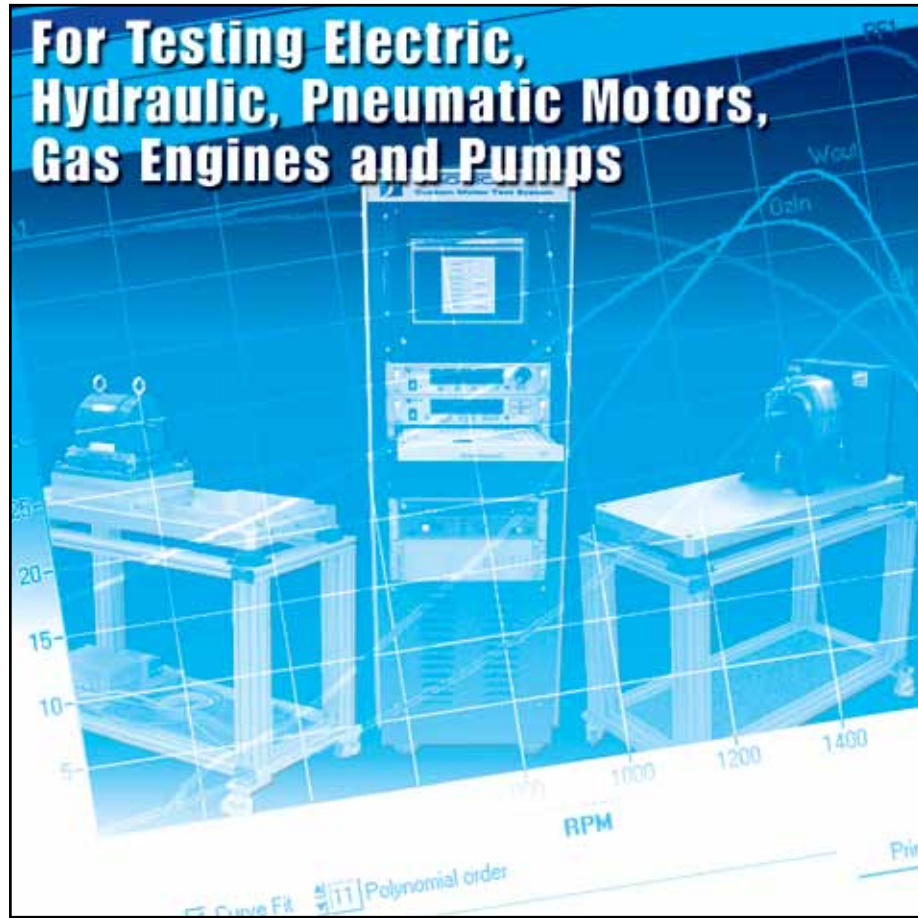


# TORQUE-SPEED-POWER



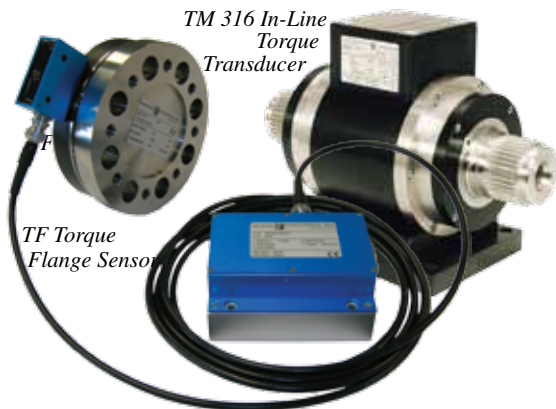
# MAGTROL

**For Testing Electric,  
Hydraulic, Pneumatic Motors,  
Gas Engines and Pumps**



- ▶ **Hysteresis, Eddy-Current and Powder Absorption Dynamometers**
- ▶ **Torque Transducers**
- ▶ **High Performance Dynamometer Controllers**
- ▶ **Power Analyzers**
- ▶ **Motor Testing Software**
- ▶ **Custom Motor Test Systems**

# TORQUE TRANSDUCERS



Model 3410



## Torque Transducer Displays

Magtrol offers two different torque displays: Model 3410 for all TM/TMHS/TMB and TF Transducers and Model 6400. Both units supply power to the transducer and display torque, speed and mechanical power. Features include:

- Adjustable English, Metric and SI Torque Units
- Large, Easy-to-Read Vacuum Fluorescent Display
- Built-In Self-Diagnostic Tests
- Overload Indication
- Tare Function
- RS-232 Interface
- Torque and Speed Outputs
- Closed-Box Calibration
- Includes Torque 1.0 Software

