




HAYWARD FLOW CONTROL
LifeStar™ MV SERIES AQUATIC PUMP
INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS



Basic safety precautions should always be followed, including the following: Failure to follow instructions can cause severe injury and/or death.

 This is the safety-alert symbol. When you see this symbol on your equipment or in this manual, look for one of the following signal words and be alert to the potential for personal injury.

 **WARNING** warns about hazards that **could** cause serious personal injury, death or major property damage and if ignored presents a potential hazard.

 **CAUTION** warns about hazards that **will** or **can** cause minor or moderate personal injury and/or property damage and if ignored presents a potential hazard. It can also make consumers aware of actions that are unpredictable and unsafe.

The **NOTICE** label indicates special instructions that are important but not related to hazards.

TO PREVENT POTENTIAL INJURY, READ THIS MANUAL CAREFULLY AND COMPLETELY.

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PLEASE READ THE FOLLOWING INFORMATION PRIOR TO INSTALLING AND USING HAYWARD LifeStar™ MV SERIES AQUATIC PUMP. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN PRODUCT DAMAGE, PROPERTY DAMAGE, PERSONAL INJURY, OR EVEN DEATH.

1. Hayward Flow Control (Hayward), a division of Hayward Industries, guarantees its products against defective material and workmanship only. Hayward assumes no responsibility for property damage or personal injury resulting from improper installation, misapplication, or abuse of any product.
2. Hayward assumes no responsibility for property damage or personal injury resulting from chemical incompatibility between its products and the process fluids to which they are exposed. Determining whether a particular PVC, CPVC, or PP product is suitable for an application is the responsibility of the user. Chemical compatibility charts provided in Hayward literature are based on ambient temperatures of 70°F and are for reference only.
3. Hayward products are designed for use with non-compressible liquids.

WARNING

Hayward PVC and CPVC products should NEVER be used or tested with compressible fluids such as compressed air or nitrogen. Use of PVC and CPVC products in compressible fluid applications may result in product damage, property damage, personal injury, or even death.

4. The maximum recommended fluid velocity through any Hayward product is eight feet per second (8 ft/s). Higher fluid velocity can result in damage due to the water hammer effect.
5. Piping systems must be designed and supported to prevent excess mechanical loading on Hayward products due to system misalignment, weight, shock, vibration, and the effects of thermal expansion and contraction.
6. The effect of temperature on plastic piping systems must be considered when the systems are initially designed. The pressure rating of plastic systems must be reduced with increasing temperature. Maximum operating pressure is dependent upon material selection as well as operating temperature. Before installing any Hayward product, consult Hayward product literature for pressure vs. temperature curves to determine any operating pressure or temperature limitations.
7. PVC and CPVC plastic products become brittle below 40°F. Use caution in their installation and operation below this temperature.

WARNING

Hayward PVC and CPVC products should not be used in services with operating temperature below 34°F.

8. Due to differential thermal expansion rates between metal and plastic, transmittal of pipe vibration and pipe loading forces, **DIRECT INSTALLATION INTO METAL PIPING SYSTEMS IS NOT RECOMMENDED**. Wherever installation of plastic equipment into metal piping systems is necessary, it is recommended that at least 10 pipe diameters in length of plastic pipe be installed upstream and downstream of the plastic equipment to compensate for the factors mentioned above.
9. Published operating requirements are based on testing of new pumps using clean water at 70°F. Pump performance is affected by many factors including fluid chemistry, viscosity, specific gravity, flow rate, and temperature. These should be considered when sizing Hayward products.
10. Systems should always be depressurized and drained prior to installing or maintaining any Hayward product.

WARNING

Failure to depressurize and drain system prior to installing or maintaining filter vessel may result in product damage, property damage, personal injury, or even death.

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IMPORTANT SAFETY INSTRUCTIONS



⚠ WARNING - Read and follow all instructions in this IOM manual and on the equipment. Failure to follow instructions can cause severe injury and/or death.

⚠ WARNING – Suction Entrapment Hazard.

Suction in suction outlets and/or suction outlet covers which are, damaged, broken, cracked, missing, or unsecured can cause severe injury and/or death due to the following entrapment hazards:

Hair Entrapment- Hair can become entangled in suction outlet cover.

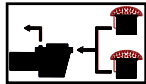
Limb Entrapment- A limb inserted into an opening of a suction outlet sump or suction outlet cover that is damaged, broken, cracked, missing, or not securely attached can result in a mechanical bind or swelling of the limb.

Body Suction Entrapment- A negative pressure applied to a large portion of the body or limbs can result in an entrapment.

Evisceration/ Disembowelment - A negative pressure applied directly to the intestines through an unprotected suction outlet sump or suction outlet cover which is, damaged, broken, cracked, missing, or unsecured can result in evisceration/ disembowelment.

Mechanical Entrapment- There is potential for jewelry, hair decorations, finger, toe or knuckle to be caught in an opening of a suction outlet cover resulting in mechanical entrapment.

