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TYPE A, AF PUMPS

REPAIR INSTRUCTIONS



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 carefully read 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 installation and should be preserved in a convenient location for ready reference. If these instructions should become soiled, obtain a new copy from Peerless. Include pump model and/or serial number with your request.

WARNING

SECTION I DISASSEMBLY

Shut down pump. Disconnect power to the pump driver before starting any repairs. Refer to Bulletin No.2880459 for the procedure to follow.

1-1. Remove coupling guard. Disengage the coupling Halves. Refer to the coupling manufacturer's instructions. Disconnect plumbing from water-cooled bearings. 1-2. PUMP (See Figure 1.) Disassemble pump (to the extent required) as follows:

- a. Remove the nuts from the gland bolts (17B) and remove glands (17) from the shaft (6). The gland halves are separable.
- b. Remove all nuts or cap screws from the upper casing (1B) and from the bearing caps (41).
- c. Screw down the jack screws to separate the upper and lower casings. Turn the jack screws back after the case halves have separated to avoid interference at reassembly.
- d. Match mark and remove both bearings caps (41).
- e. Attach a hoist to eye bolt(s) (customer furnished) to lift upper casing (1B). Do not use eye bolts to lift pump!
- f. Place slings around the shaft near the bearing housings and lift rotating element from lower casing (1A). Tap lightly on the underside of the bearing housings to separate the housings from the brackets.
- g. Place rotating element in a convenient work place.

1-3. ROTATING ELEMENT. Remove the plugs and drain oil from the oil lubricated bearings. Remove constant-level oilers (125) and pipe nipples. (Not required for grease lubricated bearings.) Proceed as follows:

- a. Loosen set screw and remove the coupling half. Tap from the back of the hub or use a puller. Remove coupling key (46).
- b. Loosen set screws on the water deflectors (40).
- c. Remove cap screws or stud nuts from bearing covers (35) and separate covers from housings (31) and (33). (Use care not to damage the oil seal (107A) used with oil lubricated bearings.)
- d. Lightly tap around housings (31, 33) to remove. Do not cock or force housings off, as to do so may damage the bearings (16, 18), or the oil seal (107A).
- e. Loosen and remove bearing locknut (22) and lock-washer (69A).
- f. Remove bearings as described in Figure 2.
- g. Carefully remove shaft collars (68) (if present) and bearing covers (35). Use care not to damage cover gasket (73B) or oil seal (107A).

NOTE

Clearance between collar and shaft is approximately 0.002 inch. Use care when removing not to cock or force as this will score the shaft.

- h. Withdraw casing rings (7). On most pumps, these may be withdrawn before removing the coupling half.
- i. Remove packing (13), lantern rings (29) and stuffing box bushings (63). Make note of the number of packing rings on each side of the lantern rings.

