Sunflo

P-1500 Pumps

Installation and Operation Manual

Sundyne CORPORATION

02.10.10E, February, 2000
Supercedes: November 1999

Visit our website at www.sundyne.com

WARRANTY

Sundyne Corporation warrants to Buyer for a period of twelve (12) months from the date of being placed in service (but not to exceed eighteen (18) months after the date of shipment) that the equipment at the time of shipment will be free from defects of design, material and workmanship. If any defects or malperformance occur during the warranty period, Sundyne's sole obligation shall be limited to alteration, repair or replacement at Sundyne's expense, F.O.B. Factory, of parts or equipment, which upon return to Sundyne and upon Sundyne's examination prove to be defective. Equipment and accessories not manufactured by Sundyne are warranted only to the extent of and by the original manufacturers' warranty. Sundyne shall not be liable for damage or wear to equipment caused by abnormal conditions, vibration, failure to properly prime or to operate equipment without flow or caused by corrosives, abrasives or foreign objects. THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. In no event shall Sundyne be liable for consequential or incidental damages.

Icons Used in this Manual

The following icons (symbols) are used to indicate specific types of information.

 Good ideas to use. A reminder to do something.

 Equipment use alert. Unless you follow these procedures correctly, the equipment may be damaged.

 Safety alert. Failure to follow these procedures can endanger the safety of you or others.

 Electrical hazard. Failure to follow these procedures can endanger the safety of you or others.

USING THIS MANUAL:

This manual details the procedures to be followed in servicing your SUNFLO P-1500 model pump.

For guidance and recommendations regarding installation and operation of your pump, please refer to the SUNFLO PUMP TECHNICAL MANUAL.

If any other assistance is required please contact your nearest SUNFLO distributor or contact Sundyne directly at:

Sundyne Corporation
14845 West 64th Avenue
Arvada, Colorado 80007
Telephone: 303-425-0800
Fax: 303-425-0896

or

Sundyne - Europe
13-15 Blvd. Eiffel
Zone Industrielle de Dijon SUD (21600)
B.P. 30
21600 Longvic Cedex
France

This manual contains the following sections:

TORQUE VALUES

DESCRIPTION	ITEM	TORQUE (in-lbs)	TORQUE (kg-m)
Pump Case Bolts	P15-42	95-110	1.10 - 1.27
Impeller (With all o-rings except Teflon)	P15-33 or P15-47	180 - 200	2.08 - 2.32
Impeller (Teflon o-rings)	P15-33 or P15-47	246 - 266	2.85 - 3.08

TABLE 1

Safety Precautions

Safety Warning

Sundyne Corporation manufactures pumps and compressors to exacting International Quality Management System Standards (ISO 9001 - 1987) as certified and audited by Lloyd's Register Quality Assurance Limited. Genuine parts and accessories have been specifically designed and tested for use with these products to ensure continued product quality and performance. As Sundyne Corporation cannot test all parts and accessories sourced from other vendors, incorrect design and/or fabrication of such parts and accessories may adversely affect the performance and safety features of these products. Failure to properly select, install, or use authorized Sundyne parts and accessories is considered misuse, and damage or failure caused by misuse is not covered by Sundyne Corporation's warranty. Additionally, modification of Sundyne products or removal of their original components may impair the safety of these products and their effective operation.

Suggested Safety Instructions

During installation, maintenance, or repair operations of Sundyne Corporation pumps or compressors, systems for safety shall be applied before the commencement of work. Failure to take responsibility for safety may lead to operator injury.

Personal Protective Equipment (PPE) safety glasses with side shields shall be worn by all personnel installing or performing maintenance or repair on the equipment. If equipment is to be manually lifted over 15 pounds (7kg), or if pallet jacks or forklifts are to be used, the person shall wear safety toed shoes. When testing the equipment, hearing protectors (ear defenders) are recommended to be worn if noise levels exceed 85 dB over the work day. Chemical resistant gloves shall be used if chemical use is required (see Chemical Use below for additional information). If chemicals have warnings regarding fumes and/or dust/mists, a dust mask respirator shall be worn.

When selecting one piece of PPE to be used with another, consider the compatibility between them. For example, safety glasses should not interfere with the seal from hearing protectors to protect hearing. Be sure to clean the PPE after each use.

Use of Forklifts: All forklift drivers must have a current recognized license. If using a forklift, first ensure that the lift is in safe operating condition.

 **Electrical Safety:**

Installation, Service, Repair: Ensure all electrical sources are off and safe to install, service, and/or repair the equipment. A recognized Lockout/Tagout program should be followed - Locks and/or tags should be provided warning employees that the equipment is being installed, serviced, and/or repaired. Once the work is completed, the person installing the lock and/or tag shall remove it and inform others of start-up. Should there be a shift change, the lock and/or tag shall be removed by the first authorized person and the lock and/or tag shall be installed by the second shift authorized person.

 Testing Equipment: Persons in the immediate area shall be warned when a test is to be performed.

 Tools: Tools shall be insulated from electrical shock. Insure all tools are clean and free of oil and the insulation is not damaged in any way.

 Chemical Use: Any chemicals to be used shall be accompanied by a relevant Hazard Data Sheet, in accordance with your government legislation. If applicable, chemical proof gloves shall be used. An eye wash station (or equivalent) should be available in the event of injury. Should any hazardous or flammable chemicals have flowed through the equipment a complete decontamination of the equipment is required.

 Fall Protection: When working over six feet from the ground, fall protection is required.

 Machine Guarding: Guards shall remain in place on all equipment. Only during maintenance/repair can the guards be removed, and prior to start-up, the guard must be replaced.

