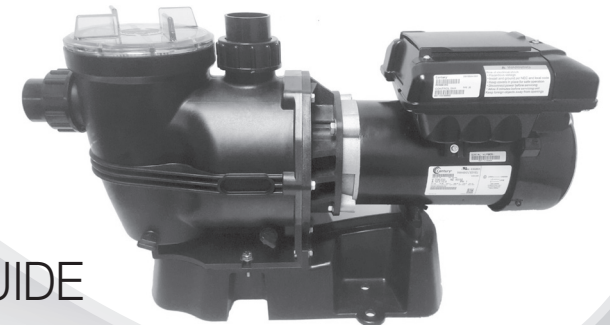


INFINIUM ∞ ECO-V150

Variable Speed Pump

INSTALLATION AND USER'S GUIDE



CUSTOMER SERVICE / TECHNICAL SUPPORT

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NOTICE TO INSTALLER

THIS MANUAL CONTAINS IMPORTANT INFORMATION ABOUT THE INSTALLATION, OPERATION AND SAFE USE OF THIS PRODUCT. ONCE THE PRODUCT HAS BEEN INSTALLED THIS MANUAL MUST BE GIVEN TO THE OWNER/OPERATOR OF THIS EQUIPMENT.

THIS EQUIPMENT MUST BE INSTALLED AND SERVICED BY A QUALIFIED TECHNICIAN. IMPROPER INSTALLATION CAN CREATE ELECTRICAL HAZARDS WHICH COULD RESULT IN PROPERTY DAMAGE, SERIOUS INJURY OR DEATH. IMPROPER INSTALLATION WILL VOID THE WARRANTY.

WATERCO

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IMPORTANT PUMP AND SAFETY INSTRUCTIONS

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

- **⚠ WARNING – Read and follow all instructions in this owner's manual and on the equipment. Failure to follow instructions can cause severe injury and/or death.**
- **⚠ 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 Electric 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 – 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 is capable of being readily disassembled for storage and reassembled to its original integrity.**
 - **Do not install within an outer enclosure or beneath the skirt of a hot tub or spa.**
- **⚠ WARNING – It is required that licensed electricians do all electrical wiring. Risk of Electric Shock. Hazardous voltage can shock, burn, cause death or serious property damage. To reduce the risk of electric shock, do NOT use an extension cord to connect unit to electric supply. All electrical wiring MUST be in conformance with applicable local and national codes and regulations. Before working on pump or motor, turn off power supply to the pump.**

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 ENTANGLE- MENT, BODY ENTRAPMENT, EVisCERATION AND/OR DEATH.

- **⚠ WARNING – Suction Entrapment Hazard.** Suction in suction outlets and/or suction outlet covers, which are damaged, broken, cracked, missing, or unsecured cause severe injury and/or death due to the following entrapment hazards:
 - **Hair Entrapment** - Hair can become entangled in suction outlet cover.
 - **Limb Entrapment** - A limb inserted into an opening of a suction outlet sump or suction outlet cover that is damaged, broken, cracked, missing, or not securely attached can result in a mechanical bind or swelling of the limb.
 - **Body Suction Entrapment** - A pressure applied to a large portion of the body or limbs can result in an entrapment.
 - **Evisceration/ Disembowelment** - A negative pressure applied directly to the intestines through an unprotected suction outlet sump or suction outlet cover which is damaged, broken, cracked, missing, or unsecured can result in evisceration/disembowelment.
 - **Mechanical Entrapment** - There is potential for jewelry, swimsuits, hair decorations, fingers, toes, or knuckles to be caught in an opening of a suction outlet cover resulting in mechanical entrapment.

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 current National Electrical Code and all applicable local codes and ordinances.
- Before servicing the pump; switch OFF power to the pump by disconnecting the main circuit to the pump.
- This appliance is not intended for use by persons (including children) of reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.

NOTE:

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

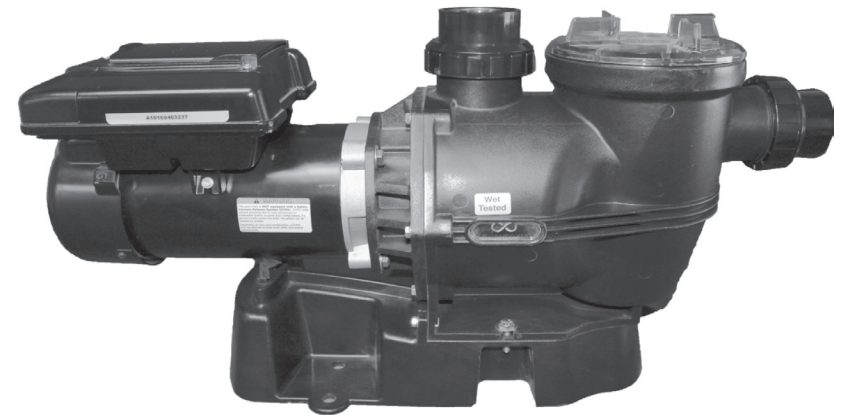
- PUMPS IMPROPERLY SIZED OR INSTALLED OR USED IN APPLICATIONS OTHER THAN FOR WHICH THE PUMP WAS INTENDED CAN RESULT IN SEVERE PERSONAL INJURY OR DEATH. THESE RISKS MAY INCLUDE BUT NOT BE LIMITED TO ELECTRIC SHOCK, FIRE, FLOODING, SUCTION ENTRAPMENT OR SEVERE INJURY OR PROPERTY DAMAGE CAUSED BY A STRUCTURAL FAILURE OF THE PUMP OR OTHER SYSTEM COMPONENT.
- **⚠ WARNING – To reduce the risk of Entrapment Hazards:**
 - When outlets are small enough to be blocked by a person, a minimum of two functioning suction outlets per pump must be installed. Suction outlets in the same plane (i.e. floor or wall), must be installed a minimum of three feet (3') [0.91 meter] apart, as measured from near point to near point.
 - Dual suction fittings shall be placed in such locations and distances to avoid “dual blockage” by a user.
 - Dual suction fittings shall not be located on seating areas or on the backrest for such seating areas.
 - The maximum system flow rate shall not exceed the values shown in the “Pipe Sizing Chart” found at the bottom of page 5 of this manual.
 - Never use pool or spa if any suction outlet component is damaged, broken, cracked, missing, or not securely attached.
 - Replace damaged, broken, cracked, missing, or not securely attached suction outlet components immediately.
 - In addition to two or more suction outlets per pump installed in accordance with latest IAF (formerly NSPI) standards and CPSC guidelines, follow all national, state, and local codes applicable.
 - Installation of a vacuum release or vent system, which relieves entrapping suction, is recommended.

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



Pump Overview

The perfect choice for all types of pools, the Infinium Eco-V Variable Speed Pump is specifically designed to be your best choice for a variety of in-ground pools.

Thick walled body parts, a heavy duty TEFC motor, and highly engineered hydraulics make this rugged and tested design perfect for any pool, spa, water feature, or fountain.

All pumps from Waterco incorporate innovative hydraulic engineering that has been refined for over 40 years.

Compact, rugged, and easy to maintain, the Infinium Eco-V pump will deliver years of reliable service.

