WB SERIES
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

- 12 Standard Models with Maximum Torque: 400 mN·m ... 560 N·m (56.6 oz·in ... 413 lb·ft)
- Braking Power: 500 W ... 140 kW
- Stable Braking Torque, without Shock
- Low Moment of Inertia
- Low Residual Torque
- Operating Direction CW / CCW
- Braking Torque Measurement Integrated
- High Rotational Speed (≤ 80 000 rpm)
- Integrated Optical Speed Sensor
- Special designs available upon request

Fig. 1: 1 WB 115 | Eddy-Current Dynamometer

DESCRIPTION

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, providing high continuous power ratings (max. 140 kW). WB Series Dynamometers integrate a torque measuring system with an accuracy ratings of ± 0.3 % to ± 0.5 % full scale, depending on size and system configuration.

OPERATING PRINCIPLES

The WB Eddy-Current Dynamometers develop their full power at high rotation speeds. The WB Series is particularly intended for motors which rotate at high speeds, up to 80 000 rpm (up to 100 000 rpm with WB 23 / 27; see specific datasheet). The braking torque depends on the rotation speed.

APPLICATIONS

Mounted on test benches, the WB Series Eddy-Current Dynamometers allow performance and reliability testing on driving elements such as servomotors, micromotors for cameras, fans, drills, combustion engine, pumps, pneumatic equipment, hydraulic transmission systems, gas turbines, spindles, compressors and motors for domestic appliances.

OPTICAL SPEED SENSOR

Each WB Series Dynamometer is equipped with an optical speed sensor delivered as standard. WB 32 is equipped with a 4 PPR (Pulses Per Revolution) encoder, WB 43 and WB 65 HS are equipped with a 30 PPR encoder; WB 65, WB 115 & WB 15 are equipped with a 60 PPR encoder.

MODELS	WB 32	WB 43	WB 43 HS	WB 65	WB 65 HS	WB 115	WB 115 HS	WB 15	WB 15 HS
Encoder 4 PPR	x								
Encoder 30 PPR		x	x		x				
Encoder 60 PPR				x		x	x	x	x

DYNAMOMETER CONFIGURATIONS

The Dynamometers can be complemented by various electronic modules such as the DES Series (Power Supply), TSC Series (Torque & Speed Conditioner) and DSP 7010 (High Speed Programmable Dynamometer Controller).

Magtrol also offers In-Line Torque Transducers (TS 100 Series or TM 300 Series) or Torque Flange (TF 300 Series) for extremely accurate torque and speed measurement with high noise immunity. For a dynamic, high-precision system, the torque transducer can be mounted in line between the unit under test and the dynamometer, providing a torque accuracy of 0.1 %.

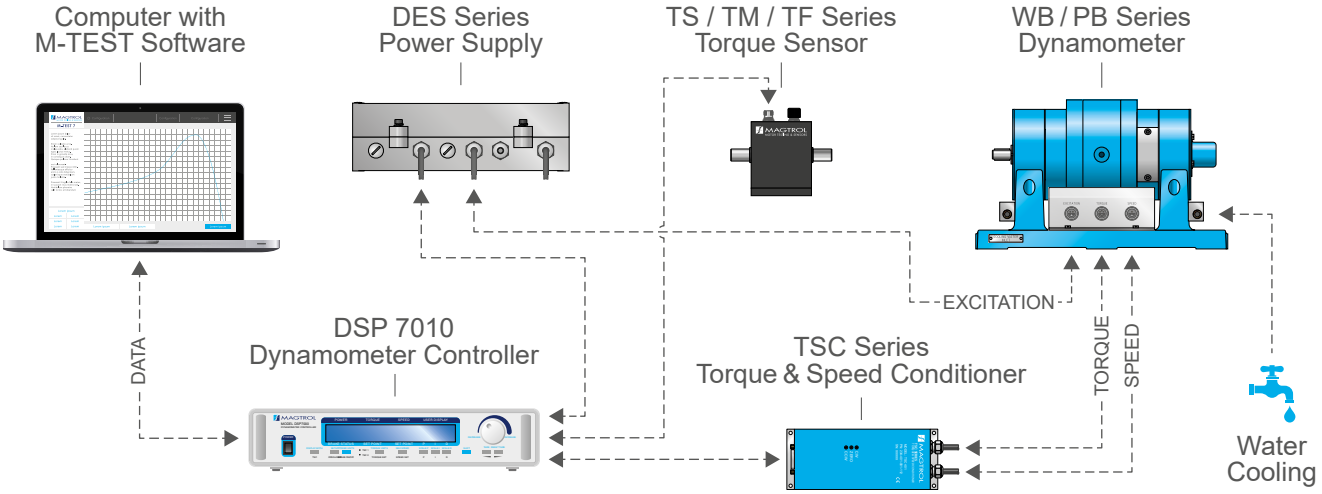


Fig. 2: Configuration of the WB Series Dynamometer with its accessories

SPECIFICATIONS

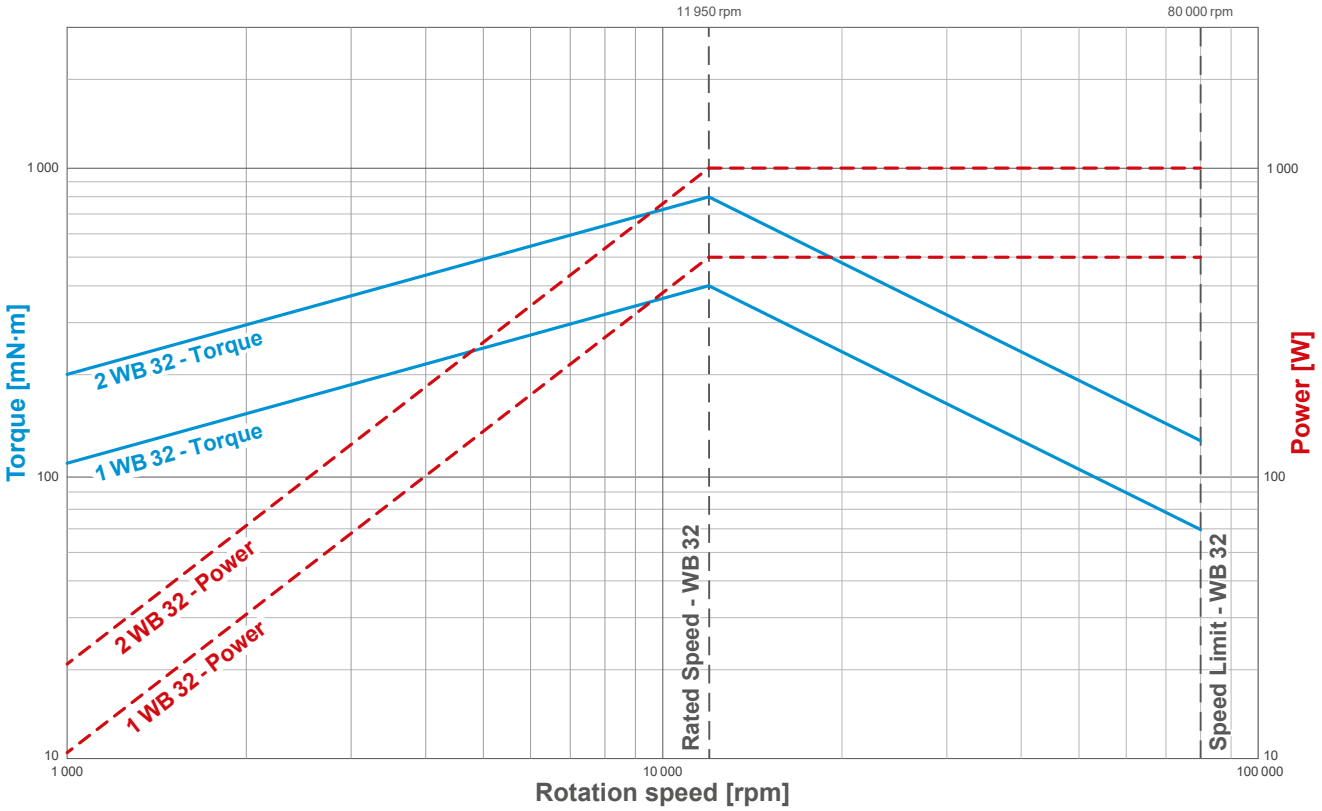
NOTE: For continuous operating (≥ 2 hours) at constant torque or power, please consider 20% reserve in both torque & power
NOTE: Original dimensions are in Metric units. Dimensions converted to English units have been rounded up to 4 decimal places.

