

Self Study Program 893213

## The 2022 GTI and Golf R

Tablet Format



Volkswagen Group of America, LLC  
Volkswagen Academy  
Published in U.S.A.  
11/2021

Course Number SSP 893213

©2021 Volkswagen Group of America, LLC.

All rights reserved. All information contained in this manual is based on the latest information available at the time of publishing and is subject to the copyright and other intellectual property rights of Volkswagen Group of America, LLC., its affiliated companies and its licensors. All rights are reserved to make changes at any time without notice. No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, nor may these materials be modified or reposted to other sites without the prior expressed written permission of the publisher.

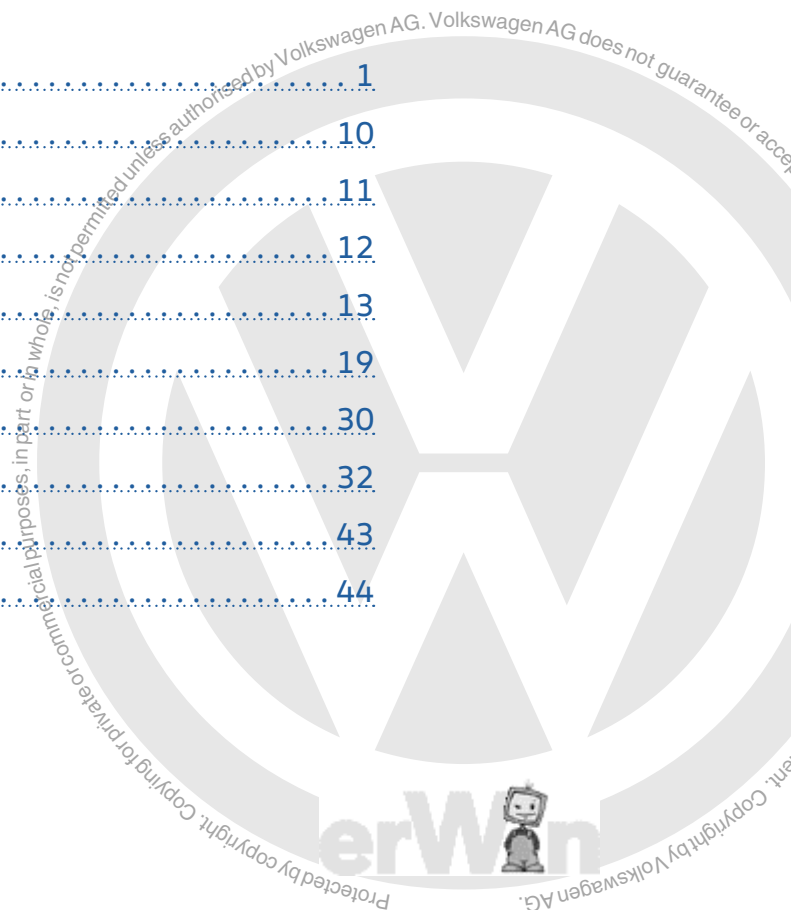
All requests for permission to copy and redistribute information should be referred to Volkswagen Group of America, LLC.

Always check Technical Bulletins and the latest electronic repair information for information that may supersede any information included in this booklet.

Trademarks: All brand names and product names used in this manual are trade names, service marks, trademarks, or registered trademarks; and are the property of their respective owners.

# Table of Contents

<a href="#">Introduction.....</a>	<a href="#">1</a>
<a href="#">Body.....</a>	<a href="#">10</a>
<a href="#">Occupant Protection.....</a>	<a href="#">11</a>
<a href="#">Powertrain.....</a>	<a href="#">12</a>
<a href="#">Transmission.....</a>	<a href="#">13</a>
<a href="#">Heating and Air Conditioning System.....</a>	<a href="#">19</a>
<a href="#">Running Gear.....</a>	<a href="#">30</a>
<a href="#">Electrical System.....</a>	<a href="#">32</a>
<a href="#">Convenience Systems.....</a>	<a href="#">43</a>
<a href="#">Infotainment.....</a>	<a href="#">44</a>



# Introduction

---

Along with its sporty design, the new GTI and Golf R have the same technical and forward-thinking momentum of the previous generations, including digital and interactive displays and controls and new driver assist functions. In addition, these vehicles are the most sustainable, secure, communicative, convenient and most intelligent GTI and Golf R ever.



# Introduction

---

## Product Features

This SSP provides a summary of the 2022 GTI and Golf R features such as:

- IQ.Drive with Adaptive Cruise Control, Lane Assist, Travel Assist and Emergency Assist
- Driving modes
- Chassis features
- Natural voice control
- Climate control
- Modular infotainment matrix MIB 3
- 2.0L Engines
- Active Info Display (Digital Cockpit)
- Windshield head-up display (wHUD)
- Sensitive operation buttons
- New digital display components in the dash panel



# Introduction

## The Exterior

Enlarged Panoramic Sliding Sunroof



Side View



- Deep-drawn roof line for authentic sportiness
- Sharper forward-leaning C-pillar angle
- Character line all the way to the rear

New LED Headlight Design



Aggressive Vehicle Front With LED Front Foglights



# Introduction

## The Exterior

New LED Tail Light Cluster Design



Exterior Lighting



- Background lighting with door handle recess lighting
- Downward projection of Volkswagen logo by exterior mirror

Rear Horizontal Lines Reinforce the Impression of Width



Brand Logo and GTI Lettering at the Rear



# Introduction

## Interior

All Interior Lights in Full LED Technology



Shift-by Wire Module with Selector Lever



Roof Console with Controls Including the Panoramic Sliding Sunroof with Touch Slider and Dimmable Interior Lights



Controls for Light Functions, Windshield Heating and Ventilation



# Introduction

## Interior

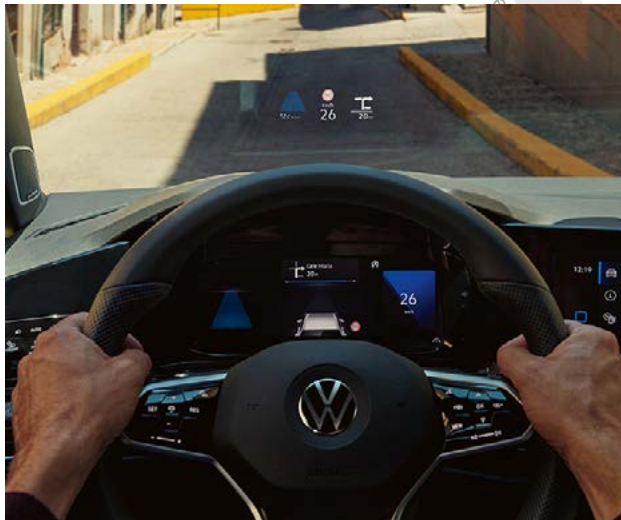
Infotainment System with 8.25" or 10" Touchscreen



Digital Dash Panel Insert with 10.2 inch Display



Windshield Head-up Display (HUD) with Special Windshield Film



Slider Control for the Air Conditioning System Temperature Setting and Volume Setting



# Introduction

## Interior



Touch controls to open the infotainment system menu:

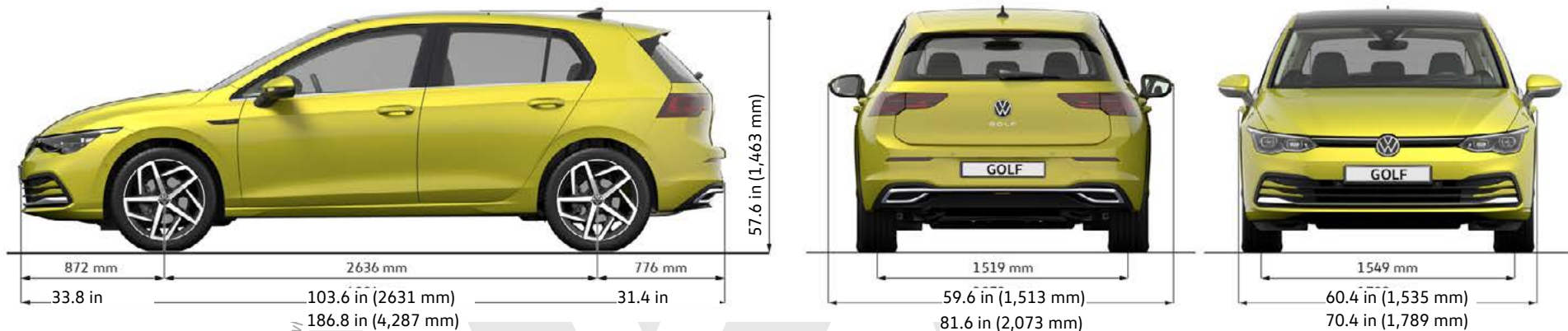
- Air conditioning system
- Heater and fresh air system
- Driving profile selection
- Driver assist systems

Hard button for hazard warning lights system.

# Introduction

## Technical Data - Dimensions and Weights

The data for the GTI is displayed below. Golf R specifications vary.



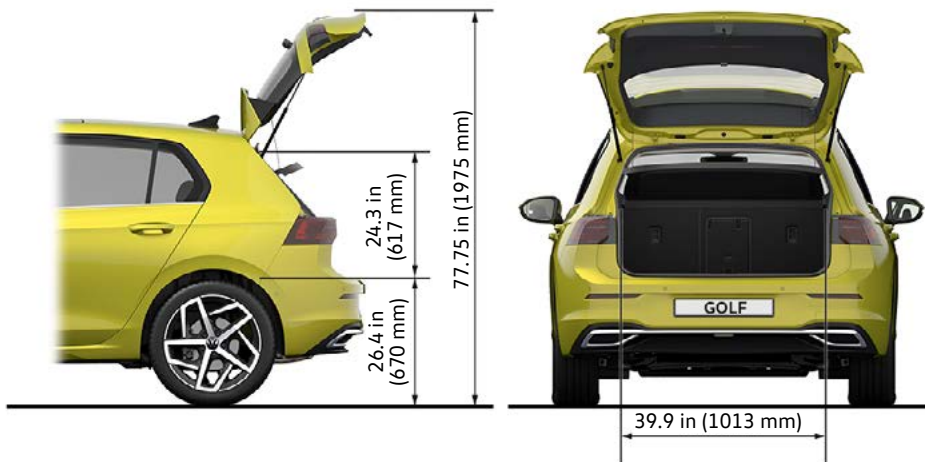
### Specifications

Gross Vehicle Weight Rating	4,255 lb (1,930 kg)
Curb Weight	3,113 lb (1,412 kg)
Turning Circle	35.8 ft (10.9 m)
Ground Clearance	4.6 in (118 mm)
Drag Coefficient	0.31 cw

# Introduction

## Technical Data - Dimensions and Capacities

The data for the GTI is displayed below. Golf R specifications vary.



