

STEP INTO THE FUTURE OF MOBILITY.

Your eMobility solutions from MAN.



The world of urban transportation is changing. Public transport systems need to meet increasingly demanding requirements, whilst increasing passenger numbers need to be reconciled with ever-stricter legislation and a desire for a better quality of life. The key to finding a comprehensive solution to this challenge is to take a holistic approach.





URBAN TRANSPORT: WHERE DOES THE FUTURE LIE?

Cities of tomorrow that want to ensure an emissions-free future need to set the right course today. The key is to move from “low emission” to “no emission”. However, converting part or all of your fleet to electric vehicles can give rise to a whole host of questions:

- Which lines can I run using electric vehicles?
- What steps can a city take to optimise the transition?
- What is the future of battery technology?

MAN can already provide the answer to these questions, with ideas and technologies that take you reliably into the future.

We're ready! By as early as 2030, every second MAN city bus is set to have an emissions-free drive system. In order to realise this vision, MAN has developed a comprehensive overall concept for you. By combining holistic and tailored consultation, customised mobility solutions and a reliable electric bus with tried-and-tested cell and battery technology, we pave the way for you to get started with e-mobility from 2020 onwards.

THE FUTURE IS HERE: E-MOBILITY SOLUTIONS FROM MAN.

Turning a vision into reality: with our extensive experience and exceptional innovative spirit, we at MAN work hand in hand with you to devise the roadmap to the future. Thanks to MAN's expertise, you can easily convert part or all of your fleet to electric vehicles.

The MAN Lion's City E electric bus will go into series production in 2020, and is set to make e-mobility a very attractive proposition for transport companies and passengers alike. For example, the capacity of the installed batteries enables a year-round range of 200 km or even 270 km over the entire battery service life and with high passenger numbers. The vehicle offers a wealth of benefits: rapid depot charging, a constant high range, optimised interior, upgradeable batteries and a reliable central motor that is easy to maintain. By combining maximum flexibility with pioneering efficiency, we offer transport companies the key to getting started with e-mobility.

The MAN Lion's City E ensures:

- maximum deployment flexibility
- maximum availability as a result of intensive testing
- affordable and comfortable mobility
- simple integration into existing fleets
- an easily implemented depot charging concept





