MAN eMobility Truck

Transforming Transportation

More than just a vehicle !!

eMOBILITY FOR DISTRIBUTOR LOGISTICS

eTGM CONCEPT TRUCK – on the road since September 2018 !!

MAN eTGM 26 tonne electric truck for urban goods transport

- With a range of up to 180 km suitable for the urban goods transport
- Since September 2018 member companies of the Austrian company consortium CNL are testing nine trucks in real distributor logistics with various bodies
- Mass production of electric trucks starts in the mid 2020

Why MAN eTrucks?

Because without them, cities would come to a standstill!

It can't go on like this

- Rural-urban drift and online trading have led to an explosive increase in traffic density and demand for goods in cities.
- Without new delivery models outside peak periods, traffic gridlocks and bans on vehicles due to pollutants are impending.
- EU requirements with regard to clean air must be met (current discussion).

Solution approaches with new traffic concepts

- Cites need congestion-, emission- and noise-free logistics:
- electromobility enables delivery times to be staggered by extending them to night trips

eMobility from MAN as an investment in the future

- Purely electric drives
- Truck and charging technology optimised for cities
- All-round consulting on fleet conversion, route planning, infrastructure and so on

City and urban agglomeration – ideal market for eTrucks

Why city?

For city logistics, eTrucks are optimal:

- Agile delivery to urban networks of branches (supermarkets, department stores, media stores and so on):
  - Inner city (radius ≤ 50 km)
  - Distribution transport (radius ≤ 150 km)
- Ideal environment for charging infrastructure
- Frequent acceleration and braking allow efficient energy recuperation.

Who does the testing?

MAN's development partnership with CNL (Council for Sustainable Logistics) puts eTrucks on the road:

- Practical pilot projects with big chains (Hofer, Metro, REWE, Spar and so on) secure mature motor, rechargeable battery and charging technology.

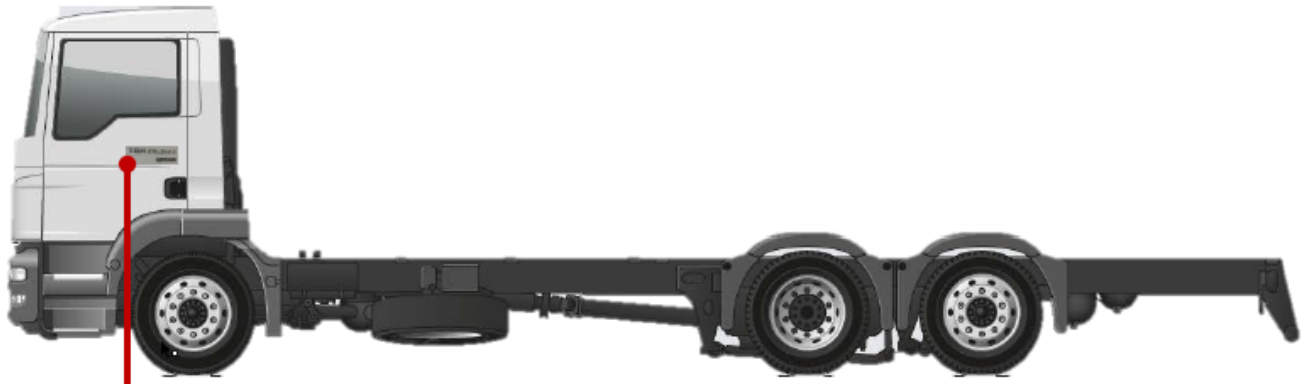
The immediate effects

- Reduction of the pollution load in the air that we breathe
- Reduction of noise pollution
- Peak times can be staggered because new delivery times in the evening or at night are possible
- Increased acceptance of trucks in urban traffic

