

M-TEST 7

MOTOR TESTING SOFTWARE

NEW FEATURES WITH M-TEST 7

- New Graphical User Interface has user friendly tabbed pages for quick navigation.
- Optional Analog and Digital I/O provides more device flexibility.
- DSP7010 Programmable Controller Support.
- Supports the optional Analog and Digital I/O Modules on the DSP7010 Programmable Controller.
- Compare function allows overlay of data from five separate tests on the same graph.
- Expanded power analyzer and power supply selections.
- Cursor tools can obtain the X and Y coordinates of any point on a curve and magnify any section of the graph.
- Additional test choices (coast and overload to trip).
- Programmable analog and digital outputs per step in curve and pass/fail tests.
- Export graph images to clipboard or file.
- Two page report generates a five-axis graph on second page.

DESCRIPTION

Magtrol's new M-TEST 7 is a state-of-the-art motor testing program for PC (Windows® 10/11 64-bit) based data acquisition. Used with a Magtrol Programmable Dynamometer Controller, M-TEST 7 works with any Magtrol Dynamometer or In-Line Torque Transducer to help determine the performance characteristics of a motor under test. Up to 63 parameters are calculated and displayed utilizing M-TEST 7's feature-rich testing and graphing capabilities.

An integral component of any Magtrol Motor Test System, M-TEST 7 performs ramp, curve, manual, pass/fail, coast and overload to trip tests in a manner best suited to the overall efficiency of the test rig. Written in LabVIEW™, M-TEST 7 has the flexibility to test a variety of motors in a multitude of configurations. The data generated from this user-friendly program can be stored, displayed and printed in tabular or graphical formats, and is easily imported into a spreadsheet.



Fig. 1 : M-TEST 7 Motor Testing Software

Magtrol can also make custom modifications to the software to meet additional motor testing requirements.

ANALOG INPUT MEASUREMENT

Up to 128 thermocouples or analog sensors can be read and monitored during a motor test. Heat rise curves on the bearings, windings and housing of a motor can be performed and air flow/exhaust efficiencies can be measured with an air tool or internal combustion engine. M-TEST 7, with its complete dynamometer control, even allows for analog measurement while performing load simulation for duty cycle and life testing.

APPLICATIONS

M-TEST 7—besides being well-suited for simulating loads, cycling the unit under test and motor ramping—is also ideal for production line and inspection applications, due to its pass/fail test function. Another time-saving feature, that engineering labs will benefit from, is the ability to duplicate tests and run them automatically. This versatile program is extremely valuable to anyone involved in motor testing.

STANDARD FEATURES

- **Multiple Testing Options:**

Ramp: Select from average ramp down/up or ramp down with inertia correction factor. Also allows extrapolation of free-run and locked-rotor data, plus interpolation of specific speed or torque data points.

Curve: Test speed, torque, amps, watts input, watts output and open loop parameters. Capable of adjusting sampling rate and using step or ramp from one load point to the next.

Manual: Controls test from front panel of the Dynamometer Controller or screen control while computer acquires data. Allows adjustment of sampling rate.

Pass/Fail: Checks amps, input watts (with optional Power Analyzer), speed, torque and output watts against user-defined values.

Coast: Counts degrees of revolution after motor power is removed.

Overload to Trip: Loads and monitors temperature until the motors thermal cutout trips.

- **Displays 63 Tested and Calculated Parameters:** Torque, speed and auxiliary input are displayed from the DSP6000/6001/7000/7010 Controller; amps, volts and watts from an (optional) power analyzer. Calculated values including horsepower, efficiency, power factor, output watts and time can also be displayed. Optional analog and digital inputs can also be displayed.
- **Three-Phase Power Analyzer Data Acquisition:** Obtain data on each individual phase and/or the

sum used in the chosen parameters (amps, volts, input watts and power factor).

