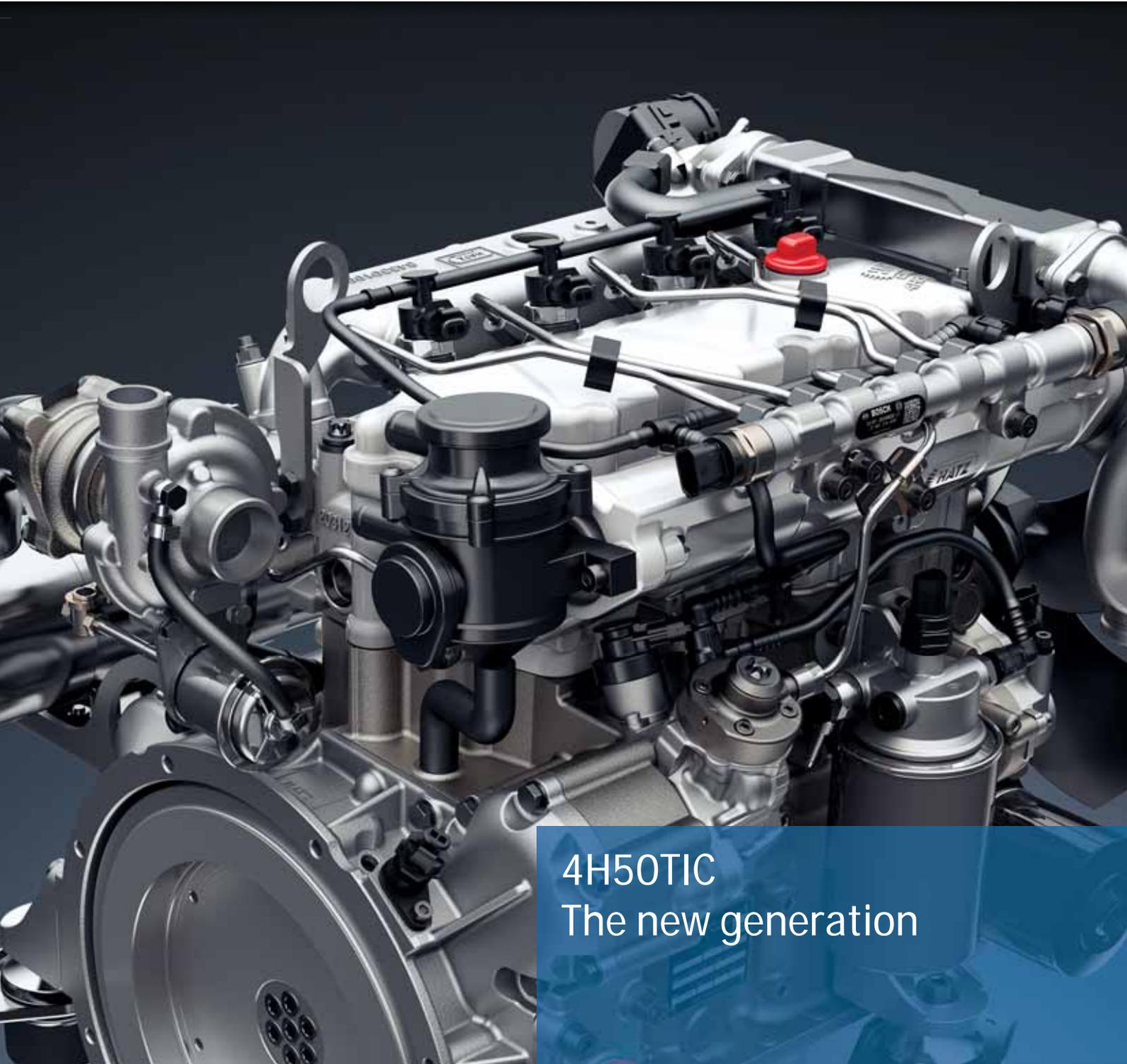


CREATING POWER SOLUTIONS.



