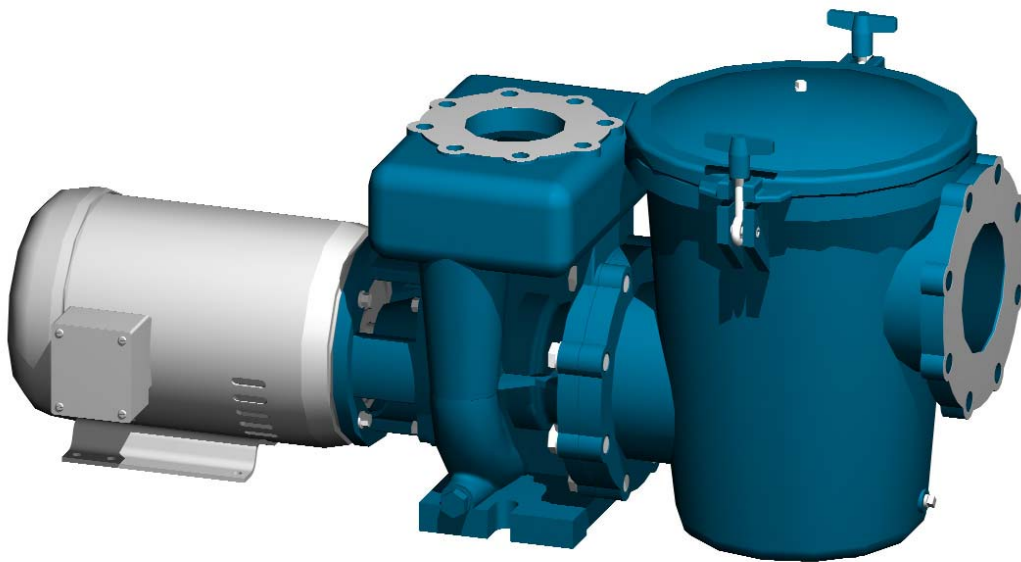




Hydro 5000

Centrifugal Self Priming Pump with Trap



Waterco USA, Inc.
1864 Tobacco Rd.
Augusta, GA 30906
(800)247-7291

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Safety Instructions

READ AND FOLLOW ALL SAFETY INSTRUCTIONS. FAILURE TO FOLLOW SAFETY INSTRUCTIONS MAY CAUSE SEVERE INJURY OR DEATH.

Carefully read and follow all safety instructions in this manual and on equipment.
Keep safety labels in good condition; replace if missing or damaged.

General Safety:

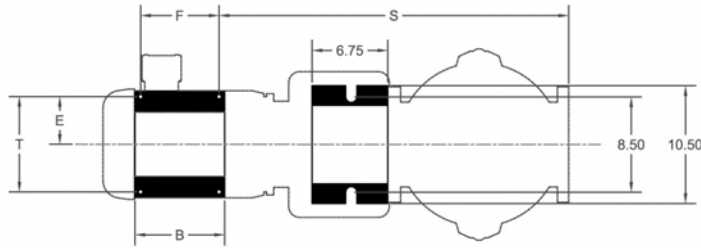
1. Have a trained pool professional perform all pressure tests.
2. Do not connect system to a high pressure or city water system.
3. Use equipment only in a pool or spa installation.
4. Install pump with at least 2 hydraulically balanced main drains equipped with correctly installed, screw-fastened, anti-entrapment certified covers.
4. Trapped air in system can cause an explosive condition. **BE SURE** all air is out of system before operating or testing equipment.