- **Motor Shaft Direction Indicator:** Indicates if the motor is turning clockwise or counterclockwise.
- **IEEE-488, USB and RS-232 Interface or GPIB-USB-HS:** Computer interface with National Instruments™ PCI-GPIB. RS-232 available with DSP7000, DSP6001 and DSP6000 only. USB on DSP7000, DSP7010 and Micro Dyne only.
- **Dynamic PID Scaling:** Provides consistent control loop results throughout motor speed range during ramp test (for DSP6001/7000/7010 only).
- **PID Adjustment Routines:** Helps user adjust the system for ramp and step functions.
- **Graphing Capabilities:** Display up to 5 test curves in a single graph; easy-to-read colored and labeled plots with several graph formatting options; manual or auto scaling.
- **Curve Fitting:** A curve fitting routine can be applied to most motor test curves. Raw data and curve fit data can also be displayed simultaneously.
- **Customized Reports:** Allows user to produce a one or two-page motor test summary, which can include the motor's serial number; maximum torque, speed, power and current values; operator name; time and date of test; motor direction; 32 data points; and an X-Y plot.
- **Save/Load Setup Function:** Test procedure configurations may be stored and recalled using standard Windows® file structure.

SYSTEM REQUIREMENTS

- Personal computer with Intel® i5 processor (or equivalent)
- Microsoft® Windows® 10/11 64-bit
- 8 GB of RAM
- 5 GB of available hard drive space
- VGA color monitor with minimum screen resolution of 1024 × 768
- National Instruments™ PCI-GPIB card, GPIB-USB-HS Interface (available from Magtrol). GPIB card can be used for interfacing with Magtrol DSP6000, DSP6001 or DSP7000 Controllers
- In addition, a USB Interface can be used with the DSP7000 Controller.

SYSTEM CONFIGURATION

A Magtrol Dynamometer provides motor loading with a Magtrol Programmable Dynamometer Controller acting as the interface between the PC running M-TEST 7 and the dynamometer. If motor electrical parameters are to be measured or used to determine load points, a Magtrol Power Analyzer is also required. Interfacing between the computer and electronic instrumentation is via the National Instruments™ PCI-GPIB card, RS-232 serial interface or GPIB-USB-HS (when using a DSP7000, DSP6000 or DSP6001) or USB (DSP7000/DSP7010, Micro Dyne).

M-TEST 7 is equipped to work in conjunction with any of the following Magtrol motor testing instruments:

- Dynamometer Controller (DSP7010/7000/6001/6000)
- Micro Dyne
- Hysteresis, Eddy-Current or Powder Dynamometer (HD, HD5, WB, PB)
- In-Line Torque Transducer (TM, TF, TMB, TMHS)
- Power Analyzer (7530, 7510, 6530, 6510e, 6510, 6550, 5100, 5300, 5310, 5330)

