

HB/MHB SERIES

HYSTERESIS BRAKES / MATCHED HYSTERESIS BRAKES

MAGTROL offers 5 main types of Hysteresis Brakes to absorb a load: Pure Hysteresis (**HB Series**), Compressed-Air-Cooled (**AHB Series**), Blower-Cooled (**BHB Series**), Base Mounted (**CHB Series**) & Torque Powder (**TPB Series**). Each type of Brakes has advantages and limitations. With over 50 standard models to choose from, Magtrol Sales professionals are readily available to assist in selecting the better brake to meet your application needs.

FEATURES

- Ideal for low-torque/high-speed applications with exceptional power ratings
- Torque: 2.5 ... 3 500 oz·in (0.018 ... 26 N·m)
- Speed: ≤ 20 000 rpm
- Power: ≤ 2 400 W
- Available in Imperial or Metric dimensions
- Torque independent of speed
- Long, maintenance-free life
- Magtrol hysteresis braking technology provides precise torque control independent of shaft speed
- EMC conforms to European standards

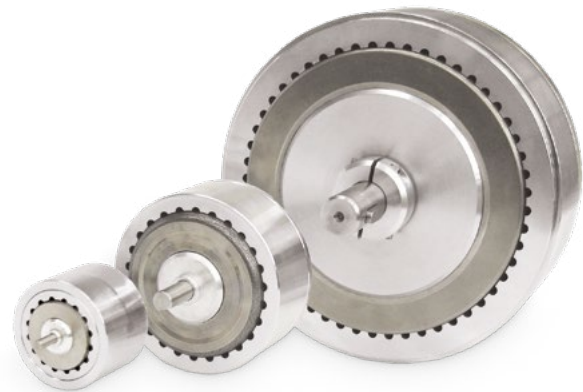


Fig. 1: HB Series | Hysteresis Brake

DESCRIPTION

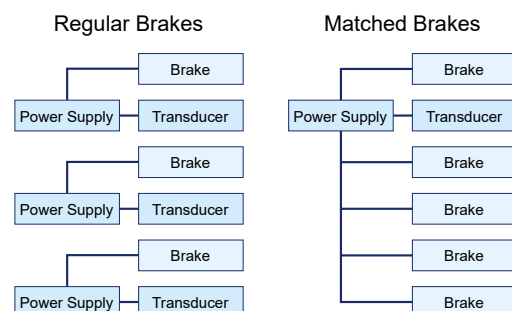
Magtrol pioneered the technology of applying the principles of hysteresis to meet the critical needs for reliable, smooth and adjustable torque control. Magtrol's Hysteresis Brakes produce torque strictly through a magnetic air gap without the use of magnetic particles or friction components. This method of braking provides far superior operating characteristics (smoother torque, longer life, superior repeatability, high degree of controllability, and less maintenance and down time) which make them the preferred choice for precise tension control during the processing of nearly any material, web or strand.

MATCHED BRAKES

In tension control applications that have multiple webs or multiple strands, it is very desirable to match the tension of each web or strand. This is most commonly attained by using a closed-loop servo control system which controls current to a braking device through the use of dancer arms, follower arms and in-line tension transducers. The problem with such systems is that each web or strand must be individually controlled, increasing the cost and complicating the system with multiple sensors and power supplies.

To solve this problem, Magtrol developed a system to assure that every brake of a given model designation will be matched

(at a predetermined torque and current point) to other brakes of the same model designation. Regardless of material and manufacturing tolerances, each brake is matched at the selected match point to within a tolerance of $\pm 1\%$. The maximum deviation in torque from brake to brake at any point along their torque/current curve (from 0 torque up to the selected matched torque point) is less than $\pm 4\%$ of the selected matched torque value. With this level of matching, a system with multiple tension rollers would provide tension consistency within $\pm 1\%$ if set at the matched point with all brakes receiving the same current. The matched point can be any value between 50% and 100% of rated torque, which allows the brakes to be optimized for specific applications. Unless otherwise specified, all brakes are matched at 100 rpm.



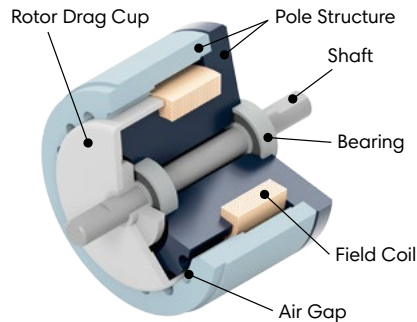
APPLICATIONS

- Precise control of wire tension during wind, hook and cut operation of high-speed automated winding machines
- Frictionless, non-breakaway force for tensioning materials during slitting and many other material processing operations
- Load simulation applications for life testing on electric motors, actuators, small gas engines, gearboxes, and many other rotating devices and assemblies
- Open-loop control for maintaining precise tension during winding process in transformer and coil winding operations
- Holding of backdriving loads
- Ultimate tension control, regardless of control scheme—dancer roll, follower arm, photo or ultrasonic sensors
- Precise load control and programmed repeatability in fitness machines

PRINCIPLES OF HYSTERESIS

The hysteresis effect in magnetism is applied to torque control by the use of two basic components—a reticulated pole structure and a specialty steel rotor/shaft assembly—fastened together but not in physical contact. Until the field coil is energized, the drag cup can spin freely on the ball bearings. When a magnetizing force from either a field coil or magnet is applied to the pole structure, the air gap becomes a flux field. The rotor is magnetically restrained, providing a braking action between the pole structure and rotor.

Because torque is produced strictly through a magnetic air gap, without the use of friction or shear forces, Magtrol Hysteresis Brakes provide absolutely smooth, infinitely controllable torque loads, independent of speed, and they operate quietly without any physical contact of interactive members. As a result, with the exception of shaft bearings, no wear components exist.



In an electrically operated Hysteresis Brake, adjustment and control of torque is provided by a field coil. This allows for complete control of torque by adjusting DC current to the field coil. Adjustment from a minimum value (bearing drag) to a maximum value of rated torque is possible. Additional torque in the range of 15-25% above rated torque may be available on some brakes.

The amount of braking torque transmitted by the brake is proportional to the amount of current flowing through the field coil. The direction of current flow (polarity) is of no consequence to the operation of the brake. For optimum torque stability, a DC supply with current regulation is recommended. This will help to minimize torque drift attributable to changes in coil temperature and in-line voltage, which can result in changes in coil current, and consequently, in torque.

ADVANTAGES OF HYSTERESIS DEVICES

LONG, MAINTENANCE-FREE LIFE

Magtrol Hysteresis Brakes produce torque strictly through a magnetic air gap, making them distinctly different from mechanical-friction and magnetic particle devices. Because hysteresis devices do not depend on friction or shear forces to produce torque, they do not suffer the problems of wear, particle aging, and seal leakage. As a result, hysteresis devices typically have life expectancies many times that of friction and magnetic particle devices.

EXCELLENT ENVIRONMENTAL STABILITY

Magtrol hysteresis devices can withstand significant variation in temperature and other operating conditions. In addition, because they have no particles or contacting active parts, Hysteresis Brakes are extremely clean. Magtrol devices are used in food and drug packaging operations, in clean rooms, and environmental test chambers.

OPERATIONAL SMOOTHNESS

Because they do not depend on mechanical friction or particles in shear, Hysteresis Brakes are absolutely smooth at any speed. This feature is often critical in wire drawing, packaging and many other converting applications.

LIFE CYCLE COST ADVANTAGES

While the initial cost of hysteresis devices may be the same or slightly more than that of their counterparts, the high cost of replacing, repairing and maintaining friction and magnetic particle devices often makes hysteresis devices the most cost-effective means of tension and torque control available.