MAN eMobility distuinguishing

Blaue Zierstreifen

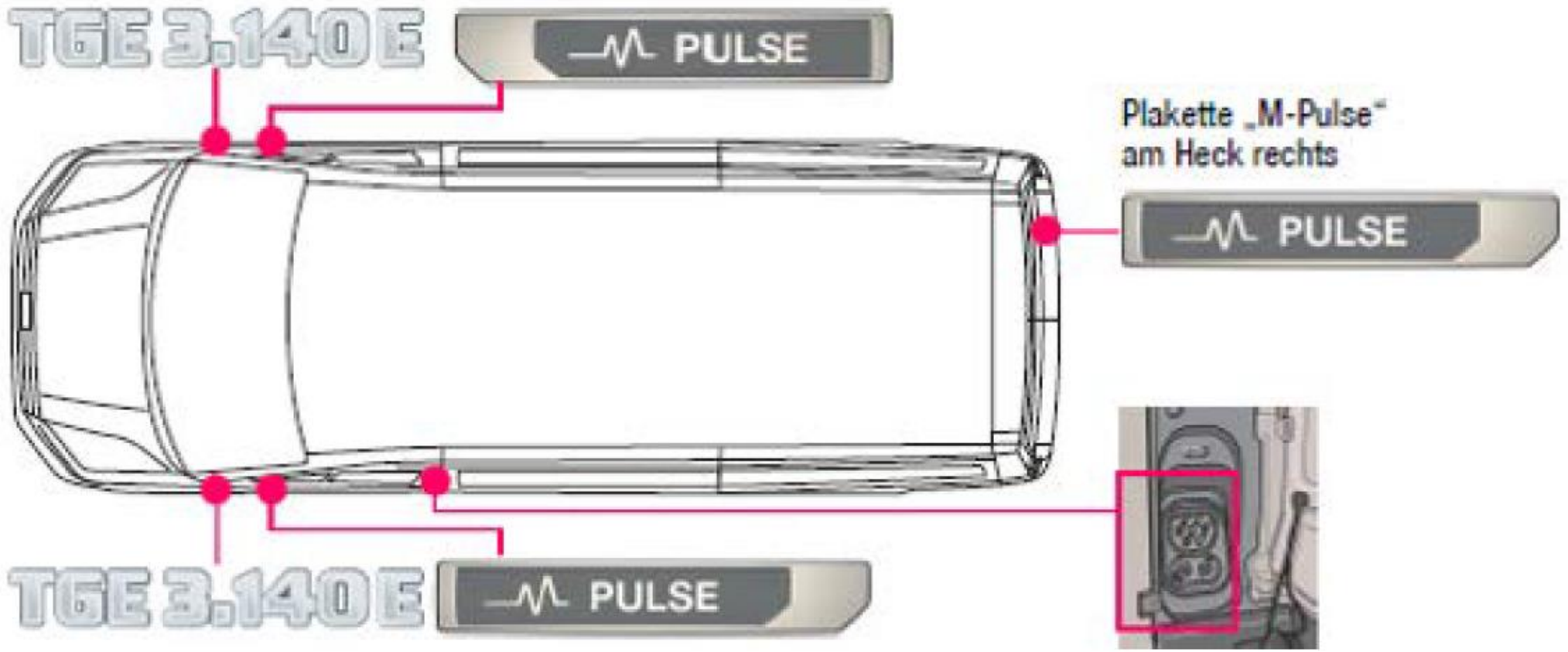
Aufkleber
„Hochvolt Fahrzeugtechnik“



Typbezeichnung
„TGM 26.360 E“

Schriftzug
„M-Pulse“

MAN eMobility distuinguishing



MAN products supplemented by a holistic consulting approach

eMobility by MAN
Portfolio

eBus

eTruck

eVan

- ✓ Battery-electric vehicel (BEV)
- ✓ Urban use
- ✓ No local emissions of NOx, noise, particels

MAN Transport Solutions
Mobility Consulting

- ✓ Holistic individual consulting
- ✓ experienced + forward thinking
- ✓ Future safe setup for eMobility

TGM 26.360 E 6x2-4 LL

Technical data	
Segment classification, wheel configuration	Distribution transport, 6x2-4
Suspension	Air-air
Height	Normal
Cab	C (2,240 mm wide, 1,620 mm long)
Engine	PSM (permanently excited synchronous machine)
Emission standard / exhaust system	-/-
Output	264 kW (360 hp)
Torque	3,100 Nm
Gearbox	Fixed transmission ratio without manually operated gearbox
Gearbox software	-/-
Drive ratio total (incl. rear axle)	i = 7.5 (engine speed at 85 km/h = 3,580 rpm)
Wheelbase / overhang	4,725 mm + 1,350 mm / 2,675 mm
Permissible gross weight (technical)	26,000 kg
Permissible gross train weight (technical)	-/-
Unladen weight (chassis with cab)	Approx. 10,500 kg

