

**Service Training**



**Self Study Program 890143**

**The 2015 GTI**



Volkswagen Group of America, Inc.  
Volkswagen Academy  
Printed in U.S.A.  
Printed 2/2014

Course Number SSP 890143

©2014 Volkswagen Group of America, Inc.

All rights reserved. All information contained in this manual is based on the latest information available at the time of printing and is subject to the copyright and other intellectual property rights of Volkswagen Group of America, Inc., 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, Inc.

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.

# Contents

<b>Introduction</b> .....	<b>1</b>
<b>Body</b> .....	<b>4</b>
<b>Engine</b> .....	<b>6</b>
<b>Transmission</b> .....	<b>8</b>
<b>Running Gear</b> .....	<b>15</b>
<b>Heating and Air Conditioning</b> .....	<b>19</b>
<b>Electrical System</b> .....	<b>20</b>
<b>Knowledge Assessment</b> .....	<b>25</b>



This Self-Study Program provides information regarding the design and function of new models. This Self-Study Program is not a Repair Manual. This information will not be updated.

For maintenance and repair procedures, always refer to the latest electronic service information.



---

## The New GTI

For more than 30 years, the GTI has set the standard for compact performance. For 2015, Volkswagen set the bar higher:

- Increasing horsepower from 200 to 210 or 220, depending on options
- Reducing weight of all powertrain groups
- Reducing fuel consumption

The resulting vehicle represents sportiness, dynamics and innovation, and economic efficiency and environmental friendliness.



## Visual Features of the GTI



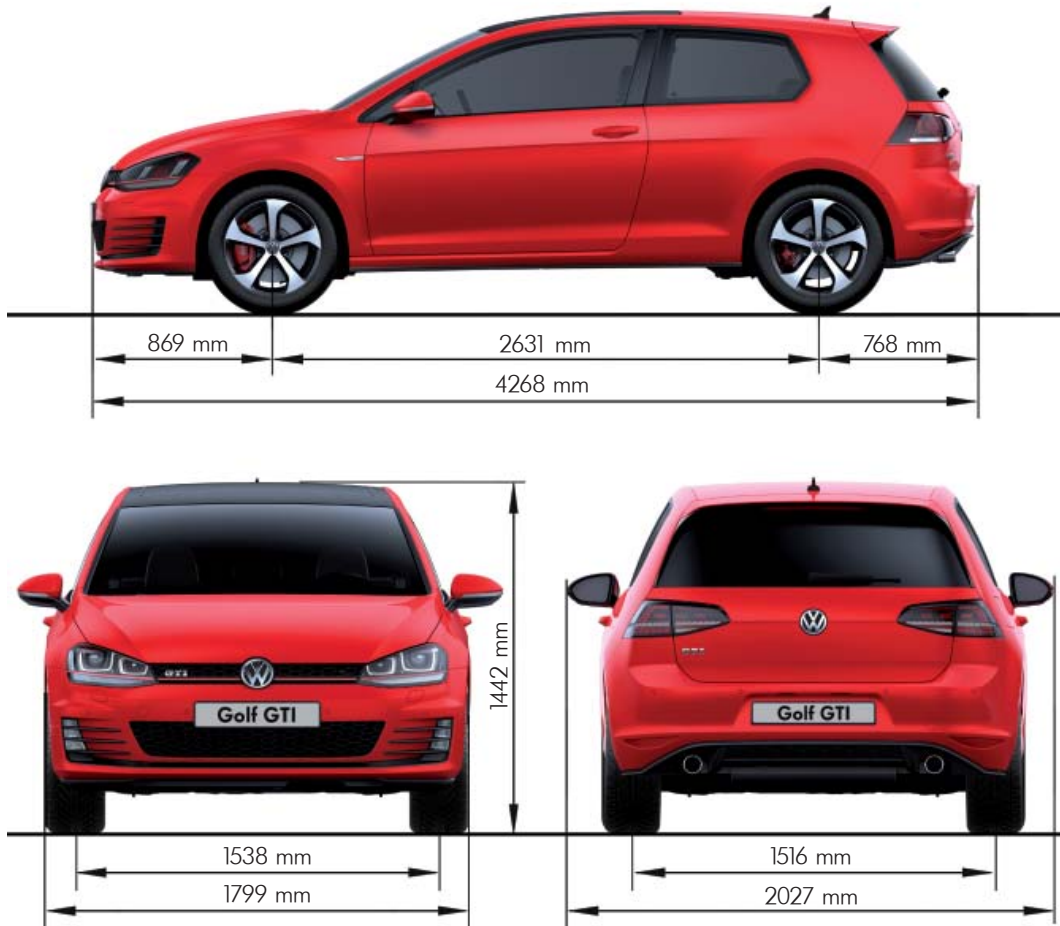
\* The "Performance Package" has front disc brakes with GTI lettering

s521\_666

# Introduction

## Technical Data

### Exterior Dimensions and Weights



s521\_012

#### Exterior Dimensions

	2015 GTI
Length	169 in (4268 mm)
Width	71 in (1799 mm)
Height	56.7 in (1442 mm)
Wheelbase	103.6 in (2631 mm)
Track Width at Front	60.6 in (1538 mm)
Track Width at Rear	59.7 in (1516 mm)

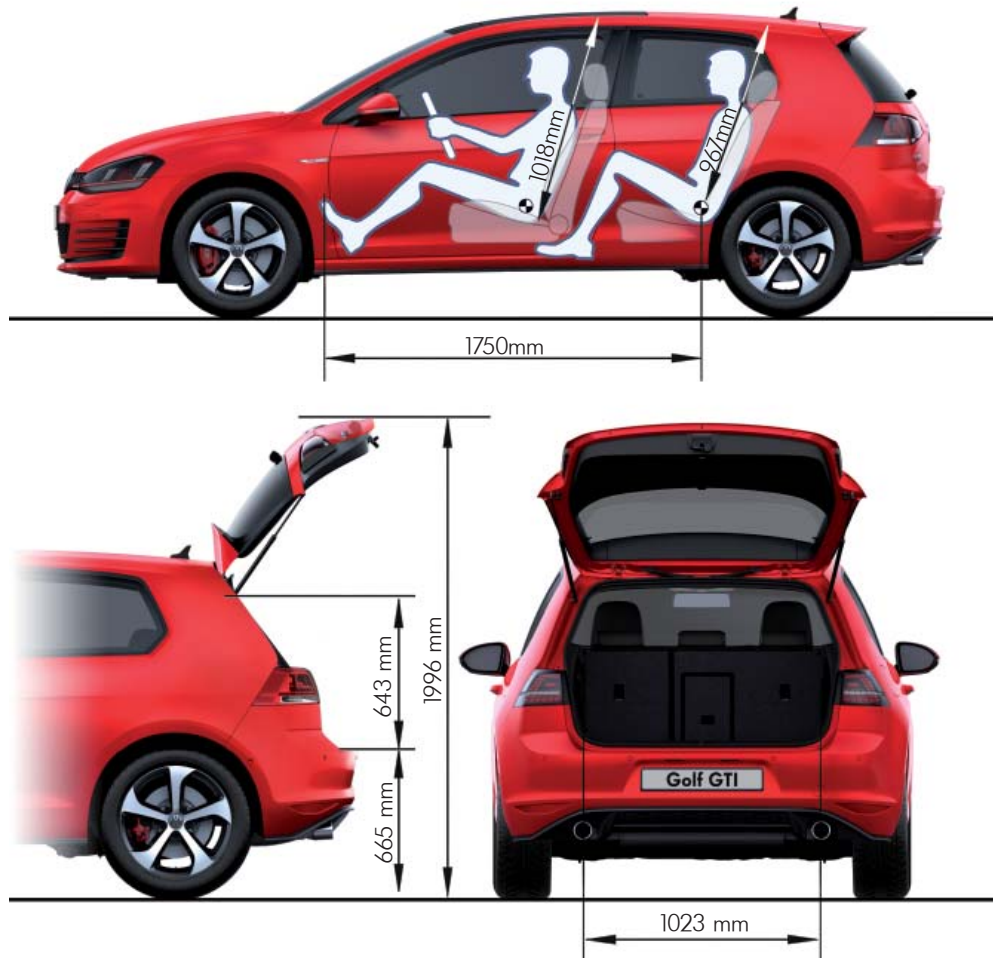
#### Weights/Other Data

	2015 GTI
GVWR	4,012 lb (1820 kg)*
Curb Weight	2,813 lb (1276 kg)*
Maximum Roof Load	150 lb (75 kg)*
Turning Radius	35.7 ft (10.9 m)
Tank Capacity	13.2 gallons (50 liters)
Drag Coefficient	0.318 cw

