

SERVO BRAKING MODULES

The M3500DB and M3500DB4 Dynamic Safety Brake modules are compatible with any Servo system and are designed for use in conjunction with regenerative braking for E-Stop applications. These modules enhance system performance and safety by providing resistive braking control for emergency stop applications when regenerative braking fails.

The Dynamic Safety Brake will satisfy three basic functions as outlined below:

- The need to physically isolate one motor from its drive on a very frequent basis so that the Axis module is in a safe condition for an operator to intervene in a process. The System module and other Servo modules remain live.
- To act as a back-up brake in E-stop situations where an operator has tripped a light curtain or other safety interlock device.
- To act as a back-up brake to slow an Servo in case of power loss or a malfunction which prevents the use of regenerative braking in an emergency stop situation.

Both the M3500DB and M3500DB4 modules can be run right out of the box. However, these modules also provide the user a measure of control via selectable contactor drop-out delay time settings to allow custom integration into existing safety schemes. All Model M3500DB and M3500DB4 Dynamic Safety Brake modules are designed for use in 380/460VAC rated systems using any available permanent magnet Servo-motors and are available with 1., 3., 6., 16., or 36. internal load sizes. The modules utilize safety class-2, positive guided contactors to stop an Axis module on command.

The standard M3500DB is designed to provide resistive E-stop braking control for servo motion systems and conforms to category II safety



requirements per EN-954. The model M3500DB4 incorporates redundant, positive guided contactors to satisfy category IV safety requirements per EN-954.

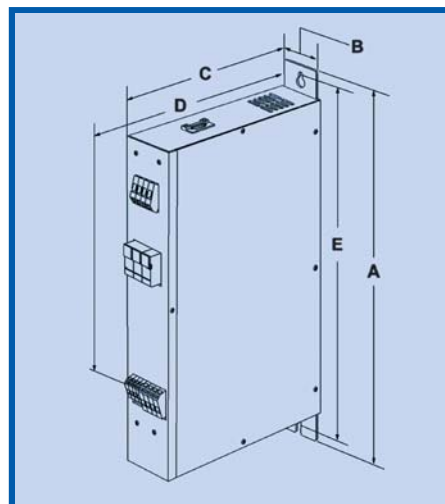
The M3500DB brake modules incorporate positive guided contactors, and can be used in conjunction with a control reliable safety relay to provide the desired level of safety. In order to achieve redundancy as in EN-954, the drive is the primary brake and must always attempt to stop the axis (controlled stop) upon E-stop or light curtain command.

Regenerative braking may be needed in order to achieve a safe decel time. The M3500DB is the secondary brake and will stop the motor in case of motion controller or power failure, as well as isolate the motor from its power source once it is stopped.

BONITRON – INDUSTRIAL ELECTRONICS

M3500DB & M3500DB4 DIMENSIONS

Model	Dimensions A x B x C x D	Mounting E
DB	15.95 x 2.915 x 9.63 x 10.20"	15.0" (height)
DB4	15.95 x 2.915 x 9.63 x 10.20"	15.0" (height)



ELECTRICAL SPECIFICATIONS

Control Signals (20-28VDC)	Inrush Current @ 24VDC	Holding Current @ 24VDC	Impedance In Ohms	Time Delay
Enable-1	0.5 Amp	0.5 Amp	50	None
Brake-1	0.25 Amp	0.05 Amp	500	0 - 2 sec
Enable-2	0.37 Amp	0.37 Amp	65	None
Brake-2	0.25 Amp	0.05 Amp	500	0 - 2 sec

Note: For DC ratings at 600 Volts or less, the make and break ratings shall be obtained by dividing the volt-ampere rating by the application voltage but shall not exceed the continuous carrying current.

