Regal Rexnord

Electric Spring Applied Friction Brakes FSB/FSBR

WARNER ELECTRIC™

A REGAL REXNORD BRAND

WARNER ELECTRIC

THE WARNER ELECTRIC ADVANTAGE

Warner Electric is a global leader in developing innovative electromagnetic clutch and brake solutions. Warner Electric engineers utilize the latest materials and manufacturing technologies to design long-life and easy-to-use clutches and brakes for improved accuracy and repeatability.

Our business growth has been achieved by a customer-dedicated employee team. Our success and our future are based on our commitment to being a world-class manufacturer of clutches and brakes. We pride ourselves on total customer service with a high-quality product delivered on time for you.

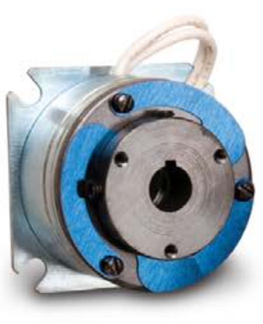
We manufacture a full line of products to solve your motion control needs -power-on and spring-applied friction clutches and brakes, motor brakes, controls, and moment of inertia measuring equipment.

Warner Electric excels at creating a custom clutch or brake solution or brake solution for your OEM application. Each of our standard products in this catalog can be adapted to meet a wide variety of applications. Put us to the test- we enjoy assisting customers with challenging projects. Our engineers welcome the opportunity to provide cost-effective solutions in situations where unique, one-of-a-kind designs are needed.

Warner Electric is located 20 minutes from both Hartford, Connecticut, and Bradley International Airport. Our engineering, manufacturing, and support staff are located in our facility in New Hartford, Connecticut. We welcome you to tour our facility and meet our people.

At Warner Electric, we provide solutions!

VISIT US ON THE WEB AT
WWW.WARNERELECTRIC.COM

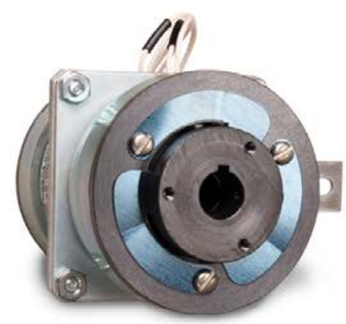


FB Power-On Brake

MPC C-Face Brake

FSB Brake

SO Clutch-Coupling



Power-On Clutch/Brake Combination

Spring Applied Brakes

(For Imperial Units) **A A B B – C D E F**

DIGIT	DIGIT	MODEL NO.
1	7	FSB
1	9	FSBR

DIGIT	DIGIT	SIZE
0	1	001
0	2	003
0	3	007
0	4	015
0	5	035
0	6	050
0	7	100

DIGIT	VOLTS
1	90 VDC
2	24 VDC
3	12 VDC
4	120 VAC

DIGIT	BORE (INCH)
1	1/8
2	3/16
3	1/4
4	5/16
5	3/8
6	1/2
7	5/8
8	3/4
9	7/8
0	1
11	1 1/8
12	1 1/4
13	1 3/8
14	1 1/2

DIGIT	DRIVE
1	ZERO BACKLASH
2	HEX/SQUARE

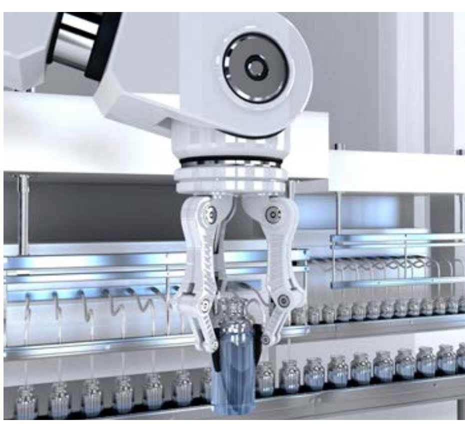
DIGIT	CONNECTION
1	LEAD WIRES
2	SCREW TERMINALS
4	CONDUIT BOX

How To Order

A. Select the model number from the product guide.
B. Select the size of the brake.
C. Select the voltage.
D. Select the bore diameter.
E. 1. For model FSBR, select 2. For model FSB spring applied brakes, select 1 or 2.
F. For all, refer to the product guide and specify 1 or 2.