MODEL	RATED TORQUE		DRAG TORQUE DE-ENERGIZED		NOMINAL INPUT INERTIA		RATED POWER	RATED SPEED	MAX. SPEED STANDARD	MAX. SPEED HIGH-SPEED (HS version)	EXCITATION CURRENT
	N·m	oz·in	mN·m	oz·in	kg·m²	lb·ft·s²	kW	rpm	rpm	rpm	A
1 WB 32 [f]	0.4	56.6	≤ 20 [e]	≤ 2.83	2.71×10^{-5}	1.19×10^{-5}	0.5	11 950	80 000	N/A	0.7 [a]
2 WB 32 [f]	0.8	113.3			5.03×10^{-5}	3.71×10^{-5}	1.0				1.4 [a]
1 WB 43	1.5	211.2	15	2.12	1.21×10^{-4}	8.92×10^{-5}	1.5	9 550	50 000	65 000	1.0 [b]
2 WB 43	3.0	422.4	30	4.24	2.17×10^{-4}	1.60×10^{-4}	3.0				2.0 [b]

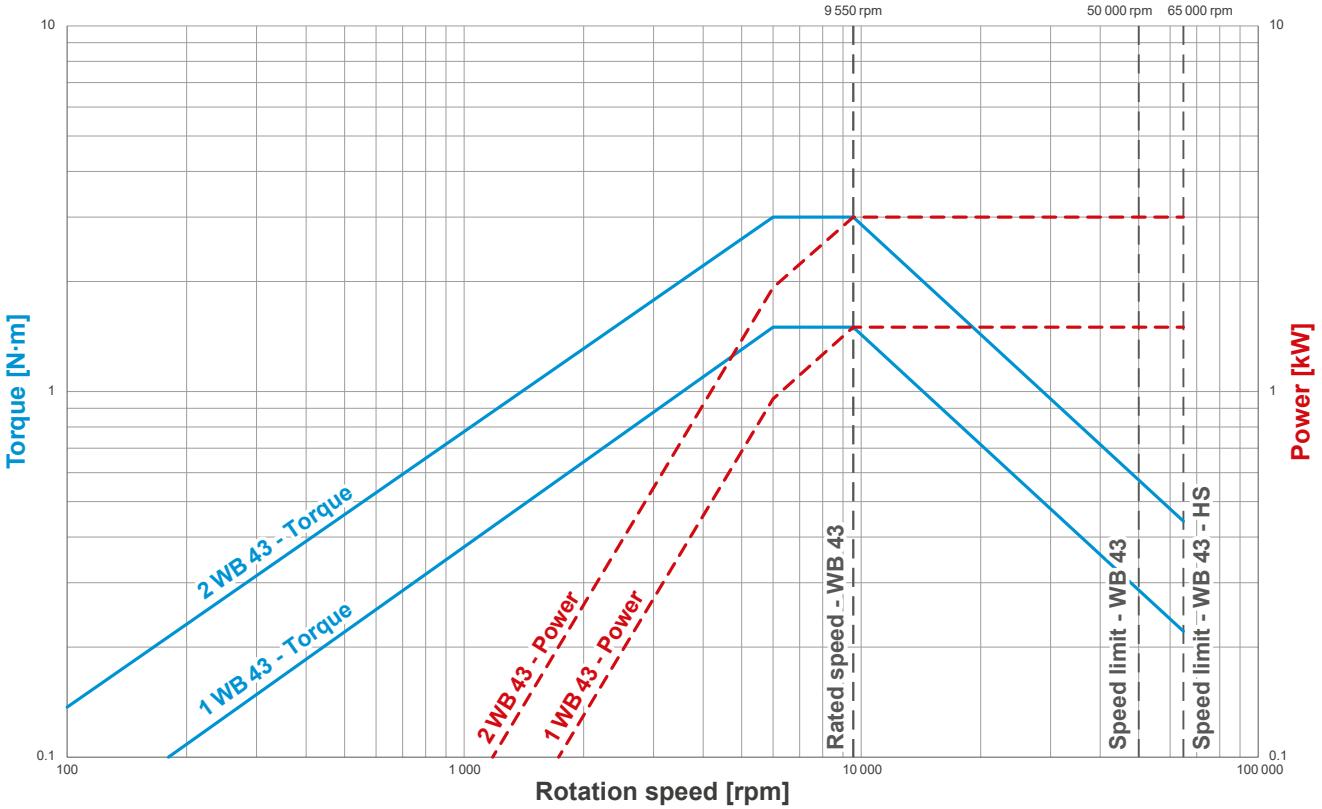
MODEL	RATED TORQUE		DRAG TORQUE DE-ENERGIZED		NOMINAL INPUT INERTIA		RATED POWER	RATED SPEED	MAX. SPEED STANDARD	MAX. SPEED HIGH-SPEED (HS version)	EXCITATION CURRENT
	N·m	lb·ft	N·m	lb·in	kg·m²	lb·ft·s²	kW	rpm	rpm	rpm	A
1 WB 65	10	7.3	0.1	0.88	0.82×10^{-3}	6.04×10^{-4}	6	5 730	30 000	50 000	2.5 [c]
2 WB 65	20	14.7	0.2	1.77	1.55×10^{-3}	1.14×10^{-3}	12				5.0 [c]
1 WB 115	50	36.8	0.5	4.43	1.27×10^{-2}	9.36×10^{-3}	15	2 865	18 000	22 000	2.5 [c]
2 WB 115	100	73.7	1.0	8.85	2.57×10^{-2}	1.89×10^{-2}	30				5.0 [c]
1 WB 15	140	103.0	1.4	12.30	5.00×10^{-2}	3.68×10^{-2}	35	2 390	7 500	10 000	4.0 [d]
2 WB 15	280	206.0	2.8	24.70	1.00×10^{-1}	7.37×10^{-2}	70				7.5 [d]
3 WB 15	420	309.0	4.2	37.10	1.50×10^{-1}	1.10×10^{-1}	105				10.0 [d]
4 WB 15	560	413.0	5.6	49.50	2.00×10^{-1}	1.47×10^{-1}	140				12.0 [d]