⚠ WARNING - To Reduce the risk of Entrapment Hazards:



- o When outlets are small enough to be blocked by a person, a minimum of two functioning suction outlets per pump must be installed. Suction outlets in the same plane (i.e. floor or wall), must be installed a minimum of three feet (3') [1 meter] apart, as measured from near point to near point.
- o Dual suction fittings shall be placed in such locations and distances to avoid “dual blockage” by a user.
- o Dual suction fittings shall not be located on seating areas or on the backrest for such seating areas.
- o The maximum system flow rate shall not exceed the flow rating of as listed on Table 1.
- o Never use system if any suction outlet component is damaged, broken, cracked, missing, or not securely attached.
- o Replace damaged, broken, cracked, missing, or not securely attached suction outlet components immediately.
- o In addition two or more suction outlets per pump installed in accordance with latest ASME, APSP Standards and CPSC guidelines, follow all National, State, and Local codes applicable.
- o Installation of a vacuum release or vent system, which relieves entrapping suction, is recommended.

⚠ WARNING – Failure to remove pressure test plugs and/or plugs used in winterization of the system from the suction outlets can result in an increase potential for suction entrapment as described above.

⚠ WARNING – Failure to keep suction outlet components clear of debris, such as leaves, dirt, hair, paper and other material can result in an increase potential for suction entrapment as described above.

⚠ WARNING – Suction outlet components have a finite life, the cover/grate should be inspected frequently and replaced at least every ten years or if found to be damaged, broken, cracked, missing, or not securely attached.

⚠ CAUTION – Components such as the filtration system, pumps and heater must be positioned so as to prevent their being used as means of access to the system by unauthorized or unqualified individuals.

⚠ WARNING – Never operate or test the circulation system at more than 50 PSI.

⚠ WARNING – Never change the filter control valve position while the pump is running.



⚠ WARNING – Hazardous Pressure. Circulation systems operate under hazardous pressure during start up, normal operation, and after pump shut off. Stand clear of circulation system equipment during pump start up. Failure to follow safety and operation instructions could result in violent separation of the pump housing and cover, and/or filter housing and clamp due to pressure in the system, which could cause property damage, severe personal injury, or death. Before servicing circulation system, all system and pump controls must be in off position and filter manual air relief valve must be in open position. Before starting system pump, all system valves must be set in a position to allow system water to return back to the system. Do not change filter control valve position while system pump is running. Before starting system pump, fully open filter manual air relief valve. Do not close filter manual air relief valve until a steady stream of water (not air or air and water) is discharged.



⚠ WARNING – Separation Hazard. Failure to follow safety and operation instructions could result in violent separation of pump and/or filter components. Strainer cover must be properly secured to pump housing with strainer cover lock ring. Before servicing circulation system, filters manual air relief valve must be in open position. Do not operate circulation system if a system component is not assembled properly, damaged, or missing. Do not operate circulation system unless filter manual air relief valve body is in locked position in filter upper body.



⚠ WARNING – Risk of Electric Shock. All electrical wiring MUST be in conformance with applicable local codes, regulations, and the National Electric Code (NEC). Hazardous voltage can shock, burn, and cause death or serious property damage. To reduce the risk of electric shock, do NOT use an extension cord to connect unit to electric supply. Provide a properly located electrical receptacle. Before working on any electrical equipment, turn off power supply to the equipment.

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⚠ WARNING – To reduce the risk of electric shock replace damaged wiring immediately.

⚠ WARNING – Ground all electrical equipment before connecting to electrical power supply. Failure to ground all electrical equipment can cause serious or fatal electrical shock hazard.

⚠ WARNING – Do NOT ground to a gas supply line.

⚠ WARNING – To avoid dangerous or fatal electrical shock, turn OFF power to all electrical equipment before working on electrical connections.

⚠ WARNING – Failure to bond all electrical equipment to system structure will increase risk for electrocution and could result in injury or death. To reduce the risk of electric shock, see installation instructions and consult a professional electrician on how to bond all electrical equipment. Also, contact a licensed electrician for information on local electrical codes for bonding requirements.

⚠ WARNING – Risk of Electric Shock. Connect only to a branch circuit protected by a ground-fault circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the circuit is protected by a GFCI.

⚠ WARNING – Risk of Electric Shock. The electrical equipment must be connected only to a supply circuit that is protected by a ground-fault circuit-interrupter (GFCI). Such a GFCI should be provided by the installer and should be tested on a routine basis. To test the GFCI, push the test button. The GFCI should interrupt power. Push reset button. Power should be restored. If the GFCI fails to operate in this manner, the GFCI is defective. If the GFCI interrupts power to the electrical equipment without the test button being pushed, a ground current is flowing, indicating the possibility of an electrical shock. Do not use this electrical equipment. Disconnect the electrical equipment and have the problem corrected by a qualified service representative before using.

⚠ CAUTION – This pump has been evaluated for use with water only.

⚠ ATTENTION - Cette pompe a été évalué pour une utilisation avec de l'eau seulement.

