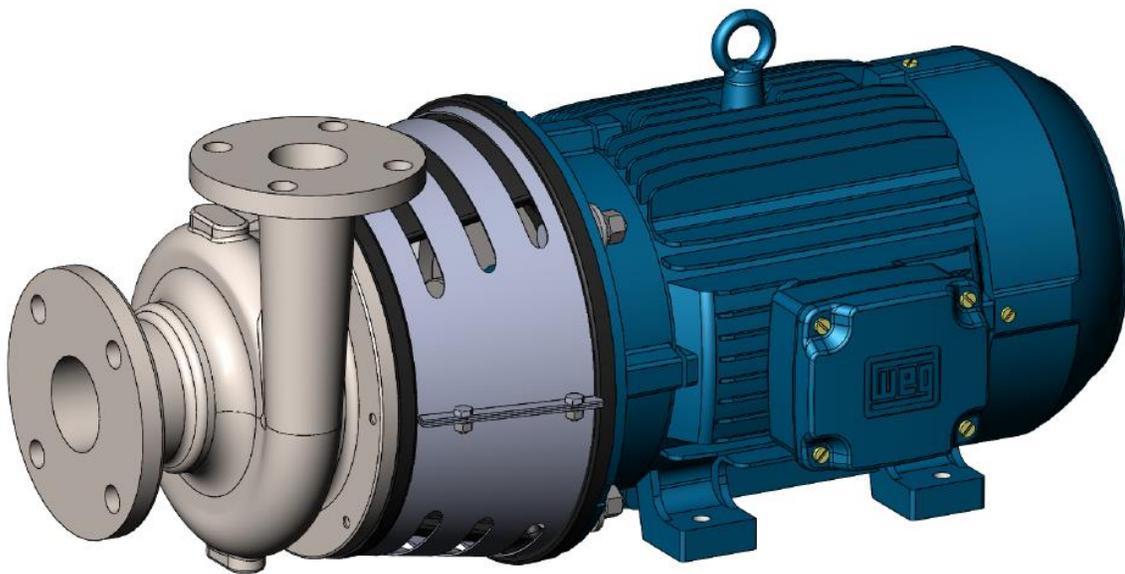


Ampco Pumps Company



Z-Series: Metric Components Service Manual



This service manual includes installation, operation, and maintenance instructions for Ampco Pump Company's Z-Series: ZCM and ZCHM. Failure to learn the correct procedures for installing and servicing the pump from this manual could result in equipment failure.



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. Attempt to turn the impeller, it should turn 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 then 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 the piping to stop debris from getting into the pump.

Pump Location

Use the following pump location guidelines to help ensure proper pump performance:

- Locate the pump so that the shortest and most direct possible suction piping can be used.
- To facilitate priming, ensure a steady flow, and provide positive suction head, locate the pump below system level, when possible.
- Ensure the NPSH available to the suction end is always equal-to or greater-than the specified NPSH required on the pump performance curve by considering the pump's location in relation to the entire system.

Foundation (if applicable)

The base attached to the pumping unit has pre-drilled mounting holes so that the pumping unit can be fixed to a foundation, providing a permanent rigid support. The foundation is necessary in order to absorb vibration, strain, and shock on the pumping unit. The foundation should be about 6 inches longer and wider than the pump base and have a depth of about 20 times the diameter of the foundation bolts.



General Piping Notes

- Pipe hangers or other supports must be used at proper intervals to ensure proper piping support near the pump. **Do not use the pump to support piping!**
- When flange bolts are tightened no strain should be transmitted to the pump, thus suction and discharge piping should be supported independent of the pump and care should be taken that the pump and piping are properly aligned.
- Piping must be as straight as possible. Avoid all unnecessary bends and fittings. When bends are necessary use 45° or long-sweep 90° pipe fittings in order to decrease minor friction losses.
- Make sure all flanged joints have matching inside diameters and properly aligned mounting holes – especially close to the pump.
- **Do not force piping when making connections. This can cause the impeller to rub on the casing or premature seal failure.**

Suction Piping

It is very important that suction piping be selected and installed such that it minimizes pressure loss and allows sufficient liquid flow into the pump. A proper suction piping system design can eliminate many NPSH problems. The following precautions should be followed to ensure a proper suction piping system.