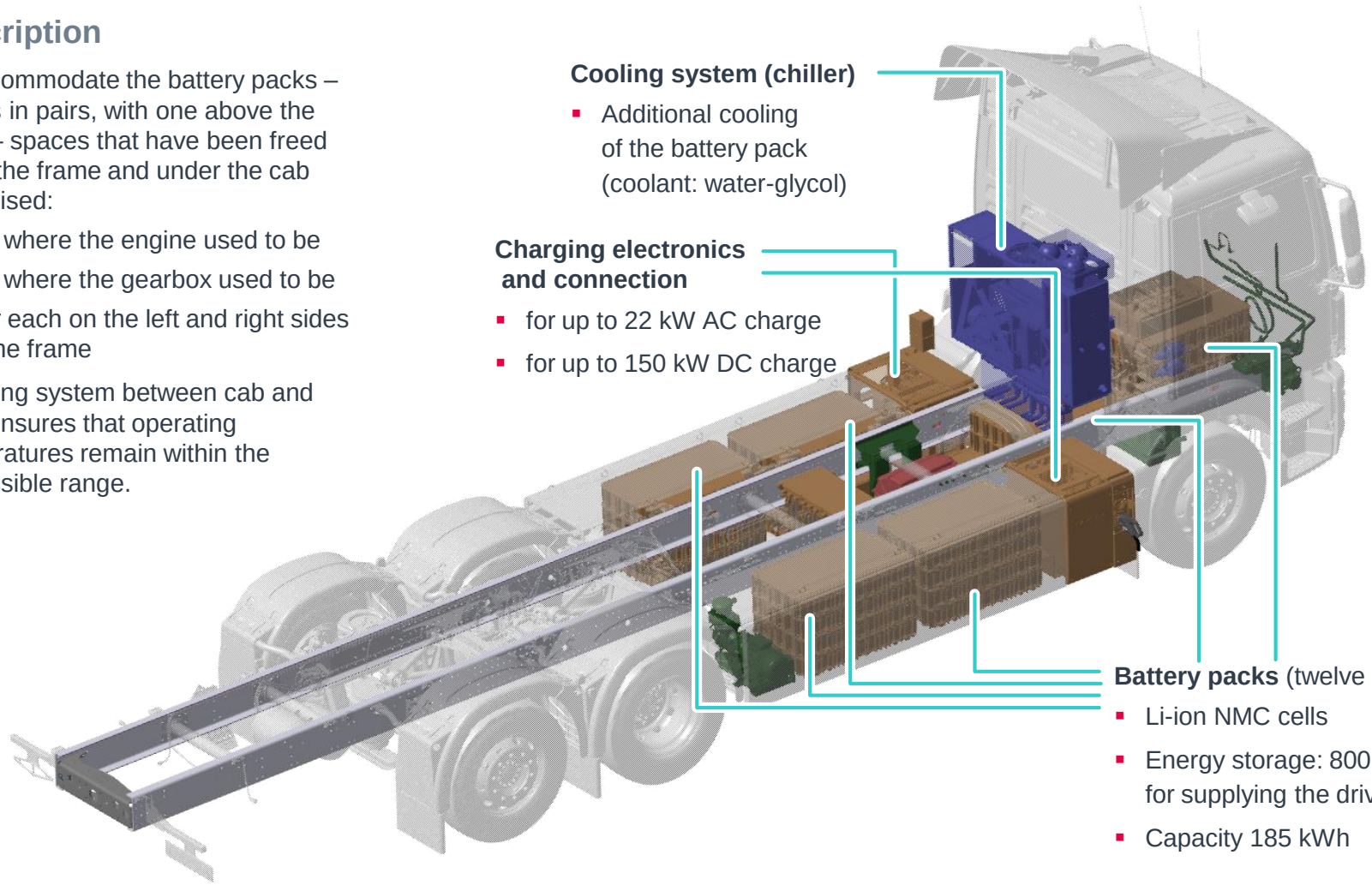
An overview of the eTGM – charging and battery technology

Description

To accommodate the battery packs – always in pairs, with one above the other – spaces that have been freed up on the frame and under the cab are utilised:

- two where the engine used to be
- two where the gearbox used to be
- four each on the left and right sides of the frame

A cooling system between cab and body ensures that operating temperatures remain within the permissible range.



