Self Study Program 893213

The 2022 GTI and Golf R

Tablet Format



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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 Wideness



Brand Logo and GTI Lettering at the Rear



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

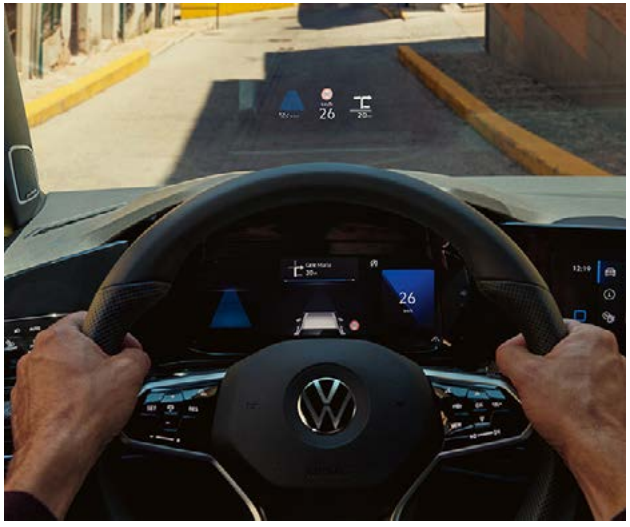
Infotainment System with 8.25" or 10" Touchscreen



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



Interior



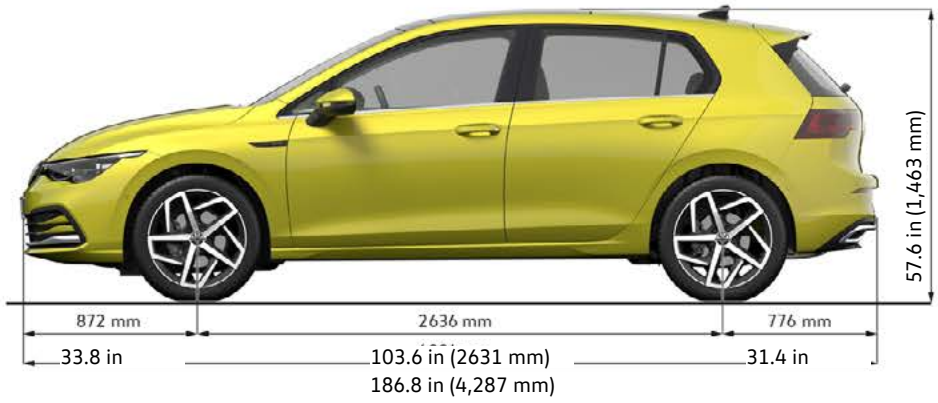
Touch controls to open the infotainment system menu:

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

Hard button for hazard warning lights system.

Technical Data - Dimensions and Weights

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





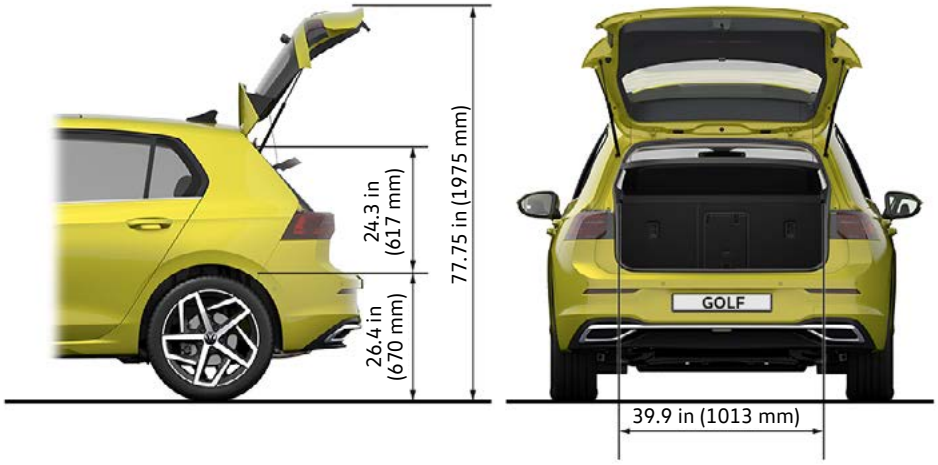


Specifications

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

Technical Data - Dimensions and Capacities

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



Capacities and Load-through Width

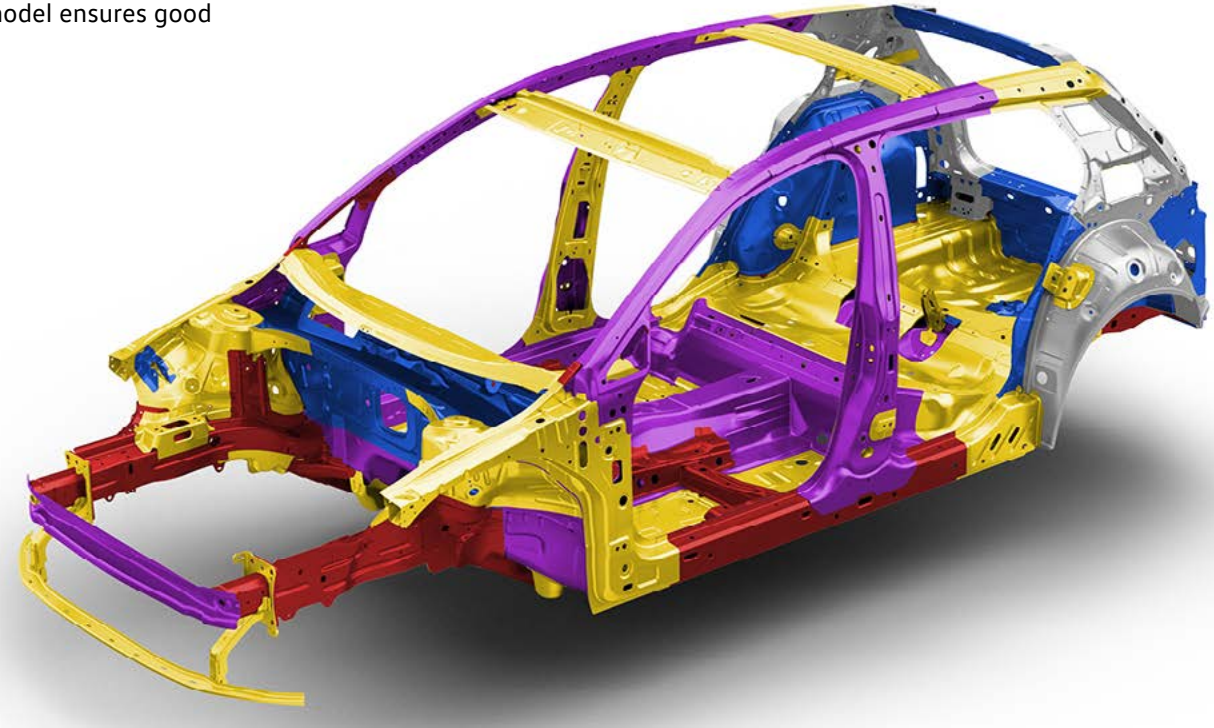
Luggage Compartment Capacity	19.9 Ft^3 (564 l)
Luggage Compartment with Rear Seat Backrest Folded Down	34.5 Ft^3 (977 l)
Fuel Tank Capacity	13.2 Gallons (50 l)
Wheel Housing Load-through Width	39.9 in (1013 mm)

