



**Self-study Programme 527**

**The e-up!**



The e-up! is the first electric vehicle from Volkswagen to go into mass production.

Its distinctive characteristic is the curved light signature; an LED daytime running light in the front bumper.

As well using innovative, sophisticated technology, the primary objective for the e-up! was to develop a safe vehicle which meets demand and is suitable for everyday use.

It is the first time that large-scale use of renewable energy has been possible. Exclusively in Germany, Volkswagen is offering electricity under the name **BluePower\***. The energy is generated without CO<sub>2</sub> and is taken solely from **hydroelectric power plants\***.

The pleasure of driving and environmental awareness are no longer mutually exclusive.

The maximum drive torque of the electric drive is 210 newton metres and the maximum power is 60 kilowatts. This means the e-up! can powerfully accelerate from zero km/h.

Aerodynamic features and the lithium ion high-voltage battery with a capacity of 18.7 kWh enable a range of up to 160 km.

\* Varies according to country.



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**Caution! Hazardous electric voltage!**

**The Self-study Programme describes the design and function of new developments. The contents will not be updated.**

For current testing, adjustment and repair instructions, refer to the relevant service literature.



**Important Note**

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# Introduction



## E-mobility – the path to the future

Since the 1970s, Volkswagen has been intensely involved in the field of electric mobility. Many concept studies have been developed since then and in the 90s, a small number of Golf CitySTROMer vehicles even went into production.

In 2010, the Touareg Hybrid was the first vehicle with an electric hybrid drive from Volkswagen to go into mass production. The second vehicle series was the Jetta Hybrid, produced in 2012, which combined a combustion engine and a three-phase current drive.

The e-up! is the first fully electric vehicle to be introduced and will be followed by the e-Golf in 2014. The new lithium ion high-voltage battery in the e-up! is an important building block for e-mobility which simultaneously provides technology suitable for everyday use.

Looking to the future, Volkswagen are already researching and developing further concepts such as the use of fuel cells.

Under the terms “Think Blue” and “BlueMotion”, Volkswagen combines advanced environmentally-friendly technology, from BlueMotion technologies to hybrid drives and electric drives.

The objective is CO<sub>2</sub> neutral, sustainable and safe electric mobility that is suitable for everyday use.



Golf CitySTROMer 1993



Touareg Hybrid 2010



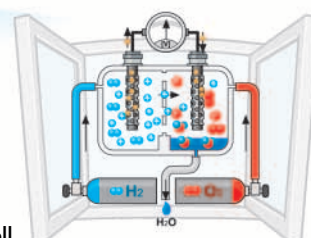
e-up! 2013



Jetta Hybrid 2012



e-Golf 2014



Fuel cell

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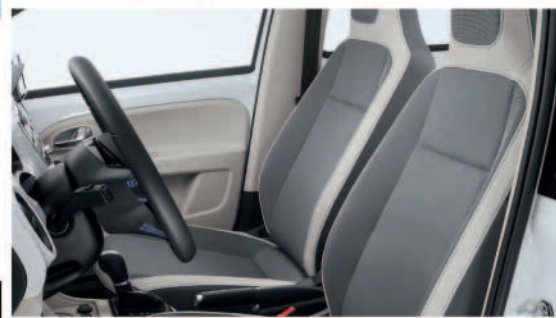
## Distinguishing features of the e-up!



Volkswagen badge with blue ring



15-inch alloy wheels



Specially designed seat covers



e-up! badge on the rear lid



Reflectors in a curved electric vehicle signature



Selector lever with blue seam and gear display "B"



Dash panel insert with electric vehicle-specific display



LED daytime running lights at front

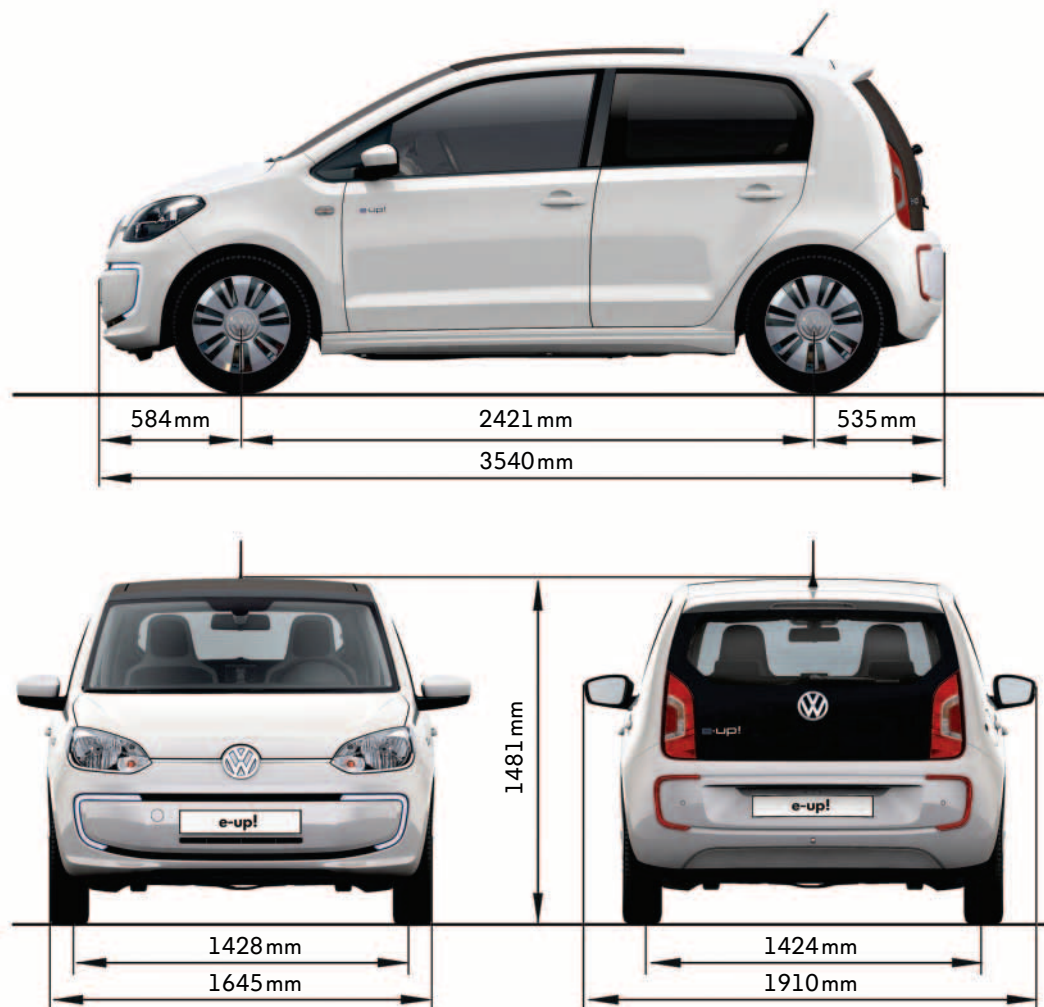
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# Introduction

## Technical data

### Exterior dimensions and weights

The data refers to a vehicle without driver, with standard equipment and electric drive, a lithium ion high-voltage battery and tyre size 165/65 R15. The dimensions correspond to those of the up!, introduced to the market in 2011, with some minor deviations.



#### Exterior dimensions

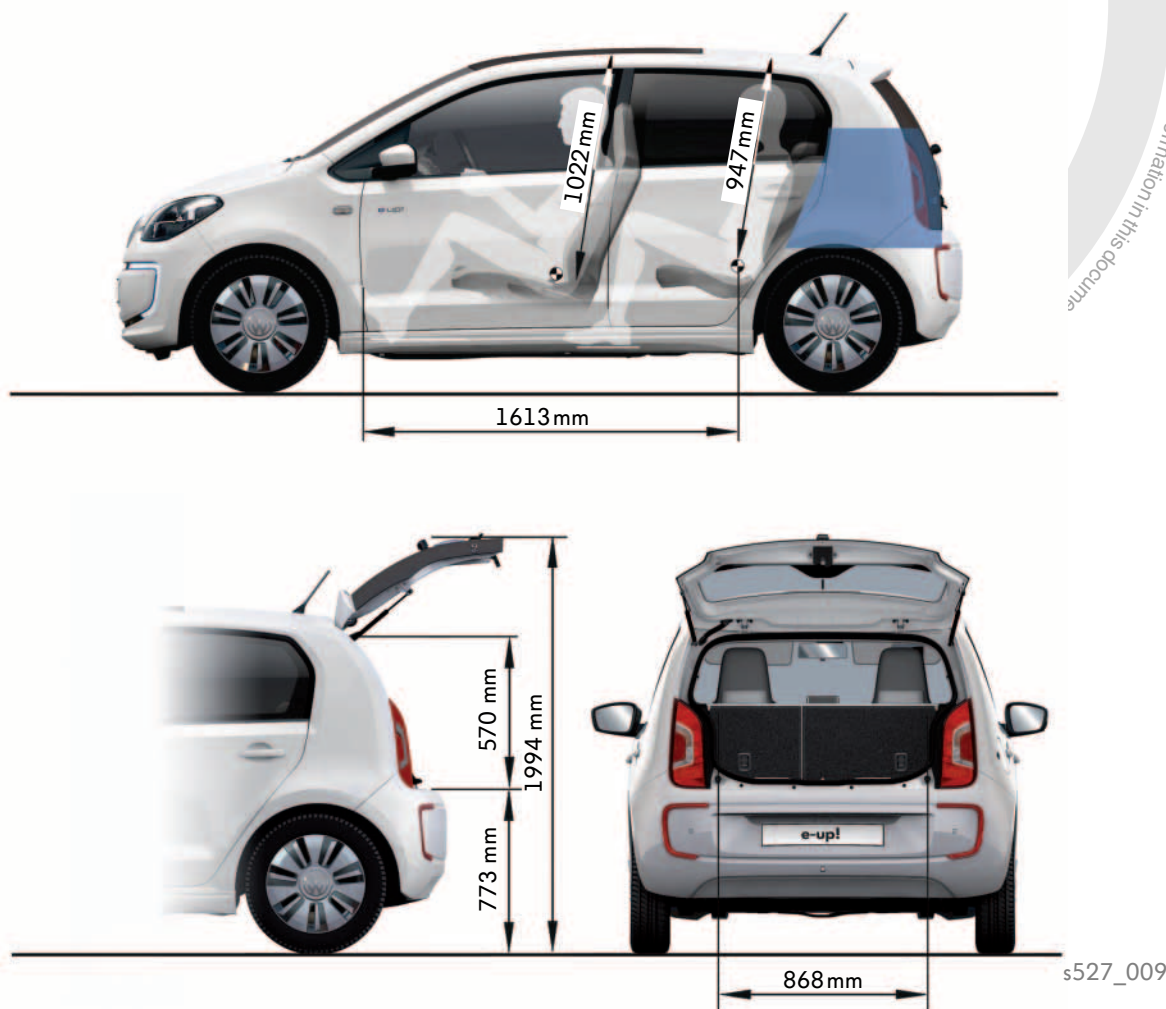
Length	3540mm
Width	1645mm
Height	1481mm
Wheelbase	2421mm
Track width at front	1428mm
Track width at rear	1424mm

#### Weights/further data

Gross vehicle weight rating	1500kg
DIN kerb weight*	1139kg
Weight of the high-voltage battery	230kg
Turning circle	9.8m
Nominal energy	18.7kWh
Max. power/max. torque	60kW/210Nm
Drag coefficient	0.308 c <sub>d</sub>

\* DIN  $\triangleq$  **D**eutsche **I**ndustrie **N**orm  
(German Industry Standard)

## Interior dimensions and volumes



### Interior dimensions and volumes

Length of vehicle interior	1613mm
Luggage compartment volume	250litres
Height of open rear lid	1994mm
Height of load sill	773mm
Height of luggage compartment aperture	570mm

Width of luggage compartment aperture	868mm
Front headroom, max.	1022mm
Headroom – 2nd seat row	947mm
Legroom, 2nd seat row	*

\* Sufficient legroom can only be obtained by reducing the legroom of the front seats.

# Body

## Body structure

The development from up! to e-up! has also influenced the body structure. The vehicle floor has been modified and reinforced in order to create space for the high-voltage battery. Stringent safety requirements for high voltages have meant an increase in the number of hot formed parts and changes to the geometry and quality of the materials. The front part of the longitudinal member of the e-up! is structurally identical to that of the up!. The e-up! is only available as a 4-door model.

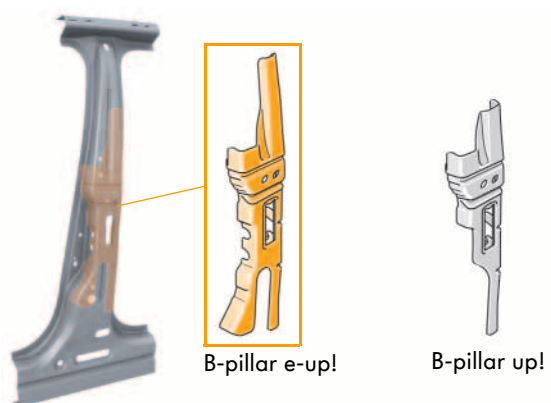


### Strengths of steel sheets

- Soft steel sheet metal <350 MPa
- Strengthened steel sheet metal <590MPa
- Modern strengthened steel sheet metal <980MPa
- Ultra-strengthened steel sheet metal <1150MPa
- Ultra-strengthened (hot formed) steel sheet metal >1400 MPa

## Additional B-pillar reinforcement

The B-pillar has been reinforced in the mid-section to meet special crash requirements. This is the only component in the upper body structure which has a different geometry and material from the up!

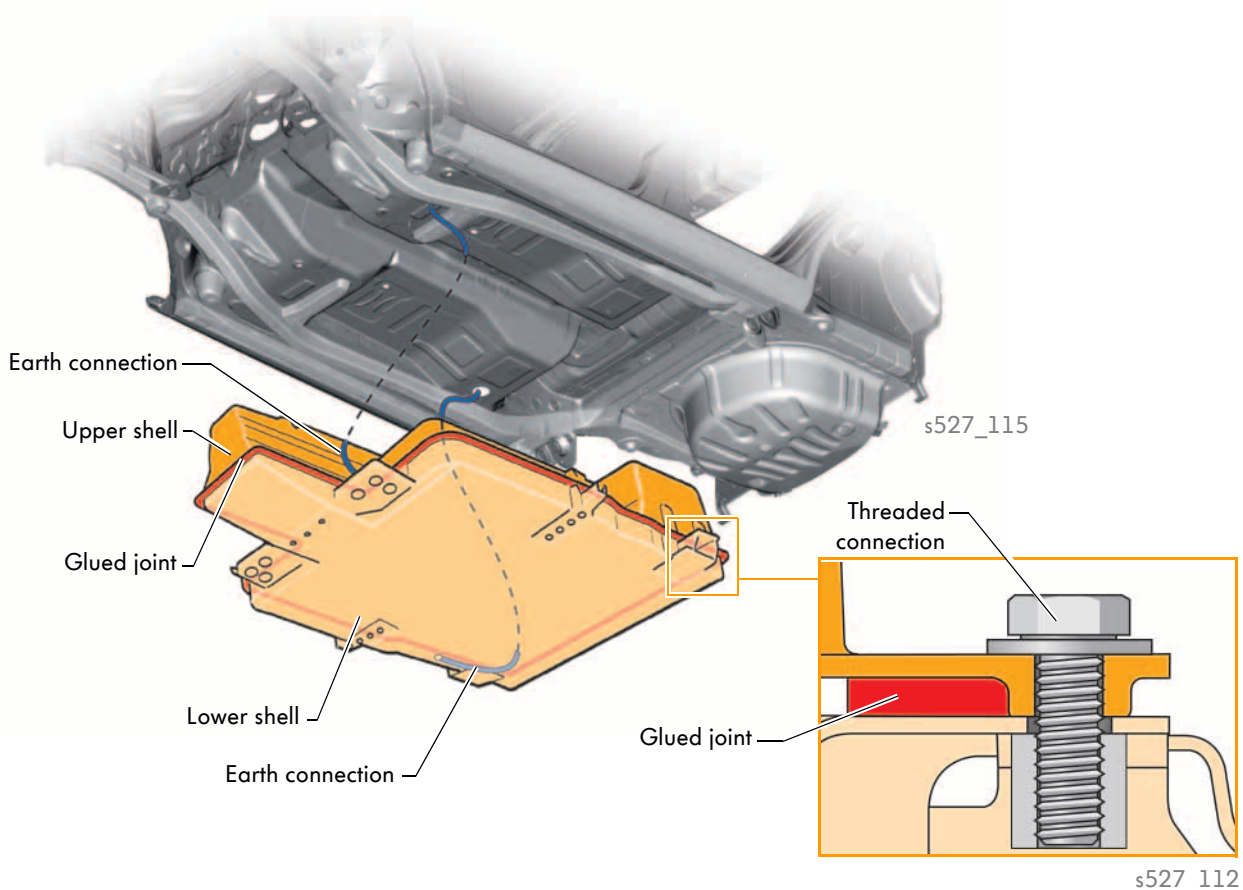


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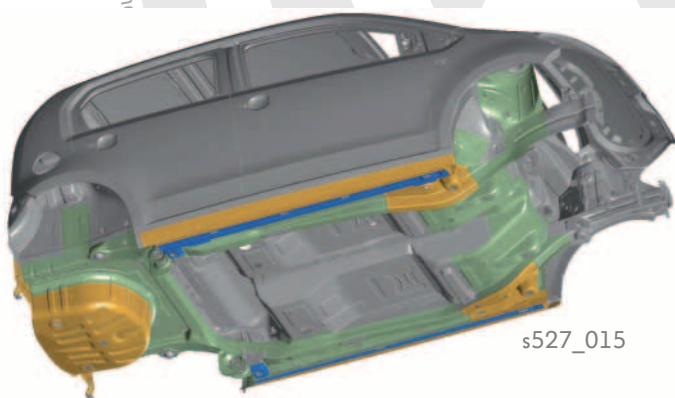
## High-voltage battery housing

The high-voltage battery is secured in a housing under the vehicle. The housing consists of two main parts: the upper and lower shells. The upper shell is made of plastic and coated in aluminium to ensure electromagnetic compatibility. The pressure equalisation elements are part of the upper shell. The lower shell is made of metal. The fixing rails for the battery cell pairs and the crash cross members are part of the lower shell. The upper and lower shells are bolted together and glued. A check is then carried out to ensure no water can enter or gas can escape. Potential equalisation between the housing and vehicle is via two earth connections to the vehicle.



## Underbody

The middle underbody and the back vehicle floor had to be redeveloped for the e-up! due to the built-in high-voltage battery. The underbody must meet crash requirements. The e-up! is equipped with an underbody cover to protect it from damage and corrosion. The underbody cover is mounted on the lower shell of the high-voltage battery and the longitudinal members.



