Service.



# Self-Study Programme 274

# The Phaeton Infotainment System

Design and Function



The VOLKSWAGEN Infotainment system is an electronic system for centrally controlling and operating a large number of functions such as climate, navigation, mobile phone etc.

The aim of this programme is provided interested readers with an overview of the components belonging to the Infotainment system as well as the operation and display functions of the Infotainment system.

Due to the complexity of the system, this Self-Study Programme cannot achieve the depth of an operating manual but it can serve as a reference guide within the structure of the system. As the Infotainment system is subject to continuous development, this Self-Study Programme can only describe the current version of the functions.

For more information about the inclusion of the Infotainment system within the onboard power supply, please refer to SSP272 "The Phaeton Onboard Power Supply". You will find in detail information about climate control in SSP271 "The Phaeton Heating and Air Conditioning System".





Please always refer to the relevant Service literature for up-to-date inspection, adjustment and repair instructions.

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The Infotainment system in the Phaeton manages a large number of functions which are centrally controllable via a front information display and operating unit in the centre console of the dash panel, the multifunction steering wheel and a rear information display and operating unit.

#### Functions of the Infotainment system:

- Audio/TV (radio, CD player, TV)
- Car phone (mobile phone, telephone directory management)
- Navigation (route guidance, destination information)
- Telemetrics (traffic congestion warning, alternative routes)
- Trip data (distance data, fuel consumption, refueling stops)
- Climate (regulation of heating and air conditioning system, solar roof function, auxiliary heating)

- Running gear settings (level and damper regulation)
- Service functions (wiper blade and headlight range adjustment)
- Adjustment variants (language input, country selection etc.)



The actual functions that are available in a vehicle is mainly dependent on the equipment of the Phaeton.



The Infotainment system mainly consists of the following, besides the operating units in the dash panel, the steering wheel and in the rear:

- the MF display in the dash panel insert,
- the navigation computer and the CD-ROM the CD player in the glove box,
- the aerials in the rear window, and
- the microphone for language input and car phone functions.

The microphone is mounted in the console in the headlining.

These main elements are interlinked in the CAN databus Infotainment system. This data network is one of a total of three CAN databus networks in the Phaeton:

- Drive CAN databus
- Convenience CAN databus
- Infotainment system CAN databus

All three networks interchange information. This allows the Infotainment system to access a large number of sensors and actuators.



# **Overview of design**

## Front information display and operating unit



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- The operating unit is mounted in the centre console of the dash panel and is divided into various sections.
- Climate line The buttons have fixed functions for controlling the heating and air conditioning system.
- Function keys with screen The screen indicates the various menus and information.

The meaning of function keys is menu-dependent and is shown on the screen as indications in the side columns.  Main menu line with the central rotary/push knob
The buttons in this line select the main menus. Use the rotary/push knob to select entries from a list or confirm the selection by pressing the button.

Audio line

Here you can toggle between the radio, CD player and TV. Use the various buttons to select radio stations or TV channels or regulate the volume.



The workshop manual refers to this display and operating unit by the term "Front information display and operating unit control unit".



### **Steering wheel functions**

The inside of the multi-function steering wheel has two button clusters in addition to the horn. They have the following functions:

- CCS (cruise control system)
- Automatic distance control (ADR),
- Subfunctions of the Infotainment system
- Menu switch-over for display in the dash panel insert
- Activation of the language input



# MF display in the dash panel insert

Depending on the equipment level there is a choice of 3" monochrome screen or 5" colour screen. The screen can present 7 different menus containing various functions of the Infotainment system. You can select the information contained in a menu from a list. Select the menu using the multi-function steering wheel. The screen in the front information display and operating unit does not change when a selection is made.

# Rear information display and operating unit

The buttons on this unit only allow access for controlling the rear climate zones.







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#### Outlook

An extended rear operating unit is conceivable as part of further development of the Infotainment system.

Similar to the front information display and operating unit the functions in the operating menu are selectable from a function key line. There is also a rotary/push knob to select entries from the menu display or to confirm selection by pressing the button.

