



7.2 Rotor Side Plate

Removal

The rotor side plate might need to be removed if:

- Rotor contains solids that normal cleaning will not remove
- Design change or corrosion requires that new elements be fitted

Use the following procedure to remove the rotor side plate. Have a B&P representative present the first time this operation is performed.

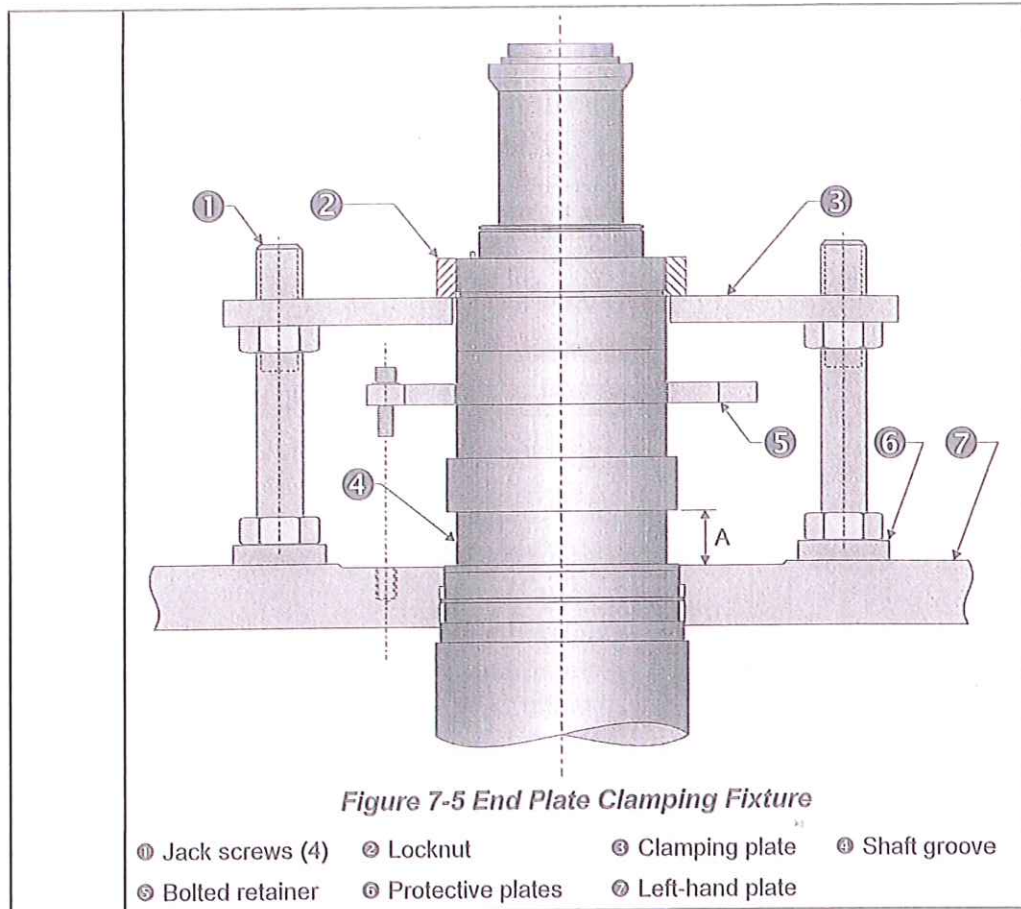
Step	Action
1	Remove rotor from base and place in pedestal with sheave end down (Section 7.1).
2	Loosen set screws in split ring.
3	Remove socket-head cap screws with lock washers holding the split-ring retainer at the inner circumference of the rotor plate.
4	Remove split-ring retainer and split ring.
5	Remove socket-head cap screws at outer circumference of rotor plate.
6	Place eye bolts in tapped holes in side plate and connect cables and hoist.
	Be careful not to damage machined grooves on inside face of rotor plate, bore of side plate, or shaft when removing side plate.
7	Remove side plate.
8	Clean and/or inspect internal section of the rotor.
	Always keep at least one row of tubes installed to prevent elements from shifting.
9	Remove shaft O-ring, rim O-ring, and rim gasket.