- Suction piping must be kept as direct as possible. It is suggested that any elbows be kept at least 5 pipe diameters away from the pump's suction flange.
- Suction piping length should be at least ten times the pipe diameter overall.
- When suction piping has a larger diameter than the pump suction opening an eccentric reducer must be used, with the taper oriented down. (Note: Do not use a concentric reducer)
- Suction piping must never have a smaller diameter than the pump suction opening.
- When possible, horizontal suction piping should follow an even gradient.
- For suction lift conditions it is recommended that the suction piping have a gradual upward slope approaching the pump. For positive suction head the suction piping should have a gradual downward slope approaching the pump.



- High point such as loops or arcs must be avoided as they may create air pockets, throttle the system, and produce erratic pumping.
- A valve must be installed in the suction piping in order to isolate the pump during shutdown and maintenance, and to facilitate pump removal. If two or more pumps are connected to a single suction line, each pump should be isolated by a separate valve.
- Gate valves need to be positioned so that air pockets are not produced. If NPSH is critical, globe valves should not be used. (**Note: During operation all valves installed on the suction line must be at full open**)
- To enable the pump operator to monitor pump performance, properly sized pressure gauges may be installed in gauge taps on pump suction and discharge nozzles. Pressure gauges will also indicate the presence of cavitation, vapor binding, or other unstable operation by showing wide fluctuations in suction and discharge pressures. For these reasons Ampco highly recommends gauges.

Discharge Piping

To ensure proper pump performance the following precautions regarding discharge piping should be followed:

- If the discharge piping distance is short the piping can be the same diameter as the pump discharge opening.
- Long horizontal lengths of discharge piping should maintain an even gradient.
- A valve needs to be installed near the pump's discharge opening to prime and start the pump, as well as to isolate the pump during shutdown, maintenance, and to facilitate pump removal.
- High points should be avoided in discharge piping as they can entrap air or gas and retard pump operation.
- If liquid hammer might exist, such as when check valves are used, the discharge gate valve should be closed prior to pump shutdown.



Priming

The Z-Series pump is not a self-priming pump and must be completely filled with the pumping liquid before operation. If the system has a positive suction head priming can be done by opening the valve in the suction piping as well as the pump's air vents to allow the liquid to enter the pump casing. Rotate the shaft by hand to free entrapped air from the impeller and then ensure that all air has been forced out by the liquid before closing the air vents. If the pump has a suction lift, priming must be done by using foot valves, ejectors or manual filling of the pump casing.

CAUTION!

Running the pump dry will result in serious damage to the mechanical seal.

Pre-Start Checklist

Before operating the Z-Series pump ensure that all of the following requirements are met

- Check that all motor and starting device wirings match the wiring diagram.
- Make sure the shaft rotates clockwise when viewed from behind the motor.
- Refer to motor instructions before starting if the motor has not been operated over an extended period of time.
- Make sure that that voltage, phase, and line circuit frequency match what is specified on the motor data plate.
- Turn shaft by hand to make sure it rotates freely.
- Tighten all gauge and drain tap plugs. When not in use, close the gauge cocks on pumps fitted with pressure gauges.
- Check that all flange bolts are tightened and the suction and discharge piping is not leaking.

Pump Operation

WARNING

Operating the pump without an approved coupling guard installed could result in operating personnel injury.

Start Up Instructions

1. Set the suction line gate valve to full open and close the discharge line gate valve.
2. Fill the suction line and prime the pump.
3. Start the motor and immediately check the pump and suction piping for leaks.



4. As soon as the pump reaches operating speed, open the discharge gate slowly until complete system flow is achieved. There may be valve chatter during transient period

during valve adjustment. Be aware that the pump's motor is specified for the flow and pressure specified by the customer and that higher flow rates could damage the motor.

5. Check for leaks in the discharge piping.
6. (For pumps with pressure gauges) Open gauge cocks and record pressure reading. Check that the pump is performing as specified by the performance curve.

Shut Down Instructions

(Note: If the pump will be shut down for an extended period refer to the Extended Duration Shutdown)

1. Slowly close the discharge piping gate valve. (Closing valve too quickly can cause hydraulic shock)
2. Turn off power supply to the pump.

Short Duration Shutdown

For short shutdown periods the pump can remain filled but make sure the pump is fully primed prior to restarting. If the pump is subject to freezing conditions then the pump exterior should be insulated or heated and the fluid within the pump casing must be kept moving in order to prevent freezing.

Extended Duration Shutdown

For extended duration shutdowns close the suction piping gate valve or if no suction valve is installed then drain the suction line to stop liquid flow to the suction nozzle. Remove pump drain and vent tap plugs as required and completely drain the pump casing. If the pump will be subjected to freezing conditions during shutdown then all liquid must be completely blown out of all passages and pockets using compressed air or the pump must be filled with an antifreeze solution to prevent damage.