### Capacities and Load-through Width

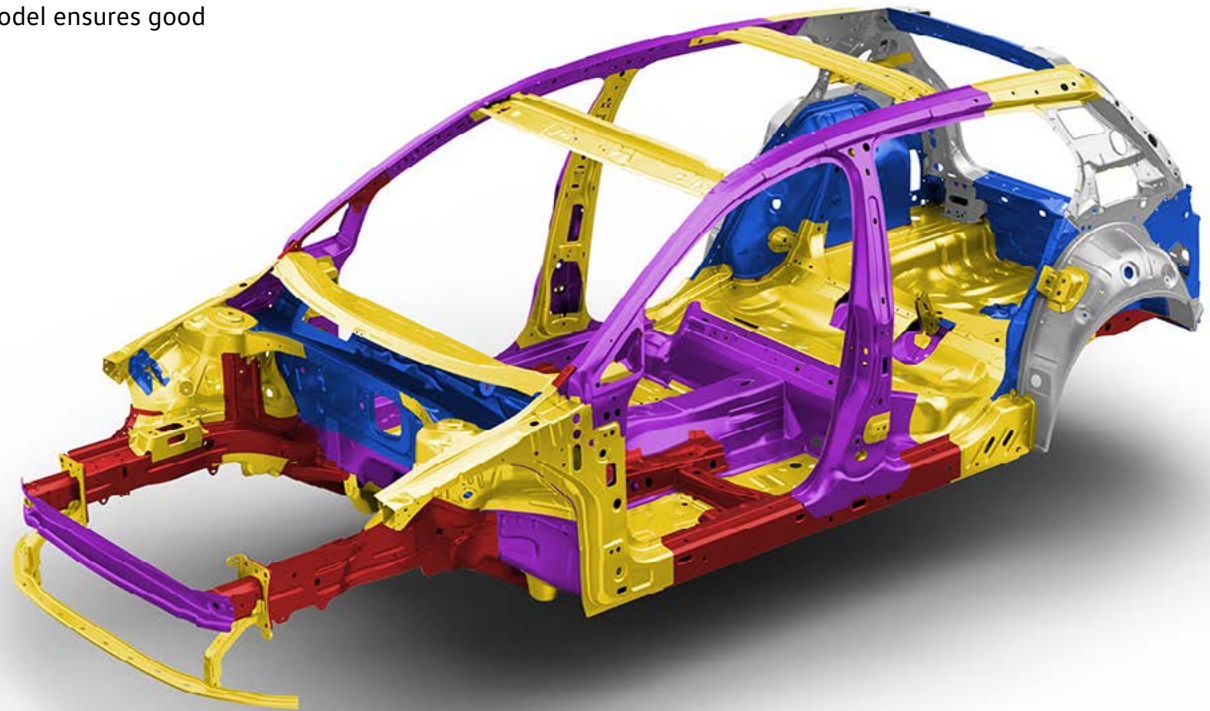
Luggage Compartment Capacity	19.9 Ft <sup>3</sup> (564 l)
Luggage Compartment with Rear Seat Backrest Folded Down	34.5 Ft <sup>3</sup> (977 l)
Fuel Tank Capacity	13.2 Gallons (50 l)
Wheel Housing Load-through Width	39.9 in (1013 mm)

# Body

## Body Structure

When the 2022 GTI was developed, chassis focal points were on creating a high degree of crash safety and a low vehicle body weight. This is why a higher share of ultra high-strength (hot-formed) sheet metal components are used.

A C-pillar with a sharper angle than the previous model ensures good aerodynamics.



Soft Steel	< 160 MPa
High-strength Steel	>220 MPa
Super High-strength Steel	>420 MPa
Ultra High-strength Steel	<1000 MPa
Hot-formed Steel	>1000 MPa

# Occupant Protection

---

## Occupant Protection

The occupant protection features the following components:

- Front driver airbag
- Front passenger airbag with deactivation (two-stage)
- Side airbags in front
- Curtain airbags that cover front and rear
- Three-point automatic seat belts with belt pretensioner in front and rear outside seats
- Belt tension limiter in front
- Top tether



Protected by copyright  
Volkswagen AG.

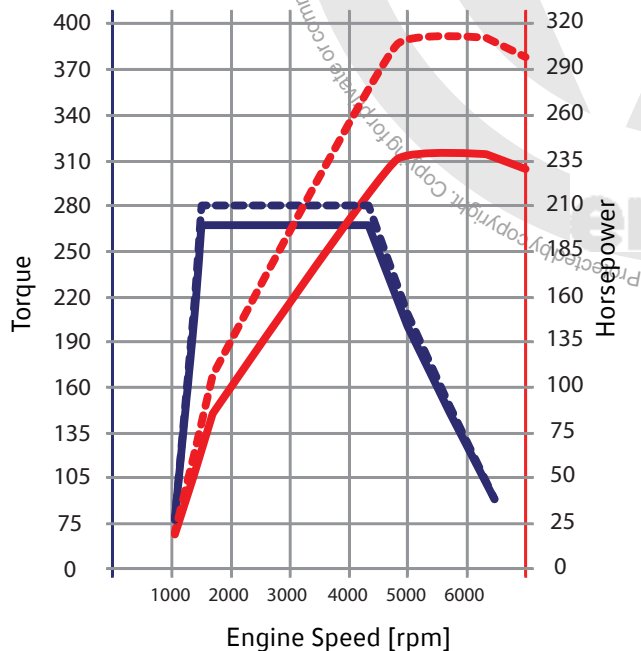
# Powertrain

## 2.0L TSI Engine

The 2.0L TSI engine is an EA888 engine design.

### Technical Features

- Cylinder head with integrated exhaust manifold
- Roller bearing balance shafts
- Smaller crankshaft main bearings with only four counterweights
- Turbocharger with electrical wastegate flap actuation
- Reduced oil pressure
- Sump with upper aluminum section and lower plastic section
- Accessory bracket with integrated oil filter and oil cooler



Solid line - GTI  
Dashed line - Golf R

Displacement	1984 cm3
Bore	82.5 mm
Stroke	92.8 mm
Valves Per Cylinder	4
Compression Ratio	GTI - 9.6:1 Golf R - 9.3:1
Horsepower	GTI - 180 kW (241 hp) Golf R - 235 kW (315 hp)
Torque	GTI - 370 Nm (273 lb-ft) Golf R - 380 Nm (280 lb-ft)
Engine Management	SIMOS 18.1
Fuel	GTI - 87 Octane Golf R - 91 Octane
Emission Treatment	Three-way catalytic converter, one upstream broadband lambda probe of the turbocharger and one step-type lambda probe downstream of the catalytic converter

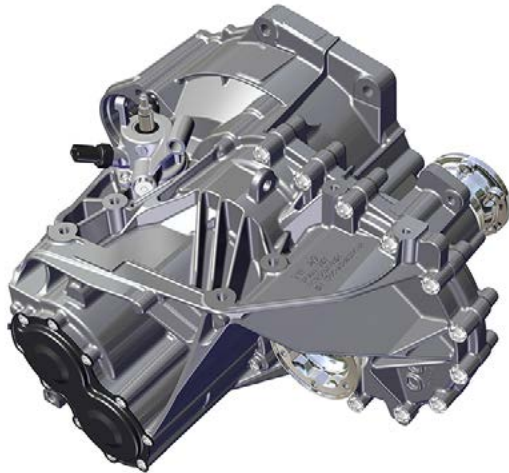
# Powertrain

## Transmissions

Two transmissions are available on the GTI and Golf R. One is a 6-speed manual transmission and the other is a 7-speed DSG transmission. Although these transmissions appear similar, internal modifications have been made to accommodate the different engine power outputs and performance requirements.

The DSG transmission is based on the OGC 7-speed transmission used in the previous Golf R.

- Low-friction shaft bearings and differential bearings
- Low-friction seals on the shafts
- A low-leakage hydraulic system
- Low-friction transmission oil



Manual Transmission  
MQ350 - 6F



DSG Transmission  
DQ381 - 7F

# Transmission

## The Overall Design of the Shift-by-Wire System

The shift-by-wire module with selector lever is located in the center console for DSG transmission vehicles.

An actuator with a cable is attached to the center tunnel under the module. The cable for the actuator operates the parking lock on the transmission.



For DSG transmissions, gears can be shifted manually using the paddles on the steering wheel.

# Transmission

## The Overall Design of the Shift-by-Wire System

The selector lever for the DSG has been replaced by a compact shift-by-wire module. Inactive gears are illuminated in white. The selected gear lights up in amber.

The digital dash panel insert shows a dynamic, multicolored gear shift pattern. The parking lock button is highlighted visually and to the touch.

Shift by-wire provides convenience and safety advantages. When leaving the vehicle, the parking lock engages automatically.

Parking Lock Button

Selector Lever



# Transmission

## How the Shift-by-Wire System is Displayed and Operated

### Display in Instrument Cluster

The gears are displayed in the instrument cluster.



Dynamic Gear Display

# Transmission

## How the Shift-by-Wire System is Displayed and Operated

### Operation of the Selector Lever

The E313 Selector Lever can be shifted by two sensor positions in both directions (A1, A2, or B1, B2) from position X.

The selector lever returns to its starting position X when released.

There is no longer a P position or Tiptronic gate on the selector lever.

The Y5 Selector Lever Range Display in the selector lever shows which gear has been selected – R, N or D/S. Inactive gears are illuminated in white. The active gear lights up in amber.