FLEET CONCEPTS

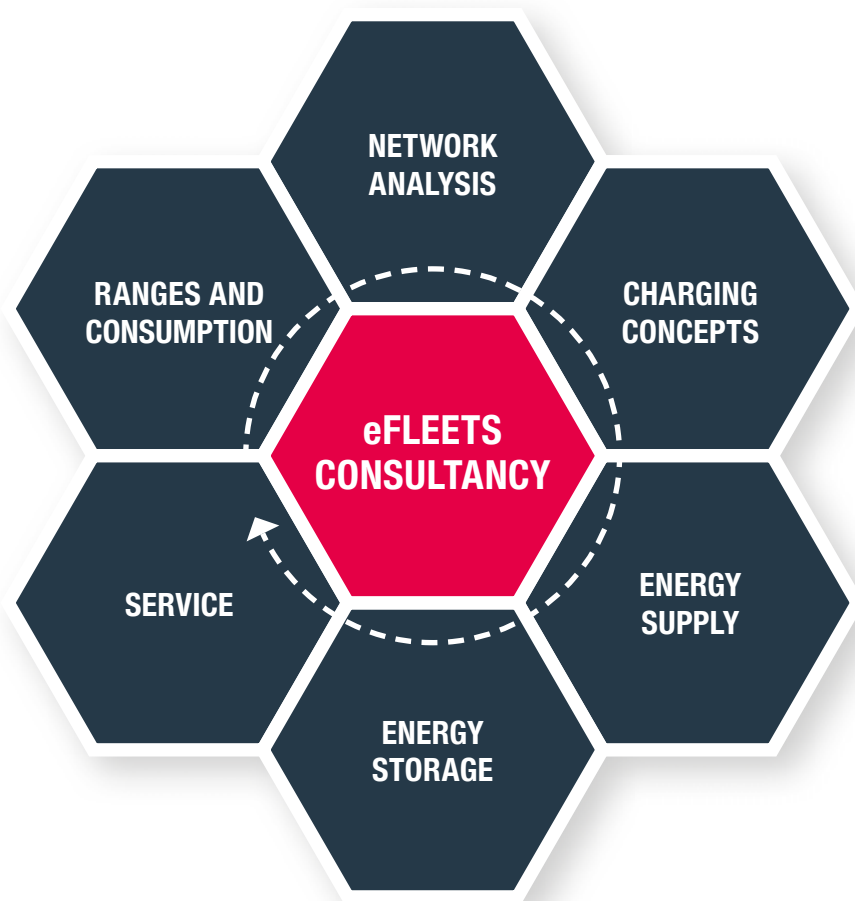
TECHNOLOGY

COST-EFFECTIVENESS

COMFORT AND DESIGN

SERVICES

MAN TRANSPORT SOLUTIONS: TAILORED SOLUTIONS FOR EVERY FLEET.



Changing over to e-mobility can throw up a number of issues. Therefore, it is important to also think about suitable charging solutions, an adequate energy supply and internal workflows in good time, and incorporate and analyse them at an early stage. The expert team at MAN Transport Solutions focuses precisely on this area, and creates customised transport solutions with the maximum cost efficiency for you. The consultancy services cover all aspects of the e-mobility ecosystem:

- **Orientation** provided by a competent partner in a complex and sometimes unfamiliar field.
- **Individual** and customised concepts for stable and optimised operating processes.
- **A holistic approach** by identifying and considering all questions and issues before start-up.
- **Optimum support** across all development stages. This ensures maximum reliability and cost effectiveness over the entire system.

With MAN Transport Solutions by your side, you know that the solution is tailored to the respective route, in line with the focus, range or passenger capacity in each case.

Global climate protection targets, local emission regulations, cleaner cities or company environmental targets based on fleet emissions – the reasons for switching to alternative drive systems are multifaceted, yet specific to each customer. Just like the solutions from MAN.



GO FURTHER ...

The new MAN Lion's City E is synonymous with total flexibility, thanks to intensive tests conducted under real-world conditions, at extreme temperatures and under the highest loads. With its extraordinary range, the MAN Lion's City E integrates seamlessly into existing schedules without the need for long charging times along the route. This maximises the vehicle's practicality in everyday road traffic.

The MAN Lion's City E's smart charging concept offers an impressive answer to the challenges of daily deployment. Thanks to the depot charging concept and individual charges as required at the ends of the line, there is no need to construct charging infrastructure along the route itself. This enables up to 80% of lines to be converted to e-mobility on a like-for-like basis, without any modifications. With our support, it is easy to implement the necessary charging infrastructure at the depot. Our charging concept enables charging times to be scheduled so as to maximise cost efficiency.

480

kWh battery capacity*

Fully usable year-round and over the entire battery service life.

2-3

hours charging duration**

Charging times are easy to schedule, ensuring efficient route planning.

150

kW charging power

Quick battery charging using a standardised CCS plug.

* Lion's City 12 E; 640 kWh for Lion's City 18 E.

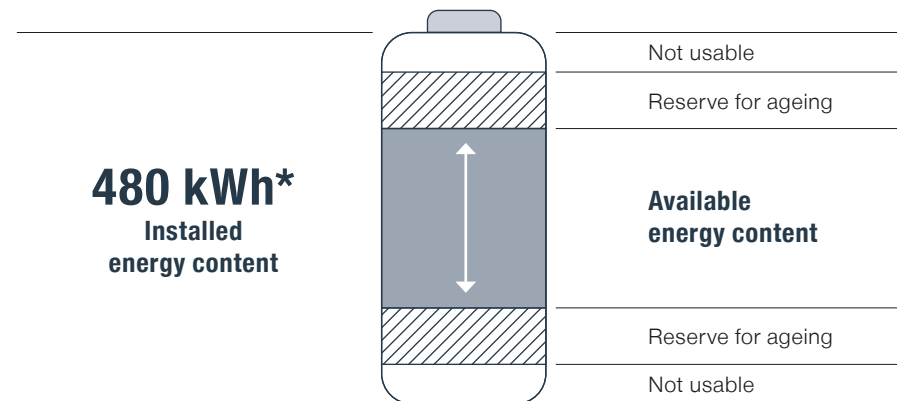
** Lion's City 12 E; 3-4 hours charging duration for Lion's City 18 E.

... WITH SMARTER POWER.

