

# Primary Clutch/Brake Pin Drive, Spline Drive PCB-825, PCB-1000, PCB-1225 Primary Clutch/Brake Coupling PCBC-825, PCBC-1000, PCBC-1225

P-205  
819-0474

## Installation Instructions



Contents

Installation Instructions  
PCB-825, PCB-1000, PCB-1225 .....3  
Pin Drive Armature  
PCB-825, PCB-1000, PCB-1225 .....8  
Spline Drive Armatures  
PCBC-825, PCBC-1000, PCBC-1225 .....9  
Coil Data .....14  
Burnishing and Maintenance .....14-15  
Illustration Drawings  
PCB-825, PCB-1000, PCB-1225 .....16  
Pin Drive  
PCB-825, PCB-1000, PCB-1225 .....22  
Spline Drive  
PCBC-825, PCBC-1000, PCBC-1225 .....28  
Bushing Part Numbers .....34  
Warranty .....Back Page

**⚠ WARNING** Follow the installation instructions in this manual carefully to ensure safe, reliable operation. All stated or implied manufacturer warranties are voided if this product is not installed in accordance with these instructions.

**⚠ WARNING** Failure to follow these instructions may result in product damage, equipment damage, and serious or fatal injury to personnel.



PCB-825  
Pin Drive



PCBC-825  
Spline Drive

## Clutch-Brake Pin Drive Armatures PCB-825 PCB-1000 PCB-1225

The illustration drawings, parts lists, and exploded views for these units can be found starting on page 16.

The brake half of the clutch/brake unit is usually installed first; however, in some cases it may be necessary to start with the clutch portion of the unit to assure a proper assembly when complete.

### A. Installing the Conduit Box

Install the conduit box on the brake magnet. Instructions for this procedure can be found with Conduit Box.

### B. Mounting the Brake Magnet

The brake magnet is mounted to a stationary machine member by a flange. Extreme care must be taken in selecting the location for the mounting of the magnet. Proper positioning is very important for the unit to function correctly.

1. A pilot diameter on the mounting surface is essential to hold the magnet within the required tolerances. (Figure 1)

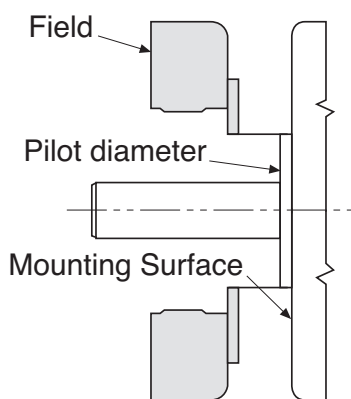


Figure 1

2. A machined pilot diameter is provided on the magnet mounting flange (refer to illustration drawings) to aid in the proper positioning of the magnet.
3. Once the mounting surface has been prepared, the magnet is bolted in place with capscrews and lock-washers. (Figure 2)

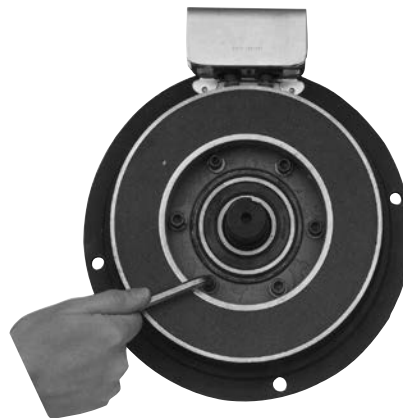


Figure 2

4. Use a dial indicator to check the unit for concentricity and squareness to the shaft. The unit should be concentric within .010 T.I.R. and square within .006 T.I.R. (Figure 3)

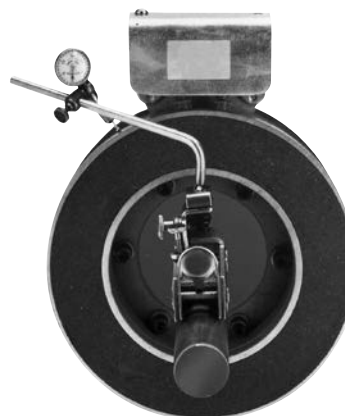


Figure 3

### C. Assembling the Clutch Magnet and Magnet Hub

1. Insert the lead wires through the rubber terminal caps and into the collector ring. The shorter wire goes into the hole in the front of the ring (the side that will be mounted to the magnet). The longer wire goes through the ring and into the hole in the back.

Press the bullet-type connectors firmly into place. (Figure 4)

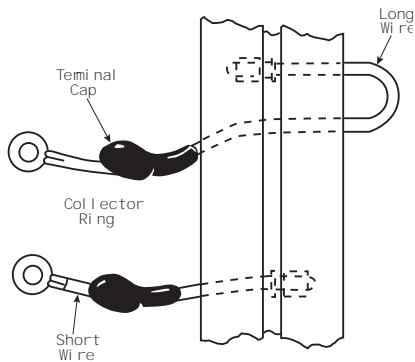


Figure 4

2. Mount the magnet to the magnet hub using capscrews and lockwashers. (Figure 5)



Figure 5

3. Secure the lead wires to the magnet terminals with screws and lockwashers.
4. Pull the rubber caps over the terminals.

### D. Assembling the Brake Armature and Magnet Hub

Assemble the armature to the magnet hub with the autogap mounting accessory.

The autogap accessory is a double spring device which allows for automatic armature clearance and adjustment for wear. The smaller or conical spring pushes the armature from the magnet face, leaving a gap of about 1/32 inch, while the straight spring automatically follows up for wear. This combination maintains maximum performance efficiency throughout the life of the unit.

The assembly procedure for the autogap accessory is as follows. (Figure 6)

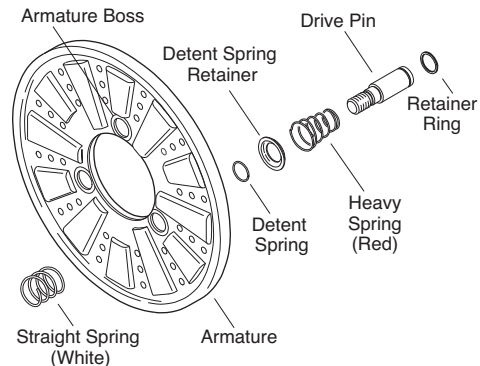


Figure 6

**Note:** The 1225 unit is mounted with four drive pins instead of three as shown in the pictures; however, the assembly procedure is the same for either case.

#### Step 1

Place straight springs (white) over armature bosses on back side of armature. (Figure 7)



Figure 7

### Step 2

Compress the heavy (red) spring on each drive pin by sliding detent spring towards head of pin. (Figure 8)



Figure 8

### Step 3

Insert assembled drive pins through armature (entering from segmented side), through straight (white) springs, and into magnet hub. (Figure 9)

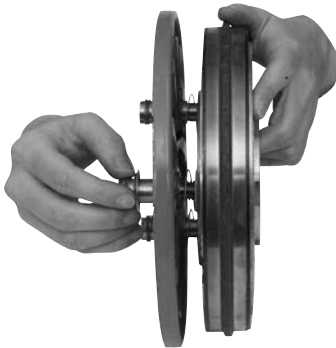


Figure 9

**Note:** Apply Grade "AA" Loctite® Sealant on pin threads.

### Step 4

Tighten pins until shoulders of pins are against face of hub. Since threads are class No. 3 fit, pins may seem to bind.

**CAUTION** Straight springs must not get caught under shoulders of drive pins.

### Step 5

Check to see that the armature is completely compressed against the face of the hub.

### Step 6

To set the autogap, slide the detent spring retainers against the armature face. (Figure 10)



Figure 10

**Note:** This position must not be disturbed during completion of assembly.

## E. Mounting the Magnet-Hub-Armature Assembly

This assembly is mounted on the shaft with a taperlock bushing. All parts must be clean and free from burrs and chips before assembling.

1. Place the bushing into the hub, and insert the key. The key is a side-to-side fit and should not contact the top of the keyway.
2. Insert the locking setscrews loosely into the bushing, and slide the assembly onto the shaft.

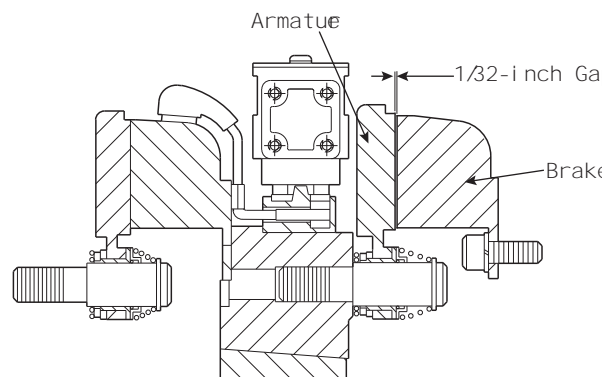


Figure 11

3. Position the assembly to allow a gap of about 1/32-inch between the brake magnet and armature faces. (Figure 11)

Once this gap is set, it will be automatically maintained for the life of the unit.

4. Secure the assembly in this position on the shaft by alternately tightening each setscrew. During the tightening process, the bushing should be tapped lightly to make certain it seats-in properly.

**Note:** For pin drive armatures (normal duty), continue to F. For spline drive armatures (heavy duty), proceed to F. on page 8.

### F. Assembling the Clutch Armature

1. A customer may wish to use the autogap accessory to mount a clutch armature to his own pulley, hub, gear, etc. Follow the illustrated dimensions (Figures 12 & 13) to properly adapt these parts to the armature.

- a. Chordal dimensions "A" and "C" must be held for all chords between pin holes.
- b. Drill 27/64-inch diameter holes to a sufficient depth and tap for 1/2-13 NC-3 1-1/8-inch minimum full threads. Pin holes must be square with plane of mounting surface and magnet mounting.
- c. Ream .501/.500 to a 3/8-inch depth and to be concentric with tapped holes.

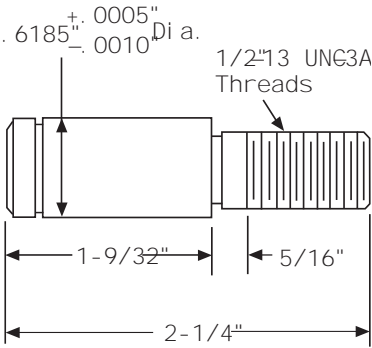
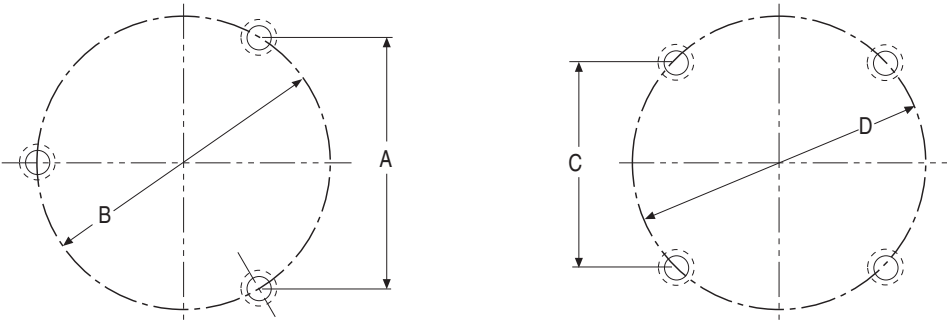


Figure 13

### Machining Instructions for Gear, Sprocket, or Pulley



| Unit Size | A            | B            | C            | D            |
|-----------|--------------|--------------|--------------|--------------|
| 825       | 3.085 ± .001 | 3.563 ± .001 |              |              |
| 1000      | 4.548 ± .002 | 5.252 ± .002 |              |              |
| 1225      |              |              | 4.155 ± .002 | 5.877 ± .002 |

Figure 12

2. Once the pulley, gear, etc., has been adapted to the armature according to the above directions, it may be mounted to the armature using the autogap accessory.

The procedure is the same as described for the brake armature on page 3.

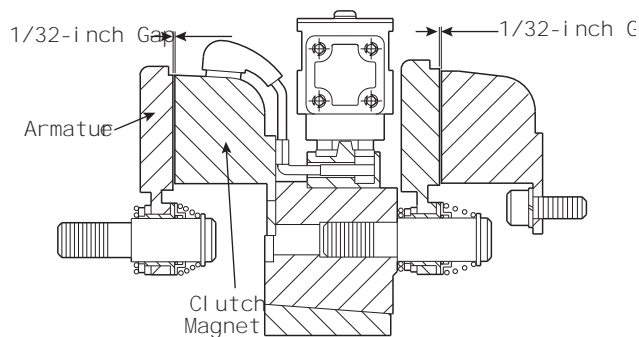


Figure 14

## G. Mounting the Clutch Armature

1. Slide the armature and customer supplied pulley sprocket or hub assembly onto the shaft.
2. Adjust the armature's position to allow a 1/32" gap between the magnet and armature faces. (Figure 14)

Once this gap is set, it will be automatically maintained for the life of the unit.

3. The armature and customer supplied pulley, sprocket or hub assembly can be held in position on the shaft by (a) retainer rings, (b) set collars, (c) a shoulder on the shaft, or (d) any combination of these. The best method will depend on the characteristics of each application.

## H. Mounting the Brushholder

1. The brushholder is mounted on a bracket which must be furnished by the customer. The bracket must be firmly secured to prevent vibration which could cause improper contact between the brushes and collector ring.
2. The distance from the centerline of the shaft to the top of the brushholder should be 5-3/4". Maintaining this distance will assure proper spring tension on the brushes and maximum wear follow-up. A detailed dimensional drawing is included with each brushholder.

## PCB-825 PCB-1000 PCB-1225 Clutch-Brake Spline Drive Armature

The illustration drawings, parts lists, and exploded views for these units can be found beginning on page 22.

Refer to the installation instructions for pin drive armature units, page 3, for steps A-E.

### F. Assembling the Spline Drive Armature

1. These clutch-brake units contain spline drive armatures and hubs. The armatures are shipped with a built-in autogap spring accessory. This device automatically maintains a gap of about 1/32 inch between the armature and magnet faces for the life of the unit.

The spline drive armature assembly is shipped with the armature, splined armature adapter, and autogap already assembled. The splined hub and capscrew accessories are shipped as separate parts.

Follow these instructions to assemble the splined armature assembly and hub:

- a. Place the armature-adapter assembly on a flat surface with the segmented side up.
- b. Push the splined hub, with the pilot diameter down (refer to illustration drawings) through the autogap spring and splined armature adapter. (Figure 12)

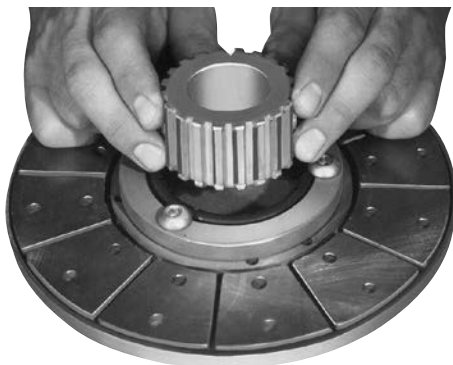


Figure 12

2. A customer may mount the clutch armature to his own pulley, hub, gear, etc. Refer to the illustration drawings, "Armature View," for the dimensional information needed to drill and tap holes in the customer part.

The splined hub pilot diameter must be concentric with the splined armature center of rotation within .010 T.I.R.

3. Mount the armature to the customer's part using the capscrew accessory provided.

Maintain a 1/16-inch clearance between the armature adapter and the customer part after the parts have been assembled.

### G. Mounting the Clutch Armature Assembly

1. Slide the complete armature and customer supplied pulley, sprocket or hub assembly on to the shaft.
2. Adjust the armature's position to allow a 1/16-inch gap between the magnet and armature faces. (Figure 13)

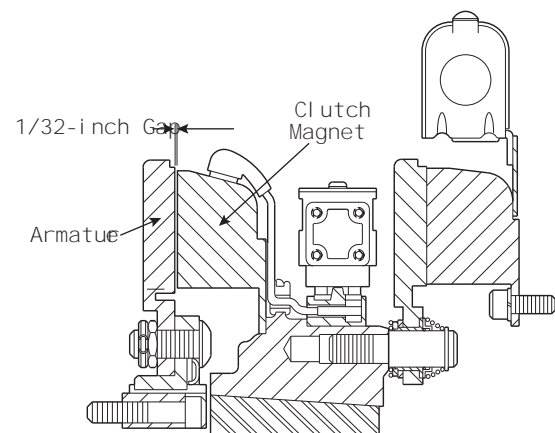


Figure 13

3. Secure the armature assembly in position by a) retainer rings, b) set collars, c) shoulder on the shaft, or d) any combination of these. The best method will depend on the characteristics of each application.
4. When the armature is secure on the shaft, push the armature against the magnet face. When the armature is released, it will spring back about 1/32-inch. This gap will be automatically maintained for the life of the unit. P- 205-01 • 819-0474

## H. Mounting the Brushholder

1. The brushholder is mounted on a bracket which must be furnished by the customer. The bracket must be firmly secured to prevent vibration which could cause improper contact between the brushes and collector ring.
2. The distance from the centerline of the shaft to the top of the brushholder should be 5-3/4". Maintaining this distance will assure proper spring tension on the brushes and maximum wear follow-up. A detailed dimensional drawing is included with each brushholder.

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### Clutch-Brake Coupling PCBC-825 PCBC-1000 PCBC-1225

The illustration drawings, parts lists, and exploded views for these units can be found beginning on page 28.

The brake half of the clutch/brake unit is usually installed first; however, in some cases it may be necessary to start with the clutch portion of the unit to assure a proper assembly when complete.

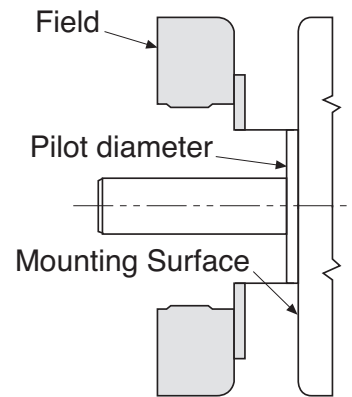


Figure 1

#### A. Installing the Conduit Box

Install the conduit box on the brake magnet. Instructions for this procedure can be found with Conduit Box.

#### B. Mounting the Brake Magnet

The brake magnet is mounted to a stationary machine member by a flange. Extreme care must be taken in selecting the location for the mounting of the magnet. Proper positioning is very important for the unit to function correctly.