Installation

To install rotor side plate:

Step	Action
1	Carefully install side plate without O-rings and gasket. If side plate does not fit, some elements might be bent or out of line. If necessary, realign rotor elements (Section 7.3).
2	Remove side plate. Install shaft O-rings, rim O-ring, and rim gasket. Use assembly cement on the gasket to prevent shifting. Lubricate shaft O-rings, taking care not to damage O-rings when lowering side plate into position.



3	Line up work-point (WP) marks on the rotor and cover.
4	Using hoist, lower side plate into place.
5	Remove eye bolts from tapped holes in side plate.
6	Install lubricated rim screws and tighten only until snug.
7	Put bolted retainer on end plate (Figure 7-5).
8	Mount clamping fixture (Figure 7-5). Tighten jack screws onto protective plates to avoid damage to end plate.
9	Continue tightening screws until gap A (Figure 7-5) permits insertion of split retainer after lifting up bolted retainer.
10	Install bolted retainer over split retainer.
11	Remove fixture.
12	Complete tightening of rim screws (desired torque shown on the assembly drawing).
13	Confirm proper installation by measuring gap between rotor side plate and rotor at the periphery. B series rotor should fit flush (metal to metal). D and E series rotors should have a uniform 0.063 to 0.090 cm (0.025 to 0.035 inch) gap.



7.3 Rotor Elements

Introduction Feed and ASCO tubes can be removed or installed for cleaning or repair.

Removal To remove rotor elements:

Step	Action
1	Remove left-hand rotor side plate (Section 7.2).
2	Inspect exposed end of elements for marks in line with work point (WP) scribed on rotor rim. If no marks exist, mark the elements with a file for precise refitting.
	Return each feed tube to its original hole to maintain rotor balance. Be careful not to damage threads on plugs and tubes.
3	Remove all feed and ASCO tubes (Section 7.6 or 7.7). Mark each tube with the number stamped by its hole if not already marked.
	If elements are held together by solids deposits, it might be necessary to remove them as a set. Place lifting hooks over bars inserted into the ASCO or feed-tube holes to lift elements as a set.
4	Begin with the smallest element and lift one or more elements at a time. Insert lifting hooks through ASCO or feed-tube holes in the elements.
5	Store elements as two stacks of alternate elements.

Installation To install rotor elements:

Step	Action
1	Put the end of each element (normally opposite the left-hand side plate) into that element's groove in the left-hand side plate to check for bends and fit in the grooves.
2	Straighten bends using an element straightening tool (430-049, Figure 7-6).
3	If the element does not fit into the groove, it can sometimes be expanded or shrunk by gentle tapping with a rubber mallet.
4	Install largest element into rotor first (seat properly in its groove). Check that the file mark on the element lines up with work point (WP) scribed on rotor rim.

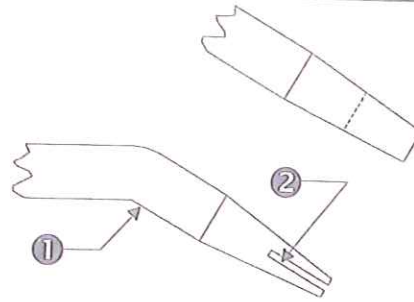
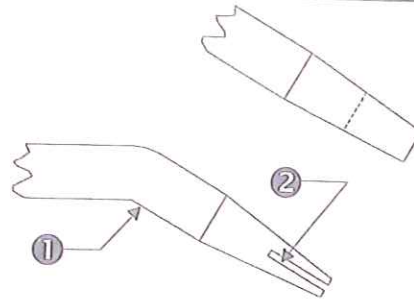




