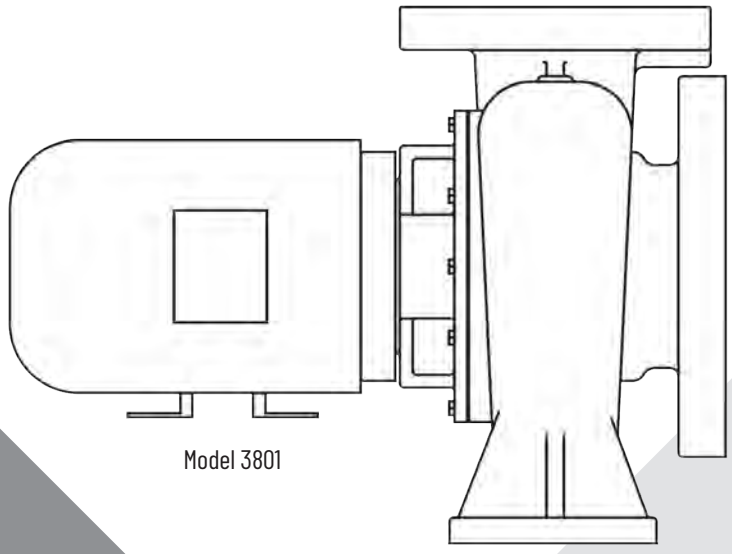
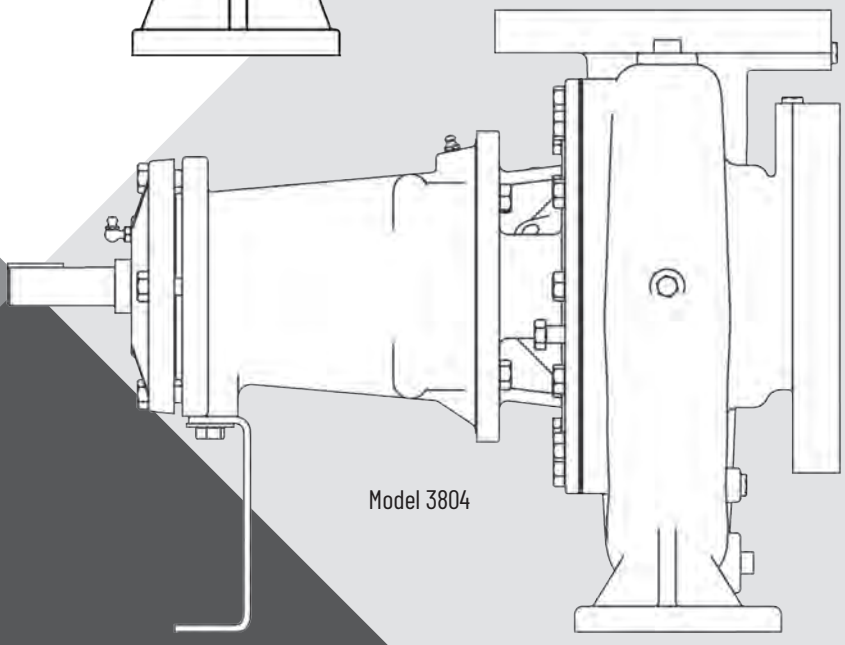
# APPENDIX H – EQUIPMENT MANUALS AND PRODUCT BROCHURES

PENTAIR AURORA*

## END SUCTION PUMPS
3801 • 3804



Model 3801



Model 3804

# INSTALLATION AND OPERATION MANUAL

**pentair.com**

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# GENERAL INFORMATION

***NOTICE to the installer:*** Please make sure you provide this manual to the owner of the equipment or to the responsible party who maintains the system.

This manual contains important information for the safe use of Pentair Aurora* 3800 End Suction Pumps. Read this manual completely before using this product. DO NOT DISCARD OR LOSE THIS MANUAL.

Pentair Aurora 3804 Series pumps are frame mounted. They feature high efficiency, rugged construction, foot mounted volutes with back pullout power frames, center drop out spacer couplings (optional) and regreasable ball bearings. The pump's stainless steel fitted construction is suitable for unheated domestic, fresh water, condensate, boiler feed water, pressure boosting and hydronic coiling and/or heating.

## SAFETY

### Explanation of Designations

**⚠ DANGER** warns about hazards that will cause serious personal injury, death or major property damage if ignored.

**⚠ WARNING** warns about hazards that can cause serious personal injury, death or major property damage if ignored.

**⚠ CAUTION** warns about hazards that will or can cause minor personal injury or property damage if ignored.

***NOTICE:*** indicates special instructions which are important but not related to hazards.

### General Guidelines

- These instructions must always be kept close to the product's operating location or directly with the product.
- These instructions should be read prior to installing, operating, using and maintaining the equipment in any region worldwide. The equipment must not be put into service until all the conditions relating to safety, noted in the instructions, have been met.
- The product must not be operated beyond the parameters specified for the application. If there is any doubt as to the suitability of the product for the application intended, contact Pentair Aurora Customer Service for advice, quoting the serial number.

### Personnel Qualification and Training

All personnel involved in the operation, installation, inspection and maintenance of the unit must be qualified to carry out the work involved. If the personnel in question do not already possess the necessary knowledge and skill, appropriate training and instruction must be provided. It is responsibility of owner or operator to provide training for all personnel involved in the operation, installation, inspection and maintenance of the equipement.

It is recommended that proper documentation of personnel should be maintained by the responsible part(ies).

### Personnel Safety Actions

**CALIFORNIA PROPOSITION 65 WARNING:**

**⚠ WARNING** This product and related accessories contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

**⚠ DANGER** Never do maintenance work when the unit is connected to power. Always follow lock out – tag out procedures when working on equipment that may turn on.

**⚠ WARNING** Guards must not be removed while the pump is operational. Always follow lock out – tag out procedures when working on equipment that may turn on.

**⚠ WARNING** Isolate the pump from any fluid in the system and then drain any remaining fluid from the pump casing before proceeding with dismantling the pump. The appropriate safety precautions should be taken where the pumped liquids are hazardous.

**⚠ WARNING** **Fluoroelastomers (when fitted) :** When a pump has experienced temperatures over 135°C (275°F), partial decomposition of fluoroelastomers (example: Viton™) will occur. In this condition these are extremely dangerous and skin contact must be avoided.

**⚠ WARNING** **Handling components:** Many precision parts have sharp corners, thus wearing of appropriate safety gloves and equipment is required when handling these components. To lift heavy pieces above 25 kg (55 lb.) use a crane appropriate for the mass and in accordance with current local regulations.

**⚠ WARNING** **Thermal shock:** Rapid changes in the temperature of the liquid within the pump can cause thermal shock, which can result in damage or breakage of components and should be avoided.

**⚠ WARNING** Never apply heat to remove impeller.

**⚠ WARNING** **Noise & vibration levels:** Pentair Aurora 3800 End Suction pumps have been designed to meet the noise and vibration levels as per the Hydraulic Institute (HI) standard 9.6.4.

### Electrical Safety

**⚠ WARNING** **Sudden start-up hazard:** Disconnect and lock out power source before servicing. Failure to follow these instructions could result in serious personal injury, death or property damage.

**⚠ WARNING** **Electrical shock hazard:** All electrical connections are to be made by a qualified electrician in accordance with all codes and ordinances. Failure to follow these instructions could result in serious personal injury, death or property damage.

**⚠ WARNING** **Electrical overload hazard:** Ensure all motors have properly sized overload protection. Failure to follow these instructions could result in serious personal injury, death or property damage.

### High Temperature Safety

**⚠ WARNING** **Hot surface hazard:** If pumping hot water, ensure guards or proper insulation is installed to protect against skin contact with hot piping or pump components. Failure to follow these instructions could result in serious personal injury, death or property damage.

**⚠ WARNING** **Spraying water hazard:** When servicing pump, replace all gaskets and seals. Do not reuse old gaskets or seals. Failure to follow these instructions could result in serious personal injury, death or property damage.

### High Pressure Safety

**⚠ WARNING** **High pressure hazard:** All the pumps are designed for specific maximum working pressure. Do not exceed this pressure. Install properly sized pressure relief valves in system. Failure to follow these instructions could result in serious personal injury, death or property damage.

**⚠ WARNING** **Expansion hazard:** Water expands when heated. Install properly sized thermal expansion tanks and relief valves. Failure to follow these instructions could result in serious personal injury, death or property damage.

**⚠ CAUTION**

- Ensure correct lubrication. See "Lubrication" on Page 13 for lubrication instruction.
- Start the pump at reduced speed or with the discharge valve partly opened. This is recommended to minimize the risk of overloading and damaging the pump motor at full or zero flow. Pumps may be started with the valve further open only on installations where this situation cannot occur. The pump discharge control valve may need to be adjusted to comply with the duty following the run-up process. See "Pump Operation" on page 13.
- Suction valves should be fully open when pump is running.
- Do not run the pump continuously outside the allowable operating region.
- Operating at a flow rate higher than normal or at a flow rate with no backpressure on the pump may overload the motor and cause cavitation. Low flow rates may cause a reduction in pump/bearing life, overheating of the pump, instability, and cavitation/vibration. Running the pump at a flow rate below the manufacturer's recommended minimum flow rate can cause damage.
- Handling, transportation and installation of this equipment should only be undertaken by trained personnel with proper use of lifting equipment. See "Uncrating and Lifting" Figures 1A and 1B for reference.
- Only water or other suitable HVAC media may be circulated through the use of these pumps. Circulation of hazardous, corrosive or flammable liquids by using these pumps is strictly prohibited.
- DO NOT turn on the electrical supply to the pump until all the plumbing connections and commissioning procedure have been completed.
- The pump must not be operated dry without fluid.
- Pipe systems must be installed in such a manner so there is no pipe strain and no piping loads are being transferred on pump flanges.
- Ensure that the motor installation instruction manual has been followed for determining the proper terminal connections so that correct pump rotation is obtained.

## TRANSPORT AND STORAGE

**Transport and Handling Requirements**

The pump has been prepared for shipment at the factory in such a way as to minimize potential damage due to handling and transport. The equipment should not be subjected to excessive G-forces during the handling or transport. For large, heavy, rotating components, the manufacturer shall consider and adapt a means to restrict the movement of the rotating assembly to prevent damage to the bearings during transport. All such means shall be removed before installation.

**Uncrating and Lifting**

Pump is fastened securely to the crate before shipment. The pump should be removed from the crate carefully by using proper tools and equipment. After removing from crate make sure that all the components are in good condition and have been received as mentioned in the packing list. Report immediately to the concerned person/department if any component is missing or received in a damaged condition. Extreme care must be taken while handling the pump set. Slings and hooks should be used in such a manner, so that while lifting the pump is not exposed to stresses.

While lifting the pump or pump set (with or without driver) suitable lifting equipment of adequate capacity should be used. The unit should be unloaded and handled by lifting equally. Entire pump with base frame should be lifted at four or more points provided in base frame. Attach nylon slings, chains, or wire rope to the hooks or clevises for lifting. Ensure that the lift angle of the slings, chains or wire rope is less than 45° from vertical.

**⚠ CAUTION** Do not use lifting lugs on drivers or pumps to lift base plated units; these are only for the individual driver or pump.

Extra care must be taken when lifting base plated pump units without driver because of the unbalanced load that may exist due to the driver not being mounted on the base.

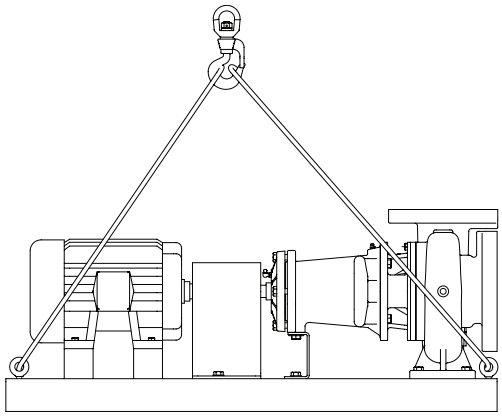


Figure 1A
Lifting of Pentair Aurora* 3804 pump assembly

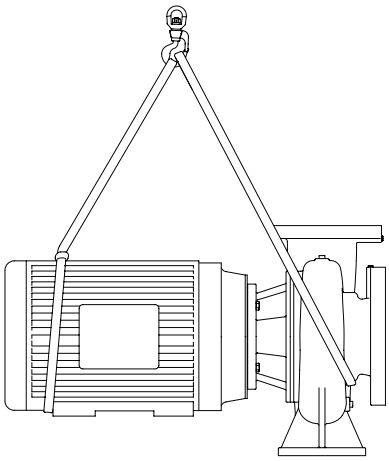


Figure 1B
Lifting of Pentair Aurora* 3801 pump assembly

**Receipt, Inspection, and Damage Reporting**

Upon receipt of the pump, immediately check for shortages of parts and damages. Prompt reporting to the carrier's agent, with notations made on the freight bill, may expedite resolution by the carrier.

Immediately upon receipt of the pump equipment, check carefully to see that all items have been received and are undamaged. Report any shortage or damage to the transport company handling the shipment and to the equipment manufacturer, noting the extent of damage or shortage on the freight bill and bill of lading. This should be done at once. Do not unpack any more than required to verify that the equipment is complete

and undamaged unless installation is to be done immediately. Do not leave the pump unit or any accessories exposed to weather or construction hazards, which may cause damage to the equipment.

### Unpacking

As stated above, do not unpack any more than required to verify that the equipment is complete and undamaged unless installation is to be done immediately. Check all packing material that is to be discarded to verify that no parts or instructions are being accidentally discarded as well. It is best to leave small parts in their shipping container until installation so they do not get misplaced. Make certain that accessories with a pump unit are clearly marked showing which pump unit they are to be used. Clean all parts of dirt, packing materials, and other foreign matter. Clean all non-coated machined surfaces. If the pump is to be installed immediately, then clean all coated machined surfaces too. Remove any rust spots found on the machined surfaces with a fine emery cloth. Clean all threaded connections and any accessory equipment.

### Storage

The standard packaging is suitable for protection during shipment and during covered storage at the jobsite for a short period between installation and start-up. The preservatives applied at the factory have an effective life of two to three months from date of shipment, depending on the severity of the environment in which the equipment is stored.

### Short Term Storage

The pump and equipment, as shipped, have adequate protection for short-term (up to three months) storage in a covered, dry, and ventilated location at the jobsite prior to installation.

- Dry pump internals and spray the liquid end with a water-displacement rust inhibitor.
- Apply a film of compatible lube oil over the water-displacement rust preventative.
- After the pump has been thoroughly drained, cover the pump suction and discharge flanges with full gasket material and blank off these openings with metal blank flanges and a minimum of four bolts. If mechanical seals have been used, then the annular opening between gland plate and shaft should be closed by a removable sealing ring supplied by the original equipment manufacturer to exclude airborne dust. Additionally, all connections in the seal cartridge must be plugged or sealed.
- All exposed painted surfaces should be dry, clean, and free of grease and other contaminants.
- The pump should be covered with a weather-resistant cover of waterproof paper or plastic to prohibit the build-up of dirt and dust accumulations.

### Long Term Storage

All pumps are shop serviced and delivered in a ready to operate condition. If the pump after being delivered is not put into immediate operation, then proper care should be taken so that it operates without failure when put into service. The pump should be kept in a clean and dry area in a horizontal position. Ensure that the following precautions are taken for pumps being stored for more than three months.

- Pump surfaces which are machined and unpainted (e.g. flange ends, feet mounting etc.) and are easily subjected to corrosion must be protected by corrosion resistant coating.
- The pump shaft should be rotated once in a month to avoid locking of rotating assembly. This would also be helpful in uniform distribution of lubrication on bearings.
- Bearings must be lubricated with fresh lubricants when pump is being put into service after a long time.

### Disposal of Packaging Materials

Most of the materials supplied in the pump unit are suitable for recycling. Please conserve our natural resources and recycle these materials.

## PRODUCT DESCRIPTION

### Configuration

Pumps are offered in two models.

- Pentair Aurora* 3801 close coupled
- Pentair Aurora 3804 frame mounted

Along with above mentioned models, pumps are also offered with following options required and mentioned by customer at the time of placing order.

- With or without flush line
- Oil lube bearings (frame mounted pumps only)
- Type 21 mechanical seal options (required for temperatures over 225˚F or 107.2˚C

### Parts

Refer to "Assembly Exploded View" Figures 45 and 46 on Pages 23-24 for listing various parts.

## INSTALLATION

### Pump Location

- Pentair Aurora* 3800 End Suction pump must be installed horizontally.
- The pump should be located as close to the liquid source as possible so that the suction line can be short and direct. See Figures 2 and 3 shown below.
- It should be located in a clean, open area, where it is easily accessible for inspection, disassembly and repair. Pumps installed in dark, dirty areas or in cramped locations are often neglected, which can result in premature failure of both the pump and the driver.
- Your pump should be located so that a hoist or crane can be used to move it without interference from piping. This factor is often overlooked in the advance planning stage.
- Install isolating valves on each side of pump so pump maintenance can be performed without draining the system.
- Special mounting requirements may be required if the pump is to be mounted near a noise or vibration sensitive area.
- The pump should be located in an area where moisture from condensation, can be adequately drained off. Moisture dripping on exposed metal or wood can cause rapid deterioration of the area. Also wet floor produces safety hazards.
- Adequate provisions should be made for electrical wiring to the pump motor. A switch and overload protection should be installed near the pump if conditions permit. The electrical conduit should be positioned in such a way as to preclude the possibility of moisture entering the conduit or the motor, and causing short circuits.
- The installation must be evaluated to ensure that the net positive suction head available (NPSHA) meets or exceeds the limits as stated below:
    - 2 ft for building services
    - 5 ft for municipal application
- Outdoor installation will normally provide all of the above mentioned conditions. However, it is recommended to provide a weather shelter for your pump.

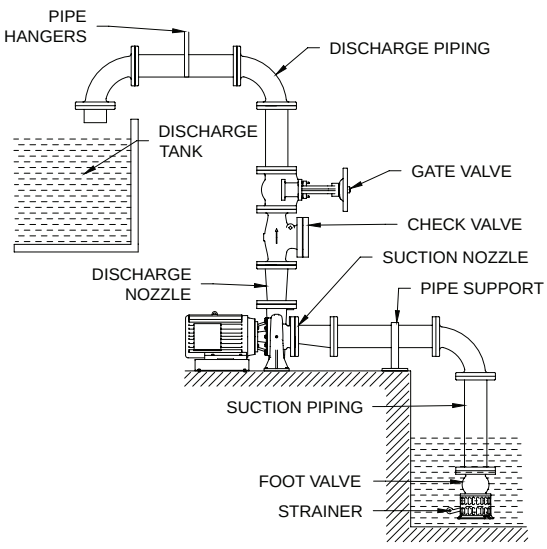



Figure 2
Recommended location (Short direct suction)

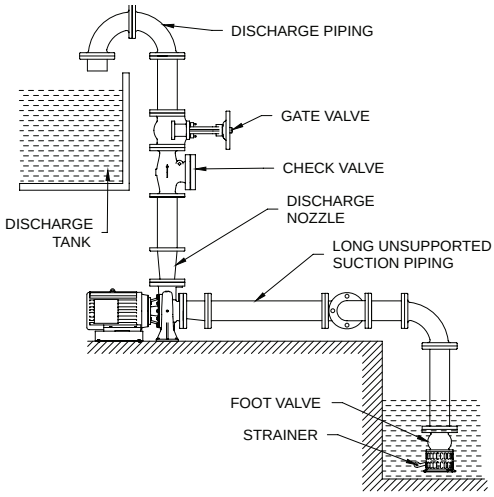



Figure 3
Unsatisfactory location (Long indirect suction with no support)

### Foundation

The foundation for your pump must be sufficiently rigid to absorb any vibration and stress encountered during pump operation. The mass of the foundation should be sufficient; preferably five times that of the pumping equipment, to form a permanent and rigid support for the baseplate.

A raised foundation of concrete is preferable for most floor mounted pumps. The raised foundation assures a satisfactory base, protects against flooding, simplifies moisture drainage, and facilitates keeping the area clean.

- Your pump should be firmly bolted to the foundation, whether it is a raised concrete base, steelwork wall, or structural member. The mounting bolts or lag screws should be accurately located per the applicable Pentair Aurora dimension sheet.
- Bolt sizing is critical particularly on high-pressure pumps, to adequately restrain reaction forces generated from directional flow change, system transients, and sudden valve closure.

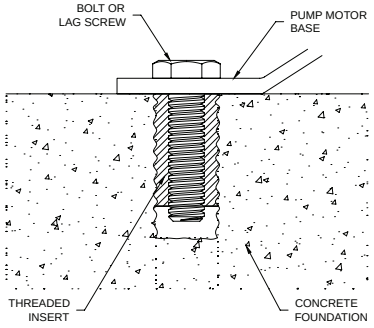



Figure 4
Typical close coupled pump mounting

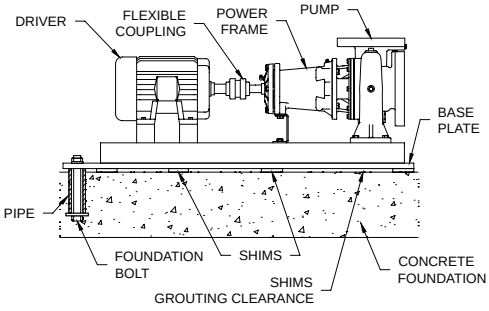



Figure 5
Typical flexible coupled pump mounting

- Lag screws or bolts screwed into threaded inserts in the concrete are recommended for mounting close coupled pumps, rather than studs set into concrete (Figure 4 on Page 6). This permits removal of the drive motor without disturbing the pump liquid end or the piping.
- If a large pump is to be mounted on steelwork or other structure, adequate support should be provided to prevent deflection of the structure which could produce excessive strain on the pump casing and piping.

### Setting the Pump

- Check the mounting surfaces of the pump unit and the foundation to make sure they are clean and free of obstructions. Set the pump on the foundation, being careful not to damage the foundation bolts or studs if used.
- Tighten the nuts or bolts finger tight.

  ***NOTICE:*** In close coupled pump assembly make sure the motor (driver) and pump casing are grounded.

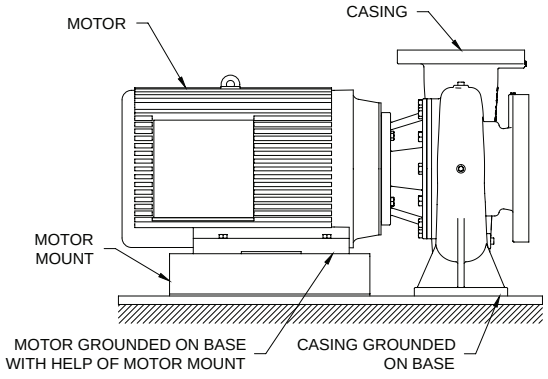



Figure 6

Setting a close coupled pump

### Seismic Analysis

Please consult factory if the pump is to be installed in seismic zones.

## BASE PLATE

### Leveling The Pump

Pump unit leveling can be done using the suction and discharge nozzles or flanges as reference points. Insertion of a shot piece of pipe in the threaded nozzles will facilitate use of a spirit level to determine whether or not the pump unit is leveled in all directions. See Figure 7 shown below.

A spirit level can also be used on the machined faces of the suction and discharge flanges (Figure 8).

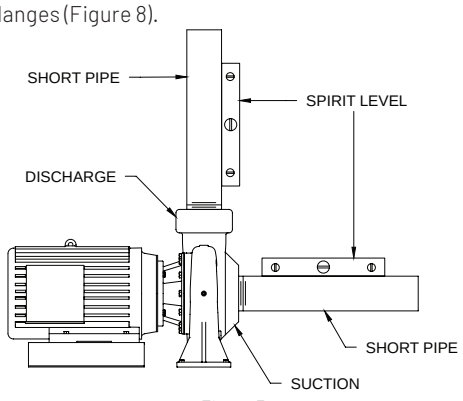



Figure 7

Leveling pump with spirit level and short lengths of pipe

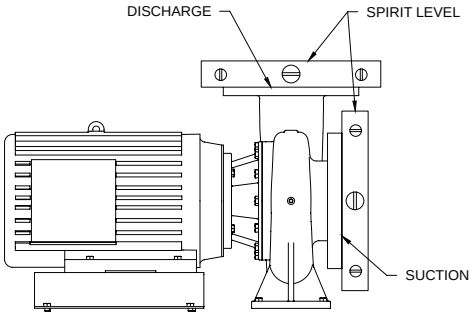



Figure 8

Leveling with spirit level on pump flanges

Leveling the pump can require enough shims to support the base plate near the foundation bolts and at any points of the base plate carrying a substantial weight load. The shims should be large enough to allow a gap of 3/4" to 1-1/2" between the base plate and foundation for grouting.

***NOTICE:*** The pump base must be set level to avoid any mechanical difficulties with the pump or motor.

Pentair Aurora* 3804 pump was properly aligned, if supplied with a motor, at the factory. However, since the pump base is flexible, it may spring and twist during shipment. Do not pipe the pump until it is realigned. Realign the base after piping is completed and after the pump is grouted in and bolted down.

***NOTICE:*** It may be necessary to readjust the alignment from time to time while the unit and foundation are new. Realignment may prevent premature bearing failure, excessive vibration or shaft failure.

Ensure that proper hydronic accessories such as pressure relief valves, thermal expansion tanks and flow/pressure control devices are installed in the system. Consult the responsible party for your system to ensure these devices are installed and of the proper size.

### Grouting the Installation

Grouting the base plate prevents lateral movement of the base plate, and improves the vibration absorbing characteristics of the foundation by increasing its mass. A wooden dam should be constructed around the base plate to contain the grout while it is being poured. The dam can be built tight against the base plate, or slightly removed from it as desired. Refer to Figure 9 shown below.

The entire base plate should be completely filled with non-shrinkable type grout. The grout should be puddled frequently to remove any air bubbles from the grout.

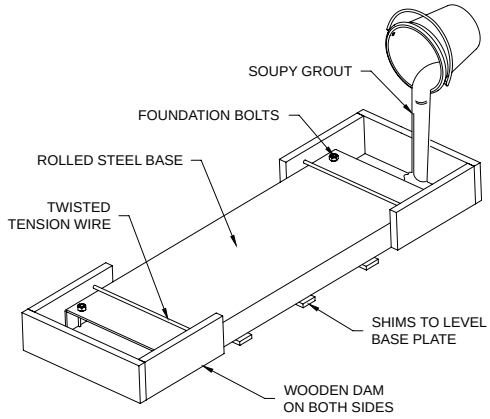



Figure 9

Grouting the base for frame mounted pumps

### Piping and Connections

Inlet and outlet piping should be anchored, supported, and restrained near the pump to avoid application of forces and moments to the pump in excess. In calculating forces and moments, the weights of the pipe, internal thrust, contained fluid and insulation, as well as thermal expansion and contraction, should be considered. It is recommended that the first section of pipe be installed on the pump flange and then properly supported. Both the suction and discharge piping should be independently supported. The system piping should then be brought into alignment to the first section of pipe attached to the pump before completing the connections to the piping system.

To verify that there is no pipe strain and no piping loads being transmitted to the pump flanges, the flange connections are loosened and the alignment of the piping inspected. The piping to the pump inlet and outlet should be aligned to the pump flanges. The bolts should freely pass through flange with no binding. The alignment of the axis of the flanges should be within a tolerance of ½ the radial bolt clearance. Faces of the flanges should be in alignment so that the dimensions between the faces indicate that they are parallel and allow for the insertion of the gasket.

### Suction Piping

The suction piping should be short, but no less than ten pipe diameters in length, and direct with as few elbows and fittings as possible to keep head loss, from friction, at a minimum. However, the suction pipe should provide a minimum uninterrupted length, equal to ten pipe diameters, to the pump suction flange. A horizontal suction line should have a gradual rise to the pump, and pass under any interfering piping. See Figure 10 shown below.

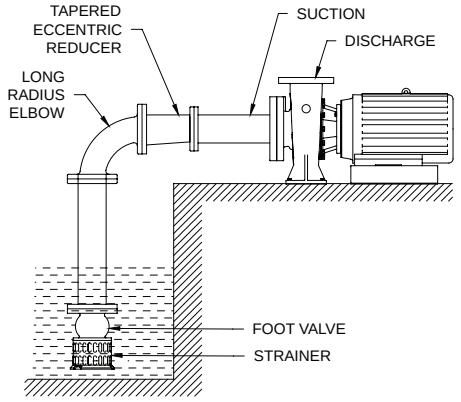



Figure 10

Recommended suction lift piping (Short and direct)

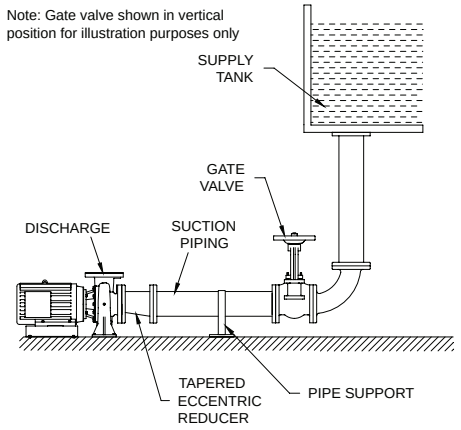



Figure 11

Recommended flooded suction piping (Short and direct)

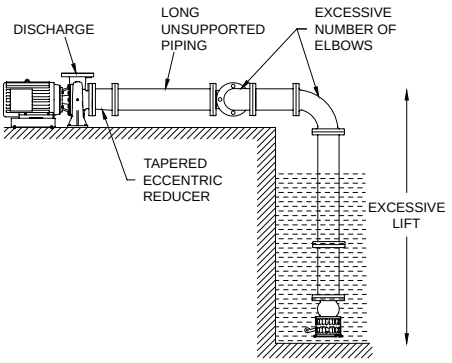



Figure 12

Unsatisfactory suction lift piping (Long and indirect with no support)

### Pipe

The suction pipe diameter should be at least the same diameter as the suction nozzle on the pump, and preferably larger. Use of a smaller diameter pipe will result in loss of head due to friction. All joints must be tight to maintain prime on the pump.

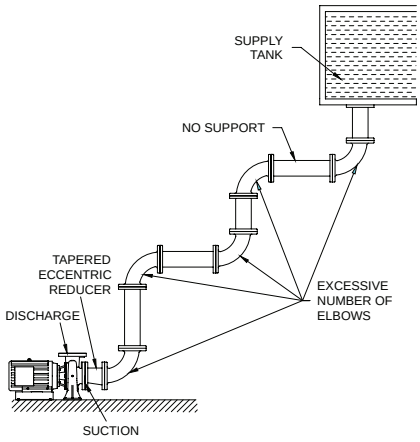



Figure 13

Unsatisfactory flooded suction piping (Long and indirect with no support)

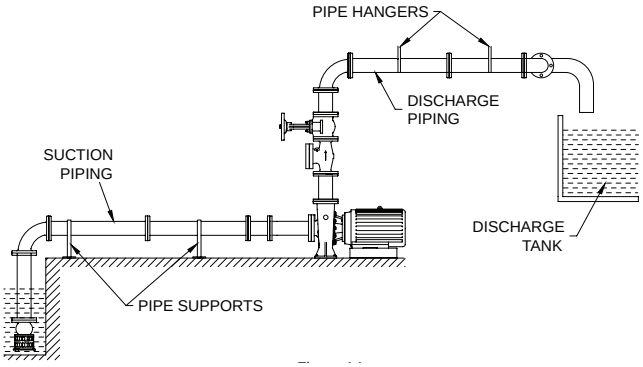



Figure 14

Supporting piping

### Elbows

Long radius elbows should be used in place of standard elbows wherever possible, because of their superior flow characteristics. For instance, head loss in a standard four inch elbow is equivalent to the head loss in a piece of pipe 11 feet long, while the head loss in a long radius elbow is approximately half as much. Elbows should not be used at the suction

nozzle, but if it is unavoidable, they should be installed in a vertical position. Elbows installed in any position at the suction nozzle have a tendency to distribute the liquid unevenly in the impeller chamber, causing a reduction in capacity, and creating an undesirable thrust condition. See Figures 15, 16A, and 16B shown below.

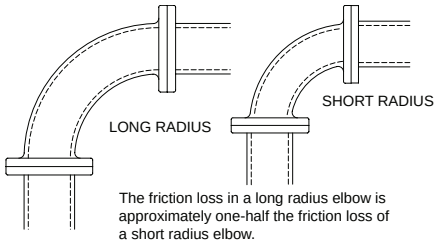



FIgure 15
Long versus short radius elbows

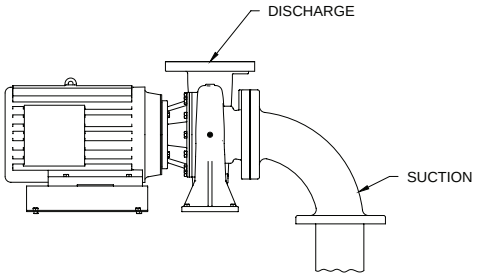



Figure 16A
Correct elbow installation on suction nozzle

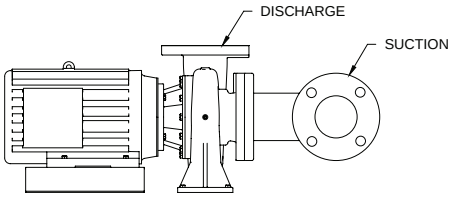



Figure 16B
Incorrect elbow installation on suction nozzle

### Reducers

Eccentric reducers should be installed directly at the suction nozzle, with the taper at the bottom to prevent air pockets from forming. Straight taper reducers should never be used in a horizontal suction line because of the air pocket that is formed at the leg of the reducer and the pipe. See Figures 17A, 17B, and 18 shown below.

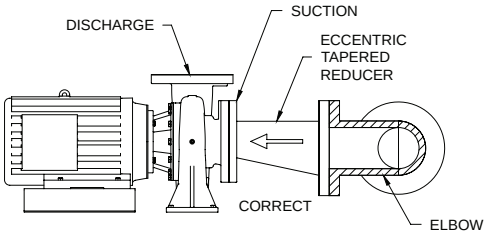



Figure 17A
Correct Installation of eccentric tapered reducers

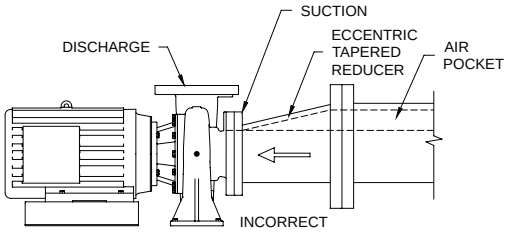
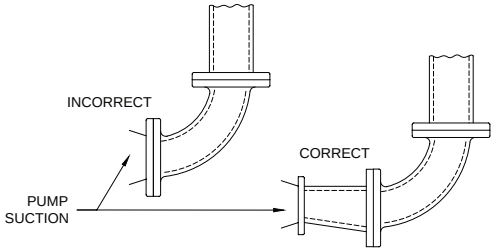



Figure 17B
Incorrect Installation of eccentric tapered reducers




Spacer between suction and elbow permits equal flow of water to each side of double suction impeller, prevents excessive thrust and resulting wear on bearings, etc.

Figure 18
Reducer between elbow and pump suction nozzle

### Discharge Piping

Discharge piping should also be short and direct as possible, with few elbows and fittings, to reduce head loss from friction. See Figures 19 and 20 shown below.

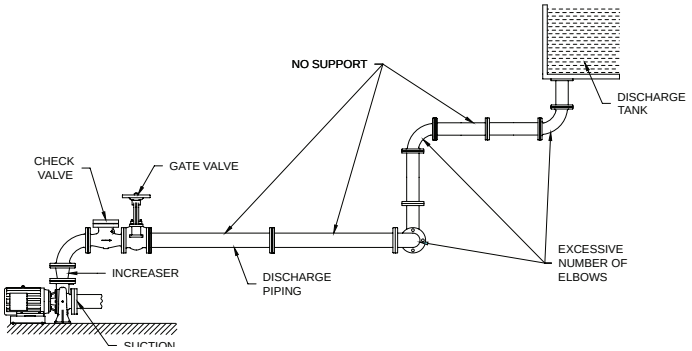



Figure 19
Unsatisfactory discharge piping
(Long with excessive elbows and joints)

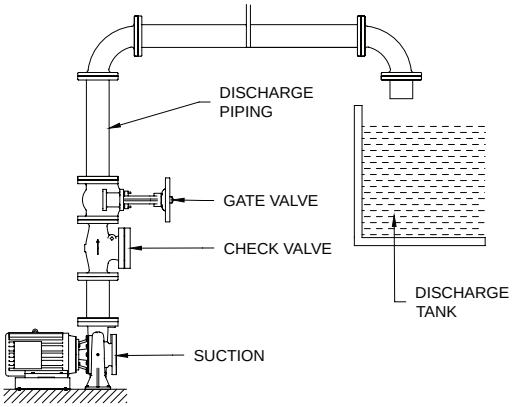



Figure 20
Recommended discharge piping
(Short and direct)

# PUMP INSTALLATION

### Pipe

The discharge pipe diameter should be the same as, or larger than, the discharge nozzle diameter. The size of discharge pipe to be used is dependent upon the application. The recommended pipe diameter can be obtained from your nearest Pentair Aurora* authorized distributor or Customer Service.

### Reducers and Increasers

An increaser should be installed at the discharge nozzle if larger diameter discharge piping is used. Straight taper increasers and/ or reducers are satisfactory in discharge piping, because air pockets on the discharge side do not affect pump efficiency. See Figure 21 below.

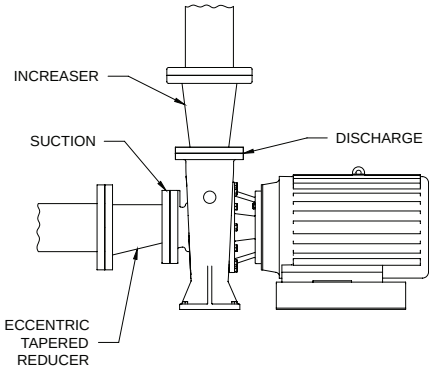



Figure 21
Reducer and increaser installation

### Valves

Valves are an important part of your installation. They facilitate priming of the pump, and control the volume of the pumped liquid.

### Foot Valves

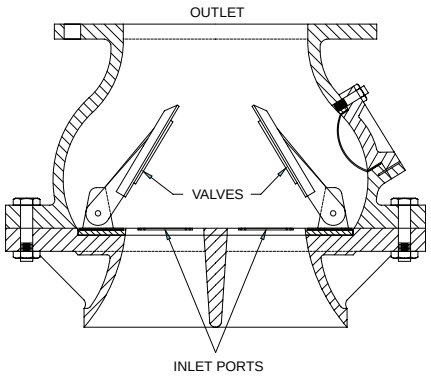



Figure 22
Foot valve

**Suction Lift:** In suction lift applications where the suction lift is low, a foot valve can be installed to maintain the prime of the pump. A foot valve is essentially a check valve, allowing flow in one direction only, towards the pump. When the pump is shut down, the pressure of the liquid returning to the well causes the valve to close, retaining the liquid in the suction line.

A slow closing check valve should be installed when the static discharge head is high. A foot valve should not be used under these conditions, as failure of the driver would allow the water to rush back rapidly thus causing a heavy water hammer.

Foot valves, when used, should be the flat type rather than multiple spring type. The valve should have a large inlet area, because the friction loss in the foot valve is high. Install check and foot valve as indicated by arrow to ensure proper installation.

**Flooded Suction:** When the liquid source is above the pump centerline, a flooded suction condition exists and a gate valve is required to shut off the liquid supply for pump inspection and maintenance. The gate valve should be installed with the stem in a horizontal or downward position to prevent formation of an air pocket in the valve.

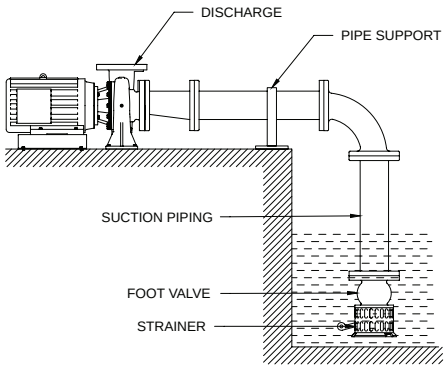



Figure 23
Foot valve installed with screen

### Discharge Valves

The discharge piping should include a check valve and a gate valve. The check valve should be located between the gate valve and the pump. If an increaser is used in the discharge piping, the increaser should be installed between the pump nozzle and the check valve. The check valve protects against a reverse flow of the liquid if the driver fails. See Figure 24 shown below.

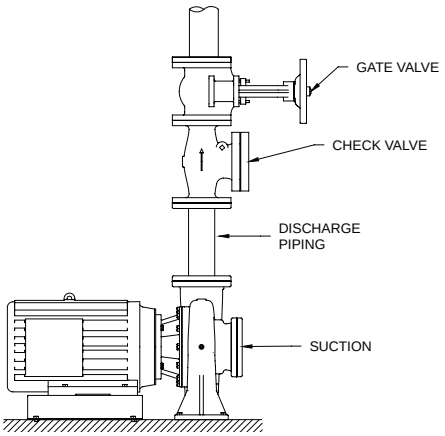



Figure 24
Gate Valve and Check Valve

### Air Vent Valves

Vent valves are installed at the high points in the pump casing to allow air or vapor to escape. These valves are used to release trapped air from the pump casing during priming and when pump becomes air bound. See Figure 25 shown below.

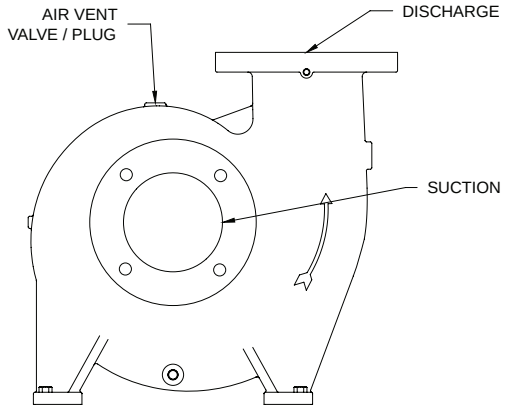



Figure 25
Air vent valve or plug

### Expansion Joints

Expansion joints are used primarily to prevent transmission of piping strain, caused by thermal expansion and contraction, piping misalignment, pressure changes, or other causes, to the pump casing. They are also used to suppress any noise that may be transmitted through the piping. It is recommended that the flexible metal type of expansion joint be used because rubber expansion joints, have a tendency to deteriorate, making frequent replacement necessary.

If an expansion joint is used, an anchor or a restraining device should be installed between the joint and the pump to prevent objectionable forces from being transmitted to the pump. If an anchor is not installed at this point, a force equal to the area of the expansion joint times the pressure in the pipe is developed and transmitted to the pump. This force may exceed the allowable flange loading and could result in damage to the pump or piping. See Figures 26 and 27 shown below.

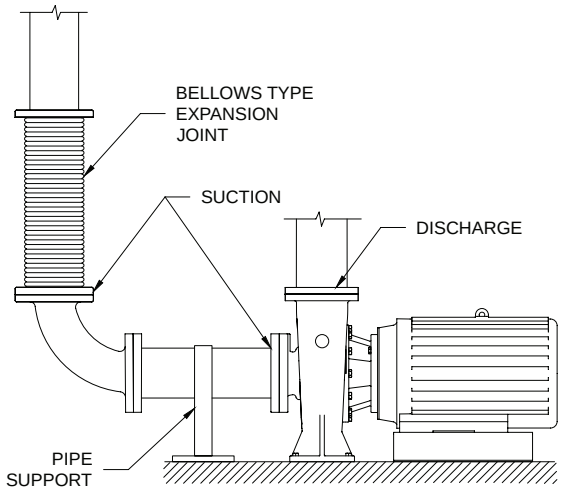



Figure 26
Expansion joint in suction line

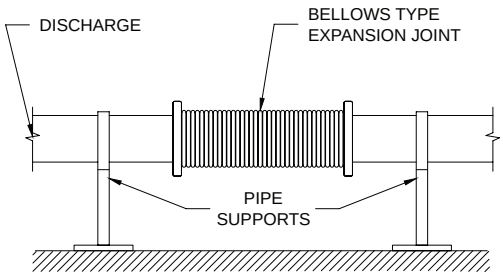



Figure 27
Expansion joint in discharge piping

### Strainers and Screens

It is important to remove foreign matter that can clog the pump and impair its capacity, or stop it completely. Small particles such as sand, dirt, scale from inside pipe and other extraneous materials can get into the close clearance parts of the pump and cause considerable damage to the parts.

Strainers should be selected to have a total area of holes equal to at least four times the suction pipe area.

In applications where stick, twigs, leaves and other large debris are present, a larger outside screen should be placed around the suction inlet to prevent choking of the strainer. This screen should have sufficient openings so that flow velocity does not exceed two feet per second.

## ALIGNMENT

### General Alignment

Pumps and drivers received from the factory with both machines mounted on a common baseplate are aligned or checked for alignment before shipment. All baseplates are flexible to some extent and, therefore, must not be relied on to maintain the factory alignment. Realignment is necessary after the complete unit has been leveled, the grout has set, foundation bolts have been tightened and the piping has filled with fluid. The alignment must be rechecked after the unit is piped and rechecked periodically.

## SHAFT/COUPLING ALIGNMENT

### Initial Alignment of Flexible Coupling

A flexible coupling is used to compensate for minor misalignment of the pump and driver shaft and is limited to misalignment due to minor temperature changes.

The pump and driver were accurately aligned at the factory. However, alignment cannot be maintained during shipping and handling. Therefore it will be necessary for you to realign the pump and driver. Flexible couplings are not universal joints. They should not be used to compensate for misalignment of the pump and motor shafts. Their function is to transmit power from the driver to the pump while compensating for thermal expansion and shaft end movement. The coupling faces should be far enough apart so that they do not make contact when the motor shaft is forced to the limit of the bearing clearance toward the pump shaft.

In order to properly align the coupling, you will need a taper gauge or set of feeler gauges, and a straight edge.

There are two types of misalignment encountered with flexible couplings: angular misalignment, in which the shafts are not parallel, and parallel misalignment where the shafts are parallel but not on the same axis.

To check angular alignment, insert a feeler gauge or taper gauge at any four places 90° apart around the coupling halves. Insert shims under the driver feet until the same reading is obtained at all four check points. The pump and driver will then be in angular alignment.

To check parallel alignment, a straight edge should be held against the edges of the coupling halves at any four places 90° apart around the coupling. The straight edge should be parallel to the pump and driver shafts at all times. Insert shims until the straight edge lies flat against both coupling halves at all four checkpoints. The pump and driver will then be in proper parallel alignment. For more detailed alignment information consult the coupling manufacturer's installation instructions. Refer to Figure 28 shown below.

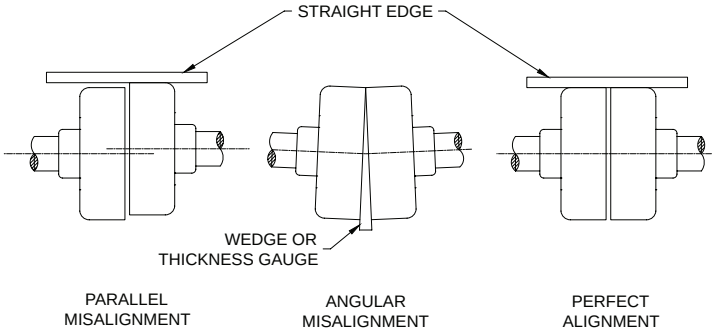



Figure 28
Flexible coupling alignment piping

**For Fine Alignment, 3500 RPM Operation, For All Other Coupler Types**

A dial indicator should be used when greater alignment accuracy is required. Use the following alignment tolerances unless specified otherwise by the coupling manufacturer. On sleeve type couplings make sure there is at least 1/8" end clearance between the sleeve and the two coupling halves.

To check angular misalignments, mount the dial indicator base to the coupling half, and position the dial indicator button on the front or rear face of the opposite coupling half. Set the dial to zero, rotate both coupling halves together, making sure the indicator button always indicates off the same spot. Misalignment values within 0.004 inches TIR per inch of coupler radius is permissible.

To check parallel misalignment, mount the dial indicator base to one coupling half, or shaft and position the dial indicator button on the outside diameter of the opposite coupling half. Set the dial to zero. Rotate both coupling halves together, making sure the indicator button always indicates off the same spot. Misalignment within 0.004 inches TIR is permissible.

**Pipe Alignment**

Proper piping alignment is essential before connection is made. Piping alignment should never be achieved by force, as this could produce strain on the piping and the pump casing. Proper supports should be installed for the piping to keep its weight off the pump casing.

When flange bolts are used, line up the piping first, then loosely install flange bolts. Check the piping alignment, and tighten the flange bolts until all bolts are tightened securely. See Figure 29 shown below.

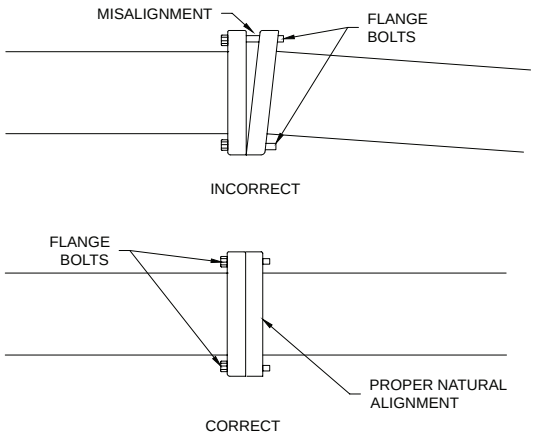



Figure 29
Pipe alignment

**Air in Piping**

One of the most common conditions affecting pump efficiency is the formation of air pockets in the suction line. The air pockets are a result of high points and improper installation of elbows, reducers, and valves in the suction piping. See Figures 30 and 31 shown below and on next page.

The pump seal depend on the liquid being pumped for lubrication with resultant damage to them.

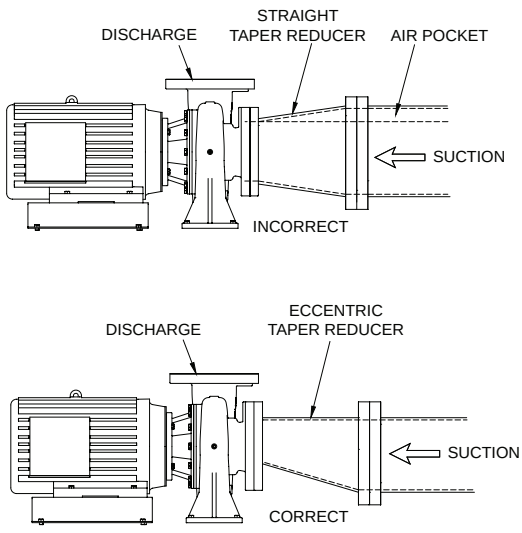



Figure 30
Air pocket in reducer

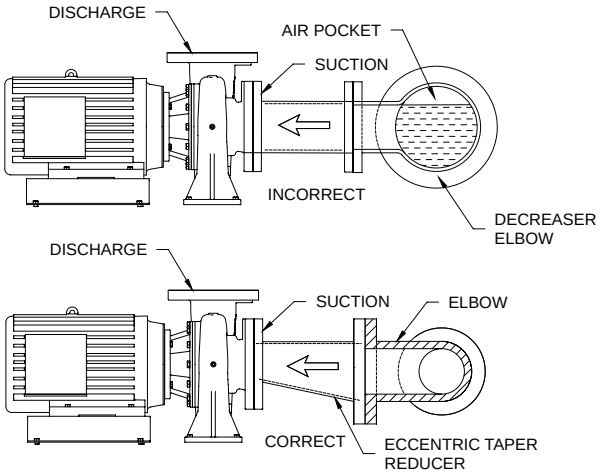



Figure 31
Air pocket in elbow

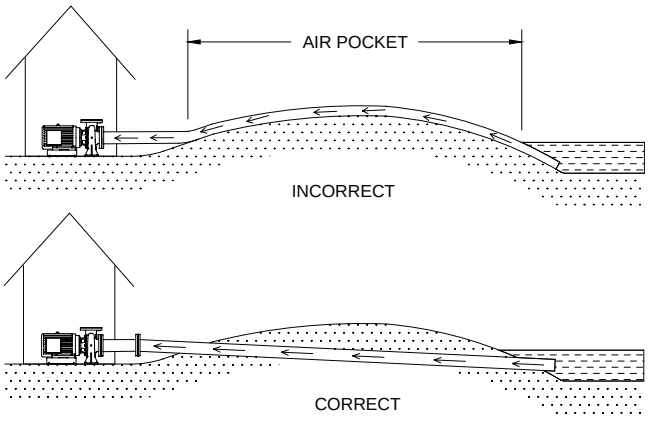



Figure 32
Air pocket in horizontal suction piping

In suction lift applications, the suction pipe in the liquid well must be sufficiently submerged to prevent exposure of the end of the pipe when the well is at its minimum level and to prevent vortex action (whirlpool effect) of the liquid at the suction pipe, which will draw air into the pipe. Also, care should be taken to keep the suction pipe located away from the well inlet since the incoming liquid may be carrying air bubbles. Another cause of air in the liquid is dropping of the liquid from too high a point into the well. See Figure 32 shown above.

### Electrical Wiring

Normally, your pump will be supplied with an attached drive motor. The motor should be wired in accordance with the wiring diagram found on the motor nameplate. Be sure the voltage, frequency, and phase of your power supply corresponds with the nameplate data. It is recommended to provide a separate switch and overload protection for your pump motor to protect against power failure in some other area. Conversely, if the pump motor develops electrical problems, it will be isolated from other equipment.

***Notice:*** PRESTARTING INSTRUCTION: The coupling halves should be connected. Prior to connection, however, the drive motor should be started to make sure the direction of rotation is the same as the direction indicated by the arrow on the pump casing.

## COMMISSIONING, START-UP, OPERATION, AND SHUTDOWN

### Lubrication

In dry locations, each bearing will need lubrication at least after every 4,000 hours of running time or 6 to 12 months, whichever is more frequent. In wet locations (exposed to dripping water, to the weather or to heavy condensation found in unheated or poorly ventilated underground locations) every 2,000 hours or every 3 to 6 months, whichever is more frequent. Applicable to 3804 series pumps.

- Use Chevron® SRI Grease NLGI grade 2.

**⚠ CAUTION** Before running the driver, either separately or connected to the pump, check lubrication and cooling requirements.

**⚠ CAUTION** Proper lubrication is critical for trouble-free, long-term operation of the equipment. Lubrication methods and frequency vary with bearing type, application, environment, and the unique operating characteristics of the individual piece of equipment. Ensure lubrication is present and lubrication systems are connected and operational per instructions.

### Rotation

Pump rotation is clockwise when viewed from the back of the motor. An arrow is also located on the pump casing to show the direction of rotation.

It is absolutely essential that the rotation of the motor be checked before connecting the shaft coupling. Incorrect rotation of the pump, for even a short time, can dislodge and damage the impeller, casing, shaft, and shaft seal.

### Guarding

All guards must be in place and secure per the instructions prior to start-up.

**⚠ WARNING** Guards must not be removed while the pump is operational. Always follow lock out – tag out procedures when working on equipment that may turn on.

## START-UP CONSIDERATIONS

### System Flushing

When the pump is installed in the completed piping system, it is recommended that the system be flushed to remove debris such as stubs of welding rod, welding slag, and loose scale. The pump manufacturer should be consulted as to the suitability of any chemical flush additives added to the system.

### Priming and Filling

The pump should not run unless it is completely filled with liquid as there is danger of damaging some of the pump components. This includes short runs for rotation verification. The pump will not operate satisfactorily until it is primed. All air must be expelled from the suction piping and pump casing, and replaced by the liquid to be pumped. There are several methods of priming pumps. The one you select will depend on your specific requirements.

### Flooded Suction Priming

This method of priming a pump is relatively simple. The liquid source is located above the pump, and all that is necessary to prime the pump is to open the air vent valve or plug in the pump casing, and to crack the gate valve in the suction line. The suction line and pump should be filled

slowly until a steady stream of liquid is observed flowing from the air vent. After your pump is operating, it is recommended that the air vent valve or plug be opened again to ensure that all air has been expelled from the pump casing. See Figure 33 on shown below.

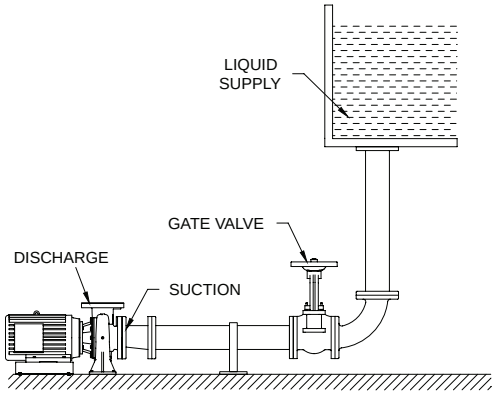



Figure 33
Flooded suction priming

**Foot Valve Priming**

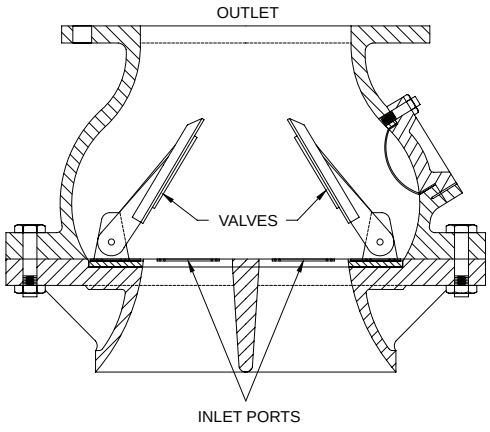



Figure 34
Foot valve cutaway

A foot valve can be used for priming on suction lift applications. The foot valve located at the bottom end or foot of the suction piping, functions as a check valve which allows flow in one direction only toward the pump.

Initial priming is accomplished by completely filling the suction piping and pump casing with the liquid to be pumped. This can be done by removing the air vent valve or plug at the top of the pump casing, and inserting a pipe nipple in the orifice with an appropriate increaser to accommodate a hose connection.

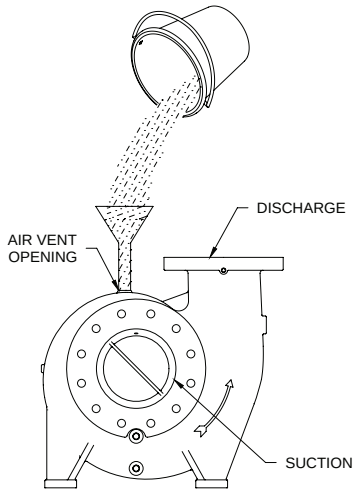



Figure 35
Priming by hand

A priming line can also be inserted in the discharge piping between the check valve and the pump, or the priming can be done with a bucket and funnel. Refer to Figure 35 shown above. It is important to completely fill the suction pipe and pump casing with liquid. When the pump is started, the vacuum created by pumping the priming fluid, combined with atmospheric pressure in the liquid well, forces liquid into the suction piping, thus opening the valve and keeping it open until the pump is shut down. When the pump is shut down, the liquid being pumped reverses its flow causing the valve to close. The liquid is now trapped in the suction piping and pump casing, thus maintaining a prime on the pump.

**Vacuum Priming**

Vacuum priming consists of removing air from the pump casing and suction piping, and drawing liquid into them by means of a vacuum creating device. The types of vacuum equipment range from a simple hand pump to complex central priming systems. Your specific priming requirements will govern what type of vacuum primer you use.

**Air Ejector**

One type of vacuum primer is the air ejector. If liquid under pressure or steam is available, an ejector can be used. The ejector is connected to the air vent orifice. A stream of the ejecting medium is passed through the ejector creating a vacuum in the ejector, and drawing air from the pump casing and suction piping. When liquid flows steadily from the ejector discharge pipe, the pump is primed. See Figure 36 shown below.

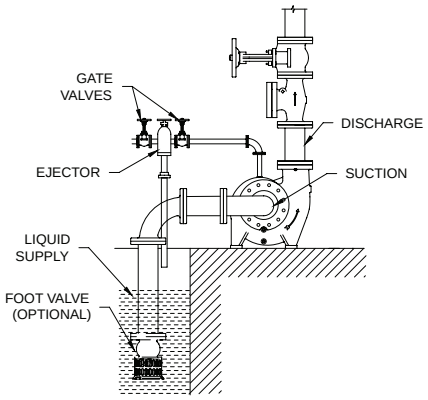



Figure 36
Priming by ejector

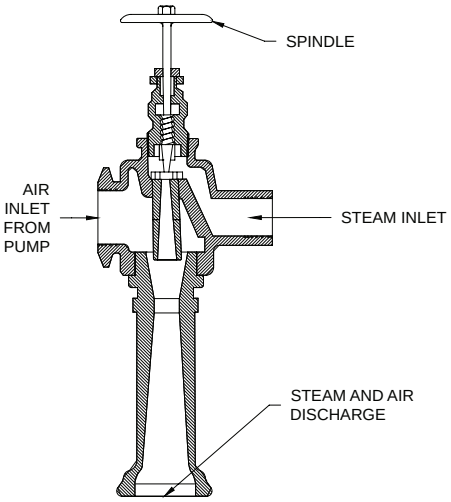



Figure 37
Ejector cutaway

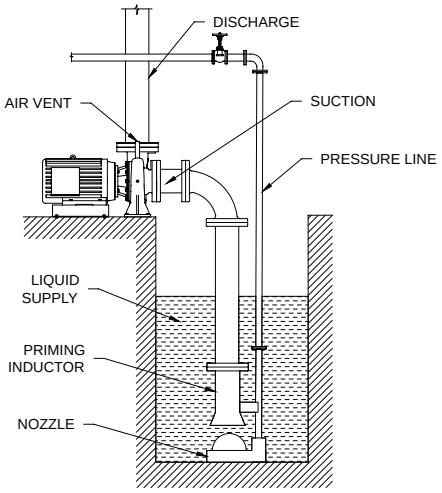



Figure 39
Inductor priming

**Vacuum Pumps**

Rotary or reciprocating pumps are frequently used as vacuum pumps. They fall into two categories, wet-vacuum and dry-vacuum. The principle of operation is essentially the same, however, the dry-vacuum pump cannot accommodate a liquid and air mixture, while the wet-vacuum pump can accommodate liquid, air, or a combination of both.

Vacuum pumps can be installed as part of a central priming system servicing many pumps, as an automatic priming system, or as a manually controlled independently driven pump.

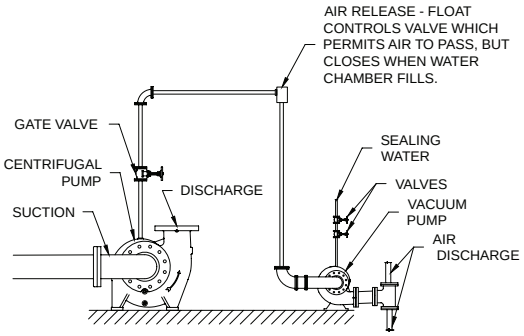



Figure 38
Vacuum pump priming

The suction piping of the vacuum pump is connected to the air vent orifice on the pump to be primed. The vacuum produced by the vacuum pump removes air from the turbine pump suction piping and casing, and draws liquid from the liquid well into the turbine pump. Dry-vacuum pumps must be installed so that no liquid is taken into the air pump. Installation of a water trap or use of a vacuum tank is recommended for dry-vacuum pumps. Refer to Figure 38 shown above.

**Inductor Priming**

On suction lift applications it may be desirable to prime your pump with a priming inductor. This type of primer is comprised of a liquid nozzle and an inductor at the foot end of the suction piping. The nozzle and inductor are connected to a high pressure liquid supply such as a city water service. The pump is primed by opening the valve in the pressure line. This will allow the liquid to flow through the nozzle and into the inductor. The velocity of the high pressure liquid drives the liquid into the suction piping and up to the pump, thus completing the priming operation. Refer to Figure 39.

## SHAFT SEALING SETTINGS AND ADJUSTMENTS

**Mechanical Seals**

A mechanical seal consists of a rotating element and a stationary element. The sealing faces are highly lapped surfaces on materials selected for their low coefficient of friction and their resistance to corrosion by the liquid being pumped. The faces run with a very thin film of liquid between them. In addition, there must be a means of loading the seal. This is accomplished either with a spring (or springs) or with an elastomeric or metallic flexible member.

Mechanical seals are made in a wide variety of designs; therefore the instructions for the specific seal must be carefully studied and followed. A mechanical seal is a precision device and must be treated accordingly. Mechanical seals normally require no adjustment during operation. Except for slight initial leakage, the seal should operate with negligible leakage.

**⚠ CAUTION** Mechanical seals should not run dry unless allowed by the manufacturer. Seals require a continuous supply of flush and/or cooling fluid.

## START-UP, OPERATION, AND SHUTDOWN

**Valve Setting at Start-up**

**Position of Discharge Gate Valve When Starting**

The discharge gate valve should be partially closed when a high or medium head centrifugal pump is started, because this type of pump requires much less power with the gate valve closed, than when it is operated at rated capacity and head with the discharge gate valve open. As soon as the pump is up to operating speed, the discharge gate valve should be opened to the desired position.

**Position of Suction Piping Gate Valve When Starting**

In flooded suction applications, the gate valve is opened at the time the pump is being primed, and will remain open for starting and operation.

**⚠ CAUTION** The pump should not be operated with the inlet or outlet valves closed. The operation of a pump with the inlet valve closed may cause serious damage and should not be attempted. Operation with both inlet and outlet valves closed for even brief periods of time is an unacceptable and dangerous practice.

### Operation

The following points must be ensured before starting the pump:

1. The current supply agrees with the voltage and frequency on the motor nameplate.
2. The motor is wired for correct voltage.
3. The thermal overload relays are correct size and set for operation.
4. The pump is fully primed. Flood the casing and seal area with liquid to release the air out of pump through flush line and air vent valve near discharge flange. Priming must be continued until air is completely removed. This is indicated by continuous flow of liquid through flush line and air vent. Disconnect power to the motor and lock-out / tag-out the power source prior to rotating the shaft by hand.
   a. Failure to flood the seal area with water may cause seal failure due to lack of lubrication.
5. Jog the motor to check that the motor rotates clockwise, as indicated by the arrow on the pump casing.
6. Coupling guard must be in its appropriate position on account of human safety.

### Starting Up

1. Start the pump with the discharge valve slightly open and verify that the pump is operating smoothly and is not rubbing.
2. Start opening the discharge valve gradually.
   ***Notice:*** Do not run the pump for extended period with discharge valve closed, so as to avoid overheating and potential damaging loads.
3. If the pump is equipped with a circulation relief valve, such valve prevents overheating when the pump is operating at reduced capacity.
4. Stop the pump immediately if any of the following situations arise:
   a. No/insufficient liquid.
   b. Inadequate discharge pressure.
   c. Loss of suction pressure.
   d. High power consumption.
   e. Noisy operation and/or high vibration after discharge valve is in an open position.
   Check the manual for troubleshooting the cause. See Pages 21 - 22.

### Shut Down

It is recommended to close the discharge valve before stopping the pump to avoid any water hammer effect. However, this practice is not mandatory and pump may be stopped with discharge valve open in case an emergency.

Preferred shutdown sequence is as follows:

1. Preferably close the discharge valve first.
2. Then turn off the motor.
3. Now, close the suction line valve.
4. Drain the pump liquid completely, if pump to be kept nonoperational for longer period or if there is danger of freezing.
5. If it is necessary for the pump to maintain its prime while it is shutdown, it is recommended to install either a foot valve or a check valve in the suction piping.

## MAINTENANCE AND SERVICE

### Schedule

Preventive maintenance and routine check-ups may prevent the pump from major failures. An inspection & maintenance log should be kept and the inspector is to immediately report any problems. Pump should be checked on regular basis for any unusual noise, vibrations and abnormal rise of temperature. If equipped with a sight flow indicator, check it from time to time for fluid flow and if no flow is observed, replace the filter or check the separator. A suggested guide for preventive maintenance for normal application is given below in Table 1:

**Table 1**

Guide for preventive maintenance

| ITEMS | ACTION REQUIRED | FREQUENCY |
|---|---|---|
| Vibration | Check for change in vibration levels | Refer to ANSI/HI 9.6.5 Condition Monitoring |
| Bolting | Check for proper bolt torque | Annually |
| Mechanical Seals | Monitor seal leakage | Refer to ANSI/HI 9.6.5 Condition Monitoring |
| Pump/Motor Alignment | Check for change in alignment | Annually |
| Surface Inspection | Check for coating integrity or signs of corrosion | Exterior components: Quarterly<br>Interior components: Annually |
| Wear and running clearance | Inspect and measure | Annually or as determined by service condition when performance decreases are noted or as recommended |
| No flow in sight flow indicator (if installed) | Replace filter, Inspect separator | Daily |
| Controls and accessories | Inspect for damage, proper function and condition | Annually |
| General site conditions | Inspect for damage, proper function and condition | 150 hours of operation as necessary |

### Cold Weather Maintenance

When handling water or other liquids that may freeze at low temperatures, care should be taken to prevent the pump from freezing during cold weather when the pump is not in operation. It may be necessary to drain the pump casing during shutdown periods by removing the bottom drain plug.

### Mechanical Seal Maintenance

The mechanical seal require flushing which is flushed from discharge of the pump through a flush line. A throttle bush isolates the mechanical seal from the liquid in the pump. Since mechanical seals need a film of liquid between the sealing faces, pump must not be run unless properly filled with liquid for intended operation.

A 'weep' sound may be heard from mechanical seals at start-up. The pump should run for approximately 8-10 hours, which is the break-in period for seal. During this operation the mechanical seal would 'seat' properly.

Pentair Aurora* 3800 pumps are supplied with type 21 mechanical seal.

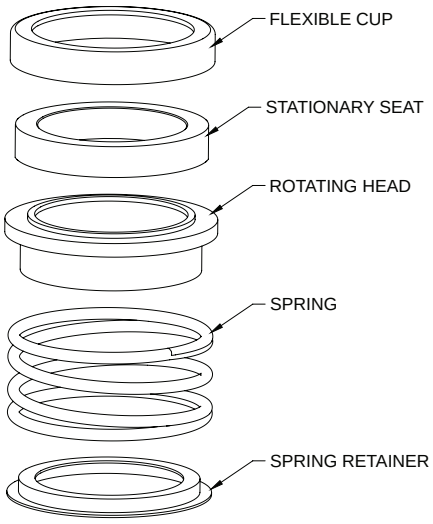



Figure 40
Mechanical Seal (type 21)

### Recommended Spare Part List

Although all the components could be procured by the customer at short interval, to reduce downtime the below mentioned components should be kept handy in case the pump is to be shut down for maintenance. The components are:

- Mechanical seal
- Wear rings
- Gaskets, O-rings, seals

***Notice:*** Refer to Table 2 before ordering seal kit corresponding to power frame numbers in case of Pentair Aurora 3804 pumps.

**Table 2**

Pentair Aurora 3804 pumps seal kit selection matrix

| IMPELLER SIZE[1] | POWER FRAME NO. | POWER FRAME PART NO. | SEAL KIT NO. |
|---|---|---|---|
| 7" PUMPS | 1 | 3550006644 | 4761251644 |
| | 2 | 3550008644 | 4761252644 |
| | 3 | 3550009644 | 4761252644 |
| | 21A | NA | NA |
| ALL 9.5" PUMPS EXCEPT 6x8x9.5 | 1 | 3550006644 | 4761254644 |
| | 2 | 3550008644 | 4761255644 |
| | 3 | 3550009644 | 4761255644 |
| | 21A | NA | NA |
| 6x8x9.5 | 1 | NA | NA |
| | 2 | 3550008644 | 4761256644 |
| | 3 | 3550009644 | 4761256644 |
| | 21A | NA | NA |
| 11" PUMPS | 1 | 3550006644 | 4761257644 |
| | 2 | 3550008644 | 4761258644 |
| | 3 | 3550009644 | 4761258644 |
| | 21A | 3550300644 | 4761260644 |
| 1.5x2x12 | 1 | 3550006644 | 4761261644 |
| 13.5" PUMPS | 1 | NA | NA |
| | 2 | 3550008644 | 4761263644 |
| | 3 | 3550009644 | 4761263644 |
| | 21A | 3550300644 | 4761264644 |

[1] Last digit of pump model denotes impeller size. E.g., 2x2.5x7, here 7" is the impeller size

### Consumables

Following items are of regular use during preventive and accidental maintenance and must be kept in stock by the customer.

- Lubricants
- Cleaning materials
- Touch up coating

### Tools and Fixtures

Pump assembly and disassembly can be performed by using standard hand tools available in market. For quick reference, tools required for disassembly of various pump components are mentioned below in Table 3 on the next page.

**Table 3**

Quick reference for tools and fixtures

| ITEM NO. | MOTOR FRAME | PUMPS | WRENCH SIZE AND TYPE |
|---|---|---|---|
| #4 & #4A | ALL | ALL | 9/16" wrench |
| #5 | ALL | 7" | 9/16" wrench |
| | | 9.5",11" | 3/4" wrench |
| | | 13.5" | 1-1/2" wrench |
| #5B | 143-184 | 9.5", 11", 12", 13.5" | 9/16" wrench |
| | 213-215 | 9.5", 11", 12", 13.5" | |
| | 254-256 | 9.5", 11", 13.5" | |
| | 284-326 | 9.5", 11", 13.5" | |
| | 364-405 | 9.5" | 3/4" wrench |
| | 444-449 | 9.5" | |
| #9 | 143-215 | 7", 9.5", 11", 13.5" | 9/16 " socket wrench |
| | 254-326 | 7", 9.5", 11", 13.5" | 3/4" socket wrench |
| | 364-449 | | |
| #32 | 143-184 | 7", 9.5" | 9/16" wrench |
| | 213-215 | 7", 9.5", 11", 13.5" | 3/4" wrench |
| | 254-256 | | |
| | 284-326 | 7", 9.5", 11", 13.5" | 1-1/2" wrench |
| | 364-405 | | |
| | 444-449 TCZ | | |

In addition to the above mentioned tools some additional equipment & fixtures may be required which are mentioned below:

- Lifting devices (crane, hoist, lifting chains or straps)
- Impeller puller (to remove pressed-on impeller from shaft)
- Torch (to heat parts to aid in removal)
- Die grinder (to cut out wear rings or shaft sleeves, if needed)
- Work table or fixture for holding pump
- Measuring equipment (feeler gauges, dial indicator, etc.)
- Bearing puller (to remove pressed on bearings from shaft)
- Hot oil bath (or method to heat bearings and coupling hubs for installation)

**Fastener Torque and Sequence**

Proper tightening of bolting is very important. Torque values will vary depending on the size and grade of bolting used. Torque values for coupling bolts and grub screws and sequence of their tightening are mentioned in the following section for replacement procedure of mechanical seals. Tightening torques for common bolt diameter can be found in Table 4 below.

**Table 4**

Cap screw torque for common bolt diameters

| CAPSCREW TYPE | HEAD MARKING | IN-POUNDS | FOOT-POUNDS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1/4" | 5/16" | 3/8" | 7/16" | 1/2" | 5/8" | 3/4" |
| SAE GRADE 5 |  | 85 | 180 | 27 | 43 | 65 | 130 | 230 |

## REPAIRS

***Notice:*** READ AND UNDERSTAND ALL SAFETY WARNINGS AT THE BEGINNING OF THE MANUAL BEFORE BEGINNING INSTALLATION OR ANY REPAIR WORK

This repairs section is broken into two major parts. The first part covers the dismantling of the mechanical seal, power frame disassembly and complete pump disassembly. The second part covers installation of mechanical seal, power frame reassembly and complete pump assembly. Refer to the exploded pump diagram (Figures 45 and 46 on Pages 23-24) for item numbers.

**Complete Pump Disassembly - Pentair Aurora* Model 3804/3801**

⚠ WARNING **SUDDEN START-UP HAZARD.** Disconnect and lock out power source before servicing. Failure to follow these instructions could result in serious personal injury, death or property damage.

1. Ensure the electrical power is locked out, the system pressure has been lowered and temperature of the unit is at a safe level.
2. Isolate the pump from the system by closing the valves that should be located on the suction and discharge side of the pump.
3. Loosen pipe plug and drain the pump.
4. Remove all relief, cooling, flushing, or drain lines from the pump. Break suction and discharge connections only if it is desired to remove casing (#6).

   ⚠ WARNING **Hot surface hazard:** If pumping hot water, ensure guards or proper insulation is installed to protect against skin contact to hot piping or pump components. Failure to follow these instructions could result in serious personal injury, death or property damage.

   ⚠ WARNING **High pressure hazard:** All pumps are designed for specific maximum working pressure. Do not exceed this pressure. Install properly sized pressure relief valves in system. Failure to follow these instructions could result in serious personal injury, death or property damage.

   ⚠ WARNING **Spraying water hazard:** When servicing pump replace all gaskets and seals. Do not reuse old gaskets or seals. Failure to follow these instructions could result in serious personal injury, death or property damage.

   ***Notice:*** For Pentair Aurora 3804 complete pump disassembly continue with step 5, For Pentair Aurora 3801 complete pump disassembly proceed to step 7 on the next page.
5. For Pentair Aurora 3804 pumps, remove the coupling guard.
6. For Pentair Aurora 3804 pumps, loosen the set screws in both coupling halves and slide each half back as far as possible on its shaft. Then, remove the coupling insert. See Figure 41 shown on next page.

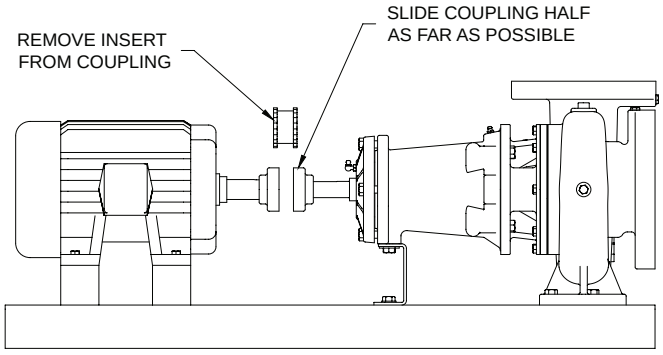



Figure 41
Pentair Aurora* 3804-frame mounted pump assembly

7. Remove the foot support cap screws of power frame (for 3804)/ motor (for 3801).
8. Loosen the casing cap screws (#5) connecting the seal plate (#35A). Do not remove them. Utilize two casing bolts to jack the power frame assembly (for 3804)/ motor assembly (for 3801) out from the casing (#6).
9. Utilize suitable lifting equipment to lift the motor assembly out from the casing.
10. Utilize suitable lifting equipment to lift the power frame assembly (for 3804)/ motor assembly (for 3801) out from the casing.
11. Remove impeller (#11).
12. Remove impeller key (#12).
13. Slide sleeve (#25) and O-ring (#10) with the rotating parts of the mechanical seal (Refer Figure 42) from the shaft. See Figure 43.

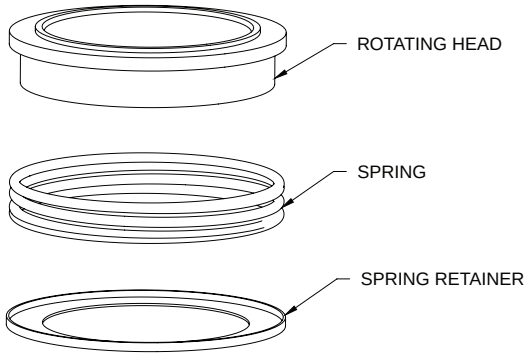



Figure 42
Rotating parts of mechanical seal

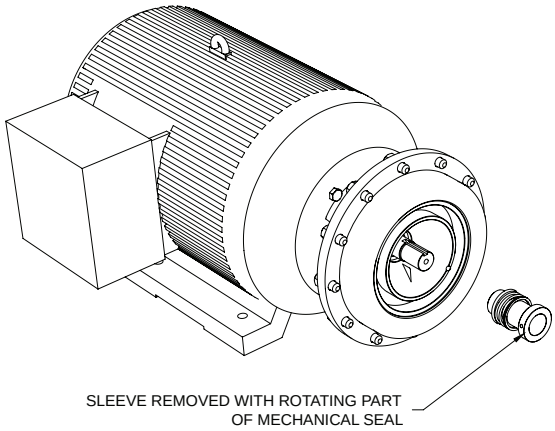



Figure 43

14. Unscrew cap screws (#5B) holding motor bracket (#35B) and seal plate (#35A) if any repair is required or for ease of replacing mechanical seal.
15. The seal flexible cup and stationary seat should be pressed out of the seal plate and the cavity cleaned of all residues. Make sure that the seal cavity is not damaged during disassembly since sharp edge can easily damage the elastomer on the mechanical seal during reassembly.

**⚠ CAUTION** The mechanical seal is a precision product and must be treated as such. During removal, great care must be taken to avoid dropping any part of the seal. Take particular care not to scratch the lapped faces on the washer or the sealing seat. Do not put a seal back into service until the sealing faces of the washer and the seat have been lapped or replaced.

***Notice:*** The sleeve should be carefully cleaned to remove any residue that may be remaining in the seal area. The rubber in the seal may have been partially adhered to the sleeve. The sleeve must also be checked for abrasion or corrosion that can occur when fluid residue penetrates between the seal and the sleeve. The sleeve under the seal may be polished lightly to a 32 RMS finish before reassembly. Do not reuse a pitted sleeve. Pin may be removed if necessary.

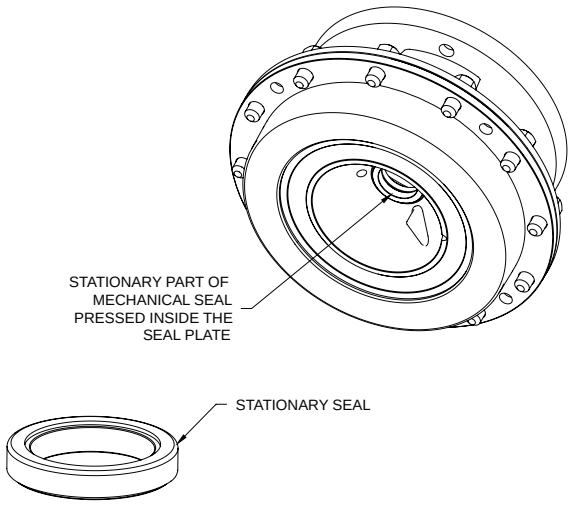



Figure 44

If only mechanical seal is to be replaced, stop at this point and proceed to step 1 under section titled "Installation of the Mechanical Seal - 3801/3804 pumps". Otherwise continue for Pentair Aurora* 3804 complete pump disassembly.

**Pentair Aurora* 3804 Complete Pump Disassembly or Power Frame Disassembly**

***Notice:*** Read and understand all safety warnings at the beginning of the manual before beginning installation or any repair work.

16. Remove the seal plate (#35A) cap screws (#5B) from the bracket (#35B).
17. Remove the power frame cap screws (#5) and washers (#5A) from the bracket (#35B).
    If the power frame assembly is being replaced, skip to section titled "Power Frame Reassembly". If replacing the shaft (#55), continue with step 18 for shaft disassembly.
18. Remove the grease fittings (#43) from the power frame.
19. Unscrew cap screws (#48) and remove bearing cap (#49). Remove O-ring (oil lubed only) and retainer ring (#52).
20. Slide out shaft (#55), bearings (#53 and #54). Since bearings (#53 and #54) are press fitted on the shaft, they will have to be pulled or pressed off the shaft. Remove grease seals (#51 & #51A) from frame (#57) and bearing cap (#49) respectively
21. Thoroughly clean the shaft (#55), removing any oil or dirt.

**Inspection**

Once the pumping unit is disassembled, component parts should be inspected to determine their condition. Ball bearings that turn roughly or show wear should be replaced. Cracked castings should never be used. Scored or worn pump shaft should be replaced. Gaskets should be replaced at reassembly for efficiency. It is recommended to replace routinely than to replace singly as the need arises.

**Complete Pump Reassembly - Model 3804/3801**

To install mechanical seal skip to step 8 under section "Installation of the Mechanical Seal-3801-3804 Pumps". Otherwise continue with step 1 for "Complete Pump Reassembly - Model 3804/3801".

**Power Frame Reassembly**

Reassembly will generally be in reverse order of disassembly. If disassembly was not complete, use only those steps related to your particular repair program.

1. Press grease seals (#51 & 51A) into frame (#57) and bearing cap (#49) respectively.
2. Press bearings (#53 & #54) onto shaft (#55).
3. Snap retainer ring (#52) into place.
4. Slide shaft (#55) and bearings (#53 & #54) into frame (#57).
5. Fasten bearing cap (#49) in position with cap screws (#48). Position slingers (#47) on the shaft.
6. Position the bracket (#35B) on the power frame (#57) and secure with cap screws (#5) and washers (#5A). Tighten screws evenly to assure proper alignment.
7. Position the Seal Plate (#35A) on the bracket (#35B) and secure with cap screws (#5B). Tighten screws evenly to assure proper alignment.

**Installation of the Mechanical Seal-3801-3804 Pumps**

8. Thoroughly clean the shaft sleeve and seal plate seal cavity. Replace the shaft sleeve (#25) or seal plate (#35A) if there is evidence of surface damage like pitting, corrosion, nicks or scratches.
9. Lubricate the shaft sleeve (#25) and seal plate (#35A) with soap and water or P-80™ rubber emulsion. Do not use petroleum lubricant. Install a new insert gasket and a new seal (#27) insert down into the seal plate.
10. Slide a new rotating seal assembly (#27) on to the shaft sleeve. With a screwdriver, push the top of the compression ring until the seal is tight against the seal insert. Install seal spring.

    ***Notice:*** Refer to Table 2 "Seal Kit Selection Matrix" on Page 17 to determine the seal kit to be used for repair in relation to the power frame assembly for Pentair Aurora 3804- frame mounted pumps.

    **⚠ CAUTION** The mechanical seal (#27) is a precision product and must be treated as such. During installation, great care must be taken to avoid dropping any part of the seal. Take particular care not to scratch the lapped faces on the washer or the sealing seat.
11. Install O-ring (#10).
12. Install a new impeller key (#12).
13. Install impeller (#11), new impeller washer gasket (#9B), impeller washer (#9A), impeller seal (#9C) and cap screw (#9). Tighten cap screw per torque chart (see Table 4 on Page 18).
14. Install new casing gasket (#8). Then install the pump assembly into the volute.
15. Tighten volute cap screws (#5) per torque chart (see Table 4 on Page 18).
16. For Pentair Aurora 3804 pumps, install foot support cap screws (#62)
17. For Pentair Aurora 3804 pumps, install coupling and align. (Follow coupling alignment procedure "Shaft/Coupling Alignment" on Page 12).
18. Install drain plugs, close drain valve.
19. For Pentair Aurora 3804 pumps, reinstall the coupling guard.
20. Open isolation valves and inspect pump for leaks.
21. Return pump to service.

    **⚠ CAUTION** Do not start pump until all air and vapor has been bled and until making sure that there is liquid in the pump to provide the necessary lubrication for the packing.

    ***Notice:*** WHEN ORDERING SPARE PARTS ALWAYS INCLUDE THE PUMP TYPE, SIZE, SERIAL NUMBER, AND THE PIECE NUMBER FROM THE EXPLODED VIEW IN THIS MANUAL. ORDER ALL PARTS FROM YOUR LOCAL AUTHORIZED DISTRIBUTOR OR PENTAIR AURORA CUSTOMER SERVICE.

    PENTAIR AURORA RESERVES THE RIGHT TO SUBSTITUTE MATERIALS WITHOUT NOTICE.

# TROUBLESHOOTING GUIDE

**THE FOLLOWING IS A LIST OF COMMON PROBLEMS AND THEIR PROBABLE CAUSES.**

| Symptoms | Possible causes | Possible remedies |
|---|---|---|
| Insufficient pressure or Insufficient/no flow | Speed too low | Check and ensure correct voltage at motor terminals |
| | | Check if rotating elements freely rotate |
| | Wrong direction of rotation | Check motor rotation with direction arrow on casing |
| | | Ensure correct motor wiring |
| | Entrained air in pump | Ensure all air is vented, and pump is adequately primed |
| | | Ensure eccentric reducer, if correctly installed |
| | Air leaks into suction line | Tighten the suction piping flange bolts as required |
| | Leaking joints | Check for any external leakage and arrest |
| | Excessive leakage from seal | Inspect and replace mechanical seal, as required |
| | Insufficient submergence of suction pipe | Check and ensure sufficient pipe length, submerged well below the water surface |
| | Insufficient pressure at pump inlet | Ensure correct suction pipe sizing |
| | | Raise fluid level or move pump closer to the water level |
| | Clogged impeller | Clean impeller as required |
| | Damaged impeller | Check and replace impeller as required |
| | Worn wear rings | Check and replace wear rings, if equipped |
| | System head not as anticipated | Contact manufacturer for correct pump sizing |
| | Smaller impeller diameter | Contact manufacturer for correct impeller sizing |
| Excessive power consumption | Speed too high | Check and ensure correct voltage at motor terminals |
| | Rubbing or binding of rotating elements | Check if rotating elements are not rubbing against stationary components |
| | Shaft bent | Inspect shaft for any deformation and replace |
| | Worn wear rings | Check and replace wear rings, if equipped |
| | Head lower than rating, pumps too much liquid | Contact manufacturer for correct pump/impeller sizing |
| Abnormal noise and vibration | Coupling misalignment | Check and ensure alignment between pump and driver shaft |
| | Foundation/grouting not rigid | Ensure foundation is adequately sized and rigid to absorb the vibrations |
| | | Ensure foundation bolts are tightened to adequate torque |
| | Defective bearings | Check motor and/or pump for worn bearings, and replace as required |
| | Rubbing or binding of rotating elements | Check if rotating elements are not rubbing against stationary components |
| | Pump operating outside Allowable Operating Region (AOR) | Ensure the pump is being operated within its Allowable Operating region. Contact manufacturer for correct pump sizing. |
| | Entrained air in pump | Ensure all air is vented, and pump is adequately primed |
| | | Ensure eccentric reducer, if correctly installed |
| | Insufficient pressure at pump inlet | Ensure correct suction pipe sizing |
| | | Raise fluid level or move pump closer to the water level |

# TROUBLESHOOTING GUIDE

| | | |
|---|---|---|
| Motor fails to start | Incorrect wiring | Check motor wiring against motor wiring diagram (on motor) |
| | Wrong voltage | Check and ensure correct voltage at motor terminals |
| | Switches not set | Set switches ON |
| | Tripped thermal overload relay | Set relays ON |
| | Blown fuses | Replace fuses |
| | Loose or broken wiring | Check and tighten connections. Replace broken wiring |
| | Binding of rotating elements | Check if rotating elements freely rotate |
| | Defective motor | Check and replace motor |
| Motor runs hot | Speed too high | Check and ensure correct voltage at motor terminals |
| | Voltage lower than rated | Check and ensure correct voltage at motor terminals |
| | Rubbing or binding of rotating elements | Check if rotating elements are not rubbing against stationary components |

**Note: The pump delivered may not be fitted with all the components mentioned in the troubleshooting guide.**

For further troubleshooting assistance, contact Pentair Aurora Customer Service or your nearest Pentair Aurora authorized distributor.

## PENTAIR AURORA*
## MODEL 3801
## CLOSE COUPLED CONFIGURATION

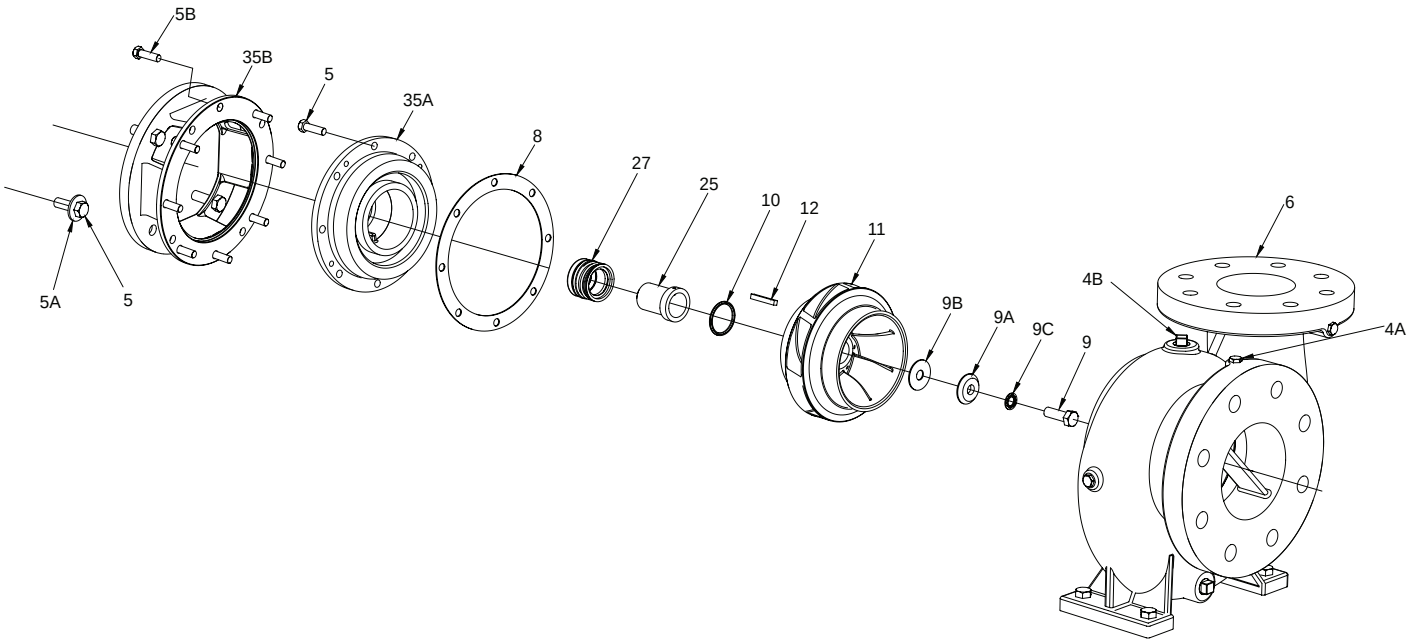



Figure 45
Pentair Aurora Model 3801, close coupled configuration

## PENTAIR AURORA*
## MODEL 3804
## FRAME MOUNTED CONFIGURATION

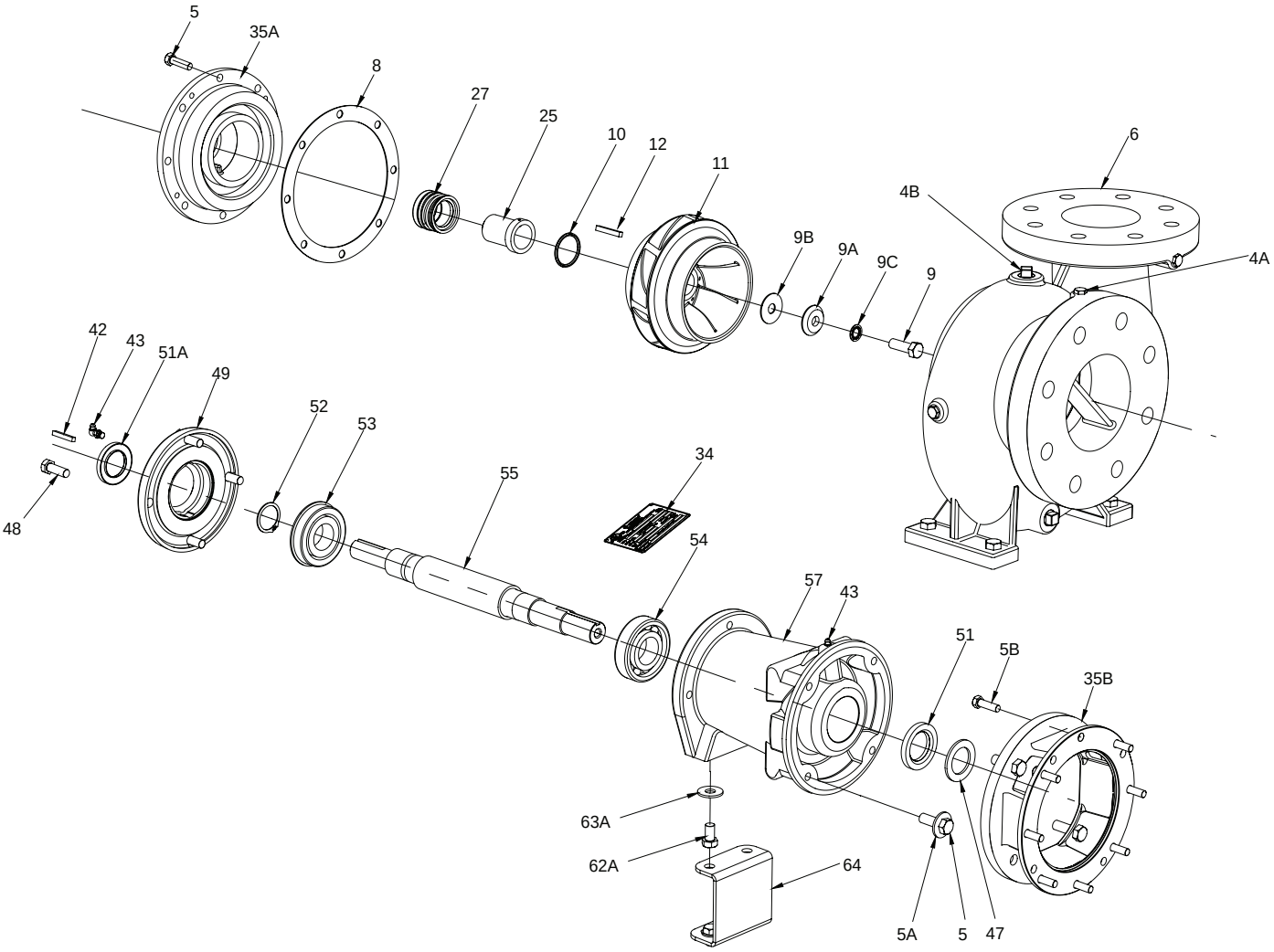



Figure 46
Pentair Aurora Model 3804, frame mounted configuration

## PENTAIR AURORA*
## 3801 AND 3804

Reference: Figure 45, 46 (Exploded Views)

| ITEM NO. | DESCRIPTION |
|---|---|
| 4 | Pipe plug |
| 4A/B. | Cap screw |
| 5A. | Cap screw washer |
| 5B. | Cap screw |
| 6 | Casing |
| 8 | Gasket |
| 9 | Impeller screw |
| 9A. | Impeller washer |
| 9B. | Impeller gasket |
| 9C. | Impeller seal |
| 10 | O-ring |
| 11 | Impeller |
| 12 | Impeller key |
| 25 | Sleeve |
| 27 | Mechanical seal |
| 32 | Cap screw |
| 33 | Screw |
| 34 | Nameplate |
| 35A. | Seal plate |
| 35B. | Motor bracket |
| 42 | Key |
| 43 | Grease fitting |
| 47 | Slinger |
| 48 | Cap screw |
| 49 | Bearing cap |
| 52 | Retaining ring |
| 53 | Bearing |
| 54 | Bearing |
| 55 | Shaft |
| 57 | Power frame |
| 62A. | Cap screw |
| 62B. | Nut |
| 63 | Washer |
| 64A/B. | Foot support |

# AQUATRAM®
## ADA COMPLIANT POOL ACCESS LIFTS

RECREATION FOR ALL. SUPPORT BY PENTAIR.

AquaTRAM 90

Choose the only ADA Compliant lift brand that's backed by the world's #1 manufacturer of swimming pool equipment. When you install an AquaTRAM lift, you provide safer, easier swimming pool access for swimmers with physical disabilities. Thanks to our versatile five-model lineup, there's an AquaTRAM lift to fit every pool and every budget... comfortably. And with the backing of the industry leader, Pentair Commercial Aquatics™, there's every reason to feel confident about the quality of your purchase.

## STANDARD FEATURES

- All AquaTRAM lifts comply with ADA Guidelines.
- Dual flip-up armrests provide easier and safer access.
- Rechargeable battery-powered operation for easier use.
- Comfortable seat with adjustable lap belt.
- Simple-to-operate controls provide easier access in and out of pool.
- Stainless steel with corrosion-resistant powder-coated finish.
- Lifting capacities up to 500 pounds.

AquaTRAM LT

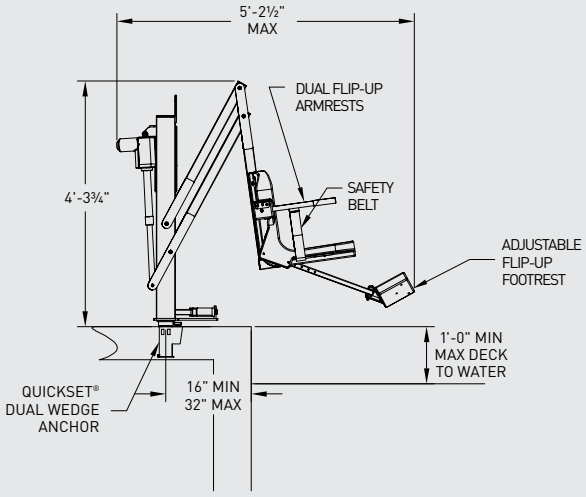
AquaTRAM 360

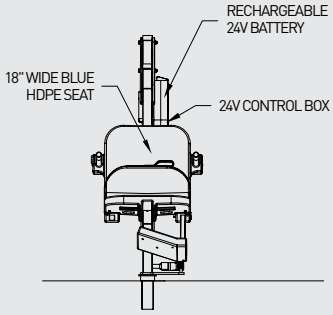
AquaTRAM PT

AquaTRAM

# AQUATRAM®
## ADA COMPLIANT POOL ACCESS LIFTS

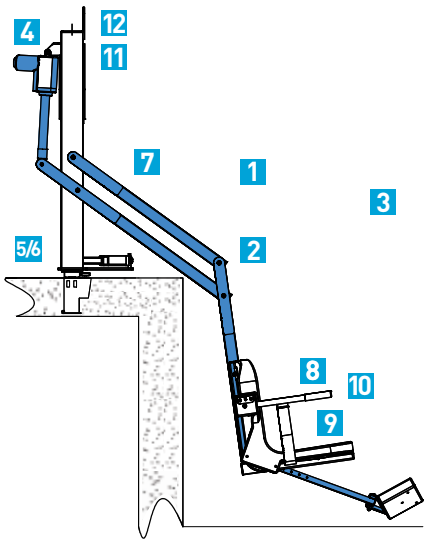
## AQUATRAM 90 LIFT




### Features and Benefits

1. Unique, versatile and cost-effective design accommodates most pools with a deck-to-water (d-w) dimension up to 12".
2. ADA Compliant; Lifting Capacity: 300 lbs.
3. Reversible design rotates 90°. Same model number can be installed "Right-Facing" or "Left-Facing" by rotating the lift 90° in its anchor.
4. Superior Reach and Versatile Anchor Placement:
   - **A.** Can clear a 16" Built-In (Spa) Bench when installed with a 16" anchor set-back* (at 6" d-w).
   - **B.** Can accommodate anchor set-back* of 16"-20" for "Square" Pool Profiles (with max.d-w).
   - **C.** Can accommodate up to 29" anchor set-back* for typical "Roll-Out" Gutter Profile (based on 6" d-w dimension).
   - **D.** Consult with factory for assistance with your application.
5. Quickset model (11220) has a 2-1/2" square port penetration for use with Paragon Dual-Wedge, tool-less, clamping anchor which also retrofits into existing 2-1/2" sq. x 6" deep anchors.
6. Round post model (11221) has a 1.90" OD Round post X 6" deep penetration. Lift may be purchased with anchor, or can retrofit into many existing anchor systems**.
7. Lightweight; easy to move and store when not in use. Optional cart available.
8. Dual flip-up armrests provide easier access and safer transfers on the pool deck and in the water.
9. Comfortable seat has an adjustable lap belt with hook-and-loop fasteners, plus an adjustable and removable footrest.
10. Simple 4-button submersible handset lets the user raise, lower, and rotate while seated or from the pool edge.
11. Stainless steel construction with corrosion -resistant epoxy powder-coat finish.
12. Rechargeable battery-powered operation is easier to install than water-powered lifts; provides a smoother ride, greater reliability and easier servicing with plug-and-play components.

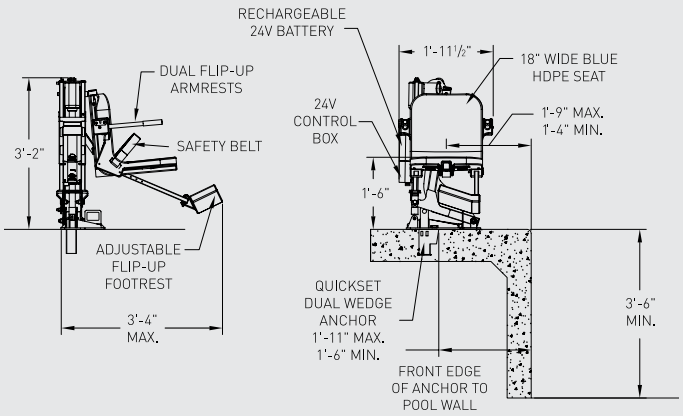



*Set-back dimension as referenced herein is from pool wall to centerline of anchor. All clearance dimensions presented are estimated and are affected by d-w, deck obstructions and other physical characteristics of the specific application.

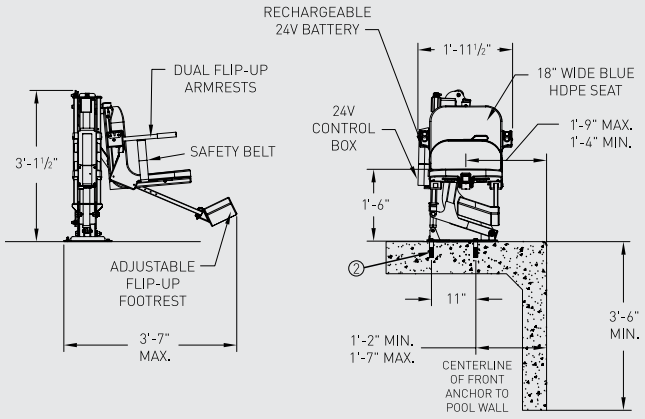
**For retrofit, the existing anchor must be designed to accept a 1.90" diameter x 6" long round post penetration and the entire anchor system must be designed to withstand the resulting loads applied by lift under full capacity. Adapter kits are available for existing 2-3/8", 2-1/2", and 2-5/8" round anchors. In new installations, the anchor should be installed in a deck or footing as specified in the Installation and User's Guide (3'-3" x 3'-3" x 10" thick at time of this printing.)

## AQUATRAM AND AQUATRAM LT LIFTS

AquaTRAM Lift

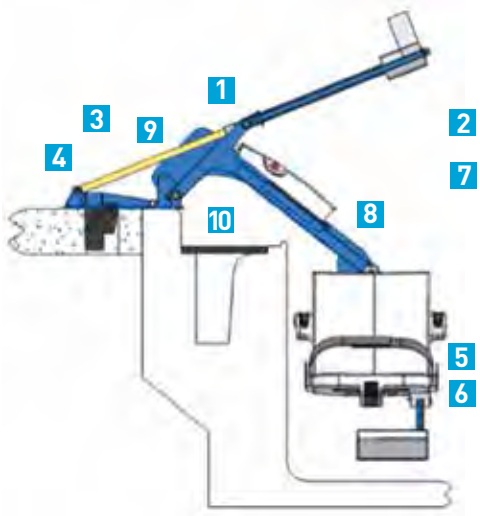



AquaTRAM LT Lift

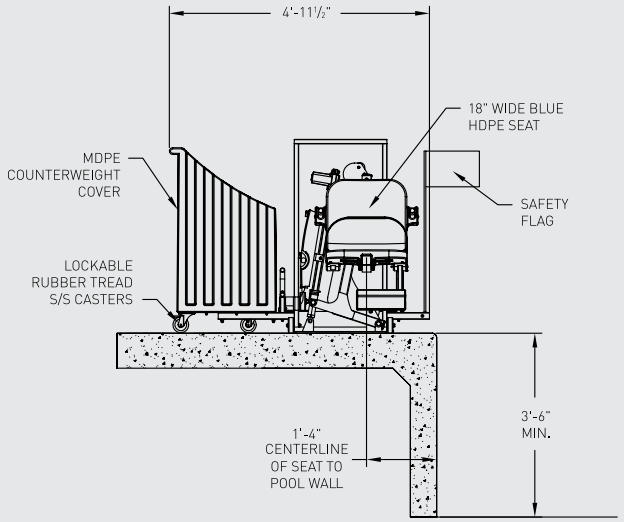


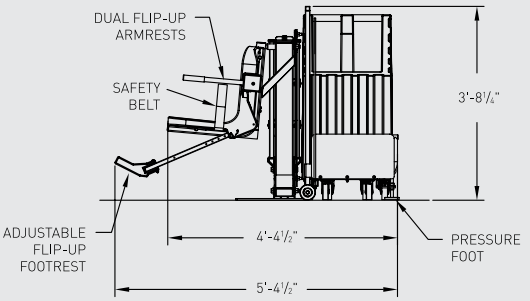

### Features and Benefits

1. Ultra-compact design has low height, uses minimal deck space, and does not extend into the water when not in use. Accommodates most pools with a deck-to-water (d-w) dimension up to 9".
2. ADA Compliant; Lifting Capacity: 400 lbs. (AquaTRAM); 350 lbs. (AquaTRAM LT)
3. Lightweight; easily transports with optional cart. Anchors can be installed in multiple locations around the pool to best support scheduled activities.
4. AquaTRAM lift: Removes without tools; AquaTRAM LT lift: Lag bolt anchoring allows quick removal with tools.
5. Dual flip-up armrests provide easier access and safer transfers on the pool deck and in the water.
6. Comfortable seat has an adjustable lap belt with hook-and-loop fasteners, plus an adjustable and removable footrest.
7. Simple 2-button submersible handset lets the user raise and lower while seated or from the pool edge.
8. Stainless steel construction with corrosion-resistant powder-coat finish.
9. Rechargeable battery-powered operation is easier to install than water-powered lifts; provides a smoother ride, greater reliability and easier servicing with plug-and-play components.
10. Standard models are "Right-Facing" as shown. "Left-Facing" (Reversed) models are also available upon request.



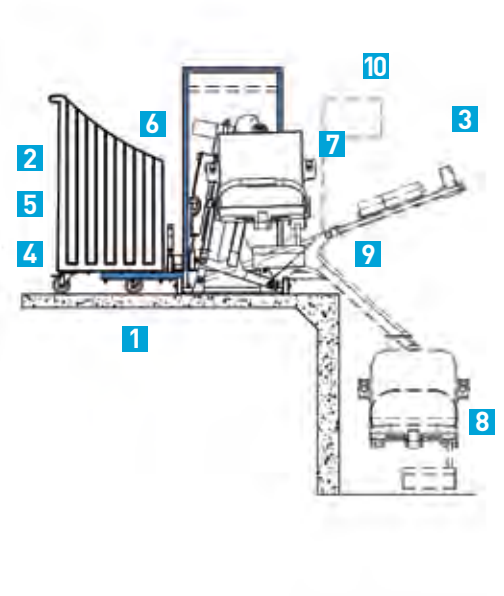
## AQUATRAM PT LIFT



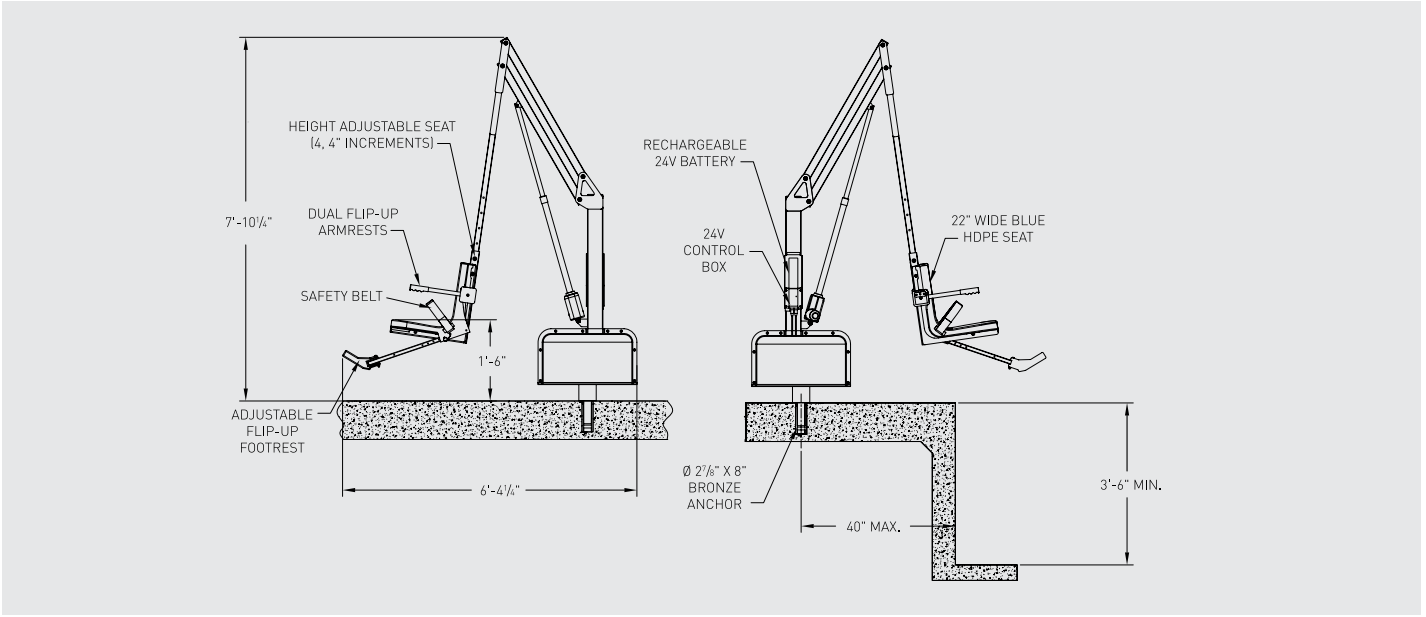

### Features and Benefits

1. Mobile swimming pool access stores off-deck when not in use.
2. Highly maneuverable. Fits through most doorways.
3. ADA compliant with the use of the Affixment Kit (included). Docking Bar and anchor "affix" the lift in place during operating hours. Kits can be installed at various locations.
4. Standard model (11280S) is counter-weighted using sand ballast. Sand can be sourced locally, saving substantial freight cost. 350 lb. Lifting Capacity.
5. Also available with optional Concrete Block Ballast included with factory shipment (11280) for ease of ordering. 350 lb. Lifting Capacity.
6. Accommodates most pools with a "deck-to-water" dimension of up to 6".
7. Dual flip-up armrests provide easier access and safer transfers on the pool deck and in the water.
8. Comfortable seat has an adjustable lap belt with hook-and-loop fasteners, plus an adjustable and removable footrest.
9. Simple 2-button submersible handset lets the user raise and lower while seated or from the pool edge.
10. Rechargeable battery-powered operation is easier to install than water-powered lifts; provides a smoother ride, greater reliability and easier servicing with plug-and-play components.



