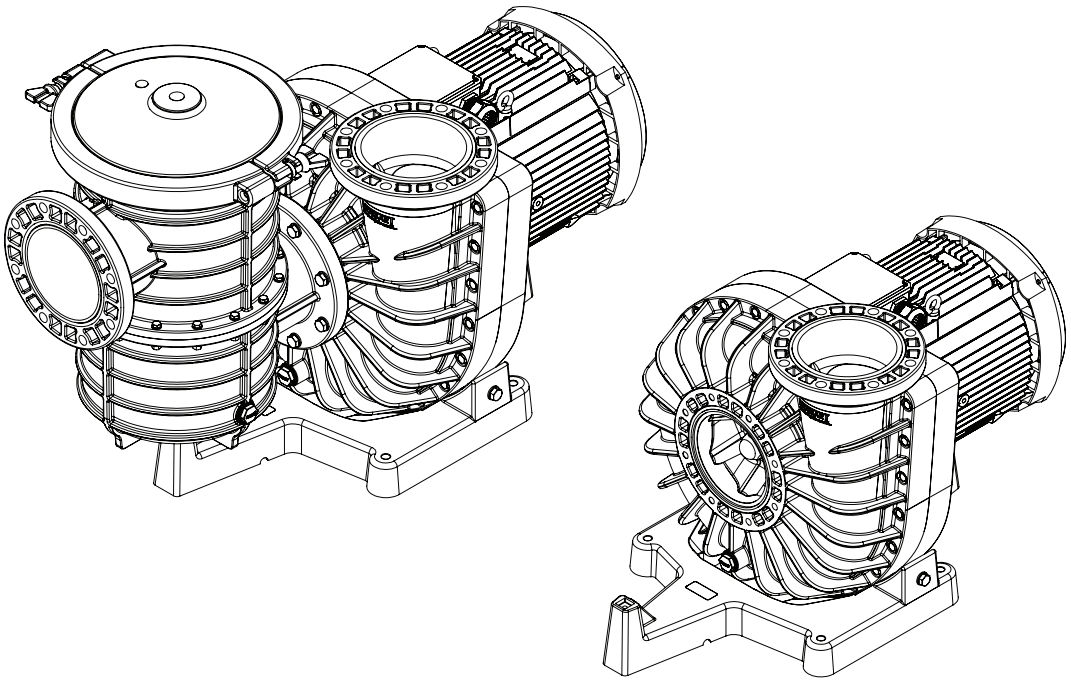
PENTAIR

AQUATIC ECO-SYSTEMS

VERUS™ MAX

PREMIUM EFFICIENT AQUACULTURE DUTY 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 Eco-Systems replacement parts and products, please use the following contact information:

Customer Service
Monday to Thursday: 8 AM to 7 PM EST
Friday: 8 AM to 5 PM EST

US
Phone: (877) 347-4788
FAX: (407) 886-6787

International
Phone: (407) 886-3939
FAX: (407) 886-4884

Web site

Visit www.pentairaes.com*

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** Translated versions of this manual are available online at / La versión en español de este manual del producto, se puede encontrar en línea en / La version française de ce manuel est disponible à :* **http://pentairaes.com/verus-max-high-efficiency-aquaculture-duty-pumps.html**

P/N 490208 Rev. B 11/23/16

IMPORTANT PUMP WARNING AND SAFETY INSTRUCTIONS

IMPORTANT NOTICE

This guide provides installation and operation instructions for this product. 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. This pump is for use for aquaculture installations ONLY. Do not use with any type of swimming pool, hot tub, or spa.

Attention User: This manual contains important information that will help you in operating and maintaining this product. Please retain it for future reference. This pump is for use for aquaculture installations ONLY. Do not use with any type of swimming pool, hot tub, or spa. Warnings and safety instructions for Pentair Aquatic Eco-Systems pumps and other related products are available at:

http://www.pentairaes.com or call U.S. (877) 347-4788 • International (407) 886-3939 for additional free copies of these instructions.

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 **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.

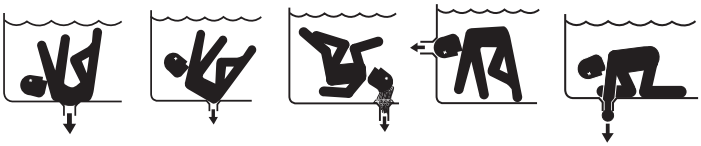
WARNING This unit must be connected only to a supply circuit that is protected by a ground-fault circuit-interrupter (GFCI). Such a GFCI should be provided by the installer and should be tested on a routine basis. To test the GFCI, push the test button. The GFCI should interrupt power. Push the reset 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.

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 the electrical connection differ from country to country, state to state, as well as local municipalities. Install equipment in accordance with the current 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 SERVICE PROFESSIONAL. INSTALLERS, 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 PRODUCT 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.

DANGER **RISK OF ELECTRICAL SHOCK OR ELECTROCUTION: PUMPS REQUIRE HIGH VOLTAGE WHICH CAN SHOCK, BURN, OR CAUSE DEATH.** BEFORE WORKING ON PUMP! Always disconnect power to the pump at the circuit breaker from the pump before servicing the pump. Failure to do so could result in death or serious injury to service person, system users or others due to electric shock.

IMPORTANT PUMP WARNING AND SAFETY INSTRUCTIONS

NOTE: ALL SUCTION PLUMBING MUST BE INSTALLED IN ACCORDANCE WITH THE LATEST NATIONAL AND LOCAL CODES, STANDARDS AND GUIDELINES.

⚠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.

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.

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

⚠CAUTION Before operation, be sure to completely rinse the pump volute with water.

Cord Connected Models Only

⚠WARNING **RISK OF ELECTRICAL SHOCK.** This pump is supplied with a grounding conductor and grounding type attachment plug. To reduce the risk of electric shock, be certain that it is connected only to a properly grounded, grounding-type receptacle.

⚠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 aquaculture systems.

⚠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 aquaculture applications. The pump will function correctly only if it is properly sized to the specific application and properly installed.