2880551



WARRANTY

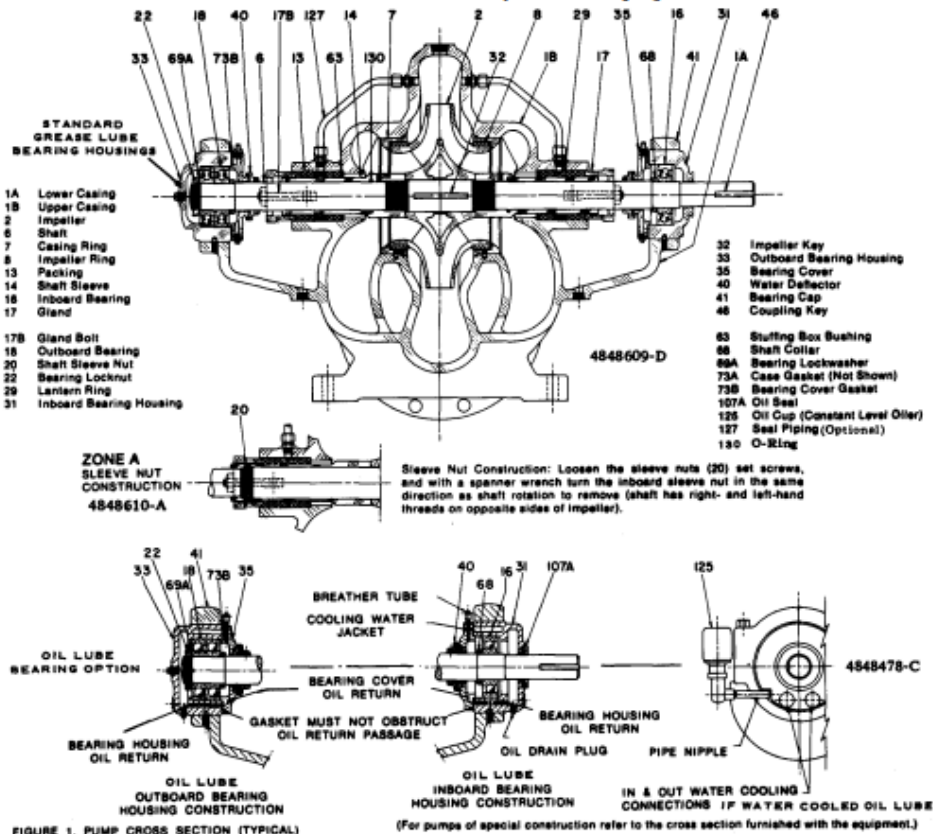
WARRANTY. New Equipment manufactured by Seller or Service supplied by Seller is warranted to be free from defects in material and workmanship under normal use and service for a period of one year from date of shipment. In the case of spare or replacement parts manufactured by Seller, the warranty period shall be for a period of twelve months from shipment. Seller's obligation under this warranty is 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. Parts replaced under warranty shall be warranted only from date of repair. 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. If Purchaser or others repair, replace, or adjust Equipment or parts without Seller's prior written approval, Seller is relieved of any further obligation to Purchaser under this section with respect to such Equipment or parts, unless such repair, replacement, or adjustment was made after Seller failed to satisfy within a reasonable time Seller's obligations under this Paragraph. **Seller's liability for breach of these warranties (or for breach of any other warranties found by a court of competent jurisdiction to have been given by Seller) shall be limited to:**

- (a) accepting return of such Equipment FCA Plant of Manufacture (CPT under Incoterms 2000), and
- (b) 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 canceling any balance still owing on the Equipment.
- (c) in the case of Service, at Seller's option, redoing the Service, or refunding the purchase order amount of the Service or portion thereof upon which such liability is based.

These warranties are expressly in lieu of any other warranties, express or implied, and Seller specifically disclaims any implied warranty of merchantability or fitness for a particular purpose, and in lieu of any other obligation or liability on the part of the Seller whether a claim is based upon negligence, breach of warranty, or any other theory or cause of action. In no event shall Seller be liable for any consequential, incidental, indirect, special or punitive damages of any kind.

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.



NOTE

If pump is equipped with a mechanical seal (in place of packing), refer to the seal manufacturer's maintenance and repair instructions.

j. Loosen the shaft sleeve (14) set screws near impeller hub. With a spanner wrench, turn the inboard sleeve in the same direction as shaft rotation to remove (shaft has right and left-hand threads on opposite sides of impeller).

NOTE

A seal between the shaft and sleeve is made with a rubber O-ring in a groove in the sleeve. Use care not to damage the O-ring.

k. Remove the impeller with an arbor press or a tube and hammer (refer to bearing removal. Figure No. 2).

NOTE

The interference between impeller hub ID and shaft OD meets ANSI B4.1 standards for "Preferred Limits and Fits for Cylindrical Parts" and corresponds to standard fit LC-1.

1-4. **CLEANING.** Clean all metal parts (except 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.

- a. Blow dry with clean dry compressed air.
- b. Clean bearings as described in Paragraph 1-5.

1-5. CLEANING BEARINGS

a. Remove bearings from housings. See figure 2 and refer to Disassembly instructions for the specific type pump.

b. Place bearings in wire basket so there is space for cleaner to reach all parts.

c. Immerse in Stoddard solvent. Agitate basket until grease is thoroughly loosened and can be flushed out.

d. Place bearings on a screened surface.

e. Using a spray gun with air filter and clean Stoddard solvent, flush each bearing until all grease and sludge is removed.

f. Blow solvent out of bearings with dry filtered air.

g. Lubricate bearings immediately after cleaning with light spindle oil and place them in a covered container.

h. Do not spin bearings any time during cleaning.