Pump Controller Features

- Simple user interface
- Motor design reduces noise emissions
- UV and rain-proof enclosure
- Manual OVERRIDE
- High efficiency electromechanical motor and control design

General Features

- Extremely quiet operation
- Unionized fittings (1.5" and 2") for simple replacement
- Screw on lid for easy cleaning and maintenance
- Heavy-duty TEFC motor for long life
- Integral volute and pot reduce hydraulic noise
- See-through lid permits easy inspection of strainer basket
- Self-priming for quick, easy start-up
- IAPMO Listed and tested to UL 1081

INSTALLATION INSTRUCTIONS

IMPORTANT NOTES -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.

Pump Location

- Locate pump as close to pool as practical and run suction lines as direct as possible to reduce friction loss. Suction lines should have continuous slope upward from lowest point in line. Joints must be tight (but not over-tightened). Suction line diameter must equal or be larger than the discharge line diameter.
- Though the pump is designed for outdoor use, it is strongly advised to protect the electrical components from the weather. Select a well-drained area, one that will not flood when it rains. **Do NOT install pump in a damp or non-ventilated location.** Keep motor clean. Pump motors require free circulation of air for cooling.

Pump Mounting

- Install pump on a firm, level base or pad to meet all local and national codes. Fasten pump to base or pad with screws or bolts to further reduce vibration and stress on pipe or hose joints. The base **MUST** be solid, level, rigid, and vibration free.
 - **Pump mount must:**
 - Allow pump inlet height to be as close to water level as possible.
 - Allow use of short, direct suction pipe (to reduce friction losses).
 - Allow for isolation valves in suction and discharge piping.
 - Be protected from excess moisture and flooding.
 - Allow adequate access for servicing pump and piping.

IMPORTANT NOTES -

- All work must be performed by a qualified service professional, and must conform to all national, state, and local codes.
- No system should allow any higher than 8-ft/sec [2.44 meters/sec] water velocity. It is recommended that a minimum length of piping, equivalent to 10 pipe diameters, be used between the pump suction inlet and any plumbing fittings.

Plumbing

- The INFINIUM ECO V-150 comes equipped with external and internal threads. External threads are designed to be used with the supplied union adapter only and seals with an O-ring. No thread sealant is used when using the union connectors. When using the internal threaded ports, This will require a threaded fitting and must be supplied by the installer. This will require the use of **Teflon tape** to seal threaded connections on molded plastic components. All plastic fittings must be new or thoroughly cleaned before use. **NOTE - Do NOT use Plumber's Pipe Dope as it may cause cracking of the plastic components.**
- When applying **Teflon tape** to plastic threads, wrap the entire threaded portion of the male fitting with one to two layers of tape. Wind the tape clockwise as you face the open end of the fitting, beginning at the end of the fitting. The pump suction and outlet ports have molded-in thread stops. **Do NOT attempt to force hose connector fitting past this stop.** It is only necessary to tighten fittings enough to prevent leakage. Tighten fitting by hand and then use a tool to engage fitting an additional 1 ½ turns. Use care when using Teflon tape as friction is reduced considerably; **DO NOT over-tighten fitting or you may cause damage.** If leaks occur, remove connector, clean off old Teflon tape, re-wrap with one to two additional layers of Teflon tape, and re-install connector.

Pipe and Fittings

- Small Pipe and inefficient Fittings restrict flow. For better efficiency, we recommend the use of 2" or larger plumbing. use the fewest possible fittings (but at least two suction outlets). Avoid fittings that could cause an air trap. Pool and spa fittings **MUST** conform to the International Association of Plumbing and Mechanical Officials (IAPMO) standards. Use a non-entrapping suction fitting in pool (multiple drains) or double suction (skimmer and main drain).

WARNING!

RISK OF ELECTRICAL SHOCK OR ELECTROCUTION. The Infinium Eco-V Variable Speed Pump must be installed by a licensed or certified electrician or a qualified service professional in accordance with the National Electrical Code and all applicable local codes and ordinances. **Improper installation will create an electrical hazard which could result in death or serious injury to users, installers, or others due to electrical shock, and may also cause damage to property.**

Always disconnect power to the pump at the circuit breaker before servicing the pump. Failure to do so could result in death or serious injury to service people, pool users or others due to electric shock and/or property damage. Read all servicing instructions before working on the pump.

ELECTRICAL WIRING INSTALLATION

1. Be sure all electrical breakers and switches are turned off before wiring motor.
 2. Insure the supplied power supply matches the motor Voltage, Cycle, and Phase found on the motor data plate. Voltage must be within 10% of the specified voltage on the data plate. If they do not match, the motor can overheat and cause damage.
 3. Choose a wire size for the pump in accordance with the current National Electrical Code and all applicable local codes and ordinances. When in doubt use a heavier gauge (larger diameter) wire. Heavier gauge will allow the motor to run cooler and more efficient. Use copper conductors only.
 4. Be sure all electrical connections are clean and tight.
 5. Cut wires to the appropriate length so they do not overlap or touch when connected to the terminal board.
 6. Prior to connecting the power supply to the motor, permanently ground the motor using the ground screw located on the inside rear of the controller interface, **see figure 3.**
 7. Use the correct wire size and type specified by the current National Electrical Code. Be sure the ground wire is connected to an electrical service ground and **never ground to a gas line.**
 8. Prior to connecting the power supply to the motor, Bond the motor to the pool structure in accordance with the current National Electrical Code. UL requires use of a solid copper bonding conductor not smaller than 8 AWG. For Canada, a 6 AWG or larger solid copper bonding conductor is required.
 9. Connect the wire from the accessible wire connector on the motor to all metal parts of the swimming pool, spa, or hot tub structure and to all electrical equipment, metal conduit, and metal piping within 5 feet (1.5 M) of the inside walls of the swimming pool, spa, or hot tub.
 10. The pump should be permanently connected to a GFCI circuit breaker, use a dedicated circuit breaker that has no other electrical loads.
 11. Connect the pump permanently to a circuit. Make sure no other lights or appliances are on the same circuit.
- 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.

Wiring Diagrams

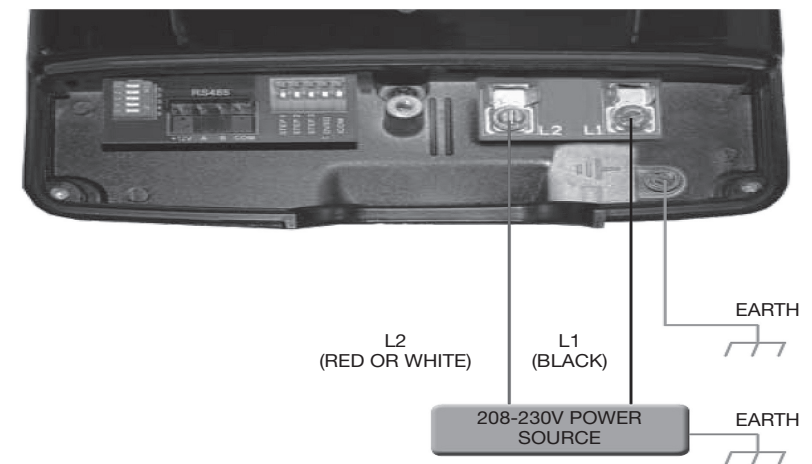
Pin #	Wire Color	Description
L1	Black	Hot 1
L2	Red or White	Hot 2
Green screw	Green	Earth

Table 1 : Mains Connection

Pin #	Wire Color	Description
J201 - 1	Red	+12V
J201 - 2	Black	A
J201 - 3	Yellow	B
J201 - 4	Green	COM

Table 2 : Communication Connection**! WARNING**

Power should be turned off when installing, servicing, or repairing electrical components. Observe all warning notices posted on the existing equipment, INFINIUM ECO V-150 and in these installation instructions.