1. A pilot diameter on the mounting surface is essential to hold the magnet within the required tolerances. (Figure 1)
2. A machined pilot diameter is provided on the magnet mounting flange (refer to illustration drawings) to aid in the proper positioning of the magnet.
3. Once the mounting surface has been prepared, the magnet is bolted in place with capscrews and lockwashers. (Figure 2)

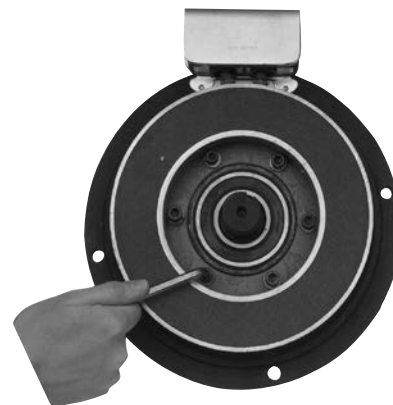


Figure 2

4. Use a dial indicator to check the unit for concentricity and squareness to the shaft. The unit should be concentric within .010 T.I.R. and square within .006 T.I.R. (Figure 3)

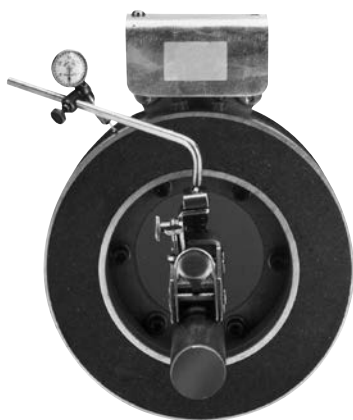


Figure 3

### C. Assembling the Clutch Magnet and Magnet Hub

1. Insert the lead wires through the rubber terminal caps and onto the collector ring. The shorter wire goes into the hole in the front of the ring (the side that will be mounted to the magnet). The longer wire goes through the ring and into the hole in the back.

Press the bullet-type connectors firmly into place. (Figure 4)

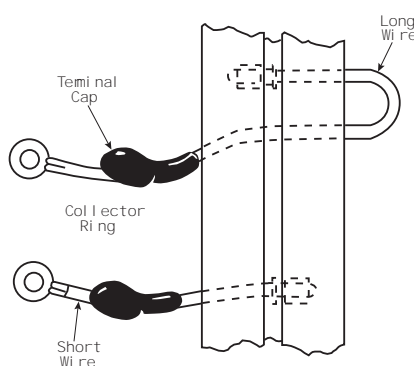


Figure 4

2. Mount the magnet to the magnet hub using capscrews and lockwashers. (Figure 5)



Figure 5

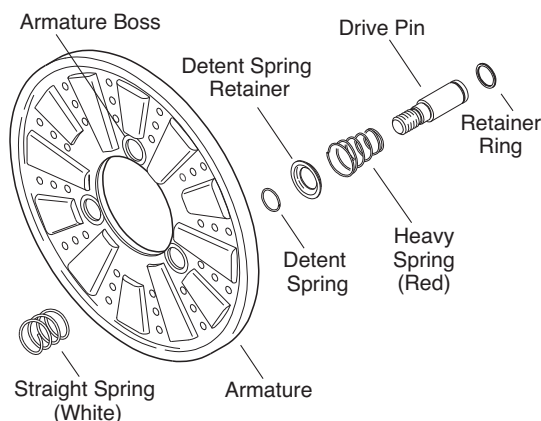
3. Secure the lead wires to the magnet terminals with screws and lockwashers.
4. Pull the rubber caps over the terminals.

### D. Assembling the Brake Armature and Magnet Hub

Assemble the armature to the magnet hub with the autogap mounting accessory.

The autogap assembly is a double spring device which allows for automatic armature clearance and adjustment for wear. The smaller or conical spring pushes the armature from the magnet face, leaving a gap of about 1/32 inch, while the straight spring automatically follows up for wear. This combination maintains maximum efficiency throughout the life of the unit.

The assembly procedure for the autogap accessory is as follows (Figure 6):



(Figure 6)

**Note:** The 1225 unit is mounted with four drive pins instead of three as shown in the pictures; however, the assembly procedure is the same for either case.

### Step 1

Place straight springs (white) over armature bosses on back side of armature. (Figure 7)



Figure 7

### Step 2

Compress the heavy (red) spring on each drive pin by sliding detent spring towards head of pin. (Figure 8)



Figure 8

### Step 3

Insert assembled drive pins through armature (entering from segmented side), through straight (white) springs, and into magnet hub.

**Note:** Apply Grade "AA" Loctite® Sealant on pin threads. (Figure 9)

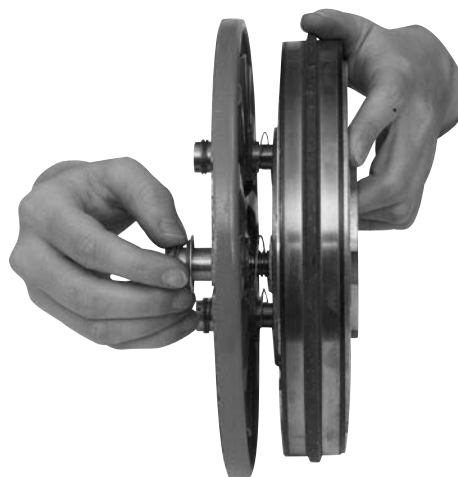


Figure 9

### Step 4

Tighten pins until shoulders of pins are against face of hub. Since threads are class No. 3 fit, pins may seem to bind.

**⚠CAUTION** Straight springs must not get caught under shoulders of drive pins.

### Step 5

Check to see that the armature is completely compressed against the face of the hub.

### Step 6

To set the autogap, slide the detent spring retainers against the armature face.

**Note:** This position must not be disturbed during completion of assembly. (Figure 10)



Figure 10

## E. Mounting the Magnet-Hub-Armature Assembly

This assembly is mounted on the shaft with a taperlock bushing. All parts must be clean and free from burrs and chips before assembling.

1. Place the bushing into the hub, and insert the key. The key is a side-to-side fit and should not contact the top of the keyway.
2. Insert the locking setscrews loosely into the bushing, and slide the assembly onto the shaft.
3. Position the assembly to allow a gap of about 1/32-inch between the brake magnet and armature faces. (Figure 11)

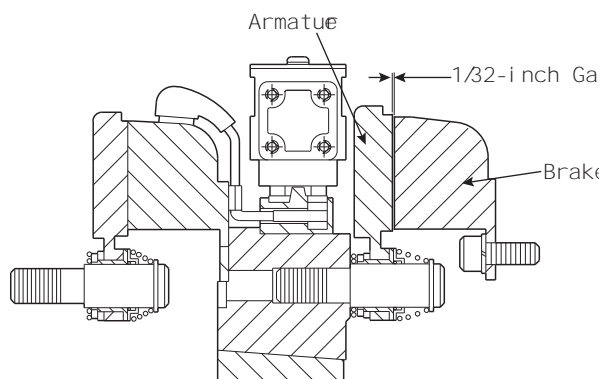


Figure 11

Once this gap is set, it will be automatically maintained for the life of the unit.

4. Secure the assembly in this position on the shaft by alternately tightening each setscrew. During the tightening process the bushing should be tapped lightly to make certain it seats-in properly.

## F. Assembling the Clutch Armature

The spline drive armatures are shipped with a built-in autogap spring accessory. This device automatically maintains a gap of about 1/32-inch between the armature and magnet faces for the life of the unit.

These units are shipped with the armature, splined armature adapter, and autogap already assembled. The splined hub, retainer ring, and bushing are shipped as separate parts.

Follow these instructions to assemble the armature and splined hub.

### Step 1

Place the armature-splined adapter assembly on a flat surface with the segmented side up. Push the splined hub, with the retainer ring groove down, through the autogap spring and splined armature adapter. (Figure 12)

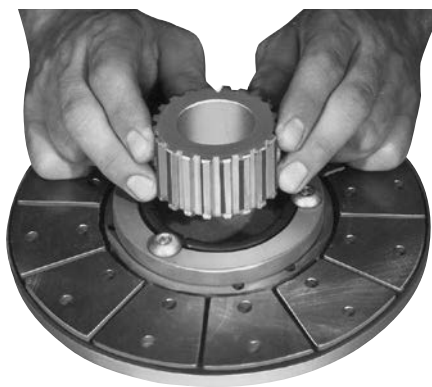


Figure 12

### Step 2

Turn the armature-adapter assembly over, and insert the retainer ring in the groove. (Figure 13)



Figure 13

### Step 3

Slide the armature-adapter assembly up against the retainer ring.

#### Step 4

Insert the bushing into the retainer ring side of the splined hub. The clearance holes in the bushing flange should line up with the tapped holes in the splined hub. (Figure 14)



Figure 14

#### G. Mounting the Armature and Hub Assembly

1. Slide the complete armature and hub assembly onto the shaft until the armature face touches the magnet face.
2. Tighten the bushing capscrews, taking a few turns at a time on each capscrew. As the capscrews are tightened, the armature will back away slightly from the magnet. There should be a clearance of  $1/16$ " between the armature and magnet when the capscrews are completely tight. (Figure 15)

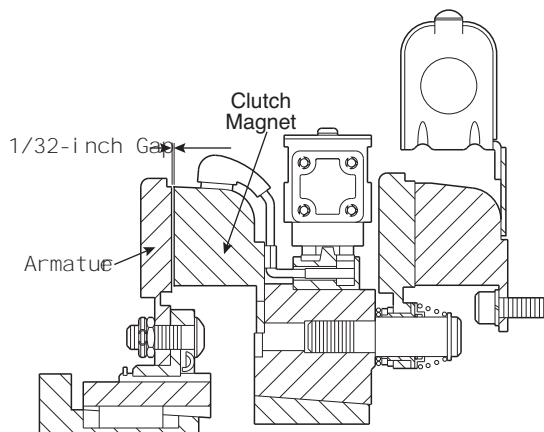


Figure 15

3. When the bushing is secure on the shaft, push the armature against the magnet face. When the armature is released, it will spring back about  $1/32$ ". The gap will be automatically maintained for the life of the unit.

#### H. Mounting the Brushholder

1. The brushholder is mounted on a bracket which must be furnished by the customer. The bracket must be firmly secured to prevent vibration which could cause improper contact between the brushes and collector ring.
2. The distance from the centerline of the shaft to the top of the brushholder should be  $5-3/4$ ". Maintaining this distance will assure proper spring tension on the brushes and maximum wear follow-up. A detailed dimensional drawing is included with each brushholder.

## Coil Data

| Unit Size                    | PB & PC-825 |      |       | PB & PC-1000 |      |       | PB & PC-1225 |      |      |
|------------------------------|-------------|------|-------|--------------|------|-------|--------------|------|------|
| Voltage — DC                 | 6           | 24   | 90    | 6            | 24   | 90    | 6            | 24   | 90   |
| Resistance @ 20°C — Ohms     | 1.27        | 20.4 | 223.3 | 1.23         | 19.7 | 248.7 | 1.33         | 22.2 | 61.7 |
| Current — Amperes            | 4.74        | 1.18 | .4    | 4.87         | 1.22 | .36   | 4.5          | 1.08 | .34  |
| Watts                        | 28          | 28   | 36    | 29           | 29   | 33    | 27           | 26   | 31   |
| Coil Build-up — Milliseconds | 170         | 170  | 170   | 205          | 220  | 235   | 300          | 320  | 350  |
| Coil Decay — Milliseconds    | 70          | 75   | 80    | 70           | 75   | 80    | 190          | 190  | 190  |

**Notes:** Build-up time equals current to approximately\* 90% of steady state value and flux to 90%.

Decay time equals current to approximately\* 10% of steady state value and flux to 10%.

\*Approximately because current leads or lags flux by a small amount.

## Burnishing and Maintenance

### Burnishing

Intimate metal to metal contact is essential between the armature and the metal rings (poles) of the magnet or rotor. Warner Electric clutches and brakes leave the factory with the friction material slightly undercut to assure good initial contact.

Normally, the desired wearing-in process occurs naturally as the surfaces slip upon engagement. The time for wear-in, which is necessary to obtain the ultimate torque of the unit, will vary depending on speed, load, or cycle duty.

If maximum torque is required immediately after installation, the unit should be burnished by slipping the friction surfaces together at reduced voltage. It is recommended that the burnishings be done right on the application, if at all possible.

Burnishing at high speed will result in a smoother wear-in pattern and reduce the time for burnishing. The voltage should be set at approximately 30% or 40% of the rated value.

The unit should be cycled on and off to allow sufficient time between slip cycles to prevent overheating.

When a Warner Electric brake or clutch is properly assembled and installed, no further servicing, lubrication, or maintenance should be required throughout the life of the unit.

### Maintenance

**Wear Pattern:** Wear grooves appear on the armature and magnet surfaces. This is a normal wear condition, and does not impair functioning of the unit. Normally, the magnet and armature, as a mating pair, will wear at the same rate. It is the usual recommendation that both components be replaced at the same time.

Remachining the face of a worn armature is not recommended. If a replacement armature is to be used with a used magnet, it is necessary to remachine the worn magnet face. In refacing a magnet: (1) machine only enough material to clean up the complete face of the magnet; (2) hold the face within .005" of parallel with the mounting plate; and (3) undercut the molded facing material .002" - .004" below the metal poles.

**Heat:** Excessive heat and high operating temperatures are causes of rapid wear. Units, therefore, should be ventilated as efficiently as possible, especially if the application requires fast, repetitive cycle operation.

**Foreign Materials:** If units are used on machinery where fine, abrasive dust, chips or grit are dispelled into the atmosphere, shielding of the brake may be necessary if maximum life is to be obtained.

Where units are used near gear boxes or transmissions requiring frequent lubrication, means should be provided to protect the friction surfaces from oil and grease to prevent serious loss of torque.

Oil and grease accidentally reaching the friction surfaces may be removed by wiping with a rag dampened with a suitable cleaner, which leaves no residue. In performing this operation, do not drench the friction material.

If the friction materials have been saturated with oil or grease, no amount of cleaning will be completely effective. Once such a unit has been placed back in service, heat will cause the oil to boil to the surface, resulting in further torque loss.

**Torque Loss:** If a brake or clutch slips or loses torque completely, the initial check should be the input voltage to the magnet as follows:

**90-Volt Series:** Connect a DC voltmeter with a range of 0-100 or more directly across the magnet terminals. With the power on and the potentiometer turned up, a normal reading is 90 volts, although 85 to 95 is satisfactory. The reading should drop as the potentiometer control is adjusted counterclockwise.

**24-Volt Series:** Use a DC voltmeter with a range of 0-30 volts or more. A normal reading is approximately 22-26 volts.

**6-Volt Series:** Use a DC voltmeter of approximately 0-15 volt range. A normal reading is from 5.5 to 6.5 volts.

The above checks normally are sufficient. Further checks may be made as follows: a low range ammeter, when connected in series with one magnet lead, will normally indicate approximately .40 amperes for the 90 volt units, 1.0 ampere for the 24 volt, and 3.5 amperes for the 6 volt series. These readings are with the power on and the potentiometer control in the maximum position.

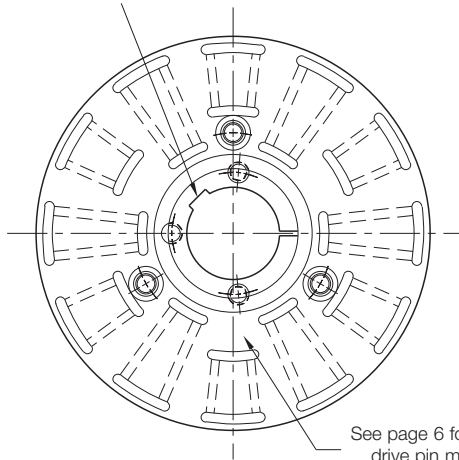
Ohmmeter checks should be made with the power off and the circuit open (to be certain, disconnect one lead to the magnet). Average resistance for the 90 volt series is 220 ohms; for the 24 volt, 20 ohms; and for the 6 volt series, 1.5 ohms. A very high or infinite resistance reading would indicate an open coil.

If the above checks indicate that the proper voltage and current is being supplied to the magnet, mechanical parts should be checked to assure that they are in good operating condition and properly installed.

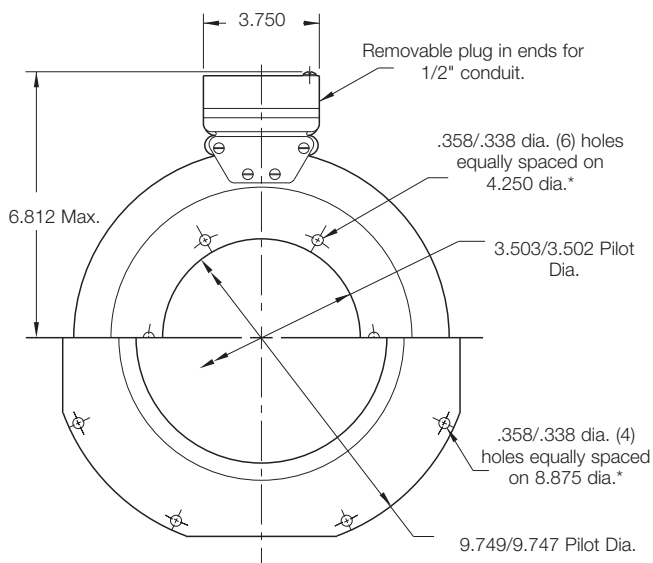
## PCB-825 Clutch-Brake Normal Duty

## Drawing I-25568

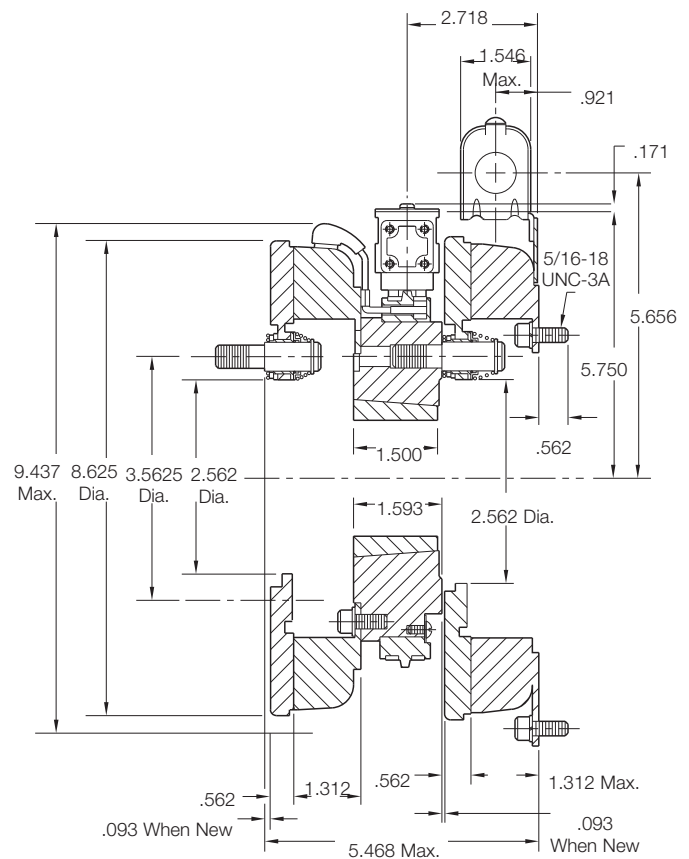
See page 34 for details on  
Bore & Keyway.



Armature View



Magnet View



\* Mounting holes are within .010 of true position relative to pilot diameter.

