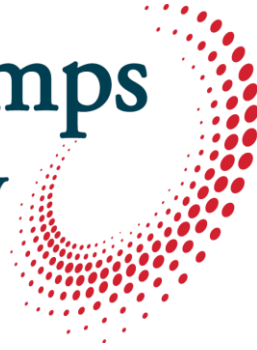


Ampco Pumps Company



LH Series Pump (High Pressure Pump Line)

Installation & Maintenance Manual

For LH 532, 542, and 552 model pumps

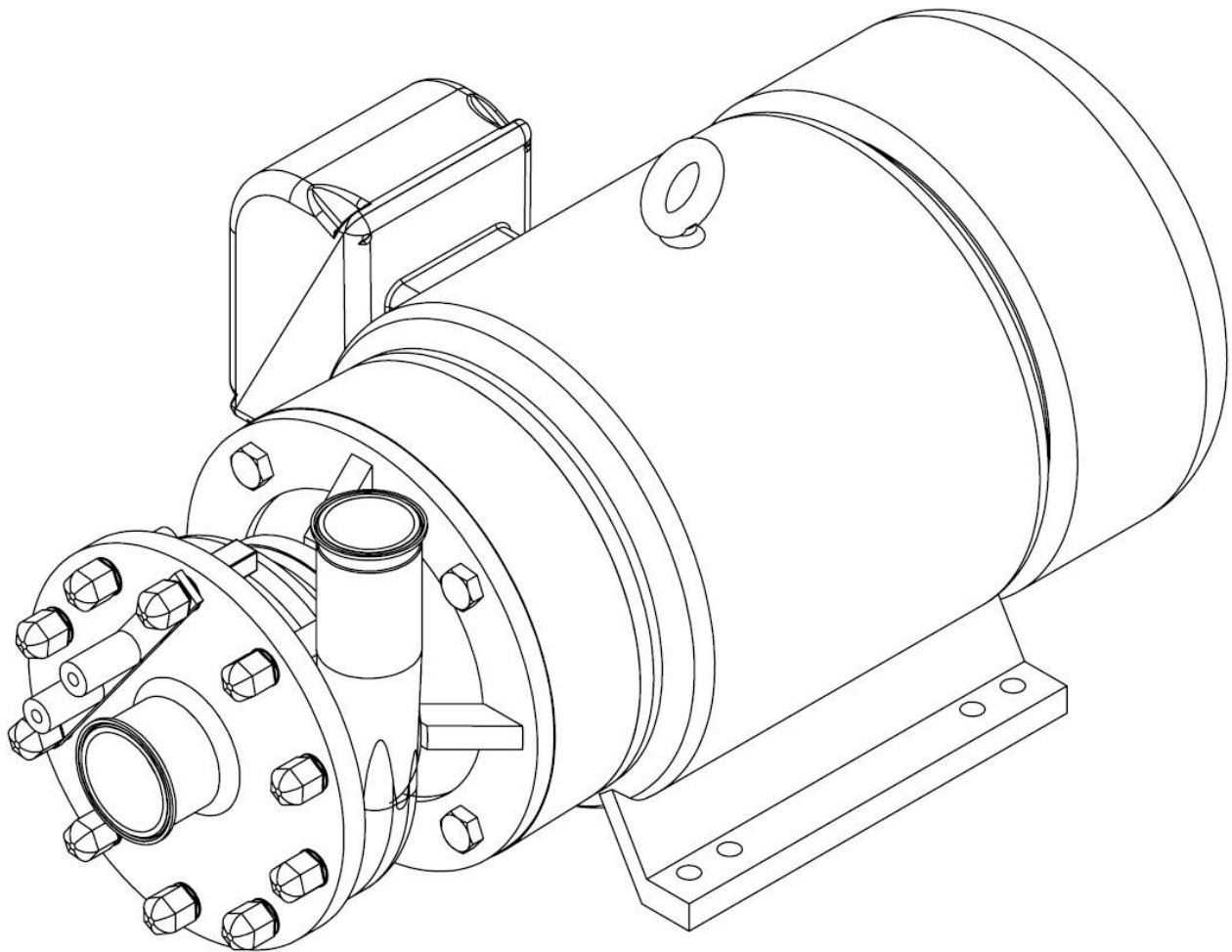


TABLE OF CONTENTS

TECHNICAL DATA	3
COMPOSITE OF LH PUMP CURVES	4
ASSEMBLY DRAWING & PARTS LIST.....	5
SEAL DRAWINGS & PART LIST	6
MAINTENANCE & SCHEDULING.....	7
DAILY MAINTENANCE & SCHEDULING	7
SEMI-ANNUAL MAINTENANCE CHECKS.....	7
ANNUAL MAINTENANCE CHECKS	7
MOTOR LUBRICATION SCHEDULE	7
CONTINGENCY PLAN.....	7
PUMP INSTALLATION	8
PUMP RECEIVING	8
PUMP LOCATION	8
ELECTRICAL INSTALLATION	8
FLUSH INSTALLATION FOR LIP SEAL (OPTIONAL).....	8
PUMP ORIENTATION	9
SHUT DOWN	9
PUMP DISSEMBLY & SEAL REMOVAL.....	10
TOOLS REQUIRED	10
PUMP DISASSEMBLY AND SEAL REMOVAL.....	10
PUMP ASSEMBLY & SEAL INSTALLATION.....	13
PIPING CONNECTIONS	17
TROUBLESHOOTING.....	18

TECHNICAL DATA

Specifications

Maximum Inlet Pressure..... 600 PSI
Temperature Range..... -40° F → 400° F / -40° C – 204° C

Materials of Construction

Casing AISI 316L Stainless Steel
Cover..... AISI 316L Stainless Steel
Impeller AISI 316L Stainless Steel
Shaft Sleeve AISI 316L Stainless Steel
Seal Driver AISI 316L Stainless Steel
Adapter..... AISI 304 Stainless Steel
Product Contact Surface Finish 32Ra (standard)
 Optional Finishes 25Ra, 20Ra, 15Ra, Electro Polish
 O-Rings & Gaskets..... Viton (standard)
 Optional Materials..... EPDM, Buna (others per request)

Seal

Type..... Internal Single Mechanical
 Optional..... Lip Seal
 Pressure (lip seal flush) < .5 BAR / 7 PSI
 Water Consumption (lip seal flush)..... 4-6 GPH
Stationary Seal Material..... Silicon Carbide
 Optional Material Tungsten
Rotating Seal Material Carbon
 Optional Material Silicon Carbide

Motor

Baldor Special JM NEMA Frame High Thrust Bearing Motor

Voltage and Frequency

3 Phase, 50 HZ, 208-220/330-415 VAC 2900RPM
3 Phase, 60 HZ, 208-220/460 VAC..... 3500RPM
3 Phase, 60 HZ, 575 VAC 3500RPM

Recommended Torque Values

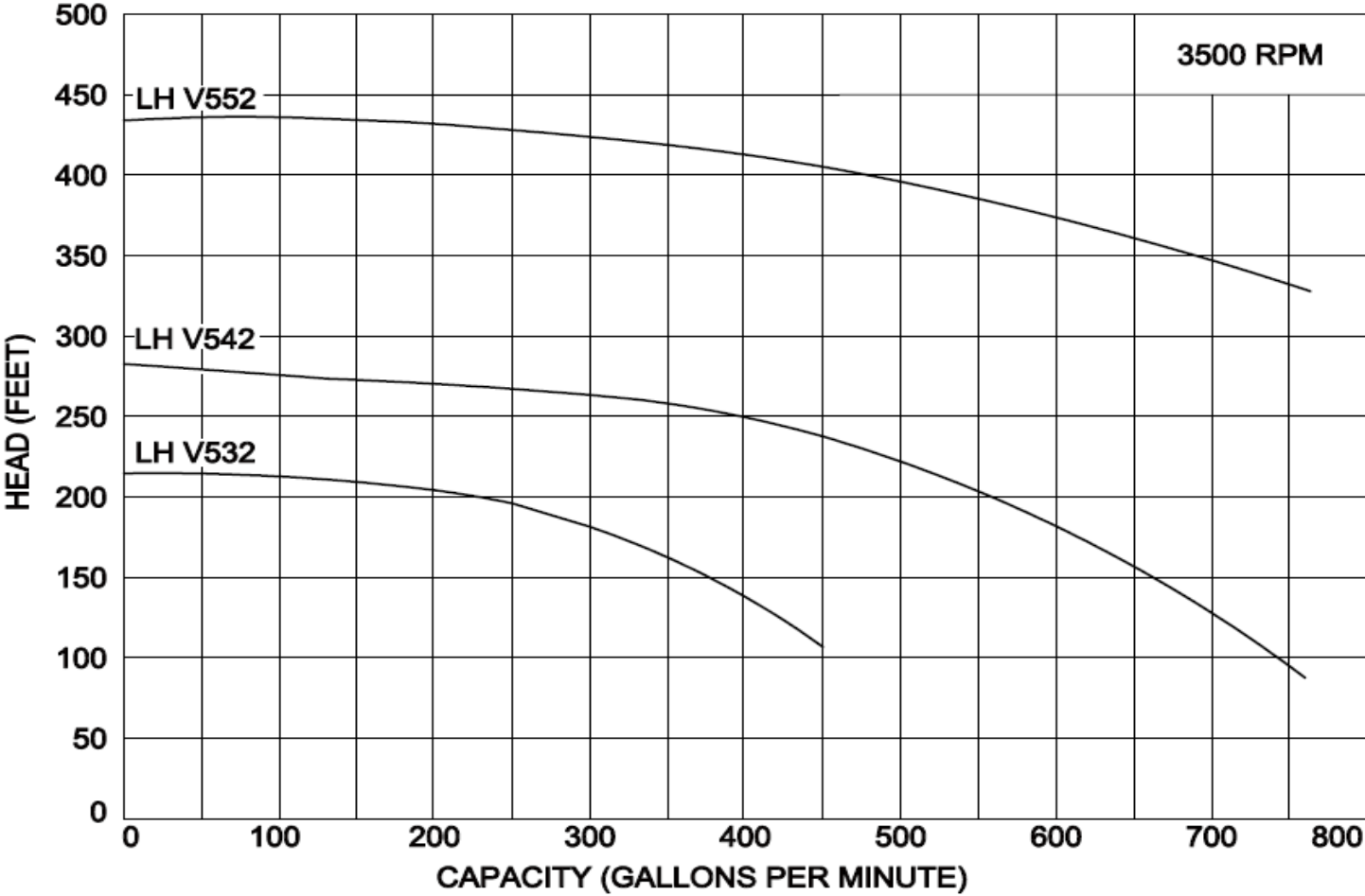
Impeller nut..... 40ft-lbs.
Cover Nuts 90ft-lbs.

