Insert Hub Units for Trams in Halle, Germany

Examples of Application Engineering

WL 07 544 GB-D

MGT-K tram in Halle, from the Bombardier FLEXITY Classic family

In Halle an der Saale – with a population of more than 230,000 the largest city in the German state of Sachsen-Anhalt – the public transport provider HAVAG (Hallesche Verkehrs-AG) operates an 84.4 kilometer long tram network with 21 lines.
HAVAG wanted to add a larger number of smaller vehicles to its fleet for efficient transport service with a higher frequency.
The ideal solution are the trains of the Bombardier FLEXITY Classic family.
In late 2001, a total of 30 low floor trams of type MGT-K were ordered, all of which have by now been delivered. The trams' outstanding characteristics are particularly smooth running and a low noise level.
Every car runs on three bogies, two of which are motorized.
The trams have doors on both sides, only one driver's cab and Scharfenberg couplers at both ends. They can do service both as bi-directional trains (two coupled trains, with a total length of 41 m) and as single-directional trains (either singly or coupled with a total length of 41 m).

Schaeffler Group Industrial supplies FAG insert hub units for the loose wheels of all trams.

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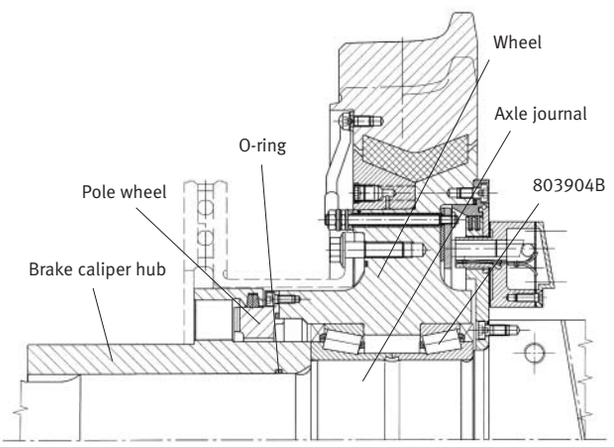
Technical data

Mass	27 t
Motor output	4 × 85 kW
Max. speed	70 km/h
Width	2,30 m
Length	20,50 m
Minimum curve radius	18 m
Max. gradient	60 ‰
Low floor portion	70 %

Low floor axle concept: design and development Bochumer Verein Verkehrstechnik



Due to the low floor section, carrying bogies cannot be fitted with through-going wheelset axles. Instead, low floor axles are used where the wheels are mounted on a stationary axle. Unlike the wheelset, the wheels can move independently from each other at different speeds. The ready-to-mount low floor axles consist of a one-piece forged axle. At the ends of the axles there are press-fitted brake caliper hubs and housings for accommodating the primary springs (Megi springs). The two rubber-buffered wheels “System Bochum 2000” are arranged between the brake caliper hubs and the cranked part of the low floor axle. An encapsulated (in oil-tight enclosure) pole wheel for speed measurement, a grounding contact and a brake disk are mounted on each wheel.

FAG insert hub units

FAG insert hub units consist of a tapered roller bearing pair. The cones of the two bearings are manufactured with such precision that the specified preload is obtained after the mounting of the bearing unit. FAG insert hub units are sealed and are provided with a sufficient lubricant quantity during mounting to last for one maintenance interval. The trams are expected to reach maintenance intervals corresponding to a mileage of ca. 500 000 km.
The preload inside the bearing units ensures an optimal load distribution, resulting in a significantly longer service life. Even under preload, the bearings’ internal geometry ensures good running properties (low friction).
FAG insert hub units simplify mounting, require significantly less space than previous solutions and yet promise a longer service life.

Low floor axle in the bogie

FAG insert hub units offer the following advantages:

- Minimal space requirements due to compact design
- Integrated seals
- Easy mounting (no adjusting required, reducing the number of potential mistakes)
- Improved material / heat treatment
- Bearing units are mounted with a defined preload and have an optimized internal design (profiles, lip angles etc.)
- Favourable pressure distribution within the unit, especially when moment loads have to be accommodated
- Higher rigidities as the unit is preloaded

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