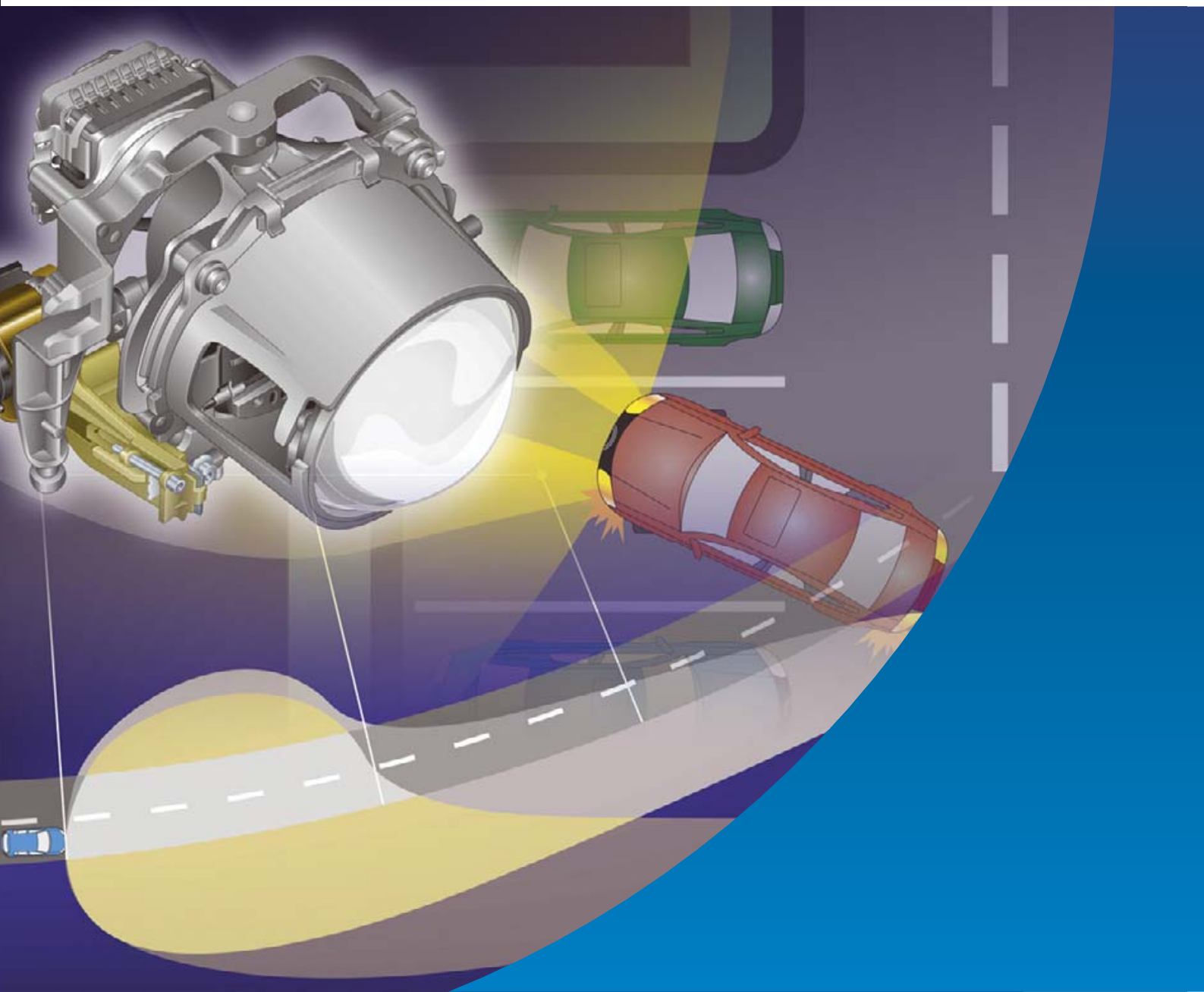




Self-study Programme 335

Cornering Light System

Design and Function

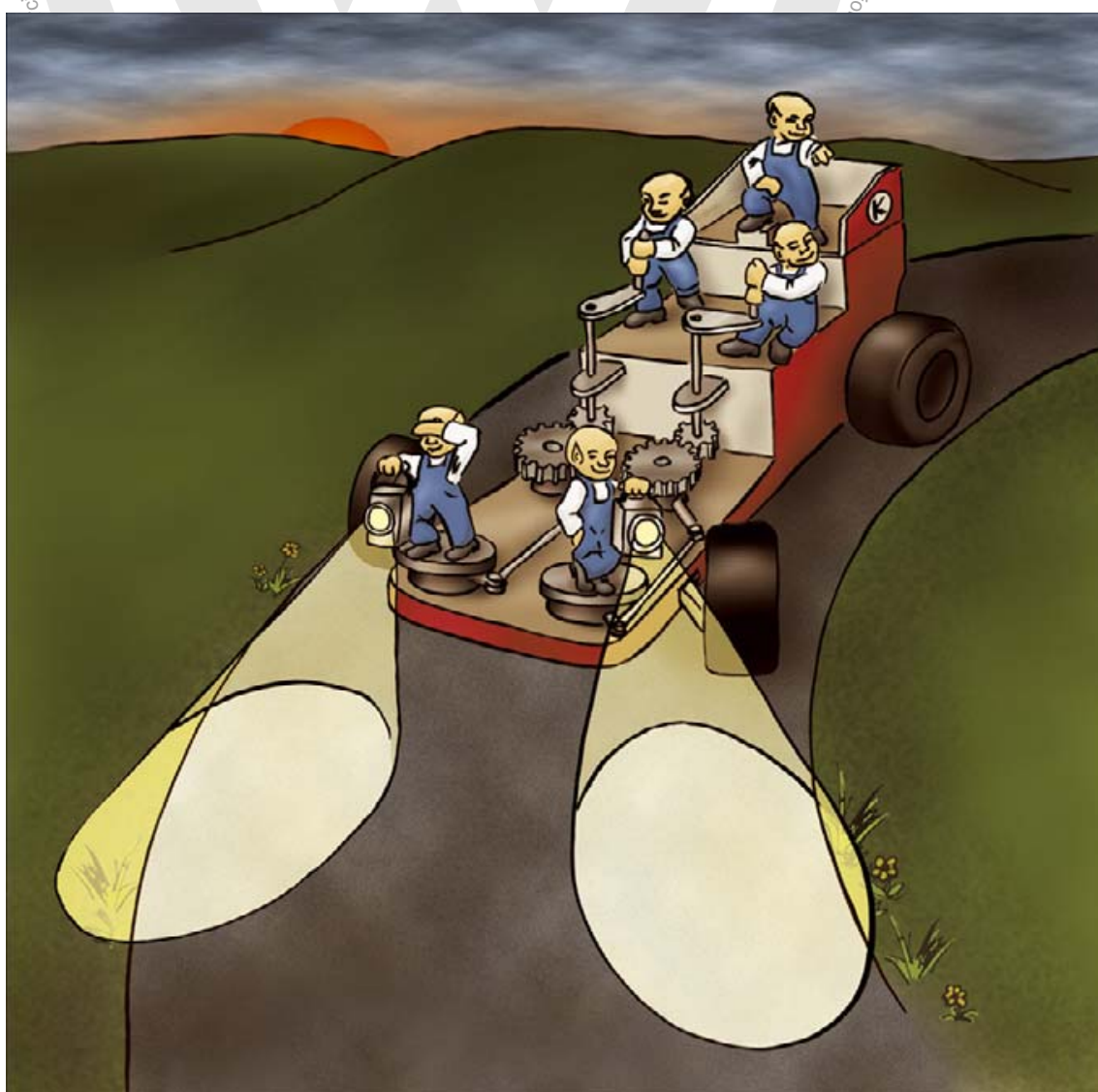


Volkswagen's cornering light system features two new light functions:

- the dynamic cornering light and
- the static cornering light.

Both functions improve road illumination considerably compared with conventional headlights when the vehicle is cornering and turning.

This self-study programme will teach you how the cornering light system works in detail.



