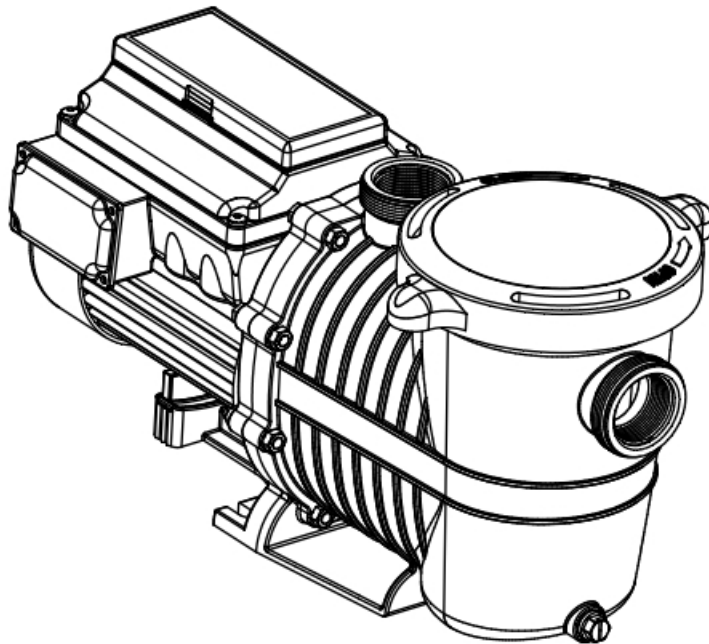


Variable Speed

Programmable Pump



SAVE THESE INSTRUCTIONS

Installation and User's Guide

IMPORTANT SAFETY INSTRUCTIONS
READ AND FOLLOW ALL INSTRUCTIONS
SAVE THESE INSTRUCTIONS

IMPORTANT PUMP WARNING AND SAFETY INSTRUCTIONS



IMPORTANT NOTICE

This guide provides installation and operation instructions for the Variable Speed Pump. **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 heat pump. **Attention User:** This manual contains important information that will help you in operating and maintaining this product. Please retain it for future reference.

READ AND FOLLOW ALL INSTRUCTIONS SAVE THESE INSTRUCTIONS



This is the safety alert symbol. When you see this symbol on your system or in this manual, look for one of the following signal words and be alert to the potential for personal injury.



DANGER Warns about hazards that can cause death, serious personal injury, or major property damage if ignored.



WARNING Warns about hazards that may cause death, serious personal injury, or major property damage if ignored.



CAUTION Warns about hazards that may or can cause minor personal injury or property damage if ignored.

NOTE indicates special instructions not related to hazards.

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

When installing and using this electrical equipment, basic safety precautions should always be followed, include the following:



WARNING Do not permit children to use this product.



WARNING Risk of Electrical Shock. Connect only to a branch circuit protected by a ground-fault circuit-interrupter (GFCI). Contact a qualified electrician if you cannot verify that the circuit is protected by a GFCI.



WARNING This unit must be connected only to a supply circuit that is protected by a ground-fault circuit-interrupter (GFCI). Such a GFCI should be provided by the installer and should be tested on a routine basis. To test the GFCI, push the test button. The GFCI should interrupt power. Push the reset button. Power should be restored. If the GFCI fails to operate in this manner, the GFCI is defective. If the GFCI interrupts power to the pump without the test button being pushed, a ground current is flowing, indicating the possibility of an electric shock. Do not use this pump. Disconnect the pump and have the problem corrected by a qualified service representative before using.



WARNING This pump is for use with permanent swimming pools and may also be used with hot tubs and spas if so marked. Do not use with storable pools. A permanently-installed pool is constructed in or on the ground or in a building such that it cannot be readily disassembled for storage. A storable pool is constructed so that it is capable of being readily disassembled for storage and reassembled to its original integrity.



CAUTION This pump is for use with permanent swimming pools and may also be used with hot tubs and spas if so marked. Do not use with storable pools. A permanently-installed pool is constructed in or on the ground or in a building such that it cannot be readily disassembled for storage. A storable pool is constructed so that it is capable of being readily disassembled for storage and reassembled to its original integrity.

General Warnings

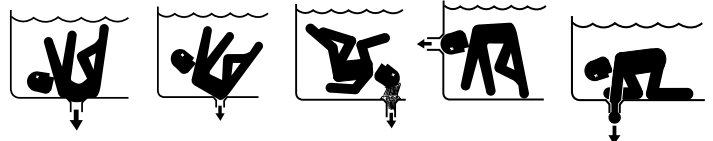
- Never open the inside of the drive motor enclosure. There is a capacitor bank that holds a 230 VAC charge even when there is no power to the unit.
- The pump is not submersible.
- The pump is capable of high flow rates; use caution when installing and programming to limit pumps performance potential with old or questionable equipment.
- Code requirements for the electrical connection differ from state to state. Install equipment in accordance with the National Electrical Code and all applicable local codes and ordinances.
- Before servicing the pump; switch OFF power to the pump by disconnecting the main circuit to the pump.
- This appliance is not intended for use by persons (including children) of reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.



DANGER FAILURE TO FOLLOW ALL INSTRUCTIONS AND WARNINGS CAN RESULT IN SERIOUS BODILY INJURY OR DEATH. **THIS PUMP SHOULD BE INSTALLED AND SERVICED ONLY BY A QUALIFIED POOL SERVICE PROFESSIONAL. INSTALLERS, POOL OPERATORS AND OWNERS MUST READ THESE WARNINGS AND ALL INSTRUCTIONS IN THE OWNER'S MANUAL BEFORE USING THIS PUMP. THESE WARNINGS AND THE OWNER'S MANUAL MUST BE LEFT WITH THE POOL OWNER.**



DANGER SUCTION ENTRAPMENT HAZARD: STAY OFF THE MAIN DRAIN AND AWAY FROM ALL SUCTION OUTLETS!



THIS PUMP PRODUCES HIGH LEVELS OF SUCTION AND CREATES A STRONG VACUUM AT THE MAIN DRAIN AT THE BOTTOM OF THE BODY OF WATER. THIS SUCTION IS SO STRONG THAT IT CAN TRAP ADULTS OR CHILDREN UNDER WATER IF THEY COME IN CLOSE PROXIMITY TO A DRAIN OR A LOOSE OR BROKEN DRAIN COVER OR GRATE.

THE USE OF UNAPPROVED COVERS OR ALLOWING USE OF THE POOL OR SPA WHEN COVERS ARE MISSING, CRACKED OR BROKEN CAN RESULT IN BODY OR LIMB ENTRAPMENT, HAIR ENTANGLEMENT, BODY ENTRAPMENT, EVisCERATION AND/OR DEATH.

The suction at a drain or outlet can cause:

Limb Entrapment: When a limb is sucked or inserted into an opening resulting in a mechanical bind or swelling. This hazard is present when a drain cover is missing, broken, loose, cracked or not properly secured.

Hair Entanglement: When the hair tangles or knots in the drain cover, trapping the swimmer underwater. This hazard is present when the flow rating of the cover is too small for the pump or pumps.

Body Entrapment: When a portion of the body is held against the drain cover trapping the swimmer underwater. This hazard is present when the drain cover is missing, broken or the cover flow rating is not high enough for the pump or pumps.

Evisceration/Disembowelment: When a person sits on an open pool (particularly a child wading pool) or spa outlet and suction is applied directly to the intestines, causing severe intestinal damage. This hazard is present when the drain cover is missing, loose, cracked, or not properly secured.

IMPORTANT PUMP WARNING AND SAFETY INSTRUCTIONS

Mechanical Entrapment: When jewelry, swimsuit, hair decorations, finger, toe or knuckle is caught in an opening of an outlet or drain cover. This hazard is present when the drain cover is missing, broken, loose, cracked, or not properly secured.

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

WARNING TO MINIMIZE THE RISK OF INJURY DUE TO SUCTION ENTRAPMENT HAZARD:

- A properly installed and secured ANSI/ASME A112.19.8 approved anti-entrapment suction cover must be used for each drain.
- Each suction cover must be installed at least three (3') feet apart, as measured from the nearest point to nearest point.
- Regularly inspect all covers for cracks, damage and advanced weathering.
- If a cover becomes loose, cracked, damaged, broken or is missing, replace with an appropriate certified cover.
- Replace drain covers as necessary. Drain covers deteriorate over time due to exposure to sunlight and weather.
- Avoid getting hair, limbs or body in close proximity to any suction cover, pool drain or outlet.
- Disable suction outlets or reconfigure into return inlets.

WARNING A clearly labeled emergency shut-off switch for the pump must be in an easily accessible, obvious place.

Make sure users know where it is and how to use it in case of emergency.

The Virginia Graeme Baker (VGB) Pool and Spa Safety Act creates new requirements for owners and operators of commercial swimming pools and spas.

Commercial pools or spas constructed on or after December 19, 2008, shall utilize:

(A) A multiple main drain system without isolation capability with suction outlet covers that meet ASME/ANSI A112.19.8a Suction Fittings for Use in Swimming Pools, Wading Pools, Spas, and Hot Tubs and either:

- (i) A safety vacuum release system (SVRS) meeting ASME/ANSI A112.19.17 Manufactured Safety Vacuum Release systems (SVRS) for Residential and Commercial Swimming Pool, Spa, Hot Tub, and Wading Pool Suction Systems and/or ASTM F2387 Standard Specification for Manufactured Safety Vacuum Release Systems (SVRS) for Swimming pools, Spas and Hot Tubs or
- (ii) A properly designed and tested suction-limiting vent system or
- (iii) An automatic pump shut-off system.

Commercial pools and spas constructed prior to December 19, 2008, with a single submerged suction outlet shall use a suction outlet cover that meets ASME/ANSI A112.19.8a and either:

- (A) A SVRS meeting ASME/ANSI A112.19.17 and/or ASTM F2387, or
- (B) A properly designed and tested suction-limiting vent system, or
- (C) An automatic pump shut-off system, or
- (D) Disabled submerged outlets, or
- (E) Suction outlets shall be reconfigured into return inlets.

For Installation of Electrical Controls at Equipment Pad (ON/OFF Switches, Timers and Automation Load Center)

CAUTION Install all electrical controls at equipment pad, such as on/off switches, timers, and control systems, etc. to allow the operation (startup, shut-down, or servicing) of any pump or filter so the user does not place any portion of his/her body over or near the pump strainer lid, filter lid or valve closures. This installation should allow the user enough space to stand clear of the filter and pump during system start-up, shut down or servicing of the system filter.



DANGER



HAZARDOUS PRESSURE: STAND CLEAR OF PUMP AND FILTER DURING START UP

Circulation systems operate under high pressure. When any part of the circulating system (i.e. locking ring, pump, filter, valves, etc.) is serviced, air can enter the system and become pressurized.

Pressurized air can cause the pump housing cover filter lid and valves to violently separate which can result in severe personal injury or death. Filter tank lid and strainer cover must be properly secured to prevent violent separation. Stand clear of all circulation system equipment when turning on or starting up pump.

