

7.9 Bearings—Model B and D Series

Introduction

The bearings are single-row, deep-groove (both ends of all Model B and most Model D (except D-36; Model D-36 uses a straight roller bearing on the nondrive end). Deep-groove ball bearings are indicated by the suffix 'C3' following the bearing number. Internal bearing clearance is greater than in most ball bearings because the extra clearance allows for more than normal in-and-out movement between the inner and outer race. The drive end of the shaft, where sheave is located, is called the "locking" end and the other end of the shaft is called the nondrive or "floating" end.

Except as noted, the steps are the same for removing and installing both ball bearings and roller bearings.

Removal— Standard Method

There are two methods for removing the bearings. The standard method:

Step	Action										
1	Fabricate puller. (Figure 7-18)										
<p style="text-align: center;">Figure 7-18 Bearing Puller</p> <p>Ⓚ Horseshoe puller Ⓛ Bolling ring and bearing Ⓜ Protective hat Ⓨ Studs (2) Ⓩ Plate</p>											
	Floating End					Locking End					
	X		Y		Z	X		Y		Z	
Model	cm	inch	cm	inch	inch	cm	inch	cm	inch	inch	
B-10	26.7	10.50	14.0	5.50	½×15 lg	26.7	10.50	14.0	5.50	½×20 lg	
D-18	27.3	10.75	20.3	8.00	¾×20 lg	26.7	10.50	20.3	8.00	¾×20 lg	
D-36	22.2	8.75	15.9	6.25	¾×15 lg	40.6	16.00	15.9	6.25	¾×30 lg	
E-48	26.7	10.50	22.2	8.75	¾×25 lg	39.4	15.5	24.1	9.50	¾×30 lg	

2	Remove rotor from base (Section 7.1) and place on floor with shaft horizontal.
3	Remove sheave from shaft (Section 7.8) if working on drive end.
4	Remove lock nut (Figure 7-19).
5	Remove lock washer, outboard bearing collar, and bearing capsule (Figure 7-19).

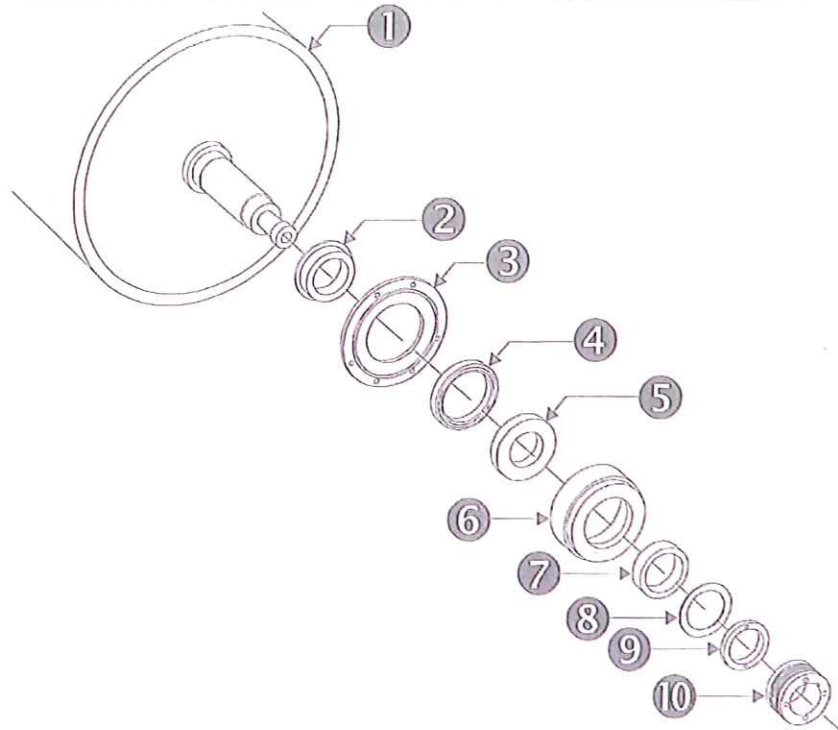




Figure 7-19 Bearing Assembly

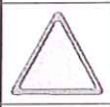

- ① Rotor
- ② Inboard collar
- ③ Spacer (Omitted on D-36 and E-48)
- ④ Bearing capsule
- ⑤ Lock nut
- ⑥ Bolling ring
- ⑦ Bearing
- ⑧ Outboard collar
- ⑨ Lock washer
- ⑩ Sheave