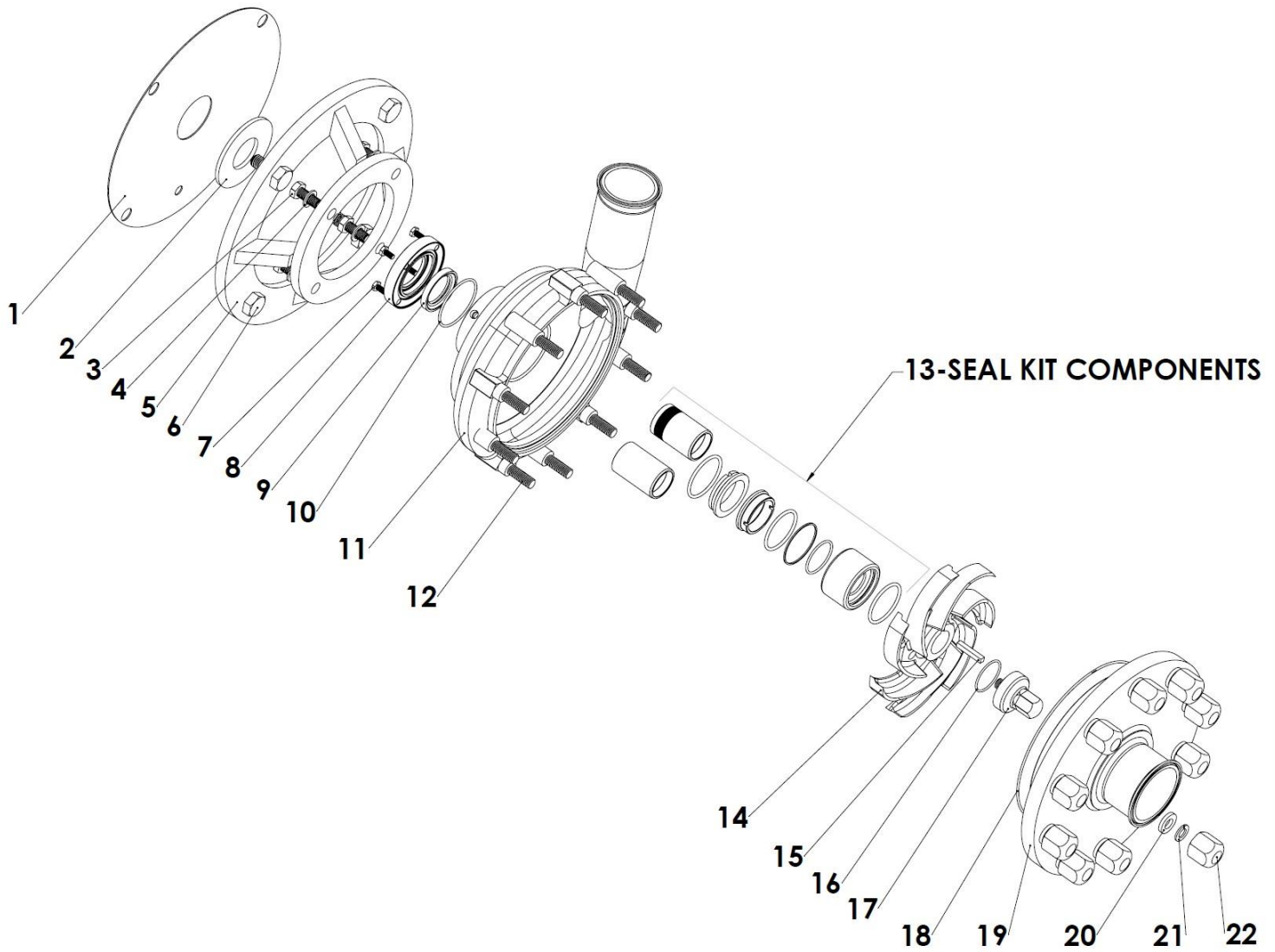
Impeller Clearance 0.040"

LH SERIES SUMMARY CURVE

Composite Performance Curve: 3500 RPM

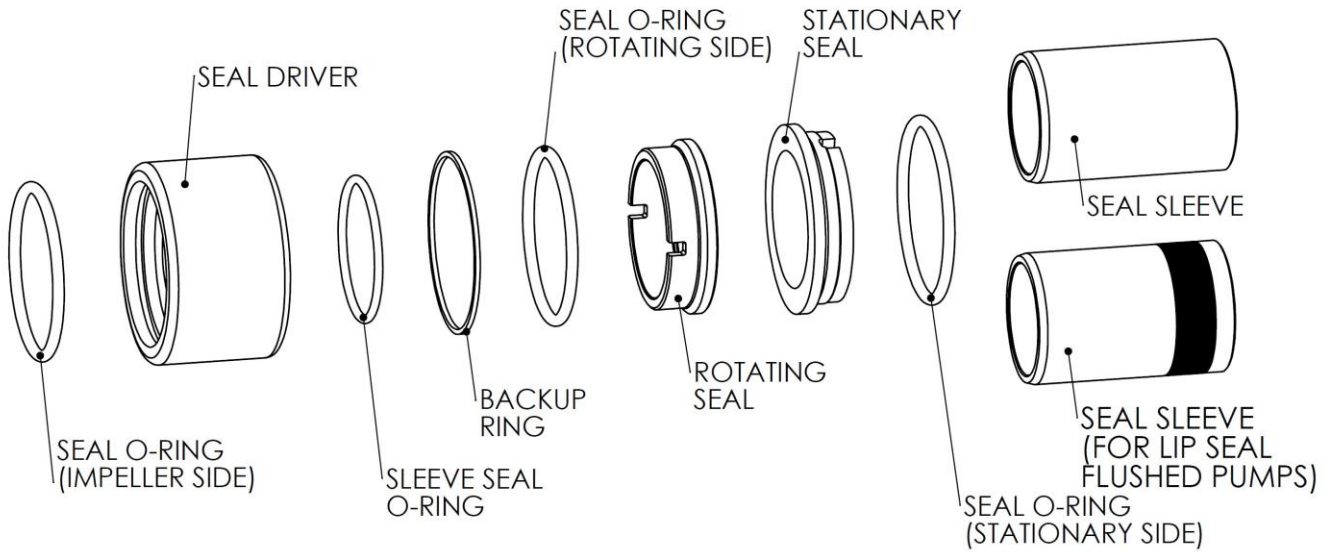
Performance curves are based on pumping water.
A tolerance of +/- 5% applies to all figures