Underbody cover s527\_113

### Underbody coating layer thickness

300µm
500µm
1200µm

## Cargo management in the luggage compartment

The floor in the luggage compartment of the e-up! has also been redesigned and has the following functions:

- Accommodation of the vehicle tool kit
- Accommodation of the charging cable
- Reinforcement measures and maintenance of clearances to protect the high-voltage battery in rear crashes

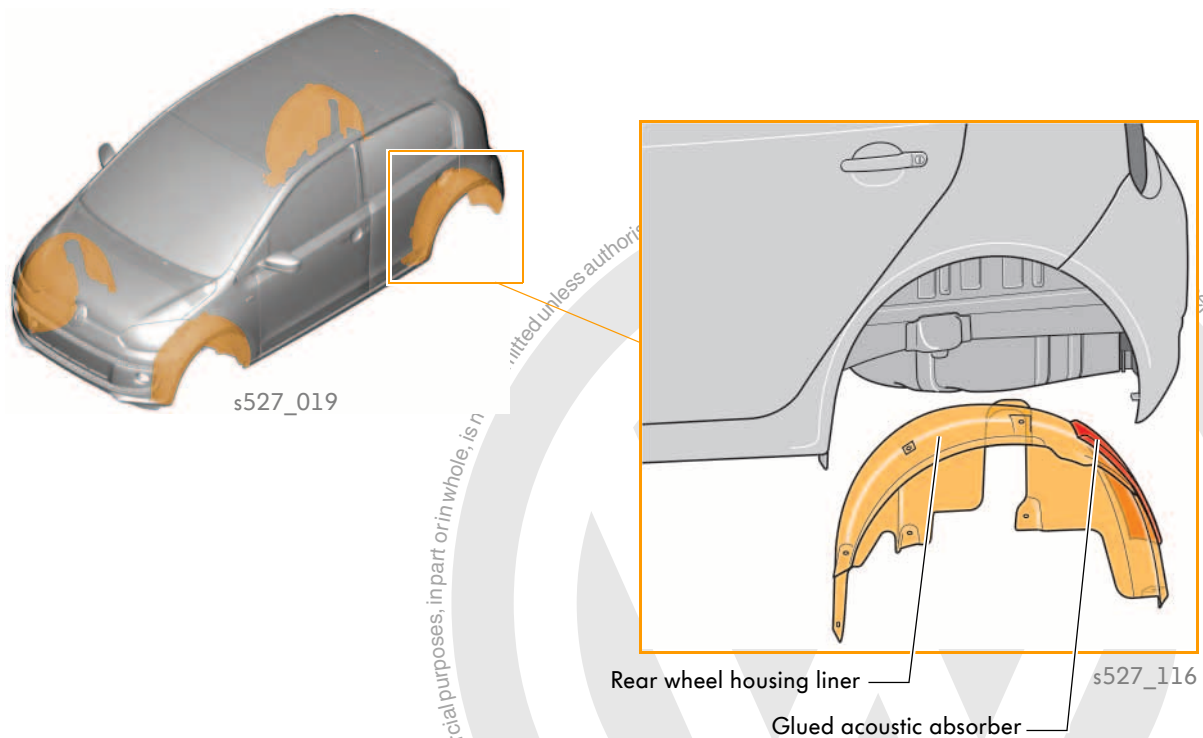


## Acoustic measures

To increase passenger comfort and reduce noise transmission from the drive and its vicinity, additional measures have been taken concerning the vehicle acoustics. These measures have mostly been implemented using acoustic fleeces and can be divided into two areas:

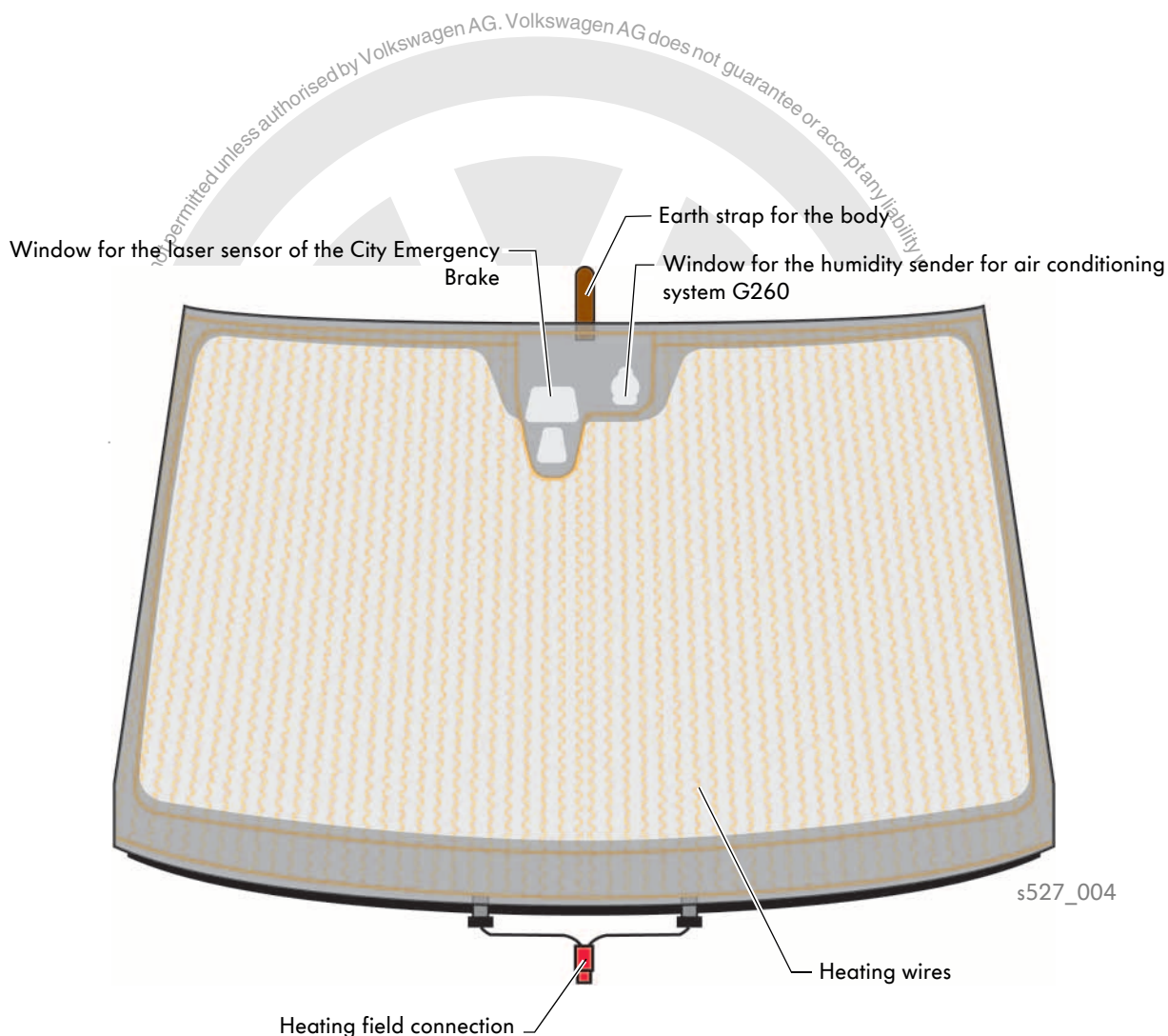
1. Rear noises
2. Front end

Unlike the standard up!, the e-up! also has rear wheel housing liners. The front and rear wheel housing liners are fitted with acoustic absorbers (damping sections) on the inside.



## Windscreen heater

The e-up is equipped with a surface windscreen heater as standard. The trapezoidal arrangement of the heating wires ensures that the entire surface can be kept free of condensation or de-iced. Depending on the model, the windscreen is available with or without a sensor for the City Emergency Brake. This also dictates the design of the interior mirror. The windscreen does not have a seal around the edge; instead it is glued into the frame. If the e-up! has a sliding sunroof, the upper part of the frame is designed as a lip profile.

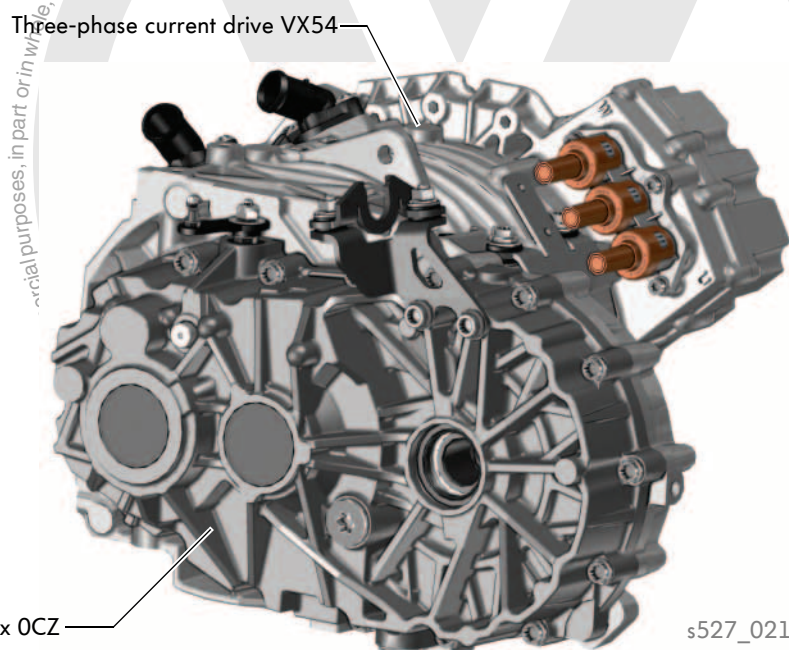


The earth strap is bolted under the interior light at the earth point of the body.



## 1-gear gearbox 0CZ

The e-up! is equipped with the 1-gear gearbox 0CZ. The gearbox and the three-phase current drive VX54 form a single unit. The challenge was to construct a gearbox that remains quiet over the entire motor speed range.



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### Technical data

Gearbox designation	0CZ
Number of gears	1
Transmission levels	2
Transmission ratios	Level 1: 1.577 (Z1 = 26; Z2 = 41) Level 2: 5.176 (Z3 = 17; Z4 = 88)
Max. input torque	210Nm
Max. input motor speed	12,000rpm
Weight (with oil)	16.3kg
Oil volume	0.7l (for part number see ETKA)
Drive shafts	Plugged connections



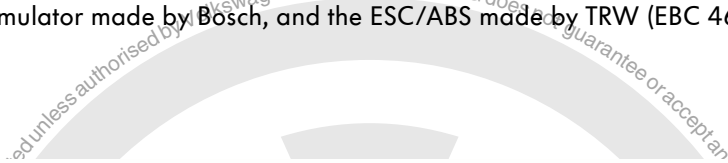
Further information can be found in Self-study Programme no. 529 "The e-up! Running Gear and Power Transmission".

# Running gear

## An overview of the running gear

This overview explains the standard and optional running gear equipment for the e-up!.

The e-up! is fitted with a standard running gear. Its new features are the electromechanical brake servo (eBKV) with a pressure accumulator made by Bosch, and the ESC/ABS made by TRW (EBC 460).



- McPherson strut front suspension

- Electromechanical brake servo (eBKV)  
with brake system pressure accumulator

- Electromechanical power steering C-EPS  
(Column Electric Power Steering) with integrated steering angle sensor made by TRW

- ESC/ABS, made by TRW  
(Electronic Brake Control – EBC 460)

- Front disc brakes





- City Emergency Brake (optional)  
in Drive Pack Plus package

- Torsion beam rear axle

- Rear drum brakes

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Further information can be found in Self-study Programme no. 529 "The e-up! Running Gear and Power Transmission".

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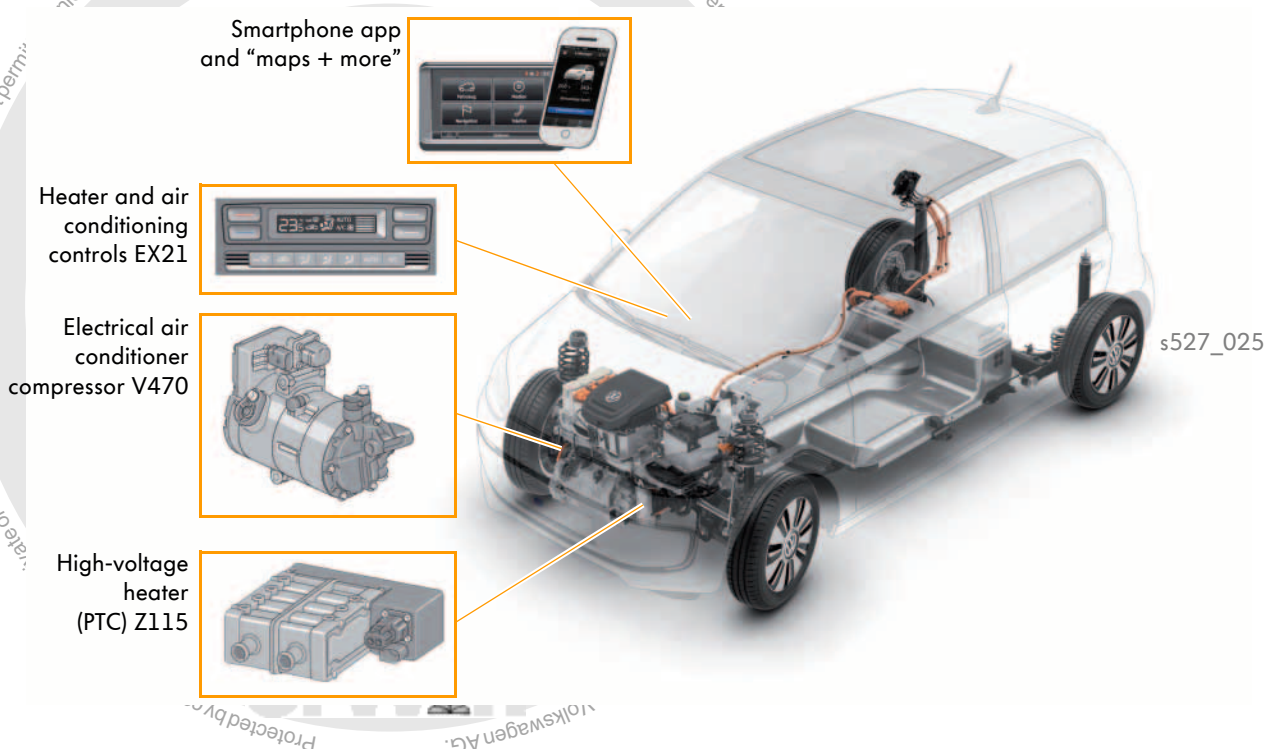
# Heating and air conditioning

## Overview of components

The heating and air conditioning systems contain some new components. Across all markets, a 1-zone Climatronic is installed as series standard. The stationary air conditioning function is also new. It can be activated via a smartphone app, the customer portal or via “maps + more”.

Other new components are:

- Electrical air conditioner compressor V470
- High-voltage heater (PTC) Z115
- Heater and air conditioning controls EX21



The selected driving mode affects the power of the electrical air conditioner compressor V470 and the high-voltage heater (PTC) Z115:

Systems affected/driving modes	Normal	ECO	ECO+
Electrical air conditioner compressor V470	Normal	Reduced	Deactivated
High-voltage heater (PTC) Z115	Normal	Reduced	Deactivated
Temperature indicator	Normal	Normal	Deactivated

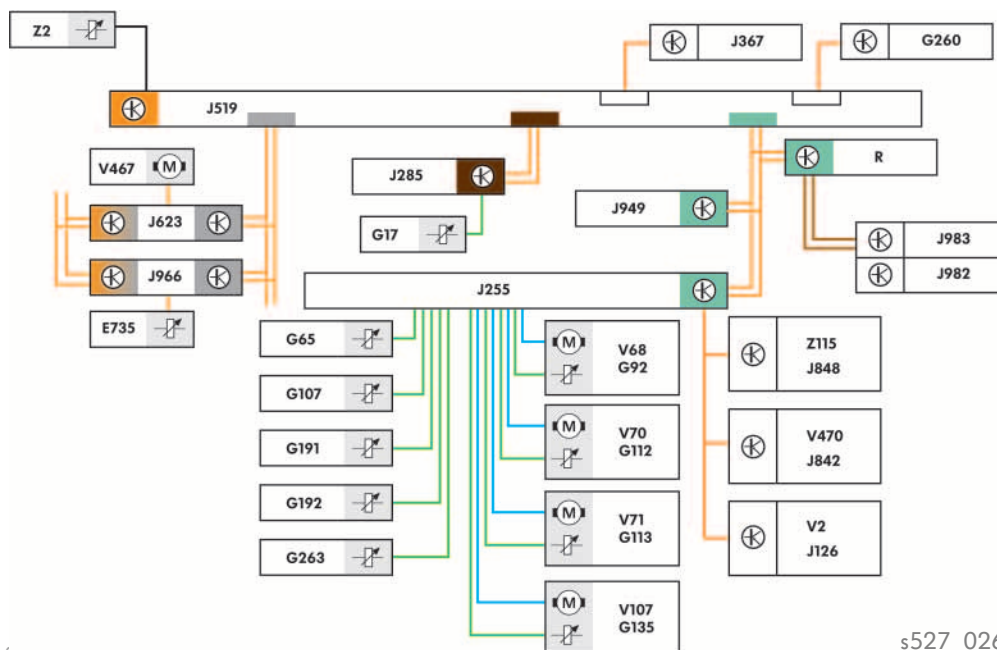


### Caution! Hazardous electric voltage!

Before any work on the electrical air conditioner compressor V470 and the high-voltage heater (PTC) Z115 are carried out, the high-voltage system must be certified as de-energised and the refrigerant circuit drained.



# Climate control network plan



s527\_026

## Key

E735	Driving mode selection button	J983	Interface for portable navigation and infotainment system
G17	Ambient temperature sensor	R	Radio
G65	High-pressure sender	V2	Fresh air blower
G92	Potentiometer for temperature flap control motor	V68	Temperature flap control motor
G107	Sunlight penetration photosensor	V70	Centre flap control motor
G112	Potentiometer for centre flap servomotor	V71	Air flow flap control motor
G113	Potentiometer for air flow flap control motor	V107	Defroster flap control motor
G135	Potentiometer for defroster flap control motor	V467	Coolant pump for high-temperature circuit
G191	Centre vent temperature sender	V470	Electrical air conditioner compressor
G192	Footwell vent temperature sender	Z2	Heated windscreen
G260	Humidity sender for air conditioning system	Z115	High-voltage heater (PTC)
G263	Evaporator output temperature sender		Powertrain CAN data bus
J126	Fresh air blower control unit		Hybrid CAN data bus
J255	Climatronic control unit		Diagnostic CAN data bus
J285	Control unit in dash panel insert		Dash panel insert CAN data bus
J367	Battery monitor control unit		Convenience CAN data bus
J519	Onboard supply control unit		LIN data bus
J623	Engine (motor) control unit		CAN data bus wire
J842	Control unit for air conditioning compressor		LIN data bus wire
J848	High-voltage heater (PTC) control unit		Unidirectional LIN data bus wire
J949	Emergency call module control unit and communication unit		Actuator line
J966	Charge voltage control unit for high-voltage battery		Sensor line
J982	Portable navigation and infotainment system		

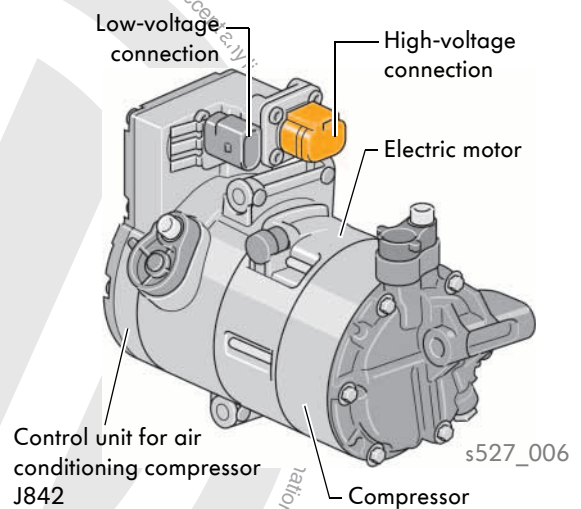
# Heating and air conditioning

## Electrical air conditioner compressor V470

The electrical air conditioner compressor V470 has been completely overhauled for the e-up!. The challenge was to reduce the effects of the rotating masses in the air conditioner compressor both acoustically and in terms of vibrations, as in an electric vehicle this noise is not covered by the electric drive. The electrical air conditioner compressor V470 is installed at the front on the right of the electric drive. It is a scroll compressor and is intended for use with the refrigerant R134a .