Before pressure testing, make the following safety checks:

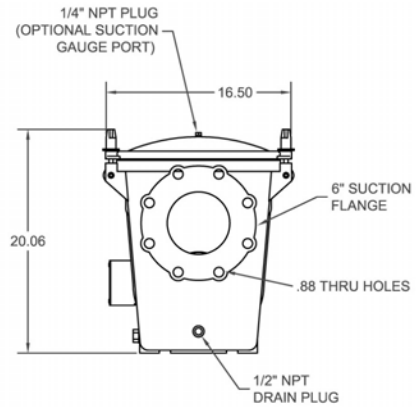
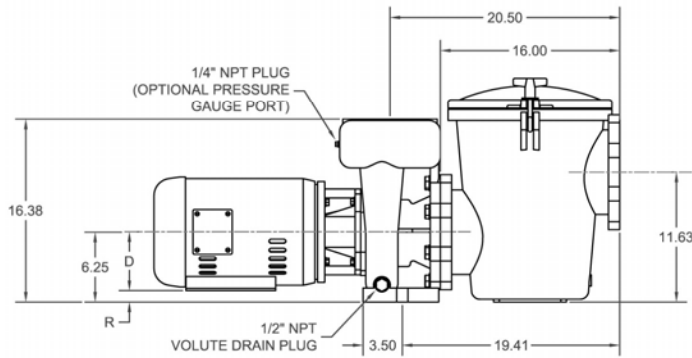
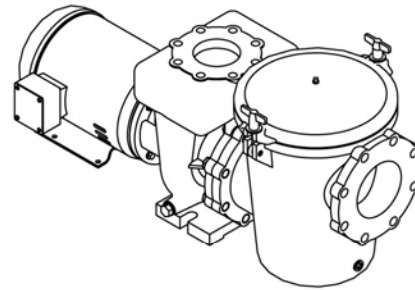
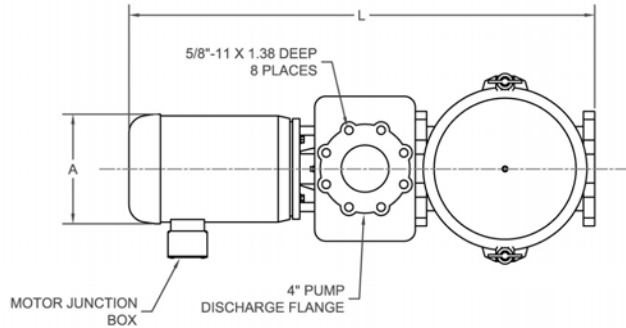
- Check all clamps, bolts, lids, and system accessories before testing.
- Release all air in system before testing.
- **Tighten Suction Strainer lid to 25 Ft. Lbs. torque for testing only.**
- When pressure testing pumps and traps water pressure for test must be less than 40 PSI (2.8 kg/cm²).
- Water Temperature for test must be less than 100 F (38 C).
- Limit test to 24 hours. After test, visually check system to be sure it is ready for operation. **Remove trap lid and retighten hand tight only.**

NOTICE: These parameters apply only to equipment covered in this manual. For any other equipment contact manufacturer for testing procedures.

This pump is for use with permanently installed 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 may be readily disassembled for storage and reassembled to its original integrity.