Figure 7-6 Element Straightening Tool

① Tool 430-049

② Slot

	 <p>Figure 7-6 Element Straightening Tool</p> <p>① Tool 430-049 ② Slot</p>
	<p>When properly installed, ends of the elements will extend above machined face of the rotor approximately 0.12 to 0.16 cm (0.046 to 0.062 inch).</p> <p>If feed tubes are used to align and secure elements, insert them backwards to protect the feed tube threads.</p>
5	<p>To secure in place:</p> <ul style="list-style-type: none"> ◦ Insert three feed tubes or three bars of the same diameter through the top three feed-tube holes. ◦ Push bars or tubes far enough in to go through the holes in the largest element, but not so much as to interfere with installation of the next-smaller element.
6	<p>Install next-smaller element into rotor (seat properly in its groove). Check that file marks on the element line up with work point (WP) scribed on rotor rim.</p>
7	<p>Push three feed tubes or bars in further so that they go through the top feed tube holes in the element just installed, but not enough to interfere with installation of next-smaller element.</p>
8	<p>Repeat steps 6 and 7 until all elements are installed.</p>
	<p>It should not be necessary to ream feed tube or ASCO tube holes in elements if original elements are used.</p>
9	<p>Install all feed and ASCO tubes in original locations.</p>
10	<p>Place left-hand side plate on a flat surface, cover side up.</p>
11	<p>Place guide ring (made of 1/8 inch gasket material or soft-rolled metal) into the bore of the plate. Gasket material fits firmly against wall of the bore (Figure 7-7).</p>

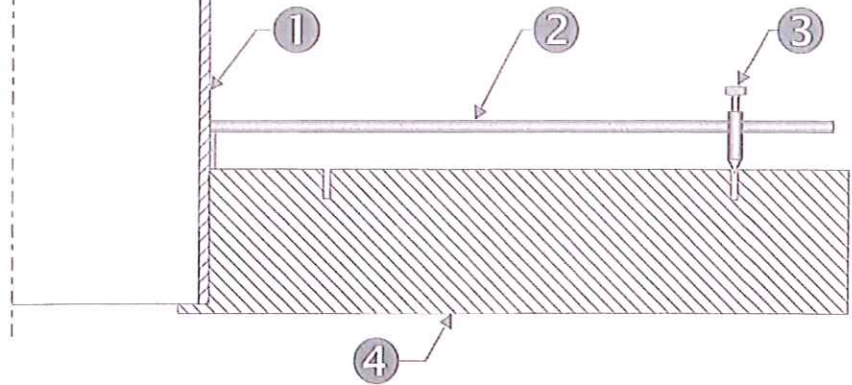


Figure 7-7 Alignment Tool Setup

- ① Gasket material or soft metal rolled to fit cover ID ② Alignment tool 431-049
- ③ Adjustable pointer ④ Left-hand side plate

12 Assemble alignment tool 431-049 (Figure 7-7) over gasket ring.

13 Move pointer to center of outer groove (Figure 7-7).

14 Lock pointer in place.

15 Transfer alignment tool to rotor shaft (Figure 7-8).

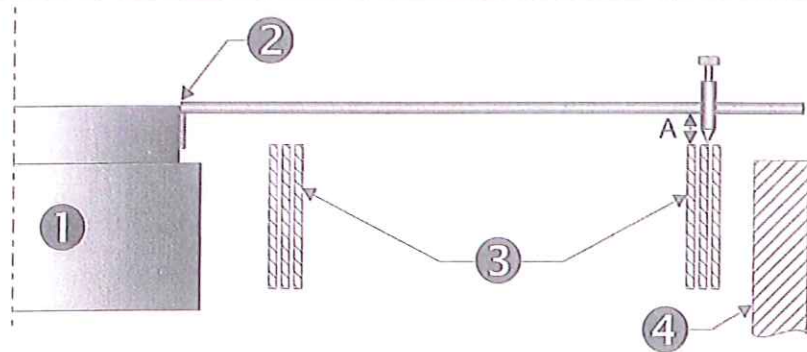


Figure 7-8 Element Alignment Check

- ① Rotor shaft ② Wrap tape around shaft if necessary for snug fit. Apply light coat of grease to prevent binding.
- ③ Elements ④ Rotor band

