Vossloh Kiepe GmbH

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Electrical Systems

Kiepe Traction Equipment for Low-Floor Trolley Buses

Philadelphia, PA, USA

Low-Floor Trackless Trolley Buses

The Southeastern Pennsylvania Transportation Authority (SEPTA) is the nation's fifth largest public transportation system and one of only two truly multi-modal transit properties in the United States operating bus, subway, commuter rail, trackless trolley, regional rail and paratransit vehicles. In order to provide sustainable public transportation services, SEPTA is adding modern zero-emission trackless trolley buses to its fleet.

Project characteristics

- **Low-floor design made possible by compact Kiepe propulsion system**
- **Zero-emission**
- **Semi automatic current collector with pneumatic retriever units**
- **Emergency power unit (EPU)**

The Southeastern Pennsylvania Transportation Authority (SEPTA) is replacing its trolley buses, known in Philadelphia as trackless trolleys, with new ADA accessible, zero-emission vehicles. A fleet of modern low floor buses with Vossloh Kiepe, Germany electrical equipment is being built to the Authority's specifications.

These low-floor vehicles are designed and built in close cooperation with New Flyer of America Inc. of Crookston, MN, USA. A total of 38 trolley buses are on order with an option for 23 extra vehicles. The Pilot bus is due to be delivered in 2007 with the balance of the fleet to follow in 2008. These air conditioned vehicles will fulfill the highest requirements regarding passenger and operator comfort.

Major components of the propulsion system are manufactured in the USA allowing the buses to comply with the Buy America Requirements.

A mobility aid ramp (MAR), in conjunction with the kneeling function of the bus, permits comfortable boarding of special needs and disabled passengers. A retractable bicycle rack is provided on the front of the bus.

A reliable and fast electric dewirement detection system is implemented. Supported by pneumatically-propelled retriever reels, this system adds to the proven Vossloh Kiepe current collector design.

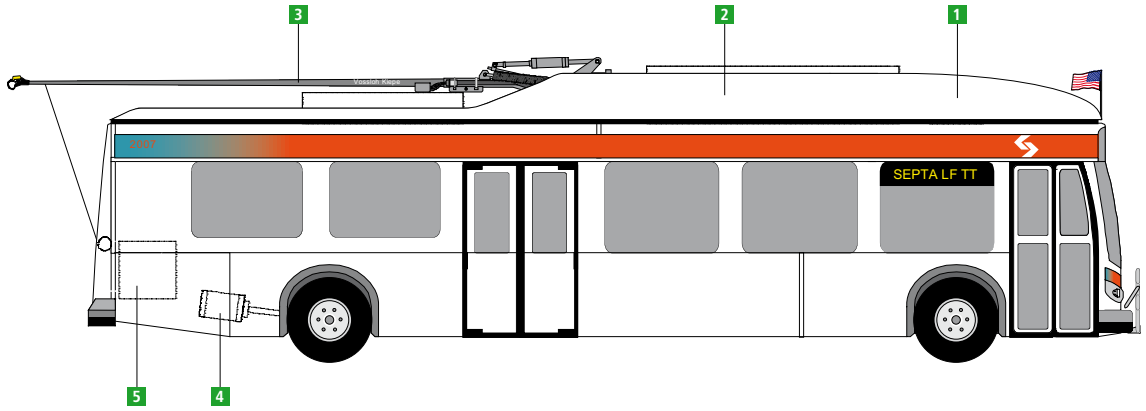
A diesel engine powered emergency power unit (EPU) provides power when the overhead line is not available, so that route deviations may be made.

Electronic data transmission via the proven CANopen and J1939 systems helps to reduce the amount of cabling and boosts system reliability. Moreover, a user-friendly and efficient diagnostic system is available.

The low-floor trolley bus design is made possible by the compact Vossloh Kiepe roof-mounted equipment enclosure. This container is easily accessible for maintenance and safely protected in the event of traffic accidents. The aluminium housing includes the most important electronic units for the traction and the on-board power supply, and has been designed to facilitate rapid replacement of key modules, thus ensuring the highest degree of vehicle availability. The modern technology also offers ABS and TCS as well as a vehicle roll-back protection and allows powerful driving up to an electronically limited maximum speed of 70 km/h (43 mph).

