PENTAIR

INTELLILEVEL™

AUTOMATIC WATER LEVELING SYSTEM FOR POOL AND SPA



INSTALLATION AND USER'S GUIDE

IMPORTANT SAFETY INSTRUCTIONS
READ AND FOLLOW ALL INSTRUCTIONS
SAVE THESE INSTRUCTIONS

CUSTOMER SERVICE / TECHNICAL SUPPORT

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READ AND FOLLOW ALL INSTRUCTIONS IN THIS MANUAL
SAVE THESE INSTRUCTIONS

P/N 523307 Rev. D 12/2018

IMPORTANT WARNING AND SAFETY INSTRUCTIONS



IMPORTANT NOTICE

Attention Installer: This Installation and User's Guide ("Guide") contains important information about the installation, operation and safe use of this underwater pool and spa device. This Guide should be given to the owner and/or operator of this equipment.

Attention User: This manual contains important information that will help you in operating and maintaining this product. Please retain it for future reference.

⚠ WARNING

Before installing this product, read and follow all warning notices and instructions in this Guide. Failure to follow warnings and instructions can result in severe injury, death, or property damage. Call (800) 831-7133 for additional free copies of these instructions. Please refer to www.pentairpool.com for more information related to this products.

⚠ WARNING

SERIOUS BODILY INJURY OR DEATH CAN RESULT IF THE INTELLILEVEL™ AUTOMATIC WATER LEVELING SYSTEM IS NOT INSTALLED AND USED CORRECTLY.
INSTALLERS, POOL OPERATORS AND POOL OWNERS MUST READ THESE WARNINGS AND ALL INSTRUCTIONS BEFORE INSTALLATION.

⚠ WARNING

This device must be installed by a licensed or certified electrician or a qualified pool professional in accordance with the National Electrical Code (NEC), NFPA 70 or the Canadian Electrical Code (CEC), CSA C22.1.

All applicable current local installation codes and ordinances must also be adhered to. Improper installation will create an electrical 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 the power at the circuit breaker before installation and servicing.

Most states and local codes regulate the construction, installation, and operation of public pools and spas, and the construction of residential pools and spas. It is important to comply with these codes, many of which directly regulate the installation and use of this product. Consult your local building and health codes for more information.

⚠ CAUTION: DO NOT PRESSURE TEST THE PLUMBING WITH THE INTELLILEVEL™ AUTOMATIC WATER LEVELING SYSTEM INSTALLED. PERMANENT DAMAGE MAY OCCUR.

IntelliLevel™ Automatic Water Leveling System Overview

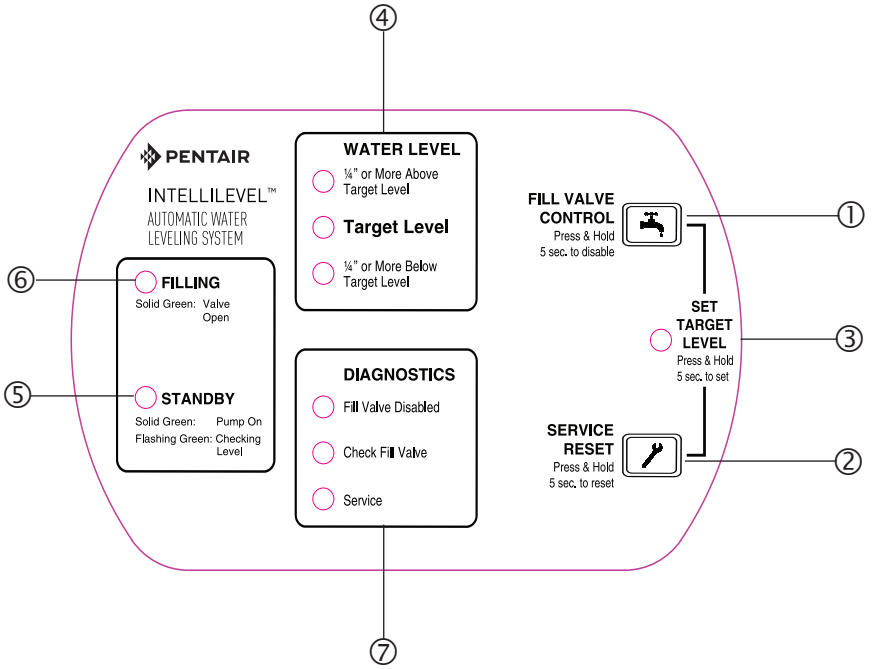
The IntelliLevel system controller is a swimming pool and spa water leveling device that allows for accurate addition of water by sensing water level through an active line, or static line. The IntelliLevel controller water leveling device is installed on any of the suction side ports of a pool water circulation system, eliminating the requirement for a separately installed (wired or wireless) sensor. The device uses a combination of pressure sensing, ultrasonic water level detection and an electromechanical micro-venting system to measure and fill water to an accuracy of 1/4th inch.