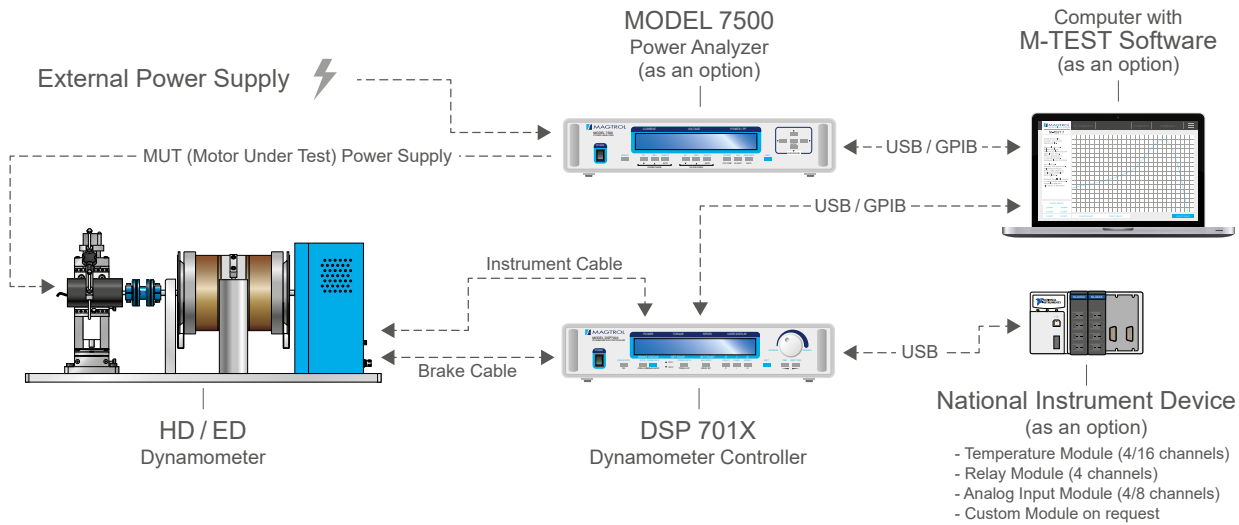


Fig. 2: M-Test 7 System Configuration with HD Series Dynamometer

ALTERNATIVE MOTOR TESTING SOFTWARE

In addition to M-TEST 7, Magtrol offers EM-TEST 2.0 specifically designed for endurance motor testing and DUAL-TEST 7 fully independent dual channel control software.

| DESCRIPTION | MODEL/PART # |
|--|------------------|
| EM-TEST2.0 Endurance Motor Testing Software | SW-EM-TEST2.0-WE |
| DUAL-TEST7 Dual Channel Motor Testing Software | SW-DUAL-TEST7-WE |

RELATED PRODUCTS

DSP 7010 - DYNAMOMETER CONTROLLERS

Magtrol's MODEL DSP 7010 Series Dynamometer Controller employs state-of-the-art Digital Signal Processing Technology to provide superior motor testing capabilities. Designed for use with any Magtrol Hysteresis, Eddy-Current or Powder Dynamometer, Magtrol In-Line Torque Transducer or auxiliary instrumentation, the DSP 7010 can provide complete PC control via the USB or IEEE-488 interface. With up to 500 readings per second, the DSP 7010 is ideally suited for both the test lab and the production line.



Fig. 3: DSP 7011 | Programmable Dynamometer Controller

WB & PB SERIES - DYNAMOMETER



Fig. 4: 1 PB 115 | Dynamometer

The WB Series (eddy current) and PB Series (magnetic powder) dynamometers are particularly suitable for demanding applications requiring low (PB) to high (WB up to 65 000 rpm) speeds. The PB brakes will develop their nominal torque at standstill, while the WB brakes develop a braking torque proportional to the

speed and their maximum torque is reached at nominal speed. The brake is cooled by water circulating in the stator. As a result, these dynamometers are able to dissipate high continuous loads (up to 140 kW). The WB and PB dynamometers incorporate a torque measuring system which has an accuracy of $\pm 0.3\%$ to $\pm 0.5\%$ at full scale.

HD SEREIS - DYNAMOMETER



Fig. 5: HD Series | Dynamometer

Magtrol's Hysteresis Brake Dynamometers (HD Series) are versatile and ideal for testing in the low to medium power range (maximum 14 kW intermittent duty). With a Hysteresis Braking system, the Dynamometers do not require speed to create torque, and therefore can

provide a full motor ramp from free-run to locked rotor. Brake cooling is provided by convection (no external source), by compressed air or by dedicated blower, depending on the model. All Magtrol Hysteresis Dynamometers have accuracy ratings of $\pm 0.25\%$ (full scale) depending on size and system configuration. To better integrate dynamometers into systems, Magtrol offers both long and short base plates. The shorter base plate facilitates easier motor mounting when used with T-slot tables and Magtrol Adjustable Motor Fixtures, where as the long base plates are better suited for table top testing.

CMTS - CUSTOM MOTOR TEST SYSTEMS

Magtrol provides motor testing components to turnkey solutions for all your motor testing needs. Typical test benches include: dynamometers, 4-Quadrant loading motors, tables, fixtures, control racks, power supplies, power analyzers, ohmmeters, temperature measurement and dedicated M-TEST software. Other sensors can be integrated upon request.



Fig. 6: Custom Motor Test System with WB Series brake