

Installation, Operating, and Service Manual

Badu[®] EcoM3V

Variable Speed Pool Pump



Technical Support

Address: Speck Pumps
8125 Bayberry Road
Jacksonville, FL. 32256
USA

Hours: (Monday - Friday) 8:00 am to 5:00 pm EST

Toll Free: 800-223-8538

Phone: 904-739-2626

Fax: 904-737-5261

Website: www.usa.speck-pumps.com

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This document is subject to change without notice.

Date of Installation: _____

Installed By: _____

Serial Number: _____

For Service Call: _____

SAVE THESE INSTRUCTIONS!

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1 Important Safety Instructions

READ THIS MANUAL CAREFULLY BEFORE USING THE SPECK PUMP

READ AND FOLLOW ALL INSTRUCTIONS!

Important Notice:

This manual 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.

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 1-800-223-8538 or visit www.usa.speck-pumps.com for additional copies of these instructions.*

WARNING - Entrapment Prevention



DANGER: DO NOT BLOCK SUCTION

SUCTION HAZARD. *Can cause serious injury or death. Do not use this pump for wading pools, shallow pools, or spas containing bottom drains, unless pump is connected to at least two (2) functioning suction outlets.*

WARNING: *Pump suction is hazardous and can trap and drown or disembowel bathers. Do not use or operate swimming pools, spas, or hot tubs if a suction outlet cover is missing, broken, or loose.*

The following guidelines provide information for pump installation that minimizes risk of injury to users of pools, spas, and hot tubs:

Entrapment Protection: *The pump suction system must provide protection against the hazards of suction entrapment.*

Suction Outlet Covers: *All suction outlets must have correctly installed, screw-fastened covers in place. All suction outlet (drain) covers must be maintained. Drain covers must be listed/certified to the latest published edition of ANSI/ASME A112.19.8 (ANSI/APSP-16, 2011). They must be replaced if cracked, broken, or missing.*

Number of Suction Outlets Per Pump: *Provide at least two (2) hydraulically-balanced main drains, with covers, as suction for each circulating pump suction line. The centers of the main drains (suction outlets) on any one (1) suction line must be at least three (3) feet apart, center to center.*

The system **must** be built to include at least two (2) suction outlets (drains) connected to the pump whenever the pump is running. However, if two (2) main drains run into a single suction line, the single suction line may be equipped with a valve that will shut off both main drains from the pump. The system shall be constructed such that it shall not allow for separate or independent shutoff or isolation of each drain.

More than one (1) pump can be connected to a single suction line as long as the requirements above are met.

Water Velocity: The maximum water velocity through the suction fitting or cover for any suction outlet must be 1.5 feet per second, unless the outlet complies with the latest published edition of ANSI/ASME A112.19.8 (ANSI/APSP-16, 2011), the standard for Suction Fittings For Use in Swimming and Wading Pools, Spas, Hot Tubs, and Whirlpool Bathtub Applications. In any case, do not exceed the suction fitting's maximum designed flow rate.

If 100% of the pump's flow comes from the main drain system, the maximum water velocity in the pump suction hydraulic system must be six (6) feet per second or less, even if one (1) main drain (suction outlet) is completely blocked. The flow through the remaining main drain(s) must comply with the latest published edition of ANSI/ASME A112.19.8 (ANSI/APSP-16, 2011), the standard for Suction Fittings For Use in Swimming and Wading Pools, Spas, Hot Tubs, and Whirlpool Bathtub Applications.

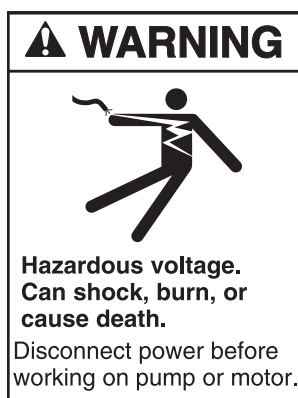
Testing and Certification: Suction outlet covers must have been tested by a nationally recognized testing laboratory and found to comply with the latest published edition of ANSI/ASME A112.19.8 (ANSI/APSP-16, 2011), the standard for Suction Fittings For Use in Swimming and Wading Pools, Spas, Hot Tubs, and Whirlpool Bathtub Applications.

Fittings: Fittings restrict flow; for best efficiency use fewest possible fittings (but at least two (2) suction outlets).

Avoid fittings that could cause an air trap.

Pool cleaner suction fittings must conform to applicable International Association of Plumbing and Mechanical Officials (IAPMO) standards.

WARNING - Risk of Electrical Shock or Electrocution



This pool pump must be installed by a licensed or certified electrician or a qualified pool serviceman in accordance with the National Electrical Code and all applicable local codes and ordinances. Improper installation will create an electric hazard which could result in death or serious injury to pool users, installers, or others due to electrical shock, and may also cause damage to property.

Always disconnect power to the pool pump at the circuit breaker 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.

Important Safety Instructions

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

READ AND FOLLOW ALL INSTRUCTIONS

WARNING: *To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.*

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

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

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

TO REDUCE THE RISK OF ELECTRICAL SHOCK, *connect ground wires to grounding screw located in the motor. Use no smaller than a #12 AWG (3.3mm²) wire.*

TO REDUCE THE RISK OF ELECTRICAL SHOCK, *a bonding connector is provided for bonding to metal water pipes, metal rails, or other metal within 5 feet of the swimming pool. All local points should be bonded with a #8 AWG (8.4mm²) wire.*

SAVE THESE INSTRUCTIONS.

2 General Description

Badu EcoM3 - Variable Speed

The Badu EcoM3 - Variable Speed swimming pool pump is both environment friendly and cost efficient. This revolutionary three speed pump provides the pool owner a simple three button control to operate the pump, greatly reducing the operating cost at a reasonable investment. The robust pump is based on Speck Pumps energy efficient design platform. The Badu EcoM3 - Variable Speed high performance, medium head pump uses a state of the art axial flux permanent magnet brushless-DC motor controlled by advance logic electronics. Providing cooler and quieter operation at a fraction of the cost of a standard PSC motor.

