

# F10 General Vehicle Electronics



**BMW Service**

Edited for the U.S. market by:  
**BMW Group University**  
**Technical Training**

4/1/2010

# General information

## Symbols used

The following symbol / sign is used in this document to facilitate better comprehension and to draw attention to particularly important information:



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Contains important safety guidance and information that is necessary for proper system functioning and which it is imperative to follow.

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## Information status and national-market versions

The BMW Group produces vehicles to meet the very highest standards of safety and quality. Changes in terms of environmental protection, customer benefits and design make it necessary to develop systems and components on a continuous basis. Consequently, this may result in differences between the content of this document and the vehicles available in the training course.

As a general principle, this document describes left-hand drive European version vehicles. Some controls or components are arranged differently in right-hand drive vehicles than those shown on the graphics in this document. Further discrepancies may arise from market-specific or country-specific equipment specifications.

## Additional sources of information

Further information on the individual topics can be found in the following:

- in the Owner's Handbook
- in the integrated service technical application

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The information in the document is part of the BMW Group technical training course and is intended for its trainers and participants. Refer to the latest relevant BMW Group information systems for any changes/supplements to the technical data.

Information status: **December 2009**

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# F10 General Vehicle Electronics

## 1. Introduction

The vehicle electrical system of the F10 is based on that of the F01/F02. This training material provides an overview of the following vehicle electrical system topics.

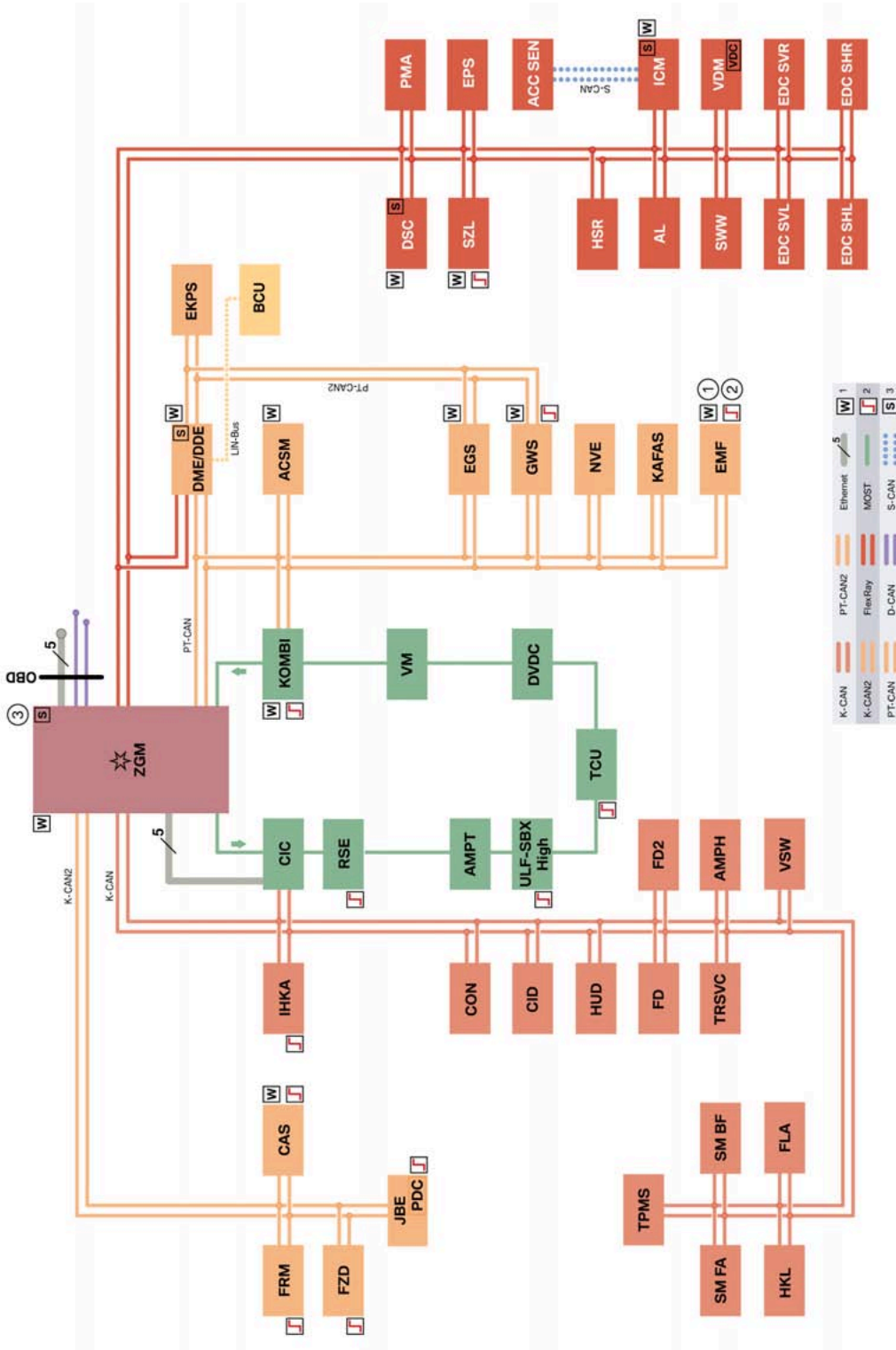
For more information on the respective topics, refer to the F01/F02 training material available on TIS and ICP.

<b>F10 Topic</b>	<b>F01/F02 Training Material</b>
Voltage supply	F01/F02 Voltage supply
Car Access System	F01/F02 Car Access System
Comfort Access	F01/F02 Comfort Access
Central locking system	F01/F02 Central locking system
Automatic Soft Close system	F01/F02 Automatic Soft Close system
Power window regulators	F01/F02 Power windows
Roller sun blinds for side windows	F01/F02 Power windows
Glass sunroof	F01/F02 Slide/tilt sunroof
Alarm system	F01/F02 Alarm system
Luggage compartment lid lift	F01/F02 Automatic operation of tailgate
Exterior lighting	F01/F02 Exterior lights
Interior lighting	F01/F02 Interior lighting
Seats	F01/F02 Seats
Heating and air conditioning systems	F01/F02 Heating and air conditioning systems

# F10 General Vehicle Electronics

## 1. Introduction

### 1.1. Bus diagram



F10 Bus diagram

# F10 General Vehicle Electronics

## 1. Introduction

<b>Index</b>	<b>Explanation</b>
1	Wakeable control units
2	Control units authorized to wake up the vehicle
3	Startup node control units, for starting up and synchronizing the FlexRay bus system
ACC-SEN	Active Cruise Control Sensor
ACSM	Advanced Crash Safety Module
AL	Active steering
AMPH	Amplifier High (high fidelity amplifier)
AMPT	Amplifier Top (top high fidelity amplifier)
BSD	Bit-serial data interface
BCU	Battery Charge Unit (for auxiliary battery)
CAS	Car Access System
CIC	Car Information Computer
CIC Basic	Car Information Computer Basic
CID	Central Information Display
CON	Controller
D-CAN	Diagnosis on Controller Area Network
DDE	Digital Diesel Electronics (Not for US)
DME	Digital Motor Electronics
DSC	Dynamic Stability Control
DVD	DVD changer
EDC SHL	Electronic Damper Control, rear left satellite unit
EDC SHR	Electronic Damper Control, rear right satellite unit
EDC SVL	Electronic Damper Control, front left satellite unit
EDC SVR	Electronic Damper Control, front right satellite unit
EGS	Electronic transmission control
EKPS	Electronic fuel pump control
EMF	Electromechanical parking brake
EPS	Electronic Power Steering
Ethernet	Cabled data network technology for local data networks
FD	Rear display
FD2	Rear display 2
FLA	High-beam assistant
FlexRay	Fast, preset and fault-tolerant bus system for use in automotive applications
FRM	Footwell module

# F10 General Vehicle Electronics

## 1. Introduction

<b>Index</b>	<b>Explanation</b>
FZD	Roof function center
GWS	Gear selector switch
HKL	Luggage compartment lid lift
HSR	Rear suspension slip angle control
HUD	Head-Up Display
ICM	Integrated Chassis Management
IHKA	Integrated automatic heating / air conditioning
JBE	Junction box electronics
KAFAS	Camera-based driver assistance system
K-Bus	Body bus
K-CAN.	Body controller area network
K-CAN2	Body controller area network 2 (500 kBit/s)
KOMBI	Instrument cluster
LIN-Bus	Local Interconnect Network bus
Local-CAN	Local Controller Area Network
MOST	Media Oriented System Transport
MOST port	Media Oriented System Transport port
NVE	Night Vision electronics
PDC	Park Distance Control
PMA	Parking Maneuvering Assistant Control Unit
PT-CAN	Powertrain CAN
PT-CAN2	Powertrain controller area network 2
OBD	Diagnosis socket
RSE	Rear seat entertainment system
SDARS	Satellite tuner
SMBF	Front passenger seat module
SMFA	Seat module, driver
SWW	Blind Spot Detection
SZL	Steering column switch cluster
TCU	Telematics Control Unit
TPMS	Tire Pressure Monitoring System
TR SVC	Control unit for reversing camera and side view
ULF-SBX	Universal interface box



# F10 General Vehicle Electronics

## 1. Introduction

<b>Index</b>	<b>Explanation</b>
VDM	Vertical Dynamics Management
VM	Video Module
VSW	Video switch
ZGM	Central Gateway Module

# F10 General Vehicle Electronics

## 2. Voltage Supply

The Voltage supply concept of the F10 is based on that of the F01. The components and the structure used are largely the same.

### 2.1. Components

Due to the steady increase of electrical functions for comfort, communication and safety in BMW vehicles, the voltage supply is becoming ever more important.

In the F10, two separate power distribution boxes with fuse blocks are installed. The front power distribution box with fuse block is near the glove box and the rear power distribution box with fuse block is on the right-hand side of the luggage compartment.

The front power distribution box with fuse block forms the junction box together with the junction box electronics (JBE).

In the graphic below, you can see the layout of the most important components of the voltage supply system in the F10.

In the F10, three main power lines (bolted to on the underbody of the vehicle) are run from the power distribution box on the battery to the engine compartment :

- One of the main power lines runs via the positive battery terminal to the starter motor and to the alternator.
- The second line supplies the electronics box in the engine compartment with voltage for the engine electronics. This line is protected by a high-current fuse in the distribution box at the battery.
- The third line leads to the engine compartment power distribution box. This distribution box supplies the electric fan with power. This line is protected by the high-current fuse in the distribution box at the battery.

In addition, a battery cable is routed through the vehicle interior to the front power distribution box with fuse block. This line is also protected by a high-current circuit breaker.

Depending on the model, different line cross sections are used.

The transfer points for the main power cables are located under the luggage compartment floor. The main power lines on the underbody are laid in a protected area to prevent damage.

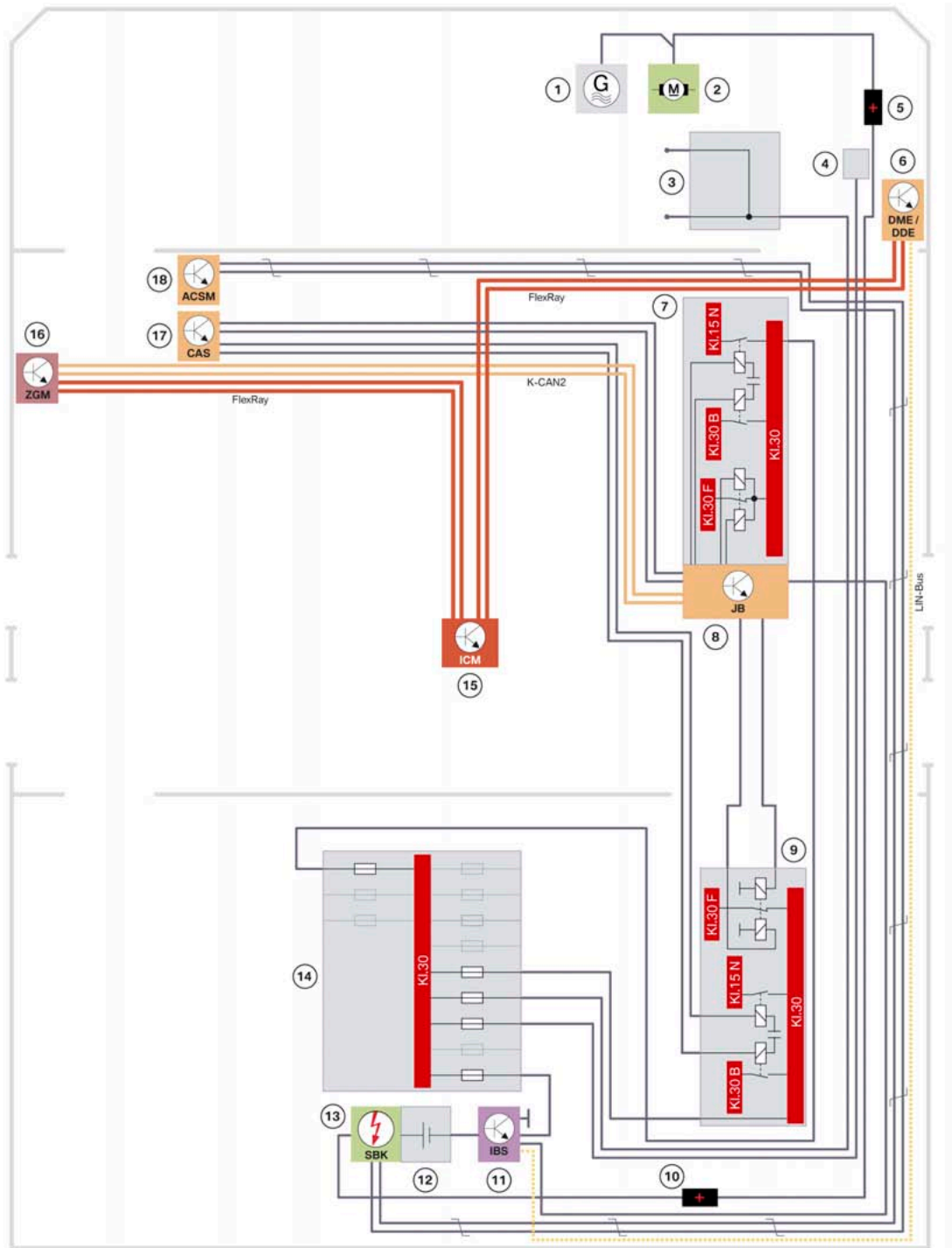
The electromechanical power steering is supplied with voltage differently, depending on equipment and engine.

For more information on the voltage supply, refer to the F01/F02 "Voltage Supply" training material available on TIS and ICP.

# F10 General Vehicle Electronics

## 2. Voltage Supply

### 2.2. System wiring diagram



F10 System wiring diagram for voltage supply

TE08-0084

# F10 General Vehicle Electronics

## 2. Voltage Supply

Index	Explanation
1	Alternator
2	Starter
3	Power distribution box in engine compartment
4	Electronics box in the engine compartment
5	Positive battery connection point
6	Digital Motor Electronics (DME)
7	Power distribution box with fuse block in front behind the glove box
8	Junction box electronics
9	Power distribution box with fuse block, rear right in the luggage compartment
10	Transfer point under the luggage compartment floor
11	Intelligent battery sensor (IBS)
12	Battery
13	Safety battery terminal (SBK)
14	Power distribution box on the battery
15	Integrated Chassis Management (ICM)
16	Central Gateway Module (ZGM)
17	Car Access System (CAS)
18	Crash safety module (ACSM)

### 2.3. EPS Voltage Supply

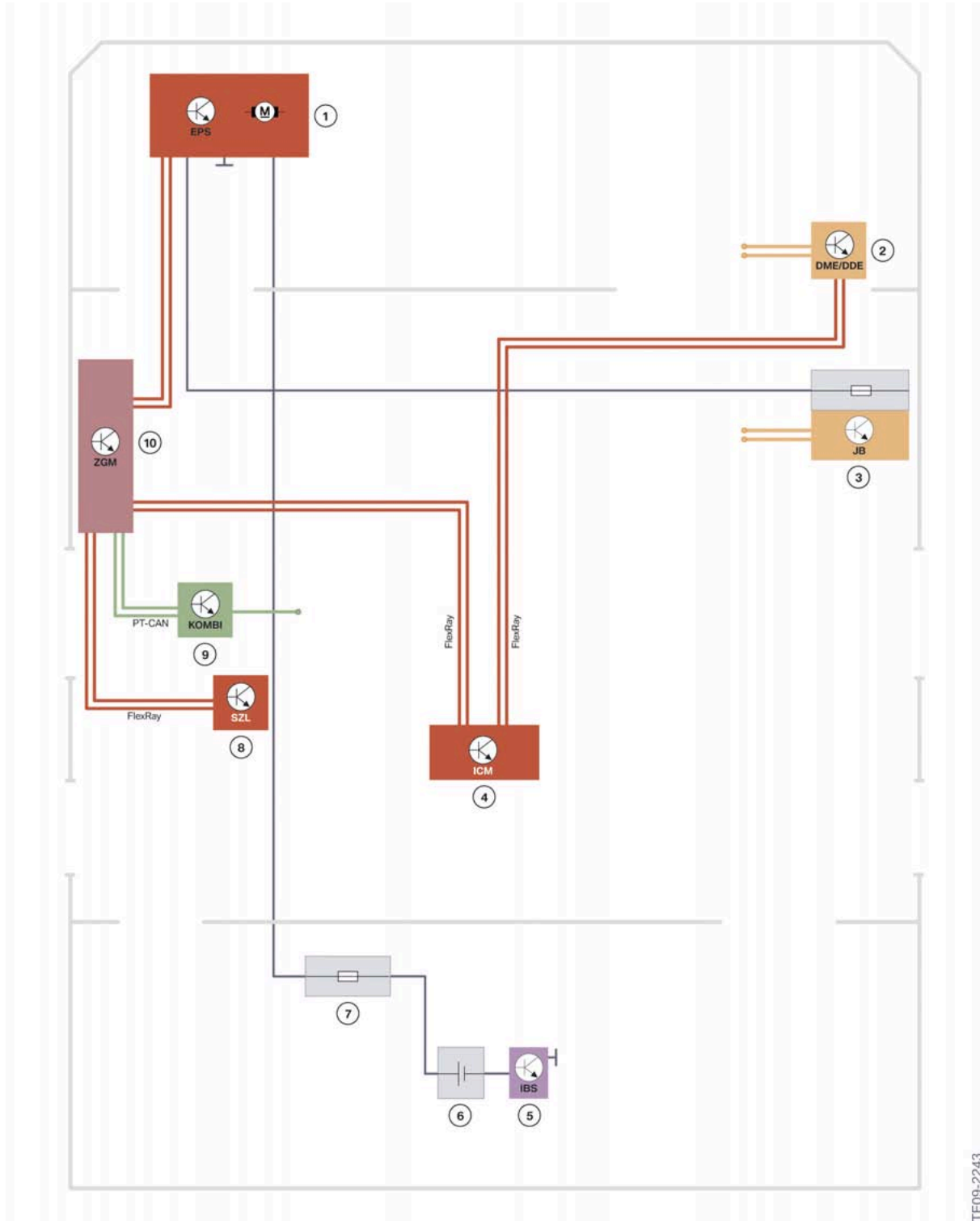
The electromechanical power steering is supplied with voltage differently, depending on equipment and engine.

