

REPAIR INSTRUCTIONS

TYPE AD PUMPS SERIES 5300

Read this entire book

before attempting to install, operate or repair this pump. Properly installed, your Peerless pump will give you satisfactory, dependable service. We urge that you read carefully these step-by-step instructions, to simplify any problems of installation, operation or repair.

Failure to read and comply with installation and operating instructions will void the responsibility

of the manufacturer and may also result in bodily injury as well as property damage.

This book is intended to be a permanent part of your pump installation and should be preserved in a convenient location for ready reference. If these instructions should become soiled, obtain a new copy from Peerless Pump. Include pump model and/or serial number with your request.



Peerless Pump Company
2005 Dr. Martin Luther King Jr. Street
Indianapolis, IN 46202
Phone: (317) 925-9661 • Fax: (317) 924-7388



A member of the Sterling Fluid Systems Group

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WARRANTY

New equipment manufactured by Seller is warranted to be free from defects in material and workmanship under normal use and service for a period of one year from date of shipment; Seller's obligation under this warranty being limited to repairing or replacing at its option any part found to its satisfaction to be so defective provided that such part is, upon request, returned to Seller's factory from which it was shipped, transportation prepaid. This warranty does not cover parts damaged by decomposition from chemical action or wear caused by abrasive materials, nor does it cover damage resulting from misuse, accident, neglect, or from improper operation, maintenance, installation, modification or adjustment. This warranty does not cover parts repaired outside Seller's factory without prior written approval. Seller makes no warranty as to starting equipment, electrical apparatus or other material not of its manufacture, since the same are usually covered by warranties of the respective manufacturers thereof.

In the event, notwithstanding the terms of this agreement, it is determined by a court of competent jurisdiction that an express warranty has been given by Seller to Purchaser with respect to the head, capacity or other like performance characteristics of said equipment, Seller's liability for breach of the same shall be limited to accepting return of such equipment F.O.B. plant of manufacture, refunding any amount paid thereon by Purchaser (less depreciation at the rate of 15% per year if Purchaser has used equipment for more than thirty (30) days) and cancelling any balance still owing on the equipment.

This warranty is expressly in lieu of any other warranties, expressed or implied, and Seller specifically disclaims any implied warranty of merchantability or fitness for a particular purpose.

WARNING

Do not operate this pump at any pressure, flow rate, or liquid temperature other than those for which the pump was originally purchased. Do not pump any other liquid than the one for which the pump was originally purchased

without the consent of Peerless Pump or its authorized representatives. Disregard of this warning can result in pump failure and serious personal injury or death.

SECTION I – DISASSEMBLY

WARNING

Shut down the pump. Temporarily disable the pump drive before starting any repairs. Refer to Bulletin No. 2880549 for the procedure to follow.

1-1. Remove coupling guard. Disengage the drive coupling halves. Refer to the coupling manufacturer's instructions.

1-2 PUMP DISASSEMBLY. (See Figure 1) Disassemble pump to the extent required as follows:

a. At the outboard bearing cartridge block (18), remove bearing cover with screwdriver by prying outwardly in slot around cover. Loosen set screws in clamp rings of both bearing cartridge blocks (16&18). Do not remove clamp ring or set screws.

b. Remove the cap screws from each stuffing box (83).

c. Take off all cap screws from upper casing (1B). Remove taper dowel pins. Turn pump jack screw clockwise to separate upper casing from lower casing. After the casings have separated, turn jack screw back so that it will not interfere with the pump reassembly. Using eye bolt and hoist (customer furnished), lift off upper casing. Do not use eye bolts to lift pump!

d. Place suitable slings around the shaft (6) near the impeller. Lift the rotating element from lower casing. Place in a convenient work area.

e. Loosen drive coupling set screw, and tap coupling at back of its hub to remove from shaft. If coupling does not come off easily, use a suitable puller to pull from shaft. Extract coupling key (46).

