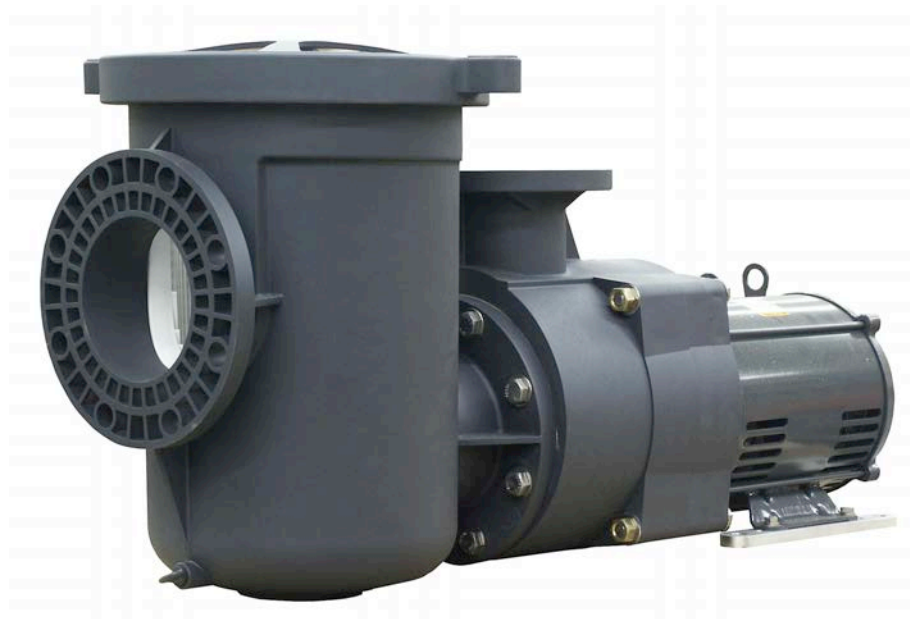




AQUATIC ECO-SYSTEMS™

VERUS™ 850

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, Inc., replacement parts and products, please use the following contact information:

Customer Service

8 AM to 7 PM — Eastern and Pacific Times

US

Phone: (877) 347-4788

FAX: (407) 886-6787

International

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FAX: (407) 886-4884

Web site

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IMPORTANT WARNING AND SAFETY INSTRUCTIONS



Important Notice:

This guide provides installation and operation instructions for the Verus™ 850 Pump. Consult Pentair Aquatic Eco-Systems™ 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 pump. 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.

⚠ WARNING — Before installing this product, read and follow all warning notices and instructions which are included. Failure to follow safety warnings and instructions can result in severe injury, death, or property damage. Call (877) 347-4788 (US) or (407) 866-3939 (INT) for additional free copies

Consumer Information and Safety

The Verus™ 850 pump 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 and the installation codes referred to in later sections. Throughout the manual, safety warnings and cautions are identified by the “⚠” symbol. Be sure to read and comply with all of the warnings and cautions.

⚠ DANGER — **Risk of electrical shock or electrocution.**



This pump must be installed by a licensed or certified electrician or a qualified installer in accordance with the current National Electrical Code (“NEC”) and/or all applicable local codes and ordinances. The specific section of NEC covering your pump may vary depending on your location. Some states, and/or municipalities may not have adopted the 2008 edition of the NEC. In this case your state or local code may only be applicable and/or an earlier edition of the NEC may apply. 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 to users, installers or others (due to electrical shock) and/or property damage.

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

IMPORTANT WARNING AND SAFETY INSTRUCTIONS



WARNING — Never exceed the maximum operating pressure or temperature limits of the system components. Pumps installed with the Pentair Strainer Pot Assembly should not be tested at a pressure that exceeds 20 psi. 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. A pressure relief device should be installed that would 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 or more. These components could cause severe personal injury or death if they were to strike a person.



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 or more. These components could cause severe personal injury or death if they were to strike a person.

IMPORTANT WARNING AND SAFETY INSTRUCTIONS

General Installation Information

⚠ 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.



- The pump is available with or without a specially designed strainer pot assembly. Pumps without the strainer pot assembly are not self-priming and must be installed so that the pump is always flooded with water. If the pump is to be installed without a strainer pot, plumbing suction inlets must prevent debris large than ¼ in. (0.6 cm) in diameter from being drawn into the pump.
- Pumps installed with the specially designed strainer pot assembly are self-priming at heights up to 10 ft. (3 meters) depending on the specific installation.