General Description - continued

The affinity laws of hydraulics states that if you half the speed, the power reduces by 8 times. The multiple speeds offered by the Badu EcoM3 - Variable Speed enables it to run slower and consume less energy but still have the ability to run at full speed if required.

The Badu EcoM3 - Variable Speed operates at a maximum system flow of 100 gallons per minute (GPM) at 3450 RPM.

This pump can operate from 1000 RPM to 3450 RPM with factory preset speeds of 1600, 2600, and 3450 RPM. This allows you to select the most appropriate speed for your application. The Badu EcoM3 - Variable Speed pump was designed to meet the needs of today's more environmentally friendly consumer. The pump parts are made of 100% recyclable "environment friendly" plastic. The axial flux brushless-DC motor, has a significant reduction in greenhouse gas emissions, saving greater than 2 tonne CO₂ per year. Lower noise reduction, and energy savings per year.

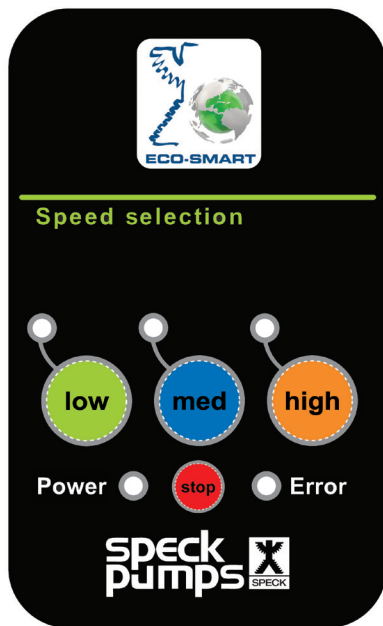


Figure 1

The Badu EcoM3 - Variable Speed control panel provides manual speed controls for the pump. There are three preset speed buttons that can be selected LOW, MEDIUM, and HIGH.

Controls and LEDs

1. LOW, MED, and HIGH buttons/LED: Press one of the buttons to select the desired factory preset pump speed. The pump factory preset speeds are: LOW (1600 RPM), MED (2600 RPM), and HIGH (3450 RPM). The button's green LED is on when the selected button is pressed.
2. Power LED: This green LED light is on when the Badu EcoM3 - Variable Speed pump is powered up.
3. Error LED: This red LED is on whenever an error has occurred.
4. STOP button: Press to stop the pump.

WARNING: STOP button will turn off the pump but voltage is still present. Always turn OFF the breaker before servicing.

3 Installation Information

Preparation Guide

1. Upon receipt of the pump, check the carton for damage. Open the carton and check the pump for concealed damage, such as cracks, dents, or a broken base. If damage is found, contact the shipper or distributor where the pump was purchased.
2. Inspect the contents of the carton and verify that all parts are included. See Section 7, Parts List and Exploded View for details.

Pump Location

NOTE: In Canada, the pump must be located a minimum of three (3) meters (approximately ten (10) feet) from the water (CSA C22.1).

1. Speck Pumps recommends in order to achieve better self-priming, to install the pump as close to the pool as practical. Consult local codes for minimum distance between pool and pump.

WARNING: Some Safety Vacuum Release System (SVRS) devices are not compatible with the installation of check valves. If the pool has an SVRS device, be sure to confirm that it will continue to safely operate when the check valves are installed.

2. The piping should be as direct and free from turns or bends as possible, as elbows and others fittings greatly increase friction losses.

3. Place pump on solid foundation which provides a rigid and vibration-free support so that it is readily accessible for service and maintenance.

4. Protect the pump against flooding and excess moisture, and prevent foreign objects from clogging air circulation around motor. All motors generate heat that must be removed by providing proper ventilation.

5. **DO NOT** store or use gasoline or other flammable vapors or liquids in the vicinity of this pump. **DO NOT** store pool chemicals near the pump.

6. **DO NOT** remove any safety alert labels such as **DANGER**, **WARNING**, or **CAUTION**. Keep safety labels in good condition and replace any missing or damaged labels.

7. Provide access for future services by leaving a clear area around the pump. Allow plenty of space above the pump to remove lid and basket for cleaning.

8. Install the pump in a well ventilated location protected from direct sunlight and excessive moisture. (rain, sprinklers, etc.)

Pipe Sizing

NOTE: All pipe sizes are able to withstand the pressures the pump will deliver, but not necessarily the flow. If the pipe is too small for the pump, or is elevated above water, the maximum gallons per minute (GPM) may not be delivered. If this happens, the pump will develop a pocket of air (cavitation) that makes noise. This may shorten the life of the pump.

SUCTION & DISCHARGE:

When the pump is located up to 50 feet from the pool, the recommended minimum pipe size for both the suction and discharge is 2".

Plumbing Installation

When installing the pump, care should be taken to see the suction line is below water level to a point immediately beneath the pump to ensure quick priming via a flooded suction line. The height between the pump and water level should not be more than five (5) feet.

Plumbing Installation - continued

If the pump is located below water level, isolation valves must be installed on both sides of the pump to prevent the back flow of pool water during any routine or required servicing. The Badu EcoM3 - Variable Speed comes equipped with unions on both the suction and discharge ports. This feature simplifies installation and service and eliminates the possibility of leaks at the threaded adaptors.

Before starting the pump for the first time, remove the see-through lid. (Turn lid counter clockwise to remove.) Fill strainer tank with water until it is level with the suction inlet. Replace lid, making sure the o-ring is not damaged. Screw down, hand tight.

Suction and discharge line should be independently supported at a point near the pump to avoid strains being placed on the pump. Always use properly sized valves.

