

FAG Gearbox, Axle Box and Traction Motor Bearings in Class 185 Locomotives



Examples of Application Engineering

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Class 185 multisystem locomotive, developed by Bombardier Transportation, Kassel

In the late nineties, Bombardier Kassel developed the Class 185 locomotives, a multisystem version for fast, crossborder freight services. They are a further development of Class 145.

The Class 185 locomotives can also operate in Austria, Switzerland, France, Luxemburg and Denmark. A number of trial runs were conducted in Norway and Sweden. In 1998, DB Railion (formerly DB

Cargo) placed an order for 400 Class 185 locomotives. Since 2001, a total of 50 locomotives have been delivered each year. But DB is not the only customer of Bombardier Transportation. Numerous private railway companies and foreign state railway companies, like CFL Luxemburg or SBB Switzerland, run some Class 185 versions too. In addition to the locomotives designed to operate on

15 kV / 16 2/3 Hz and 25 kV / 50 Hz AC networks, Bombardier is now also planning to build a direct current version that will be compatible with all of the four European power systems.

Since 1995, FAG has been the exclusive supplier of gearbox and traction motor bearings. Since 2004, FAG has also been supplying the axle box bearings and axle box housings for Class 185.

Technical data of Class 185

Max. speed	140 km/h
Wheel arrangement	Bo'Bo'
Mass in service	85 t
Rail gauge	1 435 mm
Wheel diameter	1 250 mm
Distance between bogie centres	10 400 mm
Distance between wheel pairs	2 600 mm
Maximum tractive effort	300 kN
Maximum power	4 200 kW

Drive system

Each of the four wheelsets has a suspension bearing drive with a three-phase asynchronous traction motor. The drive system is supported both by the traction motor suspension in the bogie frame and directly on the wheelset axle in so-called suspension bearings. Unlike other vehicles with a sprung hollow shaft drive system, suspension bearing drives are used only for speeds of up to ca. 140 km/h. However, as Class 185 locomotives are mainly used in freight traffic, with speeds from 90 - 120 km/h, this drive system is more than sufficient, and it is significantly more cost-effective.

Traction motor bearings

The traction motors are equipped at the fan end with a current insulated single-row cylindrical roller bearing **FAG NJ220E.TVP2.C4.F1.J20AA**. At the drive end, the traction motor is supported in the gearbox bearings on the input shaft via a membrane coupling.

Gearbox bearings

On the input shaft, the gearboxes are equipped with two single-row cylindrical roller bearings with an outer ring riding machined brass cage **NU2220E.MPA.C4** and a four-point bearing with a machined brass cage **QJ218N2MPA.C4.F59**. On the output shaft, a single-row cylindrical roller bearing with a crosspiece-riveted outer ring riding machined brass cage **NU1968E.M1A.C3** and a single-row deep groove ball bearing **6044.578958** are used.



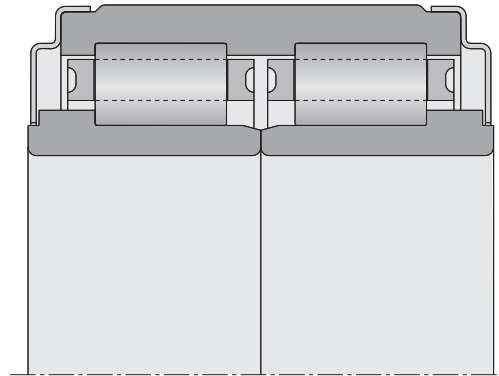
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Bogie

Two monobloc wheelsets each are used in both bogies of box frame construction. They serve to support the frame and transmit the pulling and braking forces via a pull/pressure rod.

Axle box bearings

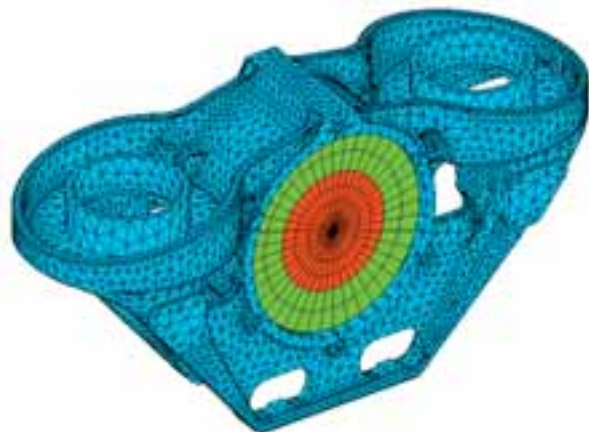
Double-row cylindrical roller bearings **FAG 801804** with a polyamide cage and seal caps are used as axle box bearings.



Axle box housings

The basic version of the housing body can be used at any bearing location. **ASZ160Z.176548.-** housings are available in various versions for different cover designs and are delivered completely painted and ready for mounting.

The quality of the spheroidal graphite cast iron housing was tested in accordance with EN 1563 and backed up by additional component tests. Moreover, the housing bodies were calculated using modern structural analysis methods (FEM) and optimised for this application.



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