Submenus or special functions are also activated via function keys whose functions may change from menu to menu.

At the bottom of the operating unit there is a socket to plug in headphones.



Design study for extended rear operating unit





Navigation computer with CD-ROM



Audio CD player



#### Navigation computer with CD-ROM

This is housed in the glove box together with the CD player of the audio system.

#### CD player with CD changer

It can handle 6 CDs and has a shock memory. Severe shocks may cause the reading head to jump to another position. The shock memory has the function of returning the reading head to the place where it was directly before the shock. The car occupants will not hear the interruption since the CD player buffers the music read by the reading head for about 10 seconds before it plays back.

#### **Aerials**

All aerials are recognisable by thin lines at the top of the rear window.

The control unit for the aerials is fitted under the cover in the headlining just in front of the rear window.

Control unit for aerial selection

# **Central unit**

#### **Climate line**

The climate line buttons have fixed functions. In addition to these buttons there are a number of different settings provided by the function keys. The buttons in the climate line are always active no matter what main Infotainment system menu is currently in the screen.



#### Button functions



This is a rocker switch. Adjusts the temperature on the driver and front passenger sides separately in steps of 0.5°C. The side with the red dot raises the temperature, and the side with the blue dot lowers the temperature. The temperature setting is displayed in the central display and operating unit and, if selected, in the MF display in the dash panel insert.

# AUTO

This is the button for the automatic climate control. It adjusts the air temperature, air volume and air distribution automatically to reach the selected temperature as quickly as possible and keep a constant temperature.



Switches the manual defrost function on or off.



Adjusts all settings in the four climate zones to the driver's settings.



Switches the manual air recirculation function on or off.



Switches the rear window heater on or off.

#### **Function keys**



There are 8 function keys arranged on the left and right of the 7" colour screen. The function of these function keys is different depending on whether the main menu or a submenu is selected. This means that the button function is menu-dependent. Each button function is described by terms or icons in the two dark border strips of the colour screen. The icons relating to the function keys have the following functions:



The function keys switch a function on or off. An active function is displayed on screen by a colour icon similar to an LED.



A second function of the function keys is to select submenus. This is indicated on the screen by a small triangle next to the button. When a submenu is started, the user is guided down through the menu system.



To return to the previous level, a function key always has a "Back" or "Cancel" function indicated by an arrow.



Another possibility is to use the rotary/push knob to select or confirm a function. This option is indicated on screen by a small circled dot next to the button.



#### 7" colour screen

The term "7 inch" when referring to the size of the screen indicates the length of the screen diagonal. The outer dimensions of the screen are 150mm x 85mm and it has a resolution of 480 x 234 pixels. The colour depth is 8 bits. This means that the screen can display 256 colours.

The screen is divided into a number of sections which display different types of information.

The dark header contains the temperature settings for the driver and front passenger climate zones. Between the two settings is the radio station or TV channel setting or CD track. The two dark sections on the side are for describing the functions of the function keys (see above).

The bright central section is reserved for displaying the information in the menus. In navigation mode and also in TV function, a full-screen display is selectable. This uses the full area of the screen for the display.



#### Main menu buttons

The main menu buttons comprise 12 different functions which control the Infotainment system. The related main menu is displayed on screen when a button is pressed.



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#### Audio line

The audio line helps to control the radio, TV and music CD function as well as the tone and balance settings.



#### Button functions



switches the radio on and opens the radio main menu on screen in the front information display and operating unit. Press twice to switch between FM and MW radio.



changes to playback mode when music CDs are loaded in the player.



TV switches the TV function on. The TV picture can only be viewed at the front when the car is at standstill.



activates the traffic radio function.



adjusts the volume. Press to switch the loudspeaker to mute.



Depending on whether FM/AM, TV or CD is active, the station buttons 1 to 6 either select a programmed radio station or TV channel or a CD sin the CD changer.



starts a station/channel search in FM/AM or TV mode. In CD mode, selects a track using the buttons or activates the scan function to search forward or back within a track.