In the F10, electromechanical power steering is combined for the first time with the active steering planetary gearbox with override function already familiar from the F01. As a result, the steering is implemented completely electrically.

# F10 General Vehicle Electronics

## 2. Voltage Supply

### 2.3.1. System wiring diagram



F10 System wiring diagram for basic steering

TE09-2243

# F10 General Vehicle Electronics

## 2. Voltage Supply

Index	Explanation
1	EPS
2	Digital Motor Electronics (DME)
3	Junction box electronics with front power distribution box
4	Integrated Chassis Management (ICM)
5	Intelligent battery sensor (IBS)
6	Battery
7	Battery power distribution box
8	Steering column switch cluster (SZL)
9	Instrument cluster (KOMBI)
10	Central Gateway Module (ZGM)

### 2.3.2. EPS in conjunction with active steering

Due to the higher weight of the some engines and the higher steering forces associated with the greater front axle load, the power of a 12V steering system is no longer sufficient. For this reason, on F10 vehicles with the V8 engine a 24V EPS system will be installed in conjunction with the optional Integral Active Steering equipment.

The following table tells you when a 24V EPS is installed.

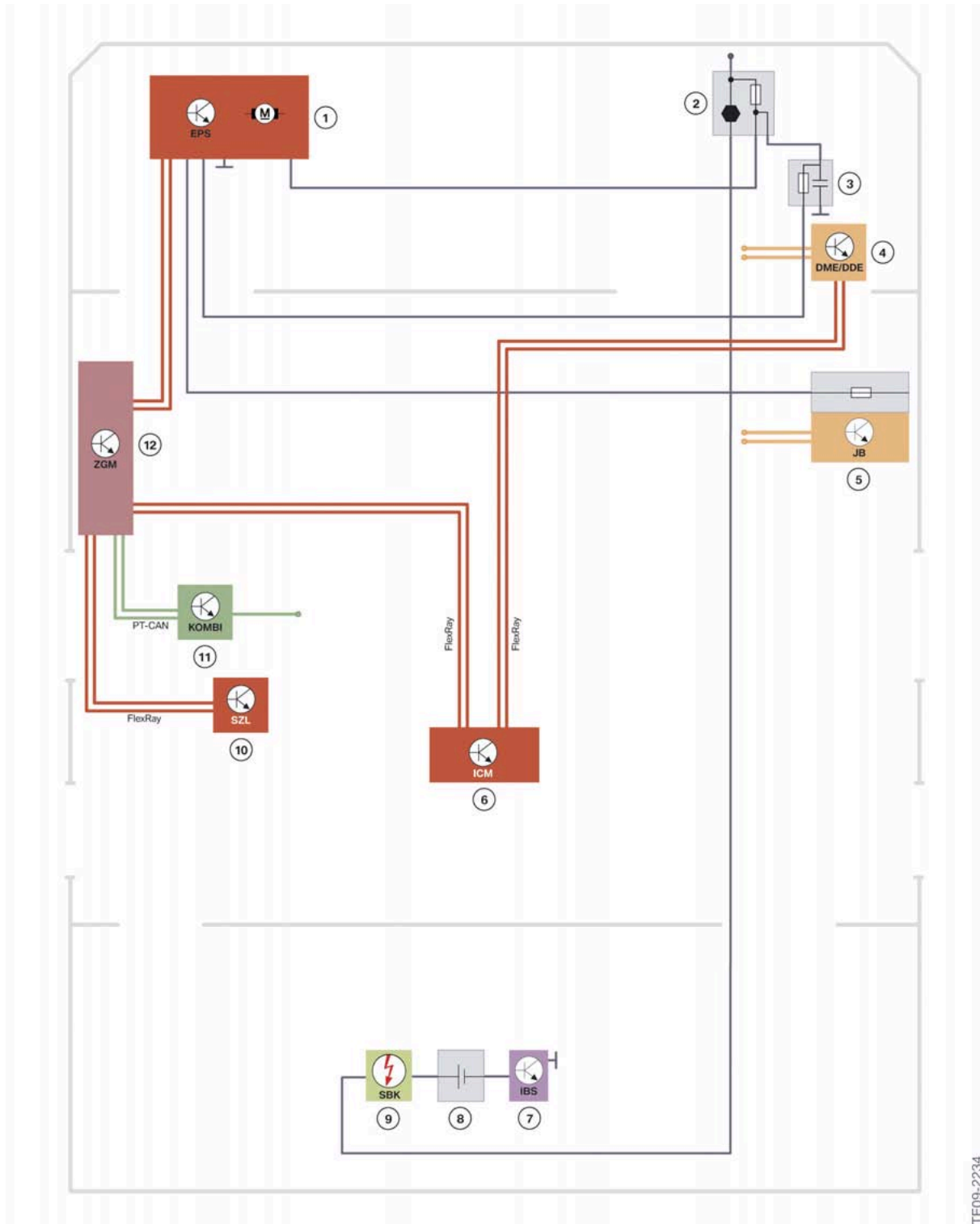
Engine	EPS voltage supply
528i	12V
535i	12V
550i	24V

#### EPS with 12V

Since active steering demands higher forces from the electromechanical steering and due to the higher current necessary, the voltage supply can no longer be implemented as in previous systems. If active steering is used in a vehicle with 12V EPS, the voltage is supplied through a separate positive battery connection point.

# F10 General Vehicle Electronics

## 2. Voltage Supply



F10 System wiring diagram EPS with 12V and active steering

TE09-2234

# F10 General Vehicle Electronics

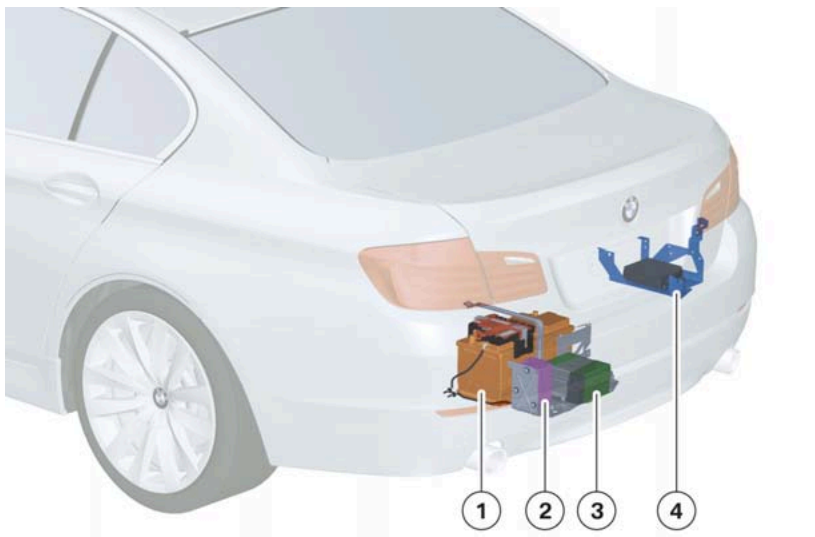
## 2. Voltage Supply

Index	Explanation
1	EPS
2	Positive battery connection point
3	Capacitor box
4	Digital Motor Electronics (DME)
5	Junction box electronics with front power distribution box
6	Integrated Chassis Management
7	Battery power distribution box
8	Intelligent battery sensor (IBS)
9	Battery
10	Safety battery terminal (SBK)
11	Steering column switch cluster
12	Instrument cluster (KOMBI)
13	Central Gateway Module (ZGM)

### EPS with 24V

The higher weight of the V8 engines in the BMW 550i results in a higher front axle load. This in turn causes the power required for the steering system to increase. In conjunction with the active steering, an even higher exertion of force, and therefore an even higher current is required by the steering electrical components. This high current made it necessary to increase the voltage supply of the EPS to 24V.

This system requires an auxiliary battery, a separator and a charging unit for the auxiliary battery. These components are installed in the luggage compartment of the F10.



F10 24V components



# F10 General Vehicle Electronics

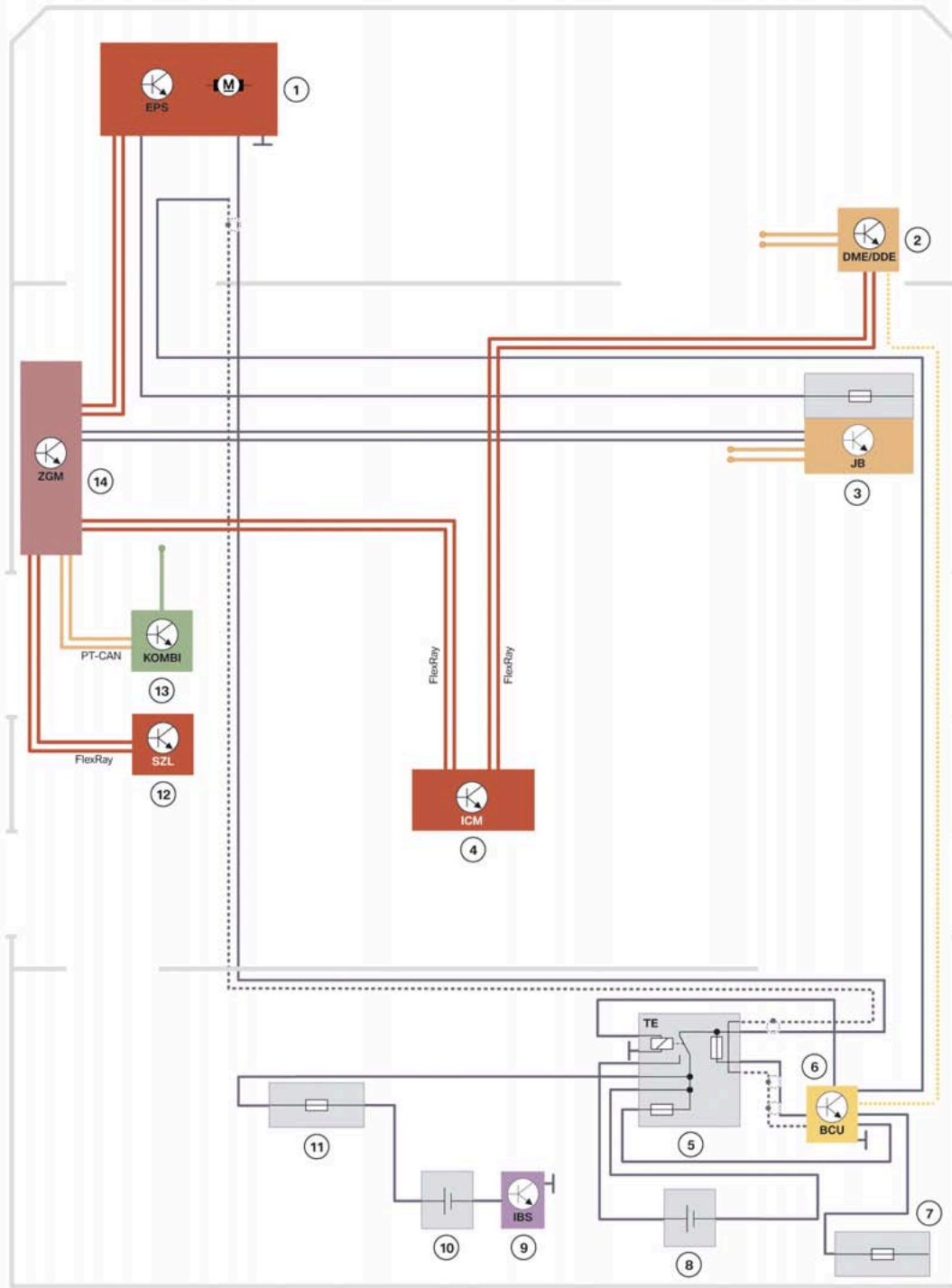
## 2. Voltage Supply

Index	Explanation
1	Battery
2	Separator
3	Auxiliary battery
4	Battery Charge Unit (BCU) (for auxiliary battery)

The battery charging unit (BCU) takes over the monitoring of the state of charge and the charging of the auxiliary battery with an 150W DC/DC converter. It monitors a cable sheathing of the 24V line (isolation) and among various other preconditions; it also switches the relay in the separator with which the auxiliary battery is integrated into the circuit. The EPS is supplied with 24V only after this relay has been switched (closed). In the event of a fault, the EPS can also be operated with 12V. If there is no fault, the relay in the separator is switched (to close the circuit) as of terminal 15.

# F10 General Vehicle Electronics

## 2. Voltage Supply



TE09-2216

F10 System wiring diagram EPS with 24V and active steering

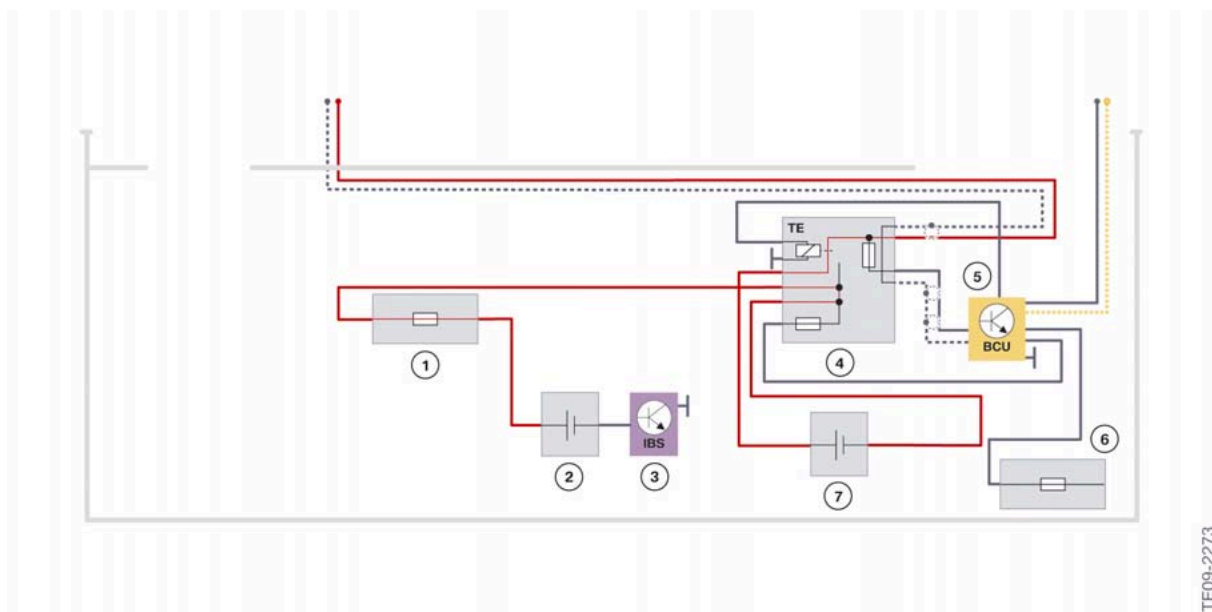
# F10 General Vehicle Electronics

## 2. Voltage Supply

Index	Explanation
1	EPS
2	Digital Motor Electronics (DME)
3	Junction box electronics with front power distribution box
4	Integrated Chassis Management (ICM)
5	Separator
6	Battery Charge Unit (BCU) (for auxiliary battery)
7	Rear right power distribution box
8	Auxiliary battery
9	Intelligent battery sensor (IBS)
10	Battery
11	Battery power distribution box
12	Steering column switch cluster (SZL)
13	Instrument cluster (KOMBI)
14	Central Gateway Module (ZGM)

The 24V line is routed on the vehicle floor. It is surrounded by a cable sheathing (isolation) that is monitored by the battery charging unit.

The following system wiring diagram details show the various switch situations and the charging of the auxiliary battery.