PROCEDURE FOR DISASSEMBLING PUMP

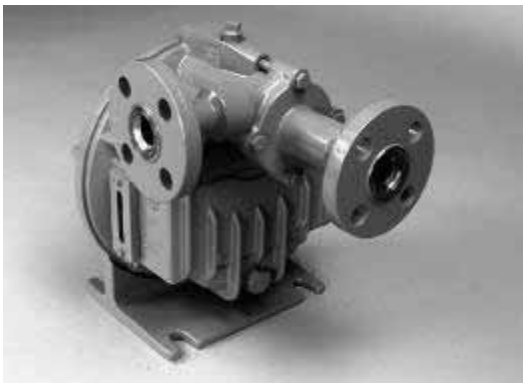
The following is the basic procedure for disassembling your series P-1500 pump.

NOTE

All o-rings removed should be replaced with new o-rings when reassembling the unit. O-ring replacement kits are available in a wide variety of materials for Sunflo P-1500 pumps. Contact your local distributor or Sundyne Corporation direct.

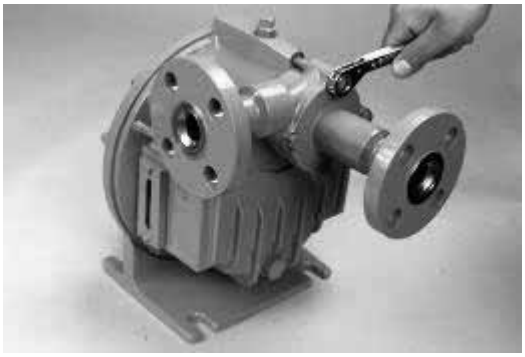
STEP 1

Disconnect all electrical power and insure pump casing and piping have been depressurized. Remove suction and discharge piping.



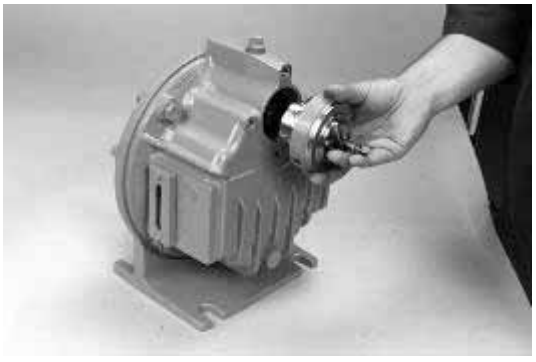
STEP 2

Remove Pump casing (P15-32) by unscrewing the four pump case bolts (P15-42). Also remove the pump case o-ring (P15-20).



STEP 3

Pull out the high speed shaft assembly (P15-9). A slight force will be required to overcome the gearbox o-ring (P15-148).

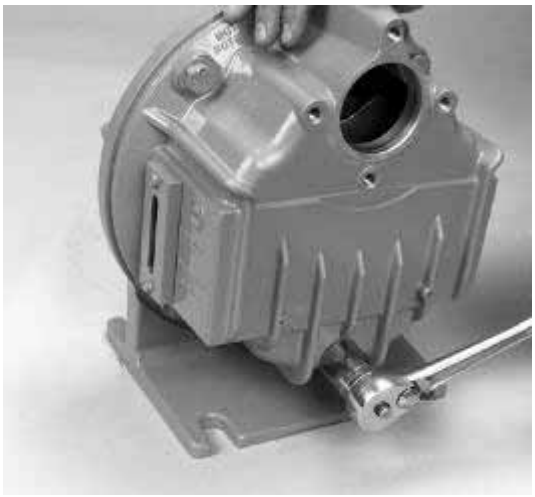


NOTE

Support the high speed shaft assembly fully, while removing. Use care to not catch the outboard bearing against the drive gear.

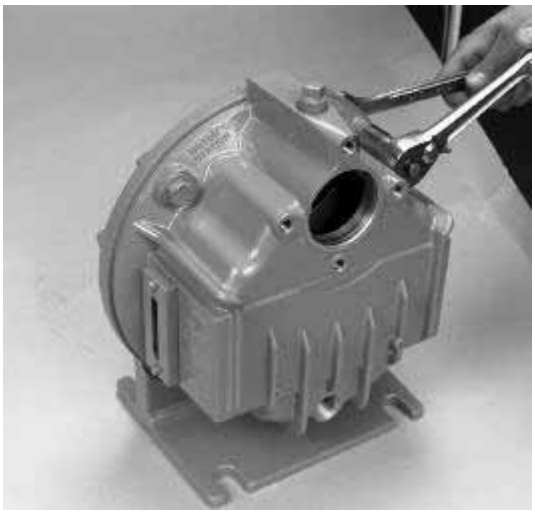
STEP 4

Remove oil plug (P15-14) and drain gearbox. A small amount of residual oil will remain.



STEP 5

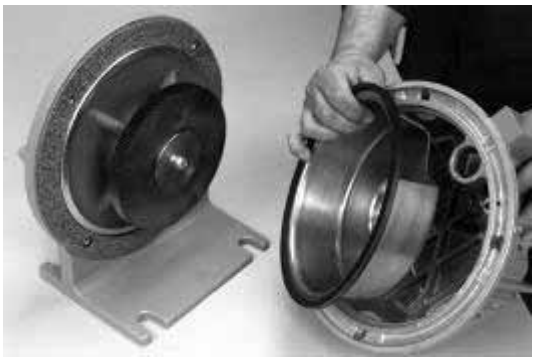
Remove the gearbox housing (P15-15) by unscrewing the gearbox housing bolts (P15-17).



STEP 6

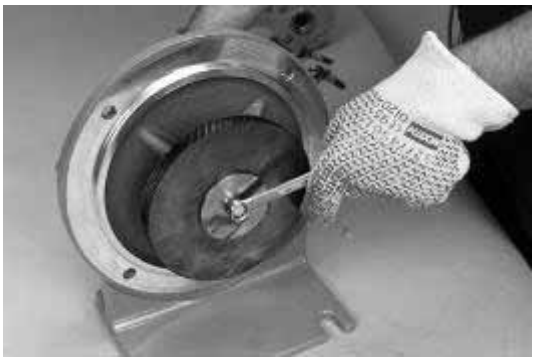
Lift out the oil shroud (P15-16).

NOTE
During reassembly, clean all gearbox components and check the weephole at the bottom of the oil shroud to ensure it is not plugged.