BAL/FAD and tone adjust the balance and tone qualities via the rotary/push knob in the front information display and operating unit.



is the station/channel selector for adjusting the station/channel manually.

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# Steering wheel functions

The operating elements for the Infotainment system are arranged on the right side of the steering wheel.



Button functions



+Vol and -Vol adjust the volume.



switches language input on. When language input is active, certain functions, e.g. entering the mobile phone pin code, can be triggered directly by voice. If the vehicle is not equipped with language input, this button repeats the last speech output from the navigation system.

The button with the telephone receive icon is for setting up or cancelling a telephone connection.



browses between the 7 different screen displays in the dash panel insert.



is a thumbwheel. Selects values from a list or press to confirm selection.



displays the previous screen contents or cancels a process.

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# 5" MF display in the dash panel insert

The MF display is divided into a number of sections. The central section displays information about the Infotainment system. The following displays are available as standard:

#### Trip data to destination (a)

In addition to the station/channel setting, displays the distance to destination entered in the navigation system.

#### Automatic proximity control (b)

Displays the entered proximity setting on an outer trapezoidal scale. The inner trapezoidal bar shows the car's actual proximity. The figures above the car icon show the desired car speed.

#### Navigation (c)

The MF display displays road route information and direction instructions from the navigation system.

#### Mobile phone (d)

Besides the name stored in the telephone directory, the MF display also displays the call number which was selected or entered.











#### Select CD or TV channel or radio station (e)

Depending on what function is active in the Audio line (TV/ Radio/CD), you can select a loaded CD or one of the programmed stations/channels from a list.









#### Display of current trip data (f)

The MF display displays a fixed selection from the data status of the on-board computer:

- time elapsed since start
- distance travelled since start
- average speed
- average consumption

#### User-defined display (h)

In display (a) you can select, say, the reading "KM to destination" using the thumbwheel. Press the wheel to access a display (g) which shows all the information available in the form of a list. You can activate an item of information for display from the list using the thumbwheel. The information is then displayed in the MF display.

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# **Operating elements**

### Rear air conditioning operating unit



#### Button functions



activates indirect ventilation of rear seats via air outlets in B pillar.



controls rear footwell flaps separately for driver and front passenger sides to direct ventilation onto occupants.



opens footwell outlets.



rocker switches to change temperature in steps of 0.5°C.



rotary knob to adjust blower setting.



activates automatic climate control for each climate zone.



switches climate control for rear seats on or off.



switches the MF display on or off.

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# Navigation computer with CD-ROM





When the navigation system is active, a navigation CD must be loaded in the tray of the navigation computer.



A loaded CD can be ejected by pressing the Eject button, for example, to load the navigation CD of a different region.

# **CD** player

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VOLKTWAGEN

The CD changer of the CD player can contain six music CDs. They are loaded into the changer through the CD slot.

To change a CD, first press the Eject button. Buttons 1 to 6 determine which CD is ejected.

To load a CD, first press the "Load" button. The MF display on the CD player then start to flash slowly.

Only when the LED starts to flash fast may the CD be inserted in the CD tray. Then press buttons 1 to 6 to select the place where the CD is loaded. If you press the Load button for longer than three seconds, a fast load function is tripped. This means that empty trays are automatically set to ready and can be loaded in quick succession. LINCT

& DIRE CD CHAN

URC

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& DISC CD CHANGES

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0 = 1 = 1 = 1 = 1 = 0

1 1 2 1 2 1 4 1 3 1 4

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# Entry dialog

After switching on the ignition, the Infotainment system switches on automatically and the welcome screen appears while the Infotainment system is running up.

If a user profile has been assigned to the ignition key inserted, the system then loads all the settings stored for the user. Then the start screen appears.



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Other user profiles can be loaded via the start screen. The current profile is displayed by the small key.

Press the "Guest" function key to start the system using factory defaults.