F10 24V operation of the EPS

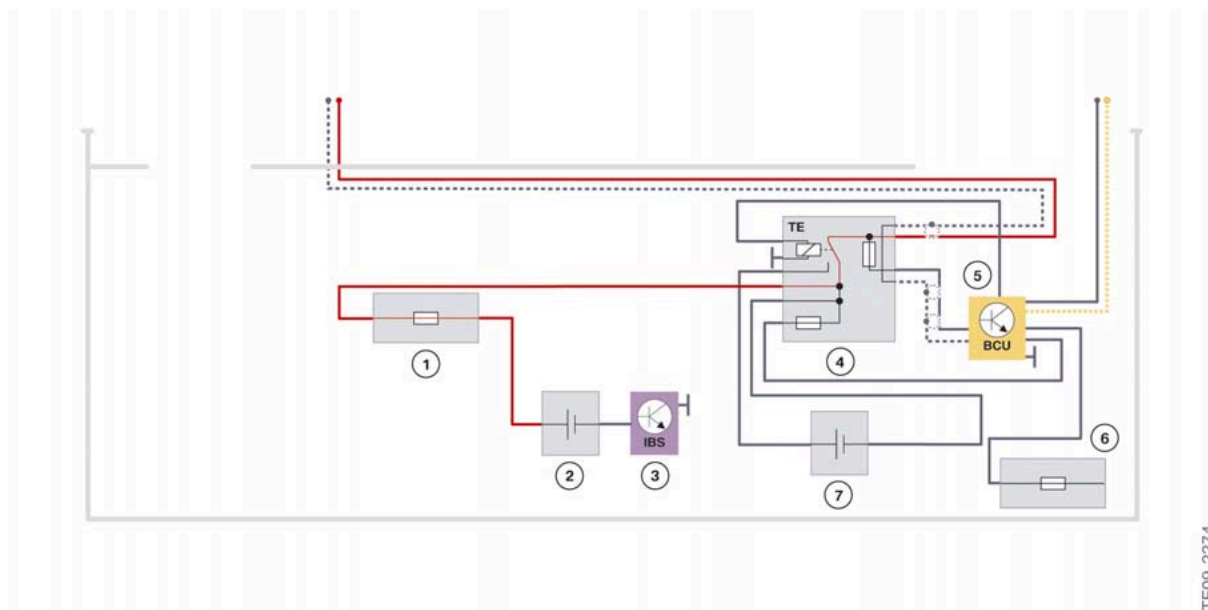
TE09-2273

# F10 General Vehicle Electronics

## 2. Voltage Supply

Index	Explanation
1	Battery power distribution box
2	Battery
3	Intelligent battery sensor IBS.
4	Separator (here: 24V operation)
5	Battery Charge Unit (BCU)
6	Rear right power distribution box
7	Auxiliary battery

In 24V operation, the battery and the auxiliary battery are connected in series by the relay in the separator. As a result, the EPS is operated with 24V.



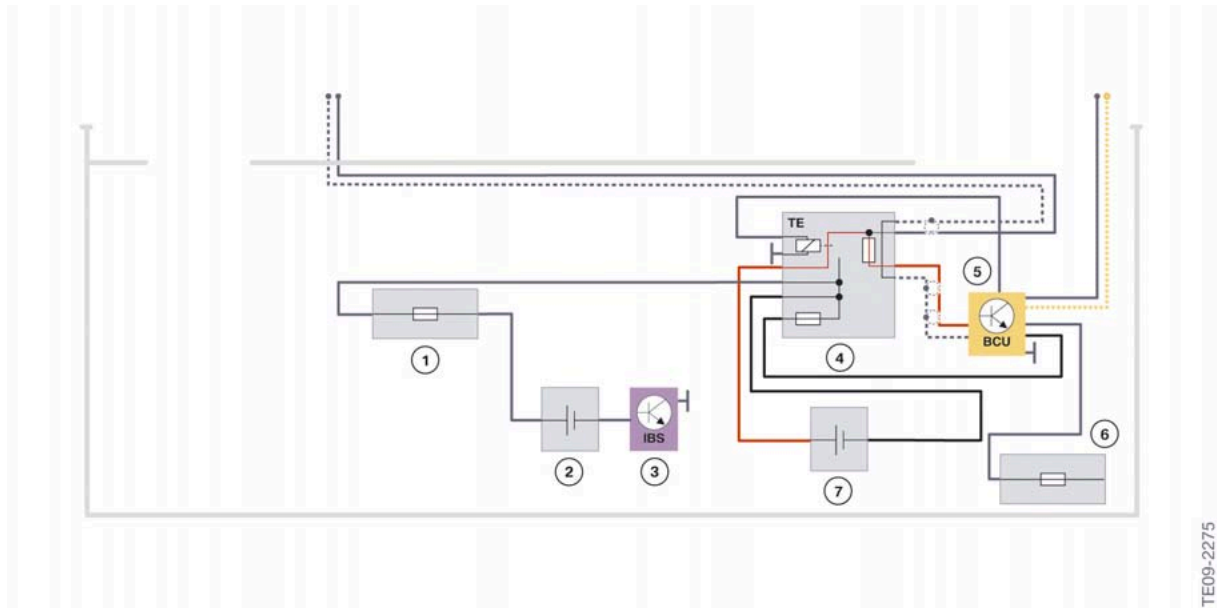
F10 12V operation in the event of a fault

Index	Explanation
1	Battery power distribution box
2	Battery
3	Intelligent battery sensor IBS.
4	Separator (here: 12V operation)
5	Battery Charge Unit (BCU)
6	Rear right power distribution box
7	Auxiliary battery

In the event of a fault or before terminal 15, the relay is open and the separator is in the 12V position. The auxiliary battery is no longer connected in series and is no longer in the circuit.

# F10 General Vehicle Electronics

## 2. Voltage Supply



F10 Charging of the auxiliary battery in 24V operation

TE09-2275

Index	Explanation
1	Battery power distribution box
2	Battery
3	Intelligent battery sensor IBS.
4	Separator (here: 24V operation)
5	Battery Charge Unit (BCU)
6	Rear right power distribution box
7	Auxiliary battery

The auxiliary battery can be charged in 24V operation using the battery charging unit (BCU) for the auxiliary battery. To do so, the charging unit takes the energy it uses for charging the auxiliary battery from the vehicle electrical system via the rear right power distribution box.

The 24V line is routed on the vehicle floor and is surrounded by a cable sheathing that is monitored by the BCU.

# F10 General Vehicle Electronics

## 2. Voltage Supply



F10 24V components and line routing

Index	Explanation
1	Battery Charge Unit (BCU) (Charging unit for auxiliary battery)
2	Separator and auxiliary battery
3	Battery
4	EPS with active steering

# F10 General Vehicle Electronics

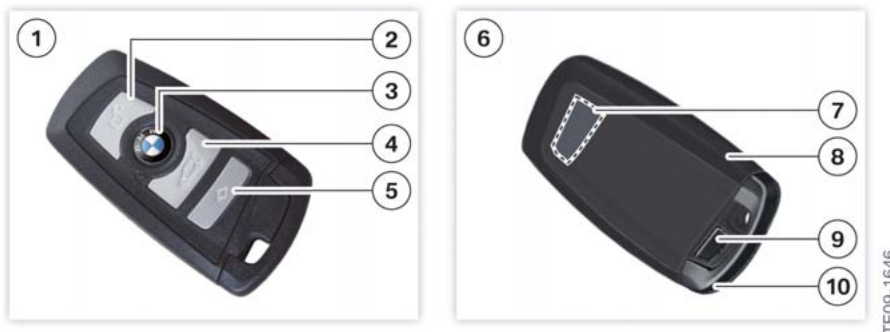
## 3. Car Access System

The Car Access System used in the F10 is the fourth generation of the control unit and the same type as in the F01. The Comfort Access functions are completely integrated into the Car Access System.

All F10 models are equipped with “Passive Go” (drive authorization system) as standard equipment. Drive authorization allows the driver to start the engine without actively using the ID transmitter. Due to the drive authorization (Passive Go), the vehicle does not require any key insertion slot. The ID transmitter only needs to be somewhere inside the passenger compartment for the engine to be started.

The ID transmitter has a battery with a service life of approximately four years.

Up to eight ID transmitters can be used for a particular vehicle.



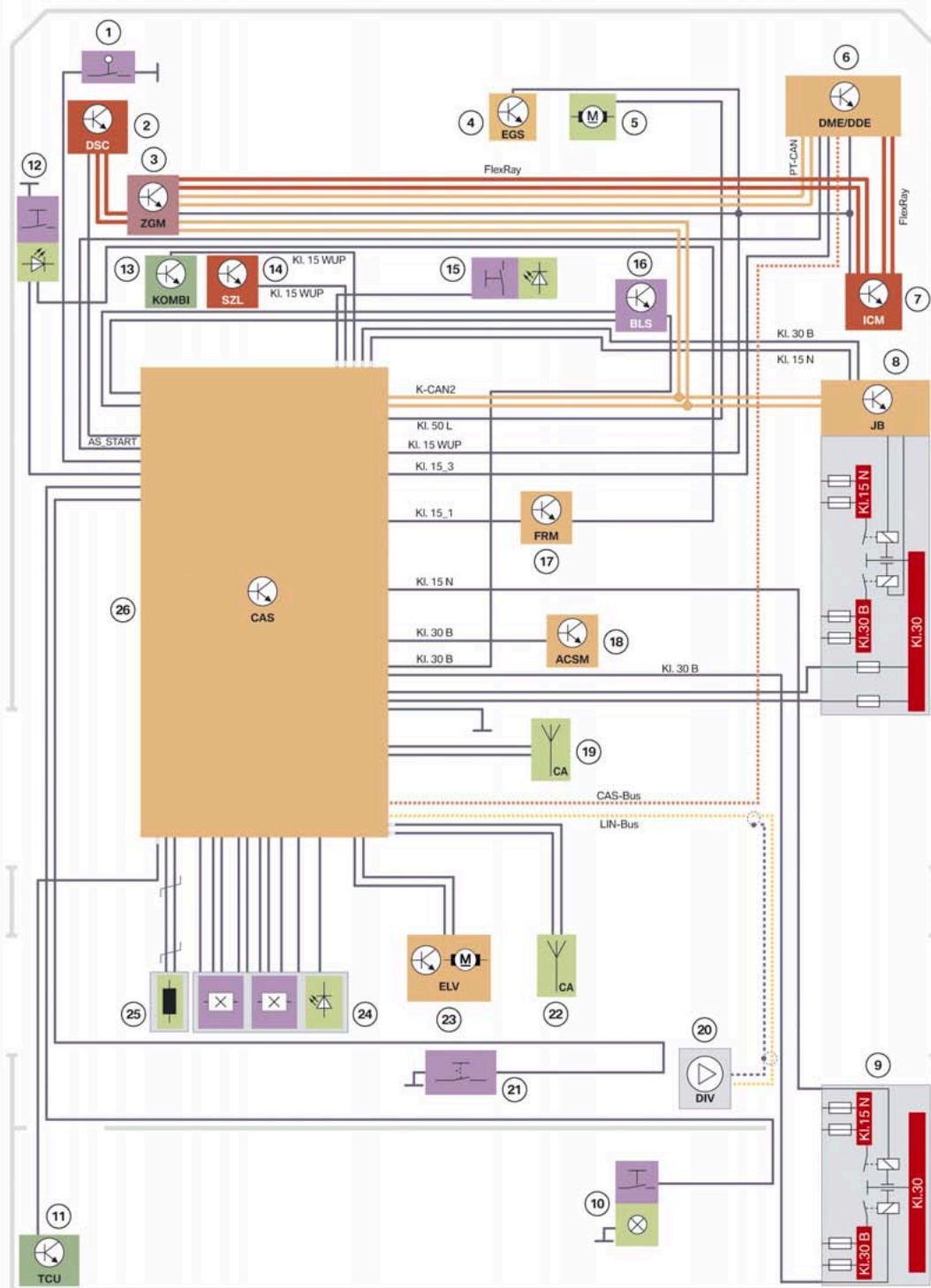
F10 ID transmitter

Index	Explanation
1	ID transmitter top view
2	Unlock Vehicle button
3	Lock Vehicle button
4	Tailgate unlock button
5	Headlight courtesy delay feature or open luggage compartment lid (automatic operation of tailgate, option 316)
6	ID transmitter rear view
7	Area for ring antenna (transponder coil for emergency start)
8	Battery compartment
9	ID transmitter release button
10	ID transmitter

# F10 General Vehicle Electronics

## 3. Car Access System

### 3.1. System wiring diagram



TE09-2337

F10 System wiring diagram of Car Access System



# F10 General Vehicle Electronics

## 3. Car Access System

Index	Explanation
1	Engine compartment lid contact switch
2	Dynamic Stability Control (DSC)
3	Central Gateway Module (ZGM)
4	Electronic transmission control (EGS)
5	Starter
6	Digital Motor Electronics (DME)
7	Integrated Chassis Management (ICM)
8	Junction box electronics (JBE) and front power distribution box
9	Luggage compartment junction box
10	Tailgate central double-locking button
11	Telematics Control Unit (TCU)
12	Interior tailgate button, A-pillar
13	Instrument cluster (KOMBI)
14	Steering column switch cluster (SZL)
15	Central locking button/hazard warning switch
16	Brake light switch (BLS)
17	Footwell module (FRM)
18	Crash safety module (ACSM)
19	Comfort Access interior antenna
20	Remote control receiver in the diversity module DIV
21	Hotel position switch
22	Comfort Access interior antenna
23	Electric steering lock (not for US)
24	START/STOP button
25	Ring antenna (transponder coil)
26	Car Access System (CAS)
Kl. 15_1	Terminal 15 (output 1)
Kl. 15_3	Terminal 15 (output 3)
Kl. 15 WUP	Terminal 15, wake-up
Term. 15N	Terminal 15 after-run
Kl. 30	Terminal 30
Term. 30B	Terminal 30B, switched
Kl. 50L	Terminal 50 load
CAS bus.	Car Access System bus

# F10 General Vehicle Electronics

## 3. Car Access System

Index	Explanation
LIN-Bus	Local Interconnect Network bus
K-CAN2	Body controller area network 2
PT-CAN	Powertrain CAN
AS_START	Start/start termination DME

### 3.2. Function overview

The Car Access System provides, among other things, the central control unit for accessing and locking the vehicle. Therefore, the Car Access System has full responsibility for central locking.

The Car Access System incorporates the following functions on the F10:

- Comfort Access
- Central locking system
- Power window regulator
- Glass sunroof
- Terminal control
- Electronic immobilizer

Other functions of the Car Access System include:

- Vehicle data storage
- Data transmission for Conditioned Based Service (CBS)
- Checking plausibility of ID transmitter signals

The Car Access System enables or disables the execution of a number of functions. However, other control units may be involved in the execution of the function:

- Junction box electronics
- Footwell module
- Roof function center
- Central locking system
- Power window regulator
- Glass sunroof

For the purposes of communication with other bus users in the vehicle electrical system, the Car Access System is connected via the K-CAN2, the CAS bus and the LIN-Bus.

The Car Access System analyzes the status of the trunk lid contact switch and broadcasts it for use by the alarm system.

The Car Access System also analyzes the status of the following buttons and initiates the central locking function:

# F10 General Vehicle Electronics

## 3. Car Access System

- Central locking system button
- Open large trunk button on the A-pillar
- Complete locking of the vehicle with the button in the underside of the open luggage compartment lid.

The Car Access System provides the power supply for the brake light switch and also analyzes its status.

For a more detailed description of the Car Access System functions, refer to the F01/F02 "Car Access System" training material available on TIS and ICP.

# F10 General Vehicle Electronics

## 4. Comfort Access

Using Comfort Access, the customer can unlock and open the vehicle without active use of the ID transmitter. Access to the vehicle can be gained from any point. It is important that the ID transmitter be located in the vehicle's immediate vicinity (approx. 1.5 m). It is sufficient to have the ID transmitter somewhere on your person.

Comfort Access was first introduced on the E65 (03/2002). The system was then gradually introduced on different BMW models. Comfort Access can be ordered as optional equipment (option 322) as part of ZCV Convenience Package (which also includes 316 Power tailgate 323 Soft-close automatic doors.

The benefits of Comfort Access are:

- High level of convenience when unlocking and locking the vehicle
- Convenient and fast access to the vehicle
- Simple engine start/stop procedure
- Maximum comfort for the driver.

Comfort Access in the F10 is based on predecessor systems and is adapted to the F10. However, the complete function continues to be in the Car Access System, just as in the F01. That is why the F10 also has no separate Comfort Access control unit.

The vehicle is unlocked when your hand touches the handle recess of the outer door handle and is opened when you pull the door handle.

The vehicle can be locked simply by touching sensitive surfaces of the outer door handle.