6	Put puller behind bearing.
7	Put hat, which was fabricated for sheave removal (Section 7.8), onto shaft.
8	Assemble studs into puller.
9	Put plate onto studs.
10	Assemble nuts onto studs and finger-tighten against plate.
11	Tighten each nut one turn at a time until bearing loosens.

	<p>If bearing is difficult to remove:</p> <ul style="list-style-type: none"> ◦ Pack dry ice (solid CO₂) around shaft at the point of bearing fit (stainless-steel shaft will contract faster than carbon steel bearing). ◦ Pour hot oil (95°C, 200°F) into inner race. <p>Bearing should release easily. The bearing can be removed by cooling the shaft only, but hot oil speeds the process and lubricates bearing and shaft.</p>
	<p>To prevent shaft warping, do not use flame to heat shaft.</p>
12	Remove plate, studs, and puller.
13	Remove hat, bearing, bolting ring, and inboard bearing collar.
14	Remove gaskets from bolting ring and bearing capsule.

**Removal—
 Alternate Method**



Alternative method for removing bearings:


Step	Action
1	Remove rotor from base (Section 7.1) and place on floor with shaft horizontal.
2	Remove sheave from shaft (Section 7.8).
3	Fabricate horseshoe puller (Figure 7-18).
4	Remove lock nut.
5	Remove lock washer, outboard bearing collar, and bearing capsule.
	<p>Stop if bolting ring begins to distort. Do not bend bolting ring or strip threaded holes.</p>
6	Install jackscrews in two tapped holes in bolting ring.
7	Tighten each jackscrew one turn at a time until bearing loosens.
	<p>If bearing is difficult to remove:</p> <ul style="list-style-type: none"> ◦ Pack dry ice (solid CO₂) around shaft at the point of bearing fit (stainless-steel shaft will contract faster than carbon steel bearing). ◦ Pour hot oil (95°C, 200°F) into the inner race. <p>Bearing should release easily. The bearing can be removed by cooling the shaft only, but hot oil speeds the process and lubricates bearing and shaft.</p>

	To prevent shaft warping, do not use flame to heat shaft.
	Straight roller bearing: Use steps 8 through 16 only. <i>or</i> Deep groove ball bearing: Go directly to step 17.
8	Remove bearing, spacer (if present), bolting ring, and inboard collar.
9	Put puller between inboard collar and rotor drum.
10	Put hat (fabricated for sheave removal in Section 7.8) onto shaft.
11	Screw studs into puller.
12	Put plate on studs.
13	Screw nuts onto studs and finger-tighten against plate.
14	Tighten each nut one turn at a time until inner race and inboard collar loosens.
15	Remove plate, studs, and puller.
16	Remove hat, inner race, and inboard collar.
	Straight roller bearing: Stop here.
17	Remove jackscrews from bolt collar.
18	Remove gaskets from bolting ring and bearing capsule.

Installation

To install bearings:

Step	Action
1	Check shaft and capsule for burrs and nicks. Remove high spots with honing stone.
	Do not use file or emery cloth to remove burrs or nicks from shaft. If damage to capsule or shaft is severe, contact B&P for recommended repair procedure to minimize shaft warping. Bearing fit must allow for thermal expansion.
2	Heat bearing in clean mineral oil at (95°C, 200°F) for 20 minutes.
	Heat bearing with clean oil only. Other methods can distort bearing or change metal temper.
3	Apply light coat of lubricant, such as molybdenum disulfide, to shaft.
4	Put new cork gasket on bolting ring and hold in place with rubber cement.
5	Put new cork gasket on bearing capsule and hold in place with rubber cement.