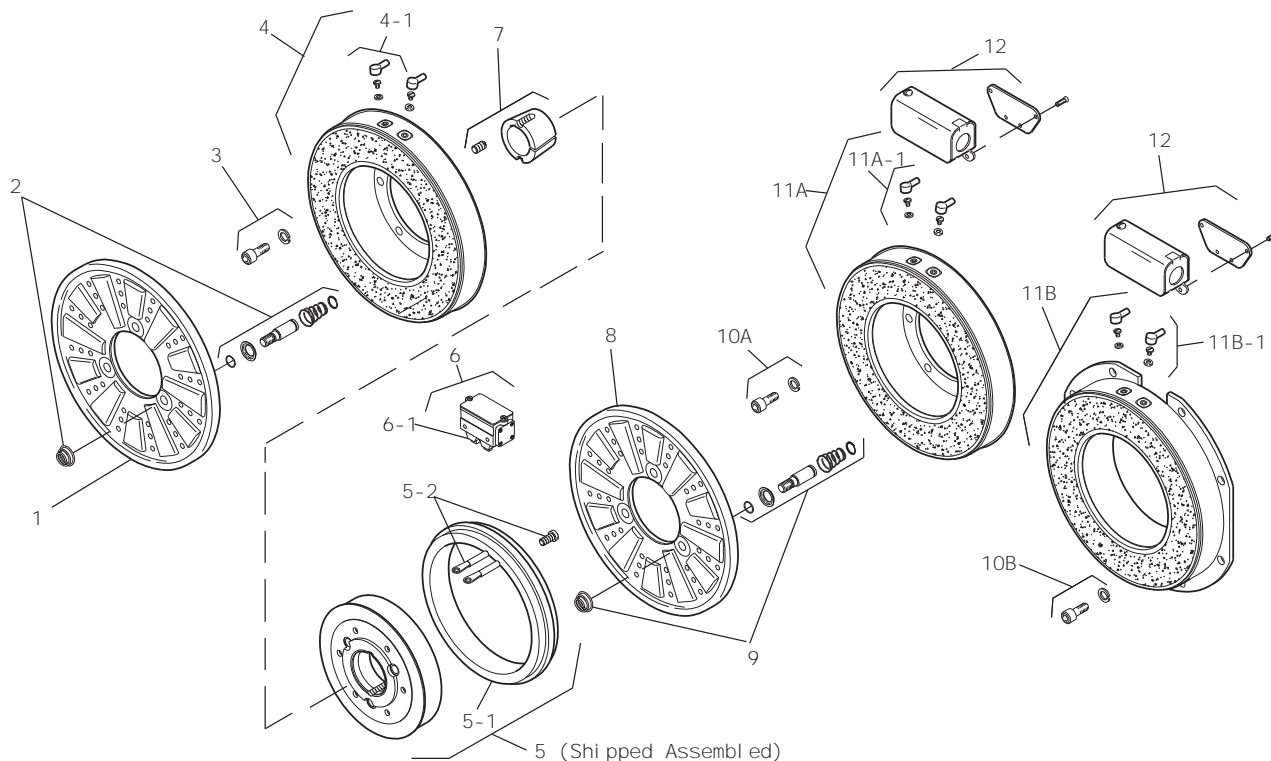
### Customer Shall Maintain:

1. Concentricity of brake mounting pilot diameter with mounting shaft within .010 T.I.R.
2. Squareness of brake magnet mounting face with mounting shaft within .006 T.I.R. measured at magnet mounting bolt circle.

|                  |                |
|------------------|----------------|
| Shaft Size       | .500 – 1.625   |
| Static Torque    | 125 lb. ft.    |
| Maximum Speed    | 4,000 rpm      |
| Standard Voltage | D.C. 6, 24, 90 |

All dimensions are nominal unless otherwise noted.

## PCB-825 Clutch Brake Flange Mounted Per I-25568 Inside Mtd. Outside Mtd.



| PCB-825, N.D. |                           |                      |      |
|---------------|---------------------------|----------------------|------|
| Item          | Description               | Part Number          | Qty. |
| 1             | Armature                  | 5301-111-018         | 1    |
| 2             | Autogap Accessory         | 5201-101-008         | 3    |
| 3             | Mounting Accessory        | 5321-101-001         | 1    |
| 4             | Magnet                    |                      |      |
|               | 6 Volt                    | 5301-631-002         |      |
|               | 24 Volt                   | 5301-631-004         |      |
|               | 90 Volt                   | 5301-631-005         |      |
| 4-1           | Terminal Accessory        | 5311-101-001         | 1    |
| 5             | Magnet Hub                |                      |      |
|               | Left Hand                 | 5301-541-001         |      |
|               | Right Hand                | 5301-541-002         |      |
| 5-1           | Collector Ring            | 5301-749-001         | 1    |
| 5-2           | Collector Ring Assembly   | 5301-101-002         | 1    |
| 6             | Brushholder               | 5300-178-001         | 1    |
| 6-1           | Brush                     | 176-0001             | 4    |
| 7             | Bushing*                  |                      |      |
|               | 1/2" to 1-5/8" Bore       | 180-0131 to 180-0149 | 1    |
| 8             | Armature                  | 5301-111-018         | 1    |
| 9             | Autogap Accessory         | 5201-101-008         | 3    |
| 10A           | Mounting Accessory - I.M. | 5321-101-001         | 1    |
| 10B           | Mounting Accessory - O.M. | 5321-101-002         | 1    |
| 11A           | Magnet - Inside Mounted   |                      |      |
|               | 6 Volt                    | 5311-631-002         |      |
|               | 24 Volt                   | 5311-631-003         |      |
|               | 90 Volt                   | 5311-631-004         |      |
| 11A-1         | Terminal Accessory        | 5311-101-001         | 1    |
| 11B           | Magnet - Outside Mounted  |                      |      |
|               | 6 Volt                    | 5311-631-007         |      |

| PCB-825, N.D. |                    |              |      |
|---------------|--------------------|--------------|------|
| Item          | Description        | Part Number  | Qty. |
|               | 24 Volt            | 5311-631-009 |      |
|               | 90 Volt            | 5311-631-008 |      |
| 11B-1         | Terminal Accessory | 5311-101-001 | 1    |
| 12            | Conduit Box        | 5200-101-011 | 1    |

\*See page 34 for specific part numbers

### How to Order:

1. Specify Voltage for Item 4 and Item 11A or 11B.
2. Specify left hand or right hand hub for Item 5.  
Bushing enters from magnet side for L.H. hub and from hub side for R.H.
3. Specify Bore Size for Item 7.
4. Specify Inside Mounted for Items 10A and 11A or Outside Mounted for Items 10B and 11B.

### Example:

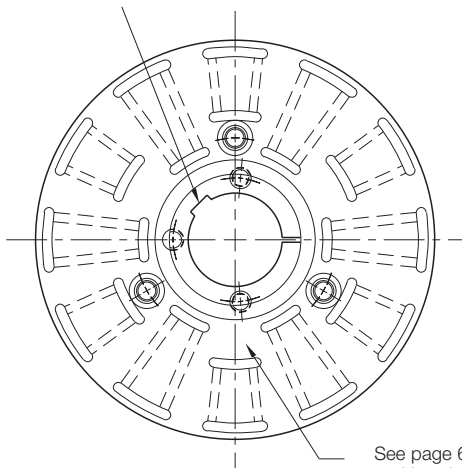
PCB-825 Clutch Brake per I-25568 - 90 Volt, Left Hand hub, 1" Bore, Inside Mounted

These units meet standards set forth in UL508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

# PCB-1000 Clutch-Brake Normal Duty

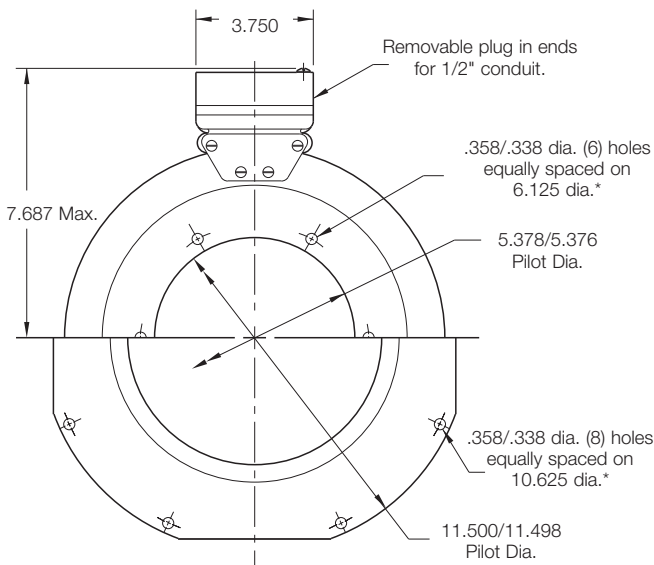
Drawing I-25588

See page 34 for details on Bore & Keyway.

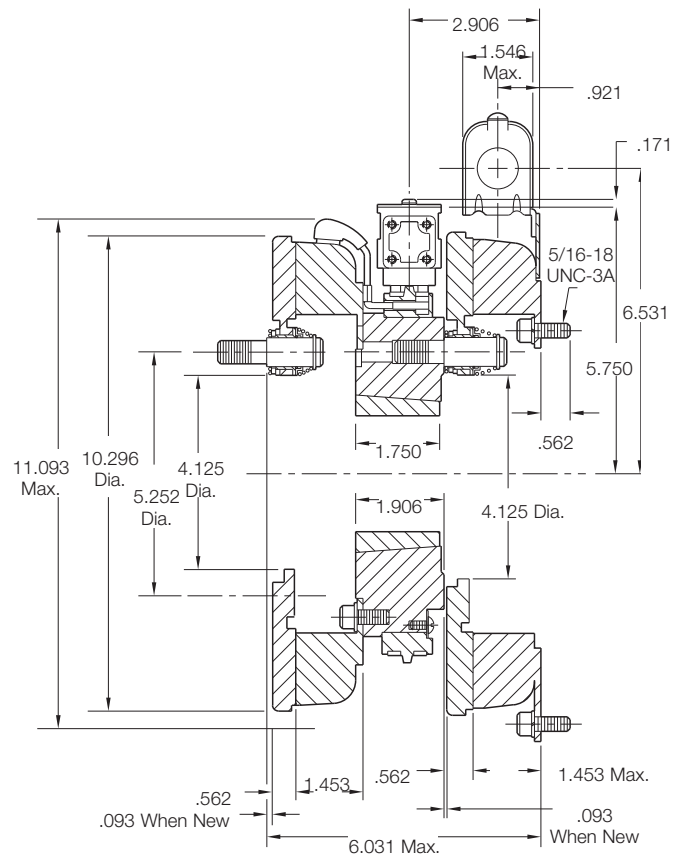


Armature View

See page 6 for details on drive pin mountings.



Magnet View  
(Inside & Outside Mounted)



\* Mounting holes are within .010 of true position relative to pilot diameter.

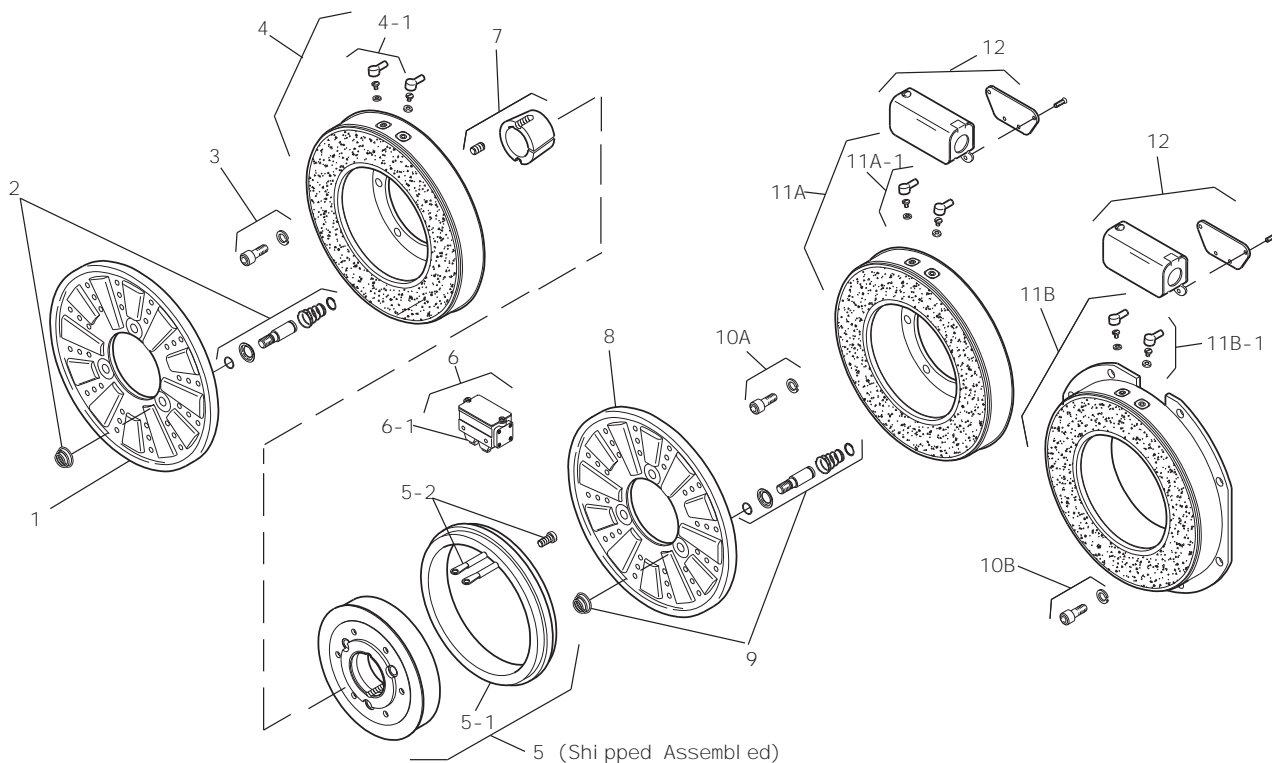
## Customer Shall Maintain:

1. Concentricity of brake mounting pilot diameter with mounting shaft within .010 T.I.R.
2. Squareness of brake magnet mounting face with mounting shaft within .006 T.I.R. measured at magnet mounting bolt circle.

|                  |                |
|------------------|----------------|
| Shaft Size       | .500 – 2.500   |
| Static Torque    | 240 lb. ft.    |
| Maximum Speed    | 3,600 rpm      |
| Standard Voltage | D.C. 6, 24, 90 |

All dimensions are nominal unless otherwise noted.

## PCB-1000 Clutch Brake Flange Mounted Per I-25588 Inside Mtd. Outside Mtd.



| PCB-1000, N.D. |                           |                      |      |
|----------------|---------------------------|----------------------|------|
| Item           | Description               | Part Number          | Qty. |
| 1              | Armature                  | 5302-111-013         | 1    |
| 2              | Autogap Accessory         | 5201-101-008         | 3    |
| 3              | Mounting Accessory        | 5321-101-001         | 1    |
| 4              | Magnet                    |                      | 1    |
|                | 6 Volt                    | 5302-631-003         |      |
|                | 24 Volt                   | 5302-631-014         |      |
|                | 90 Volt                   | 5302-631-005         |      |
| 4-1            | Terminal Accessory        | 5311-101-001         | 1    |
| 5              | Magnet Hub                |                      | 1    |
|                | Left Hand                 | 5302-541-001         |      |
|                | Right Hand                | 5302-541-002         |      |
| 5-1            | Collector Ring            | 5301-749-001         | 1    |
| 5-2            | Collector Ring Assembly   | 5302-101-002         | 1    |
| 6              | Brushholder               | 5300-178-001         | 1    |
| 6-1            | Brush                     | 176-0001             | 4    |
| 7              | Bushing*                  |                      |      |
|                | 1/2" to 2-1/2" Bore       | 180-0185 to 180-0217 | 1    |
| 8              | Armature                  | 5302-111-013         | 1    |
| 9              | Autogap Accessory         | 5201-101-008         | 3    |
| 10A            | Mounting Accessory - I.M. | 5321-101-001         | 1    |
| 10B            | Mounting Accessory - O.M. | 5321-101-002         | 2    |
| 11A            | Magnet - Inside Mounted   |                      | 1    |
|                | 6 Volt                    | 5312-631-004         |      |
|                | 24 Volt                   | 5312-631-005         |      |
|                | 90 Volt                   | 5312-631-006         |      |
| 11A-1          | Terminal Accessory        | 5311-101-001         | 1    |
| 11B            | Magnet - Outside Mounted  |                      | 1    |
|                | 6 Volt                    | 5312-631-011         |      |

| PCB-1000, N.D. |                    |              |      |
|----------------|--------------------|--------------|------|
| Item           | Description        | Part Number  | Qty. |
|                | 24 Volt            | 5312-631-013 |      |
|                | 90 Volt            | 5312-631-012 |      |
| 11B-1          | Terminal Accessory | 5311-101-001 | 1    |
| 12             | Conduit Box        | 5200-101-011 | 1    |

\*See page 34 for specific part numbers.

### How to Order:

1. Specify Voltage for Item 4 and Item 11A or 11B.
2. Specify left hand or right hand hub for Item 5.  
Bushing enters from magnet side for L.H. hub and from hub side for R.H.
3. Specify Bore Size for Item 7.
4. Specify Inside Mounted for Items 10A and 11A or Outside Mounted for Items 10B and 11B.

### Example:

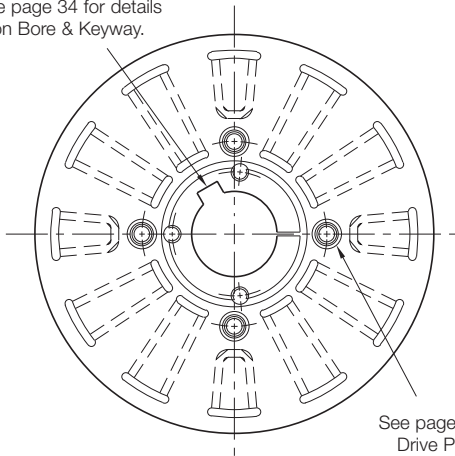
PCB-1000 Clutch Brake per I-25588 - 90 Volt, Left Hand hub, 1-1/2" Bore, Inside Mounted

These units meet standards set forth in UL508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

# PCB-1225 Clutch-Brake Normal Duty

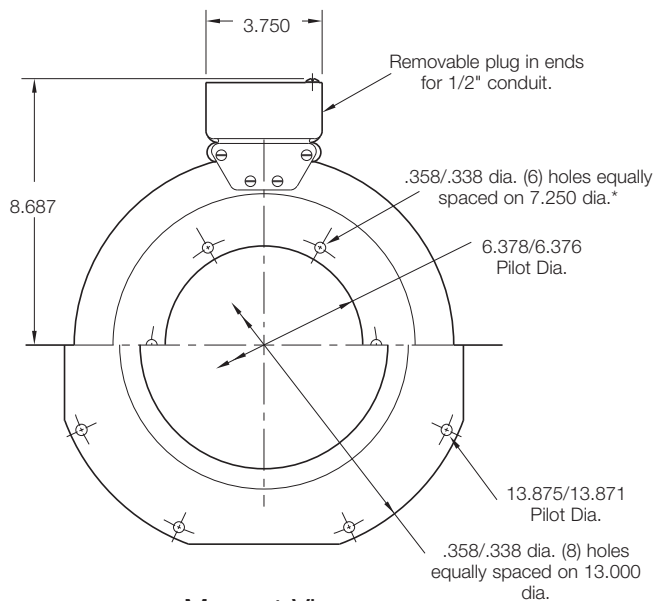
Drawing I-25608

See page 34 for details  
on Bore & Keyway.