The IntelliLevel controller measures the amount of water being added ensuring the correct fill regardless of size of pool and flow rate from the city plumbing. This ensures the correct addition of water without any adjustment of the flow through the solenoid valve. **Note: For best results, on a new construction site it is recommended to install the IntelliLevel controller near the pool equipment pad and at the same level as the pool as possible.**

Features

- IntelliLevel controller Class 2, 24 VAC, 50/60Hz, 400mA
- Solenoid valve control 24 VAC, 50/60Hz, 250mA
- Operating temperature range 35° to 149° F (2° to 65° C)
- Water level resolution 1/4 inch
- Sensing range 18” to 60” (Height of IntelliLevel controller above maximum water level)
- A maximum of six fill operations per day

Control Pad and Indicators



Control Pad and Indicators (Continued)

① Press the **FILL VALVE CONTROL** button to temporarily disable the IntelliLevel controller from filling. The fill function is enabled or disabled by pressing the button for five (5) seconds.

② Use the **SERVICE RESET** button to clear any service messages. These include an open or shorted solenoid, water fill failure etc. The service message is cleared when the button is held for five (5) seconds.

③ The **SET** indicator is solid Green when the desired water level has been set. To set, the water level, press and hold both Fill Control button and Service Reset button for five (5) seconds until the set indicator is solid. The complete set process takes about a minute. During the setup time, the standby indicator will blink.

The **SET** indicator may flicker with 2 short interruptions every 2 seconds. This flicker is an indication that the Sonar is having difficulty taking measurements. This can be caused by a circulating pump, atmospheric changes or even strong winds. This condition will exit without any intervention. During this time the IntelliLevel controller will not fill the pool.

④ The **WATER LEVEL** indicators (solid green) show the water level of the pool. The water level of the pool can be at target level (+/- ¼") or greater than ¼" above water level or ¼" below water level. If a single WATER LEVEL indicator is blinking then the temperature is unstable and the IntelliLevel will wait for it to stabilize before taking any more water depth measurements.

If all three WATER LEVEL indicators are blinking in unison, the IntelliLevel controller has not been Set.

If all three WATER LEVEL indicators are scrolling, the IntelliLevel controller is completing a 60 second vent.

⑤ The **STANDBY** indicator is solid green when the pump is running.

The **STANDBY** indicator blinks green when the system is waiting for the water level to stabilize, or when there is a large disturbance of the water (windy conditions or people splashing). During this time, the system may vent the pipe to allow for the water level in the pipe to be the same as the pool or spa.

If the STANDBY indicator stays solid green for a long period of time when the circulating pump is not running. See Manual Venting on page 15.

⑥ The **FILL** indicator is solid green when the IntelliLevel controller provides power to the solenoid to fill the pool or spa. The indicator is off when the fill valve is not activated.

⑦ **DIAGNOSTICS:**

FILL Valve Disabled indicator: If the FILL VALVE DISABLED indicator is solid red and the other Diagnostic indicators are off, the Fill Valve has been manually disabled.

CHECK FILL VALVE indicator: Please refer to page 13 for Diagnostic Codes.

SERVICE indicator: Please refer to page 13 for Diagnostic Codes.

Note: See Troubleshooting on page 13 for other combination of the three Diagnostics indicators.

Frequently Asked Questions

How does the IntelliLevel™ Automatic Water Leveling System work on a suction line that is connected to the pump?
The IntelliLevel system controller incorporates a pressure sensor that detects operation of the pump at different speeds. When the pump is not functioning, the IntelliLevel controller opens a small micro-vent for a brief duration of time to allow the water level in the pipe to become equal to that of the pool. The IntelliLevel controller is able to shut the vent within a fraction of a second if the pump operation is detected when the micro-vent is open. A static line can also be used if 24/7 hr. filter pump operation is desired.

How does the IntelliLevel controller identify when the water is low?
The IntelliLevel controller uses pressure sensors to continuously measure the pressure in the pipe (when the pump is not running). If the pressure level changes significantly, a micro vent is opened internally to allow the water level in the pipe to become equal to the level of the pool or spa. At this time ultrasonic sensors are used to accurately determine the difference in water level compared to the water level of the set point. If water level is measured to be a ¼ inch or more below the Target Level, the IntelliLevel controller enables the Fill Control Valve.

How does the IntelliLevel controller measure the amount of water filled?
While filling, the pressure sensor is used again to measure the change of pressure in the pipe and after venting, the ultrasonic sensors are used to measure the water height.

The IntelliLevel controller does not have any jumpers to configure time of fill. How does it work with different pool sizes?
The IntelliLevel controller monitors the amount of water added, and saves a running average of the measured fill time to recognize any abnormalities in filling.
For example, water line being disabled, etc.

Why can't I set the water level while the pump is running?
Turn the pump OFF for a minimum of one hour a day to allow the IntelliLevel controller to operate. The IntelliLevel controller will not measure or fill the pool when the pump is running. If you run the pump 24/7 hr., the IntelliLevel controller will not measure the water height.

Static Line Installation: A static line can also be used if 24/7 hr. filter pump operation is desired. Be sure the riser pipe is 18" minimum above the maximum possible water level in the pool.

