



EnergyDecentral 2024: MAN Engines presents battery solutions for container applications as well as updates for gas engines

Munich, 11/11/2024

- **MAN BatteryPack: robust battery solution for demanding mobile applications**
- **89 kWh gross scalable and in different designs**
- **Comprehensive recycling options**

- **Further development of the tried-and-tested MAN E3262 and MAN E3268 series with optimized cylinder head**

- **MAN E3872: Natural gas and special gas variants available as series**

MAN Truck & Bus
Dachauer Straße 667
D-80995 Munich

Should any questions arise, please contact:
Florian Schaffelhofer
Phone: +49 151 11766475
Florian.Schaffelhofer@man.eu
www.man-engines.com/press

MAN Engines, leading manufacturer of stationary engines for power and heat generation, is presenting its latest developments for electricity storage in the industrial sector for the first time at EnergyDecentral in Hanover. The focus of the trade fair appearance will be on the innovative MAN BatteryPack, which sets new standards in terms of quality and robustness and can therefore play to its strengths especially in mobile applications.

The MAN BatteryPack is based on state-of-the-art nickel-manganese-cobalt batteries (so-called NMC battery) as a variant of the lithium-ion battery. This advanced battery solution is characterized by its focus on cell chemistry, charging cycles, mechanical robustness, vibration resistance and service life. "We see MAN BatteryPacks in mobile charging solutions that are exposed to high loads and at the same time have to meet a variety of different operating conditions. Compared to other cell chemistries, NMC cell chemistry offers a high energy density, which is very crucial for mobile applications," says Reiner Roessner, Head of Sales MAN Engines. Thanks to the modular design of the MAN BatteryPack, customers can flexibly and individually scale the capacity and performance of their energy storage systems for different energy requirements in order to optimally reflect their specific needs.

MAN Truck & Bus is one of Europe's leading commercial vehicle manufacturers and transport solution providers, with an annual revenue of about 14,8 billion euros (2023). The company's product portfolio includes vans, trucks, buses/coaches and diesel and gas engines along with services related to passenger and cargo transport. MAN Truck & Bus is a company of TRATON GROUP and employs approx. 33,000 people worldwide.



A MAN BatteryPack, also known as a battery system, generally consists of several battery modules arranged in two to four layers within the housing. Each of these modules contains many battery cells. Different modules can be arranged in different ways to produce different designs of MAN BatteryPacks. A MAN BatteryPack stores 89 kWh of energy, of which 80 kWh can be used. Due to the three varying shapes – from almost square to elongated – there are a wide range of integration options in different installation spaces. Currently, up to six MAN BatteryPacks can be combined to achieve a total system capacity of up to 534 kWh gross (480 kWh net). Expansion to other packs for higher capacities is being planned.

MAN Engines' many years of experience in the customer-specific development of diesel and gas engines for various applications in agricultural and railway technology, shipping and power generation will now also be transferred to battery production. With their in-depth industry know-how, the engineers at MAN Engines optimize existing engines and assemblies to create leading drive solutions. This expertise makes it possible to offer industrial customers tailor-made battery solutions from the large-scale production of MAN vehicle technology. Thanks to large-scale production at the Nuremberg plant of MAN Truck & Bus and a global service network, customers benefit from established processes and advantages, such as meeting the requirements for the European Battery Regulation.

MAN Truck & Bus – and thus also MAN Engines – considers the entire life cycle of the battery to be a closed cycle up to recycling. The overarching goal in dealing with batteries is to close the material cycle in order to make a major contribution to more sustainable development. To this end, MAN will automatically assess the condition of batteries that can no longer be used for a specific application and then dismantle them. For further use, reuse in a new application is considered after appropriate reprocessing. After the aforementioned factory repair (2nd-use) of the batteries or in the event that batteries are no longer suitable for stationary buffer storage systems of solar, wind power or biogas plants after their first use or after an accident (2nd-life), recycling comes into play. MAN will implement a closed cycle for battery raw materials with the primary goal of continuously extending the use of batteries and thus resources. Only when this is no longer possible will the valuable, recovered raw materials such as nickel, manganese, cobalt or lithium flow into the production of new batteries. MAN is part of the Volkswagen Group recycling network with recycling partners throughout Europe.



