

WB 32 SERIES

HIGH-SPEED EDDY-CURRENT DYNAMOMETERS

MAGTROL offers 3 types of dynamometer brakes to absorb load: Hysteresis (**HD Series**), Eddy-Current (**WB Series**) and Magnetic Powder (**PB Series**). Each type of Dynamometer has advantages and limitations and choosing the correct one will depend largely on the type of testing to be performed. With over 50 standard models to choose from, Magtrol Sales professionals are readily available to assist in selecting the proper Dynamometer to meet your testing needs.

FEATURES

- 2 Models with maximum Torque: 400 mN·m & 800 mN·m
- Speed: up to 80 000 rpm
- Power: 0.5 kW & 1 kW
- Low Moment of Inertia
- Stable & smooth Braking Torque
- Data acquisition via DSP 7010 Series Controller & M-TEST Software
- Built-in Electronics with Torque & Speed Measurement and Excitation Supply

DESCRIPTION

Magtrol's WB 32 Series - Eddy-Current Dynamometers are designed for high-speed testing applications. They are ideal for applications requiring high speeds and also when operating in the lower power range (up to 1 kW). By providing a braking torque that is proportional to the rotational speed, rated torque is reached at the rated speed.

The Dynamometers feature a low level of inertia, due to small rotor dimensions. Brake cooling (required) is provided by a water circulation system, which passes inside the stator to dissipate heat generated by braking; this enables higher continuous power ratings.

The stator is mounted on carrier bearings and the torque is measured by the reaction torque sensor protected by overload limiter and transport locking device. The dynamometer has a torque measuring accuracy rating of $\pm 0.5\%$ full scale. The speed is measured by an optical sensor and a 4 PPR (Pulses Per Revolution) encoder. This sensor measures speeds from 100 ... 80 000 rpm with a full scale accuracy of $\pm 0.06\%$ by using a Magtrol DSP 7010 Series Dynamometer Controller (due to encoder 4 PPR, the system is not suitable for precise closed-loop control below 1 000 rpm).

A Thermal Switch monitors the brake temperature and alarms the Controller (DSP 7010 Series) to stop the brake excitation current in order to protect the dynamometer from overheating.



Fig. 1: 1WB32 - High-Speed Eddy-Current Dynamometer with calibration arms mounted

OPERATING PRINCIPLES

The WB 32 Eddy-Current Dynamometers provide their full braking power at high speed. This type of brake has been specially designed to test motors rotating at speeds up to 80 000 rpm (100 000 rpm with WB 23/27, see specific datasheet), with the braking torque dependent upon the rotation speed.

APPLICATIONS

Mounted on test benches, the WB 32 Series Dynamometers allow performance and reliability testing on driving elements such as servomotors, micro and small motors, drone motors, fans, drills, hobby tools, small pumps, spindles, motors for domestic appliances, etc.

REVISITED DESIGN

Based on Magtrol's extensive experience in motor testing (over 70 years), the WB 32 Series is the most recent Eddy-Current Dynamometer and will gradually replace the WB 2.7 Dynamometer. Its design has been rethought to be more compact, easier to handle and easier to install on a test bench (due to its large base plate).

A speed signal conditioner, power supply and all the necessary filter electronics are integrated into the housing, making the dynamometer a turn-key unit.

SYSTEM CONFIGURATION

The WB 32 Series Dynamometers should be used with a Magtrol DSP 7010 Series Dynamometer Controller in order to supply the closed-loop control of the test system. In addition, the DSP 7010 Series displays the measured torque, rotation speed and mechanical power of the motor under test and features a built-in alarm system for user-defined limits.

A Single or Three-phase Power Analyzer (MODEL 7500 Series), a required component in a test system measuring motor efficiency, can be integrated into this system as well as Magtrol's Temperature Testing Hardware.

