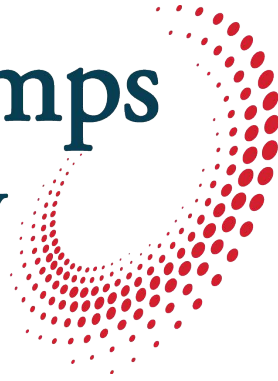


Ampco Pumps
Company



SB / SBH / SBI Series

Instruction and Maintenance Manual

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TECHNICAL DATA

SPECIFICATIONS

MAXIMUM INLET PRESSURE.....	150 PSIG /10.3 BAR
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
Seal Driver.....	AISI 316L STAINLESS STEEL
Adapter.....	AISI 304 STAINLESS STEEL
O-RINGS & GASKETS.....	VITON (standard)
Optional Materials.....	EPDM, BUNA (others per request)
PRODUCT CONTACT SURFACE FINISH.....	32Ra (standard)

SEAL

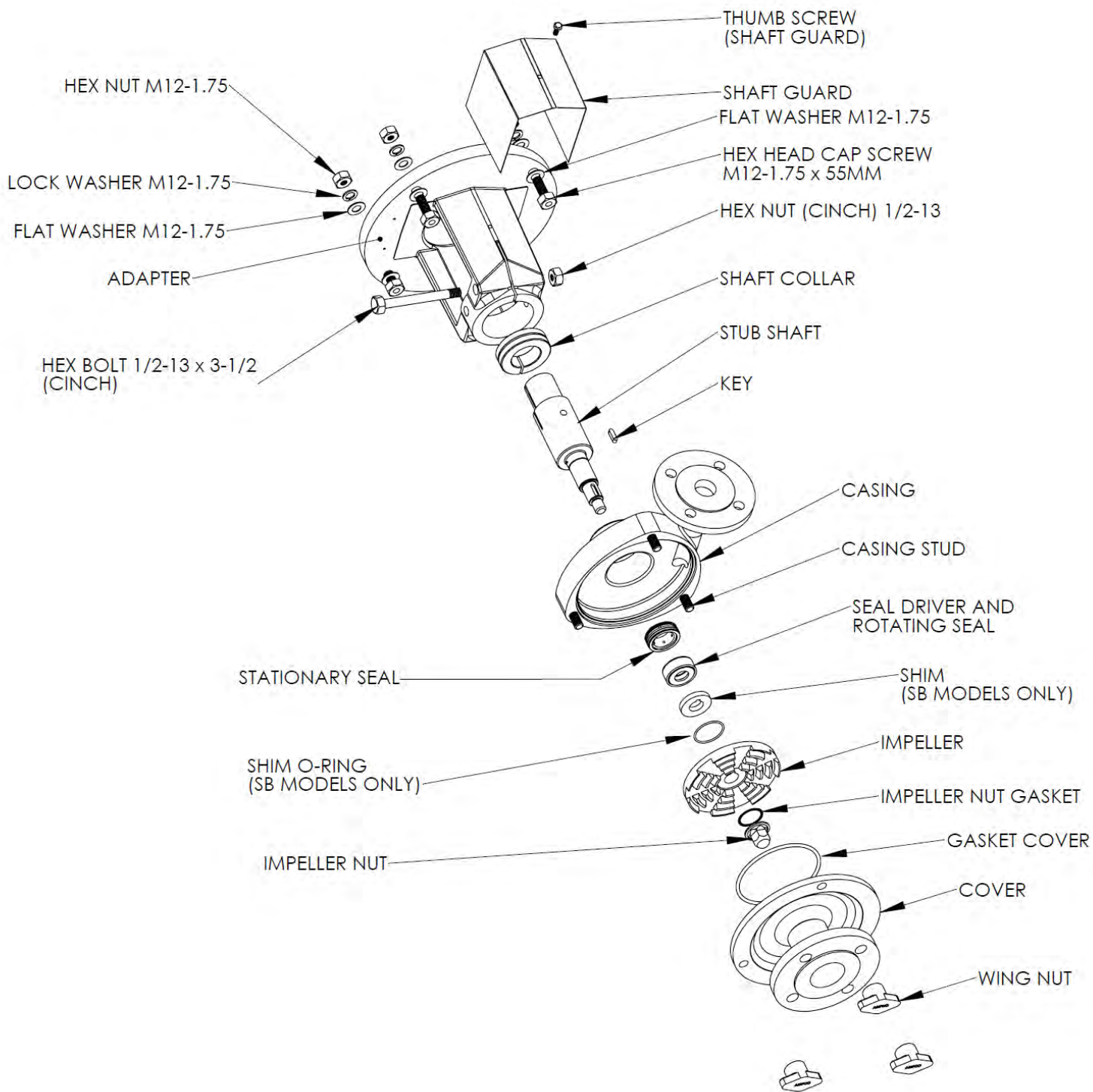
Type.....	INTERNAL SINGLE MECHANICAL
Stationary Seal Material.....	SILICON CARBIDE
Rotating Seal Material.....	SILICON CARBIDE

