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Primary Brakes
PB-120, PB-170, PB-250, PB-400

Installation Instructions

P-201-WE
819-0480

Warner Electric

An **Altra Industrial Motion** Company

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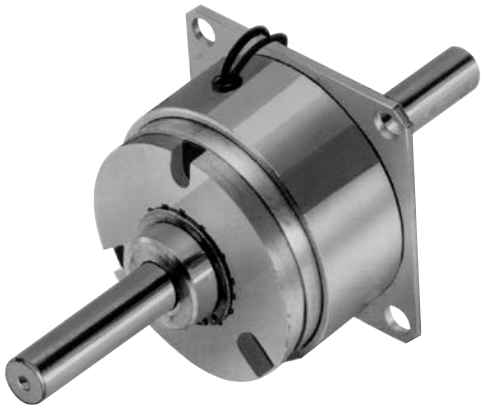

PB-170

PB-400

Follow the installation instructions in this manual carefully to ensure safe, reliable operation. All stated or implied manufacturer warranties are void 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.

Primary Brake
PB-120 PB-170 PB-250 PB-400

The illustration drawings, parts lists, and exploded views for these units can be found beginning on page 10.

A. Installing the Conduit Box

To install the conduit box on the size 400 unit, refer to the instructions supplied with conduit box.

B. Mounting the 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 page 10-17) to aid in the proper positioning of the magnet.

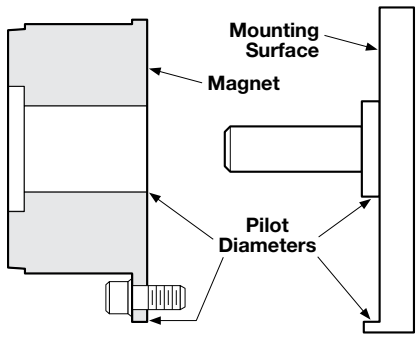

Figure 1

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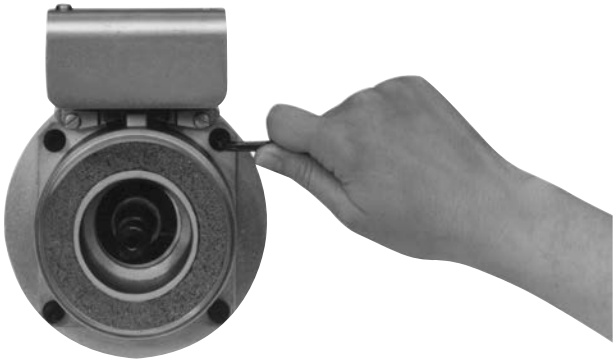

Figure 2

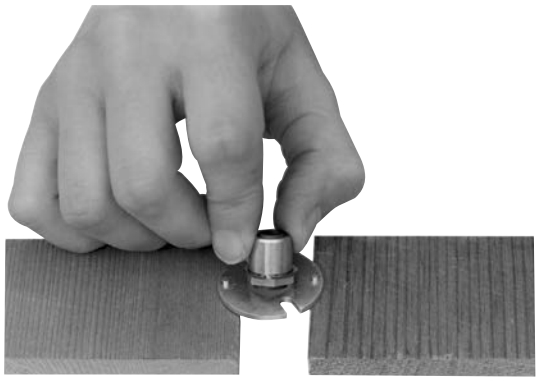

Figure 3

3. Once the mounting surface has been prepared, the magnet is bolted in place with capscrews and lockwashers. (Figure 2.)

4. After assembly, the magnet must be concentric and square within the required tolerances listed on the illustration drawing.

C. Assembling the Armature and Hub

1. The **antibacklash armatures** are shipped assembled and ready to be installed. See Step D.

2. The **standard armature** and hub must be assembled before it can be installed. Assemble the armatures so that the shiny surfaces (120 and 170) or backing plate sides (250 and 400) are against the hub retainer ring (Figure 3).

3. An **optional release spring** may be used with the standard armatures and hubs. The release spring forces the armature back against the hub retainer ring when the magnet coil is de-energized.

   Follow these instructions to assemble the armature and hub when the optional release springs are being used.

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PB-170

Assemble the splined armature to the hub. The shiny side of the armature should be against the hub retainer ring.

Assemble the release spring into the groove in the hub spline. The curved portion of the spring should be against the armature. (Figure 4)

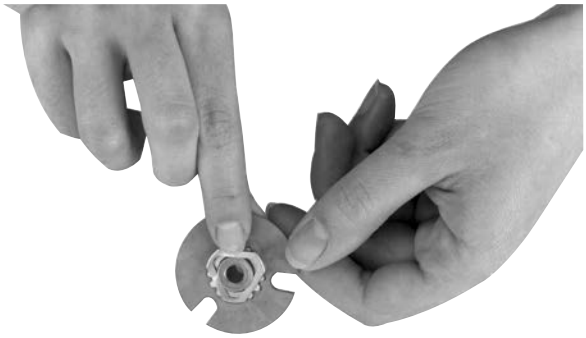

Figure 4

PB-250

Insert the hub, with snap ring intact, into the armature from the backing plate side. (Figure 5)

Figure 5

Insert both release springs into the holes of the backing plate. Bow the springs as necessary to insert them into the armature. (Figure 6)

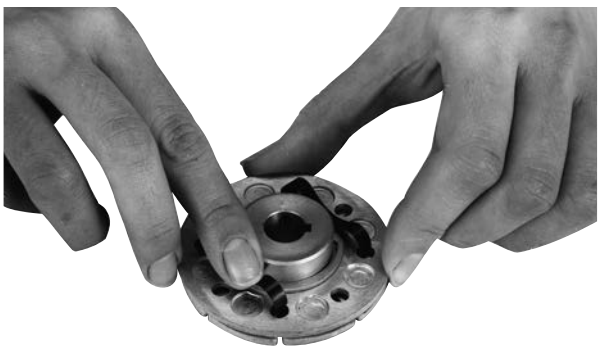

Figure 6

PB-400

Insert the release springs into the backing plate holes of the armature. Bow the springs as necessary to insert them into the armature. (Figure 7)

Figure 7

Remove the snap ring from the hub.

Insert the hub, with the setscrew end first, into the armature from the segmented side. Slide the hub into the armature until the release springs engage the snap ring groove. (Figure 8)

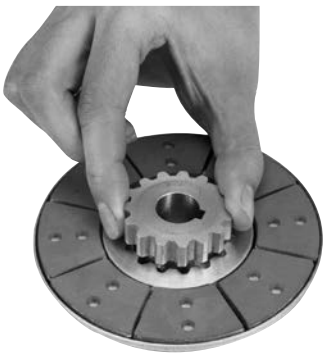

Figure 8

Assemble the snap ring into the groove in the hub, clamping the release spring against the end of the spline. (Figure 9)

Figure 9

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D. Mounting the Armature Assembly

1. (250 and 400 units only) Insert a key in the keyway of the shaft.