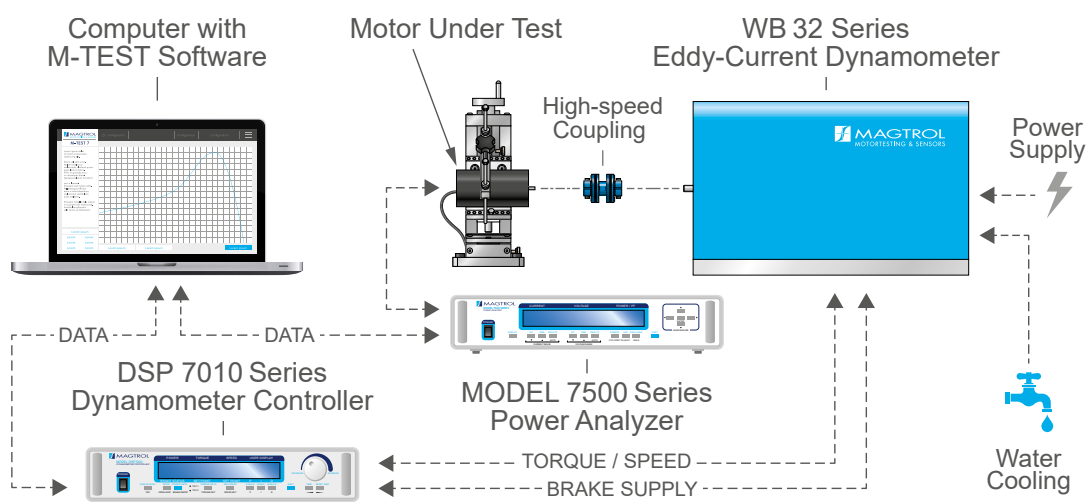


Fig. 2: Configuration of the WB 32 Series Dynamometer with its main accessories

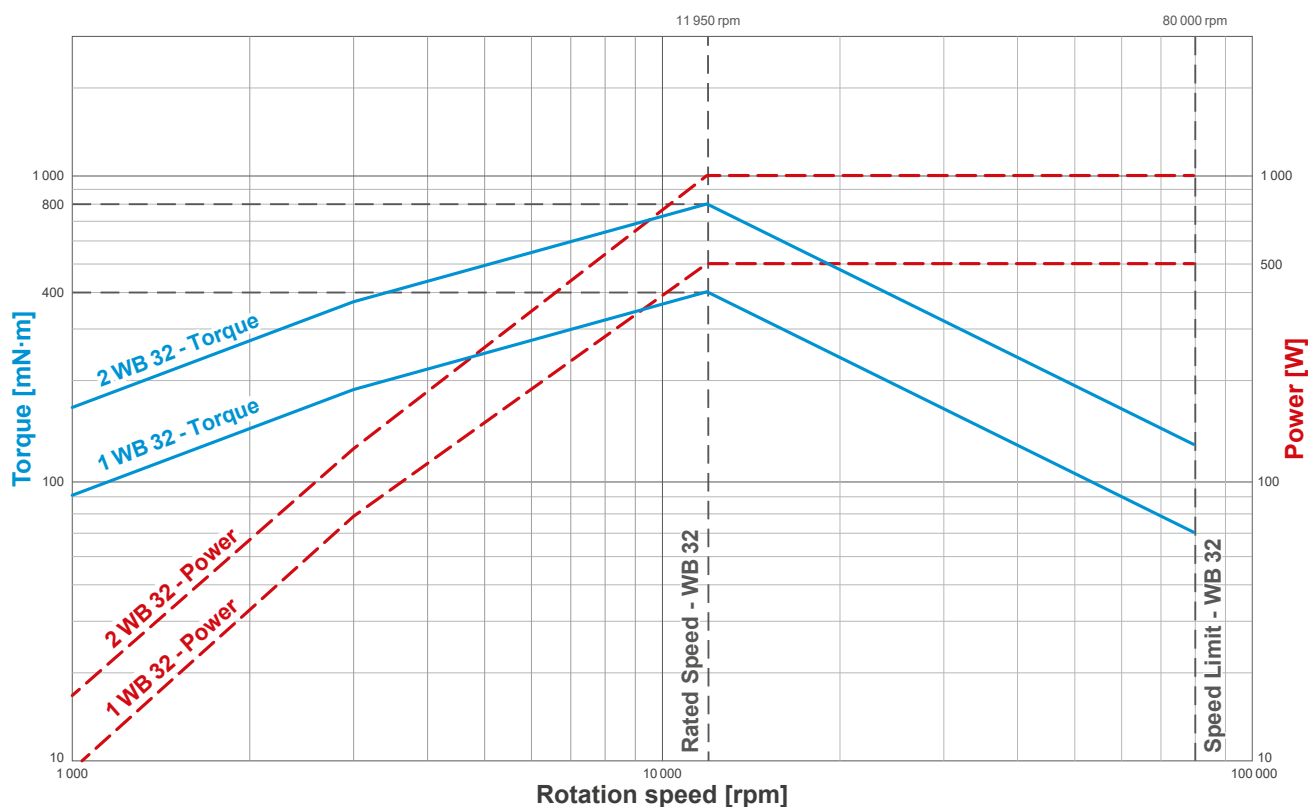
SPECIFICATIONS

NOTE: For continuous operating (≥ 2 hours) at constant torque or power, please consider 20% reserve in both torque & power

MODEL	RATED TORQUE N·m	DRAG TORQUE DE-ENERGIZED mN·m	NOMINAL INPUT INERTIA kg·m ²	RATED POWER W	RATED SPEED rpm	MAX. SPEED rpm	EXCITATION CURRENT A
1 WB 32	0.4	<20	2.71×10^{-5}	500	11 950	80 000	0.7
2 WB 32	0.8	(at 80 000 rpm)	5.03×10^{-5}	1000			1.4

MECHANICAL & ELECTRICAL CHARACTERISTICS	
Weight	~24 kg
Cooling Water	Water flow: 2.5 l/min Pressure: 0.5 bar max.
Power Supply	100-240 VAC / 50-60 Hz
Protection Class	IP42
Operating Temperature	+10 °C ... +40 °C

TORQUE-SPEED-POWER CURVES



M-TEST MOTOR TESTING SOFTWARE



Magtrol M-TEST is an advanced motor testing software (Windows® based) for data acquisition. Used with a Magtrol Programmable Dynamometer Controller (i.e. DSP 7010), M-TEST 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's feature-rich testing and graphing capabilities.

An integral component of any Magtrol Motor Test System, M-TEST 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 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.

To meet additional engine testing requirements or specific needs, Magtrol can also make custom modifications to the software.