RECOMMENDED TORQUE VALUES

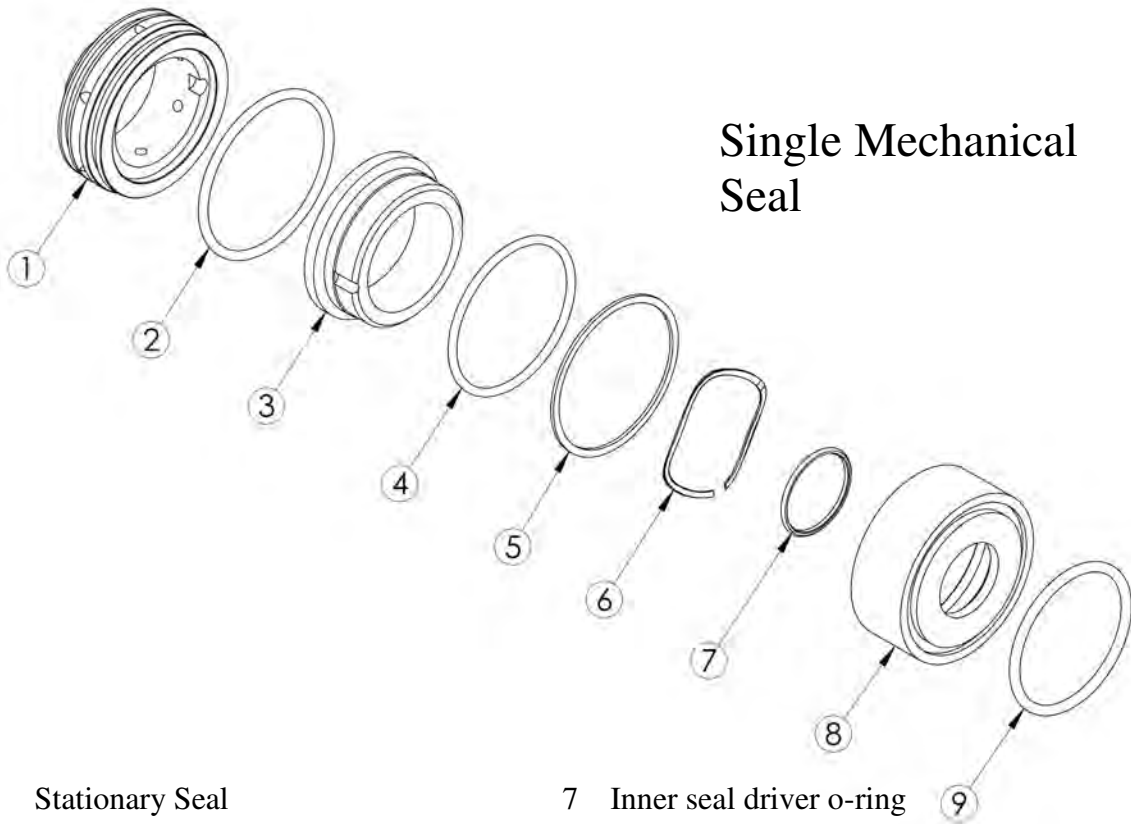
Impeller nut.....	40ft-lbs.
Adapter Clamping bolt.....	55ft-lbs / 75N-m
Adapter Cap Screws	
NEMA 56C-140TC/ IEC 80-112.....	20ft-lbs / 27N-m
NEMA 180TC-280TC/ IEC 132-200.....	50ft-lbs / 68N-m
NEMA 320TC-360TC.....	110ft-lbs / 149N-m
Shaft Collar Socket Head Cap Screws	
NEMA 56C-140TC/ IEC 80-112.....	6ft-lbs / 8N-m
NEMA 180TC-280TC/ IEC 132-200.....	15ft-lbs / 20.5N-m
NEMA 320TC-360TC.....	40ft-lbs / 54N-m
Socket Head Cap Screw Size For Shaft Collar	
NEMA 56C-180TC.....	3/16" Hex socket
NEMA 210TC-280TC.....	1/4" Hex socket
NEMA 320TC-360TC.....	5/16" Hex socket
IEC 80-200.....	6mm Hex socket
IEC 225.....	8mm Hex socket

IMPELLER CLEARANCE

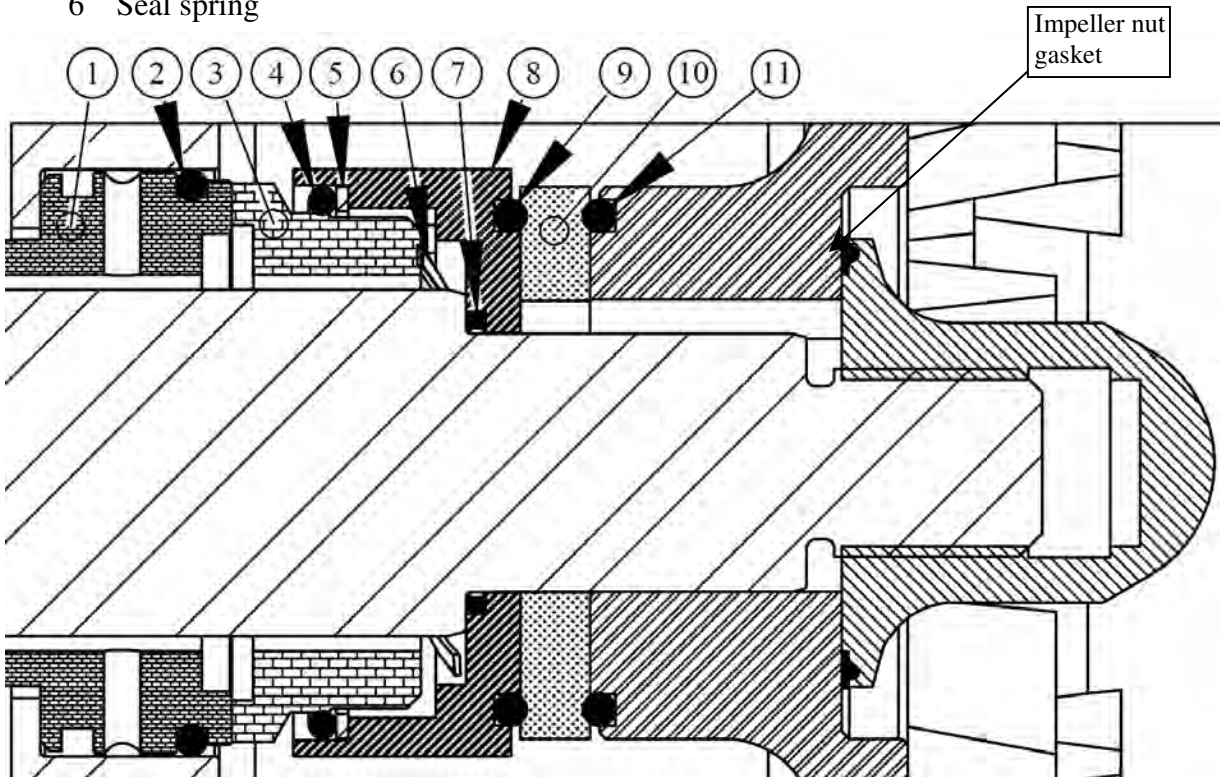
SB, SBI, and SBH Pumps.....0.04" / 1.0mm



