# POOL PUMP

## OWNER'S MANUAL AND SAFETY INSTRUCTIONS

**SAVE THIS MANUAL: KEEP THIS MANUAL FOR SAFETY WARNINGS, PRECAUTIONS,**

**ASSEMBLY, OPERATING, INSPECTION, MAINTENANCE AND CLEANING PROCEDURES.**

**FOR QUESTIONS PLEASE CONTACT LOCAL DISTRIBUTORS**

# WARNING IMPORTANT SAFETY INFORMATION

## GENERAL SAFETY WARNINGS

**Read all safety warnings and instructions carefully and completely. Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury. Save all warnings and instructions for future reference.**

## SAFETY

The warnings, precautions, and instructions discussed in this instruction manual cannot cover all possible conditions and situations that may occur. It must be understood by the operator that common sense and caution are factors which cannot be built into this product, but must be supplied by the operator. Read carefully and understand all ASSEMBLY AND OPERATION INSTRUCTIONS before operating. Failure to follow the safety rules and other basic safety precautions may result in serious personal injury.

- To reduce risk of injury, **DO NOT** permit children to use or climb on this product. Closely supervise children at all times. Components such as the filtration system, pumps, and heaters must be positioned to prevent children from using them as a means of access to the pool.
- **CAUTION** – This pump is intended for use on permanently installed swimming pools and may also be used with hot tubs and spas if so marked. **DO NOT** use with storable pools. A permanently installed pool is constructed in or on the ground or in a building such that it cannot be readily disassembled for storage. A storable pool is constructed so that it is capable of being readily disassembled for storage and reassembled to its original integrity.
- Though this product is designed for outdoor use, it is strongly advised to **protect the electrical components from the weather**. Select a well-drained area, one that will not flood when it rains. It requires free circulation of air for cooling. Do not install in a damp or on ventilated location. If installed within an outer enclosure or beneath the skirt of a hot tub or spa, adequate ventilation and free circulation of air must be provided to prevent overheating of the motor.
- Pool and spa components have a finite life. **All components should be inspected frequently and replaced at least every ten years**, or if found to be damaged, broken, cracked, missing, or not securely attached
- Hazardous voltage can shock, burn, or cause death. To reduce the risk of electric shock, **DO NOT** use an extension cord to connect unit to electric supply. Provide a properly located outlet. It is required that licensed electricians do all electrical wiring. All electrical wiring **MUST** be in conformance with applicable local and national codes and regulations. Before working on pump or motor, disconnect motor wiring.
- To reduce the risk of electric shock, replace damaged cord immediately. **DO NOT** bury cord. Locate cord to prevent abuse from lawn mowers, hedge trimmers and other equipment.

# WARNING IMPORTANT SAFETY INFORMATION

- Failure to bond pump to pool 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 pump.Also, contact a licensed electrician for information on local electrical codes for bonding requirements.

- **Suction Entrapment Hazard:**
  Suction in suction outlets and/or suction outlet covers, which are damaged, broken, cracked, missing, or unsecured 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 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, swimsuits, hair decorations, fingers, toes, or knuckles to be caughtin an opening of a suction outlet cover resulting in mechanical entrapment.

- **To Reduce the risk of Entrapment Hazards:**
  - 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') [0.91 meter] apart, as measured from near point to near point.
  - Dual suction fittings shall be placed in such locations and distances to avoid "dual blockage"
  - Dual suction fittings shall not be located on seating areas or on the backrest for such seating areas.
  - The maximum system flow rate shall not exceed the values shown in the "Pipe Sizing Chart" found at the bottom of page 4 of this manual.
  - Never use pool or spa if any suction outlet component is damaged, broken, cracked, missing, or not securely attached.
  - Replace damaged, broken, cracked, missing, or not securely attached suction outlet components immediately.
  - Installation of a vacuum release or vent system, which relieves entrapping suction, is recommended.

- **Hazardous Pressure.**
  Pool and spa water 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 due to pressure in the system, which could cause property damage, severe personal injury, or death. Before servicing pool and spa water 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 pool. 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. All suction and discharge valves **MUST** be **OPEN** when starting the circulation system. Failure to do so could result in severe personal injury and/or property damage.

