

# Tips and Technology

For Bosch business partners

Current topics for successful workshops No. 68/2013

## Braking Technology



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## Electrohydraulic Brake (EHB)

### Safety Instructions

There is a risk of injury in the form of body parts becoming trapped or crushed. When working on the brake system, injury to skin or eyes may occur as a result of brake fluid exiting at high pressure. When working on the brake system, preventive action must be taken to ensure that pressure is not built up by the system. Brake pressure build-up could for instance be caused by:

- Opening of doors
- Activation of central locking system
- Actuation of brake pedal

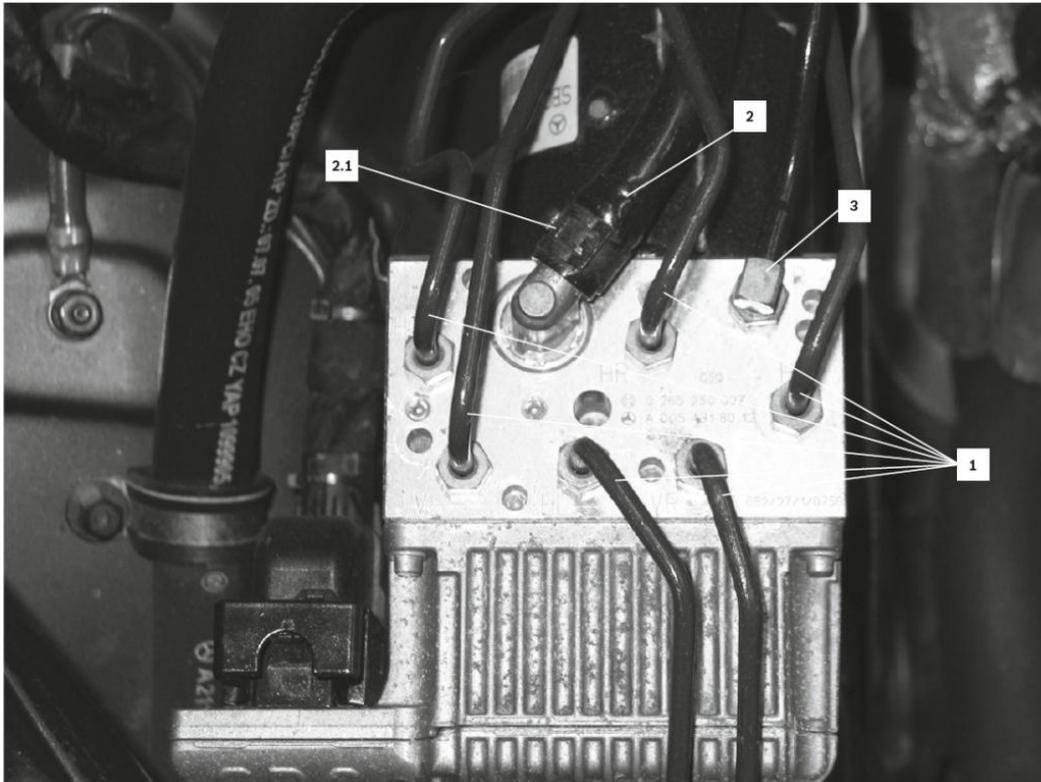
Therefore, it is absolutely vital to deactivate the brake system before starting any work using, for example, one of the following tools:

- Bosch KTS
- MB STAR DIAGNOSIS
- Comparable diagnostic equipment

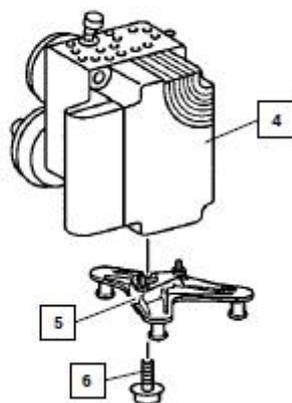
In deactivated state the brake is inoperable. The corresponding warning is shown on the display. The vehicle must be secured using suitable means to prevent it from rolling away. Brake fluid may cause severe poisoning if swallowed. Skin or eye irritation may occur in the case of direct contact with brake fluid. Always use suitable containers for storing or transporting brake fluid. Wear appropriate protective clothing and glasses when working with brake fluid. Follow the common rules for protecting electronic systems against damage caused by electrostatic discharge (ESD). Do not disconnect or connect the electrical connector until the brake system has been deactivated! This can lead to damage or initial damage to the system and loss of functionality of the system immediately or at a later date.

