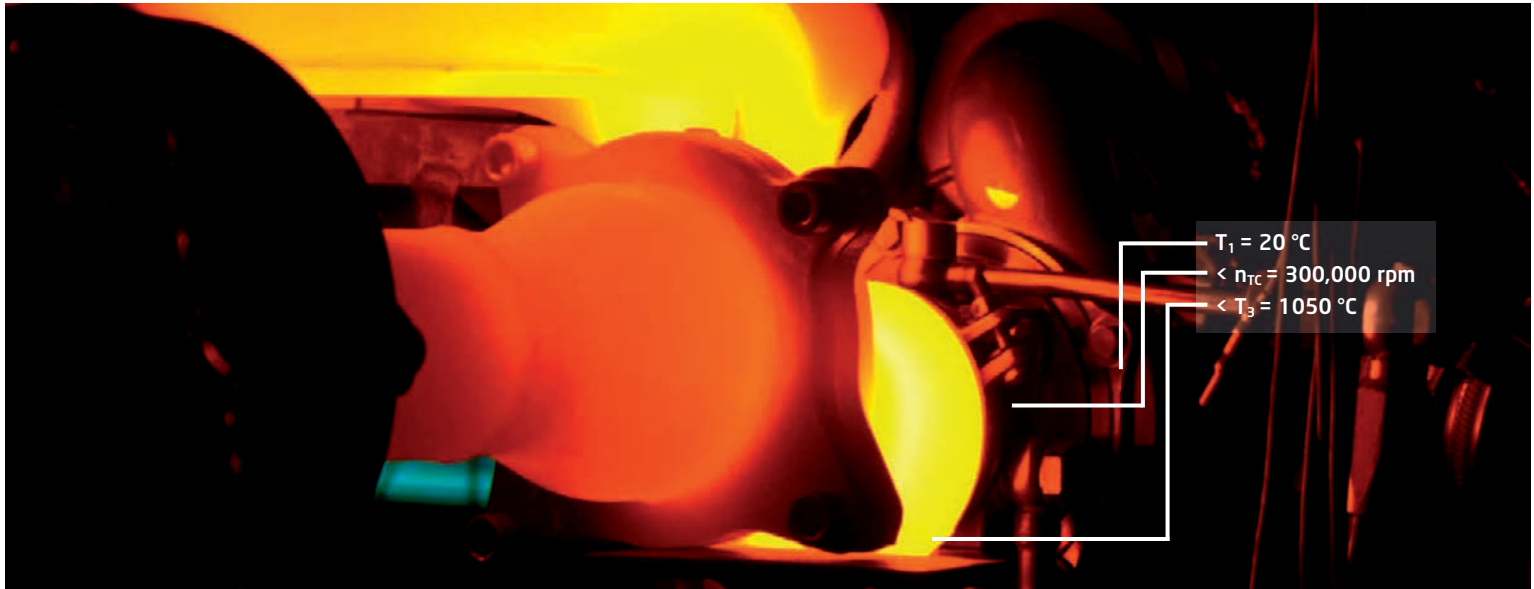


IAV Turbocharger Test Bench

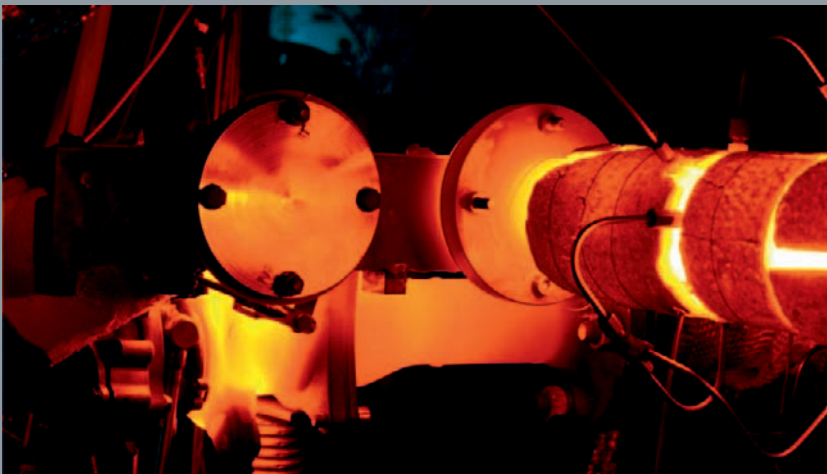
Tool for Developing Turbocharged Engines