**Figure 3 : Mains Connection Diagram**

Digital Inputs

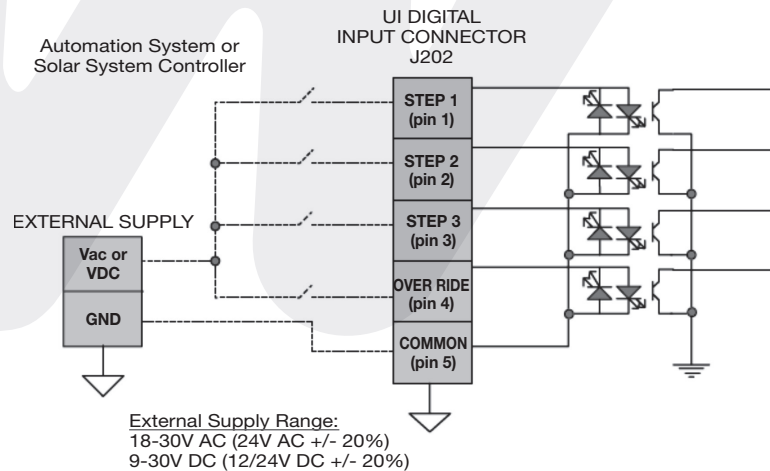


Figure 4 : Wiring Diagram for Digital Inputs

WARNING

Access to these terminals is in close proximity to the mains connectors which carry line voltage capable of causing personal injury or damaging the equipment if contact is made.

Power should be turned off when accessing this area.

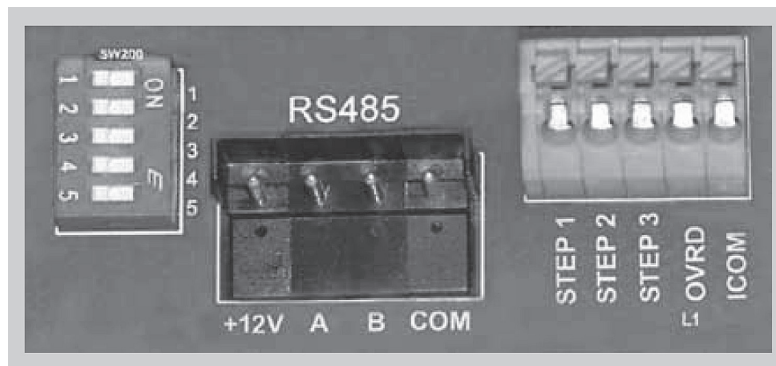


Figure 5 : Digital Inputs connector

Operating Instructions

Start-Up & General Operation

CAUTION - Before removing strainer cover:

- STOP PUMP before proceeding.
- CLOSE VALVES in suction and outlet pipes.
- RELEASE ALL PRESSURE from pump and piping system using filter manual air relief valve. See filter owner's manual for more detail.

CAUTION - All suction and discharge valves MUST be OPEN, as well as filter air relief valve (if available) on filter, when starting the circulating pump system. Failure to do so could result in severe personal injury.

NEVER OPERATE THE PUMP WITHOUT WATER.
 Running pump dry may damage seals, causing leakage, flooding, and voids warranty.

DO NOT add chemicals to pool/spa system directly in front of pump suction or in Pump Strainer housing. Adding undiluted chemicals may damage pump and voids warranty.

Priming Pump

- Remove Strainer cover by turning the lid Counter Clockwise.
- Fill strainer housing with water up to the suction pipe level.
- If water source is higher than the pump, pump will prime itself when suction and outlet valves are opened. Always verify the strainer housing is full of water. If water source is lower than the pump, the pump must be filled.
- Clean and lubricate strainer cover O-ring with "Silicone based O-ring Lube" each time it is removed. Inspect O-ring and re-install on strainer cover.
- Replace strainer cover on strainer housing; turn clockwise to tighten cover. NOTE - Tighten Lid by hand only (no wrenches).
- Turn on power and wait for pump to prime, which may take up to five (5) minutes. Priming time will depend on vertical length of suction lift and horizontal length of suction pipe. If pump does NOT prime within five minutes, stop motor and determine cause. Be sure all suction and discharge valves are open when pump is running. See Troubleshooting Guide.

ATTENTION - Wait five (5) seconds before re-starting pump. Failure to do so may cause reverse rotation of motor and consequent serious pump damage.

- Close filter manual air relief valve after pump is primed.

Maintenance

- Clean strainer basket regularly. Do NOT strike basket to clean. Inspect strainer cover gasket regularly and replace as necessary.
- Waterco pumps have self-lubricating motor bearings and shaft seals. No lubrication is necessary.
- Keep motor clean. Insure air vents are free from obstruction to avoid damage. Do NOT use water to hose off motor.
- Occasionally, shaft seals must be replaced, due to wear or damage. Replace with genuine Waterco seal assembly kit.

Storage/Winterization

- ⚠ **WARNING** – Separation Hazard. Do not purge the system with compressed air. Purging the system with compressed air can cause components to explode, with risk of severe injury or death to anyone nearby. Use only a low pressure (below 5 PSI), high volume blower when air purging the pump, filter, or piping.
- ⚠ **ATTENTION** – Allowing the pump to freeze will void the warranty.
- ⚠ **ATTENTION** – Use ONLY propylene glycol as antifreeze in your pool/spa system. Propylene glycol is non-toxic and will not damage plastic system components; other anti-freezes are highly toxic and may damage plastic components in the system.
- ⚠ **WARNING** – To avoid dangerous or fatal electrical shock hazard, turn OFF power to motor before draining pump. Failure to disconnect power may result in serious personal injury or death.

Storing Pump For Winterization

- Drain water level below all inlets to the pool.
- Drain all water from pump and piping when expecting freezing temperatures or when storing pump for a long time (see instructions below).
- Remove drain plugs from bottom of strainer body, and remove strainer cover from strainer housing.
- Disconnect pump from mounting pad, wiring system (after power has been turned OFF), and piping system.
- Keep motor dry and covered during storage. To avoid condensation/corrosion problems, do NOT cover or wrap pump with plastic film or bags.

Programing

Introduction

The INFINIUM ECO V-150 uses a premium efficiency variable speed motor that provides tremendous program flexibility in terms of motor speed and time settings. The variable speed motor is intended to enable running at the lowest speeds needed to maintain a sanitary environment, which in turn minimizes energy consumption. Pool size, the presence of additional water features, chemicals used to maintain sanitary conditions, and environmental factors will impact optimal programming necessary to maximize energy conservation.