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

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

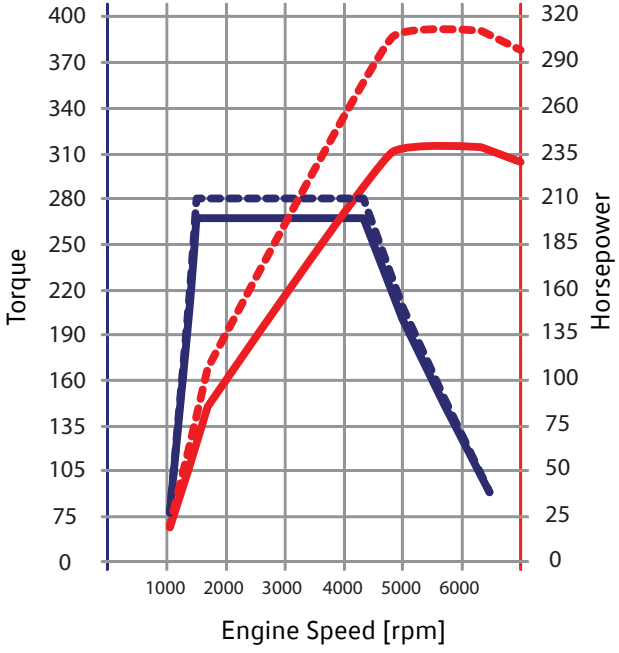


2.0L TSI Engine

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



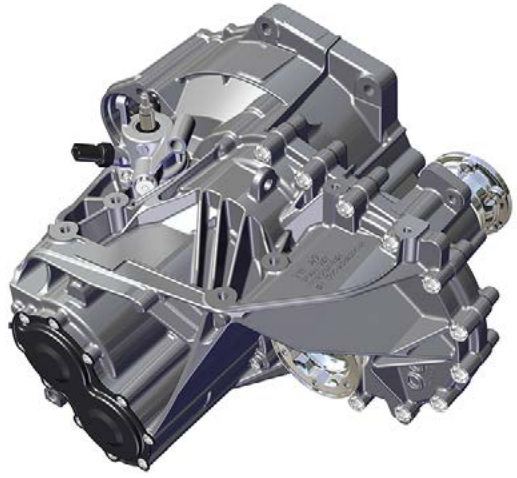
Displacement	1984 cm3
Bore	82.5 mm
Stroke	92.8 mm
Valves Per Cylinder	4
Compression Ratio	GTI - 9.6:1 Golf R - 9.3:1
Horsepower	GTI - 180 kW (241 hp) Golf R - 235 kW (315 hp)
Torque	GTI - 370 Nm (273 lb-ft) Golf R - 380 Nm (280 lb-ft)
Engine Management	SIMOS 18.1
Fuel	GTI - 87 Octane Golf R - 91 Octane
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

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 0GC 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

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.

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.



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

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 Positions

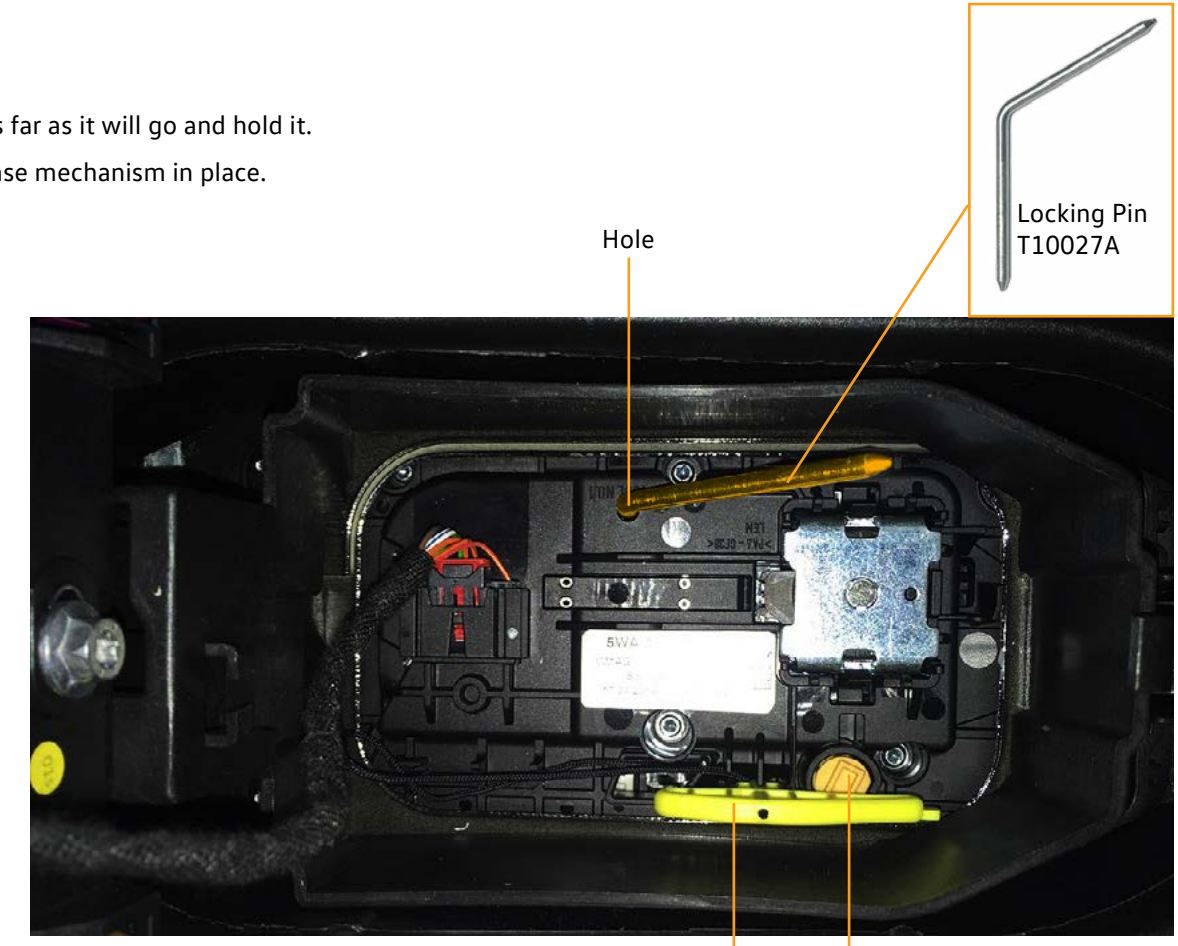
The Manual Release Mechanism for the Shift-by-Wire System

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

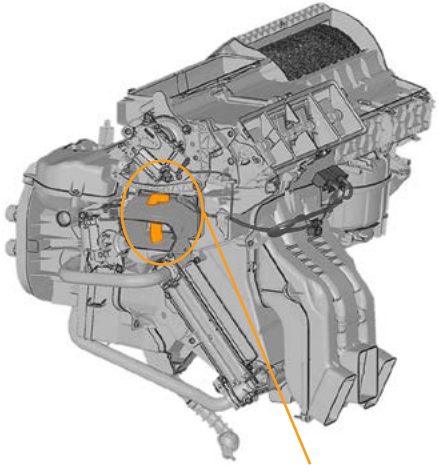
1-zone Heater and Air Conditioning Unit
This heater and air conditioning unit has three control motors:

- 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.