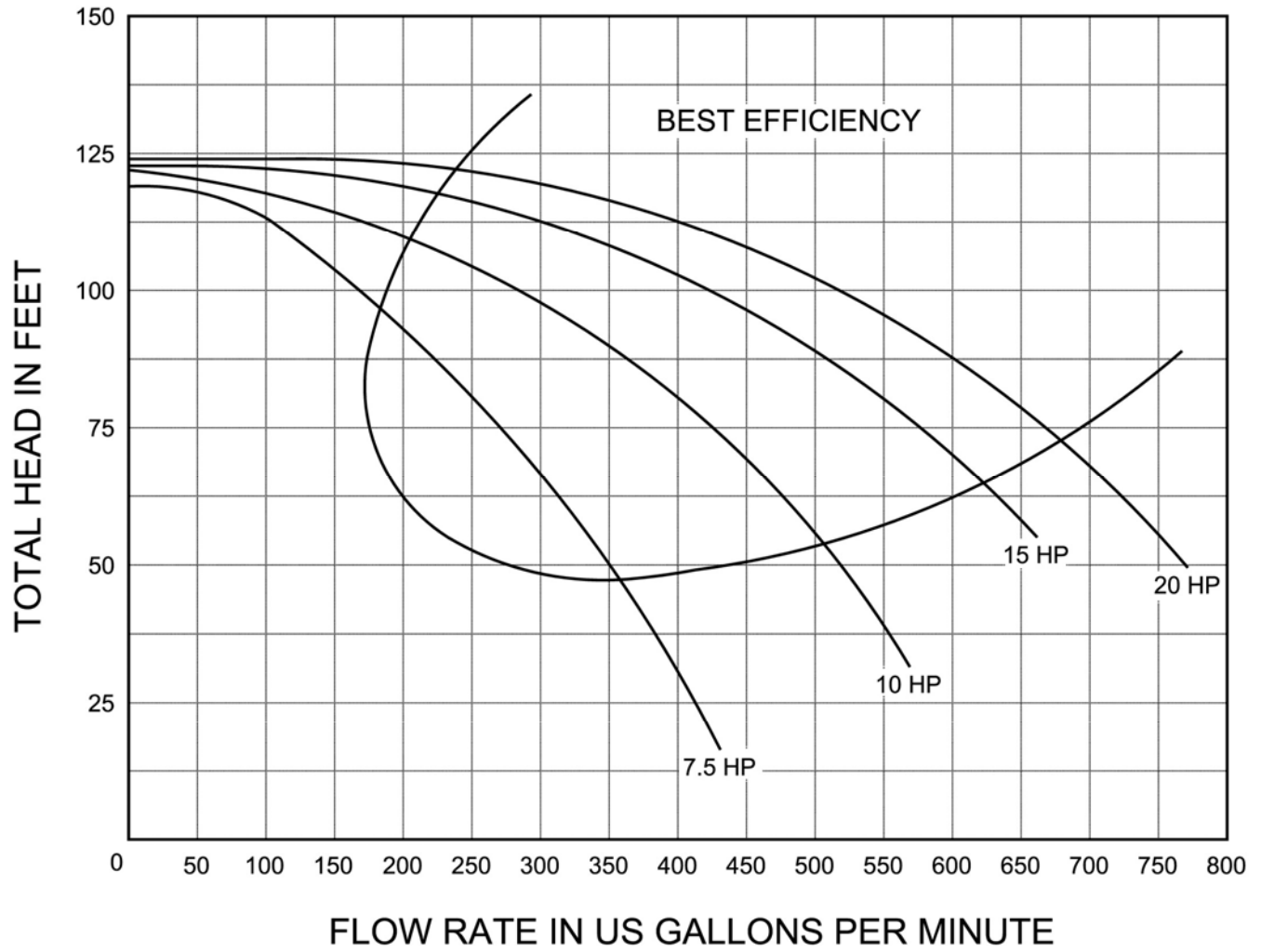


FOOTPRINT DETAIL



Model Number	HP	A	D	E	F	L	R	S	T
19B05000	7.5	9.00	4.50	3.75	5.50	40.31	1.75	29.13	7.50
19B05001	10	10.62	5.25	4.25	5.50	41.00	1.00	30.00	8.50
19B05002	15	10.62	5.25	4.25	7.00	42.50	1.00	31.62	8.50
19B05003	20	12.50	6.25	5.00	8.20	46.75	0.00	30.00	10.00
19B05004	7.5 / 1Ph.	10.62	5.25	4.25	5.50	39.44	1.00	30.00	8.50
19B05005	10 / 1Ph.	10.35	5.25	4.25	7.00	42.69	1.00	30.00	8.50

All Dimensions are in Inches



UNCRATING AND INSPECTION

Handle with care. Pump and strainer are heavy. Remove outer carton before trying to move. Check items received against packing list to be sure that all equipment has been received. Inspect for shipping damage. If found, file claim with carrier immediately.

Cleanup

Clean up all trash and other materials which will interfere with installation from foundation and surrounding area. For easy assembly, make sure all threaded joints and mating surfaces are clean. If necessary, clean with wire brush and solvent.

Fire and explosion hazard. To reduce danger of explosion and fire, do not use gasoline as a cleaning solvent.

Remove all foreign material (packing, etc.) from pump and strainer.

Fire and burn hazard. Modern motors run at high temperatures. To reduce the risk of fire, do not allow leaves, debris, or foreign matter to collect around the pump motor. To avoid burns when handling the motor, let it cool for 20 minutes before trying to work on it.