16 Pointer should line up with outer edge of element (Figure 7-8).

17 Rotate alignment tool 360°.

18 Pointer should line up with element all the way around.

19	Use element straightening tool 430-049 (Figure 7-6) to adjust irregularities in alignment. See table below for specifications.				
	Figure 7-7 Alignment Tool	Model Size	Item A	Roll Item A to Reference ID	Item B ¼ Rod
	Part No.		inch	inch	inch
	431-049-1	B-10	⅛ x ½ x 13⅛	4⅛	9½ long
	431-049-2	D-18/36	⅛ x ½ x 20⅞	6½	17½ long
	431-049-3	E-48	⅛ x ½ x 30⅞	9½	18½ long
20	Repeat Steps 12 through 19 for the rest of the elements.				
21	Remove gasket ring from cover.				
22	Install side plate (Section 7.2).				

7.4 Thread Liners

Introduction


Alloy thread liners are threaded into rotor rim and used as a safeguard against wear and galling for equipment that must be cleaned frequently.

ASCO tubes are threaded into the liners and sealed with a gasket.

Removal

To remove thread liners, use the special tool provided with the contactor.



Step	Action
1	Thread the tool jam nut onto the bolt (Figure 7-9).
2	Slide adapter onto tool bolt.
	<p style="text-align: center;">Figure 7-9 Thread Liner Removal</p> <p> Ⓚ Rotor rim Ⓜ Adapter Ⓝ Jam nut Ⓛ Gasket Ⓟ Liner Ⓠ Bolt </p>
3	Thread bolt into liner (Figure 7-9).

4	Tighten jam nut against adapter.
5	Put wrench on adapter, unscrew, and remove liner.
6	Loosen jam nut.
7	Remove liner from bolt.
8	Remove and discard gasket from liner.
	<p>Liners are factory-assembled with thread-locking compound. If the liner does not turn out freely, do not force it. Carefully apply heat to soften compound and release thread liner.</p> <p>If heat does not free liner, apply thread lubricant and rap sharply on end of tool while working liner in and out. This method usually works and prevents costly thread damage.</p> <p>If all attempts fail, drill out thread liner; avoid damaging rotor threads and gasket seat.</p>

Installation



Do not reuse a thread liner with damaged inner or outer thread. Plug, tube, and thread liner could be thrown out by centrifugal force and cause injury or death.

Step	Action				
1	Thoroughly degrease rotor rim threads and thread liner threads with appropriate solvent.				
2	Screw tool jam nut onto tool bolt (Figure 7-9).				
3	Slide tool adapter onto tool bolt.				
4	Screw thread liner onto tool bolt.				
5	Tighten tool jam nut against tool adapter.				
	If thread sealer is not used on thread liner outer threads, liner could unscrew with tube (liner might need to be destroyed to reclaim tube).				
6	Apply thread adhesive (for example, Loctite 242) to thread liner outer threads (check specific directions on adhesive container).				
7	Put new gasket on thread liner.				
	If reusing thread liners, return them to their original hole to preserve rotor balance.				
8	Screw thread liner into place and torque to specifications shown in table below.				
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Liner Size</th> <th style="text-align: center;">Liner Torque</th> </tr> </thead> <tbody> <tr> <td style="height: 40px;"></td> <td></td> </tr> </tbody> </table>	Liner Size	Liner Torque		
Liner Size	Liner Torque				

	Tool Part Number	inch	N-m	lb-ft
	339-049-1	1	5	120
	339-049-2	1¼	5	120
	339-049-3	1½	6.7	160
	339-049-4	1¾	6.7	160
	339-049-5	2¼	6.7	160
9	Loosen tool jam nut.			
10	Unscrew and remove tool bolt from thread liner.			
11	Slide adapter off tool bolt.			
12	Unscrew jam nut from screw bolt.			

7.5 Drain Plugs

Introduction

Drain plugs, cleanout plugs, and feed tubes can be removed to:

- Clean rotor
- Modify internals
- Eliminate leaks
- Inspect rotor

Removal

Remove and install drain plugs (ASCO plugs, Figure 7-10) and cleanout plugs (ASCO tubes, Figure 7-11) using tools provided with the equipment or standard tools. Avoid damaging plug sockets or dropping plugs into base drain.

