All-round vision camera

All-round vision camera (Top Rear Side View Camera - TRSVC)

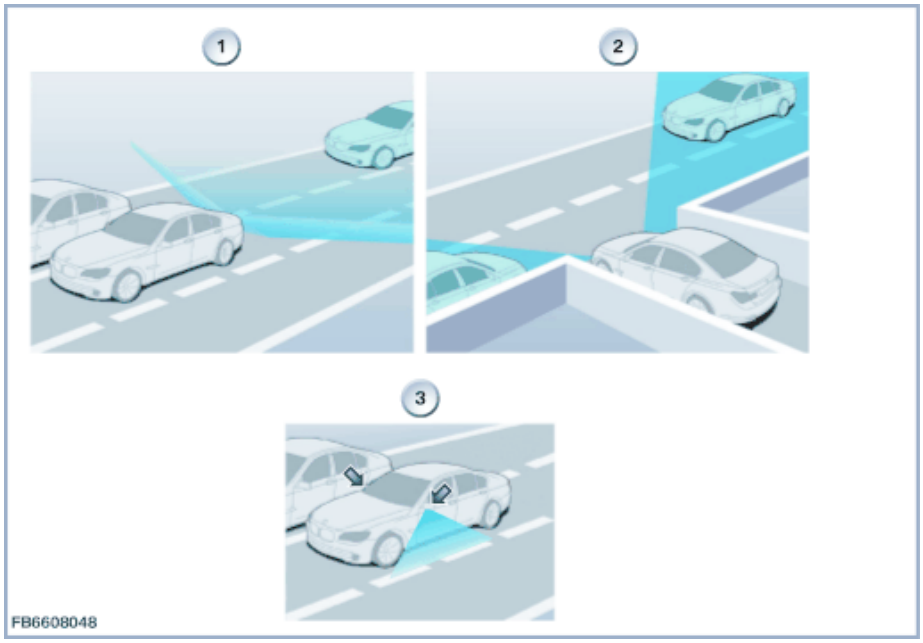
Depending on the options fitted, various camera-based systems are available. Technically, the system is implemented with various cameras and a joint control unit, the TRSVC control unit. TRSVC stands for: Top rear bumper camera. The functions of this camera-based assist system are currently:

- Exterior mirror camera
- Bumper camera
- Rear view camera

Note! Ensure that mandatory connections for optional equipment are in place!

Alongside the already familiar PDC parking and manoeuvring aids and reversing camera, another parking and manoeuvring aid is offered in the form of the bumper camera as well as the exterior mirror camera.

The system is described using the BMW 7-Series as an example.



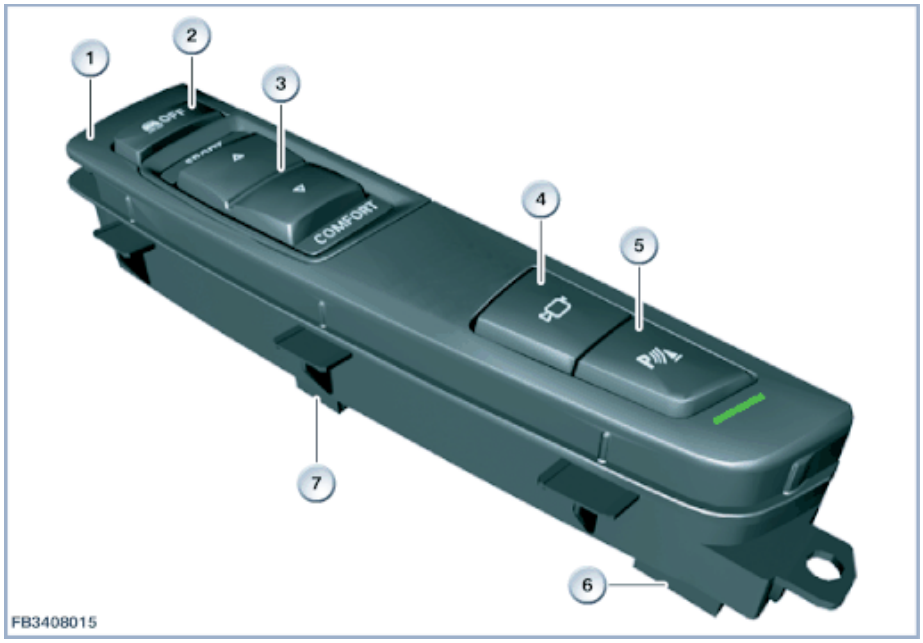
Item	Explanation	Item	Explanation
1	Rear view camera	2	Bumper camera
3	Exterior mirror camera		

Brief component description

The following components are described for the all-round vision camera (TRSVC):

Centre console operating facility

The cameras are activated by a button in the centre console operating facility. The camera images are displayed on a split screen in the central information display (CID). The system is automatically switched off above a speed of 15 km/h. The reversing camera is also activated by a button in the centre console operating facility. Conditions required for switch-on, see Owner's Handbook.