Before servicing equipment, make note of the filter pressure. Be sure that all controls are set to ensure the system cannot inadvertently start during service. Turn off all power to the pump. **IMPORTANT: Place filter manual air relief valve in the open position and wait for all pressure in the system to be relieved.**

Before starting the system, fully open the manual air relief valve and place all system valves in the "open" position to allow water to flow freely from the tank and back to the tank. Stand clear of all equipment and start the pump.

IMPORTANT: Do not close filter manual air relief valve until all pressure has been discharged from the valve and a steady stream of water appears. Observe filter pressure gauge and be sure it is not higher than the pre-service condition.

General Installation Information

- All work must be performed by a qualified service professional, and must conform to all national, state, and local codes.
- Install to provide drainage of compartment for electrical components.
- These instructions contain information for a variety of pump models and therefore some instructions may not apply to a specific model. All models are intended for use in swimming pool applications. The pump will function correctly only if it is properly sized to the specific application and properly installed.

WARNING Pumps improperly sized or installed or used in applications other than for which the pump was intended can result in severe personal injury or death. These risks may include but not be limited to electric shock, fire, flooding, suction entrapment or severe injury or property damage caused by a structural failure of the pump or other system component.

WARNING The pump can produce high levels of suction within the suction side of the plumbing system. These high levels of suction can pose a risk if a person comes within the close proximity of the suction openings. A person can be seriously injured by this high level of vacuum or may become trapped and drown. It is absolutely critical that the suction plumbing be installed in accordance with the latest national and local codes for swimming pools.

SAVE THESE INSTRUCTIONS

Section 1

Pump Overview

Introduction

The Variable Speed pump is well suited for all of your pool, spa, cleaner, waterfall and other water applications. Using the control panel, pump can use one of the four selectable preset speeds or the pump speed can be adjusted to run at a specific speed. Advanced energy conservation features ensure that your filtration system is operating at peak efficiency.

This pump is a variable speed pump that can use up to eight speeds that can be adjusted to run at specific speeds and time intervals. The Variable Speed pump out performs all conventional pumps in its class.

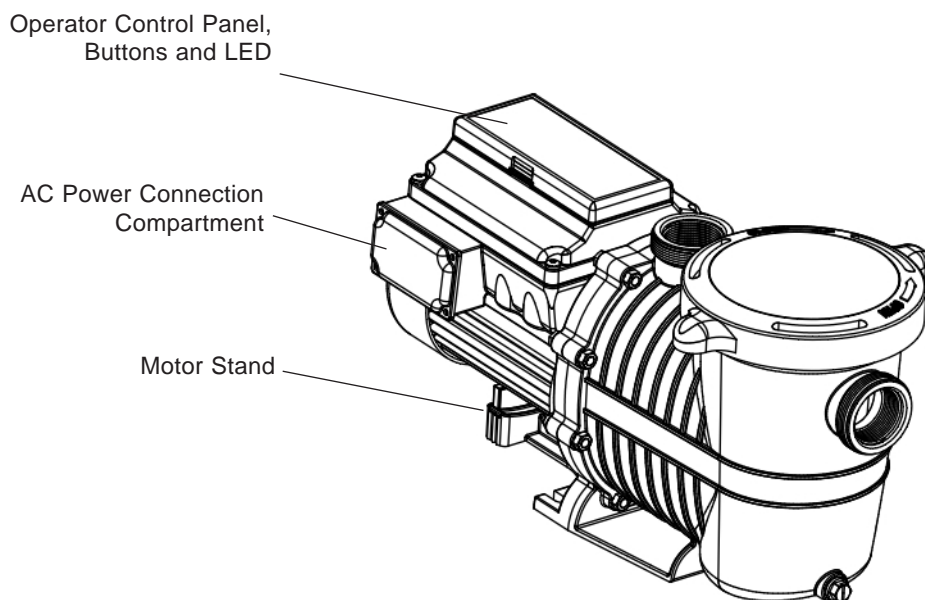
The pump can operate from 450 RPM to 3450 RPM with preset speeds of 750, 1500, 2350 and 3110 RPM. The pump can be adjusted from the control panel to run at any speed between 450 RPM to 3450 RPM for different applications. The pump control panel alarm LED and error messages warn the user against under and over voltage, high temperature, over current and freeze protection with user defined minimum and maximum speed presets.

Features

- Adjusts to various pool sizes
- Prevents thermal overload
- Detects and prevents damage from under and over voltage conditions
- Protects against freezing
- Easy to use operator control panel
- Operator control panel buttons for speed control
- Built-in strainer pot and volute
- Ultra energy-efficient TEFC Square Flange Motor
- Compatible with most cleaning systems, filters, and jet action spas
- Heavy-duty, durable construction designed for long life
- 12 Programmable Speeds
 - Eight Set speeds
 - Schedule
 - Duration
 - Manual
 - Four IntelliComm speed modes
 - Priming Feature
 - Load Sensing
 - Enable or Disable
 - Lock out protection
 - Four Digit password
 - Enable or Disable
 - LCD Display
 - Power and Speed
 - Text Alerts
 - Antifreeze Protection
 - Adjustable speed
 - Adjustable Temperatures
 - Enable and Disable in stand alone
- Additional Features
 - Clock and Timer
 - Maximum and Minimum Speed Limits
 - Quick Clean Mode
 - Service Features
 - Timeout Mode

Drive Assembly and Control Panel

The drive assembly consists of an operator control panel and the system electronics that drive the motor. The drive microprocessor controls the motor by changing the frequency of the current it receives together, with changing the voltage to control the rotational speed.



Variable Speed Drive Assembly

Variable Speed Motor Features

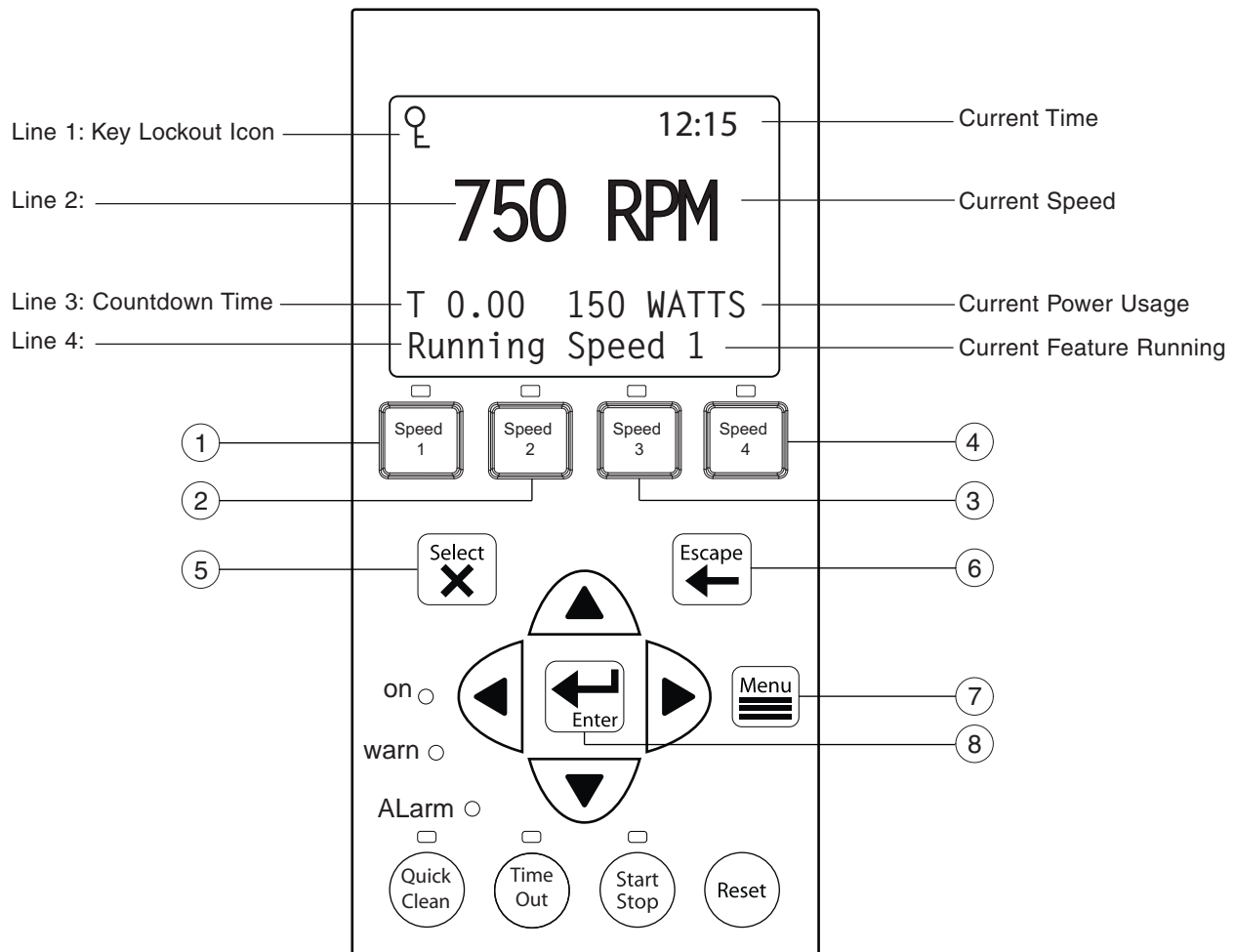
- High efficiency (3450 RPM 92% and 1000 RPM 90%)
- Superior speed control
- Operates at lower temperatures due to high efficiency
- Same technology as deployed in hybrid electric vehicles
- Designed to withstand outdoor environment
- Totally enclosed fan cooled
- Three-phase motor
- 56 Square Flange
- Low noise

Section 2

Operator Control Panel

This section describes the Variable Speed pump operator controls and LEDs.