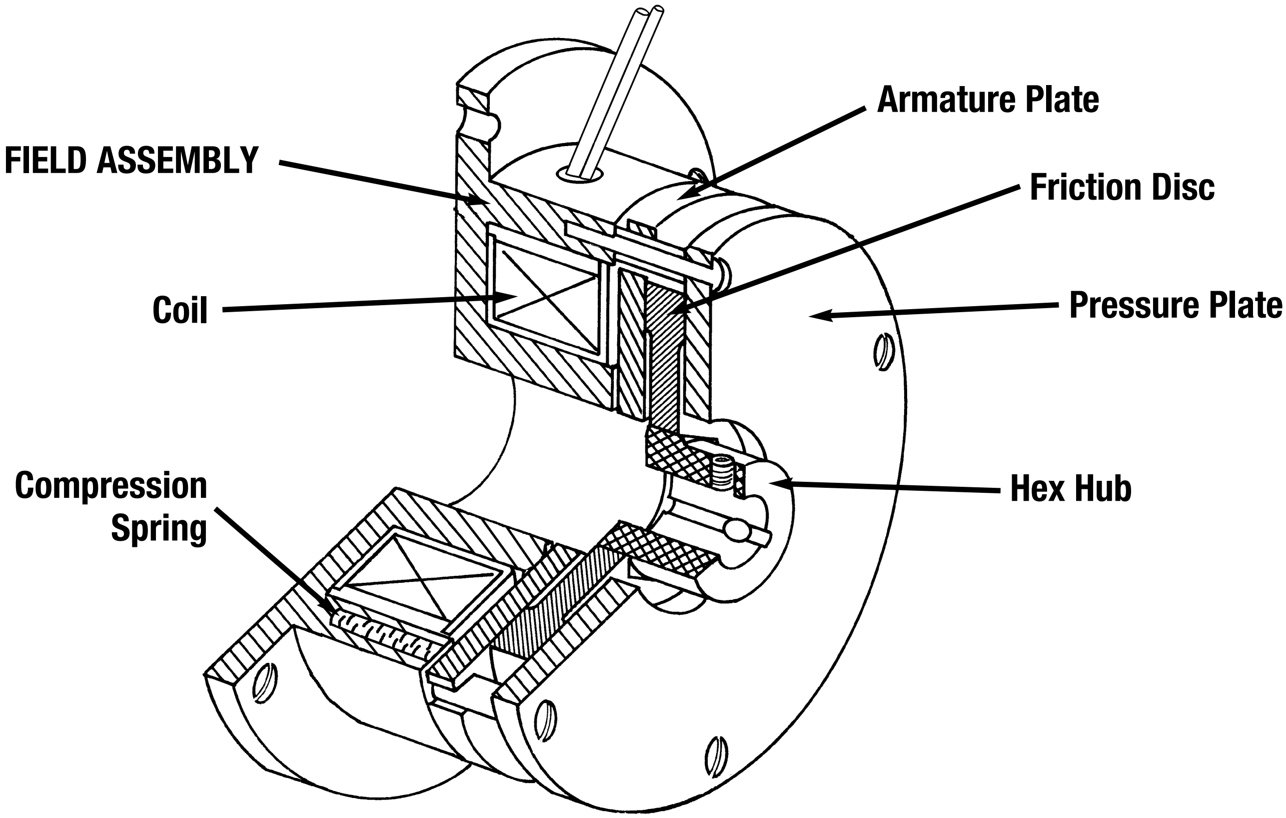
Example (Imperial)

FSB050 brake, 24 volts, 1/2 bore,
Hex drive
Part No. 1706-2621



Spring Applied Friction Brakes

Spring Applied Brake Description



Generating the Braking Torque

Warner Electric FSB/FSBR spring applied brakes are designed to decelerate or park inertial loads when the voltage is turned off, either intentionally or accidentally, as in the case of a power failure. The friction disc with the hub is coupled to the shaft to be braked but is capable of moving axially. Through several compression springs, the axial force acts against the axially moving armature plate which compresses the friction disc against the pressure plate. Brake torque is generated on both faces of the friction disc.

When voltage is applied to the coil, the magnetic force caused by the magnetic flux pulls the armature across the air gap against the force of the compression springs. The friction disc is released, and the brake is free of torque.

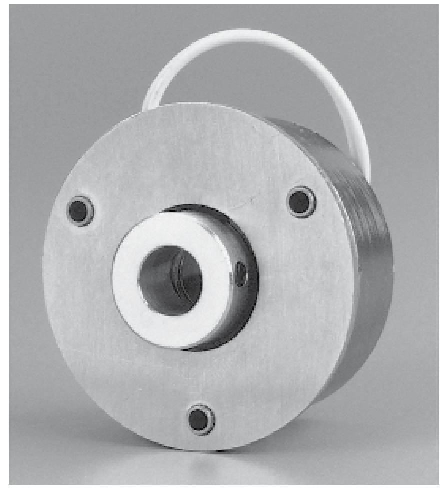
Special Features of the Warner Electric Brake

- Several 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. Always asbestos-free.
- Two mounting styles offered to accommodate your specific application.
- Metric bore sizes available.
- ROHS compliant.

FSB SERIES SPRING APPLIED BRAKES

Flange Mounted Spring Applied Brakes – Type FSB

Warner Electric type FSB brakes are designed to decelerate or hold inertial loads when the voltage is turned off. These brakes can be mounted to a bulkhead or motor.