INSTALLATION

Only qualified, licensed personnel should install pump and wiring.

Note: These pumps must be installed with strainer to be NSF certified self priming per Standard 50.

Location:

Ambient air temperature should be kept at 104° F (40° C) or less.
Store pool chemicals away from pump.

Footing / Enclosure:

Footing / Enclosure must:

Be located away from corrosive or flammable liquids.

Have enough ventilation to maintain air temperature at less than the maximum ambient temperature rating (Max. Amb.) listed on the motor model plate.

Be Solid - Level - Rigid - Vibration free

Be provided with necessary hold-down bolts, washers, and shims.

Allow pump inlet to be as close to water level as possible.

Use short, direct suction pipe (to reduce friction losses).

Maximum suction lift is 10' (3 m).

Allow for gate or butterfly valves in suction and discharge piping.

If vertical suction lift is higher than 5 feet, installation of a foot valve at lowest portion of the vertical suction pipe may be needed.

Have adequate floor drainage to prevent flooding.

Be protected from excess moisture.
Allow adequate access for servicing pump and piping.

PUMP SUCTION REQUIREMENTS

Safety Precautions:

Pump suction flow is hazardous and can trap and drown or disembowel bathers. Do not use or allow anyone else to use a pool, spa, or hot tub unless it has at least two suction outlets to each pump suction line. (See “Outlets Per Pump” below)

Do not use or operate swimming pools, spas, or hot tubs if a suction outlet cover is missing, broken, or loose.

Follow the guidelines below for a pump installation which minimizes risk to users of pools, spas, and hot tubs.

Suction Pipe

Suction pipe must be straight directly in front of pump for at least 6 pipe diameters in order to normalize flow into pump

Entrapment Protection

The pump suction system *must* provide protection against the hazard of suction entrapment or hair entrapment/entanglement.

Suction Outlet Covers

All suction outlet covers must be maintained. They must be replaced if cracked, broken, or missing. All suction outlets must have correctly installed, screw-fastened covers in place.

Outlets Per Pump

Provide at least two hydraulically balanced main drains, with covers (see Figure 1, Page 8), for each swimming pool pump suction line. The centers of the main drains (suction fittings) must be at least three feet apart. The system must be built so that it cannot operate with the pump drawing water from only *one* main drain (that is, there must be at least two main drains connected to the pump whenever it is running, see Figure 1). However, if two main drains run into a single suction line, the single suction line may be equipped with a valve which will shutoff *both* main drains from the pump (see Figure 1).

More than one pump can be connected to a single suction line as long as the requirements above are met.

Water Velocity and Flow Rates

The maximum water velocity must be six feet per second or less unless the outlet complies with the latest ASME/ANSI Specification for *Suction Fittings For Use in Swimming Pools, Spas, Hot Tubs, and Whirlpool Bathtub Applications*.

If 100% of the pump's flow comes from the main drain system, the maximum water velocity in the pump suction hydraulic system must be six feet per second or less even if one main drain (suction fitting) is completely blocked. The flow through the remaining main drain(s) must

comply with the latest ASME/ANSI Specification for *Suction Fittings For Use in Swimming Pools, Spas, Hot Tubs, and Whirlpool Bathtub Applications*.

Piping – General

System piping must be at least equal to size of pump connections. To prevent strain on the pump casing and foundation, pipe and fittings must be aligned to pump without forcing. To avoid strains on the pump, support both suction and discharge pipes independently. Place these supports near the pump. To avoid a strain left by a gap at the last connection, start all piping at the pump and run pipe **away** from the pump.

Piping – Suction

Hazardous suction. Risk of severe injury or drowning from hair or body entrapment. To reduce risk of entrapment against pump suction opening, connect pump to multiple drains and skimmers of non-entrapment design. See “Pool Pump Suction Requirements,” Page 6.

NOTICE: If pump suction becomes clogged, pump will cavitate, damaging pump internal parts. Keep suction pipe clear of debris, dirt, etc.