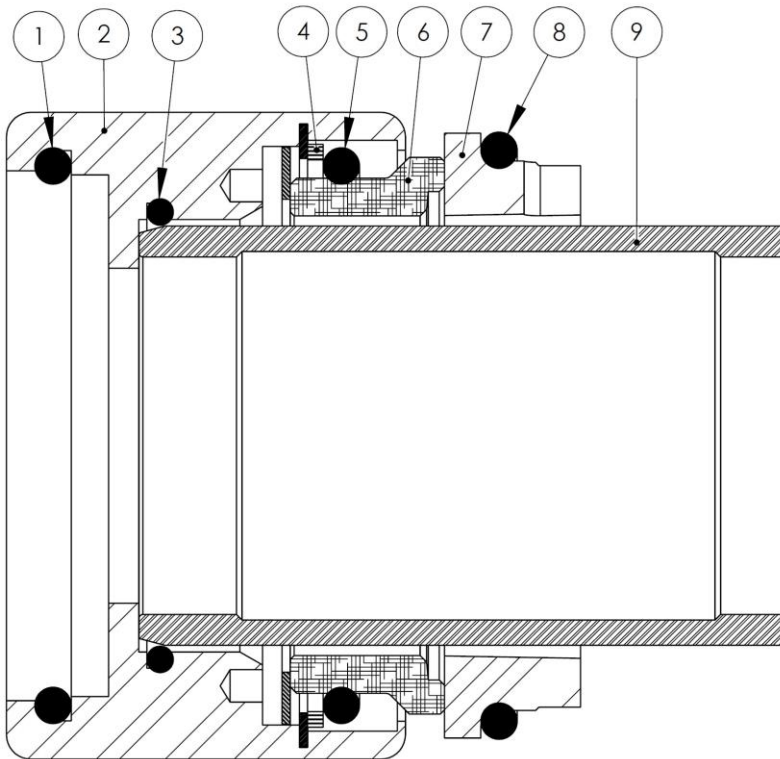


1	Splash Plate	12	Casing Stud
2	Slinger	13	Impeller Screw Shims
3	Hex Bolt (M12-1.75 x 30mm)	14	Impeller
4	Lock Washer	15	Key (for LH Pumps)
5	Adapter	16	Impeller Screw Gasket
6	5/8 Hex Head Bolt	17	Impeller Screw
7	Cap Screw (1/4-28 x 3/8")	18	Gasket (Cover)
8	Gland	19	Cover
9	Lip Seal	20	Flat Washer
10	Gland O-ring	21	Lock Washer
11	Casing	22	Cover Nut

LH-SERIES MECHANICAL SEAL



LH-SERIES MECHANICAL SEAL SECTION



NO.	PART DESCRIPTION
1	SEAL O-RING IMPELLER
2	SEAL DRIVER
3	SLEEVE SEAL O-RING
4	BACKUP RING
5	SEAL O-RING (ROTATING SIDE)
6	ROTATING SEAL
7	STATIONARY SEAL
8	SEAL O-RING (STATIONARY)
9	SEAL SLEEVE

LH Pump Installation

Pump Receiving

Visually inspect shipping crate(s)/pallet(s) for damage. Ampco pumps will be shipped in boxes labeled Ampco Pumps or in crates. If there is any damage it is imperative to notify the driver at the time of delivery. Failure to do so will make it difficult, if not impossible, to file a damage claim and Ampco Pumps will not be held accountable. Please contact Ampco Pumps shipping department with damage details ASAP.

Once unpacked, carefully inspect the pump for any damage that may have occurred during shipping. Using a 15/16" socket, an extension drive, and ratchet turn the impeller nut to make sure the impeller turns freely. There should be a little noise from the seal which is normal. If there is metal to metal contact when the impeller is turned shipping damage is likely. Leave the protective covers on the inlet and discharge connections until the pump is installed and is ready to be connected to piping.

Pump Location

Install the pump in an optimal location. Be sure that there is room around the pump so it can be accessed readily for maintenance. Ensure that the motor has adequate ventilation. Make sure the motor type is suitable for the environment in which it is installed.

Electrical Installation

Have a qualified electrician connect the motor using sound electrical practices. Do not test run the motor with the pump dry. Mechanical seals can be damaged running dry even momentarily. The pump must be flooded and the flush must be connected with flushing water flowing before starting the pump. The pump and motor has been selected for a specific environment and system application. Changing the environment or system conditions (i.e. change of fluid, change in head losses, and change in NPSHr) can overload the motor. When changing system conditions or when in doubt, contact Ampco Pumps Company for technical assistance and someone will be ready to assist.

Flush for Lip Seal

Install flush piping as shown in Figure 23. The regulating valve must be on the inlet end of the flush. The flush requires 4-6 gallons per hour at .5 BAR or 7 PSI maximum. The tubing on the exit side of the flush has a least 2 feet of height so once the flush has ran there will be a small amount of water on the seal and it will not run dry. Direction of flow should always be from a lower elevation inlet to a higher elevation outlet to evacuate air.

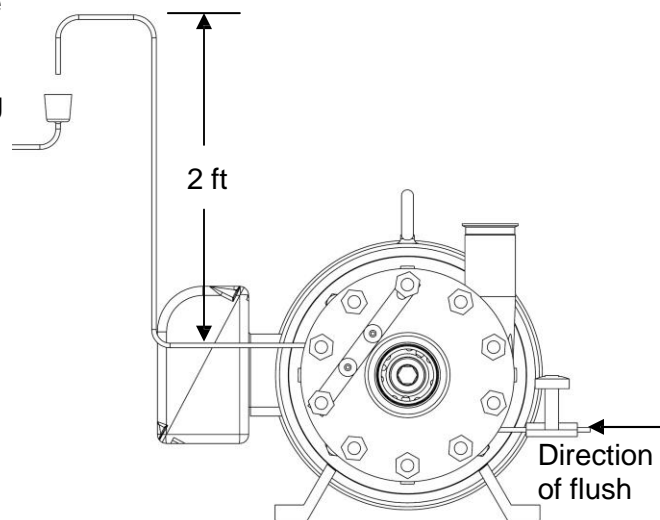
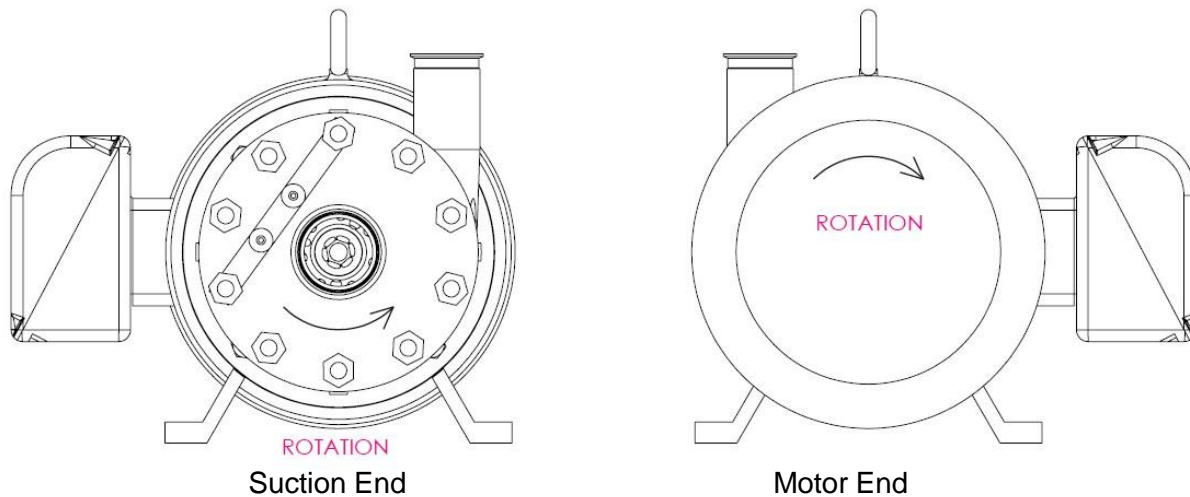


Figure 23

Pump Operation

Make sure the pump is clean and free of any foreign matter.

Once the motor, flush, and piping have been properly connected, the flush can be turned on (if the pump has a flush option). When the pump has been flooded, the pump can be momentarily turned on to check the motor rotation. The correct rotation is counter-clock wise while looking at the pump from the suction end and clock wise if looking at the pump from the motor end.



When the rotation of the motor has been verified to be correct the pump is ready to run continuously for service.

Shut Down Instructions

- Turn off power supply to the pump
- Close shut-off valves
- Drain and clean pump

Pump Disassembly and Seal Removal

IMPORTANT: Before attempting any service on the pump or motor, disconnect/lockout electrical power to the pump motor. If the pump and motor are to be removed as a unit, note the wiring and configuration. Use colored or numbered tape to mark the wire connections of the pump motor and power source for re-connection.

Seal Removal

Tools Needed:

1" or 1¼" Wrench

90° O-Ring Pick

Impeller Stop Tool (provided with pump)

15/16" Socket Wrench

0.040" Feeler Gage

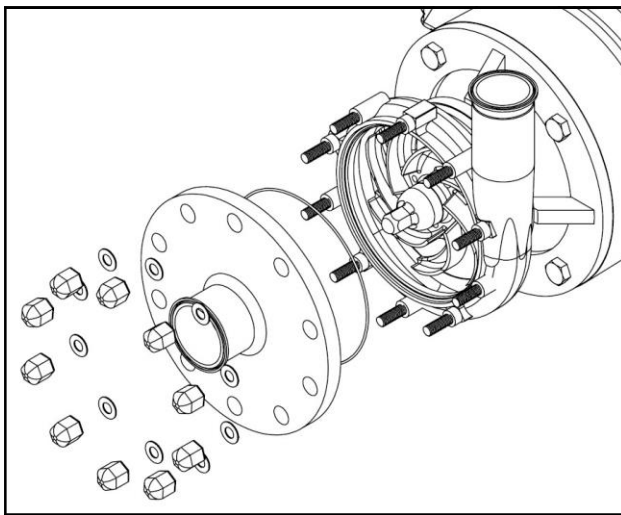


Figure 1

1. Disconnect electrical power to the pump motor and follow any lockout / tag-out procedures in place at your facility.

2. Disconnect the pump from the suction piping. Drain all fluids from the pump.

3. Loosen cover nuts with a 1" or 1¼" wrench. Remove cover nuts, flat washers (if provided), lock washers (if provided), cover, and cover gasket. See Figure 1.

