convenience CAN bus
- 3 Power current to the side lights and tail lights
- 4 Fault message to the dash panel insert via Convenience CAN bus; if a side light is defective, a fault message appears in the display
- 5 Fault message to the dash panel insert via Convenience CAN bus; if a tail light is defective, a fault message appears in the display
- 6 Fault message to the dash panel insert via Convenience CAN bus; if a tail light in the trailer is defective, a fault message appears in the display

Networked functions

Light activation via the light switch or the automatic driving light control

Control units involved

- Onboard power supply control unit
- Dash panel insert
- Control unit for entry and start authorisation
- Control unit for sunroof electronics



Signals

- 1 Signal 'Ignition on' from control unit for entry and start authorisation via Convenience CAN bus
- 2 Activation of the onboard power supply control unit by the light switch with an analogue voltage signal, V_{bat} approx. 12 volts
- 3 Power current to the headlights

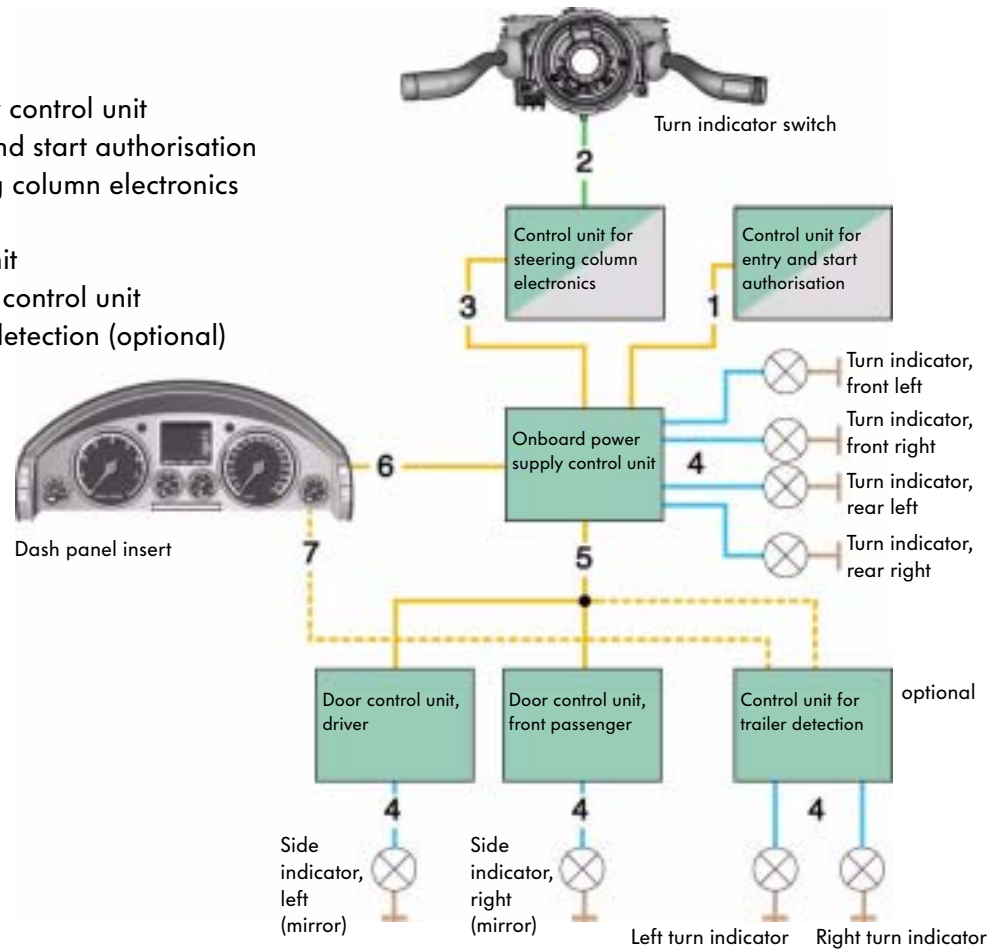
If light sensor fitted

- 4 Analogue brightness signal from light sensor to control unit for sunroof electronics
- 5 Signal 'Switch on dipped beam headlights' via Convenience CAN bus in the case of automatic driving light control from control unit for sunroof electronics to onboard power supply control unit
- 6 Fault message to the dash panel insert via Convenience CAN bus; if dipped beam headlight is defective, a fault message appears in the display

Control of the turn indicator

Control units involved

- Onboard power supply control unit
- Control unit for entry and start authorisation
- Control unit for steering column electronics
- Dash panel insert
- Driver's door control unit
- Front passenger's door control unit
- Control unit for trailer detection (optional)



Signals

- 1 Signal 'Ignition on' from control unit for entry and start authorisation via Convenience CAN bus
- 2 Signal 'turn indicating' from turn indicator switch into control unit for steering column electronics
- 3 Signal 'turn indicating' from control unit for steering column electronics via Convenience CAN bus to onboard power supply control unit
- 4 Power current to the indicator lights
- 5 Signal 'turn indicating' from onboard power supply control unit via Convenience CAN bus to door control units driver/front passenger and, if present, to the control unit for trailer detection
- 6 Signal for activation of the indicator lamps and poss. fault messages via Convenience CAN bus from onboard power supply control unit to dash panel insert
- 7 Signal for activation of the indicator lamps and poss. fault messages via Convenience CAN bus from control unit for trailer detection to dash panel insert

S272_047

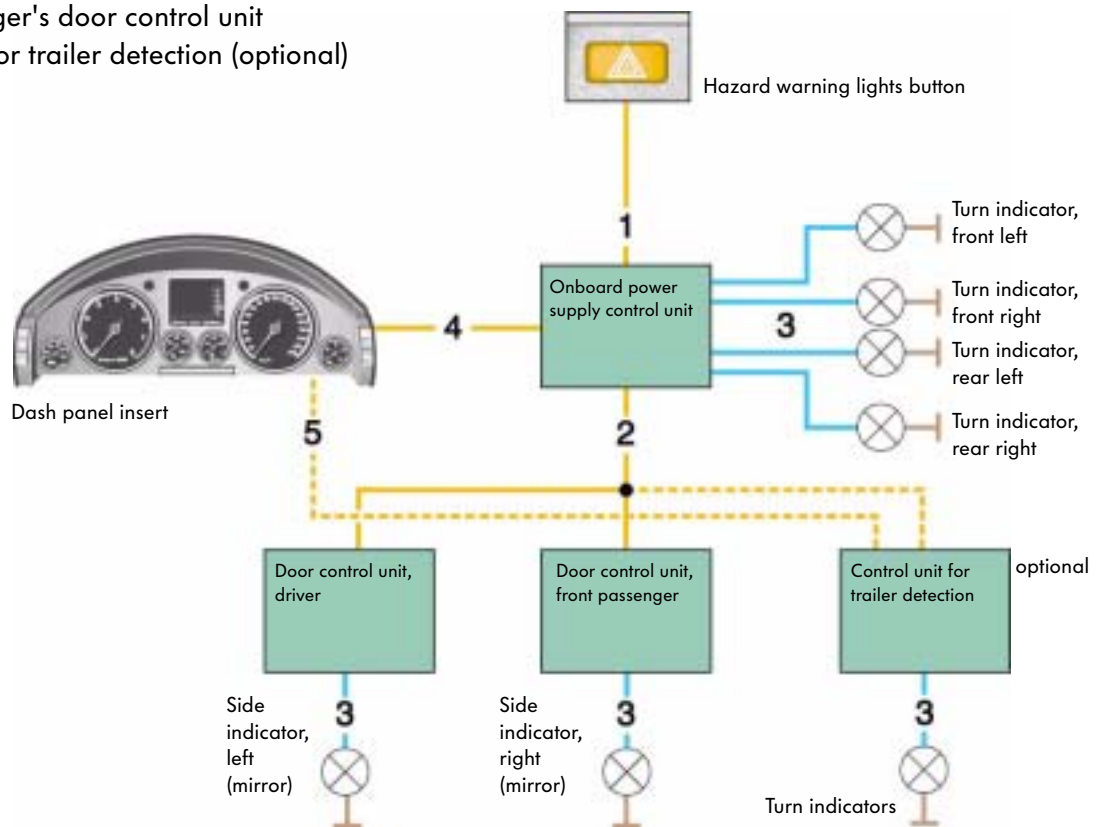


Networked functions

Hazard warning lights control

Control units involved

- Onboard power supply control unit
- Dash panel insert
- Driver's door control unit
- Front passenger's door control unit
- Control unit for trailer detection (optional)



S272_088

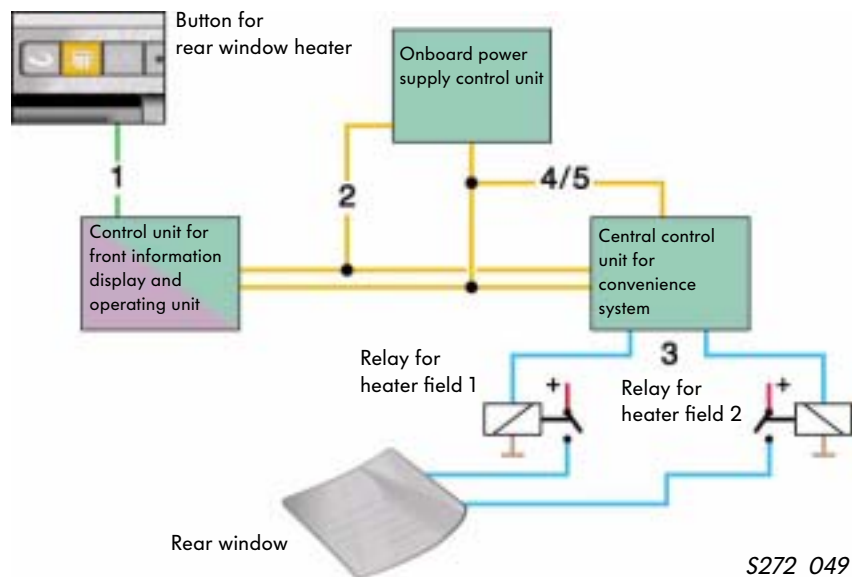
Signals

- 1 Signal 'hazard warning lights' from hazard warning lights button to onboard power supply control unit
- 2 Signal 'hazard warning lights' from onboard power supply control unit via Convenience CAN bus to door control units driver/front passenger and, if present, to the control unit for trailer detection
- 3 Power current to the indicator lights
- 4 Signal for activation of indicator lamps and acoustic check signal and poss. fault messages via Convenience CAN bus from onboard power supply control unit to dash panel insert
- 5 Signal for activation of the indicator lamps and poss. fault messages via Convenience CAN bus from control unit for trailer detection to dash panel insert

Control of the rear window heater

Control units involved

- Control unit, front information display and operating unit
- Onboard power supply control unit
- Central control unit for convenience system



Signals

- 1 Signal from rear window heater button to control unit, front information display and operating unit
- 2 Signal 'Button actuated' from control unit, front information display and operating unit to central control unit for convenience system via Convenience CAN bus
- 3 Analogue activation of the relay for heater field 1 and 2 on rear window
- 4 Signal 'Heater fields of rear window switched on' via Convenience CAN bus from central control unit for convenience system to onboard power supply control unit and control unit for front display and operating unit; indicator lamp is switched on
- 5 Signal 'Power output reduction of rear window heater' via Convenience CAN bus from onboard power supply control unit to central control unit for convenience system



The upper and lower heater fields of the rear window are activated separately. In the case of an overload of the onboard power supply control unit, the onboard power supply control unit reduces the heat output by 50%. The heater fields are activated alternately.



