

TPB SERIES

TORQUE POWDER BRAKE

FEATURES

- Available torque ratings:
12, 25, 50, 100, 200, 400, 600 N·m
- Braking power up to 900W
(2100W with air cooling)
- Rated torque available from 0 rpm
- Stable braking torque
- Low moment of inertia
- Low residual torque
- Operation in both rotational directions
- Delivered with foot mount
- For horizontal use only



Fig. 1: TPB012 | Torque Powder Brake

DESCRIPTION

The Torque Powder Brakes (TPB Series) are ideal for applications operating in the low speed range or middle to-high torque range. These magnetic powder brakes provide full torque at zero speed and are convection or air cooled, allowing power ratings up to 900W (2100W with air cooling).

APPLICATIONS

These units are suited for tension control applications, such as wire winding, foil, film, and tape tension control. Mounted on test benches, TPB Series - Torque Powder Brakes allow performance and reliability testing on driving elements such as electric motors, hand-held power tools, geared motors, reduction gears, and hydraulic transmission systems. Other applications include load simulation for life testing on electric motors, actuators, gearboxes, power steering, and many other rotating devices and assemblies.

POWER SUPPLY

A constant-current DC current supply is recommended. Magtrol offers suitable supply options (see specific section below).

COUPLING

Although intended for coupled service, moderate overhung loads can be tolerated depending on operating characteristics as speed, weight and center of gravity of the load. Care should be taken to ensure precise shaft alignment. Couplings should be of proper size and flexibility to adequately protect bearings from undue stress and shock loading.

OPERATING PRINCIPLES

The TPB Series Torque Powder Brakes 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 magnetic coupling between the rotor and stator. Magnetic powder brakes produce their rated torque from zero speed. The element to be tested can be loaded from zero speed to determine the starting torque. Without electrical excitation, the shaft rotates freely. Since the magnetic powder is always contained within the brake, all powder brakes have a minimum drag torque associated with them. With electrical excitation, the shaft becomes magnetically coupled. While the torque is less than the brake output torque, the shaft will not rotate. When the torque is increased, the brake will slip at the torque level set by the input current.

TECHNICAL DATA
MECHANICAL CHARACTERISTICS

MODEL	RATED TORQUE	RATED CURRENT	VOLTAGE	RESISTANCE (±10 % at 25°C)	NOMINAL ELECTRICAL POWER	KINETIC POWER RATINGS	
	N·m	A	VDC	Ω	W	Without cooling W	With air cooling W
TPB012	12	0.94	24	75	22.5	145	250
TPB025	25	1.24		20	30.0	230	380
TPB050	50	2.15		11	51.5	360	700
TPB100	100	2.40		10	57.6	600	1100
TPB200	200	2.70		9	64.8	840	1900
TPB400	400	3.50		7	84.0	900	2100
TPB600	600	4.30		6	103.0		

MODEL	MAXIMUM SPEED	INERTIA	TORQUE TO INERTIA RATIO	WEIGHT	AIR PRESSURE	FLOW RATE
	rpm	kg·m ²	rad/s ²	kg	bar	m ³ /min
TPB012	1800	1.34 x 10 ⁻³	8955	5	0.3	0.2
TPB025		3.80 x 10 ⁻³	6579	10	0.4	0.4
TPB050		9.50 x 10 ⁻³	5263	15	1.0	0.6
TPB100		3.50 x 10 ⁻²	2857	25	0.6	1.1
TPB200		9.15 x 10 ⁻²	2186	55	0.5	1.6
TPB400		2.43 x 10 ⁻¹	1646	105	1.6	2.0
TPB600		2.45 x 10 ⁻¹	2449	120		

CONTINUOUS BRAKING POWER

The brake can dissipate higher amounts of heat for short periods of time, but the average must not exceed 1max kinetic power rating. For continuous power, please use the formula:

$$\text{POWER [W]} = \frac{\text{SPEED [rpm]} \times \text{TORQUE [N·m]}}{9.55}$$