1-6. Bearing not removed from the housing may be cleaned in the following manner:

a. Remove grease fittings and drain plug, or bearing cover.

b. Flush with Stoddard solvent or equal until all old grease is removed. Rotate bearing **slowly** (by hand) while flushing. DO NOT use kerosene or fuel oil flushing.

c. Replace grease fitting or bearing cover.

d. Re-lubricate.

e. Replace drain plug (run out excess grease).

1-7. **INSPECTION.** After bearings have been cleaned, inspect visually for defects given in Table I. Replace any bearing having any defect listed.

SECTION II INSPECTION AND REPAIR

2-1. **INSPECTION.** Visually inspect part 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 bearing cover gaskets for cracks, nicks or tears; packing rings for excessive compression, fraying or shredding, embedded particles (dirt or metal). Replace if defective in any way.

b. Mount the shaft between lathe centers. Check the eccentricity throughout the entire length with a dial indicator to be not more than .003 inch total indicator reading. Check that threads are clean and sharp. Surfaces on which bearings mount must be smooth, have a finish not less than 32 microinches and the shoulders square and free from nicks.

c. Measure the OD of the impeller (2) wear surface or ring (8) and the ID of the casing ring (7). Compute the diametrical clearance (ID minus OD) and compare with the limits given in Figure 3. ID surface of casing ring must be smooth and concentric.

d. Examine impeller passages for cracks, dents, gouges or embedded material.

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

a. If ID of casing ring (7) is grooved, scored or eccentric, bore to produce a smooth, concentric surface. Measure and record the new ID.

b. If impeller rings (8) are defective, or mating casing rings require boring, remove the old rings by turning in a lathe-be sure machining is concentric with impeller ID. Use care NOT to reduce the impeller hub OD.

NOTE

For bronze impellers and rings, the ring is shrunk on the hub according to standard fit FN-4 of ANSI B4.1 standards. For pumps of 10-inch discharge and larger, the rings are also tack welded to the hub at three places 120 degrees apart. Hardened impeller rings are installed according to ANSI B4.1 standard fit FN-1.

c. Install new rings (8) on the impeller (shrink or press depending on material) and tack weld, if old rings were tacked. The ID is factory-machined for proper fit.

d. Turn the OD of the new rings to provide the proper diametrical clearance and to be smooth and concentric with hub bore. Use clearance limit from Figure 3 and ID of casing ring from paragraph 2-2a to computer OD of impeller rings.

NOTE

All "A" pumps of 6" and smaller discharge flanges are furnished without impeller rings; the wear surface is an integral part of the impeller. On all but two sizes of such pumps, wear rings may be field-installed by machining the hub. Refer to note following paragraph 2-2b for standard fits to be produced by machining when making such repair. Replace defective impellers which cannot be salvaged by such repair.

e. Replace worn shaft sleeves.

f. Straighten or replace shafts having excessive run-out (eccentricity). See paragraph 2-1b.





DF
MOUNTING



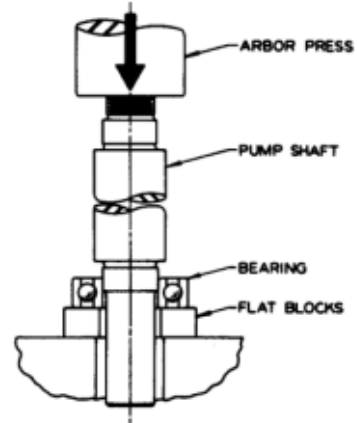
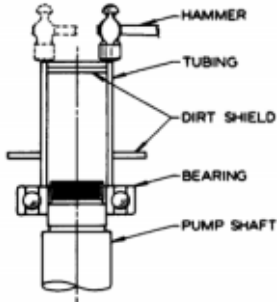
DB
MOUNTING

USING AN ARBOR PRESS

1. PLACE THE BEARING ON TWO FLAT BLOCKS SO THAT THEY CONTACT THE INNER RING OR BOTH RINGS OF THE BEARING.
2. HOLD SHAFT STRAIGHT – FORCE THE SHAFT BY A STEADY PRESSURE, UNTIL THE BEARING IS SEATED AGAINST THE SHAFT SHOULDER.

USING TUBING

1. PLACE THE BEARING ON SHAFT.
2. PLACE TUBING OVER SHAFT IN CONTACT WITH THE INNER RING OF THE BEARING.
3. APPLY HAMMER ALTERNATELY AT OPPOSITE POINTS – AVOID COCKING.