Cooling system (chiller)

- Additional cooling of the battery pack (coolant: water-glycol)

Charging electronics and connection

- for up to 22 kW AC charge
- for up to 150 kW DC charge

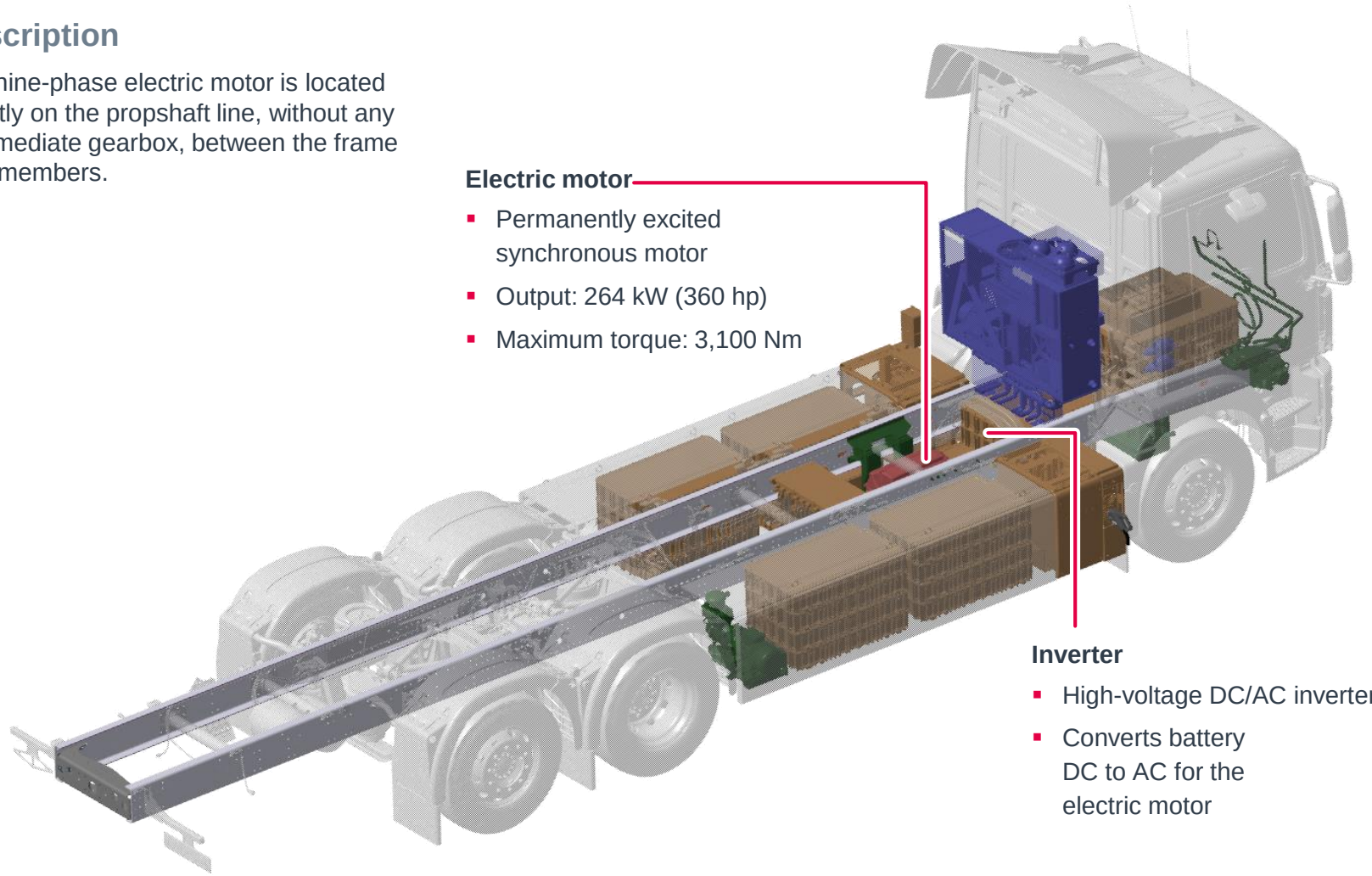
Battery packs (twelve units)

- Li-ion NMC cells
- Energy storage: 800 V DC for supplying the drive
- Capacity 185 kWh

An overview of the eTGM – the drive

Description

The nine-phase electric motor is located directly on the propshaft line, without any intermediate gearbox, between the frame side members.