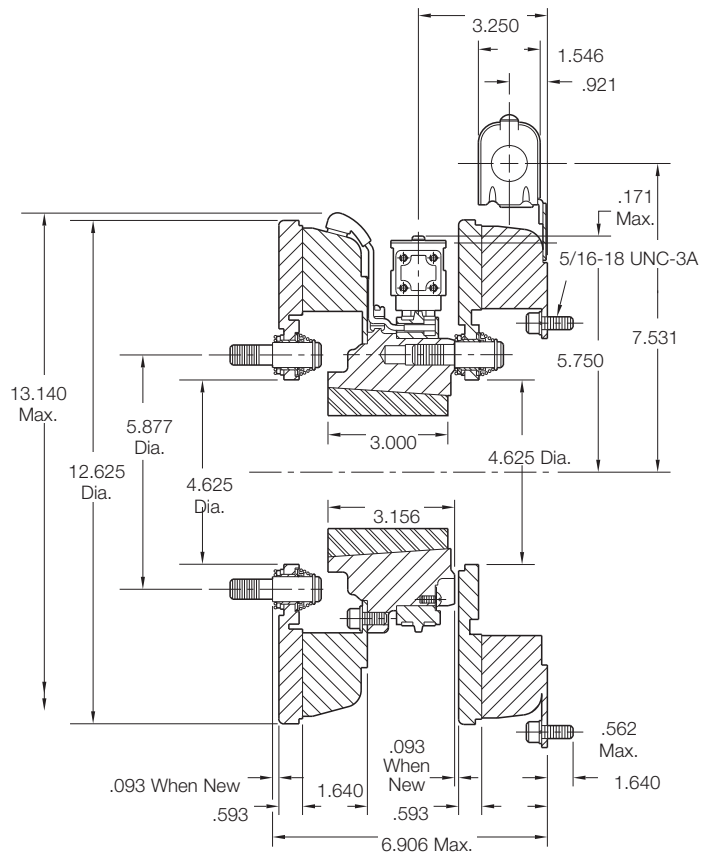


See page 6 for details on  
Drive Pin mountings.

Armature View



Magnet View  
(Inside & Outside Mounted)



\* Mounting holes are within .010 of true position  
relative to pilot diameter.

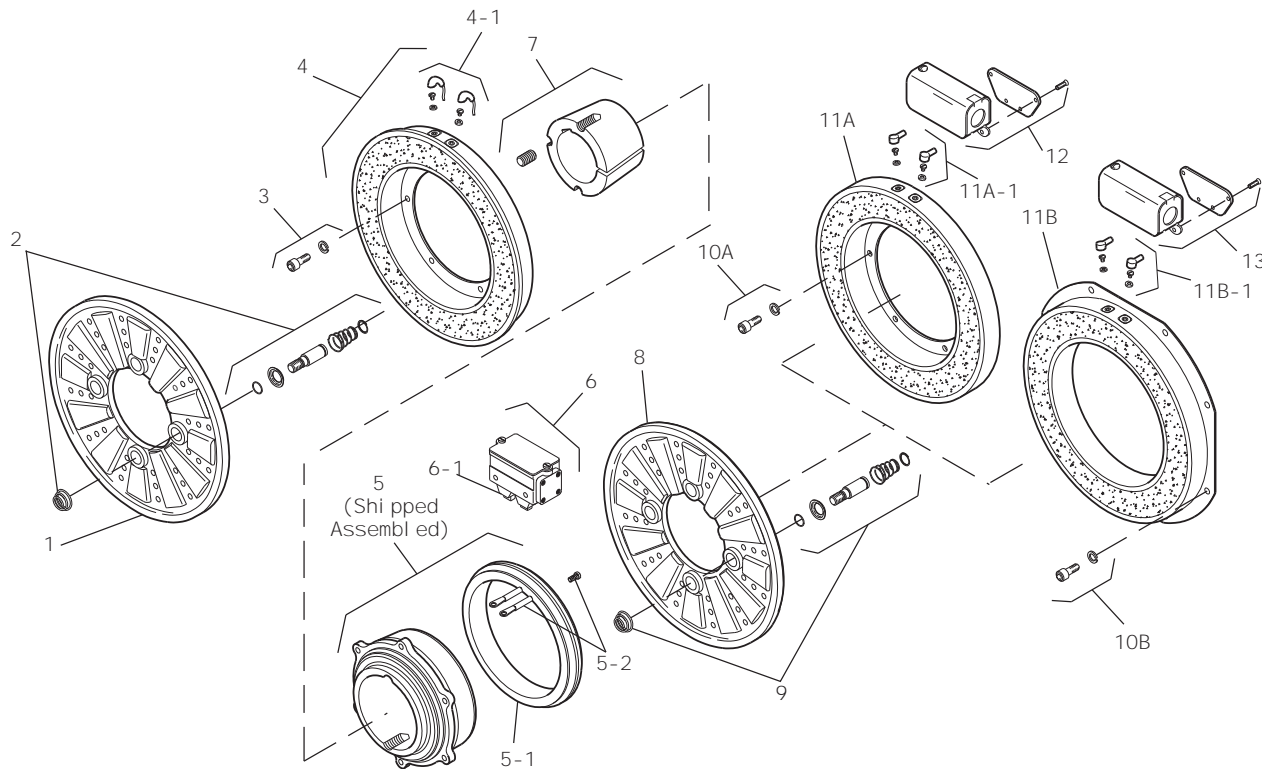
## Customer Shall Maintain:

1. Concentricity of brake mounting pilot diameter  
with mounting shaft within .010 T.I.R.
2. Squareness of brake magnet mounting face  
with mounting shaft within .006 T.I.R measured  
at magnet mounting bolt circle.

|                  |                |
|------------------|----------------|
| Shaft Size       | .937 – 3.000   |
| Static Torque    | 465 lb. ft.    |
| Maximum Speed    | 3,000 rpm      |
| Standard Voltage | D.C. 6, 24, 90 |

All dimensions are nominal unless otherwise noted.

## PCB-1225 Clutch Brake Flange Mounted Per I-25608 Inside Mtd. Outside Mtd.



| PCB-1225 N.D. |                           |                      |      |
|---------------|---------------------------|----------------------|------|
| Item          | Description               | Part Number          | Qty. |
| 1             | Armature                  | 5303-111-009         | 1    |
| 2             | Autogap Accessory         | 5201-101-008         | 4    |
| 3             | Mounting Accessory        | 5321-101-001         | 1    |
| 4             | Magnet                    |                      | 1    |
|               | 6 Volt                    | 5303-631-005         |      |
|               | 24 Volt                   | 5303-631-007         |      |
|               | 90 Volt                   | 5303-631-008         |      |
| 4-1           | Terminal Accessory        | 5311-101-001         | 1    |
| 5             | Magnet Hub                |                      | 1    |
|               | Left Hand                 | 5303-541-001         |      |
|               | Right Hand                | 5303-541-002         |      |
| 5-1           | Collector Ring            | 5301-749-001         | 1    |
| 5-2           | Collector Ring Assembly   | 5303-101-004         | 1    |
| 6             | Brushholder               | 5300-178-001         | 1    |
| 6-1           | Brush                     | 176-0001             | 4    |
| 7             | Bushing*                  |                      |      |
|               | 15/16" to 3" Bore         | 180-0262 to 180-0295 | 1    |
| 8             | Armature                  | 5303-111-009         | 1    |
| 9             | Autogap Accessory         | 5201-101-008         | 4    |
| 10A           | Mounting Accessory - I.M. | 5321-101-001         | 1    |
| 10B           | Mounting Accessory - O.M. | 5321-101-002         | 2    |
| 11A           | Magnet - Inside Mounted   |                      | 1    |
|               | 6 Volt                    | 5313-631-005         |      |
|               | 24 Volt                   | 5313-631-006         |      |
|               | 90 Volt                   | 5313-631-007         |      |
| 11A-1         | Terminal Accessory        | 5311-101-001         | 1    |
| 11B           | Magnet - Outside Mounted  |                      | 1    |
|               | 6 Volt                    | 5313-631-010         |      |

| PCB-1225 N.D. |                    |              |      |
|---------------|--------------------|--------------|------|
| Item          | Description        | Part Number  | Qty. |
|               | 24 Volt            | 5313-631-012 |      |
|               | 90 Volt            | 5313-631-011 |      |
| 11B-1         | Terminal Accessory | 5311-101-001 | 1    |
| 12            | Conduit Box        | 5200-101-011 | 1    |

\*See page 34 for specific part numbers.

### How to Order:

1. Specify Voltage for Item 4 and Item 11A or 11B.
2. Specify left hand or right hand hub for Item 5.  
Bushing enters from magnet side for L.H. hub and from hub side for R.H.
3. Specify Bore Size for Item 7.
4. Specify Inside Mounted for Items 10A and 11A or Outside Mounted for Items 10B and 11B.

### Example:

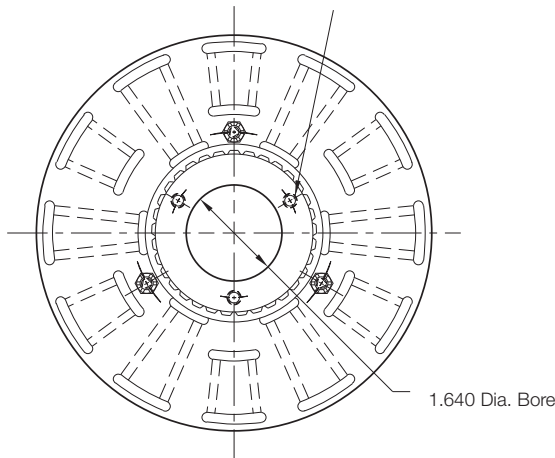
PCB-1225 Clutch Brake per I-25608 - 90 Volt, Left hand hub, 2" Bore, Inside Mounted.

These units meet the standards of UL508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

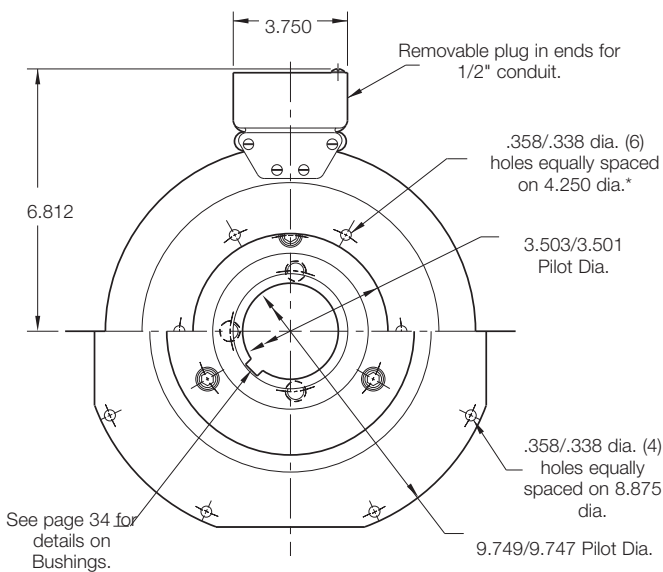
# PCB-825 Clutch-Brake Heavy Duty

Drawing I-25569

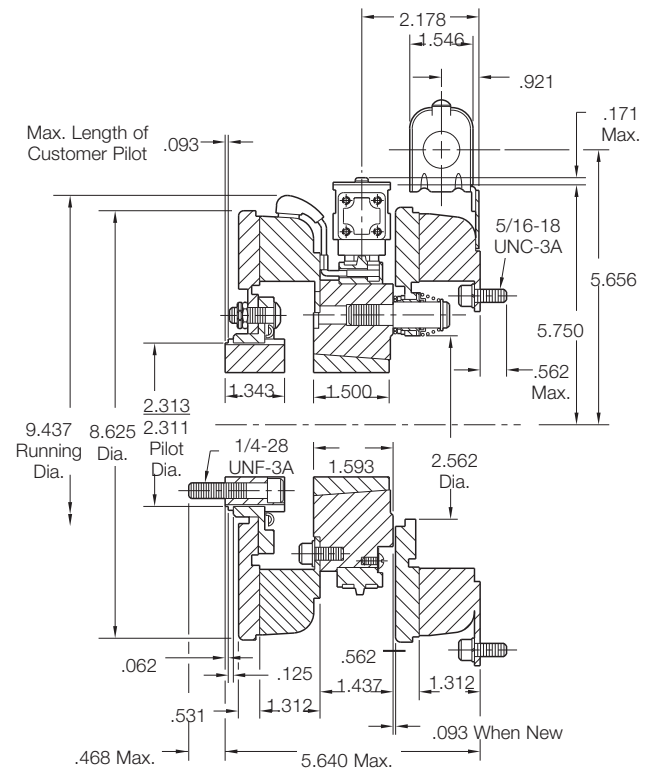
.271/.263 dia. (5) holes (hub) equally spaced on 2.015 dia. and within .003 of true position in relation to 2.313/2.311 pilot dia.



Armature View



Magnet View  
(Inside & Outside Mounted)



\* Mounting holes are within .010 of true position relative to pilot diameter.

## Customer Shall Maintain:

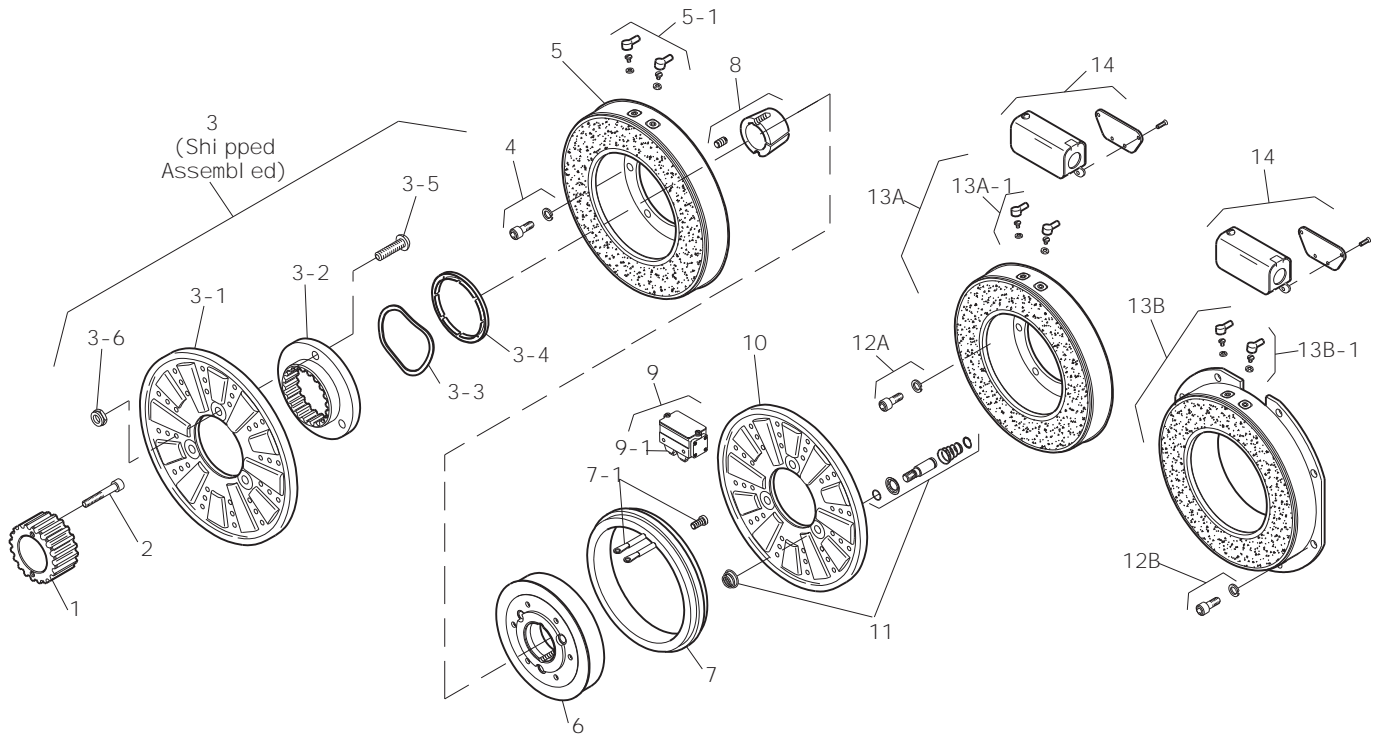
1. Concentricity of brake magnet mounting pilot diameter with mounting shaft within .010 T.I.R.
2. Squareness of brake magnet mounting face with magnet mounting shaft within .006 T.I.R.
3. Splined hub pilot diameter to be concentric with splined armature center of rotation within .010 T.I.R.
4. Mounting shaft to be concentric with splined armature center of rotation within .006 T.I.R.

|                  |                |
|------------------|----------------|
| Shaft Size       | .500 – 1.625   |
| Static Torque    | 125 lb. ft.    |
| Maximum Speed    | 4,000 rpm      |
| Standard Voltage | D.C. 6, 24, 90 |

All dimensions are nominal unless otherwise noted.