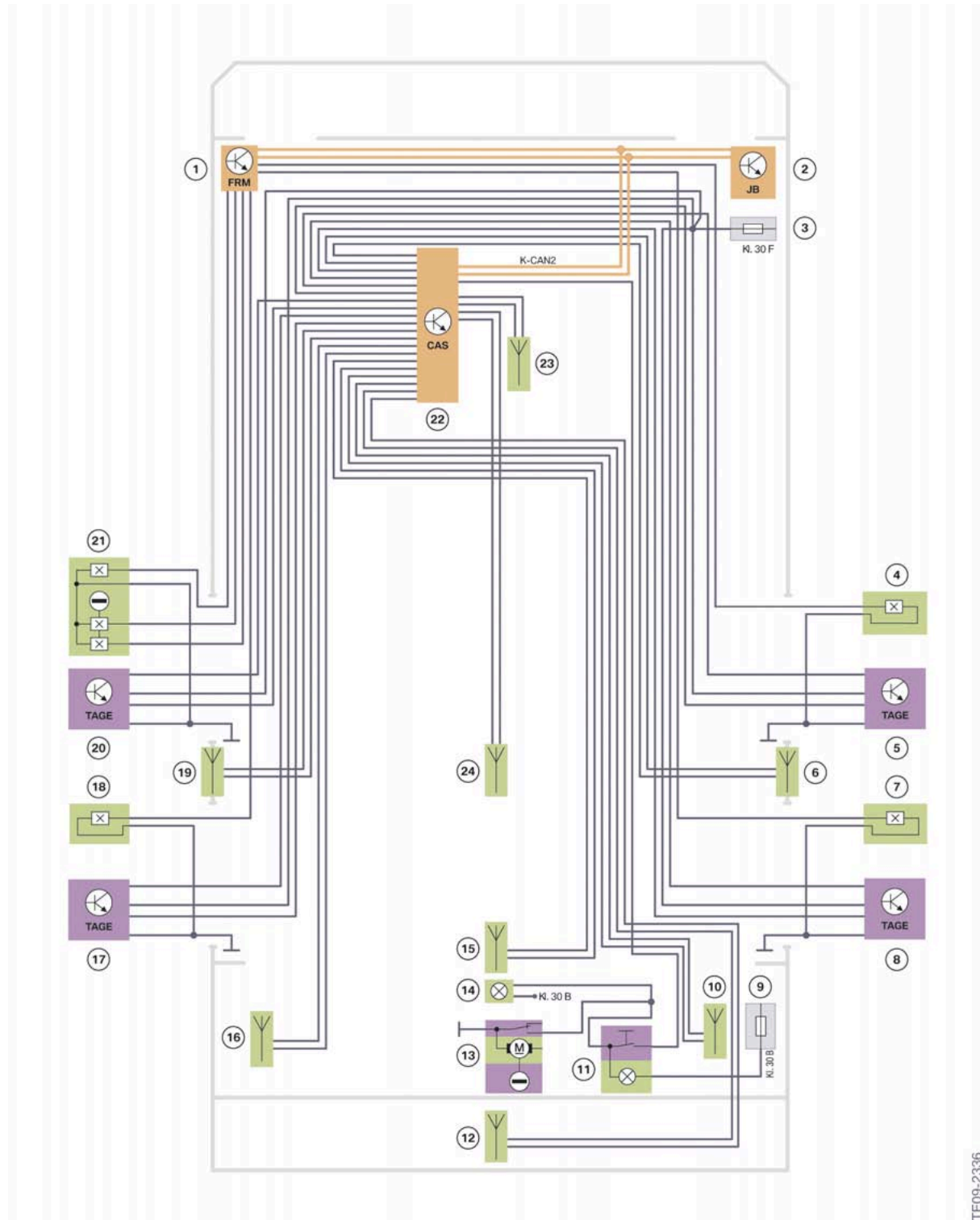
For vehicles fitted with the Automatic Soft Close system (option 323), the drive for the Automatic Soft Close system fully closes the vehicle door. You can then lock the vehicle again by subsequently pressing on the sensitive surface of the outer door handle.

The ID transmitter must be located in the vehicle interior in order for the engine to be started. The engine can now be started by pressing the START-STOP button when the brake pedal is operated and the vehicle is ready to be driven.

# F10 General Vehicle Electronics

## 4. Comfort Access

### 4.1. System wiring diagram



F10 System wiring diagram for Comfort Access

TE09-2336

# F10 General Vehicle Electronics

## 4. Comfort Access

Index	Explanation
1	Footwell module (FRM)
2	Junction Box (JB)
3	Front distribution box
4	Lock door contact, front-passenger side, front
5	Outside door handle electronics (TAGE), front passenger side
6	Antenna for Comfort Access, door sill, front-passenger side
7	Lock door contact, front-passenger side, rear
8	Outside door handle electronics (TAGE), rear passenger side
9	Luggage compartment junction box
10	Luggage compartment antenna, front-passenger side
11	Central locking system button
12	Antenna for Comfort Access, bumper
13	Tailgate lock
14	Luggage compartment lighting
15	Storage shelf antenna
16	Luggage compartment antenna, driver's side
17	Outside door handle electronics (TAGE), rear driver's side
18	Lock door contact, driver's side, rear
19	Antenna for Comfort Access, door sill, driver's side
20	Outside door handle electronics (TAGE), front driver's side
21	Lock door contact, driver's side, front and locking cylinder in driver's door
22	Car Access System (CAS) with Comfort Access function (CA)
23	Antenna for Comfort Access, interior, front
24	Antenna for Comfort Access, interior, rear
K-CAN2	Body controller area network 2

### 4.2. Function overview

Comfort Access is divided into the following functions:

- Access authorization (Passive Entry)
- Drive authorization (Passive Go)
- Locking authorization (Passive Exit).

ID transmitters are required for Comfort Access to function.

An ID transmitter incorporates the following:

# F10 General Vehicle Electronics

## 4. Comfort Access

- A battery
- Remote control function
- Transponder coil for emergency start function
- Spare key
- Receiver unit.

The driver's door can also be unlocked and locked with the spare key.

For a more detailed description of the comfort access functions, refer to the F01/F02 "Comfort Access" training material available on TIS and ICP.

# F10 General Vehicle Electronics

## 5. Central Locking System

The central locking system makes it possible to unlock or lock the vehicle. It is fitted as standard equipment and relates to all vehicle doors, the fuel filler flap and the tailgate.

The central locking can be operated via the following components:

- ID transmitter
- Driver's-door lock barrel (door lock)
- Central locking system button
- Exterior tailgate button
- Interior tailgate button in the A-pillar
- Outer door handle (outside door handle electronics with Comfort Access, option 322)
- Button in the underside of the open luggage compartment lid for central locking system (automatic operation of tailgate, option 316).

The F10 has no lock in the luggage compartment lid for unlocking with the mechanical or spare key.

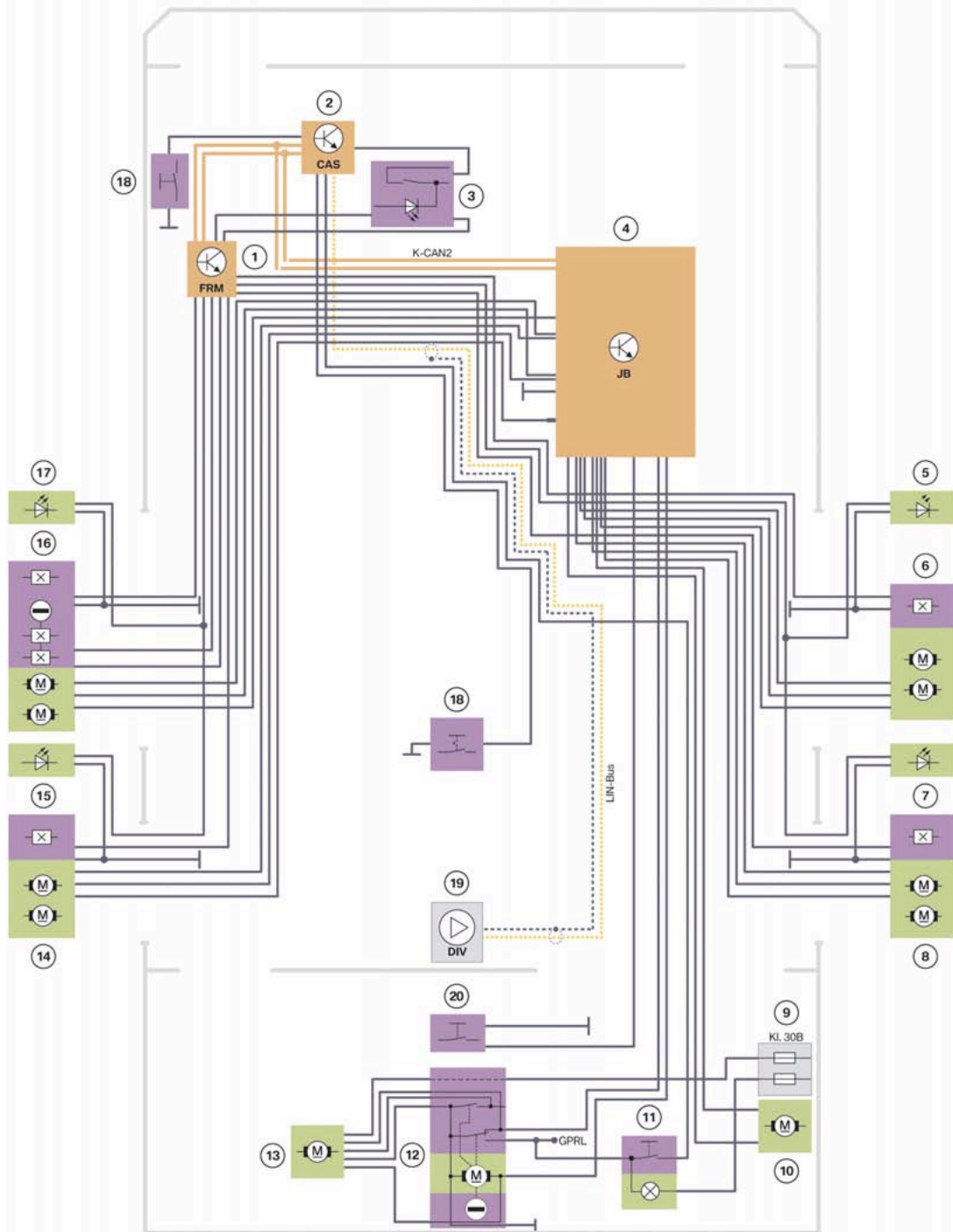
The central locking system in the F10 is based on previous central locking systems used in, for instance, the E70, E90 or F01.



# F10 General Vehicle Electronics

## 5. Central Locking System

### 5.1. System wiring diagram



F10 System wiring diagram for central locking system

TE09-2338

# F10 General Vehicle Electronics

## 5. Central Locking System

Index	Explanation
1	Footwell module (FRM)
2	Car Access System (CAS)
3	Central locking system button
4	Junction Box (JB)
5	Front-passenger-door illuminated entry system
6	Door contact, central locking, front passenger door
7	Rear, passenger-side illuminated entry system
8	Door contact, central locking, rear passenger side
9	Rear power distribution box
10	Central locking, fuel filler flap
11	Central locking button
12	Central locking system for tailgate lock
13	Automatic Soft Close system drive for luggage compartment lid
14	Rear, driver's side central locking system
15	Rear, driver's side illuminated entry system
16	Hall sensors for lock barrel, door contact, driver's-door central locking system
17	Driver's-door illuminated entry system
18	Hotel position switch (only vehicles in US version)
19	Antenna diversity module with antenna amplifier
20	Trunk lid button

### 5.2. Function overview

The function of the central locking system is basically divided between two control units.

The Car Access System has overall control. The Car Access System is aware of the statuses of the central locking system. Therefore it is the Car Access System which causes the unlocking, locking and central deadlocking of the vehicle.

The junction box electronics execute the request to unlock or lock the vehicle.

It is possible to unlock and lock the vehicle actively or passively.

Active means that the vehicle can be opened after it has been unlocked by pressing the button on the ID transmitter. The vehicle can be locked by pressing the Lock button after the doors have been closed.



**Note: The vehicle can only be locked with the driver's door closed.**

# **F10 General Vehicle Electronics**

## **5. Central Locking System**

Passive locking and unlocking requires the optional Comfort Access equipment (option 322).

Passive means that the vehicle is unlocked when the outer door handle is grasped, provided the ID transmitter is located no more than approx. 1.5 metres away from the vehicle. The locking function is triggered by pressing on the sensitive area on the outer door handle.

For a more detailed description of the locking functions, refer to the F01/F02 "Central locking system" training material available on TIS and ICP.

# F10 General Vehicle Electronics

## 6. Automatic Soft Close System

The Automatic Soft Close system (SCA) can be ordered as optional equipment (option 323) on all F10 models as part of the ZCV Convenience Package.

The ZCV Convenience Package also includes, Power tailgate (option 316) and Comfort Access keyless entry (option 322).

The luggage compartment lid is equipped with the Automatic Soft Close system only in conjunction with the Power tailgate (option 316).

The Automatic Soft Close system requires the installation of suitable door locks with drives for the Automatic Soft Close system.

The special feature of the F10's Automatic Soft Close system is that the door lock and the drive for the Automatic Soft Close are no longer combined as a single component. The drive for the Automatic Soft Close system is separate and controls the door lock via a Bowden cable, the same as in the F01.

This means that the lock and the drive can be fitted separately.

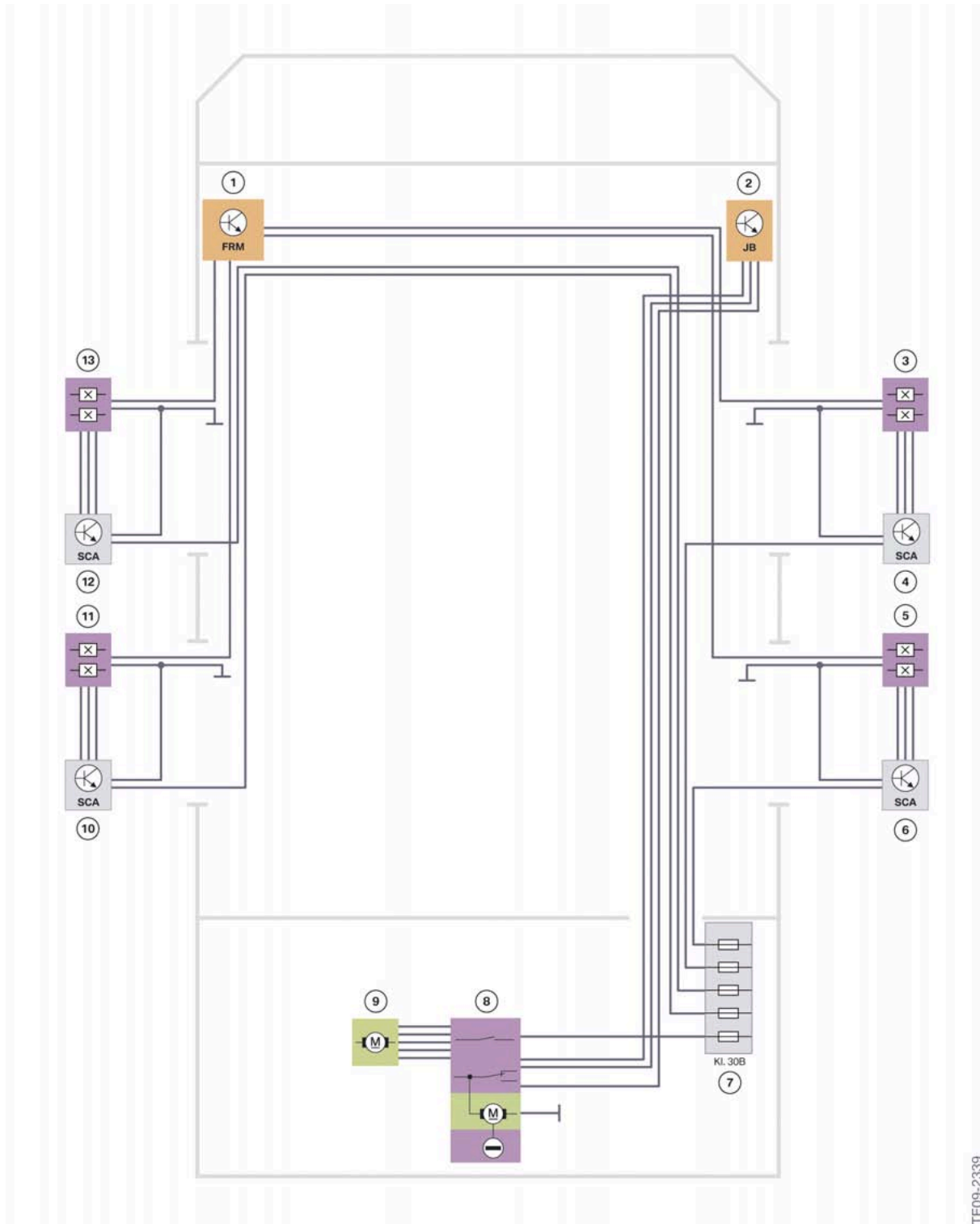
With the Automatic Soft Close system, it is sufficient to press the luggage compartment lid gently into the trunk lid lock. As soon as the locking pawl reaches the pre-locking position, the Automatic Soft Close system fully closes the luggage compartment lid. The locking pawl is then located in the main locking position.

For more information on the Automatic Soft Close system, refer to the F01/F02 "Automatic Soft Close system" training material available on TIS and ICP.

