

Convenience System

Construction and Operation

Self-Study Programme

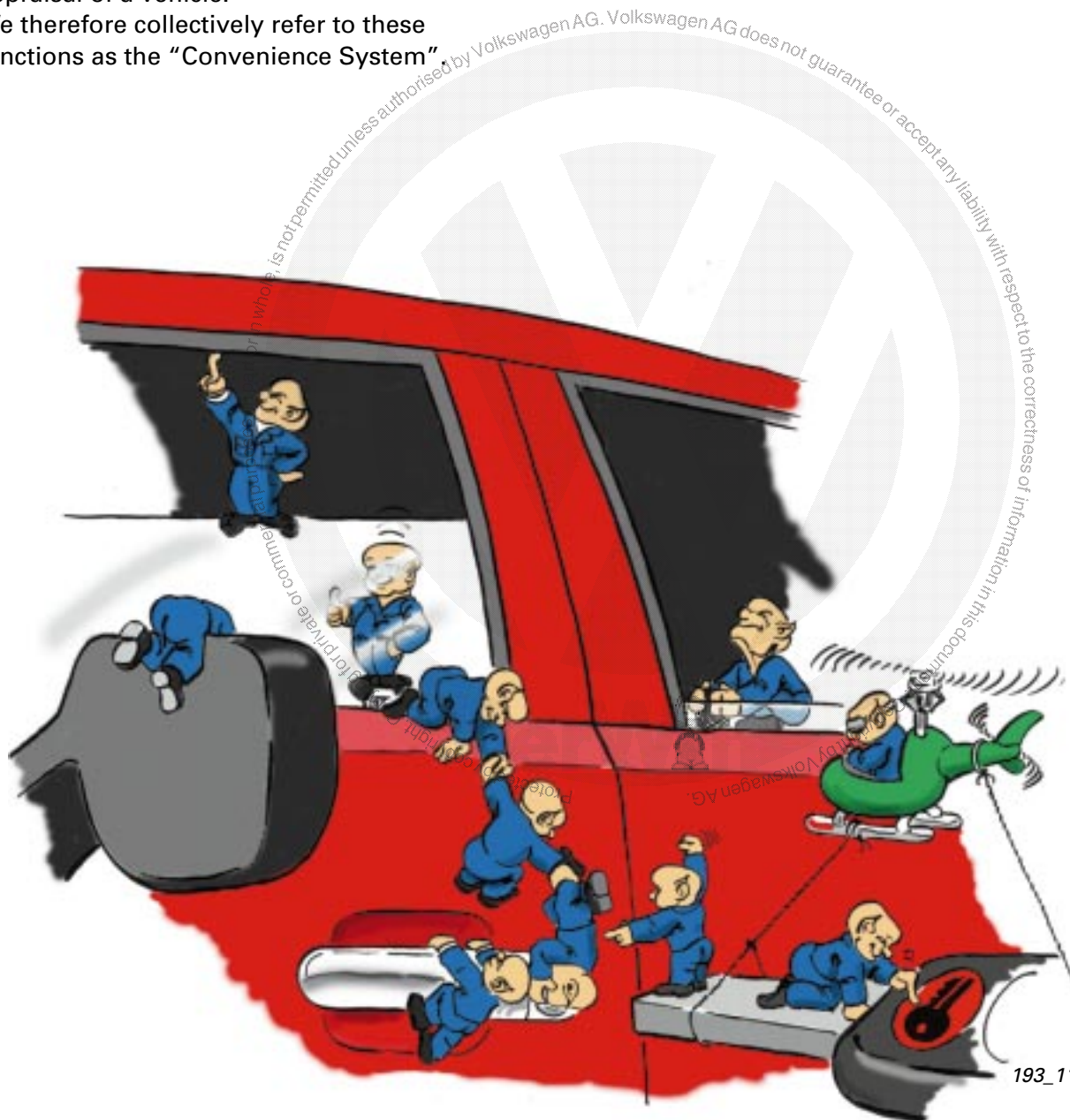


Service Department

The customer gauges the level of comfort of a vehicle not only by its handling and the level of comfort afforded by the passenger cabin. The ease of operation of the various components, such as central locking, mirror adjustment, electric windows or interior light, are also major factors in the customer's appraisal of a vehicle. We therefore collectively refer to these functions as the "Convenience System"

The rapid development of microelectronics and micromechanics has made it possible to optimise and simplify the design of vehicle systems such as the convenience system.

In this booklet, we will inform you about their construction and operation.



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Important ! / Note !



New !

This Self-Study Programme is not a Workshop Manual!
Please refer to the relevant Service Literature for all inspection, adjustment and repair instructions.

General information

About the convenience system

The first generation of the convenience system was featured on the Passat 97.

As of model year 1998 the Golf and Passat will be equipped with the second generation of convenience system. The distinguishing features of the new system are the two-touch switches in the door control panel on the driver's side.

The sub-functions of the convenience system, such as central locking, mirror adjustment and anti-theft warning system, have basically remained unchanged.

However, the design and the layout of the convenience system are new.

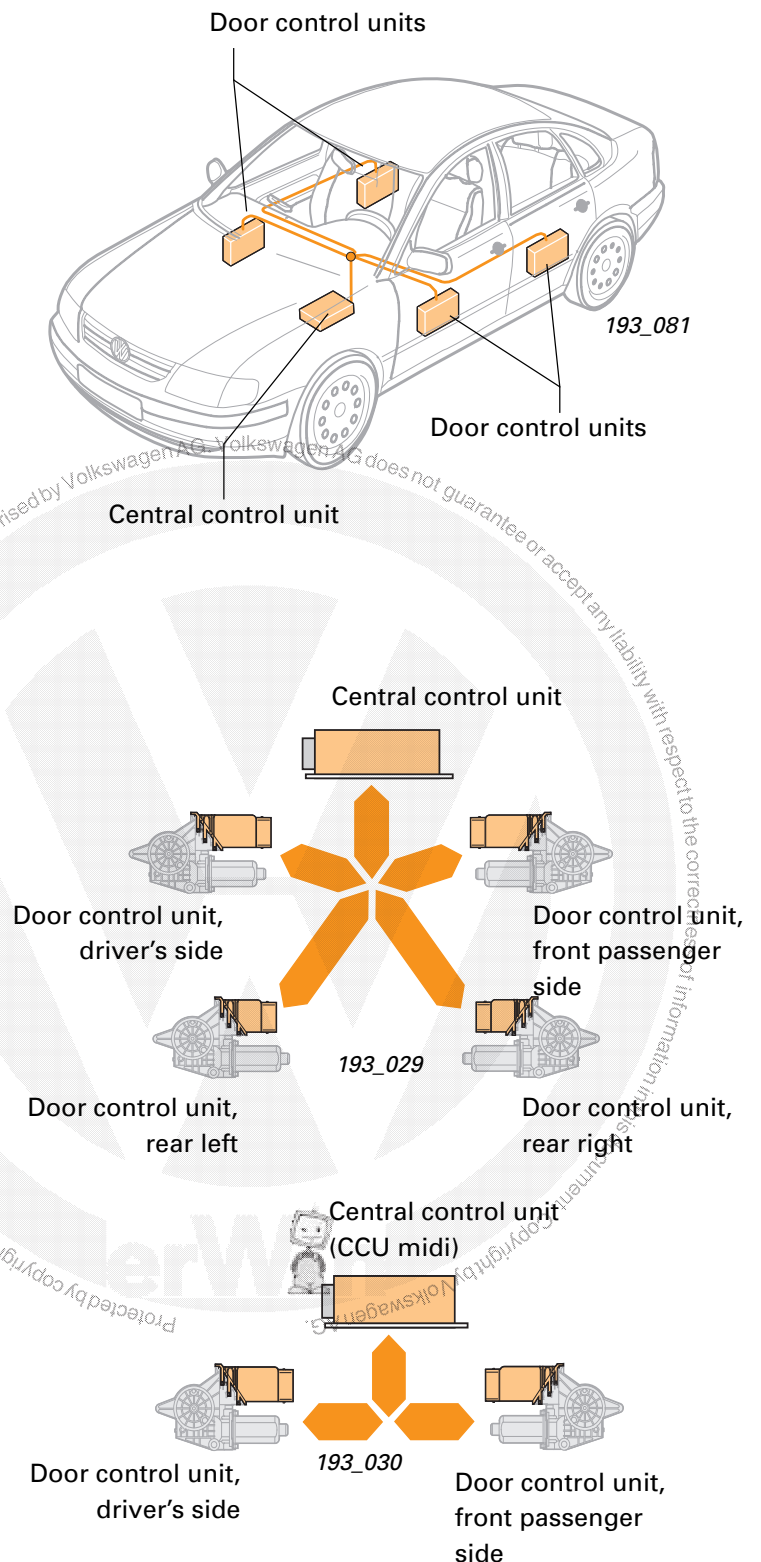
Compared with the previous system, the new system now has a decentralised layout. This means that the tasks of the convenience system are shared by several control units.

- Advantage of the decentralised system:
if a fault occurs in one control unit, only a small part of the overall system fails.

The convenience system is installed in combination with electric windows. The functions of the convenience system are controlled by a central control unit and also by two or four door control units.

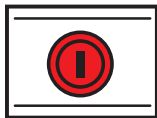
Two versions are therefore possible:

1. One central control unit and four door control units if all doors are fitted with electric windows,
2. One central control unit and two door control units if only the front doors are fitted with electric windows.

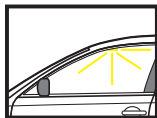


Functions of the convenience system (example: Passat 97)

The central control unit assumes the following functions:



Bootlid central locking



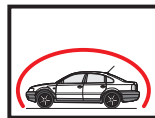
Interior light control



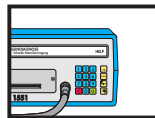
Radio wave remote control



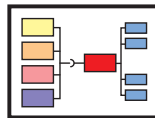
Sliding/tilting roof
- enable
- convenience closing



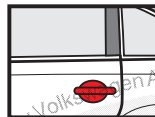
Anti-theft warning system



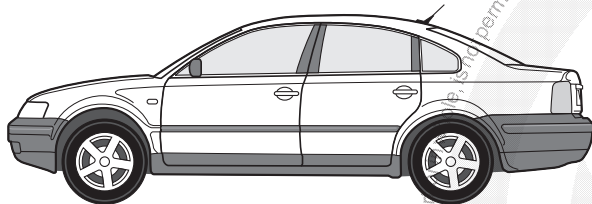
Diagnosis
Address word "46"



Interface to vehicle electrical system



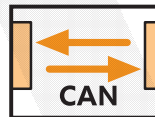
Central locking
of rear doors (if only mechanical
window lifters are fitted in the rear)



Seat and mirror memory



Driver's seat and
mirror adjustment

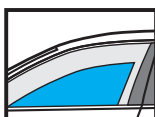


Data interchange

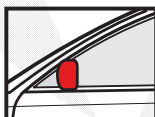
The door control units assume the following functions



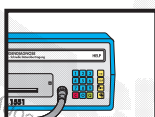
Central locking of the
doors with/without Safe facility



Electric windows with
FLI



Electrically adjustable,
heated exterior mirror



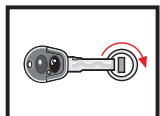
Diagnosis
Address word "46"

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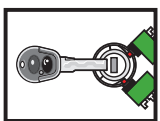
General information

What happens when the vehicle is locked?

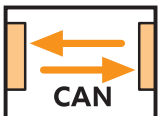
When the vehicle ignition key is inserted into the door lock and a lock command is generated using the SAFE facility, numerous functions are activated.



1. The command is generated by the vehicle ignition key at the door lock on the driver's side.



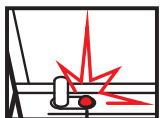
2. The microswitch in the door lock transfers the lock command to the door control unit. The door is locked.



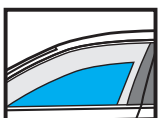
3. The driver's door control unit transfers the lock command to the other control units via the CAN databus.



4. The doors are locked by the door control units and the bootlid by the central control unit. The SAFE function is activated at the doors.



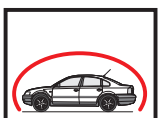
5. The warning lamp for SAFE central locking comes on.



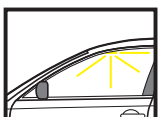
6. The windows are closed.



7. The sliding roof closes.



8. The anti-theft warning system is activated.



9. The interior light control switches off all interior lights after a fixed period of time elapses.

The facility for closing the sliding roof and the windows from the door lock is referred to as convenience locking.

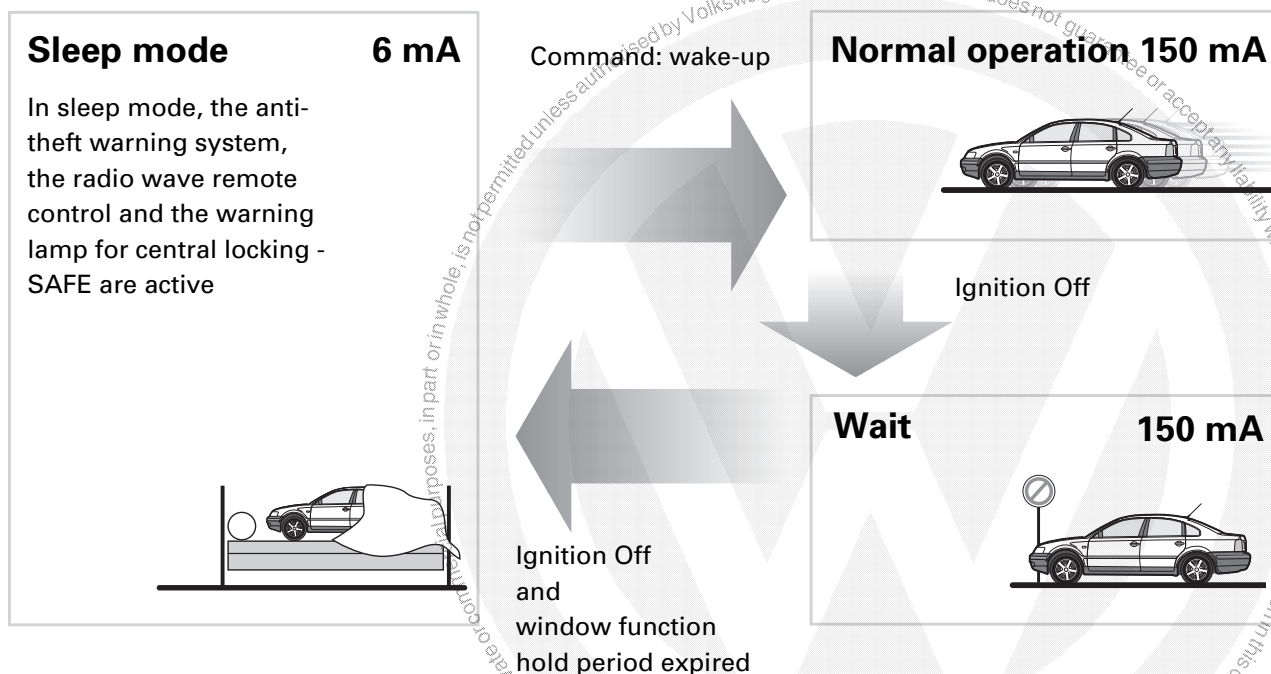
Energy-saving functions

Sleep mode

To reduce no-load power consumption, the control units go into a sleep mode. This occurs when the ignition is switched off and the doors are locked or when the function hold period (e.g. electric windows) has elapsed.

