



## **MAN eTruck electrifies road freight transport**

**MAN eTGX for long-distance transport, MAN eTGS for distribution**

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- **Daily ranges up to 800 km, later up to 1,000 km**
- **High charging power with MCS (750 kW) and CCS (375 kW) standards with variable positioning of the CCS charging port**
- **Battery technology developed by MAN specifically for commercial vehicles, made in Germany**
- **Battery performance period of up to 1.6 million kilometres or up to 15 years, depending on use**
- **Three, four, five or six modularly positionable battery packs for optimum deployment flexibility and buildability**
- **Modular battery concept offers up to 2.4 tons of payload variance depending on transport task and range requirements**
- **Numerous semitrailer and chassis variants, also with very short wheelbases from 3,750 mm for all common trailer and body combinations**
- **Ex-works volume tractor unit and chassis for transports up to three meters internal height**
- **Over one million possible variants configurable**
- **MAN eMobility Consulting from fleet consulting to charging infrastructure development to digital tools for deployment analysis and route planning based on many years of expertise with the eBus and the eVan**

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MAN Truck & Bus is setting an important milestone in the decarbonisation of freight transport with its first heavy-duty electric truck. The first 200 units will be rolling out to selected customers as early as 2024, before production at the MAN plant in Munich starts in larger quantities from 2025 as orders ramp up.

With the eMobility Centre, MAN laid the foundation for the development of the new MAN eTGX and MAN eTGS high-volume electric trucks at the Munich plant in 2021 and invested heavily in preparing for the mixed

MAN Truck & Bus is one of Europe's leading commercial vehicle manufacturers and providers of transport solutions with an annual turnover of around 14.8 billion euros (2023). The product portfolio includes vans, trucks, buses, diesel and gas engines as well as passenger and freight transport services. MAN Truck & Bus is a TRATON GROUP company and employs around 33,000 people worldwide.



production of diesel and electric trucks. MAN is investing around €100 million in the development of battery production at the MAN site in Nuremberg.

In order to achieve the 1.5-degree target of the Paris Climate Agreement, the commercial vehicle industry must play its part and reduce CO<sub>2</sub> emissions sustainably. Electric trucks are the key to this. With the sale of the new MAN eTruck since the end of 2023, MAN has entered a new era of climate-neutral transport. By 2030, every second MAN truck registered in Europe will be electric.

For MAN's developers, it was clear from the outset that the nationwide switch to electromobility would only succeed if the new eTruck was in no way inferior to a diesel truck in terms of practicality and application suitability, but above all in terms of its ability to be combined with a wide range of body solutions. Equally important is the pre-purchase consultation phase as an essential basis for successful use.

### **eConsulting to eServices**

While the development staff have been working hard to make the electric drive in trucks fit for all areas of application and use in road haulage, the MAN Transport Solutions team is working continuously to prepare transport companies for this new era. Because on the user side, too, a transformation is needed on the way to the eTruck. This is where 360 Degree eMobility Consulting comes in. In addition to advice on suitable vehicles, this also includes consideration of customer-specific operating conditions such as operating phases including cost optimization, route analysis, fleet optimization and, building on this, the necessary advice on the charging infrastructure. Additional support is provided by digital tools such as the new MAN eReadyCheck, which customers can use to check how their delivery routes can be driven purely electrically, and the MAN eManager, which enables fleet managers to keep a constant eye on the important information on the charging status of all trucks in the fleet.

Beyond the product and its application, MAN is also committed to expanding the charging infrastructure: together with Daimler Truck and the Volvo Group, the TRATON GROUP has established a joint venture to set up at least 1,700 high-performance charging points on or near highways and logistics hubs throughout Europe.

MAN also has its own charging infrastructure offering for customers in its portfolio. For this purpose, MAN cooperates with charging infrastructure manufacturers such as ABB, Heliox, and SBRS.



However, for the nationwide switchover to succeed, the public charging infrastructure needs to be expanded much more quickly to at least 4,000 megawatt charging points in Germany and 50,000 high-performance and megawatt charging points in Europe by 2030. Politicians and industry need to work closely together to achieve this.

### **Application-modular battery and charging connection range**

The new MAN eTGX and MAN eTGS are characterized by high variability in battery configurations. With six battery packs, two of which are installed under the cab and up to four more on the side of the vehicle frame, both offer up to 480 kWh of usable battery capacity for daily ranges of up to 800 kilometers. Developed by MAN specifically for use in commercial vehicles, they will be mass-produced at the Nuremberg plant from 2025. With their NMC cell chemistry and specially developed temperature management, the battery packs offer high energy density with a compact design, long service life and fast charging - even with low residual battery charge and low outside temperatures. This means that the optimum vehicle configuration in terms of range, payload and charging time can be selected for every application characteristic - from supermarket deliveries in the city center, through regional building materials supply, to long-distance transport in production logistics.

Operations in urban distribution transport, for example, generally require shorter daily ranges of up to 250 kilometers, and recharging takes place overnight after the tours in the logistics depot. The modular battery concept of the MAN eTGX and MAN eTGS offers the option of equipping the vehicle with only three, four or five battery packs instead of six, thus reducing the vehicle weight by up to 2.4 metric tons for more available payload and lower consumption for partial loads or empty runs.