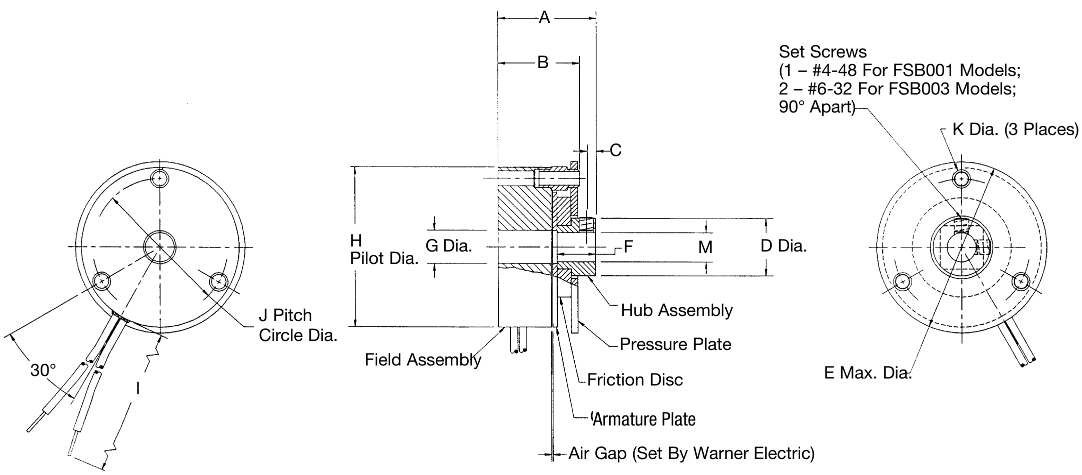


FSB001 Shown

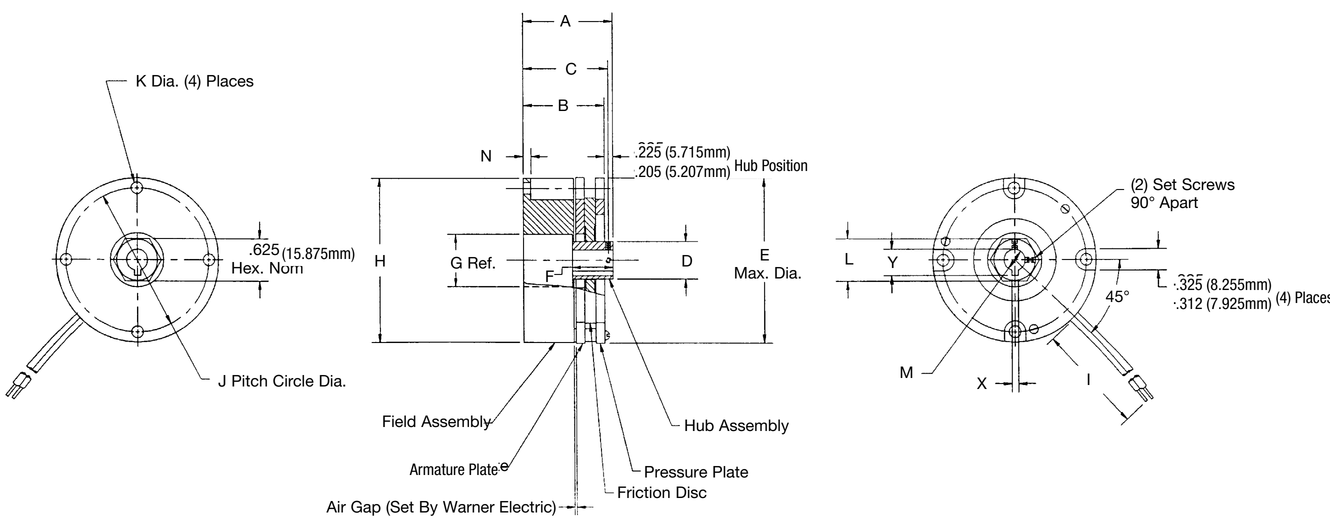
Customer Shall Maintain:

The perpendicularity of the mounting surface with respect to the shaft not to exceed .005 inch (0.127 mm) T.I.R. at a diameter equal to the brake body outside diameter; the concentricity between the mounting holes and the shaft not to exceed .010 T.I.R. for sizes 001-015 and .020 (0.508 mm) T.I.R. for sizes 035-100. Refer to instruction manual #040-10110.