NOTICE: To prevent flooding when removing pump for service, all flooded suction systems **must** have valves in suction and discharge pipes.

Use at least 6” (152 mm) pipe. Never use a suction pipe smaller than the pump suction connection.

Use larger pipe as required to keep water velocity below six feet per second in suction lines and ten feet per second in discharge lines. If code requires a lower water velocity, comply with the code.

Suction pipe must rise continuously from source to pump. To avoid airlocking, do not allow high spots in pipe.

When using reducer to connect to pump flange, use an eccentric reducer with the straight side on top.

Piping – Discharge

To minimize friction losses, make piping one size larger than pump openings.

Fittings restrict flow; for best performance use fewest possible fittings.

Avoid fittings which could cause an air trap. Pool fittings must conform to International Association of Plumbing and Mechanical Officials (IAPMO) standards.

Strainer

Hazardous pressure. Maximum hydrostatic test pressure is 40 PSI (275 kPa) water pressure. To avoid explosion hazard, DO NOT test strainer with air pressure.

Air pressure in strainer can blow cover off of strainer body, which can cause severe or fatal injury. Remove vent plug (Top of Strainer lid) and release ALL air (wait for a steady stream of

water from vent) before hydrostatically testing strainer. To avoid breaking pump or putting unnecessary strains on pump or strainer body, support pipe independently of pump/strainer. Center the strainer cover when installing it (especially when pressure testing). When installing cover, clean O-Ring groove in strainer body, and lubricate with Silicone grease as follows:

A. O-Ring;

B. Sealing surfaces of strainer cover and body;

C. Threads and faces of wing nuts.

This will prevent corrosion, improve seal, and ease maintenance. If strainer is installed backwards, debris will collect in suction pipe instead of in strainer basket. Install strainer with cast-on flow arrows pointing in direction of water flow.

Basket will only go into strainer one way; don't force it.

ELECTRICAL

***** Disconnect power at service panel before connecting motor.**

***** Ground motor before connecting to electrical power supply.**

***** Failure to ground motor can cause severe 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.**

***** Match supply voltage to nameplate voltage. Incorrect voltage and/or wiring can cause fire or seriously damage motor and voids warranty.**

***** All electrical wiring, grounding, and bonding must be done by a licensed electrical contractor who is familiar with commercial swimming pool installations and electrical codes and requirements.**

NOTICE: Due to wide variation in electrical equipment, power supply, and installation requirements, this manual does not make specific recommendations concerning auxiliary equipment or fusing/wiring. Wire sizing, wire type, branch circuit fuse protection, motor starter, control equipment, and related items must meet National Electrical Code and local code requirements. Motors are supplied by several manufacturers and nameplate data (service factor, maximum amperage, etc.) will vary. Consult control manufacturer and motor nameplate on your pump to correctly choose and size motor starter and control equipment for your particular installation. Specific electrical questions or problems should be addressed to the manufacturer of the electrical component in question.

Voltage/Phase

Voltage at motor must be not more than 10% above or below motor nameplate 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. Do not try to connect 3-phase motors to single phase power supply or single phase motors to 3-phase power supply.

Emergency Shutoff

Install an Emergency Shutoff Switch near pool. Clearly mark this switch and mount it in a location that is accessible to bathers or pool operating personnel (e.g. lifeguards). Make sure

that all lifeguards and pool personnel understand the switch's use in case of emergency (entrapment, electrical malfunction, etc).

Grounding/Bonding

Install, ground, bond and wire motor according to local and National Electrical Code requirements. Permanently ground motor. Use green grounding 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 pool structure according to local or National Electrical Code. Use a solid copper conductor, size No. 8 (6.0 mm²) AWG or larger.

Wiring

Pump must be permanently connected to circuit; be sure no other appliances are on the same circuit. Make sure that motor nameplate connection diagram includes connection diagram for available voltage. If not, consult power company or a licensed electrician.

Hazardous voltage. Can shock, burn, or cause death.

Ground pump before connecting to power supply.

Check rotation before attaching strainer and before making final connection to power supply.

Pump should rotate counterclockwise when viewed through pump suction port.

