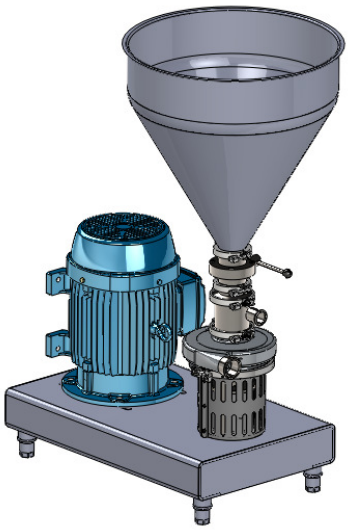
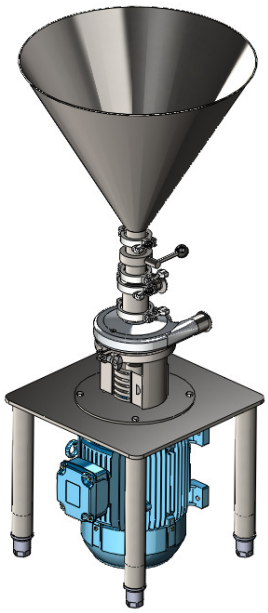
Ampco Pumps Company

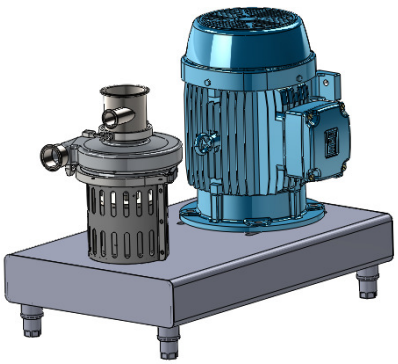
AC+ DRY BLENDER SERVICE MANUAL

READ AND STUDY THIS MANUAL TO ENSURE YOU UNDERSTAND THE CORRECT PROCEDURES BEFORE YOU INSTALL, OPERATE, OR SERVICE THE EQUIPMENT.

MODELS 2116, 2116 System, 3218, 4329







Contents

This service manual includes operation instructions, installation guidelines directions, and cleaning and repair instructions for Ampco Pumps Company's AC+2116, AC+2116 System, and AC+4329 Dry Blender models. Trouble shooting guidelines are also included in this manual.

Failure to learn the correct procedures for servicing the Dry Blender by studying this manual could result in equipment failure or even personal injury.

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SAFETY

Read and understand the instructions in this manual before installing, operating, or servicing this equipment. Failure to learn the correct procedures for servicing the Dry Blender by studying this manual could result in equipment failure or even personal injury.

Ampco Pumps Company advises users of our equipment to follow current Industrial Safety Standards. At the least, the following should be included:

- Occupational Safety and Health Administration (OSHA), Title 29 of CFR Section 1920.212
- General Requirements for all Machines
  National Fire Protection Association, ANSI/NFPA 79
- Electrical Standards for Industrial Machinery
  National Electrical Code, ANSI/NFPA 79
  ANSI/NFPA 70 – National Electrical Code
  ANSI/NFPA 70E – Electrical Safety Requirement for Employee Workplaces
- American National Standards Institute, Section B11

Servicing electrically charged equipment can be dangerous. Unintended actuation of equipment or shock or burn may result in severe injury or death. It is recommended that industrial equipment be disconnected or locked out from the power source and stored energy, if present, be released. Refer to National Fire Protection Association Standards and OSHA rules for the Control of Hazardous Energy Sources and the Electrical Safety Related Work Practices. Check for procedural requirements for lockout-tagout and personnel qualifications and training.

Interconnected devices should be checked to insure they are capable of performing their planned functions and are in proper working condition. These devices should be serviced according to the manufacturer's instructions.

It is recommended periodic inspections be made of the equipment with an initial inspection done within 3 to 4 months of installation, at the minimum. Check the standards set by the National Electrical Manufacturers Association (NEMA) for inspection of the electrical control system and for setting up a scheduled maintenance and inspection program.

SAFETY CONTINUED….

DO NOT ATTEMPT TO MODIFY AMPCO PUMPS COMPANY BLENDERS. Your altering the product may give rise to unsafe conditions and result in harm to you or others. Altering the product voids Ampco Pumps warranty on the blender. Ampco blenders should only be used where general product service ratings apply.

This manual uses the following warnings and cautions to help you avoid injury or possible equipment damage.

	Indicates a hazardous situation is imminent that ***will*** result in death or serious injury if not avoided.
	Marked with a warning triangle to indicate that hazards or unsafe practices, if not avoided, could result in severe injury or death. Also used to warn against unsafe functioning or maintenance practices.
	Marked with a warning triangle to indicate that hazards or unsafe practices, if not avoided, could result in death or injury or product or property damage.

All Ampco blenders have safety labels. Do not remove any labels from any Ampco Pumps product.

WARRANTY

Ampco Pumps warrants its products for a period of one (1) year from the date of shipment. Products will be free of material or workmanship defects. Service of products for normal wear and tear is not covered under warranty. Warranty does not cover damage caused by misuse, incorrect maintenance, or accident. Warranty applies to the original buyer only. Products manufactured by others, such as motors, are not covered by Ampco Pumps warranty and limited to the original equipment manufacturer's warranty.

Under this warranty, Ampco Pumps is obligated to repair or replace any products it determines to be defective. Ampco reserves the right to inspect the product, either in the field or at Ampco Pumps' Glendale, Wisconsin facility. Freight to return the production for inspection is to be prepaid by the buyer. Any duties, taxes, labor, transportation, or other costs are not Ampco Pumps responsibility. Removal of product and installation of repaired or replaced product is the buyer's responsibility.

Ampco Pumps Company refutes all other warranties and shall not be liable for any incidental or indirect damages or the loss of profit or material resulting from, or connected to, the sale or operation of the Ampco blender.

SHIPPING DAMAGE OR LOSS

You must immediately file a claim with the delivering carrier if the blender is damaged or lost in transit. All products are shipped from Ampco Pumps in good condition; a statement verifying that good condition is signed by the carrier at the time of shipment from Ampco. Ampco Pumps is not responsible for filing or collection of freight claims or the replacement of products damaged or shorted in transit.

WARRANTY CLAIM

All products being returned for warranty must have a Returned Goods Authorization (RGA) before Ampco Pumps accepts them for return.

INTRODUCTION

How It Works

Powder is introduced through the inner tube while the liquid flows through the outer tube to the mixing chamber. Because the liquid enters the chamber in the same direction as the impeller rotation, the flow is accelerated with minimal splashing. An inner screen creates back pressure, moving the liquid down and creating a natural suction into which the dry ingredient is introduced by opening the butterfly valve. AC+ Dry Blenders are also suitable for liquid to liquid applications.

INSTALLATION

Unpacking

Inspect the contents of all packages when unpacking your equipment. If damage has occurred during shipment, you must report the damage to the carrier. Ampco Pumps Company is not responsible for damages that occur in transit.

Location and Installation

It is important that the AC+ Dry Blender be installed with 3 feet (1 meter) of the liquid source. The supply piping should be short with a minimum number of elbows and fittings that impact flow of the liquid into the blending chamber. An eccentric reducer is recommended at the liquid inlet of the blender. The need for future cleaning and inspection should be considered when installing the blender.

A supply pump is required to feed the liquid to the blender. A discharge pump may also be required for certain applications. Contact Ampco Pumps for supply and discharge pump recommendations.

The adjustable legs should be installed to the base of the unit and the blender should be positioned where the blending operation will take place. Use a wrench to adjust the legs, one at a time, until the unit is level.

Installation continued…..