The Model 6400 Display (for TM series only) has the following additional features:

- Pass/Fail Torque, Speed and Power Testing Capabilities
- IEEE-488 Interface
- Auxiliary Analog Input

## TM, TMHS & TMB In-Line Transducers

Magtrol's In-Line Torque Transducers deliver precise torque and speed measurement over a very broad range. Each model has an integrated conditioning electronic module providing 0 to  $\pm 10$  VDC torque output and an open collector speed output. All TM In-Line Transducers employ Magtrol's unique **non-contact** differential transformer torque measuring technology which makes them very reliable, providing high overload protection, excellent long-term stability and high noise immunity.

## TF Torque Flange Sensors

Based on strain-gauge technology, the TF Sensor's precise telemetry system enables highly accurate signal transmission between its measuring flange, HF transmitter and receiver/conditioner. With a compact, bearingless, maintenance-free design, the TF Torque Flange Sensor brings many appealing advantages to torque measurement applications—most notably, the TF's insusceptibility to signal interference, axial and radial misalignment, noise and shocks. Another key benefit is the sensor's high rigidity which supports direct mounting on the machine shaft or flange, avoiding the use of couplings on one side.

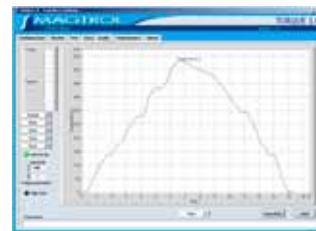
## Torque 1.0 Software

Magtrol's Torque 1.0 Software is an easy-to-use Windows® executable program, used to automatically collect torque, speed and mechanical power data. The data can be printed, displayed graphically or quickly saved as a Microsoft® Excel spreadsheet. Standard features of Torque 1.0 include:

- Measured Parameter vs. Time
- Adjustable Sampling Rates
- Polynomial Curve Fitting
- Peak Torque Capture
- Multi-Axes Graphing



Test Configuration



Data Graph

## TORQUE TRANSDUCER RATINGS

Model #s		Nominal Rated Torque		TMB Series <i>Basic Accuracy</i>		TM Series <i>High Accuracy</i>		TMHS Series <i>High Speed &amp; Accuracy</i>		TF Series <i>Torque Flange Sensor</i>	
TM	TF	N·m	lb·ft	Accuracy Class	Max. Speed rpm	Accuracy Class	Max. Speed rpm	Accuracy Class	Max. Speed rpm	Accuracy Class	Max. Speed* rpm
301	---	0.1	0.07		N/A	0.2%	20,000		N/A		N/A
302	---	0.2	0.15		N/A	< 0.1%	20,000		N/A		N/A
303	---	0.5	0.37	< 0.1%	6,000	< 0.1%	20,000	< 0.1%	40,000		N/A
304	---	1	0.7	< 0.1%	6,000	< 0.1%	20,000	< 0.1%	50,000		N/A
305	---	2	1.5	< 0.1%	6,000	< 0.1%	20,000	< 0.1%	50,000		N/A
306	---	5	3.7	< 0.1%	6,000	< 0.1%	20,000	< 0.1%	50,000		N/A
307	---	10	7.4	< 0.1%	6,000	< 0.1%	20,000	< 0.1%	50,000		N/A
308	---	20	15	< 0.1%	6,000	< 0.1%	20,000	< 0.1%	50,000		N/A
309	209	20	15	< 0.1%	4,000	< 0.1%	10,000	< 0.1%	32,000	< 0.1%	17,000
310	210	50	37	< 0.1%	4,000	< 0.1%	10,000	< 0.1%	32,000	< 0.1%	17,000
311	211	100	74	< 0.1%	4,000	< 0.1%	10,000	< 0.1%	32,000	< 0.1%	17,000
312	212	200	148	< 0.1%	4,000	< 0.1%	10,000	< 0.1%	24,000	< 0.1%	17,000
313	213	500	369	< 0.1%	4,000	< 0.1%	10,000	< 0.1%	24,000	< 0.1%	13,000
314	214	1,000	738		N/A	< 0.1%	7,000	< 0.1%	16,000	< 0.1%	13,000
315	215	2,000	1,475		N/A	< 0.1%	7,000	< 0.1%	16,000	< 0.1%	10,000
316	216	5,000	3,688		N/A	< 0.1%	5,000	< 0.1%	12,000	< 0.1%	8,000
317	217	10,000	7,375		N/A	< 0.15%	5,000	< 0.15%	12,000	< 0.1%	8,000
---	218	20,000	14,751		N/A		N/A		N/A	< 0.25%	3,000
---	219	50,000	36,878		N/A		N/A		N/A	< 0.25%	3,000
---	220	100,000	73,756		N/A		N/A		N/A	< 0.30%	3,000

\* High speed versions on request.