2. Slide the armature assembly onto the shaft.

3. Position the assembly in accordance with the overall axial dimensions given on the illustration drawings. For air gap (.015").

4. Secure the assembly in this position by alternately tightening the two setscrews in the hub.

5. The hub will need to be repositioned as wear occurs with time.

Electrical Specifications

Unit Size	PB 120			PB 170		
Voltage – DC	6	24	90	6	24	90
Resistance @ 20°C — Ohms	6.32	104	1386	6.96	111.2	1506
Current — Amperes	.949	.230	.065	.861	.215	.060
Watts	5.69	5.52	5.85	5.85	5.16	5.37
Coil Build-up — Milliseconds	12	12	11	17	17	16
Coil Decay — Milliseconds	8	8	7	8	7	6

Unit Size	PB 400			PB 400		
Voltage – DC	6	24	90	6	24	90
Resistance @ 20°C — Ohms	5	76.4	1079	4.88	73	1087
Current — Amperes	1.2	.314	.084	1.23	.322	.083
Watts	7.2	7.5	7.51	7.39	7.96	7.45
Coil Build-up — Milliseconds	48	48	44	154	154	154
Coil Decay — Milliseconds	15	15	13	62	60	55

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%.

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Installation Instructions

Conduit box kit No. 5200-101-010 contains all components needed to assemble a conduit box for PB-400 brake.

When properly installed, this conduit box is designed to provide a proper means for field wiring terminations. It conforms to the requirements of Underwriters Laboratories.

⚠CAUTION Do not connect rigid conduit directly to the conduit box. A minimum of 12" of flexible liquid tight conduit or other suitable flexible wiring with appropriate fittings is required. Flexible wiring is required to prevent side loading of bearing on bearing mounted clutches and possible deformation or breakage of the conduit box or clutch/brake components during assembly.

Step 1

Assemble a customer supplied flexible wiring connector into desired end of conduit box (3). Press protective plug (5) into unused conduit hole.

Thread green washer head hex screw (9) into round hole in base of conduit box. Place terminal ring (9-1) over screw before inserting.

Snap two wire grommets (6) into square holes in conduit box base. The grommet crowns should be toward the outside of the box and the rubber flanges should be on both sides of the conduit box.

Push two terminal spacers (7) through rubber grommets. Number 6 spacers fit in PB400. (See Figure 10)

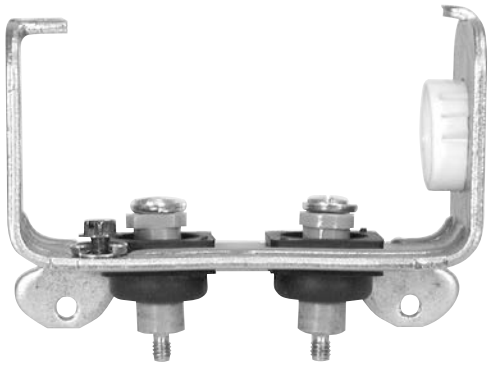
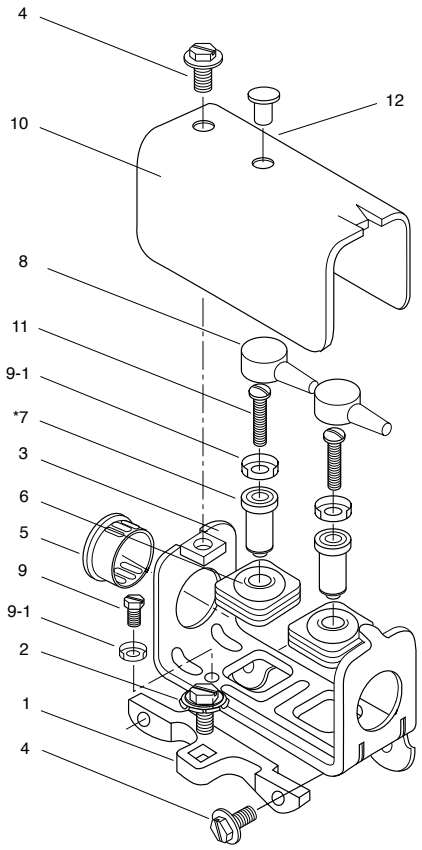


Figure 10

Components



Parts List for kit 5200-101-010

Item	Quantity	Part Name
1	1	Bracket
2	1	Screw, Hex, Washer Head and Sems Conical Washer
3	1	Box, Conduit
4	3	Screw, Hex, Washer Head
5	1	Plug, Protective
6	2	Grommet, Wire
*7	2	Spacer No. 8 Thd.
	2	Spacer No. 6 Thd.
8	2	Cap terminal
9	1	Screw, Hex, Washer Head, Green
9-1	3	Terminal, Ring
10	1	Cover
11	2	Screw, No. 8 Brass
12	1	Plug, Protective

*The No. 6 spacers are required on Sizes 375, 400 and 475. All others use No. 8.

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Step 2

Fasten bracket (1) to clutch field/brake magnet with one No. 10-32 hex washer head screw (2). The screw is self-tapping, threads are not
provided in the magnet bracket adapter. The square projection on the magnet fits into the square hole in the bracket. The curved side of the bracket mounts toward the magnet. The bracket flange is toward the flange side of the magnet. (See Figure 11)

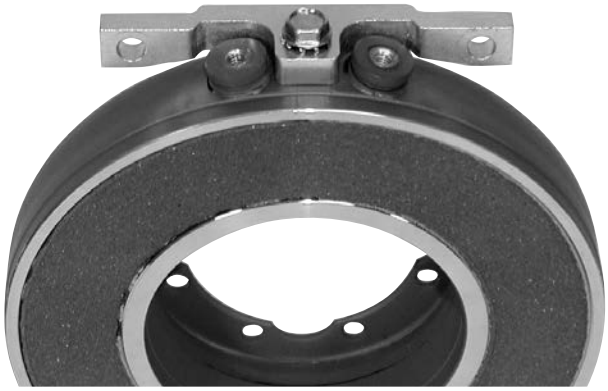

Figure 11

Step 3

Mount conduit box to bracket. The conduit box flange must be toward flange side or the magnet (rear of bracket). Thread terminal spacers into field/magnet before fastening conduit box to bracket. Do not over tighten, excessive torque will pull thread insert out of magnet/field. Secure conduit box to bracket with two No. 10-32 hex washer head screws (4). (See Figure 12)

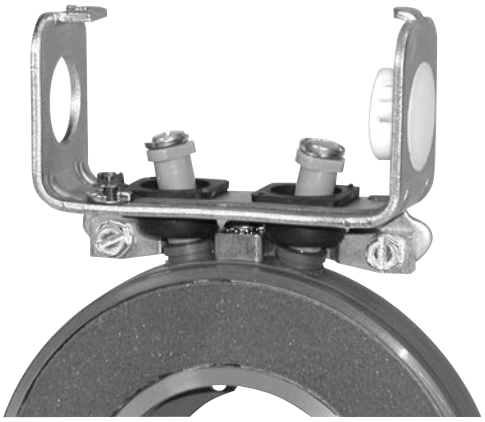

Figure 12

Step 4

Connect electric supply cable to the fitting installed on the conduit box. If an external power supply is furnishing DC current to the clutch or brake, proceed to Step 5 and skip Step 6. If a Warner Electric CBC-100 power supply is being installed in the conduit box, skip Step 5 and proceed to Step 6.