Connect the supply and discharge piping, making sure each is positioned correctly and properly supported. Incorrect piping may result in strain on the blender casing. The AC+2116 model has a 1 ½ inch (38.1mm) liquid inlet, 2 inch (50.8mm) powder inlet, and 1 ½ inch (38.1mm) liquid outlet. The AC+3218 model has 1 ½ inch (38.1mm) liquid inlet, 3 inch (76.2mm) powder inlet, and 2 inch (50.8mm) liquid outlet. The AC+4329 model has a 2 inch (50.8mm) liquid inlet, 4 inch (101.6 mm) powder inlet, and 3 inch (76.2 mm) liquid outlet.

The purchaser is responsible for supplying and installing all piping. Liquid inlet piping should be short and provide a direct route into the blender. There should be a minimum number of elbows and fittings in the supply piping. Elbows in the liquid inlet piping will produce increased friction in the line which will result in cavitation in the blender casing. Cavitation will result in vibration, noise, poor performance, and possible damage to the blender. It is recommended the pipe diameter at the inlet be increased in size where possible. Using an eccentric tapered reducer in place of a concentric reducer at the inlet will help direct the flow to minimize turbulence.

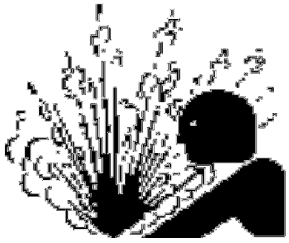
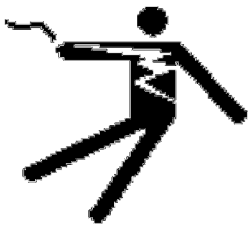
It is possible to order the blender with an electrically controlled Butterfly valve. The electric valve should be wired to an auxiliary 110V power source. This will allow the valve to operate separately from the blender motor so it may be closed if the motor fails. If the power source to the Butterfly valve (the 110v) also fails, it should be possible to manually override the valve by applying a wrench to the flats on the coupling adapter.

MAINTENANCE

General

The AC+ Dry Blender requires only normal cleaning and inspection to insure its best performance. The blender is relatively maintenance free but Ampco Pumps Company recommends periodic inspection of seals and seal faces. Worn or damaged parts that may include cuts or abrasions to seals or nicks or cracks to seal faces, should be replaced upon detection.

Cleaning

	**WARNING** Relieve pressure and remove all fluid from blender prior to disassembly
	**WARNING** **Turn off electrical power supply and *Lock Out* before servicing or maintenance. Use a locking device for which only the person doing the work has the key.**

In order to clean and sanitize the blender, it is necessary to disassemble all the parts to the AC+ except for the drive motor.

1. Disconnect the liquid supply piping and the discharge piping from the blender.
2. Remove the clamp securing the hopper to the AC+ Dry Blender. **The AC+4329 is normally *not* ordered with a hopper and valve. If that is the case with your blender, skip to step 5.
3. Remove the clamp connecting the end connections of the Butterfly valve.
4. Refer to valve manual for disassembling the valve.
5. Remove the clamps and blender tubes, beginning at the top and working towards the bottom. Continue until you reach the casing.

6. Remove the clamp that secures the casing to the back plate. Use both hands to firmly grasp the casing, pulling it up and off the back plate. **A gasket separates the casing and back plate. Do not use a tool to try and pry them apart. This could damage the surfaces of the adapter ring and the gasket. Firmly tugging the casing should separate the casing from the back plate.
7. Remove the screen inside the casing.
8. Remove the impeller and back plate. Protect the sealing surface of the back plate against all nicks and scratches when removing for cleaning and disassembly.
9. Rinse all disassembled parts with lukewarm water (approximately 100 deg F) until all traces of product are removed.
10. Clean all the components with an all-purpose, powdered alkaline cleaner, following manufacturer's recommendations.
11. Immediately rinse with lukewarm water until all of the cleaning agent has been removed.
12. Rinse with hot water.
13. Place components so they will drain and air dry.
14. Inspect o-rings and replace if necessary.
15. Before reassembling, spray gaskets with a sanitary lubricant.
16. If any damaged or worn parts are noticed during cleaning, replace them before reassembling the unit.
17. Reverse the order of disassembly to reassemble the blender.

REPAIR

Normal repair on the AC+ Dry Blender usually includes the simple replacement of defective or worn parts. There are few moving parts to the blender; they include the control valve – either a Butterfly valve or a ball valve – the shafts, impeller, seal, belt (for 3218 and 4329 models), and the motor shaft. Refer to the manufacturer's recommendations for repair or replacement of the drive motor.

DISASSEMBLY

Remove power before servicing to prevent unintended start of the blender

Inlet and discharge piping must be disconnected from the blender before servicing

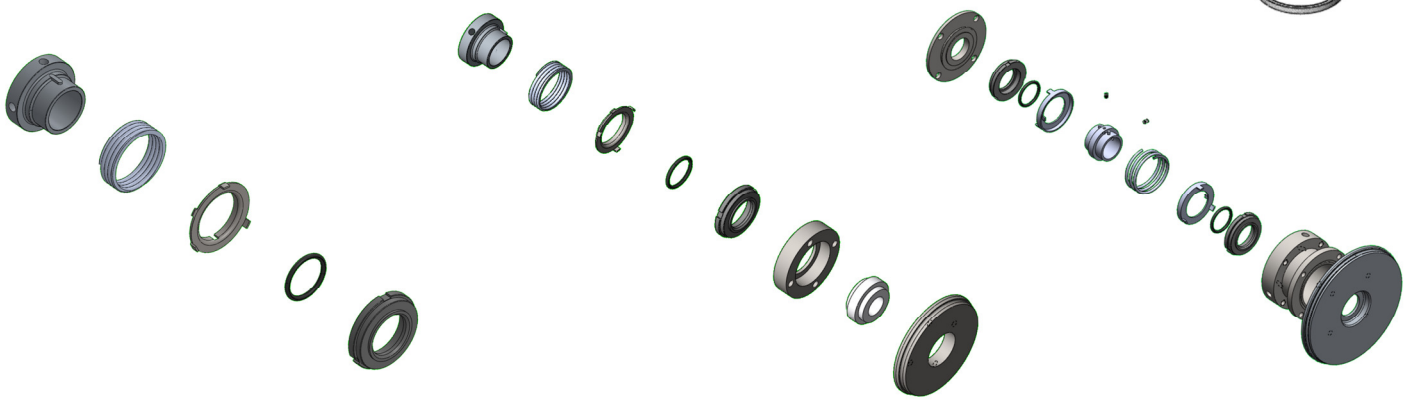
To prevent malfunctions as a result of warn or broken parts, it is recommended the blender be inspected periodically. Following are procedures for disassembling the AC+2116, AC+3218, and the AC+4329 models. Certain instructions are the same for all models but where there are differences, the procedure for each model is included.

There are three types of seals available for the AC+ Dry Blender: D DG and E Double Seal. Disassembly varies according to the seal type.

Basic Disassembly

1. Disconnect the blender from the liquid inlet piping (suction) and the discharge piping.
2. Loosen the nut on the clamp securing the hopper to the blender until the tension on the clamp is relieved.
3. Remove the clamp, hopper, and gasket.
4. Loosen the clamp holding the control valve.
5. Hold the valve while removing the clamp to prevent it from falling. To repair the valve, see manufacturer's instructions.
6. Loosen and remove the clamp at the top of the inlet adapter.
7. Remove the clamp, the diffuser, and the suction tube.
8. Loosen and remove the clamp securing the inlet tube adapter to the casing.
9. Remove the adapter and the gasket.
10. Remove the large clamp that secures the casing to the back plate.
11. Using both hands, firmly pull the casing straight up and away from the back plate.
12. Remove the screen from inside the casing.
13. Using the appropriate wrench, remove the nut and gasket that secure the impeller to the stub shaft.
14. Remove the impeller.

From this point forward, disassembly varies according to the type of seal in the blender. Refer to the instructions for your specific seal arrangement.



D Seal **DG Seal** **E Seal**

1. Carefully remove the back plate and inspect the back plate, the gasket, and the casing for scratches, nicks or wear.
2. For models with the DG seal, remove four screws from the back plate. Inspect the DG seal insert, gland ring, and gaskets. Replace parts showing any wear or damage. Caution should be used in handling the back plate. Avoid damage to the back plate surface around the carbon seal opening.
3. Remove the carbon seal, cup, spring, and o-ring seal from the stub shaft.
4. Remove the drive collar from the shaft.