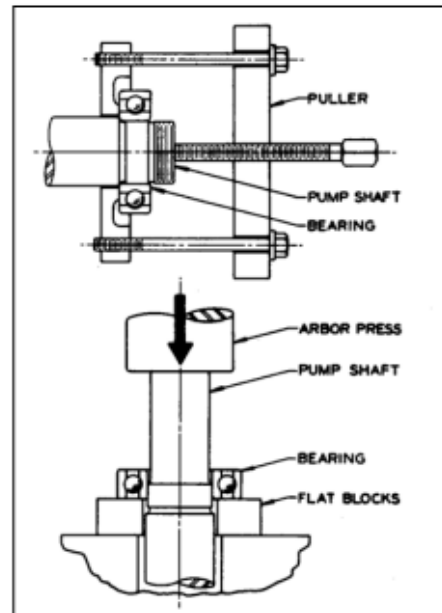
BEARING MOUNTING

USING A BEARING PULLER

1. PLACE BEARING PULLER BEHIND BEARING INNER RING. SET PULLER JAWS SO THAT THEY WILL NOT SLIP OVER THE INNER RING AND DAMAGE SPARATOR OR SHIELD WHEN PRESSURE IS APPLIED.
2. FORCE BEARING OFF SHAFT BY A STRAIGHT PULL. DO NOT COCK BEARINGS.

USING AN ARBOR PRESS

1. REST THE BEARING INNER RING OR BOTH RINGS (NEVER THE OUTER RING ONLY) AGAINST A PAIR OF FLAT BLOCKS.
2. FORCE THE SHAFT OUT BY A STEADY PRESSURE – KEEP SHAFT STRAIGHT – DO NOT ALLOW SHAFT TO COCK OR DROP.



BEARING REMOVAL

-COURTESY OF NEW DEPARTURE-

FIGURE 2, BEARING REMOVAL AND MOUNTING

TABLE 1
BEARING DEFECTS
(Failures – Replace if found)

DEFECT (Failure)	APPEARANCE	PROBABLE CAUSE
Flaking and cracking	In the early stages, the surface of the inner and outer races develop small cracks, which flake. The cracks and flaking ultimately spread over the entire race surface.	1. Normal fatigue failure. 2. Bearing loads in excess of bearing capacity caused by misalignment.
Indentations	Indentations or cavities in the inner and outer races.	1. Dirt in the bearings. 2. Excessive impact loading of the bearings such as improper mounting or removal.
Broken separator (cage)	Cracked separator or separator in pieces.	1. Poor Lubrication. 2. Misalignment of shaft. 3. Excessive shaft deflection.
Wear	Bore and OD of outer ring of bearing galled or braided.	1. Fit on shaft or in housing too loose. 2. Bearing locked by dirt and turning on shaft or in housing.
Fractured ring	Hairline cracks or complete ring fracture.	1. Forcing a cocked bearing on or off a shaft. 2. Too heavy a press fit.
Discoloration	Rolling elements and races darker than Normal appearance of bearing metal. (Moderate discoloration of rolling elements and races not a reason for discard.)	1. Inadequate lubrication.
Corrosion	Rolling elements and raceways rusted.	1. Water entering the housing. 2. Condensation inside the housing. 3. Lubricant breaks down into acid. (Wrong lubricant.)

IMPELLER WEAR RING DIAMETRICAL CLEARANCE					
0.010 0.014	0.012 0.016	0.013 0.017	0.014 0.018	0.015 0.019	0.018 0.022
4A12B 4AF12B 4A12C 4AF12C	6AL10 8AL11	5A16 5AF10 6A13 6AF13 6A14 6AF14 6A19B 6AF15B	10AL12B 10A14B 10A15B	5A13 5AF13 6A16 6AF16 8A13B 8AF13B 8A16B 8AF20B 8A20B 8AF25B	10A16B 10AF16B 10AX16B 10AX16C 10A16D 10A17C 10A20B 10AX20C 10A22B 12A22B
0.020 0.024	0.022 0.026	0.024 0.028	0.026 0.030	0.028 0.032	
12A16B 12AF19B 12AF19G 12A16C 12A16D 12A20B 14A20B 14A20C 14A20G 14A20N 14A22B 14A22C 14A22G 14A24B 14A24C	16A18B 16A20B	18A22B 18A22C 18A22G 18A22N 20A35	20A25B 20AX25B 20A28	24A28B	

FIGURE 3
NOTE

Clearance are for standard bronze or cast iron fitted pumps. For material with a tendency to gall, such as

stainless steel, increase clearance approximately .010 inch.

