

# INSTRUCTION MANUAL FOR DODGE® FSB AND FSBR SERIES POWER OFF BRAKES



**FSB SERIES**



**FSBR SERIES**

**WARNING:** To ensure that drive is not unexpectedly started, turn off and lock out tag power source before proceeding. Failure to observe these precautions could result in bodily injury.

## INSTALLATION

1. Pre-Assembly Inspection: All parts should be examined for any damage during the shipping and handling process. Measurements should be taken to ensure parts meet application mounting requirements, such as hub and shaft separation, etc. All parts must be clean and free of any foreign material before attempting assembly.

Prior to installing the FSB or FSBR brakes, ensure that the shaft is square with the mounting plate so that the hub seats properly in the friction material. This will help allow the brake to develop full rated torque.

2. Installation of Keys: Install key in shaft. Key should fit keyseat with a tight fit on the sides and slight clearance over the key.
- 3.

### A. FSB SERIES

Field coil assembly with mounting flange should be fastened securely to motor or other mounting surface.

**NOTE:** The perpendicularity of this mounting surface with respect to the shaft is not to exceed .005 inch total indicator reading (T.I.R.) at a diameter equal to the brake body outside diameter. Also the concentricity between the mounting holes or pilot diameter and the shaft should not exceed .010 inch T.I.R. for units FSB 001, 003, 007, 015 and .020 inch T.I.R. for units FSB 035, 050, 100.

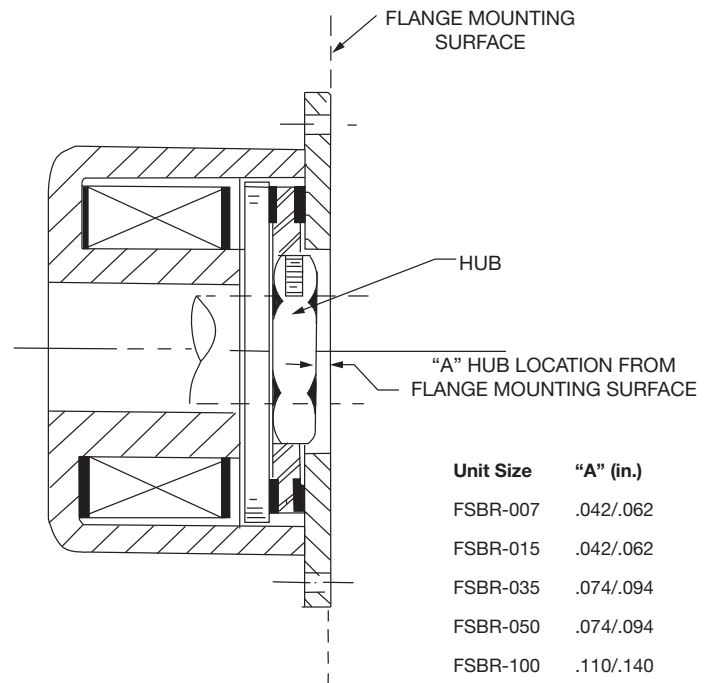
**WARNING:** Because of the possible danger to persons(s) or property from accidents which may result from the improper use of products, it is important that correct procedures be followed: Products must be used in accordance with the engineering information specified in the catalog. Proper installation, maintenance and operation procedures must be observed. The instructions in the instruction manuals must be followed. Inspections should be made as necessary to assure safe operation under prevailing conditions. Proper guards and other suitable safety devices or procedures as may be desirable or as may be specified in safety codes should be provided, and are neither provided by Baldor Electric Company nor are the responsibility of Baldor Electric Company. This unit and its associated equipment must be installed, adjusted and maintained by qualified personnel who are familiar with the construction and operation of all equipment in the system and the potential hazards involved. When risk to persons or property may be involved, a holding device must be an integral part of the driven equipment beyond the speed reducer output shaft.

Install hub with set screws outboard being certain hex or square hub mates with friction disc. With the brake coil not energized, bottom out the hub on the clapper plate, back hub away from clapper .010 to .025 inch, and then tighten set screws to recommended torque levels. See chart. On Models FSB 007 and FSB015 the hub will not bottom out on clapper plate.

**NOTE:** Brake mounting flange carries reaction load. Secure tightly.

### B. FSBR SERIES

Install hub on shaft. Locate the hub relative to mounting surface per dimension "A" in Figure 1. Then tighten set screws in hub to recommended tightening torques. See Table 3.