SAVE THESE INSTRUCTIONS

Warning Page P/N 352560 Rev. B 12/15

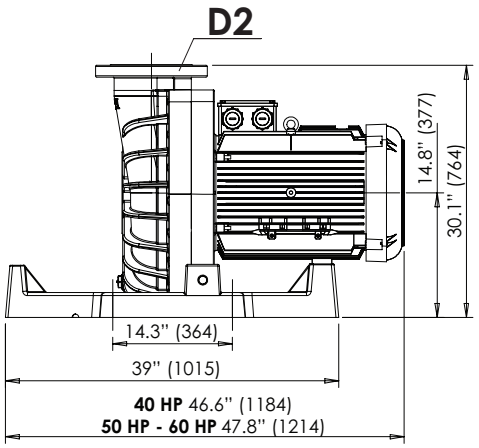
INTRODUCTION

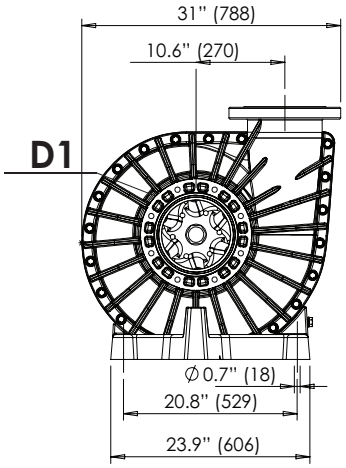
⚠CAUTION **DO NOT OPERATE THE PUMP WITHOUT WATER! OPERATING THE PUMP WITHOUT WATER WILL CAUSE FAILURE OF THE MECHANICAL SEAL!**

Pump Overview

- Efficient, quiet, lightweight and corrosion-resistant with innovative impeller design.
- Available in three-phase, 50 and 60 Hz models
- 8” (20.32 cm) suction and discharge with or without strainer pot
- Heat-resistant seal with 316 stainless steel spring, silicon carbide seal face and EPDM bellows
- Pump body made of fiberglass reinforced PPH
- Optional bolt-on Strainer Pot (P/N 350805)
- Flooded suction use pump
- CE Listed - Conforms with all health, safety and environmental protection standards of the European Union. [Applies to 50 Hz models only (see Engineering Specifications table, on page 15)].
- All wetted metal components are stainless steel
- Suitable for use with salt water (maximum 4% salt concentration)

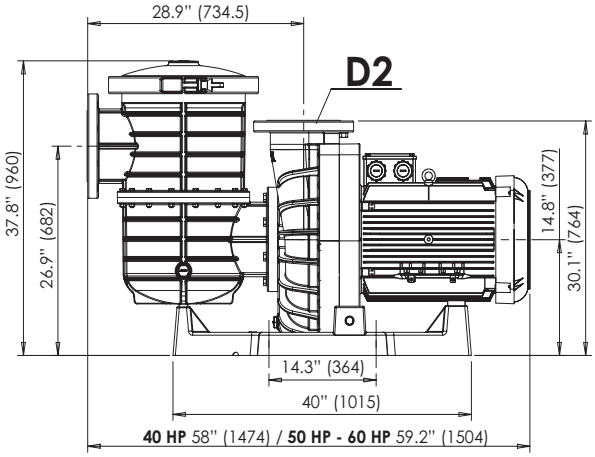
Pump Dimensions

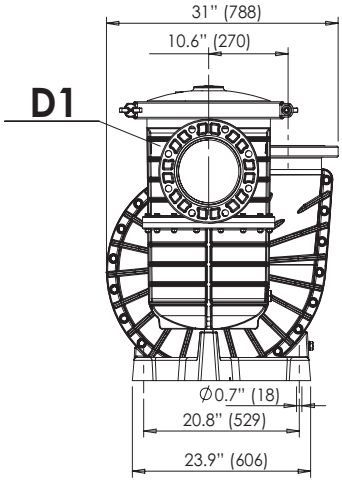




HP	METRIC ISO / DIN	IMPERIAL BS / ANSI / ASTM / AS / NZS	
	D1 / D2	D1 / D2	
	mm	inch	mm
40	225	8"	219.4
50	225	8"	219.4
60	225	8"	219.4

Pump Dimensions (With Optional Strainer Pot, P/N 350805)





HP	METRIC ISO / DIN	IMPERIAL BS / ANSI / ASTM / AS / NZS	
	D1 / D2	D1 / D2	
	mm	inch	mm
40	225	8"	219.4
50	225	8"	219.4
60	225	8"	219.4

INSTALLATION

This pump is for use for aquaculture installations ONLY. Do not use with any type of swimming pool, hot tub, or spa. The following general information describes how to install the Verus™ Max Aquaculture Duty Pump.

Note: Before installing this product, read and follow all warning notices and instructions starting on pages ii-iii.

Installing the Pump

Only a qualified service person should install the pump.

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

Mechanical Installation

1. Carefully remove the pump unit and strainer pot assembly, if included, from its shipping package.
2. A solid flat foundation should be provided to support the pump. The area should be well drained so that the pump motor will not be flooded under any circumstances. Ensure that adequate space and lighting around the pump is provided for routine maintenance activities
3. It is recommended 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 pipe diameter.

   The pump suction and discharge pipes will need to be supported mechanically. Support piping within 3 feet, (0.9 meters), of the suction and discharge to prevent cracking of pump and pipe components. Several items listed below can cause additional stress on the pump and strainer pot if left unsupported.

   - Shutting the pump on and off repeatedly, (Continuous Cycling).
   - Natural vibrations from the water flow in the piping can cause stress on the pump strainer pot and volute.
   - Shutting off the water flow suddenly on a large volume of moving water, (Water Hammer).

   Rigid connections of the pump and piping can cause cracking of the pump and or piping due to the issues above. Flexible pipe joints may also help in reducing the stress on the pump depending on the setup.