Note:

To change rotation: Three phase motors: Reverse any two leads to motor.

Single phase motors: Follow motor manufacturer's instructions to reverse.

OPERATION

Hazardous suction. Can trap hair or body parts, causing severe injury or death by drowning. Do not block pump or strainer suction with body. Small children using pool must ALWAYS have close adult supervision!

Explosion hazard. Do not run pump against closed discharge valve. To do so can boil water in pump body, and can cause severe burns to people working on pump.

Fire and burn hazard.

Modern motors run at high temperatures. To reduce the risk of fire, do not allow leaves, debris, or foreign matter to collect around the pump motor. To avoid burns when handling the motor, let it cool for 20 minutes before trying to work on it. An automatic internal cutoff switch protects the motor from heat damage during operation.

NEVER run pump dry. Running pump dry may damage seals, causing leakage and flooding. Fill pump with water before starting motor.

Before removing strainer cover:

1. STOP PUMP.

2. CLOSE GATE OR BUTTERFLY VALVES in suction and discharge pipes.

3. RELEASE ALL PRESSURE from pump and piping system.

After pressure test, release all pressure before removing strainer cover!

NOTICE: Provide adequate ventilation. Ambient air temperature should be 104°F (40° C) or less.

NOTICE: To prevent corrosion damage, store pool chemicals in another room away from pump.

Priming Pump

Hazardous Pressure! Before removing strainer cover, remove vent plug in cover and release all pressure from system.

In a flooded suction system open suction/discharge valves to prime.

If pump is not in a flooded suction system, remove strainer cover; fill strainer and pump with water. If necessary, use a wrench on flats when removing wing nuts.

When installing cover, clean O-Ring sealing surface on strainer body, and lubricate with silicone grease as follows:

A. O-Ring and Sealing surfaces of strainer cover and body;

B. Threads and faces of wing nuts.

This will prevent corrosion, improve seal, and ease maintenance.

Center strainer cover when installing it (especially when pressure testing).

Hand tighten wing nuts. When tightening, alternate back and forth between nuts to compress O-Ring evenly. Maximum wing nut torque is 25 ft.-lbs. (3.5 kg.-m).

Start pump; it should prime now. Priming time will depend on vertical length of suction lift (10'/3m maximum) and horizontal length of suction pipe. Pump is tested to prime to 10 feet (3m) in nine minutes, using 6" piping with strainer attached. Priming time will vary with altitude above sea level. If pump does not prime, make sure that all valves are open, suction pipe end is under water and that there are no leaks in suction pipe. See Troubleshooting Guide, [Page XX](#).

NOTICE: To avoid corrosion damage to pump and strainer, do not add chemicals to system anywhere on suction side of pump (including into skimmers). Do not pour chemicals into strainer. Follow chemical manufacturer's instructions when mixing or adding chemicals to system.

Storage/Winterizing

NOTICE: Allowing pump to freeze will damage pump and void warranty.

NOTICE: Do not use anti-freeze (except propylene glycol) in your pool system. Propylene glycol (RV anti-freeze) is non-toxic and will not damage plastic system components. Other anti-freezes are highly-toxic and may damage plastic system components.

Drain all water from pump and piping when expecting freezing temperatures or when storing pump for a long time. Keep motor dry and covered during storage.

To avoid condensation/corrosion problems, **do not** cover pump with plastic.

For outdoor/unprotected installation:

1. Enclose entire system in a weatherproof enclosure.
2. To avoid condensation/corrosion damage, allow ventilation; do not wrap system in plastic.
3. Use a 40% propylene glycol/60% water solution to protect pump to -50° F (-46° C).

Draining Pump

Hazardous Voltage. Can shock, burn or cause death. Disconnect all power before draining the pump.

Explosion Hazard. Purging the system with compressed air can cause components to explode causing risk of severe injury or death to anyone nearby.

1. Pump down water level until it is below all inlets to pool.
2. Remove the strainer cover. When the interior is dry, replace the strainer cover.
3. To prevent pump from freezing, drain pump body and strainer through the two drain plugs. Gravity drain the system as far as possible.
4. Clean the pump thoroughly and replace the priming plug.
5. Be sure the motor is kept dry and covered.