### System description and explanation

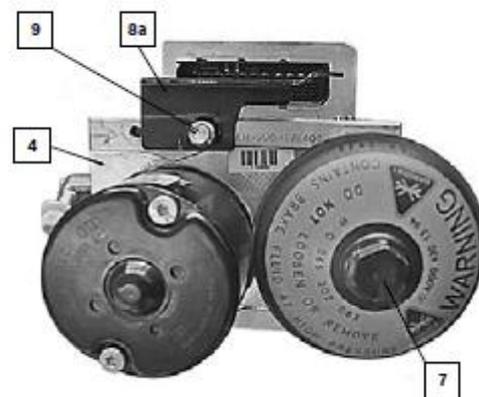
The following pictures show the system and relevant parts. Numbers are used for reference in the following instructions.



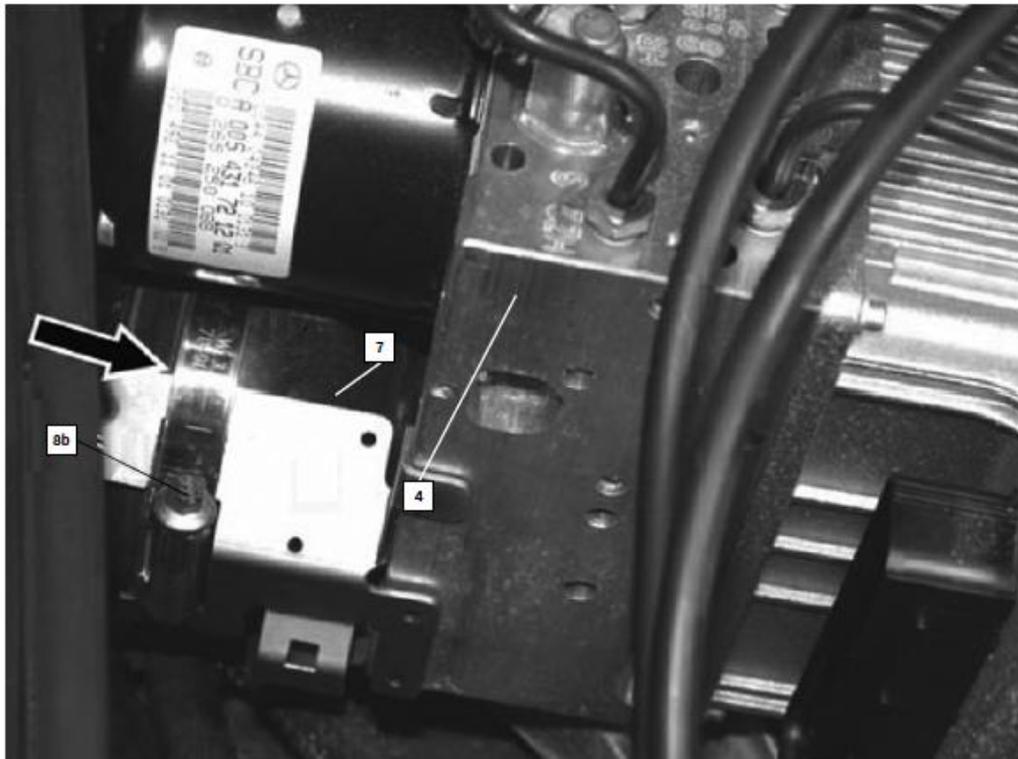
- 1 Hydraulic line(s)
- 2 Intake hose
- 2.1 Hose lamp
- 3 Return pipe