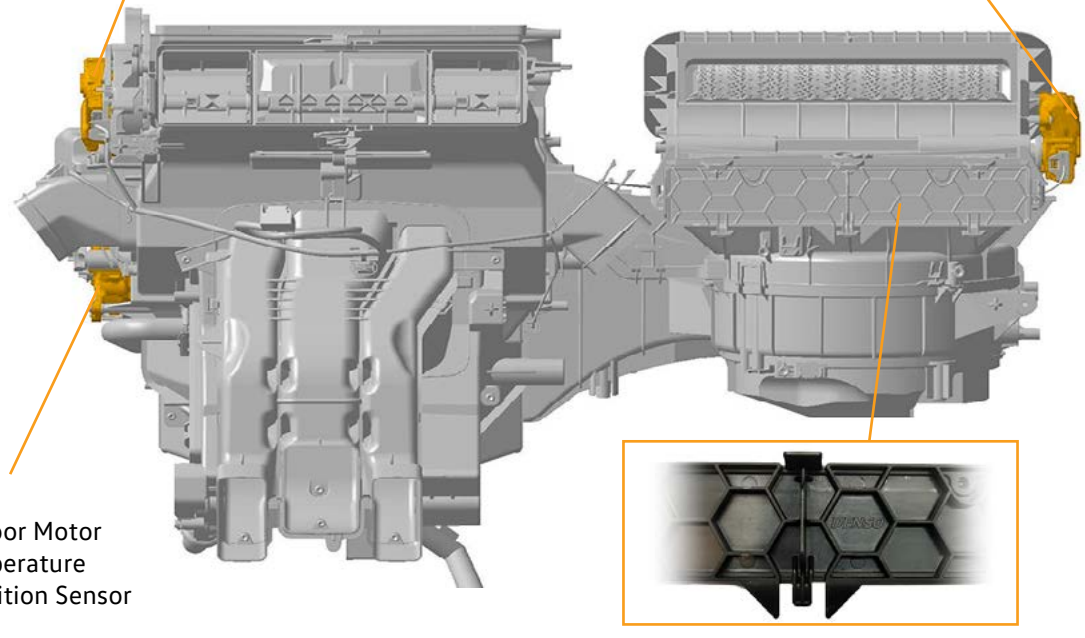


VX components have a control motor and feedback potentiometer.
V components only have a control motor.



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



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

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

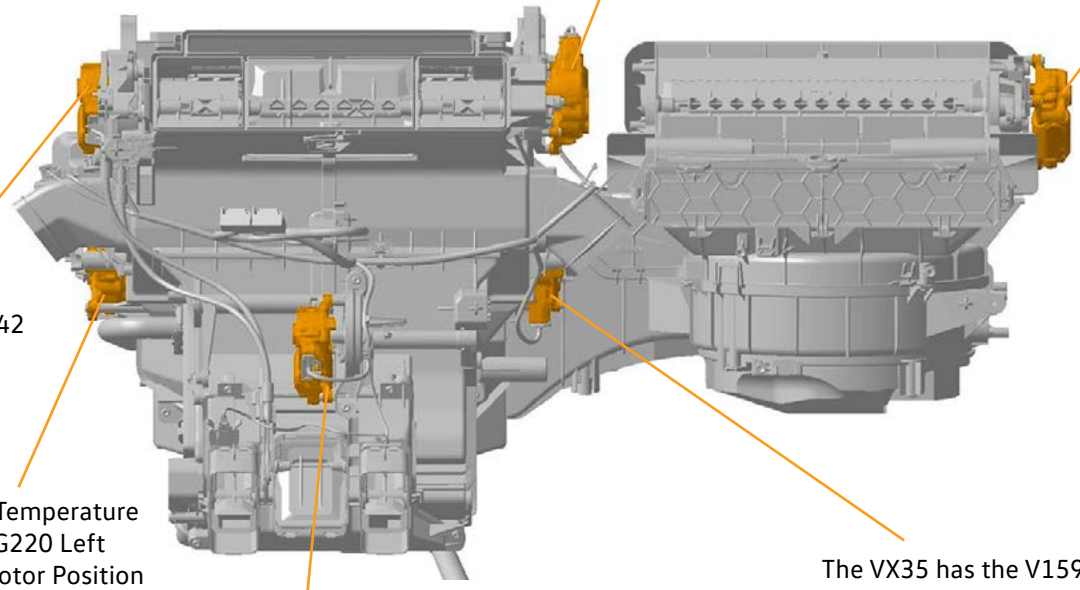
The Heater and Air Conditioning Unit Design

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.



The VX47 has the V107 Defroster Door Motor and the G135 Defroster Door Motor Position Sensor

The VX96 has the V425 Fresh Air/ Recirculating Air/Back Pressure Door Motor and the G644 Fresh Air/ Recirculating Air/Back Pressure Door Motor Position Sensor