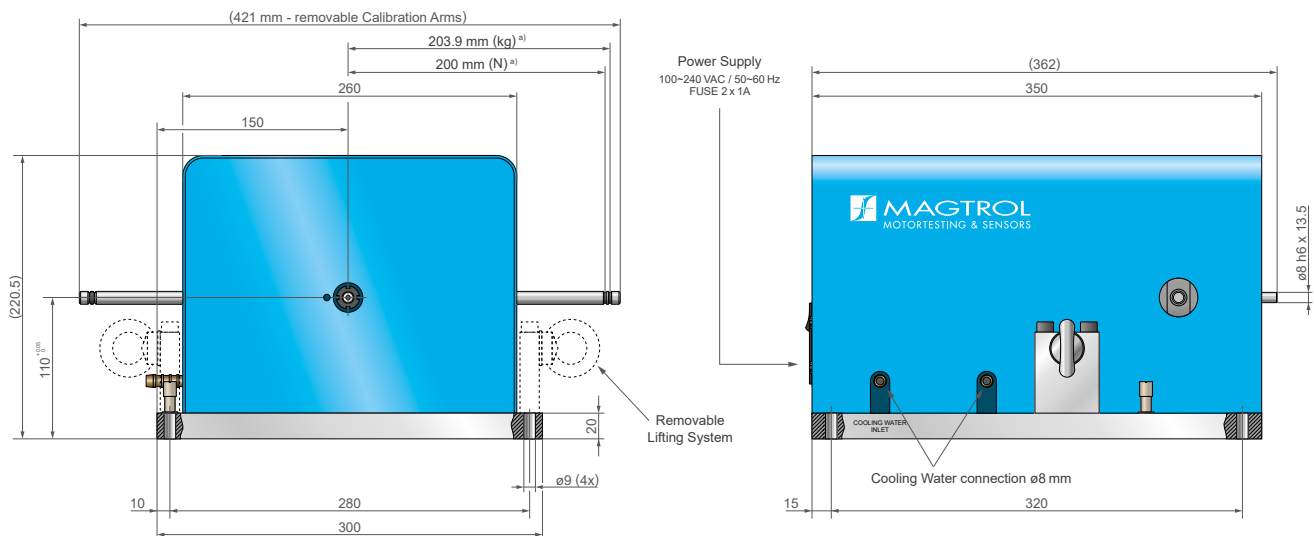
CUSTOM MOTOR TEST SYSTEMS

MAGTROL provides motor testing components to turnkey solutions for all your motor testing needs. Typical test benches may include: various dynamometers, 4-quadrant loading motors, back EMF system, cogging test system, tables, fixtures, control racks, power supplies, power analyzers, ohmmeters, temperature measurement and dedicated M-TEST software. Other sensors, systems and electronics can be integrated upon request.



