

# Instruction Manual

## DODGE IEB Series Electric Brakes

These instructions must be read thoroughly before installation or operation.

**Figure 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. All parts must be clean and free of any foreign material before attempting assembly.

**NOTE:** IEB electric brakes are power on units (brake engages when power is on). IEB brakes are preburnished at the factory and do not require break-in operation. IEB brakes are designed with DYNAGAP™ self-adjusting feature that will automatically compensate for friction surface wear. Armature air gaps should range from 0.030" to 0.050", which have been pre-set at the factory. Do not oil or grease friction surfaces.

IEB brakes may be mounted on either a thru shaft or motor with shaft extension.

DODGE IEB Series brakes meet UL508 standards and are also CSA (Canadian Standards Association) approved.

### INSTALLATION: Thru Shaft Mounting

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

1. The IEB-375 is furnished as straight bored brake only and mounts directly on a thru shaft. Install key and slide brake into position. Tighten the two setscrews to 78 in-lbs.

All other IEB brakes are mounted using TAPER-LOCK® bushings. Pre-position TAPER-LOCK bushing in armature hub before sliding onto shaft. Do not completely draw-in TAPER-LOCK bushing.

2. Install reaction arm on brake housing, (see Installing Brake Reaction Arm section).

**Table 1 - Brake/Bushing Compatibility**

Brake Size	TAPER-LOCK Bushing Size Used
IEB-375	None Used – Bored-to-Size
IEB-475	#1008 – 1" Max. Bore
IEB-650	#1310 – 1-7/16" Max. Bore
IEB-825	#1615 – 1-11/16" Max. Bore

**WARNING:** Because of the possible danger to person(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 risks 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.

**Table 2 - Electrical Coil Data**

IEB-375			
Voltage—DC	90	24	6
Resistance @ 20°C—Ohms	458	30	1.97
Current—Amperes	.196	.800	3.05
Watts	17.6	19.2	18.3
Coil Build-up—milliseconds	35	36	32
Coil Decay—milliseconds	6	6	6
IEB-475			
Voltage—DC	90	24	6
Resistance @ 20°C—Ohms	476	32.3	2.06
Current—Amperes	.189	.743	2.92
Watts	17.0	17.8	17.5
Coil Build-up—milliseconds	96	97	91
Coil Decay—milliseconds	16	16	16
IEB-650			
Voltage—DC	90	24	6
Resistance @ 20°C—Ohms	250	16.2	.910
Current—Amperes	.36	1.48	6.63
Watts	32	36	39
Coil Build-up—milliseconds	115	112	110
Coil Decay—milliseconds	20	20	20
IEB-825			
Voltage—DC	90	24	6
Resistance @ 20°C—Ohms	220	14.5	1.10
Current—Amperes	.40	1.65	5.4
Watts	36	40	32
Coil Build-up—milliseconds	175	172	170
Coil Decay—milliseconds	85	83	80

**NOTE:** Coil build-up is to 80% of Rated Current. Coil Decay Time is with DODGE Power Supply. Due to variations in other manufacturers' supplies, the delay time may vary.

### INSTALLATION: Motor Mounting

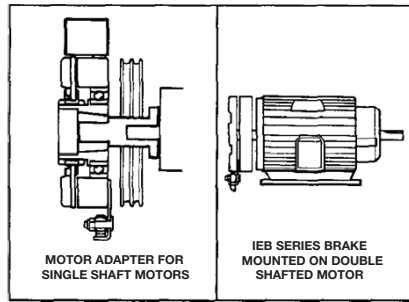
Mounting the IEB brake onto a motor shaft may require an optional shaft extension.

