Self Study Program 890473

The 2018 Tiguan Electrical System

Design and Function - Tablet Format

Volkswagen

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Table of Contents

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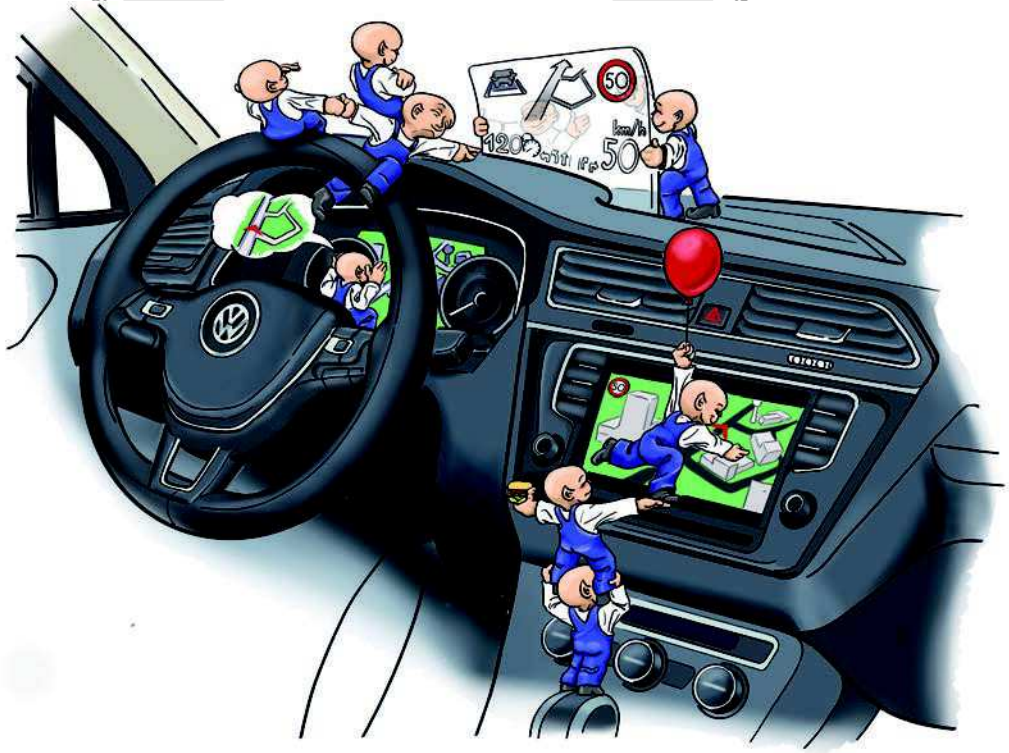
Introduction

The 2018 Tiguan has improved driving dynamics, convenience equipment and driving experience. In addition, more functions and assistance systems are available to the driver. This includes LED light technology, Virtual Cluster, driver assistance systems and the MIB II interface.

The driver gets easy to use information with increased driving safety. Various phone and media interfaces are offered for the occupants so that the Tiguan is even more entertaining and individual.

This Self-study Program will cover the electrical system of the 2018 Tiguan in detail.



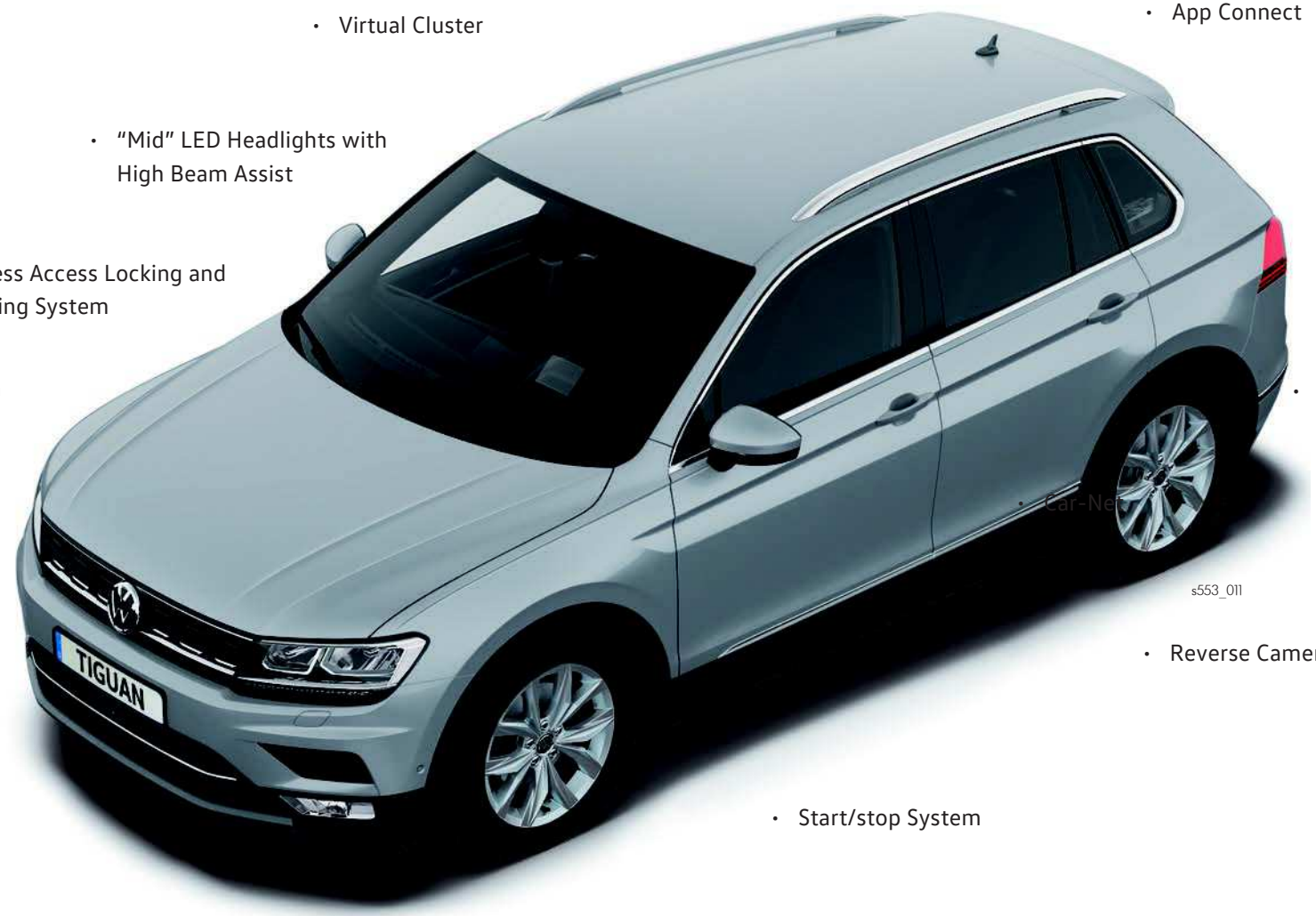
Some options and features portrayed in this Self-Study Program may not be available for the North American Market.

Introduction

Overview of electrical system and infotainment systems

These systems vary according equipment level.

- MIB Generation 2
- App Connect
- Virtual Cluster
- Power Liftgate
- "Mid" LED Headlights with High Beam Assist
- Keyless Access Locking and Starting System
- Fifth Generation Immobilizer and Component Protection
- Fender Sound System



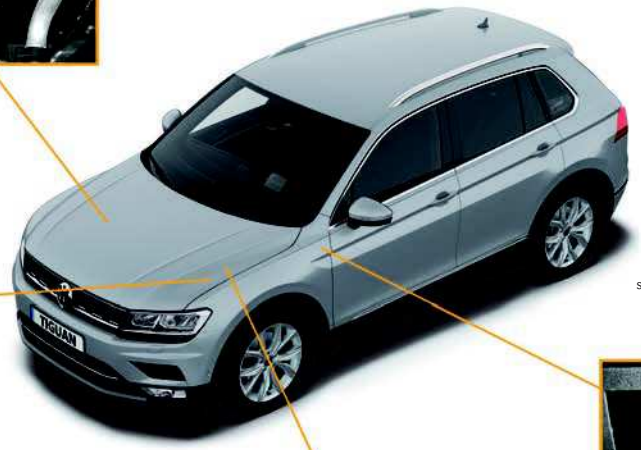
- Reverse Camera
- Start/stop System

Overview of Electrical System

Locations in Electrical System

An alternator with a charging current of 110A, 140A or 180A is used depending on equipment.

Alternator



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E-box

Multi-fuse pre-Fuse Panel SA

Fuse Panel SB

Fuse Panel SC

12-V battery in engine compartment

Power Supply

The power is distributed in the vehicle through three fuse holders or relay and fuse carriers:

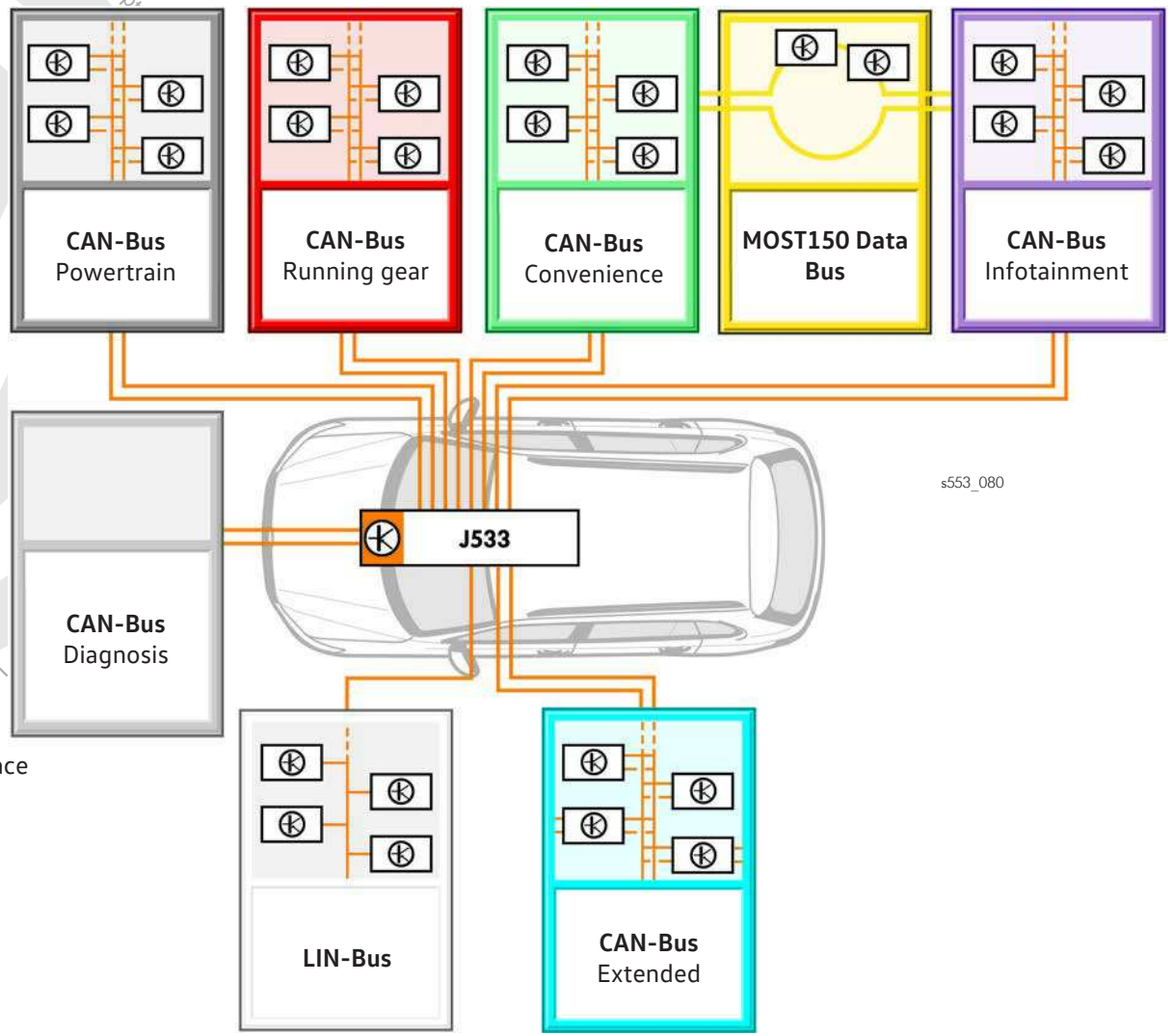
- Multi-fuse pre-Fuse Panel SA on the E-Box in the engine compartment
- Fuse Panel SB on the E-Box in the engine compartment
- Fuse Panel SC on the left under the dash panel, behind the storage compartment

Network System

Overview of Data-Bus Systems

The network has been expanded in comparison with the previous model. All CAN-Bus systems have a transmission speed of 500 kbit/s. The LIN-Bus rate is 19.2kbit/s. The MOST150 Data-Bus, which uses fiber-optic technology, has a transfer speed of 150Mbit/s.