S335_027

NEW



**Important
Note**

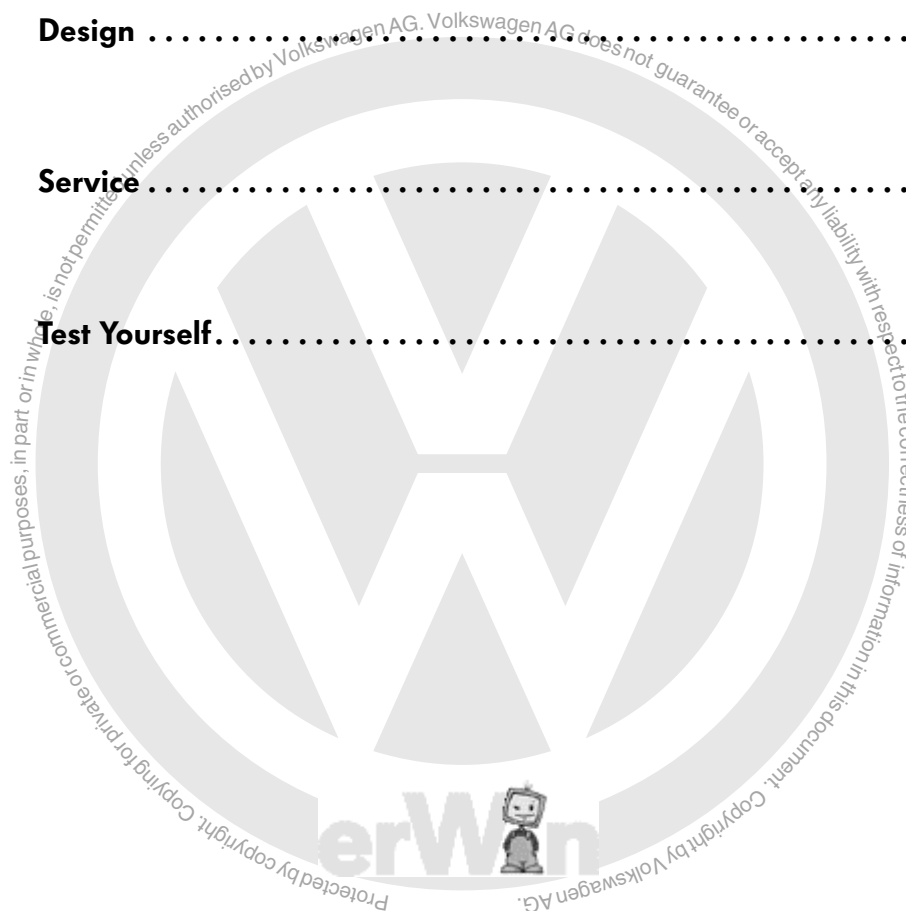


**The self-study programme shows the design and function of new developments.
The contents will not be updated.**

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



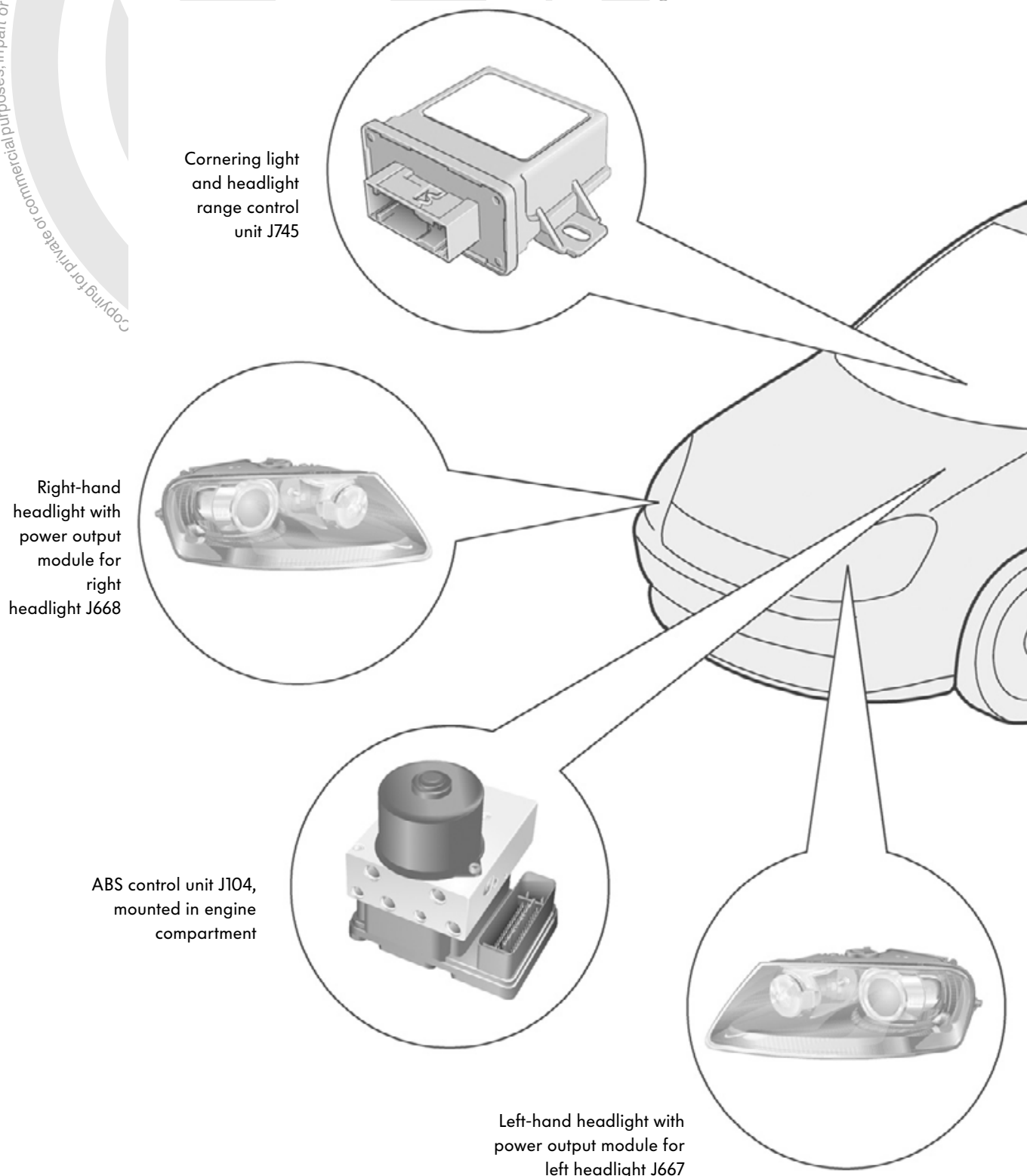
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System Overview	6
CAN Communication	9
Dynamic Cornering Lights	10
Static Cornering Light	12
Design	14
Service	17
Test Yourself	18