Electric motor

- Permanently excited synchronous motor
- Output: 264 kW (360 hp)
- Maximum torque: 3,100 Nm

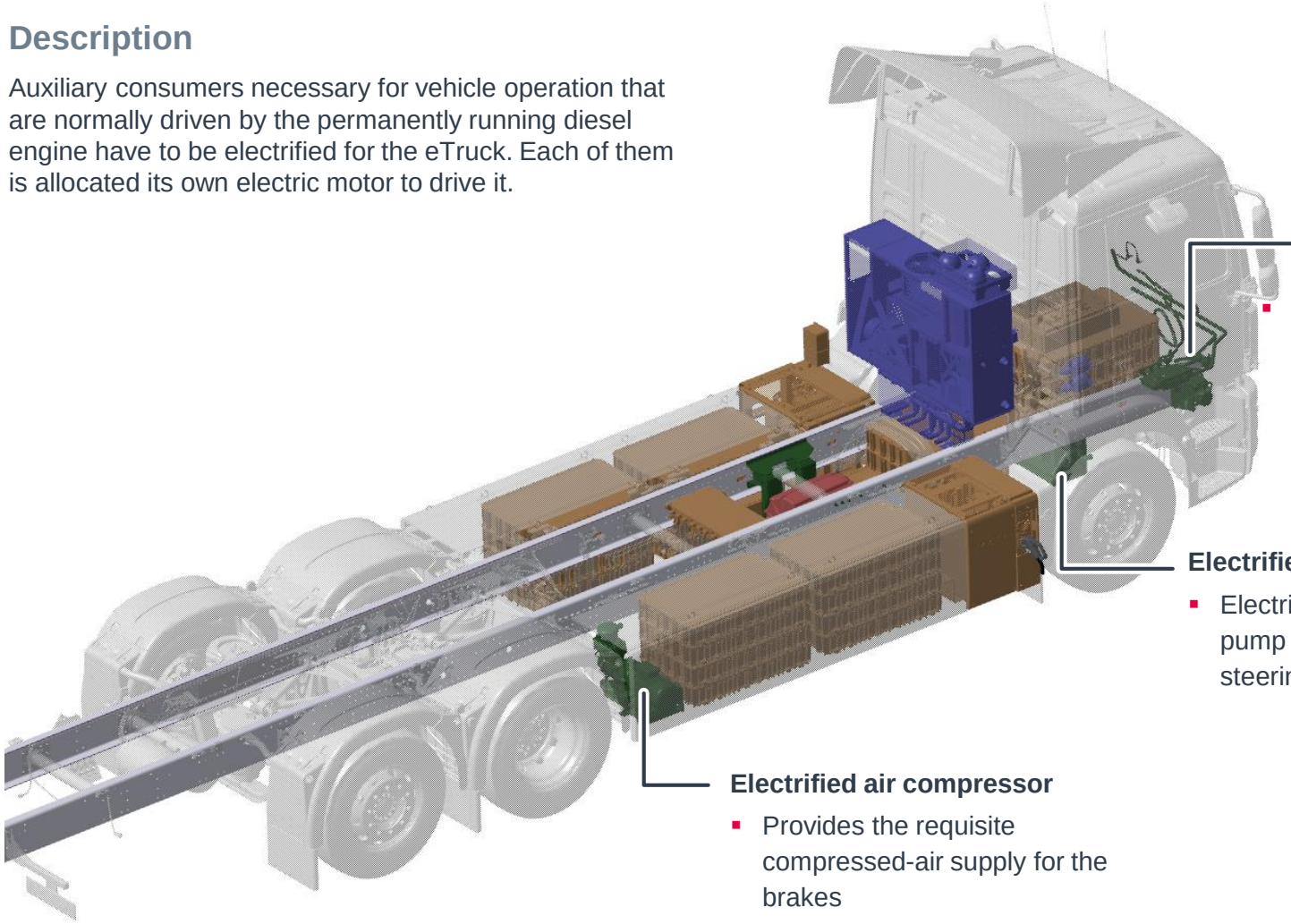
Inverter

- High-voltage DC/AC inverter
- Converts battery DC to AC for the electric motor

An overview of the eTGM – important additional electric components

Description

Auxiliary consumers necessary for vehicle operation that are normally driven by the permanently running diesel engine have to be electrified for the eTruck. Each of them is allocated its own electric motor to drive it.