The Data-Bus On Board Diagnostic Interface J533 (Gateway) contains the control system for several LIN-Buses and forms the link between the individual CAN-Buses. Additional LIN-Buses are connected to various control modules.



Key

J533 Data-Bus On Board Diagnostic Interface

CAN-Bus wire

LIN-Bus wire

MOST fiber-optic cable

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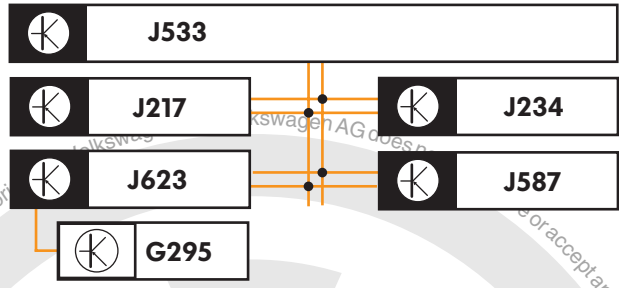
Network System

CAN-Busses

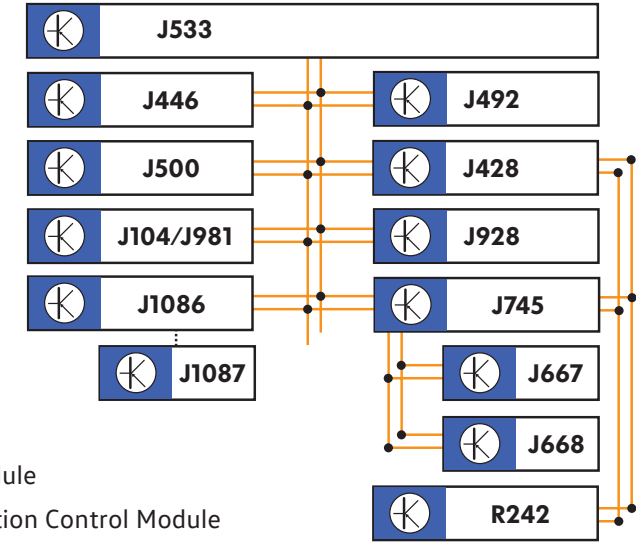
Powertrain CAN-Bus



Key

G295 NOx Sensor
J217 Transmission Control Module
J234 Airbag Control Module
J533 Data-Bus On Board Diagnostic Interface
J587 Selector Lever Sensor System Control Module
J623 Engine Control Module

Running Gear CAN-Bus



Key

J104 ABS Control Module
J428 Distance Regulation Control Module
J446 Parking Aid Control Module
J492 All Wheel Drive Control Module
J500 Power Steering Control Module
J533 Data-Bus On Board Diagnostic Interface
J667 Left Headlamp Power Output Control Module
J668 Right Headlamp Power Output Control Module
J745 Cornering Lamp and Headlamp Range Control Module
J928 Peripheral Camera Control Module
J981 ESC Control Module
J1086 Blind Spot Detection Control Module
J1087 Blind Spot Detection Control Module 2
R242 Driver Assistance Systems Front Camera

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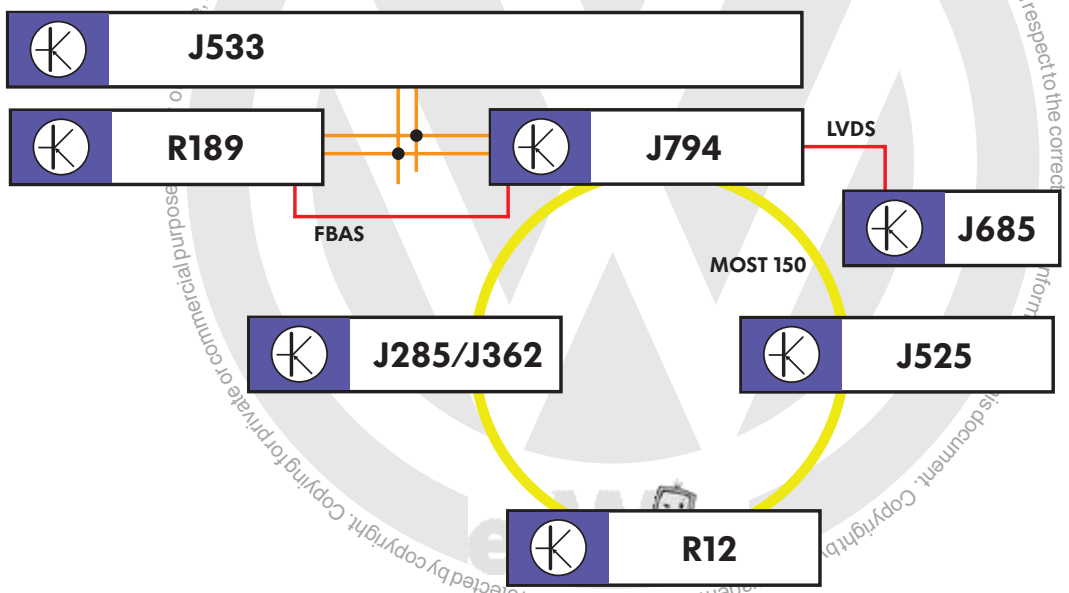
Network System

Infotainment CAN-Bus

The MIB CAN-Bus sub-network and the LVDS-Bus are connected to the Infotainment CAN-Bus. The video signal from the reverse camera is transferred through the FBAS-Bus to the Information Electronics Control Module 1 J794.



Key

J285	Instrument Cluster Control Module
J362	Anti-Theft Immobilizer Control Module
J525	Digital Sound System Control Module
J533	Data-Bus On Board Diagnostic Interface
J685	Front Information Display Control Head
J794	Information Electronics Control Module 1
R12	Amplifier
R189	Rearview Camera
FBAS	Color Video Blanking Signal
LVDS	Low Voltage Differential Signalling

MOST150 Data-Bus

The MOST connection is used for rapid transfer of multimedia data such as image, video and audio files using a fiber-optic cable. Data can be transferred at 150 Mbit/s.

Data is exchanged between the following components on the MOST-Bus:

- Instrument Cluster Control Module J285 (only with the Virtual Cluster)
- Digital Sound System Control Module J525
- Information Electronics Control Module 1 J794

J794 is the function and diagnosis master for the MOST-Bus ring.

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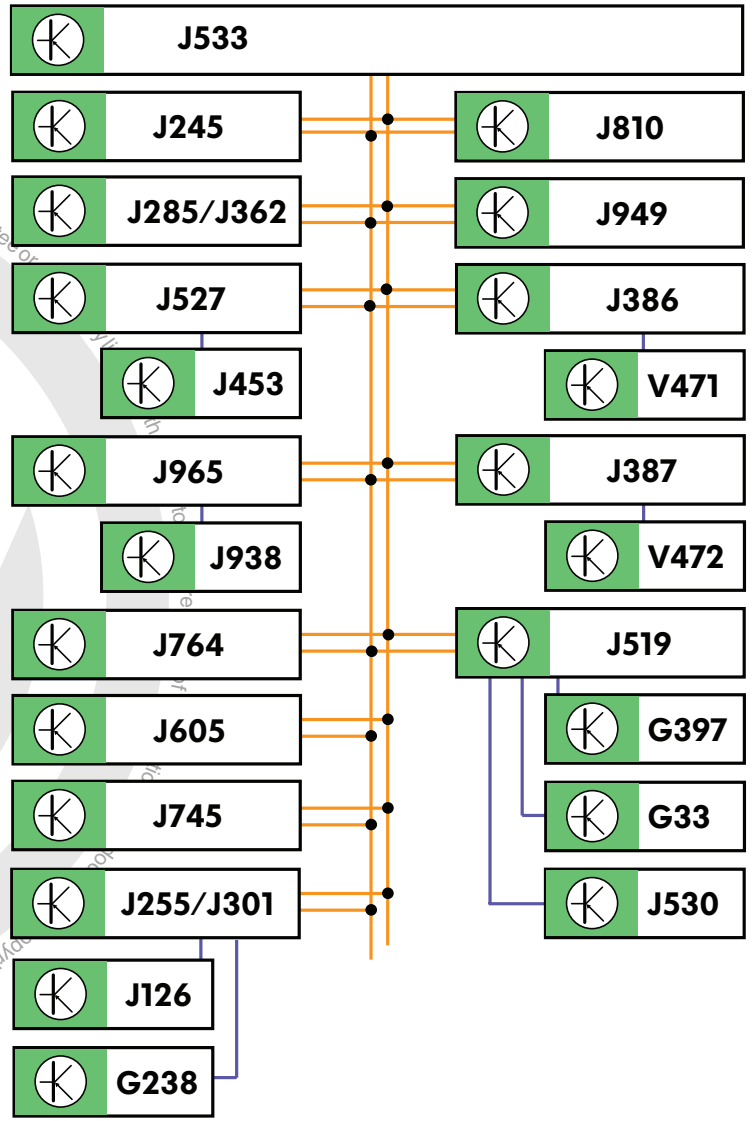
Network System

Convenience CAN-Bus

Since the number of control modules, sensors and actuators has increased, particularly on the Convenience CAN-Bus, numerous systems have been combined into separate LIN-Busses.

Key

G33 Windshield Washer Fluid Level Sensor
G238 Air Quality Sensor
G397 Rain/Light Recognition Sensor
J126 Fresh Air Blower Control Module
J245 Power Sunroof Control Module
J255 Climatronic Control Module
J285 Instrument Cluster Control Module
J301 A/C Control Module
J362 Anti-theft Immobilizer Control Module
J386 Driver Door Control Module
J387 Front Passenger Door Control Module
J453 Multifunction Steering Wheel Control Module
J519 Vehicle Electrical System Control Module
J527 Steering Column Electronics Control Module
J530 Garage Door Opener Control Module
J533 Data-Bus On-Board Diagnostic Interface
J605 Rear Lid Control Module
J745 Cornering Lamp and Headlamp Range Control Module
J764 Electronic Steering Column Lock Control Module
J810 Driver Seat Adjustment Control Module
J938 Rear Lid Opener Control Module
J949 Control Module for Emergency Call Module and Communication Unit
J965 Access/Start System Interface
V471 Driver Side Rear Window Regulator Motor
V472 Passenger Side Rear Window Regulator Motor



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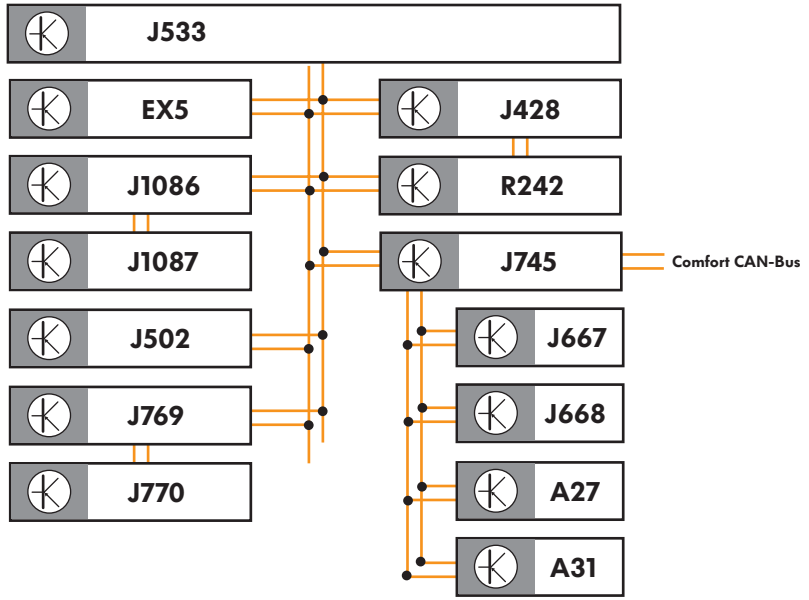
Network System

Extended CAN-Bus

The majority of the control modules for driver assistance systems are combined on the Extended CAN-Bus.