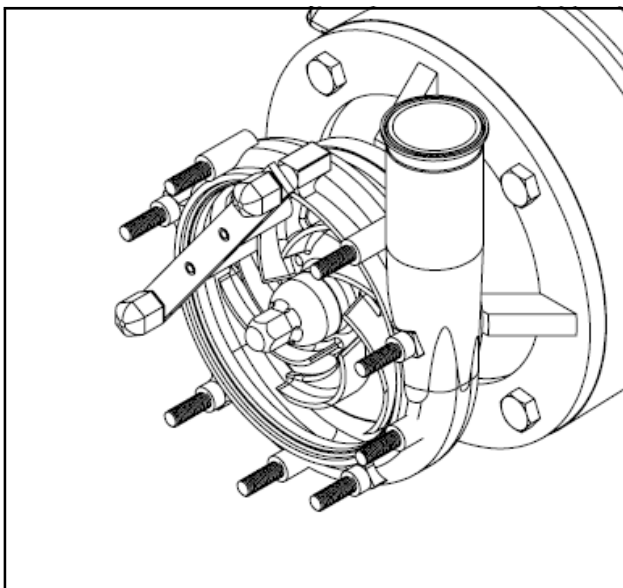


Figure 2

4. Place impeller stop tool over casing studs though the two holes in both ends of the tool, as shown in Figure 2. Rotate the impeller so a vein of the impeller is between the impeller stop tool's bronze pegs.

Use two (2) cover nuts to hold the stop tool in place to securely hold the impeller and shaft. See Figure 2.

Loosen the impeller screw turning a 15/16" wrench counterclockwise.

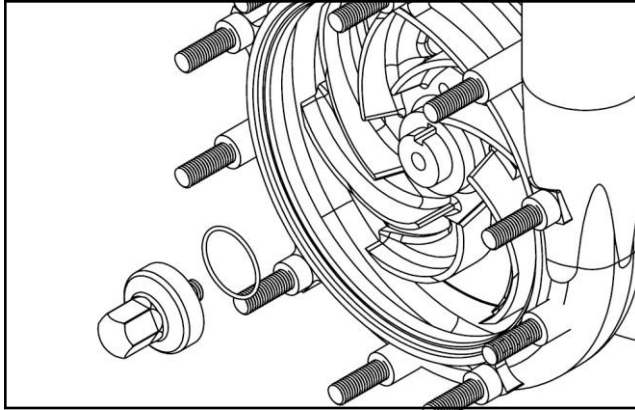


Figure 3

5. Once the impeller nut has been loosened, the impeller stop tool may be removed. Remove the impeller nut and the nut gasket. This process can be seen in Figure 3.

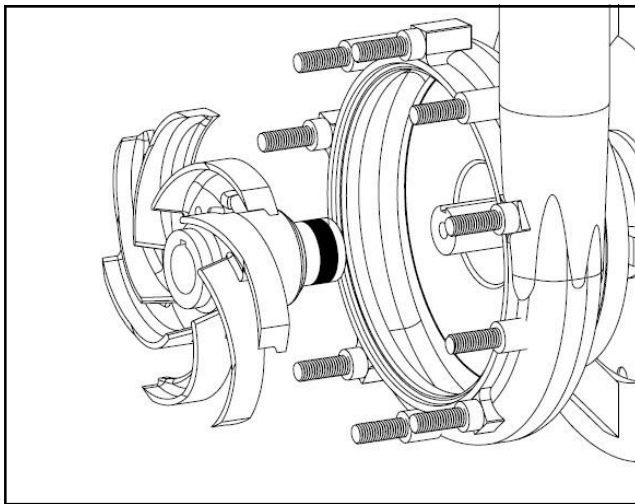


Figure 4

6. Remove the impeller. The seal driver and rotating parts of the seal will come off the motor shaft and adhere to the hub of the impeller. The key will fall into the bore of the impeller, Figure 4.

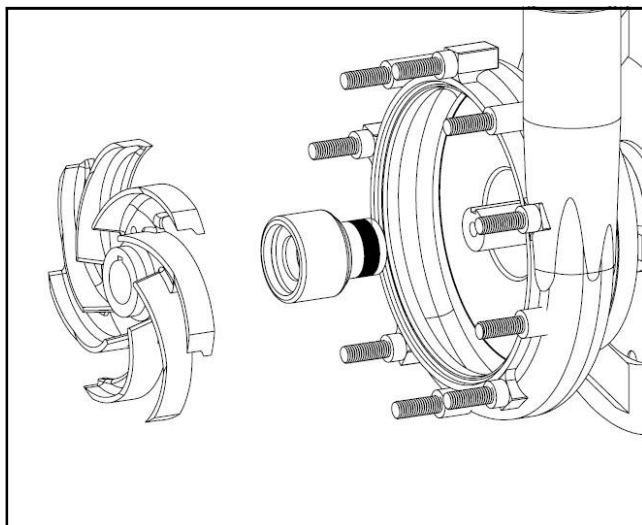


Figure 5

7. Pull the seal driver off of the back of the impeller, Figure 5.

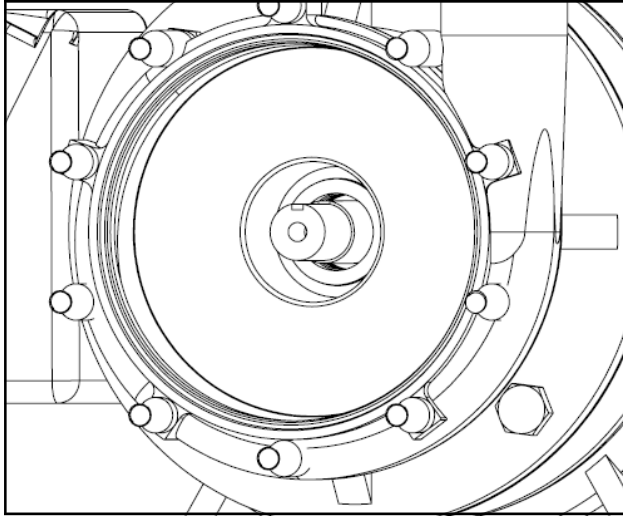


Figure 6

8. The stationary half of the seal may stick inside the casing. To remove this half of the seal use an o-ring pick.

Carefully pull on the back of the seal alternating sides to avoid cocking the seal in the casing, Figure 7.

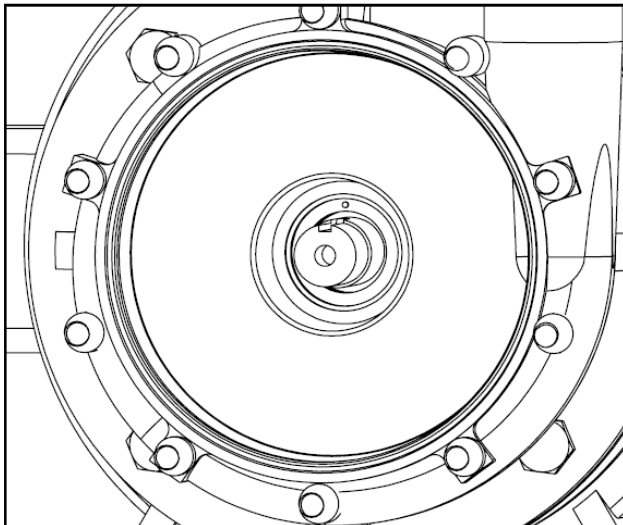


Figure 7

9. Check the condition of the casing and seal locating pin. Clean and remove any foreign matter before installing the seal.