6	Install inboard bearing collar, bolting ring, and bearing.
7	Put on inboard bearing collar.
8	Put on bolting ring.
9	Put on inner spacer. (Model B-10 only)
	Bearing is hot. Handle with heat-insulated gloves or tools.
10	Install bearing.
11	Put on outboard bearing collar.
12	Put on lock washer.
13	Install lock nut and tighten.
14	Allow assembly to cool.
15	Retighten lock nut.
16	Remove lock nut, lock washer, and outboard collar.
17	Assemble bearing capsule.
18	Put new cork gasket on bearing capsule and hold in place with rubber cement.
19	Replace outboard collar and lock washer.
20	Install lock nut.
21	Install sheave (Section 7.8).
22	Install rotor in base (Section 7.1).

7.10 Bearings—Model E Series



Introduction

The Model E contactor uses a double-cone tapered roller bearing on the locking end and a cylindrical roller bearing on the floating end. A double-cone tapered roller bearing consists of a double cup (outer race), two single cones with races, and a cone spacer. The cone spacer thickness controls the shaft end-play and is determined at the time of manufacture based on expected operating speed, temperature, and other variables.

Bearing parts are *not* interchangeable, and replacement with stock units can result in bearing failure and other damage.

Removal

Except as noted, bearing removal is the same for both locked and floating end bearings on Model E contactors. Because correct end play needs to be reestablished, installation is different. To remove bearings:

Step	Action
1	Fabricate puller (Figure 7-18).
2	Remove rotor from base (Section 7.1) and place on floor with shaft horizontal.
3	Remove sheave from shaft (Section 7.8) if working on locking end.
4	Remove lock nut.
5	Remove lock washer, outboard bearing collar, and bearing capsule.
6	On locking end, put puller (step 1) snugly behind inner bearing race.
7	On floating end, put puller (step 1) behind inboard collar.
8	Put hat (fabricated for sheave removal in Section 7.8) onto shaft.
9	Assemble studs into puller.
10	Assemble nuts onto studs and finger-tighten against plate.
11	Tighten each nut one turn at a time until bearing loosens.
	<p>If bearing is difficult to remove:</p> <ul style="list-style-type: none"> ◦ Pack dry ice (solid CO₂) around shaft at the point of bearing fit (stainless steel shaft will contract faster than carbon steel bearing). ◦ Pour hot oil (95°C, 200°F) into the inner race. <p>Bearing should release easily. The bearing can be removed by cooling the shaft only, but hot oil speeds the process and lubricates bearing and shaft.</p>
	To prevent shaft warping, do not use flame to heat shaft.




12	Remove plate, studs, and puller.
13	Remove hat.
14	Remove assembled inboard and outboard bearing cones and spacer on locking end. Also remove bolting ring and inboard bearing collar.
15	Disassemble bearing cones and spacer from outer race.
16	Remove bearing and inboard bearing collar on floating end.
17	Remove gaskets from bolting ring and bearing capsule.

Inspection

Check shaft and capsule for burrs or nicks. Remove high spots with honing stone. Do not use file or emery cloth to remove burrs or nicks from shaft. If damage to capsule or shaft is severe, contact B&P for recommended repair procedure to minimize shaft warping. Bearing fit must allow for thermal expansion.

**Installation—
 Locking End**




It is important to install bearings with proper bench end-play. B&P replacement bearings consider processing temperature and operating speed to ensure bearing cone spacer has proper thickness. Use of other bearings could result in rapid failure.

Step	Action
1	Fabricate inner bearing installation tool. Tool is a standard pipe with 8.07 inch ID, 4¾ inch length, and precisely squared ends.
2	Heat bearing in clean mineral oil at (95°C, 200°F) for 20 minutes.
	Heat bearing with clean oil only. Other methods can distort bearing or change metal temper.
3	Apply light coat of lubricant, such as molybdenum disulfide, to shaft.
	Do not use lubricant containing particulates, such as anti-seize compound.
4	Put new cork gasket on bolting ring and hold in place with rubber cement.
5	Install inboard bearing collar and bolting ring.
	Bearing is hot. Handle with heat-insulated gloves or tools.
6	Install inboard bearing cone.
7	Install inner bearing installation tool (step 1).
8	Install lock nut and tighten.

