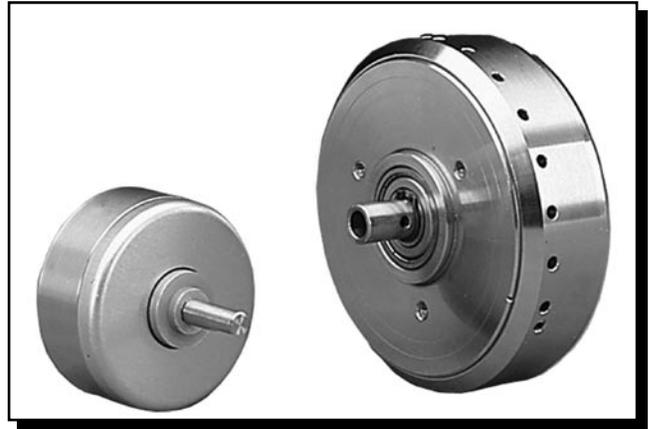


HPM/HPMC Series Permanent Magnet Brakes & Clutches

FEATURES

- Torque up to 210 oz-in
- Speed up to 10,820 rpm
- Power up to 450 W
- Ideal solution for when electrical power cannot be provided to the coil
- Torque independent of speed
- Long, maintenance-free life
- Operational smoothness
- Superior torque repeatability
- Broad speed range
- Excellent environmental stability



DESCRIPTION

Magtrol Hysteresis Permanent Magnet Brakes and Clutches are ideal in applications where electrical power cannot be provided to a brake or clutch coil. While best suited to applications where fixed torque is to be applied, adjustable units can be made specifically tailored to the application. While typically provided as brake units, by the addition of an input shaft, the same unit can be used as a clutch. In a

clutch application, the pole/case member becomes the drive element, and the rotor/shaft assembly becomes the driven element of the clutch with torque being transmitted through the magnetic air-gap. Magtrol Hysteresis Permanent Magnet devices provide all the superior operating characteristics of smooth operation, precise repeatability and long life inherent in all of Magtrol's hysteresis devices..

RATINGS

Brake Model	Clutch Model	Rated Torque*	Maximum Speed**	Kinetic Power		External Inertia	Angular Acceleration	Weight
				5 Minutes	Continuous			
				oz-in	rpm			
HPM-2.5	HPMC-2.5	2.5	10,820	20	7	3.8 × 10 ⁻⁶	41,100	0.17
HPM-8	HPMC-8	8	10,140	60	15	3.3 × 10 ⁻⁵	15,200	0.49
HPM-16	HPMC-16	16	6,340	75	20	5.6 × 10 ⁻⁵	17,900	0.65
HPM-32	HPMC-32	32	3,800	90	25	8.6 × 10 ⁻⁵	23,300	1.06
HPM-120	HPMC-120	120	3,380	300	75	9.1 × 10 ⁻⁴	8,240	4.06
HPM-210	HPMC-210	210	2,900	450	110	2.75 × 10 ⁻³	4,770	7.73

* Permanent Magnet Brakes can be charged at factory to produce lower torque if desired.

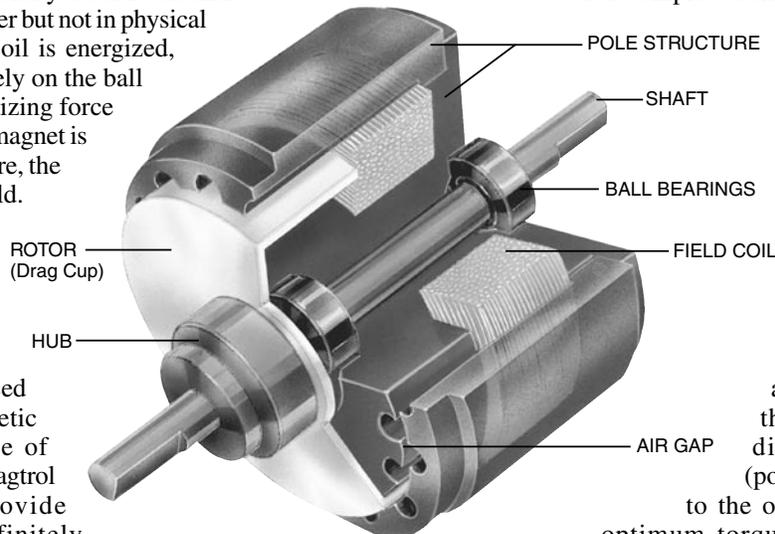
** Maximum speed listed will produce 5-minute kinetic power rating at rated torque.