The integrated electronics interface controls the speed settings as well as the run durations. The INFINIUM ECO V-150 can run at speeds ranging between 600 and 3450 RPM and is rated for 208-230 Vrms at an input frequency of 60 Hz.

Navigation Overview

- > +, - Increases/decreases selected value
- > Pressing any key following a change accepts the current value displayed inside the setting

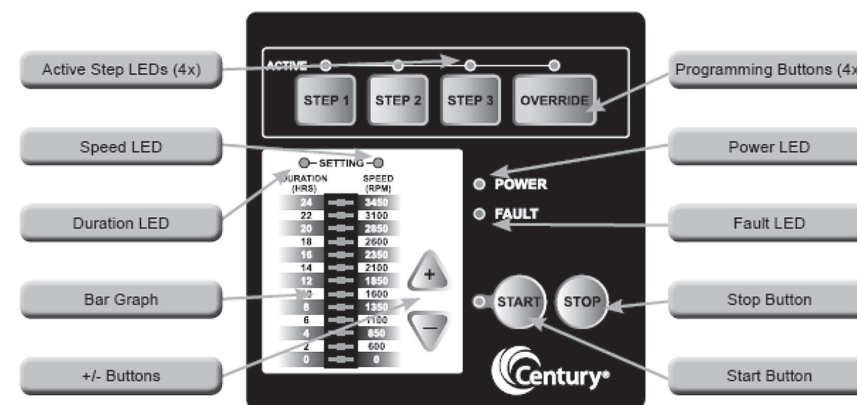


Figure 1 : V-Green 165 User Interface Button Descriptions

Note: The START button must be pressed for the INFINIUM ECO V-150 to operate. The START LED will illuminate after the button has been pressed indicating the INFINIUM ECO V-150 is capable of operating. Pressing the stop button will turn off the START LED and stop the motor if running.

INFINIUM ECO V-150 Features

- Simple user interface
- Digital inputs for compatibility with pool automation systems
- Motor design reduces noise emissions
- UV and rain-proof enclosure
- Freeze Protection
- Manual OVERRIDE
- High efficiency electromechanical motor and control design

LED and Function Overview

Key for LEDs	
X	Solid ON Indication
*	Blinking @ 1 sec
**	Alternates between DURATION and SPEED
#	Blink for three times @ 1 sec

	Power	START	FAULT	STEP1	STEP2	STEP3	OVERRIDE	SPEED SETTING	DURATION SETTING	BARGRAPH
Power On	X									
Keypad Functions										
Step1	X	X		X				**	**	**
Step2	X	X			X			**	**	**
Step3	X	X				X		**	**	**
Override	X	X					X	**	**	**
Keypad lock	X			*	*	*				
Keypad Unlock	X			X	X	X				
Schedule Advance	X	*							X	X
Restore Default settings	X									# (All LED)
Motor pause	X	*					*	X		X
Temporary stop	X									*(0 RPM)
Digital Input Functions										
DI1 ON	X			*				X		X
DI2 ON	X				*			X		X
DI3 ON	X					*		X		X
DI4 ON	X						*	X		X
Serial Communication Functions										
Serial Communication	X							*		
Motor spinning	X							*		X
Freeze Protection										
Freeze Protection	X								*	X
Fault Handling										
UI fault	X		*							
	X		X							

Figure 6: LED Functionality Table

Quick Start Instructions

CAUTION - If power is connected to the INFINIUM ECO V-150 motor, pressing any of the following buttons referred to in section 3 could result in the motor starting. Failure to recognize this could result in personal injury or damage to equipment.

Quick Start Guide (Using the factory default schedule)

The following table describes the factory default settings for DURATION and SPEED order:

Button	Duration (In Hours)	Speed (In RPM)
STEP 1	4	3100
STEP 2	4	2600
STEP 3	8	1600
OVERRIDE	2	3450

Pressing the START key will start the INFINIUM ECO V-150 based on the factory default schedule.

NOTE: If power is cycled to the INFINIUM ECO V-150 and the user does not press the STOP key, the INFINIUM ECO V-150 will **automatically** start and run the programmed default schedule shown in the chart above. This feature ensures that the INFINIUM ECO V-150 will re-start in the event of a power outage.

Quick Start Guide (User-defined custom schedule)

A user can set the program DURATION and SPEED for STEP 1, STEP 2, STEP 3 & OVERRIDE keys.

NOTE: INFINIUM ECO V-150 must be Stopped (Press STOP Key) for programming DURATION and SPEED of the STEP 1, STEP 2, and STEP 3 keys. OVERRIDE DURATION and SPEED can be programmed when the INFINIUM ECO V-150 is either stopped or running.

Press the STEP 1 key. The STEP 1 button and DURATION setting LEDs will illuminate. The bar graph will show default DURATION for STEP 1.

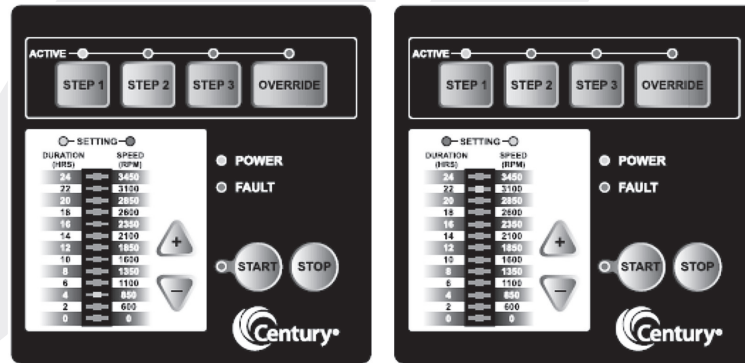
Overview

NOTICE

The INFINIUM ECO V-150 can and should be optimized to suit individual pool conditions. Specific conditions including pool size, other devices, features, and environmental factors can all impact the optimal settings.

Program customization may require some trial-and-error to determine the most satisfactory settings as dictated by the conditions. In all cases, setting the INFINIUM ECO V-150 at the lowest speed for the longest duration is the best strategy to minimize energy consumption. However, conditions may require running the INFINIUM ECO V-150 at a higher speed for some duration of time each day to maintain proper filtration to achieve satisfactory sanitation.

The User Interface is located on top of the INFINIUM ECO V-150 to the right of the STEP buttons is the OVERRIDE button. This button can be used to operate the INFINIUM ECO V-150 at speeds outside of the normal operating schedule.



1. Press UP (+) or DOWN (-) arrows to change the DURATION
2. Press the STEP 1 key again to change the SPEED setting. The SPEED setting LED will illuminate. The bar graph will show default SPEED for STEP 1.
3. Press UP (+) or DOWN (-) arrows to change the SPEED.
4. Press any STEP or OVERRIDE key to save the DURATION and SPEED settings for STEP 1. If the user decides not to save the settings, pressing the STOP key will revert back to the previously stored setting.
5. Press STEP 2, STEP 3, or OVERRIDE key. Repeat steps 1- 4 to program the corresponding DURATION and SPEED for each button.
6. Press START to run the INFINIUM ECO V-150 based on the programmed 24 hour schedule.
7. Pressing the STOP button will stop the INFINIUM ECO V-150.