# F10 General Vehicle Electronics

## 6. Automatic Soft Close System

### 6.1. System wiring diagram



F10 System wiring diagram for Automatic Soft Close system

TE09-2339

# F10 General Vehicle Electronics

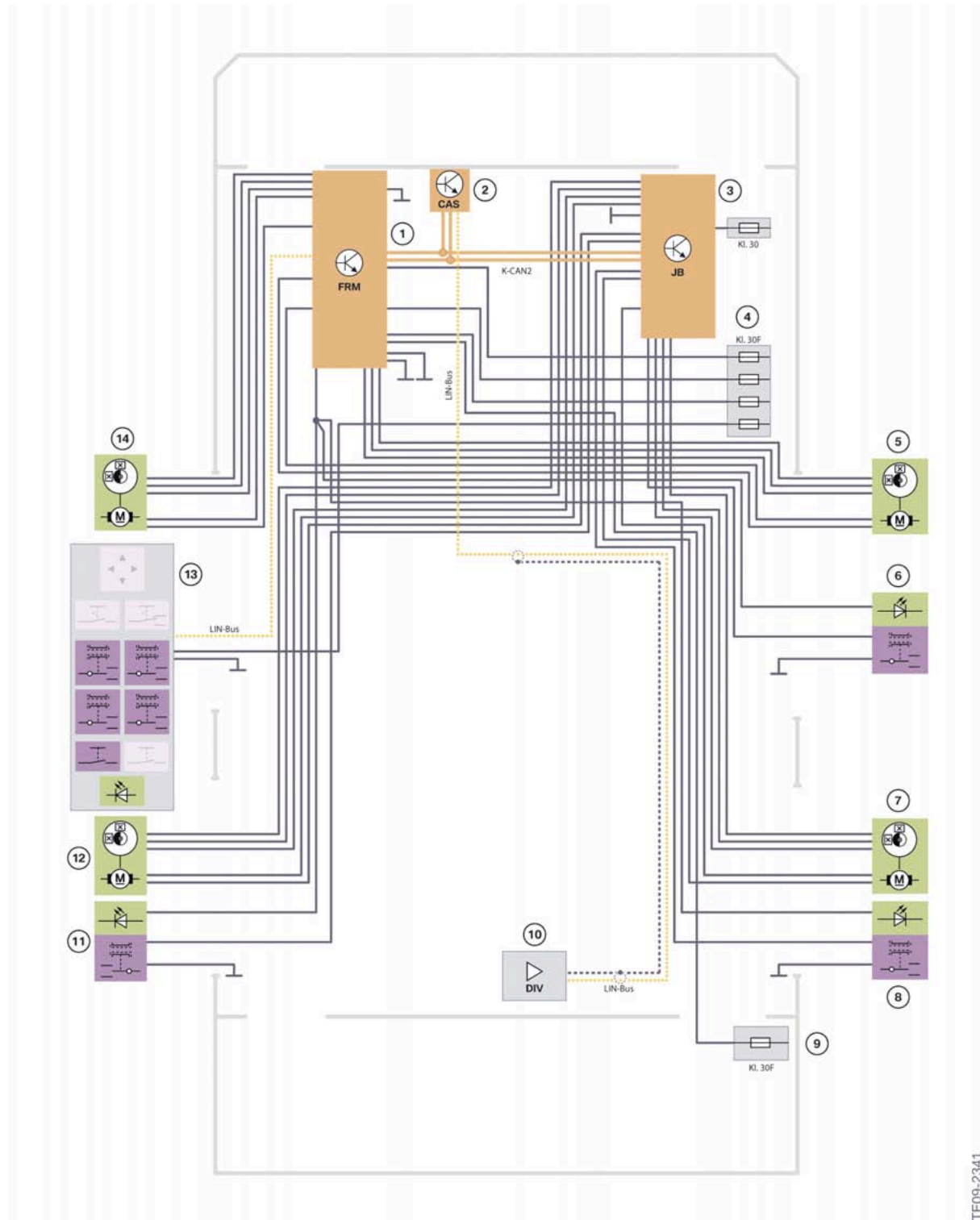
## 6. Automatic Soft Close System

<b>Index</b>	<b>Explanation</b>
1	Footwell module (FRM)
2	Junction Box (JB)
3	Door contact, central locking system, Hall sensor for front passenger door Automatic Soft Close system
4	Front passenger door Automatic Soft Close system (SCA)
5	Door contact, central locking system, Hall sensor for rear passenger side Automatic Soft Close system
6	Rear passenger side Automatic Soft Close system (SCA)
7	Rear power distribution box
8	Central locking, luggage compartment lid
9	Automatic Soft Close system for luggage compartment lid (only with option 316)
10	Rear driver side Automatic Soft Close system
11	Door contact, central locking system, Hall sensor for rear driver's side Automatic Soft Close system
12	Driver's door Automatic Soft Close system (SCA)
13	Door contact, central locking system, Hall sensor for driver's door Automatic Soft Close system

# F10 General Vehicle Electronics

## 7. Power Windows

### 7.1. System wiring diagram



F10 System wiring diagram for power windows

TE09-2341

# F10 General Vehicle Electronics

## 7. Power Windows

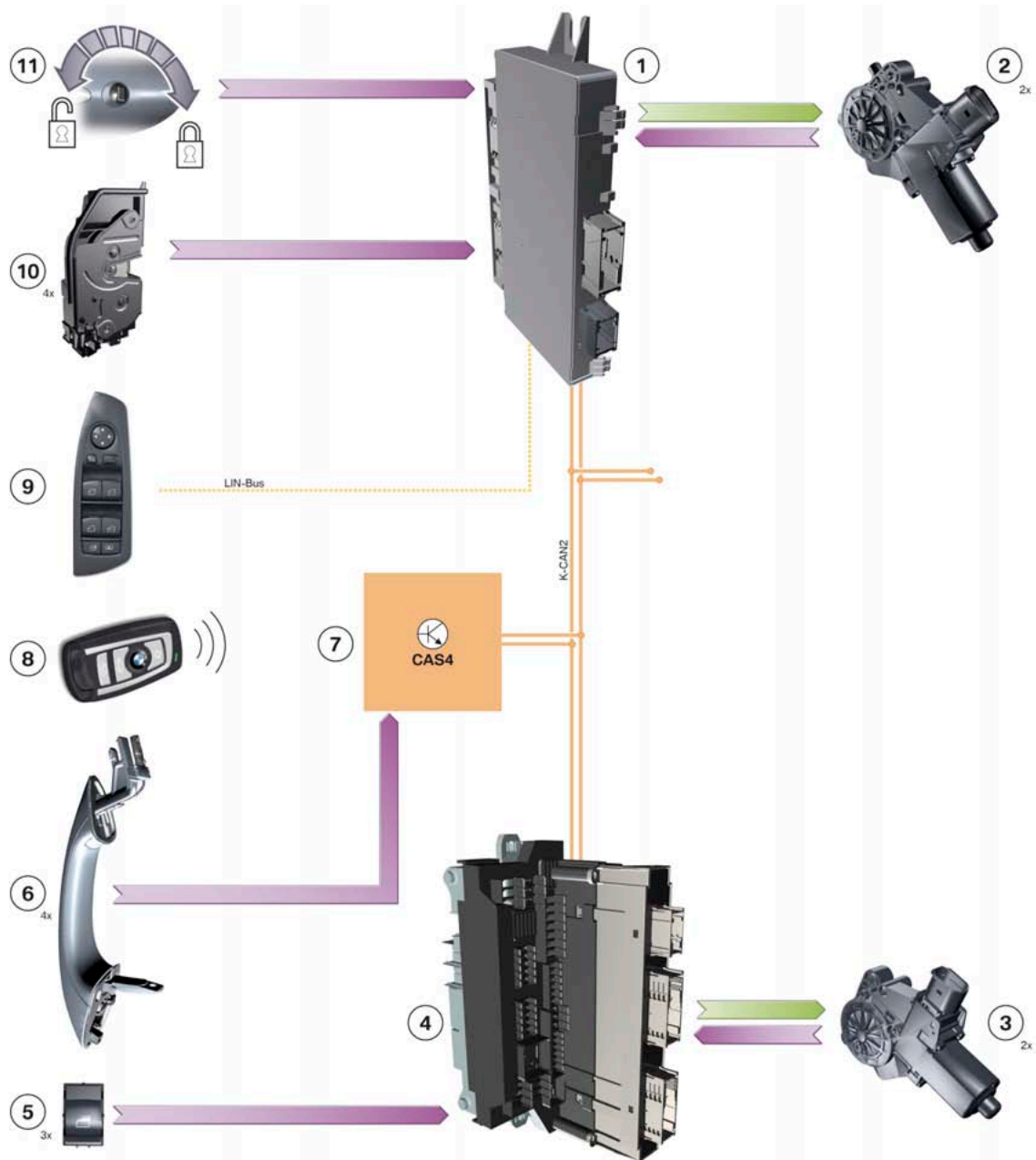
<b>Index</b>	<b>Explanation</b>
1	Footwell module (FRM)
2	Car Access System (CAS)
3	Junction Box (JB)
4	Front distribution box
5	Power window motor with front right indirect anti-trap mechanism
6	Power window switch, passenger side front
7	Power window motor with indirect anti-trap mechanism, rear right
8	Power window switch, passenger side rear
9	Luggage compartment junction box
10	Aerial diversity module with antenna amplifier
11	Power window switch, driver's side rear
12	Power window motor with indirect anti-trap mechanism, rear left
13	Switch block in the driver's door
14	Power window regulator with front left indirect anti-trap mechanism
K-CAN2	Body controller area network 2
LIN-Bus	Local Interconnect Network bus
Kl. 30	Terminal 30
Term. 30F	Terminal 30 incorrectly switched



# F10 General Vehicle Electronics

## 7. Power Windows

### 7.2. Input/output Signals



F10 Power window input/output

Index	Explanation
1	Footwell module (FRM)
2	Power window motor, front doors
3	Power window motor, rear doors
4	Junction box electronics (JBE)

TE08-0137

# F10 General Vehicle Electronics

## 7. Power Windows

Index	Explanation
5	Power window switch, driver's side rear/passenger side front and rear
6	Outer door handle with Comfort Access (CA)
7	Car Access System (CAS)
8	ID transmitter
9	Switch block in the driver's door
10	Lock with door contact
11	Driver's-door lock barrel
K-CAN.	Body controller area network
LIN-Bus	Local Interconnect Network bus

### 7.3. Examples of signal paths

The following signal path examples show the paths the signal takes before the power window motors open or close the windows. A requirement is that the Car Access System has issued the enable to operate the power windows.

#### 7.3.1. Driver's door switch cluster

When the power window switch for the driver's window or front passenger's window is operated, the signal is routed via the LIN-Bus to the footwell module. The footwell module activates the corresponding power window motor.

The signal is routed from the driver's door switch cluster via the LIN-Bus to the footwell module when the power window switches for the windows in the rear doors are operated. The footwell module sends the signal via the K-CAN2 to the junction box electronics. The junction box electronics receive the signal and activate the corresponding power window motor.

# F10 General Vehicle Electronics

## 7. Power Windows



F10 Driver's door switch cluster

Index	Explanation
1	Button for exterior mirror adjustment
2	Mirror folding button
3	Mirror changeover switch
4	Power window regulator switch, front left
5	Power window regulator switch, front right
6	Power window regulator switch, rear left
7	Power window regulator switch, rear right
8	Safety switch

### 7.3.2. Power window switch, front passenger's door

The signal is routed to the junction box electronics when the power window switch in the front passenger's door is operated.

The junction box electronics sends the signal to the footwell module on the K-CAN2. The footwell module activates the power window motor.

# F10 General Vehicle Electronics

## 7. Power Windows

### 7.3.3. Power window switch, rear doors

When the power window switches in the rear doors are operated, the signal is routed to the junction box electronics. The junction box electronics drives the power window motor.

# F10 General Vehicle Electronics

## 8. Glass Sunroof

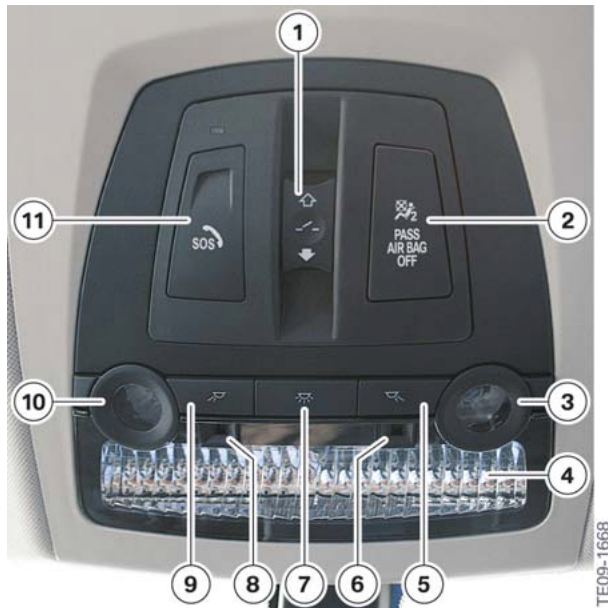
The glass sunroof is standard equipment on all F10 models. Several control units are involved in operating the glass sunroof.

For example, the roof function center (FZD) is linked with the Car Access System (CAS), which enables or disables operation of the glass sunroof.

The footwell module (FRM) supplies the signal from the door contacts. The Junction Box electronics provide the power supply for the motors via terminal 30.

The roof function center controls and monitors the motors of the glass sunroof. The function is identical to that of the slide/tilt sunroof of the F01/F02.

For more information on the operating principle of the glass sunroof, refer to the F01/F02 "Slide/tilting sunroof" training information available on TIS and ICP.



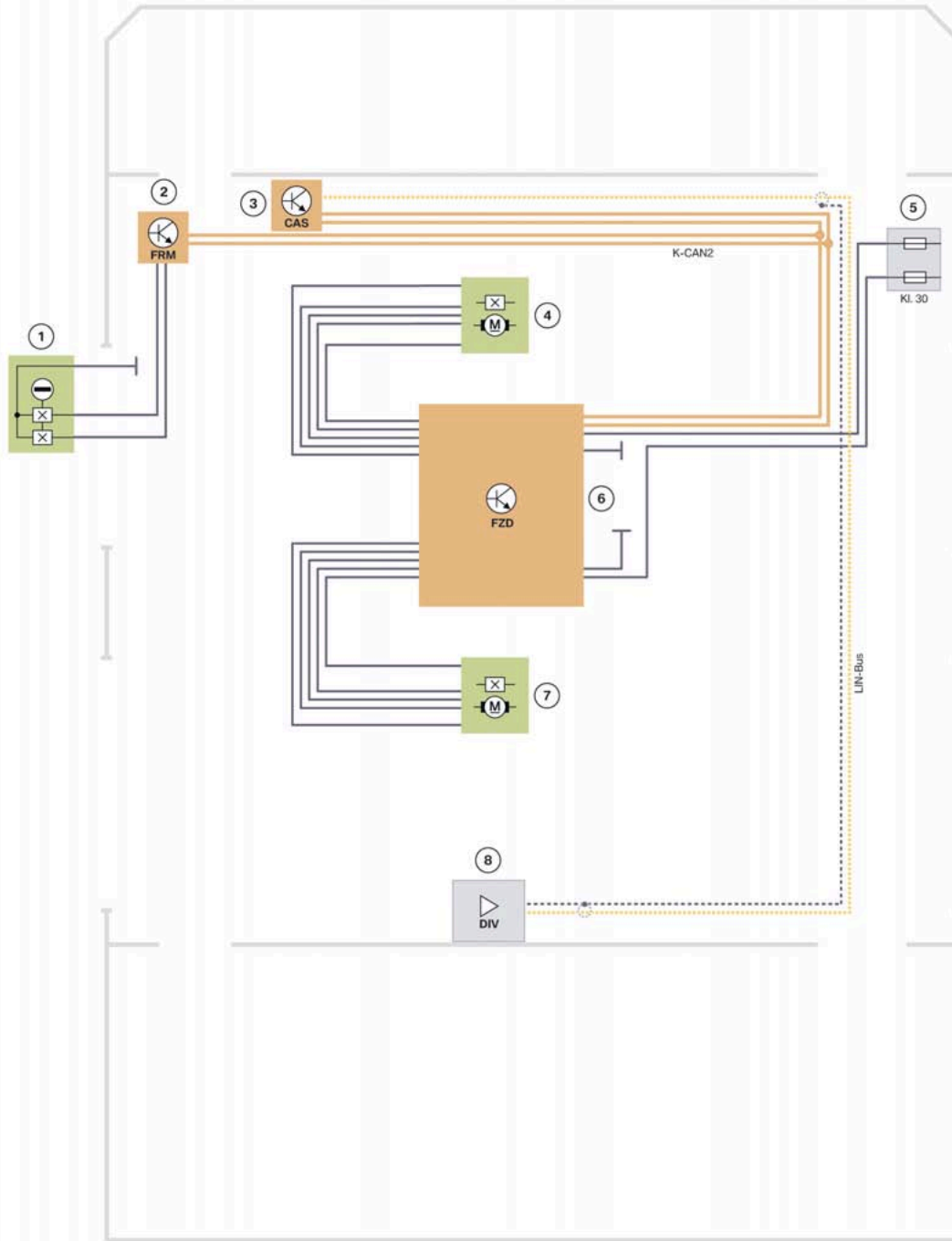
F10 Roof function center

Index	Explanation
1	Glass sunroof switch
2	Indicator lamp for front passenger airbag deactivation
3	Right reading light
4	Interior light
5	Right reading light button
6	Ambient lighting
7	Interior light button
8	Ambient lighting
9	Left reading light button
10	Left reading light
11	Emergency call button

# F10 General Vehicle Electronics

## 8. Glass Sunroof

### 8.1. System wiring diagram



TE09-2342

F10 System wiring diagram for glass sunroof

# F10 General Vehicle Electronics

## 8. Glass Sunroof

<b>Index</b>	<b>Explanation</b>
1	Hall sensors, driver's door lock barrel
2	Footwell module (FRM)
3	Car Access System (CAS)
4	Glass sunroof motor
5	Front distribution box
6	Roof function center (FZD) with button for glass sunroof
7	Sliding trim motor
8	Aerial diversity module with antenna amplifier
K-CAN2	Body controller area network 2
LIN-Bus	Local Interconnect Network bus
Kl. 30	Terminal 30

# F10 General Vehicle Electronics

## 9. Anti-theft Alarm System

The anti-theft alarm system is standard equipment on all F10 models. As on previous models, the alarm system must be activated. When activated, the alarm monitors the whole of the vehicle interior.

