

BLDC engines – Test in the oil bath

Endurance testing in climate chamber

Key challenges in the project:

- Reproduction of real, highly dynamic load profiles
- Test items operated in oil bath, reproduction of operation in contaminated oil
- Endurance test with assorted equipment of 6 or 8 test item fixtures (free variant mix)
- Flexible process sequences of the endurance test can be configured / modified
- Fast data collection (10 kHz per measurement channel)



How did we solve them?

- Highly dynamic servo drives as load engines
- Quick regulation of the speed and torque specifications (speed up to 8.0000 RPM, torque up to 65 Nm) through precision torque sensors
- Control of the test item via the built-in BLDC controller (LIN or CAN bus)
- Programming and control of the Engine Control Unit (ECU) used
- Use of a fast real-time measuring system NI PXI

Purpose of the project

It relates to endurance test benches with 6 or 8 test stations for 2- or 3-phase brushless DC engines (BLDC engines). Up to 6 or 8 BLDC engines can be tested at the same time. The test benches are used in the automotive division for development and audit, e.g. ABS pump drives, hydraulic pump drives, motors for steering wheel or seat adjustment and many more.

Technical requirements for the test bench

Test items are operated inside a climate chamber in an oil bath. The test mechanism is mobile, assembled at the door. 6 or 8 special fixtures for adapting the test specimens in the oil bath are available. Test items are conditioned thermally inside a climate chamber (-40°C - +130°C). Test items are controlled electrically by integrated BLDC controller (LIN bus, optional CAN bus). There is an industrial PC and an NI PXI real-time measuring system in the control cabinet. Measuring application and user interface base on the Berghof Testing Framework, created in NI LabVIEW. Currents, voltages, angles, speeds, torques and temperatures are recorded. Endurance tests of up to 8 months possible with storage of measurement data of approx. 300 measurement channels at full sampling rate.

Test keywords:

6 or 8-time test benches, brushless DC engines (BLDC engines), drive systems, climate chamber, endurance test bench, brushless (BL), direct current (DC), ABS (anti-blocking system), ECU (Engine Control Unit), SIGI (Berghof Testing Sequencer), Berghof Testing Framework



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