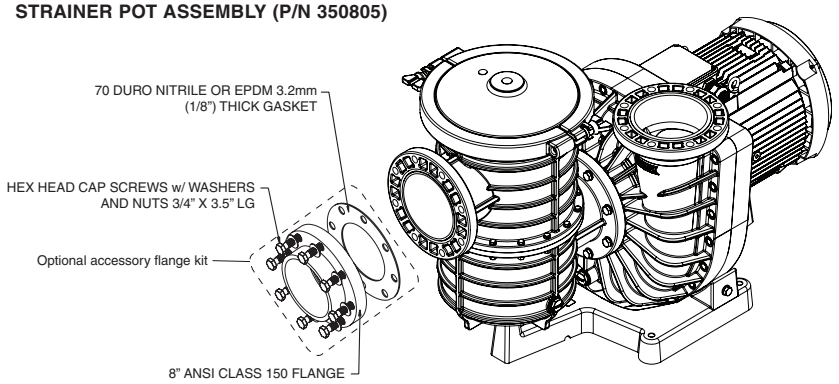


Figure 1

4. Assemble the strainer pot assembly, if included, to the pump. Be sure to install the O-Ring (included with the strainer pot assembly) over the protruding plastic ring on the front of the pump housing before mounting the strainer pot. Properly position the strainer pot to the housing and secure in place using the 8 large flange bolts and washers included with the strainer pot assembly. These bolts should not be over tightened as this could damage the pump. Proper technique is to lightly snug each bolt with a wrench. A squealing sound during tightening of the bolts indicates that the bolts are being excessively tightened.
5. Place the pump in its final location and ensure that the mating flanges of the suction and discharge piping are in line and parallel to the flanges on the pump. Resolve any problems with misalignment before bolting the flanges to the pump.

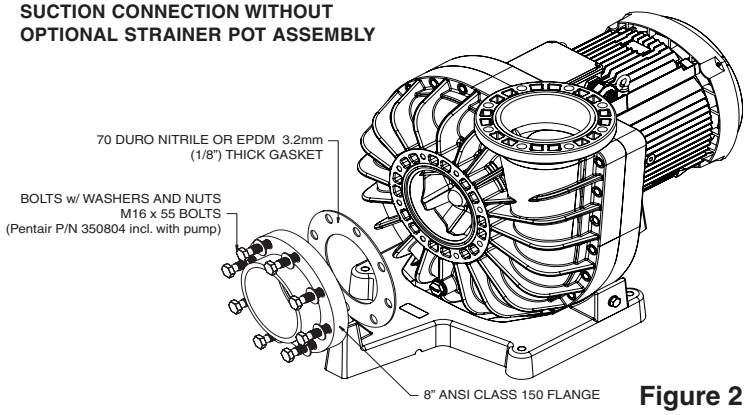


Figure 2

6. Ensure that the flange gasket is properly positioned between the suction flange of the pump and the flange of the suction piping. Use only high quality rubber, full diameter flange gaskets with holes for the bolts to pass through. Do not use grease or glue as they may contain chemicals that could attack the plastic material. Install the flange bolts hand tight on the suction side of the pump.

> **⚠CAUTION** Use large diameter flat washers between the hex nut and the pump flanges to properly distribute the clamping forces on the flange. Tighten the flanges to 20 ft.-lb. (27.1 newton/meters) unless otherwise specified by the flange manufacturer. If it is not possible to use a torque wrench then care should be taken not to over tighten the flange bolts. Failure to follow the above instructions can result in damage to the pump flange.

7. Properly insert the flange gasket on the discharge port of the pump. Install the flange bolts hand tight on the discharge flange connection.
8. Inspect both the suction and flange connection to ensure alignment remains acceptable. Take any corrective action before tightening the flange bolts to the required torque.

> **⚠CAUTION** Suction and discharge piping must be supported by an appropriate system of supports or hangers. Inadequately supported pipe can cause excessive loads to be transmitted to the pump resulting in a structural failure of the pump that could result in flooding and property damage.

Flange kit part numbers (available separately)

- P/N 854080: FLANGE 8 INCH SCHEDULE-40 (QTY. 2)
- P/N 854080G: FLANGE GASKET/BOLT SETS, 8", GALVANIZED BOLTS (QTY. 2)

  P/N 854080SS: FLANGE GASKET/BOLT SETS, 8", STAINLESS STEEL BOLTS (QTY. 2)

  Note: The standard Flange Kit includes galvanized bolts (854080G). If stainless steel bolts are preferred Pentair recommends 854080SS.

Table 1

PIPE DIAMETERS FOR MOUNTING TO INLET AND OUTLET			
Pump Model Number	**HP**	**Suction Line Diameter**	**Discharge Line Pipe Diameter**
VERMX5-160-AQ / VERMX6-160-AQ	40	14in / 355mm	11in / 280mm
VERMX5-200-AQ / VERMX6-200-AQ	50	16in / 400mm	12in / 315mm
VERMX5-240-AQ / VERMX6-240-AQ	60	16in / 400mm	14in / 355mm

Pressure Testing

Certain local codes require that the circulation system be pressure tested with a proof pressure before being commissioned into service or before allowing construction to progress to the next stage.

> **⚠WARNING** Improperly pressure testing a circulation system can involve significant risk of property damage or severe personal injury or death. Circulation systems store energy when pressure tested due to the elastic nature of the materials used in construction and due to the compressibility of air that may be contained in the system. The instructions below should be considered a guide only. Each installation should be considered a unique situation that should be carefully investigated for risk.
>
> **⚠WARNING** Never test this equipment with air pressure even if specified by the local code. Even low levels of air pressure result in tremendous storage of energy that can instantaneously be released if a system failure occurs. This instantaneous release of energy can cause failed components to be accelerated to high velocities and to travel distances of 100 feet (30.48 meters) or more. These components could cause severe personal injury or death if they were to strike a person.

1. Understand the local code. The intent of the code may be to ensure that the piping system with its many bonded joints is leak free. Piping systems typically have a higher pressure capability than the other system components such as the pump or filter. Do not pressure test the Verus™ Max Aquaculture Duty Pump unless the code specifically requires this.
2. Verify that each component in the system is designed to meet the local code test pressure. Most components should be marked with a maximum operating pressure. If a component is not marked consult the Owner's Instructions that came with the component or consult the manufacturer.

3. Verify that the pressure test will be conducted within the operating temperature listed on the components that make up the circulation system. If no maximum operating temperature is listed then it may be necessary to review the owner's manual or contact the manufacturer for this information.
4. Use only a high quality pressure gauge that is certified to be accurate for the pressure for which the test is going to be conducted. Do not rely on the pressure gauge included with the filtration system as it may not be sufficiently accurate to conduct a pressure test for the system. Please note that the pressure in the system will vary depending on where the pressure is taken due to the weight of the water.
5. Ensure that all air will be evacuated from the system when the water pressure is applied to the system. This will require that all air bleeders on any equipment are open. It also may be necessary to remove some lids or covers on system equipment such as the pump strainer lid to prevent air from being trapped in the system. In addition, there may be other areas of the circulation system where air may be trapped. Do not connect water pressure to the system until you are certain that air will be totally evacuated.
6. Determine the appropriate location in the system to apply the test water pressure. Consider the place in the system that will best ensure that all air will be displaced when water is introduced.