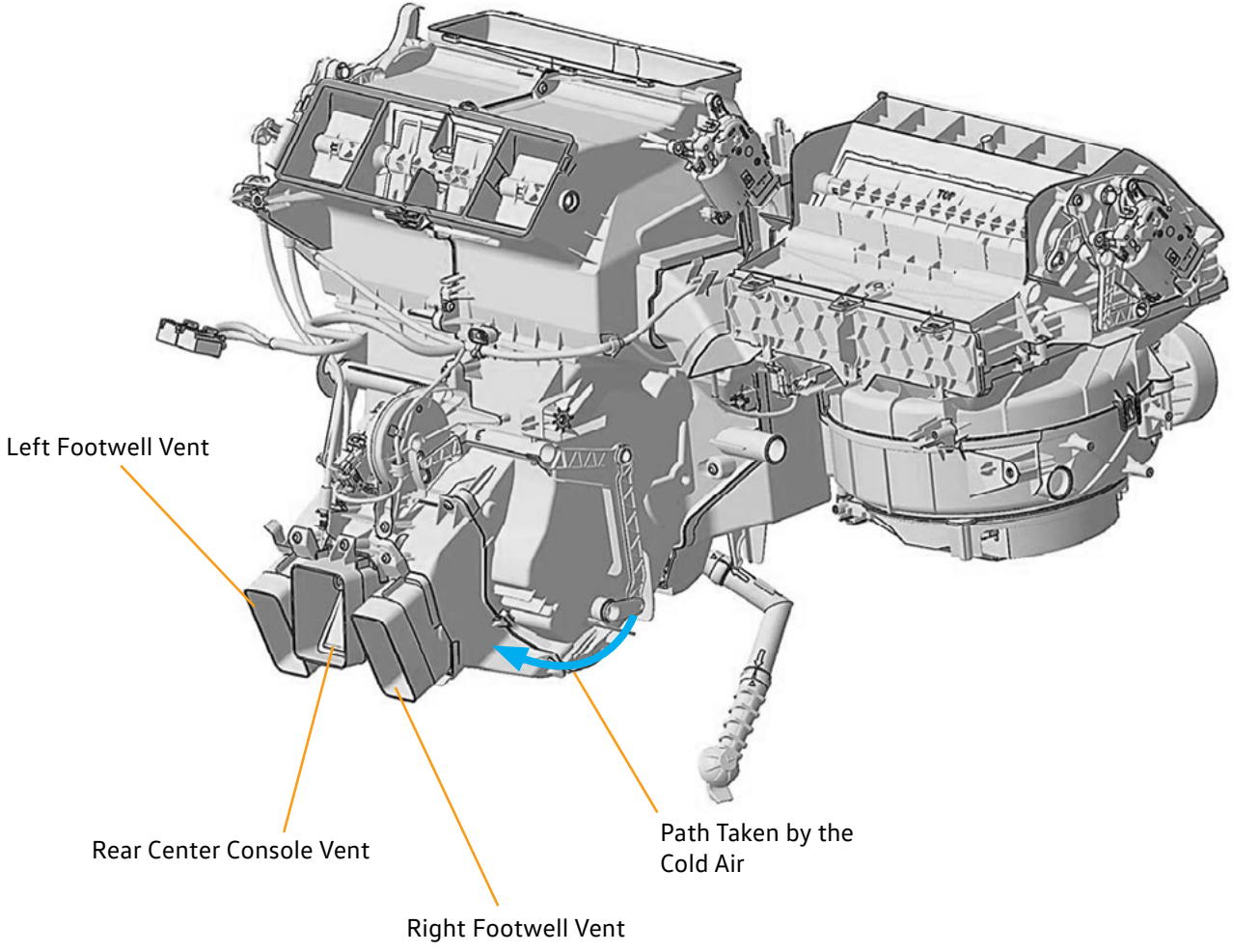
The VX33 has the V426 Front Air Distribution Door Motor and the G642 Front Air Distribution Door Motor Position Sensor

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

The VX95 has the V137 Rear Temperature Control Door Motor and the G479 Rear Temperature Control Door Motor Position Sensor

The VX35 has the V159 Right Temperature Control Door Motor and the G221 Right Temperature Control Door Motor Position Sensor

The Heater and Air Conditioning Unit Design



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.

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



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.



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)



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.

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.

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).



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

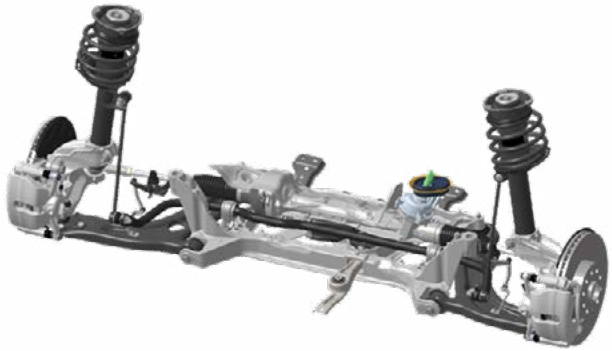
Running Gear Overview
The running gear has the following features:

Front Axle
- McPherson front axle suspension strut

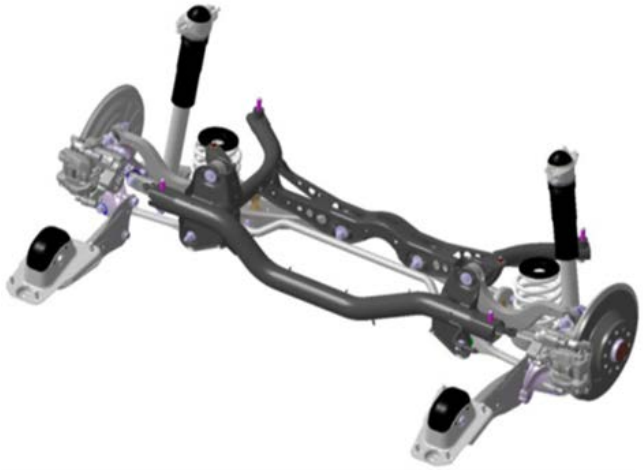
Rear Axle
- Multi-link rear axle, motor output
- Multi-link rear axle 4MOTION drive (Golf R)

Steering
- Electromechanical power steering with a dual pinion with progressive steering

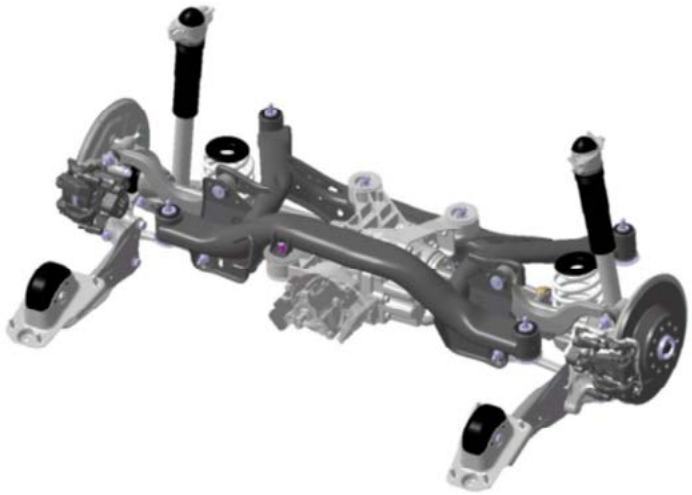
Brake System
- ABS/ESC unit MK100
- Electromechanical brake servo, generation 2
- Electromechanical parking brake



Front axle for both GTI and Golf R



GTI rear axle



Golf R rear axle

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.