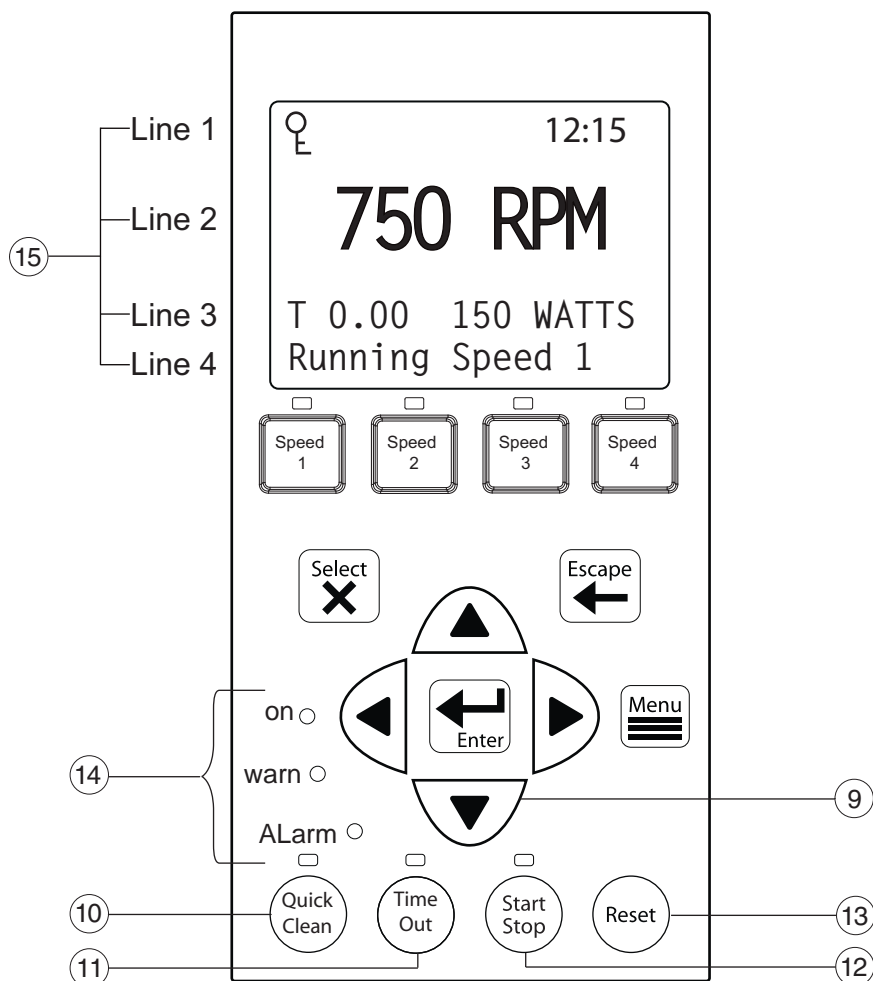
Operator Control Panel



Controls and LEDs

- ① **Speed 1 button/LED:** Press button to select Speed 1 (750 RPM). LED on indicates Speed 1 is active.
- ② **Speed 2 button/LED:** Press button to select Speed 2 (1500 RPM). LED on indicates Speed 2 is active.
- ③ **Speed 3 button/LED:** Press button to select Speed 3 (2350 RPM). LED on indicates Speed 3 is active.
- ④ **Speed 4 button/LED:** Press button to select Speed 4 (3110 RPM). LED on indicates Speed 4 is active.
- ⑤ **Select button:** Displays available menu items or enters edit mode for changing a value on line two of the display.
- ⑥ **Escape button:** Moves to next level up in the menu structure, and/or stops editing the current setting.
- ⑦ **Menu button:** Accesses the menu items if the pump is stopped.
- ⑧ **Enter button:** Saves current menu item setting. Press this button to acknowledge alarms and warning alerts.

Controls and LEDs (Continued)



⑨ Arrow buttons:

- **Up arrow:** Move one level up in the menu tree or increase a digit when editing a setting.
- **Down arrow:** Move one level down in the menu tree or decrease a digit when editing a setting.
- **Left arrow:** Move cursor left one digit when editing a setting.
- **Right arrow:** Move cursor right one digit when editing a setting.

⑩ **Quick Clean:** Duration and speed (RPM) can be preset to save energy. The LED is on when active.

⑪ **Time Out:** When active (LED on), at the end of a “Time Out” preset time, the pump will run a schedule.

⑫ **Start/Stop button:** Start or Stop the pump. When the LED is on, the pump is currently running or in a mode to start automatically.

⑬ **Reset button:** Reset alarm or alert.

⑭ LEDs

On: This green, power LED is on when pump is powered on.

Warning: LED is on if a warning condition is present.

Alarm: The red LED is on if an alarm condition occurs. See “Alerts and Warnings” on page 35.

⑮ Control Panel LCD:

- **Line 1** - Key icon indicates password protect mode is active. If password protect is not enabled, no key icon is displayed.
- **Line 2** - Displays the current pump speed (RPM).
- **Line 3** - Count down time and Watts
- **Line 4** - Current pump status.

Section 3

Operating the Pump

This section describes how to operate the pump using the control panel buttons and menu features.

Starting the pump

To start the pump

1. Be sure the pump is powered on and the green power LED is on.
2. Select one of the speed buttons, then press the **Start** button (LED on) to start the pump.

Stopping the pump

To stop the pump

- Press the **Stop** button to stop the pump.

Servicing Equipment (Disconnect Power to Pump)

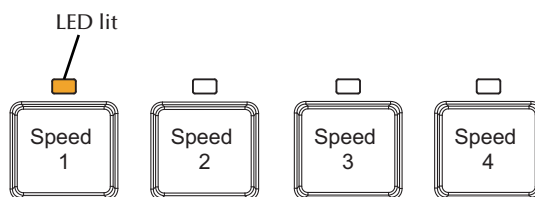
- When servicing equipment (filters, heaters, chlorinators etc.), disconnect the communication cable, and switch OFF circuit breaker to remove power from the pump.

Operating the Pump at Preset Speeds

The Variable Speed pump is programmed with four default speeds of **750, 1500, 2350** and **3110** RPM. A **Speed** button is assigned to each of the preset speeds as shown.

To operate the pump at one of the four preset speeds

1. Be sure the pump is powered on and the green power LED is on.
2. Press the **Speed** button (**1- 4**) corresponding to the desired preset speed, and release quickly. The LED above the **Speed** button will come on as shown.
3. Press the **Start** button. The pump will quickly ramp to the selected preset speed.



Adjusting the pump speed

1. While the pump is running, press the **Up Arrow** to increase speed setting.
2. Press the **Down Arrow** to decrease speed Setting.
3. Press and hold down a **Speed Button** for three (3) seconds to save speed to the button or press the **Enter** button to save the speed.

Pump Operating Modes

The Variable Speed pump can be programmed three ways:

1. **Manual Operation:** Speed buttons 1-4 can be programmed for Manual operation. This means the speed button is pressed and then the start button and the pump runs a programmed speed. Speeds 5-8 cannot be programmed for Manual operation because there are no buttons associated with them.

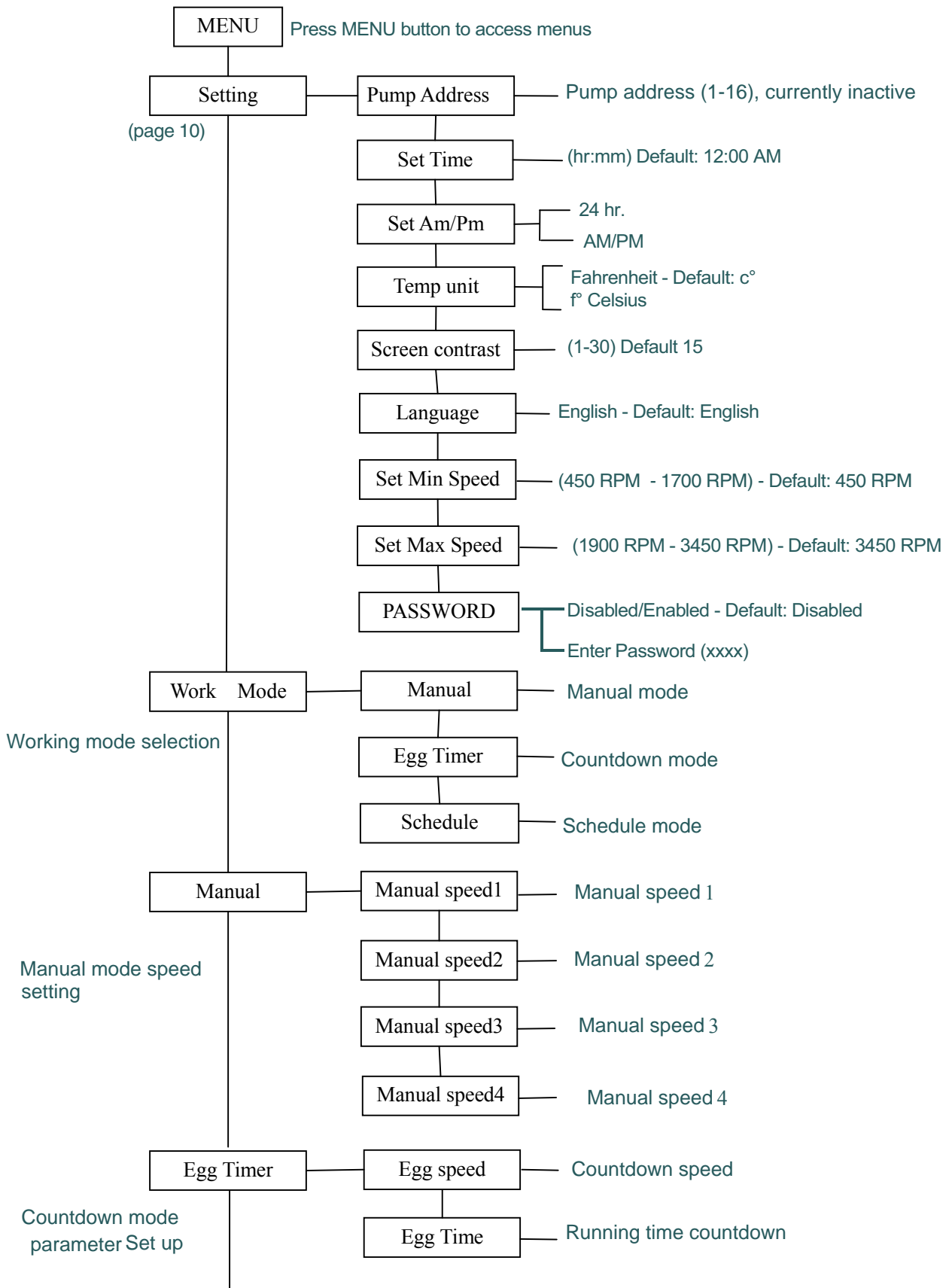
To operate the pump in Manual Mode, press one of the four speed buttons, and press the Start/Stop button to run the assigned speed for that button. When the pump is running a Manual Speed Setting (speed 1, 2, 3 or 4 button pressed manually) and a scheduled speed is set to run, the scheduled speed will take priority regardless of speed (RPM) assigned to each button. When the Scheduled Speed's time is over, it will not revert back to the manually pressed speed. If the pump is running a schedule and a speed button is pressed manually, the pump will run the manually selected speed until the next scheduled speed program.

2. **Egg Timer (Duration):** Speeds 1-4 can be programmed to run for a duration of time once pressed. This means that the Speed button is pressed and then the start button and the pump runs a programmed speed and the speed will turn off at the end of a preprogrammed amount of time. Speeds 5-8 have no direct pump speed buttons and therefore cannot be programmed with an Egg-Timer.
3. **Schedule:** The speed button can be programmed to turn on and off at a certain time. The LED above the Start/Stop button must be lit for the pump to run schedules. When a speed is set to run in Schedule mode it can still be operated manually. When a speed is programmed to run 23 hours and 59 minutes per day it will not turn off. For example, for the pump to run 24 hours per day, program the pump to start at 8:00 AM and stop at 7:59 AM.