Using the "PIN entry" function key, you can enter the PIN code here for the mobile phone without going through the phone menu.

The "Next" function key start the system with the functions which were active the last time the Infotainment system was switched off.

If no button is pressed for 15 to 20 seconds after the start menu appears, the system starts the function of the "Next" button automatically.



# **Overview of functions**

### Climate main menu



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The climate menu allows you to control the air outlets for the driver and front passenger independently. The force of the air flow adjusted by means of the rotary/push knob is displayed by a scale and is of equal strength for all four climate zones.

The "ECON" button switches the cooling function of the air conditioning system off and on.

Using the "Other" function key, you can select submenus in the climate menu.

There you will find additional functions, e.g. switch off the two rear climate zones from the front, or switch the auxiliary heating with timer function, or the solar roof function.

#### **Auxiliary heating**

When you select the "Other" option, you can set various timers for operating the auxiliary heating in the "Auxiliary heater" submenu. You can select the settings to start the auxiliary heating on a particular weekday at a certain time and for a fixed period of time. On the next day, you need only activate the auxiliary heating as the start time and duration are taken over from the previous day.

#### Solar roof function

When the solar roof function is active, the design covers are open.

The blower is powered by the solar cells in the solar roof.

### Phone main menu

Pho boo	ne 23.5° C NDR 2 18° ( ok PHONE	sos —
Red	ial Manual dial	Save
Call	er 05311 2 3	Correction
Option Option	ons 4 5	Dial



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When the phone function is switched on by pressing the main menu key "Phone", the driver is requested to enter the PIN code. You can enter the PIN using the rotary/push knob of by language input. When the system accepts the PIN code, the phone main menu appears.

The computer requires about 30 seconds to load the telephone directory from the mobile phone to the system. Before switch-off the computer compares the stored entries with the connected mobile phone and updates the memory entries in the mobile if necessary. If the mobile phone is switched off, the driver must enter the PIN code again, and the telephone directory is downloaded again from the mobile phone.

All entries in the telephone directory are displayed in the form of an on-screen list. The entries are selectable and confirmable by using the rotary/push knob.

Using the rotary/push knob and another submenu, you can correct existing entries or add new entries to the directory. Select and confirm letters and numbers from the alphabet using the rotary/push knob.s

# **Overview of functions**

#### Language input



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If the car is equipped with language input, the following functions are currently available:

- enter PIN code and
- select a name from the telephone directory.

To select an entry from the telephone directory using spoken words, a speech sample must be stored in the Infotainment system so that the computer can recognise the name in the book by the spoken word.

The voice sample is defined by pressing the function key "Enter" in the telephone directory menu. First select an entry from the telephone directory. Then press the Enter key. The driver must then say the name loudly and clearly after a voice request so that the computer can record the voice sample.

As confirmation, the name must be repeated a second time after a speech request. Then the

computer will be able to recognise the telephone directory entry when it is spoken.

The language input will only function correctly is the correct national language is selected from the Settings menu using the "Language" function.

### Navigation system





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As the Navigation menu is highly complex, we will only describe the main menu briefly here. This is the menu which appears when you press the "Navi" key in the main menu key line on the information display and operating unit.

Press the "Enter dest." key to open a submenu where you can define various routes to the destination for the route guidance system.

Press "Save veh. location" in a submenu to save the current vehicle location in the memory by entering the place name letter by letter using the rotary/push knob. In the "Alternative route" submenu to define the distance which you want to cover with the alternative route.

When you press the "Full screen" key, the map section expands to the full screen area. The key function descriptions are then hidden. Press any function key to return to standard display mode. The submenus "Display" and "Section" allow a number of different display options.

When you have finished entering the destination, the route guidance function is activated by pressing the "Start route" key.

# **Overview of functions**

# Audio/TV function

#### Radio main menu

The main menu shows a directory of all receivable stations. The numbers in front of the names indicate the station button assignments. The tick indicates the current station selection. Press "List/Manual" to toggle between a list display and a frequency scale display.