PRINCIPLES OF HYSTERESIS

Overview

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.



Control

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. Adjustability 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.

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.

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 slip ratio. This feature is often critical in wire drawing, packaging and many other converting applications.

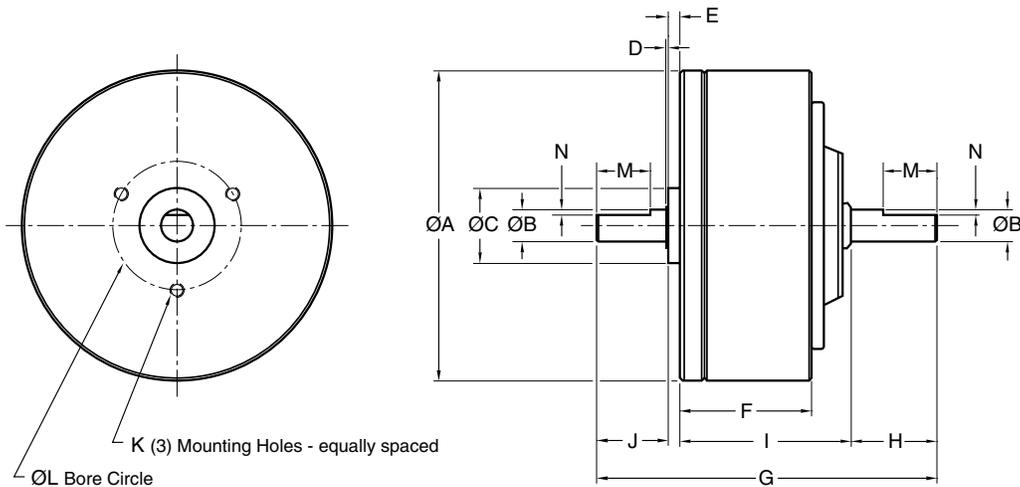
Superior Torque Repeatability

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

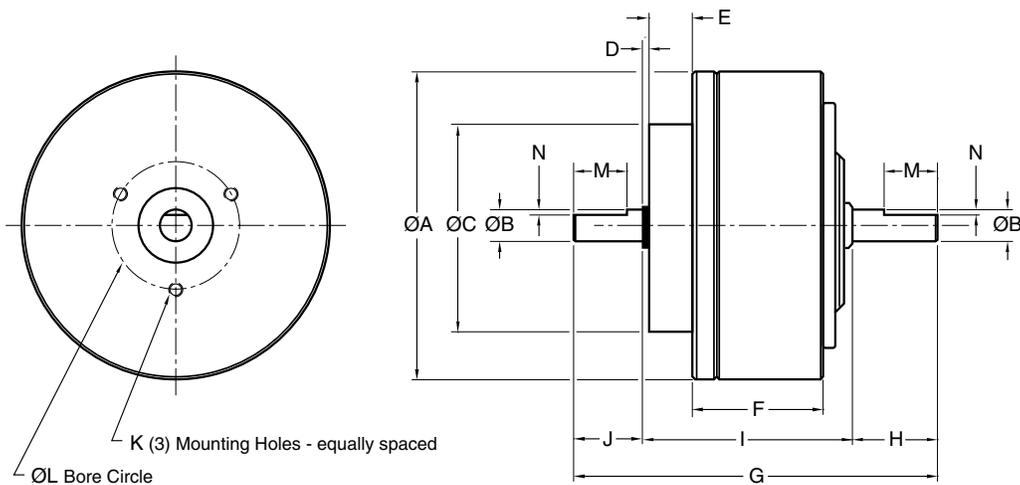
Magtrol hysteresis devices offer the highest slip speed range of all electric torque control devices. Depending on size, kinetic power requirements and bearing loads, many Magtrol Brakes can be operated at speeds in excess of 10,000 rpm. In addition, full torque is available even at zero slip speed and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