Fig. 3: Custom Motor Test System with WB brake

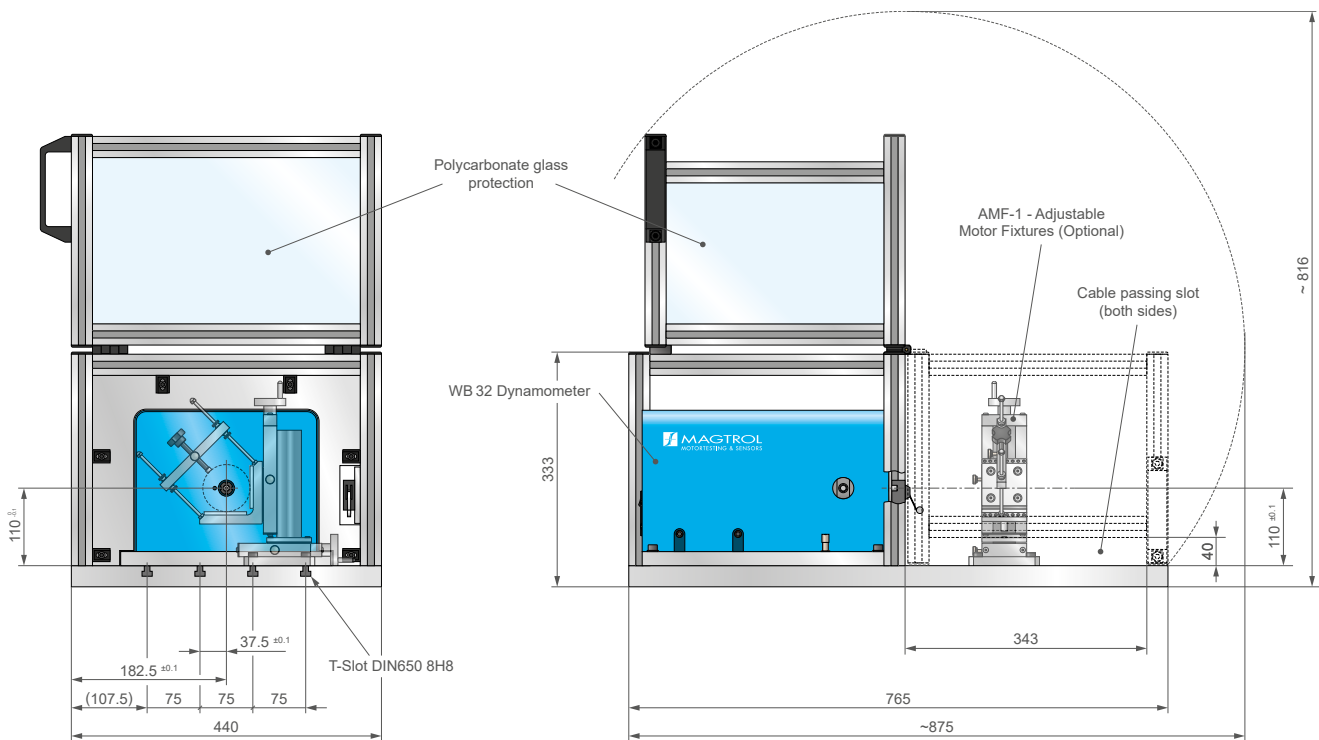
DIMENSIONS



CAUTION: All WB 32 Series Dynamometers must be water cooled.

NOTE: All values are in metric units. Dimensions are in millimeters.

WB 32 - FULL SYSTEM



The WB32 dynamometer can be integrated as a component of a measurement system.

Magtrol offers a standard version integrating the dynamometer on a base plate. The standard plate has 4 T-Slots to facilitate the attachment of other components and an ergonomic protective cover for the safety of the user.

As an option, the system can also be supplied with an AMF-1 Adjustable Motor Fixture. This allows test mounting and alignment of devices with diameters up to 100mm and 4.5kg.

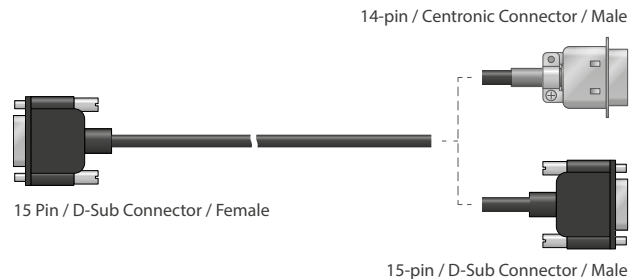
Other designs and mounting systems are available on request. Please, contact our sales department for custom designs. Magtrol is at your service, and has a long experience in providing customized solutions.

NOTE: 3D STEP files for most of our products are available on our website: www.magtrol.com. Other files are available on request.

CABLE ASSEMBLIES

Cables are required to connect the WB 32 Series to DSP7010 Series Dynamometer Controller. Since 2020, Magtrol initiated an upgrade of its device connectivity. Depending on the DSP 70XX model, the connectors may not be compatible; for more information please contact our sales department.

TORQUE & SPEED SIGNAL CABLE



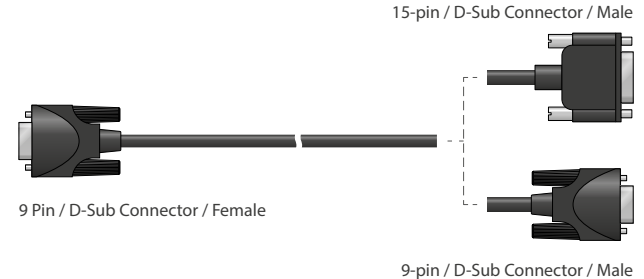
ORDERING NUMBER	88M	/
372 : 14 Pin Centronics connector ^{a)}		
368 : 15 Pin D-Sub connector ^{b)}		
0500 : Cable length 5m		
1000 : Cable length 10m		
xxxx : Customized ^{c)}		

a) For use with: DSP700X

b) For use with: DSP701X

c) Other cable length available on request.