Wake-up command

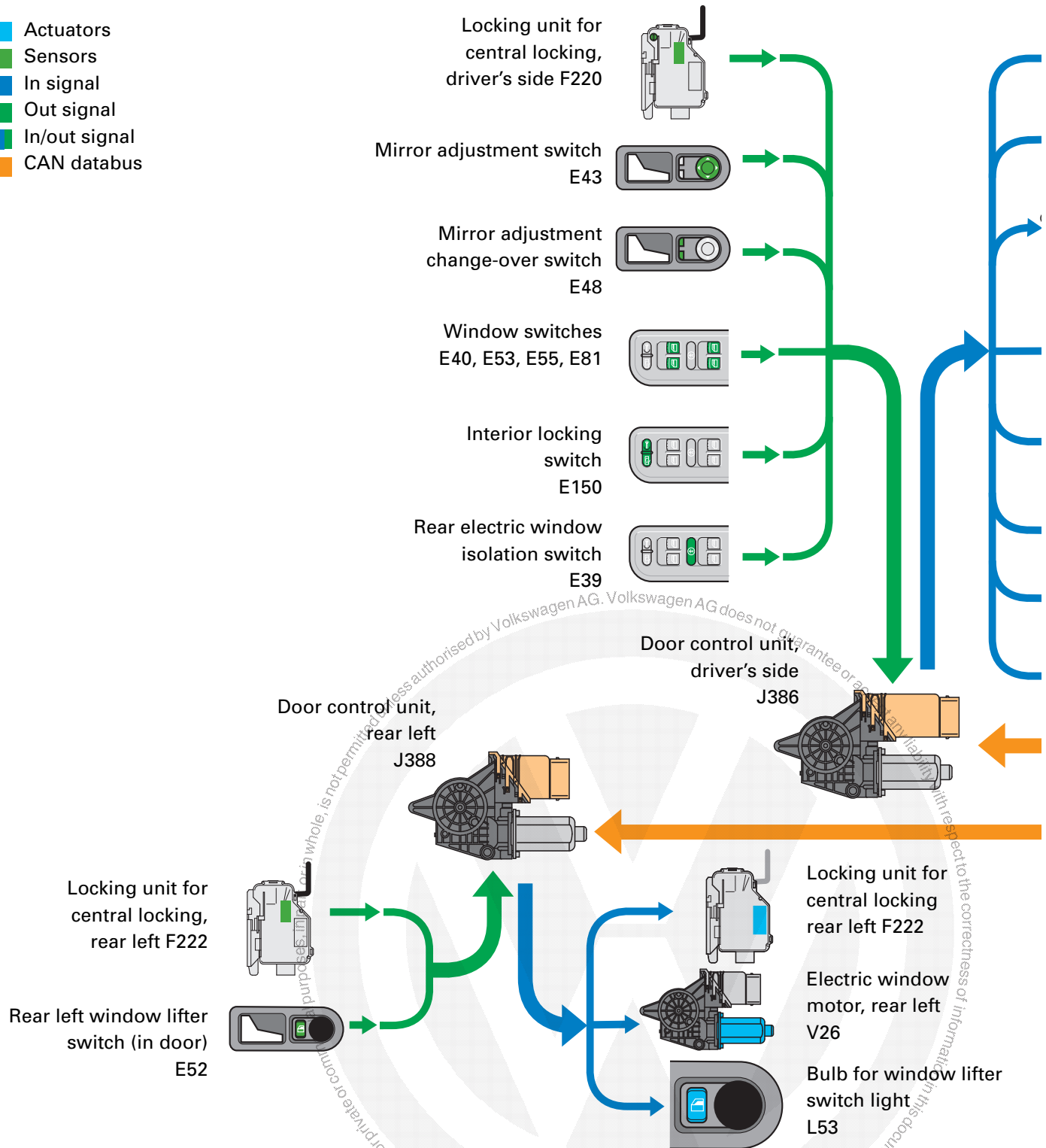
When a control unit detects a wake-up command which is initiated by an action such as opening the vehicle, it transfers the wake-up command to the other control units via the CAN databus so that they, too, are activated.

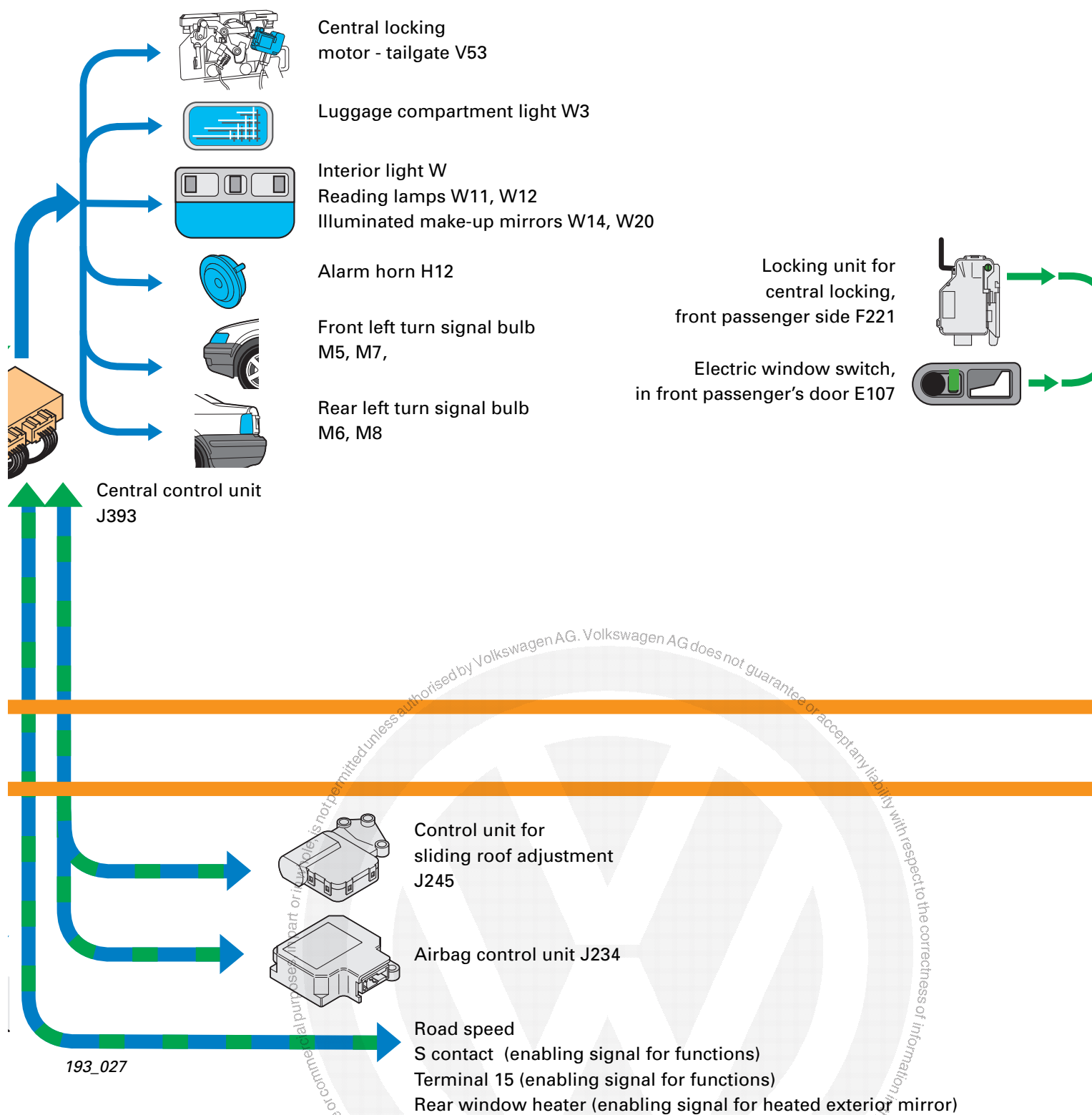


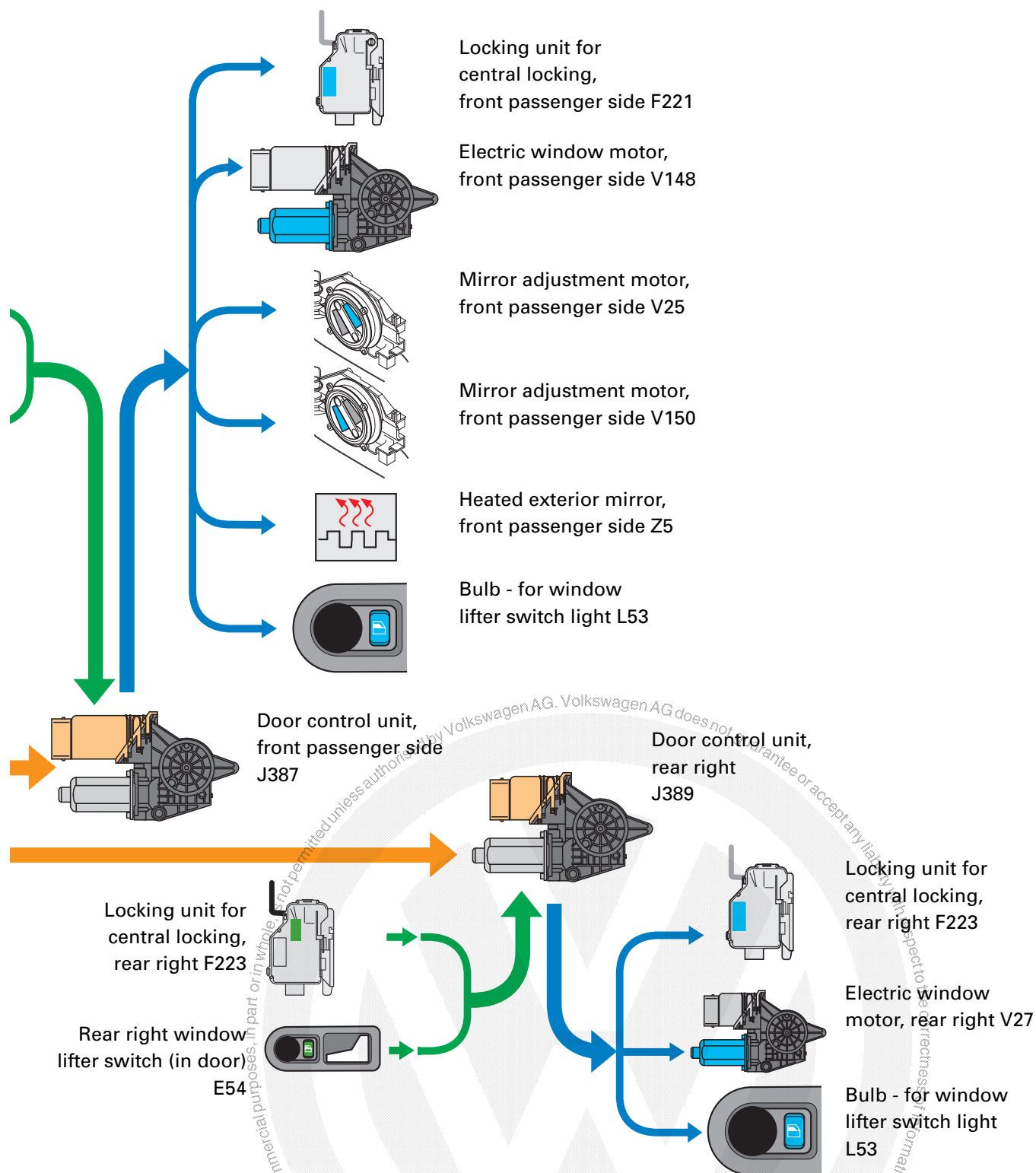
System overview

Example: Passat 98

-  Actuators
-  Sensors
-  In signal
-  Out signal
-  In/out signal
-  CAN databus







Control units

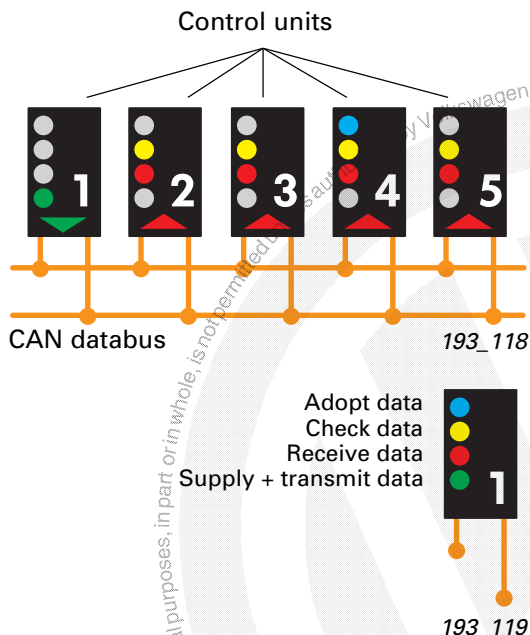
CAN databus

The convenience system control units are interconnected by two lines, known as the CAN databus.