Vossloh Kiepe roof-mounted equipment enclosure DGG 343

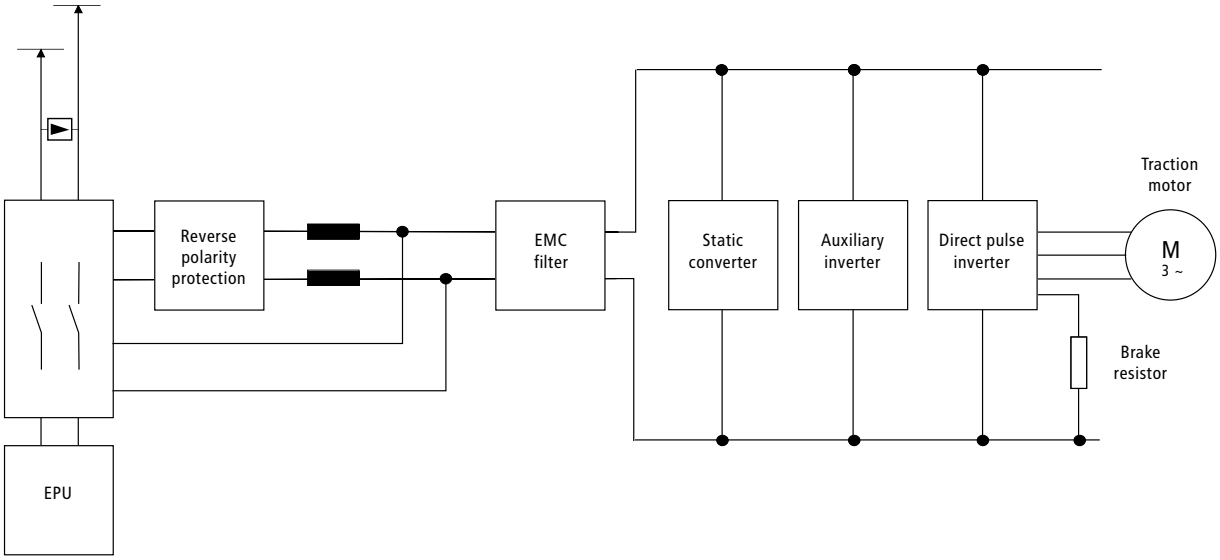
Arrangement of equipment



1 Brake resistor
2 Roof-mounted equipment enclosure
- Direct pulse inverter
- Static converter
- Auxiliary inverter for heating, ventilation and air-conditioning
- Line filter, EMC filter
- Main contactors and main fuses

3 Current collector
4 Traction motor
5 EPU diesel generator-set

Power circuit schematics



Technical data	
Design	2-axle low-floor trolley bus
Type	E40LFR
Manufacturer of chassis and vehicle body	New Flyer of America Inc.
Traction electronics	Vossloh Kiepe
Maximum speed	70 km/h (43 mph)
Line voltage	DC 600 V (+ 25 %, - 30 %)
Vehicle length	12.2 m (40 ft)
Vehicle width	2.6 m (8.5 ft)
Gear ratio	11.73 : 1
Tires	305 / 70 R-22.5
Weight of vehicle (tare / full vehicle)	approx. 14 t / approx. 20 t (approx. 31,500 lbs / 44,100 lbs)
Vehicle capacity	39 seated, 39 standing
Traction inverter	
	IGBT direct pulse inverter Kiepe DPU 450
Input voltage	DC 600 V (+20 %, -30 %)
Output permanent/max.	250 kW / 600 kVA for t < 30 s
Version	Mounted on an insulated Kiepe DGT 124 frame for the Kiepe DGG 343 roof-mounted equipment enclosure
Design	Pulse inverter operated directly on the overhead line
Cooling	Forced air cooling
Weight	90 kg (200 lbs)
Traction motor	
	Force-ventilated three-phase asynchronous motor
Rated output	240 kW
Dimensions	763 x 510 x 430 mm (length x width x height)
Weight	585 kg (1,300 lbs)
Current collector	
	Kiepe OSA 291 and Kiepe PRE 100
Characteristics	With pneumatic quick-lowering, triggered by the electric dewirement detection,
	maximum height (static) and monitoring of the rope drum (dynamic).
	Automatic lowering possible
On-board power supply	
	Static converter Kiepe BNU 521
Outputs	3/N AC 400 / 230 V, 50 Hz: 20 kVA, DC 24 V: 280 A
Type	Mounted on an insulated Kiepe DGT 124 frame for the Kiepe DGG 343 roof-mounted equipment enclosure
Weight	170 kg (375 lbs)
Auxiliary inverter	
	Auxiliary inverter Kiepe KGU 101
Output	3/N AC 400 / 230 V, 10 to 50 Hz: 26 kVA
Emergency power unit (EPU)	
	Diesel generator-set
Rated output	100 kW
Engine	Cummins QSB 4.5
Weight	750 kg (1,650 lbs)

Subject to change without notice

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