Primary and Secondary Contactors:

Power: 20hp @ 460VAC-3 (16kW @ 380/415VAC, 50Hz)
 Max FLA: 32 Amps
 Switching Delay: 35-70 ms

Auxiliary Contacts:

Continuous Thermal Current: A600 - 10A Q600 - 2.5A
 Max VA/Amps Making: A600 - 7200 VA / 60A Q600 - 69 VA
 Max VA/Amps Breaking: A600 - 720 VA / 6A Q600 - 69 VA
 Max Operating Voltage: A600 - 600VAC Q600 - 600V DC

Braking Loads (ENABLE-1, BRAKE-1):

Duty Cycle: No more than 5 full load E-Stop conditions per minute per hour
 Resistance: Rated load +/- 10% per leg, WYE configuration
 Available in : 1., 3., 6., 16., or 36. loads

Motor Brake/Thermal Signal Conditioning (B1, B2, K1, K2):

LC Filtering: 47µh, 1µf each signal
 Transient suppression: 30V TVS between B1,B2
 Max Ratings: 28V DC @ 2 Amps

Control Inputs:

Max. Operations:

Primary Circuit (ENABLE-1/BRAKE-1):
 Full Load: No more than 5 **full load** E-Stop conditions per minute per hour
 No Load: 1200 operations per hour
 Secondary Circuit (ENABLE-2/BRAKE-2):
 Full Load: 1200 operations per hour
 No Load: 1200 operations per hour

BONITRON MOTION CONTROL ACCESSORIES

M3500DB AND M3500DB4 OPERATION

The M3500DB and M3500DB4 Dynamic Braking Modules are designed to provide E-stop braking control for safety category 2, or category 4 systems. The DBModule accepts the Axis Modules motor output, and feeds it through to the motor via a contactor. The contactor is controlled by a dry “brake” contact from the motor control system. When the “brake” command is received, a selectable time delay ranging from 0 to 2 seconds begins, allowing for controlled decel of the motor. When the time delay is over, the contactor disconnects the motor from the Axis Module, resistance is added to the motor output and an auxilliary contact reports status of the module to safety control circuits. The system is designed so that if power is removed, or if the Axis Module doesn’t decel in time, the DB Module will disconnect the Axis Module and motor, then place resistance across the motor windings for emergency stopping. The braking delay times are jumper selectable in half-second increments, and adjustable in between those increments. The Module comes factory set for a .5 second delay. Filtering is also provided for brake and thermal signals to and from the motors. Aux contacts are provided to report the state of the “positive guided” motor contactor.

M3500DB AND M3500DB4 MODEL RATINGS

The Bonitron part numbers listed in bold represent the standard configuration.