Switching signals, lock states and additional information are transmitted via the CANbus.

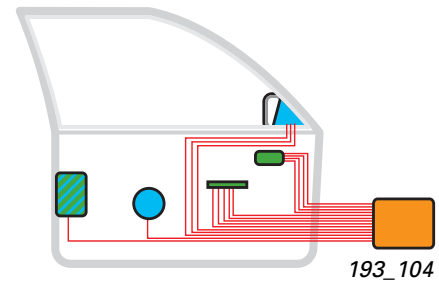
The data interchange procedure is as follows:

- A control unit supplies data and
- transmits it to the other control units.
- These control units receive the data,
- check it and
- adopt it as required.



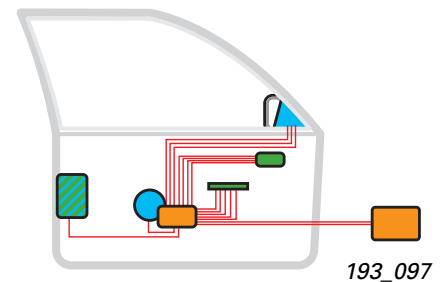
Advantage of the databus

without databus



If the databus is not installed, a large number of lines have to be routed to the doors.

with databus



If the databus is installed, the number of lines to the door transitions can be reduced dramatically.

Effects of failure

If a CAN databus line fails, the convenience system goes into emergency mode. Full functional capability is retained.

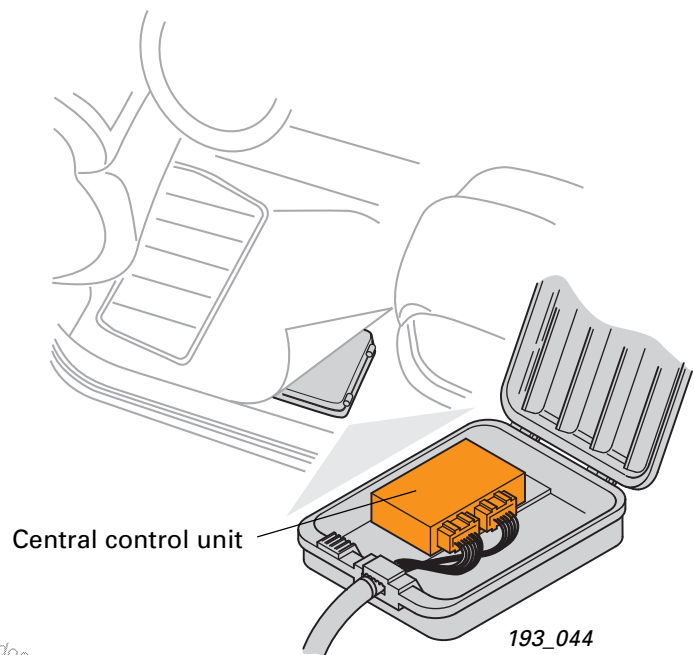
If the entire CAN databus fails, all electric functions are disabled. The doors can then only be locked and unlocked mechanically.

The central control unit

In addition to its functions in the convenience system, the central control unit is the link to other parts of the vehicle electrical system and the self-diagnosis. It has no higher-order function.

Functions of the central control unit:

- Interior light control
- Bootlid central locking
- Radio wave remote control
- Anti-theft warning system



Fitting location

The central control unit is located inside the passenger cabin.

On the Passat 97, the central control unit is located below the floor covering in front of the driver's seat.

On the Golf 98 you will find the central control unit in the dash panel insert.

Effects of failure

If the central control unit fails, the convenience system goes into emergency mode.

The functions of the central control unit are disabled.

In this case, functions which require information from the central control unit can only be executed partially, if at all.



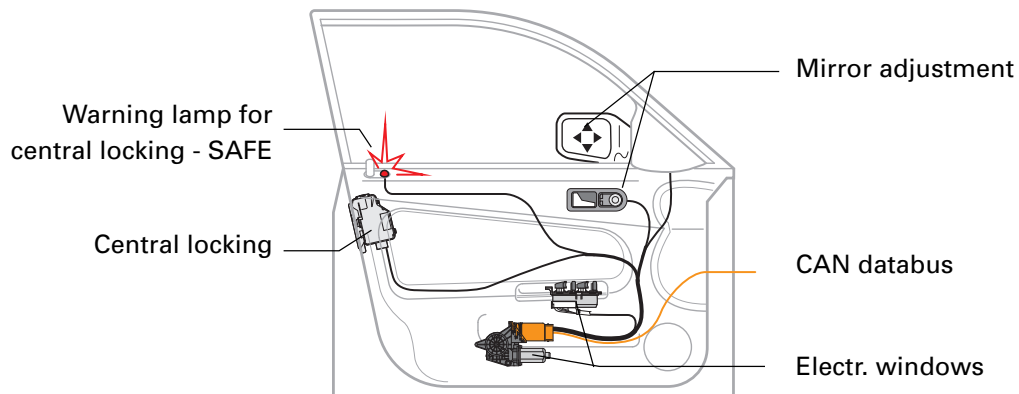
When you renew a central control unit, the new control unit must be encoded.



Control units

The door control units

The door control units monitor and control the convenience system functions shown in the diagram below.



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Fitting location

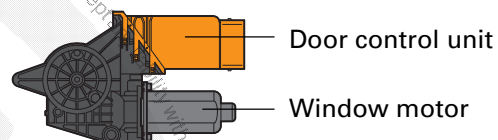
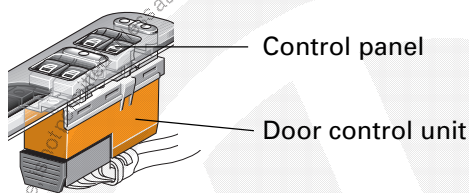
First generation control unit MY97:

The driver's door control unit is mounted on the control panel.

The door control units of the other doors are located on the electric window motors.

Second generation control unit MY 98:

The door control units are located on the electric window motors in all doors.



Effects of failure

If a door control unit fails, its functions can no longer be executed.

The doors can only be locked and unlocked individually using the key, i.e. mechanically.



After replacing a first generation door control unit, it must be encoded.

If you have replaced a second generation door control unit, you do not have to perform an encoding routine, because the code is transferred from the central control unit via the CAN databus to the door control unit and stored there.

Central locking

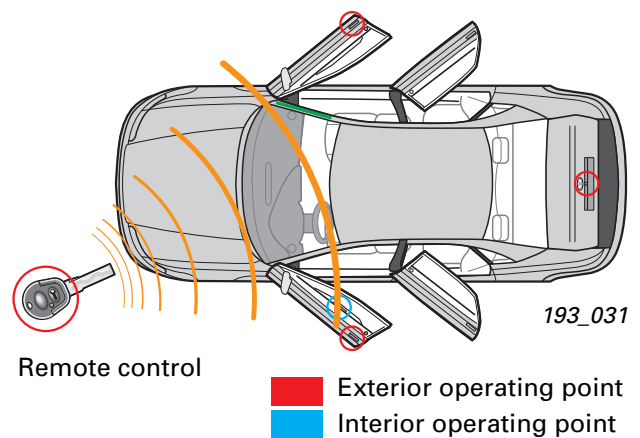
Central locking with Safe function

The ease of operation and anti-theft security of the central locking system have been extended.

The central locking comprises the following functions:

- CLOSE central locking with SAFE function,
- CLOSE central locking without SAFE function,
- OPEN central locking w/o individual door opening (encodable version)
- OPEN central locking with individual door opening (encodable version)
- OPEN central locking from luggage compartment
- OPEN central locking during vehicle collision
- Lock-unlock function

Central locking operating points



Control panel, driver's door
Switch for interior locking



The lock-unlock function

The lock-unlock function enables all doors to be locked and unlocked from inside the passenger cabin.

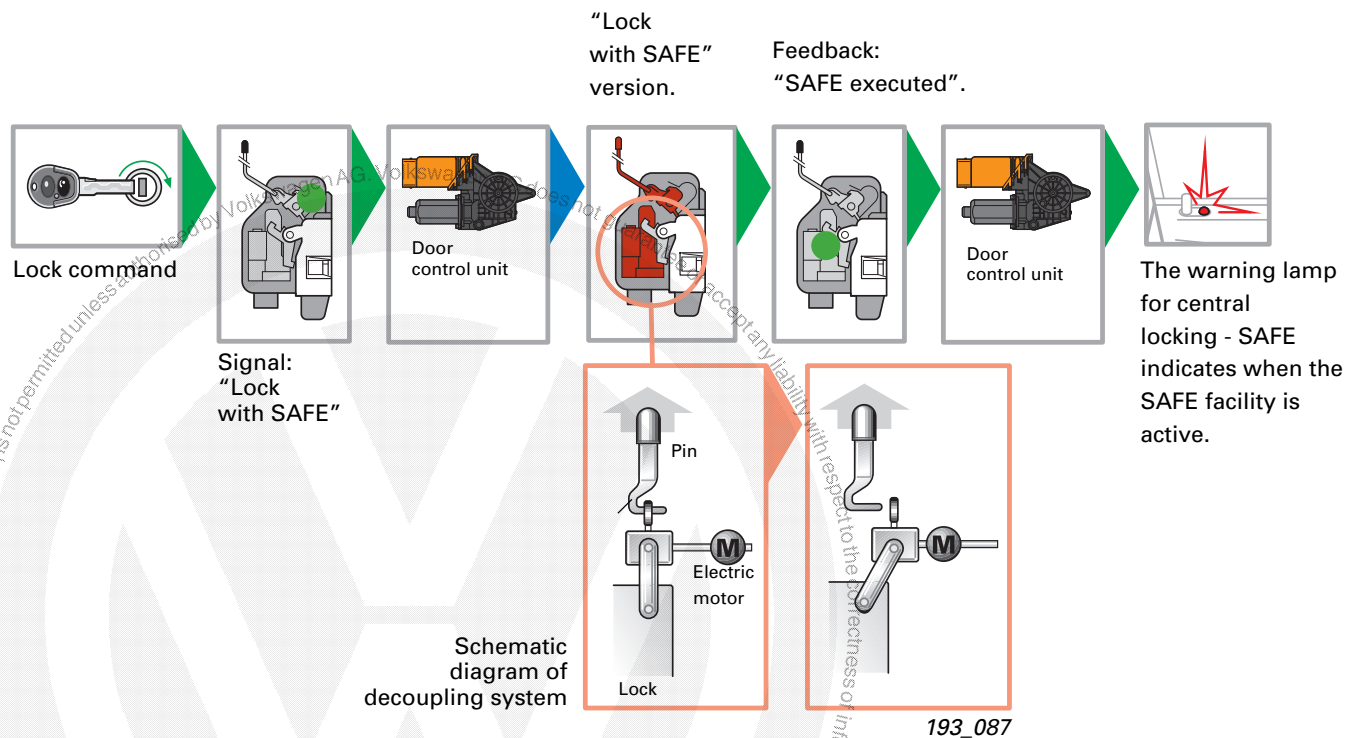
It is switched on using the interior locking switch.

Central locking

The SAFE function

provides better anti-theft security, because the door opener and the locking pins are decoupled mechanically by the SAFE facility.

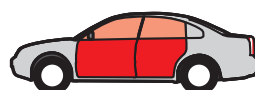
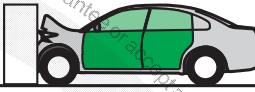
The SAFE function can be activated on the driver's or front passenger's door lock or by using the radio wave control unit. Only the doors are affected.



Operating the central locking system (CL)

The central locking system is available in two encodable versions.

Encodable version 1: opening all doors (basic equipment)

Command	Function	Effect
	CLOSE CL with SAFE	 - All doors are locked (SAFE), - Bootlid is locked, - Lock-unlock button is disabled,
  5 sec	CLOSE CL without SAFE within 5 seconds	 - All doors are locked - Bootlid is locked
 	OPEN CL	 - All doors are unlocked - Bootlid is unlocked - Lock-unlock button is enabled
	OPEN CL during accident	 - All doors are unlocked - Lock-unlock button is enabled - Interior light is switched on

Encodable version 2: individual door opening

Command	Function	Effect
 	OPEN CL with individual door opening	 - SAFE function cancelled - Door to be opened is unlocked - Lock-unlock button is enabled - Bootlid remains locked - Other doors remain locked
 5 sec 	OPEN CL with opening all doors within 5 seconds	 - All doors are unlocked - Bootlid is unlocked - Lock-unlock button is enabled
	OPEN CL at tailgate lock	 - SAFE function is cancelled - Bootlid is unlocked - Other doors remain locked - SAFE function is reactivated when bootlid is closed and no door is opened.



A lock command is only executed if the driver's door and the locking position in use are closed.

The system does not recognise doors in the pre-detent position as closed, since it cannot differentiate between the open and pre-detent positions.