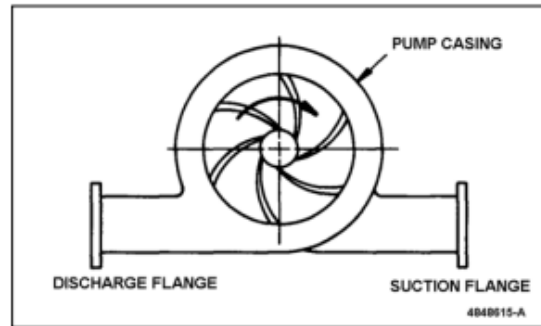
SECTION III
REASSEMBLY

3-1. ROTATING ELEMENT. (See Figure 1.)

Reassemble as follows:

- a. Coat the shaft (6) lightly with oil.
- b. Place impeller keys (32) on shaft.
- c. Align impeller (2) on shaft and install with an arbor

press or with a brass tubular sleeve and hammer. Guard against bending shaft. When assembled, the impeller vanes must rotate in the proper direction (see Figure 4).



- d. Install O-ring in shaft sleeves (14), coat with oil and screw sleeves on shaft to loosely butt the impeller. If sleeve nut construction, slide shaft sleeves to butt against impeller. Screw on sleeve nuts (20).

e. Install the stuffing box bushing (63) and lantern ring (20) on the shaft. If a mechanical seal is used, install according to the seal manufacturer's instructions.

f. Locate casing rings (7) on impeller.

g. Place water deflectors (40) on shaft.

h. Slide bearing covers (35) (with oil seals (107A) installed for oil lubricated bearings) on the shaft.

i. Place shaft collars (68) on the shaft.

j. Mount the bearings (16) and (18) as described in Figure 2. The outboard bearings are two single row angular contact bearings mounted in the recommended duplex DF mounting. The duplex DB mounting is acceptable. All bearings should conform to C-3 internal clearance.

k. Install bearing lock washer (69A) and locknut (22) and tighten against the outboard bearing.

l. Install gaskets (73B) on bearing covers. Cut replacement gaskets from 1/16 inch No. 444 Vellumoid. Apply cement (i.e. Permatex No. 2) to bearing cover gaskets when bearings are water cooled.

m. Slide the housings (31, 33) over the bearings. Tap lightly and evenly around the end as necessary. Do not force.

n. Attach the bearing covers (35). In the assembled position, the grease fittings or breather tubes must be located on top.

o. Locate water (40) deflectors and tighten the set screws. Install oil seal (107A) in the inboard bearing housing (31) (for oil lubricated bearings).

p. Install coupling key; assemble coupling half on the shaft and tighten set screw.

3-2. PUMP. Complete the assembly of pump as follows:

a. Clean the remnants of the old gasket from the lower and upper casings. Wash off all the old shellac from the mating flanges. Be sure the surfaces are free from burrs, nicks and dirt. Use the upper casing (1B) for a template to cut a new gasket (73A). This gasket must be no thicker than 1/64 inch. Gasket material such as Vellumoid or treated manila paper is recommended.

b. Shellac the new gasket to the lower casing (1A). Trim the gasket so no part extends into the casing ring area.

c. Use slings around the shaft near bearings to set rotating element into lower casing. Position the casing rings (7) and both bearing housings so that all dowel pins engage. If necessary, loosen set screws of water deflectors to shift bearing housings slightly. Retighten set screws.

d. Assemble both bearing caps and tighten the cap screws.

e. Adjust the shaft sleeves (14) to center the impeller in the lower casing. Tighten the set screws. Make sure that impeller is centered.

f. Cover the top side of the casing gasket with a mixture of graphite and oil. Install the gland bolts. Carefully locate the upper casing on the lower, making certain the dowel pins engage. Attach case nuts and alternately tighten at diagonally opposite positions. Rotate shaft by hand to check that it runs free. See Table IV.

g. Withdraw the lantern rings (29) and push the bushings (63) to the rear of the stuffing boxes. Insert the same number of packing rings as were found during disassembly on each side of the lantern ring. Insert each ring separately and stagger the joints of successive rings 90 degrees. Insert the glands (17) and set the nuts finger

tight- **DO NOT USE A WRENCH.**

h. Rotate the shaft by hand to check that it runs free.

i. Replace all drain plugs removed during disassembly. Reinstall plumbing for water cooled bearings. Install constant level oilers (if used – refer to Figure 1).

