



DIESEL
MONOBLOCK

CYLINDER

[2][4][6] [HYBRID]
[SYSTEMS]



VEHICLE ENGINES

COMPETENCE THROUGH EXPERIENCE

STEYR MOTORS originates from the former Steyr-Daimler-Puch group and was founded as an entirely independent company following a management buyout in 2001. Drawing from the extensive know-how and experience of 150 years of engineering history, STEYR MOTORS focuses on the development of high-performance engines and propulsion technologies for current and future demands.

The company has a worldwide reputation for being an expert in engineering and manufacturing of high-performance diesel engines and hybrid systems. STEYR MOTORS provides strong solutions for use at land and sea, i.e. for the marine industry, for special land and amphibious vehicles and for industrial use. The product range includes diesel engines and diesel-electric solutions as well as highly-specialized engineering services for specific requirements. Great importance is placed on quality management in every step of the production and service chain. Therefore, the company consistently passes quality audits and certification procedures.

A recent milestone in the company's history was a remarkable investment in the expansion of the Austrian facilities doubling the premises and capacities. The extended R&D headquarter was inaugurated in May 2015. It is the heart of STEYR MOTORS' innovation and engineering competence, ensuring cutting-edge developments and product launches for the future.



DIESEL MONOBLOCK

All engines of STEYR MOTORS are based on a well-proven Monoblock design, capable of fulfilling highest demands in operational reliability. Durability, safety and robust cooling behavior were the guidelines of the design and led to an unrivalled product range of compact and lightweight high-performance diesel engines.

The STEYR Monoblock is a highly efficient single casting from special high tensile alloy. Its key characteristic is a modular, compact design allowing for effective cooling through an unrestricted flow of coolant. The elimination of cylinder head warping and the reduction of mechanical and thermal forces within the Monoblock material lead to significantly improved durability and robustness of STEYR MOTORS' engines. Furthermore, due to the lack of cylinder head bolts and anchoring threads, the Monoblock design enables shorter, slimmer and more lightweight solutions.



FORWARD THINKING

LIGHTWEIGHT POWER PLAYERS

Our specialty is the design of engines and aggregates featuring one of the best power to weight ratio in the market. Though lightweight and compact, STEYR MOTORS' products are also very robust and provide remarkable performance. While downsizing became a trend in the common industry over the last years, STEYR MOTORS has always focused on small and lightweight solutions with high power density and with the same durability and reliability as heavier products competing in the same power range.

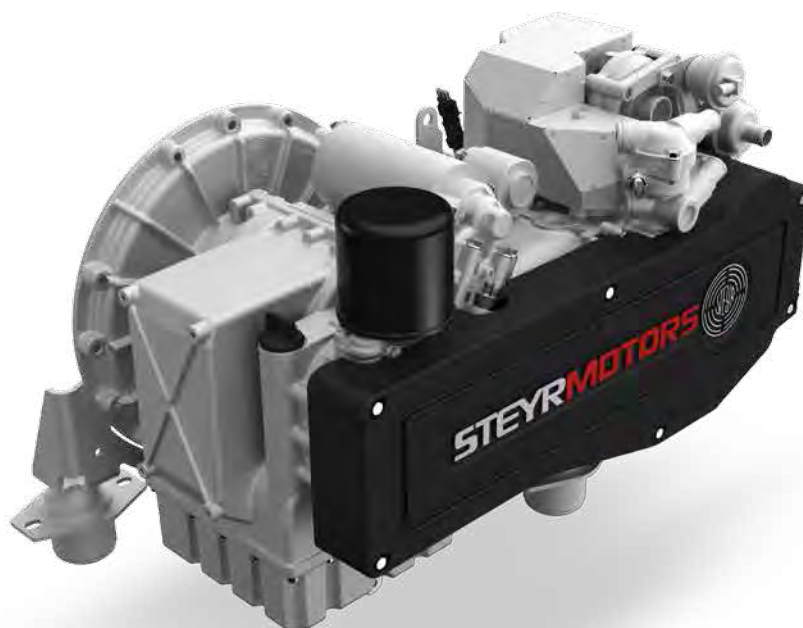
EFFICIENT TECHNOLOGIES FOR THE FUTURE

The product portfolio of STEYR MOTORS includes diesel engines and diesel-electric solutions for a wide range of applications in the marine, vehicle and industrial business segment. The future engineering strategy continues to focus on diesel and hybrid solutions complying with leading industry standards, such as the ISO 9001:2008 certification, and also emphasizes environmental effects, targeting reduced fuel consumption and emissions.