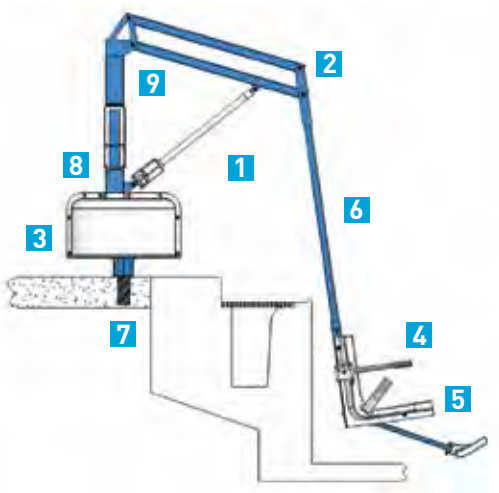
# AQUATRAM®
## ADA COMPLIANT POOL ACCESS LIFTS

## AQUATRAM 360 LIFT




### Features and Benefits

1. ADA Compliant; Lifting Capacity: 500 lbs.
2. Versatile boom arm design accommodates anchor set-back distances up to 40"; clears walls up to 30" high and 10" wide; and can serve two adjoining pools from the same install location.
3. 360° unimpeded rotation in either direction allows access to and from the lift, even in small areas.
4. Dual flip-up armrests provide easier access and safer transfers on the pool deck and in the water.
5. Comfortable seat has an adjustable lap belt with hook-and-loop fasteners, plus an adjustable and removable footrest.
6. Simple 4-button submersible handset lets the user raise, lower and rotate while seated or from the pool edge.
7. Removes without tools, and moves easily with the optional transport cart. Multiple anchors can be installed in various locations around the pool to accommodate the pool's scheduled activities.
8. Stainless steel construction with corrosion-resistant powder-coat finish.
9. Rechargeable battery-powered operation is easier to install than water-powered lifts; provides a smoother ride, greater reliability and easier servicing with plug-and-play components.



## Choose the AquaTRAM Lift that Rises to Your Needs

| Features and Benefits | AquaTRAM 90 | AquaTRAM 360 Lift with in-deck tool-free anchoring | AquaTRAM Lift with in-deck tool-free anchoring | AquaTRAM LT Lift with Lag-bolt anchoring | AquaTRAM PT |
|---|---|---|---|---|---|
| Lifting capacity | 300 lbs. | 500 lbs. | 400 lbs. | 350 lbs. | 350 lbs. |
| ADA Compliant | √ | √ | √ | √ | √ |
| Rotation for tight-area access | 90° right or left | 360° | | | |
| Boom arm design adapts to the most demanding and specialized applications; superb reach and wall clearance | √ | √ | | | |
| Can serve 2 adjoining pools with 1 lift | | √ | | | |
| Low profile design uses minimal deck space | √ | | √ | √ | √ |
| 22" wide seat standard | | √ | | | |
| Compact and lightweight, fits through most doorways | √ | | √ | √ | √ |
| Secure in-deck anchoring with patented design; tool-free removal; portable with optional Transport Cart | √ | √ | √ | | |
| Secure Docking Bar included to secure in place per ADA requirement | | | | | √ |
| Lag bolt anchoring, quick removal with tools; portable with optional Transport Cart | | | | √ | |
| Dual flip-up armrests for easier access and safer transfers | √ | √ | √ | √ | √ |
| Adjustable & removable footrest fits users across a wide range of sizes | √ | √ | √ | √ | √ |
| Adjustable lap belt with hook & eye fastening | √ | √ | √ | √ | √ |
| Easy-to-use Slim Line controls can be operated from seat or pool ledge | √ | √ | √ | √ | √ |
| Stainless steel construction, durable powder-coat finish | √ | √ | √ | √ | √ |
| Battery-operated; easier to install & smoother transport than water power | √ | √ | √ | √ | √ |
| Slim, one-piece 24v rechargeable battery | √ | √ | √ | √ | √ |
| Submersible remote | √ | √ | √ | √ | √ |
| 5-year Limited Warranty (pro-rated after Year 2 on electronics) | | √ | √ | | |
| Lifetime Limited Warranty on frame | | √ | √ | | |
| 2-year Limited Warranty | √ | | | √ | √ |

### AquaTRAM LT Lift and Anchor

| Pentair P/N | Description |
|---|---|
| 11230 | AquaTRAM LT Lift w/ Anchor Kit |
| 11230-A | AquaTRAM LT Lift Less Anchor Kit |
| 11231 | AquaTRAM LT Anchor Kit only |
| 11232 | AquaTRAM LT Transport Cart |
| 11204 | AquaTRAM Protective Cover |
| 11205 | Adjustable Headrest, AquaTRAM only |
| 11270 | AquaTRAM Replacement Hand Control |
| 11271 | AquaTRAM Replacement Control Box |
| 11273 | AquaTRAM Replacement Actuator Cover |

### AquaTRAM Series SHARED Options & Accessories

| Pentair P/N | Description |
|---|---|
| 11206 | AquaTRAM Series Adjustable Chest Strap |
| 11208 | AquaTRAM Series Pull-out Leg rest |
| 11211 | AquaTRAM Series Replacement Battery |
| 11277 | AquaTRAM Series Replacement Charger |
| 11213 | AquaTRAM Series Replacement Footrest |
| 11207 | AquaTRAM Series Cycle Attachment |
| 11214 | AquaTRAM Series Replacement Seat w/ Arms |
| 11215 | AquaTRAM Series Replacement Seat Belt |

### AquaTRAM PT Lift

| Pentair P/N | Description |
|---|---|
| 11280S | AquaTRAM PT Lift w/ Sand Ballast (sand not incl.) |
| 11280 | AquaTRAM PT Lift w/ Concrete Ballast (concrete incl.) |
| 11285 | AquaTRAM PT Cover, Blue |
| 11287 | AquaTRAM PT Accessory Upgrade Kit** |
| 11289 | Affixment Kit (contains docking bar and anchor) |

**Includes cover, headrest, chest strap and extra battery

### AquaTRAM Lift and Anchor

| Pentair P/N | Description |
|---|---|
| 11200 | AquaTRAM Lift w/ Anchor |
| 11200-A | AquaTRAM Lift without Anchor |
| 11201 | AquaTRAM Lift w/ Anchor - Left facing |
| 11201-A | AquaTRAM Lift without Anchor - Left facing |
| 11202 | QuickSet Dual Wedge Anchor for AquaTRAM Lift |
| 11203 | AquaTRAM Transport Cart |
| 11272 | AquaTRAM Replacement Actuator w/ Frame |
| 11204 | AquaTRAM Protective Cover |
| 11205 | Adjustable Headrest, AquaTRAM Only |
| 11270 | AquaTRAM Replacement Hand Control |
| 11271 | AquaTRAM Replacement Control Box |
| 11273 | AquaTRAM Replacement Actuator Cover |

### AquaTRAM 90 Lift

| Pentair P/N | Description |
|---|---|
| 11220 | AquaTRAM 90 Lift w/ Quickset Dual Wedge Anchor |
| 11220-A | AquaTram 90 Lift w/o Quickset Dual Wedge Anchor |
| 11221 | AquaTRAM 90 Lift for Round Anchor Post w/Anchor |
| 11221-A | AquaTRAM 90 Lift for Round Anchor w/o Anchor |
| 11222 | AquaTRAM 90 Lift Cover |
| 11224 | AquaTRAM 90 Lift Transport Cart |
| 11226 | AquaTRAM 90 Anchor for Round Post Model |
| 11202 | AquaTRAM 90 Anchor for Square Post Anchor |
| 11240 | 2-1/2"OD x 1.95"ID Anchor Adapter Sleeve |
| 11241 | 2-3/8"OD x 1.95"ID Anchor Adapter Sleeve |
| 11242 | 2-5/8"OD x 1.95"ID Anchor Adapter Sleeve |
| 11243 | Round Anchor for Wood Framed Deck |

### AquaTRAM 360 Lift and Accessories

| Pentair P/N | Description |
|---|---|
| 11250 | AquaTRAM 360 Lift w/ Anchor |
| 11250-A | AquaTRAM 360 Lift without Anchor |
| 11252 | AquaTRAM 360 Anchor Kit w/ Cap |
| 11257 | AquaTRAM 360 Protective Cover |
| 11254 | AquaTRAM 360 Adjustable Headrest |
| 11253 | AquaTRAM 360 Transport Cart |
| 11255 | AquaTRAM 360 Sling Arm Option (500# Capacity) |
| 11256-C | AquaTRAM 360 Replacement Sling Chain Set |
| 11256 | AquaTRAM 360 Replacement Sling (500# Capacity) |
| 11256-B | AquaTRAM 360 Replacement Sling Bars |
| 11258 | AquaTRAM 360 Gurney Option |
| 11260 | AquaTRAM 360 Spine Board Option |
| 11261 | AquaTRAM 360 Head Immobilizer for Spine Board |
| 11274 | AquaTRAM 360 Replacement Hand Control, 4-Button |
| 11275 | AquaTRAM 360 Replacement Control Box |
| 11276 | AquaTRAM 360 Replacement Actuator |
| 11259 | AquaTRAM 360 Wheelchair Option 22" Chair included |

PENTAIR

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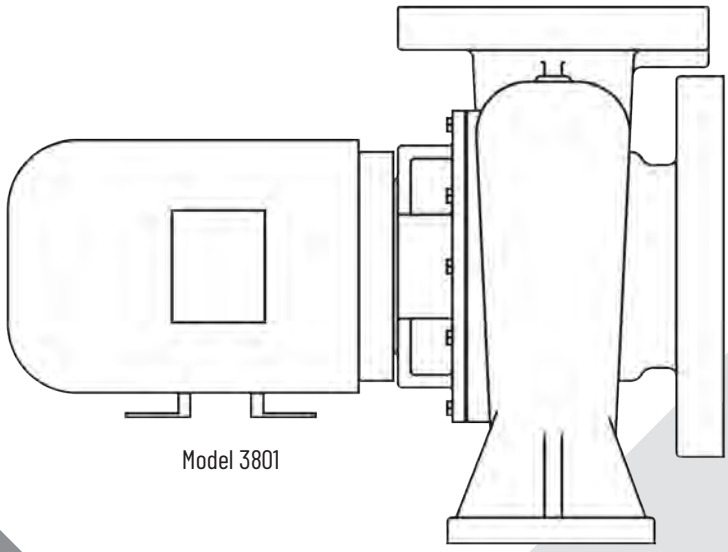
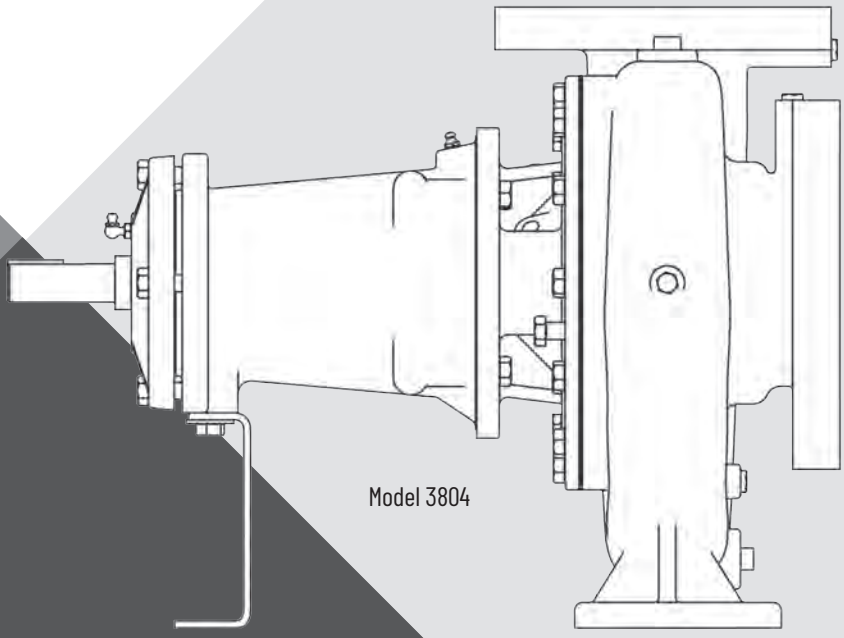
6/14 Part # P1-169 

PENTAIR AURORA

## END SUCTION PUMPS
3801 ◆ 3804



Model 3801



Model 3804

# DIMENSION TABLES ADDENDUM

**pentair.com**

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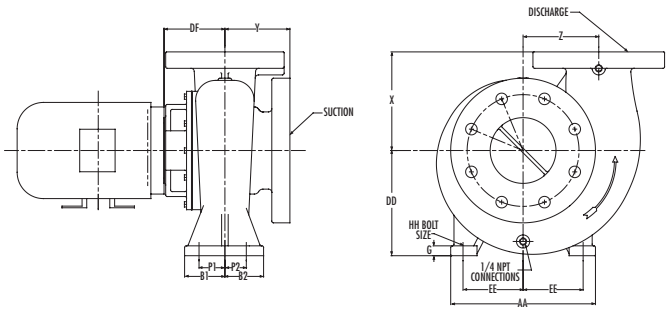
# PENTAIR AURORA® MODEL 3801 PUMPS

| Pump Size | Disch. | Suct. | DD | X | Y | Z | P1 | P2 | B1 | B2 | G | HH | EE | AA | DF 143-184JM | DF 213-215JM | DF 254-256JM | DF 284-326JM | DF 364-405TCZ | DF 444-449TCZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.25x1.5x7 (NPT) | 1.25 | 1.5 | 7.00 (178) | 5.00 (127) | 3.25 (083) | 4.50 (114) | 1.63 (041) | 1.38 (035) | 2.63 (067) | 2.38 (060) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 4.25 (108) | 4.25 (108) | N/A | N/A | N/A | N/A |
| 1.25x1.5x9.5 (NPT) | 1.25 | 1.5 | 7.00• (178) | 8.00 (203) | 3.25 (83) | 5.50 (140) | 2.44 (62) | 1.94 (49) | 3.06 (78) | 2.56 (65) | 0.63 (16) | 0.50 (13) | 4.56 (116) | 10.38 (264) | 4.59 (117) | 4.59 (117) | 5.25 (133) | 5.25 (133) | N/A | N/A |
| 1.5x2x7 (NPT) | 1.5 | 2 | 7.00 (178) | 6.00 (152) | 3.13 (079) | 4.63 (117) | 1.44 (037) | 1.56 (040) | 2.44 (062) | 2.56 (065) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 4.75 (121) | 4.75 (121) | 5.31 (135) | N/A | N/A | N/A |
| 1.5x2x9.5 (NPT) | 1.5 | 2 | 7.00• (178) | 6.50 (165) | 3.11 (79) | 5.75 (146) | 2.44 (62) | 1.94 (49) | 3.25 (83) | 2.75 (70) | 0.63 (16) | 0.63 (16) | 4.56 (116) | 10.75 (273) | 4.59 (117) | 4.59 (117) | 5.25 (133) | 5.25 (133) | N/A | N/A |
| 1.5x2x11 (NPT) | 1.5 | 2 | 8.00 (203) | 9.00• (229) | 3.13 (079) | 5.75 (146) | 1.44 (037) | 2.94 (075) | 2.25 (057) | 3.75 (095) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 4.63 (118) | 4.63 (118) | 5.63 (143) | 5.63 (143) | N/A | N/A |
| 1.5x2x12 (NPT) | 1.5 | 2 | 10.00 (254) | 7.75 (197) | 2.75 (070) | 5.75 (146) | 1.94 (049) | 2.94 (075) | 2.87 (073) | 3.75 (095) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 4.81 (122) | 4.81 (122) | N/A | N/A | N/A | N/A |
| 2x2.5x7A▲ | 2 | 2.5 | 7.00 (178) | 6.50 (165) | 3.50 (089) | 4.75 (005) | 1.56 (040) | 1.44 (037) | 2.56 (065) | 2.44 (062) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 4.88 (124) | 4.88 (124) | 5.50 (140) | 5.50 (140) | N/A | N/A |
| 2x2.5x9.5▲ | 2 | 2.5 | 8.00 (203) | 7.00 (178) | 4.00 (102) | 5.88 (149) | 1.56 (040) | 2.81 (071) | 2.38 (060) | 3.63 (092) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 4.75 (121) | 4.75 (121) | 5.44 (138) | 5.44 (138) | N/A | N/A |
| 2x3x11▲ | 2 | 3 | 10.00 (254) | 8.00 (203) | 5.50 (140) | 6.50 (165) | 2.23 (057) | 2.77 (070) | 3.23 (082) | 3.77 (096) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 4.44 (113) | 4.44 (113) | 5.31 (135) | 5.31 (135) | 9.13 (232) | 9.13 (232) |
| 2x3x13.5▲ | 2 | 3 | 10.00 (254) | 9.00 (229) | 5.50 (140) | 7.25 (184) | 2.00 (051) | 3.00 (076) | 3.00 (076) | 4.00 (102) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | N/A | 5.38 (137) | 5.38 (137) | 5.38 (137) | N/A | N/A |
| 2.5x3x7▲ | 2.5 | 3 | 7.00 (178) | 6.00 (152) | 4.25 (108) | 4.69 (005) | 1.63 (041) | 1.38 (035) | 2.63 (067) | 2.38 (060) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 4.81 (122) | 4.81 (122) | 4.44 (113) | 4.44 (113) | N/A | N/A |
| 2.5x3x9.5▲ | 2.5 | 3 | 8.00 (203) | 6.75 (171) | 4.00 (102) | 6.00 (152) | 1.63 (041) | 2.75 (070) | 2.44 (062) | 3.56 (090) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 4.94 (125) | 4.94 (125) | 5.56 (141) | 5.56 (141) | 9.56 (243) | 9.56 (243) |
| 2.5x3x13.5▲ | 2.5 | 3 | 10.00 (254) | 9.00 (229) | 6.00 (152) | 8.00 (203) | 2.00 (051) | 3.00 (076) | 3.00 (076) | 4.00 (102) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | N/A | 5.50 (140) | 5.50 (140) | 5.50 (140) | N/A | N/A |
| 3x4x7A▲ | 3 | 4 | 7.00 (178) | 6.00 (152) | 4.13 (105) | 5.00 (127) | 1.69 (043) | 1.31 (033) | 2.69 (068) | 2.31 (059) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 4.69 (119) | 4.69 (119) | 5.31 (135) | 5.31 (135) | N/A | N/A |
| 3x4x9.5▲ | 3 | 4 | 8.00 (203) | 7.50 (191) | 4.75 (121) | 6.13 (156) | 1.81 (046) | 2.56 (065) | 2.69 (068) | 3.31 (084) | 0.75 (019) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 4.69 (119) | 4.69 (119) | 5.31 (135) | 5.31 (135) | 9.31 (236) | 9.31 (236) |
| 3x4x11▲ | 3 | 4 | 10.00 (254) | 9.50 (241) | 5.50 (140) | 7.38 (187) | 2.44 (062) | 2.56 (065) | 3.44 (087) | 3.56 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 4.44 (113) | 4.44 (113) | 5.31 (135) | 5.31 (135) | 9.13 (232) | 9.13 (232) |
| 3x4x13.5▲ | 3 | 4 | 10.00 (254) | 9.50 (241) | 5.63 (143) | 8.00 (203) | 2.13 (054) | 2.88 (073) | 3.13 (080) | 3.88 (098) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | N/A | N/A | 5.44 (138) | 5.44 (138) | 9.31 (236) | 9.31 (236) |
| 4x5x7A*▲ | 4 | 5 | 8.00 (203) | 7.50 (191) | 4.94 (125) | 5.75 (146) | 2.25 (057) | 2.13 (054) | 3.06 (078) | 2.94 (075) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 4.94 (125) | 4.94 (125) | 5.56 (141) | 5.56 (141) | N/A | N/A |
| 4x5x9.5▲ | 4 | 5 | 10.00 (254) | 8.00 (203) | 5.00 (127) | 7.00 (178) | 1.88 (048) | 2.50 (064) | 2.69 (068) | 3.31 (084) | 0.75 (019) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 4.69 (119) | 4.69 (119) | 5.31 (135) | 5.31 (135) | 9.31 (236) | 9.31 (236) |
| 4x5x11A▲ | 4 | 5 | 10.00 (254) | 9.75 (248) | 5.56 (141) | 7.25 (184) | 2.41 (061) | 2.59 (066) | 3.41 (087) | 3.59 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 4.50 (114) | 4.50 (114) | 5.38 (137) | 5.38 (137) | 9.19 (233) | 9.19 (233) |
| 4x5x13.5▲ | 4 | 5 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 8.56 (218) | 2.25 (057) | 2.75 (070) | 3.25 (083) | 3.75 (095) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | N/A | N/A | 5.06 (129) | 5.06 (129) | 8.88 (226) | 8.88 (226) |
| 5x6x7A▲ | 5 | 6 | 10.00 (254) | 8.50 (216) | 5.81 (148) | 6.25 (159) | 2.81 (071) | 1.56 (040) | 3.63 (092) | 2.38 (060) | 0.69 (018) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 5.18 (132) | 5.18 (132) | 5.81 (148) | 5.81 (148) | 9.50 (241) | N/A |
| 5x6x9.5A▲ | 5 | 6 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 7.50 (191) | 2.19 (056) | 2.81 (071) | 3.19 (081) | 3.81 (097) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 5.06 (129) | 5.06 (129) | 5.69 (145) | 5.69 (145) | 9.69 (246) | 9.69 (246) |
| 5x6x11▲ | 5 | 6 | 11.00 (279) | 10.50 (267) | 5.44 (138) | 7.94 (202) | 2.59 (066) | 2.41 (061) | 3.44 (087) | 3.56 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | N/A | N/A | 5.44 (138) | 5.44 (138) | 9.25 (235) | 9.25 (235) |
| 5x6x13.5▲ | 5 | 6 | 12.00 (305) | 13.00 (330) | 6.00 (152) | 9.00 (229) | 4.19 (106) | 4.81 (122) | 5.19 (132) | 5.81 (148) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | N/A | N/A | 5.56 (141) | 5.56 (141) | 9.38 (238) | 9.38 (238) |
| 6x8x9.5A*▲ | 6 | 8 | 11.00 (279) | 10.50 (267) | 7.00 (178) | 8.25 (210) | 3.13 (079) | 1.88 (048) | 4.13 (105) | 2.88 (073) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | N/A | N/A | 6.19 (157) | 6.19 (157) | N/A | N/A |
| 6x8x11A▲ | 6 | 8 | 12.00 (305) | 11.00 (279) | 6.13 (156) | 8.47 (215) | 4.63 (117) | 4.38 (111) | 5.63 (143) | 5.38 (137) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | N/A | N/A | 5.81 (148) | 5.81 (148) | N/A | N/A |
| 6x8x13.5▲ | 6 | 8 | 12.63• (321) | 13.38• (340) | 6.50 (165) | 9.31 (237) | 4.50 (114) | 4.50 (114) | 5.50 (140) | 5.50 (140) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | N/A | N/A | 8.38 (213) | 8.38 (213) | 9.44 (240) | 9.44 (240) |
| 8x10x13.5*▲ | 8 | 10 | 15.00 (381) | 14.00 (356) | 8.00 (203) | 11.00 (279) | 4.50 (114) | 4.50 (114) | 5.50 (140) | 5.50 (140) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | N/A | N/A | 8.19 (208) | 8.19 (208) | 9.25 (235) | 9.25 (235) |

*Temporarily unavailable until further notice.

NOTES:

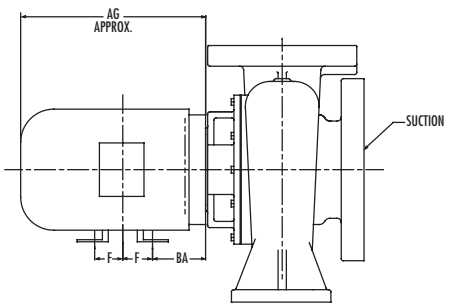
1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Not for construction purposes unless certified.
4. ▲ Available in 250 lb./125 lb. flanges.
5. • Dimensions do not match Bell & Gossett®.
6. Conduit box is shown in approximate location. Dimensions are not specified as they may vary with each motor manufacturer.

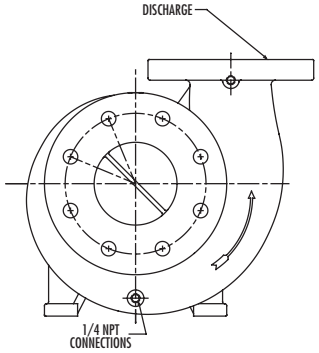


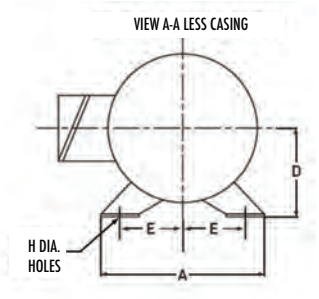
## MOTOR FRAME

| Frame | AG Approx. | A | D | E | F | H | BA[3] |
|---|---|---|---|---|---|---|---|
| 143JM | 10.00 (254) | 7.00 (178) | 3.50 (089) | 2.75 (070) | 2.00 (051) | 0.34 (009) | 2.25 (057) |
| 145JM | 11.00 (279) | 7.00 (178) | 3.50 (089) | 2.75 (070) | 2.50 (064) | 0.34 (009) | 2.25 (057) |
| 182JM | 11.00 (279) | 9.00 (229) | 4.50 (114) | 3.75 (095) | 2.25 (057) | 0.41 (010) | 2.75 (070) |
| 184JM | 12.00 (305) | 9.00 (229) | 4.50 (114) | 3.75 (095) | 2.75 (070) | 0.41 (010) | 2.75 (070) |
| 213JM | 14.00 (356) | 10.50 (267) | 5.25 (133) | 4.25 (108) | 2.75 (070) | 0.41 (010) | 3.50 (089) |
| 215JM | 15.00 (381) | 10.50 (267) | 5.25 (133) | 4.25 (108) | 3.50 (089) | 0.41 (010) | 3.50 (089) |
| 254JM | 17.50 (445) | 12.50 (318) | 6.25 (159) | 5.00 (127) | 4.13 (105) | 0.53 (013) | 4.25 (108) |
| 256JM | 19.00 (483) | 12.50 (318) | 6.25 (159) | 5.00 (127) | 5.00 (127) | 0.53 (013) | 4.25 (108) |
| 284JM | 19.00 (483) | 14.00 (356) | 7.00 (178) | 5.50 (140) | 4.75 (121) | 0.53 (013) | 4.75 (121) |
| 286JM | 21.00 (533) | 14.00 (356) | 7.00 (178) | 5.50 (140) | 5.50 (140) | 0.53 (013) | 4.75 (121) |
| 324JM | 22.00 (559) | 16.00 (406) | 8.00 (203) | 6.25 (159) | 5.25 (133) | 0.66 (017) | 5.25 (133) |
| 326JM | 23.00 (584) | 16.00 (406) | 8.00 (203) | 6.25 (159) | 6.00 (152) | 0.66 (017) | 5.25 (133) |
| 364JM | 26.00 (660) | 17.17 (436) | 9.00 (229) | 7.00 (178) | 5.63 (143) / 6.13 (156)[5] | 0.66 (17) | 5.88 (149) |
| 365JM | 26.00 (660) | 17.17 (436) | 9.00 (229) | 7.00 (178) | 5.63 (143) / 6.13 (156)[5] | 0.66 (17) | 5.88 (149) |
| 404JM | 32.00 (813) | 19.92 (506) | 10.00 (254) | 7.99 (203) | 6.12 (155) / 6.87 (174)[5] | 0.81 (21) | 6.61 (168) |
| 405JM | 32.00 (813) | 19.92 (506) | 10.00 (254) | 7.99 (203) | 6.12 (155) / 6.87 (174)[5] | 0.81 (21) | 6.61 (168) |
| 364TCZ | 24.00 (610) | 18.00 (457) | 9.00 (229) | 7.00 (178) | 5.63 (143) | 0.66 (017) | 5.88 (149) |
| 365TCZ | 24.00 (610) | 18.00 (457) | 9.00 (229) | 7.00 (178) | 6.13 (156) | 0.66 (017) | 5.88 (149) |
| 404TCZ | 27.25 (692) | 20.00 (508) | 10.00 (254) | 8.00 (203) | 6.13 (156) | 0.81 (021) | 6.63 (168) |
| 405TCZ | 28.75 (730) | 20.00 (508) | 10.00 (254) | 8.00 (203) | 6.88 (175) | 0.81 (021) | 6.63 (168) |
| 444TCZ | 31.13 (791) | 22.00 (559) | 11.00 (279) | 9.00 (229) | 7.25 (184) | 0.81 (021) | 7.50 (191) |
| 445TCZ | 31.13 (791) | 22.00 (559) | 11.00 (279) | 9.00 (229) | 8.25 (210) | 0.81 (021) | 7.50 (191) |
| 447TCZ | 39.63 (1006) | 22.00 (559) | 11.00 (279) | 9.00 (229) | 10.00 (254) | 0.81 (021) | 7.50 (191) |
| 449TCZ | 39.63 (1006) | 22.00 (559) | 11.00 (279) | 9.00 (229) | 12.50 (318) | 0.81 (021) | 7.50 (191) |

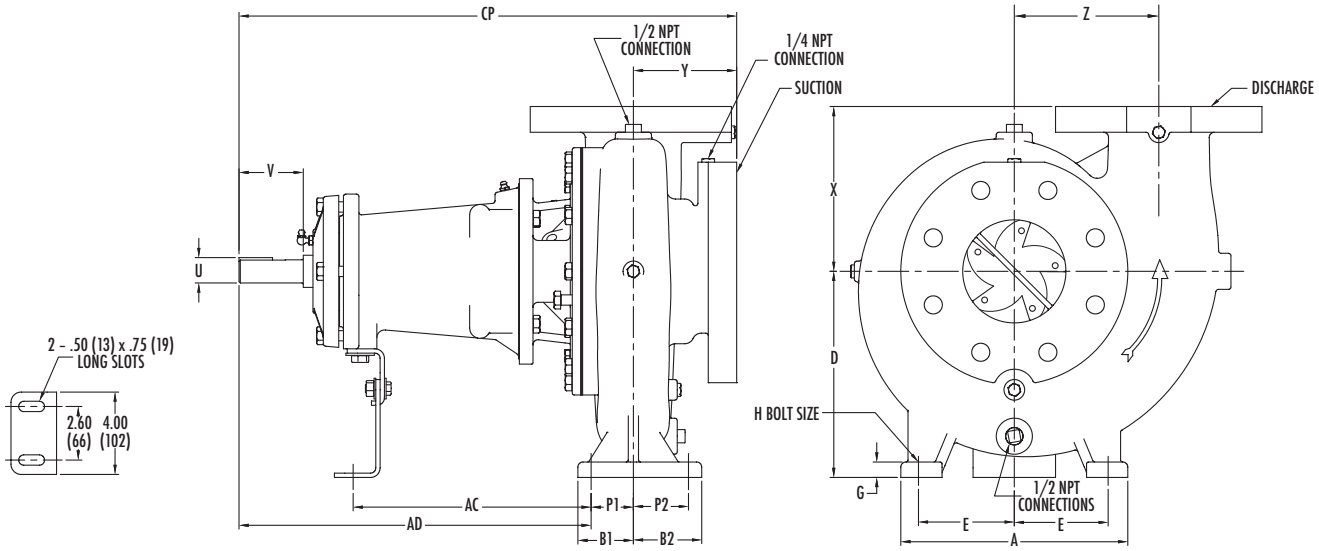
NOTES:
1. All dimensions are in inches (mm) and may vary ± 1/4 (6).
2. Not for construction purposes unless certified.
3. BA dimensions may vary for different manufacturers. Reference only.
4. Conduit box is shown in approximate location. Dimensions are not specified as they may vary with each motor manufacturer.
5. There are two mounting holes on the rear foot for the noted motors.



## PUMP END ONLY




## PUMP END ONLY

| Pump Size | Power Frame Size | Discharge | Suction | D | X | Y | Z | P1 | P2 | B1 | B2 | G | H | E | A | AC | AD | CP | U | V | Key |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.25x1.5x7 (NPT) | S | 1.25 | 1.5 | 7.00 (178) | 5.00 (127) | 3.25 (083) | 4.50 (114) | 1.63 (041) | 1.38 (035) | 2.63 (067) | 2.38 (060) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 8.35 (212) | 12.93 (328) | 17.81 (452) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 1.25x1.5x9.5 (NPT) | S | 1.25 | 1.5 | 7.00 (178) | 8.00 (203) | 3.25 (83) | 5.5 (140) | 2.44 (62) | 1.94 (49) | 3.06 (78) | 2.56 (65) | 0.63 (16) | 0.50 (13) | 4.56 (116) | 10.38 (264) | 7.71 (196) | 12.27 (312) | 17.96 (456) | 0.88 (22) | 2.13 (54) | 0.19 (5) SQ. x 1.38(35) LNG. |
| 1.25x1.5x9.5 (NPT) | L | 1.25 | 1.5 | 7.00 (178) | 8.00 (203) | 3.25 (83) | 5.5 (140) | 2.44 (62) | 1.94 (49) | 3.06 (78) | 2.56 (65) | 0.63 (16) | 0.50 (13) | 4.56 (116) | 10.38 (264) | 10.63 (270) | 16.43 (417) | 22.12 (562) | 1.13 (29) | 3.13 (80) | 0.25 (6) SQ. x 1.75(44) LNG. |
| 1.5x2x7 (NPT) | S | 1.5 | 2 | 7.00 (178) | 6.00 (152) | 3.13 (079) | 4.63 (117) | 1.44 (037) | 1.56 (040) | 2.44 (062) | 2.56 (065) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 9.03 (229) | 13.59 (345) | 18.16 (461) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 1.5x2x9.5 (NPT) | S | 1.5 | 2 | 7.00 (178) | 6.50 (165) | 3.11 (79) | 5.75 (146) | 2.44 (62) | 1.94 (49) | 3.25 (83) | 2.75 (70) | 0.63 (16) | 0.63 (16) | 4.56 (116) | 10.75 (273) | 7.90 (201) | 12.46 (316) | 18.01 (457) | 0.88 (22) | 2.13 (54) | 0.19 (5) SQ. x 1.38 (35) LNG. |
| 1.5x2x9.5 (NPT) | L | 1.5 | 2 | 7.00 (178) | 6.50 (165) | 3.11 (79) | 5.75 (146) | 2.44 (62) | 1.94 (49) | 3.25 (83) | 2.75 (70) | 0.63 (16) | 0.63 (16) | 4.56 (116) | 10.75 (273) | 10.81 (275) | 16.62 (422) | 22.17 (563) | 1.13 (29) | 3.13 (80) | 0.25 (6) SQ. x 1.75 (44) LNG. |
| 1.5x2x11 (NPT) | S | 1.5 | 2 | 8.00 (203) | 9.00• (229) | 3.13 (079) | 5.75 (146) | 1.44 (037) | 2.94 (075) | 2.25 (057) | 3.75 (095) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.92 (227) | 13.48 (342) | 18.05 (458) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 1.5x2x11 (NPT) | L | 1.5 | 2 | 8.00 (203) | 9.00• (229) | 3.13 (079) | 5.75 (146) | 1.44 (037) | 2.94 (075) | 2.25 (057) | 3.75 (095) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 12.19 (310) | 18.62 (473) | 23.19 (589) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 1.5x2x12 (NPT) | S | 1.5 | 2 | 10.00 (254) | 7.75 (197) | 2.75 (070) | 5.75 (146) | 1.94 (049) | 2.94 (075) | 2.87 (073) | 3.75 (095) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.60 (218) | 13.16 (334) | 17.85 (453) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 2x2.5x7A▲ | S | 2 | 2.5 | 7.00 (178) | 6.50 (165) | 3.50 (089) | 4.75 (005) | 1.56 (040) | 1.44 (037) | 2.56 (065) | 2.44 (062) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 9.08 (231) | 13.63 (346) | 18.70 (475) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 2x2.5x9.5▲ | S | 2 | 2.5 | 8.00 (203) | 7.00 (178) | 4.00 (102) | 5.88 (149) | 1.56 (040) | 2.81 (071) | 2.38 (060) | 3.63 (092) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.94 (227) | 13.50 (343) | 19.07 (484) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 2x2.5x9.5▲ | L | 2 | 2.5 | 8.00 (203) | 7.00 (178) | 4.00 (102) | 5.88 (149) | 1.56 (040) | 2.81 (071) | 2.38 (060) | 3.63 (092) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 11.85 (301) | 17.69 (449) | 23.22 (590) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 2x3x11▲ | S | 2 | 3 | 10.00 (254) | 8.00 (203) | 5.50 (140) | 6.50 (165) | 2.23 (057) | 2.77 (070) | 3.23 (082) | 3.77 (096) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 7.93 (201) | 12.52 (318) | 20.22 (514) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |

S - denotes small power frame
L - denotes large power frame
XL - denotes extra large power frame

NOTES:
1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Not for construction purposes unless certified.

▲ Available in 250 lb./125 lb. flanges.
• Dimensions do not match Bell & Gossett®.

4. Use Extra Large power frame with impeller diameters larger than 12.5 (318).

# PENTAIR AURORA® MODEL 3804 PUMPS

## PUMP END ONLY

| Pump Size | Power Frame Size | Discharge | Suction | D | X | Y | Z | P1 | P2 | B1 | B2 | G | H | E | A | AC | AD | CP | U | V | Key |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2x3x11▲ | L | 2 | 3 | 10.00 (254) | 8.00 (203) | 5.50 (140) | 6.50 (165) | 2.23 (057) | 2.77 (070) | 3.23 (082) | 3.77 (096) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 11.06 (281) | 16.87 (428) | 24.59 (625) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 2x3x13.5▲ | L | 2 | 3 | 10.00 (254) | 9.00 (229) | 5.50 (140) | 7.25 (184) | 2.00 (051) | 3.00 (076) | 3.00 (076) | 4.00 (102) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 11.34 (288) | 17.25 (438) | 24.65 (626) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 2.5x3x7▲ | S | 2.5 | 3 | 7.00 (178) | 6.00 (152) | 4.25 (108) | 4.69 (119) | 1.63 (041) | 1.38 (035) | 2.63 (067) | 2.38 (060) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 8.94 (227) | 13.50 (343) | 19.38 (492) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 2.5x3x7▲ | L | 2.5 | 3 | 7.00 (178) | 6.00 (152) | 4.25 (108) | 4.69 (119) | 1.63 (041) | 1.38 (035) | 2.63 (067) | 2.38 (060) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 11.81 (300) | 17.69 (449) | 23.49 (597) | 1.13 (029) | 3.13 (080) | .25(6) SQ. x 1.75(44) LNG |
| 2.5x3x9.5▲ | S | 2.5 | 3 | 8.00 (203) | 6.75 (171) | 4.00 (102) | 6.00 (152) | 1.63 (041) | 2.75 (070) | 2.44 (062) | 3.56 (090) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 9.03 (229) | 13.62 (346) | 19.22 (488) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 2.5x3x9.5▲ | L | 2.5 | 3 | 8.00 (203) | 6.75 (171) | 4.00 (102) | 6.00 (152) | 1.63 (041) | 2.75 (070) | 2.44 (062) | 3.56 (090) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 11.93 (303) | 17.75 (451) | 23.37 (594) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 2.5x3x13.5▲ | L | 2.5 | 3 | 10.00 (254) | 9.00 (229) | 6.00 (152) | 8.00 (203) | 2.00 (051) | 3.00 (076) | 3.00 (076) | 4.00 (102) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 11.47 (291) | 17.28 (439) | 25.28 (642) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 3x4x7A▲ | S | 3 | 4 | 7.00 (178) | 6.00 (152) | 4.13 (105) | 5.00 (127) | 1.69 (043) | 1.31 (033) | 2.69 (068) | 2.31 (059) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 8.73 (222) | 13.24 (336) | 19.11 (485) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 3x4x7A▲ | L | 3 | 4 | 7.00 (178) | 6.00 (152) | 4.13 (105) | 5.00 (127) | 1.69 (043) | 1.31 (033) | 2.69 (068) | 2.31 (059) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 11.60 (295) | 17.43 (443) | 23.22 (590) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 3x4x9.5▲ | S | 3 | 4 | 8.00 (203) | 7.50 (191) | 4.75 (121) | 6.13 (156) | 1.81 (046) | 2.56 (065) | 2.69 (068) | 3.31 (084) | 0.75 (019) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.54 (217) | 13.19 (335) | 19.72 (501) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 3x4x9.5▲ | L | 3 | 4 | 8.00 (203) | 7.50 (191) | 4.75 (121) | 6.13 (156) | 1.81 (046) | 2.56 (065) | 2.69 (068) | 3.31 (084) | 0.75 (019) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 11.50 (292) | 17.32 (440) | 23.87 (606) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 3x4x11▲ | S | 3 | 4 | 10.00 (254) | 9.50 (241) | 5.50 (140) | 7.38 (187) | 2.44 (062) | 2.56 (065) | 3.44 (087) | 3.56 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 7.71 (196) | 12.31 (313) | 20.22 (514) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 3x4x11▲ | L | 3 | 4 | 10.00 (254) | 9.50 (241) | 5.50 (140) | 7.38 (187) | 2.44 (062) | 2.56 (065) | 3.44 (087) | 3.56 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 10.84 (275) | 16.69 (424) | 24.59 (625) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 3x4x13.5▲ | L | 3 | 4 | 10.00 (254) | 9.50 (241) | 5.63 (143) | 8.00 (203) | 2.13 (054) | 2.88 (073) | 3.13 (080) | 3.88 (098) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 11.28 (287) | 17.12 (435) | 24.84 (631) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 4x5x7A*▲ | S | 4 | 5 | 8.00 (203) | 7.50 (191) | 4.94 (125) | 5.75 (146) | 2.25 (057) | 2.13 (054) | 3.06 (078) | 2.94 (075) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.40 (213) | 12.94 (329) | 20.16 (512) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 4x5x7A*▲ | L | 4 | 5 | 8.00 (203) | 7.50 (191) | 4.94 (125) | 5.75 (146) | 2.25 (057) | 2.13 (054) | 3.06 (078) | 2.94 (075) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 11.28 (287) | 17.06 (433) | 24.28 (617) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 4x5x9.5▲ | S | 4 | 5 | 10.00 (254) | 8.00 (203) | 5.00 (127) | 7.00 (178) | 1.88 (048) | 2.50 (064) | 2.69 (068) | 3.31 (084) | 0.75 (019) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.52 (216) | 13.12 (333) | 19.97 (507) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 4x5x9.5▲ | L | 4 | 5 | 10.00 (254) | 8.00 (203) | 5.00 (127) | 7.00 (178) | 1.88 (048) | 2.50 (064) | 2.69 (068) | 3.31 (084) | 0.75 (019) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 11.43 (290) | 17.25 (438) | 24.12 (613) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 4x5x11A▲ | S | 4 | 5 | 10.00 (254) | 9.75 (248) | 5.56 (141) | 7.25 (184) | 2.41 (061) | 2.94 (075) | 3.59 (091) | 3.59 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 7.81 (198) | 12.41 (315) | 20.35 (517) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 4x5x11A▲ | L | 4 | 5 | 10.00 (254) | 9.75 (248) | 5.56 (141) | 7.25 (184) | 2.41 (061) | 2.94 (075) | 3.59 (091) | 3.59 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 10.94 (278) | 16.78 (426) | 24.72 (628) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 4x5x11A▲ | XL | 4 | 5 | 10.00 (254) | 9.75 (248) | 5.56 (141) | 7.25 (184) | 2.41 (061) | 2.59 (066) | 3.41 (087) | 3.59 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 15.38 (391) | 24.52 (623) | 32.49 (825) | 2.38 (060) | 5.50 (140) | .63(16) SQ x 4.00(102) LNG |
| 4x5x13.5▲ | L | 4 | 5 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 8.56 (218) | 2.25 (057) | 2.75 (070) | 3.25 (083) | 3.75 (095) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 10.78 (274) | 16.63 (422) | 24.84 (631) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 4x5x13.5▲ | XL | 4 | 5 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 8.56 (218) | 2.25 (057) | 2.75 (070) | 3.25 (083) | 3.75 (095) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 15.25 (387) | 24.38 (619) | 32.63 (829) | 2.38 (060) | 5.50 (140) | .63(16) SQ x 4.00(102) LNG |
| 5x6x7A▲ | S | 5 | 6 | 10.00 (254) | 8.50 (216) | 5.81 (148) | 6.25 (159) | 2.81 (071) | 1.56 (040) | 3.63 (092) | 2.38 (060) | 0.69 (018) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.09 (205) | 12.63 (321) | 21.28 (541) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 5x6x7A▲ | L | 5 | 6 | 10.00 (254) | 8.50 (216) | 5.81 (148) | 6.25 (159) | 2.81 (071) | 1.56 (040) | 3.63 (092) | 2.38 (060) | 0.69 (018) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 10.97 (279) | 16.76 (426) | 25.39 (645) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 5x6x9.5A▲ | S | 5 | 6 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 7.50 (191) | 2.19 (056) | 2.81 (071) | 3.19 (081) | 3.81 (097) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 8.59 (218) | 13.19 (335) | 21.34 (542) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 5x6x9.5A▲ | L | 5 | 6 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 7.50 (191) | 2.19 (056) | 2.81 (071) | 3.19 (081) | 3.81 (097) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 11.50 (292) | 17.31 (440) | 25.50 (648) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 5x6x11▲ | L | 5 | 6 | 11.00 (279) | 10.50 (267) | 5.44 (138) | 7.94 (202) | 2.59 (066) | 2.41 (061) | 3.44 (087) | 3.56 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 10.82 (275) | 16.72 (425) | 24.65 (626) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 5x6x13.5▲ | L | 5 | 6 | 12.00 (305) | 13.00 (330) | 6.00 (152) | 9.00 (229) | 4.19 (106) | 4.81 (122) | 5.19 (132) | 5.81 (148) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | 9.34 (237) | 15.19 (386) | 25.34 (644) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 6x8x9.5A*▲ | L | 6 | 8 | 11.00 (279) | 10.50 (267) | 7.00 (178) | 8.25 (210) | 3.13 (079) | 1.88 (048) | 4.13 (105) | 2.88 (073) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 11.06 (281) | 16.93 (430) | 27.00 (686) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 6x8x11A▲ | L | 6 | 8 | 12.00 (305) | 11.00 (279) | 6.13 (156) | 8.47 (215) | 4.63 (117) | 4.38 (111) | 5.63 (143) | 5.38 (137) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | 9.15 (232) | 15.05 (382) | 25.72 (653) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(44) LNG |
| 6x8x13.5▲ | XL | 6 | 8 | 12.63• (321) | 13.38• (340) | 6.50 (165) | 9.31 (237) | 4.50 (114) | 4.50 (114) | 5.50 (140) | 5.50 (140) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | 13.44 (341) | 22.56 (573) | 33.57 (853) | 2.38 (060) | 5.50 (140) | .63(16) SQ x 4.00(102) LNG |
| 8x10x13.5*▲ | XL | 8 | 10 | 15.00 (381) | 14.00 (356) | 8.00 (203) | 11.00 (279) | 4.50 (114) | 4.50 (114) | 5.50 (140) | 5.50 (140) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | 13.33 (339) | 22.38 (568) | 34.96 (888) | 2.38 (060) | 5.50 (140) | .63(16) SQ x 4.00(102) LNG |

*Temporarily unavailable until further notice.

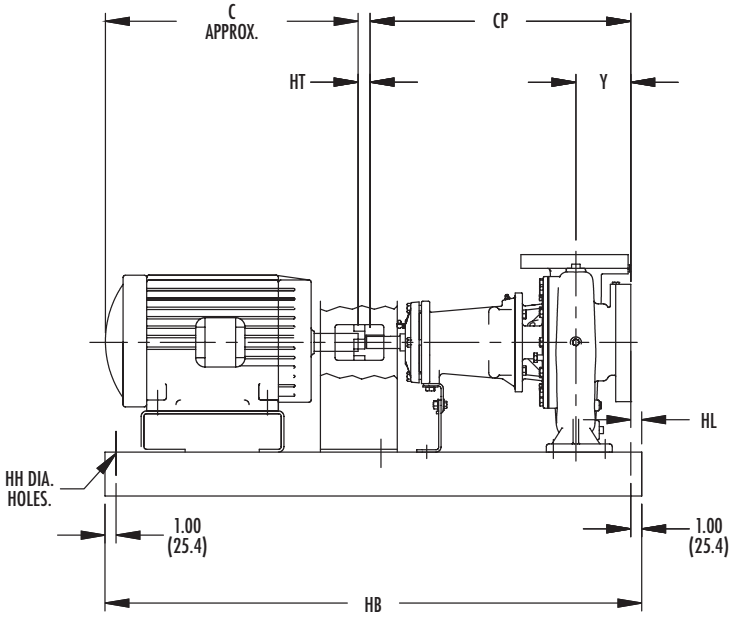
S - denotes small power frame
L - denotes large power frame
XL - denotes extra large power frame

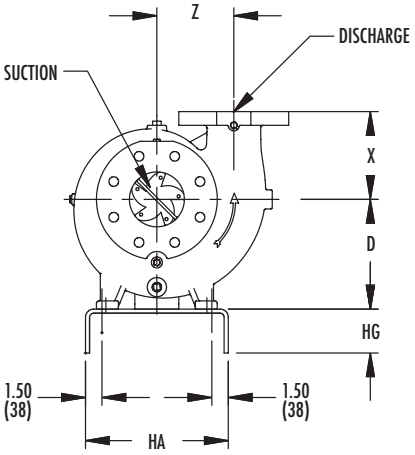
NOTES:
1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Not for construction purposes unless certified.

▲ Available in 250 lb./125 lb. flanges.
• Dimensions do not match Bell & Gossett®.

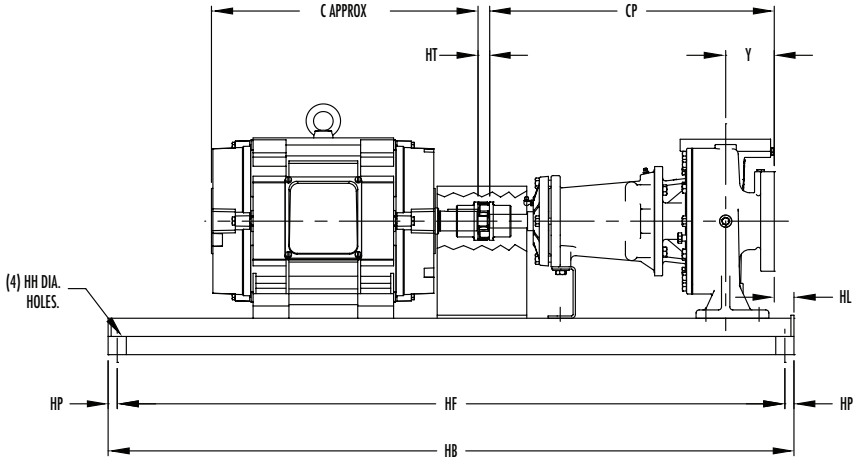
4. Use Extra Large power frame with impeller diameters larger than 12.5 (318).

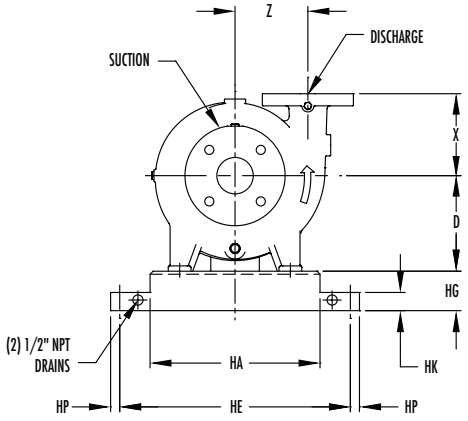
**WITH FORMED STEEL BASE, COUPLING AND MOTOR**




**WITH DRIP RIM BASE, COUPLING AND MOTOR**



## WITH OPTIONAL BASE, COUPLING AND MOTOR

| Pump Size | Discharge | Suction | D | X | Y | Z | CP | Motor Frame | C Approx. | HL | P.F. 1 | P.F. 2 | P.F. 3 | P.F. 21A | Steel Base No. | Drip Rim Base No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.25x1.5x7 (NPT) | 1.25 | 1.5 | 7.00 (178) | 5.00 (127) | 3.25 (83) | 4.50 (114) | 17.81 (452) | 56 | 12.00 (305) | 1.00 (25) | X | | | | 1 | 4 |
| | | | | | | | | 143T | 13.00 (330) | 1.00 (25) | X | | | | 2 | 5 |
| | | | | | | | | 145T | 14.00 (356) | 1.00 (25) | XXX | | | | 2 | 5 |
| | | | | | | | | 182T | 15.00 (381) | 1.00 (25) | XX | | | | 2 | 5 |
| | | | | | | | | 184T | 15.00 (381) | 1.00 (25) | XX | | | | 2 | 5 |
| | | | | | | | | 213T | 18.00 (457) | 1.00 (25) | XX | | | | 3 | 6 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | XX | | | | 3 | 6 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | XX | | | | 4 | 8 |
| 1.25x1.5x9.5 (NPT) | 1.25 (32) | 1.5 (38) | 7.00 (178) | 8.00 (203) | 3.25 (83) | 5.50 (140) | 17.96 (456) | 143T | 13.00 (330) | 1.00 (25) | X | | | | 2 | 5 |
| | | | | | | | | 145T | 14.00 (356) | 1.00 (25) | X | | | | 2 | 5 |
| | | | | | | | | 182T | 15.00 (381) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | | 184T | 15.00 (381) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | 22.12 (562) | 213T | 18.00 (457) | 1.00 (25) | | 00 | | | 5 | 9 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | | 00 | | | 5 | 9 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | | XX | | | 6 | 9 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | | XX | | | 6 | 9 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | XX | | | 7 | 10 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | XX | | | 7 | 10 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | XX | | | 7 | 10 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | XX | | | 7 | 10 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | XX | | | 12 | 12 |
| 1.5x2x7 (NPT) | 1.5 | 2 | 7.00 (178) | 6.00 (152) | 3.13 (80) | 4.63 (118) | 18.16 (461) | 56 | 12.00 (305) | 1.00 (25) | X | | | | 1 | 4 |
| | | | | | | | | 143T | 13.00 (330) | 1.00 (25) | XXX | | | | 2 | 5 |
| | | | | | | | | 145T | 14.00 (356) | 1.00 (25) | XXX | | | | 2 | 5 |
| | | | | | | | | 182T | 15.00 (381) | 1.00 (25) | XX | | | | 2 | 5 |
| | | | | | | | | 184T | 15.00 (381) | 1.00 (25) | XX | | | | 2 | 5 |
| | | | | | | | | 213T | 18.00 (457) | 1.00 (25) | XX | | | | 3 | 6 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | XX | | | | 3 | 6 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | XX | | | | 4 | 8 |
| 1.5x2x9.5 (NPT) | 1.5 (38) | 2 (51) | 7.00 (178) | 6.50 (165) | 3.11 (79) | 5.75 (146) | 18.01 (457) | 145T | 14.00 (356) | 1.00 (25) | X | | | | 2 | 5 |
| | | | | | | | | 182T | 15.00 (381) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | | 184T | 15.00 (381) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | | 213T | 18.00 (457) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | 22.17 (563) | 215T | 19.00 (483) | 1.00 (25) | | 00 | | | 5 | 9 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | | 00 | | | 6 | 9 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | | XX | | | 6 | 9 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | XX | | | 7 | 10 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | XX | | | 7 | 10 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | XX | | | 7 | 10 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | XX | | | 7 | 10 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | XX | | | 12 | 12 |
| 1.5x2x11 (NPT) | 1.5 | 2 | 8.00 (203) | 9.00 (229) | 3.13 (80) | 5.75 (146) | 18.05 (458) | 143T | 13.00 (330) | 2.50 (64) | X | | | | 2 | 5 |
| | | | | | | | | 145T | 14.00 (356) | 2.50 (64) | X | | | | 2 | 5 |
| | | | | | | | | 182T | 15.00 (381) | 2.50 (64) | X | | | | 3 | 6 |
| | | | | | | | | 184T | 15.00 (381) | 2.50 (64) | X | | | | 3 | 6 |
| | | | | | | | | 213T | 18.00 (457) | 2.50 (64) | X | | | | 3 | 6 |
| | | | | | | | 23.19 (589) | 213T | 18.00 (457) | 2.50 (64) | | XX | | | 5 | 9 |
| | | | | | | | | 215T | 19.00 (483) | 2.50 (64) | | XX | | | 5 | 9 |
| | | | | | | | | 254T | 24.00 (610) | 2.50 (64) | | XX | | | 6 | 9 |
| | | | | | | | | 256T | 25.00 (635) | 2.50 (64) | | XX | | | 6 | 9 |
| | | | | | | | | 284T | 27.00 (686) | 2.50 (64) | | XX | | | 7 | 10 |
| | | | | | | | | 284TS | 25.00 (635) | 2.50 (64) | | XX | | | 7 | 10 |
| | | | | | | | | 286T | 28.00 (711) | 2.50 (64) | | XX | | | 7 | 10 |
| | | | | | | | | 286TS | 26.00 (660) | 2.50 (64) | | XX | | | 7 | 10 |
| | | | | | | | | 324T | 29.00 (737) | 2.50 (64) | | XX | | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 2.50 (64) | | XX | | | 12 | 12 |
| | | | | | | | | 326T | 31.00 (787) | 2.50 (64) | | XX | | | 12 | 12 |
| | | | | | | | | 326TS | 29.00 (737) | 2.50 (64) | | XX | | | 12 | 12 |
| 1.5x2x12 (NPT) | 1.5 | 2 | 10.00 (254) | 7.75 (197) | 2.75 (70) | 5.75 (146) | 17.85 (453) | 182T | 15.00 (381) | 3.00 (76) | X | | | | 3 | 6 |
| | | | | | | | | 184T | 15.00 (381) | 3.00 (76) | X | | | | 3 | 6 |
| | | | | | | | | 213T | 18.00 (457) | 3.00 (76) | X | | | | 4 | 8 |
| | | | | | | | | 215T | 19.00 (483) | 3.00 (76) | X | | | | 4 | 8 |
| | | | | | | | | 254T | 24.00 (610) | 3.00 (76) | X | | | | 5 | 9 |

NOTES:
1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Conduit box is shown in approximate position. Dimensions are not specified as they vary with each motor manufacturer.
4. Not for construction purposes unless certified.
5. ▲ Available in 250 lb./125 lb. flanges.
6. X – for 1750 RPM applications
   XX – for 3550 RPM applications
   XXX – for 1750 and 3550 RPM applications
7. HT is based on Aurora standard coupling. HT may vary from .25 to 3.25".
8. 00 – 2950 RPM operation only.

## WITH OPTIONAL BASE, COUPLING AND MOTOR

| Pump Size | Discharge | Suction | D | X | Y | Z | CP | Motor Frame | C Approx. | HL | P.F. 1 | P.F. 2 | P.F. 3 | P.F. 21A | Steel Base No. | Drip Rim Base No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2x2.5x7A▲ | 2 | 2.5 | 7.00 (178) | 6.50 (165) | 3.50 (89) | 4.75 (121) | 18.70 (475) | 143T | 13.00 (330) | 1.00 (25) | X | | | | 2 | 5 |
| | | | | | | | | 145T | 14.00 (356) | 1.00 (25) | X | | | | 2 | 5 |
| | | | | | | | | 182T | 15.00 (381) | 1.00 (25) | XXX | | | | 3 | 6 |
| | | | | | | | | 184T | 15.00 (381) | 1.00 (25) | XX | | | | 3 | 6 |
| | | | | | | | | 213T | 18.00 (457) | 1.00 (25) | XX | | | | 3 | 6 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | XX | | | | 3 | 6 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | XX | | | | 5 | 9 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | XX | | | | 5 | 9 |
| 2x2.5x9.5▲ | 2 | 2.5 | 8.00 (203) | 7.00 (178) | 4.00 (102) | 5.88 (149) | 19.07 (484) | 145T | 14.00 (356) | 1.50 (38) | X | | | | 2 | 5 |
| | | | | | | | | 182T | 15.00 (381) | 1.50 (38) | X | | | | 3 | 6 |
| | | | | | | | | 184T | 15.00 (381) | 1.50 (38) | X | | | | 3 | 6 |
| | | | | | | | | 213T | 18.00 (457) | 1.50 (38) | X | | | | 3 | 6 |
| | | | | | | | 23.22 (590) | 215T | 19.00 (483) | 1.50 (38) | | XX | | | 5 | 9 |
| | | | | | | | | 254T | 24.00 (610) | 1.50 (38) | | XX | | | 6 | 9 |
| | | | | | | | | 256T | 25.00 (635) | 1.50 (38) | | XX | | | 6 | 9 |
| | | | | | | | | 284T | 27.00 (686) | 1.50 (38) | | XX | | | 7 | 10 |
| | | | | | | | | 284TS | 25.00 (635) | 1.50 (38) | | XX | | | 7 | 10 |
| | | | | | | | | 286T | 28.00 (711) | 1.50 (38) | | XX | | | 7 | 10 |
| | | | | | | | | 286TS | 26.00 (660) | 1.50 (38) | | XX | | | 7 | 10 |
| | | | | | | | | 324T | 29.00 (737) | 1.50 (38) | | XX | | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.50 (38) | | XX | | | 12 | 12 |
| | | | | | | | | 326T | 31.00 (787) | 1.50 (38) | | XX | | | 12 | 12 |
| | | | | | | | | 326TS | 29.00 (737) | 1.50 (38) | | XX | | | 12 | 12 |
| | | | 9.00 (229) | | | | | 364TS | 31.00 (787) | 1.50 (38) | | XX | | | 14 | 16 |
| 2x3x11▲ | 2 | 3 | 10.00 (254) | 8.00 (203) | 5.50 (140) | 6.50 (165) | 20.22 (514) | 182T | 15.00 (381) | 1.00 (25) | X | | | | 8 | 11 |
| | | | | | | | | 184T | 15.00 (381) | 1.00 (25) | X | | | | 8 | 11 |
| | | | | | | | | 213T | 18.00 (457) | 1.00 (25) | X | | | | 9 | 11 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | X | | | | 9 | 11 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | X | | | | 10 | 11 |
| | | | | | | | 24.59 (625) | 284T | 27.00 (686) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 364TS | 31.00 (787) | 1.00 (25) | | | XX | | 14 | 16 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | | XX | | 14 | 16 |
| | | | | | | | | 404TS | 34.00 (864) | 1.00 (25) | | | XX | | 15 | 16 |
| | | | | | | | | 405TS | 36.00 (914) | 1.00 (25) | | | XX | | 15 | 16 |
| | | | 11.00 (279) | | | | | 444TS | 41.00 (1041) | 1.00 (25) | | | XX | | 18 | 21 |
| 2x3x13.5▲ | 2 | 3 | 10.00 (254) | 9.00 (229) | 5.50 (140) | 7.25 (184) | 24.65 (626) | 184T | 15.00 (381) | 1.00 (25) | | | X | | 10 | 11 |
| | | | | | | | | 213T | 18.00 (457) | 1.00 (25) | | | X | | 10 | 11 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | | | X | | 10 | 11 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | | | X | | 11 | 12 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | | | X | | 11 | 12 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | | X | | 11 | 12 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | | X | | 11 | 12 |
| 2.5x3x7▲ | 2.5 | 3 | 7.00 (178) | 6.00 (152) | 4.25 (108) | 4.69 (119) | 19.38 (492) | 143T | 13.00 (330) | 1.00 (25) | X | | | | 2 | 5 |
| | | | | | | | | 145T | 14.00 (356) | 1.00 (25) | X | | | | 2 | 5 |
| | | | | | | | | 182T | 15.00 (381) | 1.00 (25) | XXX | | | | 3 | 6 |
| | | | | | | | | 184T | 15.00 (381) | 1.00 (25) | XXX | | | | 3 | 6 |
| | | | | | | | | 213T | 18.00 (457) | 1.00 (25) | XX | | | | 3 | 6 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | XX | | | | 3 | 6 |
| | | | | | | | 23.49 (597) | 254T | 24.00 (610) | 1.00 (25) | | XX | | | 6 | 9 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | | XX | | | 6 | 9 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | XX | | | 11 | 12 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | XX | | | 11 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | XX | | | 11 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | XX | | | 11 | 12 |

NOTES:
1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Conduit box is shown in approximate position. Dimensions are not specified as they vary with each motor manufacturer.
4. Not for construction purposes unless certified.
5. ▲ Available in 250 lb./125 lb. flanges.
6. X – for 1750 RPM applications
   XX – for 3550 RPM applications
   XXX – for 1750 and 3550 RPM applications
7. HT is based on Aurora standard coupling. HT may vary from .25 to 3.25".
8. 00 – 2950 RPM operation only.

## WITH OPTIONAL BASE, COUPLING AND MOTOR

| Pump Size | Discharge | Suction | D | X | Y | Z | CP | Motor Frame | C Approx. | HL | P.F. 1 | P.F. 2 | P.F. 3 | P.F. 21A | Steel Base No. | Drip Rim Base No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.5x3x9.5▲ | 2.5 | 3 | 8.00 (203) | 6.75 (171) | 4.00 (102) | 6.00 (152) | 19.22 (488) | 182T | 15.00 (381) | 1.50 (38) | X | | | | 3 | 6 |
| | | | | | | | | 184T | 15.00 (381) | 1.50 (38) | X | | | | 3 | 6 |
| | | | | | | | | 213T | 18.00 (457) | 1.50 (38) | X | | | | 3 | 6 |
| | | | | | | | | 215T | 19.00 (483) | 1.50 (38) | X | | | | 4 | 8 |
| | | | | | | | | 254T | 24.00 (610) | 1.50 (38) | X | | | | 5 | 9 |
| | | | | | | | 23.37 (594) | 254T | 24.00 (610) | 1.50 (38) | | | XX | | 6 | 9 |
| | | | | | | | | 256T | 25.00 (635) | 1.50 (38) | | | XX | | 6 | 9 |
| | | | | | | | | 284T | 27.00 (686) | 1.50 (38) | | | XX | | 7 | 10 |
| | | | | | | | | 284TS | 25.00 (635) | 1.50 (38) | | | XX | | 7 | 10 |
| | | | | | | | | 286T | 28.00 (711) | 1.50 (38) | | | XX | | 7 | 10 |
| | | | | | | | | 286TS | 26.00 (660) | 1.50 (38) | | | XX | | 7 | 10 |
| | | | | | | | | 324T | 29.00 (737) | 1.50 (38) | | | XX | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.50 (38) | | | XX | | 12 | 12 |
| | | | | | | | | 326T | 31.00 (787) | 1.50 (38) | | | XX | | 12 | 12 |
| | | | | | | | | 326TS | 29.00 (737) | 1.50 (38) | | | XX | | 12 | 12 |
| | | | 9.00 (229) | | | | | 364TS | 31.00 (787) | 1.50 (38) | | | XX | | 14 | 16 |
| | | | | | | | | 365TS | 32.00 (813) | 1.50 (38) | | | XX | | 14 | 16 |
| | | | 10.00 (254) | | | | | 404TS | 34.00 (864) | 1.50 (38) | | | XX | | 14 | 16 |
| | | | | | | | | 405TS | 36.00 (914) | 1.50 (38) | | | XX | | 14 | 16 |
| 2.5x3x13.5▲ | 2.5 | 3 | 10.00 (254) | 9.00 (229) | 6.00 (152) | 8.00 (203) | 25.28 (642) | 184T | 15.00 (381) | 1.00 (25) | | | X | | 10 | 11 |
| | | | | | | | | 213T | 18.00 (457) | 1.00 (25) | | | X | | 10 | 11 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | | | X | | 10 | 11 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | | | X | | 11 | 12 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | | | X | | 11 | 12 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | | X | | 11 | 12 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | | X | | 11 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | | X | | 12 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | | X | | 12 | 12 |
| 3x4x7A▲ | 3 | 4 | 7.00 (178) | 6.00 (152) | 4.13 (105) | 5.00 (127) | 19.11 (485) | 143T | 13.00 (330) | 1.00 (25) | X | | | | 2 | 5 |
| | | | | | | | | 145T | 14.00 (356) | 1.00 (25) | X | | | | 2 | 5 |
| | | | | | | | | 182T | 15.00 (381) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | | 184T | 15.00 (381) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | | 213T | 18.00 (457) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | 23.22 (590) | 213T | 18.00 (457) | 1.00 (25) | | XX | | | 5 | 9 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | | XX | | | 5 | 9 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | | XX | | | 6 | 9 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | | XX | | | 6 | 9 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | XX | | | 11 | 12 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | XX | | | 11 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | XX | | | 11 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | XX | | | 11 | 12 |
| | | | 8.00 (203) | | | | | 324T | 29.00 (737) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | XX | | | 12 | 12 |
| 3x4x9.5▲ | 3 | 4 | 8.00 (203) | 7.50 (191) | 4.75 (121) | 6.13 (156) | 19.72 (501) | 182T | 15.00 (381) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | | 184T | 15.00 (381) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | | 213T | 18.00 (457) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | X | | | | 4 | 8 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | X | | | | 5 | 9 |
| | | | | | | | 23.87 (606) | 286TS | 26.00 (660) | 1.00 (25) | | | XX | | 7 | 10 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | 9.00 (229) | | | | | 364TS | 31.00 (787) | 1.00 (25) | | | XX | | 14 | 16 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | | XX | | 14 | 16 |
| | | | 10.00 (254) | | | | | 404TS | 34.00 (864) | 1.00 (25) | | | XX | | 14 | 16 |
| | | | | | | | | 405TS | 36.00 (914) | 1.00 (25) | | | XX | | 14 | 16 |
| | | | 11.00 (279) | | | | | 444TS | 41.00 (1041) | 1.00 (25) | | | XX | | 15 | 16 |
| | | | | | | | | 445T | 46.00 (1168) | 1.00 (25) | | | XX | | 20 | 17 |
| | | | | | | | | 445TS | 42.00 (1067) | 1.00 (25) | | | XX | | 15 | 16 |

NOTES:
1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Conduit box is shown in approximate position. Dimensions are not specified as they vary with each motor manufacturer.
4. Not for construction purposes unless certified.
5. ▲ Available in 250 lb./125 lb. flanges.
6. X – for 1750 RPM applications
   XX – for 3550 RPM applications
   XXX – for 1750 and 3550 RPM applications
7. HT is based on Aurora standard coupling. HT may vary from .25 to 3.25".
8. 00 – 2950 RPM operation only.

### WITH OPTIONAL BASE, COUPLING AND MOTOR

| Pump Size | Discharge | Suction | D | X | Y | Z | CP | Motor Frame | C Approx. | HL | P.F. 1 | P.F. 2 | P.F. 3 | P.F. 21A | Steel Base No. | Drip Rim Base No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3x4x11▲ | 3 | 4 | 10.00 (254) | 9.50 (241) | 5.50 (140) | 7.38 (187) | 20.22 (514) | 184T | 15.00 (381) | 1.00 (25) | X | | | | 8 | 11 |
| | | | | | | | | 213T | 18.00 (457) | 1.00 (25) | X | | | | 9 | 11 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | X | | | | 9 | 11 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | X | | | | 10 | 11 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | X | | | | 10 | 11 |
| | | | | | | | 24.59 (625) | 284TS | 25.00 (635) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 364TS | 31.00 (787) | 1.00 (25) | | | XX | | 14 | 16 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | | XX | | 14 | 16 |
| | | | | | | | | 404TS | 34.00 (864) | 1.00 (25) | | | XX | | 15 | 16 |
| | | | | | | | | 405TS | 36.00 (914) | 1.00 (25) | | | XX | | 15 | 16 |
| | | | 11.00 (279) | | | | | 444TS | 41.00 (1041) | 1.00 (25) | | | XX | | 18 | 21 |
| | | | | | | | | 445T | 46.00 (1168) | 1.00 (25) | | | XX | | 18 | 21 |
| | | | | | | | | 445TS | 42.00 (1067) | 1.00 (25) | | | XX | | 18 | 21 |
| 3x4x13.5 ▲ | 3 | 4 | 10.00 (254) | 9.50 (241) | 5.63 (143) | 8.00 (203) | 24.84 (631) | 213T | 18.00 (457) | 1.00 (25) | | X | | | 10 | 11 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | | X | | | 10 | 11 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | | X | | | 11 | 12 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | | X | | | 11 | 12 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 364TS | 31.00 (787) | 1.00 (25) | | | 00 | | 14 | 16 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | | 00 | | 14 | 16 |
| | | | | | | | | 404TS | 34.00 (864) | 1.00 (25) | | | 00 | | 15 | 16 |
| | | | | | | | | 405TS | 36.00 (914) | 1.00 (25) | | | 00 | | 15 | 16 |
| | | | 11.00 (279) | | | | | 444TS | 41.00 (1041) | 1.00 (25) | | | 00 | | 18 | 21 |
| | | | | | | | | 445T | 46.00 (1168) | 1.00 (25) | | | 00 | | 18 | 21 |
| | | | | | | | | 445TS | 42.00 (1067) | 1.00 (25) | | | 00 | | 18 | 21 |
| | | | | | | | | 447T | 52.00 (1321) | 1.00 (25) | | | 00 | | 19 | 21 |
| | | | | | | | | 447TS | 49.00 (1245) | 1.00 (25) | | | 00 | | 19 | 21 |
| 4x5x7A*▲ | 4 | 5 | 8.00 (203) | 7.50 (191) | 4.94 (125) | 5.75 (146) | 20.16 (512) | 145T | 14.00 (356) | 1.00 (25) | X | | | | 2 | 5 |
| | | | | | | | | 182T | 15.00 (381) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | | 184T | 15.00 (381) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | | 213T | 18.00 (457) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | X | | | | 4 | 8 |
| | | | | | | | 24.28 (617) | 215T | 19.00 (483) | 1.00 (25) | | XX | | | 5 | 9 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | | XX | | | 6 | 9 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | | XX | | | 6 | 9 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | XX | | | 7 | 10 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | XX | | | 7 | 10 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | XX | | | 7 | 10 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | XX | | | 7 | 10 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | 9.00 (229) | | | | | 364TS | 31.00 (787) | 1.00 (25) | | XX | | | 14 | 16 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | XX | | | 14 | 16 |

*Temporarily unavailable until further notice.

NOTES:
1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Conduit box is shown in approximate position. Dimensions are not specified as they vary with each motor manufacturer.
4. Not for construction purposes unless certified.
5. ▲ Available in 250 lb./125 lb. flanges.
6. X – for 1750 RPM applications
   XX – for 3550 RPM applications
   XXX – for 1750 and 3550 RPM applications
7. HT is based on Aurora standard coupling.
   HT may vary from .25 to 3.25".
8. 00 – 2950 RPM operation only.

### WITH OPTIONAL BASE, COUPLING AND MOTOR

| Pump Size | Discharge | Suction | D | X | Y | Z | CP | Motor Frame | C Approx. | HL | P.F. 1 | P.F. 2 | P.F. 3 | P.F. 21A | Steel Base No. | Drip Rim Base No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4x5x9.5▲ | 4 | 5 | 10.00 (254) | 8.00 (203) | 5.00 (127) | 7.00 (178) | 19.97 (507) | 213T | 18.00 (457) | 1.00 (25) | X | | | | 4 | 8 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | X | | | | 4 | 8 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | X | | | | 5 | 9 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | X | | | | 5 | 9 |
| | | | | | | | 24.12 (613) | 284TS | 25.00 (635) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | XX | | | 12 | 12 |
| | | | | | | | | 364TS | 31.00 (787) | 1.00 (25) | | XX | | | 14 | 16 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | XX | | | 14 | 16 |
| | | | | | | | | 404TS | 34.00 (864) | 1.00 (25) | | XX | | | 15 | 16 |
| | | | | | | | | 405TS | 36.00 (914) | 1.00 (25) | | XX | | | 15 | 16 |
| | | | 11.00 (279) | | | | | 444TS | 41.00 (1041) | 1.00 (25) | | XX | | | 18 | 21 |
| | | | | | | | | 445T | 46.00 (1168) | 1.00 (25) | | XX | | | 18 | 21 |
| | | | | | | | | 445TS | 42.00 (1067) | 1.00 (25) | | XX | | | 18 | 21 |
| | | | | | | | | 447T | 52.00 (1321) | 1.00 (25) | | XX | | | 19 | 21 |
| | | | | | | | | 447TS | 49.00 (1245) | 1.00 (25) | | XX | | | 19 | 21 |
| 4x5x11A▲ | 4 | 5 | 10.00 (254) | 9.75 (248) | 5.56 (141) | 7.25 (184) | 20.35 (517) | 213T | 18.00 (457) | 1.00 (25) | X | | | | 9 | 11 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | X | | | | 9 | 11 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | X | | | | 10 | 11 |
| | | | | | | | 24.72 (628) | 256T | 25.00 (635) | 1.00 (25) | | X | | | 11 | 12 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | X | 00 | | 12 | 12 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | X | 00 | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | X | 00 | | 12 | 12 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | | 00 | | 12 | 12 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | | 00 | | 12 | 12 |
| | | | | | | | | 364TS | 31.00 (787) | 1.00 (25) | | | 00 | | 14 | 16 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | | 00 | | 14 | 16 |
| | | | | | | | | 404TS | 34.00 (864) | 1.00 (25) | | | 00 | | 15 | 16 |
| | | | | | | | | 405TS | 36.00 (914) | 1.00 (25) | | | 00 | | 15 | 16 |
| | | | 11.00 (279) | | | | | 444TS | 41.00 (1041) | 1.00 (25) | | | 00 | | 18 | 21 |
| | | | | | | | | 445T | 46.00 (1168) | 1.00 (25) | | | 00 | | 18 | 21 |
| | | | | | | | | 445TS | 42.00 (1067) | 1.00 (25) | | | 00 | | 18 | 21 |
| | | | | | | | | 447T | 52.00 (1321) | 1.00 (25) | | | 00 | | 19 | 21 |
| | | | | | | | | 447TS | 49.00 (1245) | 1.00 (25) | | | 00 | | 19 | 21 |
| | | | 10.00 (254) | | | | 32.49 (825) | 364TS | 31.00 (787) | 1.00 (25) | | | | XX | 15 | 16 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | | | XX | 15 | 16 |
| | | | | | | | | 404TS | 34.00 (864) | 1.00 (25) | | | | XX | 18 | 21 |
| | | | | | | | | 405TS | 36.00 (914) | 1.00 (25) | | | | XX | 18 | 21 |
| | | | 11.00 (279) | | | | | 444TS | 41.00 (1041) | 1.00 (25) | | | | XX | 19 | 21 |
| | | | | | | | | 445T | 46.00 (1168) | 1.00 (25) | | | | XX | 19 | 21 |
| | | | | | | | | 445TS | 42.00 (1067) | 1.00 (25) | | | | XX | 19 | 21 |
| | | | | | | | | 447T | 52.00 (1321) | 1.00 (25) | | | | XX | 23 | 23 |
| | | | | | | | | 447TS | 49.00 (1245) | 1.00 (25) | | | | XX | 23 | 23 |
| | | | | | | | | 449TS | 49.00 (1245) | 1.00 (25) | | | | XX | 23 | 23 |
| 4x5x13.5▲ | 4 | 5 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 8.56 (217) | 24.84 (631) | 254T | 24.00 (610) | 1.00 (25) | | | X | | 11 | 12 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | | | X | | 11 | 12 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | | X | | 12 | 12 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | | X | | 12 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | | X | | 12 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | | X | | 12 | 12 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | | X | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | | X | | 12 | 12 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | | X | | 12 | 12 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | | X | | 12 | 12 |
| | | | | | | | | 364TS | 31.00 (787) | 1.00 (25) | | | X | | 14 | 16 |
| | | | | | | | 32.63 (829) | 365TS | 32.00 (813) | 1.00 (25) | | | | 00 | 15 | 16 |
| | | | | | | | | 404TS | 34.00 (864) | 1.00 (25) | | | | 00 | 18 | 21 |
| | | | | | | | | 405TS | 36.00 (914) | 1.00 (25) | | | | 00 | 18 | 21 |
| | | | | | | | | 444TS | 41.00 (1041) | 1.00 (25) | | | | 00 | 19 | 21 |
| | | | | | | | | 445T | 46.00 (1168) | 1.00 (25) | | | | 00 | 19 | 21 |
| | | | | | | | | 445TS | 42.00 (1067) | 1.00 (25) | | | | 00 | 19 | 21 |
| | | | | | | | | 447T | 52.00 (1321) | 1.00 (25) | | | | 00 | 23 | 23 |
| | | | | | | | | 447TS | 49.00 (1245) | 1.00 (25) | | | | 00 | 23 | 23 |
| | | | | | | | | 449TS | 49.00 (1245) | 1.00 (25) | | | | 00 | 23 | 23 |

### WITH OPTIONAL BASE, COUPLING AND MOTOR

| Pump Size | Discharge | Suction | D | X | Y | Z | CP | Motor Frame | C Approx. | HL | P.F. 1 | P.F. 2 | P.F. 3 | P.F. 21A | Steel Base No. | Drip Rim Base No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5x6x7A▲ | 5 | 6 | 10.00 (254) | 8.50 (216) | 5.81 (148) | 6.25 (159) | 21.28 (541) | 182T | 15.00 (381) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | | 184T | 15.00 (381) | 1.00 (25) | X | | | | 3 | 6 |
| | | | | | | | 25.39 (645) | 213T | 18.00 (457) | 1.00 (25) | | X | | | 10 | 11 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | | X | | | 10 | 11 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | | | XX | | 11 | 12 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | | | XX | | 11 | 12 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | | XX | | 12 | 12 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | | XX | | 13 | 13 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | | XX | | 13 | 13 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | | XX | | 13 | 13 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | | XX | | 13 | 13 |
| | | | | | | | | 364TS | 31.00 (787) | 1.00 (25) | | | XX | | 14 | 16 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | | XX | | 14 | 16 |
| 5x6x9.5A▲ | 5 | 6 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 7.50 (191) | 21.34 (542) | 213T | 18.00 (457) | 1.00 (25) | X | | | | 9 | 11 |
| | | | | | | | | 215T | 19.00 (483) | 1.00 (25) | X | | | | 9 | 11 |
| | | | | | | | | 254T | 24.00 (610) | 1.00 (25) | X | | | | 10 | 11 |
| | | | | | | | 25.50 (648) | 256T | 25.00 (635) | 1.00 (25) | | X | | | 11 | 12 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | | 00 | | 13 | 13 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | | 00 | | 13 | 13 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | | 00 | | 13 | 13 |
| | | | | | | | | 364TS | 31.00 (787) | 1.00 (25) | | | 00 | | 14 | 16 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | | 00 | | 14 | 16 |
| | | | | | | | | 404TS | 34.00 (864) | 1.00 (25) | | | 00 | | 15 | 16 |
| | | | | | | | | 405TS | 36.00 (914) | 1.00 (25) | | | 00 | | 15 | 16 |
| | | | | | | | | 444TS | 41.00 (1041) | 1.00 (25) | | | 00 | | 18 | 21 |
| | | | | | | | | 445T | 46.00 (1168) | 1.00 (25) | | | 00 | | 18 | 21 |
| | | | | | | | | 445TS | 42.00 (1067) | 1.00 (25) | | | 00 | | 18 | 21 |
| 5x6x11▲ | 5 | 6 | 11.00 (279) | 10.50 (267) | 5.44 (138) | 7.94 (202) | 24.65 (626) | 254T | 24.00 (610) | 1.00 (25) | | X | | | 11 | 12 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | | X | | | 11 | 12 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | | 00 | | 14 | 16 |
| | | | | | | | | 404TS | 34.00 (864) | 1.00 (25) | | | 00 | | 15 | 16 |
| | | | | | | | | 405TS | 36.00 (914) | 1.00 (25) | | | 00 | | 15 | 16 |
| | | | | | | | | 444TS | 41.00 (1041) | 1.00 (25) | | | 00 | | 18 | 21 |
| | | | | | | | | 445T | 46.00 (1168) | 1.00 (25) | | | 00 | | 18 | 21 |
| | | | | | | | | 445TS | 42.00 (1067) | 1.00 (25) | | | 00 | | 18 | 21 |
| | | | | | | | | 447T | 52.00 (1321) | 1.00 (25) | | | 00 | | 19 | 21 |
| | | | | | | | | 447TS | 49.00 (1245) | 1.00 (25) | | | 00 | | 19 | 21 |
| | | | | | | | | 449TS | 49.00 (1245) | 1.00 (25) | | | 00 | | 19 | 21 |

NOTES:
1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Conduit box is shown in approximate position. Dimensions are not specified as they vary with each motor manufacturer.
4. Not for construction purposes unless certified.
5. ▲ Available in 250 lb./125 lb. flanges.
6. X – for 1750 RPM applications
   XX – for 3550 RPM applications
   XXX – for 1750 and 3550 RPM applications
7. HT is based on Aurora standard coupling. HT may vary from .25 to 3.25".
8. 00 – 2950 RPM operation only.

# PENTAIR AURORA® MODEL 3804 PUMPS

## WITH OPTIONAL BASE, COUPLING AND MOTOR

| Pump Size | Discharge | Suction | D | X | Y | Z | CP | Motor Frame | C Approx. | HL | P.F. 1 | P.F. 2 | P.F. 3 | P.F. 21A | Steel Base No. | Drip Rim Base No. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5x6x13.5▲ | 5 | 6 | 12.00 (305) | 13.00 (330) | 6.00 (152) | 9.00 (229) | 25.34 (644) | 256T | 25.00 (635) | 2.00 (51) | | | X | | 16 | 22 |
| | | | | | | | | 284T | 27.00 (686) | 2.00 (51) | | | X | | 16 | 22 |
| | | | | | | | | 284TS | 25.00 (635) | 2.00 (51) | | | X | | 16 | 22 |
| | | | | | | | | 286T | 28.00 (711) | 2.00 (51) | | | X | | 16 | 22 |
| | | | | | | | | 286TS | 26.00 (660) | 2.00 (51) | | | X | | 16 | 22 |
| | | | | | | | | 324T | 29.00 (737) | 2.00 (51) | | | X | | 17 | 21 |
| | | | | | | | | 324TS | 28.00 (711) | 2.00 (51) | | | X | | 17 | 21 |
| | | | | | | | | 326T | 31.00 (787) | 2.00 (51) | | | X | | 17 | 21 |
| | | | | | | | | 326TS | 29.00 (737) | 2.00 (51) | | | X | | 17 | 21 |
| | | | | | | | | 364TS | 31.00 (787) | 2.00 (51) | | | X | | 17 | 21 |
| | | | | | | | | 365TS | 32.00 (813) | 2.00 (51) | | | X | | 17 | 21 |
| | | | | | | | | 404TS | 34.00 (864) | 2.00 (51) | | | X | | 18 | 21 |
| | | | | | | | | 405TS | 36.00 (914) | 2.00 (51) | | | X | | 18 | 21 |
| 6x8x9.5A*▲ | 6 | 8 | 11.00 (279) | 10.50 (267) | 7.00 (178) | 8.25 (210) | 27.00 (686) | 254T | 24.00 (610) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 256T | 25.00 (635) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 284T | 27.00 (686) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 284TS | 25.00 (635) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 286T | 28.00 (711) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | X | | | 12 | 12 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | X | | | 13 | 13 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | X | | | 13 | 13 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | X | | | 13 | 13 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | X | | | 13 | 13 |
| 6x8x11A▲ | 6 | 8 | 12.00 (305) | 11.00 (279) | 6.13 (156) | 8.47 (215) | 25.72 (653) | 254T | 24.00 (610) | 2.00 (51) | | | X | | 16 | 22 |
| | | | | | | | | 256T | 25.00 (635) | 2.00 (51) | | | X | | 16 | 22 |
| | | | | | | | | 284T | 27.00 (686) | 2.00 (51) | | | X | | 16 | 22 |
| | | | | | | | | 284TS | 25.00 (635) | 2.00 (51) | | | X | | 16 | 22 |
| | | | | | | | | 286T | 28.00 (711) | 2.00 (51) | | | X | | 16 | 22 |
| | | | | | | | | 286TS | 26.00 (660) | 2.00 (51) | | | X | | 16 | 22 |
| | | | | | | | | 324T | 29.00 (737) | 2.00 (51) | | | X | | 17 | 21 |
| | | | | | | | | 324TS | 28.00 (711) | 2.00 (51) | | | X | | 17 | 21 |
| | | | | | | | | 326T | 31.00 (787) | 2.00 (51) | | | X | | 17 | 21 |
| | | | | | | | | 326TS | 29.00 (737) | 2.00 (51) | | | X | | 17 | 21 |
| | | | | | | | | 364TS | 31.00 (787) | 2.00 (51) | | | X | | 17 | 21 |
| | | | | | | | | 365TS | 32.00 (813) | 2.00 (51) | | | X | | 17 | 21 |
| 6x8x13.5▲ | 6 | 8 | 12.00 (305) | 13.38 (340) | 6.50 (165) | 9.31 (236) | 33.57 (853) | 286T | 28.00 (711) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 364TS | 31.00 (787) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 404TS | 34.00 (864) | 1.00 (25) | | | | X | 19 | 21 |
| | | | | | | | | 405TS | 36.00 (914) | 1.00 (25) | | | | X | 19 | 21 |
| | | | | | | | | 444TS | 41.00 (1041) | 1.00 (25) | | | | X | 19 | 21 |
| | | | | | | | | 445T | 46.00 (1168) | 1.00 (25) | | | | X | 23 | 23 |
| 8x10x13.5*▲ | 8 | 10 | 15.00 (381) | 14.00 (356) | 8.00 (203) | 11.00 (279) | 34.96 (888) | 286T | 28.00 (711) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 286TS | 26.00 (660) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 324T | 29.00 (737) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 324TS | 28.00 (711) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 326T | 31.00 (787) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 326TS | 29.00 (737) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 364TS | 31.00 (787) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 365TS | 32.00 (813) | 1.00 (25) | | | | X | 18 | 21 |
| | | | | | | | | 404TS | 34.00 (864) | 1.00 (25) | | | | X | 19 | 21 |
| | | | | | | | | 405TS | 36.00 (914) | 1.00 (25) | | | | X | 19 | 21 |
| | | | | | | | | 444TS | 41.00 (1041) | 1.00 (25) | | | | X | 19 | 21 |
| | | | | | | | | 445T | 46.00 (1168) | 1.00 (25) | | | | X | 23 | 23 |
| | | | | | | | | 445TS | 42.00 (1067) | 1.00 (25) | | | | X | 19 | 21 |
| | | | | | | | | 447T | 52.00 (1321) | 1.00 (25) | | | | X | 23 | 23 |

*Temporarily unavailable until further notice.

NOTES:
1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Conduit box is shown in approximate position. Dimensions are not specified as they vary with each motor manufacturer.
4. Not for construction purposes unless certified.
5. ▲ Available in 250 lb./125 lb. flanges.
6. X – for 1750 RPM applications
   XX – for 3550 RPM applications
   XXX – for 1750 and 3550 RPM applications
7. HT is based on Aurora standard coupling. HT may vary from .25 to 3.25".
8. 00 – 2950 RPM operation only.

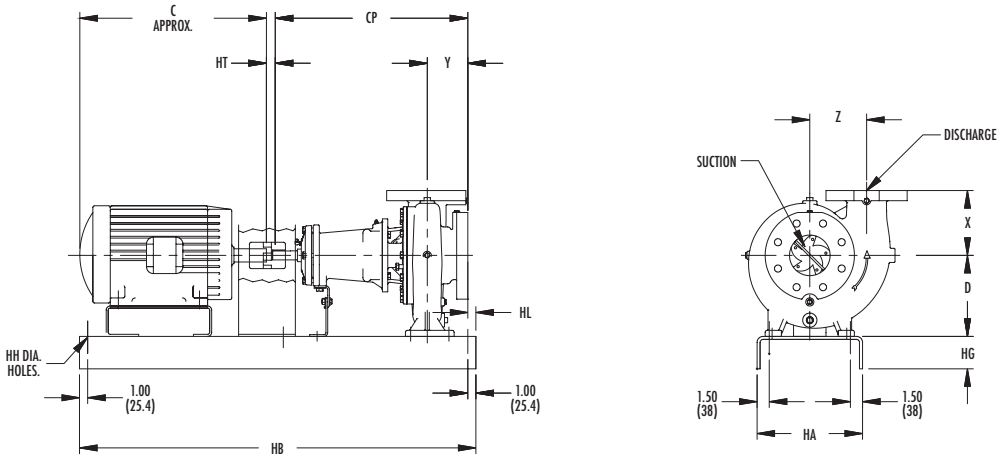
### WITH FORMED STEEL BASE, COUPLING AND MOTOR

| BASE | SIZE | HA | HB | HG | HH |
|---|---|---|---|---|---|
| 1 | 12 x 30 | 12.00 (305) | 30.00 (762) | 3.00 (76) | 0.63 (16) |
| 2 | 12 x 34 | 12.00 (305) | 34.00 (864) | 3.00 (76) | 0.63 (16) |
| 3 | 12 x 38 | 12.00 (305) | 38.00 (965) | 3.00 (76) | 0.63 (16) |
| 4 | 13 x 42 | 13.00 (330) | 42.00 (1067) | 4.00 (102) | 0.75 (19) |
| 5 | 13 x 45 | 13.00 (330) | 45.00 (1143) | 4.00 (102) | 0.75 (19) |
| 6 | 15 x 48 | 15.00 (381) | 48.00 (1219) | 3.38 (86) | 0.75 (19) |
| 7 | 15 x 52 | 15.00 (381) | 52.00 (1321) | 4.13 (105) | 0.75 (19) |
| 8 | 18 x 38 | 18.00 (457) | 38.00 (965) | 4.00 (102) | 0.75 (19) |
| 9 | 18 x 42 | 18.00 (457) | 42.00 (1067) | 4.00 (102) | 0.75 (19) |
| 10 | 18 x 44 | 18.00 (457) | 44.00 (1118) | 4.00 (102) | 0.75 (19) |
| 11 | 18 x 50 | 18.00 (457) | 50.00 (1270) | 4.00 (102) | 0.75 (19) |
| 12 | 18 x 54 | 18.00 (457) | 54.00 (1372) | 4.00 (102) | 0.75 (19) |
| 13 | 18 x 60 | 18.00 (457) | 60.00 (1524) | 4.00 (102) | 0.75 (19) |
| 14 | 22 x 60 | 22.00 (559) | 60.00 (1524) | 4.00 (102) | 0.75 (19) |
| 15 | 22 x 64 | 22.00 (559) | 64.00 (1626) | 4.00 (102) | 0.75 (19) |
| 20 | 22 x 72 | 22.00 (559) | 72.00 (1829) | 4.00 (102) | 0.75 (19) |
| 16 | 26 x 54 | 26.00 (660) | 54.00 (1372) | 4.00 (102) | 0.75 (19) |
| 17 | 26 x 60 | 26.00 (660) | 60.00 (1524) | 4.50 (114) | 0.75 (19) |
| 18 | 26 x 66 | 26.00 (660) | 66.00 (1676) | 4.50 (114) | 0.75 (19) |
| 19 | 26 x 72 | 26.00 (660) | 72.00 (1829) | 4.50 (114) | 0.75 (19) |
| 23 | 26 x 84 | 26.00 (660) | 84.00 (2134) | 4.50 (114) | 0.75 (19) |

| MOTOR HORSEPOWER AND FRAME DESIGNATION | | | | | | |
|---|---|---|---|---|---|---|
| HORSEPOWER | 3600 RPM | | 1800 RPM | | 1200 RPM | |
| RATING | ODP | TEFC | ODP | TEFC | ODP | TEFC |
| 1/2 | 56 | – | 56 | 56 | 56 | 56 |
| 3/4 | 56 | 56 | 56 | 56 | 143T | 143T |
| 1 | 56 | 56 | 143T | 143T | 145T | 145T |
| 1-1/2 | 143T | 143T | 145T | 145T | 182T | 182T |
| 2 | 145T | 145T | 145T | 145T | 184T | 184T |
| 3 | 145T | 182T | 182T | 182T | 213T | 213T |
| 5 | 182T | 184T | 184T | 184T | 215T | 215T |
| 7-1/2 | 184T | 213T | 213T | 213T | 254T | 254T |
| 10 | 213T | 215T | 215T | 215T | 256T | 256T |
| 15 | 215T | 254T | 254T | 254T | 284T | 284T |
| 20 | 254T | 256T | 256T | 256T | 286T | 286T |
| 25 | 256T | 284TS | 284T | 284T | 324T | 324T |
| 30 | 284TS | 286TS | 286T | 286T | 326T | 326T |
| 40 | 286TS | 324TS | 324T | 324T | 364T | 364T |
| 50 | 324TS | 326TS | 326T | 326T | 365T | 365T |
| 60 | 326TS | 364TS | 364TS | 364TS | 404T | 404T |
| 75 | 364TS | 365TS | 365TS | 365TS | 405T | 405T |
| 100 | 365TS | 405TS | 404TS | 405TS | 444T | 444T |
| 125 | 404TS | 444TS | 405TS | 444TS | 445T | 445T |
| 150 | 405TS | 445TS | 444TS | 445TS | – | – |
| 200 | 444TS | – | 445TS | – | – | – |

| Power Frame | U | V | KEY |
|---|---|---|---|
| 1 | .88 (22) | 2.13 (54) | .19 (5) SQ. x 1.38 (35) LNG |
| 2 & 3 | 1.13 (28) | 3.13 (79) | .25 (6) SQ. x 1.75 (44) LNG |
| 21A | 2.38 (60) | 5.50 (139) | .63 (16) SQ. x 4.00 (101) LNG |

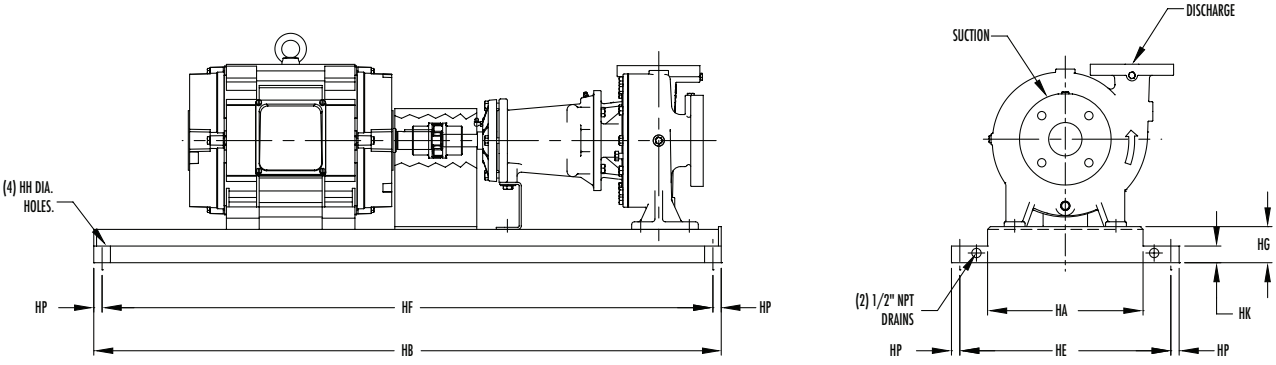
NOTES:
1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Conduit box is shown in approximate position. Dimensions are not specified as they vary with each motor manufacturer.
4. Not for construction purposes unless certified.



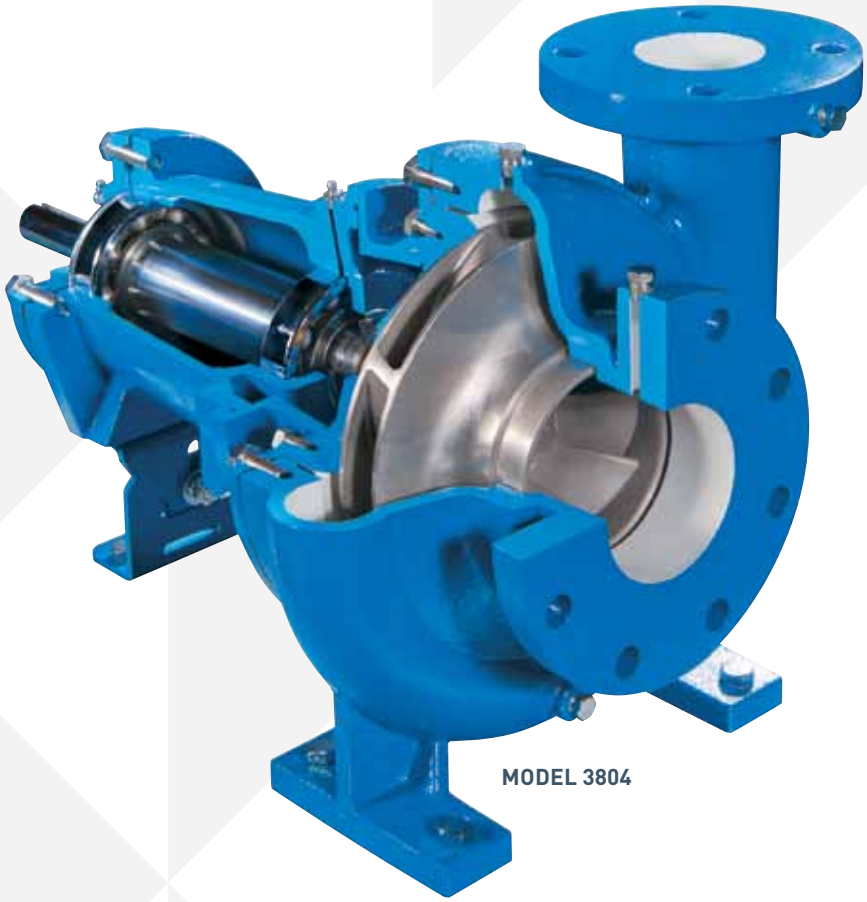
### WITH DRIP RIM BASE, COUPLING AND MOTOR

| BASE | SIZE | HA | HB | HE | HF | HG | HH | HK | HP |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 11 x 30 | 11.00 (279) | 30.50 (775) | 15.88 (403) | 29.13 (740) | 3.00 (76) | .88 (22) | 1.50 (38) | 0.69 (17) |
| 5 | 11 x 36 | 11.00 (279) | 36.50 (927) | 15.88 (403) | 35.13 (892) | 3.00 (76) | .88 (22) | 1.50 (38) | 0.69 (17) |
| 6 | 11 x 42 | 11.00 (279) | 42.50 (1080) | 15.88 (403) | 41.13 (1045) | 3.00 (76) | .88 (22) | 1.50 (38) | 0.69 (17) |
| 8 | 14 x 42 | 14.00 (356) | 42.50 (1080) | 19.00 (483) | 41.00 (1041) | 3.00 (76) | 1.00 (25) | 1.50 (38) | 0.75 (19) |
| 9 | 14 x 48 | 14.00 (356) | 48.50 (1232) | 19.00 (483) | 47.00 (1194) | 3.00 (76) | 1.00 (25) | 1.50 (38) | 0.75 (19) |
| 10 | 14 x 56 | 14.00 (356) | 56.50 (1435) | 19.00 (483) | 55.00 (1397) | 3.00 (76) | 1.00 (25) | 1.50 (38) | 0.75 (19) |
| 11 | 18 x 46 | 18.00 (457) | 46.50 (1181) | 25.13 (638) | 44.88 (1140) | 4.00 (102) | 1.13 (29) | 2.00 (51) | 0.81 (21) |
| 12 | 18 x 54 | 18.00 (457) | 54.50 (1384) | 25.13 (638) | 52.88 (1343) | 4.00 (102) | 1.13 (29) | 2.00 (51) | 0.81 (21) |
| 13 | 18 x 64 | 18.00 (457) | 64.50 (1638) | 25.13 (638) | 62.88 (1597) | 4.00 (102) | 1.13 (29) | 2.00 (51) | 0.81 (21) |
| 16 | 22 x 64 | 22.00 (559) | 64.50 (1638) | 29.13 (740) | 62.88 (1597) | 4.50 (114) | 1.13 (29) | 2.00 (51) | 0.81 (21) |
| 17 | 22 x 74 | 22.00 (559) | 74.50 (1892) | 29.13 (740) | 72.88 (1851) | 4.50 (114) | 1.13 (29) | 2.00 (51) | 0.81 (21) |
| 22 | 26 x 54 | 26.00 (660) | 54.50 (1384) | 33.13 (841) | 52.88 (1343) | 4.50 (114) | 1.13 (29) | 2.00 (51) | 0.81 (21) |
| 21 | 26 x 72 | 26.00 (660) | 72.50 (1842) | 33.13 (841) | 70.88 (1800) | 4.50 (114) | 1.13 (29) | 2.00 (51) | 0.81 (21) |
| 23 | 26 x 84 | 26.00 (660) | 84.50 (2146) | 33.13 (841) | 82.88 (2105) | 4.50 (114) | 1.13 (29) | 2.00 (51) | 0.81 (21) |

NOTES:
1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Conduit box is shown in approximate position. Dimensions are not specified as they vary with each motor manufacturer.
4. Not for construction purposes unless certified.



PENTAIR



MODEL 3804

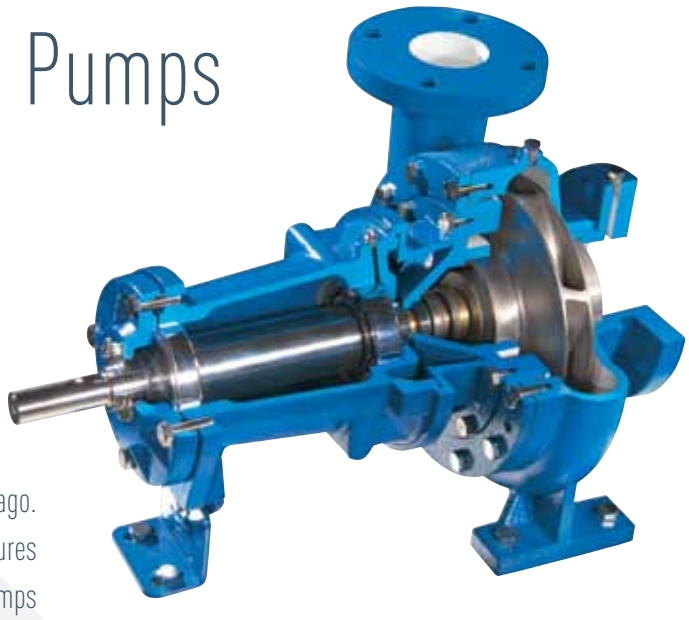
# AURORA® 3800 SERIES
# SINGLE STAGE END SUCTION PUMPS

Distributed By: Flow-Tech Industries

Flow-Tech Industries
4601 South Pinemont, Suite 100
Houston, Texas 77041
Phone: 713.690.7474
Fax: 409.882.0254

sales@flow-tech.com
www.flow-tech.com

# AURORA® 3800 SERIES
# Single Stage End Suction Pumps



Capacities to 4200 G.P.M. (954 $m^3$/hr)
Heads to 520 Feet (158 Meters)
Temperatures to 300°F (149°C)

## Setting New Standards of Efficiency

Liquid handling requirements are much more involved than they were years ago. The variety of liquids being handled has increased along with temperatures and pressures. Today's installations demand quiet, smooth running pumps with long life. Aurora Pump's 90 years of experience with design, sales and manufacturing of centrifugal pumps has led to the 3800 Series. These modern pumps with a clean, straightforward design were developed with maximum interchangeability in mind. Aurora's highly reliable 3800 pumps offer an economical solution to your liquid handling problems.

