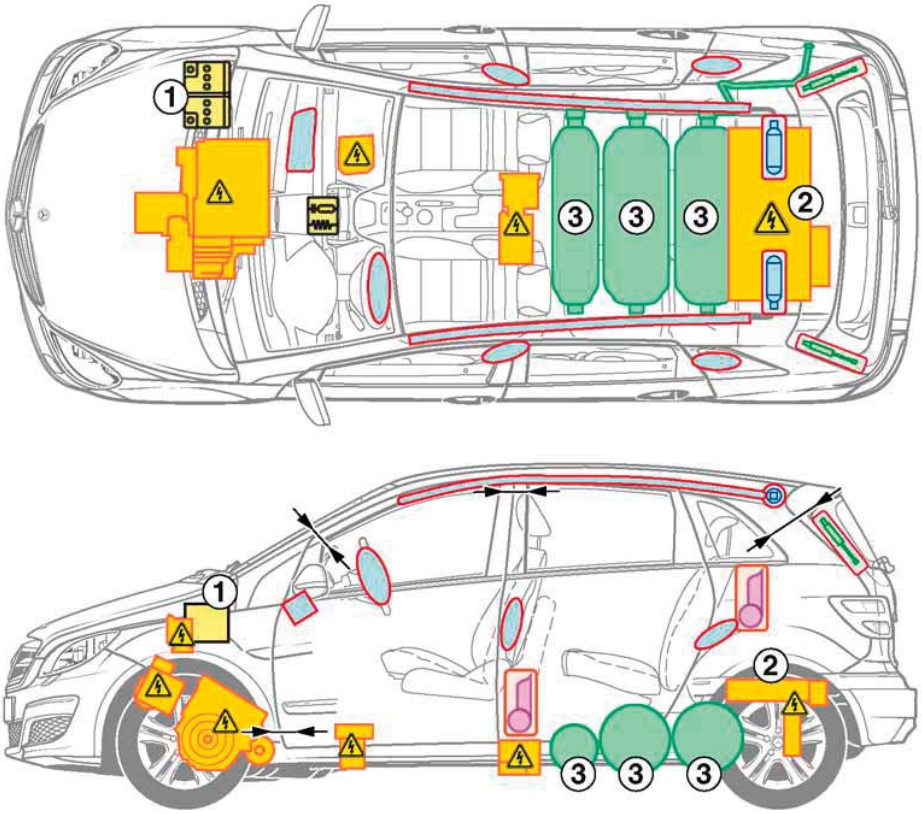
Mercedes-Benz

B-Class
F-Cell
Fuel Cell
drive system
Model 245

as of 2010



1 12 V-battery
2 High-voltage battery
3 Hydrogen cylinder

Legend

Airbag	Structural reinforcements	Battery
Gas generator	Rollover protection	High-voltage components
Seat belt tensioner	Fuel tank	Cutting points
Gas filled spring device	Control unit	

Fuel cell drive system

B-Class F-Cell (model 245) with fuel cell drive

NOTE

When working on high-voltage components observe the instructions in the **"High-voltage systems"** chapter (pages 117-119).

NOTE

Before commencing any rescue action, make sure that the high-voltage and fuel systems are deactivated.

DANGER

Risk of explosion from escaping hydrogen.

Hydrogen does not burn visibly!

If malfunctions occur in the hydrogen system, the hydrogen alarm issues warnings. This is done by means of

- acoustic warnings
- messages in the multifunction display
- lighting of the red "hydrogen alarm and tank system" warning lamp H_2 in the instrument cluster
- automatic activation of the hazard warning system when fueling

To avoid an explosion of the escaping hydrogen, the following instructions must be observed:

- **Deactivate the hydrogen circuit.**
- **Keep all ignition sources away from the vehicle.**
- **Do not move the vehicle into enclosed spaces, e.g. into a garage or a tunnel.**
- **Avoid cutting or deforming the bodywork with rescue equipment in the vicinity of lines and components carrying hydrogen!**

Features

The body, interior equipment and the location of the occupant restraint systems are the same as in the B-Class (model 245) with internal combustion engine.

Fuel cell system

The entire fuel cell system is located on the vehicle floor.

Power supply

The high-voltage battery is housed in the trunk floor. All high-voltage components are marked with an appropriate **warning label** alerting to the existence of a high voltage. High-voltage lines are **orange**.

The 12 V battery is located in the right of the engine compartment.