SAVE THESE INSTRUCTIONS

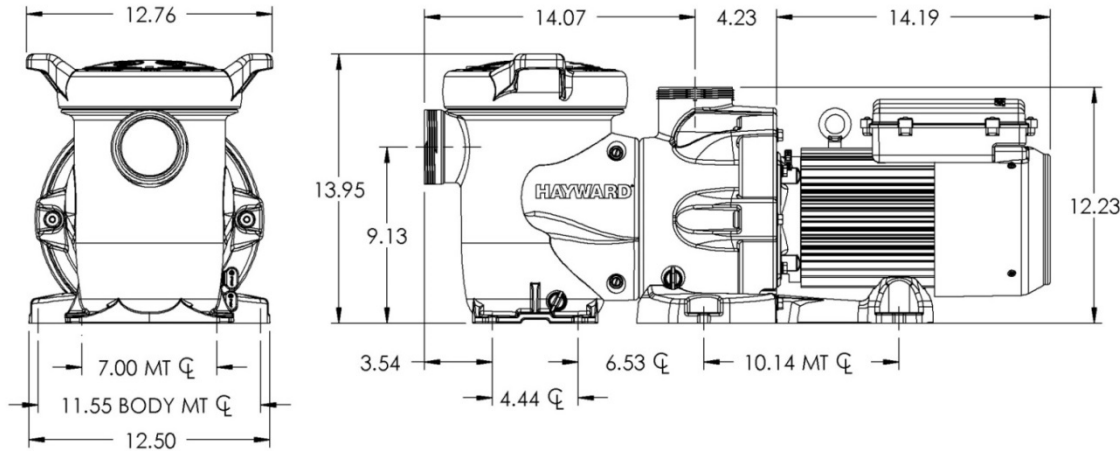
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General Information

Introduction

This manual contains information for the proper installation and operation of the Hayward LifeStar™ MV Series Aquatic Pump. The instructions in this manual **MUST** be followed precisely. **Failure to install according to defined instructions will void warranty.**

Product Dimensions

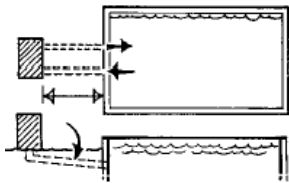


Installation and Wiring

⚠ WARNING — This product should be installed and serviced only by a qualified professional.

Pump Location

⚠ WARNING - Fire and burn hazard. Motors operate at high temperatures and if they are not properly isolated from any flammable structures or foreign debris they can cause fires, which may cause severe personal injury or death. It is also necessary to allow the motor to cool for at least 20 minutes prior to maintenance to minimize the risk for burns.



Locate pump as close to system as practical and run suction lines as direct as possible to reduce friction loss. Pump height locations should be as close to system level as possible and NOT to exceed 8 feet. Suction lines should have continuous slope upward from lowest point in line. Joints must be tight (but not over-tightened). Suction line diameter must equal or be larger than the discharge line diameter.

Though the pump is designed for outdoor use, it is strongly advised to place pump indoors, or in the shade to shield them from continuous direct heat. Select a well-drained area that will not flood when it rains. **Do NOT install pump and filter in a damp or non-ventilated location.** Keep motor clean. Pump motors require free circulation of air for cooling.

Pump Mounting

Install pump on a level concrete slab or other rigid base to meet all local and national codes. Secure pump to base with screws or bolts to further reduce vibration and stress on pipe or hose joints. The base must be level, rigid, and vibration free.

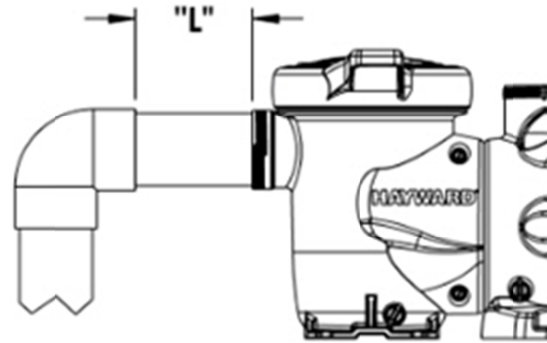
Pump mount must:

- Allow pump inlet height to be as close to water level as possible.
- Allow use of short, direct suction pipe (to reduce friction losses).
- Allow for valves in suction and discharge piping.
- Be protected from excess moisture and flooding.
- Allow adequate access for servicing pump and piping.

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Pipe Sizing Chart

MINIMUM INLET PIPING SIZE CHART	
Pipe Size in. [mm]	Minimum Suction Pipe Length "L" in. [mm] *
2 ½" [64]	12 ½" [317]
3" [76]	15" [381]
4" [102]	20" [508]
6" [152]	30" [762]



* **NOTE** - It is recommended that a minimum length of straight piping (shown as "L" in above diagram), equivalent to 5 pipe size diameters, be used between the pump suction inlet and any plumbing fittings (elbows, valves, etc.).



Plumbing

Use PTFE tape to seal threaded connections on molded plastic components. All plastic fittings must be new or thoroughly cleaned before use. **NOTE - Do NOT use Plumber's Pipe Dope as it may cause cracking of the plastic components.** When applying PTFE tape to plastic threads, wrap the entire threaded portion of the male fitting with one to two layers of tape. Wind the tape clockwise as you face the open end of the fitting, beginning at the end of the fitting. It is only necessary to tighten fittings enough to prevent leakage. Tighten fitting by hand and then use a tool to engage fitting an additional 1 ½ turns. Use care when using PTFE tape as friction is reduced considerably; **do NOT over-tighten fitting or you may cause damage.** If leaks occur, remove connector, clean off old PTFE tape, re-wrap with one to two additional layers of PTFE tape, and re-install connector.

Fittings restrict flow. For better efficiency, use the fewest possible fittings (but at least two suction outlets). Avoid fittings that could cause an air trap. Use a non-entrapping suction fitting in system (multiple drains) or double suction (skimmer and main drain).

Electrical



⚠ WARNING — All electrical wiring **MUST** be in conformance with all applicable local codes, regulations, and the National Electric Code (NEC).