1-3. ROTATING ELEMENT. Disassemble to the extent required as follows:

a. Remove the adapters (71), deflectors (40A), and cartridge blocks (16&18), and stationary seal elements as one assembly. Do not nick or scratch face of stationary seal seat.

b. To remove either cartridge block (16&18) from its stuffing box (83), take out its four attaching cap screws. Support bracket on both sides at larger flange with cartridge on underside. With blunt tool, tap around registered fit to remove the cartridge from the adapter. Do not disassemble bearing cartridge block, as it is replaced as a unit assembly.

c. Remove the mechanical seal rotating elements.

d. Remove case rings (7) from impeller (2).

e. To remove impeller, loosen set screws in locking nuts, since impeller nut is a cam lock; it must be loosened in opposite direction of pump rotation.

f. To loosen impeller nuts, use spanner wrench or blunt-nose pin. Nut will release with one or two sharp taps in opposite direction of pump rotation.

NOTE

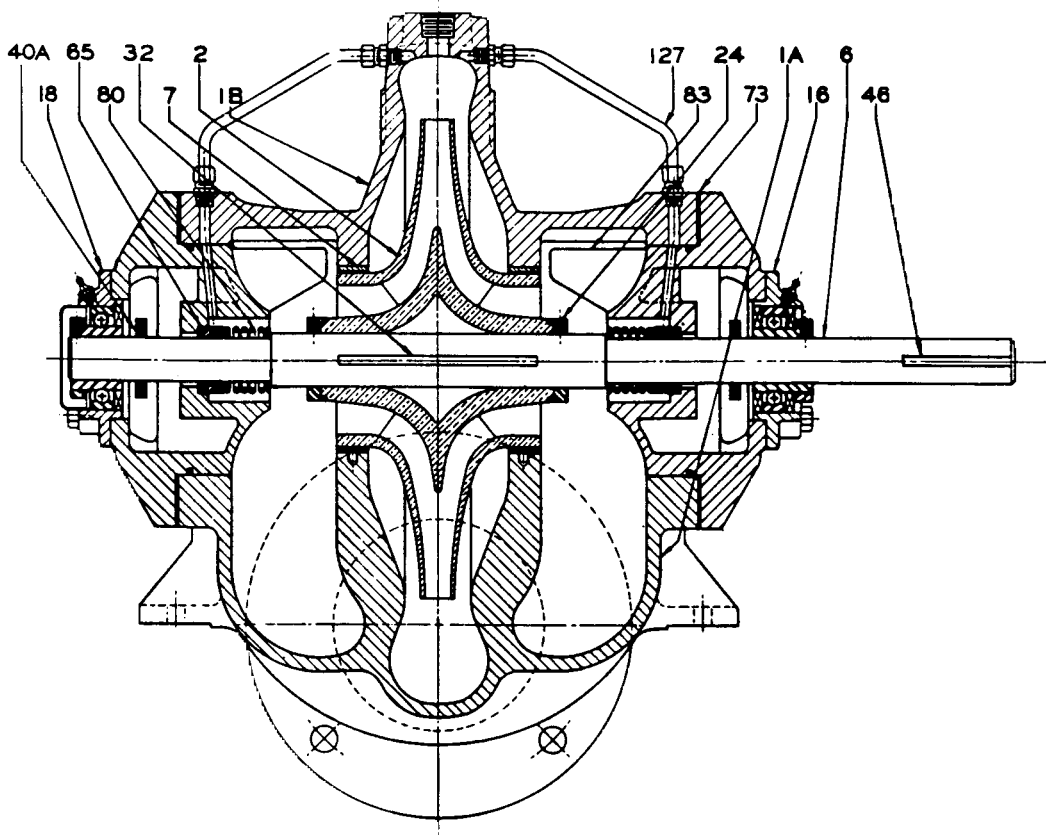
Seals must not come in contact with, or be exposed to, Hydrocarbon materials such as: Gasoline, Grease, Oil, Propane; Cleaning Agents such as: Kerosene, Lacquer Thinners, Alcohol, etc.

1-4. CLEANING. Clean all metal parts (except seals and bearings) with a solvent. Use a bristle brush (NOT metal or wire) to remove tightly adhering deposits. A fiber scraper may be used to remove the gasket and shellac from casing flanges. Blow dry with clean dry compressed air.

NOTE

It is not possible to clean or inspect a sealed "lifetime" lubricated ball bearing without permanently damaging it. If good condition of such a bearing is in doubt for any reason, replace bearing or bearing cartridge block.

