

Technical training.
Product information.

G30 PHEV Update



BMW Service

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Technical Training

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General information

Symbols used

The following symbol is used in this document to facilitate better comprehension or to draw attention to very important information:



Contains important safety information and information that needs to be observed strictly in order to guarantee the smooth operation of the system.

Information status: March 2019

BMW Group vehicles meet the requirements of the highest safety and quality standards. Changes in requirements for environmental protection, customer benefits and design render necessary continuous development of systems and components. Consequently, there may be discrepancies between the contents of this document and the vehicles available in the training course.

The information contained in the training course materials is solely intended for participants in this training course conducted by BMW Group Technical Training Centers, or BMW Group Contract Training Facilities.

This training manual or any attached publication is not intended to be a complete and all inclusive source for repair and maintenance data. It is only part of a training information system designed to assure that uniform procedures and information are presented to all participants.

For changes/additions to the technical data, repair procedures, please refer to the current information issued by BMW of North America, LLC, Technical Service Department.

This information is available by accessing TIS at www.dealerspeed.net.

Additional sources of information

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

- Owner's Handbook
- Integrated Service Technical Application
- Aftersales Information Research (AIR)

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G30 PHEV Update

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G30 PHEV Update

1. Introduction

1.1. Further information

From the production date July 2019, the G30 PHEV will be equipped with a modified high-voltage battery. In terms of outward appearance, there is no difference between this high-voltage battery and the previous high-voltage battery. The capacity of the individual cell modules has been increased from 26 Ah to 34 Ah.

This product information only covers the alterations made to the new BMW 530e compared to its predecessor (BMW 530e iPerformance). Knowledge of the high voltage technology of the hybrid generation 3.0 is a prerequisite for this.

Further information can be found in the listed documents:

Further information

- **G12 PHEV High-voltage Components** Reference Manual
- **G12 PHEV High-voltage Battery** Reference Manual
- **SP41 High-voltage Battery** Reference Manual



Only Service employees who satisfy all the prerequisites are permitted to work on the designated high-voltage components: suitable qualifications, compliance with the safety rules, procedure following the exact repair instructions.



Work on live high-voltage components is expressly prohibited. Prior to every operation which involves a high-voltage component, it is essential to disconnect the high-voltage system from the voltage supply and to secure it against unauthorized return to service.

G30 PHEV Update

1. Introduction

- 1 Charging plug is not connected to the vehicle.
 - 2 Enter the PARK vehicle condition (e.g. by holding down the volume control button).
 - 3 Wait until the vehicle enters "Sleep" mode (identifiable by the fact that the inscription in the START/STOP button is not illuminated).
 - 4 Open high-voltage service disconnect.
 - 5 Secure the high-voltage service disconnect to prevent the high-voltage system against restarting.
 - 6 Activate PAD mode (by pressing the START/STOP button three times within 0.8 s).
 - 7 Wait until the Check Control message "High-voltage system switched-off" is displayed in the instrument cluster.
 - 8 Enter PARK vehicle condition.
-

1.2. Positioning

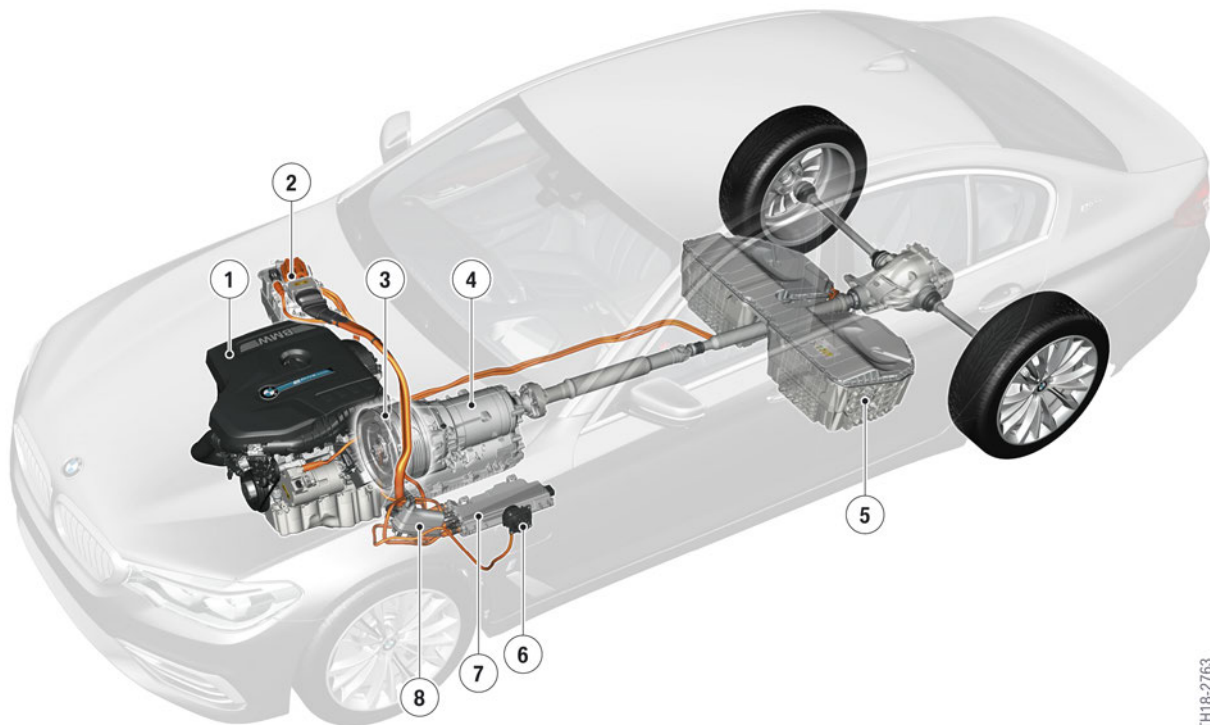
The new high-voltage battery (SP41) is visually identical to the predecessor model (SP06). In order to be able to more clearly differentiate between the high-voltage batteries, the term (SP41) will be used in future designations in the technical product information. You can find more information on this in the reference manual for the **SP41 high-voltage battery**.