Text in red has not yet been verified for accuracy



## Interior Dimensions and Volumes



s521\_038

## Interior Dimensions and Volumes

	<b>2015 GTI</b>
Interior Vehicle Length	68.9 in (1750 mm)
Luggage Compartment Volume	13.4 ft <sup>3</sup> (380 liters)
Luggage Compartment Volume with Rear Seat Backrest Folded Down	44.9 ft <sup>3</sup> (1270 liters)
Height of Luggage Compartment Opening	25.3 in (643 mm)
Width of Luggage Compartment Opening	40.3 in (1023 mm)

	<b>2015 GTI</b>
Through - Load Width between Wheel Housings	39.5 in (1003 mm)
Maximum Front Headroom	40.1 in (1018 mm)
Rear Headroom	38.1 in (967 mm)
Knee Room - 2nd seat row	** mm

Text in red has not yet been verified for accuracy

# Body

---

## 2015 GTI Equipment



s521\_064

- Front bumper adapted to contour and design
- Front Park Distance Control sensors
- Bumper with fog lights
- Air intake grille with custom honeycomb structure in the middle
- Radiator grille with custom honeycomb structure and customized trim strips
- Bi-xenon headlights with red trim strip
- Front fog lights with LED technology (optional)
- GTI lettering on the air intake grille and the fenders
- Side member trims, black grain effect
- Panorama sliding/tilting sunroof





- Tailgate spoiler with separate brake light and integrated washer nozzle
- Flaps (side spoilers) bonded to the rear window and integrated into the rear spoiler
- Rear bumper with diffuser
- Right and left tailpipes
- Rear Park Distance Control sensors
- GTI lettering on the rear
- LED rear fog lights
- LED tail light cluster

# Engine

## The 2.0L TSI Engine

### Technical Features

- A variation of the EA888 engine
- Higher power accomplished using software
- Integrated exhaust manifold in the cylinder head
- Regulated piston cooling nozzles
- Plastic oil sump
- Front differential lock
- Variable Valve Lift
- Innovative thermal management

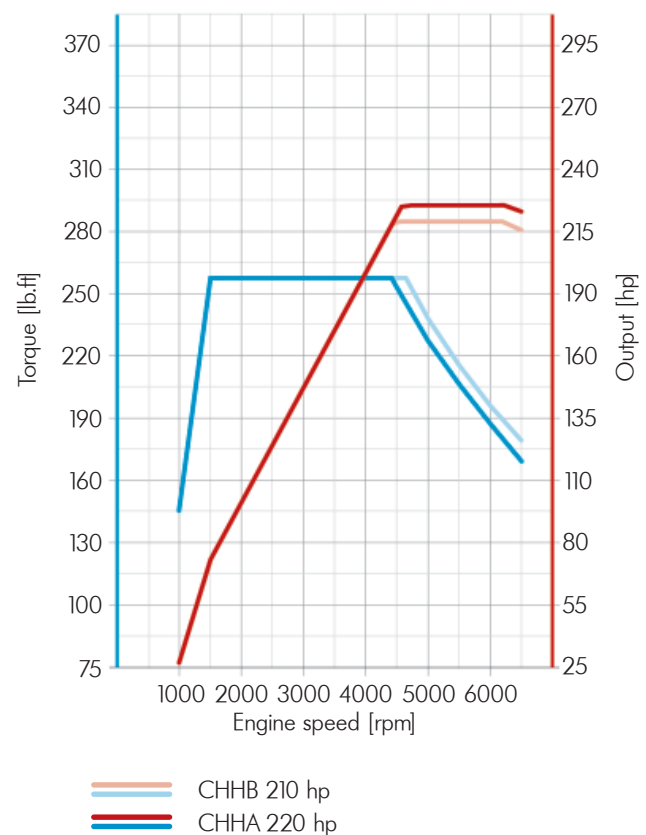


s521\_002

### Technical Data



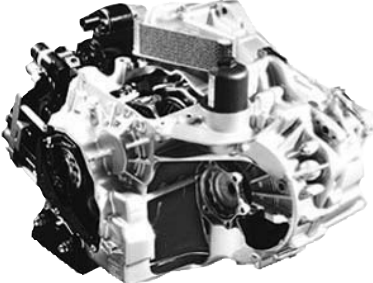
Engine Code	CHHB	CHHA
Design	4-cylinder inline engine	
Displacement	1984cm <sup>3</sup>	
Bore	82.5mm	
Stroke	92.8mm	
Valves per Cylinder	4	
Compression Ratio	9.6:1	
Maximum Output	210 hp (162 kW) from 4,500 - 6,200 rpm	220 hp (169 kW) from 4,700 - 6,200 rpm
Maximum Torque	257 lb/ft (350 Nm) from 1,500 - 4,400 rpm	257 lb/ft (350 Nm) 1,500 - 4,600 rpm
Engine Management	SIMOS 18.1	
Fuel	Premium	
Exhaust Gas Aftertreatment	Three-way catalytic converter, one upstream broadband lambda probe of the turbocharger and one step-type lambda probe downstream of the catalytic converter	
Emission Standard	PZEV	

### Torque and Performance Diagram



s521\_004

## Engine and Transmission Combinations

<b>2.0L TSI Engine</b>	 s521_002a
<b>6-Speed Manual Transmission 02Q MQ350-6F</b>	 s521_050
<b>6-Speed Dual-Clutch Transmission DQ250-6F</b>	 s521_052

6F = 6-speed front-wheel drive



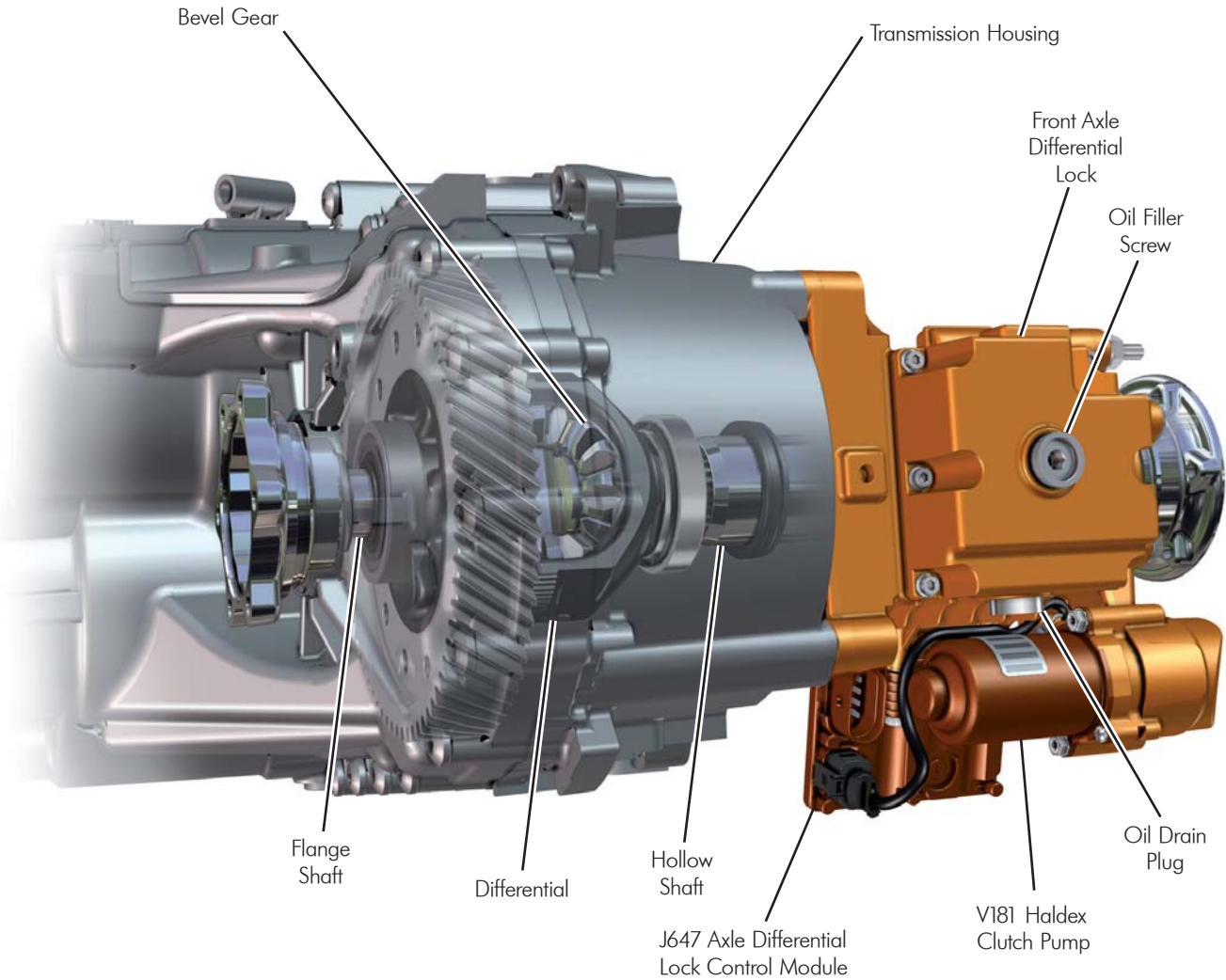
More information on the 2.0L engine is in SSP  
820533 3rd Generation EA888 Gasoline  
Engines