Selector Lever

Y5 Selector Lever  
Transmission  
Range Display



Selector Lever Positions

# Transmission

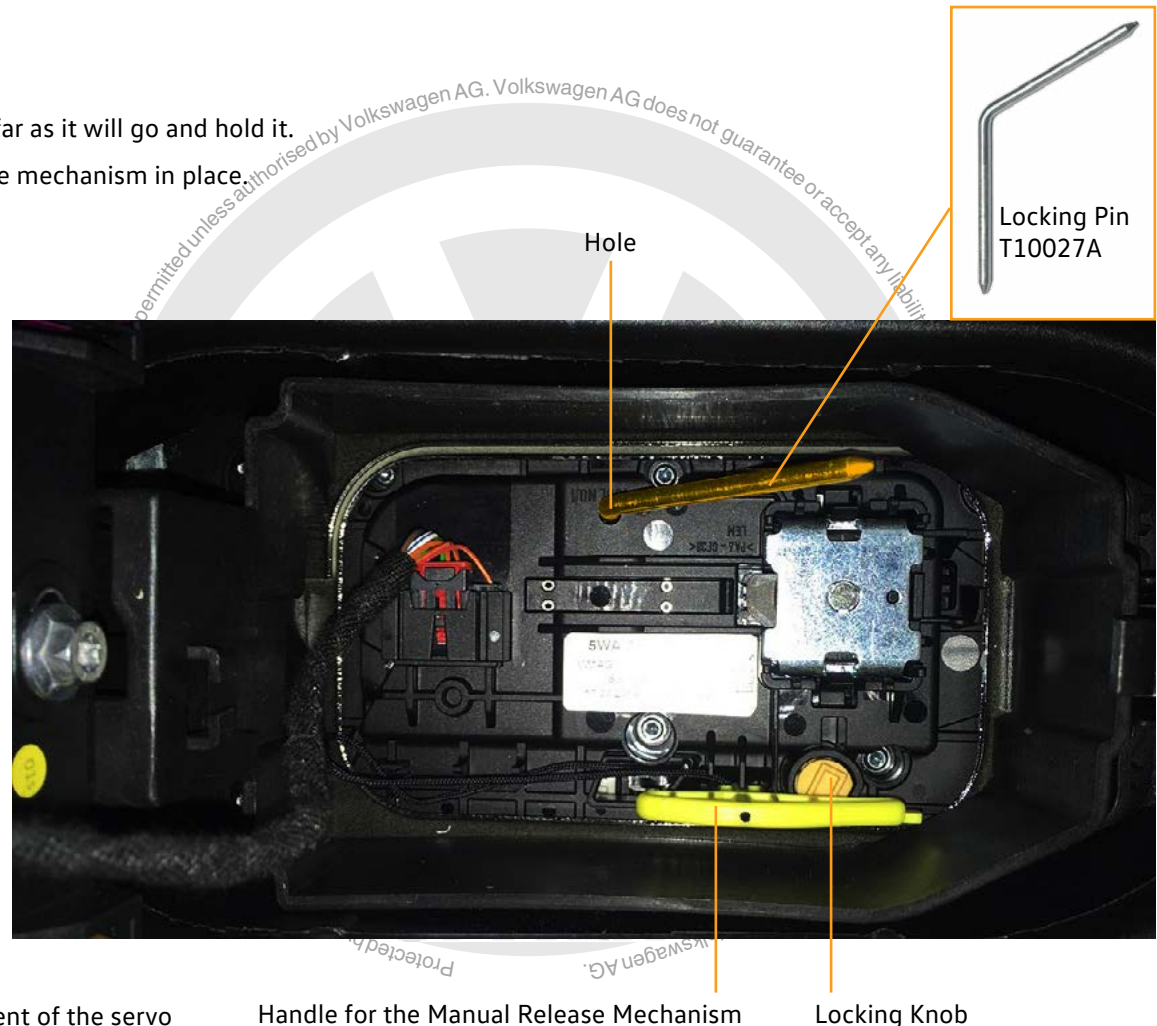
## The Manual Release Mechanism for the Shift-by-Wire System

How to proceed:

1. Insert the locking pin T10027A into the hole.
2. Pull the handle for the manual release mechanism as far as it will go and hold it.
3. Then press the locking knob to lock the manual release mechanism in place.

To reset the manual release mechanism:

1. Pull the handle again. The locking knob pops out.
2. Allow the handle to slowly retract.
3. Put the handle in its home position.
4. Now remove the locking pin.



**Important!**

Insertion of the locking pin prevents any movement of the servo motor in the actuator, and makes the parking lock easy to reset.

# Heating and Air Conditioning System

## Air Conditioning

Two versions of the air conditioning system are available for the GTI/Golf R:

- 1-zone Climatronic
- 3-zone Climatronic



The E265 Rear A/C Display Control Head and the G174 Rear Vent Temperature Sensor allow temperature control for rear seat occupants.



# Heating and Air Conditioning System

## The Heater and Air Conditioning Unit Design

### 1-zone Heater and Air Conditioning Unit

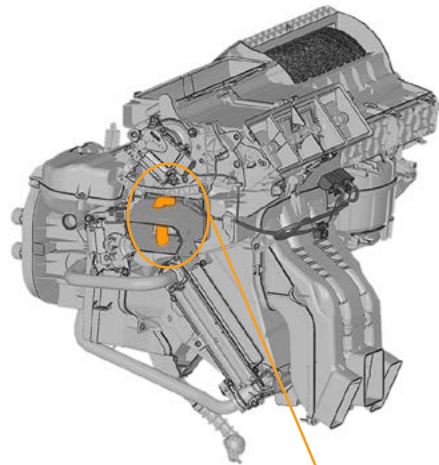
This heater and air conditioning unit has three control motors:

- VX33 Air Distribution Door
- VX34 Left Front Control Temperature Door
- V113 Recirculation Door Motor

This unit also has the G192 Footwell Vent Temperature Sensor so that the interior has the same comfortable temperature that a Climatronic provides.

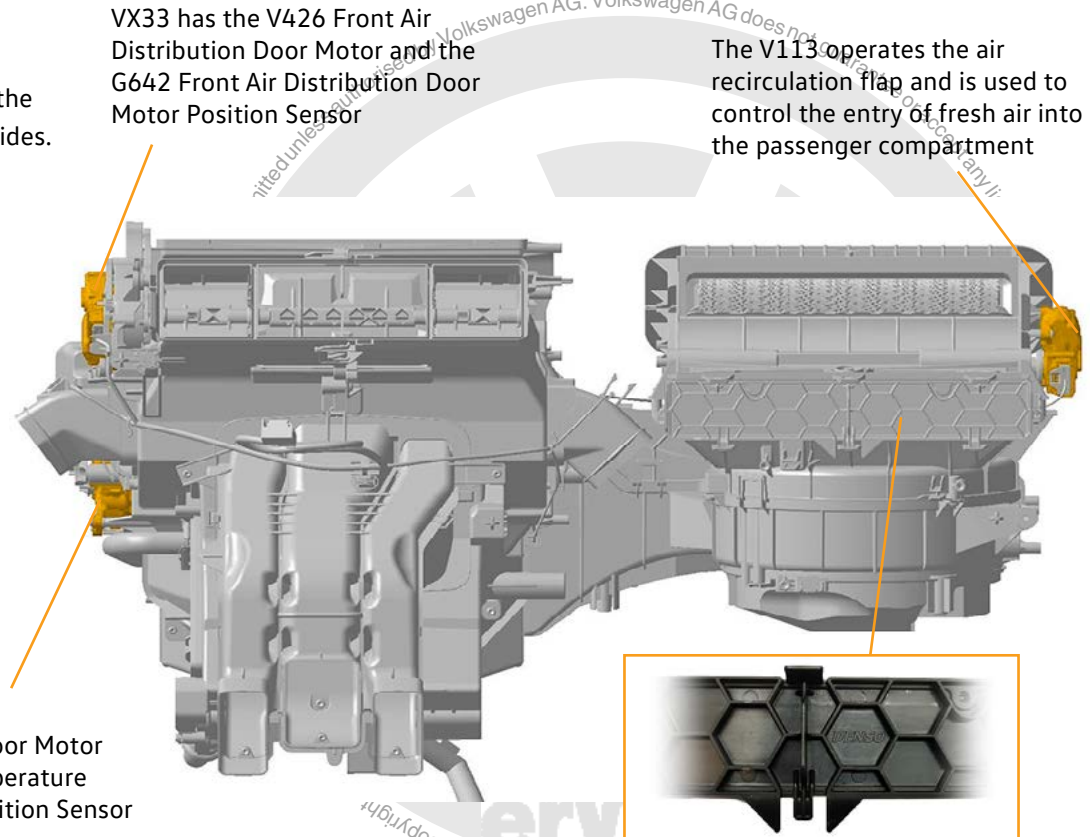


VX components have a control motor and feedback potentiometer. V components only have a control motor.



G192

VX34 has the V158 Left Temperature Control Door Motor and the G220 Left Temperature Control Door Motor Position Sensor



VX33 has the V426 Front Air Distribution Door Motor and the G642 Front Air Distribution Door Motor Position Sensor

The V113 operates the air recirculation flap and is used to control the entry of fresh air into the passenger compartment



The heater and air conditioning units are made by Valeo or Denso.