> **⚠WARNING** Never exceed the maximum operating pressure or temperature limits of the system components. See the Owner's Manual that accompanies that product for more instructions. Ensure that pressures higher than those required in the pressure test cannot inadvertently be applied to the circulation system. This may require the use of a pressure regulator between the water supply and the circulation system.
>
> Changes in temperature or barometric pressure can cause the internal test pressure to increase or decrease over time once the system is isolated. If the pump is installed with a strainer pot, a pressure relief device will need to be installed on the strainer pot drain plug to prevent the pressure from exceeding the intended test pressure. Exceeding these limits could result in a component failing under pressure. This instantaneous release of energy can cause failed components to be accelerated to high velocities and to travel distances of 100 feet (30.48 meters) or more. These components could cause severe personal injury or death if they were to strike a person.

7. Slowly apply the water pressure and allow the water to flow out all of the openings intended for air to escape. Close the openings beginning at the lowest level first and progressing to the highest level. Do not close any opening until you are sure that air is completely out of that part of the system.
8. Allow the pressure to slowly build once all of the air openings are closed. Close the valve between the water supply and circulation system to isolate the system from the supply pressure.
9. Monitor the system pressure for a few minutes to ensure that it is stabilized.

> **⚠WARNING** Due to the potential risk that can be involved it is recommended that the pressure test be kept to the minimum time required by the local code. Do not allow people to work around the system when the circulation system is under pressure test. Post appropriate warning signs and establish a barrier around the pressurized equipment. If the equipment is located in an equipment room, lock the door and post a warning sign.
>
> Never attempt to adjust any closures or lids or attempt to remove or tighten bolts when the system is pressurized. These actions can result in a separation or failure of system components. This instantaneous release of energy can cause components to be accelerated to high velocities and to travel distances of 100 feet (30.48 meters) or more. These components could cause severe personal injury or death if they were to strike a person.

10. It is normal for the test pressure to drift down slightly during the first few minutes as the circulation system expands under pressure.
11. If the system pressure continues to fall, then bleed off the remaining water pressure in the circulation system and inspect the system for leaks. Look for water on the floor and feel around joints for moisture.
12. Ensure the system is not under pressure before attempting any system adjustments or repairs.
13. Repeat the pressurization sequence once the system leaks have been corrected.

ELECTRICAL REQUIREMENTS

This section describes how to secure and wire the Verus™ Max Aquaculture Duty Pump.

Electrical Requirements

⚠CAUTION To prevent possible voltage reduction that cause flicker sensations in lighting equipment, this product should be powered by a dedicated power line. Other equipment connected to the same power line may experience operations problems caused by the inrush current during start-up of this product.

⚠WARNING

RISK OF ELECTRICAL SHOCK OR ELECTROCUTION.
This pump must be installed by a licensed or certified electrician or a qualified installer in accordance with all applicable national and local codes and ordinances. Please check your local and state codes and regulations before commencing any installation of this pump. Improper installation could create, among other things, an electrical hazard which may result in death or serious injury to users, installers, or others due to electrical shock, and/or property damage. 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 users, installers or others (due to electrical shock) and/or property damage.

1. Ensure that the electrical service is disconnected, properly tagged and locked out before working on the pump.
2. Carefully review the motor label. Take note of the important nameplate information such as volts, amps, phase, HP and code. Most pump models may be field connected so that they can operate on two different voltage circuits. Use extreme care in reviewing the motor wiring diagrams and always verify the voltage of the electrical supply circuit.
3. Carefully review the electrical supply circuit to ensure that it is adequate to meet the pump requirements identified on the motor nameplate. An electrical code letter is identified on the motor nameplate that identifies the load characteristics of the motor.

⚠CAUTION Three-phase pumps do not contain an internal thermal protector and must be externally protected by an appropriately sized protective device commonly referred to as a starter. Improper sizing of the starter can result in the motor being destroyed or in frequent tripping of the starter.

4. It is important that all portions of the electrical circuit including the conductors that connect the electrical panel to the pump motor are properly sized based on the nameplate information on the pump.
5. Following any applicable national and local electrical codes connect the grounding conductor and electrical supply conductors to the motor. Ensure that the pump is properly grounded per the above codes utilizing the grounding screw identified in the terminal box of the pump motor.
6. It will be necessary to confirm that the rotation of the motor is in the correct direction on all three-phase pump units. Checking rotation by energizing the pump for one second and then watching the rotation through the back of the motor as it coasts to a stop. Ensure that the rotation matches the direction arrow on the pump. Operating a pump with the incorrect rotation can cause many problems including poor priming, diminished water flow, excessive noise, overloading of the motor and premature failure of the pump.

Field Wiring

NOTICE: Due to wide variation in electrical equipment, power equipment, power supply, and installation requirements, **this manual does not make specific recommendations concerning auxiliary equipment or fusing/wiring.**

Wiring

Wire sizing, wire type, branch circuit fuse protection, motor starter, control equipment, and related items must meet any applicable national and local code requirements.

Motors are supplied by several manufacturers and nameplate data (service factor, maximum amperage, etc.) will vary. Consult control manufacturer and motor nameplate on your pump to correctly choose and size motor starter and control equipment for your particular installation. Specific electrical questions or problems should be addressed to the manufacturer of the electrical component in question.

Voltage/Phase

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

Do not try to connect 3-phase motors to single phase power supply or single phase motors to 3-phase power supply.

Emergency Shutoff

Install an Emergency Shutoff Switch near the aquaculture application. Clearly mark this switch and mount it in a location that is accessible to users or operating personnel. Make sure that all personnel understand the switch's use in case of emergency (entrapment, electrical malfunction, etc.).