## PCB-825 Clutch Brake Flange Mounted Per I-25569 Inside Mtd. Outside Mtd.



| Item | Description               | PCB-825 H.D.<br>Part Number | Qty. |
|------|---------------------------|-----------------------------|------|
| 1    | Splined Hub               | 540-0146                    | 1    |
| 2    | Mounting Accessory        | 5201-101-001                | 1    |
| 3    | Armature Accessory        | 5321-111-001                | 1    |
| 3-1  | Armature                  | 5321-111-022                | 1    |
| 3-2  | Armature Adapter          | 104-0008                    | 1    |
| 3-3  | Autogap Spring            | 808-0054                    | 1    |
| 3-4  | Retainer Ring             | 748-0373                    | 1    |
| 3-5  | Buttonhead Screw          | 797-0272                    | 3    |
| 3-6  | Locknut                   | 661-0004                    | 3    |
| 4    | Mounting Accessory        | 5321-101-001                | 1    |
| 5    | Magnet                    |                             | 1    |
|      | 6 Volt                    | 5301-631-002                |      |
|      | 24 Volt                   | 5301-631-004                |      |
|      | 90 Volt                   | 5301-631-005                |      |
| 5-1  | Terminal Accessory        | 5311-101-001                | 1    |
| 6    | Magnet Hub                |                             | 1    |
|      | Right Hand                | 5301-541-002                |      |
|      | Left Hand                 | 5301-541-001                |      |
| 7    | Collector Ring            | 5301-749-001                | 1    |
| 7-1  | Collector Ring Accessory  | 5301-101-002                | 1    |
| 8    | Bushing*                  | 180-0131 to 180-0149        | 1    |
| 9    | Brushholder               | 5300-178-001                | 1    |
| 9-1  | Brush                     | 176-0001                    | 4    |
| 10   | Armature                  | 5301-111-018                | 1    |
| 11   | Autogap Accessory         | 5201-101-008                | 3    |
| 12A  | Mounting Accessory - I.M. | 5321-101-001                | 1    |
| 12B  | Mounting Accessory - O.M. | 5321-101-002                | 1    |
| 13A  | Magnet - Inside Mounted   |                             | 1    |
|      | 6 Volt                    | 5311-631-002                |      |
|      | 24 Volt                   | 5311-631-003                |      |
|      | 90 Volt                   | 5311-631-004                |      |

| Item  | Description                  | PCB-825 H.D.<br>Part Number | Qty. |
|-------|------------------------------|-----------------------------|------|
| 13A-1 | Terminal Accessory           | 5311-101-001                | 1    |
| 13B   | Magnet Hub - Outside Mounted |                             | 1    |
|       | 6 Volt                       | 5311-631-007                |      |
|       | 24 Volt                      | 5311-631-009                |      |
|       | 90 Volt                      | 5311-631-008                |      |
| 13B-1 | Terminal Accessory           | 5311-101-001                | 1    |
| 14    | Conduit Box                  | 5200-101-011                | 1    |

\*See page 34 for specific part numbers.

### How to Order:

1. Specify Voltage for Item 5 and Item 13A or 13B.
2. Specify left hand or right hand hub for Item 6.  
Bushing enters from magnet side for L.H. hub and from hub side for R.H. hub.
3. Specify Bore Size for Item 8.
4. Specify Inside Mounted for Items 12A and 13A or Outside Mounted for Item 12B and 13B.

### Example:

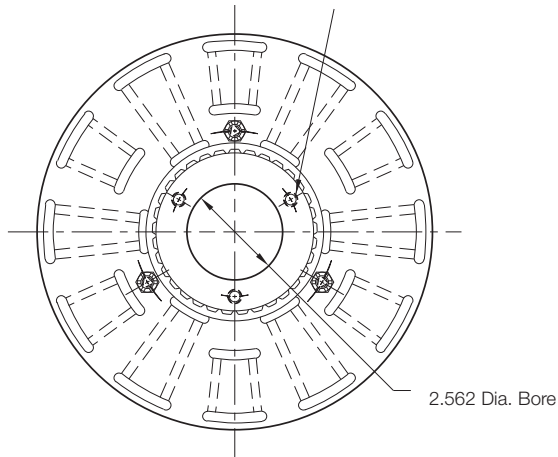
PCB-825 Clutch Brake per I-25569 - 90 Volt, Left Hand hub, 1" Bore, Inside Mounted.

These units meet the standards of UL508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

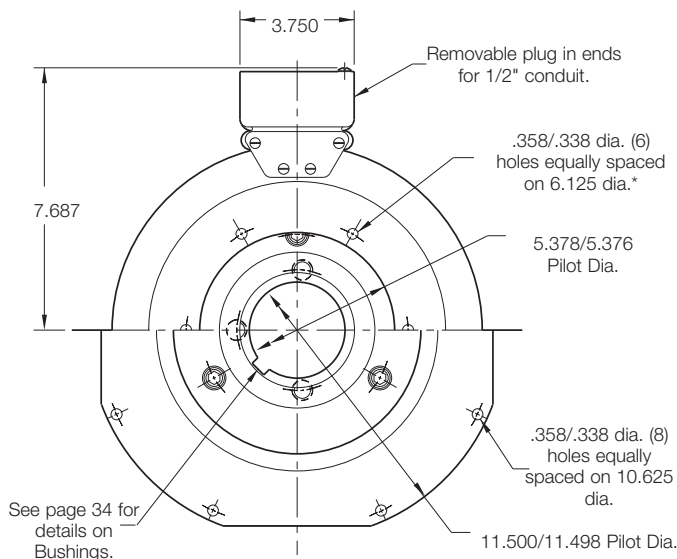
# PCB-1000 Clutch-Brake Heavy Duty

Drawing I-25589

.397/.388 dia. (3) holes (hub) equally spaced on 3.187 dia. and within .003 of true position in relation to 4.001/3.999 pilot dia.



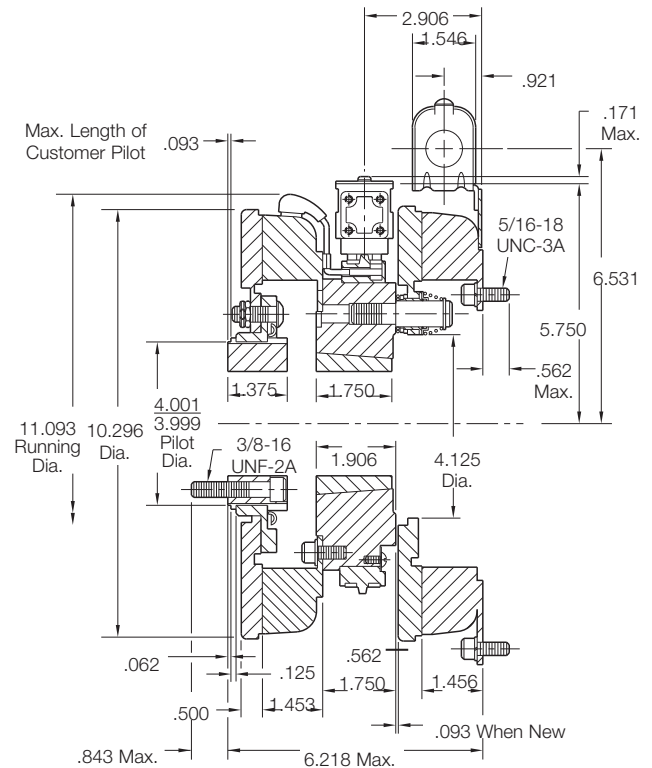
Armature View



Magnet View  
(Inside & Outside Mounted)

## Customer Shall Maintain:

1. Concentricity of brake magnet mounting pilot diameter with mounting shaft within .010 T.I.R.
2. Squareness of brake magnet mounting face with magnet mounting shaft within .006 T.I.R.
3. Splined hub pilot diameter to be concentric with splined armature center of rotation within .010 T.I.R.
4. Mounting shaft to be concentric with splined armature center of rotation within .006 T.I.R.



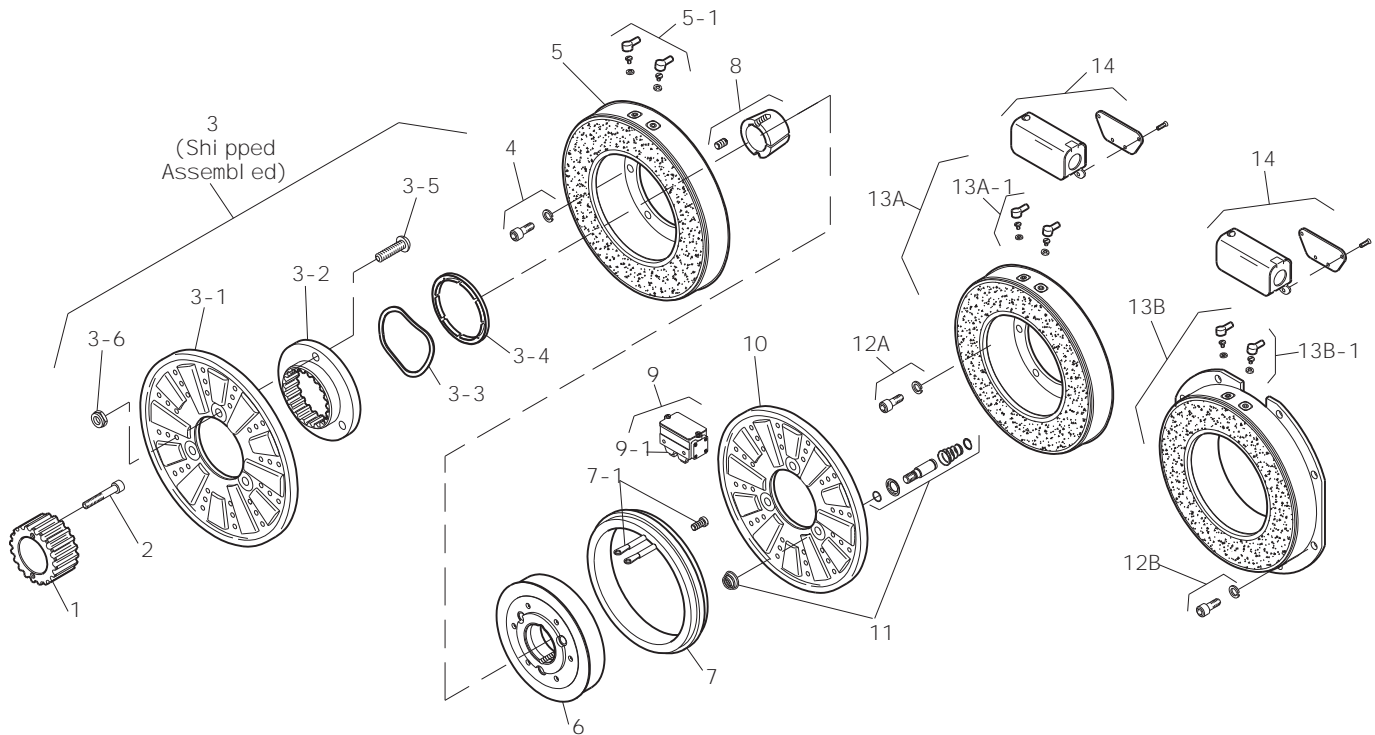
\* Mounting holes are within .010 of true position relative to pilot diameter.

|                  |                |
|------------------|----------------|
| Shaft Size       | .500 – 2.500   |
| Static Torque    | 240 lb. ft.    |
| Maximum Speed    | 3,600 rpm      |
| Standard Voltage | D.C. 6, 24, 90 |

All dimensions are nominal unless otherwise noted.



## PCB-1000 Clutch-Brake Flange Mounted Per I-25589 Inside Mtd. Outside Mtd.



| Item | Description               | PCB-1000 H.D. Part Number | Qty. |
|------|---------------------------|---------------------------|------|
| 1    | Splined Hub               | 540-0147                  | 1    |
| 2    | Mounting Accessory        | 5202-101-001              | 1    |
| 3    | Armature Accessory        | 5322-111-002              | 1    |
| 3-1  | Armature                  | 5322-111-036              | 1    |
| 3-2  | Armature Adapter          | 104-0009                  | 1    |
| 3-3  | Autogap Spring            | 808-0061                  | 1    |
| 3-4  | Retainer Ring             | 748-0374                  | 1    |
| 3-5  | Buttonhead Screw          | 797-0272                  | 3    |
| 3-6  | Locknut                   | 661-0004                  | 3    |
| 4    | Mounting Accessory        | 5321-101-001              | 1    |
| 5    | Magnet                    |                           | 1    |
|      | 6 Volt                    | 5302-631-003              |      |
|      | 24 Volt                   | 5302-631-014              |      |
|      | 90 Volt                   | 5302-631-005              |      |
| 5-1  | Terminal Accessory        | 5311-101-001              | 1    |
| 6    | Magnet Hub                |                           | 1    |
|      | Right Hand                | 5302-541-002              |      |
|      | Left Hand                 | 5302-541-001              |      |
| 7    | Collector Ring            | 5301-749-001              | 1    |
| 7-1  | Collector Ring Accessory  | 5301-101-002              | 1    |
| 8    | Bushing*                  | 180-0185 to 180-0217      | 1    |
| 9    | Brushholder               | 5300-178-001              | 1    |
| 9-1  | Brush                     | 176-0001                  | 4    |
| 10   | Armature                  | 5302-111-013              | 1    |
| 11   | Autogap Accessory         | 5201-101-008              | 3    |
| 12A  | Mounting Accessory - I.M. | 5321-101-001              | 1    |
| 12B  | Mounting Accessory - O.M. | 5321-101-002              | 2    |
| 13A  | Magnet - Inside Mounted   |                           | 1    |
|      | 6 Volt                    | 5312-631-004              |      |
|      | 24 Volt                   | 5312-631-005              |      |

| Item  | Description                  | PCB-1000 H.D. Part Number | Qty. |
|-------|------------------------------|---------------------------|------|
|       | 90 Volt                      | 5312-631-006              |      |
| 13A-1 | Terminal Accessory           | 5311-101-001              | 1    |
| 13B   | Magnet Hub - Outside Mounted |                           | 1    |
|       | 6 Volt                       | 5312-631-011              |      |
|       | 24 Volt                      | 5312-631-013              |      |
|       | 90 Volt                      | 5312-631-012              |      |
| 13B-1 | Terminal Accessory           | 5311-101-001              | 1    |
| 14    | Conduit Box                  | 5200-101-011              | 1    |

\*See page 34 for specific part numbers.

### How to Order:

1. Specify Voltage for Item 5 and Item 13A or 13B.
2. Specify left hand or right hand hub for Item 6.  
Bushing enters from magnet side for L.H. hub and from hub side for R.H. hub.
3. Specify Bore Size for Item 8.
4. Specify Inside Mounted for Items 12A and 13A or Outside Mounted for Item 12B and 13B.

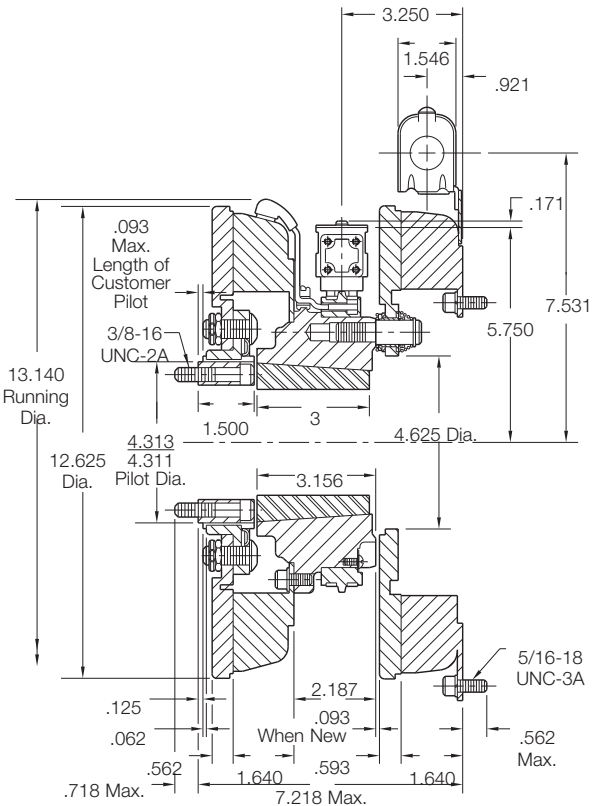
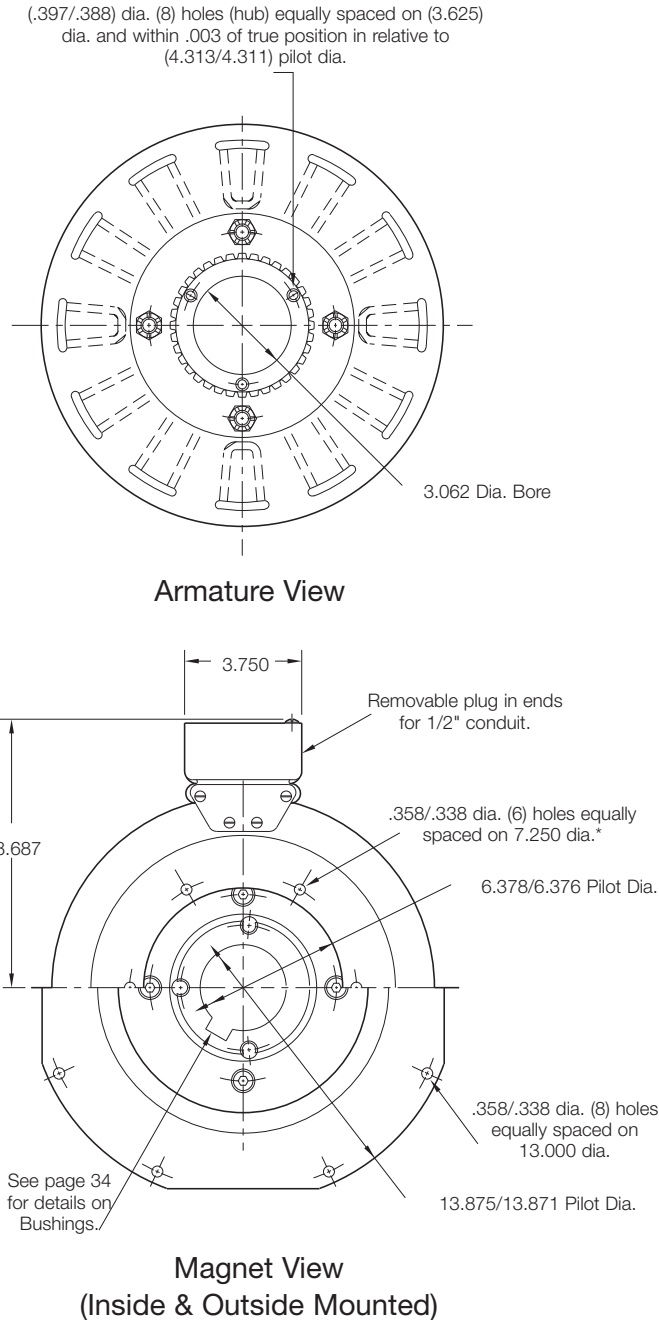
### Example:

PCB-1000 Clutch Brake per I-25589 - 90 Volt, Left Hand hub, 1-1/2" Bore, Inside Mounted

These units meet the standards of UL508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

# PCB-1225 Clutch-Brake Heavy Duty

Drawing I-25609



\* Mounting holes are within .010 of true position relative to pilot diameter.