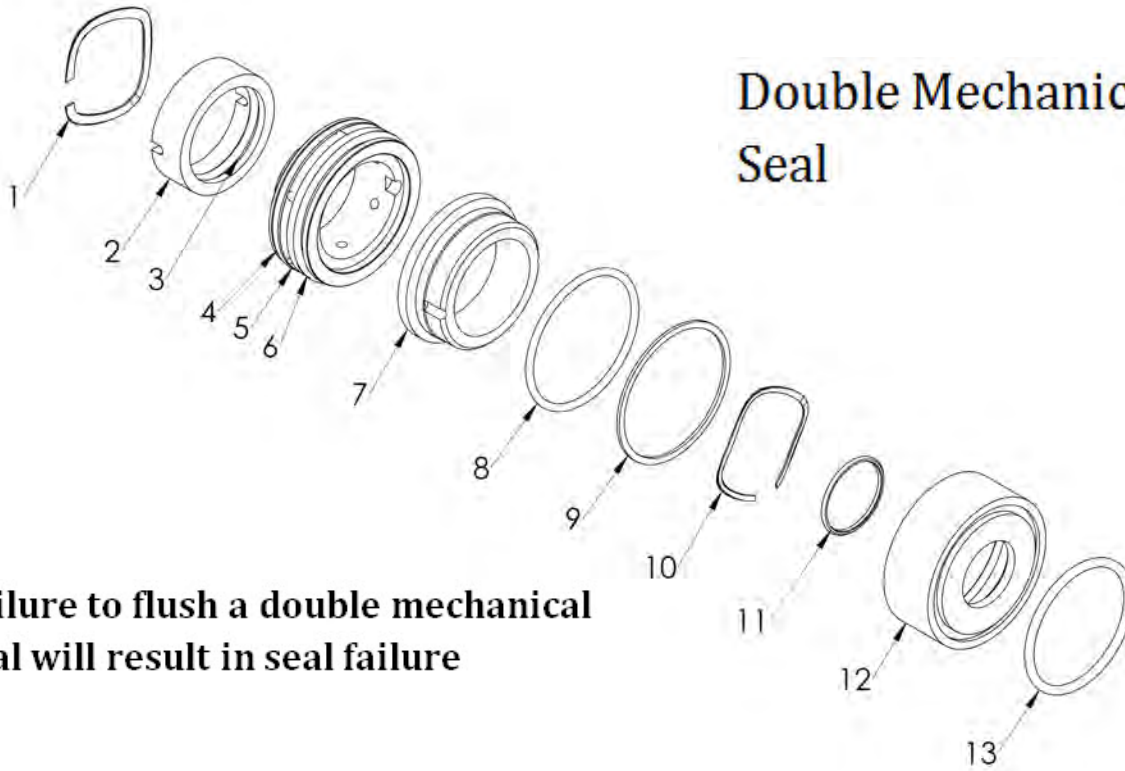
Single Mechanical Seal



- | | |
|-------------------------------|---------------------------------------|
| 1 Stationary Seal | 7 Inner seal driver o-ring |
| 2 Stationary seal o-ring | 8 Seal driver |
| 3 Single rotating seal | 9 Outer seal driver o-ring |
| 4 Single rotating seal o-ring | 10 Shim (SB Blenders only) |
| 5 Backup ring | 11 Impeller o-ring (SB Blenders only) |
| 6 Seal spring | |

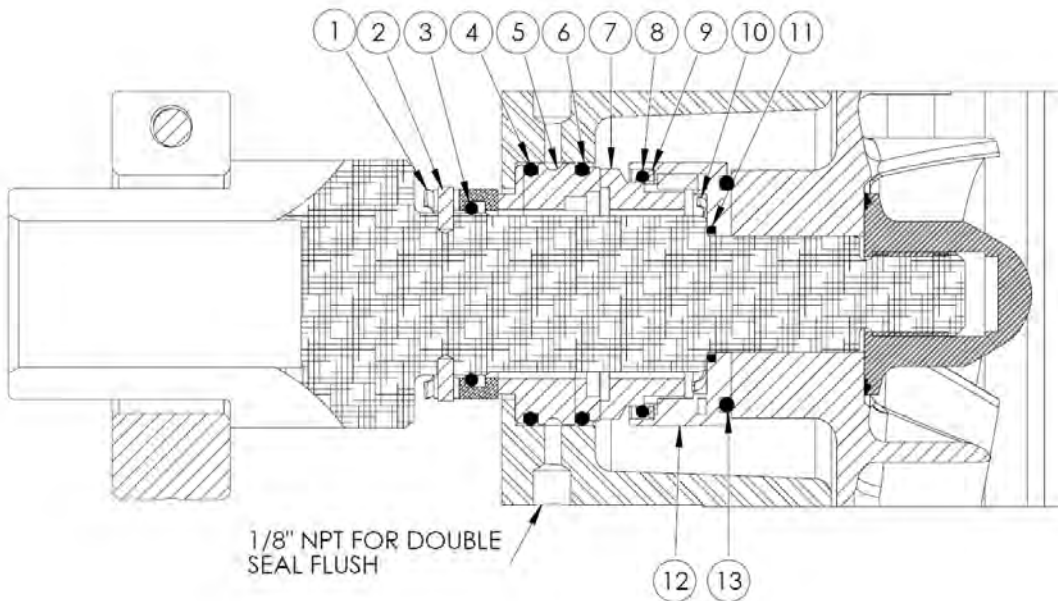


Double Mechanical Seal



Failure to flush a double mechanical seal will result in seal failure

- | | |
|----------------------------|-------------------------------|
| 1 Rotating double spring | 8 Single rotating seal o-ring |
| 2 Rotating double seal | 9 Backup ring |
| 3 Rotating double o-ring | 10 Seal spring |
| 4 Stationary double o-ring | 11 Inner seal driver o-ring |
| 5 Stationary seal | 12 Seal driver |
| 6 Stationary seal o-ring | 13 Outer seal driver o-ring |
| 7 Single rotating seal | |



SERVICE MAINTENANCE AND SCHEDULING (continued)

CONTINGENCY PLAN

FOR INSPECTION FINDINGS AND BREAKDOWNS, AN ADEQUATE SUPPLY OF PROBABLE REPLACEMENT PARTS SHOULD BE KEPT ON HAND.

THE MINIMUM SPARE PARTS ARE AS FOLLOWS:

1. Single mechanical seal kit
2. Cover gasket
3. Impeller key

IN ADDITION AMPCO RECOMMENDS

4. Impeller
5. Cover
6. Impeller nut

Where service cannot be interrupted, a complete stand-by pump unit fully assembled (in a by-pass line) is recommended.

SB & SBH PUMP INSTALLATION

Receiving pumps:

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 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.

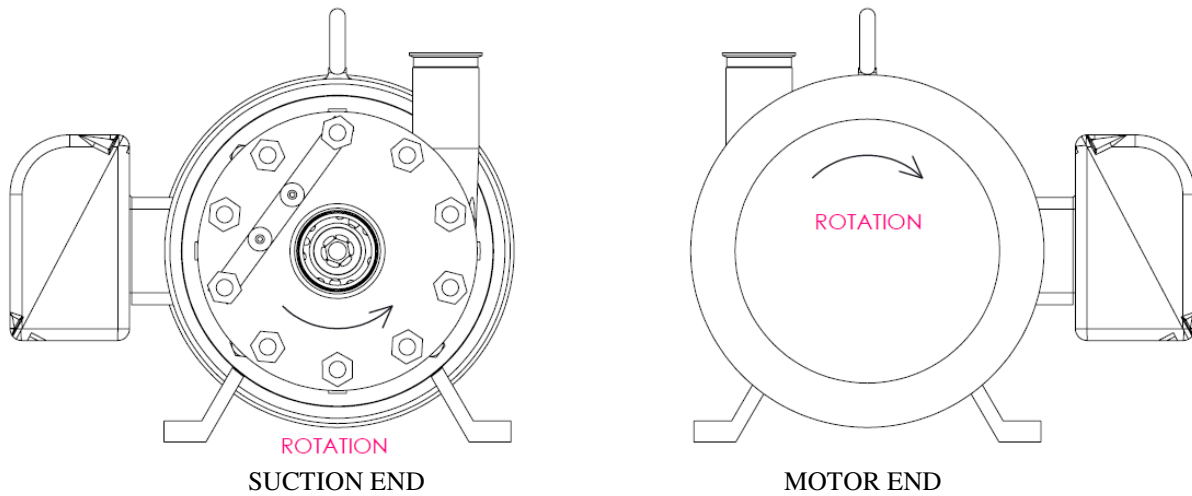
Electrical installation:

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, 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.