Model FSB001 or FSB003 - Square Drive

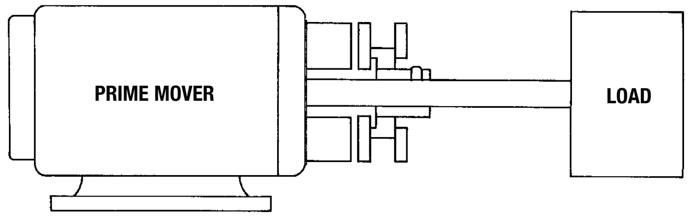


Model FSB007 or FSB015 - Hex Drive

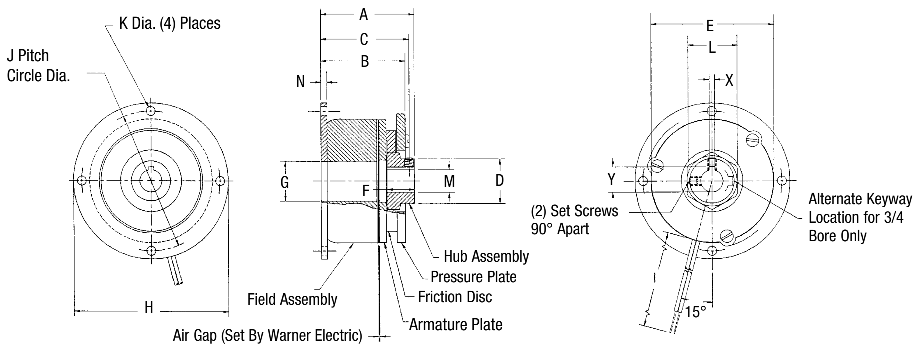


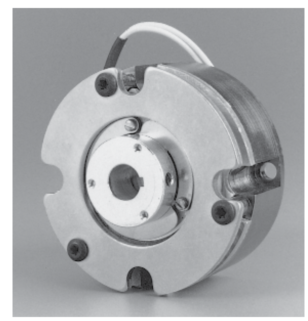
Spring Applied Friction Brakes

Flange Mounted Spring Applied Brakes – Type FSB



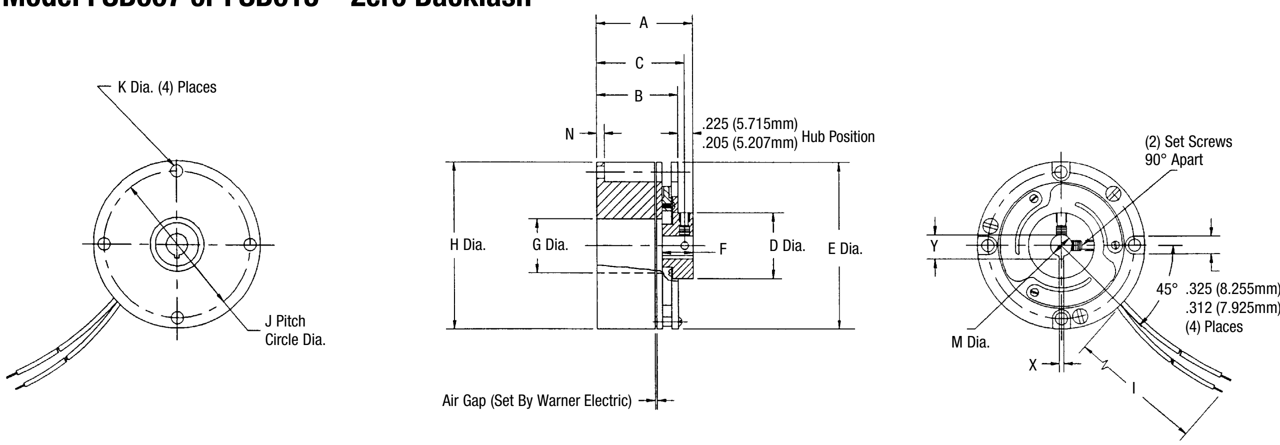
Model FSB035, FSB050,or FSB100 - Hex Drive



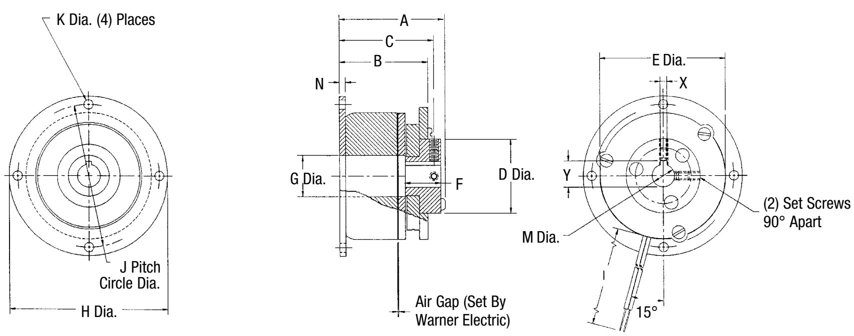


FSB007 Shown

Model FSB007 or FSB015 – Zero Backlash



Model FSB035, FSB050 o



FSB035 Shown

Flange Mounted Spring Applied Brakes – Type FSB Imperial

Mechanical

MODEL NO.	STATIC TORQUE LB. - IN.	INERTIA LB. - IN.^{2} ARMATURE & HUB ASSEMBLY		WEIGHT OZ.
		SQUARE OR HEX DRIVE	ZERO BACKLASH	
FSB001	1	.0004	N.A.	2
FSB003	3	.0017	N.A.	3
FSB007	7	.0133	.0176	15
FSB015	15	.0133	.0176	16
FSB035	35	.084	.1733	33
FSB050	50	.084	.1733	36
FSB100	100	.205	N.A.	64

Electrical

MODEL NO.	90 VDC		24 VDC		12 VDC		120 VAC	
	AMPS	OHMS	AMPS	OHMS	AMPS	OHMS	AMPS	OHMS
FSB001	.051	1880	.220	117	.430	30	.044	N.A.
FSB003	.041	2177	.182	132	.353	34	.050	N.A.
FSB007	.059	1520	.247	97.3	.477	25.1	.045	N.A.
FSB015	.098	922	.369	65.1	.719	16.7	.077	N.A.
FSB035	.093	964	.394	61.0	.755	15.9	.073	N.A.
FSB050	.194	465	.717	33.5	1.54	7.75	.140	N.A.
FSB100	.180	501	.707	34	1.41	8.5	.142	N.A.

Lead wire is UL recognized style 1430 or 1015, 22 gage.
Insulation is .064 O.D. on 001 & 003 units; .095 O.D. on 007, 015, 035, 050 & 100 units.

Dimensions

MODEL NO.	HUB STYLE	A MAX.	B MAX.	C NOM.	D MAX.	E MAX.	F MIN.	G REF.	H MAX	I ± .500	J NOM.	K MIN.	L NOM.	N MAX.	M BORES & KEYWAY		
															BORE	NOMINAL KEYWAY X	NOMINAL KEYWAY Y
FSB001	Square Drive	.890	.710	.072	.510	1.485	.320	.280	1.375	12.0	1.180	.113	3/8	N.A.	1/8 3/16 1/4	SET SCREWS ONLY	
FSB003	Square Drive	1.060	.870	.115	.755	1.910	.380	.410	1.752	12.0	1.545	.113	9/16	N.A.	3/16 1/4 5/16 3/8	SET SCREWS ONLY	
FSB007	Hex Drive	1.400	1.200	1.255	.722	2.465	.605	.781	2.436	12.0	2.125	.170	5/8	.120	1/4 5/16 3/8 1/2*	.0625 – .0655 .0625 – .0655 .094 – .097 .125 – .128	.285 – .290 .347 – .352 .417 – .427 .560 – .567
	Zero Backlash	1.400	1.200	1.255	.955	2.465	.450	.781	2.436	12.0	2.125	.170	N.A.	—			
FSB015	Hex Drive	1.400	1.200	1.255	.722	2.465	.605	.781	2.436	12.0	2.125	.170	5/8	.120	1/4 5/16 3/8 1/2*	.0625 – .0655 .0625 – .0655 .094 – .097 .125 – .128	.285 – .290 .347 – .352 .417 – .427 .560 – .567
	Zero Backlash	1.400	1.200	1.255	.955	2.465	.450	.781	2.436	12.0	2.125	.170	N.A.	—			
FSB035	Hex Drive	2.110	1.920	1.960	1.000	3.010	.580	.891	3.500	18.0	3.125	.200	11/8	.142	3/8 1/2 5/8 3/4	.094 – .097 .125 – .128 .1885 – .1905 .1885 – .1905	.417 – .427 .560 – .567 .709 – .719 .836 – .844
	Zero Backlash	2.230	1.915	1.998	1.625	3.010	.730	.891	3.500	18.0	3.125	.200	N.A.	—			
FSB050	Hex Drive	2.110	1.920	1.960	1.000	3.010	.580	.891	3.500	18.0	3.125	.200	11/8	.142	3/8 1/2 5/8 3/4	.094 – .097 .125 – .128 .1885 – .1905 .1885 – .1905	.417 – .427 .560 – .567 .709 – .719 .836 – .844
	Zero Backlash	2.230	1.915	1.998	1.625	3.010	.730	.891	3.500	18.0	3.125	.200	N.A.	—			
FSB100	Hex Drive	2.320	2.080	2.100	.975	4.000	.555	1.188	5.250	18.0	4.750	.216	11/2	.210	1/2 5/8 3/4	.125 – .128 .1885 – .1905 .1885 – .1905	.560 – .567 .709 – .716 .836 – .844