⚠ WARNING - Ground and bond motor before connecting to electrical power supply. Failure to ground and bond pump motor can cause serious or fatal electrical shock hazard. **Do NOT** ground to a gas supply line. To avoid dangerous or fatal electrical shock, turn **OFF** power to motor before working on electrical connections. **Fire Hazard - match supply voltage to motor nameplate voltage.** Insure

that the electrical supply available agrees with the motor's voltage, phase, and cycle, and that the wire size is adequate for the amps rating and distance from the power source. Use copper conductors only.

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Electrical Specs

Use copper conductors only. For indoor & outdoor use.

60 Hz Electrical Data					
PUMP MODEL	RATED HP	TOTAL HP	PHASE	VOLTAGE	AMPS
1APSES16	2	2.7	1	208-230	8.7-8.5
1APSES36	2	2.7	3	208-230/460	6.1-6.0/3.0
1APSES36H	2	2.7	3	575	2.4
1APSES17	3	3.45	1	208-230	11.7-11.5
1APSES37	3	3.45	3	208-230/460	9.2-9.0/4.5
1APSES37H	3	3.45	3	575	3.8
1APSES18	5	5.5	1	208-230	21.0-20.0
1APSES38	5	5.5	3	208-230/460	13.6-13.2/6.6
1APSES38H	5	5.5	3	575	5.4
1APSES39	7	7.49	3	208-230/460	19.8-17.2/8.6
1APSES39H	7	7.49	3	575	7.2

50 Hz Electrical Data					
PUMP MODEL	RATED HP	TOTAL HP	PHASE	VOLTAGE	AMPS
1APSES16	2	2	1	220-240	8.9-8.7
1APSES36	2	2	3	190/380-415	6.8/3.4-3.5
1APSES17	3	3	1	220-240	12.1-12.4
1APSES37	3	3	3	190/380-415	10.0/5.0-5.0
1APSES38	5	5	3	190/380-415	15.4/7.7-7.9
1APSES39	7	7	3	190/380-415	21.0/10.5-9.9

Voltage

Voltage at motor **MUST NOT** be more than 10% above or below motor name plate rated voltage, or motor may overheat, causing overload tripping and reduced component life. If voltage is less than 90% or more than 110% of rated voltage when motor is running at full load, consult power company.

Grounding and Bonding

Install, ground, bond, and wire motor in accordance with local or national electrical code requirements.

Permanently ground motor. Use green ground terminal provided under motor canopy or access plate; use size and type wire required by code. Connect motor ground terminal to electrical service ground.

Bond motor to system structure. Bonding will connect all metal parts within and around the system with a continuous wire. Bonding reduces the risk of a current passing between bonded metal objects, which could potentially cause electrical shock if grounded or shorted. **Reference NEC codes for all wiring standards including, but not limited to, grounding, bonding and general wiring procedures.**

Use a solid copper conductor, size 8 or larger. Run wire from external bonding lug to reinforcing rod or mesh. Connect a No. 8 AWG (8.4 mm²) [No. 6 AWG (13.3 mm²) for Canada] solid copper bonding wire to the pressure wire connector provided on the motor housing and to all metal parts of system, and to all electrical equipment, metal piping (except gas piping), and conduit within 5 ft. (1.5 m) of system.

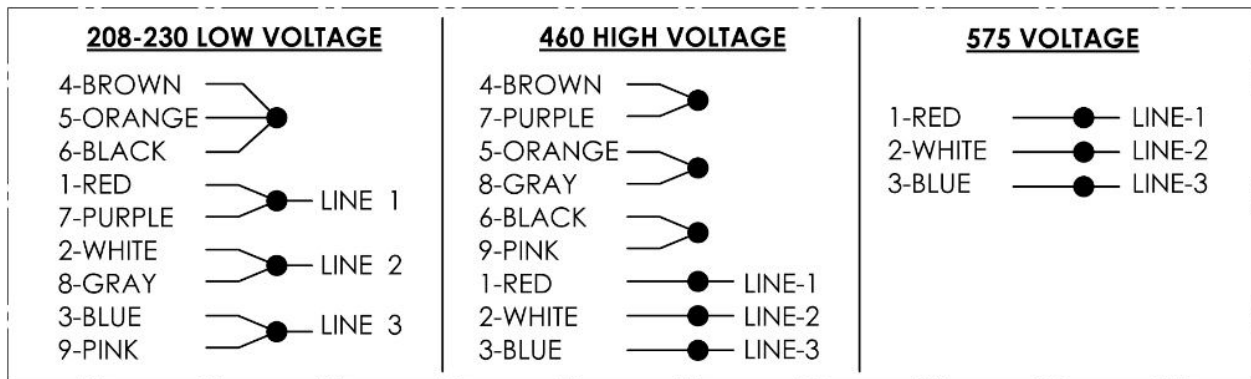
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⚠ WARNING – All electrical wiring **MUST** be in conformance with all applicable local codes, regulations, and the National Electric Code (NEC). Refer to motor nameplate for wiring diagram.

Pump MUST be permanently connected to circuit. If other lights or appliances are also on the same circuit, be sure to add their amp loads before calculating wire and circuit breaker sizes. Use the load circuit breaker as the Master On-Off switch.

⚠ WARNING - Risk of dangerous or fatal electrical shock. Be sure that power to the motor circuit is off before working on wiring, wiring connections, or motor. Re-install the motor end cover and all other wiring covers before turning on the power.



1. Turn off power.
2. Remove the motor end cover.
3. There are two terminals labeled L1 and L2. Attach the power leads to these terminals. Either wire may attach to either terminal.
4. Reinstall motor end cover.