For E Seal replacement/reassembly, see page 17

5. Disconnect the inlet and outlet for the water to the stuffing.
6. Four screws hold the follower to the stuffing box. Remove all four screws.
7. Carefully slide the back plate assembly with the stuffing box off the shaft.
8. From the shaft, remove the inboard carbon seal, the cup, the seal spring, and the seal o-ring.
9. Loosen the two set screws and remove the drive collar.
10. From the stub shaft, remove the carbon seal, cup, seal o-ring , and the follower.

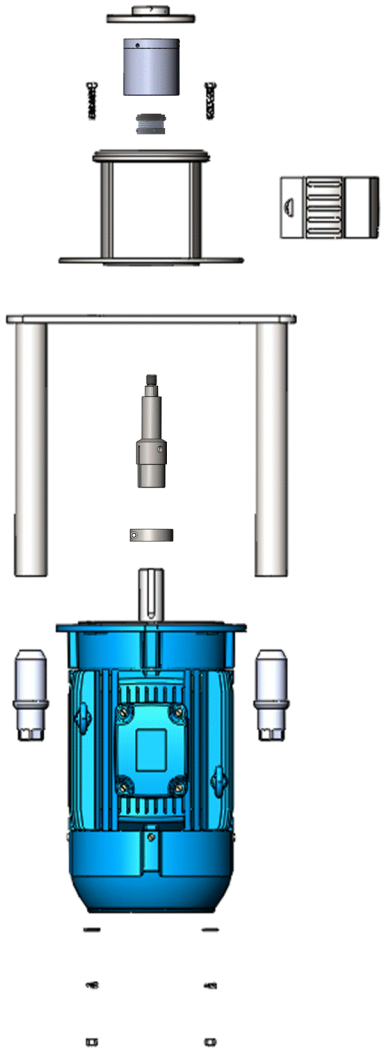
Please note, special attention should be made to drive collar replacement, as incorrect setting on the DG seal may allow for excessive wear on the seal

DISASSEMBLY (Continued)

Stub Shaft and Motor Removal

Models AC+2116 and AC+2116 System

1. To remove the drive motor from the AC+2116 or AC+2116 System, place a block suitable in size under the motor. Turn the adjustable legs until the motor rests on the block.
2. Remove the seal guard.
3. Remove the carbon seal, cup, spring, and o-ring from the stub shaft.
4. Loosen the set screws and remove the drive collar.
5. The deflector should be removed by lifting it straight up and off.
6. Use the appropriate wrench to remove the four nuts, bolts, and lock washers that secure the motor to the base.
7. The motor should now rest on the block. Lift the base from the motor. The stub shaft should remain attached to the motor.
8. Loosen the socket head cap screw in the shaft collar and slide the collar off.
9. Use a flat bar to pry beneath the stub shaft and remove it from the motor shaft.
10. Check the stub shaft for nicks or scratches that may cause o-ring seal wear and leaking.
11. To remove the adapter ring and spacers, set the base on its side and hold the adapter ring while removing the six socket head screws in the bottom of the base.
12. Remove the legs from the base.
13. Inspect all blender o-rings for damage and replace as needed.

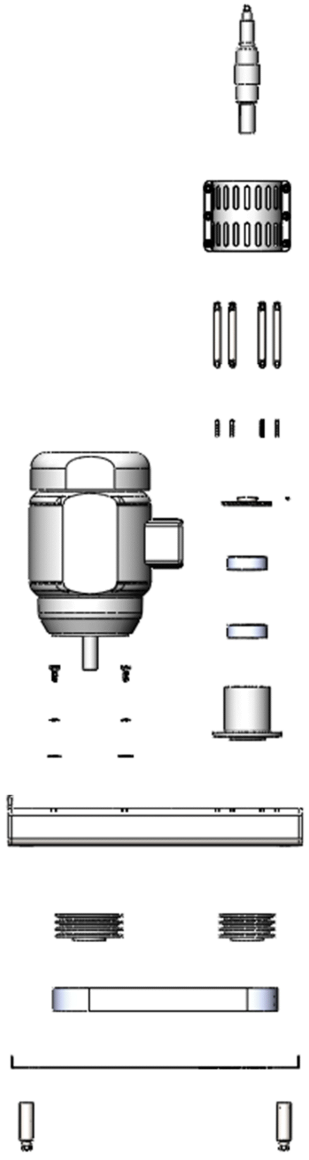


DISASSEMBLY (Continued)

Models AC+3218 and AC+4329

Models AC+3218 and AC+4329 are operated by a pulley system located on the underside of the base. To remove drive components the entire blender and base must be tipped on its side. The motor end should be toward the floor. The hopper, valve, inlet tubing, casing, impeller, seal guard, and seal components should all be removed before tipping the unit on its side.

1. On the top of the base, loosen the mounting bolts that secure the drive to the base. The base is slotted so the motor may be slid toward the blender.
2. Remove the drive belts.
3. Remove the bolts that secure the blender pulley to the underside of the base.
4. Use those same bolts and tighten into the forcing holes. Finger tighten.
5. Using the appropriate wrench, tighten the bolt until the pulley releases from the bushing. Remove the bolt and the pulley.
6. Remove the tapered bushing from the shaft of the blender.
7. To remove the adapter ring and spacers, hold the adapter ring to prevent it from falling while you remove the six cap screws.
8. Set the blender back down on all four legs.
9. Loosen the bearing housing from the base by removing the cap screws .
10. Grasp the bearing housing with both hands and firmly lift it off the blender base.
11. Remove the retaining ring.
12. Press the shaft from the housing. Use the appropriate puller to remove the bearings from the shaft then remove the second bearing from the housing.
13. Check the stub shaft for nicks or scratches.
14. All components should be checked for cracks or wear. Check o-rings for damage. Inspect the legs for worn threads. Worn or damaged components should be replaced.



Bearings are sealed and have lifetime lubrication. Worn or damaged bearings should be replaced with identical bearings and be replaced as a set.

REASSEMBLY

Models AC+2116 and AC+2116 System

1. Screw the adjustable legs into the base. On the 2116 System, use bolts to attach the base to the dolly.
2. Mount the six spacers and the ring adapter to the base. Place the base on the top of the motor. Mount the motor.
3. Loosely set the four motor mounting screws. Enough movement must be allowed to allow alignment of the motor shaft in the back plate.
4. Slide the stub shaft down and over the motor shaft.
5. Place the casing gasket on the back plate. Slide the back plate over the stub shaft.
6. Place the impeller on the shaft. There should be approximately 1/16" clearance between the back plate and impeller. The caps crews on the shaft collar may now be tightened securely.
7. Remove the impeller and check the position of the stub shaft. If the stub shaft is not centered in the back plate, move the motor until the stub shaft is centered. Securely tighten the motor mount screws.
8. Install the balanced seal. Sealing of the process fluid along the shaft is accomplished by action of the process pressure on an o-ring seal installed in a groove in the carbon seal. The same action pressurizes the o-ring groove and augments the spring tension in keeping a tight joint at the sealing faces. The width of the seal face controls the balancing of the seal. This type of seal should be replaced when the clearance between the carbon seal face and the back plate is less then 1/32: (0.79mm) or when leakage is noted. **See instructions for setting the drive collar and seal replacement on page 17**
9. Again place the impeller back gasket and impeller on the stub shaft. Place the impeller nut gasket on the impeller nut. Secure the impeller by tightening the impeller nut.
10. Place the screen to the notch on the inside of the casing. Check to see the screen fits snugly and does not spin.
11. Set the casing on the back plate and clamp together with the large casing clamp.
12. Install the seal guard.
13. Install the inlet tube assembly with gaskets and clamps. Tighten clamps. Note: there is a top and bottom to the inlet tube assembly. Place the assembly to be opposite the casing outlet tube.
14. Install the diffuser and suction tube with the gaskets and clamps. Tighten securely.
15. Mount the control valve with gaskets and clamps. Tighten.
16. Mount the hopper to the top of the valve with gaskets and clamps. Tighten.
17. Connect supply and discharge piping.