Example BMW 7-Series

Item	Explanation	Item	Explanation
1	Centre console operating facility	2	DTC button
3	Drive dynamics control switch	4	Button for bumper camera
5	PDC button with function indicator light as well as button for reversing camera	6	4-pin plug connection
7	six-pin plug connection		

The centre console operating facility has 2 plug connections (6-pin and 4-pin). Electrical connections exist between the buttons in the centre-console control panel and various control units:

- Bumper camera button and PDC button to the controller (CON)
- Driving dynamics control switch and DTC button to the Integrated Chassis Management (ICM)

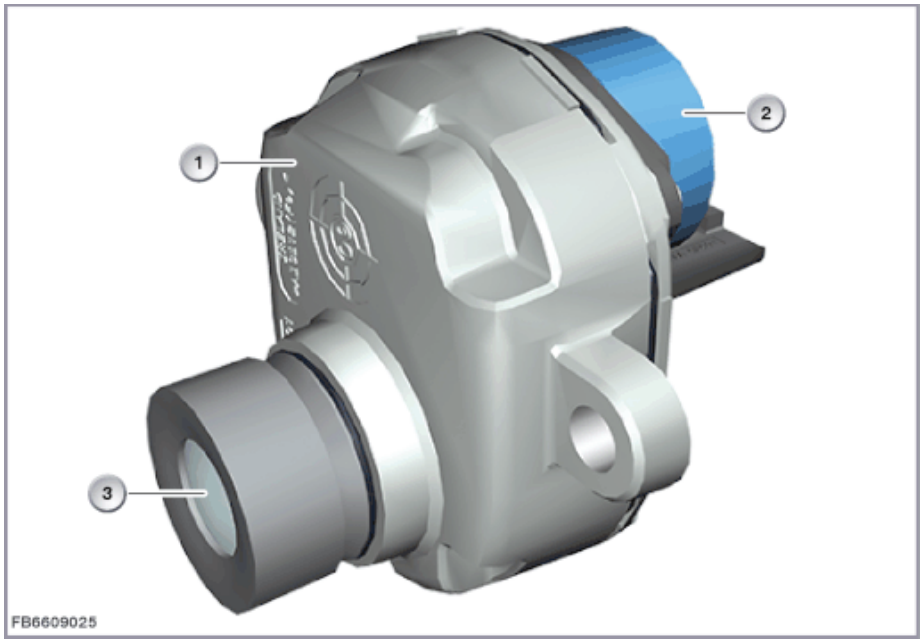
Note! New update procedure!

The centre console operating facility is only still connected to the ICM for the next Integrated Chassis Management (ICM) generation.

Exterior mirror camera

From the driver's side a certain area of the passenger's side cannot be viewed. The view is obscured by the exterior mirror and the A-pillar. So that this area can still be viewed, the exterior mirror is equipped with the exterior mirror camera. The exterior mirror cameras are a constituent for all-round visibility (as well as national-market version Japan).

The two exterior mirror cameras make their signals available to the all-round vision camera control unit over a LVDS data line.



Item	Explanation	Item	Explanation
1	Exterior mirror camera	2	4-pin plug connection
3	Lens		

The two exterior mirror cameras are located on the underside of the driver's door mirror and passenger side mirror. The exterior mirror cameras are connected to the all-round vision camera control unit by the following lines:

- LIN bus
- LVDS data line

Note! Follow the instructions in the operating instructions!