PERMANENT MAGNET BRAKE DIMENSIONS



Brake Model	ØA	ØB	ØC	D	E	F	G	H	I	J	K	ØL	M	N
HPM-2.5	1.250	0.1250	0.375	0.015	0.030	0.840	1.564	0.290	0.940	0.290	#4-40 × 0.16	0.750	---	---
HPM-8	1.750	0.1875	0.500	0.015	0.060	0.915	2.109	0.500	0.953	0.584	#4-40 × 0.16	0.687	0.375	0.025
HPM-16	1.970	0.1875	0.500	0.019	0.096	0.812	2.109	0.515	0.940	0.540	#4-40 × 0.20	0.750	0.375	0.025
HPM-32	2.250	0.2500	0.625	0.025	0.094	0.865	2.431	0.562	1.125	0.625	#6-32 × 0.20	0.906	0.375	0.030
HPM-120	3.625	0.3750	0.875	0.025	0.130	0.985	3.490	0.910	1.654	0.800	#8-32 × 0.25	1.500	0.625	0.060
HPM-210	4.437	0.5000	1.125	0.035	0.156	2.410	4.693	1.062	2.510	0.930	#10-32 × 0.38	1.750	0.625	0.060

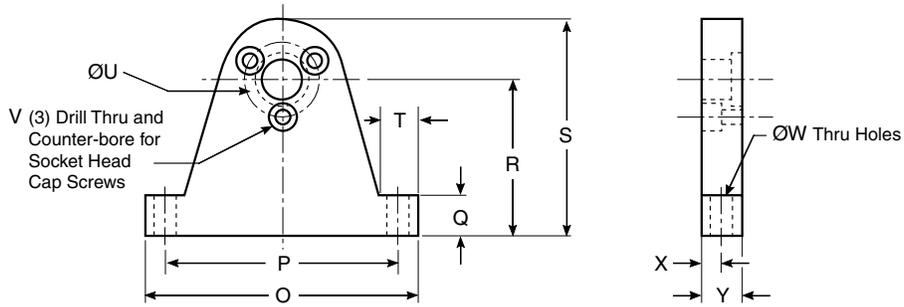
PERMANENT MAGNET CLUTCH DIMENSIONS



Clutch Model	ØA	ØB	ØC	D	E	F	G	H	I	J	K	ØL	M	N
HPMC-2.5	1.250	0.1250	1.059	0.032	0.250	0.840	1.803	0.290	1.224	0.290	#4-40	0.750	---	---
HPMC-8	1.750	0.1875	1.000	0.032	0.312	0.915	2.375	0.500	1.295	0.584	#4-40	0.687	0.375	0.025
HPMC-16	1.970	0.1875	1.000	0.032	0.312	0.812	2.340	0.515	1.283	0.545	#4-40	0.750	0.375	0.025
HPMC-32	2.250	0.2500	1.500	0.032	0.375	0.865	2.719	0.562	1.532	0.625	#6-32	0.906	0.375	0.030
HPMC-120	3.625	0.3750	2.000	0.032	0.375	0.985	3.736	0.910	2.026	0.800	#8-32	1.500	0.625	0.060
HPMC-210	4.437	0.5000	2.250	0.062	0.500	2.410	5.060	1.062	3.067	0.935	#10-32	1.750	0.625	0.060

PILLOW BLOCK DIMENSIONS

Pillow Block Assemblies are an available option for all brake and clutch units.