Further technical development of the E32 series (V12 and V8)

Another highlight at EnergyDecentral 2024 is the MAN E3268, which is equipped with a revolutionary cylinder head. The V8 gas engine on display is an example of the entire MAN E32 series, consisting of V8 and V12 engines that benefit from technical development. This update to the cylinder head brings numerous improvements and sets new standards in terms of reliability and efficiency. The design changes made to the new cylinder head further increase the robustness of the engine and thus contribute to a further reduction in the total cost of ownership (TCO).

A key feature of this innovation is the introduction of two O-rings in the spark plug sleeve. In contrast to earlier models, these two O-rings have been placed in the cylinder head in a more optimized way, resulting in significant thermal relief and better coolant flow. This arrangement ensures significantly higher resistance to chemical and thermal influences, for which new O-rings made of particularly resistant material were also chosen. In addition, it is possible to optionally equip the cylinder head with pre-chamber spark plugs, which are becoming increasingly popular in the biogas sector. Pre-chamber spark plugs have a small chamber that is located in front of the main combustion chamber. This enables more efficient ignition of the gas mixture, which leads to improved engine performance and higher efficiency, especially in biogas applications.

Other robustness-enhancing measures include the adaptation of the exhaust valve and valve seat with more wear-resistant materials. In addition, Roto-caps integrated into the new cylinder head contribute to the additional robustness of the engine, which further increases its reliability and longevity. Roto-caps provide uniform thermal stress on the seat rings and valve discs because when the valve is opened, a disc spring is flattened and presses on a ring of balls, causing the valve to rotate slightly with each opening stroke.

The MAN E32 series, consisting of the MAN E3268 and MAN E3262 V8 and V12 engines, has been successfully established on the market since 2012 with many thousands of units. Continuous technical development and adaptation to the latest technical possibilities have contributed to the fact that this engine series continues to meet the high demands and expectations of the

industry. Continuous further developments also help to ensure that the company is always designed to meet the latest emission requirements.

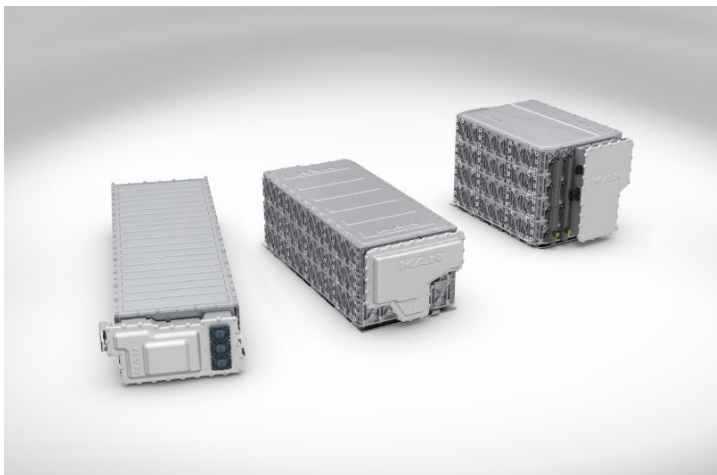
E3872 available in series production

Another highlight of EnergyDecentral is the new MAN E3872 with a displacement of 30 litres, which is available in 50 and 60 heart variants for natural gas as well as special applications from the series. With an impressive 29.6 liters of displacement, a bore of 138 mm and a stroke of 165 mm, this four-stroke gasoline gas engine delivers a remarkable performance of 735 kW_{mech} at 1500 rpm and even 840 kW_{mech} at 1800 rpm.

With nitrogen oxide values of 500 mg/Nm³ NO_x (5% O₂), the compact V12 engine achieves an impressive mechanical efficiency of 44.0% at 50 Hz.

MAN Engines will be presenting its new MAN BatteryPack, the design development of the E32 engine series and a 3D model of the MAN E3872 at EnergyDecentral in Hall 24, Stand 24A22.

Pictures:



The MAN BatteryPack is the ideal solution for mobile applications when it comes to design flexibility in connection with robustness.