9	Check bearing, both visually and by rocking, to ensure that there is no excess play.
10	Allow assembly to cool to ambient temperature.
11	Retighten lock nut.
12	Remove lock nut and inner bearing installation tool.
13	Install cone spacer and cup.
14	Install outer bearing cone.
15	Install outboard bearing collar.
16	Install lock washer and lock nut and tighten.
17	Check for excessive end play visually and by rocking bearing. Tighten if necessary.

**Installation—
Floating End**

To install bearings on floating end:

Step	Action
1	Heat bearing in clean mineral oil at (95°C, 200°F) for 20 minutes.
	Heat bearing with clean oil only. Other methods may distort bearing or change metal temper.
2	Apply light coat of lubricant, such as molybdenum disulfide, to shaft.
	Do not use lubricant containing particulates, such as anti-seize compound.
3	Put new cork gasket on bolting ring and hold in place with rubber cement.
4	Install inboard bearing collar and bolting ring.
	Bearing is hot. Handle with heat-insulated gloves or tools.
5	Install inner bearing race.
6	Install outboard bearing collar and lock nut.
7	Tighten lock nut.
8	Allow bearing race to cool to ambient temperature.
9	Retighten lock nut.
10	Check that bearing race is drawn fully onto shaft.
11	Install sheave (Section 7.8).

12	Install rotor (Section 7.1).
----	------------------------------

7.11 Seals

Introduction

Identical seal assemblies are used at both ends of the contactor. Seals keep the inlet and outlet liquids from leaking out of the equipment or out through the base drain and keep the light and heavy inlet and outlet liquids separated.

Sealing is accomplished by light contact between the face of a nonrotating carbon seal ring against the face of an alloy metal seal ring. The contact surfaces of the seal rings are maintained in hydraulic balance by accurate proportioning of the contact surfaces.

Each seal ring rests on a Teflon or gasket pad, which cushions the ring. Seals are also made by an O-ring, which fits in a groove in the seal ring and in either the shaft or seal housing. O-rings on each rotating seal provide necessary contact with the shaft. O-rings on each nonrotating seal provide the necessary contact with the seal housing to keep them from rotating.

Servicing Seals

Ensure seals do not become distorted; a precise finish is required for seals to work properly. If necessary, seal rings can be refaced by lapping if damage is not severe.

Process liquids lubricate the seals. Do not operate contactor unless there is liquid present, or the seals will be damaged.

7.11.1 Small Seal Unit

Removal

To remove smaller seal units:

Step	Action
1	Disconnect pipe connections and carefully remove elbows with gaskets.
2	Remove seal ring holder with small carbon seal ring and springs.
3	Remove seal housing from bracket by pulling straight back (do not damage the large carbon seal ring).
4	Remove large carbon holder with large carbon seal ring and springs. (On Models D-18 and 36 a snap ring must be removed first.)
5	Remove hard face rings along with gaskets from rotor shaft.

Inspection

Clean and inspect all parts. All O-ring surfaces should have a mirror-like finish.

Repair


Recondition seals if required. Replace or resurface carbon seal and metal rings as necessary. Unless badly worn, hard face rings can usually be reconditioned many times.

Installation

The following tools are required to adjust seal preload:

- Machinist's scale calibrated in 64ths of an inch.
- Piece of flat bar stock of uniform thickness, approximately $\frac{1}{8} \times 2 \times 8$ inches. Use tool to make measurements for calculations.

Step	Action
1	Ensure all parts are thoroughly clean. Keep area where gaskets are to be installed free of dirt.
2	Lubricate O-ring assembly: <ul style="list-style-type: none"> ◦ Silicone grease for EPR (ethylene-propylene rubber) O-rings ◦ Silicone grease or petrolatum for neoprene or Viton O-rings Inspect all O-ring surfaces for a mirror-like finish (32 RMS).
3	On rotor, install gasket (lightly greased) in recess provided in small seal shaft. Inspect for proper seating. Dress gasket if necessary.
4	Place small hard face ring on shaft and press on without O-ring in place.
5	Using the piece of flat bar stock, measure and record the distance D between face of seal housing and face of hard face.