REASSEMBLY (Continued)

Models AC+3218 and AC+4329

1. Place the o-ring into the deflector collar.
2. From the bottom, slide one bearing onto the shaft until it rests against the shoulder. The AC+4329 model requires two bearings at the shoulder of the shaft.
3. Place the shaft in the bearing housing.
4. The other bearing should be installed on the shaft through the bottom of the bearing housing.
5. Place the retaining ring on the bottom of the shaft.
6. The bearing housing should then be installed by placing it on top of the base and tightening the bolts.
7. Place the deflector at the top of the bearing housing.
8. The retainer ring and spacers are set by first screwing the six spacers into the ring then bolting the spacers onto the base plate.
9. If your blender has the DG seal, install the seal gland ring with gaskets and insert to the back plate before installing the back plate.
10. Slide the back plate over the shaft, being careful to not damage the sealing surface. Place the back plate onto the retainer ring.
11. Center the shaft by tightening the spacer bolts in a cross pattern. Once the shaft is centered, remove the back plate.
12. To install the motor, the blender must be tipped back on its side. Tighten the motors bolts so they touch the bottom of the base and can be used to adjust the tension on the belts.
13. To install the pulley system, start with the blender pulley, installing the pulley key, pulley, and bushing. Tighten the bolts.
14. Next install the motor end of the pulley system. Install the motor pulley key, the pulley, and the bushing. Tighten the bolts. Both pulleys should be aligned horizontally.
15. Use the mounting bolts to draw the motor pulley tight. Tighten the bolts a small amount at a time, alternating between the three, until all are tight.
16. Now you need to install the drive belts onto both the motor and the blender pulley. You may need to move the motor to do this. The plate that holds the motor to the top of the base has slots with bolts that can be loosened to allow for this movement.
17. Once the drive belts are on the pulleys, move the motor back and away from the blender until there is a deflection of 5/16” (7.9mm) when applying 5 to 7 pounds of force to the belt.
18. Secure the motor and set the blender back on all four legs

19. Install the seal. See the instructions for setting the drive collar and seal replacement.
20. Place the casing gasket on the back plate and install the back plate on the shaft.
21. Install the impeller by tightening it down with the impeller nut, making sure the impeller nut gasket is included.
22. Place the screen to the notch on the inside of the casing. Check to see the screen fits snugly and does not spin.
23. Firmly place the casing on the back plate and use the casing clamp to secure.
24. Install the seal guard below the casing.
25. Place the inlet adapter above the casing. Secure the adapter to the casing with the clamp and gasket.
26. Add the diffuser and suction tube assembly to the top of the inlet adapter. Secure with the clamp and gasket.
27. Install the butterfly valve if supplied with the blender.
28. Install the hopper to the top of the butterfly valve and secure it with a gasket and clamp.

MAINTENANCE

SETTING THE DRIVE COLLAR AND SEAL REPLACEMENT

Follow these steps before continuing to the final assembly steps.

BLENDERS WITH D OR DG SEALS

To replace the seal, assemble the spring, seal cup, o-ring seal, and carbon seal. Install as a unit, taking care that the slot in the seal cup is aligned with the pin on the drive collar. Gentle finger pressure will overcome o-ring resistance on the shaft.

When the carbon seal is replaced, the location of the drive collar should be checked and relocated if necessary. Use one of the two following methods.

Set the Drive Collar by Measurement

1. Install the back plate, gasket, and casing.
2. Install and tighten the casing clamp.
3. Behind the back plate, mark the correct location of the drive collar by scribing a line on the shaft. See Figures 1-3. Where A is 11/32" (0.87mm)
4. Remove the casing clamp, casing, and back plate.
5. Place the drive collar on the shaft, setting it in relation to the scribe mark and tighten set screws.
6. Install the seal spring, cup, seal o-ring and carbon onto the shaft.

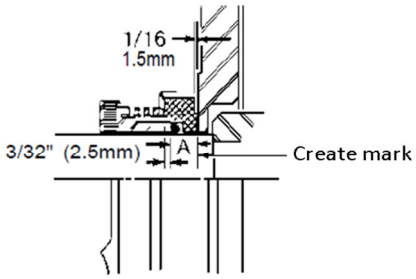


Figure 1: D Seals

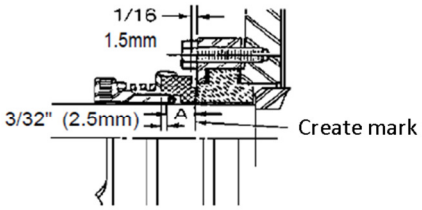


Figure 2: DG Seals

Set the Drive Collar by Position

1. Set the spring, cup, o-ring seal, and carbon seal on the drive collar.
   Check that the spring does not rest on the tab that is spent back. A portion of the spring is offset to provide clearance for this tab. Care must be taken to ensure that the pin on the drive collar is in line with the slot on the cup.
2. Install the spring, cup, o-ring, and carbon as a unit onto the shaft.
3. Install the back plate and casing..
4. Clamp the casing to the back plate and tighten clamp.

5. To locate the drive collar position, slide the collar and seal assembly towards the back plate until the o-ring and carbon seal are pushed tight against the back plate.
6. Slide the drive collar back from the back plate by 1/32" (0.79mm). Tighten the set screws to secure the drive in this location.
7. Install the seal spring, cup, seal o-ring and carbon onto the shaft.
8. For DG seals, set the DG insert and gaskets into the gland ring and screw the gland ring to the back plate.

NOTE: Extra care should be taken when assembling AC+ Blenders with type DG seals. Incorrect stub shaft settings will allow the impeller hub to contact the inboard face of the stationary seal seat. Interference of the impeller hub and seal seat face will cause wear of impeller hub and damage to the inboard or secondary seal face of the clamped-in seat. Visual inspection is recommended after installation of the impeller and before installation of the casing to ensure clearance between the impeller hub and seal face. If no clearance is visible, the blender should be disassembled and the stub shaft moved forward to provide at least 1/32" (.79mm) clearance between the impeller hub and seal seat face. Reset seal drive collar if necessary.

If the drive collar is properly positioned and seal components are properly installed, the shaft should rotate freely by hand. If excessive effort is required to rotate the shaft, check to be sure that all components are properly installed and the drive collar is properly installed.

TYPE E WATER COOLED BALANCED DOUBLE SEAL

DISCONNECT ELECTRICAL POWER SOURCE

1. Install the back plate, gasket, and casing.

2. Secure the casing to the back plate with the clamp and gasket.

3. To mark the location of the drive collar, scribe a line on the shaft.

4. Remove the casing clamp, casing, and back plate.

5. Place the follower, one of the carbon seals, one seal o-ring, one cup, and the drive collar on the shaft.

6. Set the drive collar to the scribe mark shown in Figure 3 and secure it to the shaft by tightening the set screws.

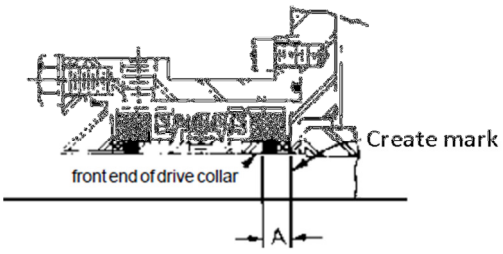


Figure 3: E Seals

7. Install the remaining seal components, including the seal spring, cup, seal o-ring, and carbon onto the shaft. Take care that the slot in the seal cup is aligned with the pin on the drive collar. Gentle finger pressure will overcome o-ring resistance on the shaft.