⚠ WARNING - If you do not use conduit when wiring motor, be sure to seal wire opening on end of motor to prevent dirt, bugs, etc., from entering.

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Start-Up & Operation

Prior to Start-Up

NOTE - If it is necessary to perform a pressure test, prior to initial use to ensure plumbing system is functioning properly, then the following criteria should be maintained for this test:

1. Have a professional perform this test.
2. Ensure all Hayward pump and system components are removed from system prior to performing test.



⚠ WARNING - If circulation equipment must remain in the plumbing system during water pressure test, do not apply more than 10 psi pressure to the system. Be sure water pressure has been released, using the filter manual air relief valve, before removing pump strainer cover.



⚠ WARNING — All suction and discharge valves **MUST** be **OPEN**, as well as filter air relief valve (if available) on filter, when starting the circulating pump system. Failure to do so could result in severe personal injury.

Starting/Priming the Pump

Rotate strainer cover counter clockwise to remove. **Fill strainer housing with water to suction pipe level.** Replace strainer cover, rotate clockwise and hand tighten. If water leakage occurs from anywhere on the pump or filter, **DO NOT** start the pump. If no leakage occurs, stand at least 10 feet from pump and/or filter and proceed with starting the pump.

⚠ WARNING — Return to filter to close filter manual air relief valve when a steady stream of water (not air or air and water) is discharged from valve. Failure to do so could result in severe personal injury.

⚠ CAUTION — **NEVER OPERATE THE PUMP WITHOUT WATER.** Water acts as a coolant and lubricant for the mechanical shaft seal. **NEVER** run pump dry. Running pump dry may damage seals, causing leakage, flooding, and voids warranty. Fill strainer housing with water before starting motor.

⚠ CAUTION — Do **NOT** add chemicals to system directly in front of pump suction. Adding undiluted chemicals may damage pump and voids warranty.

⚠ CAUTION — Before removing strainer cover:

1. **STOP PUMP** before proceeding.
2. **CLOSE VALVES** in suction and outlet pipes.
3. **RELEASE ALL PRESSURE** from pump and piping system using filter manual air relief valve. **See filter owner's manual for more details.**
4. If water source is higher than the pump, pump will prime itself when suction and outlet valves are opened. If water source is lower than the pump, unscrew and remove strainer cover; fill strainer housing with water.
5. Clean and lubricate strainer cover O-ring with "Jack's 327" if necessary.
6. Replace strainer cover on strainer housing; turn clockwise to tighten cover.

NOTE - Tighten strainer cover lock ring by hand only (no wrenches).

Turn on power and wait for pump to prime, which may take up to twenty (20) minutes. Priming time will depend on vertical length of suction lift and horizontal length of suction pipe. If pump does **NOT** prime within twenty (20) minutes, stop motor and determine cause. Be sure all suction and discharge valves are open when pump is running. See Troubleshooting Guide.

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Maintenance

- Clean strainer basket regularly. Do NOT strike basket to clean. Inspect strainer cover gasket regularly and replace as necessary.
- Hayward pumps have self-lubricating motor bearings and shaft seals. No lubrication is necessary.
- Keep motor clean. Insure motor air vents are free from obstruction to avoid damage. Do NOT use water to hose off motor.
- Occasionally, shaft seals must be replaced, due to wear or damage. Replace with genuine Hayward seal assembly kit. See “Shaft Seal Change Instructions” in this manual.

Storage/Winterization



⚠ WARNING — Separation Hazard. Do not purge the system with compressed air. Purging the system with compressed air can cause components to explode, with risk of severe injury or death to anyone nearby. Use only a low pressure (below 5 PSI), high volume blower when air purging the pump, filter, or piping.

⚠ CAUTION — Allowing the pump to freeze will void the warranty.

⚠ CAUTION — Use ONLY propylene glycol as antifreeze in your system. Propylene glycol is non-toxic and will not damage plastic system components; other anti-freezes are highly toxic and may damage plastic components in the system.

Drain all water from pump and piping when expecting freezing temperatures or when storing pump for a long time (see instructions below). Gravity drain system as far as possible.

Keep motor dry and covered during storage. To avoid condensation/corrosion problems, do NOT cover or wrap pump with plastic film or bags.

Storing Pump for Winterization



⚠ WARNING — To avoid dangerous or fatal electrical shock hazard, turn OFF power to motor before draining pump. Failure to disconnect power may result in serious personal injury or death.

1. Drain water level below all inlets to the system.
2. Remove drain plugs and strainer cover from strainer housing. (See Parts Diagram on page 14 of this manual for pump component locations.)
3. Disconnect pump from mounting pad, wiring (after power has been turned OFF), and piping.
4. Once the pump is fully drained of water, re-install the strainer cover and drain plugs. Store pump in a dry area.

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Shaft Seal Change Instructions

IMPORTANT SAFETY INSTRUCTIONS PLEASE READ AND FOLLOW ALL INSTRUCTIONS

When servicing electrical equipment, basic safety precautions should always be observed including the following. Failure to follow instructions may result in injury.

⚠ WARNING — To reduce risk of injury, do not permit children to use this product.

- Disconnect all electrical power service to pump before beginning shaft seal replacement.
- Only qualified personnel should attempt rotary seal replacement. Contact Hayward Flow Control if you have any questions.
- See “Parts Diagram” for pump component locations.
- Exercise extreme care in handling both the rotating and the stationary sections of the two-part replacement seal. Foreign matter or improper handling will damage the sealing surfaces.