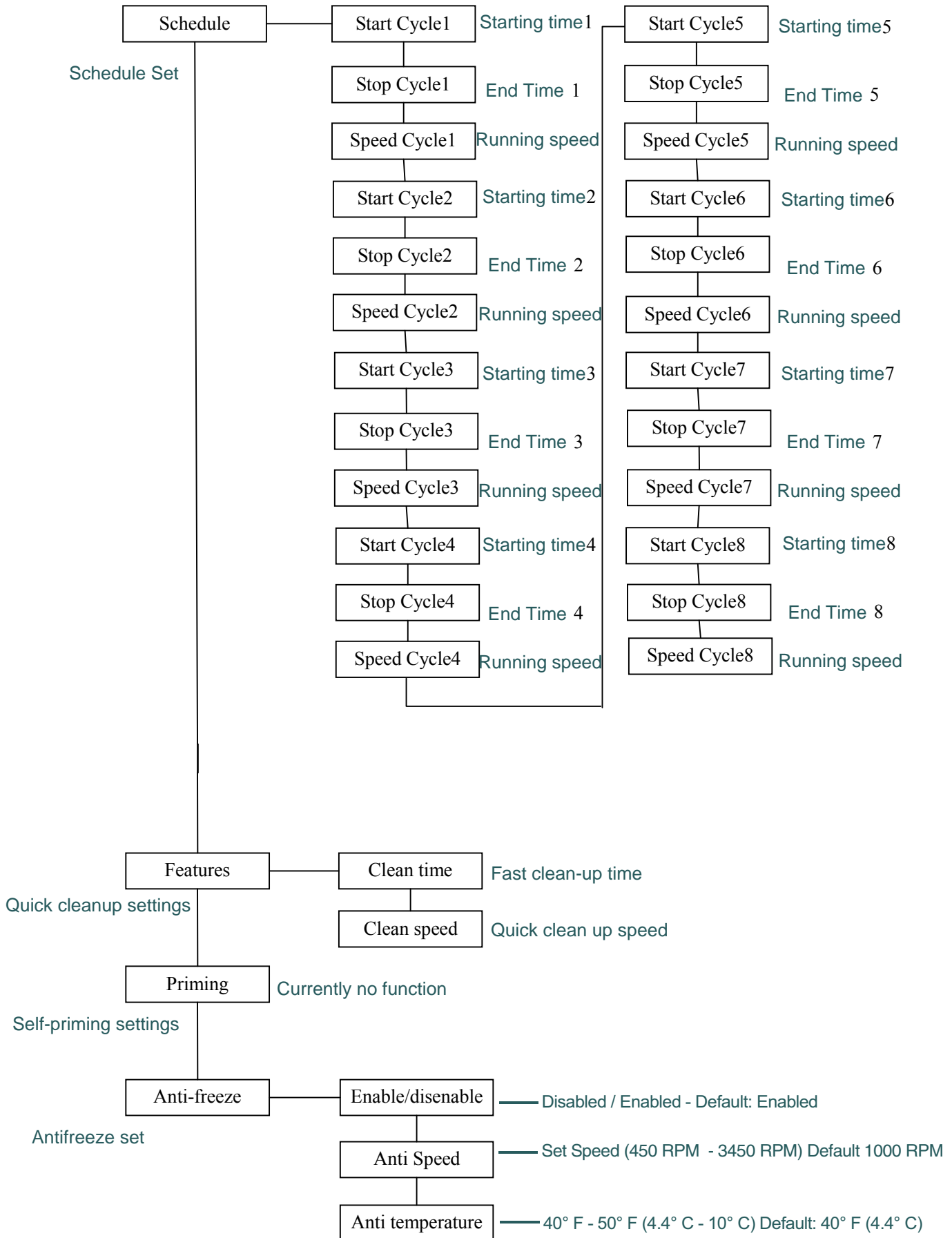
Programming the Pump

When the pump is running, a manual speed and password time out is activated (see page 12) the pump can be turned off but it cannot be turned back on. Pressing the Start/Stop button places it in the Running Schedule mode. Therefore, it will only run Speeds that are Scheduled to come on at their scheduled Start Time.

Variable Speed Pump Menus



After entering the setup options, first through the "left" and "right" keys to change the settings, and then through the "up", "down" key to change the set value



After entering the setup options, first through the "left" and "right" keys to change the settings, and then through the "up", "down" key to change the set value

Settings: Set Time

Use “Set Time” to set the system time. The system clock controls all scheduled start and stop times, functions, and programmed cycles. The system clock can store the correct time for up to 96 hours after power is shut off. The will retain the time memory for 96 hours before a reset is needed.

To access the Set Time menu:

1. Check that the green power LED is on.
2. Press the **Menu** button. “Settings” is displayed.
3. Press the **Select** button. “Pump Address” is displayed.
4. Use the **Up** or **Down** arrow button to scroll to “Set Time”
5. Press the **Select** button. The cursor will appear in the Minutes column.
6. Use the Left or Right arrow button to mover the cursor and use the Up or Down arrow button to change the number.
7. Press the **Enter** button to save the setting. To cancel any changes, press the **Escape** button to exit edit mode without saving.
8. Press the **Escape** button to exit.

Settings: Set AM/PM or 24 Clock

This setting is for changing the pump’s time clock from regular time (AM/PM) to a 24 hour clock. For example, Midnight (12:00 AM) is 0000 hr., 8:00 AM is 0800 hr., and 11:00 PM is 2300 hr.

To access the AM/PM or 24 hr. menu:

1. Check that the green power LED is on.
2. Press the **Menu** button. “Settings” is displayed.
3. Press the **Select** button. “Pump Address” is displayed.
4. Use the **Up** or **Down** arrow button to scroll to “AM/PM.”
5. Press the **Select** button to change the setting.
6. Press the Left or Right arrow button to choose between 24 hr. and AM/PM.
7. Press the **Enter** button to save the setting. To cancel any changes, press the **Escape** button to exit edit mode without saving.
8. Press the **Escape** button to exit.

Settings: Set Temperature Unit

Use this setting to set the temperature unit to Celsius (°C), or Fahrenheit (°F). The AntiFreeze protection feature see page 20 can be set to either Fahrenheit or Celsius.

To access the Temperature Units menu:

1. Check that the green power LED is on.
2. Press the **Menu** button. “Settings” is displayed.
3. Press the **Select** button. “Pump Address” is displayed.
4. Use the **Up** or **Down** arrow button to scroll to “Temp Unit” menu item.
5. Press the **Select** button. “C” is displayed.
6. Press the Left or Right arrow button to choose between Celsius (° C), or Fahrenheit (° F).
7. Press the **Enter** button to save the setting. To cancel any changes, press the **Escape** button to exit edit mode without saving.
8. Press the **Escape** button to exit.

Settings: Screen Contrast Level

This setting changes the contrast of the LCD screen. The default setting is 15. Screen contrast levels can be adjusted from 1 to 30 units for low or high lighting conditions.

To access the Temperature Units menu:

1. Check that the green power LED is on.
2. Press the **Menu** button. “Settings” is displayed.
3. Press the **Select** button. “Pump Address” is displayed.
4. Use the **Up** or **Down** arrow to scroll to “Contrast level.
5. Press the **Select** button. Screen will show current contrast setting number. The default is “15”.
6. Press the Left or Right arrow button to change the settings.
7. Press the **Enter** button to save the setting. To cancel any changes, press the **Escape** button to exit edit mode without saving.
8. Press the **Escape** button to exit.

Settings: Language

To access the language menu:

1. Check that the green power LED is on.
2. Press the **Menu** button. “Settings” is displayed.
3. Press the **Select** button. “Pump Address” is displayed.
4. Use the **Up** or **Down** arrow button to scroll to “Language”.
5. Press the **Select** button to access the language menu.
6. Press **Select** to highlight current Language in use.
7. Press the **Enter** button to select the desired language for the control panel. To cancel any changes, press the **Escape** button to exit edit mode without saving.
8. Press the **Escape** button to exit.

Settings: Set Minimum Speed (RPM)

The minimum pump speed can be set from 450 RPM to 1700 RPM. The default setting is 750 RPM.

To access the Set Minimum Speed menu:

1. Check that the green power LED is on.
2. Press the **Menu** button. “Settings” is displayed.
3. Press the **Select** button. “Pump Address” is displayed.
4. Use the **Up** or **Down** arrow button to scroll to “Set Min Speed”.
5. Press the **Select** button to change the setting. The cursor will appear in the first number column (ones)
6. Press the Left or Right arrow button to move the cursor, and use Up or Down arrow button to change the numbers
7. Press the **Enter** button to save the setting. To cancel any changes, press the **Escape** button to exit edit mode without saving.
8. Press the **Escape** button to exit.

Settings: Set Maximum Speed (RPM)

The maximum speed can be set from 1900 RPM to 3450 RPM. The default setting is 3450. This setting is used to set the maximum running speed of the pump. When the pump is set to Priming “Enabled” the pump will ramp up to and run at the Maximum Speed setting to attain the prime. A Service Professional must set the Maximum Speed of the pump to not exceed the maximum flow rate of the system on which it will operate.

CAUTION: The Maximum Flow rate setting should be set so the system never operates at or above a 0.635 meter vacuum.

To access the Set Maximum Speed menu:

1. Check that the green power LED is on.
2. Press the **Menu** button. “Settings” is displayed.
3. Press the **Select** button. “Pump Address” is displayed.
4. Use the **Up** or **Down** arrow button to scroll to “Set Max Speed”.
5. Press the **Select** button to change the setting. The cursor will appear in the first number column (ones)
6. Press the Left or Right arrow button to move the cursor, and use Up or Down arrow button to change the numbers
7. Press the **Enter** button to save the setting. Press the **Escape** button to exit. To cancel any changes, press the **Escape** button to exit edit mode without saving.

Settings: Password

When the Password feature is enabled, the pump will enter into password protection mode for a preprogrammed amount of time after the last button is pressed. The entered password is any combination of four (4) digits.

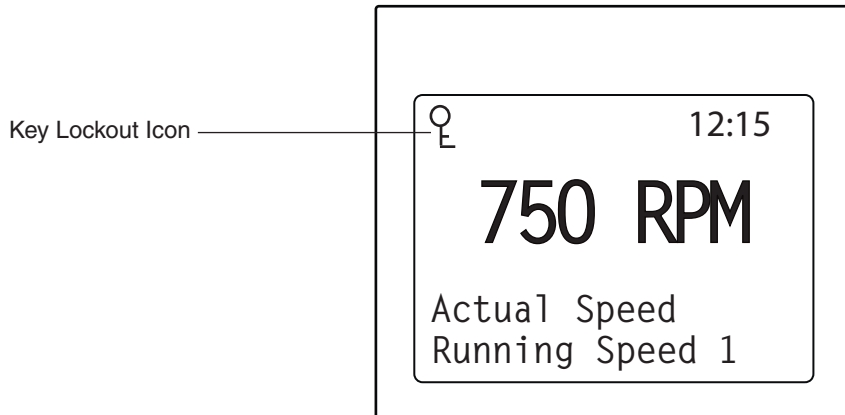
To access the Password menu:

1. Check that the green power LED is on.
2. Press the **Menu** button. “Settings” is displayed.
3. Press the **Select** button. “Pump Address” is displayed.
4. Use the **Up** or **Down** arrow button to scroll to “Password”.
5. Press the **Select** button. The default setting is “Disabled”.
7. Press the Left or Right arrow button to change the setting to enable.
8. Press the **Enter** “Enter Password” is displayed.
9. The button " Speed 1" means number 1, \$speed 2" means number 2, \$speed 3" means number 3,and\$speed 4\$means number 4. Please set up the pass word use the \$speedbutton.
10. Press the **Enter** button to save the setting. To cancel any changes, press the **Escape** button to exit edit mode without saving.
11. Press the **Escape** button to exit.