Pump operation:

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

Once the motor, flush and piping all have been properly connected, the flush is turned on and is visibly flowing (if the pump has a flush option) and 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 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 DISMANTLING, SEAL REMOVAL & CHANGING SHIMS

ATTENTION! BEFORE ATTEMPTING ANY SERVICE ON ANY PUMP OR MOTOR, DISCONNECT OR 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.

TOOLS REQUIRED TO DISASSEMBLE AND REMOVE SEAL

7/16" wrench

15/16" socket wrench

90 degree o-ring pick

Torque wrench

3/8" round bar

Dead blow hammer

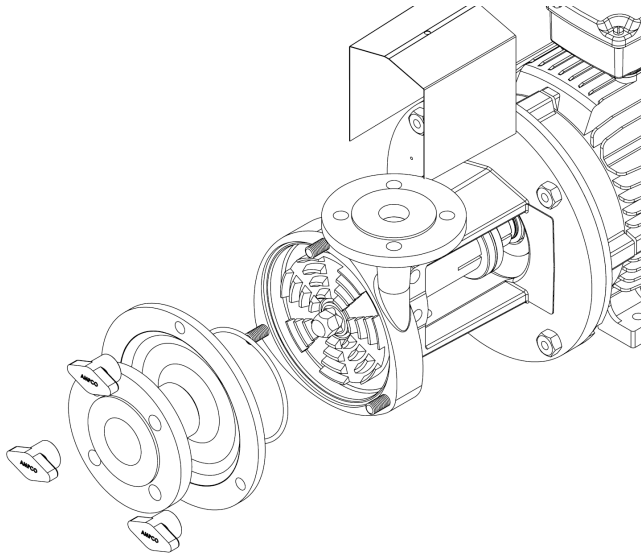


Figure 1

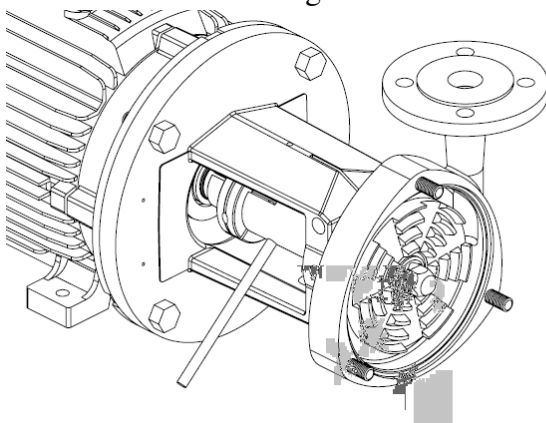


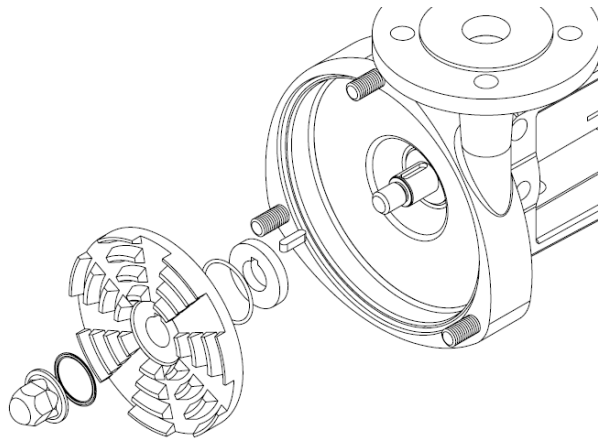
Figure 2

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

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

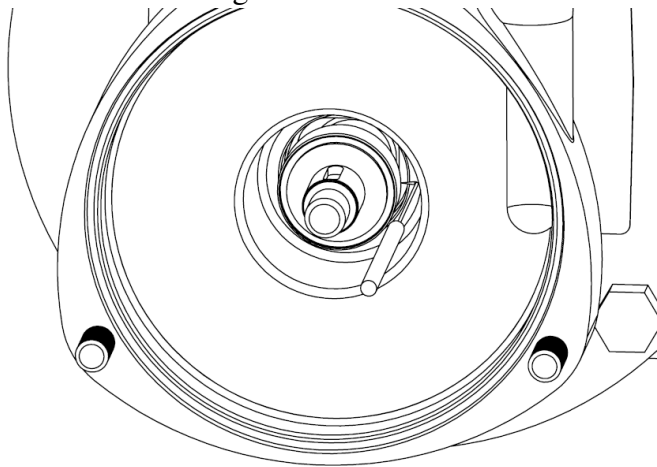
3. Loosen cover nuts with a 1-1/4" wrench. Remove cover wing nuts, flat washers (if provided), lock washers (if provided), cover, cover gasket and shaft guard. See figure 1.

4. Insert a 3/8" bar in the hole in the stub shaft. See figure 2. Loosen the impeller nut. Turn the impeller nut with a 15/16" wrench counterclockwise.



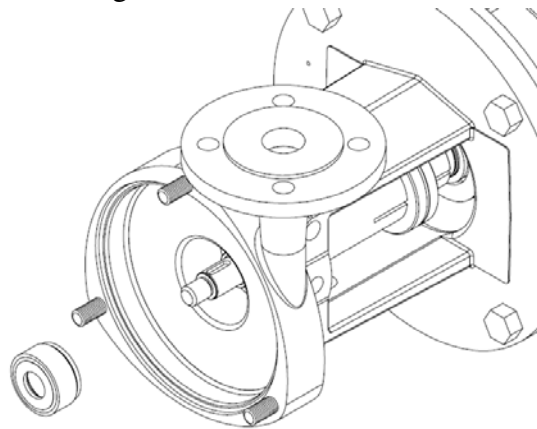
5. Remove the impeller nut, the nut gasket, impeller, shim and then the key. This process can be seen in Figure 3.

Figure 3



6. Pull out the seal driver. You may have to use a pick to separate the rotating seal from the stationary seal, figure 4.

Figure 4



7. The rotating seal, o-ring and spring will come out as a single component, figure 5.

Figure 5

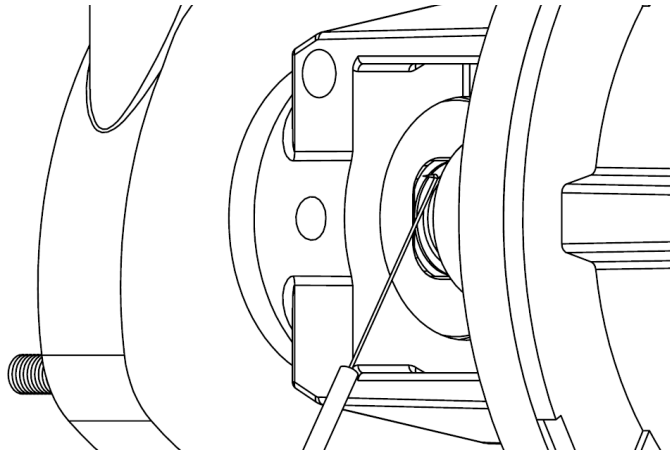


Figure 6

8. Push the stationary seal out from the back of the pump using an o-ring pick or your fingers or both. Pushing on opposite sides of the shaft with constant light pressure the best. Make sure to push outside of the rear seal face. See figure 6.

