

# FAG Rolling Bearings in the Wheel Hub Drives of Trams in Frankfurt/Germany



## Examples of Application Engineering

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Low-floor tram with wheel hub drives.

Courtesy of Siemens AG

This generation of innovative trams has been in use since the autumn of 1993. A comfortable entrance height of no more than 30 cm enables disabled and elderly people as well as parents with prams to board and alight the trams without problems. The trams consist of three-section, articulated low-floor cars that are

mounted on three bogies. The bogies, each with 4 individual wheels, are arranged centrally under the individual sections. The wheels of the bogies under the front and rear sections are driven by eight water-cooled wheel hub motors. Thanks to this drive concept, with a rated power of 55 kW at every wheel, the trams

could be designed as 100 percent low-floor vehicles. This also means that there are no steps inside the trams. FAG supplies all the rolling bearings for the driving wheels and for the planet wheels in the wheel hub motors.

## Vehicle data

Wheel arrangement:	Bo'2'Bo'
Wheel diameter (driving wheels)	740/670 mm
Entrance height/ platforms	300 mm
Max. speed	70 km/h
Gear ratio of the planetary gear	$i = 1:9.3$

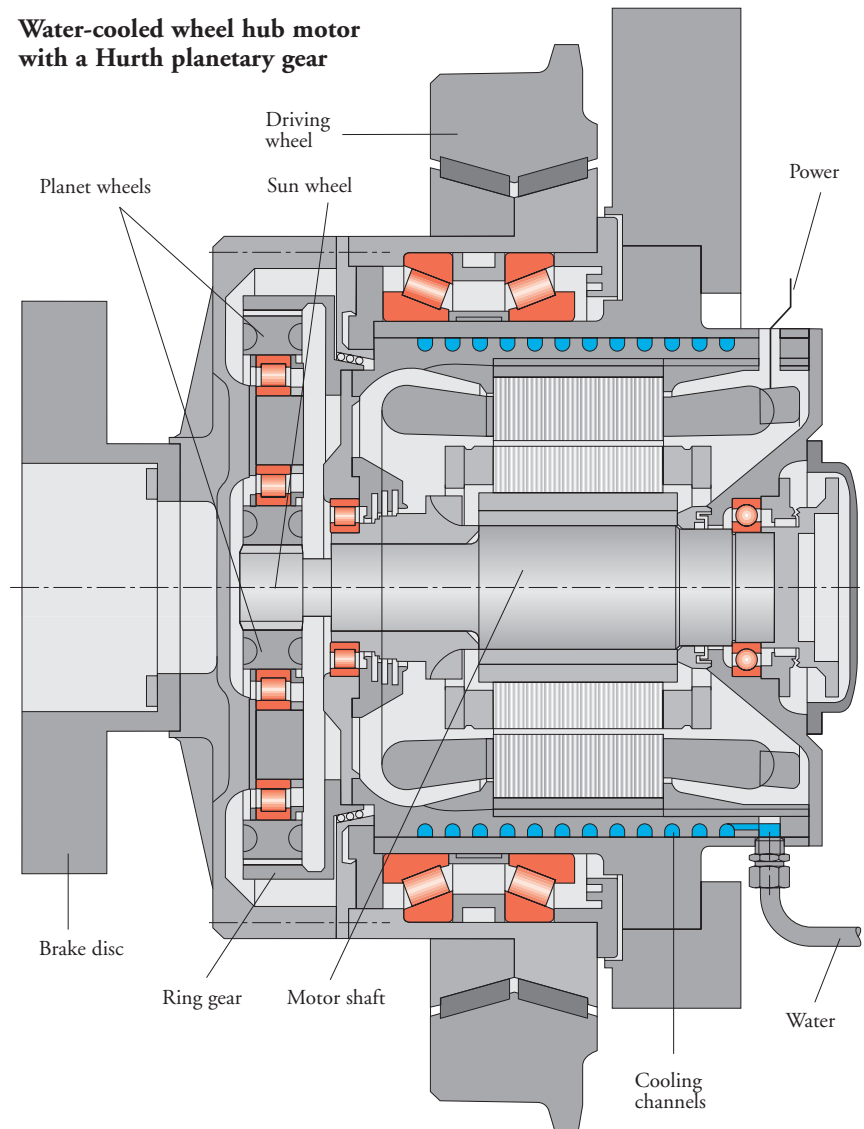
## Wheel hub drive

The wheel hub drive forms a unit consisting of motor, planetary gear and wheel bearing arrangement. The motor housing in addition accommodates the weight of the driving wheel via the wheel bearing arrangement. The planet carrier of the gear is attached to the motor housing; together they form the axis.

## Wheel bearing arrangement

Two tapered roller bearings in O arrangement form the wheel bearing arrangement. They easily accommodate the forces, while at the same time centering the gear. The sun wheel shaft of the gear is attached to the motor shaft in an overhung arrangement. This ensures that the loads are evenly distributed over the whole meshing so that the gear can reach a long service life.

## Water-cooled wheel hub motor with a Hurth planetary gear



## FAG Rolling bearings in each drive unit

### *Wheel bearings*

Two tapered roller bearings, dwg. no. 580755  
(dia 403.225 x 460.375 x 28.575 mm)

### *Planet wheel bearings*

Three cylindrical roller bearings NUP310E  
(dia 50 x 110 x 27 mm)

## Lubrication and sealing

- The wheel bearings are lubricated with grease
- The planet wheel bearings are connected to a circulating oil lubrication system

All bearings are sealed by means of non-rubbing labyrinth rings.

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Wheel hub drive