The alarm system monitors the engine compartment and the vehicle's rest position. So that nothing can be stolen from the luggage compartment, the alarm system monitors opening of the trunk lid.

The alarm system also signals an attempt to tamper with the vehicle, e.g. cutting the supply line to the emergency power siren.

An Ultrasonic interior movement detector is integrated in the roof function center.

The ultrasonic signal passes into the inside of vehicle through apertures in the grille of the roof function center. The emergency power siren with tilt sensor is located near the rear wheel arch.

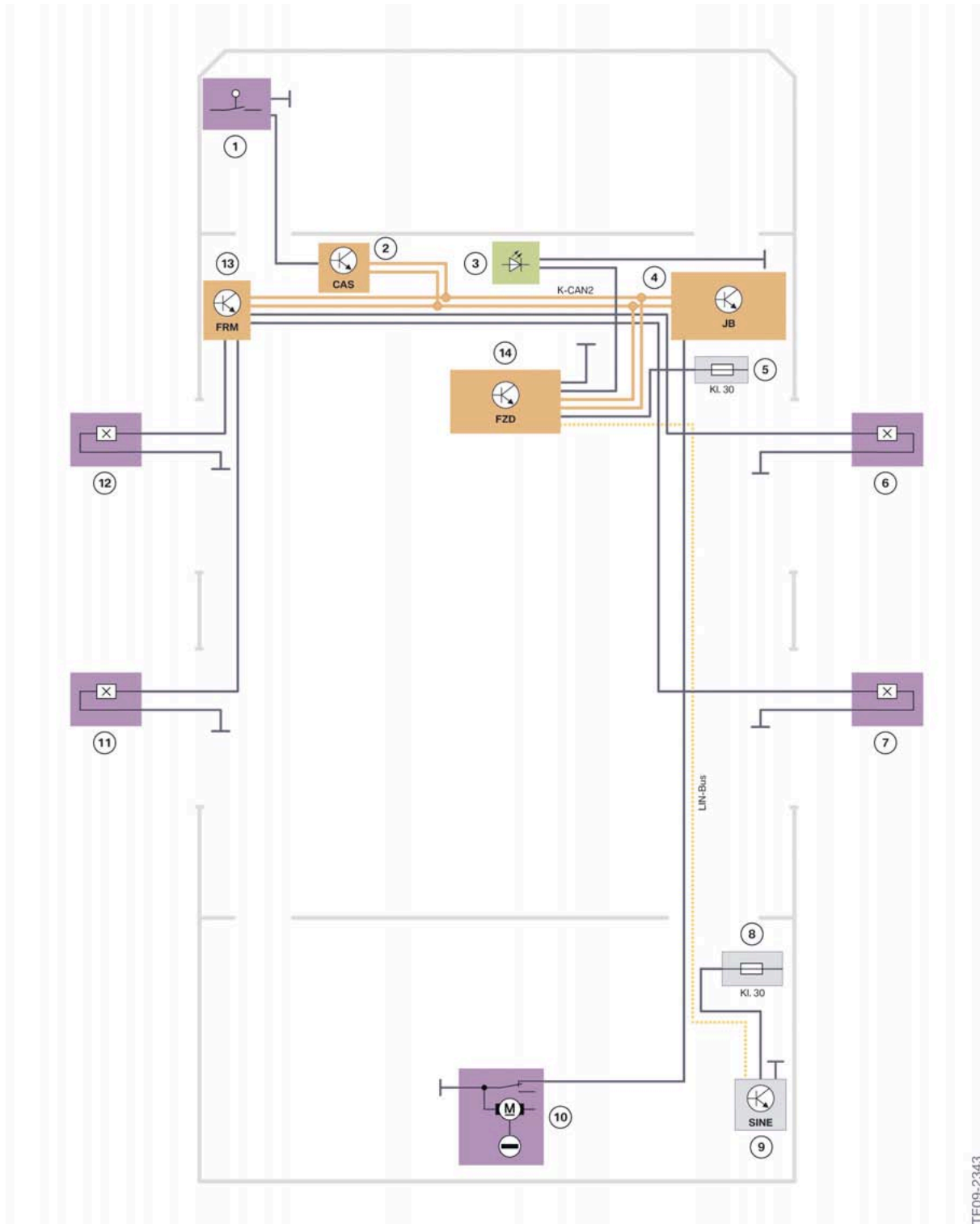
For more information on the operating principle of the alarm system, refer to the F01/F02 "Anti theft System" training material available on TIS and ICP.



# F10 General Vehicle Electronics

## 9. Anti-theft Alarm System

### 9.1. System wiring diagram



F10 Alarm system

TE09-2343

# F10 General Vehicle Electronics

## 9. Anti-theft Alarm System

Index	Explanation
1	Hood contact switch
2	Car Access System (CAS)
3	LED alarm system
4	Junction box electronics (JBE)
5	Front distribution box
6	Door contact, passenger's door
7	Door switch, passenger side, rear
8	Luggage compartment junction box
9	Emergency power siren with integrated tilt sensor (SINE)
10	Trunk lock with trunk-lid switch
11	Door switch, driver's side, rear
12	Door switch, driver's door
13	Footwell module (FRM)
14	Roof function center (FZD) with ultrasonic interior movement detector (USIS)
LIN-Bus	Local Interconnect Network bus
K-CAN2	Body controller area network 2
Kl. 30	Terminal 30

The Hall sensors in the doors (6, 7, 11, 12) are monitored by the footwell module (13). As soon as the status of a Hall sensor changes, the ultrasonic interior movement detector (14) receives that information via the K-CAN2. If the anti-theft alarm system is activated, an alarm is triggered.

The hood contact switch (1) is monitored by the Car Access System (2). If the status changes, an alarm is triggered in the same way.

Opening of the trunk is monitored by the junction box electronics (4). If the status of the trunk lid contact switch (10) changes, it triggers an alarm.

# F10 General Vehicle Electronics

## 10. Automatic Trunk Lid

The "Power Tailgate" option is offered in the F10 as part of the ZCV Convenience Package, which also includes Comfort Access keyless entry and Soft-close automatic doors.

The automatic operation of the trunk lid improves vehicle access by enabling the luggage compartment lid to be opened or closed automatically at the press of a button. A spindle-driven system is used in the F10 for automatic opening or closing of the luggage compartment lid.

With Comfort Access, it is even possible to open the luggage compartment lid while the vehicle is locked.

Pressing the outer trunk lid button opens the luggage compartment lid automatically. The only requirement is that a vehicle-specific ID transmitter must be present in the immediate vicinity of the rear end of the vehicle. The trunk lid can also be opened by pressing the button on the ID transmitter.

An open luggage compartment lid can be closed by pressing the "close trunk lid" button.



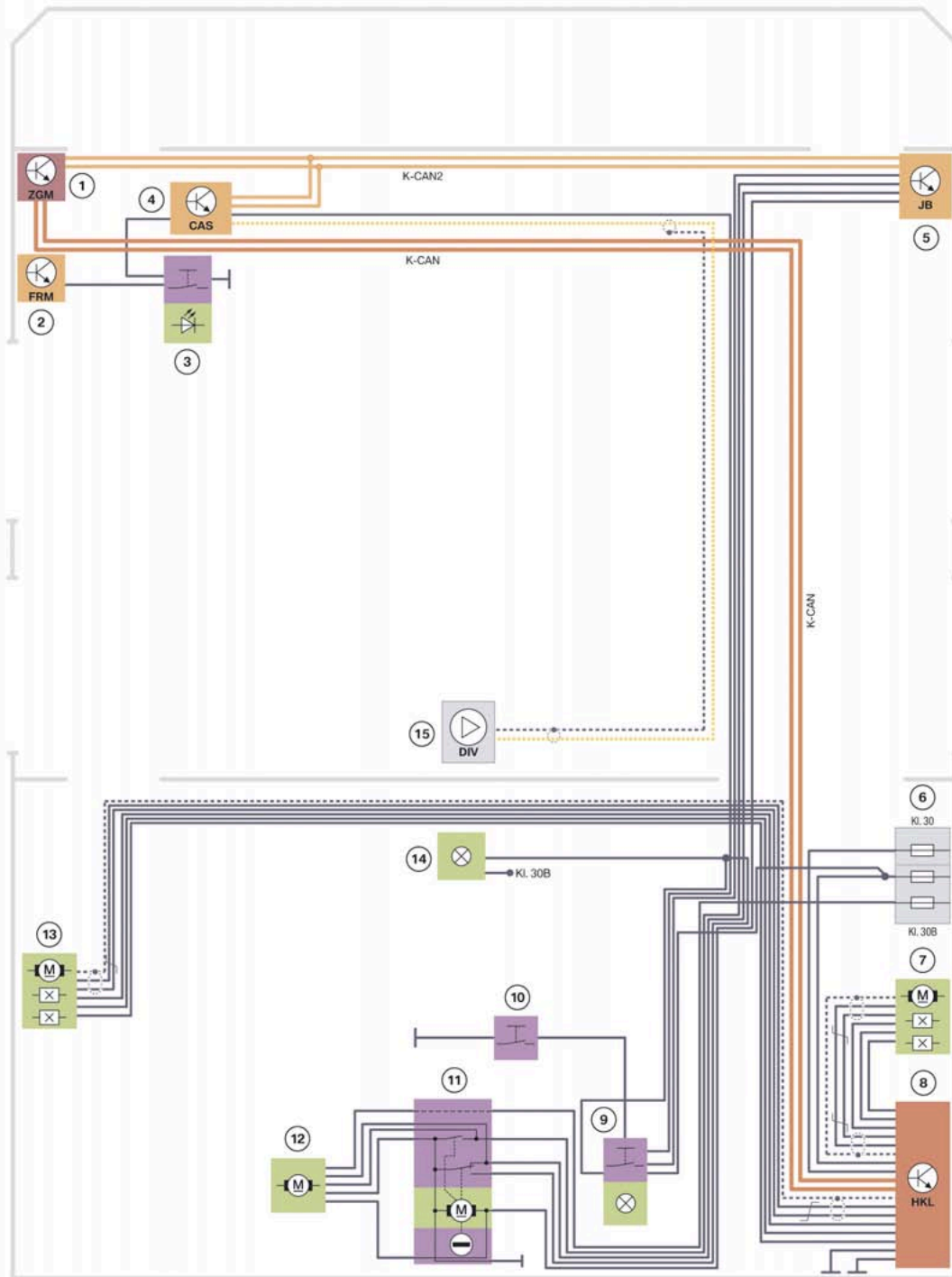
Index	Explanation
1	Close trunk lid button
2	Close and lock trunk lid button (deadlocking)

In connection with Comfort Access, it is now also possible to deadlock the vehicle doors from the trunk lid. The "deadlock" button for this is located in the trunk lid.

# F10 General Vehicle Electronics

## 10. Automatic Trunk Lid

### 10.1. System wiring diagram



TE09-2345

F10 System wiring diagram for automatic operation of trunk lid

# F10 General Vehicle Electronics

## 10. Automatic Trunk Lid

Index	Explanation
1	Central gateway module (ZGM)
2	Footwell module (FRM)
3	Trunk lid button, A-pillar
4	Car Access System (CAS)
5	Junction Box (JB)
6	Luggage compartment junction box
7	Spindle drive motor, right
8	Control unit for automatic operation of trunk (HKL)
9	Interior trunk lid button and deadlocking button
10	Exterior trunk lid button
11	Trunk lock with trunk lid contact switch and lock barrel
12	Automatic Soft Close system for trunk lid
13	Spindle drive motor, left
14	Luggage compartment lighting
15	Antenna diversity module with antenna amplifier
K-CAN.	Body controller area network
K-CAN2	Body controller area network 2
Kl. 30	Terminal 30
Term. 30B	Terminal 30 basic operation
LIN-Bus	Local Interconnect Network bus

The radio signal from the ID transmitter is received by the rear window antenna. The remote control receiver in the antenna diversity module (15) forwards the signal to the Car Access System (4). The Car Access System is the master control unit for the central locking function.

Once the signal has been successfully verified, the Car Access System issues a command to activate the central locking in the trunk lid.

The junction box electronics (5) execute the command to activate the central locking system in the trunk lid. The junction box electronics detect the status of the trunk lid contact switch (11) for the automatic operation of trunk lid function. The status of the trunk lid contact switch is sent via the K-CAN to the automatic operation of trunk (8). The status is one of the triggering criteria for trunk lid operation.

The sensors (13) and (7) in the spindle drives monitor the movement of the trunk lid. If the trunk lid is blocked while being closed, the automatic operation of trunk reverses a little if necessary to remove the obstacle.

An obstruction to luggage compartment lid movement during the opening procedure causes the trunk lid to stop and it is not reversed.

# **F10 General Vehicle Electronics**

## **10. Automatic Trunk Lid**

The control unit for the automatic operation of trunk lid monitors the power consumption of the spindle drive. A rise in current from the trunk lid being blocked results in the lid movement being stopped or reversed.

# F10 General Vehicle Electronics

## 11. Exterior Lighting

The exterior lights of the F10 are based on those of the F01.

The F10 535i and 550i come standard equipped with bi-xenon headlights (option 522).

The F10 528i is equipped with halogen headlights as standard equipment (bi-xenon headlights option 522 is available).

With bi-xenon headlights, the daytime running lights and the side lights are implemented using light-emitting diodes.

The familiar light switches from the F01 is used on the F10.

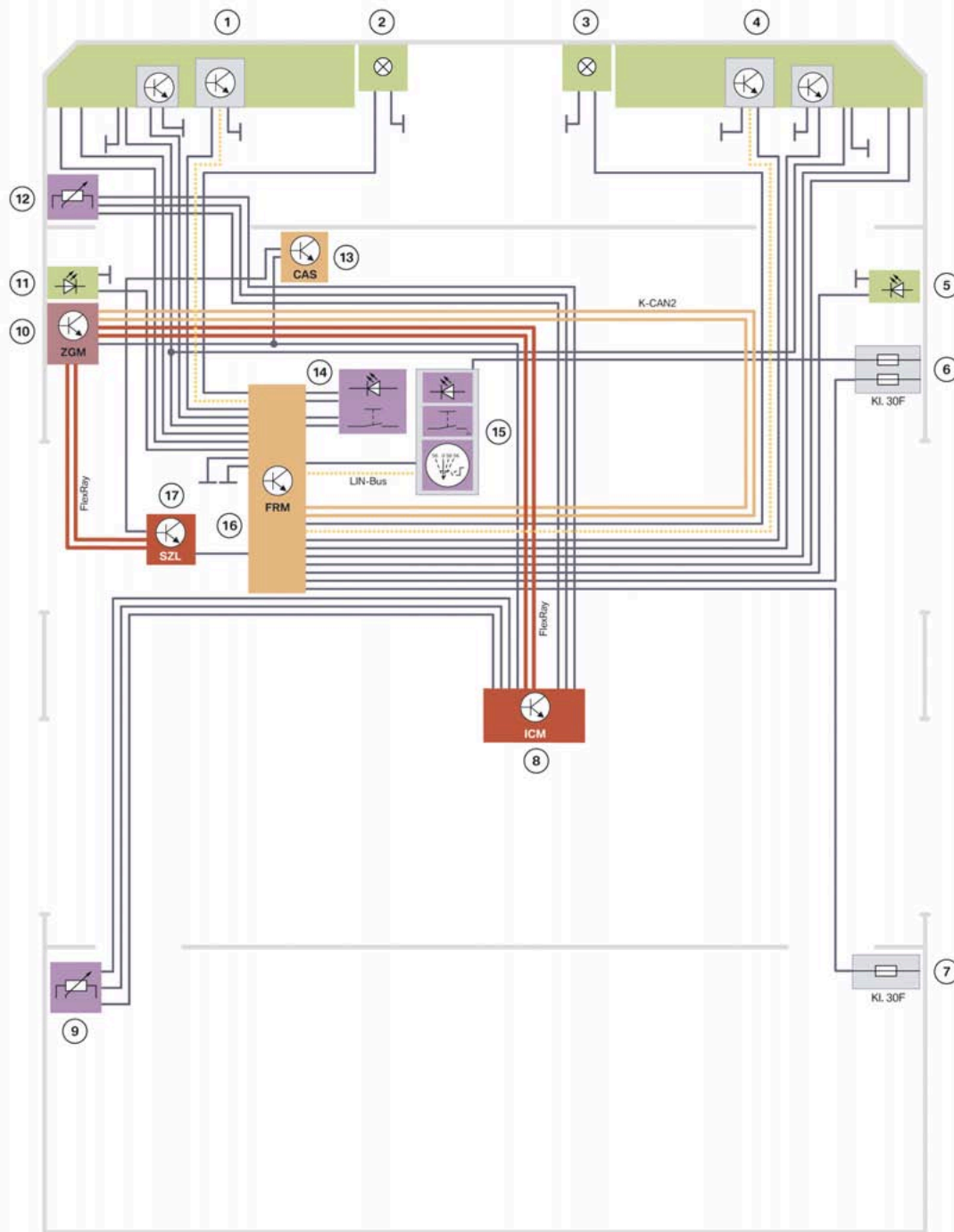
The adaptive headlights are available for the F10 as optional equipment (option 524). It is installed only in conjunction with bi-xenon headlights (option 522).

For more information on the exterior lights, refer to the F01/F02 "Exterior lighting" training material available on TIS and ICP.