**Mechanical Seal Type Figure 5300
Cross Sectional Drawing**



BRONZE FITTED AD PUMP STANDARD MATERIALS OF CONSTRUCTION

Item No.	Description	Material	Item No.	Description	Material	
1A, 1B	Upper & Lower Casings	Cast Iron	65	Mechanical Seal Seat	Ni-Resist	
2	Impeller	Bronze	80	Mechanical Seal Rotary 225° F. (107.2°C.) Max. Temp.	Flexible	Buna Rubber
6	Shaft	416 Stn. Steel			Washer	Carbon
7	Casing Ring	Bronze			Metal	18-8 Stn. Stl.
16	Inboard Ball Bearing Cartridge Assembly	Steel & Cast Iron Assembly			Spring	18-8 Stn. Stl.
18	Outboard Ball Bearing Cartridge Assembly	Steel & Cast Iron Assembly			Bellows	Buna Rubber
24	Impeller Nut	Steel	73	Adapter Gasket	Vegetable Fiber	
32	Impeller Key	Steel	73A	Casing Gasket (Not Shown)	Vegetable Fiber	
40A	Inboard Deflector	Rubber	83	Stuffing Box	Cast Iron	
46	Coupling Key	Steel	127	Water Seal Piping	Copper Tubing with Brass Fittings	

SECTION II INSPECTION AND REPAIR

2-1. **INSPECTION.** Visually inspect parts for damage affecting serviceability or sealing. Emphasize inspection of mating parts having relative motion — wear rings, for example. Perform detailed inspection as follows:

- a. Check "O" rings and gaskets for shrinkage, cracks, nicks or tears. The gasket at the case split must be flush with bores. When case split is open for any length of time gasket will shrink.
- b. Mount the shaft between lathe centers. Check the eccentricity throughout the entire length with a dial indicator to be not more than 0.003 inch total indicator reading. Surfaces on which bearings mount must be smooth, have a finish not less than 63 microinches and the shoulders square and free from nicks.
- c. Measure the OD of the impeller wearing surface, and the ID of the casing ring (7). Compute the diametrical clearance (ID minus OD) and compare the difference with the limits given in Figure 3. ID surface of casing rings and OD of impeller ring must be smooth and concentric.
- d. Examine impeller passages for cracks, dents, gouges or embedded material.
- e. Examine the mechanical seal for wear at the seal faces and for damage to the bellows. Replace the complete seal if scoring or hardening of the bellows is evident, or if the seal lapped faces are cracked, nicked or scored.

NOTE

If dirt or lint is present on the lapped sealing faces, wipe clean only with clean lintless paper or cloth. Lightly oil the stationary face. Do not wipe off excess oil. Do not use oil on shaft or on carbon seal face.

2-2. **REPAIR.** Make needed repairs in the following manner:

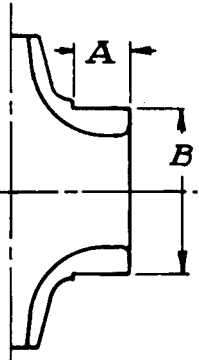
- a. If ID of casing ring (7) is grooved, scored, or eccentric, replace case ring. Check Figure 3 for diametrical clearance between impeller and case rings. Add 0.030 for maximum allowable clearance.
- b. If diametrical clearance is not within limits, the clearance can be restored by installing impeller wear rings on OD of impeller wearing surface.

NOTE

If impeller wear rings were previously installed, remove old rings by turning in a lathe; be sure machining is concentric with impeller ID. Use care not to reduce impeller ring skirt OD. If no rings were installed on impeller skirt, turn OD to diameter shown for Model (see Figure 2).

(1) Heat wear rings to a temperature that will enable the ring to drop onto the machined impeller skirts. The ID is factory-machined for proper fit. Allow the assembly to cool to room temperature.

(2) After installation, machine the wear rings OD to provide the nominal diametrical clearance shown in Figure 3.