8. Place the stuffing box and back plate assembly over the stub shaft and the seal components.

9. Next set the follower onto the stuffing box and secure it by tightening the four screws.

10. Assemble the seal guard and tighten the nut.

11. Attach the water inlet and outlet to the stuffing box.

After setting the drive collar and assembly the seal, return the *Reassembly* section for final steps.

TROUBLESHOOTING

The AC+ Dry Blender requires little maintenance however, it is necessary to sanitize and inspect the equipment regularly. It is expected that occasional problems will occur. This section of the service manual is intended to assist you in determining the cause of the problem, and how to correct the problem you may be having with your blender.
Problems with the motor drive should be directed to the motor manufacturer.
The chart below lists problems, probable causes, and remedies with the assumption that the blender is suitable to the application and has been properly installed. If the suggested remedies do not resolve the problem, it may be that impeller cavitation is the problem. If the suction tube and the auxiliary pump are not applied correctly, you may experience the symptoms of cavitation, such as vibration, insufficient discharge, and noisy operation. Ampco recommends you double check the system and the application if any of these symptoms occur. If you need further assistance, contact Ampco Pumps Company.

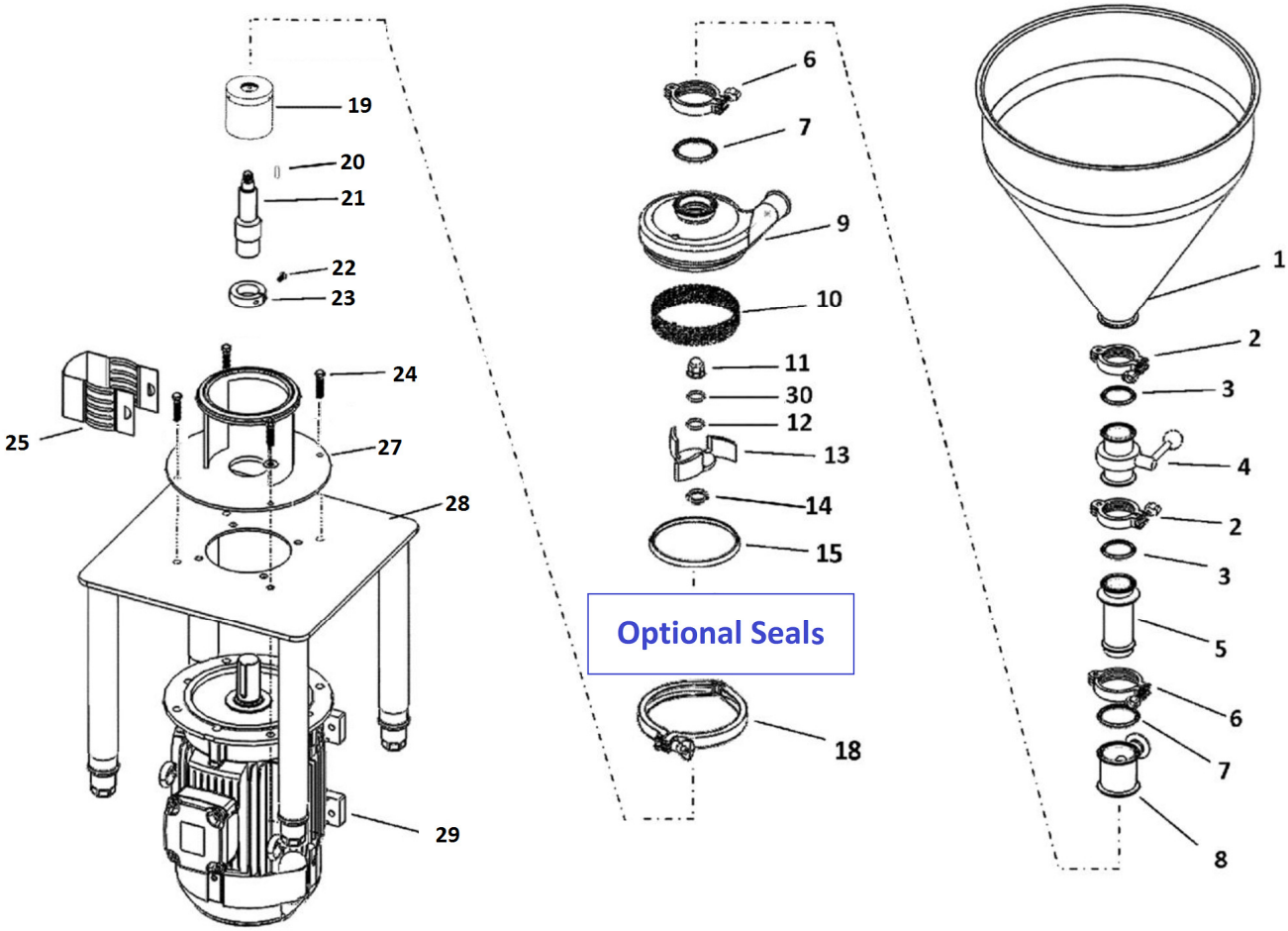
PROBLEM	PROBABLE CAUSE	REMEDY
1.) No suction	a.) Wrong supply pump or need of discharge pump b.) Leak on the suction side of the supply pump or blender. c.) Carbon seal is worn. d.) Wrong direction of rotation. e.) Liquid inlet port on the wrong side. f.) Splashing in the suction throat of the Tri-Blender. g.) High percentage of solids. h.) High temperature.	a.) Verify that pumps are sized correctly to suit application. Contact Ampco Pumps Company if you require assistance. b.) Tighten all clamps, and fittings. Replace worn out gaskets. c.) Replace carbon seal on blender and/or supply pump. d.) Reverse a three phase motor by switching any two of the three power leads at the motor or controller. e.) Remove inlet adapter housing and relocate so it is correctly positioned as shown on the exploded view pages. f.) High Flow – oversized supply pump; see 1a. and 1d. above.

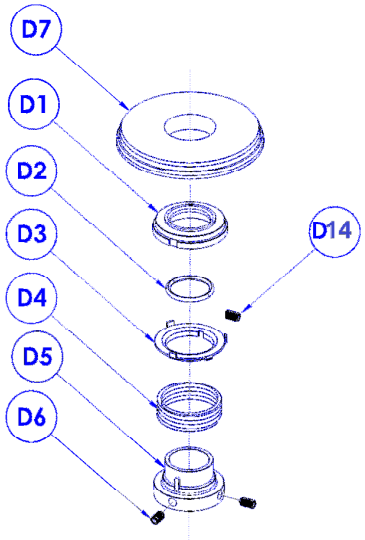
		g.) See 3b. h.) Reduce temperature below 140°F (60°C).
2.) Insufficient discharge	a.) High percentage of solids with screen in casing. b.) No liquids. c.) Product too viscous or discharge head too great.	a.) Remove screen. b.) Check supply pump. c.) Add discharge pump.
3.) Excessive power consumption	a.) High percentage of solids with screen in casing. b.) No liquids.	a.) Remove screen. b.) Install discharge pump on discharge end of the Tri-Blender.
4.) Tri-Blender is noisy.	a.) Magnetic hum in motor. b.) Motor bearings are worn. c.) Tri-Blender bearings are worn. d.) Foreign matter is rotating with impeller. e.) Blender screen rotating inside casing.	a.) Consult motor manufacturer. b.) Consult motor manufacturer. c.) Replace bearings. d.) Remove casing and foreign matter inside. Inspect for damage. e.) Replace the screen with a larger screen that fits snugly inside the casing.
5.) Excessive vibration.	a.) Blender is not leveled properly. b.) Impeller is damaged. c.) Foreign matter in casing.	a.) Level blender. b.) Replace impeller. c.) Remove casing and foreign matter. Inspect for damage.
6.) Dry-Blender leaks.	a.) O-ring seal is worn. b.) Carbon seal is worn. c.) Insufficient compression on seal. d.) Backplate gasket is worn. e.) Backplate is worn. f.) Clamp is loose.	a.) Replace o-ring seal. b.) Replace carbon seal. c.) Replace spring. d.) Replace gasket. e.) Replace backplate. f.) Tighten clamp.