*1/2 bore available in Zero Backlash only.

Notes:

Hex Drive – FSB

1. For sizes 001 and 003, position hub .010- .020 inches back from friction disc with coil de-energized.
2. For sizes 007 and larger, position hub .010- .030 inches back from armature plate with coil de-energized.
3. 1/2 inch bore not available for sizes 007 and 015.

Zero Backlash – FSB

1. Position hub to run freely with coil energized taking care to center the friction disc between the armature and pressure plate.

Spring Applied Friction Brakes

Reverse Mounted Spring Applied Brakes – Type FSBR Imperial

FSBR007 Shown

FSBR SERIES SPRING APPLIED BRAKES

Reverse Mounted Spring Applied Brakes – Type FSBR

Warner Electric type FSBR brakes are designed for applications requiring minimum space (short axial length) or for motors with short shaft extensions. When mounted, the hub is installed on the shaft first, then the brake is installed over the hub and attached to the motor.

Customer Shall Maintain:

The perpendicularity of the mounting surface with respect to the shaft not to exceed .005 inch T.I.R. at a diameter equal to the brake body outside diameter; the concentricity between the mounting holes and the shaft not to exceed .020 inch T.I.R.

Mechanical

MODEL NO.	STATIC TORQUE LB. - IN.	INERTIA LB. - IN.^{2} ARMATURE & HUB ASSEMBLY	WGT. OZ.
FSBR007	7	.0133	11
FSBR015	15	.0133	12
FSBR035	35	.084	24
FSBR050	50	.084	27
FSBR100	100	.205	56

Electrical

MODEL NO.	90 VDC		24 VDC		12 VDC		120 VAC	
	AMPS	OHMS	AMPS	OHMS	AMPS	OHMS	AMPS	OHMS
FSBR007	.059	1520	.247	97.3	.477	25.1	.048	N.A.
FSBR015	.098	922	.369	65.1	.719	16.7	.077	N.A.
FSBR035	.093	964	.394	61.0	.755	15.9	.073	N.A.
FSBR050	.194	465	.717	33.5	1.43	8.4	.140	N.A.
FSBR100	.180	501	.707	34	1.41	8.5	.142	N.A.

Lead wire is UL recognized style 1015, 22 gage. Insulation is .095 O.D.

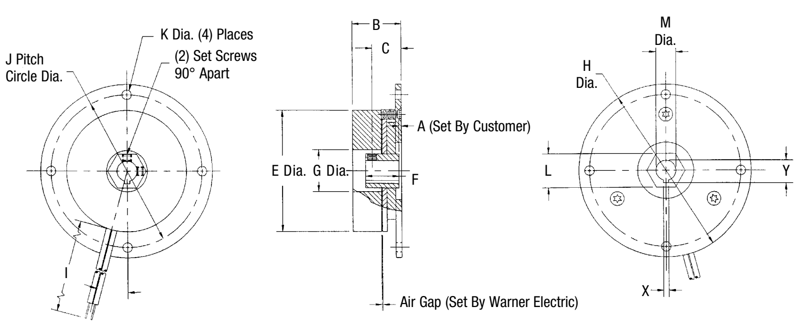
Dimensions

MODEL NO.	HUB STYLE	A MAX.	B MAX.	C NOM.	E MAX.	F MIN.	G REF.	H MAX.	I ± .500	J NOM.	K MIN.	L NOM.	M BORES & KEYWAY: BORE	NOMINAL KEYWAY X	NOMINAL KEYWAY Y
FSBR007	Hex Drive Only	.062	.960	.550	2.260	.605	.781	3.235	12.0	2.844	.172	5/8	1/4 5/16 3/8	.0625 – .0655 .0625 – .0655 .094 – .097	.285 – .290 .347 – .352 .417 – .427
FSBR015	Hex Drive Only	.062	1.200	.600	2.400	.605	.945	3.235	12.0	2.844	.187	5/8	5/16 3/8 1/2	.0625 – .0655 .094 – .097 .125 – .128	.347 – .352 .417 – .427 .560 – .567
FSBR035	Hex Drive Only	.094	1.905	.239	2.810	.280	.891	3.500	18.0	3.125	.200	1 1/8	3/8 1/2 5/8 3/4	.094 – .097 .125 – .128 .1885 – .1905 .1885 – .1905	.417 – .427 .560 – .567 .709 – .719 .836 – .844
FSBR050	Hex Drive Only	.094	1.905	.239	2.810	.280	.891	3.500	18.0	3.125	.200	1 1/8	3/8 1/2 5/8 3/4	.094 – .097 .125 – .128 .1885 – .1905 .1885 – .1905	.417 – .427 .560 – .567 .709 – .719 .836 – .844
FSBR100	Hex Drive Only	.140	1.870	.545	4.000	.555	1.188	5.250	18.0	4.750	.216	1 1/2	1/2 5/8 3/4	.125 – .128 .1885 – .1905 .1885 – .1905	.560 – .567 .709 – .716 .836 – .844

Notes:

Hex Drive – FSBR

1. Refer to dimension “A” for the distance the hub should be installed on the shaft from the mounting surface.
2. Dimension “F” is the minimum length of the hex hub.



