











The Bosch Large Diesel Range

System	Bosch large diesel product	Benefits	Potential applications
Conventional systems			
	<div>ZWM injection pump Max. injection pressure at nozzle: 1,200 bar</div> <div></div>	<div><ul style="list-style-type: none">▶ Established system▶ Injection quantity can be varied quickly, continuously and easily▶ Highly robust, therefore suitable for many areas of application</div>	<div>In generators and ship engines with 6, 8 or 12 cylinders and cylinder output of up to 140 kW</div> <div></div>
	<div>Unit Pump System for large diesel engines Max. injection pressure at nozzle: 1,800 bar</div> <div></div>	<div><ul style="list-style-type: none">▶ Established system▶ Electronically controlled. Quick and infinitely variable adjustment of the injection quantity▶ Highly robust, therefore suitable for many areas of application</div>	<div>In locomotives, generators and ship engines with 6, 8, 12 or 16 cylinders and cylinder output of up to 350 kW</div> <div></div>
	<div>Mechanically controlled single-cylinder pump for heavy fuel oil Max. fuel pressure: 2,000 bar</div> <div></div>	<div><ul style="list-style-type: none">▶ Reduced emissions▶ Proven and robust technology, over 40 years field experience▶ Easy on-board service▶ Repair via replacement of components</div>	<div>For heavy-fuel-oil engines with a cylinder output of 1,200 kW</div> <div></div>
Common rail systems			
	<div>Modular Common Rail System MCRS-T for off-highway Max. system pressure: 1,600 to 2,200 bar</div> <div></div>	<div><ul style="list-style-type: none">▶ High injection pressure independent of engine speed▶ Lower operation noise▶ Reduced fuel consumption▶ Reduced emissions▶ Long service life</div>	<div>For operation in off-highway large diesel engines, such as locomotives and cargo ships with an engine output of up to 3,500 kW</div> <div></div>
	<div>Focus of this brochure: Modular Common Rail System MCRS for marine diesel engines Max. system pressure: 1,600 bar</div> <div></div>	<div><ul style="list-style-type: none">▶ High injection pressure, independent of speed▶ Lower operating noise▶ Reduced fuel consumption▶ Reduced emissions▶ Exhaust-gas treatment possible due to time-controlled multiple injections▶ Long service life</div>	<div>For operation in off-highway large diesel engines, such as marine applications, generators and commercial and industrial applications with an engine output of up to 2,200 kW</div> <div></div>

Bosch – Comprehensive Expertise for Large Diesel Engines.

Bosch is the only company in the world that offers the entire spectrum of diesel injection systems, from the smallest car engine to the largest medium-speed heavy-fuel-oil engines. Major vehicle and engine manufacturers around the world use Bosch injection systems. The Modular Common Rail System MCRS is used in high-speed engines with a displacement of more than 2.5 litres per cylinder.

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Efficiency on a Large Scale:
The Modular Common Rail System
MCRS for Large Diesel Engines



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Invented for life



BOSCH
Invented for life

Low Consumption, High Performance:

The Modular Common Rail System MCRS for Large Diesel Engines

With the MCRS series, Bosch offers the first fully modular Common Rail systems for large diesel engines. They are designed to be highly efficient and with a long service life. In operation, the MCRS offers both impressive robustness and resistance, as well as low consumption and good emission values.

Better efficiency, lower emissions

The MCRS offers all the benefits of Common Rail injection. It injects fuel at 1,600 bar. Hydraulic pulsations in the high-pressure system are minimized thanks to the fuel storage volume in the high-pressure pump and injectors, which is specific to the MCRS. The fuel accumulator in the injector also ensures a nearly constant pressure, even during injection, as well as maximum flexibility during multiple injection. This means that the MCRS reduces fuel consumption and contributes to the compliance with stricter exhaust gas limits. The system is also extremely robust in every detail and boasts impressive service life.

In use around the world

Large diesel engines are off-highway engines with engine output of over 560 kW. They have a wide range of applications. For example, they power mining and construction vehicles, container and cargo ships, ferries and cruise liners, as well as locomotives and generators. The MCRS from Bosch is suitable for large diesel engines up to 2.2 MW. It is the first fully modular Common Rail system for this kind of engine and is used by vehicle and engine manufacturers around the world. Thanks to its modular construction, it is extremely flexible and is used in large diesel engines from 4-cylinder inline engines to 20-cylinder V engines.



