

Self-Priming Pumps



Operation Manual

WDM Water Systems

## 1. Introduction.

This manual contains instructions for the installation and operation of your Self-Priming pump. Read these recommendations carefully before use. Keep this manual for future reference.

Congratulations! You have purchased a product developed with the latest technology from WDM Pumps, Inc. (referred to as “WDM”).

WDM designs and manufactures our products with the highest quality components. Our experience as a manufacturer and our special care and dedication in production result in products that meet the highest standards.

The information contained in this manual is important for the installation, operation and maintenance of your WDM Self-Priming pump. Read all instructions carefully before installing and using the product. Keep this manual for future reference.

Our products are factory tested to ensure proper operation. Inspect carefully and make sure there are no missing or damaged pieces from shipping. If, upon delivery, parts are damaged or missing, make a claim to the shipping company as soon as possible.

The design of this product, as well as the materials and processes used in its manufacture provide for proper operation. However product performance and lifespan depend on appropriate application, installation, periodic inspection and general preventive maintenance.



## **WARNING.**

WDM is not responsible for any damage or accidents that occur when the instructions given in this manual have not been followed.

The warranty is only valid when using WDM original spare parts. Failure to follow these guidelines in installing and starting your pump will void your warranty.

## **2. Safety Recommendations.**

- WDM pumps are designed to operate safely when used and maintained according to this manual.
- Rotating parts of the pumps are dangerous and can cause injury. Operators and maintenance personnel should be aware of and follow safety recommendations.
- The pumps are considered heavy equipment. Handle them with care.
- To reduce the risk of electrical shock, all wiring of pumps, motors, overload protection and control panels must be in accordance with the National Electric Code (NEC) or the Canadian Electrical Code (CEC) and all applicable state, province, local codes and ordinances. Requirements will vary depending on usage and location. Improper grounding will void the warranty.
- To reduce risk of electrical shock, always disconnect the pump from the power source before handling or servicing. Cable should be inspected frequently.
- Never handle connected power cords with wet hands.
- If any product is to be returned, it must be cleaned, sanitized, or decontaminated as necessary according to any applicable laws and regulations prior to shipment, to protect employees from exposure to health hazards.
- Bronze/brass and bronze/brass fitted pumps may contain lead levels higher than considered safe for potable water systems. Lead is known to cause cancer and birth defects or other

reproductive harm. Leaded copper alloys should not be used in potable water applications. If this pump is for use in a potable water application, contact manufacturer to determine suitability.

- Loose fitting clothing can easily be caught by the impeller or other moving parts, therefore do not wear loose fitting clothing when doing maintenance or service work on the pump. Always wear appropriate protective equipment, including gloves, safety glasses or shoes, when installing, servicing or repairing the pump or piping.
- Keep clear of suction and discharge openings.
- Disconnect power before inserting fingers in pump.
- Do not operate pump without safety devices in place. Make sure lifting handles are securely fastened each time before lifting.
- Replace all safety features and devices that may have been removed during service or repair.
- During installation, secure the pump so it cannot tip over, fall or slide from its operating position.
- Do not allow pump to exceed manufacturer's recommendation for maximum performance, as doing so could cause the motor to overheat.
- Operating the pump while the discharge valve is closed will cause premature bearing and seal failure on any pump. Heat buildup inside end-suction and self-priming pumps may generate steam, resulting in dangerous pressures. WDM recommends that a high temperature switch or pressure relief valve be installed on the pump body.
- Pumps build up heat and pressure during operation. Allow sufficient time for pumps to cool before handling or servicing.
- Never pump hazardous materials (flammable, caustic, etc.) unless the pump is specifically designed and designated to handle them. Doing so will void the warranty.

## **Pump coupled to combustion engines.**

- Make sure combustion engines have adequate ventilation. Never operate combustion engines in an enclosed area where fumes can collect.
- Do not refuel the tank while the engine is running. Shut off engine and wait until it cools.

## 3. General Information.

### Receiving.

Pumps should be inspected upon receipt. Make note of damage or missing parts, if any, and immediately file a claim with the shipping company. During inspection, if the manual is removed, do not lose or misplace it.

### Storage.

While our pumps are designed to work efficiently after a short period of storage, best results occur when the pump is kept, as assembled in the factory, in a storage facility that has a dry atmosphere and constant temperature. Short term storage should not exceed 6 months.