Key

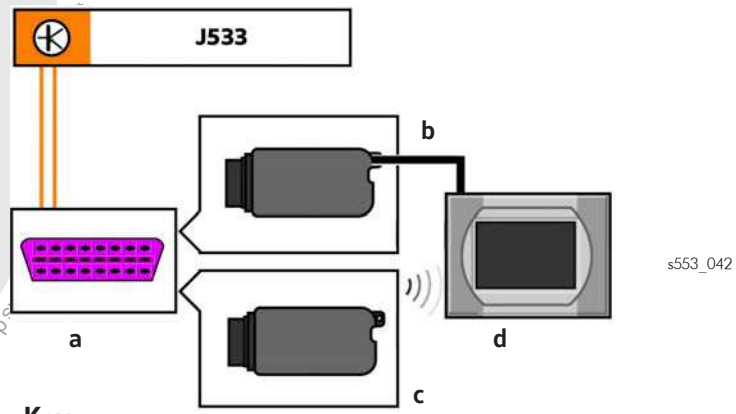
A27 Right LED Headlamp Power Output Module 1
A31 Left LED Headlamp Power Output Module 1
EX5 Interior Rearview Mirror
J428 Distance Regulation Control Module
J502 Tire Pressure Monitoring Control Module
J533 Data-Bus On Board Diagnostic Interface
J667 Left Headlamp Power Output Module
J668 Right Headlamp Power Output Module
J745 Cornering Lamp and Headlamp Range Control Module
J769 Lane Change Assistance Control Module
J770 Lane Change Assistance Control Module 2
J1086 Blind Spot Detection Control Module
J1087 Blind Spot Detection Control Module 2
R242 Driver Assistance Systems Front Camera

Diagnostic CAN-Bus

The Diagnostic CAN-Bus allows for communication between the vehicle diagnostic tester and the electronic vehicle systems via J533.

Depending on the vehicle diagnostic tester, the Data-Bus Diagnostic Interface can be connected to the vehicle wirelessly. The diagnostic head can also be connected directly to the tester via a USB cable.

The USB cable is absolutely necessary for control module flashing.



Key

J533 Data-Bus On Board Diagnostic Interface
b Diagnostic cable
c Connection adapter for wireless connection
d Suitable diagnostic unit

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Network System

CAN-Bus Sub-networks

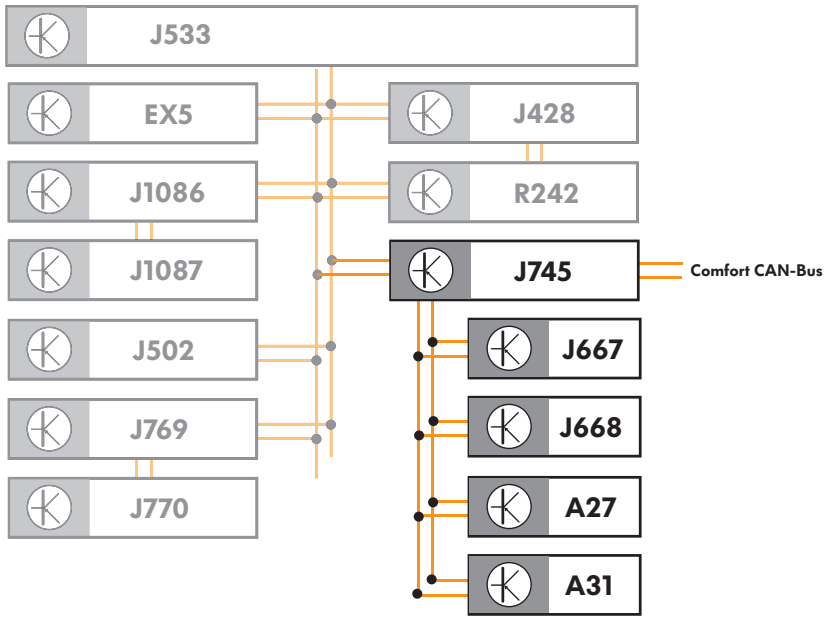
The sub-networks reduce data traffic on the higher-level Data-Busses and enable fast data transmission, involving only necessary control modules.
The following are new Data-Bus sub-networks in the Tiguan: sensor fusion (SF), lane change (SW), MIB and two LIN-Buses on the Data-Bus On Board Diagnostic Interface J533.

Cornering Light CAN-Bus (AFS)

The Cornering Light CAN-Bus (AFS) is part of the Extended CAN-Bus and is only available on certain trim levels.

The Cornering Light CAN-Bus combines the Cornering Lamp and Headlamp Range Control Module J745 with the Left/Right Headlamp Power Output Module J667/J668 and A27/A31. Data transfer enables:

- The activation of the LED modules for low and high beams
- The activation of the static cornering light (A27/A31)
- The activation of the turn signal, (J667/J668)
- The regulation of the control motors for the (J667/668)



Key

A27	Right LED Headlamp Power Output Module 1
A31	Low LED Headlamp Power Output Module 1
J667	Left Headlamp Power Output Module
J668	Right Headlamp Power Output Module
J745	Cornering Lamp and Headlamp Range Control Module

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Network System

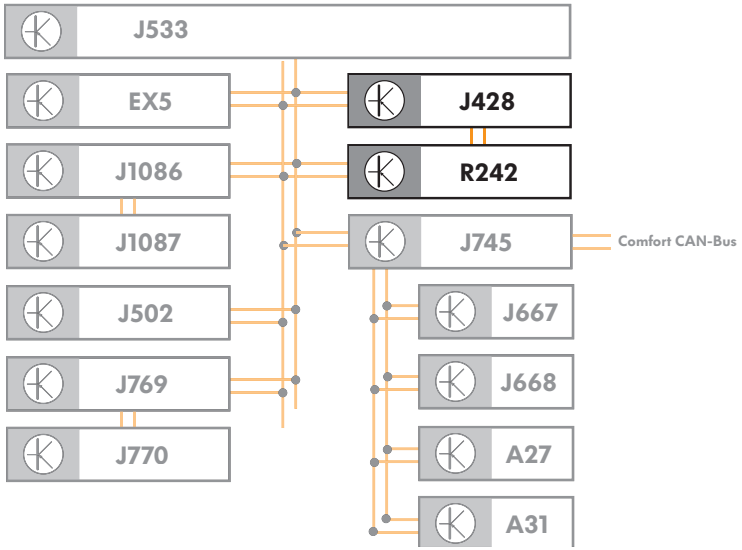
Sensor Fusion CAN-Bus (SF)

The Sensor Fusion CAN-Bus is a sub-network Extended CAN-Bus. The Driver Assistance Systems Front Camera R242 communicates directly with the Distance Regulation Control Module J428 via the CAN-Bus for faster data transmission. J428 and the camera R242 are also connected directly to the Extended CAN-Bus.

Key

J428 Distance Regulation Control Module

R242 Driver Assistance Systems Front Camera



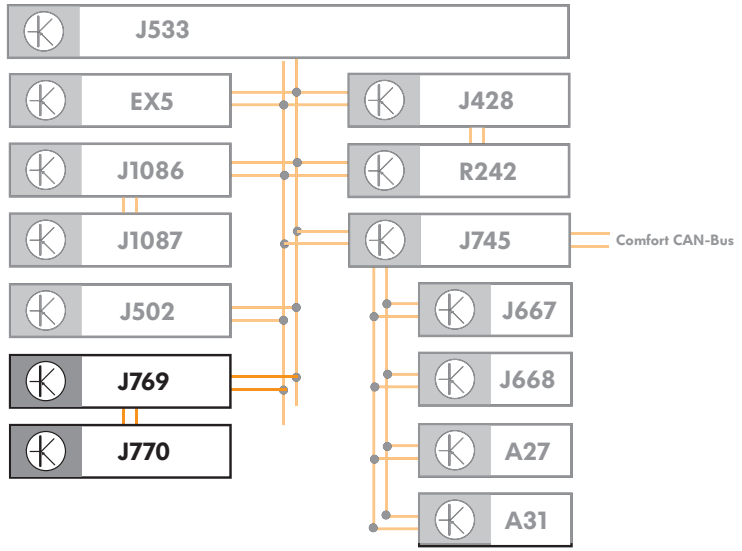
Lane Change CAN-Bus (SW)

The Lane Change CAN-Bus is a sub-network of the Extended CAN-Bus. The Lane Change Assistance Control Module J769 uses the Lane Change CAN-Bus to communicate directly with Lane Change Assistance Control Module 2 J770 to ensure faster data transmission. In addition, both control modules are also connected directly to the Extended CAN-Bus.

Key

J769 Lane Change Assistance Control Module

J770 Lane change Assistance Control Module 2



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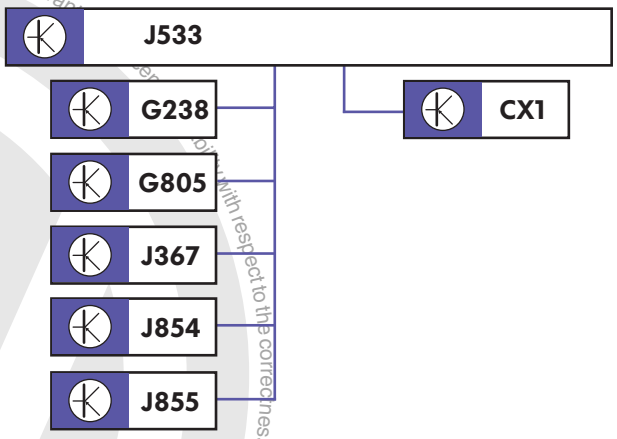
LIN-Bus on Data-Bus On Board Diagnostic Interface J533

Two separate LIN-Busses are connected to the Data-Bus diagnostic interface. The diagnostic interface is the master for the two LIN-Buses.



Key

CX1	Alternator
G238	Air Quality Sensor
G805	Refrigerant Circuit Pressure Sensor
J367	Battery Monitoring Control Module
J533	Data-Bus On Board Diagnostic Interface
J854	Left Front Seat Belt Tensioner Control Module
J855	Right Front Seat Belt Tensioner Control Module

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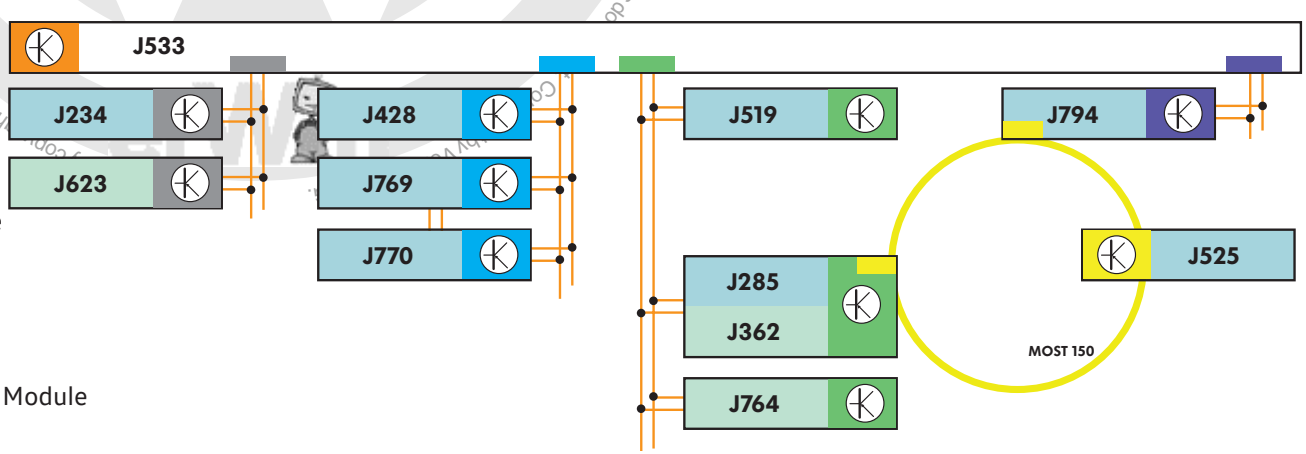
Network System

Immobilizer and Component Protection

The 2018 Tiguan has the fifth generation immobilizer and component protection.