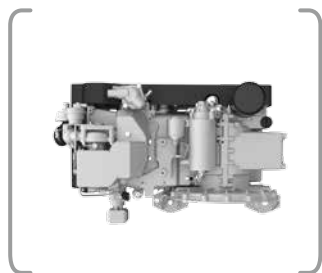


M12 UI

2-CYL UNIT INJECTOR



[2]
CYLINDER



SMALL BUT POWERFUL

The 2-cylinder unit injector diesel engine (M12 UI) of STEYR MOTORS is characterized by a horizontal parallel twin piston configuration resulting in one of the most compact products on the market regarding the power output. The M12 UI was created to work perfectly even under extreme conditions. It is proven and tested according to several civilian and military standards including high altitude requirements, varying fuel qualities, tough environmental conditions and other challenging requirements. Due to our vast experience in tailored engineering, the 2-cylinder unit injector with 26 kW mechanical output can also be customized to fit specific requirements.

Small and lightweight, but also robust and powerful are the key characteristics of STEYR MOTORS' engines and, thus, also of the M12 UI. The 2-cylinder diesel engine is based on STEYR MOTORS' Monoblock design and features direct injection with a mass balancing system for smooth operation. The engine is fuel efficient, turbocharged (single stage, wastegate) and intercooled as well as being multifuel capable (including military fuels). A long lifetime as well as the longest possible service intervals are further benefits of this product.

THE PERFECT APU

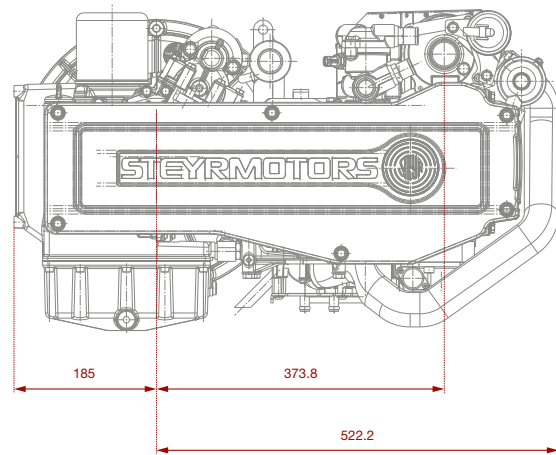
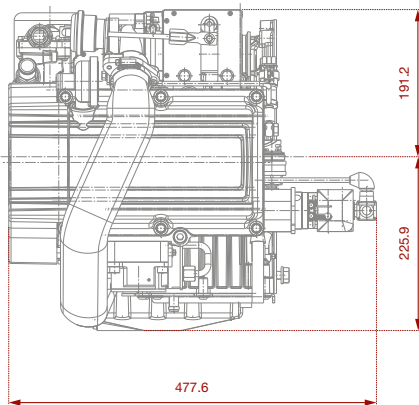
The 2-cylinder diesel engine can be used for various applications. However, the perfect solution is applying it as an auxiliary power unit. The M12 UI is particularly suited for combination with small-sized permanent magnet synchronous motors (PMSM), but it can also be used for continuously variable transmissions, hydraulic pumps etc.

MADE FOR EXTREME CONDITIONS

The main difference of the M12 UI compared to the 2-cylinder common rail engine (M12 CR) is the ability to run under toughest ambient conditions as for instance sand, dust, low fuel quality, temperature, shock/rough terrain. The operational temperature comprises a range from -32 °C to +49 °C, but can be extended to -46 °C with a preheater. In short, the 2-cylinder unit injector is the first choice for demanding environmental conditions and military applications.