a) Voltage at 20 °C is 15 V
b) Voltage at 20 °C is 24 V
c) Voltage at 20 °C is 30 V
d) Voltage at 20 °C is 45 V
e) At 80 000 rpm
f) This product will be available in summer 2025

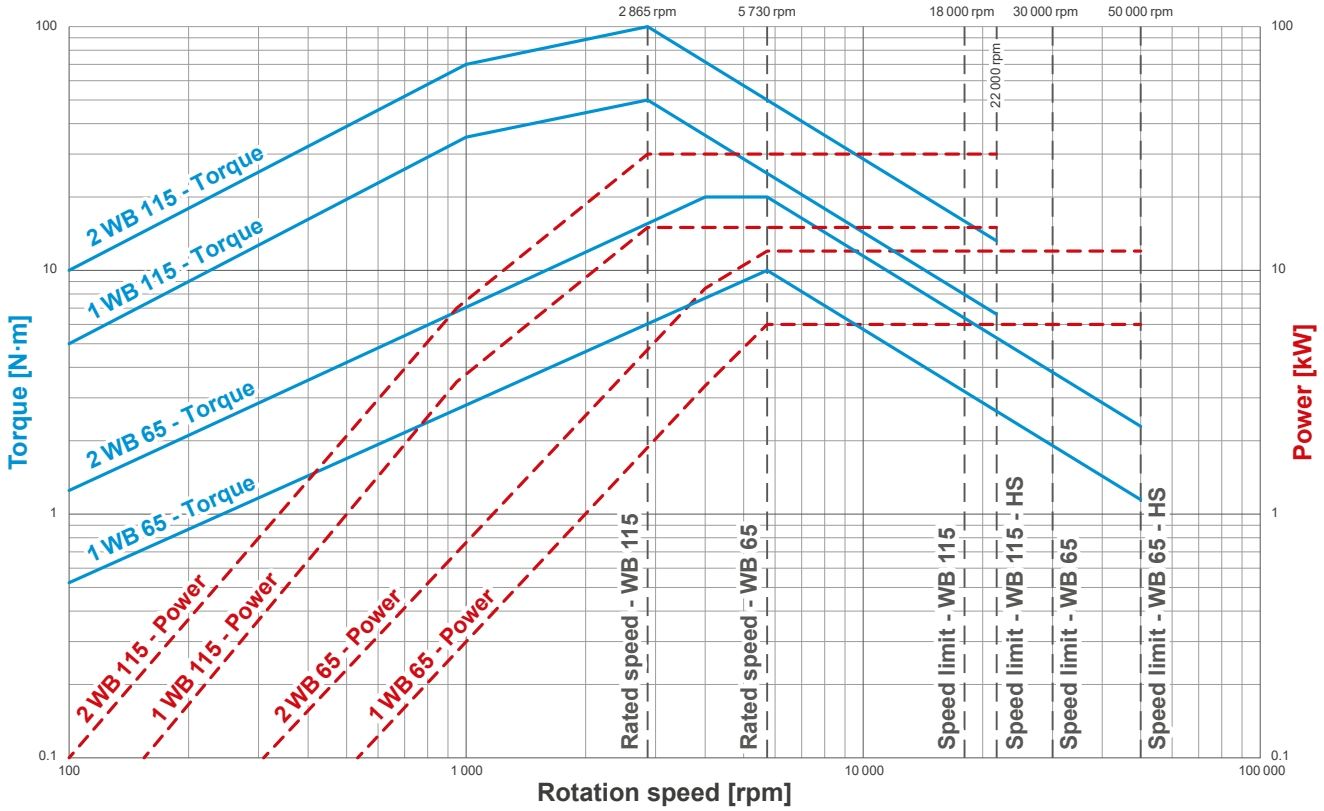
WB 32 TORQUE-SPEED-POWER CURVES