STEP 7

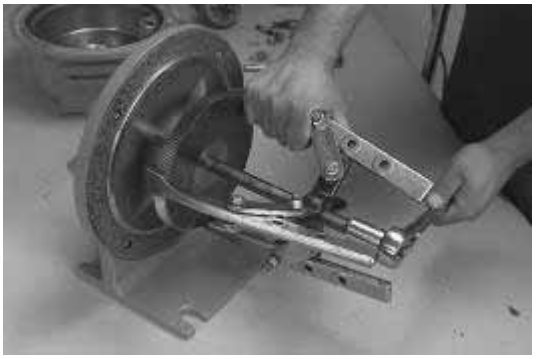
Remove drive gear bolt (P15-62), lock washer (P15-63) and flat washer (P15-64)



STEP 8

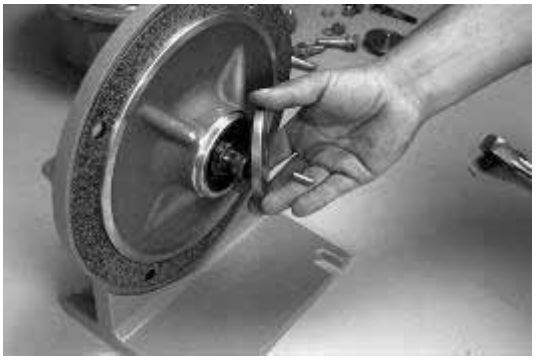
Using a gear puller remove the drive gear (P15-3).

WARNING
Do not allow the puller to bear directly on the gear teeth as they may be damaged by doing so.



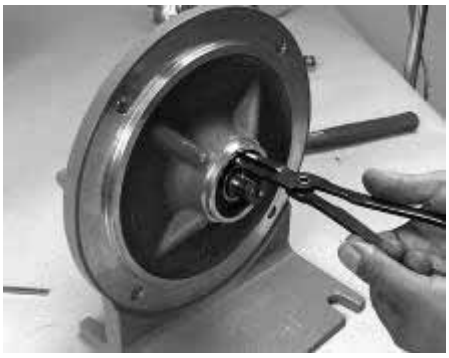
STEP 9 (FRAME MOUNT ONLY)

Remove the drive gear key (P15-124) and slinger (P15-64).



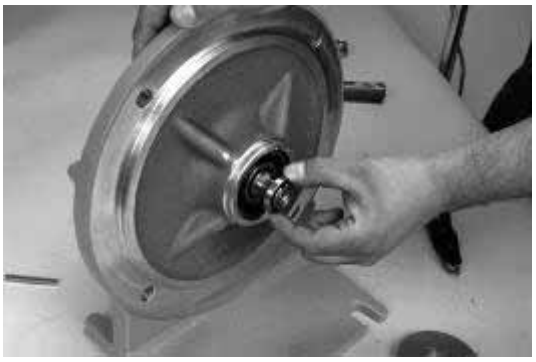
STEP 10 (FRAME MOUNT ONLY)

Remove the bearing retainer snap ring (P15-114) using snap ring pliers.



STEP 11 (FRAME MOUNT ONLY)

Remove the spacer (P15-123). Using a soft mallet, gently tap on the driver end of the shaft and remove the shaft and bearing assembly from the frame.



WARNING

Do not use heat to remove or install the input shaft bearings (P15-95). The bearing are grease packed for life and contain two non-removable seals. Do not immerse the bearings in solvent.

CLOSE COUPLED UNITS ONLY (ASSEMBLY)

When reattaching the drive gear (P15-3) to the motor, the face of the drive gear nearest the motor must be positioned 1.71 + .020 in. (4.3 cm + .05 cm) from the motor flange. A spacer gauge is an accurate method to control the gear position.

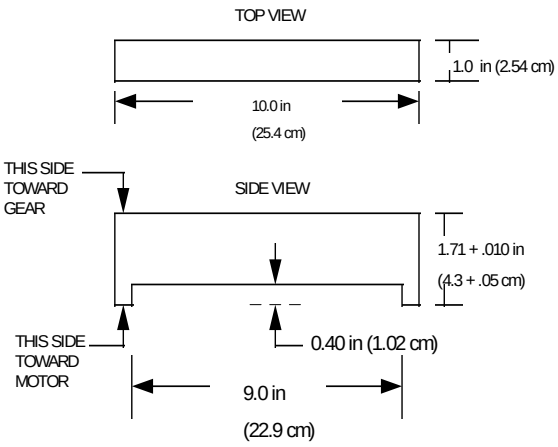


Figure 1

HIGH SPEED SHAFT ASSEMBLY - ASSEMBLY

STEP 1 (Single and Double Seal)

Install bearings - When replacing the bearings (P15-23 and P15-37), it is important to have the thrust side of angular contact bearings facing outward from the pinion gear as shown. The bearings are press fit on the shaft.

NOTE

Only use the inner race to press a bearing on the shaft.

STEP 2 (Single and Double Seal)

Place bearing spacer (P15-154) on shaft.

STEP 3 (Single and Double Seal)

Place gearbox rotating face (P15-25) on shaft. The rotating face is bi-directional.

STEP 4 (Single and Double Seal)

Place the shaft sleeve (P15-40) on the shaft. The o-ring groove should face toward the impeller.

STEP 5 (Single and Double Seal)

Place the shaft sleeve o-ring (P15-183) in the groove in the shaft sleeve.

STEP 6 (Single and Double Seal)

Place the gearbox seal o-ring (P15-90) in the bottom groove in the seal housing.

STEP 7 (Single and Double Seal)

Press the gearbox seal (P15-27) into the seal housing. The gearbox seal o-ring will seat on the outer diameter of the gearbox seal. The seal face should be facing downward.

STEP 8 (Single and Double Seal)

Place the seal spacer (P15-153) with the flat side facing upward.

STEP 9 (Single and Double Seal)

Place the process seal o-ring (P15-90) in the seal housing.

STEP 10 (Single and Double Seal)

Press the process seal (P15-30) over the process seal o-ring.