NOTE: The INFINIUM ECO V-150 can only be set to operate on a 24-hour schedule. If a user attempts to program a schedule with a combined duration for all three steps greater than 24 hours, the INFINIUM ECO V-150 software will retain the current STEP time duration only, and will zero out the other two STEP time settings. As an example, if STEP 1 equals eight (8) hours, STEP 2 equals nine (9) hours, and STEP 3 equals eight (8) hours – for a combined 25 hours – the INFINIUM ECO V-150 will retain the setting for the current Step being programmed and zero out the remaining two. For details regarding the set-up of the three steps as part of a 24-hour schedule, see section 6.

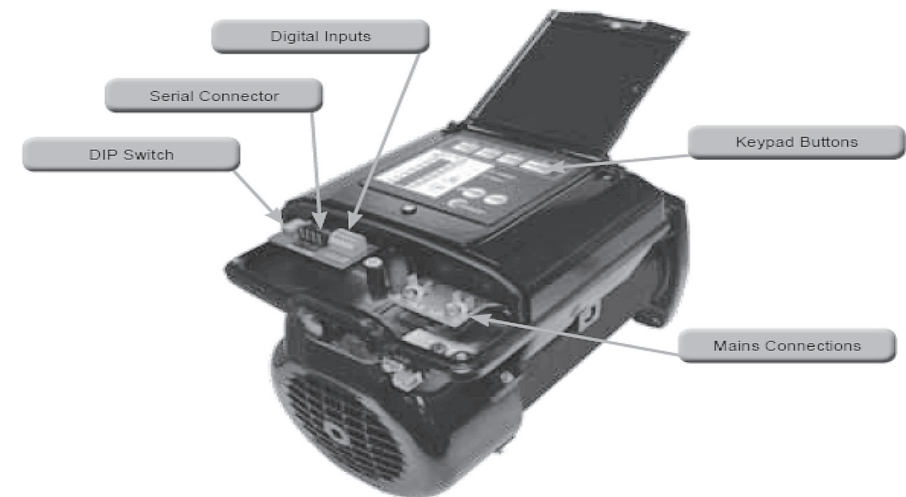


Figure 2: INFINIUM ECO V-150 Overview

User Interface Key Pad Overview

⚠ CAUTION

If power is connected to the INFINIUM ECO V-150 motor, pressing any of the following buttons referred to in this section 6.2 could result in the motor starting. Failure to recognize this could result in personal injury or damage to equipment.

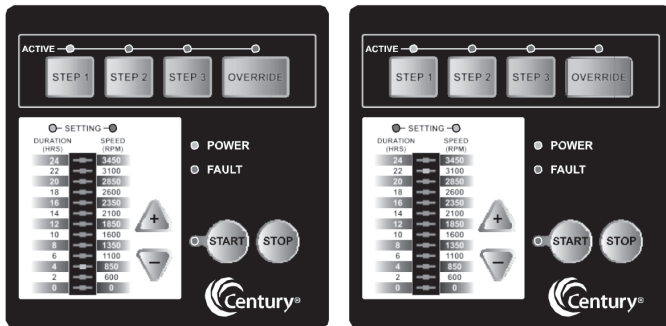
- 1. **STEP 1 (Set Schedule)** -> DURATION and SPEED
- 2. **STEP 2 (Set Schedule)** -> DURATION and SPEED
- 3. **STEP 3 (Set Schedule)** -> DURATION and SPEED
- 4. **OVERRIDE (Settings)** -> DURATION and SPEED
- 5. **START**
- 6. **STOP**

Set the Schedule

⚠ CAUTION

If power is connected to the INFINIUM ECO V-150 motor, pressing any of the following buttons referred to in this section 6.3 could result in the motor starting. Failure to recognize this could result in personal injury or damage to equipment.

Set the DURATION and SPEED for the INFINIUM ECO V-150 using the keys on the User Interface. The schedule is based on a 24-hour schedule and will repeat each day of the week.



The highest speed rating for the INFINIUM ECO V-150 is 3450 RPM and the lowest is 600 RPM. Unless a new user-defined schedule is entered, the INFINIUM ECO V-150 will operate based on the following factory default schedule:

Button	Duration (In Hours)	Speed (In RPM)
STEP 1	4	3100
STEP 2	4	2600
STEP 3	8	1600
OVERRIDE	2	3450

Table 3: Factory default schedule

Schedule Tables

Use the tables below to record a personalized operating schedule. Recording the planned schedule in the table below will make the programming process easier and will help the user remember the custom settings in case of inadvertent loss of schedule. The user interface will not allow the user to program an overlap between different STEPs of the schedule. The STEP currently being set will always take priority over any previous settings. In the event a user attempts to program with a combined duration greater than 24 hours, the current STEP setting will be retained whereas the other two STEP settings will be cleared to zero hours requiring the user to reset them. Prior to beginning the actual programming process, it is advisable for the user to review the planned schedule as outlined in chart form to ensure the cumulative duration is not greater than 24 hours and no overlaps exist. It is always a good idea to double check your programmed settings for accuracy once you have completed the programming process.

Setup #1			
	STEP 1	STEP 2	STEP 3
Duration			
Speed			

Setup #2			
	STEP 1	STEP 2	STEP 3
Duration			
Speed			

Table 4: Custom Schedule

Running INFINIUM ECO V-150 from Keypad

⚠ CAUTION

If power is connected to the INFINIUM ECO V-150 motor, pressing any of the following buttons referred to in this section 6.4 could result in the motor starting. Failure to recognize this could result in personal injury or damage to equipment.

1. Press the START key and the INFINIUM ECO V-150 will run the programmed 24 hour duration schedule. The START event will be stored in the controller. Should a power outage occur, the INFINIUM ECO V-150 will automatically re-start at STEP 1 when power is restored.
2. The INFINIUM ECO V-150 will always run the PRIMING sequence when it starts from the OFF state, including when it automatically restarts following a power outage. The default Prime setting is defined in the "Priming" section of this document.
3. The INFINIUM ECO V-150 then starts running in STEP 1 at the programmed DURATION and SPEED. The "ACTIVE LED" for STEP 1 will turn ON. The DURATION and SPEED setting LEDs along with the respective bar graph LED will blink back and forth every three (3) seconds.

4. This sequence will then repeat for STEP 2 and then STEP 3 without the INFINIUM ECO V-150 stopping.
5. At the end of STEP 3, the INFINIUM ECO V-150 will wait if necessary for the completion of the 24-hour schedule. During this waiting period (if applicable), all of the “active step LEDs” will remain OFF. However, the START LED will still be illuminated. After completion of the 24 hour schedule, the system restarts at STEP 1 and this cycle will repeat indefinitely until the user presses the STOP key.

NOTE: Pressing a STEP key other than for the STEP currently running will cause an immediate transition to the newly selected STEP. The INFINIUM ECO V-150 will continue with the programmed schedule from that point forward.

NOTE: If STOP is pressed during normal schedule operation, the 24 hour schedule will stop. When START is pressed again, the 24 hour schedule will start from STEP 1.

NOTE: If power is lost while the INFINIUM ECO V-150 is running a 24 hour schedule, upon restoration of power the INFINIUM ECO V-150 will start the 24 hour schedule from STEP 1.