Networked functions

Control of windscreen heater

Control units involved

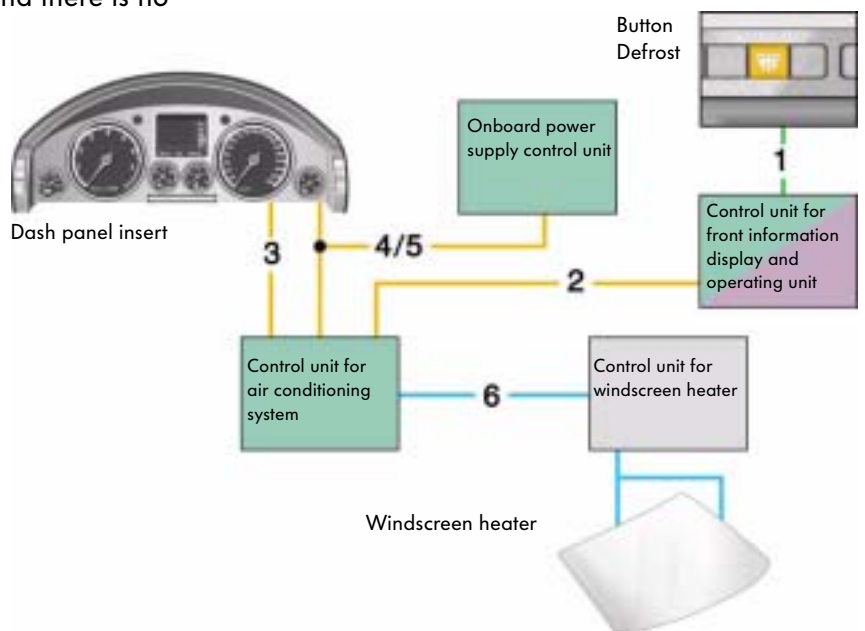
- Control unit, front information display and operating unit
- Onboard power supply control unit
- Control unit for air conditioning system
- Dash panel insert



The windscreen heater is switched on by the control unit for air conditioning system depending on the ambient temperature. The switch-on time is based on the ambient temperature:

- +5 to 0°C = 2 minutes
- 0 to -20°C = 4 minutes
- 20 to -40°C = 6 minutes

Activation via the defrost button is only possible when the engine is running, when the ambient temperature is colder than +5°C, and there is no engine load limitation.



Signals

- 1 Signal 'Windscreen heater on' with manual operation
- 2 Forwarding of signal 'Windscreen heater on' in the case of manual operation from control unit for front display and operating unit for information to control unit for air conditioning system via Convenience CAN bus
- 3 Signal 'Engine speed > 0 rpm' from dash panel insert to control unit for air conditioning system via Convenience CAN bus
- 4 Signal 'Switch-off windscreen heater' in the case of load limitation from onboard power supply control unit via Convenience CAN bus
- 5 Signal 'Windscreen heater on' from control unit for air conditioning system to dash panel insert as well as information signal 'Windscreen heater on' from control unit for air conditioning system to onboard power supply control unit via Convenience CAN bus
- 6 Activation to control unit for windscreen heater to switch on the windscreen heater

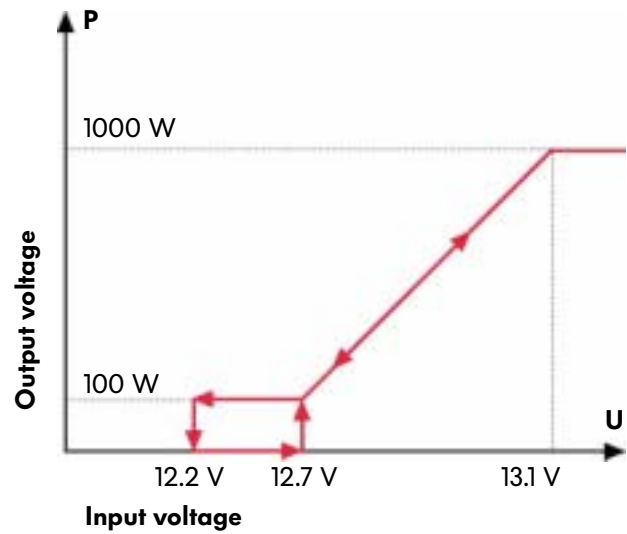
S272_050

Control unit for windscreen heating

In order to enhance convenience and safety (fogged or iced windows), a heated windscreen is used.

The windscreen is heated by means of an integrated metal foil. Due to the necessary electrical power output of approx. 1000 watts, as a result of the foil resistance, a voltage is required that exceeds the onboard power supply voltage of 12 volts.

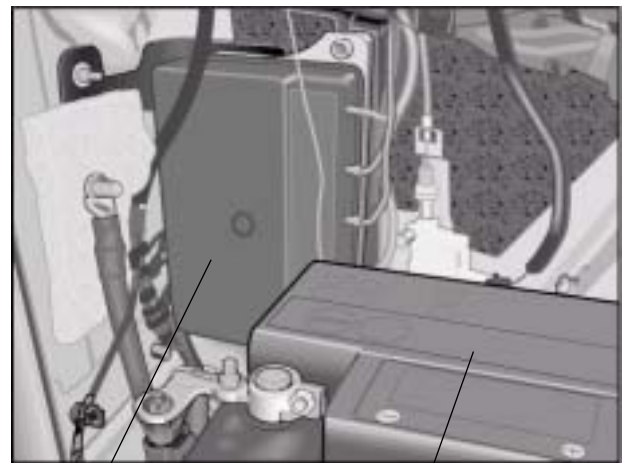
This voltage is provided by the control unit for the windscreen heater (DC/DC converter). Depending on the input voltage, an output voltage of up to 42 volts DC and power output of up to 1000 watts is provided.



S272_089

A crack in the windscreen or a short circuit is detected by the control unit. The windscreen is then not heated.

The control unit for the windscreen heater is located in the rear right of the boot.



Control unit for windscreen heater

Starter battery

S272_094



Switches

Resistance-coded switches

Switches serve to switch electrical components and functions on and off.

In the case of conventional switches, one cable connection per switch function is required.

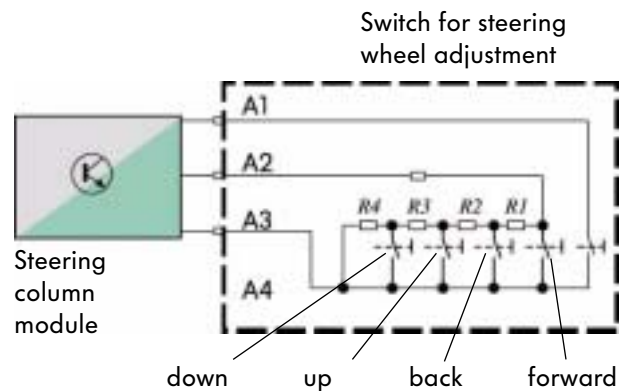
Resistance-coded switches need a considerably lower number of cable connections.

Functional example

Switch for steering wheel adjustment

Switch open

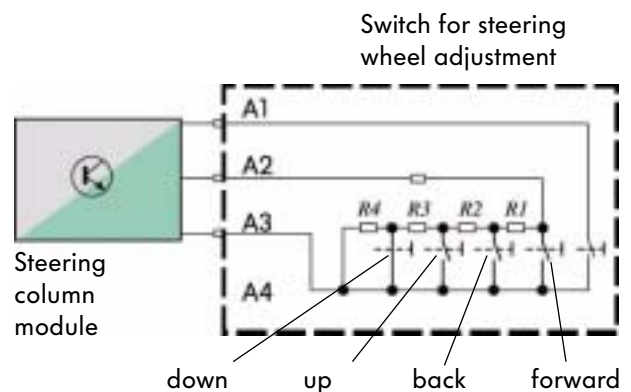
If all the switches are open, no signal is transmitted to the steering column module.



S272_064

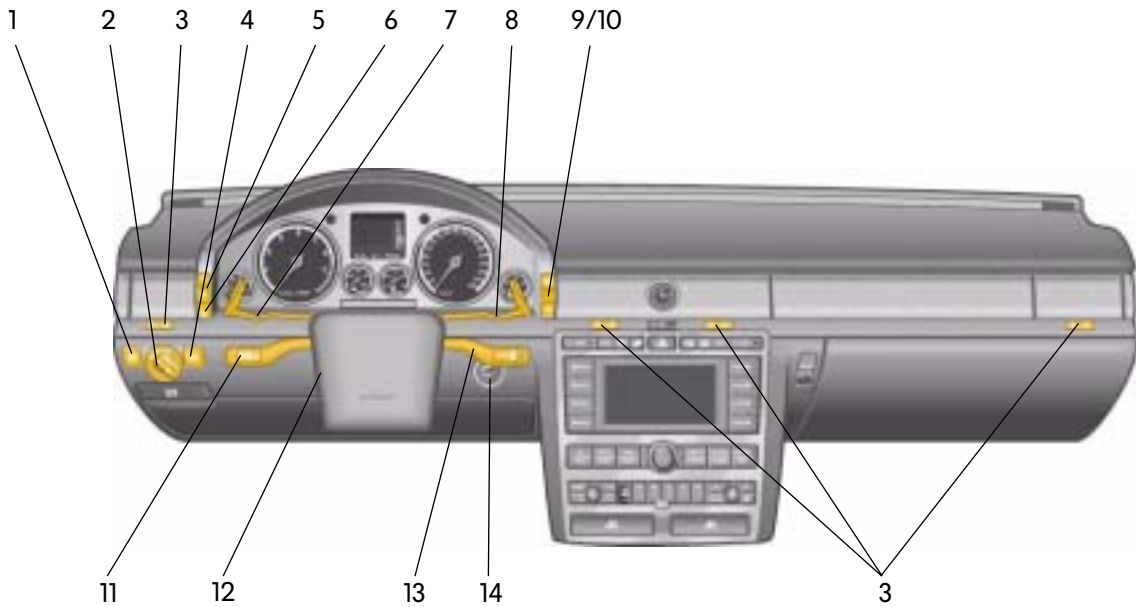
Switch 'down' is actuated

Via contact A2, the steering column module transmits a voltage signal to the switch. This voltage signal is changed by resistance R4. As the resistances R1, R2, R3 and R4 are different, the control unit recognises the switch position.