Pillow Block Model	For Brake/Clutch Models	O	P	Q	R	S	T	ØU	V	ØW	X	Y
4736	HPM-2.5, HPMC-2.5	1.75	1.500	0.31	1.000	1.500	0.25	0.750	#4-40	0.125	0.125	0.25
4702	HPM-8, HPMC-8	2.50	2.125	0.37	1.437	2.120	0.38	0.687	#4-40	0.201	0.187	0.38
4703	HPM-16, HPMC-16	2.50	2.125	0.37	1.437	2.120	0.38	0.750	#4-40	0.201	0.187	0.38
4705	HPM-32, HPMC-32	2.50	2.125	0.37	1.437	2.120	0.38	0.906	#6-32	0.201	0.187	0.38
4711	HPM-120, HPMC-120	4.00	3.500	0.37	2.000	3.190	0.50	1.500	#8-32	0.201	0.250	0.50
4714	HPM-210, HPMC-210	4.00	3.500	0.37	2.375	3.690	0.50	1.750	#10-32	0.201	0.250	0.50

SPECIAL DESIGNS

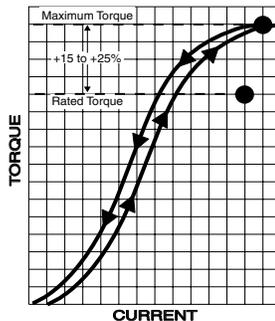
Since 1953, Magtrol has created literally thousands of special and modified brake and clutch designs to help solve specific application problems for our customers.

Common Modifications

- Non-Standard Coil Voltages
- Special Shaft Configurations: keyways, flats, holes and hollow
- Dust Covers
- Speed Pickups
- Special Mounting Configurations
- Non-Standard Lead: material, lengths, location
- Higher Torque Devices
- High Speed Units

Higher Torque Capability

It is Magtrol's policy never to overstate the capabilities of our products. As a result, our brakes and clutches are conservatively rated. However, Magtrol can typically provide higher torque of up to 15% to 25% above rated value in the same size device to meet your requirements. Special designs capable of producing even higher torques are also available.



BRAKE & CLUTCH OPTIONS

Torque Current Curves

Nominal performance characteristic curves similar to that shown above will be provided by Magtrol, upon request. Precise calibration curves for individual brakes can be provided, but must be specified at time of order and do require an additional charge.

Couplings

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

POWER SUPPLIES

For optimum torque stability, Magtrol offers four different power supplies for its Hysteresis Brakes and Clutches:

Model 6100 Closed Loop Speed Control/Power Supply

The 6100 is a durable, variable, closed loop speed control power supply governed by an adjustable proportional/integral (PI) control algorithm for unsurpassed stability in its class. Designed to work with a Magtrol Hysteresis Brake that is specially fitted with a speed pick-up, the 6100 functions as a power supply and also features an easy-to-read digital speed display.



Model 5200 Power Supply

The Model 5200 is an unregulated 0 to 35 VDC Power Supply which offers control and regulation of the braking torque via a 10 turn potentiometer. The 5200 is our most basic control for manual testing in an open loop torque control mode.

Model 5210 Current Regulated Power Supply

The Model 5210 provides the same control capabilities as the 5200, and also provides current regulation of the brake. With regulated current, the 5210 will eliminate torque drift caused by temperature changes within the brake coil.

Model 5250 Current Regulated Power Supply

Model 5250-2 is an open frame, current regulated power supply.

SOLID MODELS

Solid 3D models are available for most Magtrol Hysteresis Devices by contacting Customer Service:

E-mail: magsales@magtrol.com
Phone: 1-716-668-5555

Due to the continual development of our products, we reserve the right to modify specifications without forewarning.



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