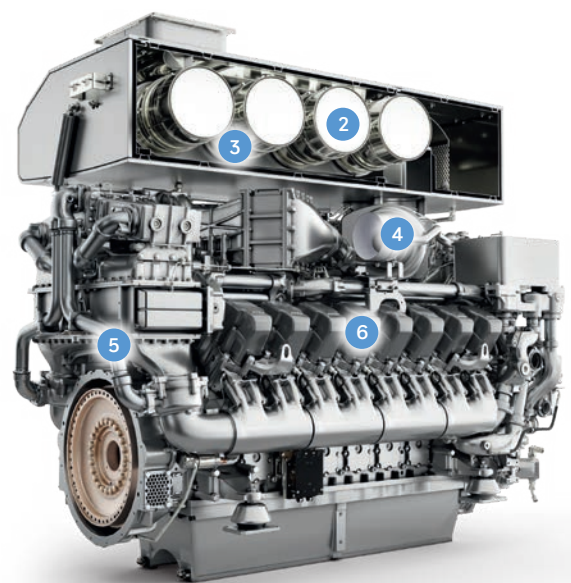


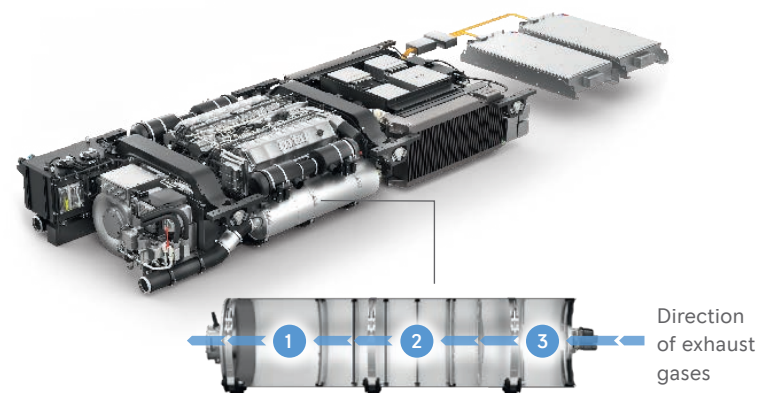
Emission reduction solutions

CLEAN EFFICIENCY. KEY GREEN TECHNOLOGIES.

Our advanced emission reduction solutions combine key technologies to meet current and future emissions standards as well as reduce fuel consumption. They are designed to ensure smooth system component interaction and clean operational efficiency.



Series 4000 EU Stage V with DPF and DOC



Example based on the PowerPack Series 1600 Series 1600 and 1800 EU Stage V with SCR plus DPF and DOC

1 Selective catalytic reduction (SCR)

Our SCR solution removes up to 90 percent of nitrogen oxides from exhaust gas. A closed-loop control system prevents ammonia slip during operation. Its fuel and space-efficient design is also very maintenance friendly.

2 Diesel particulate filter (DPF)

Our diesel particulate filters reduce particulate emissions to levels that, in some cases, are well below statutory limits.

3 Diesel oxidation catalyst (DOC)

Easy to install and highly effective in the breakdown of exhaust pollutants – our diesel oxidation catalysts exceed regulatory standards.

4 Two-stage turbocharging

With our two-stage turbocharging, engines achieve high output across a wide speed range and superb fuel efficiency. Their space-saving engine integration offers additional benefits.

5 Exhaust gas recirculation (EGR)

Modern EGR solutions can reduce nitrogen oxides generation within the cylinder by more than 40%. We have designed a highly compact one that integrates all EGR components. It enables the cost-effective upgrade of rail vehicles for compliance with new emissions standards.

6 Common rail injection

Our common rail injection solutions have been enhancing rail engine combustion processes for over 20 years already, making them especially clean and economical.

Stay posted with more powerful information and follow [mtusolutions](https://www.mtu-solutions.com/rail) under:



Rolls-Royce Group
www.mtu-solutions.com/rail

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Rail

POWERPACK SERIES 1600 – 1800 EU STAGE V SERIES 4000 EU STAGE V



A Rolls-Royce
solution

ENGINES AND POWERPACKS TO DRIVE YOUR FUTURE: OUR SOLUTIONS FOR EU STAGE V

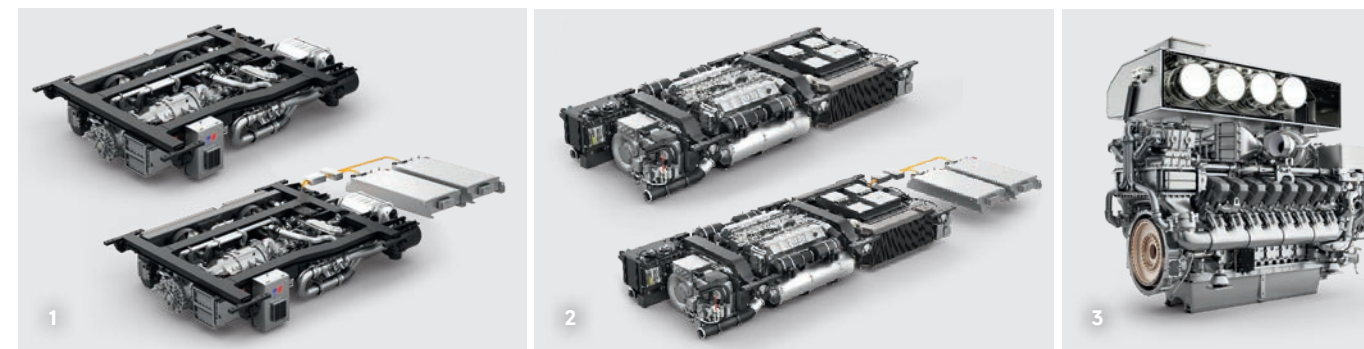
With increasingly stringent emission standards the rail industry is facing major challenges. Vehicle manufacturers, rail operators and other players are having to respond ever more quickly, and with ever-increasing agility, to emissions- and noise-sensitive environments, while at the same time maximizing equipment availability.

Under challenging circumstances like these, it pays to have a strong partner by your side—a partner who thinks ahead and focuses on achieving sustainable success for your business above all else. By presenting our green drive solutions portfolio as EU-Stage-V-ready, we take the next logical step. Not only are all new **mtu** PowerPacks available as Hybrid solutions, but our modular strategy sets the stage for continuous improvements without alterations to the **mtu** PowerPack footprint. The Series 4000 is our masterpiece for the locomotive segment. This engine is always one step ahead of the future: the first engine in its class with EU Stage IIIB certification in 2012 –and now EU-Stage-V type approved. Available in 12V and 16V cylinder configurations, this engine provides clean power and pure profitability in all conditions. All drive solutions are ready to repower your equipment, helping you extend the life of your investment.

- 1 **mtu** PowerPack Series 1800/Hybrid Solution
- 2 **mtu** PowerPack Series 1600/Hybrid Solution
- 3 Series 4000 R04

Series		mtu PowerPack Series 1800	mtu PowerPack Series 1600	Series 4000 R04
Configuration		6H	12V	12V, 16V
Rated power	kW	315 - 375	565 - 736	1500 - 2400
	bhp	422 - 503	758 - 987	2012 - 3218
Rated speed	rpm	1800	1900	1800
Bore/stroke	mm	128/166	122/150	170/210
Bore/stroke	in	5.0/6.5	4.8/5.9	6.7/8.3
Displacement/cylinder	l	2.14	1.75	4.77
	cu in	130	107	291
Emissions technology		DOC + DPF + SCR	DOC + DPF + SCR	DOC + DPF + EGR
Emission		EU Stage V	EU Stage V	EU Stage V

Specifications are subject to change without notice.



PowerPacks for underfloor/roof mounting - Series 4000 for engine room installation

DESIGNED FOR THE FUTURE. BUILT FOR YOUR SUCCESS.

The PowerPack: Compact. Modular. Flexible.

The **mtu** PowerPack is an innovative drive system that seamlessly combines all individual system elements into a single, functional unit mounted on a supporting frame. All our modular **mtu** PowerPacks in the future will be Stage V-ready – allowing for continuous development and improvement without alterations to the footprint. Every **mtu** PowerPack can be individually configured, including hybridization. The drive system itself, as well as **mtu** EnergyPacks, are designed for underfloor or roof installation, and are characterized by their particularly flat design. We supply all four types of power transfer: diesel-electric, diesel-mechanical, diesel-hydraulic and hybrid solutions. Every **mtu** PowerPack can be individually configured.

PowerPack key benefits at a glance:

- Scope for individual configuration; flexible and standardized interface solutions
- Continuous development and improvement without alterations to the footprint
- Low operating costs
- High performance efficiency
- Lowest fuel consumption
- Minimal exhaust emissions
- Long service life and excellent reliability
- Simple maintenance
- High level of availability
- Minimal resource requirement thanks to plug & play design
- Ready for repowering projects: extend the life of your investment

The Series 4000 R04:

Always one step ahead of the future. The Series 4000 was the first rail engine in its class with EU Stage IIIB certification in 2012 – and now EU-Stage-V type approved. With its superb mix of key in-engine and post-combustion technologies, the Series 4000 is on track to continue as one of the world's most fuel-efficient, environmentally friendly and reliable locomotive engines. A compact, highly economical powerhouse that really goes the distance. The Series 4000 has proven itself thousands of times over, and like it's predecessors, the latest edition is a force to be reckoned with. Working for you. And for the environment.

Series 4000 key benefits at a glance:

- EU-Stage-V type approved
- Reliable performance: in all conditions
- Clean power – pure profitability
- Identical footprint to the previous model (EU Stage IIIB)
- Ready for repowering projects: extend the life of your investment