The following steps only apply to Single Seal units. For Double Seal units go to PAGE 15:

STEP 11 **(Single Seal Only)**

Insert the assembled shaft into the seal housing. The bearing should slide into the rear of the seal housing.

STEP 12 **(Single Seal Only)**

Place the snap ring (P15-24) using snap ring pliers in the groove behind the inboard bearing.

STEP 13 **(Single Seal Only)**

Place the rotating face (P15-25) on the shaft. It should rest against the process seal.

STEP 14 **(Single Seal Only)**

Place the impeller spacer o-ring (P15-183) on the shaft on top of the rotating face.

STEP 15 **(Single Seal Only)**

Slide the inboard shaft sleeve (P15-34) on the shaft.

STEP 16 **(Single Seal Only)**

Place the impeller o-ring (P15-18) on top of the inboard shaft sleeve.

STEP 17 **(Single Seal Only)**

Place the diffuser plate (P15-31) on the seal housing.

STEP 18 **(Single Seal Only)**

Screw the impeller (P15-33 or P15-47) on to the shaft. Use Sundyne Corporation tool number T-JM01FL-175. Torque the impeller per Table 1. Clamp the shaft with soft jawed pliers or in a soft jawed vise.

NOTE: Do not clamp on the gear

Sundyne Corporation Tool T-JM01FL-175 can be purchased from your Sunflo Distributor.

PROCEED TO STEP 23 ON PAGE 21

STEP 11 **(Double Seal Only)**

Place the seal spacer (P15-35) on top of the outboard process seal with the flat side up.

NOTE: The process seal spacer and gearbox spacer are not interchangeable.

STEP 12 **(Double Seal Only)**

Place the inboard process seal o-ring (P15-90) in the o-ring groove in the seal housing.

STEP 13 **(Double Seal Only)**

Gently place the rotating face (P15-25) on the outboard process seal. It will sit loosely until insertion of the high speed shaft.

STEP 14 **(Double Seal Only)**

Press the inboard process seal (P15-30) over the inboard seal o-ring. The seal face should be facing the rotating face.

STEP 15 **(Double Seal Only)**

Insert the inboard seal retaining ring (P15-27) in the groove in the seal housing. The inboard seal should have to be compressed slightly.

STEP 16 **(Double Seal Only)**

Insert the high speed shaft into the seal housing. Insure the rotating face is centered so the shaft does not hit or damage the rotating face surface.

STEP 17 **(Double Seal Only)**

Place the snap ring (P15-24) using snap ring pliers in the groove behind the inboard bearing.

STEP 18 **(Double Seal Only)**

Slide the inboard shaft sleeve o-ring (P15-183) on the shaft.

STEP 19 **(Double Seal Only)**

Place the inboard shaft sleeve (P15-34) on the shaft.

STEP 20 **(Double Seal Only)**

Place the impeller o-ring (P15-18) on top of the inboard shaft sleeve.

STEP 21 **(Double Seal Only)**

Place the diffuser plate (P15-31) on the seal housing.

STEP 22 **(Double Seal Only)**

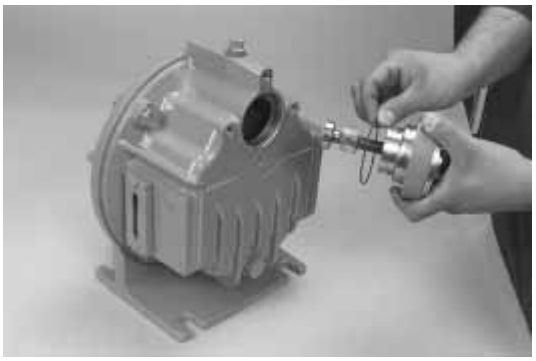
Screw the impeller (P15-33 or P15-47) on to the shaft. Use Sundyne Corporation tool number T-JM01FL-175. Torque the impeller per Table 1. Clamp the shaft with soft jawed pliers or in a soft jawed vise.

NOTE: Do not clamp on the gear

Sundyne Corporation Tool T-JM01FL-175 can be purchased from your Sunflo Distributor.

STEP 23 (Single and Double Seal)

Place the gearbox o-ring (P15-148) on the seal housing and insert the High Speed Shaft Assembly (P15-9) into the gearbox housing.



STEP 24 (Single and Double Seal)

Place the pump case o-ring (P15-20) and the pump case (P15-32) on to the gearbox and torque the pump case bolts (P15-42).