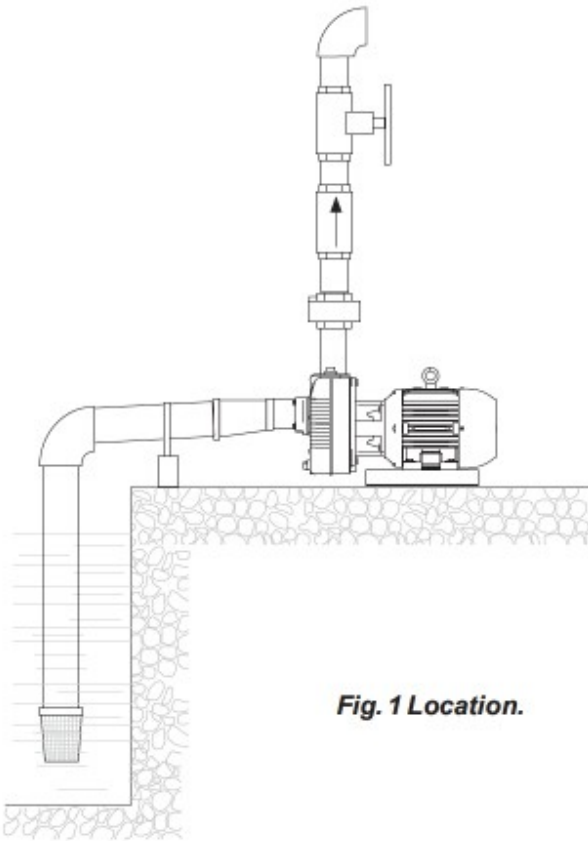
If planning to store the pump for more than 6 months, but less than 24 months, the pump should be stored inside an enclosure that is temperature controlled between 40°F - 120°F (4°C - 50°C). The enclosure should provide protection from all elements.

Prior to storage, if high humidity is expected during storage, all exposed areas with paint should be inspected and repainted with a water base, air dry enamel paint. Then all surfaces should be sprayed with rust-inhibiting oil. The pump should be kept in its original storage container. Before starting the pump up, the impeller should be rotated by hand to see if seal and impeller rotate freely.

## 4. Installation.

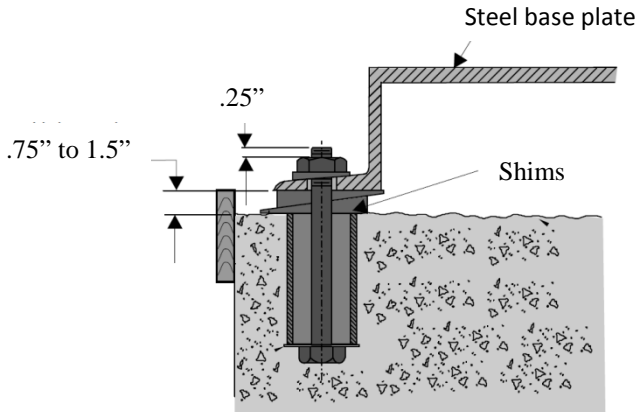
### Location.

The pump should always be as close as possible to the liquid supply and in no case should the pump be more than 25 feet above the surface of the liquid supply. The pump should always be as level as possible. (See Fig. 1).



**Fig. 1 Location.**

## Pump Foundation.



## Rotation.

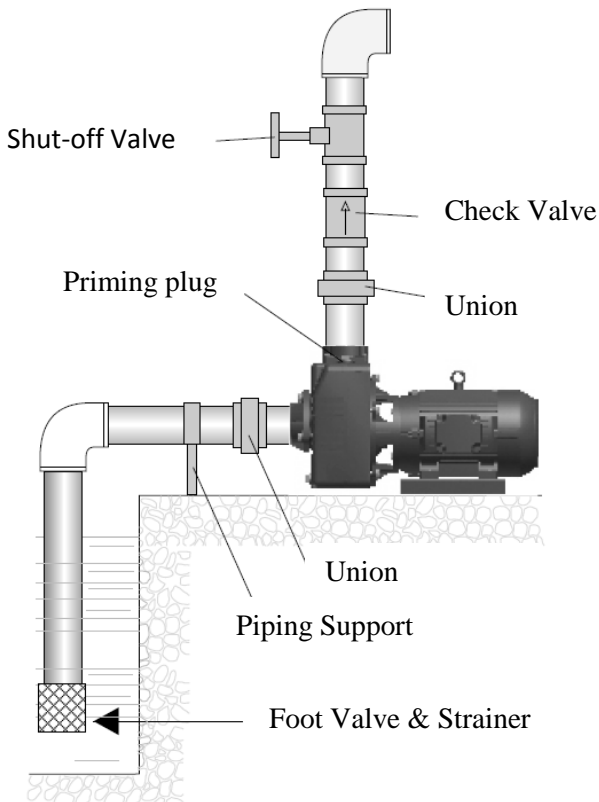
Check the direction of the rotation of the pump to be sure that it agrees with direction indicated on the rotation plate. If the direction of the rotation is incorrect, consult the following instructions. For a 3 phase, exchange any two incoming wire leads. For a 1 phase, follow the connection name plate on the motor. All pump units should rotate clockwise when viewing from the motor end of the pump. Securely install the pump on a firm footing to make sure the pump will not move due to vibration.