SUPERIOR TORQUE REPEATABILITY

Because torque is generated magnetically without any contacting parts or particles, Hysteresis Brakes provide superior torque repeatability. Friction and magnetic particle devices are usually subject to wear and aging with resultant loss of repeatability. Magtrol devices will repeat their performance precisely, to ensure the highest level of process control.

BROAD SPEED RANGE

Magtrol hysteresis devices offer the highest slip speed range of all electric torque control devices. Depending on size, kinetic power requirements and bearing loads, many Magtrol Brakes can be operated at speeds in excess of 10 000 rpm. In addition, full torque is available even at zero slip speed and torque remains absolutely smooth at any slip speed.



HB/MHB Hysteresis Brakes from Magtrol are available in two different ranges with Imperial Units (HB-XXX) or Metric Units (HB-XXXM). Please check in the following pages that you are using the appropriate brake.

SPECIFICATIONS - IMPERIAL UNITS

HYSTERESIS BRAKE RATINGS - IMPERIAL UNITS

BRAKE MODEL	MATCHED BRAKE MODEL	MIN. TORQUE AT RATED CURRENT		RATED CURRENT	VOLTAGE ^{a)}	MAXIMUM SPEED rpm	KINETIC POWER ^{b)}	
		N·m	oz·in	mA	VDC		5 MINUTES W	CONTINUOUS W
HB-2.5	MHB-2.5 ^{c)}	0.018	2.5	146 ^{b)}	25.0	20 000	20	5
HB-10	MHB-10	0.071	10.0	133	24.0		45	12
HB-16	---	0.113	16.0	192	24.0		75	20
HB-38	MHB-38	0.268	38.0	250	26.3	15 000	90	25
HB-50	MHB-50	0.350	50.0	253	24.0		90	23
HB-140	MHB-140	1.000	140.0	253	24.0	12 000	300	75
HB-250	MHB-250	1.750	250.0	270	26.0	10 000	450	110
HB-450	MHB-450	3.200	450.0	442	22.1	8 000	670	160
HB-750	MHB-750	5.300	750.0	383	23.0	7 000	1 000	200
HB-840	---	5.900	840.0	600	24.0	6 000	1 340	300
HB-1750	MHB-1750	12.360	1 750.0	500	26.0		1 200	350
HB-3500	---	24.720	3 500.0	1 000	26.0		2 400	600

BRAKE MODEL	MATCHED BRAKE MODEL	DRAG TORQUE DE-ENERGIZED @ 1000 rpm		NOMINAL POWER	RESISTANCE AT 25°C ± 10 %	EXTERNAL INERTIA		WEIGHT	
		N·m	oz·in	W	Ω	kg·cm ²	lb·in·s ²	kg	lb
HB-2.5	MHB-2.5	3.53 x 10 ⁻⁴	0.05	3.70	171	4.30 x 10 ⁻³	3.800 x 10 ⁻⁶	0.11	0.24
HB-10	MHB-10	7.06 x 10 ⁻⁴	0.10	3.18	180	3.70 x 10 ⁻²	3.300 x 10 ⁻⁵	0.22	0.49
HB-16	---	7.06 x 10 ⁻⁴	0.10	4.60	125	6.30 x 10 ⁻²	5.600 x 10 ⁻⁵	0.29	0.65
HB-38	MHB-38	1.41 x 10 ⁻³	0.20	6.60	105	0.97 x 10 ⁻¹	8.600 x 10 ⁻⁵	0.48	1.06
HB-50	MHB-50	1.41 x 10 ⁻³	0.20	6.10	95	1.67 x 10 ⁻¹	1.478 x 10 ⁻⁴	0.78	1.72
HB-140	MHB-140	4.94 x 10 ⁻³	0.70	6.10	95	1.03 x 10 ⁰	9.100 x 10 ⁻⁴	1.86	4.10
HB-250	MHB-250	7.77 x 10 ⁻³	1.10	7.00	96	3.11 x 10 ⁰	2.750 x 10 ⁻³	3.50	7.70
HB-450	MHB-450	1.41 x 10 ⁻²	2.00	9.80	50	7.50 x 10 ⁰	6.600 x 10 ⁻³	5.85	12.90
HB-750	MHB-750	5.00 x 10 ⁻²	7.08	8.80	60	11.40 x 10 ⁰	1.000 x 10 ⁻²	12.80	28.30
HB-840	---	2.82 x 10 ⁻²	4.00	14.40	40	14.80 x 10 ⁰	1.310 x 10 ⁻²	12.00	26.30
HB-1750	MHB-1750	9.18 x 10 ⁻²	13.00	13.00	52	5.63 x 10 ¹	4.980 x 10 ⁻²	24.50	54.00
HB-3500	---	1.36 x 10 ⁻¹	19.30	26.00	26	1.11 x 10 ²	1.056 x 10 ⁻¹	50.00	110.00

a) Standard supply voltage is ~24VDC. Other coil voltages (12VDC and 90VDC) are available on request.

b) Kinetic power ratings are maximum values based on limiting coil and/or bearing temperature to approximately 100 °C, and should not be exceeded. Actual values in service may vary ±50% depending on mounting, ventilation, ambient temperature, etc.

c) Matching current for MHB-2.5 is 98mA.

NOTE: Angular Acceleration values are available upon request.