Password Protection

Password: The default for this setting is disabled, which means the pump does not have password protection. When this feature is enabled, for a preset amount of time after the last button is pressed, the pump display will prompt for the password before allowing access to the control panel and buttons. The password must be a four (4) numeric digit password. Write down the password and keep in a secure place.

- When the pump is password protected the pump can always be turned off by pressing the **Start/Stop** button.
- When running the pump in manual mode it cannot be turned back on with the press of the **Start/Stop** button.
- Pressing the **Start/Stop** button when the pump is off will return it back to the **Running Cycles Mode** and will run at the next scheduled run time. If the present time is within the scheduled run time the pump will run the scheduled speed.
- All functions including programming are disabled in Password Protection Mode.
- If any button other than the **Start/Stop** button is pressed, the screen reads Enter Password.
- When Password Protection is enabled there is a key icon displayed in the upper left side of the LCD.



Entering Password

- When Password Protection is enabled, press any button (besides the speed button) to prompt the screen to for a password.
- To Enter the password, use the Speed button to input the number and then press the Enter button to confirm.

Settings: Choosing pump operating modes

The pump has 3 choices for running, Manual operation, Egg timer and Schedule modes.

To access the Setting menu:

1. Check that the green power LED is on.
2. Press the **Menu** button, "Setting" is displayed.
3. Use the **up** or **Down** arrow button to scroll to "Work Mode"
4. Press the **Select** button, "Manual Mode" is displayed.
5. Press **Left** or **Right** arrow button to choose the work mode.
6. Press **Enter** button to save the setting. To cancel any changes, press the **Escape** button to exit edit mode without saving.
7. Press **Escape** button to exit

Setting: Manual mode Speed

Speed 1-4 default setting is Manual which is from 450 RPM – 3450RPM.

To access the MANUAL menu

1. Check the green power LED is on.
2. Press the **Menu** button, "Setting" is displayed.
3. Use the **up** or **Down** arrow button to scroll to "Manual".
4. Press **Select** button, manual mode speed is displayed
5. Use the **up** or **Down** arrow button to change the Manual speed1, Manual speed 2, Manual speed 3 and Manual speed 4.
6. Press **Select** button; display the manual speed, which will be changed.
7. Press **Select** button, access manual speed setting change, Use **Left** or **Right** arrow button to change the cursor highlight the number which will be changed. And use **up** or **Down** arrow button to change the numbers.
8. Press **Enter** button to save the setting. To cancel any changes, press the **Escape** button to exit edit mode without saving.
9. Press **Escape** button to exit.

Settings: Egg timer mode

Access Egg timer menu:

1. Check that the green power LED is on.
2. Press the **Menu** button. "Setting" is displayed.
3. Use the **up** or **Down** arrow button to scroll to "Egg timer".
4. Press the **Select** button; the egg timer speed and time are displayed.
5. Use the **up** or **Down** arrow button to choose the egg timer speed and time.
6. Press the **Select** button, egg timer speed is displayed, use the **Left** or **Right** arrow button to move the cursor, and use the **up** or **Down** arrow button to change the number. The range of the speed is 450RPM-3450RPM
7. Press the **Enter** button to saving the settings.
8. Press the **Select** button, egg timer time is displayed, use the **Left** or **Right** arrow button to move the cursor, and use the **up** or **Down** arrow button to change the number. The time range is 00:01-19:59.
9. Press **Enter** button to save the setting. To cancel any changes, press the **Escape** button to exit edit mode without saving.
10. Press **Escape** button to exit

Settings: Schedule mode

By setting a start time and a stop time, speeds 1-8 can be programmed to run a certain speed at a certain time of day.

To set a schedule to run the pump:

1. Check that the green power LED is on.
2. Press the **Menu** button. "Setting" is displayed.
3. Use the **up** or **Down** arrow button to scroll to "Schedule"
4. Press the **Select** button, the start time 1; stop time 1 and running speed 1 are displayed.
5. Use the **up** or **Down** arrow button to select your wanted start time 1, stop time 1 and running time 1.
6. Press the **Select** button, start time 1 is displayed, use the **Left** or **Right** arrow button to move the cursor and use **up** or **Down** arrow button to change the number.
7. Press the **Enter** button to saving the setting
8. Use the **up** or **Down** arrow button to choose the stop time , Press the **Select** button Use the **Left** or **Right** arrow button to move the cursor and use the **up** or **Down** arrow button to change the number.
9. Press the **Enter** button to saving the setting.
10. Use the **up** or **Down** arrow button to choose the running speed ,Press the **Select** button Use the **Left** or **Right** arrow button to move the cursor and use the **up** or **Down** arrow button to change the number.
11. Press the **Enter** button to saving the setting.
12. Speed 2-8 setting is same as above steps.
13. Press **Enter** button to save the setting. To cancel any changes, press the **Escape** button to exit edit mode without saving.
14. Press **Escape** button to exit

Programming for Constant Run

When programming a schedule for a Speed, the Speed can not be programmed with the same start and stop times. However, it will run without stopping if it is programmed with the Start time set one minute after the stop time. Example: A single speed will run non stop if programmed with a Start Time of 8:00 AM and a Stop time of 7:59 AM.

Features: Quick Clean

This feature can be used to ramp the pump up to a higher RPM for vacuuming, cleaning, adding chemicals, after a storm for extra skimming capability. Press the **Quick Clean** button (LED on) and then the **Start/Stop** button (LED on) to start the pump at preset RPM and duration of time. When the Quick Clean cycle is over it will resume regular schedules, it will be in the “Running Schedule” mode.

To access the Quick Clean menu:

1. Check that the green power LED is on.
2. Press the **Menu** button. “Settings” is displayed.
3. Use the **Down** arrow button to scroll to “Features”.
4. Press the **Select** button. “Clean time” is displayed.
5. Press the **Select** button. The cursor will appear in the minutes column.
6. Press the **Left** or **Right** arrow button to change the cursor and Use the **up** or **Down** arrow button to change the number.
7. Press the **Enter** button to save the setting.
8. Press the **Select** button. “Clean speed” is displayed.
9. Press the **Select** button. The “RPM” first (ones) column will highlight.
10. Press the **Left** or **Right** arrow button to change the cursor and Use the **up** or **Down** arrow button to change the number.
11. Press the **Enter** button to save the setting. Note: To cancel any changes, press the **Escape** button to exit without saving.
12. Press the **Escape** button to exit.

AntiFreeze

This feature allows you to set a speed (450 RPM -3450 RPM) that will run when the pump goes into anti freeze mode. The temperature level that you wish anti freeze mode to start can also be set.

IMPORTANT NOTE: This feature is for protection of the pump. Do not depend on the antifreeze feature for freeze protection of the pool. Certain situations could cause the pump to sense a different temperature than actual air temperature. Your automation systems air temperature sensor should be used to sense actual temperature. For example, if the pump is located indoors, the temperature of the room does not indicate the outdoor temperature. The pump does not sense the water temperature.

To access the AntiFreeze menu:

1. Check that the green power LED is on.
2. Press the **Menu** button. “Settings” is displayed.
3. Use the **Down** arrow button to scroll to “AntiFreeze”.
4. Press the **Select** button. The factory default is AntiFreeze “disenable”.
5. Use the **Left** or **Right** arrow button to choose the " Enable"
6. Press the **Enter** button.

To program AntiFreeze when enabled:

7. Press the **Down** arrow button.“Set Speed” is displayed. The factory default is 1000 RPM.
8. Press the **Select** button to change the setting. The cursor will highlight the first column (ones).
9. Press the **Left** or **Right** arrow button to move the cursor and use the **up** or **Down** arrow button to change the number.
10. Press the **Enter** button to save the setting.
11. Press the **Down** arrow button. “Pump Temperature” is displayed. This is the temperature the pump will activate AntiFreeze. the factory default is 4°C.
12. Press the **Select** button to change the setting. Press the **Left** or **Right** arrow button to move the cursor and use the **up** or **Down** arrow button to change the number.
13. Press the **Enter** button to save the setting. Note: To cancel any changes, press the **Escape** button to exit without saving.
14. Press the **Escape** button to exit.

Priming the pump for the first time, or after service

The pump must be primed before starting the pump for the first time. To prime a pump means filling the pump and suction pipe with water. This process evacuates the air from all the suction lines and the pump. It may take several minutes to prime depending on the depth of water, pipe size and length. It is easier to prime a pump if you allow all the air to escape from the pump and pipes. The water cannot enter unless the air can escape. Pumps do not hold prime, the pool piping system has that task.

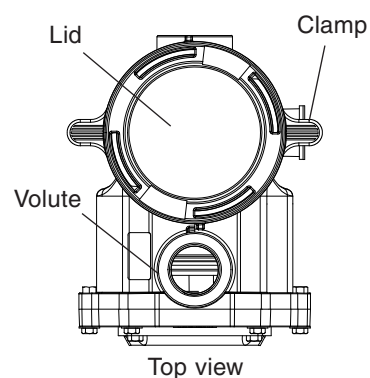
CAUTION - To avoid permanent damage to the pump, before starting the pump, fill the housing strainer with water so that the pump will prime correctly. If there is no water in the strainer the pump will not prime.

- Do not allow the pump to run dry. Running the pump dry may damage the seals, causing leakage and flooding.
- Do not add chemicals to the system directly in front of pump suction. Adding undiluted chemicals may damage the pump and will void the warranty.
- Open gate valves before starting system.
- Be sure to release all air from filter and piping system.
- The pump is a variable speed pump. Typically the lower speeds are used for filtration and heating. The higher speeds can be used for spa jets, water features, and priming.

CAUTION - Before starting this procedure, first read the following:

Before removing the pump lid:

1. **Press the Stop button** if the pump is running before proceeding.
2. **Disconnect the communication cable from the pump.**
3. **Disconnect main power supply**
4. **Close the gate valves** in suction and discharge pipes.
5. **Release all pressure** from pump and piping system.
6. **Never tighten or loosen** the clamp while the pump is operating.



WARNING - If the pump is being pressure tested, release all pressure before removing trap cover. Do not block the pump suction while the pump is running. If a body part blocks the pump suction it may cause severe or fatal injury. Small children using the pool must ALWAYS have close adult supervision.

WARNING - FIRE and BURN HAZARD - The pump motor may run at a high temperatures. To reduce the risk of fire, do not allow leaves, debris, or foreign matter to collect around the pump motor. To avoid burns when handling the motor, shut off the motor and allow it to cool for 20 minutes before trying to work on it. The provides an automatic internal cutoff switch to protect the motor from heat damage during operation.

Priming the pump for the first time, or after service (Continued)

Priming the Pump

NOTICE: If you replace the o-ring with a non-lubricated o-ring, you may need to apply a silicone based lubricant.

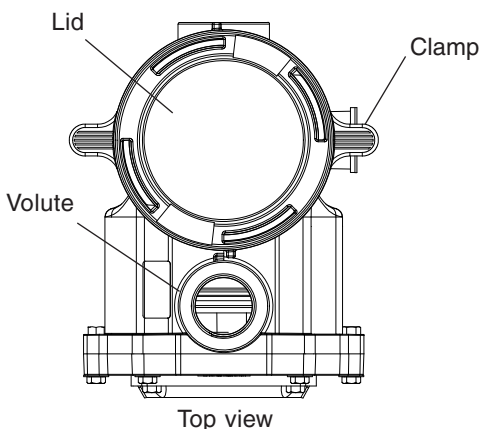
- Clean and inspect o-ring; reinstall on trap cover.
- Replace trap cover on trap; turn clockwise to tighten cover.