## Suction System.

Use a suction line that is the same size as the pump port. Using a suction line smaller than the pump port size can cause internal damage to the pump. Horizontal suction lines should slope up to the pump to prevent trapped air pockets. Support the weight of the suction line by installing an adjustable stand, pipe clamp or a floor flange.

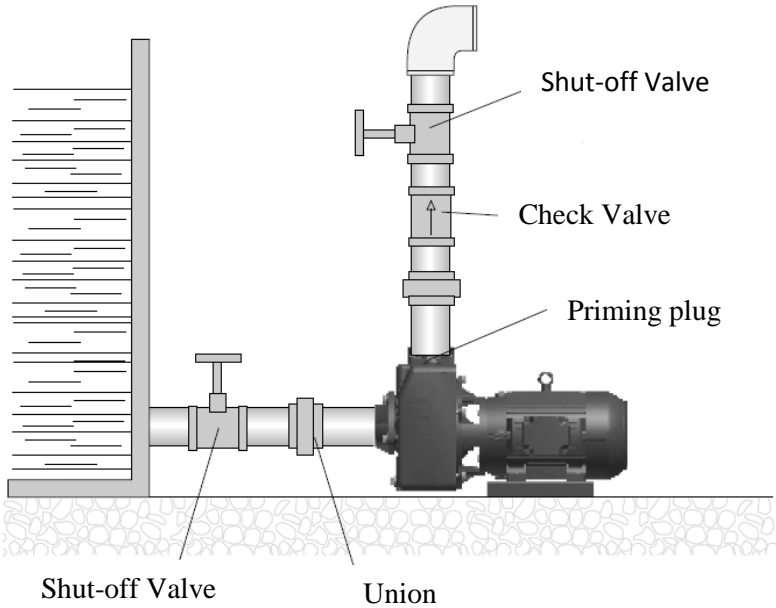
The suction line must not have holes. The slightest air leak in the suction line can prevent the pump from priming. To insure an air tight joint, use pipe thread compound in all threaded connections in the suction line. . Suction flanges should also be pulled up tight to prevent air leaks.