# Transmission

## Front Differential Lock

The 2015 GTI with the Performance Package is the first vehicle at Volkswagen to feature an electrohydraulic front differential lock. The Performance Package has a 17-inch brake system and the 220 hp engine.

The front differential lock is installed on the transmission housing. It distributes drive torque depending on the driving situation, and actively counteracts understeer when cornering.

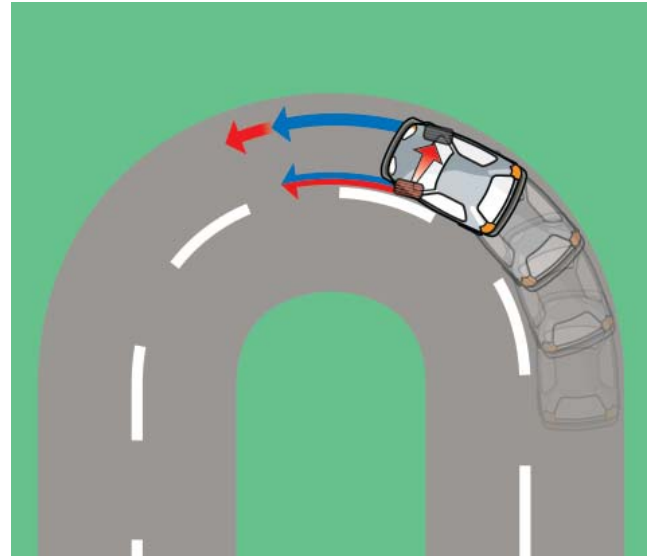


s521\_008

## Design



The front differential lock allows for:

- Improved driving response in corners, less understeer
- Higher cornering speed
- More precise and more agile steering
- Increase in the drive power on the outer wheel
- Fewer Traction Control System (TCS) interventions
- Reduced tendency to skid
- More stable vehicle response and improved driving safety
- Maximum traction for front-wheel drive vehicles



s521\_020

### Legend

-  The distribution of the drive torque without front differential lock
-  The distribution of the drive torque with front differential lock

## Technical Data

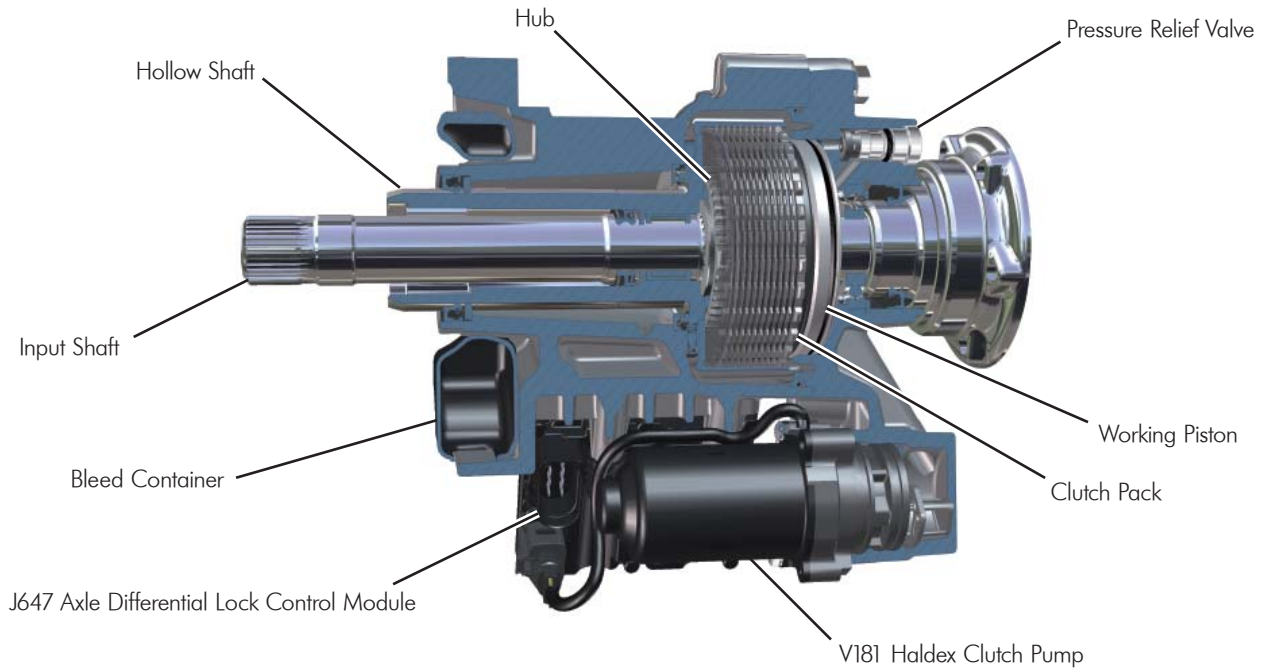
Transmission Versions	6-Speed Manual Transmission MQ350-6F* 6-Speed Double Clutch Transmission DQ250-6F*
Oil Quantity	570 ml +/- 30 ml
Weight	11 kg (Without Oil)

\*The length of the flange shaft within the front differential lock for the manual transmission is different than for the dual clutch transmission.

# Transmission

The input shaft is connected to the hub and the inner plates by splines.

The hollow shaft and the plate carrier are one component, and the hollow shaft is connected to the outer plates.



s521\_034

The following components of the front axle differential lock are the same as the components of the Generation V Haldex Clutch Pump.

- Generation V V18
- Pressure relief valve (opens when system pressure exceeds 44 bar)
- Working piston
- Clutch pack

The following components have been added:

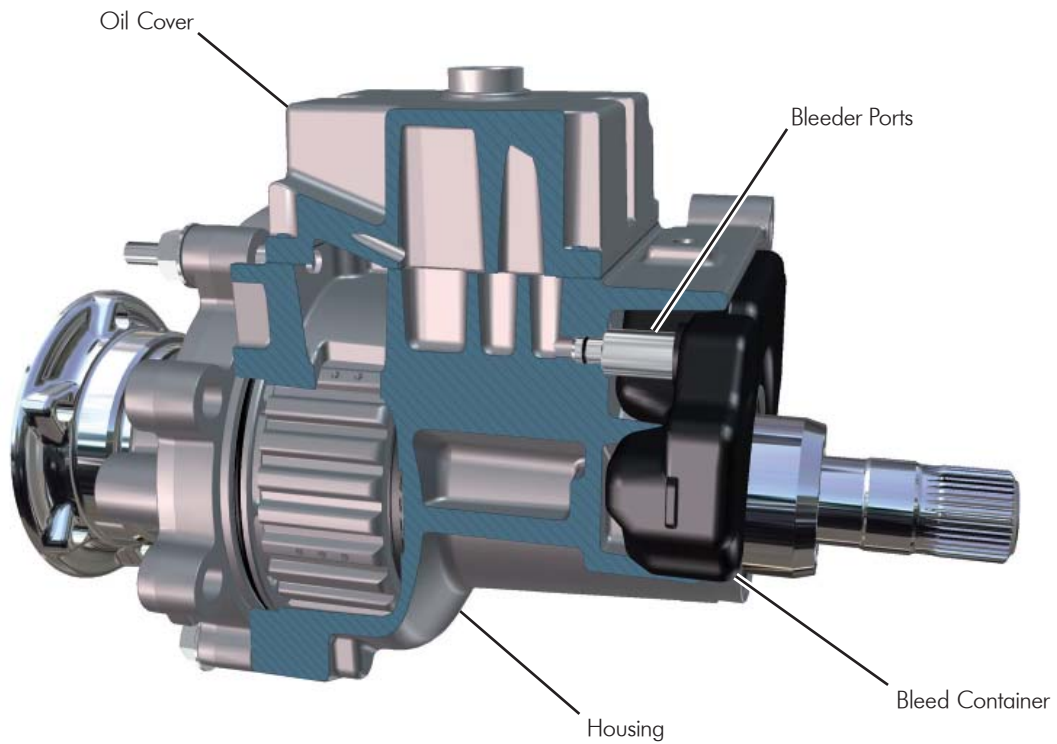
- Input shaft
- Hollow shaft (system familiar from the bevel box for four-wheel drive)
- Bleed container



## Bleed Container with Bleeder Ports

The air from the oil reservoir can escape through a labyrinth in the oil cover and housing via the bleeder ports in the bleed container.