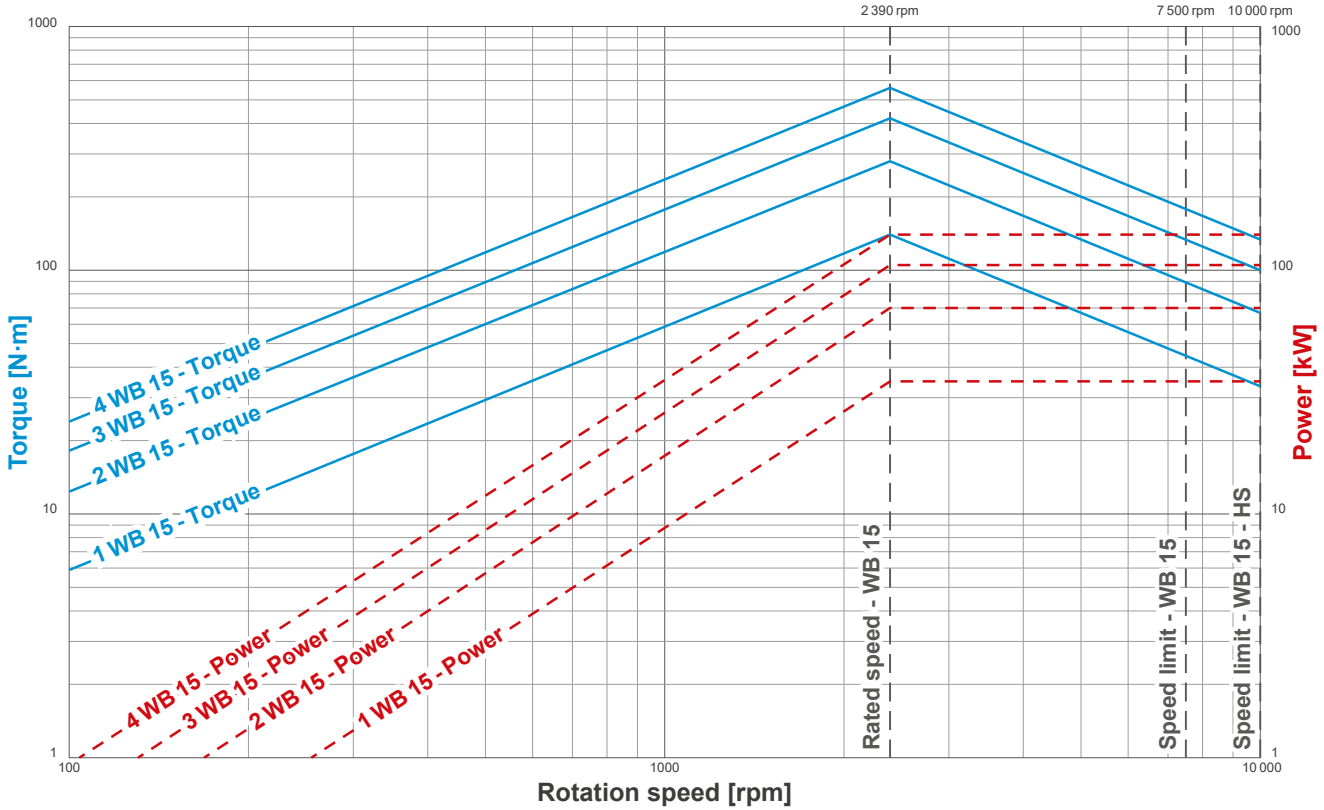
WB 43 TORQUE-SPEED-POWER CURVES



WB 65 & WB 115 TORQUE-SPEED-POWER CURVES

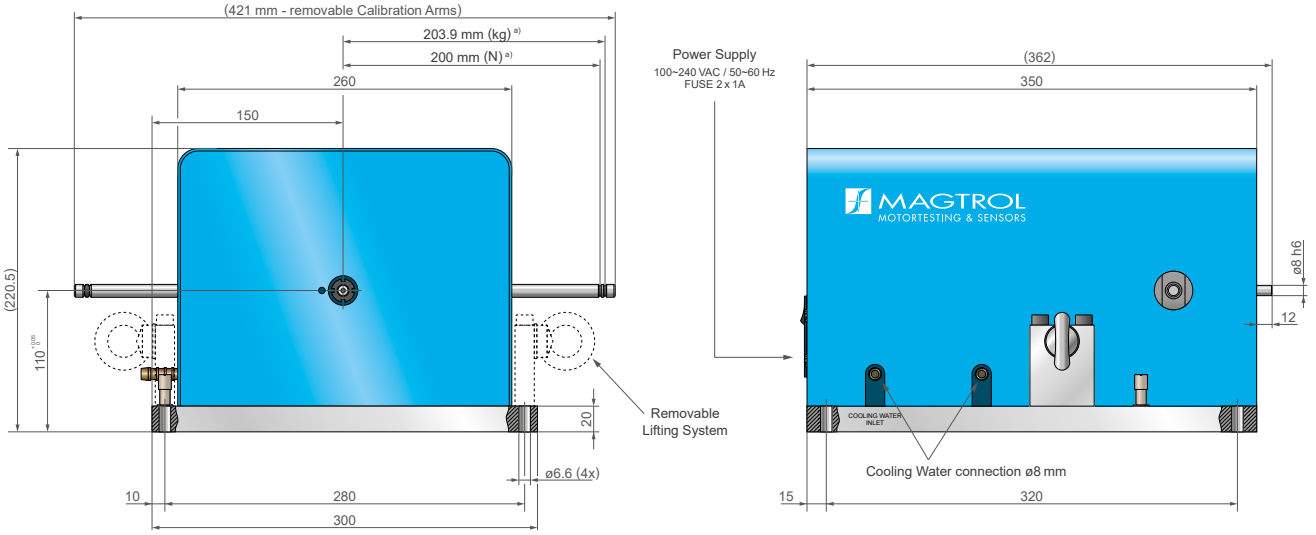


WB 15 TORQUE-SPEED-POWER CURVES



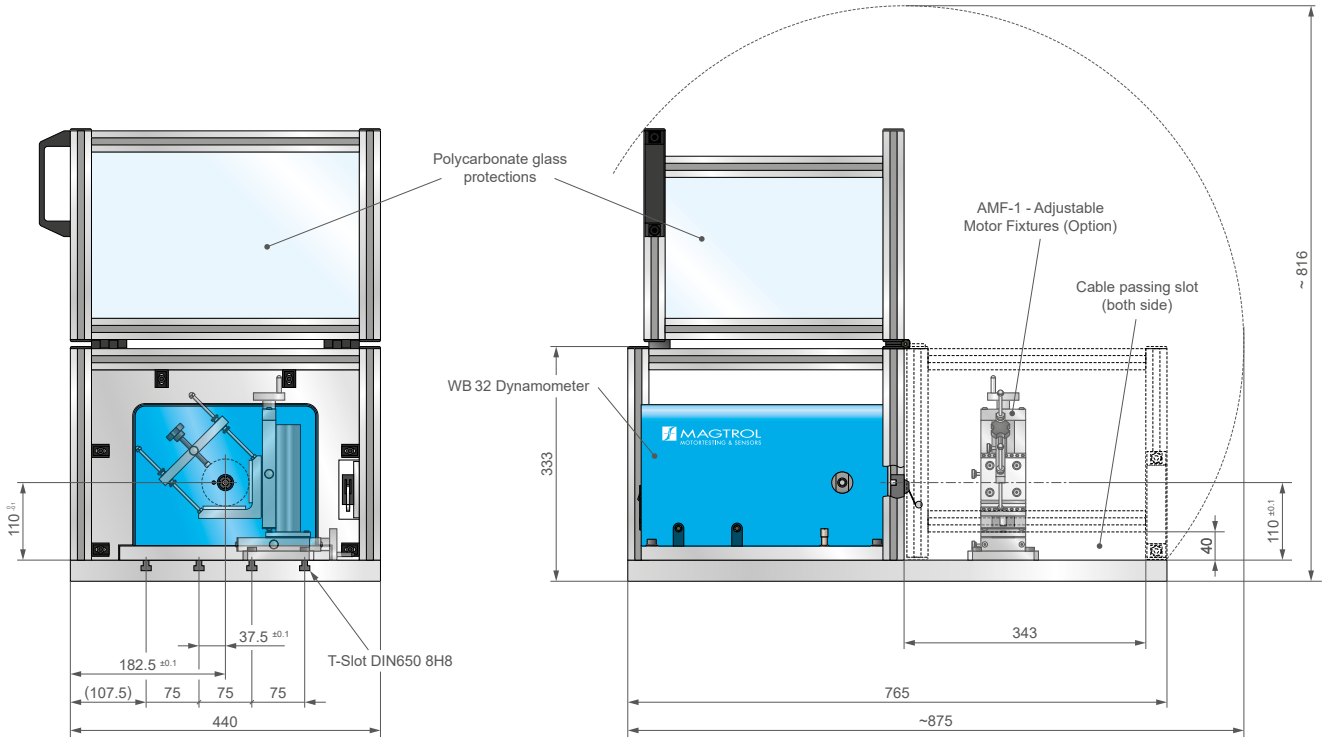
WB 32 DIMENSIONS

AVAILABLE IN SUMMER 2025.