Assembly – ZCM/ZCHM

*Refer to the parts list appended to this manual for the part name and quantity corresponding to each number in Figure 9.

- 1) Begin with the bare motor. Ensure that the shaft and C-face areas are clean.

- 2) Attach the stub shaft [6] and locking collar [7] to the motor and the motor adapter [5] as shown in Figure 1.

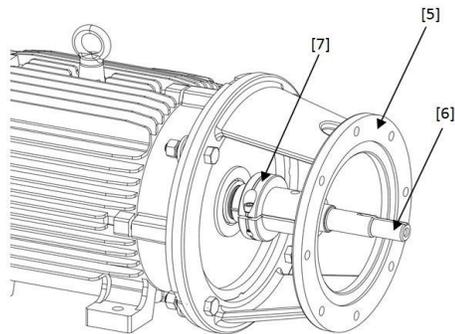


Figure 1: Step 2 Illustration

3) Measure the stub shafts axial location with respect to the outer-most face on the adapter as shown in Figure 2. This will dictate the impeller clearance to the pump casing. Once the dimension is set, tighten the collar screw to 20 ft-lbs [27 Nm]. Ensure that the collar [7] remains all the way against the shoulder on the stub shaft [6] (in the outboard direction). **Once the stub shaft's axial location is set, do not remove the screw unless you believe it is not in its original location.**

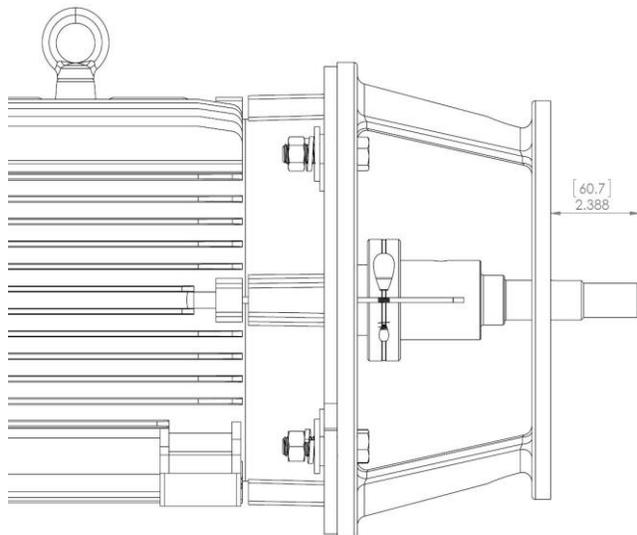


Figure 2: Shaft to adapter measurement

4) The remaining pump assembly is now ready to be performed. (For double seal assembly refer to instructions listed in Appendix B) First the stationary seal [16+17] must be pressed into the cover or stuffing box [4]. Temporary rubber emulsion or water should be used on the elastomer, and the seal should be pressed in by hand. Attach the cover to the pump adapter [5], or attach the stuffing box to the cover. Then place the cover in the pump adapter. This may require screws with the large flat covers.

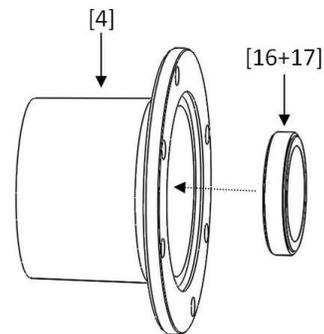


Figure 3: Step 4.1, stationary seal into stuffing box

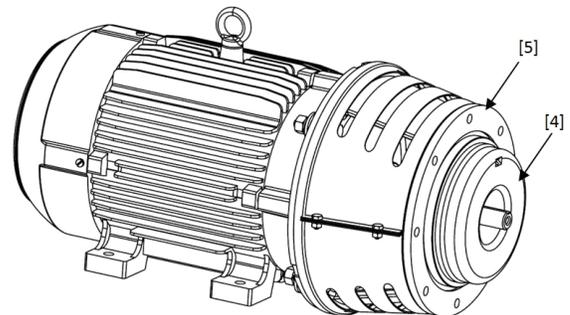


Figure 4: Step 4.2, cover mounted to adapter

5) The shaft sleeve [12] should now be prepped by applying the seal and o-rings [13+14]. Use temporary rubber emulsion or water and push on the rotating seal portion [15+18+19] of the elastomer bellows seal onto the shaft sleeve [12]. Put the o-ring(s) [13+14] into their grooves in the shaft sleeve

and then place the seal spring into the rotating seal element. Once the shaft sleeve is prepped, push it onto the stub shaft until it seats against the shoulder.