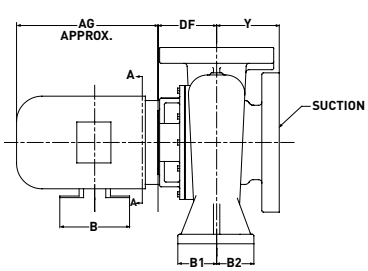
## Standard Features

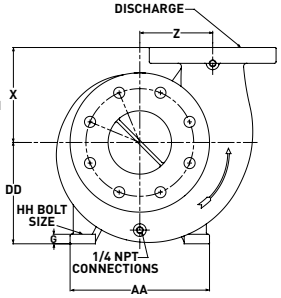
- Offered in two models:
  - 3801 close coupled
  - 3804 flexible coupled-frame mounted
- 316 stainless steel impeller
- Double volute on 4" discharge and larger to reduce bearing loads
- Gauge taps on suction and discharge on flanged models
- 4 power frame sizes
- Casing feet for easy back pullout
- Regreaseable bearings (3804 only)
- Coupling guard (flex coupled design)
- Formed steel base (flex coupled design)

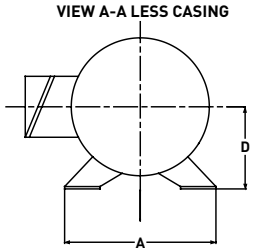
## Optional Features

- 316 stainless steel shaft
- 316 stainless steel shaft sleeve
- Drip rim base
- Drip pan (3804 only)
- Flush lines
- Epoxy coating
- Several mechanical seal options (required for temperatures over 225°F)
- Oil lube bearings (flex coupled only)
- Case wear ring

# Model 3801 Product Offering



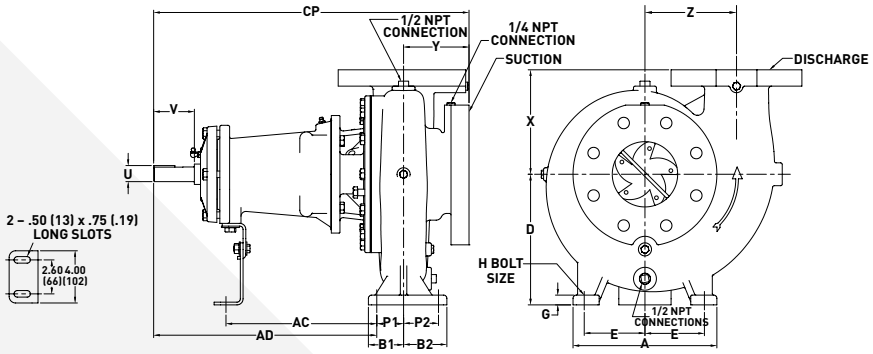

Notes:

1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Not for construction purposes unless certified.
4. ▲ Available in 250 lb./125 lb. flanges.
5. ● Dimensions do not match Bell & Gossett.
6. Conduit box is shown in approximate location. Dimensions are not specified as they may vary with each motor manufacturer.
7. There are two mounting holes on the rear foot for the noted pumps.

| Pump Size | Disch. | Suct. | DD | X | Y | Z | B1 | B2 | G | HH | AA | DF 143-184JM | DF 213-215JM | DF 254-256JM | DF 284-326JM | DF 364-404TCZ | DF 444-449TCZ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.25x1.5x7 (NPT) | 1.25 | 1.5 | 7.00 (178) | 5.00 (127) | 3.25 (083) | 4.50 (114) | 2.63 (067) | 2.38 (060) | 0.63 (016) | 0.44 (011) | 8.00 (203) | 4.25 (108) | 4.25 (108) | N/A | N/A | N/A | N/A |
| 1.5x2x7 (NPT) | 1.5 | 2 | 7.00 (178) | 6.00 (152) | 3.13 (079) | 4.63 (117) | 2.44 (062) | 2.56 (065) | 0.63 (016) | 0.44 (011) | 8.00 (203) | 4.75 (121) | 4.75 (121) | 5.31 (135) | N/A | N/A | N/A |
| 1.5x2x11 (NPT) | 1.5 | 2 | 8.00 (203) | 9.00● (229) | 3.13 (079) | 5.75 (146) | 2.25 (057) | 3.75 (095) | 0.69 (017) | 0.44 (011) | 11.00 (279) | 4.63 (118) | 4.63 (118) | 5.63 (143) | 5.63 (143) | N/A | N/A |
| 1.5x2x12 (NPT) | 1.5 | 2 | 10.00 (254) | 7.75 (197) | 2.75 (070) | 5.75 (146) | 2.87 (073) | 3.75 (095) | 0.69 (017) | 0.44 (011) | 11.00 (279) | 4.81 (122) | 4.81 (122) | N/A | N/A | N/A | N/A |
| 2x2.5x7▲ | 2 | 2.5 | 7.00 (178) | 6.50 (165) | 3.50 (089) | 4.75 (005) | 2.56 (065) | 2.44 (062) | 0.63 (016) | 0.44 (011) | 8.00 (203) | 4.88 (124) | 4.88 (124) | 5.5 (140) | 5.5 (140) | N/A | N/A |
| 2x2.5x9.5▲ | 2 | 2.5 | 8.00 (203) | 7.00 (178) | 4.00 (102) | 5.88 (149) | 2.38 (060) | 3.63 (092) | 0.69 (017) | 0.44 (011) | 11.00 (279) | 4.75 (121) | 4.75 (121) | 5.44 (138) | 5.44 (138) | N/A | N/A |
| 2x3x11▲ | 2 | 3 | 10.00 (254) | 8.00 (203) | 5.50 (140) | 6.50 (165) | 3.23 (082) | 3.77 (096) | 0.88 (022) | 0.50 (013) | 16.00 (406) | 4.44 (113) | 4.44 (113) | 5.31 (135) | 5.31 (135) | 9.13 (232) | 9.13 (232) |
| 2x3x13.5▲ | 2 | 3 | 10.00 (254) | 9.00 (229) | 5.50 (140) | 7.25 (184) | 3.00 (076) | 4.00 (102) | 0.88 (022) | 0.50 (013) | 16.00 (406) | N/A | 5.38 (137) | 5.38 (137) | 5.38 (137) | N/A | N/A |
| 2.5x3x7▲ | 2.5 | 3 | 7.00 (178) | 6.00 (152) | 4.25 (108) | 4.69 (005) | 2.63 (067) | 2.38 (060) | 0.63 (016) | 0.44 (011) | 8.00 (203) | 4.81 (122) | 4.81 (122) | 4.44 (113) | 4.44 (113) | N/A | N/A |
| 2.5x3x9.5▲ | 2.5 | 3 | 8.00 (203) | 6.75 (171) | 4.00 (102) | 6.00 (152) | 2.44 (062) | 3.56 (090) | 0.69 (017) | 0.44 (011) | 11.00 (279) | 4.94 (125) | 4.94 (125) | 5.56 (141) | 5.56 (141) | 9.56 (243) | 9.56 (243) |
| 2.5x3x13.5▲ | 2.5 | 3 | 10.00 (254) | 9.00 (229) | 6.00 (152) | 8.00 (203) | 3.00 (076) | 4.00 (102) | 0.88 (022) | 0.50 (013) | 16.00 (406) | N/A | 5.5 (140) | 5.5 (140) | 5.5 (140) | N/A | N/A |
| 3x4x7▲ | 3 | 4 | 7.00 (178) | 6.00 (152) | 4.13 (105) | 5.00 (127) | 2.69 (068) | 2.31 (059) | 0.63 (016) | 0.44 (011) | 8.00 (203) | 4.69 (119) | 4.69 (119) | 5.31 (135) | 5.31 (135) | N/A | N/A |
| 3x4x9.5▲ | 3 | 4 | 8.00 (203) | 7.50 (191) | 4.75 (121) | 6.13 (156) | 2.69 (068) | 3.31 (084) | 0.75 (019) | 0.44 (011) | 11.00 (279) | 4.69 (119) | 4.69 (119) | 5.31 (135) | 5.31 (135) | 9.31 (236) | 9.31 (236) |
| 3x4x11▲ | 3 | 4 | 10.00 (254) | 9.50 (241) | 5.50 (140) | 7.38 (187) | 3.44 (087) | 3.56 (091) | 0.88 (022) | 0.50 (013) | 16.00 (406) | 4.44 (113) | 4.44 (113) | 5.31 (135) | 5.31 (135) | 9.13 (232) | 9.13 (232) |
| 3x4x13.5▲ | 3 | 4 | 10.00 (254) | 9.50 (241) | 5.63 (143) | 8.00 (203) | 3.13 (080) | 3.88 (098) | 0.88 (022) | 0.50 (013) | 16.00 (406) | N/A | N/A | 5.44 (138) | 5.44 (138) | 9.31 (236) | 9.31 (236) |
| 4x5x7▲ | 4 | 5 | 8.00 (203) | 7.50 (191) | 4.94 (125) | 5.75 (146) | 3.06 (078) | 2.94 (075) | 0.69 (017) | 0.44 (011) | 11.00 (279) | 4.94 (125) | 4.94 (125) | 5.56 (141) | 5.56 (141) | N/A | N/A |
| 4x5x9.5▲ | 4 | 5 | 10.00 (254) | 8.00 (203) | 5.00 (127) | 7.00 (178) | 2.69 (068) | 3.31 (084) | 0.75 (019) | 0.44 (011) | 11.00 (279) | 4.69 (119) | 4.69 (119) | 5.31 (135) | 5.31 (135) | 9.31 (236) | 9.31 (236) |
| 4x5x11▲ | 4 | 5 | 10.00 (254) | 9.75 (248) | 5.56 (141) | 7.25 (184) | 3.41 (087) | 3.59 (091) | 0.88 (022) | 0.50 (013) | 16.00 (406) | 4.5 (114) | 4.5 (114) | 5.38 (137) | 5.38 (137) | 9.19 (233) | 9.19 (233) |
| 4x5x13.5▲ | 4 | 5 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 8.56 (218) | 3.25 (083) | 3.75 (095) | 0.88 (022) | 0.50 (013) | 16.00 (406) | N/A | N/A | 5.06 (129) | 5.06 (129) | 8.88 (226) | 8.88 (226) |
| 5x6x7▲ | 5 | 6 | 10.00 (254) | 8.50 (216) | 5.81 (148) | 6.25 (159) | 3.63 (092) | 2.38 (060) | 0.69 (018) | 0.44 (011) | 11.00 (279) | 5.18 (132) | 5.18 (132) | 5.81 (148) | 5.81 (148) | 9.5 (241) | N/A |
| 5x6x9.5▲ | 5 | 6 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 7.50 (191) | 3.19 (081) | 3.81 (097) | 0.88 (022) | 0.50 (013) | 16.00 (406) | 5.06 (129) | 5.06 (129) | 5.69 (145) | 5.69 (145) | 9.69 (246) | 9.69 (246) |
| 5x6x11▲ | 5 | 6 | 11.00 (279) | 10.50 (267) | 5.44 (138) | 7.94 (202) | 3.44 (087) | 3.56 (091) | 0.88 (022) | 0.50 (013) | 16.00 (406) | N/A | N/A | 5.44 (138) | 5.44 (138) | 9.25 (235) | 9.25 (235) |
| 5x6x13.5▲ | 5 | 6 | 12.00 (305) | 13.00 (330) | 6.00 (152) | 9.00 (229) | 5.19 (132) | 5.81 (148) | 1.00 (025) | 0.63 (016) | 23.00 (584) | N/A | N/A | 5.56 (141) | 5.56 (141) | 9.38 (238) | 9.38 (238) |
| 6x8x9.5▲ | 6 | 8 | 11.00 (279) | 10.50 (267) | 7.00 (178) | 8.25 (210) | 4.13 (105) | 2.88 (073) | 0.88 (022) | 0.50 (013) | 16.00 (406) | N/A | N/A | 6.19 (157) | 6.19 (157) | N/A | N/A |
| 6x8x11▲ | 6 | 8 | 12.00 (305) | 11.00 (279) | 6.13 (156) | 8.47 (215) | 5.63 (143) | 5.38 (137) | 1.00 (025) | 0.63 (016) | 23.00 (584) | N/A | N/A | 5.81 (148) | 5.81 (148) | N/A | N/A |
| 6x8x13.5▲ | 6 | 8 | 12.63● (321) | 13.38● (340) | 6.50 (165) | 9.31 (237) | 5.50 (140) | 5.50 (140) | 1.00 (025) | 0.63 (016) | 23.00 (584) | N/A | N/A | 8.38 (213) | 8.38 (213) | 9.44 (240) | 9.44 (240) |
| 8x10x13.5▲ | 8 | 10 | 15.00 (381) | 14.00 (356) | 8.00 (203) | 11.00 (279) | 5.50 (140) | 5.50 (140) | 1.00 (025) | 0.63 (016) | 23.00 (584) | N/A | N/A | 8.19 (208) | 8.19 (208) | 9.25 (235) | 9.25 (235) |

| Motor Frame | | | |
|---|---|---|---|
| Frame | AG Approx. | A | D |
| 143JM | 10.00 (254) | 7.00 (178) | 3.50 (089) |
| 145JM | 11.00 (279) | 7.00 (178) | 3.50 (089) |
| 182JM | 11.00 (279) | 9.00 (229) | 4.50 (114) |
| 184JM | 12.00 (305) | 9.00 (229) | 4.50 (114) |
| 213JM | 14.00 (356) | 10.50 (267) | 5.25 (133) |
| 215JM | 15.00 (381) | 10.50 (267) | 5.25 (133) |
| 254JM | 17.50 (445) | 12.50 (318) | 6.25 (159) |
| 256JM | 19.00 (483) | 12.50 (318) | 6.25 (159) |
| 284JM | 19.00 (483) | 14.00 (356) | 7.00 (178) |
| 286JM | 21.00 (533) | 14.00 (356) | 7.00 (178) |
| 324JM | 22.00 (559) | 16.00 (406) | 8.00 (203) |
| 326JM | 23.00 (584) | 16.00 (406) | 8.00 (203) |
| 364JM | 26.00 (660) | 17.17 (436) | 9.00 (229) |
| 365JM | 26.00 (660) | 17.17 (436) | 9.00 (229) |
| 404JM | 32.00 (813) | 19.92 (506) | 10.00 (254) |
| 405JM | 32.00 (813) | 19.92 (506) | 10.00 (254) |
| 364TCZ | 24.00 (610) | 18.00 (457) | 9.00 (229) |
| 365TCZ | 24.00 (610) | 18.00 (457) | 9.00 (229) |
| 404TCZ | 27.25 (692) | 20.00 (508) | 10.00 (254) |
| 405TCZ | 28.75 (730) | 20.00 (508) | 10.00 (254) |
| 444TCZ | 31.13 (791) | 22.00 (559) | 11.00 (279) |
| 445TCZ | 31.13 (791) | 22.00 (559) | 11.00 (279) |
| 447TCZ | 39.63 (1006) | 22.00 (559) | 11.00 (279) |
| 449TCZ | 39.63 (1006) | 22.00 (559) | 11.00 (279) |

# Model 3804 Pump End Only Product Offering




| Pump Size | Disch | Suct | D | X | Y | Z | P1 | P2 | B1 | B2 | G | H | E | A | AC | AD | CP | U | V | Key |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.25x1.5x7S (NPT) | 1.25 | 1.5 | 7.00 (178) | 5.00 (127) | 3.25 (083) | 4.50 (114) | 1.63 (041) | 1.38 (035) | 2.63 (067) | 2.38 (060) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 8.35 (212) | 12.93 (328) | 17.81 (452) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 1.5x2x7S (NPT) | 1.5 | 2 | 7.00 (178) | 6.00 (152) | 3.13 (079) | 4.63 (117) | 1.44 (037) | 1.56 (040) | 2.44 (062) | 2.56 (065) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 9.03 (229) | 13.59 (345) | 18.16 (461) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 1.5x2x11S (NPT) | 1.5 | 2 | 8.00 (203) | 9.00● (229) | 3.13 (079) | 5.75 (146) | 1.44 (037) | 2.94 (075) | 2.25 (057) | 3.75 (095) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.92 (227) | 13.48 (342) | 18.05 (458) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 1.5x2x11L (NPT) | 1.5 | 2 | 8.00 (203) | 9.00● (229) | 3.13 (079) | 5.75 (146) | 1.44 (037) | 2.94 (075) | 2.25 (057) | 3.75 (095) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 12.19 (310) | 18.62 (473) | 23.19 (589) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 1.5x2x12S (NPT) | 1.5 | 2 | 10.00 (254) | 7.75 (197) | 2.75 (070) | 5.75 (146) | 1.94 (049) | 2.94 (075) | 2.87 (073) | 3.75 (095) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.60 (218) | 13.16 (334) | 17.85 (453) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 2x2.5x7S◆ | 2 | 2.5 | 7.00 (178) | 6.50 (165) | 3.50 (089) | 4.75 (005) | 1.56 (040) | 1.44 (037) | 2.56 (065) | 2.44 (062) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 9.08 (231) | 13.63 (346) | 18.70 (475) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 2x2.5x9.5S◆ | 2 | 2.5 | 8.00 (203) | 7.00 (178) | 4.00 (102) | 5.88 (149) | 1.56 (040) | 2.81 (071) | 2.38 (060) | 3.63 (092) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.94 (227) | 13.50 (343) | 19.07 (484) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 2x2.5x9.5L◆ | 2 | 2.5 | 8.00 (203) | 7.00 (178) | 4.00 (102) | 5.88 (149) | 1.56 (040) | 2.81 (071) | 2.38 (060) | 3.63 (092) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 11.85 (301) | 17.69 (449) | 23.22 (590) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 2x3x11S◆ | 2 | 3 | 10.00 (254) | 8.00 (203) | 5.50 (140) | 6.50 (165) | 2.23 (057) | 2.77 (070) | 3.23 (082) | 3.77 (096) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 7.93 (201) | 12.52 (318) | 20.22 (514) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 2x3x11L◆ | 2 | 3 | 10.00 (254) | 8.00 (203) | 5.50 (140) | 6.50 (165) | 2.23 (057) | 2.77 (070) | 3.23 (082) | 3.77 (096) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 11.06 (281) | 16.87 (428) | 24.59 (625) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 2x3x13.5L◆ | 2 | 3 | 10.00 (254) | 9.00 (229) | 5.50 (140) | 7.25 (184) | 2.00 (051) | 3.00 (076) | 3.00 (076) | 4.00 (102) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 11.34 (288) | 17.25 (438) | 24.65 (626) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 2.5x3x7S◆ | 2.5 | 3 | 7.00 (178) | 6.00 (152) | 4.25 (108) | 4.69 (005) | 1.63 (041) | 1.38 (035) | 2.63 (067) | 2.38 (060) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 8.94 (227) | 13.50 (343) | 19.38 (492) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 2.5x3x9.5S◆ | 2.5 | 3 | 8.00 (203) | 6.75 (171) | 4.00 (102) | 6.00 (152) | 1.63 (041) | 2.75 (070) | 2.44 (062) | 3.56 (090) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 9.03 (229) | 13.62 (346) | 19.22 (488) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 2.5x3x9.5L◆ | 2.5 | 3 | 8.00 (203) | 6.75 (171) | 4.00 (102) | 6.00 (152) | 1.63 (041) | 2.75 (070) | 2.44 (062) | 3.56 (090) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 11.93 (303) | 17.75 (451) | 23.37 (594) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |

S – denotes small power frame
L – denotes large power frame
XL – denotes extra large power frame

Notes:

1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Not for construction purposes unless certified.
   - ◆ Available in 250 lb./125 lb. Flanges
   - ● Dimensions do not match Bell & Gossett
4. ▬ Use extra large power frame with impeller diameters larger than 12.5 (318).
5. See 3800 dimension pages for base mount information.

# Model 3804 Pump End Only Product Offering

| Pump Size | Disch | Suct | D | X | Y | Z | P1 | P2 | B1 | B2 | G | H | E | A | AC | AD | CP | U | V | Key |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.5x3x13.5L◆ | 2.5 | 3 | 10.00 (254) | 9.00 (229) | 6.00 (152) | 8.00 (203) | 2.00 (051) | 3.00 (076) | 3.00 (076) | 4.00 (102) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 11.47 (291) | 17.28 (439) | 25.28 (642) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 3x4x7S◆ | 3 | 4 | 7.00 (178) | 6.00 (152) | 4.13 (105) | 5.00 (127) | 1.69 (043) | 1.31 (033) | 2.69 (068) | 2.31 (059) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 8.73 (222) | 13.24 (336) | 19.11 (485) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 3x4x7L◆ | 3 | 4 | 7.00 (178) | 6.00 (152) | 4.13 (105) | 5.00 (127) | 1.69 (043) | 1.31 (033) | 2.69 (068) | 2.31 (059) | 0.63 (016) | 0.44 (011) | 3.25 (083) | 8.00 (203) | 11.60 (295) | 17.43 (443) | 23.22 (590) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 3x4x9.5S◆ | 3 | 4 | 8.00 (203) | 7.50 (191) | 4.75 (121) | 6.13 (156) | 1.81 (046) | 2.56 (065) | 2.69 (068) | 3.31 (084) | 0.75 (019) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.54 (217) | 13.19 (335) | 19.72 (501) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 3x4x9.5L◆ | 3 | 4 | 8.00 (203) | 7.50 (191) | 4.75 (121) | 6.13 (156) | 1.81 (046) | 2.56 (065) | 2.69 (068) | 3.31 (084) | 0.75 (019) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 11.50 (292) | 17.32 (440) | 23.87 (606) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 3x4x11S◆ | 3 | 4 | 10.00 (254) | 9.50 (241) | 5.50 (140) | 7.38 (187) | 2.44 (062) | 2.56 (065) | 3.44 (087) | 3.56 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 7.71 (196) | 12.31 (313) | 20.22 (514) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 3x4x11L◆ | 3 | 4 | 10.00 (254) | 9.50 (241) | 5.50 (140) | 7.38 (187) | 2.44 (062) | 2.56 (065) | 3.44 (087) | 3.56 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 10.84 (275) | 16.69 (424) | 24.59 (625) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 3x4x13.5L◆ | 3 | 4 | 10.00 (254) | 9.50 (241) | 5.63 (143) | 8.00 (203) | 2.13 (054) | 2.88 (073) | 3.13 (080) | 3.88 (098) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 11.28 (287) | 17.12 (435) | 24.84 (631) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 4x5x7S◆ | 4 | 5 | 8.00 (203) | 7.50 (191) | 4.94 (125) | 5.75 (146) | 2.25 (057) | 2.13 (054) | 3.06 (078) | 2.94 (075) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.40 (213) | 12.94 (329) | 20.16 (512) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 4x5x7L◆ | 4 | 5 | 8.00 (203) | 7.50 (191) | 4.94 (125) | 5.75 (146) | 2.25 (057) | 2.13 (054) | 3.06 (078) | 2.94 (075) | 0.69 (017) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 11.28 (287) | 17.06 (433) | 24.28 (617) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 4x5x9.5S◆ | 4 | 5 | 10.00 (254) | 8.00 (203) | 5.00 (127) | 7.00 (178) | 1.88 (048) | 2.50 (064) | 2.69 (068) | 3.31 (084) | 0.75 (019) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.52 (216) | 13.12 (333) | 19.97 (507) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 4x5x9.5L◆ | 4 | 5 | 10.00 (254) | 8.00 (203) | 5.00 (127) | 7.00 (178) | 1.88 (048) | 2.50 (064) | 2.69 (068) | 3.31 (084) | 0.75 (019) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 11.43 (290) | 17.25 (438) | 24.12 (613) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 4x5x11S◆ | 4 | 5 | 10.00 (254) | 9.75 (248) | 5.56 (141) | 7.25 (184) | 2.41 (061) | 2.94 (075) | 3.59 (091) | 3.59 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 7.81 (198) | 12.41 (315) | 20.35 (517) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 4x5x11L◆ | 4 | 5 | 10.00 (254) | 9.75 (248) | 5.56 (141) | 7.25 (184) | 2.41 (061) | 2.94 (075) | 3.59 (091) | 3.59 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 10.94 (278) | 16.78 (426) | 24.72 (628) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 4x5x11XL◆ | 4 | 5 | 10.00 (254) | 9.75 (248) | 5.56 (141) | 7.25 (184) | 2.41 (061) | 2.59 (066) | 3.41 (087) | 3.59 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 15.38 (391) | 24.52 (623) | 32.49 (825) | 2.38 (060) | 5.50 (140) | .63(16) SQ x 4.00(102) LNG |
| 4x5x13.5L◆ | 5 | 5 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 8.56 (218) | 2.25 (057) | 2.75 (070) | 3.25 (083) | 3.75 (095) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 10.78 (274) | 16.63 (422) | 24.84 (631) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 4x5x13.5XL◆ | 5 | 5 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 8.56 (218) | 2.25 (057) | 2.75 (070) | 3.25 (083) | 3.75 (095) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 15.25 (387) | 24.38 (619) | 32.63 (829) | 2.38 (060) | 5.50 (140) | .63(16) SQ x 4.00(102) LNG |
| 5x6x7S◆ | 5 | 6 | 10.00 (254) | 8.50 (216) | 5.81 (148) | 6.25 (159) | 2.81 (071) | 1.56 (040) | 3.63 (092) | 2.38 (060) | 0.69 (018) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 8.09 (205) | 12.63 (321) | 21.28 (541) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 5x6x7L◆ | 5 | 6 | 10.00 (254) | 8.50 (216) | 5.81 (148) | 6.25 (159) | 2.81 (071) | 1.56 (040) | 3.63 (092) | 2.38 (060) | 0.69 (018) | 0.44 (011) | 4.56 (116) | 11.00 (279) | 10.97 (279) | 16.76 (426) | 25.39 (645) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 5x6x9.5S◆ | 5 | 6 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 7.50 (191) | 2.19 (056) | 2.81 (071) | 3.19 (081) | 3.81 (097) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 8.59 (218) | 13.19 (335) | 21.34 (542) | 0.88 (022) | 2.13 (054) | .19(5) SQ. x 1.38(35) LNG |
| 5x6x9.5L◆ | 5 | 6 | 11.00 (279) | 10.00 (254) | 6.00 (152) | 7.50 (191) | 2.19 (056) | 2.81 (071) | 3.19 (081) | 3.81 (097) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 11.50 (292) | 17.31 (440) | 25.50 (648) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 5x6x11L◆ | 5 | 6 | 11.00 (279) | 10.50 (267) | 5.44 (138) | 7.94 (202) | 2.59 (066) | 2.41 (061) | 3.44 (087) | 3.56 (091) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 10.82 (275) | 16.72 (425) | 24.65 (626) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 5x6x13.5L◆ | 5 | 6 | 12.00 (305) | 13.00 (330) | 6.00 (152) | 9.00 (229) | 4.19 (106) | 4.81 (122) | 5.19 (132) | 5.81 (148) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | 9.34 (237) | 15.19 (386) | 25.34 (644) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 5x6x13.5XL◆ | 5 | 6 | 12.00 (305) | 13.00 (330) | 6.00 (152) | 9.00 (229) | 4.19 (106) | 4.81 (122) | 5.19 (132) | 5.81 (148) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | 13.81 (351) | 22.94 (583) | 33.13 (842) | 2.38 (060) | 5.50 (140) | .63(16) SQ x 4.00(102) LNG |
| 6x8x9.5L◆ | 6 | 8 | 11.00 (279) | 10.50 (267) | 7.00 (178) | 8.25 (210) | 3.13 (079) | 1.88 (048) | 4.13 (105) | 2.88 (073) | 0.88 (022) | 0.50 (013) | 7.00 (178) | 16.00 (406) | 11.06 (281) | 16.93 (430) | 27.00 (686) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 6x8x11L◆ | 6 | 8 | 12.00 (305) | 11.00 (279) | 6.13 (156) | 8.47 (215) | 4.63 (117) | 4.38 (111) | 5.63 (143) | 5.38 (137) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | 9.15 (232) | 15.05 (382) | 25.72 (653) | 1.13 (029) | 3.13 (079) | .25(6) SQ. x 1.75(45) LNG |
| 6x8x13.5XL◆ | 6 | 8 | 12.63● (321) | 13.38● (340) | 6.50 (165) | 9.31 (237) | 4.50 (114) | 4.50 (114) | 5.50 (140) | 5.50 (140) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | 13.44 (341) | 22.56 (573) | 33.57 (853) | 2.38 (060) | 5.50 (140) | .63(16) SQ x 4.00(102) LNG |
| 8x10x13.5XL◆ | 8 | 10 | 15.00 (381) | 14.00 (356) | 8.00 (203) | 11.00 (279) | 4.50 (114) | 4.50 (114) | 5.50 (140) | 5.50 (140) | 1.00 (025) | 0.63 (016) | 10.50 (267) | 23.00 (584) | 13.33 (339) | 22.38 (568) | 34.96 (888) | 2.38 (060) | 5.50 (140) | .63(16) SQ x 4.00(102) LNG |

S – denotes small power frame

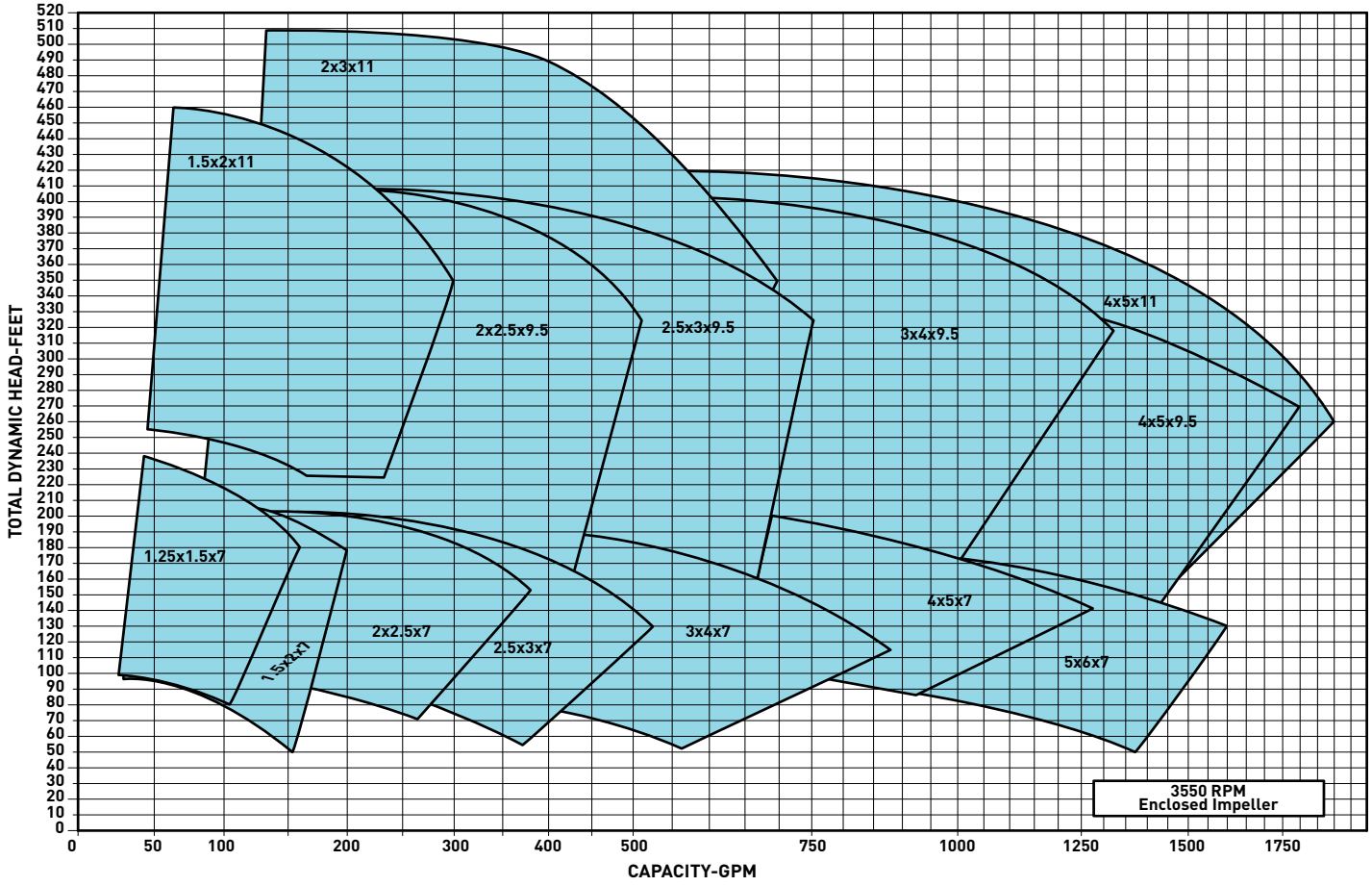
L – denotes large power frame

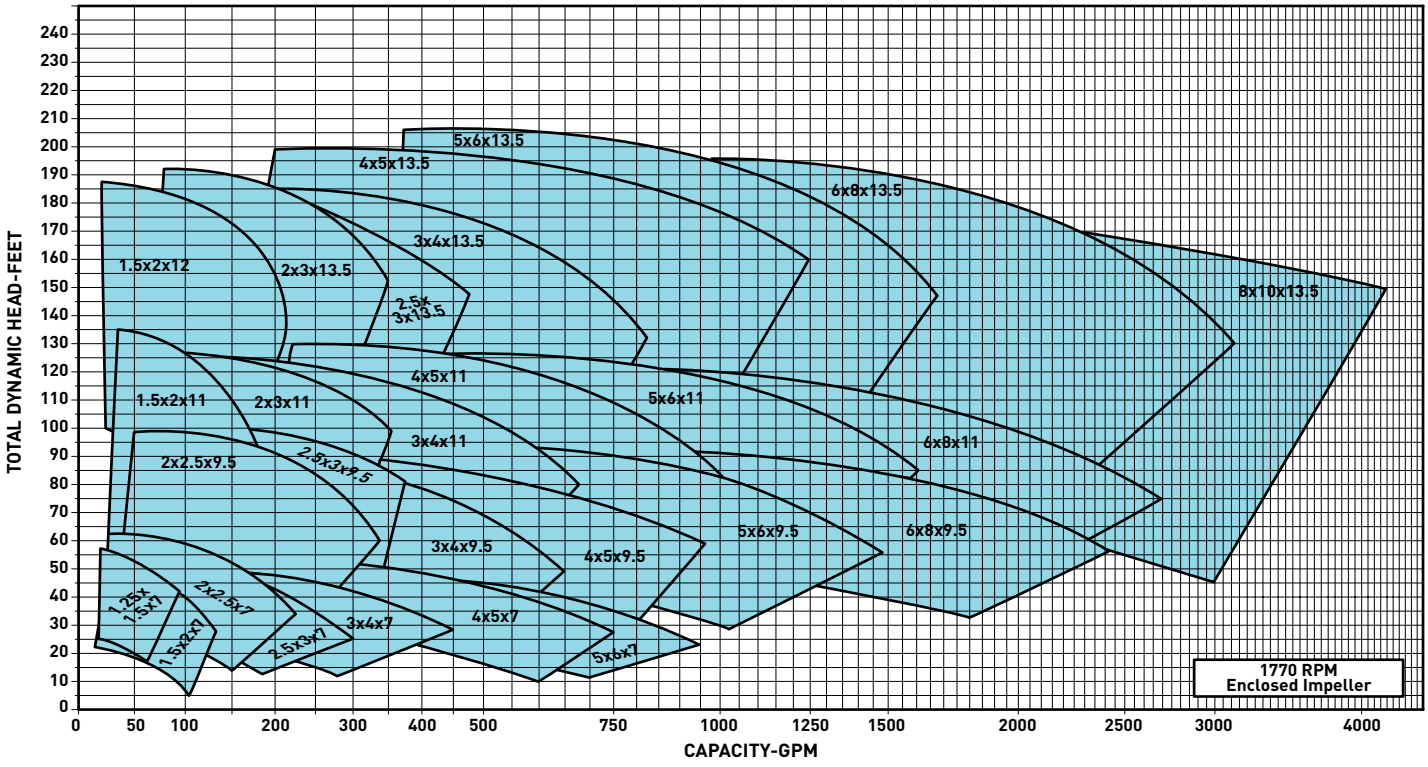
XL – denotes extra large power frame

Notes:

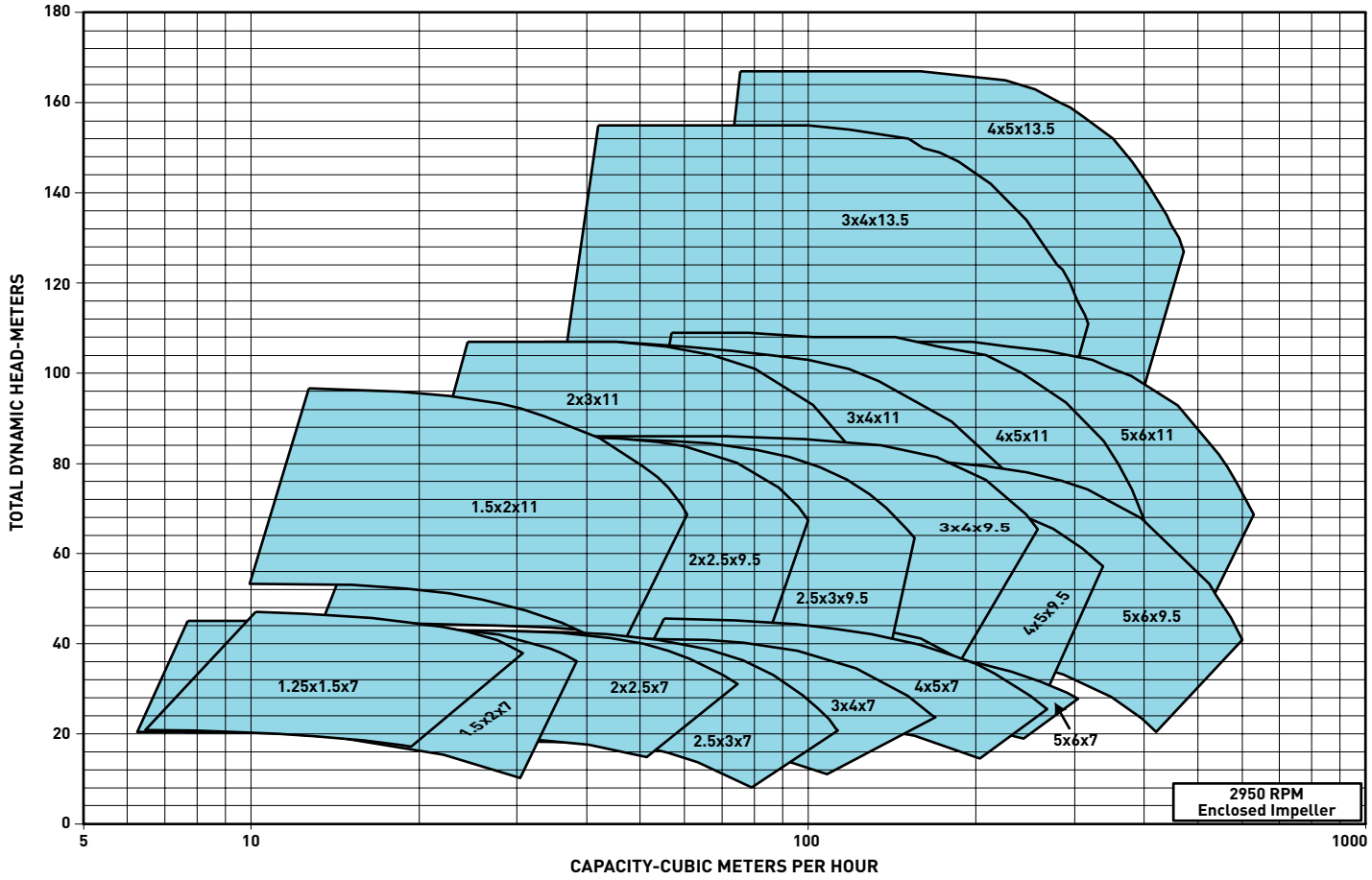
1. Dimensions are approximate.
2. All dimensions are in inches (mm) and may vary ± 1/4 (6).
3. Not for construction purposes unless certified.
   - ◆ Available in 250 lb./125 lb. Flanges
   - ● Dimensions do not match Bell & Gossett
4. ▬ Use extra large power frame with impeller diameters larger than 12.5 (318).
5. See 3800 dimension pages for base mount information.

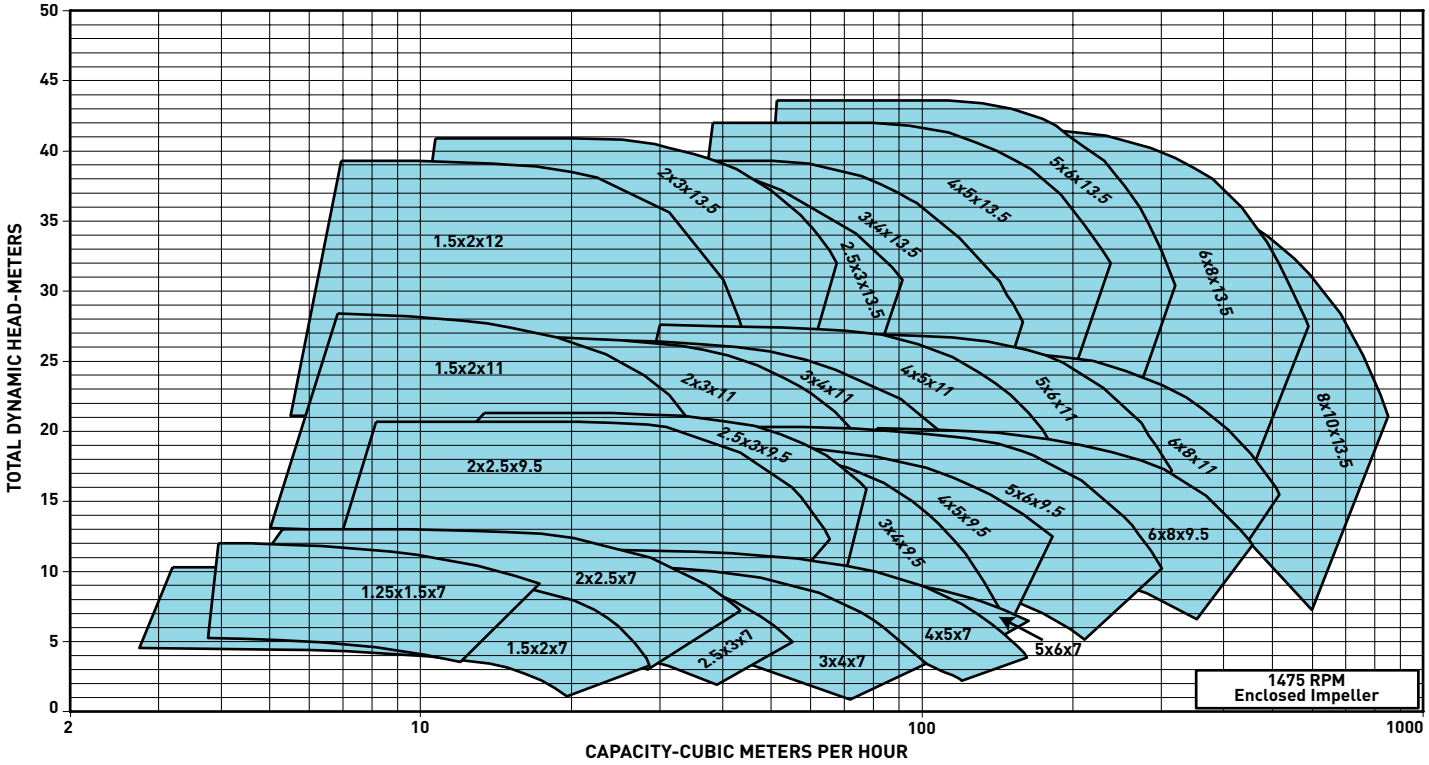
# 3550 and 1770 RPM Range Charts



# 2950 and 1475 RPM Range Charts



# Engineering Specifications

## 3800 Series Specifications

The contractor shall furnish (and install as shown on the plans) Aurora® model (3801 horizontal close coupled) (3804 horizontal flexible coupled) back pullout centrifugal pump size ___ x ___ x___ of stainless fitted construction.

Each pump shall have a capacity of ___ GPM at ___ ft. of total head, with a temperature of ___ F°, ___ specific gravity. Each pump is to be furnished with a mechanical seal with all metal parts to be 303 stainless steel with Buna-N elastomers, ceramic seat and carbon washer. The unit must be equipped with bronze shaft sleeve that extends the length of the seal plate. The pump shaft extension shall be gasket sealed from the pumped liquid. Impellers to be 316 stainless steel, dynamically balanced and key locked to the shaft.

## Flexible Coupled–Frame Mounted (3804)

Pump and motor are to be mounted on a common fabricated steel base plate. The shaft is to be steel, installed in a cast iron power frame. Pumps shall have a shaft design of .002" deflection at the seal face with the pump running under maximum load condition. Grease ball bearings have a 3-year minimum life (AFBMA B10) under the maximum condition of load. The pump shall be flexible coupled to a standard horizontal NEMA ___ HP, ___ phase, ___ Hertz, ___ volts, ___ RPM (open drip-proof) (totally enclosed fan cooled) motor. Alignment shall be checked in accordance with the standards of the Hydraulic Institute after installation and there shall be no strain transmitted to the pumps.

## Materials of Construction

| Pump Part | Stainless Fitted |
|---|---|
| Casing | Cast iron ASTM A48 |
| Impeller | 316 stainless steel |
| Seal plate/motor bracket | Cast iron ASTM A48 |
| Shaft | Steel AISI 1018 |
| Sleeve | Bronze ASTM B62 |
| Power frame (3804) (PF1, PF2, PF3 or PF21A) | Cast iron ASTM A48 |
| Mechanical seal | 303 stainless steel metal parts, Buna-N elastomer parts, ceramic seat and carbon washer |

## Design Details

| Area | Description | Power Frame | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 21A |
| Pump Shaft | Rotation–from driver end | CW | CW | CW | CW |
| | Diameter at impeller | 0.88 | 1.25 | 1.25 | 1.63 |
| | Diameter at shaft sleeve | 1 | 1.38 | 1.38 | 1.75 |
| | Diameter between bearings | 1.38 | 1.94 | 2.38 | 3.25 |
| | Diameter at coupling end | 0.88 | 1.13 | 1.13 | 2.38 |
| | Coupling key–square | 0.19 | 0.25 | 0.25 | 0.63 |
| | Max. deflection at seal face | 0.002 | 0.002 | 0.002 | 0.002 |
| Ball Bearings | Bearing (inboard radial) | 206K | 308K | 310K | 313 |
| | Bearing (outboard thrust) | 206KG | 308KG | 310KG | 5313 |
| | Bearing centers | 5.69 | 7.69 | 7.69 | 9.63 |
| | Bearing type | Ball | Ball | Ball | Ball |
| | Min B10 bearing life under maximum load | 3 years | 3 years | 3 years | 3 years |
| Sleeve | Outside diameter of sleeve | 1.13 | 1.50 | 1.50 | 2 |

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# AUTOMATIC POOL FILLER
## MODEL T40-F

## Installation Instructions

Prior to installation, check local building codes for exceptions to these instructions.

1. Install leveler bucket so top of bucket is flush with bond beam of pool (See Fig. A). Ring and Lid then should be installed flush with deck. Use rebar mounting flanges provided on bucket to insure and aid in keeping bucket level during concrete pour.

2. Install 1½" equalizer pipe. IMPORTANT: Equalizer pipe must be straight, as shown in Figure A. The use of any 45° or 90° pipe could cause air lock and void warranty. Use only PVC to ABS transition cement for this application.

3. Connect 3/4" fresh water supply pipe to side leveler bucket. (See Fig. A). Special Note: Please allow adequate cure time as per cement manufacturer before applying pressure.

4. You can pressure test auto-fill with supplied fitting P/N 210067. (See Fig. D). CAUTION: Do not over tighten.

5. Remove test plug and flush supply line for approximately 60 seconds or until all debris has cleared.

6. Connect 3/4" overflow pipe in port (See Fig. A), using a PVC to ABS transition cement.

7. Install valve assembly, Fluidmaster® Valve with PTFE thread seal tape. IMPORTANT: Do not use liquid or paste sealers. Pentair Water Pool and Spa, Inc. does not cover warranty if damaged because of over tightening or cross threading.

8. To adjust float height of Fluidmaster® valve, lightly press down the top of fill valve with one hand, while turning clockwise or counter-clockwise to adjust valve. Continue turning until water level is achieved. (See Figure E).

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www.pentairpool.com or www.staritepool.com

P/N YYLEVF Rev. C 12/2015

# AUTOMATIC POOL FILLER
# INSTALLATION GUIDES
# Model # T40-F

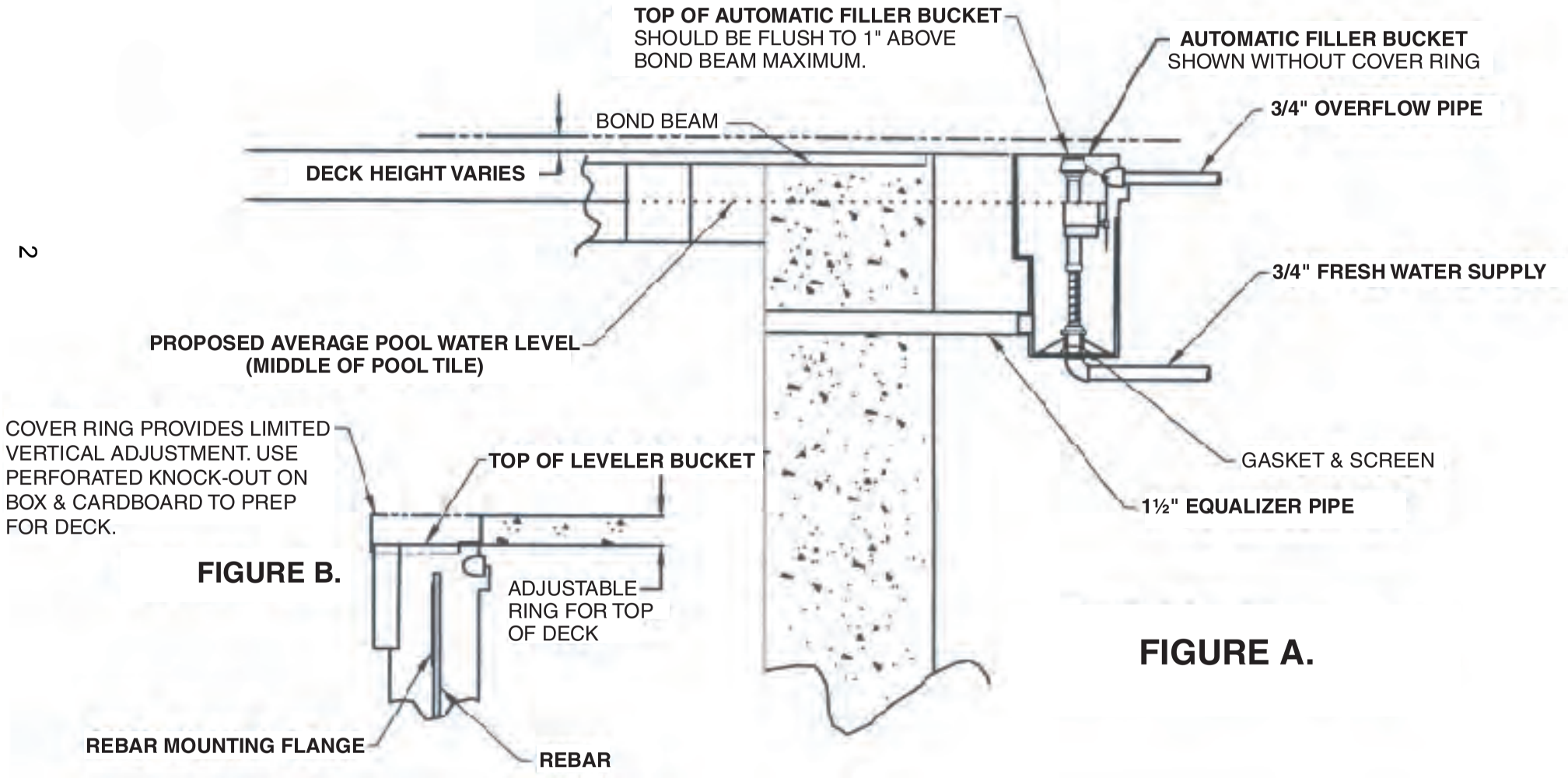
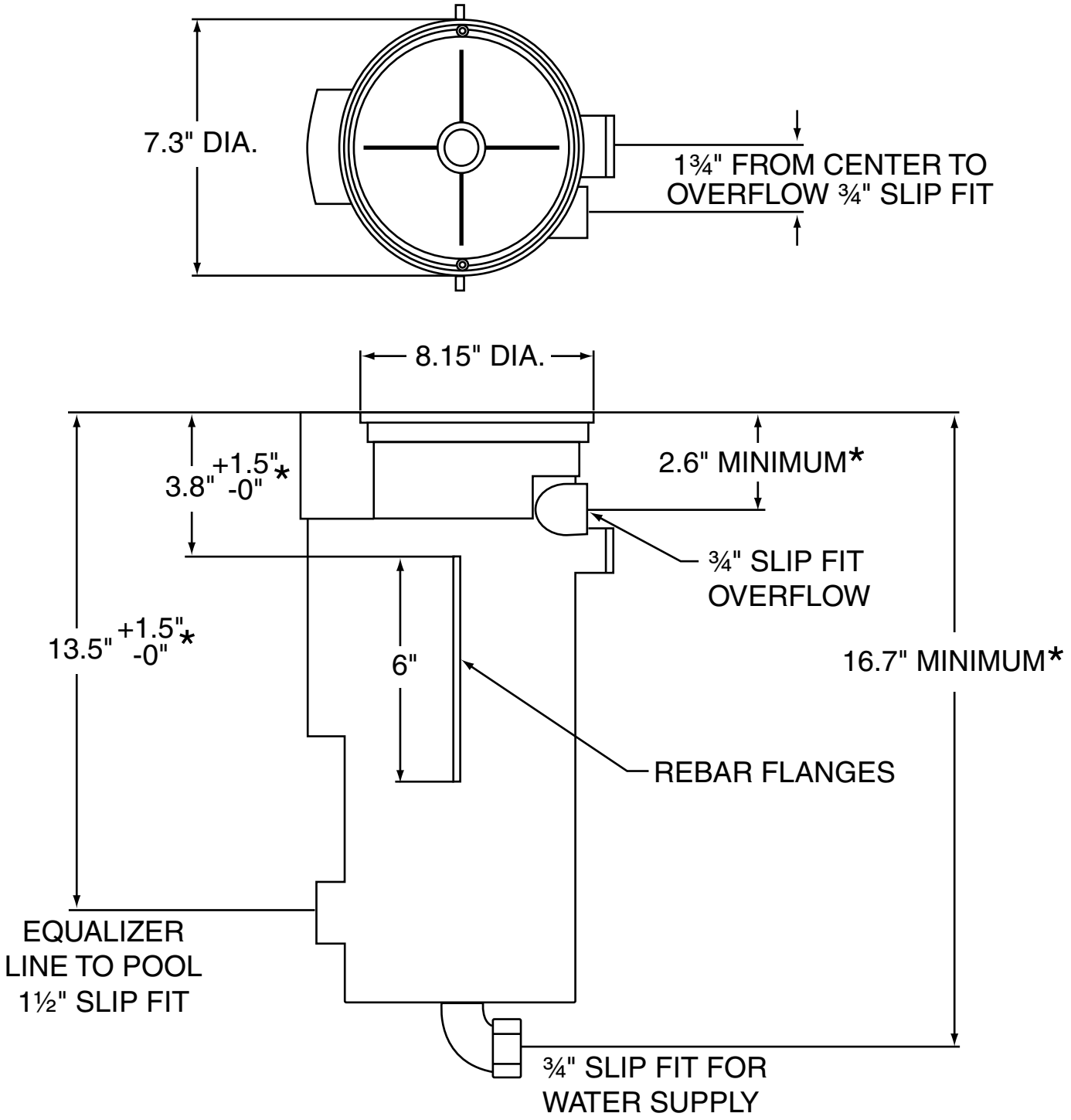



FIGURE B.

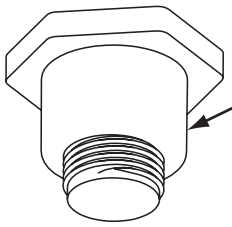
FIGURE A.




## FIGURE C.

* REFER TO FIGURE A OF INSTALLATION INSTRUCTIONS FOR HEIGHT OF DECK CONSIDERATIONS.

## Teat Plug

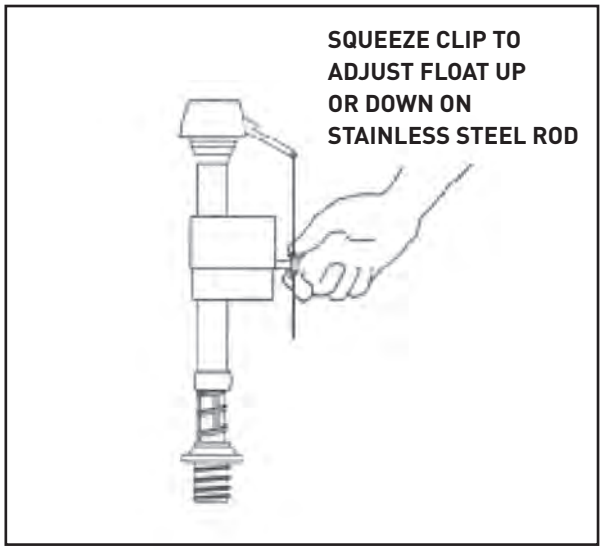


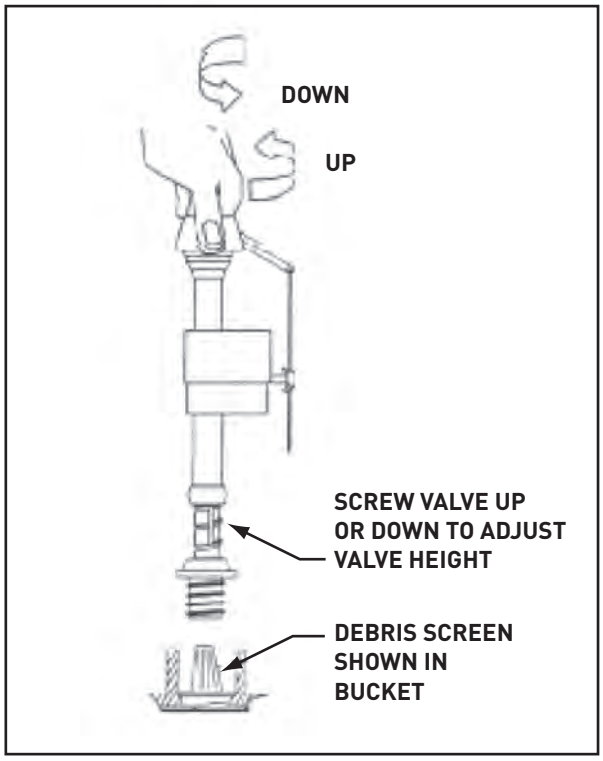
**P/N 210067**
**WITH O-RING**
**(PLUG HAS NO THROUGH HOLE)**

**(SUPPLIED BY PENTAIR WATER POOL AND SPA, INC.)**

**CAUTION: DO NOT OVER-TIGHTEN!**

**Figure D**




**TO CLEAR SAND AND DEBRIS FROM SUPPLY LINE, REMOVE DEBRIS SCREEN, AND CLEAN SCREEN. THEN REINSTALL SCREEN AND VALVE.**

**Figure E**

Pentair Water Pool and Spa, Inc.
1620 Hawkins Ave., Sanford, NC 27330 • (800) 831-7133 • (919) 566-8000
10951 West Los Angeles Ave., Moorpark, CA 93021 • (800) 831-7133 • (805) 553-5000
www.pentairpool.com or www.staritepool.com

PENTAIR

BIOSHIELD®

# BIOSHIELD®

## UV STERILIZER

Neutralize harmful bacteria while using less chlorine.


PENTAIR.COM

eco select™ TRADEGRADE

# GIVE YOURSELF THE PEACE OF MIND OF CLEANER POOL WATER.

Pool water can be a breeding ground for several kinds of harmful bacteria and pathogens that can cause Recreation Water Illnesses (RWIs). That's why Pentair has harnessed the power of UV light to neutralize bacteria and prevent its reproduction. The BioShield® UV Sterilizer provides instant protection as it "zaps" those harmful waterborne pathogens, providing cleaner, safer pool water for friends and family.

Neutralizes harmful bacteria and pathogens instantly

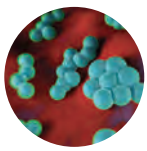
Reduces chlorine use

Commercial-grade sterilization power

## KEEP UNINVITED GUESTS OUT OF YOUR POOL.

You want your backyard oasis to be relaxing, enjoyable and protected. Keeping your pool water sparkling clean and virtually bacteria free is your top priority, and BioShield is the proven way to do it—without producing harmful byproducts. With the power of UV light, you'll neutralize harmful bacteria while using less chlorine, for less hassle and reduced odors.

Here are some of the unwanted guests you'll kick out of your pool:



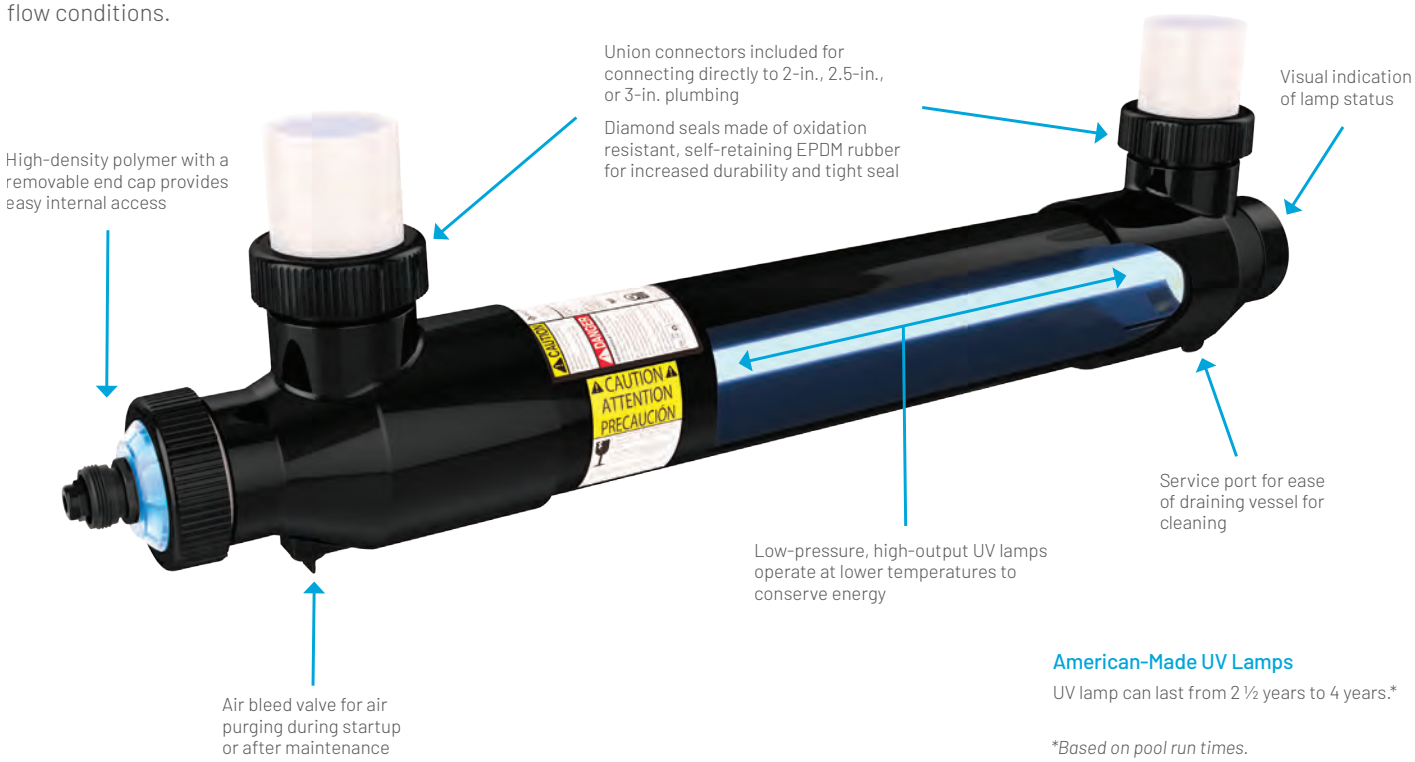
**Cryptosporidium** is a leading cause of waterborne illness and is highly resistant to chlorine disinfection.

**Giardia** is a microscopic parasite that causes severe intestinal discomfort.

**E.coli bacteria** can cause urinary tract infections, respiratory illness and other health issues.

## AUTOMATION READY.

BioShield UV Sterilizer pairs perfectly with IntelliTouch® or EasyTouch® Pool Control Systems and IntelliChlor® Salt Chlorine Generators and/or IntelliChem® Water Chemistry Controllers for ultimate pool control and operation ease. Automatic shut-off feature protects the unit and prolongs the lamp life under low flow conditions.



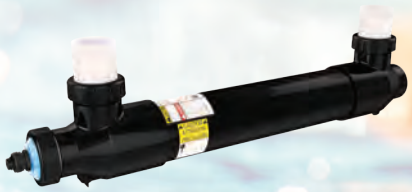

### American-Made UV Lamps

UV lamp can last from 2 ½ years to 4 years.*

**Based on pool run times.*

# BIOSHIELD®

## UV STERILIZER



### DECADES OF LEADING THE WAY TO CLEANER WATER.

Pentair has a long history of managing and treating water with advanced technology in water filtration and purification serving commercial, municipal and residential customers around the world.

We've made safe drinking water more accessible by treating and purifying water for reuse and desalination. Our comprehensive line of compatible water filtration and purification products help make water cleaner, clearer and safer for everything from agriculture to industry to the refreshing pool in your backyard.

PENTAIR

eco select™

The BioShield® UV Sterilizer has earned the Eco Select® brand distinction as one of the greenest and most efficient choices from Pentair.

TRADEGRADE

The TradeGrade family of products is exclusively made for and sold by the world's most demanding pool professionals.

1620 Hawkins Ave | Sanford, NC 27330 | United States | 800.831.7133 | pentair.com

# Data Sheet

## Series C
# Electronic Metering Pumps

## Configuration Data

Model C92 1 - 363SI

**Control & Output Code**

**Manual Control**

Speed (stroking frequency) and stroke length manually adjustable.

C10 --- 1.3 GPH (4.9 l/h) ... 300 psi (20.7 Bar)
C11 --- 2.5 GPH (9.5 l/h) ... 150 psi (10.3 Bar)
C12 --- 4.0 GPH (15.1 l/h) ... 100 psi (6.9 Bar)
C13 --- 8.0 GPH (30 l/h) ..... 60 psi (4.1 Bar)
C14 --- 20 GPH (76 l/h) ..... 25 psi (1.7 Bar)

**Instrument Responsive/Manual Control**

Manual adjustment features of C1 Series plus switch conversion to external control for automatic systems.

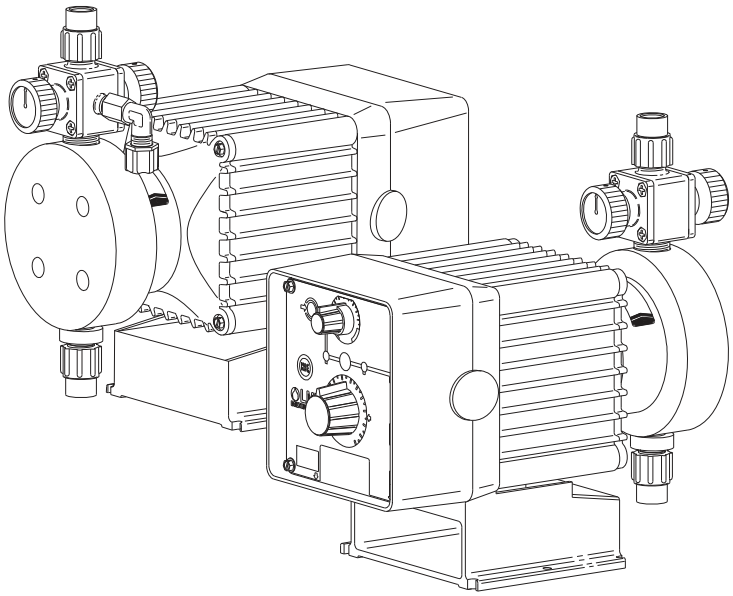
C70 --- 1.3 GPH (4.9 l/h) ... 300 psi (20.7 Bar)
C71 --- 2.5 GPH (9.5 l/h) ... 150 psi (10.3 Bar)
C72 --- 4.0 GPH (15.1 l/h) ... 100 psi (6.9 Bar)
C73 --- 8.0 GPH (30 l/h) ..... 60 psi (4.1 Bar)
C74 --- 20 GPH (76 l/h) ..... 25 psi (1.7 Bar)
C76* --- 4.0 GPH (15.1 l/h) ... 175 psi (12.1 Bar)
C77* --- 10 GPH (38 l/h) ..... 80 psi (5.5 Bar)
C78* --- 25 GPH (95 l/h) ..... 30 psi (2.07 Bar)
C90 --- 1.3 GPH (4.9 l/h) ... 300 psi (20.7 Bar)
C91 --- 2.5 GPH (9.5 l/h) ... 150 psi (10.3 Bar)
C92 --- 4.0 GPH (15.1 l/h) ... 100 psi (6.9 Bar)
C93 --- 8.0 GPH (30 l/h) ..... 60 psi (4.1 Bar)
C94 --- 20 GPH (76 l/h) ..... 25 psi (1.7 Bar)

**Voltage Code**

1 ------- 120 VAC US Plug
2 ------- 240 VAC US Plug
3 ------- 220-240 VAC DIN Plug
5 ------- 240-250 VAC, UK Plug
6 ------- 240-250 VAC, AUST/NZ Plug
7 ------- 220-240 VAC, SWISS Plug

**Liquid End**

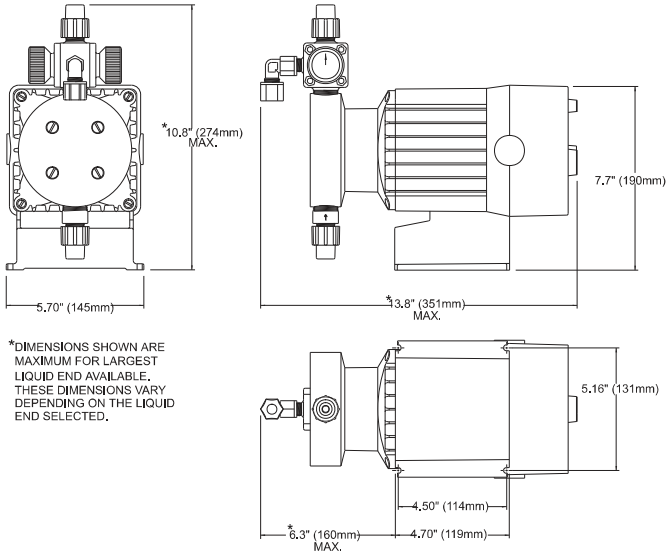
See next page for complete liquid end specifications and selection.



## Specifications

| Series | Strokes Per Minute (Adjustable) Min | Max | Stroke Length (Adjustable) Recommended Minimum | Average Input Power @Max Speed | Shipping Weight |
|---|---|---|---|---|---|
| C10, C70, C90<br>C11, C71, C91<br>C12, C72, C92<br>C13, C73, C93<br>C14, C74, C94 | 1 | 100 | 10% | 44 watts | 20 lbs (9.1 kg) |
| C76<br>C77<br>C78 | 1 | 100 | 10% | 87 watts | 28 lbs (12.7 kg) |

## Dimensions




*DIMENSIONS SHOWN ARE MAXIMUM FOR LARGEST LIQUID END AVAILABLE. THESE DIMENSIONS VARY DEPENDING ON THE LIQUID END SELECTED.


LMI MILTON ROY

201 Ivyland Road
Ivyland, PA 18974 USA
TOLL FREE: (800) 564-1097
TEL: (215) 293-0401
FAX: (215) 293-0445
http://www.lmipumps.com





Replaces same of Rev.H 09/07
1712.I 06/09

## Standard Liquid End Configuration Data & Materials of Construction

| Drive Assembly | Liquid End No. | Size Code | Materials of Construction: Head & Fittings | Balls | Liquifram™ | Check Valve | Accessory | Tubing & Connections: Discharge | Suction |
|---|---|---|---|---|---|---|---|---|---|
| C90, C70 ■ - | 498SP | 0.9 | PVC | Ceramic | Fluorofilm™ | PVDF / PTFE | 4FV | Pipe 1/2" NPT M | |
| C10 ■ - | 297 | 0.9 | 316 S.S. | 316 S.S. | Fluorofilm™ | 316 S.S. | | Pipe 1/4" NPT M | |
| | 468SI | 1.8 | PVC / PVC | Ceramic | Fluorofilm™ | PVDF / Polyprel® | 4FV | PE .375" O.D. | |
| | 460SI | 1.8 | Acrylic / PVC | Ceramic | Fluorofilm™ | PVDF / Polyprel® | 4FV | PE .375" O.D. | |
| C92 ■ - | 469SI | 1.8 | Acrylic / PVDF | PTFE | Fluorofilm™ | PVDF / Polyprel® | 4FV | PE .375" O.D. | |
| C91 ■ - | 368SI† | 1.8 | PVC / PVC | Ceramic | Fluorofilm™ | PVDF / Polyprel® | 4FV | PE .375" O.D. | |
| C72 ■ - | 362SI† | 1.8 | PVDF / PVDF | Ceramic | Fluorofilm™ | PVDF / Polyprel® | 4FV | PE .375" O.D. | |
| C71 ■ - | 363SI† | 1.8 | PVDF / PVDF | Ceramic | Fluorofilm™ | PVDF / PTFE | 4FV | PE .375" O.D. | |
| C12 ■ - | 465SI | 1.8 | Polypropylene | Ceramic | Fluorofilm™ | PVDF / PTFE | 4FV | PE .375" O.D. | |
| C11 ■ - | 75HV | 1.8 | Polypropylene | 316 S.S. | Fluorofilm™ | PTFE | | PE .5" O.D. | Vinyl .938" O.D. |
| | 76HV | 1.8 | Acrylic/PP | 316 S.S. | Fluorofilm™ | Hypalon® | | PE .5" O.D. | Vinyl .938" O.D. |
| | 277 | 1.8 | 316 S.S. | 316 S.S. | Fluorofilm™ | 316 S.S. | | Pipe 1/4" NPT M | |
| | 312SI# | 3.0 | PVDF / PVDF | Ceramic | Fluorofilm™ | PVDF / Polyprel® | 4FV | PE .5" O.D. | |
| | 313SI# | 3.0 | PVDF / PVDF | Ceramic | Fluorofilm™ | PVDF / PTFE | 4FV | PE .5" O.D. | |
| | 318SI# | 3.0 | PVC / PVC | Ceramic | Fluorofilm™ | PVDF / Polyprel® | 4FV | PE .5" O.D. | |
| | 410SI# | 3.0 | Acrylic / PVC | Ceramic | Fluorofilm™ | PVDF / Polyprel® | 4FV | PE .5" O.D. | |
| | 415SI# | 3.0 | Polypropylene | Ceramic | Fluorofilm™ | PVDF / PTFE | 4FV | PE .5" O.D. | |
| C93 ■ - | 418SI# | 3.0 | PVC / PVC | Ceramic | Fluorofilm™ | PVDF / Polyprel® | 4FV | PE .5" O.D. | |
| C73 ■ - | 419SI# | 3.0 | Acrylic / PVDF | PTFE | Fluorofilm™ | PVDF / Polyprel® | 4FV | PE .5" O.D. | |
| C13 ■ - | 20 | 3.0 | Acrylic / PVC | Ceramic | Fluorofilm™ | Hypalon® | | PE .5" O.D. | |
| | 20HV | 3.0 | Acrylic/PP | 316 S.S. | Fluorofilm™ | Hypalon® | | PE .5" O.D. | Vinyl .938" O.D. |
| | 20S | 3.0 | Acrylic/PVC | Ceramic | Fluorofilm™ | Hypalon® | 4FV | PE .5" O.D. | Vinyl .5" O.D. |
| | 24 | 3.0 | PVC | Ceramic | Fluorofilm™ | PTFE | | Pipe 1/2" NPT M | |
| | 25HV | 3.0 | Polypropylene | 316 S.S. | Fluorofilm™ | PTFE | | PE .5" O.D. | Vinyl .938" O.D. |
| | 26 | 3.0 | PVC | Ceramic | Fluorofilm™ | Viton® | | PE .5" O.D. | |
| | 26S | 3.0 | PVC | Ceramic | Fluorofilm™ | Viton® | 4FV | PE .5" O.D. | |
| | 27 | 3.0 | 316 S.S. | 316 S.S. | Fluorofilm™ | PTFE | | Pipe 1/2" NPT M | |
| | 29 | 3.0 | UHMW PE | Ceramic | Fluorofilm™ | Hypalon® | | PE .5" O.D. | |
| | 30 | 6.0 | Acrylic/PVC | Ceramic | Fluorofilm™ | PTFE | | PE .5" O.D | Vinyl .5" O.D. |
| C94 ■ - | 34 | 6.0 | PVC | Ceramic | Fluorofilm™ | PTFE | | Pipe 1/2" NPT M | |
| C78 ■ - | 35P | 6.0 | Polypropylene | Ceramic | Fluorofilm™ | PTFE | | Pipe 1/2" NPT M | |
| C74 ■ - | 35T | 6.0 | Polypropylene | Ceramic | Fluorofilm™ | PTFE | | PE .5" O.D. | |
| C14 ■ - | 36 | 6.0 | PVC | Ceramic | Fluorofilm™ | PTFE | | PE .5" O.D. | |
| | 37 | 6.0 | 316 S.S. | 316 S.S. | Fluorofilm™ | PTFE | | Pipe 1/2" NPT M | |
| | 468SP | 1.8 | PVC/PVC | Ceramic | Fluorofilm™ | PVDF / Polyprel® | 4FV | Pipe 1/2" NPT M | |
| C76 ■ - | 74S | 1.8 | PVC | Ceramic | Fluorofilm™ | PTFE | 4FV | Pipe 1/4" NPT M | |
| | 277 | 1.8 | 316 S.S. | 316 S.S. | Fluorofilm™ | 316 S.S. | | Pipe 1/4" NPT M | |
| | 20HV | 3.0 | Acrylic/PP | 316 S.S. | Fluorofilm™ | Hypalon® | | PE .5" O.D. | Vinyl .938" O.D. |
| | 20S** | 3.0 | Acrylic/PVC | Ceramic | Fluorofilm™ | Hypalon® | 4FV | PE .5" O.D. | Vinyl .5" O.D. |
| C77 ■ - | 24 | 3.0 | PVC | Ceramic | Fluorofilm™ | PTFE | | Pipe 1/2" NPT M | |
| | 25HV | 3.0 | Polypropylene | 316 S.S. | Fluorofilm™ | PTFE | | PE .5" O.D. | Vinyl .938" O.D. |
| | 25P | 3.0 | Polypropylene | Ceramic | Fluorofilm™ | PTFE | | Pipe 1/2" NPT M | |
| | 25T | 3.0 | Polypropylene | Ceramic | Fluorofilm™ | PTFE | | PE .5" O.D. | |
| | 26S** | 3.0 | PVC | Ceramic | Fluorofilm™ | Viton® | 4FV | PE .5" O.D. | |
| | 27 | 3.0 | 316 S.S. | 316 S.S. | Fluorofilm™ | PTFE | | Pipe 1/2" NPT M | |
| | 29 | 3.0 | UHMW PE | Ceramic | Fluorofilm™ | Hypalon® | | PE .5" O.D. | |

## Output Information

| Series | Gallons per Hour Min | Gallons per Hour Max | Liters per Hour Min | Liters per Hour Max | mL/cc per Minute Min | mL/cc per Minute Max | mL/cc per Stroke Min | mL/cc per Stroke Max | Maximum Injection Pressure |
|---|---|---|---|---|---|---|---|---|---|
| C10, C70*, C90* | 0.001 | 1.3 | 0.005 | 4.9 | 0.08 | 82 | 0.08 | 0.82 | 300 psi (20.7 Bar) |
| C11, C71*, C91* | 0.003 | 2.5 | 0.010 | 9.5 | 0.16 | 158 | 0.16 | 1.58 | 150 psi (10.3 Bar) |
| C12, C72*, C92* | 0.004 | 4.0 | 0.015 | 15.1 | 0.25 | 252 | 0.25 | 2.52 | 100 psi (6.9 Bar) |
| C13, C73*, C93* | 0.008 | 8.0 | 0.030 | 30.0 | 0.51 | 505 | 0.51 | 5.05 | 60 psi (4.1 Bar) |
| C14, C74*, C94* | 0.020 | 20.0 | 0.076 | 76.0 | 1.26 | 1262 | 1.26 | 12.62 | 25 psi (1.7 Bar) |
| C76* | 0.004 | 4.0 | 0.015 | 15.1 | 0.25 | 252 | 0.25 | 2.52 | 175 psi (12.1 Bar) |
| C77* | 0.010 | 10.0 | 0.038 | 38.0 | 0.63 | 631 | 0.63 | 6.31 | 80 psi (5.5 Bar) |
| C78* | 0.025 | 25.0 | 0.095 | 95.0 | 1.58 | 1577 | 1.58 | 15.77 | 30 psi (2.07 Bar) |

* Minimum output is based on 1 stroke per minute and 10% stroke setting, minimum output can be reduced further in external mode. Series C9 pumps may be programmed for strokes per hour for lower outputs.

## AutoPrime Liquid End Configuration Data & Materials of Construction

| Drive Assembly | Liquid End No. | Size Code | Head & Fittings | Balls | Liquifram™ | Check Valve | Accessory | Tubing & Connections |
|---|---|---|---|---|---|---|---|---|
| C11 C71 C91 | D60HI | 1.8 | Acrylic / PVC | Ceramic | Fluorofilm™ | PVDF / Polyprel® | 4FV | PE .375" O.D. |
| C12 C72 C92 | D68HI | 1.8 | PVC / PVC | Ceramic | Fluorofilm™ | PVDF / Polyprel® | 4FV | PE .375" O.D. |

## Output Information - Autoprime Liquid Ends (Liquid end models beginning with "D")

| Series | Maximum Output GPH | Maximum Output Liters/hr | Maximum Output mL/cc per minute | Maximum Output mL/cc per stroke | Maximum Pressure PSI | Maximum Pressure Bar |
|---|---|---|---|---|---|---|
| C11, C71, C91 | 2 | 7.5 | 125.0 | 1.25 | 150 psi | 10.3 |
| C12, C72, C92 | 2.5 | 9.5 | 158.3 | 1.58 | 100 psi | 6.9 |

Auto prime liquid ends have 3 check valves: Suction on the bottom; Discharge on the front; Autoprime bleed on the top. By design, a repeatable portion of the process fluid continuously bleeds through the top check valve to be returned to the chemical supply. The result is the assurance that any gas in the head is automatically relieved thus eliminating air-binding. The maximum output per the tables above is reduced to account for the continuous bleed.

■ See front page for voltage code specifications.
Plastic heads with tubing connection include 1/2" NPT and 1/2" BSP.
**These Liquid Ends are available without a 4FV, simply drop the 'S' at the end of the Liquid End number to order the model without a 4FV.
#These liquid ends use 3/8" diameter balls. Pump output may be reduced in some applications.
†To specify ¼" NPT male, change 'I' to 'P'.
To specify black, UV resistant tubing, change "I"to "U".
To specify 3FV, change "S" to "T".
**3FV** indicates that the pump is equipped with an LMI Three Function Valve (pressure relief, priming aid, line drain).
**4FV** indicates that the pump is equipped with an LMI Four Function Valve. This diaphragm type, anti-syphon/pressure relief valve is installed on the pump head. It provides anti-syphon protection and aids priming, even under pressure.

Fluorofilm™ is a copolymer of PTFE and PFA. Polyprel® is an elastomeric PTFE copolymer.

Polyprel is a registered trademark of the Milton Roy Company.

Fluorofilm and Liquifram are trademarks of the Milton Roy Company.

Hypalon is a registered trademark of E. I. du Pont de Nemours & Co., Inc.

## Description

BECSys $CO_2$ Feed Systems provide a rugged and reliable solution to pH control in aquatics facilities. $CO_2$ is recognized as a safe and easy-to-use method for pH control.

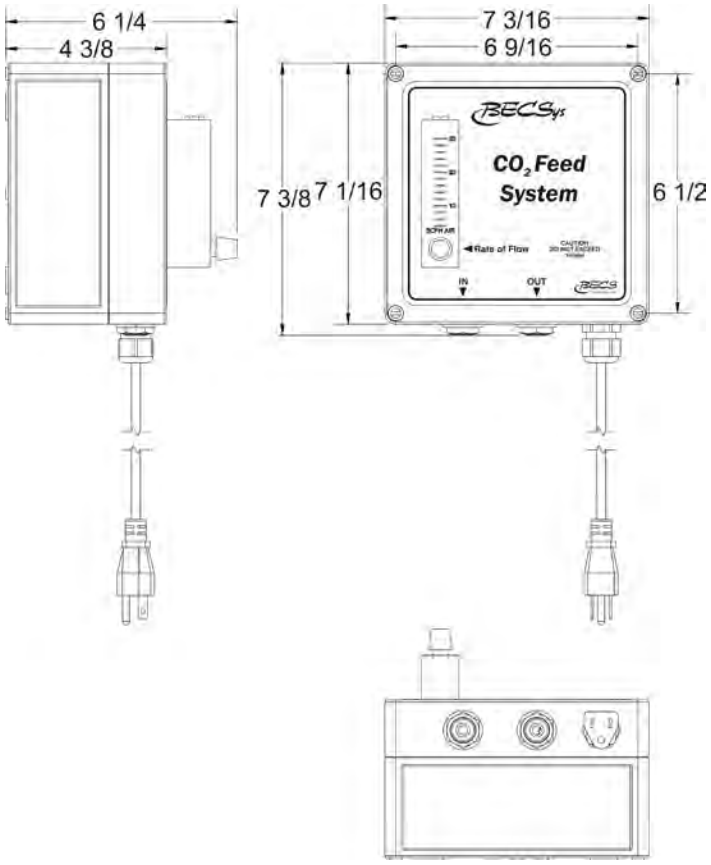
The BECSys $CO_2$ Feeder comes in two sizes of adjustable flow control:

- 4-30 SCFH
- 20-200 SCFH

There are also two injection methods available: diffuser or venturi eductor. The diffuser assembly is simple and effective. A check valve is included to prevent $CO_2$ tanks from filling with pool water as the $CO_2$ is depleted. The venturi eductor assembly is ideal for more demanding applications, requiring minimal maintenance. Internal mixing vanes assure optimal delivery of $CO_2$ into pool water with maximum gas-to-water transfer efficiency.

A full line of accessories is also available for the BECSys $CO_2$ Feed System including regulators, heaters and tank switchover units.

BECSys
**$CO_2$ Feeder**

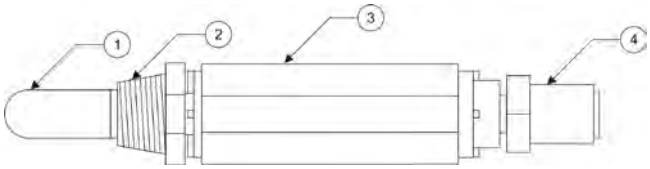

## Features

- NEMA housing
- 3/8” tubing included (10’)
- 3/8” press fittings
- Two models available
  - 4-30 SCFH
  - 20-200 SCFH
- Two $CO_2$ injection technologies
  - Diffuser
  - Venturi eductor
- 230 VAC version also available


9487 Dielman Rock Island Industrial Drive, St. Louis, MO 63132 (314) 567-0088 www.becs.com

## Diffuser Assembly

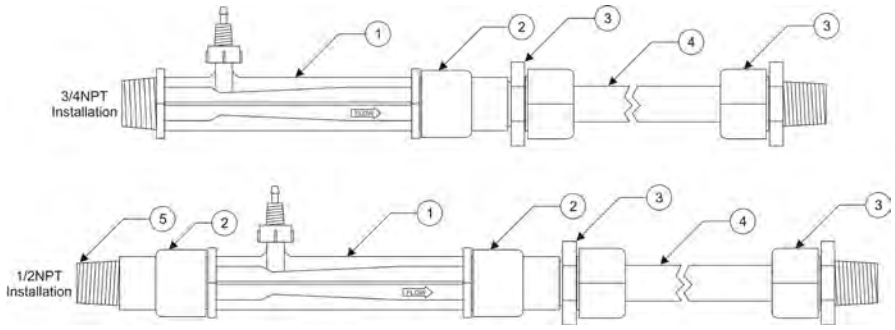
- Micro porous polyethylene diffuser
- Diffuser bushing with ½" NPT Process connection
- Check-valve included in assembly
- Push fitting for 3/8" OD tubing




| Diffuser Assembly (Part Number 2210326) | | |
|---|---|---|
| Item | Part Number | Description |
| 1 | 8060794 | Diffuser |
| 2 | 2220353 | Diffuser Bushing, ½" NPT |
| 3 | 8060792 | Check Valve, 1/4NPT |
| 4 | 8060757 | 1/4NPT Straight Adapter, 3/8 Tube |

## Eductor Assembly

- High-efficiency, venturi-type, differential pressure injector
- Internal mixing vanes
- Integral check valve
- Trouble-free operation; no moving parts
- Includes parts for either ¾NPT or ½NPT installation




| Eductor Assembly (Part Number 2210327) | | |
|---|---|---|
| Item | Part Number | Description |
| 1 | 8060795 | Eductor |
| 2 | 8060796 | 3/4NPT x 1/2NPT Reducer Coupling (2) |
| 3 | 8060797 | Compression Fitting, 1/2NPT x 5/8 Tube (2) |
| 4 | 8060802 | 5/8 OD Tubing, 15 ft |
| 5 | 8060541 | Pipe Nipple, 1/2NPT x Close |

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## Specifications

| Physical | |
|---|---|
| Enclosure Material | Glass Reinforced Polycarbonate, NEMA 4X (IP66) |
| Overlay Material | UV Stabilized Polyester |
| Input Power Cord (110VAC only) | SJTW Type, 6' length |
| Enclosure Dimensions | Width: 7.17" Height: 7.09" Depth: 4.37" |
| **Environmental** | |
| Storage Temperature | -30 to 60 °C |
| Ambient Operating Temperature | -18 to 40 °C |
| Ambient Humidity | 95% non condensing maximum |
| **Electrical** | |
| Voltage | 115/230 VAC, 50/60 Hz |
| Phase | Single |
| Current | 0.1 amps full load |

## Ordering/Specification Guide

| Part Number | Description & Options |
|---|---|
| **2100298-** | 4 – 30 SCFH $CO_2$ Feeder |
| ↓ | **Injector Type** |
| | **D** Diffuser Assembly |
| | **E** Eductor Assembly |
| | ↓ **Input Voltage** |
| | **1** 115 VAC Input Power |
| | **2** 230 VAC Input Power |
| **2100298-D1** | **Sample Part Number**<br>4-30 SCFH $CO_2$ Feeder with diffuser assembly for 115 VAC input power |

| Part Number | Description & Options |
|---|---|
| **2100299-** | 20 – 200 SCFH $CO_2$ Feeder |
| ↓ | **Injector Type** |
| | **D** Diffuser Assembly |
| | **E** Eductor Assembly (recommended) |
| | ↓ **Input Voltage** |
| | **1** 115 VAC Input Power |
| | **2** 230 VAC Input Power |
| | ↓ **Heaters** |
| | **O** One Heater (rated for up to 100 SCFH) |
| | **T** Two Heaters (in parallel, will handle up to 200 SCFH) |
| | **X** No Heaters |
| **2100299-E1T** | **Sample Part Number**<br>20-200 SCFH $CO_2$ Feeder with eductor assembly for 115 VAC input power with two heaters |



9487 Dielman Rock Island Industrial Drive, St. Louis, MO 63132 (314) 567-0088 www.becs.com

# $CO_2$ Accessories

## Single Tank Regulator

- BECS PN: 9680043
- Forged brass body and housing cap
- 2” guages
- Stem type seat mechanism
- Diaphragm: 1¾”
- Delrin cap bushing for smooth adjustments
- External self-reseating relief valve (not designed to protect downstream apparatus)
- Sintered inlet filter
- Inlet fitting: CGA 320
- Weight: 2 lb 15 oz
- Maximum inlet: 3000 PSIG
- Delivery Range: 4-80 PSIG

Regulator – PN 9680043

## Heater

- Two versions available: 120VAC and 240VAC
  - 120VAC, 60 Hertz, single phase
    - PN: 9680045
  - 240VAC, 60 Hertz, single phase
    - PN: 9680046
- Case: Aluminum
- Expansion Chamber: Solid Brass
- Dimensions: 2” Diameter, 6” Overall length
- Fittings: Solid Brass for CO2 cylinders, CGA 320
- Power Consumption: 100 Watts
- Capacity: 90 scfh

120VAC Heater
PN 9680045

240VAC Heater
PN 9680046



9487 Dielman Rock Island Industrial Drive, St. Louis, MO 63132 (314) 567-0088 www.becs.com

## Dual Tank Switchover

- BECS PN: 2210343
- Dual tank manual switchover
- Includes pressure regulator with gauges


CO2 Dual Tank Switchover
PN 2210343

## Automatic Dual Tank Switchover

- BECS PN: 9680044
- Automatically switches to full $CO_2$ tank when the tank in use becomes empty
- Cylinder in use indicator
- Output is unregulated; requires Single Tank Regulator (9680043)
- Inlet Pressure: 3000 psig max
- Changeover Pressure: 185 psig +/- 15 psig
- Flow Rate: 2625 cfh @2000 psig inlet, 525 cfh @250 psig inlet


Automatic Dual $CO_2$ Tank Switchover
PN 9680044



9487 Dielman Rock Island Industrial Drive, St. Louis, MO 63132 (314) 567-0088 www.becs.com

PENTAIR

# ETi® 400 HIGH EFFICIENCY HEATER
## INSTALLATION AND USER'S GUIDE

**⚠ WARNING**

**FOR YOUR SAFETY - READ BEFORE OPERATING**

If you do not follow these instructions exactly, a fire or explosion may result, causing property damage, personal injury or loss of life. For additional free copies of this manual; call USA (800) 831-7133

**FOR YOUR SAFETY** - This product must be installed and serviced by authorized personnel, qualified in pool/spa heater installation. Improper installation and/or operation can create carbon monoxide gas, fire or explosion, and flue gases which can cause serious injury, property damage, or death. For indoor installations, as an additional measure of safety, Pentair Water Pool and Spa, Inc. strongly recommends installation of suitable **Carbon Monoxide detectors** in the vicinity of this appliance and in any adjacent occupied spaces. Improper installation and/or operation will void the warranty.

**⚠ WARNING**

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or death. Installation and service must be performed by a qualified installer, service agency or the gas supplier.

| 120 / 240 VAC NATURAL GAS / LP GAS | |
|---|---|
| **Model** | **Natural** |
| ETi® 400 NA - ASME | 461113 |


**OWNER: Retain For Future Reference**

## FOR YOUR SAFETY

### WHAT TO DO IF YOU SMELL GAS

- Do not try to light any appliance.
- Do not touch any electrical switch; do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your gas supplier, call the fire department.

DO NOT store or use gasoline or other flammable vapors and liquids in the vicinity of this or other appliances.

Pentair Water Pool and Spa, Inc.
1620 Hawkins Ave., Sanford, NC 27330 • (800) 831-7133 or (919) 566-8000
10951 W. Los Angeles Ave., Moorpark, CA 93021 • (800) 831-7133 or (805) 553-5000

## Customer Service and Technical Support

If you have questions about ordering Pentair Water Pool and Spa, Inc. replacement parts, and pool products, please call:

**Phone: (800) 831-7133**

**Fax: (800) 284-4151**

(8 AM to 7:30 PM Eastern Time/Pacific Time)

Web sites: www.pentair.com

Contents

Contents

# Warning and Safety Instructions

## IMPORTANT SAFETY INSTRUCTIONS
## READ AND FOLLOW ALL INSTRUCTIONS
## SAVE THESE INSTRUCTIONS

### ETi® 400 High Efficiency Pool and Spa Heater

Thanks you for choosing the Pentair ETi® 400 High Efficiency Pool and Spa Heater. With proper installation and service of your new heating system, and correct chemical maintenance of the water will ensure years of heater operation. The ETi 400 High Efficiency heater is equipped with Pentair advanced heater technology which includes a multifunction temperature controller to continuously monitor the heater for proper operation. ETi 400 High Efficiency heaters are designed with direct spark ignition (DSI) for on demand heat, which eliminates the need for a standing pilot.

**SPECIAL INSTRUCTIONS TO OWNER:** Retain this manual for future reference. This instruction manual provides operating instructions, installation and service information for the heater. **READ AND REVIEW THIS MANUAL COMPLETELY,** it is very important that the owner/installer read and understand the section covering installation instructions, and recognize the local and state codes before installing the ETi 400 High Efficiency heater. Its use will reduce service calls and chance of injury and will lengthen product life. History and experience has shown that most heater damage is caused by improper installation practices.

## IMPORTANT NOTICES

**For the installer and operator of the ETi 400 High Efficienc Heater:** The manufacturer's warranty may be void if, for any reason, the heater is improperly installed and/or operated. Be sure to follow the instructions set forth in this manual. If you need any more information, or if you have any questions regarding to this pool heater, please contact Pentair Water Pool and Spa Customer Support at (800) 831-7133.

## HEATER APPLICATION INFORMATION

The ETi 400 Heater is sold with a limited factory warranty. Pentair Water Pool and Spa high standards of excellence include a policy of continuous product improvement resulting in your advanced technology pool and spa heater. Pentair reserves the right to make improvements which change the specifications of the heater without incurring an obligation to update the current heater equipment.

The ETi 400 Heater is designed for the heating of chlorine, bromine or salt system swimming pools and spas. The heater should never be employed for use as space heating boilers or general purpose water heaters. The manufacturer's warranty may be void if, for any reason, the heater is improperly installed and/or operated. Be sure to follow the instructions set forth in this manual.

## CODE REQUIREMENTS

Installation must be in accordance with all local codes and/or the latest edition of the National Fuel Gas Code, ANSI Z223.1 and the latest edition of the National Electrical Code, NFPA 70 (US).

Installation in Canada must be in accordance with the latest CAN/CGA-B149.1 or .2 and CSA C22.1 Canadian Electric Code, part 1.

The heater, when installed, must be electrically grounded and bonded in accordance with local codes, or, in absence of local codes, with the National Electrical Code, ANSI/NFPA70 (US) or in Canada in accordance with the Canadian Electric Code, part 1 as applicable.

The ETi 400 Pool Heater meets the requirements of the ASME Boiler and Pressure Vessel Code.

# CONSUMER INFORMATION AND SAFETY

## ⚠WARNING

**The U.S. Consumer Product Safety Commission warns that elevated water temperature can be hazardous. See below for water temperature guidelines before setting temperature.**

1. Spa or hot tub water temperatures should never exceed 104° F (40° C). A temperature of 100° F (38° C) is considered safe for a healthy adult. Special caution is suggested for young children.
2. Drinking of alcoholic beverages before or during spa or hot tub use can cause drowsiness which could lead to unconsciousness and subsequently result in drowning.
3. Pregnant women beware! Soaking in water above 102° F (39° C) can cause fetal damage during the first three months of pregnancy (resulting in the birth of a brain-damaged or deformed child). Pregnant women should stick to the 100° F (38° C) maximum rule.
4. Before entering the spa or hot tub, the user should check the water temperature with an accurate thermometer. Spa or hot tub thermostats may error in regulating water temperatures by as much as 4° F (2.2° C).
5. Persons with a medical history of heart disease, circulatory problems, diabetes or blood pressure problems should obtain their physician's advice before using spas or hot tubs.
6. Persons taking medication which induce drowsiness, such as tranquilizers, antihistamines or anticoagulants should not use spas or hot tubs.

## ⚠WARNING

**Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the heater. Do not use this heater if any part has been under water. Immediately call a qualified service technician to inspect the heater and to replace any part of control system and gas control which has been under water.**

## ⚠WARNING

**The U.S. Consumer Product Safety Commission warns that carbon monoxide is an "invisible killer". Carbon monoxide is a colorless and odorless gas.**

1. Carbon monoxide is produced by burning fuel, including natural gas and propane.
2. Proper installation, operation and maintenance of fuel-burning appliances in the home is the most important factor in reducing carbon monoxide poisoning.
3. Be sure that fuel burning appliances such as heaters are installed by professionals according to manufacturer's instructions and codes.
4. Always follow the manufacturer's directions for safe operation.
5. Have the heating system (including vents) inspected and serviced annually by a trained service technician.
6. Examine vents regularly for improper connections, visible cracks, rust or stains.
7. Install battery-operated carbon monoxide alarms. The alarms should be certified to the requirements of the most recent UL, IAS, CSA and IAPMO standard for carbon monoxide alarms. Test carbon monoxide alarms regularly and replace dead batteries.

# SAFETY INFORMATION

The ETi® 400 High Efficiency Pool and Spa Heater is designed and manufactured to provide many years of safe and reliable service when installed, operated and maintained according to the information in this manual. Throughout this manual, safety warnings and cautions are identified by the "⚠" symbol. Be sure to read and comply with all of the warnings and cautions.

**⚠ DANGER — CARBON MONOXIDE GAS IS DEADLY**
**READ OWNERS MANUAL COMPLETELY BEFORE OPERATING**

THIS PRODUCT MUST BE INSTALLED AND SERVICED BY A PROFESSIONAL SERVICE TECHNICIAN, QUALIFIED IN POOL HEATER INSTALLATION. Some jurisdictions require that installers be licensed. Check with your local building authority about contractor licensing requirements. Improper installation and/or operation could create carbon monoxide gas and flue gases which could cause serious injury or death. Improper installation and/or operation will void the warranty.

Exhaust from this pool heater contains toxic levels of carbon monoxide, a dangerous, poisonous gas you cannot see or smell. Symptoms of carbon monoxide exposure or poisoning include dizziness, headache, nausea, weakness, sleepiness, muscular twitching, vomiting and inability to think clearly. IF YOU EXPERIENCE ANY OF THE ABOVE SYMPTOMS, IMMEDIATELY TURN OFF THE POOL HEATER, LEAVE THE VICINITY OF THE POOL OR SPA AND GET INTO FRESH AIR IMMEDIATELY. THE POOL HEATER MUST BE THOROUGHLY TESTED BY A GAS PROFESSIONAL BEFORE RESUMING OPERATION.

**EXCESSIVE CARBON MONOXIDE EXPOSURE CAN CAUSE BRAIN DAMAGE OR DEATH.**

- NEVER use this pool heater indoors without specified ventilation system (and properly installed vent pipe).
- NEVER use this pool heater in the home or in partly enclosed areas (such as garages), unless the specified ventilation system is used. If used outdoors, install far from open windows, doors, vents and other openings.
- Pentair strongly recommends that all vents, pipes and exhaust systems be initially and periodically tested for proper operation. This testing can be accomplished by using a hand-held carbon monoxide meter and/or by consulting with a gas professional.
- Pool heaters must be used in conjunction with carbon monoxide detectors installed near the pool heater. The carbon monoxide detectors must be periodically inspected for proper operation so as to insure continued safety. Broken or malfunctioning carbon monoxide detectors must be replaced immediately.

**⚠ WARNING — FOR YOUR SAFETY**

This product must be installed and serviced by a professional service technician, qualified in pool heater installation. Some jurisdictions require that installers be licensed. Check with your local building authority about contractor licensing requirements. Improper installation and/or operation could create carbon monoxide gas and flue gases which could cause serious injury or death. Improper installation and/or operation will void the warranty.

**⚠ WARNING — This heater is equipped with an unconventional gas control valve that is factory set at a pressure of -.2 inches wc.** Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation or service must be performed by a qualified installer, service agency or the gas supplier. If this control is replaced, it must be replaced with an identical control.

**Do not attempt to adjust the gas flow by adjusting the regulator setting.**

## SAFETY INFORMATION (continued)

**WARNING — Risk of fire or explosion from incorrect fuel use.** Do not try to run a heater set up for natural gas on propane gas or vice versa. Only qualified service technicians should attempt to convert heater from one fuel to the other. Do not attempt to alter the rated input or type of gas by changing the orifice. If it is necessary to convert to a different type of gas, consult your Pentair dealer. Serious malfunction of the burner can occur which may result in loss of life. Any additions, changes, or conversions required in order for the appliance to satisfactorily meet the application needs must be made by a Pentair dealer or other qualified agency using factory specified and approved parts. The heater is available for use with natural gas or LP (propane) gas only. It is not designed to operate with any other fuels. Refer to the nameplate for the type of gas the heater is equipped to use.

- Use heater only with the fuel for which it is designed.
- If an LP (propane) gas conversion is necessary, this MUST be done by a qualified professional service technician qualified in pool heater installation or by qualified gas supplier before the herater is operational.

**WARNING — Risk of fire or explosion from flammable vapors.** Do not store gasoline, cleaning fluids, varnishes, paints, or other volatile flammable liquids near heater or in the same room with heater.

**WARNING — Risk of explosion if unit is installed near propane gas storage.** Propane (LP) gas is heavier than air. Consult local codes and fire protection authorities about specific installation requirements and restrictions. Locate the heater away from propane gas storage and filling equipment as specified by the Standard for the Storage and Handling of Liquefied Petroleum Gases, CAN/CSA B149.2 (latest edition) or ANSI/NFPA 58 (latest edition).

**WARNING — Risk of fire, carbon monoxide poisoning, or asphyxiation if exhaust venting system leaks.** Only qualified service technicians should attempt to service the heater, as leakage of exhaust products or flammable gas may result from incorrect servicing.

**WARNING — Risk of asphyxiation if exhaust is not correctly vented. Follow venting instructions exactly when installing heater.** Do not use a draft hood with this heater, as the exhaust is under pressure from the burner blower and a draft hood will allow exhaust fumes to blow into the room housing the heater. The heater is supplied with an integral venting system for indoor installation. **Canada:** In Canada, this pool heater can only be installed outdoors or in an enclosure that is not normally occupied and has no openings directly into occupied areas. See Page 25 - 29 for enclosure venting requirements.

**CAUTION — Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Wiring errors can also destroy the control board.**

- Connect heater to **120** or **240** Volt, 60 Hz., Single Phase power only.
- Verify proper operation after servicing.
- Do not allow children to play on or around heater or associated equipment.
- Never allow children to use the pool or spa without adult supervision.

**DANGER**

**CARBON MONOXIDE GAS IS DEADLY –** Exhaust from this pool heater contains toxic levels of carbon monoxide, a dangerous, poisonous gas you cannot see or smell.

# GENERAL SPECIFICATIONS

### NOTICE

- Combustion air contaminated by corrosive chemical fumes can damage the heater and will void the warranty.
- The Combination Gas Control Valve on this heater differs from most appliance gas controls. If it must be replaced, for safety reasons replace it only with an identical gas control valve.
- The heater's access side panels must be in place to provide proper ventilation and to avoid water intrusion. **Do not operate the heater for more than five (5) minutes with the side panels emoved.**
- This heater is certified by CSA International as complying with the Standard for Gas Fired Pool Heaters, ANSI Z21.56/CSA 4.7, and is intended for use in heating fresh water swimming pools or spas.
- The ETi® 400 Heater is designed for the heating of chlorine, bromine or salt system swimming pools and spas. It should **NOT** be used as a space heating boiler, or general purpose water heater.
- The heater should be located in an area where leakage of the heater or connections will not result in damage to the area adjacent to the heater or to the structure. When such locations cannot be avoided, it is recommended that a suitable drain pan, adequately drained, be installed under the heater. The pan must not restrict air flow.
- The heater may not be installed within 5 ft. (1.5M ) of the inside surface of a pool or spa unless it is separated by a solid fence, wall or other permanent barrier.
- In the United States, installation must be in accordance with local codes and the most recent edition of the National Fuel Gas Code, ANSI Z223.1/NFPA-54. The Code can be obtained from: National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169 www.nfpa.org
- In Canada, install the heater in accordance with local codes and the most recent edition of the Natural Gas and Propane Installation Code, CAN/CSA B149.1.

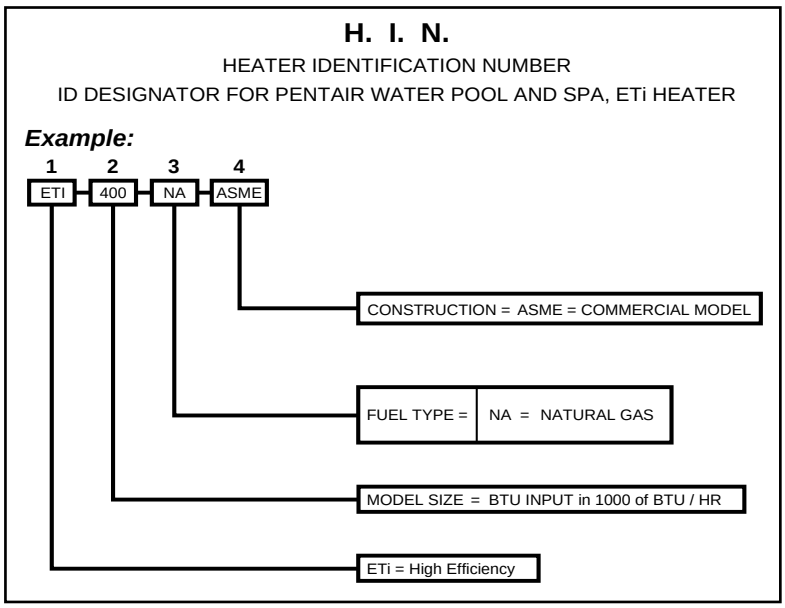
# Heater Identification Information (HIN)

To identify the heater, see rating plate on the inner front panel of the heater. There are two designators for each heater, one is the Model Number and the other is the Heater Identification Number (HIN).

Heater Identification Number (HIN)

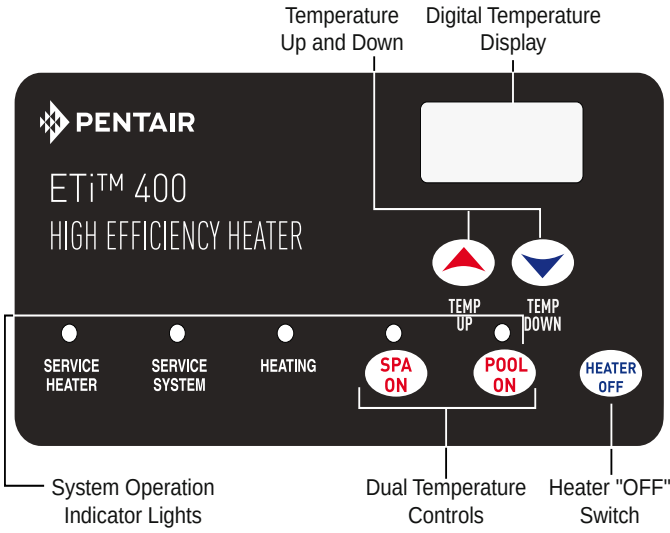
The following example simplifies the identification system:

1) ETi
2) Model Size : (400) : Input rating (Btu/hr) X 1000
3) Fuel Type : NA = Natural gas
4) Construction : ASME = Commercial Model



# Section 1: Operation Instructions

## OPERATOR CONTROL PANEL




## TEMPERATURE SETTING

The ETi® 400 Heater is shipped factory set at 70° F (35° C) for pool mode and 95° F (21° C) for spa mode. Using the up and down arrows, you can set the thermostats to a minimum temperature of 65° F (18.3° C), or a maximum of 104° F (40° C).

The heater operator controls are as follows:

**POOL ON** Press this button to control the heater operation by the pool temperature setting.

**SPA ON** Press this button to control the heater operation by the spa temperature setting.

**HEATER OFF** Press this button to switch off the heater.

**▲ TEMP** Press this button to raise the temperature setting.

**▼ TEMP** Press this button to lower the temperature setting.

To toggle the display between degrees Centigrade (°C) and degrees Fahrenheit (°F):

1. Press the HEATER OFF button to switch the heater OFF.
2. Press **▲ TEMP** or **▼ TEMP** for 5 seconds. The display will flash once and change modes (°C to °F or vice versa).
3. Press the HEATER OFF button to switch the heater ON.

When either the **▲ TEMP** or **▼ TEMP** buttons are depressed, the digital display will indicate the temperature setting. After five seconds, the display will return to the actual pool/spa temperature.

In addition to the digital temperature display, there are five indicator lights:

The **POOL ON** light indicates the pool water temperature is controlling the heater operation.

The **SPA ON** light indicates the spa water temperature is controlling the heater operation.

The **HEATING** light comes on and stays on when the heater's burner chamber is firing. This light should be on whenever the burner is on. This light blinks when the heater is calling for heat but not firing. If this light is on but the burner fails to come on, one of the "service" lights should come on, indicating a fault in the system.

The **SERVICE SYSTEM** light indicates that there is insufficient water flow to the heater. If the pump is operating, this usually indicates that the filter and/or skimmers should be cleaned (some filters may require back-washing). If the light remains on after the filter/skimmers have been serviced, the system should be checked by a qualified service technician.

The **SERVICE HEATER** light indicates a fault in the heater or its controls. If this light comes on, shut down the heater (**See TO TURN OFF GAS TO THE APPLIANCE on page 13**), and have a qualified service technician check the system.

# OPERATOR CONTROL PANEL

**VIEW FAULT CODES:** Press the POOL ON button and the ▲ **TEMP** button to view the last fault code. Press the ▲ **TEMP** button to scroll up to view the previous 4th. fault codes. The next message displayed after the 5th. fault code is END.

**VIEW STACK FLUE GAS TEMPERATURE:** Press and hold the POOL ON (or SPA ON) button for more than 5 seconds to view the current Stack Flue Gas temperature. Each heat exchange has one temperature sensor (SF1 and (SF2), the SF1 temperature is displayed on the heater's LCD with a dot on the upper left corner of the LCD. Scroll up or down to display the SF2 current temperature and the dot will not be displayed on the LCD.

# BASIC SYSTEM OPERATION

**Start the pump. Be sure the pump is running and primed to close the water pressure switch and supply power to heater. Be sure the pool and/or spa is properly filled with water. Follow the Lighting and Operating instructions below.**

## ⚠WARNING

**Risk of explosion or fire causing burns or death if safety interlocks are disabled. DO NOT** attempt to operate heater when SERVICE HEATER light is on or if blower or burner will not start. Instead, follow instructions under "To Switch Off Gas to the Appliance," and call a qualified service technician to repair unit.

## HEATER DSI ELECTRONIC IGNITION LIGHTING/OPERATION

### FOR YOUR SAFETY: READ BEFORE LIGHTING

## ⚠WARNING

**If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.**

**Do not attempt to light the heater if you suspect a gas leak. Lighting the heater can result in a fire or explosion which can cause personal injury, death, and property damage.**

# BASIC SYSTEM OPERATION (CONTINUED)

## START-UP AND OPERATION

**START-UP AND SHUTDOWN INSTRUCTIONS ARE ON THE LABEL ATTACHED TO THE INSIDE COVER OF THE APPLIANCE WATER CONNECTION PANEL.**

## BEFORE START-UP

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burners. DO NOT try to light the burners by hand.

B. **BEFORE OPERATING,** smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

### WHAT TO DO IF YOU SMELL GAS

– Do not try to light any appliance.

– Do not touch any electrical switch; do not use any phone in your building.

– Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

– If you cannot reach your gas supplier, call the Fire Department.

C. Use only your hand to turn the gas control on or off. Never use tools. If you cannot change the ON/OFF setting by hand, don't try to repair it, call a qualified service technician. Forced or attempted repair may result in a fire or explosion.

D. Do not use this heater if any part has been under water. Immediately call a qualified service technician to inspect the heater and to replace any part of the control system and any gas control which has been under water.

E. Do not operate the pool heater unless the pool or spa is properly filled with water.

F. Before operating the appliance for the first time or after it has been off for an extended time, perform the following checklist:

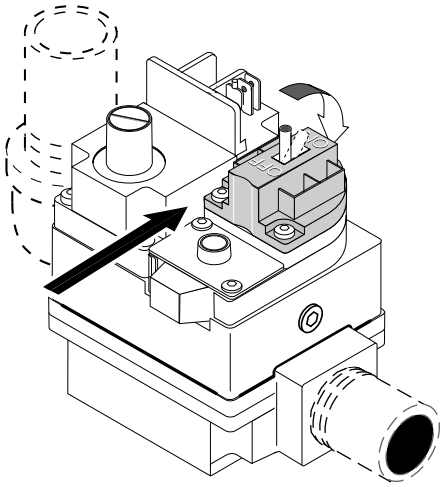
1. Remove debris or other articles from inside the heater and the area around the heater and its exhaust vent. Make sure the ventilation openings are clear of debris or obstruction. For installations in an enclosed space, make sure openings for combustion and ventilation air are unobstructed.
2. Keep heater area clear and free from combustibles, flammable liquids and chemicals.
3. Check that all water connections are tight.
4. Water must be flowing through the heater during operation. Make sure that pool/spa is filled with water and have pump operating. Check that water flow is unobstructed from the appliance. When operating for the first time or after an extended shut-down, run filter pump for several minutes to clear all air from the system.

# PUTTING THE HEATER INTO SERVICE

If the heater's **Water Pressure Switches (PS)** are below or above the water level by 1 ft (30 cm), after the heater installation the Water Pressure Switch setting should be adjusted. **See WATER PRESSURE SWITCH, in SAFETY CONTROLS on page 14.**

**Note: Before putting the heater into service for the first time, follow the instructions under BEFORE START-UP on page 12. Check for proper operation of the heater by following the steps under OPERATING INSTRUCTIONS on page 13. Damage to equipment caused by improper installation or repair will void the warranty.**

## HEATER OPERATING INSTRUCTIONS



Gas control is shown **OFF**. Push toggle switch away from you to switch **ON**.

**Figure 1.**

1. **STOP!** Read the safety information on (page 12).
2. Set both pool and spa thermostats to the lowest settings.
3. Turn off all electric power to the appliance.
4. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.
5. Remove the access door panels by unfastening the latch located on each door, then lift up and out from the bottom of the panel to remove.
6. **Toggle-Style Valve:** Pull toggle toward you to turn gas off , see Figure 1.
7. Wait five (5) minutes to clear out any gas. If you then smell gas, **STOP! Follow B in the BEFORE START-UP instructions on page 12. If you don't smell gas, go to the next step.**
8. Push the toggle switch away from you to switch the gas on.
9. Replace the Door Access Panels. All panels must be in place when operating the heater.
10. Set 3-way valves on inlet and outlet to pool or spa, as appropriate.
11. Turn on all electric power to the appliance.
12. Press either the POOL ON or SPA ON button switch on the operating control.
13. Set the thermostat to desired setting. **NOTICE: Setpoint must be above actual water temperature or burner will not fi e. See OPERATOR CONTROL PANEL on page 11.**
14. The blower should come on immediately, and after about 15 seconds, the burner should fire. When operating for the first time, the burner may not fire on the first try because of air in the gas line. If it does not fire at first, push the OFF switch, wait five minutes, and again push the POOL or SPA ON switch. The burner should fire after about 15 seconds. You may have to repeat this until all of the air has cleared the gas line.
15. The burner should fire until the pool/spa temperature reaches the desired temperature set on the thermostat. The blower will continue to run for about 45 seconds after the burner shuts off. If any of the safety interlocks should open during burner operation, the burner shuts off immediately, but the blower continues to run for about 45 seconds. Should overheating occur or the gas supply fail to shut off, turn off the manual gas control valve to the appliance.
16. If the appliance will not operate, follow the instructions **TO TURN OFF GAS TO THE APPLIANCE** below, and call your service technician or gas supplier.
17. If the electrical power is shut off to the heater while it is running, once power is restored, the heater will power up with the previous programed settings.

## TO TURN OFF GAS TO APPLIANCE

1. Press the OFF button on operating control.
2. Switch off all electric power to the unit.
3. Remove the access door panels.
4. **Toggle-Style Valve:** Pull toggle toward you to turn gas off, see Figure 1.
5. Replace the Access Door Panels.

# SAFETY CONTROLS

## AIR FLOW SWITCH (AFS)

There are two air flow switches, (see Figure 2), designed as a safety device to ensure the two combustion air blowers (fans) are operating and are monitoring the differential (negative) pressure within the blower housing. These air pressure switches are factory set. The switches (see page 63 #29) are connected upstream of the ignition module. The ignition module does not operate unless the air flow switches and all safety switches are closed.