The benefits of MCRS in overview

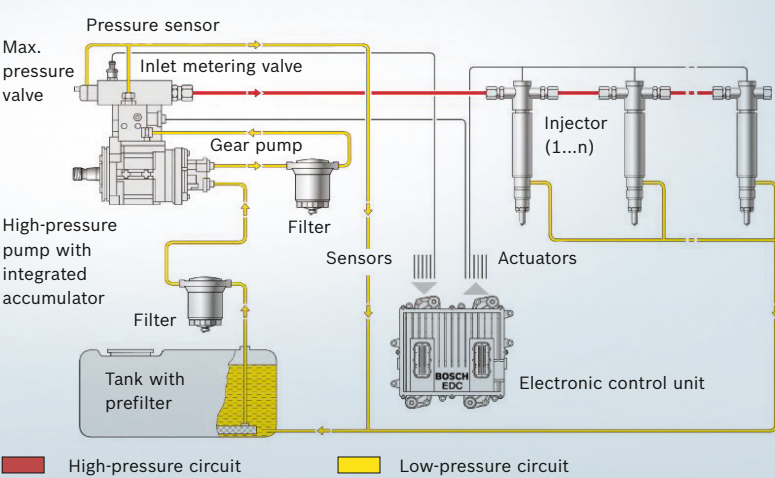
- ▶ Higher injection pressure, independent of engine speed
- ▶ Lower operating noise
- ▶ Reduced fuel consumption
- ▶ Good emission values
- ▶ Option of exhaust gas treatment due to time-controlled multiple injection
- ▶ Long service life

Technology in Detail:

The Components of the MCRS

The MCRS from Bosch sets new benchmarks with its robust technology. The modular construction offers high flexibility for various applications. It also helps to make the engines quicker to repair and maintain.

MCRS function diagram with CP9.1

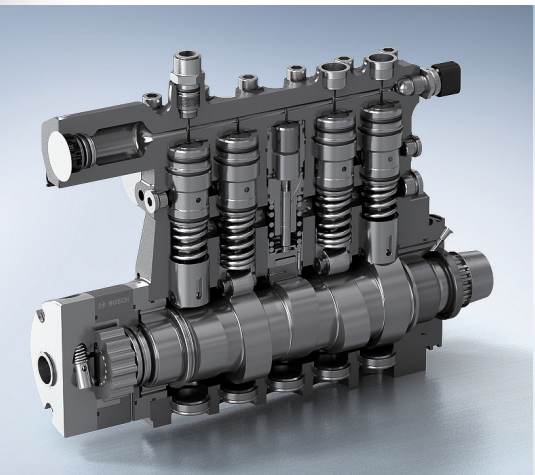


MCRS construction

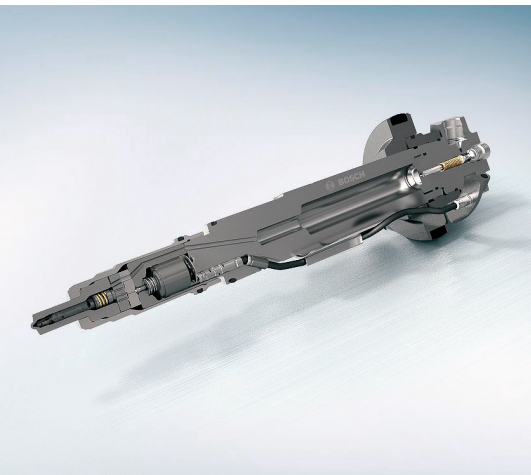
The electronically controlled and oil-lubricated CP9.1 high-pressure inline pump generates the high pressure. Depending on output requirements, it is equipped with 2 to 5 cylinders and integrated high-pressure accumulator, pressure sensor and a pressure safety valve. No separate rail is required. The fuel is injected into the combustion chamber with CRIN-LE-type injectors. These are each equipped with their own high-pressure accumulator, safety flow limiter and solenoid valve for multiple injection. The individual injectors are connected via a short high-pressure line, which can also be double-walled.

Technical features (example of application)	
Max. system pressure	1 600 bar
Number of injections	3
Operating voltage	24 V
Control unit	Engine manufacturer or Bosch
Service life	20 000 h
Scope of application	Marine diesel, generators
Engine power	1 500 – 2 200 kW
Engine speed	2 500 min ⁻¹
Max. number of cylinders	20
Engine displacement	60 l

CP9.1 high-pressure pump



CRIN-LE injector



Metering unit