Removing the Motor Assembly (See Parts Diagram on page 14 of this manual for pump component locations.)

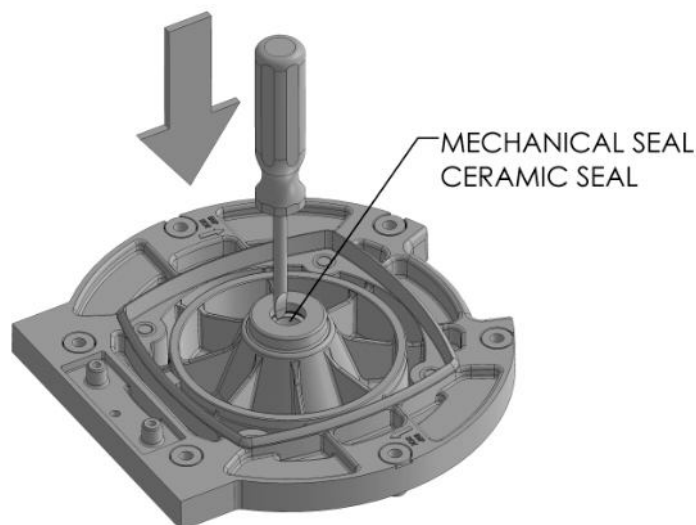
1. Remove the six (6) 5/16" x 2" hex head bolts (item #20), which hold the motor assembly to the pump/strainer housing (item #9), using a 1/2" wrench or socket.
2. Slide the motor assembly out of the pump/strainer housing (item #9), exposing the diffuser (item #12). Remove the four (4) diffuser screws (item #11), and pull the diffuser (item #12) off of the seal plate (item #18) to expose the impeller (item #15).

Removing the Impeller (See Parts Diagram on page 14 of this manual for pump component locations.)

3. To prevent motor shaft from turning, insert a 5/16" allen wrench into the end of the motor shaft through the center hole in the motor end cover/canopy.
4. Rotate the impeller (item #15) counterclockwise and remove. The spring portion of the seal assembly (item #16) is now exposed. Note carefully the position of the spring seal, and remove it. **NOTE** - Replace motor cover to protect delicate motor parts.

Removing the Seat (See Parts Diagram on page 14 of this manual for pump component locations.)

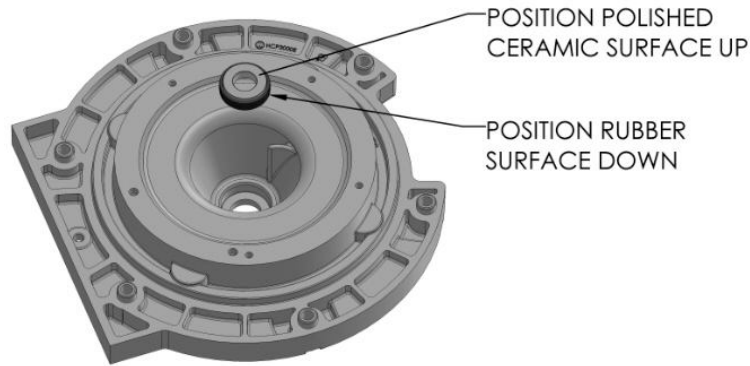
5. Remove the seal plate (item #18) from the motor by removing the four (4) 3/8" x 1" hex head bolts (item #21) that secure it to the motor, using a 1/2" wrench or socket.
 6. Press the ceramic seat with rubber cup out of the seal plate (item #18). If tight, use a small screwdriver to tap seal out.
- STOP** - Clean all recesses & parts to be reassembled. Inspect gaskets & replace if necessary.



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Seal Installation (See Parts Diagram on page 14 of this manual for pump component locations.)

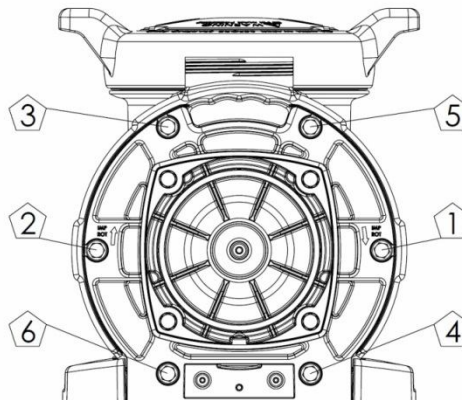
7. Clean and lightly lubricate the motor shaft and seal recesses in the seal plate (item #18) with a dilute solution of non-granulated liquid-type soap. Gently wipe the polished face of the seal with a clean, soft, cotton cloth. Lubricate the rubber cup on the seat and press it firmly into the recess of the seal plate (item #18), with the polished surface facing out.
8. Reassemble the motor to the seal plate (item #18) using the four (4) 3/8" x 1" bolts (item #21). Torque bolts to 95-105 in-lbs.
9. Gently wipe the black, polished surface of the spring seal assembly (item #13) with a clean, soft, cotton cloth.
10. Press the spring seal assembly (item #16) onto the motor shaft, with the black polished surface facing toward the polished surface of the ceramic seat.

**Replacing the Impeller and Diffuser** (See Parts Diagram on page 14 of this manual for pump component locations.)

11. Screw the impeller (item #15) onto the motor shaft in a clockwise direction. Tighten snugly by holding motor shaft with wrench as noted in step #4.
12. Place the diffuser (item #12) over the impeller (item #15) and onto the seal plate (item #18), aligning the two (2) protruding pins with the matching holes in the seal plate (item #18). Replace the four (4) diffuser screws (item #11).