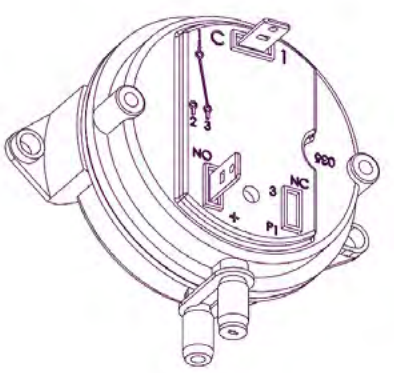



**Figure 2.** Air Flow Switch

## WATER PRESSURE SWITCHES

**⚠WARNING**

**Hazardous pressure. Do not bypass the Water Pressure Switches or render it inoperable.**

The heater has two Water Pressure switches, see Figure 3. If the water flow is restricted, the water pressure switches may prevent the burner from firing and cause the Service System LED indicator to go on. **Note: If the light remains on after the filte has been serviced, have a qualifie service technician check the system.**

For deck-level heater installations, the Water Pressure switches are factory set at 3.00 psi (20.6 kPa). **Note: See Below Pool Level Installation, on page 21.** If the pressure switches are 1 ft (0.3M) below or above the pool water level, reset the switches so that it is open when the pump is off and closed when the pump is running. Turn the star-wheel on the switch clockwise ( ↷ ) to raise setting (heater below the pool level) and counterclockwise ( ↶ ) to lower the setting (heater above the pool level), see Figure 4. Test each switch after resetting.

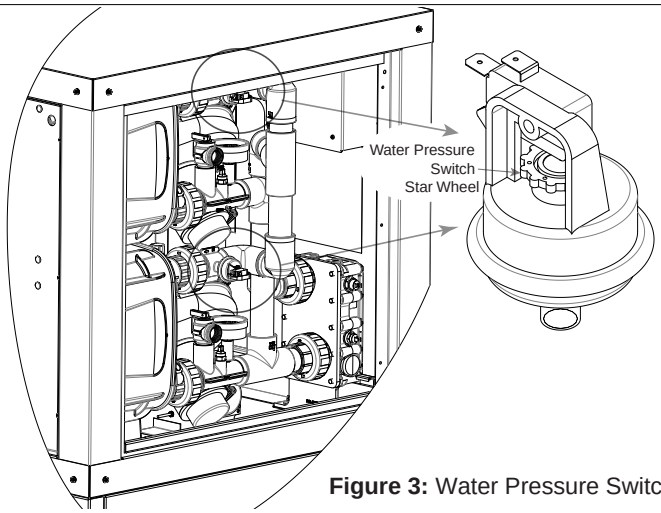



**Figure 3:** Water Pressure Switch

**NOTICE:** When the heater is mounted more than 1 ft (30 m) above or 1 ft (30 cm) below the deck level, a pressure switch is no longer adequate. A Flow Switch must be installed instead.

CAUTION! Heater operation with an incorrect water pressure switch setting, may cause the heater to operate without sufficient water flow, and may cause severe heater damage.

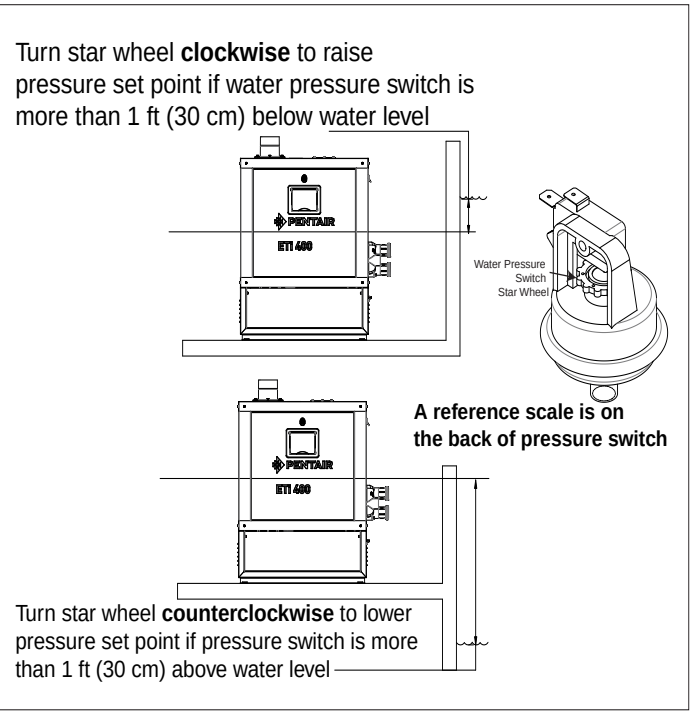



**Figure 4.**

## HIGH LIMIT SWITCH AND AUTOMATIC GAS SHUT-OFF SWITCHES (AG1 AND AG2)

A High Limit Switch (HLS), is a safety device that opens the electrical circuit and shuts off the heater based on a water temperature set point within the HLS. The heater contains two AGS switches and one HLS switch. The AGS switches are located in the outlet plumbing assembly, and the HLS switch is located on the main Inlet/Outlet Header (see page 16).

# SAFETY CONTROLS (continued)

## STACK FLUE SENSORS (SF1, SF2)

The heater is equipped with two Stack Flue sensors; one for each heat exchanger. These sensors monitor the stack flue temperature and if needed will shut down the heater if the stack flue temperature exceeds 170° F (77° C).

## THERMAL FUSE

A Thermal Fuse (TF) is a safety protection device that opens the electrical circuit if the temperature reaches 187° F (86° C). The fuse cannot be reset, it must be replaced. See page 17 for more information.

## FLOAT SWITCH

The Float Switch (FS) is a sensing application that shuts down the heater once the condensate level exceeds the permitted level in the condensate container. See page 17 for more information.

## IGNITION MODULE OPERATION

The Ignition Module, (Figure 5), is microprocessor based and operates on 24VAC supplied by the transformer. The control works in conjunction with a fan control board (Figure 6), and utilizes a microprocessor to continually safely monitor, analyze, and control the proper operation of the gas flame holder. The module with the presence of the flame sensor, using flame rectification, allows the heater to operate.

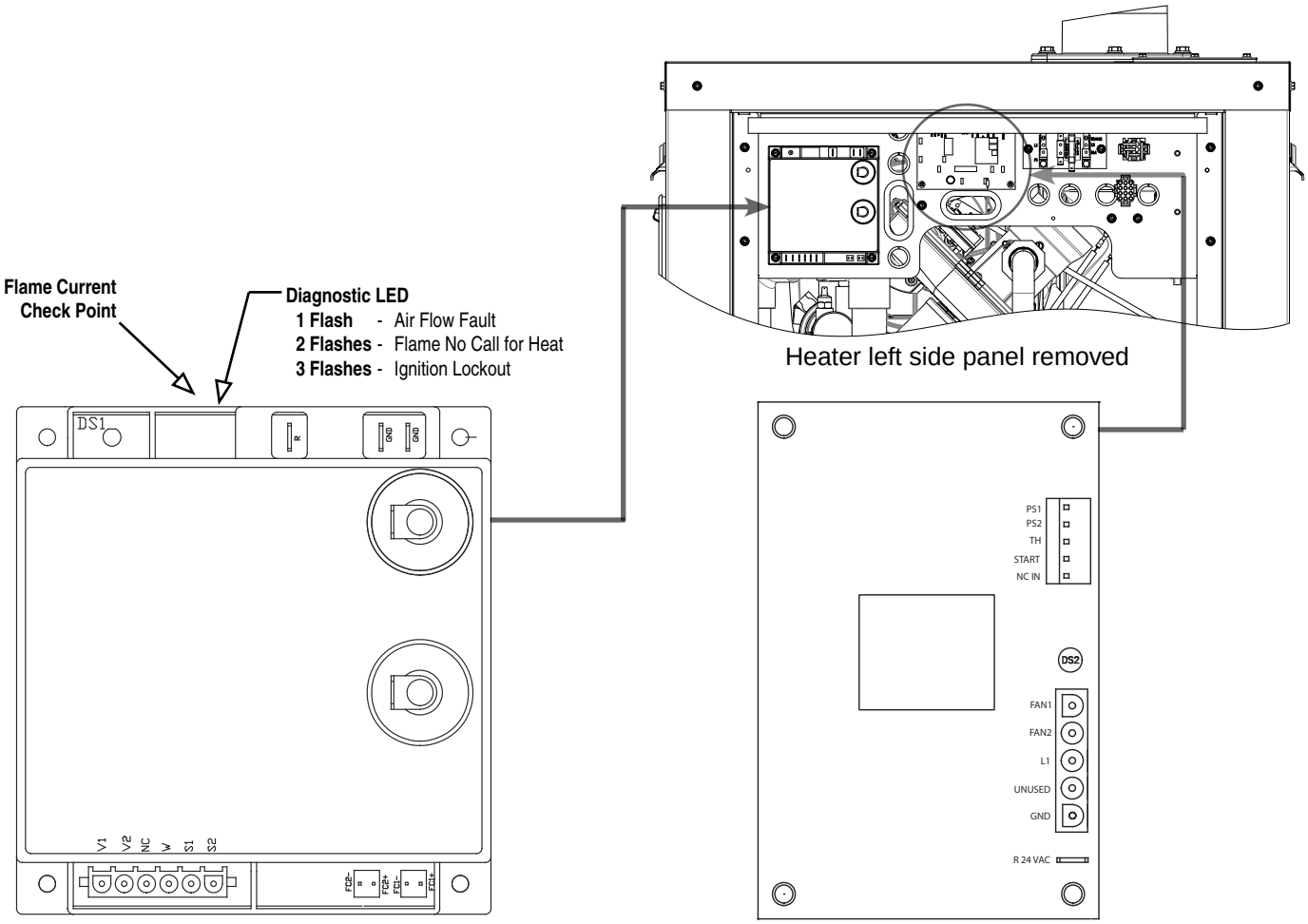



**Figure 5.** Ignition Control Module

**Figure 6.** Fan Control Circuit Board

# Section 2: Installation Instructions

**THIS HEATER MUST BE INSTALLED AND SERVICED BY A PROFESSIONAL SERVICE TECHNICIAN, QUALIFIED IN POOL HEATER INSTALLATION.**

Pentair strongly recommends that all vents, pipes and exhaust systems be initially and periodically tested for proper operation. This testing can be accomplished by using a **hand-held carbon monoxide meter** and/or by consulting with a gas professional. Pool and spa heaters must be used in conjunction with **carbon monoxide detectors** installed near the pool heater. The carbon monoxide detectors must be periodically inspected for proper operation so as to insure continued safety. Broken or malfunctioning carbon monoxide detectors must be replaced immediately.

## HEATER DESCRIPTION

The ETi® 400 Heater has precisely matched orifice plates to meter the air and gas into the mixer. The blower draws the air and gas through the mixer and forces it into the burner's flame holder. A sealed TitanTough™ Heat Exchanger surrounds the flame holder, discharging exhaust gases out the flue (See Figure 7 & 8). **Use a 2 in fitting to connect to the 2 in PVC slip unions provided with the heater.** The outer manifold remains cool; no heat sinks are required. The heater operator control panel is located on the side of the heater.

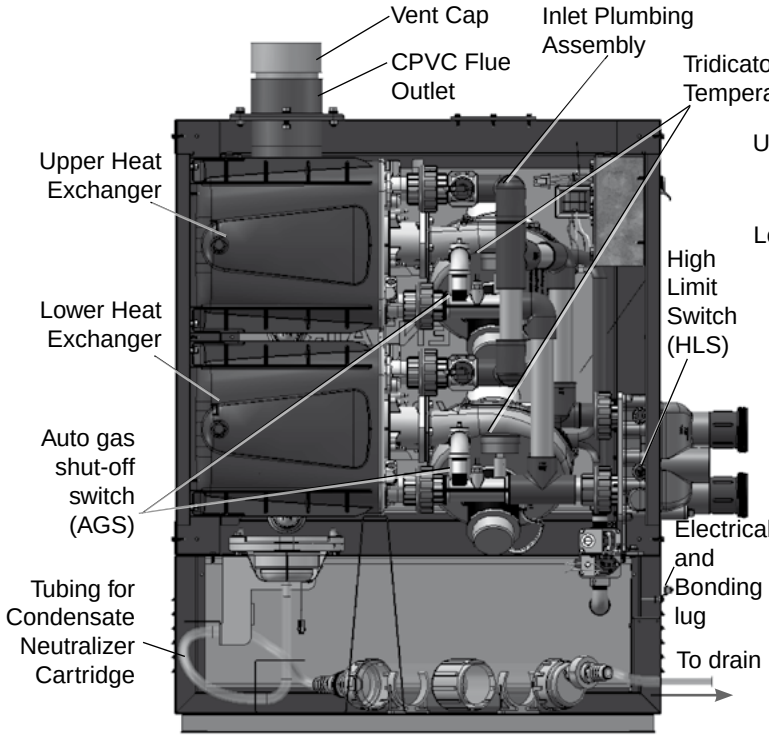



**Figure 7.** ETi® 400 Heater (Left Side View)

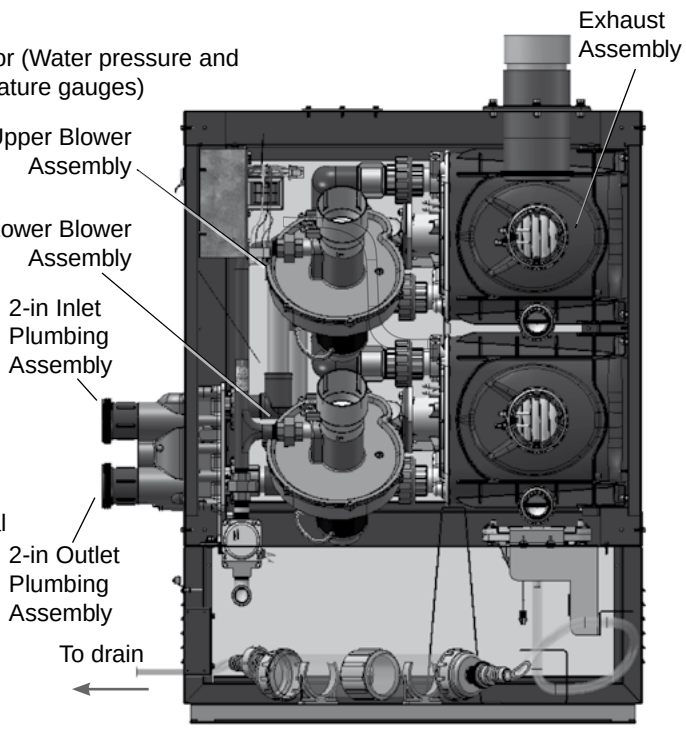
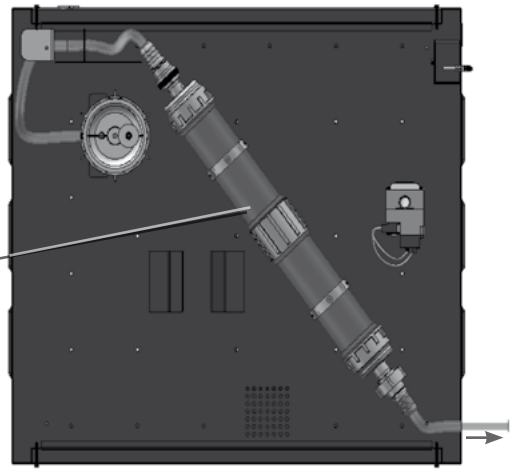



**Figure 8.** ETi® 400 Heater (RIght Side View)



Condensate Neutralizer Cartridge (Optional, P/N 475612 sold separately). The cartridge may be mounted onto the heater base for heater outdoor installation.

Heater Base (Top View)

# SEQUENCE OF OPERATION

An electronic temperature sensing **thermistor** in the manifold adapter inlet controls the heater operation. When the inlet water temperature drops below the temperature set on the **operator control panel**, the **control board** supplies power to the combustion **air blowers** through a series of **safety interlocks**. The heater interlocks consist of:

- the **two water pressure switches** (**PS**), which senses that the pump is running,
- the **tridicator gauges (2)** which monitors the water temperature in degree Fahrenheit and pressure in psi.
- the **high limit switch** (**HLS**), which opens if the heat exchanger outlet temperature goes above 135° F (57° C), and
- the **two air flow switche** (**AFS**), sense the pressure drop across the air metering orifices.
- the **two thermal fuses (TF)** open if the flue gas temperature reaches 187° F (86° C).
- the **automatic gas shut-off** (**AG1, AG2**) switches, which open if the heat exchanger outlet temperature goes above 150° F (66° C).
- the **float switch (FS)** which opens if the condensate overflows at the float switch due to blockage in the condensate drain hose or neutralizer cartridge.
- the **stack flue sensor** (**SF1, SF1**), which shut down the heater if the flue gas temperature reaches 170° F (77° C).

The air flow switches (AFS) sense the pressure differential between both of the air metering orifices. As soon as there is sufficient air flow, the AFS closes, completing the circuit to the Fan Conrol board. The gas ignition control then opens the gas valve and the fuel mixture is ignited by the Direct Spark Ignition (DSI). On a call for heat, the blowers are energized for 15 seconds, the gas valve opens simultaneously as the direct spark igniters are energized, then ignition occurs. The heater is equipped with a digital operating control that enables the user to pre-set the desired pool and spa water temperatures. The control enables the user to select between pool and spa heating, and features a digital display

# SPECIFICATIONS

The installation instructions contained in this manual are designed for use by qualified personnel only, trained especially for installation of this type of heating equipment and related components. Some states require installation and repair by licensed personnel. If this applies in your state, be sure your contractor bears the appropriate license. See Figure 9, 10 & 11 for Outdoor and Indoor installations, dimensions and orientation of the heater.

**Dimensions in Millimeters / Inches**

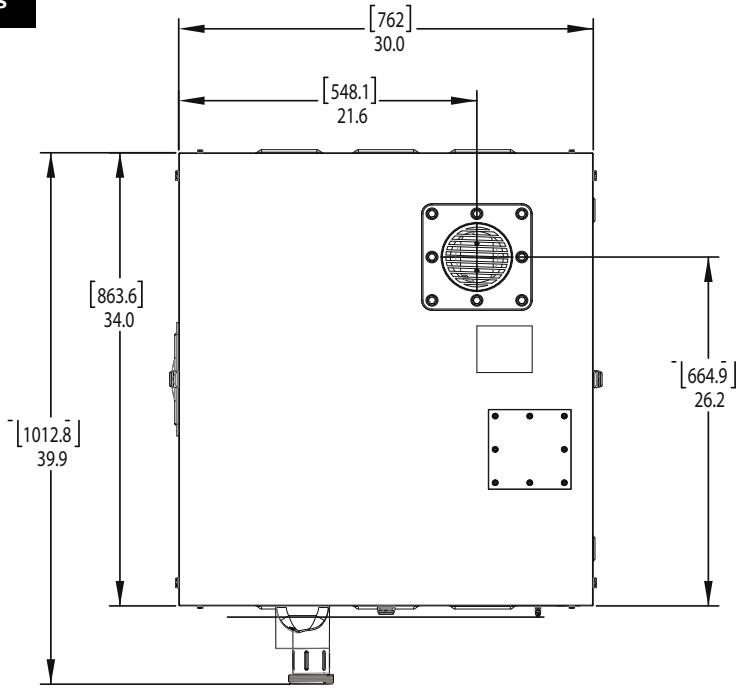



**Figure 9.** Heater Top View

## SPECIFICATIONS (CONTINUED)

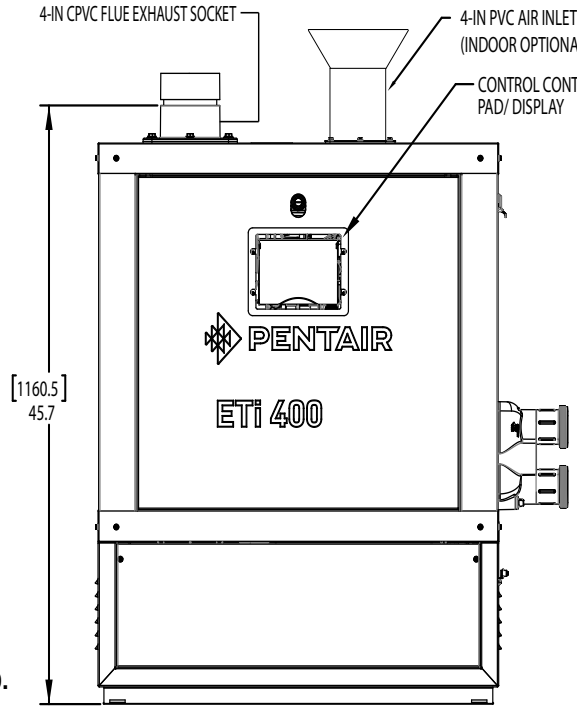



**Figure 10.** Heater Front View

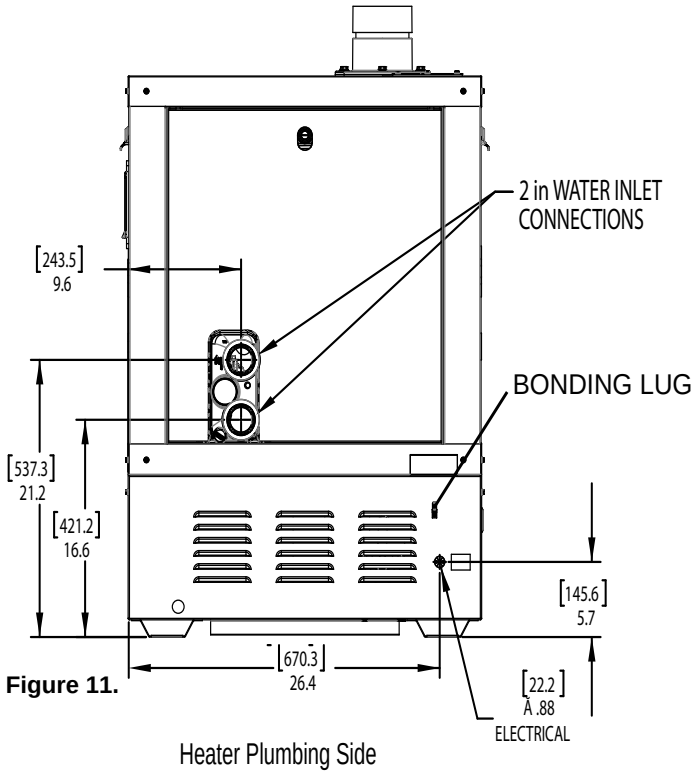
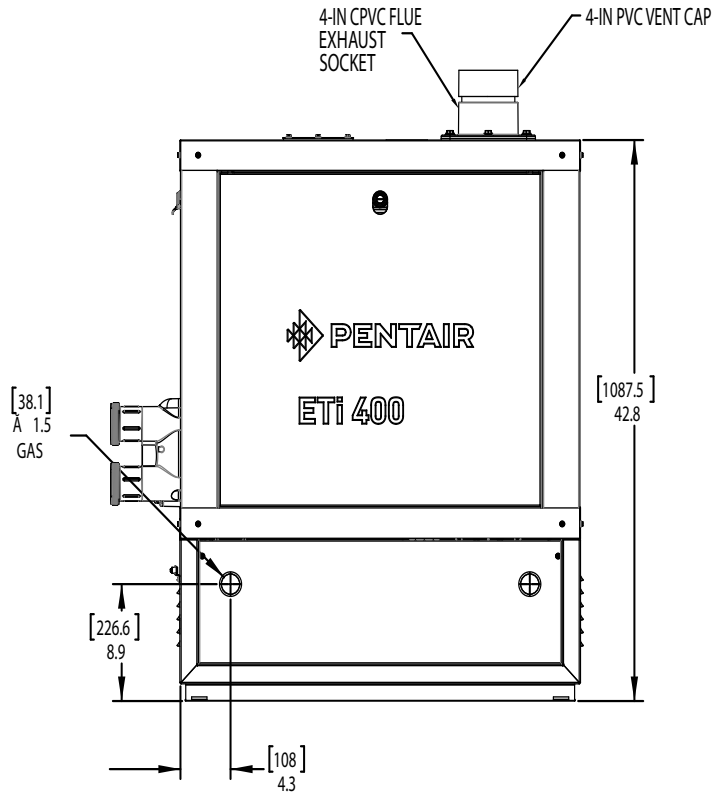



**Figure 11.** Heater Plumbing Side




Heater Rear View

# PLUMBING CONNECTIONS

The heater has the unique capability of direct schedule 40 PVC plumbing connections. A set of bulkhead fittings is included with the heater to ensure conformity with Pentair's recommended PVC plumbing procedure. Other plumbing connections can be used. See Figure 12 for plumbing connections.

**⚠ CAUTION**

**Before operating the heater on a new installation, turn on the circulation pump and bleed all the air from the filter using the air relief valve on top of the filter. Water should flow freely through the heater. Do not operate the heater unless water in the pool/spa is at the proper level. If a manual by-pass is installed, temporarily close it to ensure that all air is purged from the heater.**

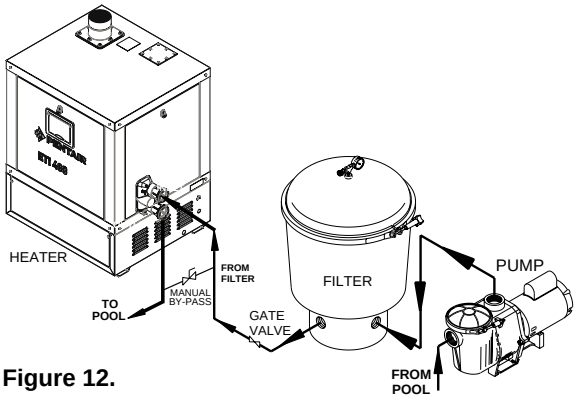



**Figure 12.**

# WATER CONNECTIONS

The heater requires proper water flow and pressure for its operation. See Figure 13 for the recommended installation. The filter pump discharges to the filter, the filter discharges to the heater, and the heater discharges directly to the pool or spa.

A manual bypass valve should be installed before the heater when the pump flow exceeds 120 GPM (454 LPM ). **See WATER FLOW RATE Table 1 on page 21** for setting of the manual by-pass valve.

Make sure that the outlet plumbing from the heater contains no shut-off valves or other flow restrictions that could prevent flow through the heater (except for pool installations as noted below, or winterizing valves where needed). To switch flow between the pool and spa, use a diverter valve. Do not use any valve that can shut off the flow.

Install the chemical feeder downstream of the heater. Install a chemical resistant one-way check valve between the heater and the chemical feeder to prevent back-siphoning through the heater when the pump is off.

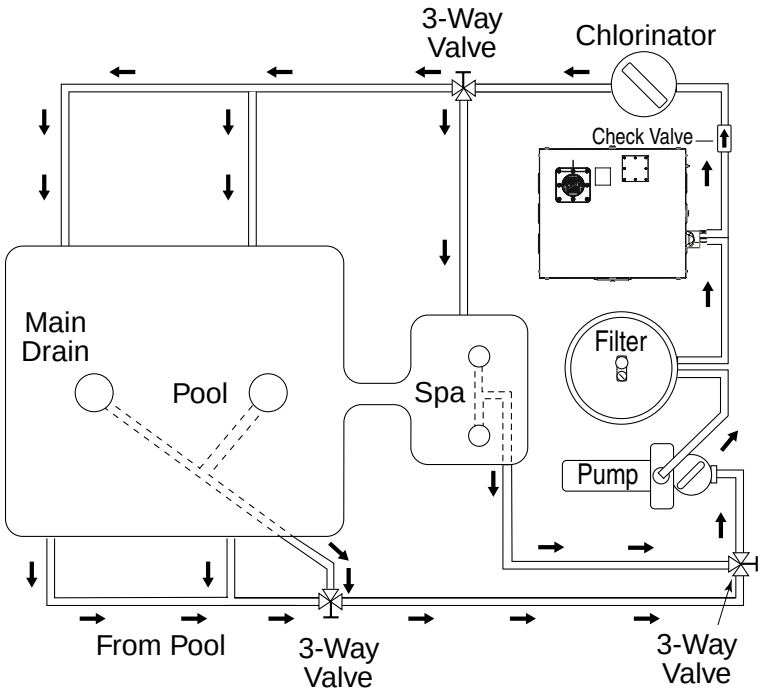



**Figure 13.**

Note: For Multiple Heater installation, see page 20.

**NOTICE:** If the heater is plumbed in backwards, it will cycle continuously. Make sure piping from filter is not reversed when installing heater.

Connect the heater directly to 2 in PVC pipe, using the provided unions. Heat sinks are not required. The low thermal mass of the heater will prevent overheating of the piping connected to the pump even if the heater shuts down unexpectedly.

Occasionally a two-speed pump will not develop enough pressure on the low speed to operate the heater. In this case, run the pump at high speed only to operate the heater. If this does not solve the problem, do not try to run the heater. Instead, correct the installation.

Do not operate the heater while an automatic pool cleaner is also operating. If the circulation pump suction is plugged (for example by leaves), there may not be adequate flow to the heater. Do not rely on the pressure switch in this case.

# MULTIPLE HEATER INSTALLATION

All plumbing on multiple heater installations must be done in parallel. See Figure 14 and Figure 15.
To prevent heater overheating and to ensure heater longevity, water flow to each heater must be balanced for optimum operation. To meet recommended flow rates, be sure all installed pipes are installed in accordance with local and state codes or, in the absence of local codes, with all applicable codes and industry plumbing standards. To allow for proper operation and service clearance, maintain spacing to adjacent heaters. Heaters installed too close to one another may encounter operational issues associated with exhaust and/or condensation.

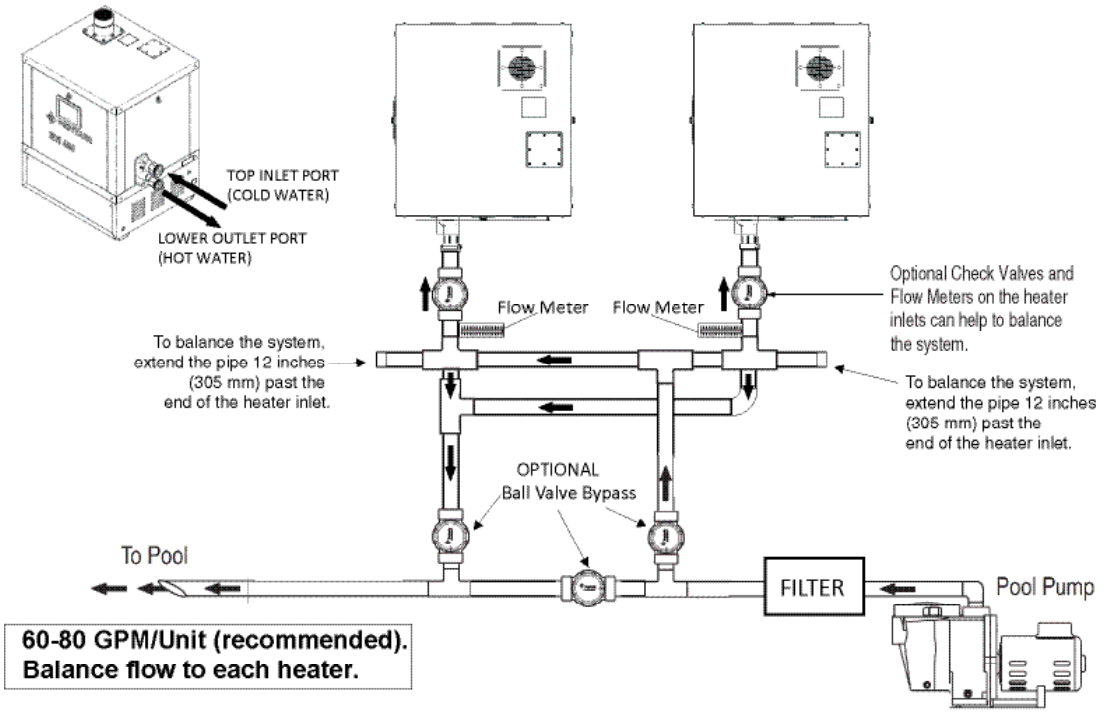
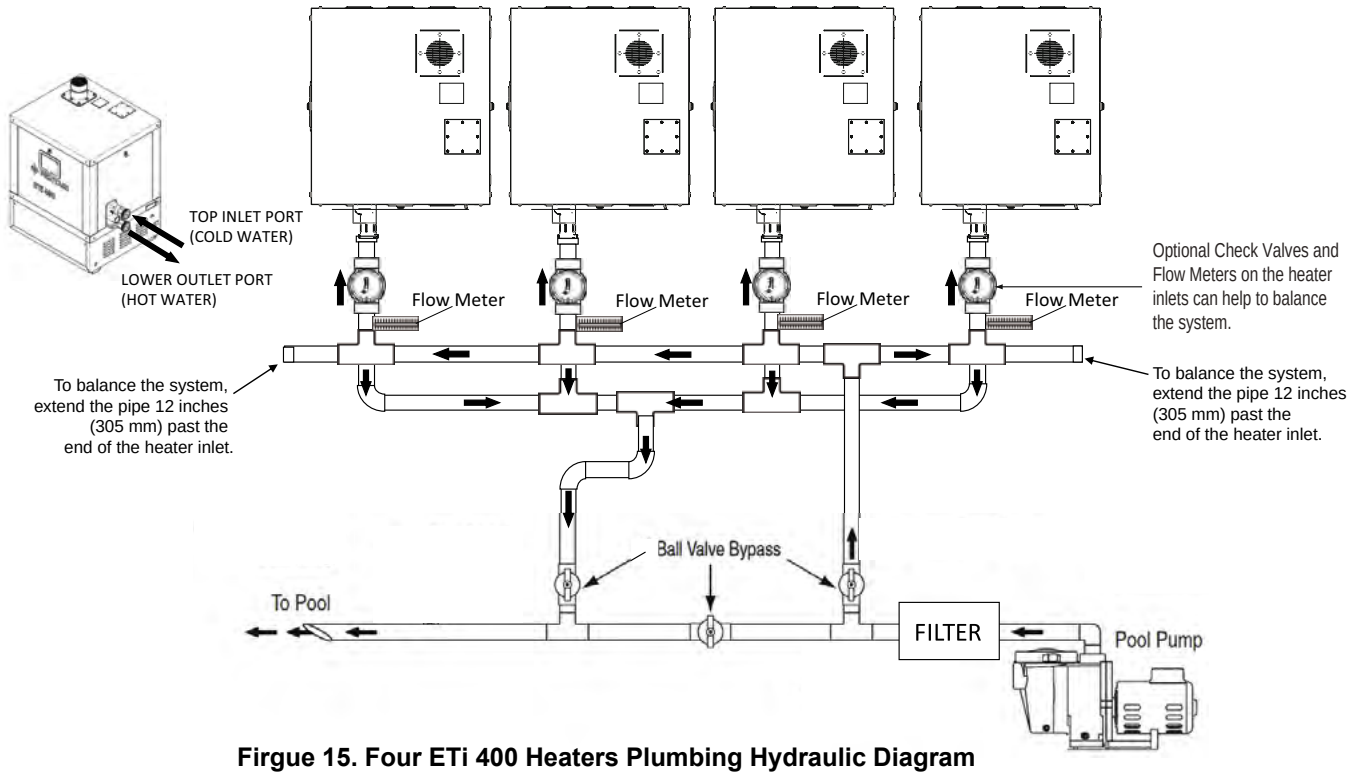



**Figure 14. Two ETi 400 Heaters Plumbing Hydraulic Diagram**




**Firgue 15. Four ETi 400 Heaters Plumbing Hydraulic Diagram**

## VALVES

When any equipment is located below the surface of the pool or spa, valves should be placed in the circulation piping system to isolate the equipment from the pool or spa. Check valves are recommended to prevent back-siphoning. Back-siphoning is most likely to occur when the pump stops, creating a pressure-suction differential. Do **NOT** sanitize the pool by putting chlorine tablets or sticks into the skimmer(s). When the pump is off, this will cause a high concentration of chlorine to enter the heater, which could cause corrosion damage to the heat exchanger.

### ⚠CAUTION

**Exercise care when installing chemical feeders so as to not allow back siphoning of chemical into the heater, filters or pump. When chemical feeders are installed in the circulation of the piping system, make sure the feeder outlet line is down stream of the heater, and is equipped with a positive seal noncorrosive Check Valve, (P/N R172288), between the feeder and heater.**

## MANUAL BY-PASS

**Where the water flow rate exceeds the maximum 120 GPM, a manual bypass should be installed. After installing the valve, adjust the valve to bring the flow rate within the acceptable range. Then remove the valve handle or lock it in place to avoid tampering. See Figure 16.**

**Table 1: Heater Water Pressure.**

| ETi® 400 | GPM (min. / max) | Max. △T (°F) / Min △T (°F) |
|---|---|---|
| | 40 / 120 | 35 / 25* |

(*) Compare △**T** by observing the Temperature Pressure gauges located inside the heater (see page 16), and the water inlet temperature displayed on the Control Board LCD.

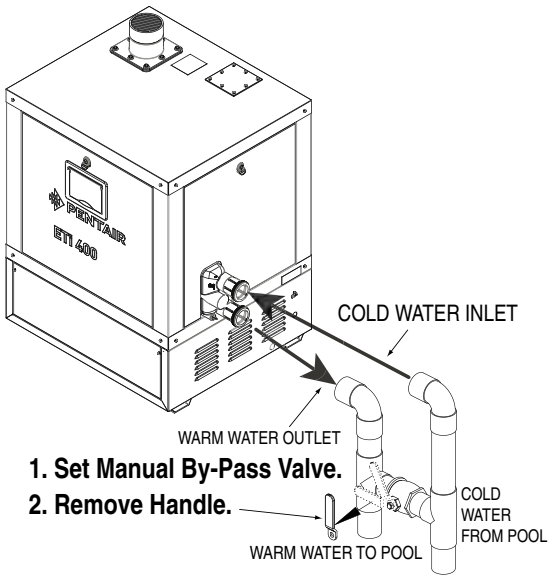



**Figure 16.**

## BELOW POOL INSTALLATION

If the heater is below water level, the pressure switch must be adjusted.
This adjustment must be done by a qualified service technician. See following **CAUTION** before installation.

### ⚠CAUTION

**BELOW OR ABOVE POOL INSTALLATION**

**The water pressure switch is set in the factory at 3.00 PSI (± 0.75 PSI). This setting is for a heater installed at pool level. If the water pressure switch is more than 1 ft (30 cm) below or above the pool level, the water pressure switch must be adjusted by a qualified service technician. Figure 4 on page 14.**

**FLOW SWITCH**

**If the water pressure switch is installed more than 3 ft (0.9 m) above the pool or more than 3 ft (0.9 m) below the pool level, you will be beyond the limits of the pressure switch and a flow switch must be installed. Locate and install the flow switch externally on the outlet piping from the heater, as close as possible to the heater. Connect the flow switch wires in place of the water pressure switch wires.**

# GAS CONNECTIONS

## GAS LINE INSTALLATIONS

Before installing the gas line, be sure to check which gas the heater has been designed to burn. This is important because different types of gas require different gas pipe sizes. The rating plate on the heater will indicate which gas the heater is designed to burn. The Table 2 below, show which size pipe is required for the distance from the gas meter to the heater. The table description is for natural gas at a specific gravity of 0.60, and propane gas at a specific gravity of 1.50.

When sizing gas lines, calculate three (3) additional feet of straight pipe for every elbow used. When installing the gas line, avoid getting dirt, grease or other foreign material in the pipe as this may cause damage to the gas valve, which may result in heater failure.

*The gas meter should be checked to make sure that it will supply enough gas to the heater and any other appliances that may be used on the same meter. The gas line from the meter will usually be of a larger size than the gas valve supplied with the heater. Therefore a reduction of the connecting gas pipe will be necessary. Make this reduction as close to the heater as possible.*

The heater requires a gas supply of not less than 4 in (10.2 cm) wc, and not more than 10.5 in (27 cm) wc for natural gas, and not more than 14 in (36 cm) wc for propane gas. Gas supply pressures outside of this range may result in improper burner operation. A minimum flowing or dynamic inlet pressure (while the heater is running) of 4 in (10.2 cm) wc is required to maintain input rating with no more than a 2 in pressure drop between static and dynamic. The gas supply must be installed in accordance with the *National Fuel Gas Code, ANSIZ223.1*, or standard *CSA B149.1, Natural Gas and Propane Installation Codes*, as applicable and all applicable local codes. Install a manual shut-off valve and a sediment trap and union located outside the heater panels, see Figure 16. Do not use a restrictive gas cock. The following minimum gas pipe sizes are recommended for natural gas supply piping, see Table 2 on below. For low pressure LP gas, pipe size may be reduced by 1/4-in, with a minimum pipe size of 1/2-in. Check for compliance with local codes.

The heater and any other gas appliances must be disconnected from the gas supply piping system during any pressure testing on that system, (greater than ½ PSI). The heater and its gas connection must be leak tested before placing the heater in operation. **Do not use flame to test the gas line** Use soapy water or another nonflammable method.

**NOTE**

**A manual main shut-off valve must be installed externally to the heater.**

**⚠WARNING**

**DO NOT INSTALL THE GAS LINE UNION INSIDE THE HEATER CABINET. THIS WILL VOID YOUR WARRANTY.**

# GAS PIPE SIZING

## STAGE TWO LOW PRESSURE GAS PIPE SIZING

| Maximum Equivalent Pipe Length (ft) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Natural Gas 1000 BTU/FT$^3$ 0.60 Specific Gravity at 0.5 in. WC Pressure Drop | | | | | | | | | |
| Propane Gas 2500 BTU/FT$^3$ 1.50 Specific Gravity at 0.5 in. WC Pressure Drop | | | | | | | | | |
| | Input | 3/4” | | 1” | | 1-1/4” | | 1-1/2” | |
| Model | (KBTU) | N | P | N | P | N | P | N | P |
| ETi ™ 400 | 399.0 | * | 20 | 20 | 60 | 90 | 150 | 200 | 450 |

**Table 2: Note (*) A 3/4” gas line can be used for up to 2 ft (61 cm) maximum length from the gas valve in addition to the sediment trap.**

# GAS PRESSURE TESTING

(See page 24 for Checking Gas Pressure Through Control Valve)

Before operating the heater, the heater and its gas connections must be leak tested. **Do NOT use an open flame to test for leaks.** Test all gas connections for leaks with soapy water or another non-flammable method.

The heater and its individual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig (3.5 kPa). The heater must be isolated from the gas supply system by closing its individual manual shut-off valve during any pressure testing of the gas supply at test pressures equal to or less than 1/2 psig (3.5 kPa).

⚠ **Caution:** Dissipate test pressure in the gas supply line before reconnecting the heater and its manual shut off valve to gas supply line. Failure to follow this procedure may damage the gas valve. Over pressurized gas valves are not covered by warranty. The heater and its gas connections shall be leak tested before placing the appliance in operation. Use soapy water for leak test. Do not use open flame.

**Note: do not use threaded seal tape on gas line pipe thread.** A pipe compound rated for use with natural and propane gases is recommended. Apply sparingly only on male pipe ends, leaving the two end threads bare.

**Special safety and precautions for LP gas:** If proper ventilation is not provided gas can collect or *pool* in enclosed areas, because LP gas is heavier than air. Pentair does not recommend installing the heater in an enclosed areas, such as a ground pit. If the heater is required to be installed in an enclosed area, be sure proper ventilation for LP gas are met and locate the heater a safe distance from LP gas cylinders and filling equipment. **Before installation, consult the national fuel gas code (NFPA 54 / ANSI Z223.1, Latest edition), the natural gas and propane installation code in Canada (CAN/CSA B149.1, Latest edition), and any other local codes and fi e protection authorities about specific installation estrictions in your location.**

## CHECKING GAS PRESSURE THROUGH GAS CONTROL VALVE

### ⚠WARNING

**Risk of explosion if a unit burning propane gas is installed in a pit or other low spot.** Propane is heavier than air. Do not install the heater using propane in pits or other locations where gas might collect. Consult your local building code officials to determine installation requirements and specific installation restrictions of the heater relative to propane storage tanks and filling equipment. Installation must meet the requirements for the Standard for the Storage and Handling of Liquefied Petroleum Gases, CAN/CSA B149.2 (latest edition) or ANSI/NFPA 58 (latest edition). Consult local codes and fire protection authorities about specific installation restrictions.

**CHECKING THE GAS PRESSURE THROUGH THE COMBINATION GAS CONTROL VALVE (See Figure 15):** Before operating the heater, the heater and its gas connections must be leak tested. **Do NOT use an open flame to test for leaks.** Test all gas connections for leaks with soapy water or another non-flammable method.

The heater and its individual shut-off valve must be disconnected from the gas supply piping system during any pressure testing of that system at test pressures in excess of 1/2 psig (3.5 kPa). The heater must be isolated from the gas supply system by closing its individual manual shut-off valve during any pressure testing of the gas supply at test pressures equal to or less than 1/2 psig (3.5 kPa).

## CHECKING GAS PRESSURE THROUGH GAS CONTROL VALVE (CONTINUED)

This appliance is equipped with an unconventional gas control valve that is factory set with a manifold pressure of –.2" (–0.5cm) wc. Installation or service must be performed by a qualified installer, service agency, or the gas supplier. If this control valve is replaced, it must be replaced with an identical control.

The combination gas valve incorporates dual shut-off valves and a negative-pressure regulator. For proper operation, the regulated pressure at the outlet manifold of the valve must be –0.2" (–0.5cm) wc below the reference pressure at the blower mixer inlet, and the gas valve 'VENT' tap must be connected to the end cap air orifice as shown in Figure 17.

Do not attempt to adjust the gas input by adjusting the regulator setting. The correct gas regulator setting is required to maintain proper combustion and must NOT be altered.

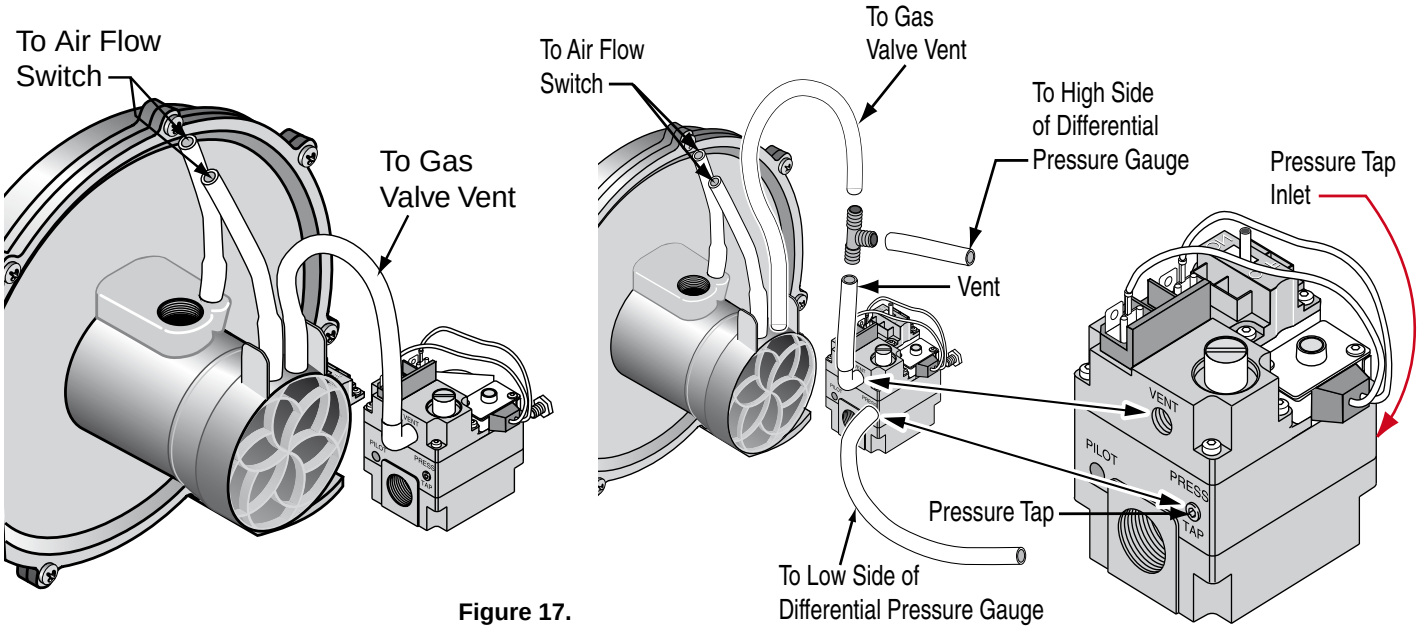



**Figure 17.**

**IMPORTANT: IF THERE ARE ANY IGNITION ISSUES AFTER THE NATURAL GAS TO PROPANE (LPG) CONVERSION, CALL PENTAIR TECHNICAL SUPPORT AT 800.831.7133.**

# SEDIMENT TRAPS

Install a sediment trap and union located outside the heater panels in accordance with National code requirements. Do not use a restrictive gas cock. The sediment trap shall be either a tee fitting with a capped nipple in the bottom outlet which can be removed for cleaning, as shown in Figure 18, or an other device recognized as an effective sediment trap. All gas piping should be tested after installation in accordance with local codes.

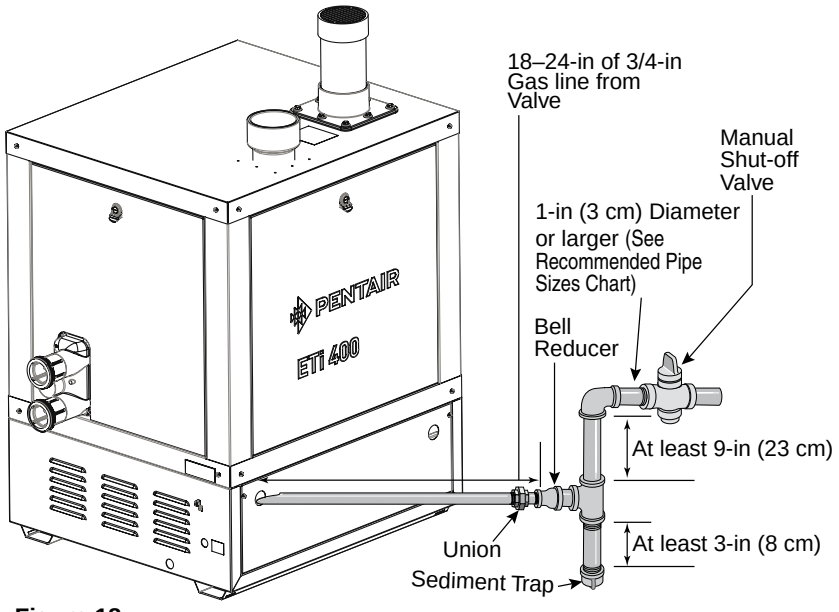



**Figure 18.**

# OUTDOOR HEATER INSTALLATION (U.S. and Canada)

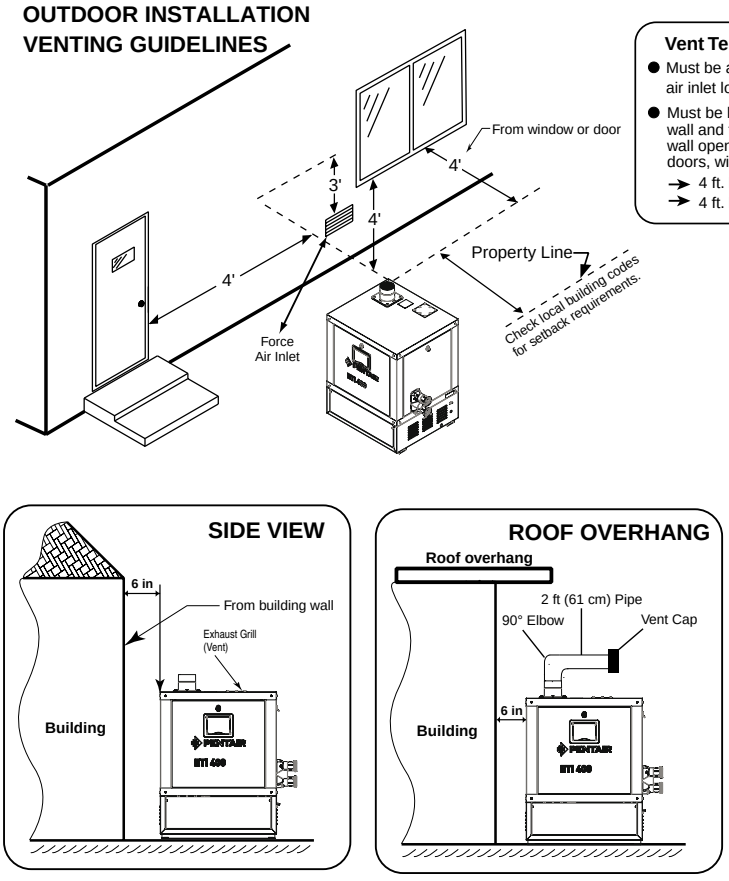
The heater is designed and certified for outdoor installation using the 2 ft (61 cm) long vent pipe stack.

## ⚠WARNING

**Risk of explosion if a unit burning propane gas is installed in a pit or other low spot.** Propane is heavier than air. Do not install the heater using propane in pits or other locations where gas might collect. Consult your local building code officials to determine installation requirements and specific installation restrictions of the heater relative to propane storage tanks and filling equipment. Installation must meet the requirements for the Standard for the Storage and Handling of Liquid Petroleum Gases, ANSI/NFPA 58 (latest edition) in the U.S., or CAN/CSA B149.2 (latest edition) in Canada. Consult local codes and fire protection authorities about specific installation restrictions.

The heater is designed for outdoor operation in ***non-freezing conditions only***. During freezing conditions the condensate drain line and trap may freeze, causing the heater to shut down due to a blocked condensate drain. Also, the heater condensate system components may be damaged by the ice forming on the condensate drain line and trap. If the heater is installed in freezing climates for seasonal use, winterize the heater to avoid freeze damage. See Winterizing Instructions on page 56. Locate the heater on a level surface in an open area that is protected from drainage or run-off. Install the heater in an area where leaves or other debris will not collect on or around the heater. To avoid damage to the electronic components in the heater, take care to prevent prolonged exposure to driving sources of water (such as lawn sprinklers, heavy roof runoff, hoses, etc.). Avoid operation in persistent, extreme, moist or salty environments.

**⚠ CAUTION! In an outdoor installation it is important to ensure water is diverted from overhanging eaves with a proper gutter/drainage system. CAUTION! If the heater is installed directly under a roof overhang, install a 90° street elbow onto the vent terminal. Install a 2 ft (61 cm) pipe section onto the elbow. Install the vent cap onto the end of the pipe. Direct the vent cap away from the house or building, See Figure 19 below.**




## ⚠WARNING

**Risk of explosion if a unit burning propane gas is installed in a pit or other low spot.** Propane is heavier than air. Do not install the heater using propane in pits or other locations where gas might collect. Consult your local building code officials to determine installation requirements and specific installation restrictions of the heater relative to propane storage tanks and filling equipment. Installation must meet the requirements for the Standard for the Storage and Handling of Liquefied Petroleum Gases, CAN/CSA B149.2 (latest edition) or ANSI/NFPA 58 (latest edition). Consult local codes and fire protection authorities about specific installation restrictions.

**Figure 19.**

## OUTDOOR HEATER INSTALLATION (CONTINUED)

The following information is for heaters located outdoors, using a 2 ft (61 cm) long vent pipe stack.

### ⚠WARNING

**CARBON MONOXIDE GAS IS DEADLY –** Exhaust from this pool heater contains carbon monoxide, a dangerous, poisonous gas you cannot see or smell. Symptoms of carbon monoxide exposure or poisoning include dizziness, headache, nausea, weakness, sleepiness, muscular twitching, vomiting and inability to think clearly. IF YOU EXPERIENCE ANY OF THE ABOVE SYMPTOMS, IMMEDIATELY TURN OFF THE POOL HEATER, LEAVE THE VICINITY OF THE POOL OR SPA AND GET INTO FRESH AIR IMMEDIATELY. THE POOL HEATER MUST BE THOROUGHLY TESTED BY A GAS PROFESSIONAL BEFORE RESUMING OPERATION.

**EXCESSIVE CARBON MONOXIDE EXPOSURE CAN CAUSE BRAIN DAMAGE OR DEATH.**

### ⚠WARNING

**Risk of explosion if a unit burning propane gas is installed in a pit or other low spot.** Propane is heavier than air. Do not install the heater using propane in pits or other locations where gas might collect. Consult your local building code officials to determine installation requirements and specific installation restrictions of the heater relative to propane storage tanks and filling equipment. Installation must meet the requirements for the Standard for the Storage and Handling of Liquefied Petroleum Gases, CAN/CSA B149.2 (latest edition) or ANSI/NFPA 58 (latest edition). Consult local codes and fire protection authorities about specific installation restrictions.

Locate the heater in an open, unroofed area and on a level surface that is protected from drainage or run-off. Install the heater in an area where leaves or other debris will not collect on or around the heater. See Figure 20.

It is recommended that a non-combustible base be a platform under the heater, not less than 100 millimeters (mm) thick **However, the heater is approved to be installed on a combustible surface.** To avoid damage to the electronic components in the heater, take care to prevent prolonged exposure to driving sources of water (such as lawn sprinklers, heavy roof runoff, hoses, etc.). Avoid operation in persistent, extreme, moist or salty environments. In extreme weather, shut down the heater and disconnect the power to it until the weather has moderated. In areas subject to hurricanes or very high winds, purchase the Bolt Down Bracket Kit, P/N 476004, see Figure 21.

***Note 1: DO NOT locate the heater where it is exposed to a prevailing wind. Note 2: Be sure the heater is level.***

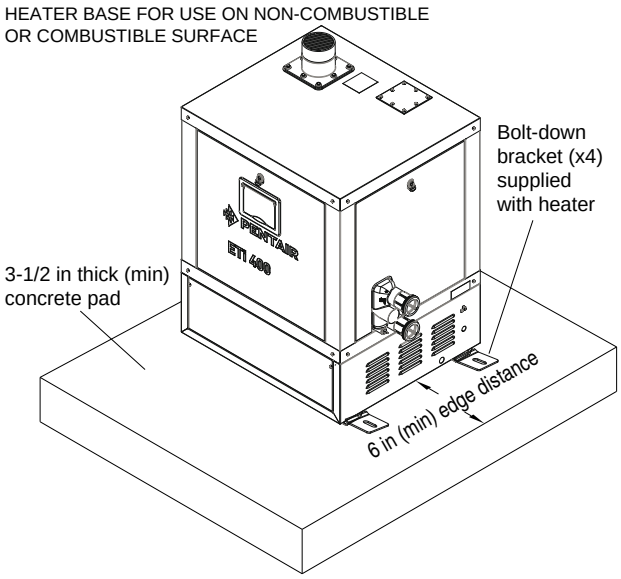



**Figure 20.**

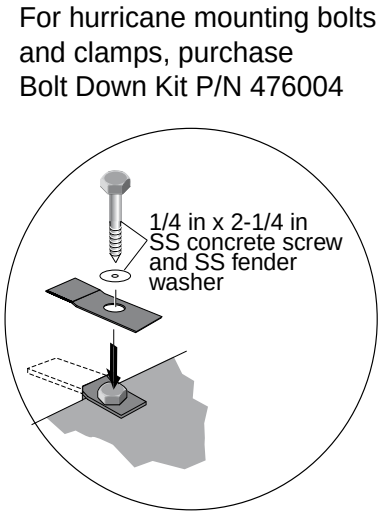



**Figure 21.**

# OUTDOOR HEATER INSTALLATION (CONTINUED)

## HEATER CLEARANCES – OUTDOOR

**IMPORTANT!**

- **In an outdoor installation it is important to ensure water is diverted from overhanging eaves with a proper gutter/drainage system. CAUTION! If the heater is installed directly under a roof overhang, install a 90° street elbow onto the vent terminal. Install a 2 ft (61 cm) pipe section onto the elbow. Install the vent cap onto the end of the pipe. Direct the vent cap away from the house or building, (see page 25).**
- **The heater must be set on a level foundation for proper drainage.**
- **This unit shall not be operated outdoors at temperatures below 32° F (0° C).**

If the heater is located under a roof or deck overhang, there must be at least three (3) feet (1 m) of clearance between the bottom of the overhang and the top of the heater exhaust vent, see Figure 22. If the heater is under a roof or deck overhang, the space around the heater must be open on three sides. DO NOT install the heater under any deck.

For minimum exhaust vent clearances for building openings, see Figure 27 on page 34.

In Canada, the heater must be installed with the top of the vent at least 10 ft (3 m) below, or to either side of, any opening into a building.

Orient the heater for convenient access to the water connections and the gas and electrical connections.

***Note: Check local building codes for installing the heater from any property line set back requirements (see Figure 19 on page 25 for installation illustration).***

**⚠CAUTION**

**If installing the heater next to or near an air conditioning unit, heat pump or another gas pool heater, allow a minimum of 36 in. (91.4 cm) between the unit and the heater.**

Note: (*) See Table 4 (page 30) Category IV Requirements

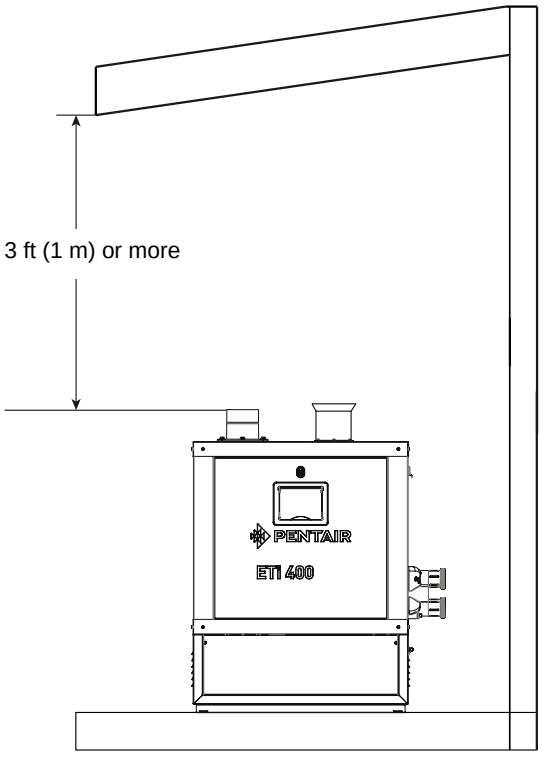



**Figure 22.**

**⚠ CAUTION! A Propane (LPG) fired heater must not be installed in a garage in Massachusetts, by order of the Massachusetts State Fire Marshal. For more information, call the Massachusetts State Fire Marshal's office.**

# INDOOR VENTING — General Requirements

## The heater must be installed as a Category IV appliance.

### *Vented Appliance (Category IV) – Vertical or Horizontal*

An appliance that operates with a *positive* vent static pressure and with a vent gas temperature that allows excessive condensate production in the vent, see Figure 24 (page 30) and Figure 27, page 34.

If you are considering connecting this heater to a pre-existing vent system, make sure that the vent system meets the appropriate venting requirements as given in this manual on page 34. If not, replace the vent system. **DO NOT** use a draft hood with this heater.

The heater operates with a positive vent static pressure and with a vent gas temperature less than 170° F (77° C). The total length of the horizontal run must not exceed the length that is listed in Table 3 on page 29.

# HEATER CLEARANCES — General Requirements

### *INDOOR INSTALLATION OR OUTDOOR SHELTER (US AND CANADA)*

The following clearances must be maintained from combustible surfaces:

**TOP..... 6 in (15 cm)**
**EXHAUST SIDE ..... 6 in (15 cm)**
**HEADER SIDE ..... 6 in (15 cm)**
**DOOR PANELS (*) ..... 6 in (15 cm)**

**NOTE:** (*) For service access it is advisable to allow for sufficient clearance on at least one door panel. The heater is design certified by CSA International for installation on combustible flooring. For installation on carpeting, the heater must be mounted on a metal or wood panel that extends at least 3 in (10 cm) beyond the base of the heater. If the heater is installed in a closet or alcove, the entire floor shall be covered by the panel. For an outdoor shelter installation, the exhaust must discharge into a vent pipe. Orient the heater so that the vent pipe does not interfere with adjustment of the operator control panel.

**180° Control Panel and Plumbing Orientation:** The control panel board can be installed 180 degrees on either side of the heater, allowing for left or right side plumbing orientation for easy access.

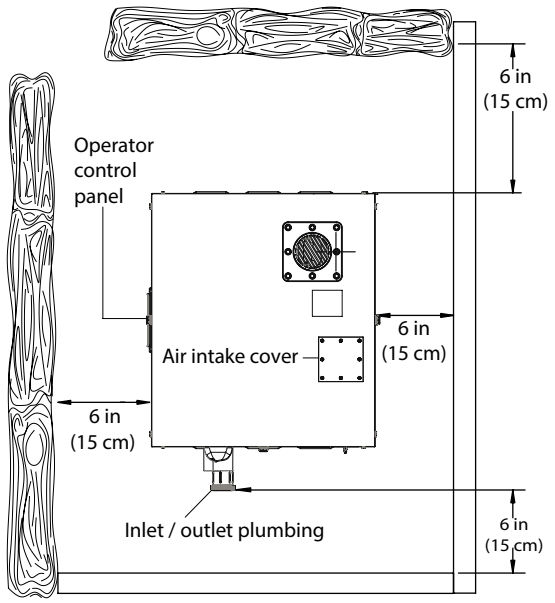



**Figure 23.**

## DIRECT AIR INTAKE COVER

The heater is supplied from the factory with a cover on the top panel for outdoor installation (see Figure 23). Remove the outside air intake cover for outdoor shelter installation or Indoor Installation.

# COMBUSTION AIR SUPPLY

For indoor installation, the heater location must provide sufficient air supply for proper combustion and ventilation of the surrounding area, see Table 3 below.

The minimum requirements for the air supply specify that the room in which a heater is installed should be provided with two permanent air supply openings; one within 12 inches (30 cm) of the ceiling, the other within 12 in (30 cm) of the floor for combustion air, in accordance with the latest edition of ANSI Z223.1, or the National Fuel Gas code, the CSA B149.1, Natural Gas and Propane Installation Codes, as applicable, and any local codes that may apply. These openings shall directly, or through duct, connect to outdoor air.

## Air Supply Requirements Guide for the ETi® 400 Heater

| Minimum Net Free Open Area for Each Opening* (Square Inches / Square Centimeters) | | | | |
|---|---|---|---|---|
| Model | All Air From Inside Building | | All Air From Outside Building | |
| | Combustion | Vent | Combustion | Vent |
| ETi 400 | 400 in² 2580 cm² | 400 in² 2580 cm² | 100 in² 645 cm² | 100 in² 645 cm² |

**Table 3.** Note (*) Area indicated is for one of two openings; one at floor level and one at the ceiling.

**NOTE *:** Vent must be at least 2.4 m (8 ft) away from nearest vertical surface. Vents extending 1.5 m (5 ft) or more above the roof must be braced or guyed. Consult your local code officials for detailed information.

**⚠CAUTION**

Chemicals should not be stored near the heater installation. Combustion air can be contaminated by corrosive chemical fumes which can void the warranty.

**Note:** For indoor installations where combustion air might be insufficient, see **Direct Air Intake Duct with 4 in PVC Pipe (Indoor Installation) on page 30 and 31.**

## *Direct Air Intake Duct with 4-inch or 6-inch PVC Pipe (Indoor Installation)*

For indoor heater installations, the heater is tested for a direct air intake duct using 4 in or 6 in PVC pipe. If outside air is drawn through 4 in or 6 in PVC duct directly into the heater, vent pipe can be installed in accordance with the following requirements, see Table 4 below.

The air intake opening MUST be installed at least 1 ft. above the roof line or normal snow levels for free air flow. The Category IV exhaust vent termination cap must have at least 3 ft. (1 m) minimum vertical clearance from air intake duct, see Figure 24.

**Combustion Air Intake (Vertical or Horizontal) Duct Requirements***

| * Combustion Air Intake (Vertical or Horizontal) Maximum length in Feet (m) | | |
|---|---|---|
| No. of 90° Elbows | 4-in (10 cm) pipe | 6-in (15 cm) pipe |
| 0 | 120 ft. (36.6 m) | 300 ft. (91.4 m) |
| 1 | 108 ft. (33 m) | 288 ft. (87.7 m) |
| 2 | 96 ft. (29.3 m) | 276 ft. (84.1 m) |
| 3 | 84 ft. (26 m) | 264 ft. (80.4 m) |
| 4 | 72 ft. (22 m) | 252 ft. (76.8 m) |

Table 4.

**⚠CAUTION**

Do **NOT** combine exhaust vent pipes to a common exhaust vent in multiple unit installations. Run separate vent pipes.

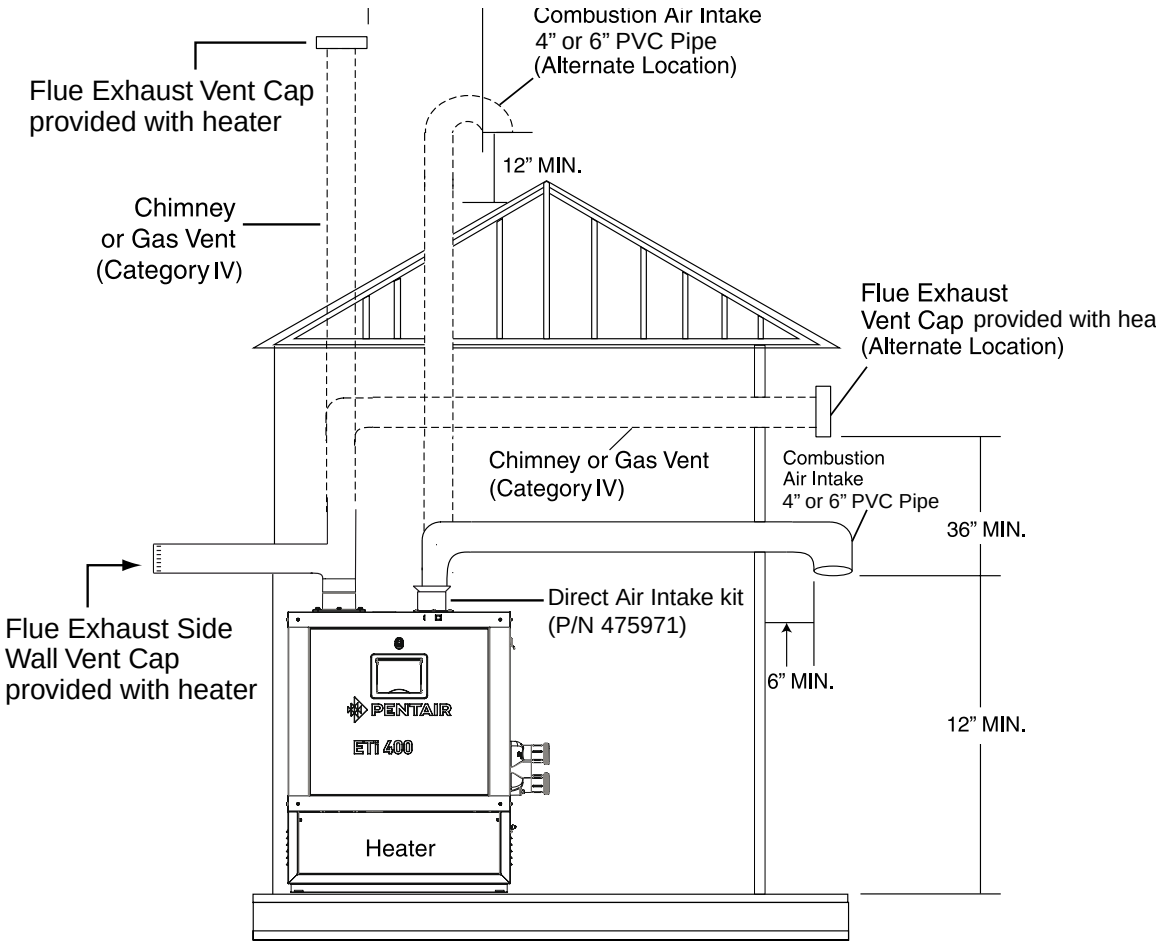



**Figure 24.**

# DIRECT AIR INTAKE KIT (P/N 475971) INSTALLATION

**IMPORTANT: For indoor heater installations with Direct Air Intake duct using 4 in PVC duct it is required to order and install the Direct Air Intake Kit (P/N 475971).**

To install the Direct Air Intake Kit (see Figure 25), the steps are as follows:

1. Remove the side panel from the heater to access the Vent Terminal (see illustration below). Using a flat-blade screwdriver, insert press and turn the screwdriver to unlock the panel.
2. Remove the Air Intake Vent cover from the top of the heater.
3. Insert the spigot part of the street wye up through the air intake hole in the top panel.
4. Insert the 45° elbow into the 3 in pipe section of the assembly that has the street wye.
5. Adjust the 45° elbow to align each 3 in pipe section with the air orifice.
6. Push the air intake assembly into the air orifices. Note: Be sure the top part of the elbow is concentric to the air intake hole in the top panel (see Figure 26).
7. Place the 3 x 4 in reducer to the street wye plate of the elbow and secure it with the 3 sheet metal retaining screws.

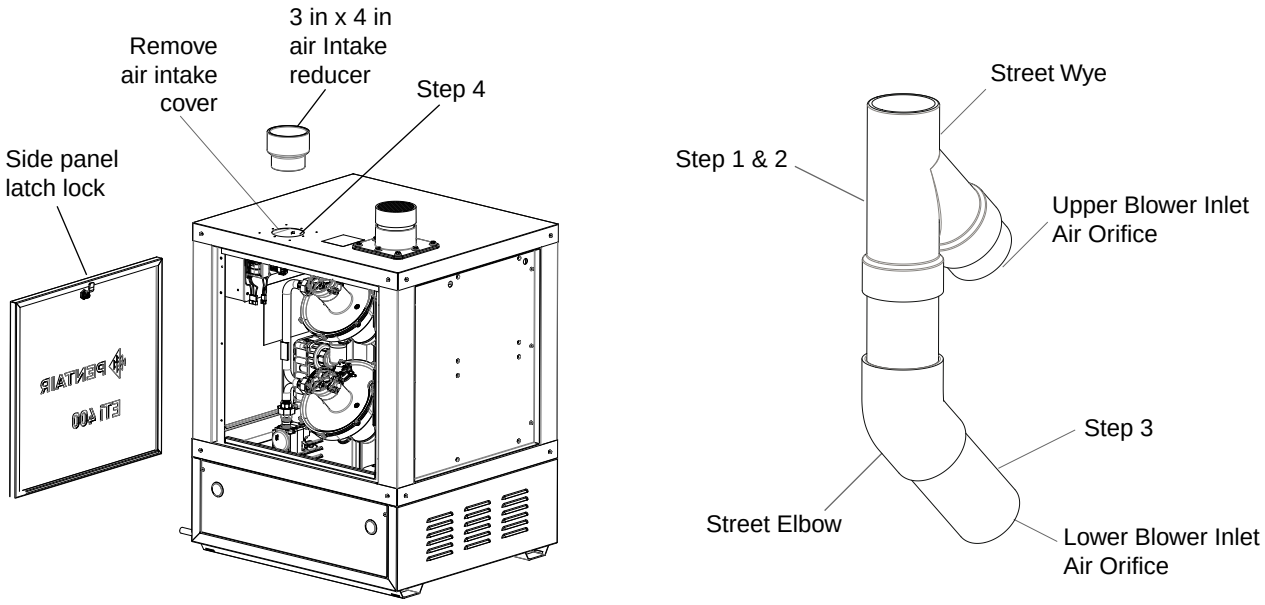



**Figure 25.**

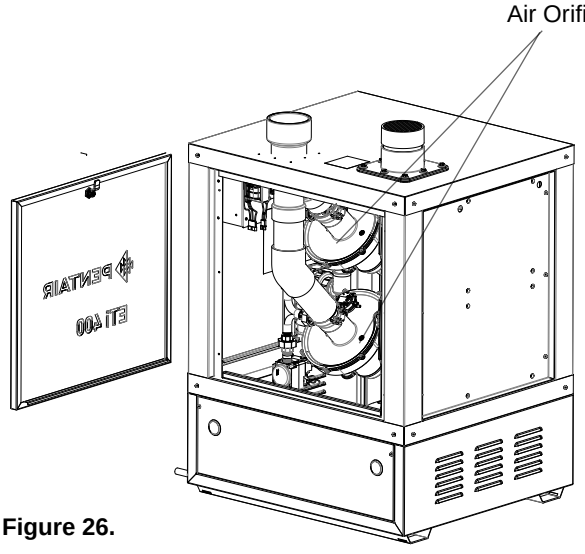



**Figure 26.**

# COMBUSTION AIR SUPPLY (CONTINUED)

**NOTE**

Each 90-degree elbow reduces the maximum horizontal PVC air intake duct run by 12 feet and each 45-degree elbow in the PVC air intake duct run reduces the maximum run by 6 feet. See the Table 6 on page 33 for the maximum lengths using 90-degree elbows.

**⚠CAUTION**

Chemicals should not be stored near the heater installation. Combustion air can be contaminated by corrosive chemical fumes which can void the warranty.

## Corrosive Vapors and Possible Causes

| Area | Likely Contaminants |
|---|---|
| Chlorinated swimming pools and spas | Pool or spa cleaning chemicals. Acids, such as hydrochloric or muriatic acid. |
| New construction and remodeling areas | Glues and cements, construction adhesives, paints, varnishes, and paint and varnish strippers. Waxes and cleaners containing calcium or sodium chloride. |
| Beauty parlors | Permanent wave solutions, bleaches, aerosol cans containing chlorocarbons or fluorocarbons. |
| Refrigeration plants or various industrial finishing and processing plants | Refrigerants, acids, glues and cements, construction adhesives. |
| Dry cleaning and laundry areas | Bleaches, detergents, or laundry soaps containing chlorine. Waxes and cleaners containing chlorine, calcium or sodium chloride. |

Table 5.

## *HORIZONTAL OR VERTICAL VENTING (CATEGORY IV) - POSITIVE PRESSURE*
### *(See Figure 28, page 35 and Figure 29, page 36)*

Vent the heater either horizontally or vertically using the 4 in Vent Adapter that is provided with the heater. Install the vent pipe in accordance with local codes and the provisions of the National Fuel Gas Code, ANSI Z223.1 (U.S.), or the standards CSA B149.1, Natural Gas and Propane Installation Codes (Canada), and the vent manufacturer's instructions. Do not use a draft hood with this heater. Install the vent according to the vent manufacturer's detailed instructions. **Note:** Maintain clearance between the vent pipe and combustible surfaces according to the vent manufacturer's instructions and code requirements. Do not place any insulating materials around the vent or inside the required clear air space surrounding the vent. See Table 6 for maximum permissible vent lengths.

**NOTE**

**Each 90° elbow reduces the maximum horizontal vent run by 12 ft and each 45-degree elbow in the vent run reduces the maximum vent run by 6 ft. See the Table 6 below for the maximum vent lengths using 90° elbows.**

## The ETi® 400 heater is a Category IV appliance

The ETi 400 heater requires a 4 in special gas approved ***Category IV*** vent pipe and is a forced-draft pool and spa heater which uses positive pressure to push flue gases through the vent pipe to the outside. **Flue gases under positive pressure may escape into the dwelling with any cracks or loose joints in the vent pipe, or improper vent installation.** The vent pipe must be of a sealed-seam construction, such as those listed for use with ***Category IV Appliances.*** Vent pipe construction will be of UL 1738 approved non-corrosive material, such as non-metalic PVC schedule 40 per ASTM D2665, CPVC schedule F441 or stainless steel such as AL 29-4C per UL 1738 in USA. In Canada must comply with ULC-5636 code requirements. The 4-in exhaust socket is CPVC. A condensate trap is required.

**Note: To solvent weld the PVC vent pipe to the CPVC exhaust socket use an approved industry standard primer and cement solvent specifically intended and marketed fo PVC/CPVC joints, consult the adhesive manufacturer for details.**

The use of *Approved* thimbles, roof jacks and/or side vent terminals are required; and the proper clearances to combustible materials must be maintained in accordance with type of vent pipe employed—in the absence of a clearance recommendation by the vent pipe manufacturer, the requirements of the Uniform Mechanical Code should be met. **The ventilation air requirements for the heater are shown on page 34 and 36.** It is recommended that use of a condensate trap in the vent run close to the heater may be necessary in certain installations such as cold climates. Horizontal vents 4 in (25.4 mm) or less in length do not require a condensate tee. The heater is suitable for through-the-wall venting.

| (*) Special Gas Vent (Vertical or Horizontal) Maximum length in Feet (m) | | |
|---|---|---|
| No. of 90° Elbows | 4-in (10 cm) pipe | 6-in (15 cm) pipe |
| 0 | 120 ft. (36.6 m) | 300 ft. (91.4 m) |
| 1 | 108 ft. (33 m) | 288 ft. (87.7 m) |
| 2 | 96 ft. (29.3 m) | 276 ft. (84.1 m) |
| 3 | 84 ft. (26 m) | 264 ft. (80.4 m) |
| 4 | 72 ft. (22 m) | 252 ft. (76.8 m) |

Table 6.

**(*) Minimum vent length is 1 ft (.34M), or in accordance with vent manufacturer's instruction, and local and national codes. Horizontal vents 3 ft (1M) or less in length do not require a condensate tee, but must slope down toward the heater at 1/4 in to the foot (2 cm / m) to allow condensate to drain through the neutralizer cartridge.**

## *DIRECT VENT REQUIREMENTS*

1. Install vent pipe so that it can expand and contract freely as the temperature changes. Support the vent pipe according to applicable codes and vent manufacturer's instructions. Pipe support must allow the vent pipe free movement out and back, from side to side, or up and down as necessary, without putting a strain on the heater or vent body. It is recommended to slope the horizontal pipe runs up from the heater at least 1/4" per foot (2 cm/M). Install ***Approved*** condensate drains at low points where condensate might collect. Plumb condensate drains to a drain through hard piping or high-temperature tubing such as silicone rubber or EPDM rubber – do not use vinyl or other low temperature tubing. Follow drain manufacturer's installation instructions.
2. Use an *Approved* firestop for floor and ceiling penetrations. Use an *Approved* thimble for wall penetrations. Use an *Approved* roof flashing, roof jack, or roof thimble for all roof penetrations. Do not fill the space around the vent (that is, the clear air space in the thimble or firestop) with insulation. The roof opening must be located so that the vent is vertical.
3. **Vent Termination:** Vertical (See Figure 27 below and Figure 29 on page 36), for height of vent termination above the roof. Use an *Approved* vent terminal specified by local and national codes and your manufacturer's instructions. A roof termination must be vertical. In Canada, the Vent Cap location shall have a minimum clearance of 4 feet (1.2M) horizontally from electric meters, gas meters, regulators, and relief openings.
4. Make sure entire installation is sealed according to approved standards.

**⚠WARNING**

**Risk of carbon monoxide poisoning if adapter is improperly attached.** Mechanical connections (such as screws) can cause cracking and leaks in the adapter. Do **NOT** drill holes or use screws to connect the appliance adapter to the heater vent body. Attach with manufacturer's specified adhesive.

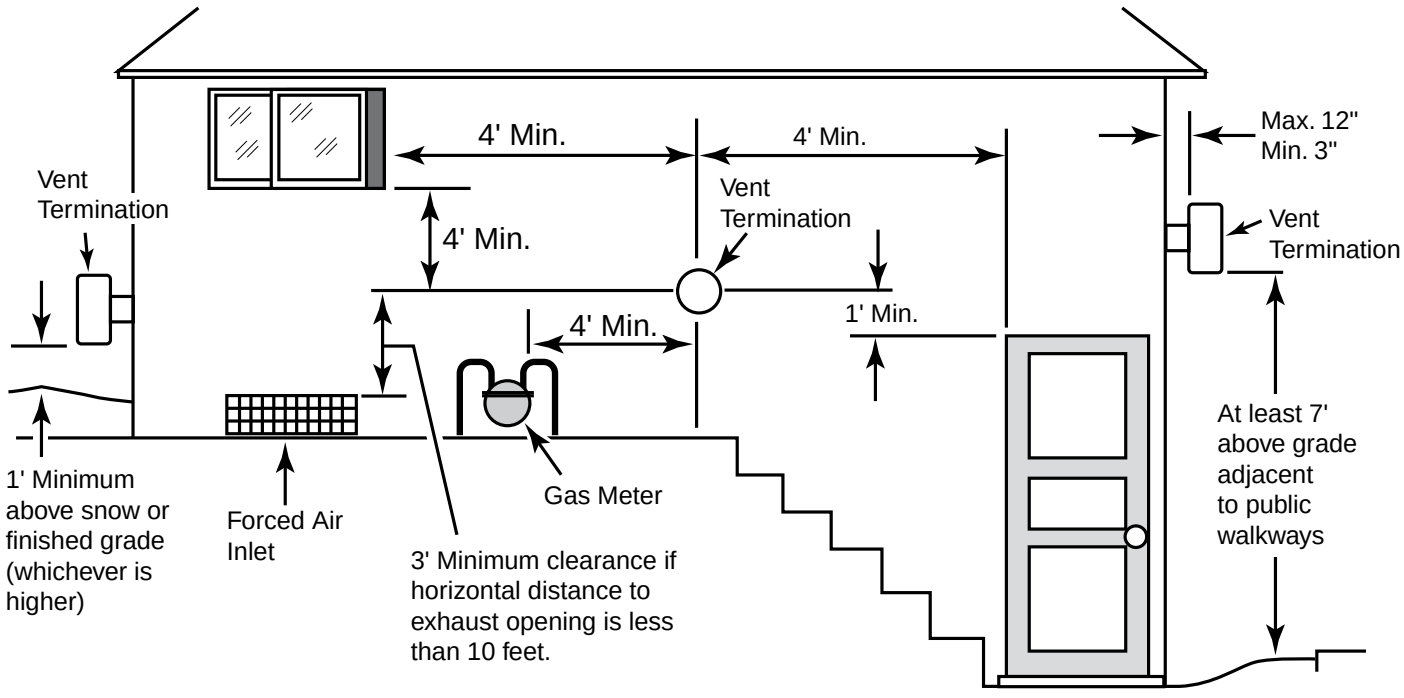



**Figure 27.**

### 5. **Vent Termination - Horizontal**

The terminal must be located (U.S. – See Figure 27 on page 34):

- at least 3" and at most 12" out from the wall (see Figure 29 on page 36), following the vent manufacturer's instructions
- at least 12" above finished grade or the normally expected snow accumulation level, whichever is higher
- at least 4 feet below or horizontally from, or 1 foot above, any doors or windows or gravity air inlet to a building
- at least 3 feet above any forced air inlet located within 10 ft.
- at least 4 feet horizontally from electric meters, gas meters, regulators and relief equipment
- at least 7 feet above grade adjacent to walkways or similar traffic areas

The terminal must be located (Canada – See Figure 27 on page 34):

- at least 10 feet (3.3M) from any opening into a building
- at least 12" (.3M) above finished grade or the normally expected snow accumulation level, whichever is higher
- at least 4 feet (1.2M) horizontally from electric meters, gas meters, regulators and relief equipment
- at least 7 feet (2.1M) above grade adjacent to walkways or similar traffic areas

Allow at least three feet (1M) vertical clearance over vent termination when terminating under an overhang.

Avoid corners or alcoves where snow or wind could have an effect. Exhaust may affect shrubbery and some building materials. Keep shrubbery away from termination. To prevent staining or deterioration, sealing or shielding exposed surfaces may be required.

**⚠WARNING**

**Fire Hazard.** Do not run the heater vent into a common vent with any other appliance. Do not run the Special Gas Vent into, through, or within any active vent such as a factory built or masonry chimney.

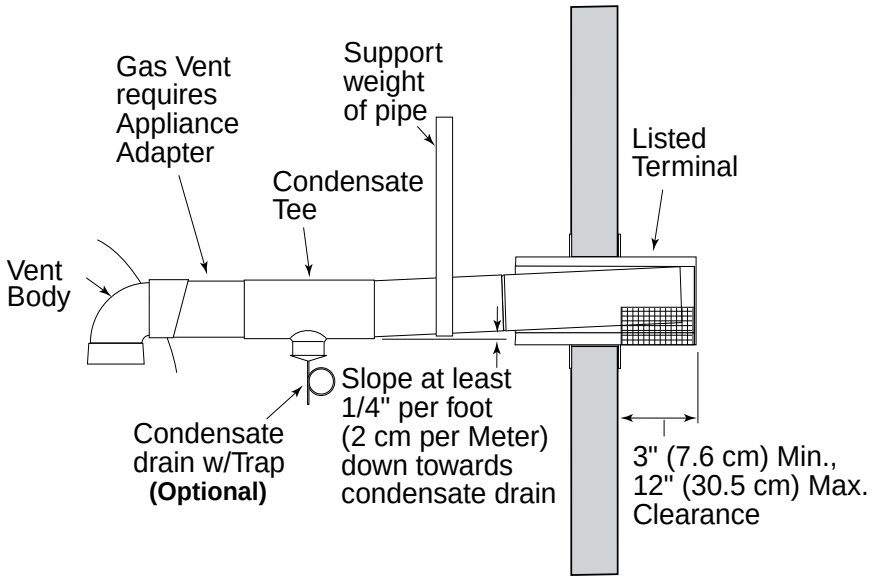



**Figure 28.**

# *Direct Vent Indoor Installation (US and Canada) Horizontal Through-the-Wall*

## Termination

The flue direct vent cap MUST be mounted on the exterior of the building. The direct vent cap cannot be installed in a well or below grade. The direct vent cap must be installed at least 1’ (0.3 m) above ground level and above normal snow levels, see Figure 27, page 34. The direct vent cap MUST NOT be installed with any combustion air inlet directly above a direct vent cap. This vertical spacing would allow the flue products from the direct vent cap to be pulled into the combustion air intake installed above.

This type of installation can cause non-warrantable problems with components and poor operation of the heater due to the recirculation of flue products. Multiple direct vent caps should be installed in the same horizontal plane with a 4’ (1.22 m) clearance from the side of one vent cap to the side of the adjacent vent cap(s).

Care must be taken during assembly that all joints are sealed properly and are airtight. The vent must be drained to prevent the potential accumulation of condensate in the vent pipes.

It is recommended that the intake vent (see Figure 29 below) be insulated in colder climates.

Combustion air supplied from outdoors must be free of particulate and chemical contaminants. To avoid a blocked flue condition, keep the vent cap clear of snow, ice, leaves, debris, etc.

**⚠WARNING**

**No substitutions of flue pipe or vent cap material are allowed. Such substitutions would jeopardize the safety and health of inhabitants. Use CPVC schedule 40 per ASTM D2665, CPVC schedule F441 or stainless steel, such as AL 29-4C per UL 1738 in USA. Canada must comply with ULC-S636 code requirements.**

**Venting:** Vent systems for Category IV appliances that terminate through an outside wall of a building and discharge flue gases perpendicular to the adjacent wall, must be located not less than 10 ft horizontally from an operable opening in the adjacent building. **Exception:** This does not apply to vent terminals that are 2 ft or more above 25 ft or more below the operable openings. Through the wall vents for Category IV must not terminate over public walkways or over an area where condensate or vapour could create nuisance or hazard or could be detrimental to the operation of regulators, relief valves, or other equipment.

Note: (*) See Table 4 (page 30) Category IV Requirements

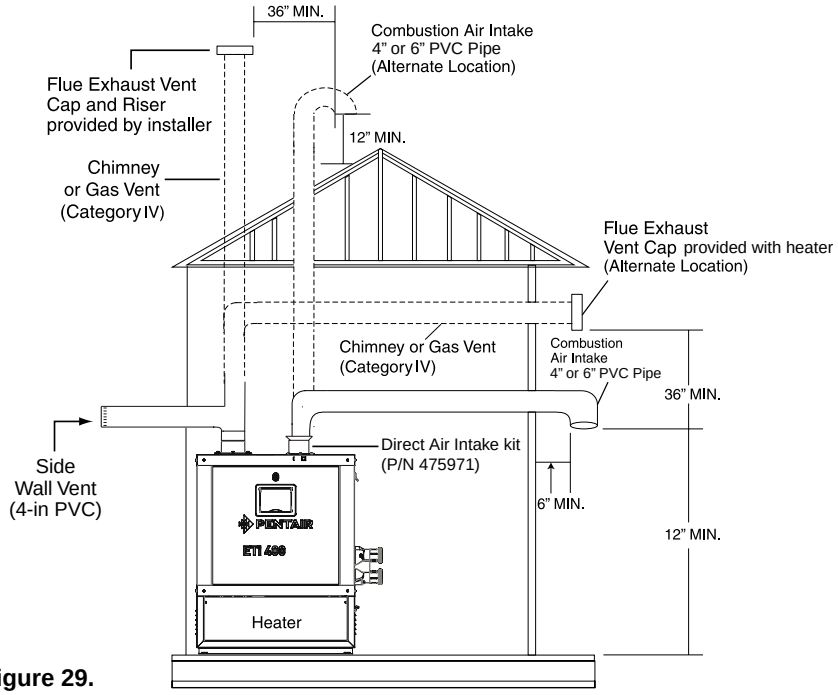



**Figure 29.**

## GARAGE OR UTILITY ROOM INSTALLATION

**⚠WARNING**

**Risk of fire and explosion if installed at floor level in an automotive garage or near gasoline or flammable liquid storage.** Gasoline fumes are heavier than air and will settle to floor level in closed spaces. Gasoline fumes and spilled gasoline or other volatile liquids (such as some paints and varnishes) will travel across the floor and can be ignited by a gas appliance.

In any utility room or residential garage installation, install the heater with the base at least 18 inches (.5M) above the floor, see Figure 30. In a garage, install a rail or wall to protect the heater from physical damage by a moving vehicle.

**NOTICE: A Propane (LPG) fired heater must not be installed in a garage in Massachusetts, by order of the Massachusetts State Fire Marshal. For more information, call the Massachusetts State Fire Marshal's office.**

## VENT INSTALLATION – INDOOR INSTALLATION (U.S. AND CANADA)

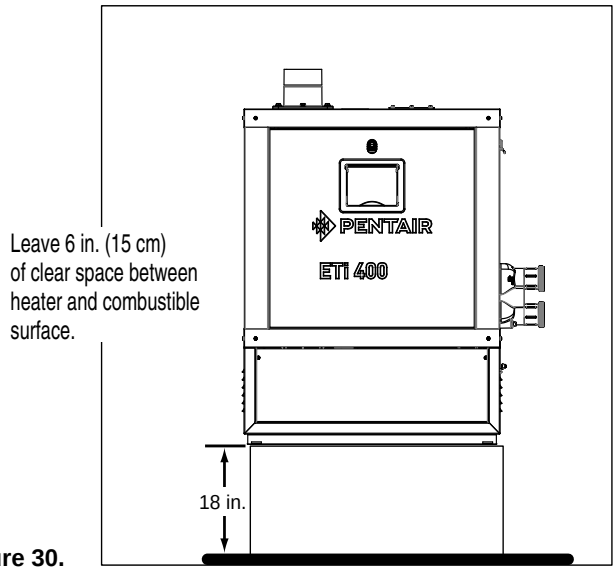



**Figure 30.**

## FINAL INSTALLATION CHECK

After heater installation, check and verify the following:

- Check that horizontal vent pipe runs slope uniformly at least 1/4" per foot (2 cm per meter) upward from the heater to the vent terminal. No sags, no dips, no high or low spots.
- Check that vent is supported at elbows, tees, and horizontal and vertical runs according to manufacturer's instructions and code requirements.
- Check that vent supports and wall and ceiling penetrations allow free movements up, down, and sideways without causing any strains on the heater or vent body.
- Check for at least six inch (15 cm) free air clearance between the heater vent pipe and combustible materials.
- There should be at least 30 in of clearance in front of the heater to provide adequate service space and access to the operator control panel, electrical controls and other operating components.
- Check that all joints are completely together and sealed.
- In Florida, building codes require that the heater be anchored to the equipment pad or platform to withstand high wind pressures created during hurricanes. A hold down bracket kit is designed to hold the unit to the equipment pad in high wind conditions. Installation of the anchor clamps are recommended in all installations and are required in Florida, (See Florida Building Code 301.13). For hurricane mounting bolts and clamps, purchase Bolt Down Kit P/N 476004.

# CONDENSATION MANAGEMENT

The ETi® 400 Heater is a condensing appliance. The flue gases will produce condensate while in operation and must be drained correctly. **Note: The condensate pH level is between 3.1 and 4.2, Pentair recommends to neutralize the condensate to avoid potential damage over time to the drainage system, and to comply with local water authorities where applicable.** To neutralize the condensate, use an optional Condensate Neutralizer Kit P/N 475612 or similar. The condensate drain must be installed so as to prevent accumulation of condensate. When a condensate pump is not used, the tubing must continuously slope downward toward the drain with no spiraling.

**⚠ CAUTION! pH levels of 5.0 and below may harm some floor drains and/or pipes, particularly those that are metal. Ensure that the drain, drainpipe, and anything that will come in contact with the condensate can withstand the acidity. Damage caused by failure to install a neutralizer kit or to adequately treat condensate will not be the manufacturer's responsibility.**

**⚠ WARNING! DO NOT allow the exhaust flue gases to vent through the neutralizer. All condensate drains MUST have a trap to prevent flue gas leakage. Flue gas leakage can cause personal injury or death from carbon monoxide. Check with local authorities for regulations regarding discharge of condensate to the drain sewer system.**

## Condensate Maintenance

**Annual condensate assembly inspection:** Inspect the inside tubing top for any dirt or particles that could collect and clog the condensate neutralizer cartridge. **DO NOT route the condensate outside tubing through any area that is exposed to freezing** temperatures.

## Condensate Neutralizer Cartridge Drain/Tubing Installation (FOR INDOOR OR OUTDOOR HEATER INSTALLATION)

To install the external condensate neutralizer cartridge drain/tubing:

1. Connect the PVC socket adaptors to the neutralizer. DO NOT OVERTIGHTEN.
2. Connect the inside tubing to the inlet of the neutralizer cartridge.
3. **Indoor Heater Installation (Figure 31):** Mount the neutralizer cartridge on the floor near the side of the heater. **Outdoor Heater Installation (Figure 32):** Using the provided brackets, secure the neutralizer cartridge onto the heater base.
4. Connect the outside tubing to the outlet of the neutralizer cartridge. Be sure the tubing is at its highest point at the cartridge outlet.
5. Route the outside tubing to a drain or to a pump. Maintain a pitch of ¼ in per foot downward from the cartridge outlet.
6. Fill the condensate trap with water until flow is established through the neutralizer. **Note: Observe the neutralizer during the heater operation to ensure unrestricted flo .**

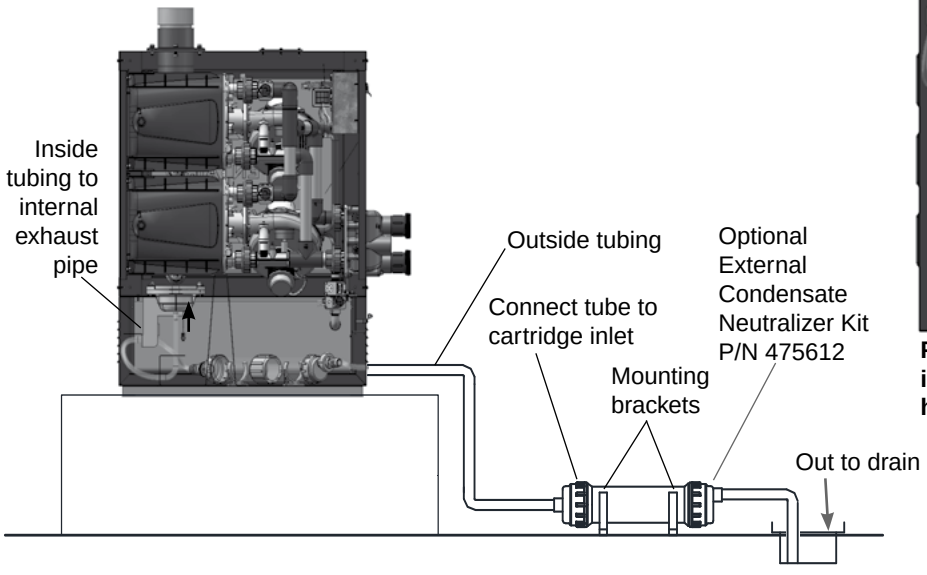



**Figure 31. External Neutralizer Cartridge for indoor heater Installation**

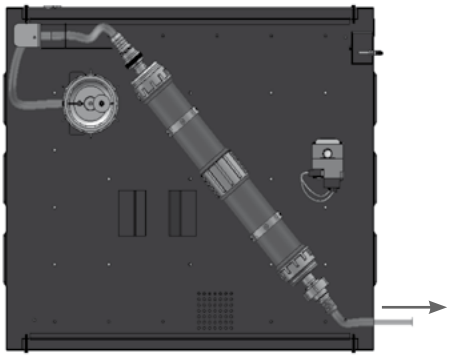


**Figure 32. Internal Neutralizer Cartridge installed on base of heater for outdoor heater Installation**

# ELECTRICAL CONNECTIONS

**Electrical Rating: 60 Hz 120 / 240 Volts AC, single phase.**

**Enclose the incoming AC power line to the heater, in an approved flexible conduit connected directly to the junction box on the inside of the lower right side of the heater (see Figure 11 on page 18). The Line Voltage field wiring is 14 gauge, with a circuit capacity of 15 Amps.**

**The heater is factory wired for 240 VAC. See page 40 for 240 VAC and 120 VAC wiring. Operating amp draw is about 5 Amps at 120VAC and 2.5 Amps at 240VAC. A 15 Amp circuit capacity is required for the inrush current at startup.**

## ⚠CAUTION

**This heater is designed to operate at 120 or 240 VAC. It is not recommended to be connected to OR operate on a 208 VAC.**

## ⚠CAUTION

**The heater ships from the Factory with the 240V plug installed. Installing the 120V plug and then connecting the heater to 240V line current will immediately damage the transformer, control board, and will void the warranty. If you install the 240V plug and connect the heater to 120 volts line current, the heater will not operate.**

## ⚠CAUTION

**If, while there is line voltage connected to the heater, you touch either line voltage terminal with any 24VAC wire that is connected to the control board (including the Fireman's Switch jumper), you will immediately destroy the control board and void the warranty.**

**Please read the information under IMPORTANT! (page 44) and READ ME FIRST! (page 48) before proceeding.**

- All wiring must be in accordance with all applicable codes.
- The heater, when installed, must be electrically grounded and bonded in accordance with local codes or, in the absence of local codes, with the National Electrical Code or the Canadian Electrical Code (as applicable).
- Electrical power circuits to the pool heater must follow local codes and National Electrical Code or Canadian Electrical Code (as applicable).
- All wiring between the heater and devices not attached to it, or between separate devices which are installed in the field, must be **Type T** wire rated for 35°C rise.
- All line voltage wiring shall be enclosed in approved flexible conduit, and shall be securely attached to the field wiring box located in the lower right side of the water manifold panel **(see Figure 11 on page 18)**. The conduit or cable connector at the field wiring box should contain an insulating bushing or its equivalent to prevent abrasion of the wires as they enter the box.

### HEATER BONDING

## ⚠ WARNING

- **A bonding lug is provided on the heater located on the upper side of the base by the "Plumbing" side (see page 18). The heater along with the pool system equipment must be bonded together. Using solid copper conductor not smaller then 8 AWG to reduce voltage gradients in the pool area.**
- **Not properly bonding and grounding the heater increases the risk of electrical shock. Damage to the heat exchanger can occur from electrolysis when the heater is not bonded properly.**

# ELECTRICAL CONNECTIONS (CONTINUED)

## 120 VAC Wiring

- Connect the BLUE PLUG (120 VAC) into the 12-pin plug located on the electrical panel, see Figure 33).
- Connect the L1 to the BLACK WIRE in the heater.
- Connect the NEUTRAL WIRE to the RED WIRE in the heater.
- Connect the GROUND WIRE to the GREEN WIRE in the heater.

## 240 VAC Wiring

- Connect the RED PLUG (240 VAC) into the 12-pin plug located on the electrical panel, see Figure 34).
- Connect the L1 to the BLACK WIRE in the heater and the other L2 to the RED WIRE at the heater.
- Connect the GROUND WIRE to the GREEN WIRE in the heater.

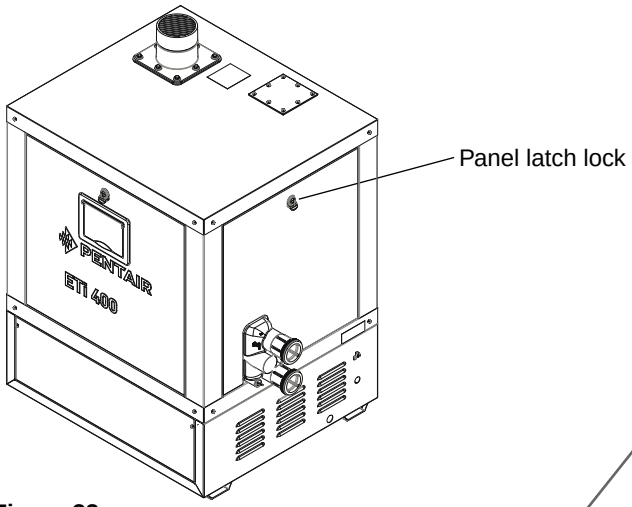



**Figure 33.**

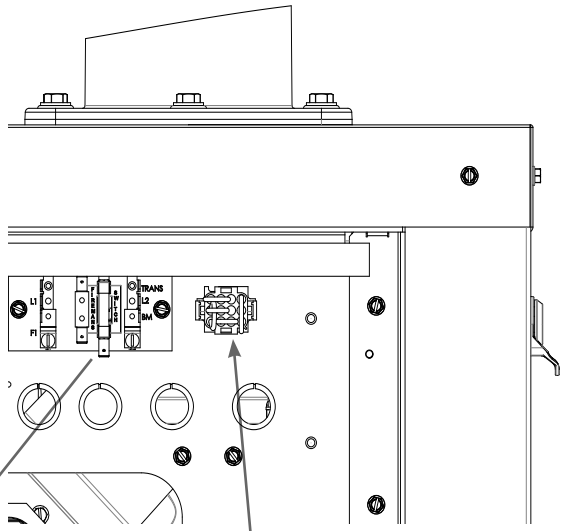
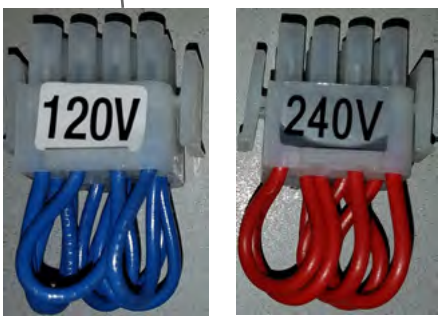



**Figure 34.**




**120 VAC (BLUE)** **220 VAC (RED)**

⚠ CAUTION! The 120 VAC (Blue plug) voltage selector is NOT interchangable with the MasterTemp® or StaRite® Heater voltage selector (Black plug)

# ELECTRICAL CONNECTIONS (CONTINUED)

## REMOTE CONTROL CONNECTIONS

1. **NOTE: Switch off powe to heater at main circuit breaker panel.**
2. Remove the front side door panel, see Figure 33 on page 40.
3. Locate the **Fireman Switch jumper wire**; remove the wire. See Figure 35 below.
4. Connect the **Remote Control Dry Contact wires**. See Figure 35 below.

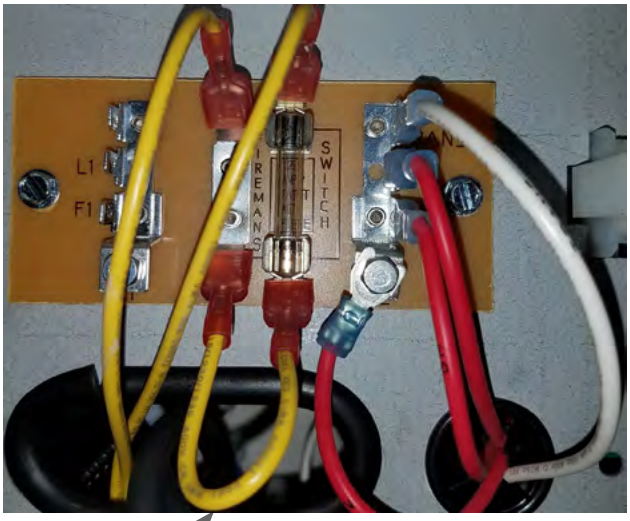



**Figure 35.** **CONNECTION OF FIREMAN'S SWITCH OR REMOTE CONTACT YELLOW JUMPER WIRE**

4. **To connect a 2-Wire Control (for IntelliCenter®, IntelliTouch® or EasyTouch® Control System) or a timer:**
   - Remove the factory installed jumper from the Fireman's Switch terminals.
   - Connect wires between the Fireman's Switch terminals on the heater and the relay. Connect wires from the controller or timer to the Fireman's Switch. Controller, timer or relay should be sized to handle 24 VAC at 0.5 Amp (because it will be completing the 24 VAC control board circuit on the heater as shown in Figure 34 on page 40). DO NOT apply line voltage to the Fireman's Switch terminals. Use 18 gauge wire with a minimum 3/64-in (1.2 mm) thick insulation rated for a temperature rise of at least 105°C.
   - Knock-outs are provided to route the wires through the bottom of the control box and past the junction box.
5. Close front side door panel.

To control heaters that are operated in parallel, connect wiring at same locations on heater as 2-Wire. It is imperative that each control circuit is isolated from the other control circuits, to avoid that current will flow from one heater to another through the control circuits.

**NOTICE: The fuse for the Fireman's Switch is a 1.25 Amp 1¼ x ¼" fast blow fuse, which is commonly available.**

### *FIREMAN'S SWITCH*

**TIME CLOCK/FIREMANS SWITCH (See Figure 31 above):**

A time clock controlling the filter pump should be a dual switch low-voltage Fireman's Switch should be set to shut off the call for heat to the pool heater 15 to 20 minutes before shutting down the pool pump. Always use crimp type connectors when connecting two wires. To operate the heater with a time clock, connect the timer to the fireman's switch wiring connection, as shown in the illustration on right. **The fireman's switch connection is located at the Yellow jumper wire below the fuse.** The fireman's switch connection must be a dry contact and must not supply power to the heater. Powering the fireman's switch connection externally may damage the heater, and is not covered by the herater warranty.

# HEATER CONNECTION WIRING DIAGRAM

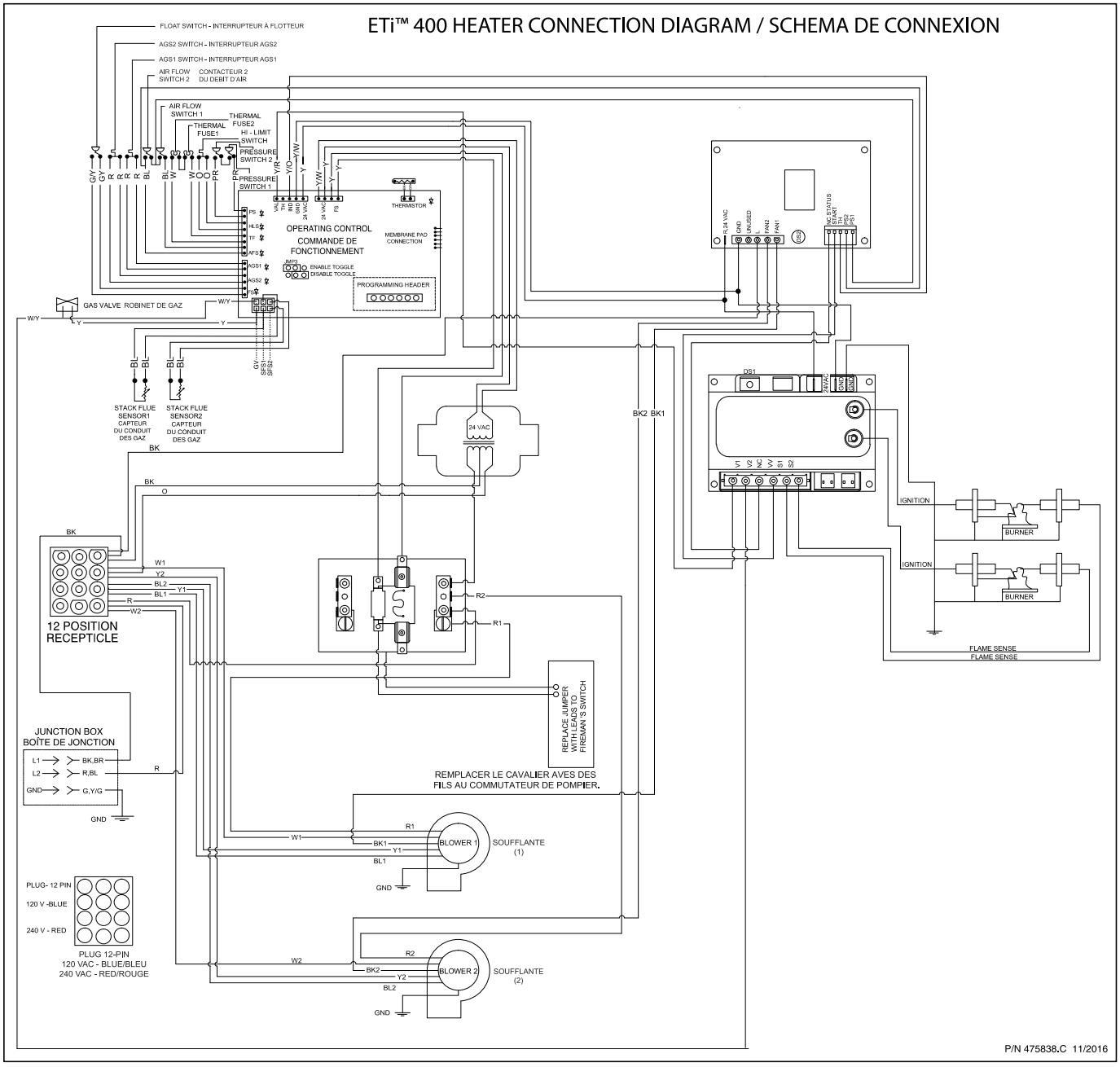
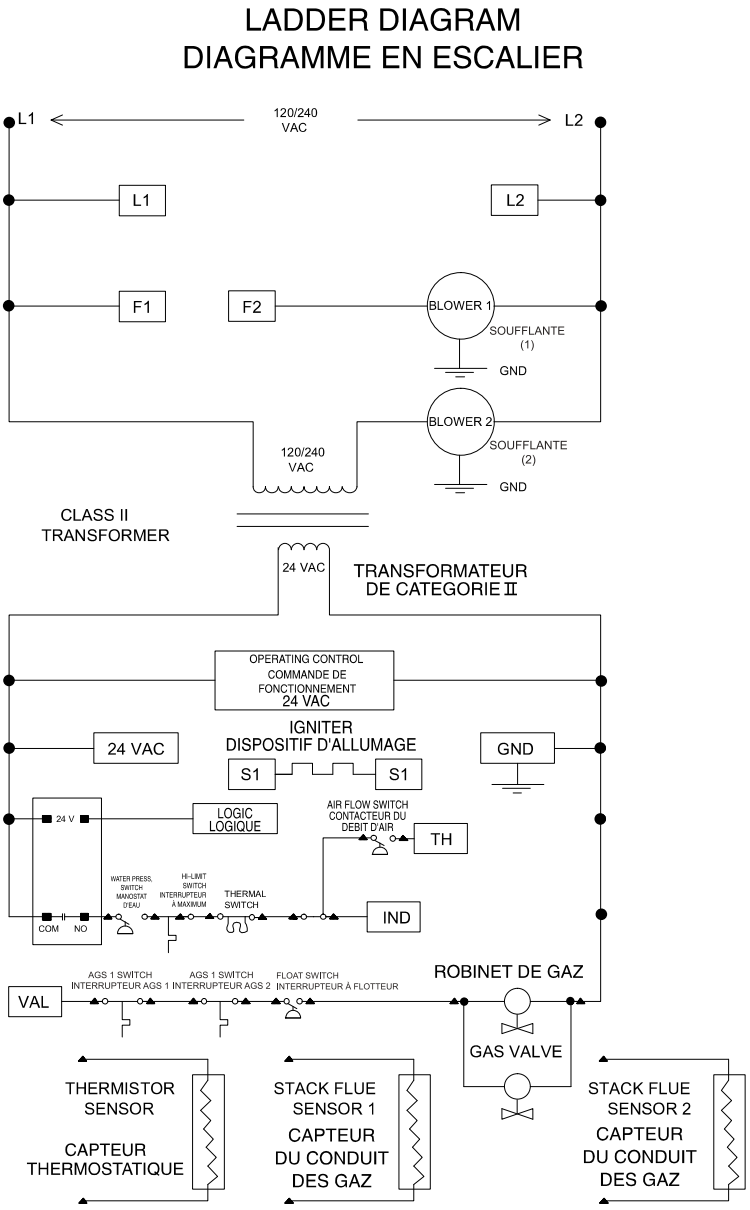



**Figure 36.**

# HEATER LADDER WIRING DIAGRAM




NOTES:-

1) L1 L2 F1 F2 S1 24 VAC
S2 GND IND VAL TH
ARE CONNECTED ON THE IGNITION MODULE.