Use the fewest fittings as possible. Each additional fitting has the effect of moving the equipment farther away from the water.

NOTE: If more than ten (10) suction fittings are needed, the pipe size must be increased.

Every new installation must be pressure tested according to local codes. *See the Pressure Testing Section on page 7*

Bonding and Grounding

When installing and using the motor, basic safety precautions should always be followed. The wiring of the motor should be done by a licensed electrician in accordance with local codes.

BONDING AND GROUNDING

1. The motor frame must be grounded to a reliable grounding point using a solid copper conductor, No. 8 AWG or larger. In Canada, No. 6 AWG or larger must be used. If the pump is installed within five (5) feet of the inside walls of the swimming pool, spa, or hot tub, the motor frame must be bonded to all metal parts of the swimming pool, spa, or hot tub structure and to all electrical equipment, metal conduit, and metal piping within five (5) feet of the inside walls of the swimming pool, spa, or hot tub.
2. Bond the motor using the provided external lug.

WARNING: Always disconnect the power source before working on a motor or its connected load.

WARNING: In order to avoid the risk of property damage, severe personal injury, and/or death, make sure that the control switch, time clock, or control system is installed in an accessible location, so that in the event of an equipment failure or loose plumbing fitting, the equipment can be easily turned off.

CAUTION: The pump must be permanently connected to a dedicated electrical circuit. No other equipment, lights, appliances, or outlets may be connected to the pump circuit, with the exception of devices that may be required to operate simultaneously with the pump, such as a chlorinating device or heater.

WARNING: Motor is fitted with internal auto reset. May restart without warning!

Electrical Installation

1. The pump motor must be securely grounded inside the motor control box. (See Figure 2.0)

NOTE: Do not connect to electric power supply until unit is permanently grounded.

2. Wire size must be adequate to minimize voltage drop during the start-up and operation of the pump. See Table 1.0 for recommended wiring sizes.

3. Insulate all connections carefully to prevent grounding or short-circuits. Sharp edges on terminals require extra protection. To prevent the wire nuts from loosening, tape them using suitable, listed (UL, ETL, CSA) electrical insulating tape. For safety, and to prevent entry of contaminants, reinstall all conduit and terminal box covers. Do not force connections into the conduit box.

Table 1.0
Recommended Wire Sizes for the Badu EcoM3 - Variable Speed

Recommended Wire Sizes For The Badu EcoM3 - Variable Speed			
Distance from Sub-panel	0 - 50 Feet	50 - 100 Feet	100 - 150 Feet
Voltage	208 - 230 VAC	208 - 230 VAC	208 - 230 VAC
Minimum Wire Size	12	10	8

1. Remove the three screws holding the top control enclosure onto the motor. Carefully lift the top panel and turn it over to expose the inside terminal box. See Figure 2

2. The terminal box is supplied with a 1/2" -14 NPS threaded hole. Use only liquid tight fittings in order to protect the electronics and the motor.

CAUTION: Failure to use liquid tight fittings will void the warranty.

3. The right side of the terminal block will be marked ground, L2, and L1. See Figure 2

4. After running L1, L2, and ground wire from conduit, connect the L1 to the opening directly across from the **orange** wire on the terminal block. See Figure 2

5. Connect L2 to the opening directly across from the **white** wire on the terminal block. See Figure 2

6. Connect the ground wire to the opening directly across from the **green/yellow** wire on the terminal block. See Figure 2

7. Carefully fold all wires inside the terminal box and place the top control panel back on top of the terminal box.

8. Tighten the three screws into the terminal box while applying light pressure to the top control enclosure. **DO NOT OVER TIGHTEN.**

9. The Badu EcoM3 - Variable Speed is a 208-230 volt pump. Make sure the correct voltage is supplied (refer to the motor plate). *Note: If the motor exceeds 250 volts the pump will not start from the Off/Stop position.*