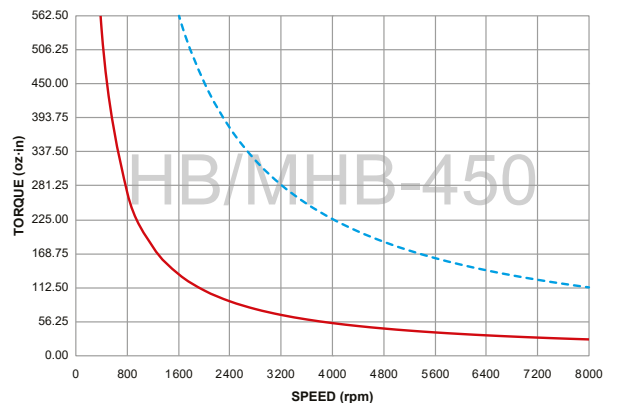
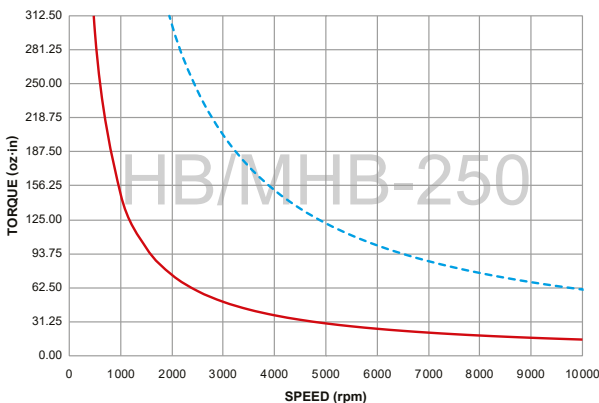
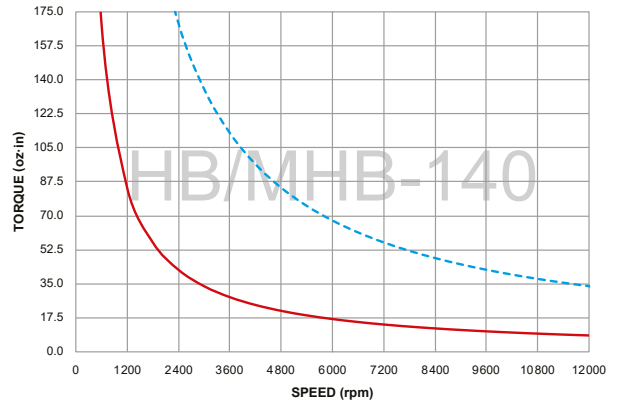
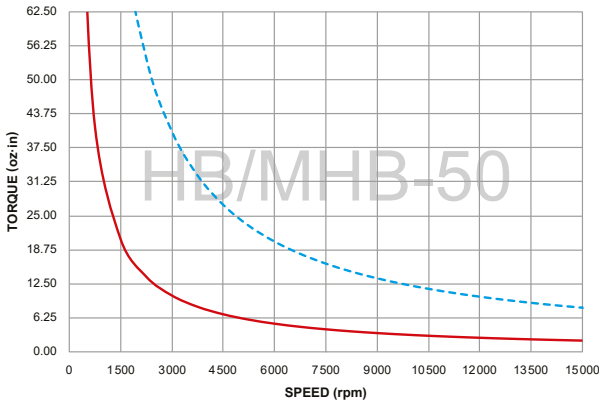
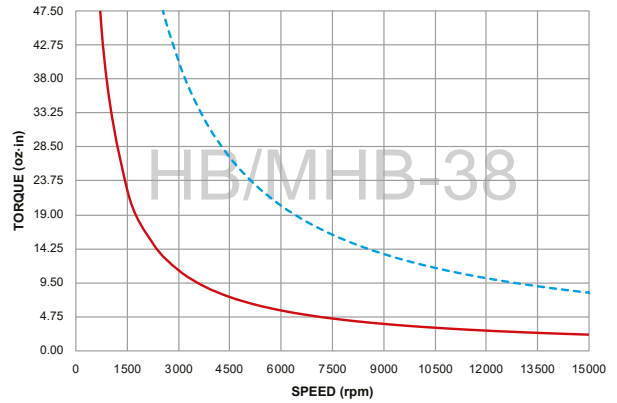
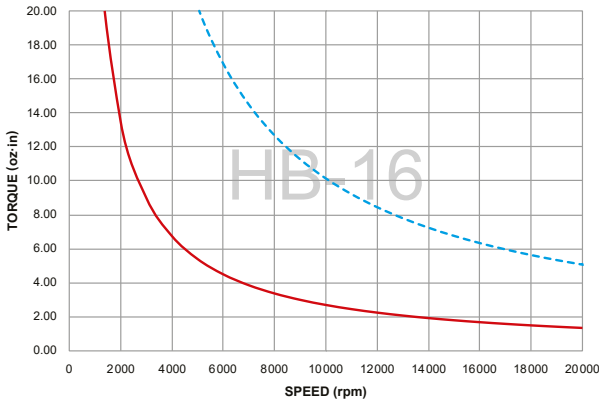
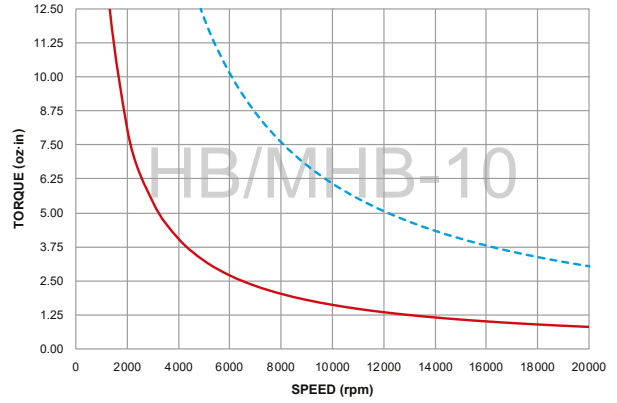
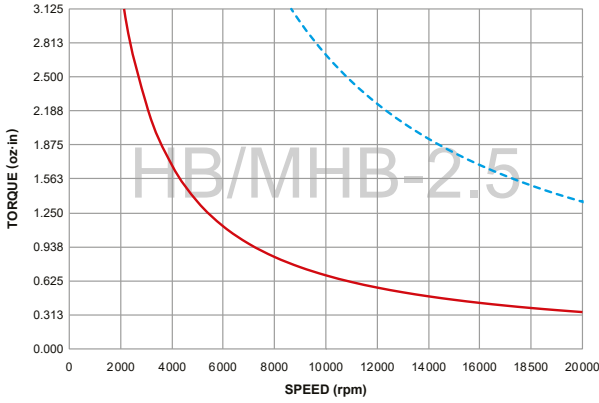
CAUTION: To prevent damage to the power supply from inductive kickback, connect a diode rated at greater than or equal to the power supply's output voltage and current across the brake leads. Connect the cathode to the positive lead and the anode to the negative lead.

POWER ABSORPTION CURVES - IMPERIAL UNITS

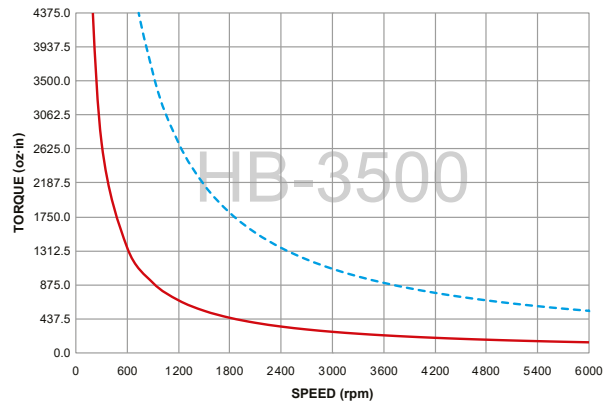
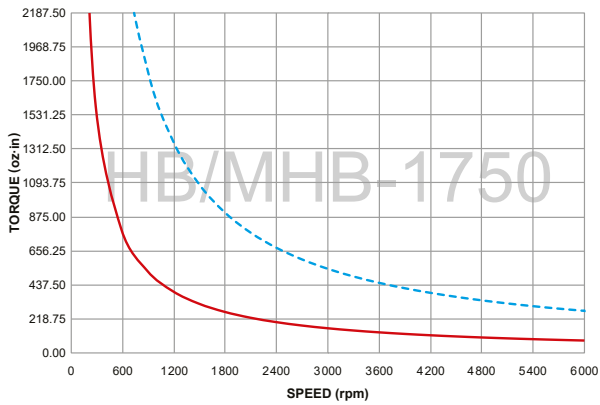
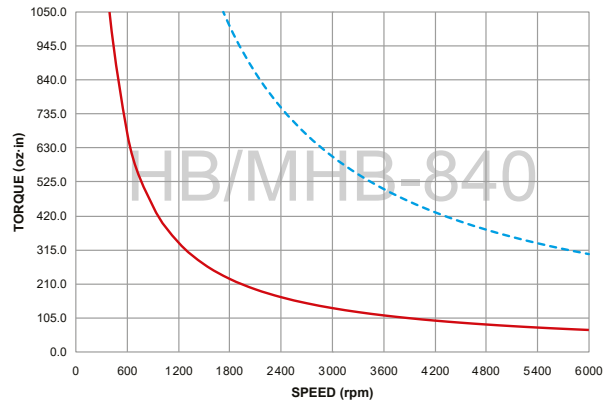
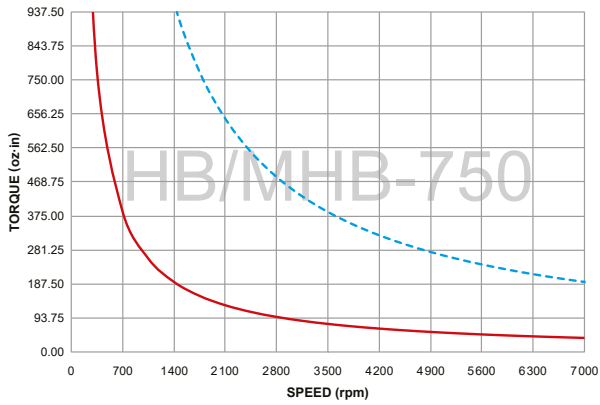
The power absorption curves represent the maximum power (heat) that the hysteresis brake can dissipate over time.