2) ▲ PIN AND SOCKET CONNECTOR.

3) IF ANY OF THE ORIGINAL WIRES AE SUPPLIED WITH THE APPLIANCE MUST BE REPLACED,THEY MUST BE REPLACED WITH TYPE 105°C WIRE OR ITS EQUIVALENT.

**Figure 37.**

# Section 3: Troubleshooting

## Initial Troubleshooting

Only qualified, trained service technicians with appropriate test equipment should service the heater. Remember that all parts of the system affect heater operation. Before starting this troubleshooting procedure, make sure that the pump is running correctly, that there are no blockages in the system, that the valves are correctly set and that the time clock is correctly set and is running.

**CAUTION: Installing the BLUE 120 volt plug in the control box and then connecting the heater to a 240 volt line will destroy the transformer, control broad, and ignition control module, and will void the warranty. If you install the RED 240 volt plug and then connect the heater to a 120 volt line, the heater**

**READ THE FOLLOWING INFORMATION CAREFULLY**

1. Check the line voltage to your heater. This heater will operate on either 120 Volts AC or 240 Volts AC.
2. Remove the covers and check the 12-pin plug in the back of the control box. The plug must match the voltage in the heater circuit.
3. If the 12-pin plug is not plugged into the back of the control box, select the correct plug from the bag in the control box and plug it in. The BLUE plug is for 120 volts, the RED plug is for 240 volts. See Figure 34 on page 40)

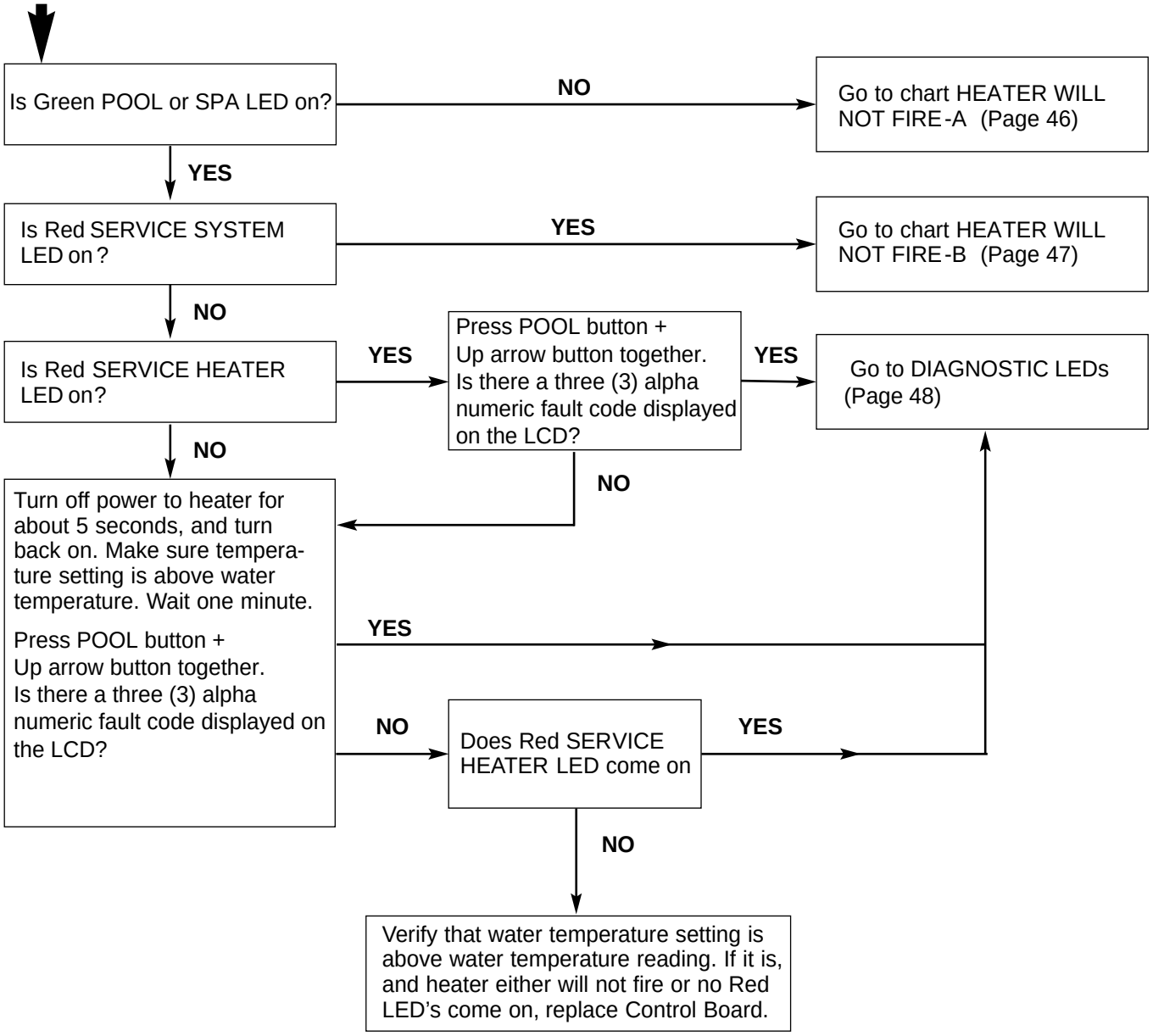
## Error and Fault Codes

The following table lists the ETi® 400 Heater Error and Fault Codes.

| Fault Condition | Initial Error Code Display | * Error Symbol/Text (Press and disengage POOL ON and UP arrow at the same time) Error display will apear for 30 seconds and then previous state will display. | Note | Troubleshooting |
|---|---|---|---|---|
| SHORTED Stack Flue Sensors (SFS1 or SFS2) means flue temperature is greater than 170 F (77.7 C) | **E06** | SFS symbol will be displayed | All keypad disabled (To Reset: Cycle Power) | Follow diagram on page 50 |
| OPEN Stack Flue Sensor (SFS) | **E05** (error should display after 30 sec of firing) | SFS symbol will be displayed | All keypad disabled except OFF (To Reset: OFF key) | Follow diagram on page 50 |
| OPEN Automatic Gas Shut-off Switch (AGS1 and AGS2)--opens when outlet temperature goes above 150 F (65.5 C) | | AGS1 or AGS2 symbol will be displayed along with text **"AG1" or "AG2".** | All keypad disabled (To Reset: Cycle Power) | Follow diagram on page 49 |
| Air Flow Switch (AFS1 and AFS2) | | AFS symbol will be displayed along with text **"AFS".** | | Follow diagram on page 49 |
| High Limit Switch (HLS)--Opens when outlet temperature goes above 135 F (57.2 C) | | HLS Symbol will be displayed along with text **"HLS".** | | Follow diagram on page 49 |
| OPEN Water Pressure Switch (PS) | | PS symbol will be displayed along with text **"PS".** | | Follow diagram on page 49 |
| OPEN Water Temperature Sensor | **E01** | **E01** | LED 7 will light up on back of board | Follow diagram on page 49 |
| SHORTED Water Temperature Sensor or water tempeature greater than 125 F (51.6 C) | **126** | **126** | | Follow diagram on page 49 |
| OPEN Condensate Float Switch | | "FS" text will be displayed | | Follow diagram on page 51 |
| Flame Sensor | | IGN symbol will be displayed along with text **"IGN"** | All keypad disabled (To Reset: Cycle Power) | Follow diagram on page 47 |
| OPEN Thermal Sensor | | tf Symbol will be displayed along with text **"tf".** | | Follow diagram on page 51 |

# Section 3: Troubleshooting

## Start here for directions to specific Troubleshooting Chart

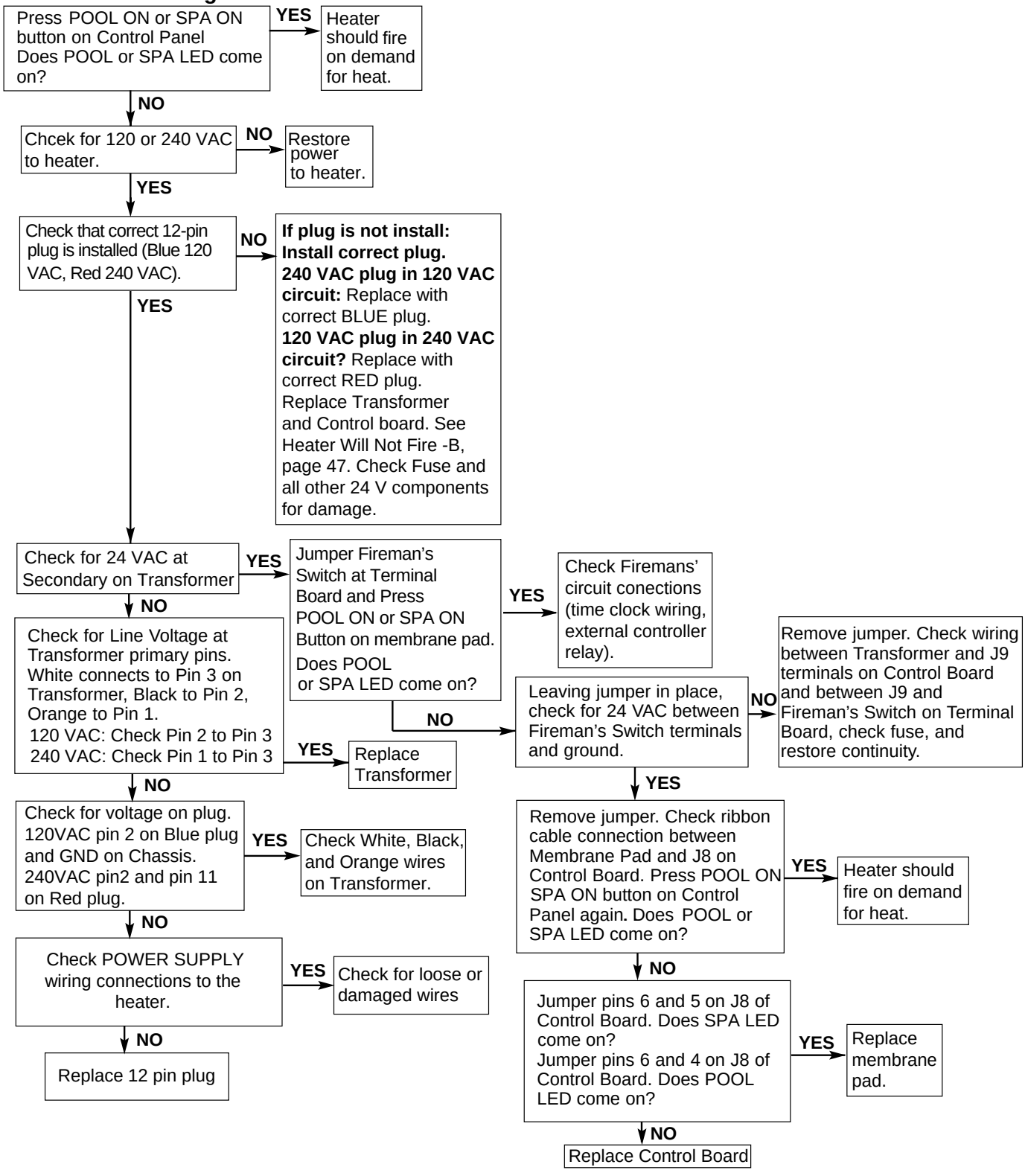



**⚠ WARNING Hazardous voltage. Can shock, burn or kill.** Disconnect power before servicing any components.

**⚠ WARNING Fire and Explosion hazard.** Do not jumper switch terminals to remedy a failed safety switch.

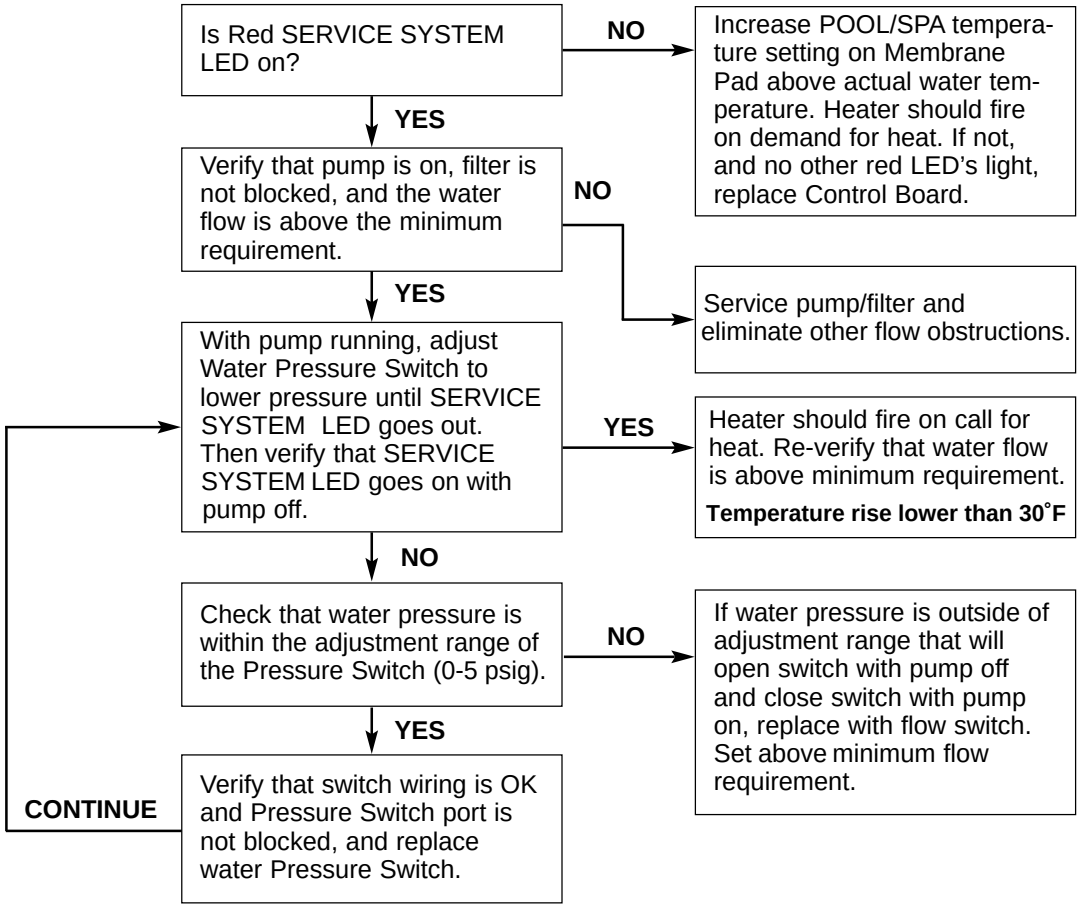
# Heater Will Not Fire - A

**Start Here: from Page 45.**



# Heater Will Not Fire - B

## From page 45: Start

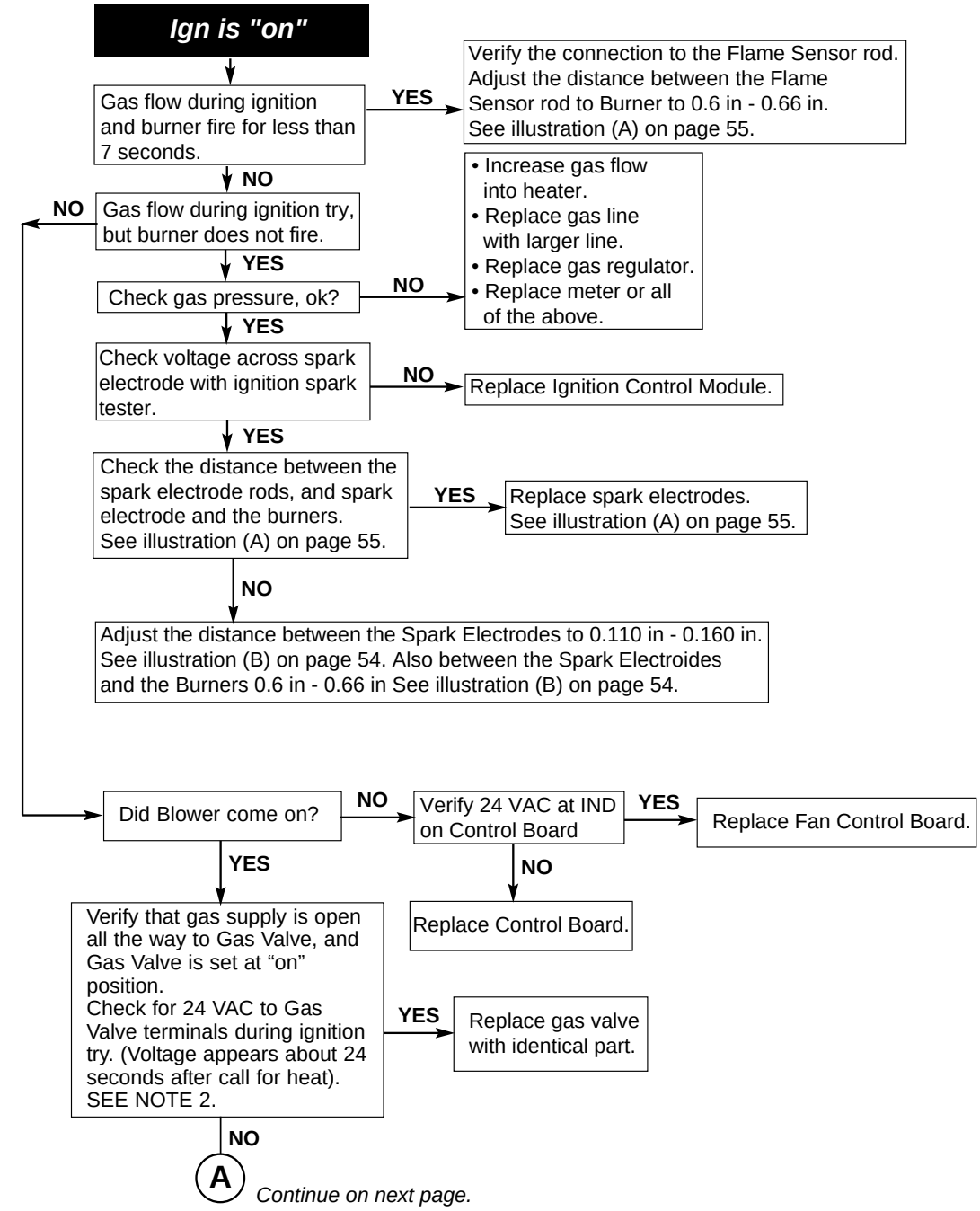


# Diagnostic LEDs: PS, HLS, TF, IGN, AFS, AG1, AG2, FS

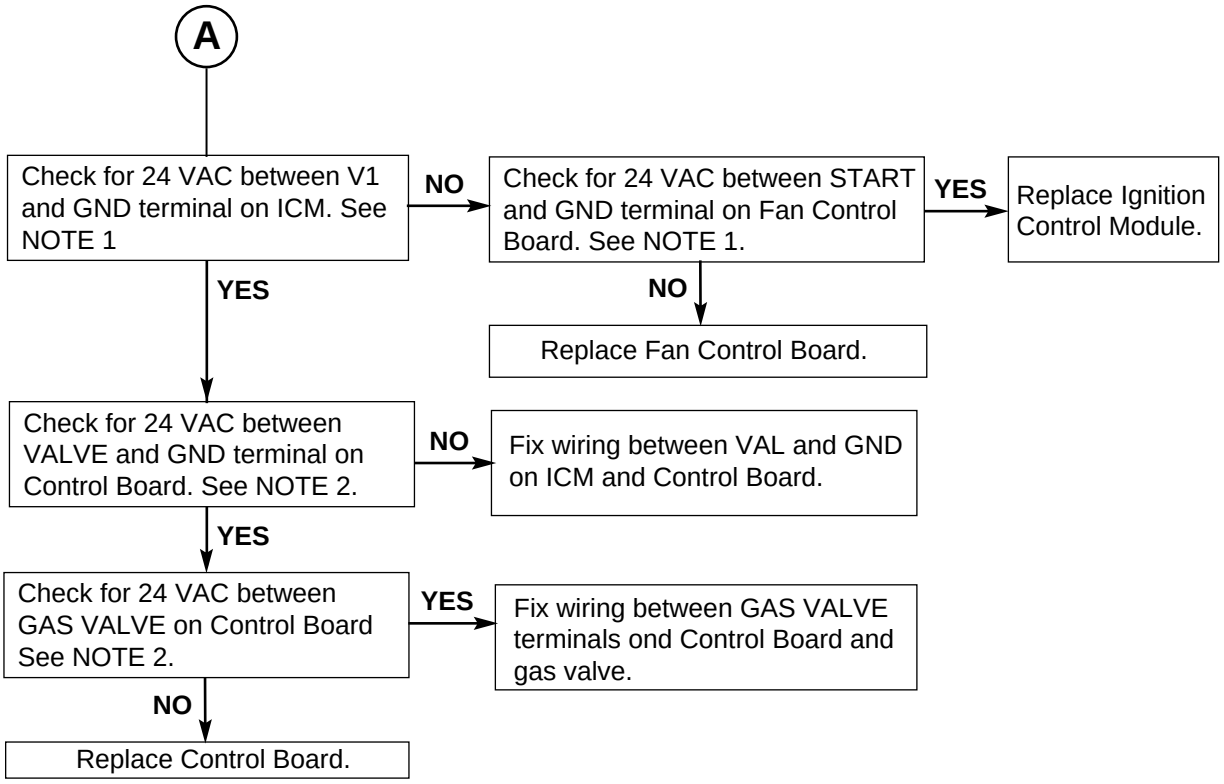
## IMPORTANT! READ ME FIRST!

**IMPORTANT! READ ME FIRST!!**

If your heater is correctly connected to **240 Volts AC,** the Ignition Control Module (ICM) will convert the 240VAC to an intermittent pulse to the ignitor. Digital meters don't read this type of signal well. (An analog meter will give a better reading than a digital meter). If the ICM is bad, your voltmeter will read either 0 VAC or 240 VAC. If your ICM is good, your meter will read some voltage between 0 and 240 VAC. Exactly what reading you get will depend on the meter, but with a good ICM, the reading won't be 0 VAC or 240 VAC, but somewhere in between.



# Diagnostic LEDs: PS, HLS, TF, IGN, AFS, AG1, AG2, FS (Continued)



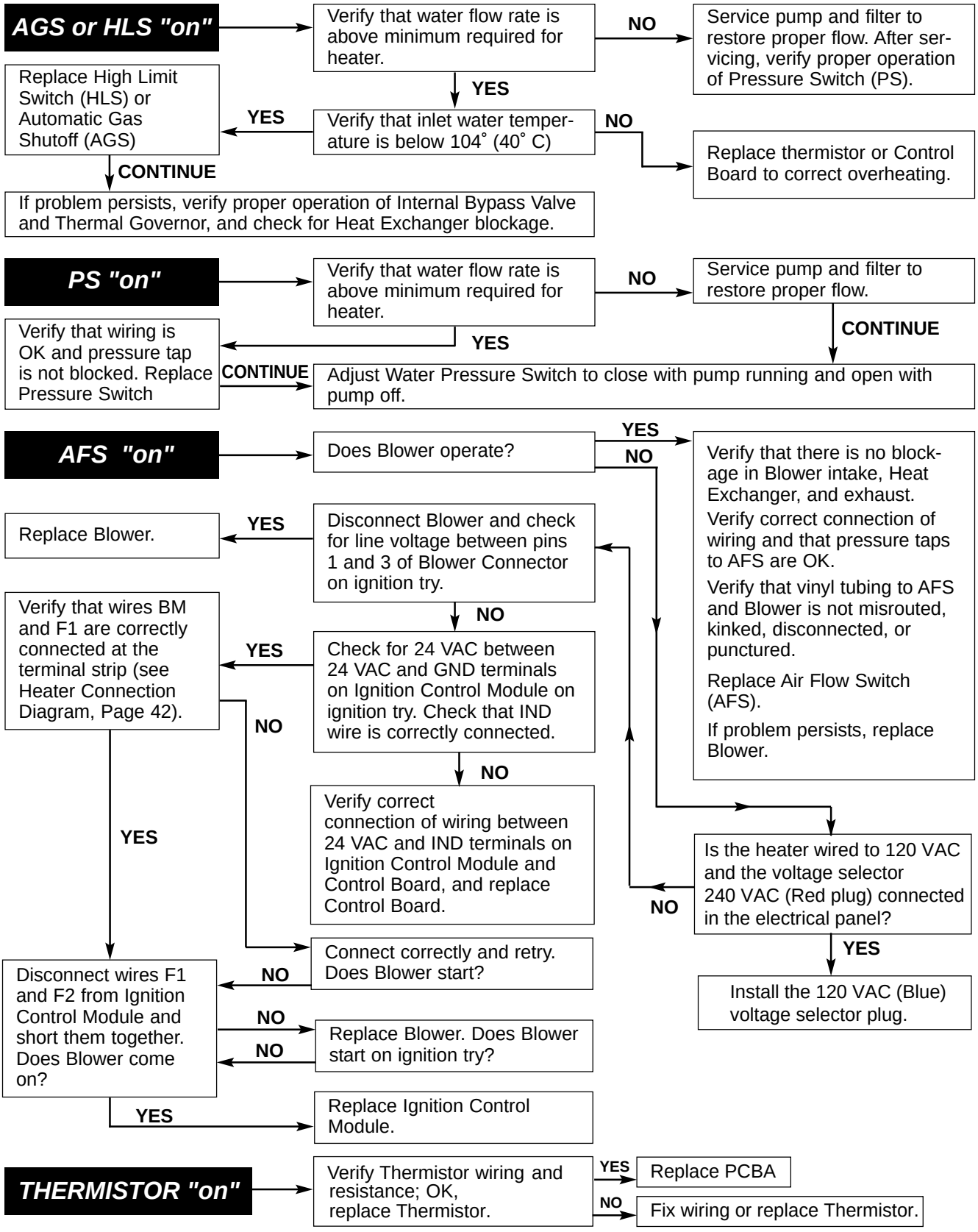

**NOTE 1:** Voltage appears immediately after call for heat, and may be on for only about 30 seconds.

**NOTE 2:** Voltage appears about 24 seconds after call for heat, and may be on for only about 7 seconds.

**⚠ CAUTION Do not jumper a safety switch to remedy a failed switch.**

**NOTE:** ES1 is a spare and should be jumpered.

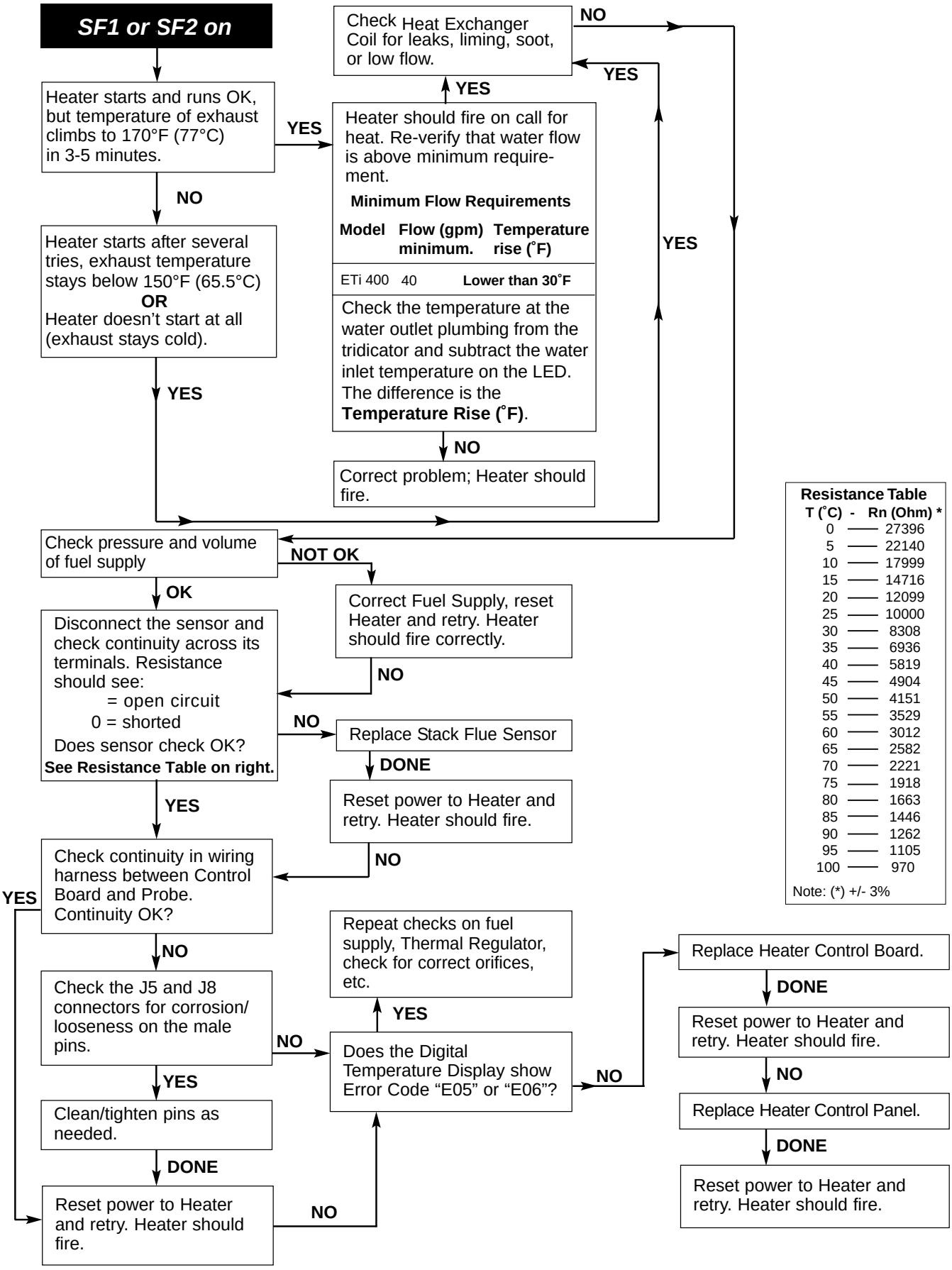
# Diagnostic LEDs: PS, HLS, TF, IGN, AFS, AG1, AG2, FS



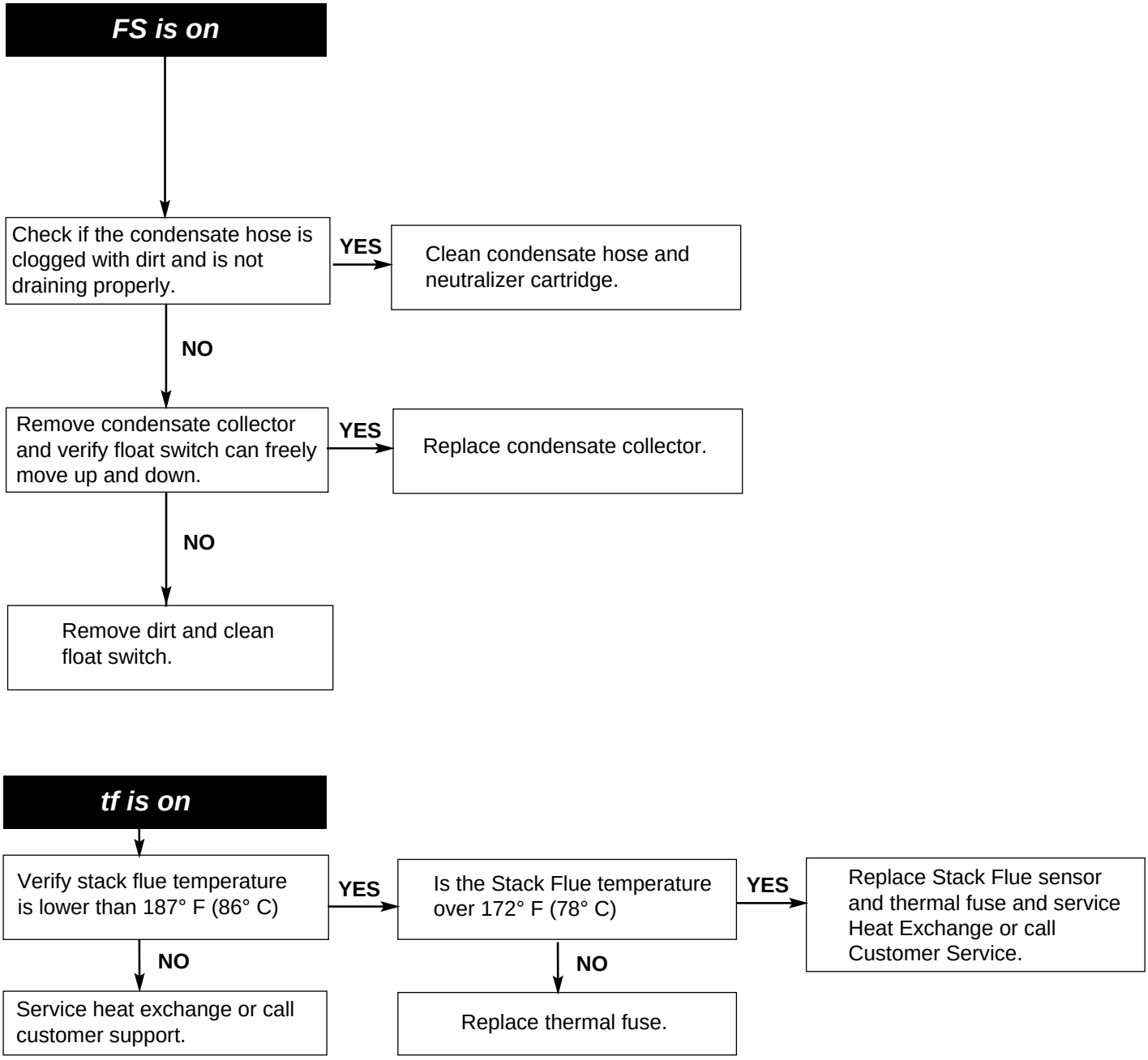

**⚠ CAUTION** **Do not jumper a safety switch to remedy a failed switch.**

**NOTE:** ES1 is a spare and should be jumpered.

# Diagnostic LEDs: PS, HLS, TF, IGN, AFS, AG1, AG2, FS



# Diagnostic LEDs: PS, HLS, TF, IGN, AFS, AG1, AG2, FS



# Burner Troubleshooting

| SYMPTOM | CAUSE | REMEDY |
|---|---|---|
| Loud, high-pitched whine | Flame is too rich. | Verify pressure tap between gas valve and blower inlet.<br>See page 16 and verify that the gas regulator setting is –0.2" (–0.5cm) wc.<br>Contact a qualified technician or service agency to replace the gas orifice. |
| Flame is "fluttery." Exhaust may have acrid smell or burner may fail to stay lit. | Flame is too lean. | See page 16 and verify that the gas regulator setting is –0.2" (–0.5cm) wc.<br>Contact a qualified technician or service agency to replace the gas orifice. |
| Burner pulsates or surges, especially on ignition. | Exhaust vent is too long. | Reduce length of exhaust vent and/or number of elbows. |
| Combustion appears normal, but flame does not stay lit. | Flame current is not being sensed. | Check for wet or damaged igniter with low resistance to ground. Replace with new igniter.<br>Verify burner flameholder is properly grounded.<br>Replace Ignition Control Module. |

# Heat Exchanger Troubleshooting

| SYMPTOM | CAUSE | REMEDY |
|---|---|---|
| Boiling in heat exchanger. May be accompanied by "bumping" sounds. | Low water flow to heater<br>Heat exchanger plugged.<br>Bypass valve stuck open. | Service pump and or filter.<br>Service heat exchanger. Correct water chemistry.<br>Service bypass valve. |

# Operator Control Panel Displays RNC Code

| SYMPTOM | CAUSE | REMEDY |
|---|---|---|
| Operator control panel LCD displays the RNC code. | Neutralizer maintenance reminder.<br>The RNC code is displayed on the LCD to remind you to do the maintenance on the neutralizer cartridge. | To clear this code, press the OFF button to put the heater in off mode, then press and hold the OFF button for 5 seconds.<br>Contact a qualified technician or service agency to service the condensate neutralizer cartridge. |

# Section 4: Maintenance and Care Instructions

## MAINTENANCE AND CARE INSTRUCTIONS

**⚠WARNING**

**Risk of fire or explosion from flammable vapors.** Do not store gasoline, cleaning fluids, varnishes, paints, or other volatile flammable liquids near heater or in the same room with heater.

The following maintenance is recommended every six months and at the start of every swimming season:

1. Inspect the heater panels and venting system to make sure that there are no obstructions to the flow of ventilating air or burner exhaust. Check that room air intakes are open and clear of obstructions.
2. Keep the area in and around the heater clear and free from combustible materials, gasoline and other flammable vapors and corrosive liquids.
3. Test the operation of the pressure relief valve by lifting the valve lever (if installed).
4. Test for proper operation of the water pressure switch. **See WATER PRESSURE SWITCH on page 14 for testing instructions.**
5. For enclosed installations, repeat the **Final Installation Check**, page 37. Check for evidence of joint leakage. Make sure that joints have not slipped partially or completely apart. Check pipe and fittings for cracks or breaks. The combustion air blower is permanently lubricated, and does not require periodic lubrication.

## TITANTOUGH™ HEAT EXCHANGER ASSEMBLIES ANNUAL INSPECTION

The following maintenance is recommended every 12 months and at the start of every swimming season:

1. The upper and lower TitanTough Heat Exchanger assembly must be inspected every 12 months and cleaned. It is recommended to call a qualified service technician to inspect the heat exchangers. See Figure 38.

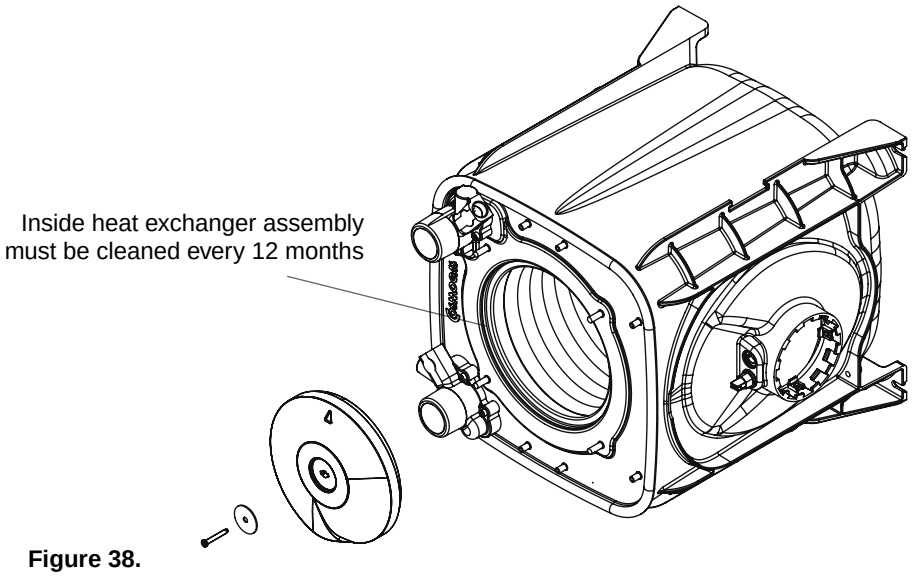



**Figure 38.**

Heat Exchanger Assembly

⚠ **CAUTION:** The gasket ensures that the combustion chamber is sealed. If the gasket appears to be damaged, DO NOT reuse it. The combustion chamber must be replaced with the burner unit. To replace it, **call Pentair Customer Support at 800. 831.7133.**

## BURNER SPARK ELECTRODE AND FLAME SENSOR ROD ANNUAL INSPECTION

**The following maintenance is recommended every 12 months and at the start of every swimming season:**

- The Thermal Insulation must be checked every 12 months, and if necessary be replaced. Inspect the Thermal Insulation for signs of exterior damage to the device. It is recommended to call a qualified service technician to inspect the Thermal Insulation. See Figure 39 and Figure 40.

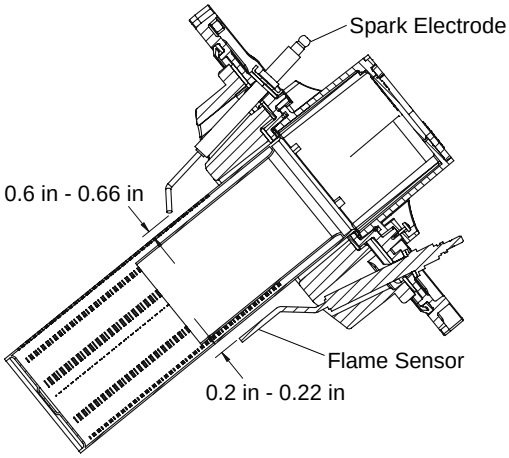



Figure 39. (A) Burner Spark Electrode

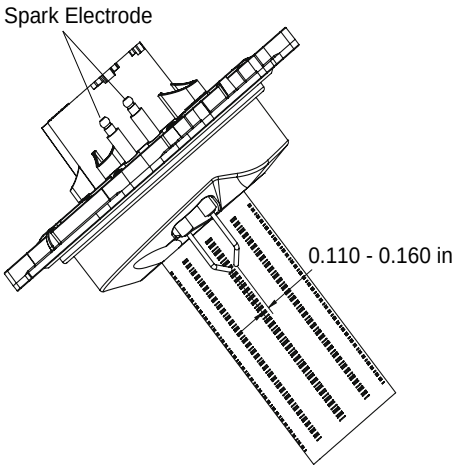



Figure 40. (B) Flame Sensor Rod

## PRESSURE RELIEF VALVE (50 PSI) (FACTORY INSTALLED)

To avoid water damage or scalding from operation of the pressure relief valve (see Figure 41), install a drain pipe in the outlet of the pressure relief valve that will direct water discharging from the valve to a safe place for disposal. Do not install any reducing couplings or valves in the drain pipe. The drain pipe must be installed so as to allow complete drainage from the valve and drain line. The relief valve should be tested at least once a year by lifting the valve lever.

### ⚠WARNING

**Explosion hazard.** Any heater installed with restrictive devices in the piping system downstream from the heater, (including check valves, isolation valves, flow nozzles, or therapeutic pool valving), must have a relief valve installed as described above.

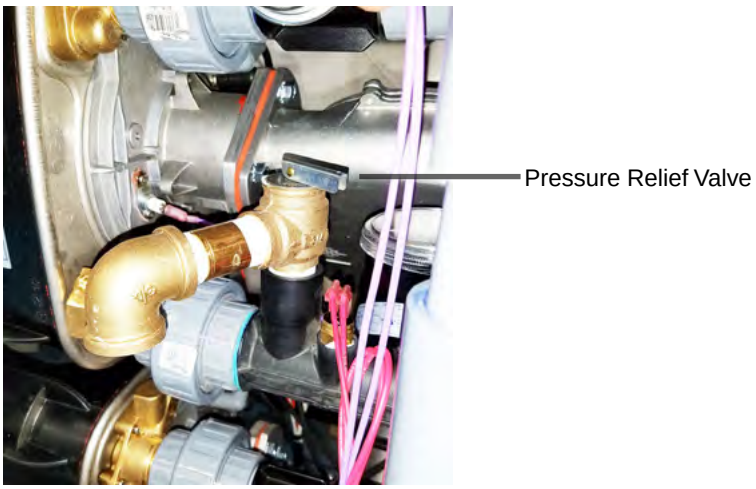



**Figure 41.**

# AFTER START-UP

## CHECKING WATER FLOW

**⚠WARNING**

**Fire or flooding hazard.** If the heater overheats and the burners fails to shut off, follow the instructions under **To Turn Off Gas to the Appliance, on page 13,** and call a qualified service technician to repair the heater**.**

After start-up, the outlet water pipe should feel slightly warmer than the inlet pipe. If it feels hot, or if you hear the water in the heater boiling, there may not be enough water flow to the appliance. Make sure that the filter is not plugged. If water temperature remains high but the unit continues to operate, turn off the appliance and call your service technician.

## SPRING AND AUTUMN OPERATION

If the pool is only used occasionally, lower the pool thermostat to 68° F (20° C) and leave the heater on. This will keep the pool and the surrounding ground warm enough so that the heater should restore the pool to a comfortable temperature within about one day.

## WINTER OPERATION AND WINTERIZATION

**Notice:** Pentair recommends to use a blower to remove all of the water out of the heater in areas subject to freezing temperatures while the heater is not being used.

**⚠WARNING**

**Explosion hazard.** 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 or 35 kPa), high volume blower when air purging the heater,

**⚠CAUTION**

- **If the heater has been drained for freezing condition, DO NOT TURN ON the heater until the system is circulating water.**
- **Water trapped in the heat exchanger can result in freeze damage to the exchanger or headers. Freeze damage is specifically not covered by the warranty.**
- **When starting the heater for the swimming season with a water temperature below 50° F (10° C), the heater may be used to heat the water; however, make sure that the heater operates continuously until the water temperature reaches the heater's minimum setting of 68° F (20° C). During cold weather, if there is no danger of freezing, operate the filter pump continuously even if the heater is not operating. If air temperatures are expected to drop below freezing (32° F/0° C), shut down the heater and winterize it.**

For outdoor heaters in freezing climates, shut the heater down and drain it for winter as follows:

1. Turn off the electrical supply to the heater and pump ay the main circuit breakers.
2. Close main gas control valve and manual gas valve (located outside the heater). **See Figure 16 on page 21.**
3. Open the main DRAIN COCK located on the bottom of the manifold adapter and drain the heater exchanges, internal CPVC plumbing, and manifold adapter completely.
4. If the heater is **below pool water level**, be sure to close the isolation valves to prevent from draining the pool. Isolation valves are not required and should not be used on heaters installed above pool water level, except when needed for winterization valves.
5. Remove the two WATER PRESSURE SWITCHES located in the plumbing inlet assembly. **See Figure 3, page 14.** Plug the water pressure switches ports to prevent insects and dirt from getting into the plumbing inlet assembly

*Continue with Step 6 on next page.*

6. Drain the plastic inlet/outlet manifold through the outlet pipe. If the pipe does not drain naturally to the pool, install a drain cock in the outlet pipe to drain the manifold.
7. Use a blower to remove all remaining water in the heater.
8. Cover air inlet grate with a plastic bag to prevent bugs, leaves, etc., from getting into the heater.

***NOTICE: Water trapped in the heater can cause freeze damage. Allowing the heater to freeze voids the warranty.***

## Removal of Condensate Cartridge and Neutralizer Hose-Loop in Freezing Temperatures

If the ETi 400 heater is installed outdoors and ***must operate*** in below freezing temperatures (32° F/0° C or below), to prevent freezing of the condensate line, the condensate neutralizer cartridge and the condensate neutralizer hose-loop located inside the heater must be removed.

First remove the condensate cartridge and store it, then unwrap the hose-loop below the exhaust to prevent any condensation water from being trapped inside the hose and freezing. Run the condensate hose to the outside of the heater sloping downward at all times.

***Note: The condensate neutralizer cartridge should be reinstalled on the heater in the Springtime when outdoor temperatures are above freezing point.***

## RETURN THE HEATER TO SERVICE

**To return the heater to service after winterizing:**

1. Connect the INLET and OUTLET unions to the system plumbing, see page 16. Check that they are connected correctly and there are no water leaks.
2. Reinstall the two WATER PRESSURE SWITCHES in the CPVC plumbing inlet assembly. **See Figure 16 on page 21.**
3. Place the DRAIN PLUG back into the port at the manifold assembly.
4. Before starting the heater, circulate water through the heater for several minutes until all air noises stop. See also **BEFORE START-UP** (page 12) and **CARE AND MAINTENANCE** (page 54). ***See additional notes on page 12.***

# MAINTAINING POOL TEMPERATURE

To maintain pool temperature, make sure that the heater switch and valving are reset to pool settings after using the spa.

### ENERGY SAVING TIPS

1. Keep the pool or spa covered when not in use. This will reduce heating costs, reduce water evaporation, conserve chemicals and reduce load on the filtering system.
2. Reduce pool thermostat to 78° F (25° C) or lower; reduce spa temperature to 100° F (38° C). This is accepted as being the most healthy temperature for swimming by the American Red Cross.
3. Use a time clock to start the filter pump at 6 a.m. or later. The swimming pool loses less heat after daybreak.
4. For pools used only on weekends, lower the thermostat setting by 10° F to 15° F (5° C to 8° C) during the week to reduce heat loss. A properly sized heater will restore normal temperature within one day.
5. Turn the heater off when the pool will not be used for an extended period.
6. Follow a regular program of preventive maintenance for the heater each new swimming season. Check operation of the heater and its controls.

# CHEMICAL BALANCE

## *POOL AND SPA WATER*

Your pool heater was designed specifically for your spa or pool and will give you many years of trouble-free service, provided you keep your water chemistry in proper condition.

Water chemistry should follow good swimming pool water chemistry practices. When using a chlorinator, install it down stream from the heater and at a lower level than the heater outlet. Install a corrosion resistant positive seal "Check Valve", (P/N R172288), between the heater and the chlorinator to prevent concentrated chemicals from back-siphoning into the heater. Back-siphoning is most likely to occur when the pump stops, creating a pressure-suction differential. Do NOT sanitize the pool by putting chlorine tablets or sticks into the skimmer(s). When the pump is off, this will cause a high concentration of chlorine to enter the heater, which could cause corrosion damage to the heat exchanger.

Three major items that can cause problems with your pool heater are: improper pH, disinfectant residual, and total alkalinity. These items, if not kept properly balanced, can shorten the life of the heater and cause permanent damage.

**⚠CAUTION**

**Heat exchanger damage resulting from chemical imbalance is not covered by the warranty.**

### WHAT A DISINFECTANT DOES

Two pool guests you do not want are algae and bacteria. To get rid of them and make pool water sanitary for swimming - as well as to improve the water's taste, odor and clarity - some sort of disinfectant must be used.

Chlorine and bromine are universally approved by health authorities and are accepted disinfecting agents for bacteria control.

### WHAT IS A DISINFECTANT RESIDUAL?

When you add chlorine or bromine to the pool water, a portion of the disinfectant will be consumed in the process of destroying bacteria, algae and other oxidizable materials. The disinfectant remaining is called chlorine residual or bromine residual. You can determine the disinfectant residual of your pool water with a reliable test kit, available from your local pool supply store.

You must maintain a disinfectant residual level adequate enough to assure a continuous kill of bacteria or virus introduced into pool water by swimmers, through the air, from dust, rain or other sources.

# CHEMICAL BALANCE (continued)

It is wise to test pool water regularly. Never allow chlorine residual to drop below 0.6 ppm (parts per million). The minimum level for effective chlorine or bromine residual is 1.4 ppm.

**pH** - The term pH refers to the acid/alkaline balance of water expressed on a numerical scale from 0 to 14. A test kit for measuring pH balance of your pool water is available from your local pool supply store; see Table 7 below.

Muriatic Acid has a pH of about 0. Pure water is 7 (neutral). Weak Lye solution have a pH of 13-14.

**RULE:** 7.4 to 7.6 is a desirable pH range. It is essential to maintain correct pH, see Table 7 below.

## If pH becomes too high (over alkaline), it has these effects:

1. Greatly lowers the ability of chlorine to destroy bacteria and algae.
2. Water becomes cloudy.
3. There is more danger of scale formation on the plaster or in the heat exchanger tubing.
4. Filter elements may become blocked.

## If pH is too low (over acid) the following conditions may occur:

1. Excessive eye burn or skin irritation.
2. Etching of the plaster.
3. Corrosion of metal fixtures in the filtration and recirculation system, which may create brown, blue, green, or sometimes almost black stains on the plaster.
4. If you have a sand and gravel filter, the alum used as a filter aid may dissolve and pass through the filter.

***CAUTION: Do not test for pH when the chlorine residual is 3.0 ppm or higher, or bromine residual is 6.0 ppm or higher. See your local pool supply store for help in properly balancing your water chemistry.***

**RULE**: Chemicals that are acid lower pH. Chemicals that are alkaline raise pH.

## ALKALINITY High or Low:

Total alkalinity is a measurement of the total amount of alkaline chemicals in the water, and control pH to a great degree. It is not the same as pH which refers merely to the relative alkalinity/acidity balance. Your pool water's total alkalinity should be 100 - 140 ppm to permit easier pH control. A total alkalinity test is simple to perform with a reliable test kit. You will need to test about once a week and make proper adjustments until alkalinity is in the proper range. Then, test only once every month or so to be sure it is being maintained. See your local pool dealer for help in properly balancing the water chemistry.

## WATER CHEMISTRY PARAMETERS

| **Disinfectant levels** | **Minimum** | **Ideal** | **Maximum** |
|---|---|---|---|
| Free Chlorine, ppm | 1.0 | 2.0-3.0 | 4.0** |
| Salt, ppm | 3000 | 3400 | 4500 |
| Combined Chlorine, ppm | None | None | 0.2 |
| Bromine, ppm | 2.0 | 4-6 | 10.0 |
| Other Sanitizers | Levels not established. Consult local health department before use. | | |
| **Chemical Values** | | | |
| pH | 7.2 | 7.4-7.6 | 7.8** |
| Total Alkalinity (Buffering), ppm | 60 | 80-100 | 180 as CaCO3 |
| Salt ppm | 2000 | 3200 | 5000** |
| Total Dissolved Solids (includes salt) | 3000 ppm | 5700 (6000 max) | 1,500 ppm > TDS at startup* |
| Calcium Hardness, ppm, as CaCO3 | 150 | 200-400 | 500-1,000 |
| Cyanuric Acid | Less than 30 ppm | | |
| **Biological Values** | | | |
| Algae | None | None | None |
| Bacteria | None | None | Refer to Local Code |

Table 7.

*Start-up TDS includes source water TDS and any other inorganic salt added at start-up.

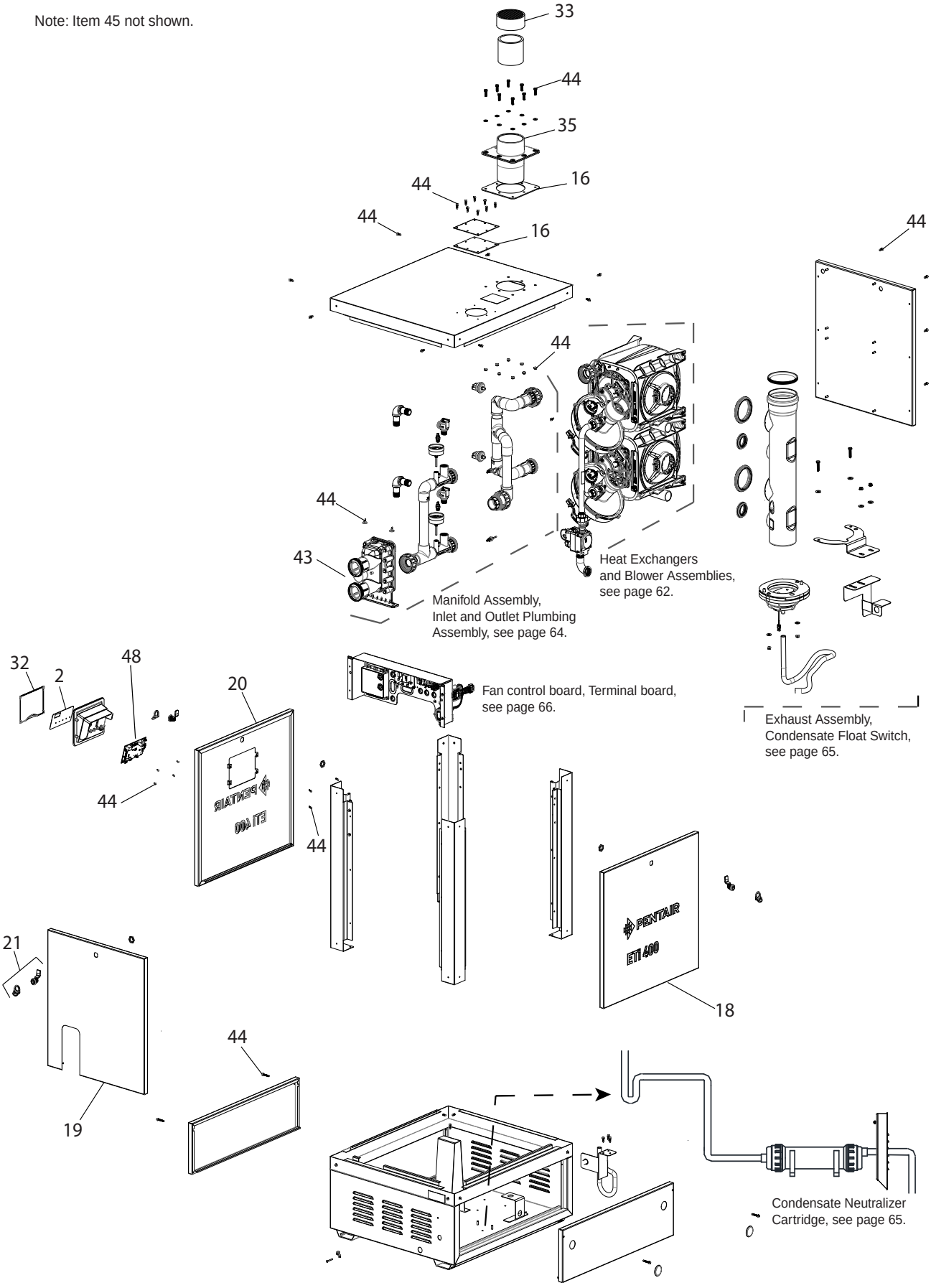
**NOTE (**):** Failure to adhere to the listed water chemistry parameters may result in premature failure of the heat exchanger and will **void the warranty**.

# ETI® 400 HEATER REPLACEMENT PARTS LIST

| Item | Description | Quantity | Part Number |
|---|---|---|---|
| 1 | Fan Control Board | 1 | 475978 |
| 2 | Membrane pad | 1 | 475984 |
| 3 | Automatic Gas Shut-Off Switch (AGS) 150°F | 1 | 475985 |
| 4 | Air pressure switch | 1 | 475987 |
| 5 | Thermal fuse | 1 | 475998 |
| 6 | Wire harness (not shown) | 1 | 475996 |
| 7 | Stack flue sensor | 2 | 475601 |
| 8 | Spark electrodes | 1 | 476081Z |
| 9 | Spark Electrodes cables (not shown) | 1 | 475982 |
| 10 | Condesate assembly/float switch | 1 | 475980 |
| 11 | HX and Chimney gaskets and Insulation | 1 | 475615 |
| 12 | Heat exchanger screws | 1 | 475606 |
| 13 | Plug 120/240 V | 1 | 475979 |
| 14 | Tridicator Gauge | 1 | 475603 |
| 15 | Air orifice | 1 | 475604 |
| 16 | Heater gasket kit | 1 | 475973 |
| 17 | Air intake Kit (not shown) | 1 | 475971 |
| 18 | Gas side panel | 1 | 475608 |
| 19 | Water manifold panel | 1 | 475609 |
| 20 | Control board panel | 1 | 475610 |
| 21 | Latch assy | 1 | 475611 |
| 22 | Condensate neutralizer cartridge kit | 1 | 475612 |
| 23 | Inlet plumbing assembly | 1 | 475613 |
| 24 | Outlet plumbing assembly | 1 | 475614 |
| 25 | Exhaust assembly | 1 | 475617 |
| 26 | Terminal board | 1 | 42001-0056S |
| 27 | Fireman's Switch Fuse (1.25 amps) | 1 | 32850-0099 |
| 28 | Thermistor, water sensor (not shown) | 1 | 42001-0053S |
| 29 | Water pressure switch | 1 | 42001-0060S |
| 30 | Dual voltage transformer | 1 | 42001-0107S |
| 31 | Pressure relief valve | 1 | 475618 |
| 32 | Control cover | 1 | 475619 |
| 33 | Vent cap exhaust | 1 | 475620 |
| 34 | Water bypass assy | 1 | 475621 |
| 35 | Vent socket | 1 | 475622 |
| 36 | TitanTough Heat Exchanger | 1 | 475623 |
| 37 | Burner | 1 | 475624 |
| 38 | Blower | 1 | 476000 |
| 39 | Gas valve | 1 | 476001 |
| 40 | 3/4" Union | 1 | 38404-4097S |
| 41 | High Limit Switch | 1 | 42001-0063S |
| 42 | Drain plug | 1 | U178-920P |
| 43 | Manifold | 1 | 476002 |
| 44 | Manifold-Enlosure Fasteners | 1 | 476003 |
| 45 | Hold down bracket kit (not shown) | 1 | 476004 |
| 47 | Propane gas orifice kit (not shown) | 1 | 476040 |
| 48 | Heater control board | 1 | 475975 |
| 49 | Ignition control module | 1 | 475976 |
| 50 | Flame sensor | 1 | 462023 |
| 51 | Burner Assembly | 1 | 476059 |
| 52 | Natural gas to propane (LPG) conversion Kit | 1 | 476072 |
| 53 | Inlet Brass Fitting for Heat Exchanger | 1 | 461103 |
| 54 | Outlet Brass Fitting for Heat Exchanger | 1 | 461104 |

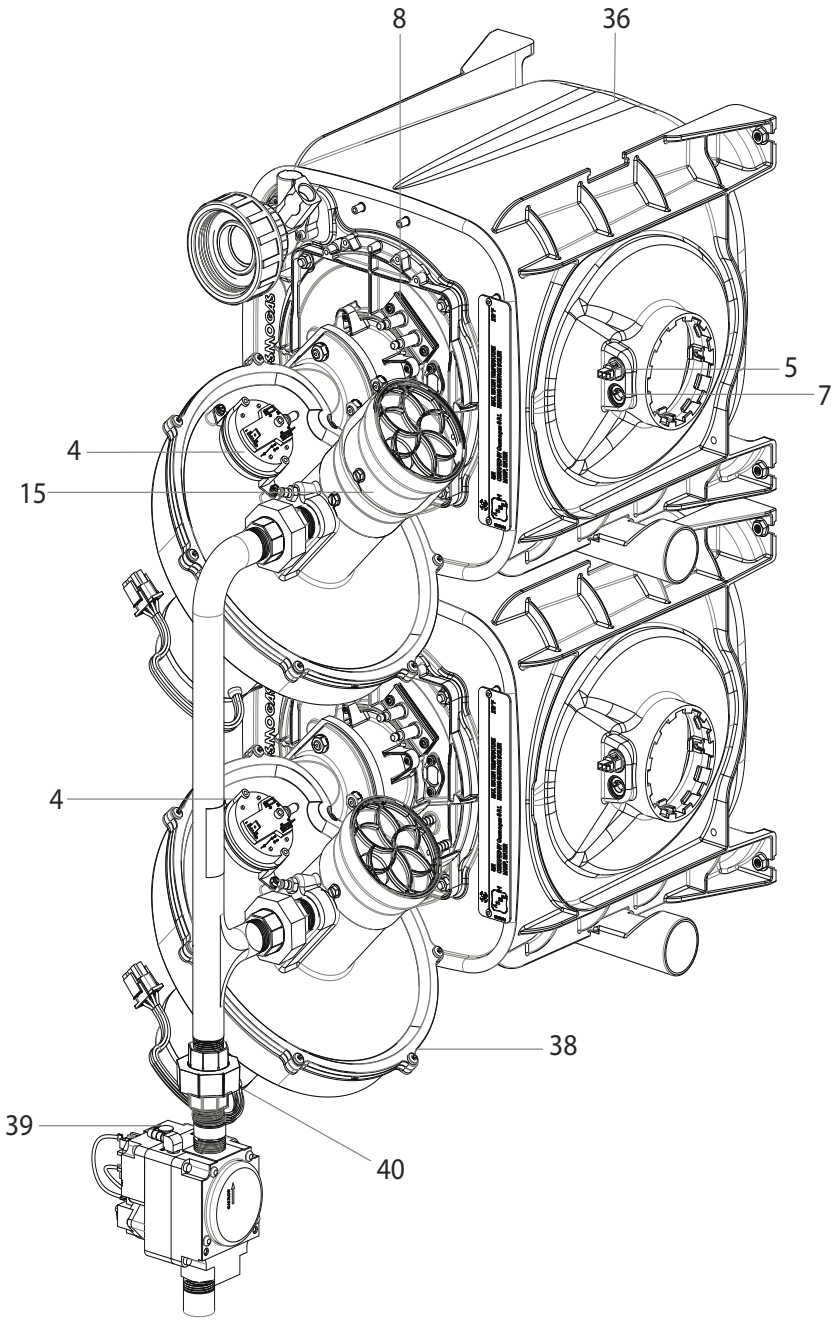
## ETI® 400 HEATER GENERAL REPLACEMENT PARTS

Note: Item 45 not shown.



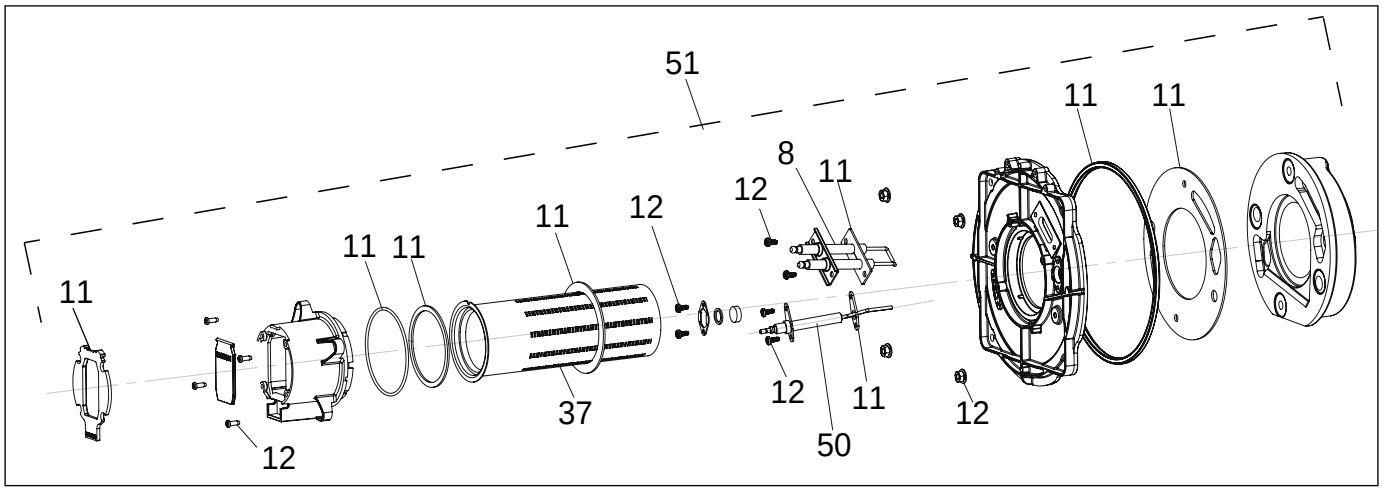
## ETI® 400 HEATER HEAT EXCHANGER AND BLOWER ASSEMBLIES REPLACEMENT PARTS

Note: Item 11, 12, 17, 37 not shown.

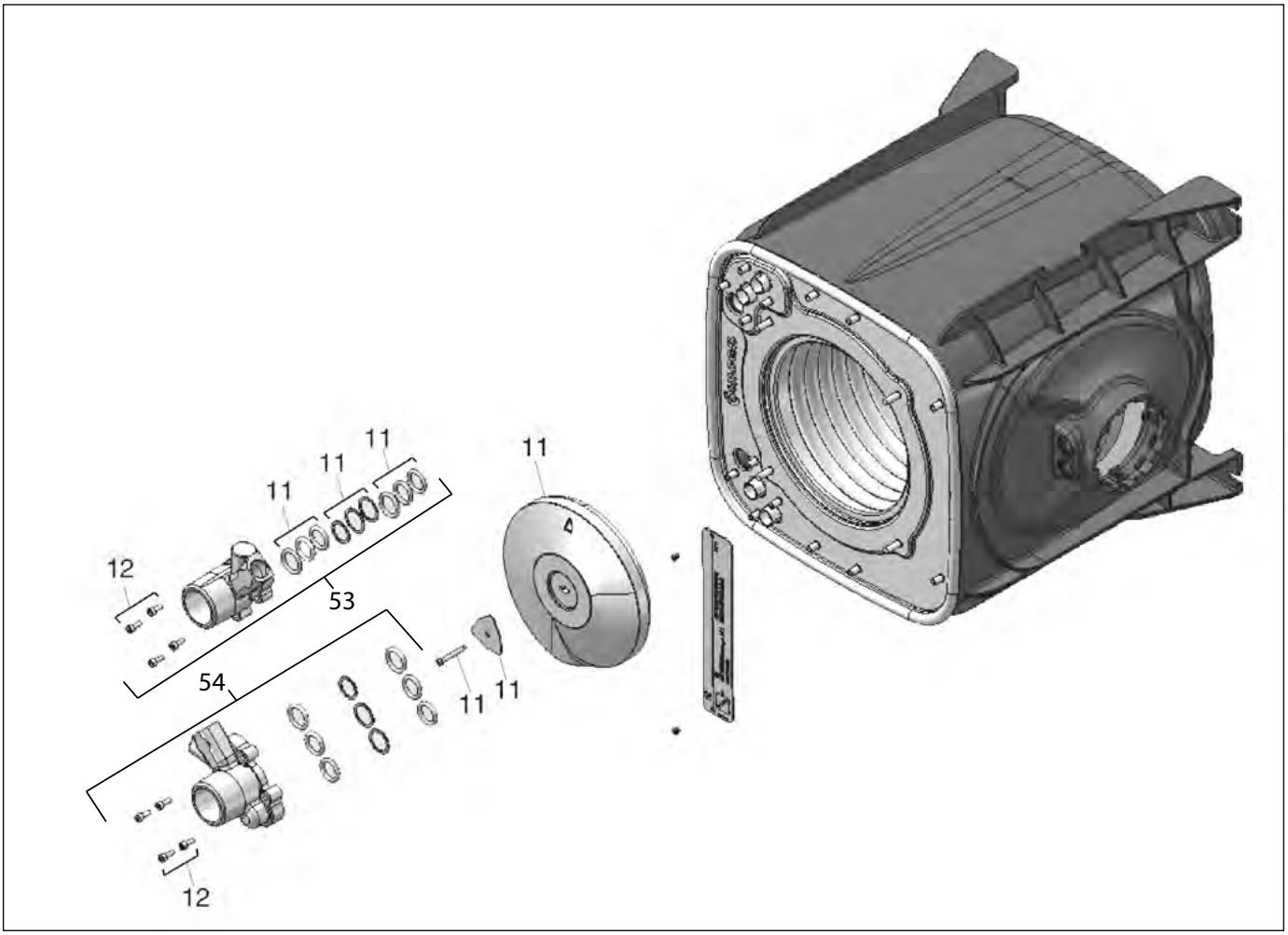



Heat Exchangers and Blower Assemblies

## ETI® 400 HEATER HEAT EXCHANGER ASSEMBLY REPLACEMENT PARTS (CONTINUED)



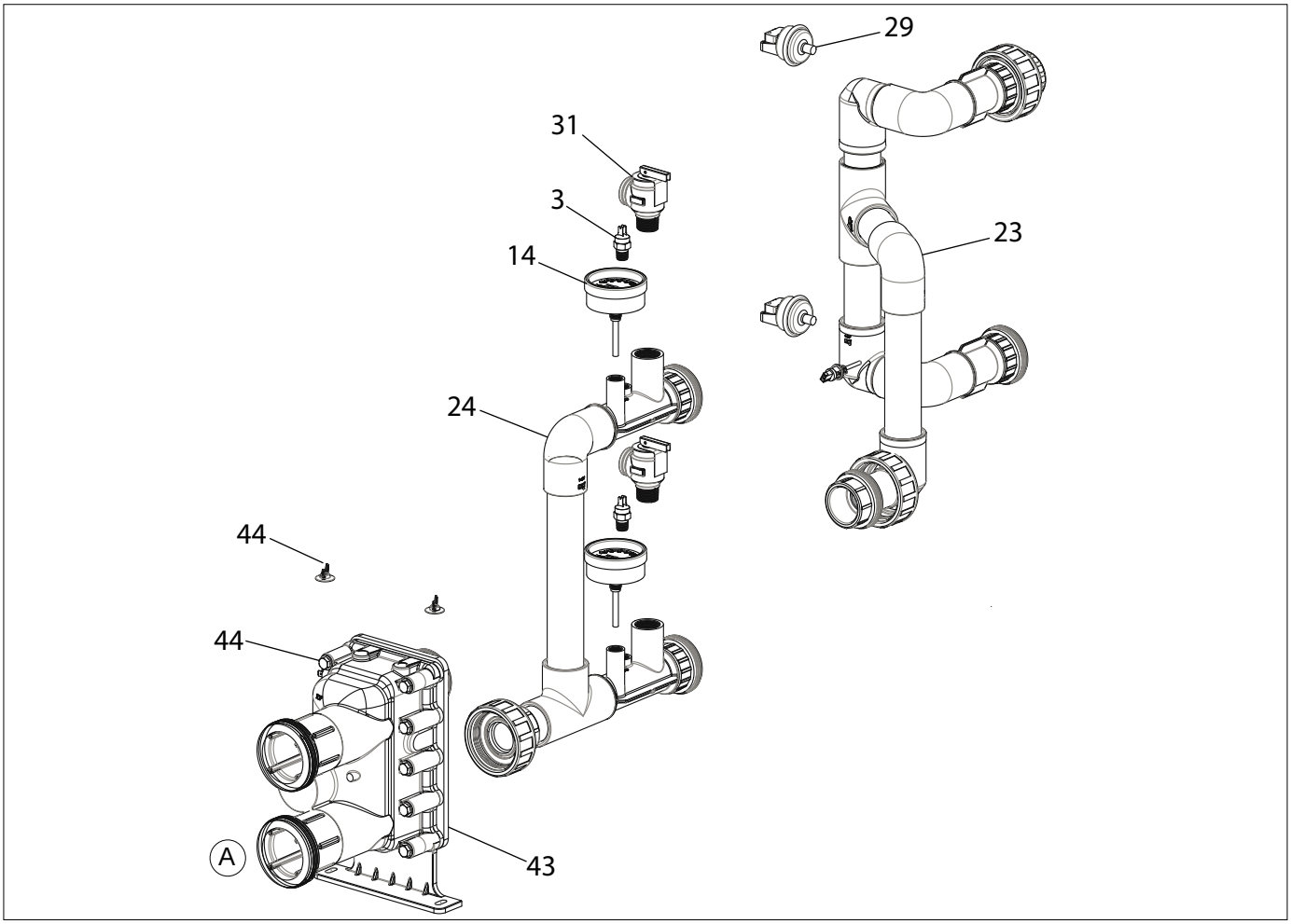

Heat Exchanger Assembly



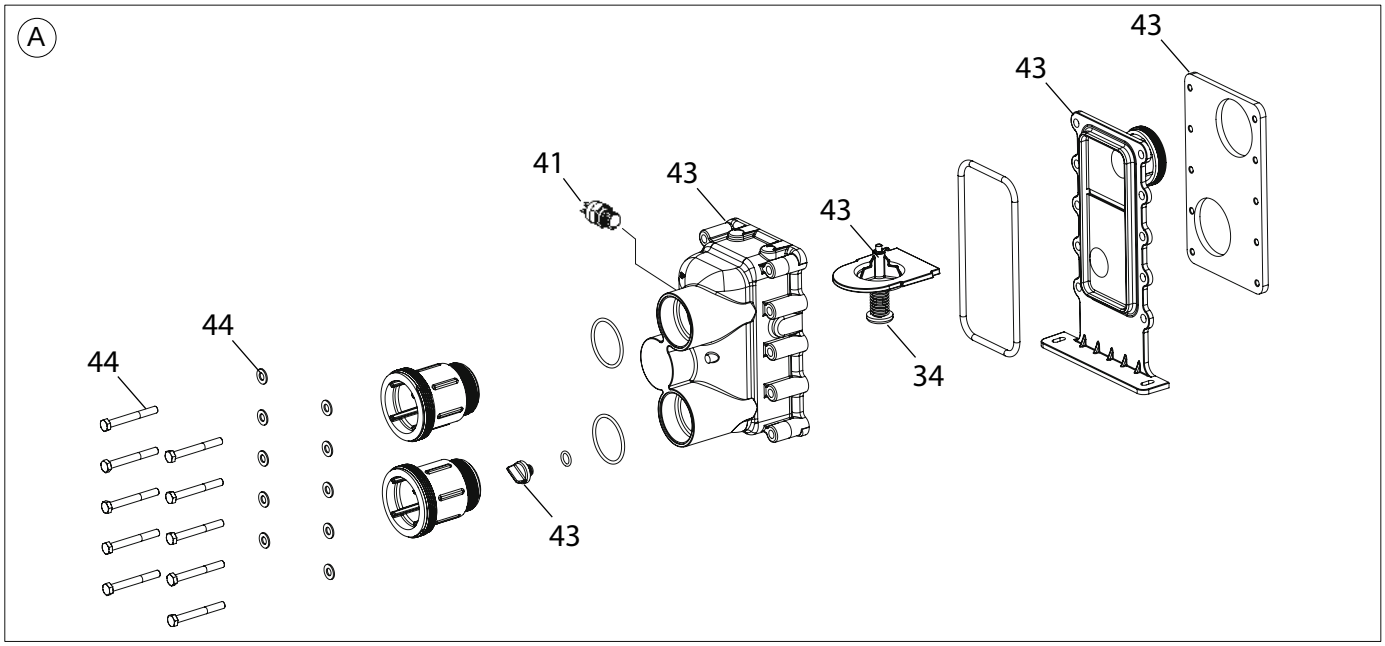

Heat Exchanger Assembly

## ETI® 400 HEATER MANIFOLD ASSEMBLY - INLET AND OUTLET PLUMBING ASSEMBLY

## REPLACEMENT PARTS

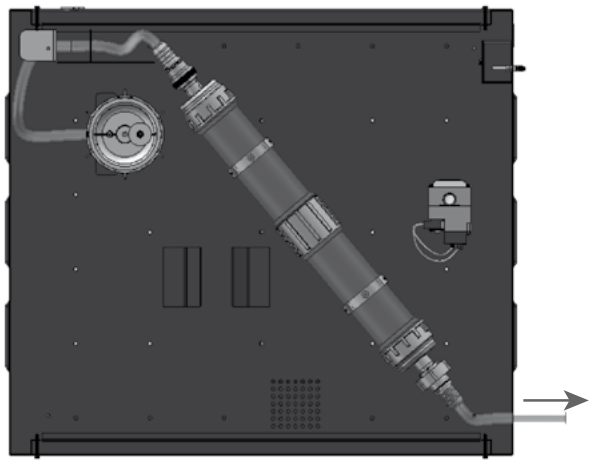


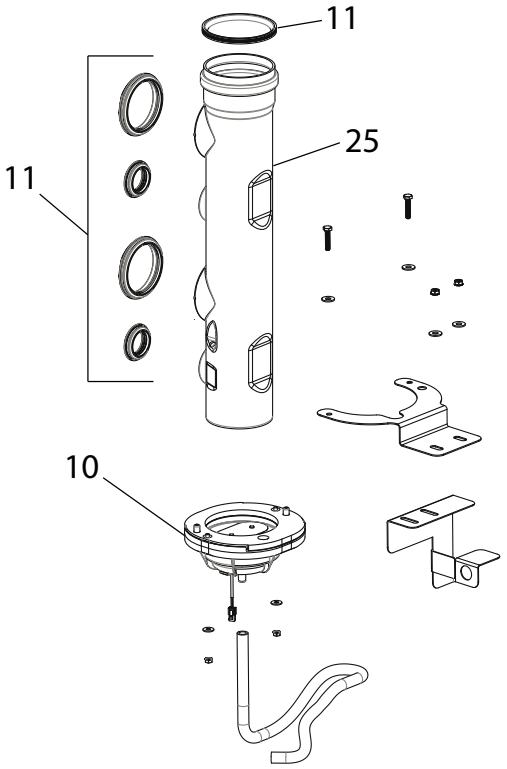

Manifold Assembly - Inlet and Outlet Plumbing Assembly



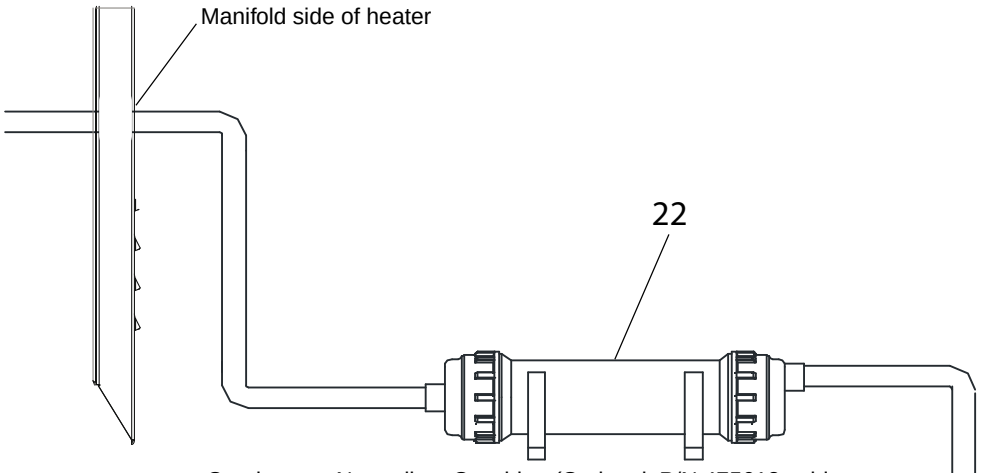

Manifold Assembly

## ETI® 400 HEATER CONDENSATE AND EXHAUST ASSEMBLY REPLACEMENT PARTS





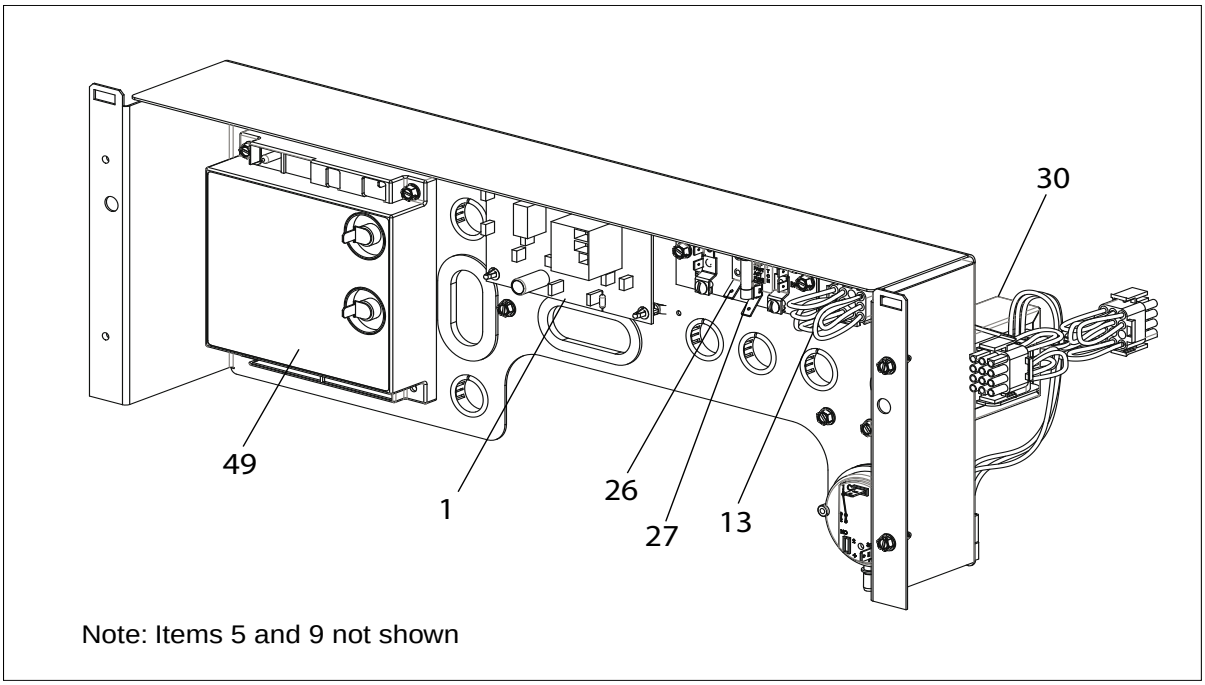

Condensate Neutralizer Cartridge (Optional, P/N 475612 sold separately). The cartridge may be mounted to the base of the heater for an outdoor installation.




Condensate Neutralizer Cartridge (Optional, P/N 475612 sold separately). The cartridge may be mounted external to the heater for an indoor installation.

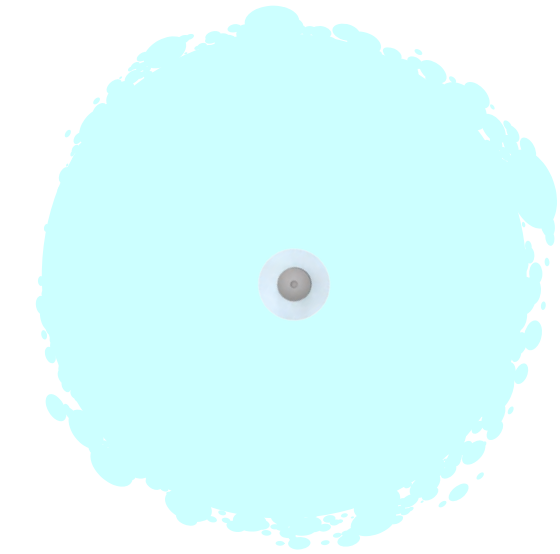
Condensate Neutralizer Cartridge Assembly and Exhaust Assembly.

## ETI® 400 HEATER OPERATOR CONTROL PANEL ASSEMBLY REPLACEMENT PARTS




Fan Control Board and Terminal Board

waterplay® Solutions Corp.



# FUN-BRELLA

## PLAY ZONES

0 - 4 | 5 - 8 | 9 +

## HIGHLIGHTS

The Fun-Brella features a unique laminar water effect that fascinates curious minds. Waterplayers love to run fingers through, or huddle under the Fun-Brella's shield of water.

### WATER DISPLAY

laminar effect

- gentle water effect
- collaboration
- discovery play

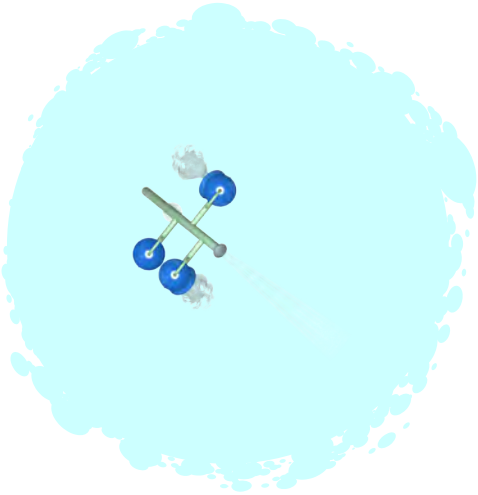
### PRODUCT COLLECTION

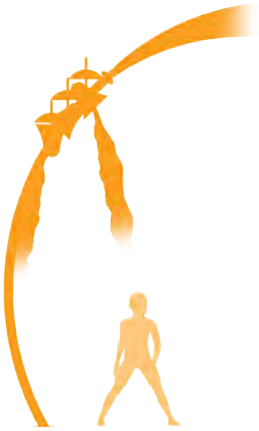
Kaleidoscope, Play Pals

### COLOURS

See Waterplay Colour Collections

waterplay® solutions corp.
1.800.590.5552 (USA & CAN) | +1 (250) 712.3393 (INTL)
info@waterplay.com | www.waterplay.com





# SNEAKY SOAKER 3

## PLAY ZONES

0 - 4 | **5 - 8** | **9 +**

## HIGHLIGHTS

Keep waterplayers on their toes with the Sneaky Soaker 3. Its bell-shaped tipping buckets spill and dump water at random intervals to create bursts of excitement on the play pad.

### WATER DISPLAY

spray and splash effect

ACTION high action

big splash

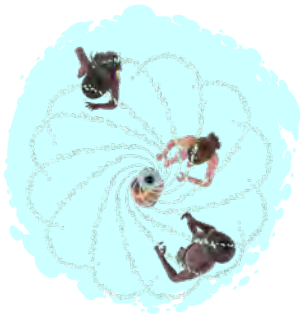
### PRODUCT COLLECTION

Play Pals

### COLOURS

See Waterplay Colour Collections

waterplay® solutions corp.
1.800.590.5552 (USA & CAN) | +1 (250) 712.3393 (INTL)
info@waterplay.com | www.waterplay.com



5% DISCOUNT

When Water Weavers are purchased in groups of 3 or more.


# WATER WEAVER 2

## PLAY ZONES

0 - 4 | **5 - 8** | **9 +**

## HIGHLIGHTS

Spin the hub to create a water fortress that comes alive through weaving water. Excited waterplayers crouch down to hide under the stunning water streams, spinning the hub faster or slower to experiment with the water and invent new games.

### WATER DISPLAY

weaving spray effect

- social play
- interactive
- 360° rotation

## PRODUCT COLLECTION

Play Pals

## COLOURS

See Waterplay Colour Collections

**waterplay® solutions corp.**

1.800.590.5552 (USA & CAN) | +1 (250) 712.3393 (INTL)
info@waterplay.com | www.waterplay.com

# model 8300-8309

AXION® MSR Emergency Shower and Eye/Face Wash

## FEATURES & BENEFITS

**CONSTRUCTION**

1-1/4" IPS Schedule 40 hot-dipped galvanized steel pipe and fittings along with powder-coated cast-iron 9" (22.9 cm) diameter floor flange and 11" (27.9 cm) stainless steel receptor provide an additional corrosion resistance in a long lasting product.

**QUALITY CONTROL**

Eye/face wash and valve assembly are pre-built and fully water/pressure tested to ensure no leaks and proper function which ultimately reduces installation time.

**VALVES**

Eyewash and shower ball valves are designed to make the flushing of contaminants occur with the simple pull of a lever or push of a stainless steel flag. Both valves come equipped with stainless steel ball and stem to provide greater protection against corrosion and breakage.

**STRAINERS/FILTERS**

Chrome-plated brass in-line 50 x 50 mesh water strainer prevents debris from reaching the eyewash so the unit stays functioning at its best. Strainer is easily serviceable.

**SHOWERHEAD**

AXION® MSR ABS plastic drench showerhead uses a hydrodynamic design to give equal distribution of water throughout the entire footprint of flow.

**EYE/FACE WASH**

AXION® MSR eye/face wash head uses an inverted directional laminar flow to sweep contaminants away from the vulnerable nasal cavity.

## OPTIONS

- ☐ Scald Protect Bleed Valve: Model SP157A, stainless steel scald protection bleed valve. Automatic thermal actuator bleed valve opens when internal water temperature reaches 98° F (36.7° C) and closes at 95° F (35° C).
- ☐ Thermostatic Mixing Valve: Model 9201E AXION® Emergency Tempering Valve thermostatically mixes hot and cold water to provide a safe fluid supply for emergency showers and eyewash equipment, with a flow rate of 31 gpm (117.3 L).
- ☐ Emergency Alarm System: Model 9001, 1-1/4" 120 VAC emergency alarm and light system. Buzzer and flashing light are activated by an 1-1/4" double pole, double throw flow switch.
- ☐ Dust Cover: Model 9102 is a stainless steel cover that protects the eyewash heads as well as the bowl. (Picture shows cover mounted to an eyewash.)

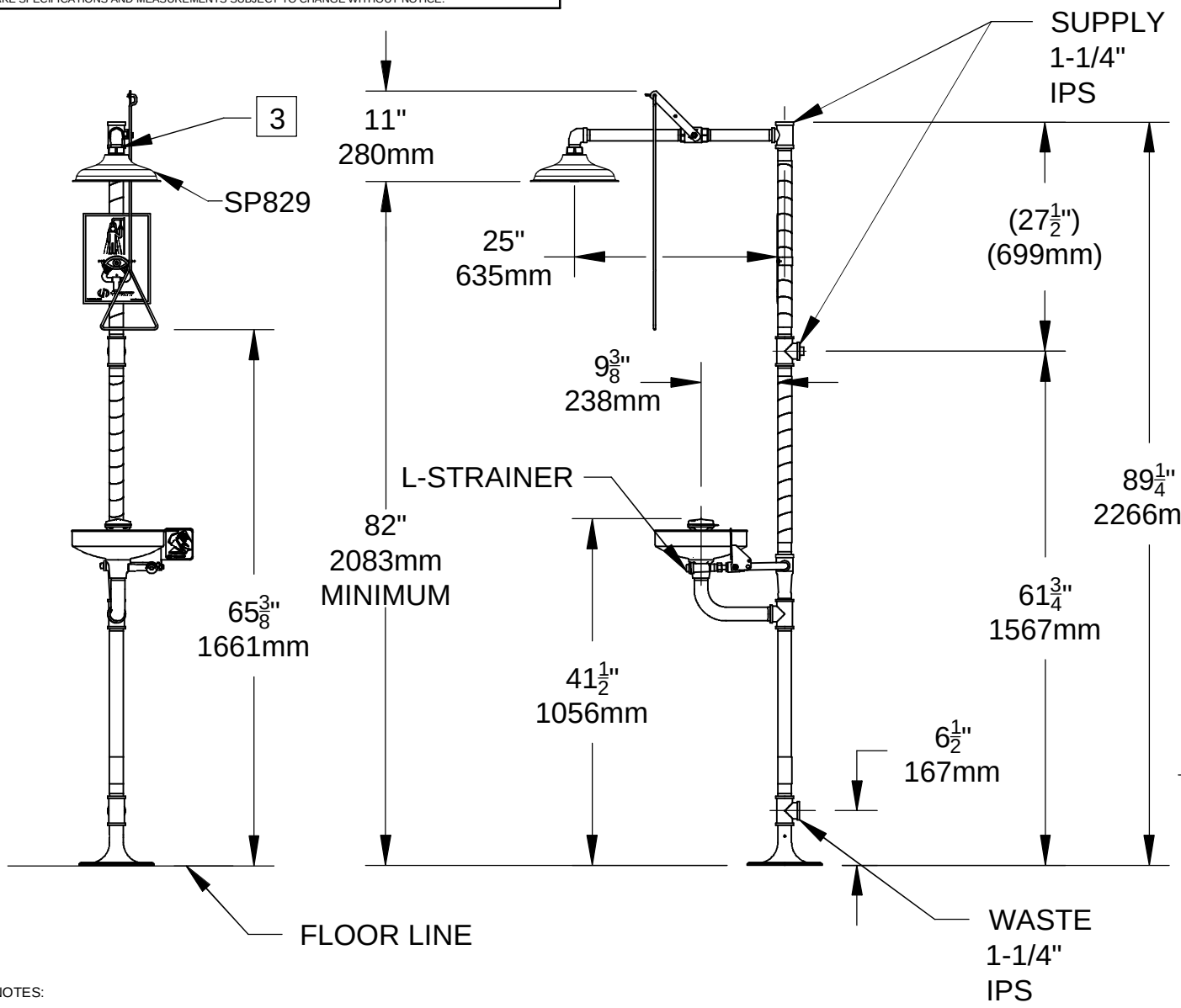
For more information, visit www.hawsco.com or call (888) 640-4297.

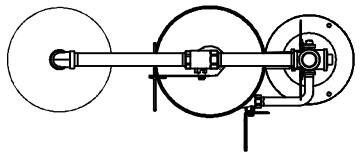
## SPECIFICATIONS

Model 8300-8309 combination shower and eye/face wash shall include a stainless steel 11" (27.9 cm) round bowl, an AXION® MSR eye/face wash head shall feature inverted directional laminar flow which achieves Zero Vertical Velocity™ supplied by an integral 3.7 gpm flow control. Unit shall also include the AXION MSR hydrodynamic designed ABS plastic showerhead with 20 gpm flow control, chrome-plated brass stay-open ball valve equipped with stainless steel ball and stem, and chrome-plated brass in-line 50 x 50 mesh water strainer. Unit shall also include Schedule 40 hot-dipped galvanized steel pipe and fittings, powder-coated cast-iron 9" (22.9 cm) diameter floor flange, self-adhesive high visibility safety green and bright yellow stripes, universal sign, and 1-1/4" NPT supply.

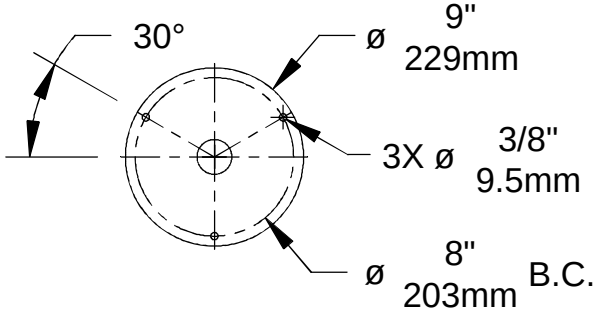
## APPLICATIONS

Where the eyes or body of any person may be exposed to injurious or corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use. Emergency eyewash facilities and deluge showers shall be in unobstructed and accessible locations that require no more than 10 seconds for the injured person to reach.Model 8300-8309 is certified by CSA to meet the ANSI Z358.1 Standard for Emergency Eyewash and Shower Equipment.



TOP VIEW




# MOUNTING DETAIL

SCALE 10:1

NOTES:

1. DIMENSIONS MAY VARY BY ± 1/2 INCH [13mm].

2. TO COMPLY WITH ANSI Z358.1-2009 FOR EMERGENCY EYEWASH OR EYE/FACE WASH AND SHOWER EQUIPMENT:
   - UNIT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND ACCEPTABLE PLUMBING PRACTICES.
   - EYEWASH OR EYE/FACE WASH SHALL BE POSITIONED WITH NOZZLES NOT LESS THEN 83.8 CM (33 IN.) AND NO GREATER THAN 114.3 CM (45 IN.) FROM SURFACE ON WHICH USER STANDS AND 15.3 CM (6 IN.) MINIMUM FROM WALL OR NEAREST OBSTRUCTION.
   - SHOWER SHALL BE POSITIONED SO THAT SHOWER HEAD IS NOT LESS THAN 208.3 CM (82 IN.) NOR MORE THAN 243.8 CM (96 IN.) FROM SURFACE ON WHICH USER STANDS.
   - SHOWER SPRAY PATTERN SHALL HAVE A MINIMUM DIAMETER OF 50.8 CM (20 IN.) AT 152.4 CM (60 IN.) ABOVE SURFACE ON WHICH USER STANDS, AND CENTER OF SPRAY PATTERN SHALL BE LOCATED AT LEAST 40.6 CM (16 IN.) FROM ANY OBSTRUCTION.

3. DO NOT USE REGULAR PIPE SEALANT. IF NECESSARY USE DOW CORNING 832 SEALANT PLACING 5 SMALL BEADS ON THE MALE THREADS, JUST ABOVE THE FIRST THREAD.

Haws®
1455 KLEPPE LANE
SPARKS, NEVADA 89431
(775) 359-4712 FAX (755) 359-7424
E-MAIL: HAWS@HAWSCO.COM
WEBSITE: WWW.HAWSCO.COM

| ECN NO. | REVISED PER ECN: 4938 | BY: VWC |
|---|---|---|
| DRAWN: SLS | DATE: 04/25/08 | CHK'D.: |
| APPROVED: FV | DATE: 01/08/15 | |

MODEL(S)
8300-8309/8300CRP-8309CRP

PART NUMBER 0002080162.D
DRAWING NO. 09459A00 REV 23

SCALE: 1:1 | DRAWING TYPE: INSTALLATION | SIZE: A | SHEET 1 OF 1

# INTELLICHEM®
## COMMERCIAL WATER CHEMISTRY CONTROLLER


## ULTIMATE POOL CHEMICAL MANAGEMENT AND CONVENIENCE

Step up to the new Commercial IntelliChem pool chemical management system. The IntelliChem controller automatically monitors your pH and chemical levels and delivers just the right amount of chemicals to keep your pool clearer, safer and ready to enjoy...anytime.

With IntelliChem continuously checking and automatically dispensing the required chemicals, you avoid the harsh chemical swings that can lead to burning eyes, itchy skin and bleached out bathing suits...or worse, costly and time consuming maintenance to correct your water chemistry problems.

With the included ScreenLogic2® Interface, local or remote chemical control management is taken to a new level.

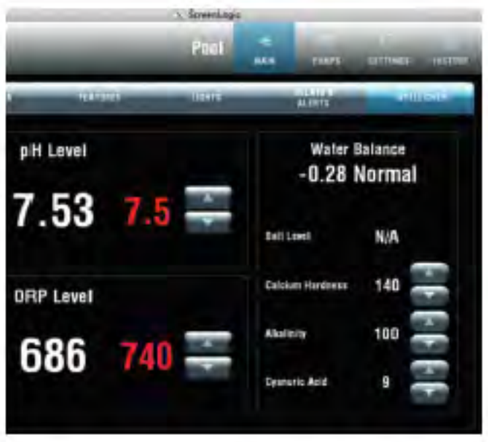
## STANDARD FEATURES

- Programmable chemical feed cycle and on and off times for precise water balance.
- Flow sensor ensures chemicals won't feed without system flow, guarding against false readings and equipment damage.
- Dual sanitizer support. When sudden heavy bather load occurs secondary chlorine source feeder kicks in to get pool up to chlorine set point quickly.
- Built-in Langelier Saturation Index calculator lets you know when your water chemistry is perfectly in balance...and when it's not.
- The use of ScreenLogic2 on PC offers the ability to keep track of pH and ORP levels and make adjustments locally or remotely.
- Compatible with IntelliChlor® Salt Chlorine Generators, liquid feed pumps and $CO_2$ systems.
- Password-protected access prevents tampering or accidental program change.
- Assures safer water conditions by preventing excess chemical addition within a 24-hour period.

## BENEFITS

- Dual sanitizer support, with sudden heavy bather load secondary chlorine source feeder kicks in to get pool up to chlorine set point quickly.
- The use of ScreenLogic2® Interface on PC offers the ability to keep track of pH and ORP levels and make set point adjustments. Connecting remotely to keep tabs on the pool.
- Eliminates the time and guesswork that lead to imbalances as bather loads change and airborne contaminants invade your pool.
- Eliminates eye and skin irritation and the odor caused by out-of-balance water conditions.
- Helps protect your pool equipment from corrosion caused when pH swings in and out of balance.
- Minimizes chemical costs by adding chemicals with precision, and only when needed, to eliminate waste. No more manual handling of chlorine and acid.
- Makes sanitizer more effective by eliminating fluctuations in pH level.
- Auto Setup/Configuration wizard makes start-up quick and easy.


Plug & Play installation.
Powerful chemical automation.




Easy to install, powerful chemical automation with ScreenLogic integration.

## SPECIFICATIONS

Commercial IntelliChem® Commercial Water Chemistry Controller has the controller, flow cell, ScreenLogic wireless transceiver, and Stenner commercial pump mounted on a 2' x 2' backboard. Supports dual sanitization (SCG primary + liquid secondary) and can be monitored and controlled by ScreenLogic's PC interface.

| Model Number | Feed Pumps | UPC Number |
|---|---|---|
| 522577 | 1 | 788379506469 |
| 522578 | 2 | 788379506476 |

PENTAIR

1620 HAWKINS AVE, SANFORD, NC 27330 800.831.7133 WWW.PENTAIRCOMMERCIAL.COM

Catalog #: _____ Project: _____

Prepared By: _____ Date: _____ Type: _____

# Mirada Medium (MRM)

## Outdoor LED Area Light

IP66

| OVERVIEW | |
|---|---|
| Lumen Package | 7,000 - 48,000 |
| Wattage Range | 48 - 401 |
| Efficacy Range (LPW) | 117 - 160 |
| Weight lbs(kg) | 30 (13.6) |

## QUICK LINKS

Ordering Guide | Performance | Photometrics | Dimensions

## FEATURES & SPECIFICATIONS

### Construction

- Rugged die-cast aluminum housing contains factory prewired driver and optical unit. Cast aluminum wiring access door located underneath.
- Designed to mount to square or round poles.
- Fixtures are finished with LSI's DuraGrip® polyester powder coat finishing process. The DuraGrip finish withstands extreme weather changes without cracking or peeling. Other standard LSI finishes available. Consult factory.
- Shipping weight: 37 lbs in carton.

### Optical System

- State-of-the-Art one piece silicone optic sheet delivers industry leading optical control with an integrated gasket to provide IP66 rated sealed optical chamber in 1 component.
- Proprietary silicone refractor optics provide exceptional coverage and uniformity in IES Types 2, 3, 5W, FT, FTA and AM.
- Silicone optical material does not yellow or crack with age and provides a typical light transmittance of 93%.
- Zero uplight.
- Available in 5000K, 4000K, and 3000K color temperatures per ANSI C78.377. Also Available in Phosphor Converted Amber with Peak intensity at 610nm.
- Minimum CRI of 70.
- Integral louver (IL) and house-side shield (IH) options available for improved backlight control without sacrificing street side performance. See page 3 for more details.

### Electrical

- High-performance programmable driver features over-voltage, under-voltage, short-circuit and over temperature protection. Custom lumen and wattage packages available.
- 0-10V dimming (10% - 100%) standard.
- Standard Universal Voltage (120-277 Vac) Input 50/60 Hz or optional High Voltage (347-480 Vac).
- L80 Calculated Life: >100k Hours (See Lumen Maintenance on Page 5)
- Total harmonic distortion: <20%
- Operating temperature: -40°C to +50°C (-40°F to +122°F). 42L and 48L lumen packages rated to +40ºC.
- Power factor: >.90
- Input power stays constant over life.
- Field replaceable 10kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).
- High-efficacy LEDs mounted to metal-core circuit board to maximize heat dissipation
- Components are fully encased in potting material for moisture resistance. Driver complies with FCC standards. Driver and key electronic components can easily be accessed.

### Controls

- Optional integral passive infrared Bluetooth™ motion and photocell sensor (see page 9 for more details). Fixtures operate independently and can be commissioned via iOS or Android configuration app
- LSI's AirLink™ wireless control system options reduce energy and maintenance costs while optimizing light quality 24/7. (see page 9 for more details).

### Installation

- Designed to mount to square or round poles.
- A single fastener secures the hinged door, underneath the housing and provides quick & easy access to the electrical compartment.
- Included terminal block accepts up to 12 ga. wire.
- Utilizes LSI's traditional 3" drill pattern B3 for easy fastening of LSI products. (See drawing on page 9)

### Warranty

- LSI LED Fixtures carry a 5-year warranty.

### Listings

- Listed to UL 1598 and UL 8750.
- Meets Buy American Act requirements.
- IDA compliant; with 3000K color temperature selection.
- Title 24 Compliant; see local ordinance for qualification information.
- Suitable for wet Locations.
- IP66 rated Luminaire per IEC 60598.
- 3G rated for ANSI C136.31 high vibration applications are qualified.
- DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.
- Patented Silicone Optics (US Patent NO. 10,816,165 B2)

*Specifications and dimensions subject to change without notice.*

Type: _____

# Mirada Medium Outdoor LED Area Light

## ORDERING GUIDE

Back to Quick Links

TYPICAL ORDER EXAMPLE: **MRM LED 36L SIL FTA UNV DIM 50 70CRI ALSCS04 BRZ IL**

| Luminaire Prefix | Light Source | Lumen Package | Light Output | Distribution | Orientation[2] | Voltage | Driver |
|---|---|---|---|---|---|---|---|
| **MRM** - Mirada | **LED** | **7L** - 7,000 lms<br>**9L** - 9,000 lms<br>**12L** - 12,000 lms<br>**18L** - 18,000 lms<br>**24L** - 24,000 lms<br>**30L** - 30,000 lms<br>**36L** - 36,000 lms<br>**42L** - 42,000 lms<br>**48L** - 48,000 lms<br>**Custom Lumen Packages**[1] | **SIL** - Silicone | **2** - Type 2<br>**3** - Type 3<br>**5W** - Type 5 Wide<br>**FT** - Forward Throw<br>**FTA** - Forward Throw Automotive<br>**AM** - Automotive Merchandise | **(blank)** - standard<br>**L**- Optics rotated left 90°<br>**R** - Optics rotated right 90° | **UNV** - Universal Voltage (120-277V)<br>**HV** - High Voltage (347-480V) | **DIM** - 0-10V Dimming (0-10%) |

| Color Temp | Color Rendering | Finish | Options |
|---|---|---|---|
| **50** - 5,000 CCT<br>**40** - 4,000 CCT<br>**30** - 3,000 CCT<br>**AMB** - Phosphor Converted Amber[12] | **70CRI** - 70 CRI | **BLK -** Black<br>**BRZ -** Dark Bronze<br>**GMG -** Gun Metal Gray<br>**GPT -** Graphite<br>**MSV -** Metallic Silver<br>**PLP -** Platinum Plus<br>**SVG -** Satin Verde Green<br>**WHT -** White | **(Blank)** - None<br><br>**IH -** Integral Houseside Shield[2]<br>**IL -** Integral Louver (Sharp Spill Light Cutoff)[2] |

### Controls (Choose One)

**(Blank)** - None

**Wireless Controls System**
**ALSC** - AirLink Synapse Control System
**ALSCH** - AirLink Synapse Control System Host / Satelite[3]
**ALSCS02** - AirLink Synapse Control System with 12-20' Motion Sensor
**ALSCHS02** - AirLink Synapse Control System Host / Satelite with 12-20' Motion Sensor[3]
**ALSCS04** - AirLink Synapse Control System with 20-40' Motion Sensor
**ALSCHS04** - AirLink Synapse Control System Host / Satelite with 20-40' Motion Sensor[3]
**ALBCS1** - AirLink Blue Wireless Motion & Photo Sensor Controller (8-24' mounting height)[4]
**ALBCS2** - AirLink Blue Wireless Motion & Photo Sensor Controller (25-40' mounting height)[4]

**Stand-Alone Controls**
**EXT** - 0-10v Dimming leads extended to housing exterior
**CR7P** - 7 Pin Control Receptacle ANSI C136.41[6]
**IMSBT1-** Integral Bluetooth™ Motion and Photocell Sensor max 8-24' mounting height[4,5]
**IMSBT2-** Integral Bluetooth Motion and Photocell Sensor max 25-40' mounting height[4,5]

**Button Type Photocells**
**PCI120** - 120V
**PCI208-277** - 208 -277V
**PCI347** - 347V

**Lutron Limelight Controls**
**LLC** – LimeLight Integral Wireless Radio Control by Lutron[4]
**LLCS1** – Limelight Integral Wireless Radio Control and PIR Motion/ Daylight Sensor by Lutron 8-15' mt height[4]
**LLCS2** – Limelight Integral Wireless Radio Control and PIR Motion/ Daylight Sensor by Lutron 16-30' mt height[4]
**LLCS3** – Limelight Integral Wireless Radio Control and PIR Motion/ Daylight Sensor by Lutron 31-40' mt height[4]

## Accessory Ordering Information[7]

| Controls Accessories | |
|---|---|
| **Description** | **Order Numberr[10]** |
| PC120 Photocell for use with CR7P option (120V)[8] | 122514 |
| PC208-277 Photocell for use with CR7P option (208V, 240V, 277V)[8] | 122515 |
| Twist Lock Photocell (347V) for use with CR7P[8] | 122516 |
| Twist Lock Photocell (480V) for use with CR7P[8] | 1225180 |
| AirLink 5 Pin Twist Lock Controller[8] | 661409 |
| AirLink 7 Pin Twist Lock Controller[8] | 661410 |
| PMOS24-24V Pole-Mounted Occupancy Sensor (24V) | 663284CLR |
| Shorting Cap for use with CR7P | 149328 |

| Mounting Accessories[9] | |
|---|---|
| **Description** | **Order Number[10]** |
| Universal Mounting Bracket | 684616CLR |
| Adjustable Slip Fitter (2" - 2 3/8" Tenon) | 688138CLR |
| Horizontal Slip Fitter (2" - 2 3/8" Tenon) | 652761CLR |
| Quick Mount Pole Bracket (Square Pole) | 687073CLR |
| Quick Mount Pole Bracket (4-5" Round Pole) | 689903CLR |
| 15 Tilt Quick Mount Pole Bracket (Square Pole) | 688003CLR |
| 15 Tilt Quick Mount Pole Bracket (4-5" Round Pole) | 689905CLR |
| Wall Mount Bracket | 382132CLR |
| Wood Pole Bracket (6" Minimum Pole Diameter) | 751219CLR |

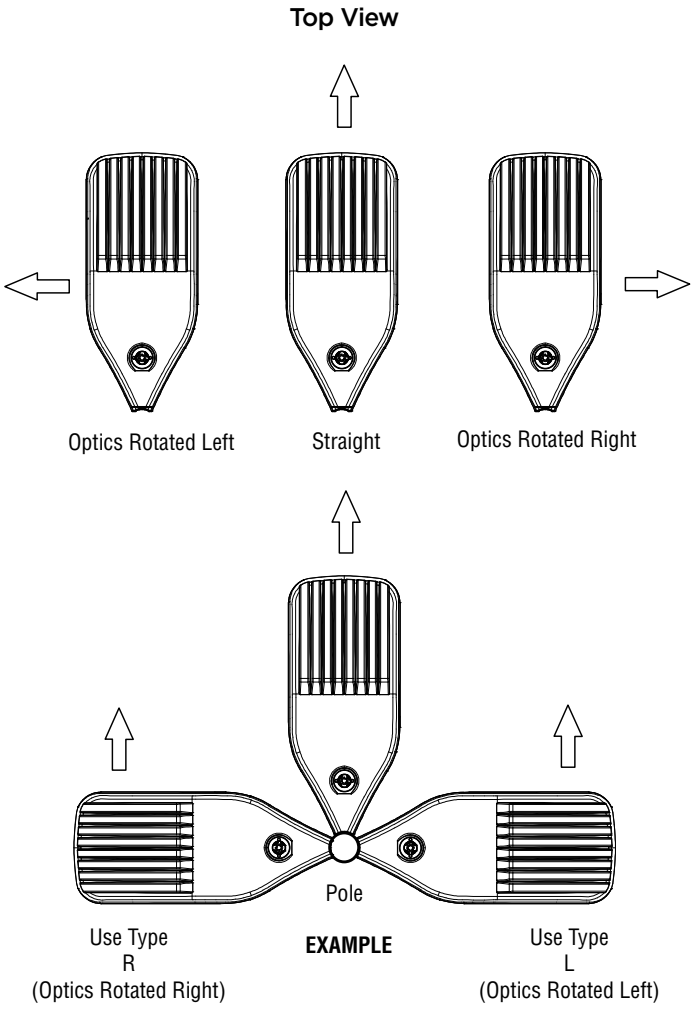
| Fusing Accessories[11] | |
|---|---|
| **Description** | **Order Number** |
| Single Fusing (120V) | FK120 |
| Single Fusing (120V) | FK277 |
| Double Fusing (208V, 240V) | DFK240 |
| Double Fusing (480V) | DFK480 |
| Double Fusing (347V) | DFK347 |

| Miscellaneous Accessories | |
|---|---|
| **Description** | **Order Number** |
| Integral Louver/Shield | 690981 |
| Integral House Side Shield | 743415 |
| 10' Linear Bird Spike Kit (3' Recommended per Luminaire) | 736795 |

FOOTNOTES:
1. Custom lumen and wattage packages available, consult factory. Values are within industry standard tolerances but not DLC listed.
2. Not available with 5W distribution
3. Consult Factory for availability.
4. Not available in HV.
5. IMSBT is field configurable via the LSI app that can be downloaded from your smartphone's native app store
6. Control device or shorting cap must be ordered separately. See Accessory Ordering Information.
7. Accessories are shipped separately and field installed.
8. Factory installed CR7P option required. See Options.
9. "CLR" denotes finish. See Finish options.
10. Only available with ALSC/ALSCH control options.
11. Fusing must be located in hand hole of pole.
12. Only available in 9L and 12L Lumen Packages. Consult factory for lead time and availability.