### Technical data

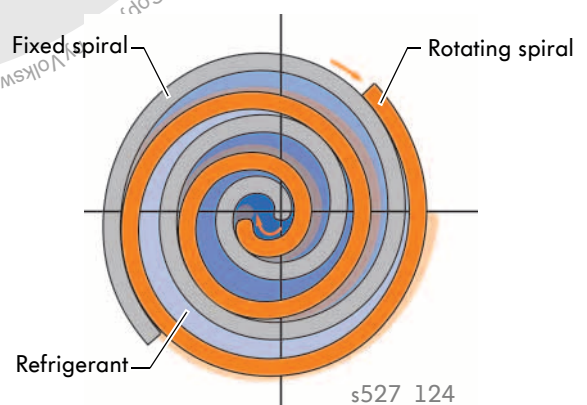
Type	Scroll compressor
Nominal voltage	374V
Rotational speed	800 to 8600 rpm
Power consumption	3.6kW
Operating temperature	- 10 °C to + 120 °C
Weight	6kg
Refrigerant	R134a
Refrigerant oil	SP-A2
Communication	LIN bus



### Scroll compressor

The compressor consists of a fixed and a rotating spiral which intermesh.

The rotating spiral is driven by the electric motor in an eccentric motion, and moves on a circular path. This eccentric movement allows the spirals to form several, increasingly small chambers in which the coolant is compressed.



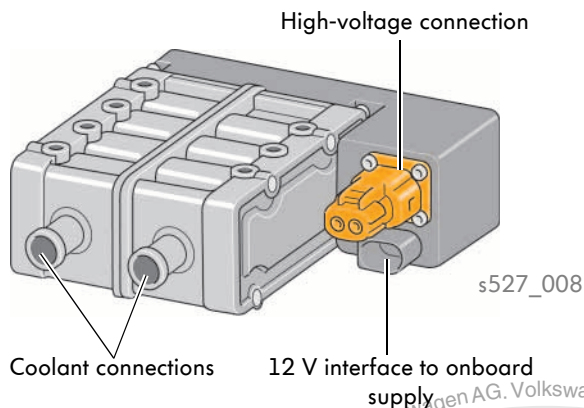
Further information on the design and function of the electrical air conditioner compressor can be found in Self-study Programme No. 525 "The Jetta Hybrid".

# High-voltage heater (PTC) Z115

The high-voltage heater (PTC) Z115 heats the coolant in the coolant circuit, as there is no combustion engine to heat up the coolant.

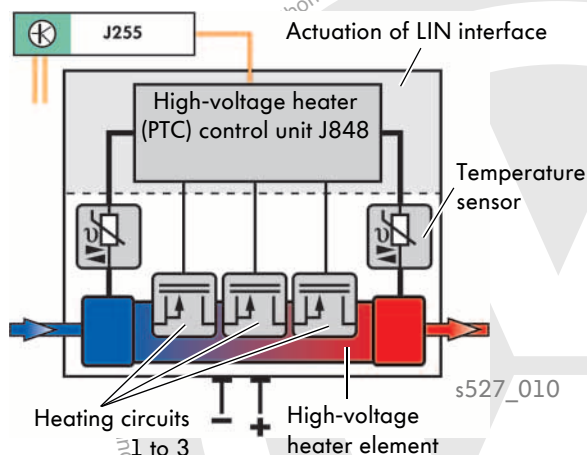
## Design

The high-voltage heater (PTC) Z115 is connected to the high-voltage system via a high-voltage wire. The 12-volt interface to the onboard supply ensures communication with the Climatronic control unit J255 via the LIN data bus.



## Function

The Climatronic control unit J255 actuates the high-voltage heater (PTC) Z115. The input and output temperature of the coolant are both measured by a temperature sensor. It specifies the required heat output within a range from 0 to 100 %. The requirement is converted into control signals for the heating circuits by the high-voltage heater (PTC) control unit J848. The high-voltage heater (PTC) Z115 has three heating circuits with connected PTC elements. Heating circuits 1 and 2 are actuated with a pulse-width modulated signal (PWM). Heating circuit 3 is switched on or off depending on the required switching level.



## Key

- J255 Climatronic control unit
- Convenience CAN data bus
- CAN data bus wire
- LIN data bus wire

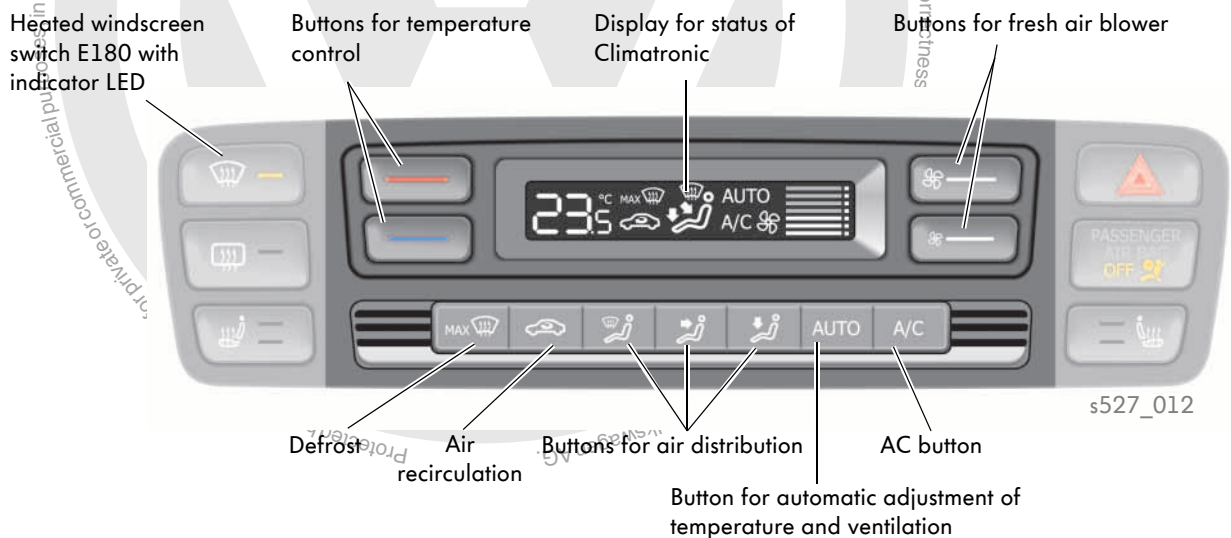
## Technical data

Power	5.5kW
Actuation	0-100%
Input voltage	180-374V
Max. input current	30A
Interfaces	LIN 2.0 with self-diagnosis
AC/DC insulation	100MΩ

# Heating and air conditioning

## Heater and air conditioning controls EX21

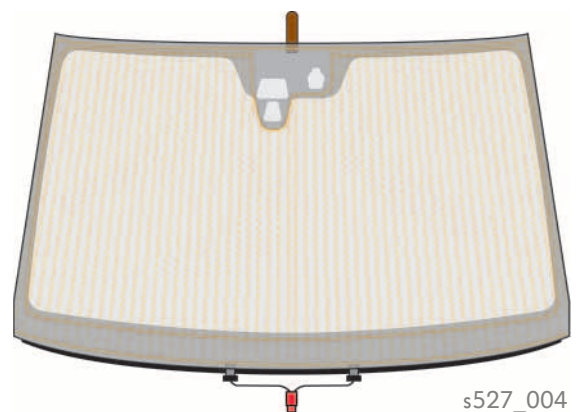
All controls used to adjust the temperature and ventilation have been integrated into one operating unit.



## Heated windscreen Z2

There are two ways to activate the windscreen heater:

1. Manual activation using the heated windscreen switch E180
2. Automatic activation using the Climatronic control unit J255





## Manual activation using switch

Heated windscreen switch E180 with indicator LED

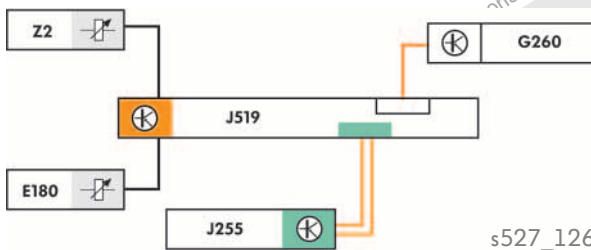


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The windscreen heater is activated with the switch for windscreen heater E180, which is connected to the onboard supply control unit J519.






The heating duration is limited. Shut-off occurs after a maximum of 4 minutes via the onboard supply control unit J519. If necessary, the heating can be switched off immediately using the heated windscreen switch E180. The windscreen heater can also be switched off as part of load management.

## Automatic activation



s527\_126

### Key

E180	Heated windscreen switch
G260	Humidity sender for air conditioning system
J255	Climatronic control unit
J519	Climatronic control unit
Z2	Heated windscreen
	Diagnostic CAN data bus
	Convenience CAN data bus
	LIN data bus
	CAN data bus wire
	LIN data bus wire

The windscreen heater can also be activated by the Climatronic control unit J255 if the dew point exceeds a defined value. The dew point is the temperature at which the humidity condenses into water droplets. The temperature and humidity on the windscreen are registered by the humidity sender for the air conditioning system G260. The windscreen heater is then switched on automatically, if necessary. This only takes place in "AUTO" mode and can be more economical in terms of energy than switching to the high-voltage compressor for the air conditioning system. This function can be interrupted at any time by pressing the heated windscreen switch E180.



# Heating and air conditioning

## Stationary air conditioning

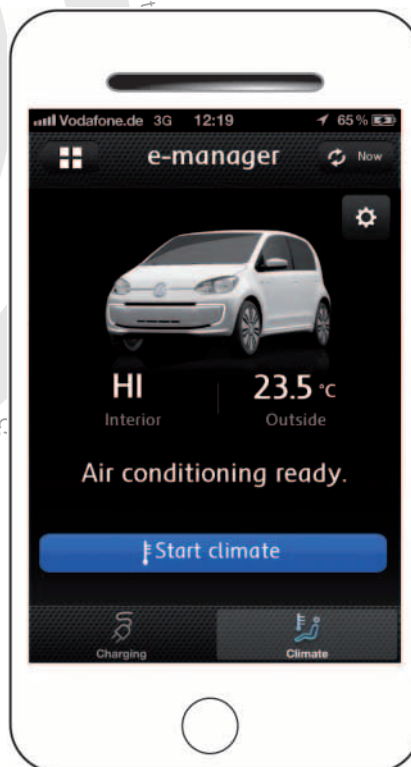
The e-up! offers the driver the option of stationary air conditioning. The temperature inside the vehicle can be controlled remotely or via a timer. Stationary air conditioning is independent of the selected driving mode. It is not possible to operate the air conditioning system using the controls during stationary air conditioning. The LED for the AC button lights up and the buttons are not active. When the vehicle is made ready for driving, the stationary air conditioning is deactivated and the air conditioning system can only be operated using the controls in the vehicle. The e-up! has two stationary air conditioning variants:

1. Instant air conditioning via a smartphone app or the customer portal (further information on the app and the customer portal can be found in the section Car-Net, from page 54).
2. Timer program via "maps + more".

## Instant air conditioning

The stationary air conditioning can be activated as immediate air conditioning via the smartphone app or the customer portal. Both of these can be used to regulate the temperature inside the vehicle. The driver can enter a preferred temperature between 16°C and 29 °C.

When in the modes "Low" and "High", the Climatronic control unit J255 controls a temperature range between Low = 15.5 °C and High = 30.5 °C. The maximum run time for the air conditioning is 30 minutes when charging and 10 minutes maximum when in high-voltage battery operation. Instant air conditioning via the smartphone app is possible when the high-voltage battery has a charging capacity of 20% or more.



s527\_027

## Timer program



s527\_020



s527\_022

Stationary air conditioning can be activated by means of timer programming via “maps + more”. If air conditioning has been pre-selected for the time of departure, the Climatronic control unit J255 is activated by the high-voltage battery charger control unit J1050 one hour before departure. It calculates the required duration for air conditioning, sends the value to the control unit for high-voltage battery charging unit J1050 and then becomes inactive again. Once the calculated start time for the air conditioning has been reached, the Climatronic control unit J255 is reactivated and stationary air conditioning begins. The maximum power which can be consumed for stationary air conditioning is limited by the charge voltage control unit for high-voltage battery J966 to 3.3 kW.

If stationary air conditioning was activated via “maps + more”, any other timer entries which may still be stored are ignored. Changes made via “maps + more” are not synchronised with the smartphone.

### Timer programming in charging mode

The stationary air conditioning only starts if the high-voltage battery has a charge level of at least 20 %. Charging the high-voltage battery is limited when the stationary air conditioning is running. Charging and air conditioning cannot take place simultaneously when charging with alternate current (AC charging). Air conditioning can only take place during the charging process when charging with direct current (DC charging). Once the charging station has been switched off, the stationary air conditioning also switches off.

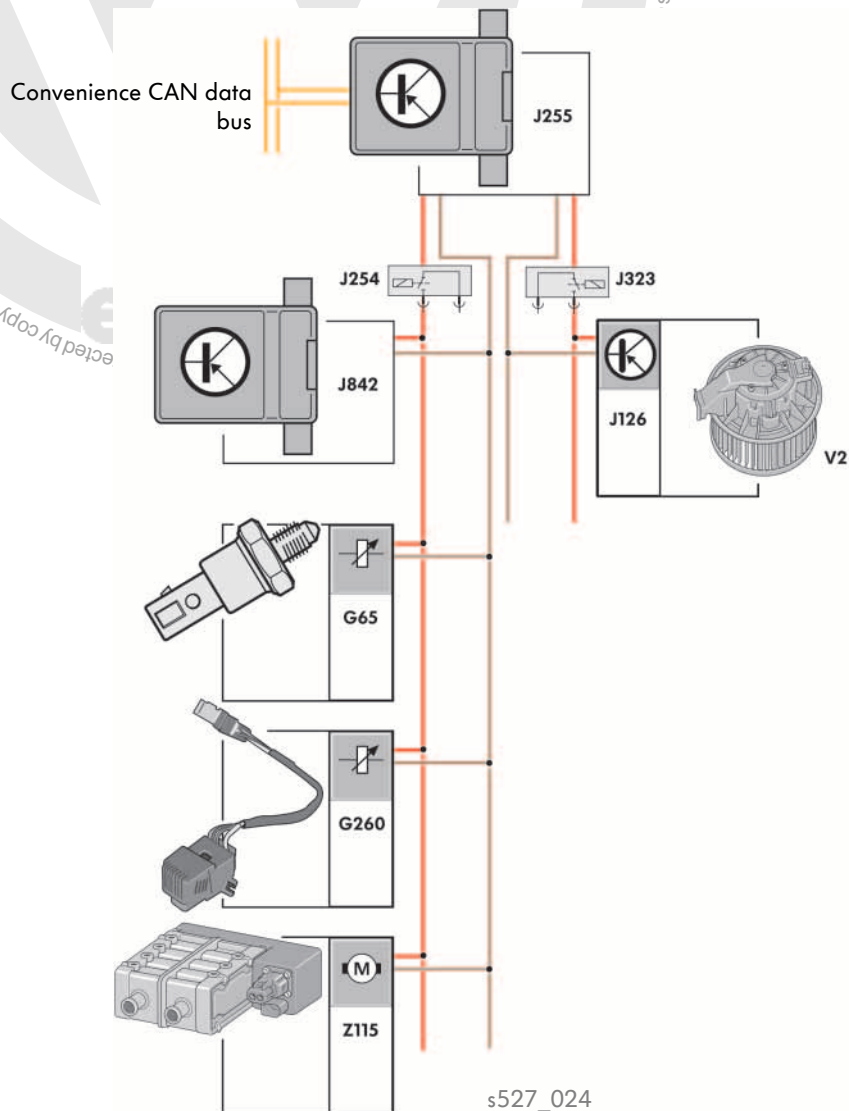
### Timer programming in high-voltage battery mode

In high-voltage battery mode, the stationary air conditioning starts 10 minutes before the programmed time of departure. If the high-voltage battery's minimum charging capacity of 20% has not been reached, stationary air conditioning will not start. The minimum charging capacity can be set by the customer, but may never be lower than 20 %.

# Heating and air conditioning

## Actuation of components with ignition "off"

If the stationary air conditioning has been activated via "maps + more", the smartphone app or the customer portal, the high-voltage components for the heating and air conditioning will work even if the ignition is not on. The high-voltage components are supplied with a current via the Climatronic relay J254 and the blower relay J323.



### Key

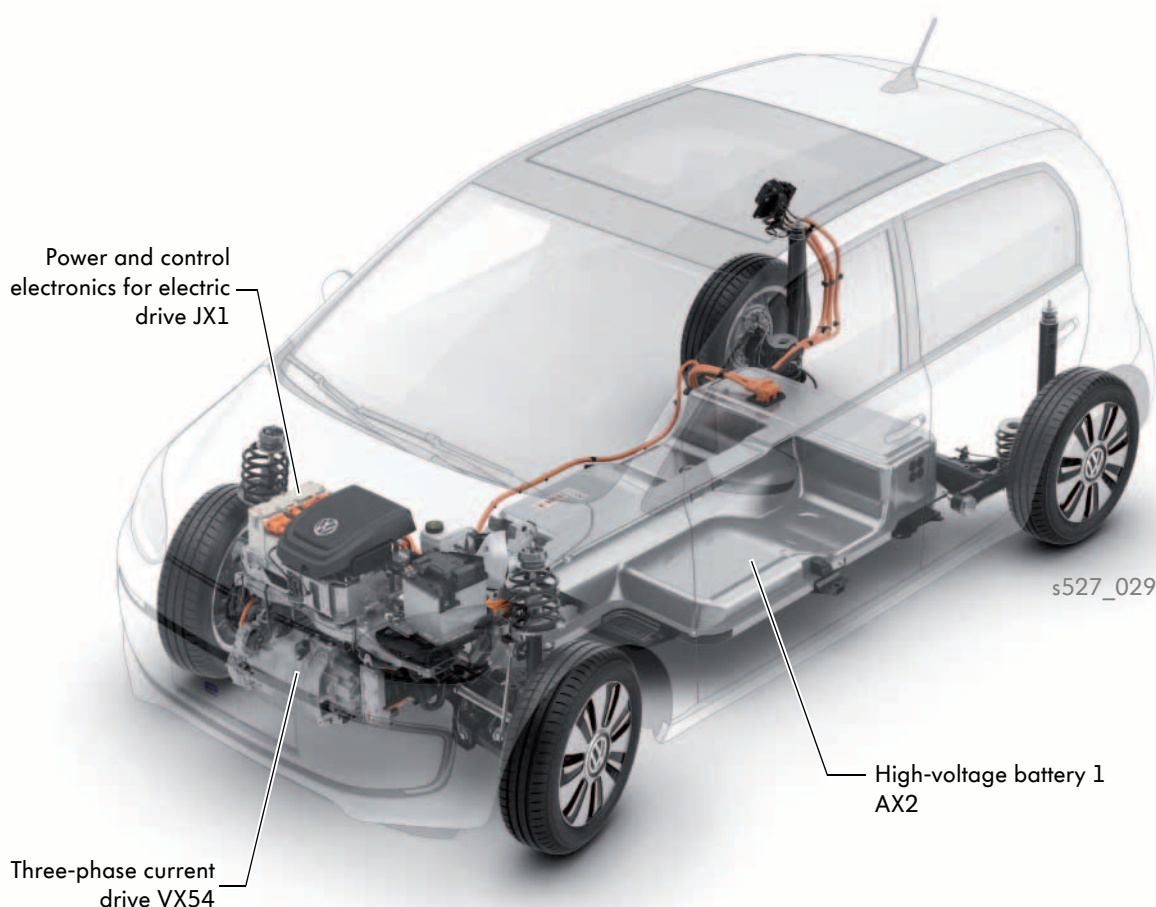
- G65 High-pressure sender
- G260 Humidity sender for air conditioning system
- J126 Fresh air blower control unit
- J254 Climatronic relay
- J255 Climatronic control unit
- J323 Blower relay
- J842 Control unit for air conditioning compressor
- V2 Fresh air blower

- Z115 High-voltage heater (PTC)
- CAN data bus wire
- Positive
- Earth



## Overview of the high-voltage system

The e-up! consists of a three-phase current drive VX54, power and control electronics for electric drive JX1 and a high-voltage battery 1 AX2. The components are in a space-saving arrangement so that there are no limitations concerning the space available and operation.