1. Mount a standard sheave, sprocket or pulley on the usable length of the brake adapter (see Table 5 for brake adapter dimensions). The drive component can be mounted using TAPER-LOCK® or Q.D. Bushings.
2. Insert the proper TAPER-LOCK® bushing into the IEB Brake.  
**NOTE:** IEB-375 is straight bore mounted.
3. Finger tighten setscrews (loosely) into bushing.
4. Mount IEB brake on end of motor adapter. Tighten setscrews in bushing (or hub for IEB 375) per recommended tightening torques.
5. Slide complete assembly (brake, drive component and adapter) onto motor shaft extension and tighten setscrews. (Be sure key is installed in keyway).
6. Position V-belts, chains, etc. on drive component.
7. Fasten reaction arm on brake housing. See Installation: Brake Reaction Arm.



8. Be sure all parts are securely fastened before attempting to operate this unit.

Figure 2



## ELECTRICAL CONNECTIONS

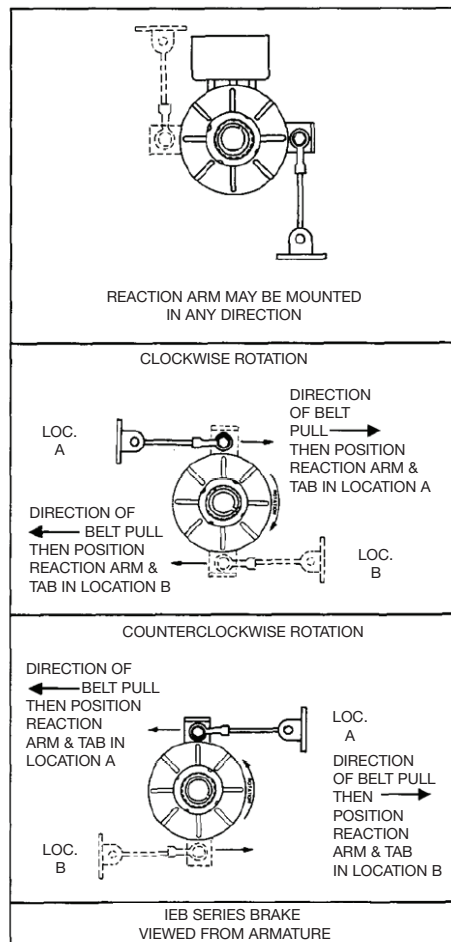
**DANGER:** The user is responsible for conforming with the National Electrical Code and all other applicable local codes. Wiring practices, grounding, disconnects and overcurrent protection are of particular importance. Failure to observe these precautions could result in severe bodily injury or loss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

DODGE IEB Series brakes operate on standard DC voltage coils. To operate the brake with alternating current, an AC to DC power supply is required. Do not connect AC voltage directly to coil leads. Wire the two leads to the power supply. DODGE power supplies are available with a wiring diagram showing proper electrical connections.

## INSTALLATION: Brake Reaction Arm

The reaction arm acts as a restraining mechanism when the brake is applied. The IEB brake operates best when used with the supplied reaction arm. The ball joint ensures proper housing reactions. If an alternate reaction arm is being used, be sure to use a ball-type joint that pivots to allow the holding reaction without binding the magnet field. The threaded rod provided can be cut to any length desired. The reaction arm should be mounted so the arm is at a right angle and in tension rather than compression.

Figure 3



## MAINTENANCE GUIDE

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

### TASK

### PROCEDURE

#### Armature Replacement

Remove worn armature by rotating and gradually prying the armature off the splined hub. (On sizes 650 and 825 this will involve first removing the retaining ring on the outside diameter of the spline hub.) You must overcome gripping force of the grip ring, therefore, the use of a small puller simplifies this task. You must overcome this same gripping force when installing the new armature. Care must be taken not to bend armature washers during assembly. A soft mallet and/or block of wood can be used to start the armature onto the spline. With the finned armature surface facing away from the friction surface, push brake armature flush against brake magnet friction surface and release. The DYNAGAP™ feature will automatically set air gap. Reinstall retaining ring when finished.