Electrical Installation - continued

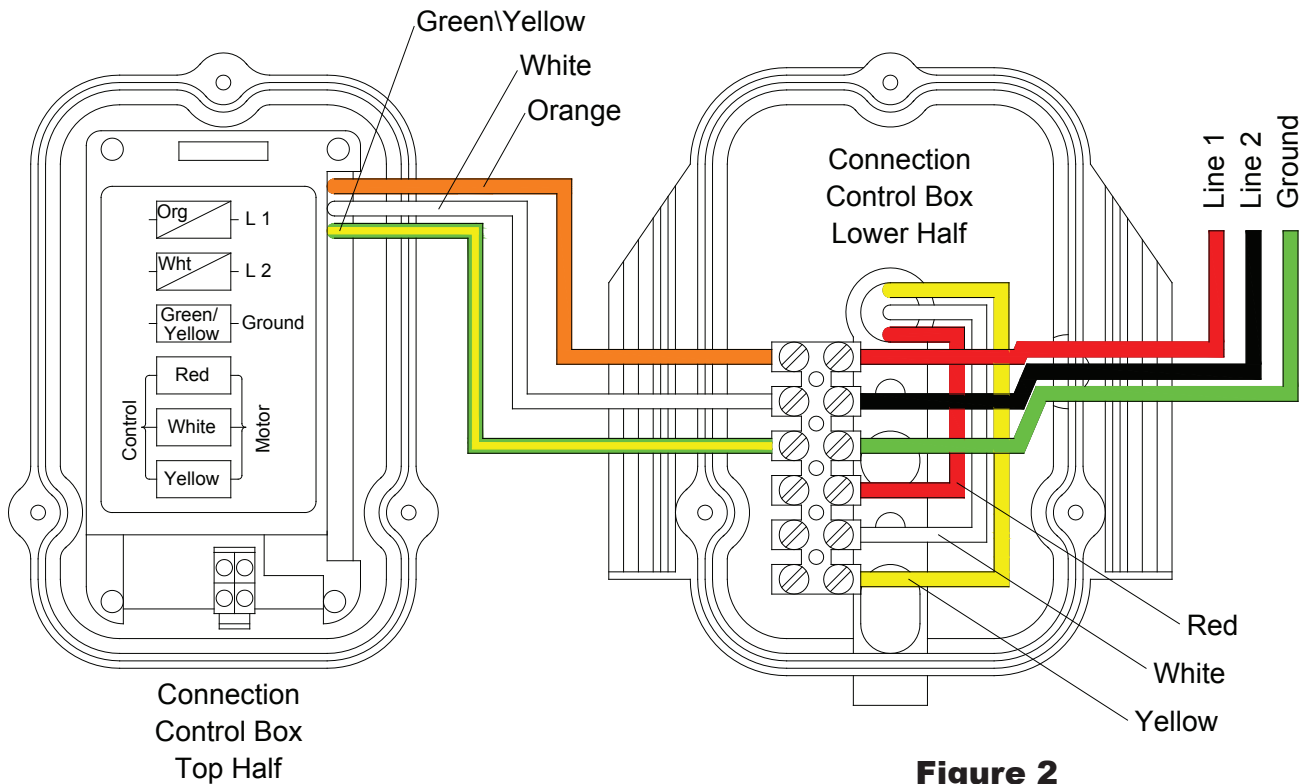


Figure 2

Voltage Checks

The correct voltage, as specified on the pump data plate, is necessary for proper performance and long motor life. Incorrect voltage will cause the error light to turn on and cause damage to the motor if not turned off immediately.

It is the responsibility of the electrical installer to provide data plate operating voltage to the pump by ensuring proper circuit sizes and wire sizes for this specific application.

CAUTION: Failure to provide data plate voltage during operation will cause the motor to overheat and void the warranty.

Pressure Test

WARNING: When pressure testing a system with water, air is often trapped in the system during the filling process. This air will compress when the system is pressurized. Should the system fail, this trapped air can propel debris at a high speed and cause injury. Every effort to remove trapped air must be taken, including opening the bleed valve on the filter and loosening the pump basket lid while filling the pump.

WARNING: Trapped air in the system can cause the filter lid to be blown off, which can result in death, serious injury, or property damage. Be sure all air is properly purged out of the system before operating. DO NOT USE COMPRESSED AIR TO PRESSURE TEST OR CHECK FOR LEAKS.

Pressure Test - continued

WARNING: When pressure testing the system with water, it is very important to make sure that the pump basket and lid is completely secure.

STEPS:

1. Fill the system with water, using care to eliminate trapped air.
2. Pressurize the system with water to no more than 35 PSI.

WARNING: Do not pressure test above 35 PSI. Pressure testing must be done by a trained pool professional. Circulation equipment that is not tested properly might fail, which would result in severe injury or property damage.

3. Close the valve to trap pressurized water in the system.
4. Observe the system for leaks and/or pressure decay.
5. If there are leaks, repeat Steps 1 -3. For technical support, call 1-800-223-8538.

4 Operation

Start Up Guide

CAUTION: Never run the pump without water. Running the pump “dry“ for any length of time can cause severe damage to both the pump and the motor and will void the warranty.

If this is a new pool installation, make sure all piping is clear of construction debris and has been properly pressure tested. The filter should be checked for proper installation, verifying that all connections and clamps are secure according to the manufacturer’s recommendations.

WARNING: To avoid risk of property damage, severe personal injury or death, verify that all power is turned off before starting this procedure.

1. Release all pressure from the system and open the filter pressure release valve.
2. Depending on the location of the pump, do one of the following:
 - If the pump is located below the water level of the pool, open the filter pressure valve to prime the pump with water.
 - If the pump is located above the water level of the pool, remove the lid and fill the basket with water before starting the pump.
3. Prior to replacing the lid, check for debris around the lid o-ring seat. Debris around the lid o-ring seat will make it difficult to prime the pump.
4. **Hand-tighten** the lid to make an air tight seal. Do not use any tools to tighten the lid: **hand-tighten only**. Make sure all valves are open and the unions are tight.
5. Once all the air has left the filter, close the pressure release valve.

Start Up Guide - continued

6. Switch on power to the pump-motor to start. There will be a delay of six to twelve (6 to 12) seconds as the pump powers up.

7. The unit will automatically run on high speed for two (2) minutes to prime the pump. After the two minutes the pump will default to low speed. *Note: When you press the medium or high button after the two (2) minute priming, the pump will then run for two (2) hours on the speed you selected then default back to low. If full prime has not been achieved after initial 2 minute prime cycle, refill the pump with water and start on High speed and allow pump to run on High speed for up to 5 minutes to allow air trapped in the suction line to be purged.*

8. The pump has three (3) speed settings - low, medium, and high.

High: Used when vacuuming the pool or operating the spa jets or some water features such as water falls.

Medium: Used for gentle spa jet action, or filtration for the pool.

Low: Recommended for everyday filtration of your pool. (This speed will achieve the lowest operating costs with the lowest noise level.)

SPEED	LOW	MEDIUM	HIGH
Default	1600	2600	3450
MAXIMUM	1725	2800	3450
MINIMUM	1000	1800	2850

9. If the power is turned off or the pump is stopped, it will repeat this process. (See number 6 & 7)

10. If the pump does not prime and all the instructions to this point have been followed, check for a suction leak. If there is a leak repeat Steps 2 through 6.

11. For technical assistance, call Speck Pumps Technical Support at 800-223-8538.

Changing the Default Speed

The pump is factory set with a default speed of LOW. However, it can be modified to medium speed as required by minimum flow pressure requirements of various pool side equipment/features as defined by the manufacturer specifications. The default speed should be modified during the first two minutes of applying power to the unit.