## Negative Suction



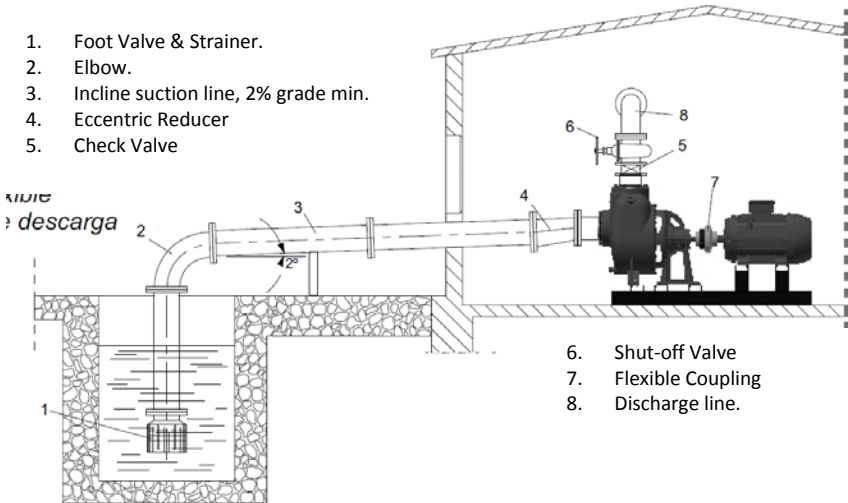


## Positive Suction

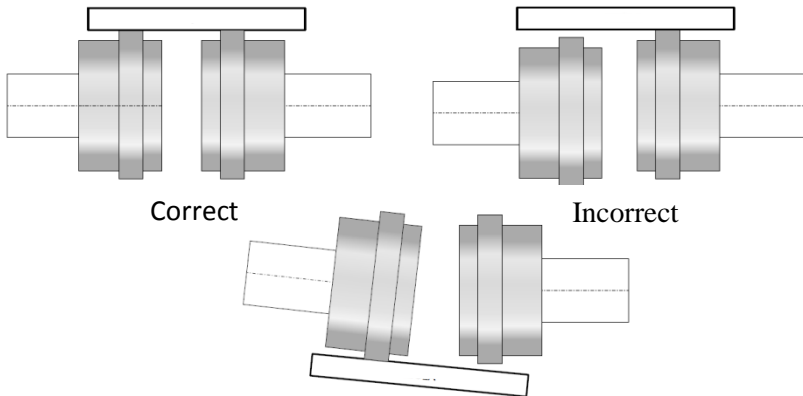


## Frame Mounted Units

1. Foot Valve & Strainer.
2. Elbow.
3. Incline suction line, 2% grade min.
4. Eccentric Reducer
5. Check Valve



Verify the correct alignment between the motor and the pump shafts. The pump was accurately aligned with the motor at factory, but you should always verify and realign if required during final installation. Failure to do it might cause pump malfunction and void the manufacturer warranty.



## CAUTION.

Always operate this pump with a strainer on the end of the suction line to prevent sticks, stones, rags and other foreign matter from being drawn into the impeller. Clean the strainer regularly to prevent clogging and insure full flow.

## Discharge System.

Connect the discharge hose or pipe to the side outlet on the discharge tee, or to the discharge elbow.



## ATTENTION.

WDM does not supply all the accessories (valves, gauges, pipes, extensions, etc.) mentioned in this operation manual.

## Electric motor & connections.

Read the motor manufacturer's instructions, or consult the connection diagram located either on the motor name plate or inside the cover on the conduit box. The wiring of the motor and control panel, overload protection and grounding should be in accordance with State, Province, Local and National Electrical Code (NEC) or Canadian Electrical Code (CEC). Be sure the following criteria are met:

1. AC power is within  $\pm 10\%$  of rated voltage with rated frequency. (See motor name plate for rating).  
OR
2. AC power is within  $\pm 5\%$  of rated frequency with rated voltage. OR
3. A combined variation in voltage and frequency of  $\pm 10\%$  (sum of absolute values) of rated values, provided the frequency variation does not exceed  $\pm 5\%$  of rated frequency.

## Pump Lubrication.

The pump requires no lubrication. The impeller and seal are the only moving parts of the pump. These parts are water lubricated and need no attention.



### **CAUTION.**

Do not operate pump without liquid in pump body as operating dry will result in damage to the seal.

## 5. Operation.

### Priming.

Remove the priming plug, located in the top of the discharge tee or in

top of pump body, and fill the pump body completely with liquid. Liquid should be as free of solids as possible. In freezing weather, the pump should be primed with warm water whenever possible, to prevent damage that might be caused by ice forming inside the pump.

## **Starting.**

After completing this procedure, the pump is now ready for operation. Start the pump by applying power to motor as outlined in the motor instructions.

## **Shutdown.**

Operation may be discontinued by disconnecting electric power. When the pump has been operating in freezing weather or in liquid that contains a considerable amount of solids, it is advisable to drain the pump body by removing the drain plug and flushing the solids out of the pump body.

Replace the drain plug.

## **Restart.**

Any time the pump is restarted, but especially when the pump has been drained, check to make sure the pump is refilled back to the level required for self-priming. The pump is self-priming only when the body is full of liquid

## **6. Pump service and repair.**

### **Check valve service.**

To clean out or repair a check valve, disconnect the suction piping, then remove cap screws and suction flange.



## ATTENTION.

Do not pry the flange off, but rather bump it off with a block of wood and a hammer. Pull off the gasket together with the weights, round head screw and lockwasher. All parts should be examined and parts showing wear or damage should be replaced. When replacing the gasket and weight assembly onto the pump body, make sure that the hinge section of the gasket is at the top and that the large weight is on the pump side of gasket.

## Body, volute and impeller service.

To clean out or repair the body, volute or impeller, disconnect suction and discharge piping.