PUMP SIZE	REPAIR DIMENSIONS (INCHES)	
	A	B
1-1/2 AD 9	9/16	3.250/3.248
2 AD 8		
2 AD 11		
3 AD 10		
2-1/2 AD 13	3/4	4.000/3.998
3 AD 8		
3 AD 12		
3 AD 15-1/2	1	4.750/4.748
4 AD 8		
4 AD 9-1/2		
4 AD 14		
4 AD 11-1/2		
4 AD 11	1	5.385/5.383

PUMP SIZE	REPAIR DIMENSIONS (INCHES)	
	A	B
6 AD 8-1/2	1-1/4	6.500/6.498
6 AD 10		
6 AD 14		
4 AD 18-1/2		
6 AD 11-1/2	1-1/8	5.385/5.383
6 AD 9-1/2		
6 AD 16-1/2		
6 AD 11		
6 AD 11	1-1/4	7.125/7.123
8 AD 9-1/2		
8 AD 11		
8 AD 13-1/2		
8 AD 17	1-1/2	9.250/9.248
10 AD 11-1/2		
10 AD 13-1/2		

FIGURE 2. IMPELLER DIMENSIONS FOR WEAR RING INSTALLATION

IMPELLER/CASE WEAR RING DIAMETRICAL CLEARANCE						
.015 .021	.016 .022	.017 .023	.018 .024	.019 .025	.020 .026	.020 .027
3AD15½	1½AD9	4AD11	6AD9½	6AD8½	8AD9½	10AD11½
4AD8	2AD8	4AD18½	6AD16½	6AD10	8AD11	10AD13½
4AD9½	2AD11	6AD11½		6AD11	8AD13½	
4AD11½	2½AD13			6AD14	8AD17	
4AD14	3AD8					
	3AD10					
	3AD12					

FIGURE 3.

SECTION III REASSEMBLY

3-1 ROTATING ELEMENT

- Place impeller key (32) in shaft slot. Install impeller (2) on shaft. Center impeller hub on key (32) as closely as possible. Check impeller to make sure vanes will rotate in proper direction. (See Figure 4.)
- Slide impeller nuts (24) on shaft. Engage cams and tighten nuts by hand in direction of pump rotation. This prevents impeller from sliding back and forth on shaft when assembling other parts.
- Slide one casing ring (7) over each impeller ring skirt.

NOTE

No oil or hydrocarbon base product may be used for installation of seals over shaft. Recommended substitutes for installation purposes are DC MOLYKOTE® 55M grease, 3% detergent solution, mild soap solution, glycerine, ethylene glycol, or silicone grease.

- Slide the seal rotating element (80) over each end of shaft so that its sealing face is directed outward from the impeller. The mechanical seal bellows which seats on the shaft is coated with a mastic. The mechanical seal rotating element should be moved back and forth several times to make sure it is free to move when stuffing box (83) is installed. If mechanical seal rotating element is allowed to set for any length of time, it will set itself to shaft, which could cause breakage of stationary or rotating seat when stuffing box (83) is assembled on pump. Install seal stationary element (65) in each stuffing box (83) so that its sealing face is directed outward. See Figure 6 for Stuffing Box data.
- Assemble bearing cartridge block (16&18) in each stuffing box (83) and use cap screws to attach the inboard and outboard bearing cartridge blocks to each stuffing box so that the grease fitting is in line with stuffing box splitter.
- Install rotating element in lower casing (1A) as assembled thus far. Locate the two case ring pins in holes provided in lower casing.
- Install "O" ring in groove provided in stuffing box (83).
- Install stuffing box gaskets (73). (See Figure 1.)
- Slip water deflector (40A) and stuffing box over each end of shaft (6). Locate stuffing box splitter or gusset which extends into suction chamber at top center facing towards eye of impeller. Attach stuffing box

(83) to lower casing (1A) by use of two cap screws. Tighten cap screws, moving inboard stuffing box face within 1/16 inch of lower casing. Tighten outboard stuffing box securely to lower case.

