Vossloh Kiepe GmbH

vossloh
Electrical Systems

Kiepe Traction Equipment for Low-floor Trolley Buses
and Articulated Low-floor Trolley Buses

Vancouver, Canada

Articulated Low-floor Trolley Buses

Vancouver is the largest metropolis in Western Canada and operates the second largest fleet of zero emission electric trolley buses in North America.

Project characteristics

- **Low-floor design made possible by compact Kiepe propulsion system**
- **zero emission electric vehicle**
- **semi automatic current collector with pneumatic retriever units**
- **battery powered emergency power unit**

South Coast British Columbia Transportation Authority (TransLink) has upgraded its fleet with modern low floor buses with electrical equipment from Vossloh Kiepe, Germany. Thus reliable and quiet, zero emission trolley buses will continue to be the backbone of local passenger transit in the Vancouver city region.

These low-floor vehicles are designed and built in close cooperation with New Flyer Industries of Winnipeg, Canada. A total of 228 trolley buses have been ordered with 34 extra units on order: 188 standard electric trolley buses (SETB) and 74 articulated electric trolley buses (AETB) of the E40LFR and E60LFR family. These vehicles fulfill the highest requirements regarding passenger and operator comfort.

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.

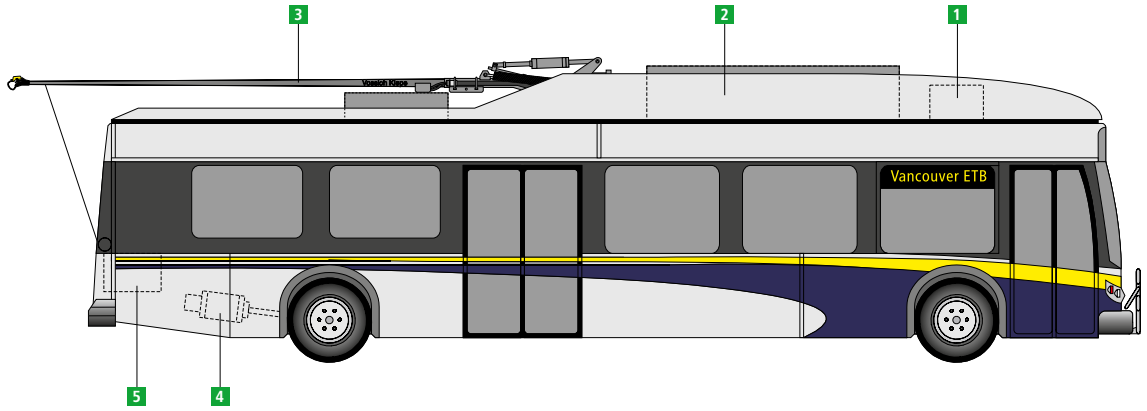
A new electric dewirement detection system has been developed for this series.

This patented device was designed together with Coast Mountain Bus Company. Supported by pneumatically-propelled retriever reels, this system adds to the proven Vossloh Kiepe current collector design.

A battery-powered emergency power unit (EPU) provides power when the overhead line is not available, so that minor route deviations may be made around road construction sites or traffic jams.

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 65 km/h.