The size and design of the bleed container does not allow any water (e.g. when driving through water) to enter the housing.



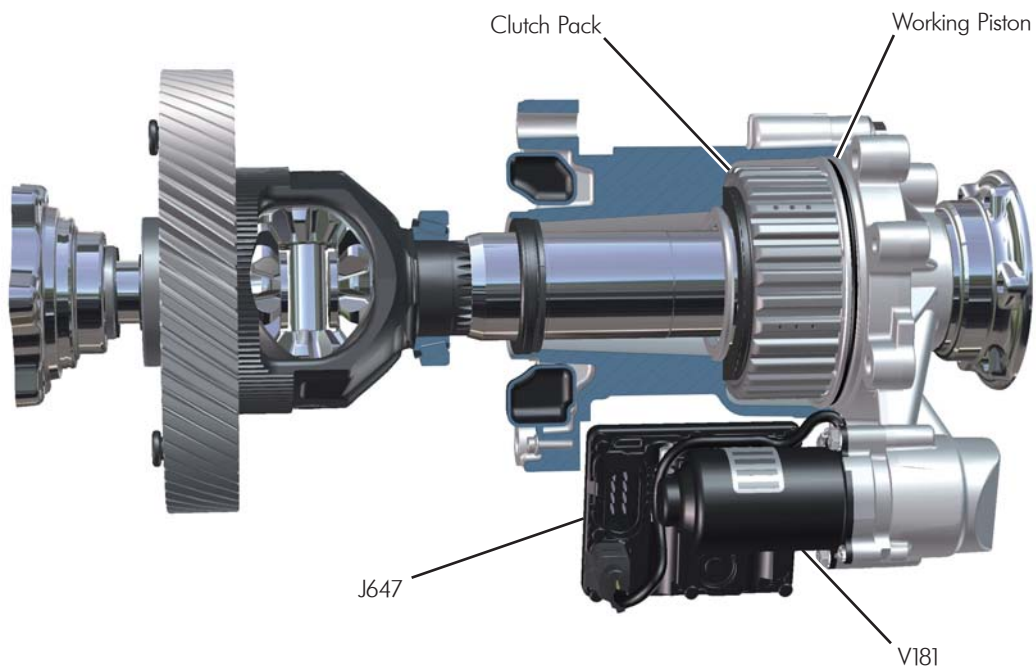
s521\_024

# Transmission

## Function

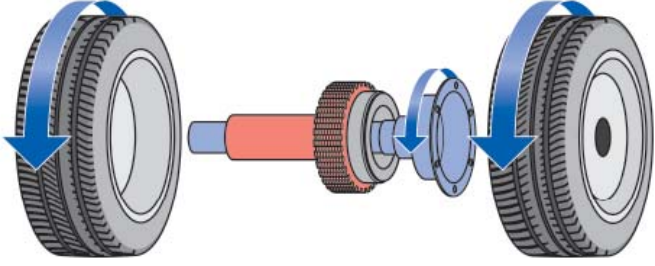
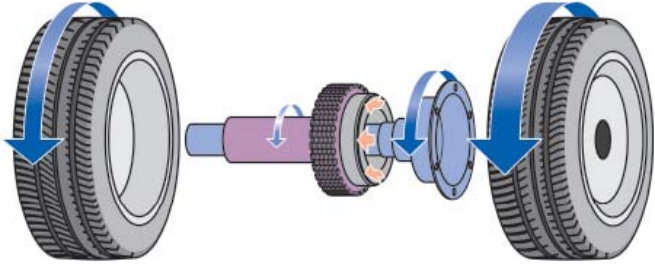
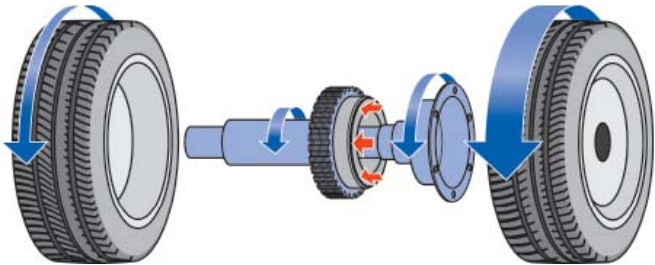
If a wheel speed sensor on the front axle identifies that a wheel is spinning (when cornering, the inner wheel), the signal is sent across the CAN-Bus to J647 Axle Differential Lock Control Module. J647 increases the speed of the Haldex Clutch Pump V181, which applies variable pressure to the working piston. The working piston compresses the clutch pack.

The amount of pressure also affects the transfer of torque (from the spinning wheel to the driven outer wheel). This allows a torque of between 0 and 100% to be transferred. The torque acting on the inner wheel is reduced and directed to the driven outer wheel. The difference in speed between the inner wheel and the outer wheel remains the same.



s521\_036

## Operation

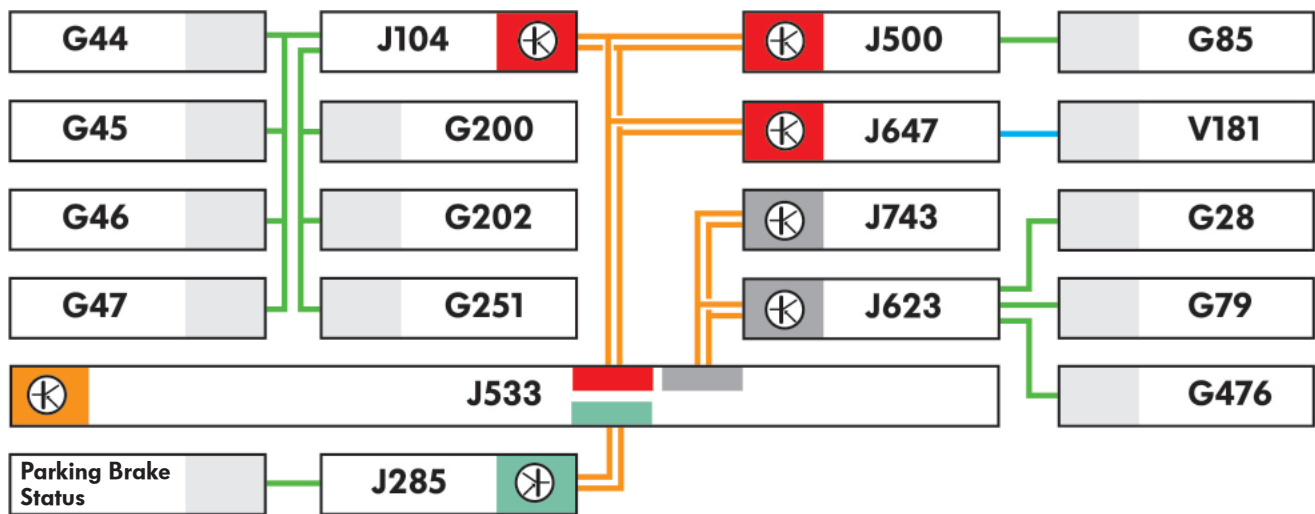
 <p>s521_081</p>	<p>No contact pressure – no locking effect:</p> <p>The drive torque for the outer wheel is equal to the maximum torque which can be transferred to the inner wheel.</p>
 <p>s521_083</p>	<p>Light contact pressure – low locking effect:</p> <p>If the inner wheel can only apply part of the drive torque to the road surface, the torque that cannot be transferred is applied to the outer wheel by pressing the plates together.</p>
 <p>s521_085</p>	<p>High contact pressure – full locking effect:</p> <p>The maximum drive torque is distributed to the outer wheel.</p>