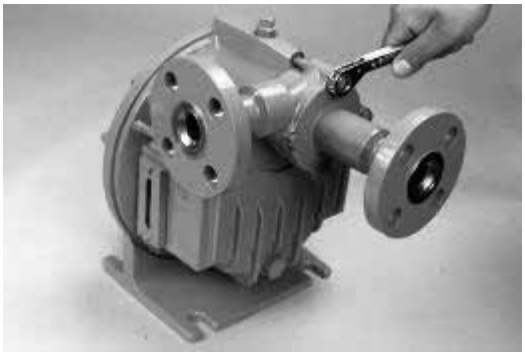


TABLE 2 PARTS LIST (S) - Single Seal (D) - Double Seal

ITEM NO.	PART NAME	QUANTITY
P15-1	Flat Washer, SAE	4
P15-2	Hex Nut	4
P15-3	Drive Gear	1
P15-5	Key	1
P15-6	Drive Gear Hub	1
P15-7	Gasket, Shroud	1
P15-8	Oil Fill Plug	1
P15-9	High Speed Shaft Assembly (see Figure ??)	1
P15-10	Sight Glass	2
P15-11	Sight Glass Gasket	2
P15-12	Sight Glass Retainer	2
P15-13	Self Tapping Screw, Sight Glass Retainer	4
P15-14	Drain Plug	1
P15-15	Gearbox Housing	1
P15-16	Gearbox Oil Shroud	1
P15-17	Hex Head Screw - Gearbox	4
P15-18	O-ring - Impeller	1
P15-19	Seal Housing	1
P15-20	O-ring - Pump Case	1
P15-23	Ball Bearing - Outboard	1
P15-24	Retaining Ring - Inboard Bearing	1
P15-25	Mating Ring	2
P15-27	Seal - Gearbox	1
P15-28	O-ring - Process Seal	1 (S) 2 (D)
P15-29	Plug	2 (S) 0 (D)
P15-30	Seal - Process	1 (S) 2 (D)
P15-31	Diffuser Plate	1
P15-32	Pump Case	1
P15-33	Impeller	1
P15-35	Spacer - Double Seal	0 (S) 1 (D)
P15-34	Shaft Sleeve - Inboard	1
P15-37	Ball Bearing - Inboard	1
P15-38	Shaft - Pinion	1
P15-40	Shaft Sleeve - Outboard	1
P15-42	Hex Head Screw - Pump Case	4
P15-43	Washer - Pump Case	4
P15-46	Lock Washer - Gearbox	4
P15-47	Impeller/Inducer	1
P15-62	Hex Head Screw - Drive Gear	1
P15-63	Lock Washer - Drive Gear	1
P15-64	Washer - Drive Gear	1
P15-89	Retaining Ring	0 (S) 1 (D)
P15-90	O-ring - Gearbox Seal	1
P15-95	Ball Bearing - Frame	2
P15-96	Shaft - Frame	1
P15-99	Key - Input Shaft	1

TABLE 2 (con't) PARTS LIST (S) - Single Seal (D) - Double Seal

ITEM NO.	PART NAME	QUANTITY
P15-100	Housing - Frame Mount	1
P15-114	Retaining Ring - Frame	1
P15-116	Slinger	1
P15-124	Key - Bull Gear	1
P15-121	Gasket	1
P15-123	Spacer	1
P15-148	O-ring, HSSA - Gearbox Side	1
P15-151	Retaining Ring - Outboard Bearing	1
P15-152	Spring - Preload, Outboard Bearing	1
P15-153	Spacer - Seal	1
P15-154	Spacer - Bearing	1
P15-183	O-ring - Shaft Sleeve	2