Replacing the Motor Assembly (See Parts Diagram on page 14 of this manual for pump component locations.)

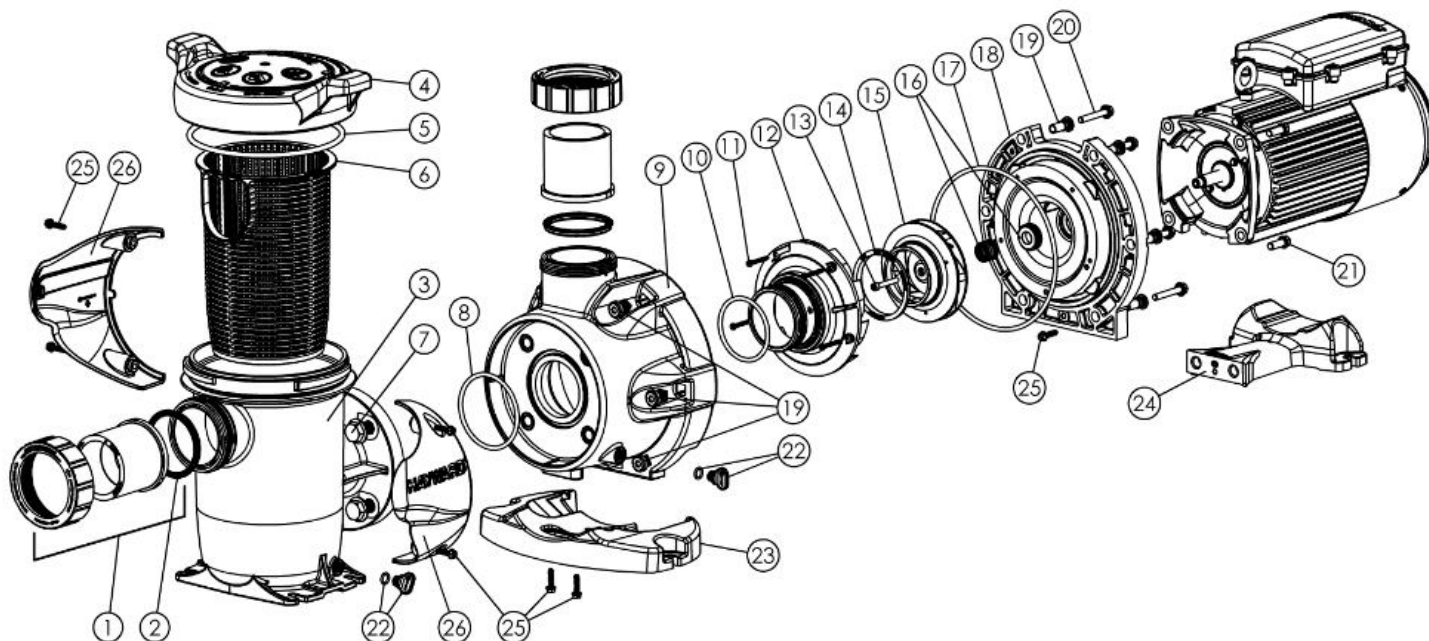
13. Re-attach motor canopy (item #20) using the hex headed screws. Slide the motor assembly, with the diffuser (item #12) in place, into pump/strainer housing (item #9), being careful not to disturb the diffuser o-ring (item #10).
14. Fasten assembly to pump housing (item #9) using the six (6) 5/16" x 2" bolts (item #20). (Be sure housing o-ring (item #17) is in place, and lubricated. Replace if damaged). Tighten bolts alternately and evenly to 185-195 inch-pounds range using torque pattern in the following diagram.



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Replacement Parts

Parts Diagram



Parts Listing

Ref. No.	Part No.	Description	Qty.
1	HCXP3000UNKIT	Union Connector Kit (Includes Union Nut, Union Connector, Union Gasket – 2 each)	1
2	HCXP3000UG	Union Gasket	1
3	HCXP3000H	Strainer Housing with Drain Plug	1
4	HCXP3000DLS	Strainer Cover Kit (Includes Strainer Cover, Lock Ring, O-Ring)	1
5	SPX4000S	Strainer Cover O-Ring	1
6	HCXP3000M	Strainer Basket	1
7	HCXP3000Z3	Strainer Housing Flange Bolt/Washer – 4 each	1
8	HCXP343V70	Strainer Housing Flange O-Ring	1
9	HCXP3000A	Pump Housing with Drain Plug	1
10	HCXP338V60	Diffuser O-Ring	1
11	SPX2700Z3SSPAK4	Diffuser Screws (4 Pack)	1
12	HCXP3000B	Diffuser, 2 - 5 HP	1
12	HCXP3000B2	Diffuser, 7 HP	1
13	SPX3200Z1	Impeller Screw	1
14	HCXP3000R	Impeller Ring, 2 - 5 HP	1
14	HCXP3001R	Impeller Ring, 7 HP	1
15	HCXP3020C	2 HP Impeller with Impeller Screw	1
15	HCXP3030C	3 HP Impeller with Impeller Screw	1
15	HCXP3050C	5 HP Impeller with Impeller Screw	1
15	HCXP3070C	7 HP Impeller with Impeller Screw	1
16	1AX3SESSA	Shaft Seal Assembly	1
17	HCXP369V70	Pump Housing O-Ring	1
18	HCXP3000E	Seal Plate	1
19	SPX3200Z211FC	Housing Insert/Seal Plate Spacer	6
20	SPX3200Z3	Housing Bolt	6
21	SPX3200Z34PAK4	Motor Bolt (4 Pack)	1
22	SPX4000FG	Drain Plug with O-Ring	1
23	HCXP3000F	Pump Housing Base	1
24	HCXP3000G	Motor Support Base	1