# Heating and Air Conditioning System

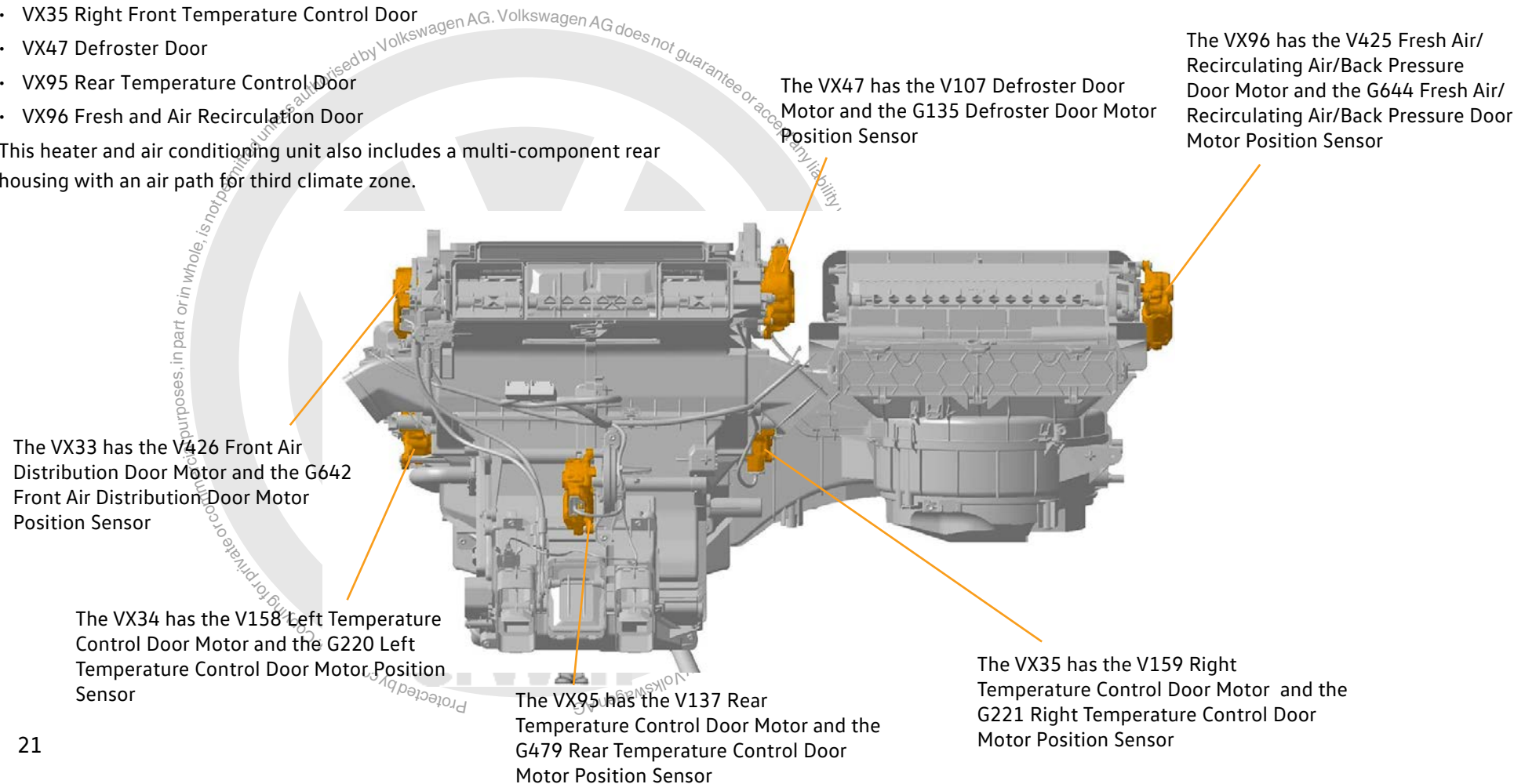
## The Heater and Air Conditioning Unit Design

### 3-zone Heater and Air Conditioning Unit

This heater and air conditioning unit has six electrically operated flaps:

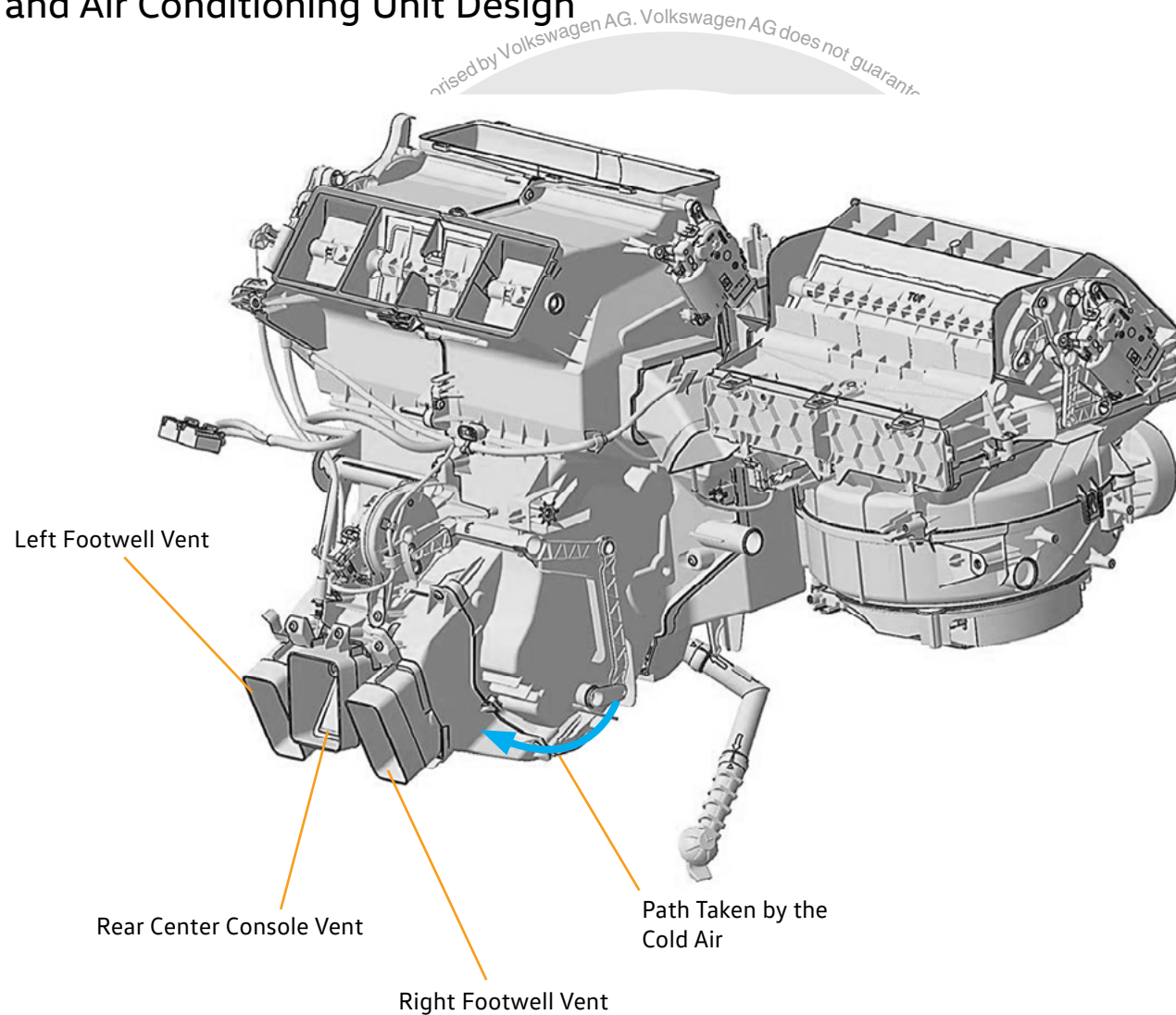
- VX33 Air Distribution Door
- VX34 Left Front Control Temperature Door
- VX35 Right Front Temperature Control Door
- VX47 Defroster Door
- VX95 Rear Temperature Control Door
- VX96 Fresh and Air Recirculation Door

This heater and air conditioning unit also includes a multi-component rear housing with an air path for third climate zone.



# Heating and Air Conditioning System

## The Heater and Air Conditioning Unit Design



# Heating and Air Conditioning System

## Electrical Components

### J979 Heating and Air Conditioning Control Module

This module is located below the instrument panel near the center vent and attached to the instrument panel central tube with a bracket. It regulates the Climatronic system and is also used to activate and control seat and windshield heating, depending on equipment.



The touchscreen of the infotainment system is used for climate control operation.

# Heating and Air Conditioning System

## Electrical Components

### G1090 Vehicle Interior Temperature Sensor Location and Electrical Connection

The vehicle interior temperature sensor is located in the lower steering column trim.

A LIN-Bus is used to transmit data to the control module



# Heating and Air Conditioning System

## Climatronic Operation

### General Operation

All functions of the 1-zone and 3-zone Climatronic systems are operated using the touchscreen of the infotainment system.

The EX22 Switch Module in Instrument Panel, Center provides fast and direct access to the menu for the infotainment system. Along with the air conditioning menu button, the other touch-sensitive buttons in EX22 area control:

- Driver assist systems
- Park menu
- Mode menu

There is a button for the hazard warning lights system.

EX59 Illumination  
Control Head



EX22

# Heating and Air Conditioning System

## Climatronic Operation

### Operation using the Infotainment System

After pressing the air conditioning menu button, the infotainment system displays Climatronic operation.

The header has three air conditioner menus to choose from;

- Smart Climate (only available in 3-zone Climatronic)
- Classic Climate
- Air Care (only available in 3-zone Climatronic)

Air Conditioner Menu Headers

Air Conditioner Menu Button



# Heating and Air Conditioning System

## Climatronic Operation

### Operation Using the Infotainment System - Smart Climate

After selecting the 'Smart Climate' menu, some familiar buttons appear in the infotainment system:

#### Defrost

- Increases air flow to the window
- Intensification of air drying by lowering the evaporator temperature
- Increase the vent temperature

#### Foot Warmer

- Increase air flow to the footwell
- Increase vent temperature

#### Hand Warmer

- Increase air flow onto the person
- Increase output temperature

#### Foot Cooler

- Increase air flow to the footwell
- Decrease vent temperature

#### Fresh Air

- Increase volume of air without adjusting distribution
- Decrease the vent temperature
- Switch from re-circulation mode to fresh air mode



Only one of the functions listed can be active at any one time. Manual activation of air recirculation mode when the 'Fresh Air' function is active will switch off the 'Fresh Air' function.

# Heating and Air Conditioning System

## Climatronic Operation

### EX59 Illumination Control Head (Light and Visibility Cluster)

The defrost function and rear window heating function are not a part of the climate control infotainment system screens. Instead, they are now integrated into the EX59 Light and Visibility Cluster. The Light and Visibility Cluster has touch controls that put all lighting and visibility functions in one place for quick access.



If the Climatronic system is turned off, it can be activated using the button for the defrost function.

# Heating and Air Conditioning System

## Climatronic Operation

### Voice Control

The 3-zone Climatronic system has a new voice control feature, depending on equipment.