S272_065

Dash panel



S272_026

- 1 Fog light, optional
- 2 Rotary light switch
- 3 Vent flow restrictor
- 4 Rear fog light
- 5 Instrument lighting
- 6 Reset trip recorder
- 7 Tiptronic -
- 8 Tiptronic +

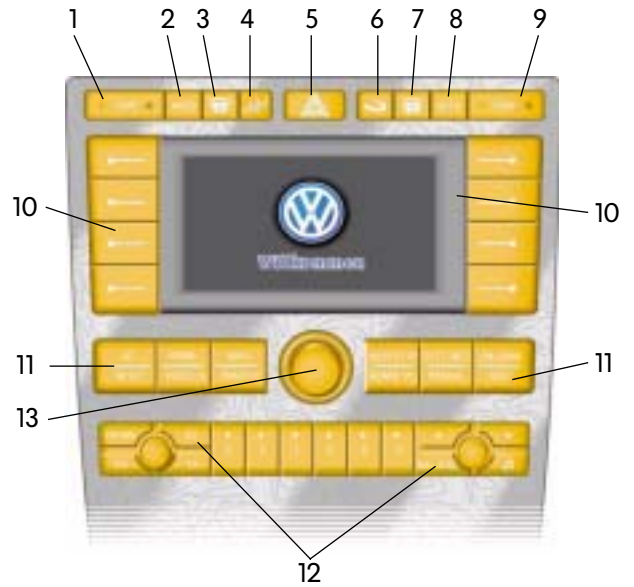
- 9 Turn off parking aid
- 10 Rear roller blind up/down
- 11 Turn indicators and main beam headlights
- 12 Steering wheel adjustment
- 13 Wipers
- 14 Electronic ignition lock



Switches

Front information display and operating unit

- 1 Air conditioning temperature, driver's side
- 2 Automatic air conditioning, driver's side
- 3 Windscreen defrost
- 4 Air conditioning toggle Quattro/Mono
- 5 Hazard warning light switch
- 6 Air conditioning air recirculation
- 7 Rear window heater
- 8 Automatic air conditioning, front passenger's side
- 9 Air conditioning temperature, front passenger's side
- 10 Softkeys for menu control
- 11 Switch-over menu on screen
- 12 Radio operating keys
- 13 Rotary/push knob



S272_039

Multi-function steering wheel

- 1 APC or CCS On/Off
- 2 APC Distance +/-
- 3 APC or CCS Cancel
- 4 Key lighting On/Off (on the back)
- 5 APC or CCS -
- 6 APC or CCS Set
- 7 APC or CCS Resume
- 8 APC or CCS +
- 9 Volume +
- 10 Answer telephone call
- 11 Navigation announcement
- 12 Volume -
- 13 Menu selection, forward
- 14 List selection
- 15 Menu selection, backward



S272_027

Driver's door

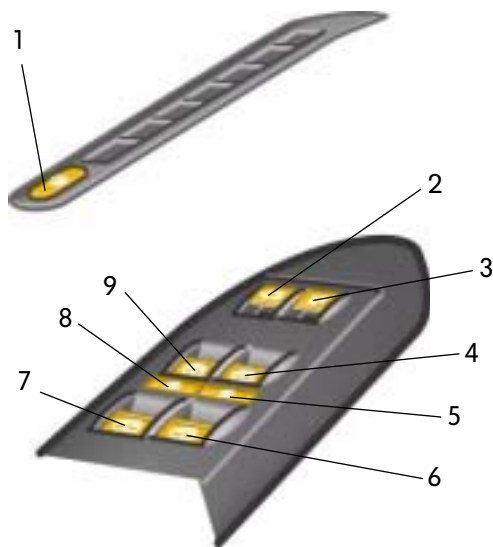
- 1 Locking/unlocking doors (in driver's and front passenger's door)



S272_031

Driver's door

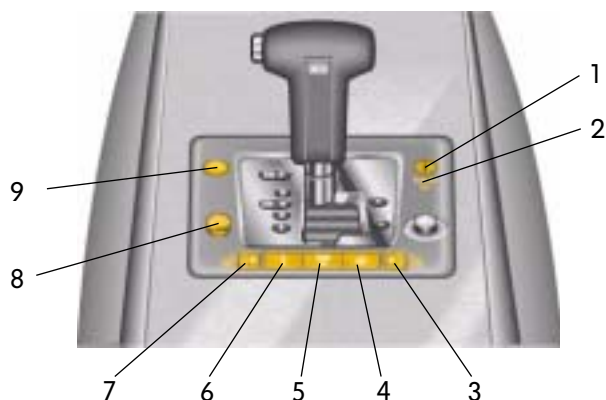
- 1 Defroster vent, driver's door
- 2 Bootlid open
- 3 Tank filler flap release
- 4 Front right window regulator
- 5 Right child-proof lock
- 6 Rear right window regulator
- 7 Rear left window regulator
- 8 Left child-proof lock
- 9 Front left window regulator



S272_030

Centre console

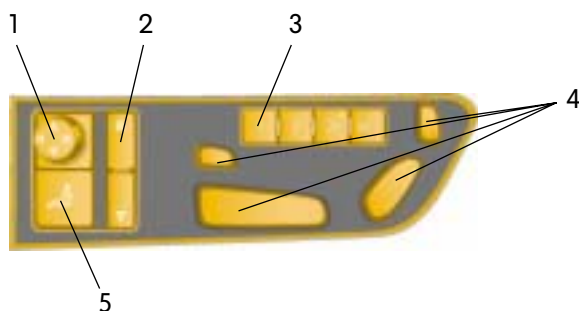
- 1 Deactivation, front passenger's airbag
- 2 Indicator lamp, deactivation front passenger's airbag
- 3 Seat heater and ventilation, front passenger (optional)
- 4 Damper setting
- 5 ESP switch
- 6 Air suspension adjustment
- 7 Seat heater and ventilation, driver, and steering wheel heating (optional)
- 8 Mirror adjustment, mirror heating, optional mirror folding function
- 9 Ignition and starting engine, optional



S272_038

Driver's and front passenger's seat

- 1 4-way adjustment lumbar support
- 2 Belt height adjustment
- 3 Position memory of seats (3 positions, 1 set)
- 4 Seat adjustment
- 5 Massage On/Off



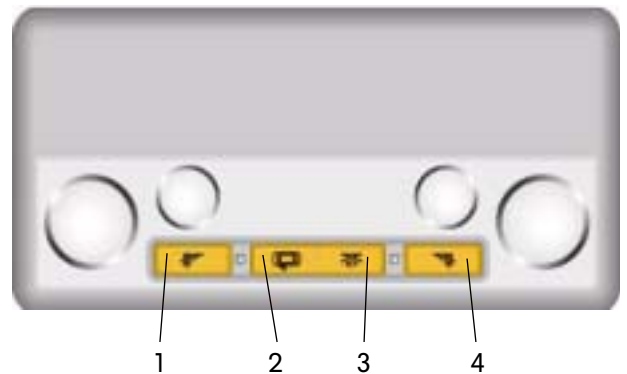
S272_029



Switches

Rear roof module

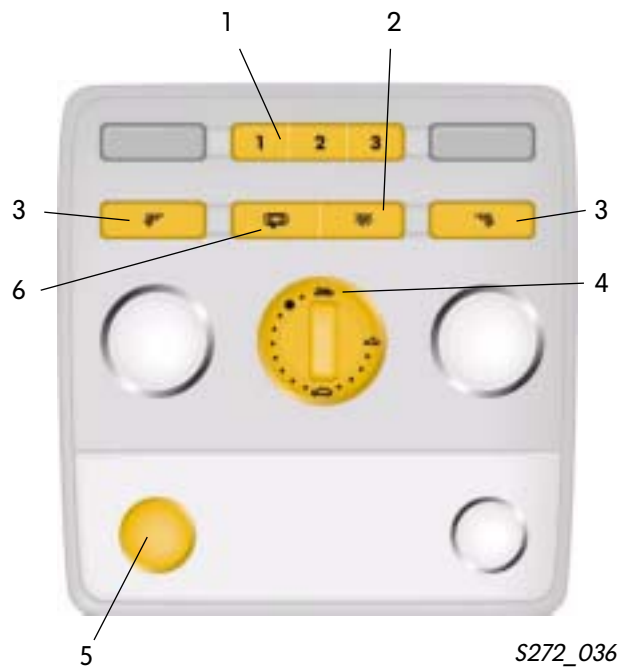
- 1 Rear left reading light On/Off
- 2 Interior light via door contact On/Off
- 3 Interior light On/Off
- 4 Rear right reading light On/Off



S272_037

Front roof module

- 1 Trigger for programmed remote control (e.g. open garage door)
- 2 Interior light On/Off
- 3 Reading light On/Off
- 4 Control of sliding/tilting roof
- 5 Hands-free microphone for driver (car phone and voice operation)
- 6 Interior light via door contact On/Off

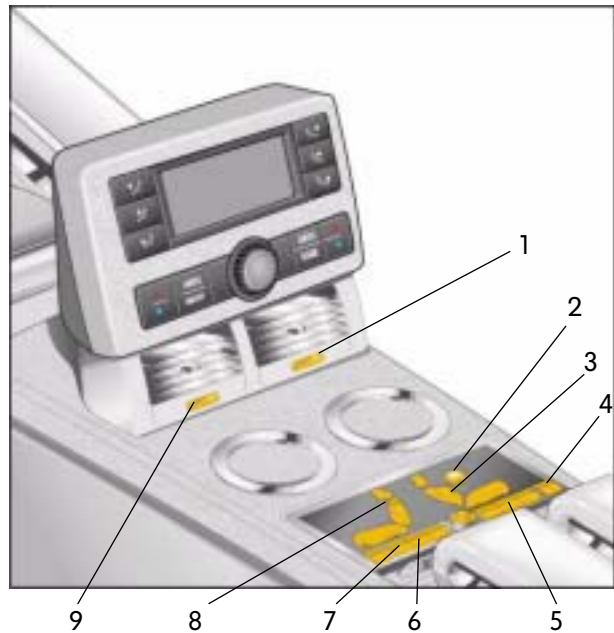


S272_036



Operating elements on the console in the rear

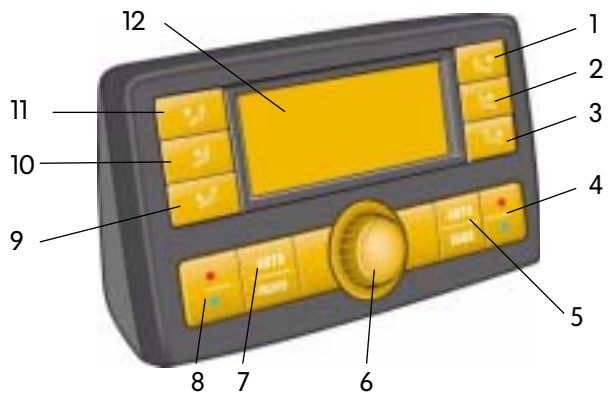
- 1 Vent flow restriction, centre rear right
- 2 Switch-over to seat control, front passenger's seat
- 3 Rear right seat setting
- 4 Rear right seat heater and ventilation
- 5 Rear right seat memory (2/3 positions and massage at 2 positions)
- 6 Rear left seat memory (2/3 positions and massage at 2 positions)
- 7 Rear left seat heater and ventilation
- 8 Rear left seat setting
- 9 Vent flow restriction, centre rear left



S272_032

Rear air conditioner/Climatronic operating and display unit (four-seater)

- 1 Rear right head vent
- 2 Rear right body vent
- 3 Rear right foot vent
- 4 Rear right manual temperature control
- 5 Rear right automatic control
- 6 Fan +/-
- 7 Rear left automatic control
- 8 Rear left manual temperature control
- 9 Rear left foot vent
- 10 Rear left body vent
- 11 Rear left head vent
- 12 Display



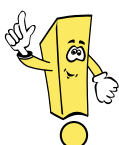
S272_033



As regards operation of a retrofitted version, please consult the manual.