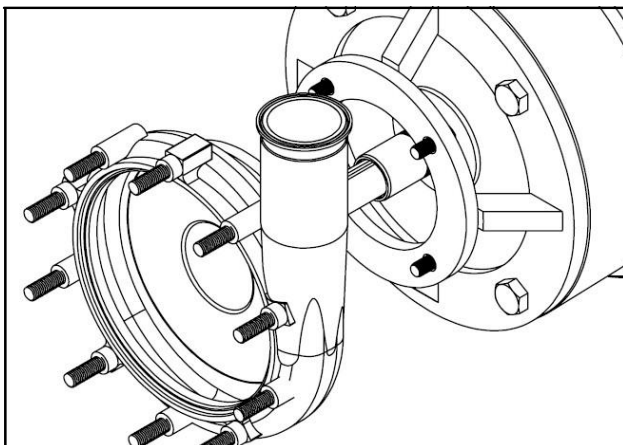
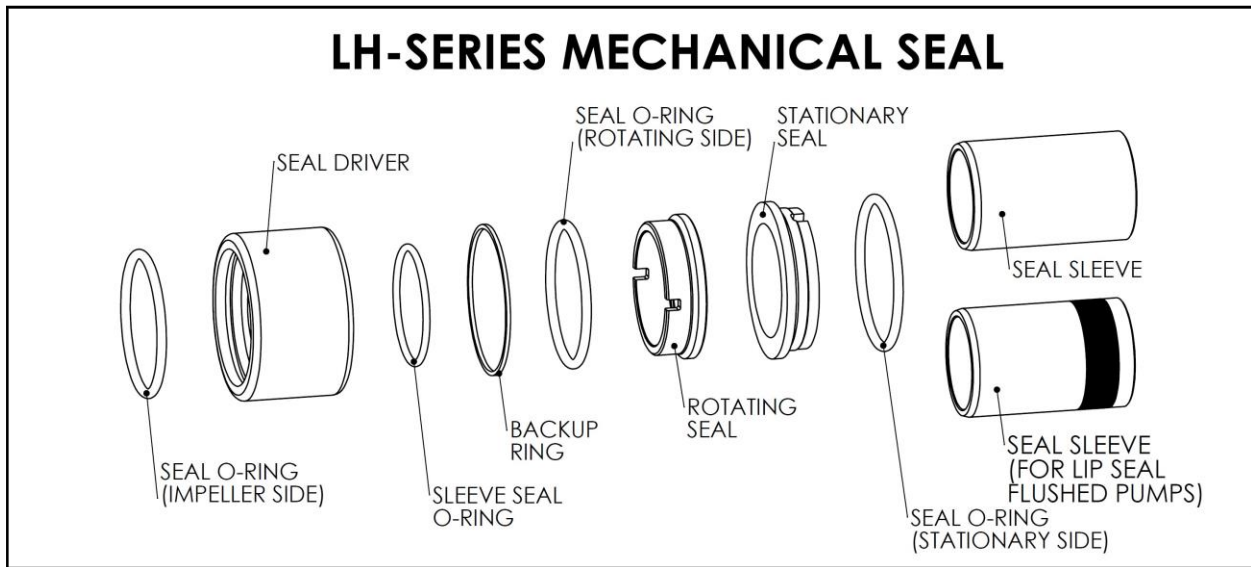


Figure 8

10. Remove the casing to access the lip seal gland and lip seal.

Pump Assembly and Seal



When replacing the seal assembly make sure that you use all of the components supplied with the replacement seal kit, Figure 8. Failure to do so may result in reduced seal life. Assembly instructions for the LH-Series pumps without lip seals start at step # 3.

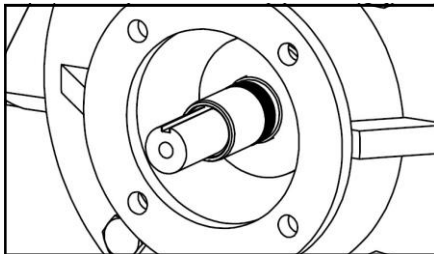


Figure 9

1. Slide the shaft sleeve onto the motor shaft with the coated end toward the motor, Figure 9.

Note: If the pump being assembled does not have a coated sleeve then the chamfered end will face away from the motor.

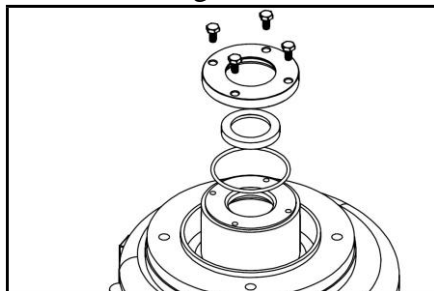


Figure 10

2. Install lip seal, gland, and the gland o-ring onto the casing if your LH pump has this option. See Figure 10. Note which way the lip(s) of the seal faces in Figure 11.

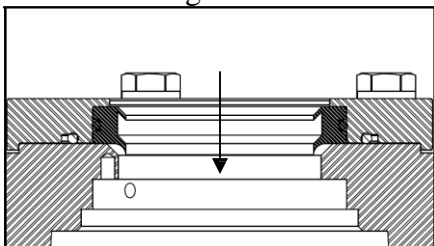


Figure 11

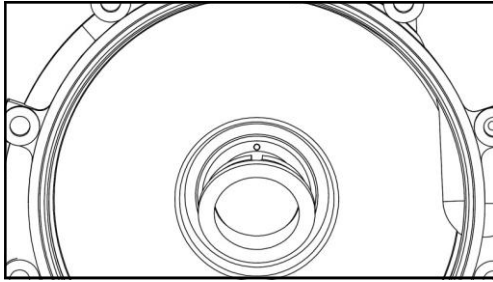


Figure 12

3. Install the stationary seal into the casing. Make sure the notch in the stationary seal fits over the seal pin in the bottom of the casing's seal bore, Figure 12.

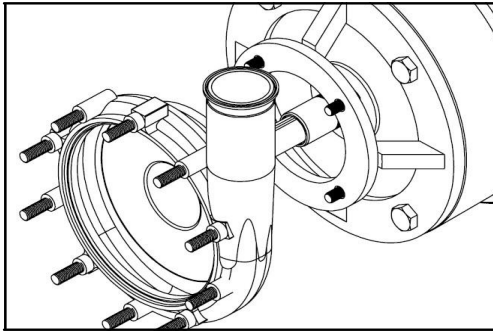


Figure 13

4. Slide the casing onto the motor shaft, taking care not to damage the lip seal if the pump is equipped with one, or knocking the stationary seal out of the casing bore.

Bolt the casing to the adapter, see Figure 13.

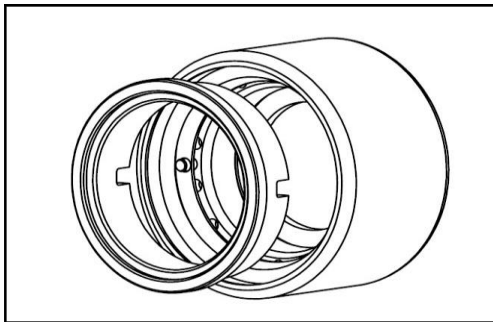


Figure 14

Note: Use a food grade lubricant that is compatible with the pump's elastomers (o-rings) to lubricate all o-rings. The seal driver should have the rotating seal o-ring (impeller side), sleeve seal o-ring, Teflon ring, and the rotating seal o-ring already assembled. It is important that the rotating seal o-ring is lubricated to ease assembly.

5. Slide the rotating seal into the seal driver making sure to align the pins inside the driver with the slots on the seal, Figure 14. Push the rotating seal halfway into the seal driver a few times watching the pins fit into the slots of the rotating seal while compressing the seal driver springs.

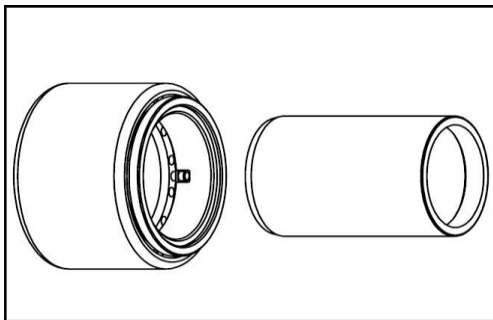


Figure 15

6. For pumps with lip seals, skip this step. Slide the chamfered end of the seal sleeve into the seal driver assembly as seen in Figure 15. The sleeve will stick in the seal driver due to the sleeve o-ring.

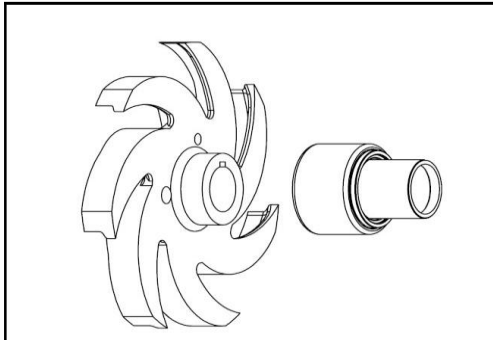


Figure 16

7. Insert the impeller hub into the seal driver, see Figure 16. The impeller will be gripped by the impeller side seal o-ring. For pumps with lip seals the shaft sleeve will already be on the motor shaft.

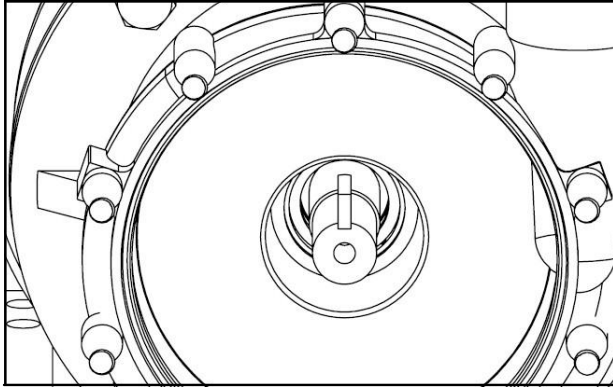


Figure 17

8. Rotate the motor shaft so the keyway is on top (at the 12:00 position and is in line with the seal pin, Figure 17).

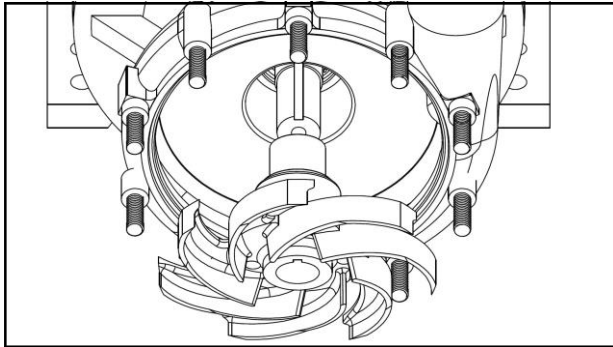


Figure 18

9. Carefully slide the seal assembly and impeller over the motor shaft and slide the assembly until the seal faces meet. You should notice the amount of spring play from the seal driver.