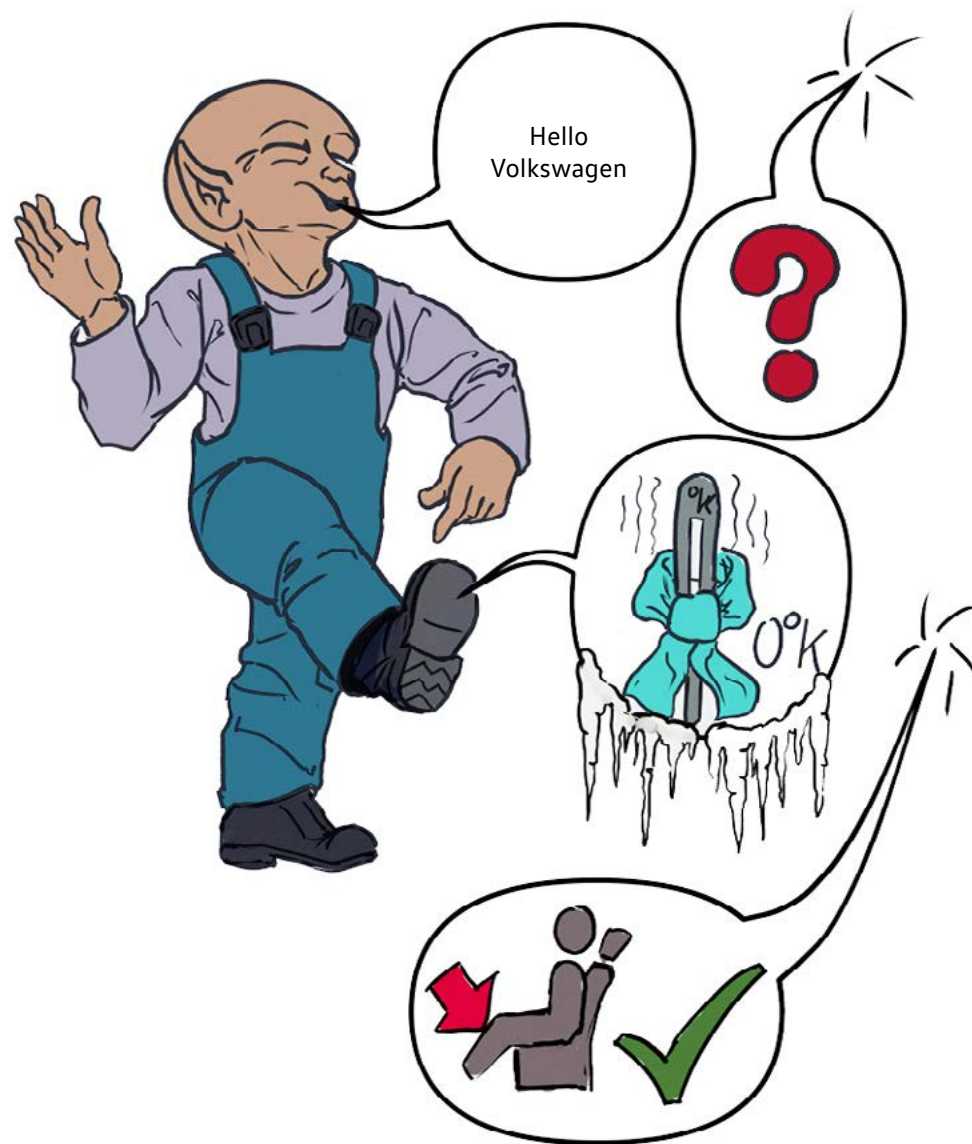
The system is easy to activate by saying the words "Hello Volkswagen" or using the voice input button on the steering wheel.

Voice control responds by saying, for example, "Yes?" and "What would you like to do?" and reacts intuitively to voice commands such as "I feel cold."

The use of new, digital microphones not only improves voice recognition but also voice quality when making phone calls. The microphones can pinpoint who the person speaking is (driver or front passenger).

Online voice recognition is very responsive. The commands spoken can be given in a "natural" language. Voice control only has a limited function when offline.

The statements "I feel cold" or "I feel warm" lower or raise the preset temperature by about 2°F (1°C) unless the temperature is set to "Low" or "High." In this case, the temperature is set to about 72°F (22°C).



# Running Gear

---

## Overview

### The 2022 GTI and Golf R

The overview of the running gear shows standard and optional equipment for the 2022 GTI and Golf R.



# Running Gear

## Overview

### Running Gear Overview

The running gear has the following features:

#### Front Axle

- McPherson front axle suspension strut

#### Rear Axle

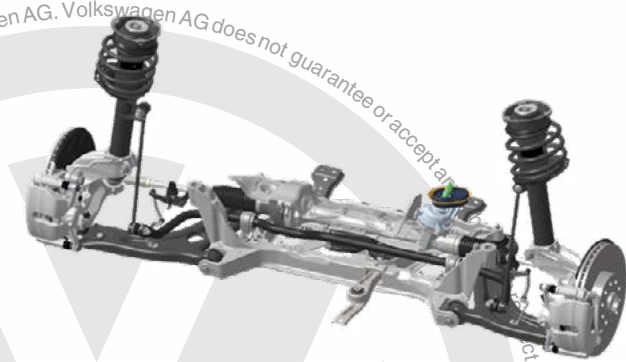
- Multi-link rear axle, motor output
- Multi-link rear axle 4MOTION drive (Golf R)

#### Steering

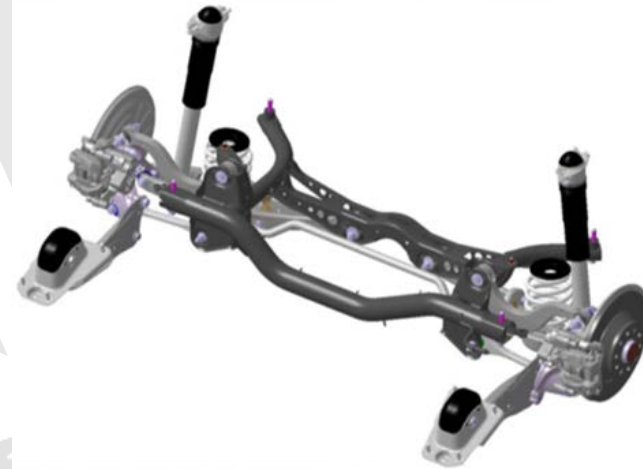
- Electromechanical power steering with a dual pinion with progressive steering

#### Brake System

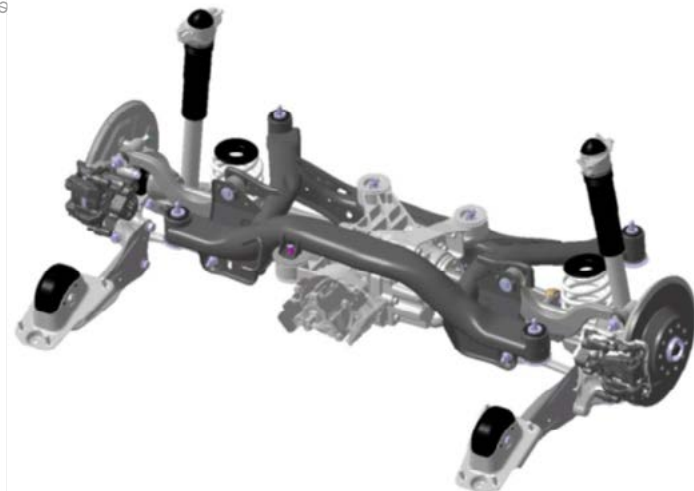
- ABS/ESC unit MK100
- Electromechanical brake servo, generation 2
- Electromechanical parking brake



Front axle for both GTI and Golf R



GTI rear axle



Golf R rear axle

# Electrical System

## The 12 Volt Electrical System



A latest-generation alternator with a higher efficiency is used to generate the charge current.



The relay and fuse holder SC is located on the left side of the dash panel. This is where the fuses and relays are installed that supply the electrical components in the interior with power.



Fuse carrier ST4 is located in front of the 12 volt battery in the engine compartment.

# Electrical System

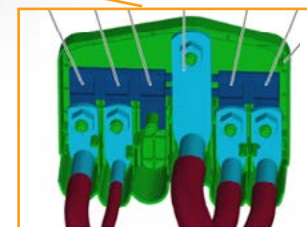
## The 12 Volt Electrical System

Depending on equipment, batteries with a capacity between 59 Ah and 70 Ah are used:

- Improved wet battery EFB (Enhanced Flooded Battery)
- Improved wet battery EFB+
- AGM (Absorbent Glass Mat).



The electronics box is located on the left in the engine compartment next to the 12 volt battery. This is where the fuses and relays are found that supply the electrical components in the engine compartment with power.

