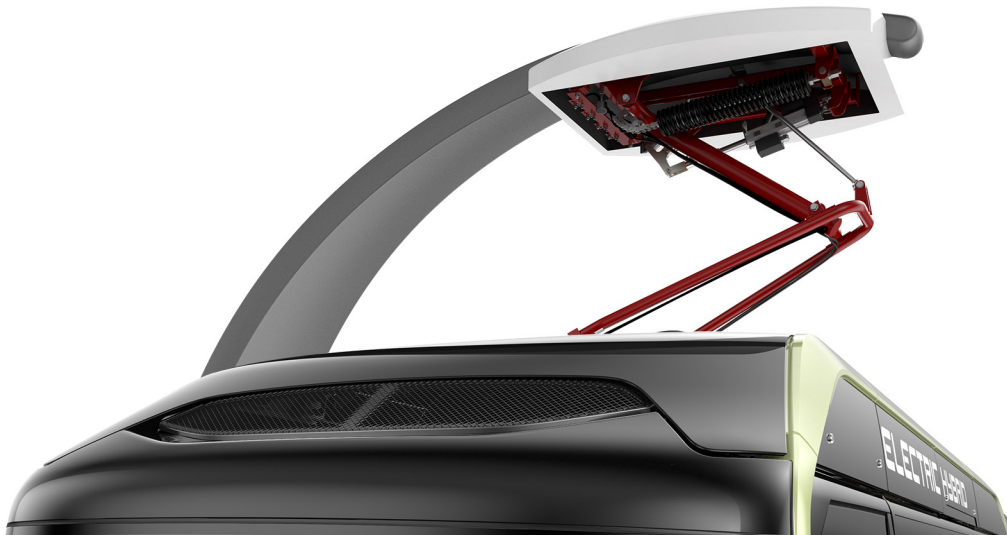




Volvo Buses. Driving quality of life

VOLVO OPPORTUNITY CHARGING SYSTEM

For Electric and Electric Hybrid buses



FAST, RELIABLE AND SAFE

The Opportunity Charging System provides automatic charging of batteries in electric hybrids and full-electric buses. The system is designed to be part of ordinary bus stops and it constitutes the complete interface between the energy grid and the vehicle.

Ensuring performance

The main prerequisites for charging electrically powered vehicles are safety, reliability, short charging times and ease of operation. Volvo Opportunity Charging System delivers on all these criteria, thus ensuring uptime and energy efficiency.

What is opportunity charging?

Virtually all buses have a couple of minutes rest at the end stations of their routes. We make use of this time and charge the battery of the Electric or Electric Hybrid driveline, hence the name Opportunity Charging. Due to an advanced control system this charging takes only up to six minutes to complete and your uptime is left undisturbed.

Simple and safe system structure

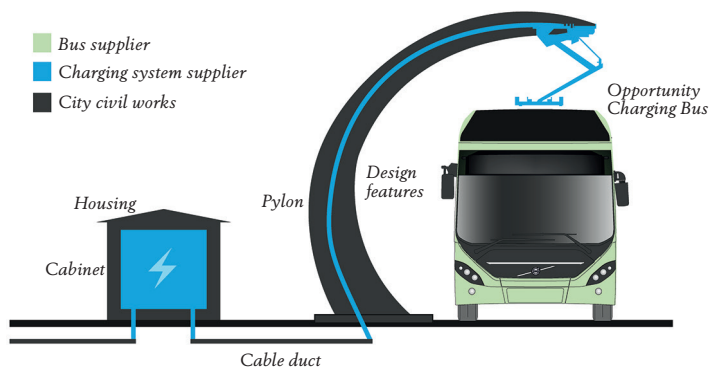
The charging station has a minimal impact on the bus stop. All control devices and electronics are gathered in a heavy-duty cabinet, placed in a suitable housing. Underground cabling connects it to the pylon where the charging contact device, the pantograph, is mounted.