Fuel supply

Instead of a conventional fuel tank there are three cylindrical hydrogen tanks mounted on the vehicle floor in front of the rear axle. Hydrogen components are marked with an appropriate warning label, as are the two hydrogen lines between the fuel cell and the anode module.

High-voltage warning label

Hydrogen warning label

Safety systems

Overloading of the high-voltage system is monitored, as are undervoltages and overvoltages. If the permissible limits are not maintained, the main contactors in the high-voltage distributor module and in the high-voltage battery open.

All the high-voltage connectors are monitored with an interlock signal. The interlock signal of all connectors is connected in series. When a connector is separated, the interlock signal is interrupted and the main contactors in the high-voltage distributor module and in the high-voltage battery are opened.

The hydrogen system is monitored by one sensor in the underfloor area between the anode module and the humidifier module, and one sensor above the valve unit of the center hydrogen tank, so that any hydrogen escaping in the event of a malfunction can be detected immediately. As soon as escaping hydrogen is detected, the red "hydrogen alarm and tank system" warning lamp $\boxed{H_2}$ in the instrument cluster lights up. The sensors are activated when the vehicle is unlocked (actuation of the transmitter key).

Fuel cell drive system

Advanced crash safety

In addition to triggering the conventional systems (airbags, emergency tensioning retractors), the hydrogen supply and the high-voltage system in a fuel cell vehicle are deactivated by the pyrotechnic isolation element in the event of a crash. The pyrotechnical isolation element is triggered by the restraint systems control unit. As a result

- the main contactors in the high-voltage distributor module and in the high-voltage battery open
- the electric drive control unit activates a short circuit in the motor winding and then performs a rapid discharge of all capacitors on the central high-voltage circuit. The active short circuit is intended to prevent the drive system from generating a voltage (if the vehicle rolls on after the impact).
- the hydrogen tank control unit closes the tank system shutoff valves 1-3. The fuel cell measurement control unit closes the fuel cell system shutoff valve. These measures prevent the further escape of hydrogen from the tank system.

Switching off the drive system

- Move the selector lever to position **P**
- Turn the key in the ignition lock to position **0** and remove

The drive system is switched off and actively discharged.

Disconnecting the 12 V battery

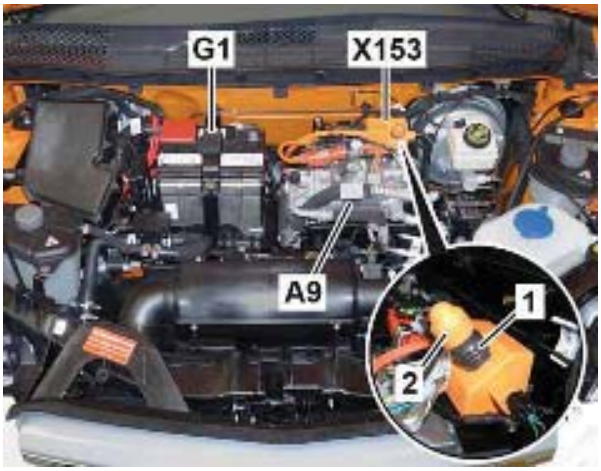
The 12 V battery is located on the firewall on the right in the engine compartment.

Deactivating the high-voltage system

The service interruption separation point is located on the top of the refrigerant compressor in the left side of the engine compartment. If the service interruption separation point is opened, the interlock signal is interrupted. As a result the main contactors in the high-voltage distributor module and in the high-voltage battery are opened and the tank system shutoff valves 1-3 are closed.

Unplugging the service interruption separation point connector:

- Pull the retaining ring (1) upwards
- Unplug the service interruption separation point connector (2)



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1 Retaining ring
2 Service interruption separation point connector
G1 12 V battery
A9 Refrigerant compressor
X153 Service interruption separation point

Vent line

The vent line leads from the three tank system shutoff valves to the rear. The outlet at the rear is in the center of the mounting frame of the hydrogen tanks and is sealed with a protective cap.