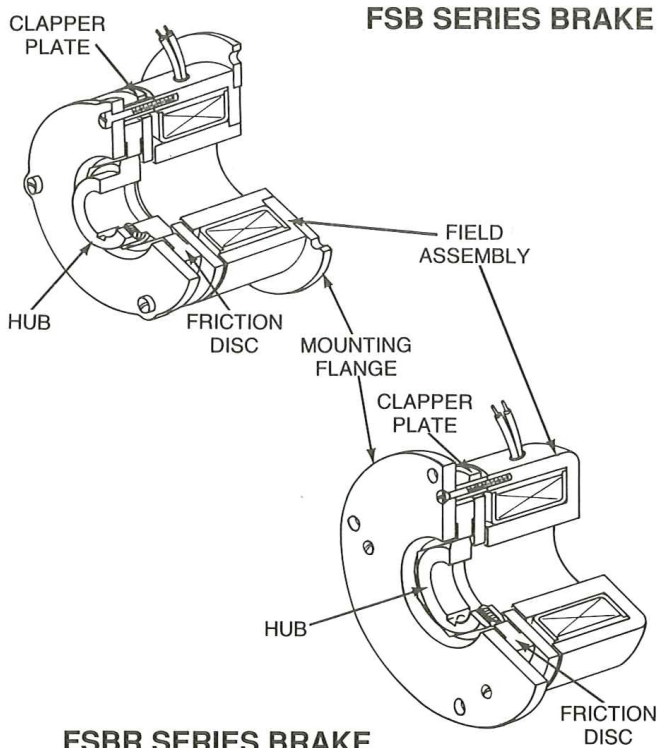


**Figure 1 - Dimension "A"**

**NOTE:** Positioning of hub is important for proper functioning of brake as it prevents hub from touching clapper plate and mounting surface. Flange carries brake reaction load, so secure tightly. Mount field assembly on hub and secure mounting flange to mounting surface.

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





## FSBR SERIES BRAKE

Figure 2 - FSB and FSBR Series Brakes

**WARNING:** The user is responsible for conforming with the National Electrical Code and all other applicable local codes. Wiring practices, grounding, disconnects and overcurrent protections are of particular importance. Failure to observe these precautions could result in severe bodily injury or loss of life.

4. Wire the two leads to the power supply. DODGE power supplies are available with a wiring diagram showing the proper electrical connections.
5. Burnish if desired. See Burnishing Procedure for details. FSB/FSBR series brake are not supplied preburnished.
6. After unit has operated for a short period, recheck air gaps, drive component mounting, and set screw torques.

## BURNISHING PROCEDURE

Burnishing is a wearing-in or mating process to ensure that the highest possible output torques will be obtained from the individual unit.

Unless it is required to decelerate a large inertia load, the normal slip that will occur when the load is engaged is frequently sufficient to cause the unit to become burnished. DODGE clutches and brakes typically will produce 50-90% of their rated torque "out of box" without burnishing. Customer should determine if "out of box" torques are adequate for the application as torque will automatically improve with normal cycling.

Care must be taken to prevent contamination of the friction faces with oil or dirt particles during the burnishing process.

1. If possible burnish units in their final application or location to ensure alignment of the mated parts.
2. If units cannot be burnished in final application, mount units in a test stand observing concentricity, alignment and air gaps.
3. Rotate hub member of the brake at suggested RPM (see chart) while holding the mounting plate stationary to obtain a forced slip while the unit is unenergized.
4. Run unit for a three (3) minute forced slip.

Table 2 - Suggested RPM

Unit Size	Burnishing RPM ± 10%	Standard Static Torque Rating
001	500	1 in. lbs.
003	500	3 in. lbs.
007	380	7 in. lbs.
015	320	15 in. lbs.
035	300	35 in. lbs.
050	260	50 in. lbs.
100	100	100 in. lbs.

Table 3 - RECOMMENDED TIGHTENING TORQUES

Set Screw Size	Recommended Tightening Torque (in. lb.)
#4	5.0
#5	9.5
#6	9.5
#8	19.4
#10	33.5
1/4"	78.0

Do not prolong beyond a three (3) minute duration. Long burnish time will cause excessive heat build-up at the friction faces resulting in poor performance.

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5. Measure the static (or breakaway) torque of the unit.
6. Static torque of DODGE Power Off brakes after burnishing to the above procedure should be at their catalog rating (see chart.)
7. If the unit does not measure catalog rating, repeat steps 3 and 4 after a cool down period of five (5) minutes until unit comes up to the rated torque.

## REPLACEMENT PARTS (FSB & FSBR UNITS)

Adjustments are made at the factory to ensure proper gaps, etc. Since virtually all components will wear during normal operation, it is suggested that when replacement is necessary, the entire unit be replaced.