CAUTION: All WB Series Dynamometers must be water cooled.
NOTE: All values are in metric units. Dimensions are in millimeters.

WB 32 WITH PROTECTION COVER



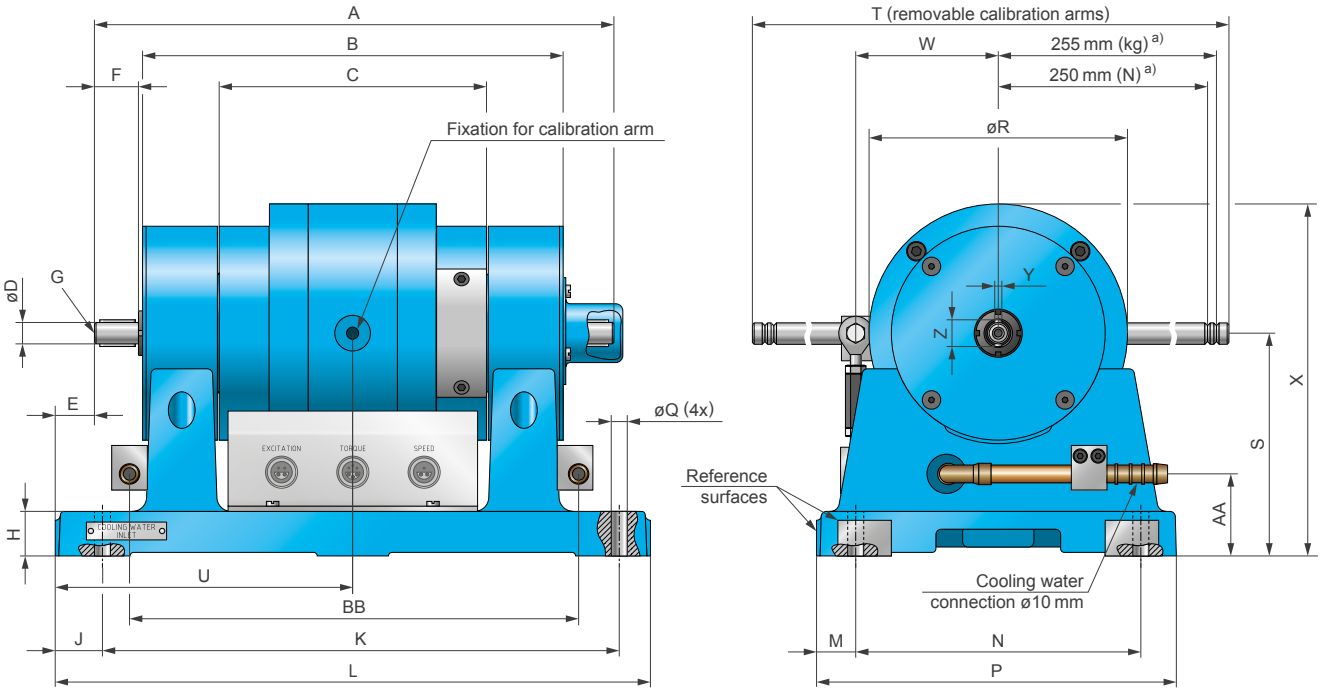
Magtrol offers a standard version integrating the dynamometer on a rigid base plate. The standard plate has 4 T-Slots to facilitate the attachment of other components and an ergonomic protective cover for the safety of the user.

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.

WB 43 DIMENSIONS



CAUTION: All WB Series Dynamometers must be water cooled.
NOTE: Dimensions for the specific versions (HS, IS, ... see page 10) can slightly vary from the standard versions. For more information, please, contact our sales technicians for specific drawing.
NOTE: Original dimensions are in Metric units. Dimensions converted to English units have been rounded up to 4 decimal places.

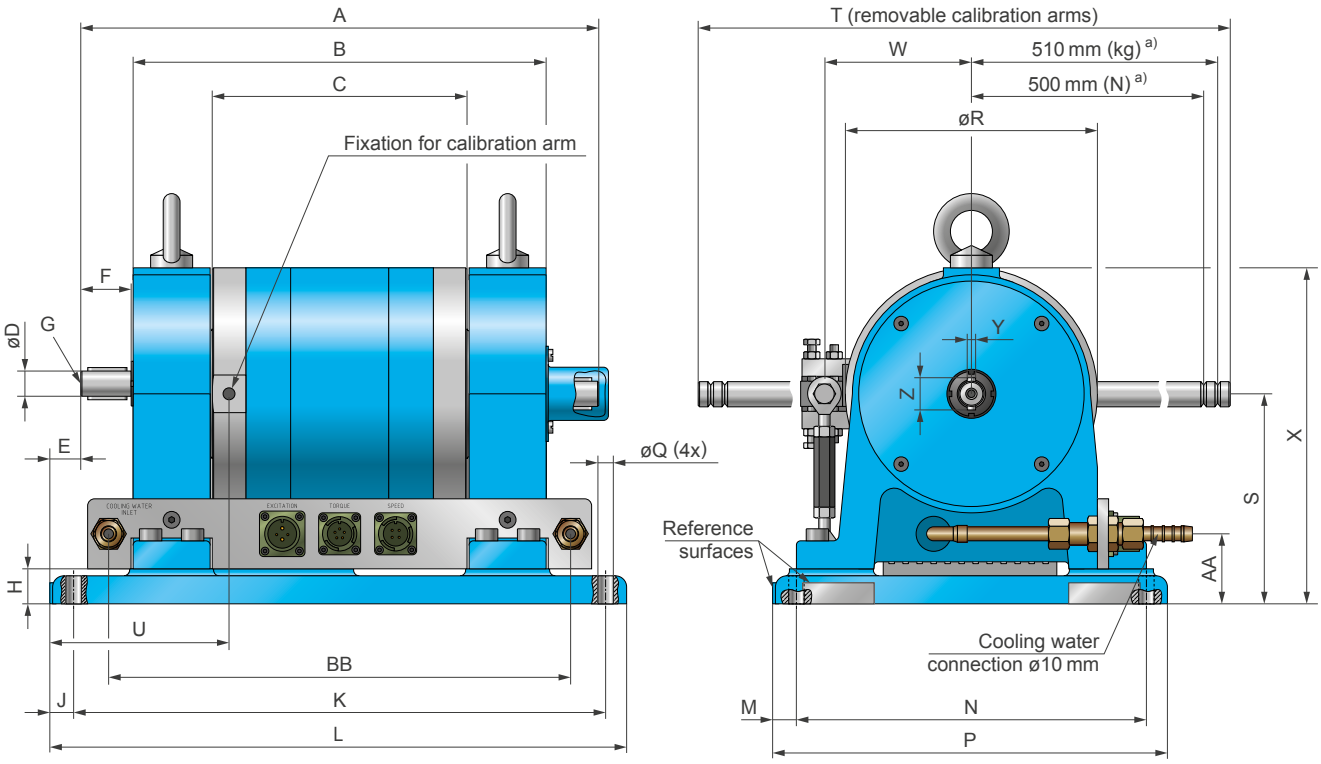
MODEL	units	A	B	C	øD c)	E	F	G b)	H	J	K	L	M	N	P
1 WB 43	mm	240	186	100	12 h6	22	25	M4	25	22	240	284	22	160	202
	in	9.45	7.32	3.94	0.4724 0.4721	0.87	0.98		0.98	0.87	9.45	11.18	0.87	6.30	7.95
2 WB 43	mm	290	236	150	12 h6	22	25		25	22	290	334	22	160	202
	in	11.42	9.29	5.91	0.4724 0.4721	0.87	0.98		0.98	0.87	11.42	13.15	0.87	6.30	7.95