Electrified air conditioning

- for heating, ventilating and cooling the cab

Electrified steering pump

- Electrified high-voltage servo pump to assist in providing steering force

Electrified air compressor

- Provides the requisite compressed-air supply for the brakes

DC charging up to 150 kW possible

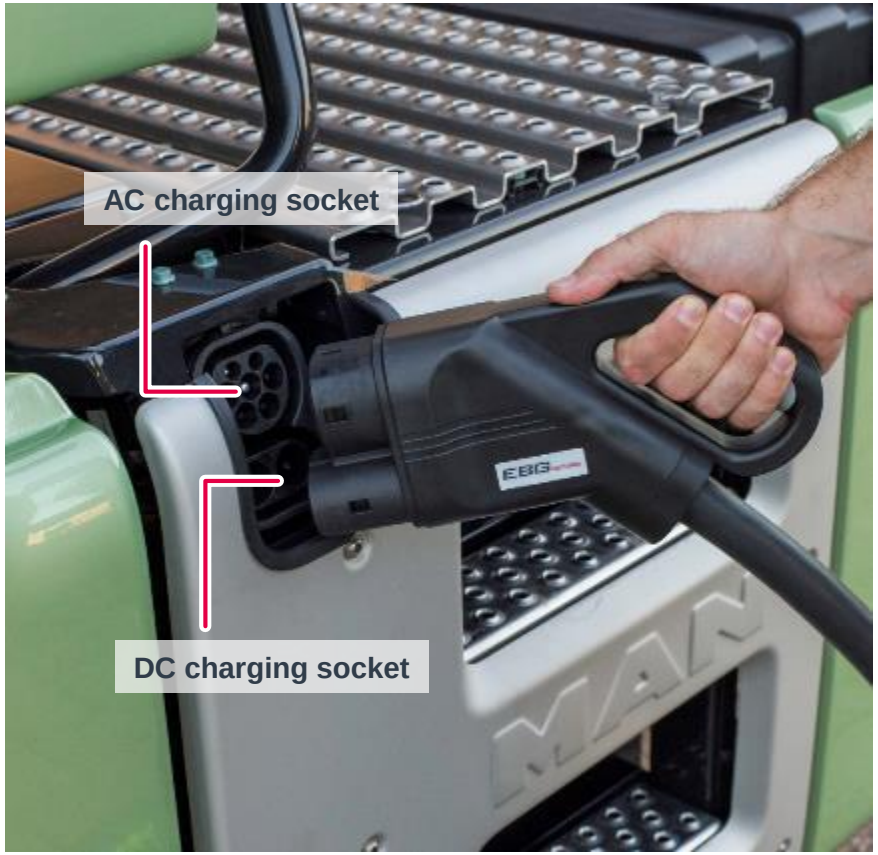
Description

There are two different methods of charging the rechargeable batteries employed for vehicles:

- Charging with alternating current (AC)
  - Slow charging that preserves the battery
  - Ideal charging option for idle periods
  - Up to 44 kW possible
  - Charging time (h) is calculated from the amount of charge required (kWh) divided by the charging power (kW). Example: 110 kWh / 22 kW = 5 h
- Charging with direct current (DC)
  - Fast charging
  - Ideal charging option for breaks
  - Up to 150 kW possible
  - Max. charging time (with a discharged battery) 1.2 h

Customer benefits

- If required, short charging periods (DC charging) for rapid availability of the vehicle
- Flexible use of proven charging standards provides independence from the type of charging infrastructure.



Combined Charging System (CCS)

- The CCS connection on the eTGM combines both types of charging socket in a single charging connection, for both AC and DC charging.

