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Bloomy Solutions

A Technical Newsletter for PC-Based Measurement and Automation Users

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Welcome to the Winter 2002 issue of *Bloomy Solutions*. This technical newsletter is filled with information on PC-based measurement and automation.

Have functional test needs? Meet Bloomy Controls functional test expert on page 2.

PC-based measurement and automation combines flexible, low-cost hardware and software with industry-standard computers and Internet technology to quickly and economically create high-performance, tightly integrated applications.

Since 1991, Bloomy Controls has delivered these benefits to customers through its software development, systems integration, and training services.

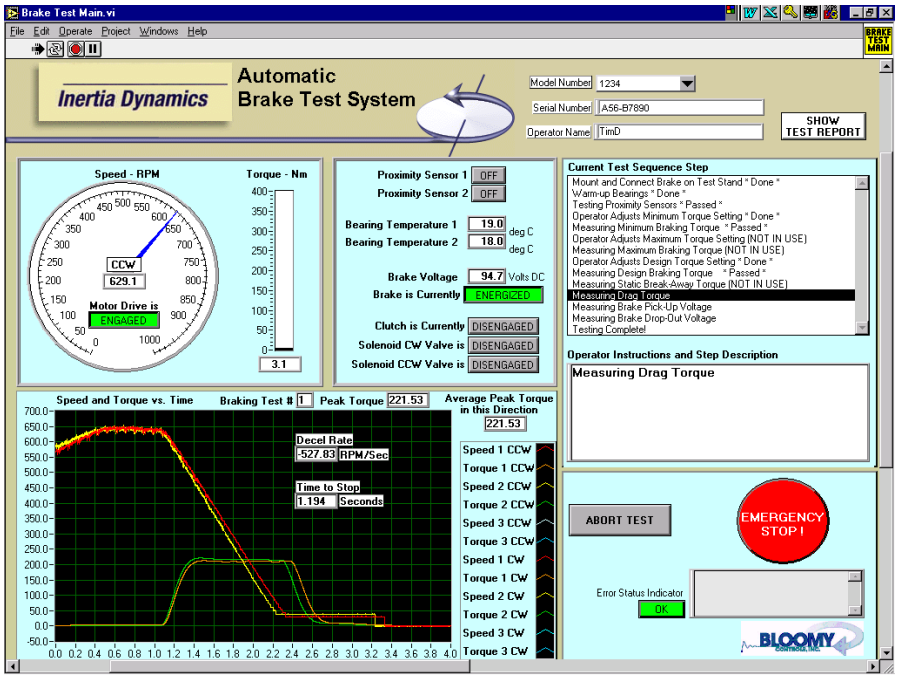
For more information on how Bloomy Controls can assist you with your measurement and automation needs, call Rob Michell at (860) 298-9925, e-mail info@bloomy.com, or visit our Web site at www.bloomy.com.

LabVIEW™-based Automatic Brake Test System

Inertia Dynamics in Collinsville, Conn., manufactures a range of electromagnetically operated mechanical brakes, which are used in a variety of demanding applications. Currently, the company is producing a large-model brake for which functional testing is required. Four major aspects of the operation of these brakes must be accurately and repeatably measured, including dynamic braking characteristics (maximum braking torque, time to brake, deceleration rate); drag torque with brake engaged; proper operation of integral proximity sensors; and brake pick-up and drop-out actuation voltages.

Inertia Dynamics engineers developed a test rig to facilitate these measurements. The rig incorporates a large AC drive motor to spin the brake for dynamic measurements, a programmable DC power supply for actuating the brake, and associated sensors (speed, torque, temperature) to measure the desired parameters. A PC-based system using National Instruments SCXI (Signal Conditioning eXtensions for Instrumentation) hardware performs the necessary data collection and control. The system includes an SCXI-1000 four-slot chassis, 1102D Voltage Input, 1121 Strain Gage Input, 1102 Thermocouple Input, and 1161 Relay Card, all interfacing to and multiplexed by a PCI-6025E Data Acquisition (DAQ) card in the host PC. SCXI provides an ideal solution since the system requires sensor signal conditioning functions, high acquisition rates, and a compact form factor.

Continued on page 2



Brake Test Main.vi displays the current test sequence step, values, and operator instructions during a transient stop test.

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LabVIEW™-based Automatic Brake Test System

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Bloomy Controls developed the data acquisition and control system in LabVIEW, which provides the capability to automatically perform this defined test procedure. The graphical user interface (GUI) displays only those parameters and items of interest which are pertinent to the test being performed. A Test Status indicator shows the operator at which step the test sequence is executing and the status of the current step, and prompts the operator for all necessary actions in order to proceed to the next step. Upon completion of a test sequence, a report is generated which summarizes the results of the test, such as dynamic and drag torque values for minimum and maximum brake settings. Detailed data collected during the dynamic transient test is logged to a delimited text file for further analysis, archiving, and reporting. The system incorporates significant flexibility in its design, both for modifications and extensions of this test procedure, as well as its ability to be adapted to future applications encompassing different products.

As with all mechanical test systems, several "real-world" challenges arose in the system's deployment. During the transient deceleration, a great deal of vibration occurred when the brake was applied, which translated into undesirable noise on the Torque vs. Time curve. To remove the noise and enable an accurate peak torque measurement, a second-order software-implemented Butterworth filter was applied. This greatly improved both readability of displayed data and consistency of measurements. Additionally, the GUI required a continuous live display of both speed and torque. To meet this requirement, a continuous buffering technique was used that allowed the display to be updated in real time. At the conclusion of the test, the buffer was then read back to the beginning of the braking event and displayed on the Torque vs. Time graph. This same data was analyzed to provide calculated parameters such as maximum torque, braking time, and deceleration rate.

The system has provided enormous advantages over previous manual test benches in terms of productivity, user-friendliness, and accuracy. It has been in continuous operation for many months, and thousands of brakes have been tested safely, reliably, and consistently thanks to the solution provided by Bloomy Controls and National Instruments.

Bloomy Controls principal engineer Robert Hamburger designed, developed, and integrated the automatic brake test system. For more information about this system, e-mail info@bloomy.com.

FREE Seminars at

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Visit www.bloomy.com for event times, registration, and directions.

Windsor, Conn.

Feb. 21, LabVIEW 6.1 and LabVIEW Family Hands-On

Feb. 27, Computer-Based Measurement and Automation

March 27, LabVIEW 6.1 and LabVIEW Family Hands-On