MODEL	units	øQ	øR	S	T	U	W	X	Y	Z	AA	BB	Weight
1 WB 43	mm	9	145	125 ±0.05	524	153	80	198	4 h9	15	46	202	~ 24 kg
	in	0.35	5.71	4.923 4.919	20.63	6.02	3.15	7.80	0.1574 0.1563	0.59	1.81	7.95	~ 52.9 lb
2 WB 43	mm	9	145	125 ±0.05	524	167	80	198	4 h9	15	46	252	~ 31 kg
	in	0.35	5.71	4.923 4.919	20.63	6.57	3.15	7.80	0.1574 0.1563	0.59	1.81	9.92	~ 68.4 lb

a) 255 mm for a calibration in N·m with weight in kg (use outer groove); 250 mm for calibration in N·m with weight in N (use inner groove)
b) Center according to DIN 332-D
c) Shaft of High Speed version (HS) is ø12 h6, smooth (without key) with a different length. For more information, please contact our sale service.

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

WB 65 DIMENSIONS



CAUTION: All WB Series Dynamometers must be water cooled.
NOTE: Dimensions for the specific versions (HS, IS, ... see page 10) can slightly vary from the standard versions. For more information, please, contact our sales technicians for specific drawing.
NOTE: Original dimensions are in metric units. Dimensions converted to English units have been rounded up to 4 decimal places.

MODEL	units	A	B	C	øD c)	E	F	G b)	H	J	K	L	M	N	P
1 WB 65	mm	300	225	112	18 h6	22	36	M5	25	17	310	342	17	250	282
	in	11.81	8.86	4.41	0.7086 0.7083	0.87	1.42		0.98	0.67	12.2	13.46	0.67	9.84	11.10
2 WB 65	mm	370	295	182	18 h6	22	36		25	17	380	412	17	250	282
	in	14.57	11.61	7.17	0.7086 0.7083	0.87	1.42		0.98	0.67	14.96	16.22	0.67	9.84	11.10

MODEL	units	øQ	øR	S	T	U	W	X	Y	Z	AA	BB	Weight
1 WB 65	mm	11	180	150 ±0.1	1034	128	105	240	6 h9	23	50	260	~ 55 kg
	in	0.43	7.09	5.909 5.902	40.71	5.04	4.13	9.45	0.2362 0.2351	0.91	1.97	10.24	~ 122 lb
2 WB 65	mm	11	180	150 ±0.1	1034	128	105	240	6 h9	23	50	330	~ 70 kg
	in	0.43	7.09	5.909 5.902	40.71	5.04	4.13	9.45	0.2362 0.2351	0.91	1.97	12.99	~ 155 lb

a) 510 mm for a calibration in N·m with weight in kg (use outer groove); 500 mm for a calibration in N·m with weight in N (use inner groove).
b) Center according to DIN 332-D
c) Shaft of High Speed version (HS) is ø12 h6, smooth (without key) with a different length. For more information, please contact our sale service.

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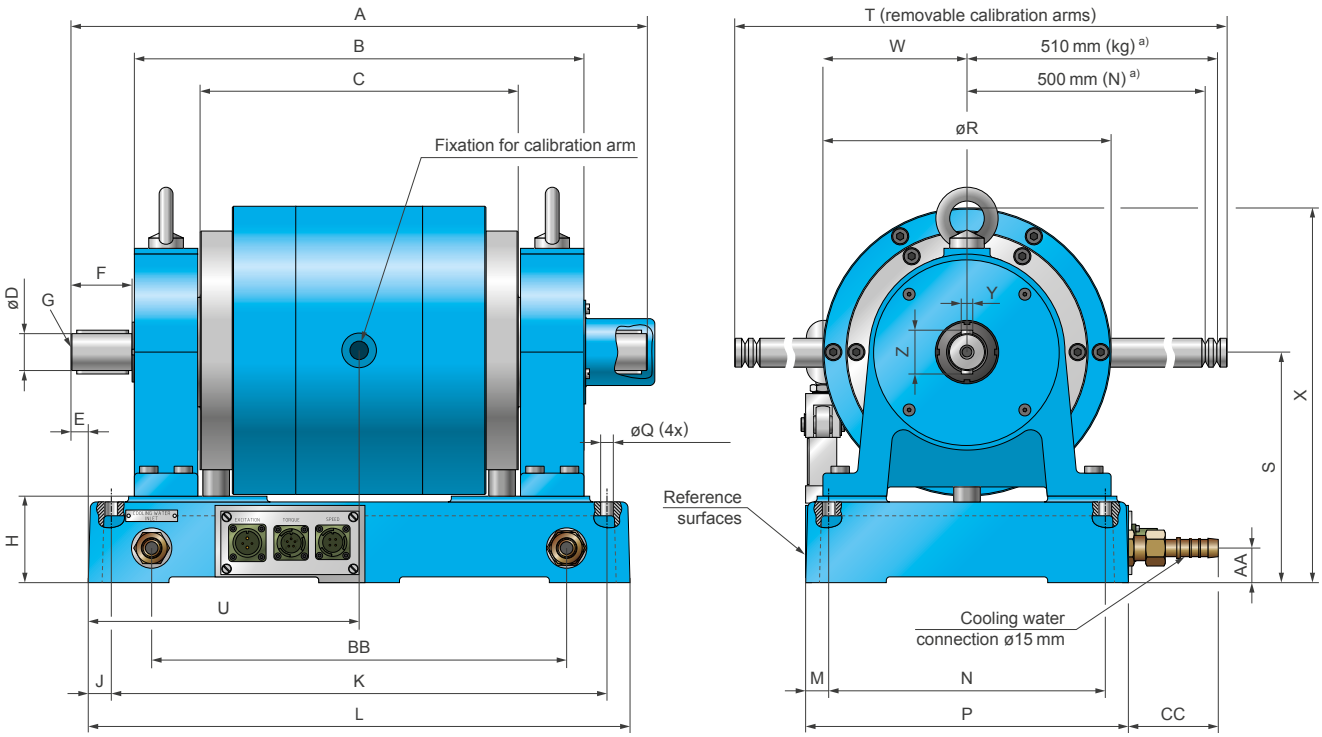
WB 115 DIMENSIONS



CAUTION: All WB Series Dynamometers must be water cooled.
NOTE: Dimensions for the specific versions (HS, IS, ... see page 10) can slightly vary from the standard versions. For more information, please, contact our sales technicians for specific drawing.
NOTE: Original dimensions are in metric units. Dimensions converted to imperial units have been rounded up to 4 decimal places.

