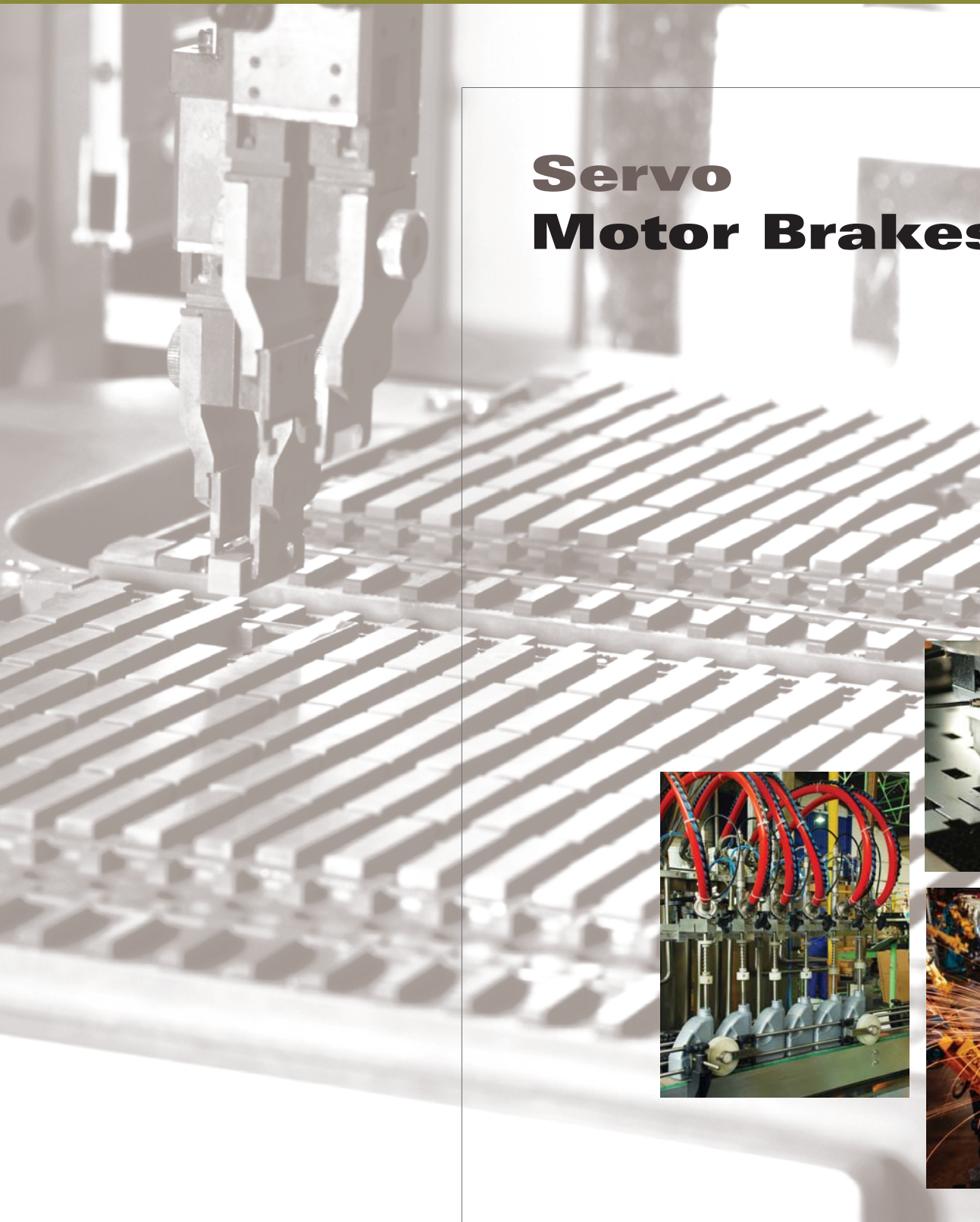


Servo Motor Brakes



 **Matrix[®]**
International

 **Inertia[®]**
Dynamics

A variety of brake solutions to meet specific servo motor application requirements

For over 30 years, Matrix and Inertia Dynamics, both companies of Altra Industrial Motion, have manufactured more than 1000 variants of spring-applied, electromagnetic brakes for servo motor manufacturers in the USA and Europe.