Step	Action														
1	Insert drain-plug wrench into hex slot of plug (Figure 7-12). Use the correct tool.														
	<table border="1"> <thead> <tr> <th>Tool Part Number</th> <th>Drain Plug/ASCO Tube Size</th> </tr> </thead> <tbody> <tr> <td>233-047-6</td> <td>1-14</td> </tr> <tr> <td>1X233-047-6</td> <td>1¼-12</td> </tr> <tr> <td>2X233-047-6</td> <td>1½-12</td> </tr> <tr> <td>3X233-047-6</td> <td>2-12</td> </tr> <tr> <td>4X233-047-6</td> <td>1¾-12</td> </tr> <tr> <td>5X233-047-6</td> <td>2¼-12</td> </tr> </tbody> </table>	Tool Part Number	Drain Plug/ASCO Tube Size	233-047-6	1-14	1X233-047-6	1¼-12	2X233-047-6	1½-12	3X233-047-6	2-12	4X233-047-6	1¾-12	5X233-047-6	2¼-12
Tool Part Number	Drain Plug/ASCO Tube Size														
233-047-6	1-14														
1X233-047-6	1¼-12														
2X233-047-6	1½-12														
3X233-047-6	2-12														
4X233-047-6	1¾-12														
5X233-047-6	2¼-12														