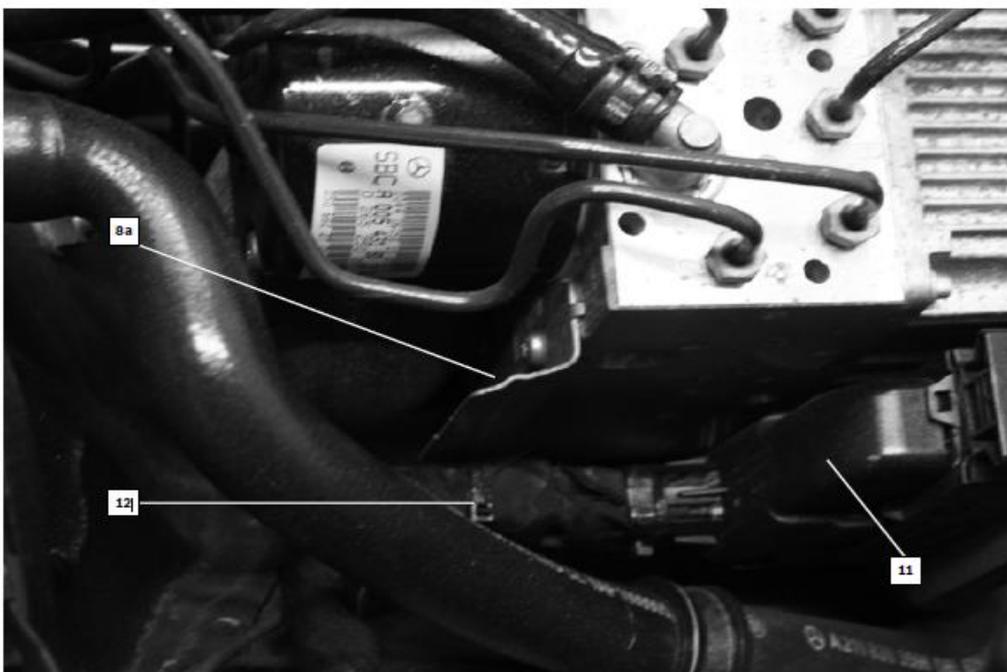
- 4 Hydraulic unit EHB BX
- 5 Fastening plate
- 6 Screw



- 7 Pressure reservoir
- 8a Support
- 9 Screw



4 Hydraulic unit EHB BX  
 7 Pressure reservoir  
 8b Support



8a Support  
 11 Electrical connector  
 12 Cable strap

## Exchange Procedure

### 1. Deactivate brake system

Deactivate the brake system using one of the proposed service devices or an equivalent and following the relevant instructions.

### 2. Turn off ignition

Turn off ignition, remove ignition key (transmitter key). Vehicles with Code (889) Keyless Go: Press start/stop button for Keyless Go repeatedly until ignition is switched off. Remove the Keyless Go transmitter card or transmitter key from the car and store it out of its operating distance away from the car (min. 2 m).

Clean the hydraulic unit and connecting lines (electrical and hydraulic) to prevent ingress of contamination in hydraulic or electrical connections during the following procedures.

### 3. Preparations

- Clean the hydraulic unit and connecting lines (electrical and hydraulic) to prevent ingress of contamination in hydraulic or electrical connections during the following procedures.

#### Note:

*Even the smallest particles of dirt can cause severe malfunction of the hydraulic system.*

- Remove intake air duct (right-hand side in the direction of travel).
- Remove air filter housing.

### 4. Dismounting

- Unscrew screw (9), take off support (8a) together with electrical cable harness.

Or:

- Remove support (8b) together with electrical cable harness from pressure reservoir (7).