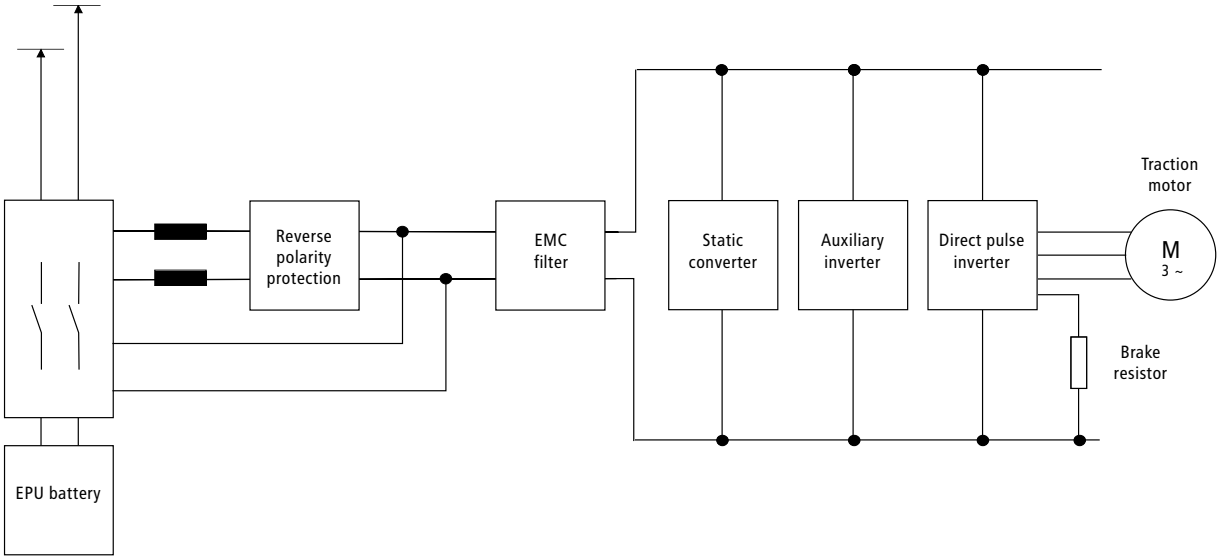
Arrangement of equipment



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

3 Current collector
4 Traction motor
5 EPU battery

Power circuit schematics

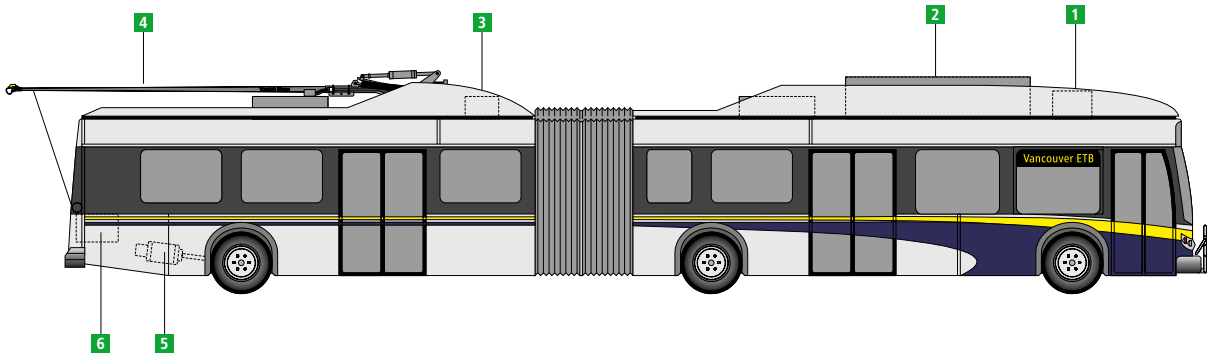


Technical data	
Design	2-axle low-floor trolley bus
Type	E40LFR
Manufacturer of chassis and vehicle body	New Flyer Industries Inc., Winnipeg, Canada
Traction electronics	Vossloh Kiepe
Maximum speed	65 km/h
Line voltage	DC 600 V (+25 %, -30 %)
Vehicle length	12.2 m (40 ft)
Vehicle width	2.6 m
Gear ratio	11.73 : 1
Tires	305 / 70 R-22.5
Weight of vehicle (tare / GVWR)	13.5 t / 18.7 t
Vehicle capacity	29 seating, 48 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 118 frame for the Kiepe DGG 338 roof-mounted equipment enclosure
Design	Pulse inverter operated directly on the overhead line
Cooling	Forced air cooling
Traction motor	
	Force-ventilated three-phase asynchronous motor
Rated output	240 kW
Dimensions	983 x 510 x 430 mm (length x width x height)
Current collector	
	Kiepe OSA 289 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 508
Outputs	3/N AC 400 / 230 V, 50 Hz: 14 kVA, DC 24 V: 250 A
Battery charger	DC 24 V: 20 A up to 80 A (adjustable), DC 300 V: 20 A for EPU battery (adjustable)
Type	Mounted on an insulated Kiepe DGT 118 frame for the Kiepe DGG 338 roof-mounted equipment enclosure
Auxiliary inverter	
	Auxiliary inverter Kiepe KGU 106
Output	24 kVA, 3 AC 400 V, 10 to 50 Hz
Emergency power unit (EPU)	NiCd Battery

Subject to change without notice

Eco-friendly electric trolley buses have remained a constant, stable force in Vancouver's urban landscape over 60 years