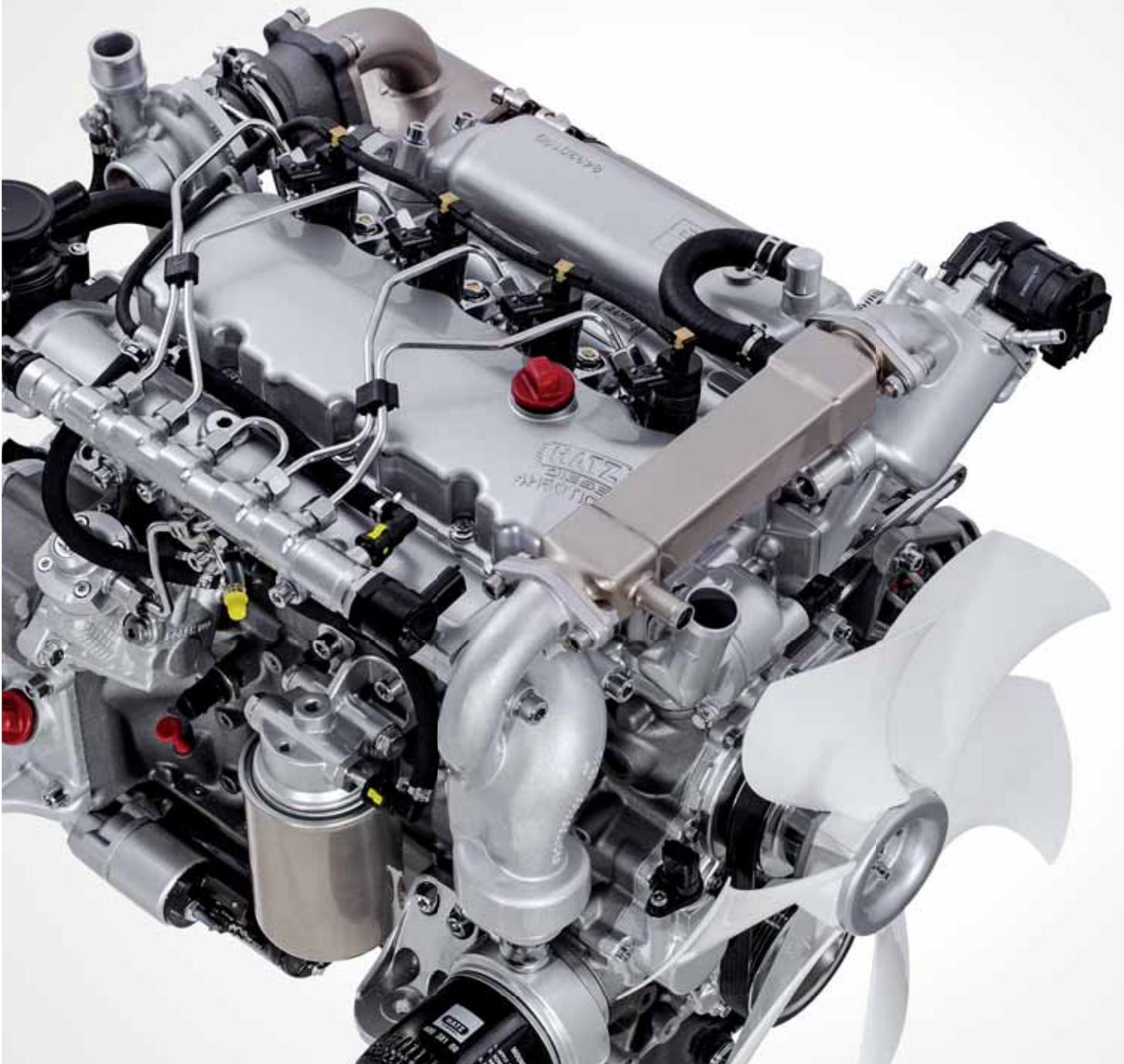
4H50TIC The new generation

Hatz Diesel Engines – Made in Germany



The new generation of water-cooled Hatz diesel engines

From 2014 a new engine family will extend the Hatz product portfolio: The H-series. Starting with the 4H50TIC water-cooled 4-cylinder model, Hatz is relying on common-rail technology, turbocharger and external exhaust gas recirculation with the new generation.