- Adjust shaft laterally by loosening impeller nuts (24) and moving shaft until outboard end of shaft is flush with face of outboard bearing cartridge block (18). Tighten set screws, in cartridge block collar, to shaft. (Table 1A).
- Center impeller in volute and tighten impeller nuts (24) in same direction as pump rotation, and lock set screws in impeller nuts to shaft.
- Use upper case as template to cut a casing gasket (73A) from 1/64 inch vellumoid or equal. Shellac the new case gasket to lower case (1A). (Be sure gasket is flush with bore where stuffing box (83) locates; if gasket is not flush, "O" ring will not seal at this area.) Coat top of gasket with a mixture of graphite and oil.
- Loosen outboard stuffing box slightly to install upper case (1B) on lower case (1A). Be sure case splits are flush. Insert dowel pins for positive location of bores. Secure upper case (1B) to lower case (1A) with cap screws and tighten alternately and diagonally at opposite locations. Tighten cap screws which attach stuffing box to case. Tighten set screws in collar on inboard cartridge bearing. Rotate shaft by hand to see if it runs free. See Torque Chart – Table 1B.
- Replace any drain plugs that were removed during disassembly.
- Relubricate the bearings. Refer to Bulletin No. 2880549 for grease type recommendation.

It is most important to provide proper lubrication and keep bearings clean. Frequency of lubrication must be determined by experience as it depends upon bearing size, speed, operating conditions and location (environment). Table II should be used as a guide for grease re-lubrication.

- Replace coupling guard.

3-2. TEST. Follow instructions in Bulletin No. 2880549 to check out the pump after repair.

NOTE

Some couplings require grease or oil lubrication prior to assembly. Refer to coupling instructions. See Figure 5 on page 7 for general instructions regarding frequency of lubrication and type of grease or oil recommended.

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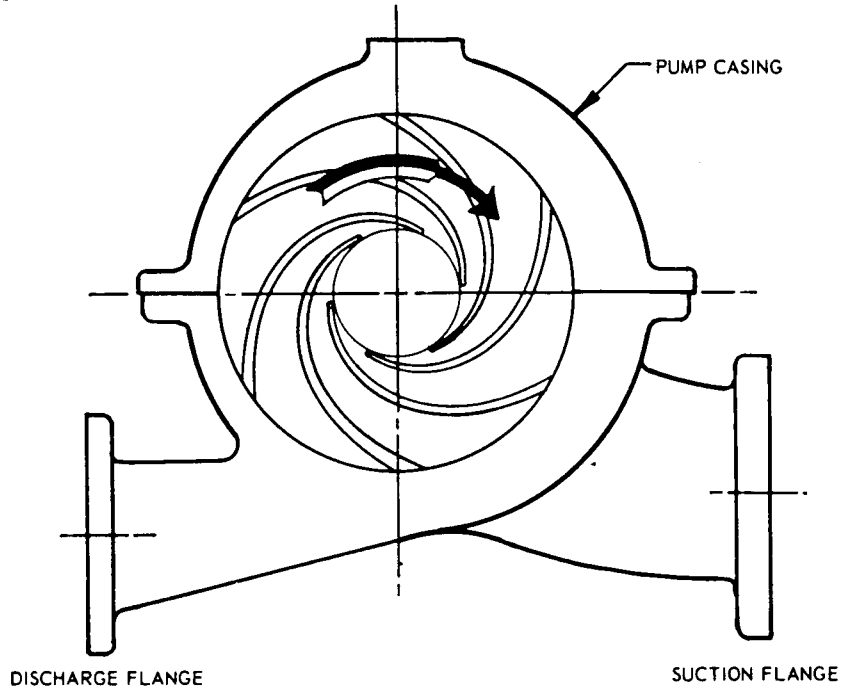


FIGURE 4. VANE POSITION FOR PROPER ROTATION

GREASE LUBRICATED COUPLING		
Temperature Range	Recommended Grease	
-20° to 150°F	Sodium or Lithium soap Type NLGI No. 2 or ASTM worked penetration 250-300	
+150° to 250°F	Lithium soap Type grease NLGI No. 3 or ASTM worked penetration 200 to 250	
OIL LUBRICATED COUPLING		
Temperature Range	Recommended Oil	
-20° to 300°F	Mineral base oil with viscosity minimum of 150 SSU maximum 1000 SSU at 210°F	
COUPLING LUBRICATION		
Type Coupling	Type Lubrication	Frequency of Lubrication
Falk	Grease	6 Months
Fast	Grease-Oil	6 Months
Sier-Bath	Grease	6 Months
Waldron	Oil	6 Months
T. B. Wood's	No Lubrication Required	

FIGURE 5

3-3. TROUBLES. To reliably establish the malfunctioning of either the pump or driver, instruments such as tachometers, pressure gauges and electric meters must be in proper working condition and preferably of recent calibration. In many cases, much time and expense have been expended with faulty instruments. Table IV lists a number of troubles commonly occurring. If unable to determine the cause, and remedy the trouble, from this list, refer the problem to the Peerless representative.