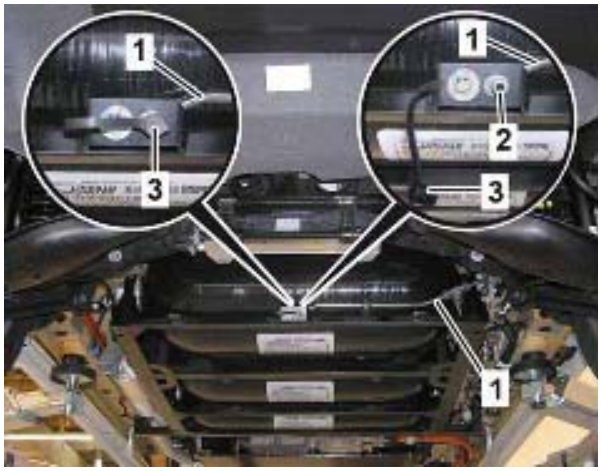
Overpressure safeguard

In the event of a malfunction of the hydrogen pressure regulator in the fuel system, the pressure relief valve opens and enables the controlled release of the hydrogen via the vent line into the atmosphere. The pressure relief valve opens at pressures above approx. 16 bar. The protective cap on the outlet of the vent line is blown off by the pressure of the escaping hydrogen.

Overtemperature safeguard

An overtemperature safeguard is integrated in the tank system shutoff valve on each of the hydrogen tanks.

The overtemperature safeguard prevents the hydrogen tanks from bursting under the effects of heat. At temperatures > 110 °C the overtemperature safeguard opens and allows a controlled escape of the hydrogen via the vent line.



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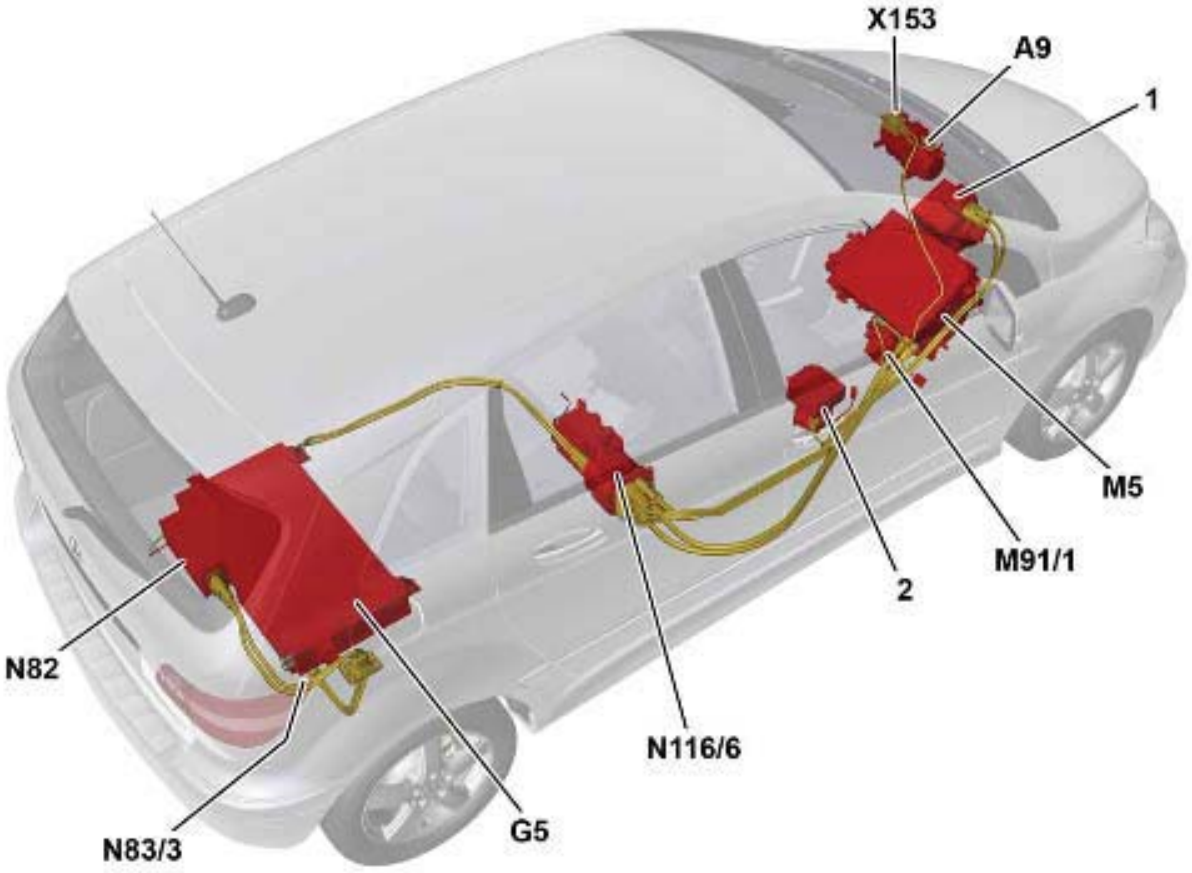
1 Vent line
2 Outlet
3 Protective cap

NOTE

A blown protective cap on the outlet can be an indication that hydrogen has been or is being vented into the atmosphere via the vent line!