#### TV main menu

When the Audio/TV function is active, the TV picture appears when you press the "TV" key in the audio line. However, the TV picture only appears on the main screen when the car is not moving.



#### Music CD main menu

The "CD" key in the audio line opens a list of CD tracks when the Audio/TV function is active. You can then select a track by pressing the key 1 to 6 in the audio line. You can also select a track by using the rotary/push knob or by using the operating elements in the Audio line.

The "Playback mode" function key opens a submenu in which you can activate, say, a random track selection.



#### Settings menu



The Settings main menu displays 6 submenus for selection.

The "User profiles" function offers the possibility of assigning customised settings to one of three ignition keys. When the door is opened with one of the keys assigned to a profile, the Infotainment system sets all functions to the stored values.

With the "Volume" submenu, you can set different volume functions, e.g. volume of traffic announcements.

The "Other" function key opens a submenu in which you will find the date and time settings and the

"Maintenance & Service" function.

The "Maintenance & Service" function is required when replacing wiper blades, for example.

The Infotainment system uses the "Language" menu to change the system to the various national languages.

The "Outside illumination" submenu defines functions such as whether and for how long the

illumination will stay on after the driver has left the car.

Another setting function in this submenu determines whether headlights and outer mirror illumination are switched on when the remote control in the ignition key is operated.



### **Reset function**

The "Reset" key resets all the values in a function, e.g. climate, or the values of all functions to the factory defaults after a confirmation. The entries in the telephone directory or programmed stations/channels are retained.





### Vehicle menu

The "Vehicle" menu switches the type pressure check on or off when the "TPC" key is pressed. Optionally, the spare tyre can also be monitored. The reference pressure is displayed at a tyre temperature of 20°C.

The "Inflation. info." key opens a submenu which displays the pressure by which the tyre needs to be re-inflated at the current tyre temperature.









The following information is displayed using the "Board PC" function:

- Start time
- Expected time of arrival
- Elapsed time
- Total distance
- Distance travelled
- Average speed
- Average consumption
- Distance to next refueling stop
- Current fuel consumption
- Travel time since last stop

### Traffic menu

The "Traffic" function opens the Traffic main menu.

The "TIM" key opens a submenu, which can recall recorded radio traffic announcements.

The last digital traffic announcements stored are displayed in the centre of the screen. After you select an entry using the rotary/push knob, you can view the details of the announcement of play back the announcement.

# **On-board computer**

The main menu of the "Board PC" function displays statistical data about the current trip. Press the keys "To dest." or "From start" to select whether the data displayed refer to the start or the destination.

The "Long-term stats" key opens a submenu which display data referring to total operating time.

# **On/Dark function**

This function switches off the MF display except for the status line at the top edge of the display. Press the function key again to switch the display back on. When "Ignition off" is selected, the Infotainment system can be switched on by pressing the "On/Dark" key.



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### **Manual function**

Opens the electronic owner's manual. Press the function key to open the index. There you can select an entry by using the rotary/push knob.



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### Help menu

The "Help" function can be opened when you need information on how to use the Infotainment system when you are in a menu. Press "OK" to return to the menu. "More" opens a chapter in the electronic owner's manual.



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### Other functions

Press the "Shock abs." key in the centre console in front of the gear selector to display the menu for setting the air suspension of the Phaeton. Press the rotary/push knob to select one of the four settings which range from a comfortable, soft suspension and a sporty, hard suspension.



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The "Self-levelling suspension" key opens the menu for setting the self-levelling suspension. Here you can select between two settings.

# Connection to power supply

#### network

The electrical terminals of the Infotainment system are located on the rear of the front information display and operating unit.

Connectors are provided for:

- navigation sensors -
- CD changer and additional terminals -
- loudspeaker terminals
- voltage supply, K wire, -
- aerials for radio, TV, navigation and mobile phone, and
- optical bus -





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#### **Optical bus**

It connects the central display and operating unit to the navigation computer.

As it is very important for the navigation system to have trouble-free data interchange, this connection has been implemented by an optical fibre cable.