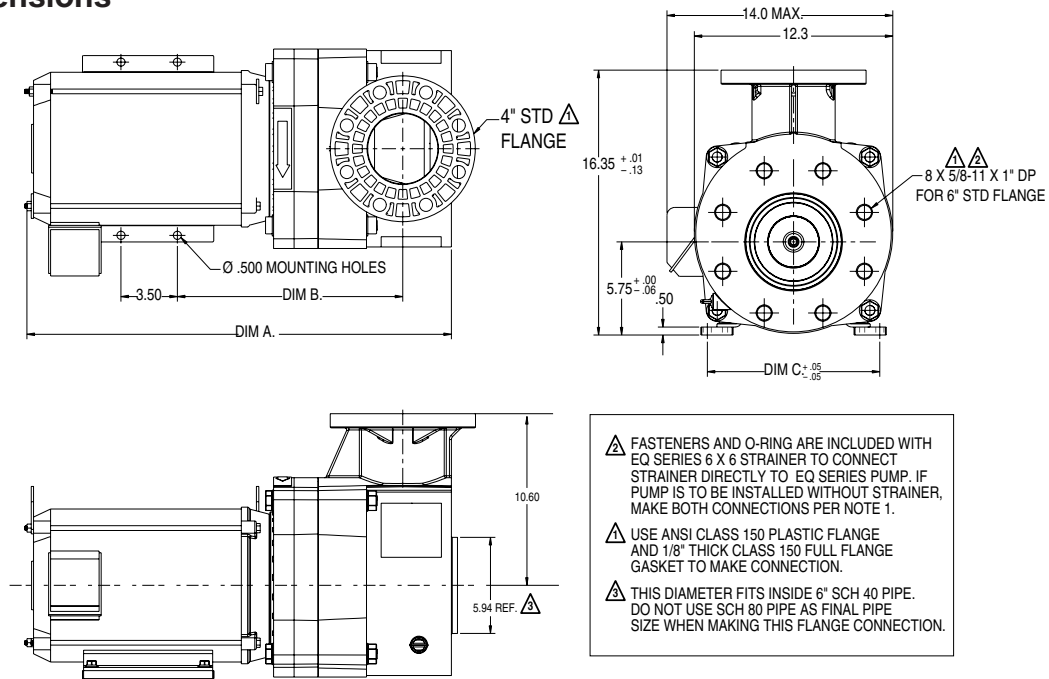
Section 1

Introduction

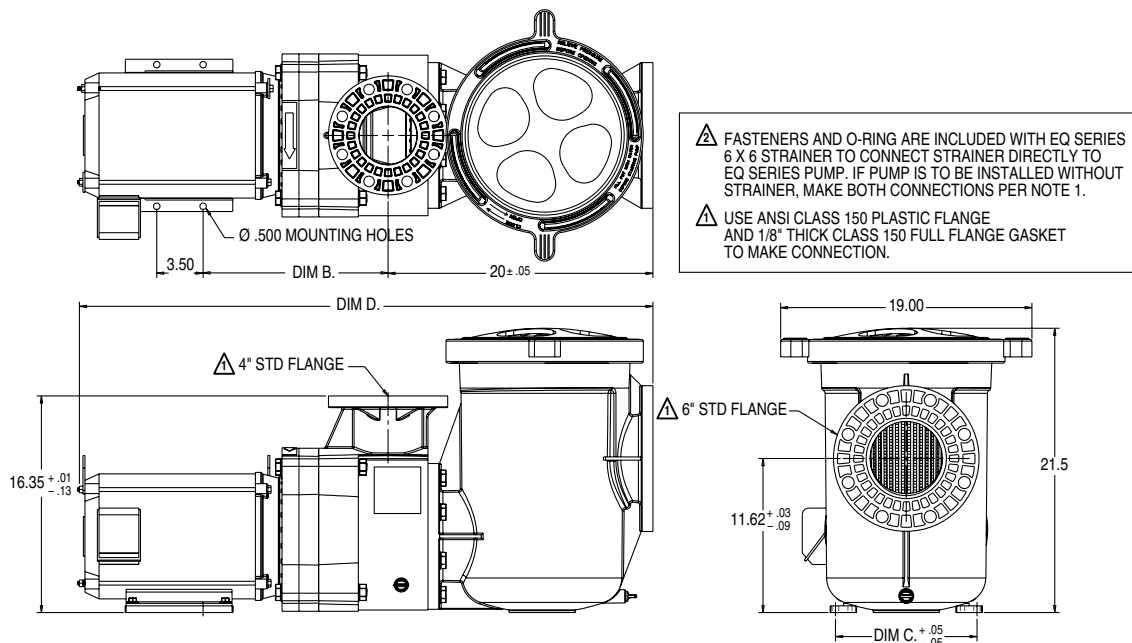
Verus™ 850 Premium Efficient Aquaculture Duty Pump Overview

- Efficient, quiet, lightweight and corrosion-resistant with innovative impeller design.
- Available in single and three-phase, 50 and 60 Hz models
- 6" (15.24 cm) suction and 4" (10.16 cm) discharge with strainer pot
- Heat-resistant seal operates at up to 150° F (66 C°)
- Optional bolt-on Strainer Pot (P/N 347013)
- Self-priming pump
- Some Models are ETL Listed, (see table on [page 19](#))
- CE Listed - Conforms with all health, safety and environmental protection standards of the European Union. Applies to 50 Hz models only, (see table on [page 19](#)).

Pump Dimensions



Pump Dimensions (With Optional Strainer Pot, P/N 347013)



Section 2

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™ 850 Premium Efficient Aquaculture Duty Pump.

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

Installing the Pump

Only a qualified service person should install the pump.

Mechanical Installation and Pressure Testing

Mechanical Installation

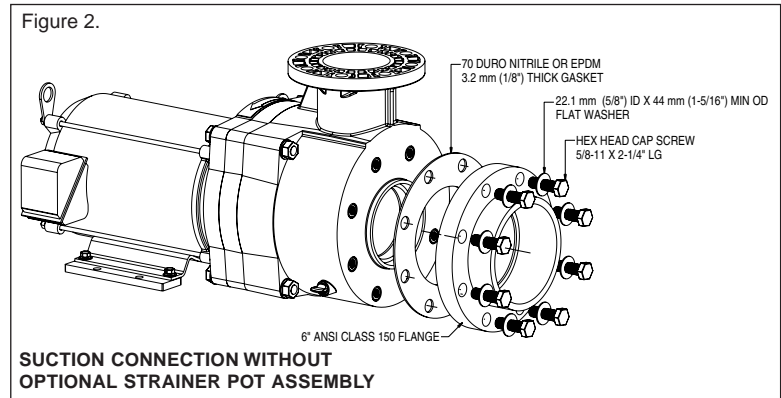
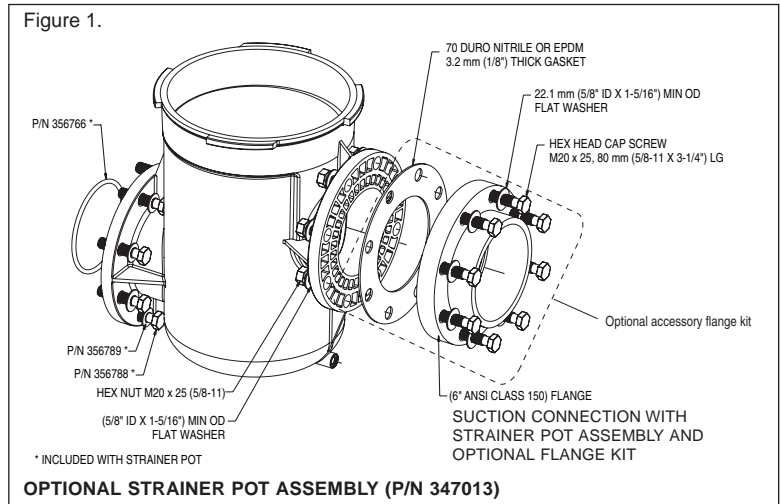
1. Carefully remove the pump unit and strainer pot assembly, if included, from its shipping package.
2. The pump will perform best when the suction and return head losses (Total Dynamic Head [TDH]) of the aquaculture system have been carefully determined and the correct pump model selected to fit these requirements. A pump should be selected to operate near the center of its Performance Curve with as high an efficiency as possible. It is also important that the Net Positive Suction Head Available (NPSHA) be greater than the Net Positive Suction Head Required (NPSHR) at the design flow rate.
3. If it is not possible to determine accurate suction and discharge head losses (Total Dynamic Head [TDH]), conservative plumbing practices should be strictly adhered to. This would include installing the pump as close as possible and at approximately the same level as the water level. (See [page iv](#), General Installation Information, regarding when a strainer pot assembly is required.) Use large diameter pipe especially on the suction line to keep flow velocities at or below 6 feet per second (fps), (1.8 meters per second [mps]). Flow velocities in the return plumbing should not exceed 10 fps, (3 mps). Also keep elbows and tees to a minimum. Installations where the pump is going to be installed more than 10 feet, (3 meters), below or 5 feet, (1.5 meters), above the water level must be evaluated by an experienced professional to ensure that the pump will function correctly.
4. 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
5. The pump suction and discharge pipes will need to be supported mechanically. Support piping within 3 feet 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.

6. 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.

Mechanical Installation (Continued)

7. 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.
8. The pump may be secured to bolts buried in the concrete by using the holes on the outside of the motor supports.
9. 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. It may be necessary to hold the gasket in place with either silicone or two or three drops of a cyanoacrylate (super glue) material. Do not use any other 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 — Some off the shelf, non-Pentair, 6" flange adapters will **not** work with pump without the strainer pot. Note the tabs on the flange on the left, (Figure 3). These tabs will interfere with the strainer pot alignment lip on the housing. This lip is used to locate the strainer pot on models that are so equipped. Please contact Pentair for a replacement flange adapter kit (Pentair P/N 357212).