Rear doors

- 1 Locking/unlocking doors



New!



S272_035



Dash panel insert

The dash panel insert is designed as a premium version with a 5" colour TFT screen (thin-film transistor) and a highline version with a 3" monochrome dot-matrix screen.



S272_056

The top-of-the-range dash panel insert has the following functions:

Analogue displays

- Speed (country-specific in kph, mph + kph, kph + mph)
- Engine speed
- Fuel gauge
- Coolant temperature (country-specific in °C/°F)
- Oil temperature (country-specific in °C/°F)
- Onboard power supply voltage (V)
- Odometer display (total distance driven, trip counter)

5" colour TFT screen

- The on-board computer can be switched to country-specific units
- Driving time
- Distance
- Average speed
- Average consumption
- Momentary consumption
- Ambient temperature/ice warning
- Remaining distance
- Maintenance due indicator
- Gear selection for automatic
- Alarm indications with pictograms
- Navigation/radio data
- APC displays
- Tyre pressure warning
- Lamp failure display

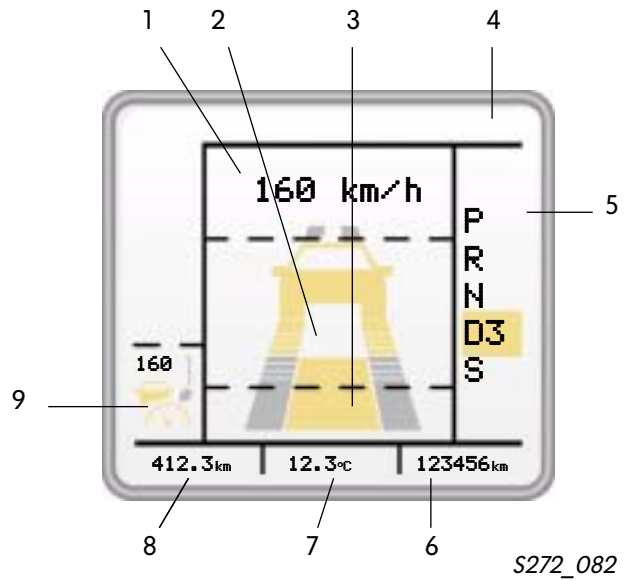
Highline dash panel insert

- a 3" monochrome dot-matrix screen
- a clock with LC display in the rev counter
- a total distance driven and trip counter with LC display in the speedometer



Layout of the display

- 1 Audio part display
Warnings
- 2 Multi-function display
Warnings
Automatic proximity control main screen
Voice input
Navigation main screen
Car phone
Telematics
Audio
- 3 Buttons of the multi-function steering wheel that can be activated
APC part screen
Audio list
Car phone list
Navigation: current road
Warnings
- 4 Marker for warnings
- 5 Gear selection display
- 6 Total distance driven
- 7 Ambient temperature
- 8 Trip counter
- 9 Red symbol for APC



The display areas 1, 2 and 3 are assigned according to the priority of the displays to be shown.

High, red warnings:

- Danger or cars down

Medium, amber warnings:

- Messages

Low:

- Information



Dash panel insert

Existing driver information

Driver information	Analogue display	Symbols	Text messages
ABS			
APC displays			e.g. APC defective
Airbag displays			e.g. airbag fault
Ambient temperature		12.3°C	
Onboard power supply voltage			Electrics: electrical equipment switch-off
Lack of brake fluid			e.g. brake fluid, stop vehicle!
Brake fault, EBD fault			e.g. brake fault, stop vehicle!
Brake wear			Check brake pads
Damper function			e.g. Sport
Damper fault			Fault
Dynamic oil warning			Oil pressure, engine off!
Engine speed			
EPC		EPC	
Ice warning			
ESP/TCS displays			
Turn indicator check, trailer			
Turn indicator check, left/right			
Main beam headlights			
Handbrake			Release handbrake!
Total distance driven		123456 km	
Speed			
Light bulb failure			e.g. check rear fog light
Light bulb failure, brake light			Please check brake light
ID sender 'Battery warning'			Key battery empty
ID sender not authorised (immobiliser)			Key not authorised
ID sender not detected			e.g. system fault, workshop!
Fuel gauge			
Lack of coolant			Lack of coolant
Coolant temperature			
Coolant overheating			Coolant overheating



Driver information	Analogue display	Symbols	Text messages
Charge control			Alternator, workshop
Steering wheel cannot be locked			Please move steering wheel
Steering wheel locked			Locking: press start/ stop for longer period
Steering defective			Steering defective, workshop
Headlight range control failure			Check headlight range control
Light warning			e.g. switch on side lights
Bonnet, doors, bootlid open, child-proof lock			
Fog lights			
Rear fog light			
Self-levelling function			e.g. vehicle lowering
Level, fault			Fault
Emergency start			Please start engine
EOBD			e.g. engine fault
Oil temperature			
Oil level too low			Check oil level
Oil level sensor defective			Oil sensor fault, workshop!
Tyre pressure control displays			e.g. tyre pressure control off
Key warning			Key not found
Shift lock			Press brake
Seat belt, driver			Driver: fasten seat belt
Trip counter		123.4km	
Fuel warning			Please refuel
Gear selection display		D3	
Place selector lever in position 'P'			Place selector lever in position 'P'
Service due indicators			e.g. Service now
Washer fluid level			Add washer fluid