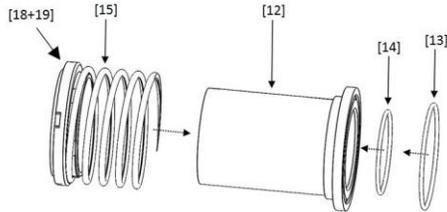


Figure 5: Stub shaft preparation

6) Place the casing gasket [9] onto its spot on the cover [4].

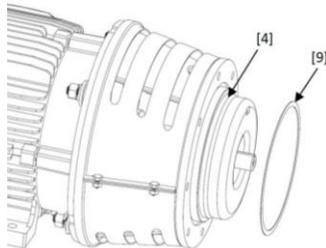
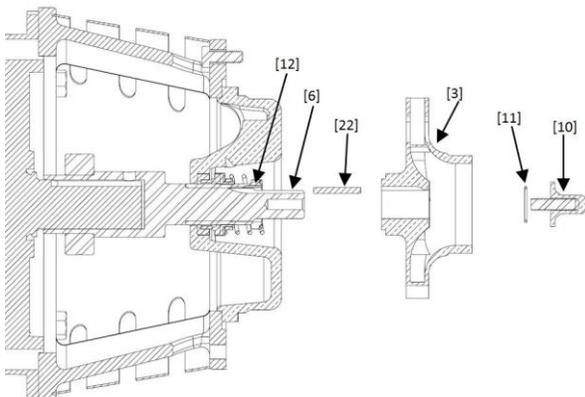


Figure 6: Cover gasket on to cover

7) Place the key [22] into the stub shaft [6] and align it so it also engages in the shaft sleeve [12]. If you have a stepped key, the taller side goes toward the motor. Install the impeller [3] onto the shaft [6]. Apply the gasket or o-ring [11] and torque the impeller screw to 50-60 ft-lbs [68-81 Nm]. Use blue thread-locker on the threads.

Figure 7: Step 7 illustration



8) Ensure the impeller does not rub against the cover by turning it by hand. You are now ready to attach the pump casing [1]. Have the screws ready and apply the casing to the cover. Tighten all the casing screws in an alternating fashion to 25 ft-lbs [34 Nm].

Again, check the pump for rubbing by rotating the stub shaft. If the impeller contacts, look into the suction flange on the pump and see if it is bound against the front wear ring. If it is,

please repeat step 2 and ensure you have the correct measurement.