From a technical standpoint, the G30 PHEV is largely based on the drive technology used in the BMW iPerformance models. The G30 PHEV is a full hybrid vehicle with lithium-ion high-voltage battery which can for example be charged using a household socket. The abbreviation PHEV in the development code stands for **P**lug-in **H**ybrid **E**lectric **V**ehicle.

From July 2019, the optional equipment wireless charging will no longer be available for the G30 PHEV.

G30 PHEV Update

1. Introduction



G30 PHEV hybrid drive (example with rear-wheel drive)

TH18-2763

Index	Explanation
1	Combustion engine B48B20M0
2	Electric motor electronics (EME)
3	Electric motor
4	Automatic transmission GA8P75HZ
5	High-voltage battery
6	Charging socket
7	Convenience charging electronics (KLE)
8	Electrical heating (EH)

1.3. Identifying features

The external identifying features of the G30 PHEV are no longer as obvious as before. The G30 PHEV can now only be identified from the model designation and charging socket cover in the front side panel. The G30 PHEV is therefore now referred to as the BMW 530e, and not the BMW 530e iPerformance.

G30 PHEV Update

1. Introduction



G30 PHEV identifying features from July 2019

Index	Explanation
1	Model designation "530e" on the tailgate
2	Charging socket cover

1.4. Technical data

The technical data of the BMW 530i, the BMW 530e iPerformance and the new BMW 530e are compared in the following table:

Combustion engine and transmission	Unit	BMW 530i G30	BMW 530e iPerformance G30 PHEV	BMW 530e G30 PHEV
Design		R4	R4	R4
Number of valves per cylinder		4	4	4
Displacement	[cm ³]	1998	1998	1998
Transmission		GA8HP50Z	GA8P75HZ	GA8P75HZ
Drive		Rear	Rear	Rear xDrive as optional equipment
Maximum power, combustion engine	[kW (HP)] [rpm]	185 (252) 5200 – 6500	135 (184) 5000 – 6500	135 (184) 5000 – 6500
Maximum torque of combustion engine	[Nm] [rpm]	350 1450 – 4800	290 1350 – 4250	290 1350 – 4250
Complete system power	[kW (HP)]		185 (252)	185 (252)

G30 PHEV Update

1. Introduction

Combustion engine and transmission	Unit	BMW 530i G30	BMW 530e iPerformance G30 PHEV	BMW 530e G30 PHEV
High-voltage battery			Lithium-ion	Lithium-ion
Output of electrical machine*	[kW (HP)]		83 (113)	83 (113)
Maximum torque, electrical machine	[Nm]		250	250
Vehicle performances	Unit	BMW 530i G30	BMW 530e iPerformance G30 PHEV	BMW 530e G30 PHEV
Acceleration 0 – 60 mph	[s]	6.0	6.0	–
Maximum speed	[mph]	130	130	–
Consumption and emissions	Unit	BMW 530i G30	BMW 530e iPerformance G30 PHEV	BMW 530e G30 PHEV
Average fuel consumption**	[l/100 km]	6.1 – 5.8	2.3 – 2.1	–
Average carbon dioxide emissions**	[g/km]	139 – 132	52 – 47	–
Dimensions and weights	Unit	BMW 530i G30	BMW 530e iPerformance G30 PHEV	BMW 530e G30 PHEV
ECE vehicle curb weight	[kg]	1615	1845	–
Payload ECE	[kg]	680	650	–
Fuel tank capacity	[liters]	68	46	46
Luggage compartment volume	[liters]	530	410	–

– Values were unavailable by the editorial deadline.