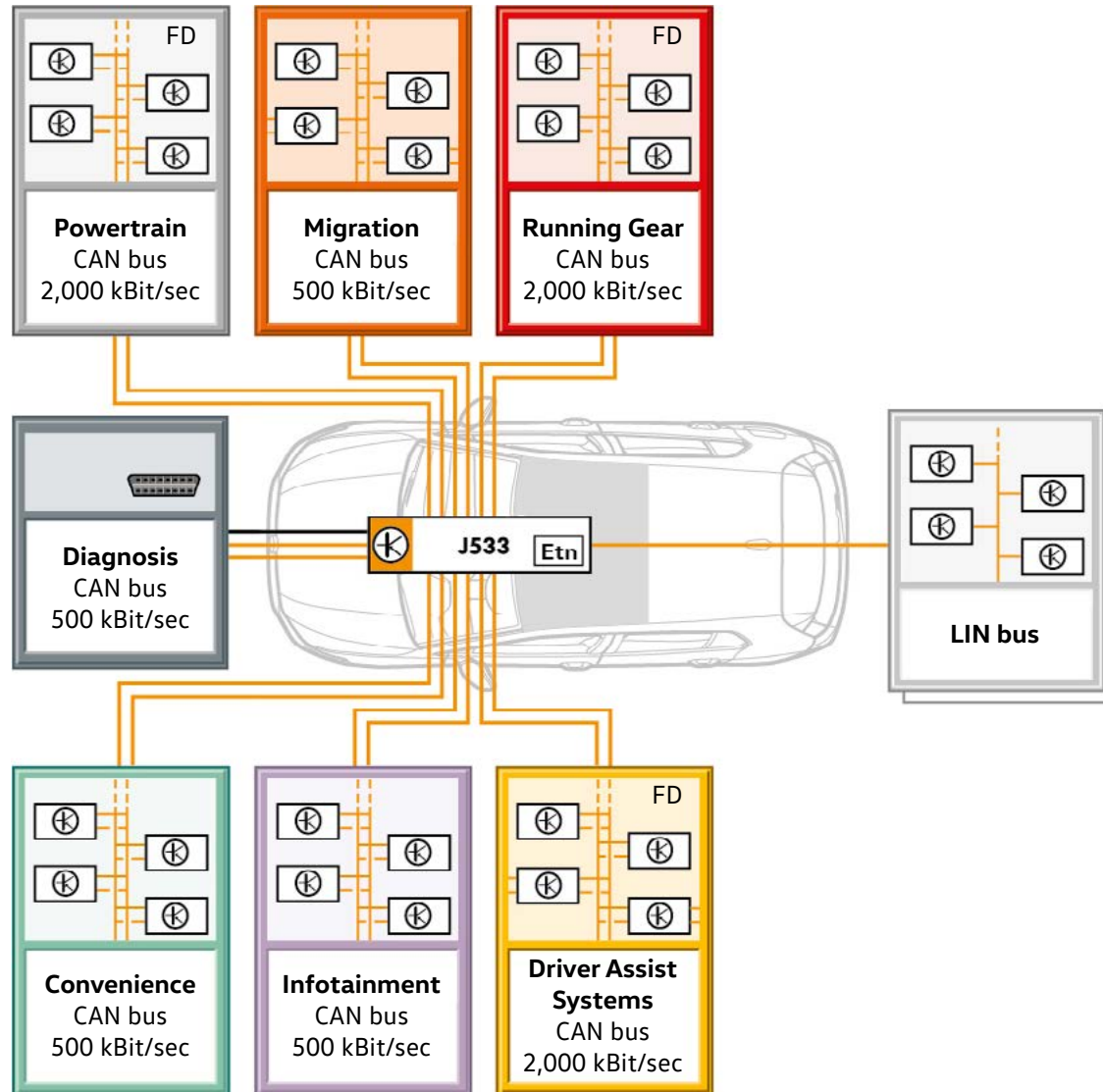


Fuse holder SA is located between the battery and the plenum chambers in the engine compartment. This has fuses to protect the relay and fuse holders SB and SC.

whole, is not permitted unless authorised by Volkswagen AG. Volkswagen AG does not guarantee or accept any liability with respect to the correctness of information in this document.

# Electrical System

## The Networking Concept



not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by Volkswagen

# Electrical System

## The Networking Concept

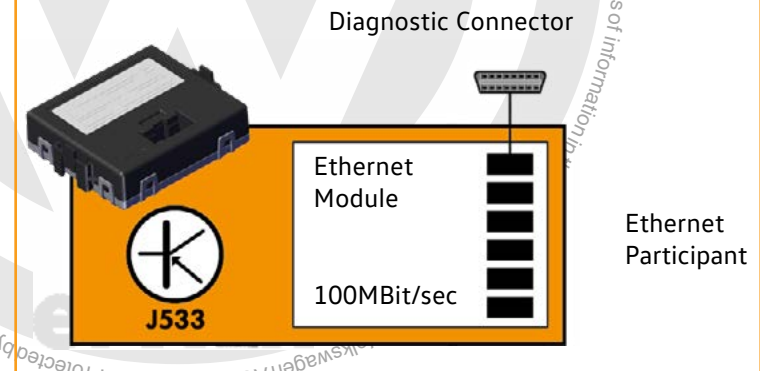
This version of the GTI and Golf R have very complex networking and electrical systems. It has eight CAN-Bus Connections, four LIN-Bus connections and an internal Ethernet module.

Three of the CAN-Buses have been equipped with a flexible data rate (FD) of up to 2,000 kbit/sec.

A second version of the data bus diagnostic interface (Gateway low) without an Ethernet module will be introduced at a later point in time.



It has six Ethernet connections. One of these leads to the vehicle diagnostic connector. A maximum of one Ethernet participant/control unit can be connected to the others respectively. The Ethernet data rate totals 100 MBit/sec.



# Electrical System

## The Exterior Lighting

### Headlights

There are three headlight versions available for the GTI and Golf R:

- Entry LED headlights
- Mid LED headlights
- High LED headlights



Entry LED headlights



Mid LED headlights



High LED headlights



## The Exterior Lighting

### Headlights

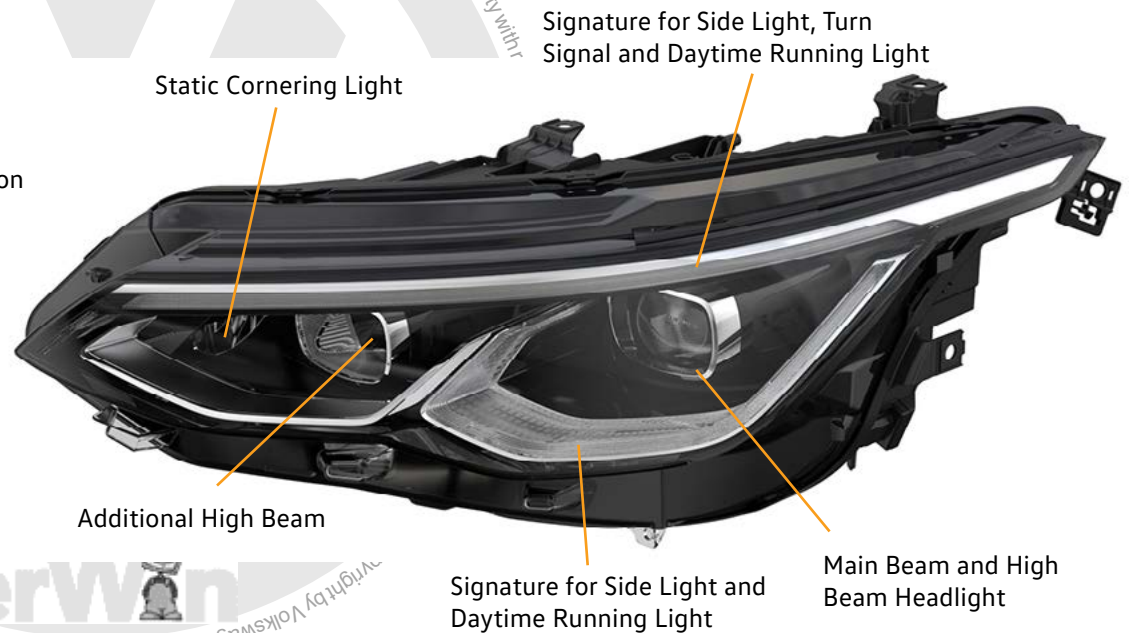
The Entry LED headlight has the following technical features:

- Reflector technology
- LED technology, except for the turn signal (incandescent bulb)



The Mid LED headlight has the following technical features:

- Module for main and high beams use lens technology
- Module for additional high beam uses reflector technology
- Design with full LED technology
- Integrated static cornering light with 'poor weather light' function



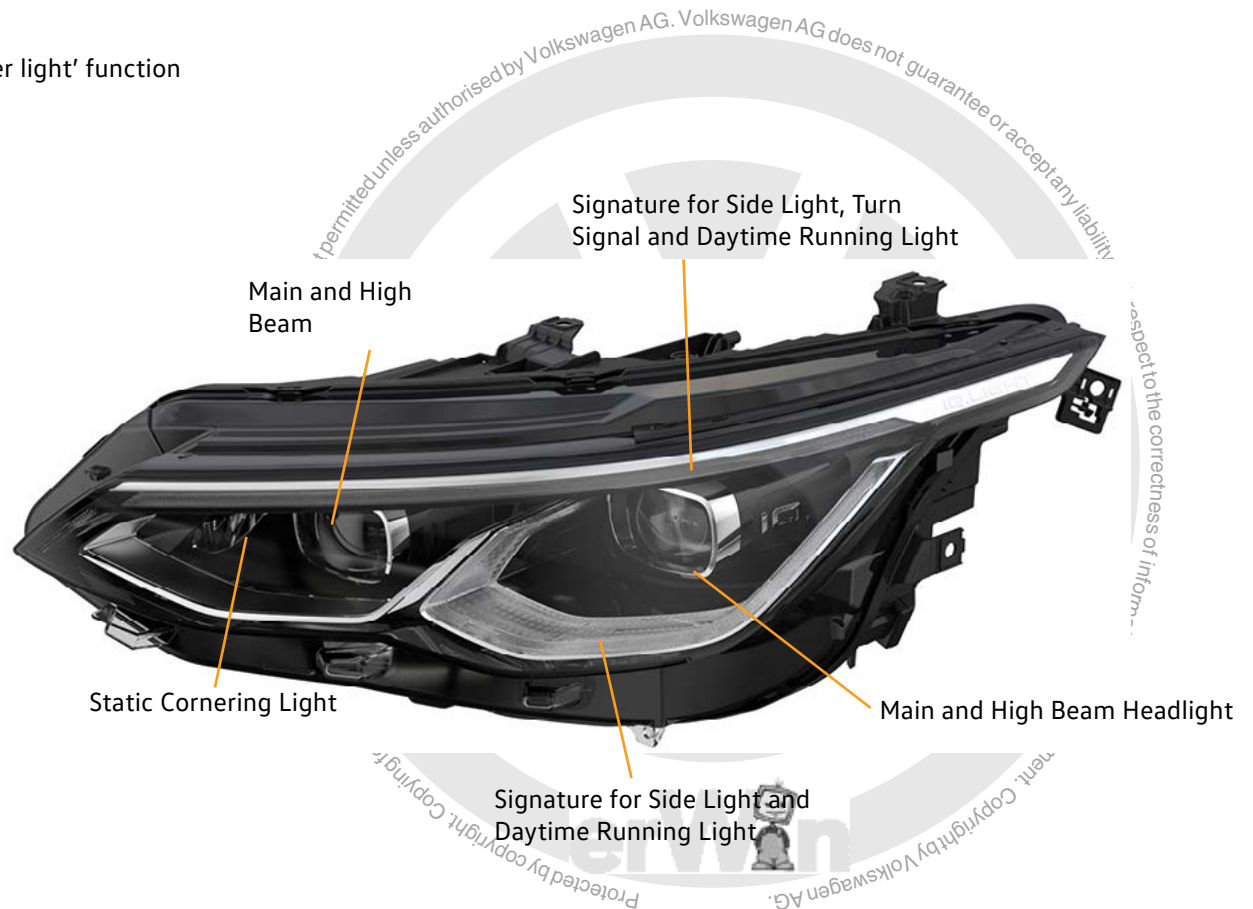
# Electrical System

## The Exterior Lighting

### Headlights

The High LED headlights have the following features:

- Lens technology
- Full LED technology
- Dynamic turn signal
- Integrated static cornering light with 'poor weather light' function
- Dynamic Light Assist (DLA)



# Electrical System

## The Exterior Lighting

### Tail Light Clusters

There are two tail light clusters available for the GTI and Golf R. Both have full LED technology:

- Basic LED tail light cluster
- High LED tail light cluster

The tail light clusters are split into a fixed side part and a component on the rear lid.