In optical data transfer digital information is converted into a series of light pulses and launched into the optical fibre cable.

The advantage of optical fibre technology compared with metallic leads is that data flow is immune to electromagnetic fields.

These fields occur in every lead through which a current flows. Leads which run parallel or cross each other can interfere with each other. This includes electromagnetic radiation, e.g. mobile radio, which can also affect data transfers.



As optical bus connectors are highly sensitive to damage, they must be provided with protective caps during installation work.

# **Electrics**

# **Electrical connection of components**



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Loudspeakers DSP amplifier Mobile AF-DSP AF Nav **N** Infotainment Multi-function steering wheel

#### AF wire

It has a double screen. This gives it fault immunity, low capacitance and high mechanical stability.

#### Y-C wire

This is an audio and video cable.

Some components, e.g. radio, are contained in the front information display and operating unit. Other units and components are connected to the system via various interfaces, e.g.:

- the navigation computer with CD-ROM in the glove box via the CAN databus for the Infotainment system and an optical bus,
- the CD changer in the glove box via the CAN databus for the Infotainment system and AF wire,
- the TV tuner in the luggage compartment via the CAN databus for the Infotainment system, AF and Y-C wires,
- the instrument panel via the CAN databus for the Infotainment system,
- the telephone control unit in the luggage compartment via the CAN databus for the Infotainment system and an AF-in and AF-out wire,
- the mobile unit in the driver's armrest via a special connection,
- the DSP amplifier in the luggage compartment via the CAN databus for the Infotainment system and two AF wires and the stereo outputs for the loudspeaker system,
- the aerials in the rear window via direct HF/IF input and output wires and
- the microphone in the vehicle headlining via a separate input wire.



# Self-diagnosis

#### Diagnosis

The following operating modes are available via the Vehicle Diagnostic, Testing and Information System VAS 5051:

- guided fault-finding and
- vehicle self-diagnosis

The operating modes "**Guided fault-finding**" tests all control units fitted to a particular vehicle to find error entries. It also compiles automatically an individual test plan from the results.

Together with ELSA information, e.g. current flow diagrams or workshop manuals, this guides you directly to the cause of the trouble.

Irrespective of this, you can compile your own test plan.

Using function and component selection, the tests you selected are included in the test plan and they can be worked off in any sequence during diagnosis work.

The "**vehicle self-diagnosis**" operating mode can be used as before.

However, there is no further information available from ELSA.





For more information on the workflow and functioning of Guided Fault-Finding, please refer to Chapter 7 of the VAS 5051 Operating Manual.

# Service



#### **Replacing wiper blades**

To replace wiper blades, start the Infotainment system.

After selecting the "Settings" function, press the "Changing the wiper blades" function key by selecting the submenus "Other" and "Maintenance Service". The windscreen wipers then move to change position and can be replaced as described in the instructions in the workshop manuals. When you have finished replacing them, move the blades back to home position by pressing the key again.

#### **Unlocking headlights**

Proceed in a similar way for working on the front headlights. The "Headlights" function unlocks the front headlights mechanically. You can then carry out work on them, e.g. adjusting the bulbs. When you have finished adjustment work, lock the headlights mechanically by pressing the key again.



	1.	What i	is the	Infotainment	system
--	----	--------	--------	--------------	--------

- a) A system which combines only the information media radio, TV and mobile phone.
- b) A system which is capable of managing various functions in the vehicle and operating them centrally.

#### 2. What main menus are currently displayed in the Infotainment system?



- 3. Where is the navigation CD player?
- a) in the plenum chamber
- b) in the glove box
- c) in the luggage compartment

#### 4. In what main menu can you select the current language?

(d .F

2. AC (climate control), Phone (mobile phone), Traffic (traffic announcements), Mavi (navigation system), Vehicle (tyre pressure check), Settings (Settings), Radio/TV (radio, CD, TV function), Board-PC (trip and consumption data), On Dark, Reset, Manual,

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2. Settings



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