## MOTOR TESTING SOFTWARE

### M-TEST 5.0

Magtrol's M-TEST 5.0 is a state-of-the-art motor testing program designed for use with Windows® operating systems for PC-based data acquisition. Used in conjunction with Magtrol's Motor Testing Equipment, M-TEST 5.0 is equipped with ramp, curve and manual testing capabilities to help determine the performance characteristics of a motor under test, and also provides pass/fail testing for production line and inspection applications. The data generated can be stored, displayed and printed in tabular or graphic formats, and is easily imported into a spreadsheet. M-TEST 5.0 is ideal for simulating loads, cycling the unit under test and motor ramping. Magtrol can also make custom modifications to the software to meet your specific motor testing needs.

#### New Features

- Temperature Measurement Capability is Now Included in Standard Program
- Tabbed Interface for Quick Navigation
- More Graphing Options
- Simplified PID Scaling
- Automatic GPIB Device/Address Detection
- Multiple Language Support
- Single/Multi-User Login with Password Protection

#### Other Features

- Displays 22 Tested and Calculated Parameters
- Pass/Fail Testing
- Automatically Loads Default Test Instrument Parameters
- Motor Shaft Direction Indicator
- IEEE-488 & RS-232 Interface
- Three-Phase Power Analyzer Data Acquisition
- Curve Fitting
- Customized Reports
- Report Saving and Recall

#### Sensor Input Measurement

M-TEST 5.0 is capable of reading and monitoring up to 32 thermocouples or analog sensors during a motor test. Perform heat rise curves on the bearings, windings and housing of a motor, or measure air flow/exhaust efficiencies with an air tool or internal combustion engine. M-TEST 5.0, with its complete dynamometer control, even allows for sensor measurement while performing load simulation for duty cycle and life testing.



Overlay data from two separate tests



Cursor tools for plot analysis

## CUSTOM MOTOR TEST SYSTEMS



Magtrol's Customized Motor Test Systems (CMTS) are PC-based, turnkey systems custom designed and built to meet your specific requirements.



#### CMTS Component Options

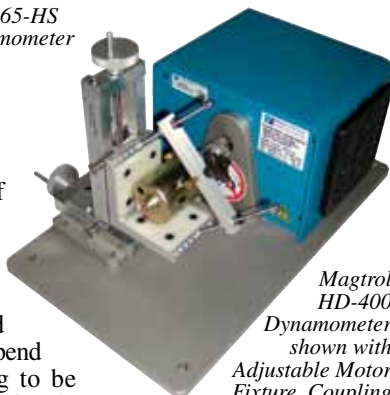
- Custom Test Stand, Table or Cabinet
- One or More Dynamometers
- Programmable Dynamometer Controller
- Power Analyzer
- Customized Software
- Motor Power Supply (AC and/or DC)
- Personal Computer and Printer
- GPIB Cards & Cables
- Motor Fixturing
- Safety Guards
- Multiple Point Temperature Measurement
- Cooling System
- Calibration Weights
- On-Site Services: commissioning & training

# DYNAMOMETERS



1 WB 65-HS  
Dynamometer

Magtrol offers three types of dynamometer brakes to absorb load: Hysteresis, Eddy-Current and Magnetic Powder. Each type of Dynamometer has advantages and limitations and choosing the correct one will depend largely on the type of testing to be performed. Magtrol sales professionals are readily available to assist in selecting the proper dynamometer to meet your testing needs.



Magtrol  
HD-400  
Dynamometer  
shown with  
Adjustable Motor  
Fixture, Coupling  
and DC Motor

## Hysteresis Brake Dynamometers **HD**

Hysteresis Brake Dynamometers (*HD series*) are versatile and ideal for testing in the low to middle power range (max. 14 kW intermittent duty). Hysteresis Brakes **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) or by air (compressed air or dedicated blower) depending on the model. Hysteresis Dynamometers have both continuous and intermittent power ratings where the dynamometer is capable of dissipating more power for shorter periods of time. All Hysteresis Dynamometers have accuracy ratings of  $\pm 0.25\%$  to  $\pm 0.5\%$  full scale, depending on size and system configuration. Also available are special designs for small engine and high-speed motor testing.