Arrangement of equipment

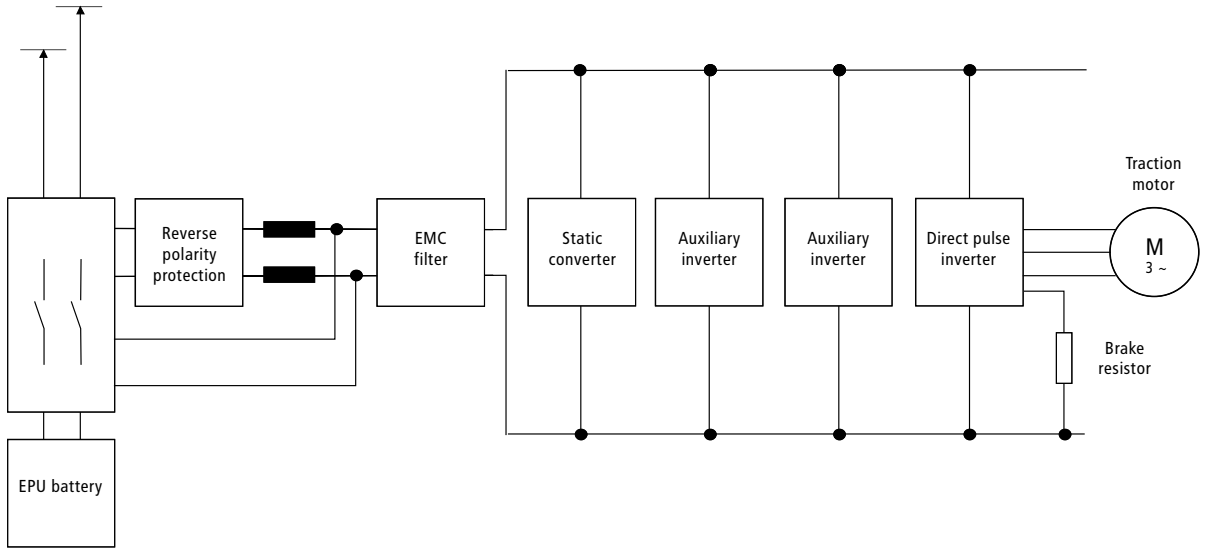


1 Brake resistor
2 Roof-mounted equipment enclosure
- Direct pulse inverter
- Static converter
- Auxiliary inverter for heating and ventilation
- Line filter, EMC filter

3 Roof-mounted equipment enclosure, trailer
- Main contactors and main fuses

4 Current collector
5 Traction motor
6 EPU battery

Power circuit schematics



Technical data	
Design	3-axle low-floor trolley bus
Typ	E60LFR
Manufacturer of chassis and vehicle body	New Flyer Industries Inc., Winnipeg, Canada
Traction electronics	Vossloh Kiepe
Maximum speed	65 km/h
Line voltage	DC 600 V (+25 %, -30 %)
Vehicle length	18.2 m (60 ft)
Vehicle width	2.6 m
Gear ratio	11.73 : 1
Tires	305/70 R-22.5
Weight of vehicle (tare / GVWR)	19.7 t / 27.9 t
Vehicle capacity	54 seating, 66 standing
Traction inverter	
	IGBT direct pulse inverter Kiepe DPU 450
Input voltage	DC 600 V (+25 %, -30 %)
Output permanent/max.	250 kW / 600 kVA for t < 30 s
Version	Mounted on an insulated Kiepe DGT 119 frame for the Kiepe DGG 339 roof-mounted equipment enclosure
Design	Pulse inverter operated directly on the overhead line
Cooling	Forced air cooling
Traction motor	
	Force-ventilated three-phase asynchronous motor
Rated output	240 kW
Dimensions	983 x 510 x 430 mm (length x width x height)
Current collector	
	Kiepe OSA 289 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 508
Outputs	3/N AC 400 / 230 V, 50 Hz: 14 kVA, DC 24 V: 250 A
Battery charger	DC 24 V: 20 A up to 80 A (adjustable), DC 300 V: 20 A for EPU battery (adjustable)
Type	Mounted on an insulated Kiepe DGT 119 frame for the Kiepe DGG 339 roof-mounted equipment enclosure
Auxiliary inverter	
	2x Auxiliary inverter Kiepe KGU 106
Output	24 kVA, 3 AC 400 V, 10 to 50 Hz
Emergency power unit (EPU)	NiCd Battery

Subject to change without notice

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