NOTE: If a digital input (provided from an external source) is detected, the INFINIUM ECO V-150 will start running on the STEP 1, STEP 2, STEP 3, or OVERRIDE speed corresponding to the digital input. Upon removing the digital input (provided from an external source), the INFINIUM ECO V-150 will stop and the user will need to press START to begin the 24 hour schedule operation. However, if START was already pressed prior to receiving a digital input, then the INFINIUM ECO V-150 will resume running the 24 hour schedule once the digital input is removed.

NOTE: Pressing STOP at any time turns the INFINIUM ECO V-150 OFF and clears the start time for the 24 hour schedule.

OVERRIDE

The INFINIUM ECO V-150 is equipped with an OVERRIDE feature, which can be engaged to temporarily run at higher or lower speeds ranging between 600 to 3450 RPM. Once the OVERRIDE duration has elapsed, the INFINIUM ECO V-150 will automatically return to the programmed schedule.

1. Pressing the OVERRIDE key while the INFINIUM ECO V-150 is running will cause the INFINIUM ECO V-150 to start running in the OVERRIDE mode at the programmed DURATION and SPEED. The “active LED” for OVERRIDE will illuminate. The DURATION and SPEED setting LEDs along with its respective bar graph LED will blink back and forth at three (3) second intervals.
2. The UP (+) / DOWN (-) arrows allow the user to configure OVER RIDE DURATION and SPEED. These settings can be changed while the INFINIUM ECO V-150 is running. These settings are stored each time the UP (+) / DOWN (-) arrows are pressed.

NOTE: When the OVERRIDE duration ends, the INFINIUM ECO V-150 resumes the 24 hour schedule at the point in the currently programmed 24 hour schedule where it normally would be running at that time. The OVER- RIDE duration will not affect the start or stop times of the 24 hour schedule. For example, if OVERRIDE runs during a period overlapping with a later part of STEP 1 and an early part of STEP 2, the start time of STEP 3 is not affected.

NOTE: Pressing/Holding OVERRIDE key for more than three (3) seconds will cancel OVERRIDE mode.

NOTE: During the OVERRIDE mode, the INFINIUM ECO V-150 will not start with the priming sequence.

NOTE: It is recommended that you do not set the OVERRIDE duration to 0 HRS. Setting the OVERRIDE duration to 0 HRS will not allow you to change the duration setting while the motor is running. The motor will have to be stopped in order to change the OVERRIDE settings if the duration is set to 0 HRS.

Schedule Advance



DANGER

Do not perform any maintenance on the motor while the motor is in Schedule Advance Mode. The motor may start without warning. This event could cause death or serious personal injury.

The Schedule Advance mode allows the user to press the START button at one time of the day, with the 24-hour schedule starting at a different time of day. The INFINIUM ECO V-150 can run in the Schedule Advance mode (by using the OVERRIDE button) and upon completion will begin the programmed 24 hour schedule at STEP 1 DURATION and SPEED.

The following steps should be followed to set Schedule Advance mode:

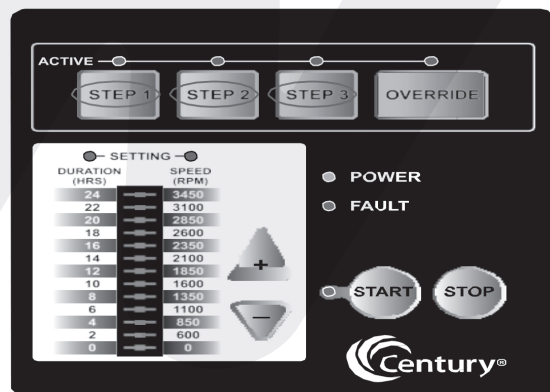
1. With the INFINIUM ECO V-150 stopped, press and hold the START key for more than three (3) seconds. The START LED will blink at a rate of one second per pulse. The DURATION setting LED and respective bar graph LED will remain turned ON until the Schedule Advance mode is complete.
2. Press the UP (+) or DOWN (-) arrows to set the desired delay time after which the 24-hour schedule should start. The Schedule Advance mode will automatically start after the desired delay time is selected. The Schedule Advance mode can be canceled by pressing the STOP key.

NOTE: The OVERRIDE button will still function when the Schedule Advance mode is active. This will allow the user to run the INFINIUM ECO V-150 during the period of the Schedule Advance mode.

NOTE: While the INFINIUM ECO V-150 is in the Schedule Advance mode, if a user presses STEP 1, STEP 2, STEP 3 or the START key, the system will start the normal schedule and the Schedule Advance mode will be canceled.

NOTE: While the INFINIUM ECO V-150 is in the Schedule Advance mode, if a user presses the STOP key, then the Schedule Advance mode is canceled.

NOTE: If power is lost while the INFINIUM ECO V-150 is in the Schedule Advance mode, then the 24-hour schedule will automatically start when power is restored.



Key Lockout

CAUTION

Key lockout will not prevent the motor from being stopped by pressing the STOP button. If the motor is operating in “key lockout” mode, and being controlled through a digital or serial input, the motor will only temporarily stop (4 min.) it will then restart.

The INFINIUM ECO V-150 user interface has a “key lockout” feature to prevent unwanted changes to the settings.

To lock the keys, hold down the “STEP 1, STEP 2, and STEP 3” buttons all at the same time for at least three seconds. The “active LEDs” for STEP 1, STEP 2, and STEP 3 will blink for 30 seconds indicating that the keypad is locked.

The user can unlock the keys by holding down the same three STEP buttons for at least three seconds. The “active LEDs” for STEP 1, STEP 2, and STEP 3 will illuminate temporarily indicating the keypad is un- locked.

NOTE: While operating in “key lockout” mode the motor can still be stopped by pressing the stop key. If no digital or serial input is present the motor will remain stopped. If the motor is being controlled by a digital or serial input the motor will only temporarily stop for 4 minutes. See section 6.9 for more information on temporary stop.

Motor Pause

The INFINIUM ECO V-150 user interface has a “motor pause” feature that will allow the user to temporarily stop the INFINIUM ECO V-150 for maintenance work without disrupting the 24 hour schedule (i.e., for backwashing the filter). If the INFINIUM ECO V-150 is currently running, the user can press and hold the START button for more than three (3) seconds and the INFINIUM ECO V-150 will stop and remain off until the user presses and holds the START button again for more than three (3) seconds. The START and OVERRIDE buttons will blink once every second indicating that the “motor pause” feature is enabled. These LEDs will stop blinking once this feature is canceled.

Temporary Stop with Digital / Serial Input

DANGER

Temporary stop functionality only works while the INFINIUM ECO V-150 is being controlled by a digital or serial input. If the motor is being controlled by the integrated key pad and STOP is pressed, the motor will stop and remain stopped.

The INFINIUM ECO V-150 has a “temporary stop” feature that will immediately stop the INFINIUM ECO V-150 when being controlled by a serial or digital input. The user can press the STOP button while the INFINIUM ECO V-150 is running and the INFINIUM ECO V-150 will stop and stay off for four (4) minutes. Once this time has elapsed, the INFINIUM ECO V-150 will return to normal operation and accept an input from digital or serial input source. Refer to section 9 for additional details on digital inputs.