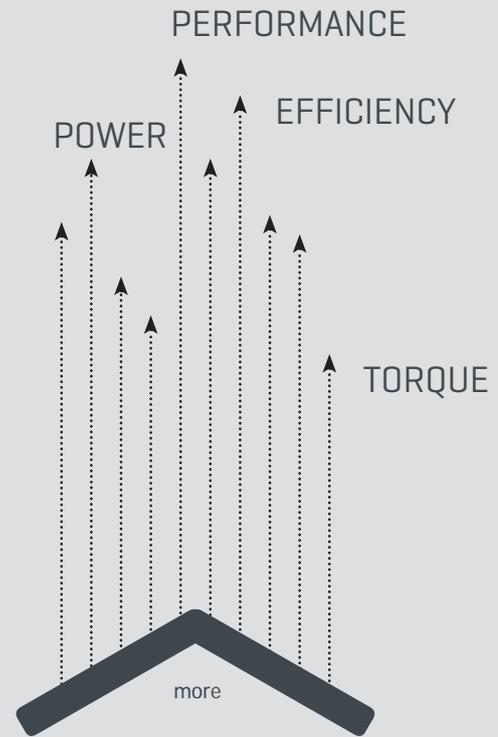


Downsizing approach

A groundbreaking downsizing approach was adopted in the development of the 4H50TIC. The topmost development objectives were the reduction in size and weight, and simultaneously a high power and good exhaust gas value. The result is a turbocharged 2-litre engine that achieves a maximum power of 55 kW and sets the benchmark in its performance class with a weight of 173 kg. The engine fulfils the strict limits of 97/68/EC Stage IIIB and EPA Tier 4 final without particulate filter.

Conservative-innovative engine for a long service life

All mechanical components were designed and developed with a conservative-innovative approach. The 4H50TIC therefore has two valves per cylinder, which achieves high efficiency, mechanical robustness and functional simplicity. This is expressed in turn by the familiar long service life, which is also supported by the use of exclusively premium products for all important components.