Please follow all local/state regulations regarding pool motor and timer speeds settings when choosing the default speed.

1. Allow the pump to achieve prime if starting the system for the first time.

2. Turn the power off using the off button on the controller once prime is reached. Allow the pump to sit in the off position for at least 30 seconds.

3. Turn the pump on and allow the motor to come to full speed.

4. Press and hold the high and medium buttons simultaneously until the low speed LED indicator light begins to blink and then release.

Changing the Default Speed - continued

5. The low speed LED will continue to blink for three seconds to indicate a modification to the automatic default speed is being requested. After a brief pause, a second series of LED blinks will indicate the new default setting has been set to either medium speed (medium speed LED blinks) or low speed (low speed LED blinks).

Adjusting the Speeds

The Badu EcoM3 - Variable Speed pump control panel provides manual speed controls for the pump. There are three (3) factory preset buttons that can be selected (LOW, MED, or HIGH). The LOW button is preset to 1600 RPM. The MED button is preset to 2600 RPM. The HIGH button is preset to 3450 RPM. Once a button (LOW, MED, or HIGH) is pressed the LED for the appropriate button will appear. However, the three (3) speeds can be modified to various speeds required by minimum flow pressure requirements of various pool side equipment/features as defined by the manufacturer specifications.

Please follow all local/state regulations regarding pool motor and timer speeds settings when choosing the appropriate speeds.

To Adjust LOW Speed

- Verify that the pump is powered ON and the green power LED light is on.
- Press the LOW button for 5 to 10 seconds, this will switch the control from Normal Operation Mode to the Speed Adjust Mode. The LOW LED light will begin to blink.
- Press the left (LOW) button to decrease the speed.
or
- Press the right (HIGH) button to increase the speed.
(NOTE: The button will increase or decrease in increments of 200 RPM, in most cases. The Speed Range for Low Speed is 1000, 1200, 1400, 1600, 1725. Factory Preset is 1600.)
- Press the middle (MED) button to save the current the speed and return to Normal Operation Mode.
- To Stop or Exit out of Speed Adjust Mode, Press the STOP button or wait 30 seconds without pressing any buttons. *NOTE: If the power is shut off or the pump is stopped using the stop button, upon powering up the pump will run a two (2) minute prime on HIGH and then resume normal operation. DO NOT press any buttons during prime operation.*

To Adjust the MEDIUM Speed

- Verify that the pump is powered ON and the green power LED light is on.
- Press the MED button for 5 to 10 seconds, this will switch the control from Normal Operation Mode to the Speed Adjust Mode. The MED LED light will begin to blink.
- Press the left (LOW) button to decrease the speed.
or
- Press the right (HIGH) button to increase the speed.
(NOTE: The button will increase or decrease in increments of 200 RPM, in most cases. The Speed Range for Medium Speed is 1800, 2000, 2200, 2400, 2600, 2800. Factory Preset is 2600.)
- Press the middle (MED) button to save the current the speed and return to Normal Operation Mode.
- To Stop or Exit out of Speed Adjust Mode, Press the STOP button or wait 30 seconds without pressing any buttons. *NOTE: If the power is shut off or the pump is stopped using the stop button, upon powering up the pump will run a two (2) minute prime on HIGH and then resume normal operation. DO NOT press any buttons during prime operation.*

Adjusting the Speeds - continued

To Adjust the HIGH Speed

- Verify that the pump is powered ON and the green power LED light is on.
- Press the HIGH button for 5 to 10 seconds, this will switch the control from Normal Operation Mode to the Speed Adjust Mode. The HIGH LED light will begin to blink.
- Press the left (LOW) button to decrease the speed.
or
- Press the right (HIGH) button to increase the speed
(NOTE: The button will increase or decrease in increments of 200 RPM, in most cases. The Speed Range for HIGH Speed is 2850, 3050, 3250, 3450. Factory Preset is 3450.)
- Press the middle (MED) button to save the current the speed and return to Normal Operation Mode.
- To Stop or Exit out of Speed Adjust Mode, Press the STOP button or wait 30 seconds without pressing any buttons. *NOTE: If the power is shut off or the pump is stopped using the stop button, upon powering up the pump will run a two (2) minute prime on HIGH and then resume normal operation. DO NOT press any buttons during prime operation.*

Adjusting Back to Factory Settings

- Verify that the pump is powered ON and the green power LED light is on.
- Press and Hold all three (3) speed buttons (LOW, MED, and HIGH) for 5 to 10 seconds.
- All LED light will be fully lit. The LED's will blink to indicate the factory defaults were re-established.

5 Service and Maintenance

Routine Maintenance

This pump requires little or no service other than reasonable care and periodic cleaning of the strainer basket.

1. Inspect the pump basket for debris by looking through the clear pump lid.
2. Turn off the power to the pump. If the pump is located below the water level, close isolation valves on the suction and discharge sides of the pump to prevent back flow of water.
3. Remove any debris, because as the debris accumulates, it will begin to block the flow of water through the pump. Keep the basket clean and clear to improve the performance of the pump.
4. Turn the lid's lock ring counter clockwise until it stops. Carefully remove the lid and lock ring.
5. Remove the basket and properly dispose of the debris into the trash and rinse out the basket. Check basket for cracks, if crack is found replace basket.
6. Replace basket back into the pump, align the basket properly with the suction pipe. Then fill with water up to the suction pipe. Clean clear cover, lid o-ring and sealing surface of the pump of any debris.
7. Replace lid with locking ring. *Hand-tighten* the lid to make an air-tight seal. **Do not use any tools to tighten the lid.**

Routine Maintenance - continued

8. Verify that all valves have been returned to the proper position for normal operation. Turn on the power to the pump.

Winterizing

CAUTION: The pump must be protected when freezing temperatures are expected. Allowing the pump to freeze will cause severe damage and void the warranty.