Key

J234 Airbag Control Module
J285 Instrument Cluster Control Module
J362 Anti-theft Immobilizer Control Module
J428 Distance Regulation Control Module
J519 Vehicle Electrical System Control Module
J525 Digital Sound System Control Module
J533 Data-Bus On Board Diagnostic Interface
J623 Engine Control Module
J764 Electronic Steering Column Lock Control Module
J769 Lane Change Assistance Control Module
J770 Lane Change Assistance Control Module 2
J794 Information Electronics Control Module



Immobilizer Subscriber
Component Protection Subscriber
Powertrain CAN-Bus
CAN-Bus Extended
Convenience CAN-Bus
Infotainment CAN-Bus
MOST-Bus
CAN-Bus wire
MOST Fiber Optic Cable

When terminal 15 is switched on, all corresponding control modules are checked for component protection. If the result of the check is negative, the respective control module will block its function partly or completely (e.g. the radio can be switched on, but the amplifier stage is blocked).

The component protection function then needs to be initiated online using the vehicle diagnostic tester to the FAZIT database. This is both responsible for enabling the component protection and also for all adaptations of the immobilizer components.

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Lights

Headlights

Three different versions of the headlights based on the MQB are available:

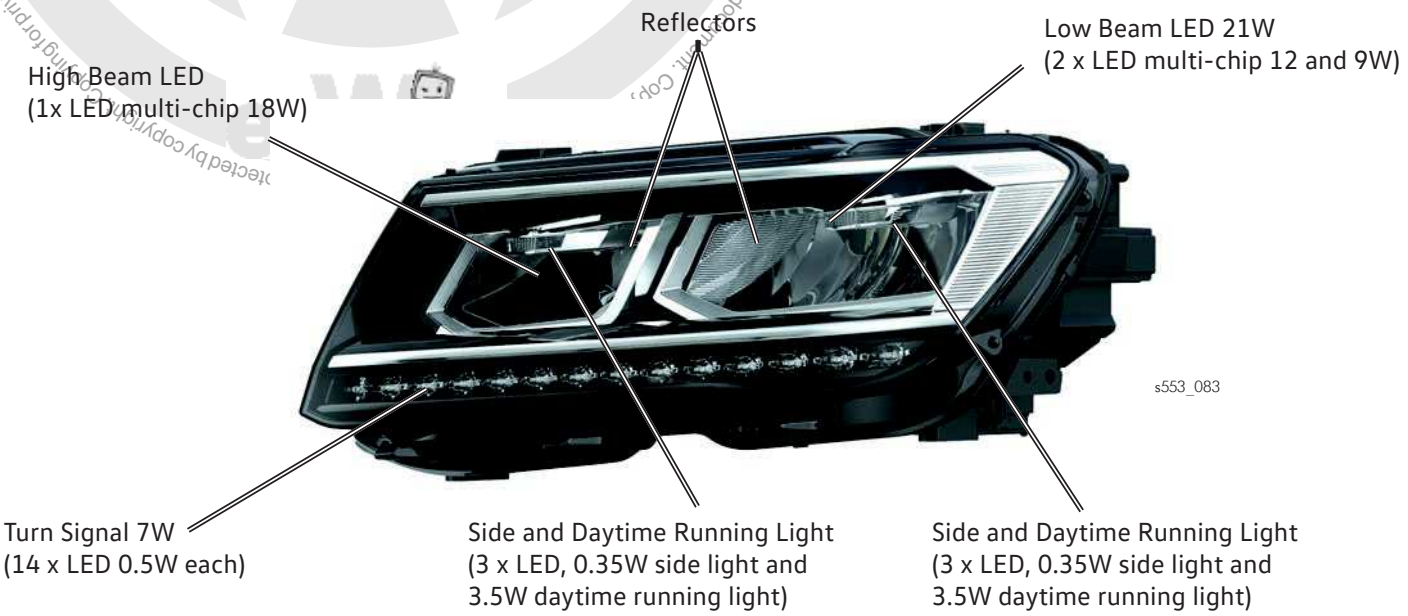
- Halogen headlight
- “Basic” LED headlights
- “Mid” LED headlights

Halogen Headlight

Lights

Basic LED Headlights

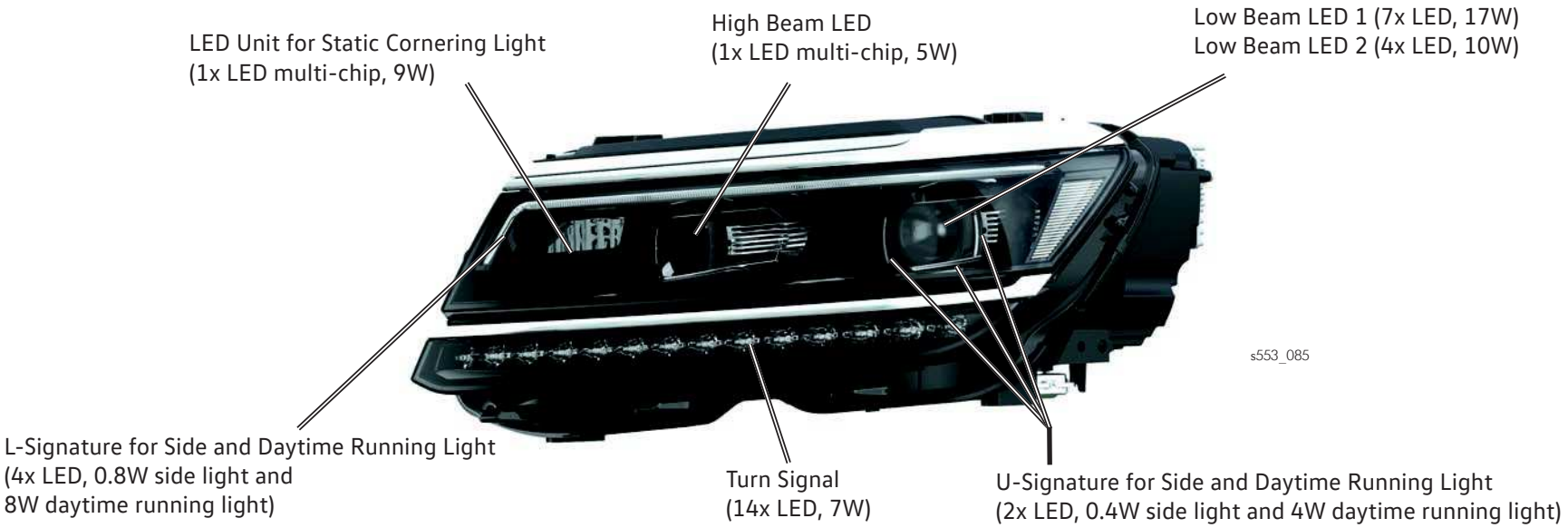
- The Basic LED headlights use reflector technology. The LEDs emit their light against a reflector, which distributes it over the road
- The daytime running light and the side light functions are carried out by two LEDs in the upper part of the reflectors
- The LED light is dimmed for the side light function
- The Basic headlights have dynamic headlight range control



Lights

Mid LED Headlights

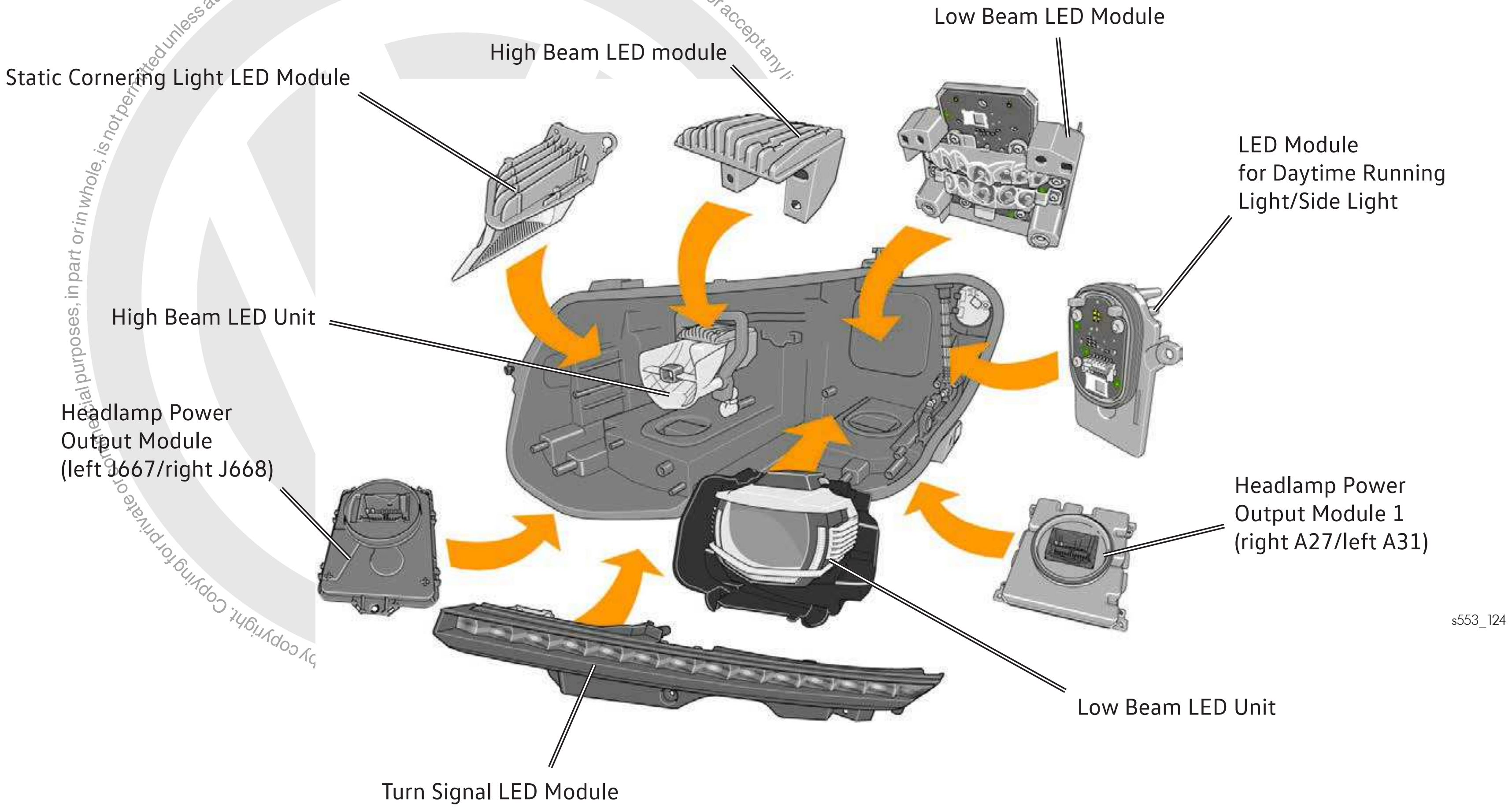
- The LED unit for the Low and High beams use LED lens technology. The LEDs project their light through a lens
- The Mid headlights also have an LED unit for an additional high beam using reflector technology. The LED unit for additional high beam supports the LED unit for main beam and high beam during high beam usage
- The Mid headlights also have the Dynamic Cornering Light (AFS)



Lights

Design

The following LED components make up the LED headlight housing:



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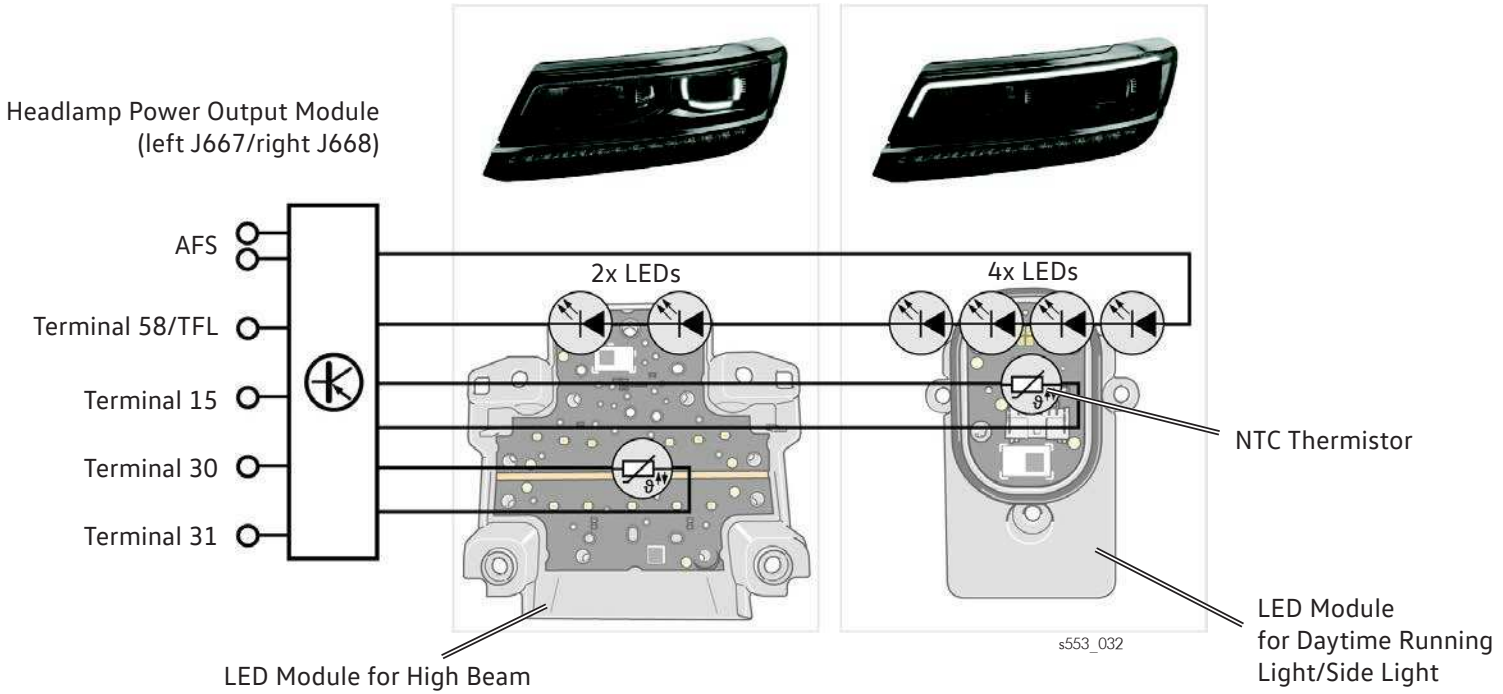
Lights

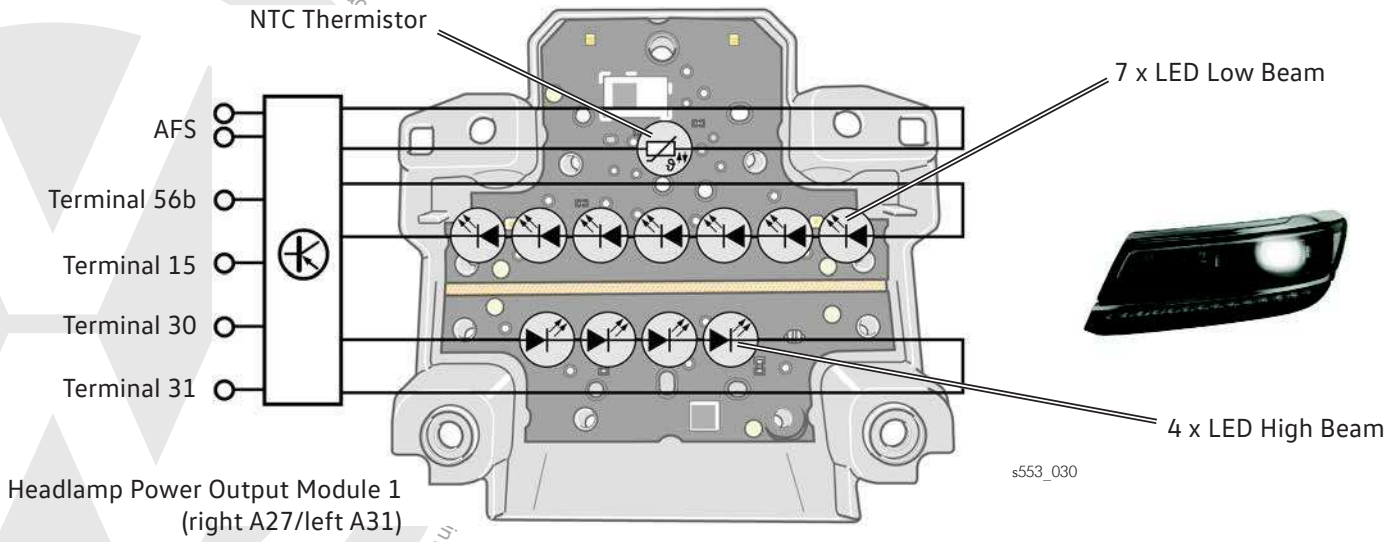
Daytime Running Lights and Side Lights (terminal 58)

The six LEDs used for the daytime running and side lights are connected in series. Two LEDs on the high beam LED module create the U-shape around the low beam with a light strip. Four LEDs in the daytime running light/side light LED module create the L-shape on the upper edge of the headlight with another light strip. An NTC thermistor is installed in each of the LED units and can send the temperature to the output module. If the LEDs overheat, the output module reduces the current strength.



Low Beam (terminal 56b) and High Beam

Seven LEDs are installed in the upper part of the LED module for the low beam. There are four LEDs for the high beam in the lower part. All LEDs for a beam function are connected in series. The temperature in the module is monitored at all times by an NTC thermistor. If the LEDs overheat, the control module reduces the current strength.



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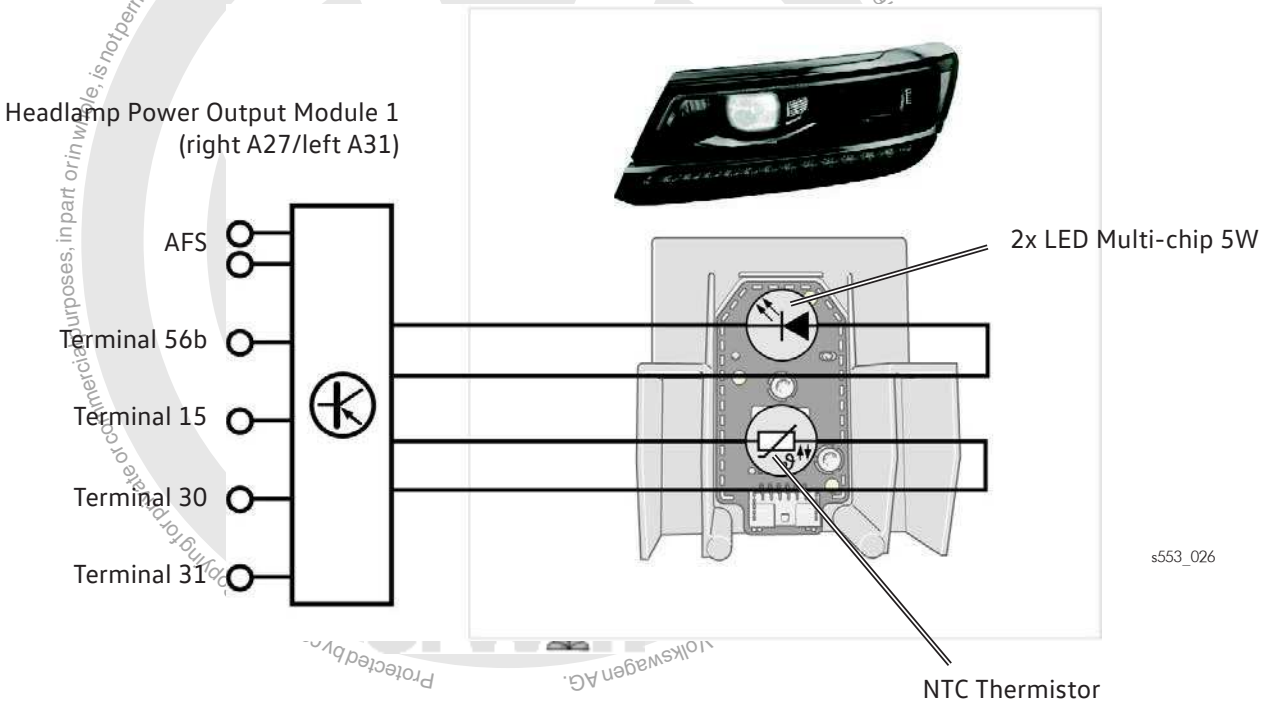
Additional High Beam

The additional high beam LED module has a double LED multi-chip (5W) that is supplied by the A27/A31 output module. The temperature of the LEDs is also monitored by an NTC thermistor.



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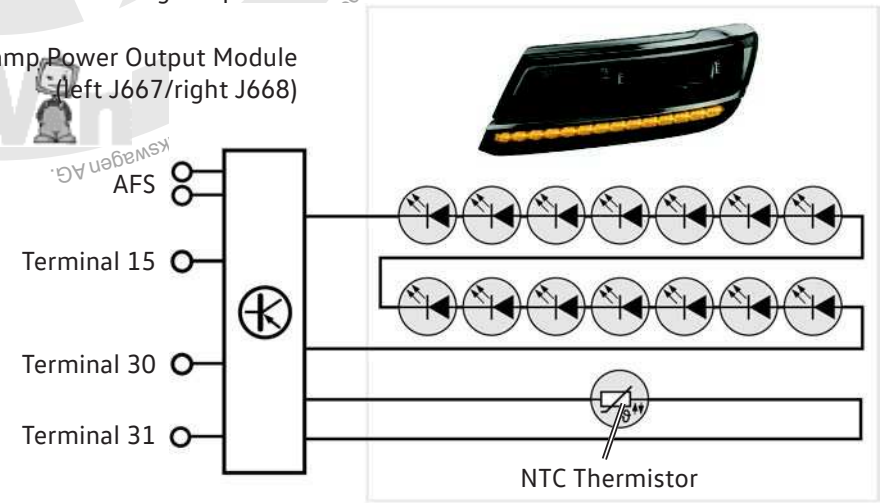
Lights

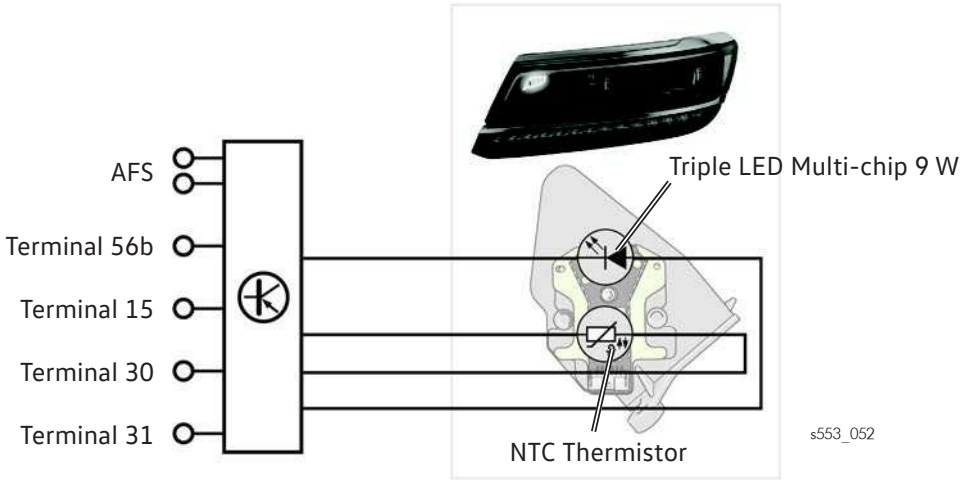
Turn Signal

The turn signal LED module has 14 LEDs that are connected in series. The temperature of the LEDs is monitored by an NTC thermistor and the current strength is reduced if it approaches overheating temperature.