6	Remove small hard face ring and install well lubricated O-ring (Section 7.12) on small seal shaft. Reinstall small hard face ring squarely and firmly against gasket. Use care to engage drive pin.
7	On bench, install larger well lubricated O-ring (Section 7.12) on small carbon holder, along with springs and disk. (The long end of locating pin in disk fits into hole provided in small carbon holder.)
8	Place small carbon ring onto holder without smaller O-ring in place.
9	Measure with small carbon seal ring assembly in free position. $S_2 = E - D - (5/32 \text{ to } 3/16 \text{ inch})$ E = distance between seal holder flange and small carbon face D = distance between face of seal housing and face of hard face (Step 5 above) S ₂ = distance to be made up by small shims. (Shims are 1/32 in. thick)
10	Remove small carbon ring from holder and install well lubricated O-ring (Section 7.12) on end of small seal holder. Reinstall small carbon ring on holder. (With O-ring installed, small carbon ring should be free to move on holder. Failure to move freely requires disassembly and inspection of O-rings for damage.)
11	Use tool to keep assembly in slight tension, allowing easy insertion into seal housing bore and ensuring that small seal components remain in perfect alignment during installation on Model B and D contactors.
	Avoid scratching face of carbon ring when using tool.
12	Maintain slight pressure on the seal holder while removing the tool to prevent it from being pushed out of the bore by the compressed springs. The seal holder can now be held in position with flange gasket. Place it flush with seal holder and press outer edge to lock it into the threads of the protruding studs.
13	Install flanged elbow on the seal housing using a criss-cross tightening sequence to prevent misalignment.

7.11.2 Large Seal Unit

Removal

To remove larger seal units:

Step	Action
1	Disconnect pipe connections and carefully remove the elbows with gaskets.
2	Remove seal ring holder with small carbon seal ring and springs.
3	Remove seal housing from bracket by pulling straight back. Do not damage large carbon seal ring.
4	Remove large carbon holder with large carbon seal ring and springs. (On Models D-18 and 36 a snap ring must be removed first.)
5	Remove hard face rings along with gaskets from rotor shaft.

Inspection

Clean and inspect all parts. All Teflon O-ring mating surfaces should have a mirror-like finish.

Repair

Recondition if required. Replace or resurface carbon seal rings as necessary. Unless badly worn, hard face rings can usually be reconditioned many times.

Installation

To install large seal units:

Step	Action
1	Use dial indicator on small shaft to check face of seal housing bracket for runout (face to be square to shaft within 0.005 inch TIR). If necessary, correct by loosening bracket and bearing cap screws. Gradually tighten bracket screws, always tightening at high point of bracket. It might be necessary to tap the bearing cap in or out with a soft hammer. Tighten cap screws before final tensioning of bracket screws.
2	Install lightly greased gasket on rotor in recess provided in large seal shaft. Inspect for proper seating. Dress gasket if necessary.
3	Place large hard face ring on shaft and press on without O-ring in place.
4	Using the piece of flat bar stock, measure and record distance A between the face of the hard face and the face of the seal housing bracket. (Refer to drawing.)
5	Remove large hard face ring and install well lubricated O-ring in groove on large seal shaft. Reinstall large hard face ring squarely and firmly against gasket. Use care engaging drive pin.