Basic LED Tail Light Cluster



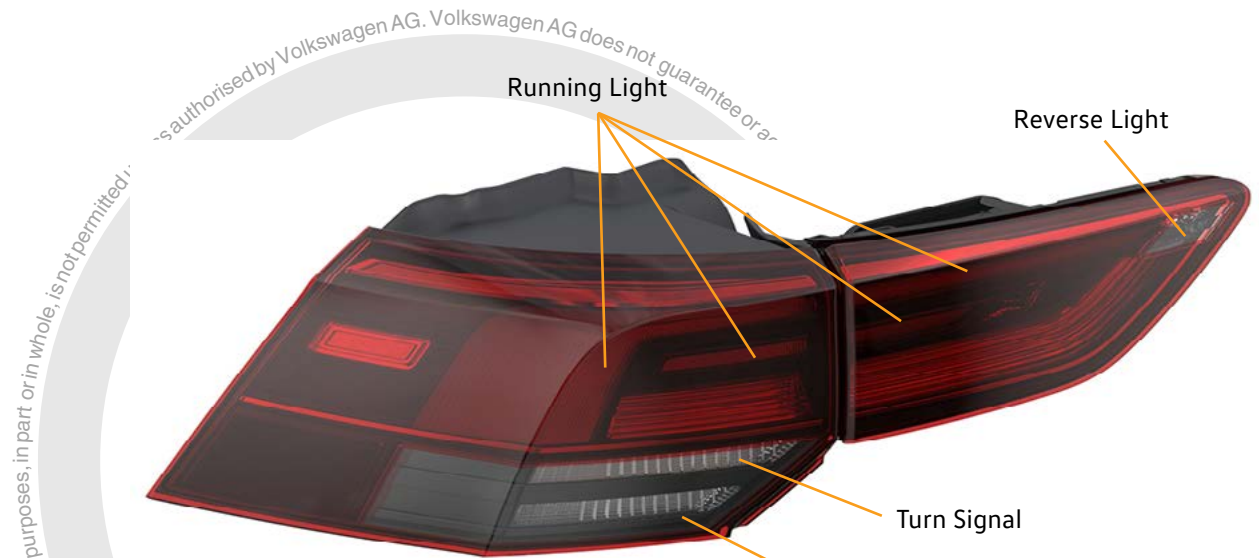
High LED Tail Light Cluster



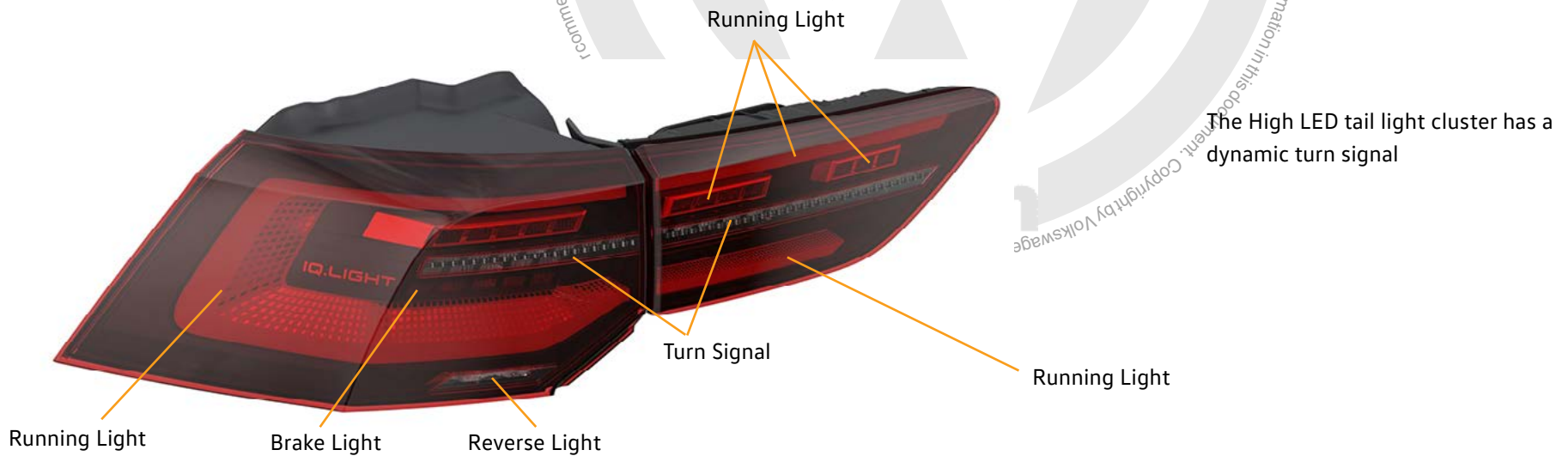
# Electrical System

## The Exterior Lighting

### Basic LED Tail Light Cluster



### High LED Tail Light Cluster



# Electrical System

## The Background Lighting

The background lighting provides indirect lighting in different areas of the vehicle interior. The indirect lighting areas depend on vehicle options.

There are two ways to control the background lighting.

- Using the infotainment system
- By selection of the driving profile

The infotainment system has a menu that allows specific settings to be made for the color of the background lighting. The selection of a driving profile results in a choice of color that suits the driving profile.



# Electrical System

## The Dash Panel Insert

### Digital Cockpit

The GTI and Golf R will have a digital dash panel insert.

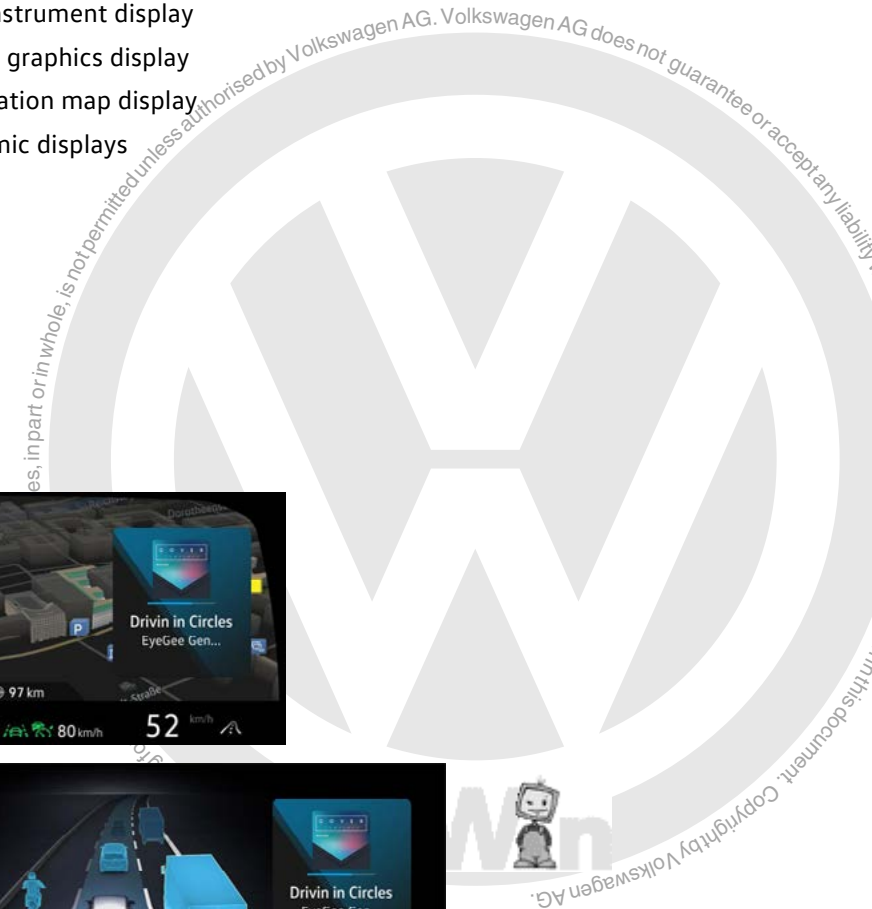
The driver can use the VIEW button on the steering wheel to switch between four views: Classic, Reduced, Navigation, and Assist Systems. The view selected determines what is displayed in the middle.

The content on the left and right can only be changed using the multifunction steering wheel. The following information can be shown: current speed, gear selected, fuel level and remaining range, driving profile and ambient temperature.

### Functions and properties

- 10.25" TFT color display with a resolution of 1,280 × 480 pixels
- Convenience CAN-Bus and Ethernet connection
- Dial instrument display
- Media graphics display
- Navigation map display
- Dynamic displays

### Driver Assist Systems



# Convenience System

## Keyless Access

There are two Keyless Access Systems available for GTI and Golf R: Go and Advanced. Keyless Access Go is the standard system. There is no longer a conventional ignition lock.