3-3. RELUBRICATION. Grease that has been in service does not "wear away." It needs replacing only because of contamination by dust, metal particles, moisture or high temperature breakdown. Oil will be consumed by evaporation and small leakage. It will need replacement for the same reasons as grease. Re-lubricate bearings as follows (with pump shut down):

a. Grease (Pumps are shipped with grease in the bearing housing).

(1). Thoroughly clean grease fittings and outside of bearing housing.

(2). Remove grease drain plug.

(3). Inject clean, new grease, forcing out the old.

(4). Start and run pump for a short time to eject any excess grease.

(5). Wipe off all ejected grease and replace drain plug.

**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

**TABEL III
AMOUNT OF GREASE FOR BALL BEARINGS**

OUNCES	GRAMS	MODEL
1.3	36.4	4A12B, 4AF12B, 6AL10
1.4	39.2	4A12C, 4AF12C
2.0	56.0	5A13, 5AF13, 8A11
3.0	84.0	5A16, 5AF13, 6A13, 6AF13, 6A14, 6AF14, 6A16, 6AF16, 10AL12B
4.5	126	6A19B, 6AF15B, 8A13B, 8AF13B 8A16B, 8AF20, 10A14B, 10A15B
5.8	162.4	8A20B, 8AF25B, 10A16B, 10AF16B, 10A17C, 12A16B, 12A16C, 12A16D, 10A20B
9.5	266	10AX16C, 10A20B, 10AX20C, 10A22B 12A20B, 12A22B, 14A20B, 14A20C, 14A20G, 14A20N, 16A18B, 18A22B, 18A22C, 18A22G, 18A22N
13.3	372.4	12AX19B, 12A19G, 12AF19B, 12AF19G, 14A22B, 14A22C, 14A22G 14A24B, 14A24C
17.0	476	24A28B
21.0	588	16A20B
22.5	630	20AX25B, 20A25B, 20A28
29.0	812	20A35

b. Oil. (Pumps are shipped without oil in the bearing housings.) Be sure to fill and adjust constant level oilers before initial start of pump.

(1) Adjust dust cap to lowest possible position on base fittings



(2) The pipe nipple and base fitting must be level; check with spirit level. If the pipe nipple is bent, replace it. A constant level oiler that is not level will not provide proper lubrication to the bearings.

(3) Fill bottle, screw it into the dust cap as far as it will go – do not force. Allow the oil to flow into the bearing housing. Repeat this procedure until there remains a supply of oil in the bottle. Never fill bearing housing through base fitting.

(4) Check the breather tube for cleanliness. The breather tube must be used with the oil lubrication system.

(5) The bottle on the constant level oilers is made of plastic – the oil temperature must never exceed 170 degrees Fahrenheit, or solvents such as alcohol be put in it. For such applications, use a glass bottle.

c. Consult the driver manufacturer's Maintenance instructions for lubricants and re-lubrication procedure for the driver bearings.

LUBRICATING INSTRUCTIONS

Lubricating Instructions	
1. The pump is shipped without oil in the bearing housings.	
2. Change first oil after operating 1000 hrs. or 60 days, whichever occurs sooner.	
3. Frequency of oil change thereafter is dictated by service conditions. It is suggested, however, that oil changes occur at least every 3000 hrs. of operation.	
4. In order to keep the bearing housings vented, the breather tubes and filters must be kept clean.	
Lubricating Oils	
Type: High quality non-detergent straight H.V.I. mineral Oil.	
Weight: Brg. Operating Range °F.	
Weight	
0-150	150 SSU at 100°F.
150-200	300 SSU at 100°F.
200-250	500 SSU at 100°F.
*Maximum oil temperature in plastic oiler bottle 170 °F.	