— Maximum Kinetic Power Rating Curve for **Continuous Duty**: Area under curve equals the maximum speed and torque combinations for a continuous duty motor test.

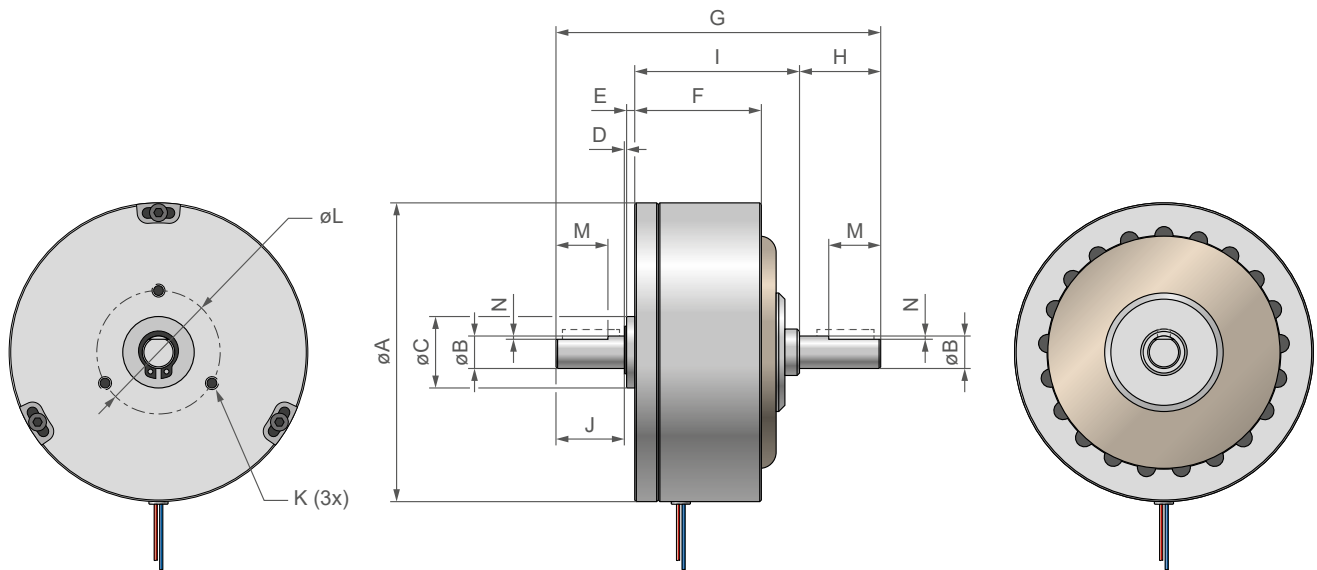
- - - Maximum Kinetic Power Rating Curve for **Less Than Five Minutes**: Area under curve equals the maximum speed and torque combinations for a motor test of less than five minutes.



POWER ABSORPTION CURVES - IMPERIAL UNITS



DIMENSIONS HB/MHB SERIES - IMPERIAL UNITS



NOTE: All dimensions are in Imperial Units (Inches). For Metric Units (mm) please see further in the dedicated section.

MODEL	ØA	ØB	ØC	D	E	F	G	H	I	J	K	ØL	M	N
MHB-2.5	1.250	0.1250	0.375	0.010	0.030	0.73	1.564	0.30	0.94	0.29	#4-40 ↓ 0.16	0.750	---	---
HB-2.5	1.250	0.1250	0.375	0.012	0.030	0.73	1.564	0.29	0.94	0.29	#4-40 ↓ 0.16	0.750	---	---
HB / MHB-10	1.800	0.1875	0.500	0.021	0.096	0.82	2.120	0.50	1.00	0.50	#4-40 ↓ 0.19	0.687	0.375	0.025
HB-16	1.970	0.1875	0.500	0.015	0.096	0.81	2.109	0.50	0.95	0.50	#4-40 ↓ 0.25	0.750	0.375	0.025
HB / MHB-38	2.155	0.2500	0.625	0.032	0.096	1.25	3.000	0.56	1.69	0.63	#6-32 ↓ 0.25	0.906	0.375	0.025
HB / MHB-50	2.360	0.2500	0.625	0.033	0.096	1.56	3.000	0.56	1.69	0.63	#6-32 ↓ 0.25	0.906	0.375	0.025
HB / MHB-140	3.624	0.3750	0.875	0.025	0.140	1.53	3.968	1.00	2.00	0.80	#8-32 ↓ 0.37	1.500	0.625	0.060
HB / MHB-250	4.437	0.5000	1.125	0.035	0.156	1.98	4.718	1.06	2.53	0.93	#10-32 ↓ 0.50	1.750	0.625	0.060
HB / MHB-450	5.420	0.5000	1.125	0.035	0.156	2.06	5.156	1.06	2.87	1.03	#10-32 ↓ 0.38	1.750	0.630	0.060
HB / MHB-750	6.220	0.6250	1.375	0.035	0.163	2.87	6.930	1.50	3.74	1.50	¼-20 ↓ 0.44	2.750	0.750	0.060
HB-840	5.485	0.5000		-- ^{a)}		4.13	7.750	1.00	-- ^{a)}	1.00	-- ^{a)}	-- ^{a)}	0.625	0.060
HB / MHB-1750	8.900	1.0000	2.000	0.055	0.250	3.00	8.310	2.04	4.18	1.79	¼-20 ↓ 0.50	3.000		keyway ^{b)}
HB-3500	8.900	1.0000		-- ^{a)}		6.00	12.460	2.04	-- ^{a)}	2.04	-- ^{a)}	-- ^{a)}		keyway ^{b)}

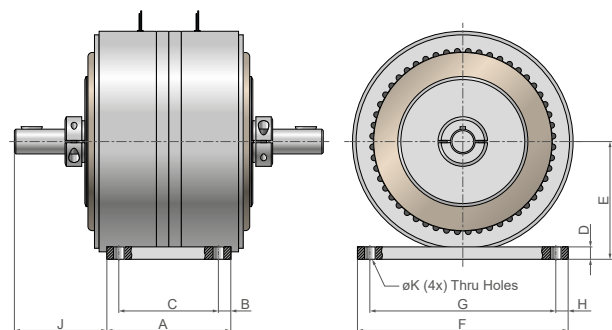
a) HB-840 and HB-3500 are double brake assemblies that require base mounting. See base mounting dimensions below for details. Magtrol manufactures double brakes to increase torque capability. For more information and a drawing, contact Magtrol.

b) #807 woodruff keyway (2 places)

BASE MOUNTING DIMENSIONS

Base mounting is standard on all HB-840, HB-3500 and HB-3500M brakes.

MODEL	A	B	C	D	E	F	G	H	J	ØK
IMPERIAL UNITS - DIMENSIONS (Inches)										
HB-840	4.13	0.25	3.63	0.50	3.15	5.25	4.75	0.25	1.81	0.204
HB-3500	5.00	0.50	4.00	0.50	4.75	8.50	7.50	0.50	3.73	0.406
METRIC UNITS - DIMENSIONS (mm)										
HB-3500M	127.0	13.5	100	12.7	120.7	216.0	190	13	92.5	11





HB/MHB Hysteresis Brakes from Magtrol are available in two different ranges with Imperial Units (HB-XXX) or Metric Units (HB-XXXM). Please check in the following pages that you are using the appropriate brake.