# Mirada Medium Outdoor LED Area Light

## OPTICS ROTATION




## ACCESSORIES/OPTIONS

### Integral Louver (IL) and House-Side Shield (IH)

Accessory louver and shield available for improved backlight control without sacrificing street side performance. LSI's Integral Louver (L) and Integral House-Side Shield (IH) options deliver backlight control that significantly reduces spill light behind the poles for applications with pole locations close to adjacent properties. The design maximizes forward reflected light while reducing glare, maintaining the optical distribution selected, and most importantly eliminating light trespass. Both options rotate with the optical distribution.

**Luminaire Shown with IMSBT & IL/IH Options**


### 7 Pin Photoelectric Control

7-pin ANSI C136.41-2013 control receptacle option available for twist lock photocontrols or wireless control modules. Control accessories sold separately. Dimming leads from the receptacle will be connected to the driver dimming leads (Consult factory for alternate wiring).

**Luminaire Shown with PCR 7P**

# Mirada Medium Outdoor LED Area Light

Back to Quick Links

**Delivered Lumens***

| Lumen Package | Distribution | CRI | 3000K CCT | | | 4000K CCT | | | 5000K CCT | | | Wattage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delivered Lumens | Efficacy | BUG Rating | Delivered Lumens | Efficacy | BUG Rating | Delivered Lumens | Efficacy | BUG Rating | |
| 7L | 2 | 70 | 7560 | 157 | B2-U0-G2 | 7560 | 157 | B2-U0-G2 | 7560 | 157 | B2-U0-G2 | 48 |
| | 3 | | 7616 | 159 | B1-U0-G2 | 7616 | 159 | B1-U0-G2 | 7616 | 159 | B1-U0-G2 | |
| | 5W | | 7292 | 152 | B3-U0-G1 | 7292 | 152 | B3-U0-G1 | 7292 | 152 | B3-U0-G1 | |
| | FT | | 7562 | 158 | B2-U0-G2 | 7562 | 158 | B2-U0-G2 | 7562 | 158 | B2-U0-G2 | |
| | FTA | | 7595 | 158 | B2-U0-G2 | 7595 | 158 | B2-U0-G2 | 7595 | 158 | B2-U0-G2 | |
| | AM | | 7687 | 160 | B1-U0-G1 | 7687 | 160 | B1-U0-G1 | 7687 | 160 | B1-U0-G1 | |
| 9L | 2 | 70 | 9853 | 159 | B2-U0-G2 | 9853 | 159 | B2-U0-G2 | 9853 | 159 | B2-U0-G2 | 62 |
| | 3 | | 9926 | 160 | B2-U0-G2 | 9926 | 160 | B2-U0-G2 | 9926 | 160 | B2-U0-G2 | |
| | 5W | | 9504 | 153 | B3-U0-G2 | 9504 | 153 | B3-U0-G2 | 9504 | 153 | B3-U0-G2 | |
| | FT | | 9856 | 159 | B2-U0-G3 | 9856 | 159 | B2-U0-G3 | 9856 | 159 | B2-U0-G3 | |
| | FTA | | 9900 | 160 | B2-U0-G2 | 9900 | 160 | B2-U0-G2 | 9900 | 160 | B2-U0-G2 | |
| | AM | | 10019 | 162 | B2-U0-G1 | 10019 | 162 | B2-U0-G1 | 10019 | 162 | B2-U0-G1 | |
| 12L | 2 | 70 | 13135 | 155 | B3-U0-G2 | 13135 | 155 | B3-U0-G2 | 13135 | 155 | B3-U0-G2 | 85 |
| | 3 | | 13232 | 156 | B2-U0-G2 | 13232 | 156 | B2-U0-G2 | 13232 | 156 | B2-U0-G2 | |
| | 5W | | 12669 | 149 | B4-U0-G2 | 12669 | 149 | B4-U0-G2 | 12669 | 149 | B4-U0-G2 | |
| | FT | | 13138 | 155 | B2-U0-G3 | 13138 | 155 | B2-U0-G3 | 13138 | 155 | B2-U0-G3 | |
| | FTA | | 13196 | 155 | B2-U0-G2 | 13196 | 155 | B2-U0-G2 | 13196 | 155 | B2-U0-G2 | |
| | AM | | 13355 | 157 | B2-U0-G2 | 13355 | 157 | B2-U0-G2 | 13355 | 157 | B2-U0-G2 | |
| 18L | 2 | 70 | 19318 | 143 | B3-U0-G3 | 19318 | 143 | B3-U0-G3 | 19318 | 143 | B3-U0-G3 | 135 |
| | 3 | | 19461 | 144 | B3-U0-G3 | 19461 | 144 | B3-U0-G3 | 19461 | 144 | B3-U0-G3 | |
| | 5W | | 18633 | 138 | B4-U0-G2 | 18633 | 138 | B4-U0-G2 | 18633 | 138 | B4-U0-G2 | |
| | FT | | 19324 | 143 | B3-U0-G3 | 19324 | 143 | B3-U0-G3 | 19324 | 143 | B3-U0-G3 | |
| | FTA | | 19408 | 144 | B3-U0-G3 | 19408 | 144 | B3-U0-G3 | 19408 | 144 | B3-U0-G3 | |
| | AM | | 19641 | 145 | B3-U0-G2 | 19641 | 145 | B3-U0-G2 | 19641 | 145 | B3-U0-G2 | |
| 24L | 2 | 70 | 25957 | 147 | B4-U0-G3 | 25957 | 147 | B4-U0-G3 | 25957 | 147 | B4-U0-G3 | 176 |
| | 3 | | 26149 | 149 | B3-U0-G4 | 26149 | 149 | B3-U0-G4 | 26149 | 149 | B3-U0-G4 | |
| | 5W | | 25037 | 142 | B5-U0-G3 | 25037 | 142 | B5-U0-G3 | 25037 | 142 | B5-U0-G3 | |
| | FT | | 25964 | 148 | B3-U0-G4 | 25964 | 148 | B3-U0-G4 | 25964 | 148 | B3-U0-G4 | |
| | FTA | | 26077 | 148 | B3-U0-G3 | 26077 | 148 | B3-U0-G3 | 26077 | 148 | B3-U0-G3 | |
| | AM | | 26393 | 150 | B3-U0-G2 | 26393 | 150 | B3-U0-G2 | 26393 | 150 | B3-U0-G2 | |
| 30L | 2 | 70 | 32417 | 140 | B4-U0-G3 | 32417 | 140 | B4-U0-G3 | 32417 | 140 | B4-U0-G3 | 232 |
| | 3 | | 32656 | 141 | B3-U0-G4 | 32656 | 141 | B3-U0-G4 | 32656 | 141 | B3-U0-G4 | |
| | 5W | | 31267 | 135 | B5-U0-G3 | 31267 | 135 | B5-U0-G3 | 31267 | 135 | B5-U0-G3 | |
| | FT | | 32424 | 140 | B3-U0-G4 | 32424 | 140 | B3-U0-G4 | 32424 | 140 | B3-U0-G4 | |
| | FTA | | 32566 | 140 | B4-U0-G3 | 32566 | 140 | B4-U0-G3 | 32566 | 140 | B4-U0-G3 | |
| | AM | | 32960 | 142 | B3-U0-G3 | 32960 | 142 | B3-U0-G3 | 32960 | 142 | B3-U0-G3 | |
| 36L | 2 | 70 | 38275 | 133 | B4-U0-G4 | 38275 | 133 | B4-U0-G4 | 38275 | 133 | B4-U0-G4 | 288 |
| | 3 | | 38557 | 134 | B4-U0-G5 | 38557 | 134 | B4-U0-G5 | 38557 | 134 | B4-U0-G5 | |
| | 5W | | 36917 | 128 | B5-U0-G4 | 36917 | 128 | B5-U0-G4 | 36917 | 128 | B5-U0-G4 | |
| | FT | | 38283 | 133 | B4-U0-G5 | 38283 | 133 | B4-U0-G5 | 38283 | 133 | B4-U0-G5 | |
| | FTA | | 38450 | 134 | B4-U0-G4 | 38450 | 134 | B4-U0-G4 | 38450 | 134 | B4-U0-G4 | |
| | AM | | 38916 | 135 | B3-U0-G3 | 38916 | 135 | B3-U0-G3 | 38916 | 135 | B3-U0-G3 | |

# Mirada Medium Outdoor LED Area Light

## PERFORMANCE (CONT.)

**Delivered Lumens***

| Lumen Package | Distribution | CRI | 3000K CCT | | | 4000K CCT | | | 5000K CCT | | | Wattage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delivered Lumens | Efficacy | BUG Rating | Delivered Lumens | Efficacy | BUG Rating | Delivered Lumens | Efficacy | BUG Rating | |
| 42L | 2 | 70 | 44118 | 125 | B5-U0-G4 | 44118 | 125 | B5-U0-G4 | 44118 | 125 | B5-U0-G4 | 354 |
| | 3 | | 44444 | 126 | B4-U0-G5 | 44444 | 126 | B4-U0-G5 | 44444 | 126 | B4-U0-G5 | |
| | 5W | | 42555 | 120 | B5-U0-G4 | 42555 | 120 | B5-U0-G4 | 42555 | 120 | B5-U0-G4 | |
| | FT | | 44130 | 125 | B4-U0-G5 | 44130 | 125 | B4-U0-G5 | 44130 | 125 | B4-U0-G5 | |
| | FTA | | 44322 | 125 | B4-U0-G4 | 44322 | 125 | B4-U0-G4 | 44322 | 125 | B4-U0-G4 | |
| | AM | | 44859 | 127 | B4-U0-G3 | 44859 | 127 | B4-U0-G3 | 44859 | 127 | B4-U0-G3 | |
| 48L | 2 | 70 | 48795 | 122 | B5-U0-G4 | 48795 | 122 | B5-U0-G4 | 48795 | 122 | B5-U0-G4 | 401 |
| | 3 | | 49156 | 123 | B4-U0-G5 | 49156 | 123 | B4-U0-G5 | 49156 | 123 | B4-U0-G5 | |
| | 5W | | 47066 | 117 | B5-U0-G4 | 47066 | 117 | B5-U0-G4 | 47066 | 117 | B5-U0-G4 | |
| | FT | | 48809 | 122 | B4-U0-G5 | 48809 | 122 | B4-U0-G5 | 48809 | 122 | B4-U0-G5 | |
| | FTA | | 49021 | 122 | B5-U0-G4 | 49021 | 122 | B5-U0-G4 | 49021 | 122 | B5-U0-G4 | |
| | AM | | 49615 | 124 | B4-U0-G3 | 49615 | 124 | B4-U0-G3 | 49615 | 124 | B4-U0-G3 | |

**ELECTRICAL DATA (AMPS)***

| Lumens | 120V | 208V | 240V | 277V | 347V | 480V |
|---|---|---|---|---|---|---|
| 7L | 0.40 | 0.23 | 0.20 | 0.17 | 0.14 | 0.10 |
| 9L | 0.52 | 0.30 | 0.26 | 0.22 | 0.18 | 0.13 |
| 12L | 0.71 | 0.41 | 0.35 | 0.31 | 0.24 | 0.18 |
| 18L | 1.13 | 0.65 | 0.56 | 0.49 | 0.39 | 0.28 |
| 24L | 1.47 | 0.85 | 0.73 | 0.64 | 0.51 | 0.37 |
| 30L | 1.93 | 1.12 | 0.97 | 0.84 | 0.67 | 0.48 |
| 36L | 2.40 | 1.38 | 1.20 | 1.04 | 0.83 | 0.60 |
| 42L | 2.95 | 1.70 | 1.48 | 1.28 | 1.02 | 0.74 |
| 48L | 3.4A | 1.9A | 1.7A | 1.5A | 1.2A | 0.8A |

**ELECTRICAL DATA - PHOSPHOR CONVERTED AMBER (AMPS)***

| Lumens | Watts | 120V | 208V | 240V | 277V | 347V | 480V |
|---|---|---|---|---|---|---|---|
| 9L | 74.3 | 0.6A | 0.4A | 0.3A | 0.3A | 0.2A | 0.2A |
| 12L | 102.9 | 0.9A | 0.5A | 0.4A | 0.4A | 0.3A | 0.2A |

*Electrical data at 25°C (77°F). Actual wattage may differ by +/-10%

**RECOMMENDED LUMEN MAINTENANCE[1] (7-18L)**

| Ambient | Intial[2] | 25h[2] | 50hr[2] | 75hr[2] | 100hr[2] |
|---|---|---|---|---|---|
| 0-50 C | 100% | 96% | 92% | 88% | 84% |

**RECOMMENDED LUMEN MAINTENANCE[1] (24-48L)**

| Ambient | Intial[2] | 25h[2] | 50hr[2] | 75hr[2] | 100hr[2] |
|---|---|---|---|---|---|
| 0-40 C | 100% | 100% | 97% | 94% | 92% |

1. Lumen maintenance values at 25C are calculated per TM-21 based on LM-80 data and in-situ testing.
2. In accordance with IESNA TM-21-11, Projected Values represent interpolated value based on time durations that are within six times the IESNA LM-80-08 total test duration for the device under testing.
3. In accordance with IESNA TM-21-11, Calculated Values represent time durations that exceed six times the IESNA LM-80-08 total test duration for the device under testing.

**DELIVERED LUMENS***

| Lumen Package | Distribution | Phosphor Converted Amber (Peak 610mm) | | | Wattage |
|---|---|---|---|---|---|
| | | Delivered Lumens | Efficacy | BUG Rating | |
| 9L | 2 | 5848 | 80 | B2-U0-G2 | 74 |
| | 2 - IL | 3644 | 50 | B0-U0-G1 | |
| | 3 | 6018 | 82 | B1-U0-G2 | |
| | 3 - IL | 4468 | 61 | B0-U0-G2 | |
| | 5W | 5471 | 74 | B3-U0-G1 | |
| | FT | 5801 | 79 | B1-U0-G2 | |
| | FT - IL | 3649 | 50 | B0-U0-G1 | |
| | FTA | 5924 | 81 | B1-U0-G1 | |
| | FTA - IL | 4243 | 58 | B1-U0-G1 | |
| 12L | 2 | 7530 | 74 | B2-U0-G2 | 102 |
| | 2 - IL | 4692 | 46 | B0-U0-G1 | |
| | 3 | 7749 | 76 | B1-U0-G2 | |
| | 3 - IL | 5753 | 57 | B0-U0-G2 | |
| | 5W | 7045 | 69 | B3-U0-G2 | |
| | FT | 7470 | 73 | B2-U0-G2 | |
| | FT - IL | 4699 | 46 | B0-U0-G2 | |
| | FTA | 7628 | 75 | B2-U0-G2 | |
| | FTA-IL | 5464 | 54 | B1-U0-G1 | |

*LEDs are frequently updated therefore values are nominal.

# Mirada Medium Outdoor LED Area Light

## PHOTOMETRICS

Back to Quick Links

Luminaire photometry has been conducted by a NVLAP accredited testing laboratory in accordance with IESNA LM-79-08. As specified by IESNA LM-79-08 the entire luminaire is tested as the source resulting in a luminaire efficiency of 100%.

See https://www.lsicorp.com/product/mirada-medium/ for detailed photometric data.

### MRM-LED-30L-SIL-2-40-70CRI

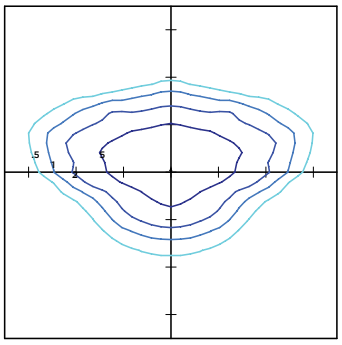
**LUMINAIRE DATA**

| Type 2 Distribution | |
|---|---|
| Description | 4000 Kelvin, 70 CRI |
| Delivered Lumens | 32,416 |
| Watts | 232 |
| Efficacy | 140 |
| IES Type | Type II - Short |
| BUG Rating | B4-U0-G3 |

**Zonal Lumen Summary**

| Zone | Lumens | %Luminaire |
|---|---|---|
| Low (0-30)° | 4796 | 15% |
| Medium (30-60)° | 19811 | 61% |
| High (60-80)° | 7474 | 23% |
| Very High (80-90)° | 335 | 1% |
| Uplight (90-180)° | 0 | 0% |
| Total Flux | 32416 | 100% |

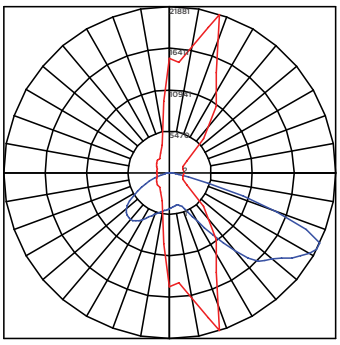
ISO FOOTCANDLE



25' Mounting Height/ 25' Grid Spacing

5 FC 2 FC 1 FC 0.5 FC

POLAR CURVE



### MRM-LED-30L-SIL-3-40-70CRI

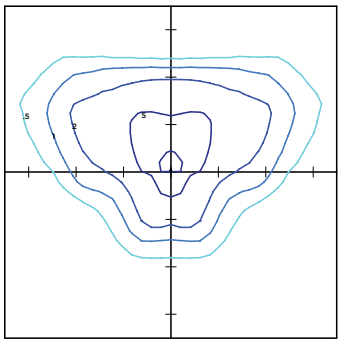
**LUMINAIRE DATA**

| Type 3 Distribution | |
|---|---|
| Description | 4000 Kelvin, 70 CRI |
| Delivered Lumens | 32,656 |
| Watts | 232 |
| Efficacy | 141 |
| IES Type | Type III - Short |
| BUG Rating | B3-U0-G4 |

**Zonal Lumen Summary**

| Zone | Lumens | %Luminaire |
|---|---|---|
| Low (0-30)° | 3385 | 10% |
| Medium (30-60)° | 16250 | 50% |
| High (60-80)° | 12430 | 38% |
| Very High (80-90)° | 591 | 2% |
| Uplight (90-180)° | 0 | 0% |
| Total Flux | 32656 | 100% |

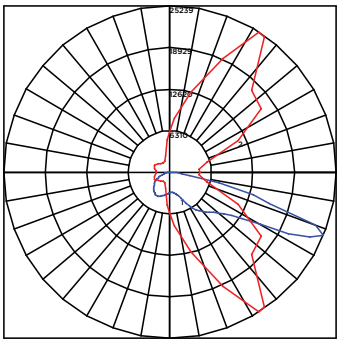
ISO FOOTCANDLE



25' Mounting Height/ 25' Grid Spacing

5 FC 2 FC 1 FC 0.5 FC

POLAR CURVE



### MRM-LED-30L-SIL-FT-40-70CRI

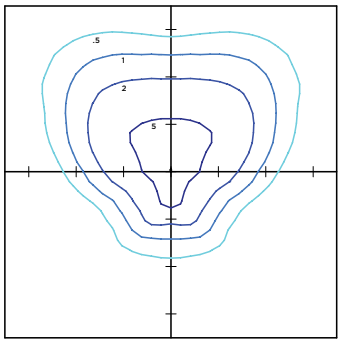
**LUMINAIRE DATA**

| Type FT Distribution | |
|---|---|
| Description | 4000 Kelvin, 70 CRI |
| Delivered Lumens | 32,424 |
| Watts | 232 |
| Efficacy | 140 |
| IES Type | Type IV - Short |
| BUG Rating | B3-U0-G4 |

**Zonal Lumen Summary**

| Zone | Lumens | %Luminaire |
|---|---|---|
| Low (0-30)° | 3952 | 12% |
| Medium (30-60)° | 15505 | 48% |
| High (60-80)° | 12279 | 38% |
| Very High (80-90)° | 688 | 2% |
| Uplight (90-180)° | 0 | 0% |
| Total Flux | 32424 | 100% |

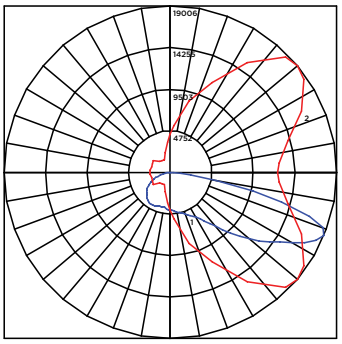
ISO FOOTCANDLE



20' Mounting Height/15' Grid Spacing

20 FC 10 FC 5 FC 2 FC

POLAR CURVE



## PHOTOMETRICS (CONT)

### MRM-LED-30L-SIL-5W-40-70CRI

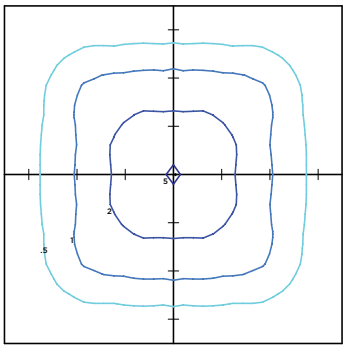
**LUMINAIRE DATA**

| Type 5W Distribution | |
|---|---|
| Description | 4000 Kelvin, 70 CRI |
| Delivered Lumens | 31,267 |
| Watts | 232 |
| Efficacy | 135 |
| IES Type | Type VS - Short |
| BUG Rating | B5-U0-G3 |

**Zonal Lumen Summary**

| Zone | Lumens | %Luminaire |
|---|---|---|
| Low (0-30)° | 3138 | 10% |
| Medium (30-60)° | 13193 | 42% |
| High (60-80)° | 14641 | 47% |
| Very High (80-90)° | 296 | 1% |
| Uplight (90-180)° | 0 | 0% |
| Total Flux | 31267 | 100% |

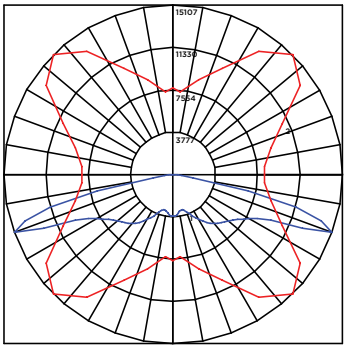
ISO FOOTCANDLE



25' Mounting Height/ 25' Grid Spacing

5 FC 2 FC 1 FC 0.5 FC

POLAR CURVE




### MRM-LED-30L-SIL-FTA-40-70CRI

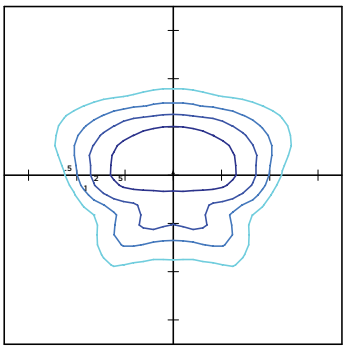
**LUMINAIRE DATA**

| Type FTA Distribution | |
|---|---|
| Description | 4000 Kelvin, 70 CRI |
| Delivered Lumens | 32,566 |
| Watts | 232 |
| Efficacy | 140 |
| IES Type | Type VS - Short |
| BUG Rating | B4-U0-G3 |

**Zonal Lumen Summary**

| Zone | Lumens | %Luminaire |
|---|---|---|
| Low (0-30)° | 6986 | 21% |
| Medium (30-60)° | 19172 | 59% |
| High (60-80)° | 5875 | 18% |
| Very High (80-90)° | 534 | 2% |
| Uplight (90-180)° | 0 | 0% |
| Total Flux | 32566 | 100% |

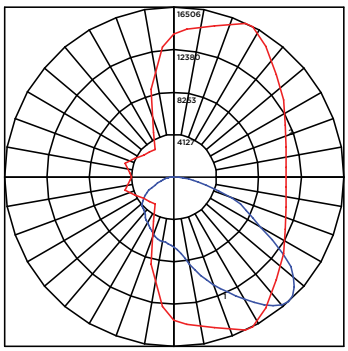
ISO FOOTCANDLE



25' Mounting Height/ 25' Grid Spacing

5 FC 2 FC 1 FC 0.5 FC

POLAR CURVE




### MRM-LED-30L-SIL-AM-40-70CRI

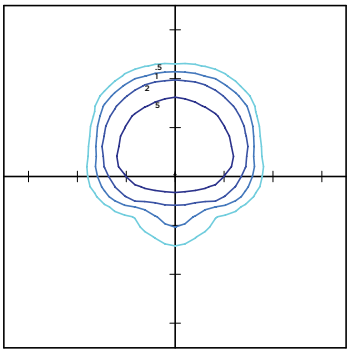
**LUMINAIRE DATA**

| Type AM Distribution | |
|---|---|
| Description | 4000 Kelvin, 70 CRI |
| Delivered Lumens | 32,960 |
| Watts | 232 |
| Efficacy | 142 |
| IES Type | Type III - Very Short |
| BUG Rating | B3-U0-G3 |

**Zonal Lumen Summary**

| Zone | Lumens | %Luminaire |
|---|---|---|
| Low (0-30)° | 6363 | 9% |
| Medium (30-60)° | 22026 | 43% |
| High (60-80)° | 4192 | 48% |
| Very High (80-90)° | 379 | 1% |
| Uplight (90-180)° | 0 | 0% |
| Total Flux | 32960 | 100% |

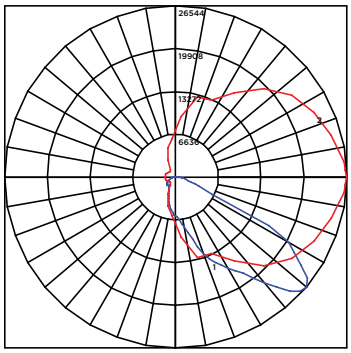
ISO FOOTCANDLE



25' Mounting Height/ 25' Grid Spacing

5 FC 2 FC 1 FC 0.5 FC

POLAR CURVE

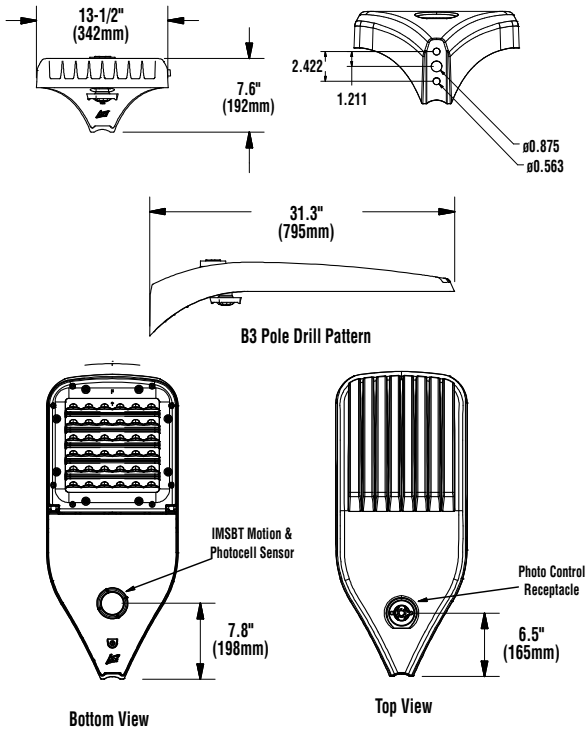


Type: _____

# Mirada Medium Outdoor LED Area Light

Back to Quick Links

## PRODUCT DIMENSIONS




**LUMINAIRE EPA CHART - MRM**

| Tilt Degree | | 0° | 30° | 45° |
|---|---|---|---|---|
| | Single | 0.5 | 1.5 | 1.9 |
| | D180° | 1.0 | 1.5 | 1.9 |
| | D90° | 0.8 | 1.9 | 2.3 |

| Tilt Degree | | 0° | 30° | 45° |
|---|---|---|---|---|
| | T90° | 1.0 | 2.5 | 2.8 |
| | TN120° | 1.0 | 3.3 | 3.9 |
| | Q90° | 1.0 | 2.5 | 2.8 |

## CONTROLS

### AirLink Wireless Lighting Controller

The AirLink integrated controller is a California Title 24 compliant lighting controller that provides real-time light monitoring and control with utility-grade power monitoring. It includes a 24V sensor input and power supply to connect a sensor into the outdoor AirLink wireless lighting system. The wireless integrated controller is compatible with this fixture.

Click the link below to learn more details about AirLink.

https://www.lsicorp.com/wp-content/uploads/documents/products/airlink-outdoor-specsheet.pdf

### Integral Bluetooth™ Motion and Photocell Sensor (IMSBT)

Slim low profile sensor provides multi-level control based on motion and/or daylight. Sensor controls 0-10 VDC LED drivers and is rated for cold and wet locations (-30° C to 70° C). Two unique PIR lenses are available and used based on fixture mounting height. All control parameters are adjustable via an iOS or Android App capable of storing and transmitting sensor profiles.

Click the link below to learn more details about IMSBT.

https://www.lsicorp.com/wp-content/uploads/documents/products/imsbt-specsheet.pdf

### AirLink Blue

Wireless Bluetooth Mesh Outdoor Lighting Control System that provides energy savings, code compliance and enhanced safety/security for parking lots and parking garages. Three key components; Bluetooth wireless radio/sensor controller, Time Keeper and an iOS App. Capable of grouping multiple fixtures and sensors as well as scheduling time-based events by zone. Radio/Sensor Controller is factory integrated into Area/Site, Wall Mounted, Parking Garage and Canopy luminaires.

Click the link below to learn more details about AirLink Blue.

https://www.lsicorp.com/product/airlink-blue/

Type: _____

# Mirada Medium Outdoor LED Area Light

## POLES & BRACKETS

LSI offers a full line of poles and mounting accessories to complete your lighting assembly. Aluminum and steel in both square and round shafts. In addition, LSI offers round tapered, fluted and hinge based poles. Designed and engineered for durability and protected with our oven baked DuraGrip Protection System. Also available with our DuraGrip+ Protection system for unmatched corrosion resistance and an extended warranty. American made in our Ohio facility with industry leading lead times.

Click the link below to learn more details about poles & brackets.

https://www.lsicorp.com/products/poles-brackets/

**BKA UMB CLR**

The 3G rated UMB allows for seamless integration of LSI luminaires onto existing/ retrofit or new construction poles. The UMB was designed for square or round (tapered or straight) poles with two mounting hole spacings between 3.5" – 5".

**BKA ASF CLR**

The adjustable Slip Fitter is a 3G rated rugged die cast aluminum adapter to mount LSI luminaires onto a onto a 2" iron pipe , 2 3/8 OD tenon. The Adjustable Slip Fitter can be rotated 180° allowing for tilting LSI luminaires up to 45° and 90° when using a vertical tenon.

**BKS PQM15 CLR**

The Pole Quick Mount Bracket allows for preset 15° uptilt of LSI luminaires for greater throw of light and increased vertical illumination as well as fast installation onto poles with LSI's 3" or 5" bolt pattern.

**BKS PQMH CLR**

The Pole Quick Mount Bracket allows for lightning fast installation of LSI luminaires onto existing and new construction poles with LSI's B3 or B5 standard pole bolt patterns.

Square Pole
14'-39'

Round Pole
10'-30'

Tapered Pole
20'-39'

Catalog #: _____ Project: _____

Prepared By: _____ Date: _____ Type: _____

# Mirada Small Area (MRS)

## Outdoor LED Area Light

IP66

| OVERVIEW | |
|---|---|
| Lumen Package | 6,000 - 24,000 |
| Wattage Range | 41 - 196 |
| Efficacy Range (LPW) | 112 - 156 |
| Fixture Weight lbs (kg) | 20 (9.1) |

## QUICK LINKS

Ordering Guide | Performance | Photometrics | Dimensions

## FEATURES & SPECIFICATIONS

### Construction

- Rugged die-cast aluminum housing contains factory prewired driver and optical unit. Cast aluminum wiring access door located underneath.
- Fixtures are finished with LSI's DuraGrip® polyester powder coat finishing process. The DuraGrip finish withstands extreme weather changes without cracking or peeling. Other standard LSI finishes available. Consult factory.
- Shipping weight: 27 lbs in carton.

### Optical System

- State-of-the-Art one piece silicone optic sheet delivers industry leading optical control with an integrated gasket to provide IP66 rated seal.
- Proprietary silicone refractor optics provide exceptional coverage and uniformity in distribution types 2, 3, 5W, and FT.
- Silicone optical material does not yellow or crack with age and provides a typical light transmittance of 93%.
- Zero uplight.
- Available in 5000K, 4000K, and 3000K color temperatures per ANSI C78.377
- Minimum CRI of 70.
- Integral louver (IL) and house-side shield (IH) options available for improved backlight control without sacrificing street side performance. See page 3 for more details.

### Electrical

- High-performance driver features over-voltage, under-voltage, short-circuit and over temperature protection.
- 0-10V dimming (10% - 100%) standard.
- Standard Universal Voltage (120-277 VAC) Input 50/60 Hz or optional High Voltage (347-480 VAC).
- L70 Calculated Life: >60k Hours
- Total harmonic distortion: <20%
- Operating temperature: -40°C to +50°C (-40°F to +122°F).
- Power factor: >.90
- Input power stays constant over life.
- Field replaceable 10kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).
- High-efficacy LEDs mounted to metal-core circuit board to maximize heat dissipation
- Driver is fully encased in potting material for moisture resistance and complies with FCC standards. Driver and key electronic components can easily be accessed.

### Controls

- Optional integral passive infrared Bluetooth™ motion and photocell sensor. Fixtures operate independently and can be commissioned via iOS or Android configuration app.
- LSI's AirLink™ wireless control system options reduce energy and maintenance costs while optimizing light quality 24/7.

### Installation

- Designed to mount to square or round poles.
- A single fastener secures the hinged door, underneath the housing and provides quick & easy access to the electrical compartment.
- Included terminal block accepts up to 12 ga. wire.
- Utilizes LSI's traditional B3 drill pattern.

### Warranty

- LSI luminaires carry a 5-year limited warranty. Refer to https://www.lsicorp.com/resources/terms-conditions-warranty/ for more information.

### Listings

- Listed to UL 1598 and UL 8750.
- Meets Buy American Act requirements.
- IDA compliant; with 3000K color temperature selection.
- Title 24 Compliant; see local ordinance for qualification information.
- Suitable for wet locations.
- IP66 rated Luminaire per IEC 60598-1.
- 3G rated for ANSI C136.31 high vibration applications are qualified.
- DesignLights Consortium® Listings in progress.

Specifications and dimensions subject to change without notice.

Type: _____

# Mirada Small Area Light (MRS)

## ORDERING GUIDE

Back to Quick Links

TYPICAL ORDER EXAMPLE: **MRS LED 18L SIL FT UNV DIM 40 70CRI ALBCS1 BLK IH**

| Luminaire Prefix | Light Source | Lumen Package | Lens | Distribution | Orientation[2] | Voltage | Driver |
|---|---|---|---|---|---|---|---|
| **MRS** - Mirada Small Area Light | **LED** | **6L** - 6,000 lms<br>**9L** - 9,000 lms<br>**12L** - 12,000 lms<br>**15L** - 15,000 lms<br>**18L** - 18,000 lms<br>**21L** - 21,000 lms<br>**24L** - 24,000 lms<br>Custom Lumen Packages[1] | **SIL** - Silicone | **2** - Type 2<br>**3** - Type 3<br>**5W** - Type 5 Wide<br>**FT** - Forward Throw | **(blank)** - standard<br>**L**- Optics rotated left 90°<br>**R** - Optics rotated right 90° | **UNV** - Universal Voltage (120-277V)<br>**HV** - High Voltage (347-480V) | **DIM** - 0-10V Dimming (0-10%) |

| Color Temp | Color Rendering | Controls (Choose One) | Finish | Options |
|---|---|---|---|---|
| **50** - 5,000 CCT<br>**40** - 4,000 CCT<br>**30** - 3,000 CCT | **70CRI** - 70 CRI | **(Blank)** - None<br><br>**Wireless Controls System**<br>**ALSC** - AirLink Synapse Control System<br>**ALSCS2** - AirLink Synapse Control System with 12-20' MH Motion Sensor<br>**ALSCS4** - AirLink Synapse Control System with 20-40' MH Motion Sensor<br>**ALBCS1** - AirLink Blue Wireless Motion & Photo Sensor Controller (8-24' MH)<br>**ALBCS2** - AirLink Blue Wireless Motion & Photo Sensor Controller (25-40' MH)<br><br>**Stand-Alone Controls**<br>**EXT** - 0-10v Dimming leads extended to housing exterior<br>**CR7P** - 7 Pin Control Receptacle ANSI C136.41 [3]<br>**IMSBT1** - Integral Bluetooth™ Motion and Photocell Sensor (8-24' MH)[4]<br>**IMSBT2** - Integral Bluetooth™ Motion and Photocell Sensor (25-40' MH)[4] | **BRZ** - Bronze<br>**BLK** - Black<br>**GPT** - Graphite<br>**MSV** - Metallic Silver<br>**WHT** - White<br>**PLP** - Platinum Plus | **(Blank)** - None<br><br>**IH** - Integral Houseside Shield[2]<br>**IL** - Integral Louver (Sharp Spill Light Cutoff)[2] |

## Accessory Ordering Information[5]

### Controls Accessories

| Description | Order Number |
|---|---|
| Twist Lock Photocell (120V) for use with CR7P | 122514 |
| Twist Lock Photocell (208-277) for use with CR7P | 122515 |
| Twist Lock Photocell (347V) for use with CR7P | 122516 |
| Twist Lock Photocell (480V) for use with CR7P | 1225180 |
| AirLink 5 Pin Twist Lock Controller | 661409 |
| AirLink 5 Pin Twist Lock Controller | 661410 |
| Pole-Mounted Occupancy Sensor (24V) | 663284CLR[6] |
| Shorting Cap for use with CR7P | 149328 |
| | |
| | |

### Mounting Accessories

| Description | Order Number[6] |
|---|---|
| Universal Mounting Bracket | 684616CLR |
| Adjustable Slip Fitter (2" - 2 3/8" Tenon) | 688138CLR |
| Horizontal Slip Fitter (2" - 2 3/8" Tenon) | 652761CLR |
| Quick Mount Pole Bracket (Square Pole) | 687073CLR |
| Quick Mount Pole Bracket (4-5" Round Pole) | 689903CLR |
| 15 Tilt Quick Mount Pole Bracket (Square Pole) | 688003CLR |
| 15 Tilt Quick Mount Pole Bracket (4-5" Round Pole) | 689905CLR |
| Wall Mount Bracket | 382132CLR |
| Integral Louver/Shield | TBD |
| Internal Houseside Shield | TBD |

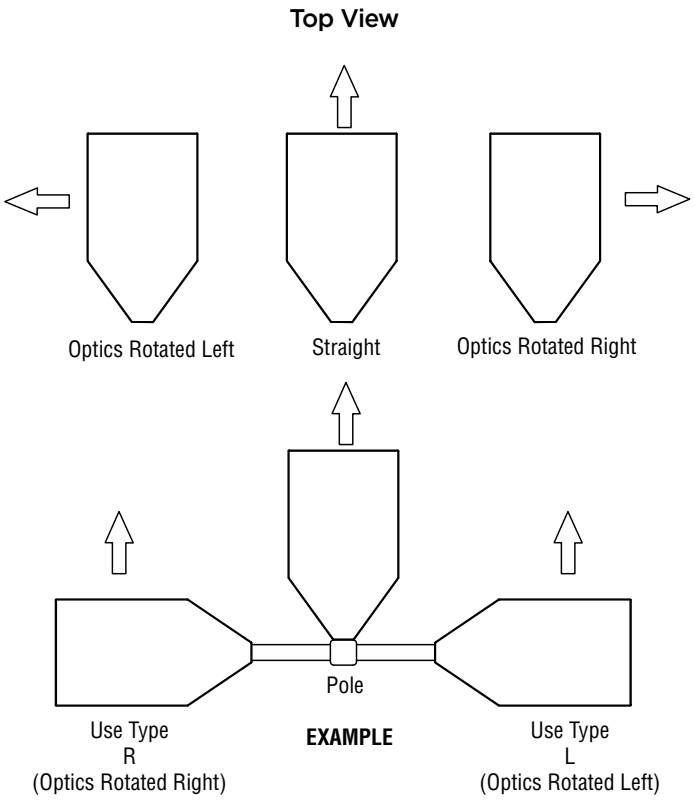
### Fusing Accessories[7]

| Description | Order Number |
|---|---|
| Single Fusing (120V) | FK120 |
| Single Fusing (277V) | FK277 |
| Double Fusing (480V) | DFK480 |
| Double Fusing (347V) | DFK347 |

FOOTNOTES:
1. Custom lumen and wattage packages available, consult factory. Values are within industry standard tolerances but not DLC listed.
2. Not available on "Type 5W" distribution.
3. Control device or shorting cap must be ordered separately. See Accessory Ordering Information.
4. IMSBT is field configurable via the LSI app that can be downloaded from your smartphone's native app store. Consult Facotry for 347-480V.
5. Accessories are shipped separately and field installed.
6. "CLR" denotes finish. See Finish options.
7. Fusing must be located in hand hole of pole.

# Mirada Small Area Light (MRS)

## OPTICS ROTATION




## ACCESSORIES/OPTIONS

### Integral Louver (IL) and House-Side Shield (IH)

Accessory louver and shield available for improved backlight control without sacrificing street side performance. LSI's Integral Louver (L) and Integral House-Side Shield (IH) options deliver backlight control that significantly reduces spill light behind the poles for applications with pole locations close to adjacent properties. The design maximizes forward reflected light while reducing glare, maintaining the optical distribution selected, and most importantly eliminating light trespass. Both options rotate with the optical distribution.

**Luminaire Shown with Integral Louver (IL)**

**Luminaire Shown with IMSBT Option**


### 7 Pin Photoelectric Control

7-pin ANSI C136.41-2013 control receptacle option available for twist lock photocontrols or wireless control modules. Control accessories sold separately. Dimming leads from the receptacle will be connected to the driver dimming leads (Consult factory for alternate wiring).

**Luminaire Shown with CR7P**

## PERFORMANCE

**Delivered Lumens***

| Lumen Package | Distribution | CRI | 3000K CCT | | | 4000K CCT | | | 5000K CCT | | | Wattage |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delivered Lumens | Efficacy | BUG Rating | Delivered Lumens | Efficacy | BUG Rating | Delivered Lumens | Efficacy | BUG Rating | |
| 6L | 2 | 70 | 6045 | 148 | B2-U0-G1 | 6268 | 154 | B2-U0-G1 | 6253 | 153 | B2-U0-G1 | 41 |
| | 3 | | 6145 | 151 | B1-U0-G2 | 6372 | 156 | B1-U0-G2 | 6357 | 156 | B1-U0-G2 | |
| | 5W | | 5812 | 142 | B3-U0-G1 | 6,026 | 148 | B3-U0-G1 | 6012 | 147 | B3-U0-G1 | |
| | FT | | 5947 | 146 | B1-U0-G1 | 6166 | 151 | B1-U0-G1 | 6152 | 151 | B1-U0-G1 | |
| 9L | 2 | 70 | 9091 | 145 | B2-U0-G2 | 9484 | 152 | B2-U0-G2 | 9462 | 151 | B2-U0-G2 | 63 |
| | 3 | | 9241 | 148 | B2-U0-G2 | 9641 | 154 | B2-U0-G2 | 9619 | 154 | B2-U0-G2 | |
| | 5W | | 8740 | 140 | B3-U0-G2 | 9,118 | 146 | B3-U0-G2 | 9097 | 144 | B3-U0-G2 | |
| | FT | | 8943 | 143 | B2-U0-G2 | 9330 | 149 | B2-U0-G2 | 9308 | 149 | B2-U0-G2 | |
| 12L | 2 | 70 | 12132 | 141 | B3-U0-G2 | 12685 | 148 | B3-U0-G2 | 12514 | 146 | B3-U0-G2 | 86 |
| | 3 | | 12333 | 143 | B2-U0-G2 | 12894 | 150 | B2-U0-G2 | 12721 | 148 | B2-U0-G2 | |
| | 5W | | 11664 | 136 | B4-U0-G2 | 12195 | 142 | B4-U0-G2 | 12031 | 140 | B4-U0-G2 | |
| | FT | | 11935 | 139 | B2-U0-G2 | 12479 | 145 | B2-U0-G2 | 12311 | 143 | B2-U0-G2 | |
| 15L | 2 | 70 | 14220 | 128 | B3-U0-G2 | 15167 | 137 | B3-U0-G2 | 14488 | 131 | B3-U0-G2 | 111 |
| | 3 | | 14938 | 135 | B2-U0-G2 | 15933 | 144 | B2-U0-G2 | 15219 | 137 | B2-U0-G2 | |
| | 5W | | 14304 | 129 | B4-U0-G2 | 15257 | 137 | B4-U0-G2 | 14574 | 131 | B4-U0-G2 | |
| | FT | | 14342 | 129 | B2-U0-G2 | 15297 | 138 | B2-U0-G2 | 14612 | 132 | B2-U0-G2 | |
| 18L | 2 | 70 | 16438 | 122 | B3-U0-G3 | 17532 | 130 | B3-U0-G3 | 16747 | 124 | B3-U0-G3 | 135 |
| | 3 | | 17267 | 128 | B3-U0-G3 | 18417 | 137 | B3-U0-G3 | 17592 | 131 | B3-U0-G3 | |
| | 5W | | 16535 | 123 | B4-U0-G2 | 17636 | 133 | B5-U0-G3 | 16846 | 125 | B4-U0-G2 | |
| | FT | | 16578 | 123 | B3-U0-G3 | 17682 | 131 | B3-U0-G3 | 16890 | 125 | B3-U0-G3 | |
| 21L | 2 | 70 | 19488 | 118 | B3-U0-G3 | 20786 | 126 | B3-U0-G3 | 19885 | 120 | B3-U0-G3 | 165 |
| | 3 | | 20472 | 124 | B3-U0-G3 | 21835 | 132 | B3-U0-G3 | 20857 | 126 | B3-U0-G3 | |
| | 5W | | 19604 | 119 | B5-U0-G3 | 20,909 | 126 | B5-U0-G3 | 19973 | 121 | B5-U0-G3 | |
| | FT | | 19655 | 119 | B3-U0-G4 | 20964 | 127 | B3-U0-G4 | 20025 | 121 | B3-U0-G4 | |
| 24L | 2 | 70 | 21976 | 112 | B3-U0-G3 | 23439 | 120 | B3-U0-G3 | 22390 | 114 | B3-U0-G3 | 196 |
| | 3 | | 23085 | 118 | B3-U0-G3 | 24622 | 126 | B3-U0-G3 | 23519 | 120 | B3-U0-G3 | |
| | 5W | | 22105 | 113 | B5-U0-G3 | 23578 | 120 | B5-U0-G3 | 22522 | 115 | B5-U0-G3 | |
| | FT | | 22164 | 113 | B3-U0-G3 | 23640 | 121 | B3-U0-G3 | 22581 | 115 | B3-U0-G3 | |

*LEDs are frequently updated therefore values are nominal.

**ELECTRICAL DATA (AMPS)***

| Lumens | 120V | 208V | 240V | 277V | 347V | 480V |
|---|---|---|---|---|---|---|
| 6L | 0.34 | 0.20 | 0.17 | 0.15 | 0.12 | 0.09 |
| 9L | 0.52 | 0.30 | 0.26 | 0.23 | 0.18 | 0.13 |
| 12L | 0.72 | 0.41 | 0.36 | 0.31 | 0.25 | 0.18 |
| 15L | 0.93 | 0.53 | 0.46 | 0.40 | 0.32 | 0.23 |
| 18L | 1.12 | 0.65 | 0.56 | 0.49 | 0.39 | 0.28 |
| 21L | 1.38 | 0.80 | 0.69 | 0.60 | 0.48 | 0.34 |
| 24L | 1.63 | 0.94 | 0.82 | 0.71 | 0.56 | 0.41 |

*Electrical data at 25°C (77°F). Actual wattage may differ by +/-10%

**RECOMMENDED LUMEN MAINTENANCE[1]**

| Ambient Temp | Lumen Multiplier | | | | |
|---|---|---|---|---|---|
| C | 0 hrs.[2] | 25K hrs.[2] | 50K hrs.[2] | 75K hrs.[3] | 100K hrs.[3] |
| 0 C - 25 C | 100% | 95% | 89% | 94% | 79% |
| 40 C | 100% | 94% | 87% | 80% | 74% |

**FOOTNOTES:**

1. Lumen maintenance values at 25°C are calculated per TM-21 based on LM-80 data and in-situ luminaire testing.
2. In accordance with IESNA TM-21-11, Projected Values represent interpolated value based on time durations that are within six times (6X)the IESNA LM-80-08 total test duration (in hours) for the device under testing ((DUT) i.e. the packaged LED chip).
3. In accordance with IESNA TM-21-11, Calculated Values represent time durations that exceed six times NA LM-80-08 total test duration (in hours) for the device under testing ((DUT) i.e. the packaged LED chip).

## PHOTOMETRICS

Back to Quick Links

Luminaire photometry has been conducted by a NVLAP accredited testing laboratory in accordance with IESNA LM-79-08. As specified by IESNA LM-79-08 the entire luminaire is tested as the source resulting in a luminaire efficiency of 100%.

See http://www.lsi-industries.com/products/led-lighting-solutions.aspx for detailed photometric data.

### MRS-LED-18L-SIL-2-40-70CRI

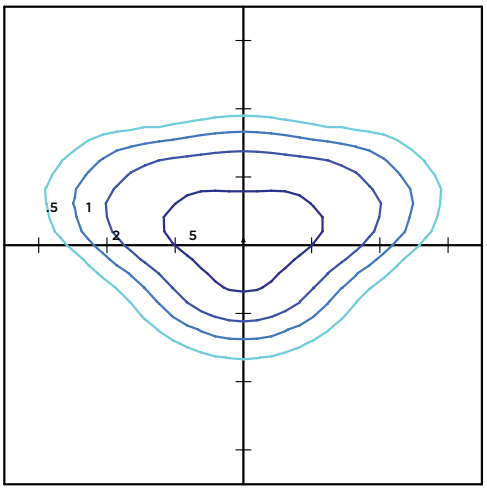
#### LUMINAIRE DATA

| Type 2 Distribution | |
|---|---|
| Description | 4000 Kelvin, 70 CRI |
| Delivered Lumens | 17,532 |
| Watts | 135 |
| Efficacy | 130 |
| IES Type | Type II - Short |
| BUG Rating | B3-U0-G3 |

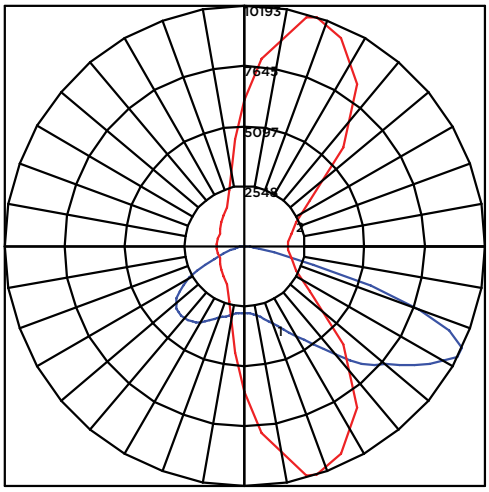
#### Zonal Lumen Summary

| Zone | Lumens | %Luminaire |
|---|---|---|
| Low (0-30)° | 2831 | 16% |
| Medium (30-60)° | 10310 | 59% |
| High (60-80)° | 4208 | 24% |
| Very High (80-90)° | 184 | 1% |
| Uplight (90-180)° | 0 | 0% |
| Total Flux | 17532 | 100% |

ISO FOOTCANDLE




POLAR CURVE




20' Mounting Height/20' Grid Spacing

5 FC 2 FC 1 FC 0.5 FC

### MRS-LED-18L-SIL-3-40-70CRI

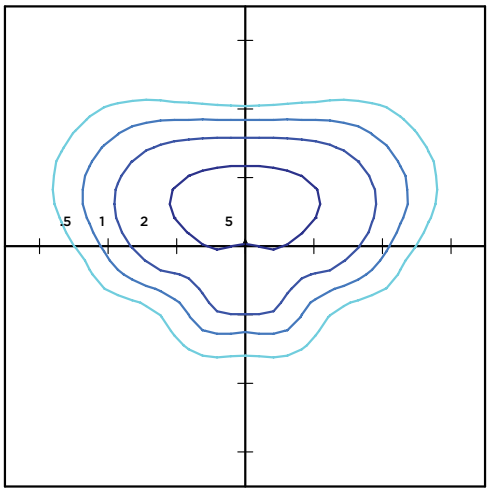
#### LUMINAIRE DATA

| Type 3 Distribution | |
|---|---|
| Description | 4000 Kelvin, 70 CRI |
| Delivered Lumens | 18,417 |
| Watts | 135 |
| Efficacy | 137 |
| IES Type | Type III - Short |
| BUG Rating | B3-U0-G3 |

#### Zonal Lumen Summary

| Zone | Lumens | %Luminaire |
|---|---|---|
| Low (0-30)° | 2329 | 13% |
| Medium (30-60)° | 10634 | 61% |
| High (60-80)° | 5246 | 30% |
| Very High (80-90)° | 208 | 1% |
| Uplight (90-180)° | 0 | 0% |
| Total Flux | 18417 | 100% |

ISO FOOTCANDLE

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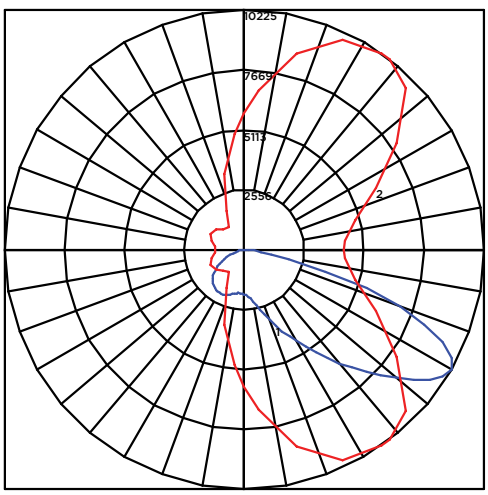



20' Mounting Height/20' Grid Spacing

5 FC 2 FC 1 FC 0.5 FC

## PHOTOMETRICS (CONT)

### MRS-LED-18L-SIL-FT-40-70CRI

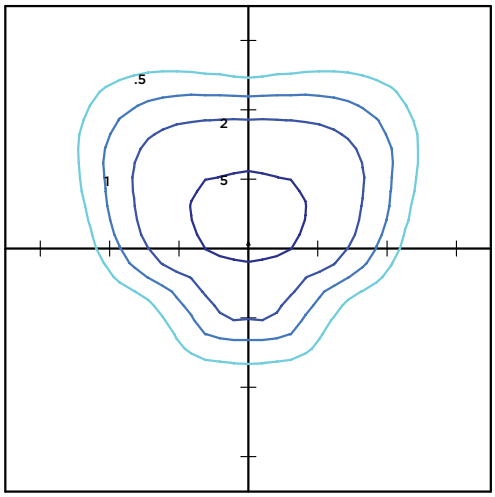
#### LUMINAIRE DATA

| Type FT Distribution | |
|---|---|
| Description | 4000 Kelvin, 70 CRI |
| Delivered Lumens | 17,682 |
| Watts | 135 |
| Efficacy | 131 |
| IES Type | Type III - Short |
| BUG Rating | B3-U0-G2 |

#### Zonal Lumen Summary

| Zone | Lumens | %Luminaire |
|---|---|---|
| Low (0-30)° | 2255 | 13% |
| Medium (30-60)° | 9463 | 54% |
| High (60-80)° | 5696 | 32% |
| Very High (80-90)° | 268 | 2% |
| Uplight (90-180)° | 0 | 0% |
| Total Flux | 17682 | 100% |

ISO FOOTCANDLE

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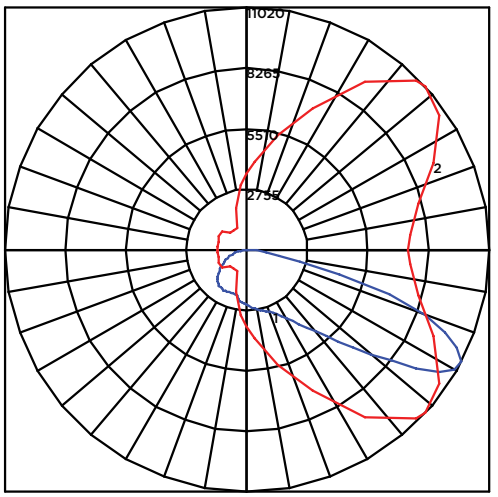



**20' Mounting Height/20' Grid Spacing**

**5 FC** **2 FC** **1 FC** **0.5 FC**

### MRM-LED-30L-SIL-5W-40-70CRI

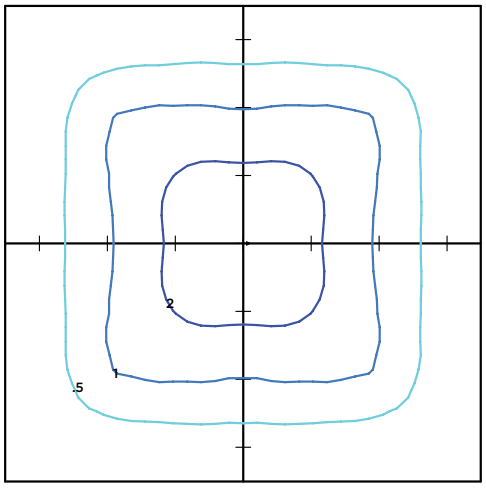
#### LUMINAIRE DATA

| Type 5W Distribution | |
|---|---|
| Description | 4000 Kelvin, 70 CRI |
| Delivered Lumens | 17,636 |
| Watts | 135 |
| Efficacy | 131 |
| IES Type | Type VS - Short |
| BUG Rating | B4-U0-G2 |

#### Zonal Lumen Summary

| Zone | Lumens | %Luminaire |
|---|---|---|
| Low (0-30)° | 1646 | 9% |
| Medium (30-60)° | 7453 | 43% |
| High (60-80)° | 8405 | 48% |
| Very High (80-90)° | 132 | 1% |
| Uplight (90-180)° | 0 | 0% |
| Total Flux | 17636 | 100% |

ISO FOOTCANDLE

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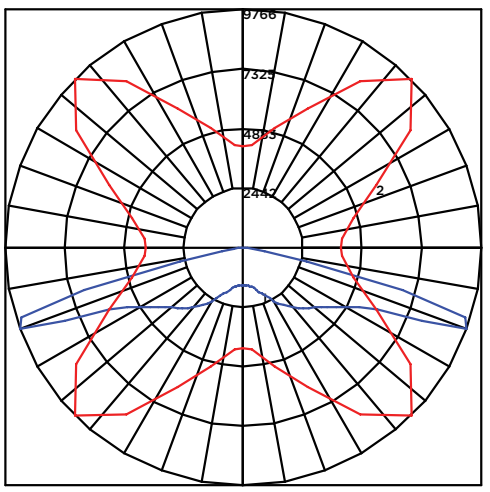


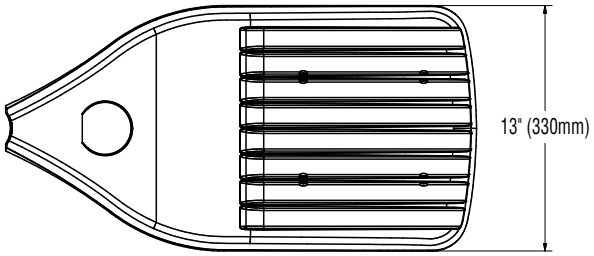

**20' Mounting Height/20' Grid Spacing**

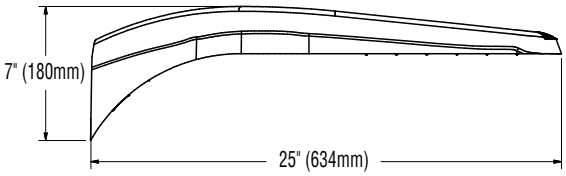
**5 FC** **2 FC** **1 FC** **0.5 FC**

# Mirada Small Area Light (MRS)

Back to Quick Links

## PRODUCT DIMENSIONS

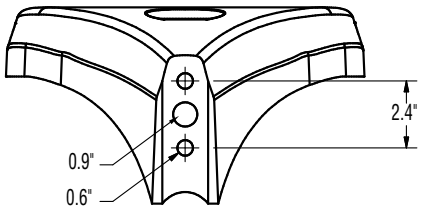



**LUMINAIRE EPA CHART - MRS**

| Tilt Degree | | 0° | 30° | 45° |
|---|---|---|---|---|
| | Single | 0.5 | 1.3 | 1.8 |
| | D180° | 0.9 | 1.3 | 1.8 |
| | D90° | 0.9 | 1.8 | 2.2 |

| Tilt Degree | | 0° | 30° | 45° |
|---|---|---|---|---|
| | T90° | 1.4 | 2.3 | 2.6 |
| | TN120° | 1.4 | 1.9 | 2.3 |
| | Q90° | 1.4 | 2.3 | 2.6 |




**B3 Drill Pattern**

## CONTROLS

### AirLink Wireless Lighting Controller

The AirLink integrated controller is a California Title 24 compliant lighting controller that provides real-time light monitoring and control with utility-grade power monitoring. It includes a 24V sensor input and power supply to connect a sensor into the outdoor AirLink wireless lighting system. The wireless integrated controller is compatible with this fixture.

Click here to learn more about AirLink.

### Integral Bluetooth™ Motion and Photocell Sensor (IMSBT)

Slim low profile sensor provides multi-level control based on motion and/or daylight. Sensor controls 0-10 VDC LED drivers and is rated for cold and wet locations (-30° C to 70° C). Two unique PIR lenses are available and used based on fixture mounting height. All control parameters are adjustable via an iOS or Android App capable of storing and transmitting sensor profiles.

Click here to learn more about IMSBT.

### AirLink Blue

Wireless Bluetooth Mesh Outdoor Lighting Control System that provides energy savings, code compliance and enhanced safety/security for parking lots and parking garages. Three key components; Bluetooth wireless radio/sensor controller, Time Keeper and an iOS App. Capable of grouping multiple fixtures and sensors as well as scheduling time-based events by zone. Radio/Sensor Controller is factory integrated into Area/Site, Wall Mounted, Parking Garage and Canopy luminaires.

Click here to learn more about AirLink Blue.

# Mirada Small Area Light (MRS)

## POLES & BRACKETS

LSI offers a full line of poles and mounting accessories to complete your lighting assembly. Aluminum and steel in both square and round shafts. In addition, LSI offers round tapered, fluted and hinge based poles. Designed and engineered for durability and protected with our oven baked DuraGrip Protection System. Also available with our DuraGrip+ Protection system for unmatched corrosion resistance and an extended warranty. American made in our Ohio facility with industry leading lead times.

Click here to learn more details about poles & brackets.

**BKA UMB CLR**

The 3G rated UMB allows for seamless integration of LSI luminaires onto existing/ retrofit or new construction poles. The UMB was designed for square or round (tapered or straight) poles with two mounting hole spacings between 3.5" – 5".

**BKA ASF CLR**

The adjustable Slip Fitter is a 3G rated rugged die cast aluminum adapter to mount LSI luminaires onto a onto a 2" iron pipe , 2 3/8 OD tenon. The Adjustable Slip Fitter can be rotated 180° allowing for tilting LSI luminaires up to 45° and 90° when using a vertical tenon.

**BKS PQM15 CLR**

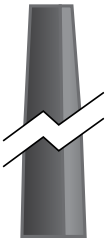
The Pole Quick Mount Bracket allows for preset 15° uptilt of LSI luminaires for greater throw of light and increased vertical illumination as well as fast installation onto poles with LSI's 3" or 5" bolt pattern.

**BKS PQMH CLR**

The Pole Quick Mount Bracket allows for lightning fast installation of LSI luminaires onto existing and new construction poles with LSI's B3 or B5 standard pole bolt patterns.

Square Pole
14'-39'

Round Pole
10'-30'



Tapered Pole
20'-39'

PENTAIR

**PARAGON™**

# COMMERCIAL SWIMMING POOL DECK EQUIPMENT

# CONTENTS



# PARAGON™ DECK EQUIPMENT

For well over 60 years Paragon Deck Equipment has been the flagship of the aquatics industry for quality, craftsmanship, and innovation. We remain focused on the core values that helped make us the leader: build to our customer's specifications through a commitment to custom products and continuous improvement; provide superior customer service and communication; in short, listen and be responsive to our partners in the aquatics industry, whether they are architects, engineers, distributors, contractors, facility managers or competitive swimming and diving professionals.

## NEW INSIDE:

**Track Start PLUS+™ STS**
Introduces a back plate option for our standard size tops.
Page 7.

**Griff's Vision Guard Station™**
Unique, Innovative. Lighweight. Easy to move and assemble.
Page 18.

**All Terrain Griff's Guard Station®**
Versatile and effective. Front and rear access.
Page 19.

**Diving Tower Stair System**
For new or retrofit. Many architectural/aesthetic options.
Page 26.

For a full scope of the Pentair Aquatic product line visit:
pentaircommercial.com

Call or e-mail for consultation.
Paragon Customer Service
888.534.7946 845.463.7291 fax
paragoncustserv@pentair.com

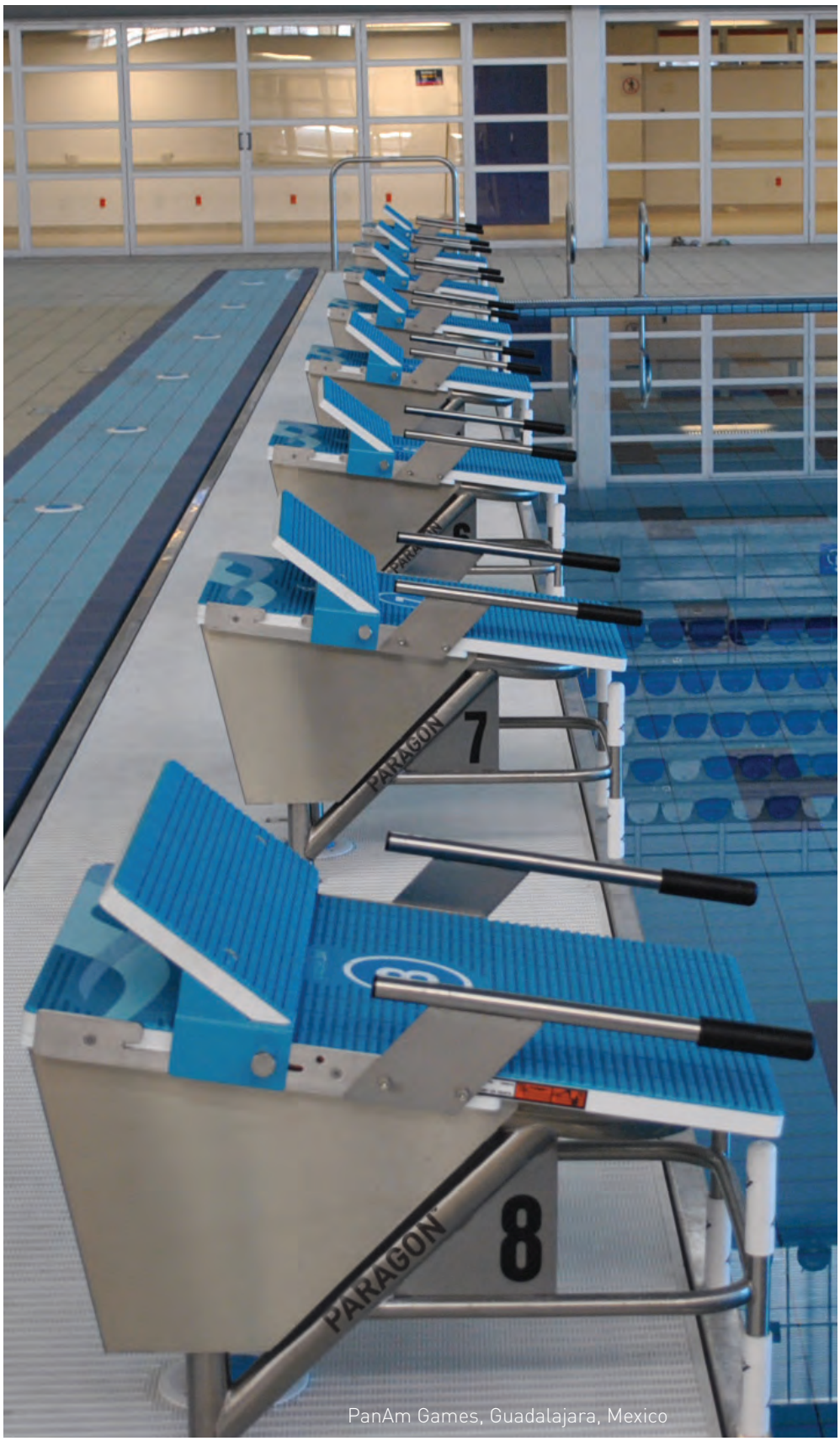
## STARTING PLATFORMS

Paragon Starting Platforms are used in competitive facilities across the United States and are widely used in FINA, NCAA, NFHS, USMS, and USAS events.

A combination of functional simplicity, contemporary design and unsurpassed workmanship make Paragon Starting Platforms a superior product. Their unique features help competitive swimmers improve training, technique and performance.

Each Starting Platform frame is a single weldment manufactured of high-grade stainless steel, polished and buffed to a 320 grit finish. All welds are electro-chemically passivated for maximum corrosion resistance. Each top is a solid sheet of 1-1/4" high density (UV inhibited) polypropylene with a patented, cross-grooved, non-skid, white sand finish.

Paragon platforms cannot absorb water, so they will never warp, shrink, rot or crack.



PanAm Games, Guadalajara, Mexico

WARNING: Starting Platforms are to be used only by trained competitive swimmers. Only shallow racing dives should be executed. Impact with the pool bottom can cause serious injury. Please refer to applicable codes and regulations for your specific installation.

# HOW TO SELECT THE PARAGON STARTING PLATFORM MODEL

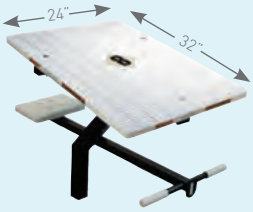
When choosing a starting platform, your first consideration should be the size of the platform top. (Note: All ruling bodies call for a minimum of 20" x 20" starting platform tops). Choose either the single leg (Paraflyte or Quickset Anchor) or dual legs (Competitor). Select the anchor style (Paraflyte, Quickset or Competitor). Then select color and graphics (Standard sand finish is white).

## SELECT TOP SIZE

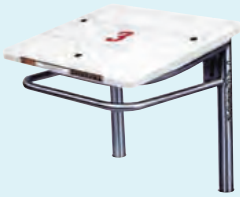
Track Start Size (top: 24" x 32")

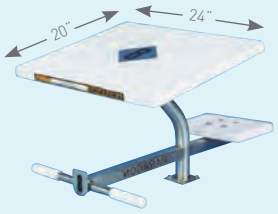
Standard Size (top: 24" x 20")

## SELECT SINGLE OR DUAL




Single Leg or Dual Leg

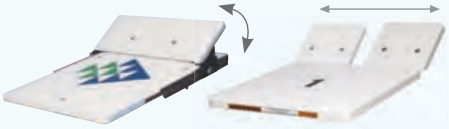





Dual Leg or Single Leg

## TRACK START PLATFORM OPTIONS

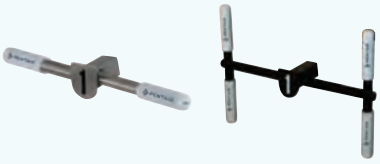
### Backplate



Adjustable Full Backplate

STS Backplate (slides side to side)

### Bars



Backstroke Bars (standard) or FINA Bars

### Grips

Side Hand Grips

## SELECT ANCHOR STYLE

### Single Leg

Paraflyte

Standard Long Reach

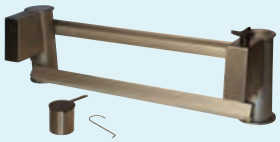
Single Leg only. Bolt mounted. Tools required for installation of starting platform.

Quickset

Single Leg. Dual-Wedge™. No tools required for installation of starting platform.

### Dual Leg

Competitor



Dual Leg. Dual-Wedge. Taper lock. No tools required for installation of starting platform.

## SELECT COLOR OR GRAPHICS OPTION

### Colors

All Paragon Starting Platforms are available in any color in the Pantone Matching System.
(Standard Sand Finish is White)

### Powder Coating

Custom Color Powder Coating can be applied to all models.

### Graphics

Custom logos and numbering are available on all models.

## SELECT MODEL NUMBER

### Select Model

See pages 15 and 16 for How to Size and to view Platform Selector Charts. When chosing a model consider the specific requirements of applicable ruling bodies, e.g. FINA , NCAA, USAS, USMS, NFHS as well as local, municipal and state statutes. If this selection does not meet your precise requirements, we will make something that does. Custom Platforms are our speciality.

Please see the following pages for remaining selection criteria.

WARNING: Starting Platforms are to be used only by trained competitive swimmers. Only shallow racing dives should be executed. Impact with the pool bottom can cause serious injury. Please refer to applicable codes and regulations for your specific installation.

## OUR TOP

Each Paragon™ top is made from solid sheet of 1-1/4" high density (UV Inhibited) polypropylene with a patented, cross-grooved, non-skid, white sand finish.

- Cross groove pattern enhances drainage and is crucial to a solid start.
- Impervious to corrosion.
- Cannot absorb water and will not crack, warp or rot.
- Non-metallic surface stays relatively cool in direct sunlight.
- Track Start size (24" x 32")
- Standard size (24" x 20")
- Safety Covers Available for both sizes.


**Quickset Single-Leg**

## OUR PEDESTAL

Each pedestal is a single weldment of high-grade Certified T304L stainless steel, polished and buffed to a 320 grit finish. Welds are electro-chemically passivated for maximum corrosion resistance.

- Custom Fabricated for your Facility.
- Superior Workmanship.
- Dual Leg (Competitor) and Single Leg (Quickset or Paraflyte) Options.

## OUR ANCHORS

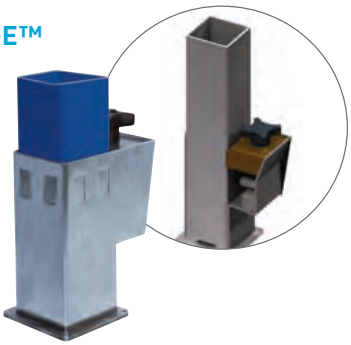
Dual-Wedge™ Tool-Less Clamping Anchors
Our unique taper-lock base (wedge #1) combined with a tool-less clamping wedge at the top of the anchor creates a simple, **zero-movement** installation. Anchor is tightened by hand using the knob shown. Wedge assembly stores in the anchor when the platform is not on deck.

Quickset anchor is available in custom depths to allow the same platforms to be used in multiple locations with different deck-to-water dimensions.

**Competitor Dual-Leg**

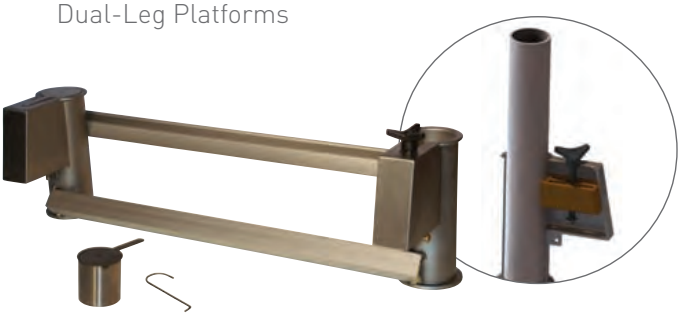
### QUICKSET® DUAL-WEDGE™ ANCHOR

Single-Leg Platforms



### COMPETITOR DUAL-WEDGE™ ANCHOR

Dual-Leg Platforms



### PARAFLYTE FIXED ANCHOR

Single-Leg Platforms
Ideal when the platform does not need to be removed. Platform is bolted to the cast bronze anchor. Tools required.

WARNING: Starting Platforms are to be used only by trained competitive swimmers. Only shallow racing dives should be executed. Impact with the pool bottom can cause serious injury. Please refer to applicable codes and regulations for your specific installation.

## TRACK START PLUS+™

The Track Start PLUS+™ starting platform offers enhancements for the competitive swimmer. This is available for all new Track Start platforms, and can also be easily used as a retrofit to any existing Track Start starting platforms.*

The PLUS+ Adjustable Backplate optimizes the position of the swimmers rear leg allowing for a more powerful start. Easily adjustable to five front-to-back positions using the knobs located on the side of the unit. It is so easy to adjust that it can be reset in the middle of a relay race. It can be used with or without relay platforms for timing systems and can be easily removed for storage.

The Adjustable Backplate can be used with or without the PLUS+ Side Hand Grip Kit which further enhances energy transfer during take-off.

This modular approach provides full flexibility for the individual swimming program and coaching technique.

Track Start PLUS+ Enhancements shown on Track Start Competitor Side Step

*IMPORTANT NOTE:
These kits are only for use on Paragon Aquatics Track Start starting platforms with solid, polypropylene tops.

## POWER + LEVERAGE = ULTIMATE STARTING SYSTEM

The Track Start Plus+™ is a modular concept that adds optional enhancements to new and existing Track Start starting platforms. These features will be factory installed if ordered with new Track Start platforms. The same kits, complete with mounting hardware and installation instructions will be provided for an easy retrofit in the field for existing platforms.


Track Start PLUS+ Enhancements shown on Track Start Quickset Side Step with graphics

Start with our leading Track Start platform.
Then add either or both of the following kits.

### TRACK START PLUS+™ ADJUSTABLE BACKPLATE KIT

The Adjustable Backplate supporting frame is constructed of T304 stainless steel, factory spaced and assembled. It is powder coated in Black for additional corrosion resistance. The slide track is electro-polished T304 stainless steel precisely machined to mate with the support frame locking pins. Stainless steel knobs adjust the Backplate in 5 positions. The footrest is 9" x 24" polypropylene, cross-grooved, white sand coated finish, angled at 30° to render a 90° knee angle.
All hardware is stainless steel.

I.D. No. 27500
Spec Sheet SP 10.75

### OPTIONAL COLOR ADDER FOR SAND FINISH FOOTREST

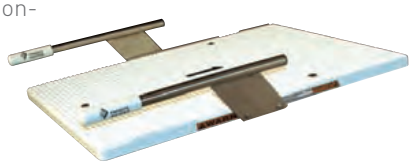
Coodinate the footrest color to the platform color scheme.
NOTE: The optional color adder is included when ordered with a colored top.

I.D. No. 23994C

### TRACK START PLUS+™ SIDE HAND GRIP KIT

Contains 2 polished 1.0" OD., T304 stainless steel tubes welded to a heavy duty mounting plate, rubber non-slip grips, and stainless mounting hardware. It is powder coated in Black for additional corrosion resistance

I.D. No. 27501
Spec Sheet SP 10.76



### CUSTOM COLOR POWDER-COATING FOR HANDGRIPS

Coordinate the Hand Grip color to the platform color scheme. NOTE: Optional custom color powder-coat is provided at no additional charge if ordered with a powder-coated starting platform pedestal.

I.D. No. 23995; Standard Color is Black

WARNING: Starting Platforms are to be used only by trained competitive swimmers. Only shallow racing dives should be executed. Impact with the pool bottom can cause serious injury. Please refer to applicable codes and regulations for your specific installation.

# TRACK START PLUS+™ STS

## Starting Platform Back Plate For Standard Platform Tops

Once only available on larger starting platforms, the STS brings a Back Plate option to standard (24" x 20") size PARAGON tops. This product is an excellent option to introduce swimmers to the new starting techniques, or for where existing standard size starting platforms have a lot of life left in them. It is the most cost-effective way to introduce a back plate to your facility.

The STS is a seamless upgrade to existing Quickset, Paraflyte, or Competitor style platform with standard size tops. It features side-to-side adjustment for unimpeded access to platforms using existing rear mounting step. The back plate removes in seconds without tools. It can be used with or without a relay judges platform (RJP). Non-skid white sand finish 9" x 10" UV inhibited polypropylene kick plate. Track and frame are constructed of black powder-coated T304 Stainless Steel. Custom powder-coat colors and top surface colors are available.


### FOR QUICKSET/PARAFLYTE STYLE PLATFORM
I.D. No. 27510

### FOR COMPETITOR STYLE PLATFORM
I.D. No. 27512

### COLOR UPGRADE FOR POLY/SAND FOOTREST
I.D. No. 23994C; Standard Color is White

### COLOR UPGRADE FOR POWDER-COATED TRACK/FRAME
I.D. No. 23997; Standard Color is Black

## SAFETY COVERS

### PLATFORM SAFETY COVERS

Constructed of tough, light-weight plastic, covers prevent unauthorized use of platforms. Easy installation with bungee cord (included). Stack easily for storage. Comes in safety orange per ANSI standards.

### STANDARD PLATFORM SAFETY COVER
fits 24" x 20" tops
I.D. No. 23960
Spec Sheet AA 20.74

### TRACK START SAFETY COVER
fits 24" x 32" tops
I.D. No. 23967
Spec Sheet AA 20.74

### TRACK START PLUS + SAFETY COVER
I.D. No. 23969
Spec Sheet AA 20.74

La Mirada Splash, La Mirada, California

Track Start Plus+ with Adjustable Backplate

### PLATFORM SAFETY LABELS
Be sure every starting platform is labeled to advise users of proper racing dive technique. Set of 2 labels for labeling back and side of platform top.
I.D. No. 22621X


All platforms now come with molded-in safety label which cannot peel or be removed.

# FULL HEIGHT TRACK START TOP

For competitive swimming a deeper size starting platform top has become the more preferrable option.The Track Start top is 24" x 32" and can be mounted to a single-leg quickset or dual leg stainless steel pedestal. Our anchoring systems allow for quick installation and provide a secure base. Custom designs are available for special facility circumstances.

## LONG REACH TRACK START COMPETITOR REAR MOUNT

The anchor setback ("B" dimension) is available from 36" to 40".
Uses 10" Competitor Dual-Wedge Anchor
Anchor I.D. No. 23140DW
B= 36"- 40"
Spec Sheet SP 10.60.6

Track Start PLUS+ Enhancements shown on Long Reach Competitor Rear Mount

The Long Reach is designed for deck level pools with wide overflow gutter systems.

## Full Height Track Start Size

### Single Leg (Quickset)

The Track Start top (24" wide x 32" deep) is mounted to a single-leg quickset stainless steel pedestal. A seamless upgrade and replacement to your existing Paragon Quickset Platforms, it has been designed to use existing Quickset Anchors. Make your starting platforms one-of-a-kind.

### TRACK START QUICKSET STARTING PLATFORM

This Single Leg design utilizes the Track Start size top (24" x 32"). The anchor setback range ("B" dimension) is 21" to 26". It comes standard with a rear step but can have a side step when the deck constraints require it.
Uses Quickset Dual-Wedge Anchor
Anchor I.D. No. 23302
Spec Sheet SP 10.60.7

### Dual Leg (Competitor)

Our highly regarded Track Start Competitor Models (available in side step and rear mount give swimmers an extra fast takeoff. The 24" x 32" top supports the "track-type" start now used by many competitive swimmers.

### TRACK START COMPETITOR SIDE STEP FULL HEIGHT

The anchor setback ("B" dimension*) is available at 18" or 24". Uses 6" Competitor Dual-Wedge
* Anchor set back from pool wall
Anchor I.D. No. 23103DW
B= 18", A < 24 1/2"
Spec Sheet SP 10.60.3
B= 18", A > 24"
Spec Sheet SP 10.60.4
B= 24", A = 17"-31"
Spec Sheet SP 10.60.5

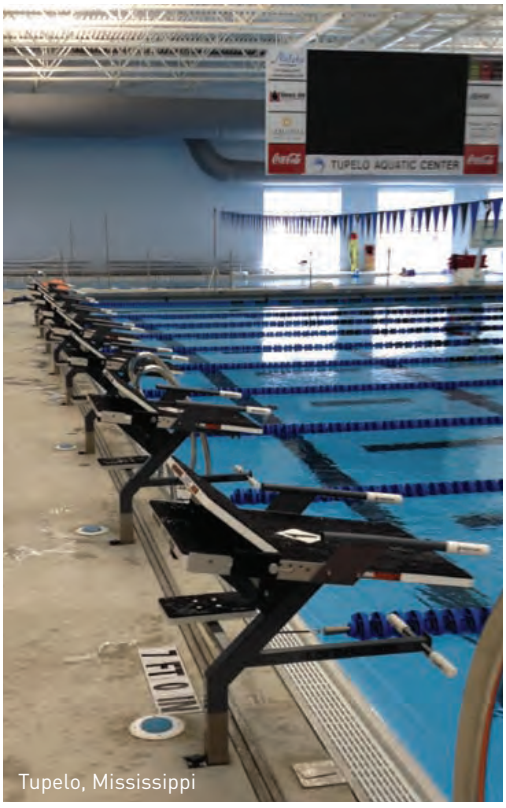
WARNING: Starting Platforms are to be used only by trained competitive swimmers. Only shallow racing dives should be executed. Impact with the pool bottom can cause serious injury. Please refer to applicable codes and regulations for your specific installation.

## FULL HEIGHT STANDARD SIZE TOP

### Dual Leg (Competitor)

The Competitor platform is our dual leg model starting platform. This versatile design accommodates our standard tops (24" x 20") as well as our track start tops (24" x 32"). All Competitor anchor systems (patented) come in two types of anchor assemblies, 6" Competitor Dual-Wedge (for anchor setbacks of under 30") or 10" Competitor Dual-Wedge (for anchor setbacks of over 30"). Colors and graphics are an option.

Note: All platforms are furnished with a tilted top unless otherwise specified.



Tupelo, Mississippi

### Standard Dual Leg (Competitor)

#### CLASSIC STANDARD COMPETITOR

This Dual Leg design utilizes the standard size top (24" x 20"). The anchor setback ("B" dimension) is fixed at 18".

Uses 6" Competitor Dual-Wedge Anchor
Anchor I.D. No. 23103DW
Spec Sheet SP 10.59

#### LONG REACH STANDARD COMPETITOR

(B = 20"-29-1/2")
Designed to accommodate most pool profiles. The anchor setback ("B" dimension) range is 20" to 29-1/2".
Uses 6" Competitor Dual-Wedge Anchor
Anchor I.D. No. 23103DW
Spec Sheet SP 10.60.1

#### LONG REACH STANDARD COMPETITOR

(B = 30"–40")
For pools with wide overflow gutter systems. The anchor setback ("B" dimension) range is 30" to 40".
Uses 10" Competitor Dual-Wedge Anchor
Anchor I.D. No. 23140DW
Spec Sheet SP 10.60.2

WARNING: Starting Platforms are to be used only by trained competitive swimmers. Only shallow racing dives should be executed. Impact with the pool bottom can cause serious injury. Please refer to applicable codes and regulations for your specific installation.

# FULL HEIGHT

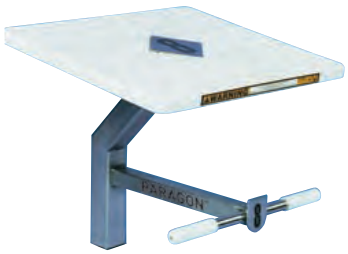
## Single Leg - Standard Top

These platforms are designed to render the maximum allowable height above water. They are available in a variety of configurations to accommodate your specific facility requirements and come with your choice of two anchoring systems, Paraflyte or Quickset. All Full Height Single Leg platforms come with anchors. Platform top is 24"x 20".

The Shortee Model is designed for pools where the deck-to-water dimension exceeds 12". The anchor setback ("B" dimension) is fixed at 18".

### SHORTEE
**Paraflyte Model**

Requires tools for installation and removal. Uses Paraflyte Anchor
Anchor I.D. No. 22201
Spec Sheet SP 10.57



### SHORTEE
**Quickset Model**

Requires no tools for installation or removal.
Uses Quickset Dual-Wedge Anchor
Anchor I.D. No. 23302
Spec Sheet SP 10.58

The Classic Standard Model is designed to fit most pools. The anchor setback ("B" dimension) ranges from 21" to 26" depending upon platform height.

### CLASSIC
**Standard Paraflyte Full Height**

Requires tools for installation and removal.
Uses Paraflyte Anchor
Anchor I.D. No. 22201
Spec Sheet SP 10.51

### CLASSIC
**Standard Quickset Full Height**

Requires no tools for installation or removal.
Uses Quickset Dual-Wedge Anchor
Anchor I.D. No. 23302
Spec Sheet SP 10.52

The Long Reach Standard is designed for deck level pools with wide overflow gutter systems. The anchor setback ("B" dimension) is fixed at 34-1/2".

### LONG REACH
**Standard Paraflyte Full Height**

Requires tools for installation and removal.
Uses Long Reach Paraflyte Anchor
Anchor I.D. No. 22501
Spec Sheet SP 10.53

### LONG REACH
**Standard Quickset Full Height**

Requires no tools for installation or removal.
Uses Quickset Dual-Wedge Anchor
Anchor I.D. No. 23302
Spec Sheet SP 10.54

The Florida standard model is designed to be set atop an elevated curb adjacent to the gutter. Such protective curbs are required by some states to keep out debris and runoff. The anchor setback ("B" dimension) is fixed at 18".

### FLORIDA
**Standard Paraflyte Full Height**

Requires tools for installation and removal. Uses Paraflyte Anchor
Anchor I.D. No. 22201
Spec Sheet SP 10.55

### FLORIDA
**Standard Quickset Full Height**

Requires no tools for installation or removal.
Uses Quickset Dual-Wedge Anchor
Anchor I.D. No. 23302
Spec Sheet SP 10.56

WARNING: Starting Platforms are to be used only by trained competitive swimmers. Only shallow racing dives should be executed. Impact with the pool bottom can cause serious injury. Please refer to applicable codes and regulations for your specific installation.

# LOW HEIGHT
## Varsity

Our varsity starting platform series was originally designed to accommodate the high school ruling of an allowable height above water in some venues of 18". This ruling has changed. However, the coaching community still utilizes this platform to render less than maximum height above water. All Low Height Varsity platforms include anchors with the exception of the Classic Standard and Long Reach Standard Paraflyte platforms. Platform top is 24"x 20". Varsity models do not include a mounting step and must be specified at time of order.

We recommend a mounting step be added when the "A" dimension is 15" or greater (at additional cost).

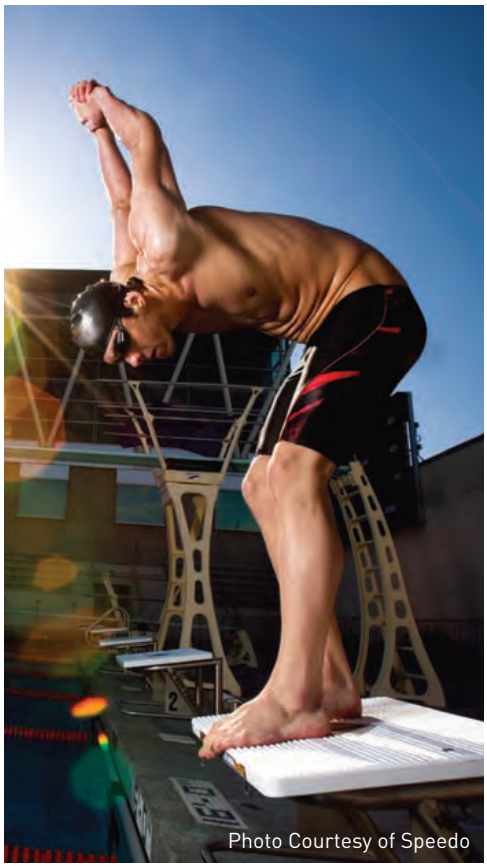


Photo Courtesy of Speedo

Note: All platforms are furnished with a tilted top unless otherwise specified.

## Single Leg

The Classic Standard Model is designed to fit most pools.

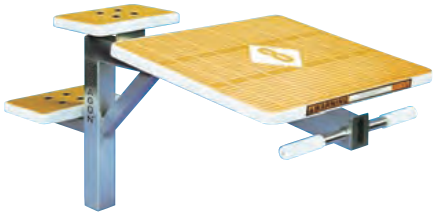
**VARSITY CLASSIC**
**Standard Paraflyte**
The anchor setback ("B" dimension) is available at 14", 18", 21" or 26".
Uses Paraflyte Anchor (not included)
Anchor I.D. No. 22201
B = 21" or 26" – Spec Sheet SP 10.61
B = 14" or 18" – Spec Sheet SP 10.62

**VARSITY CLASSIC**
**Standard Quickset**
The anchor setback ("B" dimension) is available at 14", 18", 21" or 26".
Uses Quickset Dual-Wedge Anchor
Anchor I.D. No. 23302
Spec Sheet SP 10.63

Varsity Standard Platform Optional Step – I.D. No. 23950

The Long Reach Standard is designed for deck level pools with wide overflow gutter systems.

**VARSITY LONG REACH**
**Standard Paraflyte**
The anchor setback ("B" dimension) is fixed at 34 1/2".
Uses Long Reach Paraflyte Anchor (not included)
Anchor I.D. No. 22501
Spec Sheet SP 10.65



**VARSITY LONG REACH**
**Standard Quickset**
The anchor setback ("B" dimension) is fixed at 34 1/2".
Uses Quickset Dual-Wedge Anchor
Anchor I.D. No. 23302
Spec Sheet SP 10.67

Varsity Long Reach Platform Optional Step I.D. No. 23951

## Dual Leg - Competitor

This dual leg design utilizes the standard size top.

**VARSITY STANDARD COMPETITOR**
The anchor setback ("B" dimension) is fixed at 18".
Uses 6" Competitor Dual-Wedge Anchor
Anchor I.D. No. 23103DW
Spec Sheet SP 10.69

**VARSITY COMPETITOR PLATFORM OPTIONAL STEP** I.D. No. 24090
(must be ordered with platform)

WARNING: Starting Platforms are to be used only by trained competitive swimmers. Only shallow racing dives should be executed. Impact with the pool bottom can cause serious injury. Please refer to applicable codes and regulations for your specific installation.

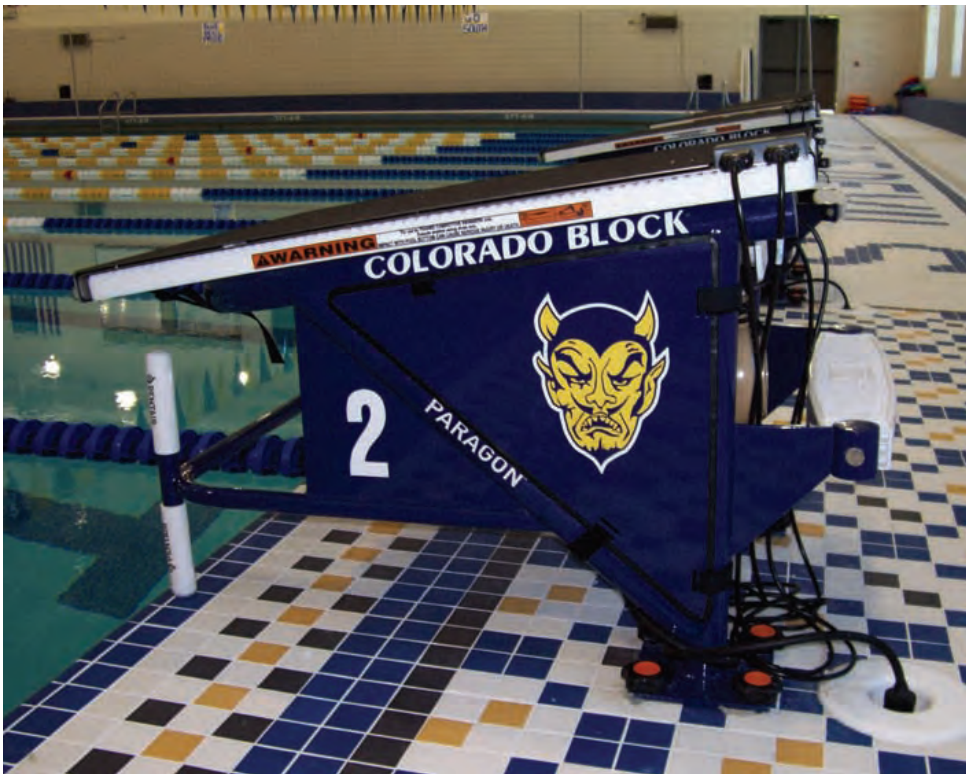
# COLORADO BLOCK BY PARAGON™

For competitive swimming venues, two companies have established their products as essential for accurate, problem-free racing. Paragon with its unrivaled starting platforms; Colorado Time Systems and its relay judging platforms (RJP) and other components.

The RJP, mounts securely atop the Paragon platform with an exclusive system which does not require tools, providing the most accurate way by far to judge a swimmer's departure for starts and relay exchanges. With the Colorado Block you can rely on accuracy to 1/100th of a second! The RJP portion of the block can decipher between weight shifts and actual starts.

The uniquely-engineered Colorado Block houses the connection plate, which protects the electronics from the harsh pool environment. Additionally, it enables the removal of the timing system without the use of tools.

The Colorado Block is also a great training device. Swimmers can fine-tune their start reaction times and their relay exchanges.




(Shown with FINA Backstroke Bars atop a Track Start Competitor Rear Step Model, and powder-coated platform and sponsor panel.)

## ADAPTER KIT FOR PARAGON STARTING PLATFORM

Sponsor's panel of stainless steel fits on platform's slide brackets to display sponsor info, school logo or other graphics. Also includes horn and deck plate mounting bracketry. Panel slides open for easy access to horn and deck plate. It is removable from the starting platform without tools.

Included: hardware, quick connectors, instructions, drill bit for retrofits and sponsor's panel slide brackets. These are factory installed on the starting platforms or can be easily retrofitted for field upgrades


Sponsors panel with connection hub and horn

## TRACK START SIDE STEP

I.D. No. 22670D

Spec Sheet SP 10.70

## STANDARD COMPETITOR

I.D. No. 22672D

## STANDARD PARAFLYTE/QUICKSET

I.D. No. 22674D

Spec Sheet SP 10.72


Shown atop a Track Start Competitor Rear Mount Model

## LONG REACH TRACK START REAR MOUNT

I.D. No. 22671D

Spec Sheet SP 10.71

## LONG REACH COMPETITOR

I.D. No. 22673D

Rear mount models available with stainless steel sponsor's panel.

WARNING: Starting Platforms are to be used only by trained competitive swimmers. Only shallow racing dives should be executed. Impact with the pool bottom can cause serious injury. Please refer to applicable codes and regulations for your specific installation.

# STARTING PLATFORM ANCHORS

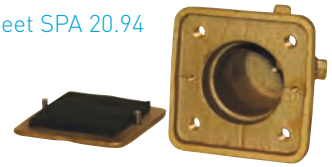
## Fixed Platform Anchors

Requires tools to install and remove platform.

### PARAFLYTE ANCHOR

Ideal for situations where the platform does not need to be removed from the pool deck. Single-leg starting platform is bolted to the cast bronze anchor requiring tools for installation and removal of the platform.

I.D. No. 22201
Spec Sheet SPA 20.94



### LONG REACH PARAFLYTE ANCHOR

Designed for the Long Reach Standard Paraflyte single-legged platform. Attaches to the heavy-duty stainless steel anchor with four bolts and requires the use of tools for installation and removal of the platform.

I.D. No. 22501
Spec Sheet SPA 20.95

## Dual-Wedge Anchors

Removable Platform Anchors
Does not require tools to install and remove platform.

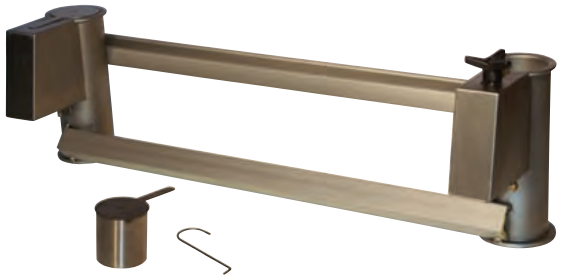
## Competitor Dual-Wedge Anchor

6" and 10" Dual-Wedge Competitor Anchors, featuring heavy duty cast, electro-polished T316 stainless steel sockets with patented taper lock base and wedge, eliminates all free movement in the anchor. Bronze wedge assembly is easily adjusted by hand using the integrated knob design allowing the starting platform to be installed and removed without the use of tools. When the platform is removed from the anchor the wedge assembly is stored inside the socket and the cover (included) can be installed. Welded spacers are factory installed to ensure proper alignment with platforms.

### 6" COMPETITOR DUAL-WEDGE ANCHOR

This 6" deep anchor assembly is used on all Competitor starting platforms with an anchor setback ("B" dimension) of under 30".

I.D. No. 23103DW
Spec Sheet SPA 20.96



### 10" COMPETITOR DUAL-WEDGE ANCHOR

This 10" deep anchor assembly is used on all Competitor starting platforms with an anchor setback ("B" dimension) of 30" to 40".

I.D. No. 23140DW
Spec Sheet SPA 20.97

### QUICKSET® DUAL-WEDGE ANCHOR

Constructed of heavy duty T304 stainless steel, a combination of the patented taper lock base and dual acting wedge design eliminates front-to-back and side-to-side movement. Dual-Wedge Assembly has an integral adjusting knob which is easily turned by hand to install and remove the platform without the need for tools.

Self-contained wedge assembly, readily removable and stored within the anchor when not in use.
Anchor cover included.

Dual-Wedge Anchor I.D. No. 23302

Cover I.D. No. 22213

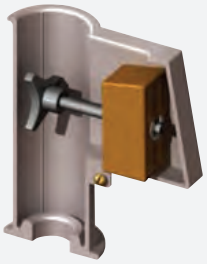
Replacement Wedge Assembly
I.D. No. 23304
Spec Sheet SPA 20.90

## Anchor Wedge Assembly Storage

When the anchor is not in use and the wedge assembly is inside the anchor, the cover slips on, preventing debris from entering the anchor.

Anchor does not require tools to operate. Integrated plastic knob allows for tightening of wedge assembly. Wedge assembly is removeable for storage inside anchor socket when not in use.

Quickset® Anchor Interior Detail of storage



Competitor Anchor Interior Detail of storage

## Our Standard Colors

Red (#R1)

Blue (#B6)

White

Green (#GN23)

Yellow (#Y17)

Cranberry (#R12)

Black (#BL1)

Adding color is an option. We're able to match any color within a color-coding system such as the Pantone Color Matching System. Virtually all school colors are matchable.

Color Upgrade I.D. No. 23990C
(for color upgrade per unit)

# CUSTOMIZE YOUR SAND TOP STARTING PLATFORMS

## POWDER COATING

Pedestal powder coating is now available in a variety of colors. Combined with our platform top colors and graphics, this option can make your starting platform one-of-a-kind.

## POWDER COATING UPGRADE

I.D. No. 23992
(I.D. No. for powder coating upgrade only)

## RENEW . . .

your existing Paragon Starting Platform Tops (and steps) with the new patented and grooved sand finish.


Send us your old style Paragon white polypropylene tops and steps and take advantage of our refinishing program. You'll get the most recent groove patterns as well as the sand finish surface for a great value. Adding color is also an option for refinished platforms for minimal additional cost.

Please contact us or your authorized Paragon Aquatics distributor.

## GRAPHICS

Our custom logo sand top option has become a popular upgrade. We have been customizing and installing in facilities across the United States. Featured here are few of our high quality finished sand tops.

This custom feature offers expanded design options (i.e., school or team logo). Paragon is again leading the field with new and innovative products.
Custom Logo Upgrade
I.D. No. 23991
(I.D. No. for logo upgrade only)


# HOW TO SIZE YOUR STARTING PLATFORMS

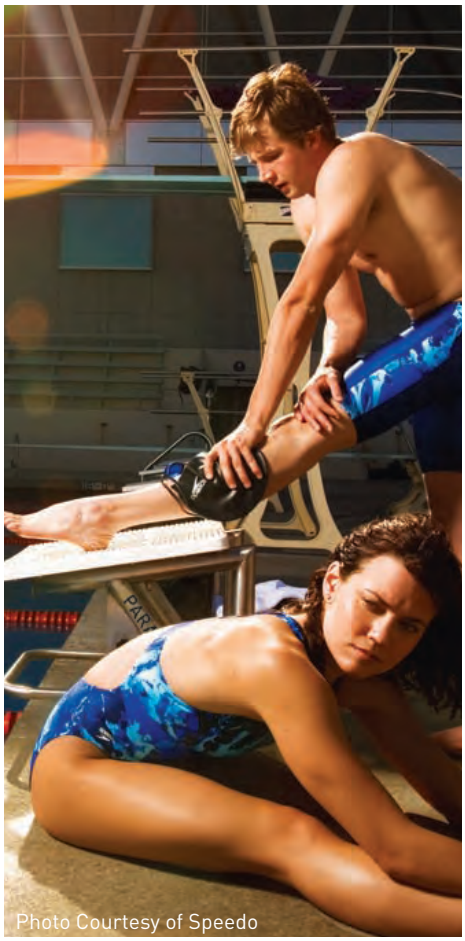


Photo Courtesy of Speedo

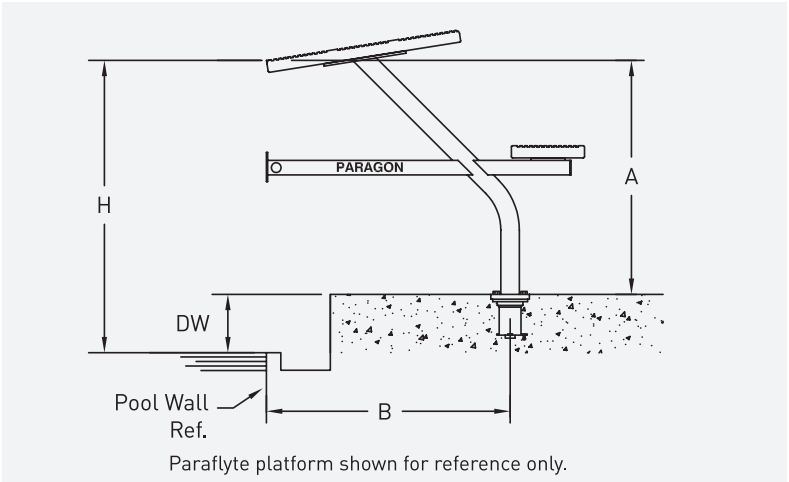
1. Review our catalog to become familiar with the variety of models, options and anchor systems available.
2. Establish the maximum desired height above water using applicable rulings that govern competitive swimming. Information provided is the latest available at the time of printing. Please confirm that rules have not changed.
   Important: Please refer to your local, municipal, and state statutes, ordinances, and regulations, which may vary from locale to locale.

**STARTING PLATFORM HEIGHT REQUIREMENTS**

| | | Water Depth | | |
|---|---|---|---|---|
| Ruling Body | Course Length | Less Than 4'-0" | 4'-0" to 4'-6" | Greater Than 4'-6" |
| FINA | Long/Short | NO PLATFORM | | 20" - 29 1/2" |
| NCAA | Long/Short | NO PLATFORM | 30" MAX | |
| USAS | Long | NO | 20" - 29 1/2" | |
| | Short | PLATFORM | 30" MAX | |
| USMS | Long | NO | 20" - 29 1/2" | |
| | Short | PLATFORM | 30" MAX | |
| NFHS | Long/Short | NO PLATFORM | 30" MAX | |

| Location of Water Depth Measurement from Pool Wall | |
|---|---|
| FINA | 3'-3 1/2" (1 meter) to 19'-8 1/4" (6 meters) |
| NCAA | Minimum 4'-0" throughout pool recommended |
| USAS | 3'-3 1/2" (1 meter) to 16'-5" (5 meters) |
| USMS | 3'-3 1/2" (1 meter) to 16'-5" (5 meters) |
| NFHS | From pool wall (0 meters) to 16'-5" (5 meters) |

3. Determine "B" Dimension: The dimension is always taken from the vertical pool wall to the center of the anchor socket.
4. Calculating The "A" Dimension: The "A" dimension is defined as the vertical dimension from the top of the anchor socket (flush with the pool deck slab) to the top, front edge of the starting platform top. The "A" dimension plus the deck to water dimension (DW) cannot exceed the maximum height above water (H) as determined by your ruling body. If your pool deck is sloped (for drainage), please account for the rise/drop in elevation of the deck in calculating the "DW" dimension.
5. For each given pool type, Paragon has general platform recommendations. These are provided for your convenience in selecting a platform. Select a platform with the appropriate "A" and "B" dimensions as determined above. The diagram references Paragon's standard platform style offerings.



Paraflyte platform shown for reference only.

NOTE: If you require a special configuration, please contact us or one of our authorized distributors.

# PLATFORM SELECTOR CHARTS

Now that you have sized your platform use the charts to determine the product that will work best at your pool facility. If this selection does not meet your precise requirements, we will make something that does. Custom platforms are our specialty.

## SELECTOR CHART — FULL HEIGHT MODELS (UP TO 30" ABOVE WATER)

| Model | | Classic Page 10 | | Long Reach Page 11 | | Florida Page 10 | | Competitor Classic Standard Page 9 | Long Reach Competitor Page 9 | | Track Start Competitor Page 6 | | Track Start Quickset Page 6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Paraflyte | Quickset | Paraflyte | Quickset | Paraflyte | Quickset | | | | Side Step | Rear Mount | |
| A Dim In. | B Dim In.* | | | B=34-1/2" | | B=18" | | B=18" | B=30"-40" | B=20"-29-1/2 | B=18", 24" | B=36"-40" | B=21"-26" |
| | | I.D. Number | | I.D. Number | | I.D. Number | | I.D. Number | I.D. Number | | I.D. Number | | I.D. Number |
| 31.0 | | | | 22401 | 23401 | | | | 24301 | 24401 | 24501 | 24601 | |
| 30.5 | | | | 22402 | 23402 | | | | 24302 | 24402 | 24502 | 24602 | |
| 30.0 | 26 | 22101 | 23201 | 22403 | 23403 | | | 23001 | 24303 | 24403 | 24503 | 24603 | 24700 |
| 29.5 | 26 | 22102 | 23202 | 22404 | 23404 | | | 23002 | 24304 | 24404 | 24504 | 24604 | 24701 |
| 29.0 | 26 | 22103 | 23203 | 22405 | 23405 | | | 23003 | 24305 | 24405 | 24505 | 24605 | 24702 |
| 28.5 | 26 | 22104 | 23204 | 22406 | 23406 | | | 23004 | 24306 | 24406 | 24506 | 24606 | 24703 |
| 28.0 | 26 | 22105 | 23205 | 22407 | 23407 | 22901 | 23531 | 23005 | 24307 | 24407 | 24507 | 24607 | 24704 |
| 27.5 | 26 | 22106 | 23206 | | | 22902 | 23532 | 23006 | 24308 | 24408 | 24508 | 24608 | 24705 |
| 27.0 | 26 | 22107 | 23207 | | | 22903 | 23533 | 23007 | 24309 | 24409 | 24509 | 24609 | 24706 |
| 26.5 | 26 | 22108 | 23208 | | | 22904 | 23534 | 23008 | 24310 | 24410 | 24510 | 24610 | 24707 |
| 26.0 | 26 | 22109 | 23209 | | | 22905 | 23535 | 23009 | 24311 | 24411 | 24511 | 24611 | 24708 |
| 25.5 | 26 | 22110 | 23210 | | | 22906 | 23536 | 23010 | 24312 | 24412 | 24512 | 24612 | 24709 |
| 25.0 | 26 | 22111 | 23211 | | | 22907 | 23537 | 23011 | 24313 | 24413 | 24513 | 24613 | 24710 |
| 24.5 | 25 | 22112 | 23212 | | | 22908 | 23538 | 23012 | 24314 | 24414 | 24514 | 24614 | 24711 |
| 24.0 | 25 | 22113 | 23213 | | | 22909 | 23539 | 23013 | 24315 | 24415 | 24515 | 24615 | 24712 |
| 23.5 | 24 | 22114 | 23214 | | | | | 23014 | 24316 | 24416 | 24516 | 24616 | 24713 |
| 23.0 | 24 | 22115 | 23215 | | | | | 23015 | 24317 | 24417 | 24517 | 24617 | 24714 |
| 22.5 | 23 | 22116 | 23216 | | | | | 23016 | 24318 | 24418 | 24518 | 24618 | 24715 |
| 22.0 | 23 | 22117 | 23217 | | | | | 23017 | 24319 | 24419 | 24519 | 24619 | 24716 |
| 21.5 | 23 | 22118 | 23218 | | | | | 23018 | 24320 | 24420 | 24520 | 24620 | 24717 |
| 21.0 | 23 | 22119 | 23219 | | | | | 23019 | 24321 | 24421 | 24521 | 24621 | 24718 |
| 20.5 | 23 | 22120 | 23220 | | | | | 23020 | | 24422 | 24522 | | 24719 |
| 20.0 | 23 | 22121 | 23221 | | | | | 23021 | | 24423 | 24523 | | 24720 |
| 19.5 | 22 | 22122 | 23222 | | | | | 23022 | | 24424 | 24524 | | 24721 |
| 19.0 | 22 | 22123 | 23223 | | | | | 23023 | | 24425 | 24525 | | 24722 |
| 18.5 | 22 | 22124 | 23224 | | | | | 23024 | | 24426 | 24526 | | 24723 |
| 18.0 | 21 | 22125 | 23225 | | | | | 23025 | | 24427 | 24527 | | 24724 |
| 17.5 | 21 | 22126 | 23226 | | | | | 23026 | | 24428 | 24528 | | 24725 |
| 17.0 | 21 | 22127 | 23227 | | | | | 23027 | | 24429 | 24529 | | 24726 |

* 'B' dimensions refer to Classic models only. 'B' dimensions vary on other models as indicated.