MODEL	units	A	B	C	øD	E	F	G b)	H	J	K	L	M	N	P
1 WB 115	mm	390	280	166	32 h6	-40	54	M8	75	20	430	470	40	200	280
	in	15.35	11.02	6.54	1.2598 1.2593	-1.57	2.13		2.95	0.79	16.93	18.50	1.57	7.87	11.02
2 WB 115	mm	500	390	276	32 h6	15	54		75	20	430	470	40	200	280
	in	19.69	15.35	10.87	1.2598 1.2593	0.59	2.13		2.95	0.79	16.93	18.50	1.57	7.87	11.02

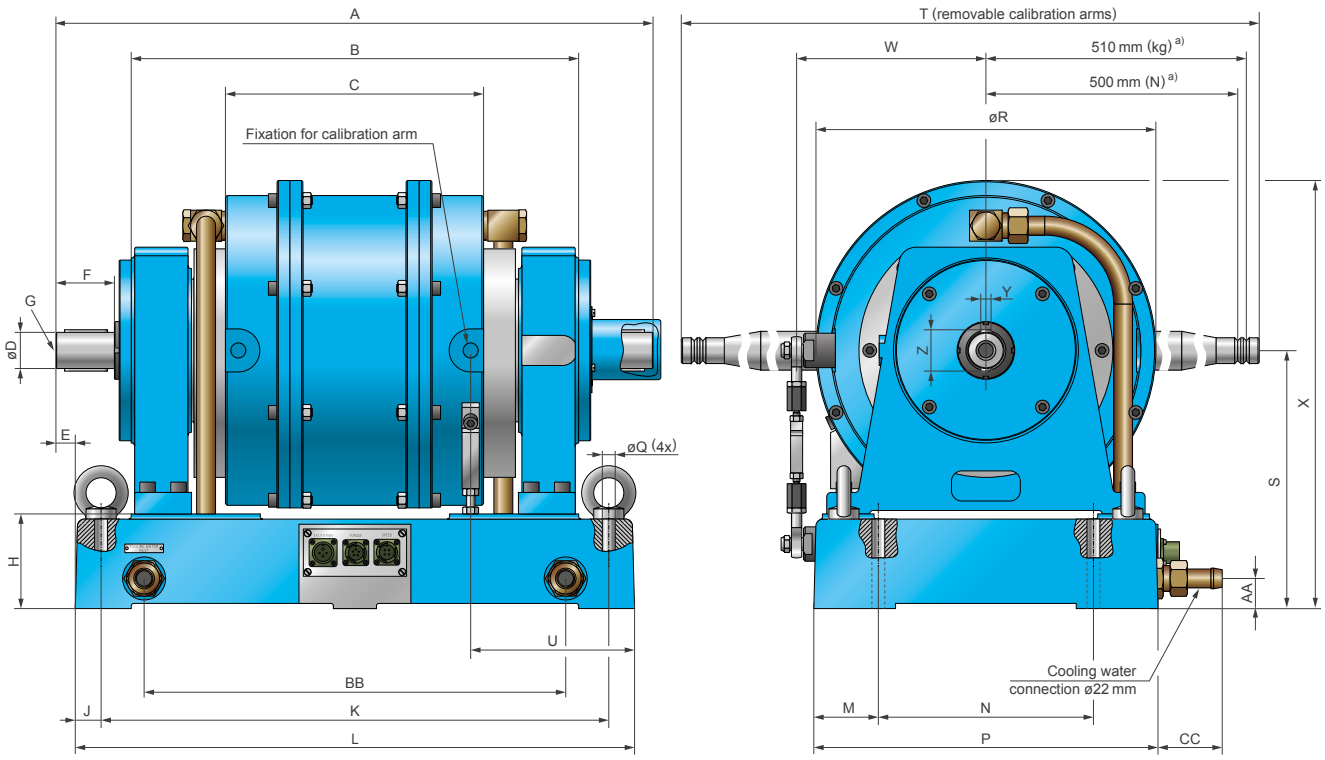
MODEL	units	øQ	øR	S	T	U	W	X	Y	Z	AA	BB	CC	Weight
1 WB 115	mm	11	250	200 ±0.1	1038	197	125	325	10 h9	38	30	360	80	~ 80 kg
	in	0.43	9.84	7.878 7.870	40.87	7.76	4.92	12.80	0.3937 0.3932	1.50	1.18	14.17	3.15	~ 177 lb
2 WB 115	mm	11	250	200 ±0.1	1038	235	125	325	10 h9	38	30	360	80	~ 130 kg
	in	0.43	9.84	7.878 7.870	40.87	9.25	4.92	12.80	0.3937 0.3932	1.50	1.18	14.17	3.15	~ 287 lb

a) 510 mm for a calibration in N·m with weight in kg (use outer groove); 500 mm for a calibration in N·m with weight in N (use inner groove).

b) Center according to DIN 332-D

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

WB 15 DIMENSIONS



CAUTION: All WB Series Dynamometers must be water cooled.
NOTE: Dimensions for the specific versions (HS, IS, ... see page 10) can slightly vary from the standard versions. For more information, please, contact our sales technicians for specific drawing.
NOTE: Original dimensions are in metric units. Dimensions converted to imperial units have been rounded up to 4 decimal places.