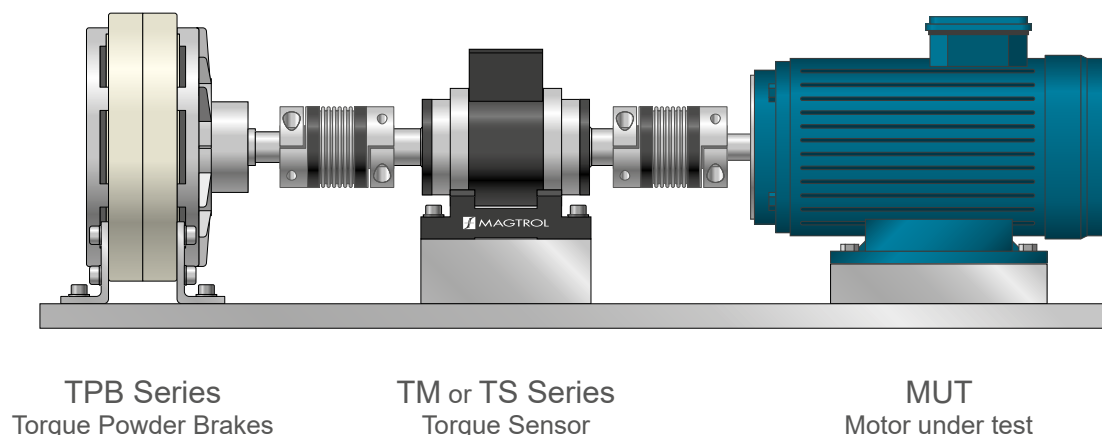
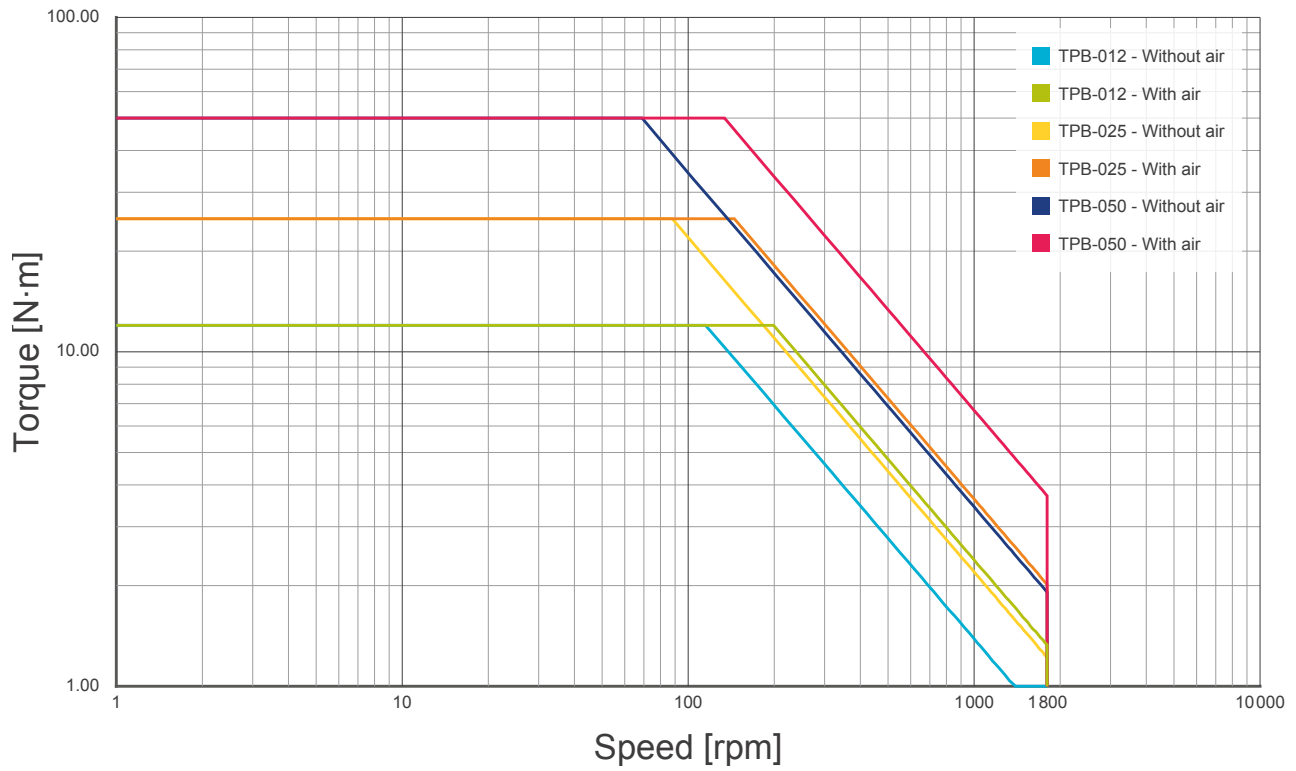