FEATURES

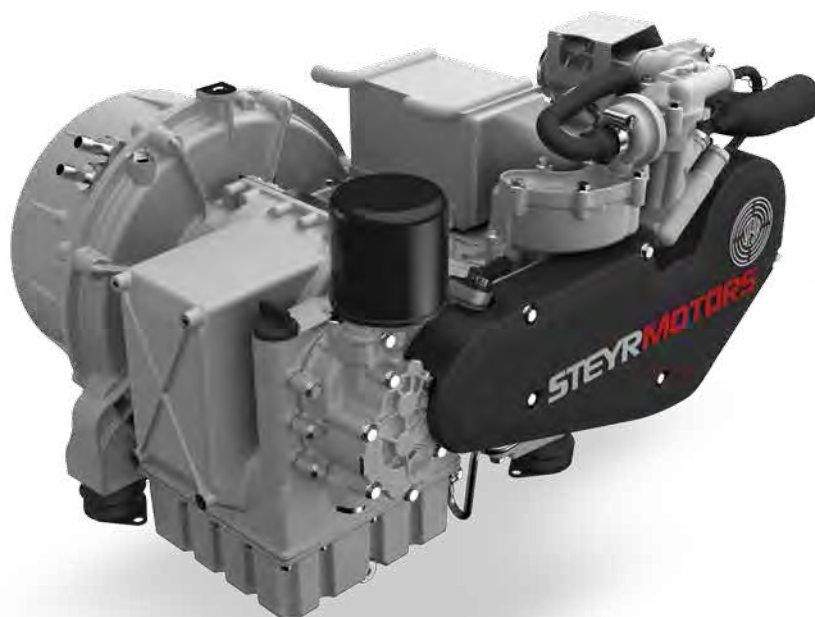
- Monoblock design
- Parallel twin DI diesel engine
- Reliable unit injector technology
- 26 kW mechanical output
- Fully mass balanced
- Small, lightweight and fuel efficient
- Multifuel capable (incl. military fuels)



	M12 UI
NUMBER OF CYLINDERS	2 in-line, horizontal
INJECTION SYSTEM	2-stage unit injector
DISPLACEMENT (LT)	1.06
RATED POWER (KW @ RPM)	26.4 @ 3600
MAX. TORQUE (NM @ RPM)	77 @ 1500
MIN. FUEL CONSUMPTION (G/KWH)	225
DRY WEIGHT (KG)	104

M12 CR

2-CYL COMMON RAIL



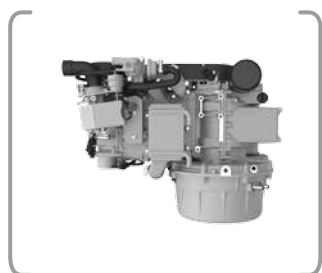
2
CYLINDER



A COMMON RAIL WITH UNCOMMON ABILITIES

The common rail version of the 2-cylinder diesel engine (M12 CR) inherited the striking characteristics of the M12 UI, but in addition has been particularly optimized to run the new STEYR MOTORS E-machine.

Based on the proven Monoblock design, this horizontal parallel twin features direct common rail injection, a mass balancing system for smooth operation and an intercooler for fuel efficiency and low emission usage. The M12 CR is turbocharged (single stage, wastegate) and provides 40 kW mechanical output.



Besides the combination with the brand-new STEYR E1, it is also possible to run other DC and AC generators, hydraulic pumps, CVT transmissions and more. The M12 CR is an ideal enhancement for electric-driven vehicles, for example by applying it as a range extender.

DIESEL-ELECTRIC POWER PACK

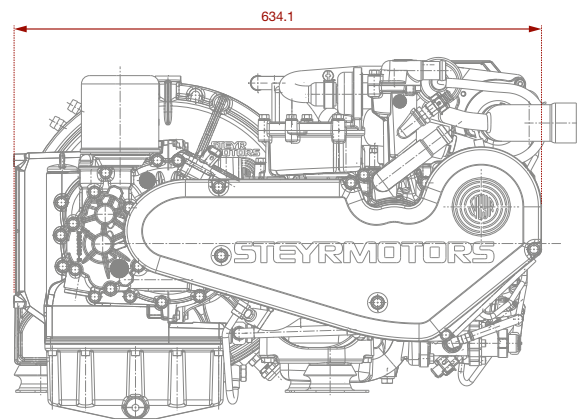
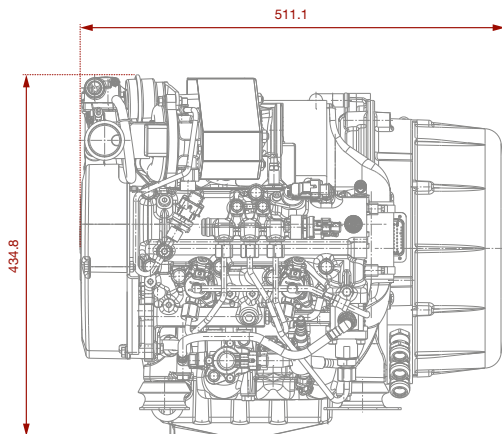
A unique way of application for the M12 CR is the assembly of the engine, E-machine, after treatment system, radiators, fans and all peripheral components within a frame including acoustic insulation walls. The resulting set is an outstanding, compact and lightweight assembly that is fully equipped for powering various applications while in addition being more easily transportable than the common heavier and sturdier solutions.