SPECIFICATIONS - METRIC UNITS

HYSTERESIS BRAKE RATINGS - METRIC UNITS

BRAKE MODEL	MATCHED BRAKE MODEL	MIN. TORQUE AT RATED CURRENT		RATED CURRENT	VOLTAGE ^{a)}	MAXIMUM SPEED	KINETIC POWER ^{b)}	
		N·m	oz·in	mA			5 MINUTES	CONTINUOUS
					VDC	rpm	W	W
HB-3M	MHB-3M	0.02	2.8	145	25.0	20000	20	5
HB-10M	MHB-10M	0.07	9.9	133	24.0		45	12
HB-20M	MHB-20M	0.14	19.8	217	26.0		50	12
HB-50M	MHB-50M	0.35	50.0	253	24.0	15000	90	23
HB-140M	MHB-140M	1.00	140.0	253	24.0	12000	300	75
HB-250M	MHB-250M	1.75	250.0	270	26.0	10000	450	110
HB-450M	MHB-450M	3.20	450.0	442	22.1	8000	670	160
HB-750M	MHB-750M	5.00	708.0	383	23.0	7000	1000	200
HB-1750M	MHB-1750M	13.00 ^{c)}	1840.0	600	31.2	6000	1200	350
HB-3500M	---	26.00 ^{d)}	3682.0	1200	31.2		2400	600

BRAKE MODEL	MATCHED BRAKE MODEL	DRAG TORQUE DE-ENERGIZED @ 1000 RPM		NOMINAL POWER	RESISTANCE AT 25 °C ±10%	EXTERNAL INERTIA		WEIGHT	
		N·m	oz·in	W	Ω	kg·cm ²	lb·in·s ²	kg	lb
HB-3M	MHB-3M	3.53 x 10 ⁻⁴	0.05	3.59	171.0	4.30 x 10 ⁻³	3.800 x 10 ⁻⁶	0.11	0.24
HB-10M	MHB-10M	7.06 x 10 ⁻⁴	0.10	3.18	180.0	4.35 x 10 ⁻²	3.800 x 10 ⁻⁵	0.22	0.49
HB-20M	MHB-20M	7.77 x 10 ⁻⁴	0.11	5.65	120.0	4.58 x 10 ⁻²	4.100 x 10 ⁻⁵	0.29	0.65
HB-50M	MHB-50M	1.55 x 10 ⁻³	0.22	6.10	95.0	1.67 x 10 ⁻¹	1.478 X 10 ⁻⁴	0.78	1.72
HB-140M	MHB-140M	5.42 X 10 ⁻³	0.77	6.10	95.0	1.00 x 10 ⁰	8.850 x 10 ⁻⁴	1.86	4.10
HB-250M	MHB-250M	7.77 X 10 ⁻³	1.10	7.00	96.0	3.45 x 10 ⁰	3.050 x 10 ⁻³	3.50	7.70
HB-450M	MHB-450M	1.51 x 10 ⁻²	2.14	9.80	50.0	7.50 x 10 ⁰	6.600 x 10 ⁻³	5.85	12.90
HB-750M	MHB-750M	5.00 x 10 ⁻²	7.08	8.80	60.0	11.40 x 10 ⁰	1.000 x 10 ⁻²	12.80	28.30
HB-1750M	MHB-1750M	9.18 x 10 ⁻²	13.00	13.00	52.0	5.63 x 10 ¹	4.980 x 10 ⁻²	24.50	54.00
HB-3500M	---	1.36 x 10 ⁻¹	19.30	26.00	28.0	1.25 x 10 ²	1.110 x 10 ⁻¹	50.00	110.00

a) Standard supply voltage is ~24VDC. Other coil voltages are available (12VDC, 90VDC)..

b) Kinetic power ratings are maximum values based on limiting coil and/or bearing temperature to approximately 100 °C, and should not be exceeded. Actual values in service may vary ±50% depending on mounting, ventilation, ambient temperature, etc.

c) 13 N·m is attainable @ approx. 600 mA. This value may decrease to 12.36 N·m if the brake is powered by any power supply or controller limited to 500 mA.

d) 26 N·m is attainable @ approx. 1200 mA. This value may decrease to 24.72 N·m if the brake is powered by any power supply or controller limited to 1000 mA.