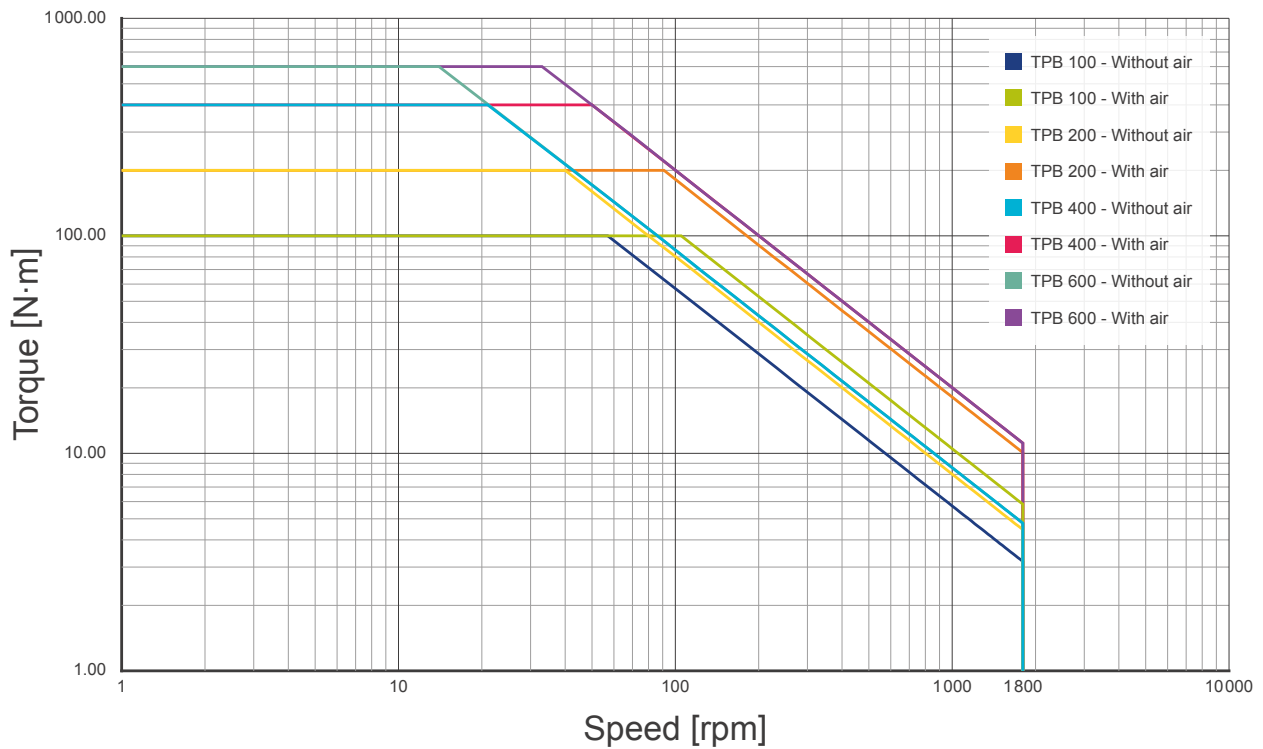
SYSTEM CONFIGURATION