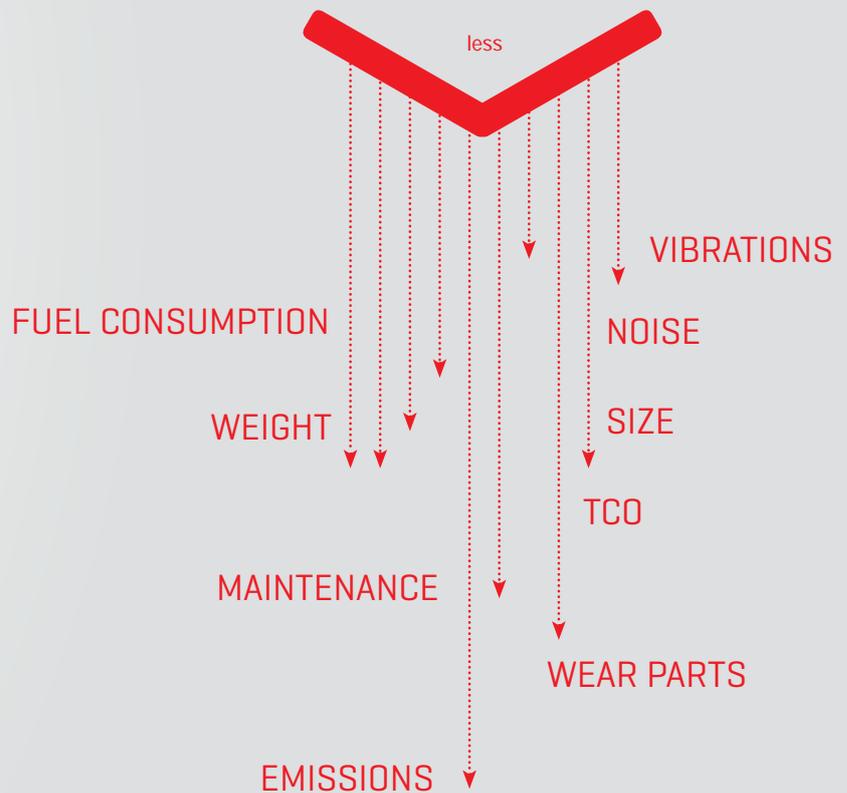


4H50TIC

ROBUST BASIC ENGINE

HIGH-QUALITY COMPONENTS

TIER 4F/STAGE IIIB COMPLIANCE WITHOUT DPF



"Flagship" 4H50TIC

Compact, light, economical, robust and environmentally friendly: The new Hatz common-rail diesel engine provides everything expected from a powerful and modern industrial engine. It impresses through its quiet running, dynamics and maintenance friendliness. Its constantly low fuel consumption over a wide load range sets the benchmark.

Innovation meets reliability. No contradiction for Hatz.

Just like all Hatz engines, the new 4H50TIC also contains a whole series of technical refinements that make it the most compact engine in its class and it has the best fuel efficiency compared to the competition. And with all this innovation, the well known Hatz reliability was of course not ignored.



BOSCH common-rail system for ultimate fuel efficiency

One of the key factors for the high power density of the 4H50TIC is the common-rail system. Hatz opted for the Bosch off-highway CRS, a common-rail system with 1800 bar. It works with three precisely calculated injections per power stroke: A pre-, main- and post-injection. Together with the other Bosch components matched ideally to each other – high-pressure pump, injector control unit, and off-highway injector – the perfect balance is achieved between dynamics, quiet combustion noise, low pollutant levels, and economy.

When it comes to fuel efficiency, the newly developed engine sets new standards for top points with a specific consumption of just 210 g/kWh. The special feature here is that consumption values close to the optimum operating point are achieved in a wide load and speed range. This is unrivaled today and makes the 4H50TIC the most efficient engine in the 37-56 kW class.

Combustion strategy

The exhaust gas recirculation system was developed further by Hatz engineers to impact positively on exhaust gas values.

A pre-cooling unit for the exhaust gas recirculation considerably reduces the temperature of the exhaust gas upstream from the EGR valve thereby protecting it against thermal damage and sooting. An optimized EGR mixing nozzle is also used that uniformly distributes the recirculated exhaust gases together with the fresh combustion air to all four cylinders. In conjunction with the common-rail system, an outstanding exhaust gas quality is produced, which ensures that the 4H50TIC is fitted with solely an oxidation catalytic converter and there is no additional need to fit a particulate filter. And nonetheless, the engine significantly undercuts the 97/68/EC and EPA emission limits.

Maintenance friendliness

A maintenance interval of 500 hours means the engine scores top points with regard to customer friendliness and reliability. The extended intervals are due to hydraulic valve lash adjustment and large-sized filters. Additionally, the engine has a shut-off sensor system that switches off the engine in an emergency to avoid major damage. The robust construction and careful selection of all components ensure that the engine is fit for the most demanding applications.