Recuperation in braking operation to increase the range

Description

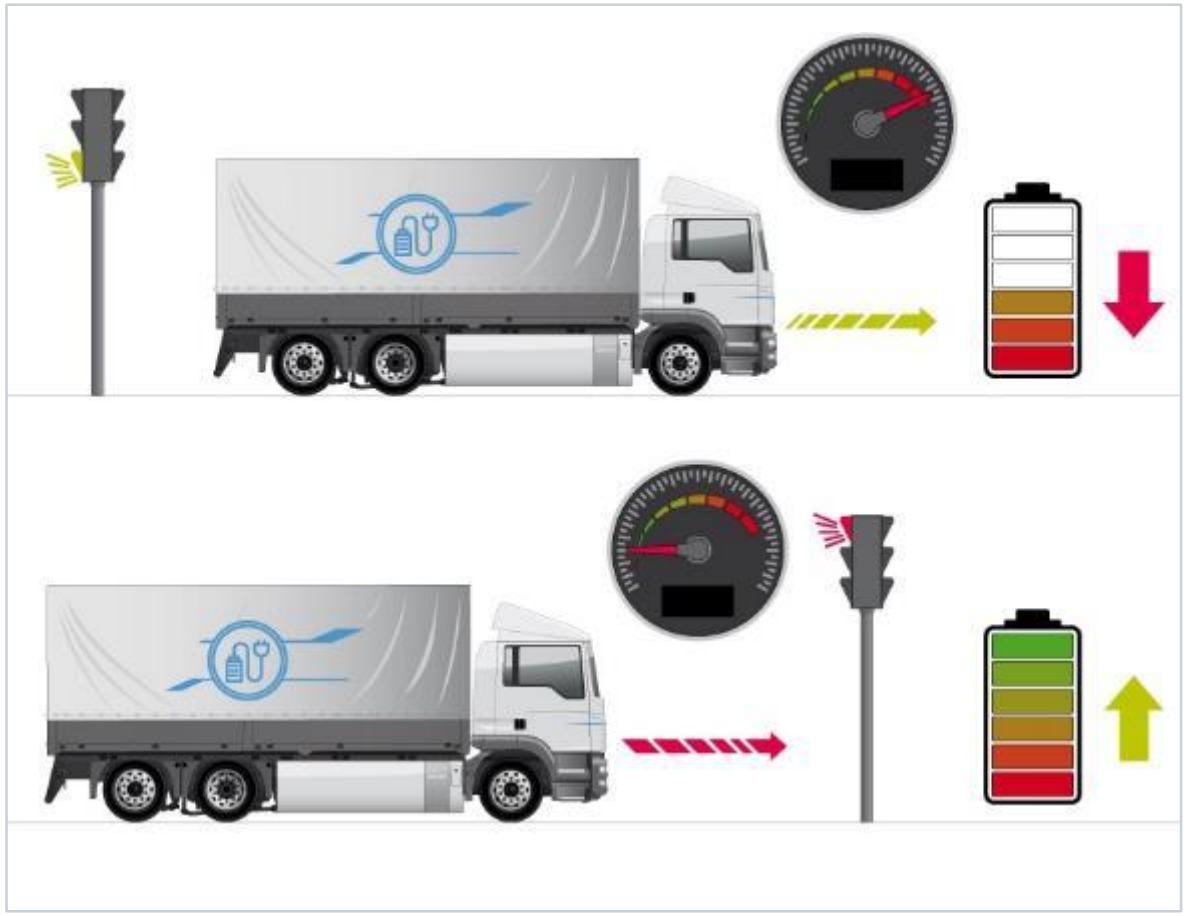
The electric motor in the eTGM converts electrical energy into mechanical energy (**motor** operation) as well as mechanical energy into electrical energy (**generator** operation). This means that it can be used both to provide drive power as well as for the recuperation of braking energy.

Recuperation acquires energy

- A motor brake (analogous to the retarder in a diesel vehicle) and pre-shift on the brake pedal charges the battery pack during braking procedures.
- The charge extends the range, especially in urban traffic with its frequent stop-and-go situations.

Customer benefits

- Lowering of energy costs due to increase of range
- Relief of service brake system



Energy recuperation by conversion of brake energy to electrical energy