NOTE: If the INFINIUM ECO V-150 is operating from serial or digital input, the ‘0 RPM’ LED of the bar graph will blink once every second indicating the “temporary stop” feature has been activated. After the specified time period, the INFINIUM ECO V-150 will return to normal operation and accept an input from any digital or serial input source. Refer to section 9 for additional details on digital inputs.

Reset Factory Defaults

The INFINIUM ECO V-150 user interface has a “Reset to Factory Defaults” feature to restore the schedule settings back to the original values programmed at the factory. The user must press and hold the STOP and OVERRIDE buttons for three (3) seconds to reset the settings back to factory defaults. All of the UI bar graph LED’s will flash three (3) times to confirm the settings were restored to factory defaults.

Priming

The INFINIUM ECO V-150 will always run the PRIMING sequence when starting from the OFF state, except when starting in OVERRIDE. The factory Prime settings are 2600 RPM for three (3) minutes.

Freeze Protection

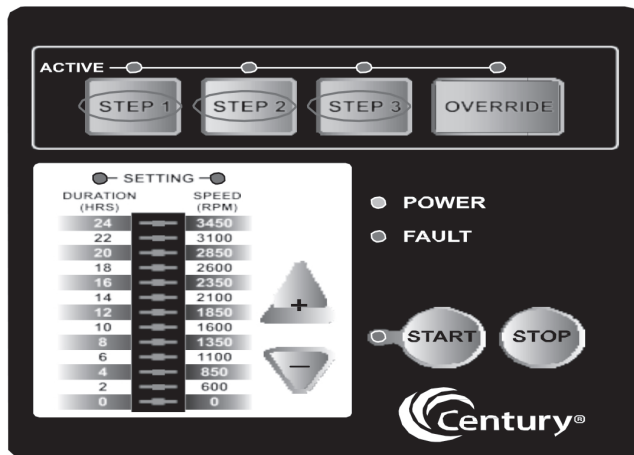
NOTE

The freeze protection function will NOT operate if the START button is not pressed. This can be confirmed by verifying that the START LED is illuminated.

In the event that the outside air temperature drops below a set threshold, the INFINIUM ECO V-150 will automatically turn on (assuming the START button has been pressed) and circulate the pool water. The Freeze Protection will run according to the following conditions (utilizing the factory default settings):

Freeze Protection turn ON temperature = 39°F Freeze Protection Duration = 8 Hours

Once this eight (8) hour period has elapsed, the INFINIUM ECO V-150 will check the ambient temperature again. If the temperature is still below the set threshold, the INFINIUM ECO V-150 will run for an additional 8 hours. If the temperature is above the threshold, the INFINIUM ECO V-150 will automatically return to the 24-hour based schedule.



Control with Digital Inputs

The user can run the INFINIUM ECO V-150 at the programmed STEP 1, STEP 2, STEP 3, or OVERRIDE speeds by utilizing the four digital inputs. STEP 1, STEP 2, STEP 3, or OVERRIDE are equivalent to Digital Input 1, 2, 3 or 4 respectively.

NOTE: The controller is rated to accept digital inputs of 18V-30V AC (24V AC +/- 20%) and 9-30V DC (12/24V DC +/- 20%).

NOTE: The INFINIUM ECO V-150 will detect either a 50/60Hz for AC input or an active low signal for DC digital inputs.

The items below describe the functionality of the digital inputs:

1. If the user provides any one of the 4 digital inputs, then the corresponding ACTIVE STEP LED will blink every one (1) second. The SPEED LED and corresponding bar graph LED will be illuminated to indicate the Digital Input is functioning properly.
2. The START LED will be OFF when a digital input is present.

WARNING

Access to these terminals is in close proximity to the mains connectors which carry line voltage capable of causing personal injury or damaging the equipment if contact is made. Power should be turned off when accessing this area.

NOTE: A generic wiring diagram is provided in figure 7 for connecting the INFINIUM ECO V-150 to a "System Level Controller". This concept can be applied to a solar system or any other type of control system.

NOTE: There is no schedule for digital inputs. The timing for each speed is controlled directly by the digital inputs.

NOTE: The digital inputs have the highest priority amongst all the inputs (i.e., keypad, serial, or digital). Therefore the serial commands as well as the User Interface inputs will be ignored when a digital input is present.

NOTE: If more than one digital input (switch) is present, then the INFINIUM ECO V-150 will give priority to the highest number digital input. Therefore OVERRIDE has highest priority followed by STEP 3, then STEP 2, then STEP 1.

NOTE: If no digital input is detected, the INFINIUM ECO V-150 will automatically start the 24 hour schedule if the START key was pressed prior to the application of a digital input.

WARNING

Access to these terminals is in close proximity to the mains connectors which carry line voltage capable of causing personal injury or damaging the equipment if contact is made. Power should be turned off when accessing this area.

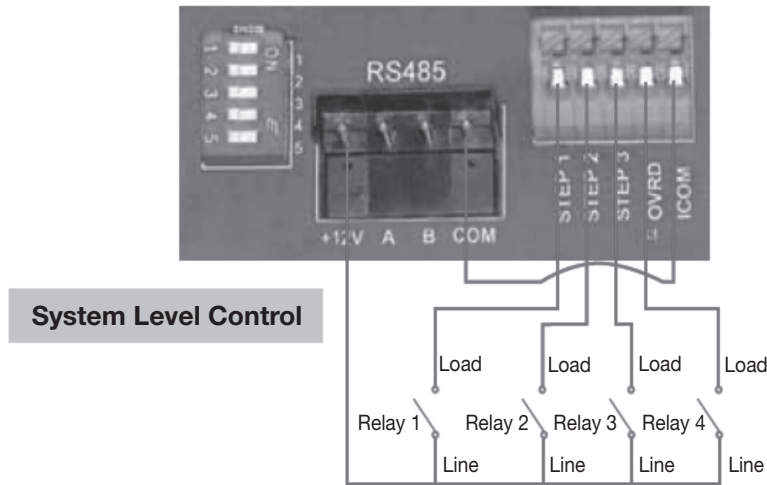


Figure 7: System Level Control Wiring Diagram

DIP Switches

The DIP switches can be used to configure different settings for the INFINIUM ECO V-150. Each DIP switch and their corresponding function is defined in Table 5.

Switch #	Function
1	Power output on/off
2	Not Used
3	Not Used
4	Not Used
5	Not Used

Table 5: DIP Switch Functions

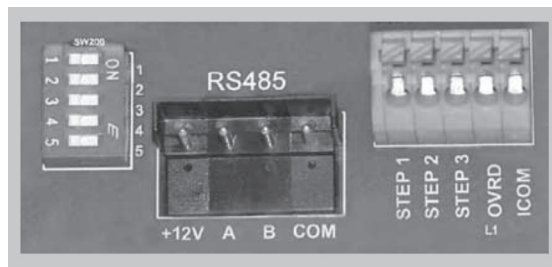


Figure 8: DIP Switches

Care and Maintenance

The INFINIUM ECO V-150 is both reliable and robust in harsh environments. However, this product does contain electronics that are cooled by a fan mounted to the INFINIUM ECO V-150. In order to ensure optimum reliability of this product, it is recommended to clean the fan inlet on the back of the INFINIUM ECO V-150 once a month. It is also important to keep this area free of large debris such as leaves, branches, mulch, plastic bags, etc.