Moreover, the diesel-electric power pack enables a weight reduction if the power unit is not needed and temporarily removed. Consequently, this leads to a reduction of service costs due to extended service intervals and overhaul periods in comparison with common diesel solutions.

FEATURES

- Monoblock design
- Parallel twin DI diesel engine
- Common rail technology
- 40 kW mechanical output
- Fully mass balanced
- Small, lightweight and fuel efficient
- Optimized to run the new STEYR E1



M12 CR	
NUMBER OF CYLINDERS	2 in-line, horizontal
INJECTION SYSTEM	Common Rail
DISPLACEMENT (LT)	1.06
RATED POWER (KW @ RPM)	40 @ 3200
MAX. TORQUE (NM @ RPM)	140 @ 2200
MIN. FUEL CONSUMPTION (G/KWH)	210
DRY WEIGHT (KG)	90

M14 UI

4-CYL UNIT INJECTOR



FACTS

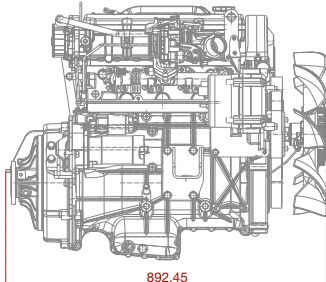
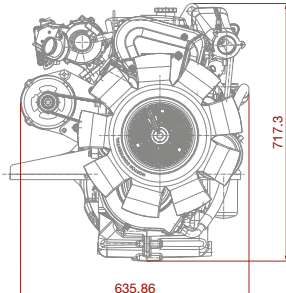
- Reliable unit injector technology
- Made for challenging ambient conditions
- Multifuel capable



MEETS CHALLENGES WITH EASE

The 4-cylinder diesel engine with unit injection system is designed for challenging ambient conditions. The M14 UI is particularly robust and enduring while also being lightweight with a respectively high power output. Due to the Monoblock basis, the product features high reliability and an excellent cooling behavior. The operational temperature range of the engine's standard version starts at -32 °C and goes up to +49 °C. Another important asset is the multifuel capability, enabling the use of various types of fuel including military fuels.

The M14 UI is perfectly suited for powering light applications such as special land or amphibious vehicles due to its compact size and reliability in tough environments.



M14 UI	
NUMBER OF CYLINDERS	4 in-line
INJECTION SYSTEM	Unit Injector
DISPLACEMENT (LT)	2.1
RATED POWER (KW/HP)	95/129 - 120/163
MAX. TORQUE (NM)	295 - 340
DRY WEIGHT (KG)	179 - 220

M14 CR

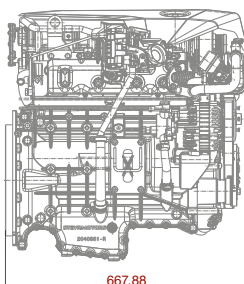
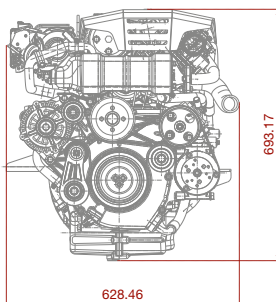
4-CYL COMMON RAIL



4
CYLINDER

FACTS

- Advanced common rail technology
- Smooth operation
- Fuel efficient



IDEAL FOR LIGHT COMMERCIAL VEHICLES

The M14 CR is the common rail version of STEYR MOTORS' 4-cylinder diesel engine. The underlying Monoblock design ensures reliability and durability with best cooling behavior. Smooth operation and fuel efficiency were further improved with the engine's advanced common rail technology. Moreover, it features a remarkable robustness due to its components maintained from the original M14 heavy duty applications. The operational temperature range of the common rail 4-cylinder engine starts at -25 °C and goes up to +39 °C.

The compact and powerful M14 CR is a great solution for powering passenger cars and other light commercial vehicles with a total gross weight of up to 3.5 tons. This weight limit can be further increased by combining the engine with a hybrid driveline.