6	On bench, place springs into holes provided in seal housing. (Some models have a single spring for each carbon seal ring rather than multiple springs.)
7	Install lightly greased gasket in recess provided in large carbon holder. Inspect for proper seating. Dress gasket if necessary.
8	Place large carbon seal ring onto carbon holder without O-ring in place.
9	Place large carbon holder assembly into seal housing bore without O-ring in place (Model E-48 uses two rings or a single ring with a cup gasket). This ensures "free positioning" of components when making measurements for seal compression.
10	With large carbon holder in "free position," proceed as below to determine shims necessary for proper seal preload. (As seal wears, fewer shims will be necessary. When adjustment cannot be made, the carbon ring must be replaced.) Use flat bar stock tool to measure distances.
Model B-10 only	$S_1 = B - A - (5/32 \text{ to } 3/16 \text{ inch})$ B = distance from seal housing flange to large carbon face A = distance measured in #4 above S ₁ = distance to be made up by large shims. (Shims are 1/32 in. thick.)
Models D-18 and 36 only	$S_1 = B - C - A - (5/32 \text{ to } 3/16 \text{ inch})$ B = distance between seal housing flange and housing lip A = distance measured in #4 above C = distance between housing lip and large carbon face S ₁ = distance to be made up by large shims. (Shims are 1/32 in. thick.)
Models E-48 only	$S_1 = A + B - C - (5/32 \text{ to } 3/16 \text{ inch})$ B = distance between seal housing flange and housing lip A = distance measured in #4 above C = distance between lip and large carbon face S ₁ = distance to be made up by large shims. (Shims are 1/32 in. thick.)

11	<p>Remove large seal holder from seal housing and install well lubricated ring(s) on large seal holder. (For E-48 with cup gasket, always install with cup facing or opening into the housing bore.)</p> <p>Reinstall assembly into seal housing. (With holder in housing and ring(s) installed, holder should be free to move in housing bore. Failure to move freely requires disassembly of seal holder parts and inspection of O-rings for damage.)</p> <p>Models D-18 and 36 only: Install snap ring into seal housing bore to prevent the seal holder from falling out during assembly to bracket.</p>
12	<p>Carefully mount assembled seal housing on seal housing bracket. Bolt in place using a criss-cross tightening sequence. (Some resistance should be felt when seal faces come together and seal springs are compressed.)</p>

7.12 O-Rings

Introduction This section includes tips for installing O-rings.

Teflon Two styles of Teflon O-rings are used.

- Bal-Seal (or Omniseal) is used under dynamic loads where the O-ring must move.
- TG-type O-ring is installed when a static seal is sufficient.

In both cases, install O-rings so that the highest pressure faces the open lips or spring and the hydraulic pressure flares out the Teflon lips that seal against the metal or carbon surface.

The contactor assembly drawing should be studied carefully. Determine the pressures on inlet and outlet streams to ensure that the O-rings face the proper direction.

When using Teflon O-rings, all surfaces in contact with O-ring should be polished to at least a 9–12 RMS finish. This can be done with fine crocus cloth wrapped around a pencil or wooden rod (for inside surfaces) or by applying strips of crocus cloth by hand to outside surfaces while the pieces are spun in a lathe. Be careful not to crush carbon seal rings or mar surfaces of metal parts. Polish so that images are reflected.

Type	Description
Bal-Seal	These O-rings have a U-shaped cross section with a corrosion-resistant coil spring the full circumferential length. As a result the O-ring can flex and compress like an elastomeric O-ring.
TG-type	These O-rings have a V-shaped groove machined in one face to a depth of about 60% of the cross section, the included angle of which is about 40°. This allows the O-ring to be easily installed and still seal properly.

Installation Installation procedures vary depending on the type of O-ring.

7.12.1 TG-Type on Large Metal Ring

Introduction

To install TG-type O-rings on the large metal seal ring:

Step	Action
1	Place O-ring in boiling water for 15 minutes to soften Teflon.
2	Carefully place most of O-ring in the machined shaft groove with the V-portion facing away from contactor.
3	Stretch O-ring to force the remainder into the shaft groove. Let O-ring return to its original shape while working outer diameter with fingers. Do not scratch, nick, or mar O-ring.
4	Apply petroleum jelly or silicone grease liberally to O-ring.
5	Place metal seal ring squarely on the O-ring and push it over O-ring with fingers. This might be difficult initially, but after "preforming" O-ring several times, the metal seal ring should slide on easily.