Static Cornering Light

The static cornering light is a triple multi-chip. Its temperature is monitored by an NTC thermistor and the current strength is reduced if it overheats.

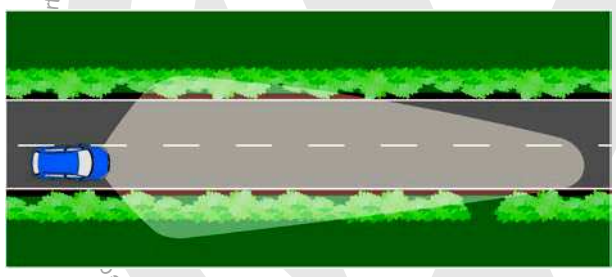


Lights

High Beam Assist

The Tiguan has a High Beam Assist function. This function is designed to automatically change the headlights from a high beam to a low beam.

The Driver Assistance Systems Front Camera R242 is used to detect oncoming headlights. When headlights are detected, the system will dim the headlights. When the camera detects that the headlights are gone, the headlamps will automatically be returned to high beam operation.



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Fog Lights and Static Cornering Lights

The front fog lights are located in the bumper. These are also used as the static cornering light.

s553_135

Front fog light/static cornering light (H8, 35W)

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Lights

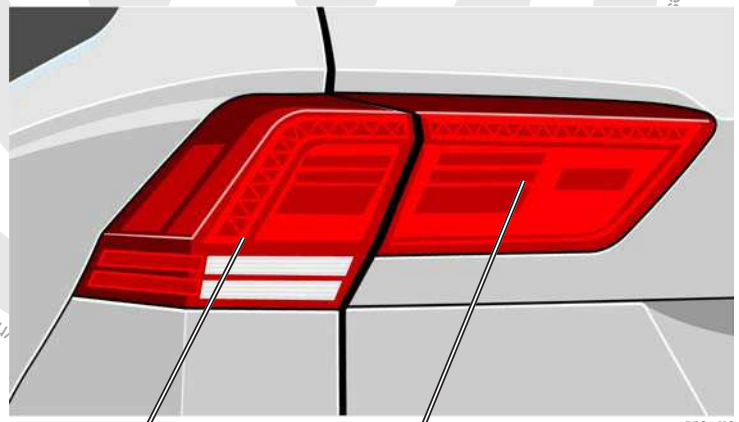
Tail Lights

Two versions are available:

- Basic tail light cluster
- High tail light cluster

The tail light clusters predominantly feature LED technology. One exception is that a bulb is used for the turn signal on the Basic version.

Both types of tail light clusters are split into a fixed section and a section on the rear lid.



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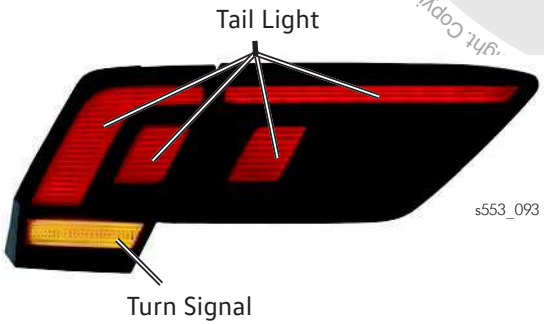
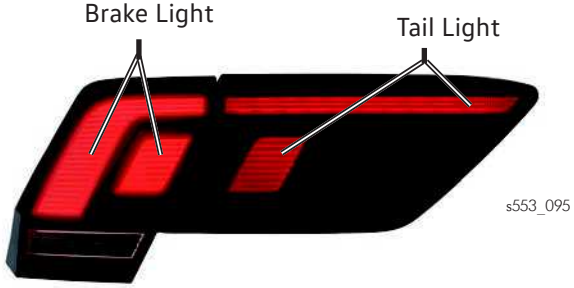
Lights

“Basic” Tail Light Cluster

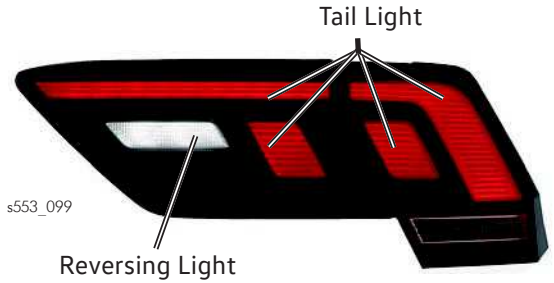
Light Pattern: Tail Light with Turn Signal



Light Pattern: Tail Light with Brake Light



Light Pattern: Tail Light with Reverse Light



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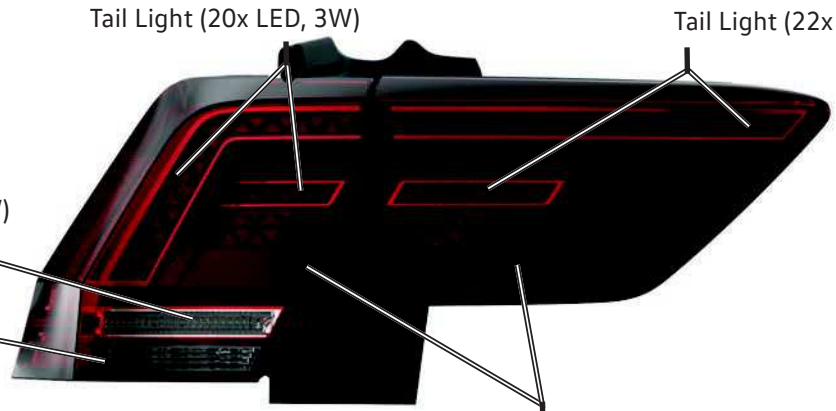
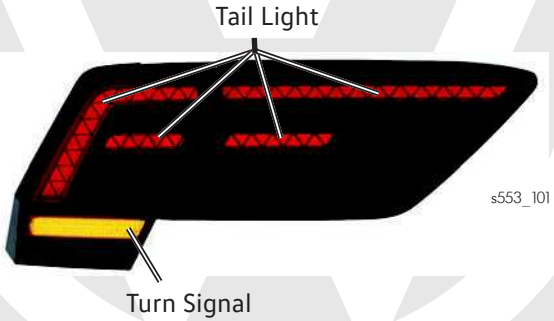
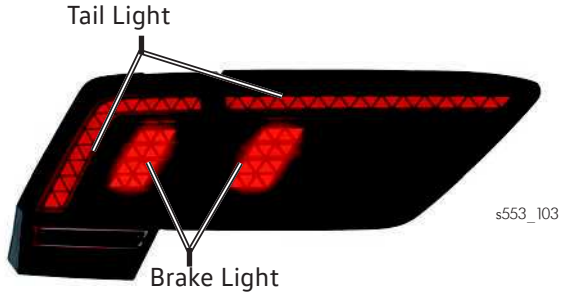
“High” Tail Light Cluster



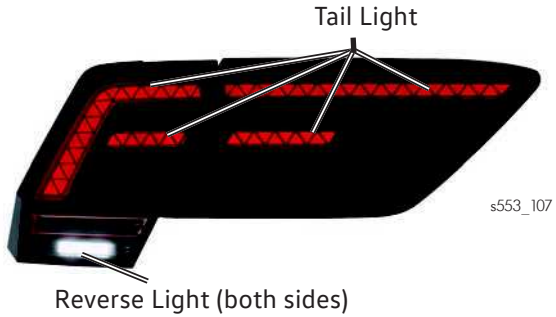
Light Pattern: Tail Light with Turn Signal



Light Pattern: Tail Light with Brake Light



Light Pattern: Tail Light with Reverse Light



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Infotainment

Modular Infotainment Matrix (MIB) II

The second generation of the MIB Infotainment System is used in the Tiguan. The following systems are used:

- Composition Color
- Composition Media
- Discover Media

Composition Color Technical Features

- 6.5" 800X480 px color resistive touchscreen
- Single integrated unit
- Six side keys for functions
- Single-disc, MP3 compatible CD player
- Eight speakers (4 X 20 Watt output)
- SD card slot in the infotainment interface
- AUX-IN located near USB port in center console
- Front USB input that can control a phone and has charging capability
  - This port is backwards compatible and will charge and import media from iPods, MP3 devices, etc. using the device's USB cable. It operates like the MDI in previous vehicles
  - iPods and other media devices are not integrated into App-Connect and can be accessed through the Media hardkey
  - More USB ports may be available depending on model and trim
- Compatible with Car-Net App-Connect, Security and Service features
- Bluetooth with audio capability (HFP, A2DP, PBAP, AVRCP)
- Double tuner with phase diversity for radio signal reception

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Infotainment

Composition Media Technical Features

All functions of the Composition Color plus:

- 8.0" 800X480 px color resistive touchscreen
- Glass covered panel on infotainment interface
- Swipe and zoom gesture capability
- Eight side keys for functions
- Additional USB Ports (depending on options). These ports provide charging capability and can transfer audio data from the phone to the infotainment system. These ports do not provide smartphone control from the Infotainment system:
  - Center USB input in the center console jumbo box
  - Two USB inputs at the base of the center console for charging only
- (1) SD and (1) CD input in glove box

Discover Media Technical Features

All functions of the Composition Media plus:

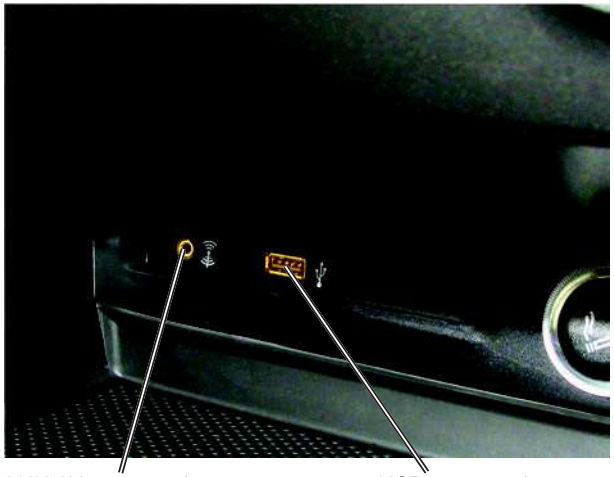
- Navigation functions
- Travel Link information through Sirius XM
- WiFi for Media Control

Infotainment

MIB II Media Inputs

The Tiguan has up to four media inputs, depending on trim level.

- AUX-IN connection and USB connections in front of the selector lever
  - Either one or two USB ports are available depending on trim
  - If both USB ports are present, both USB ports charge, support audio integration and App-Connect
- USB connection in the rear
  - Supports charging only



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Infotainment

USB Socket in the Rear

As noted on the previous page, the rear USB port is optional. The USB Distributor R293 allows for two USB connections to be used at the same time.

It is located inside of the center console near the selector lever.