Determining the Brake Size

Static Applications

A static application is one in which there is no dynamic braking. In this mode the brake is used to hold the inertial load in a fixed or parked position. Match your required torque to the static torque rating of the brake. Be sure the brake torque exceeds your requirement. A service factor of 1.4 is recommended.

Dynamic Applications

A dynamic application is one in which the brake decelerates an inertial load. To properly size the brake you need to calculate the dynamic torque required. There are two methods that can be used.

$$T_d = \left[\frac{WR^2 \times N}{C \times t}\right] \times S.F.$$

Where:

- WR^2 = Total inertia reflected to the clutch/brake, lb.–in.^{2} (kg.m^2)
- N = Shaft speed at clutch/brake, RPM
- C = Constant, use 3696 for English units and 9.55 for metric units
- t = Desired stopping or acceleration time, seconds
- S.F. = Service Factor, 1.4 recommended
- T_d = Average dynamic torque, lb.–in. (N–m)

Warner Electric brakes are rated by static torque. Therefore, the dynamic torque rating obtained should be converted to a static torque value:

$$T_s = \frac{T_d}{0.80}$$

NOTE:
The 80% derating factor should be used as a guide only.

Where:

- T_s = Static torque
- 0.80 = Derating factor

The brake size can also be determined using the selection charts. Find the intersection of the prime mover horsepower (HP) and shaft speed at the brake using the selection charts. (Fig. A & B). The relationship between the horsepower and speed to determine the dynamic torque required is expressed as:

$$T_d = \left[\frac{63{,}025 \times P}{N}\right] \times S.F.$$

Where:

- T_d = Average dynamic torque, lb.–in.
- P = Horsepower, HP
- N = Shaft Speed
- S.F. = Service Factor
- 63,025 = Constant

Additional formulas and conversion charts are found on pages 60 and 79.

Fig. A
Type FSBR Series Selection

HP	SHAFT SPEED AT BRAKE (RPM)																			
	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600	4000	5000
1/50																				
1/20																				
1/12											7									
1/8																				
1/6											15									
1/4																				
1/3																				
1/2											35									
3/4											50									
1																				
1 1/2											100									
2																				
3																				
5																				
7 1/2																				
10																				

Spring Applied Friction Brakes

Selecting a Spring Applied Brake Imperial

Fig. B

Type FSB Series Selection

Torque Rating vs. RPM (Sizes 001 through 007) - Selection Chart

TORQUE LB.-IN.*	SHAFT SPEED AT BRAKE (RPM)																		
	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600	4000	5000
.50											001									
.75																				
1.0																				
2.0											003									
2.5																				
2.75																				
3.0																				
5.0																				
6.25											007									
6.5																				
6.75																				
7.0																				

*Slightly higher torque ratings may be allowable for some speeds. Consult Warner Electric.

HP vs. RPM (Sizes 15 through 100) – Selection

HP	SHAFT SPEED AT BRAKE (RPM)																		
	100	200	300	400	500	600	700	800	900	1000	1100	1200	1500	1800	2000	2400	3000	3600	4000	5000
1/50																				
1/20																				
1/12											15									
1/8																				
1/6																				
1/4																				
1/3											35									
1/2																				
3/4											50									
1																				
1 1/2											100									
2																				
3																				
5																				
7 1/2																				
10																				

Selection Considerations

The required size is determined mostly from the brake torque needed. The inertia to be braked, the speed, the braking times, duty cycle, and life requirements are all considerations in brake sizing. Other conditions to be considered are ambient temperatures, humidity, dust, and contaminants which may affect the brake performance. For these reasons, brake performance should be evaluated under actual application conditions.

Brake Location

Whenever possible, the brake should be mounted to the highest-speed shaft. This will allow a brake with the lowest possible torque to be used. However, the maximum allowable shaft speed should not be exceeded.

120 VAC Operation

All brakes include full wave rectification.

Maintenance

Warner Electric brakes are virtually maintenance-free. The air gap is set at the factory and requires no adjustments. The friction faces must be kept free of grease and oil for proper operation.

Response Time - Standard Power-Off Brakes

The following is a list of typical "Pick" and "Drop" times for standard power-off brakes.
"Pick" is defined as time to electrically energize and free the brake of torque.
"Drop" is defined as time to electrically de-energize and produce torque.

SERIES	PICK TIME	DROP TIME WITH DIODE ARC SUPPRESSION	DROP TIME WITH MOV ARC SUPPRESSION
001	8	14	77
003	26	30	14
007	39	88	30
015	30	92	35
035	60	205	70
050	68	60	32
100	100	140	50
20	30	92	40
90	45	75	25
180	40	140	40
400	85	160	45
1200	138	170	50

All times are measured in milliseconds.