In addition to the CCS standard with up to 375 kW, MAN will be offering the much more powerful megawatt charging standard (MCS) for fast intermediate charging during breaks in driving times right from the start of sales, which will initially enable 750 kW, and in a later expansion stage even more than one megawatt of charging power. And here, too, MAN has thought of as much flexibility as possible for customer use with different charging station locations at the depots. Two CCS connections can be variably combined on the left and right sides behind the front wheel arch or on the right side of the frame at the rear. The MAN battery management system ensures that the batteries are always in optimum operating condition with regard to the charging status of the individual cells, voltage and current



monitoring, optimum temperature regulation and insulation monitoring during charging and driving. Thanks to an expected predicted high-performance service life of up to 1.6 million kilometres or up to 13 years in long-distance transport and up to 15 years in distribution transport, depending on the type of application, the batteries are also extremely durable and suitable for many types of use.

### **Optimal positioning of batteries and drive unit**

The modular battery architecture makes the MAN eTGX and MAN eTGS particularly body-friendly. Free spaces on the left or right of the frame for high-performance pumps, equipment stowage areas, crane outriggers and similar body components with increased space requirements can be easily realized thanks to the flexible positioning of the batteries. The standard installation of two batteries under the cab, similar to the combustion engine in conventional vehicles, also ensures favorable weight distribution. The positioning of the central drive unit also contributes to this. It sits centrally in the frame and comprises the synchronous electric motor, the inverter responsible for converting battery direct current into alternating current and for motor control, and the 2- or 4-speed transmission used depending on the power design, which drives the drive axles proven in the previous vehicle portfolio via a conventional cardan shaft.

Depending on the application configuration, the electric motor produces 333 hp (245 kW), 449 hp (330 kW) or 544 hp (400 kW) with corresponding maximum torque of 800, 1,150 or 1,250 Newton meters. In overrun and braking phases, the electric motor can be used by the driver as a generator, depending on usage requirements, and converts the vehicle's kinetic energy back into electrical energy. The batteries are recharged in the process. The maximum possible recuperation power corresponds to the drive power of the electric motor and is thus comparable to that of today's high-performance diesel engine endurance brakes. As with these, the automatic shifting of the transmission supports the best possible recuperation with increased engine speeds.

### **Optimum bodybuilder friendliness**

The advantages of the electric powertrain body of MAN eTGX and MAN eTGS, e.g. compared with e-axle concepts or similar designs, are, in addition to a very good payload of the rear axle, a high level of ride comfort due to low unsprung masses and good protection of the drive unit, which is securely



mounted in the frame, against impacts and vibrations. In addition, a mechanical auxiliary drive can be easily integrated in this installation position to drive body functions such as hydraulic pumps. Connecting an electromechanical power take-off is also straightforward on the new MAN eTrucks.

The overall combination of modular battery concept and payload- and body-friendly positioning of the drive unit also allows very short wheelbases from 3.75 meters, which makes it possible to combine the semitrailer tractor with all common semitrailer variants within the permissible overall length specifications.

The chassis versions of the eTGX and eTGS can be highly customised with a variety of wheelbases, cab versions, engine power classes, battery combinations, charging connection positions and numerous other industry-typical features. With their three, four, five or six modularly combinable and variably positionable batteries, the 18 to 28 tonne chassis offer exactly what the extensive variety of body solutions requires: flexible free space for body components on the vehicle frame, a variety of mechanical and electric drives for body functions in different performance classes, up to nine different wheelbases, six cab variants, steered and unsteered trailing axles, leaf air and full air suspension, driving programmes specially tailored to the respective application and numerous other industry-typical features.

The compact design of the batteries is also the reason why MAN can also offer the new eTruck as a volume variant with a very low frame height for transports with an interior height of three meters. The area of application here is primarily production logistics, for example in the automotive industry, which is particularly predestined for a rapid switch from diesel to electric drive due to its application profiles with their standard transports between logistics hubs.

### **Electrically even better: relaxed driving with a high level of comfort**

Drivers of the MAN eTGX and MAN eTGS need have no fear of contact with the new technology. Inside the cabs, they are greeted by the familiar, driver-centric cockpit layout and the familiar operating logic, supplemented by typical e-vehicle operating features such as the settings for optimum use of recuperation, which also covers the continuous brake function. This can be operated both via the familiar steering column lever on the right of the steering wheel and via the selectable One-Pedal-Driving mode. Here, recuperation kicks in with increasing intensity the more the driver reduces the pressure on the accelerator pedal. This allows him to sensitively adjust the driving speed without having to use the service brake and at the same



time feed kinetic energy from the vehicle back into the batteries in the form of electricity. The completely newly developed fully digital instrument cluster provides information on the state of charge of the batteries, energy consumption and energy recovery.

In an electric vehicle, energy from the batteries is used not only for pure driving, but also for comfort functions such as heating or cooling the driver's cab. To make this as efficient as possible, the vehicle's overall thermal management system intelligently combines the cooling circuits of the cab heating system, the drive unit and the temperature management of the high-voltage batteries to efficiently use excess heat generated during operation for cab heating and only use additional energy from the batteries for this purpose when necessary. This guarantees good temperature control even under winter conditions in all cab sizes. These are fully in line with the range of today's diesel series, with a wide cab for the MAN TGX and a narrower one for the MAN TGS, each available in three roof height versions.