The 12 Volt Electrical System

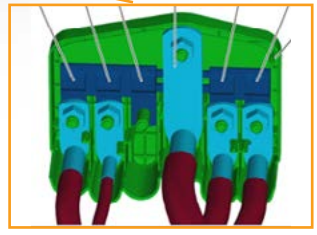
Depending on equipment, batteries with a capacity between 59 Ah and 70 Ah are used:

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



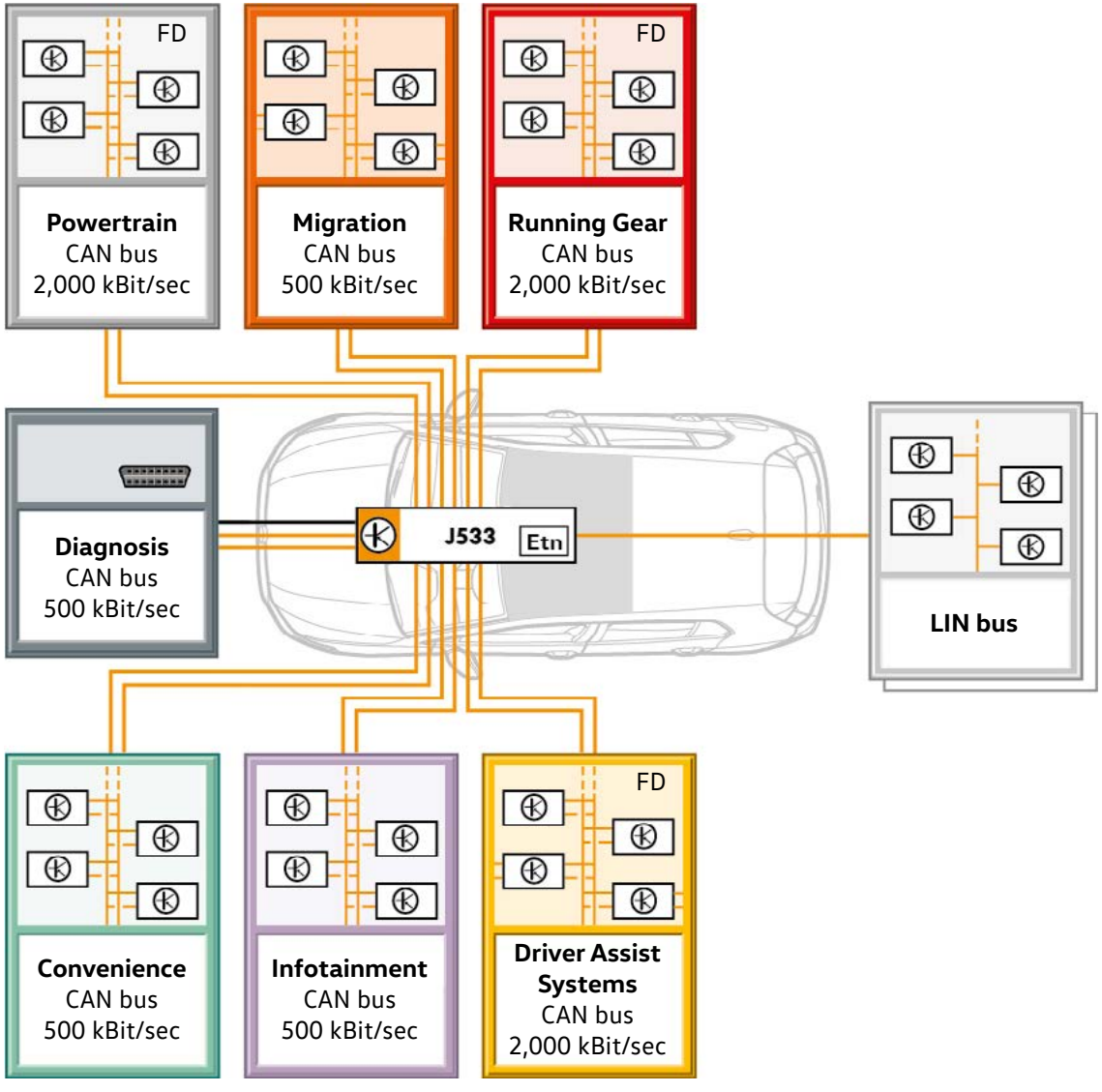


The electronics box is located on the left in the engine compartment next to the 12 volt battery. This is where the fuses and relays are found that supply the electrical components in the engine compartment with power.



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.

The Networking Concept



The Networking Concept

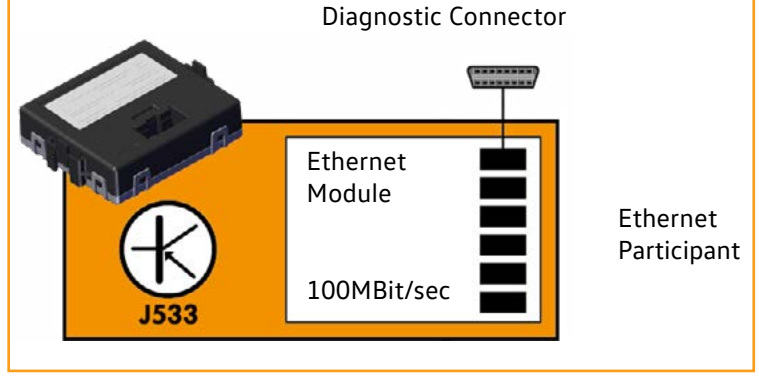
This version of the GTI and Golf R have very complex networking and electrical systems. It has eight CAN-Bus Connections, four LIN-Bus connections and an internal Ethernet module.

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.