There are two options when winterizing the pump

Option 1:

1. Drain all the water from the pump, system equipment, and piping.
2. Remove drain plugs. Do not replace plugs. Store the plugs in the empty strainer basket for winter.
3. Keep the motor covered and dry.

Option 2:

1. Drain all the water from the pump, system equipment, and piping.
2. Remove the pump and motor from the plumbing and store indoors in a warm and dry location.

Note: When the winter season is over the pump will need to be primed prior to start. Refer to Section 4 Operation, Start Up Guide.

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

6 Troubleshooting

Controller Malfunction Warnings

WARNING: The pump must be serviced by a professional service technician qualified in pool/spa installation. The following procedures must be followed exactly. Improper installation and/or operation can create dangerous electrical hazards, which can cause high voltage to run through the electrical system. This can cause property damage, serious personal injury, and/or death. Improper installation and/or operation will void the warranty.

The Badu EcoM3 - Variable Speed malfunction warnings are indicated by a flashing LED light on the control panel. If the error light is on pay attention to the appropriate number of flash intervals of short or long duration, then shut the pump down immediately. For example, if a “Low Voltage” warning occurs, the LED will blink two times, then off, then blink two times. This sequence is repeated until the condition is cleared.

Controller Malfunction Warnings - continued

Table 2.0
The Badu EcoM3 - Variable Speed Error Light Sequence

Flash Rate LED "Error" Light	Error Description	Cause
1 Flash	Microprocessor fault	Microprocessor Start-Up
2 Flashes	Low voltage	Voltage must exceed < 208V AC control activates itself independently when voltage exceeds 208V for more than six (6) seconds (Motor Activates)
3 Flashes	Temperature too high Temperature too low	Temperature Too High > 100° C (212° F) Temperature Too Low < -20° C (4° F)
4 Flashes	Thermal overload tripped	Motor is drawing too many amps
5 Flashes	High voltage	Voltage has exceeded 269V AC
6 Flashes	Shaft locked	Impeller or pump locked/motor shaft stopped turning
7 Flashes	Self-test	One or more self-test were not completed
8 Flashes	Motor Error	One or more phases are not connected

General Pump Troubleshooting

Table 3.0
The Badu EcoM3 - Variable Speed General Troubleshooting

Problem	Possible Cause	Solution
1. Error Light appears during start-up	A. Low Voltage	During the initial start-up (6-12 seconds delay) there is a momentary power drop, in which case the pump will restart itself after the voltage is above 208V for a period of six seconds.
2. Pump will not prime.	A. Suction air leak	Make sure see-through lid and o-rings are clean and properly positioned. Hand tighten see-through lid. Tighten all pipes and fittings on suction side of pump. Be sure water in pool is high enough to flow through skimmer.
	B. No water in pump.	Make sure strainer tank is full of water.
	C. Closed valves or blocked lines.	Open all valves in system. Clean skimmer and strainer tank. Open pump and check for clogging of impeller.
	D. Low voltage to motor.	Check voltage at motor. If low, pump will not come up to speed.
3. Motor does not turn	A. No power to motor.	Check that all power switches are on. Be sure fuse or circuit breaker is properly set. Time set properly? Check motor wiring at terminal.
	B. Pump jammed	With power off, turn shaft. It should spin freely. If not, disassemble and repair.
4. Low flow	A. Dirty filter	Back wash filter when filter pressure is high, or clean cartridges.
	B. Suction Leak	See Problem 2

Blocked Impeller

WARNING: Before servicing the pump, switch off the circuit breakers at the power source. Severe personal injury or death may occur if the pump starts while your hand is inside the pump.

1. Turn off the pump. Switch off the circuit breaker to the pump motor.
2. Remove the pump lid and strainer tank.
3. Look inside pump for debris. Remove any debris found inside.
4. Replace the strainer tank and lid.
5. Switch on the circuit breaker to the pump motor.
6. Turn on the pump, see if the problem is solved.
7. If the impeller is still blocked with debris and it is not possible to remove the debris using Steps 2 - 4, the pump will need to be disassembled in order to access the inlet and outlet of the impeller.

Removal and Replacement of the Impeller and/or Mechanical Seal

WARNING: Before servicing the pump, switch off the circuit breakers at the power source. Severe personal injury or death may occur if the pump starts while your hand is inside the pump.

1. Turn off the pump. Switch off the circuit breaker to the pump motor. If you are not replacing the motor, do not disconnect the electrical wiring.
2. Turn off any valves to prevent pool water from reaching the pump. Drain water from the pump by loosening the unions or removing the drain plugs.
3. Remove the eight screws connecting the pump casing to the flange.
4. Pull the motor, seal housing, flange out from the pump casing. Remove the pump casing o-ring. The impeller is connected to the motor shaft.
5. Remove the diffuser by gently pulling the diffuser (the diffuser is the cover over the impeller) horizontally until the pins clear the seal housing.
6. Place a flat head screwdriver through the center hole of the fan cover and into the screwdriver slot on the motor shaft.
7. While holding the motor shaft, turn the impeller counter-clockwise.
8. Gently pull the mechanical seal from the impeller shaft noting the way it was originally installed.

CAUTION: Do not damage the ceramic or carbon surfaces of the seal. If the surfaces is damaged, leaks will occur.

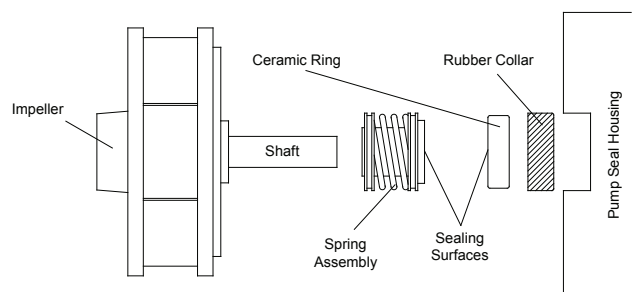


Figure 3

Removal and Replacement of the Impeller and/or Mechanical Seal - continued

9. Using water with a small amount of dish soap, brush the impeller shaft for ease of assembly.
10. With the carbon side up, push the mechanical onto the impeller shaft and wipe carbon surface with a clean cloth.