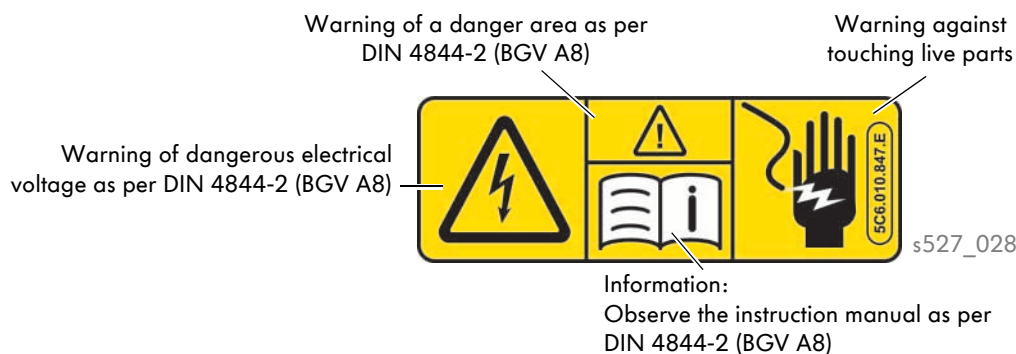
### **Caution! Hazardous electric voltage!**

Please note that work on the hybrid vehicle performed near or on high-voltage components may be carried out only by qualified and therefore authorised Volkswagen high-voltage technicians. Improper handling of high-voltage systems involves a risk of fatal injury due to electric shock. AC voltages of 25 volts or more and DC voltages of 60 volts or more are dangerous for humans. Please observe the safety information in the service literature, the diagnostic tester and on the vehicle itself.

# High-voltage system

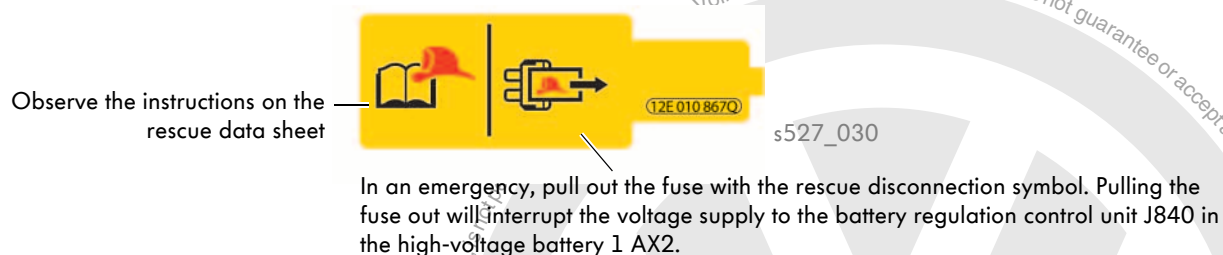
## Warning signs

### Warning on the front lock carrier (bonnet)



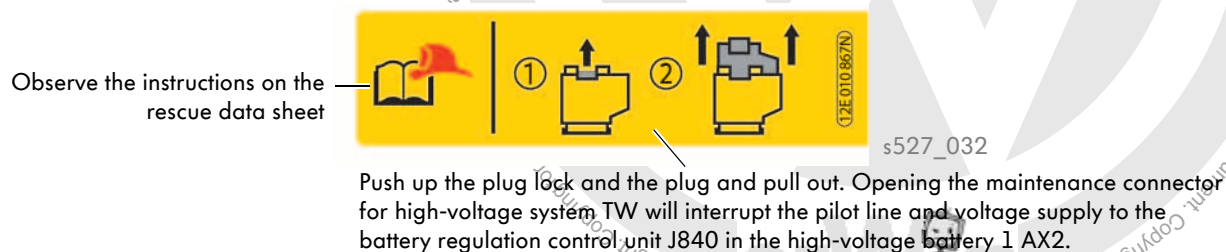
### Information: rescue disconnection point in passenger compartment

The rescue disconnection point 1 for the emergency services is located in the interior of the vehicle on the fuse carrier of the left A-pillar.



### Information: rescue disconnection point in motor compartment

The rescue disconnection point 2 for the emergency services is located in the motor compartment underneath the cover on the left facing the direction of travel.



The high-voltage system is deactivated if the airbag or belt tensioner are triggered. Please observe the instructions on the rescue data sheet.

## Warning on all high-voltage components



Warning against dangerous electrical voltage as per DIN 4844-2 (BGV A8)

Warning against touching live parts

Instruction markers:  
Observe the instruction manual as per DIN 4844-2 (BGV A8)

## Information on the high-voltage battery



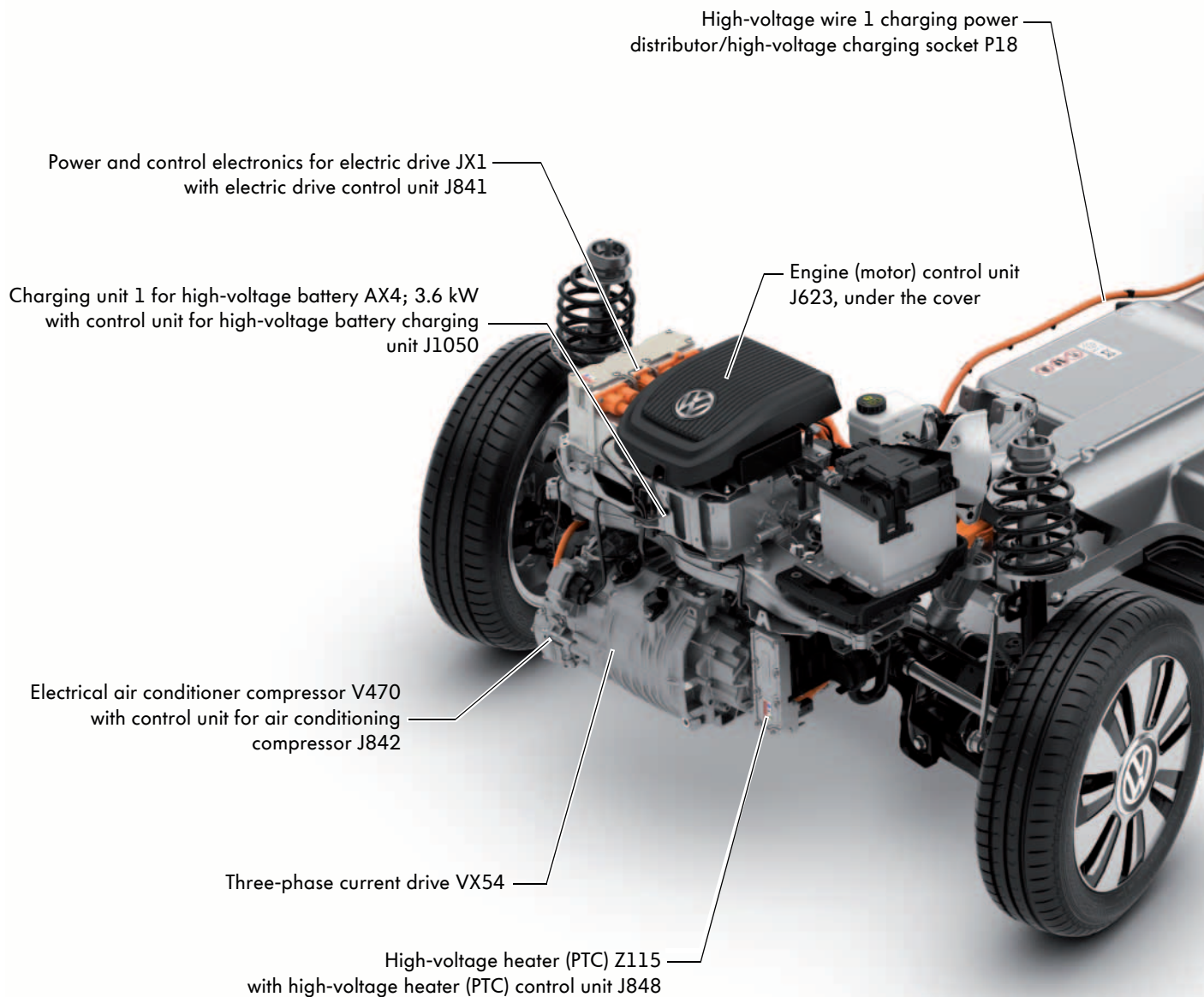
\* The note on the high-voltage battery may vary by country.

- 1 High voltages can result in severe injury or even death. Never touch battery terminals with fingers, tools, jewellery or other objects made of metal.
- 2 The high-voltage battery contains hazardous fluid and solid substances. In the event of outgassing, severe chemical burns and blindness could result. When working on the high-voltage battery, suitable eye protection and protective clothing must be worn to prevent skin and eye contact with battery acid. If skin or eye contact with battery acid occurs, the areas affected must be rinsed for at least 15 minutes using clean fresh water, and a doctor should be consulted immediately.
- 3 The high-voltage battery is flammable. The high-voltage battery must never be exposed to fire, sparks or naked flames. The high-voltage battery must always be handled with caution to prevent any damage or acid discharge.
- 4 Always keep the high-voltage battery away from children.
- 5 More detailed information and warnings can be found in the owner's manual and in the workshop manual.
- 6 Improper handling of the high-voltage battery can result in severe injury or even death. Do not remove the high-voltage battery or its cover under any circumstances. Never make changes to the high-voltage battery.
- 7 The high-voltage battery must not come into contact with water or other fluids when opened. Fluids can cause short circuits, electric shocks and fires.

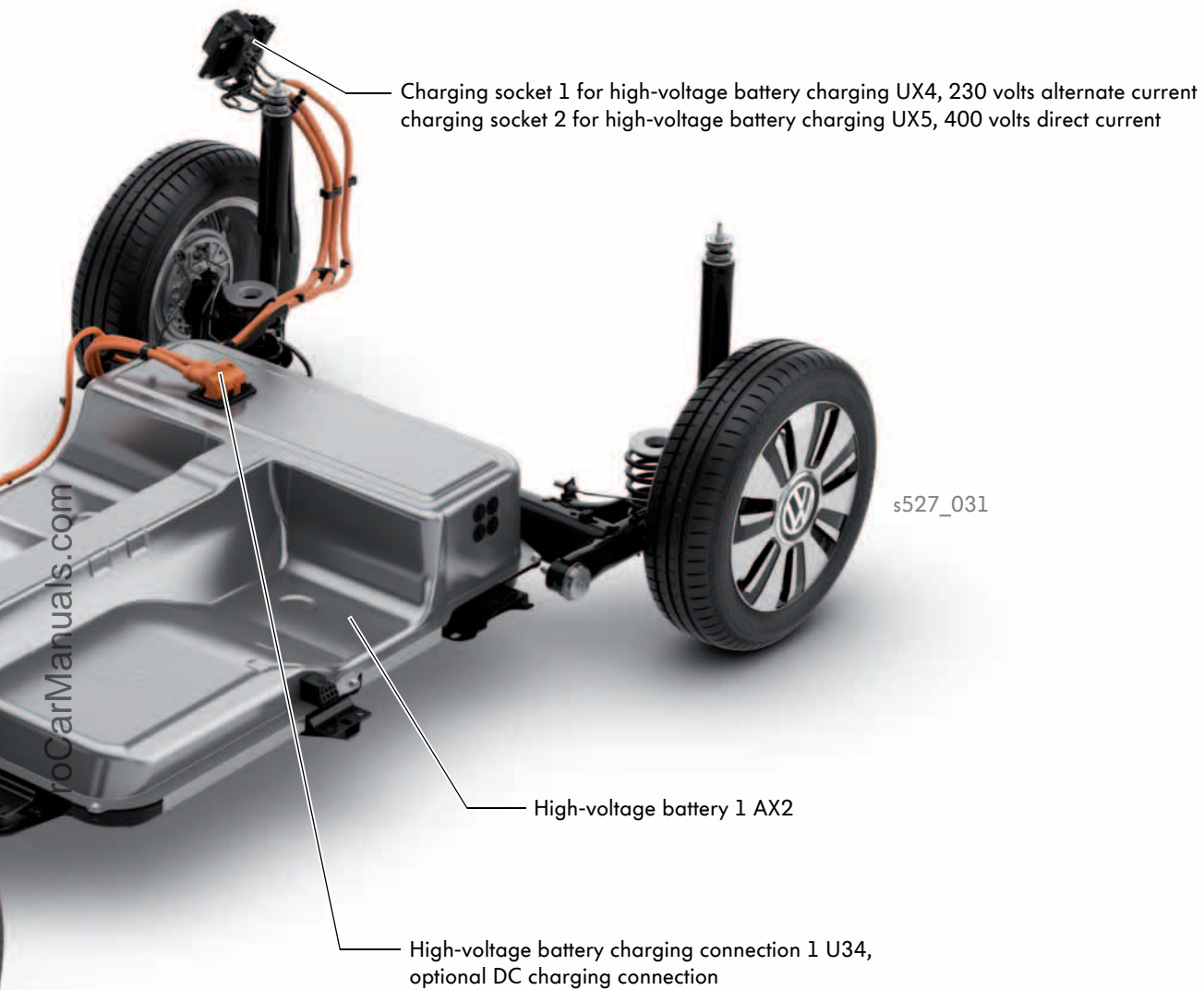


# High-voltage system

## Location of high-voltage components






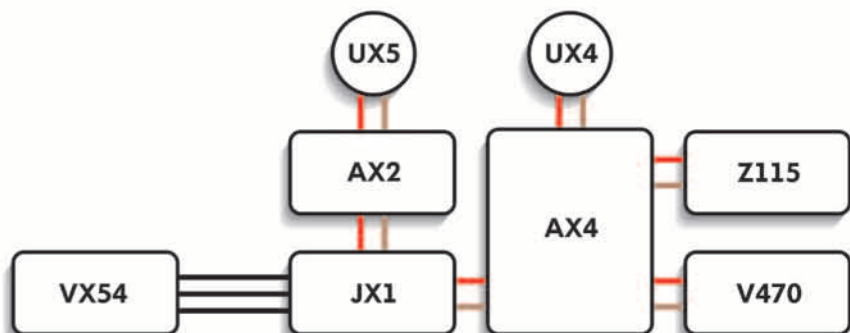




### Route of the high-voltage lines

#### Key

-  Three-phase cables U, V and W
-  High-voltage positive
-  High-voltage negative



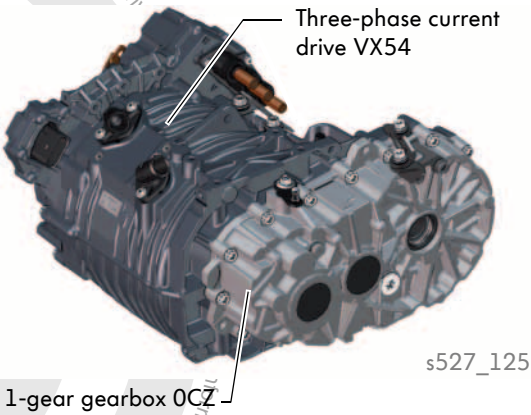
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# High-voltage system

## Three-phase current drive VX54

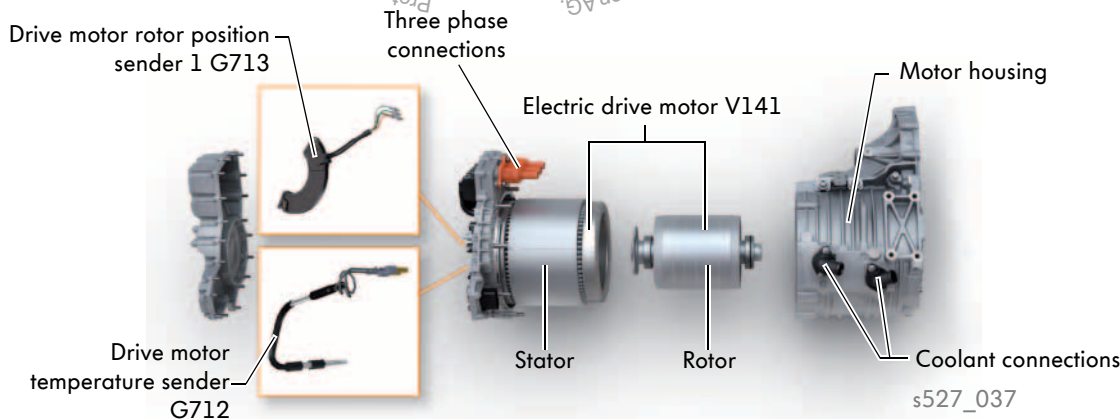
The three-phase current drive VX54 has a cast aluminium housing and is paired as one component together with the 1-gear gearbox 0CZ.



### Design

The three-phase current drive VX54 contains the electric drive motor V141, the drive motor temperature sender G712, the drive motor rotor position sender 1 G713, the coolant connections and the three phase connections.

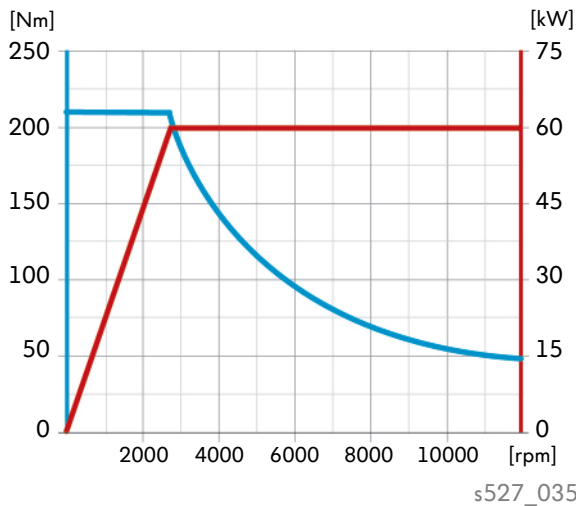
The stator consists of 5 coils per phase and the rotor consists of 5 magnetic pole pairs. This results in good response and a high degree of efficiency.



### Technical data

Max. output	60kW
Max. torque	210Nm
Max. motor speed	12000rpm
Weight including gearbox	76kg
Efficiency	up to 94%

### Torque and power diagram



## Electric drive motor V141

The electric drive motor V141 converts the three-phase current into drive power.

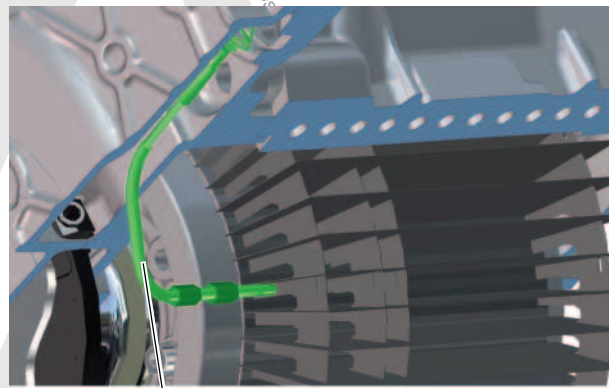
The internal rotor is weighted and two bearings keep it in position. If the electric drive motor V141 is not being used as a drive motor, it takes on an alternator function.

## Sensors

### Drive motor temperature sender G712

The drive motor temperature sender G712 records the temperature of the coils in the stator.