# Transmission

## System Network

J647 Axle Differential Lock Control Module evaluates important input signals from other control modules:

- J104 ABS Control Module sends wheel speed, vehicle position and acceleration rate signals
- J623 Engine Control Module sends signals such as the total torque for transfer
- J500 Power Steering Control Module sends steering angle and torque signals
- Other signals are sent from J743 DSG Transmission Mechatronic and J285 Instrument Cluster Control Module



s521\_030

### Legend

G28	Engine Speed Sensor	J500	Power Steering Control Module
G44	Right Rear ABS Wheel Speed Sensor	J533	Data Bus on Board Diagnostic Interface
G45	Right Front ABS Wheel Speed Sensor	J623	Engine Control Module
G46	Left Rear ABS Wheel Speed Sensor	J647	Axle Differential Lock Control Module
G47	Left Front ABS Wheel Speed Sensor	J743	DSG Transmission Mechatronic
G79	Accelerator Pedal Position Sensor	V181	Haldex Clutch Pump
G85	Steering Angle Sensor		Powertrain CAN-Bus
G200	Transverse Acceleration Sensor		Running Gear CAN-Bus
G202	Rotation Rate Sensor		Convenience CAN-Bus
G251	Longitudinal Acceleration Sensor		CAN Data-Bus Line
G476	Clutch Position Sensor		Sensor Line
J104	ABS Control Module		Actuator Wire
J285	Instrument Cluster Control Module		

## Running Gear and the Driver Assist Systems

The 2015 GTI is equipped with either a sport suspension or an optional Dynamic Chassis Control (DCC).

### Running Gear

- McPherson strut front suspension
- Four-link rear axle suspension
- Electromechanical power steering (ZF, third generation with progressive steering)
- ABS/ESP Continental MK 100

### Driver Assist Systems

- Cruise Control System (CCS)
- Automatic Post-Collision Braking System
- Tire Pressure Monitoring System (TPMS)
- Park Distance Control (PDW)

### ESP Sport

- 2-Stage Button
  - Stage 1: TCS/ETC is shut down.
  - Stage 2: ESC is switched to delayed intervention. This allows more “oversteer.”

### Two Sets of Brake Equipment

- Disc brakes at the front and rear with a red brake calliper, brake disc size:
  - Front: 312mm x 25mm
  - Rear: 300mm x 12mm
- Performance disc brakes at the front and rear with GTI lettering, brake disc size:
  - Front: 340mm x 30mm
  - Rear: 312mm x 22mm



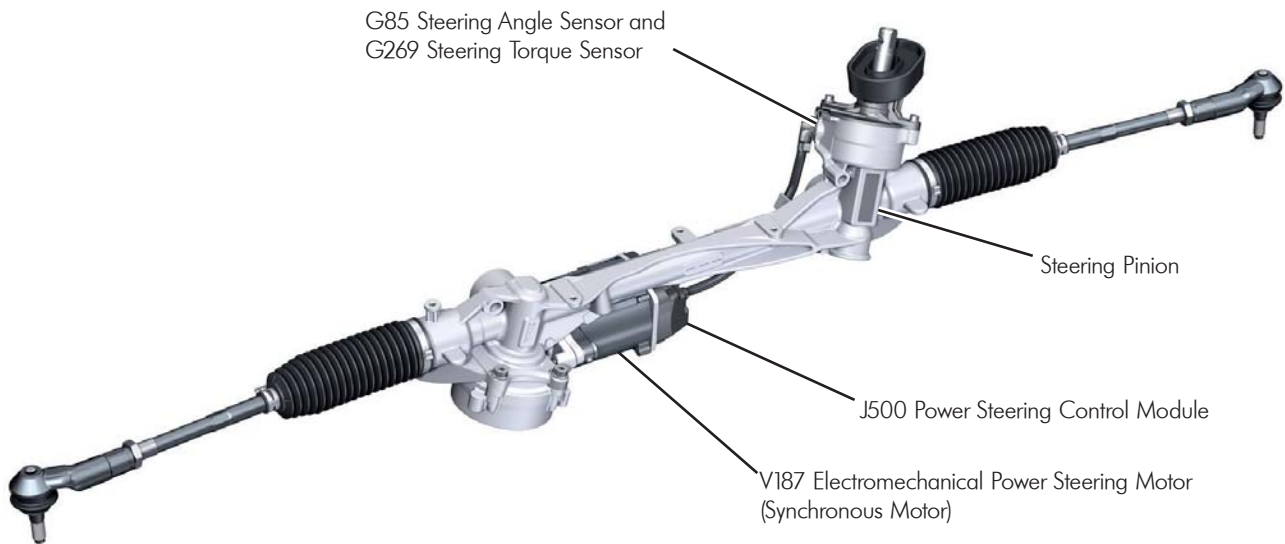
s521\_060

# Running Gear

## Progressive Steering

The GTI uses a new progressive electromechanical steering unit. The steering ratio increases progressively as the steering angle increases due to variable teeth on the steering rack. The steering response becomes more direct and the ease of steering is increased.

## Design



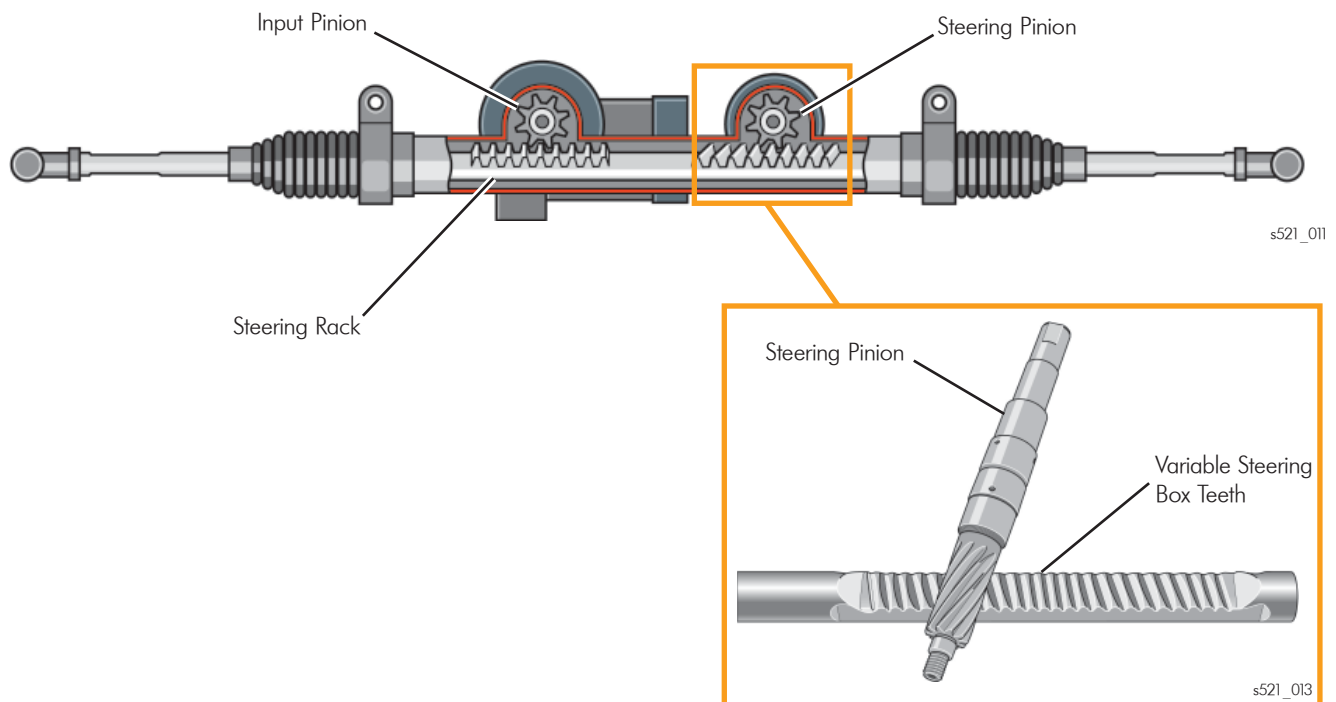
s521\_032



## Function

The progressive steering is different than standard electromechanical steering systems because of the variable teeth on the steering rack, the pinion and its more powerful electric motor.