FAULT Status

WARNING

While the FAULT LED is illuminated the motor will not run, upon clearing the fault, the motor may automatically resume running depending on where in the schedule the FAULT occurred. This may cause personal injury or damage to the equipment.

The paragraphs below illustrate the possible faults that can occur with the INFINIUM ECO V-150. If the INFINIUM ECO V-150 does not restart automatically following the FAULT, cycle ac power to the INFINIUM ECO V-150 and wait five (5) minutes. If this does not correct the situation, please contact Customer Service at 706-793-7291.

The INFINIUM ECO V-150 reads the FAULT status and provides feedback to the user via the FAULT LED. The INFINIUM ECO V-150 will illuminate the FAULT LED when a FAULT is present. The INFINIUM ECO V-150 will stop and remain OFF when the FAULT is present. Once the FAULT is cleared, if the INFINIUM ECO V-150 was previously running, it will automatically resume running the normal schedule.

Below is the behavior of the FAULT LED when a FAULT is detected:

1. When a FAULT is present, and the motor is not running, only the FAULT LED and power LED will illuminate.
2. When a FAULT is present, and the motor is running, then the FAULT LED will illuminate. During the FAULT condition, the bar graph LEDs on the interface will turn OFF. However, the power LED, start LED & active STEP LED will remain illuminated.
3. When a FAULT is present and the FAULT LED is illuminated, only the STOP key will function. The remaining buttons become disabled.
4. When the FAULT LED is continuously ON (i.e. not blinking), a FAULT is present in the controller. When the FAULT LED is blinking every one (1) second, a FAULT is present in the user interface.
5. When the FAULT has cleared, the FAULT LED will turn OFF.
6. Once the FAULT is cleared, if the INFINIUM ECO V-150 was previously running, it will automatically resume running the normal schedule.

Please see page 25 for troubleshooting issues and their resolutions.

WARNING

Diagnosing certain symptoms may require close interaction with, or in close proximity to, components that are energized with electricity. Contact with electricity can cause death, personal injury, or property damage. When trouble shooting the INFINIUM ECO V-150 diagnostics involving electricity should be cared for by a licensed professional.

Troubleshooting Guide

SYMPTOM	POSSIBLE CAUSE	POTENTIAL SOLUTIONS
INFINIUM ECO V-150 FAILS TO START	Controller DIP switches not configured properly	Verify that the DIP switches of SW100 under the controller terminal box cover are in the correct position. Refer to section 10.
	Mains Voltage is not present	Replace fuse, reset breaker/GFI. Tighten mains wire connections.
	User Interface is not connected	Check connections at J201 connector.
	INFINIUM ECO V-150 shaft is locked	Check if the INFINIUM ECO V-150 can be rotated by hand and remove any blockage.
	INFINIUM ECO V-150 shaft is damaged	Replace INFINIUM ECO V-150.
INFINIUM ECO V-150 RUNS THEN STOPS	Over temperature FAULT	Check that back of INFINIUM ECO V-150 is free from dirt and debris. Use compressed air to clean.
	Over current FAULT	INFINIUM ECO V-150 will automatically restart after one (1) minute.
INFINIUM ECO V-150 IS NOISY	Debris in contact with fan	Check that back of INFINIUM ECO V-150 is free from dirt and debris. Use compressed air to clean.
	Debris in strainer basket	Clean strainer basket.
	Loose mounting	Check that mounting bolts of INFINIUM ECO V-150 and pump are tight.
INFINIUM ECO V-150 RUNS, BUT NO FLOW	Impeller is loose	Check that INFINIUM ECO V-150 is spinning by looking at fan on back of the motor. If so, check that pump impeller is correctly installed.
	Air leak	Check plumbing connections and verify they are tight.
	Clogged or restricted plumbing	Check for blockage in strainer or suction side piping. Checked for blockage in discharge piping including partially closed valve or dirty pool filter.

PROBLEM	POSSIBLE CAUSE	CORRECTIVE ACTION
PUMP FAILURE.	Pump will not prime - Air leak, too much air.	Check suction piping and valve glands on any suction gate valves. Secure lid on pump strainer pot and be sure lid gasket is in place. Check water level to be sure skimmer is not drawing air.
	Pump will not prime - Not enough water.	Be sure the suction lines, pump, strainer, and pump volute are full of water. Be sure valve on suction line is working and open (some systems do not have valves). Check water level to make sure water is available through skimmer. Clean pump strainer pot. Replace gasket.
REDUCED CAPACITY AND/OR HEAD.	Air pockets or leaks in suction	Check suction piping and valve glands on any suction Gate valves. Secure lid on pump strainer pot and be sure lid gasket is in place. Check water level to be sure skimmer is not drawing air.
	Clogged impeller.	Turn off electrical power to the pump. Disassemble (see page 16, 'Pump Disassembly') Clean debris from impeller. If debris cannot be removed, complete the following steps: 1. Remove left hand thread anti-spin bolt and O-ring. 2. Remove, clean, and reinstall impeller. Reassemble (see page 17, 'Pump Reassembly')
	Pump strainer clogged.	Clean suction trap.
PUMP FAILS TO START.	Mains	1. Replace fuse, reset breaker/GFCI. 2. Tighten mains wire connections.
	Voltage is	Check if the pump can be rotated by hand and remove any blockage.
	not present	Replace pump.
PUMP RUNS THEN STOPS	Over temperature FAULT	Check that back of pump is free from dirt and debris. Use compressed air to clean.
	Over current FAULT	Pump will automatically restart after one (1) minute.
PUMP IS NOISY.	Debris in contact with fan	Check that back of pump is free from dirt and debris. Use compressed air to clean.
	Debris in strainer	Clean strainer basket. Check that mounting bolts of pump and pump are tight.
PUMP RUNS WITHOUT FLOW.	Impeller is loose	Check that pump is spinning by looking at fan on back of Inifium Eco-V Variable Speed Pump. If so, check that pump impeller is correctly installed.
	Air leak Clogged or restricted plumbing	Check plumbing connections and verify they are tight. Check for blockage in strainer or suction side piping. Checked for blockage in discharge piping including partially closed valve or dirty pool filter.

Pump Performance Curves

SPECIFICATIONS

Overall Ratings

Input Voltage	208 - 230 Vrms nominal	
Input Current	10.5 - 10.0 Arms	
Input Frequency	Single phase, 60 Hz	
Control Terminals	18-30V AC (24V AC+/- 20%) or 9-30V DC (12/24V DC+/- 20%)	
Auxiliary Load Terminals	N/A	
Maximum Continuous Load	1.65 THP (Total Horse Power)	
Speed Range	600 - 3450 RPM	
Environmental Rating	NEMA Type 3R	
Agency Approval	R/C XDNW2.E302804 R/C XDNW2.E302804	
Ambient Conditions		
	Storage	-40°C to +85°C (-40°F to +185°F)
	Operating	0°C to +50°C (+32°F to +122°F)
	Humidity	Relative 0 to 95 % non-condensing