Parts List: AC+2116

Key	Description	Part Number	Qty	Key	Description	Part Number	Qty
1	Hopper	DBH2116-2-TC	1	15	Casing Gasket	S216-90A-U	1
2	(2”) Clamp	13MHHM200	2	18	Casing Clamp	S216-75AR-S	1
3	(2”) Gasket	40MP-U200	2	19	Deflector/Slinger	DBX8207351	1
4	(2”) Butterfly Valve	B5101E200CC-C	1	20	Impeller Key	S216-95C-316L	1
5	Diffuser/Dry Feed Tube	DBX2116-200D	1	21	Stub shaft	C216E-18TP-06	1
6	(2.5”) Clamp	13MHHM250	2	22	Shaft Collar Screw	GX5494026SS	1
7	(2.5”) Gasket	40MP-U250	2	23	Shaft Collar	SX18000014	1
8	Inlet Adapter	DBX2116-250W	1	24	Adapter Cap Screw	(D) GX5079700 (DG) SC1710H-SS (E) SC1106E-SS	4
9	Pump Casing	S316DB-01C	1	25	Seal Guard	C216-18T-131-S	1
10	Casing Screen	DBX8307982	1	27	Adapter	216D18T-71DB-SS	1
11	Impeller Nut	S2116-91C-316L	1	28	Platform/Base	DBB-2116-180	1
12	Impeller Nut Gasket	S216-25A-U	1	29	Motor	Optional	1
13	Impeller	S216-02DB-316L	1	30	O-Ring, Rotor Hub	N70224	1
14	Impeller Back Gasket	S216-25B-U	1				

D1	Carbon Seal	216E-80-1A	1 (D)	E1	Carbon Seal	216E-80-1A	2
D2	Seal O-Ring	01-1165-19-U	1	E2	Seal O-Ring	01-1165-19-E	2
D3	Cup D	216D-80-3P	1	E3	Cup E	216E-80-3P	2
D4	Spring D	216D-80-4	1	E4	Drive Collar E	216E-23-316L	1
D5	Drive Collar D	SP216D-23P-S	1	E5	Spring E	216E-80-4A	1
D6	Set Screws	SC1105A-SS	3	E6	Set Screws	SC1103A-SS	3
D7	Backplate D	(D) 216D-11-316 (DG) SP216G-11-316L	1	E7	Stuffing Box	216E-83B-316	
D8	Gasket -Thick	SP216G-80-12AG	1	E8	Backplate E	216E-11B-316	1
D9	Seal Seat	SP216G-80-11SC	1	E9	Follower	216E-17-316	1
D10	Gasket -Thin	SP216G-80-12G	1	E10	Lockwasher	LWA1300-SS	4
D11	Gland Ring	SP216G-17-316L	1	E11	Machine Screw	SC1308H-SS	4
D12	Mounting Bolt	GX5076004	4	E12	O-RING	17-122-U	1
D13	Lock Washer	LWA-1300-SS	4	E13	O-Ring	17-275-U	1
D14	Set screw cup point	GX5494026SS	3				





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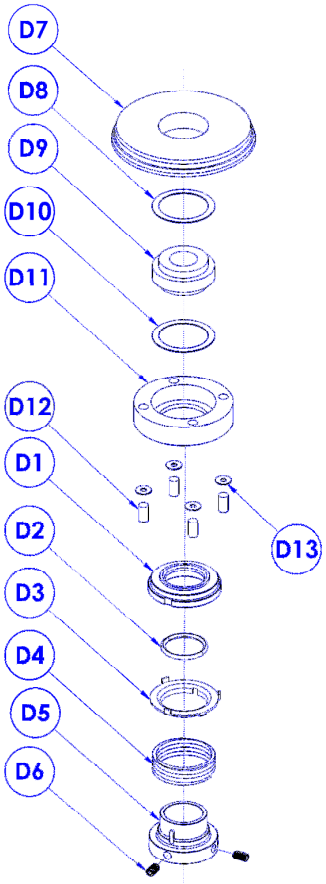

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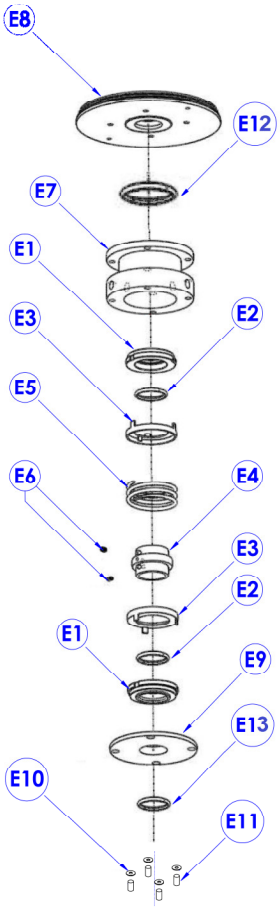
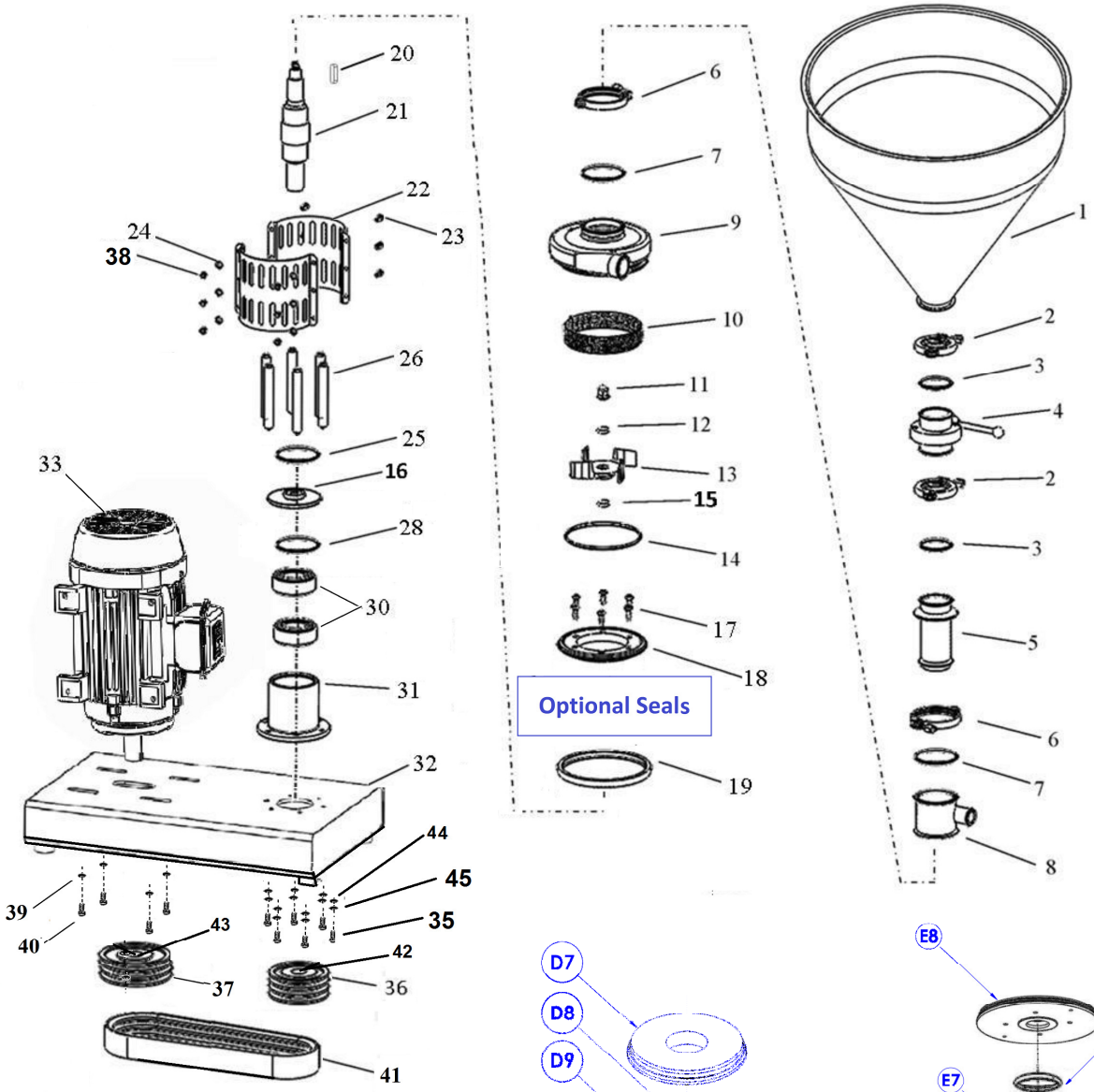