Brief Overview

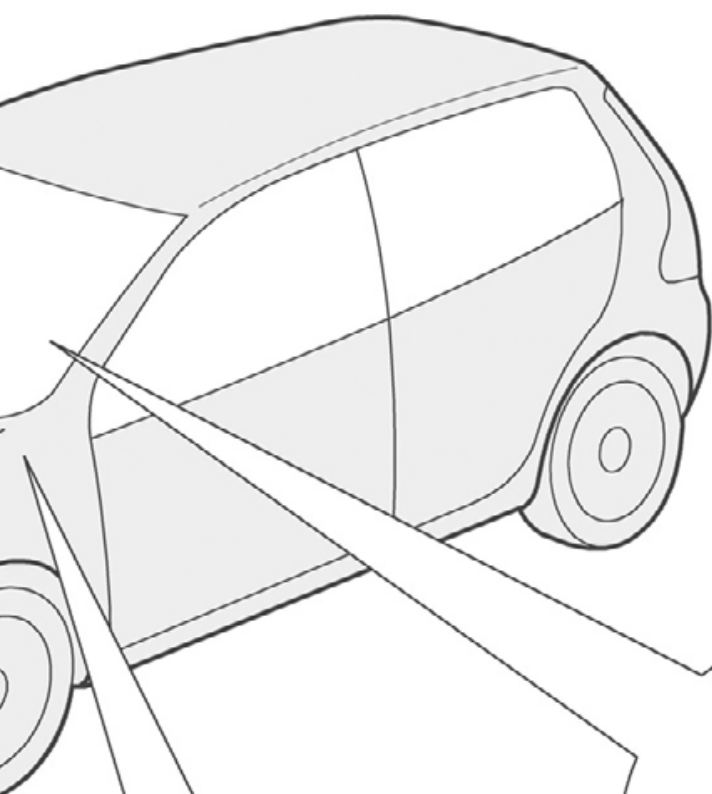
Components and Locations

The following diagram shows the locations of the control units and components that make up the cornering light system in the vehicle. The locations are almost identical in all types of vehicle.

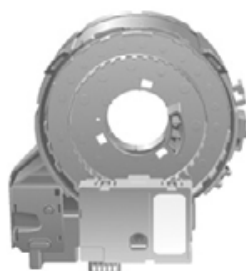


The cornering light system has the following functions:

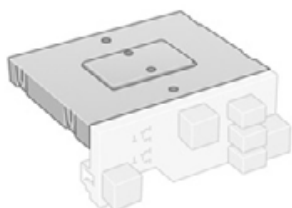
- dynamic cornering light (swivelling dipped beam) on the road,
- static cornering light, additional lights for better illumination when driving around tight curves, for example, when turning off.



S335_009



Steering angle sensor G85,
built into the steering column



Onboard supply control unit
J519,
mounted behind the
fuse box

my liability with respect to the correctness of information in this

System Overview

Sensors

- * only in vehicles without air suspension
- ** only in vehicles with air suspension

G474 Left swivel module position sensor
(type depends on manufacturer)

G76 Rear left vehicle level sender*
G77 Rear right vehicle level sender*
G78 Front left vehicle level sender*
G289 Front right vehicle level sender*

G475 Right swivel module position sensor
(type depends on manufacturer)