* According to ECE R85

**According to the EEC definition (KV01) and with standard tires

1.5. Equipment

Certain optional equipment is not available for the G30 PHEV. The optional equipment packages that are not available have not changed. These are briefly summarized here once again:

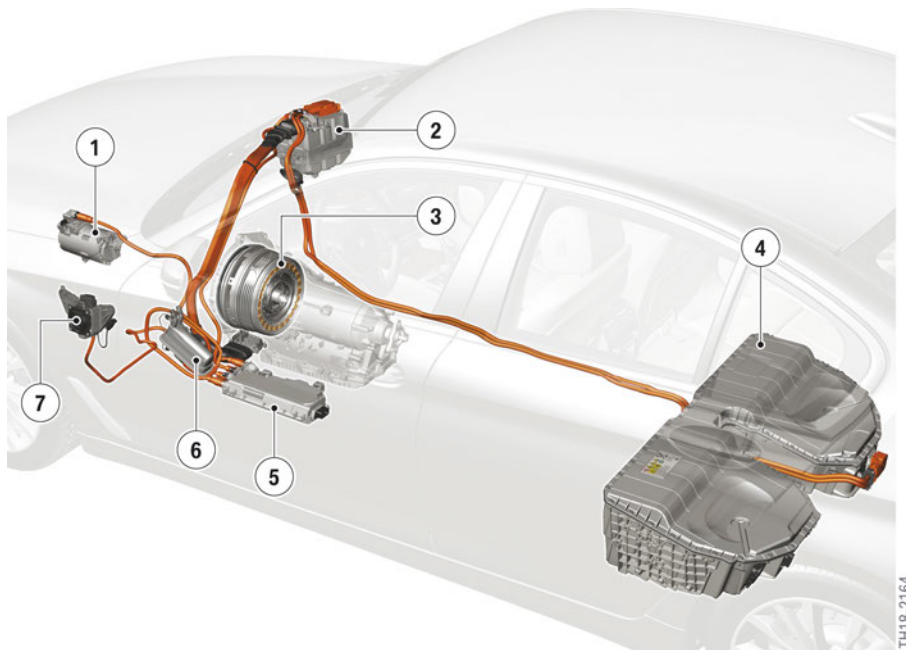
G30 PHEV Update

1. Introduction

- Steptronic sport transmission (OE 2TB)
- Adaptive Drive (OE 2VA)
- Integral Active Steering (OE 2VH)
- M sports suspension (OE 704)
- Compact spare wheel (OE 300)
- Parking assistant (OE 5DV)

1.6. High-voltage system

The biggest **change/innovation** in the high-voltage system is the use of a new high-voltage battery SP41 with a higher cell capacity.



G30 PHEV high-voltage system

Index	Explanation
1	Electric A/C compressor (EKK)
2	Electric motor electronics (EME)
3	Electric motor
4	High-voltage battery
5	Convenience charging electronics (KLE)
6	Electrical heating (EH)
7	Charging socket

G30 PHEV Update

1. Introduction

Many high-voltage components and hybrid-specific modifications have been adopted **unchanged** (apart from small changes to software or modifications):

- Electric motor
- Automatic transmission GA8P75HZ
- Electric motor electronics (EME)
- Convenience charging electronics (KLE)
- Electric A/C compressor (EKK)
- Electrical heating (EH)
- Fuel supply with pressurized fuel tank below the luggage compartment
- High-temperature and low-temperature coolant circuits
- 12 V power supply with vehicle battery and auxiliary battery in the luggage compartment (supplementary start system)
- Auxiliary battery with separate intelligent battery sensor (IBS2) and separate safety battery terminal, (SBK 2)
- High-voltage safety plug in the luggage compartment on the right and rescue disconnect in the engine compartment on the right.

1.6.1. Training

Qualification to work on the high-voltage system of the G30 PHEV can be acquired via the respective successfully concluded **web-based training** if the service employee meets the following **requirements**:

Performing work on high-voltage components

- Valid "High-voltage Components" certification for another vehicle of hybrid generation **3.0**
AND
- Valid "High-voltage Components" web based training for another vehicle of hybrid generation **4.0**

Working on the high-voltage battery

- Valid "High-voltage Battery" certification for another vehicle of hybrid generation **3.0**
AND
- Valid "High-voltage Battery" web based training for another vehicle of the high-voltage battery generation **4.0**.

As the list indicates, a first-time qualification for the hybrid generation 4.0 can be acquired via web-based training if the relevant valid qualification for hybrid generation 3.0 has already been obtained. Face-to-face training specifically for qualification for hybrid generation 4.0 is then not required.