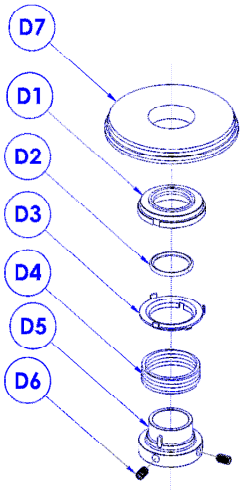
E SEAL

Parts List: AC+3218

Key	Description	Part Number	Qty	Key	Description	Part Number	Qty
1	Hopper	DBH3218-3-TC	1	23	Hex Cap Screw	GX5503110	6
2	3” Clamp	13MHHM300	2	24	Flat Washer	P1GX43-189	12
3	Gasket	40MPF-U300	2	25	O-Ring Rotor Nut	N70130	1
4	Butterfly Valve	B5101E300CC-C	1	26	Support Column	DBX8112312	6
5	Diffuser/Suction Tube	DBX3218-300D	1	28	Retaining/Snap Ring	99142A685	1
6	4” Clamp	13MHHM400	2	30	Bearing	DBX5212-2RS	2
7	Gasket	40MPF-U400	2	31	Bearing Frame	DBX8307752	1
8	Inlet Adapter	DBX3218-400W	1	32	Blender Base	DBB3218-250	1
9	Pump Casing	S428DB-01C-E	1	33	Motor	Optional	1
10	Screen	DBX8307762	1	35	Socket Cap Screw	GX5503115S	6
11	Impeller Nut	S328-91C-316L	1	36	Sheave Dodge 1	455630	1
12	Impeller Nut Gasket	S328-25A-U	1	37	Sheave Dodge 2	455621	1
13	Impeller	S328-02DB-316L	1	38	Hex Nuts	GX5503000	6
14	Casing Gasket	S328-90A-U	1	39	Flat Washer	GX10610500	4
15	Impeller Back Gasket	S328-25B-U	1	40	Adapter Capscrew	GX5079700	4
16	Deflector/Slinger	(D) DBX8207082 (E) DBX8207702	1	41	Belt	7888K222 (1750) 788K252 (1450)	1
17	NEED 6	GX5077200	6	42	SD Sheave Bushing	120382	1
18	Pump Adapter	DBX8307742	1	43	SK Sheave Bushing	120431	1
19	Adapter Casing Clamp	S328-75AR-S	1	44	Flat Washer	GX5505015	6
20	Impeller Key	S328-95C-316L	1	45	Lockwasher	GX5503010	6
21	Stub shaft	C328E-25DB-06	1				
22	Guard	DBX8207292	1				

D1	Carbon Seal	328E-80-1A	1	E1	Carbon Seal	328E-80-1A	2
D2	Seal O-Ring	S328-80-2-U	1	E2	Seal O-Ring	328E-80-1A	2
D3	Cup D	328D-80-3P	1	E3	Cup E	328E-80-3P	2
D4	Spring D	328D-80-4	1	E4	Drive Collar E	328E-23-316L	1
D5	Drive Collar D	SP328D-23P-S	1	E5	Spring E	328E-80-4A	1
D6	Set Screws	SC1105A-SS	2	E6	Set Screws	SC1103A-SS	2
D7	Backplate D	(D) 328D-11-316 (DG) SP328G-11-316L	1	E7	Stuffing Box	DBX8207712	1
D8	Gasket -Thick	SP328G-80-12AG	1	E8	Backplate E	328E-11B-316	1
D9	Seal Seat	SP328G-80-11SC	1	E9	Follower	DBX8207722	1
D10	Gasket -Thin	SP328G-80-12G	1	E10	Lockwasher	LWA1300-SS	4
D11	Gland Ring	SP328G-17-316L	1	E11	Machine Screw	SC1308E-SS	4
D12	Mounting Bolt	SC1310H-SS	4	E12	O-Ring	17-274-U	1
D13	Lock Washer	LWA-1300-SS	4	E13	O-Ring	17-153-U	1





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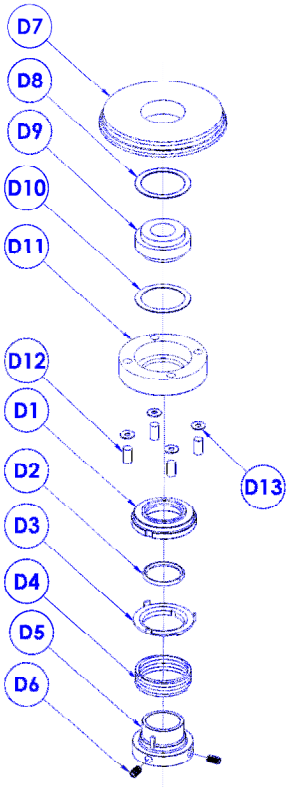

