

## SF 30 Combino plus

### Motor and Trailer Bogie for Low-Floor Tramcar Combino

The bogie SF 30 Combino GT is in service for the low floor tram Combino plus and is a further development of the bogies which are in service since 1998.

In opposition to the original Combino concept, the Combino plus bogies are located in the centre of the carbody modules which requires a rotating angle of app. 4.5°.

The floor height of 350 mm above TOR throughout the whole length of the car, however, remains the same for the new concept. For the further development the conceptual differences for motor bogie and trailer bogie are limited to traction and brake units.

The transmission of longitudinal forces is realized via a longitudinal rod containing two rubber bushes.

The secondary suspension is performed by 4 rubber springs (hourglass springs), which allow a higher lateral movement than steel coil springs.

For primary suspension the same conical rubber springs as for the original bogie design are applied. Stub axles allow low floor without ramps.

The motor bogies with the outboard longitudinal traction units have small unsprung mass and a low centre of gravity compared with other 100% low floor bogies.

The motor bogie is equipped with completely suspended traction drive units with self ventilated three-phase asynchronous motors. The wheels of these motors are arranged in line and speed-coupled by means of the motor gearing unit. This design gives the bogie excellent axle guidance characteristics such as self-centering and low tendency to lateral oscillation. The traction drive units are equipped with spring-loaded brakes, with the brake disc directly arranged on the motor shaft. This allows an easy access to all major traction and brake components. As a result nearly all maintenance work can usually be performed without the need for a pit.

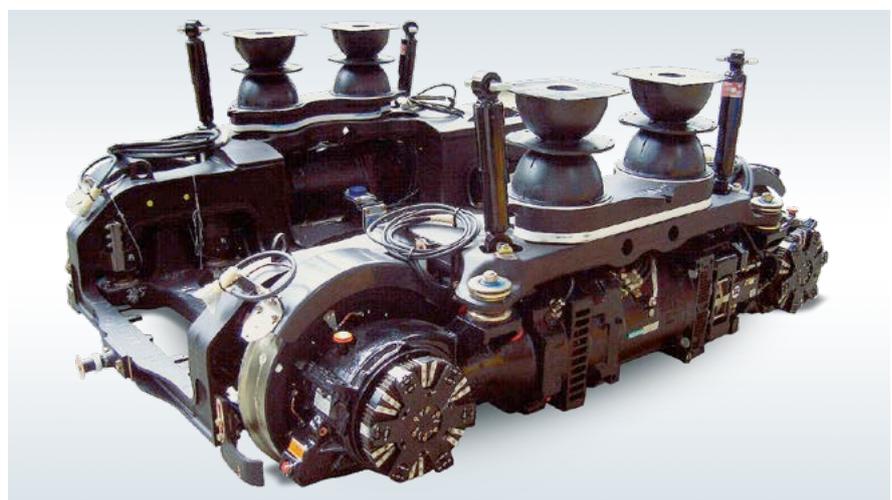
The complete traction drive units can even be removed and installed without having to lift the vehicle or remove the bogies.

The torque transmission from the traction motor to the front and rear wheel is effected by a low-noise bevel gear and two cardanic spider couplings, which are arranged at different levels.

For the trailer bogie the brake disc is directly flanged to the wheel. Braking is carried out by active brake callipers.

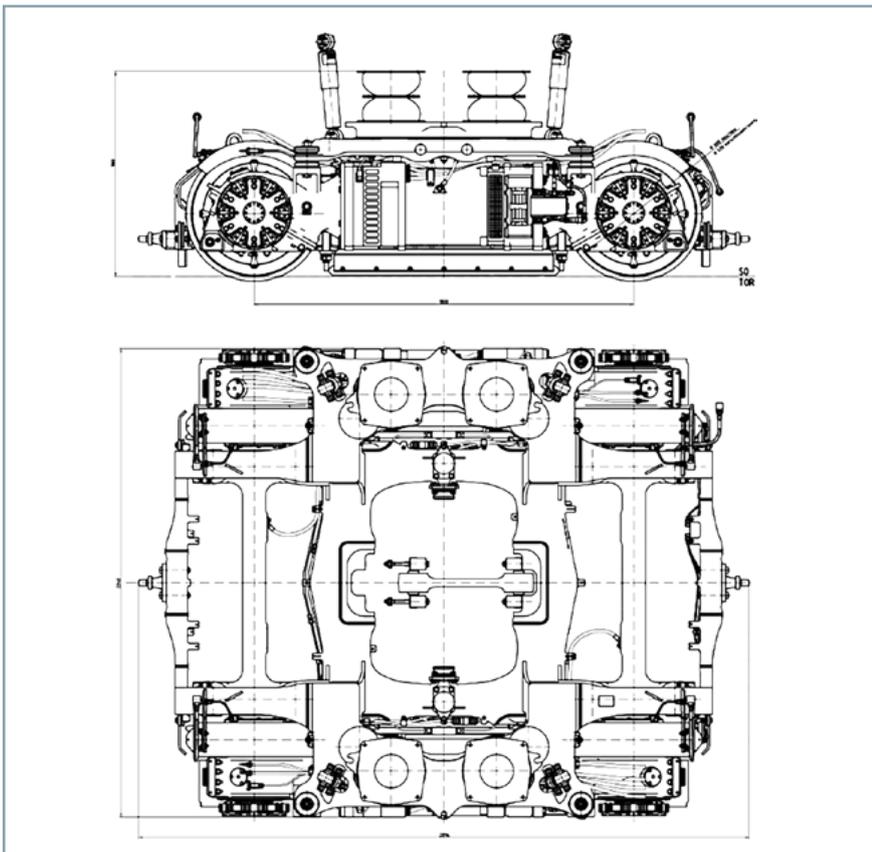
The stub axle is of cast or forged design and carries tapered roller bearings. The wheel diameter for both motor and trailer bogie is 600 mm (new) and 520 mm (worn). To reduce wheel squeal, noise absorber can be mounted.

The bogie frame is a combination of plates, cast, forged parts and a head beam integrated on both of its ends.



## Technical data

Bogie	SF 30 C
Running Speed	70 km/h
Axle load	2x 10 t
Wheelbase	1800 mm
Track gauge	1435 mm
Wheel diameter new / worn	600/520 mm
Smallest radius of curvature	15 m
Weight	Approx. 4.9 t
Additional equipment	Sanding, wheel flange, lubrication system wheel noise absorbers



## References

Metro Sul do Tejo  
Budapest  
China



Siemens Mobility Austria GmbH  
SMO RS CP BG&P  
Eggenberger Straße 31  
A-8020 Graz  
Austria

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The information given in this document contains general descriptions of technical possibilities which may not always be available in a particular case. The requested performance characteristics have therefore to be defined in the event of contract ward for the particular case in question.