Central locking

The locking unit

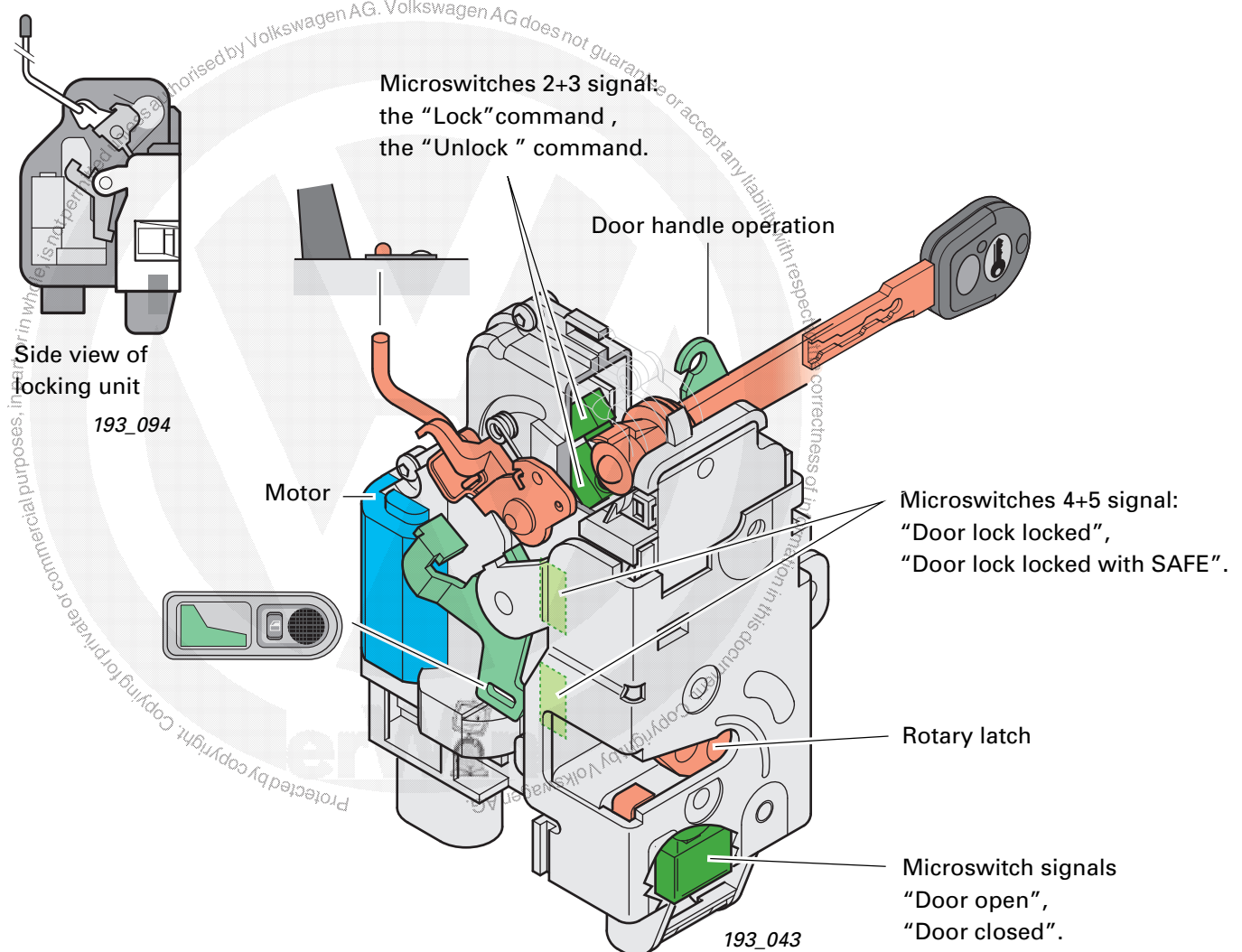
has the following tasks:

- to lock the door mechanically,
- to signal the momentary locking state to the door control unit.

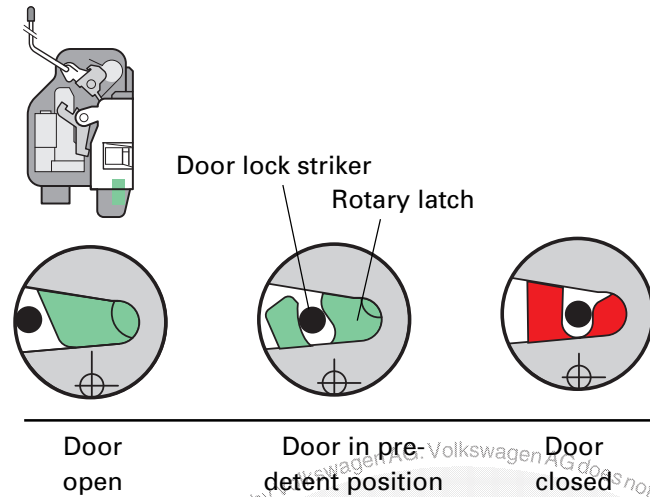
The front and rear door locking units are equipped with 5 and 3 microswitches respectively.

One motor in each locking unit performs the locking and SAFE functions.

The locking unit is controlled and supplied with power by the door control unit.

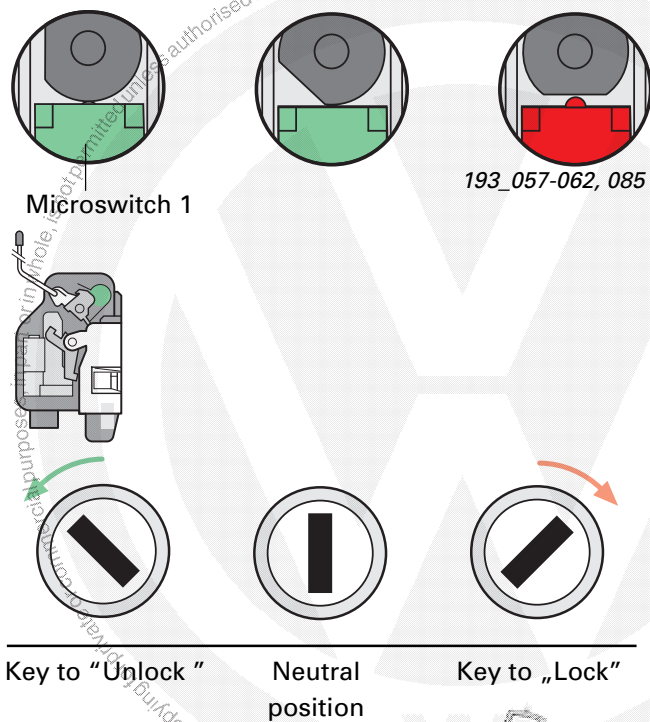


Function of the microswitches



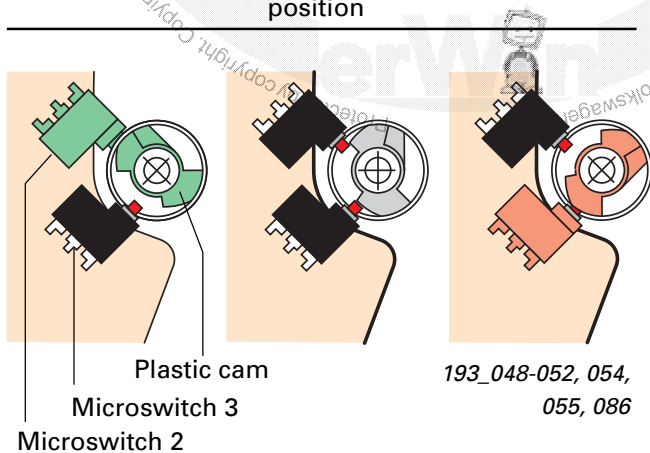
How does the system recognise if a door is open or closed?

When the door is open or in the pre-detent position, microswitch 1 is closed.
When the door is closed, the switch is open.



How does the system recognise that the lock or unlock command has been generated by the door lock?

The rotation of the key is transmitted to the door lock. A plastic cam in the door lock actuates microswitch 2 or 3, depending on the direction of rotation of the key. The one microswitch commands the door control unit to lock the doors, while the other generates the unlock command.



Central locking

How does the system recognise whether the SAFE function is active or inactive?

Located inside the locking unit are a gate and a plastic arm which are driven by an electric motor.

They lock and unlock the lock and also decouple the door openers and the locking pins when the SAFE function is active.

Microswitches 4+5 tell the system whether a lock command was executed or not.

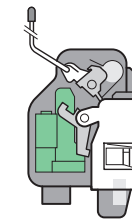
When the lock is unlocked, the gate moves to its lower position.

This causes switch 4 to close.

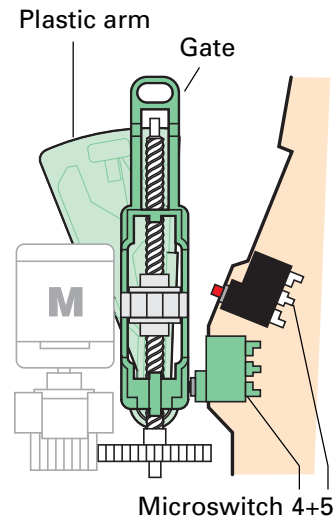
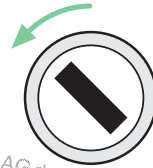
The convenience system recognises that the door is unlocked.

When the "Lock with SAFE" command is generated, the gate moves upwards and switch 4 opens. Microswitch 5 closes and the gate decouples the locking pins mechanically. The system recognises that the door is locked and the SAFE function is active.

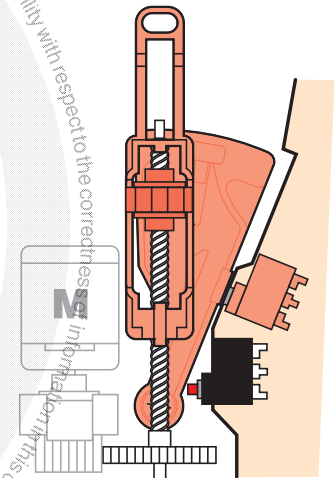
When the "Lock without SAFE" command is generated, the gate moves back slightly from its upper position. This causes the plastic arm to move back and open switch 5. The gate re-engages the locking pins and door opener. The system recognises that the door is locked and the SAFE function is inactive.



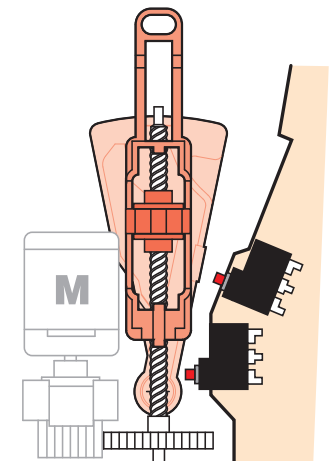
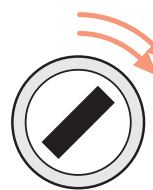
"Unlock "



"Lock with SAFE"



"Lock without SAFE"



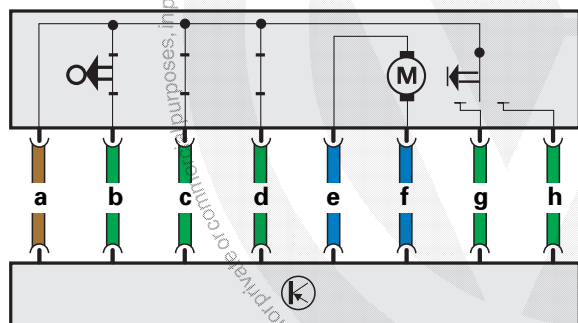
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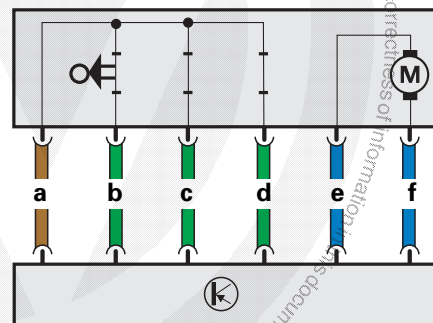
The pin assignments of a control unit may change in the course of advance development. The contacts are no longer specified together with the pin designation in the Self-Study Programme, as this may give rise to faulty repairs. You will find the current pin assignments in the Workshop Manual Current Flow Diagrams.

Electric circuit:

Locking unit for central locking, driver's side/front passenger side F220/F221



Locking unit for central locking, rear left/rear right F222/F223



At the front, 8 lines are routed to the door control units (DCU). At the rear, 6 lines are routed to the locking units.

The definitions of the individual lines are as follows:

- | | |
|--|---|
| a - Earth line | e - Command from DCU "Unlock CL motor" |
| b - Signal "Door rotary latch open" | f - Command from DCU "Lock CL motor" |
| c - "Feedback locked with SAFE" | g - Signal to DCU "Unlock command," |
| d - Signal to DCU "Feedback locked" | h - Signal to DCU "Lock command" |

Radio wave remote control

The radio wave remote control has a longer range than the conventional infrared remote control.

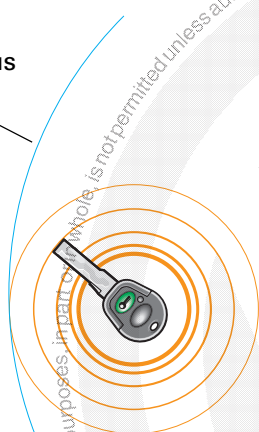
Its range is approx. 7 metres. In favourable conditions (e.g. inside a building), its range is over 10 metres.

Data transfer from the transmitter to the receiver is displayed visually by an LED on the keyswitch.

When the radio wave remote control is operated, a variable code is transferred to the central control unit where it is verified.

Convenience closing by radio wave remote control is not possible for safety reasons.

Reception radius



A radio wave remote control can be operated from a greater distance.
The key may be pointed in any direction.

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A certain number of variable codes are stored in the vehicle ignition key. If the key is pressed often when out of range, the central control unit will no longer be able to recognise the variable code of the vehicle ignition key. In this case, the central control unit and the vehicle ignition key must be re-matched with one another. Please follow the instructions in the vehicle Owner's Manual or in the Workshop Manual.