G30 PHEV Update

2. Carryover Components

2.1. Drive

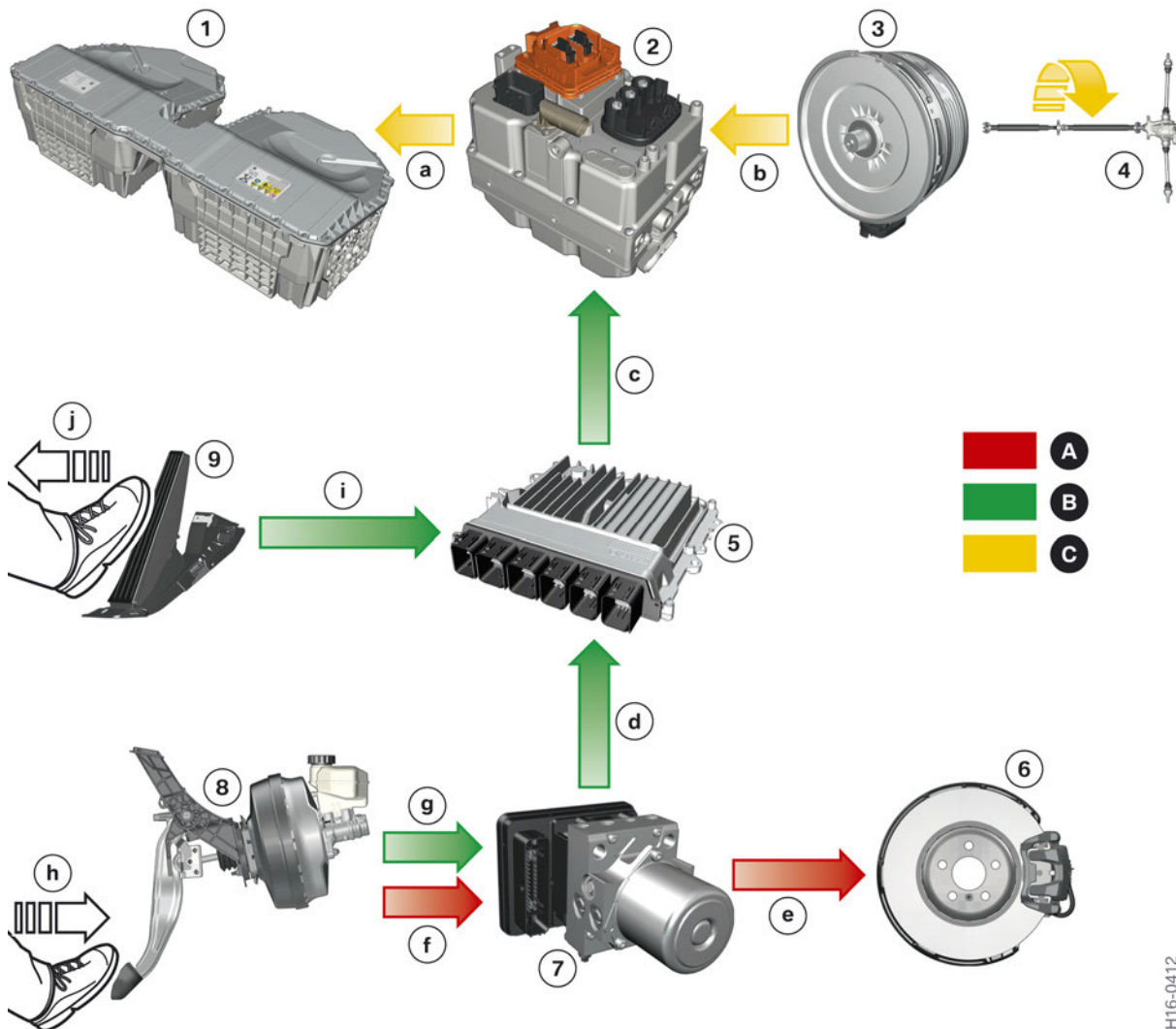
The **B48B20M0** is installed unchanged as the combustion engine. The other drive components, such as automatic transmission or the fuel system, are also carried over unchanged.

Further information on the combustion engine and the other drive components can be found in the ST1700 **G30 PHEV High-voltage Components** reference manual.

2.2. Chassis/suspension and driving stability control

No changes have been made to the chassis and the driving dynamics system. This means that a DSCi control unit is **not** installed, as is the case for example with the G12 LCI PHEV or G05 PHEV.

The following graphic shows the system overview of the braking system:



G30 PHEV braking system

TH16-0412

G30 PHEV Update

2. Carryover Components

Index	Explanation
A	Hydraulic braking
B	Signal path
C	Regenerative braking
1	High-voltage battery
2	Electric motor electronics (EME)
3	Electric motor
4	Drive train
5	Digital Motor Electronics (DME)
6	Wheel brakes
7	Dynamic Stability Control (DSC)
8	Brake pedal with brake pedal angle sensor and brake booster
9	Accelerator pedal module
a	Rectified high voltage (DC) for storage in the high-voltage battery
b	Electrical energy generated by the electrical machine (AC voltage)
c	Bus message "Accelerator pedal angle" from the DME to the EME (energy recovery in coasting overrun mode)
d	Bus message "Braking torque setpoint" from the DSC to the EME
e	Hydraulics from the DSC to the wheel brakes
f	Hydraulic pressure from the brake booster to the DSC
g	Electrical signal "Brake pedal angle" from brake pedal angle sensor to the DSC
h	Operation of the brake pedal
i	Electrical signal "Accelerator pedal angle" from accelerator pedal module to the DME (energy recovery in coasting overrun mode)
j	Releasing the accelerator pedal

G30 PHEV Update

2. Carryover Components

2.3. Electric motor

The electrical machine is a carry-over part from the G30 Plug-in Hybrid Electric Vehicle.

Further information on the electrical machine can be found in the ST1700 **G30 High-voltage Components** reference manual.

The electrical machine is a high-voltage component.