M14 CR	
NUMBER OF CYLINDERS	4 in-line
INJECTION SYSTEM	Common Rail
DISPLACEMENT (LT)	1.99 - 2.1
RATED POWER (KW/HP)	110/148
MAX. TORQUE (NM)	320
DRY WEIGHT (KG)	200 - 240

M16 UI

6-CYL UNIT INJECTOR



6
CYLINDER



POWERING A WIDE RANGE OF OPTIONS

The M16 UI features a very compact and lightweight design compared to other products with similar power on the market. In the main product portfolio of STEYR MOTORS' vehicle segment, the 6-cylinder diesel engine is the biggest and most powerful product - only topped by very special developments and prototypes for specific demands. The M16 has been selected by many international manufacturers of medium-duty vehicles, hybrid trolley busses, light-protected military vehicles and special purpose aggregates.



The Monoblock design is the basis for a most compact core engine while the surrounding housings, manifolds and auxiliaries can be easily adapted to suit diverse vehicle requirements. Besides its handy design, the M16 UI is also the preferred choice of renowned manufacturers due to the unrivaled cooling capacity, the sequential charging system, the direct intercooling and the many variations for oil sumps, front-end accessory drives and transmission flanges. Another crucial characteristic of STEYR MOTORS' engines is their exceptional robustness and reliability, applying likewise to the M16 UI. Furthermore, the 6-cylinder engine is multifuel capable (including military fuels) and prepared for single bearing generators.

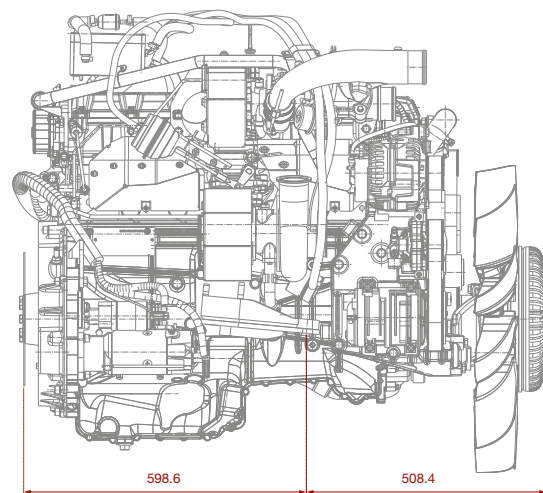
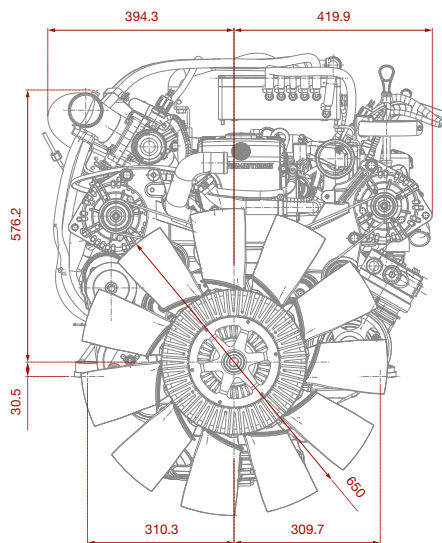


MODULARITY & INDIVIDUALITY

The base engine design of STEYR MOTORS has a similar form factor across a wide power range and therefore is perfectly applicable in fleet logistics, ensuring lean logistic practices due to a variety of models with many interchangeable parts. Moreover, all our vehicle engines are cleverly developed for customizing to meet special requirements. The M16 UI is a prime example for individual solutions and features a vast scope of references.

FEATURES

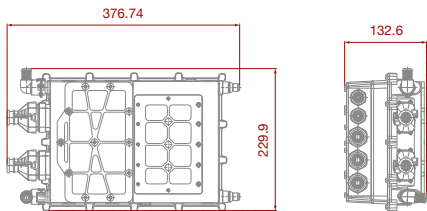
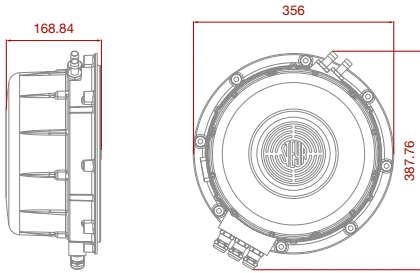
- Monoblock design
- 6-cylinder DI diesel engine
- Reliable unit injector technology
- Sequential charging or single-stage intercooled charging
- Multifuel capable (incl. military fuels)
- Prepared for single bearing generator



