

DSCIII MK60

As of 9/2000, the E46 (standard drive) and Z3 is fitted with the Continental Teves DSCIII MK60. This replaces the DSCIII MK20EI. On the Mini (R50), the DSCIII MK60 will be fitted as of 12/2001.

The most important new features are:

- Distinct reduction in size of control module/hydraulic unit
- Always installed in the vicinity of the master brake cylinder
- Presupply pump dispensed with
- ADB and DBC function (not available on the Mini)
- Wheel speed sensors (active)

System configuration

The DSCIII MK60 consists of the following components:

- Control module/hydraulic unit (new)
- Master brake cylinder (new, without perforated insert)
- Expansion tank with reed contact (new)
- 2 pressure sensors at the master brake cylinder
- 4 wheel speed sensors (new)
- Steering angle sensor
- Yaw rate sensor E46: as of 09/2001 replaced by DSC sensor Z3: The yaw rate sensor is still fitted.
- Lateral-acceleration sensor E46: as of 09/2001 replaced by DSC sensor Z3: The yaw rate sensor is still fitted.
- DSC sensor (as of 09/2001 on E46 models and as of 12/2001 on the Mini)
- Brake light switch
- DSC button (new function)
- Parking brake switch

The hydraulic diagram of the DSCIII MK60 is configured as follows:

Component description

Control module/hydraulic unit

By optimizing the components it has been possible to considerably reduce the size of the control module/hydraulic unit. The design of the hydraulic unit corresponds to that of the DSCIII MK20EI hydraulic unit. It is secured on the mounting bracket by three screws (1).

The close proximity of the control module/hydraulic unit to the master brake cylinder and intake optimization of the return flow pump and hydraulic lines ensure more rapid pressure buildup, thus rendering the presupply pump unnecessary.

As the master brake cylinder and hydraulic unit are installed very close to each other, they are interconnected by means of two flexible lines for vibration isolation purposes.

The control module features the familiar DBC functions.

To date, the battery was installed on the right in the luggage compartment on LHD vehicles with 4-cylinder engine and DSCIII. Since the control module/hydraulic unit is fitted on the left, the battery is now installed on the front right in the engine compartment.

Master brake cylinder, expansion tank and brake booster

As the presupply pump has been dispensed with, it has been necessary to modify the master brake cylinder and the expansion tank.

A perforated insert is no longer fitted in the master brake cylinder, as it is no longer necessary to build up prepressure.

The connection for the presupply pump has been dispensed with both on the master brake cylinder as well as on the expansion tank.

The brake booster is the same as that already known from the E46.

Wheel speed sensor

With the introduction of the DSCIII MK60, active wheel speed sensors that operate with the magnetoresistive effect are used for the first time on BMW vehicles.

Sensor design:

The sensor element and evaluation circuitry are accommodated separately in the sensor housing. This arrangement ensures advantages with regard to temperature characteristics of the sensor.

Functional principle:

The active wheel speed sensors make use of the magnetoresistive effect. A magnet in the sensor produces a magnetic field with the lines of magnetic flux running at right angles to the sensor layer. Deflection of the lines of magnetic flux by the pulse wheel causes changes in resistance in the thin ferromagnetic layer of the sensor element.

The sensor element converts the changes in resistance into voltages. From the relatively small voltages from 1...100 mV, the evaluation circuitry generates current pulses with a distinctly differing low and high level (7 mA and 14 mA). The supply voltage of the sensor is 12 V. Signals in the range from 0 - 2500 Hz can be recognized. Different types of sensors are used depending on the type of vehicle and installation location. The coded connectors are blue instead of gray as for the DSCIII MK20EI.

Speed sensor variants:

	E46	Z3
Front axle	Different sensors on left and right	Different sensors on left and right
Rear axle	Two versions are used: Short sensor: M43TU to M54/B25, M47 Long sensor: M54/B30, M57	Same sensors on left and right

DSCIII MK60 uses the pulse wheels already known from the E46.

Yaw rate sensor

DSCIII MK60 uses the yaw rate sensor familiar from the MK20EI. It is fitted under the left hand seat.

Lateral-acceleration sensor

DSCIII MK60 uses the lateral-acceleration sensor already known from the MK20EI. It is fitted at the bottom of the left-hand A-pillar.

DSC sensor

The DSC sensor combines the functions of the yaw rate and lateral-acceleration sensors. The DSC sensor is fitted in the same position as the yaw rate sensor on previous models, i.e. under the left-hand seat. The DSC sensor is fitted as of 09/2001 in the E46 and in the Mini. The DSC sensor is not being used on Z3 models, which will continue to be fitted with separate yaw rate and lateral-acceleration sensors.

Steering angle sensor

DSCIII MK60 uses the steering angle sensor already known from the MK20EI.

Functional description DSCIII MK60

Description of the traction control systems with subfunctions

ABS system

CBC: Cornering brake control

EBV: Electronic charge-air pressure distribution

ASC system

ADB: Automatic Differential Brake (not available on the Mini)

The ADB is an automatic differential lock that improves traction. The wheel that tends to slip is braked by active brake

pressure buildup in the hydraulic unit. The drive torque is transferred to the other wheel which, due to the higher coefficient of friction, can transmit the drive power.

In addition, the engine torque can be reduced by means of the ASC function. In this way, optimum power transmission of the drive wheels is ensured under all circumstances.

Up to approx. 70 km/h, ADB permits more slip than the standard ASC thus making available more traction.

DSC system

GMR: Yawing moment control with brake and engine intervention

DBC: Dynamic Brake Control (not available on the Mini)

DBC is a full braking aid. It assists the driver in emergency braking situations by automatically increasing the braking pressure. In this way it ensures the shortest braking distance that the relevant situation allows for. DBC features the subsystems DBS and MBS that are already known from the Bosch system (E38, E39, X5).

- **DBS Dynamic brake support**

When the brake is applied rapidly (emergency braking) with the brake pressure below the ABS control threshold, the front and rear axle brakes are brought into the ABS control range.

- **MBS Maximum brake support**

When the brake is applied more slowly and ABS control is active on the front axle, the rear axle is automatically brought into the ABS control range by increasing the brake pressure. MBS is mainly effective when the vehicle is fully loaded.

Functions of DSC button (E46, Z3)

The DSC button features two functions that can be set by pressing the button for different length of time:

Button pressed briefly (< 2.5 s):

Only the yawing moment control of the DSC is deactivated. The ADB and DBC functions remain active.

A higher slip rate is permitted up to 70 km/h for the purpose of improving traction. ASC uses different slip thresholds. The DSC light is on.

Button pressed for longer (>2.5 s):

All ASC (ADB) and DSC (GMR and DBC) control functions are deactivated.

DSC light and general brake warning light (yellow) ON This mode is mainly intended for roller dynamometers and service purposes.

By pressing the button again, the system reverts from the respective function to normal DSC function. It is not possible to "switch" directly from one function to the other.

Functions of DSC switch (Mini)

The DSC switch switches DSC on/off. After the DSC has been switched off, only the ABS function is active and the DSC lamp is on.

Diagnosis and service information

Steering angle sensor

With the standard drive in the E46, ABS, ASC and EBV continue to function despite the steering angle sensor failing. The following steps must be carried out after replacing the steering angle sensor:

1. Coding (standard or all-wheel drive E46/16)
2. Offset (calibration designed to inform the steering angle sensor of the straight ahead position)

Control module replacement

Refer to the Workshop Manual when replacing the control module.