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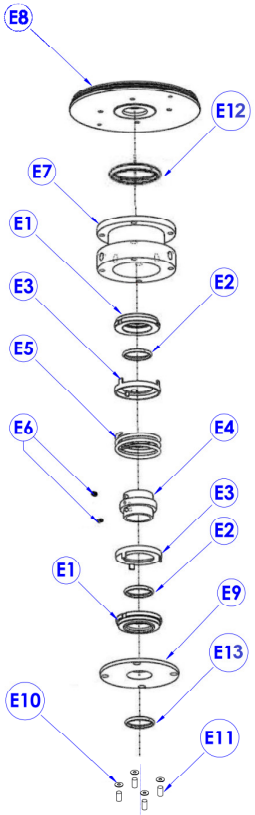
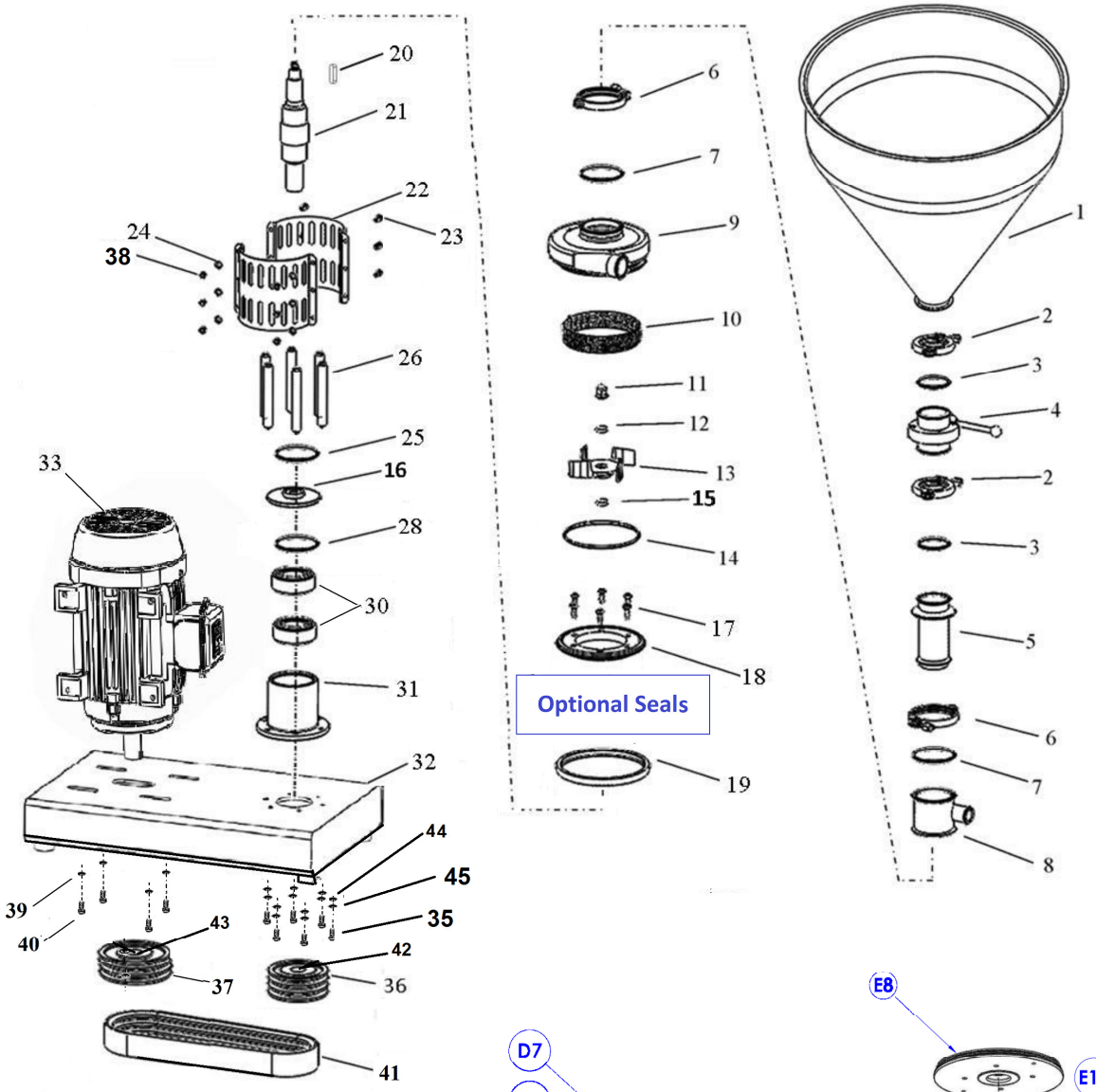


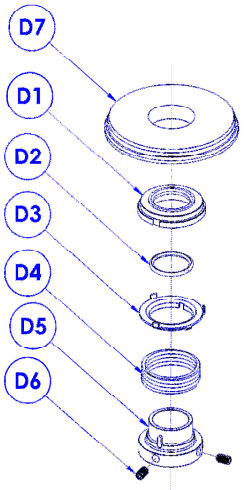
E SEAL

Parts List: AC+4329

Key	Description	Part Number	Qty	Key	Description	Part Number	Qty
1	Hopper	DBH4329-4-TC	1	22	Guard	DBX8307732	1
2	6” Clamp	13MHHM600	1	23	Hex Cap Screw	GX5503110	6
3	Gasket	40MPF-U600	2	24	Flat Washer	P1GX43-189	12
4	Butterfly Valve	B5101E400CC-C	1	25	O-Ring Rotor Nut	N70130	1
5	Diffuser/Suction Tube	DBX4329-400D	1	26	Support Column	DBX8112462	6
6	4” Clamp	13MHHM400	2	28	Retaining/Snap Ring	99142A685	1
7	Gasket	40MPF-U400	1	30	Bearing	DBX5212-2RS	2
8	Inlet Adapter	DBX4329-600W	1	31	Bearing Frame	DBX8307752	1
9	Pump Casing	S6410DB-01C-E	1	32	Blender Base	DBB3218-280	1
10	Screen	DBX8308112	1	33	Motor	Optional	1
11	Impeller Nut	S4410-91C-316L	1	35	Socket Cap Screw	GX5503115S	6
12	Impeller Nut Gasket	(D) N70130 (E&DG) S4410-25A-U	1	36	Sheave Dodge 1	455621	1
13	Impeller	S4410-02DB-316L	1	37	Sheave Dodge 2	455627	1
14	Casing Gasket	SP4410-90A-U	1	38	Hex Nuts	GX5503000	6
15	Impeller Back Gasket	S4410-25B-U	1	39	Thick Flat Washer	GX10610500	4
16	Deflector/Slinger	(D) DBX8207082 (DG) DBX8207331 (E) DBX8207702	1	40	Adapter Cap Screw	GX5079700	4
17	Cap Screw	GX5077200	6	41	Belt	788K252	1
18	Pump Adapter	DBX8308231	1	42	SD Sheave Bushing	120382	1
19	Adapter Casing Clamp	SP4410-75D-S	1	43	SK Sheave Bushing	120435	1
20	Impeller Key	S4410-95C-316L	1	44	Flat Washer	GX5503015	6
21	Stub Shaft	4410E-25DB-06	1	45	Lock Washer	GX5503010	6

D1	Carbon Seal	4410E-80-1	1	E1	Carbon Seal	4410E-80-1	2
D2	Seal O-Ring	17-15-U	1	E2	Seal O-Ring	17-15-U	2
D3	Cup D	4410D-80-3	1	E3	Cup E	4410E-80-3	2
D4	Spring D	4410D-80-4	1	E4	Drive Collar E	4410E-23-316	1
D5	Drive Collar D	4EHD-143-23P-S	1	E5	Spring E	4410E-80-4	1
D6	Set Screws	SC1105A-SS	2	E6	Set Screws	SC1105A-SS	2
D7	Backplate D	(D & E) 4410D-11-316 (DG) 4410G-11-316	1	E7	Stuffing Box	4410E-83B-316	1
D8	Gasket -Thick	4410G-80-12AG	1	E8	Backplate E	4410E-11-316	1
D9	Seal Seat	4410G-80-11SC	1	E9	Follower	4410E-17-316	1
D10	Gasket -Thin	4410G-80-12G	1	E10	Lockwasher	LWA-1300-SS	4
D11	Gland Ring	4410G-17-316L	1	E11	Machine Screw	SC1308E-SS	4
D12	Mounting Bolt	SC1310H-SS	4	E12	O-Ring	17-108-U-25	1
D13	Lock Washer	LWA-1300-SS	4	E13	O-Ring	17-153-U	1





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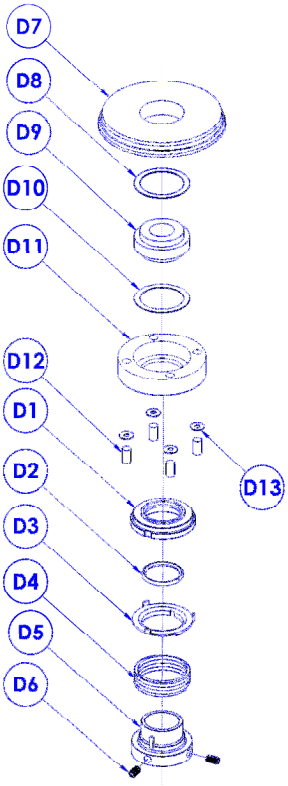

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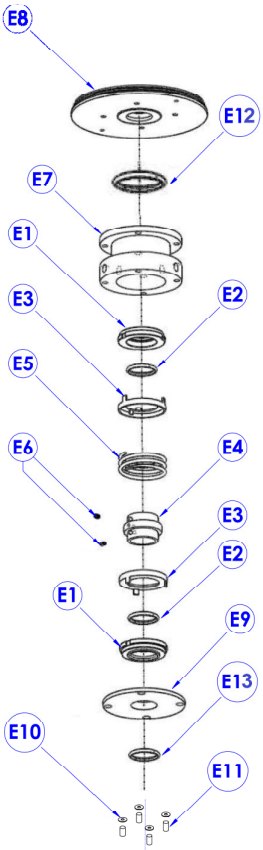

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