Table 4 - APPLICATION DATA											
FSB Allowable Cycle/Minute *											
Model No	RPM	Inertia (lb. in2)				Model No	RPM	Inertia (lb. ins.)			
		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	.8						

\* Chart intended as a guide. For other speeds and inertia, consult Dodge.

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Table 5 - FSB Allowable Cycle/Minute*					
Model No.	RPM	Inertia (lb-in2)			
		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 inertia, consult Dodge.

Table 6 - MAXIMUM INPUT RPM	
(Note: Consult Dodge Engineering For Special Applications)	
Type: FSB and FSB	
Size	Max. Input RPM
001	20,000
003	
007	15,000
015	
035	10,000
050	
100	5,000

The following is a list of typical “Pick” and “Drop” times for standard Power Off Brakes.

Table 7 - Response Time – Standard Power Off Brakes			
Series	Pick Time	Drop Time with Diode Arc Suppression	Drop Time With MOV Arc Suppression
001	8	14	1
003	35	34	2
007	39	88	1
015	30	92	1
035	60	205	1
050	68	60	3
100	100	140	5

*Pick* is defined as time to electrically energize and free the brake torque.

*Drop* is defined as time to electrically de-energize and produce torque.

All times are measured in milliseconds.

Notes:

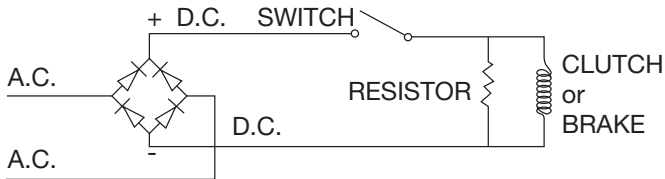
1. Brakes tested at 72°F and at nominal voltage air gap.
2. The Pick and Drop values are typical and should be used as a guide.
3. For special applications consult Dodge Engineering.

## ARC SUPPRESSION

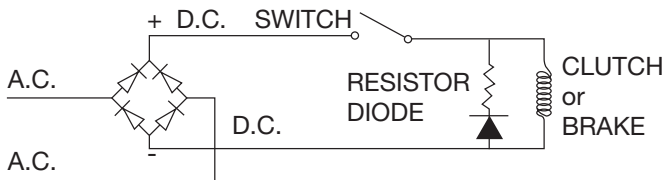
When the clutch or brake is de-energized, a reverse voltage is generated in the coil. The reverse voltage can be very high and may cause damage to the coil and switch in the circuit. To protect the coil and switch the voltage should be suppressed using an arc suppression circuit.

### Resistor/Diode/Zener Diode— Normal Disengagement Time

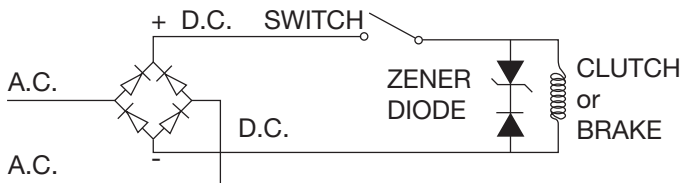
For most applications a resistor connected in parallel with the clutch/brake coil is adequate. The resistor should be rated at six times the coil resistance and approximately 25% of the coil wattage.



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

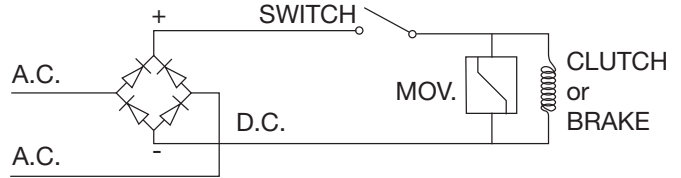


For faster release use a zener diode with a rating two times the coil voltage.



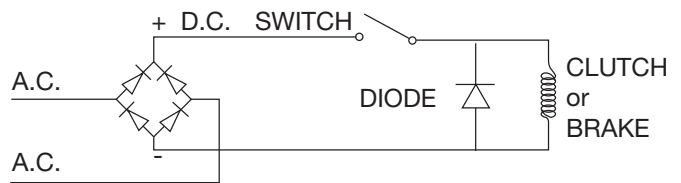
### Capacitor or Metal Oxide Varistor (MOV)— Fast Disengagement Time

For applications requiring fast clutch or brake disengagement, MOV connected in parallel with 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 clutch/brake coil or switch the A/C side of the circuit.



DODGE FSB and FSBR Series Power-Off Brakes are recognized by the Underwriters Laboratories (UL) and the Canadian Standards Association (CSA). All products built to meet their construction requirements are labeled with the UL and CSA recognized symbol. All products meet UL Class B requirements.

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