3-4. SPARE PARTS. To keep delays to a minimum when pump repairs are required, we suggest that the following spare parts be stocked. The number of each part required depends upon the application. For a minimum, we recommend:

- (A) One set of inboard bearings.
- (B) One set of outboard bearings.
- (C) One set of case wear rings.
- (D) One set impeller wear rings.
- (E) In some instances, an entire rotating element should be stocked.

3-5. To obtain quick and accurate service when ordering spare parts, provide the following information:

- (A) Pump size and type as noted on nameplate.
- (B) Pump serial number as noted on nameplate.
- (C) The name and number of the parts as shown on the sectional drawings.
- (D) Quantity required of each item.

Aid may be obtained from the Peerless representative or an authorized distributor for planning an adequate supply of spare parts.

TABLE IA

BEARING SET SCREW TORQUE VALUES	
60LBF-IN	1½AD9, 2AD8, 2AD11, 2½AD13, 3AD8, 3AD10, 3AD12, 3AD15½, 4AD8, 4AD9½, 4AD11, 4AD14, 6AD8½, 6AD10, 6AD11
110LBF-IN	4AD11½, 4AD18½, 6AD9½, 6AD11½, 6AD14, 6AD16½, 8AD9½, 8AD11
200LBF-IN	8AD13½, 8AD17, 10AD11½, 10AD13½

TABLE III
AMOUNT OF GREASE FOR BALL BEARINGS

OUNCES	GRAMS	MODEL
1.2	33.6	1½AD9, 2AD8, 2AD11, 2½AD13, 3AD8, 3AD10, 3AD12, 3AD15½, 4AD8, 4AD9½, 4AD14, 4AD11, 6AD8½, 6AD10, 6AD11
2.4	67.2	4AD11½, 4AD18½, 6AD9½, 6AD11½, 6AD14, 6AD16½, 8AD9½, 8AD11
2.7	75.6	8AD13½, 8AD17, 10AD11½, 10AD13½

TABLE IB

TORQUE VALUE CHART TORQUE VALUE (FT-LB)	
SIZE INCH	MEDIUM CARBON STEEL, SAE 5 105-120,000 PSI
3/8	23-25
1/2	59-62
5/8	120-125
3/4	210-225
7/8	305-325
1	450-475

TORQUE VALUES SHOWN ARE FOR CLEAN & LUBRICATED THREADS; GASKETED JOINTS. INSTALL UPPER CASE, TIGHTEN CENTER CAP SCREWS, THEN WORK OUT FROM CENTER TO EACH SIDE, TIGHTENING WITH TORQUE WRENCH TO VALUES SHOWN ON CHART.

TABLE II
GREASING FREQUENCY
(See Table III for amounts)

SERVICE	GREASE EACH
Normal, 8-hour day operation. Room free of dust and damaging atmosphere.	6 Months
Severe, 24-hour day operation. Room with moderate dust and/or damaging atmosphere, or outdoor service.	1 Month
Light, approximately 10-hour week. Room relatively free of dust and damaging atmosphere.	1 Year

