

Influence of Tyres on Wheel-Speed Measurement

Fitting different tyres to ABS and ASC vehicles

When fitting a different size of tyre, always make sure that the new tyres have the same rolling circumference ($\pm 1.5\%$) as the tyres fitted as standard:

e.g.

standard: 205/60 R15: U = 1910 mm

or: 225/55 R15: U = 1920 mm

or: 225/60 R16: U = 1930 mm

Especially when fitting wheels with different dimensions on the front and rear axles, deviating rolling circumferences may lead to the ASC and ABS systems cutting in, because the wheels roll at different speeds (the ABS pulse gear only counts revolutions and derives the speed from this).

ABS:

Up to a specified differential speed, the most major effect is a slight reduction in braking performance. This applies only if the system is performing its control function. Depending on the road speed and on the duration of the journey with differing wheel speeds, greatly differing rolling circumferences of the tyres can lead to a fault input in the control unit and consequently to the system cutting out.

ASC:

ASC systems continue functioning even if the rolling circumferences of the tyres differ. However, depending upon the axle on which the wheels with the wrong diameter are fitted, there is a possibility of a loss of performance by the ASC (responding too early) or of instability (responding too late).

Modern ASC systems have a tyre tolerance compensation function integrated into them that can compensate for differences in the rolling circumference of 3 to 4 %. This compensation is performed automatically over a short distance. The problems mentioned above only arise if the differences in rolling circumference are greater. ASC systems do not react to different tyre rolling circumferences by cutting out.

Whenever the effects described above arise, always fit standard wheels to the vehicle and take it for a test run in order to exclude the possibility of the tyres influencing measurement of the wheel speeds.

Wheel calibration on vehicles fitted with navigation system

The navigation computer uses wheel calibration to calculate the exact circumference of the tyres and it then stores this value.

This calibration is absolutely essential whenever the tyres/wheels have been changed. Otherwise, the navigation system will produce unnecessary and undesirable errors of calculation.

Always make sure that the tyre inflation pressure is maintained precisely!

Procedure for calibration:

- Mark the starting point of a route on the road
- Confirm by pressing Start on the on-board monitor
- Drive a distance of between 4 and 6 m; the speed must not exceed 10 km/h (6 mph)
- Confirm the end of the trip at the on-board monitor
- Then measure the distance driven (tolerance < 1 cm). Enter the distance measured into the on-board monitor.
- Immediately after doing this, the vehicle must be driven over a distance of at least 100 m straight ahead. A message is displayed if the distance driven was too short or the steering wheel was turned too much.

Wheel calibration is only necessary when a sudden change is made to the tyre circumference, e.g. when the wheels are changed; a gradual change such as through normal wear does not necessitate wheel calibration.

The following documents dealing with this subject have been published:

BMW Service: On-Board Monitor System E38
65 02 94 (1238)

BMW Service Information bulletin: Navigation system 65 03 95 (902)