High-voltage component warning sticker



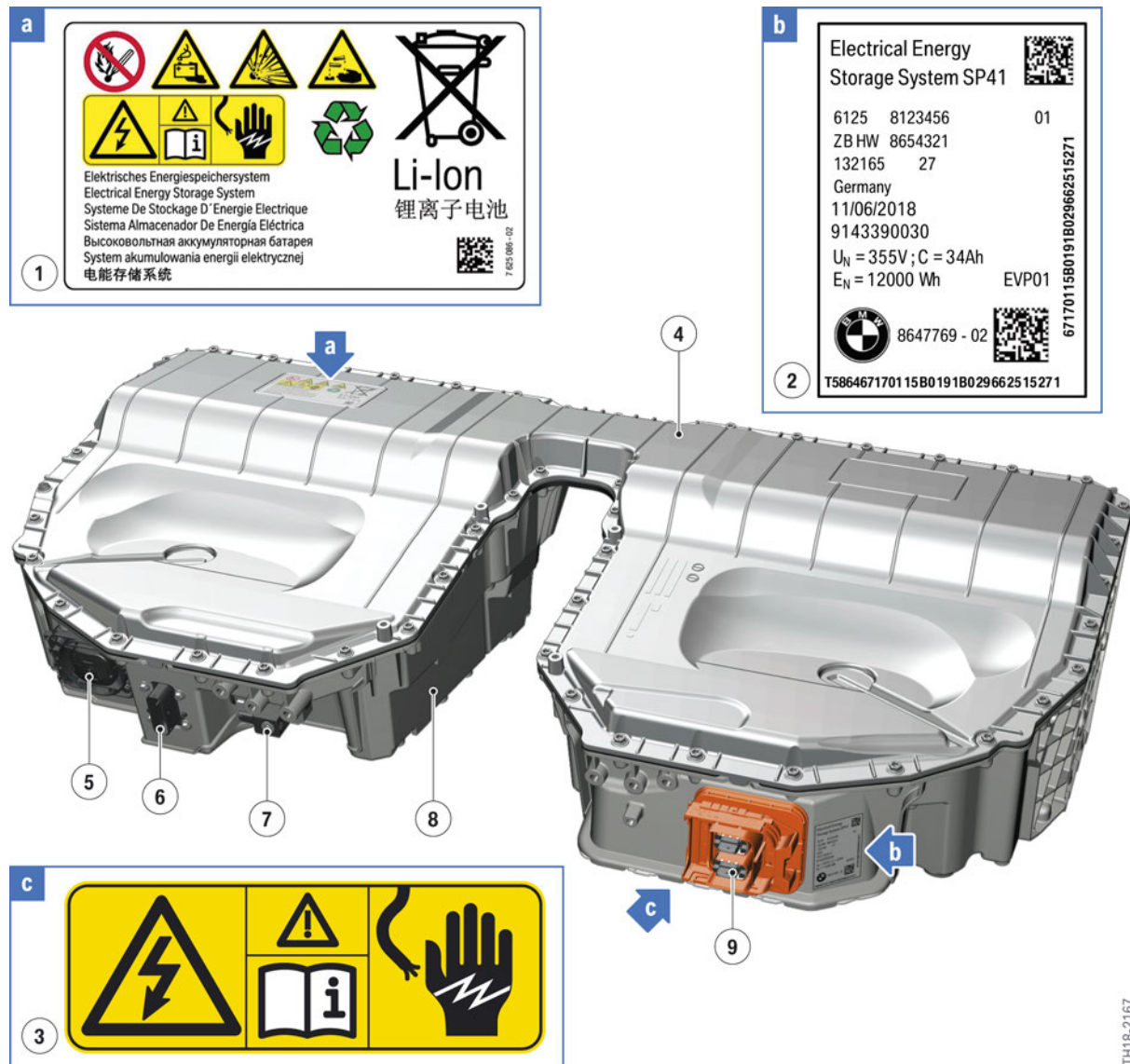
Only Service employees who satisfy all the prerequisites are permitted to work on the designated high-voltage components: suitable qualifications, compliance with the safety rules, procedure following the exact repair instructions.

G30 PHEV Update

3. High-voltage Battery

3.1. Overview

The SP41 high-voltage battery will be installed in the G30 Plug-in Hybrid Electric Vehicle from July 2019. The lithium-ion battery has the same basic design as the SP06 high-voltage battery. The most significant change from the predecessor model is that the cell capacity has been increased from 26 Ah to **34 Ah**.



G30 Plug-in Hybrid Electric Vehicle signs and connections of the high-voltage battery

Index	Explanation
1	Warning sticker for high-voltage battery
2	Type plate with technical data
3	High-voltage component warning sticker
4	Upper housing section of the high-voltage battery

TH18-2167

G30 PHEV Update

3. High-voltage Battery

Index	Explanation
5	Venting unit
6	Connection for signal connector
7	Connection for refrigerant lines
8	Lower housing section of the high-voltage battery
9	High-voltage connection

Neither the connections nor the mounting of the high-voltage battery have been changed. The procedure for installation must continue to be complied with (four-eyes principle, documentation etc.).

The type plate is now visible with the high-voltage battery installed. Previously, it was located on the upper housing section.

The following table shows the technical data of the previous high-voltage battery and the new one:

Technical data	G30 PHEV (SP06)	G30 PHEV (SP41)
Voltage	351.4 V (nominal voltage) Min. 269 V – Max. 398 V (voltage range)	355 V (nominal voltage) Min. 269 V – Max. 403 V (voltage range)
Battery cells	Lithium-ion	Lithium-ion
Number of battery cells	96 in series	96 in series
Number of cell modules	6	6
Cell voltage	3.66 V	3.70 V
Capacitance	26 Ah	34 Ah
Storable amount of energy	9.2 kWh	12 kWh
Usable energy	7.4 kWh	10.4 kWh
Max. power (discharge)	83 kW (short-term)	83 kW (short-term)
Maximum power (AC charging)	3.7 kW	3.7 kW
Weight	248 lbs (without retaining brackets)	261 lbs (without retaining brackets)
Dimensions	541 mm x 1134 mm x 271 mm	541 mm x 1134 mm x 271 mm
Cooling system	Refrigerant R1234yf	Refrigerant R1234yf

For more information on the high-voltage battery, refer to the product information **SP41** high-voltage battery.