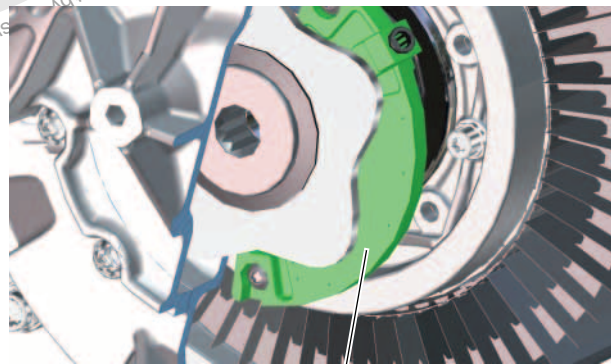
The NTC sensor (Negative Temperature Coefficient) is directly connected to the power and control electronics for electric drive JX1. With a core temperature of 150 °C or more, the power is restricted and shortly afterwards the electric drive motor V141 is switched off.



Drive motor temperature sender G712 s527\_041

### Drive motor rotor position sender 1 G713

The drive motor rotor position sender 1 G713 is to the right of the three-phase current drive VX54 and works as an inductive sender with enhanced evaluation. The sender wheel is driven by the rotor and the fixed sensor records the position, the direction of rotation and the component tolerances. It is directly connected to the power and control electronics for electric drive JX1.



Drive motor rotor position sender 1 G713 s527\_043

## Effects upon failure

In event of a sensor failure, the vehicle is no longer operational for driving.

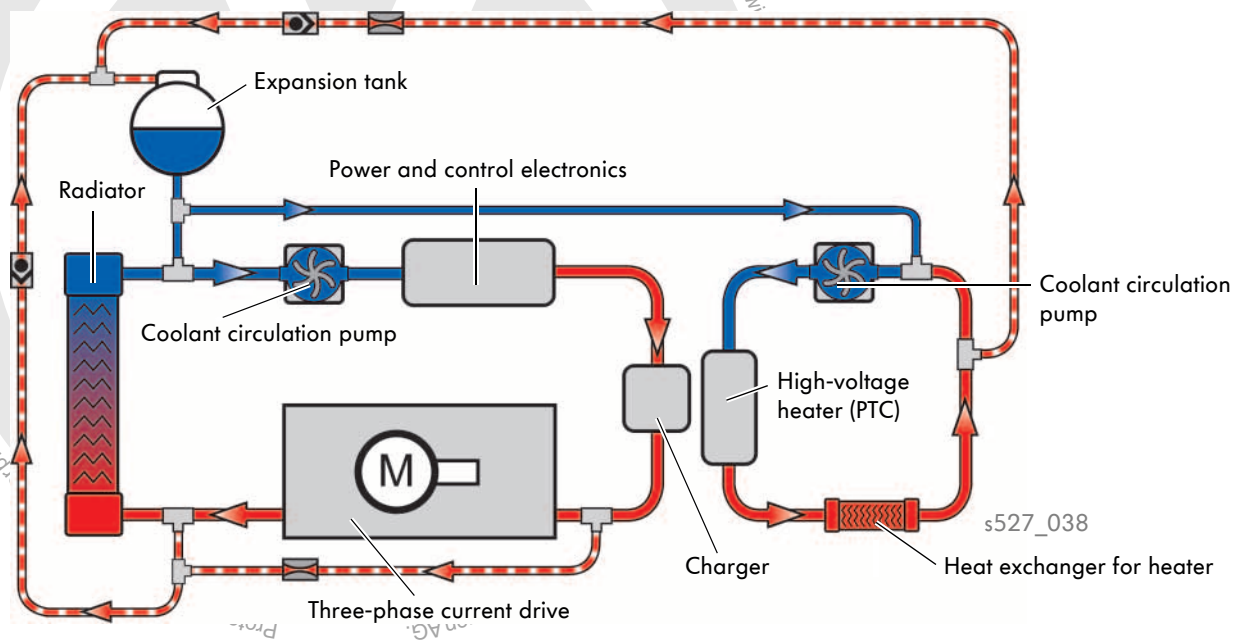


# High-voltage system

## Coolant

To protect them from high temperatures, all sensitive components are kept at the correct temperature using coolant. The coolant has a temperature of up to 65°C and is electronically monitored and controlled by the engine (motor) control unit J623. The following components are cooled with coolant:

- Three-phase current drive VX54
- Charging unit 1 for high-voltage battery AX4
- Power and control electronics for electric drive JX1



### Key

- Cold coolant
- Warm coolant
- ... Pressure equalisation coolant

## Power and control electronics for electric drive JX1

The power and control electronics control the power flow from the high-voltage battery 1 AX2 to the three-phase current drive VX54. It is installed at the front of the motor compartment on the right-hand side. It is also responsible for charging the 12-volt onboard supply battery.



Further information can be found in the Self-study Programme no. 525, "The Jetta Hybrid".

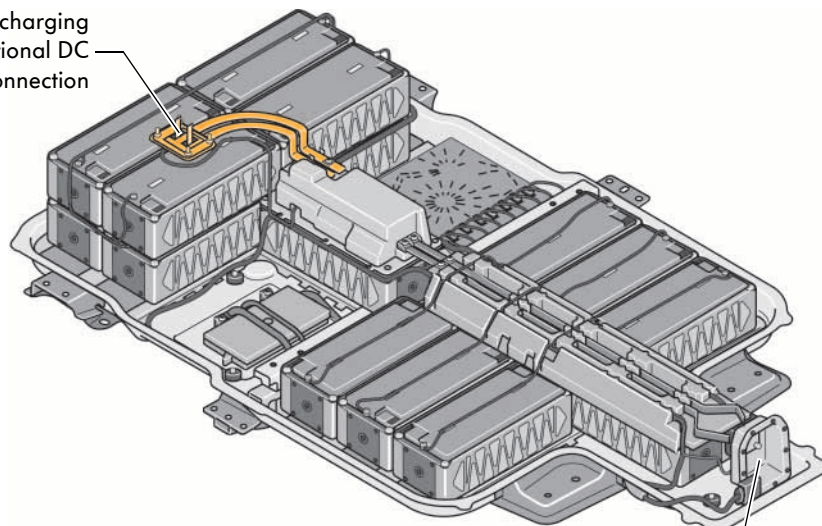
## High-voltage battery 1 AX2

The high-voltage battery is a lithium ion high-voltage battery. This is installed in the vehicle underbody. The advantages of this are a low centre of gravity and optimised weight distribution.

The high-voltage battery 1 AX2 provides the energy for driving and is available in two versions:

- Series with AC charging connection
- With AC and DC charging connection (optional)

High-voltage battery charging connection 1 U34, optional DC charging connection



Connection for converted DC current from the AC charging connection

### Technical data

Weight	230kg
Number of cells	204 cells, 2 x 102 battery cell pairs, connected in parallel
Cell type	Lithium ion 3.75V; 25Ah
Nominal voltage	374V
Capacity	50Ah
Nominal energy	18.7 kWh
Operating range	-30 °C to +50 °C For differing temperatures the power is reduced or switched off completely.
Battery cell chemistry	Lithium ion rechargeable battery with nickel, manganese and cobalt oxide

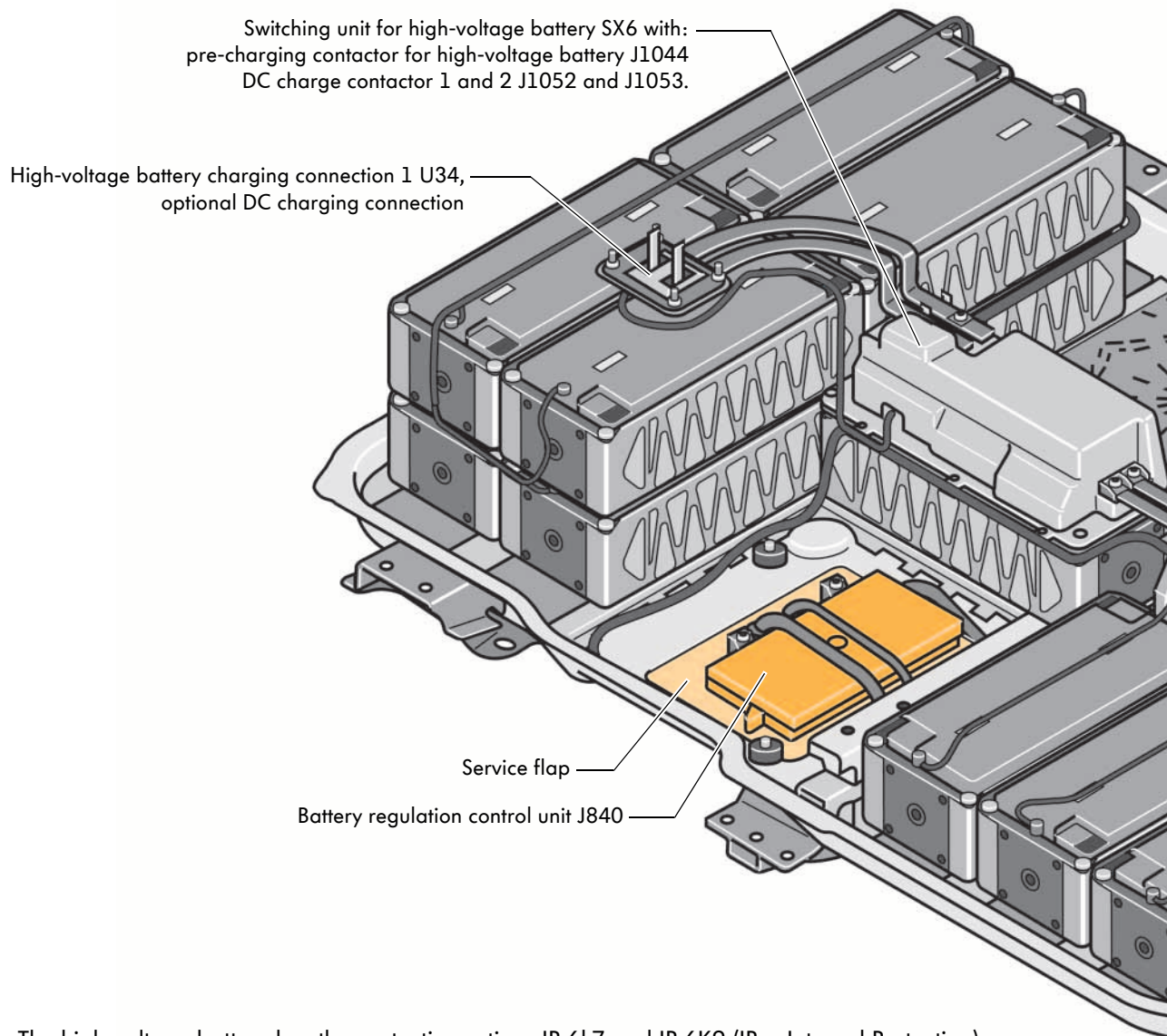




# High-voltage system

## Overview of components

The overview shows the components of the high-voltage battery 1 AX2. It is sealed with a waterproof seal and cannot be accessed from the outside. The battery regulation control unit J840 can be accessed via a service flap.



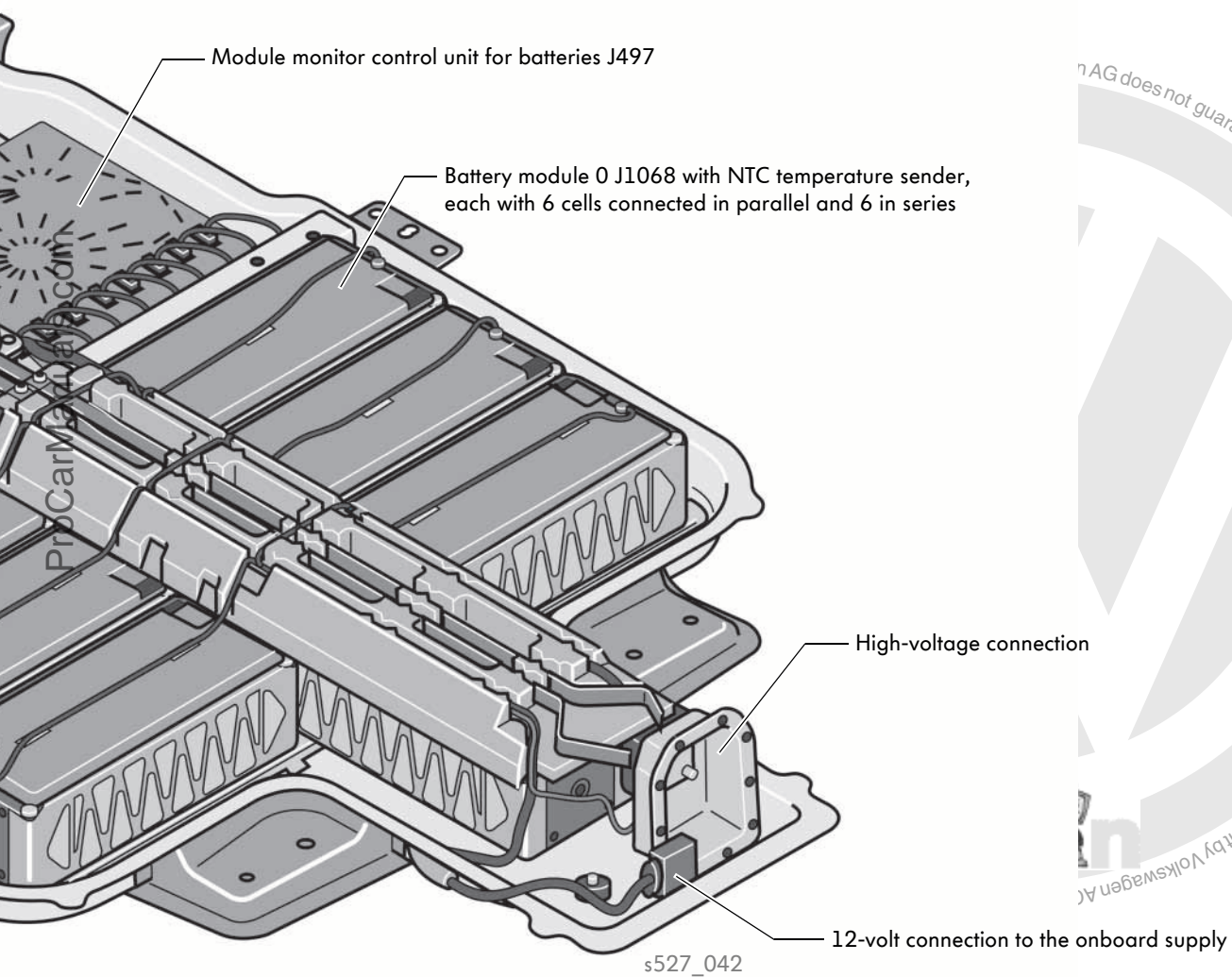
The high-voltage battery has the protection ratings IP 6k7 and IP 6K9 (IP = Internal Protection):

- 6 = Complete protection against accidental contact, dust protection (dustproof)
- K = Special requirement in the automotive sector
- 7 = Protection against water if submerged
- 9 = Protection against water during high-pressure/steam cleaning

In addition:

- B = Finger protection against fingers with a diameter of >12mm and up to 80mm length





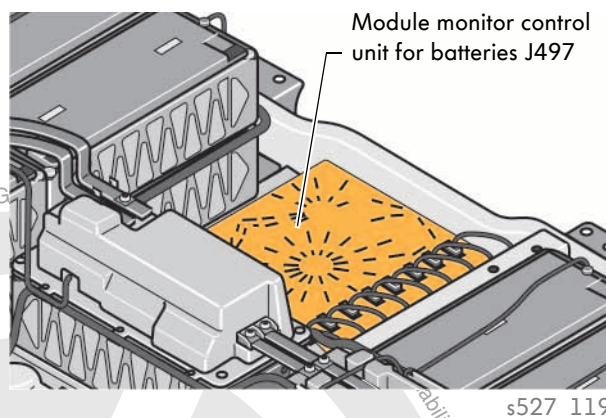
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# High-voltage system

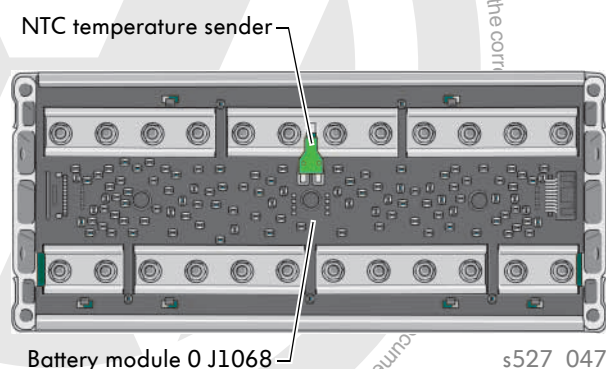
## Module monitor control unit for batteries J497

The module monitor control unit for batteries J497 is connected to each battery cell pair. It monitors the cell voltage, the temperature (1x per battery module) and the charge level. Controlling the charge level is especially important to ensure that all cells have an equal charge level. All information is sent to the battery regulation control unit J840.



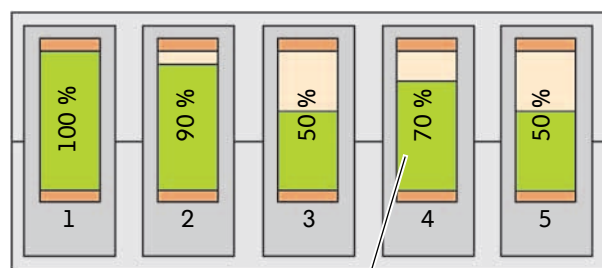
## Temperature and voltage monitoring

To extend the service life of the cells, the voltage of the battery cell pairs and the temperature of the 17 battery modules are monitored. Monitoring ensures that the cells are kept within the optimum voltage and temperature range, which in turn extends the service life.



## Charge level regulation

Charge level regulation ensures that all battery cells have the same voltage level in order to achieve the maximum battery capacity possible. The module monitor control unit J497 measures the voltages and discharges the fully charged cells via integrated resistors. This ensures that all cells are equally charged and the high-voltage battery uses maximum capacity.



Examples of possible tolerances of the cell pairs among one another

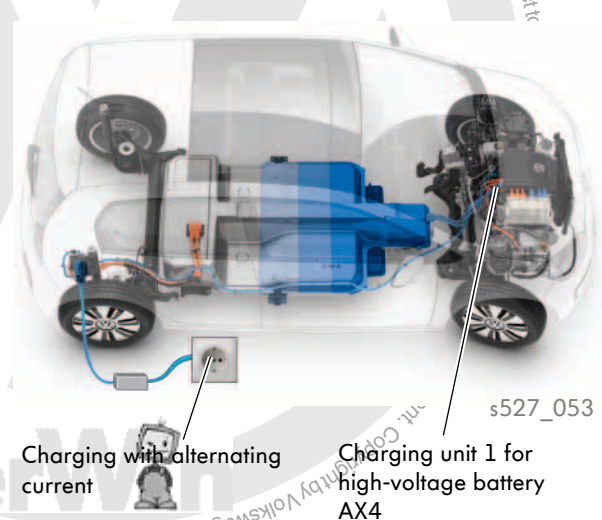
s527\_110

## Charging options for the high-voltage battery 1 AX2

The e-up! can be charged in two different ways: using alternating current (AC) or direct current (DC). The high-voltage battery is always charged using direct current. Both alternating and direct current can be connected to the vehicle.

### Charging with alternating current (AC)

If alternating current is used to charge the high-voltage battery, the system uses the voltage converter that is integrated into the vehicle, the charging unit 1 for high-voltage battery AX4. It is mounted at the front of the drive compartment. The charger converts the alternating current to direct current for charging. The charger limits the charge power to a maximum of 3600 watts.