Remove the hex nuts and lockwashers and pull the body from the intermediate coupling. This will expose the O-ring, impeller, impeller locking screw, volute and volute gasket. Examine all parts for wear and tear and replace as necessary.

If the impeller needs to be replaced, pull volute from intermediate coupling, remove set screw or cap screws and washers, and unscrew the impeller from the motor shaft. As the impeller is screwed onto the shaft with right hand thread, break loose by placing a block of wood against a vane and striking it with a hammer. When reassembling, be sure to use the required number of shims to result in an impeller-to-volute clearance of not more than .021”.

## Shaft seal service.

When examining or replacing the shaft seal, remove the body and impeller, impeller shims and rotating member of shaft seal from motor shaft. This exposes all components of the shaft seal so they can be examined. When any part shows wear and tear or damage, the entire shaft seal assembly should be replaced. If a stationary member needs replacing, pry the used stationary member from the

intermediate coupling.



## **CAUTION.**

All seal parts should be handled with extreme care. Do not scratch or mar lapped faces.

Lightly oil the ring and press the replacement stationary member over motor shaft and into intermediate coupling.

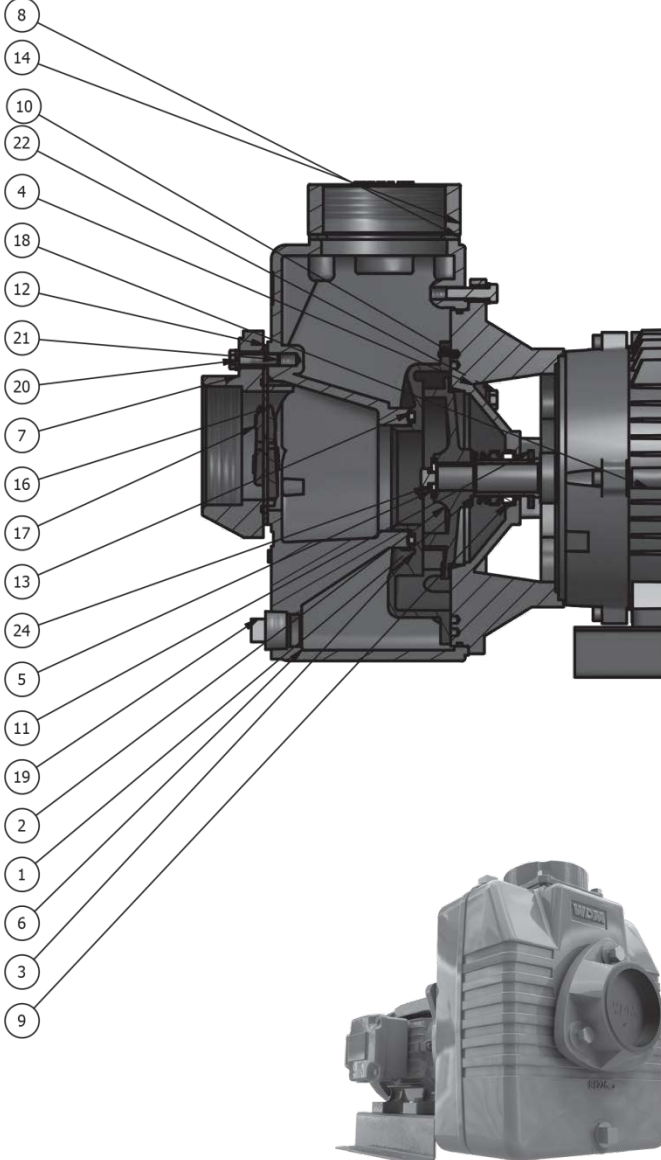
The motor shaft and inner surface of bellows of rotating member should be lightly oiled. With the lapped surface facing the intermediate coupling, slide the rotating member onto the shaft until the lapped faces of the rotating member and stationary member are together. Then reassemble the remainder of the pump.

## **Motor service.**

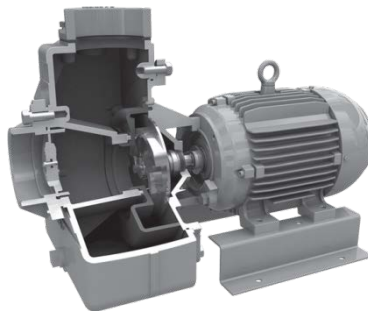
To remove or replace the motor, disassemble the pump. Remove the cap screws and lockwashers to remove the motor, and base. To remove the motor from the base, remove the cap screws on hex nuts.