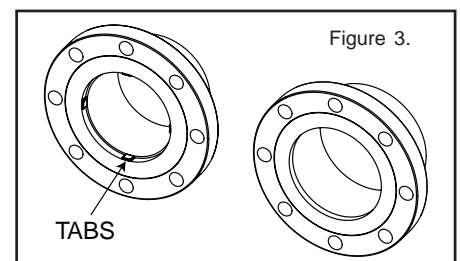
CAUTION — Use large diameter flat washers between the hex nut and the pump flanges to properly distribute the clamping forces on the flange. Tighten the flanges to 20 ft.-lb. (27.1 newton/meters) unless otherwise specified by the flange manufacturer. If it is not possible to use a torque wrench then 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.

10. Properly insert the flange gasket on the discharge port of the pump. Install the flange bolts hand tight on the discharge flange connection.
11. 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 357259: FLANGE 2.5 INCH SCHEDULE-80 WITH GASKET AND S/S HARDWARE (QTY. 1)
- P/N 357260: FLANGE 5 INCH SCHEDULE-80 WITH GASKET AND S/S HARDWARE (QTY. 1)
- P/N 357261: FLANGE 3 INCH SCHEDULE-80 WITH GASKET AND S/S HARDWARE (QTY. 1)
- P/N 357262: FLANGE 4 INCH SCHEDULE-80 WITH GASKET AND S/S HARDWARE (QTY. 1)
- P/N 357263: FLANGE 6 INCH SCHEDULE-80 WITH GASKET AND S/S HARDWARE (QTY. 1)
- P/N 357212: FLANGE 6 INCH SCHEDULE-80 WITH GASKET AND S/S HARDWARE WITHOUT POT (QTY. 1)



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 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. It is common practice for plastic components to be pressure rated at 72° F (22° C). and then derated for temperatures greater than this.
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. Pumps installed with the Strainer Pot Assembly should not be tested at a pressure that exceeds 20 psi. 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.

Pressure Testing (Continued)

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.

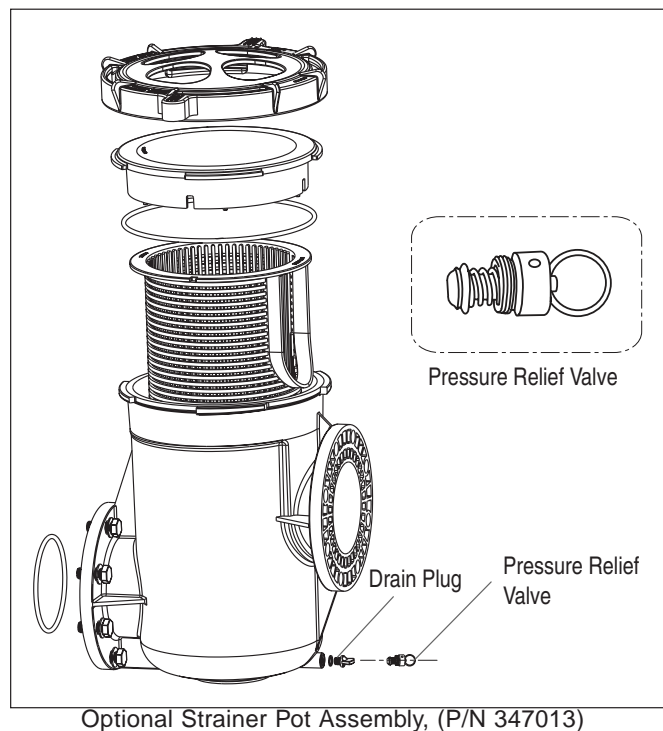
WARNING — Due to the potential risk that can be involved it is recommended that the pressure test be kept to the minimum time required by the local code. Do not allow people to work around the system when the circulation system is under pressure test. Post appropriate warning signs and establish a barrier 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.

Pressure Relief Valve

If a strainer pot is installed, use a pressure relief valve (P/N 350087) in the drain plug of the strainer pot.



Section 3

Electrical Requirements

This section describes how to secure and wire the Verus™ 850 Aquaculture Duty Pump.

Electrical Requirements and Field Wiring

⚠ CAUTION — To prevent possible voltage reduction that cause flicker sensations in lighting equipment, this product should be powered by a dedicated power line capable of providing at least 32 A per phase. 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 the current National Electrical Code (“NEC”) and/or all applicable local codes and ordinances. The specific section of NEC covering your pump may vary depending on your location. Some states, and/or municipalities may not have adopted the current edition of the NEC. In this case your state or local code may only be applicable and/or an earlier edition of the NEC may apply. 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 — Some single-phase pumps may contain an internal thermal protector designed to temporarily stop the pump if the motor exceeds a preset temperature. The pump will automatically restart when the motor temperature falls to a preset limit. Always disconnect power before working on the pump to eliminate the possibility that the pump could start unexpectedly.

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.

Electrical Requirements and Field Wiring (Continued)

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 the National Electrical Code and any 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 and on certain single-phase pump units. Check wiring diagram to determine if motor can be field wired to rotate in both directions. 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.

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.**

Wire sizing, wire type, branch circuit fuse protection, motor starter, control equipment, and related items must meet National Electrical Code and local code requirements.

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


Voltage/Phase

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

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

Emergency Shutoff

Install an Emergency Shutoff Switch near 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.

Section 4

Initial Operation of Pump

⚠ 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 pool 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. If the pump is installed below the water level, water will flow into the pump. If the pump is installed above the water level it will be necessary to fill the strainer pot with water up to the suction pipe connection.
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.
6. If the pump is installed above the water level then the pump must remove the air from the suction piping. This phase of pump operation is referred to as priming. Pumps that are labeled self-priming have demonstrated in a test laboratory that they can prime when installed 10 feet (3 meters) above the water level in a time not exceeding 45 minutes. (**Exception:** Models VREW-12 1 Phase and VREW-12 3 Phase may require up to 1 hour and 15 minutes to prime to 10 feet (3 meters). Disconnect power to the pump if it does not prime within the time indicated. A pump that will not prime usually indicates a system problem such as an air leak on the suction side of 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 personal injury make sure the strainer pot temperature has cooled to room temperature. Carefully remove the drain plug on the strainer pot and allow the pressure to equalize before removing the locking ring.

NOTE: It is possible that if the pump fails to prime than the motor will shutdown due to overheating. If this happens, some models will have a red reset button located on the side of the motor on the field wiring box. This button can be very hard to press; use of a flat, blunt tool (nothing sharp) will make resetting the pump much easier, (see Figure 4). Be careful when resetting the motor not to puncture the rubber seal around the switch. The button will click into place once completely pressed. If there is no red reset button on the motor, then allow the motor to cool to room temperature before trying to prime again.

7. It is important that once the pump has primed and 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.

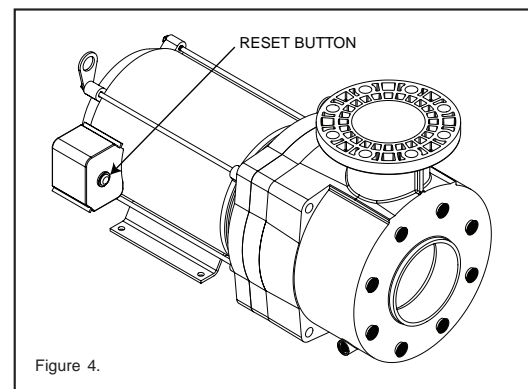


Figure 4.

