



SIEMENS



Excellence in testing

Comprehensive test bay solutions from a single source

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Driving large-scale testing forward

Reliably measuring the performance qualities of motors and machines under realistic conditions can pose special challenges, particularly for large-scale applications. Designing test bays suitable for accurately testing the capabilities of some of the most powerful systems worldwide requires engineering and technology that is both forward-thinking and flexible.

Siemens has extensive experience and in-depth knowledge in developing test bays for applications of every scale. It also possesses an extremely broad portfolio of appropriate technologies, including powerful drives and motors, automation solutions, measuring instruments and control systems.

In all types of projects around the world and in many types of industries, Siemens has earned a reputation for providing excellent test bay solutions and support. Case in point: KSB, one of the world's leading manufacturers of pumps, valves and related systems, headquartered in Frankenthal, Germany.



Test bay for large-scale water supply pumps



Within the scope of its production expansion for large-scale water supply pumps at its site in Halle (Saale), Germany, KSB installed a new test bay for pumps. The supply voltages for the test facility needed to be able to vary between 3.3 kV and 11 kV, and the pump power capacity between a few hundred kW and a maximum of 10 MW.

Siemens supplied the drive equipment as well as the automation technology, measuring instruments, control system and medium-voltage switchgear. A SINAMICS PERFECT HARMONY water-cooled, medium-voltage frequency converter with an infeed voltage of 20 kV is used to drive the motors. What's more, a matching transformer can be connected to the converter output to accommodate various motor voltages.

In addition, a SIMATIC PCS 7 based test system was developed as a control system for the testing procedures. Automated sequences control the selection of the test bay configuration for the pump and string tests along with the drive, frequency converter and auxiliary equipment, thereby considerably reducing the workload of the test field personnel, while increasing overall productivity.

The test system controls and monitors the frequency converter via PROFIBUS DP. It is also used to control and monitor the various flaps and valves in the water circuit, as well as the auxiliary pumps and equipment in addition to connecting the HART-capable sensors of the SITRANS family. A modular 3RK3 control system ensures the safety of the system.

Technical specifications of the project

Drive

Shaft output 10 MW
Speed 350 rpm ... 1,800 rpm
Torque 95,500 Nm up to 1,000 rpm
Clockwise or counterclockwise rotation

System data

Flow rate 16,000 m³/h
Temperature in the test circuit 40 °C

Test bay for boiler feed pumps



As part of the new pump production facilities at its plant in Frankenthal, Germany, KSB installed one of the largest and most powerful boiler feed pump test bays in the world. System requirements included a pump power capacity of 20 MW, a maximum water flow rate of 5,000 m³/h, water temperatures of up to 230 °C and a maximum water pressure of 600 bar. In addition, supply voltages needed to be able to vary between 6.6 kV and 11 kV and the pump power capacity between a few hundred kW and a maximum of 20 MW.

Siemens provided the drive equipment along with a SINAMICS PERFECT HARMONY frequency converter to supply the output voltage. A SIMATIC PCS 7 based test system was developed to control the automatic sequences, specifically the control valves, flaps, auxiliary components and the drive with the frequency converter. The solution has helped to greatly reduce the workload of the test field personnel.

To verify pump functionality, measurements of temperature, pressure and flow rate are conducted at defined operating points, and must be maintained at stable levels with control mechanisms. The measuring instruments, mainly sensors from the SITRANS family, are connected via PROFIBUS PA. A PROFIBUS DP interface enables communication between the control and automation.

The controls needed to operate the test bay run in real time on a separate SIMATIC RackPC 847B.

The system is designed to enable further expansions such as archiving measured data, automatic tests or additional test bays.

Technical specifications of the project

Drive

Shaft output 20 MW
Speed 350 rpm ... 1,800 rpm
Torque 191,000 Nm up to 1,000 rpm
Clockwise or counterclockwise rotation

System data

Flow rate 5,000 m³/h
Temperature in the test circuit 230 °C
System pressure 600 bar
Pump speed 2,500 rpm ... 6,750 rpm



Siemens benefits at a glance

- Complete test bay solutions from a single source, designed to specific customer requirements
- Flexible concepts for operating different types of motors, also without inverter grade insulation
- Typically weak power grids in test bay environments are not affected by line harmonics with SINAMICS PERFECT HARMONY drives
- Automated testing procedures for reduced workload and increased productivity of test field personnel
- Powerful real-time control system enables you to quickly and reliably achieve and maintain defined operating points
- Open architecture to support fast test bay extensions at a later stage, safeguarding your investment well into the future

Discover more:

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Discover in detail how Siemens can provide you with a complete test bay solution for your pump, fan or compressor systems.



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Siemens AG
Process Industries and Drives
Large Drives
P.O. Box 47 43
90025 NUREMBERG
GERMANY