- **Separation Hazard.**
  Failure to follow safety and operation instructions could result in violent separation of pump components. Strainer cover must be properly secured to pump housing with strainer cover lock ring. Before servicing pool and spa circulation system, all system and pump controls must be in off position and filter manual air relief valve must be in open position. Do not operate pool and spa circulation system if a system component is not assembled properly, damaged, or missing. Do not operate pool and spa circulation system unless filter air relief valve body is in locked position in filter upper body. All suction and discharge valves **MUST** be **OPEN** when starting the circulation system. Failure to do so could result in severe personal injury and/or property damage.
- **Never** operate or test the circulation system at more than 40 PSI.
- **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.
- Failure to install according to defined instructions may result in severe personal injury or death.
- **NEVER** run pump dry. Running pump dry may damage seals, causing leakage, flooding, and voids warranty. Fill strainer housing with water before starting motor.
- 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 H.P. (KW) rating and distance from the power source.
- **DO NOT** use anti-freeze solutions (except propylene glycol) in your pool/spa 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.

# Installation Instructions

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

### Pump Location

Locate pump as close to pool as practical and run suction lines as direct as possible to reduce friction loss. 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 protect the electrical components from the weather. Select a well-drained area, one that will not flood when it rains. Do NOT install pump 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 firm, level base or pad to meet all local and national codes. Fasten pump to base or pad with screws or bolts to further reduce vibration and stress on pipe or hose joints. The base MUST be solid, 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 gate valves in suction and discharge piping.
- Be protected from excess moisture and flooding.
- Allow adequate access for servicing pump and piping.

### Pipe Sizing Chart

MAXIMUM RECOMMENDED SYSTEM FLOW RATE BY PIPE SIZE

| Pipe Size [mm] | Flow rate GPM [Liter/Min] | Pipe Size [mm] | Flow rate GPM [Liter/Min] | Pipe Size [mm] | Flow rate GPM [Liter/Min] |
|---|---|---|---|---|---|
| 1” [32] | 20 [75] | 1 ½” [50] | 45 [170] | 2 ½” [75] | 110 [415] |
| 1 ¼” [40] | 30 [110] | 2” [63] | 80 [300] | 3” [90] | 160 [600] |

**NOTE** - It is recommended that a minimum length of piping, equivalent to 10 pipe diameters, be used between the pump suction inlet and any plumbing fittings.

### WARNING – Hazardous Pressure.

Pumps, filters, and other equipment/ components of a swimming pool filtration system operate under pressure. Incorrectly installed and/or improperly tested filtration equipment and/or components may resulting in injury and/or property damage.

**Plumbing**

Use **Teflon 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 **Teflon 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. The pump suction and outlet ports have molded-in thread stops. **Do NOT attempt to force hose connector fitting past this stop.** 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 Teflon tape as friction is reduced considerably; **do NOT over-tighten fitting or you may cause damage**. If leaks occur, remove connector, clean off old Teflon tape, re-wrap with one to two additional layers of Teflon tape, and re-install connector.

**Fittings**

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. Pool and spa fittings MUST conform to the International Association of Plumbing and Mechanical Officials (IAPMO) standards. Use a non-entrapping suction fitting in pool (multiple drains) or double suction (skimmer and main drain).

**Electrical**

**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.
**WARNING –** Do NOT ground to a gas supply line.
**WARNING –** To avoid dangerous or fatal electrical shock, turn OFF power to motor before working on electrical connections.
**WARNING –** 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 H.P. (KW) rating and distance from the power source. **NOTE - All electrical wiring MUST be performed by a licensed electrician.**

**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 place; use size and type wire required by code. Connect motor ground terminal to electrical service ground. Bond motor to pool structure. Bonding will connect all metal parts within and around the pool 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.

Use a solid copper conductor, run wire from external bonding lug to reinforcing rod or mesh. Connect a solid copper bonding wire to the pressure wire connector provided on the motor housing and to all metal parts of swimming pool, spa, or hot tub, and to all electrical equipment, metal piping (except gas piping), and conduit within 5 ft. (1.5 m) of inside walls of swimming pool, spa, or hot tub.