## Eddy-Current Brake Dynamometers **WB**

Eddy-Current Brake Dynamometers (*WB series*) are ideal for applications requiring high speeds and also when operating in the middle to high power range. Eddy-Current Brakes provide increasing torque as the speed increases, reaching peak torque at rated speed. The Dynamometers have low inertia as a result of small rotor diameter. Brake cooling is provided by a water circulation system, which passes inside the stator to dissipate heat generated by the braking power. The water cooling in the WB provides high continuous power ratings (max. 140 kW). The WB Dynamometers have typical accuracy ratings of  $\pm 0.3\%$  to  $\pm 0.5\%$  full scale ( $\pm 2\%$  for WB 2.7), depending on size and system configuration.

## Powder Brake Dynamometers **PB**

Powder Brake Dynamometers (*PB series*) are ideal for applications operating in the low to middle speed range or when operating in the middle to high torque range. Like Hysteresis Brakes, Powder Brakes provide full torque at zero speed. Like the Eddy-Current Brake Dynamometers, the PB series is water-cooled, allowing for power ratings up to 48 kW. The PB Dynamometers have typical accuracy ratings of  $\pm 0.3\%$  to  $\pm 0.5\%$  full scale ( $\pm 2\%$  for PB 2.7), depending on size and system configuration.

## Tandem Dynamometer

Magtrol offers Eddy-Current and Powder Dynamometers mounted in tandem. In tandem, the unique features of each type of dynamometer brake are utilized, allowing nominal braking torque to be applied to the unit under test from zero speed to maximum rotation. The Tandem Dynamometers are available on a number of PB/WB combinations.

### HYSTERESIS DYNAMOMETERS

Model	Maximum Torque Range			Power Ratings		Maximum Speed*
	English	Metric	SI	5 minutes	continuous	
HD-106	2.5 oz-in	180 g-cm	18 mN-m	35	7	30,000
HD-100	11 oz-in	800 g-cm	80 mN-m	75	20	25,000
HD-400	40 oz-in	2.8 kg-cm	280 mN-m	200	55	25,000
HD-500	120 oz-in	8.5 kg-cm	850 mN-m	400	80	25,000
HD-510	120 oz-in	8.5 kg-cm	850 mN-m	750	375	25,000
HD-505	240 oz-in	17 kg-cm	1.7 N-m	800	160	25,000
HD-515	240 oz-in	17 kg-cm	1.7 N-m	1,500	900	25,000
HD-700	440 oz-in	31 kg-cm	3.1 N-m	700	150	25,000
HD-710	440 oz-in	31 kg-cm	3.1 N-m	1,500	935	25,000
HD-705	55 lb-in	62 kg-cm	6.2 N-m	1,400	300	25,000
HD-715	55 lb-in	62 kg-cm	6.2 N-m	3,400	3,000	25,000
HD-800	125 lb-in	140 kg-cm	14.0 N-m	2,800	1,800	12,000
HD-810	125 lb-in	140 kg-cm	14.0 N-m	3,500	3,000	12,000
HD-805	250 lb-in	280 kg-cm	28.0 N-m	5,300	3,000	12,000
HD-815	250 lb-in	280 kg-cm	28.0 N-m	7,000	6,000	12,000
HD-825	500 lb-in	565 kg-cm	56.5 N-m	14,000	12,000	8,000

\* Higher speeds available on request.