MODEL	units	A	B	C	øD	E	F	G b)	H	J	K	L	M	N	P
1 WB 15	mm	544	370	150	42 g6	-53	68	M8	110	30	590	650	75	250	400
	in	21.42	14.57	5.91	1.6531 1.6526	-2.09	2.68		4.33	1.18	23.23	25.59	2.95	9.84	15.75
2 WB 15	mm	694	520	300	42 g6	22	68		110	30	590	650	75	250	400
	in	27.32	20.47	11.81	1.6531 1.6526	0.87	2.68		4.33	1.18	23.23	25.59	2.95	9.84	15.75
3 WB 15	mm	844	670	450	42 g6	-78	68		110	30	940	1000	75	250	400
	in	33.23	26.38	17.72	1.6531 1.6526	-3.07	2.68		4.33	1.18	37.01	39.37	2.95	9.84	15.75
4 WB 15	mm	994	820	600	42 g6	-3	68		110	30	940	1000	75	250	400
	in	39.13	32.28	23.62	1.6531 1.6526	-0.12	2.68		4.33	1.18	37.01	39.37	2.95	9.84	15.75

MODEL	units	øQ	øR	S	T	U	W	X	Y	Z	AA	BB	CC	Weight
1 WB 15	mm	15	395	$300^{\pm 0.2}$	1030	265	220	498	12	48	35	490	75	~ 185 kg
	in	0.59	15.55	11.819 11.803	40.55	10.43	8.66	19.61	0.47	1.89	1.38	19.29	2.95	~ 408 lb
2 WB 15	mm	15	395	$300^{\pm 0.2}$	1030	190	220	498	12	48	35	490	75	~ 290 kg
	in	0.59	15.55	11.819 11.803	40.55	7.48	8.66	19.61	0.47	1.89	1.38	19.29	2.95	~ 640 lb
3 WB 15	mm	15	395	$300^{\pm 0.2}$	1030	290	220	498	12	48	35	840	75	~ 385 kg
	in	0.59	15.55	11.819 11.803	40.55	11.42	8.66	19.61	0.47	1.89	1.38	33.07	2.95	~ 849 lb
4 WB 15	mm	15	395	$300^{\pm 0.2}$	1030	215	220	498	12	48	35	840	75	~ 520 kg
	in	0.59	15.55	11.819 11.803	40.55	8.46	8.66	19.61	0.47	1.89	1.38	33.07	2.95	~ 1147 lb

a) 510 mm for a calibration in N·m with weight in kg (use outer groove); 500 mm for a calibration in N·m with weight in N (use inner groove).
b) Center according to DIN 332-D

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

RELATED PRODUCTS

PB SERIES - POWDER DYNAMOMETER

Fig. 3: 1 PB 115 | Powder Dynamometer

The PB Series Powder Dynamometers contain, as their name suggests, a magnetic powder. The electrical current passing through the coil generates a magnetic field, which changes the property of the powder, thus producing a smooth braking torque through friction between rotor and stator. The Powder Dynamometers (PB) produce their rated torque at zero speed. The element to be tested can be loaded at standstill to determine the starting torque.

TANDEM SERIES - WB + PB DYNAMOMETER

Fig. 4: 4 WB 15 + 4 PB 15 | TANDEM

Because the characteristics of the WB and PB dynamometers are complementary, Magtrol is able to offer them mounted in a tandem setup. Each dynamometer (WB and PB) can autonomously operate according to its own characteristics. An electromagnetic clutch is needed for this application which automatically switches off at the maximum speed of the PB Powder Dynamometer and automatically switches on at zero speed.

DUAL SERIES - DOUBLE WB DYNAMOMETER IN TANDEM SETUP

For application requiring higher power in a dedicated speed range, Magtrol offers some of the Eddy Current Dynamometer mounted in line on a common base. This would be for example the models 2 WB 65 + 2 WB 65 (rated torque 40 N·m, max speed 24 000 rpm, max power 24 kW) or 2 WB 115 + WB 115 (rated torque 200 N·m, max speed 15 000 rpm, max power 60 kW).

DYNAMOMETER OPTIONS

HIGH SPEED (HS)

For testing high-speed motors, Magtrol offers WB Series Eddy-Current Dynamometer with speed ranges up to 65 000 rpm (according to the version, see specification table).

For small or miniature motors, Magtrol models WB 23 / 27, WB 32 or Microdyne are available for speed up to 100 000 rpm (see specific data sheet).

INDUSTRIAL VERSION (IS)

WB Series Dynamometers are also available in an industrial version, which includes the base plate, but does not provide torque nor speed measurement.

MECHANICAL ROTOR BLOCKING DEVICE (MB)

As Eddy Current principle is proportional to speed and do not provide braking torque at 0 rpm, a mechanical rotor blocking device, which allows locked rotor testing, is available as an option for the WB Dynamometer.

VERTICAL MOUNTING (V)

Vertical Mounting is available on the Eddy-Current WB Dynamometers. The vertical version has an adapted bearing fitting and its maximum speed is limited.

NOTE: Dimensions of the specific versions can slightly vary from the standard versions. Please, contact our sales technicians for specific drawing.

ORDERING INFORMATION

ORDERING NUMBER	_	WB	_ _ _	-	_ _
1, 2, 3, 4 : Model number					
32 [a], **43, 65, 115, 15** : Model number					
HS: High speed version [b] **IS** : Industrial version [b] **MB** : Mechanical rotor bloking device [b] **V** : Vertical mounting [b]					

Example: 2 WB 43 Eddy-Current Dynamometer, high speed version would be ordered as **2WB43-HS**

1 WB 115 Eddy-Current Dynamometer, vertical mounting version would be ordered as **1WB115-V**

3 WB 65 Eddy-Current Dynamometer, industrial version would be ordered as **3WB65-IS**

a) Available in summer 2025

b) Not available for WB 32

SYSTEM OPTIONS AND ACCESSORIES

DSP 7010 - DYNAMOMETER CONTROLLER

Magtrol's DSP 7010 High-Speed 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 (WB Series) or Powder Brake (PB Series) Dynamometer, Magtrol In-Line Torque Transducer/Sensor (TS, TM, TF Series) or auxiliary instrument, 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. 5: DSP 7010 | Programmable Dynamometer Controllers

TSC SERIES - TORQUE/SPEED CONDITIONER

The TSC Series is the Torque & Speed Conditioner used to connect Magtrol Eddy-Current (WB Series) or Powder (PB Series) Dynamometers to the DSP 7010 Controller. Powered by the DSP 7010, and based on a precision instrumentation amplifier, the unit amplifies and filters the torque signal. It also provides power supply and connections for the speed pickup sensor which is located in the dynamometer.

DES SERIES - POWER SUPPLIES

DES Series Power Supplies are specially designed for the full range of Magtrol's Eddy-current and Powder brake dynamometers with the design goal providing the best response time. The DES Series supplies are packaged in an industrial housing made of cast aluminum. This housing must be installed directly on the test bench, ideally on a thermal conductive surface.

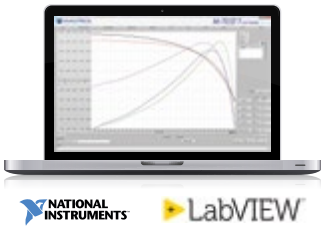
Fig. 6: Custom Motor Test System with WB Series brake

MODEL 7500 SERIES - POWER ANALYZERS

The Magtrol MODEL 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 Series measures volts, amps, watts, volt-amps, frequency, crest factor, Vpeak, Apeak 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. 7: MODEL 7510 | Power Analyzers

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 (e.g. 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.

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

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 measurment and dedicated M-TEST software. Other sensors can be integrated upon request.

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