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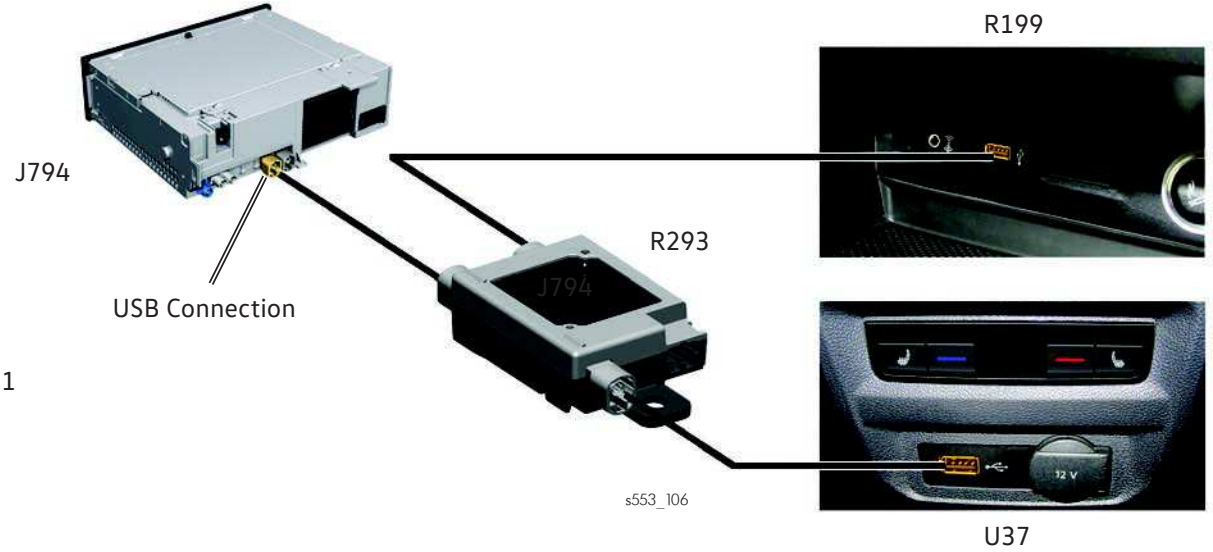
USB Connection



Key

J794	Information Electronics Control Module 1
R199	External Audio Source Connection
R293	USB Distributor
U37	USB Charging Socket 1 (data-enabled)

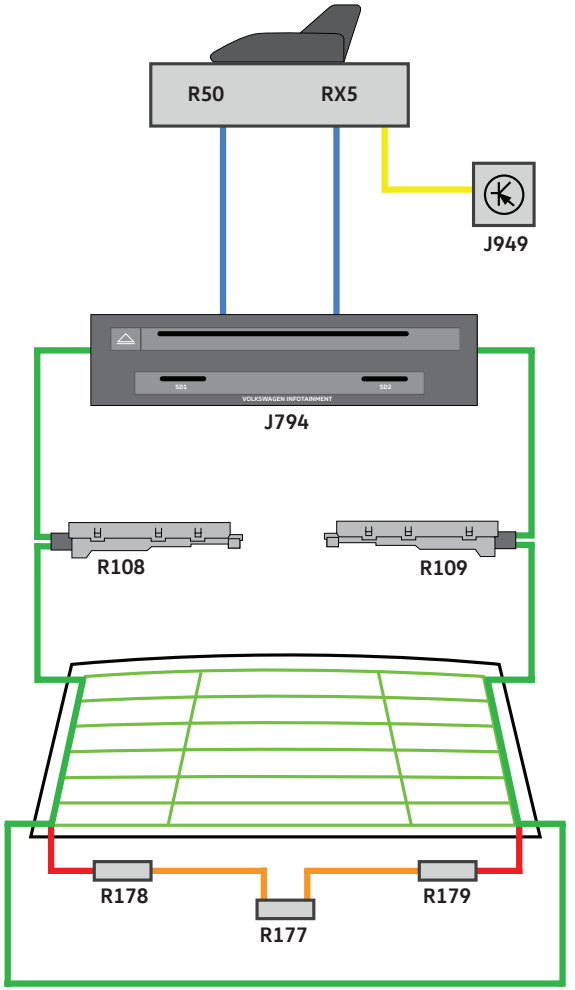
Infotainment

Aerial systems

In addition to the roof aerial, which is available in various versions, the Tiguan has several aerials in the rear window. The following graphic shows the aerial components of a fully-equipped vehicle.

Key

J794 Information Electronics Control Module 1
J949 Control Module for Emergency Call Module and Communication Unit
R50 GPS Antenna
R108 Left Antenna Module (for FM2/DAB)
R109 Right Antenna Module (for AM/FM1)
R177 AM Frequency Filter
R178 FM Frequency Filter in Negative Wire
R179 FM Frequency Filter in Positive Wire
RX5 Roof Antenna



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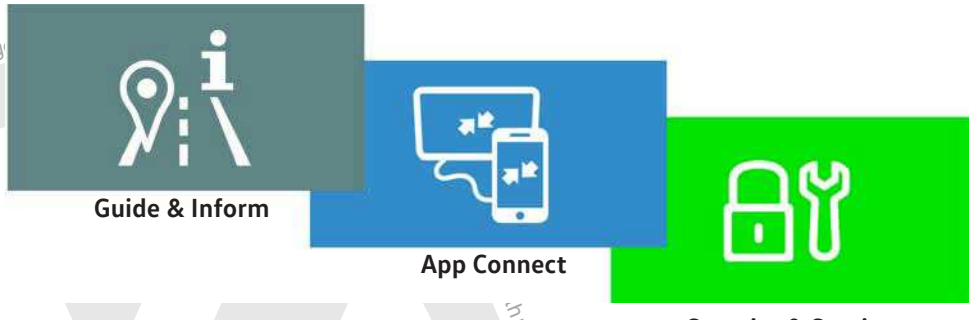
Car-Net

Mobile Online Services

Volkswagen continues to use the Car-Net mobile service in the 2018 Tiguan. There are three main services available with Car-Net:



Guide and Inform:

- Additional online services for the Discover Media navigation system

App Connect:

- Apple CarPlay
- Android Auto
- MirrorLink

Security and Service:

- Emergency calling, vehicle and maintenance interval information, remote control capability for some vehicle functions

All functions except for App Connect require a subscription

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Car-Net

Overview

This table shows the respective available Car-Net services for the “Guide & Inform,” “App Connect” and “Security & Service” functions.

Guide & Inform

Satellite navigation

Parking space information

Traffic information (SIRIUS)

Fuel station prices (SIRIUS)

Weather (SIRIUS)

News

Route importing (Discover Media only)

Destination importing (Discover Media only)

Fuel information

Parking information

Online POI search (voice and/or text)

Personal POI

Online traffic information

App Connect

Apple Car Play

Google Android Auto

MirrorLink

Security and Service

Safe and Secure:

- Automatic crash notification and emergency call
- Manual emergency call
- Roadside assistance
- Stolen vehicle location assistance

Family Guardian:

- Speed alert
- Boundary alert

Remote Vehicle Access:

- Door lock/unlock
- Horn honk/signals flash
- Last parked location
- Send destination to vehicle navigation system
- Agent destination assistance
- Remote status check
- Remote lock/unlock using app or online portal

Diagnostics and Maintenance:

- Service scheduling
- Vehicle health report

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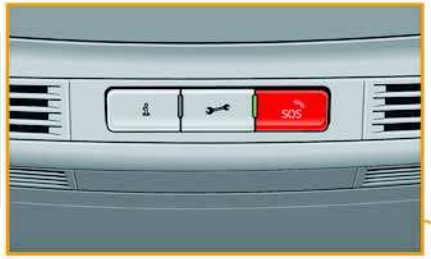
Security & Service

The following components are installed in the Tiguan for the "Security & Service" function:

The three-button module is located in the roof console. The buttons are used to make information, breakdown and emergency calls. The buttons need to be pressed and held briefly in order to set up the connection.

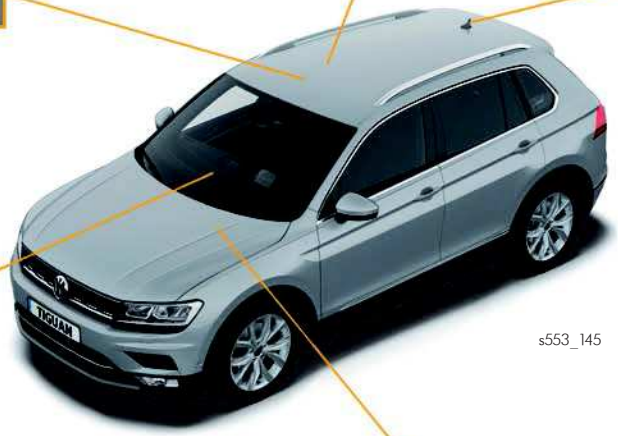


The hands-free system microphone is used for communication.

The microphone is connected directly to the Control Module for Emergency Call Module and Communication Unit J949.

The J949 uses the roof Antenna RX5.

The infotainment system loudspeakers are used for the emergency call and breakdown call. If the infotainment system fails (e.g. after an accident), the additional loudspeaker for telematics will be used. This speaker is directly connected to J949.



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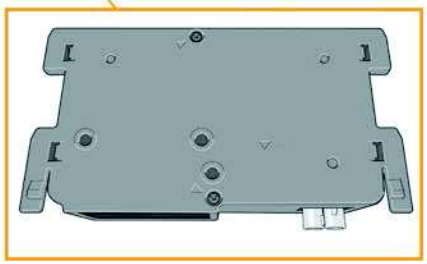
The J949 is located below the dash panel above on the fuse carrier.



Car-Net

Services

The services from the “Security & Service” Car-Net function allow drivers to optimize their personal safety. In addition, they can access important information about their vehicle with this function.

	Service	Description
	Automatic emergency call	An automatic emergency call is triggered when the Airbag Control Module J234 recognizes a collision and a restraint system (belt tensioner or airbag) is triggered. The airbag control module transmits a signal to the Control Module for Emergency Call Module and Communication Unit J949. This automatically triggers an emergency call.
	Manual emergency call	The emergency call can also be made manually. Just press and hold the emergency call button in the roof console.
	Automatic accident notification	In a minor accident without airbag deployment, the user will see a pop-up window on the infotainment system display. The Volkswagen Roadside Assistance call center can be contacted directly. If you wish, a voice connection will be set up and vehicle and position data transferred to the call center.
	Service scheduling	In order to use this service, users need to save their primary Volkswagen dealer on the customer portal. When the next service is due, the vehicle will automatically transmit the vehicle data to this dealer. The dealer can then contact the customer and prepare the appointment accordingly.
	Breakdown call	If the vehicle has a fault, the user can set up a voice connection to the Volkswagen Roadside Assistance by pressing a button. At the same time, vehicle and position data is transferred.
	Vehicle health report	Users can find out about the condition of their vehicle online with this service. On the customer portal, the customer is provided with an overview of any illuminated indicator or warning lamps, the mileage and the time until the next service. The vehicle health report can only be accessed via the customer portal.
	Driving data	Users can check the driving data for their vehicles on the customer portal or in the Car-Net smartphone app. This includes: • Fuel consumption • Distance covered • Driving time

Car-Net

	Services	Description
	Vehicle status	Users can access vehicle data via the Car-Net smartphone app. The following is displayed: • Mileage • Service information • Remaining range • Fuel level
	Doors and lights	This function allows users to check whether doors and windows are closed, whether the vehicle is locked and whether the exterior lights are still turned on.
	Lock and unlock	This service allows users to lock and unlock the vehicle remotely with the smartphone app.
	Horn and turn signals	The user can activate the horn and turn signals via the smartphone app.
	Boundary alert	Users can define up to ten different areas that the vehicle may not leave or enter on a map provided on the customer portal and in the app. If the vehicle then leaves or enters one of the defined areas, the user will be notified.
	Speed alert	This service allows users to define speed limits for the vehicle. If the vehicle exceeds the set speed, the user will be notified.
	Parking position	Users can display the last parking position of their vehicle on the customer portal and in the smartphone app. When you switch off the ignition, the parking position is transmitted to the Volkswagen server and stored.
	Online anti-theft alarm	If the anti-theft alarm detects that the vehicle has been broken into, the user will automatically receive an email and a message on their smartphone.

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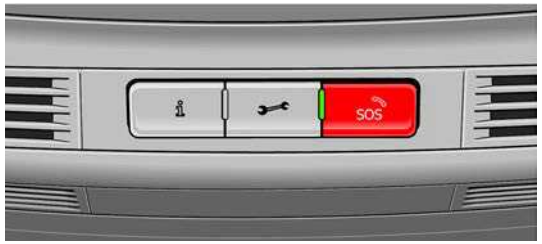
Car-Net

Car-Net Activation

The Car-Net system must be activated before it is delivered to the customer. These general steps should be performed at PDI for activating :

- The vehicle must be in an AT&T cellular coverage area
- The vehicle must have a clear line of sight to the sky
- The vehicle must have 5 miles on the odometer
- The vehicle must be out of Transport Mode and the ignition should be ON. This process should be done as soon as the vehicle is taken out of Transport Mode
- The button assembly should turn green within 5 minutes. The green light confirms that over the air registration has occurred and the Car-Net system is ready
- After the light is green, press the "i" button to connect to the Car-Net service and talk with a representative
- You are not calling to activate the service, just to make sure that the vehicle can connect.
  - Note the name of the representative you talk to in the R.O.
  - Note the case number of the call in the R.O.