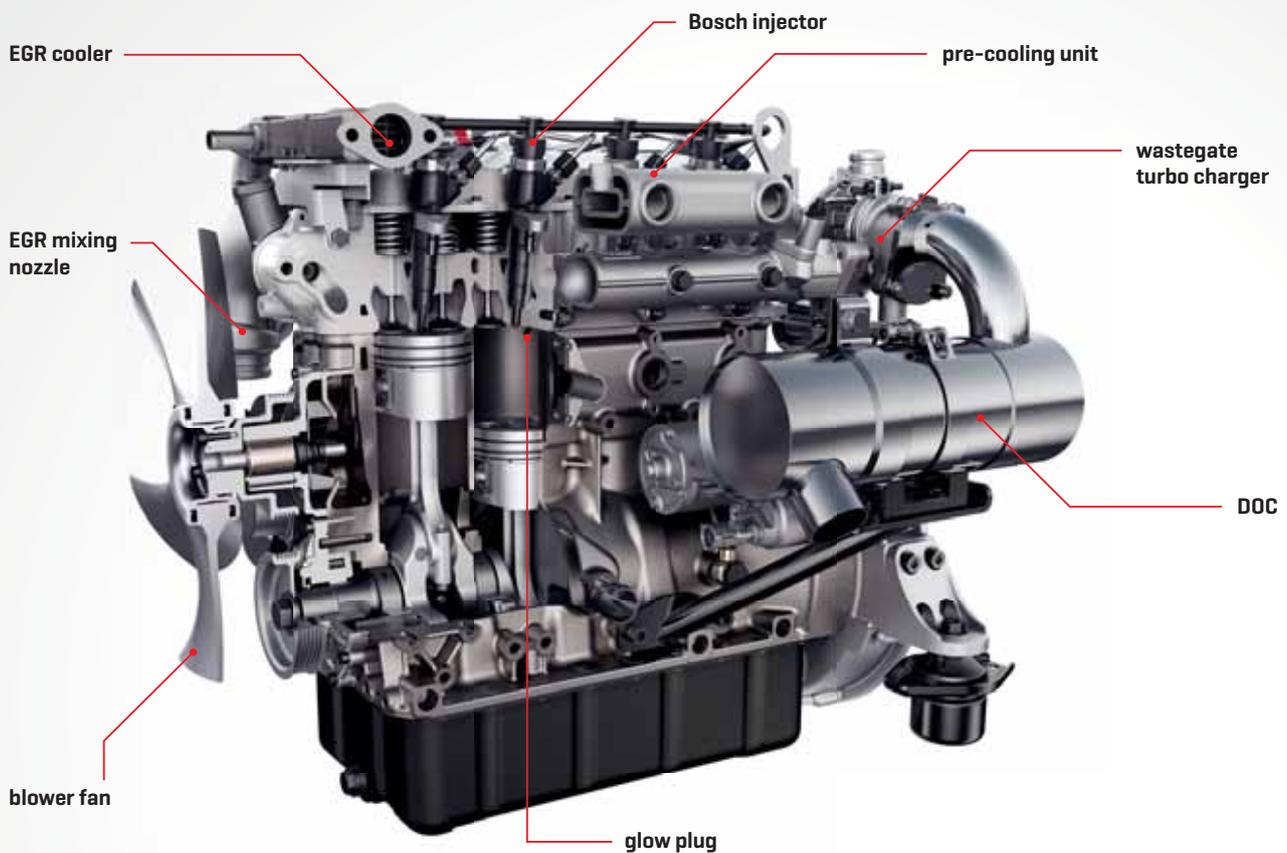
Internal friction

A further key element for the extraordinarily high fuel efficiency is the reduction of internal friction due primarily to the conservative design with only a few moving parts. A major contribution to this is made by the 2-valve technology in conjunction with roller tappets as well as the lower camshaft that reduces installation space. Additionally, exclusively high-end materials are used for the conrod and bearings.



Not only the power counts. The internal values are also convincing.

Hatz has opted for premium products from well-known suppliers primarily from Germany for all the essential parts of the engine such as the injection system, crankcase, crankshaft, camshaft, exhaust gas recirculation valve, catalytic converter, and sensor system.