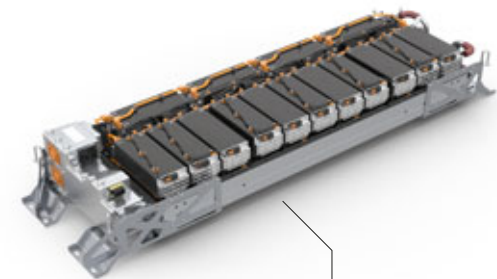
In order for future technology to become part and parcel of everyday life, all components need to interact perfectly with one another. That's why the MAN Lion's City E also comes equipped with the latest battery technology, as well as an intelligent energy management system.

With the tried-and-tested, future-proof lithium-ion technology (NMC) in the MAN batteries, customers benefit from optimum costs, weight and reliability. By calling on MAN's full breadth of expertise, the batteries have been tailored specifically to the MAN Lion's City E. As they have been developed, manufactured and tested in the Volkswagen Group, they are guaranteed to operate reliably for customers. The extremely high battery capacity of 480 kWh* and the ReliableRange usage strategy offer maximum flexibility in deployment. With their reliable range, which is available over the entire battery useful life, routes can be planned with ease.

ReliableRange usage strategy:

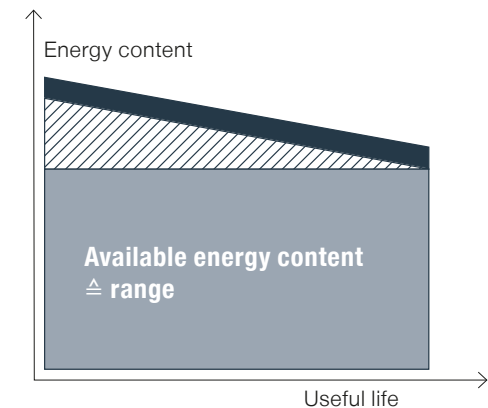


In the VW Group, the highest standards of sustainability and social conditions play an important role in the procurement of raw materials for the battery.



Lithium-ion battery

Reliable and future-proof technology.



THE RIGHT CHARGING SOLUTION FOR YOUR REQUIREMENTS.

MAN now also offers you the right charging infrastructure in cooperation with two strategic partners.

In close cooperation with Heliox and SBRS, MAN provides you with holistic solutions for your entry into electromobility – as simple, safe and cost-efficient as possible.

The new range is available in 28 European countries. It covers a wide spectrum of requirements: from mobile charging units through to large fleet solutions. The mobile chargers can be used flexibly in the depot and are not permanently installed. The range extends from 40 kW to 150 kW charging capacity, so that a future-proof and tailor-made solution can be presented for each and every customer. It is also possible to charge multiple vehicles from a single charging station. Together with our partners, we determine a charging structure that is perfectly tailored to you and your requirements. In addition to receiving the appropriate charging infrastructure, you can also have it installed and maintained by a single source if you require..



A BIG IDEA. AND BIG ON DESIGN, TOO.

Form follows function. The MAN Lion's City E has been thoughtfully designed throughout – which offers tangible benefits.

Cleverly positioning the components outside the passenger area has created a generously proportioned interior. Omitting the engine tower even allows for up to four additional seats. All elements show the future from its best side: with its high-gloss exterior, comfortable interior fittings and distinctive shape, it is immediately apparent that a member of the great MAN city bus family is entering the arena. As such, the MAN Lion's City E is a pioneer of a contemporary cityscape.

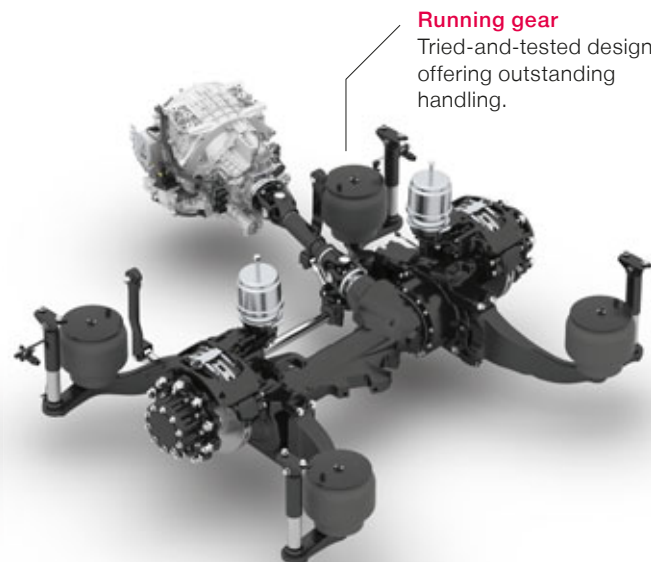


TOP-OF-THE-LINE RELIABILITY.