Section 5

Maintenance

Cleaning of the Strainer Basket

1. The 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.

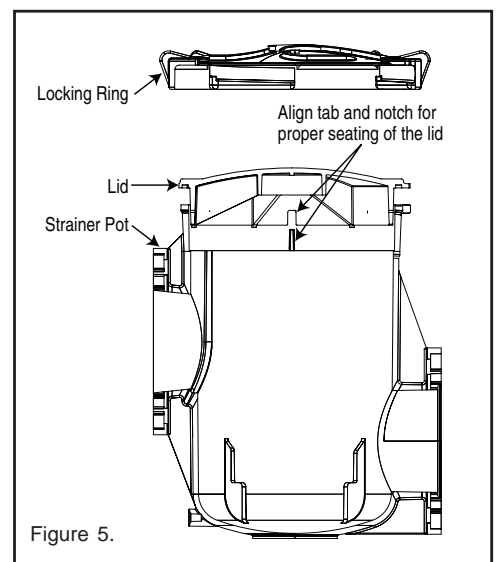
⚠ WARNING — If the pump has been energized for a period greater than 45 minutes without water flowing through the pump for any reason, the water in the strainer pot may be hot. Attempting to remove the locking ring without removing the drain plug in the pot and allowing the pressure to equalize may result 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, by aligning the four tabs with the tabs on the strainer pot and making sure the O-ring is clean and is properly located in the groove of the lid.

NOTE

The lid must be properly aligned before the locking ring will seat completely. Ensure that the notch in the lid is properly aligned with the tab in the strainer pot, (see Figure 5). Also ensure that the locking ring is aligned properly before tightening. If the locking ring is misaligned, the handles will interfere with the pump before the locking ring is completely locked, (see Figure 6 on page 12).

10. Secure the lid in place by tightening the locking ring hand tight only. Do not over tighten the locking ring as that will make removal difficult.

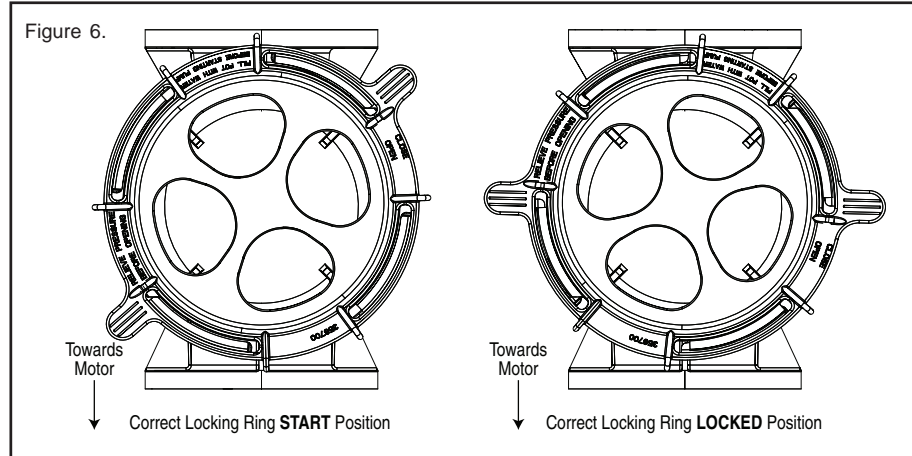


⚠ WARNING — It is recommended that only water and a soft cloth be used to clean the lid and other pump components. Cleaners may contain chemicals that could damage or weaken pump components causing them to fail and allowing an instantaneous release of energy. This instantaneous release of energy can 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 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. Record the time it takes for the pump to prime and come to a stable operating condition. Increased priming times can indicate a problem. See Section 7, Troubleshooting.
2. 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.
3. Observe the sound coming from the motor. Motor bearings rarely fail without first becoming noisy.
4. 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 Section 7, Troubleshooting.
5. Record any flow and pressure readings on the circulation system meters and gages. See Section 7, Troubleshooting.
6. 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.
7. 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.
8. 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.
9. Verify that the support brackets or hangers for the suction and discharge piping are continuing to fully support the weight of the piping.
10. Motor bearings are a permanently lubricated/sealed type and do NOT need grease or oil applied, (even in the presence of zerk/grease fittings). Applying grease or oil can damage the bearing seal allowing water to enter the bearing causing premature bearing failure.

Section 6

Servicing

WARNING — RISK OF ELECTRICAL SHOCK OR ELECTROCUTION.




This pump must be installed by a licensed or certified electrician or a qualified serviceman in accordance with the National Electrical Code and all applicable 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. Ensure that the disconnected circuit is locked out or properly tagged so that it cannot be switched on while you are working on the pump. Failure to do so could result in death or serious injury to serviceman, users or others due to electric shock.

Read all servicing instructions before working on the pump.

The pump is designed to allow for quick servicing of any moving parts without disturbing the plumbing connections. The pump can be serviced with the common tools that are in nearly every service persons toolbox. The following sequential instructions are for a complete disassembly in order to replace a failed motor. The same instructions may be used to perform a partial disassembly to replace any internal component, but following all steps will not be required.

 **CAUTION —** It is recommended that you replace the motor with the Pentair replacement motor as identified in Section 8. This motor has been thoroughly tested to ensure that it will function appropriately with the pump under a wide variety of operating conditions. If you choose to use another replacement motor it is important that the frame type, the HP, the service factor, the voltage, the phase and the motor speed match exactly to that listed on the original motor. Slight differences in these parameters can cause the motor to not fit the pump correctly or cause the motor to fail prematurely.