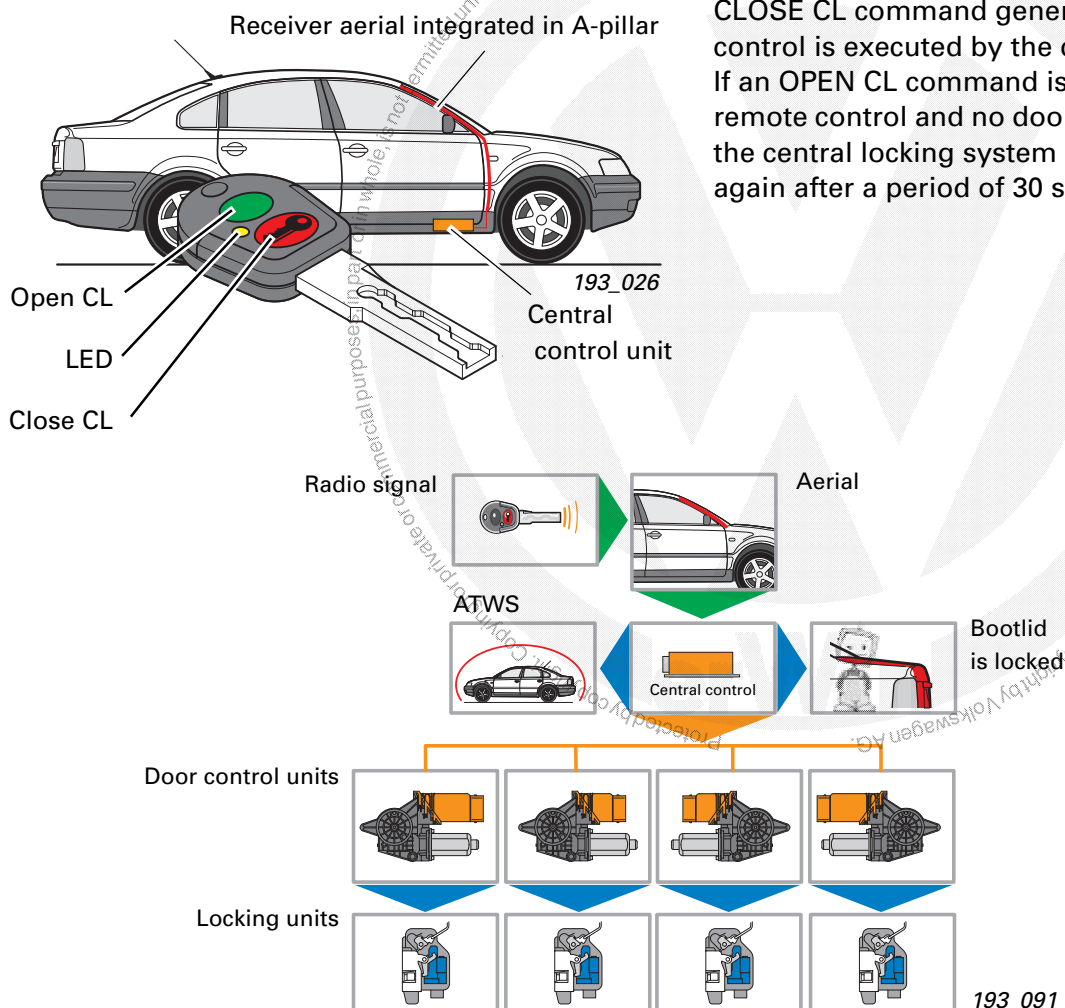
The radio wave remote control comprises a transmitter and a receiver.
 It acts on the central locking and the anti-theft warning systems.
 The transmitter is integrated in the vehicle ignition key.
 The receiver is an integral part of the central control unit.

The transmitter

The key has two buttons:
 one button for the "OPEN CL" command and
 one button for the "CLOSE CL" command.
 The voltage supplied to the transmitter from the integrated battery will last for about 5000 operations.

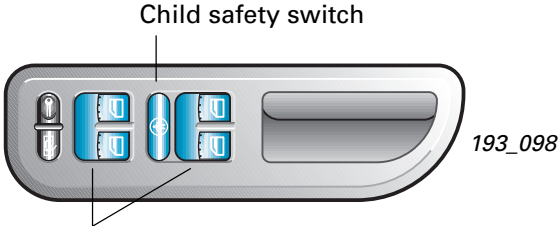
The receiver

The receiver aerial for the radio wave remote control is located inside the A-pillar on the front passenger's side.
 The receiver is integrated in the central control unit. It can recognise up to four logged-on keys.

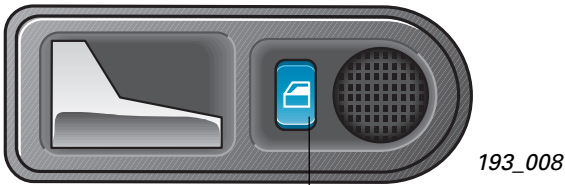


Windows

The electric windows are operated from the control panels in the doors.
The electric window switches in the rear doors can be inhibited by a safety switch on the control panel on the driver's side (child safety feature).



All windows can be activated by the driver using the switches on the control panel in the driver's door.



Switches on the front passenger door and on the rear left and right doors

Functions

The windows have the following individual functions:

- Automatic opening and closing
- Opening and closing
- Opening or closing of the windows from the exterior with the vehicle ignition key

Function (requirement: ignition ON)

Automatic opening, automatic closing	Automatic opening/closing of the front windows can be initiated from the driver's door by pressing the appropriate switch beyond the second pressure point. Automatic opening/closing is not possible from the other doors.
Opening Closing	When the 1st pressure point in the switch on the driver's door is reached or if the switches in the other doors are held down.
Aborting the automatic opening or closing operation	The automatic window closing/opening operation can be stopped by pressing the electric window switch again.

Function (requirement: ignition OFF)

Automatic window closing/opening operation is not possible	
Function retention period	The window closing/opening facility remains active for up to 10 minutes after turning the ignition off, provided that no front door is opened. Window closing/opening operations which have been started are terminated.
Closing the window using the vehicle ignition key	The CLOSE CL command must be generated for longer than 1 second
Opening the window using the vehicle ignition key	The OPEN CL command must be generated for longer than 2 seconds



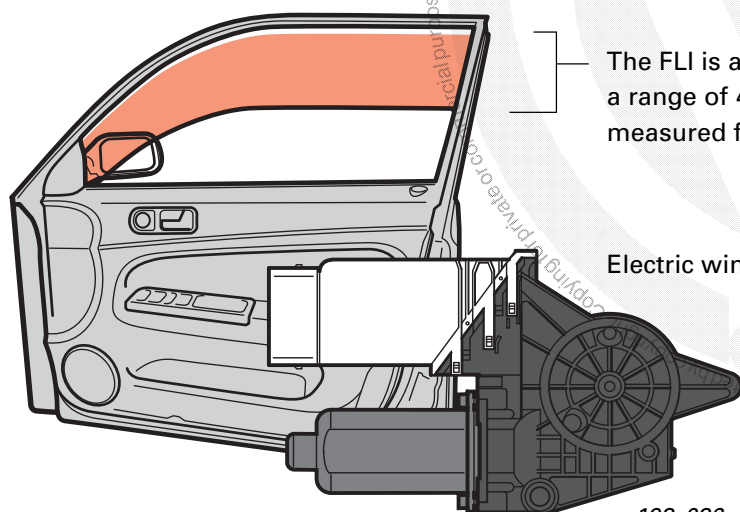
The Passat 97 only has one-touch switches in the control panel on the driver's side for operating the front windows. The system uses a time base to distinguish between automatic and manual opening and closing.

When the switch is pressed for less than 300 ms, an automatic opening/closing operation is executed.

Convenience electric window lifters with FLI

FLI (Force Limitation Intervention) reduces the risk of the electric windows causing injury.

If the opening and closing operations are executed from two operating points, the opening function always has priority.



The FLI is active within a range of 4 - 200 mm, measured from the upper weather seal.

Electric windows, front passenger side

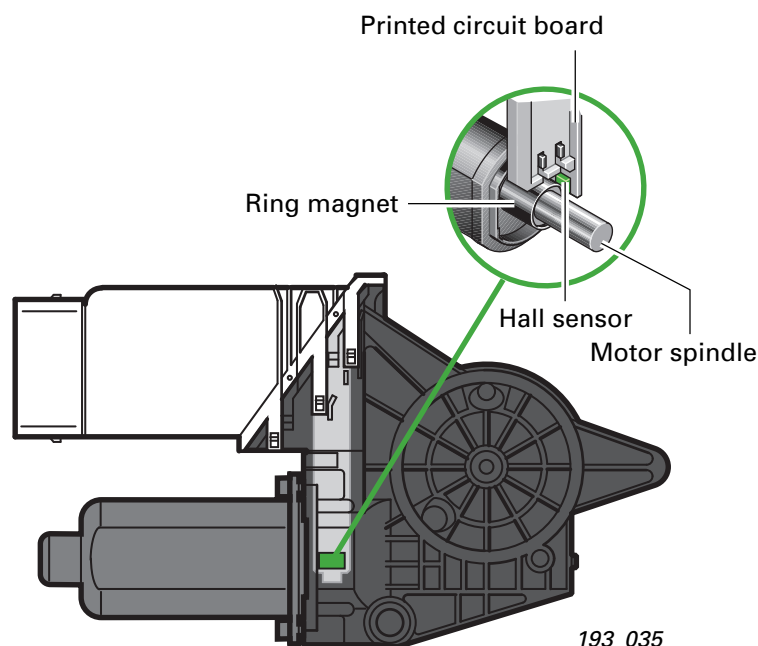


193_036

Windows

Functional principle of force limitation intervention (FLI)

The FLI contains a Hall sensor which detects whether there is a risk of something jamming in the window when it is closing. The Hall sensor is mounted on the printed circuit board of the door control unit, level with the motor spindle. A ring magnet is bonded onto the Hall sensor. If the window is obstructed while closing, the Hall sensor detects a change in motor speed. The door control unit recognises from this that the window has come up against a resistance and reverses the window's direction of movement.



193_035

Overcoming sluggishness

The system cannot distinguish between an actual jamming hazard and mechanical sluggishness.

Therefore, if the window moves sluggishly (at reduced speed), it will also roll back when closing.

If a window jams, the FLI can be switched off.

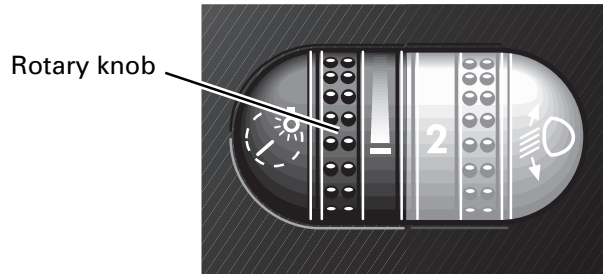
Command	Effect
1. Close	The window jams. The FLI rolls back the window. The window rolls back to its previous position.
2. Close	The window jams again. The roll-back function is not executed. The window remains in position.
3. Close	The window closing operation is performed without FLI. Full motor power is available over the full travel distance. The window can be closed despite any sluggishness.



All three commands must be generated when the ignition is switched on within a 5-second period after the window comes to a stop.

After loss of power (battery disconnected), a window teach-in routine must be performed to determine the limit stop of the window. If this teach-in routine is not performed, auto-adjustment is not possible.

Switch light



193_123

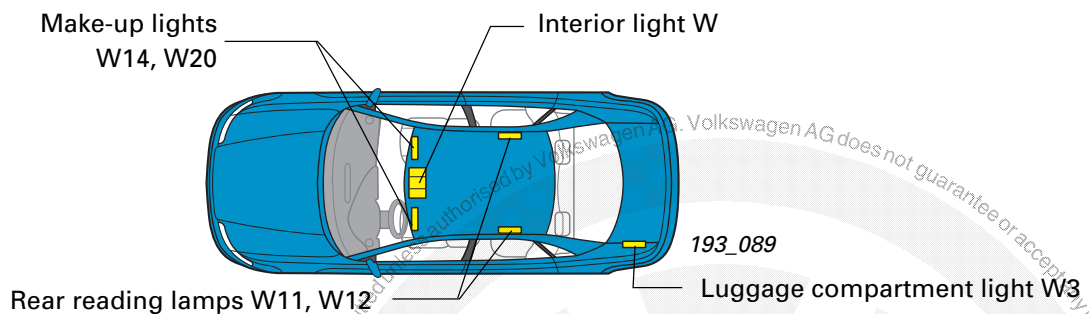
The brightness of the switch light of the convenience system can be set using a 16-step rotary knob.

The value is stored in the central control unit and transferred via the CAN databus to the door control units.

Interior light

The interior light comprises the interior light, the reading lamps, the make-up lights and the luggage compartment light.

Power is supplied by the central control unit.



To protect the battery, three switch-off stages are available:

1. Switch-off after 30 seconds

takes place when the key is removed from the ignition lock or a door is opened and closed again.

2. Switch-off after 10 minutes

takes place if the ignition is switched off and one or more doors are open.

3. Switch-off after 1 hour

Lights which have been switched on manually are extinguished one hour after turning off the ignition.

The central control unit switches the interior light on for 10 minutes if it receives the "Crash detected" signal from the airbag control unit.



To switch make-up or reading lights on again after the switch-off time has elapsed, all lamps must first be switched off and then switched on again.