**Central motor**

Simple concept that is easy to maintain.

MAN uses an electric central motor on the rear axle to drive its solo-buses, or two central motors on the second and third axles to power its articulated buses. These are easier to access and more simply designed than motors in close proximity to the wheel hubs, which is advantageous in terms of maintenance and the Life Cycle Costs (LCC).

**Running gear**

Tried-and-tested design offering outstanding handling.

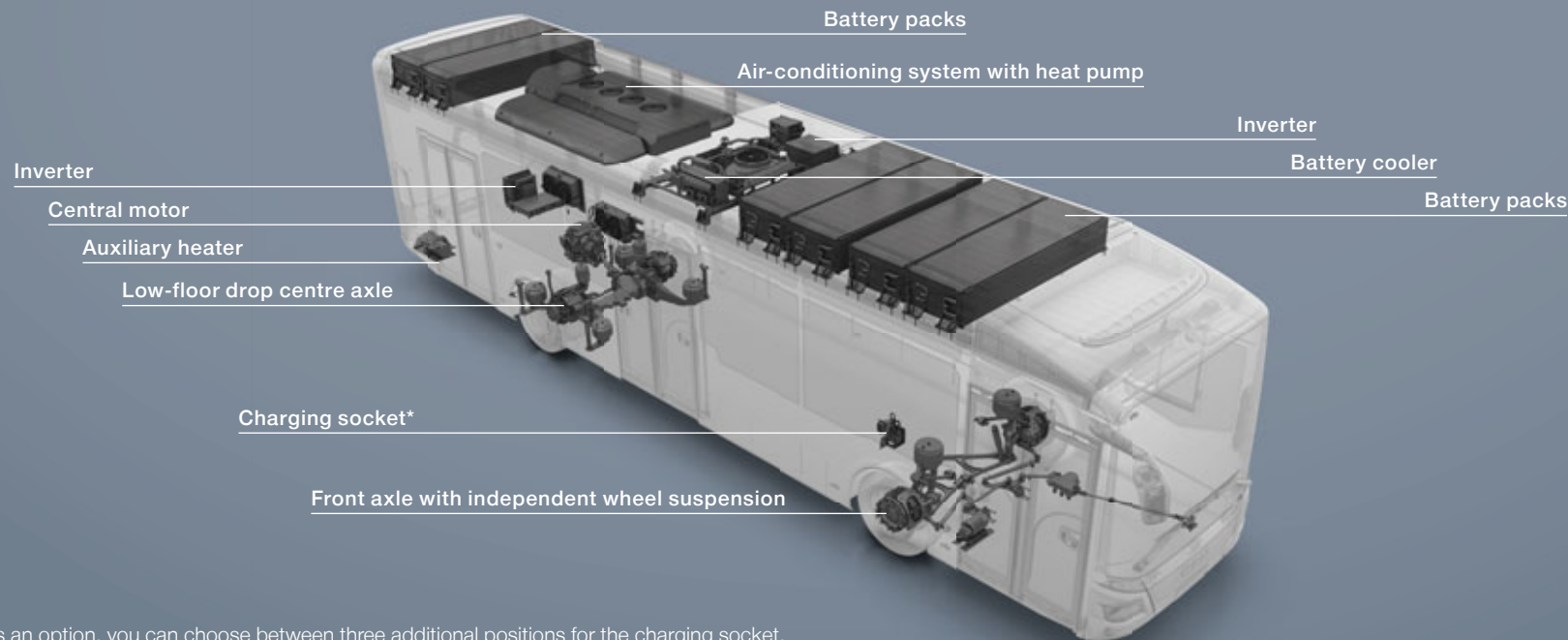
The MAN Lion's City E offers exceptional driving dynamics thanks to the specially coordinated and optimised design of the running gear. The two driven axles increase the driving stability of the MAN Lion's City 18 E articulated bus and, in turn, its safety, as well as providing maximum energy recovery when braking.