Step 5 - DC Connection

Slide one terminal cap (8) onto each of the two supply conductors, small end first. Connect the two supply conductors (with rubber caps) to the magnet or field terminals using two No. 8 brass screws (11) and ring terminals (9-1). The stripped wires can wrap around the screw between the terminal ring and the screw head or other ring type terminals may be used. Electrical supply connections must conform to local electrical codes. Install plug (12) into cover hole.

Step 6 - AC Connection

When a CBC-100 power supply is used, refer to installation sheet P-266 provided with the CBC-100, following instructions carefully. To mount the CBC-100 to the conduit box, place the control into the cover so the curved surfaces conform, line up the cover hole with the control mounting hole and fasten with screw provided in the mounting kit. Connections to the magnet or field terminals are as outlined in Step 5.

Step 7

A ground wire is recommended for grounding of the conduit box and brake magnet or clutch field. Connect this wire with the green ground screw (9) to the hole in the bottom of the box. Consult electrical local codes regarding grounding requirements.

Step 8

Install cover (10) by sliding the slot in the cover over the tab on one end of the conduit box and secure the cover on the opposite end with one No. 10-32 hex washer head screw (11).

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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 .001” - .003” 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.

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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: Connect a low range ammeter in series with one magnet lead. Correct amperage readings for each coil voltage and unit size are found on page 5 of this manual.

These readings are with the power on and condition control in the maximum output voltage.

Ohmmeter checks should be made with the power off and the circuit open (to be certain, disconnect one lead to the magnet). Average resistance readings are also listed on page 5 of this manual. 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.

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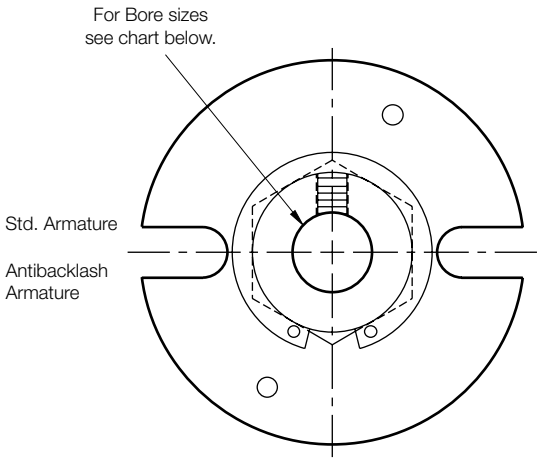
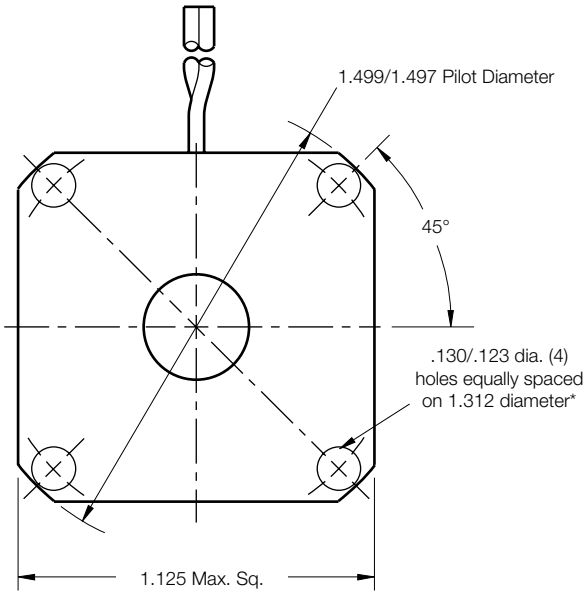
PB-120 Brake

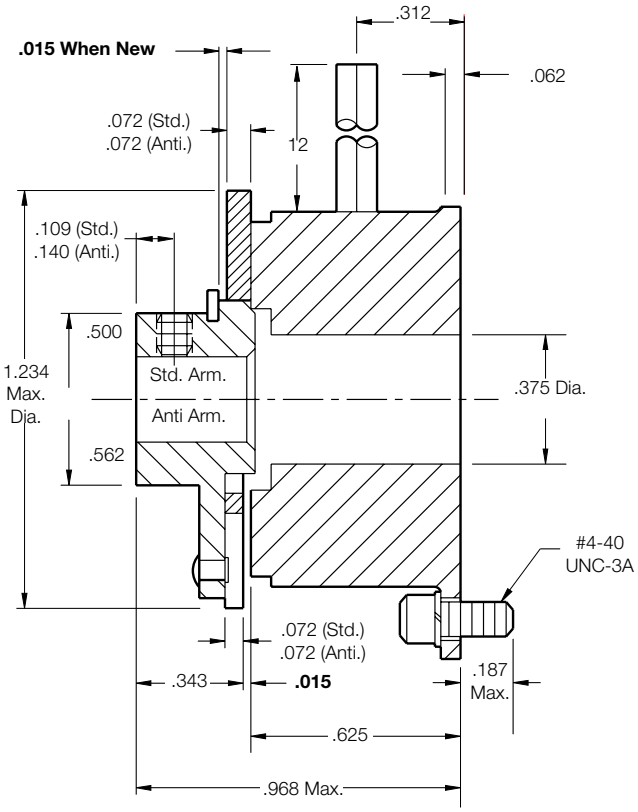


Armature View



Magnet View

*Mounting holes are within .006 of true position relative to pilot diameter.



Bore Dimensions

Armature Bore Dia.
.188/.187
.251/.250
(.313/.312)*

*(Antibacklash Armatures)

Shaft Sizes	.187 – .250
Static Torque	5 lb. in.
Maximum Speed	10,000 rpm
Standard Voltage	D.C. 6, 24, 90

Customer Shall Maintain:

1. Concentricity of brake mounting pilot diameter with armature shaft within .003 T.I.R.
2. Squareness of brake mounting face with armature shaft within .003 T.I.R.