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

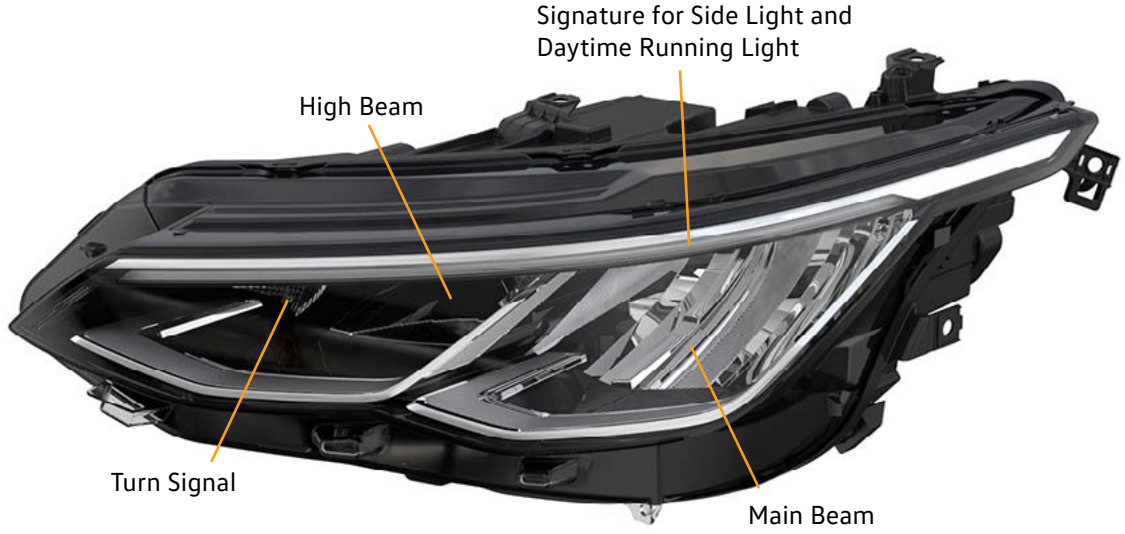


The Exterior Lighting

Headlights

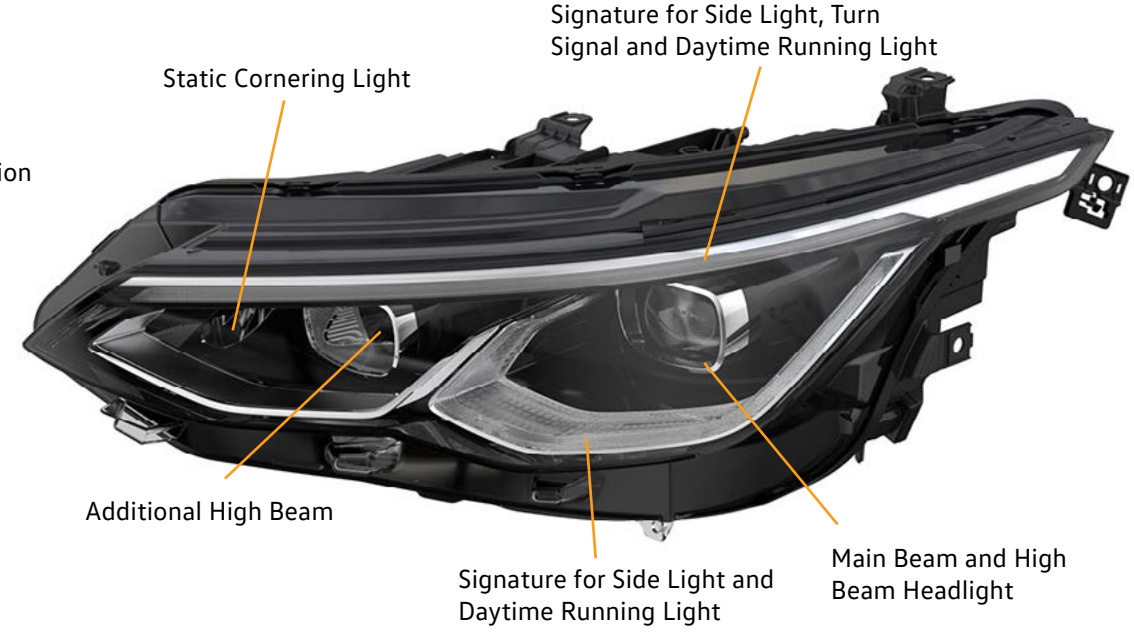
The Entry LED headlight has the following technical features:

- 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

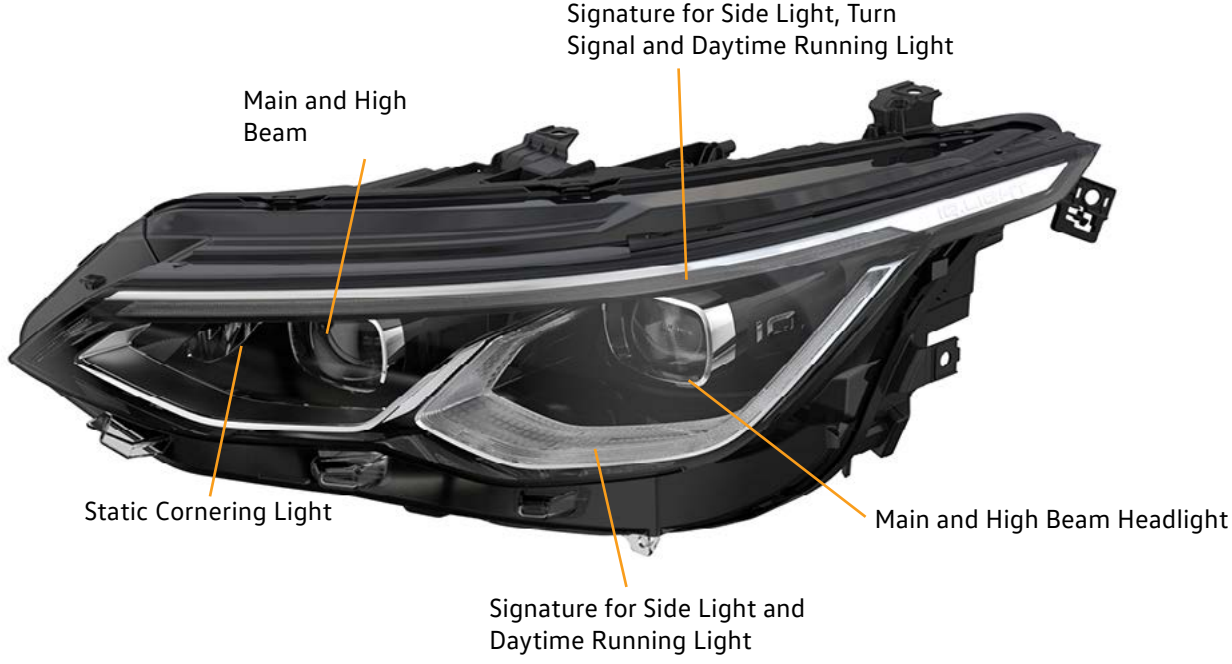


The Exterior Lighting

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)