Disassembly

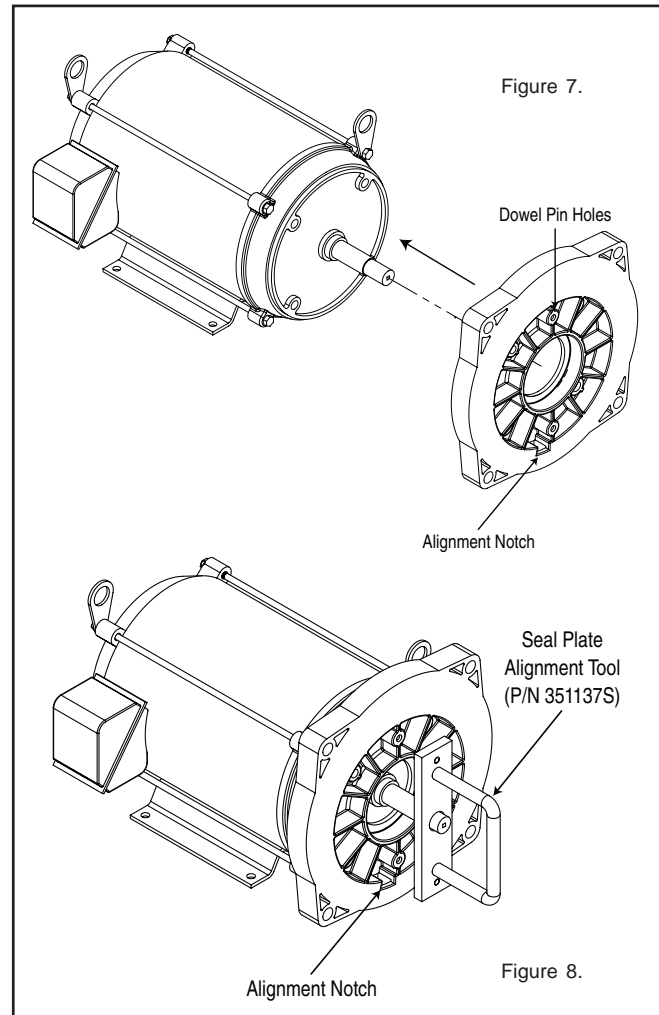
1. Ensure the electric supply circuit is disconnected and is properly tagged and locked out.
2. Disconnect the line supply conductors and the ground conductor from the motor (1) if the motor is being replaced.
3. Close any valves required to prevent flooding when the pump is disassembled.
4. Review the parts breakdown in Section 8, to understand how the pump components are assembled together.
5. Remove the pump housing (22) drain plug (24) and allow the pump to completely drain.
6. Remove the four 5/8 in. hex nuts (23) that secure the motor end assembly to the front housing (22).
7. If the motor support (2) is bolted to a permanent surface it will be necessary to remove the screws (6) that are securing the motor to the motor support (2) to allow for removal of the motor end assembly.
8. Grasp the motor end assembly and pull backwards. It may be necessary to wiggle the motor assembly from side to side to break free the O-Ring seals inside the pump.
9. Pull the motor end assembly free of the housing (22) so that there is adequate access to the internal components. If desired, the supply conductors can be disconnected and the motor end assembly can be taken to a workbench for easier service.
10. Remove the four screws (20) with washers (18) (19) that secure the diffuser (17) to the seal plate (13).
11. Hold the impeller (15) nose and remove the screw (16) and washers (4) (5) that secure the impeller (15).
12. The impeller (15) is also secured to the shaft by a parallel key . The impeller (15) can be freed from the shaft and key by grasping the outside of the impeller (15) and pulling the impeller (15) away from the motor (1). It is good practice to inspect the impeller (15) to ensure that the vane passageways are open and that no vanes have been substantially broken or worn.
13. Removing the impeller (15) will expose the two pieces of the mechanical seal (14). It will not be necessary to further disassemble the pump if only a seal replacement is required.

Assembly (Continued)



14. The seal plate (13) is attached to the motor adaptor (7) by two dowel pins (26). The seal plate (13) can be freed from these dowel pins (26) by grasping the outside of the seal plate (13) and pulling away from the motor wiggling it from side to side if required.
15. Remove the four screws (10) with washers (8) (9) that secure the motor adaptor (7) to the motor (1). These components could cause severe personal injury or death if they were to strike a person.

Assembly – Refer to the Replacement Parts (Section 8) for Figures


1. Ensure that the two 6½ in. long screws (11) with washers (12) are properly inserted into the bottom of the motor adaptor (7) before attaching the motor adaptor (7) to the new motor (1).
2. Properly orient the motor adaptor (7) to the motor (1) and secure in place using the four screws (10) and washers (8) (9). It is recommended to use the Pump Seal Plate Alignment tool (Pentair P/N 351137S) when mounting the motor adaptor to ensure that the motor adaptor is perfectly aligned to the motor shaft, (see Figures 7 & 8).
3. Insert the two dowel pins (26) into the motor adaptor (7).
4. Install the stationary ring of the mechanical seal (14) into the seal plate bore. Ensure that it is fully inserted into the bore with the white surface facing you.



CAUTION — The mechanical seal is a highly engineered component that must be carefully handled. The contact faces are manufactured to extremely precise tolerances. These faces must be free of all surface dust and debris. Always wash your hands before handling the mechanical seal. Avoid touching the contact faces except for when pressing the seal ring into the bore. Lubricate the rubber portion with a slight amount of soapy water if required to insert it into the bore. Do not use silicone or other lubricants as this can contaminate the seal face. Rinse the seal face if required after assembly to free it of any dirt or debris.

5. Properly orient the seal plate (13), slip it onto the two dowel pins (26) and secure to the motor adaptor (7) by tapping it toward the motor adaptor (7) until there is no clearance between the two parts.
6. Slip the spring portion of the mechanical seal (14) over the motor shaft, being certain that the hard black contact surface is facing the white surface of the stationary seal ring. Use a small amount of soapy water if required to lubricate the rubber of the mechanical seal (14) so that it slips easily over the shaft.
7. Install the shaft key  into the shaft of the motor and then install the impeller (15) over the shaft. It will be necessary to align the keyway in the impeller (15) with the key . Push the impeller (15) as far as possible onto the motor shaft (1).
8. Install the socket head screw (16) with washers (4) (5) to secure the impeller (15). It is important that the screw (16) be tightened securely and that the impeller (15) is fully seated.

9. Apply a light film of silicone grease to the inside diameter of the brass bushing inside the diffuser (17). This film will assist in properly centering the diffuser bushing to the impeller (15) and will reduce the friction should the parts contact during motor start-up. **DO NOT USE ANY OTHER TYPES OF LUBRICANTS.**
10. Install the diffuser (17) over the impeller (15) and secure with the four screws (20), but only hand tight. The diffuser (17) has clearance around the four screws (20) that will allow adjustment of the fit of the diffuser (17) around the impeller (15) nose. Rotate the impeller (15) by hand to ensure that it is free to turn and slowly tighten each of the four screws (20). Verify that the impeller (15) is free to turn once the diffuser screws (20) are fully tightened.
11. Lubricate the diffuser O-Ring (21) and the larger seal plate O-Ring (28) with silicone lubricant or oil soap. This will allow the O-Rings to slip into place without getting pinched. Ensure that the big seal plate O-Ring (28) is properly seated on the large diameter of the seal plate (13).
12. Carefully slip the motor end assembly into the housing (22) pushing it forward as far as possible until the large seal plate O-Ring (28) comes into contact with the housing (22). Insert the four 6½ in. long screws (11) through the housing (22) and secure the assembly in place using the washers (12) and nuts (23). Gradually tighten each of the four screws a few turns in a crossing pattern to ensure that the motor assembly is properly centered to the housing. Do not over tighten these screws.

 **CAUTION** — Failure to follow the above assembly procedures could cause the impeller to bind once the pump is fully assembled. It is possible to remove the strainer basket, reach through the strainer pot and spin the impeller to verify that it will rotate freely. A bound impeller may cause the motor to not start or cause the motor to draw excessive amps.

13. Secure the motor (1) to the motor supports (2).
14. Reconnect the ground and supply conductors.
15. Read and follow the instructions under Section 4, Initial Operation of Pump before putting the pump back into service.

Section 7

Troubleshooting

Use the following troubleshooting information to resolve possible problems with the 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.