BRAKE POWER CABLE



DESIGNATION	ORDERING NUMBERS
15 Pin D-Sub connector - 5m ^{a,c)}	ES 406
9 Pin D-Sub connector - 5m ^{b,c)}	957-18-25-0301
9 Pin D-Sub connector - 10m ^{b,c)}	957-18-25-0701

a) For use with: DSP700X

b) For use with: DSP701X

c) Other cable length available on request.

ORDERING INFORMATION

DYNAMOMETER ONLY

ORDERING NUMBER	317 -	- 000 - 01X
101 : 1 WB 32		
102 : 2 WB 32		

Example: WB 32 dynamometer only, nominal torque 0.4 N·m, would be ordered as : **317-101-000-01X**.

COMPLETE SYSTEM

ORDERING NUMBER	317 -	- 900 -
101 : 1 WB 32		
102 : 2 WB 32		
01X : without motor fixture		
02X : with AMF-1 motor fixture		

Example: WB 32 dynamometer, in complete system, nominal torque 0.8 N·m, with motor fixture AMF-1, would be ordered as : **317-102-900-02X**

SYSTEM OPTIONS AND ACCESSORIES

DSP 7010 - DYNAMOMETER CONTROLLER

Magtrol's DSP7010 Programmable 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 Brake Dynamometer, Magtrol In-Line Torque Transducer/Sensor or auxiliary instrument, the DSP7010 can provide complete PC control via the USB or IEEE-488 interface. With up to 500 readings per second, the DSP7010 is ideally suited for both the test lab and the production line.

Standard Features:

- **DSP7011 Single Channel:** Easy to use plug & play solution
- **DSP7012 Dual Channel:** Enables the support of two testing instruments with independent or tandem configurations and two fully independent control loops
- Built-in Alarm System (power, torque, speed, etc.)
- Speed & Torque closed loop Operating Modes
- Programmable Digital PID Values
- Built-in Current-Regulated Supply
- Selectable Torque Units (imperial, metric).



Fig. 4: DSP7010 | Dynamometer Controller

AMF SERIES - ADJUSTABLE MOTOR FIXTURE



Magtrol's AMF Series Adjustable Motor Fixtures are used to secure small to medium-sized motors in place while running any test. These extremely versatile fixtures also enable easy motor centering for testing. These accommodate motors up to 101 mm (4") in diameter.



CHILLER

As an option Magtrol can supply a water / air heat exchanger for the WB 32 Series Dynamometer cooling up to 1 kW (available 115/230 VAC).

Its power dissipation will however depend on the surrounding room temperature.

MODEL 7500 SERIES - POWER ANALYZERS

The Magtrol 7500 Series Power Analyzer is an easy-to-use instrument ideal for numerous power measurement applications. From DC to 80 kHz AC, the MODEL 7500 measures volts, amps, watts, volt-amps, frequency, crest factor, V_{peak}, A_{peak} and power factor in one convenient display. They may be used either as stand-alone instruments or in conjunction with any Magtrol Hysteresis, Eddy-Current or Powder Brake Dynamometer; any Magtrol Dynamometer Controller and M-TEST Software for more demanding motor test applications.



Fig. 5: 7500 Series | Power Analyzers

COUPLINGS

When Magtrol WB 32 Series Dynamometers are mounted in a drive train, double-element miniature couplings are ideal, although single-element couplings can be used for low speed applications. The criteria for selecting appropriate couplings for torque measurement is as follows:

- High torsional spring rate (ensures high torsional stiffness and angular precision)
- Clamping quality (should be self-centering and of adequate strength)
- Speed range
- Balancing quality (according to speed range)
- Alignment capability

The higher the speed of the application the more care is required in selecting the coupling and assembling (alignment and balancing) the drive train configuration. Magtrol provides a wide range of couplings suitable for torque measurement applications and can assist you in choosing the right coupling for your transducer.



Fig. 6: MIC Series Miniature coupling