CAUTION: Do not use grease or lube to install seal. It will damage the seal and cause failure.

11. The ceramic side of the seal can be pushed out from the rear of the seal housing. Please note its position before removing.
12. Using water only, wet the ceramic side of the seal and using your thumbs push into the seal housing. Clean surface with a clean cloth.
13. Wipe the motor shaft of all debris. Re-install the seal housing and apply a single drop of Loc-tite to the motor shaft threads.
14. Install impeller by spinning it clockwise onto the motor shaft. Continue to turn clockwise until the carbon and ceramic sides make contact and the seal spring slightly compresses.
15. Install the diffuser by aligning the diffuser pin with the holes in the seal housing and pressing together.
16. Make sure the diffuser and casing o-rings are in place and free of debris. Slide the motor flange into the casing.
17. Tighten the eight screws using a cross pattern from side to side and top to bottom.

CAUTION: Do not over-tighten or you will strip the casing threads.

Motor Replacement

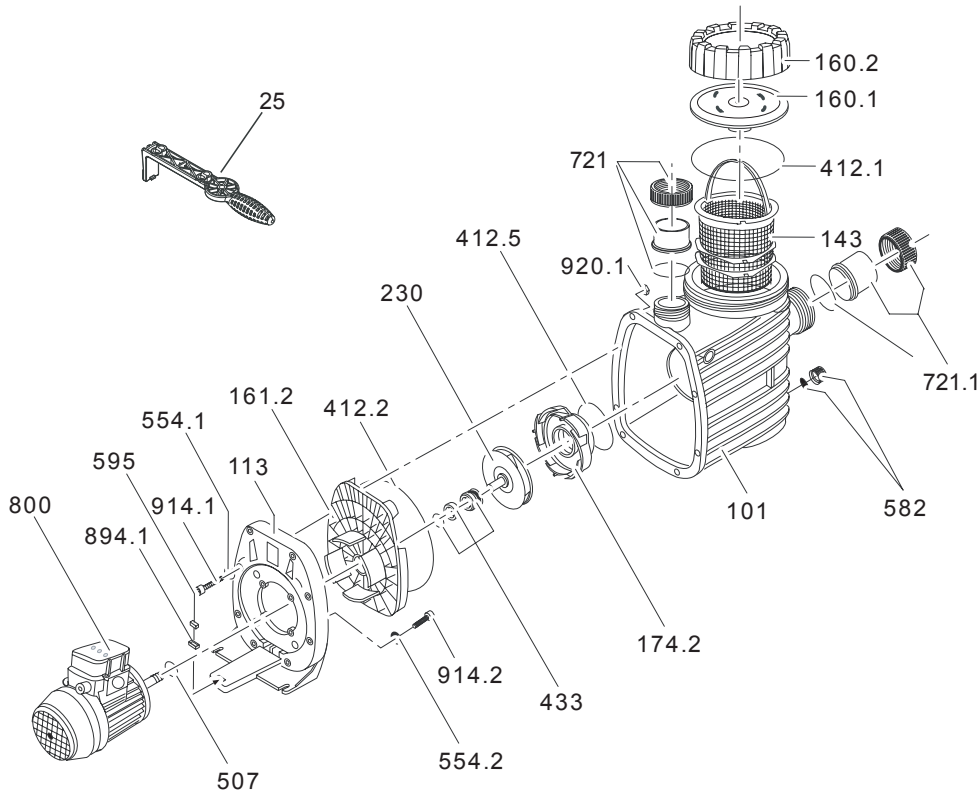
WARNING: The pump must be serviced by a professional service technician qualified in pool/spa installation. The following procedures must be followed exactly. Improper installation and/or operation can create dangerous electrical hazards, which can cause high voltage to run through the electrical system. This can cause property damage, serious personal injury, and/or death. Improper installation and/or operation will void the warranty.

1. Disconnect the wiring from the side of the motor. (Refer to the Electrical Installation on page 10)
2. Remove the eight screws holding the flange to the pump casing.
3. Slide the motor and flange from the casing.
4. Remove the diffuser by gently pulling the diffuser horizontally until the pins are clear from the seal housing.
5. Place a flat heat screwdriver through the center hole of the fan cover and into the screwdriver slot on the motor shaft.
6. While holding the motor shaft, turn the impeller counter-clockwise.

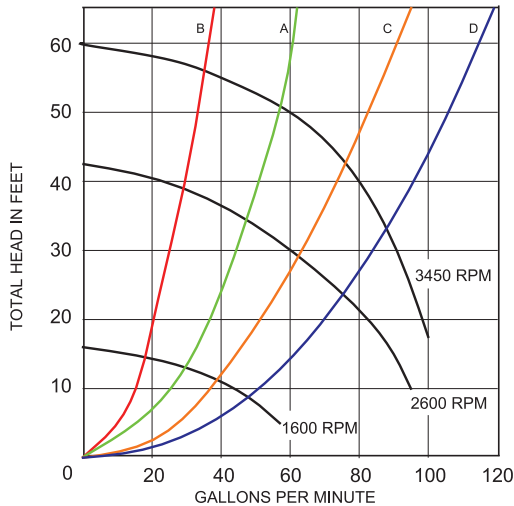
Motor Replacement - continued

7. After removal of the impeller, the seal housing will slide easily off the motor shaft.
8. Using a M8 Allen wrench, remove the four bolts and washers securing the flange to the motor.
9. Remove the slinger from the old motor and install on to the new motor.
10. Clean the surfaces of the seal (*Refer to the Removal and Replacement of the Impeller and/or Mechanical Seal Section page 17 steps 9 -17*).