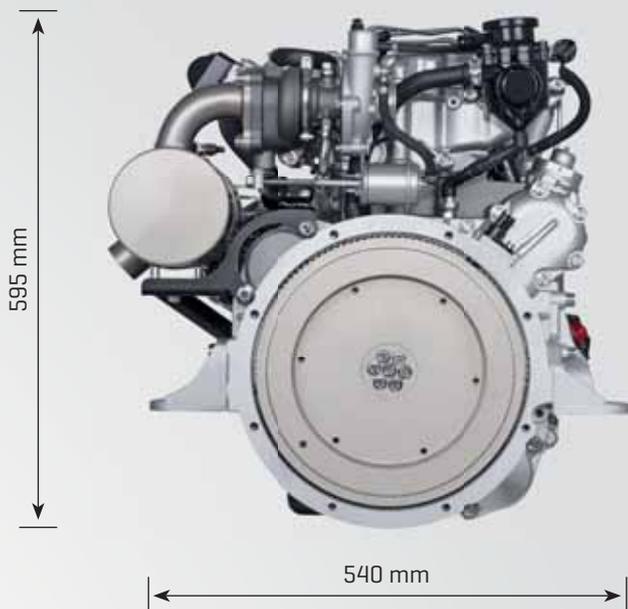


Robust but lightweight construction

The engine crankcase is made from thin-walled gray cast iron, the cylinder head and cylinder head cover from cast aluminum, and the oil sump from sheet metal. All parts are optimized for lightweight construction and structural mechanics.

Basic features 4H50TIC

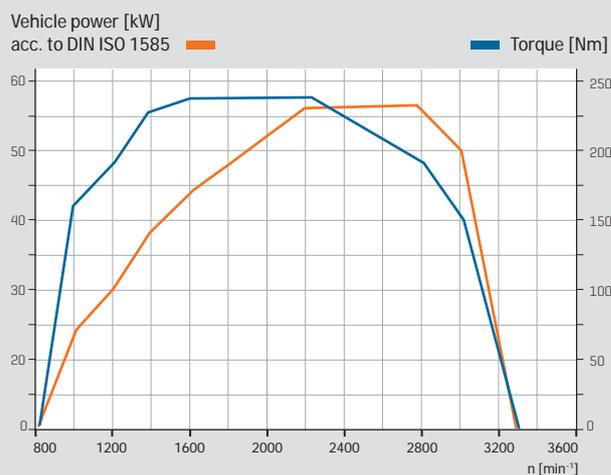
- 4-Cylinder turbo common-rail diesel engine with 2.0 litres for 55 kW
- Bosch Off-Highway Common-Rail system with 1,800 bar
- Bosch injectors [off-highway version]
- Bosch high pressure pump with electrical lift pump
- Bosch rail
- Bosch ECU in 12 V or 24 V version, external
- Bosch starter motor & Bosch alternator
- High-tech cylinder head with optimized cooling and 2 valve system
- Hydraulic valve tappets
- Wastegate turbo charger for optimized torque characteristics
- Intercooler
- Engine mounted DOC after turbine out
- Closed crankcase breather
- Gear wheel driven camshaft, no tooth belt, no chain!



| Engine type | 4H50TIC |
|-----------------------------------|---|
| Cylinders | 4 |
| Displacement [cm ³] | 1,952 |
| Valves per cylinder | 2 |
| Bore / Stroke [mm] | 84 / 88 |
| Combustion system | direct injection, exhaust gas turbocharged, with inter-cooler and externally cooled EGR |
| Injection system | Bosch Common-Rail-OHW |
| Max. injection pressure [bar] | 1,800 |
| Compression ratio | 17.5:1 |
| Aftertreatment | cEGR, DOC |
| Fuel economy @ best point [g/kWh] | 210 |
| Cooling system | water cooling |
| Emission compliance | Tier 4f, Stage IIIB |
| L x W x H [mm] | 680 x 540 x 595 |
| Weight [kg] | 173 |
| Aux. PTO max. torque [Nm] | 130 |

| Engine type | 4H50TIC |
|--------------------------------|------------|
| Max. vehicle power [kW@rpm] | 55.4@2,800 |
| Max. power IFN [kW@rpm] | 55.4@2,800 |
| Max. Genset power IFN [kW@rpm] | 48.0@3,000 |
| Max. torque [Nm@rpm] | 240@1,600 |
| Low end torque [Nm@rpm] | 191@1,200 |
| Low idle speed [rpm] | 900 |
| Max. idle speed [rpm] | 3,300 |

Performance curves 4H50TIC



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