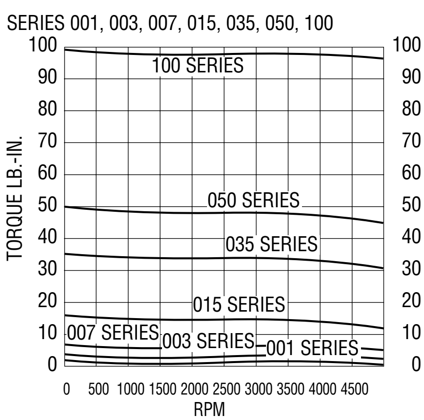
Torque Data

CLUTCHES: CLUTCH COUPLINGS: POWER ON BRAKES			
SERIES	TYPICAL OUT-OF-BOX TORQUES LB. - IN.	RATED STATIC TORQUES LB. - IN.	TYPICAL TORQUES AFTER BURNISHING LB. - IN.
001	1	1	1.5
003	3	3	4
007	7	7	9
015	15	15	18
035	35	35	42
050	50	50	60
100	100	100	120

NOTES:

1. Brakes tested at 20°C and at nominal voltage and air gap.
2. The Pick and Drop values are typical and should only be used as a guide.
3. For special applications consult Warner Electric engineering.

Dynamic Torque Curve



Spring Applied Friction Brakes

Selecting a Spring Applied Brake Imperial

Maximum Recommended/ Safe Input RPM

(Note: Consult Warner Electric Engineering for Special Applications)

Type: FSB and FSBR

SIZE	MAX. INPUT RPM
001 003	9,000
007 015	7,500
035 050	7,000
100	5,000

Burnishing

Burnishing is a wearing-in or mating process which will ensure the highest possible output torques. Burnishing is accomplished by forcing the brake to slip rotationally when engaged (brake coil not energized). Best results are obtained when the unit is forced to slip for a period of 1-3 minutes at a low speed of 60-200 RPM. Units in applications with high inertial loads and high speed will usually become burnished in their normal operating mode. Whenever possible, it is desirable to perform the burnishing operation in the final location so the alignment of the burnished faces will not be disturbed. For additional information on burnishing procedures for Spring Applied Brakes ask for burnishing spec. #040-1069.

FSB Allowable Cycles/Minutes*

MODEL NO.	RPM	INERTIA (LB. – IN.^{2})				MODEL NO.	RPM	INERTIA (LB. – IN.^{2})			
		1	5	10	50			10	50	100	500
001	1800	60	12	6	1	035	1800	25	5	2.5	5
	3600	15	3	1.5	–		3600	5	1	.5	–
003	1800	80	16	8	2	050	1800	25	5	2.5	.5
	3600	20	4	2	–		3600	5	1	.5	–
007	1800	150	30	15	3	100	1800	50	10	5	1
	3600	150	30	15	3		3600	12	2.5	1.2	–
015	1800	150	30	15	3						
	3600	40	8	4	3						

*Chart intended as a guide. For other speeds and inertias, consult Warner Electric.

FSBR Allowable Cycles/Minutes*

MODEL NO.	RPM	INERTIA (LB. – IN.^{2})			
		5	10	50	100
007	1800	30	15	3	–
	3600	8	4	.8	–
015	1800	30	15	3	–
	3600	8	4	.8	–
035	1800	50	25	5	2.5
	3600	10	5	1	.5
050	1800	50	25	5	2.5
	3600	10	5	1	.5
100	1800	100	50	10	5
	3600	25	12	2.5	1.2

*Chart intended as a guide. For other speeds and inertias, consult Warner Electric.

Hi-Pot Testing

All brakes are tested 100% for Hi-Pot failures. Typical tests are at 1500 volts RMS. Do not Hi-Pot brakes with A.C. operating voltages as this will potentially damage the rectifiers and cause failure. For additional information for brakes with D.C.opperating voltages, refer to IDI spec #040-1032.

Torque

$$T_d = \frac{63{,}025 \times P}{N} \times S.F.$$

Where:

T_d = Dynamic Torque (lb.–in.)
P = Horsepower, HP
N = RPM = Shaft Speed
S.F. = Service Factor
63,025 = Constant

Reflected Inertia

$$\text{Equivalent } WR^2_A = WR^2_B \left(\frac{N_B}{N_A}\right)^2$$

Where:

WR^2_A = Inertia of rotating load reflected to the clutch or brake shaft (lb.–in.²)
WR^2_B = Inertia of rotating load (lb.–in.²)
N_B = Shaft speed at load (RPM)
N_A = Shaft speed at clutch or brake (RPM)

Linear Inertia

$$\text{Equivalent } WR^2_A = W\left(\frac{V}{2\pi N_A}\right)$$

Where:

WR^2_A = Inertia of linear moving load reflected to the clutch or brake shaft (lb.–in.²)
V = Linear velocity of load (in./min.)
W = Weight of linear moving load (lb.)
N_A = Shaft speed at clutch or brake (RPM)
2π = Constant

Thermal Capacity

$$TC = \frac{WR^2 \times N_A \times n}{4.63 \times 10^8}$$

Where:

TC = Thermal capacity required for rotational or linear moving loads (hp–sec./min.)
WR^2 = Total system inertia reflected to the clutch or brake shaft (lb.–in.²)
N_A = Shaft speed at clutch or brake (RPM)
n = Number of stops or starts per minute, not less than one
4.63×10^8 = Constant

Linear Velocity

$IPM = PD \times N \times \pi$

Where:

IPM = Velocity of object (inches per minute)
PD = Pitch diameter of object (inches)
N = Speed of shaft at the object (RPM)
π = Constant

Inertia – (WR^2)

To calculate the inertia for a cylinder, the formula is:

$$WR^2 = \frac{\pi}{32} \times D^4 \times L \times \rho$$

Where:

WR^2 = Inertia – lb.–in.² (kg–m²)
D = Diameter – inches (meters)
L = Length – inches (meters)
ρ = Density – lb./in.³ (kg/m³)

Approximate values for ρ are:

Steel – .284 (7860)
Aluminum – .098 (2700)
Plastic – .047 (1300)
Rubber – .047 (1300)

For steel shafting, refer to the inertia chart, Fig. A.