INSTALLATION

Installing the IntelliLevel™ Automatic Water Leveling System

Note: To connect the IntelliLevel system controller power cable to the automation control system, see pages 14 and 15.

Kit Contents

- IntelliLevel controller
- 24V Solenoid Valve
- Check Valve
- 2” Coupling Sleeve
- 2” Coupling Nut
- Power Splitter
- Waterproof Wire Nuts (x 2)
- Manual

Plumbing - New Construction

The following materials and tools are required for the installation of the IntelliLevel controller in a new pool construction:

- 2" PVC pipe
- 2" PVC Tee - The selected Tee should allow for coupling the 2" PVC pipe to the suction line. If a 2.5" or a 3" pipe is used then an appropriate Tee that reduces to 2" must be used.

The IntelliLevel controller can be connected to any suction line in the pool circulation system where the pipe is accessed below the water level of the pool (see example picture on page 8). The recommended installation is at the equipment pad (which is on the same grade as the pool) before the suction lines are connected to any water flow control valves leading to the pump. IntelliLevel can also be plumbed to a static line.

Suction Lines include **Main Drain, Vacuum Lines and Skimmer Lines**. The height of the 2" PVC pipe should be installed so that the IntelliLevel controller ultrasonic sensor is **18" to 60"** above the maximum water level of the pool. Be sure to position the unit so that the control pad can be easily accessed.

Note: A static line can also be used if non-stop filter pump operation is desired. Make sure that the riser pipe is a minimum 18” above the maximum possible water level in the pool.

IMPORTANT NOTICE (DOES NOT APPLY TO STATIC LINE INSTALLATIONS)

TURN THE POOL PUMP OFF WHEN SETTING THE TARGET LEVEL. SCHEDULE THE PUMP TO BE OFF A MINIMUM OF ONE HOUR A DAY FOR THE INTELLILEVEL CONTROLLER TO OPERATE.

The IntelliLevel controller **will not measure, or allow you to set the target water level while the pump is running**. If you run the pump 24/7, the IntelliLevel controller will not measure the water height. Turn the pump OFF first before settings the Target Level.

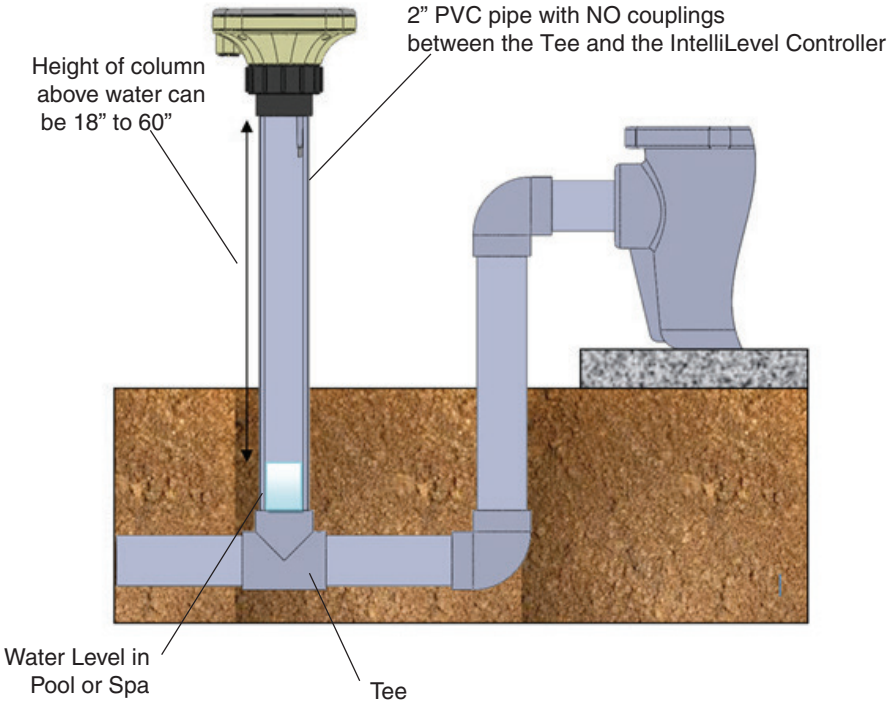
New Installation Connection

1. Install the 2” vertical tap line to access the suction line (below water level of pool or spa).

   IMPORTANT: This line cannot have any couplers between the Tee and the IntelliLevel™ Automatic Water Leveling System.
2. Clean the 2” pipe and prepare for gluing. Glue the provided IntelliLevel™ controller coupling sleeve. Be sure the nut is in place before gluing.
3. Place O-Ring on the coupling sleeve and secure the nut tightly on the IntelliLevel controller.