	M16 UI
NUMBER OF CYLINDERS	6 in-line
INJECTION SYSTEM	Unit Injector
DISPLACEMENT (LT)	3.2
RATED POWER (KW/HP)	135/184 - 225/304
MAX. TORQUE (NM)	450 - 680
DRY WEIGHT (KG)	255 - 280

STEYR E1-400

THE NEW E-MACHINE



PERMANENT MAGNET MACHINE

- Transversal flux technology
- Simplified, small and lightweight design
- Simple and low-cost copper windings, reduced copper loss
- NVH optimized housing for smooth and silent operation
- Compared to similarly sized motors:
 - Torque and power increased up to 30 %
 - Efficiency improved up to 5 %
 - Mass inertia and weight reduced up to 50 %
 - Production steps decreased up to 80 %

INVERTER

- Start function enabled (generator as e-motor)
- Voltage level selectable independently from engine speed
- Optimized efficiency at full range of engine speed
- Separate voltage and performance level
- Any engine speed (incl. fixed speed) selectable

KEY FEATURES OF THE STEYR E1

TECHNOLOGY	Permanent Magnet
CONTROLLER	Active Inverter
NOMINAL VOLTAGE RANGE	300 VDC to 400 VDC
ELECTRICAL OUTPUT (CONTINUOUS, S1)	40 kW
PEAK ELECTRIC POWER (S2)	50 kW
MAX. TORQUE (E-MOTOR)	152 Nm
RATED SPEED	2800 rpm
MAX. VOLTAGE RANGE	260 VDC to 430 VDC

NEW POSSIBILITIES IN E-MOBILITY AND HYBRID MOBILE APPLICATIONS

The latest addition to STEYR MOTORS' portfolio is a highly innovative electric solution which provides the flexibility to implement many different e-solutions based on the same hardware concept.

The brand-new E1-400 enables the development of small but surprisingly powerful hybrid power packs. Accordingly, the STEYR E1 matches perfectly the company's strategy which includes new powerful but small-sized diesel-electric solutions as one of the focus areas.

The STEYR E1-400 operates as a generator or e-motor allowing either for the use as a starter generator for serial hybrid concepts or the use as in-line E-machine for combined powertrain concepts.

The combination of the permanent magnet machine and the active inverter enables unprecedented performance and power density, thus providing a vast potential for the STEYR E1-400 in hybrid mobile applications and e-mobility.





INDIVIDUAL SOLUTIONS

On-going innovations and customer-focused development are important components of the core expertise that we have built through years of working together with our customers in order to meet their individual challenges. The skilled engineering team of STEYR MOTORS is able to customize engines even for challenging specifications.

NEWEST TECHNOLOGIES

Our tailored engineering is based on latest CAE technologies such as finite element analysis, vibration and noise prediction, flow calculations as well as sophisticated tests on our various test benches. Emerging concepts are always being turned into prototypes which are tested in depth to verify that all requirements are fulfilled.

STEYR MOTORS owns a variety of state-of-the-art test benches for diesel and gas engines, common rail engines, acoustics measurements, swirl port measurement, and precise emission measurements. The facilities are used for in-house projects, but can also be rented by other companies to test their own developments.

FULL SERVICE - WORLDWIDE

Each customer and project has its own specifically assembled project team according to the know-how required for the individual assignment. A personal project manager accompanies the customer during all engineering phases, prototyping, first installation and commissioning of the test vehicles and beyond.

Your fielded vehicles will be well backed up by our worldwide aftersales and service network. STEYR MOTORS offers full service from performance and power train simulation to engineering and prototyping of customized products, up to series production of the developed engines and aggregates.

SELECTED APPLICATIONS

- 1** LTV/ATV ENGINES
e.g. THALES HAWKEI
- 2** LTV/ATV ENGINES
e.g. KMW/RMMV AMPV
- 3** HYBRID SYSTEMS
e.g. NEOMAN Trolleybus
- 4** DIESEL-ELECTRIC GENERATORS
e.g. LEOPARD 2 A7
- 5** UTV ENGINES
e.g. BAE BV206
- 6** LTV/ATV ENGINES
e.g. URO VAMTAC S3
- 7** AUX. DIESEL AGGREGATES
e.g. SIEMENS VECTRON
- 8** LTV/ATV ENGINES
e.g. PANHARD VBL



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VEHICLE ENGINES



MARINE ENGINES



INDUSTRIAL ENGINES



ENGINEERING



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