NOTICE: Tighten the pump lid by hand only (no wrenches).

Priming time will depend on vertical length of suction lift and horizontal length of suction piping. If pump does not prime, be sure that all valves are open, suction pipe end is under water, pump suction is below water level, and that there are no leaks in suction pipe.

To prime the pump:

1. Turn the pump clamp and lid in a counter-clockwise direction until it stops and remove them.
2. Fill the pump strainer pot with water.
3. Check the system and ensure water has an open path for free system flow.
4. Reinstall the pump clamp and lid onto the strainer pot. The pump is now ready to prime.
5. Be sure all electrical connections are clean and tight.
6. Open the air release valve on the filter, and stand clear of the filter.
7. Switch the pump on at the circuit breaker. Ensure that the green power light is on.
8. Press the **Speed 1** button to select the pump speed of 750 RPM.
9. Press the **Start** button to start the pump. Use the **Up/Down** button to increase the speed as necessary to prime the pump.
10. When water comes out of the air release valve, close the valve. The system should now be circulating water back to the pool without air bubbles showing in either the hair and lint pot or at the pool return fittings.
11. Use the **Up/Down** button to adjust the operating speed as desired.



Section 4

User Maintenance

The following information describes how to service and maintain the Variable Speed pump.

Pump Strainer Basket

The strainer, sometimes referred to as the “Hair and Lint Pot,” is in front of the of the pump. Inside there is a basket which must be kept clean of leaves and debris at all times. View the basket through the top see through lid to inspect for leaves and debris.

Regardless of the length of time between filter cleaning, it is most important to visually inspect the hair and lint pot basket at least once a week. A dirty basket will reduce the efficiency of the filter and possibly the heater.

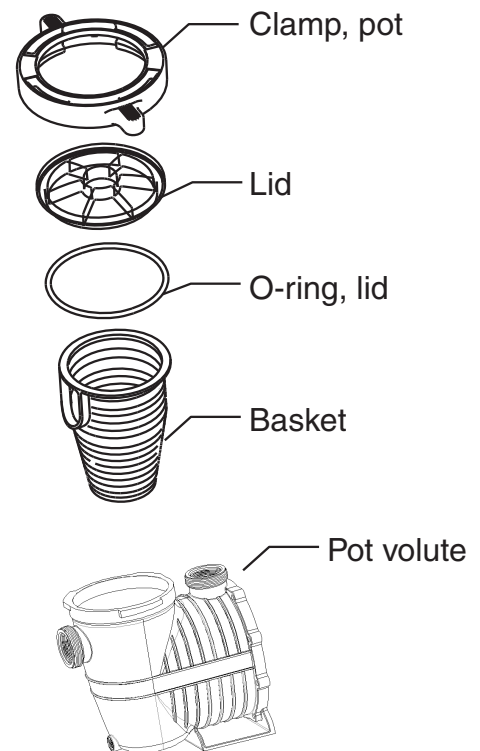
⚠ WARNING — **DO NOT** open the strainer pot if pump fails to prime or if pump has been operating without water in the strainer pot. Pumps operated in these circumstances may experience a build up of vapor pressure and may contain scalding hot water. Opening the pump may cause serious personal injury. In order to avoid the possibility of personal injury, make sure the suction and discharge valves are open and that the strainer pot is cool to the touch, then open with extreme caution.

⚠ CAUTION — To prevent damage to the pump and filter and for proper operation of the system, clean pump strainer and skimmer baskets regularly.

Pump Strainer Basket Service

If the pump is installed below the water level of the pool, close the return and suction lines before opening the hair and lint pot on the pump.

1. Press the **Stop** button to stop the pump and switch off the pump at the circuit breaker.
2. Relieve pressure in the system.
3. Turn the clamp and lid in a counter-clockwise direction until it stops.
4. Remove the clamp and lid.
5. Remove the basket and put the debris into the trash and rinse out the basket. If the basket is cracked, replace the basket.
6. Replace the basket and fill the pump pot and volute with water up to the inlet port.
7. Clean the cover, o-ring, and sealing surface of the pump pot. Grease the o-ring with a silicone based lubricant.
8. Reinstall the lid by placing the clamp and the lid on the pot.

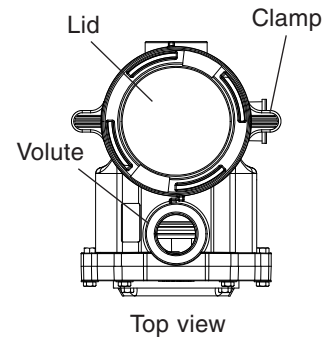


Pump Strainer Basket Service (Continued)

10. Be sure that the lid o-ring is properly placed. Seat the clamp and lid then turn clockwise until the handles are horizontal as shown.
11. Reconnect the communication cable to the pump if required.
12. Switch the power ON at the circuit breaker. Reset the pool time clock to the correct time.



WARNING — FILTER OPERATES UNDER HIGH PRESSURE. WHEN ANY PART OF THE CIRCULATING SYSTEM (e.g., LOCK RING, PUMP, FILTER, VALVES, ETC.) IS SERVICED, AIR CAN ENTER THE SYSTEM AND BECOME PRESSURIZED. PRESSURIZED AIR CAN CAUSE THE LID TO BLOW OFF WHICH CAN RESULT IN SEVERE INJURY, DEATH, OR PROPERTY DAMAGE. TO AVOID THIS POTENTIAL HAZARD, FOLLOW THESE INSTRUCTIONS.



13. Open the manual air relief valve on top of the filter.
14. Stand clear of the filter. Press the Start button on the pump.
15. Bleed air from the filter until a steady stream of water comes out.
16. Close the manual air relief valve.

Motor Service

1. Protect from heat:

- Shade the motor and controller from the sun.
- Any enclosure must be well ventilated to prevent overheating. Particular attention should be paid to the motor fan cover and the cooling fins between the drive and the motor.
- Provide ample cross ventilation.

2. Protect against dirt:

- Protect from any foreign matter or splashing water.
- Do not store (or spill) pool chemicals near the motor.
- Avoid sweeping or stirring up dust near the motor while it is operating.
- If a motor has been damaged by dirt it voids the motor warranty.

3. Protect against moisture:

- Protect from splashing pool water.
- Protect from the weather.
- Protect from lawn sprinklers.
- If a motor has become wet, let it dry before operating. Do not allow the pump to operate if it has been flooded.
- If a motor has been damaged by water it voids the motor warranty.

Note: Do not wrap motor and controller with plastic or other air tight materials during winter storage. The motor and controller may be covered during a storm, winter storage, etc., but never when operating or expecting operation.

Winterizing

To protect the pump electronics from damage due to freezing conditions, the pump will switch itself on to generate internal heat when the air temperature drops below 4.4° C (40° F). The pump “Anti Freeze” feature is not intended to protect the system plumbing from freezing.


The Anti Freeze temperature feature is adjustable and can be changed from 4.4° - 10° C (40° - 50° F). See page 11 for more information.

1. If the air temperature drops below 4.4° C (40° F) the water in the pump can freeze and cause damage. Freeze damage is not warrantable.
2. To prevent freeze damage follow the procedures listed below.
 - Shut off electrical power for the pump at the circuit breaker.
 - Drain the water out of the pump by removing the two thumb-twist drain plugs located at the bottom of the volute. Store the plugs in the pump basket.
 - Cover the motor to protect it from severe rain, snow and ice.
 - Do not wrap the motor in plastic. It will cause condensation and rust on the inside of the motor.

Note: In mild climate areas, when temporary freezing conditions may occur, run your filtering equipment all night to prevent freezing.

Priming the pump after service

Before a system start-up, the pump and system must be manually primed. Be sure to reopen valves before operating. To prime pump, the strainer pot must be filled with water.

 **CAUTION** — DO NOT run the pump dry. If the pump is run dry, the mechanical seal will be damaged and the pump will start leaking. If this occurs, the damaged seal must be replaced. ALWAYS maintain proper water level in your pool. Continued operation in this manner could cause a loss of pressure, resulting in damage to the pump case, impeller and seal.

For instructions about how to prime the pump, refer to “Priming the pump for the first time or after service” on page 19.

Section 5

Installation and Removal

The following information describes how to install the pump.

Installing the Pump

Only a qualified service person should install the pump. Refer to “Important Warning And Safety Instructions” on pages iii to vii for additional installation guidance and safety information.

Pump Kit Contents

Variable Speed pump, FWC cover, gasket, screws, communication cable, and the Installation and User's Guide (this manual).

Location

1. Install the pump as close to the pool or spa as possible. To reduce friction loss and improve efficiency, use short and direct suction and piping returns.
2. Install a minimum of 5 feet (1.52 meters) from the inside wall of the pool and spa. Canadian installations require a minimum of 9.8 feet (3 meters) from pool water.
3. Install the pump a minimum of 3 feet (0.9 meters) from the heater outlet.
4. Do not install the pump more than 10 feet (3 meters) above the water level or 3 feet (0.91 meters) below water level.
5. Install the pump in a sheltered well ventilated location protected from excessive moisture, (i.e., rain, sprinklers, etc.).
6. For hot tubs and spas, do not install within an outer enclosure or beneath the skirt of a hot tub or spa.
7. Install the pump with a rear clearance of at least 3 inches (76.2 mm) so that the motor can be removed easily for maintenance and repair.

Piping

- For improved pool plumbing, it is recommended to use a larger pipe size. When installing the inlet and outlet fittings (male adaptors), use thread sealant.
- Do not install 90° elbows directly into pump inlet or outlet. A valve, elbow or tee installed in the suction line should be no closer to the front of the pump than five times the suction line pipe diameter (i.e., 2 inch (5.1 cm) pipe requires a 10 inch (254 mm) straight run in front of the suction inlet of the pump). This will help the pump prime faster and last longer.
- Flooded suction systems should have gate valves installed on suction and discharge pipes for maintenance, however, the suction gate valve should be no closer than five times the suction pipe diameter as described above.

Electrical

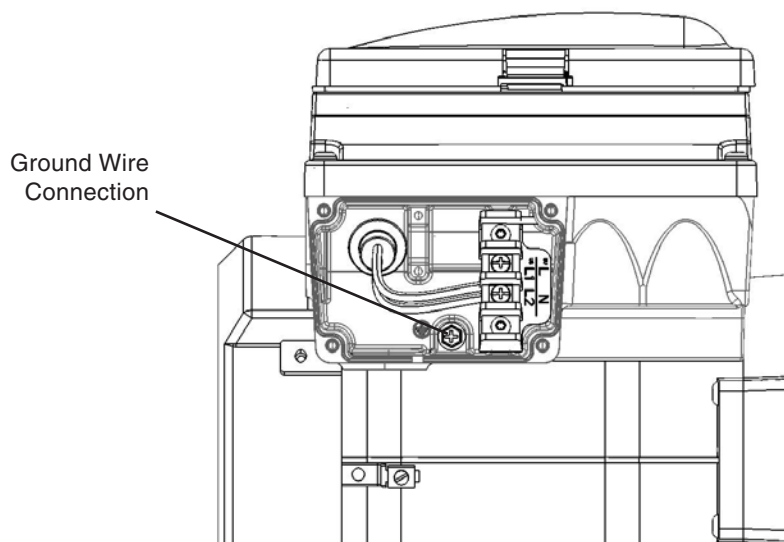
- A means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.
- The pump is to be supplied through a residual current device (RCD) having a rated residual operating current not exceeding 30mA.