Matrix and Inertia Dynamics servo motor brakes provide high torque in small space envelopes.

Our experienced design and development team provides solutions that meet the specific requirements of a wide range of servo motor applications. We utilize sophisticated computer-controlled test equipment that ensures very high quality and consistency levels.

Matrix and Inertia Dynamics quality systems are accredited to ISO 9001 ensuring that product design and development, manufacturing and service are of the highest standard. Our refined manufacturing processes and quality supply chain partners help us provide cost effective products that meet or exceed our customers expectations.



Servo-driven solutions can achieve faster speeds with more precise accuracy while providing greater flexibility and quicker changeover in various industrial applications including:

- Packaging
- Semiconductors
- Automotive
- Machine Tool
- Medical
- Printing
- Robotics
- Assembly
- Paper Converting



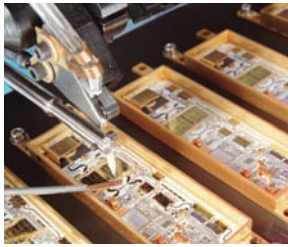
Product Range Specifications

- Torque Ratings from 1 to 4425 in. lbs. (0.1 to 500 Nm)
- Diameters from 0.86 to 12.04 in. (22 to 306 mm)
- Coil Voltages from 6 to 240 VDC
- Options Available:
 - Spring-applied, electrically released brakes with low backlash
 - Spring-applied, electrically released brakes with zero backlash
 - Permanent magnet brakes with zero backlash

Custom Designs

Our flexible engineering systems support design, development, manufacturing and testing of custom solutions. Working with your design team, we can engineer brakes that:

- provide specified performance within given space restrictions
- reduce the number of components by closely integrating the motor and brake
- use high-technology, asbestos-free friction materials to meet specific torque requirements, high temperature ranges and/or special duty cycle conditions.



1 EB SERIES

Servo Motor Brakes



Servo Motor Applications

- Packaging
- Semiconductors
- Automotive
- Machine Tool
- Medical
- Printing
- Robotics
- Assembly
- Paper Converting

Matrix servomotor brakes provide high torque in small space envelopes

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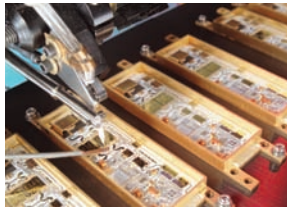
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- Diameters from 22mm (0.86 in.)
- Coil Voltages from 6 to 240 VDC
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 - Permanent magnet brakes with zero backlash

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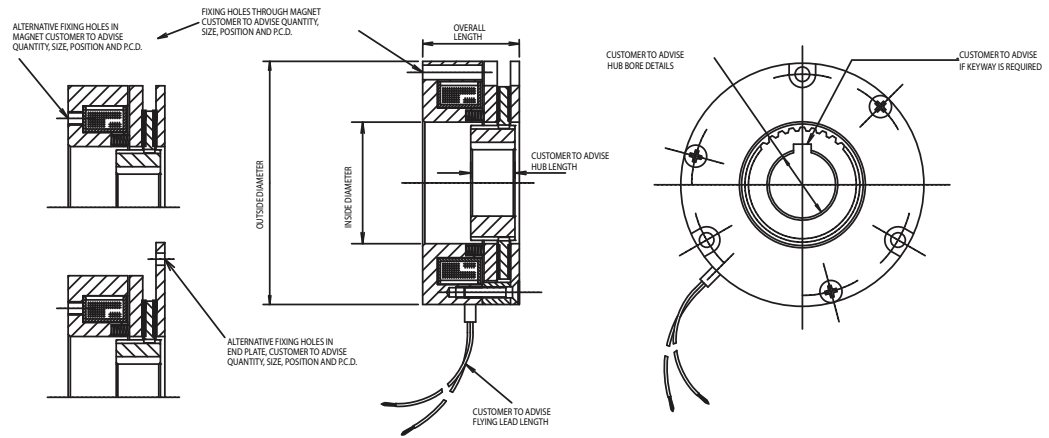