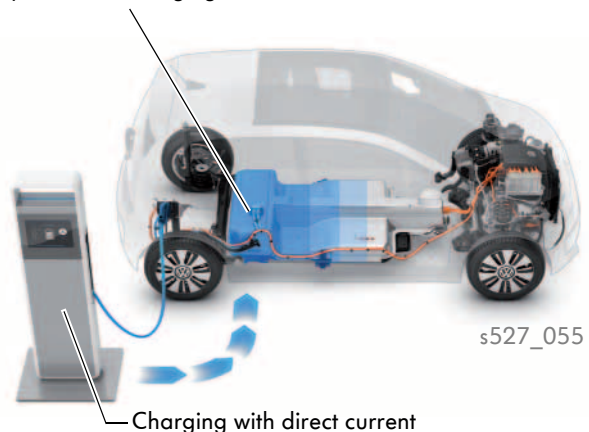


### Charging with direct current (DC)

If direct current is used to charge the high-voltage battery, it is directly supplied via the high-voltage battery charging connection 1 U34.

The direct current is generated in the charging equipment and has a maximum power of 50,000 watts.

High-voltage battery charging connection 1 U34, optional DC charging connection



The 12-volt onboard supply battery is charged when the high-voltage battery is charged.



# High-voltage system

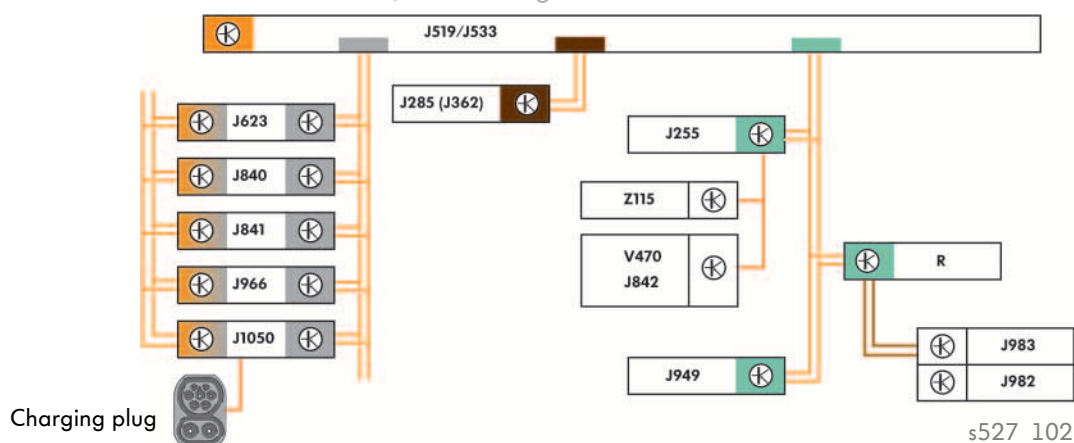
## Charge control in the vehicle

Once the charging plug is plugged in, the charge voltage control unit for high-voltage battery is active. It triggers a lock on the charging plug and activates the engine (motor) control unit. This ensures that all high-voltage control units are ready for operation. As long as there are no faults in any control units, the high-voltage contactor controls are closed. The engine (motor) control unit communicates to the charge voltage control unit for high-voltage battery that charging may take place. It monitors all high-voltage control units affected during charging. In the event of a fault, charging is interrupted by the engine (motor) control unit.

The onboard supply control unit is also activated. This activates the following:

- Control unit in dash panel insert
- Emergency call module control unit and communication unit
- Portable navigation and infotainment system
- Climatronic control unit

If all control units are active, the current charging information can be displayed and called up. If the charging plug is plugged in, the vehicle cannot be made ready for driving.



### Key

J255	Climatronic control unit
J285	Control unit in dash panel insert
J362	Immobiliser control unit
J519	Onboard supply control unit
J533	Data bus diagnostic interface
J623	Engine (motor) control unit
J840	Battery regulation control unit
J841	Electric drive control unit
J842	Control unit for air conditioning compressor
J949	Emergency call module control unit and communication unit
J966	Charge voltage control unit for high-voltage battery
J982	Portable navigation and infotainment system
J983	Interface for portable navigation and infotainment system
J1050	Control unit for high-voltage battery charging unit

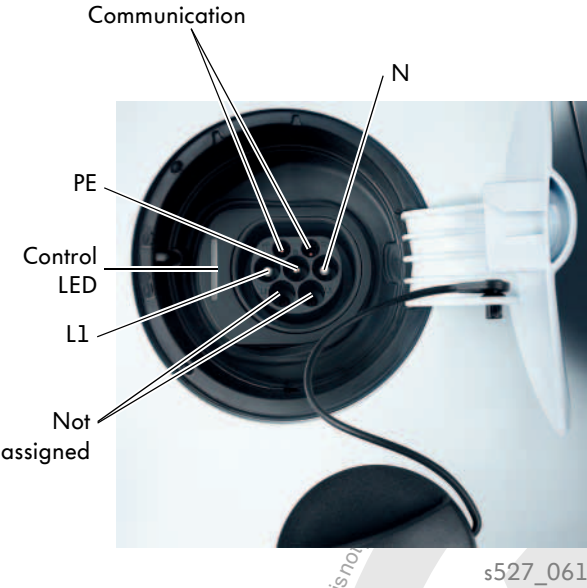
R	Radio
V470	Electrical air conditioner compressor
Z115	High-voltage heater (PTC)
	Powertrain CAN data bus
	Hybrid CAN data bus
	Diagnostic CAN data bus
	Dash panel insert CAN data bus
	Convenience CAN data bus
	LIN data bus
	CAN data bus wire
	LIN data bus wire
	Unidirectional LIN data bus wire



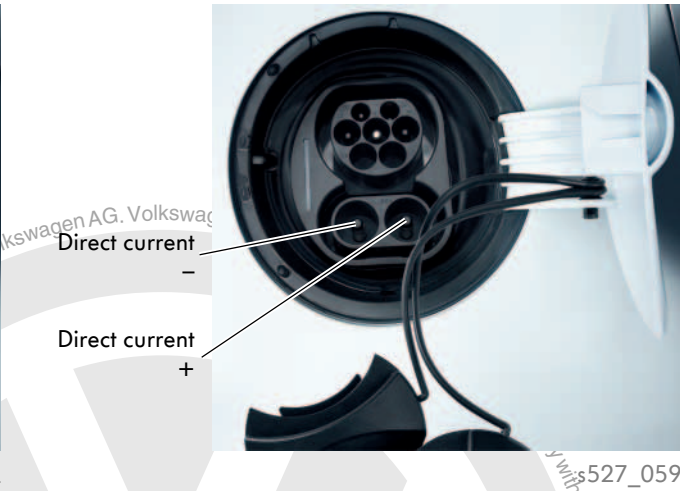
# Charging connections

The e-up! has different charging connections, depending on the model sold in a particular country. The European versions are the simple AC charging connection or the double AC/DC charging connection. Both variants are located behind the charging flap. For the Japanese market there is a self-contained variant in the motor compartment.

AC charging connection



AC/DC charging connection



Connection	Meaning
N	Neutral wire
L1	Phase
PE	Protective earth
Communication	Creates a connection between the vehicle and the charging station.
Control LED	The control LED can flash or light up in different colours. A detailed description of these can be found on the next page.





# High-voltage system

## Control LED

The control LED for the relevant charging connection can flash or light up in different colours. The following table gives a summary of all the LED modes.

LED	Meaning
LED lights up red for up to 5 minutes (10 seconds after plugging in the charging plug)	Plug recognised but not locked; charging is not possible
LED lights up yellow for up to 5 minutes	Plug recognised and locked but no supply voltage is available; charging is not possible
LED flashes yellow for up to 5 minutes	Selector lever is not in position P; charging is not possible
LED flashes green for 60 seconds at intervals of 4 seconds; then the LED goes out	Timer programming is activated; waiting mode (not possible for DC charging)
LED pulses green	Charging process is active
LED lights up green for up to 5 minutes; then the LED goes out	Charging process is complete

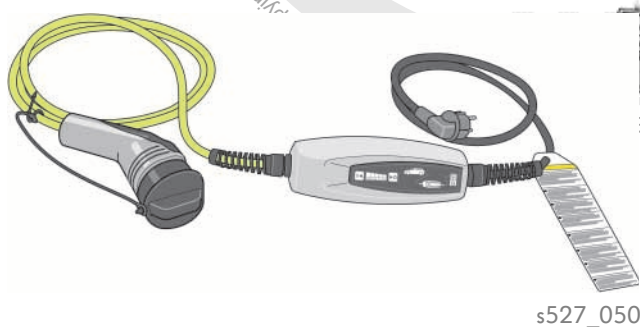
## Charging options

### Charge at home

A charging cable with charge control is delivered with the e-up! as standard. The charging cable fits every standard plug socket. The charge power can be regulated and can be set between 1380, 1840 and 2300 watts. The charging time is between 8 and 12 hours, depending on the setting. An integrated temperature sensor monitors the temperature in the charging cable. If the temperature reaches 80 °C, the charge power is reduced. If no drop in temperature occurs afterwards, the charging process is interrupted.

A charging station for domestic installation is available as an option in addition to the standard charging cable. This is permanently installed by an expert and connected to the household power supply. The charge power is 3600 watts and the charging time approx. 6 hours.

Charging cable with charge control



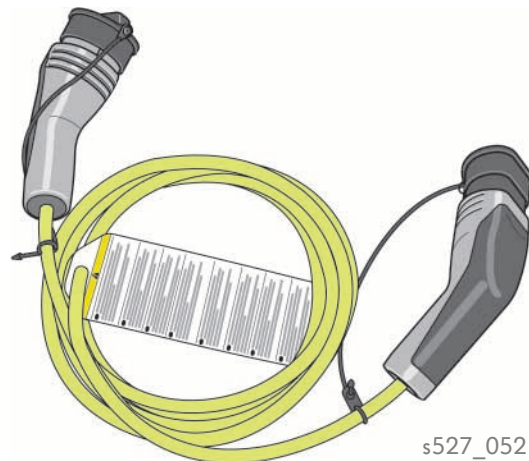
Charging station for domestic installation



### Charging while away from home

A charging cable for public charging stations is also available. The cable has a European standard plug, which is often used at public charging stations. The charge power is 3600 watts and the charging time approx. 6 hours.

Charging cable for AC charging stations



s527\_052

Another possibility is to charge using direct current at a quick charging station. These charging stations have a power of up to 50,000 watts and charge the e-up! to 80 % within 30 minutes. Charging is then ended.



Charging at a direct current charging station



s527\_111

The aforementioned charging options may vary from country to country.

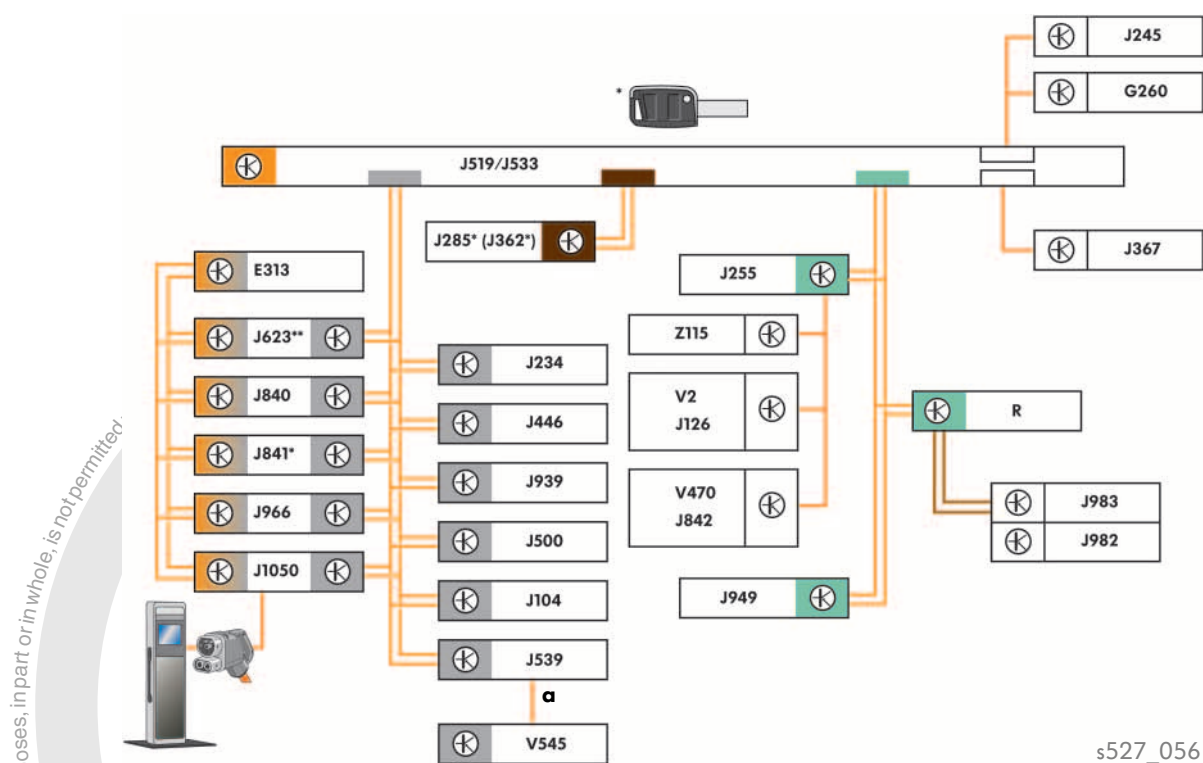


# Electrical system

## Vehicle electrical system

Due to the increased number of control units in the drive compartment, the hybrid CAN data bus is used as well as the powertrain CAN bus. This is a sub-bus (without gateway connection) and is used for communication between the individual high-voltage components.

Unlike the conventional up!, the dash panel insert is connected to the vehicle network via its own dash panel insert CAN data bus.



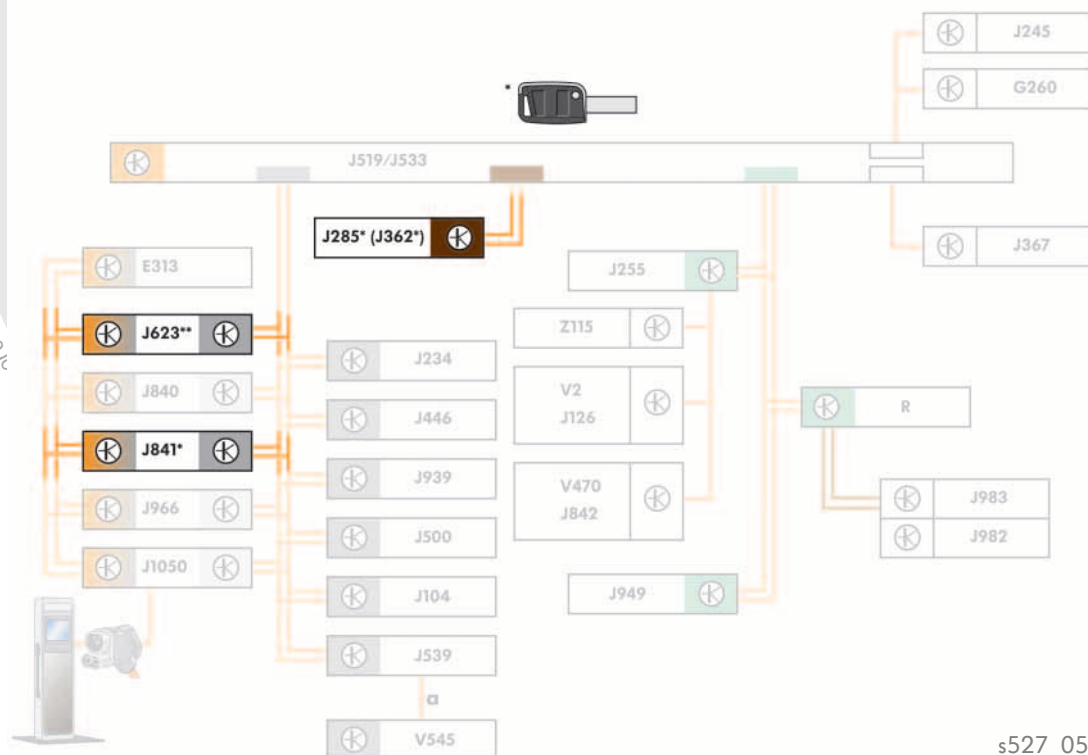
External charging unit  
(for DC charging only)

### Key

a	Private CAN data bus	J533	Data bus diagnostic interface
E313	Selector lever	J539	Brake servo control unit
G260	Humidity sender for air conditioning system	J623	Engine (motor) control unit
J104	ABS control unit	J840	Battery regulation control unit
J126	Fresh air blower control unit	J841	Electric drive control unit
J234	Airbag control unit	J842	Control unit for air conditioning compressor
J245	Sliding sunroof adjustment control unit	J939	Emergency braking function sensor unit
J255	Climatronic control unit	J949	Emergency call module control unit and communication unit
J285	Control unit in dash panel insert	J966	Charge voltage control unit for high-voltage battery
J362	Immobiliser control unit	J982	Portable navigation and infotainment system
J367	Battery monitor control unit	J983	Interface for portable navigation and infotainment system
J446	Parking aid control unit		
J500	Power steering control unit		
J519	Onboard supply control unit		

# Immobiliser

To increase the level of theft protection of the e-up!, some individual immobiliser components have already been upgraded from generation IVc to generation V. The immobiliser control unit J362, which is integrated into the control unit for the dash panel insert J285, is the master. It can operate immobiliser slaves of immobiliser generations IVc and V; it works according to the principle of immobilizer IVc. The engine (motor) control unit J623 is therefore a generation V immobiliser slave. The electric drive control unit J841 is a generation IVc immobiliser slave.



s527\_058

- J1050 Control unit for high-voltage battery charging unit
- V2 Fresh air blower
- V470 Electrical air conditioner compressor
- V545 Motor in brake pressure accumulator for energy recovery

- R Radio
- Z115 High-voltage heater (PTC)

- Powertrain CAN data bus
- Hybrid CAN data bus
- Diagnostic CAN data bus
- Dash panel insert CAN data bus
- Convenience CAN data bus

- LIN data bus
- CAN data bus wire
- LIN data bus wire
- Unidirectional LIN data bus wire
- \* Immobiliser generation IVc
- \*\* Immobiliser generation V



# Electrical system

## Installation points in the vehicle electrical system

Despite the electrification of the drive of the e-up! and the integrated high-voltage network, the power supply for almost all convenience components is via a normal 12-volt onboard supply (except for the voltage supply).



- Fuse carrier on the vehicle battery with additional fuse carrier



- In the e-up!, the power and control electronics for electric drive JX1 take care of the supply, support and charging for the 12-volt onboard supply, instead of a alternator as used in normal combustion mode.



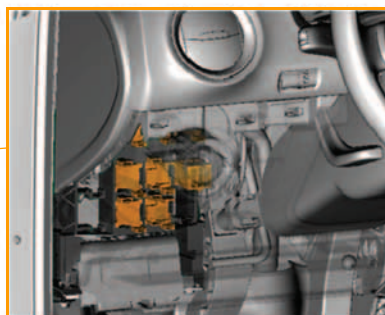
- Fuse box, at the bottom left on the driver's side of the passenger compartment





- Fuse carrier, on the driver's side of the passenger compartment, behind the left-hand dash panel. The 10 A fuse marked with a tag interrupts the power supply to the terminal 30c and therefore to the battery regulation control unit J840 in the event of an accident.

connect to the correctness of information



- Onboard supply control unit J519 with an integrated diagnostics interface for data bus J533, behind the relay carrier

s527\_065



- Relay carrier, on the driver's side of the passenger compartment, behind the left-hand dash panel



# Electrical system

## The lighting system

The daytime running lights and the additional brake light have been adapted for the design concept of the e-up!.