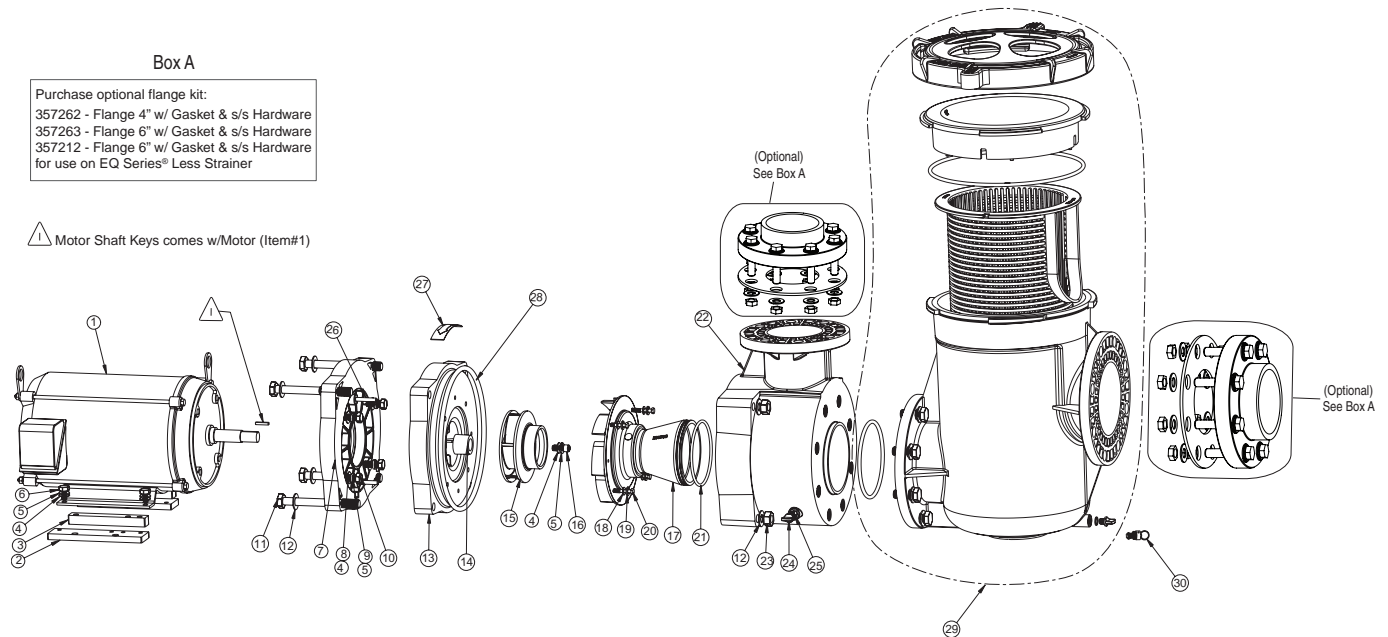
Note: Before attempting to service or repair. Turn off power to pump at the power source.
Problems and Corrective Actions

Problem	Corrective Action
Pump Will Not Prime	No water in Strainer Pot Lid is not tight Damaged lid O-Ring Closed Valve in Piping System Air leak in Suction Line Pump installed more than 10 ft. (3 m) above Water Level or otherwise too high for Hydraulic Conditions of Pool Plumbing System Pump Shaft rotating in wrong direction
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

Section 8

Replacement Parts

Verus™ 850 Duty Pump Illustrated Parts



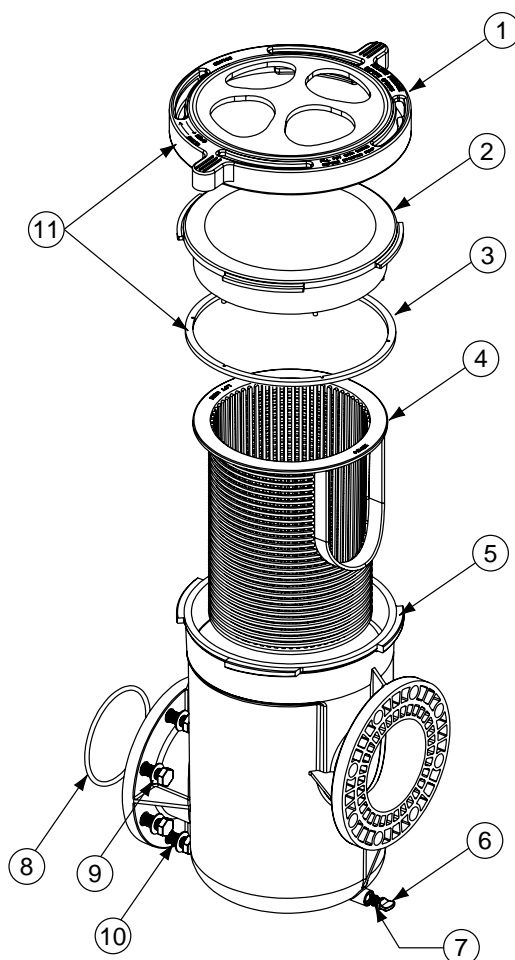
Part No. W/O Pot	Part No. W/Pot	Model Number	HP	Phase	Motor No. (Key No. 1)	Additional Motor Support (Key No. 3)	Impeller (Key No. 15)	Diffuser (Key No. 17)
347019	347030	VRE-20	5	1	357065S	356712	350030	350032SS
347020	347031	VREK-20	5	3	357068S	356712	350030	350032SS
347021	347032	VRE-30	7.5	1	357066S	N/A	350029	350033SS
347022	347033	VREK-30	7.5	3	357069S	356712	350029	350033SS
347237	347238	VRE-40	10	1	357063S	N/A	350028	350033SS
347023	347034	VREK-40	10	3	357070S	N/A	350028	350033SS
347024	347035	VREK-60	15	3	357071S	N/A	350027	356735SS
347083	347049	VREK5-40	10	3	350153S	N/A	350027	356735SS
347084	347080	VREK5-30	7.5	3	350154S	N/A	350028	350033SS
347085	347081	VREK5-20	5	3	350155S	356712	350029	350033SS
347086	347082	VREK5-12	3	3	350156S	356712	350030	350032SS
347018	347029	VREWK-20	5	3	350158S	356712	350070	357273SS
347017	347028	VREW-20	5	1	350159S	356712	350070	357273SS
347148	347155	VRECK-20	5	3	355038S	356712	350030	350032SS
347149	347156	VRECK-30	7.5	3	355039S	356712	350029	350033SS
347150	347157	VRECK-40	10	3	355042S	N/A	350028	350033SS
347151	347159	VRECK-60	15	3	355044S	N/A	350027	356735SS
347014	347026	VREW-12	3	1	357064S	356712	350027	356735SS
347016	347027	VREWK-12	3	3	357067S	356712	350027	356735SS