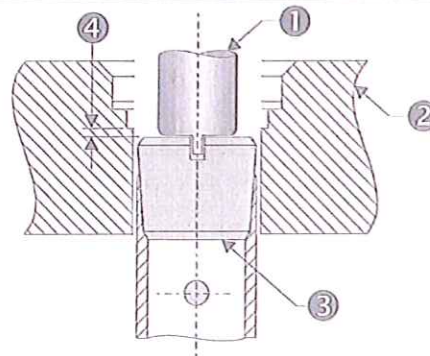


Figure 7-10 Plastic Plug Removal

① Tool 569-048-6

② Rotor

③ Slotted plastic plug

④ 0.031 to 0.047 inch or 0.8 to 1.2 mm

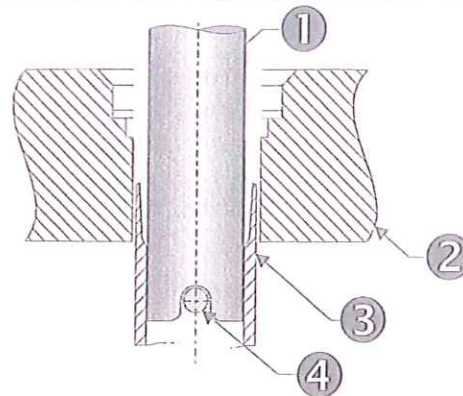


Figure 7-11 ASCO Tube Removal

① Tool 569-048-6 ② Rotor ③ ASCO tube ④ Pin

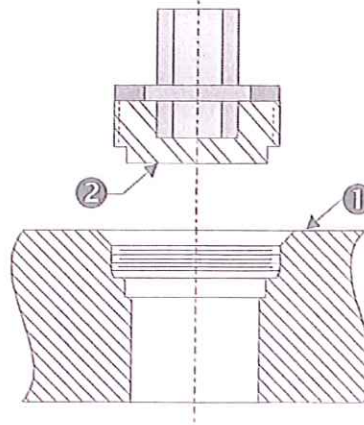


Figure 7-12 Plug Tool

① Rotor (outer) ② Drain plug, ASCO tube

2 Hold knurled adapter firmly and thread plug into adapter.


3 Remove plug.




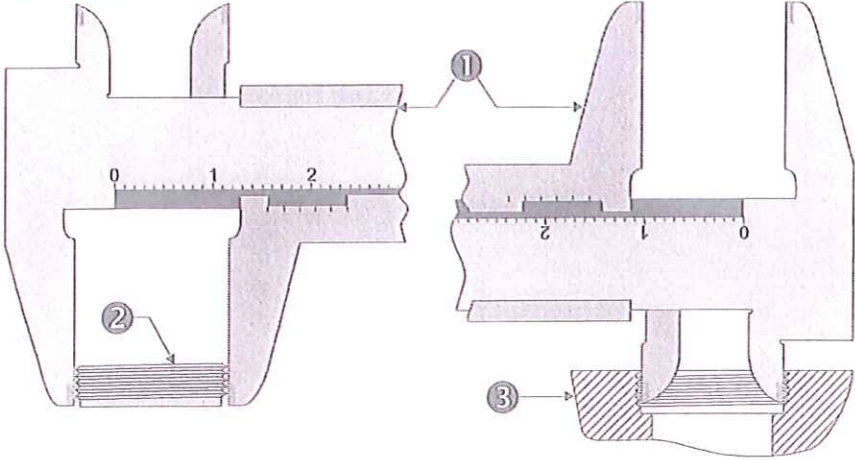
If the plugs do not back out freely, do not force them. Apply thread lubricant (for example, LPS-1) and rap sharply on the end of the wrench while working the plug in and out. This usually works and prevents damage. If all else fails the plug should be drilled out. Avoid damaging rotor threads and gasket seat.

Plugs have stamped numbers indicating corresponding holes. Return plugs to the correct holes.

Inspection

Step	Action
1	Inspect threads for damage and galling.
2	Determine engagement (Figure 7-13) by measuring plug and hole. Subtract the hole diameter from plug outer diameter.
	Replace plug and liner whenever threads are damaged or worn to engagement less than 0.125 cm (0.050 inch).

Installation




Step	Action
	Install new plug gaskets if old gaskets appear worn. Always install plugs in correct holes to maintain rotor balance.
1	Carefully clean plug threads.
2	Lightly coat threads with anti-seize compound.
3	Install tool on plug.
4	Screw plug into correct hole.
 <p>Figure 7-13 Plug Thread Measurement</p> <p>① Vernier calipers ② Plug ③ Rotor</p>	
5	Tighten screw plug to torque specifications shown below:

	Drain Plug/ASCO Tube Size	Torque	
		N-m	lb-ft
	inch		
	1	1.25	30
	1¼	1.68	40
	1½, 1¾, 2, 2¼	2.50	60
6	Retighten plugs to torque specified above next time rotor is stopped.		

7.6 Product Feed Tubes—Model B and E Series

Introduction Remove feed tubes only for changing process flow arrangements or for repair. Do not remove feed tubes unless absolutely necessary since galling of threads at the shaft is possible.

Removal To remove feed tubes in Model B and E machines:

Step	Action
1	Remove drain plug over feed tube (Section 7.5).
2	Remove inlet sleeve with O-ring using a length of $\frac{3}{8}$ "x16 threaded rod.
	The inlet sleeve is an integral part of the drain plug on Model B-10. Heavy liquid out (HLO) tubes have no sleeves.
3	Measure distance from outside surface to top of feed tube. Mark so tube can be reinserted to original depth to maintain balance.
	Do not open up or round off hex-machined end of tube.
4	Use hex wrench provided with equipment to remove tube. Turn counterclockwise until tube is free of tapped hole in rotor shaft.
	If tube does not back out freely, apply thread lubricant (for example, LPS-1) to rotor shaft with and rap sharply on end of wrench while working tube in and out. This method usually works and prevents damage.
5	Tag tube if more than one is to be removed. Tube must be returned to original location for contactor to work properly and maintain balance.

Inspection Inspect for:

- Galled or damaged threads in tube and rotor shaft
- Damaged seat, cracks, rounded hex, and eroded outlet holes

Repair Galled threads can be repaired on-site. Use a thread file on the tube and a bottom tap on the hole. Then use fine lapping compound while gently turning the tube in and out until no binding occurs. Use extra Teflon tape during installation to avoid further galling.

If major damage is apparent, factory assistance is recommended. Often repairs can be made in the field.