# F10 General Vehicle Electronics

## 11. Exterior Lighting

### 11.1. System wiring diagram



TE09-2346

F10 System wiring diagram for front exterior lights



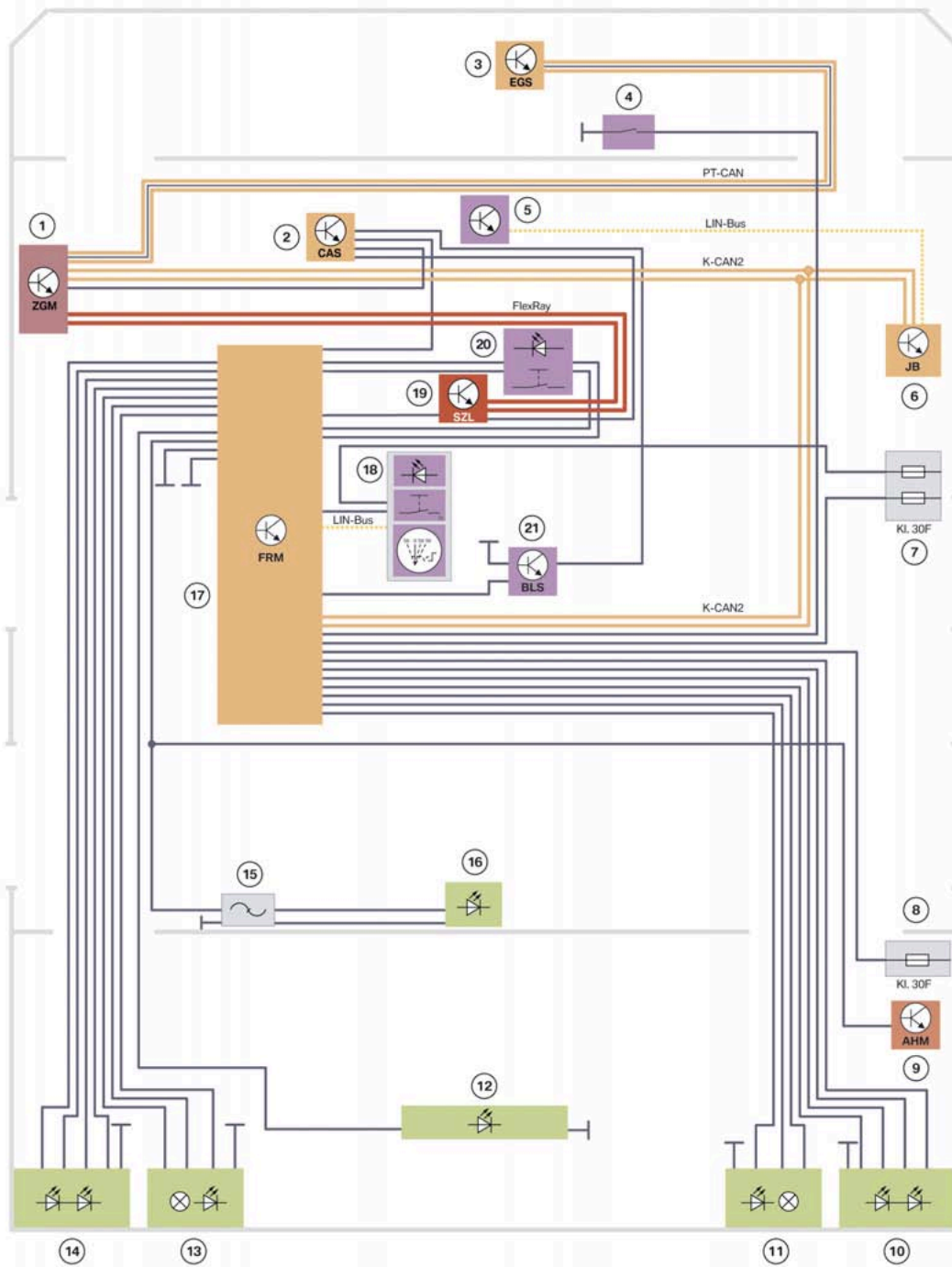
# F10 General Vehicle Electronics

## 11. Exterior Lighting

<b>Index</b>	<b>Explanation</b>
1	Left headlight
2	Front fog light, left
3	Front fog light, right
4	Right headlight
5	Right auxiliary turn indicator
6	Front distribution box
7	Rear power distribution box
8	Integrated Chassis Management (ICM)
9	Rear ride height sensor (only with option 522)
10	Central Gateway Module (ZGM)
11	Left auxiliary turn indicator
12	Front ride height sensor (only with option 522)
13	Car Access System (CAS)
14	Hazard warning switch
15	Control panel, light switch
16	Footwell module (FRM)
17	Steering column switch cluster (SZL)

# F10 General Vehicle Electronics

## 11. Exterior Lighting



F10 System wiring diagram for rear exterior lights

TE09-2347

# F10 General Vehicle Electronics

## 11. Exterior Lighting

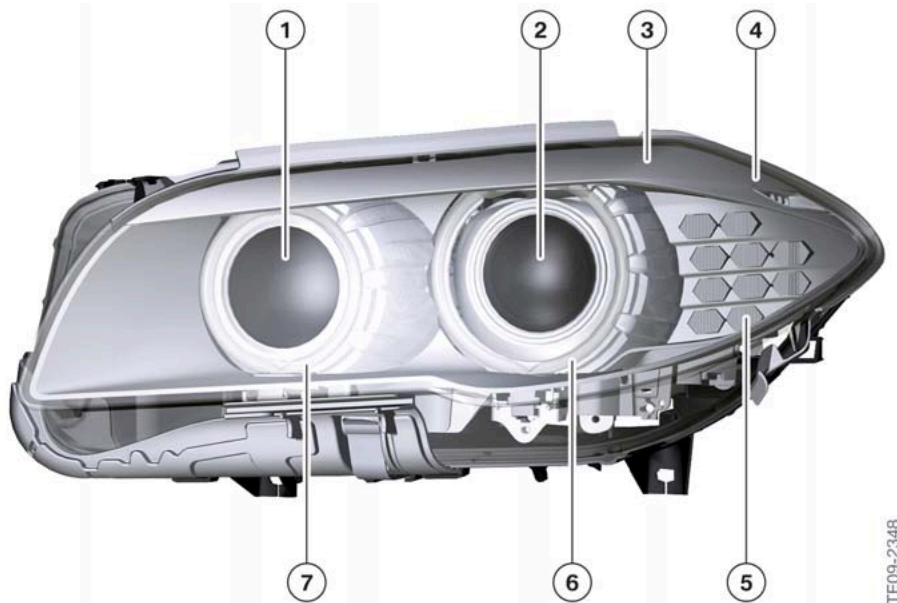
Index	Explanation
1	Central Gateway Module (ZGM)
2	Car Access System (CAS)
3	Electronic transmission control (EGS) (with automatic transmission)
4	Reverse light switch (with manual transmission)
5	Rain-light-solar-condensation sensor
6	Junction Box (JB)
7	Front distribution box
8	Rear power distribution box
9	Trailer module AHM (Not for US)
10	Outer rear light cluster, right
11	Inner rear light cluster, right
12	Licence plate light
13	Inner rear light cluster, left
14	Outer rear light cluster, left
15	Filter with trap circuit
16	Additional brake light
17	Footwell module (FRM)
18	Control panel, light switch
19	Steering column switch cluster (SZL)
20	Hazard warning switch
21	Brake light switch

### 11.2. Front Lighting

The structure of the front headlights can be seen in the following graphic.

# F10 General Vehicle Electronics

## 11. Exterior Lighting



F10 Front headlight

TE09-2348

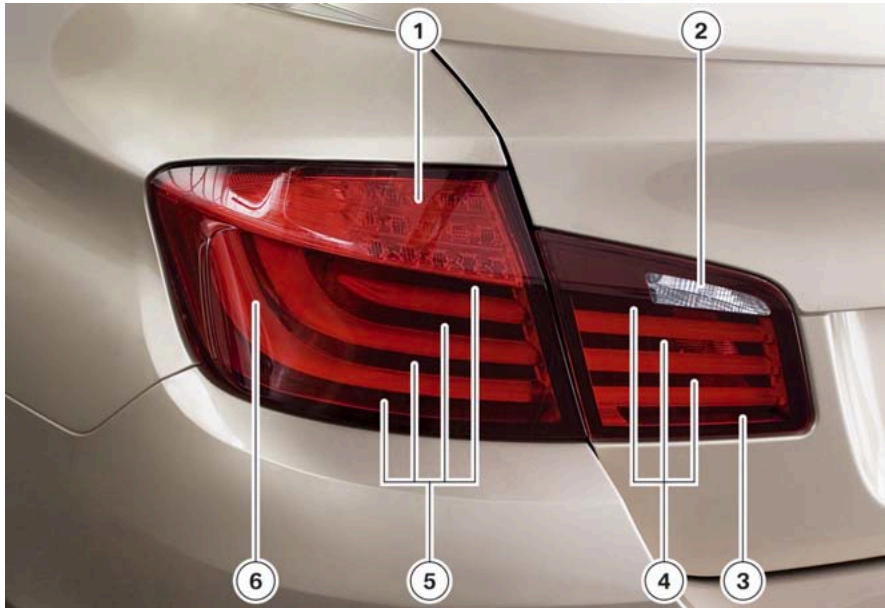
Index	Explanation
1	Turning light (option 524, only available with bi-xenon) or high beam headlight with halogen headlights
2	Bi-xenon low-beam headlight/high beam headlight or low-beam headlight with halogen headlights
3	Decorative lighting (light-emitting diodes)
4	Side marker light (light-emitting diodes)
5	Turn indicator (light-emitting diodes with bi-xenon)
6	Parking light/daytime driving lights corona ring (light-emitting diodes, daytime driving light function only with bi-xenon)
7	Parking light/daytime driving lights corona ring (light-emitting diodes, daytime driving light function only with bi-xenon)

### 11.3. Rear Lighting

The F10 has a two-piece rear light. The structure of the rear lights can be seen in the following graphic.

# F10 General Vehicle Electronics

## 11. Exterior Lighting



F10 Rear light

Index	Explanation
1	Turn signal indicator light (LEDs)
2	Reverse light
3	Brake light for Brake Force Display
4	Brake light (LEDs)
5	Reflector, side marking
6	Tail light (LEDs)

# F10 General Vehicle Electronics

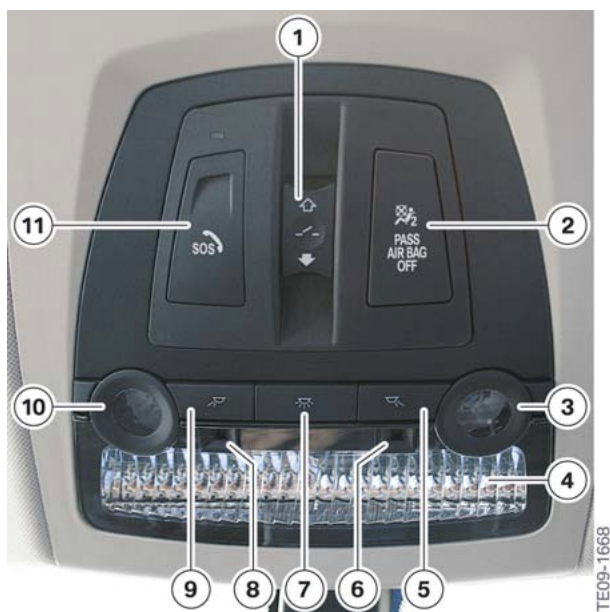
## 12. Interior Lighting

### 12.1. Overview

The interior lighting of the F10 is controlled by the footwell module FRM control unit.

The footwell module is the central control unit for the interior lighting. All interior lighting outputs of the footwell module are pulse-modulated. This ensures that the interior light functions at a constant brightness level in the event of voltage fluctuations. The pulse width modulation is also used for the "soft ON/soft OFF" function.

The components for the interior light in the front roof area are integrated in the roof function center and in the sun visors. The footwell lighting is located underneath the dashboard. The rear reading and interior lights are supplied with voltage via the roof function center.



F10 Roof function center

Index	Explanation
1	Glass sunroof switch
2	Indicator lamp for front passenger airbag deactivation
3	Right reading light
4	Interior light
5	Right reading light button
6	Ambient lighting
7	Interior light button
8	Ambient lighting
9	Left reading light button
10	Left reading light
11	Emergency call button

# F10 General Vehicle Electronics

## 12. Interior Lighting

### 12.2. System wiring diagram

The system wiring diagram follows the description below and provides an overview of the full extent of all possible interior light options.

The following examples describe some switching operations for the interior light.

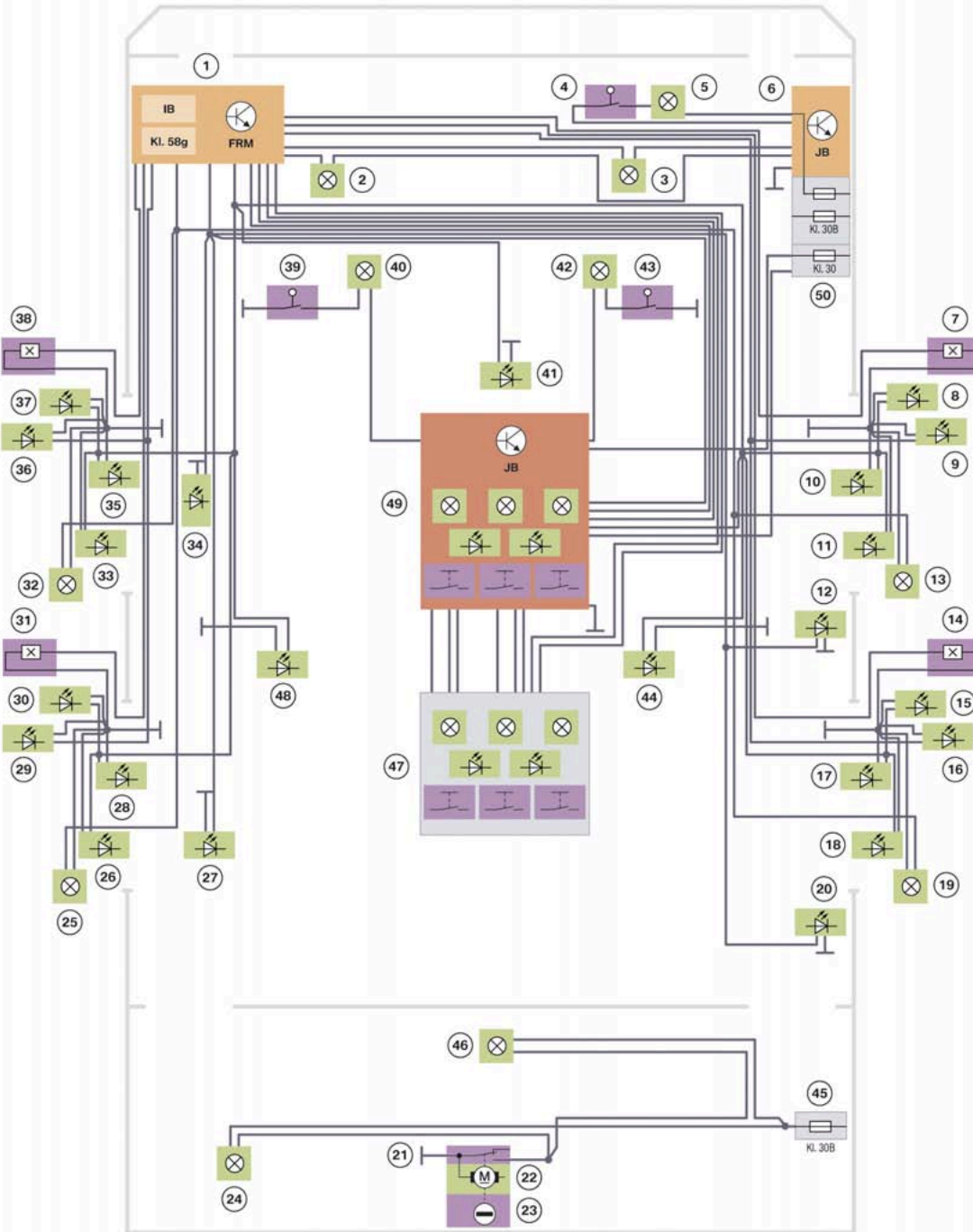
The status of the door contact (Hall sensor) in the lock (38) changes, for example, when the door is opened with the vehicle unlocked. The footwell module (1) evaluates the status and sends the request to switch on the interior light.

At the same time, the door entry lighting (32) for the door that is open and the footwell lights (2, 3) are switched on by the footwell module. The status of the door contact changes again when the vehicle door is closed. The footwell module initiates the procedure to switch off the interior light.

The luggage compartment lights and the lights in the luggage compartment lid (24, 46) are connected to the voltage supply via terminal 30B. If one of the luggage compartment lids is opened, the status of the tailgate contact switch changes (27). The luggage compartment lights and the luggage compartment lid light are switched on directly via the tailgate contact switch.