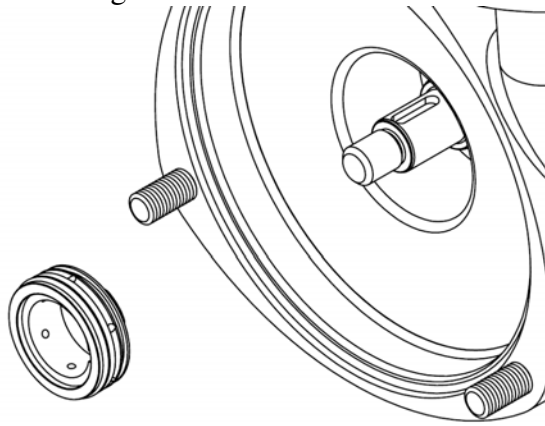


Figure 7

9. Remove stationary seal once pushed out of its' bore. See figure 7. Check the condition of the casing, rotating seal and stationary seal. Clean and remove any foreign matter before reinstalling the seal.

PUMP ASSEMBLY AND SEAL INSTALLATION

When replacing the seal assembly lubricate all o-rings with food grade lubricant. Once the pump is fully assembled turn the stub shaft a few revolutions by hand making sure it turn relatively freely and nothing is rubbing inside the pump. Running the pump with foreign objects in the pump or having the impeller making contact with either the cover or the casing will result in serious damage if not completely destroying the pump.

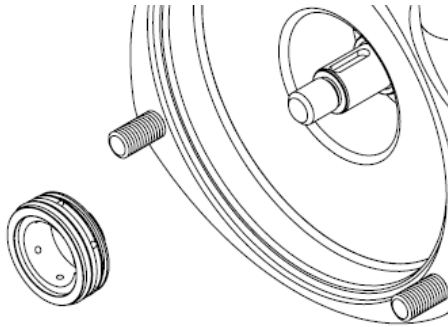


Figure 8

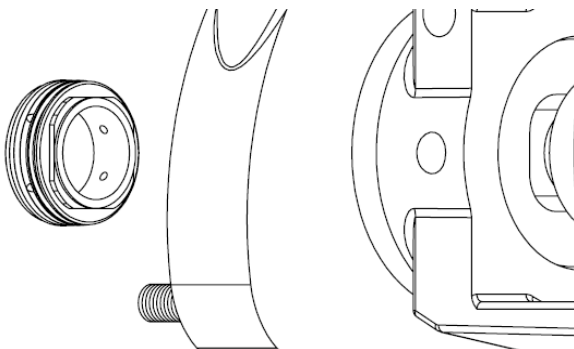


Figure 9

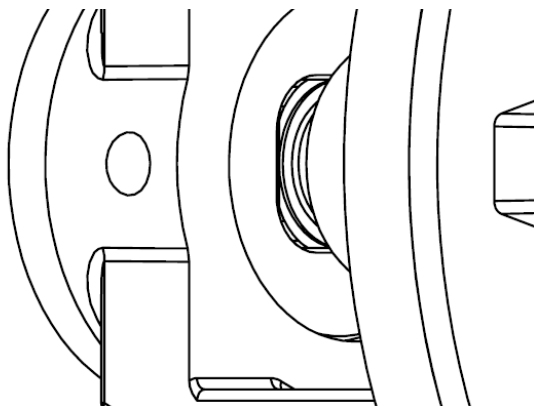
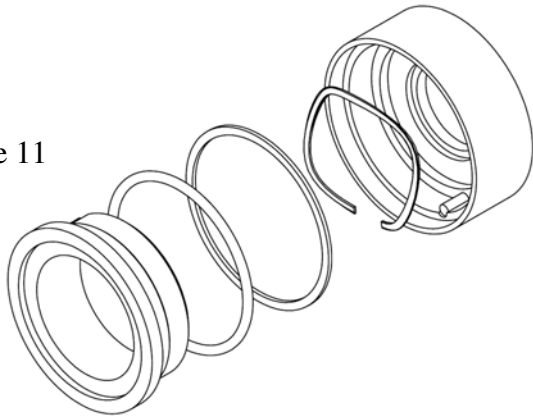


Figure 10

1. Use a food grade lubricant to lubricate all o-rings. It is important that the stationary and rotating seal o-rings are lubricated to ease assembly. Slide the stationary seal over the shaft and into the casing, figure 8. Line up a flat on the stationary seal to the a flat of the window of the casing and gently press the stationary seal into the casing bore. See figure 9.

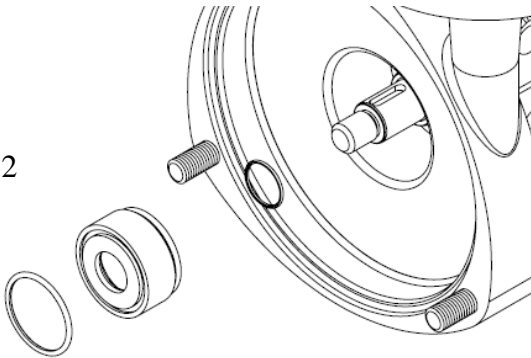
2. The stationary seal should be properly seated, as shown in figure 10, before continuing the assembly of the pump.

Figure 11



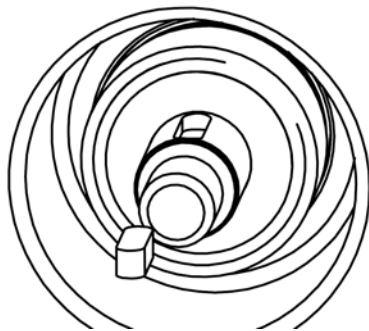
3. Assemble the rotating half of the seal. Insert the single seal spring into the seal driver. The single seal spring is smaller than the rotating double spring. Next insert the backup ring. Insert the single rotating seal o-ring then insert the single rotating seal. Be sure to line up the slots in the rotating seal with the pins in the seal driver.

Figure 12



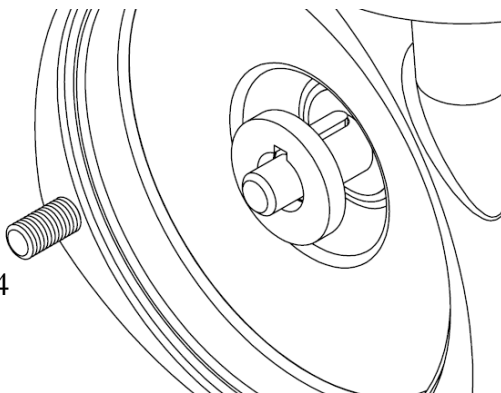
4. Install inner seal driver o-ring, then slide the rotating seal assembly onto the stub shaft, as seen in figure 12, against the stationary seal. Be sure the outer seal driver o-ring is in the o-ring groove in the seal driver.