## SELECTOR CHART — FULL HEIGHT MODELS (UP TO 18" ABOVE WATER)

| | VARSITY LINE | | | | | | | SHORTEE | |
|---|---|---|---|---|---|---|---|---|---|
| Model | Classic Page 10 | | | | Long Reach Page 11 | | Competitor Page 11 | (Full Height) Page 10 | |
| A Dim In. | Paraflyte | | Quickset | | Paraflyte | Quickset | Varsity Standard | Paraflyte | Quickset |
| | B Dim's In. | | B Dim's In. | | B=34-1/2" | B=34-1/2" | B=18" | B=18" | B=18" |
| | | I.D. Number | | I.D. Number | I.D. Number | | I.D. Number | I.D. Number | |
| 19.0 | | | | | | 23901 | 23921 | | |
| 18.5 | | | | | | 23902 | 23922 | | |
| 18.0 | 21 or 26 | 23601 | 14, 18, 21 or 26 | 23801 | 23903 | 23923 | 24001 | 22920 | 23560 |
| 17.5 | 21 or 26 | 23602 | 14, 18, 21 or 26 | 23802 | 23904 | 23924 | 24002 | 22921 | 23561 |
| 17.0 | 21 or 26 | 23603 | 14, 18, 21 or 26 | 23803 | 23905 | 23925 | 24003 | 22922 | 23562 |
| 16.5 | 21 or 26 | 23604 | 14, 18, 21 or 26 | 23804 | 23906 | 23926 | 24004 | 22923 | 23563 |
| 16.0 | 21 or 26 | 23605 | 14, 18, 21 or 26 | 23805 | 23907 | 23927 | 24005 | 22924 | 23564 |
| 15.5 | 21 or 26 | 23606 | 14, 18, 21 or 26 | 23806 | | | 24006 | 22925 | 23565 |
| 15.0 | 21 or 26 | 23607 | 14, 18, 21 or 26 | 23807 | | | 24007 | 22926 | 23566 |
| 14.5 | 21 or 26 | 23608 | 14, 18, 21 or 26 | 23808 | | | 24008 | 22927 | 23567 |
| 14.0 | 21 or 26 | 23609 | 14, 18, 21 or 26 | 23809 | | | 24009 | 22928 | 23568 |
| 13.5 | 21 or 26 | 23610 | 14, 18, 21 or 26 | 23810 | | | 24010 | 22929 | 23569 |
| 13.0 | 21 or 26 | 23611 | 14, 18, 21 or 26 | 23811 | | | 24011 | 22930 | 23570 |
| 12.5 | 21 or 26 | 23612 | 14, 18, 21 or 26 | 23812 | | | 24012 | 22931 | 23571 |
| 12.0 | 21 or 26 | 23613 | 14, 18, 21 or 26 | 23813 | | | 24013 | 22932 | 23572 |
| 11.5 | 14 or 18 | 23614 | 14, 18, 21 or 26 | 23814 | | | 24014 | | |
| 11.0 | 14 or 18 | 23615 | 14, 18, 21 or 26 | 23815 | | | 24015 | | |
| 10.5 | 14 or 18 | 23616 | 14, 18, 21 or 26 | 23816 | | | 24016 | | |
| 10.0 | 14 or 18 | 23617 | 14, 18, 21 or 26 | 23817 | | | 24017 | | |
| 9.5 | 14 or 18 | 23618 | 14, 18, 21 or 26 | 23818 | | | 24018 | | |
| 9.0 | 14 or 18 | 23619 | 14, 18, 21 or 26 | 23819 | | | 24019 | | |
| 8.5 | 14 or 18 | 23620 | 14, 18, 21 or 26 | 23820 | | | 24020 | | |
| 8.0 | 14 or 18 | 23621 | 14, 18, 21 or 26 | 23821 | | | 24021 | | |

*Note: Anchors not included with Classic Standard Varsity or Varsity Long Reach Standard Paraflyte models.

## LIFEGUARD CHAIRS

A wide selection of fixed, moveable, and portable chairs suitable for every need. The Paraflyte fixed-series chairs, designed to harmonize with our Paraflyte diving towers and starting platforms, feature both sloping pedestal and access ladder. We also have a variety of chairs that can easily be moved about as needed or to avoid the sun.

All fixed or semi-permanent chairs have a rugged platform extending to the pool edge permitting the lifeguard a safe, fast takeoff. All chairs (except Standard, Griff's high model, All Terrain Griff's Guard Station and Griff's Vision Guard Station) have a turquoise, molded fiberglass reinforced plastic seat. Chairs supported on seat pedestals have a 360° swivel.

Our Griff's Guard Station® Sun Shade gives lifeguards protection from harmful UV rays and increased visual effectiveness from their Griff's Guard Station®. The Sun Shade offers a unique range of adjustability, tilting side-to-side, forward-to-back, and up and down, providing maximum visibility by shielding the lifeguard from the sun's glare. A seamless upgrade for all Griff's Guard Stations, easy-to-install and can be retrofited to existing Griff's Guard® Stations. Many color options are available.

New to our line of Lifeguard Guard Stations are the All Terrain Griff's Guard Station, which is adaptable to any terrain, is easily moveable and can be positioned at the waters' edge. And, the Griff's Vision Guard Station which offers a compact option with dual access and is lighweight for easy moving. The Griff's Vision Sun Shade is a seamless upgrade for the Vision Guard Stations.

All models have a non-skid surface that is vented with heavy duty construction that assures long lasting, trouble-free service.

La Mirada Splash, La Mirada, California

# GRIFF'S VISION GUARD STATION™

Lifeguard effectiveness is key for public water safety. The innovative Griff's Vision Guard Station™ is designed to increase lifeguard effectiveness by providing multiple guard positions and lines of sight, a maximum viewing edge, and dual access within a compact, easily moveable lifeguard station. Dual side access and wide deck allow uninterrupted coverage during shift changes. Steps are widely spaced for safe and quick exit. Cushion seat swivels and folds down to prevent UV damage and deter unauthorized use when not in use.

## GRIFF'S VISION GUARD STATION™

The Griff's Vision Guard Station is available in 1-step, 2-step and 3-step models. All models ship flat and assemble in minutes.

1-Step I.D. No. 20340
Spec Sheet LG 40.29-1

2-Step I.D. No. 20341
Spec Sheet LG 40.29-2

3-Step I.D. No. 20342
Spec Sheet LG 40.29-3

NEW

MINIMUM FOOTPRINT...MAXIMUM IMPACT

## GRIFF'S VISION SUN SHADE

The Griff's Vision Sun Shade is a seamless upgrade to the Vision Griff's Guard Station, with no modifications required. Adjusts side-to-side, front-to-back and up and down, providing lifeguards with protection from harmful UV rays while increasing their visual effectiveness. Easily removed. Colors shown below.

I.D. No. 20345
Spec Sheet LG 40.295

**VISION SUN SHADE**


Sun Shade Color Swatches

# ALL TERRAIN GRIFF'S GUARD STATION®

The All Terrain Griff's Guard Station® was developed for adaptability to any terrain, indoor or outdoor, by the pool, at a waterpark or on the sand. This station was modeled from Tom Griffith's Five Minute Scanning Strategy with the focus on safety. The elevated platform offers lifeguards increased visibility and the front and rear access steps allow for uninterrupted water coverage during shift change. Front steps are widely spaced for safer, front-facing exit facilitating quicker response to emergencies.

The large pneumatic wheels aid in the ability to tip and roll this guard station, with ease, to the next location. Can be positioned near the water's edge, promoting movement with the tide. Cushion seat swivels and folds down to prevent UV damage and deter unauthorized use when not in use.


## ALL TERRAIN GRIFF'S GUARD STATION®

The decking is recessed into a stainless steel support. The overall platform area measures 40-3/8" x 26-3/4" and is located 2'-6" (for 4ft), 3'-6" (for 5ft), or 4'-6" (for 6ft) above the pool deck. Umbrella ring guide is attached to the superstructure and umbrella/life ring holder is attached to the fiberglass decking.

4' - I.D. No. 20330
Spec Sheet LG 40.28-4

5' - I.D. No. 20331
Spec Sheet LG 40.28-5

6' - I.D. No. 20332
Spec Sheet LG 40.28-6

Powdercoat Upgrade Is Available On All Models
I.D. No. 23996

THE MOST VERSATILE LIFEGUARD CHAIR - EVER!

# GRIFF'S WATER SAFETY SYSTEMS

The Griff's Guard Station® by Paragon, together with Tom Griffiths' 5-Minute Scanning Strategy helps to increase lifeguard effectiveness for increased water safety. The station offers room for movement, allowing lifeguard multiple viewing positions.

Griff's Guard Stations feature front entry, elevated viewing station, easy access, and non-skid surface. A wide front step provides additional station and brings the guard closer to the pool edge. Heavy duty wheels allow convenient, easy portability. Stainless steel and fiberglass construction assures long lasting and trouble-free service.

THE 5-MINUTE SCANNING STRATEGY

A self-instruction CD for guard training by Tom Griffiths, President, Aquatics Safety Research, LLC. (Formerly Director of Aquatics and Safety Officer for intercollegiate athletics at Penn State University.) "I developed the 5-Minute Scanning Strategy to help lifeguards keep alert on the job. It is based on physiological and psychological task-involved research. The process requires guards to perform specific tasks in five minute segments." For further information, please visit: **www.aquaticsafetygroup.com.**

SHALLOW WATER BLACKOUT VIDEO

A comprehensive 30 minute presentation divided into four categories:
1) Introduction and Definitions
2) Shallow Water Blackout
3) Genetic "Drowning" Triggers
4) Summary & Quiz

Both CD's are included with every Griff's Guard Station purchase.


Shown with Sun Shade

## GRIFF'S ELEVATED STEP GUARD STATION

Provides three positions for better viewing. Platform size is 39" x 60" and is 24" above the deck. Front step is 14" x 43". Elevated step is 14" x 40" and 36" above pool deck.

I.D. No. 20386
Spec Sheet LG 40.25

Sun Shade Upgrade
I.D. No. 20396
Spec Sheet LG 40.25.1

## GRIFF'S FLAT GUARD STATION

This station has a wider access for easy entry. Platform size is 39" x 60". Step is 14" x 57". Platform is 24" above deck.

I.D. No. 20385
Spec Sheet LG 40.26

Sun Shade Upgrade
I.D. No. 20395
Spec Sheet LG 40.26.1

## GRIFF'S FULL HEIGHT GUARD STATION

Higher viewing angle for greater visibility. Bench size is 14" x 40" and 4' above pool deck. Platform size is 43" x 39" and is 33" above pool deck. Access steps are 14" x 40".

I.D. No. 20387
Spec Sheet LG 40.27

Sun Shade Upgrade
I.D. No. 20397
Spec Sheet LG 40.27.1

# PERMANENT PARAFLYTE LIFEGUARD CHAIRS

All Paraflyte chairs have a platform height of 4'6", a seat height of 6'0" above the deck, and are supported by a stainless steel flanged pedestal which is set back 3'0" from the pool wall. The ladder at side is set back 3' 1-5/8" from the pool wall. Combination ladder risers and guard rails are .065" wall x 1.90" diameter, Type 304 stainless steel, polished and buffed to a 320 grit finish.

All platforms (footboards) are constructed of laminated wood, coated with fiberglass and polyester resin and have a non-skid surface.

All permanent Paraflyte lifeguard chairs are furnished with pedestal, pedestal anchor, rear anchors, (where required) and escutcheon plates. All are furnished with holders for rescue tube and umbrella.

Paraflyte ladder at rear also comes in .145" wall thickness. Replacement ladder steps are 19" and are available in vertical and sloping designs.

## LIFEGUARD CHAIR PEDESTAL ANCHOR ASSEMBLY

Stainless steel factory welded assembly for fixed pedestal chairs.

I.D. No. 21005

## PARAFLYTE LADDER AT REAR

Recommended for general use. The rear ladder with flared guard rails provides easy access to the platform. The horizontal rails provide protection and serve as arm rests.

Paraflyte (Ultraflyte) Chair

I.D. No. 20001

Stainless steel rails are .145" wall

Paraflyte (Superflyte) Chair

I.D. No. 20002

Stainless steel rails are .065" wall

Spec Sheet LG 10.41

## PARAFLYTE LADDER AT SIDES

Two access ladders allow the lifeguard to dismount quickly and safely from either side. Two guards can each stand in an elevated position for unbroken surveillance during guard change and relay of instructions.

I.D. No. 20003

Spec Sheet LG 10.43

## PARAFLYTE CLUB

Acclaimed Paraflyte styling and quality. A single anchor at pedestal base supports the entire chair. The vertical access ladder requires less deck space and does not need separate anchors. Pedestal Anchor furnished. Rear anchors and escutcheon plates not required.

I.D. No. 21001

Spec Sheet LG 10.47

## PARAFLYTE OSHA CHAIR

This chair is designed specifically to comply with federal OSHA regulations. Guard rails are 42" above the platform and extend to the front of the platform.

I.D. No. 20004

Spec Sheet LG 10.45

# MOVEABLE AND PORTABLE LIFEGUARD CHAIRS


6' Moveable

## MOVEABLE (Wheel-A-Round)

An ideal solution for a chair that is needed at different locations. Both rugged and stable, yet can be easily moved by one person. The heavy duty 7" diameter wheels roll easily on deck or lawn. The perfect chair for supervision, instruction, and judging. The wide ladder at front leads directly to platform. Furnished with 26" steps. Available with seat at eight-feet, six-feet and four-feet above deck. (Not suitable for diving.)

8-feet I.D. No. 20301
Spec Sheet LG 20.39-8

6-feet I.D. No. 20302
Spec Sheet LG 20.39-6

4-feet I.D. No. 20305
Spec Sheet LG 20.39-4

## PORTABLE CHAIRS

Portable 2-, 3-, and 4-step models are for areas not requiring a full height chair. Light enough to be lifted easily by one person (the 4-step weighs only 70 lbs.). Sloping front ladder with 19" sloping steps allows access to molded contour seat. Angled legs add stability. (WARNING: Chairs are not suitable for diving nor recommended for use with umbrellas under windy conditions.)

### 4-STEP

(6'-0" above deck)
I.D. No. 20401
Spec Sheet LG 20.37

### 3-STEP

(4'-6" above deck)
I.D. No. 20460
Spec Sheet LG 20.37

### 2-STEP

(3'-10" above deck)
I.D. No. 20450
Spec Sheet LG 20.37

Optional wheels can be retrofit for added mobility. Includes 4" wheels with mounting bracket and hardware.
4-Step Kit
I.D. No. 20404
3-Step Kit
I.D. No. 20403
2-Step Kit
I.D. No. 20402

# LOOKOUT FAMILY

Lookout chairs have a roomier, non-skid surface platform. Stand is at a low height to allow for a faster dismount. These chairs can be placed closer to pool edge for circumstances where space is a consideration.

## LOOKOUT DUAL SIDE MOUNT

Ideal for pools with limited deck space. Convenient access from both sides allows lifeguard change with uninterrupted coverage. Portable, solid stainless steel frame, swivel seat is mounted on a 4' x 4' platform. Access steps are 26". Seat height is 54" from deck. Platform height is 36" from deck. Wheels allow for easy relocation.

I.D. No. 20380

Spec Sheet LG 20.34

## LOOKOUT PLATFORM CHAIR

Engineered especially for busy aquatic facilities and water parks. Access from both sides allows uninterrupted guard change. Sloping steps allow quicker dismount. Portable, solid stainless steel frame, seat mounted on an extra large 60" x 40" platform. Utilizes 26" steps. Seat height is 54" from deck. Platform height is 36" from deck.

I.D. No. 20370

Spec Sheet LG 20.32

# THE "LOOKOUT CHAIR" FAMILY

"Lookout Chairs" have grown into an extended family of their own with 5 models designed for pools that do not require a full height chair. All Lookout chairs offer an elevated, 360° swivel seat which sits on a non-skid, fiberglass platform. Station provides easy access and dismount. Seat is molded plastic. The supporting frames are constructed of 1.90" O.D. x .065" T304 stainless steel. All models come with an umbrella holder and the 3-step also has a rescue tube holder. 4" diameter wheels are included on 2- and 3-step models for portability.

(WARNING: Umbrella use should be discontinued under windy conditions.)

## 1-STEP STANDARD MODEL

Seat 30" above deck.

Platform size is 36" x 38" and is 12" above deck.

I.D. No. 20350

Spec Sheet LG 20.31-1

1-Step Lookout Wheel Kit (optional)

I.D. No. 20377

## 2-STEP MODEL WITH WHEELS

Seat 42" above deck.

Furnished with 19" step.

Platform size 36" x 38" and is 24" above pool deck.

I.D. No. 20360

Spec Sheet LG 20.31-2

## 3-STEP MODEL WITH WHEELS

Seat 54" above deck. Furnished with 19" steps. Platform size is 48" x 48" and 36" above pool deck.

I.D. No. 20365

Spec Sheet LG 20.36

# LIFEGUARD CHAIRS

## ACCESSORIES

### LIFEGUARD CHAIR SEAT

One piece molded fiberglass reinforced, turquoise, plastic seat with stainless steel mounting bolts.
I.D. No. 20701

White Seat
I.D. No. 20701W

### CUSHIONED SEAT UPGRADE/RETROFIT

The Cushioned Seat mounts to our existing swivel support pedestals and is offered as an upgrade for new lifeguard chair orders. The seat can also be retrofitted to existing lifeguard chais with a swivel support pedestal in the field. Made from high impact plastic with cushions covered in marine grade vinyl. Seat folds down to prevent UV damage. Mounting adaptor plate and hardware kit included.

Upgrade for New Lifeguard Chairs
I.D. No. 20703

Retrofit for Existing Lifeguard Chairs
I.D. No. 20705

NEW

### SWIVEL CHAIR SEAT SUPPORT

Stainless steel welded assembly ready for installation. Designed to render proper seating angle when mounted to plastic seat. Has 360° swivel capability with bearing surface of low friction non-metallic disc to prevent seizing or binding due to corrosion. Rugged construction. Hardware is not included.
I.D. No. 20702

Seat Support Harware I.D. No. 93970

## Semi-Permanent Chair

### ROVER SEMI-PERMANENT

Designed for those pools where the lifeguard chair must be anchored, yet still be capable of being readily moved. Chair might be moved to opposite sides of the pool each day. The rear legs are set into sockets anchored in the deck, while the front legs with 7" diameter wheels allow for easy relocation. Ladder has 19" steps. Furnished with two pairs of anchor sockets (for two locations), additional sets must be ordered separately.
I.D. No. 20303
Spec Sheet LG 20.33

## Original Fixed Chair

### STANDARD

Our original, basic guard chair. The seat, backrest, and non-skid footrest are fabricated of laminated wood coated with fiberglass and polyester resin. The frame is constructed of stainless steel tube and ABS steps. Platform height is 4'4" and seat height is 6'0" above the deck. Furnished with 19" steps and holder for rescue tube and umbrella. Optional anchor socket (28102) and escutcheon plates (28301 or 28302) available.
I.D. No. 20601
Spec Sheet LG 20.35

## DIVING TOWERS

Our diving towers offer significant differences to satisfy varying needs, including budgets, preferences, and job conditions. Depending upon model, sizes vary from 1/2 meter to 3 meters in height. Paraflyte towers are available in one meter and three meter models.

Each tower is furnished complete with railings, rear anchor, front anchor, pedestal, and fulcrum. These can be varied to suit specific job requirements or specifications. Models satisfy most pool configurations, however, custom designs are available. Specification sheets, AutoCAD® drawings and Revlt models are available for each model.

Anchors are included and are shipped with each tower. Anchors needed in advance for construction purposes can be ordered by identification numbers.

Standard tower pedestals come in red prime coat, ready for painting to match your facility, or in stainless steel (at extra cost), with flanged base.

Each Paraflyte tower is available in several different grades. The variations among grades apply only to materials. There is no difference in design or detail between grades of the same tower.

# STAIR ENTRY SYSTEMS AVAILABLE FOR PARAGON DIVING TOWERS

NEW

Available both as part of a new diving tower, or as a retrofit to an existing PARAGON 3 meter diving tower.

All stair and guard rails (including both sides of diving board for new towers) to be provided with 1" OD pickets, not greater than 5" on center. All treads and platforms to be made from Duradeck Fiberglass Decking (White). Stair treads shall be 11" standard and risers shall not exceed 9". All new stair entry towers provided with flanged pedestals and Sportflyte grade materials unless otherwise specified.

Many custom architectural elements are also available including plexiglas panels (in place of pickets) and alternate stair plan views where access is limited. Additionally, AutoCAD 2D views and Revit 3D models can be provided for all standard and custom solutions. Call for a consultation.

| **NEW** PARAGON 3-METER DIVE TOWER WITH STAIR ENTRY SYSTEM | | | | | | |
|---|---|---|---|---|---|---|
| Tower Model | Paraflyte | | Duradapt | | Sportflyte | |
| Stair Position | Right | Left | Right | Left | Right | Left |
| I.D. No. | 12193R | 12193L | 12190R | 12190L | 13505R | 13505L |
| Spec Sheet | DT10.31 | | DT10.32 | | DT10.33 | |

| **RETROFIT** STAIR ENTRY SYSTEM TO EXISTING PARAGON SIDE OR REAR LADDER 3-METER DIVE TOWER | | | | | | | |
|---|---|---|---|---|---|---|---|
| Tower Model | Paraflyte | | | Duradapt | | | Sportflyte |
| Existing Ladder | | | Rear | | | Rear | Rear |
| Stair Position | Right | Left | Right* | Right | Left | Right* | Right* |
| I.D. No. | 12196R | 12196L | 12198 | 12196R | 12196L | 12199 | 12198 |
| Spec Sheet | DT10.34 | | DT10.36 | DT10.35 | | DT10.37 | DT10.36 |

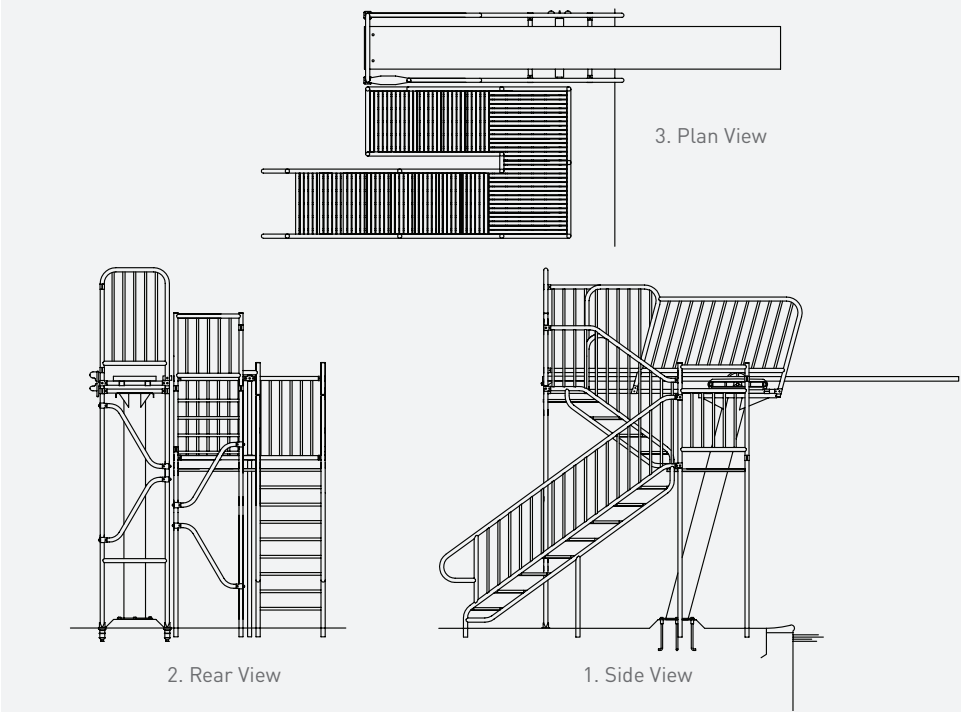
*Standard access is on Right Side (viewed from rear of tower, facing pool). Left side access also available upon request.

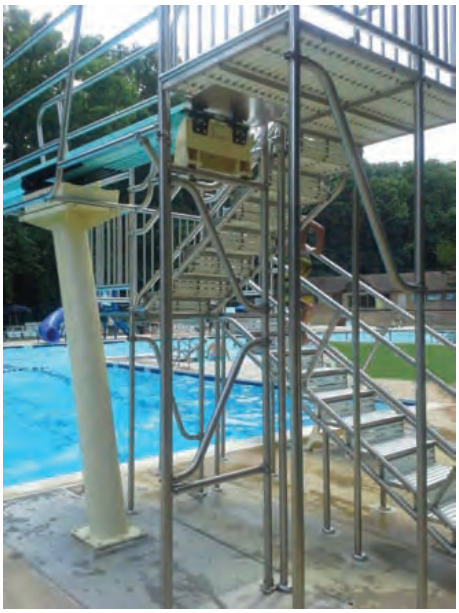
Diving board style and configuration must be specified at time of order.
Please see page 29 for specifications and board selection.

For NEW models, please specify diving board type and length when ordering.

Call or e-mail for consultation:
1-888-534-7946
PoolApplicationsRFQ@pentair.com

Custom retrofit solutions available for other styles.



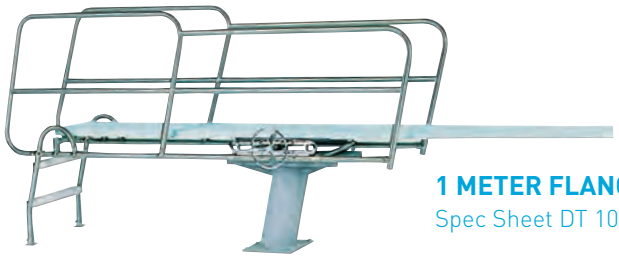



# PARAFLYTE DIVING TOWERS

## PARAFLYTE, LADDER AT REAR

The most common option, designed for competition and larger commercial or institutional pools where ample space is available. May be installed outdoors or indoors. Utilizes 26"steps. Guard rails and hand rails are welded and extend to pool edge.

**3 METER FLANGED PEDESTAL**
Spec Sheet DT 10.05

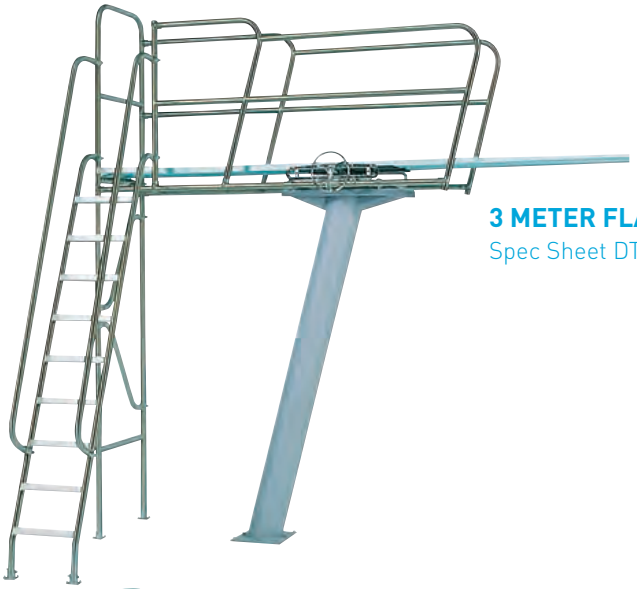


**1 METER FLANGED PEDESTAL**
Spec Sheet DT 10.09

## PARAFLYTE, LADDER AT SIDE

Designed for limited space, particularly natatoriums. Uses three feet less deck space than ladder-at-rear towers. Ladder can be mounted on either side. Utilizes 19" steps. Guard rails and hand rails are welded and extend to pool edge.

The **Anchor Bolt Assembly** is included as a standard component with all diving towers with flanged pedestals. The flanged stub or the cage anchor can be noted in the specifications and/or purchase order and will be an added cost. See page 31 for complete details on anchors and accessories.



**3 METER FLANGED PEDESTAL**
Spec Sheet DT 10.17

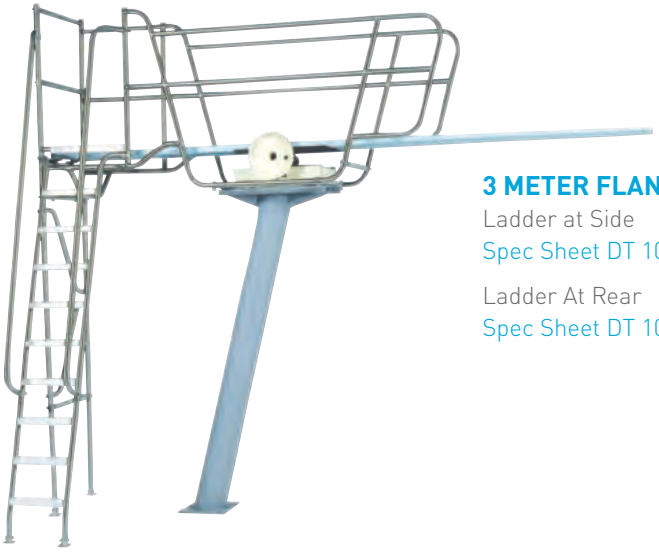
**1 METER FLANGED PEDESTAL**
Spec Sheet DT 10.21

**ANCHOR BOLT ASSEMBLY**
I.D. No. 12307
Spec Sheet DA 10.31

WARNING: Diving equipment shown here should be used only on pools that conform to FINA, NCAA, NFHS and US Diving standards. Please refer to your local, municipal and state statutes, ordinances, rules and regulations which may vary.

## DURADAPT DIVING TOWERS

Made for Durafirm short stand (fulcrum and anchor/hinged assembly). Recommended only for competition pools and only for 16' Duraflex or Maxiflex boards. Ladder at side (as shown) or can be mounted at rear if specified. Utilizes 19" steps. Comes with flanged pedestal only. Guard rails and hand rails are welded and extend to pool edge. Durafirm fulcrum and anchor/hinged assembly are not included and must be ordered separately.



### 3 METER FLANGED PEDESTAL

Ladder at Side
Spec Sheet DT 10.01S

Ladder At Rear
Spec Sheet DT 10.01R

### 1 METER FLANGED PEDESTAL

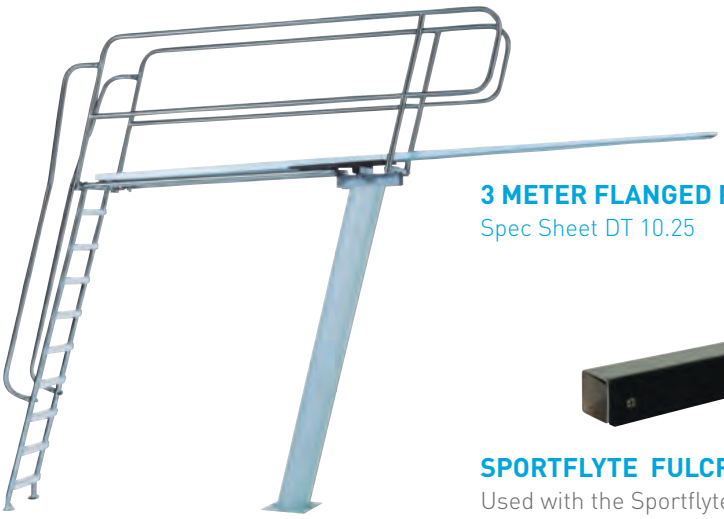
Ladder at Side
Spec Sheet DT 10.03S

Ladder At Rear
Spec Sheet DT 10.03R

## SPORTFLYTE DIVING TOWERS

Not suitable for competition. The Economy model is designed for recreational use. Utilizes 19" steps. Fulcrum may be repositioned. Guard rails and hand rails are welded and extend to pool edge.

All towers provided with flanged pedestals unless otherwise specified.



### 3 METER FLANGED PEDESTAL

Spec Sheet DT 10.25

### SPORTFLYTE FULCRUM

Used with the Sportflyte Diving Tower
I.D. No. 13554

| | BOARD LENGTH | | | |
|---|---|---|---|---|
| Height Above Water | 16' | 14' | 12' | 10' |
| 3m | 13501 | 13502 | N/A | N/A |
| 1m | 13511 | 13512 | N/A | N/A |
| 3/4 m | N/A | N/A | 13517 | N/A |
| 1/2 m | N/A | N/A | N/A | 13507 |

* Specify Century or Paraflex board at time of order. Sportflyte Towers are not intended for use with Duraflex or Maxiflex boards.

### 1 METER FLANGED PEDESTAL

Spec Sheet DT 10.29

WARNING: Diving equipment shown here should be used only on pools that conform to FINA, NCAA, NFHS and US Diving standards. Please refer to your local, municipal and state statutes, ordinances, rules and regulations which may vary.

# DIVING BOARDS

Paraflyte stands are designed to receive either 16' or 14' diving boards. A 16' diving board by 20" wide, with a 24" fulcrum range, is the only board acceptable for official, competitive diving. A 14' board may be used on a recreational diving stand when less spring is desired. All diving boards have an integral non-skid surface.

**DURAFLEX:** Acknowledged as one of the finest aluminum boards, the Duraflex can be found at leading competitive pools. It tapers from tip to fulcrum while maintaining the thicker section from fulcrum to butt end

**MAXIFLEX B:** A double tapered version of the Duraflex. This board tapers from tip to fulcrum maintaining a constant thickness through the fulcrum range, then thinning out toward the butt end. The double tapering offers livelier action. The top surface is perforated to reduce aerodynamic drag during flexing and rebound. Available in 16' length only.

**PARAFLEX:** A high-quality aluminum board for general commercial and institutional use. Uniform thickness throughout entire length.

**CENTURY (EUREKA):** The very best of the wood-fiberglass boards. The core has 26 laminations with complete fiberglass wrap on all sides and edges, with extra layers of fiberglass over the fulcrum area.

### ALUMINUM BOARDS
Spec Sheet DA 20.17

| Board | I.D. No. |
|---|---|
| 16' Duraflex | 26101-1 |
| 14' Duraflex | 26103-1 |
| 16' Maxiflex B | 26107-1 |
| 16' Paraflex | 26201-1 |
| 14' Paraflex | 26202-1 |

### WOOD BOARDS
Spec Sheet DA 20.19

| | |
|---|---|
| 16' Century | 26301-1 |
| 14' Century | 26302-1 |

## Diving Tower Selection

Each diving tower identification number defines a complete tower. It must be selected to reflect the following choices:

CONFIGURATION—Each configuration covers a particular style of tower (ladder at rear, ladder at side, etc.), the height (3 meter or 1 meter) and the type and length of diving board to be used.

GRADE—Paraflyte towers are made in three different grades—Ultraflyte, Superflyte and Topflyte.

Your choices include:
1. **Ultraflyte**—Premier grade. All tube is 1.90"O.D. x .145" wall T304 stainless steel.

2. **Superflyte**—General purpose, middle grade. All tube is T304 stainless steel 1.90" O.D., with wall thicknesses of .145", .109", .065". The wall thickness of each member is dependent upon structural requirements.

3. **Topflyte**—Economy grade. All tube with the exception of the flexural members, are T304 stainless steel 1.90" O.D. x .065" wall. The members requiring additional strength are T304 stainless steel tube 1.90" O.D. x .145" wall.

NOTE: For Paraflyte Towers, the Deluxe Geared Adjustable Fulcrum is provided with all Ultraflyte and Superflyte models. The Economy Geared Adjustable Fulcrum is provided with the Topflyte models.

Diving Board— Although a diving board is not included, the tower is fabricated to accommodate the type and length board to be used. Fabrication and setting dimensions may vary dramatically among boards.

**DIVING TOWER SELECTION BY DIVING BOARD STYLE AND CONFIGURATION**

| Identification Numbers | | | | | | | |
|---|---|---|---|---|---|---|---|
| Grade | 16' Duraflex | 14' Duraflex | 16' Maxiflex | 16' Paraflex | 14' Paraflex | 16' Century | 14' Century |
| 3 METER PARAFLYTE TOWER, LADDER AT REAR, FLANGED PEDESTAL | | | | | | | |
| Ultraflyte | 12009 | 12010 | 12011 | 12012 | 12013 | 12014 | 12015 |
| Superflyte | 12016 | 12017 | 12018 | 12019 | 12020 | 12021 | 12022 |
| Topflyte | 12023 | 12024 | 12025 | 12026 | 12027 | 12028 | 12029 |
| 1 METER PARAFLYTE TOWER, LADDER AT REAR, FLANGED PEDESTAL | | | | | | | |
| Ultraflyte | 12093 | 12094 | 12095 | 12096 | 12097 | 12098 | 12099 |
| Superflyte | 12100 | 12101 | 12102 | 12103 | 12104 | 12105 | 12106 |
| Topflyte | 12107 | 12108 | 12109 | 12110 | 12111 | 12112 | 12113 |
| 3 METER PARAFLYTE TOWER, LADDER AT SIDE, FLANGED PEDESTAL | | | | | | | |
| Ultraflyte | 12051 | 12052 | 12053 | 12054 | 12055 | 12056 | 12057 |
| Superflyte | 12058 | 12059 | 12060 | 12061 | 12062 | 12063 | 12064 |
| Topflyte | 12065 | 12066 | 12067 | 12068 | 12069 | 12070 | 12071 |
| 1 METER PARAFLYTE TOWER, LADDER AT SIDE, FLANGED PEDESTAL | | | | | | | |
| Ultraflyte | 12135 | 12136 | 12137 | 12138 | 12139 | 12140 | 12141 |
| Superflyte | 12142 | 12143 | 12144 | 12145 | 12146 | 12147 | 12148 |
| Topflyte | 12149 | 12150 | 12151 | 12152 | 12153 | 12154 | 12155 |
| 3 METER DURADAPT TOWER | | | | | | | |
| Ultraflyte | 12001 | | 12001 | | | | |
| Superflyte | 12002 | | 12002 | | | | |
| 1 METER DURADAPT TOWER | | | | | | | |
| Ultraflyte | 12003 | | 12003 | | | | |
| Superflyte | 12004 | | 12004 | | | | |

# STURDEE STAND

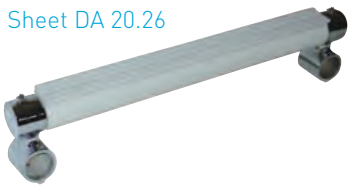
Ideal for replacing existing or obsolete diving towers up to one meter. No pedestal required. For recreational, non-competitive facilities.

Anchors are included and are shipped with each tower. Anchors needed in advance for construction purposes should be ordered by identification numbers.

## HAND ADJUSTABLE FULCRUM FOR THE STURDEE STAND

The hand adjustable fulcrum is provided as an economical alternative for pools where a readily adjustable fulcrum is not required.

White and Chrome
I.D. No. 12518HAF
Spec Sheet DA 20.26



## STURDEE STAND

Sturdee Stand is complete with frames, rear rails with one or two mounting steps, four bronze anchor sockets (28102), two deluxe rear anchors (28201), four deluxe escutcheon plates (28301) and a hand adjustable fulcrum (12518HAF). Side and intermediate guard rails are also included. Steps are 26". Rear swivels are included for Duraflex (18401) and Maxiflex (18402) diving boards.
1-Step Spec Sheet DS 20.50.1
2-Step Spec Sheet DS 20.50.2

| STURDEE STAND SELECTOR CHART | | | | | |
|---|---|---|---|---|---|
| Model | 16' Duraflex | 14' Duraflex | 16' Maxiflex | 16' Paraflex | 14' Paraflex |
| Heavy Duty 1-Step | 14101 | 14102 | 14103 | 14104 | 14105 |
| Heavy Duty 2-Step | 14108 | 14109 | 14110 | 14111 | 14112 |
| Deluxe 1-Step | 14115 | 14116 | 14117 | 14118 | 14119 |
| Deluxe 2-Step | 14122 | 14123 | 14124 | 14125 | 14126 |

| Model | 16' Century | 14' Century | 12' Board | 10' Board |
|---|---|---|---|---|
| Heavy Duty 1-Step | 14106 | 14107 | 14132 | 14142 |
| Heavy Duty 2-Step | 14113 | 14114 | N/A | N/A |
| Deluxe 1-Step | 14120 | 14121 | 14131 | 14141 |
| Deluxe 2-Step | 14127 | 14128 | N/A | N/A |

For assistance with diving tower selection, please contact us or your local Paragon Aquatics distributor.

# RAILS FOR TOWERS

Prior to 1993, industry standards did not require guard rails or hand rails. Since our products last much longer than this, we offer retrofit rails for your convenience. When ordering retrofit rails, please specify tower height (1- or 3-meter) and diving board manufacturer, model, and length.

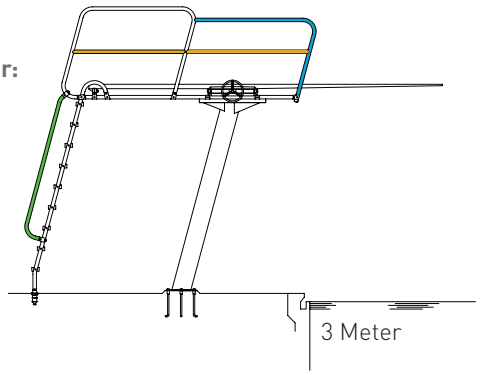
## RETROFIT RAILS FOR TOWERS

### LADDER HAND RAILS (pair):

**For 3-meter Paraflyte towers with ladder at rear:**
Ultraflyte I.D. No. 12401
Superflyte I.D. No. 12402
Topflyte I.D. No. 12403

### FRONT GUARD RAILS (pair):

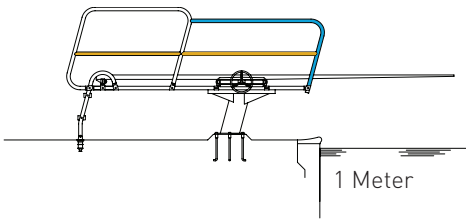
**For 1-meter or 3-meter Paraflyte towers with ladder at rear:**
Ultraflyte I.D. No. 12404
Superflyte I.D. No. 12405
Topflyte I.D. No. 12406




### MIDDLE GUARD RAILS (pair–includes front and back rail):

**For 1-meter or 3-meter Paraflyte towers with ladder at rear:**
Ultraflyte I.D. No. 12407
Superflyte I.D. No. 12408
Topflyte I.D. No. 12409

**For 1-meter or 3-meter Paraflyte towers with ladder at side:**
Ultraflyte I.D. No. 12410
Superflyte I.D. No. 12411
Topflyte I.D. No. 12412




WARNING: Diving equipment shown here should be used only on pools that conform to FINA, NCAA, NFHS and US Diving standards. Please refer to your local, municipal and state statutes, ordinances, rules and regulations which may vary.

# DIVING TOWER AND STAND ACCESSORIES

## GEARED ADJUSTABLE FULCRUM

A readily adjustable fulcrum is required for competitive diving. A geared fulcrum permits divers to select the right amount of spring for his or her weight and for specific dives. Calibrated markings on the gear-holder make it easy for the diver to re-set the fulcrum where desired. Smooth, precise adjustments are easy due to the machined gears and freely turning sleeve on the axle. The adjusting wheel is operable by hand or foot for the full 24" fulcrum range. (Stops are provided to limit the range for recreational use.) Holders keep the rolling gears locked into the gear track and shields all gears from contact by divers and spectators.

The Deluxe model contains chrome-plated bronze and stainless steel components.
26" Deluxe Geared I.D. No. 24101
30" Deluxe Geared I.D. No. 24102
Custom Deluxe Geared I.D. No. 24105

The Economy model contains painted cast aluminum and stainless steel components.
26" Economy I.D. No. 24106
30" Economy I.D. No. 24107
Custom Economy I.D. No. 24110
Spec Sheet DA 20.25

## REAR SWIVELS FOR DIVING STANDS

Permit free movement of the butt end of the diving boards, thereby improving diver performance and increasing board life. Strongly recommended for competition and/or high performance diving boards.
For Duraflex Diving Boards I.D. No. 18401
For Maxiflex Diving Boards I.D. No. 18402
For All Other Diving Boards I.D. No. 18403
Spec Sheet DA 20.21

## PEDESTAL ANCHORS

The Anchor Bolt Assembly is included as a standard component with all Paraflyte towers. The Flanged Stub or the Cage Anchor can be substituted as the anchor for the flanged pedestal and should be noted in the specifications and/or purchase order and will be an added cost.
Spec Sheet DA 10.31

## ANCHOR BOLT ASSEMBLY

Anchor j-bolts are carbon steel 3/4" in diameter and eight are furnished. Each bolt is hooked at the bottom. A threaded bushing is provided at the top. A template is included for accurate setting for alignment with tower pedestal.

I.D. No. 12307
Spec Sheet DA 10.31

## FLANGED STUB

Consists of a 3/4" thick steel plate welded to a 10" diameter pipe, with blind, threaded bushings. Can be used if the tower is supported by a foundation pad on grade or in a framed beam if it is at least 18" deep.

Carbon Steel I.D. No. 12301

Stainless Steel I.D. No. 12303 (available upon request)
Spec Sheet DA 10.31

## CAGE ANCHOR

Must be used as the pedestal anchor when the tower is to be supported on a framed slab. Anchor consists of 3/4" thick steel plates, 3/4" threaded rods and threaded bushings, which can be made to suit a beam or slab of any thickness greater than 6".

Carbon Steel I.D. No. 12304

Stainless Steel I.D. No. 12306 (available upon request)
Spec Sheet DA 10.31

## REAR ANCHOR DELUXE

To anchor rear legs of all diving towers or stands or for any other application where there is an uplift on the leg being held. Two piece, heavy cast bronze construction. The upper flange is chrome-plated. Body has threaded hole at bottom to allow addition of 1/2" diameter bolt if required for additional bond.

I.D. No. 28201
Spec Sheet AA 20.80

APPLIED LOADS: It is the designer's responsibility to provide a supporting structure able to carry the applied loads for a tower supported on a framed beam or slab. The loads to be used for this purpose are:

THREE METER:
Front Anchor: A downward, vertical load of 4,500 lbs., plus a moment of 9,000 ft. lbs.
Rear Anchors: A combined upward, vertical load of 1,500 lbs.

ONE METER:
Front Anchor: A downward, vertical load of 4,200 lbs., plus a moment of 2,000 ft. lbs.
Rear Anchors: A combined upward, vertical load of 1,800 lbs.

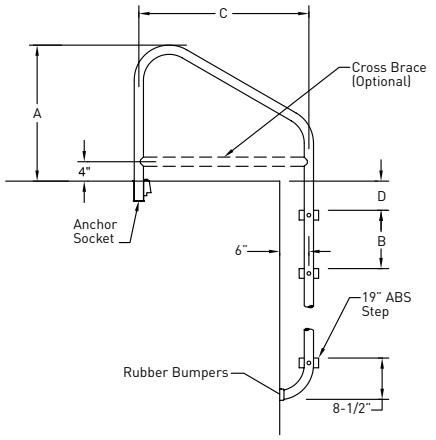
WARNING: Diving equipment shown here should be used only on pools that conform to FINA, NCAA, NFHS and US Diving standards. Please refer to your local, municipal and state statutes, ordinances, rules and regulations which may vary.

# VERTICAL LADDERS

The ladders shown on these pages offer the most convenient method of pool entry wherever stairs cannot be used. Each ladder comes standard with two frames and injection molded ABS-UV inhibited steps bolted between them. They can also be provided with stamped stainless steel steps upon request. All frames are made of corrosion resistant T304 stainless steel, 1.90" O.D. tube and provide ample length for a 4" anchor penetration. The bolts have contoured heads curved to fit the tubing of the frames. All ladder styles with frames resting against the pool wall have rubber bumpers to prevent damage to the wall. All vertical ladders use 19" vertical steps, are similar in appearance and vary only in:

– Wall thickness of tubing (.065", .109" or .145")
– Width of frames from front to back (24", 29", or 35")
– Number of steps (2 to 5)
– Florida and Therapy styles

Anchor sockets and escutcheon plates are not included with ladders and must be ordered separately.




| LADDER REFERENCE DIMENSIONS WITH AND WITHOUT CROSS BRACE | | | | |
|---|---|---|---|---|
| | A | B | C | D |
| Heavy Duty | 28" | 12" | 24", 29", 35" | 6" |
| Deluxe | 28" | 12" | 24", 29" | 6" |
| Florida | 32" | 12" | 36" | 4" |

**HEAVY DUTY** (.109" or .145" wall thickness). For commercial and institutional use. Made only in thicker grades of stainless steel to withstand heavier usage.
Spec Sheet LD 30.01

**HEAVY DUTY WITH CROSS BRACE** Recommended for heavy duty commercial use at public and institutional pools. Reinforced with cross braces for extra rigidity and strength.
Spec Sheet LD 30.03

**FLORIDA STYLE** Offered in 3 grades (.065", .109", or .145" wall thickness). Extends extra high over deck to clear the 6" curb required on all Florida pools.
Spec Sheet LD 30.02

**FLORIDA STYLE** with Cross Brace Same as Florida Style but with cross braces for extra rigidity.
Spec Sheet LD 30.04

**DELUXE** (.065" wall thickness). Recommended for residential pools and light commercial use. Ladder frames go slightly deeper into water and extend slightly higher above deck compared to normal residential ladders. Recommended only for concrete or vinyl-lined pools.
Spec Sheet LD 30.01


Cross-brace (optional)

| | HEAVY DUTY LADDERS | | | | | | DELUXE LADDERS | |
|---|---|---|---|---|---|---|---|---|
| | 24" Width | | 29" Width | | 35" Width | | 24" W | 29" W |
| | .145" | .109" | .145" | .109" | .145" | .109" | .065" | .065" |
| 2 Step | 42201 | 42213 | 42205 | 42217 | 42209 | 42221 | 42301 | 42305 |
| 3 Step | 42202 | 42214 | 42206 | 42218 | 42210 | 42222 | 42302 | 42306 |
| 4 Step | 42203 | 42215 | 42207 | 42219 | 42211 | 42223 | 42303 | 42307 |
| 5 Step | 42204 | 42216 | 42208 | 42220 | 42212 | 42224 | 42304 | 42308 |

| CROSS BRACED LADDERS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 24" Width | | | 29" Width | | | 35" Width | | |
| | .145" | .109" | .065" | .145" | .109" | .065" | .145" | .109" | .065" |
| 2 Step | 42101 | 42113 | 42125 | 42105 | 42117 | 42129 | 42109 | 42121 | 42133 |
| 3 Step | 42102 | 42114 | 42126 | 42106 | 42118 | 42130 | 42110 | 42122 | 42134 |
| 4 Step | 42103 | 42115 | 42127 | 42107 | 42119 | 42131 | 42111 | 42123 | 42135 |
| 5 Step | 42104 | 42116 | 42128 | 42108 | 42120 | 42132 | 42112 | 42124 | 42136 |

| | FLORIDA STYLE LADDERS | | | FLORIDA STYLE WITH CROSS BRACE | | |
|---|---|---|---|---|---|---|
| | 36" Width | | | 36" Width | | |
| | .145" | .109" | .065" | .145 | .109" | .065" |
| 2 step | 42519 | 42515 | 42511 | 42159 | 42155 | 42151 |
| 3 Step | 42520 | 42516 | 42512 | 42160 | 42156 | 42152 |
| 4 Step | 42521 | 42517 | 42513 | 42161 | 42157 | 42153 |
| 5 Step | 42522 | 42518 | 42514 | 42162 | 42158 | 42154 |

**THERAPEUTIC LADDER** (shown with Safety Wedge)
Designed for hospital and/or handicapped treatment pools. Sloping design, handrails and steps spaced 10" apart permit easy entry by the elderly or infirm. If dimension from deck to pool floor is:

18" to 27" use 2-step
28" to 37" use 3-step
38" to 47" use 4-step
48" to 57" use 5-step

| | | | |
|---|---|---|---|
| 2 step | 42701 | 42705 | 42709 |
| 3 step | 42702 | 42706 | 42710 |
| 4 step | 42703 | 42707 | 42711 |
| 5 step | 42704 | 42708 | 42712 |

Spec Sheet TA 30.21


Uses 19" sloping steps

**SAFETY WEDGE** The protective wedge prevents swimmers from lodging between pool wall and ladder. To ensure maximum effectiveness each wedge is custom fit to each facility. Made from white polypropylene with stainless steel mounting brackets for easy installation or retrofit.
I.D. No. 42725 (must be ordered separately)

# LADDER SOLUTIONS

## SLOPING AND VERTICAL STEPS

(include hardware)
Shipped in individual bags containing installation instructions and maintenance information. These are molded from UV inhibited ABS.
19" Vertical Step I.D. No. 44101
19" Sloping Step I.D. No. 44104
26" Vertical Step I.D. No. 44107
26" Sloping Step I.D. No. 44109

Sloping Vertical

## STAINLESS STEEL STEP

19" Vertical Step (includes hardware)
(4" Deep x 1.9" O.D. tubing)
I.D. No. 44102

# Coping and Waterfront Ladders

Uses 19" vertical steps

## COPING LADDER

For vertical wall pools where anchorage to pool structure is desired rather than to deck.
Spec Sheet LD 30.07

Uses 19" vertical steps

## PIER LADDER

For installation on fixed concrete piers where bottom support for ladder is not possible. Installed in anchor sockets cast into deck.
Spec Sheet LD 30.11

| 1.90" x .065" WALL THICKNESS | | | | |
|---|---|---|---|---|
| | Coping | Pier | Raft | Dock |
| 2 step | 42501 | N/A | N/A | N/A |
| 3 Step | 42502 | 42601 | 42604 | 42607 |
| 4 Step | 42503 | 42602 | 42605 | 42608 |
| 5 Step | N/A | 42603 | 42606 | 42609 |

Uses 19" vertical steps

## DOCK LADDER

For installation on fixed wooden docks where bottom support for ladder is not possible. Fastened to decking with lag screws (included).
Spec Sheet LD 30.13

Uses 19" sloping steps

## RAFT LADDER

For installation on floating wooden rafts. Fastened with lag screws (included).
Spec Sheet LD 30.12

# RAIL SOLUTIONS

Choose from various styles of grab, deck and stair-mounted rails to fit your needs. The heavier the traffic, the heavier the tubing you should select. Custom designs are also available. Order separately: four anchor sockets and escutcheon plates for each pair of grab rails.

Rails are available in 1.90" x .065, 1.90" x .109, 1.90" x .145 O.D., T304/T304L or T316L stainless steel tubing, polished and buffed to a 320 grit finish. Manufactured custom rails are available in 1.50" x .120 O.D. Rectangular and square tubing can be provided upon request. Passivation is in compliance with ASTM 967-99.

Standard finish is T304/T304L stainless steel polished and buffed to a 320 grit finish. Other materials and finishes including T316 stainless steel and custom powder-coating is available by custom quotation.

If rails are not being installed directly into the concrete, anchor sockets are available to accommodate 1.90" and 1.50" rails. New 1.50" O.D. x 6" deep stainless steel anchors and escutcheons can be provided where specified.

# GRAB RAILS

Grab rails come in pairs. They are used to keep racing lanes free of obstructions when used in conjunction with built-in steps.

## STAINLESS STEEL RECESSED STEP

(15"W x 5"H x 5"D) sets flush in wall. Built-in step is grouted into a rough hole and has a sloped tread to promote drainage. Polished, corrosion-resistant, non-skid sand blasted bottom tread for added traction. Recommended for use in all climates.

I.D. No. 32104
Spec Sheet AA 20.73

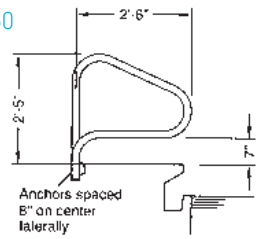
## FROST PROOF RECESSED STEP

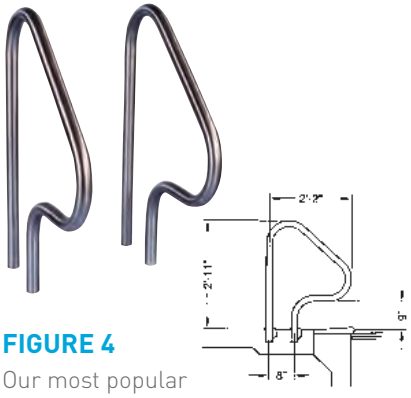
(15-1/2"W x 5"H x 5-1/2"D) is heavy duty, foamed plastic without projecting lip. Textured bottom tread for added traction. Built-in step is grouted into a rough hole. Specifically recommended for use in freezing climates. White.

I.D. No. 32102
Spec Sheet AA 20.72

## LONG REACH PRETZEL

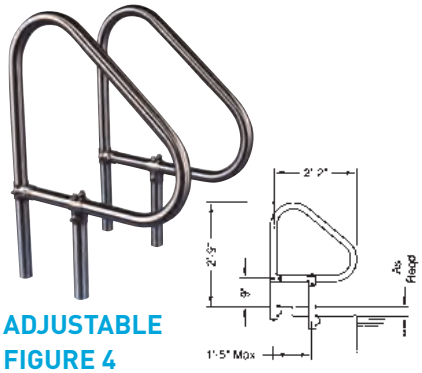
Similar to standard pretzel but recommended for installations with wide gutters. Legs are offset laterally to accommodate joints or obstructions in the pool deck.
.145" wall I.D. No. 30211
.109" wall I.D. No. 30212
.065" wall I.D. No. 30213
Spec Sheet GR 20.50



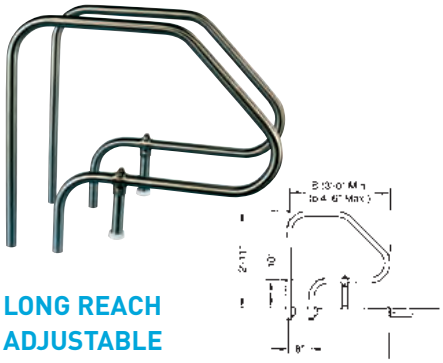

## FIGURE 4

Our most popular model. For flat deck without unusual curbs or coping.
.145" wall I.D. No. 30101
.109" wall I.D. No. 30102
.065" wall I.D. No. 30103
Spec Sheet GR 20.41



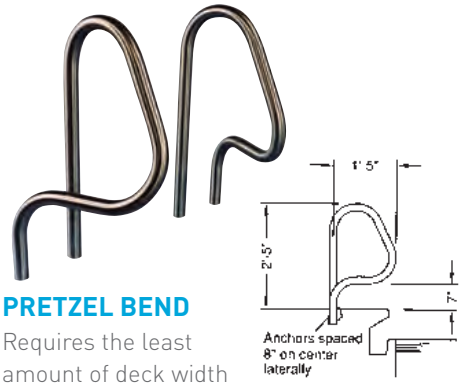

## ADJUSTABLE FIGURE 4

Front leg is adjustable in field so it can be set atop curbs or into gutters. Choose this model when unusual conditions will not permit use of Figure 4 style.
.145" wall I.D. No. 30301
.109" wall I.D. No. 30302
.065" wall I.D. No. 30303
Spec Sheet GR 20.45



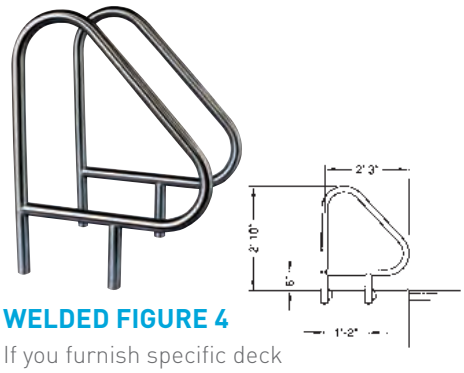

## LONG REACH ADJUSTABLE

Available in sizes to fit extra-wide gutter systems in the increasingly popular "fast- pool" design concept. Specify "B" dimension. Custom fabricated to pool profile.
.145" wall I.D. No. 30320
.109" wall I.D. No. 30321
.065" wall I.D. No. 30322
Spec Sheet GR 20.49



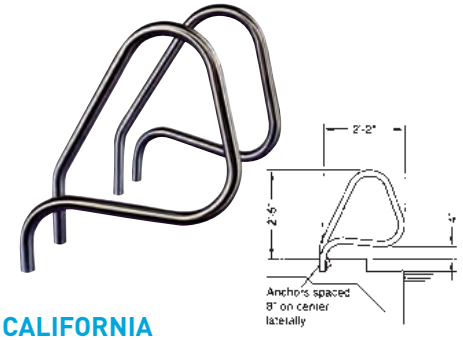

## PRETZEL BEND

Requires the least amount of deck width with the narrowest profile as the legs are offset laterally instead of front to back. Can usually be mounted on pool wall rather than the deck slab.
.145" wall I.D. No. 30201
.109" wall I.D. No. 30202
.065" wall I.D. No. 30203
Spec Sheet GR 20.43




## WELDED FIGURE 4

If you furnish specific deck and gutter dimensions we can supply our Adjustable Grab Rail styling as a fixed, fully-welded unit.
.145" wall I.D. No. 30511
.109" wall I.D. No. 30512
.065" wall I.D. No. 30513
Spec Sheet GR 20.46




## CALIFORNIA

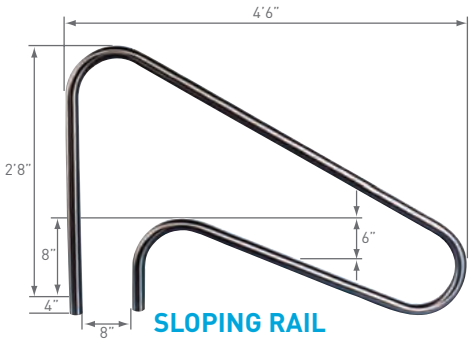
Made extra-wide to clear wide gutters or when deck-to-water distance is exceptionally great. Legs offset laterally to minimize deck width requirements. Front end dips downward for a shorter reach for low water level pools.
.145" wall I.D. No. 30401
.109" wall I.D. No. 30402
.065" wall I.D. No. 30403
Spec Sheet GR 20.47

## DECK MOUNTED RAILS

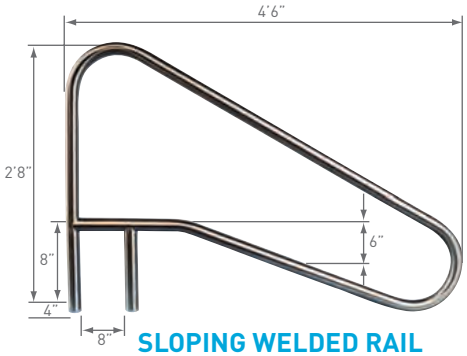
Deck Mounted Rails are intended for use with vinyl or fiberglass pools having premolded steps. Anchorage of the rails to the deck is 8" on center and provides the stability needed without penetrating the molded steps.

A variety of models are available to meet any pool or spa configuration.
1.90" O.D. x .065" wall thickness.
1.50" O.D. available upon request.

Heavier gauges available upon request.
All rails are 54" long and 32"high.

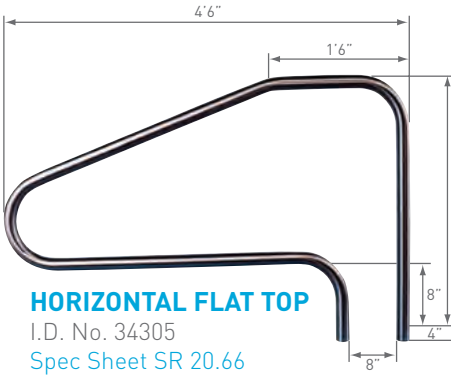



**SLOPING RAIL**
I.D. No. 34301
Spec Sheet SR 20.63




**SLOPING WELDED RAIL**
I.D. No. 34307
Spec Sheet SR 20.64

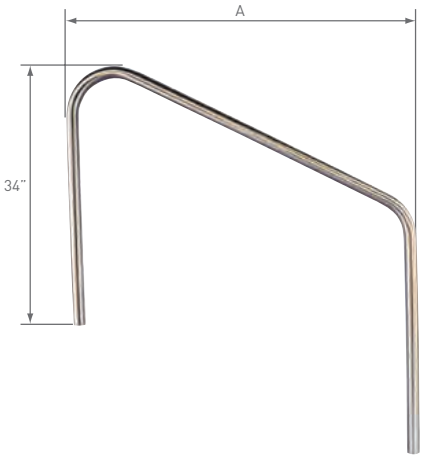

**HORIZONTAL RAIL**
I.D. No. 34303
Spec Sheet SR 20.65

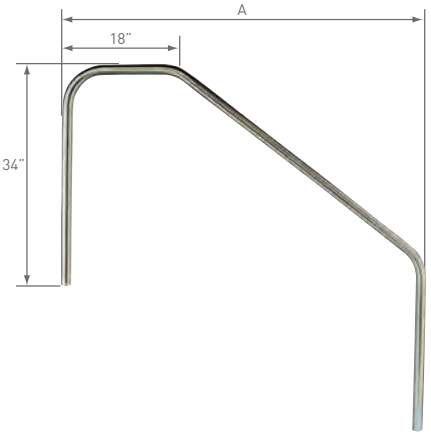



**HORIZONTAL FLAT TOP**
I.D. No. 34305
Spec Sheet SR 20.66

## STAIR MOUNTED RAILS

Stair Rails should be used on all pool entry steps as a necessary safety feature to allow safe entry and exit from the pool.




| | 48" wide | 60" wide | 72" wide |
|---|---|---|---|
| **1.90" O.D. x .065" wall thickness** | | | |
| 2 bend | 34101 | 34102 | 34103 |
| **1.90" O.D. x .109" wall thickness.** | | | |
| 2 bend | 34104 | 34105 | 34106 |
| **1.90" O.D. x .145" wall thickness** | | | |
| 2 bend | 34107 | 34108 | 34109 |
| Spec Sheet SR 20.61 | | | |

| | 48" wide | 60" wide | 72" wide |
|---|---|---|---|
| **1.90" O.D. x .065" wall thickness** | | | |
| 3 bend | 34201 | 34202 | 34203 |
| **1.90" O.D. x .109" wall thickness** | | | |
| 3 bend | 34204 | 34205 | 34206 |
| **1.90" O.D. x .145" wall thickness** | | | |
| 3 bend | 34207 | 34208 | 34209 |
| Spec Sheet SR 20.62 | | | |

# EXERCISE AND THERAPEUTIC RAILS

For exercise or therapy, we offer wall mounted and free standing solutions.

## TRANSFER RAILS

Stainless Steel Transfer Rails are available in 4 lengths...

NEW

All Transfer Rails come with Flanges and Hardware

10" Transfer Rail I.D. No 34519
12" Transfer Rail I.D. No 34520
14" Transfer Rail I.D. No 34522
16" Transfer Rail I.D. No 34524
Spec Sheet TA 20.66

## EXERCISE RAILS

May be used as wall rails for additional stability for persons entering pools, showers, locker rooms, hallways and ramps. They may also help in aiding the therapist or client by providing wall-mounted support for warming and stretching exercises, as well as wall-mounted in the pool for hydrotherapy sessions. Mounted with lag bolt and shield to maintain a 1-1/2" clear opening between rail and wall. 1.90" O.D. x .065" wall thickness. Heavier gauges and O.D.'s available upon request.
Spec Sheet TA 20.80

Plain End

Return End

| Length (ft) | Plain Ends | | Return Ends | |
|---|---|---|---|---|
| | 2 Brackets | 3 Brackets | 2 Brackets | 3 Brackets |
| 5 | 34401 | | | |
| 6 | 34402 | | 34411 | |
| 7 | 34403 | | 34412 | |
| 8 | | | 34413 | |
| 9 | | 34404 | | |
| 10 | | | | 34414 |
| 11 | | 34405 | | |
| 12 | | | | 34415 |
| 13 | | 34406 | | |
| 14 | | | | 34416 |

## LIGHTWEIGHT STAINLESS STEEL THERAPY PARALLEL BARS

Straddle bars are adjustable from a 28" to a full height of 40". Hand grips are comfortable to use. The supporting base is a solid one-piece welded construction which includes rubber pads to help stabilize the unit on a variety of floor surfaces so that it can be used in the therapy room, as well as in the pool. Custom lengths can be ordered.

6' Length I.D. No 34510
8' Length I.D. No. 34515
Spec Sheet TA 20.66

## ADJUSTABLE HEIGHT TEACHING PLATFORM

Instructional platform constructed of T304 stainless steel with non-skid, cross-grooved sand textured deck. Multi-level permanent hand rails on three sides create a controlled teaching environment. Legs adjust to 5 different height positions. Platform places swimmer 18"-26" above pool floor. 60"x39" platform with slip resistant deck.

I.D. No. 34700
Spec Sheet SR TP 10.01

NEW

## CUSTOM-MADE RAILINGS

We will fabricate railings to your specifications whenever custom fabricated, corrosion-resistant, stainless steel railings are required. Can be used for any pool application including entry, ADA compliant, stairs, deck guards and diving towers. Design and engineering support are readily available.

Our railings are manufactured and verified to meet your project's unique specifications. All rails are factory welded and are shipped ready for installation requiring no field cutting, drilling or modifications.

ORLANDO, FLORIDA

We manufacture most rail goods in 1.90" O.D. stainless steel tubing, and have extensive experience manufacturing custom rails in 1.50" O.D. as well. If rails are not being installed directly into the concrete, anchor sockets are available to accommodate 1.90" and 1.50" rails.

PHOENIX, ARIZONA

# ANCHORS

## DELUXE STAINLESS STEEL ESCUTCHEON

With set screw to cover anchor sockets. Fit 1.90" O.D. tubing. The deluxe unit is heavy duty stainless steel casting with set screw.

1.90" SS
I.D. No. 28301SS
Spec Sheet AA 20.90SS

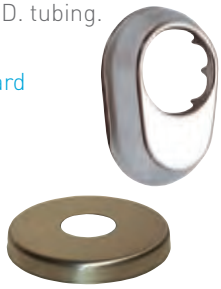
1.50" SS
I.D. No. 28303SS
Spec Sheet AA 20.93

## DELUXE BRONZE ESCUTCHEON

Covers anchor sockets. Fit 1.90" O.D. tubing. The deluxe unit is a chrome-plated bronze casting with set screw.
Escutcheon Plate, Deluxe

1.90" CPB
I.D. No. 2830
Spec Sheet AA 20.90

## STANDARD ESCUTCHEON



Made from a stainless steel stamping to fit 1.90" O.D. tubing.

Escutcheon Plate – Stainless Steel, Standard
I.D. No. 28302
Spec Sheet AA 20.91

1.50" x 4-1/2" round
I.D. No. 28303
Spec Sheet AA 20.92

## STAINLESS STEEL 1.50" WEDGE ANCHOR

For anchoring 1.50" O.D. deck equipment where specified. Heavy duty cast T316 stainless steel, 6" deep with bronze wedge and stainless hardware.

I.D. No. 28105SS
Spec Sheet AA20.82A

## ANCHOR SOCKET, BRONZE

For anchoring all 1.90"/1.50" O.D. deck equipment (except rear legs of diving towers and stands, starting platforms, and stanchions). Cast bronze with locking bronze wedge and stainless steel bolt.

1.90" O.D. x 4" Deep
I.D. No. 28102
Spec Sheet AA 20.81

1.50" O.D. x 4" Deep
I.D. No. 28105
Spec Sheet AA 20.82

## ANCHOR SOCKET COVER

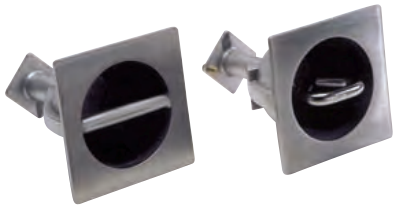
Sold Separately
I.D. No. 28104

## STAINLESS STEEL COMMERCIAL CUP ANCHORS

Anchored into pool wall for use with racing lanes and life lines. New cast stainless steel cup anchor with integral bar or triangular eye bolt for attaching multiple lanes.

## CUP ANCHOR WITH INTEGRAL ANCHOR BAR

I.D. No. 70316SS
Spec Sheet AA 20.70



## CUP ANCHOR WITH TRIANGULAR EYE BOLT

Eye Bolt is removable and replaceable
I.D. No. 70316SE

## TRIANGULAR EYE BOLT

I.D. No. 70321
Spec Sheet AA 20.71

## HEAVY DUTY EYE BOLT

I.D. No. 70317

## THREADED WALL INSERT FOR HEAVY DUTY EYE BOLT

I.D. No. 70318
Spec Sheet AA 20.83

## STANDARD EYE BOLT

I.D. No. 70319

## THREADED WALL INSERT FOR STANDARD EYE BOLT

I.D. No. 70320
Spec Sheet AA 20.84

# UNDERWATER LIGHTS

This superb collection of underwater lights includes the ultra-thin, 500W Slimlite and the new Slimlite 5G LED light which uses less energy. All lights are bronze and copper construction with chrome-plated reflector shells and grille has protective cast bronze powder coating. The 110-volt lights come with a protective grille. Each light is rigidly inspected and submersion tested for water tightness and performance. All lights come with halogen bulbs.

All lights are UL listed, when used with our niches. Lights and niches are designed for use in fresh water only. Niches have a 3/4" or a 1" threaded connection for installation in concrete or vinyl pools, and should be ordered separately.

## SLIMLITE 5G/500 WATT EQUIVALENT

Energy efficient Slimlite 5G LED light utililizes up to 86% less energy than comparable incandescent lights. This is a direct replacement for existing standard 500W Slimlite. The light has superior lens geometry and innovative reflector design combined to create a wider beam and more uniform light distribution.

30' cord I.D. No. 56400
50' cord I.D. No. 56401
100' cord I.D. No. 56402
150' cord I.D. No. 56403
200' cord I.D. No. 56404
Spec Sheet SS-UL 80.50

NEW

| NICHES FOR 500 WATT SLIMLIGHT | | |
|---|---|---|
| Model | Concrete | |
| | 3/4" | 1" |
| 500w | 56503 | 56504 |

## SLIMLITE/110V-500 WATT

10" diameter and only 3-1/2" deep, designed for fresh water, concrete pools. Installs in any wall without haunching the concrete, simplifying installation and construction. Dual bulb is wired parallel: one bulb stays lit even if the other burns out. Uses (2) 250-watt, double tube tungsten halogen bulbs with an average life rating of 2000 hours and 5000 initial lumens. All lights are UL listed. Various cord lengths available.

13' cord I.D. No. 56301
26' cord I.D. No. 56302 (standard)
50' cord I.D. No. 56303-50
75' cord I.D. No. 56303-75
Custom Cord Length I.D. No. 56303

### LIGHTS

Spec Sheet UL 80.20

### NICHES

Spec Sheet UL 80.50

### REPLACEMENT BULB

I.D. No. 56811

# UNDERWATER SPEAKERS

Sealed speaker for an underwater communication system between coach and swimmers, for providing background music for synchronized swimming and for scuba instruction. One speaker required for each 900 sq. ft. of pool surface area in deep water and one per 1200 sq. ft. in shallow area. Speakers are installed flush in niches within the pool wall and are covered by a protective grille. UL listed and recommended for use with Paragon niche.

## UW30 UNDERWATER LOUD SPEAKER

A single 30-watt speaker adequately covers a 30' x 30' pool. Encased in blue high-impact ABS cover and sealed for underwater use to a depth of up to 10 feet. (Niche and grill sold separately).

50' cord I.D. No. 68101-1
Spec Sheet US 20.30

## NICHE FOR UW30 SPEAKER

Heavy-duty, cast bronze construction with 3/4" IPS threaded connection. Includes mounting hardware. Recommended mounting location is up to 4 feet below surface of the water and flush with the pool wall.

I.D. No. 68102

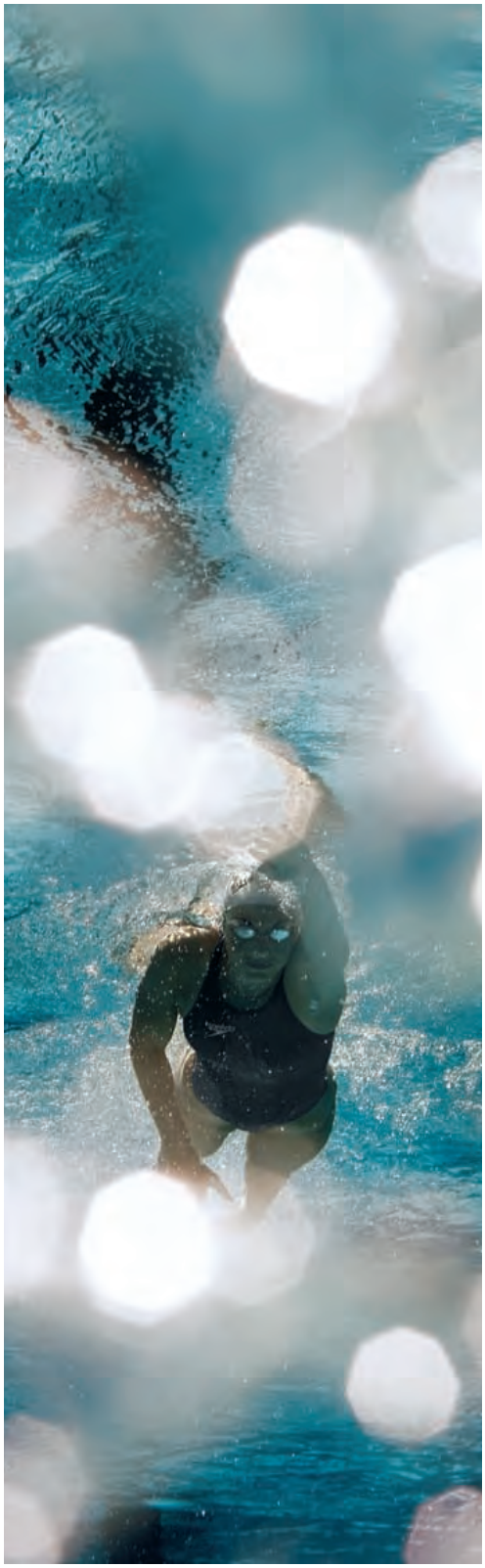
## STAINLESS STEEL GRILLE

Mounts flush with pool wall.

I.D. No. 68103SS
Spec Sheet US 80.07

# UNDERWATER WINDOWS

Commonly used as an aid to swimming and diving instruction enabling coach to observe swimmers and divers in action. Permits photography and televising of all aquatic activities. Can be installed in any concrete pool – poured or gunite – and with any finish – plain, plastered or tiled. The windows are set flush in the wall with no projections into the pool. All windows are shipped factory sealed and pressure tested for water tightness.



## RECTANGULAR UNDERWATER OBSERVATION WINDOW

Glazing can be either a glass laminate consisting of three plies of 3/8" thick tempered glass in accordance with ANSI specification Z-97.1, ASTM C-1036-85 and C-1048-85, and 16 CFR 1201 Category II, with interfaces of polyvinyl Butyral .060" thick or a single thickness of 1-1/4" plexiglass. Frame is constructed entirely of stainless steel.

Note: If a window must be submerged at greater depths than listed, or a special size is needed, please contact our Engineering Department for recommendations.

| PLEXIGLASS GLAZING | | |
|---|---|---|
| Window Size (Clear Opening) | Max Depth of Water to Center of Window | I.D. No. |
| 24" x 24" | 16' - 6" | 66201SS |
| 24" x 36" | 9' - 3" | 66202SS |
| 24" x 48" | 6' - 6" | 66203SS |
| 24" x 60" | 6' - 0" | 66204SS |
| 36" x 36" | 4' - 9" | 66205SS |
| 36" x 48" | 3' - 0" | 66206SS |

Spec Sheet UW 80.02

| LAMINATED TEMPERED GLASS GLAZING | | |
|---|---|---|
| Window Size (Clear Opening) | Max Depth of Water to Center of Window | I.D. No. |
| 24" x 24" | 14' - 6" | 66101SS |
| 24" x 36" | 8' - 6" | 66102SS |
| 24" x 48" | 7' - 0" | 66103SS |
| 24" x 60" | 6' - 3" | 66104SS |
| 36" x 36" | 6' - 6" | 66105SS |
| 36" x 48" | 4' - 3" | 66106SS |
| 36" x 60" | 3' - 6" | 66107SS |

Spec Sheet UW 80.01

## ROUND UNDERWATER OBSERVATION WINDOW

Recommended where multiple viewing areas are required in swimming pools and thermostor-age water tanks. Window has an 18" diameter viewing area and construction is of cast bronze. Entire frame is finished in chrome-colored powder coating. Glazing is either a glass laminate consisting of two plies of 3/8" thick tempered glass in accordance with ANSI Spec Z-97.1 with interfaces of polyvinyl Butyral .060" thick or a single thickness of 3/4" plexiglass.

| 18" DIAMETER ROUND WINDOWS (clear viewing area) | | |
|---|---|---|
| Glazing Material | Max Depth of Water to Center of Window | I.D. No. |
| Laminated Glass | 14'-6" | 66302<br>Spec Sheet UW 80.03 |
| Plexiglass | 8'-9" | 66301<br>Spec Sheet UW 80.04 |

# WATER POLO GOALS

Designed to meet the official rulings of FINA, NCAA, NFHS, and USA Water Polo.

Goal cages can be adjusted vertically to have the top of the cage at regulation height. Supporting legs fold flat against the cage for compact storage on the deck. The facia is a white, channel section made of glass reinforced polyester resin. Heavy duty frame is constructed of stainless steel tube. Goals are furnished as a pair, but backings/nets and anchors must be ordered separately. Each pair of cages requires four stanchion sockets and one pair of backings/nets.



**WATER POLO GOALS** (pair)
Goal posts and crossbar are rigidly constructed and come with 3" white fiberglass facia facing the field of play. The inner sides of the goal posts are 118" apart.
I.D. No. 36104
Spec Sheet WPG 20.71

**NYLON BLACK TARRED NET** (pair)
Water polo nets are constructed of 100% nylon netting with a 1-1/2" square mesh. The nets are treated for weather and water resistance.
I.D. No. 36201
Spec Sheet WPG 20.71.1

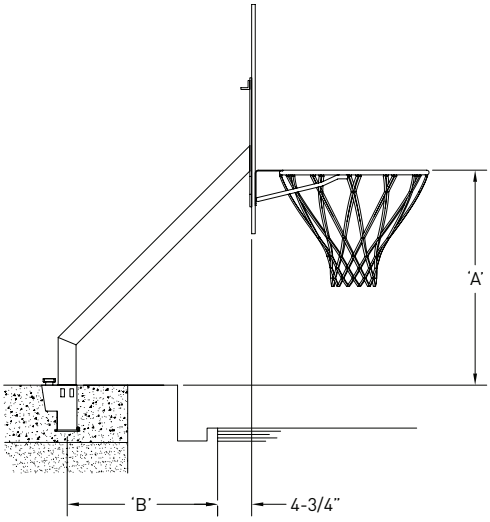
**SOLID BLUE BACKINGS** (pair)
Backings are constructed of #80 navy blue vinyl. The outside perimeter of the product is sewn with a binding of the same material and has grommets on 10" centers on all outside edges.
I.D. No. 36202

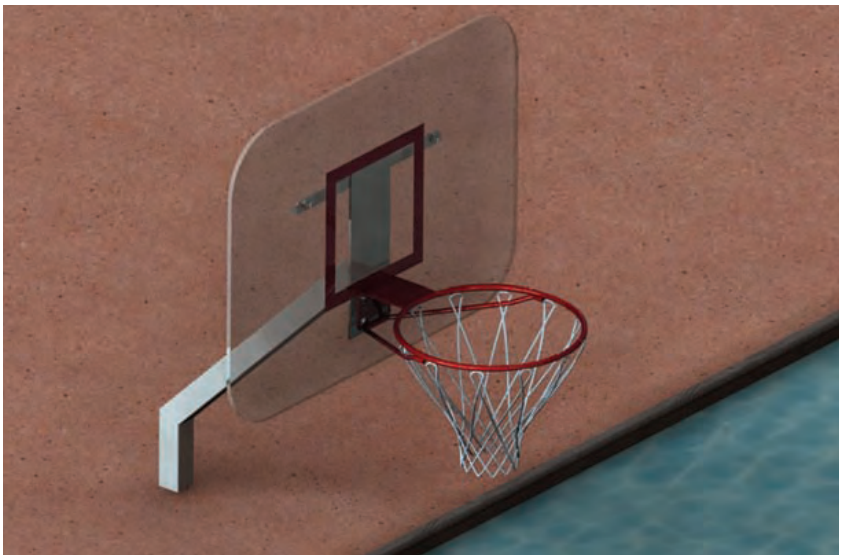
# BASKETBALL HOOPS

Our basketball hoops have a regulation-size, stainless steel frame designed to fit into Paragon's Competitor or Quickset anchors. The unit can be installed using new Dual-Wedge Anchors, included with the purchase of the hoop, or it can be ordered less anchors to be used in existing starting platform anchors. Easily removed from anchors without tools for storage or location change.

The backboard is constructed of 1/2" thick clear acrylic which helps eliminate blind spots in the pool. The hardware attaching the spring loaded, powder-coated rim and backboard to the frame is made from T304 stainless steel. Comes in 6 standard sizes or have it custom built to fit your pool configuration.

Order one of our 12 standard sizes or if you require a special configuration, provide the 'A' and 'B' dimensions to have one custom-built to fit your existing anchors and pool profile.



## QUICKSET® BASKETBALL HOOP

Stainless steel frame that fits into old and new style Quickset® anchors. Net is included. Order with or without anchors.

I.D. No. 27001-27006
(see chart below)
Spec Sheet WBH 20.71

## COMPETITOR BASKETBALL HOOP

Stainless steel frame that fits into old and new style 6" and 10" competitor anchors. Net is included. Order with or without anchors.

I.D. No. 27007-27012
(see chart below)
Spec Sheet WBH 20.72

| QUICKSET STYLE | | | COMPETITOR STYLE | | |
|---|---|---|---|---|---|
| 'A' | 'B' | I.D. No. | 'A' | 'B' | I.D. No. |
| 30" | 21" | 27001 | 30" | 18" | 27007 |
| 36" | 21" | 27002 | 36" | 18" | 27008 |
| 42" | 26" | 27003 | 42" | 24" | 27009 |
| 48" | 26" | 27004 | 48" | 24" | 27010 |
| 54" | 34-1/2" | 27005 | 54" | 36" | 27011 |
| 60" | 34-1/2" | 27006 | 60" | 36" | 27012 |
| ** | ** | 27014 | ** | ** | 27015 |

# POOL ACCESSORIES

## HOSE REEL

The ideal solution for storing unsightly and cumbersome pool vacuum hose. Unique solid stainless steel construction ensures years of trouble-free use with minimal maintenance. Reels hold up to 100 feet of 2" diameter hose. Units are portable and designed to fit through a standard door. Vacuum hose stores conveniently.

I.D. No. 75151

Spec Sheet PA 40.03

## LANE STORAGE REEL

Lightweight yet rugged stainless steel construction with zinc plated individual, double lock casters. Holds up to 650 feet of 4" lane lines and requires little maintenance. Ideal for commercial and institutional pools.

Standard Model holds up to 540 feet (164M) of 4" diameter lanes or 300 feet (91M) of 6" diameter lanes

I.D. No. 75101

Standard Model with stainless steel casters

I.D. No. 75101SS

Spec Sheet PA 40.01

Large Capacity Model holds up to 720 feet (220M) of 4" diameter lanes or 400 feet (122M) of 6" diameter lanes

I.D. No. 75111

Large Capacity Model with stainless steel casters

I.D. No. 75111SS

Spec Sheet PA 40.02

Replacement stainless steel casters

I.D. No. 75103SS

Replacement zinc plated casters

I.D. No. 75103

## LANE STORAGE REEL COVER

Heavy-duty construction in blue 16 oz. textured vinyl. All seams are double stitched with white polyester thread.

Standard Lane Reel Cover 48" x 67"

I.D. No. 75133

Spec Sheet PA 40.04

**LARGE LANE REEL COVER 53" X 73"**

I.D. No. 75133XL

Spec Sheet PA 40.04L


## COMPETITOR® ANTI-TURBULENT RACING LANES

Lanes are required for competitive swimming to separate racing lanes and to dampen turbulence. Continuous 4" diameter flow-through design discs of alternating colors are strung on a vinyl-covered stainless cable. Complete with end hooks and tensioning devices. Standard colors are red, yellow, blue, green, orange, purple, white, maroon, and black.

| Lane Length | I.D. No. |
|---|---|
| 60 feet | 76101-1 |
| 25 yard | 76102-1 |
| 25 meter | 76103-1 |
| 50 meter | 76104-1 |
| 25 meter (w/disconnect)* | 76105-1 |
| 50 meter (w/disconnect)** | 76106-1 |

Spec Sheet AA 20.75

| | |
|---|---|
| Storage Reel | 76107-1 |
| Take-up Reel | 76118-1 |
| Ratchet Wrench | 76119-1 |

Spec Sheet AA 20.75

* 7' disconnect yields 25 yard lane.
** Yields 2 equal 25 meter or 25 yard lanes.

# POOL ACCESSORIES

Backstroke Line

Finish Line

## PENNANT LINES

Triangular pennants of alternating colors spaced according to regulations. Pennants and line are of synthetic materials. Specify pool width when ordering. 20' extra will be provided at each end to reach to stanchions. Also specify colors desired. Standard colors are navy blue, Dartmouth green (finish line only), royal blue, orange, yellow, red, medium blue, kelly green, maroon, purple, black, and white. Custom lettering is available upon request.

## FINISH LINE 18" X 30" PENNANTS

I.D. No. 40101

## BACKSTROKE LINE 12" X 18" PENNANTS

I.D. No. 40102

Spec Sheet AA 20.69

## STANCHIONS

For supporting backstroke lines, finish lines, recall lines and splash curtains. They are made of stainless steel tube, capped at one end with a T304 stainless steel closure plate and U-hook. A sliding collar with eye bolt is optional and can include one or two eye bolts per collar.

## SLIDING COLLAR WITH EYE BOLT

I.D. No. 38301

Spec Sheet AA 20.89

| Material | Stanchion Height | Stanchion Height |
|---|---|---|
| 1.90" O.D. | 4'-6" I.D. No. | 8'-0" I.D. No. |
| .065" wall | 38101 | 38102 |
| .109" wall | 38103 | 38104 |
| .145" wall | 38105 | 38106 |
| | Spec Sheet AA 20.89 | Spec Sheet AA 20.89 |

## SQUARE STANCHION

NEW

Heavy duty square stanchion constructed from 2-1/2" square, .125 wall T304 material with welded end cap and 1.90" x .145 base. Use with 1.90" Round Anchor. 70% less deflection than standard stanchion. 40% less costly than Tagline Stanchion/Anchor.

## 8'0" SQUARE STANCHION POST

I.D. No. 38115

Spec No. AA 20.95

## 4'6" SQUARE STANCHION POST

I.D. No. 38116

Spec No. AA 20.67

## SQUARE SLIDING COLLAR WITH EYEBOLT

I.D. No. 38302

## TAGLINE STANCHION POST

Heavy duty tripod stanchion for supporting tag and pennant lines, curtains and any other heavy loads requiring extra support. Constructed from 1.90" x .145 T304 Stainless steel with a welded U-hook. The 3 legs will be easily mounted into a pre-fitted factory welded anchor.

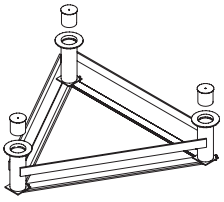
I.D. No. 38111

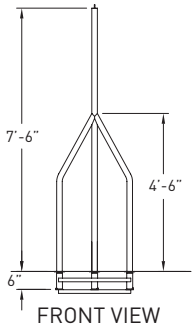
Spec No. AA 20.76

## TAGLINE STANCHION SOCKET

I.D. No. 38211

Spec No. AA 20.88






FRONT VIEW

## STANCHION SOCKETS

For stanchions and water polo goals. Three styles are available. Cast bronze with threaded cap or tamper-proof cap, and cast 316 stainless steel with slip-fit cap.

## STANCHION SOCKET, BRONZE

(Threaded Cap)

I.D. No. 38201-TC

Spec Sheet AA 20.86

## KEY FOR BRONZE THREADED CAP

I.D. No. 38202

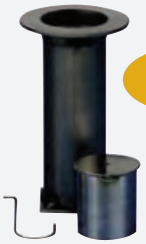
## STANCHION SOCKET, CAST T316 STAINLESS STEEL

(Cap and body are electro-polished)

I.D. No. 38210

Spec Sheet AA 20.87

NEW



## KEY FOR SLIP FIT CAP

I.D. No. 23303

## TAMPER PROOF STANCHION SOCKET,BRONZE

New version replaces slip-fit cap Stanchion Socket. Requires a screwdriver to install and remove cap, eliminating keys and key replacements.

I.D. No. 38201

Spec Sheet AA 20.85

# MATERIALS USED IN THE MANUFACTURE OF PARAGON DECK EQUIPMENT

Our products are made of the finest materials. Our selection is based upon the best value without sacrificing quality. Our standard stainless steel is dual certified T304/T304L polished and buffed to a 320 grit finish, and all welds are electro-chemically passivated for maximum corrosion resistance. Passivation is in compliance with ASTM 967-99.

We also offer T316L stainless steel, as an upgrade, as well as electro-polished and powder coated finishes upon request. However, each has their advantages and disadvantages and none will eliminate the need for proper care and maintenance.

We have and will continue to accommodate our industry's requirements by offering products in all grades and sizes. The Americans with Disabilities Act (ADA) Guidelines for handrail diameters have been finalized to include outside diameters ranging from 1-1/4" to 2". This variety is offered because no one size is best for all applications.

We manufacture rail goods from 1.90" x .065 O.D., 1.90" x .109 O.D., 1.90" x .145 and 1.50" x .120 stainless steel tubing, and can accommodate the various ranges and requirements. Retangular and square tubing is available upon request.

We are always available to provide you with complete and reliable information to make the right choice for your specific project.


## HOW TO KEEP YOUR STAINLESS STAIN-LESS

Your Paragon Commercial Deck Equipment has been fabricated of T304/T304L stainless steel and polished and buffed to a 320 grit finish and manufactured with a goal of high quality and longevity.

Stainless steel is produced to give many years of trouble-free service under normal use. This is the result of years of product development and improvement by the stainless mills. Although there are various publications available on the properties and care of stainless steel, consideration of the following points may help you attain the service life you expect.

Stainless steel is a corrosion resistant alloy, but it is not rustproof. The naturally occurring chromium oxide layer on the surface of the stainless steel provides the corrosion resistance. Proper care needs to be taken to maintain and preserve this layer. Under certain conditions this protective layer can be breached and may cause rust unless a program of preventative maintenance is instituted. Swimming pools, especially natatoriums, are an unfriendly environment for many materials. The halogen salts normally used for pool sterilization, chiefly chlorine and bromine are the most active agents that attack the chromium oxide layer on the stainless steel. The heat and humidity add to the activity of these attacking compounds.

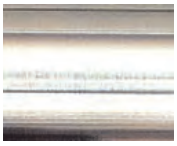
Stainless steel, as the name implies, "stains" less than other steels but may show corrosion depending on the degree of surface oxidation in a particular environment. The prevention of contaminants from interfering with the chromium oxide layer formed on the surface of a stainless product will add to the in-service life of that product. Keep the stainless surface clean, and allow the layer of protective oxides to remain intact.

The simplest way to care for a stainless product is to rinse it with fresh water on a regular basis. However, we do recommend the Operating and Cleaning Instructions, which follow, to ensure many years of product life for your Stainless Steel equipment.

WHAT NOT TO DO:

- Do not use coarse abrasives, like sandpaper or steel wool, on stainless. These may actually cause rusting.
- Do not clean with chlorine cleansers such as bleach.
- Do not leave stainless in contact with iron, steel, or other metals which cause contamination leading to rust or corrosion.
- Do not store stainless steel equipment in the near vicinity of chlorine.

Rusted Rail



Same rail after cleaning and finishing with car wax.

WHAT TO DO:

- Clean stainless frequently with soap and fresh water (not pool water) and wipe dry with a clean cloth. Any cleaner safe for glass is usually safe for stainless.
- When rubbing is necessary to remove difficult stains, care should be taken to follow the polish lines. Rinse thoroughly after cleaning.
- Remove rust spots as soon as possible with a brass, silver, or chrome cleaner. Irreversible pitting will develop under rust that remains on stainless.
- We have found using a citrus based product such as Citrisurf 77 Plus or Citrisurf 2310 will eliminate rust.
- If stainless has become scratched or pitted due to corrosion, mechanical polishing will be necessary, we find 3M Scotchbrite works well.
- Prevent corrosion from recurring by using a soft, paste car wax. Each application should last up to six months.
- Routinely inspect equipment for signs of discoloration. Clean or replace contaminated parts.

# INNOVATIVE SOLUTIONS IN COMMERCIAL AND RECREATIONAL SWIMMING POOL DECK EQUIPMENT


## PERFORMANCE • LONGEVITY • INNOVATION • COLLABORATION

THANK YOU! We wouldn't be one of the industry leaders in competitive and recreational swimming pool equipment without you and we appreciate your business. We feel great pride in knowing that our quality products and service keep bringing you back.

"No problem" is what you will hear from our team whenever you call with a special request. We specialize in custom work and our highly qualified engineers, fabricators, and other specialists will do whatever it takes to provide you with the equipment that you need for your facility. No job is too big or too small!

Total system solutions is what you can expect from Pentair Aquatic Systems.

The Paragon Awards are presented annually in association with the International Swimming Hall of Fame. They are bestowed upon those individuals who have demonstrated exceptional efforts, dedication, motivation and discipline in each of the following categories:

- Competitive Swimming
- Competitive Diving
- Water Polo
- Synchronized Swimming
- Aquatic Safety
- Recreational

PENTAIR

1351 ROUTE 55, LAGRANGEVILLE, NY 12540 845.463.7200 845.463.7291 fax WWW.PENTAIRCOMMERCIAL.COM

# THS SERIES®

## HIGH PERFORMANCE HORIZONTAL SAND FILTERS

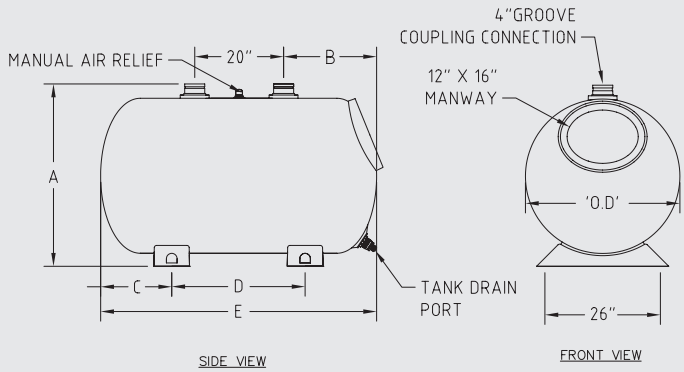
**For commercial swimming pools and other water applications and filters up to 27 sq. ft. of filtration area. Various sizes and configurations to fit almost any body of water.**

Pentair has a state-of-the-art horizontal sand filter unlike any other on the market. The THS Series filter is an NSF-approved 50 psi rated tank with flow rates up to 535 gpm in a single tank. The filter shell is manufactured from a long-lasting composite laminate that makes winding unnecessary. A special coating gives the THS Series filter a smooth and attractive finish. An interior coating protects wet surfaces.

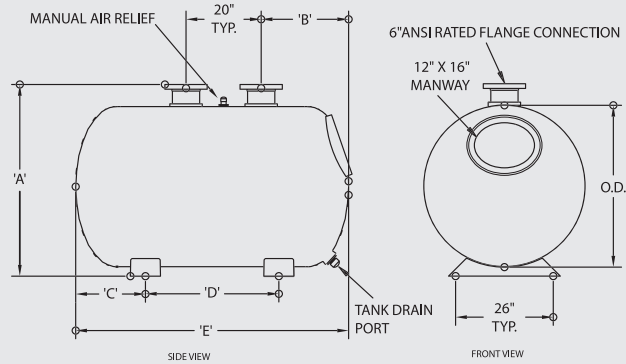
### STANDARD FEATURES

- Manway in front for easy access and smaller footprint.
- 34" diameter tanks will fit through standard doorway.
- Optional manual, semi-automatic, or fully automatic backwash systems.
- Accessible drain.
- Influent manifold distribution to help prevent clogging.
- Single-bolt saddles for easy leveling.
- NSF Listed.

## THS SERIES HIGH PERFORMANCE HORIZONTAL SAND FILTERS




THS 3461 Only




THS 3484, THS 4272, THS 4284, THS 4296

## MATERIALS AND DESIGN

### Tanks

- Construction
  - Multi-layer engineered fiberglass crafted of chopped glass and directional roving in an isopthalic polyester matrix.
- Operating Pressure
  - Capable of withstanding 50 PSI internal pressure.

### Internals

- Headers
  - One influent header is fitted with sufficient distributors to properly distribute incoming flow evenly across the sand bed surface. An additional effluent header is supplied with sufficient laterals equally distributed not less than 12 inches below the filtering sand bed.
  - Laterals are 2 3⁄8" x 10" with 2" NPT connections and constructed of ABS plastic with molded 'V'-groove slots.

### Tank Base

- Support Bases
  - Tanks feature ABS saddle style support bases for filter body, capable of rotation for leveling purposes.

### Operation / Performance

- Flow Rate
  - NSF Listed for 5 to 20 GPM per square foot of filter area.
- Maximum Limits
  - Working pressure 50 PSI max. Continuous water temperature 125° F.
- Sand Media
  - #20 white quartz silica sand. Effective size 0.45-0.55 mm.
- Safety provisions
  - Each tank features an automatic and manual air release system fabricated of non-corrosive materials.

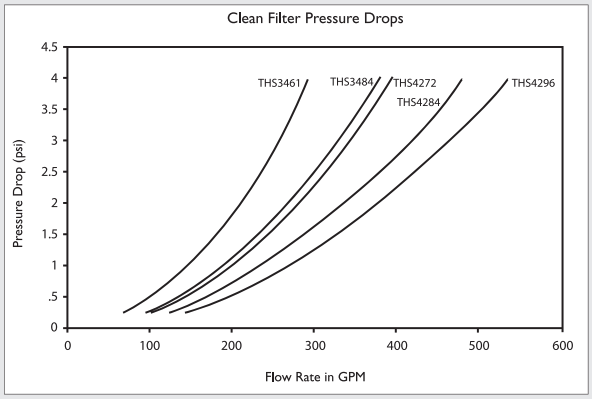
### Controllers - Must Be Used With Diaphragm Valve Kits

| | |
|---|---|
| 156850 | Single THS CA100<br>Auto-backwash controller for single tank system |
| 156800 | Dual THS CA100<br>Auto-backwash controller |
| 156400 | Single THS CM200 Semiautomatic controller 6 in. FP |
| 156450 | Dual THS CM200 Semiautomatic controller 6 in. FP |
| CS400-01 | CS400 backwash controller for single tank system |
| CS400-02 | CS400 backwash controller for dual tank system |

## FILTER ORDERING INFORMATION

| Product | Model | Description |
|---|---|---|
| 143461 | THS3461 | THS 34 in. x 61 in. |
| 143484 | THS3484 | THS 34 in. x 84 in. |
| 144272 | THS4272 | THS 42 in. x 72 in. |
| 144284 | THS4284 | THS 42 in. x 84 in. |
| 144296 | THS4296 | THS 42 in. x 96 in. |

## FILTER PERFORMANCE




### Filter Accessories Information

| | |
|---|---|
| 155700 | THS Single Tank Manifold Kit w/ Butterfly Valves |
| 155720 | THS Dual Tank Manifold Kit w/ Butterfly Valves |
| 155701 | THS Single Tank 6 in. FP Kit w/ Diaphragm Valves |
| 155721 | THS Dual 34 in. dia. 6 in. FP Kit w/ Diaphragm Valves |
| 155730 | THS Dual 42 in. dia. FP Kit w/ Diaphragm Valves |
| 155800 | WA-KIT Wedge Anchor Kit |
| 155850 | BVA-KIT 1⁄2 in. Ball Valve Adapter Kit for manual air relief |
| 156150 | Flowmaster Saddle Kit |
| 156100 | Temperature Probe Kit |
| 155702 | THS3461 Single Tank Manifold Kit w/ Butterfly Valves |
| 155703 | THS3461 Single Tank Manifold Kit w/ Diaphragm Valves |
| 155722 | THS3461 Dual Tank Manifold w/ Butterfly Valves |
| 155723 | THS3461 Dual Tank Manifold w/ Diaphragm Valves |
| 140325 | Adder Kit for Third THS Filter |

### Tank dimensions/media requirements

| Model | Maximum Flow Rates | | | | Media Requirements | | |
|---|---|---|---|---|---|---|---|
| | Filter Area (ft2) | Flow Rate@ 10 GPM/ft2 (GPM) | Flow Rate@ 15 GPM/ft2 (GPM) | Flow Rate@ 20 GPM/ft2 (GPM) | Sand Media (cu. ft.) | Gravel Media (cu. ft.) | Total Media (cu. ft.) |
| THS3461 | 13.5 | 135 | 203 | 270 | 12.5 (1,250 lbs.) | 3.0 (300 lbs.) | 15.5 (1,550 lbs.) |
| THS3484 | 19.0 | 190 | 285 | 380 | 13.5 (1,350 lbs.) | 6.0 (600 lbs.) | 19.5 (1,950 lbs.) |
| THS4272 | 19.7 | 197 | 296 | 394 | 21.0 (2,100 lbs.) | 5.0 (500 lbs.) | 26.0 (2,600 lbs.) |
| THS4284 | 23.2 | 232 | 348 | 464 | 24.0 (2,400 lbs.) | 6.0 (600 lbs.) | 30.0 (3,000 lbs.) |
| THS4296 | 26.7 | 267 | 401 | 534 | 28.0 (2,800 lbs.) | 7.0 (700 lbs.) | 35.0 (3,500 lbs.) |

| Model | Media Requirements | | | | | Tank Dimensions | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Feeboard Height (in.) | Sand Bed Depth (in.) | Gravel Depth (in.) | Operating Weight (lbs.) | Shipping Weight (lbs.) | A (in.) | B (in.) | C (in.) | D (in.) | E (in.) | O.D. (in.) |
| THS3461 | 7½ | 9 | 8 5⁄16 | 3,500 | 530 | 39 ½ | 21 | 16 | 30 | 62 | 35 |
| THS3484 | 7½ | 9 | 8 5⁄16 | 4,600 | 630 | 45 | 21¼ | 24 5⁄8 | 35¼ | 85 | 35 |
| THS4272 | 9½ | 15 | 7½ | 5,700 | 700 | 52 ¼ | 23¼ | 18 7⁄8 | 35¼ | 73 | 43 |
| THS4284 | 9½ | 15 | 7½ | 6,700 | 780 | 52 ¼ | 23¼ | 24 7⁄8 | 35¼ | 85 | 43 |
| THS4296 | 9½ | 15 | 7½ | 7,700 | 870 | 52 ¼ | 23¼ | 30 7⁄8 | 35¼ | 97 | 43 |

# THS SERIES®

## HIGH PERFORMANCE HORIZONTAL SAND FILTERS

### ENGINEERING SPECIFICATIONS

The filter system shall be a model_____as manufactured by Pentair, and shall be approved by the National Sanitation Foundation (NSF).

The system shall contain_____high rate type filter tanks, with each tank containing _____square feet of filter area totaling_____square feet of effective filtration area. The system shall have the capacity of filtering ___ gpm when filtered at_____ gpm per square foot. Each tank shall be of the horizontal type,_____inch inside diameter and _____ inches long.

The vessel(s) shall be constructed of multi-layer fiber glass. Layers shall consist of a combination of chopped glass and woven roving in an isopthalic-polyester matrix. The vessel shall be assembled from one side shell and two domed ends which shall be joined with an adhesive and reinforced with FRP layup. The vessel(s) shall be capable of with standing 50 psi internal pressure. Alternate construction methods shall not be acceptable.

Vessels shall be provided with ABS saddle style support bases with a means of rotating the saddle for leveling purposes. The use of adhesive to hold the saddle to the vessel is not acceptable.

The wetted surface shall be a modified polyester gel coat (GC). The gel coat shall be a modified polyester gel coat equivalent to a Cook gel coat 943-AN-023 with a thickness of no less than 10 mils.

The external surface shall be smooth in appearance and be free of cracks or other defects. The exterior surface shall be supplied with an all weather coating. Coating shall be urethane based with UV inhibitors. The surface coating shall be almond colored.

Each tank shall have one influent header fitted with sufficient distributors to properly distribute incoming flow evenly across the sand bed surface and one effluent header with sufficient laterals equally distributed not less than 12 inches below the filtering sand bed with a total effective slot area such that the average velocity through the slots will not exceed 6 feet per second at the design flow rate. Both headers shall be fabricated of schedule 80 PVC and all distributors and laterals shall be threaded and replaceable. The laterals shall be 2 3/8 inch diameter by 10 inches long with 2" NPT connections and constructed of ABS plastic with molded 'V'-groove slots. Laterals with machined or cut slots shall not be accepted. Laterals shall be threaded at right angles into the header pipe.

Exterior influent and effluent pipe connections shall be 6" VanStone-style flanges

Each tank shall have a 12 inch by 16 inch access manhole with yokes, molded cover, o-ring, and T316 stainless steel hardware.

The system shall be designed for installation against a back or side wall with all servicing accessible without moving tank(s). When the system is off, the tank(s) must remain full of water and not allow water to gravity drain back to the source in order to prevent disturbance of the sand bed. Each tank shall have an automatic and manual air release system and shall be of non-corrosive materials. A sufficient quantity of #20 U.S. grade clean crystal silica sand to cover filter elements with a minimum 12 inch sand bed shall be furnished and installed into each tank and shall be free of limestone or clay. The following is an acceptable gradation for this media:

#20 SILICA SAND
Effective size: 0.45 mm (0.018 in.) to 0.55mm (0.022 in.)
Uniformity coefficient: less than 1.5
Grain Sphericity: GRTR 0.7

The filter vessel shall carry a ten (10) year limited warranty covering defects in material and workmanship, the first three years of which shall not be pro-rated.

#### For Single Tank System Diaphragm Valve Face Piping Kits

- The system, including external piping, shall be fully solvent-welded. System shall be supplied with media dump port and anchor setting template.
- The backwash procedure must be accomplished by backwashing using water from the pool in reverse flow through the filter to the waste line.
- The influent, effluent and waste manifolds shall be constructed of schedule 80 PVC piping and fittings. The system shall include (2) three-way hydraulically operated diaphragm valves to direct the flow during the backwash cycle.

#### For Two Tank System Diaphragm Valve Face Piping Kits

- The system, including external piping, shall be fully solvent-welded. System shall be supplied with media dump ports and anchor setting templates.
- Each tank in system shall be capable of being backwashed individually using filtered water from the remaining tanks. The common method of backwashing by using raw source water in a reverse flow through the filter or filters will not be acceptable.
- The influent, effluent and waste manifolds shall be constructed of schedule 80 PVC piping and fittings. The system shall include (1) three-way hydraulically operated diaphragm valve per tank to direct the flow during the backwash cycle. And one two-way hydraulically operated diaphragm valve as a priority valve.

#### Semi-Automatic Controls for Diaphragm Valve Face Piping Kits

- Valve actuation to initiate the backwash cycle shall be a single-knob control using a multi-port control valve to distribute water to hydraulically operated multi-port control valve, and influent, effluent, and multi-port pressure gages shall be mounted on a common panel.

#### Automatic Controls for Diaphragm Valve Face Piping Kits

**CS 400 Commercial Backwash Controller**
This controller is programmable and controls every aspect of the backwash cycle once initiated. Backwash can be initiated three ways: by an operator with the touch of a button, by a signal from a master controller (such as the AK600), or by a signal from an optional differential pressure switch (CS400-DP). Stored backwash data and history, alarms and calculated backwash cycle times are also features of the CS400 controller, as are relays for communication with the heater, pump and Acu Drive™ XS Variable Frequency Drive.

**CA 100 Fully Automatic Backwash Controller**
This is the most comprehensive backwash controller and can be readily reprogrammed to initiate backwash automatically based on differential pressure (integral pressure transducers are standard), time (internal seven-day clock with battery back-up is standard), flow (with optional flow sensor), or any combination of the above. The controller has real-time display of operation mode, filter flow rate, and water temperature (with optional temperature probe). Also, includes Energy Saver Mode for simple On/Off pump scheduling and various interlocks and relays to communicate with other equipment (pump, heater, Acu Drive controller).

#### Certifications

The THS Series filter shall be tested and certified by a nationally recognized testing laboratory to conform to NSF (National Sanitation Foundation) Standard 50.