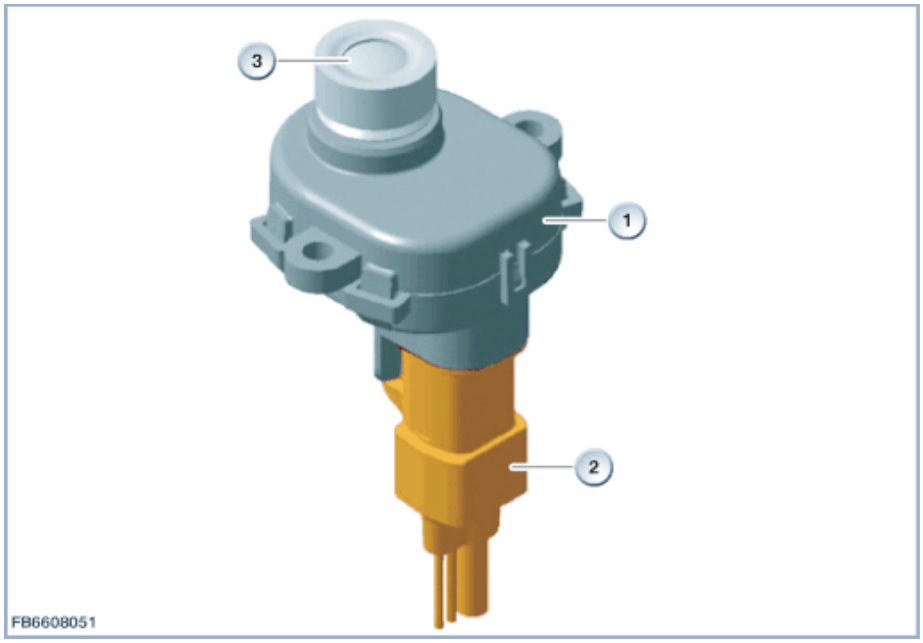
Dirt can impair the image quality of the exterior mirror cameras. To flush the lenses, comply with the Owner's Handbook.

Bumper camera

The bumper cameras enable an early view of crossing traffic at exits and junctions with a poor viewing angle. Road users concealed by objects on the sides are recognized relatively late from the driver's seat.

The detection range of the cameras is a maximum of 100 metres.

The two bumper cameras and the rear view camera makes their signals available to the TRSVC control unit via an LVDS data line.



Item	Explanation	Item	Explanation
1	Bumper camera	2	4-pin plug connection
3	Lens		

The two bumper camera are located on the left and right sides in the bumper. The bumper cameras are connected to the all-round vision camera control unit by the following lines:

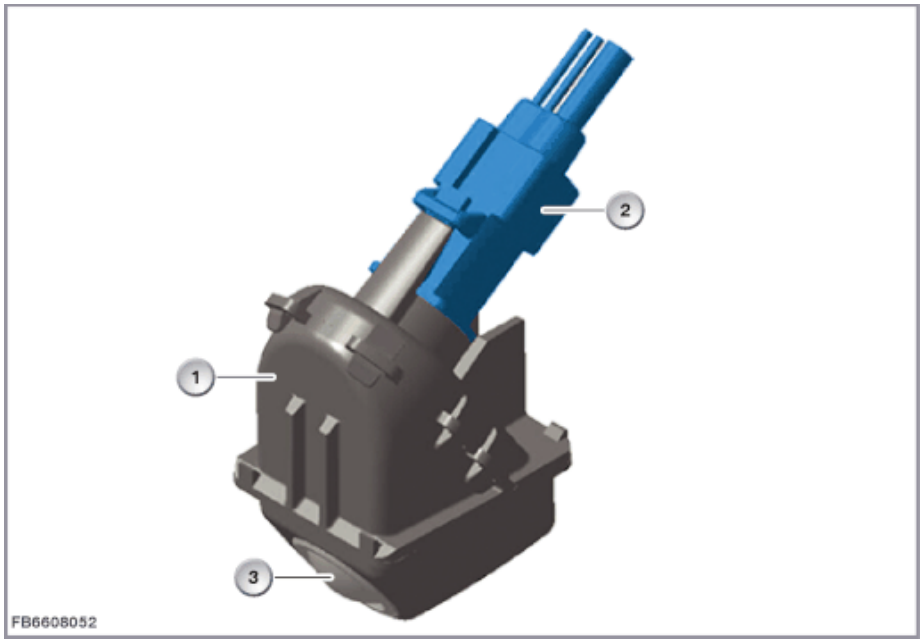
- LIN bus
- LVDS data line

Note! Follow the instructions in the operating instructions!

Dirt can impair the image quality of the bumper cameras. To flush the lenses, comply with the Owner's Handbook.

Rear view camera

In the same way as the two bumper cameras, the rear view camera makes its signals available to the TRSVC control unit via an LVDS data line. The signals are forwarded to the video switch (VSW - installed depending on the variant) and subsequently to the Car Information Computer (CIC) over CVBS lines. The CIC transmits the image data via an LVDS data line to the central information display (CID). The image data are displayed on the CID.