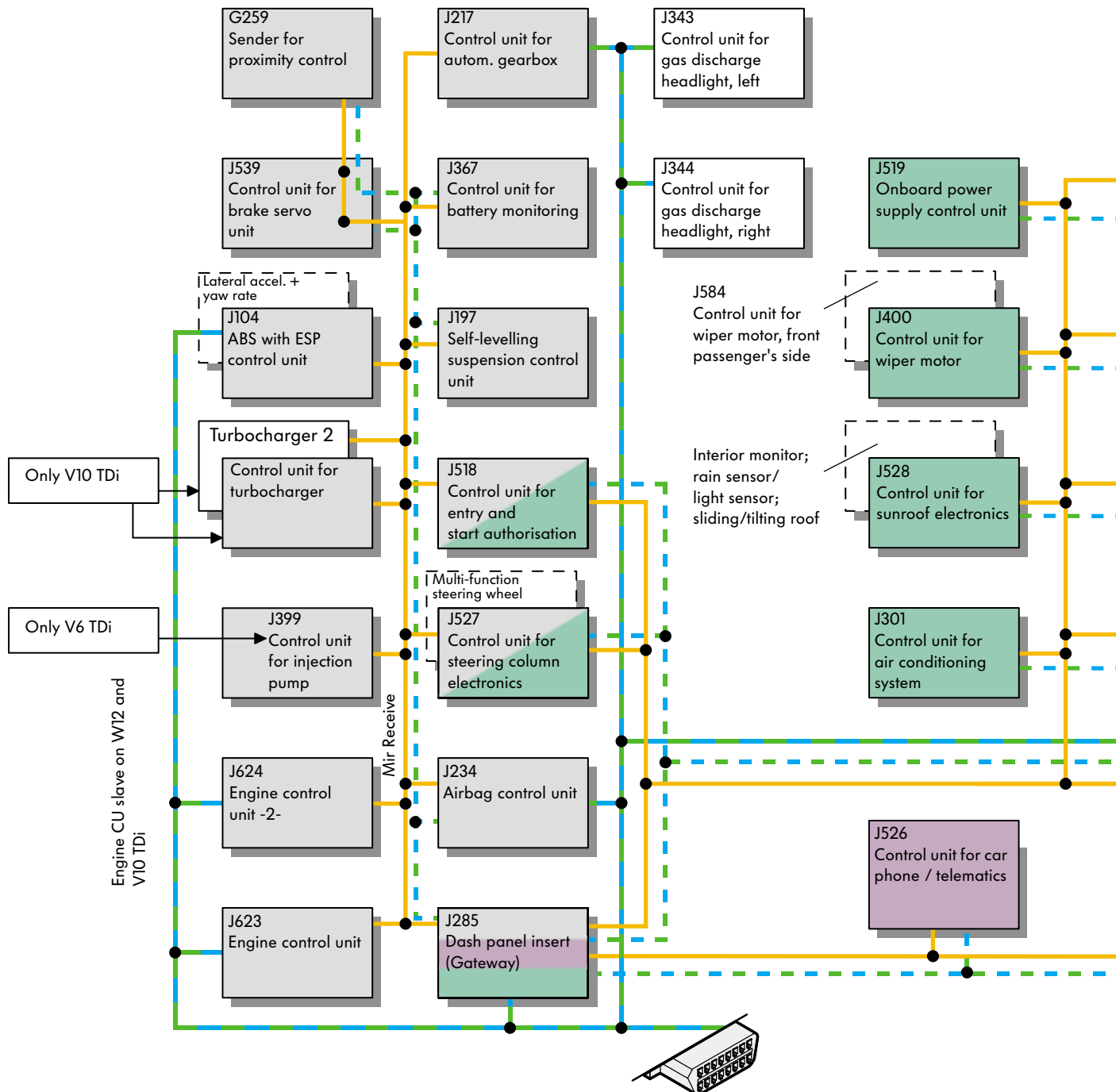


Networking

Databus topology

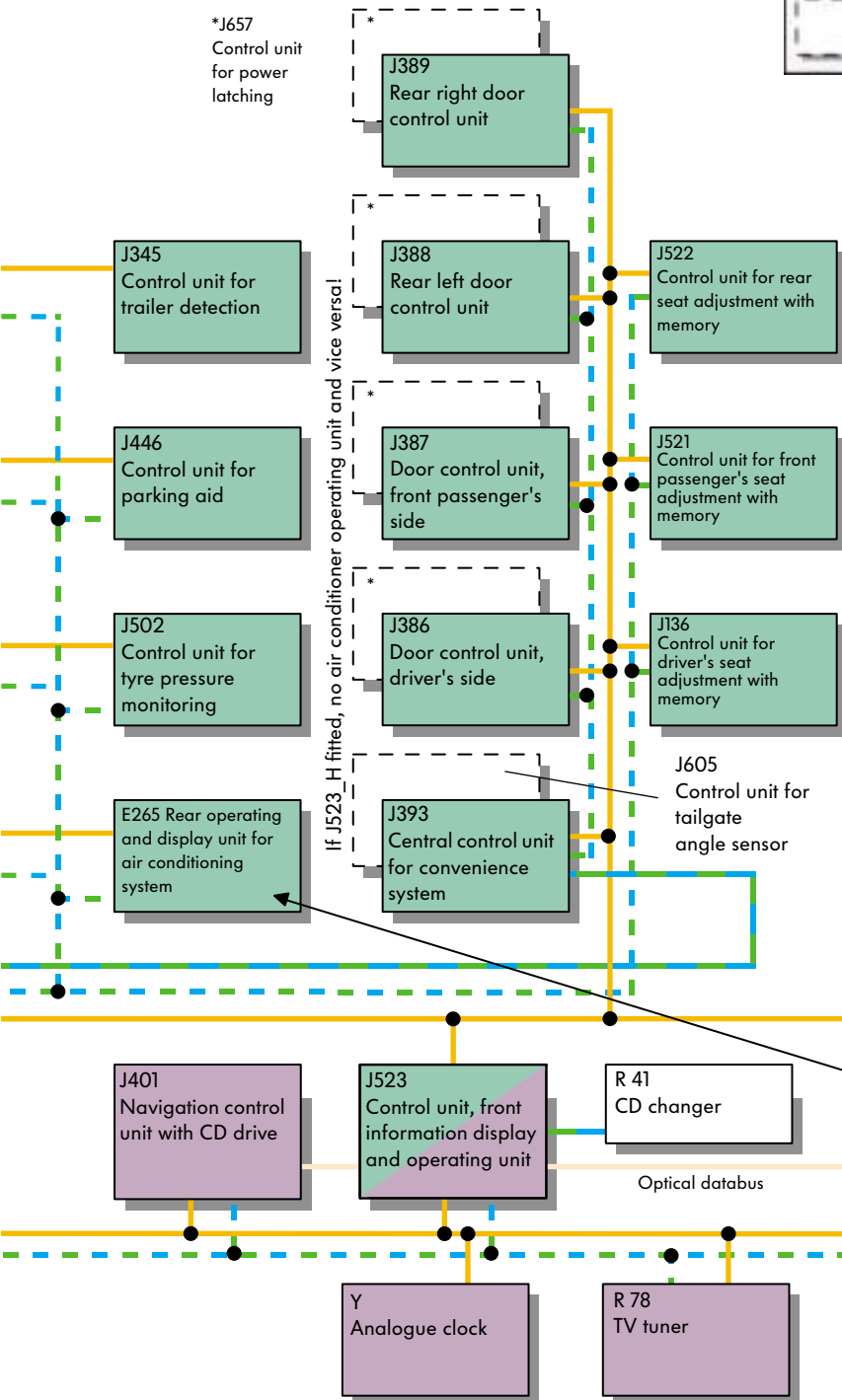
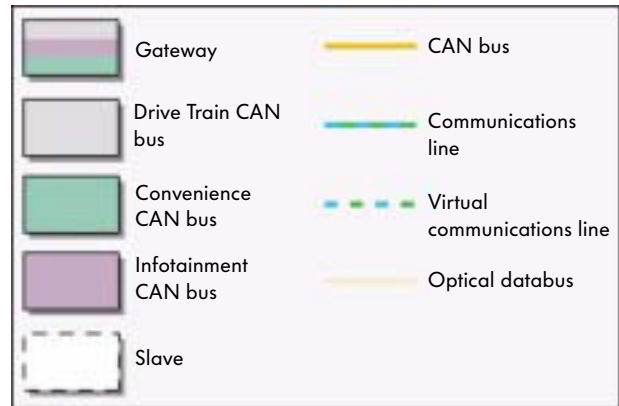
The databus system has been expanded to a great extent. It has three subsystems, the

- Drive Train CAN bus,
- Convenience CAN bus,
- Infotainment CAN bus.



Diagnosis via the databus

The diagnosis via the communications line only takes place now in the case of a few control units in the Drive Train CAN bus subsystem, the gas discharge headlights and in the central control unit for the convenience system.



All other control units, except for the analogue clock, the control units for turbochargers 1 and 2, the injection pump and the control unit for trailer detection have a virtual communications line. Diagnosis is performed via the bus system. The control units send their diagnostic data via the gateway in the dash panel insert to the diagnostic testing and information system. In the case of a defective dash panel insert, no diagnosis of control units is possible using the virtual communications line.



The control unit for trailer detection as well as the analogue clock do not have self-diagnostic capability.

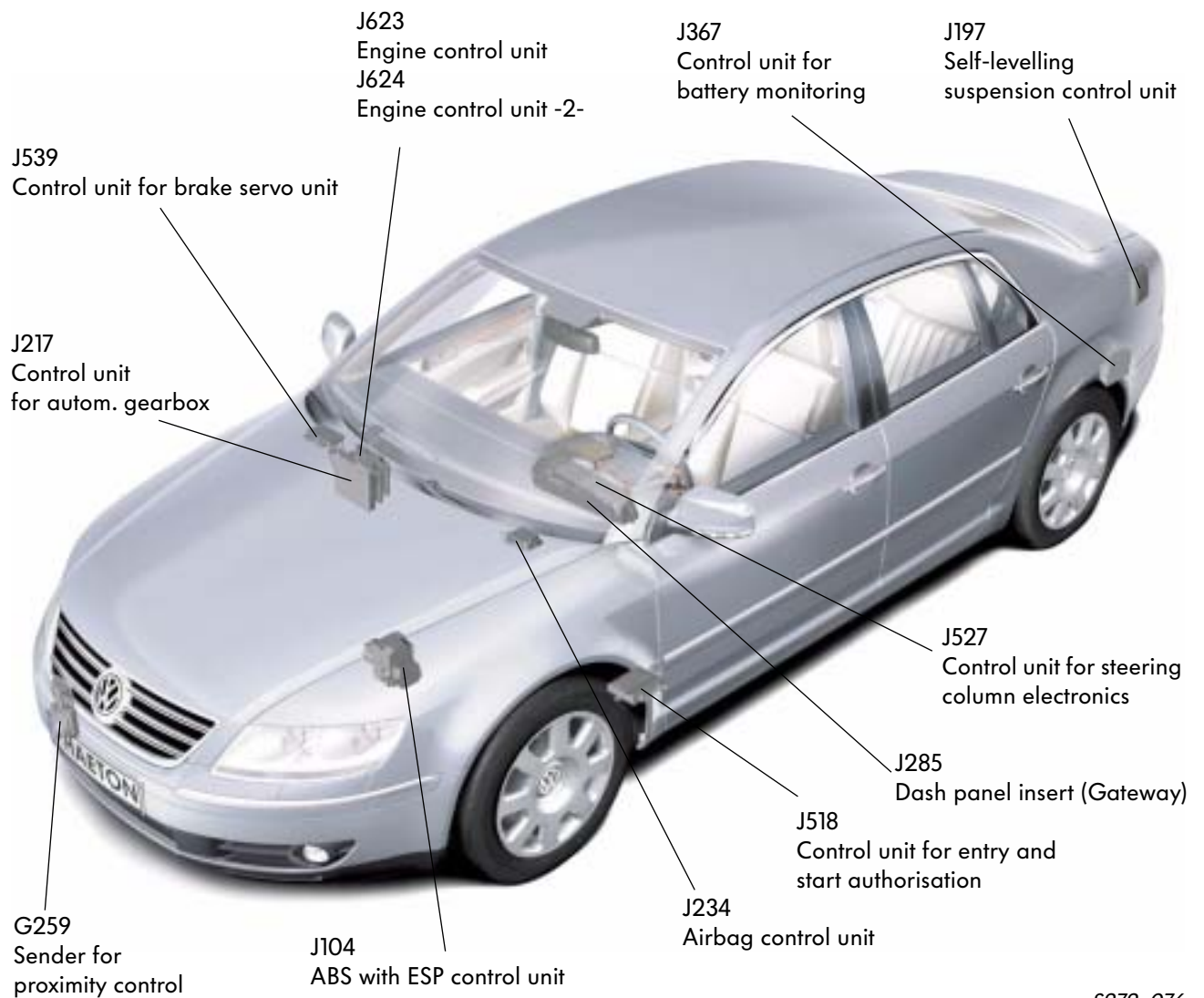


Networking

The control units in the Drive Train CAN bus

The Drive Train CAN bus operates at a data transfer rate of 500 kbit/s. The data is transmitted via the CAN High and CAN Low line.