Servomotor Series	Load Ω 's	AC Voltage	Safety Class 2			Safety Class 4		
			Brake Model		List Price	Brake Model		List Price
			N.C. Contact	N.O. Contact		N.C. Contact	N.O. Contact	
1326AB Series Servomotors								
1326AB-B410G	16	400 - 460	M3500DB-H16A	M3500DB-H16B	\$ 1,656	M3500DB4-H16A	M3500DB4-H16B	\$ 1,969
1326AB-B410J	16	400 - 460	M3500DB-H16A	M3500DB-H16B	\$ 1,656	M3500DB4-H16A	M3500DB4-H16B	\$ 1,969
1326AB-B420E	06	400 - 460	M3500DB-H06A	M3500DB-H06B	\$ 1,656	M3500DB4-H06A	M3500DB4-H06B	\$ 1,969
1326AB-B420H	06	400 - 460	M3500DB-H06A	M3500DB-H06B	\$ 1,656	M3500DB4-H06A	M3500DB4-H06B	\$ 1,969
1326AB-B430E	03	400 - 460	M3500DB-H03A	M3500DB-H03B	\$ 1,656	M3500DB4-H03A	M3500DB4-H03B	\$ 1,969
1326AB-B430G	03	400 - 460	M3500DB-H03A	M3500DB-H03B	\$ 1,656	M3500DB4-H03A	M3500DB4-H03B	\$ 1,969
1326AB-B515E	03	400 - 460	M3500DB-H03A	M3500DB-H03B	\$ 1,656	M3500DB4-H03A	M3500DB4-H03B	\$ 1,969
1326AB-B515G	03	400 - 460	M3500DB-H03A	M3500DB-H03B	\$ 1,656	M3500DB4-H03A	M3500DB4-H03B	\$ 1,969
1326AB-B520E	03	400 - 460	M3500DB-H03A	M3500DB-H03B	\$ 1,656	M3500DB4-H03A	M3500DB4-H03B	\$ 1,969
1326AB-B520F	03	400 - 460	M3500DB-H03A	M3500DB-H03B	\$ 1,656	M3500DB4-H03A	M3500DB4-H03B	\$ 1,969
1326AB-B530E	03	400 - 460	M3500DB-H03A	M3500DB-H03B	\$ 1,656	M3500DB4-H03A	M3500DB4-H03B	\$ 1,969
1326AB-B720E	01	400 - 460	M3500DB-H01A	M3500DB-H01B	\$ 1,656	M3500DB4-H01A	M3500DB4-H01B	\$ 1,969
1326AB-B720F	01	400 - 460	M3500DB-H01A	M3500DB-H01B	\$ 1,656	M3500DB4-H01A	M3500DB4-H01B	\$ 1,969
1326AB-B730E	01	400 - 460	M3500DB-H01A	M3500DB-H01B	\$ 1,656	M3500DB4-H01A	M3500DB4-H01B	\$ 1,969
1326AB-B740C	01	400 - 460	M3500DB-H01A	M3500DB-H01B	\$ 1,656	M3500DB4-H01A	M3500DB4-H01B	\$ 1,969
1326AB-B740E	01	400 - 460	M3500DB-H01A	M3500DB-H01B	\$ 1,656	M3500DB4-H01A	M3500DB4-H01B	\$ 1,969
1326AS Series Servomotors								
1326AS-B220H	01	400 - 460	M3500DB-H01A	M3500DB-H01B	\$ 1,656	M3500DB4-H01A	M3500DB4-H01B	\$ 1,969
1326AS-B310H	36	400 - 460	M3500DB-H36A	M3500DB-H36B	\$ 1,656	M3500DB4-H36A	M3500DB4-H36B	\$ 1,969
1326AS-B330H	36	400 - 460	M3500DB-H36A	M3500DB-H36B	\$ 1,656	M3500DB4-H36A	M3500DB4-H36B	\$ 1,969
1326AS-B420G	16	400 - 460	M3500DB-H16A	M3500DB-H16B	\$ 1,656	M3500DB4-H16A	M3500DB4-H16B	\$ 1,969
1326AS-B440G	16	400 - 460	M3500DB-H16A	M3500DB-H16B	\$ 1,656	M3500DB4-H16A	M3500DB4-H16B	\$ 1,969
1326AS-B460F	16	400 - 460	M3500DB-H16A	M3500DB-H16B	\$ 1,656	M3500DB4-H16A	M3500DB4-H16B	\$ 1,969
1326AS-B630F	16	400 - 460	M3500DB-H16A	M3500DB-H16B	\$ 1,656	M3500DB4-H16A	M3500DB4-H16B	\$ 1,969
1326AS-B660E	06	400 - 460	M3500DB-H06A	M3500DB-H06B	\$ 1,656	M3500DB4-H06A	M3500DB4-H06B	\$ 1,969
1326AS-B660F	06	400 - 460	M3500DB-H06A	M3500DB-H06B	\$ 1,656	M3500DB4-H06A	M3500DB4-H06B	\$ 1,969
1326AS-B690E	06	400 - 460	M3500DB-H06A	M3500DB-H06B	\$ 1,656	M3500DB4-H06A	M3500DB4-H06B	\$ 1,969
1326AS-B840E	06	400 - 460	M3500DB-H06A	M3500DB-H06B	\$ 1,656	M3500DB4-H06A	M3500DB4-H06B	\$ 1,969
1326AS-B860C	03	400 - 460	M3500DB-H03A	M3500DB-H03B	\$ 1,656	M3500DB4-H03A	M3500DB4-H03B	\$ 1,969