### EDDY-CURRENT DYNAMOMETERS

Model	Rated Torque			Rated Speed	Rated Power	Maximum Speed	
	English	Metric	SI	rpm	kW	standard version	high-speed version (HS)
1 WB 2.7	21 oz-in	1.5 kg-cm	0.15 N-m	15,915	0.25	50,000	70,000
2 WB 2.7	43 oz-in	3 kg-cm	0.3 N-m	15,915	0.50	50,000	70,000
3 WB 2.7	64 oz-in	4.5 kg-cm	0.45 N-m	15,915	0.75	50,000	70,000
4 WB 2.7	85 oz-in	6 kg-cm	0.6 N-m	15,915	1.00	50,000	70,000
1 WB 23	N/A	N/A	0.08 N-m	20,000	0.30	100,000	
1 WB 43	212 oz-in	15 kg-cm	1.5 N-m	9,550	1.50	50,000	65,000
2 WB 43	425 oz-in	30 kg-cm	3 N-m	9,550	3	50,000	65,000
1 WB 65	89 lb-in	100 kg-cm	10 N-m	5,730	6	30,000	50,000
2 WB 65	177 lb-in	200 kg-cm	20 N-m	5,730	12	30,000	50,000
1 WB 115	443 lb-in	500 kg-cm	50 N-m	2,865	15	18,000	22,000
2 WB 115	885 lb-in	1000 kg-cm	100 N-m	2,865	30	18,000	22,000
1 WB 15	1239 lb-in	1400 kg-cm	140 N-m	2,390	35	7,500	N/A
2 WB 15	2478 lb-in	2800 kg-cm	280 N-m	2,390	70	7,500	N/A
3 WB 15	3717 lb-in	4200 kg-cm	420 N-m	2,390	105	7,500	N/A
4 WB 15	4957 lb-in	5600 kg-cm	560 N-m	2,390	140	7,500	N/A

### POWDER DYNAMOMETERS

Model	Rated Torque			Rated Speed	Rated Power	Maximum Speed
	English	Metric	SI	rpm	kW	rpm
1 PB 2.7-8	85 oz-in	6 kg-cm	0.6 N-m	320	0.02	3,000
2 PB 2.7-8	170 oz-in	12 kg-cm	1.2 N-m	320	0.04	3,000
4 PB 2.7-8	340 oz-in	24 kg-cm	2.4 N-m	320	0.08	3,000
1 PB 2.7-8K	85 oz-in	6 kg-cm	0.6 N-m	2390	0.15	10,000
2 PB 2.7-8K	170 oz-in	12 kg-cm	1.2 N-m	2390	0.30	10,000
4 PB 2.7-8K	340 oz-in	24 kg-cm	2.4 N-m	2390	0.60	10,000
1 PB 43	44 lb-in	50 kg-cm	5 N-m	955	0.50	4,000
2 PB 43	89 lb-in	100 kg-cm	10 N-m	955	1.00	4,000
1 PB 65	221 lb-in	250 kg-cm	25 N-m	570	1.50	3,000
2 PB 65	442 lb-in	500 kg-cm	50 N-m	570	3	3,000
1 PB 115	885 lb-in	1,000 kg-cm	100 N-m	480	5	3,000
2 PB 115	1,770 lb-in	2,000 kg-cm	200 N-m	480	10	3,000
1 PB 15	2,655 lb-in	3,000 kg-cm	300 N-m	382	12	2,000
2 PB 15	5,311 lb-in	6,000 kg-cm	600 N-m	382	24	2,000
4 PB 15	10,621 lb-in	12,000 kg-cm	1200 N-m	382	48	2,000

# DYNAMOMETER CONTROLLERS

## DSP6001 High-Speed Programmable Controller

Magtrol's Model DSP6001 Programmable Dynamometer Controller employs state-of-the-art Digital Signal Processing technology to provide superior motor testing capabilities. Designed for use with any Magtrol HD, WB or PB Dynamometer; Magtrol In-Line Torque Transducer; or auxiliary instrumentation, the DSP6001 can provide complete PC control via IEEE-488 or RS-232 interface. Two channels enable the unit to support a combination of up to two independently configured testing instruments. With up to 100 readings per second, the DSP6001 is ideally suited for both the test lab and the production line.



### Standard Features

- Fast Full-Curve Data Acquisition
- Speed & Torque Operating Modes (Open or Closed Loop)
- Single Point or Programmed Load Control
- Torque and Speed Analog Output
- Closed-Box Calibration of Torque & Auxiliary Input
- Thermal Alarm Input
- High-Speed Data Acquisition
- Programmable Digital PID Values
- RS-232 and IEEE-488 Interfaces
- Vacuum Fluorescent Readout
- 19" Rack Mounts with Handles

## 6200 Open-Loop Controller

Magtrol's Model 6200 is an open-loop controller with a high-quality vacuum fluorescent display. The unit provides open-loop control of HD Series Dynamometers via an internal current regulated power supply. The Model 6200 displays torque, speed and mechanical power values of the motor under test. Instead of mechanical power, the unit can display an auxiliary transducer reading via the  $\pm 5$  V DC analog input. The displayed values can be stored internally or output via the RS-232 or IEEE-488 interfaces.