NOTE: Angular Acceleration values are available upon request

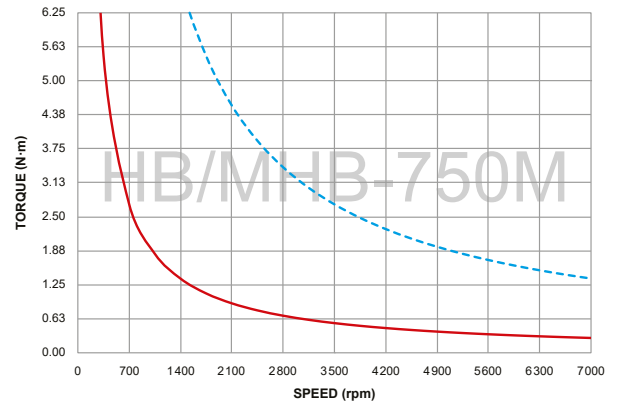
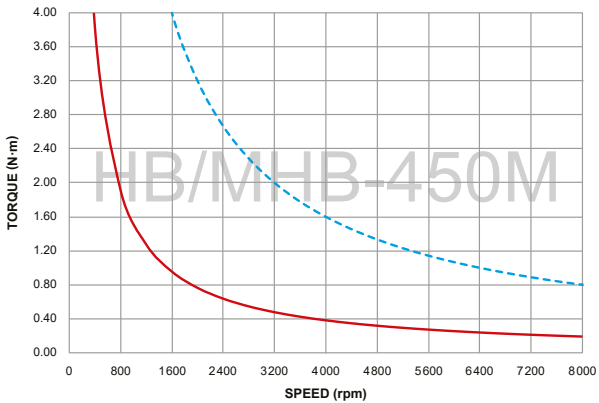
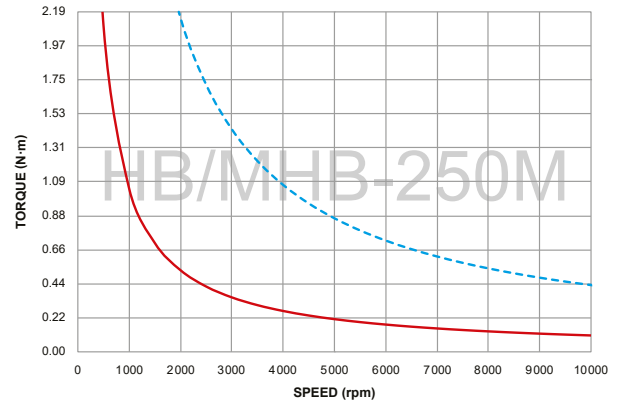
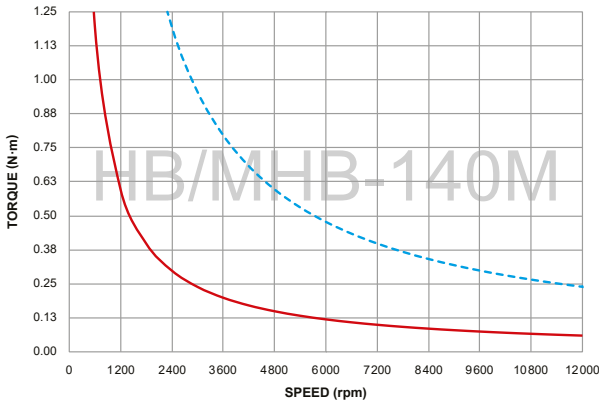
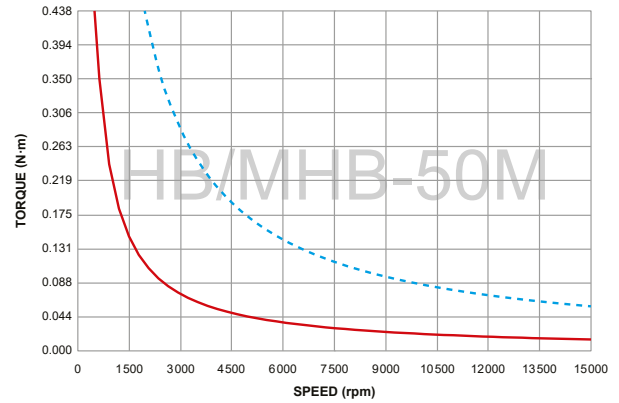
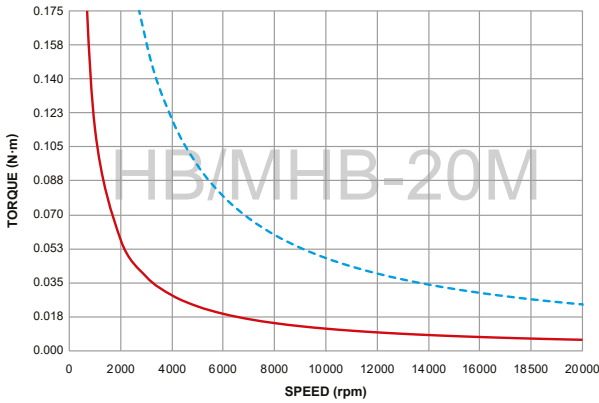
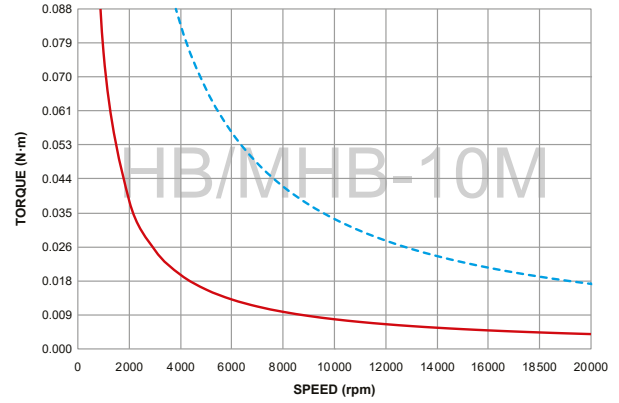
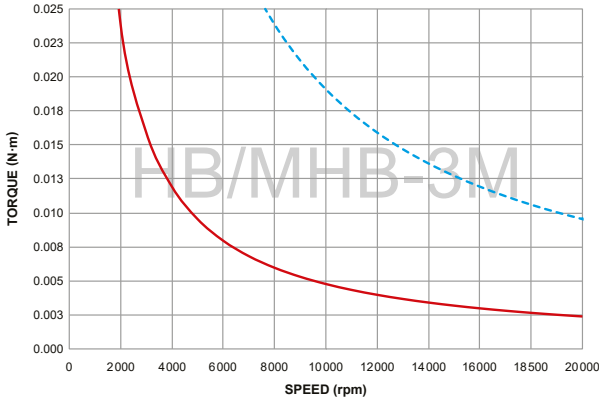
CAUTION: To prevent damage to the power supply from inductive kickback, connect a diode rated at greater than or equal to the power supply's output voltage and current across the brake leads. Connect the cathode to the positive lead and the anode to the negative lead.

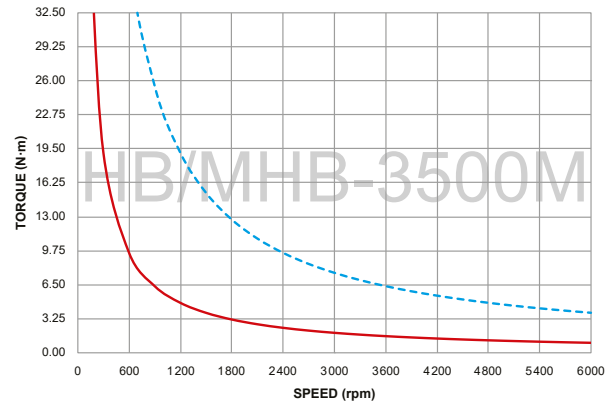
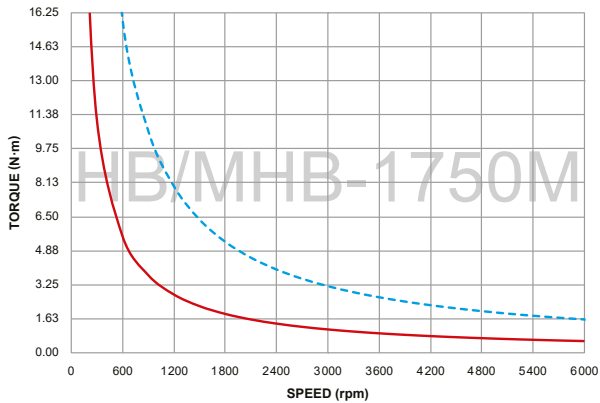
POWER ABSORPTION CURVES - METRIC UNITS

The power absorption curves represent the maximum power (heat) that the hysteresis brake can dissipate over time.

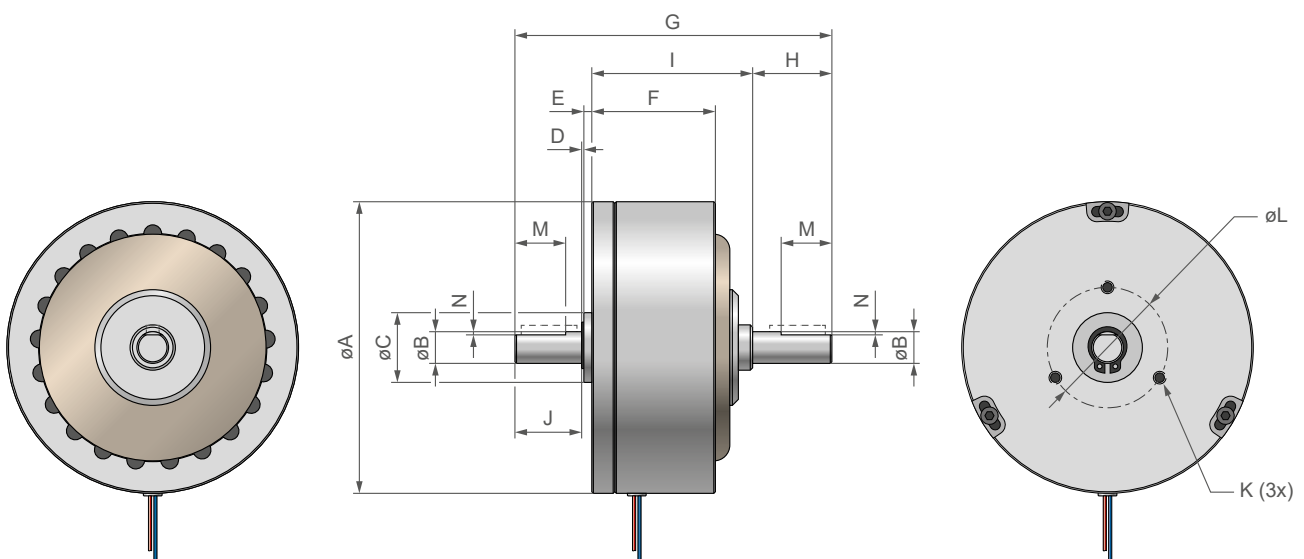
— Maximum Kinetic Power Rating Curve for **Continuous Duty**: Area under curve equals the maximum speed and torque combinations for a continuous duty motor test.