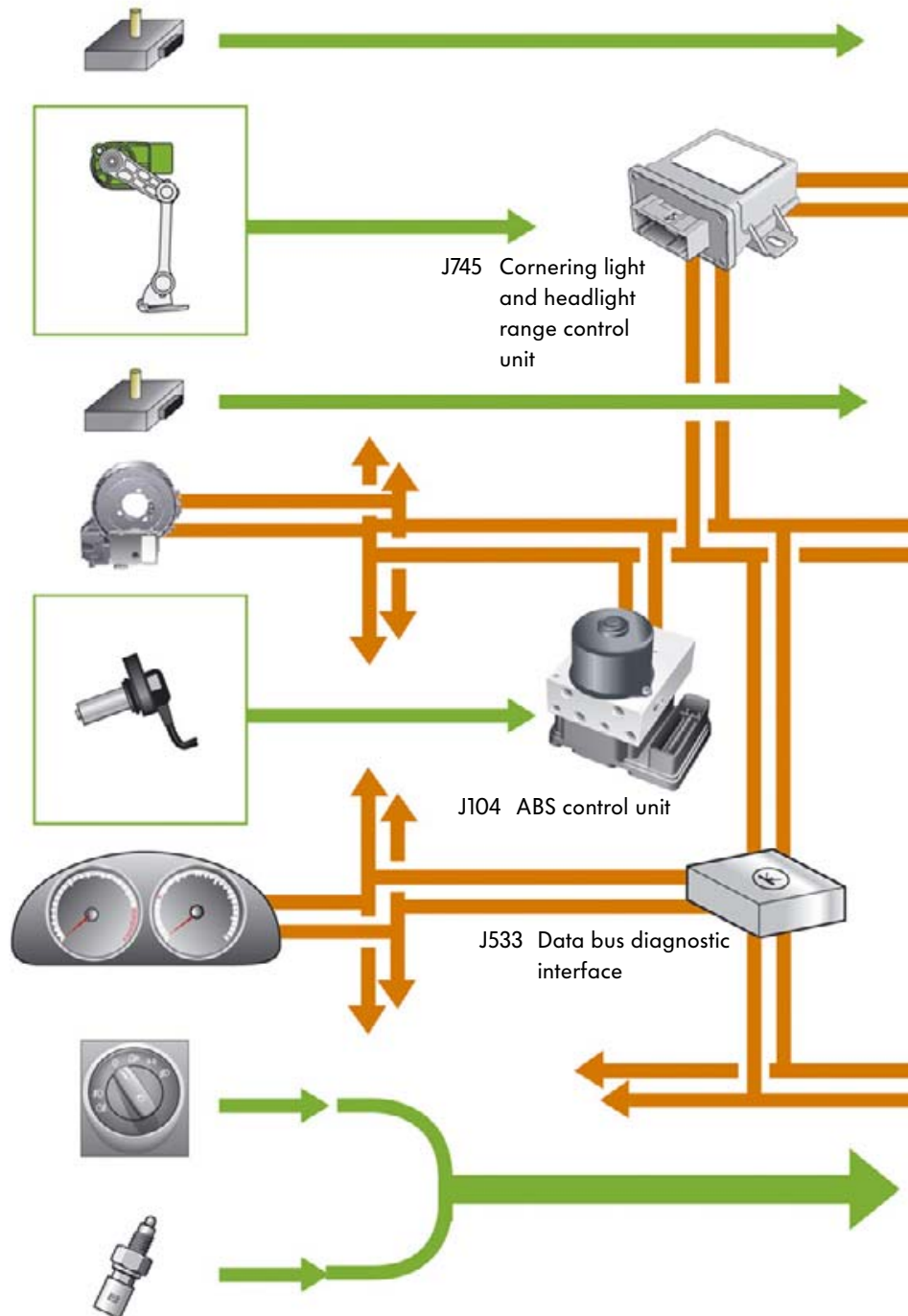
G85 Steering angle sender

G44 Rear right speed sensor
G45 Front right speed sensor
G46 Rear left speed sensor
G47 Front left speed sensor

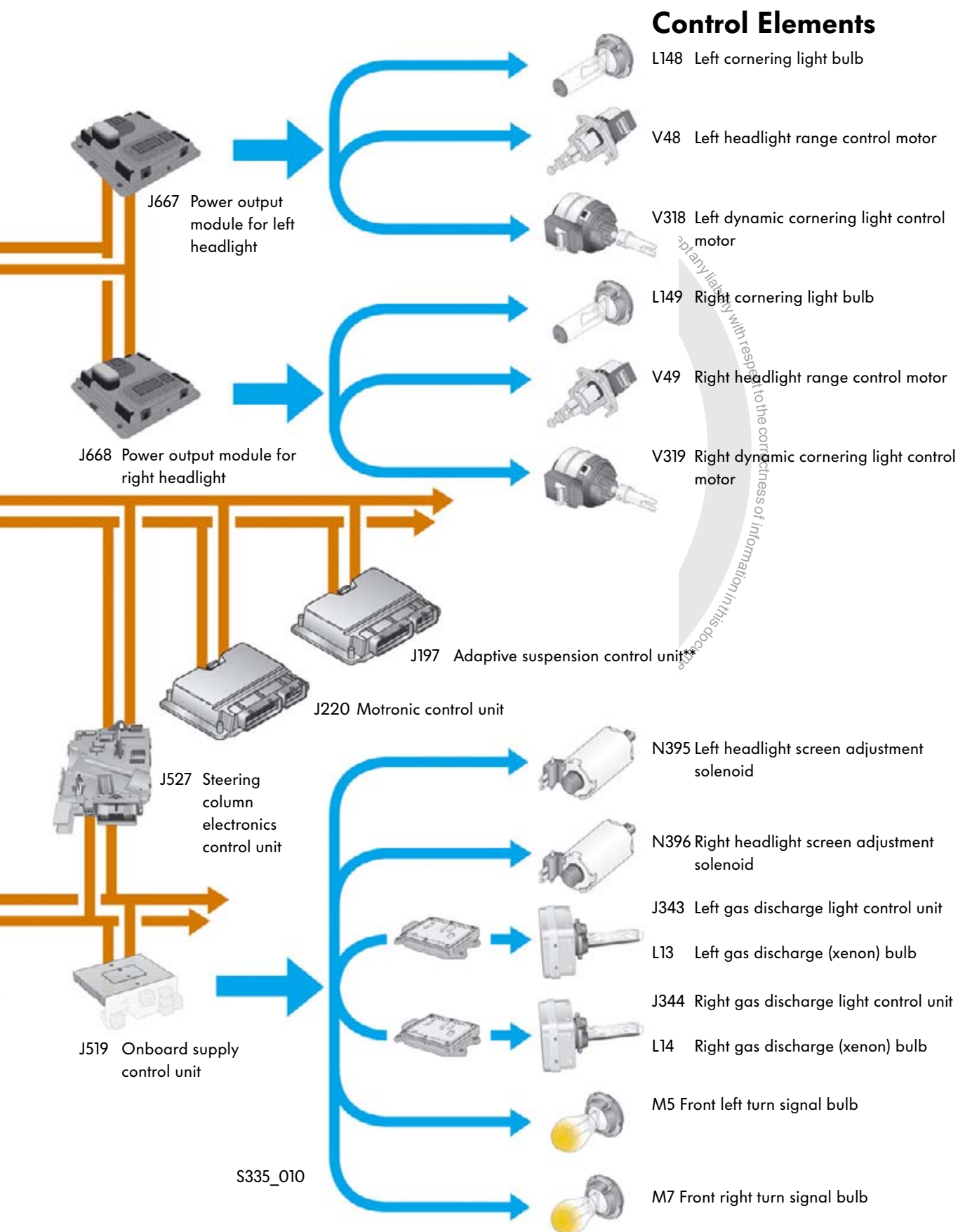
J285 Control unit with display in dash panel
insert