## 7. Sectional.

### AE Series.



Item	Description
1	Shaft Sleeve
2	Impeller
3	Volute
4	Motor Bracket
5	Washer
6	Casing
7	Suction
8	Discharge Gasket / O ring
9	Mechanical Seal
10	Volute Pin
11	Slinger
12	Check Valve Gasket
13	Volute Gasket
14	Discharge
15	Base brackets
16	Big Weight
17	Small Weight
18	Motor
19	Square Head Plug
20	Heavy Helical Spring Lock Washers (Inch Series)
21	Hex Cap Screw
22	Hex Bolt - UNC (Regular Thread - Inch)
23	Hex Cap Screw
24	Hex Bolt - UNC (Regular Thread - Inch)

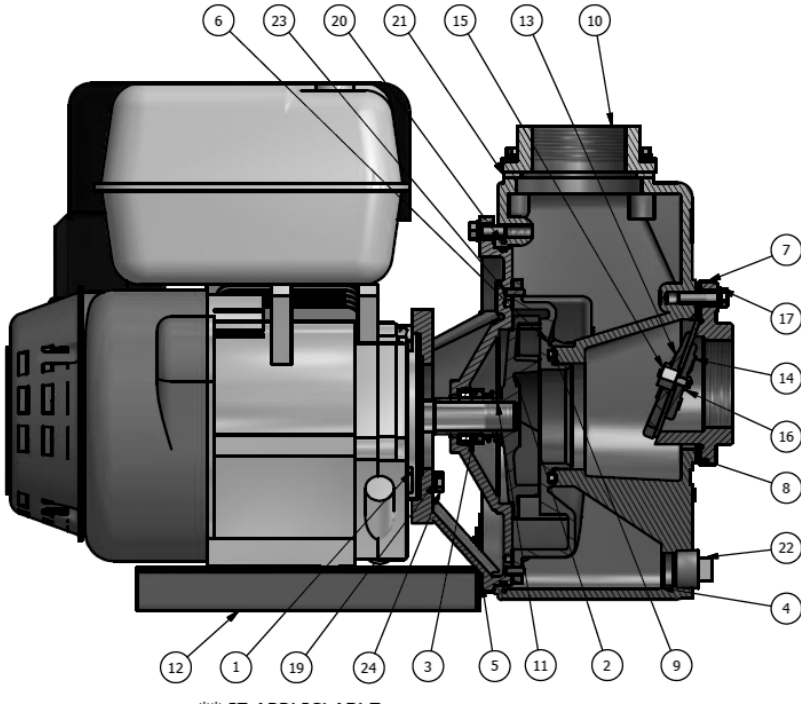




# Self-Priming Pumps.



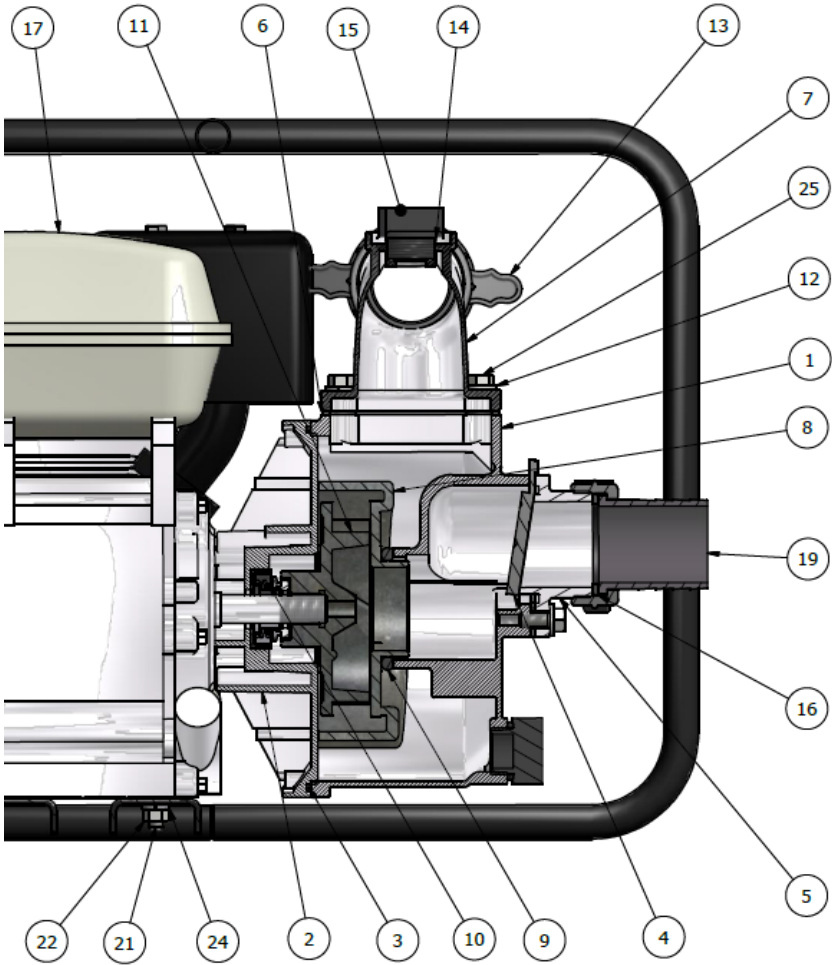
## AG/AD Series.