FIGURE 5

Oil, high quality, non-detergent, straight High Viscosity Index mineral oil. It must not contain free acid, sulfur, or chlorine and not more than a trace of alkali. See Fig.5.

3-4. Follow instructions in Bulletin No. 2880549 to check out the pump after repair and place the pump in service.

3-5. **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 V 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 Pump Company representative.

TABLE IV

TORQUE VALUE CHART		
SIZE INCH	TORQUE VALUE (FT-LB)	
	LOW CARBON STEEL, SAE 2 55-69,000 PSI	MEDIUM CARBON STEEL, SAE 5 105-120, 000 PSI
¼		7-8
3/8	16-18	23-25
½	40-44	59-62
5/8	80-86	120-125
¾	135-150	210-225
7/8	135-150	305-325
1	205-220	450-475
1-1/8	290-305	605-635

TORQUE VALUES SHOWN ARE FOR CLEAN & LUBRICATED THREADS; GASKETED JOINTS. STUDS MUST BE DRIVEN TIGHT IN LOWER WHEN USED.

INSTALL UPPER CASE, TIGHTEN CENTER NUT (OR CAP SCREWS) THEN WORK OUT FROM CENTER TO EACH SIDE, TIGHTENING WITH TORQUE WRENCH TO VALUES SHOWN ON CHART.

3-6. **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 shaft sleeves.
- (D) One set of case wear rings.
- (E) One set impeller wear rings.
- (F) In some instances, an entire rotating element should be stocked.

3-7. 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 V
TROUBLES**

**Always obtain new trim diameter from Peerless Pump Company representative.

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 Company at their option.

TROUBLE	PROBABLE CAUSE	REMEDY
Failure to deliver liquid or Sufficient pressure.	<p>Pump not primed.</p> <p>Pump not up to speed.</p> <p>Discharge head too high.</p> <p>Insufficient available NPSH.</p> <p>Incorrect direction of rotation.</p> <p>Air leaks in suction line or through Stuffing boxes.</p> <p>Impeller passages restricted.</p> <p>Worn wearing rings.</p> <p>Damaged impeller.</p> <p>Foot valve too small or restricted by dirt.</p>	<p>Re-prime</p> <p>Check for low motor voltage or motor overload. Other drives, increase driver speed when possible.</p> <p>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.</p> <p>Check NPSH requirements of pump and increase system NPSH accordingly.</p> <p>Check impeller assembly for correct rotation either by removing upper case or through priming connection.</p> <p>Check rotation of driver.</p> <p>Tighten packing. Check for air leaks between sleeve and shaft and replace O-ring if there is an air leak. Check all suction line joints for bad gaskets and loose joints.</p> <p>Disassemble the pump and clean impeller.</p> <p>Replace worn parts.</p> <p>Replace or repair impeller.</p> <p>Replace with adequate size foot valve or clean foot valve.</p>
Pump loses prime after starting.	<p>Air leaks in suction line.</p> <p>Insufficient available NPSH.</p>	<p>Tighten packing. Check for air leaks between sleeve and shaft and replace O-ring if there is an air leak. check all suction line joints for bad gaskets and loose joints.</p> <p>Check NPSH requirements of the pump and increase the system available NPSH accordingly.</p>
Overload on driver	<p>Pump speed high.</p> <p>Total head lower than rating.</p> <p>Tight packing.</p> <p>Liquid is of higher specific gravity or Viscosity than rating.</p> <p>Mechanical trouble of pump or driver.</p>	<p>Motor voltage higher than name plate 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.**</p> <p>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.**</p> <p>Stop pump – following proper repacking procedure. Check for scored sleeve; and for sleeve run-out if packing wears rapidly. Replace sleeve and packing as required.</p> <p>Check with Peerless distributor to determine if a larger motor is required.</p> <p>See if pump and motor turn freely. Check impeller fit, shaft straightness and ball bearings.</p>
Pump vibrates or is noisy	<p>Driver unbalanced.</p> <p>Misalignment</p> <p>Cracked foundation.</p> <p>Worn ball bearings.</p>	<p>Disconnect driver and operate it alone. Check pump for large pieces of debris, such as wood, rags, etc.</p> <p>Realign pumping unit.</p> <p>Replace foundation.</p> <p>Replace bearings. Check lubricants for proper Grade. Check pump alignment. Check for Condensation on water cooled bearings.</p>

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