E1 Light switch

F4 Reversing light switch



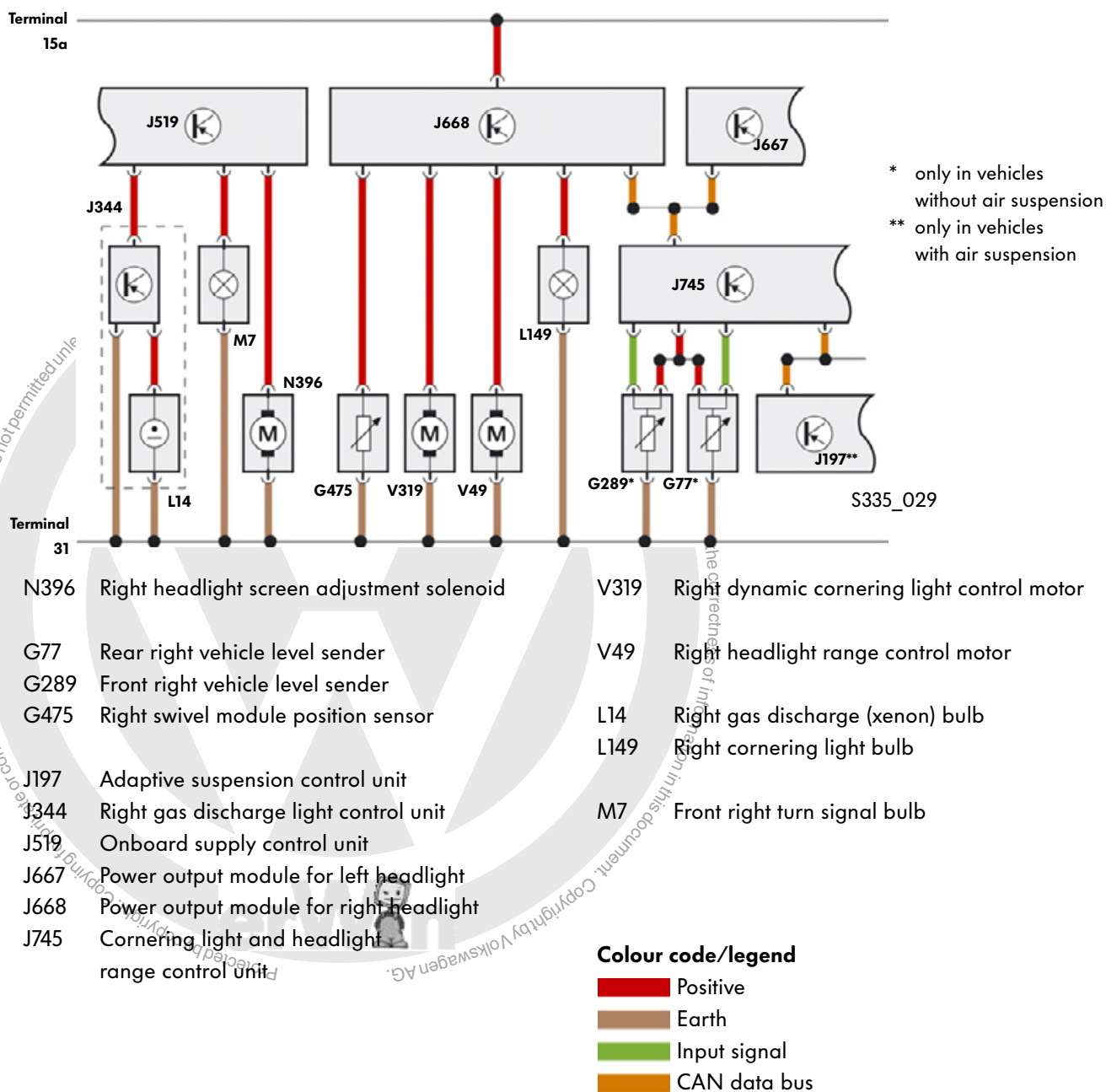
In cars with air suspension, the information on the vehicle level is sent directly from the adaptive suspension control unit to the drive CAN data bus. There it can be accessed by the cornering light and headlight range control unit. On vehicles without air suspension, the control unit receives the information from the vehicle level senders.



System Overview

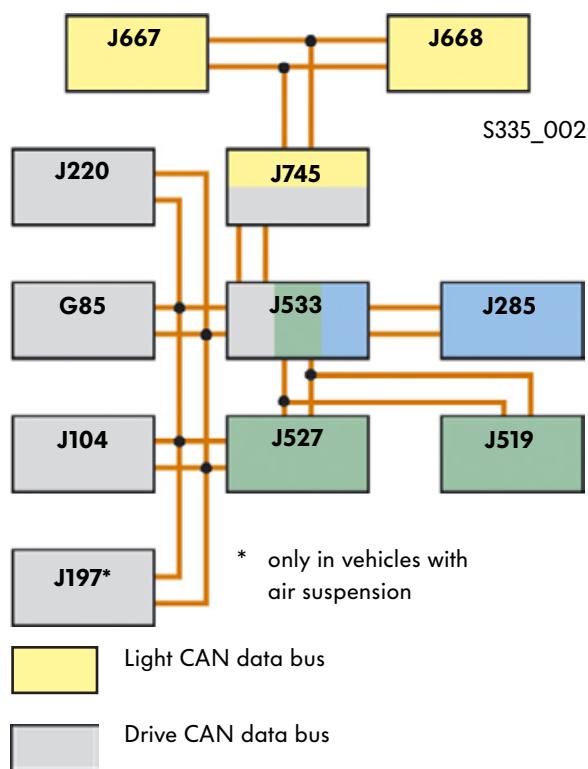
Schematic Diagram of Headlights

The following section provides a schematic diagram using the right-hand headlight as an example.



The voltage supply for the bulbs in the static cornering light is controlled by the power output modules for the right J668 and left J667 headlights. All other bulbs in the headlights are supplied by the onboard supply control unit.

Control Unit Networking



G85	Steering angle sender
J104	ABS control unit
J197	Adaptive suspension control unit
J220	Motronic control unit
J285	Control unit with display in dash panel insert
J519	Onboard supply control unit
J527	Steering column electronics control unit
J533	Data bus diagnostic interface
J667	Power output module for left headlight
J668	Power output module for right headlight
J745	Cornering light and headlight range control unit



The picture shows the control units used for the cornering light functions and the CAN network. Data is exchanged between the control unit for headlight range control J431 and the power output modules in the left J667 and right J668 headlights via a 500 kBaud CAN (light CAN data bus). This light CAN data bus is a separate CAN data bus and is not connected to the 500 kBaud drive CAN data bus. The light CAN data bus also does not run via the diagnosis interface for data bus J533.

The following variables are used as input variables for calculating the cornering light functions and are supplied to the control unit for headlight range control J431 as CAN messages.

- Steering wheel angle (steering angle sender G85)
- Steering wheel speed (steering angle sender G85)
- Wheel speed (ABS control unit J104)
- Direction of travel (onboard supply control unit J519/reversing light switch F4)
- Yaw velocity (ABS control unit J104)
- Dipped beam on (onboard supply control unit J519)



You will find further information on the CAN data bus in the self-study programmes SSP 186, SSP 238 and SSP 269.