Sliding roof activation

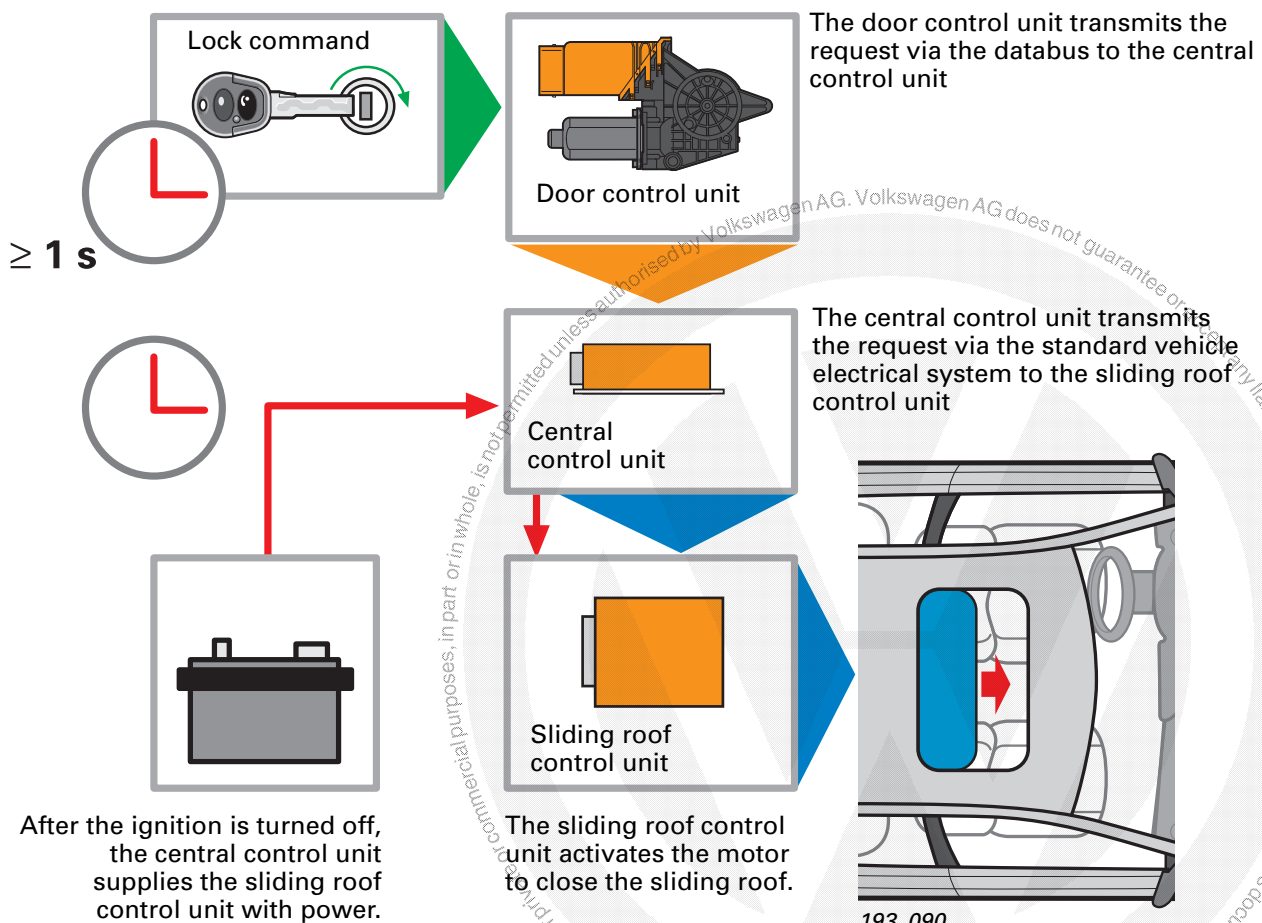
The sliding roof control unit and the central control unit are electrically interconnected, with the result that the following functions are possible:

- Convenience closing of the sliding roof via the central locking.
- Function retention after ignition OFF as long as neither of the front doors is opened.

To close the sliding roof via the door lock, the key must be held in the "CLOSE CL" position after closing the last window.

If all windows are already closed, the key must be held in the "CLOSE CL" position for longer than 1 second.

For safety reasons the sliding roof cannot be closed via the radio wave remote control.

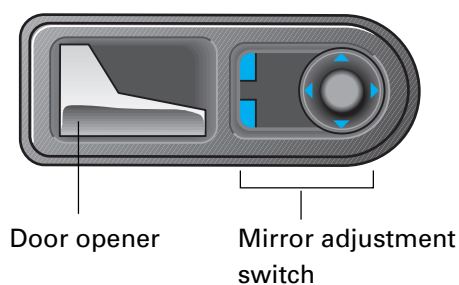


Mirror adjustment

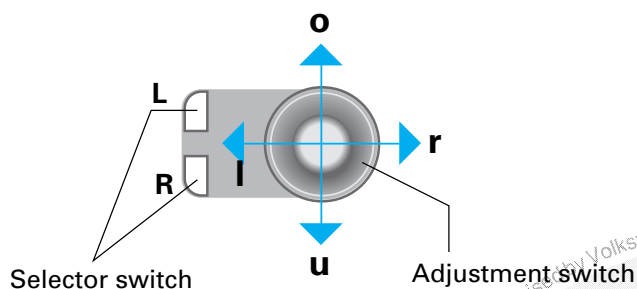
Mirror heater

The mirror heater functions when the ignition and rear window heater are switched on.

Mirror adjustment



193_131



193_134

Fitting location:

The mirror adjustment switches are located next to the driver's door opener.

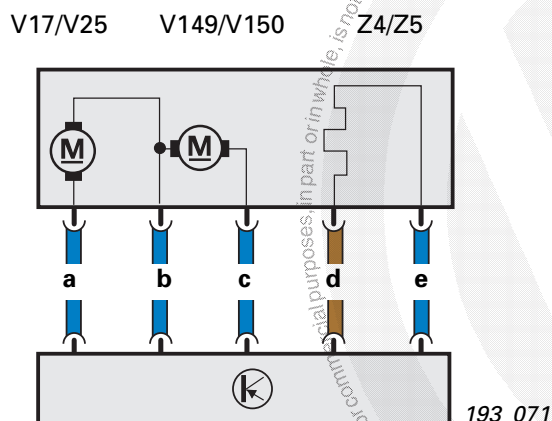
Function:

The driver uses the selector switches to select the mirror he wants to adjust.

In the "L" position, both mirrors are activated simultaneously. In the "R" position, only the front passenger side mirror is activated.

Using the adjustment switch, the driver then adjusts the mirror as required.

The servomotor runs for as long as the switch is held.



Electric circuit:

The mirrors can be adjusted in height and fore/aft by two built-in motors. The two mirror motors cannot run simultaneously (diagonal adjustment). The door control unit supplies the power required to adjust and heat the mirror.

Anti-theft warning system

The anti-theft warning system monitors the following areas:

- Bonnet
- Doors
- Bootlid or tailgate
- Ignition

An interior monitoring facility is provided.

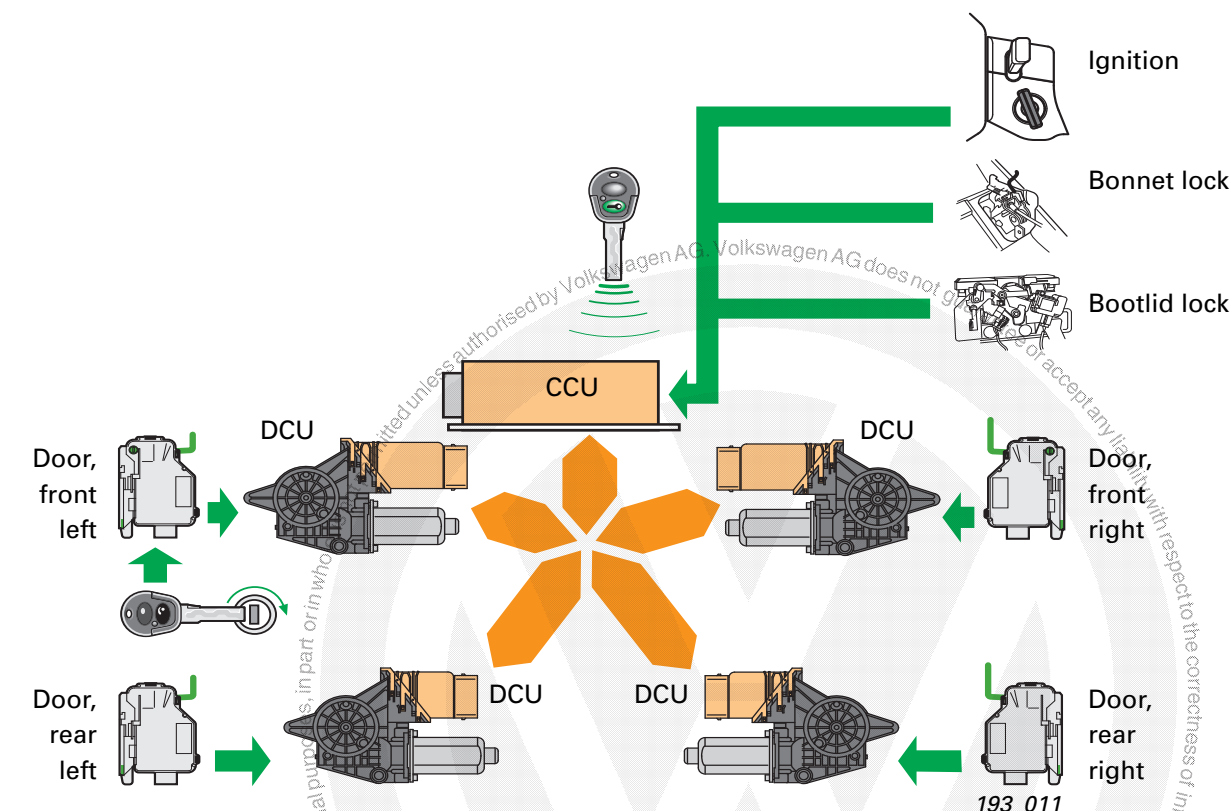
The anti-theft warning system can be operated using the keyswitch on the driver's and front passenger's door, on the tailgate lock cylinder or via the radio wave remote control.

When the ATWS is activated it is armed after a 15-second delay.

The alarm is triggered by unauthorised opening of the areas which it monitors.

One CLOSE CL command activates the ATWS. The indicator lights briefly flash to indicate that the alarm has been activated.

Two CLOSE CL commands within 5 seconds or one OPEN CL command from an exterior operating point deactivates the ATWS.



Alarm triggering is country-specific.

Seat and mirror memory

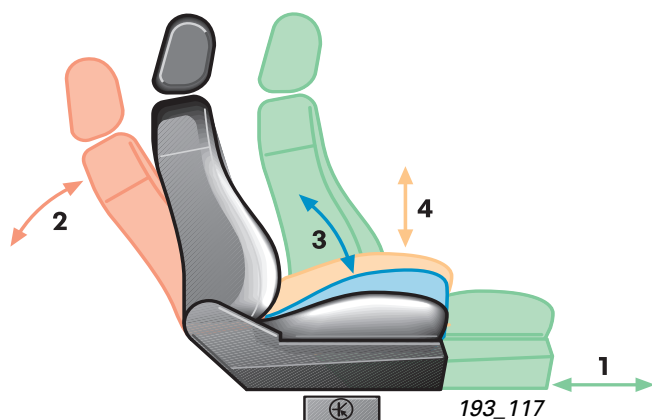
The Passat and the Golf can be fitted with a seat and mirror position memory.

This system enables the memory control unit to set the driver's seat and the exterior mirror to up to three different driver positions via the memory buttons or the radio wave remote control.

It is an independent system and has the self-diagnosis address word 36 "Seat adjustment, driver's side".

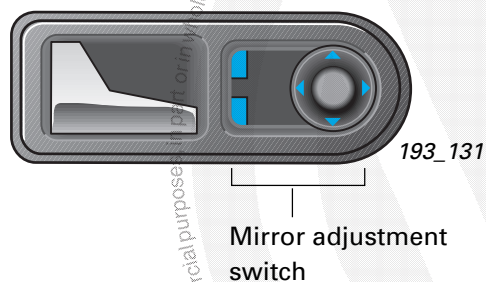
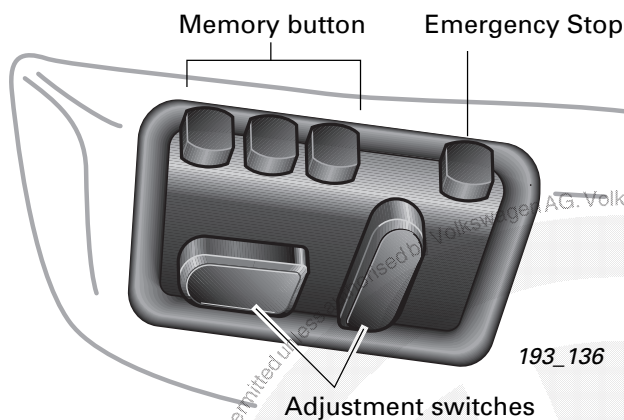
Fitting location

The control unit of the memory system is located beneath the driver's seat and is connected to the convenience system via the CAN databus.



Functions:

- Seat adjustment fore/aft (1),
- Backrest adjustment (2),
- Seat rake adjustment (3),
- Seat height adjustment (4),
- Save seat position,
- Save mirror position for seat position,
- Retrieve saved seat and mirror positions via memory buttons in seat control panel,
- Retrieve saved seat and mirror positions via the remote control,
- Mirror adjustment for reversing,
- Emergency stop button stops auto-adjustment



The control panel for the memory system is integrated in the driver's seat on the left-hand side.

The driver's seat position can be set using the two adjustment switches.

The exterior mirrors can be set using the mirror adjustment switches.

The seat and mirror positions can then be saved by pressing the memory button or the vehicle ignition key and retrieved.