THE EFFICIENCY LIES IN THE DETAILS.

The MAN Lion's City E is an electrifying proposition: profitability is incorporated as standard. Customers benefit from top efficiency as all components are networked with one another. The modular vehicle concept also increases reliability and simplifies maintenance work. This ensures maximum cost efficiency, right down to the last bolt.

MAN's extensive experience with city buses and the Group's expertise when it comes to e-mobility solutions make us an expert partner for tackling the challenges of future urban transport. We rely on tried-and-tested components such as the axles, and straightforward maintenance work is guaranteed thanks to the simpler design. With its electric central motor, the vehicle leads the way in whisper-quiet, clean performance. Omitting the engine tower has allowed for

a continuous seat bench at the rear, providing up to four additional seats. The separate central motor does not place any additional strain on the tried-and-tested standard drop centre axle. The upgradeable battery concept allows for future innovations across the entire life cycle. All batteries are located on the roof, away from the rear of the vehicle which is at risk of rear-end collisions, meaning they are easy to access and maintain.



* As an option, you can choose between three additional positions for the charging socket.

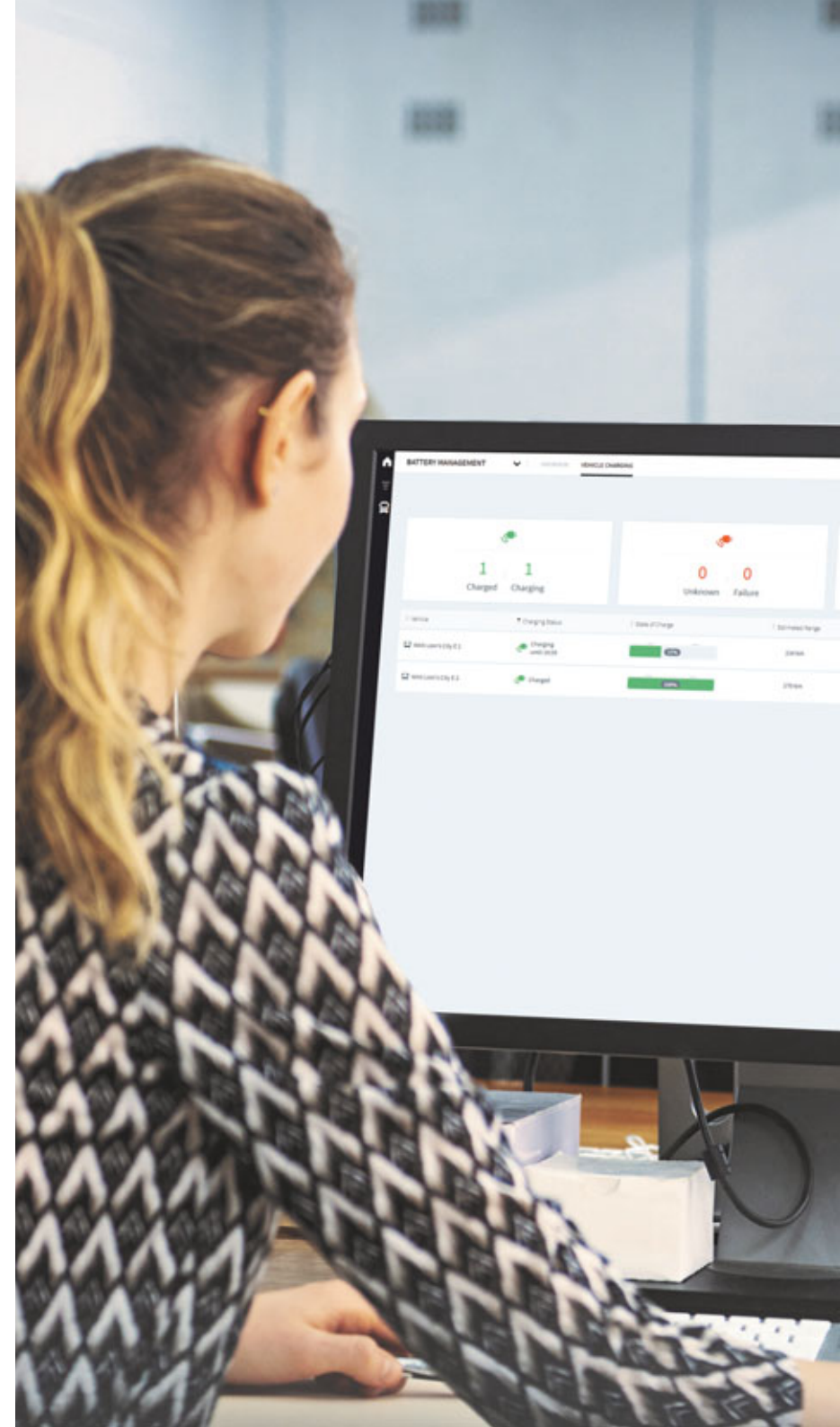
YOUR INTRODUCTION TO DIGITALISATION. WITH MAN DIGITAL SERVICES.