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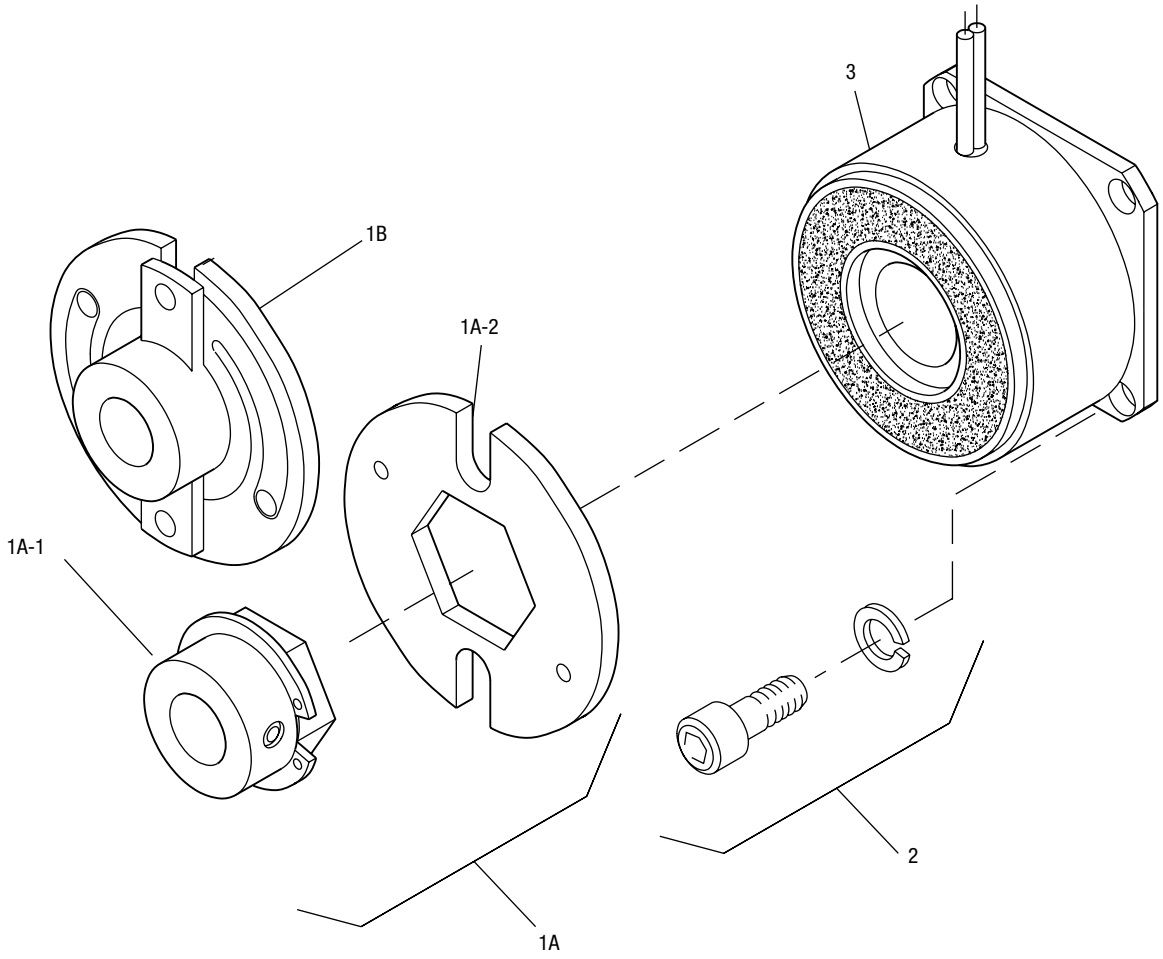
PB-120 Brake

Drawing I-25507



Item	Description	Part Number	Qty.
1A	Armature and Hub		
1A-1	Armature Hub		1
	3/16” Bore	5622-541-009	
	1/4” Bore	5622-541-008	
1A-2	Armature	110-0110	1
1B	Antibacklash Armature		1
	3/16” Bore	5622-111-004	
	1/4” Bore	5622-111-002	
	5/16” Bore	5622-111-003	
2	Mounting Accessory	5101-101-001	1
3	Magnet		1
	6 Volt	5373-631-003	
	24 Volt	5373-631-005	
	90 Volt	5373-631-007	

How to Order:

1. Specify Type of Armature Desired.
2. Specify Bore Size for Item 1A-1 or 1B.
3. Specify Voltage for Item 3.

Example:

PB-120 Brake per I-25507 - 90 Volt, Standard Armature 3/16” Hub Bore

These units meet the standards of UL508 and are listed under guide card #NMTR, file #59164.

These units are CSA certified under file #LR11543.

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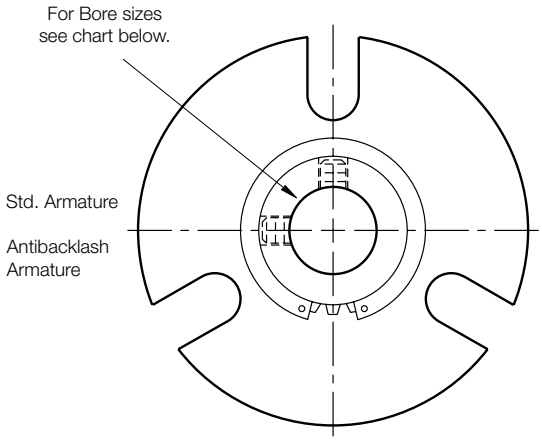
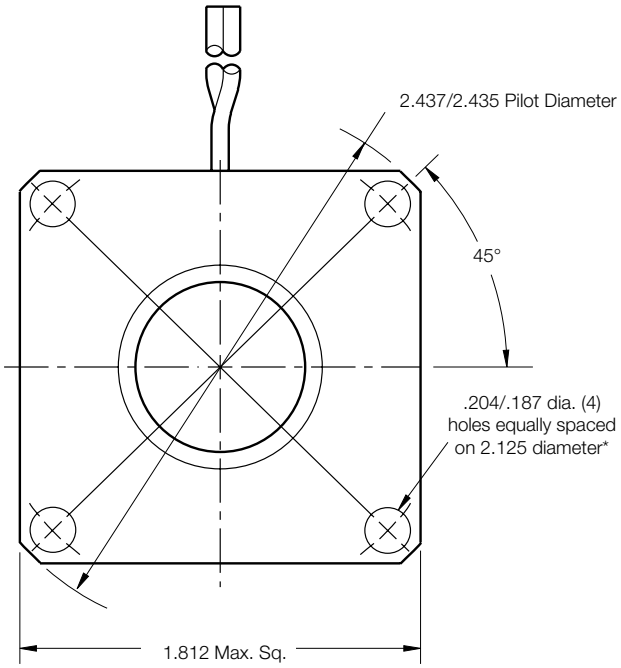
PB-170 Brake