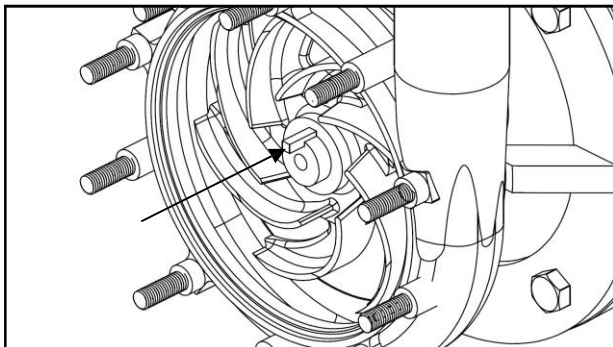


Figure 19

10. Once the seal and impeller are on, insert the key into the keyway of the motor shaft and impeller, Figure 19.

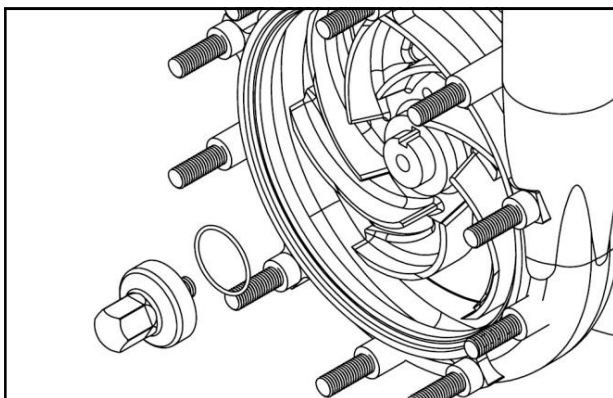


Figure 20

11. Lubricate the impeller screw gasket and place it on the impeller screw. Start to thread the impeller nut onto the motor shaft by hand, Figure 20.

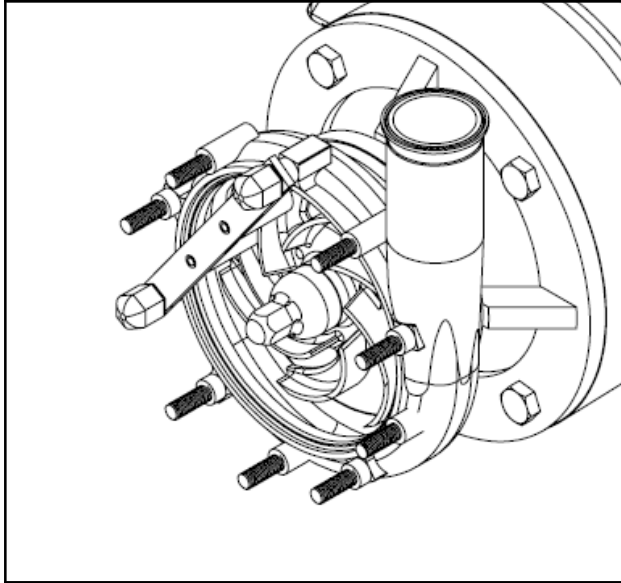


Figure 21

13. Put the impeller stop tool over two casing studs as shown to hold the impeller while tightening the impeller screw. Torque the 15/16" impeller screw to 40 ft-lbs, Figure 21.

14. Remove the impeller stop tool and rotate the impeller a few revolutions by hand to make sure that it moves freely.

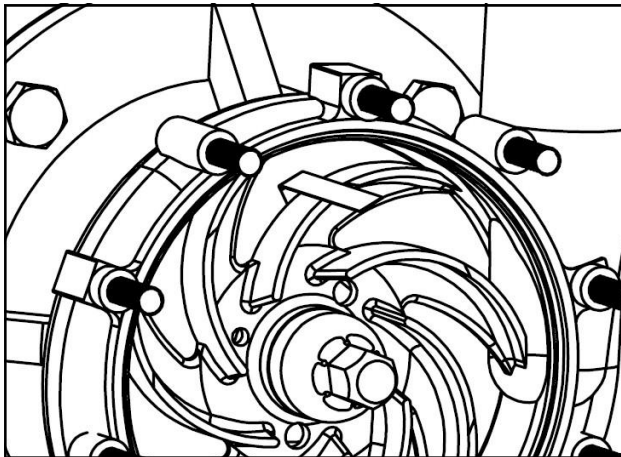


Figure 22

15. Check the impeller to casing clearance by sliding a feeler gauge between the impeller and the casing to ensure that the seal is properly set from the factory (feeler gauge thickness should be 0.04"), as seen in Figure 22.

16. Put the cover gasket on the cover. Install the cover onto the casing. Install the flat washers and cover nuts onto the pump. Tighten the cover nuts first by hand then torque the nuts to 90ft-lbs.

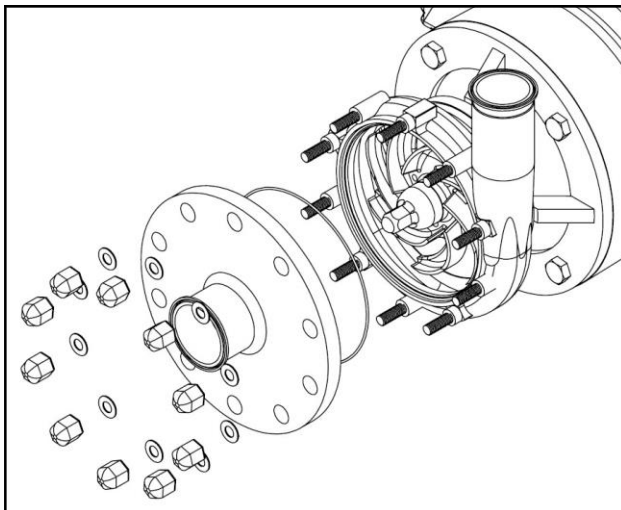


Figure 23

Again, turn the impeller by hand using a 15/16" socket and extension on the impeller nut. If the impeller and shaft turn relatively freely, reattach the suction and discharge piping and set the pump back up for operational use. If the impeller does not turn freely, the cause should be resolved before running the pump.

WARNING: Mechanical seal must never run dry. Seal damage will result.

Piping Connection

Suction and discharge piping must be properly supported and aligned with the pumps suction and discharge ports.

Avoid throttling valves in the suction line of the system.

Check valves must be at a minimum of 5 feet (1.5m) from the pump's discharge, Figure 24.

Keep the suction piping short and direct as possible. Avoid elbows in the suction line of the system. If this is unavoidable, locate the elbow as least 5 pipe diameters away from the pumps inlet and elbows should not have radii less than twice the diameter of pipe, Figure 24.

Make sure that the NPSH available is always greater than the system's NPSH required.

Avoid bending piping over piping as this will cause the formation of an air pocket in the suction line, Figure 25.

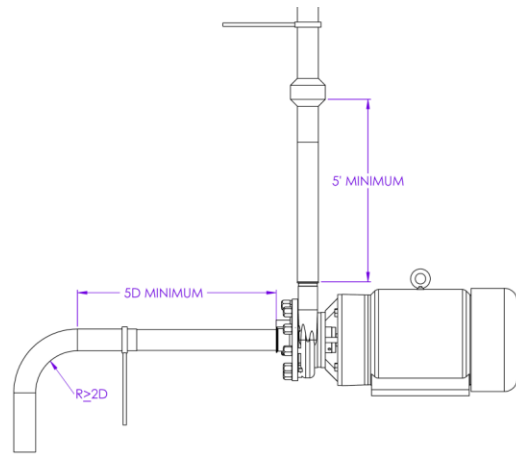


Figure 24

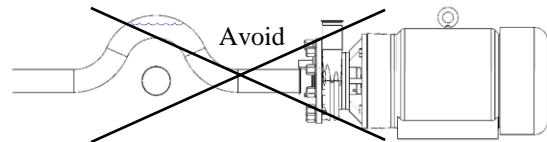


Figure 25

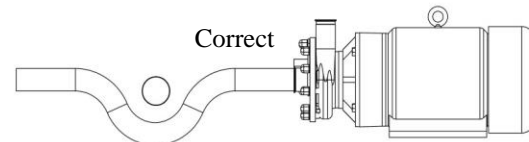


Figure 26

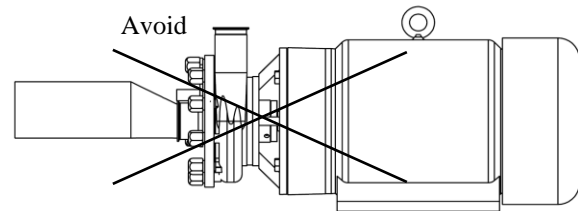


Figure 27

Route piping under any obstructions when possible, Figure 26.