Fig.2: Example of drive train

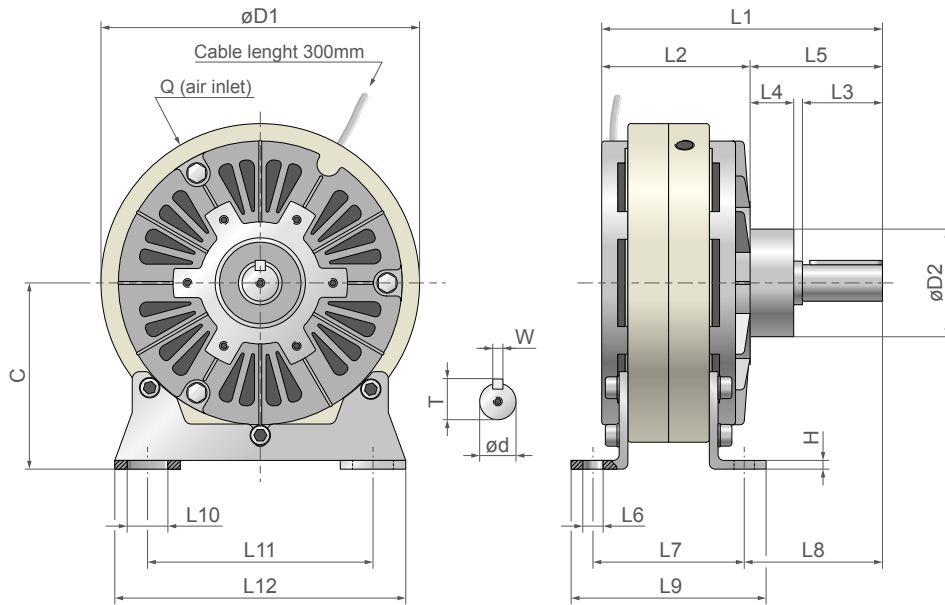
CURVES TPB 012-050



CURVES TPB 100-600



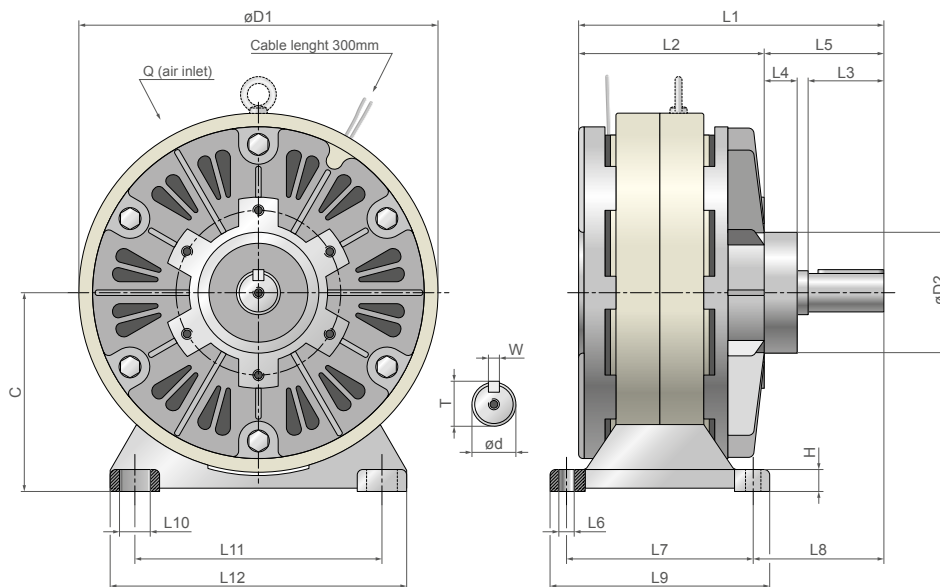
DIMENSIONS TPB 012-050



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

MODEL	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	$\phi D1$	$\phi D2$	H	C	Q (inch)	AXIS BODY		
																		$\phi d h7$	W p7	T ($^{0}_{-0.2}$)
TPB012	132	83	29	15	49	11.5	76	58	101	20	105	140	152	42	3.5	92	1/8"	15	5	17
TPB025	155	91	43	17	64	11	84	73	109	22	135	175	184	55	4.5	111	1/8"	20	5	22
TPB050	193	102	55	30	91	14	104	95	134	28	155	200	219	74	6	128	1/4"	25	7	28

DIMENSIONS TPB 100-600



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

MODEL	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	$\phi D1$	$\phi D2$	H	C	Q (inch)	AXIS BODY		
																		$\phi d h7$	W p7	T
TPB 100	239	139	65	28	100	14	146	107	176	28	195	240	278	100	20	154	3/8"	30	7	33
TPB200	278	169	69	30	109	14	170	119	200	28	225	270	327	110	20	181	3/8"	35	10	38.5
TPB400	339	200	92	35	139	17	227	136.5	267	34	250	300	398	130	23	222	3/8"	45	12	48.5
TPB600																				

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 three different power supplies for Brakes and Clutches:

ZUP 36-6 - POWER SUPPLY



Fig. 3: ZUP 36-6 | Power supply

The ZUP 36-6 is a 0...36VDC power supply which provides current regulation of the braking torque via a turning knob. The unit can be controller with an analog input signal 0...4 V.

MODEL 5211 - CURRENT REGULATED POWER SUPPLY



Fig. 4: MODEL 5211 | Current Regulated Power Supply

The MODEL 5211 is 0...35VDC Power Supply which provides current regulation of the brake torque via a 10-turn potentiometer. With regulated current, the MODEL 5211 will eliminate torque drift caused by temperature changes within the brake coil. The unit provide different current scale up to 1A

MODEL 5251 - CURRENT REGULATED POWER SUPPLY



Fig. 5: MODEL 5251 | Current Regulated Power Supply

MODEL 5251 is an open frame, current regulated power supply. With regulated current, the MODEL 5251 will eliminate torque drift caused by temperature changes within the brake coil. The unit provide different current scale up to 1A