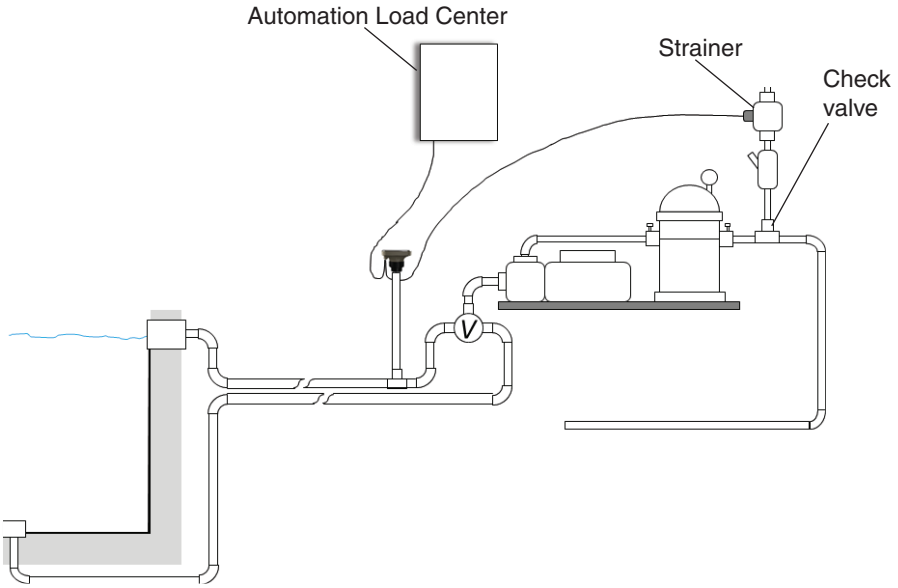
   Note: Be sure to install the O-Ring for proper operation.
4. Proceed with setting up the water line, and solenoid on page 10.

The diagram below shows IntelliLevel controller installed to the main drain of the pool.



Main Drain Installation Diagram

IntelliLevel™ Automatic Water Leveling System and System Connection Diagram



Solenoid and Water Line Setup

The exact set up of the waterline may vary from site to site and may require different components based on local state and city codes. Most installations require a check valve installed after the solenoid but before connection to the return line to prevent pool water from re-entering the city water. Typical parts required are:

- 24 VAC Solenoid Valve - included in installation kit
- Check Valve - included in installation kit
- Y Strainer
- 1” PVC Tubing and Fittings
- 1” Couplers
- Wire Nuts - included in IntelliLevel controller Kit

1. Plumb Solenoid Valve, Y Strainer and provided Check Valve to the circulating system as shown in the diagram. Check that the Solenoid, Y Strainer and Check Valve have a required direction of water flow that is shown via arrows on the product. A Check Valve is required in most plumbing regulations to prevent pool water from entering into the city water line. A Y strainer is recommended to prevent contaminants from entering the solenoid valve causing it to malfunction.
2. Connect the two Solenoid wires (black and white) to the IntelliLevel controller VLV connection.

Connecting Power to the IntelliLevel™ Automatic Water Leveling System (EasyTouch® and IntelliTouch® Control Systems)

The IntelliLevel system controller 3-pin power cable connects directly to any unused Valve Actuator 24V power socket located on the EasyTouch or IntelliTouch Control Systems circuit board. The IntelliLevel controller is designed to operate regardless of whether the valve actuator is in the ON or OFF position. The IntelliLevel controller wire is marked **PWR**.

The EasyTouch and IntelliTouch Control Systems can power up to four automatic valve actuators via a 3-pin conductor connection. Two of the standard valve outputs are dedicated to the pool/spa INTAKE and RETURN valves. Use optional Valve A or Valve B actuators sockets for the IntelliLevel controller connection.

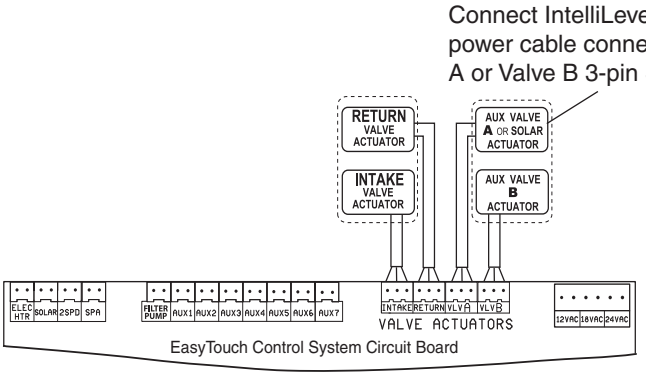
⚠ WARNING

BEFORE INSTALLATION OR SERVICING THE INTELLILEVEL CONTROLLER - ALWAYS DISCONNECT POWER AT THE CIRCUIT BREAKER BEFORE SERVICING. FAILURE TO DO SO COULD RESULT IN DEATH OR SERIOUS INJURY TO SERVICE PERSON, POOL USERS OR OTHERS DUE TO ELECTRIC SHOCK.

IMPORTANT! DO NOT CONNECT THE WHITE WIRE AND RED WIRE TOGETHER. CONNECT THE 24 VAC POWER WIRE TO THE BLACK AND WHITE WIRE OR TO THE BLACK AND RED WIRE.