#### Replacing the Brake Magnet

Remove brake from shaft. Remove armature using Armature replacement procedure. Press splined hub out of unit for use with new brake magnet. A new brake magnet assembly consists of a brake magnet (including friction material) and ball bearing. Using the splined hub out of old unit, press into new brake magnet assembly. Important: Ensure inner race of ball bearing is properly supported to avoid damage to the bearing. After replacing the snap ring, reinstall the armature again using Armature replacement procedure.

## TROUBLESHOOTING GUIDE

**DANGER:** Subsequent steps require rotating parts and/or electrical circuits to be exposed. Stay clear if unit must be running or disconnect and lockout or tag power source if contact must be made. Failure to observe these precautions could result in severe bodily injury or loss of life.

### SYMPTOM/CAUSE

### SOLUTION

#### Armature rubbing, periodic noise to constant rubbing.

Disconnect power to motor. Adjust armature position using a screwdriver to pry the armature away (.060" to .090") from friction surface on which it is rubbing. Energize coil. Using even pressure, push armature toward friction surface until it is fully engaged. It should pull in by itself when it gets close enough. Remove pressure and de-energize coil. The DYNAGAP™ self-adjusting feature will automatically maintain proper air gap (.030" to .050").

#### No engagement when coil is energized.

- (1) Coil may be shorted to ground.
- (2) Armature air gap is too large.

(1) Check coil resistance as follows: Disconnect power to motor. Connect ohmmeter to two brake leads. Check value with Table 2 Electrical Coil Data. If OK, proceed to solution for checking armature air gap. If not OK, indicates some electrical problem with coil. Proceed to procedure for replacing brake magnet in the Maintenance Guide.  
(2) Disconnect power to motor. Energize coil. Using even pressure, push armature toward friction material surface until armature engages fully. If armature still does not engage properly, see Armature rubbing.

**Excessive overlap.** Customer switch should be on DC side of rectifier (power supply). A counter or timer mechanism may include a time constant circuit or diode which may create overlap. Check components.

**Rapid wear or short life.** Brake may be cycling too rapidly and/or operating at high temperatures (component selection may need review). The unit may be operating in a harsh environment. Actuation times may need adjustment.

(1) Rapid Cycling: Fast, repetitive cycling will result in more rapid wear and higher temperatures. High temperatures will also accelerate wear rates. Ensure the unit is being ventilated for maximum cooling to maximize life.

(2) Exposure to harsh environments such as on machinery that produces abrasive dust or grit may shorten life of unit. In these types of environments, an effort should be made to shield the brake from abrasive materials.

(3) Minor adjustments to the actuation time can prevent premature failure of brake. The control potentiometer, if provided, can be adjusted to a lower setting to extend actuation time, which can result in a longer operating life.

**CAUTION: Only personnel familiar with wear patterns and the possible effect on the operation of the product's performance should adjust the potentiometer setting.**

**NOTE:** Normal wear conditions will result in grooves appearing on the friction surfaces. Machining away these grooves can result in premature failure of the unit.

**Loss of torque.** Improper input voltage can cause complete loss of torque. Brake may be nearing the end of its normal life or friction surface may be contaminated with grease/oil.

If a complete loss of torque occurs, initially check the input voltage to the brake magnet as follows: Connect a DC voltmeter with proper range across brake magnet terminals. With power to the coil and potentiometer turned to highest setting, voltage should read within 10% of unit's rating. As the potentiometer knob is adjusted counterclockwise (lower), the voltage should drop. If these checks prove proper voltages are being provided, then mechanical components of the unit should be checked to ensure the unit has not been damaged or improperly installed. A slight loss in torque may become evident as the brake nears the end of its normal life. Grease or oil contamination can result in a substantial loss of torque. If the brake is positioned near any machinery which requires frequent lubrication, care must be taken to avoid grease or oil contacting friction surfaces. Should oil or grease reach the friction area, immediately clean the friction surfaces and general area with a cloth dampened with a degreaser. Do not drench or soak the friction material. Continued loss of torque will result if friction material is completely contaminated with oil or grease. Heat developed at the friction surface will cause the oil to bleed to the surface, resulting in torque loss. In this case, the friction surfaces need replaced.