Item	Explanation	Item	Explanation
1	Rear view camera	2	4-pin plug connection
3	Lens		

The rear view camera is fitted in the handle strip in the tailgate offset to the right. The reversing camera is connected to the all-round vision camera control unit by the following lines:

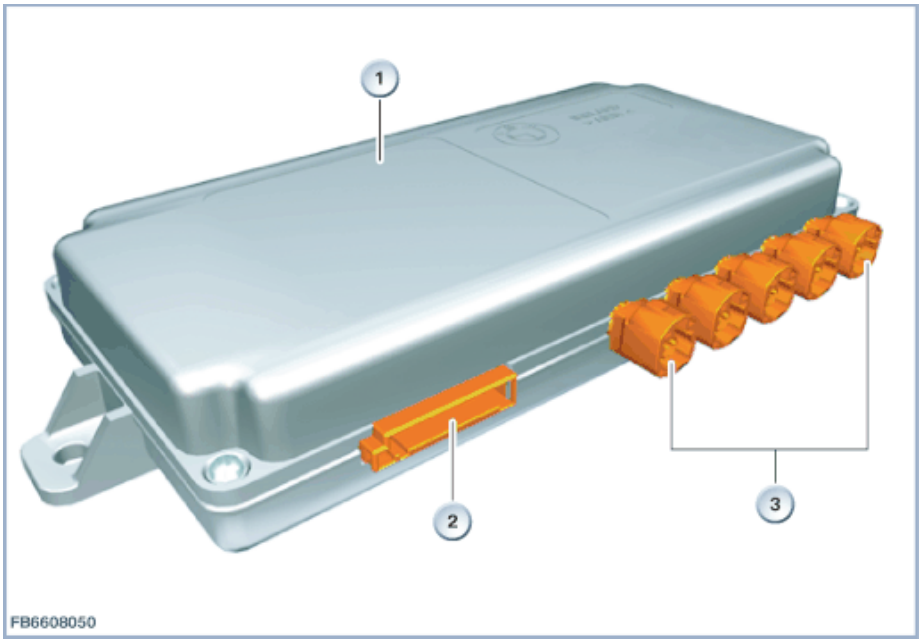
- LIN bus
- LVDS data line

Note! Follow the instructions in the operating instructions!

Dirt can impair the image quality of the reversing camera. To flush the lenses, comply with the Owner's Handbook.

TRSVC: Control unit for all-round vision camera

The TRSVC control unit is located in the driver's footwell. The light points, light colours and light intensities picked up by the video camera are evaluated by the TRSVC control unit. The bumper camera is connected to the all-round vision camera control unit by a 5-pin line. The all-round vision camera control unit is connected to the body CAN. The TRSVC control unit is supplied by the rear power distribution box via terminal 15N.



Item	Explanation	Item	Explanation
1	All-round vision camera control unit (TRSVC)	2	Plug connections for main wiring harness
3	Plug connections for cameras (maximum equipment)		