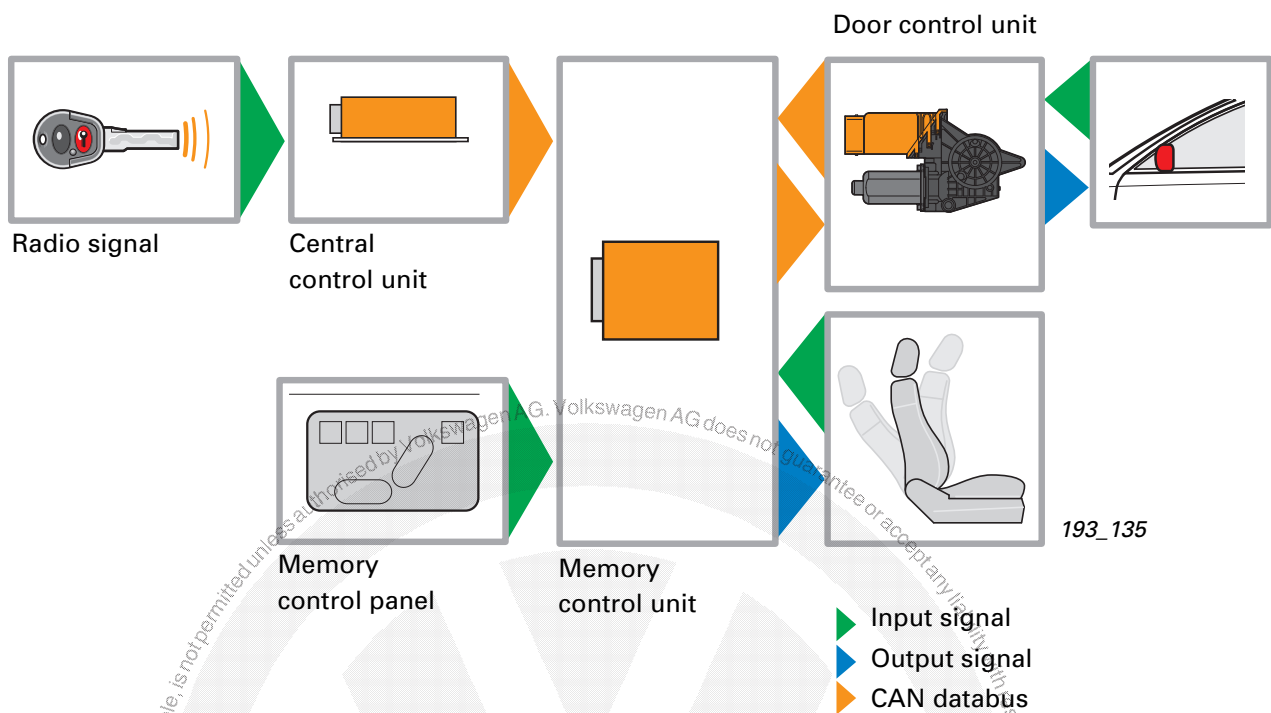
Seat and mirror memory

Retrieval of saved seat and mirror positions by pressing the memory button or using the radio wave remote control

To retrieve saved positions, the vehicle ignition key for radio wave remote control must be learnt-in at the position to be saved. This is necessary because the control unit for seat and mirror positions must be able to assign the various

vehicle ignition key codes to the seat and mirror positions. For exact instructions please refer to the Service Literature.

The diagram below shows the sequence of operations for the memory function.



After loss of power (e.g. battery disconnected), a seat adjustment teach-in routine must be performed. If this teach-in routine is not performed, auto-adjustment is not possible.



Test your knowledge

1. What functions does the convenience system assume?

- ☐ a) Central locking of the doors,
- ☐ b) Interior light control,
- ☐ c) Mirror adjustment and mirror heating,
- ☐ d) Enabling and convenience closing of the sliding/tilting roof,
- ☐ e) Electric windows,
- ☐ f) Self-diagnosis,
- ☐ g) Radio wave remote control
- ☐ h) Central locking of the tailgate lock,
- ☐ i) Anti-theft warning,
- ☐ j) Interface to vehicle electrical system.

2. What functions does the central control unit assume?

- ☐ a) Tailgate lock central locking,
- ☐ b) Interface to other parts of vehicle electrical system,
- ☐ c) Anti-theft warning,
- ☐ d) Radio wave remote control,
- ☐ e) Enabling and convenience closing of the sliding/tilting roof,
- ☐ f) Interior light control,
- ☐ g) Diagnosis.

3. What functions does the door control unit assume?

- ☐ a) Central locking of the doors,
- ☐ b) Electric windows,
- ☐ c) Electrically adjustable and heated exterior mirror,
- ☐ d) Self-diagnosis.

4. What are the distinguishing features of a second generation convenience system?

- ☐ a) The two-touch switches in the control panel on the driver's door side.
- ☐ b) The door control unit is located on the window lift motor.
- ☐ c) The door control unit is located on the control panel.

Test your knowledge

5. What information does the databus transfer to the convenience system?

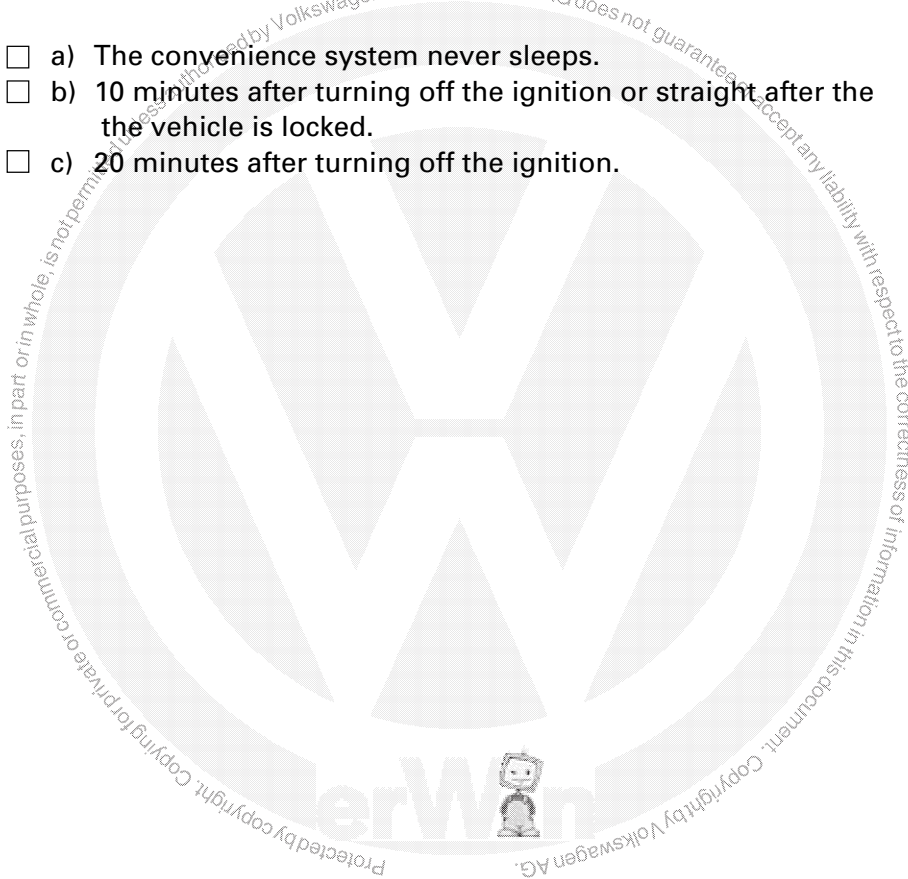
- ☐ a) Switch signals,
- ☐ b) Lock states,
- ☐ c) Information from other parts of the vehicle electrical system.

6. What is the current drain of the convenience system in normal operation?

- ☐ a) 6 mA,
- ☐ b) 150 mA,
- ☐ c) 300 mA.

7. When does the convenience system go into sleep mode?

- ☐ a) The convenience system never sleeps.
- ☐ b) 10 minutes after turning off the ignition or straight after the the vehicle is locked.
- ☐ c) 20 minutes after turning off the ignition.



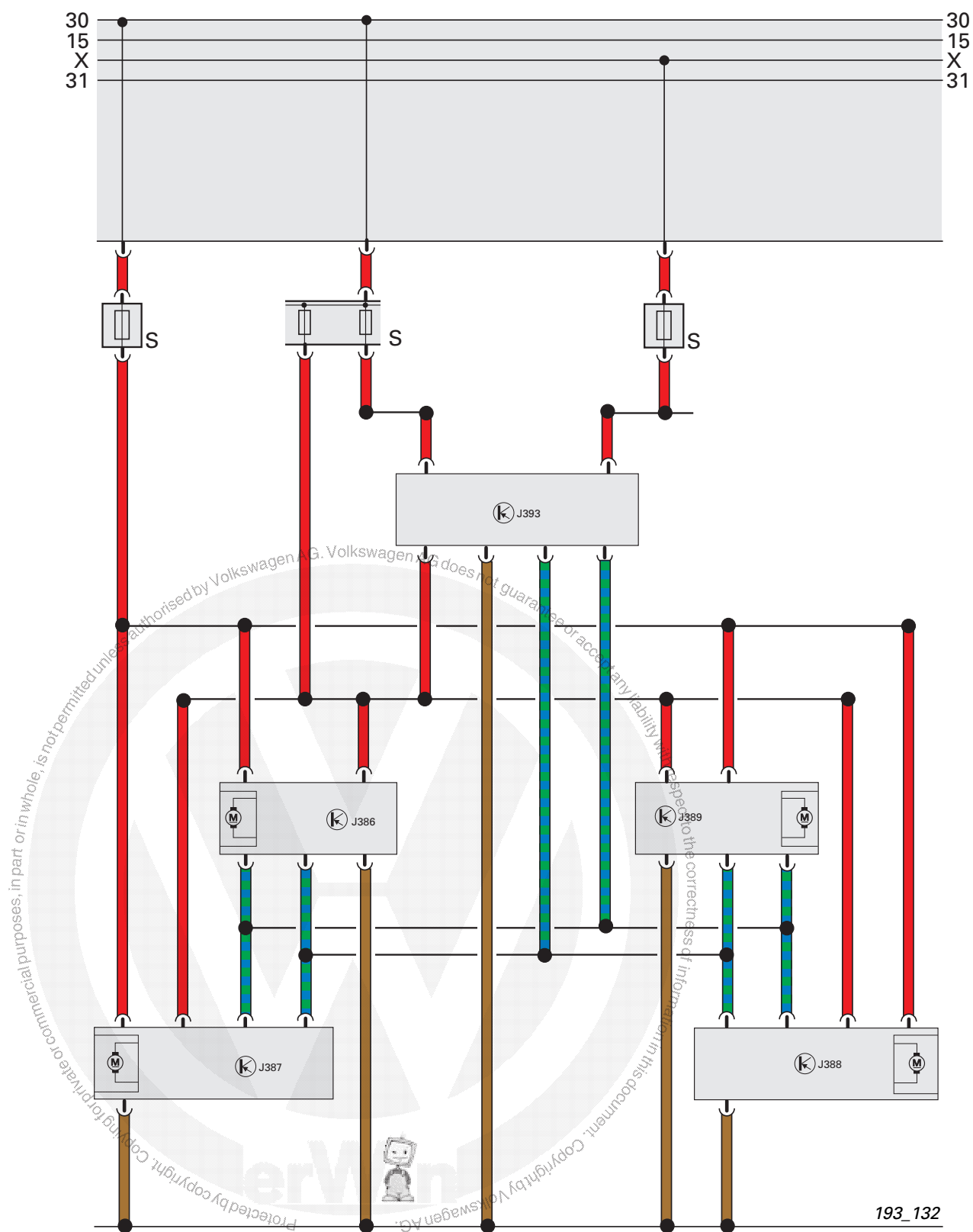
Functional diagram

Components

E39	Rear electric window isolation switch	V27	Electric window motor rear right
E40	Front left electric window switch	V53	Motor for central locking, tailgate
E43	Mirror adjustment switch	V147	Electric window motor driver's side
E48	Mirror adjustment change-over switch	V148	Electric window motor front passenger side
E52	Rear left electric window switch	V149	Mirror adjustment motor driver's side
E53	Rear left electric window switch, driver	V150	Mirror adjustment motor, front passenger side
E54	Rear right window lifter switch	W	Interior light front
E55	Rear right electric window switch (in door)	W3	Luggage compartment light
E81	Front right electric window switch, driver	W11	Reading lamp, rear left
E107	Electric window switch, in front passenger's door	W12	Reading lamp, rear right
E150	Interior locking switch, driver's side	W14	Illuminated make-up mirror, front passenger side
F5	Luggage compartment light switch	W20	Illuminated make-up mirror, driver's side
F120	Contact switch for anti-theft warning, on bootlid lock	Z4	Heated exterior mirror, driver's side
F147	Contact switch for make up mirror - driver side	Z5	Heated exterior mirror, front passenger side
F148	Contact switch for make up mirror - front passenger side		
F218	Tailgate/bootlid central locking switch		
F220	Locking unit for central locking, driver's side		
F221	Locking unit for central locking, front passenger side		
F222	Locking unit for central locking, rear left		
F223	Locking unit for central locking, rear right		
H12	Alarm horn		
J386	Door control unit, driver's 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		
K133	Warning lamp for central locking - SAFE		
L53	Bulb for window lifter switch light		
L78	Mirror adjustment switch illumination		
R47	Aerial wire for central locking and anti-theft warning system		
S	Fuse		
V17	Mirror adjustment motor (driver's side)		
V25	Mirror adjustment motor front passenger side		
V26	Electric window motor rear left		

