MBS MAGNETIC BRAKES

The MBS magnetic brakes are a combination of hysteresis and eddy current brakes. Our brakes are frictionless which means there is no wear, no dirt or dust being generated allowing for minimal maintenance.

Hysteresis brakes have been around for over 50 years. However, MBS brakes differ from those from our competitors by:

- Internal air cooling
- High power dissipation
- Linear torque output
- Static de-cogging

MBS manufactures three different series (the model MB, the model MBL, and the model MBZ) and five different sizes; our brakes sizes are based on the outside diameter of the brake.

MB series brakes, our basic model, are similar to other brakes on the market.
MBL series brakes have a linear torque output that is proportional to the torque command input.
MBZ series brakes are the same as the MBL series but are equipped with a static de-cogg function.

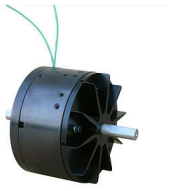
Below a certain speed, the power dissipation of the MBS brakes is limited by the maximum torque provided by the brake, and above a certain speed, by the operating temperature of the drag ring. Care must be taken not to exceed the temperature limits. For the models MBL and MBZ, a temperature sensor may be purchased with the brake, to prevent over-heating of the drag ring that could lead to the damage of the brake. As a result of this temperature rise, the outside of the brake may become extremely hot, exceeding 100 degrees C; thus, caution must be taken.

MBS also manufactures Dynamometers and Constant Tension Payoff Systems utilizing the MBS brakes.

MB SERIES - MAGNETIC BRAKE

The MB series are electrically similar to simple hysteresis brakes. The electrical input to the brake consists of two wire leads.

The current or voltage is controlled by the customer. At zero RPM the MB series brakes have the same torque characteristics as hysteresis brakes. As shown in the torque vs. speed curves for the various MB models, the torque increases with speed. This phenomenon substantially increases the torque output of the brakes but must be taken into account by the customer.



MB-2.4

MB-3.75

MB-5.7

MB-8.7

MB-17.5

MBL SERIES - MAGNETIC BRAKE LINEARIZED

The MBL series brakes have a torque output which is proportional and linear with the input voltage into the interface circuit. This linearity applies independently of whether the input signal is increasing or decreasing. The interface circuit consists, mainly, of a computer and power amplifier. The computer controls the current into the brake in such a manner that the brake has effectively no hysteresis.

Additionally, the computer controls the output torque in proportion to the input voltage into the interface circuit, independently of the speed of the brake. The maximum available torque for a particular speed must be taken into account. When the input signal into the interface circuit exceeds the available output torque, the brake torque will be the maximum available for that particular model brake.

MBL-2.4

MBL-3.75

MBL-5.7

MBL-8.7

MBL-17.5

MBZ SERIES - MAGNETIC BRAKE ZERO COGGING

One of the undesirable characteristics of conventional hysteresis brakes is the cogging phenomenon. The MBS MBZ series brakes have the ability to reduce the cogging to negligible levels in less than a second and without rotating the brake's drag ring.

WHAT IS COGGING?

Cogging is a ripple torque produced by a hysteresis brake without any current being applied to the brake. It is caused by alternating magnetic fields of residual magnetism in the brake's drag ring when the current is removed while the drag ring remains stationary. The number of alternating magnetic fields in the circumference of the drag ring will be equal to the number of poles in the stators of the brake.

A pulsating torque will immediately be evident, if the brake shaft of a cogged brake is rotated manually. Although reapplying the current to the brake will eliminate the cogging, it will also provide a resistive torque that a motor may not be able to overcome. The ripple torque may be as high as 25% of the brake's maximum torque.

MBZ-2.4

MBZ-3.75

There are two methods to degauss or de-cog a brake: dynamic de-cogging and static de-cogging.

DYNAMIC DE-COGGING

To avoid the cogging phenomenon or dynamically de-cogg a brake, one must slowly ramp the current to the brake down to zero, while the drag ring is still rotating. It eliminates the alternating magnetic fields in the drag ring and therefore the cogging.

STATIC DE-COGGING

When the available driving torque is insufficient to overcome the cogging torque, dynamical de-cogging may not be possible. The MBS controller provides a solution to this problem and allows the customer to perform static de-cogging. The static de-cog command may be executed either automatically or manually.

If configured for Automatic De-cogging, the MBS controller will automatically enter the de-cogging cycle when the brake comes to a stop, and the current to the brake is brought to zero.