- - - Maximum Kinetic Power Rating Curve for **Less Than Five Minutes**: Area under curve equals the maximum speed and torque combinations for a motor test of less than five minutes.





DIMENSIONS HB / MHB SERIES - METRIC UNITS



NOTE: All values are in Metric Units. Dimensions are in millimeters

MODEL	ØA	ØB	ØC	D	E	F	G	H	I	J	K	ØL	M	N
HB/MHB-3M	31.8	3	10	0.6	2.0	18.6	42.0	8	23.6	8	M2.5 x 4.5	19	---	---
HB/MHB-10M	45.7	5	14	0.7	2.4	20.7	52.6	12	25.5	12	M2.5 x 5	19	9.5	0.7
HB/MHB-20M	50.0	5	14	0.7	1.8	23.5	55.8	13	27.3	13	M3 x 6	21	9.5	0.7
HB/MHB-50M	60.0	7	17	0.7	2.0	39.7	76.5	15	42.8	16	M4 x 8	25	10.0	0.7
HB/MHB-140M	92.0	10	22	0.8	2.5	39.0	100.0	25	50.8	21	M4 x 9	38	16.0	1.0
HB/MHB-250M	112.7	12	28	0.7	3.9	50.4	123.1	27	64.2	27	M5 x 10	45	4 x 4 x 20 ^{b)}	
HB/MHB-450M	137.7	15	32	0.9	3.5	52.4	131.5	27	73.0	27	M5 x 10	60	5 x 5 x 20 ^{b)}	
HB/MHB-750M	158.0	17	35	0.9	4.0	73.0	176.0	38	95.0	38	M6 x 10	70	5 x 5 x 20 ^{b)}	
HB/MHB-1750M	226.1	25	52	1.2	6.0	76.2	213.0	50	105.8	50	M6 x 12	100	8 x 7 x 25 ^{b)}	
HB-3500M ^{a)}	226.0	25	a)	a)	a)	152.4	312.0	50	a)	50	a)	a)	8 x 7 x 25 ^{b)}	

a) The HB-3500M is a double brake assembly that requires base mounting. See base mounting dimensions above for details. Magtrol manufactures double brakes to increase torque capability. For more information and a drawing, contact Magtrol.

b) Round end keyway (2 places)

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

POWER SUPPLIES

For optimum torque stability, Magtrol offers different power supplies for Brakes & Clutches:

MODEL 5212 - CURRENT REGULATED POWER SUPPLY



MODEL 5212 is a 0...1A current-regulated, 0...35VDC power supply and display designed for use with hysteresis brakes and clutches. It features a 10-turn current adjustment potentiometer and 3 selectable current ranges: 200...1000 mA. A built in panel meter displays the value of output current.

The MODEL 5212 is designed as a closed-loop power supply to provide smooth application of current throughout an entire range up to a maximum set point. By utilizing regulated current, fluctuations in brake torque caused by temperature changes within the brake coil are eliminated. Braking current can be controlled manually or by an external 0...5VDC input signal.

MODEL 5251 - CURRENT REGULATED POWER SUPPLY



MODEL 5251 is an open frame, 0...1A current regulated power supply for use with Magtrol hysteresis brakes and clutches. It has a high input impedance that allows for a variety of sensors and transducers to be used. It features a selectable 0...5VDC monitor out that allows connection to a PLC, voltmeter, display or other monitoring device. This allows the user to monitor the current applied directly to the brake or clutch, if desired. With regulated current, torque drift caused by temperature changes within the brake coil is eliminated. Braking control is enabled by using either a 10-turn potentiometer or by an external 0...5VDC control signal.

MODEL 5251 is an open frame, 0...1A current regulated power supply for use with Magtrol hysteresis brakes and clutches. It has a high input impedance that allows for a variety of sensors and transducers to be used. It features a selectable 0...5VDC monitor out that allows connection to a PLC, voltmeter, display or other monitoring device. This allows the user to monitor the current applied directly to the brake or clutch, if desired. With regulated current, torque drift caused by temperature changes within the brake coil is eliminated. Braking control is enabled by using either a 10-turn potentiometer or by an external 0...5VDC control signal.

ZUP - POWER SUPPLY



The ZUP is a 0...36VDC benchtop power supply which provides current regulation of the braking torque via a turning knob. This powerful and versatile power supply can power all Magtrol brakes, with an output current up to 6A.

The ZUP power supply is required to power brakes with high kinetic power, which require supply currents greater than 3A (e.g. TPB400, TPB600, etc.). This unit can also be controlled with an analog input signal 0...4 V.

BPM SERIES - BRAKE POWER MODULE



The BPM Series - Brake Power Module is used to supply and control the current (up to 3A) of Magtrol Hysteresis Brakes and Clutches. This compact component (DIN rail mount) is recommended for easily controlling a wide range of brakes and clutches. The analog input of the

Brake Power Module is designed for 0...10VDC signals. At the maximum set value of 10VDC, the output current is adjustable 0...100%.

POWER SUPPLIES COMPATIBILITY

	MODEL 5212	MODEL 5251	BPM 101	BPM 103	ZUP
BRAKE MODELS					
All models except those listed below	X	X	X	-	-
HB-3500, HB-3500M	-	-	-	X	X

CONNECTION CABLE FOR POWER SUPPLIES

CONNECT HB/MHB SERIES TO ZUP

ORDERING NUMBER 88M175- ----

- 0200 : Cable length 2m
- 0500 : Cable length 5m

CONNECT ZUP TO DSP 7000

ORDERING NUMBER 88M176 ----

- 0100 : Cable length 1m
- 0200 : Cable length 2m

CONNECT BPM SERIES TO DSP 7000

ORDERING NUMBER ER 405/ 0 _ X

- 1 : Cable length 5m
- 2 : Cable length 10m
- 3 : Cable length 20m

CONNECT HB/MHB SERIES TO DSP 7000, MODEL 5212

ORDERING NUMBER 88M ---- - ----

- 085 : For DSP 7000^{a)}
- 410 : For MODEL 5212^{a)}

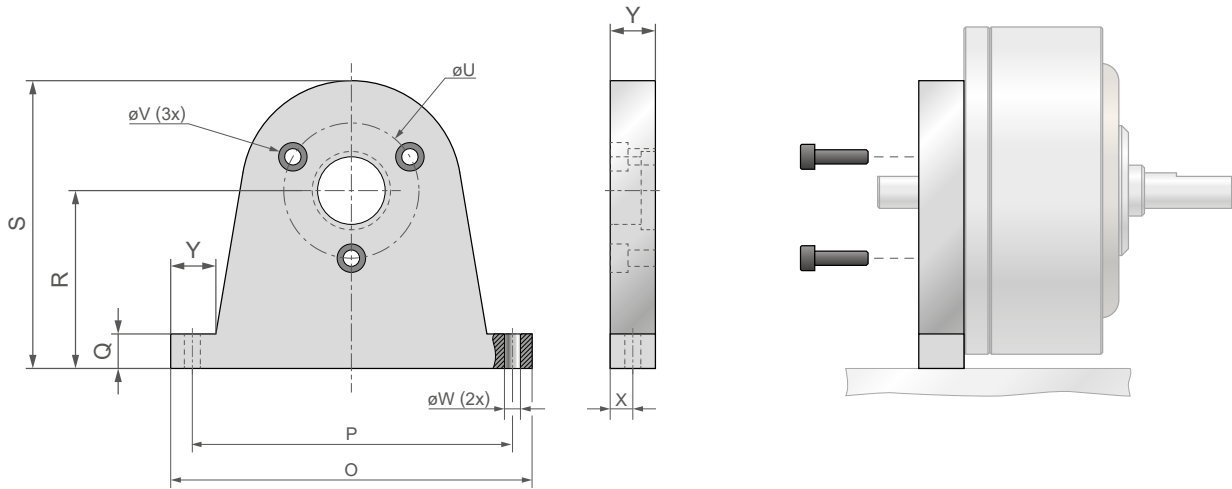
- 0150 : Cable length 1.5m
- 0500 : Cable length 5m
- 1000 : Cable length 10m