⚠CAUTION **ALWAYS FILL THE PUMP WITH WATER BEFORE ENERGIZING THE PUMP MOTOR. OPERATING THE PUMP WITHOUT WATER CAN DAMAGE THE PUMP SEAL WITHIN A FEW SECONDS.**

INITIAL START-UP

⚠WARNING Do not operate the pump until you have read and understand clearly all the operating instructions and warning messages for all equipment that is a part of the circulating system. The following instructions are intended as a guide for initially operating the pump in a general installation, however each installation may have unique conditions where the starting procedure could be different. Failure to follow all operating instructions and warning messages can result in property damage or severe personal injury or death.

⚠WARNING The strainer pot may be at a pressure that is higher or lower than the atmospheric pressure. Always open the drain plug on the strainer pot and allow for the pressure to equalize before removing the locking ring. Attempting to remove the locking ring before the pressure is equalized may result in a rapid exchange of pressure. This instantaneous release of energy can cause components to be accelerated to high velocities and to travel distances of 100 feet (30.5 meters) or more. These components could cause severe personal injury or death if they were to strike a person.

1. Relieve any pressure that may be trapped in the circulation system.
2. Open all air relief devices on any equipment in the system.
3. Open the appropriate valves on the suction and discharge plumbing. The Verus™ Max Aquaculture Duty Pump should be installed below the water level, water will flow into the pump.
4. Stand clear of all equipment and energize the pump.
5. The pump will experience a temporary unstable condition as water and air flow through the pump. During this unstable condition the pump may be noisy and produce erratic flow. If the pump is below or at water level this temporary unstable condition should last only a few seconds.

⚠CAUTION **DO NOT OPERATE THE PUMP WITHOUT WATER! OPERATING THE PUMP WITHOUT WATER WILL CAUSE FAILURE OF THE MECHANICAL SEAL!**

6. It is important that once the pump is operating in a stable manner that the voltage be measured at the pump when first put into service. If the electrical supply circuit is inadequate a voltage drop may occur when the pump is operating under load. The pump will operate most efficiently when operated at the nameplate voltage. Operating the pump at more than 10% above or below the voltage listed on the nameplate could result in the pump not operating properly and may damage the pump motor.

MAINTENANCE

Cleaning the Optional Strainer Basket

1. The Verus™ Max Aquaculture Duty Pump is designed to be maintenance free with the exception of requiring a periodic cleaning of the strainer basket.
2. A routine inspection should be done by visually looking through strainer lid for debris while the pump is in operation. The strainer basket should be cleaned when approximately 25 % blocked. Allowing the strainer basket to become excessively blocked will diminish water flow, reduce pump efficiency, cause cavitation and may damage the basket or other pump components.
3. Disconnect power to the pump before cleaning the basket.
4. Close isolation valves on the suction and discharge lines if necessary to prevent flooding.

> **⚠WARNING** The strainer pot may be at a pressure that is higher or lower than the atmospheric pressure. Always open the drain plug on the strainer pot and allow for the pressure to equalize before removing the locking ring. Attempting to remove the locking ring before the pressure is equalized may result in a rapid exchange of pressure. This instantaneous release of energy can cause components to be accelerated to high velocities and to travel distances of or 100 feet (30.5 meters) or more. These components could cause severe personal injury or death if they were to strike a person.
>
> **⚠WARNING** If the pump has been energized for a period greater than 45 minutes without water flowing through the pump for any reason, the water in the strainer pot may be hot. Attempting to remove the locking ring without removing the drain plug in the pot and allowing the pressure to equalize may result in the hot water rapidly escaping and causing severe personal injury.

5. Open the drain plug in the strainer pot and allow the pressure to completely stabilize.
6. Remove the locking ring and the clear lid from the strainer pot.
7. Remove the basket and dispose of the debris. Use a water hose and soft brush to remove debris blocking the openings in the basket if required.
8. Replace the basket making sure it is properly oriented.
9. Replace the lid, making sure the O-ring is clean and is properly located in the groove of the lid.
10. Secure the lid by tightening the butterfly nut on the split clamp ring. Hand tighten only! Overtightening the clamp ring will make removal of the clamp ring difficult.

> **⚠WARNING** It is recommended that only water and a soft cloth be used to clean the lid and other pump components. Cleaners may contain chemicals that could damage or weaken pump components causing them to fail and allowing an instantaneous release of energy. This instantaneous release of energy can cause components to be accelerated to high velocities and to travel distances of 100 feet (30.5 meters) or more. These components could cause severe personal injury or death if they were to strike a person.

Preventative Maintenance

It may be possible to extend the life of the Verus™ Max Aquaculture Duty Pump and to prevent a pump down situation by implementing a preventative maintenance program. This may be done by periodically performing a list of activities and recording certain information to be able to spot potential problems before they become serious. It is recommended that these activities be performed after the filter cleaning procedure so that the information will be taken from the same baseline each time. All or part of the following activities could provide the foundation for a preventative maintenance program.

1. Observe the sound coming from the pump housing. A substantial change in sound from inside the pump is a clue that something in the circulation system has changed.
2. Observe the sound coming from the motor. Motor bearings rarely fail without first becoming noisy.
3. Observe the temperature of the motor. The motor is designed to carry the pump load without building up excessive heat. An increase in normal operating temperatures may indicate a potential problem. A thermocouple placed at the motor ventilation discharge opening may be used to monitor motor temperature. It normally takes about 1 hour for the motor temperature to stabilize. See "Troubleshooting" section, on page 10.
4. Record any flow and pressure readings on the circulation system meters and gages. See "Troubleshooting" section, on page 10.
5. Record supply voltage and amps. Supply voltage can change throughout the day depending on other electrical loads in the area. Changes in supply voltage will affect the amp draw and water output of the pump.
6. Inspect the floor around the pump to ensure there are no indications of leaks. Address leaks immediately. A mechanical seal leak is indicated by water dripping between the motor and the motor adaptor. A mechanical seal leak can result in a failed motor bearing.
7. Inspect the exterior pump components for any sign of a structural failure. Most structural failures will start with a hairline crack that originates from a corner where two different shapes intersect.
8. Verify that the support brackets or hangars for the suction and discharge piping are continuing to fully support the weight of the piping.
9. Motor bearings are a permanently lubricated/sealed type and do NOT need grease or oil applied. Applying grease or oil can damage the bearing seal allowing water to enter the bearing causing premature bearing failure.