### Standard Features

- High-Quality, Easy-to-Read Display
- Internal Data Storage
- Open-Loop Dynamometer Control
- Dynamometer Overload Protection
- Auxiliary  $\pm 5$  V DC Analog Input for Additional Transducer
- Pass/Fail Motor Testing Capability
- RS-232 and IEEE-488 Interfaces
- 19" Rack Mounts with Handles

# POWER ANALYZERS

## Models 6510e and 6530 High-Speed Power Analyzers

The Magtrol 6510e Single-Phase and 6530 Three-Phase Power Analyzers are easy-to-use instruments ideal for numerous power measurement applications. Both power analyzers provide extremely fast data transfer rates, up to 100 per second, which makes them ideal for both static and dynamic tests. From DC to 100 kHz AC, the 6510e and 6530 measure volts, amps, watts, volt-amps, frequency, crest factor,  $V_{peak}$ ,  $A_{peak}$  and power factor in one convenient display.



At the core of the unit is a Digital Signal Processor capable of processing over 40 million instructions per second (10 million per second for the 6510e). Both units are equipped with an easy-to-read customizable vacuum fluorescent display and an optional plug-in module that provides up to 12 channels of analog output (3 channels for Model 6510e).

### Standard Features

- Easy Setup and High-Quality, Easy-to-Read Display
- Ranges: Up to 600  $V_{rms}$  @ 20 A continuous duty
- Accuracy: Up to 0.1%
- Bandwidth: DC up to 100 kHz
- Input Power: Accepts 120/240  $V_{rms}$ , 60/50 Hz power at 20 VA max
- Measurement: Continuous or Cycle-by-Cycle
- Average, Peak and Inrush Capabilities
- RS-232 and IEEE-488 Interfaces
- External Shunt Input
- 19" Rack Mounts with Handles

# NEW PRODUCTS

## Micro Dyne System

With over 50 years' experience in dynamometer design and torque measurement, Magtrol has revolutionized the industry once again. Magtrol's new Micro Dyne, capable of measuring extremely low torques (2.0 mN·m can be resolved to 0.0004 mN·m), is designed exclusively for testing miniature and micro (low-torque) motors.

For the utmost convenience, the Micro Dyne is packaged as a COMPLETE MOTOR TESTING SYSTEM. Everything that is needed to accurately and efficiently test miniature motors and micro motors is included with the purchase of a Magtrol Micro Dyne. The only component that needs to be supplied by the customer is a laptop or desktop personal computer and motor power supply.



### System Components

- Hysteresis Dynamometer  
Torque: 2.0 mN·m to 4.0 mN·m  
Speed: up to 100,000 rpm
- Motor Fixture: accommodates motors from 5 mm to 30 mm in diameter.
- All-in-one dynamometer controller, DC wattmeter, power relay and USB interface
- M-TEST 5.0
- Calibration software and weights

## AHB Series Compressed-air-cooled Hysteresis Brakes

When torque control/torque measurement must be performed at the highest possible power, Magtrol AHB Series Hysteresis Brakes are ideal. Passages running through the brakes enables compressed air cooling, providing excellent heat dissipation. This design allows for continuous power ratings up to 3000 watts (5300 watts intermittent). Use of pre-loaded bearings in the AHB Series Hysteresis Brakes allows operation at speeds of up to 25,000 rpm for extended durations.



### Basic Torque Measurement System

A cost-effective, basic motor test rig can be easily configured by mounting one or two AHB Series Compressed-air-cooled Hysteresis Brakes onto a PT Series T-slot Base Plate with a TM Series In-Line Torque Transducer and couplings (as shown in the photo above). Adding a FR10 Free-Run Speed Sensor, 3410 Torque Display or DSP6001 Controller greatly expands the system's motor testing capabilities. Other accessories available from Magtrol include: adjustable motor fixtures, power supplies, air filters, pressure gauge kits, air lines, pipe fittings, jack shafts and risers.

*Due to the continual development of our products, we reserve the right to modify specifications without forewarning.*

For more information, contact your local sales agent:

TSP-US www.08/11



For over 50 years, Magtrol Inc and Magtrol SA have been providing customers with high quality products to test, measure and control torque-speed-power, load-force-weight, tension and displacement. Magtrol Inc, headquartered in the USA, is a leading manufacturer of motor test equipment and hysteresis brakes and clutches. Magtrol SA, located in Switzerland, also offers motor test equipment as well as transducers to measure, monitor and control load, force, weight and displacement. Magtrol offers customers a wide array of test and measurement solutions, combined with excellent worldwide sales and service.

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[www.magtrol.com](http://www.magtrol.com)