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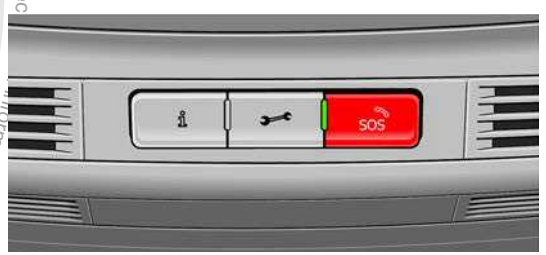
Car-Net

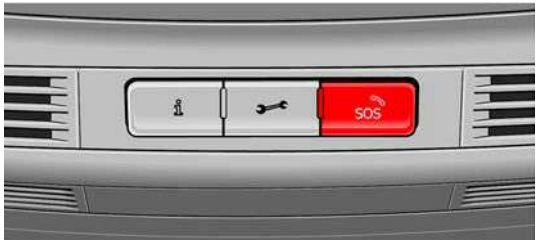
Lights

The VW Car-Net system displays its status using a light in the button assembly.

- A green light means that the system is active and the subscription's status is good



- A red light means that there is a problem in the system. It does not necessarily mean the system will not function



- No light means that the system is not active or that the trial or paid subscription has run out

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Glossary

AFS

(Advanced Frontlighting System)
This function improves illumination of the road when the vehicle is cornering because the headlight beam pattern is directed according to the position of the steering wheel.

AGM

(Absorbent Glass Mat)
Abbreviation for a type of battery in which the electrolyte is held in micro-glass fiber mats.

AM

Amplitude modulation, an electromagnetic wave used to transmit messages. In amplitude modulation, the amplitude of the high frequency is varied.

App

Software application for mobile operating systems.

AUX-IN

Signal input for external audio devices.

Bluetooth

Bluetooth is an industry standard developed by the Bluetooth Special Interest Group (SIG) for wireless communications between devices over short distances.

CAN

(Controller Area Network)
Standardized digital twin-wire data network used in vehicle electronics.

DAB

(Digital Audio Broadcasting)
Radio channel broadcast digitally by radio stations. DAB+ is a further development of digital radio, which was introduced in 2011 in Germany.

DVD

Digital Versatile/Video Disc
A further development of optical storage media with a memory capacity of 4.7 GB, on one-sided, single-layer DVDs (single-layer DVD, DVD±R, DVD±RW), and 8.5 GB, on one-sided, double-layer DVDs (dual-/ double-layer, DVD±R-DL, DVD-RW±DL).

EFB

(Enhanced Flooded Battery)
Abbreviation for the improved form of a wet battery.

Glossary

FAZIT

Fahrzeug Auskunft und zentrales Identifikations-Tool
= vehicle information and central identification tool)
This central database at Volkswagen contains all theft-relevant control unit data integrated into the “immobilizer” function.

FM

Frequency modulation, electromagnetic wave used to transmit messages. In frequency modulation, the frequency of the carrier wave varies in step with the information signal. The amplitude remains constant.

HDD

(Hard Disk Drive)
Also known as an internal hard drive, a magnetic storage medium in which data are written on the surface of rotating disks.

HFP

(Hands-free profile)
Bluetooth standard for hands-free system.

LED

(Light Emitting Diode)
Energy-saving lamp system in which one or more light-emitting diodes are connected to form a source of light.

LIN

(Local Interconnect Network)
Serial single-wire data network, which is used to connect electronic components to higher-level control units.

LVDS

(Low voltage differential signalling)
Standard interface for high speed data transmission.

MIB

(Modular infotainment matrix)
Designation for a modular system used by many brands and models for the vehicle’s infotainment components.

MOST

(Media Oriented Systems Transport)
This is a serial bus system for transmitting audio, video, speech and data signals. Volkswagen currently uses fiber optic cable for this bus system.

MP3

Abbreviation for MPEG Layer3 (Motion Picture Experts Group Layer 3); compression standard for audio data formats.

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Glossary

MQB

(Modular transverse matrix)
Designation for a modular system used by many brands and models in vehicle development and production.

RDS

(Radio Data System)
A standardized system for transmitting additional radio data information such as the name of a broadcaster, audio title etc.

Server

A computer that provides data for other computers (called clients) to access via a network.

SD card

(Secure Digital card)
Small and robust memory cards, e.g. for digital cameras.

SSD

(Solid State Drive)
Storage medium without mechanically moving parts.

Subwoofer

(Bass loudspeaker)
Subwoofers are special speakers for outputting very low frequency bass sounds. A distinction is made between active and passive subwoofers. Active subwoofers have their own power amplifiers; passive subwoofers do not have their own power amplifiers and are connected to an amplifier output like a normal loudspeaker.

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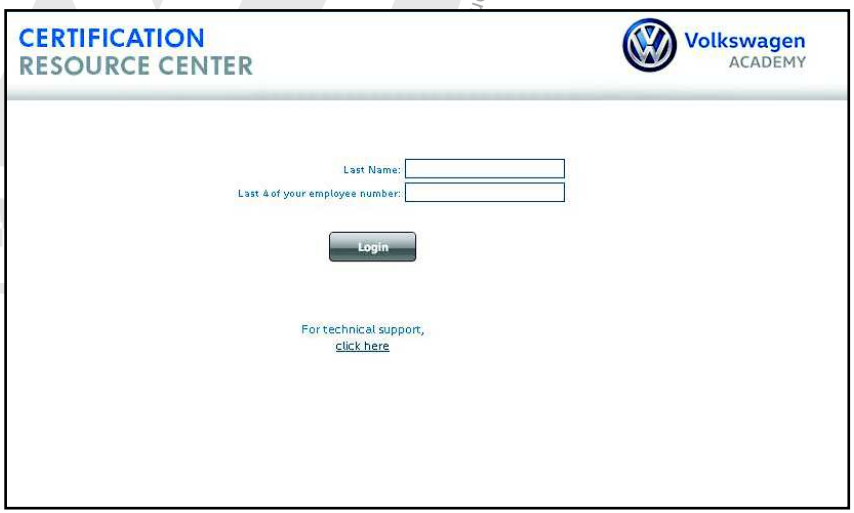

Volkswagen Group of America
2200 Ferdinand Porsche Drive
Herndon, VA 20171
June 2017

Cautions & Warnings

Please read these WARNINGS and CAUTIONS before proceeding with maintenance and repair work. You must answer that you have read and you understand these WARNINGS and CAUTIONS before you will be allowed to view this information.

- If you lack the skills, tools and equipment, or a suitable workshop for any procedure described in this manual, we suggest you leave such repairs to an authorized Volkswagen retailer or other qualified shop. We especially urge you to consult an authorized Volkswagen retailer before beginning repairs on any vehicle that may still be covered wholly or in part by any of the extensive warranties issued by Volkswagen.

- Disconnect the battery negative terminal (ground strap) whenever you work on the fuel system or the electrical system. Do not smoke or work near heaters or other fire hazards. Keep an approved fire extinguisher handy.

- Volkswagen is constantly improving its vehicles and sometimes these changes, both in parts and specifications, are made applicable to earlier models. Therefore, part numbers listed in this manual are for reference only. Always check with your authorized Volkswagen retailer parts department for the latest information.

- Any time the battery has been disconnected on an automatic transmission vehicle, it will be necessary to reestablish Transmission Control Module (TCM) basic settings using the VAG 1551 Scan Tool (ST).

- Never work under a lifted vehicle unless it is solidly supported on stands designed for the purpose. Do not support a vehicle on cinder blocks, hollow tiles or other props that may crumble under continuous load. Never work under a vehicle that is supported solely by a jack. Never work under the vehicle while the engine is running.

- For vehicles equipped with an anti-theft radio, be sure of the correct radio activation code before disconnecting the battery or removing the radio. If the wrong code is entered when the power is restored, the radio may lock up and become inoperable, even if the correct code is used in a later attempt.

- If you are going to work under a vehicle on the ground, make sure that the ground is level. Block the wheels to keep the vehicle from rolling. Disconnect the battery negative terminal (ground strap) to prevent others from starting the vehicle while you are under it.

- Do not attempt to work on your vehicle if you do not feel well. You increase the danger of injury to yourself and others if you are tired, upset or have taken medicine or any other substances that may impair you or keep you from being fully alert.

- Never run the engine unless the work area is well ventilated. Carbon monoxide (CO) kills.

- Always observe good workshop practices. Wear goggles when you operate machine tools or work with acid. Wear goggles, gloves and other protective clothing whenever the job requires working with harmful substances.

- Tie long hair behind your head. Do not wear a necktie, a scarf, loose clothing, or a necklace when you work near machine tools or running engines. If your hair, clothing, or jewelry were to get caught in the machinery, severe injury could result.

- Do not re-use any fasteners that are worn or deformed in normal use. Some fasteners are designed to be used only once and are unreliable and may fail if used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the recommendations in this manual - replace these fasteners with new parts where indicated, and any other time it is deemed necessary by inspection.

next

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Version 1.0

Cautions & Warnings

- Illuminate the work area adequately but safely. Use a portable safety light for working inside or under the vehicle. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.

- Friction materials such as brake pads and clutch discs may contain asbestos fibers. Do not create dust by grinding, sanding, or by cleaning with compressed air. Avoid breathing asbestos fibers and asbestos dust. Breathing asbestos can cause serious diseases such as asbestosis or cancer, and may result in death.

- Finger rings should be removed so that they cannot cause electrical shorts, get caught in running machinery, or be crushed by heavy parts.

- Before starting a job, make certain that you have all the necessary tools and parts on hand. Read all the instructions thoroughly; do not attempt shortcuts. Use tools that are appropriate to the work and use only replacement parts meeting Volkswagen specifications. Makeshift tools, parts and procedures will not make good repairs.

- Catch draining fuel, oil or brake fluid in suitable containers. Do not use empty food or beverage containers that might mislead someone into drinking from them. Store flammable fluids away from fire hazards. Wipe up spills at once, but do not store the oily rags, which can ignite and burn spontaneously.

- Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use these tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten fasteners to the tightening torque listed.

- Keep sparks, lighted matches, and open flame away from the top of the battery. If escaping hydrogen gas is ignited, it will ignite gas trapped in the cells and cause the battery to explode.

- Be mindful of the environment and ecology. Before you drain the crankcase, find out the proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.

- The air conditioning (A/C) system is filled with a chemical refrigerant that is hazardous. The A/C system should be serviced only by trained automotive service technicians using approved refrigerant recovery/recycling equipment, trained in related safety precautions, and familiar with regulations governing the discharging and disposal of automotive chemical refrigerants.

- Before doing any electrical welding on vehicles equipped with anti-lock brakes (ABS), disconnect the battery negative terminal (ground strap) and the ABS control module connector.

- Do not expose any part of the A/C system to high temperatures such as open flame. Excessive heat will increase system pressure and may cause the system to burst.

- When boost-charging the battery, first remove the fuses for the Engine Control Module (ECM), the Transmission Control Module (TCM), the ABS control module, and the trip computer. In cases where one or more of these components is not separately fused, disconnect the control module connector(s).

- Some of the vehicles covered by this manual are equipped with a supplemental restraint system (SRS), that automatically deploys an airbag in the event of a frontal impact. The airbag is operated by an explosive device. Handled improperly or without adequate safeguards, it can be accidentally activated and cause serious personal injury. To guard against personal injury or airbag system failure, only trained Volkswagen Service technicians should test, disassemble or service the airbag system.

back next

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Version 1.0

Cautions & Warnings

- Do not quick-charge the battery (for boost starting) for longer than one minute, and do not exceed 16.5 volts at the battery with the boosting cables attached. Wait at least one minute before boosting the battery a second time.

- Never use a test light to conduct electrical tests of the airbag system. The system must only be tested by trained Volkswagen Service technicians using the VAG 1551 Scan Tool (ST) or an approved equivalent. The airbag unit must never be electrically tested while it is not installed in the vehicle.

- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times before breaking the bead from the rim. Completely remove the tire from the rim before attempting any repair.

- When driving or riding in an airbag-equipped vehicle, never hold test equipment in your hands or lap while the vehicle is in motion. Objects between you and the airbag can increase the risk of injury in an accident.

I have read and I understand these Cautions and Warnings.

back OK

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