TROUBLESHOOTING

Use the following troubleshooting information to resolve possible problems with the Verus™ Max Aquaculture Duty Pump.

⚠WARNING **RISK OF ELECTRICAL SHOCK OR ELECTROCUTION.**

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.

1. If you are not familiar with your filtering system and/or heater/chiller:
   a. **Do NOT** attempt to adjust or service without consulting a qualified technician.
   b. Read the entire Installation & User's Guide before attempting to use, service or adjust filtration system or heater.

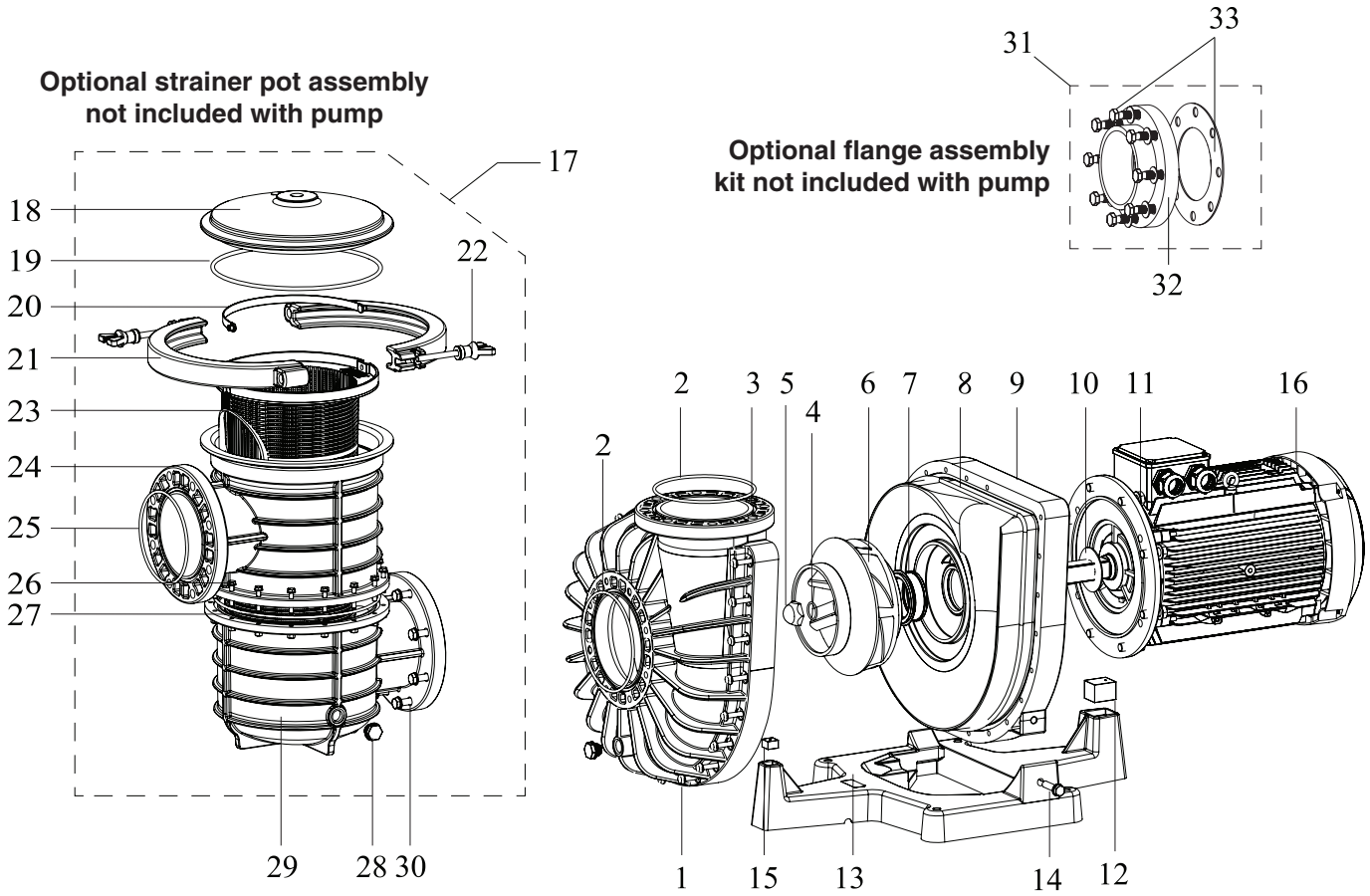
Note: Before attempting to service or repair. Turn off power to pump at the power source.

Problems and Corrective Actions

Problem	Corrective Action
Low Flow- High Filter Pressure	Filter is dirty Restriction in Filter Line
Low Flow- Low Filter Pressure	Strainer or Basket clogged Clogged Impeller Air leak in Suction Line Restriction in Suction Line Cavitation - NPSHA less than NPSHR Pump Shaft rotating in wrong direction
Motor Does Not Turn	Power Switch is off Circuit Breaker has tripped Thermal Protector has tripped Pump is in OFF mode of Timer Motor Shaft is locked by bad Bearing Impeller is jammed
Motor Over Heating	Electrical Supply Connections are incorrect Wiring to Pump is undersized Inadequate Voltage supplied to Site Ventilation is inadequate for Motor Voltage differential between legs of 3 Phase Circuit >5% Pump Shaft rotating in wrong direction
High Pitch or **Growling Noise coming from WET END of Pump**	Air Leak in Suction Line Cavitation - NPSHA less than NPSHR A Valve, Elbow or Tee is located too close to the Suction Inlet of the Pump Pump Shaft rotating in wrong direction

REPLACEMENT PARTS

Pump Illustrated Parts View



Motor and Impeller Table

Model Number	Motor P/N (Item #16)	HP	Voltage	Hz	Impeller P/N (Item #6)
VERMX5-160-AQ	348115	40	400/690 V	50	348103
VERMX5-200-AQ	348116	50	400/690 V	50	348104
VERMX5-240-AQ	348117	60	400/690 V	50	348105
VERMX6-160-AQ	348112	40	230/460V	60	348106
VERMX6-200-AQ	348113	50	230/460V	60	348107
VERMX6-240-AQ	348114	60	230/460V	60	348108