#### Note:

*If installation of a new support (8a, 8b) is not intended, it is recommended not to cut the cable strap (12) on the electrical cable harness so as to avoid the risk of damage.*

- Unlock connector for the electrical cable harness (11) at the hydraulic unit (4) and take it off.
- Deposit connector and cable harness in a well protected place.
- Mark hydraulic lines (1).
- Disconnect hydraulic lines from hydraulic unit and immediately seal them with a suitable plug to prevent ingress of air. Do not twist or bend the hydraulic lines!
- Disconnect intake hose (2) from hydraulic unit and immediately seal it with a suitable plug. Do not use any sharp or pointy tools!
- Disconnect return pipe (3) from hydraulic unit (4) and immediately seal it with a suitable plug.

- Check return pipe for damage (kinks, tears, etc.), replace if required. In case of installation of a new pipe, the new pipe must be filled with brake fluid.
- Remove hydraulic unit together with fastening plate (5).
- Unscrew screw (6) and disconnect fastening plate (5) from hydraulic unit.

## 5. Installation

- Attach holding plate (5) to new EHB BX hydraulic unit (4) using a new screw (6).
- Insert EHB BX hydraulic unit (4) with holding plate (5) into vehicle fixture.
- Remove plug from return pipe connection and connect return pipe (3) to hydraulic unit (4) with appropriate torque. Take care that the pipe (3) is not resting against any other part of the vehicle and is not under stress. This might cause an increase in operating noise of the system.
- Remove intake connection plug and connect intake hose (2) to connection using new clamp (2.1). Take care that loss of brake fluid is minimized. The intake hose must not be under stress and must not rest against the hydraulic lines or return pipe.
- For each hydraulic line, remove plug from hydraulic unit (4) and hydraulic line (1) and connect hydraulic line, taking care that loss of brake fluid is minimized.

### Note:

*Check markings to ensure correct allocation of hydraulic lines (1). When routing hydraulic lines, Make sure that they do not rest against any other components and are not under stress or twisted. Always tighten hydraulic lines using the correct torque and make sure lines do not twist.*

- Seal hydraulic connections from the old hydraulic unit with plugs from the new EHB BX hydraulic unit.
- Mount support (8a, 8b) to new EHB BX hydraulic unit (4).
- Replace screw (9).
- If electrical cable harness has been detached from support, use a cable strap (12) to affix it to support (8a, 8b).
- Take care that cable harness is firmly attached to support without tension in any direction. Check that longitudinal movement of the cable harness in relation to the support (8a, 8b) is no longer possible.
- Insert electrical connector (11) of cable harness into mating connector of hydraulic unit (4) and lock.
- Install air filter housing.
- Install intake air duct.
- Check brake fluid level in brake fluid reservoir, correct if necessary.
- Rinse out remaining brake fluid with water.
- Dry connecting points of hydraulic connections.
- Connect an auxiliary power supply to stabilize the electrical system of the vehicle and thus ensure undisrupted follow-on testing.

## 6. Bleeding

- Check brake fluid level in brake fluid reservoir, correct if necessary.
- Re-activate brake system using diagnostic tool.
- Perform bleeding procedure using an appropriate bleeding device for electro hydraulic brake systems. Sequence: rear right, rear left, front left, front right.

Note:

*When bleeding the front brakes, the brake pedal has to be actuated an additional 5 to 10 times each side.*

## 7. Testing

- Connect filling device and apply maximum pressure (2.5 to 3.0 bar) for 10 minutes.
- After this, check connection areas of intake hose, return pipe and hydraulic lines for leaks. Leakage of even a very small amount of brake fluid is not permissible. Retighten connections if necessary.
- Pay special attention to the intake hose connections (checks with absorptive paper). A visual inspection alone is not sufficient.
- Check brake fluid level in brake fluid reservoir again, correct if necessary.
- Disconnect auxiliary power supply.
- Perform brake testing on roller dynamometer.

## 8. Torques

- Hydraulic line (1) to hydraulic unit: 16 Nm
- Return pipe (3) to hydraulic unit: 16 Nm
- Screw (6) for hydraulic unit to holding plate (5): 20 Nm
- Screw (9) for support (8a) for electrical lines to hydraulic unit: 7 Nm
- Hose clamp for support (8b) for electrical lines to pressure reservoir: 5 Nm