Startup for Winterized Equipment

1. Remove any temporary weather protection placed around the system for shutdown.
2. Follow the filter manufacturer's instructions for reactivation of the filter.
3. Inspect all electrical wiring for damage or deterioration over the shutdown period. Have a qualified serviceman repair wiring as needed.
4. Inspect and tighten all watertight connections.
5. Open all valves in suction and return piping.
6. Remove any winterizing plugs in the system.
7. Drain all antifreeze from the system.
8. Close all drain valves and replace all drain plugs in the piping system.
9. Prime pump according to instructions, Page XX.

MAINTENANCE – Strainer

Hazardous pressure. Before removing strainer cover, loosen or remove 1/4” NPT vent plug in cover and release all pressure.

NOTICE: Do not allow strainer to freeze.

If system will be shut down for one day or more, drain strainer and system to prevent corrosion.

Remove strainer cover to allow interior to dry out when storing for the season. When interior is dry, replace cover.

Remove drain plug when storing for season. Leave plug out until system is restarted the following season.

To remove strainer cover, unscrew two wing nuts. If necessary, use a wrench on flats when removing wing nuts.

NOTICE: A clogged basket will cause cavitation, which will damage strainer basket, impeller, and pump. Clean weekly or each time you vacuum pool, whichever comes first.

NOTICE: Basket is a close fit in body of strainer. When cleaning basket, do not deform.

Hose basket out well. DO NOT hammer on basket or otherwise mistreat it. When installing cover, clean O-Ring groove in strainer body.

Lubricate O-Ring, sealing surfaces of strainer cover and body, and threads and faces of wing nuts with Silicone Grease to prevent corrosion, improve seal, and ease maintenance.

Center strainer cover when installing it (especially when pressure testing).

Hand tighten wing nuts. When tightening, alternate back and forth between nuts to compress O-Ring evenly. Maximum wing nut torque is 25 ft.-lbs. (3.5 kg-m).

If possible, protect from weather at all times.

For storage of outdoor installation:

1. Drain system.
2. Dry as much as possible.
3. Lubricate with petroleum jelly.
4. Reassemble.
5. Leave drain plug out during storage.

Troubleshooting

A. Electrical

Casue	Corrective Action
NO VOLTAGE IN POWER SYSTEM	Check phase-to-phase on line side of starter contactor. Check circuit breaker or fuses.
NO VOLTAGE ON ONE PHASE	Check phase voltage on line side of starter contactor. Isolate open (THREE PHASE UNITS) circuit (circuit breaker, fuse, broken connections, etc.)
LOW VOLTAGE AT MOTOR	Running voltage across each leg of motor must be $\pm 10\%$ of nominal voltage shown on nameplate.
MOTOR LEADS IMPROPERLY GROUPED	Refer to lead grouping diagram on motor nameplate
CONTROL FAILURE	Check control device, starter contactor, H-O-A selector switch, etc., for malfunction.
THERMAL OVERLOAD SWITCH OPEN	Check for drag or other overload.
INSULATION FAILURE	Check motor or windings to ground with megohmmeter
OPEN WINDINGS	Check leg-to-leg with ohmmeter.
FREQUENCY VARIATION	Check frequency of power system. Must be less than 5% variation from motor nameplate rating.
WRONG DIRECTION OF ROTATION	Reverse rotation of three phase motor by interchanging any two leads. See Manufacturer's Instructions for reversing single phase motor.

B. MECHANICAL

Casue	Corrective Action
FLOW THROUGH PUMP COMPLETELY OR PARTIALLY OBSTRUCTED	Locate and remove obstruction. Refer to Repair Instructions for disassembly.
PUMP NOT PRIMED	Reprime. Inspect suction system for air leaks.
INTERNAL LEAKAGE	Check impeller for wear of controlled clearances. (See Repair Instructions.)
LOOSE PARTS	Inspect, repair.