Altra Industrial Motion



1EB SERIES

Servo Motor Brakes



Unit Ref.	Outside Diameter in. (mm)	Inside Diameter in. (mm)	Brake Length in. (mm)	Preferred Max. Hub Bore in. (mm)	Max. Static Torque lb. in. (Nm)	Approx. Weight lbs. (kg)
1EB11	1.58 (40)	0.51 (13)	1.18 (30)	0.39 (10)	3.54 (0,4)	0.44 (0,20)
1EB12	1.73 (44)	0.55 (14)	1.22 (31)	0.47 (12)	10.62 (1,2)	0.66 (0,30)
1EB14	1.97 (50)	0.79 (20)	1.38 (35)	0.47 (12) plain bore	17.70 (2,0)	0.88 (0,40)
1EB17	2.20 (56)	1.02 (26)	1.18 (30)	0.59 (15)	22.12 (2,5)	0.88 (0,40)
1EB18	2.36 (60)	0.79 (20)	1.22 (31)	0.67 (17)	35.40 (4,0)	1.00 (0,45)
1EB20	2.76 (70)	1.18 (30)	1.30 (33)	0.79 (20) plain bore	61.95 (7,0)	1.54 (0,70)
1EB24	3.03 (77)	1.18 (30)	1.38 (35)	1.06 (27) plain bore	106.19 (12,0)	1.76 (0,80)
1EB26	3.27 (83)	1.38 (35)	1.46 (37)	1.26 (32) plain bore	119.47 (13,5)	2.20 (1,00)
1EB27	3.35 (85)	1.38 (35)	1.57 (40)	0.98 (25)	132.74 (15,0)	2.42 (1,10)
1EB28	3.54 (90)	1.38 (35)	1.42 (36)	1.26 (32) plain bore	221.24 (25,0)	2.42 (1,10)
1EB30	3.94 (100)	1.65 (42)	1.73 (44)	1.18 (30) plain bore	265.49 (30,0)	3.74 (1,70)
1EB35	4.33 (110)	2.17 (55)	1.73 (44)	1.57 (40)	442.48 (50,0)	3.96 (1,80)
1EB37	4.72 (120)	2.17 (55)	1.77 (45)	1.57 (40)	486.73 (55,0)	4.84 (2,20)
1EB40	5.04 (128)	2.17 (55)	1.81 (46)	1.57 (40)	530.97 (60,0)	7.26 (3,30)
1EB45	5.71 (145)	2.17 (55)	2.36 (60)	1.57 (40)	619.47 (70,0)	11.00 (5,00)
1EB50	6.30 (160)	2.28 (58)	2.76 (70)	1.57 (40)	1327.43 (150,0)	17.60 (8,00)
1EB60	7.28 (185)	2.60 (66)	2.99 (76)	1.57 (40)	1592.92 (180,0)	26.40 (12,00)
1EB70	8.35 (212)	3.15 (80)	3.70 (94)	1.77 (45)	3539.82 (400,0)	44.00 (20,00)
1EB70-D*	8.35 (212)	3.15 (80)	4.33 (110)	1.77 (45)	3982.30 (450,0)	55.00 (25,00)
1EB80**	10.00 (254)	4.25 (108)	4.72 (120)	2.76 (70)	3539.82 (400,00)	70.00 NA
1EB100**	12.05 (306)	5.04 (128)	5.12 (130)	3.15 (80)	5309.73 (600,00)	90.00 NA

* Brake with double friction disc.

** Brakes have been designed only, i. e. not manufactured.

Note: The table above shows some of the outline data for our range of typical servomotor brakes. It is to be used as a guide only and the torque values are based on static holding use only. For brakes that will see dynamic use or operation at elevated temperatures these values do not apply. The data may vary to suit customer requirements. Matrix International Limited reserves the right to alter any of the above information without prior notice.

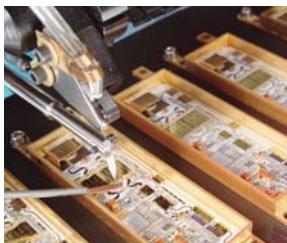


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FEATURE COMPARISON

Servo Motor Brakes

Spring Applied versus Permanent Magnet

Spring Applied

Positive Features

- Factory set - easy installation of one-piece assembly
- Can be higher torque - two (or more) friction faces
- Lower cost for given torque rating
- Ratio of T_s to T_d can be modified by material selection
- Electric leads not polarity sensitive
- Use of unstable voltage supply
- Smooth deceleration characteristic
- Stable torque - less sensitive to speed change and temperature change
- No bedding in (good from the box)
- Friction material can be non-magnetic
- Fail-safe in use
- Low power when disengaged
- Low inertia
- Stable and predictable life time
- Backlash of $<0.50^\circ$ possible