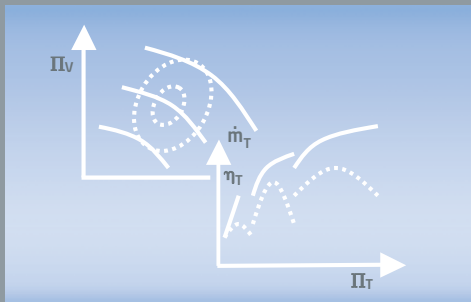


In developing turbocharged engines, a turbocharger test bench is regarded as an important tool among turbocharger and engine developers alike. The turbocharger test bench simulates the engine environment, providing developers with the capability of running a turbocharger on a steady-state basis in the relevant engine operating range and beyond. The demands on a test bench of this type are growing. Thermo-shock, shaft displacement, leakage gas (blow-by), sound pressure level maps as well as oil consumption - each under near-engine conditions - are just a few of the examples that can be investigated on this test bench from Kratzer Automation AG.

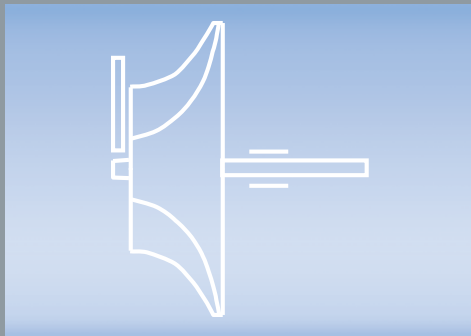
Extreme Demands in a Confined Space

Exhaust-gas temperatures up to 1050 °C, ambient temperature on the fresh-air side, turbocharger speeds of up to 300,000 rpm and gap widths of less than 0.3 mm. Hardly any other component is required to meet aerodynamic, thermo-dynamic, thermomechanical and bearing-related demands as extreme as these in such a confined space.

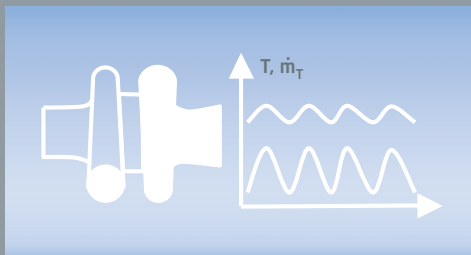




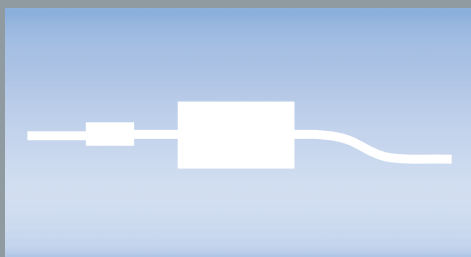
Turbocharger maps



Bearing-system investigations



Thermal-shock facility



Complete exhaust system

Possible Fields of Application

Turbocharger Maps

Engine-process simulation in particular demands comprehensive, high-quality data. Use of an auxiliary electric heater provides the capability of extending the wide operating range of the test bench even further, permitting hot-gas outputs down to a level of below 15 kW for investigating operating ranges normally not covered in turbocharger manufacturers' maps.

Shaft-Displacement Measurement

The bearing quality of turbocharger running gear can be determined by evaluating Campbell diagrams and shaft displacement. This is done by recording turbocharger-shaft excursion from the shaft axis centerline in high time resolution (50 kHz) during steady-state and transient turbocharger operation.

Thermo-Shock Facility

Measuring a component's periodic thermal load is a well-proven method for determining its thermomechanical compatibility. In addition to turbochargers, this test bench also permits the installation of other components right through to entire exhaust systems.

Sound Pressure Level Maps

Sound emissions from a turbocharger, particularly those caused by fluctuations in gas pressure, can be ascertained on the turbocharger test bench without being influenced by other disturbances.

Fields in which IAV and Kratzer are engaged in joint development activities:

- ▶ Development of a method for measuring oil consumption
- ▶ Admission of pulsating hot gas to a turbine

Max. combustion chamber output	330 kW
Flow rate	0.013-0.32 kg/s
Turbine inlet temperature	Adjustable between 150-1100 °C
Max. pressure ratio	5
Operating modes	Steady-state, transient, thermo-shock, exhaust-gas back pressure adjustable, pressure adjustable upstream of compressor

Fields of application	Measuring turbocharger maps to VFI instructions, measuring shaft orbits, measuring oil consumption, compressor instabilities, sound pressure level maps, endurance runs, admitting hot gas to components ranging from individual parts to entire exhaust systems
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