Installation

To install feed tubes:

Step	Action
1	Wrap threads with Teflon tape and lubricate.
2	Insert tube in original location in rotor.
3	Tighten until tube is at original depth.
4	Install inlet sleeve and O-ring using $\frac{3}{8}$ ×16 threaded rod.
5	Install drain plug (Section 7.5).



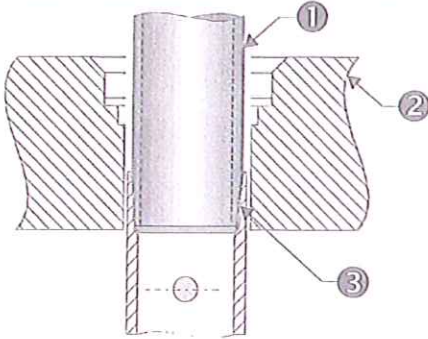
7.7 Product Feed Tubes—Model D Series


Introduction

Remove feed tubes only for changing process flow arrangements or for repair. Do not remove feed tubes unless absolutely necessary since galling of threads at the shaft is possible.

Removal

To remove product feed tubes in Model D units:

Step	Action
1	Remove drain plug over feed tube (Section 7.5).
2	Use tool 569-048-6 (Figure 7-10) to remove slotted plastic plug. on light liquid in (LLI) and heavy liquid in (HLI) tubes.
	Some tubes could have square sockets instead of slots.
3	Measure distance from rotor surface to top of feed tube. Mark so tube can be reinserted to original depth to maintain balance.
4	Insert slotted end of tool 569-048-6 and engage pin in tube (Figure 7-11).
5	Unscrew tube.
	If tube does not back out freely, apply thread lubricant (for example, LPS-1) to rotor shaft with and rap sharply on end of wrench while working tube in and out. This method usually works and prevents damage.
6	Insert threaded tool to engage threads on end of tube. Exert slight pull while screwing in tool to prevent tube threads from engaging threads in rotor shaft (Figure 7-14).
	 <p style="text-align: center;">Figure 7-14 Feed Tube Removal</p> <p>① Tool ② Rotor ③ Feed tube thread</p>
7	Remove tube.

 Tubes and rotor are identified with numbers. Return tubes to same hole for proper operation and balance.

Inspection

Inspect for:

- Galled or damaged threads in tube and rotor shaft
- Damaged seat, cracks, and eroded outlet holes

Repair

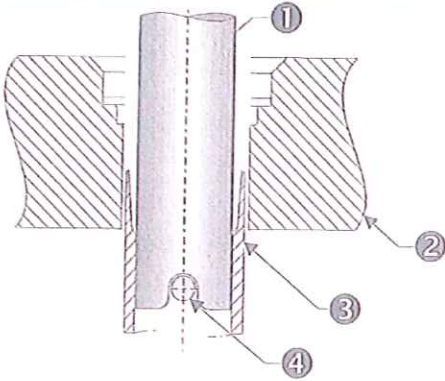
If gasket seats are worn or marred, they can be refinished with a hand-held seating tool.

Galled threads can be repaired on-site. Use a thread file on the tube and a bottom tap on the hole. Then use fine lapping compound while gently turning the tube in and out until no binding occurs. Use extra Teflon tape during installation to avoid further galling.

If major damage has occurred, factory assistance is recommended. Often repairs can be made in the field.

Installation

To install feed tubes:

Step	Action
1	Wrap threads with Teflon tape and lubricate.
2	Insert tube into rotor.
3	Using tool 569-048-6 (Figure 7-15), engage pin in tube and tighten until tube is recessed to original position.
4	On light liquid in (LLI) and heavy liquid in (HLI) tubes, use the end of tool 569-048-6 (Figure 7-16) with tang to screw in and tighten plastic plug to 1/32 to 3/32 inch below plug gasket seat.
	 <p style="text-align: center;">Figure 7-15 Feed Tube Installation</p> <p style="text-align: center;">① Tool 569-048-6 ② Rotor ③ Feed tube ④ Pin</p>