PENTAIR

**1620 HAWKINS AVE | SANFORD, NC 27330 | UNITED STATES | 800.831.7133 | pentair.com**

# ETi® 400
## HIGH-EFFICIENCY HEATER

### MORE OUTPUT, LESS INPUT

When you want quality, strength, and durability, you want the corrosion resistance of titanium. The ETi 400 High-Efficiency Heater is the world's first pool heater equipped with the exclusive TitanTough™ direct-fire titanium heat exchanger for long-lasting performance with exceptional thermal-efficiency, even in the most challenging operating conditions. Not only is it ultra-quiet to operate and easy to install both indoors and out, the ETi 400 heater has the highest efficiency in its class and offers the longest lasting heat exchanger ever built, with ASME certified construction and a 3-year warranty.

### PRODUCT FEATURES

#### Efficient

- 96% Thermal Efficiency—highest in its class
- High efficiency equals large energy savings over standard heaters and faster heat-up times

#### Durable

- Corrosion resistant with Titan-Tough™ Titanium heat exchanger
- No welds, crimps, or joints to reduce corrosion resistance.
- Titanium heat exchanger stands up to harsh water chemistry and keep

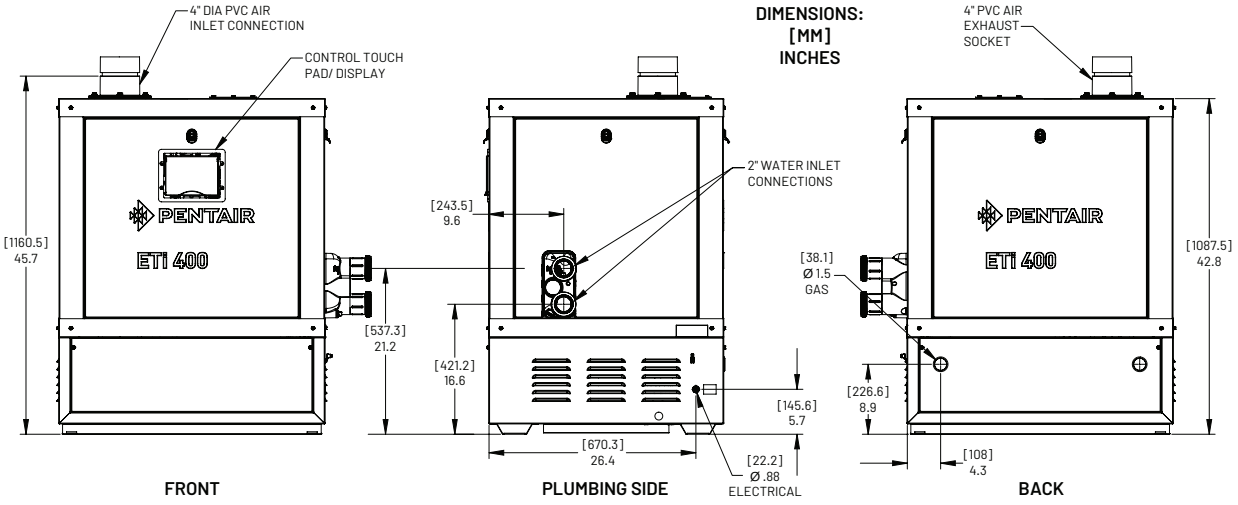
#### Easy to vent

- PVC Venting: Category IV venting and air intake: up to 120' with 4" PVC and up to 300' with 6" PVC pipe
- PVC venting makes installing indoors more easier and more economical

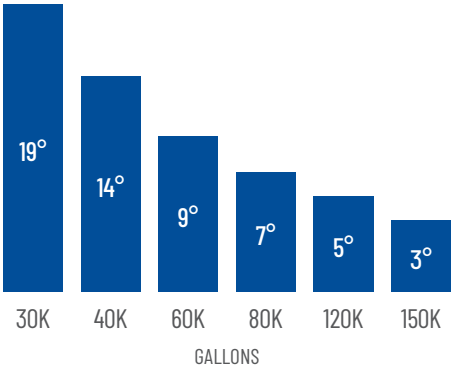
#### Easy to Install, Easier to Service

- 180° rotating control panel for left or right plumbing connection
- Large removable panels make accessing the heater internals quick and easy
- 180° rotating gas valve for front and rear gas connections
- Parts commonality with MasterTemp heaters ensures part availability and familiarity
- 3-year parts and labor warranty

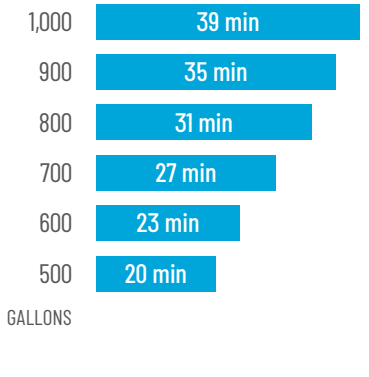
# ETi® 400
## HIGH-EFFICIENCY HEATER



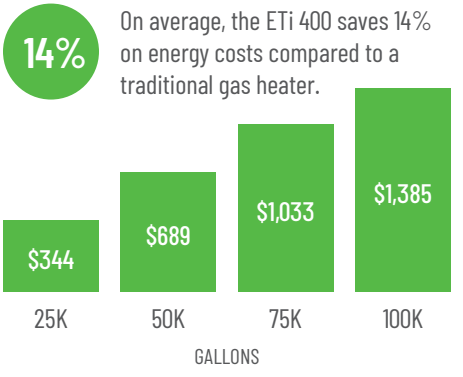

### TEMPERATURE RISE IN 12 HOURS (°F)*




### TIME TO RAISE WATER TEMPERATURE 30°F*




### AVERAGE ANNUAL COST SAVINGS*




*All calculations are estimates. Actual results may vary due to a range of factors including, but not limited to: environmental conditions, pool type/construction/materials/configuration, geographical location, installation details and various operational parameters. Cost savings estimates are based on 65°F air temperature and 82°F water target temp for an uncovered pool operating 180 days under moderate wind conditions and the cost of natural gas is $1.22 per 100,000 BTU and comparing energy use to a gas heater that is 82% efficient. For assistance with sizing and selecting a pool heating product, please consult a swimming pool professional.

## PRODUCTS

| SKU | DESCRIPTION | GAS TYPE | BTUs | DIMENSIONS IN (L x W x H) | WEIGHT (LBS) | VOLTAGE (V/Hz/PHASE) | BREAKER SIZE (AMP) |
|---|---|---|---|---|---|---|---|
| 461113 | ETi 400 | Natural | 400,000 | 40 x 30 x 46 | 379 | 120 or 240/60Hz/1 | 15 |

| SKU | DESCRIPTION |
|---|---|
| 476072 | Natural Gas to Propane Conversion Kit |
| 475612 | Condensate Neutralizer Replacement Kit |
| 475971 | Indoor Direct Air Intake Kit |

PENTAIR

For more specification information and sizing assistance, contact your local Pentair Sales Representitive or visit pentair.com.

1620 Hawkins Ave | Sanford, NC 27330 | 800.831.7133 | pentair.com

# PS SERIES™ IN-LINE STRAINER
## FOR COMMERCIAL PUMPS

PROVEN PERFORMANCE UNDER DEMANDING CONDITIONS

PS Series strainers from Pentair Commercial Aquatics™ are designed for ease of installation and hydraulic efficiencies in commercial aquatics applications. In three standard sizes and with the addition of eccentric reducers, PS Series strainers fit with almost any plumbing configuration. The design of the PS Series strainers accommodates the high-flow performance in a variety of applications. ANSI Rated flange bolt pattern allows for ease of installation and peace of mind.

## STANDARD FEATURES

- Superior design for hydraulic performance.
- Clear lid with easy access allows for simple visibility of debris.
- Extra-large stainless steel strainer basket.
- 50 psi rating.
- NSF listed.

## ENGINEERING SPECIFICATIONS

- The strainer shall consist of a nonmetallic fiberglass-reinforced plastic body, a clear cover that extends over the entire top, an O-ring seal, manually capable (no tools required) stainless steel/plastic screw fasteners, and a stainless steel basket.
- The strainer body shall be able to be fitted with PVC plastic piping connections. These connections shall be capable of accommodating Van Stone Flanges, concentric reducers, and non-concentric reducers. The strainer shall have a removable drain for winterizing and a pressure relief valve set at 50 psi.
- The strainer pipe sizes and basket characteristics shall meet and be listed to NSF/ANSI Rated Standard 50.

# PS SERIES™ IN-LINE STRAINER
## FOR COMMERCIAL PUMPS

### NECESSARY HARDWARE

| Model Designation | | Connection Size (inlet x outlet) | Inlet | | Outlet | |
|---|---|---|---|---|---|---|
| | | | Bolt Size | Number | Bolt Size | Number |
| **PS6:** | | 6 in. pipe x 6 in. pipe | no bolts | | no bolts | |
| PS6X6 | Plastic Flanged | 6 in. ANSI x 6 in. ANSI | 3/4 in. | 8 | 3/4 in. | 8 |
| PS6X5E | Plastic Flanged Eccentric | 6 in. ANSI x 5 in. ANSI | 3/4 in. | 8 | 3/4 in. | 8 |
| PS6X4E | Plastic Flanged Eccentric | 6 in. ANSI x 4 in. ANSI | 3/4 in. | 8 | 5/8 in. | 8 |
| PS6X3E | Plastic Flanged Eccentric | 6 in. ANSI x 3 in. ANSI | 3/4 in. | 8 | 5/8 in. | 4 |
| PS#X#E | Plastic Flanged Eccentric | Various Standard Reducers | various | | various | |
| **PS8:** | | 8 in. pipe x 8 in. pipe | no bolts | | no bolts | |
| PS8X8 | Plastic Flanged | 8 in. ANSI x 8 in. ANSI | 3/4 in. | 8 | 3/4 in. | 8 |
| PS8X6E | Plastic Flanged Eccentric | 8 in. ANSI x 6 in. ANSI | 3/4 in. | 8 | 3/4 in. | 8 |
| PS8X5E | Plastic Flanged Eccentric | 8 in. ANSI x 5 in. ANSI | 3/4 in. | 8 | 3/4 in. | 8 |
| PS8X4E | Plastic Flanged Eccentric | 8 in. ANSI x 4 in. ANSI | 3/4 in. | 8 | 3/4 in. | 8 |
| PS#X#E | Plastic Flanged Eccentric | Various Standard Reducers | various | | various | |
| **PS10:** | | 10 in. pipe x 10 in. pipe | no bolts | | no bolts | |
| PS10X10 | Plastic Flanged | 10 in. ANSI x 10 in. ANSI | 7/8 in. | 12 | 7/8 in. | 12 |
| PS10X8E | Plastic Flanged Eccentric | 10 in. ANSI x 8 in. ANSI | 7/8 in. | 12 | 3/4 in. | 8 |
| PS10X6E | Plastic Flanged Eccentric | 10 in. ANSI x 6 in. ANSI | 7/8 in. | 12 | 3/4 in. | 8 |
| PS10X5E | Plastic Flanged Eccentric | 10 in. ANSI x 5 in. ANSI | 7/8 in. | 12 | 3/4 in. | 8 |
| PS#X#E | Plastic Flanged Eccentric | Various Standard Reducers | various | | various | |

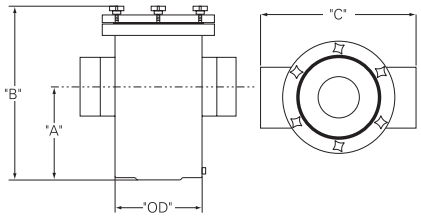
NOTE: # designation indicates optional available reducers.
Suffix E denotes Eccentric reducers. Suffix C denotes Concentric reducers.
Suffix E will be replaced with C if Concentric reducer is used.

### ENGINEERING SPECIFICATIONS

| Model | PS6 | PS8 | PS10 |
|---|---|---|---|
| Inlet Pipe Size | 6 in. (DIN 150) | 8 in. (DIN 200) | 10in. (DIN 250) |
| Maximum Pressure | 50 psi (345 kPa) | 50 psi (345 kPa) | 50 psi (345 kPa) |
| Maximum Temperature | 125° F (50° C) | 125° F (50° C) | 125° F (50° C) |
| Maximum Flow Rate | 540 GPM (2040 LPM) | 930 GPM (3520 LPM) | 1470 GPM (5560 LPM) |
| Basket Open Area | 224 sq. in. (1445 sq. cm) | 224 sq. in. (1445 sq. cm) | 335 sq. in. (2161 sq. cm) |
| Cover Material | Clear Acrylic | Clear Acrylic | Clear Acrylic |
| Basket Material | Stainless Steel | Stainless Steel | Stainless Steel |
| Body Material | Engineered Fiberglass | Engineered Fiberglass | Engineered Fiberglass |

### DIMENSIONAL DATA

| Strainer Size | "OD" | "A" | "B" | "C" |
|---|---|---|---|---|
| 6 | 12.8 | 13.6 | 25.5 | 22.8 |
| 8 | 12.8 | 13.6 | 25.5 | 22.8 |
| 10 | 12.8 | 20.6 | 32.5 | 22.8 |

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# SPCS FD


Energy Saving Solutions

SPCS Smart Pump Control System

# World Class Drives from Fuji Electric, now at the heart of the SPCS Family…

## *For Pool and Fountain Circulation Pumps*

Offering the most common required and specified features for circulation pump applications in commercial and educational swimming pools as well as fountains, splash pads and water features; the ***SPCS BC*** is ideally suited for applications involving:

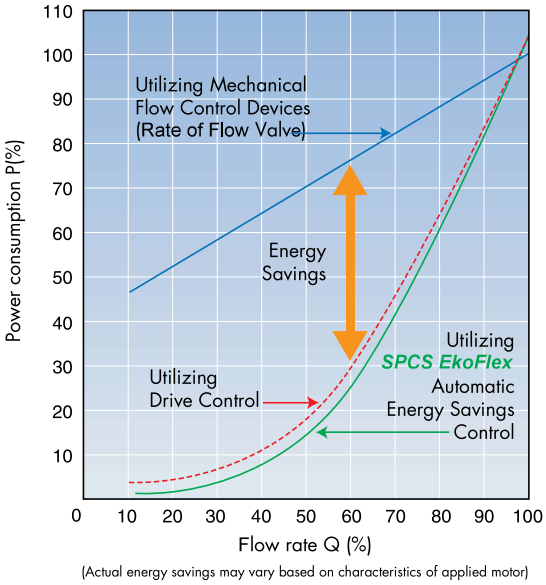
- Swimming Pool Circulation Pumps
- Splash Pad Circulation Pumps
- Water Slide Pumps
- Decorative Fountains
- Spas
- Filtration
- Pressure Boosting

## *SPCS BC Features*

- NEMA 3R Steel Enclosure
- 2 Contactor Full ByPass
- Control Transformer with CB Protection
- Integrated Motor Branch Circuit Protection, up to 100kA Short Circuit Current Rated Packages
- 3% Line Reactor for Reducing Harmonics
- Soft-Switching PWM Drive Output
- Catch-a-spinning Motor Functionality
- Enhanced Automatic Energy Savings, Reduces Power Consumption of Both the Motor and Drive
- Simple Construction Leads to Ease of Maintenance
- Touch screen interface for monitoring and control
- 110v Motor Running Output
- Power Monitoring from the Drive's Keypad or Software
- Built-in E-Stop Protection
- Communication Protocols: Modbus RTU, Metasys® N2, & APOGEE® FLN are built-in the Drive
- PC Software for Drive Set-Up & Monitoring

# for an Economical and Ecological Solution.

## Lower Energy Bills & $CO_2$ Emissions



(Actual energy savings may vary based on characteristics of applied motor)

Energy savings is achieved by matching the pump performance to the filter load as it dynamically changes during the filter cycle. By applying the Affinity Laws for centrifugal loads, we can calculate the cost of operation of a conventional starting method and operation with an ***SPCS BC***

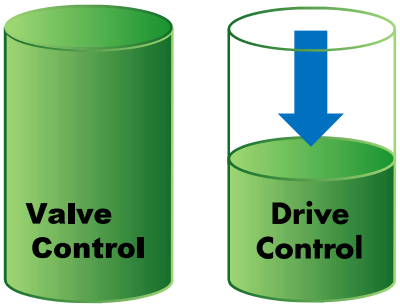
**Energy Savings Example:**
Replacing a valve controlled pump system with an across the line motor starter to an ***SPCS BC*** system with maintaining the Health Department mandated flow rate for 8,736 hrs/yr, and operated by a 25Hp motor.

Energy required by using valve control: 168,287kWh/yr
Energy required by using drive control: 100,396kWh/yr
Energy Savings by using the ***SPCS BC***: **67,890kWh/yr**

Energy savings achieved by using drives can correlate to reducing the amount of carbon dioxide ($CO_2$) emitted into the environment from power generation plants.

**$CO_2$ Emission Reduction Example:**
Using the Energy Savings previously calculated at 67,890kWh/yr and a $CO_2$ Emission factor of 1.36lbs/kWh(1)

Estimated reduction of $CO_2$ emissions: 92,330lbs/yr



**$CO_2$ Emission Reduction**

## Reduce Maintenance Cost & Ambient Noise

Drives inherently soft-start the motor, reducing wear and tear on the attached mechanical components, resulting in reduced maintenance.

Pool circulation pumps controlled by valves can produce undesirable ambient noise. A reduction in ambient noise can be accomplished by applying the ***SPCS BC*** drive system.

(1) Source: U.S. Environmental Protection Agency Office of Atmospheric Programs Climate Protection Partnerships Division
The Emissions & Generation Resource Integrated Database For 2006 (eGRID2006), April 2007

# SPCS Smart Pump Control System®

H2O-TECHNOLOGIES.COM

| | SPCS FD |
|---|---|
| **Ratings** | |
| Horsepower & Voltage | 2 - 60Hp, 208/230V 2 - 100Hp, 460V |
| NEMA Type 3R Enclosure | S |
| Ambient Temperature | -10° to 40° C |
| **Features** | |
| Input Disconnect & Branch Circuit Protection | Standard Circuit Breaker |
| Electronically & Mechanically Interlocked Drive and ByPass Conactors | S |
| Motor Overload Realy | Class 20 |
| DC Link | Standard |
| 3% Line Reactor | S |
| 5% Line Reactor | O |
| Control Power Transformer with Mini Circuit Breaker Protection | S |
| Power On Indication | via Touchscreen |
| Drive Run Indication | via Touchscreen |
| Energy Efficient Mode Indication | via Touchscreen |
| Fault Indication | via Touchscreen |
| ByPass Run Indication | via Touchscreen |
| Drive-Off-Bypass Selector Switch | S |
| BecSys- Off - Bypass Selector Switch | S |
| Voltage Fault Indication | O |
| 110v Pump Running Powered Interlock Output | S |
| Automatic Run Command Input | S |
| E-Stop | S |
| Two Pump Manual Alternating | O |
| Two Pump Simultaneous Operation | O |
| Under Voltage Automatic Bypass Protection | O |
| Access Drive via Internet | O |
| Early Pump Wear Detiction | S |
| **Communication Protocols** | |
| Modbus RTU | S |
| Metasys® N2 | S |
| APOGEE® FLN (P1) | O |
| LonWorks® | O |
| BACnet | O |
| Profibus DP | O |
| DeviceNet | O |
| Ethernet | O |
| **Codes & Standards** | |
| UL 508 & cUL | S |
| Applicable NEMA & NFPA Standards | S |

S = Provided As Standard

O = Optional

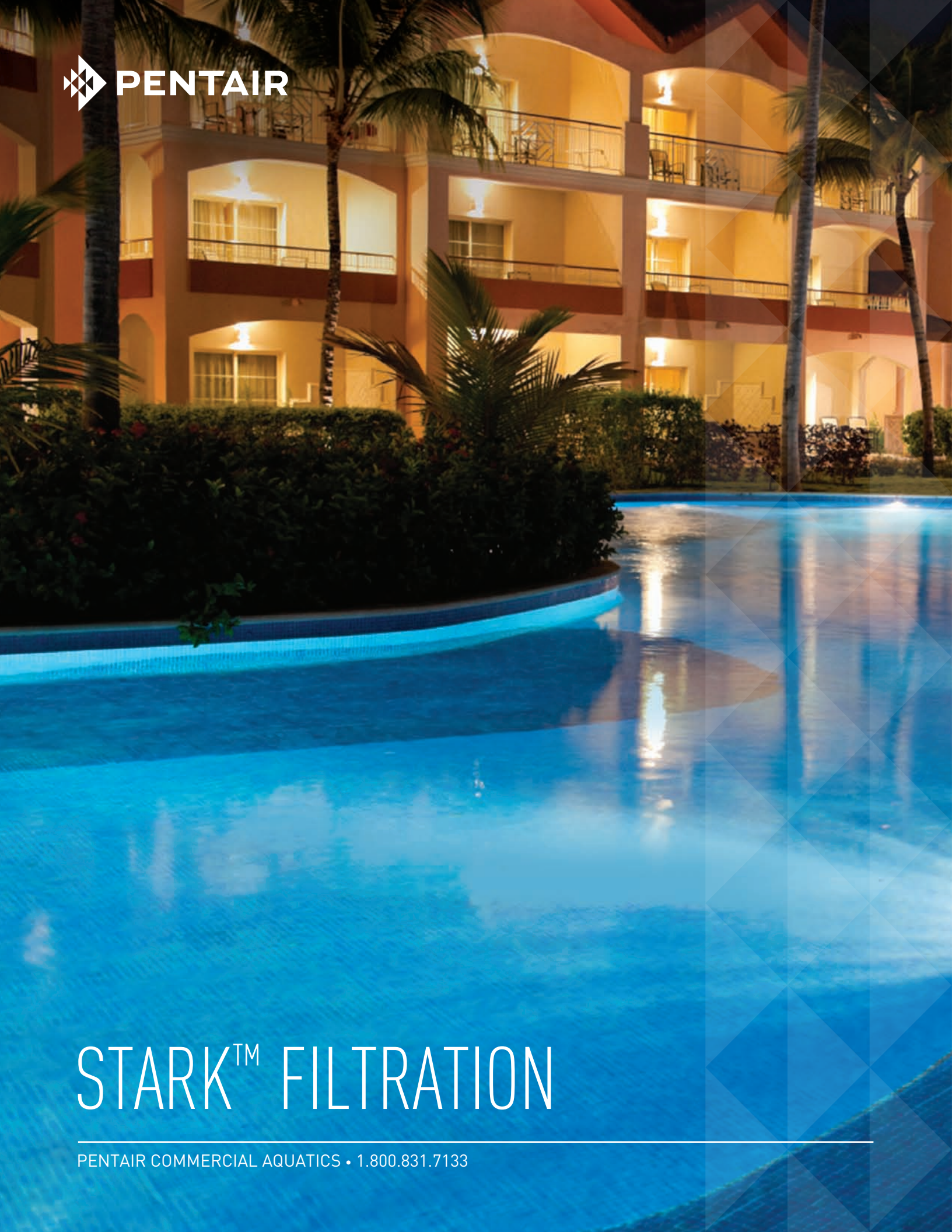


**H2O Technologies**

**4501 Sandburg Way, Irvine, CA 92612**

**[562] 260-3141**

**www.h2o-technologies.com**



PENTAIR

# STARK™ FILTRATION

PENTAIR COMMERCIAL AQUATICS • 1.800.831.7133

## MODULAR BY DESIGN

Standard and custom styles allow for influent and effluent placement to meet any and all design requirements. There are single or multiple units, side-by-side, end-to-end, or stacked. Manway locations are provided for every need.

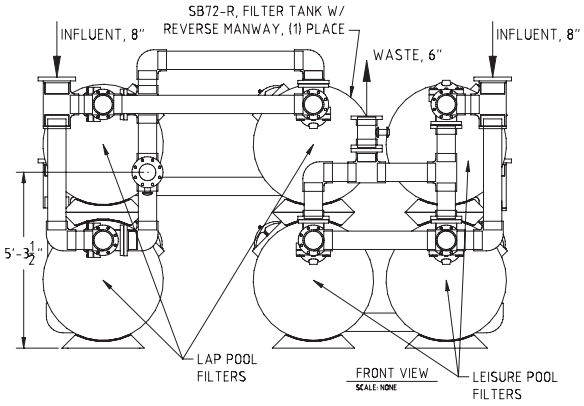
Architects and engineers favor the Stark™ Filtration System because it is designed to use as little as one-fourth the floor space of other filters. The self-supporting stackable structure eliminates the need for independent framework.

Engineered for a Lifetime of Performance
Every Stark Fiberglass Filter is built to resist structural failures caused by fatigue, corrosion, and scaling. It is also protected by a proprietary all-weather coating with UV inhibitors.

## BACKWASH CONTROLS

All Stark systems are provided with all valves and fittings required for an efficient backwash cycle. Fully Automatic, Semi-Automatic and Manual Backwash Options are available.


Custom Face-Piping Kits for your Application.




## VESSEL CONSTRUCTION

Superior, corrosion-proof, fiberglass construction. All Stark vessels are made using a dual-construction method consisting of a multiple-layer fiberglass liner filament wound with continuous fiber strand. Computer-controlled, filament winding covers the entire vessel including the domes. Durable, all-weather coating with UV inhibitors.

NSF
Certified to NSF/ANSI Standard 50

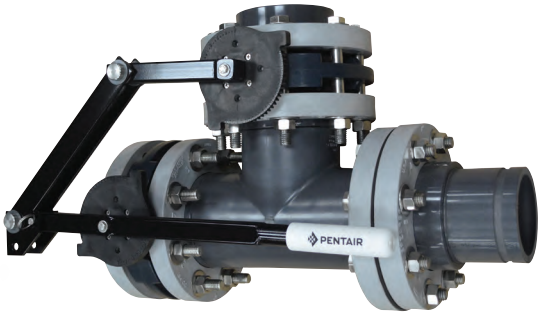
## MANWAY VIEWPORT

Provides Visual Observation of the sand bed during Filtration and Backwash. Standard on all Stark vessels. Manway opening is 12" X 16" elliptical for easy access.

6" Backwash Valve

## VALVES

Cost-effective backwash control valve have manual or automatic options. 6" version (on most models) includes a transparent ABS valve housing and cover to display valve positioning and provide convenient maintenance inspections.




## BUTTERFLY VALVE

Linked Butterfly Valves also available.

## COMMERCIAL LATERAL

2" NPT injection molded ABS with "V" groove slots and reinforcing ribs for best performance and service life.

## Optional Pressure Booster System (PBS01)

Provides consistent valve-actuation where city-water pressure is unreliable.

PBS01

## FEATURED HIGHLIGHTS

- All vessel models are NSF 50 listed.
- End-manways provide easy access for service and maintenance.
- Schedule 80 Face Piping is fully assembled and in our factory for ease of installation.
- Clear backwash valve (most models) provides for intuitive operation and troubleshooting.
- Stark valves and several control options make backwashing simple.
- Unparalleled tank construction and exterior all-weather coating.

6" Backwash Valve

# STARK™ SS SERIES™ FILTERS
## HORIZONTAL SAND FILTRATION SYSTEMS

Stark SS Series Filter Systems are designed with ease of installation, maintenance and minimal floor space in mind. Vessels are side-by-side, with manway access on the ends and all piping above the vessel(s). All piping ships fully solvent-welded and pre-assembled to ensure fit. 100 psi vessel pressure rating.

NSF Certified to NSF/ANSI Standard 50

Stark SS Series Sand Filter

### CAPACITY INFORMATION

| # Tanks | System Number | Tank Size | Filtration Area (Sq. Ft.) | Flow (GPM) 12 gpm/sf | Flow (GPM) 15 gpm/sf | Backwash Valve Size/Type | 'W' | 'L' | "Hs' | Total Media (Cu. Ft.) | Operating Weight (lbs.) | Shipping Weight (lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | RS1-60-04 | 36" x 60" | 13.5 | 162 | 203 | 4" Gray | 38" | 63" | 68" | 15.5 | 4,600 | 845 |
| | RS1-72-04 | 36" x 72" | 17.2 | 206 | 258 | 4" Gray | 38" | 75" | 68" | 19.0 | 5,500 | 915 |
| | SS1-48-04 | 42" x 48" | 12.8 | 154 | 192 | 4" Gray | 44" | 51" | 74" | 16.5 | 4,900 | 805 |
| | SS1-72-06 | 42" x 72" | 20.0 | 240 | 300 | 6" Clear | 44" | 75" | 86" | 26.0 | 7,500 | 1,105 |
| | SS1-96-06 | 42" x 96" | 27.0 | 324 | 405 | 6" Clear | 44" | 99" | 86" | 36.0 | 9,800 | 1,240 |
| 2 | RS2-60-06 | 36" x 60" | 27.0 | 324 | 405 | 4" Gray | 77" | 63" | 70" | 31.0 | 9,400 | 1,650 |
| | RS2-72-06 | 36" x 72" | 34.4 | 413 | 516 | 4" Gray | 77" | 75" | 70" | 38.0 | 11,000 | 1,830 |
| | SS2-48-06 | 42" x 48" | 25.6 | 307 | 384 | 4" Gray | 90" | 51" | 76" | 33.0 | 10,000 | 1,650 |
| | SS2-72-06 | 42" x 72" | 40.0 | 480 | 600 | 6" Clear | 90" | 75" | 87" | 52.0 | 14,800 | 2,060 |
| | SS2-96-06 | 42" x 96" | 54.0 | 648 | 810 | 6" Clear | 90" | 99" | 87" | 72.0 | 19,400 | 2,380 |
| 3 | RS3-60-06 | 36" x 60" | 40.5 | 486 | 608 | 4" Gray | 116" | 63" | 70" | 46.5 | 14,200 | 2,420 |
| | RS3-72-06 | 36" x 72" | 51.6 | 619 | 774 | 4" Gray | 116" | 75" | 70" | 46.5 | 16,800 | 2.670 |
| | SS3-48-06 | 42" x 48" | 38.4 | 461 | 576 | 4" Gray | 136" | 51" | 76" | 49.5 | 14,900 | 2,420 |
| | SS3-72-08 | 42" x 72" | 60.0 | 720 | 900 | 6" Clear | 136" | 75" | 88" | 78.0 | 22,400 | 3,140 |
| | SS3-96-08 | 42" x 96" | 81.0 | 972 | 1215 | 6" Clear | 136" | 99" | 88" | 108.0 | 29,400 | 3,620 |
| 4 | RS4-60-06 | 36" x 60" | 54.0 | 648 | 810 | 4" Gray | 155" | 63" | 70" | 62.0 | 18,900 | 3,200 |
| | RS4-72-08 | 36" x 72" | 68.8 | 826 | 1032 | 4" Gray | 155" | 75" | 76" | 76.0 | 22,300 | 3,560 |
| | SS4-48-06 | 42" x 48" | 51.2 | 614 | 768 | 4" Gray | 182" | 51" | 76" | 66.0 | 19,900 | 3,200 |
| | SS4-72-08 | 42" x 72" | 80.0 | 960 | 1200 | 6" Clear | 182" | 75" | 88" | 104.0 | 30,200 | 4,470 |
| | SS4-96-10 | 42" x 96" | 108.0 | 1296 | 1620 | 6" Clear | 182" | 99" | 88" | 144.0 | 39,900 | 5,145 |
| 5 | SS5-72-10 | 42" x 72" | 100.0 | 1200 | 1500 | 6" Clear | 229" | 75" | 88" | 130.0 | 38,400 | 5,650 |
| | SS5-96-10 | 42" x 96" | 135.0 | 1620 | 2025 | 6" Clear | 229" | 99" | 88" | 180.0 | 49,900 | 6,450 |
| 6 | SS6-72-10 | 42" x 72" | 120.0 | 1440 | 1800 | 6" Clear | 275" | 75" | 88" | 156.0 | 46,000 | 6,800 |
| | SS6-96-12 | 42" x 96" | 162.0 | 1944 | 2430 | 6" Clear | 275" | 99" | 97" | 216.0 | 60,800 | 7,900 |

## SHELL AND WINDING

Robust Dual-Wall Construction for piece of mind and long service life. Entire vessel including domes is wound on a computer-controlled multi-axis machine.

NOTES:

1. Standard header sizing shown is based on 10 fps max. at 15 gpm per sq. ft.
2. For more dimensional detail, consult the appropriate Cut Sheet in our Design Manual.
3. S-48 Vessels are not available in A Style. Dimensions above represent C Style.
4. For special requirements including non-standard header sizes/locations and systems consisting of more vessels than shown, please contact our Applications Engineering at: PoolApplicationRFQ@pentair.com

# STARK™ SS SERIES™ FILTERS (continued)
## HORIZONTAL SAND FILTRATION SYSTEMS

SS SERIES SYSTEMS INCLUDE:

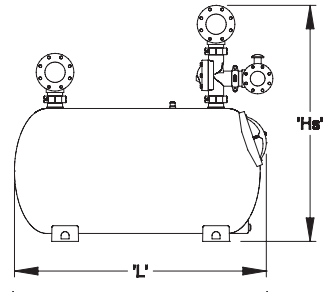
- Manway viewport standard on all Stark tanks
- Stark backwash valves (1 per tank)
- Pre-glued piping utilizing grooved couplings
- Stark diaphragm-style priority valve (on dual tank systems)

WITH FULLY AUTOMATIC (CA100) CONTROL OPTION

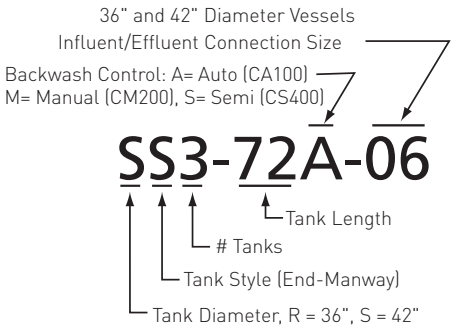
- Effluent Flow Sensor/Saddle
- Temperature Probe

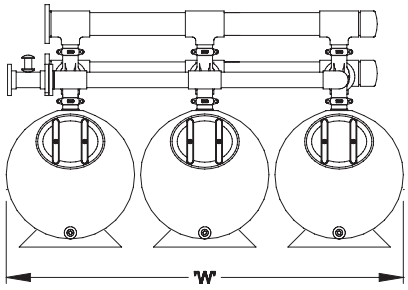
ADDITIONAL ADDERS

- Pressure Booster System (PBS01)
- Manual or Motorized Butterfly backwash
- Throttling valve for 3+ tank systems
- Advanced backwash controls




**SS Series System Numbering**




Custom Systems Available for your Application.

## FEATURED HIGHLIGHTS

- All vessel models are NSF listed
- Solid composite construction - does not employ a bladder.
- Vessels can be stacked to minimize foot print. Designed for Seismic Zone 4 loading with additional supports or braces.
- Vessels feature proprietary all-weather exterior coasting with UV inhibitors.
- Several backwash control options available.
- Multiple influent and effluent pipe locations available - A, B and C style

S SERIES SYSTEMS INCLUDE

Manway with Viewport standard on all Stark Tanks; Stark backwash valves (1 per tank); Stark diaphragm-style priority valve (on dual-tank systems).

ADDITIONAL ADDERS

Pressure Booster System (PBS01); Manual or motorized butterfly backwash; Throttling valve for 3+ tank systems; Advanced backwash controls.

# STARK™ S SERIES™ FILTERS
## HORIZONTAL SAND FILTRATION SYSTEMS

For use in commercial pool, water park and many aquarium applications. Standard systems accommodate flows from 135 to 2,500 GPM – custom systems accommodate unlimited flows.

All Stark S Series vessels are corrosion-proof, composite vessels. Systems are available with 100 psi rated filament-wound vessels. All vessels are 42" diameter to offer the best combination of cost and effectiveness for recreational water. Stark diaphragm valves and controls are standard; butterfly-valve options (including linked valves) are also available.

SA2-144M-08

Certified to NSF/ANSI Standard 50

**CAPACITY INFORMATION (INDEPENDENT OF STYLE/CONFIGURATION)**

| # Tanks | General System Number | Tank Size | Filtration Area (Sq. Ft.) | Flow (GPM) 12 gpm/sf | Flow (GPM) 15 gpm/sf | Backwash Valve Size/Type | Total Media (Cu. Ft.) | Operating Weight (lbs.) | Shipping Weight (lbs.) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | S1-48 | 42" x 48" | 12.8 | 154 | 192 | 4" Gray | 16.5 | 5,280 | 870 |
| | S1-72 | 42" x 72" | 20.0 | 240 | 300 | 6" Clear | 26.0 | 7,920 | 1,110 |
| | S1-96 | 42" x 96" | 27.0 | 324 | 405 | 6" Clear | 36.0 | 10,560 | 1,350 |
| | S1-120 | 42" x 120" | 35.0 | 420 | 525 | 6" Clear | 45.5 | 13,200 | 1,590 |
| | S1-144 | 42" x 144" | 41.0 | 492 | 615 | 6" Clear | 55.5 | 15,840 | 1,830 |
| 2 | S2-48 | 42" x 48" | 25.6 | 307 | 384 | 4" Gray | 33.0 | 10,560 | 1,740 |
| | S2-72 | 42" x 72" | 40.0 | 480 | 600 | 6" Clear | 52.0 | 15,840 | 2,220 |
| | S2-96 | 42" x 96" | 54.0 | 648 | 810 | 6" Clear | 72.0 | 21,120 | 2,700 |
| | S2-120 | 42" x 120" | 70.0 | 840 | 1050 | 6" Clear | 91.0 | 26,400 | 3,180 |
| | S2-144 | 42" x 144" | 82.0 | 984 | 1230 | 6" Clear | 111.0 | 31,680 | 3,660 |
| 3 | S3-48 | 42" x 48" | 38.4 | 461 | 576 | 4" Gray | 49.5 | 15,840 | 2,610 |
| | S3-72 | 42" x 72" | 60.0 | 720 | 900 | 6" Clear | 78.0 | 23,760 | 3,330 |
| | S3-96 | 42" x 96" | 81.0 | 972 | 1215 | 6" Clear | 108.0 | 31,680 | 4,050 |
| | S3-120 | 42" x 120" | 105.0 | 1260 | 1575 | 6" Clear | 136.5 | 39,600 | 4,770 |
| | S3-144 | 42" x 144" | 123.0 | 1476 | 1845 | 6" Clear | 166.5 | 47,520 | 5,490 |
| 4 | S4-48 | 42" x 48" | 51.2 | 614 | 768 | 4" Gray | 66.0 | 21,120 | 3,480 |
| | S4-72 | 42" x 72" | 80.0 | 960 | 1200 | 6" Clear | 104.0 | 31,680 | 4,440 |
| | S4-96 | 42" x 96" | 108.0 | 1296 | 1620 | 6" Clear | 144.0 | 42,240 | 5,400 |
| | S4-120 | 42" x 120" | 140.0 | 1680 | 2100 | 6" Clear | 182.0 | 52,800 | 6,360 |
| | S4-144 | 42" x 144" | 164.0 | 1968 | 2460 | 6" Clear | 222.0 | 63,360 | 7,320 |

**DIMENSIONS - SIDE-BY-SIDE**

| Descriptive System Number | Single-Tank and Side-by-Side Systems 'W' | 'L' | 'Hs" |
|---|---|---|---|
| *SC1-48-04 | 44" | 82" | 47" |
| *SA1-72-06 | 44" | 107" | 67" |
| *SA1-96-06 | 44" | 122" | 67" |
| SA1-120-06 | 44" | 146" | 67" |
| SA1-144-06 | 44" | 170" | 67" |
| *SC2-48-06 | 96" | 80" | 56" |
| *SA2-72-06 | 99" | 92" | 86" |
| *SA2-96-06 | 99" | 116" | 86" |
| SA2-120-08 | 110" | 144" | 91" |
| SA2-144-08 | 110" | 168" | 91" |
| *SC3-48-06 | 152" | 80" | 56" |
| *SA3-72-08 | 152" | 94" | 91" |
| *SA3-96-08 | 152" | 117" | 91" |
| SA3-120-10 | 152" | 138" | 96" |
| SA3-144-10 | 152" | 162" | 96" |
| *SC4-48-06 | 200" | 80" | 56" |
| *SA4-72-08 | 200" | 94" | 91" |
| *SA4-96-10 | 200" | 118" | 96" |
| SA4-120-10 | 200" | 142" | 96" |
| SA4-144-12 | 200" | 168" | 100" |

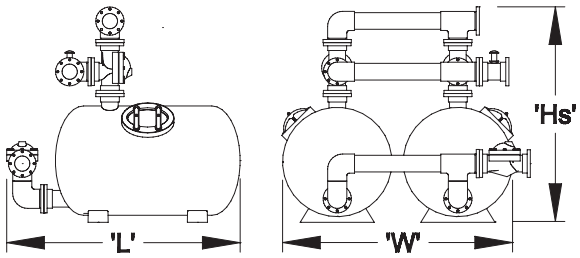
*For systems with an asterisk, SS Series systems may be used with a smaller footprint.


SB2-144M-08ST

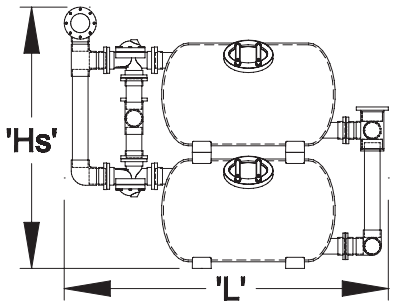
# STARK™ S SERIES™ FILTERS (continued)
## HORIZONTAL SAND FILTRATION SYSTEMS
### DIMENSIONS AND PERFORMANCE

NOTES:

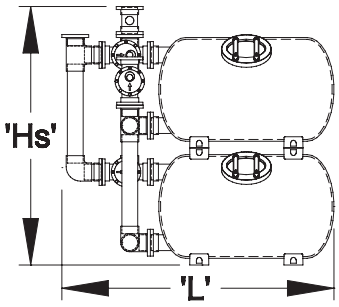
1. Standard header sizing shown is based on 10 fps max. at 15 gpm per sq. ft.
2. For more dimensional detail, consult the appropriate Cut Sheet in our Design Manual.
3. S-48 Vessels are not available in A Style. Dimensions represent C Style.
4. For special requirements including non-standard header sizes/locations and systems consisting of more vessels than shown, please contact our Applications Engineering at: PoolApplicationRFQ@pentair.com



A-Style Side-by-Side



B-Style Stacked

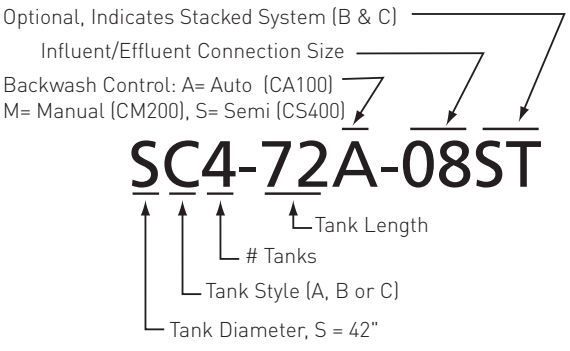


C-Style Stacked

S SERIES

| DIMENSIONS - STACKED SYSTEMS | | | | | | |
|---|---|---|---|---|---|---|
| Style | # Tanks | Descriptive System Number | Filtration Area (Sq. Ft.) | 'W' | 'L' | 'Hs' |
| Stacked Systems - B-Style | 2 | SB2-48-06ST | 25.6 | 44" | 98" | 107" |
| | | SB2-72-06ST | 40.0 | 44" | 135" | 109" |
| | | SB2-96-06ST | 54.0 | 44" | 159" | 109" |
| | | SB2-120-08ST | 70.0 | 44" | 191" | 109" |
| | | SB2-144-08ST | 82.0 | 44" | 215" | 109" |
| | 4 | SB4-48-06ST | 51.2 | 92" | 99" | 108" |
| | | SB4-72-08ST | 80.0 | 92" | 140" | 111" |
| | | SB4-96-10ST | 108.0 | 100" | 166" | 119" |
| | | SB4-120-10ST | 140.0 | 100" | 190" | 119" |
| | | SB4-144-12ST | 164.0 | 104" | 217" | 122" |
| Stacked Systems - C-Style | 2 | SC2-48-06ST | 25.6 | 50" | 80" | 107" |
| | | SC2-72-06ST | 40.0 | 50" | 114" | 109" |
| | | SC2-96-06ST | 54.0 | 50" | 138" | 109" |
| | | SC2-120-08ST | 70.0 | 53" | 165" | 109" |
| | | SC2-144-08ST | 82.0 | 53" | 189" | 109" |
| | 4 | SC4-48-06ST | 51.2 | 92" | 88" | 108" |
| | | SC4-72-08ST | 80.0 | 92" | 122" | 111" |
| | | SC4-96-10ST | 108.0 | 100" | 146" | 119" |
| | | SC4-120-10ST | 140.0 | 100" | 169" | 119" |
| | | SC4-144-12ST | 164.0 | 104" | 193" | 122" |

**S Series System Numbering**



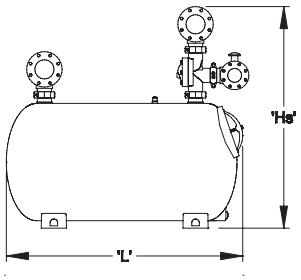
## FEATURED HIGHLIGHTS

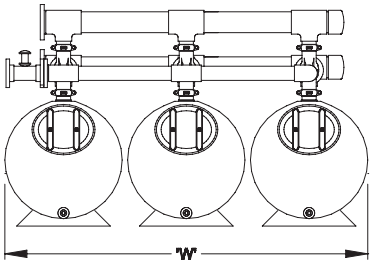
- All vessel models are NSF listed.
- Manway cover has integral viewport for Internal filter observation.
- Solid composite construction - does not employ a bladder.
- Schedule 80 Face Piping is fully assembled.
- Vessels feature proprietary all-weather exterior coating with UV inhibitors.
- Vessels greater than 40 SF utilize an innovative 8" air-actuated backwash valve.
- Several backwash control options available.
- Butterfly-valve options including linked tandem valves are also available.

# STARK™ 5S SERIES™ FILTERS
## HORIZONTAL SAND FILTRATION SYSTEMS

The 5S Series Filter Systems are designed as an extension to the industry-leading SS Series Filtration Systems, with many of the same features including fully-assembled Schedule 80 Face Piping, with the addition of new innovations. The 5S Series Filter Systems include the only 8" backwash valve in the industry, and air valve actuation for the smoothest, quickest valve movement.

### DIMENSIONS AND PERFORMANCE




Certified to NSF/ANSI Standard 50

NOTES:

1. Standard header sizing shown is based on 10 fps max. at 15 gpm per sq. ft.
2. For more dimensional detail, consult the appropriate Cut Sheet in our Design Manual.
3. For special requirements including non-standard header sizes/locations and systems consisting of more vessels than shown, please contact our Applications Engineering at: PoolApplicationRFQ@pentair.com

**5S Series System Numbering**

60" Diameter Vessels
Influent/Effluent Connection Size
Backwash Control: A= Auto (CA100)
M= Manual (CM200), S= Semi (CS400)

5S3-50A-10

- Tank Filter Area
- # Tanks
- Tank Style (End-Manway)
- Tank Diameter, 5 = 60" Diameter

**CAPACITY INFORMATION**

| # Tanks | System Number | Tank Size | Filtration Area (Sq. Ft.) | Flow (GPM) 12 gpm/sf | Flow (GPM) 15 gpm/sf | Backwash Valve Size/Type | 'W' | 'L' | "Hs' | Total Media (Cu. Ft.) | Operating Weight (lbs.) | Shipping Weight (lbs.) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5S1-30-06 | 60" x 78" | 30.0 | 360 | 450 | 6" Clear | 62" | 83" | 106" | 63.5 | 15,000 | 2,000 |
| | 5S1-35-06 | 60" x 90" | 35.0 | 420 | 525 | 6" Clear | 62" | 95" | 106" | 74.3 | 17,000 | 2,300 |
| | 5S1-40-06 | 60" x 102" | 40.0 | 480 | 600 | 6" Clear | 62" | 107" | 106" | 96.4 | 20,000 | 2,600 |
| | 5S1-45-08 | 60" x 114" | 45.0 | 540 | 675 | 8" Gray | 62" | 119" | 123" | 26.4 | 23,000 | 2,900 |
| | 5S1-50-08 | 60" x 126" | 50.0 | 600 | 750 | 8" Gray | 62" | 131" | 123" | 107.4 | 25,000 | 3,200 |
| 2 | 5S2-30-08 | 60" x 78" | 60.0 | 720 | 900 | 6" Clear | 128" | 83" | 111" | 127.0 | 30,000 | 4,100 |
| | 5S2-35-08 | 60" x 90" | 70.0 | 840 | 1050 | 6" Clear | 128" | 95" | 111" | 148.6 | 35,000 | 4,600 |
| | 5S2-40-08 | 60" x 102" | 80.0 | 960 | 1200 | 6" Clear | 128" | 107" | 111" | 170.8 | 40,000 | 5,200 |
| | 5S2-45-08 | 60" x 114" | 90.0 | 1080 | 1350 | 8" Gray | 128" | 119" | 127" | 192.8 | 45,000 | 5,700 |
| | 5S2-50-10 | 60" x 126" | 100.0 | 1200 | 1500 | 8" Gray | 128" | 131" | 133" | 214.8 | 49,000 | 6,300 |
| 3 | 5S3-30-08 | 60" x 78" | 90.0 | 1080 | 1350 | 6" Clear | 194" | 83" | 111" | 190.5 | 45,000 | 6,100 |
| | 5S3-35-10 | 60" x 90" | 105.0 | 1260 | 1575 | 6" Clear | 194" | 95" | 117" | 222.9 | 53,000 | 6.900 |
| | 5S3-40-10 | 60" x 102" | 120.0 | 1200 | 1800 | 6" Clear | 194" | 107" | 117" | 256.2 | 60,000 | 7,800 |
| | 5S3-45-10 | 60" x 114" | 135.0 | 1620 | 2025 | 8" Gray | 194" | 119" | 133" | 289.2 | 68,000 | 8,600 |
| | 5S3-50-12 | 60" x 126" | 150.0 | 1800 | 2250 | 8" Gray | 194" | 131" | 135" | 322.2 | 75,000 | 9,500 |
| 4 | 5S4-30-10 | 60" x 78" | 120.0 | 1440 | 1800 | 6" Clear | 260" | 83" | 117" | 254.0 | 61,000 | 8,100 |
| | 5S4-35-10 | 60" x 90" | 140.0 | 1680 | 2100 | 6" Clear | 260" | 95" | 117" | 297.2 | 70,000 | 9,200 |
| | 5S4-40-12 | 60" x 102" | 160.0 | 1920 | 2400 | 6" Clear | 260" | 107" | 119" | 341.6 | 80,000 | 10,400 |
| | 5S4-45-12 | 60" x 114" | 180.0 | 2160 | 2700 | 8" Gray | 260" | 119" | 135" | 385.6 | 92,000 | 11,500 |
| | 5S4-50-12 | 60" x 126" | 200.0 | 2400 | 3000 | 8" Gray | 260" | 131" | 135" | 429.6 | 100,000 | 12,600 |

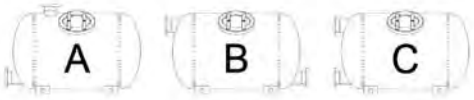
## FEATURED HIGHLIGHTS

Also available in complete systems using either our proprietary diaphragm valves or linked butterfly valves.

# STARK™ AQ SERIES™ FILTERS
## LARGE DIAMETER SYSTEMS & VESSELS

48" and 60" Diameter Stackable Horizontal Filters are available as complete filtration systems. The Stark AQ Series Filters are ideal for high-load or large flows of water, such as water parks and public aquariums. NSF-50 Listed. 75 psi pressure rating.

Stark AQ Series Sand Filter




Certified to NSF/ANSI Standard 50

| AQ SERIES VESSEL SIZING AND CAPACITY INFORMATION | | | | | |
|---|---|---|---|---|---|
| Vessel Model Number | Available Styles* | Filtration Area (sq ft) | Internal Diameter (feet) | Internal Length (ft) (feet) | Standard Flange Size (ANSI) |
| 4X6 | A, B, C | 22 | 4.0 | 6.0 | 6" |
| 4X8 | A, B, C | 30 | 4.0 | 8.0 | 6" |
| 4X10 | A, B, C | 38 | 4.0 | 10.0 | 6" |
| 4X12 | A, B, C | 46 | 4.0 | 12.0 | 8" |
| 4X14 | A, B, C | 54 | 4.0 | 14.0 | 8" |
| 5X8 | A, B, C | 37 | 5.0 | 8.0 | 8" |
| 5X10 | A, B, C | 47 | 5.0 | 10.0 | 8" |
| 5X12 | A, B, C | 57 | 5.0 | 12.0 | 8" |
| 5X14 | A, B, C | 67 | 5.0 | 14.0 | 8" |
| 5X16 | A, B, C | 77 | 5.0 | 16.0 | 8" |

*Styles B and C are stackable. All are available with the manway on the other side (reverse manway).

Stark V Series Sand Filter

# STARK™ V SERIES™ FILTERS
## HIGH LOAD VERTICAL FILTERS

Deep-Bed Filters provide "plug-flow" for extreme load applications such as sea-water intake, mammal and marine mammal exhibits. They are also frequently used as carbon (GAC) filters.

| V SERIES VESSEL SIZING AND CAPACITY INFORMATION | | | | | |
|---|---|---|---|---|---|
| Vessel Model Number | Styles | Filtration Area (sq ft) | Internal Diameter (feet) | Internal Height (ft) (feet) | Standard Flange Size (ANSI) |
| V3672 | Vertical | 7.1 | 3.0 | 6.0 | 3" |
| V4272 | Vertical | 9.6 | 3.5 | 6.0 | 3" |
| V4872 | Vertical | 12.6 | 4.0 | 6.0 | 4" |
| V6072 | Vertical | 19.6 | 5.0 | 6.0 | 6" |
| V72 | Vertical | 28.3 | 6.0 | 8.8 | 6" |
| V96 | Vertical | 50.3 | 8.0 | 9.5 | 6" |

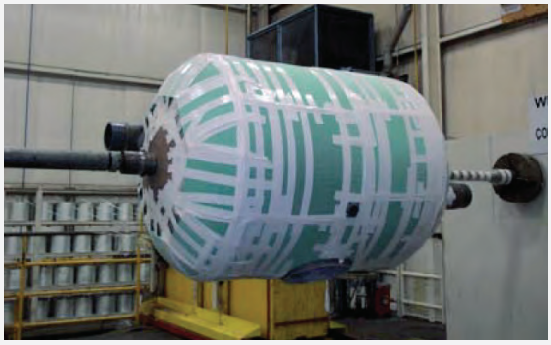
## TANK WINDING

# STARK™ TANKS ARE CORROSION PROOF

Stark fiberglass filters are designed to have a life span three-to-five-times longer than metal filters. Each Stark filter tank is manufactured under the strictest quality-control procedures. The integral composite fiberglass construction eliminates welds or seams that can leak, blow out, or rupture from vacuum damage.

All NSF-50 listed Stark Horizontal filters are designed for 75 or 100 psi working pressure, and 400 psi burst test, to meet multiple budgets and specs. Each tank is pressure tested prior to shipment. And the tank is completely impervious to corrosion.

Stark's 100 percent corrosion-resistant fiberglass filters provide the perfect solution: dependable performance with ease of operation.



## OPTIONAL INTEGRAL INSULATION

Any Stark Filter can be manufactured with integral insulation between the shell and winding layers to last as long as the vessel. Used for both cold water and warm water life support applications when filters are installed where a high differential exists between water and ambient air temperature.

# STARK™ FILTRATION
## ADDITIONAL FEATURES AND OPTIONS

### COMMERCIAL LATERAL

2" NPT injection molded ABS with "V" groove slots and reinforcing ribs for best performance and service life.

### MANWAY VIEWPORT

Provides Visual Observation of the sand bed during Filtration and Backwash. Standard on all Stark vessels. Manway opening is 12" X 16" elliptical for easy access.

### VALVES

Cost-effective backwash control valve have manual or automatic options. 6" version (on most models) includes a transparent ABS valve housing and cover to display valve positioning and provide convenient maintenance inspections.

### OPTIONAL PRESSURE BOOSTER SYSTEM (PBS01)

Provides consistent valve-actuation where city-water pressure is unreliable.

# BACKWASH CONTROLS

### CM200 MANUAL BACKWASH CONTROLLER

(Backwash Option "M")

This is the simplest option. No electronics or programming required; simply turn the knob to backwash each tank in the system.

### CS 400 SEMI-AUTO BACKWASH CONTROLLER

(Backwash Option "S")

This controller is programmable and controls every aspect of the backwash cycle once initiated. Backwash can be initiated three ways: by an operator with the touch of a button, by a signal from a master controller (such as the AK600), or by a signal from an optional differential pressure switch (CS400-DP). Stored backwash data and history, alarms, and calculated backwash cycle times are also features of the CS400 controller, as are relays for communication with the heater, pump and Acu-drive.

### CA 100 AUTOMATIC BACKWASH CONTROLLER

(Backwash Option "A")

This is the most comprehensive backwash controller and can be readily reprogrammed to initiate backwash automatically based on differential pressure (integral pressure transducers are standard), time (internal seven-day clock with battery back-up is standard), flow (with optional flow sensor), or any combination of the above. The controller has real-time display of operation mode, filter flow rate, and water temperature (with optional temperature probe). Also, includes Energy Saver Mode for simple On/Off pump scheduling and various interlocks and relays to communicate with other equipment (pump, heater, Acu-Drive).

### BUTTERFLY VALVE SYSTEMS

Systems are also available with various, simple butterfly valve backwash options, including Single Lever Linkage (Backwash Option "SL"; Single-Tank Systems Only – tank is backwashed by the throw of a single lever); and Tandem Butterfly Valve Configurations (Backwash Option TM; Multiple Tank Systems - each Stark backwash valve is replaced by a linked pair of butterfly valves. Tanks are backwashed one-at-a-time with filtered water from adjacent tank(s)). Custom systems are also available using individual (non-linked) butterfly valves.


Butterfly Valve Systems

PENTAIR

WHISPERFLO®

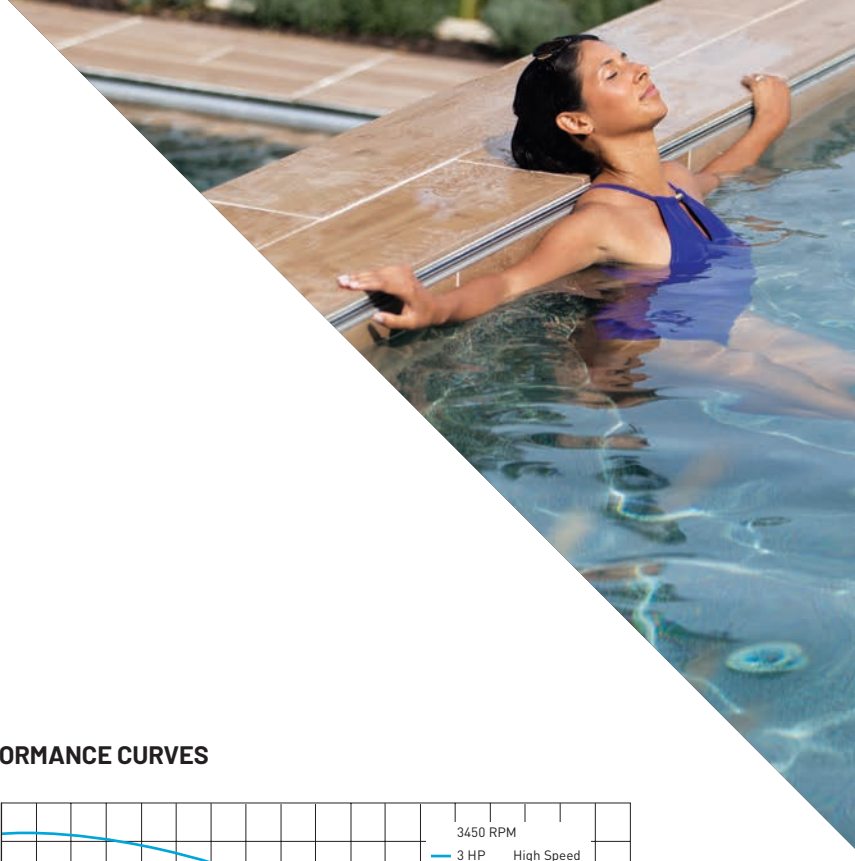
# WHISPERFLO®

## HIGH PERFORMANCE PUMP

### The industry standard by every measure.

We call it the WhisperFlo Pump for good reason. This innovative hydraulic design moves water more efficiently and more quietly than competitive pumps. Under typical operating conditions, the WhisperFlo Pump offers the highest water flow of any high performance pump. And, it's designed to be a tireless workhorse. The pump's engineered thermoplastic housing withstands extreme heat and resists corrosion. The commercial-grade motor frame has a stainless-steel motor shaft and sealed bearings that never need lubrication. Engineered to provide optimum performance in any size pool or pool and spa combination, the WhisperFlo Pump is built to last a lifetime and, as a result, has been the industry's top seller for years.


PENTAIR.COM



## WHISPERFLO® HIGH PERFORMANCE PUMP

# Quiet and durable.

The WhisperFlo Pump delivers maximum circulation and trouble-free life with minimal maintenance. Our legendary hydraulic design has been refined over 40 years for superior performance. No wonder more than 2 million Pentair Pumps have been selected by pool professionals.

## KEY FEATURES

### Cam and Ramp™ Lid
The engineered-polymer, user-friendly, see-through lid remains clear and strong for years. It permits fast and easy inspection of the strainer basket and locks in place with a quarter-turn, making cleaning easy and quick.

### Advanced FunnelFlo™ Diffuser and Impeller
Maximize water flow while minimizing turbulence and noise.

### Oversized strainer basket
Extends time between cleanings.

### TEFC/Super-Duty motor options
Provide superior performance and longevity.

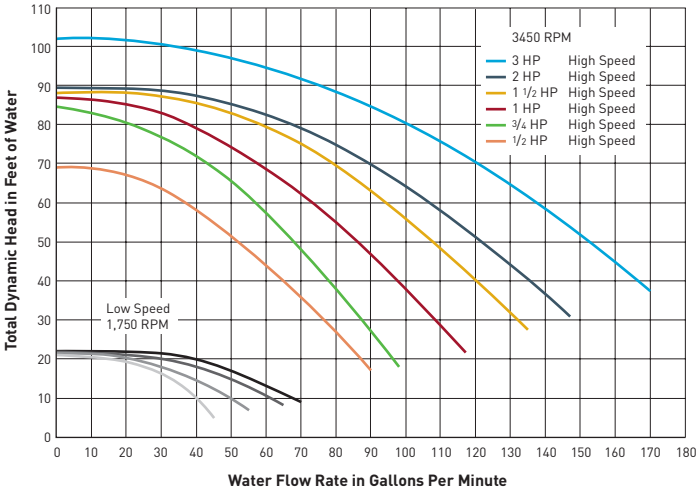
### Heavy-duty threading
For dependable, worry-free connections.

### Specially engineered design
Assures whisper-quiet operation.

### Versatile
Ideal for pool and spa combinations and for operating in-floor cleaning systems.

### Durable
Commercial-grade frame, stainless-steel shaft and permanently lubricated, sealed bearings for long life.

## PERFORMANCE CURVES




*Pumps and replacement motors that are single speed and one (1) total HP or greater cannot be sold, offered for sale or installed in a residential pool for filtration use in California, Title 20 CCR sections 1601-1609.*

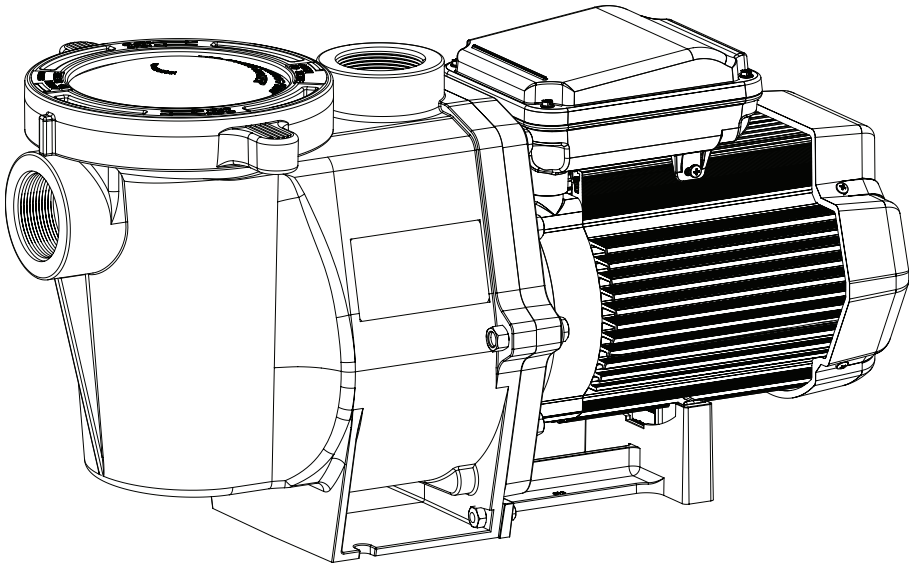
PENTAIR

**1620 Hawkins Ave | Sanford, NC 27330 | United States | 800.831.7133 | pentair.com**

PENTAIR

# WHISPERFLO®
## HIGH PERFORMANCE PUMP





# INSTALLATION AND USER'S GUIDE

IMPORTANT SAFETY INSTRUCTIONS
*READ AND FOLLOW ALL INSTRUCTIONS*
SAVE THESE INSTRUCTIONS

## CUSTOMER SERVICE / TECHNICAL SUPPORT

If you have questions about ordering Pentair Aquatic Systems replacement parts, and pool products, please contact:

**Customer Service and Technical Support, USA**
(8 A.M. to 4:30 P.M. — Eastern/Pacific Times)
Phone: (800) 831-7133
Fax: (800) 284-4151

**Web site**
Visit *www.pentairpool.com* or *www.staritepool.com*

**Sanford, North Carolina** (8 A.M. to 4:30 P.M. ET)
Phone: (919) 566-8000
Fax: (919) 566-8920

**Moorpark, California** (8 A.M. to 4:30 P.M. PT)
Phone: (805) 553-5000 (Ext. 5591)
Fax: (805) 553-5515

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10951 West Los Angeles Ave., Moorpark, CA 93021 • (805) 553-5000



P/N 071109 Rev. L 6/28/18

# IMPORTANT PUMP WARNING AND SAFETY INSTRUCTIONS

## IMPORTANT NOTICE

This guide provides installation and operation instructions for this pump. Consult Pentair with any questions regarding this equipment.

**Attention Installer:** This guide contains important information about the installation, operation and safe use of this product. This information should be given to the owner and/or operator of this equipment after installation or left on or near the pump.

**Attention User:** This manual contains important information that will help you in operating and maintaining this product. Please retain it for future reference.

### READ AND FOLLOW ALL INSTRUCTIONS SAVE THESE INSTRUCTIONS

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

**DANGER** Warns about hazards that can cause death, serious personal injury, or major property damage if ignored.

**WARNING** Warns about hazards that may cause death, serious personal injury, or major property damage if ignored.

**CAUTION** Warns about hazards that may or can cause minor personal injury or property damage if ignored.

**NOTE** Indicates special instructions not related to hazards.

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

When installing and using this electrical equipment, basic safety precautions should always be followed, include the following:

**WARNING** Do not permit children to use this product.

**WARNING** **RISK OF ELECTRICAL 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** This unit 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 the 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 pump without the test button being pushed, a ground current is flowing, indicating the possibility of an electric shock. Do not use this pump. Disconnect the pump and have the problem corrected by a qualified service representative before using.

**CAUTION** This pump is for use with permanent 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.

**General Warnings**

- Never open the inside of the drive motor enclosure. There is a capacitor bank that holds a 230 VAC charge even when there is no power to the unit.
- The pump is not submersible.
- The pump is capable of high flow rates; use caution when installing and programming to limit pumps performance potential with old or questionable equipment.
- Code requirements for electrical connection differ from country to country, state to state, as well as local municipalities. Install equipment in accordance with the National Electrical Code and all applicable local codes and ordinances.
- Before servicing the pump; switch OFF power to the pump by disconnecting the main circuit to the pump.
- This appliance is not intended for use by persons (including children) of reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.

**DANGER** FAILURE TO FOLLOW ALL INSTRUCTIONS AND WARNINGS CAN RESULT IN SERIOUS BODILY INJURY OR DEATH. **THIS PUMP SHOULD BE INSTALLED AND SERVICED ONLY BY A QUALIFIED POOL SERVICE PROFESSIONAL. INSTALLERS, POOL OPERATORS AND OWNERS MUST READ THESE WARNINGS AND ALL INSTRUCTIONS IN THE OWNER'S MANUAL BEFORE USING THIS PUMP. THESE WARNINGS AND THE OWNER'S MANUAL MUST BE LEFT WITH THE POOL OWNER.**

**DANGER** SUCTION ENTRAPMENT HAZARD: STAY OFF THE MAIN DRAIN AND AWAY FROM ALL SUCTION OUTLETS!

THIS PUMP PRODUCES HIGH LEVELS OF SUCTION AND CREATES A STRONG VACUUM AT THE MAIN DRAIN AT THE BOTTOM OF THE BODY OF WATER. THIS SUCTION IS SO STRONG THAT IT CAN TRAP ADULTS OR CHILDREN UNDER WATER IF THEY COME IN CLOSE PROXIMITY TO A DRAIN OR A LOOSE OR BROKEN DRAIN COVER OR GRATE.

THE USE OF UNAPPROVED COVERS OR ALLOWING USE OF THE POOL OR SPA WHEN COVERS ARE MISSING, CRACKED OR BROKEN CAN RESULT IN BODY OR LIMB ENTRAPMENT, HAIR ENTANGLEMENT, BODY ENTRAPMENT, EVISCERATION AND/OR DEATH.

The suction at a drain or outlet can cause:

**Limb Entrapment:** When a limb is sucked or inserted into an opening resulting in a mechanical bind or swelling. This hazard is present when a drain cover is missing, broken, loose, cracked or not properly secured.

**Hair Entanglement:** When the hair tangles or knots in the drain cover, trapping the swimmer underwater. This hazard is present when the flow rating of the cover is too small for the pump or pumps.

**Body Entrapment:** When a portion of the body is held against the drain cover trapping the swimmer underwater. This hazard is present when the drain cover is missing, broken or the cover flow rating is not high enough for the pump or pumps.

**Evisceration/Disembowelment:** When a person sits on an open pool (particularly a child wading pool) or spa outlet and suction is applied directly to the intestines, causing severe intestinal damage. This hazard is present when the drain cover is missing, loose, cracked, or not properly secured.

# IMPORTANT PUMP WARNING AND SAFETY INSTRUCTIONS

**Mechanical Entrapment:** When jewelry, swimsuit, hair decorations, finger, toe or knuckle is caught in an opening of an outlet or drain cover. This hazard is present when the drain cover is missing, broken, loose, cracked, or not properly secured.

**NOTE: ALL SUCTION PLUMBING MUST BE INSTALLED IN ACCORDANCE WITH THE LATEST NATIONAL AND LOCAL CODES, STANDARDS AND GUIDELINES.**

**⚠WARNING** TO MINIMIZE THE RISK OF INJURY DUE TO SUCTION ENTRAPMENT HAZARD:

- A properly installed and secured ANSI/ASME A112.19.8 approved anti-entrapment suction cover must be used for each drain.
- Each suction cover must be installed at least three (3') feet apart, as measured from the nearest point to nearest point.
- Regularly inspect all covers for cracks, damage and advanced weathering.
- If a cover becomes loose, cracked, damaged, broken or is missing, replace with an appropriate certified cover.
- Replace drain covers as necessary. Drain covers deteriorate over time due to exposure to sunlight and weather.
- Avoid getting hair, limbs or body in close proximity to any suction cover, pool drain or outlet.
- Disable suction outlets or reconfigure into return inlets.

**⚠WARNING** A clearly labeled emergency shut-off switch for the pump must be in an easily accessible, obvious place. Make sure users know where it is and how to use it in case of emergency.

**The Virginia Graeme Baker (VGB) Pool and Spa Safety Act** creates new requirements for owners and operators of commercial swimming pools and spas.

Commercial pools or spas constructed on or after December 19, 2008, shall utilize:

(A) A multiple main drain system without isolation capability with suction outlet covers that meet ASME/ANSI A112.19.8a Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, and Hot Tubs and either:

(i) A safety vacuum release system (SVRS) meeting ASME/ANSI A112.19.17 Manufactured Safety Vacuum Release systems (SVRS) for Residential and Commercial Swimming Pool, Spa, Hot Tub, and Wading Pool Suction Systems and/or ASTM F2387 Standard Specification for Manufactured Safety Vacuum Release Systems (SVRS) for Swimming pools, Spas and Hot Tubs or

(ii) A properly designed and tested suction-limiting vent system or

(iii) An automatic pump shut-off system.

Commercial pools and spas constructed prior to December 19, 2008, with a single submerged suction outlet shall use a suction outlet cover that meets ASME/ANSI A112.19.8a and either:

(A) A SVRS meeting ASME/ANSI A112.19.17 and/or ASTM F2387, or

(B) A properly designed and tested suction-limiting vent system, or

(C) An automatic pump shut-off system, or

(D) Disabled submerged outlets, or

(E) Suction outlets shall be reconfigured into return inlets.

**For Installation of Electrical Controls at Equipment Pad (ON/OFF Switches, Timers and Automation Load Center)**

**⚠CAUTION** Install all electrical controls at equipment pad, such as on/off switches, timers, and control systems, etc. to allow the operation (startup, shut-down, or servicing) of any pump or filter so the user does not place any portion of his/her body over or near the pump strainer lid, filter lid or valve closures. This installation should allow the user enough space to stand clear of the filter and pump during system start-up, shut down or servicing of the system filter.

**⚠DANGER** **HAZARDOUS PRESSURE: STAND CLEAR OF PUMP AND FILTER DURING START UP**

Circulation systems operate under high pressure. When any part of the circulating system (i.e. locking ring, pump, filter, valves, etc.) is serviced, air can enter the system and become pressurized. Pressurized air can cause the pump housing cover, filter lid, and valves to violently separate which can result in severe personal injury or death. Filter tank lid and strainer cover must be properly secured to prevent violent separation. Stand clear of all circulation system equipment when turning on or starting up pump.

Before servicing equipment, make note of the filter pressure. Be sure that all controls are set to ensure the system cannot inadvertently start during service. Turn off all power to the pump. **IMPORTANT: Place filter manual air relief valve in the open position and wait for all pressure in the system to be relieved.**

Before starting the system, fully open the manual air relief valve and place all system valves in the "open" position to allow water to flow freely from the tank and back to the tank. Stand clear of all equipment and start the pump.

**IMPORTANT: Do not close filter manual air relief valve until all pressure has been discharged from the valve and a steady stream of water appears.** Observe filter pressure gauge and be sure it is not higher than the pre-service condition.

**General Installation Information**

- All work must be performed by a qualified service professional, and must conform to all national, state, and local codes.
- Install to provide drainage of compartment for electrical components.
- These instructions contain information for a variety of pump models and therefore some instructions may not apply to a specific model. All models are intended for use in swimming pool applications. The pump will function correctly only if it is properly sized to the specific application and properly installed.

**⚠WARNING** Pumps improperly sized or installed or used in applications other than for which the pump was intended can result in severe personal injury or death. These risks may include but not be limited to electric shock, fire, flooding, suction entrapment or severe injury or property damage caused by a structural failure of the pump or other system component.

**⚠WARNING** The pump can produce high levels of suction within the suction side of the plumbing system. These high levels of suction can pose a risk if a person comes within the close proximity of the suction openings. A person can be seriously injured by this high level of vacuum or may become trapped and drown. It is absolutely critical that the suction plumbing be installed in accordance with the latest national and local codes for swimming pools.

**Pumps and replacement motors that are single speed and one (1) Total HP or greater cannot be sold, offered for sale, or installed in a residential pool for filtration use in California, Title 20 CCR sections 1601-1609.**

Warnings and safety instructions for Pentair Aquatic Systems pumps and other related products are available at: **http://www.pentairpool.com/pool-owner/safety-warnings/** or call (800) 831-7133 for additional free copies of these instructions. Please refer to **http://www.pentairpool.com/pool-owner/safety-warnings/** for warning and safety instructions related to the this product.

# INSTALLATION



Only a qualified plumbing professional should install the WhisperFlo® High Performance Pump. Refer to *"Pump Warning And Safety Instructions"* on pages ii - iii for additional installation and safety information.

## Location

Be sure the pump location meets the following requirements:

**Note:** Do not install this pump within an outer enclosure or beneath the skirt of a hot tub or spa unless marked accordingly.

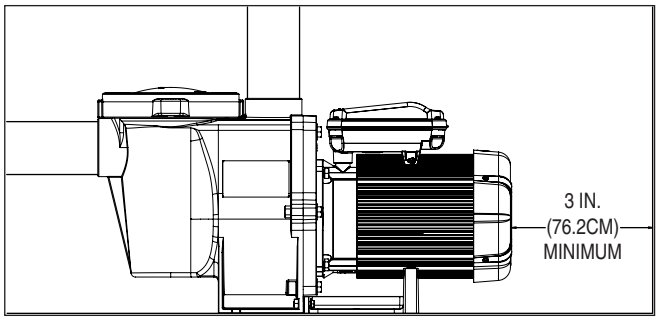
1. Install the pump as close to the pool or spa as possible. To reduce friction loss and improve efficiency, use short, direct suction piping returns.
2. Install a minimum of 5 feet (1.52 meters) from the inside wall of the pool and spa. Canadian installations require a minimum of 9.8 feet (3 meters) from pool water level.
3. Install the pump a minimum of 3 feet (.9 meters) from the heater outlet.
4. Do not install the pump more than 10 feet (3 meters) above the water level.
5. Install the pump in a well ventilated location protected from excessive moisture (i.e., rain gutter downspouts, sprinklers, etc.)
6. Install the pump with a rear clearance of at least 3 inches (76.2 mm) so that the motor can be removed easily for maintenance and repair.

## Piping

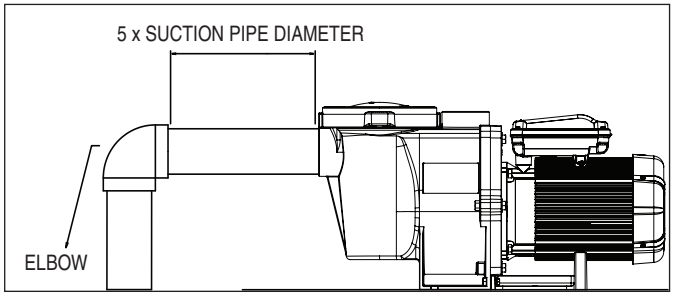
1. For improved pool plumbing, it is recommended to use a larger pipe size. When installing the inlet and outlet fittings (male adaptors), use thread sealant.
2. Piping on the suction side of the pump should be the same or larger than the return line diameter.
3. Plumbing on the suction side of the pump should be as short as possible.
4. For most installations Pentair recommends installing a valve on both the pump suction and return lines so that the pump can be isolated during routine maintenance. However, we also recommend that a valve, elbow or tee installed in the suction line should be no closer to the front of the pump than five (5) times the suction line diameter.

   **Example:** A 2 inch pipe requires a 10 inch (25.4 cm) straight run in front of the suction inlet of the pump. This will help the pump prime faster and last longer.

   **Note:** DO NOT install 90° elbows directly into the pump inlet or outlet.




Pump Rear Clearance




Recommended Piping

## Fittings and Valves

1. Do not install 90° elbows directly into pump inlet.
2. Flooded suction systems should have gate valves installed on suction and discharge pipes for maintenance, however, the suction gate valve should be no closer than five times the suction pipe diameter as described in this section.
3. Use a check valve in the discharge line when using this pump for any application where there is significant height to the plumbing after the pump.
4. Be sure to install check valves when plumbing in parallel with another pump. This helps prevent reverse rotation of the impeller and motor.

# Electrical Installation

**⚠WARNING** **RISK OF ELECTRICAL SHOCK OR ELECTROCUTION.** This pump must be installed by a licensed or certified electrician or a qualified service professional in accordance with the National Electrical Code (NEC) and all other applicable national or local codes and ordinances. Improper installation will create an electrical hazard which could result in death or serious injury to users, installers, or others due to electrical shock, and may also cause damage to property.

**Always disconnect power to the pump at the circuit breaker before servicing the pump. Failure to do so could result in death or serious injury to service people, users or others due to electric shock.**

Read all servicing instructions before working on the pump.

## Wiring

1. Be sure all electrical breakers, switches and automatic controls are turned off before wiring motor.

   **⚠WARNING** **STORED CHARGE** - Wait at least sixty (60) seconds before servicing.

2. Become familiar with the wiring diagram, volts, hertz, amps and phase of your particular pump motor. All of this information is provided on the motor nameplate label found on the side of the motor.
3. Be sure that the supply voltage meets the requirements listed on the motor nameplate. If these requirements are not met, permanent motor damage may occur.
4. For wiring sizes and general guidelines for proper electrical installation, please follow the specifications defined in the National Electrical Code and all other applicable national or local codes.
5. 3-Phase motors require external overload protection. An initial inspection is needed to ensure proper rotation of the pump.

   Once installed, momentarily cycle the power on and then off. Note the rotation of the motor fan or shaft as it comes to a stop. If wired correctly the motor shaft and/or fan will match the rotation arrow noted on the pump.
6. Use a strain relief and be sure all electrical connections are clean and tight.
7. Cut the wires to the appropriate length so they do not overlap or touch when connected.

## Grounding

1. Permanently ground the motor using the green ground screw, as shown below. Use the correct wire size and type specified by National Electrical Code. Be sure the ground wire is connected to an electrical service ground.
2. The pump should be permanently connected to either a circuit breaker, 2-pole timer or 2-pole relay.

   **Note:** If AC power is supplied by a GFCI circuit breaker, the pump should be wired on its own independent circuit **unless the pump is operated in tandem with a Pentair salt chlorine generator.**

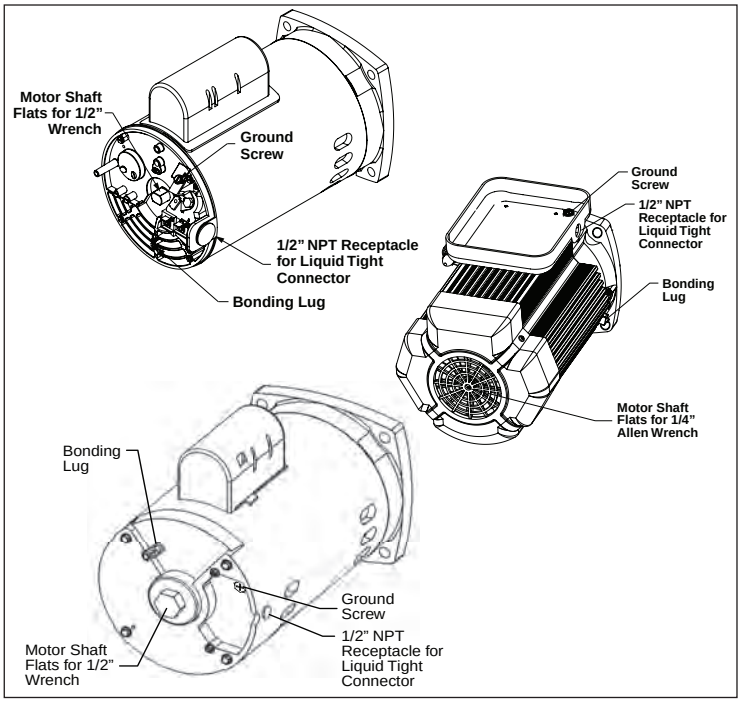
## Bonding

1. Bond the motor to the structure in accordance with the National Electrical Code and all other applicable national or local codes. Use a solid copper bonding conductor not smaller than 8 AWG. For Canadian installations, a 6 AWG or larger solid copper bonding conductor is required. Run a wire from the external bonding screw or lug to the bonding structure.
2. Connect the wire from the accessible bonding lug on the motor to all metal parts of the swimming pool, spa, or hot tub structure and to all electrical equipment, metal conduit, and metal piping within 5 feet (1.52 meters) of the inside walls of the swimming pool, spa, or hot tub. Run a wire from the external bonding screw or lug to the bonding structure.

**⚠WARNING** Before establishing or restoring power to the pump, be sure all electrical connections are tight and all electrical and wiring compartment covers are properly installed.

**Note:** When the pump is started and stopped by removing power with a relay or timer, a two-pole device should be used to apply and remove power to both POWER LINE TERMINALS.

*Pentair offers GFCI breakers which offer appropriate personal protection while meeting 2008 to current NEC Standards for Pool Pumps. See Pentair product catalog for details.*



# MAINTENANCE

**⚠WARNING** DO NOT open the strainer pot if pump fails to prime or if pump has been operating without water in the strainer pot. Pumps operated in these circumstances may experience a build up of vapor pressure and may contain scalding hot water. Opening the pump may cause serious personal injury. In order to avoid the possibility of personal injury, make sure the suction and discharge valves are open and strainer pot temperature is cool to touch, then open with extreme caution.

**⚠CAUTION** To prevent damage to the pump and for proper operation of the system, clean pump strainer and skimmer baskets regularly.

## Pump Strainer Basket

The pump strainer basket (or 'strainer pot', 'hair and lint pot'), is located in front of the volute. Inside the chamber is the basket which must be kept clean of leaves and debris at all times. View basket through the 'See Through Lid' to inspect for leaves and debris.

Regardless of the length of time between filter cleaning, it is most important to visually inspect the basket at least once a week. A dirty basket will reduce the efficiency of the filter and heater and also put an abnormal stress on the pump motor which would result in a costly repair bill.

## Cleaning the Pump Strainer Basket

1. Turn off the pump at the circuit breaker.
2. Relieve pressure in the system by allowing the water to cool.
3. Gently tap the clamp in a counter-clockwise direction to remove the clamp and lid.
4. Remove debris and rinse out the basket. Replace the basket if it is cracked.
5. Put the basket back into the housing. Be sure to align the notch in the bottom of the basket with the rib in the bottom of the volute.
6. Fill the pump pot and volute up to the inlet port with water.
7. Clean the cover, O-ring, and sealing surface of the pump pot. ***Note:*** It is important to keep the lid O-ring clean and well lubricated.
8. Reinstall the lid by placing the lid on the pot. Be sure the lid O-ring is properly placed. Seat the clamp and lid on the pump then turn clockwise until the handles are horizontal.
9. Turn the power "ON" at the house circuit breaker. Reset the pool time clock to the correct time.
10. Open the High Flow manual air relief valve on top of the filter.
11. Stand clear of the filter. Start the pump.
12. Bleed air from the filter until a steady stream of water comes out. Close the High Flow™ Manual Air Relief Valve.

**⚠WARNING** **THIS SYSTEM OPERATES UNDER HIGH PRESSURE**. When any part of the circulating system (e.g., Lock Ring, Pump, Filter, Valves, etc.) is serviced, air can enter the system and become pressurized. Pressurized air can cause the lid to separate which can result in serious injury, death, or property damage. To avoid this potential hazard, follow above instructions.

## Winterizing

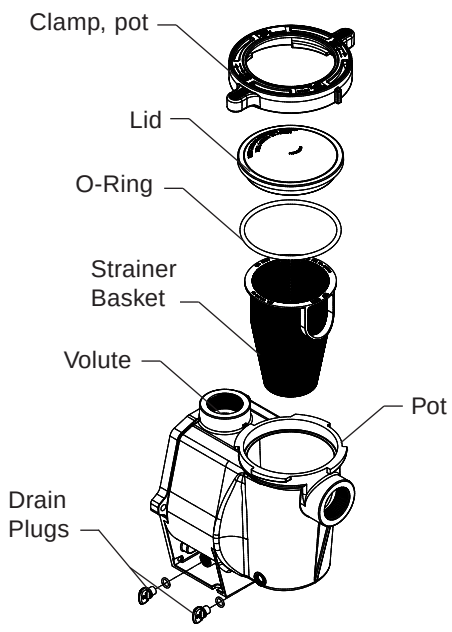
You are responsible for determining when freezing conditions may occur. If freezing conditions are expected, take the following steps to reduce the risk of freeze damage. ***Freeze damage is not covered under warranty.***

To prevent freeze damage, follow the procedures below:

1. Shut off electrical power for the pump at the circuit breaker.
2. Drain the water out of the pump housing by removing the two thumb-twist drain plugs from the housing. Store the plugs in the pump basket.
3. Cover the motor to protect it from severe rain, snow and ice.

***Note:*** Do not wrap motor with plastic or other air tight materials during winter storage. The motor may be covered during a storm, winter storage, etc., but never when operating or expecting operation.

In mild climate areas, when temporary freezing conditions may occur, run your filtering equipment all night to prevent freezing.




Strainer Pot Assembly

ENGLISH

# SERVICING

**⚠WARNING** Always disconnect power to the pump at the circuit breaker and disconnect the communication cable before servicing the pump. Failure to do so could result in death or serious injury to service people, users or others due to electric shock. Read all servicing instructions before working on the pump.

**⚠WARNING** **DO NOT** open the strainer pot if pump fails to prime or if pump has been operating without water in the strainer pot. Pumps operated in these circumstances may experience a build up of vapor pressure and may contain scalding hot water. Opening the pump may cause serious personal injury. In order to avoid the possibility of personal injury, make sure the suction and discharge valves are open and strainer pot temperature is cool to touch, then open with extreme caution.

**⚠CAUTION** Be sure not to scratch or mar the polished shaft seal faces; seal will leak if faces are damaged. The polished and lapped faces of the seal could be damaged if not handled with care.

## Motor Care

### Protect from heat

1. Shade the motor from the sun.
2. Any enclosure must be well ventilated to prevent overheating.
3. Provide ample cross ventilation.

### Protect against dirt

1. Protect from any foreign matter.
2. Do not store (or spill) chemicals on or near the motor.
3. Avoid sweeping or stirring up dust near the motor while it is operating.
4. If a motor has been damaged by dirt it voids the motor warranty.
5. Clean the lid and clamp, O-ring, and sealing surface of the pump pot.

### Protect against moisture

1. Protect from splashing or sprayed water.
2. Protect from extreme weather.
3. If a motor has become wet - let it dry before operating. Do not allow the pump to operate if it has been flooded.
4. If a motor has been damaged by water it voids the motor warranty.

***Note:*** When replacing the motor, be certain that the motor support is correctly positioned to support the size of motor being installed.

## Shaft Seal Replacement

The Shaft Seal consists primarily of two parts, a rotating member and a ceramic seal.

The pump requires little or no service other than reasonable care, however, a Shaft Seal may occasionally become damaged and must be replaced.

***Note:*** The polished and lapped faces of the seal could be damaged if not handled with care.

## Pump Disassembly

All moving parts are located in the rear sub-assembly of this pump.

Tools required:

- 3/32 inch Allen head wrench
- 1/2 inch open end wrench
- 9/16 inch open end wrench
- Flat blade screwdriver
- #2 Phillips screwdriver

To remove and repair the motor subassembly, follow the steps below:

1. Turn off the pump circuit breaker at the main panel.
2. Drain the pump by removing the drain plugs.
3. Remove the 6 bolts that hold the main pump body (strainer pot/volute) to the rear sub-assembly.
4. GENTLY pull the two pump halves apart, removing the rear sub-assembly.
5. Use a 3/32 inch Allen head wrench to loosen the two holding screws located on the diffuser.
6. Hold the impeller securely in place and remove the impeller lock screw by using a #2 Phillips screwdriver. The screw is a left-handed thread and loosens in a clockwise direction.
7. Remove the shaft cap located at the back of the motor and hold the shaft secure with a ½ inch open-end wrench.
8. To unscrew the impeller from the shaft, twist the impeller counterclockwise.
9. Remove the four bolts from the seal plate to the motor, using a 9/16 inch wrench.

**⚠CAUTION** **DO NOT run the pump dry.** If the pump is run dry, the mechanical seal will be damaged and the pump will start leaking. If this occurs, the damaged seal must be replaced. ALWAYS maintain proper water level. If the water level falls below the suction port, the pump will draw air through the suction port, losing the prime and causing the pump to run dry, resulting in a damaged seal.
Continued operation in this manner could cause a loss of pressure, resulting in damage to the pump case, impeller and seal and may cause property damage and personal injury.

## Pump Reassembly

1. When installing the replacement shaft seal, use silicone sealant on the metal portion before pressing into the seal plate, being careful to keep off of the seal face. Ensure the seal is fully seated and allow 24 hours for sealant to cure. (Complete seal plate w/seal replacement kit available, P/N 350201/350101.)
2. Before installing the ceramic section of the seal into the impeller, be sure the impeller is clean. Use a light density soap and water to seal the seal. Press the seal into the impeller with your thumbs and wipe off the ceramic and carbon faces with a clean cloth.
3. Remount the seal plate to the motor by installing bolts in an X pattern and tightening to 70 in-lbs.
4. Clean the motor shaft thread and the impeller insert, then screw the impeller onto the motor shaft.
5. Screw in the impeller lock screw (counter-clockwise and tighten to 25 in-lbs. while holding the motor shaft with wrench).
6. Remount the diffuser onto the seal plate. Make sure the plastic pins and holding screw inserts are aligned.
7. Grease the diffuser O-ring and seal plate gasket.
8. Grease the bolt threads, assemble the motor sub-assembly to the strainer pot-pump body by using the two through bolts for proper alignment. Do not tighten the through bolts until all 6 bolts are in place and finger tightened. Torque in a cross pattern to 110 in-lbs.
9. Fill the pump with water.
10. Reinstall the pump lid and plastic clamp; see the next section, ‘Restart Instructions’.
11. Reprime the system.

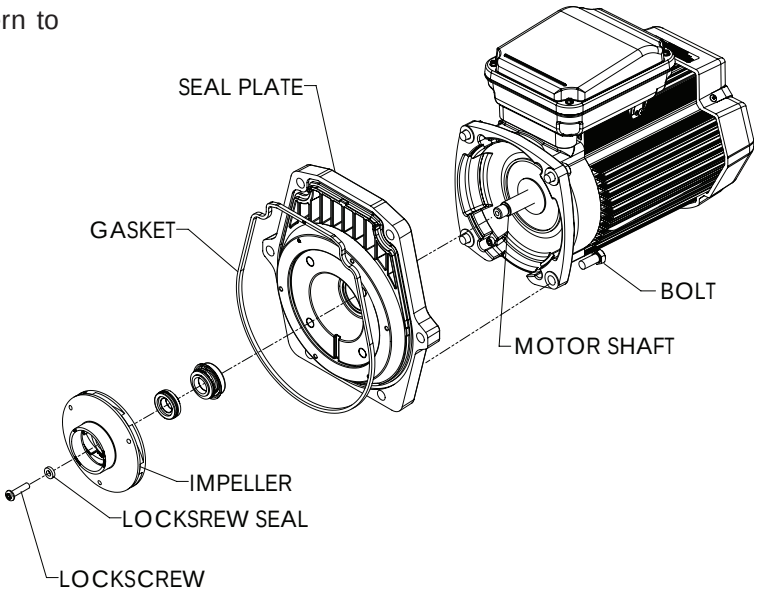
## Restart Instructions

If pump is installed below the water level of the pool, close return and suction lines prior to opening hair and lint pot on pump. Make sure to re-open valves prior to operating.

### Priming the Pump

The pump strainer pot must be filled with water before the pump is initially started. Follow these steps to prime the pump:

1. Remove the pump lid plastic clamp. Remove the pump lid.
2. Fill the pump strainer pot with water.
3. Reassemble the pump cover and plastic clamp onto the strainer pot. The pump is now ready to prime.
4. Open the air release valve on the filter, and stand clear of the filter.
5. Turn on the switch or time clock.
6. When water comes out of the air release valve, close the valve. The system should now be free of air and recirculating water to and from the pool.
7. For 2-speed pumps:
   - Pump should run on high-speed for priming.
   - The pump should not run longer than 8 minutes before priming is achieved.



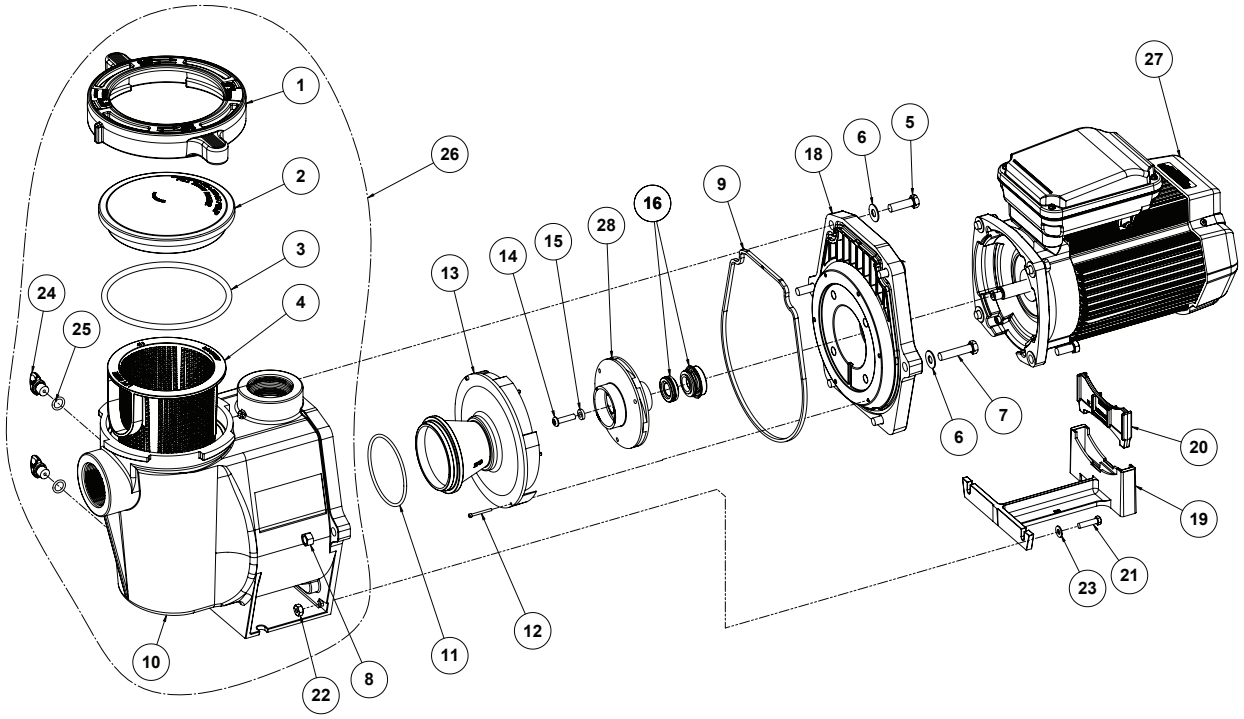

Motor Assembly

# TROUBLESHOOTING

| Problem | Possible Cause | Corrective Action |
|---|---|---|
| **Pump failure.** | Pump will not prime - Air leak, too much air. | Check suction piping and valve glands on any suction gate valves. Secure lid on pump strainer pot and be sure lid gasket is in place. Check water level to be sure skimmer is not drawing air. |
| | Pump will not prime - Not enough water. | Be sure the suction lines, pump, strainer, and pump volute are full of water. Be sure valve on suction line is working and open (some systems do not have valves). Check water level to make sure water is available through skimmer. |
| | Pump stainer gasket is clogged. | Clean pump strainer pot. |
| | Pump strainer gasket is defective. | Replace gasket. |
| **Reduced capacity and/or head.** | Air pockets or leaks in suction line. | Check suction piping and valve glands on any suction gate valves. Secure lid on pump strainer pot and be sure lid gasket is in place. Check water level to be sure skimmer is not drawing air. |
| | Clogged impeller. | Turn off electrical power to the pump.<br>Disassemble (see page 4, 'Pump Disassembly')<br>Clean debris from impeller. If debris cannot be removed, complete the following steps:<br>1. Remove left hand thread anti-spin bolt and o-ring.<br>2. Remove, clean, and reinstall impeller.<br>Reassemble (see page 5, 'Pump Reassembly') |
| | Pump strainer clogged. | Clean suction trap. |

# REPLACEMENT PARTS






| Item No. | P/N | Description |
|---|---|---|
| 1 | 357199 | Clamp, Cam & Ramp, Almond |
| 1 | 357150 | Clamp, Cam & Ramp, Black |
| 2 | 357151 | Cover, Clear, WFE Pump |
| 2 | 357156 | Cover, chemical resistant Cam & Ramp |
| 3 | 350013 | O-Ring, WFE Cover |
| 4 | 070387 | Strainer Basket, WFE |
| 5 | 070430 | Bolt, 3/8 - 16 x 1.25 Hex Head. SS, 4 Req. |
| 6 | 072184 | Washer, 3/8 x 13/16 O.D. SS, 6 Req. |
| 7 | 070431 | Bolt, 3/8 - 16 x 1.75 Hex Head. SS, 2 Req. |
| 8 | 071403 | Nut, 3/8, 16 Hex Head, 2 Req. |
| 9 | 357100 | Black Gasket for Seal Plate |
| 10 | 357149 | Volute & Seal Plate, Almond Replacement Kit |
| 10 | 350015 | Volute, WFE Pump & Pot, Almond |
| 10 | 357157 | Volute, WFE Pump & Pot, Black ❶ |
| 11 | 355227 | O-Ring Parker No. 2-238, WFE Pump |
| 12 | 071660 | Set Screw, 4-40 x 1-1/8 WFE, 2 Req. |
| 13 | 072928 | Diffuser assembly, WFE-12, 3 HP Only |
| 13 | 072927 | Diffuser assembly, WFE 2-8, 1/2 HP-2.5 HP |
| 14 | 071652 | Set Screw, 1/4 - 20 x 1 in. Phillips |
| 15 | 075713 | Rubber Washer, WFE Pump |

| Item No. | P/N | Description |
|---|---|---|
| 16 | 071734S | Seal PA-7 w/ ceramic seat, PS1000 |
| 16 | 071728 | Seal A7 w/ ceramic seat, PS201 |
| 17 | 070429 | Bolt 3/8 - 16 x 7/8 SS Hex Head, 4 Req. ❶ |
| 18 | 350201 | Seal Plate Kit WFE Almond (Includes Mechanical Seal installed) Items 9, 16 & 18 |
| 18 | 350101 | Seal Plate Kit WFE Black (Includes Mechanical Seal installed) Items 16 & 18 |
| 19 | 070927 | Foot, WFE Pump, Almond |
| 19 | 357159 | Foot, Black |
| 20 | 070929 | Foot Insert, WFE Pump, Almond ❶ |
| 20 | 357160 | Foot Insert, WFE Pump, Black |
| 21 | 071657 | Screw 1/4 - 20 x 1 In. Hex Head, SS, 2 Req. ❶ |
| 22 | 071406 | Nut, 1/4 - 20 Hex Head, SS, 2 Req. |
| 23 | 072183 | Washer, 1/4 x 5/8 OD, SS, 2 Req. |
| 24 | 071131 | Knob, Drain Plug, Almond, 2 Req. |
| 24 | 357161 | Knob, Drain Plug, Black, 2 Req. |
| 25 | 192115 | O-Ring, Drain Plug, 2 Req. ❶ |
| 26 | 357149 | Volute/Seal Plate Replacement Kit, Almond (Incl. Items: 1-4, 9, 10, 16, 18, 24, and 25) |
| - | 357923Z | Fan Guard Kit, TEFC/Super-Duty |
| 27 | *See Motor Table on next page* | |

| Item No. | P/N | Description |
|---|---|---|
| | | **Motors** |
| 27 | 355008S | 3/4 HP, 60 Hz, WFE-2, 3 & 24, 1 spd., almond, 31 lbs. ❷ |
| 27 | 355010S | 1 HP, 60 Hz, WFE-4 & 26, 1 spd., almond, 33 lbs. ❷ |
| 27 | 355012S | 1-1/2 HP, 60 Hz, WFE-6 & 28, 1 spd., almond, 39 lbs. ❷ |
| 27 | 355014S | 2 HP, 60 Hz, WFE-8 & 30, 1 spd., almond, 40 lbs. ❷ |
| 27 | 355016S | 3 HP, 60 Hz, WFE-12, 1 spd., almond, 40 lbs. ❷ |
| 27 | 356630S | 1 HP, WFDS-4 & 26, 2 spd., 34 lbs. ❹ |
| 27 | 071320S | 1-1/2 HP, WFDS-6 & 28, 2 spd., 36 lbs. ❹ |
| 27 | 071321S | 2 HP, WFDS-8 & 30, 2 spd., 45 lbs. ❹ |
| 27 | 355018S | 1/2 HP, WF-2 & 23, 1 spd., almond, 39 lbs. ❸ |
| 27 | 355020S | 3/4 HP, WF-3 & 24, 1 spd., almond, 26 lbs. ❸ |
| 27 | 355022S | 1 HP, WF-4 & 26, 1 spd., almond, 28 lbs. ❸ |
| 27 | 355024S | 1-1/2 HP, WF-6 & 28, 1 spd., 39 lbs. ❸ |
| 27 | 355026S | 2 HP, WF-8 & 30, 1 spd., 32 lbs. ❸ |
| 27 | 355033S | 3 HP, WF-12, 1 spd., almond, 40 lbs. ❸ |
| 27 | 355203S | 1 HP, WFK-4, 3 ph, 1 spd., black, 28 lbs. |
| 27 | 355204S | 1-1/2 HP, WFK-6, 3 ph, 1 spd., black, 30 lbs. |
| 27 | 355205S | 2 HP, WFK-8, 3 ph, 1 spd., black, 37 lbs. |
| 27 | 355398S | 3 HP, WFK-12, 3 ph, 1 spd., black, 35 lbs. |
| 27 | 356626S | 1 HP, WFK-4, 3 ph, 1 spd., almond, 28lbs. |
| 27 | 356627S | 1-1/2 HP, WFK-6, 3 ph, 1 spd., almond, 30lbs. |
| 27 | 356628S | 2 HP, WFK-8, 3 ph, 1 spd., almond, 37 lbs. |
| 27 | 356629S | 3 HP, WFK-12, 3 ph, 1 spd., almond, 35 lbs. |
| 27 | 354805S | 1 HP, WFK-4, Super-Duty, 3 ph, 1 spd., almond, 28 lbs. |
| 27 | 354807S | 1-1/2 HP, WFK-6, Super-Duty, 3 ph., 1 spd., almond, 30lbs. |
| 27 | 354809S | 2 HP, WFK-8, Super-Duty, 3 ph., 1 spd., almond, 36 lbs. |
| 27 | 354811S | 3 HP, WFK-12, Super-Duty, 3 ph., 1 spd., almond, 39 lbs. |
| 27 | 354821S | 1 HP, WFET-4, TEFC, 1 ph., 1 spd., almond, 29lbs. |
| 27 | 354823S | 1-1/2 HP, WFET-6, TEFC, 1 ph., 1 spd., almond, 31lbs. |
| 27 | 354815S | 2 HP, WFET-8, TEFC, 1 ph., 1 spd., almond, 37lbs. |
| 27 | 354817S | 3 HP, WFET-12, TEFC, 1 ph., 1 spd., almond, 41lbs. |

## Not Shown

| | |
|---|---|
| 79129900 | 2-Speed Toggle Switch |
| 350202 | Seal Plate Kit: Seal plate (almond), Gasket (black), with installed Seal (Includes items: 9, 16, & 18) |
| 350203 | Seal Plate Kit: Seal plate (black), Gasket (black), with installed Seal (Includes items: 9, 16, & 18) |
| 357244 | Pot Assembly, Black NPT. (Includes items: 1-4, 10, 24 [qty. 2], 25 [qty. 2]). |
| 357243 | Pot Assembly, Almond NPT. (Includes items: 1-4, 10, 24 [qty. 2], 25 [qty. 2]). |

## Power End Sub-assembly *Includes Items: 12-18, 27-28*

| | |
|---|---|
| 075136 | WFE-2 |
| 075137 | WFE-3, WFE-24 |
| 075138 | WFE-4, WFE-26 ❷ |
| 075139 | WFE-6, WFE-28 ❷ |
| 075140 | WFE-8, WFE-30 ❷ |
| 075141 | WFE-12 ❷ |
| 075145 | WFDS-3, WFDS-24 ❹ |
| 075142 | WFDS-4, WFDS-26 ❹ |
| 075143 | WFDS-6, WFDS-28 ❹ |
| 075144 | WFDS-8, WFDS-30 |
| 075251 | WF-2, WF-23 ❸ |
| 075252 | WF-3, WF-24 ❸ |
| 075253 | WF-4, WF-26 ❸ |
| 075254 | WF-6,WF-28 ❸ |
| 075255 | WF-8,WF-30 ❸ |
| 075256 | WF-12 ❸ |

## Fluid Ends-All Parts, w/o Motor

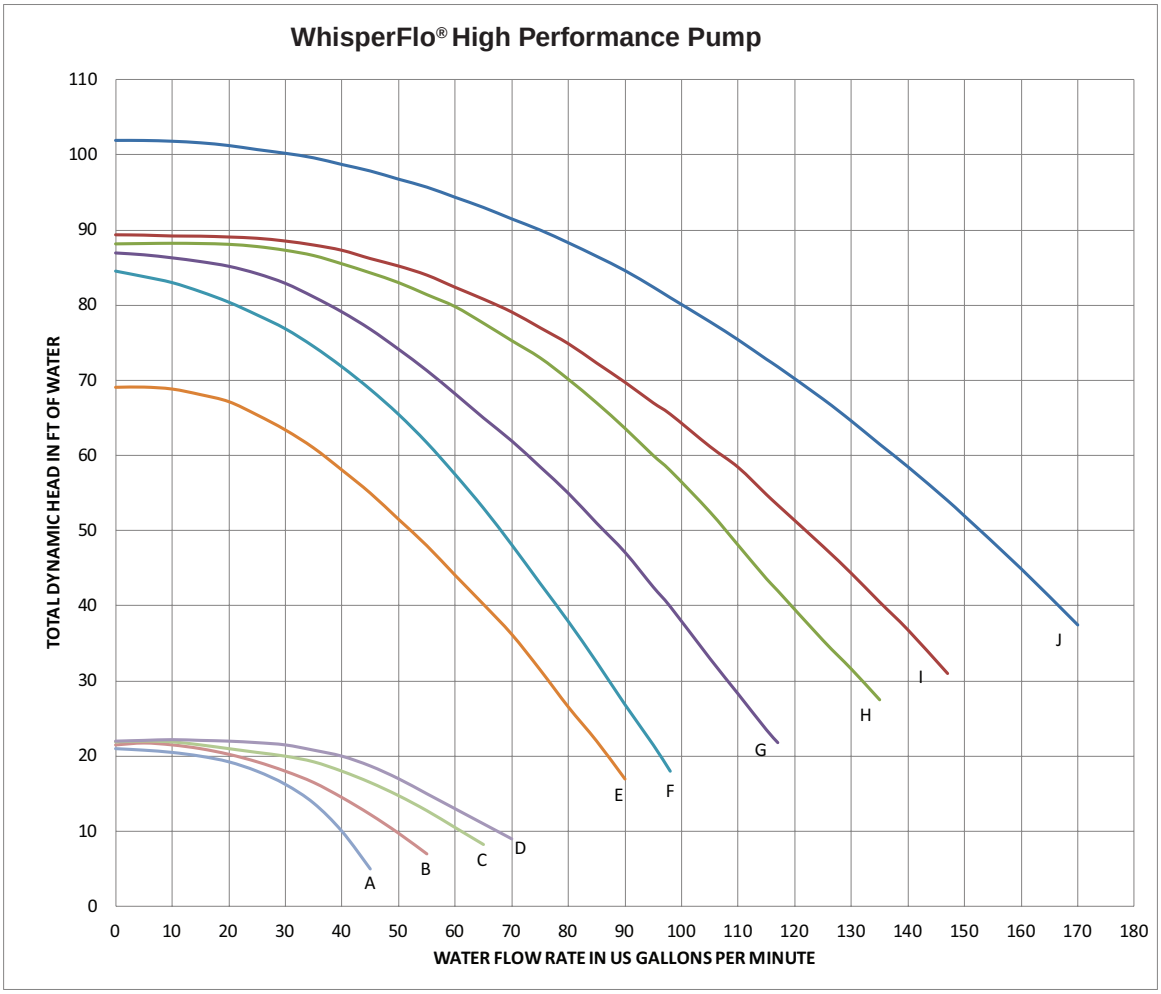
| | |
|---|---|
| 075451 | WFE-2 fluid end, 1/2 HP |
| 075452 | WFE-3 fluid end, 3/4 HP |
| 075453 | WFE-4 fluid end, 1 HP |
| 075454 | WFE-6 fluid end, 1-1/2 HP |
| 075455 | WFE-8 fluid end, 2 HP |
| 075456 | WFE-12 fluid end, 3 HP |

❶ CSA/CUL (only) for Canada
❷ Energy efficient, single phase
❸ Standard efficiency, single phase
❹ Two speed, single phase

## Impeller Chart

| HP | PUMP MODEL | STD PART NO. |
|---|---|---|
| 1/2 | WFE-2, WF-2, WF-23, WFK-2 | 073126 |
| 3/4 | WFE-3, WFE-24, WF-3, WF-24, WFK-3, WFDS-24 | 073127 |
| 1 | WFE-4, WFE-26, WFET-4, WF-4, WF-26, WFK-4, WFDS-4, WFDS-26 | 073128 |
| 1½ | WFE-6, WFE-28, WFET-6, WF-6, WF-28, WFK-6, WFDS-6, WFDS-28 | 073129 |
| 2 | WFE-8, WFE-30, WFET-8, WF-8, WF-30, WFK-8, WFDS-8, WFDS-30 | 073130 |
| 3 | WFE-12, WFET-12, WF-12, WFK-12 | 073131 |

## Pump Performance Curves




| Curve | Model |
|---|---|
| A | WFDS-3, WFDS-24 |
| B | WFDS-4, WFDS-26 |
| C | WFDS-6, WFDS-28 |
| D | WFDS-8, WFDS-30 |
| E | WFE-2, WF-2, WF-23, WFK-2 |
| F | WFE-3, WFE-24, WF-3, WF-24, WFK-3, WFDS-3, WFDS-24 |
| G | WFE-4, WFE-26, WFET-4, WF-4, WF-26, WFK-4, WFDS-4, WFDS-26 |
| H | WFE-6, WFE-28, WFET-6, WF-6, WF-28, WFK-6, WFDS-6, WFDS-28 |
| I | WFE-8, WFE-30, WFET-8, WF-8, WF-30, WFK-8, WFDS-8, WFDS-30 |
| J | WFE-12, WFET-12, WF-12, WFK-12 |