# F10 General Vehicle Electronics

## 12. Interior Lighting



TE09-2350

F10 System wiring diagram for interior light



# F10 General Vehicle Electronics

## 12. Interior Lighting

Index	Explanation
1	Footwell module (FRM)
2	Footwell light, driver's side
3	Footwell light, front passenger's side
4	Glove compartment switch
5	Glove box light
6	Junction Box (JB)
7	Door contact, front passenger side
8	Exterior door handle light, front passenger side
9	Ground lights, front passenger side
10	Inside door handle light, front passenger side
11	Door pocket lighting, front passenger side
12	Entrance lighting, front passenger side
13	Door entry lighting, front passenger side
14	Door switch, passenger side, rear
15	Exterior door handle light, passenger side, rear
16	Rear, passenger-side illuminated entry system
17	Interior door handle light, passenger side, rear
18	Door pocket light, passenger side, rear
19	Doorway light, passenger side, rear
20	Entrance lighting, rear passenger side
21	Tailgate contact switch
22	Tailgate lock motor
23	Lock barrel, tailgate
24	Luggage compartment light in tailgate
25	Doorway light, driver's side, rear
26	Door pocket light, driver's side, rear
27	Entrance lighting, rear driver's side
28	Interior door handle light, driver's side, rear
29	Rear, driver's side illuminated entry system
30	Exterior door handle light, driver's side, rear
31	Door switch, driver's side, rear
32	Door entry lighting, front driver's side
33	Door pocket lighting, front driver's side
34	Door pocket lighting, front driver's side
35	Inside door handle light, front driver's side

# F10 General Vehicle Electronics

## 12. Interior Lighting

<b>Index</b>	<b>Explanation</b>
36	Ground lights, front driver's side
37	Outside door handle light, front driver's side
38	Door contact, front driver's side
39	Make-up mirror light switch, front driver's side
40	Make-up mirror light, front driver's side
41	Center console storage compartment light, front
42	Make-up mirror light, front passenger side
43	Make-up mirror light switch, front passenger side
44	Map pocket light, front passenger seat backrest
45	Luggage compartment junction box
46	Luggage compartment light
47	Interior/reading light unit, rear
48	Map pocket light, driver's seat backrest
49	Interior/reading light unit, front
50	Front power distribution box
Kl. 30	Terminal 30
Term. 30B	Terminal 30 basic operation
Kl. 58g	Terminal 58g
IB	Interior lighting control

# F10 General Vehicle Electronics

## 13. Seats

The electrical connection of the front seats and the seats in the rear passenger compartment is the same as in the F01.

For additional information on the seats, refer to the F01/F02 "Seats" training material available on TIS and ICP.

### 13.1. Front seats

The following front seat variants are available for the F10:

- 20-way power front Comfort seats with memory (standard)
- ZAV Active vent seat package

The available ZAV Active vent seat package includes

- Multi contour seats (lumbar support)
- Front ventilated seats
- Active front seats
- Heated front seats

The front seats are largely identical to the front seats in the F07.

The following table provides an overview of the available optional equipment.

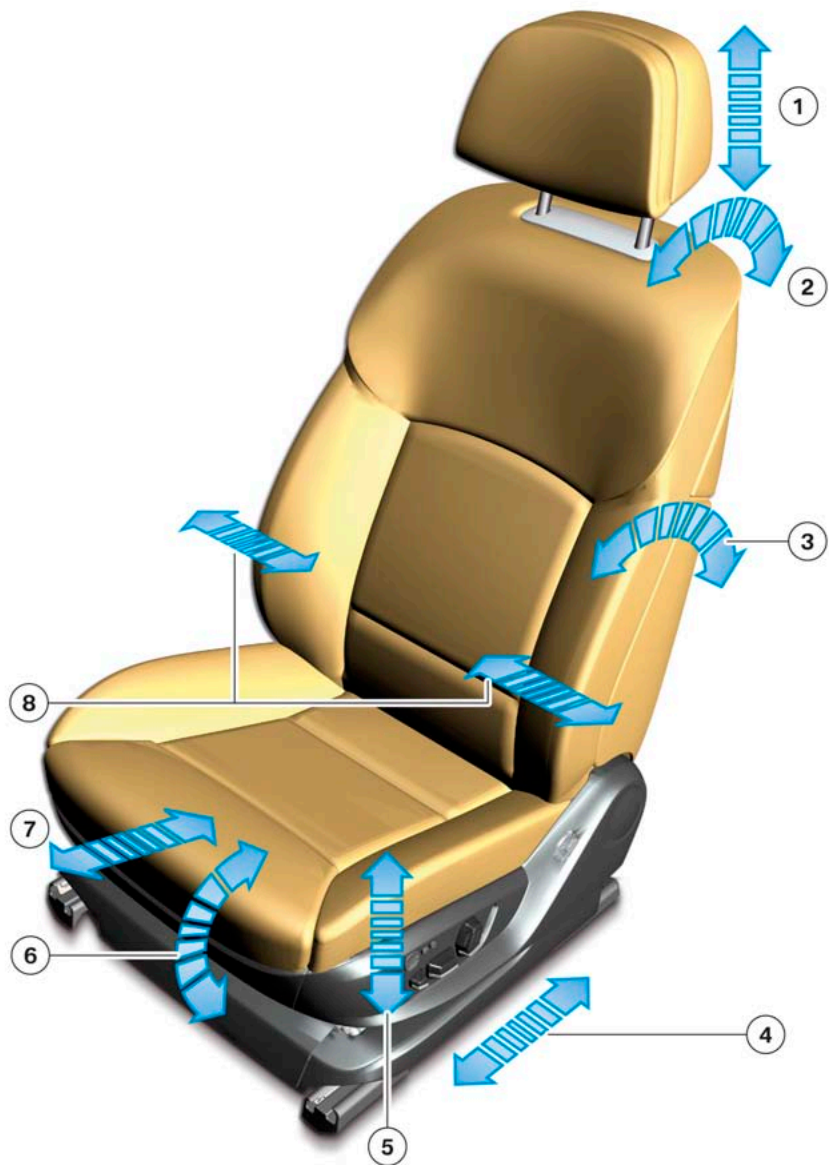
	<b>Seat adjustment, electrical, with memory (option 459)</b>	<b>Comfort seat, electrically adjustable (option 456)</b>
Seat memory	Standard	Standard
Seat heating for driver/ passenger	Option 494	Option 494
Lumbar support for driver/ passenger	Option 488	Standard
Active seat for driver/front passenger	---	Option 455
Active seat ventilation, front	Option 453	Option 453
Ambient light	Option 4UR	Option 4UR
Rear seat entertainment	Option 6FG	Option 6FG

#### 13.1.1. Seat adjustment

With the maximum equipment specification, the F10 seats can be adjusted in eight directions.

# F10 General Vehicle Electronics

## 13. Seats



TE07-1964

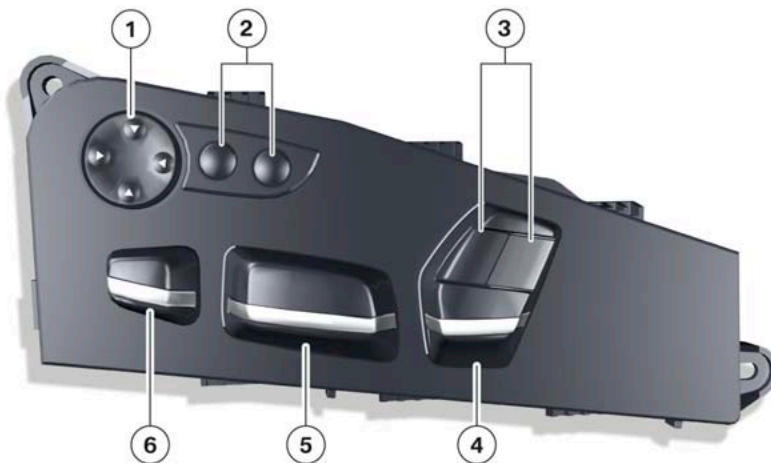
F10 Maximum seat adjustment, example: comfort seat

Index	Explanation
1	Head rest height adjustment
2	Back rest upper section adjustment
3	Back rest angle adjustment
4	Forward/Back seat adjustment
5	Seat height adjustment
6	Seat angle adjustment
7	Seat depth adjustment
8	Back rest width adjustment

# F10 General Vehicle Electronics

## 13. Seats

Seat adjustment options	Seat adjustment, electrical, with memory (option 459)	Comfort seat, electrically adjustable (option 456)
Seat height adjustment	Electrical	Electrical
Forward/back seat adjustment	Electrical	Electrical
Seat angle adjustment	Electrical	Electrical
Backrest inclination adjustment	Electrical	Electrical
Head restraint, height adjustment	Electrical	Electrical
Seat depth adjustment	Manual*	Electrical
Backrest width adjustment	---	Electrical
Upper backrest adjustment	---	Electrical



TE07-1822

F10 Switch block for comfort seat adjustment (on the seat)

Index	Explanation
1	Lumbar support adjustment
2	Back rest width adjustment
3	Back rest upper section adjustment
4	Back rest angle and head rest adjustment
5	Forward/back, seat height and angle adjustment
6	Seat depth adjustment

### 13.1.2. Seat heating

Seat heating can be ordered for the front seats (option 494) for the F10.

# F10 General Vehicle Electronics

## 13. Seats



F10 Control panel for integrated automatic heating / air conditioning system

Index	Explanation
1	Seat heating button, driver's seat
2	Seat heating button, front-passenger seat

For more information on seat heating, refer to the F01/F02 "Seats" training information available on TIS and ICP.

### 13.1.3. Active seat ventilation

Active seat ventilation can be ordered for the front seats (option 453) for the F10.



F10 Control panel for integrated automatic heating / air conditioning system

Index	Explanation
1	Button, active seat ventilation, driver's seat
2	Button, active seat ventilation, front-passenger seat

For more information on seat heating, refer to the F01/F02 "Seats" training information available on TIS and ICP.

### 13.2. Seats in the rear passenger compartment

In the F10, a seat bench with backrest in sandwich design is installed as standard, or a seat bench with through-loading system as optional equipment (option 465).

#### Highlights

# F10 General Vehicle Electronics

## 13. Seats

- Backrest in sandwich design (only basic seat bench)
- center armrest (folding) with storage compartment and cup holder
- center head restraint, folding
- Backrests, folding 40 %, 60 % or 100 % (only with through-loading system, option 465)

The following seat equipment is possible in the rear passenger compartment.

	Basic seat bench	Seat bench with through-loading system (option 465)
Seat heating for rear seats	Option 496	Option 496
Remote control in storage compartment (with rear seat entertainment or rear seat entertainment Professional)	Option 6FG, option 6FH	Option 6FG, option 6FH
Ski bag	---	Standard

Seat heating can be ordered as an option (option 496).



Control panel for automatic rear air-conditioning system

Index	Explanation
1	Left seat heating button
2	Right seat heating button

# F10 General Vehicle Electronics

## 14. Climate Control Systems

For the F10, 2 versions of the integrated automatic heating / air conditioning system IHKA are available.

- 2-zone IHKA Climate Control (option 534)
- 4-zone IHKA Climate Control (option 4NB)

The following table provides an overview of this of the 2 IHKA systems available:

	2-zone IHKA	4-zone IHKA
<b>Temperature</b>	Left/right	Front: left/right Rear: left/right
<b>Air volume</b>	Left/right	Front: left/right Rear: shared
<b>Air distribution</b>	Left/right	Front: left/right Rear: shared

### 14.1. Equipment

	IHKA 2 zones	IHKA 4 zones
Separate control of temperature, front left/right	X	X
Separate control of amount of air and air distribution, front left/right	X	X
Separate control of temperature, rear passenger compartment left/right	---	X
Independent ventilation	X	X
Residual heat utilization	X	X
Anti-misting	X	X
Fresh air and recirculating air filter (microfilter)	X	X
Ionizer to prevent condenser odors	X	X
Individual automatic control with 5 intensity levels	X	X
Solar compensation	X	X
Automatic air recirculation control (including combination filter <sup>2</sup> )	X	X



# F10 General Vehicle Electronics

## 14. Climate Control Systems

	IHKA 2 zones	IHKA 4 zones
ALL function (driver's settings are transferred to front passenger side)	X	---
ALL function (driver's settings are transferred to front passenger side and left/rear passenger compartment)	---	X
Separate IHKA controls in rear passenger compartment (center console)	---	X
Comfort nozzle (fresh-air grille on center dashboard) with individual range of adjustment from spot (focused) to diffuse (draught-free)	---	X

<sup>1</sup> A solar sensor takes into account any external light and/or heat sources that affect the climate in the passenger compartment.

<sup>2</sup> A combination of microfilter and carbon filter traps dust and pollen and protects the system against unpleasant odors.

### 14.2. 2-zone IHKA

2-zone IHKA is standard equipment for all F10 models.



TE09-1664

F10 Control panel of the 2-zone IHKA

With the 2-zone IHKA you can adjust the amount of air and air distribution separately for the left and right side.

The driver's current settings for temperature, amount of air and air distribution can be transferred to the front passenger side using the ALL button.

The system is also equipped with the automatic air recirculation control AUC. This feature blocks the fresh air duct if there are odors or pollutants coming into the vehicle. In this situation, the interior air is then recirculated.

# F10 General Vehicle Electronics

## 14. Climate Control Systems

The function, operation and structure of the 2-zone IHKA are the same as the IHKA basic version in the F01/F02. For more information on this IHKA, refer to the F01/F02 "Heating and air conditioning systems" training material available on TIS and ICP.

### 14.3. 4-zone IHKA

The 4-zone IHKA is available as optional equipment (option 4NB) on all F10 models.



F10 Control panels for the 4-zone IHKA

Index	Explanation
1	Front control panel
2	Control panel in the rear passenger compartment

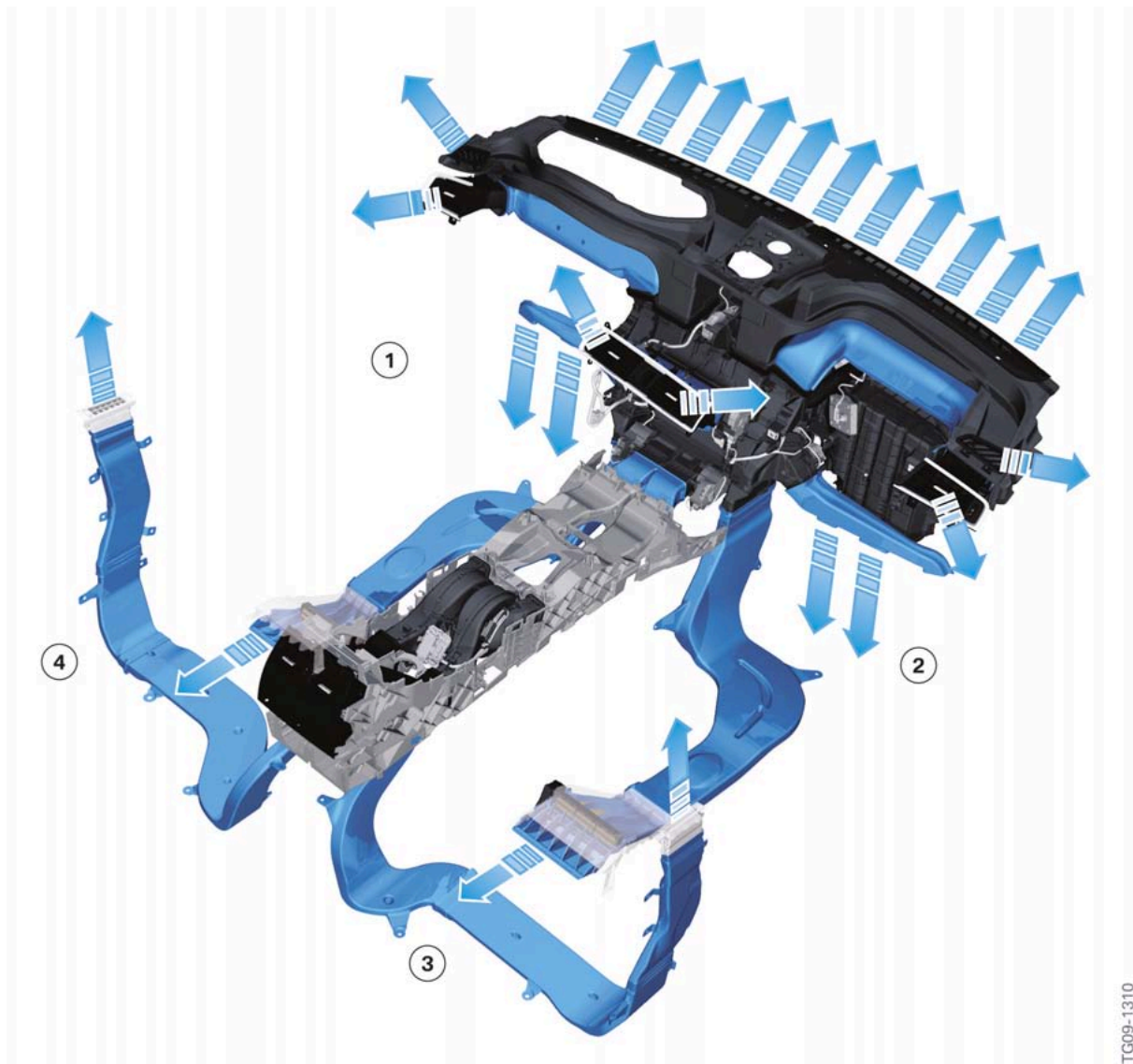
In the front of the vehicle, the 4-zone IHKA has the same control panel as the 2-zone IHKA.

The 4-zone IHKA has an additional control panel in the rear passenger compartment. The rear seat passengers can use this to adjust the temperature separately for the left and right. The amount of air and air distribution can be controlled together for the rear passenger compartment.

With the 4-zone IHKA, the driver's current settings for temperature, amount of air and air distribution can be transferred to the front passenger side and rear passenger compartment using the ALL button.

# F10 General Vehicle Electronics

## 14. Climate Control Systems



TC09-1310

F10 Air ducts and zones of the 4-zone IHKA

Index	Explanation
1	Driver zone
2	Front passenger zone
3	Right rear passenger compartment zone
4	Left rear passenger compartment zone

The function, operation and structure of the 4-zone IHKA are the same as the IHKA High version in the F01/F02. For more information refer to the F01/F02 "Climate Control Systems" training material available on TIS and ICP.



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