Fuel cell drive system

Overview of high-voltage system



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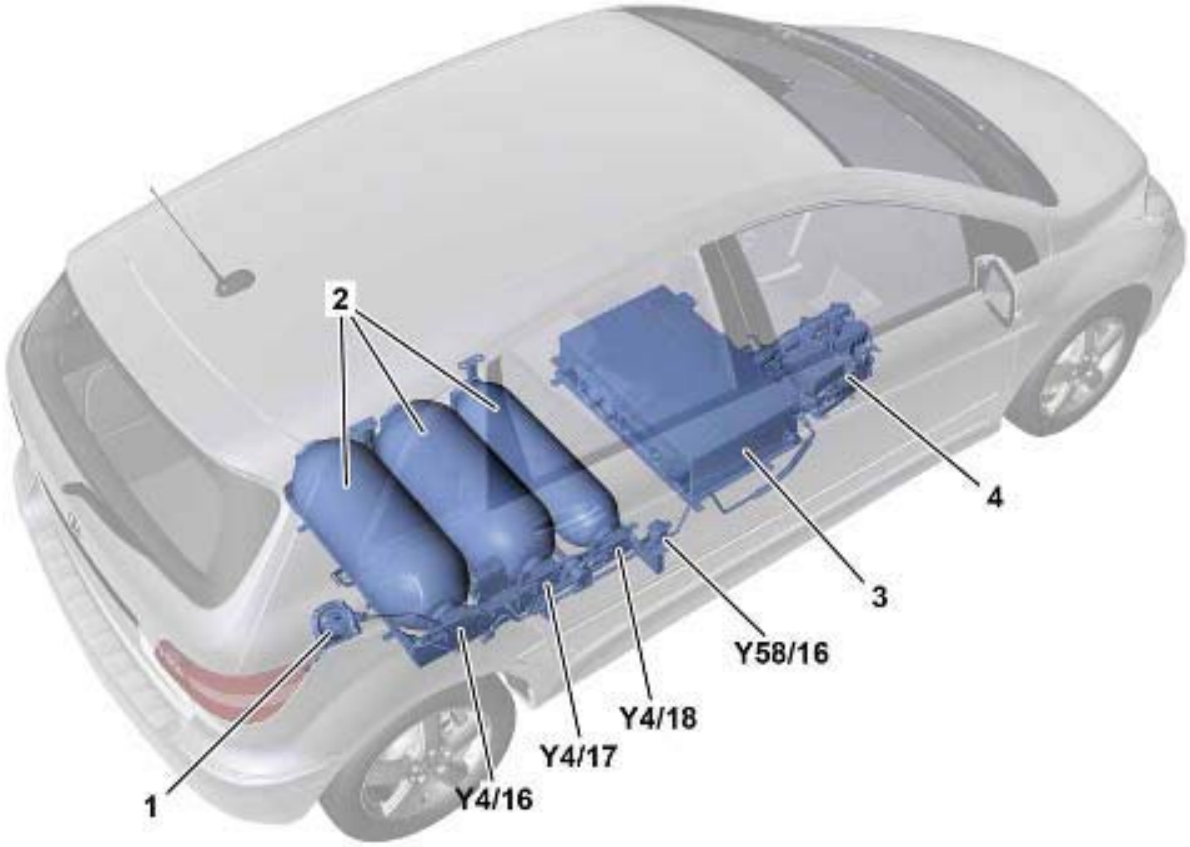
1 Air module high-voltage compressor
2 Hydrogen recirculation blower

A9	*Refrigerant compressor*
G5	*High-voltage battery*
M5	*Electric motor*
M91/1	*High-temperature coolant pump*
N82	*Battery management system control unit*
N83/3	*DC/DC converter control unit*
N116/6	*High-voltage distributor module*
X153	*Service interruption separation point*

Overview of fuel system



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1	*Filler neck*
2	*Hydrogen tank*
3	*Fuel cell*
4	*Anode module*
Y4/16	*Tank system shutoff valve 1*
Y4/17	*Tank system shutoff valve 2*
Y4/18	*Tank system shutoff valve 3*
Y58/16	*Fuel cell system shutoff valve*