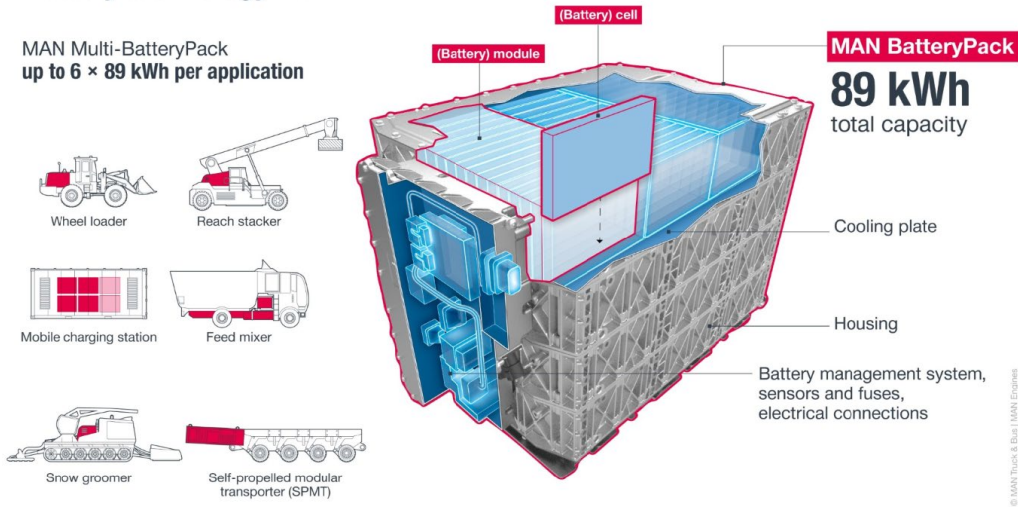
	MAN BatteryPack 403	MAN BatteryPack 303	MAN BatteryPack 203
Gesamtkapazität	89 kWh	89 kWh	89 kWh
nutzbare Energie	80 kWh	80 kWh	80 kWh
Spannungsniveau	500 - 785 V	500 - 785 V	500 - 785 V
Stromstärke Laden/Entladen (kont.)	165 A / 200 A	165 A / 200 A	165 A / 200 A
Gewicht	620 kg	595 kg	600 kg
Kühlmittelfluss	30 l/min	30 l/min	30 l/min
Maße (L/B/H)	1.050 x 670 x 645 mm	1.490 x 600 x 495 mm	2.155 x 610 x 340 mm

Alle Angaben sind China-Angaben und gerundet. Alle Werte ohne Kühlmittel und ohne Unterbodenschutz. Status: 11/2023

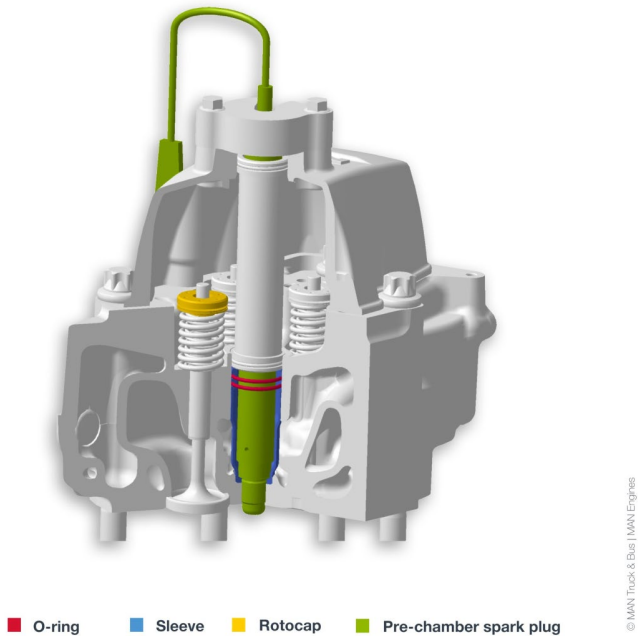
The individual battery systems, each with an output of 89 kWh (gross), are scalable up to 480 kWh net output.