The high-voltage battery is a high-voltage component.

G30 PHEV Update

3. High-voltage Battery



High-voltage component warning sticker



Only Service employees who satisfy all the prerequisites are permitted to work on the designated high-voltage components: suitable qualifications, compliance with the safety rules, procedure following the exact repair instructions.

3.2. Charging

3.2.1. Standard charging cable

The G30 PHEV is equipped with the standard charging cable of the 2nd generation for the primary AC charging. The standard charging cable is delivered with a bag and is stored in the luggage compartment.

G30 PHEV Update

3. High-voltage Battery



Standard charging cable generation 2

Index	Explanation
1	Main plug
2	In-Cable-Control-Box (ICCB)
3	Charging plug

The maximum charge current level at household sockets is market-specific. Depending on the variant, the high-voltage vehicle can be charged with 6 to 15 A.

The standard charging cable of the 2nd generation has the following features:

- Power: 2.3 kW (10 A / 230 V)
(until now 2.7 kW)
- Protection against contact and water ingress (IP degree of protection): IP 67
(until now IP 54)
- Temperature sensor system:
1 temperature sensor in the ICCB
2 temperature sensors in the mains plug.

To protect the standard charging cable, the temperature in the ICCB and in the main plug is monitored. If the temperature exceeds a defined value, the power consumption via the ICCB is reduced or temporarily switched off completely.

4. Low-voltage Vehicle Electrical System

G30 PHEV, bus overview

G30 PHEV Update

4. Low-voltage Vehicle Electrical System

Index	Explanation
ACC	Active cruise control
ACSM	Advanced Crash Safety Module
BCU	Battery Charge Unit
BDC	Body Domain Controller
Booster	Booster
CON	Controller
CSC primary	Primary cell supervision circuit
CSC secondary	Secondary cell supervision circuit
DME	Digital Motor Electronics
DSC	Dynamic Stability Control
EGS	Electronic transmission control
EH	Electrical heating
EKK	Electric A/C compressor (EKK)
EME	Electrical machine electronics
EPS	Electronic Power Steering
FBD	Remote control receiver
FLEL	Frontal Light Electronics Left
FLER	Frontal Light Electronics Right
FZD	Roof function center
GWS	Gear selector switch
HU-H	Head Unit High 3
HKFM	Tailgate function module
HRSNL	Rear radar sensor short range left
HRSNR	Rear radar sensor short range right
IBS 2	Intelligent battery sensor 2
IHKA	Integrated automatic heating / air conditioning
KAFAS	Camera-based driver assistance systems
KLE	Convenience charging electronics
KOMBI	Instrument panel
NVE	Night Vision Electronics
PMA	Parking Maneuver Assistant
RAM	Receiver Audio Module
RFK	Rear view camera
RSE	Rear Seat Entertainment system
SAS	Optional equipment system

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4. Low-voltage Vehicle Electrical System

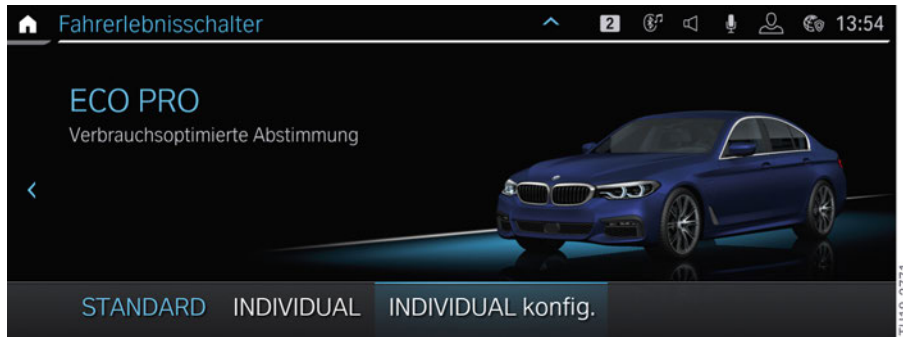
Index	Explanation
SME	Battery management electronics
SMBF	Front passenger seat module
SMFA	Driver's seat module
SPNMVR	Seat pneumatics module front right
SRSNVL	Side radar sensor short range front left
SRSNVR	Side radar sensor short range front right
TCB	Telematic Communication Box
TFE	Hybrid pressure refuelling electronic control unit
TRSVC	Top rear side view camera
VDP	Vertical Dynamic Platform
VTG	Transfer box
WCA	Wireless charging station
ZGM	Central gateway module
1	Start-up node control units for starting and synchronizing the FlexRay bus system
2	Control units authorized to perform wake-up function
3	Control units also connected at terminal 15 WUP

G30 PHEV Update

5. Displays and Operation

5.1. Displays

The G30 PHEV is equipped with the Head Unit High 3 HU-H3 and therefore features the latest display and operating concept ID7.