Connecting Power to the IntelliLevel Controller:

1. At the automation control system load center route the IntelliLevel controller power cable up through the load center 1" grommet and low voltage raceway to the circuit board.
2. **EasyTouch Control System Circuit Board (Use Optional Valve A or B):** Connect the IntelliLevel controller power cable connector to the optional Valve A or B socket. For valve actuator circuit board socket location see diagram below.



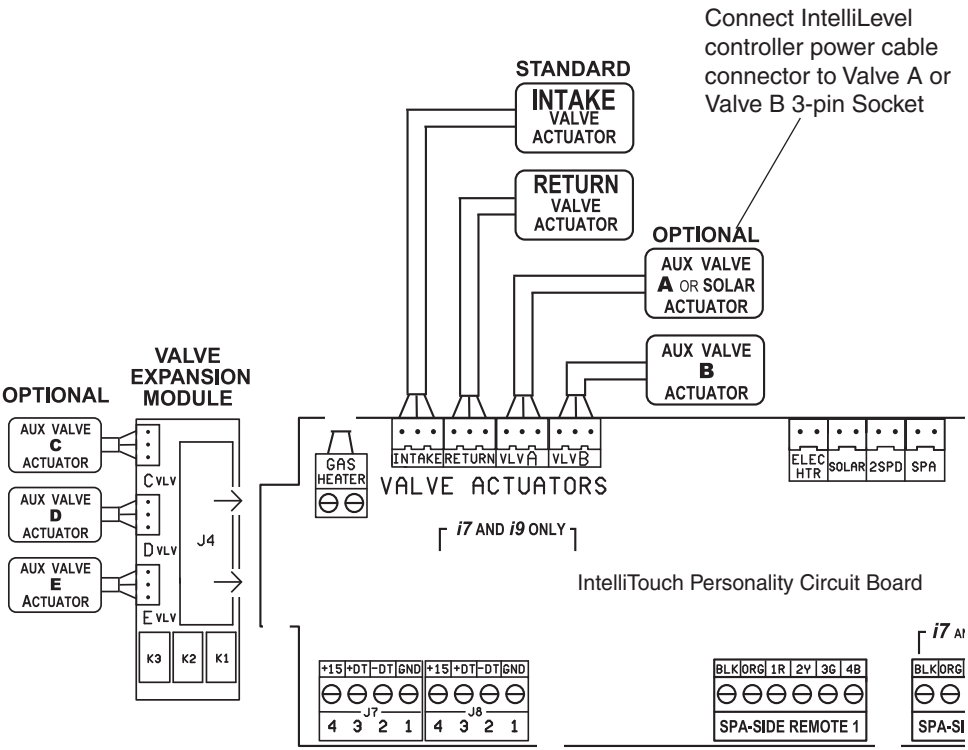
EasyTouch Control System Circuit Board

IntelliTouch® Control System:

Connecting Power to the IntelliLevel™ Automatic Water Leveling System:

1. At the automation control system load center, route the IntelliLevel system controller power cable up through the load center 1" grommet and low voltage raceway to the circuit board.

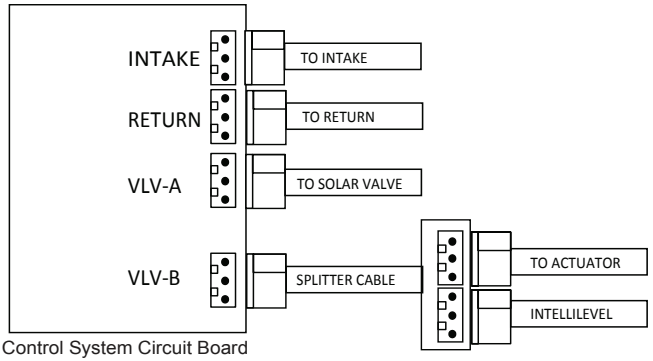
2. **IntelliTouch® Control System Personality Circuit Board (Use Optional A or B Valve):** Connect the IntelliLevel controller power cable connector to the optional Valve A or B socket. For valve actuator circuit board socket location see diagram below. Note: IntelliTouch Control System Optional Valve Module Expansion Board: Using a Valve Module Expansion board (P/N 520285), three additional valve actuators (VALVE C, D and E) can be added to the system. The expansion board attaches to the edge of the IntelliTouch Personality board. For installation and operation information, refer to the IntelliTouch Valve Actuator Installation Guide (P/N 520294).



IntelliTouch Control System Circuit Board

Connecting power to the IntelliLevel™ Automatic Water Leveling System if no valve actuator sockets are available

If there are no free valve actuator sockets available on the EasyTouch® or IntelliTouch® Control Systems circuit board the provided splitter may be used to connect the IntelliLevel controller and the respective valve actuator to the same socket. The IntelliLevel controller can share power with any valve actuator. The IntelliLevel controller automatically detects any motion on the actuator (controlled from automation control system or manually activated) and temporarily suspends any fill functions.