Battery technology from MAN

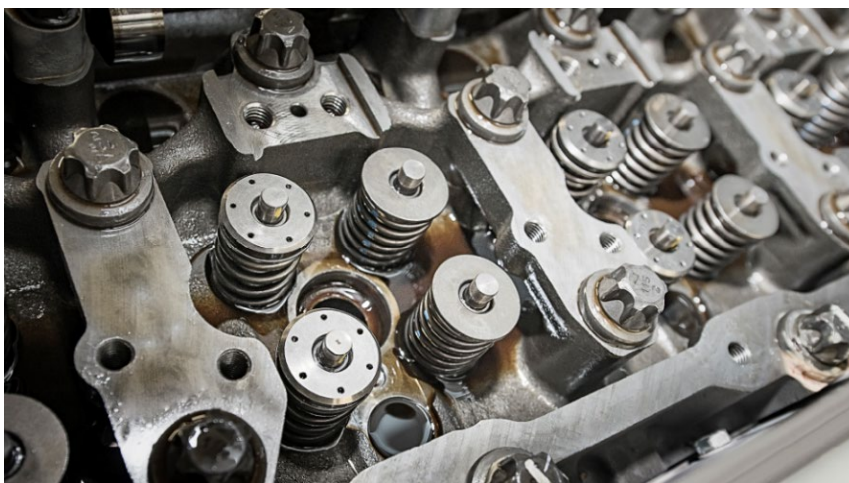
MAN Multi-BatteryPack
up to 6 × 89 kWh per application



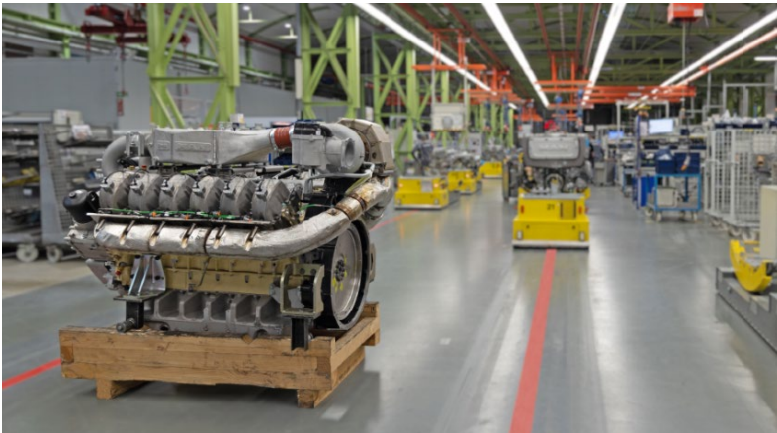
The MAN BatteryPack can be used flexibly in numerous mobile applications, including mobile charging stations.



The new cylinder head of the MAN E32 series features the following key innovations: two O-rings newly placed on the sleeve for thermal relief, the option of optional pre-chamber spark plug equipment for more efficient ignition, and the integration of rotocaps to increase robustness and uniform thermal loading.



Rotocaps are a design development of the cylinder heads of the E32 series and provide additional robustness. Pictured: Rotocaps in the field test of a MAN in-line six-cylinder engine.



The MAN E3872 with a displacement of 30 litres is available as standard in both the natural gas and special gas variants.

MAN E3872 LE201

stationärer Gasmotor / stationary gas engine

Frequenz Frequency		50 Hz		60 Hz	
Brennstoff Fuel		Erdgas natural gas	Sondergas special gas	Erdgas natural gas	Sondergas special gas
Zylinderanordnung/-anzahl Arrangement/number of cylinders		V12			
Bohrung Bore		138			
Hub Stroke		165			
Hubraum Displacement		29,6			
Nenn Drehzahl Rated speed		1500 (50 Hz)		1800 (60 Hz)	
bei NO _x =0,25 g/Nm ³ ; 5% O ₂ at NO _x =0,25 g/Nm ³ ; 5% O ₂	Nennleistung effektiv Standard power effective	kW _{mach}	735	J.	800
	Wirkungsgrad mechanisch effektiv Efficiency mechanical effective	%	43,7		40,5
bei NO _x =0,50 g/Nm ³ ; 5% O ₂ at NO _x =0,50 g/Nm ³ ; 5% O ₂	Nennleistung effektiv Standard power effective	kW _{mach}	735	735	840
	Wirkungsgrad mechanisch effektiv Efficiency mechanical effective	%	44,0	44,0	41,6
Motorlänge Engine length		1760			
Motorbreite Engine width		1245			
Motorhöhe Engine height		1410			
Gewicht (trocken) Weight (dry)		2159			

technische Daten, technical data, Stand/as at : 01.11.2024

Technical data of the MAN E3872.