7.12.2 TG-Type on Small Metal Ring

Introduction

To install TG-type O-rings on the small metal seal ring:

Step	Action
1	Place well lubricated TG-type O-ring on the small seal shaft with the V-groove facing outwards (away from the contactor) for initial preforming.
2	Preform O-ring with small metal seal ring until it slips on and off easily.
3	After inspection, remove O-ring and study the assembly drawing to determine the proper direction for O-ring. The O-ring must be installed such that the higher pressure faces the open lips or spring. That causes pressure to flare the Teflon lips, which seal against the metal or carbon surfaces. Typically, pressure are of the following descending order: LLI>LLO~HLI>HLO
4	Assemble O-ring and hard face on shaft.

7.12.3 TG-Type on Large Carbon Ring

Introduction

To install TG-type O-rings on the large carbon seal ring:

Step	Action
1	Place O-ring in boiling water for 15 minutes to soften Teflon.
2	Carefully place most of O-ring in the machined shaft groove with V-portion facing away from contactor.
3	Stretch O-ring enough to force remainder into the shaft groove. Allow O-ring to return to original shape while working outer diameter with fingers. Do not scratch, nick, or mar O-ring.
4	Apply petroleum jelly or silicone grease liberally to O-ring.
5	Place old carbon seal ring squarely on the O-ring and push it over O-ring with fingers. After "preforming" O-ring several times with the old carbon ring, slide new carbon seal ring on.

7.12.4 Bal-Seal on Large Carbon Ring

Introduction

To install Bal-Seal O-rings on the large carbon seal ring :

Step	Action
1	Place well lubricated Bal-Seal on large carbon holder (face open side toward carbon ring).
2	Use seal housing to preform O-ring by forcing the holder and O-ring into housing bore.
3	Reverse direction of Bal-Seal when installing permanently. Bal-Seal opening should always face into seal housing bore.

7.12.5 Bal-Seal on Small Carbon Ring

Introduction

To install Bal-Seal O-rings on the large carbon seal ring:

Step	Action
1	Place well lubricated Bal-Seal on small carbon holder (face open side downwards or towards flange end for the initial preforming).
2	Preform O-ring using inside surface of the small carbon ring.
3	Remove O-ring and study assembly drawing to determine which direction opening should face.
4	Install O-ring such that the higher pressure faces the open lips or spring so pressure flares Teflon lips, which seal against the metal or carbon surface. Typically, pressures are in the following descending order: LLI>LLO~HLI>HLO
5	Assemble O-ring and carbon ring on the holder.
6	Place TG-type O-ring on seal holder with V-groove towards contactor when installed.
7	Do not lubricate or preform this O-ring; it holds the small carbon holder assembly firmly in seal housing bore. Flanged elbow is bolted in place.

Section 8: Parts Information

Ordering Parts

Introduction

To ensure quick and efficient service to its customers, B&P requires the following information for properly identifying replacement parts:


Item	Description
1	The name and code or part number of the parts. (Locate part on related assembly drawing. The parts list for this drawing will show the proper part name and number following its item identification letter).
2	The part's item letter and number (found on the assembly drawing).
3	The type of equipment including serial number. This number is on the nameplate.

Example

Large hard face, Part No. 549-051 or Code No. 259X0438
Item "EB", Reference Drawing No. 344-047-D
B-10 Contactor, Serial No. 12345

Procedure for Parts from Suppliers

Use this general procedure to order parts for items manufactured by a B&P supplier:

Step	Action
1	Identify part from manufacturer's parts list (if available) and provide number of the parts list used.
2	List manufacturer, model number, and serial number of the unit for the part needed.
3	Include quantity desired and shipping instructions with order.
4	If a casting is required and a number is cast on it, provide this number in addition to the information above. (This number might not be legible or could be chipped; state that it is a cast number.) If doubt exists, submit a rough dimensional sketch.
	Order replacement parts <i>only</i> from the specific foundation and assembly drawings supplied with the equipment. Referring to instructional drawings or sketches could result in incorrect parts or unnecessary delay.