G30 PHEV ID7

5.2. Driving modes

No changes have been made to the driving modes. These are described in the following chapters.

G30 PHEV Update

5. Displays and Operation

5.2.1. Driving experience switch

There are no differences in the Driving Dynamics Control or number of driving modes.



G30 PHEV driving experience switch

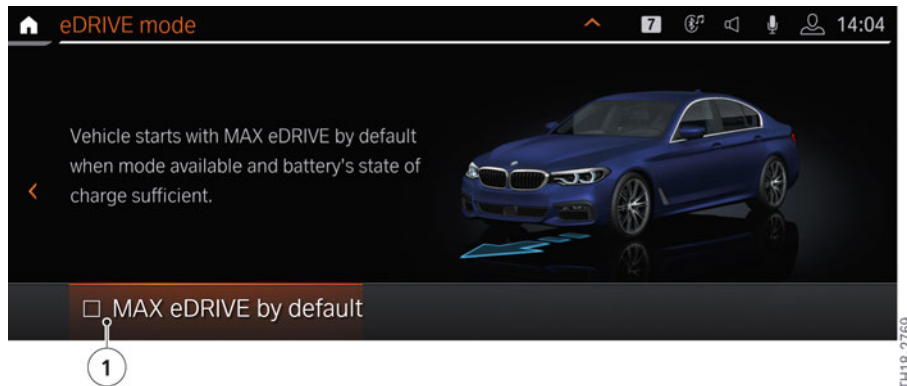
Index	Explanation
1	eDrive button
2	Driving experience switch

G30 PHEV Update

5. Displays and Operation

5.2.2. MAX eDrive

No changes have been made to the MAX eDrive function. As a new feature, the option for the MAX eDrive function to be active when the vehicle is restarted can be selected. This must be activated via the iDrive system.



G30 PHEV MAX eDrive

5.2.3. Driving style analysis

The display of the driving style analysis has been modified in the ID7. In this way, it helps to develop a particularly efficient driving style and to save fuel and/or electrical energy. The function is only available in the ECO PRO driving mode. The efficiency is visualized in the form of a triangle.



G30 PHEV driving style analysis

Index	Explanation
1	Anticipation
2	Acceleration

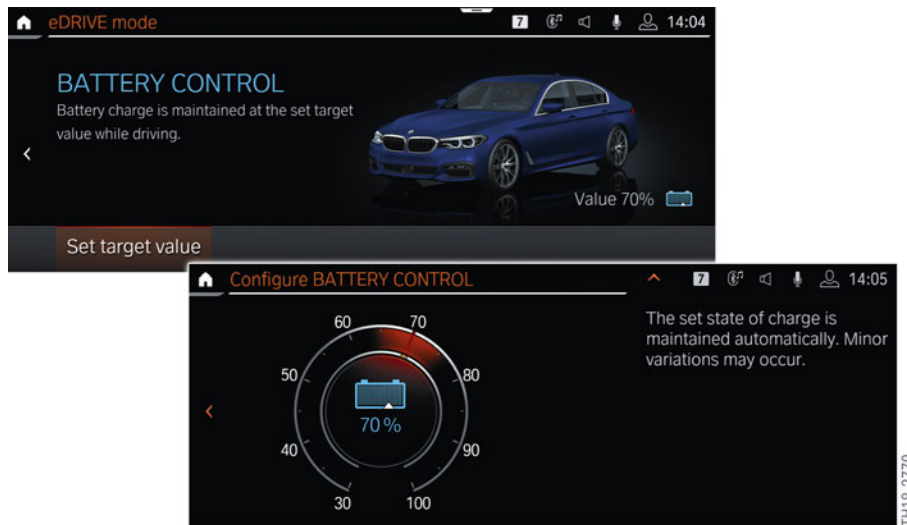
The more efficient the driving style, the more bars are displayed in color and the higher the number of points displayed. In the case of an inefficient driving style, on the other hand, a reduced number of bars and a lower number are displayed.

G30 PHEV Update

5. Displays and Operation

5.2.4. BATTERY CONTROL

The charging target value which can be adjusted when selecting the BATTERY CONTROL is now higher. A battery charge of 30 – 100% can now be set (previously 30 – 90%).



G30 PHEV BATTERY CONTROL

5.3. Instrument panel

The G30 PHEV is equipped with a new instrument cluster in combination with the Head Unit High.

The following displays are shown in the instrument cluster: (depending on the driving situation):

- "Driving readiness" display
- Display for electric driving
- eDrive range
- Display for MAX eDrive
- Display for BATTERY CONTROL
- Display for boost function
- Energy recovery.