Negative Features

- Backlash in spline connection
- Zero-backlash style is difficult to install
- Can give noise in operation due to friction plate movement
- Low backlash is more costly (spline size has to be controlled)

Permanent Magnet

Positive Features

- Zero backlash style
- No contact when disengaged
- No 'drag' torque
- Low noise in operation
- Fail-safe in use

Negative Features

- Installation difficult due to two-piece construction
- Air gap has to be set
- Single face – relatively low energy capacity
- Unstable metal-to-metal friction contact
- Metallic dust particles produced in use
- Leads are polarity sensitive
- Needs a stable power supply (current control is best)
- Unable to accept much axial movement due to temperature
- Final stage of deceleration is abrupt
- High power when disengaged
- High inertia
- Long periods of disengagement can result in low torque

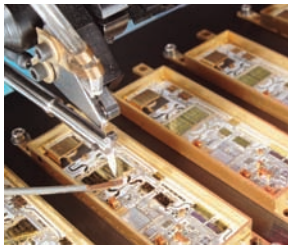


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Motor and Servo Motor Brakes



*Inertia Dynamics
Motor Brakes hold
or decelerate high
inertia loads*

Inertia Dynamics design and development team has provided custom motor brakes to assist in holding or decelerating a load for many motor applications including sub-fractional gear motors, standard AC/DC motors, and servo motor applications.

Key Features & Benefits:

- Custom designs to meet your application
- Factory set - no adjustment necessary
- High torque capacity in small space envelope
- AC and DC NEMA 56C/145TC Motor Brakes Available
- UL/cUL class B or H
- Metric bores available
- Manual release lever option available on some models

These solutions include brake models ranging from:

- Torque capacities from 1 to 1,200 in. lbs. (.11 - 135.58 Nm)
- Sizes from 1" to 8" (25.4 - 203.2 mm) diameter
- Coil voltages in 12 VDC, 24 VDC, 90 VDC, 120 VAC, and 230 VAC

For Technical Assistance Call

860-379-1252



An Altra Industrial Motion Company



FSB & FSBR SERIES



Type FSB Spring Applied (Power-Off) Brakes

Inertia Dynamics flange mounted Type FSB spring applied brakes are designed to decelerate or hold inertia loads when the voltage is turned off. These brakes can be mounted to a bulkhead or motor.

- Torque Capacities - 1 to 100 in. lbs. (.11 to 11.30Nm)
- Used to remotely decelerate a load or hold an inertia load
- Compression springs on the outermost radius of the friction disc increase the torque-to-size ratio and provide greater repeatability
- Factory-set air gap needs no adjustments and is practically maintenance-free
- All parts effectively protected against corrosion
- Advanced friction material technology for long life and high torque

Model No.	Max. Static Torque in. lbs. (Nm)	Approx. Weight oz. (kg)	Hub Style	Preferred Max. Hub Bore in. (mm)	Outside Diameter in. (mm)	Inside Field Diameter in. (mm)	Brake Length in. (mm)
FSB001	1 (.11)	2 (.057)	Square	.25 (6)	1.485 (38)	.28 (7)	.89 (23)
FSB003	3 (.34)	3 (.085)	Square	.375 (10)	1.91 (49)	.42 (11)	1.06 (27)
FSB007	7 (.79)	15 (.425)	Hex	.375 (10)	2.465 (63)	.781 (20)	1.4 (36)
FSB007	7 (.79)	15 (.425)	Zero Backlash	.5 (13)	2.465 (63)	.781 (20)	1.4 (36)
FSB015	15 (1.69)	16 (.454)	Hex	.5 (13)	2.465 (63)	.781 (20)	1.4 (36)
FSB015	15 (1.69)	16 (.454)	Zero Backlash	.375 (10)	2.465 (63)	.781 (20)	1.4 (36)
FSB035	35 (3.95)	33 (.936)	Hex	.75 (19)	3.01 (76)	.891 (23)	2.11 (54)
FSB035	35 (3.95)	33 (.936)	Zero Backlash	.75 (19)	3.01 (76)	.891 (23)	2.23 (57)
FSB050	50 (5.65)	36 (1.02)	Hex	.75 (19)	3.01 (76)	.891 (23)	2.11 (54)
FSB050	50 (5.65)	36 (1.02)	Zero Backlash	.75 (19)	3.01 (76)	.891 (23)	2.23 (57)
FSB100	100 (11.30)	64 (1.81)	Hex	.75 (19)	4 (102)	1.188 (30)	2.32 (59)