Figure 13



5. Insert key into the keyway in the stub shaft, figure 13.

Figure 14



6. For SB Blenders install the shim as in figure 14

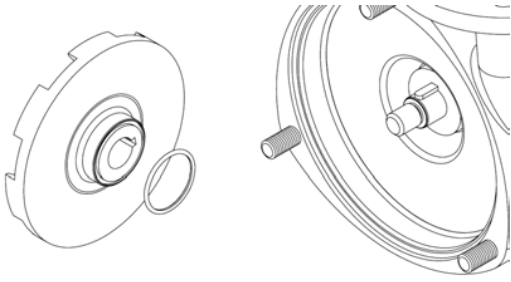


Figure 15

5. Before installing the impeller lubricate the impeller o-ring so it will stay in the impeller o-ring while installing the impeller (SB Blenders only). Slide impeller onto the shaft and over the key. Push impeller against the seal driver or shim (SB Blenders). See figure 15.

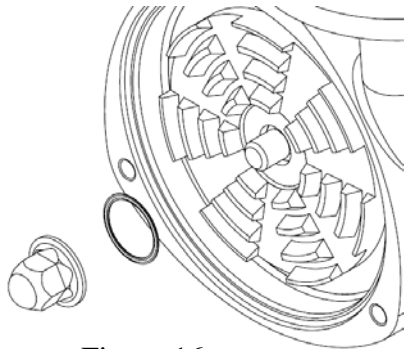


Figure 16

6. Install the impeller nut and impeller nut gasket, figure 16.

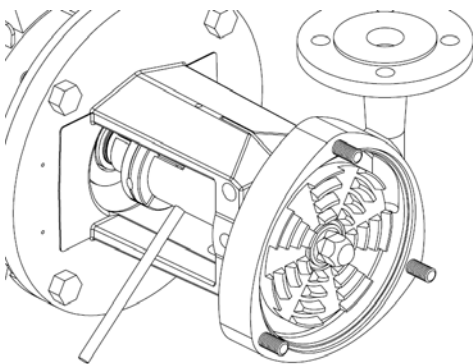


Figure 17

7. Once again insert a 3/8" bar into the hole of the stub shaft to hold the rotating parts while tightening the impeller nut. See figure 17.

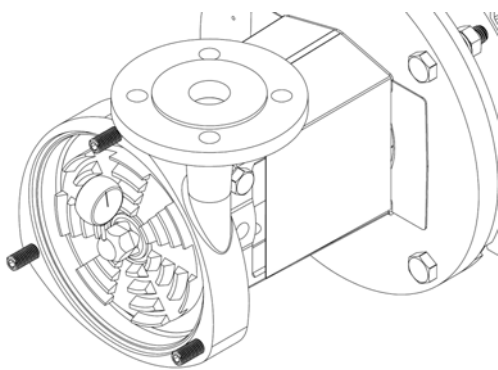
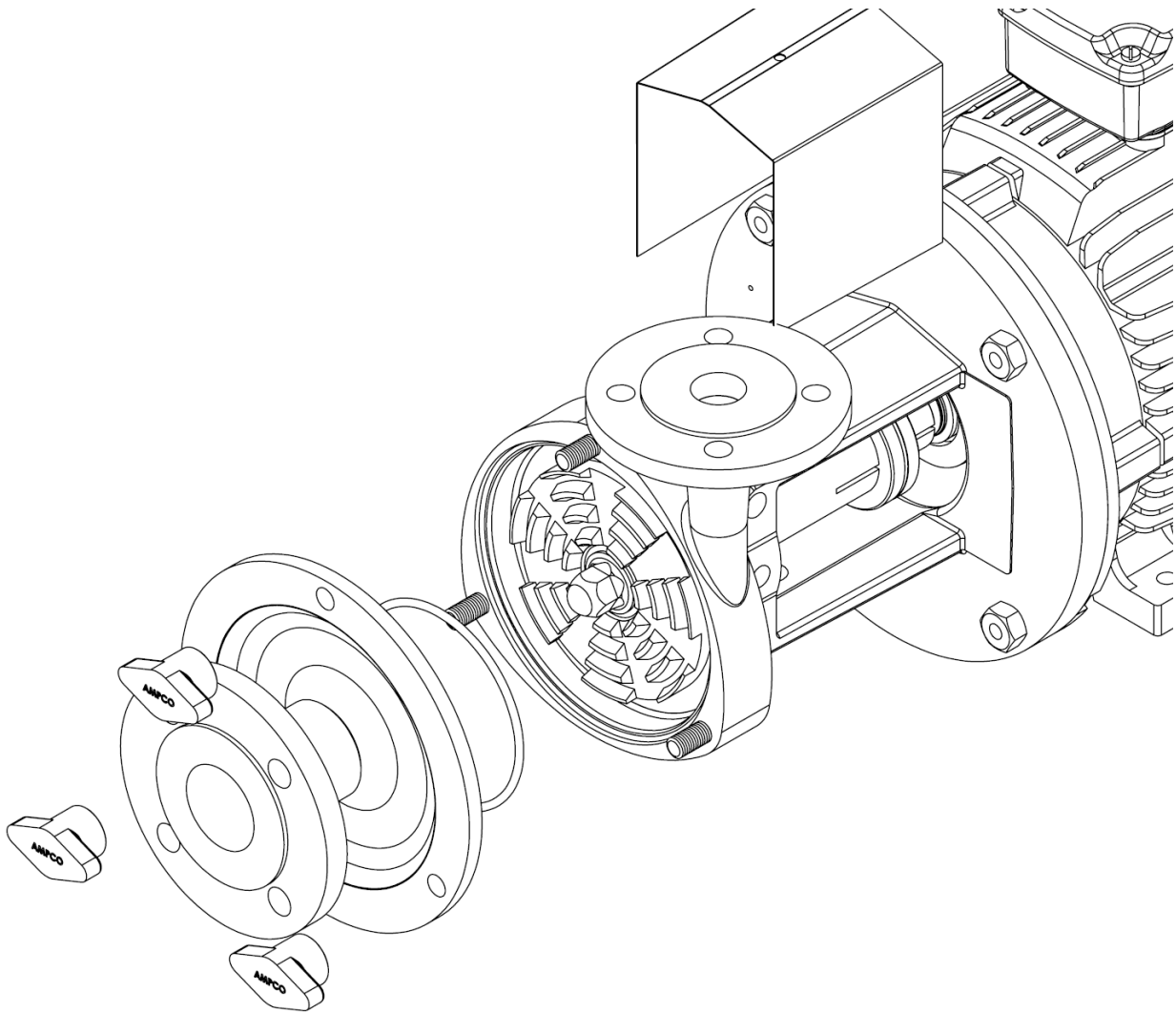


Figure 18

8. Check the stub shaft run out. Fix an indicator to the pump. See figure 18. Total indicator run out should not be greater than 0.003" (0.075mm). If stub shaft run out is greater than 0.003" remove the shaft guard, loosen collar then just snug the shaft collar (do not torque yet). Mark the highest point of run out with a grease marker. Using a dead blow hammer tap stub shaft at high run out point and recheck run out. If run out is under 0.003" torque shaft collar screw and reassemble pump. If not repeat this step until run out is under 0.003".