G30 PHEV Update

5. Displays and Operation



G30 PHEV instrument cluster

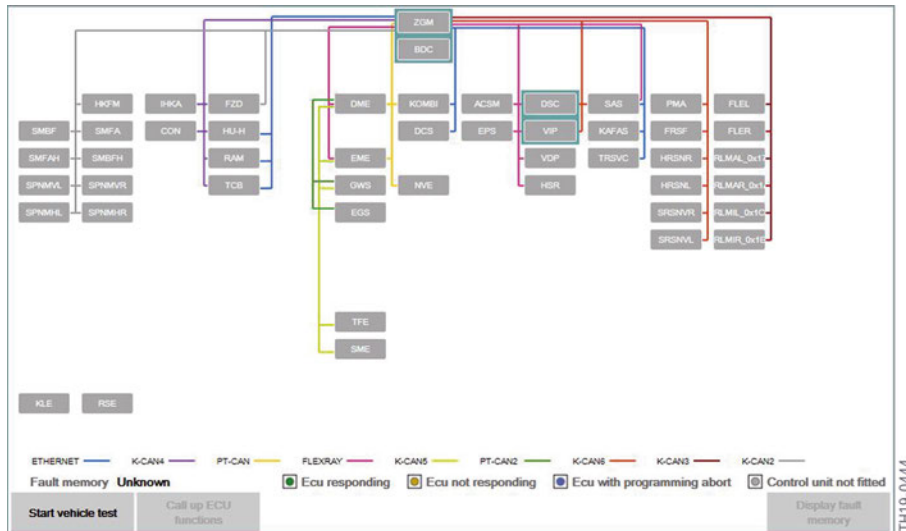
Index	Explanation
1	All-electric driving is possible within this speed range.
2	Display of the driving mode
3	eBoost; the needle is in the eBoost range during powerful acceleration.
4	All-electric driving distance travelled
5	eDrive range; all-electric driving is possible within this range.
6	READY; driving readiness established
7	CHARGE; the needle shows the energy recovery as a function of the deceleration or brake pedal actuation intensity.
8	Charge state of the high-voltage battery with new battery symbol complying with standard
9	Remaining electric range

G30 PHEV Update

6. Diagnosis

6.1. Control unit overview

The bus overviews in ISTA and this product information do not entirely correspond. Some bus systems are named differently in the diagnosis due to fixed assignments. In the bus overview of this product information, the control units of the high-voltage vehicle electrical system are shown as bus users in the PT-CAN3. The PT-CAN3 is on the other hand referred to as the K-CAN5 in the bus overview of the diagnosis.



Overview of control units, ISTA diagnosis

6.2. Procedures

Measured values can be read out in the test modules of the battery management electronics (SME) and convenience charging electronics (KLE). The prerequisite for this is that there is **no** fault in the relevant control unit.

Measurements can be read out via the individual cell modules, e.g. the voltages and temperatures, in the test module of the battery management electronics (SME).

Measured values, such as the charging output, the pulse-width modulated signal or the electrical connection can be read out in the test module of the convenience charging electronics (KLE).

The following graphic shows the measured values using the convenience charging electronics (KLE) as an example:

G30 PHEV Update

6. Diagnosis

Operations	Vehicle information	Vehicle management	Service plan	Favourites	Workshop/ Operating fluids	Measuring devices
Repair/ maintenance	Troubleshooting	Service functions	Software update	Control Unit Replacement	Vehicle modification	
Fault memory	Fault pattern	Function Structure	Component Structure	NED	Text Search	SAE fault code input

Power train / Hybrid car / Charge / Convenience charging elect
Collapse all

- Charge
 - Charge management function
 - Convenience charging electronics
 - High-voltage charging socket
- + Electrical machine electronics
 - Electrical range
- + High-voltage battery unit
- + High-voltage electrical system
- + Starter unit
- + Hybrid pressure refuelling electronic control unit
- + Interfaces
- + Longitudinal torque distribution

Type ▲	Title
ABL	Convenience charging electronics
FUB	Cooling EME and KLE
SSP	Power supply, convenience charging electronics

Hits: 3/3 Filter: Default ☐ not called ☒ performed ☐ minimized ☐ canceled ☐ suspected

Filters Repair overviews (Parts, ...)

◀ ▶ Add to test plan Display

Procedure

Status of the KLE:

- Status of the KLE:
- Charge readiness: *not ready*
- Charging power: 0 W

(setpoint value: between 0 and 3500 W during active charging procedure)

High-voltage charging socket:

- Charging plug detection (Signal name: PROXY): Charging plug not connected.
- Pulse-width modulated signal (Signal name: PILOT): No signal detected.

Alternating current connection (input of the KLE):

- Input voltage: 0.0 V
- Current: 0.0 A
- Input voltage frequency: 0 Hz

Direct current connection (KLE output):

- Output voltage: 0.0 V
- Current: 0.00 A

Additional information:

- Adjusted current level: Current level: low
- Maximum possible achievable current of the charger (charging cable or wallbox): 0.0 A
- State of charge of the high-voltage battery: 78.04 %

Procedure

Insert the charging plug into the charging socket and observe the values of the signal lines between convenience charging electronics and charger:

Charging plug detection (Signal name: PROXY): ON
The value is at ON when the plug is inserted and it was detected.

AC charging of pulse-width modulated signal (Signal name: PILOT):

- Frequency: 1005 Hz
- Level: 5.7 V
- Duty cycle: 20 %
- Calculated current value (available charge current): 12 A

Setpoint values: see documents.

Press Continue to end display.

TH19-0451

Sequence ISTA convenience charging electronics



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Händlerqualifizierung und Training
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85716 Unterschleißheim, Germany