a) Since 2020, Magtrol initiated an upgrade of its device connectivity. If you want to connect an HB brake to a device not listed in the table above (e.g. MODEL 5200, MODEL 5211, etc.), please contact our customer service team.

SYSTEM OPTIONS & ACCESSORIES

HB/MHB PILLOW BLOCKS

Pillow Block Assemblies are an available option for all brake units except the HB-3500 and HB-3500M.



DIMENSIONS - IMPERIAL UNITS (Inches)

MODEL	BRAKE MODELS	O	P	Q	R	S	T	ØU	V	ØW	X	Y
4736	HB/MHB-2.5	1.75	1.500	0.25	1.000	1.500	0.25	0.750	#4-40	0.125	0.125	0.25
4702	HB/MHB-10	2.50	2.125	0.38	1.437	2.125	0.38	0.687	#4-40	0.201	0.187	0.38
4703	HB-16	2.50	2.125	0.38	1.437	2.125	0.38	0.750	#4-40	0.201	0.187	0.38
4705	HB/MHB-38, HB/MHB-50	2.50	2.125	0.38	1.437	2.125	0.38	0.906	#6-32	0.201	0.187	0.38
4711	HB/MHB-140	4.00	3.500	0.38	2.000	3.187	0.50	1.500	#8-32	0.204	0.250	0.50
4714	HB/MHB-250	4.00	2.500	0.38	2.375	3.687	0.50	1.750	#10-32	0.204	0.250	0.50
4717	HB/MHB-450	4.62	4.000	0.50	3.000	4.310	0.56	1.750	#10-32	0.204	0.250	0.50
4720	HB/MHB-750	5.25	4.500	0.75	3.250	5.125	0.75	2.750	#¼-20	0.343	0.375	0.75
4722	HB/MHB-1750	7.50	6.500	1.00	5.000	7.000	1.00	3.000	#¼-20	0.328	0.500	1.00

DIMENSIONS - METRIC UNITS (mm)

MODEL	BRAKE MODELS	O	P	Q	R	S	T	ØU	V	ØW	X	Y
4723	HB/MHB-3M	44.5	38	6.4	25.4	38.1	7.4	19	M2.5	3.4	3.2	6.4
4700	HB/MHB-10M	63.5	54	9.7	36.5	53.9	10.4	19	M2.5	5.5	4.7	9.5
4704	HB/MHB-20M	63.5	54	9.7	36.5	53.9	10.4	21	M3	5.5	4.7	9.5
4706	HB/MHB-50M	63.5	54	9.7	36.5	53.9	10.4	25	M4	5.5	4.7	9.5
4864	HB/MHB-140M	101.6	90	9.7	50.0	80.9	12.7	38	M4	4.5	6.4	12.7
4865	HB/MHB-250M	101.6	90	9.7	60.0	93.7	12.7	45	M5	5.5	6.4	12.7
4866	HB/MHB-450M	117.3	104	12.7	76.0	120.4	14.2	60	M5	6.6	6.4	12.7
4858	HB/MHB-750M	133.4	115	19.1	83.0	130.6	19.1	70	M6	9.0	9.5	19.1
4867	HB/MHB-1750M	190.5	166	25.4	120.0	177.8	25.4	100	M6	11.0	12.7	25.4

SYSTEM OPTIONS & ACCESSORIES

TS & TM SERIES - IN-LINE TORQUE SENSOR



Fig. 2: TM313 & TS 106
In-line Torque Sensor

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...±10 VDC torque output and an open collector speed output or TTL.

TM Series Transducers are very reliable, providing high overload protection, excellent long term stability and high noise immunity. All transducer models employ our unique non-contact differential transformer torque measuring technology (no rotating component). Magtrol offers three models: basic model (**TMB Series**), high accuracy (**TM Series**) and high speed with high accuracy (**TMHS Series**). The integrated electronic circuit, supplied by single DC voltage, provides torque and speed signals without any additional amplifier.

TS Series Torque Sensors provide extremely accurate torque and speed measurement. In addition to its 0... ±5 VDC (±10 VDC) output, it also integrates a USB interface. The sensor is delivered with software allowing easy connection and data acquisition. A speed encoder provides 360...5000 PPR* (Pulse Per Revolution) in Tach A, Tach B and Index reference Z (1 PPR). Available torque ranges 0.02...500 N·m.* depending on the model.

MIC SERIES - COUPLINGS

When torque transducers, brakes and other element are mounted in a drive train, special attention must be paid to the couplings that will connect the different elements. The criteria for selecting appropriate couplings for torque measurement is as follows:

- High torsional spring rate
- Clamping quality
- Speed range
- Balancing quality
- Alignment capability



Fig. 3: MIC Series
Miniature Couplings

Magtrol provides a wide range of couplings suitable for torque measurement applications and can assist you in choosing the right coupling for your transducer.

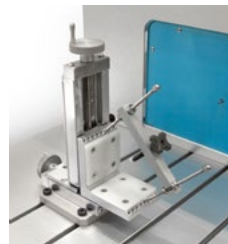
DSP 7000 - DYNAMOMETER CONTROLLERS



Fig. 4: DSP 7001 | Programmable Dynamometer Controllers

Magtrol's Model DSP7000 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 or Powder Dynamometer, Magtrol In-Line Torque Transducer or auxiliary instrumentation, the DSP7000 can provide complete PC control via the USB or optional IEEE-488 interface. With up to 500 readings per second, the DSP7000 is ideally suited for both the test lab and the production line.

AMF SERIES - MOTOR FIXTURES



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 coupling to a brake.

PT SERIES - T-SLOT BASE PLATES



Magtrol's PT Series Base Plates are used for creating a basic test rig by mounting a brake and/or TM or TS Torque Transducer, in line with the unit to be tested. Its solid, warp-resistant structure and multiple, single-sided T-slots enable modular construction that is cost-effective and easy to assemble.

RTM SERIES - RISER KITS



Depending on the system configuration, a riser may be required to lift the transducer from the baseplate to the shaft height of the brake and/or the motor being tested. Magtrol RTM Riser Kits come complete with attachment hardware for the transducer and T-nuts and bolts for attachment to the PT Base Plate.

ORDERING INFORMATION

Please consider the brakes model reference listed in the specification tables as the ordering number (e.g. **HB-10**, **MHB-10M**, **HB-1750**, etc.)

Our sales representatives will be pleased to contact you and provide you with a customized quote. Please, be careful to check or specify whether you want a **brake model in Imperial Units or Metric Units**.