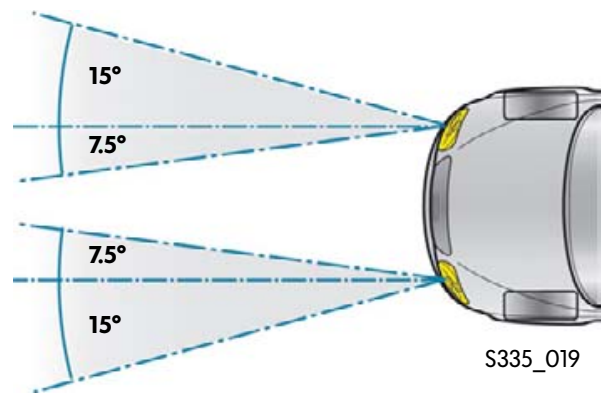


Dynamic Cornering Lights

Function

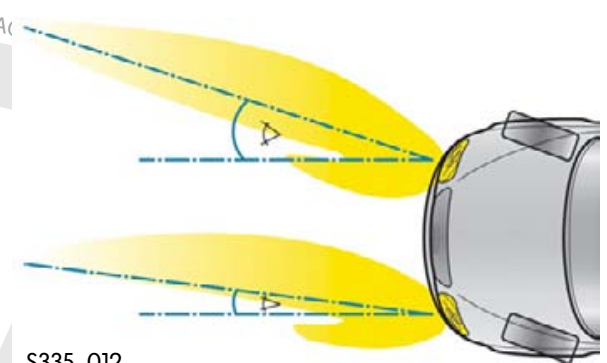
The dynamic cornering light system swivels the dipped beam bulb module horizontally with an integrated motor.

The swivelling angle is approx. 15 degrees on the side inside the curve and 7.5 degrees on the outside of the curve.



S335_019

The different swivelling angles allow better illumination of the cornering path. The module on the inside of the curve swivels in twice as much as the module on the outside of the curve. The maximum illumination width is thus achieved with even light distribution.

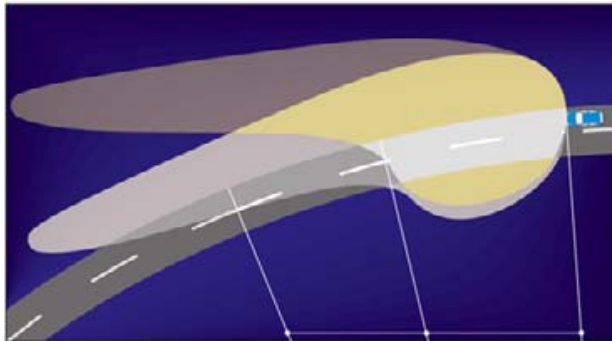


S335_012

Lights not swivelled when vehicle is stationary

At driving speeds under 10km/h, the bulb modules are not swivelled. Over 10km/h, the swivelling angle is basically dependent on the curve radius. The legal requirements stipulating that the headlights may be not swivelled while the vehicle is stationary are therefore fulfilled. Also, the headlights are swivelled slightly when the vehicle accelerates from a standstill.

The Illuminated Areas



S335_008

B

A

The diagram clearly shows the improved illumination of the road when the vehicle is cornering. The darker light cone represents the illumination with a conventional dipped beam.

It illuminates area A of the driving lane. A large part of the light cone illuminates areas next to the road. The lighter light cone shows illumination with the dynamic cornering light, which also illuminates area B of the driving lane.



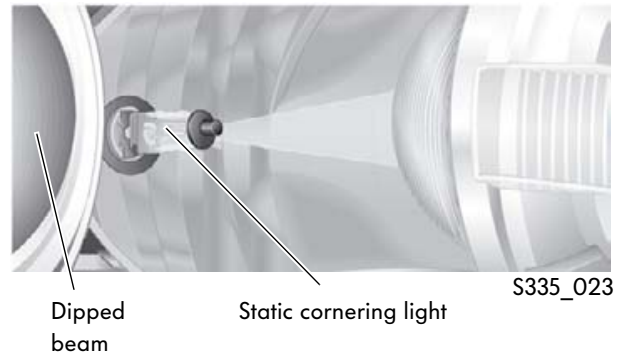
The Switching On and Off Conditions

Function	Switching on conditions	Switching off conditions
Dynamic cornering lights (swivelling dipped beam)	<ul style="list-style-type: none"> - Terminal 15 on AND - Dipped beam on AND - Vehicle speed $\geq 10\text{km/h}$ AND - Curve radius AND - Travelling forwards 	<ul style="list-style-type: none"> - No switch-on condition

Static Cornering Light

Function

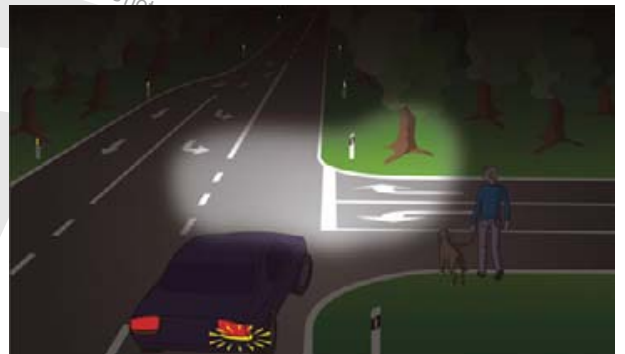
The static cornering light is one innovation that is clearly visible from outside the vehicle.
An additional reflector has been integrated in the headlight to realise this function.

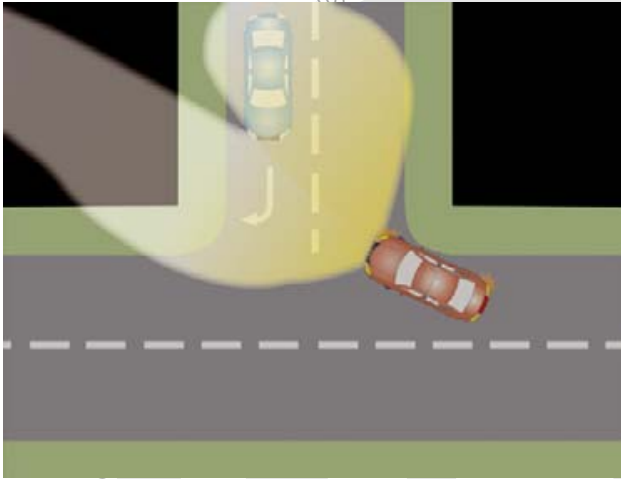


The top picture shows road illumination when turning off with conventional dipped beam headlights and the bottom picture with additional static cornering lights.

The gain in safety brought about by the improved illumination is clear to see.

The static cornering light only works in conjunction with the dipped beam headlights.





S335_028

The Halogen bulb in the additional reflector is switched on, depending on the situation, at speeds $\leq 50\text{km/h}$. They help the driver spot other road users or obstacles earlier. The static cornering light is switched on and off by dimming.