7 Product Specifications

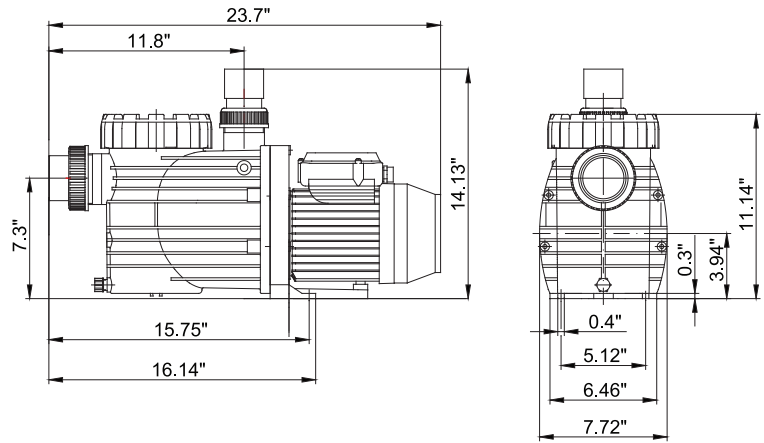


PART NUMBER	DRAWING NUMBER	QTY	DESCRIPTION	PART NUMBER	DRAWING NUMBER	QTY	DESCRIPTION
2921116010	160.1	1	LID	2920723101	230	1	IMPELLER (II) 1.0 HP S.F. 1.0 101 / 9.0mm M10
2921116020	160.2	1	LOCK RING - LID	2920143310	433	1	MECHANICAL SEAL (14mm)
2901141201	412.1	1	O-RING - LID 137 x 5mm	2921141222	412.2	1	O-RING - CASING 190 x 6mm
2901114300	143	1	BASKET - ONE PIECE	2921116125	161.2	1	SEAL HOUSING 14mm
2921110108	101	1	CASING	2921111300	113	1	FLANGE
2901158200	582	1	CAP - DRAIN (3/8") WITH GASKET - CASING	5879120825	914.2	4	BOLT - FLANGE M8 x 25mm
2920889410	894.1	2	LEGO SPACER	2991000062	554.2	4	WASHER - FLANGE BOLT (M8)
2920889420	595	1	GASKET - (1/4" x 7/16" x 1")	2500300902	721	1	SET - DISCHARGE UNION COMPLETE
2991000088	914.1	8	SCREW - CASING HEX/SLOT M7 x 48mm SS	2921770001	721.1	1	SET - SUCTION UNION COMPLETE
2920141210	412.5	1	O-RING - DIFFUSER 90 x 5mm	2500300914	721 & 721.1	1	COMPLETE UNION SET - SUCTION/DISCHARGE
2921117412	174.2	1	DIFFUSER	2921157700	25	1	SPANNER - LID (OPTIONAL)
				2921150700	507	1	SLINGER - SPLASH RING



A, B, C, and D represent average system curves for pools with below pipe diameter.

B = 1½" Pipe C = 2½" Pipe
 A = 2" Pipe D = 3" Pipe



8 Limited Warranty

The manufacturer supplies a limited warranty to the original consumer purchaser of the pump and motor on the following terms and conditions:

1. The pump and motor are warranted to be free from defects in material and workmanship for a period of twenty-four (24) months from the date that the pump is originally installed.
2. Notwithstanding any provisions herein to the contrary, the warranties and obligations hereunder shall not in any event extend for more than three (3) years beyond the date of shipment of the pump and motor from the factory in Jacksonville, Florida.
3. Warranty is void in the following cases: damages which result in whole or in part from: (a) careless or improper installation of the pump or the motor; (b) improper or negligent use and maintenance of the pump or the motor; (c) tampering with the pump or the motor by unauthorized repair personnel.
4. The manufacturer's sole obligation hereunder shall be to replace or repair any defective pump or motor. The manufacturer reserves the absolute right to determine whether any defective pump or motor should be replaced or repaired.
5. Any customer who wishes to make a claim under this Limited Warranty shall notify the manufacturer, of such claim by telephone or by mail. After the customer has been authorized to return a defective pump or motor, the customer must return the pump or motor to the manufacturer at 8125 Bayberry Road, Jacksonville, Florida 32256. Any goods returned to manufacturer without prior authorization will be returned to the shipper unopened.

The manufacturer shall not bear any costs or risks incurred in shipping a defective pump or motor to the manufacturer or in shipping a repaired or replaced pump or motor to a customer.

6. The manufacturer will charge customers for all non warranty work which it may perform. Non-warranty work will not be performed until the customer has accepted the price quoted.
7. *EXCEPT AS SPECIFICALLY SET FORTH ABOVE, NO OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE MADE BY THE MANUFACTURER. IN NO EVENT WILL THE MANUFACTURER BE LIABLE FOR ANY LOSS, INCLUDING TIME, MONEY, GOODWILL, LOST PROFITS AND CONSEQUENTIAL DAMAGES BASED ON CONTRAST, TORT OR OTHER LEGAL THEORY, WHICH MAY ARISE HEREUNDER OR FROM THE USE, OPERATION OF MODIFICATION OF THE PUMP, MOTOR OR ASSOCIATED PARTS. THE MAXIMUM LIABILITY OF THE MANUFACTURER HEREUNDER SHALL NOT EXCEED THE AMOUNT ACTUALLY PAID BY THE CUSTOMER FOR THE PUMP, MOTOR AND ASSOCIATED PARTS.*
8. Some states do not permit limitations on the terms of implied warranties or on the recovery of incidental or consequential damages. Accordingly, the limitations contained in paragraph 7, may not apply to certain customers.
9. This warranty gives customers specific legal rights. Customers may have other rights which vary from state to state.