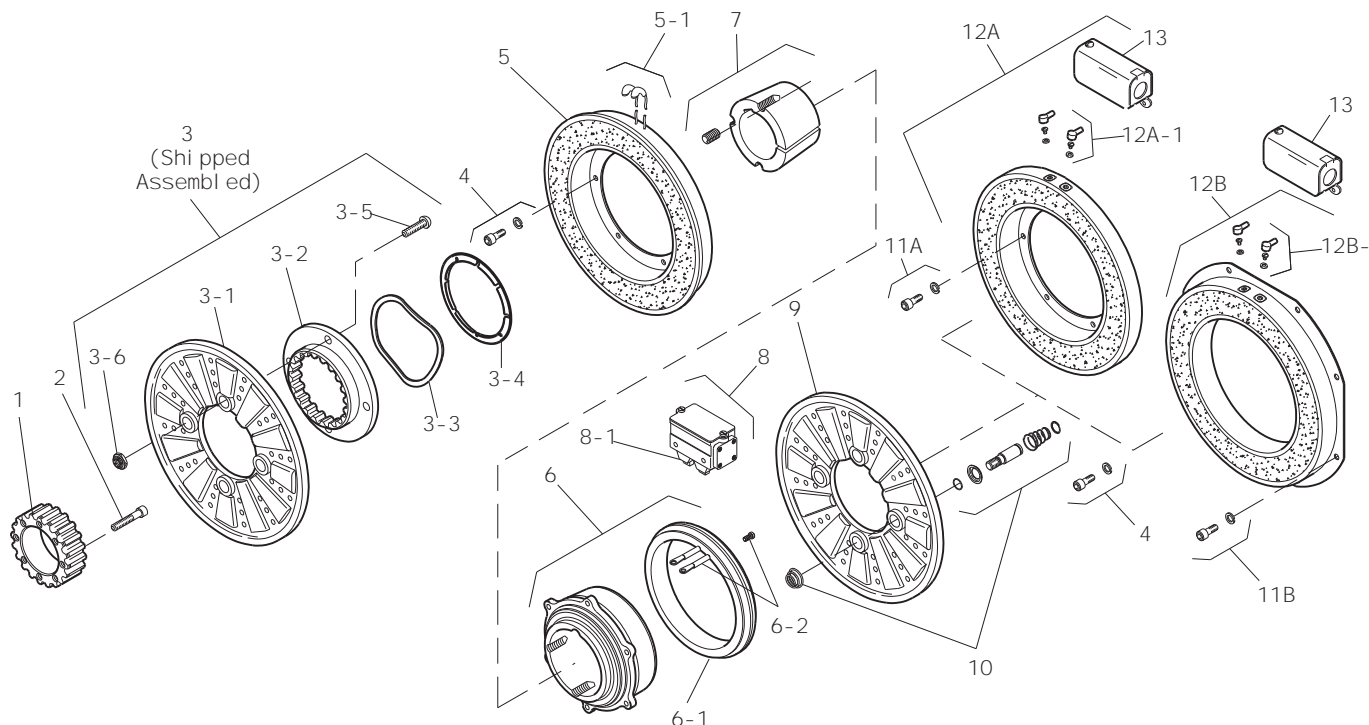
## Customer Shall Maintain:

1. Concentricity of brake magnet mounting pilot diameter with mounting shaft within .010 T.I.R.
2. Squareness of brake magnet mounting face with magnet mounting shaft within .006 T.I.R.
3. Splined hub pilot diameter to be concentric with splined armature center of rotation within .010 T.I.R.
4. Mounting shaft to be concentric with splined armature center of rotation within .006 T.I.R.

|                  |                |
|------------------|----------------|
| Shaft Size       | .937 – 3.000   |
| Static Torque    | 465 lb. ft.    |
| Maximum Speed    | 3,000 rpm      |
| Standard Voltage | D.C. 6, 24, 90 |

All dimensions are nominal unless otherwise noted.

## PCB-1225 Clutch-Brake Flange Mounted Per I-25609 Inside Mtd. Outside Mtd.



| PCB-1225 H.D. |                          |                      |      |
|---------------|--------------------------|----------------------|------|
| Item          | Description              | Part Number          | Qty. |
| 1             | Splined Hub              | 540-0148             | 1    |
| 2             | Mounting Accessory       | 5202-101-001         | 3    |
| 3             | Armature Assembly        | 5323-111-001         | 1    |
| 3-1           | Armature                 | 5323-111-034         | 1    |
| 3-2           | Armature Adapter         | 104-0010             | 1    |
| 3-3           | Autogap Spring           | 808-0044             | 1    |
| 3-4           | Retainer Ring            | 748-0370             | 1    |
| 3-5           | Buttonhead Screw         | 797-0281             | 4    |
| 3-6           | Locknut                  | 661-0005             | 4    |
| 4             | Mounting Accessory       | 5321-101-001         | 1    |
| 5             | Magnet                   |                      | 1    |
|               | 6 Volt                   | 5303-631-005         |      |
|               | 24 Volt                  | 5303-631-007         |      |
|               | 90 Volt                  | 5303-631-008         |      |
| 5-1           | Terminal Accessory       | 5311-101-001         | 1    |
| 6             | Magnet Hub               |                      | 1    |
|               | Right Hand               | 5303-541-002         |      |
|               | Left Hand                | 5303-541-001         |      |
| 6-1           | Collector Ring           | 5301-749-001         | 1    |
| 6-2           | Collector Ring Accessory | 5301-101-004         | 1    |
| 7             | Bushing*                 | 180-0262 to 180-0295 | 1    |
| 8             | Brushholder              | 5300-178-001         | 1    |
| 8-1           | Brush                    | 176-0001             | 4    |
| 9             | Armature                 | 5303-111-009         | 1    |
| 10            | Autogap Accessory        | 5201-101-008         | 4    |
| 11A           | Mounting Accessory       |                      |      |
|               | Inside Mounted           | 5321-101-001         | 1    |
| 11B           | Mounting Accessory       |                      |      |
|               | Outside Mounted          | 5321-101-002         | 2    |
| 12A           | Magnet - Inside Mounted  |                      | 1    |
|               | 6 Volt                   | 5313-631-005         |      |

| PCB-1225 H.D. |                          |              |      |
|---------------|--------------------------|--------------|------|
| Item          | Description              | Part Number  | Qty. |
|               | 24 Volt                  | 5313-631-006 |      |
|               | 90 Volt                  | 5313-631-007 |      |
| 12A-1         | Terminal Accessory       | 5311-101-001 |      |
| 12B           | Magnet - Outside Mounted |              | 1    |
|               | 6 Volt                   | 5313-631-010 |      |
|               | 24 Volt                  | 5313-631-012 |      |
|               | 90 Volt                  | 5313-631-011 |      |
| 12B-1         | Terminal Accessory       | 5311-101-001 | 1    |
| 13            | Conduit Box              | 5200-101-011 | 1    |

\*See page 34 for specific part numbers.

### How to Order:

1. Specify Voltage for Item 5 and Item 12A or 12B.
2. Specify left hand or right hand hub for Item 6.  
Bushing enters from magnet side for L.H. hub and from hub side for R.H.
3. Specify Bore Size for Item 7.
4. Specify Inside Mounted for Items 11A and 12A or Outside Mounted for Items 11B and 12B.

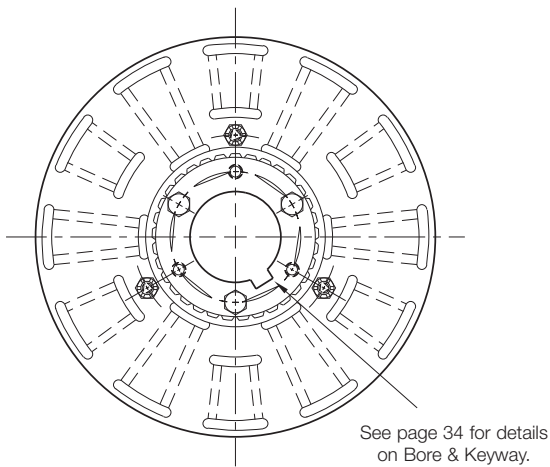
### Example:

PCB-1225 Clutch Brake per I-25609 - 90 Volt, Left Hand hub, 2" Bore, Inside Mounted

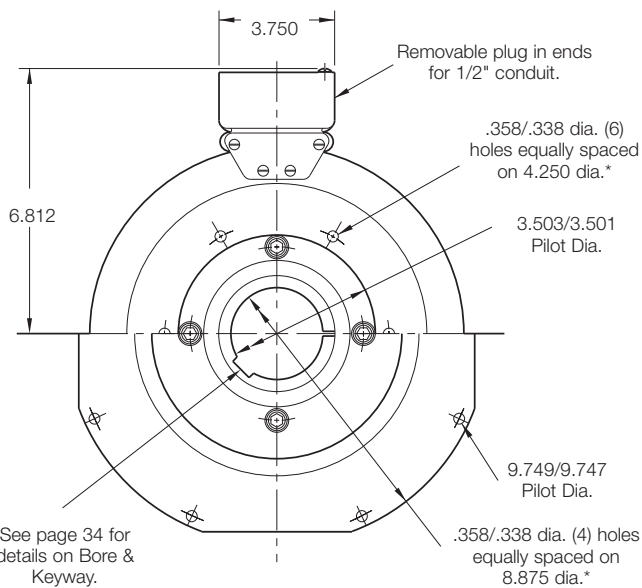
These units meet the standards of UL508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

# PCBC-825 Clutch-Brake Coupling

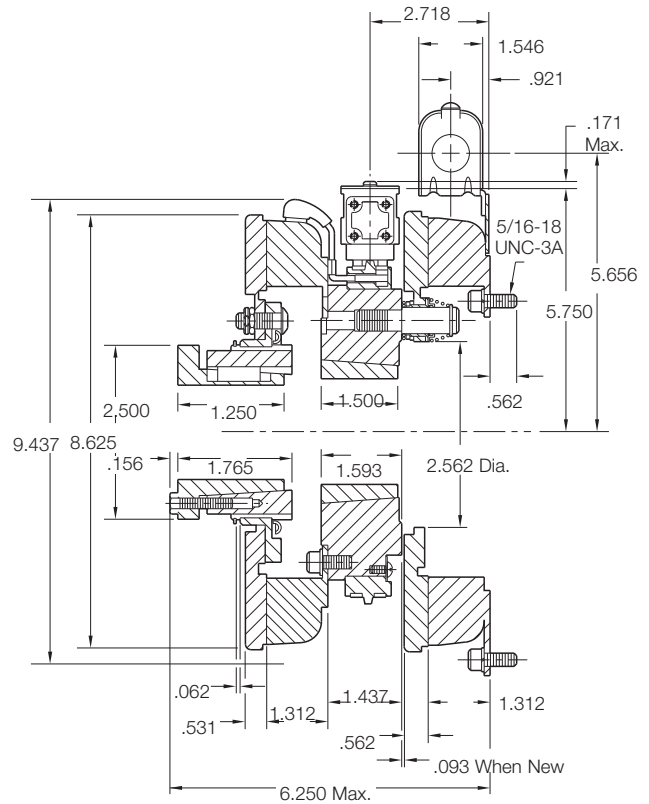
Drawing I-25570



Armature View



Magnet View  
(Inside & Outside Mounted)



\* Mounting holes are within .010 of true position relative to pilot diameter.

## Customer Shall Maintain:

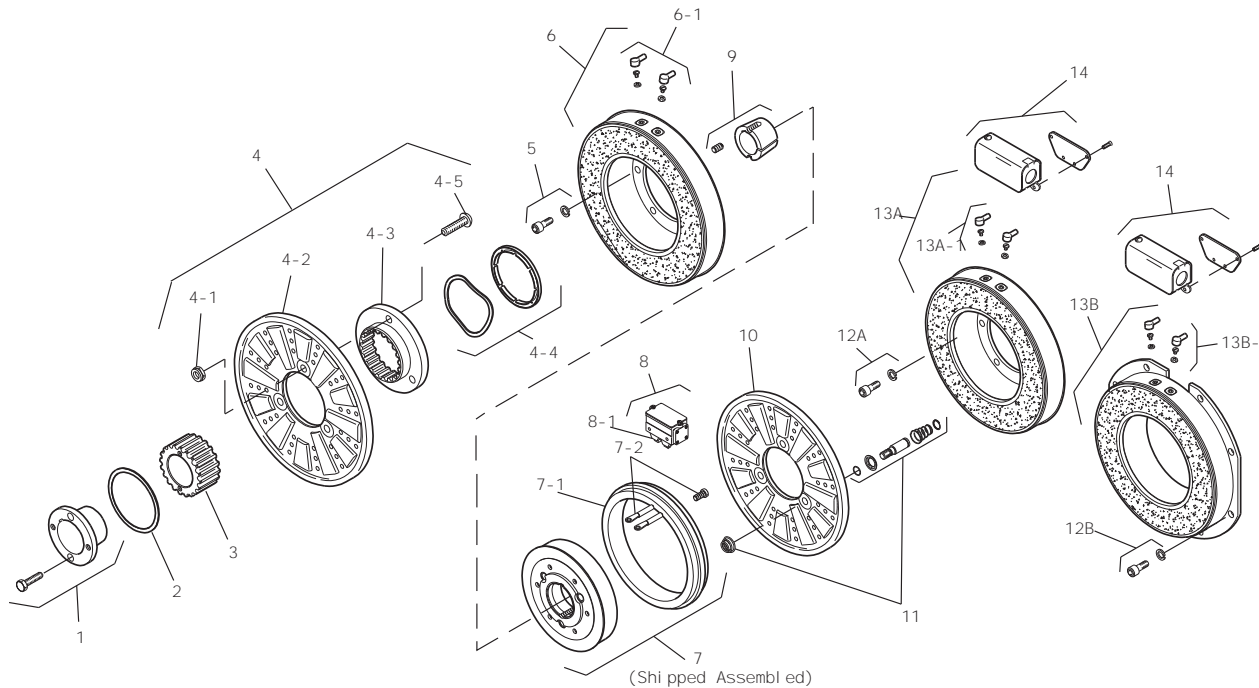
1. Armature mounting shaft concentric with magnet mounting shaft within .006 T.I.R.
2. Squareness of brake magnet mounting face with magnet mounting shaft within .006 T.I.R.
3. Concentricity of brake magnet mounting pilot diameter with magnet mounting shaft within .010 T.I.R.

|                  |                |
|------------------|----------------|
| Armature Shaft   | .500 – 1.500   |
| Magnet Shaft     | .500 – 1.625   |
| Static Torque    | 125 lb. ft.    |
| Maximum Speed    | 4,000 rpm      |
| Standard Voltage | D.C. 6, 24, 90 |

All dimensions are nominal unless otherwise noted.



## PCBC-825 Clutch-Brake Coupling Per I-25570 Inside Mtd. Outside Mtd.



| Item  | Description                | PCBC-825 Part Number | Qty. |
|-------|----------------------------|----------------------|------|
| 1     | Bushing*                   |                      |      |
|       | 1/2" to 1-1/2" Bore        | 180-0002 to 180-0018 | 1    |
| 2     | Retainer Ring              | 748-0006             | 1    |
| 3     | Splined Hub                | 540-0057             | 1    |
| 4     | Armature & Splined Adapter | 5321-111-001         | 1    |
| 4-1   | Locknut                    | 661-0004             | 3    |
| 4-2   | Armature                   | 5321-111-022         | 1    |
| 4-3   | Splined Adapter            | 104-0008             | 1    |
| 4-4   | Autogap Accessory          | 5321-101-006         | 1    |
| 4-5   | Screw                      | 797-0272             | 3    |
| 5     | Mounting Accessory         | 5321-101-001         | 1    |
| 6     | Magnet                     |                      | 1    |
|       | 6 Volt                     | 5301-631-002         |      |
|       | 24 Volt                    | 5301-631-004         |      |
|       | 90 Volt                    | 5301-631-005         |      |
| 6-1   | Terminal Accessory         | 5311-101-001         | 1    |
| 7     | Magnet Hub                 |                      | 1    |
|       | Left Hand                  | 5301-541-001         |      |
|       | Right Hand                 | 5301-541-002         |      |
| 7-1   | Collector Ring             | 5301-749-001         | 1    |
| 7-2   | Collector Ring Accessory   | 5301-101-002         | 1    |
| 8     | Brushholder                | 5300-178-001         | 1    |
| 8-1   | Brush                      | 176-0001             | 4    |
| 9     | Bushing*                   |                      |      |
|       | 1/2" to 1-5/8" Bore        | 180-0131 to 180-0149 | 1    |
| 10    | Armature                   | 5301-111-018         | 1    |
| 11    | Autogap Accessory          | 5201-101-008         | 3    |
| 12A   | Mounting Accessory - I.M.  | 5321-101-001         | 1    |
| 12B   | Mounting Accessory - O.M.  | 5321-101-002         | 1    |
| 13A   | Magnet - Inside Mounted    |                      | 1    |
|       | 6 Volt                     | 5311-631-002         |      |
|       | 24 Volt                    | 5311-631-003         |      |
|       | 90 Volt                    | 5311-631-004         |      |
| 13A-1 | Terminal Accessory         | 5311-101-001         | 1    |

| Item  | Description              | PCBC-825 Part Number | Qty. |
|-------|--------------------------|----------------------|------|
| 13B   | Magnet - Outside Mounted |                      | 1    |
|       | 6 Volt                   | 5311-631-007         |      |
|       | 24 Volt                  | 5311-631-009         |      |
|       | 90 Volt                  | 5311-631-008         |      |
| 13B-1 | Terminal Accessory       | 5311-101-001         | 1    |
| 14    | Conduit Box              | 5200-101-011         | 1    |

\*See page 34 for specific part numbers.

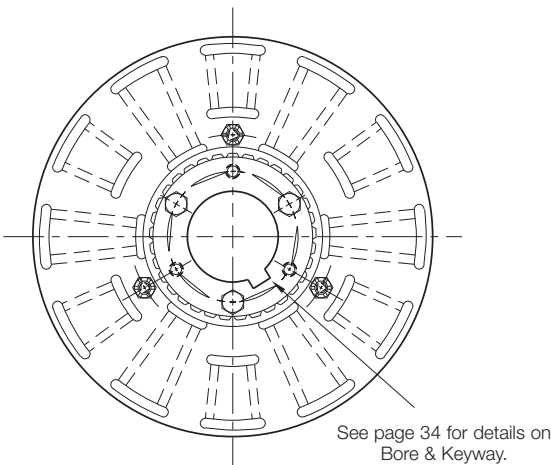
### How to Order:

1. Specify Bore Size for Items 1 and 9.
2. Specify Voltage for Items 6 and 13.
3. Specify left hand or right hand hub for Item 7.  
Bushing enters from magnet side for L.H. hub and from hub side for R.H.
4. Specify Inside Mounted for Items 12A and 13A or Outside Mounted for Items 12B and 13B.