Wiring the Pump





To connect the pump to an AC power source:

1. Be sure all electrical breakers and switches are turned off before wiring motor.
2. Be sure that the wiring voltage is 230 VAC \pm 10%.
3. Use #12 AWG for wire runs up to 100 feet (30.5 meters) and #10 AWG for lengths longer than 100 feet (30.5 meters). When in doubt use a heavier gauge (larger diameter) wire. Heavier gauge will allow the motor to run cooler and more efficient.
4. Be sure all electrical connections are clean and tight.
5. Cut the wires to the appropriate length so they do not overlap or touch when connected.
6. Permanently ground the motor using the green ground wire, as shown below. Use the correct wire size and type specified by National Electrical Code. Be sure the ground wire is connected to an electrical service ground.
7. Bond the motor to the pool structure in accordance with the National Electrical Code. Use a solid copper bonding conductor not smaller than 8 AWG. Run a wire from the external bonding lug to the pool bonding structure, as shown below.
8. Connect the wire from the accessible bonding lug on the motor to all metal parts of the swimming pool, spa, or hot tub structure and to all electrical equipment, metal conduit, and metal piping within 5 feet of the inside walls of the swimming pool, spa, or hot tub. For Canada, a 6 AWG or larger solid copper bonding conductor is required.
9. The pump should be permanently connected to either a **circuit breaker**, **2-pole timer** or **2-pole relay**. If AC power is supplied by a GFCI circuit breaker, use a dedicated circuit breaker that has no other electrical loads.

NOTE: When the pump is started and stopped by removing power with a relay or timer, a two-pole device should be used to apply and remove power to both **POWER LINE TERMINALS**.



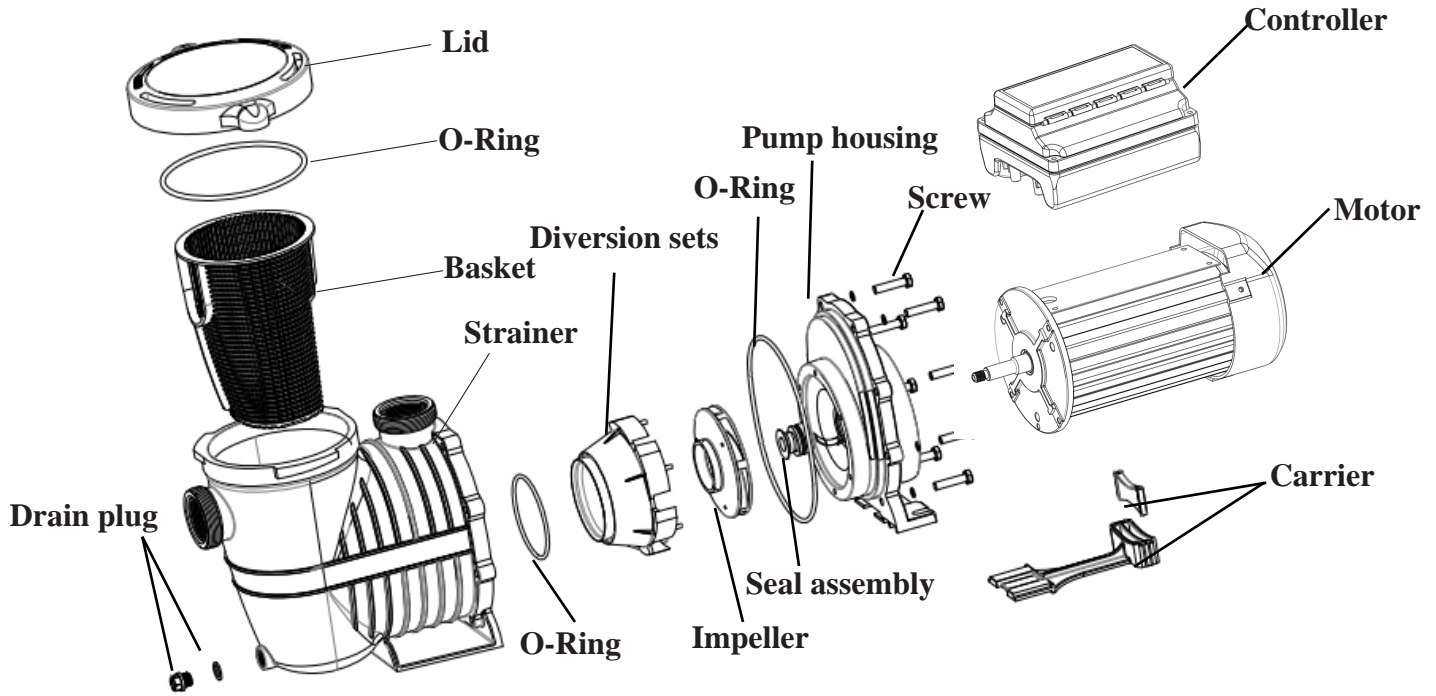
Pump Disassembly

-  **WARNING** — Always disconnect power to the pool pump at the circuit breaker and disconnect the communication cable before servicing the pump. Failure to do so could result in death or serious injury to serviceman, pool users or others due to electric shock.
-  **WARNING** — Read all servicing instructions before working on the pump.
-  **WARNING** — DO NOT open the strainer pot if pump fails to prime or if pump has been operating without water in the strainer pot. Pumps operated in these circumstances may experience a build up of vapor pressure and may contain scalding hot water. Opening the pump may cause serious personal injury. In order to avoid the possibility of personal injury, make sure the suction and discharge valves are open and strainer pot temperature is cool to touch, then open with extreme caution.
-  **CAUTION** — Be sure not to scratch or mar the polished shaft seal faces; seal will leak if faces are damaged.

All moving parts are located in the rear subassembly of the pump.

To remove and repair the pump mechanical seal, perform the following procedures:

1. Switch off the pump circuit breaker at the main panel.
2. Drain the pump by removing the drain plugs. No tools required.
3. Use the 9/16 inch wrenches to remove the six bolts that hold the housing (strainer pot/volute) to the rear subassembly.
4. Gently pull the two pump halves apart, removing the rear subassembly.
5. Use a 3/32 inch Allen head wrench to loosen the two holding screws located on the diffuser.
6. Hold the impeller securely in place and remove the impeller lock screw by using a Phillips head screwdriver. The screw is a left-handed thread and loosens in a clockwise direction.
7. Use a flat blade screwdriver to hold the motor shaft. The motor shaft has a slot on the end which is accessible through the center of the fan cover.
Note: An adjustable wrench may be used to hold the screwdriver shaft in place. Use locking pliers instead if your screwdriver has a round shaft.
8. To unscrew the impeller from the shaft, twist the impeller counterclockwise.
9. If the seal needs replacing, remove the white-colored, rotating portion of the mechanical seal from the impeller.
10. Remove the four bolts from the seal plate to the motor, using a 9/16 inch wrench.
11. Place the seal plate face down on a flat surface and tap out the carbon spring seat.
12. Clean the seal plate, seal bore, and the motor shaft.



Shaft Seal Replacement


The Shaft Seal consists primarily of two parts, a rotating member and a ceramic seal. The pump requires little or no service other than reasonable care, however, a shaft seal may occasionally become damaged and must be replaced. **Note: The polished and lapped faces of the seal could be damaged if not handled with care.**

Pump Reassembly/Seal Replacement

1. When installing the replacement shaft seal, use silicone sealant on the metal portion before pressing into the seal plate as shown. **Note: Use extreme care when applying sealant. Ensure that no sealant contacts the seal plate surface or the ceramic seal. Allow sealant to cure overnight before reassembling.**
2. Before installing the rotating portion of the seal into the impeller, be sure the impeller is clean. Use a light density soap and water to lubricate the inside of the seal. Press the seal into the impeller with your thumbs and wipe off the ceramic and carbon faces with a clean cloth.
3. Remount the seal plate to the motor.
4. Grease the motor shaft thread and screw impeller onto the motor shaft.
5. Screw in the impeller lock screw (counterclockwise to tighten).
6. Remount the diffuser onto the seal plate. Be sure the plastic pins and holding screw inserts are aligned.
7. Grease the diffuser o-ring and seal plate gasket prior to reassembly.
8. Assemble the motor subassembly to the pump housing by using the two (2) through bolts for proper alignment. Do not tighten the through bolts until all six (6) bolts are in place and finger tightened.
9. Fill the pump with water.
10. Reinstall the pump lid and plastic clamp. See “Pump Strainer Basket Service” on page 21 for details

Section 6

Troubleshooting

 **CAUTION** - Before installing this product, read and follow all warning notices and instructions on page iii - vii.

Alerts and Warnings

pump displays all alarms and warnings on the control panel display. When an alarm or warning condition exists, the corresponding LED will be lit on the display. All control panel buttons are disabled until the alarm or warning is acknowledged with the **Enter** button. Press the **Reset** button to clear the alarm once the fault condition has been resolved. Note: The pump will not start if the impeller is rotating. The alerts and warnings are:

- **Power out failure:** The incoming supply voltage is less than 170 VAC. The drive faults to protect itself from over current. The drive contains capacitors that keep it powered up long enough to save the current run parameters. If power is restored during this process, approximately 20 seconds, the drive will not restart until completed.
- **Overheat alert:** If the drive temperature gets above 54.4° C (130° F) the pump will slowly reduce speed until the over temperature condition clears.
- **Anti-freezing:** When active, the motor will run at the preset RPM until the drive temperature increases above the minimum.
- **Over current:** Indicated that the drive is overloaded or the motor has an electrical problem. The drive will restart 20 seconds after the over current condition clears.
- **Over voltage:** Indicates excessive supply voltage or an external water source is causing the pump and motor to rotate thereby generating an excessive voltage on the drives internal DC buss. The drive will restart 20 seconds after the over voltage condition clears.

General pump Troubleshooting Problems

Use the following general troubleshooting information to resolve possible problems with your pump.

Note: Turn off power to unit prior to attempting service or repair.