Armature View

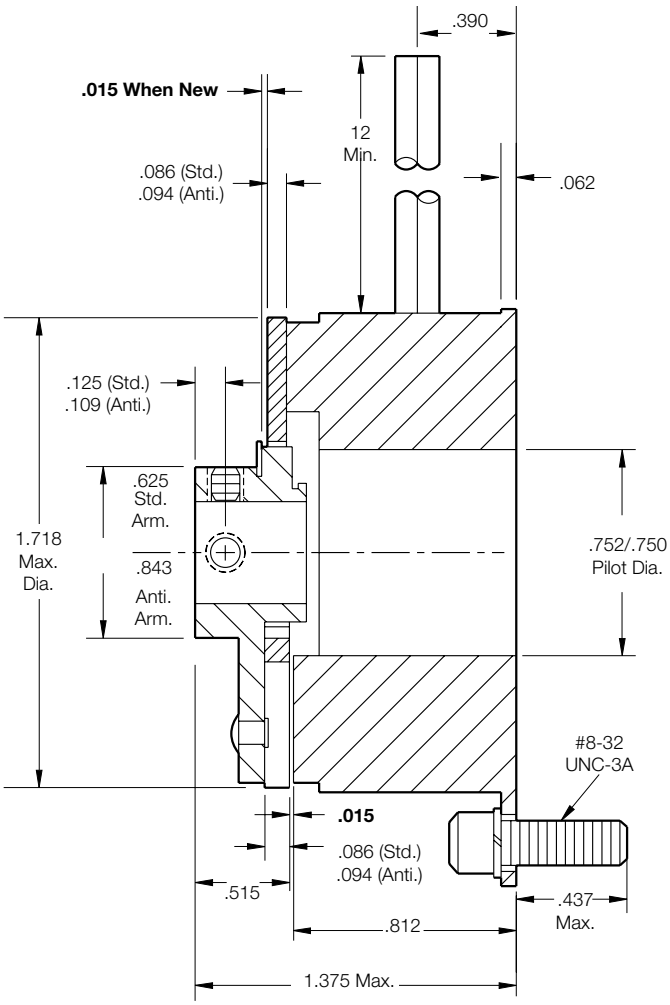


Magnet View

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

Customer Shall Maintain:

1. Squareness of brake mounting face with armature shaft within .006 T.I.R.
2. Concentricity of brake mounting pilot diameter with armature shaft within .010 T.I.R.



Bore Dimensions

Armature Bore Dia.
.251/.250
.313/.312
.376/.375

Shaft Sizes	.250 – .375
Static Torque	15 lb. in.
Maximum Speed	10,000 rpm
Standard Voltage	D.C. 6, 24, 90

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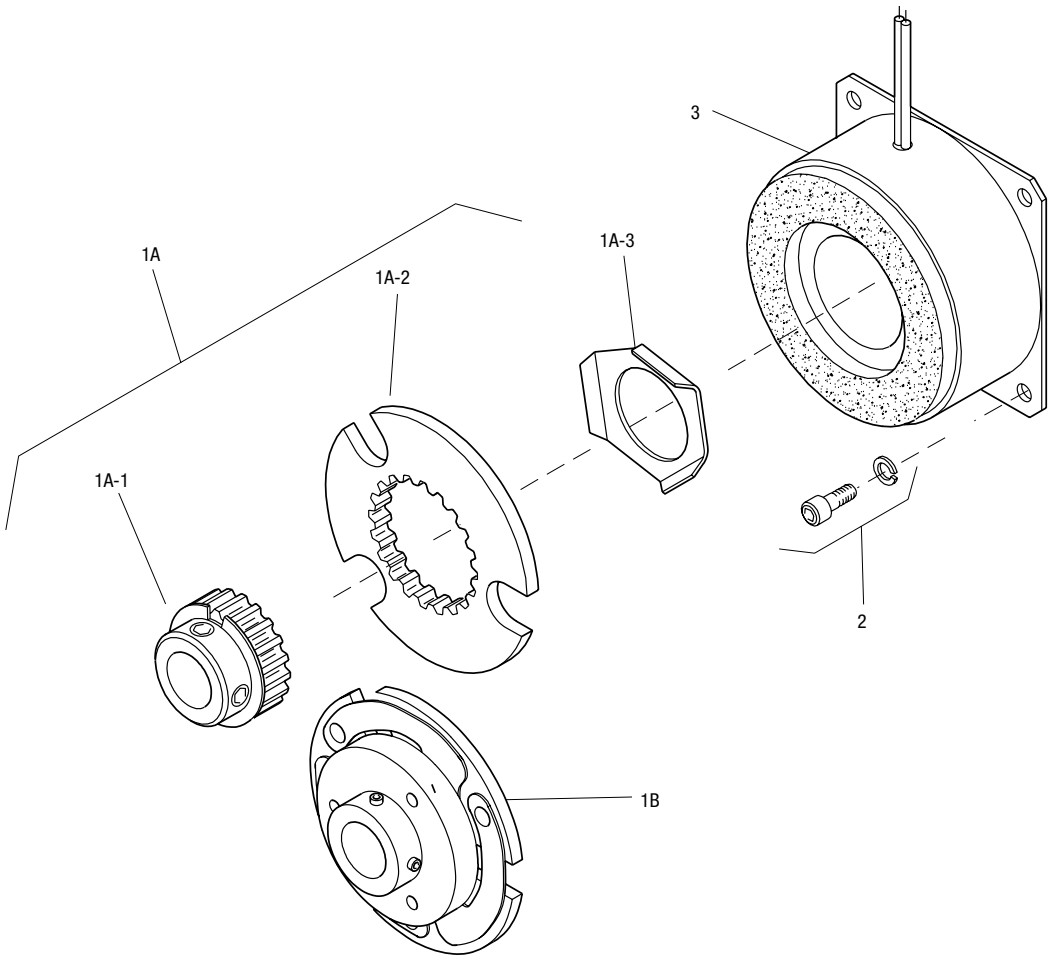
PB-170 Brake

Drawing I-25753



Item	Description	Part Number	Qty.
1A	Armature and Hub		
1A-1	Armature Hub		1
	1/4” Bore	5102-541-002	
	5/16” Bore	5102-541-003	
	3/8” Bore	5102-541-004	
1A-2	Armature	110-0111	1
1A-3	Release Spring	808-0019	1
1B	Antibacklash Armature		1
	1/4” Bore	5623-111-008	
	5/16” Bore	5623-111-009	
	3/8” Bore	5623-111-010	
2	Mounting Accessory	5102-101-001	1
3	Magnet		1
	6 Volt	5375-631-003	
	24 Volt	5375-631-005	
	90 Volt	5375-631-007	

How to Order:

1. Specify Type of Armature Desired.
2. Specify Bore Size for Item 1A-1 or 1B.
3. Specify Voltage for Item 3.

Example:

PB-170 Brake per I-25753 - 90 Volt, Antibacklash Armature, 1/4” Armature Hub Bore

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

These units are CSA certified under file #LR11543.