TABLE IV
TROUBLES

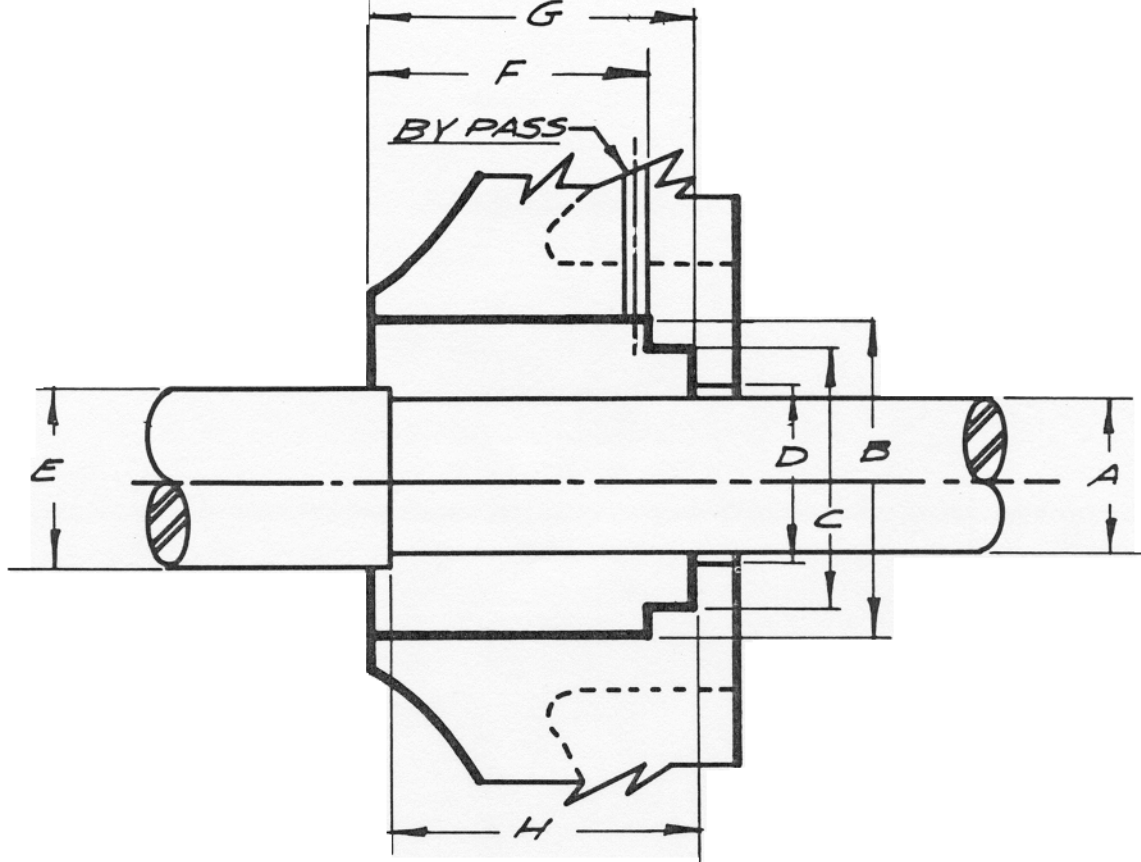
TROUBLE	PROBABLE CAUSE	REMEDY
<p>Failure to deliver liquid or sufficient pressure.</p>	<p>Pump not primed. Pump not up to speed. Discharge head too high. Insufficient available NPSH. Incorrect direction or rotation. Air leaks in suction line or through stuffing boxes. Impeller passages restricted. Worn wearing rings. Damaged impeller. Foot valve too small or restricted by dirt.</p>	<p>Reprime. Check for low motor voltage or motor overload Other drives, increase driver speed when possible. Check to see that all discharge valves are opened and the discharge line is free from obstructions. In some cases, the installation has to be altered or a pump of suitable rating must be provided. Check NPSH requirements of pump and increase system NPSH accordingly. Check impeller assembly for correct rotation either by removing upper case or through priming connection. Check rotation of driver. Check all suction line joints for bad gaskets and loose joints. Disassemble the pump and clean impeller. Replace worn parts. Replace or repair impeller. Replace with adequate size size foot valve or clean foot valve.</p>
<p>Pump loses prime after starting.</p>	<p>Air leaks in suction line. Insufficient available NPSH.</p>	<p>Check all suction line joints for bad gaskets and loose joints. Check NPSH requirements of the pump and increase the system available NPSH accordingly.</p>
<p>Overload on driver.</p>	<p>Pump speed high. Total head lower than rating. Liquid is of higher specific gravity or viscosity than rating. Mechanical trouble of pump or driver.</p>	<p>Motor voltage higher than nameplate rating will cause the motor to run faster. Either reduce motor voltage or trim impeller diameter. On other drives, reduce speed if possible. if speed reduction not realized, trim impeller diameter.** Check suction and discharge pressures and determine the total dynamic head. If TDH lower than ratings, throttle discharge to rated TDH or if this is not possible, reduce impeller diameter. Check with Peerless distributor to determine if a larger motor is required. See if pump and motor turn freely. Check impeller fit, shaft straightness and ball bearings.</p>
<p>Pump vibrates or is noisy.</p>	<p>Driver unbalanced. Misalignment. Cracked foundation. Worn ball bearings.</p>	<p>Disconnect driver and operate it alone. Check pump for large pieces of debris, such as wood, rags, etc. Realign pumping unit. Replace foundation. Replace bearings. Check lubricants for proper grade. Check pump alignment. Check for condensation on water cooled bearings.</p>