C. System

Casue	Corrective Action
PRESSURE REQUIRED BY SYSTEM AT DESIGN FLOW RATE EXCEEDS PRESSURE RATING OF PUMP	Compare pump pressure and flow rate against pump characteristic curve. Check for closed or partially closed valve in discharge piping system. Reduce system pressure requirement. Increase pressure capability of pump.
OBSTRUCTION IN SUCTION PIPING	Locate and remove obstruction.
PRESSURE RATING OF PUMP EXCEEDS PRESSURE REQUIREMENT OF SYSTEM AT DESIGN FLOW RATE.	Compare pump pressure and flow rate against pump characteristic curve. Inspect discharge piping system for breaks, leaks, open by-pass valves, etc. If necessary, reduce flow rate by partially closing discharge valve.
SUCTION LIFT EXCEEDS 10' DESIGN MAXIMUM.	Locate pump closer (vertically) to water source

DISASSEMBLY / ASSEMBLY

Locate your Model Number on the Exploded View on the next page for Key Numbers.

1. Disconnect all power to pump.
2. Close valves to isolate pump from system.
3. Drain pump and trap; be sure to vent pressure from strainer. (Remove top plug)
4. Support motor so it does not drop when bracket (Key No. 20) is unbolted from the volute.
5. Unbolt the bracket (Key No. 20) from volute (Key No. 1); slide bracket, impeller and motor out as a unit.
6. Remove impeller screw (Key No. 5), Impeller Sealing Washer (Key No. 6), impeller washer (Key No. 17).
7. With a wheel puller, pull impeller (Key No. 9).
8. Remove shaft seal retaining ring (Key No. 13).
9. To remove the shaft sleeve (Key No. 12) call customer service. Heat is needed.
10. Unbolt the bracket from motor and slide bracket off shaft, bringing the rotating portion of the mechanical seal (a portion of Key No. 14) with it.
11. Turn bracket face down on bench; tap out stationary half of seal (the other portion of Key No. 14).
12. Inspect the impeller skirt (outside impeller eye) and the wear ring (Key No. 4) for damage, pitting or wear; replace it if necessary.
13. Remove old gaskets and clean all gasket surfaces. Lubricate all rubber gaskets with Silicone Grease (Dow #4 recommended)

Fire and explosion hazard. DO NOT use gasoline as a cleaning solvent.

14. Press in new stationary seal half. If necessary, protect seal surface with a cardboard washer and tap into place using a piece of plastic pipe for a press. DO NOT scratch, nick or mar seal face.
15. Install the bracket (Key No. 20) on motor (Key No. 21); be careful not to nick seal on shaft shoulder.
16. Slide rotating half of new seal onto shaft sleeve (Key No. 12), polished face first; be careful not to nick seal on shaft shoulder.
17. Install the shaft seal retaining ring (Key No. 13).

NOTICE: Do not lubricate shaft gaskets as this may interfere with sealing.

18. Install a new impeller gasket (Key No. 11) on the shaft.
19. Install the impeller (Key No. 9) on shaft. Pull impeller into place with impeller screw (Key No. 5) and impeller washer (Key No. 7).
20. Remove impeller screw and washer, clean up screw with wire brush and prime with Loctite Primer T.
21. Install impeller gasket (Key No. 8), impeller washer (Key No. 7), Impeller Sealing Washer (Key No. 6), and impeller screw (Key No. 5) in that order. Use Loctite #271 to secure impeller screw.

Tighten as shown:

3/8" impeller screw to 200 inch-lbs. (2.3 kg-m) torque;

1/2" impeller screw to 450 inch-lbs. (5.2 kg-m) torque.

22. Install new volute gasket (Key No. 10) and slide motor/impeller/bracket assembly into place; bolt up to volute.

Tighten nuts and lockwashers (Key Nos. 17 and 16) to 450 inch-lbs. (5.2 kg-m) torque.

23. If pump is below water level: Close drains; open system valves to fill pump. If pump is above water level: Fill strainer and prime pump. Open system valve if they were closed at disassembly.

24. When pump is full, close pump and strainer vent plugs.

25. Reconnect power to pump and system is ready for operation.