## BURNISHING PROCEDURE

For consistent engagement and full rated torque it is necessary to burnish the brake.

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

**NOTE:** Burnishing is an important maintenance step. Running the unit without an initial burnishing break-in period may cause the equipment to operate erratically. Full rated torque will not be developed until friction surfaces develop full contact.

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 their final application, mount units in a test stand observing concentricity, alignment and air gaps.

**NOTE:** If burnishing capability is not practical, cycle the brake (several hundred engagements may be necessary) to wear unit in and allow torque to increase.

3. Using a filtered DC power supply, energize unit at 100% of rated coil voltage for 5 seconds maximum (this assures proper armature engagement against magnet), then reduce voltage to 30-40% of rated coil voltage.
4. Rotate the brake armature at suggested RPM (Table 3) while holding the brake magnet stationary to obtain a forced slip while the unit is energized.

**Table 3 - Recommended Burnishing RPM**

Unit Size	Burnishing RPM +10%
IEB-375	40
IEB-475	30
IEB-650	20
IEB-825	20

5. De-energize the unit after a 2-minute forced slip.

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6. Measure static (or break away) torque of the unit with both friction members of the brake stationary, at rated voltage.
7. Static torque should be at the catalog rating (Table 4). If unit does not measure catalog rating, repeat step 4 after a cool down period of 5 minutes, until the unit comes up to the rated torque.

**Table 4 - Standard Static Torques**

Unit Size	Static Torque Ft-Lbs.
IEB-375	22
IEB-475	34
IEB-650	100
IEB-825	175

### NOTES:

If clutch 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 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 application as torque will automatically improve with normal cycling (especially on high speed, high inertia load applications).

Do not prolong burnish beyond 2-minutes. Long burnish time will cause excessive heat build-up at friction faces resulting in poor performance.