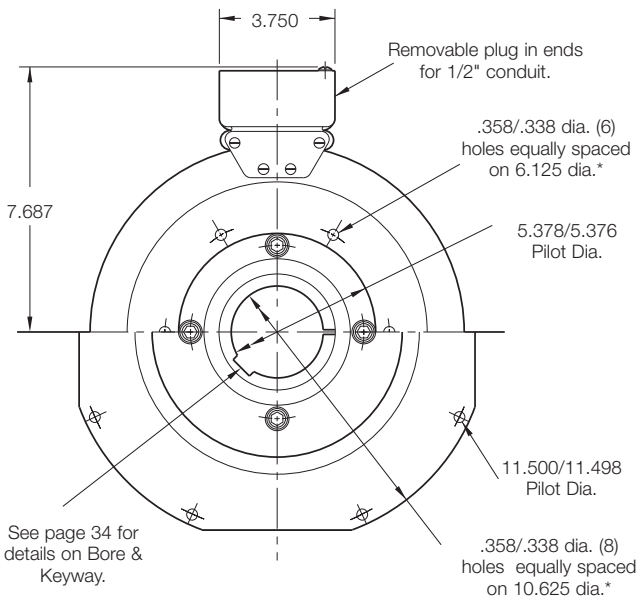
### Example:

PCBC-825 Clutch Brake Coupling per I-25570 - 90 Volt, Inside Mounted, Left Hand hub, 1" Bore, (Items 1 and 9)

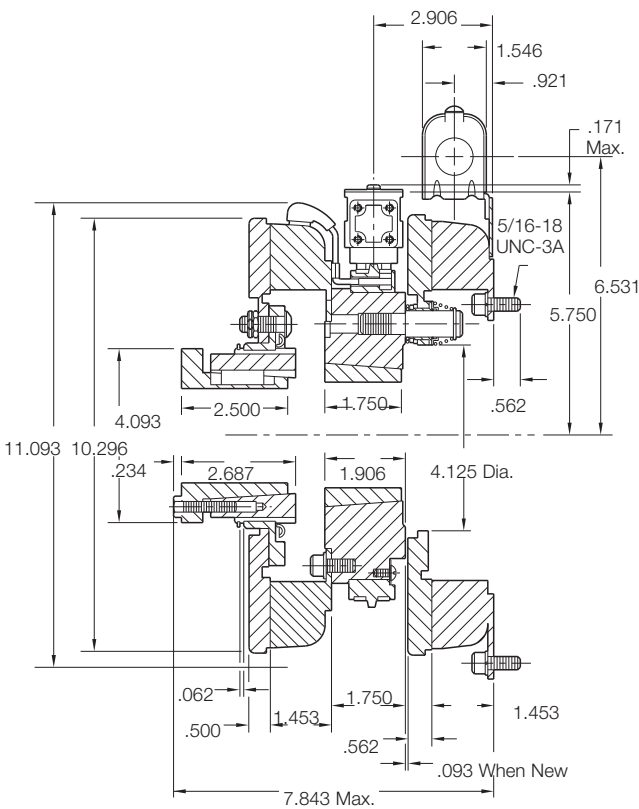
These units meet the standards of UL508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.



Armature View



Magnet View  
(Inside & Outside Mounted)



\* Mounting holes are within .010 of true position relative to pilot diameter.

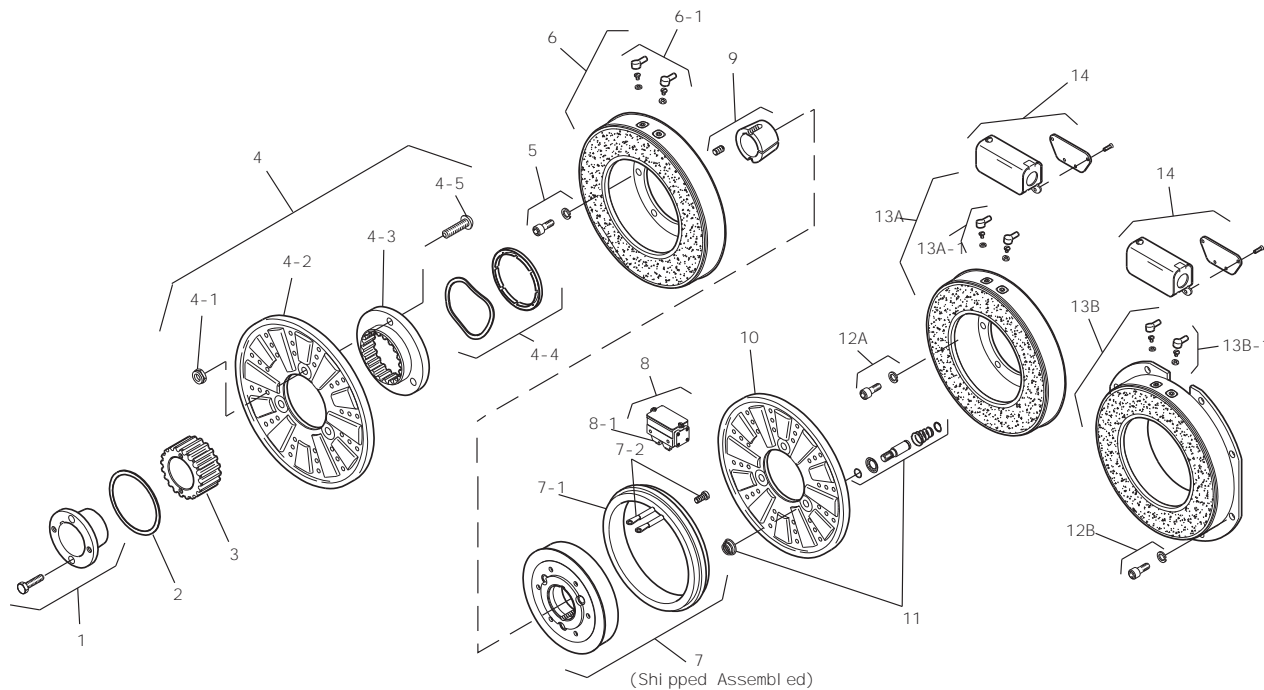
**Customer Shall Maintain:**

- 1. Armature mounting shaft concentric with magnet mounting shaft within .006 T.I.R.
- 2. Squareness of brake magnet mounting face with magnet mounting shaft within .006 T.I.R.
- 3. Concentricity of brake magnet mounting pilot diameter with magnet mounting shaft within .010 T.I.R.

|                  |                |
|------------------|----------------|
| Armature Shaft   | .750 – 2.687   |
| Magnet Shaft     | .500 – 2.500   |
| Static Torque    | 240 lb. ft.    |
| Maximum Speed    | 3,600 rpm      |
| Standard Voltage | D.C. 6, 24, 90 |

All dimensions are nominal unless otherwise noted.

## PCBC -1000 Clutch-Brake Coupling Per I-25590 Inside Mtd. Outside Mtd.



| PCBC-1000 |                            |                      |      |
|-----------|----------------------------|----------------------|------|
| Item      | Description                | Part Number          | Qty. |
| 1         | Bushing*                   |                      |      |
|           | 3/4" to 2-11/16" Bore      | 180-0026 to 180-0057 | 1    |
| 2         | Retainer Ring              | 748-0007             | 1    |
| 3         | Splined Hub                | 540-0062             | 1    |
| 4         | Armature & Splined Adapter | 5322-111-002         | 1    |
| 4-1       | Locknut                    | 661-0004             | 3    |
| 4-2       | Armature                   | 5322-111-036         | 1    |
| 4-3       | Splined Adapter            | 104-0009             | 1    |
| 4-4       | Autogap Accessory          | 5322-101-004         | 1    |
| 4-5       | Screw                      | 797-0272             | 3    |
| 5         | Mounting Accessory         | 5321-101-001         | 1    |
| 6         | Magnet                     |                      | 1    |
|           | 6 Volt                     | 5302-631-003         |      |
|           | 24 Volt                    | 5302-631-014         |      |
|           | 90 Volt                    | 5302-631-005         |      |
| 6-1       | Terminal Accessory         | 5311-101-001         | 1    |
| 7         | Magnet Hub                 |                      | 1    |
|           | Left Hand                  | 5302-541-001         |      |
|           | Right Hand                 | 5302-541-002         |      |
| 7-1       | Collector Ring             | 5301-749-001         | 1    |
| 7-2       | Collector Ring Accessory   | 5302-101-002         | 1    |
| 8         | Brushholder                | 5300-178-001         | 1    |
| 8-1       | Brush                      | 176-0001             | 4    |
| 9         | Bushing*                   |                      | 1    |
|           | 1/2" to 2-1/2" Bore        | 180-0185 to 180-0217 |      |
| 10        | Armature                   | 5302-111-013         | 1    |
| 11        | Autogap Accessory          | 5201-101-008         | 3    |
| 12A       | Mounting Accessory - I.M.  | 5321-101-001         | 1    |
| 12B       | Mounting Accessory - O.M.  | 5321-101-002         | 2    |
| 13A       | Magnet - Inside Mounted    |                      | 1    |
|           | 6 Volt                     | 5312-631-004         |      |
|           | 24 Volt                    | 5312-631-005         |      |
|           | 90 Volt                    | 5312-631-006         |      |

| PCBC-1000 |                          |              |      |
|-----------|--------------------------|--------------|------|
| Item      | Description              | Part Number  | Qty. |
| 13A-1     | Terminal Accessory       | 5311-101-001 | 1    |
| 13B       | Magnet - Outside Mounted |              | 1    |
|           | 6 Volt                   | 5312-631-011 |      |
|           | 24 Volt                  | 5312-631-013 |      |
|           | 90 Volt                  | 5312-631-012 |      |
| 13B-1     | Terminal Accessory       | 5311-101-001 | 1    |
| 14        | Conduit Box              | 5200-101-011 | 1    |

\*See page 34 for specific part numbers.

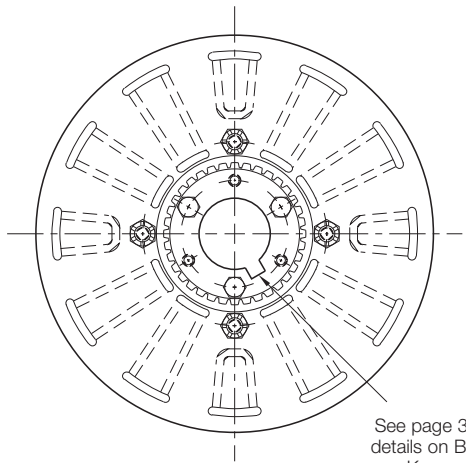
### How to Order:

1. Specify Bore Size for Items 1 and 9.
2. Specify Voltage for Items 6 and 13.
3. Specify left hand or right hand hub for Item 7.  
Bushing enters from magnet side for L.H. hub and from hub side for R.H.
4. Specify Inside Mounted for Items 12A and 13A or Outside Mounted for Items 12B and 13B.

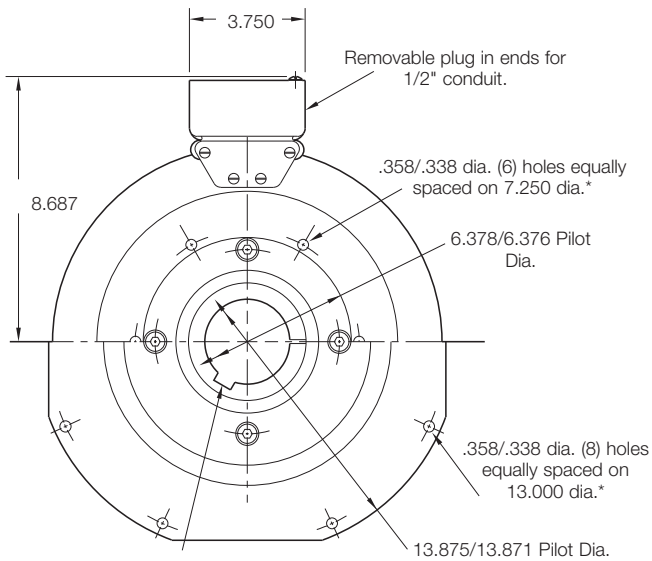
### Example:

PCBC-1000 Clutch Brake Coupling per I-25590 - 90 Volt, Inside Mounted, Left Hand hub, 1-1/2" Bore, (Items 1 and 9).

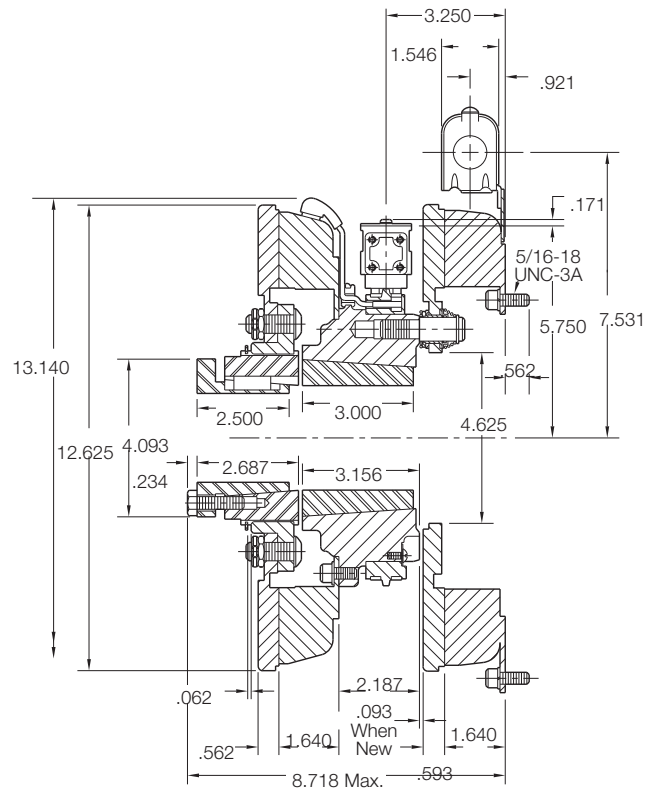
These units meet the standards of UL508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.



Armature View



Magnet View  
(Inside & Outside Mounted)



\*Mounting holes are within .010 of true position relative to pilot diameter.

**Customer Shall Maintain:**

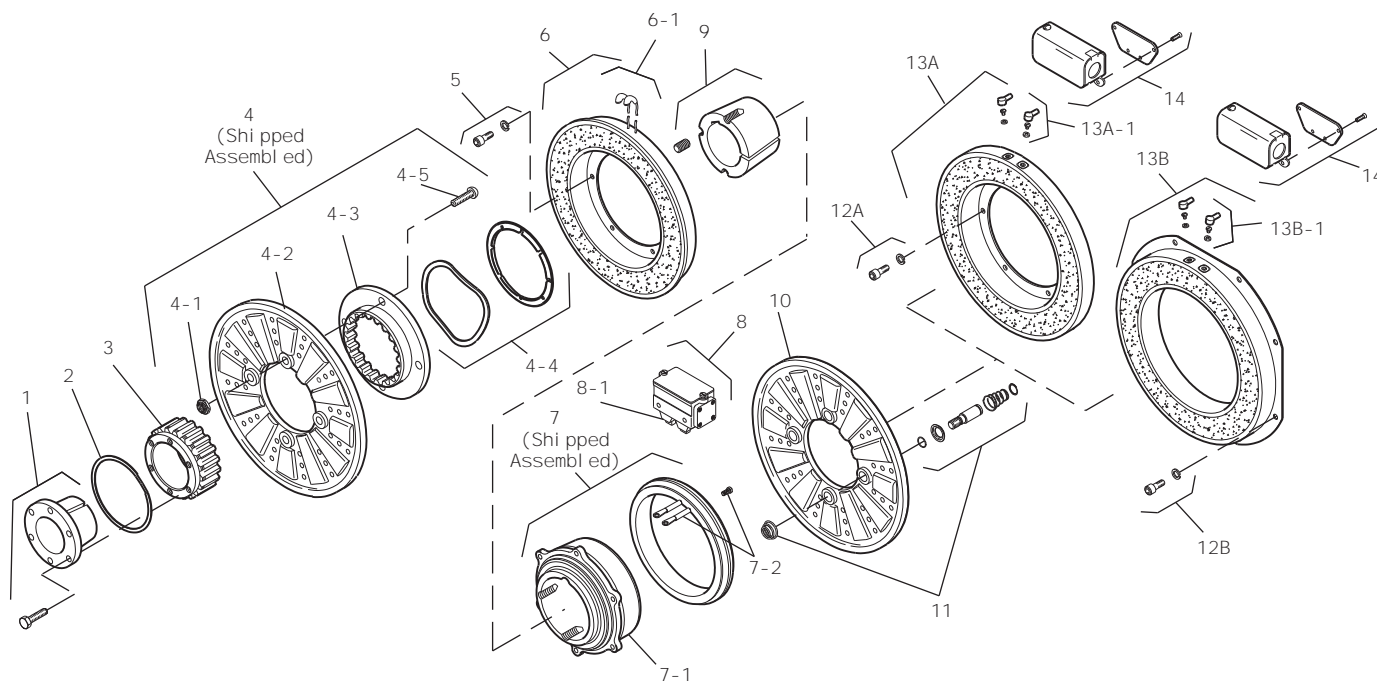
1. Armature mounting shaft concentric with magnet mounting shaft within .006 T.I.R.
2. Squareness of brake magnet mounting face with magnet mounting shaft within .006 T.I.R.
3. Concentricity of brake magnet mounting pilot diameter with magnet mounting shaft within .010 T.I.R.

|                  |                |
|------------------|----------------|
| Armature Shaft   | .750 – 2.687   |
| Magnet Shaft     | .937 – 3.000   |
| Static Torque    | 465 lb. ft.    |
| Maximum Speed    | 3,000 rpm      |
| Standard Voltage | D.C. 6, 24, 90 |

All dimensions are nominal unless otherwise noted.



## PCBC-1225 Clutch-Brake Coupling Per I-25612 Inside Mtd. Outside Mtd.



| Item | Description                | PCBC-1225<br>Part Number | Qty. |
|------|----------------------------|--------------------------|------|
| 1    | Bushing*                   |                          |      |
|      | 3/4" to 2-11/16" Bore      | 180-0026 to 180-0056     | 1    |
| 2    | Retainer Ring              | 748-0005                 | 1    |
| 3    | Splined hub                | 540-0064                 | 1    |
| 4    | Armature & Splined Adapter | 5323-111-001             | 1    |
| 4-1  | Locknut                    | 661-0005                 | 4    |
| 4-2  | Armature                   | 5323-111-034             | 1    |
| 4-3  | Splined Adapter            | 104-0010                 | 1    |
| 4-4  | Autogap Accessory          | 5323-101-002             | 1    |
| 4-5  | Screw                      | 797-0281                 | 4    |
| 5    | Mounting Accessory         | 5321-101-001             | 1    |
| 6    | Magnet                     |                          | 1    |
|      | 6 Volt                     | 5303-631-005             |      |
|      | 24 Volt                    | 5303-631-007             |      |
|      | 90 Volt                    | 5303-631-008             |      |
| 6-1  | Terminal Accessory         | 5311-101-001             | 1    |
| 7    | Magnet Hub                 |                          | 1    |
|      | Left Hand                  | 5303-541-001             |      |
|      | Right Hand                 | 5303-541-002             |      |
| 7-1  | Collector Ring             | 5301-749-001             | 1    |
| 7-2  | Collector Ring Assembly    | 5303-101-004             | 1    |
| 8    | Brushholder                | 5300-178-001             | 1    |
| 8-1  | Brush                      | 176-0001                 | 4    |
| 9    | Bushing*                   |                          |      |
|      | 15/16" to 3" Bore          | 180-0262 to 180-0295     | 1    |
| 10   | Armature                   | 5303-111-009             | 1    |
| 11   | Autogap Accessory          | 5201-101-008             | 4    |
| 12A  | Mounting Accessory - I.M.  | 5321-101-001             | 1    |
| 12B  | Mounting Accessory - O.M.  | 5321-101-002             | 2    |
| 13A  | Magnet - Inside Mounted    |                          | 1    |
|      | 6 Volt                     | 5313-631-005             |      |
|      | 24 Volt                    | 5313-631-006             |      |

| Item  | Description              | PCBC-1225<br>Part Number | Qty. |
|-------|--------------------------|--------------------------|------|
|       | 90 Volt                  | 5313-631-007             |      |
| 13A-1 | Terminal Accessory       | 5311-101-001             | 1    |
| 13B   | Magnet - Outside Mounted |                          | 1    |
|       | 6 Volt                   | 5313-631-010             |      |
|       | 24 Volt                  | 5313-631-012             |      |
|       | 90 Volt                  | 5313-631-011             |      |
| 13B-1 | Terminal Accessory       | 5311-101-001             | 1    |
| 14    | Conduit Box              | 5200-101-011             | 1    |

\*See page 34 for specific part numbers.