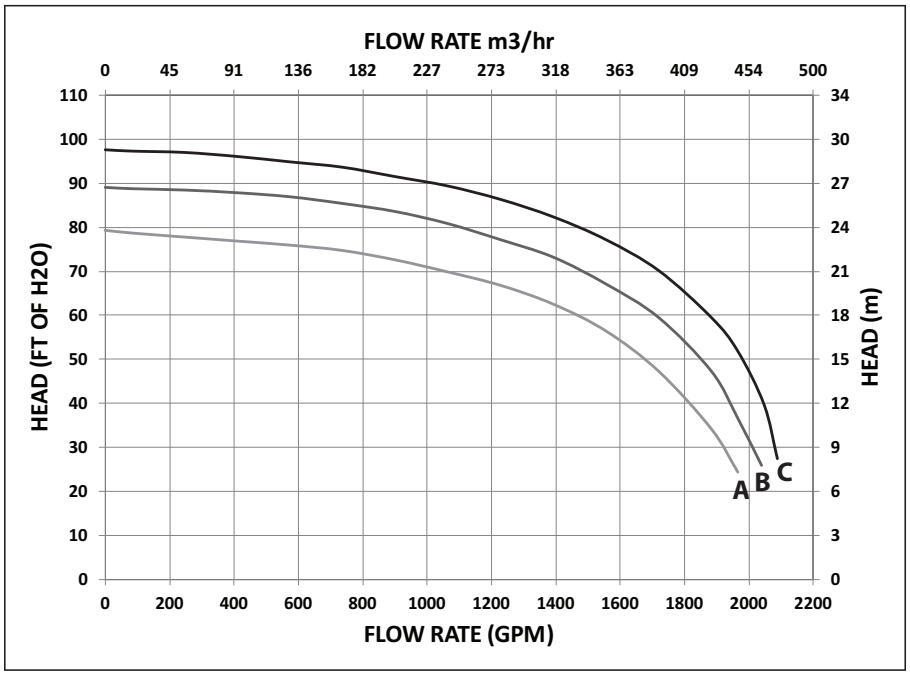
Pump Parts List

Item #	P/N	Description
1	348098	Face Plate Bolt & Washer, M12x130 - (Qty. 21)
2	348099	Connection O-Ring, 238x7
3	348100	Face Plate
4	348101	Impeller Screw
5	348102	Impeller O-Ring, 37x4
6	See Motor and Impeller Table (page 11)	Impeller
7	348109	Mechanical Seal
8	348110	Body O-Ring, 680x9
9	348122	Seal Plate
10	348123	Slinger
11	348111	Motor Bolt & Washer, M18x50 - (Qty. 8)
12	348118	Mounting Base Rubber Insert
13	348119	Mounting Base
14	348120	Mounting Base Connection Bolt & Washer, M16x60
15	348121	Mounting Base Rubber Insert
16	See Motor and Impeller Table (page 11)	Motor
-Verus Strainer Pot Assembly (Not Included with Pump)-		
17	350805	Strainer Pot Assembly [Includes Item# 18-30]
18	350806	Strainer Lid
19	350793	Strainer Lid O-Ring, 390x9.2mm
20	350794	Strained Basket Handle
21	350795	Strainer Locking Ring - (Qty. 2)
22	350796	Locking Ring Wing Nut, M14 - (Qty. 2)
23	350797	Basket
24	350798	Strainer Body, Top
25	350799	Connection O-Ring, 220x7mm
26	350800	Strainer Bolt, Washer & Nut, M10x55, Brass - (Qty. 16)
27	350801	Strainer Body O-Ring, 390x9.2mm
28	350802	Drain Plug
29	350803	Strainer Body, Bottom
30	350804	Strainer Connection Bolt & Washer, M16x55 - (Qty. 8)
-Verus Flange Assembly Kit (Not Included with Pump)-		
31	350808	8" Flange Assembly Kit [Includes Item# 32-33]
32	854080	Flange, 8" - (Qty. 2)
33*	854080G	Flange Gasket/Bolt Sets, 8", Galvanized Bolts - (Qty. 2)
	854080SS	Flange Gasket/Bolt Sets, 8", Stainless Steel Bolts - (Qty. 2)

(*) Note: The standard Flange Kit includes galvanized bolts (854080G). If stainless steel bolts are preferred Pentair recommends 854080SS.