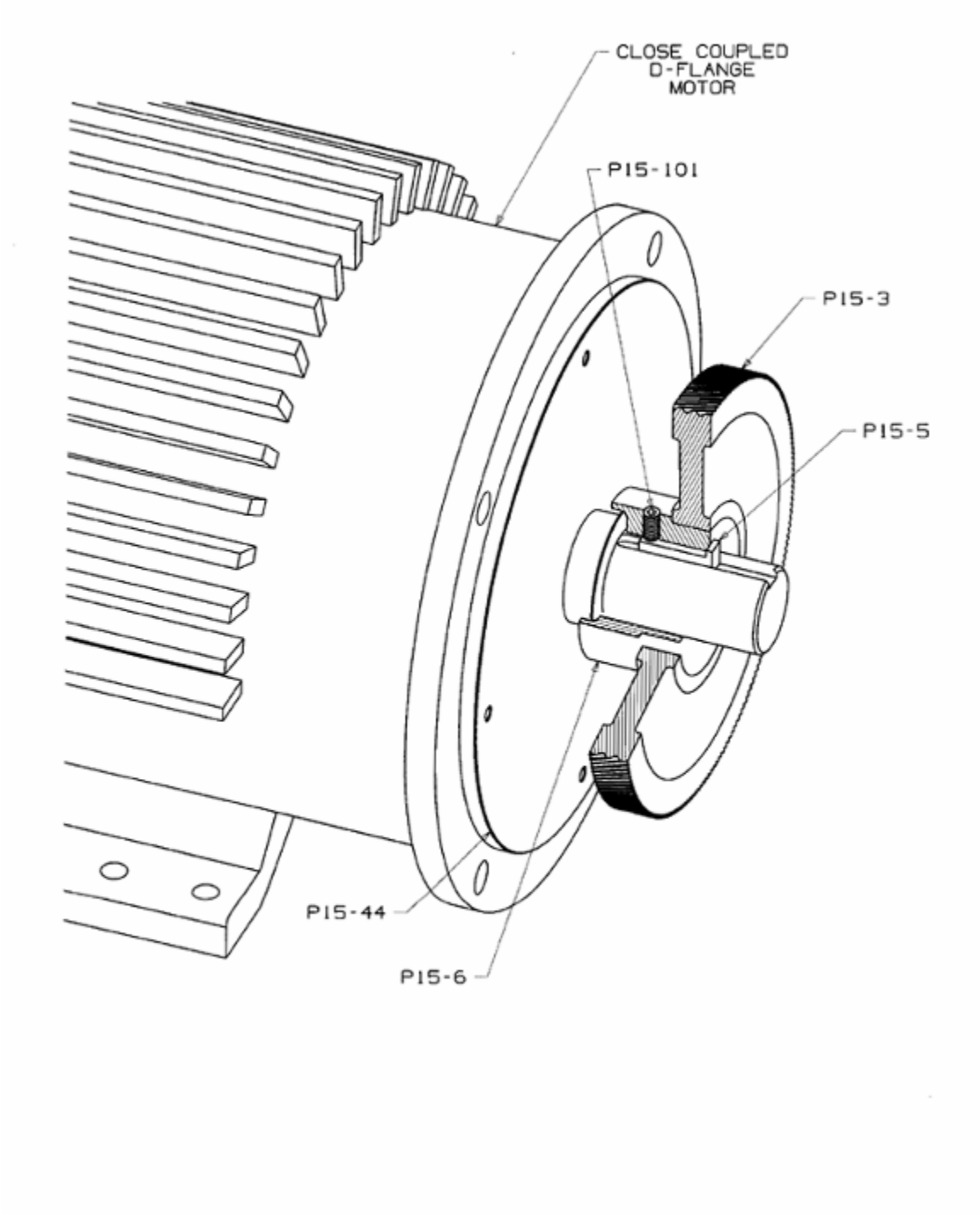


FIGURE 2 CLOSE COUPLED ASSEMBLY

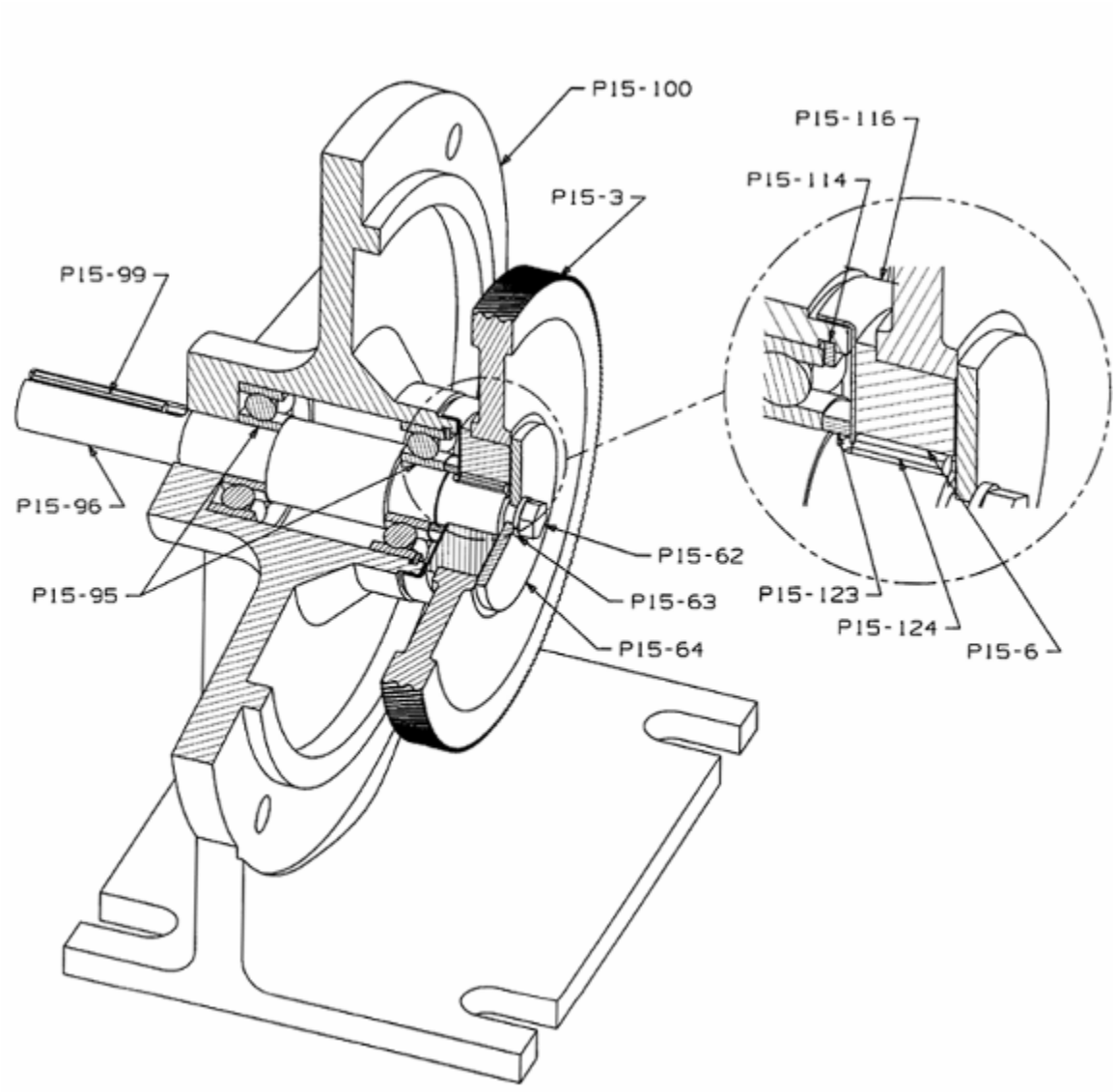


FIGURE 3 FRAME MOUNT ASSEMBLY

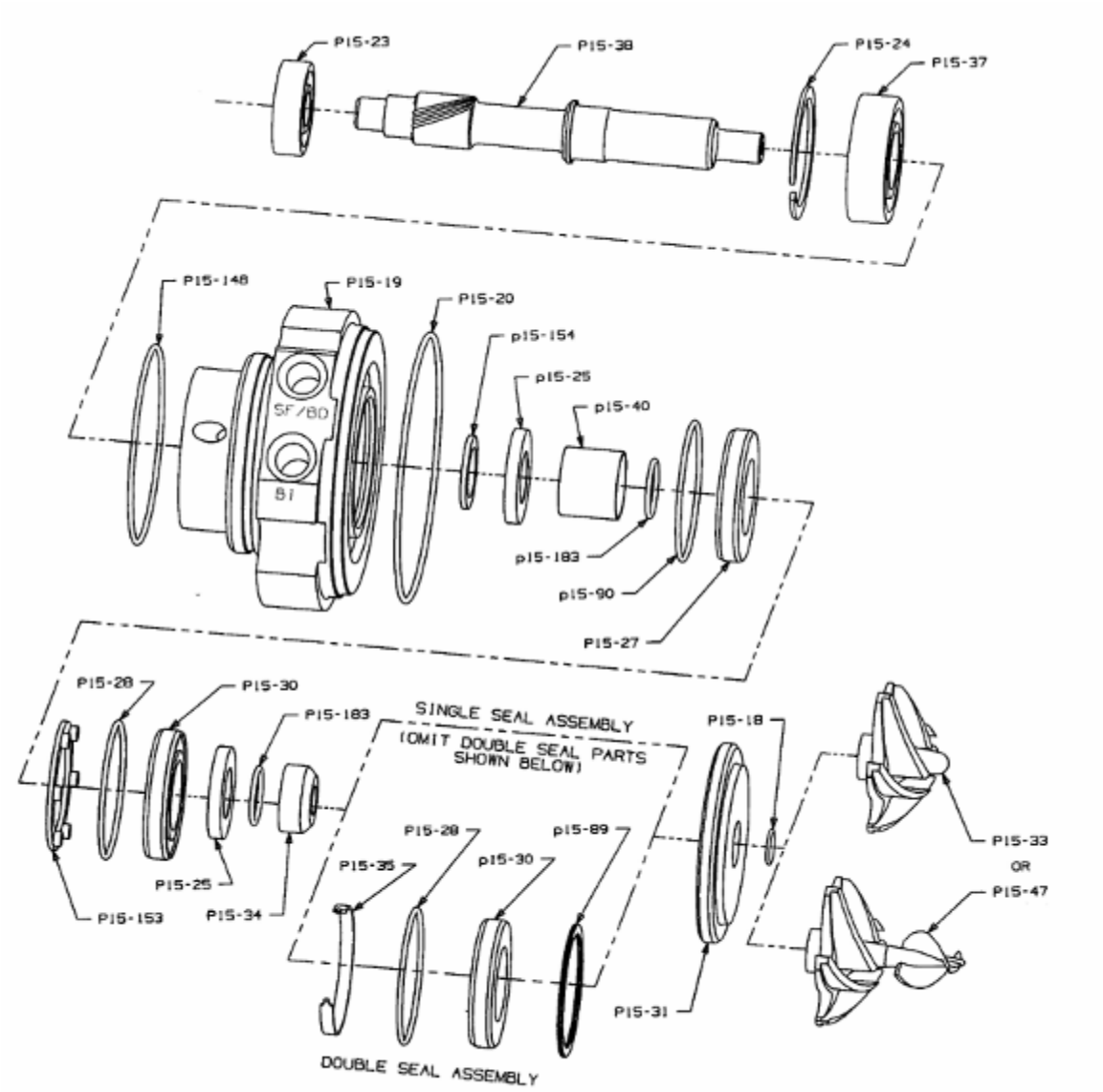


FIGURE 4 HIGH SPEED SHAFT ASSEMBLY EXPLODED VIEW

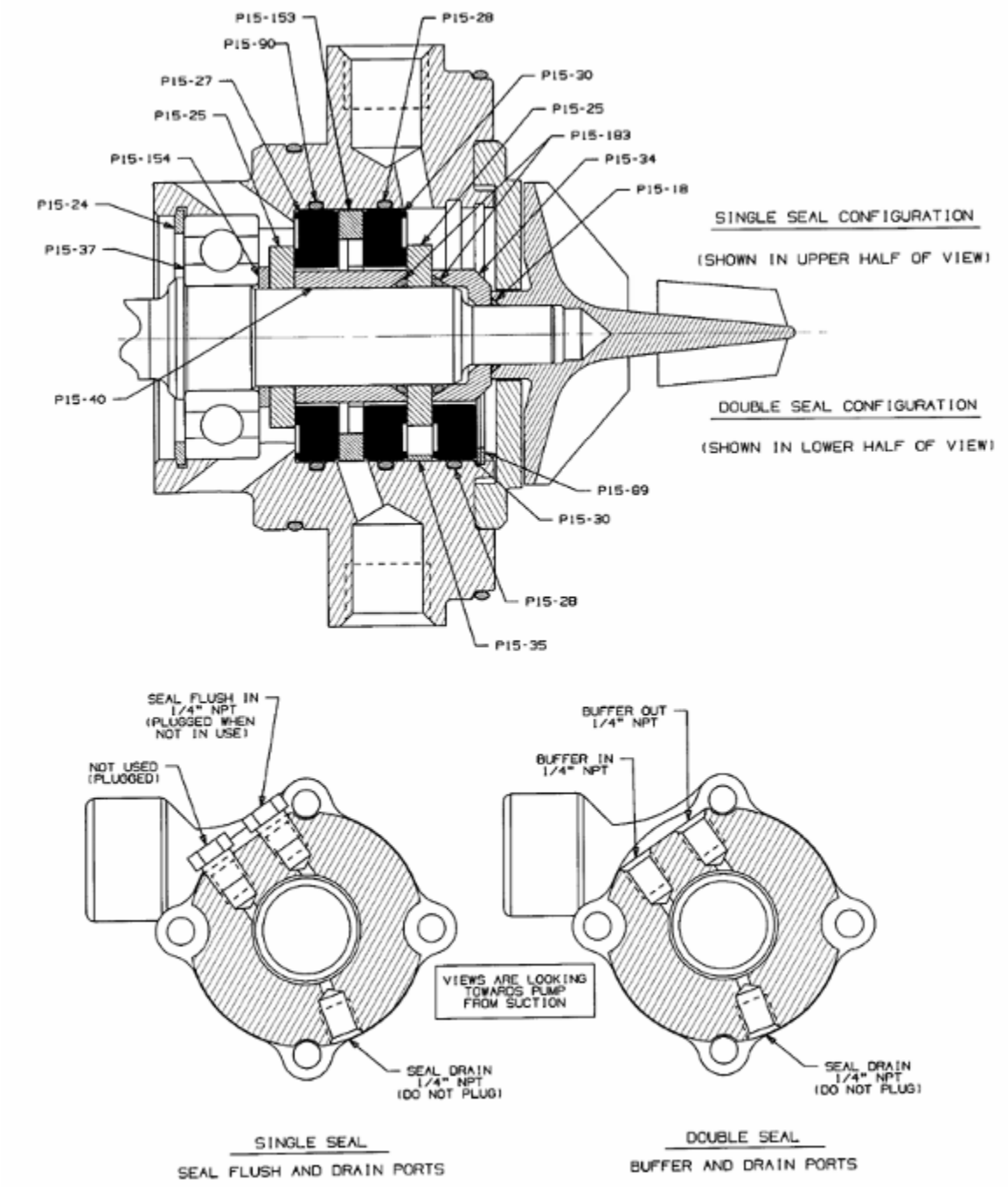


FIGURE 5 SINGLE AND DOUBLE SEAL INTERNAL CONFIGURATION CROSS-SECTION

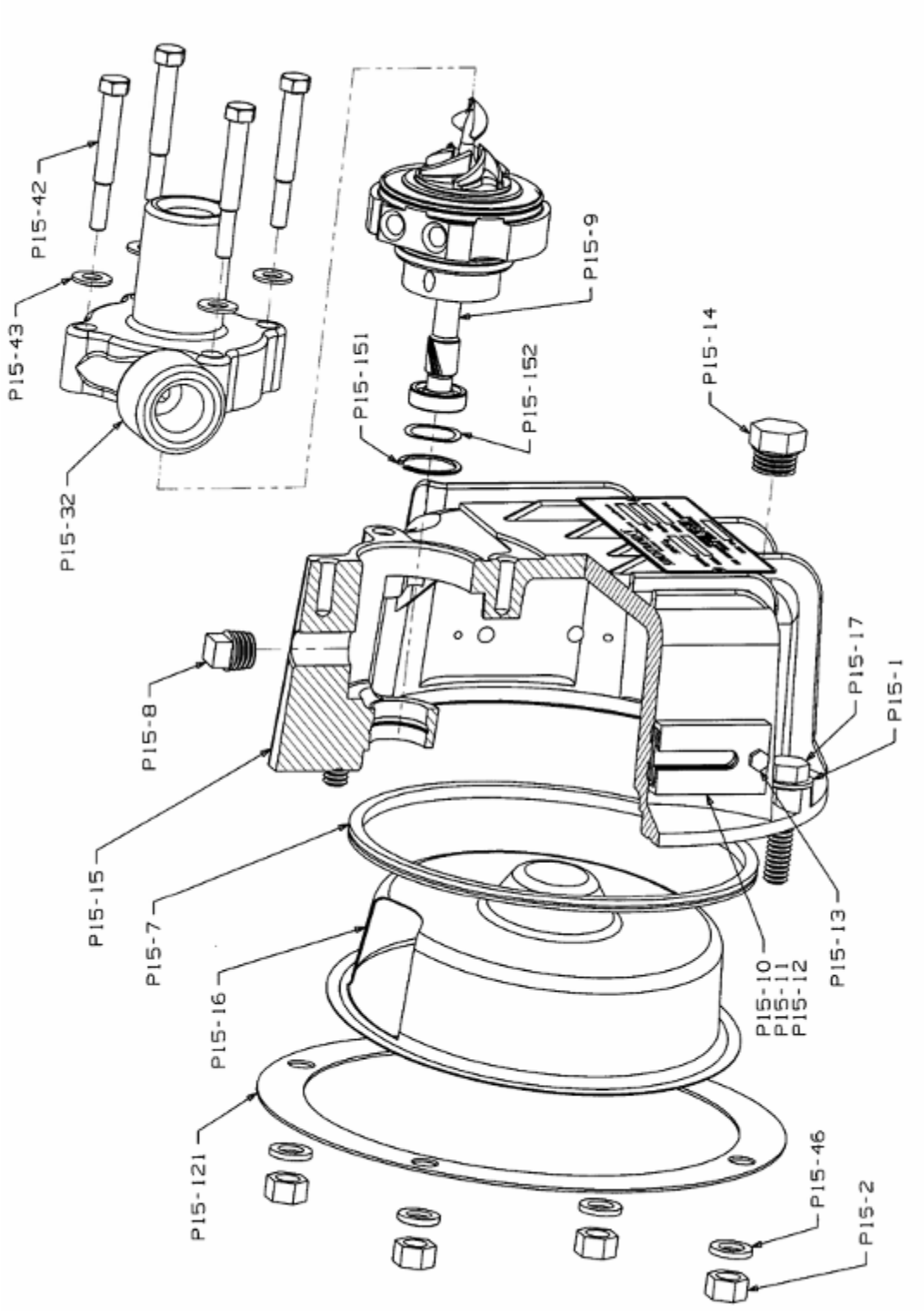


FIGURE 6 PUMP AND GEARBOX ASSEMBLY

SPARE PARTS

When ordering replacement parts, give the pump serial number, and list each part required by item number and part name along with quantities desired. When requesting information concerning your Sunflo Pump, always refer to the pump model number and pump serial number as they appear on the nameplate.