### How to Order:

1. Specify Bore Size for Items 1 and 9.
2. Specify Voltage for Items 6 and 13.
3. Specify left hand or right hand hub for Item 7.  
Bushing enters from magnet side for L.H. hub and from hub side for R.H.
4. Specify Inside Mounted for Items 12A and 13A or Outside Mounted for Items 12B and 13B.

### Example:

PCBC-1225 Clutch Brake Coupling per I-25612 - 90 Volt, Inside Mounted Left Hand hub, 1-3/4" Bore (Items 1 and 9).

These units meet the standards of UL508 and are listed under guide card #NMTR2, file #59164. These units are CSA certified under file #LR11543.

## Bushing Part Numbers Browning Bushing

| Shaft Size | Keyway Size | Bushing Number  |          |
|------------|-------------|-----------------|----------|
|            |             | Warner Electric | Browning |
| 1/2        | 1/8 x 1/16  | 180-0002        | H-1      |
| 9/16       | 1/8 x 1/16  | 180-0003        |          |
| 5/8        | 3/16 x 3/32 | 180-0004        |          |
| 11/16      | 3/16 x 3/32 | 180-0005        |          |
| 3/4        | 3/16 x 3/32 | 180-0006        |          |
| 13/16      | 3/16 x 3/32 | 180-0007        |          |
| 7/8        | 3/16 x 3/32 | 180-0008        |          |
| 15/16      | 1/4 x 1/8   | 180-0009        |          |
| 1          | 1/4 x 1/8   | 180-0010        |          |
| 1-1/6      | 1/4 x 1/8   | 180-0011        |          |
| 1-1/8      | 1/4 x 1/8   | 180-0012        |          |
| 1-3/16     | 1/4 x 1/8   | 180-0013        |          |
| 1-1/4      | 1/4 x 3/16  | 180-0014        |          |
| 1-5/16     | 5/16 x 7/32 | 180-0015        |          |
| 1-3/8      | 5/16 x 7/32 | 180-0016        |          |
| 1-7/16     | 3/8 x 1/4   | 180-0017        | H-2      |
| 1-1/2      | 3/8 x 7/32  | 180-0018        |          |
| 3/4        | 1/2 x 3/8   | 180-0026        | QI-1     |
| 13/16      | 1/2 x 3/8   | 180-0027        |          |
| 7/8        | 1/2 x 3/8   | 180-0028        |          |
| 15/16      | 1/2 x 3/8   | 180-0029        |          |
| 1          | 1/2 x 3/8   | 180-0030        |          |
| 1-1/16     | 1/2 x 3/8   | 180-0031        |          |
| 1-1/8      | 1/2 x 3/8   | 180-0032        |          |
| 1-3/16     | 1/2 x 3/8   | 180-0033        |          |
| 1-1/4      | 1/2 x 3/8   | 180-0034        |          |
| 1-5/16     | 1/2 x 3/8   | 180-0035        |          |
| 1-3/8      | 1/2 x 3/8   | 180-0036        |          |
| 1-7/16     | 1/2 x 3/8   | 180-0037        |          |
| 1-1/2      | 1/2 x 3/8   | 180-0038        |          |
| 1-9/16     | 1/2 x 3/8   | 180-0039        |          |
| 1-5/8      | 1/2 x 3/8   | 180-0040        |          |
| 1-11/16    | 1/2 x 3/8   | 180-0041        |          |
| 1-3/4      | 1/2 x 3/8   | 180-0042        |          |
| 1-13/16    | 1/2 x 3/8   | 180-0043        |          |
| 1-7/8      | 1/2 x 3/8   | 180-0044        |          |
| 1-15/16    | 1/2 x 3/8   | 180-0045        |          |
| 2          | 1/2 x 3/8   | 180-0046        | QI-2     |
| 2-1/16     | 1/2 x 3/8   | 180-0047        |          |
| 2-1/8      | 1/2 x 3/4   | 180-0048        |          |
| 2-3/16     | 1/2 x 23/32 | 180-0049        |          |
| 2-1/4      | 1/2 x 11/16 | 180-0050        |          |
| 2-5/16     | 5/8 x 5/16  | 180-0051        |          |
| 2-3/8      | 5/8 x 5/16  | 180-0052        |          |
| 2-7/16     | 5/8 x 5/16  | 180-0053        |          |
| 2-1/2      | 5/8 x 5/16  | 180-0054        |          |
| 2-9/16     | 5/8 x 5/16  | 180-0055        |          |
| 2-5/8      | 5/8 x 5/16  | 180-0056        |          |
| 2-11/16    | 5/8 x 5/16  | 180-0057        |          |

## Dodge Bushing

| Shaft Size | Keyway Size | Bushing Number  |       |
|------------|-------------|-----------------|-------|
|            |             | Warner Electric | Dodge |
| 1/2        | 1/8 x 1/16  | 180-0101        | 1210  |
| 9/16       | 1/8 x 1/16  | 180-0102        |       |
| 5/8        | 3/16 x 3/32 | 180-0103        |       |
| 11/16      | 3/16 x 3/32 | 180-0104        |       |
| 3/4        | 3/16 x 3/32 | 180-0105        |       |
| 13/16      | 3/16 x 3/32 | 180-0106        |       |
| 7/8        | 3/16 x 3/32 | 180-0107        |       |
| 5/16       | 1/4 x 1/8   | 180-0108        |       |
| 1          | 1/4 x 1/8   | 180-0109        |       |
| 1-1/16     | 1/4 x 1/8   | 180-0110        |       |
| 1-1/8      | 1/4 x 1/8   | 180-0111        |       |
| 1-3/16     | 1/4 x 1/8   | 180-0112        |       |
| 1-1/4      | 1/4 x 1/8   | 180-0113        |       |
| 1/2        | 1/8 x 1/16  | 180-0116        | 1215  |
| 9/16       | 1/8 x 1/16  | 180-0117        |       |
| 5/8        | 3/16 x 3/32 | 180-0118        |       |
| 11/16      | 3/16 x 3/32 | 180-0119        |       |
| 3/4        | 3/16 x 3/32 | 180-0120        |       |
| 13/16      | 3/16 x 3/32 | 180-0121        |       |
| 7/8        | 3/16 x 3/32 | 180-0122        |       |
| 15/16      | 1/4 x 1/8   | 180-0123        |       |
| 1          | 1/4 x 1/8   | 180-0124        |       |
| 1-1/16     | 1/4 x 1/8   | 180-0125        |       |
| 1-1/8      | 1/4 x 1/8   | 180-0126        |       |
| 1-3/16     | 1/4 x 1/8   | 180-0127        |       |
| 1-1/4      | 1/4 x 1/8   | 180-0128        |       |
| 1/2        | 1/8 x 1/16  | 180-0131        | 1615  |
| 9/16       | 1/8 x 1/16  | 180-0132        |       |
| 5/8        | 3/16 x 3/32 | 180-0133        |       |
| 11/16      | 3/16 x 3/32 | 180-0134        |       |
| 3/4        | 3/16 x 3/32 | 180-0135        |       |
| 13/16      | 3/16 x 3/32 | 180-0136        |       |
| 7/8        | 3/16 x 3/32 | 180-0137        |       |
| 15/16      | 1/4 x 1/8   | 180-0138        |       |
| 1          | 1/4 x 1/8   | 180-0139        |       |
| 1-1/16     | 1/4 x 1/8   | 180-0140        |       |
| 1-1/8      | 1/4 x 1/8   | 180-0141        |       |
| 1-3/16     | 1/4 x 1/8   | 180-0142        |       |
| 1-1/4      | 1/4 x 1/8   | 180-0143        |       |
| 1-5/16     | 5/16 x 5/32 | 180-0144        |       |
| 1-3/8      | 5/16 x 5/32 | 180-0145        |       |
| 1-7/16     | 3/8 x 3/16  | 180-0146        |       |
| 1-1/2      | 3/8 x 3/16  | 180-0147        |       |
| 1-9/16     | 3/8 x 3/16  | 180-0148        |       |
| 1-5/8      | 3/8 x 3/16  | 180-0149        |       |
| 1/2        | 1/8 x 1/16  | 180-0155        | 2012  |
| 9/16       | 1/8 x 1/16  | 180-0156        |       |
| 5/8        | 3/16 x 3/32 | 180-0157        |       |
| 11/16      | 3/16 x 3/32 | 180-0158        |       |
| 3/4        | 3/16 x 3/32 | 180-0159        |       |
| 13/16      | 3/16 x 3/32 | 180-0160        |       |
| 7/8        | 3/16 x 3/32 | 180-0161        |       |
| 15/16      | 1/4 x 1/8   | 180-0162        |       |
| 1          | 1/4 x 1/8   | 180-0163        |       |
| 1-1/16     | 1/4 x 1/8   | 180-0164        |       |
| 1-1/8      | 1/4 x 1/8   | 180-0165        |       |
| 1-3/16     | 1/4 x 1/8   | 180-0166        |       |
| 1-1/4      | 1/4 x 1/8   | 180-0167        |       |

## Bushing Part Numbers

### Dodge Bushing

| Shaft Size | Keyway Size | Bushing Number  |       |
|------------|-------------|-----------------|-------|
|            |             | Warner Electric | Dodge |
| 1-5/16     | 5/16 x 5/32 | 180-0168        | 2012  |
| 1-3/8      | 5/16 x 5/32 | 180-0169        |       |
| 1-7/16     | 3/8 x 3/16  | 180-0170        |       |
| 1-1/12     | 3/8 x 3/16  | 180-0171        |       |
| 1-9/16     | 3/8 x 3/16  | 180-0172        |       |
| 1-5/8      | 3/8 x 3/16  | 180-0173        |       |
| 1-11/16    | 3/8 x 3/16  | 180-0174        |       |
| 1-3/4      | 3/8 x 3/16  | 180-0175        |       |
| 1-13/16    | 1/2 x 1/4   | 180-0176        |       |
| 1-7/8      | 1/2 x 1/4   | 180-0177        |       |
| 1-15/16    | 1/2 x 1/4   | 180-0178        |       |
| 2          | 1/2 x 1/4   | 180-0179        |       |
| 1/2        | 1/8 x 1/16  | 180-0185        |       |
| 9/16       | 1/8 x 1/16  | 180-0186        |       |
| 5/8        | 3/16 x 3/32 | 180-0187        |       |
| 11/16      | 3/16 x 3/32 | 180-0188        |       |
| 3/4        | 3/16 x 3/32 | 180-0189        |       |
| 13/16      | 3/16 x 3/32 | 180-0190        | 2517  |
| 7/8        | 3/16 x 3/32 | 180-0191        |       |
| 15/16      | 1/4 x 1/8   | 180-0192        |       |
| 1          | 1/4 x 1/8   | 180-0193        |       |
| 1-1/16     | 1/4 x 1/8   | 180-0194        |       |
| 1-1/8      | 1/4 x 1/8   | 180-0195        |       |
| 1-3/16     | 1/4 x 1/8   | 180-0196        |       |
| 1-1/4      | 1/4 x 1/8   | 180-0197        |       |
| 1-5/16     | 5/16 x 5/32 | 180-0198        |       |
| 1-3/8      | 5/16 x 5/32 | 180-0199        |       |
| 1-7/16     | 3/8 x 3/16  | 180-0200        |       |
| 1-1/2      | 3/8 x 3/16  | 180-0201        |       |
| 1-9/16     | 3/8 x 3/16  | 180-0202        |       |
| 1-5/8      | 3/8 x 3/16  | 180-0203        |       |
| 1-11/16    | 3/8 x 3/16  | 180-0204        |       |
| 1-3/4      | 3/8 x 3/16  | 180-0205        |       |
| 1-13/16    | 1/2 x 1/4   | 180-0206        |       |
| 1-7/8      | 1/2 x 1/4   | 180-0207        |       |
| 1-15/16    | 1/2 x 1/4   | 180-0208        |       |
| 2          | 1/2 x 1/4   | 180-0209        |       |
| 2-1/16     | 1/2 x 1/4   | 180-0210        |       |
| 2-1/8      | 1/2 x 1/4   | 180-0211        |       |
| 2-3/16     | 1/2 x 1/4   | 180-0212        |       |
| 2-1/4      | 1/2 x 1/4   | 180-0213        |       |
| 2-5/16     | 5/8 x 5/16  | 180-0214        |       |
| 2-3/8      | 5/8 x 5/16  | 180-0215        |       |
| 2-7/16     | 5/8 x 5/16  | 180-0216        |       |
| 2-1/2      | 5/8 x 5/16  | 180-0217        |       |
| 15/16      | 1/4 x 1/8   | 180-0223        | 3020  |
| 1          | 1/4 x 1/8   | 180-0224        |       |
| 1-1/16     | 1/4 x 1/8   | 180-0225        |       |
| 1-1/8      | 1/4 x 1/8   | 180-0226        |       |
| 1-3/16     | 1/4 x 1/8   | 180-0227        |       |
| 1-1/4      | 1/4 x 1/8   | 180-0228        |       |
| 1-5/16     | 5/16 x 5/32 | 180-0229        |       |
| 1-3/8      | 5/16 x 5/32 | 180-0230        |       |
| 1-7/16     | 3/8 x 3/16  | 180-0231        |       |
| 1-1/2      | 3/8 x 3/16  | 180-0232        |       |
| 1-9/16     | 3/8 x 3/16  | 180-0233        |       |
| 1-5/8      | 3/8 x 3/16  | 180-0234        |       |

| Shaft Size | Keyway Size | Bushing Number  |       |
|------------|-------------|-----------------|-------|
|            |             | Warner Electric | Dodge |
| 1-11/16    | 3/8 x 3/16  | 180-0235        | 3020  |
| 1-3/4      | 3/8 x 3/16  | 180-0236        |       |
| 1-13/16    | 1/2 x 1/4   | 180-0237        |       |
| 1-7/8      | 1/2 x 1/4   | 180-0238        |       |
| 1-15/16    | 1/2 x 1/4   | 180-0239        |       |
| 2          | 1/2 x 1/4   | 180-0240        |       |
| 2-1/16     | 1/2 x 1/4   | 180-0241        |       |
| 2-1/8      | 1/2 x 1/4   | 180-0242        |       |
| 2-3/16     | 1/2 x 1/4   | 180-0243        |       |
| 2-1/4      | 1/2 x 1/4   | 180-0244        |       |
| 2-5/16     | 5/8 x 5/16  | 180-0245        |       |
| 2-3/8      | 5/8 x 5/16  | 180-0246        |       |
| 2-7/16     | 5/8 x 5/16  | 180-0247        |       |
| 2-1/2      | 5/8 x 5/16  | 180-0248        |       |
| 2-9/16     | 5/8 x 5/16  | 180-0249        |       |
| 2-5/8      | 5/8 x 5/16  | 180-0250        |       |
| 2-11/16    | 5/8 x 5/16  | 180-0251        |       |
| 2-3/4      | 5/8 x 5/16  | 180-0252        | 3030  |
| 2-13/16    | 3/4 x 3/8   | 180-0253        |       |
| 2-7/8      | 3/4 x 3/8   | 180-0254        |       |
| 2-15/16    | 3/4 x 3/8   | 180-0255        |       |
| 3          | 3/4 x 3/8   | 180-0256        |       |
| 15/16      | 1/4 x 1/8   | 180-0262        |       |
| 1          | 1/4 x 1/8   | 180-0263        |       |
| 1-1/16     | 1/4 x 1/8   | 180-0264        |       |
| 1-1/8      | 1/4 x 1/8   | 180-0265        |       |
| 1-3/16     | 1/4 x 1/8   | 180-0266        |       |
| 1-1/4      | 1/4 x 1/8   | 180-0267        |       |
| 1-5/16     | 5/16 x 5/32 | 180-0268        |       |
| 1-3/8      | 5/16 x 5/32 | 180-0269        |       |
| 1-7/16     | 3/8 x 3/16  | 180-0270        |       |
| 1-1/2      | 3/8 x 3/16  | 180-0271        |       |
| 1-9/16     | 3/8 x 3/16  | 180-0272        |       |
| 1-5/8      | 3/8 x 3/16  | 180-0273        |       |
| 1-11/16    | 3/8 x 3/16  | 180-0274        |       |
| 1-3/4      | 3/8 x 3/16  | 180-0275        |       |
| 1-13/16    | 1/2 x 1/4   | 180-0276        |       |
| 1-7/8      | 1/2 x 1/4   | 180-0277        |       |
| 1-15/16    | 1/2 x 1/4   | 180-0278        |       |
| 2          | 1/2 x 1/4   | 180-0279        |       |
| 2-1/16     | 1/2 x 1/4   | 180-0280        |       |
| 2-1/8      | 1/2 x 1/4   | 180-0281        |       |
| 2-3/16     | 1/2 x 1/4   | 180-0282        |       |
| 2-1/4      | 1/2 x 1/4   | 180-0283        |       |
| 2-15/16    | 5/8 x 5/16  | 180-0284        |       |
| 2-3/8      | 5/8 x 5/16  | 180-0285        |       |
| 2-7/16     | 5/8 x 5/16  | 180-0286        |       |
| 2-1/2      | 5/8 x 5/16  | 180-0287        |       |
| 2-9/16     | 5/8 x 5/16  | 180-0288        |       |
| 2-5/8      | 5/8 x 5/16  | 180-0289        |       |
| 2-11/16    | 5/8 x 5/16  | 180-0290        |       |
| 2-3/4      | 5/8 x 5/16  | 180-0291        |       |
| 2-13/16    | 3/4 x 3/8   | 180-0292        |       |
| 2-7/8      | 3/4 x 3/8   | 180-0293        |       |
| 2-15/16    | 3/4 x 3/8   | 180-0294        |       |
| 3          | 3/4 x 3/8   | 180-0295        |       |

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