Connections

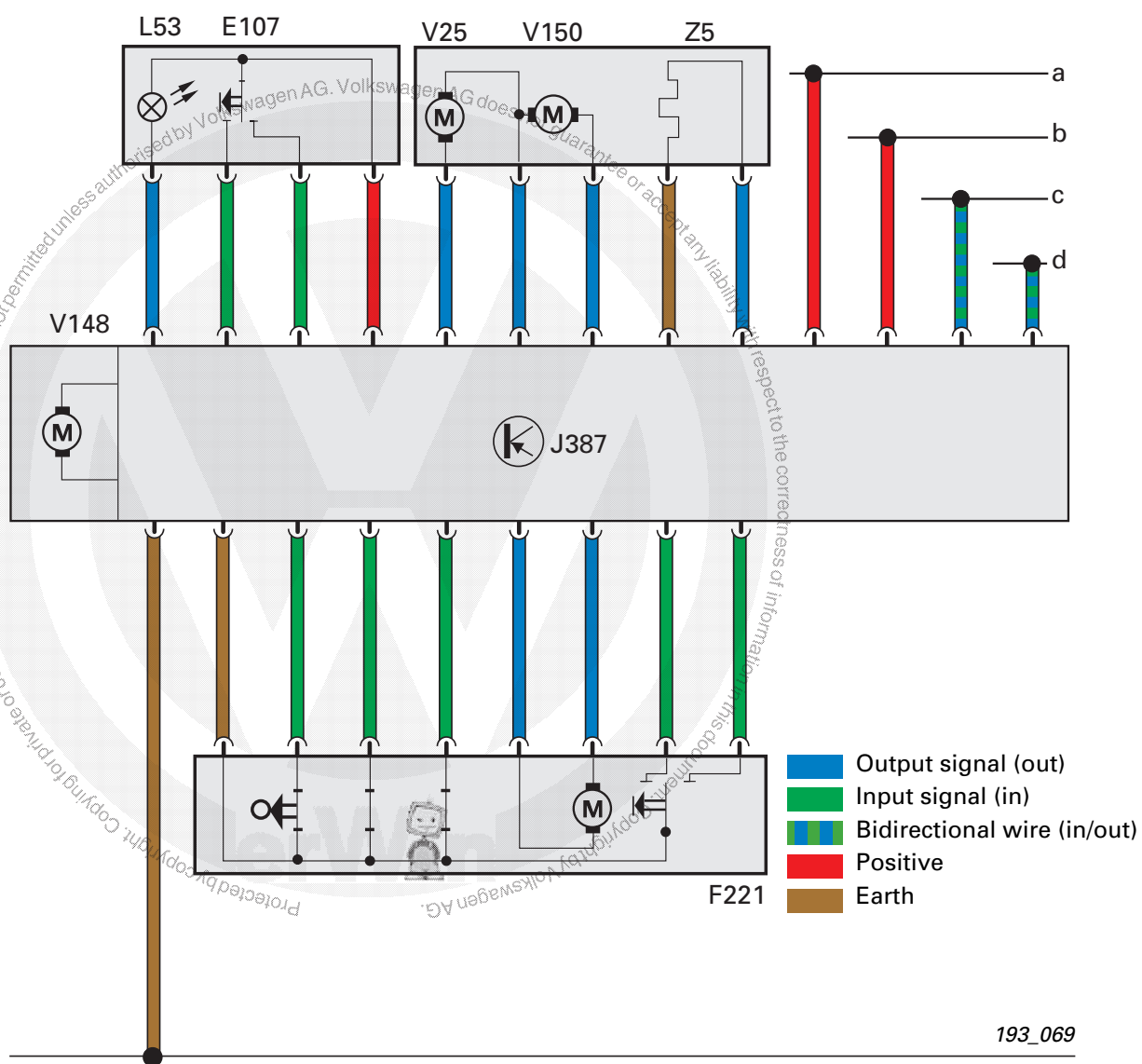
a	Voltage supply, terminal 30
b	Positive terminal (30a)
c	CAN databus H wire
d	CAN databus L wire
A	Diagnosis connection
B	Dash panel insert
C	Engine control units
D	Ignition starter switch
E	Left turn signal
F	Right turn signal
G	Connection to control unit for airbag J234
H	Connection to control unit for sliding roof adjustment J245
I	Connection to seat/mirror position control unit J394



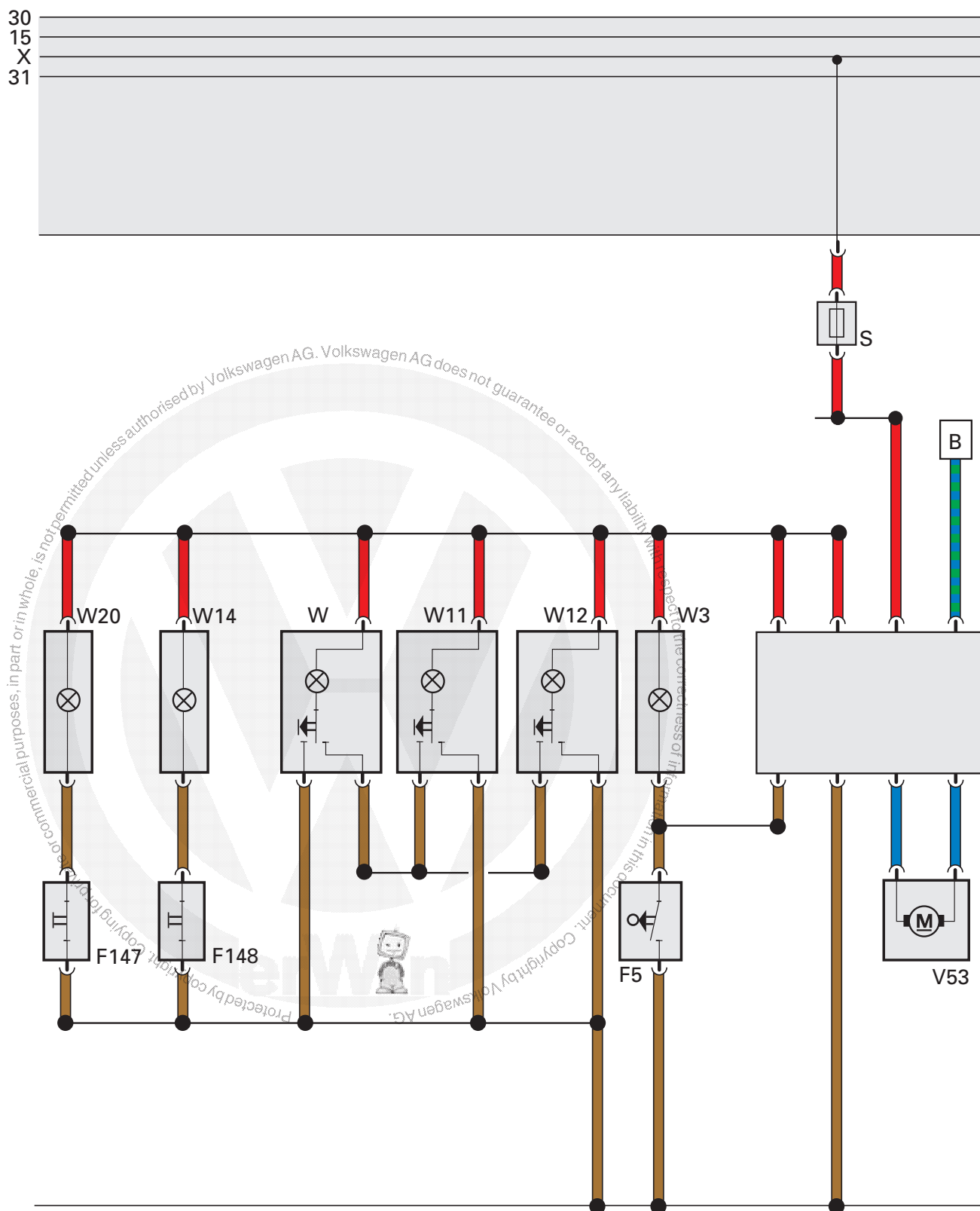
Overview of connections between the door control units and the central control unit

193_132

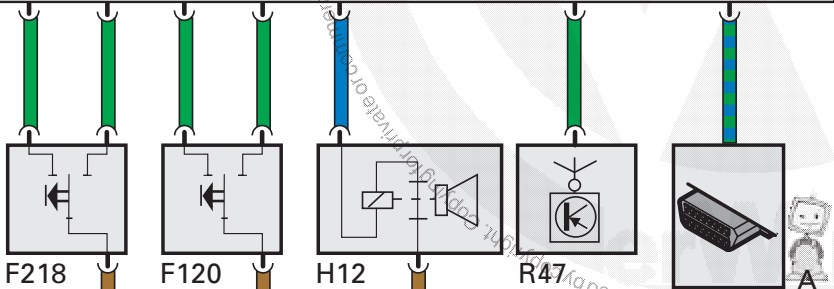
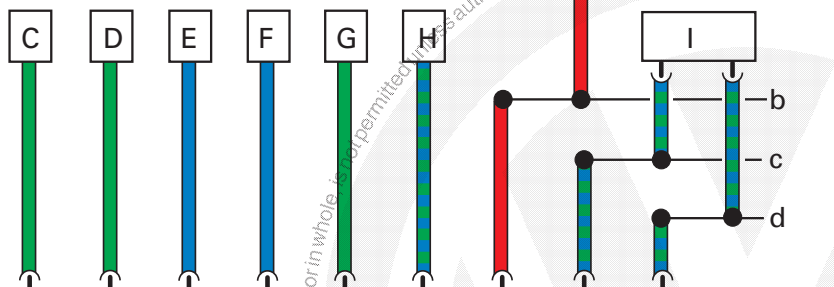
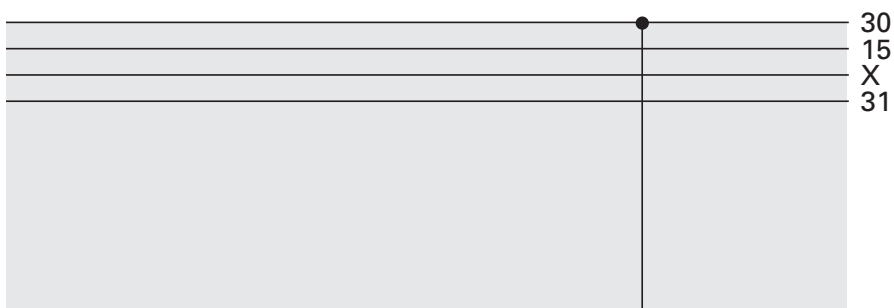
30		30
15		15
X		X
31		31



Excerpt from functional diagram of convenience locking system: door control unit, front passenger side J387



Excerpt from functional diagram of convenience locking system: convenience system central control unit J393



- Output signal (out)
- Input signal (in)
- Bidirectional wire (in/out)
- Positive
- Earth

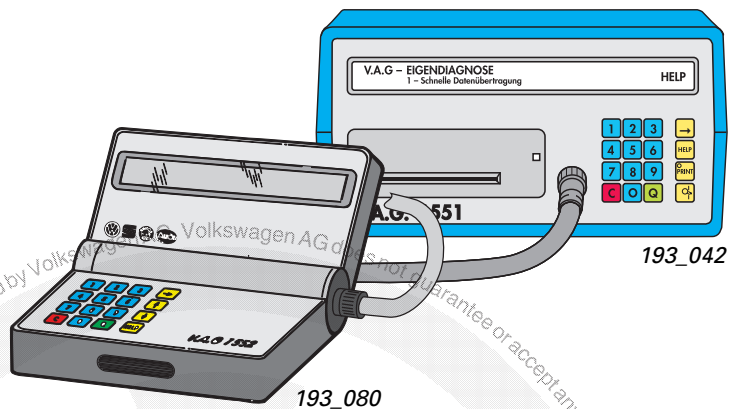
193_064

Self-diagnosis

Self-diagnosis is performed along the K wire of the central control unit and is initiated via address word "46" for the convenience system central module. It can be performed using the fault reader V.A.G.1551 or with the vehicle system tester V.A.G.1552.

The following functions are possible:

- 01 – Interrogate control unit version,
- 02 – Interrogate fault memory,
- 03 – Actuator diagnosis,
- 05 – Erase fault memory,
- 06 – End output,
- 07 – Encode control unit,
- 08 – Read measured value block
- 10 – Matching



Function 02 – Interrogate fault memory

The self-diagnosis monitors all the functions of the convenience system and saves any faults to the fault memory.



Practical experience

With regard to the first generation convenience system, the fault message "No communication" (e.g. in case of fault numbers 1331 to 1335) does not give a direct indication of a fault.

To avoid unnecessary repairs, the fault memory should therefore be erased and the functions checked when this message is displayed.

If the functions are OK, you can ignore the fault message.

Function 03 – Actuator diagnosis

This function can be used to check the actuators listed in the following table.
The components listed in the table are actuated during actuator diagnosis.
The driver's door switch light is not actuated during actuator diagnosis.

Components	Result of diagnosis
Alarm horn	Continuous horn tone
Hazard warning lights	Continuous activation (always lit)
Interior light/reading lamp	Interior reading lamp is active
Sliding roof	The sliding roof is closed
Safe LED	LED is ON
Instrument light	Instrument light is switched on
End	Actuator test is terminated correctly



Practical experience

When the test "Close sliding roof" is performed, the ignition must be off and a front door open.

Function 07 – Encode control unit

Function 07 "Encode control unit" is used for encoding the vehicle equipment and the country spec. version. Please follow the instructions given in the Workshop Manual.

Self-diagnosis

Function 08 – Read measured value block

15 display groups are stored in function 08 "Read measured value block".

Control unit	Display group number
Front left door	001, 002, 003, 004
Front right door	005, 006
Rear right door	007
Rear left door	008
Central control unit	009, 010, 011, 012, 013, 014, 015

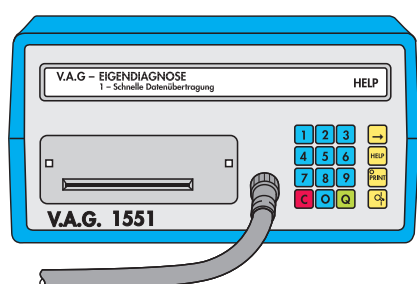
Example of driver's door control unit (front

Group	Control unit	1	2	3	4
001	Front left door	Child safety switch	Lock/unlock switch	Hall signal - electric windows	unassigned
002	Front left door	Window switch, front left	Window switch, front right	Window switch, rear left	Window switch, rear right
003	Front left door	CL keyswitch, front left	Rotary knob, front right Thermal protection	CL feedback	CL feedback - Safe
004	Front left door	Mirror adjustment switch	Mirror selection switch	unassigned	unassigned

Function 10 – Matching

Function 10 “Matching” can be used to enable or inhibit certain functions.
Channels 03 to 08 are only available with the second generation convenience system.

Channel	Effect
00	Erase matching values (referring to learnt-in radio transmitter)
01	Match radio key
02	unused
03	Activate/deactivate automatic locking at V>15 kph and automatic unlocking when key is removed from ignition lock
04	Activate/deactivate IM switch-off by generating CLOSE CL command 2x
05	Activate/deactivate beep acknowledgement signal when vehicle is unlocked
06	Activate/deactivate beep acknowledgement signal when vehicle is locked
07	Activate/deactivate flashing-light acknowledgement signal when vehicle is unlocked
08	Activate/deactivate flashing-light acknowledgement signal when vehicle is locked



193_042

Matching of radio wave keys using the V.A.G 1551

Up to four radio wave keys can be matched to the convenience system in channel 01.
Please refer to the Workshop Manual for the detailed matching procedure.

Notes



Solutions

- 1.: a, b, c, d, e, f, g, h, i, j
- 2.: a, b, c, d, e, f, g
- 3.: a, b, c, d
- 4.: a, b
- 5.: a, b, c
- 6.: b
- 7.: b