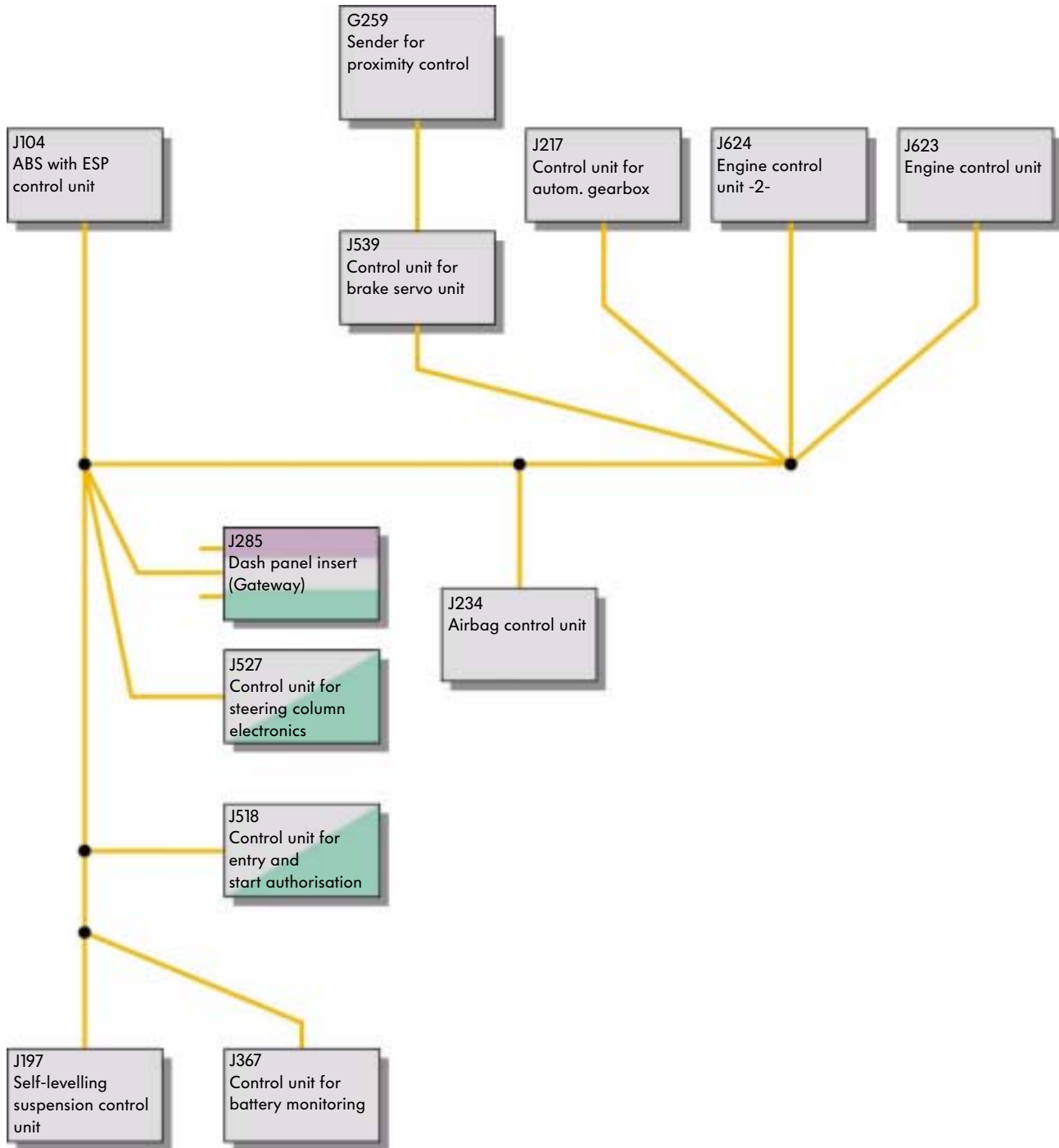
If one of these lines is defective, has a short circuit or an interruption, data transfer is no longer possible or only to a limited extent.



S272_076

Linking the Drive Train CAN bus

The control units are networked using a combination of linear and star-shaped links.



S272_058



Networking

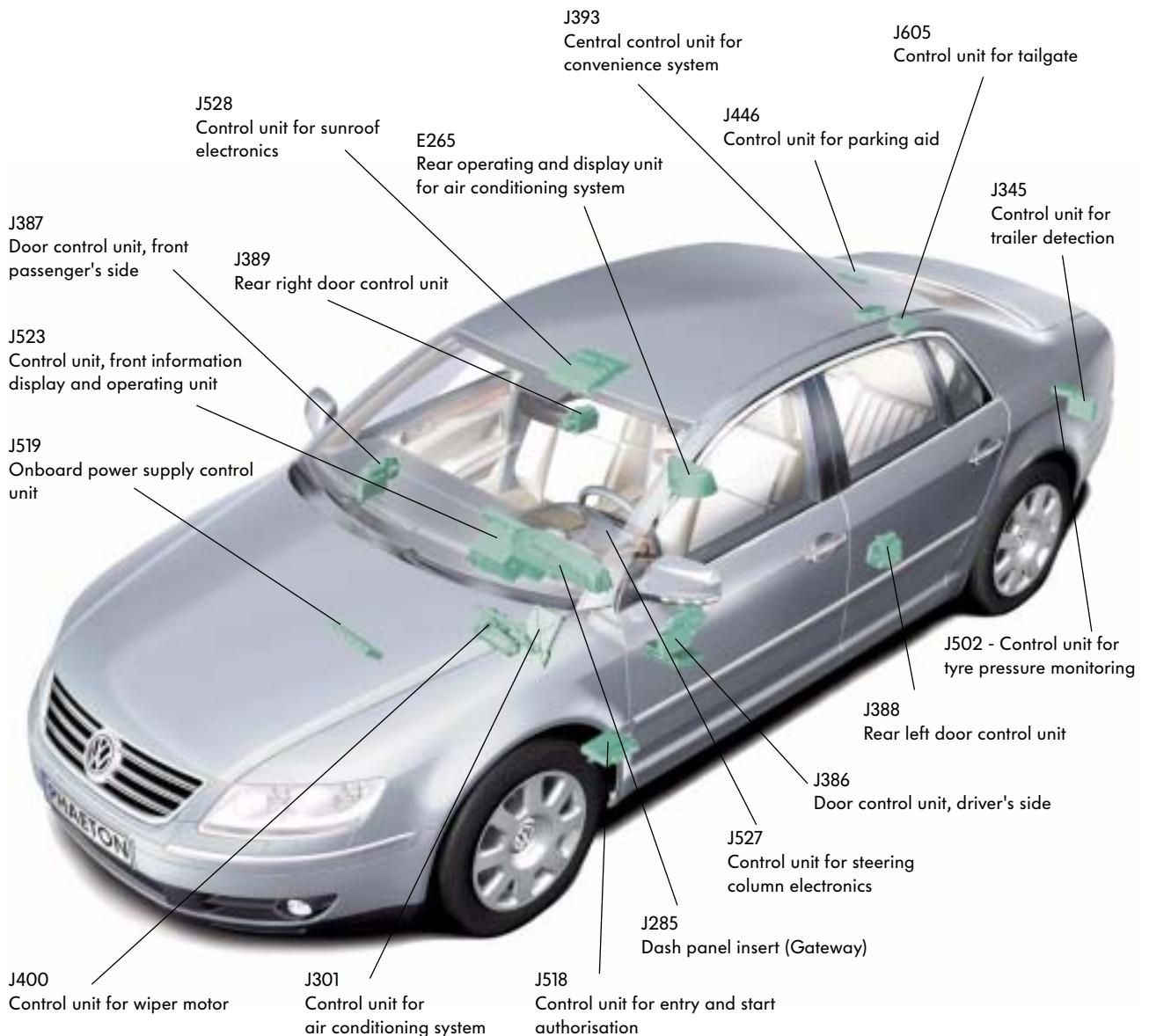
Control units in the Convenience CAN bus

The Convenience CAN bus operates at a data transfer rate of 100 kbit/s.

Data is transmitted via the CAN High and CAN Low line.

If one of these lines is defective, has a short circuit or an interruption, data transfer is possible only via one line. The databus goes to single-wire mode.

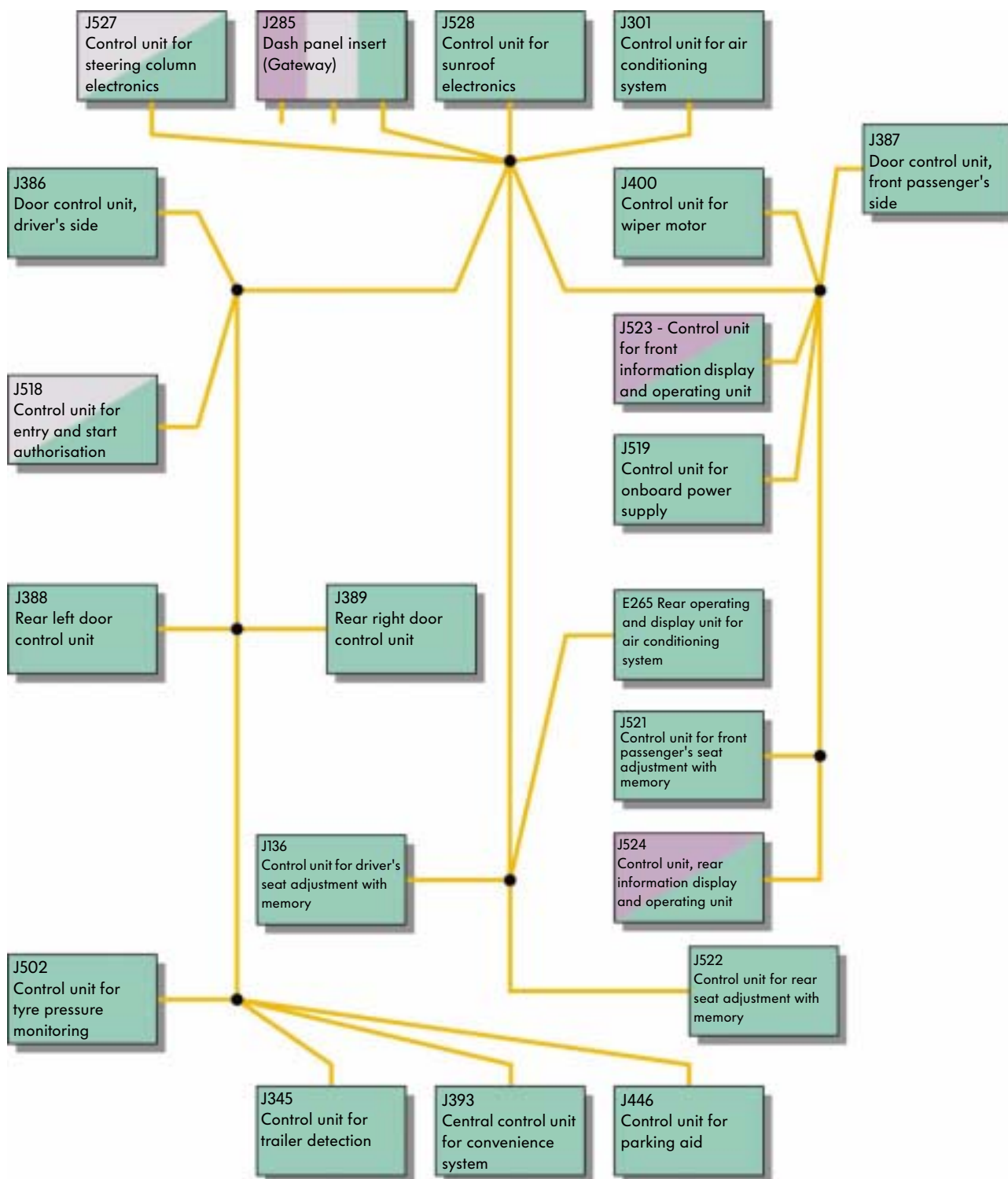
Various control units are designed as masters and communicate with their slaves via an internal data line to which only they have access. Slaves are executing control units that run the instructions from their master, e.g. switching on the wiper motor.



S272_074

Linking the Convenience CAN bus

The control units are networked using a combination of linear and star-shaped links.