**Wiring**

**WARNING – All wiring must be done by a licensed electrician.**

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.

**NOTE - 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.**

**Prior to Start-Up**

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

1. Have a professional perform this test.
2. Ensure all pump and system components are sealed properly to prevent leaks.
3. Remove any trapped air in the system by fully opening filter manual air relief valve until a steady stream of water is discharged.
4. Allow no more than 40 psi (276 kPa) at a water temperature no higher than 100 F (38 C).
5. Run pressure test for no longer than 24 hours. Immediately inspect all parts to verify they are intact and functioning properly.

Fill strainer housing with water to suction pipe level. **NEVER OPERATE THE PUMP WITHOUT WATER**. Water acts as a coolant and lubricant for the mechanical shaft seal.

**WARNING –** If pump is being pressure tested (40 PSI MAXIMUM), **be sure** pressure has been released, using the filter manual air relief valve, before removing strainer cover.

**CAUTION – NEVER** run pump dry. Running pump dry may damage seals, causing leakage, flooding, and voids warranty. Fill strainer housing with water before starting motor.

**ATTENTION – DO NOT** add chemicals to pool/spa system directly in front of pump suction. Adding undiluted chemicals may damage pump and voids warranty.

**ATTENTION –** 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 detail.

**Priming Pump**

**CAUTION –** 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.

- Release all pressure from filter, pump, and piping system. See filter owner's manual.
- 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.
- Clean and lubricate strainer cover O-ring each time it is removed. Inspect O-ring and re-install on strainer cover.
- Replace strainer cover on strainer housing; turn clockwise to tighten cover.

Turn on power and wait for pump to prime, which may take up to five (5) minutes. Priming time will depend on vertical length of suction lift and horizontal length of suction pipe. If pump does NOT prime within five minutes, stop motor and determine cause. Be sure all suction and discharge valves are open when pump is running. See Troubleshooting Guide.

**ATTENTION –** Wait five (5) seconds before re-starting pump. Failure to do so may cause reverse rotation of motor and consequent serious pump damage.

Close filter manual air relief valve after pump is primed.

**Mantenance**

 Clean strainer basket regularly. Do NOT strike basket to clean. Inspect strainer cover gasket regularly and replace as necessary.

 pumps have self-lubricating motor bearings and shaft seals. No lubrication is necessary.

 Keep motor clean. Insure 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 seal assembly kit. See “Shaft Seal Change Instructions” in this manual.

**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

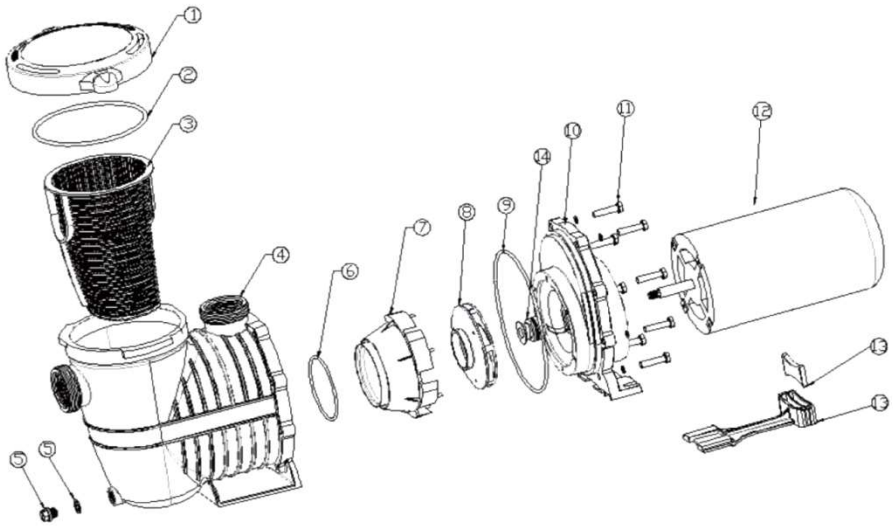
instructions may result in injury.

A. **WARNING** – To reduce risk of injury, do not permit children to use this product.

B. Disconnect all electrical power service to pump before beginning shaft seal replacement.

C. Only qualified personnel should attempt rotary seal replacement. Contact your local authorized Dealer or service center if you have any questions.