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

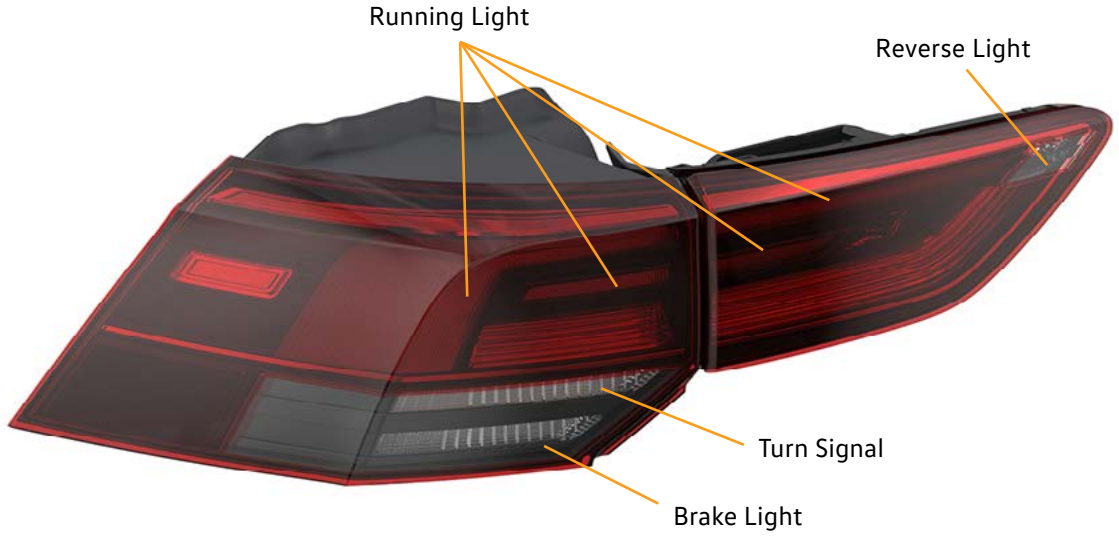


High LED Tail Light Cluster

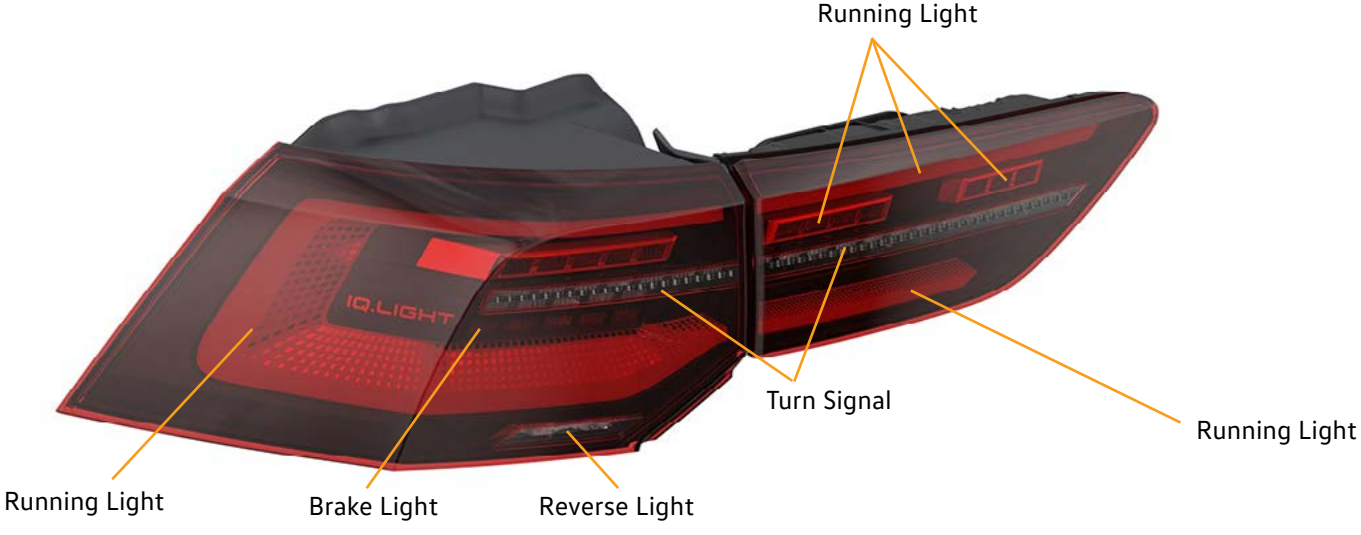


The Exterior Lighting

Basic LED Tail Light Cluster



High LED Tail Light Cluster



The High LED tail light cluster has a dynamic turn signal

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.



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.

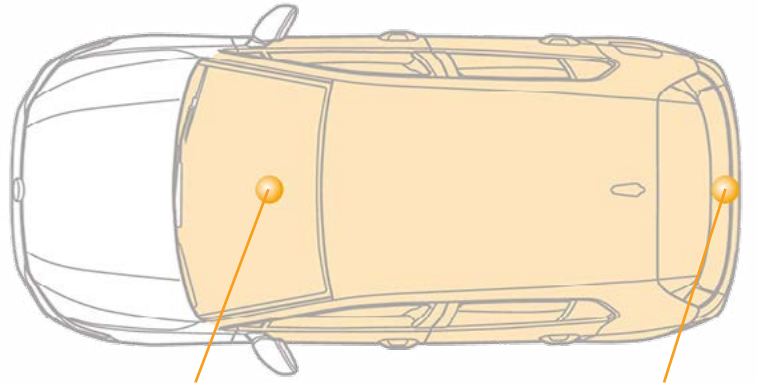
Keyless Access Go has two antennas for the entry and start system. One in the center console, and the other in the luggage compartment. These antennas detect an authorized vehicle key in the vehicle.

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:

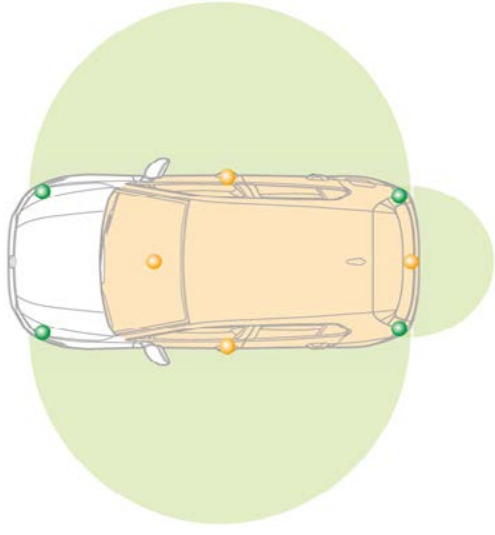
- Keyless locking and unlocking of the vehicle
- Automatic unlocking when a valid key is detected within the detection range of the side antennas for the entry and start system
- Improved security against wireless range extension by using control modules for break-in protection.



R138 Access/Start System Antenna 1 in Vehicle Interior

R137 Access/Start System Antenna in Luggage Compartment

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



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

Discover Pro



The Head-up Display (HUD)