Networking

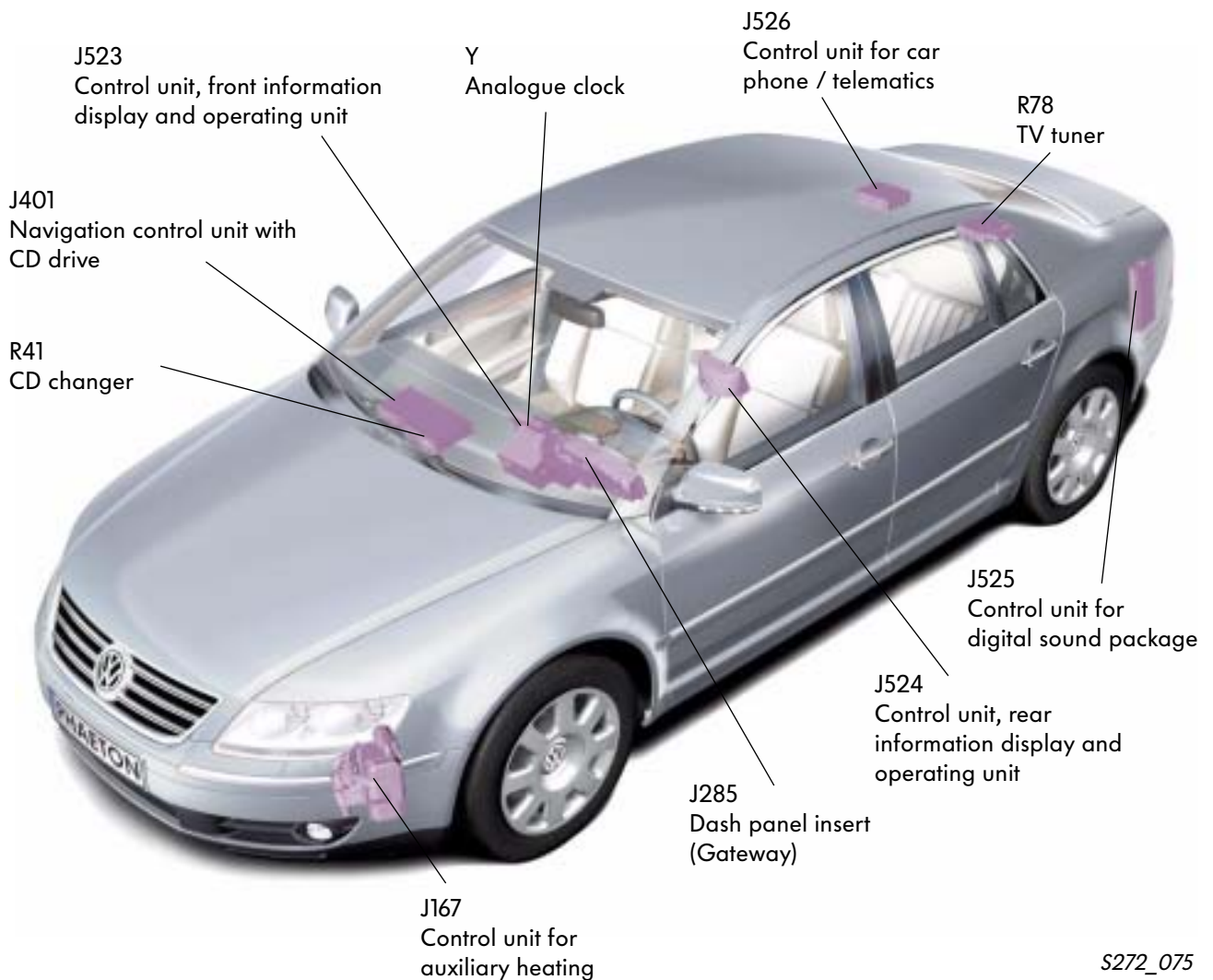
Control units in the Infotainment CAN bus

The Infotainment CAN bus operates at a data transfer rate of 100 kbit/s.

The data is transmitted via the CAN High and CAN Low line.

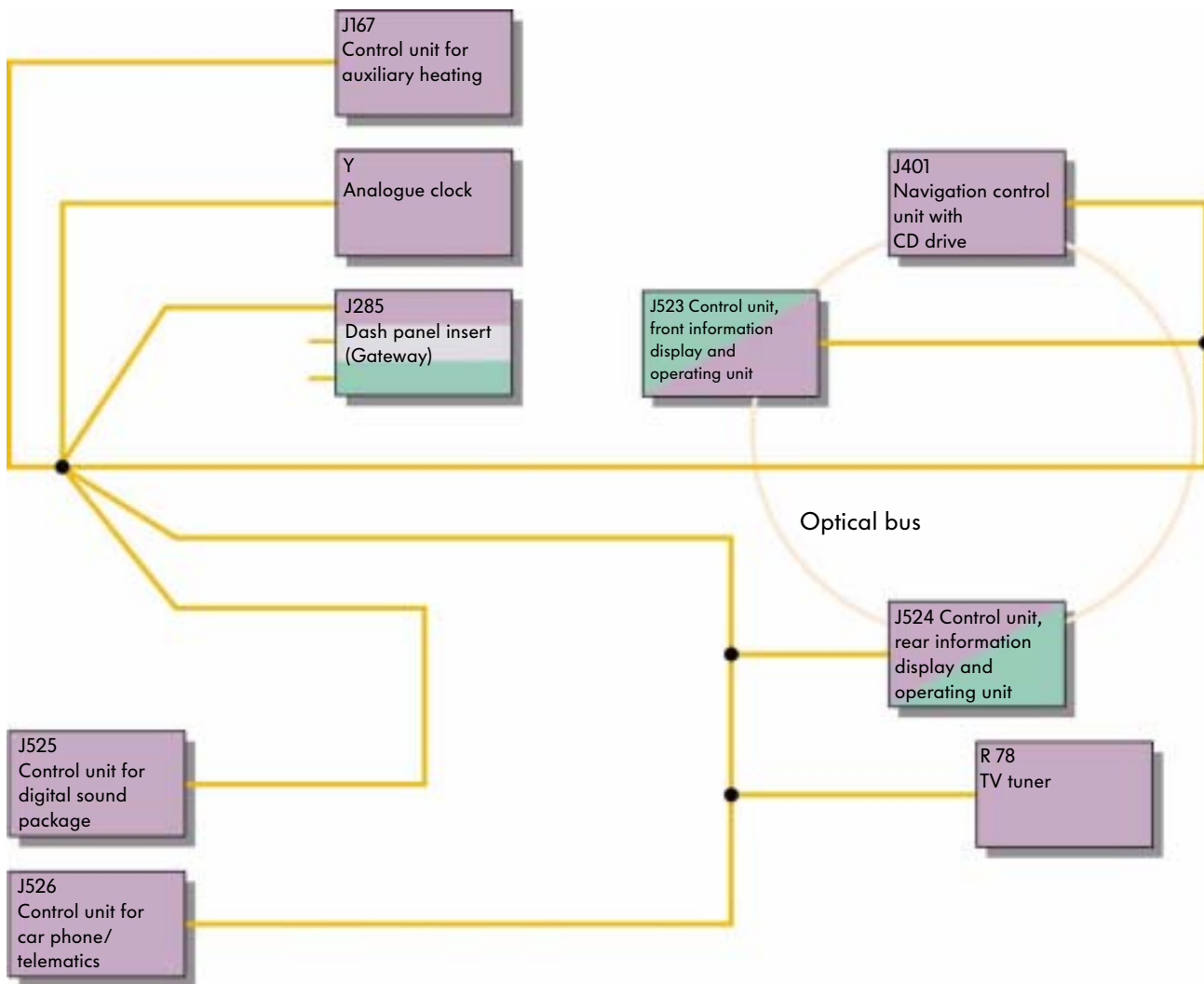
If one of these lines is defective, has a short circuit or an interruption, data transfer is possible only via one line. The databus goes to single-wire mode.

The front and rear control units, information display and operating units as well as the navigation control unit communicate with one another via an optical bus to which only they have access.



Linking the Infotainment CAN bus

The control units are networked using a combination of linear and star-shaped links.



S272_060



Networking

Optical databus

The front control unit, information display and operating unit as well as the navigation computer communicate with one another via an optical bus to which only they have access.

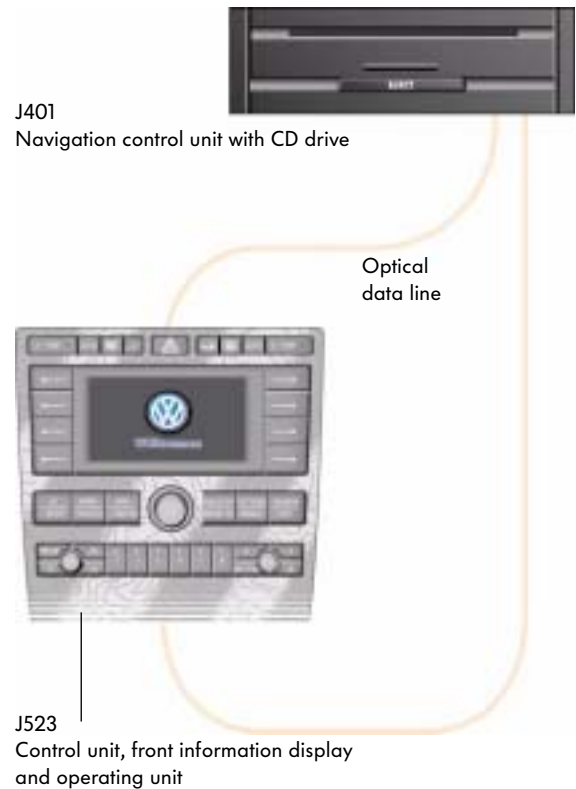
The optical databus operates at a data transfer rate of 11.2 Mbit/s.

The available bandwidth is suitable for transmitting data from the navigation CD-ROM.

On the connection level, this optical bus system is based on a single polymer fibre-optic cable that connects all the devices in a ring topology.

The information is received via an optical receiving diode and is forwarded via a transmitting diode.

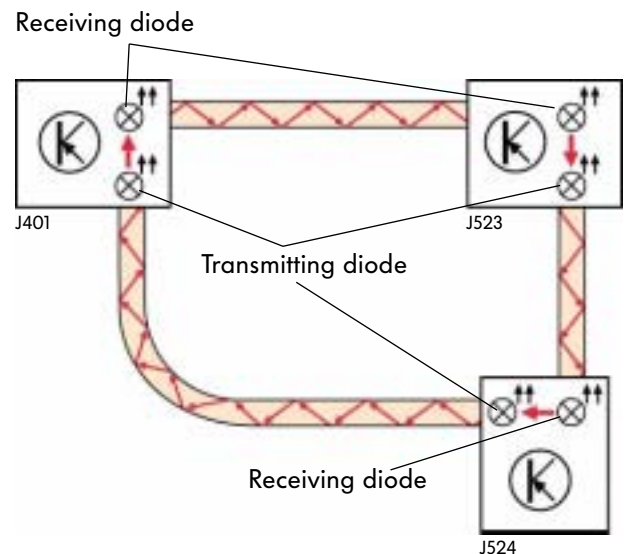
Due to the ring-shaped design, overall failure of the databus is unavoidable if one node is unable to pass on the information.