Type FSBR Spring Applied (Power-Off) Brakes

Inertia Dynamics reverse flange mounted Type FSBR spring applied brakes are designed for applications requiring minimum space (short axial length) or for motors with short shaft extensions. When mounted, the armature hub is installed on the shaft first, then the brake is installed over the hub and attached to the motor.

- Torque Capacities - 7 to 100 in. lbs. (0.79 to 11.30 Nm)
- Fewer parts – the mounting plate acts as pressure plate
- Shorter axial length than FSB
- Used to remotely decelerate or hold a load
- Manual release models are available in which you can move a lever to manually release the brake. An optional micro-switch can be activated to disconnect power to your system in case of an accidental start-up with the brake manually released.

Model No.	Max. Static Torque in. lbs. (Nm)	Approx. Weight oz. (kg)	Hub Style	Preferred Max. Hub Bore in. (mm)	Outside Diameter in. (mm)	Inside Field Diameter in. (mm)	Brake Length in. (mm)
FSBR007	7 (.79)	11 (.312)	Hex	.375 (10)	3.235 (82)	.781 (20)	.96 (24)
FSBR015	15 (1.69)	12 (.340)	Hex	.5 (13)	3.235 (82)	.945 (24)	1.2 (30)
FSBR035	35 (3.95)	24 (.680)	Hex	.75 (19)	3.5 (89)	.891 (23)	1.905 (48)
FSBR050	50 (5.65)	27 (.765)	Hex	.75 (19)	3.5 (89)	.891 (23)	1.905 (48)
FSBR100	100 (11.30)	56 (1.59)	Hex	.75 (19)	5.25 (133)	1.188 (30)	1.87 (47)

SAB & MPC SERIES



Type SAB Spring Applied (Power-Off) Brakes

Inertia Dynamics Type SAB spring applied brakes are designed to be used with servo motors for engaging static park and hold or dynamic stop conditions. Customers must specify which condition is required when ordering. These brakes can be mounted to a flange or motor using thru-holes or tapped holes in the field cup.

- SAB brakes have been used extensively for servo motor brake applications
- Static Torque Capacities - 20 to 1200 in. lbs. (2.26 to 135.58 Nm)
- Ideal for high torque in small areas
- High temperature coil insulations are available upon request
- A conduit box is optional for electrical connections



Model No.	Max. Static Torque in. lbs. (Nm)	Approx. Weight lb. (kg)	Hub Style	Preferred Max. Hub Bore in. (mm)	Outside Diameter in. (mm)	Inside Field Diameter in. (mm)	Brake Length in. (mm)
SAB20	20 (2.26)	1 (.454)	Hex	.375 (10)	2.465 (63)	.781 (20)	1.4 (36)
SAB90	90 (10.17)	3 (1.361)	Hex	.75 (19)	3.53 (90)	1.38 (35)	1.938 (49)
SAB180	180 (20.34)	5 (2.268)	Spline	.875 (22)	4.26 (108)	1.5 (38)	1.77 (45)
SAB400	400 (45.19)	7.1 (3.221)	Spline	1 (25)	5.01 (127)	1.77 (45)	2.05 (52)
SAB1200	1200 (135.58)	12.4 (5.625)	Spline	1.5 (38)	6.51 (165)	2.43 (62)	2.05 (52)

Type MPC Spring Applied (Power-Off) Brakes

Inertia Dynamics Type MPC brakes are power-off brake modules with a C-face output shaft. The unit mounts on a C-Face motor and the output can be coupled to a C-Face gear reducer.

The MPC brake is ideal for creating brake-motor packages on smaller servo and stepper frame motors. Using a bolt-on brake to create a brake motor for a smaller frame assembly is both simple and economical.