The MAN digital services make your bus fleet – whether city buses, coaches or electric buses – much more effective. Reduce consumption and wear on your buses and create reliable timetables through optimal route planning for your passengers. With MAN DigitalServices, you also meet statutory requirements for passenger transport with regard to monitoring the driving times and rest periods of your drivers.

Thanks to real-time positioning of your bus fleet, you can intervene in route planning in the event of a traffic jam so that you reach your destination promptly or are able to adhere to the timetable. All journeys are documented for verification purposes so that you are covered in the event of a claim for compensation based on delays. The recording of trips is also used for later analysis in order to optimise timetables and thus save costs. Keeping a log of consumption rates offers further optimisation potential: your drivers are encouraged to drive more economically.

Effective maintenance management also increases your vehicle uptime. Maintenance intervals are constantly visible to you, so vehicle downtimes can be scheduled appropriately.

MAN Service Care intensifies our personal contact with you. This means that you never miss any urgent maintenance appointments. Using online tracking and e-mail, it's now even easier for you to keep an eye on status, appointments, notifications and further information. The result is first-class maintenance of vehicles, maximum vehicle uptime, reduced fuel consumption and less stress in daily business operations.



CHARGE MANAGEMENT MADE EASY. WITH THE MAN eMANAGER.

With the MAN eManager, you can control the charge management and preconditioning of your MAN Lion's City E simply and efficiently. In accordance with the timetable, set a time at which your vehicle should be ready for use (and thus 100% charged) and monitor the battery status and charge level conveniently from your desk via the RIO platform. This saves you a lot of time in fleet planning and, above all, valuable battery energy in order to maximise the range.

The application makes it easy and straightforward to control the battery charging and air conditioning of your vehicle or electric buses. Using the timer mode, you stipulate when your vehicle should be fully charged. The MAN eManager takes care of the rest. This gives you a constant real-time overview of the charge level, range and time at which a full charge has been reached. You can also set automatic air conditioning of the passenger area. Thanks to preconditioning in the depot, the valuable energy of the battery is made available exclusively to power the drive after leaving the depot. In addition, the MAN eManager provides you with continuous monitoring of all data relevant to the electric bus, such as battery status and consumption.





TAKING SERVICE TO THE NEXT LEVEL.

Maximum quality over the maximum vehicle service life and excellent availability – that's our promise to you. With a wide-ranging portfolio of services, we offer 360° support that is both efficient and reliable. You can rest assured at all times: your MAN coach is in the best hands with us.

MAN services offer everything your coach needs, meaning that your MAN coaches are always operated in the best possible conditions and that you can profit from your vehicles for even longer. With MAN ServiceContracts or MAN Mobile24: your mobility is our concern. That is true of our additional services too. MAN services, for instance, have tailored solutions on hand to optimise operating your vehicles, increase profitability and increase efficiency. Whatever service you choose, you're always on the right road with MAN.

MAN | Financial Services

MAN Financial Services* help you to stay financially mobile. Moreover, our coach rental service makes it possible to be more flexible in responding to shortages or increased demand.

- **MAN Card**
Europe-wide non-cash payments
- **Financing**
Acquisition of property through flexible financing solutions
- **Insurance**
Insurance solutions for commercial vehicles
- **Leasing**
Budget-friendly leasing models
- **Rental**

Vehicle rental with a flexible contract term

*The services offered as part of the joint business relationship "MAN Financial Services" (financing, leasing and insurance products) vary from country market to country market. They are provided or brokered by various subsidiaries of Volkswagen Financial Services AG.