Item	Description
1	Engine
2	Impeller
3	Shaft Seal
4	Casing
5	Engine Bracket
6	Volute
7	Suction
8	Suction Gasket
9	Volute Gasket
10	Discharge
11	Shaft Sleeve
12	Base Brackets
13	Big Weight
14	Small Weight
15	Hex Nut
16	Round Screw
17	Lock Washer
18	Hex Bolt
19	Lock Washer
20	O-ring
21	Discharge Gasket
22	Drain Plug
23	Volute Pin
24	Cap Screw



## AAG/AAD



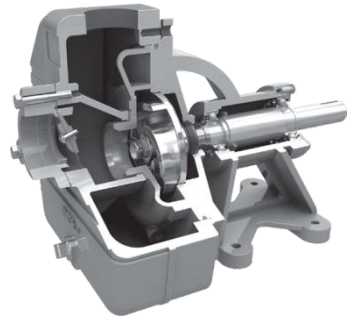
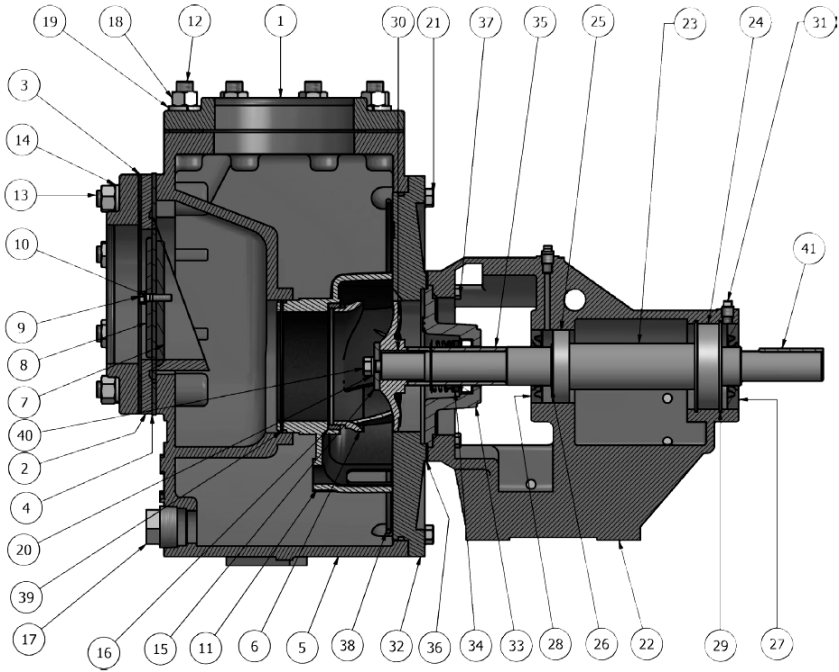
Item	Description
1	Casing
2	Engine Bracket
3	O-ring
4	Gasket
5	Suction
6	Discharge Gasket
7	Discharge
8	Volute
9	Volute Gasket
10	Mechanical Seal
11	Impeller
12	Lock Washer
13	Plastic Coupling
14	O-ring
15	Plastic Plug
16	Gasket
17	Engine
18	Hex Socket Head Cap Screw
19	Suction Fitting
20	Metal Frame
21	Hex Bolt
22	Hex Nut
23	Washer
24	Lock Washer
25	Hex Bolt