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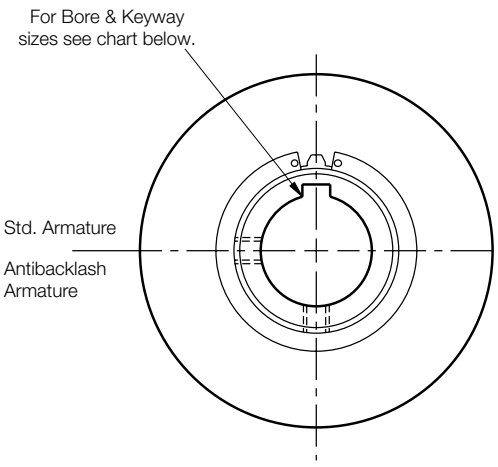
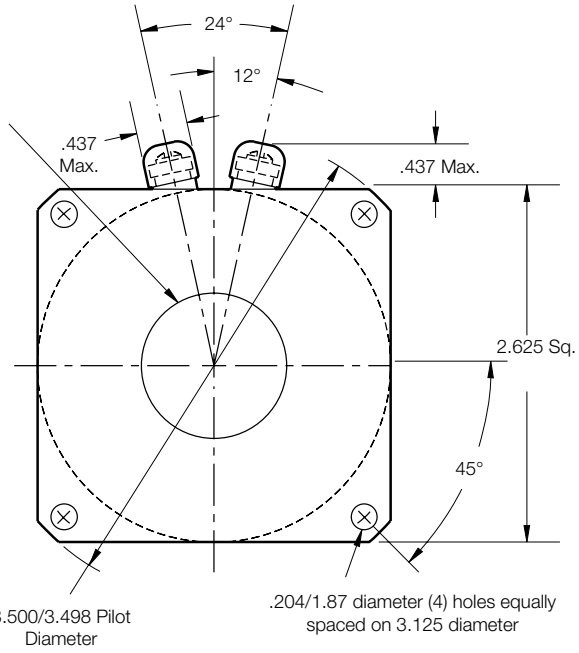
PB-250 Flange Mounted Brake

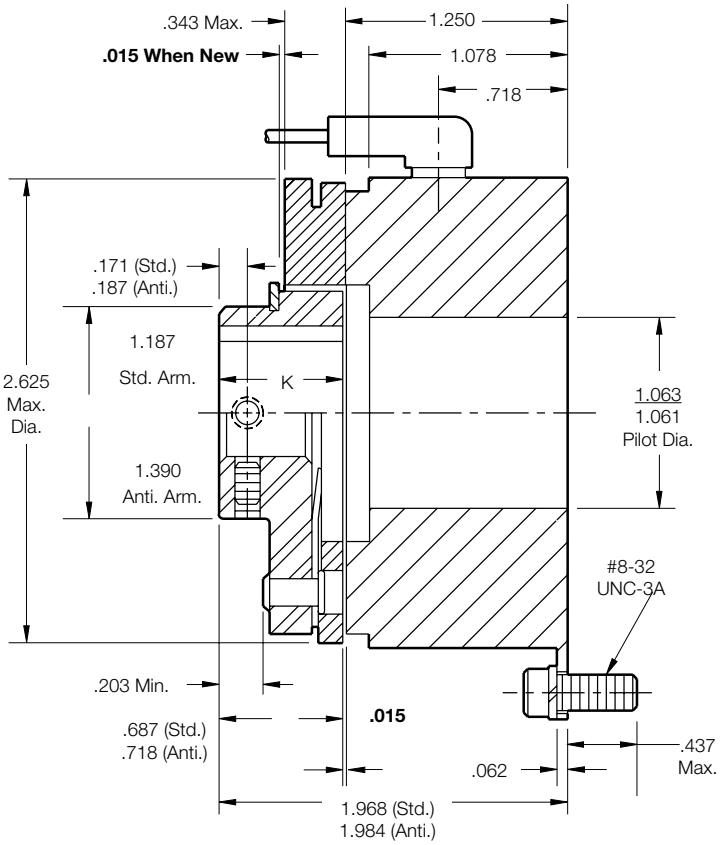


Armature View



Field View

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



Bore and Keyway Dimensions

Armature Bore Dia.	Keyway
.376/.375	.093 x .046
*.438/.437 .501/.500 *.563/.562	.125 x .062
.626/.625 *.688/.687 .751/.750	.187 x .093

*Available on special order only.

Shaft Sizes	.250 – .375
Static Torque	15 lb. in.
Maximum Speed	10,000 rpm
Standard Voltage	D.C. 6, 24, 90

Customer Shall Maintain:

1. Squareness of brake mounting face with armature hub shaft within .006 T.I.R.
2. Concentricity of brake mounting pilot diameter with armature shaft within .010 T.I.R.

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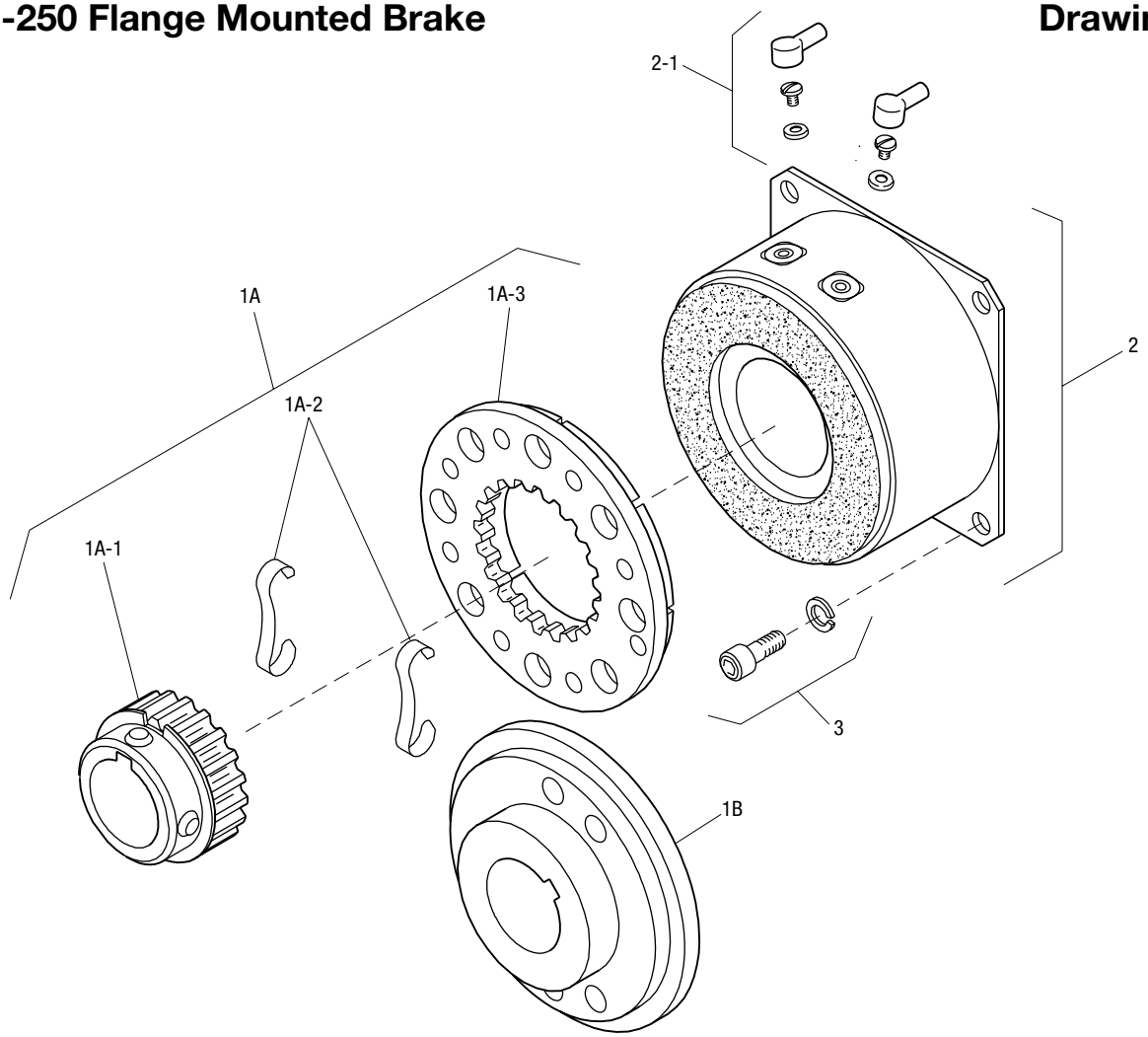
PB-250 Flange Mounted Brake