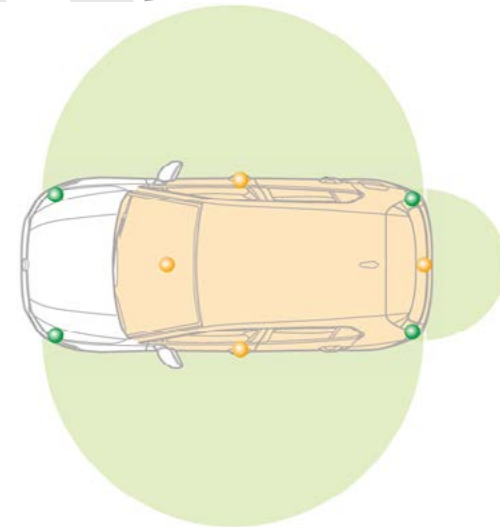
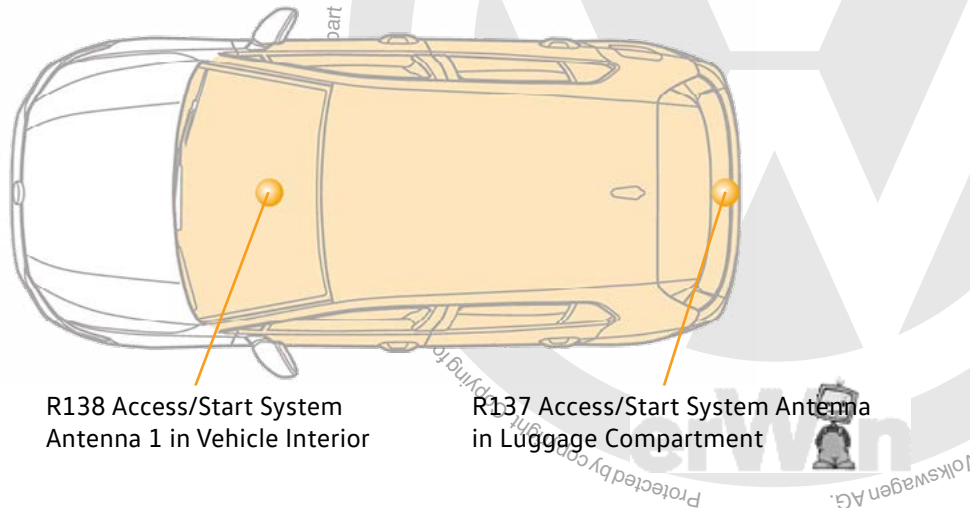
Keyless Access Go has two antennas for the entry and start system. One in the center console, and the other in the luggage compartment. These antennas detect an authorized vehicle key in the vehicle.

Unlocking and locking occurs after actively pressing the remote control.

The ignition is switched on and the engine is started using the E378 Start System Button.

Keyless Access Advanced has all the features that Keyless Access Go provides plus:

- Keyless locking and unlocking of the vehicle
- Automatic unlocking when a valid key is detected within the detection range of the side antennas for the entry and start system
- Improved security against wireless range extension by using control modules for break-in protection.



Antenna for entry and start system

Antenna for entry and start system

Control module for break -in protection

# Infotainment

## The MIB3

The GTI and Golf R have the MIB third-generation infotainment system.

The following infotainment systems are available:

- Composition radio
- Discover Pro

The Composition radio with an 8.25" touchscreen is standard.

### Technical Features

- 8.25" touchscreen
- Two rotary pushbuttons
- Screen resolution of 1,088 × 480 pixels (142 dpi)
- 4-channel amplifier
- FM radio with radio station logos
- Bluetooth hands-free system
- Bluetooth music player
- Two data-capable USB C connections
- Provision for reverse camera
- App-Connect using cable (optional)
- Data bus connection:
  - Ethernet and CAN Infotainment

### Composition Radio



# Infotainment

## The MIB 3

### Technical Features

- 10" color display
- Screen resolution of 1,560 × 700 pixels (172 dpi)
- Central processor behind the glove box
- Home screen
- Navigation with map in the center display and in the instrument cluster
- Proximity sensor (driver/front passenger detection, slide functions)
- Touch slider (touch sensitive panel)
- Joint radio station list FM/DAB/online
- Wireless Carplay
- Data bus connection:
  - Ethernet and CAN Infotainment



# Infotainment

## The Head-up Display (HUD)

### Overview

The windshield head-up display projects information such as the vehicle speed, navigation instructions etc. directly onto the windshield in the line of the driver's vision.

There is no mechanical adjustment option for the GTI and Golf R in the workshop. The small space required by the HUD results from horizontal alignment of the mirrors. A special film has been applied to the windshield to prevent duplication of the projected image. The windshield is stamped with HUD to indicate this film is applied.

The windshield does not have to be removed to remove the HUD.

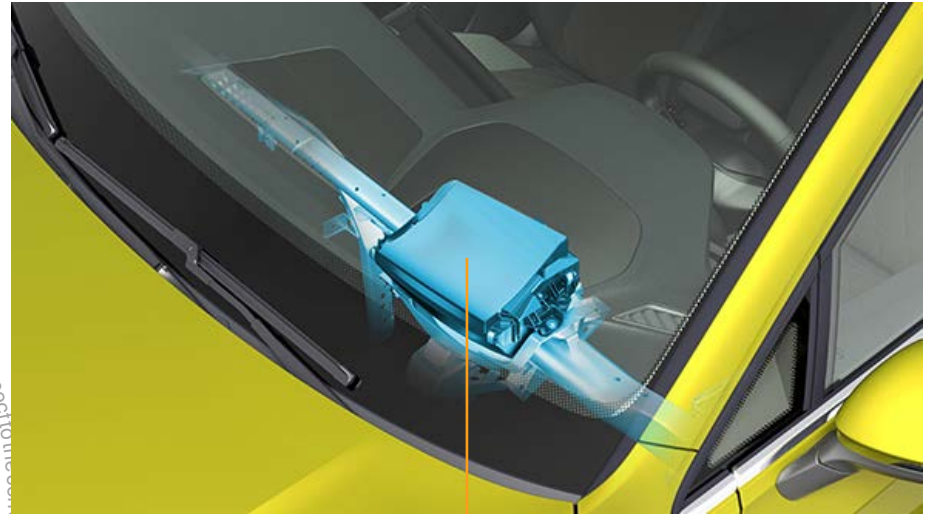


# Infotainment

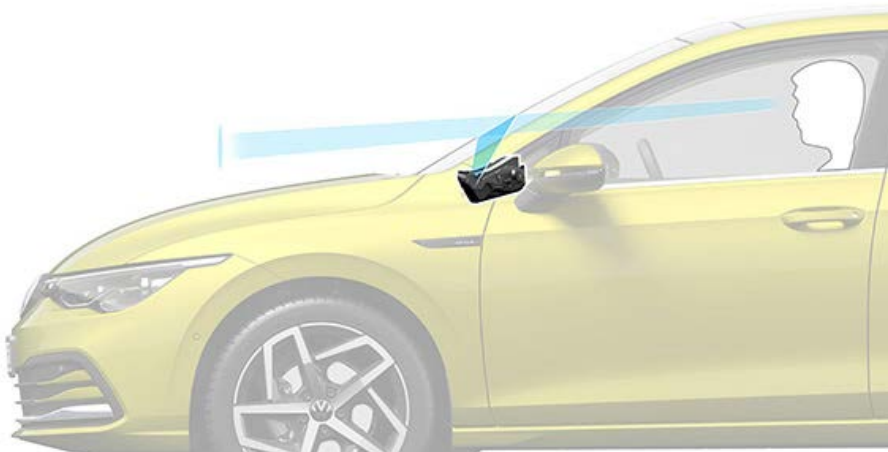
## The Head-up Display

### Technical Data

- Display size 176 mm x 51 mm, 2 rows of information
- Connected to the Convenience CAN-Bus and Ethernet
- Display is color TFT 1.8 inches, 480 x 240 pixels



Location of the Heads-up Display



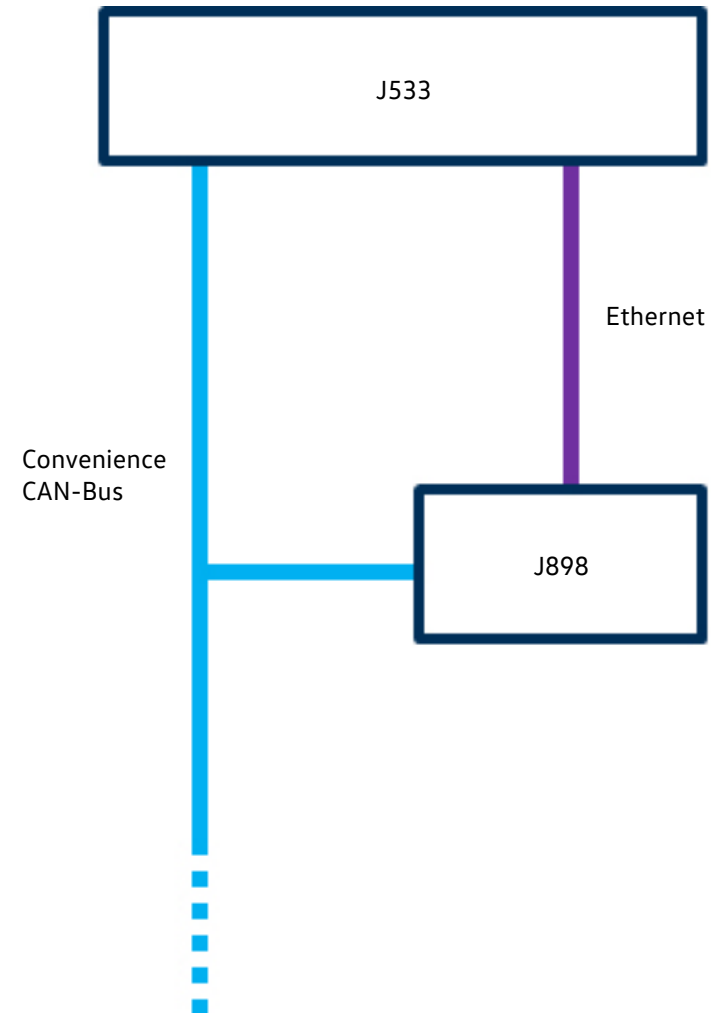
# Infotainment

## The Head-up Display

### Networking

Certain information (e.g. detailed navigation displays) are transmitted by Ethernet.

The J533 and J898 are connected by the Convenience CAN-Bus. They are also connected to each other by Ethernet.



### Key

J533 Data Bus on Board Diagnostic Interface

J898 Windshield Projection Head Up Display Control Module

mitted unless authorised by Volkswagen AG. Volkswagen AG does not guarantee or accept any li



Volkswagen Group of America  
2200 Ferdinand Porsche Drive  
Herndon, VA 20171  
November 2020



# 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 Volkswagen Factory Approved 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.

# 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.

## 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 Volkswagen Factory Approved 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.**