The bolt-on brake is spring set and has a clamp-collar fitting for quick assembly. It can be easily mounted on most standard stepper and servo motors without custom components or special engineering.

It is furnished with a built-in shaft that readily accepts a gearbox or other parts.

- Available for NEMA 17, 23, 34, and 42 frames
- Torque capacities of 1 to 50 in. lbs. (0.11 to 5.65 Nm)
- Bolts on between motor and gear reducer
- Eliminates need for special brake motors
- Ideal for servo and stepper motors



Model No.	Max. Static Torque in. lbs. (Nm)	Approx. Weight oz. (kg)	Brake Mounting Bolt Circle in. (mm)	Outside Dim. - Square in. (mm)	Max. Shaft Input Dia. in. (mm)	Max. Shaft Output Dia. in. (mm)	Brake Pilot Diameter in. (mm)
MPC17	1 (.11)	7 (.198)	1.725 (44)	1.65 (42)	.1875 (5)	.1875 (5)	.867 (22)
MPC23	3 (.34)	17 (.482)	2.625 (67)	2.25 (57)	.375 (10)	.375 (10)	1.505 (38)
MPC34	15 (1.69)	46 (1.31)	3.875 (98)	3.25 (83)	.5 (13)	.5 (13)	2.879 (73)
MPC42	50 (5.65)	96 (2.72)	4.95 (126)	4.25 (108)	.75 (19)	.75 (19)	2.19 (56)



FB SERIES & C-FACED



Type FB Fractional HP (Power-On) Clutches & Brakes

Inertia Dynamics Type FB series flange mounted power-on brakes are used to stop or hold a load that is coupled to the armature hub assembly. The armature hub is attached to the load shaft. The field assembly is mounted to a bulkhead that is perpendicular to the shaft.

- Torque Capacities - 2.5 to 250 in. lbs. (0.28 to 28.24 Nm)
- Used to remotely stop a load that is coupled to the armature hub assembly

Model No.	Max. Static Torque in. lbs. (Nm)	Approx. Weight oz. (kg)	Zero Backlash Hub Dia. in. (mm)	Preferred Max. Hub Bore in. (mm)	Outside Dim. - Square in. (mm)	Inside Field Diameter in. (mm)	Brake Length in. (mm)
FB08	2.5 (.28)	2 (.057)	1.030 (26.12)	.25 (6)	.98 (25)	N/A N/A	.885 (22)
FB11	6 (.68)	3.2 (.091)	1.312 (33.32)	.3125 (8)	1.23 (31)	.408 (10)	.954 (24)
FB15	10 (1.13)	3.8 (.108)	1.750 (44.45)	.375 (10)	1.567 (40)	.55 (14)	1.304 (33)
FB17	15 (1.69)	11 (.312)	2.125 (54.00)	.375 (10)	1.943 (49)	1.78 (45)	1.269 (32)
FB19	25 (2.82)	12 (.340)	2.125 (54.00)	.5 (13)	1.943 (49)	.752 (19)	1.33 (34)
FB22	50 (5.65)	20 (.567)	2.500 (63.50)	.5 (13)	2.32 (59)	1.002 (25)	1.757 (45)
FB26	80 (9.04)	28 (.794)	3.125 (79.35)	.625 (16)	2.63 (67)	1.06 (27)	1.815 (46)
FB30	125 (14.12)	35 (.992)	3.750 (95.25)	.75 (19)	3.200 (81)	1.753 (45)	1.9 (48)
FB42	250 (28.24)	60 (1.70)	5.000 (127.00)	1 (25)	4.255 (108)	1.876 (48)	2.29 (58)



C-Faced (Power-off) Motor Brakes

Inertia Dynamics single C-Face power-off brakes are designed to decelerate or hold inertia loads when the power is turned off. The single C-face mounts to a fan or the non-driven end of the motor.

- Torque capacities from 3 ft. lbs. to 15 ft. lbs. (4.07 to 20.34 Nm)
- Totally enclosed construction
- Torque adjustable from full-rated torque down to 50%
- All Standard Manual Release
- Single-phase
- AC coils to provide fast release times and easy wiring
- AC or DC coil voltages
- 56C and 145TC NEMA Frames available
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 or elsewhere in Asia Pacific, send an email
 to: ap@altramotion.com

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