Drawing I-25519



Item	Description	Part Number	Qty.
1A	Armature and Hub		
1A-1	Armature Hub		1
	3/8” Bore	5103-541-002	
	1/2” Bore	5103-541-004	
	5/8” Bore	5103-541-006	
	3/4” Bore	5103-541-008	
1A-2	Release Spring	5103-101-003	1
1A-3	Armature	5124-111-001	1
1B	Antibacklash Armature		1
	3/8” Bore	5365-111-003	
	1/2” Bore	5365-111-005	
	5/8” Bore	5365-111-007	
	3/4” Bore	5365-111-009	
2	Magnet		1
	6 Volt	5319-631-002	
	24 Volt	5319-631-003	
	90 Volt	5319-631-005	
2-1	Terminal Accessory	5103-101-002	1
3	Mounting Accessory	5102-101-001	1

How to Order:

1. Specify Type of Armature Desired.
2. Specify Bore Size for Item 1A-1 and 1B.
3. Specify Voltage for Item 2.

Example:

PB-250 Brake per I-25519 – 90 volt, Standard Armature, 1/2” Armature Hub Bore.

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

These units are CSA certified under file #LR11543.

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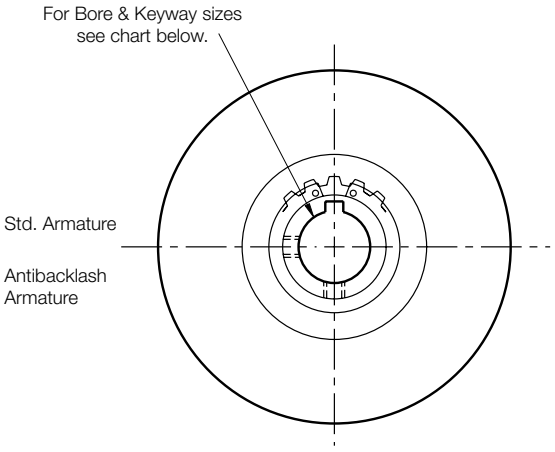
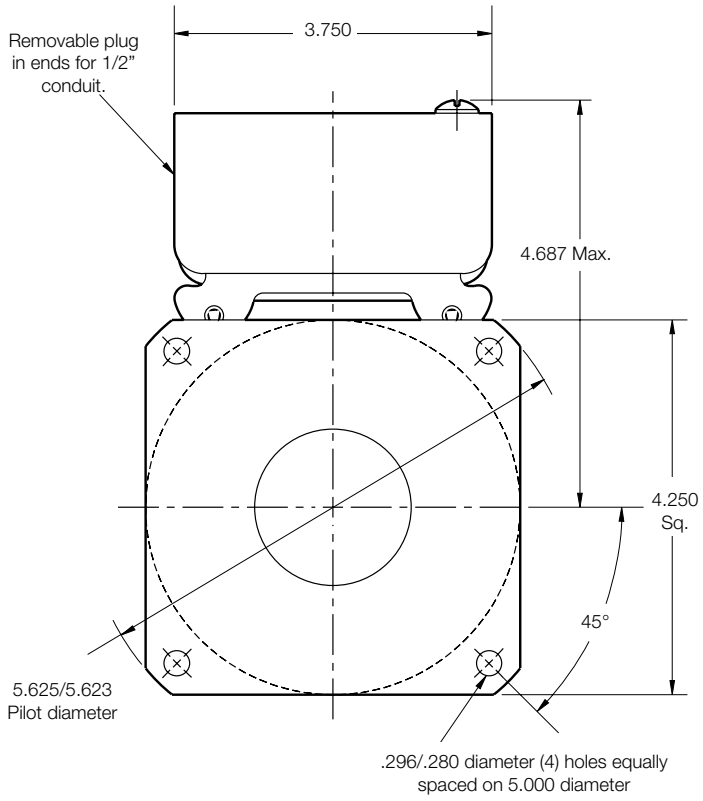
PB-400 Flange Mounted Brake