8. Replace cover gasket, cover, wing nuts, and shaft guard, figure 18. When replacing the cover, depending on the style of connection, the cover may only be installed correctly with only one orientation. Note the orientation of flange bolt hole patterns before installing the cover. Make sure the wing nuts are tight and turn the impeller slowly with a 15/16" socket, extension and ratchet to check if impeller turns freely.

Note: Always turn the stub shaft by hand before start up making sure nothing is rubbing inside the motor, such as foreign objects or the impeller touching either the back inside of the casing or the cover. Also never run this pump dry. Silicon carbide seals will heat up instantly at operating RPMs and will no longer seal when damaged.

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

SETTING THE IMPELLER CLEARANCE

Assemble the pump as described in the Pump Assembly and Seal Installation section of this manual. For double seals perform steps 1-10 and for single seals perform steps 4-10 of the Pump Assembly and Seal Installation instructions. Take note that the shaft collar screw must be torqued to the proper torque value as determined by the frame size of the motor. Using a torque value less than the prescribed value may allow the shaft to move toward the cove and cause damage to the pump.

TOOLS REQUIRED

7/16" wrench	Torque wrench	15/16" socket wrench
3/8" round bar	mallet	Hex socket (for size see technical data page 3)

- 0.04" (1.0mm) Shim for SB & SBH V Pumps

1. Remove the cover wing nuts, cover, cover o-ring, shaft guard, impeller nut, impeller nut gasket and impeller as described in the pump dismantling part of this manual. For SB models make sure the thinnest impeller shim is on the stub shaft.

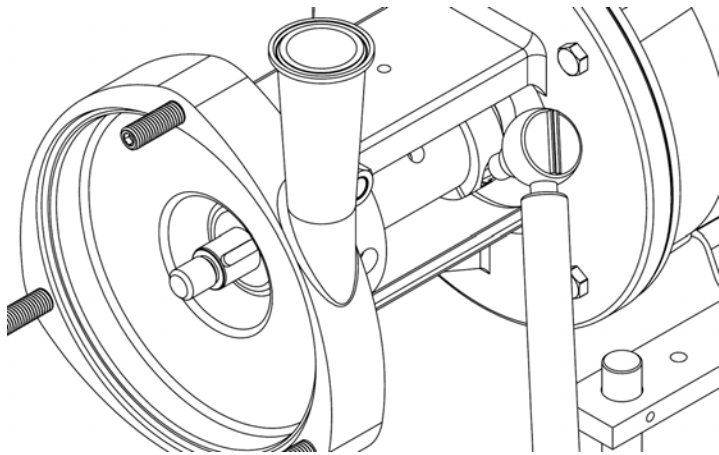


Figure 19

2. Loosen the socket head cap screw in the shaft collar and retighten it just enough so the stub shaft is still able move on the motors shaft. Figure 19.

3. Once the stub shaft is able to slide on the motor shaft place the plastic stub-shaft setting shim on the back of the impeller, over the impeller hub. Figure 20.

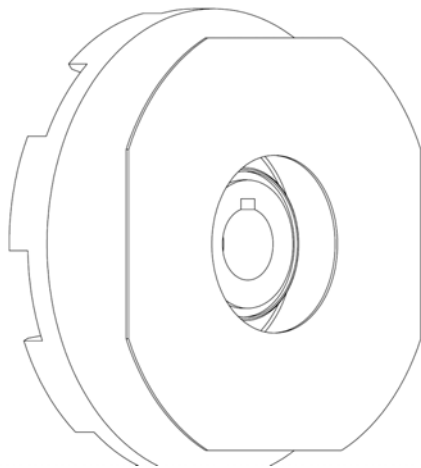


Figure 20

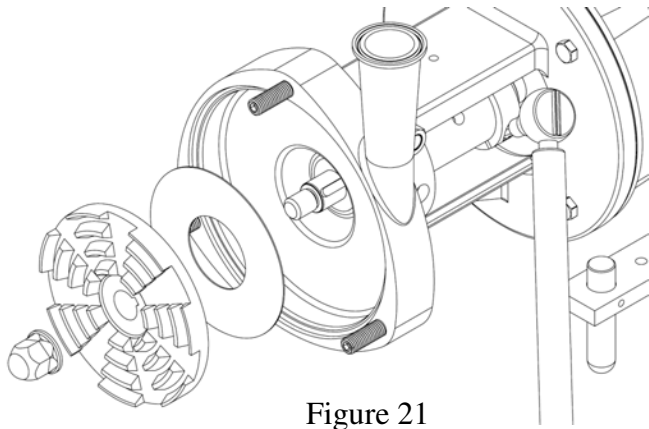


Figure 21

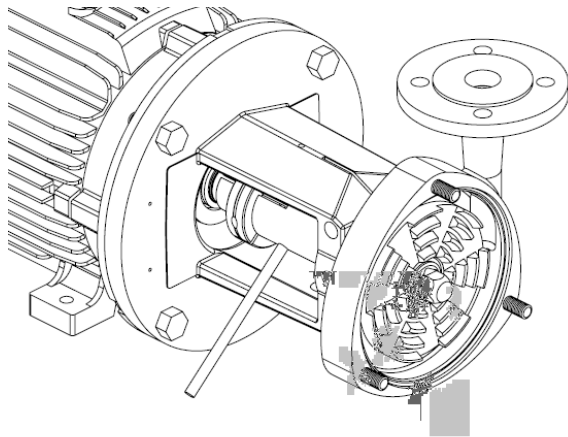


Figure 22

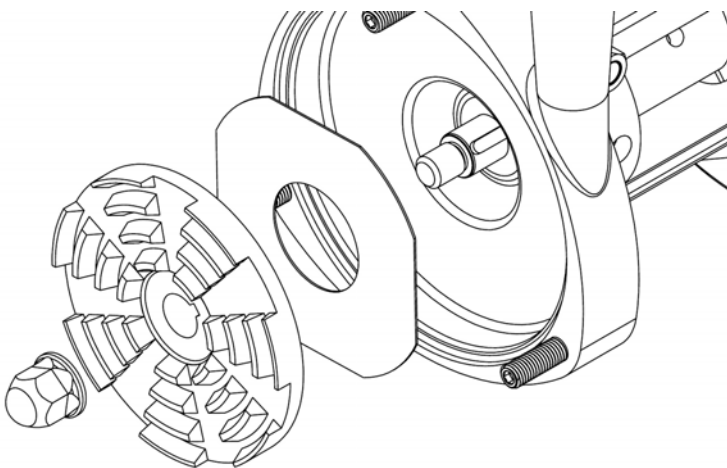


Figure 23

4. With the seal driver, the thinnest shim (SB models) and key on the stub shaft, slide the clearance shim and impeller on to the stub shaft and tighten the impeller nut on the stub shaft, figure 21. While pushing the impeller nut, impeller, and shaft collar towards the motor slightly pinching the impeller clearance shim, tighten the socket head cap screw in the shaft collar. Torque the socket cap screw to the right torque value that correlates to the frame size of the motor. When the shaft collar screw is not torqued to the correct value the shaft may move during pump operation although the shaft cannot be moved by hand along the motor's axis. Torquing the shaft collar screw more than the recommended value may break the screw.