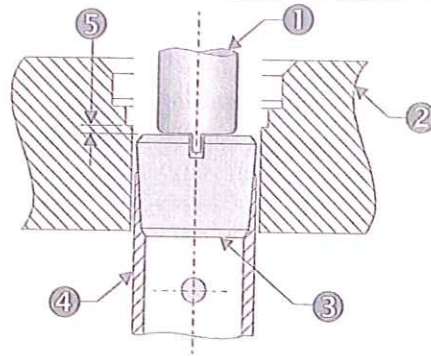


Figure 7-16 Plastic Plug Removal

- ① Tool 569-048-6 ② Rotor ③ Slotted plastic plug
- ④ Feed tube ⑤ 0.031 to 0.047 inch (0.8 to 1.2 mm)



Some tubes might have square sockets instead of slots.

5

Install drain plug over feed tube (Section 7.5).

7.8 Sheave

Introduction

The drive sheave (or pulley) is mounted on the rotor shaft.

Removal


To remove sheave:

Step	Action																																					
1	Fabricate protective hat and plate (Figure 7-17).																																					
<p>Figure 7-17 Sheave Removal</p> <table border="0"> <tr> <td>① Sheave</td> <td>② Protective hat</td> <td>③ Plate</td> </tr> <tr> <td>④ 3/8" x 16 Studs (2)</td> <td>⑤ Protective hat (detail)</td> <td>⑥ Old Large hardface</td> </tr> <tr> <td>⑦ Pipe</td> <td></td> <td></td> </tr> </table> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Model</th> <th colspan="2">A</th> <th colspan="2">B</th> <th rowspan="2">Nominal pipe size</th> </tr> <tr> <th>cm</th> <th>inch</th> <th>cm</th> <th>inch</th> </tr> </thead> <tbody> <tr> <td>B-10</td> <td>8.89</td> <td>3.50</td> <td>8.89</td> <td>3.50</td> <td>3"</td> </tr> <tr> <td>D-18/36</td> <td>14.61</td> <td>5.75</td> <td>8.89</td> <td>3.50</td> <td>4"</td> </tr> <tr> <td>E-48</td> <td>21.91</td> <td>8.63</td> <td>15.88</td> <td>6.25</td> <td>6"</td> </tr> </tbody> </table>		① Sheave	② Protective hat	③ Plate	④ 3/8" x 16 Studs (2)	⑤ Protective hat (detail)	⑥ Old Large hardface	⑦ Pipe			Model	A		B		Nominal pipe size	cm	inch	cm	inch	B-10	8.89	3.50	8.89	3.50	3"	D-18/36	14.61	5.75	8.89	3.50	4"	E-48	21.91	8.63	15.88	6.25	6"
① Sheave	② Protective hat	③ Plate																																				
④ 3/8" x 16 Studs (2)	⑤ Protective hat (detail)	⑥ Old Large hardface																																				
⑦ Pipe																																						
Model	A		B		Nominal pipe size																																	
	cm	inch	cm	inch																																		
B-10	8.89	3.50	8.89	3.50	3"																																	
D-18/36	14.61	5.75	8.89	3.50	4"																																	
E-48	21.91	8.63	15.88	6.25	6"																																	
2	Remove drive belt.																																					
3	Loosen set screw in sheave.																																					
4	Put protective hat onto shaft (Figure 7-17).																																					
5	Screw two 3/8" x 16 studs into threaded holes in sheave (Figure 7-17).																																					
6	Put plate onto studs.																																					

7	Screw on nuts until finger-tight.
8	Pack shaft at point of fit with dry ice to aid sheave removal.
9	Alternately tighten nuts against plate, thereby pulling sheave.
10	Remove sheave, assembled studs, and plate from the shaft.
11	Remove plate and studs from sheave.
12	Remove protective hat from shaft.

Installation

To install sheave:

Step	Action
1	Pack shaft with dry ice at point where sheave fits.
2	Heat sheave in clean oil at (95°C, 200°F) for 15 minutes.
3	Slide sheave into position. Line up the set-screw hole in the sheave with threaded hole in shaft.
	Sheave is hot. Handle with heat-insulated gloves or tools.
5	When sheave cools, tighten set screw.