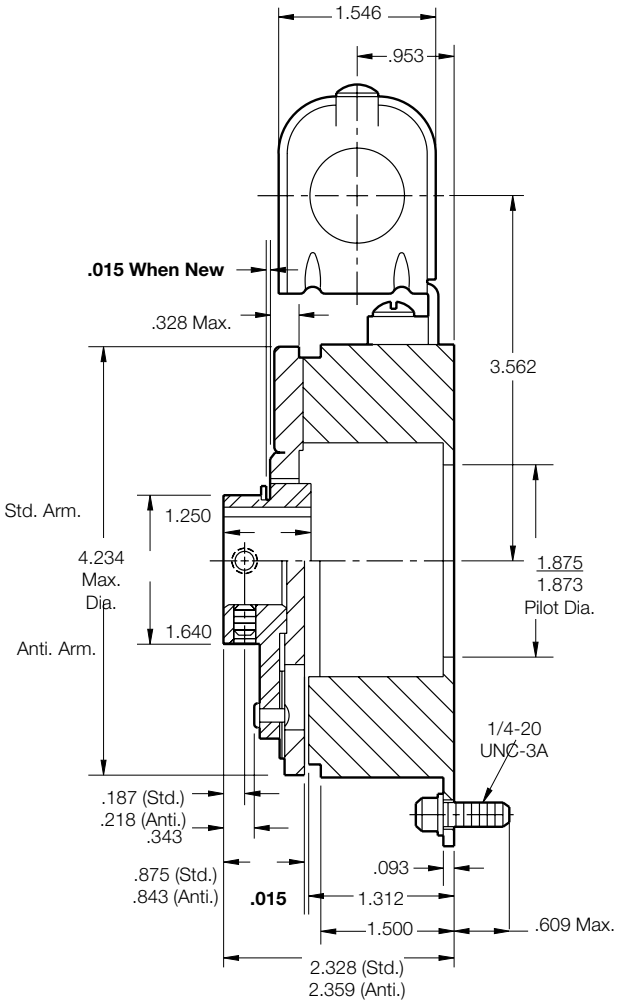


Armature View



Field View

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



Bore and Keyway Dimensions

Armature Bore Dia.	Keyway
.501/.500	.125 x .062
*.563/.562	
.626/.625	
*.688/.687	
.751/.750	.187 x .093
.876/.875	

*Available on special order only.

Shaft Sizes	.500 – .875
Static Torque	270 lb. in.
Maximum Speed	4,500 rpm
Standard Voltage	D.C. 6, 24, 90

Customer Shall Maintain:

1. Squareness of brake mounting face with armature hub shaft within .006 T.I.R.
2. Concentricity of brake mounting pilot diameter with armature shaft within .010 T.I.R.

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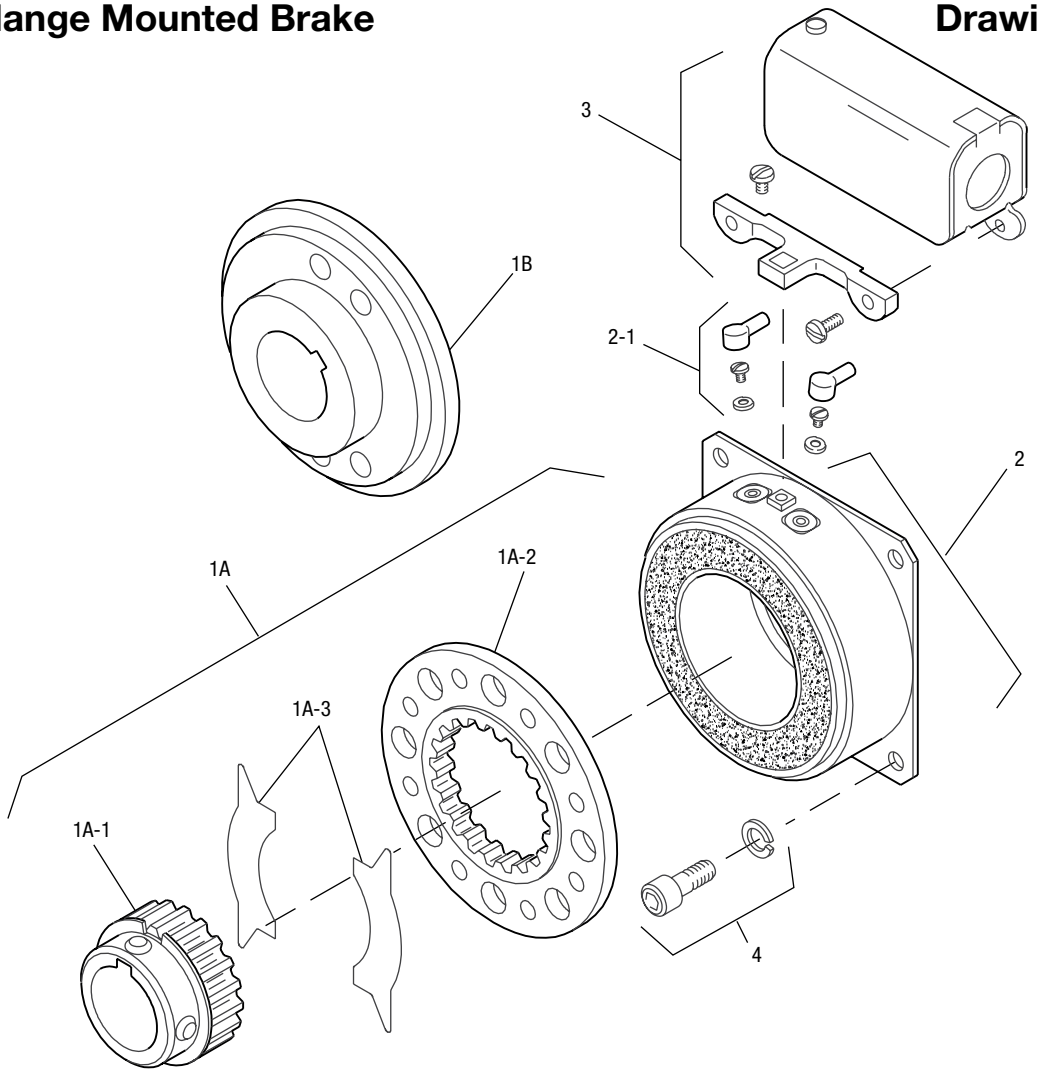
PB-400 Flange Mounted Brake

Drawing I-25694



Item	Description	Part Number	Qty.
1A	Armature and Hub		
1A-1	Armature Hub		1
	1/2” Bore	5104-541-002	
	5/8” Bore	5104-541-004	
	3/4” Bore	5104-541-006	
	7/8” Bore	5104-541-007	
1A-2	Armature	5125-111-001	1
1A-3	Release Spring	5104-101-003	1
1B	Antibacklash Armature		1
	1/2” Bore	5367-111-003	
	5/8” Bore	5367-111-005	
	3/4” Bore	5367-111-007	
	7/8” Bore	5367-111-008	
2	Magnet		1
	6 Volt	5115-631-002	
	24 Volt	5115-631-003	
	90 Volt	5115-631-004	
2-1	Terminal Accessory	5103-101-002	1
3	Conduit Box	5200-101-010	1
4	Mounting Accessory	5104-101-002	1

How to Order:

1. Specify Type of Armature Desired.
2. Specify Bore Size for Item 1A-1 and 1B.
3. Specify Voltage for Item 2.

Example:

PB-400 Brake per I-25694 - 90 Volt, Antibacklash Armature, 3/4” Armature Hub Bore

These units meet standards set forth in UL508 and are listed under guide card #NMTR, file #59164.

These units are CSA certified under file #LR11543.

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