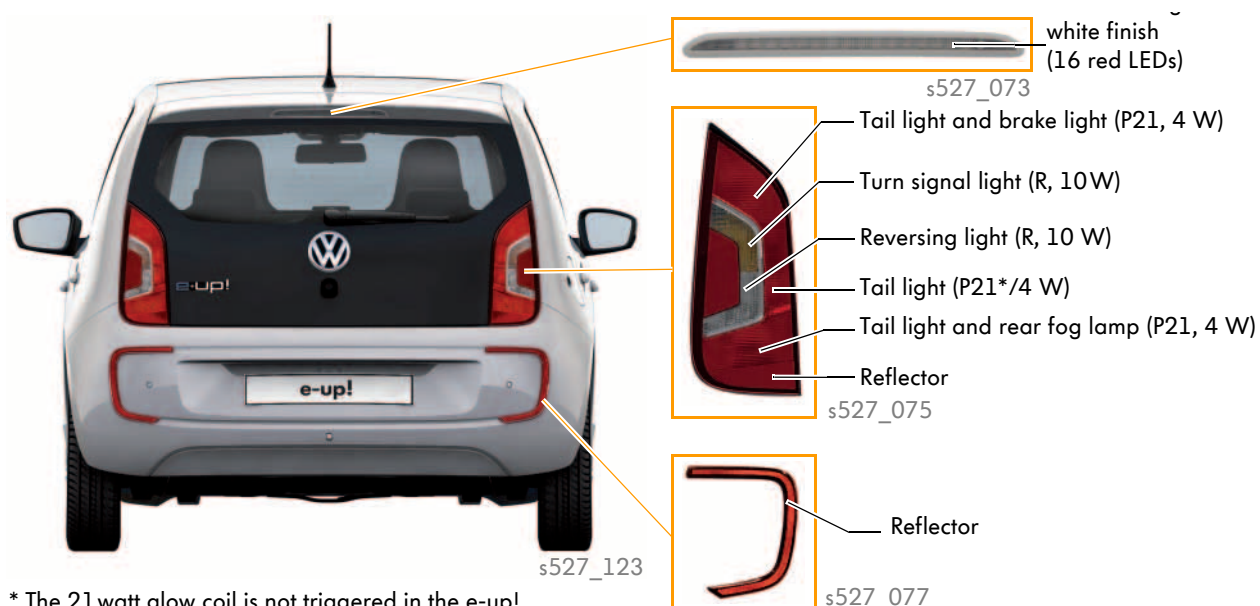
### Front lights

The front headlights of the e-up! do not differ in appearance from those of the up!. The difference is that the e-up! uses two curved LED lights in the bumper as daytime running lights. The LED daytime running lights are switched off when the dipped beam is switched off.



### Rear lights

The rear lights on the e-up! are exactly the same as those of the up!. On the e-up!, the high-level brake lights have a white lens with the red LEDs underneath.



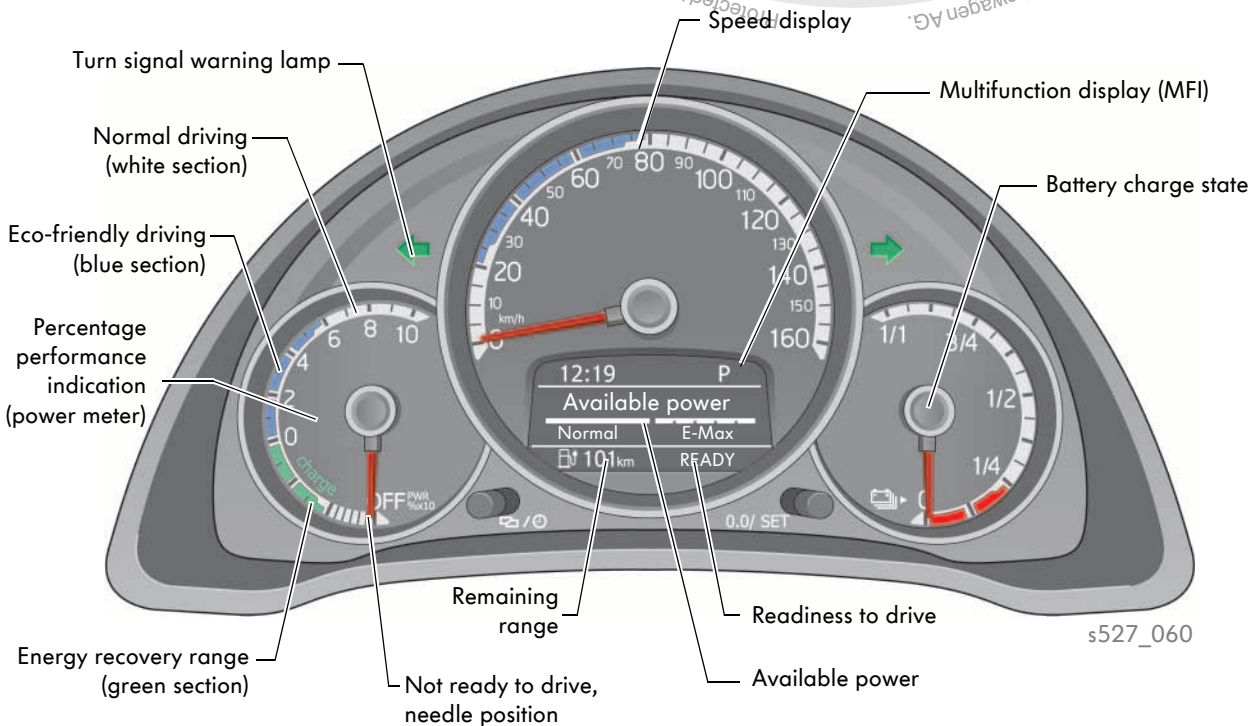
\* The 21 watt glow coil is not triggered in the e-up!.

## Dash panel insert

The dash panel insert in the e-up! is based on the highline dash panel insert of the VW Beetle. For the e-up!, the display instruments and the multifunction display (MFI) have been subjected to electric drive-specific modifications. Next to the centrally positioned analogue speed display, the battery charge level and the percentage performance indication (power meter) are shown on an analogue display.

The modified multifunction display (MFI) can display the following additional information:

- Battery range
- Momentary electrical consumption
- Average electrical consumption
- Information on the charging process
- Driving mode selection
- Ready to drive with the display "READY"
- Available power ( electrical power currently available)

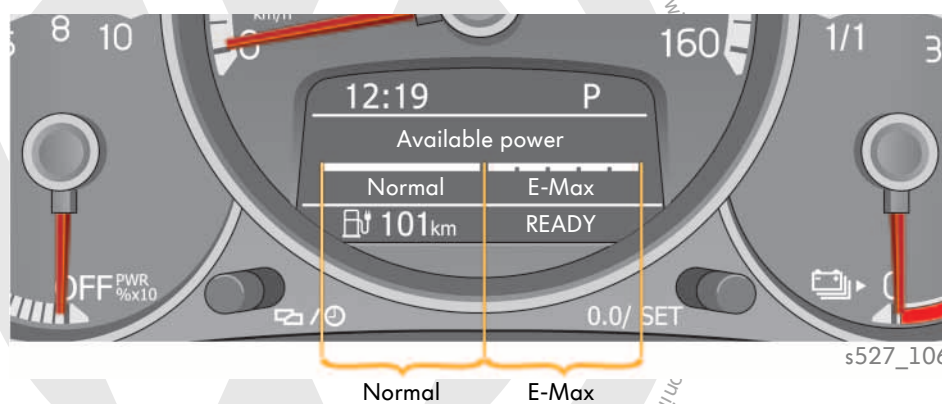


# Electrical system

## Available power

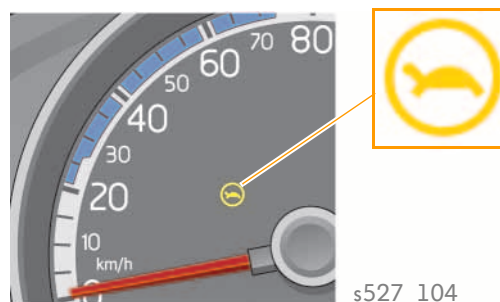
The power availability display shows the user whether the full power of 60 kW is available.

The power availability is shown using a progress bar. In the "E-Max" range, the maximum power is available to the user for 30 seconds. As the power availability decreases, the five segments in the "E-Max" range gradually fade out from right to left. If all the segments in the range have disappeared, the maximum power is no longer available and the drive power is reduced. Reasons for the reduction in power are the increased system temperature and maximisation of the battery range. If the system is too cold, the power is restricted. If the user only has a few more kilometres of range remaining, the system is restricted to up to 15 kW to ensure it's still possible to drive a few more kilometres.



## Warning lamp for restricted maximum speed K305

If the charge level of the high-voltage battery is in the lower reserve range, the maximum possible driving speed is reduced along with the power availability. If the reserve of the high-voltage battery is reached, a tortoise becomes visible in the dash panel insert, as well as text notifications. The tortoise indicates that the maximum driving speed has been restricted to 80 km/h. If the vehicle is not recharged, both the power and the maximum speed will be gradually restricted further.



If the vehicle comes to a standstill due to falling below the source voltage for a high-voltage battery, it is possible to restart the e-up! twice for a limited distance: the first time for approx. 100 m and the second time for approx. 50 m.

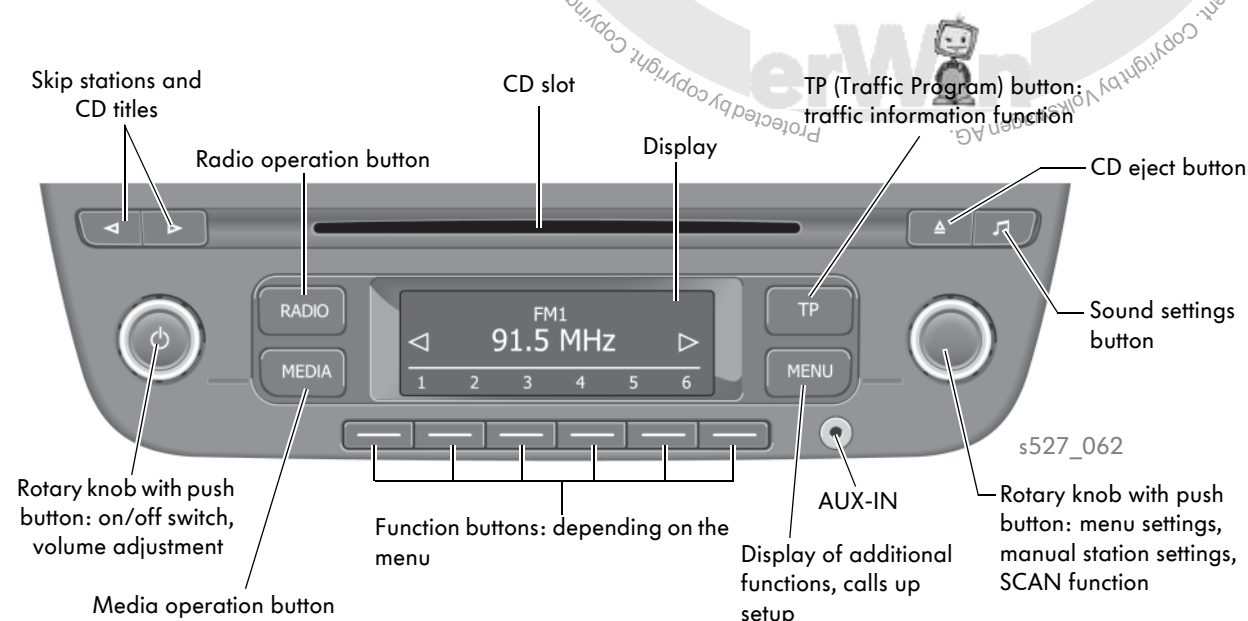


## RCD 215 radio

The RCD 215 radio already installed in the up! has been upgraded for the e-up! to include a function for DAB+ (Digital Audio Broadcasting) reception. The function has been available for the up! since week 45/2013.

### Technical features

- Monochrome display (white on black background) with a resolution of 132 x 46 pixels
- Four output stages, each with 20 W
- Two or four speakers can be connected
- Red locator light
- FM, AM and RDS reception via a single tuner
- DAB+ tuner
- Integrated CD drive
- Media support for MP3 (with ID3 tag)
- Audio input interface (AUX-IN) in the front panel
- GALA (speed-dependent volume setting)
- Preparation with gateway function for the portable navigation and infotainment system J982



### Options for combination and expansion

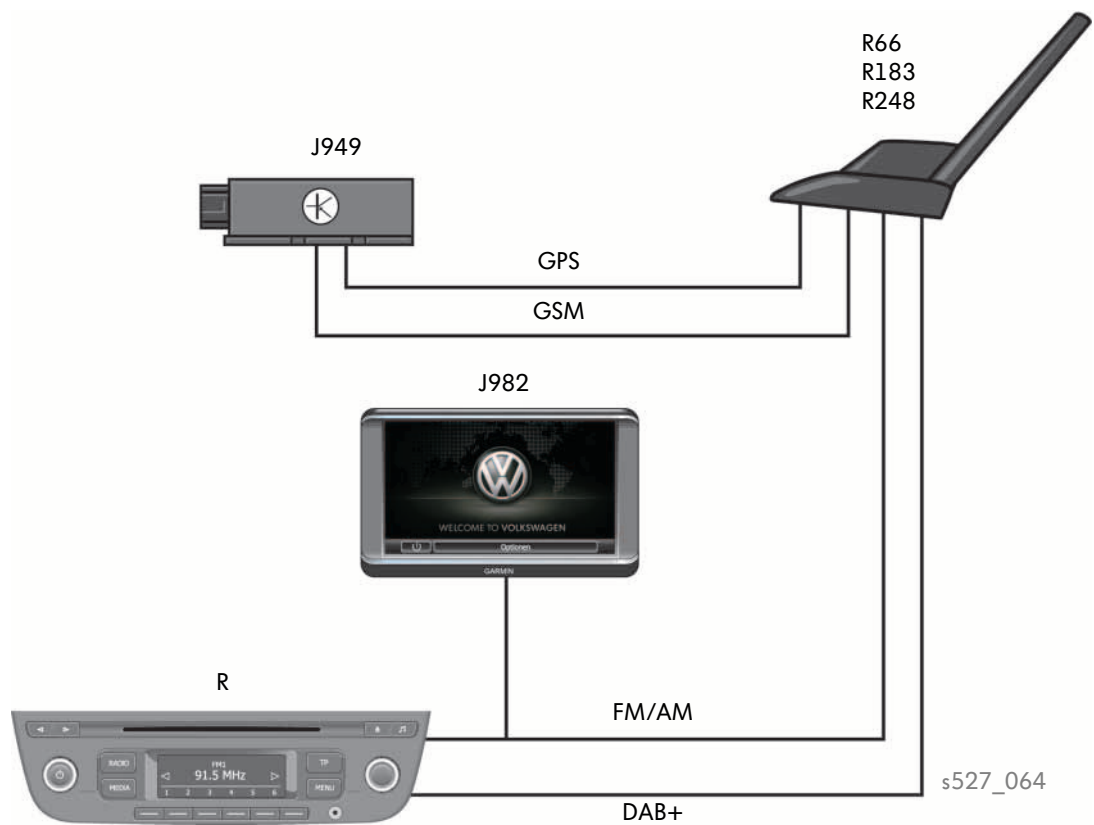
The RCD 215 radio features an interface to the portable navigation and infotainment system J982 (via J983) using two unidirectional LIN data bus wires. This means that in contrast to a standard LIN protocol, the data are only sent in one direction on each wire.





## The aerial systems

The e-up! is equipped with a short rod aerial. This incorporates the telephone, navigation system and auxiliary heater aerial R66, the radio aerial R248 and the digital radio aerial R183 (DAB+). The short rod aerial also contains the aerials for the GPS and GSM mobile phone network. Each aerial module communicates with the end devices via its own cable. The FM/AM connection in the portable navigation and infotainment system J982 is required for receiving the TMC signal.



### Key

- J949 Emergency call module control unit and communication unit
- J982 Portable navigation and infotainment system
- R Radio
- R66 Telephone, navigation system and auxiliary heater aerial
- R183 Digital radio aerial
- R248 Radio aerial

## Driving profile selection

The e-up! is equipped with three driving profiles as standard. The driving profile selection allows the driver to make vehicle settings according to their preferences. The driver can choose between dynamic (sporty driving style) or eco-friendly (enhanced range) driving modes. The following driving profiles are available:

- Normal (standard setting)
- ECO
- ECO+

The driving profiles are activated and changed via a button on the centre console. The driving profile "Normal" is preset and automatically active every time the vehicle is started. Depending on the driving profile selected, the following systems will be affected:



Driving mode selection button

s527\_066

Systems affected/driving modes	Normal	ECO	ECO+
Air conditioning	Normal	Reduced	Deactivated
Accelerator curve	Normal	Reduced	Flat
Acceleration from 0-100km/h	12.4 s	14.3 s	---
Acceleration from 0-60km/h	4.9 s	6.1 s	7.6 s
Output (peak)	60kW	50kW	40kW
Speed	130km/h	120km/h	95km/h
Max. starting torque	210Nm	167Nm	133Nm



The driving profiles ECO and ECO+ provide the full 60 kW power for a period of 10 seconds when the driver depresses the accelerator pedal completely (kickdown function).



## Portable navigation and infotainment system J982

The “maps + more” portable navigation and infotainment system J982 has been produced by Garmin since week 22/2013. It is similar to the regular “maps + more” made by Navigon, but new functions have been added.

### Live services

“maps + more” has the following live services which can be displayed when connected to the Internet:

- Current traffic information
- Speed cameras
- Current weather
- Local searches for specific destinations

For this purpose, it is necessary to pair a data-capable mobile telephone with Bluetooth tethering support with “maps + more”. The sources for the live services are the search engine Yelp, the Navteq traffic information and speed camera service, and Garmin's own weather forecast.



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\* The term tethering refers to the action of connecting a smartphone to a computer or PDA in order to enable it to access the Internet via GSM/UMTS.

### e-Manager

The user can control the charging and air conditioning of the vehicle and program the next departure time using the e-Manager. The charging locations with their requirements (available current strengths) are displayed. The strength of the charging current depends on the time of departure and the remaining charging time. From a physics point of view, it makes sense to use a smaller current strength over a longer period of time.



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## Multi-stop route planning



The “maps + more” system in the e-up! and the eco-up! features multi-stop route planning, which is accessed via the “Navigation” button.

This means that both the current battery range and the range for gas operation is taken into account for the route planning. Charging options (electric and CNG filling stations) available in the POI data (Point of Interest = POI) are included or approximate points named where the vehicle must be charged or refuelled. The duration of the charging stops is calculated in the total journey duration and also displayed separately.

## Range display



Simple range



Range that takes the return journey into account



Combined display

The “maps + more” system in the e-up! features a range display function in the Navigation menu.

The following can be displayed on the map:

- Basic battery range
- Range that takes into account the return journey to the starting point
- A combination of both

It is not displayed as a geometrical circle due to the inclusion of road categories, speed limits and the topography of the area.



Further information on the menu can be found in Self-study Programme no. 500 “The up!”.

## Mobile online services for the e-up!

Volkswagen has consolidated the mobile online services under the term “Car-Net”. These services were introduced with the Golf GTI/GTD 2013. In the GTI/GTD 2013, so-called “bright services” were used. In the e-up!, “grey services” are used for the first time. The difference is that bright services do not require any vehicle-specific data. Grey services are reliant on vehicle-specific data to guarantee the service functions, such as the vehicle identification number (VIN), the mileage and information from various control units.