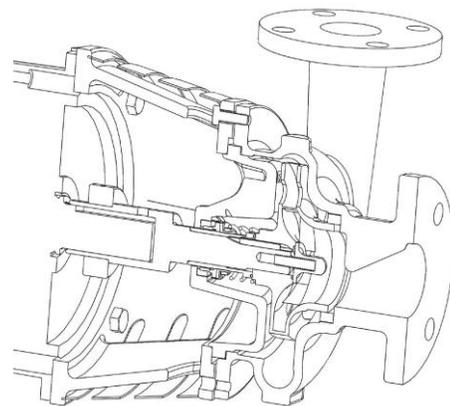


Figure 8: Step 8 illustration

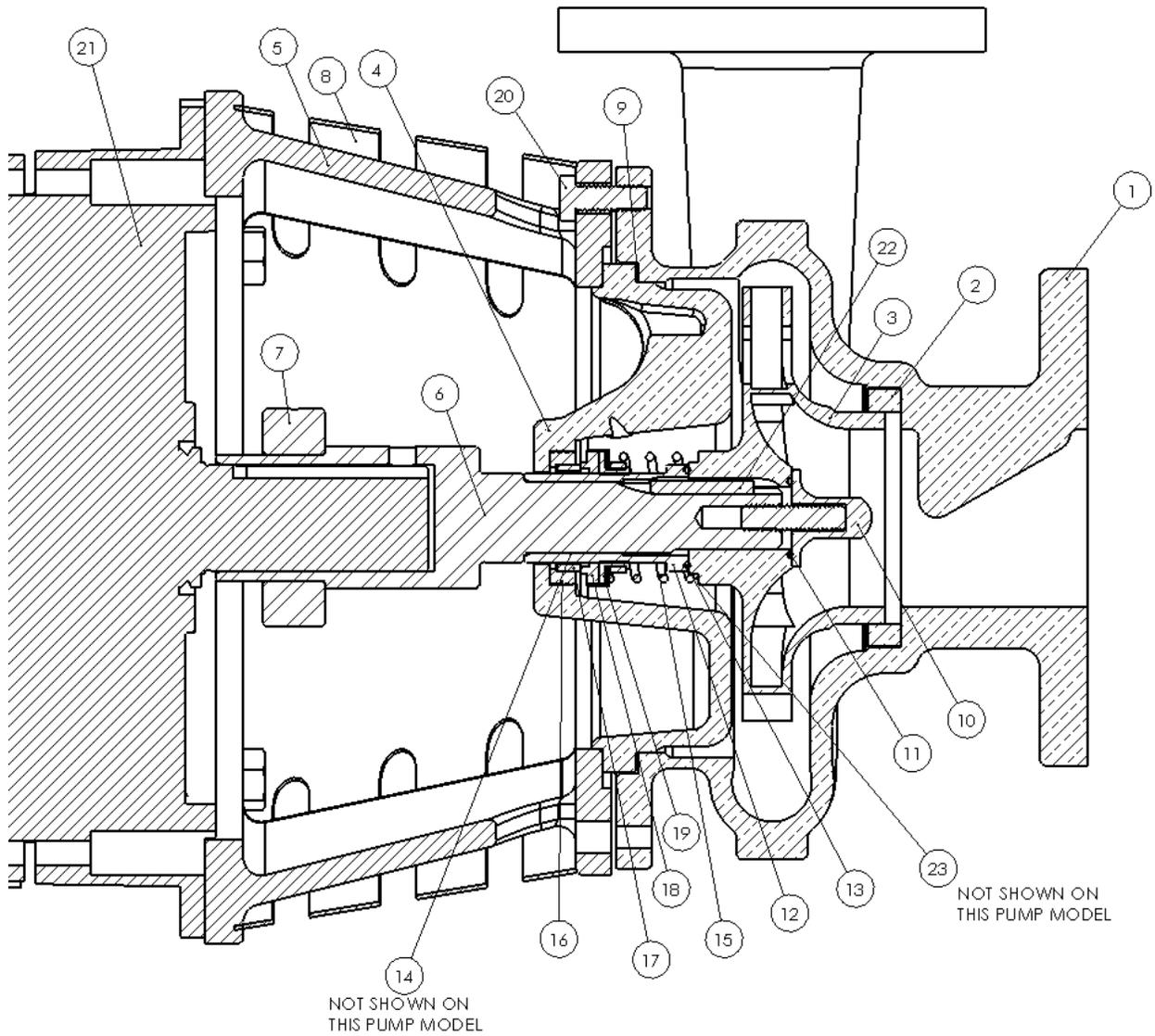


Figure 9: Type 21 seal cross section parts diagram

Appendix: A

Parts List

Number	Description	Qty. per pump
1	Pump Casing	1
2	Casing Wear Ring	1
3	Impeller	1
4	Rear cover	1
5	Motor Adapter	1
6	Stub Shaft	1
7	Shaft Collar	1
8	Adapter Guard	2
9	Cover Gasket	1
10	Impeller Screw	1
11	Impeller O-Ring	1
12	Shaft Sleeve	1
13	Shaft Sleeve O-Ring 1	1
14*	Shaft Sleeve O-Ring 2	1
15	Seal: Spring	1
16	Seal: Cup	1
17	Seal: Seat	1
18	Seal: Face	1
19	Seal: Retainer	1
20	Cover screws	8
21	Motor	1
22	Shaft Key	1
23*	Seal Spring Retainer	1

*NOT PRESENT ON ALL MODELS

Double Seal Assembly Instructions

***Refer to Figure 11 for part numbers referenced within double seal assembly instructions.**

The double seal-supplied pumps require sub-assembly of the stuffing box prior to installation on the pump. Below are the steps required (Refer to Figure 10 and Figure 11):

1. Press the inboard stationary seal [2] into the inner cavity of the stuffing box [1] (DX8307347)
2. Press the outboard stationary seal [7] into the gland [9] (DX8307337)
3. Prepare the shaft sleeve [3] (DX8307367):
(Refer to Figure 9)
 - a. With the flanged edge facing the inboard direction (toward the impeller) first put the shaft sleeve through the seal face in step 1. Apply the inboard rotating seal [4] onto the shaft sleeve with the use of temporary rubber emulsion lubricant or clean water. **You must do this sideways as gravity will allow the inboard seal face to drop out of the bellows.**
 - b. Place the spring [5] onto the shaft sleeve and make sure it seats around the inboard seal from step 3a.
 - c. Apply the outboard rotating seal [6] onto the shaft sleeve in the reverse direction of the inboard seal again using temporary rubber emulsion lubricant or clean water.