All SUNFLO products are available on an expedited basis. The factory should be contacted prior to order placement to ensure part availability. Stock spare parts requiring no machining will be shipped 24 hours after receipt of order at the factory and parts requiring additional machining will be shipped within 96 hours after receipt of order at the factory.

The kits shown below simplify maintenance and inventory control. They are available through your Sunflo distributor.

O-RING REPAIR KITS

- Packages all o-rings in one kit.
- Color coded o-ring material.
- Easy-to-read instructions describe exact location of each o-ring.

SEAL REPAIR KITS

- Custom tailored for the specific pump and seal type.
- Single and double seal options.
- Easy-to-read instructions prevent installation mistakes.
- Eliminates misplacement of parts and simplifies inventory control.

EXCHANGE HIGH SPEED SHAFT ASSEMBLIES

- Easier to perform routine seal and bearing maintenance.
- Normal delivery is 2 weeks.
- Same quality construction, testing and warranty as new shaft assemblies.
- Can ship on an expedited 3-day basis when needed. Old shaft assembly returned for credit within 60 days.

Order kits through your Sunflo distributor.

A HIGHLY RECOMMENDED OPTION TO NORMAL PUMP MAINTENANCE IS THE PURCHASE OF A SPARE HIGH SPEED SHAFT ASSEMBLY WHICH CAN BE REPLACED QUICKLY AND EASILY AS A COMPLETE UNIT.

ORDERING REPLACEMENT PARTS

Order parts through your nearest Sunflo distributor or contact Sundyne Corporation directly.

Sundyne Corporation • Arvada, CO 80007 USA • +1-303-425-0800 • FAX: +1-303-425-0800 • www.sundyne.com
Sundyne Europe • Longvic Cedex, France • +33-380-383300 • FAX: +33-380-383371 • e-mail: european-sales@sundyne.com