Dynamometer Start-Up Kit

Dynamometer Start-up Kit

Features

Graphical speed and torque profile editor
Easily modified software architecture
Low-cost dynamometer monitor and control tool
Accurate measurement capability for engine test, control, and simulation
PID control loops
Intuitive graphical interface
Signal conditioning for RPM, torque, temperature, and inputs for pressure signals

Benefits

Open source code based on LabVIEW graphical programming environment
Interfaces to a wide variety of dynamometer systems
Can be upgraded using standard PC-based technology

Includes a ready-to-run dynamometer application program that is downloaded from the Web

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Overview

The National Instruments Dynamometer Start-up Kit is designed for engine and electric motor testing applications. You can use the kit to control speed or torque, as well as monitor RPM, temperature, emissions, and pressure. You can connect to many types of signals, including voltage, frequency, thermocouples, thermistors, RTDs, and strain-gauge bridges.

The kit leverages existing PC technology and data acquisition and control to simplify configuration and lower system cost. With the open source code architecture, you can modify the kit for individual applications and connect to other I/O devices. The kit uses the LabVIEW graphical development system to log data and generate reports in word-processing, spreadsheet, and database programs.

Applications

The kit delivers monitoring and control for:

- *Automotive engine testing*
- *Dynamometer control*
- *Electric motor testing*
- *Brake testing*
- *Other speed and torque control applications*

Dynamometer Kit Components

The kit consists of the following hardware and software components, which must be ordered separately.

Hardware

- *PXI*
- *Data acquisition*
- *SCXI signal conditioning*

Software

- *LabVIEW*
- *Dynamometer Application Program**

**Dynamometer Application Program requires use of LabVIEW graphical programming software.*

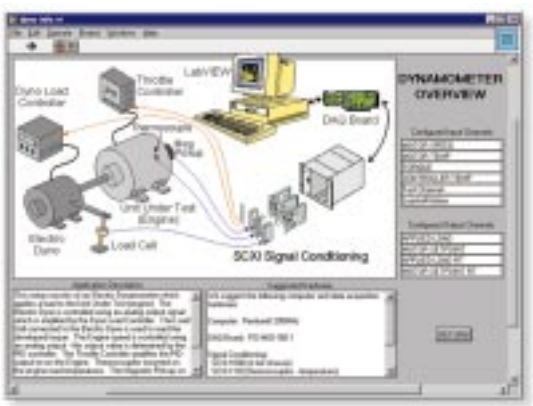

Figure 1. Dynamometer Application Program Configuration Screen

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Dynamometer Start-Up Kit

Data Acquisition

The kit includes a high-performance multifunction data acquisition board with analog, digital, and counter/timer I/O. PXI-6070E, a high-end, multi-function I/O board is recommended. The PXI-6070E features:

- *Analog inputs – 16 single ended, 8 differential channels*
- *Sampling rate – 1.25 MS/s, 12-bit resolution*
- *Analog output — 2 channels*
- *Digital I/O – 8 TTL lines*
- *Counter/timers – 2 up/down, 24-bit resolution*

SCXI™

Users can select from a variety of signal conditioning modules that offer a range of sensor connectivity, excitation, and isolation for pressure, temperature, and RPM transducers. Signal conditioning modules appropriate for dynamometer applications are listed in the table below.

PXI™ Controller, I/O, and Conditioning

The dynamometer kit is based on a ruggedized PCI-based PC and chassis. The following PXI hardware is recommended for use with the dynamometer kit.

PXI-1010 *– Chassis for PXI, CompactPCI, and SCXI modules. Integrates a high-performance 8-slot PXI backplane with a 4-slot SCXI backplane to offer a complete solution for demanding I/O applications.*

PXI-8156B *– High-performance system controller compatible with the PXI-1010 chassis. The PXI-8156B:*

- *Controls up to 7 PXI modules*
- *Includes a 333 MHz AMD-K6-2 CPU with Windows NT operating system*
- *Requires a minimum of 64 MB of RAM for use with Windows NT*
- *Compatible with LabVIEW or LabWindows/CVI application software*

LabVIEW™

The LabVIEW flexible graphical environment for high-performance systems combines easy-to-use graphical development with the flexibility of a powerful programming language. The Dynamometer Start-up Kit uses LabVIEW to provide high-performance operation and maintains flexibility for modification if necessary.