Continued on next page

Verus™ 850 Duty Pump Parts List

Item #	P/N	Description
1	---	Motor – See Table on prev. page.
2	356713	Support - Motor - {qty. 2}
3	---	Support Adapter – See Table on prev. page.
4	072184	Washer, Flat 3/8" ID x 7/8" OD .05 Thk 18-8 s/s - {qty. 5 (1) & qty. 9}
5	98220600	Washer Split Lock 3/8" 18-8 s/s- {qty. 5 (1) & qty. 9}
6	A135	Screw 3/8"-16 x 3/4" Hx Hd Cap 18-8 s/s (VRE-30, VRE-40) - {qty. 4}
6	350073	Screw 3/8"-16 x 1 1/2" Hx Hd Cap 18-8 s/s (VREW-12, VRE-20, VREK-30) - {qty. 4}
7	356790	Adapter - Motor - Verus 850 Series
8	075842	Washer, Flat 1/2" ID x 1 1/4" OD .125 Thk 300 s/s - {qty. 4}
9	350063	Washer Split Lock 1/2" 18-8 s/s - {qty. 4}
10	354290	Screw 3/8"-16 x 1" Hx Hd Cap 18-8 s/s (VREW-12, VRE-20, VREK-30) - {qty. 4}
10	075843	Screw 1/2"-13 x 1 1/4" Hx Hd Cap 18-8 s/s (VRE-30, VRE-40) - {qty. 4}
11	356710	Screw 5/8"-11 x 6 1/2" Hx Hd Cap 18-8 s/s - {qty. 4}
12	356789	Washer, Flat 11/16" ID x 1-5/16" OD .078 Thk 300 s/s {qty. 8}
13	356795SS	Seal Plate
14	071726S	Seal Set
15	---	Impeller – See Table on prev. page.
16	071037	Screw 3/8"-16 x 1" Sckt. Hd Cap 18-8 s/s
17	---	Diffuser – See Table on prev. page.
18	51008500	Washer, Flat 1/4" 300 s/s - {qty. 4}
19	072172	Washer Split Lock 1/4" 18-8 s/s - {qty. 4}
20	350035	Screw 1/4"-20 x 1 1/2" Hx Hd Cap 18-8 s/s (VRE-20, VRE-30, VRE-40) - {qty. 4}
20	356797	Screw 1/4"-20 x 1-3/4" Hx Hd Cap 18-8 s/s (VREW-12) - {qty. 4}
21	350037	O-ring Diffuser 3/16" x 4-7/8"
22	356755	Housing
23	356776	Nut 5/8"-11 Hx Brass - {qty. 4}
24	357161	Drain Plug
25	192115	O-ring Drain Plug
26	350060	Pin Dowel 5/16" x 1 1/4" 18-8 s/s - {qty. 2}
27	350072	Label, Directional Arrow
28	356780	O-ring Seal Plate 3/8" x 11" dia.
29	347013	Strainer Pot, Complete Verus 850 Series 6" x 6"
30	350087	Pressure Relief Valve
Verus 850 Series Pump Accessories — Flange Assy. Kits (Not Included, Not Shown)		
---	357262	Flange 4" w/ Gasket & s/s Hardware w/ Strainer
---	357263	Flange 6" w/ Gasket & s/s Hardware w/ Strainer
---	357212	Flange 6" w/ Gasket & s/s Hardware for use on Verus 850 w/o Strainer

Strainer Pot Parts List

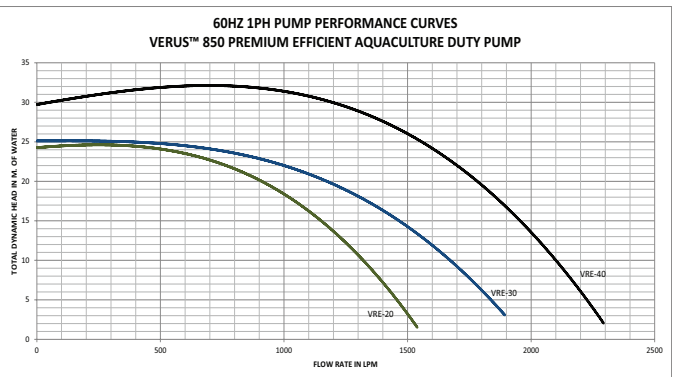
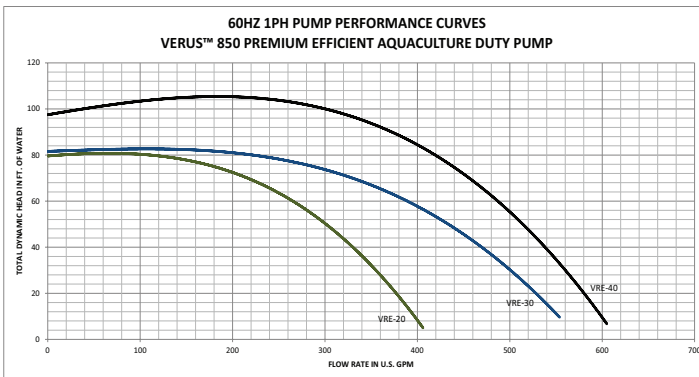
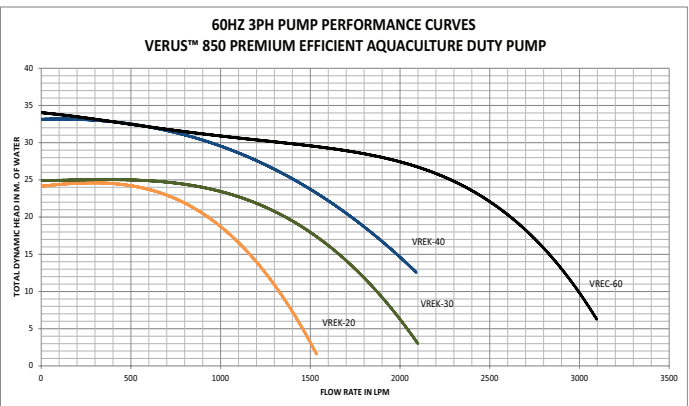
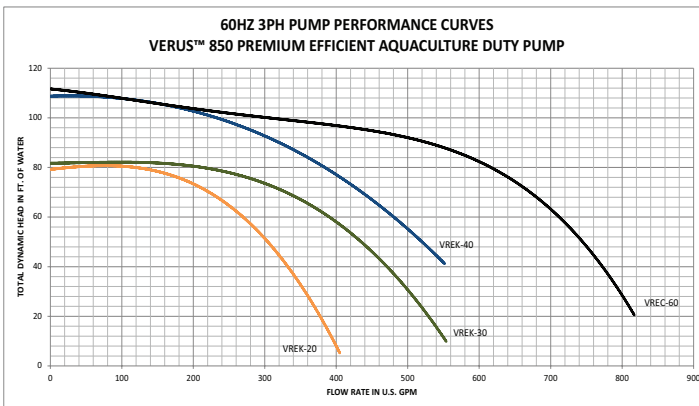
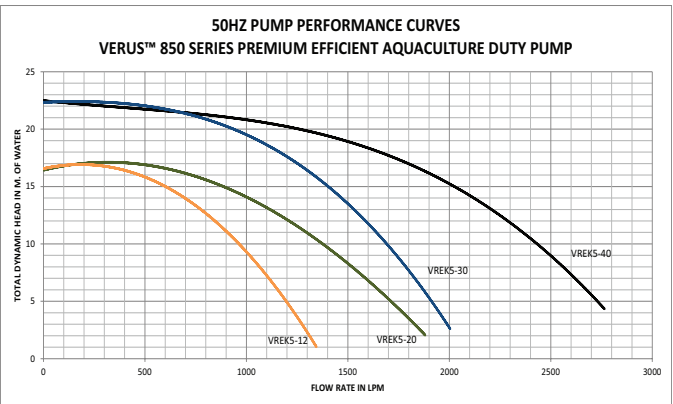
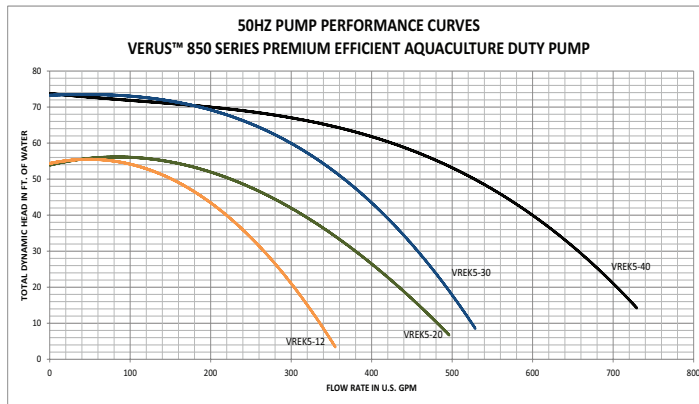