S272_091



When laying fibre-optic cables, special care is necessary, as it is only possible to bend them up a maximum radius of 25 mm.

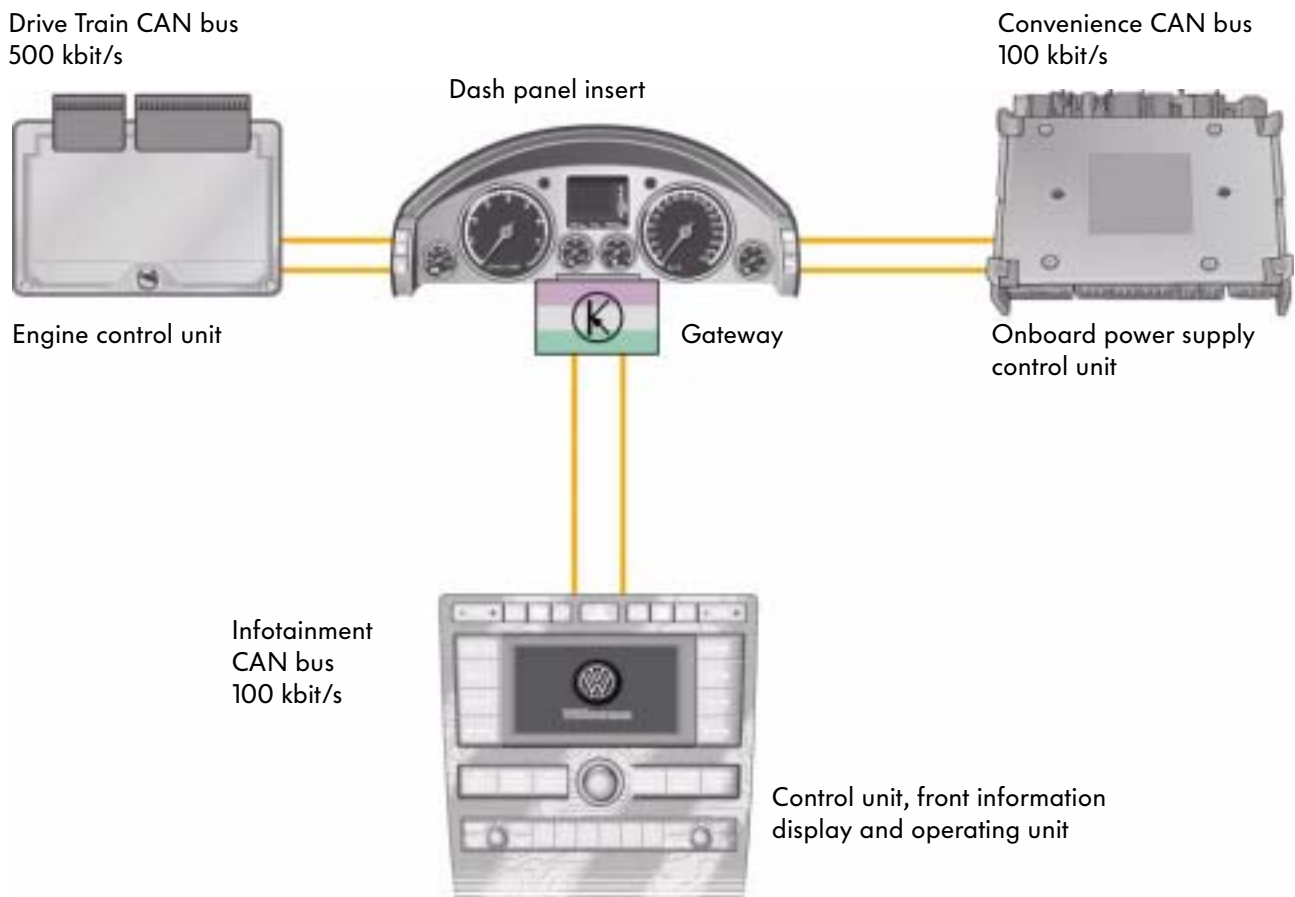


S272_090

Gateway

The gateway control unit is integrated in the dash panel insert as software; it controls communication traffic over the bus systems

- Drive Train,
- Convenience and
- Infotainment



S272_066

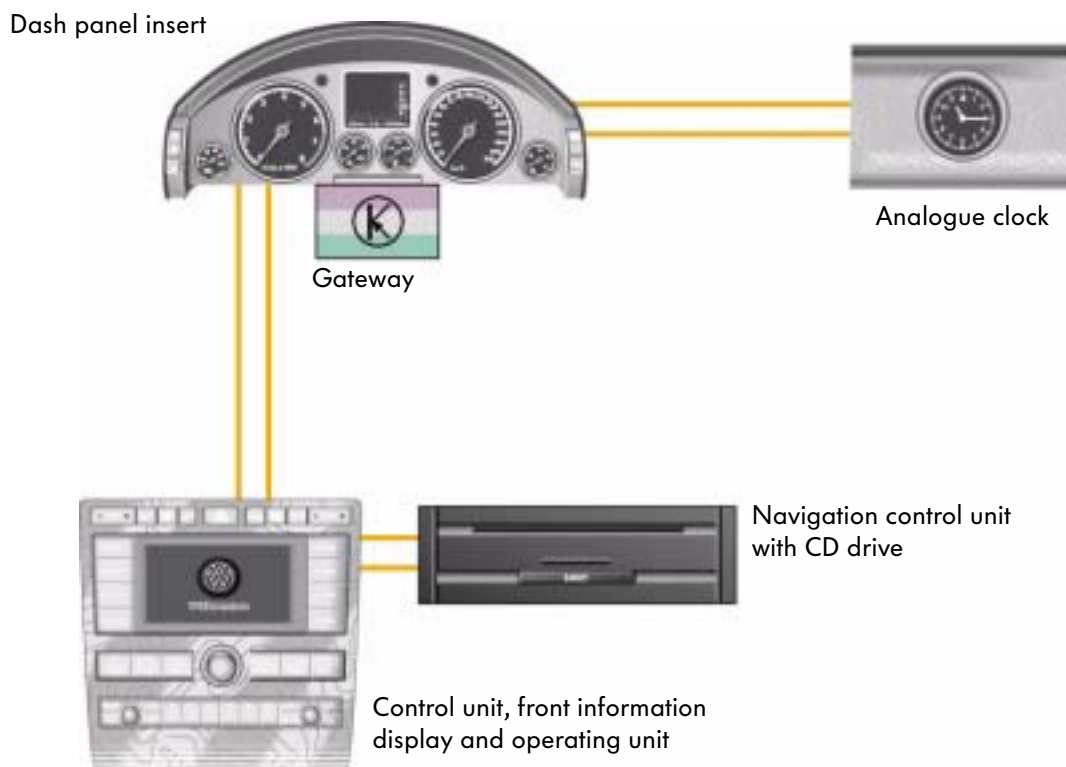


Analogue clock

The high-quality analogue clock is integrated in the wood trim strip of the dash panel in the vehicle centre.

The time is set using the control unit for the front information display and operating unit. The signals are transmitted via the CAN bus.

In the case of vehicles with navigation system, the time is synchronised by the Global Positioning System (GPS) via the navigation computer.



S272_067

CAN bus

A large number of control units are required in today's motor vehicles. In order to implement their functions, data interchange among them is absolutely necessary. The conventional method of interchanging information via individual cable connections has reached its limits. The CAN bus connects the control units with two bi-directional data lines. Data transfer is digital.

Dot-matrix screen

Numbers, letter and characters are shown on the screen as interrelated dots.

Electrical equipment required for starting

Electrical equipment absolutely necessary for starting:

- Engine control unit
- Fuel pump
- Electronic ignition lock
- Dash panel insert
- Control unit for entry and start authorisation
- Airbag control unit

Global Positioning System

This navigation system developed by the US Ministry of Defense makes world-wide navigation possible. With currently 24 to 27 satellites, the accuracy of position determination is ideally under 10 m.

Polymer fibre-optic cable

This lead comprises fibre-optic cable, comparable with flexible Plexiglas, through which digital light signals can be transmitted for data transfer without loss. Fibre-optic cables are a modern transfer medium, operating on an optical basis. The data is transported by means of high-frequency light pulses.

TFT screen

Thin Film Transistor screen, technology used for flat monitors; provides good contrast and a clear picture.



Test your knowledge

1. What are the power management components?

- a) The starter battery, the onboard power supply control unit, the relay for parallel switching of batteries, the switch-over relay for starter battery, the switch-over relay for onboard power supply and the onboard power supply battery
- b) The starter battery, the control unit for battery monitoring, the relay for parallel switching of batteries, the switch-over relay for starter battery, the switch-over relay for onboard power supply battery and the onboard power supply battery
- c) The starter battery, the control unit for battery monitoring, the relay for parallel switching, the switch-over relay for starter battery, the main relay and the onboard power supply battery

2. Which statement is correct?

- a) In the case of vehicles with petrol engine and two-battery onboard power supply, both batteries are connected in series at temperatures below -20° .
- b) In the case of vehicles with petrol engine and two-battery onboard power supply, both batteries are switched in parallel at temperatures below $+5^{\circ}$.
- c) In the case of vehicles with petrol engine and two-battery onboard power supply, both batteries are switched in parallel at temperatures below -10° .

3. What functions are switched through the onboard power supply control unit?

- a) Parking lights, main beam headlights, central locking, dipped beam headlights
- b) Fog lights, side lights, indicator lights, footwell lights
- c) Horn, indicator lamp for hazard warning lights, relay for headlight washer system



4. Which statement is correct with regard to switching off convenience electrical equipment in the case of a very critical onboard power supply?

- a) Convenience electrical equipment is switched off by priority.
- b) Convenience electrical equipment is switched off depending on the amount of power consumption.
- c) Convenience electrical equipment is switched off in the order they were switched on.

5. Which control units are involved in turn indicator activation?

- a) The steering column switching module, the control unit for entry and start authorisation, the onboard power supply control unit, the door control unit on the driver's and front passenger's side
- a) The steering column switching module, the control unit for entry and start authorisation, the indicator relay, the door control unit on the driver's and front passenger's side
- a) The control unit for entry and start authorisation, the onboard power supply control unit, the door control unit on the driver's and front passenger's side, the control unit for trailer detection

6. Which control units belong to the Convenience CAN bus?

- a) The gas discharge headlights, the control unit for entry and start authorisation, the control unit for sunroof electronics, the control unit for the air conditioning system
- b) The onboard power supply control unit, the control unit for battery monitoring, the control unit for the additional heating
- c) The control unit for trailer detection, the door control unit, the control unit for air conditioning system, the seat memory control units





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