MAN | Service



Higher quality, more time: new – two-year warranty on MAN service and parts.

- **MAN Genuine Parts:** top quality, long service life and availability ensured
- **MAN Genuine Parts ecoline:** save a lot and protect the environment in the process with reconditioned MAN Genuine Parts from MAN, the manufacturer or external service providers
- **MAN Genuine Oil:** MAN Genuine Oils are proven to provide optimum protection against wear and thus contribute to reducing overall operating costs
- **MAN Mobile24:** Europe-wide breakdown service for coaches
- **MAN ServiceContracts:** service agreements covering service and inspection tasks on the maintenance schedule. Depending on the add-on option, different modules such as contract management, driveline guarantee and wear-and-tear repairs can be included.
- **MAN guarantee extensions:** guarantee extension for driveline and complete vehicle

MAN | TopUsed

- **Top used vehicles:** large selection of high-quality used vehicles of all coach types
- **Service promise:** top quality, top advisory service, top selection, top financing, top service
- **Top services:** including used vehicle guarantee, financing

MAN ProfiDrive®

The MAN ProfiDrive® driver training programmes and corporate coaching modules bring you up to speed, making day-to-day driving safe. The support and training programmes on offer give you additional opportunities to optimise your commercial environment.

The quickest way to find out more: www.bus.man.eu

All information on our products, services and other service topics such as MAN ServiceContracts, MAN Card, MAN ProfiDrive®, MAN Financial Services and MAN Mobile24, etc. can be found on our website www.bus.man.eu – discover the MAN brand interactive and up close.

ENERGIZED SERVICE. TO PERFECTION.

New service dimensions are opening up for your electric bus – from maintenance and repair to transport and disposal of high-voltage batteries. When it comes to professional handling of high-voltage vehicles, your MAN is your strong partner in meeting all challenges.

Comprehensive, professional service for your electric vehicle awaits you – with intelligent solutions for efficient vehicle operation and integration of charging infrastructure and building technology. We offer you all services for high-voltage vehicles – from diagnosis to repair at our MAN service outlets.

Our core competence areas ensure complete service support, starting with the best qualification of our employees, perfectly suited workshop accessories, the necessary quarantine concept and a professionally set up high-voltage workplace.

We are your competent companion and dependable partner in the professional and reliable maintenance of your electric bus, as well as for providing training in your own workshop.



WITH US, YOUR ELECTRIC BUS IS IN THE BEST HANDS.

For some time now, the MAN service outlets have been maintaining mainly buses/coaches (but also other vehicles) equipped with alternative drive systems. These are the best prerequisites for long-term safety in maintenance and service for your electric bus.

- **Qualification:** Employees are well trained in the field of electromobility. Qualified know-how means that you can count on competence in dealing with high-voltage technology, professional vehicle instruction on e-vehicles and first-aid measures. Our specialist service staff undergo a multi-stage training program to provide you with optimal support.

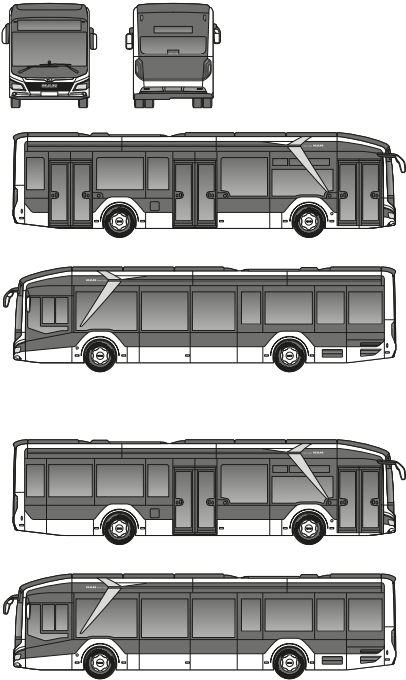
- **Special tools:** Work on electric vehicles requires additional general and vehicle-specific tools. Our service outlets are always up to date in order to be able to carry out all necessary work on your electric bus in the best possible way. This starts with diagnosis and fault analysis and leads to solving your problem using our special tools. Amongst other things, we have insulated general tools, warning signs in corresponding positions and vehicle-specific tools for all these activities, such as for disassembling and fitting high-voltage components.