The Switching On and Off Conditions

Function	Switching on conditions	Switching off conditions
Static cornering light right OR left	<ul style="list-style-type: none"> - Terminal 15 on AND - Dipped beam on AND - Driving speed $\leq 50\text{km/h}$ AND - Cornering pattern (tight corners, e.g. when turning off) 	<ul style="list-style-type: none"> - No switch-on condition

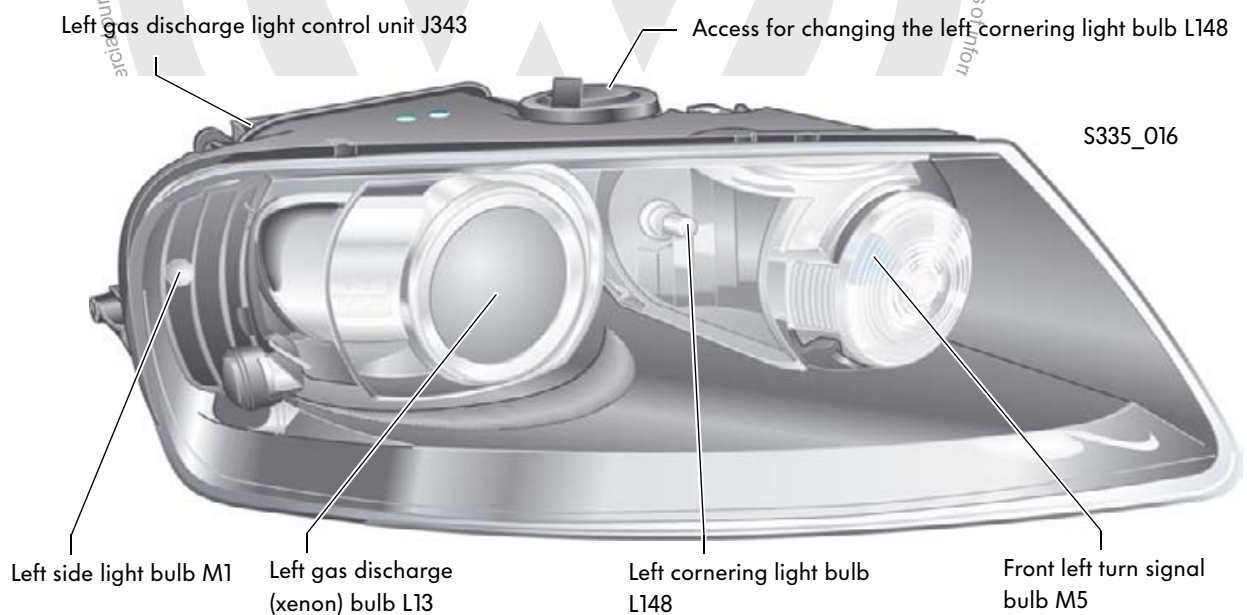


Design

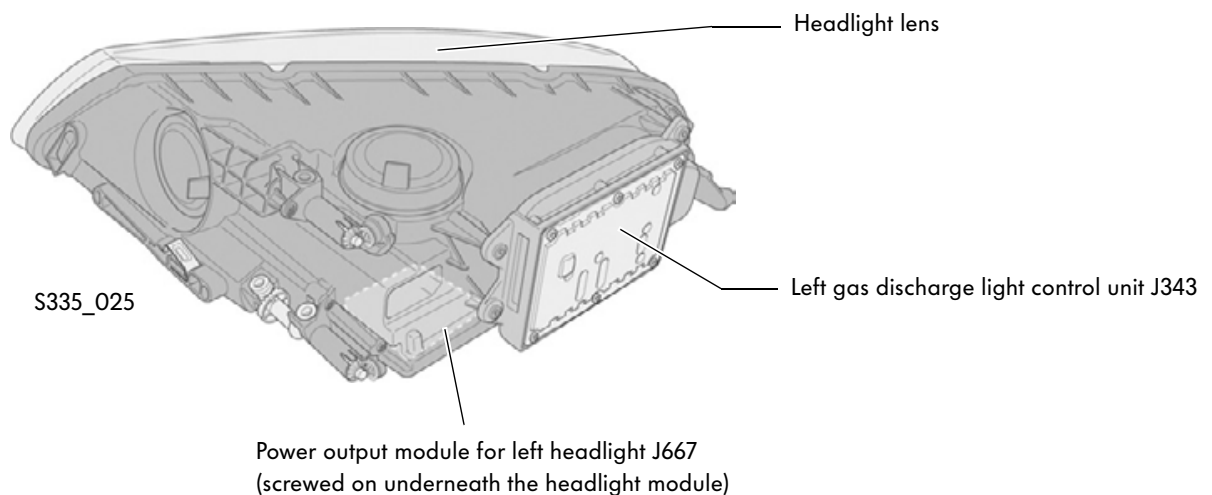
Headlight Assembly (Touareg)

A headlight with the cornering light function has four bulbs:

1. The gas discharge bulb (for dipped, full beam and dynamic cornering lights),
2. The bulb for static cornering light,
3. The turn signal bulb and
4. The side light bulb.