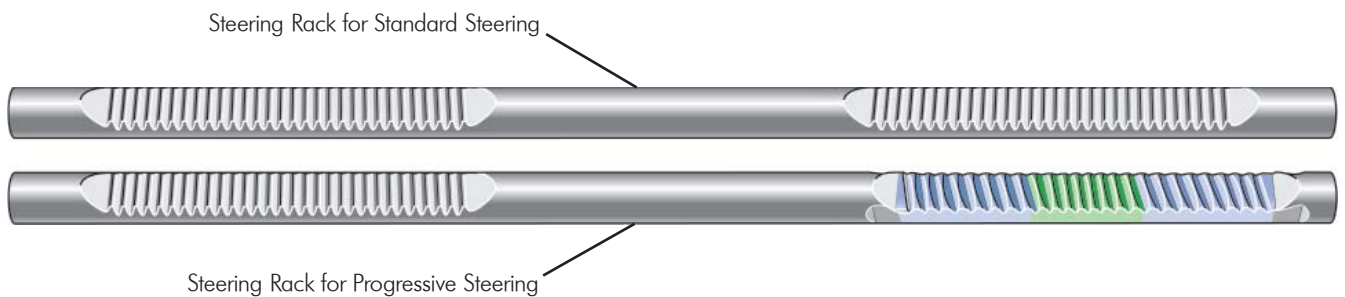
When compared to a constant steering ratio, the teeth on the steering rack are changed significantly by the amount of steering travel. The helical gearing causes the ratio of the steering pinion to the steering rack to change. The steering rack covers a greater distance although the steering angle is the same.



## Steering Rack Comparison

When driving straight ahead, the steering pinion is located on the straight teeth of the steering rack (green area).

When the steering angle is larger, the steering pinion meshes with the helical teeth of the steering rack (blue area).



s521\_017

# Running Gear

## Effects

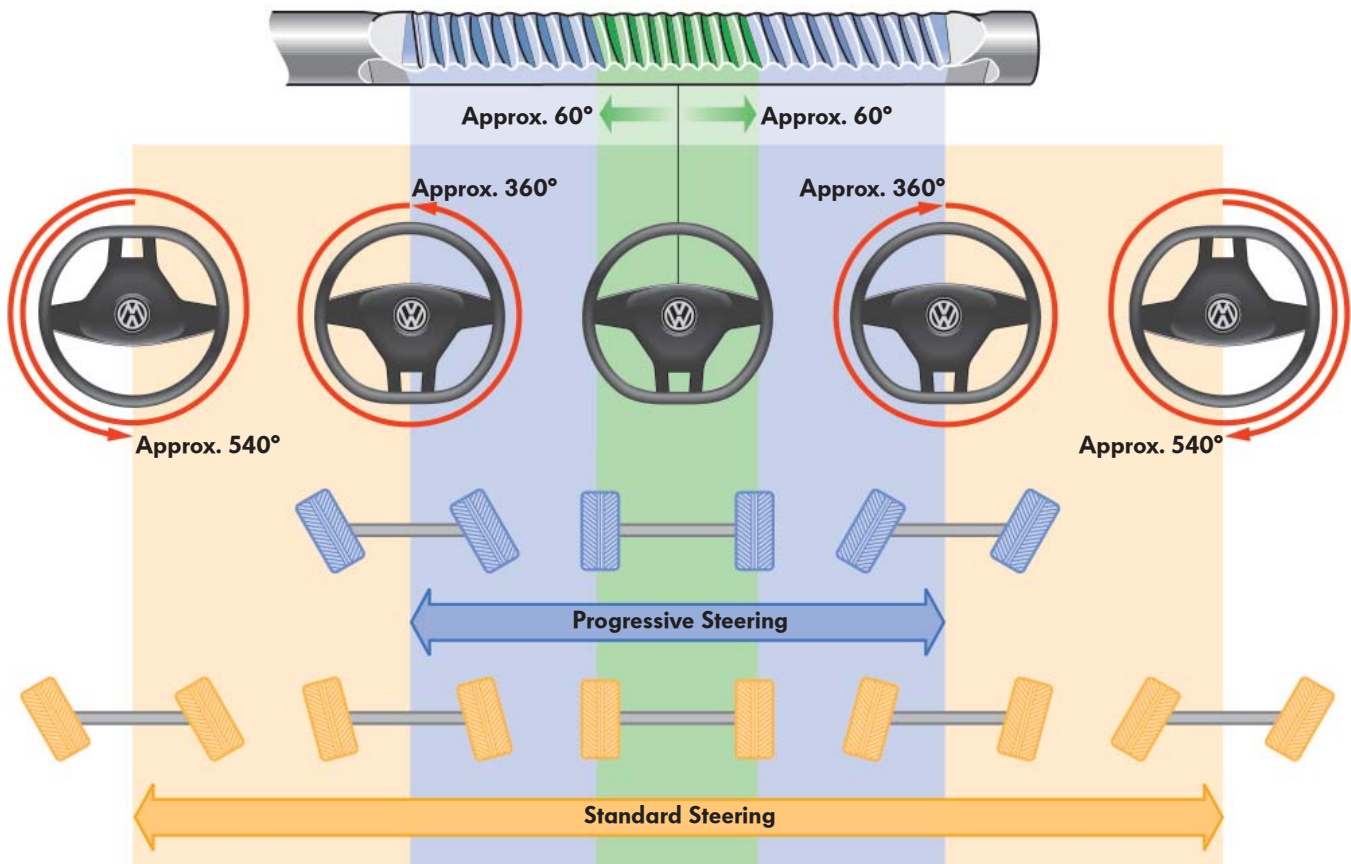
The steering wheel angle of a 2009 Golf is 1080°. The driver must turn the steering wheel 1.5 times to reach the maximum steering stop to the left and right.

A vehicle with progressive steering has a steering wheel angle of only 720°. The steering wheel only needs to be turned once (360°) to reach the maximum steering stop to the left and right.

## Steering Response with Progressive Steering

When driving straight ahead, the driver enjoys the usual, direct steering sensation. The steering pinion meshes with the straight teeth of the steering rack (green area).

When driving on winding roads, driving on hairpin bends, cornering, parking and maneuvering, the driver can feel that the steering is responding faster. With the help of the helical teeth, the steering ratio becomes higher and increases progressively as the steering angle becomes greater (blue area).