**Always obtain new trim diameter from Peerless representative.

**SECTION IV
REPAIR PARTS**

PUMP SIZE	MECHANICAL SEAL FOR FIG. 5300	STUFFING BOX O-RINGS	BALL BEARING FLANGED CARTRIDGE TYPE	
			OUTBOARD	INBOARD
1½AD9 2AD8 2AD11 2½AD13 3AD8 3AD10	BUNA "N" ELASTOMER NI-RESIST SEAT Peerless Part No. 2687625	No. 2-156 Material - Buna "N" Peerless Part No. 2691624	Peerless Part No. 2669966	Peerless Part No. 2669965
3AD12 3AD15½ 4AD8 4AD9½ 4AD11 4AD14 6AD8½ 6AD10 6AD11	BUNA "N" ELASTOMER NI-RESIST SEAT Peerless Part No. 2687626	No. 2-162 Material - Buna "N" Peerless Part No. 2691625	Peerless Part No. 2669893	Peerless Part No. 2669892
		No. 2-263 Material - Buna "N"		
4AD11½ 4AD18½ 6AD9½ 6AD11½ 6AD14 6AD16½ 8AD9½ 8AD11	BUNA "N" ELASTOMER NI-RESIST SEAT Peerless Part No. 2675319	Peerless Part No. 2617307	Peerless Part No. 2669937	Peerless Part No. 2669938
		No. 2-375 Material - Buna "N"		
8AD13½ 8AD17 10AD11½ 10AD12½ 10 AD13½	BUNA "N" ELASTOMER NI-RESIST SEAT Peerless Part No. 2675320	Peerless Part No. 2691626	Peerless Part No. 2671926	Peerless Part No. 2671925

NOTICE: Materials of construction, specifications, dimensions, design features, and application information, where shown in this bulletin, are subject to change and/or modification without notice by Peerless Pump at their option.



PUMP SIZE		Dia. A	Dia. B	Dia. C	Dia. D	Dia. E	F	G	H
1½AD9	3AD8	<u>1.1245</u>	2	1-3/4	1-7/16	<u>1.1875</u>	2-1/16	2-7/16	2-1/16
2AD8	3AD10					<u>1.1869</u>			
2AD11	2½AD13								
3AD12	4AD14	<u>1.2495</u>	2-3/8	1-7/8	1-1/2	<u>1.5000</u>	1-3/4	2-1/8	2-1/16
3AD15½	6AD8½	<u>1.2490</u>				<u>1.4994</u>			
4AD8	6AD10								
4AD9½	6AD11								
4AD11½	6AD16½	<u>1.7495</u>	2-7/8	2-1/2	2-1/8	<u>1.9375</u>	2-1/2	2-15/16	1-7/8
4AD18½	8AD9½	<u>1.7485</u>				<u>1.9369</u>			
6AD9½	8AD11								
6AD11½	8AD14								
8AD13½	10AD11½	<u>1.9995</u>	3-3/16	2-3/4	2-3/8	<u>2.2500</u>	2-7/16	2-7/8	2
8AD17	10AD13½	<u>1.9985</u>				<u>2.2494</u>			

FIGURE 6. STUFFING BOX DATA FOR MECHANICAL SEALS