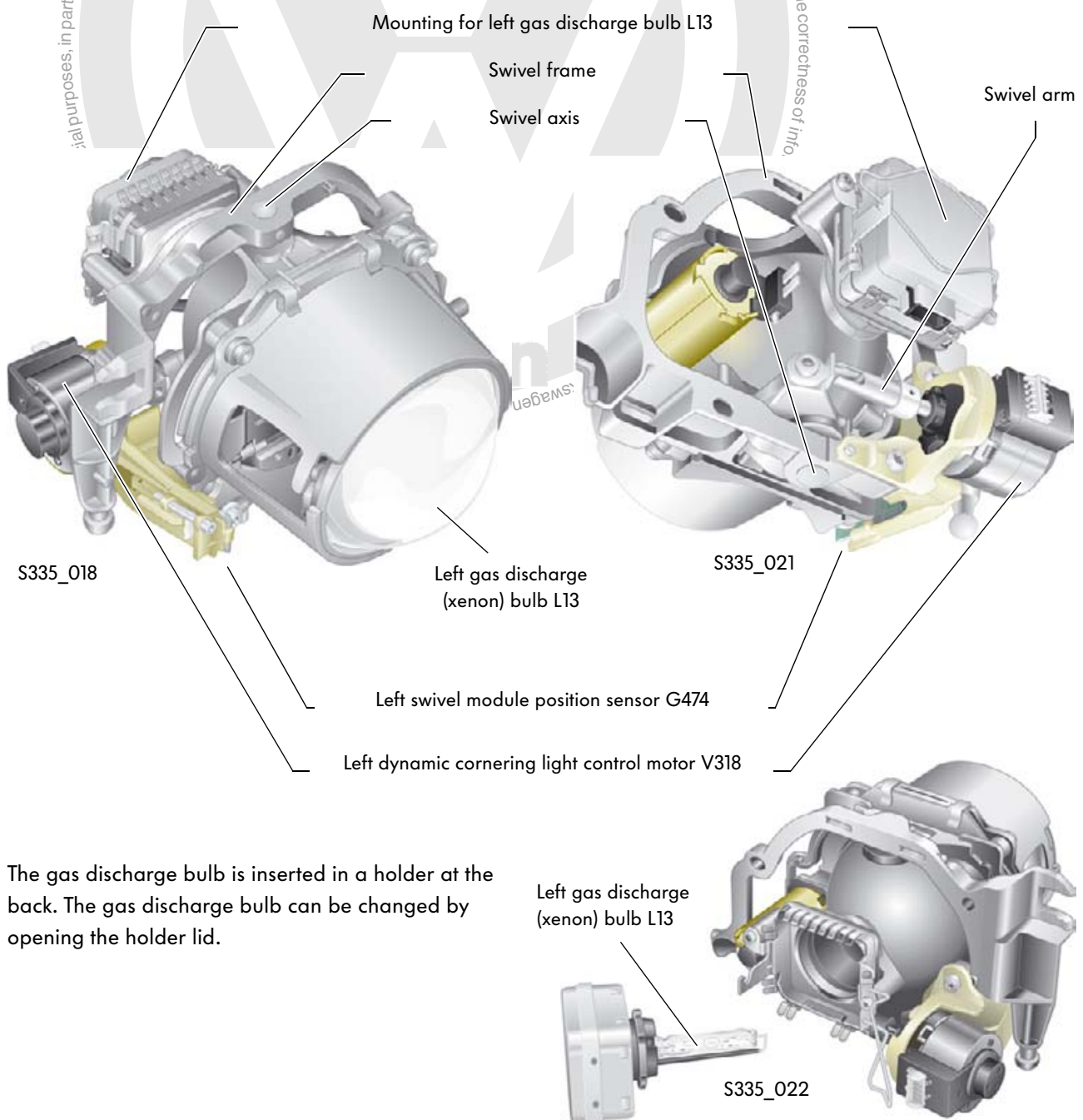


The power output modules for the left J667 and right J668 headlights are both on the bottom of the headlight modules.



Dynamic Cornering Light Assembly

The light module assembly for the dynamic cornering lights is very similar to that of a conventional Bi-Xenon module. The dipped and full beam light is contained in the bulb module. The module is mounted on bearings in a swivelling frame to allow horizontal movement. The module has an additional control motor and sensor for this. The sensor is used to recognise the swivelling angle.

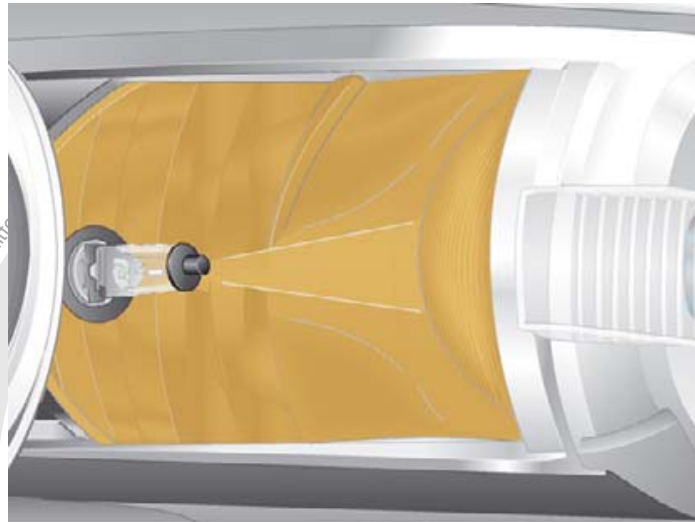


The gas discharge bulb is inserted in a holder at the back. The gas discharge bulb can be changed by opening the holder lid.

Design

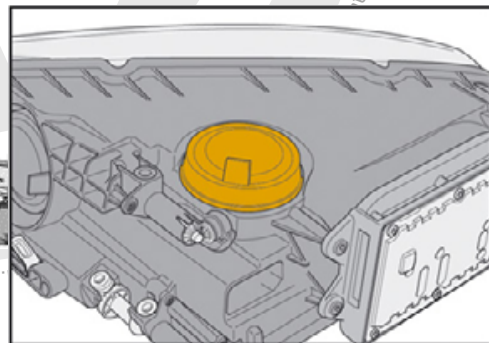
The Static Cornering Light

The static cornering light is projected outward by a reflector behind the turn signal light.



S335_017

The bulb in the static cornering light can be reached through an opening in the headlight module housing.



S335_026

Fault Indicator



S335_024

The bulb warning light in the dash panel insert flashes when the system is faulty and the fault is stored in the fault memory of the cornering light and headlight range control unit J745.

If the dipped headlights fail on one side, the cornering light function will be switched off completely.

That means that the dipped beam inserts in the headlights are no longer swivelled on corners.

If one dipped beam light fails, the corresponding static cornering light will also no longer be switched on.

Driving Abroad on the Left

There are two different solutions for converting the headlights for driving on the left (depending on the type of vehicle).

1. They can be switched over using a lever on the headlight bulb module.
2. Specific areas of the headlight lens can be masked.

In both cases, the cornering light function needs to be deactivated with the vehicle diagnosis, testing and information system VAS 5051 or the diagnosis and service information system VAS 5052.



Please refer to the electronic service information system (ELSA) for the exact procedure for converting the headlights to left-hand traffic.



Test Yourself

1. How is the improved illumination of the road on corners achieved?

- ☐ a) By switching on additional headlights in relation to the curve radius.
- ☐ b) By swivelling the dipped beam light.
- ☐ c) By automatically switching on the full-beam light.

2. How are faults in the cornering light system indicated to the driver?

- ☐ a) Faults are only stored in the cornering light and headlight range control unit J745.
- ☐ b) Faults are not indicated.
- ☐ c) Faults cause the warning light in the dash panel insert to flash.

3. Data is exchanged between the cornering light and headlight range control unit J745 and the power output module for right headlight J668 and left J667 via the...

- ☐ a) Communications line
- ☐ b) Drive CAN data bus
- ☐ c) Light CAN data bus
- ☐ d) Convenience CAN data bus

4. If the cornering light and headlight range control unit J745 detects a fault in the cornering light system of the right-hand headlight, the following will occur:

- ☐ a) The cornering light function is switched off and both headlights are set to the straight-ahead position.
- ☐ b) The left-hand headlight is still swivelled while the right-hand headlight is set to the straight-ahead position.
- ☐ c) The vehicle lights are switched off.

5. The following needs to be performed to convert the lights for driving abroad on the left:

- ☐ a) No need to change anything. The system recognises left-hand traffic and the conversion is automatic.
- ☐ b) The cornering light function needs to be deactivated using a diagnosis tester.
- ☐ c) Depending on the equipment, either a lever on the power output modules for the right headlight J668 and left headlight J667 needs to be moved or specific areas of the headlight lens need to be masked.

Answers

1. a, b)

2. c)

3. c)

4. a)

5. b, c)



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