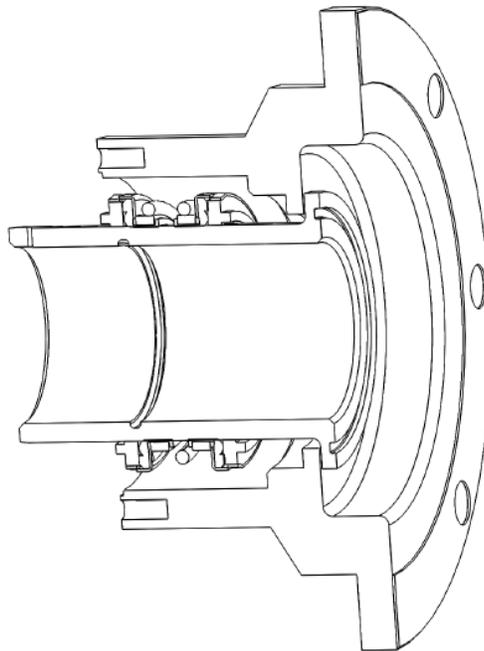


Figure 10: Double Seal

Appendix: B

Double Seal Assembly Instructions

4. Place the gland [9] with the outboard stationary seal so that it locates on its pilot in the rear of the stuffing box. **Do not forget the o-ring [8] (GX5042814)**
5. Tighten the 4 screws [11/10] (GX5501110) evenly and carefully.
6. Prepare the shaft sleeve: Place the O-ring in the groove inside the sleeve, and the O-ring on the shoulder's face– the double seal sub-assembly is now complete and can be assembled onto the pump. Slide the shaft sleeve onto the stub shaft until it seats on the shoulder of the shaft.

Continue pump assembly with step 6.

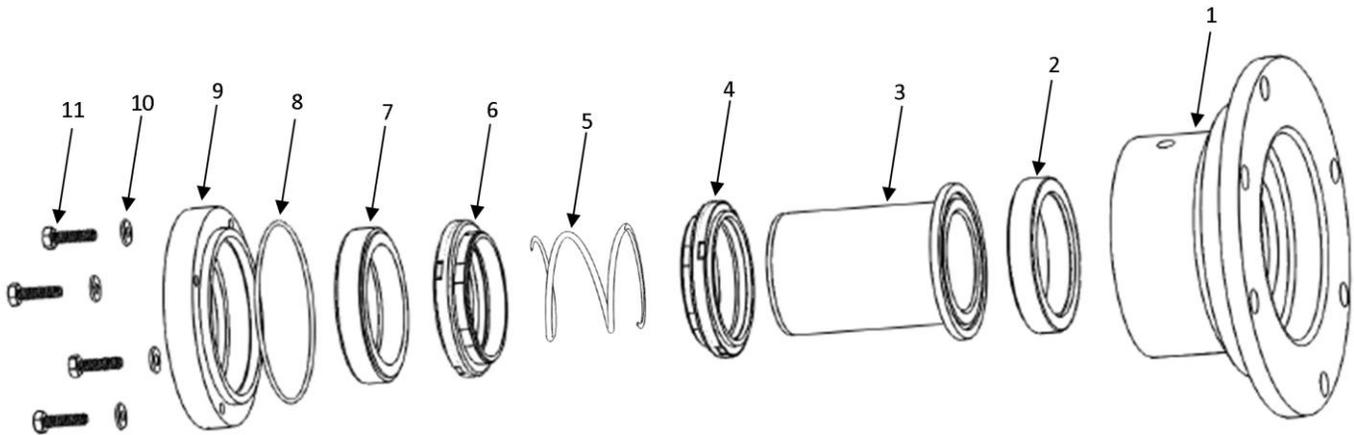


Figure 11: Double seal parts list

Number	Description	Qty. per pump
1	Stuffing Box	1
2	Inboard Stationary Seal	1
3	Shaft Sleeve	1
4	Inboard Rotating Seal	1
5	Seal Spring	1
6	Outboard Rotating Seal	1
7	Outboard Stationary Seal	1
8	Gland O-Ring	2
9	Gland	1
10	Washer	1
11	Hex Screw	1

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.



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