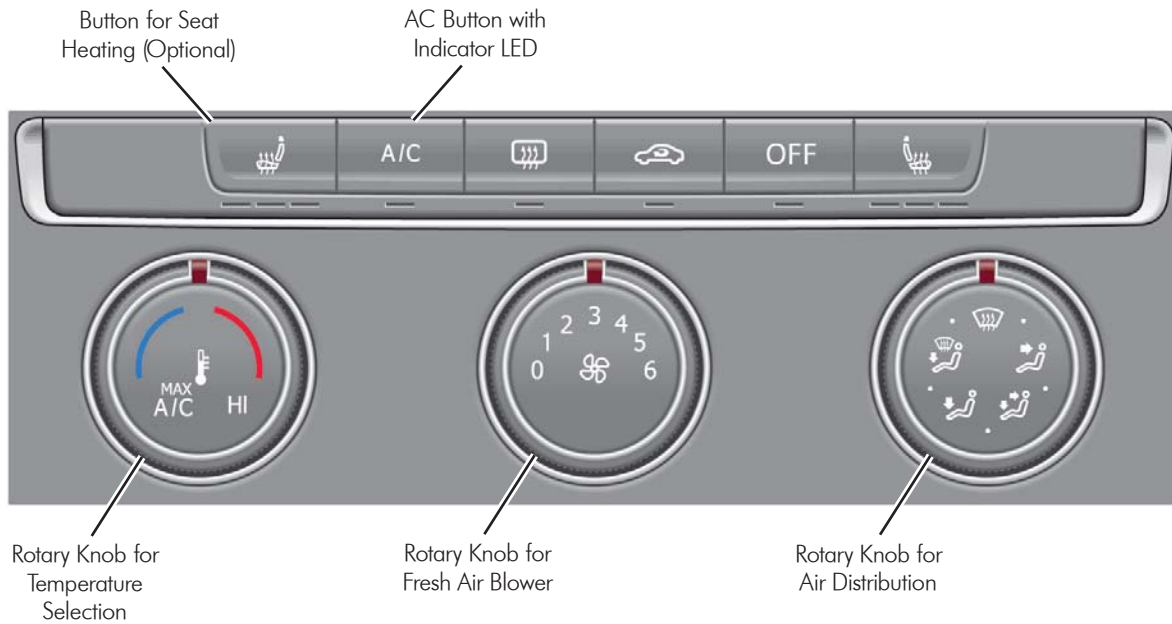
s521\_015

# Heating and Air Conditioning

## Climate Control

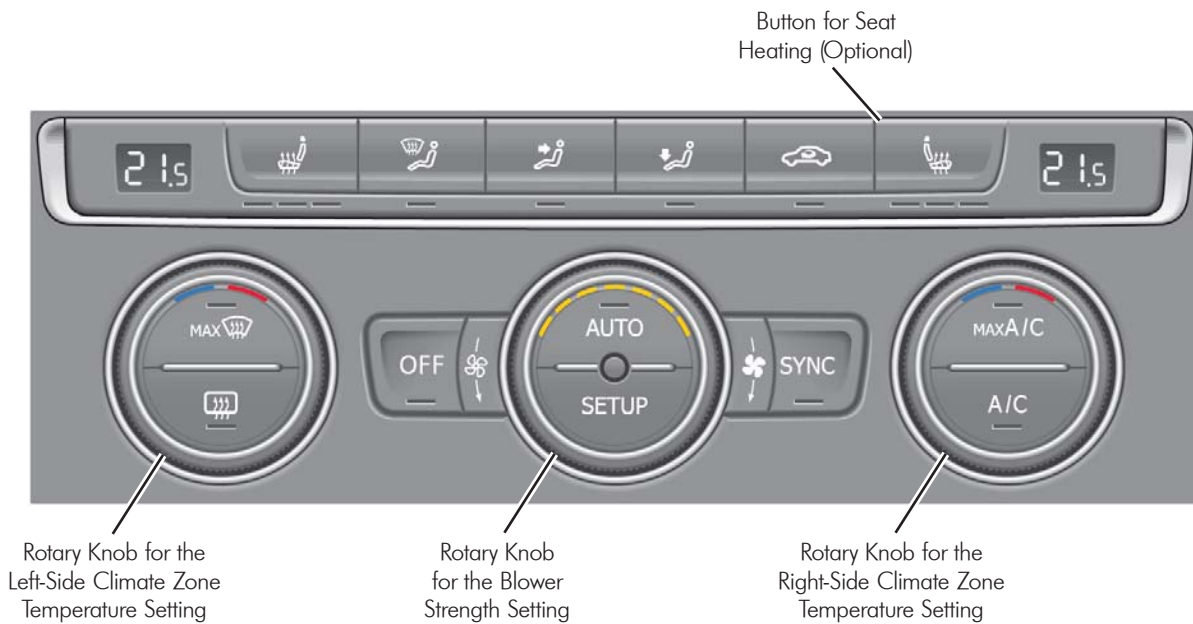
The GTI has two is available with two climate control systems, Climatic and Climatronic. Both climate control versions can be accessed using the address word 08.

### Climatic



s521\_0371

### 2-Zone Climatronic

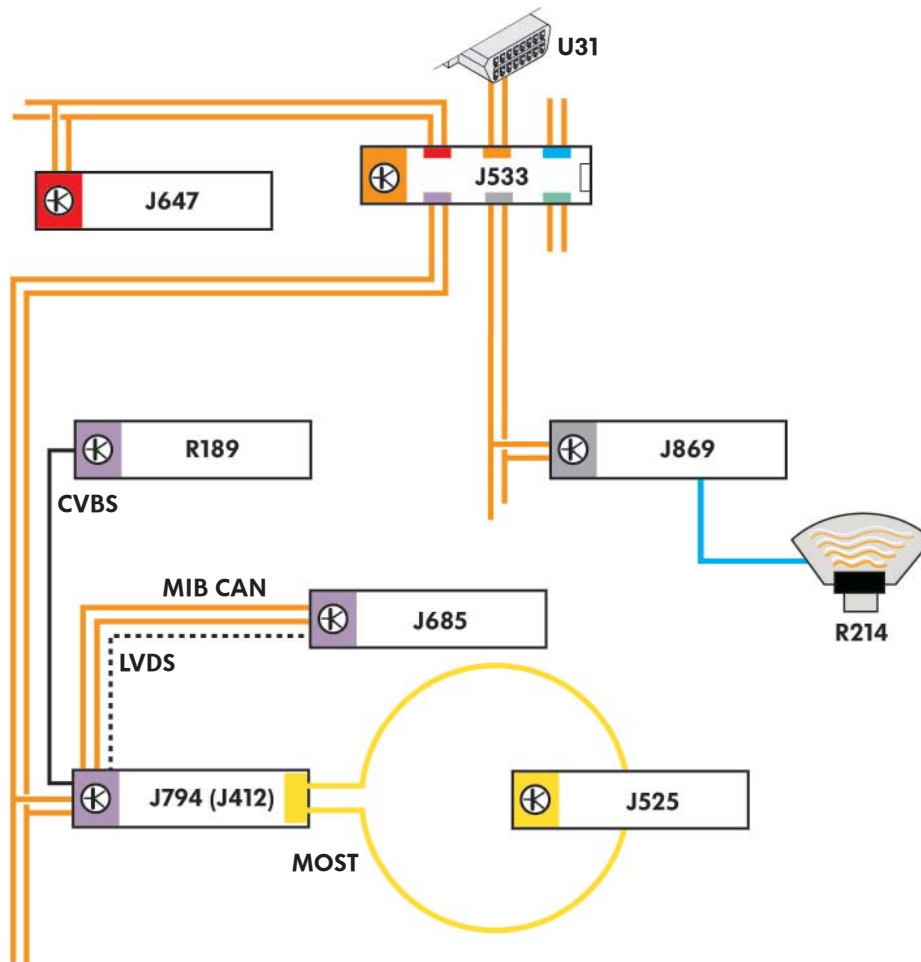


s521\_0391

# Electrical System

## Networking

This diagram shows the network structure in the 2015 GTI. All CAN-Bus systems have a transmission speed of 500 kBit/s.



s521\_051.2

### Legend

J412	Cell Phone Operating Electronics Control Module
J525	Digital Sound System Control Module
J533	Data Bus on Board Diagnostic Interface
J647	Axle Differential Lock Control Module
J685	Front Information Display Control Head
J794	Information Electronics Control Module 1
J869	Structure Borne Sound Control Module
R189	Rearview Camera
R214	Structure-Borne Sound Actuator
U31	Diagnostic Connection

	Powertrain CAN-Bus
	Running Gear CAN-Bus
	Extended CAN-Bus
	Convenience CAN-Bus
	Infotainment CAN-Bus
	Diagnosis CAN-Bus
	MOST Data Bus (150 MBit/s)
	LIN Data Bus
	CAN Data Bus Line
	MOST Fiber Optic Cable
	Actuator Output Line
	Color Video Blanking Synchronization Line for Transmission of Video Signals
	LVDS High Speed Line for Transmission of Video and Control Information

## **MOST Connection**

The Modular Infotainment Matrix (MIB) uses the MOST150 (150 MBit/s transmission speed) to transmit information. All control modules on the MOST150 have component protection.

## **J647 Axle Differential Lock Control Module**

The GTI Performance has the J647 Axle Differential Lock Control Module connected to the Drivetrain CAN-Bus. It shares signals with the ABS Control Module and other control modules to control drive torque and understeer when cornering.