Automated charging sequence

Charging starts automatically after the bus has stopped in the right position at the charging station, and after the driver has applied handbrake. The charging interface reaches the bus from above, which is optimal in terms of safety. All moving parts are integrated in the pylon, while the contacts on the bus are fixed mounted. This minimises the need for additional maintenance on the vehicle.

Open architecture

Open architecture means simple adaptations and freedom in choosing supplier/manufacturer of electrical equipment. Volvo cooperates with several leading suppliers of equipment for electrical power distribution in order to ensure smooth integration in the city's infrastructure.



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Overall dimensions		Typical value
Total height of charging carrier (m)		5.3
Free height under charging interface in stowed position (m)		4.6
Height of charging interface during charging (m)		3.0-3.2
Height of power charger (m)		2.3
Width of power charger (m)		3.8
Depth of power charger (m)		2.3
Distance between charger and charging pylon (m)		0-30

Specifications	
Input voltage (VAC)	Refer to IEC 60038: IEC standard voltages
Frequency (Hz)	50/60 ±2
Total Harmonic Distortion, THD (%)	<8
Maximum Charging Power Level for Electric Hybrid (kW)	150
Maximum Charging Power Level for Electric (kW)	300
Output DC voltage (VDC)	500-750
Max output current at 750 VDC (A)	200/400
Ambient temperature (°C)	-25 - +55

Charging station for rapid charge

- Opportunity charging
- Open standard
- Connecting interface to power grid
- Connecting interface to vehicle
- Power charger (converter)
- Earth continuity check
- Isolation resistance monitoring
- Spring loaded pantograph (raise up if power is lost)
- Charger station communications and control
- Control for vehicle interface connection
- Protective housing
- Weatherproof
- Perimeter protection according to applicable regulations
- Pylon

Automatic charging

- The driver stops the bus in the correct position for charging
- Fully automatic connection
- Fully automatic start of charging
- Fully automatic end of charging either at full charge or when vehicle needs to leave
- Charging can be interrupted by the driver if needed

Communication with vehicle

- Vehicle sets the requested charging parameters for the charging station
- Communication via WiFi
- Design reference: ISO 15118-1 and IEC 61851
- Connecting is done automatically

Safety

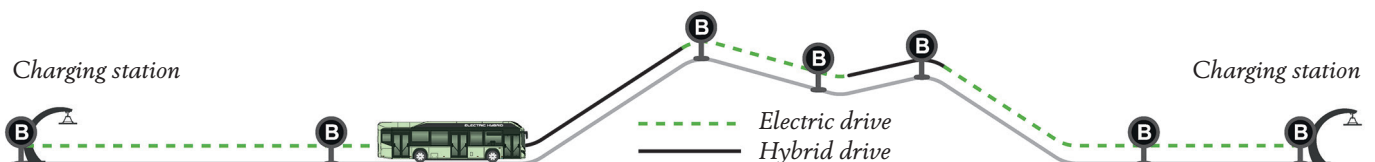
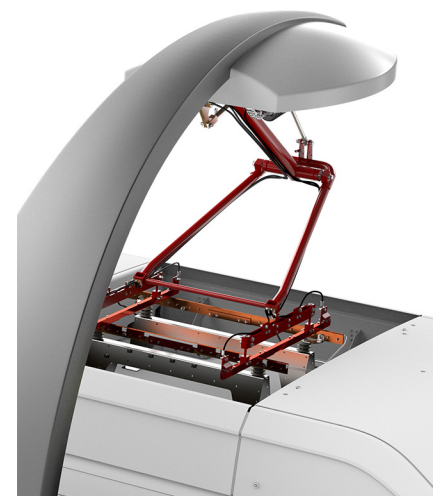
- Embarking and disembarking of vehicle is possible during the charging process
- Emergency stop
 - Stop signal from vehicle or signal device

Performance

- Typical charging duration 6 min/bus
- Duty cycle continuous
- Incremental charge current steps available
- Can withstand short circuit current for a limited time
- Supply to the auxiliary electrical loads on the bus is provided as long as the charging interface is connected

Charging interface

- Roof-mounted fixed conductors
- Pantograph mounted on charging station



VOLVO

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