When using a reducer on the suction end the reduced centerline should not be below the suction centerline as in Figure 27. The centerline of the small diameter end of the reducer should be above the centerline of the suction line as in Figure 28.

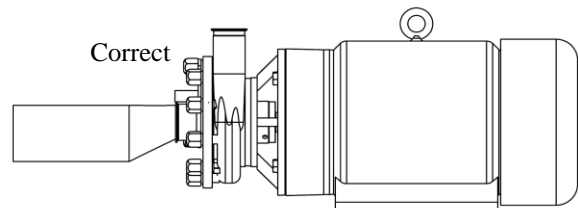


Figure 28

Injection line angles should be 45° or less, Figure 29.

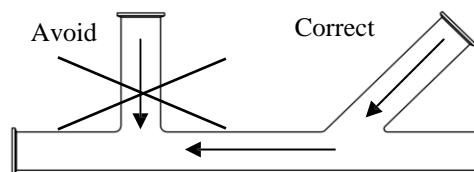


Figure 29

Troubleshooting

It is to the user's advantage to be familiar with a systematic procedure to determine reasons and causes for unsatisfactory pump operation. The following list of troubles and causes is intended to assist users in determining the cause of any pumping trouble. Faulty installations can then be corrected and clear description given the manufacturer if assistance is required. Human judgment should not be relied on to measure operating conditions. Use proper instruments to measure values of pressure, suction lift, speeds, temperature rise of motors, etc. When motor speeds are incorrect, check connections and measure voltage at motor terminals.

1. No Liquid Delivered
 - Pump and suction line not completely primed
 - Speed too low
 - Required discharge too high
 - Impeller, piping, or fittings completely plugged up
 - Wrong direction of rotation

2. Insufficient Capacity
 - Air leaks in suction pipe for shaft seal
 - Speed too low
 - Required discharge head too high
 - Suction lift too high or insufficient NPSH available
 - Impeller, piping, or fittings partially plugged
 - Insufficient positive suction head for how water or other volatile liquids
 - Liquid viscosity too high
 - Mechanical problems-impeller damaged, shaft seal defective
 - Wrong direction of rotation suction pipe entrance too close to surface of liquid
 - Air pockets in pipe high points

3. Insufficient Pressure
 - Speed too low
 - Mechanical problems- impeller damaged, shaft seal defective
 - Small impeller diameter
 - Air or gas in liquid
 - Wrong direction of rotation air pockets in pipe high points

4. Pump operates for a while, then quits
 - Leaky suction line
 - Air leaking in through shaft seal
 - Suction lift too high or insufficient NPSH available
 - Air or gas in liquid
 - Suction piping and fitting not completely freed of air during priming
 - Air pockets in pipe high points

5. Pump takes too much power
 - Speed too high
 - Pumping too much liquid because required head is lower than anticipated.
 - Viscosity and /or specific gravity is higher than specified
 - Mechanical problems (binding inside seal from distortion due to piping strains, shaft bent, impeller rubbing casing)
 - Wrong direction of rotation

AMPCO PUMPS
Made of SELECTED corrosion-resistant alloys

TERMS AND CONDITIONS OF SALE

1. **ENTIRE AGREEMENT.** This document contains all of the terms and conditions of the agreement (“the agreement”) between Ampco Pumps Company, Inc. (“Seller”) and the purchaser (“Purchaser”) of the Products (“Products”) to be sold to Purchaser, to the exclusion of any other statements and agreements, and to the exclusion of any terms and conditions incorporated in Purchaser’s order or other documents of Purchaser. Seller’s acceptance of Purchaser’s order is expressly conditioned on Purchaser’s acceptance of the terms and conditions contained herein, and Purchaser, upon placing an order, is presumed to have accepted all the terms and conditions without modification. No alteration, waiver, modification of or addition to the terms and conditions herein shall be binding on Seller unless set forth in writing and specifically agreed to by an officer of Seller. No course of dealing, usage of trade or course of performance will be relevant to supplement or explain any terms used in the agreement. All offers to purchase, quotations and contracts of sale are subject to final acceptance by Seller at its home office at Milwaukee, Wisconsin.
2. **PRICES.** Prices for Products manufactured by Seller pursuant to written accepted orders will remain firm for thirty (30) days from the date of any subsequent price change.
3. **TERMS OF PAYMENT.** Standard terms are ½% 10 days, 30 days net, from date of invoice unless otherwise stated. If, in the judgment of Seller, the financial condition of Purchaser at any time does not justify continuance of production or shipment on the terms of payment specified, Seller may require full or partial payment in advance. In cases of delays in payment, Seller reserves the right to charge interest on delinquent balances at the rate of 1 ½% per month.
4. **DELIVERY.** Except as otherwise provided expressly stated in the agreement, Products are sold F.O.B. Milwaukee. Seller will use reasonable commercial efforts to fill orders within the time stated, but the stated delivery date is approximate only, and Seller reserves the right to readjust shipment schedules without liability. Acceptance by Purchaser of the Products waives any claim for loss or damage resulting from a delay, regardless of the cause of the delay. Except as otherwise provided herein, Seller will not be responsible for freight, transportation, insurance, shipping, storage, handling, demurrage or similar charges. Claims by Purchaser for shortages in the Products must be made to Seller in writing within ten (10) days after date of receipt of the Products. No such shortage shall entitle Purchaser to withhold payment for Products which were received by Purchaser. Each such claim shall set forth in detail the basis and amount of such claim.
5. **TAXES AND FEES.** Seller shall pay all present and future sales, excise, privilege, use or other taxes, customs duties, and all other fees or other costs, imposed by any federal, state, foreign, or local authorities arising from the sale, purchase, transportation, delivery, storage, use or consumption of the Products or will, if applicable, provide Seller with an appropriate exemption certificate. Seller shall be under no obligation to contest the validity of any such taxes or to prosecute any claims for refunds or returns.
6. **INSTALLATION.** The Products shall be installed by and at the expense of Purchaser.
7. **LOSS, DAMAGE OR DELAY.** Seller will not be liable for loss, damage or delay resulting from causes beyond its reasonable control, including, without limitation, strikes or labor difficulties, lockouts, acts or omissions of any governmental authority or Seller, insurrection or riot, war, fires, floods, Acts of God, breakdown of essential machinery, accidents, embargoes, cargo or material shortages, delays in transportation, lack of production capacity or inability to obtain labor, materials or parts from usual sources. In the event of any such delay, performance will be postponed by such length of time as may be reasonably necessary to compensate for the delay. In the event performance by Seller under the agreement cannot be accomplished by Seller due to any of the foregoing causes within a reasonable period of time, Seller may, at its option, terminate the agreement without liability.
8. **RETURNS.** No Products or parts may be returned by Purchaser without the prior written consent of Seller.
9. **WARRANTY.** Seller warrants that the Products manufactured by Seller will be free from defects, material and workmanship under normal use and service for a period of one (1) year from date of shipment. In addition, the specified rating of each pump is warranted; however, the characteristic shape of the performance curves may vary from the published standards, and the capacity, head and efficiency guarantees are based on actual shop tests using clear cold water, and therefore the rating is specified in equivalent units of clear cold water. The sole obligation of Seller and the exclusive remedy of Purchaser for breach of this warranty shall be the repair (at Seller’s facility) or replacement by Seller (F.O.B. Milwaukee, Wisconsin), at Seller’s option, of any parts found to be defective, without charge and shall be conditioned upon Seller receiving written notice of any alleged breach of this warranty within a reasonable time after discovery of the defects, but in no event later than the end of the warranty period. The parts alleged to be defective shall be returned to Seller upon its request, freight prepaid. This warranty does not cover ordinary wear and tear, abuse, misuse, overloading, alteration or Products or parts which have not been installed, operated or maintained in accordance with Seller’s written instructions. Seller shall not be liable for any expenses for repairs, additions or modifications to the Products outside of Seller’s factory without its prior written consent, and any such repairs without such consent shall void this warranty. **THIS WARRANTY IS EXCLUSIVE AND IS IN LIEU OF ALL OTHER EXPRESS AND IMPLIED WARRANTIES WHATSOEVER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.** Seller may from time to time provide its facilities, personnel and experience to assist customers in the selection of materials, design, installation and operation of Products for maximum resistance to corrosion and abrasion with due consideration to the economy of the installation. This service is provided in an advisory capacity only and the final selection and operation of the Products and ancillary equipment shall be the sole responsibility of Purchaser or any user thereof. Accessories and parts manufactured by third parties are warranted only to the extent of such third party’s warranty. **IN NO EVENT SHALL SELLER BE LIABLE UNDER ANY CIRCUMSTANCES FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, ANY LOST PROFITS OR LABOR COSTS) ARISING FROM THE BREACH OF THIS WARRANTY OR OTHERWISE ARISING FROM OR RELATING TO THE PRODUCTS OR THEIR SALE, USE OR INSTALLATION.**
10. **CHANGES.** Changes in any work to be performed hereunder may be made only upon Purchaser’s written instructions and acceptance by Seller in its discretion. Any change in drawings, materials or design of the Products, or to tools, fixtures or other items used to produce the Products, which affects Seller’s cost to produce the Products will entitle Seller to adjust the price to take into account any additional costs. If work has been started, Seller shall be properly reimbursed for work already performed; if Products already produced are not accepted by Purchaser, Seller has the right to adjust the price to take into account any additional costs caused by an increase or decrease in quantities or in the time required for performance under the agreement.
11. **TERMINATION.** After Seller has commenced work, ordered any materials or made any other commitments pursuant to the agreement, it may be terminated only with the prior written agreement of Seller providing for equitable cancellation charges. Such charges shall reimburse Seller for any completed items at the contract price, and for any work-in-process items at the contract price less the cost to complete. Termination on any other basis must be specifically agreed on in writing in advance between Purchaser and Seller.
12. **DEFERRED DELIVERIES.** Orders or deliveries will be deferred only upon the prior written agreement of Seller in its discretion, and then only upon the following conditions:

(a) The deferral period may not exceed sixty (60) days. At the end of the deferral period, if no release is provided by Purchaser, Seller reserves the right to render an invoice for and ship the completed portion of the order to the destination specified in Purchaser's order, or to store such material at Purchaser's expense at Seller's standard storage charges then in effect.

(b) For the portion of the order that is not completed, if no release is provided by Purchaser at the expiration of the deferral period, Seller reserves the right to render an invoice for any completed items at the contract price, and for any work-in-process items at the contract price less the cost to complete.

(c) Purchaser shall bear the risk of loss or damage to materials held at Purchaser's request.

13. LIMITATION OF LIABILITY. IN NO EVENT SHALL SELLER BE LIABLE UNDER ANY CIRCUMSTANCES: (a) FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES (INCLUDING, WITHOUT LIMITATION, ANY LOST PROFITS OR LABOR COSTS) ARISING FROM OR RELATING TO THE PRODUCTS OR THEIR SALE, USE OR INSTALLATION; (b) FOR DAMAGES TO PROPERTY (OTHER THAN THE PRODUCTS PURCHASED FROM SELLER); (c) FROM ANY BREACH OF ITS WARRANTY OR ANY OTHER OBLIGATIONS TO BUYER; OR (d) FOR ANY OTHER CAUSE WHATSOEVER, WHETHER BASED ON WARRANTY (EXPRESSED OR IMPLIED) OR OTHERWISE BASED ON CONTRACT, OR ON TORT OR OTHER THEORY OF LIABILITY, AND REGARDLESS OF ANY ADVICE OR REPRESENTATIONS (WHETHER OR NOT IN WRITING) THAT MAY HAVE BEEN RENDERED BY SELLER CONCERNING THE DESIGN, MANUFACTURE, SALE, USE OR INSTALLATION OF THE PRODUCTS.

14. INFRINGEMENT. Seller at its expense will defend and hold Purchaser harmless from and against all damages, costs and expenses arising from any valid claim of infringement by a third party with respect to any patent or other intellectual property rights (collectively, the "Intellectual Property Rights") caused by Products originally manufactured by Seller, provided Purchaser (a) has not modified such Products, (b) gives Seller immediate notice in writing of any claim or commencement or threat of suit, and (c) permits Seller to defend or settle the same, and gives all immediate information, assistance and authority to enable Seller to do so. In the event any such originally manufactured Products are held to infringe an Intellectual Property Right and if Purchaser's use thereof is enjoined, Seller will, at its expense and option: (1) obtain for Purchaser the right to continue using the Products, (2) supply non-infringing Products, (3) modify the Products so that they become non-infringing, or (4) refund the then market value of such Products. In no event shall Seller's liability exceed the sale price of the infringing Products. THE FOREGOING REPRESENTS SELLER'S ENTIRE AND EXCLUSIVE OBLIGATION WITH RESPECT TO ANY CHARGE OF INFRINGEMENT OF ANY INTELLECTUAL PROPERTY RIGHT AND IS IN LIEU OF ANY STATUTORY WARRANTY RELATING TO INFRINGEMENT. Notwithstanding the foregoing, Seller shall have no liability as to any Products or parts thereof that are manufactured or modified by Purchaser or a third party, or that are manufactured or modified by Seller in accordance with Purchaser's specifications. Purchaser will defend and hold Seller harmless from and against all damages costs and expenses whatsoever arising from any claim for infringement of any Intellectual Property Rights relating to Products that have been manufactured or modified by Seller according to specifications provided by Purchaser.

15. CERTAIN LAWS. Seller will comply with the applicable requirements of the Fair Labor Standards Act of 1938, as amended, Executive Order 11246, and THE rules, regulations and orders of the Secretary of Labor relating thereto.

16. PERIOD FOR ACCEPTING QUOTATIONS. Unless accepted without modification within thirty (30) days of issuance, or prior to withdrawal by Seller if earlier, all quotations automatically expire at the end of such thirty (30) day period.

17. PROVISIONS FOR INTERNATIONAL TRANSACTIONS. The following provisions shall apply if the Products are to be shipped to Purchaser at a location outside the United States, and apply regardless of other provisions set forth in these Terms and Conditions:

(a) The 1980 United Nations Convention on Contracts for the International Sale of Products shall not apply.

(b) Except as otherwise provided expressly stated in the agreement, terms of delivery are Ex-Works (within the meaning of INCOTERMS 2000) and all customs fees, import duties, cargo insurance, taxes and other charges imposed on or relating to the purchase or sale of the Products shall be paid by Purchaser in addition to the stated price.

(c) Except as otherwise provided expressly stated elsewhere in the agreement, payment shall be made by issuance to Seller of an irrevocable letter of credit which (i) is issued and confirmed by a U.S. bank acceptable to Seller, (ii) is governed by the Uniform Customs and Practice for Documentary Credits (UCP 600) and otherwise acceptable in form and substance to Seller, and (iii) provides for payment to Seller of the purchase price in U.S. dollars upon presentation by Seller of Seller's certification and/or such other documents as shall be required by the letter of credit. All banking and other charges for such letter of credit shall be for the account of Purchaser.

(d) Prices include Seller's standard commercial export packaging which may vary depending on whether shipment is made by air, land or sea. Except as otherwise provided expressly stated in the agreement, Purchaser will bear any additional expenses required to satisfy Purchaser's packaging requirements. Packages will be marked in accordance with Purchaser's instructions, if any. Seller shall furnish packing lists and such other information as may be necessary to enable Purchaser's agent to prepare documents required for export shipment.

(e) All shipments hereunder are subject to compliance with the U.S. Export Administration Act, as amended, regulations thereunder and all other U.S. laws and regulations concerning exports. Purchaser shall comply with all such laws and regulations concerning the use, disposition, re-export and sale of the Products provided hereunder.

18. GENERAL. No modification or waiver of the agreement or any of its provisions is valid unless expressly agreed to by Seller in writing, and no waiver by Seller of any default under the agreement is a waiver of any other or subsequent default. The unenforceability or invalidity of one or more of the provisions of the agreement will not affect the enforceability or validity of any other provision of the agreement. Purchaser may not assign any of its rights, duties or obligations under the agreement without Seller's prior written consent and any attempted assignment without such consent, even if by operation of law, will be void. The agreement is governed by and shall be construed in accordance with the laws of the State of Wisconsin, including the Uniform Commercial Code as enacted by such state, without giving effect to its conflict of laws principles.

Ampco Pumps Company Return Policy

This policy is intended for returns that are not covered by product warranty, i.e. wrong pump or part was ordered, customer canceled order, etc. Before returning any product, contact us for a Returned Material Authorization Number (RMA#). This will eliminate confusion when the parts are received and facilitate processing the return. No action will be taken on returned parts without an RMA.

<u>Type of Return</u>	<u>Restocking Charge</u>
Standard pump with a replacement order	10%
Standard pump without a replacement order	20%
Standard parts with a replacement order	5%
Standard parts without a replacement order	10%

Additional restocking charges may be assessed for any of the following circumstances.

1. Special order motors and seals are not returnable unless we have a use for them. Credit will be determined on a case-by-case basis.
2. Impellers that are trimmed to a diameter that we don't regularly use are not returnable. Credit will be determined on a case-by-case basis.
3. Used seals and motors are not returnable.
4. For any pumps and/or parts purchased over (1) year ago, credit will be determined on a case-by-case basis.

Credits

Credit will be issued only after parts are returned and inspected. Customer is responsible for packaging parts so they are returned in "as new" condition. Any labor required by Ampco to return the parts to "as new" condition will be deducted from the credit.



Ampco Pumps Company
2045 W. Mill Road
Glendale, WI 53209
Phone: (800) 737-8671 or (414) 643-1852
Fax: (414) 643-4452
Email: ampcoocs@ampcopumps.com