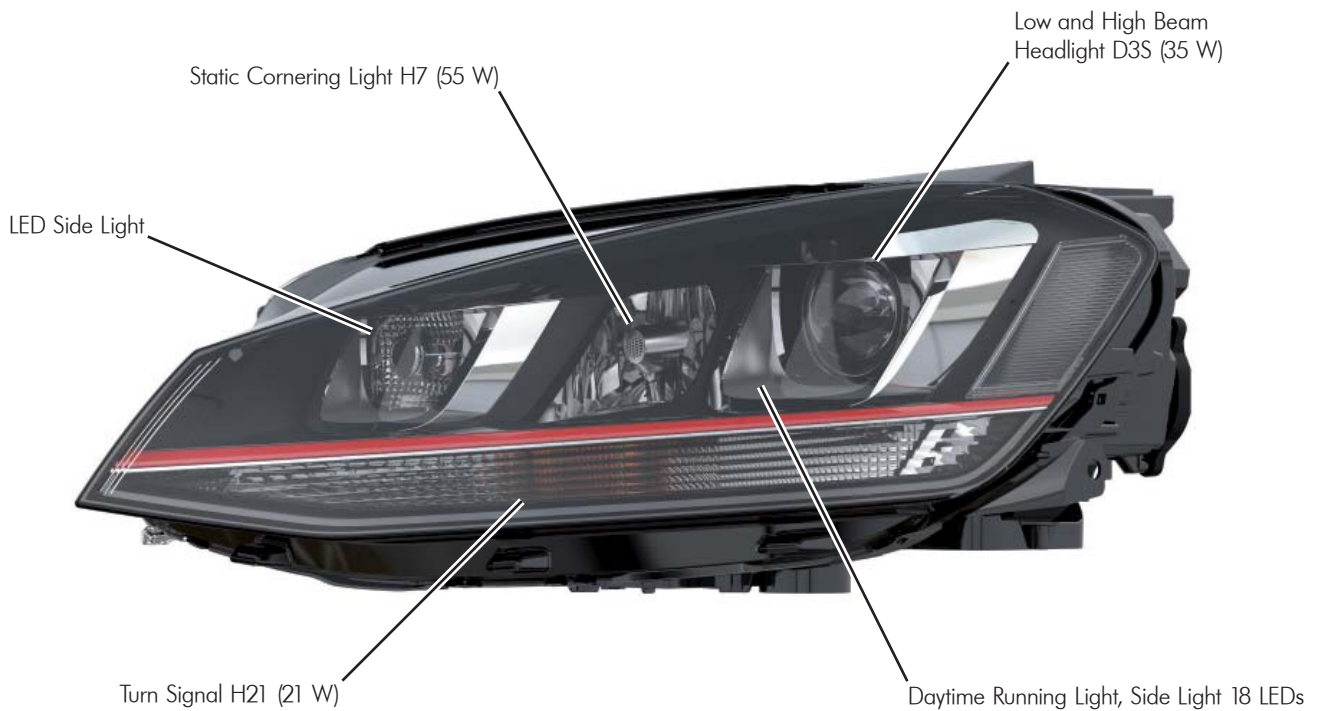
# Electrical System

## Lighting System

The headlights, the taillight cluster and the front fog lights are similar in design to the 2015 Golf, but are specific for the 2015 GTI.

### Headlights

The GTI has bi-xenon headlights for the low and high beam headlights.



s521\_042



## LED Front Fog Lights

The GTI also has front fog lights. There are three LEDs installed in each assembly, which consume a maximum power of 3.5 watts per LED (10.5 watts in total).



s521\_054



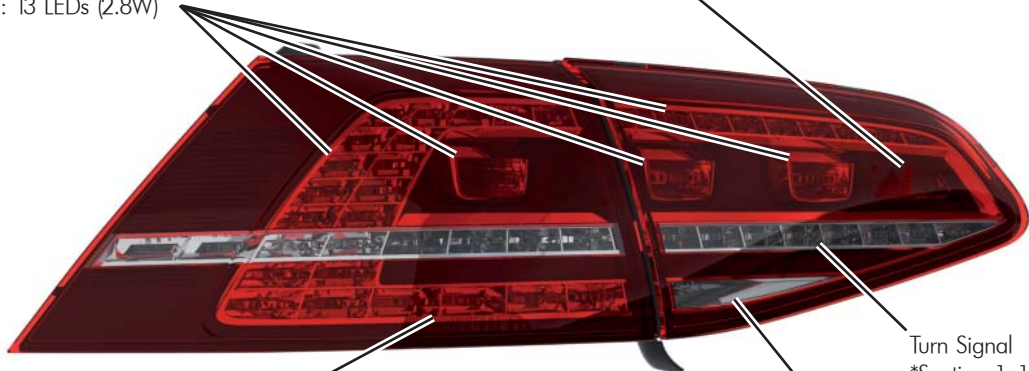
s521\_044

## Rear Lights

The rear lights use LED technology with the exception of the reverse light. The reverse light uses a conventional bulb.

Tail Light Cluster  
\*Section 1: 25 LEDs (6 W)  
\*Section 2: 13 LEDs (2.8W)

Rear Fog Light 3 LEDs  
(On One Side, 4.3 W)



Brake Light 23 LEDs (6 W)

Turn Signal  
\*Section 1: 16 LEDs (3.5W)  
\*Section 2: 16 LEDs (5.5W)

Reverse Light (H21W, 21 W)

\*Section 1 = Outer Tail Light Cluster; \*\*Section 2 = Tail Light Cluster in the Tailgate

s521\_046

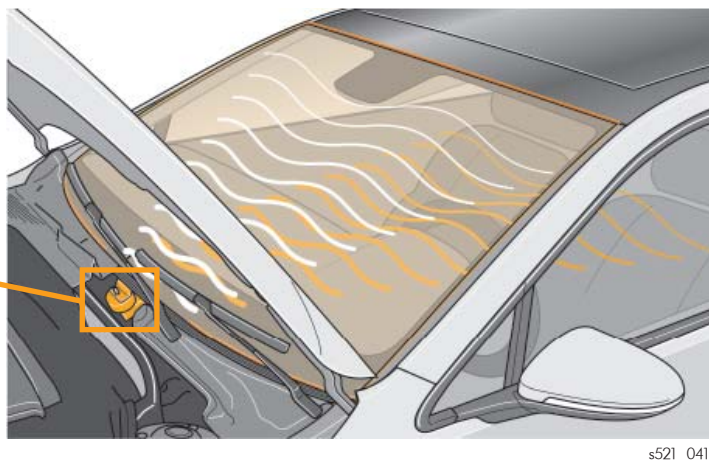
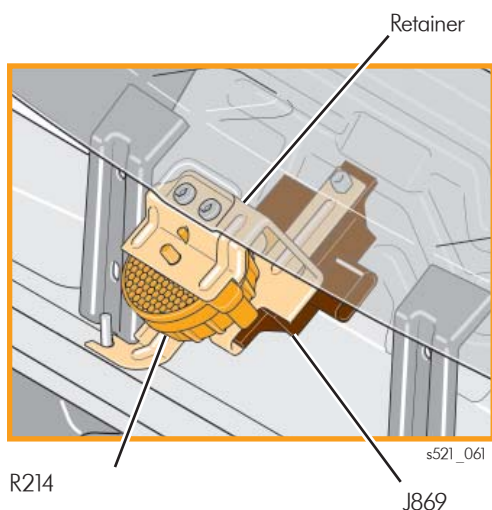
# Electrical System

## R214 Structure-Borne Sound Actuator

R214 generates a sporty engine sound in the vehicle interior so the vehicle occupants hear the engine noise.

### Installation Location

The R214 and the J869 Structure Borne Sound Control Module are located in windshield cross member.

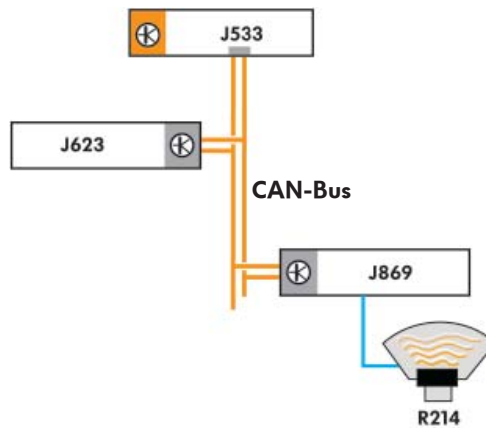


### Function

The R214 activates based on engine speed, engine torque and vehicle speed.

The ECM sends signals to J869, which determines when to activate R214.

The vibrations produced by the windshield generate an artificial driving noise which can only be heard in the vehicle interior. The driving noise is matched to the driving modes – “Normal” or “Sport.”



### Legend

- J533 Data Bus on Board Diagnostic Interface
- J623 Engine Control Module
- J869 Structure Borne Sound Control Module
- R214 Structure-Borne Sound Actuator
- Powertrain CAN-Bus
- Actuator Wire
- CAN Data-Bus Line

# Knowledge Assessment

---

An on-line Knowledge Assessment (exam) is available for this Self-Study Program.

The Knowledge Assessment may or may not be required for Certification.

You can find this Knowledge Assessment at:

**[www.vwwebservice.com](http://www.vwwebservice.com)**

For Assistance, please call:

**Volkswagen Academy**

**Certification Program Headquarters**

**1-877-791-4838**

**(8:00 a.m. to 8:00 p.m. EST)**

Or, E-mail:

**[concierge@volkswagenacademy.com](mailto:concierge@volkswagenacademy.com)**



Volkswagen Group of America  
2200 Ferdinand Porsche Drive  
Herndon, VA 20171  
February 2014

