TPB SERIES
TORQUE POWDER BRAKE

FEATURES

▪ Available torque ratings: 12, 25, 50, 100, 200, 400, 600 N·m
▪ Braking power up to 900 W (2 100 W 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

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 900 W (2 100 W 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

<table>
<thead>
<tr>
<th>MODEL</th>
<th>RATED TORQUE</th>
<th>RATED CURRENT</th>
<th>VOLTAGE</th>
<th>RESISTANCE (±10% at 25°C)</th>
<th>NOMINAL ELECTRICAL POWER</th>
<th>KINETIC POWER RATINGS</th>
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<tbody>
<tr>
<td></td>
<td>N·m</td>
<td>A</td>
<td>VDC</td>
<td>Ω</td>
<td>W</td>
<td>Without cooling</td>
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<table>
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<tr>
<th>MODEL</th>
<th>MAXIMUM SPEED</th>
<th>INERTIA</th>
<th>TORQUE TO INERTIA RATIO</th>
<th>WEIGHT</th>
<th>AIR PRESSURE</th>
<th>FLOW RATE</th>
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<tr>
<td></td>
<td>rpm</td>
<td>kg·m²</td>
<td>rad/s²</td>
<td>kg</td>
<td>bar</td>
<td>m³/min</td>
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<tr>
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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

TPB Series
Torque Powder Brakes

TM or TS Series
Torque Sensor

MUT
Motor under test
### CURVES TPB 012-050

![Graph showing curves for TPB 012-050](image)

- **TPB-012 - Without air**
- **TPB-012 - With air**
- **TPB-025 - Without air**
- **TPB-025 - With air**
- **TPB-050 - Without air**
- **TPB-050 - With air**

### CURVES TPB 100-600

![Graph showing curves for TPB 100-600](image)

- **TPB 100 - Without air**
- **TPB 100 - With air**
- **TPB 200 - Without air**
- **TPB 200 - With air**
- **TPB 400 - Without air**
- **TPB 400 - With air**
- **TPB 600 - Without air**
- **TPB 600 - With air**

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### DIMENSIONS TPB 012-050

![Diagram of TPB 012-050 dimensions](image)

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

<table>
<thead>
<tr>
<th>MODEL</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
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<th>L9</th>
<th>L10</th>
<th>eD1</th>
<th>eD2</th>
<th>H</th>
<th>C</th>
<th>Q (inch)</th>
<th>AXIS BODY</th>
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<td>219</td>
<td>74</td>
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### DIMENSIONS TPB 100-600

![Diagram of TPB 100-600 dimensions](image)

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

<table>
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<tr>
<th>MODEL</th>
<th>L1</th>
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<th>H</th>
<th>C</th>
<th>Q (inch)</th>
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</tbody>
</table>

**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

The ZUP 36-6 is a 0...36 VDC 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 5251 - CURRENT REGULATED POWER SUPPLY

MODEL5251 is an open frame, current regulated power supply. With regulated current, the MODEL5251 will eliminate torque drift caused by temperature changes within the brake coil. The unit provide different current scale up to 1A.

MODEL 5211 - CURRENT REGULATED POWER SUPPLY

The MODEL5211 is 0...35 VDC Power Supply which provides current regulation of the brake torque via a 10-turn potentiometer. With regulated current, the MODEL5211 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

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.
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...±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 elements 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

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.

**ORDERING INFORMATION**

<table>
<thead>
<tr>
<th>ORDERING NUMBER</th>
<th>954 - 25 - 02 - 0_ _ _</th>
</tr>
</thead>
<tbody>
<tr>
<td>012, 025, ... , 600</td>
<td>Model TPB</td>
</tr>
</tbody>
</table>

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