Powering IntelliLevel when no Automation control system exists

The IntelliLevel controller must be powered by a Class 2, low voltage, 24 VA, 50/60 Hz, 400MA source. This is typically provided by a separate swimming pool controller or control panel. If no such controller or panel exists, you must use a power source with the same specification.

Note: See page 16 and 17 to wire a stand alone IntelliLevel (without Automation).

IntelliLevel Controller Operation

The IntelliLevel controller is designed to be easy to setup and use. Since the system can identify the exact level of water before and after a fill is initiated, it can learn the fill rates of your pool. This eliminates overfilling without the need for manually configuring fill times or throttling the amount of water flowing through the solenoid valve. An added advantage is that the system adapts to any size of pool or spa.

The IntelliLevel controller monitors the water level of the pool using ultrasonic measurements, pressure readings and temperature readings inside the sealed pipe. It waits for the pressure, temperature and water level to all be stable before making the decision to fill the pool. Rapid temperature changes, people swimming or running the circulating pump will all cause the IntelliLevel to wait before determining the water level.

When it determines that the water is more than ¼ inch below the Set Level it will attempt to fill the pool by activating the Water Valve. When filling, the IntelliLevel may close the Water Valve and re-measure the water height several times before it has finished filling the pool.

Setting Target Water Level

The IntelliLevel™ Automatic Water Leveling System must have the Target Level set before it will start working.

To set the Target Level, follow the steps below:

1. Turn off the circulating pump that is connected to the suction line.
2. Ensure that the water level in the pool and spa is at the desired level. If the water level is low, you will need to manually add water to the desired level.
3. Press and hold both the FILL VALVE CONTROL and SERVICE RESET buttons for 5 seconds.

The STANDBY indicator and the WATER LEVEL indicators will blink and the SET TARGET LEVEL indicator will be solid during the setup process. Setting the Target Level takes roughly a minute. During this time, the IntelliLevel vents the pipe and waits for the water to stabilize. It then captures the current level of the pool as the new Target Level.

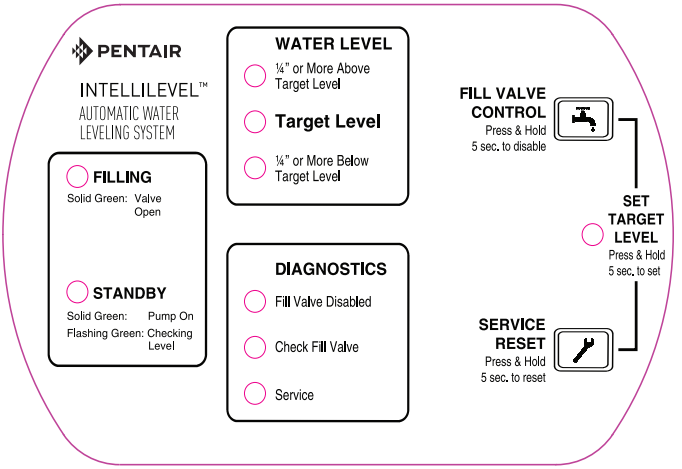
Troubleshooting

The following table explains the various error states that can be indicated by the IntelliLevel™ controller DIAGNOSTICS indicators (see Control Pad below).

	Fill Valve Disabled	**Temp Sensor Bad**	**Vent Failure**	**Fill Valve Open or Short**
Fill Valve Disabled LED	Solid	Solid	Solid	
Check Fill Valve LED		Solid		Solid
Service LED		Solid	Solid	Solid

	Temp Outside of Working Range	**Fill Failed**	**Water too High When Setting Target Level**	**Water too High in Normal Operation**	**Too Many Fill Attempts**
Fill Valve Disabled LED	Blinking		Blinking		Blinking
Check Fill Valve LED	Blinking	Blinking		Blinking	Blinking
Service LED	Blinking		Blinking	Blinking	

Troubleshooting (Continued)



IntelliLevel™ Automatic Water Leveling System Control Pad

Troubleshooting (Continued)

Fill Valve Disabled: The Fill Valve has been manually disabled by holding the FILL VALVE CONTROL button for 5 seconds. When the Fill Valve is disabled, none of the other DIAGNOSTIC indicators will function. This can be reversed by holding the FILL VALVE CONTROL button for 5 seconds.

Temp Sensor Bad: The temperature sensor has stopped working. The IntelliLevel controller cannot measure the water height without the temperature.

Vent Failure: The Micro Vent has failed.

Fill Valve Open or Short: Check the Fill Valve and the wire connection to the IntelliLevel controller.

Bad Ultrasonic Sensor Data: Try powering the IntelliLevel off and back on. Check for any obstruction or debris in the pipe leading to the IntelliLevel controller.

Temp Outside of Working Range: The IntelliLevel is unable to properly measure the water level if the temperature is not between 35 to 149F (2 to 65C)

Fill Failed: The IntelliLevel has failed to fill the pool to the Set Level in 3 hours. Check the Fill Valve and the water supply.

Water too High When Setting Target Level: The water level was closer than 18 inches when setting the Target Level.