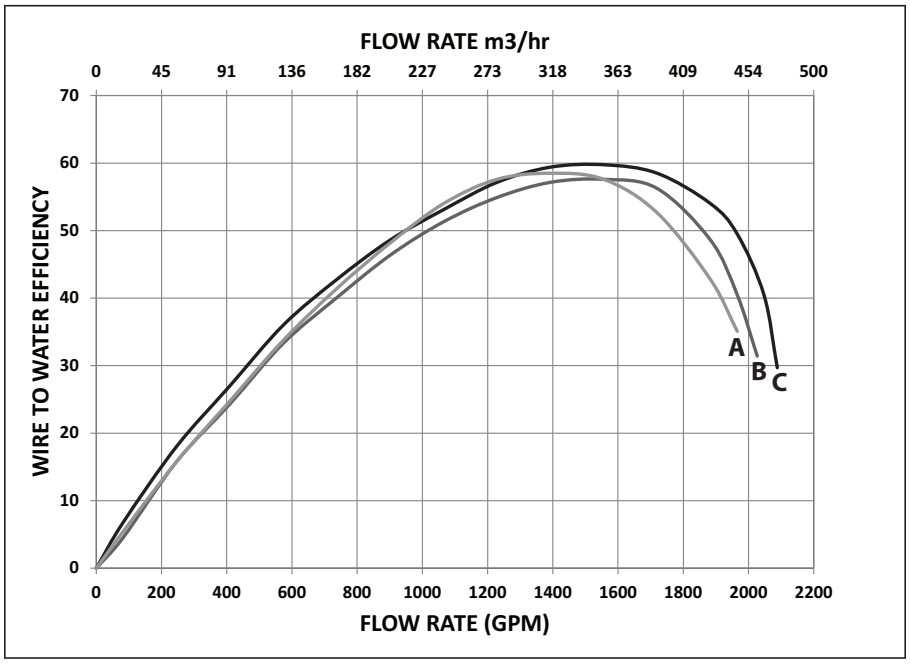
50Hz Model Pump Curves

Performance Curves



CURVE KEY	
A	40 HP
B	50 HP
C	60 HP

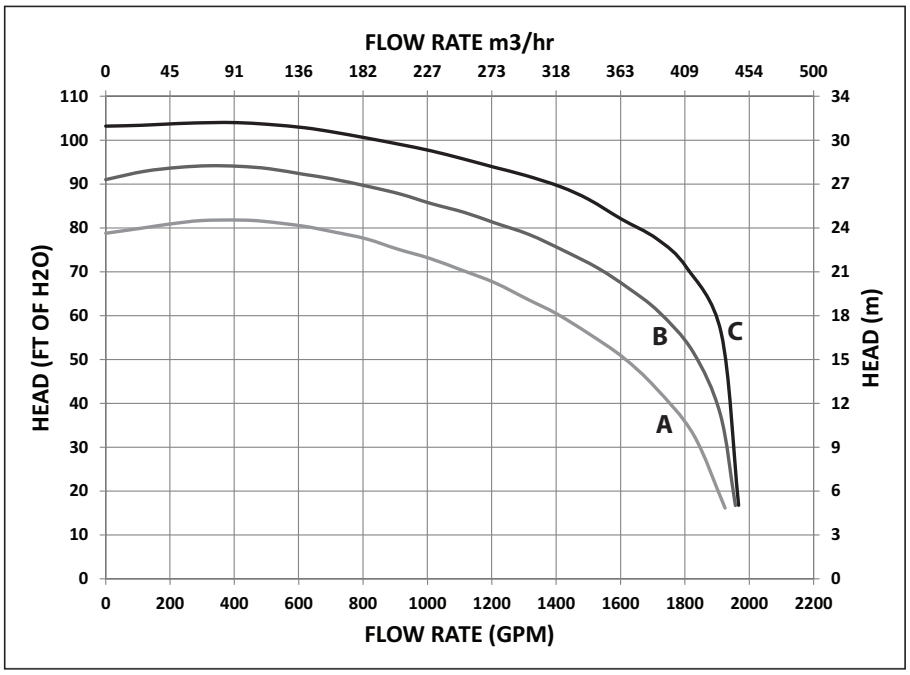
Efficiency Curves



CURVE KEY	
A	40 HP
B	50 HP
C	60 HP

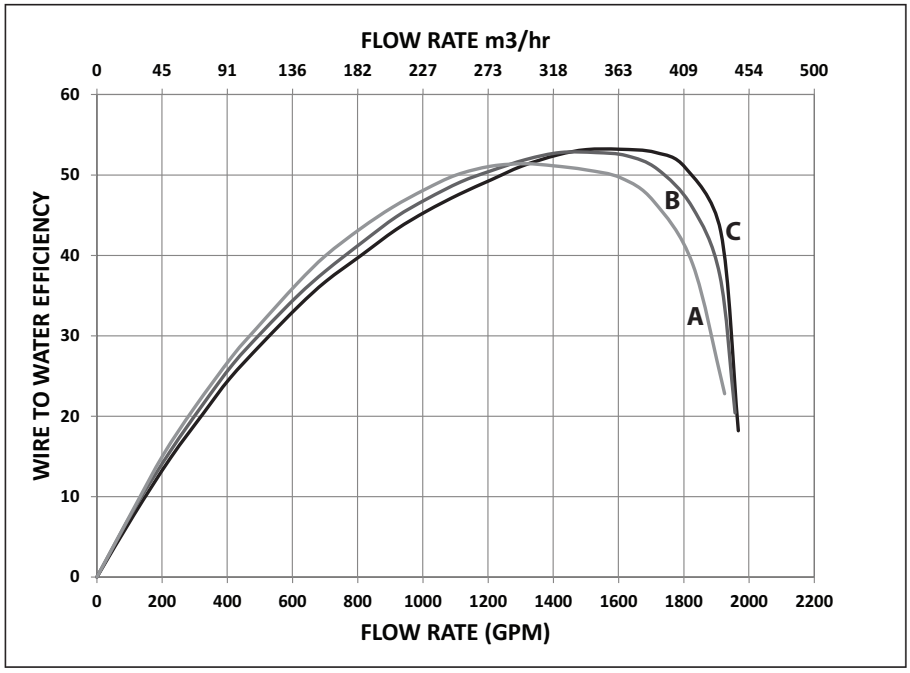
60Hz Model Pump Curves

Performance Curves



CURVE KEY	
A	40 HP
B	50 HP
C	60 HP

Efficiency Curves



CURVE KEY	
A	40 HP
B	50 HP
C	60 HP

Engineering Specifications

Part No.	Phase	HP	Voltage	Full Load Amps* (FLA)	Service Factor
50 Hz Pump Models					
VERMX5-160-AQ	3	40	400/690 V	55.7	1.15
VERMX5-200-AQ	3	50	400/690 V	69	1.15
VERMX5-240-AQ	3	60	400/690 V	83.3	1.15
60 Hz Pump Models					
VERMX6-160-AQ	3	40	230/460 V	94 / 47	1.15
VERMX6-200-AQ	3	50	230/460 V	124 / 62	1.15
VERMX6-240-AQ	3	60	230/460 V	142.2 / 71.1	1.15

(*) - This value may vary slightly depending upon motor manufacturer and motor design type.

Dimensional Data and Product Weights

Part No.	Product Weight W/O Strainer	Product Weight W/ Strainer	Length*	Width	Height
VERMX5-160-AQ / VERMX6-160-AQ	690lb / 313kg	756lb / 343kg	58in/1474mm	31in/788mm	38in/960mm
VERMX5-200-AQ / VERMX6-200-AQ	860lb / 390kg	926lb / 420kg	59in/1504mm	31in/788mm	38in/960mm
VERMX5-240-AQ / VERMX6-240-AQ	904lb / 410kg	970lb / 440kg	59in/1504mm	31in/788mm	38in/960mm

(*) - This value may vary slightly depending upon motor manufacturer and motor design type.

Flow Speed Data

Suction Line	1.5m/s, 4.9 fps
Discharge Line	2.5m/s, 8.2 fps
1.5 % Sloping Line	0.75m/s, 2.46 fps
Collector	0.5m/s, 1.64 fps

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