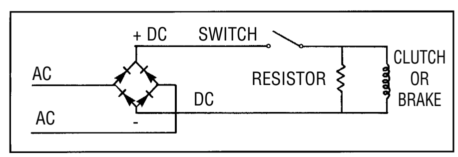
Arc Suppression

When the clutch or brake is deenergized, a reverse voltage is generated in the coil. The reverse voltage can be very high and may cause damage to the coil and switch in the circuit. To protect the coil and switch, the voltage should be suppressed using an arc suppression circuit. Arc suppression does not affect the clutch or brake engagement time.

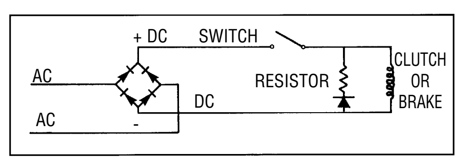
Resistor/Diode/Zener Diode –

Normal Disengagement Time

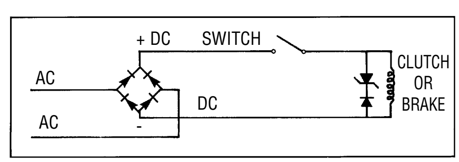
For most applications, a resistor connected in parallel with the clutch/brake coil is adequate. The resistor should be rated at six times the coil resistance and approximately 25% of the coil wattage.



To eliminate the added current draw, a diode may be added as shown below.



For faster release, use a zener diode with a rating two times the coil voltage.

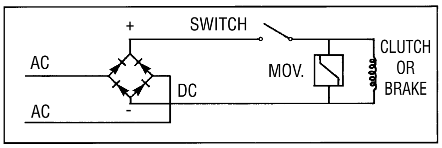


Technical Data & Formulas Imperial

Metal Oxide Varistor (MOV) –

Fast Disengagement Time

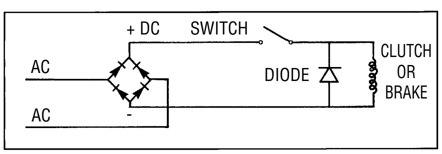
For applications requiring fast clutch or brake disengagement, an MOV connected in parallel with the clutch/brake coil should be used.



Diode

Slow Disengagement Time

For applications where a delayed disengagement is desired, a diode should be used in parallel with the clutch/brake coil or switch the AC side of the circuit.



Inertia Conversion Chart

To determine the inertia of a rotating member of a material other than steel, multiply the inertia of the steel diameter from Fig. A at right by:

MATERIAL	MULTIPLIER
Bronze	1.05
Steel	1.00
Iron	.92
Powdered Bronze	.79
Powdered Metal Iron	.88
Aluminum	.35
Nylon	.17

Fig. A Inertia Chart I = WR^2 of Steel (per inch of length)

DIA. (IN.)	WR2 (LB. - IN.^{2})
1/4	.00011
5/16	.00027
3/8	.00055
7/16	.00102
1/2	.00173
9/16	.00279
5/8	.00425
11/16	.00623
3/4	.00864
13/16	.01215
7/8	.01634
15/16	.02154
1	.0288
1 1/4	.0720
1 1/2	.144
1 3/4	.288
2	.432
2 1/4	.720
2 1/2	1.152
2 3/4	1.584
3	2.304
3 1/2	4.176
3 3/4	5.472
4	7.056
4 1/4	9.072
4 1/2	11.376
5	17.280
5 1/2	25.488
6	36.000
6 1/4	42.624
6 1/2	49.680
6 3/4	57.888
7	66.816

Note:

1. To determine WR^2 of a given shaft, multiply the WR^2 given above by the length of the shaft or the thickness of the disc in inches.
2. For hollow shafts, subtract WR^2 of I.D. from WR^2 of O.D. and multiply by length.

Underwriters Laboratories Standards

All Warner Electric standard clutches, brakes, and spring applied brakes are recognized by Underwriters Laboratories to both U.S. and Canadian safety requirements. Products built to meet their construction requirements are labeled with the UL symbol as shown above.

The products indicated meet UL Class B requirements.

Limited Warranty

For detailed information on Terms and Conditions of Sale, including warranty information, visit https://www.warnerelectric.com/company/terms-and-conditions

Warner Electric - Global Market Leader in Electromagnetic Clutch and Brake Technologies

Visit our website at https://www.warnerelectric.com for our full line of products, key markets served, literature, and news room updates.

Warner Electric Facilities

North America

USA
31 Industrial Park Road
New Hartford, CT 06057 - USA
860-379-1252
Electromagnetic Clutches and Brakes

449 Gardner Street
South Beloit, IL 61080 - USA
815-389-3771

4578 East Park 30 Drive
Columbia City, IN 46725 - USA
260-244-6183
Precision Electric Coils and Electromagnetic Clutches and Brakes

Customer Service
1-800-825-6544

Application Support
1-800-825-9050

Europe

France
7 rue de Champfleur - CS20095
49182 St Barthelemy d'Anjou - France
+33 (0)2 41 21 24 24
Electromagnetic Clutches and Brakes

Customer Service
+33 (0)2 41 21 24 76

Application Support
+33 (0) 2 41 21 24 24

Asia Pacific

Australia
+61 2 9894 0133

China
+86 21 5169-9255

Hong Kong
+852 2615 9313

Singapore
+65 6487 4464

Taiwan
+886 2 2577 8156

Thailand
+66 2322 5527

Scan to see all the brands of Regal Rexnord

WARNER ELECTRIC™
A REGAL REXNORD BRAND