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

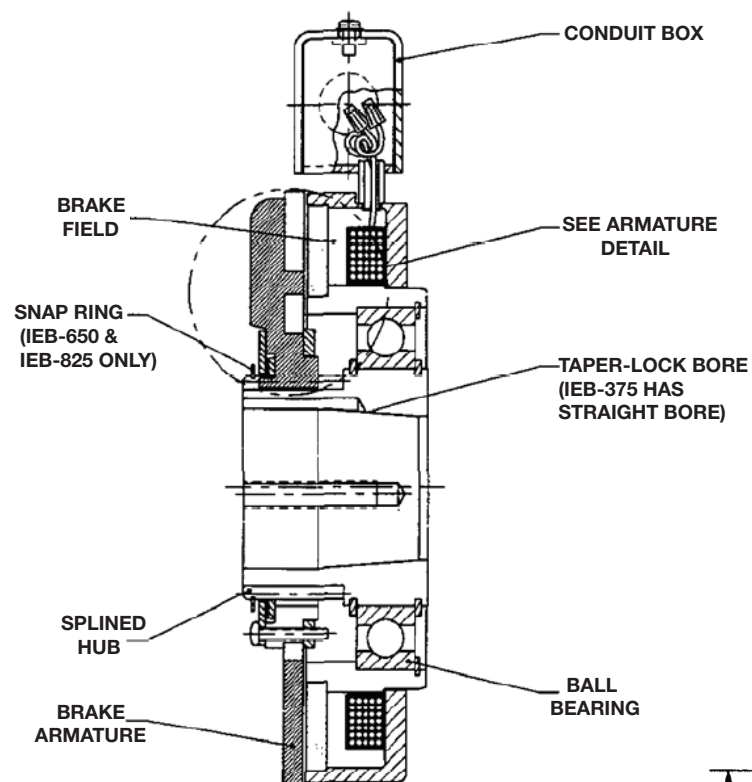


Figure 4 - IEB Cross Section

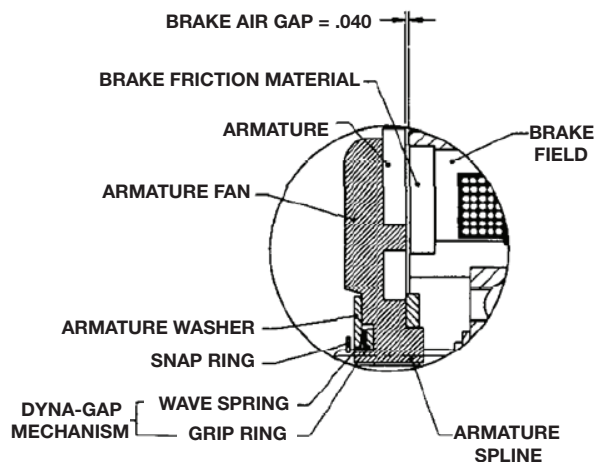


Figure 5 - Armature Detail

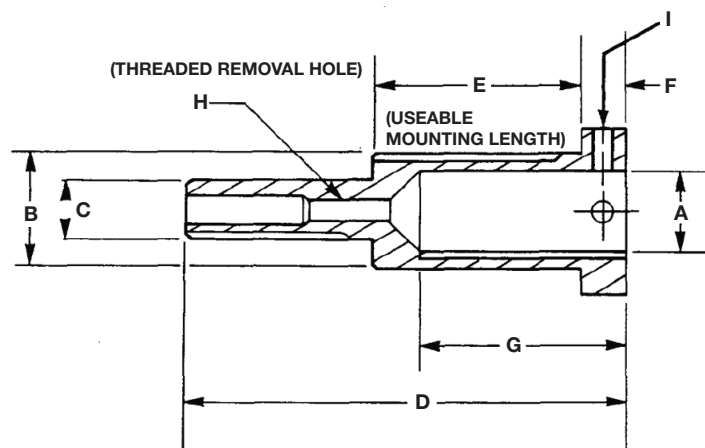


Figure 6 - IEB Adapters

Table 5 - IEB Adapter Dimensions (inches)

Size	Adapter P/N	A	A Keyway	B	B Keyway	C	C Keyway	Bushing Size	Taper-Lock Bushing P/N for Brake	Bushing P/N D	E	F	G	H	I
IEB-375	032300	5/8	3/16 x 3/32	7/8	3/16 x 3/32	5/8	3/16 x 3/32	none	none	4.391 4.359	2	.516 .484	2	1/4-20 UNC	1/4-20
	032301	7/8	3/16 x 3/32	1-1/4	1/4 x 1/8	5/8	3/16 x 3/32	none	none	4.578 4.742	2-1/4	.516 .484	2-1/4	1/4-20 UNC	1/4-20
IEB-475	032302	1-1/8	1/4 x 1/8	1-5/8	3/8 x 3/16	1	1/4 x 1/8	1008	119184	4.516 4.484	2-3/4	.641 .609	2-3/4	1/2-13 UNC	3/8-16
IEB-650 & IEB-825	032303	1-3/8	5/16 x 5/32	2	1/2 x 1/4	1-3/8	5/16 x 5/32	1310	119404	5.547 5.515	3-3/8	.641 .609	3-3/8	1/2-13 UNC	3/8-16
	032304	1-5/8	3/8 x 3/16	2-1/4	1/2 x 1/4	1-3/8	5/16 x 5/32	1310 1615	119404 119054	6.172 6.140	4	.641 .609	4	1/2-13 UNC	3/8-16

# BALDOR®

World Headquarters

P.O. Box 2400, Fort Smith, AR 72902-2400 U.S.A., Ph: (1) 479.646.4711, Fax (1) 479.648.5792, International Fax (1) 479.648.5895

Dodge Product Support

6040 Ponders Court, Greenville, SC 29615-4617 U.S.A., Ph: (1) 864.297.4800, Fax: (1) 864.281.2433

[www.baldor.com](http://www.baldor.com)