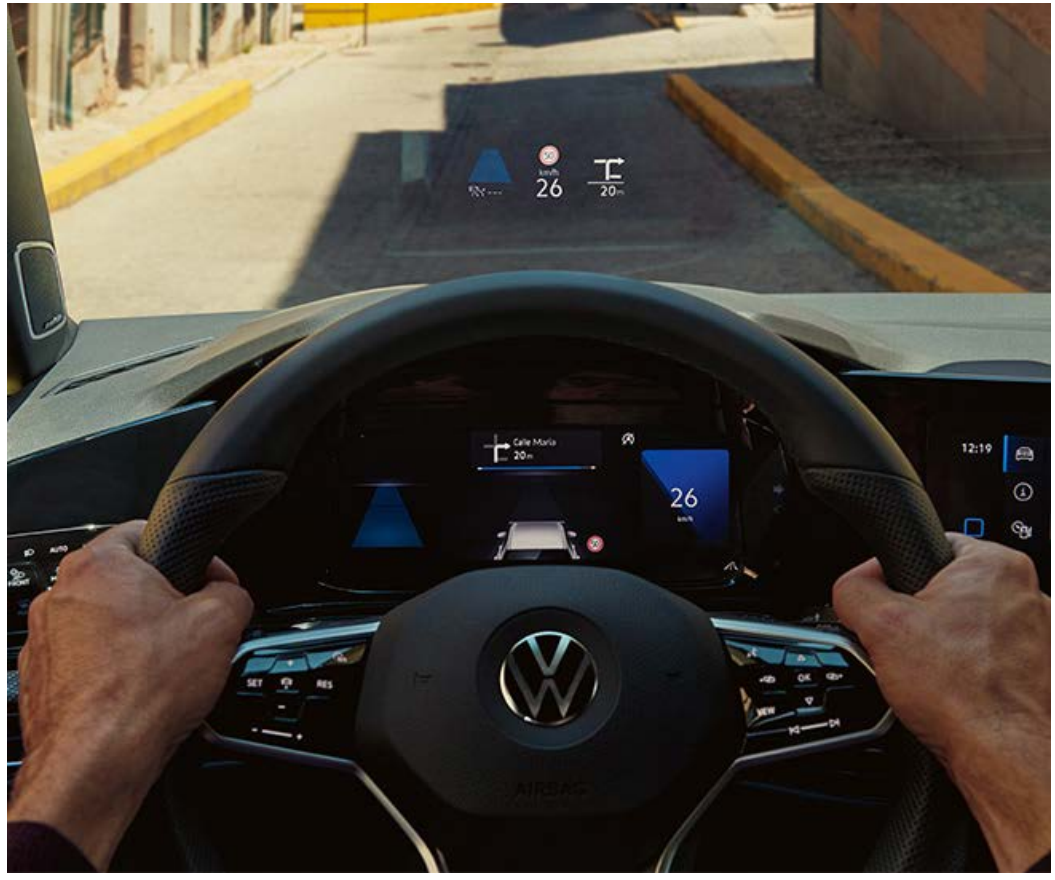
Overview

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.

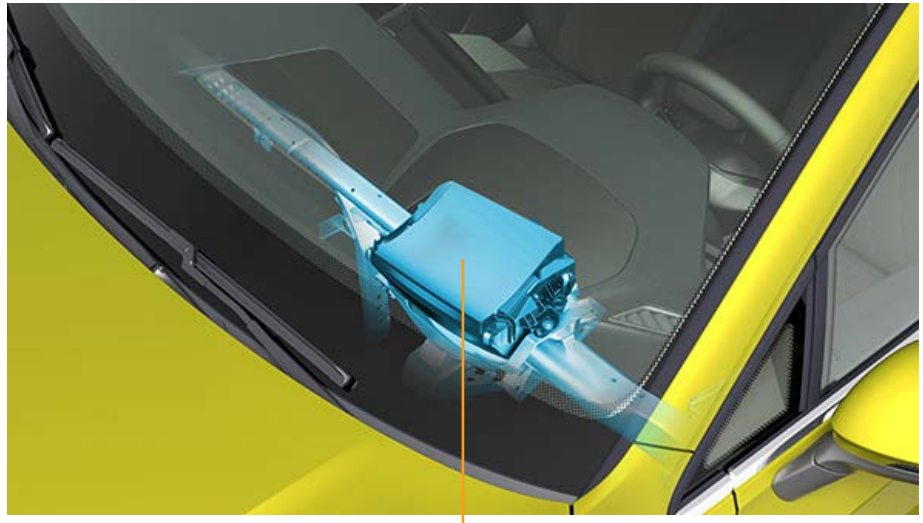




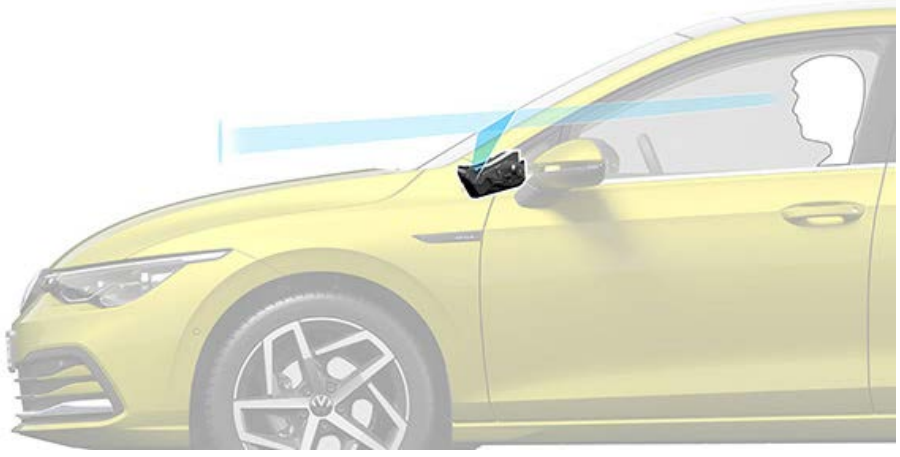
The Head-up Display

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



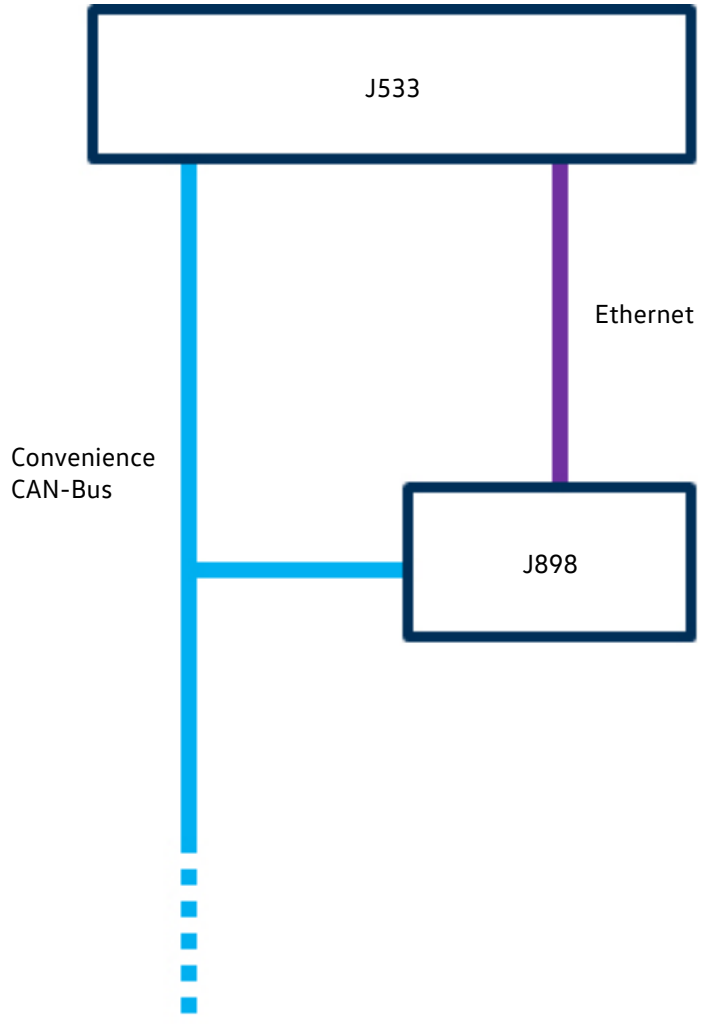
Location of the Heads-up Display



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



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