Troubleshooting (Continued)

Water too High in Normal Operation: The water has risen to a level where the IntelliLevel can no longer read it accurately. Depending on your Target Level, this can happen if the pool is overfilled with rain water. The IntelliLevel™ Automatic Water Leveling System will exit this error mode on its own if the water level falls back to a readable level.

Too Many Fill Attempts: The IntelliLevel controller has filled the pool more than 6 times in a 24 hour period. This is abnormal and the pool should be checked for a problem. The 24 hour period is started every time the IntelliLevel is powered up or reset.

NOTE: All errors can be reset by holding the Service Reset button for 5 seconds.

Manual Venting

The IntelliLevel controller uses pressure readings to determine when the water level has changed and when the pump has turned on. When there is a very large and rapid drop in the water level, the IntelliLevel can be fooled into thinking the pump is on. If this happens, the STANDBY indicator will stay solid green.

If the STANDBY indicator stays solid green for more than 15 minutes when the circulating pump is not running, the IntelliLevel may need to be manually vented using the following procedure.

1. Be sure the circulating pump is off.
2. Press and hold the FILL VALVE CONTROL button for 5 seconds to disable the Fill Valve.
3. Press and hold the SERVICE RESET button for 5 seconds.

The vent will open and the WATER LEVEL indicators will scroll for 60 seconds. The IntelliLevel controller will then return to normal operation.

Winterizing

The IntelliLevel system controller contains sensors that can be damaged by prolonged exposure to freezing temperatures. The following steps are recommended if such conditions exist:

1. At the start of the winter season disconnect power from the IntelliLevel Controller.
2. Place the IntelliLevel controller in a climate controlled room.
3. Unscrew the IntelliLevel controller from the pipe.
4. Cap the IntelliLevel controller riser pipe using the Pentair IntelliLevel Pipe Cap kit (P/N 523366Z), or use a 2” rubber plug.



Pipe Cap

INTELLILEVEL STAND ALONE *WIRED* TO 24VAC CLASS 2 TRANSFORMER

If IntelliLevel is less than 15 conduit feet from transformer, use this schematic.

IntelliLevel can be Installed without Automation.

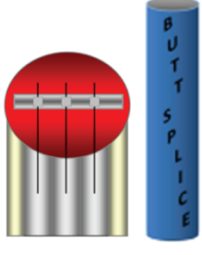
Separate 24 volt AC transformer required to power IntelliLevel and supply voltage for 24 VAC solenoid valve.

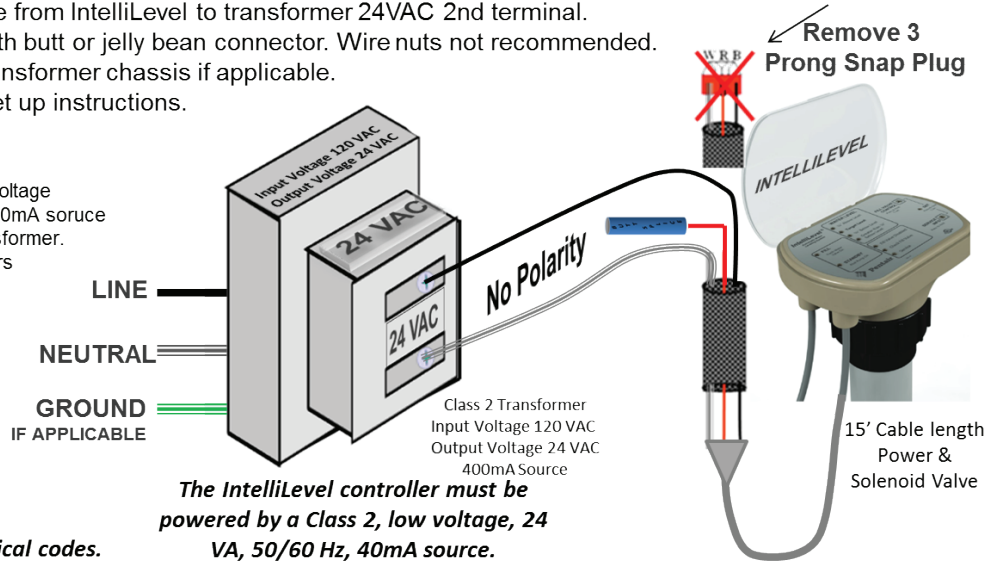
Installation Instructions:

a) Install seal tight enclosure in a convenient location close to 120 VAC.
b) Install/secure transformer in the enclosure.
c) Wire high voltage 120 VAC to transformer.
d) Remove actuator 3 prong connector located on IntelliLevel.
e) Connect BLACK wire from IntelliLevel to transformer 24VAC 1st terminal.
f) Connect WHITE wire from IntelliLevel to transformer 24VAC 2nd terminal.
g) Secure RED wire with butt or jelly bean connector. Wire nuts not recommended.
h) Secure ground to transformer chassis if applicable.
i) Follow IntelliLevel set up instructions.