Module	Description	Application	Features
SXCI-1121	Signal conditioning module	Connects to strain gauge to measure torque	• 250 Vrms working isolation per channel • 4 isolated input channels and excitation
SCXI-1102	Thermocouple amplifier/multiplexer	Temperature monitoring	• 32 channels • 2 Hz lowpass noise filters and gain amplifiers • Programmable instrumentation amplifier
SCXI-1126	Signal conditioning module	Measures RPM	• 8 isolated frequency input channels • Programmable frequency ranges from 250 Hz to 128 kHz. • Signal input levels up to +/-250 V.
SCXI-1180	Feedthrough planel	Extends unconditioned I/O signals from DAQ board to SCXI chassis	• Cables directly to breakout connector or SCXI cable assembly
SCXI-1302	Front-mounting terminal block	For use with SCXI-1180	• 50 screw terminals
SCXI-1303	Front-mounting terminal block	High-accuracy thermocouple measurements for use with SCXI-1102	• Includes isothermal construction and circuity for open thermocouple detection and automatic signal ground referencing
SCXI-1321	Front-mounting terminal block	For use with strain gauges and the SCXI-1121	• Capable of offset nulling and shunt calibration
SCXI-1327	Front-mounting terminal block	Extends the input range of the SCXI-1121 to 250 Vrms. Extends the threshold level of the SCXI-1126 up to 250 V.	• Extended voltage input range • Includes an onboard temperature sensor for cold-junction compensation with thermocouples

Dynamometer Start-Up Kit

Dynamometer Application Program

The dynamometer application program is a ready-to-run program that performs monitor and control functions and includes panels for a simple dynamometer test station. LabVIEW is required for use of the dynamometer application program. The program can be downloaded from the National Instruments Web site at ***www.ni.com/automotive/power_comp.htm***

Dynamometer program features include:

- *Web-based, downloadable*
- *Source code included*
- *Profile editor*
- *User log-on*
- *Diagnostic screen*
- *PID tuning screen*
- *Data logging to standard word processing, database, and spreadsheet applications*

Ordering Information

LabVIEW FDS

Windows 2000/NT/9x.....776670-03

LabVIEW PDS

Windows 2000/NT/9x.....776678-03

** LabVIEW is required for use of the dynamometer program.*

PXI Industrial Computer w/ SCXI chassis

PXI-1010.....777570-01

PXI-8156B.....777884-32

64 Mb SRAM.....777885-64

Data Acquisition

PXI-6070E.....777060-01

SCXI Signal Conditioning

SCXI-1121.....776572-21

SCXI-1180.....776572-80

SCXI-1102.....776572-02

SCXI-1126.....776572-26

SCXI-1321.....777687-21

SCXI-1302.....777687-02

SCXI-1303.....777687-03

SCXI-1327.....777687-27

For other configurations, please contact National Instruments.

Figure 2. Dynamometer Application Program Front Panel

Dynamometer Start-Up Kit

Technical Support

National Instruments strives to provide you with quality technical assistance worldwide. We currently offer electronic technical support along with our technical support centers staffed by Applications Engineers.

Access information from our Web site at ***www.ni.com*** *Our FTP site is dedicated to 24-hour support, with a collection of files and documents to answer your questions. Log on to our Internet host at ftp.ni.com*

You can fax questions to our Applications Engineers anytime at (800) 328-2203 or (512) 683-5678. Or, you can call from 8:00 a.m. to 6:00 p.m. (central time) at (512) 795-8248. Internationally, contact your local office. National Instruments sponsors a wide variety of group activities, such as user group meetings at trade shows and at large industrial sites. Our users also receive our quarterly Instrumentation Newsletter™ and AutomationView™ newsletters to get the latest information on new products, product updates, application tips, and current events. In addition, sign up for NI News, our electronic news service at ***www.ni.com/news***

Warranty

All National Instruments data acquisition, computer-based instrument, VXIbus, and MXIbus products are covered by a one-year warranty. GPIB hardware products are covered by a two-year warranty from the date of shipment. The warranty covers board failures, components, cables, connectors, and switches, but does not cover faults caused by misuse. The owner may return a failed assembly to National Instruments for repair during the warranty period. Extended warranties are available at an additional charge.

Information furnished by National Instruments is believed to be accurate and reliable. National Instruments reserves the right to change product specifications without notice.

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