BPM SERIES - BRAKE POWER MODULE



Fig. 6: 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 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.

OPTIONS & ACCESSORIES

TS SERIES - TORQUE SENSORS



Fig. 7: TS 104 | Torque Sensors

Magtrol's TS Series In-Line Torque Sensors provide extremely accurate torque and speed measurement. Each model has an integrated conditioning electronic module providing $0 \dots \pm 10$ VDC torque output through an 8-pole connector, as well as a USB interface which can be directly connected to a computer. The sensor is delivered with the TORQUE Software which allows easy connection and data acquisition. A speed encoder provides 360 pulses/rev. in Tach A, Tach B and Index reference Z (1 pulse/revolution). Magtrol Torque Sensors are very reliable, providing high overload protection, excellent long-term stability and high noise immunity.

COUPLINGS

When torque transducers, powder 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: Ensures a 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

TM SERIES - TORQUE TRANSDUCERS



Fig. 8: TM309 & TM308 | Torque Transducers

Magtrol offers three types of torque transducers for dynamic torque and speed measurement. All three transducer models employ our unique non-contact differential transformer torque measuring technology. This measuring technology offers many benefits most notably that no electronic components rotate during operation. Each model has an integrated conditioning electronic module providing $0 \dots \pm 10$ VDC torque output and an open collector speed output. Magtrol's Torque Transducers are very reliable, providing high overload protection, excellent long-term stability and high noise immunity.

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. 9: BK2 Series Metal bellows coupling

ORDERING INFORMATION

ORDERING NUMBER	954 - 25 - 02 - 0	---
012, 025, ... , 600 : Model TPB		

Example: TPB50 Torque Powder Break 50N·m
would be ordered as : **954-25-02-0050**.