PARTS REQUIRED:

1 – Class 2 Transformer Input voltage
120 VAC Output 24 VAC 400mA soruce
1 - Seal tight enclosure for transformer.
- Jelly beans or butt connectors





NOTE: Adhere to all electrical codes.

The IntelliLevel controller must be powered by a Class 2, low voltage, 24 VA, 50/60 Hz, 40mA source.

INTELLILEVEL STAND ALONE *SPLICED* TO 24VAC CLASS 2 TRANSFORMER

If IntelliLevel is more than 15 conduit feet from transformer, use this schematic.

IntelliLevel can be installed without automation.

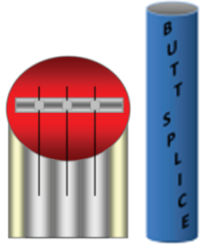
Separate 24 volt AC transformer required to power IntelliLevel and supply voltage for 24 VAC solenoid valve.

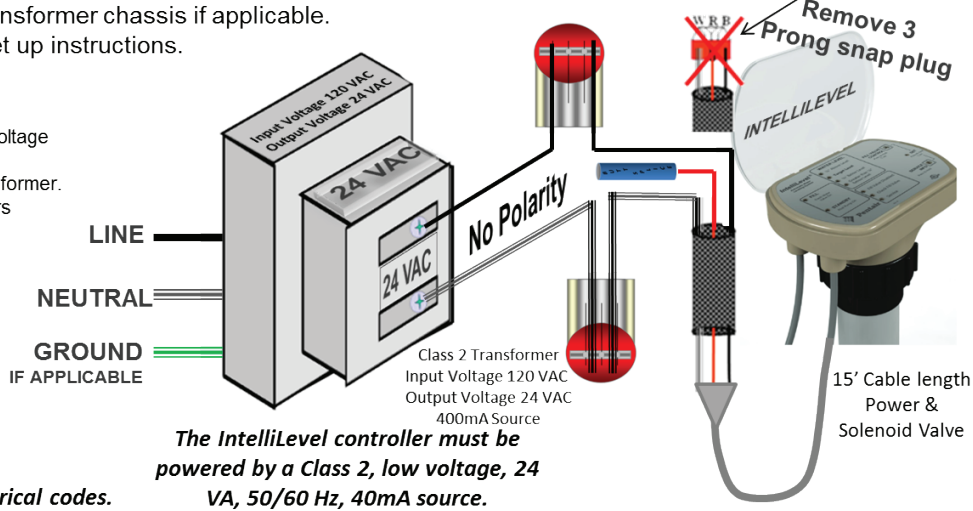
Installation Instructions:

a) Install seal tight enclosure in a convenient access location close for 120 VAC.
b) Install/secure transformer in the enclosure.
c) Wire high voltage 120 VAC to transformer.
d) Remove actuator 3 prong connector located on IntelliLevel.
e) Connect from 1st 24V screw terminal from transformer to BLACK wire from IntelliLevel with jelly bean connector.
f) Connect from 2nd 24V screw terminal from transformer to WHITE wire from IntelliLevel with jelly bean connector.
g) Secure RED wire with butt or jelly bean connector. Wire nuts not recommended.
h) Secure ground to transformer chassis if applicable.
i) Follow IntelliLevel set up instructions.

PARTS REQUIRED:

1 – Class 2 Transformer Input voltage
120 VAC Output 24 VAC
1 - Seal tight enclosure for transformer.
- Jelly beans or butt connectors





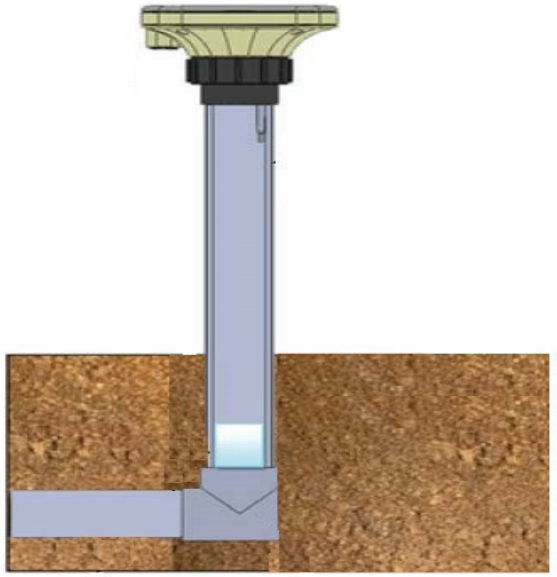
NOTE: Adhere to all electrical codes.

The IntelliLevel controller must be powered by a Class 2, low voltage, 24 VA, 50/60 Hz, 40mA source.

Static line Installation

A static line riser pipe can be used if non-stop filter pump operation is desired so that the IntelliLevel Controller is not dependent upon the filter pump.

The separate 2 inch riser pipe runs from the equipment pad to the pool. The riser pipe is vertically installed on the equipment pad with the IntelliLevel Controller attached to the top of the pipe. Be sure that the riser pipe is a minimum 18" above the maximum possible water level in the pool.



Notes

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