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Ref. No.	Part No.	Description	Qty.
25	SPX1600Z5SSPAK7	Base Screws (7 Pack)	1
26	HCXP3000N251	Right and Left Side Plate Set	1
	MOTORS		
	HCXP3020Z1M	Motor, 2HP, Single Phase 208-230V	1
	HCXP3020Z1D	Motor, 2HP, Three Phase 208-230/460V	1
	HCXP3030Z1M	Motor, 3HP, Single Phase 208-230V	1
	HCXP3030Z1D	Motor, 3HP, Three Phase 208-230/460V	1
	HCXP3050Z1M	Motor, 5HP, Single Phase 208-230V	1
	HCXP3050Z1D	Motor, 5HP, Three Phase 208-230/460V	1
	HCXP3075Z1D	Motor, 7HP, Three Phase 208-230/460V	1
	HCXP3020Z1DC	Motor, 2HP, Three Phase 575V	1
	HCXP3030Z1DC	Motor, 3HP, Three Phase 575V	1
	HCXP3050Z1DC	Motor, 5HP, Three Phase 575V	1
	HCXP3075Z1DC	Motor, 7HP, Three Phase 575V	1

Troubleshooting

General Problems

- **Motor Will NOT Start:**
 1. Make sure the terminal board connections agree with the wiring diagram on the pump data plate label.
 2. Be sure the pump is wired for the available field supply voltage.
 3. Check for and correct any improper or loose wiring connections; open switches or relays; tripped circuit breakers, or blown fuses.
 4. Manually check rotation of the motor shaft for free movement and lack of obstruction. Correct if necessary.
- **Motor Shuts OFF:**
 1. Check for low voltage or power drop at the motor (frequently caused by undersized wiring). Contact a qualified professional to verify the electrical connections and that the voltage is within +/- 10% of the motor nameplate voltage rating.
- **Motor Hums, But Does NOT Start:**
 1. Check power supply voltage. Contact a qualified professional if the voltage is more than 10% lower than the motor nameplate voltage rating.
 2. Impeller jammed with debris. Have a qualified repair professional open the pump and remove the debris.
- **Pump Won't Prime:**
 1. Empty pump/strainer housing. Make sure the pump/strainer housing is filled with water & the cover o-ring is clean. Ensure the o-ring is properly seated in the cover o-ring groove. Ensure the o-ring sealing surface is lubricated with "Jack's 327" and that the strainer cover is locked firmly in position. Lubricant will help to create a tighter seal.
 2. Loose connections on the suction side. Tighten the pipe/union connections.
NOTE - Any self-priming pump will not prime if there are suction air leaks. Leaks will result in bubbles emanating from the return fittings on the pool wall.
 3. Leaking O-ring or packing glands on valves. Tighten, repair, or replace the valves.
 4. Strainer basket or skimmer basket loaded with debris. Remove the strainer housing cover or the skimmer cover. Clean the basket, and refill the strainer housing with water. Tighten the cover.
 5. Suction side clogged. Contact a qualified repair professional. You should have 5" - 6" of vacuum at the strainer cover.
 - a. If the pump develops a vacuum, check for a blocked suction line or a dirty strainer basket. An air leak in the suction piping may be the cause.
 - b. If the pump does not develop a vacuum and the pump has sufficient "priming water":
 - i. Re-check the strainer housing cover and all threaded connections for suction leaks. Check if all system hose clamps are tight.
 - ii. Check voltage to ensure that the motor is rotating at full rpm's.
 - iii. Open the housing cover and check for clogging or obstruction in suction. Check the impeller for debris.
 - iv. Remove and replace the shaft seal only if it is leaking.

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- **Low Flow – Generally:**

1. Clogged or restricted strainer or suction line. Clean pump strainer basket and confirm no other restriction exists in suction line.
2. Undersized piping. Correct the piping size.
3. Plugged or restricted discharge line. Remove restriction from discharge line.
4. Air leak in suction (bubbles issuing from return fittings). Re-tighten the suction and discharge connections using PTFE tape. Inspect other plumbing connections, and tighten as required.
5. Plugged, restricted, or damaged impeller. Replace the impeller including a new seal assembly.

- **Noisy Pump:**

1. Air leak in suction piping, cavitation caused by restricted or undersized suction line or leak at any joint, low water level in system, and unrestricted discharge return lines. Correct the suction condition or throttle return lines, if practical.
2. Vibration due to improper mounting, etc. Mount the pump on a level surface and secure the pump to the equipment pad.
3. Foreign matter in the pump housing. Loose stones/debris hitting the impeller could be the cause. Clean the pump housing.
4. Motor bearings can become noisy from normal wear, rust, overheating or concentration of chemicals. If the motor bearing seal is damaged from leaks, water can seep into bearing washing out the grease and could cause the motor bearing to whine. Replace the motor and any seal leaks should be repaired at once by replacing the shaft seal.
5. Place pump closer to water level.

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