

# Axlebox Bearings with a Swing-Arm Housing in the CORADIA LIREX for Stockholm

# FAG

Examples of Application Engineering

WL 07 547 GB-D



CORADIA LIREX for Stockholm, developed and built by Alstom Transport, Salzgitter

The Stockholm transport authorities, AB Storstockholms Lokaltrafik (SL), have ordered a total of 71 articulated six-car CORADIA LIREX EMUs until mid-2006, with an option to buy another 34 trains. Under the local name of X60, the trains will be used in the local transport network in the greater Stockholm area, which has a population of ca. 1,9 million.

SL had very specific requirements on the trains' design. So the EMUs feature, for example, high acceleration levels between the closely spaced stations, 12 wide doors on each side to permit a fast change of passengers and a 92% low-floor portion. Large parts of the drive system as well as other modules are mounted on the roof. This not only allows for the low floor but also provides protection

from snow and ice as well as good accessibility for maintenance work. With a drive power of  $12 \times 250$  kW, distributed between three drive-trains, the EMUs reach a maximum speed of 160 km/h.

**Schaeffler Group Industrial supplies FAG axlebox bearings with a swing-arm housing for all the trains.**

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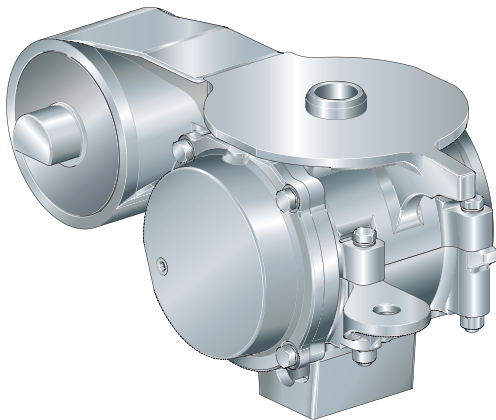
## LIREX concept

The CORADIA LIREX trains for Sweden are based on an experimental train developed jointly by the ALSTOM plant in Salzgitter and Deutsche Bahn. Schaeffler Group Industrial had already developed FAG axleboxes with split housings for this experimental train.

## Axleboxes

The ALSTOM LHB bogie concept provided for a swing-arm axlebox housing. Accordingly, Schaeffler Group Industrial has developed a complete split swing-arm bearing unit, consisting of a cap and a base, a housing ring and a rolling bearing.

The rolling bearings – in this case, cylindrical roller bearings – are mounted into a separate housing ring. In this way the bearings are optimally protected from the weather conditions in the Stockholm region, which are often rough. Particular attention was devoted to the sealing on the wheel side. Some first tests in a climate chamber prior to commissioning and the first winter under real operating conditions have confirmed the effectiveness of the chosen concept.



## Axlebox housing

The swing-arm housing is made of spheroidal graphite cast iron to DIN EN 1563 with a defined notch impact in the lower temperature range. The strength of the housing structure was checked, optimized and confirmed by means of FEM (finite element method).

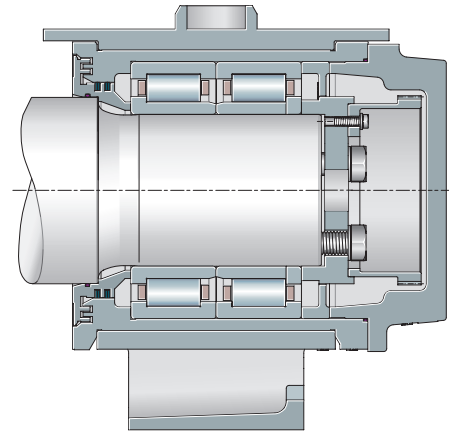


## Rolling bearings

The cylindrical roller bearings are single bearings that are mounted in the proven NJ – NJP arrangement. This offers advantages with regard to mounting/dismounting, thus reducing maintenance effort as well as life cycle costs.

The bearings are state of the art fitted with a polyamide cage and manufactured to EN 12080.

The bearings are lubricated with a field-proven grease that is approved in accordance with EN 12081. With this grease type, considerable maintenance intervals are achieved.



The initial mounting of the bearings and housing rings, including the greasing, is carried out at the wheelset manufacturer's by experienced Schaeffler Group Industrial fitting personnel. So it is ensured that this interface is done expertly.

The cap and the base of the swing-arm housing, including the end caps, are delivered to the bogie manufacturer.

## Life cycle costs

For this project, the vehicle manufacturer and Schaeffler Group Industrial have agreed to monitor the life cycle costs. Compliance with the target LCC will be monitored and evaluated over a specified period by operator and train manufacturer. In this way it will also be possible to obtain reliable, documented information about how well the vehicle components do in actual operation over an extended period.

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