Verus™ 850 Strainer Pot Assembly (P/N 347013)

Item No.	Part No.	Description
1	356700	Clamp, Cam and Ramp Verus™ 850 Pump
2	356750	Lid, Verus™ 850 Pump Clear
3	350166	Gasket, Verus™ 850 Pump Lid
4	357184	Basket, Verus™ 850 Pump Strainer
5	356725	Pot, Verus™ 850 Pump Strainer
6	154699	Plug Wire .25 in. Drain LGR
7	192215	O-ring, Drain Plug
8	356766	O-ring, Pot Flange
9	356789	Washer, Flat 11/16 in. ID x 1-5/16 in. OD .078 Thk 300 s/s {Qty. 8}
10	356788	Screw, 5/8 in.-11 x 1-3/4 in. Hx. Hd. Cap 18-8 s/s {Qty. 8}
11	350171	Clamp, Cam & Ramp and Gasket Verus™ 850 Pump Lid
<i>(NOT SHOWN)</i>		
350087		Pressure Relief Valve 1/4 in. NPT

Section 9

Pump Technical Data



Engineering Specifications

Part No. W/O Pot	Part No. W/Pot	Model Number	Phase	HP	Voltage	Full Load Amps* (FLA)	SF Amps	Service Factor
60 Hz Pump Models								
** 347014	347026	VREW-12 - 1PH 6" x 4"	1	3	208/230	19.5-19.2	21.5	1.15
347016	347027	VREWK-12 - 3PH 6" x 4"	3	3	208-230/460	8.4-7.8/3.9	9.5-8.8/4.4	1.15
** 347017	347028	VREW-20 - 1PH 6" x 4"	1	5	208/230	23.0-20.9	30.3-26.7	1.25
347018	347029	VREWK-20 - 3PH 6" x 4"	3	5	208-230/460	3.8-13.0/6.5	15.7/7.8	1.0/1.25/1.25
** 347019	347030	VRE-20 - 1PH 6" x 4"	1	5	230	20.0	23.0	1.15
347020	347031	VREK-20 - 3PH 6" x 4"	3	5	208-230/460	13.5-12.3/6.2	15.7-14.0/7.0	1.15
347021	347032	VRE-30 - 1PH 6" x 4"	1	7.5	230	30.4	35.2	1.15
347022	347033	VREK-30 - 3PH 6" x 4"	3	7.5	208-230/460	20.4-18.2/9.1	24.0-21.0/10.5	1.15
347237	347238	VRE-40 - 1PH 6" x 4"	1	10	230	40.0	45.0	1.15
347023	347034	VREK-40 - 3PH 6" x 4"	3	10	208-230/460	27.0-26.2/13.1	31.0-29.4/14.7	1.15
347024	347035	VREK-60 - 3PH 6" x 4"	3	15	208-230/460	40.0-38.0/18.8	46.0-43.0/21.3	1.15
347148	347155	VRECK-20 575V 3PH	3	5	575	5.1	5.9	1.15
347149	347156	VRECK-30 575V 3PH	3	7.5	575	7.2	8.3	1.15
347150	347157	VRECK-40 575V 3PH	3	10	575	10.2	11.5	1.15
347151	347159	VRECK-60 575V 3PH	3	15	575	15	17.4	1.15
50 Hz Pump Models								
*** 347086	347082	VREK5-12 - 50HZ - 3PH 6" x 4"	3	3	230/400	7.9/4.5	9.5/5.5	1.25/1.25
*** 347085	347081	VREK5-20 - 50HZ - 3PH 6" x 4"	3	5	230/400	12.3/7.1	15.4/8.8	1.25/1.25
*** 347084	347080	VREK5-30 - 50HZ - 3PH 6" x 4"	3	7.5	230/400	18.1/10.4	22.7/13.1	1.25/1.25
*** 347083	347049	VREK5-40 - 50HZ - 3PH 6" x 4"	3	10	230/400	24.0/13.7	30.1/17.3	1.25/1.25

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

**ETL listed

***CE listed

Dimensional Data and Product Weights

Part No. W/O Pot	Part No. W/Pot	Model Number	Product Weight W/O Strainer (lb.)*	Product Weight W/ Strainer (lb.)*	Dim A* inches	Dim B inches	Dim C inches	Dim D* inches
60 Hz Pump Models - 1 Phase								
347014	347026	VREW-12 - 1PH 6" x 4"	97	126	26.62	13.18	9.69	43.59
347017	347028	VREW-20 - 1PH 6" x 4"	97	126	26.62	13.18	9.69	43.59
347019	347030	VRE-20 - 1PH 6" x 4"	97	126	26.62	13.18	9.69	43.59
347021	347032	VRE-30 - 1PH 6" x 4"	132	161	27.53	13.93	10.69	44.59
347237	347238	VRE-40 - 1PH 6" x 4"	125	160	26.94	13.9	10.7	43.92
60 Hz Pump Models - 3 Phase								
347016	347027	VREWK-12 - 3PH 6" x 4"	77	106	23.12	13.31	9.69	40.09
347018	347029	VREWK-20 - 3PH 6" x 4"	77	106	23.12	13.31	9.69	40.09
347020	347031	VREK-20 - 3PH 6" x 4"	77	106	23.12	13.31	9.69	40.09
347022	347033	VREK-30 - 3PH 6" x 4"	87	116	24.50	13.31	9.69	41.56
347023	347034	VREK-40 - 3PH 6" x 4"	117	146	26.31	13.93	10.69	43.29
347024	347035	VREK-60 - 3PH 6" x 4"	132	161	26.31	13.93	10.69	43.29
347148	347155	VRECK-20 575V 3PH	77	106	24.62	13.31	7.5	41.59
347149	347156	VRECK-30 575V 3PH	87	116	24.62	13.31	7.5	41.59
347150	347157	VRECK-40 575V 3PH	117	146	26.31	13.93	8.5	43.29
347151	347159	VRECK-60 575V 3PH	132	161	26.31	13.93	8.5	43.29
50 Hz Pump Models								
347086	347082	VREK5-12 - 50HZ - 3PH 6" x 4"	80	109	24.62	13.31	9.69	41.59
347085	347081	VREK5-20 - 50HZ - 3PH 6" x 4"	80	109	24.62	13.31	9.69	41.59
347084	347080	VREK5-30 - 50HZ - 3PH 6" x 4"	120	150	28.31	13.93	10.69	45.29
347083	347049	VREK5-40 - 50HZ - 3PH 6" x 4"	132	162	28.31	13.93	10.69	45.29

Notes

Notes



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