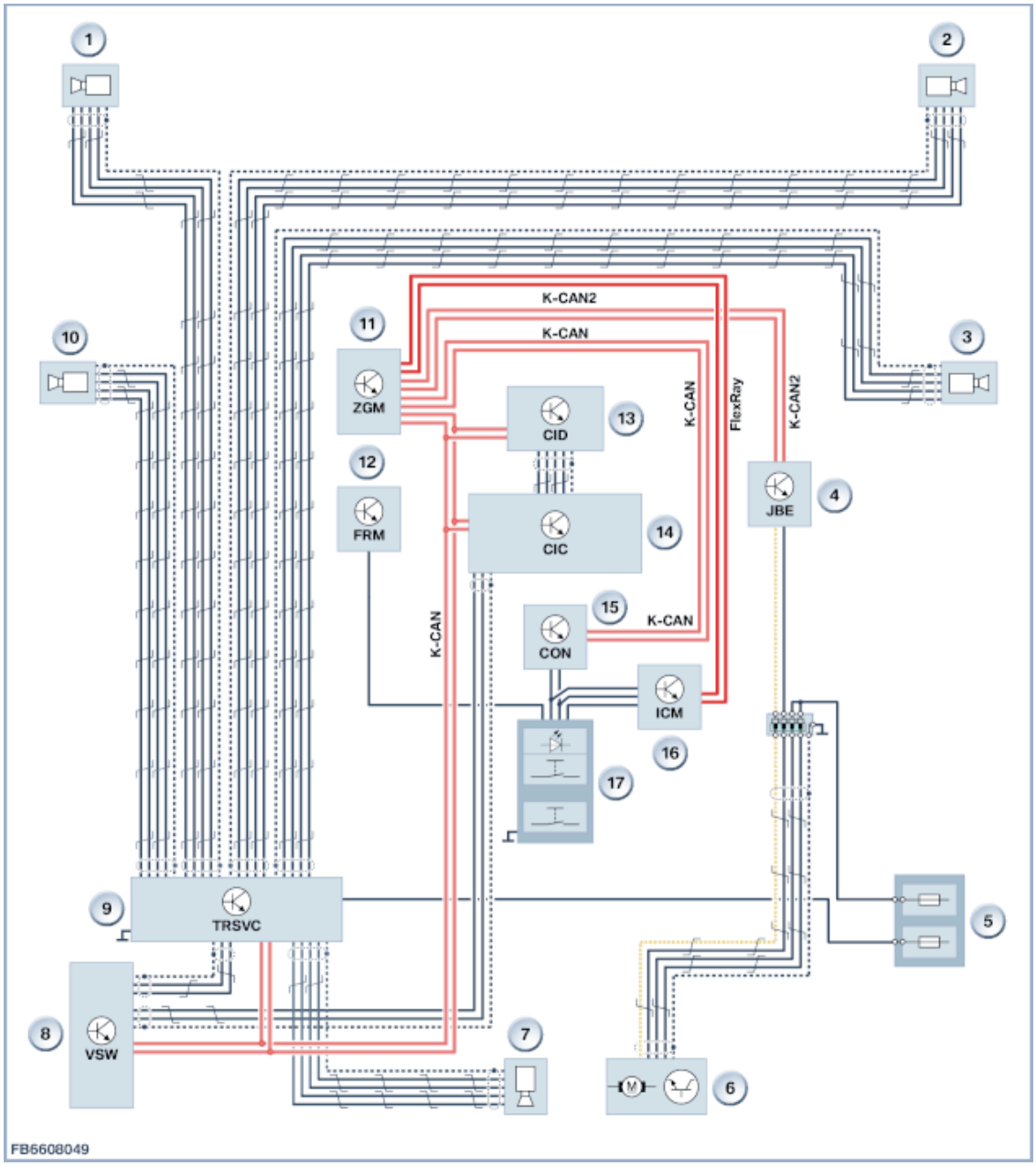
System functions

The following system functions are described:

- Functional networking
- Display

Functional networking

A complex system network with distributed functions in other control units is necessary for implementation of the all-round vision camera. The following graphic shows the system network.



Item	Explanation	Item	Explanation
1	Bumper camera, left	2	Bumper camera, right
3	Top view camera, right	4	Junction Box Electronics (JBE)
5	Power distribution box, rear	6	F12, F13: electric motor for tailgate activation (BMW badge)
7	Rear view camera	8	Video switch (VSW), if installed
9	All-round vision camera (Top Rear Side View Camera - TRSVC)	10	Top view camera, left
11	Central gateway module (ZGM)	12	Footwell module (FRM)
13	Central information display (CID)	14	Car Information Computer (CIC) or headunit
15	Controller (CON)	16	Integrated chassis management (ICM)
17	Centre console operating facility		

Display

The exterior mirror cameras give support during parking and manoeuvring. This is achieved by illustrating the vicinity of the doors and roadway around the vehicle on the Central Information Display (CID). The range is approximately three metres. The exterior mirror cameras are switched off during forwards travel after approximately 50 metres or above approximately 36 km/h.

The bumper cameras enable an early view of crossing traffic at exits and junctions with a poor viewing angle. Road users that are concealed by obstacles at the side are only detected later from the driver's seat. To improve the view, 2 cameras in the bumper pick up the traffic at the sides. The camera images are displayed in a split screen.

The rear view cameras provide support when parking backwards and manoeuvring. To achieve this, the area behind your vehicle is shown on the central information display (CID). Various assistance graphics in the form of overlays (graphics and text) can be overlaid in the image of the camera. The assistance graphics can be enabled or disabled in the menu of the rear view camera.

The assistance graphics are:

- Maximum curve radii for the turning circle
- Marker lines for the lane
- Marking of obstacles
- Zoom to trailer tow hitch

Notes for Service department

General notes

A soiled lens can lead to a poor representation. In extreme cases, the camera can no longer evaluate images. This means a soiled lens can lead to a system failure. To prevent an incorrect diagnosis, the optical elements of the camera must be cleaned.

Diagnosis instructions

Note! Follow the instructions for service functions!

The diagnosis system provides the following service function for the all-round vision camera (TRSVC):

- Calibration and teaching in for all-round vision camera

Path: **Service functions > driver assistance > all-round vision camera**

Depending on the vehicle equipment, all installed cameras are automatically learned in with this service function and the cameras can then be calibrated individually. The bumper camera cannot be calibrated.

Note! New update procedure!

Automatic calibration is now available as a new update procedure to the reversing camera and the exterior mirror camera. Following replacement each camera must be reinitialised ("learning" function). The service function provides an automatic calibration. Manual calibration using the special tool is no longer required. On vehicles with an all-round vision camera manufactured prior to 03/2011 automatic calibration can also be activated in a programming session.