If configured for Manual De-cogging, the de-cog cycle will be triggered after the operator sends a command signal to the MBS controller. The de-cog function is only operational when the brake has come to a full stop for approximately 2 seconds, and zero current is applied to the brake.

The MBZ series brakes, in addition to the de-cogging feature, have all the features of the MBL series brakes.

MBZ-5.7

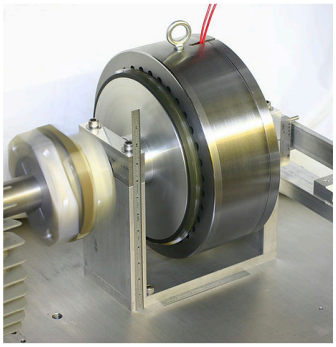
MBZ-8.7

MBZ-17.5

CUSTOM AND BUILT TO ORDER BRAKES

MBS designs and manufactures magnetic brakes to customer specifications. Even brakes with a braking power exceeding 10,000 watts do not pose a problem. MBS has extensive CNC machine shop capability. Delivery time for custom brakes can be within 90 days of order. For brakes' evaluation, MBS offers dynamometers with an output up to 30 horsepower.

In addition to custom brakes, MBS has a staff of engineers ready to help you with any special applications of the magnetic brakes such as final value controllers, speed limiting controllers and digitally controlled ramp-up and ramp-down controllers.



12.0-INCH DIAMETER CUSTOM DESIGNED BRAKE

SPECIFICATION COMPARISON TABLES - (IN-OZ)

MODEL MB, MBL, MBZ	OUTSIDE DIAMETER (inches)	MAX. TORQUE AT ZERO RPM (in-oz)	MAX. TORQUE AT MAX. RPM (in-oz)	MAX. RPM (rev/min)	MIN. TORQUE AT MAX. RPM (in-oz)	MAX. POWER AT MAX. RPM FOR 15 SEC. (hp)	MAX. CONTINUOUS POWER AT MAX. RPM (hp)
2.4	2.40	36	61	15,000	5	0.99	0.99
3.75	3.75	130	231	12,000	41	2.75	1.36
5.7	5.70	558	1,239	8,000	172	5.58	3.37
8.7	8.70	2,074	7,676	6,000	500	23.08	6.59
17.5	17.5	16,600	72,800	2,500	3,230	69.3	16.2

SPECIFICATION COMPARISON TABLES - (FT-LB)

MODEL MB, MBL, MBZ	OUTSIDE DIAMETER (inches)	MAX. TORQUE AT ZERO RPM (ft-lb)	MAX. TORQUE AT MAX. RPM (ft-lb)	MAX. RPM (rev/min)	MIN. TORQUE AT MAX. RPM (ft-lb)	MAX. POWER AT MAX. RPM FOR 15 SEC. (hp)	MAX. CONTINUOUS POWER AT MAX. RPM (hp)
2.4	2.40	0.19	0.32	15,000	0.03	0.99	0.99
3.75	3.75	0.68	1.20	12,000	0.21	2.75	1.36
5.7	5.70	2.91	6.45	8,000	0.90	5.58	3.37
8.7	8.70	10.80	39.98	6,000	2.60	23.08	6.59
17.5	17.5	86.5	3.79	2,500	16.83	69.3	16.2

SPECIFICATION COMPARISON TABLES - SI

MODEL MB, MBL, MBZ	OUTSIDE DIAMTER (mm)	MAX.TORQUE AT ZERO RPM (N-m)	MAX. TORQUE AT MAX. RPM (N-m)	MAX. RPM (rad/sec)	MIN. TORQUE AT MAX. RPM (N-m)	MAX. POWER AT MAX. RPM FOR 15 SEC. (watts)	MAX. CONTINUOUS POWER AT MAX. RPM (watts)
2.4	60.96	0.25	0.43	1,571	0.04	739	739
3.75	95.25	0.92	1.63	1,257	0.29	2,047	1,013
5.7	144.78	3.94	8.75	838	1.21	4,164	2,515
8.7	220.98	14.65	54.20	628	3.53	17,214	4,916
17.5	444.5	117.3	513.9	262	22.8	51,698	12,085

WIRING DIAGRAMS

MBL Series

0-5 VDC Input

0-10 VDC Input

MBZ Series

0-5 VDC Input AUTO DECOG

0-5 VDC Input MANUAL DECOG

0-10 VDC Input AUTO DECOG

0-10 VDC Input MANUAL DECOG