5. Now that the impeller clearance is set the clearance shim has to be removed and pump reassembled. Insert a 3/8" bar into the hole of the stub shaft and loosen the impeller nut. See figure 22.

6. Remove the impeller nut, impeller, stub-shaft setting shim and clearance shim, figure 23.

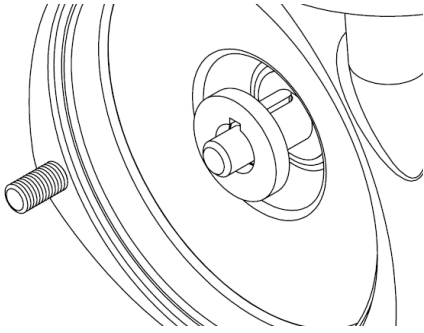


Figure 24

7. Insert the desired impeller shim (SB models only) figure 24.

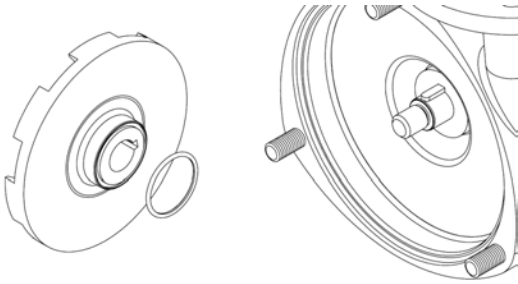


Figure 25

8. Install the impeller o-ring into the back of the impeller (SB models only) figure 25.

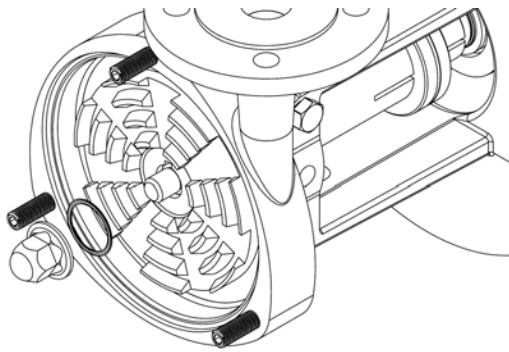


Figure 26

9. Install the impeller nut gasket and impeller nut. See figure 26.

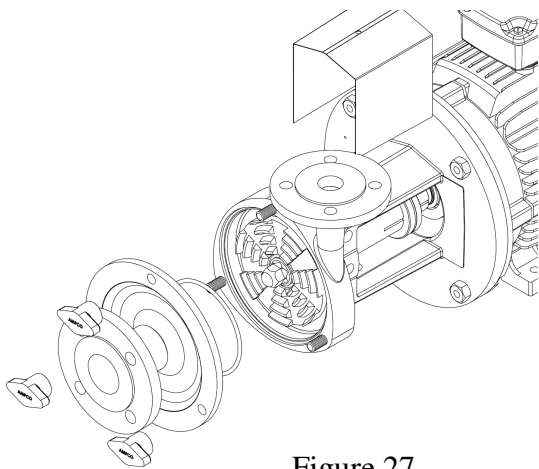


Figure 27

10. Replace cover gasket, cover, wing nuts, and shaft guard, figure 27. When replacing the cover, depending on the style of connection, the cover may only be installed correctly with only one orientation. Note the orientation of flange bolt hole patterns before installing the cover. Make sure the wing nuts are tight and turn the impeller slowly with a 15/16" socket, extension and ratchet to check if impeller turns freely. If the impeller does not turn freely do not force it to turn and absolutely do not run the pump. Reset the impeller clearance.

Sound piping practices

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 28.

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 a radii less than twice the diameter of pipe, figure 28.

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 29.

Route piping under any obstructions whenever possible. Figure 30.

When using a reducer on the suction end the reduced centerline should not be below the suction centerline as in figure 31. The centerline of the small diameter end of the reducer should be above the centerline of the suction line as in figure 32.

Injection line angles should be 45° or less. Figure 33.

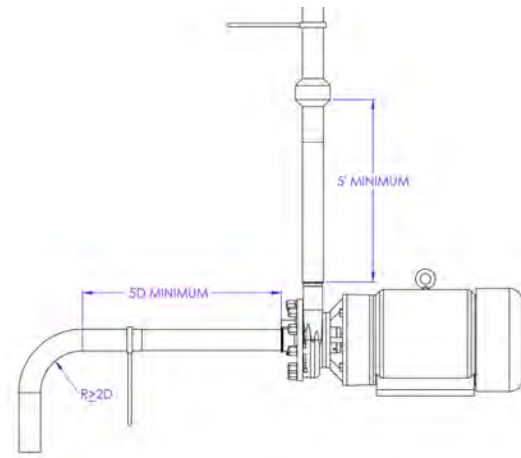


Figure 28

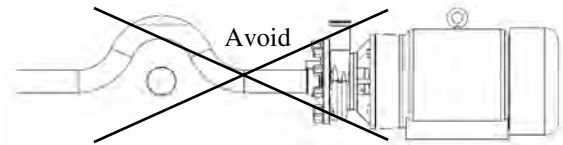


Figure 29

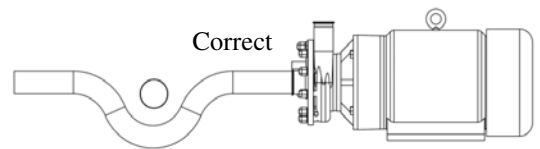


Figure 30

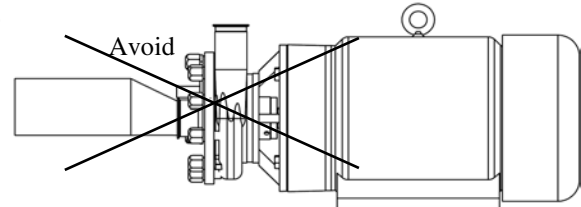


Figure 31

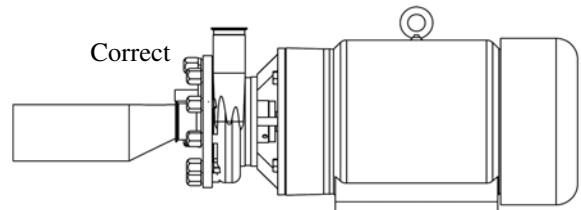


Figure 32

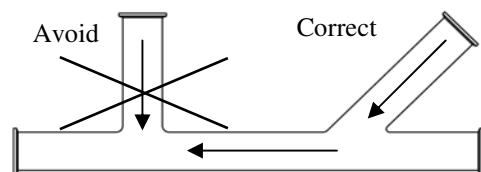


Figure 33

TROUBLESHOOTING

COMMON TROUBLES AND THEIR CAUSES

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
- Suction lift too high
- Impeller, piping, or fittings completely plugged up
- Wrong direction of rotation

2. Not sufficient 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 hot 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. Not sufficient 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.

Terms and Conditions

Ampco Pumps Company

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

Terms and Conditions

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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.

Return Policy

Ampco Pumps Company

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
1-800-737-6871 or (414)643-1852
Email: ampco@sampcopumps.com
Visit www.sampcopumps.com for more information.