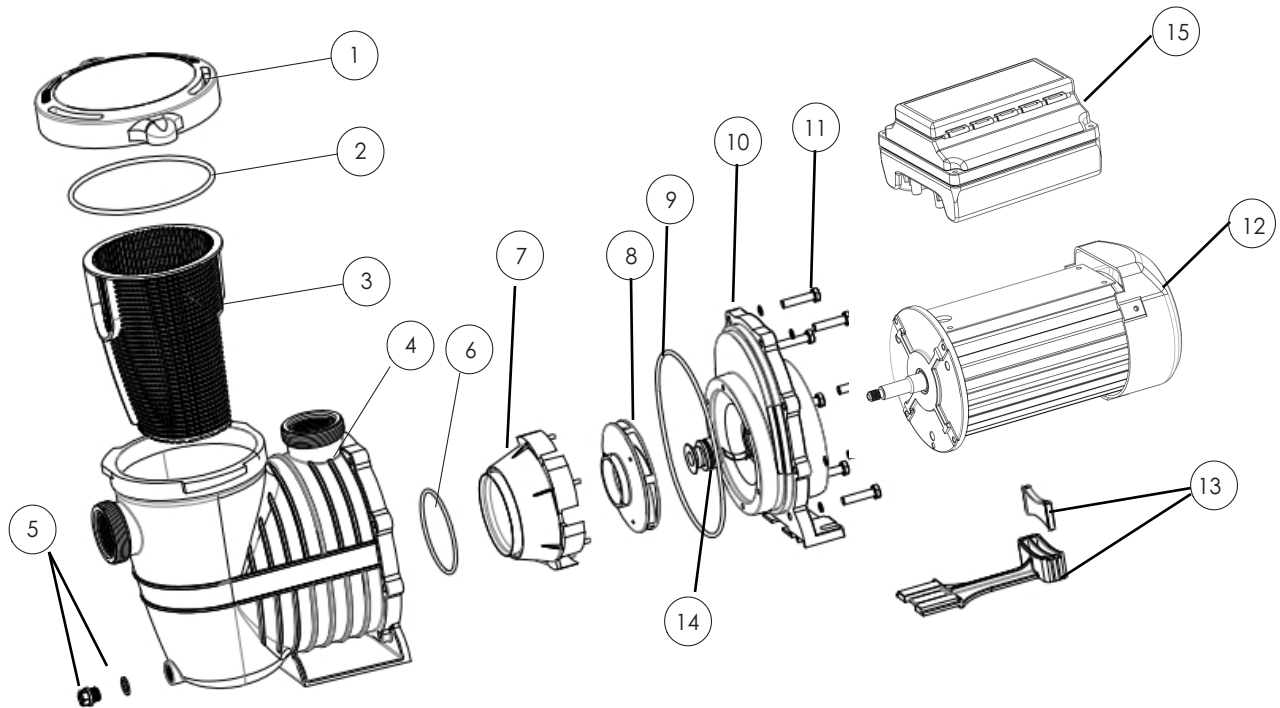
Problem	Possible Cause	Corrective Action
Pump failure.	<p>Pump will not prime - Air leak in suction. PRIME ERROR may be displayed.</p> <p>Pump will not prime - Not enough water.</p> <p>Pump does not come out of prime.</p> <p>Pump strainer gasket is clogged.</p> <p>Pump strainer gasket is defective.</p>	<p>Check suction piping and valve glands on any suction gate valves. Secure lid on pump strainer pot and be sure lid gasket is in place. Check water level to be sure skimmer is not drawing air.</p> <p>Be sure the suction lines, pump, strainer, and pump volute are full of water.</p> <p>Adjust prime sensitivity to a higher setting (default setting is 1%).</p> <p>Clean pump strainer pot.</p> <p>Replace gasket.</p>
Reduced capacity and/or head.	<p>Air pockets or leaks in suction line. PRIME ERROR may be displayed.</p> <p>Clogged impeller. PRIME ERROR may be displayed.</p> <p>Pump strainer pot clogged. PRIME ERROR may be displayed.</p>	<p>Check suction piping and valve glands on any suction gate valves.</p> <p>Turn off electrical power to the pump.</p> <p>Remove the (6) bolts that holds the housing (strainer pot/volute) to seal plate. Slide the motor and seal plate away from the volute.</p> <p>Clean debris from impeller. If debris cannot be removed, complete the following steps:</p> <ol style="list-style-type: none"> 1. Remove diffuser and o-ring. 2. Remove left hand thread anti-spin bolt and o-ring. 3. Remove, clean and reinstall impeller. 4. Reinstall anti-spin bolt and o-ring. <p>Reinstall diffuser, and o-ring.</p> <p>Reinstall motor and seal plate into volute.</p> <p>Reinstall clamp band around seal plate and volute and tighten securely.</p> <p>Clean suction trap</p>
Pump trips and restarts constantly.	<p>Air in system.</p> <p>Suction lift above design limits.</p> <p>Blocked suction Blocked discharge</p> <p>System flow too high. System changing flow too quickly. In floor cleaning system issues.</p> <p>Priming not enabled.</p> <p>Issues related to other equipment, such as Heat Pumps and Heaters with internal valves that vibrate.</p>	<p>Bleed air from filter. Ensure that air bubbles are not visible coming into pump pot.</p> <p>Insert vacuum gauge into pump port connection port. Confirm vacuum level is 25 in. mercury (hg) or less.</p> <p>Stop pump and clear blockage.</p> <p>Reduce system flow. Change speed. Reduce water flow. In floor cleaning systems must be designed with balanced hydraulic losses on all legs.</p> <p>Enable priming from the "PRIMING" menu.</p> <p>Lowering speed below 200 RPM may resolve the issue or addition of external manual valve controls, may resolve issue.</p>

General pump Troubleshooting Problems (Continued)

Problem	Possible Cause	Corrective Action
Inadequate circulation.	<p>Filter or pump basket dirty.</p> <p>Suction/discharge piping is too small.</p> <p>Speed is set too slow for proper filtration cycle.</p>	<p>Check trap basket; if plugged, turn pump off and clean basket. Check and clean pool filter.</p> <p>Increase piping size.</p> <p>Increase filtration run time</p>
Electrical problem.	<p>Could appear as a "Low Voltage" alarm. PRIME ERROR may be displayed.</p> <p>Could appear as "Over Heat" alert. PRIME ERROR may be displayed.</p>	<p>Check voltage at motor terminals and at panel while pump is running. If low, see wiring instructions or consult power company. Check for loose connections.</p> <p>Check line voltage; if less than 90% or more than 110% of rated voltage consult a licensed electrician. Increase ventilation. Reduce ambient temperature. Tighten any loose wiring connections. Motor internal terminal overload protector is open. Motor runs too hot. Turn power to motor off. Check for proper voltage. Check for proper impeller or impeller rubbing.</p>
Mechanical Troubles and Noise.	<p>The pump motor is running but with loud noise.</p> <p>Foreign matter (gravel, metal, etc.) in pump impeller.</p> <p>Cavitation.</p>	<p>If suction and discharge piping are not adequately supported, pump assembly will be strained. Do not mount pump on a wooden platform! Securely mount on concrete platform for quietest performance.</p> <p>Disassemble pump, clean impeller, follow pump service instructions for reassembly.</p> <p>Improve suction conditions. Increase pipe size. Decrease number of fittings. Increase discharge pressure.</p>

Section 7

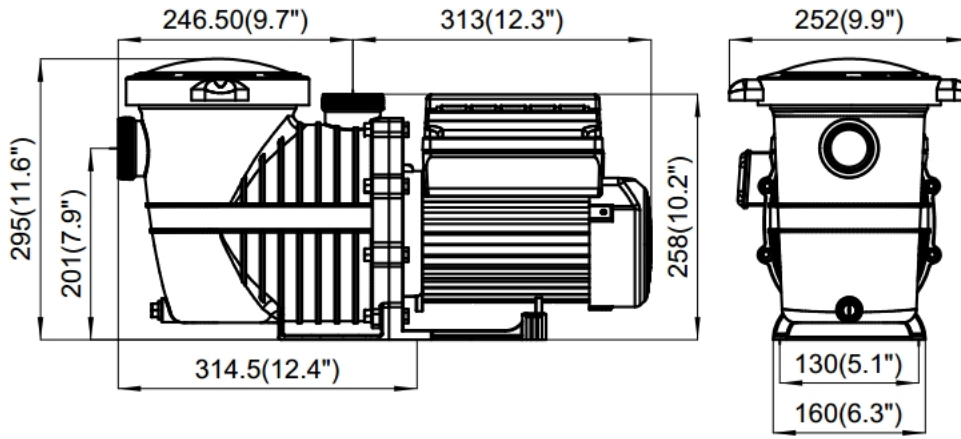
Replacement Parts



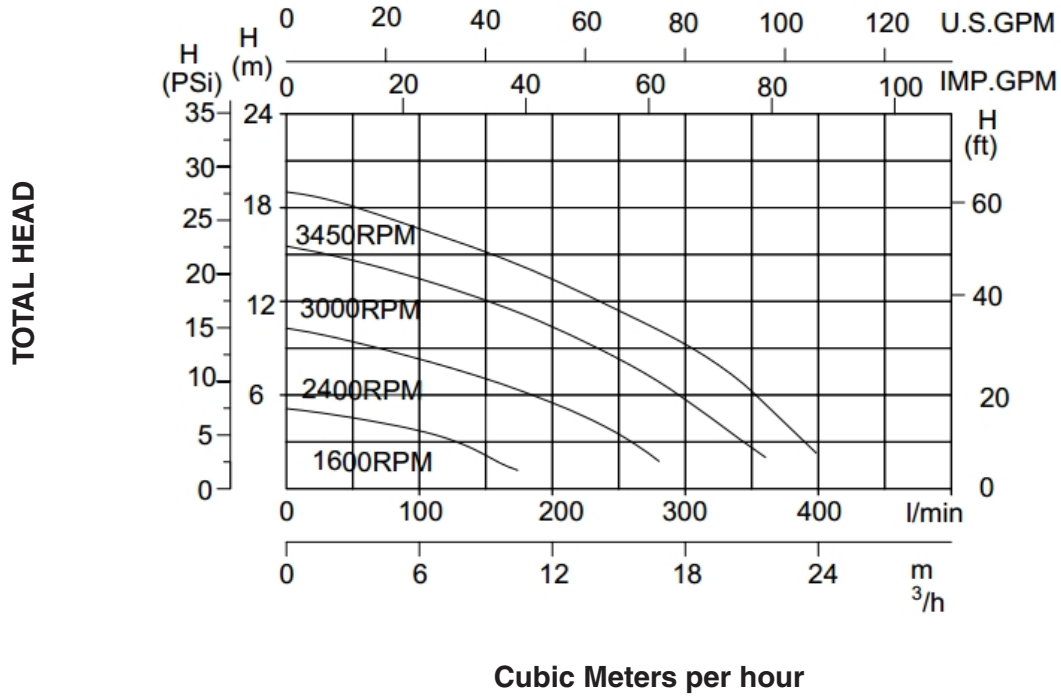
Variable Speed Replacement Parts (Almond Colored Pumps)

Key NO	Description	Art.No
1	Lid	JR07501001
2	O-Ring	JR07501002
3	Basket	JR07501003
4	Strainer	JR07501004
5	Drain plug	JR07501005
6	O-Ring	JR07501006
7	Diversion sets	JR07501007
8	Impeller of item J15001/J01502/15007	JR015001008
9	O-Ring	JR07501009
10	Pump housing	JR07501010
11	Screw	JR07501011
12	Motor of item J15007	JR015007001
13	Carrier	JR07501013
14	Seal assembly	JR07501012
15	Controller	JR15007014

Pump Dimensions



Flow Pump Performance Curve



Circuit Protection: Two-pole 20 AMP device at the Electrical Panel.

Input: 230 VAC, 50/60 Hz, 1150 Watts, 1 phase