The following grey services are used for the first time in the e-up!:

- Activation and deactivation of the vehicle charging process
- Remote climate control of the vehicle
- Querying vehicle data
- Querying the last parking position
- Querying the vehicle status
- Querying the doors and lighting

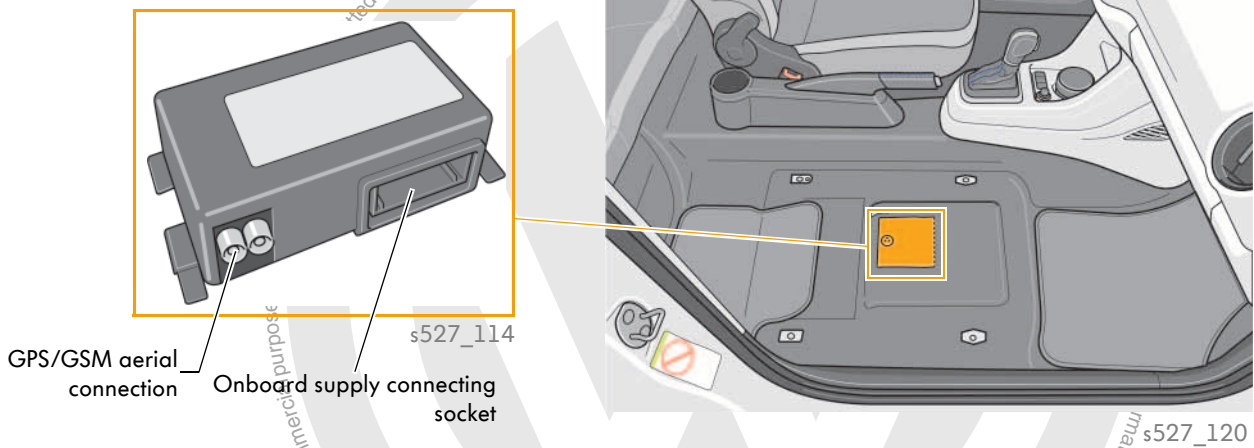


Further information on the “bright services” of Car-Net can be found in Self-study Programme no. 521 “The Golf GTI/GTD 2013”.



## Emergency call module control unit and communication unit J949

The emergency call module control unit and communication unit J949 is installed in the vehicle as standard. The installation location is under the front seat on the right-hand side. The control unit J949 contains a permanently integrated SIM card to access the mobile phone network. The data transfer between the backend system and the vehicle takes place via this mobile telephone connection. The SIM card is active when it leaves the factory and does not need to be activated separately. The control unit J949 is a participant in the convenience CAN data bus.



### Function

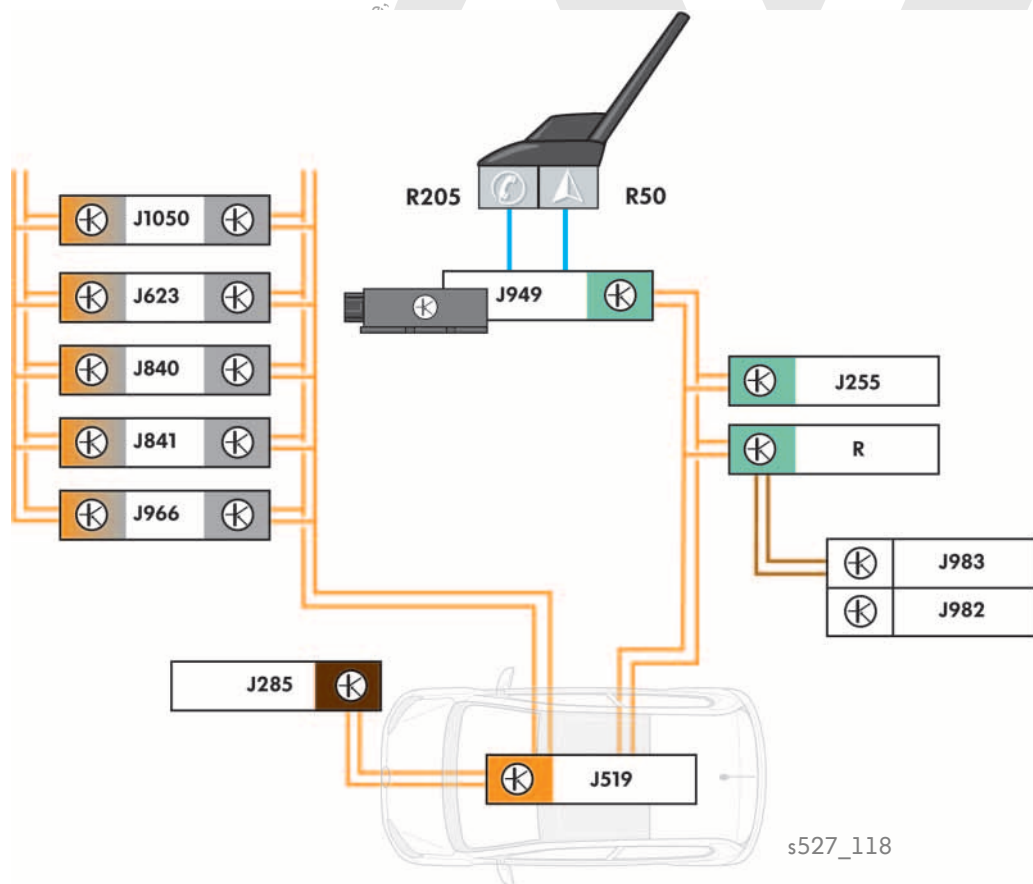
The control unit J949 transfers the relevant data collected from the control units in the network to the backend system. In the opposite direction, it receives the commands from the backend system and forwards them to the relevant control units. The emergency call module control unit and communication unit J949 is active even when the ignition is off and if necessary, it wakes up other relevant CAN data bus participants.



The term "backend" comes from the IT sector and describes a database system. All data relevant to the vehicle and customer are saved here. The backend system processes the saved data and forwards them to the vehicle or the smartphone.



## Network for the emergency call module control unit and communication unit J949.



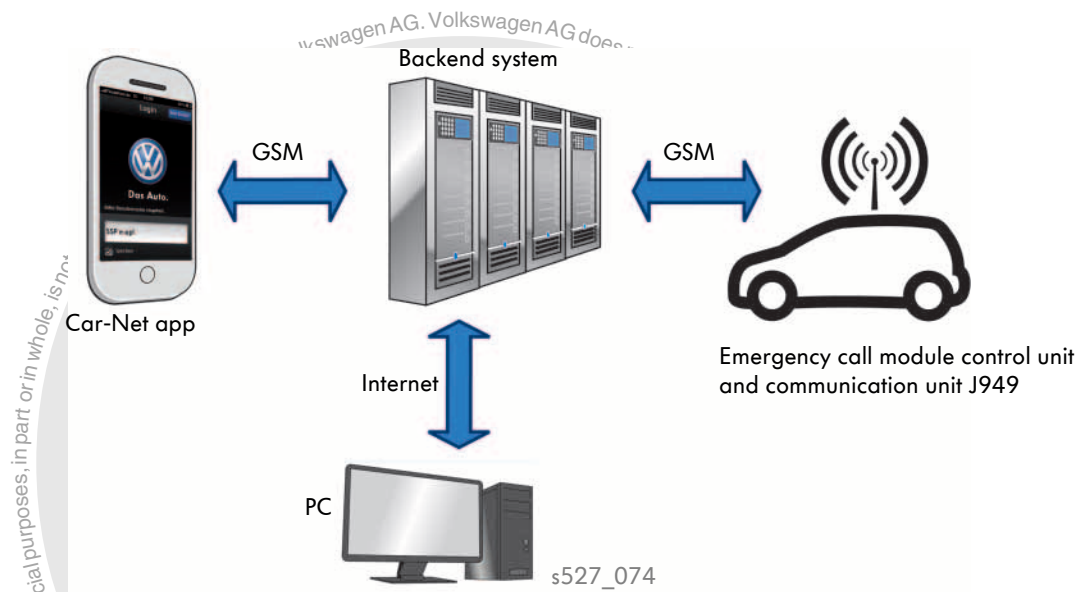
### Key

J255	Climatronic control unit
J285	Control unit in dash panel insert
J519	Onboard supply control unit
J623	Engine (motor) control unit
J840	Battery regulation control unit
J841	Electric drive control unit
J949	Emergency call module control unit and communication unit
J966	Charge voltage control unit for high-voltage battery
J982	Portable navigation and infotainment system
J983	Interface for portable navigation and infotainment system
J1050	Control unit for high-voltage battery charging unit
R	Radio
R50	GPS aerial
R205	GSM aerial

	Powertrain CAN data bus
	Hybrid CAN data bus
	Diagnostic CAN data bus
	Dash panel insert CAN data bus
	Convenience CAN data bus
	CAN data bus wire
	Unidirectional LIN data bus wire
	Actuator wire

## Data transfer

Data transfer never takes place between the end device and the vehicle directly. The vehicle data are recorded in a backend system. The user accesses the data via a smartphone, tablet or computer. The connection is via the Internet or GSM mobile phone network.



## Car-Net app

With the Car-Net app, the user has the option to control certain functions of their e-up! remotely. A smartphone or tablet is required to use the Car-Net app. The Car-Net app is available for the Apple iPhone in the Apple App Store and can also be used with an iPad. The supported operating systems are currently iOS 5, iOS 6 and iOS 7. The app is available in the Google Play Store for Android devices. The operating systems 2.3, 4.0 and higher are currently supported.



Symbol of the Car-Net app



Further information on the app can be found via Volkswagen TV.

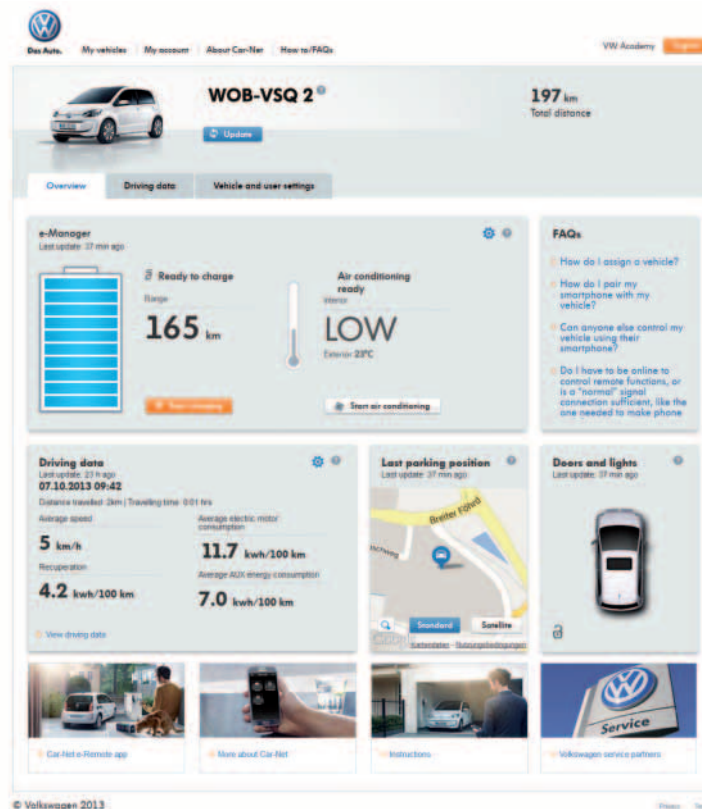


## Customer portal

The customer portal can be accessed at **www.volkswagen.com/car-net**. The following content and functions are available in the portal:

- Registration of vehicles and simultaneous activation of the Car-Net services
- Vehicle management (e.g. fleet)
- Administration of user accounts
- Operation of Car-Net functions
- Service descriptions
- Settings and options
- Frequently asked questions
- Further information related to Car-Net

To use Car-Net, both user and vehicle must be registered in the customer portal.



Customer portal homepage

If the user owns several vehicles, up to six vehicles can be registered per user account. If several people use the vehicle, up to five users can be registered per vehicle.

See the relevant Volkswagen TV entry for information on using the customer portal.

## Car-Net services in the e-up!

The Car-Net services offer the user the option to call up status information for the vehicle and control functions remotely via the Car-Net app or the customer portal. The functions of the individual services are explained below using the example of the smartphone app. The same services can also be accessed using the customer portal and work in the same way.

### Start screen

The start screen appears after the user has logged into the Car-Net app with their e-mail address and PIN. Three menu items appear:

1. Menu item: Vehicle
2. Menu item: e-Manager
3. Menu item: Setup

Within each menu item, individual services can be selected via buttons at the bottom of the screen.

After logging in, all services are displayed on the homepage in the customer portal.



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### Menu item “e-Manager”

The user can control the charging and air conditioning of the vehicle using the e-Manager. The settings are made using the Car-Net app or the customer portal, transferred to the backend system and forwarded to the vehicle from there.



Only charging and air conditioning can be remotely controlled via the Car-Net app or the customer portal.





## “Air conditioning” button

This function offers the user the option to start the instant air conditioning for their vehicle remotely. The signal route in the vehicle appears as follows:

1. The emergency call module control unit and communication unit J949 processes the request and forwards the signal to the control unit for high-voltage battery charging unit J1050.
2. The J1050 starts up the high-voltage system using the engine (motor) control unit J623 and forwards the signal to the Climatronic control unit J255.
3. The J1050 closes the high-voltage contactors. The high-voltage system is now active.
4. Air conditioning starts.

Remote-controlled air conditioning can be carried out regardless of whether the charging plug is plugged in or not.



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## “Charging” button

The charging process for the high-voltage battery can be started or ended via this function. The signal route in this case is as follows:

1. The J949 receives the signal and forwards it to the charge voltage control unit for high-voltage battery J966.
2. The J966 checks whether a charging plug is plugged in. If the plug is recognised, the signal is forwarded to the J1050.
3. The J1050 starts up the high-voltage system via the J623.
4. The battery regulation control unit J840 closes the high-voltage contactors. The high-voltage system is now active.
5. The high-voltage battery 1 AX2 charges.
6. The J840 prepares information about the charge level and the remaining charge time.



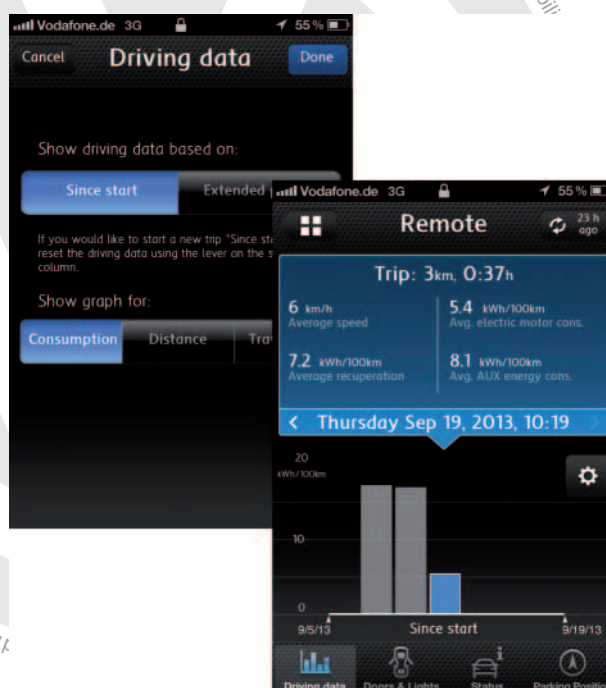
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## Menu item “Vehicle”

Here, the user can view data about their vehicle and their driving behaviour.

### “Driving data” button

This service displays selected driving data, such as consumption, driving time and driving distance, in both table and graphic form. The user can select whether the data should be displayed in the customer portal from the registration of the vehicle in the portal or from the start. The data for this service are transferred to the backend system by the control unit in dash panel insert J285 via the J949 following an ignition change (T 15 on/off).



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### “Doors & lights” button

This function shows the user whether the vehicle is locked or if doors, bonnet or tailgate are open. If it is locked, a padlock symbol is displayed. Open doors, bonnet or tailgate are coloured red. It also shows whether the vehicle lights are switched on. The light beam of the headlights and rear lights make this visible.

If a charging plug is connected, a plug symbol is displayed. Data concerning open doors and switched-on lighting are provided by the onboard supply control unit J519 and the J285. J966 recognises the charging plug.



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## “Status” button

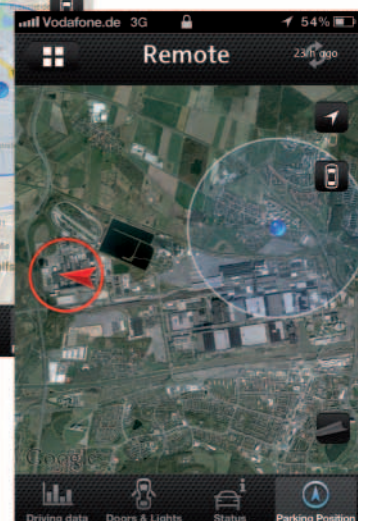
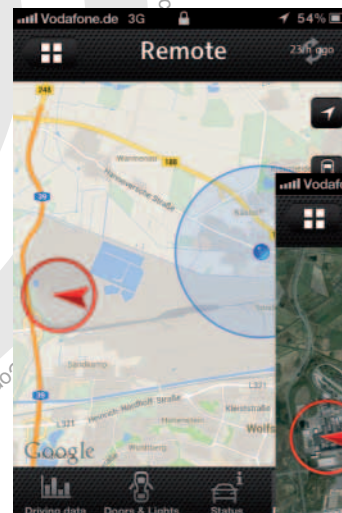
Under Status, the user is shown the charge level of the high-voltage battery, the remaining range and the entire distance travelled. The data for this service are provided by the J840 and the J285.



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## “Parking position” button

Following an ignition change (T 15 on/off), the most recent parking position is saved in the backend system. Under the tab “Parking position”, the position is shown in a standard map view. There is also the option of displaying it on a satellite map. The arrow in the red circle represents the position of the vehicle. The position of the end device is shown as a blue dot. The GPS data are delivered directly from J949.

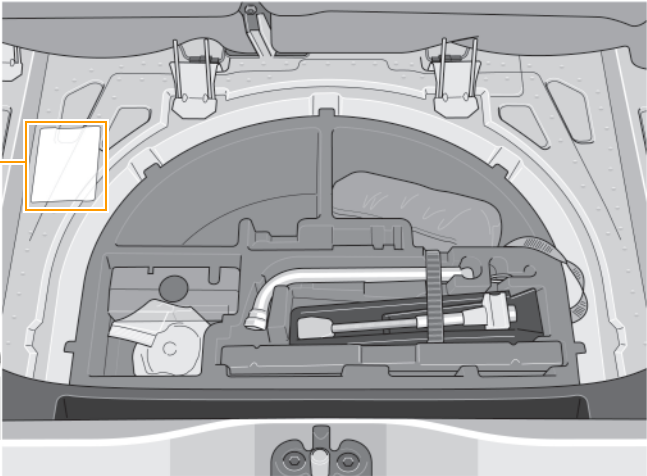
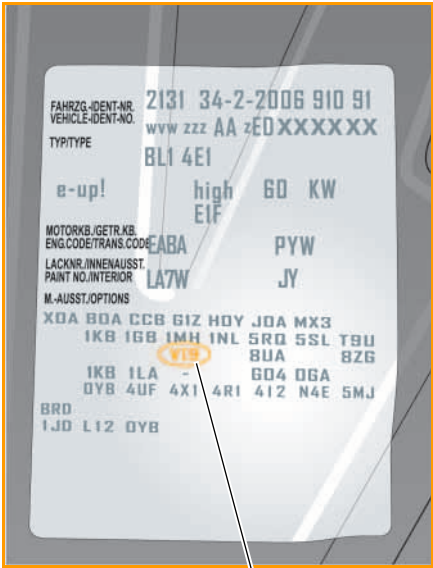


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Maintenance intervals for the e-up!

Inspection of the e-up! is dependent on the mileage and the number of months driven. The first inspection takes place after 30,000 km or 24 months, and then afterwards every 12 months or every 30,000 km, whichever comes first. The abbreviation VI9 specifically indicates an electric vehicle. The brake fluid inspection intervals remain as normal: for the first time after 3 years and then every 2 years.

Inspection and additional works	30,000km or 24 months	45,000km or 36 months	60,000km or 48 months	75,000km or 60 months
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VI9 means that the service display for an electric vehicle is activated after 30,000 km or a fixed 2 years.

Please observe the current information in the service literature.