- **Quarantine concept:** For maximum vehicle and personal safety, we recommend our well-conceived quarantine concept. Our service outlets have a specially segregated quarantine area in the event that damage with risk potential is detected. There, the required work can be carried out on the vehicle without danger. For example, in the event of smoke generation, increased temperatures or unusual noises, etc., all further measures can be taken with optimal accessibility and the required safety distances.

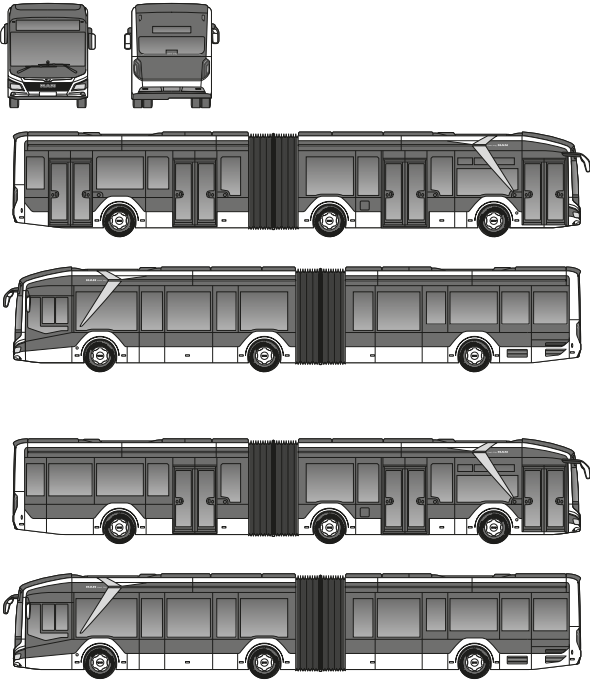
- **High-voltage work place:** Dealing with electrical current in a high-voltage environment necessitates a correspondingly sensitive approach to work in the workshop area. Our specially equipped high-voltage work place is secured by access restrictions and marked with special warning signs. More stringent cleanliness requirements, separate sockets and other aids contribute to maximum safety.

TECHNICAL DATA.

MAN Lion's City 12 E



MAN Lion's City 18 E



MAN Lion's City 12 E		MAN Lion's City 18 E
Dimensions/weights		
Length	12,200 mm	18,100 mm
Width	2,550 mm	2,550 mm
Height	3,320 mm	3,320 mm
Techn. permissible gross weight	19,500 kg	29,900 kg
Max. passenger capacity (seated/standing)	88 (25/63)	120 (43/77)
Battery and charging concept		
Battery capacity	480 kWh	640 kWh
Installation location of batteries	Roof	Roof
Battery technology	NMC	NMC
Usage strategy	ReliableRange	ReliableRange
Range Year-round	200 km under realistic conditions; up to 270 km under favourable conditions	
Charging strategy	Depot charging (overnight)	Depot charging (overnight)
Charging system	Plug charging (CCS)	Plug charging (CCS)
Charging power	Up to 150 kW (DC)	Up to 150 kW (DC)
Charging time	< 3h	< 4h
Drive and running gear		
Motor	Electric central motor	Two driven axles, two electric central motors
Continuous power	160 kW	267 kW
Maximum performance	240 kW	400 kW
Gearbox	Single-stage adapter gearbox	Single-stage adapter gearbox, electronic synchronisation between the two driven axles
Running gear	CDS shock absorbers Front axle: low-floor axle with independent wheel suspension; rear axle: low-floor drop centre axle with stabiliser.	
Air conditioning	Automatically controlled all-year concept: electric roof air conditioning system using heat pump and electric heater elements, auxiliary heater using alternative fuels (biodiesel, HVO etc.)	

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Texts and illustrations are non-binding. We reserve the right to make modifications for reasons of technical progress. All specifications in this publication represent the status at the time of going to press.

Some vehicles depicted in this brochure show equipment available on extra charge.

The vehicle's air conditioning system contains fluorinated greenhouse gases (R134a / GWP 1430 with up to 1.15 kg; 1.6445 t CO₂ accordingly).

MAN Truck & Bus – A member of the MAN Group