D. Exercise extreme care in handling both the rotating and the stationary sections of the two-part replacement seal. Foreign matter or improper handling will easily scratch the graphite and ceramic sealing surfaces.



| No. | Description | No. | Description |
|---|---|---|---|
| 1 | Lid | 8 | Impeller |
| 2 | O-Ring | 9 | Pump Casing O-Ring |
| 3 | Basket | 10 | Pump Housing |
| 4 | Strainer Casing | 11 | Screw |
| 5 | Drain Plug | 12 | Motor |
| 6 | Diffuser O-Ring | 13 | Carrier |
| 7 | Diffuser | 14 | Shaft Seal |

**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.

**ATTENTION –** Allowing the pump to freeze will void the warranty.

**ATTENTION –** Use ONLY propylene glycol as antifreeze in your pool/spa system. Propylene glycol is nontoxic 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).

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 pool.
2. Remove drain plugs from bottom of strainer body, and remove strainer cover from strainer housing.
3. Disconnect pump from mounting pad, wiring system (after power has been turned OFF), and piping system.
4. Once the pump is removed of water, re-install the strainer cover and drain plugs. Store pump in a dry area.

## Troubleshooting

| ISSUE | POSSIBLE SOLUTION |
|---|---|
| MOTOR WILL NOT START | Improper or loose wiring connections; open switches or relays; tripped circuit breakers or blown fuses. |
| | Manually check rotation of motor shaft for free movement and lack of obstruction. |
| | If you have a timer, be cetain it is working properly. Bypass it if necessary. |
| MOTOR SHUTS OFF | Undersized wiring; loose connections; etc. |
| | Low voltage at motor or power drop (frequently caused by undersized wiring or extension cord use). |
| | Mechanical binding and electrical overload. |
| MOTOR HUMS BUT DOES NOT START | Centrifugal switch stuck in OPEN position. |
| | Binding of motor shaft. |
| PUMP WON'T PRIME | Make sure pump/strainer housing is filled with water and the cover O-ring is clean, also be sure it is properly seated in the cover O-ring groove. Make sure strainer cover is locked firmly in position. |
| | Make sure all suction and discharge valves are fully open and not blocked, that pool water level is at proper level, and that skimmer weir is not hung up or stuck on skimmer wall. |
| | Block off to determine if pump will develop a vacuum. You may be able to check by removing the skimmer basket and holding your hand over the bottom port with skimmer full and pump running. If no suction if felt, check for line blockage. |
| | a. If pump develops a vacuum, check for blocked suction line or dirty strainer basket, and air leak in the suction piping may be the cause. |
| | b. If pump does not develop a vacuum and pump has sufficient "priming water": i. Re-check strainer housing cover and all threaded connections for suction leaks. Check if all hose clamps are tight. ii. Check vlotage to ensure that the motor is rotating at full RPM's. iii. Open housing cover and check clogging or obstruction in suction. Check impeller for debris. iv. Remove and replace shaft seal only if it is leaking. |
| LOW FLOW | Clogged or restricted strainer or suction line; undersized pool piping. |
| | Plugged or restricted discharge line or filter, valve partially closed (high gauge reading). How to correct: Sand filters - backwash as per manufacturer's instructions; D.E. filters - backwash as per manufacturer's instructions; Cartridge filters - clean or replace cartridge. |
| | Air leak in suction piping causing rumbling in pump. |
| | Cavitation due to restricted or undersized suction line or leak at any joint, low water level in pool, and unrestricted discharge return lines. Correct suction condition or throttle return lines, if practical. Holding hand over return fitting will sometimes prove this point or putting in a smaller eyeball fitting. |
| NOISY PUMP | Vibration due to improper mounting, etc. Put a rubber pad under metal mounting feet. |
| | Foreighn matter in pump housing. Loose stones/debris hitting impeller could be cause, remove any of the above. |
| | Motor bearings noisy from normal wear, rust, overheating, or concerntration of chemicals causing seal damage which will allow chlorinated water to seep into bearings wiping out the grease causeing bearing to whine. All seal leaks should be replaced at once. |
| | Equipment base vibrating. |