# Self-Priming Pumps.



## AU Series.



Item	Description
1	Discharge
2	Suction

3	Suction Gasket
4	Gasket
5	Casing
6	Impeller
7	Big Weight
8	Small Weight
9	Hex Bolt
10	Lock Washer
11	Volute
12	Discharge Studs
13	Suction Studs
14	Lock Washer
15	Impeller Lock Washer
16	Volute Gasket
17	Drain Plug
18	Hex Nut
19	Discharge Lock Washer
20	Impeller Lock Washer
21	Hex Bolt
22	Bearing Frame
23	Shaft
24/25	Bearing
26/29	Snap Ring
27/28	Lip Seal
30/41	Key
31	Grease Plug
32	Backplate
33	Seal Housing
34	Mechanical Seal
35	Shaft Sleeve
36	Backplate Gasket
37	Cap Screw
38/39	O -Ring
40	Impeller Bolt

## 8. Troubleshooting.

Symptom	Possible cause(s)	Possible solution(s)
Little or no discharge and unit will not prime.	1. Casing not filled with water.	1. Fill pump casing. Using a foot valve will extend pump life and facilitate immediate priming.
	2. Total head too high.	2. Shorten suction head.
	3. Suction head higher than pump designed for.	3. Lower suction head, install foot-valve and prime.
	4. Impeller partially or completely plugged.	4. Disassemble pump and clean out impeller.
	5. Hole or leak in suction line.	5. Repair or replace suction line.
	6. Foot-valve too small.	6. Match foot-valve to piping or install one size larger foot-valve.
	7. Impeller damaged.	7. Disassemble pump and replace impeller.
	8. Foot-valve or suction line not submerged deep enough in water; pulling air.	8. Submerge lower in water.
	9. Insufficient inlet pressure or suction head.	9. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line to partially closed position.
	10. Suction piping too small	10. Increase pipe size to pump inlet size or larger.
	11. Casing gasket leaking	11. Replace.
	12. Suction or discharge line valves closed.	12. Open.
	13. Piping is fouled or damaged.	13. Clean or replace.
	14. Clogged strainer or foot valve.	14. Clean or replace.
Loss of suction after satisfactory operation.	1. Air leak in suction line.	1. Repair or replace suction line.
	2. When unit was last turned off, water siphoned out of pump casing.	2. Refill (reprime) pump casing before restarting.
	3. Suction head higher than pump designed for.	3. Lower suction head; install foot-valve and primer.

	4. Insufficient inlet pressure or suction head.	4. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line to partially closed position.
	5. Clogged foot-valve, strainer, or pump.	5. Unclog, clear or replace as necessary.
Pump overloads driver.	1. Total head lower than pump rating, unit delivering too much water.	1. Increase back pressure on pump by turning gate valve on discharge line to partially closed position that will not overload motor
	2. Specific gravity and viscosity of liquid being pumped different than the pump rating	2. Consult factory.
Pump vibrates and/ or makes excessive noise.	1. Mounting plate or foundation not rigid enough.	1. Reinforce.
	2. Foreign material in pump causing unbalance.	2. Disassemble pump and remove foreign material..
	3. Impeller bent.	3. Replace impeller
	4. Cavitation present	4. Check suction line for proper size and check valve in suction line if completely open, remove any sharp bends before pump and shorten suction line.
	5. Piping not supported to relieve any strain on pump assembly.	5. Make necessary adjustments.
Pump runs but no fluid.	1. Faulty suction piping (air leak)	1. Replace faulty suction piping
	2. Pump located too far from fluid source	2. Reposition.
	3. Gate valve closed.	3. Open
	4. Clogged strainer	4. Clean or replace
	6. Discharge height too great	6. Lower the height
	7. Fouled impeller.	7. Clean or replace.
Pump leaks at shaft	8. Faulty mechanical seal	8. Replace
	1. Worn mechanical seal.	1. Replace
	2. Replacement seal not installed properly.	2. Follow Maintenance instructions carefully



## **9. Warranty.**

WDM guarantees its Self-Priming Pumps for a period of 12 months from the date of delivery, against defects in material and workmanship, as indicated in its general conditions of sale.

Failure to follow the suggestions and recommendations in this manual, as well as improper product use or handling will completely invalidate the warranty.

The warranty excludes wear and tear, misuse, repair, or replacement of the defective part by the user or unskilled personnel without specific permission of WDM Pumps.

# Operation Manual.

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Notes:

# Self-Priming Pumps.



Notes:



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