

# LE4000

Large engine diesel test bench  
for system, pump and injector testing

best testing – best quality

**moehwald**

Bosch Group





## LE4000

The LE4000 test bench has been designed for system, pump and injector testing of large diesel injection systems. The system and components are clamped on a large, stable bench bed and, thanks to the angular design of the large sliding door, can also be loaded via a ceiling crane.

### General

The compact, modular test bench design with sophisticated soundproof encapsulation enables the test bench to be used in a laboratory-like environment without being disturbed by the background noise effects of a common rail system. The wide opening doors provide the user with optimum access to the test chamber and therefore to the application.

The drive unit consists of highly dynamic frequency-controlled servomotors.

The mass moment of inertia of the drive unit can be adjusted to the application requirements using appropriate flywheels. The test oil and lubricating oil supply, including their conditioning, are integrated in the test bench frame.

The test bench is operated and controlled via an industrial PC in the attached power and measuring equipment cabinet.

Depending on the customer's requirements, the basic test bench can be used for the following tests or tasks in the large engine diesel injection system field:

- ▶ Testing common rail pumps and systems
- ▶ Testing common rail injectors
- ▶ Testing UP systems
- ▶ Testing single cylinder pumps
- ▶ Testing inline pumps
- ▶ Testing nozzle holder assemblies (NHA)

### Basic function

The customer-specific large diesel injection system clamped in the test chamber is fed from the test and lubricating oil supply integrated in the test bench and is driven by the highly dynamic drive motor.

The hydraulic supply ensures the temperature control and filtering of the test and lubricating fluid even at high pressures and volumetric flow rates.

Depending on the customer's wishes the injection system is controlled via a series-near engine control unit, a test control device or via a pressure control unit integrated in the measuring equipment cabinet, including the necessary, test sample specific power stages.

### Special features

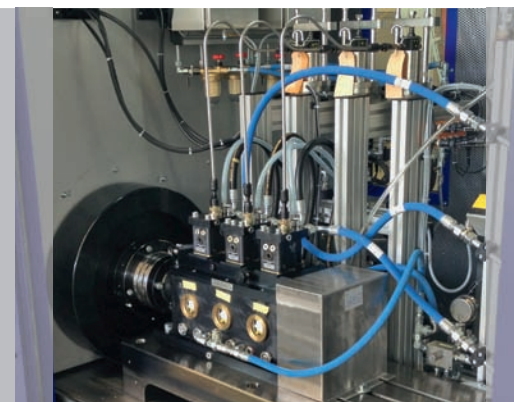
- ▶ Compact, stable design with integrated sound insulation and operator protection with approval for up to 3500 bar peak pressure
- ▶ Good accessibility for test application due to large, wide-opening safety doors
- ▶ Loading via ceiling crane possible
- ▶ Integrated test oil and lubricating oil supply with sophisticated filtering and high-precision temperature control
- ▶ Highly dynamic drive technology with an output power of up to 120 kW and peak torques of up to >1000 Nm
- ▶ Integration of series-near engine control units and test control devices possible
- ▶ Pressure control unit and magnet power stages available for CR and UP systems
- ▶ Modular test bench add-on options



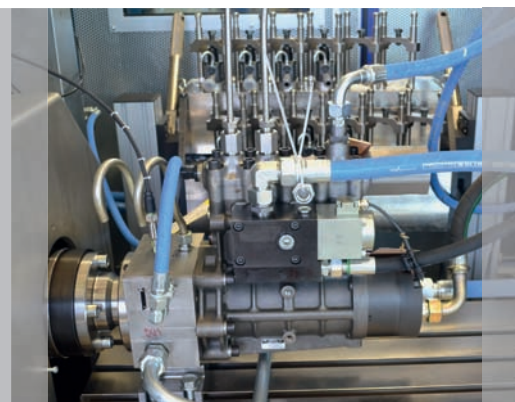
LE4000 with NHA module

Technical data	
<b>Drive system</b>	36 kW, 70 kW, 95 kW or 120 kW (at 3 x 400 VAC / 50 – 60 Hz) 0 – 3000 min <sup>-1</sup> speed range > ~600 Nm torque up to motor rated speed flywheel: 5 – 25 kgm <sup>2</sup>
<b>Calibration fluid supply</b>	Calibration fluid acc. ISO 4113 (diesel on request) 100 or 200 l tank, max. 40 l/min flow Supply temperature: +40°C ± 2 K +40°C – +120°C as option Supply pressure: suction mode or 1 – 8 bar pressure control
<b>Lubrication oil supply</b>	40 l tank, max. 10 l/min flow Supply temperature: +40°C – + 75°C +40°C – +120°C as option Supply pressure: 1 – 8 bar
<b>System control</b>	<b>Engine control units or test control devices from:</b> Bosch, ETAS, Erphi, MTU, Heinzmann, ...

<b>Available measuring systems</b>	<p><b>Pressure sensors:</b> up to 3000 bar</p> <p><b>Temperature sensors:</b> PT100</p> <p><b>Continuous measuring systems for pump test:</b></p> <ul style="list-style-type: none"> <li>▶ Coriolis mass flow meter</li> <li>▶ Gear volume and screw jack volume meter</li> </ul> <p><b>Measuring systems for injector test:</b></p> <ul style="list-style-type: none"> <li>▶ Continuous measuring system KMM or KMA</li> <li>▶ Shot-to-Shot injection quantity measuring system: EMI21-5000, EMI21-15000 und EMI21-30000</li> <li>▶ Shot-to-Shot injection quantity and rate measuring system: HDA-500, HDA-5000</li> </ul>
<b>Automation /Software</b>	<p>Computer controlled test bench with industry PC and PLC control panel</p> <p>Prisma NT: user-friendly, flexible test bench software for generating automated test sequences and high-precision data collection</p>



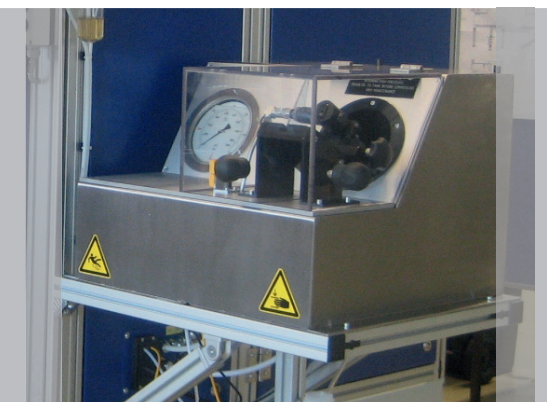
Unit pumps with cam box



Common rail pump CP9.1 setup



Inline pump setup



NHA module

**Moehwald GmbH**  
Michelinstrasse 21  
D-66424 Homburg/Germany

Contact: Stefan Klesen  
Phone: +49 6841 707 312  
E-Mail: s.klesen@moehwald.de  
www.moehwald.de

**moehwald**  
Bosch Group

© All rights reserved by Moehwald GmbH, including the right to file industrial property rights. We reserve all rights of disposal such as copying and distribution rights. Subject to technical modifications and errors.

This document is a schematic representation and not an operating manual. There may be some differences in illustrations compared to the operating manual. Please refer to the operating manual with regard to the proper use of the system.

