



# UNIVERSAL LEVEL CONTROL PILOT

Model ULC

Instruction Manual: IMC1ULC-Pilot



**ULC**

Universal Level Control Pilot

## DESCRIPTION:

The Kimray Universal Level Controller is designed for use in liquid level control applications. It provides a snap (on/of) pneumatic output and operates in a direct (increasing liquid level increases output signal) mode.

The ULC level controller is equipped with a displacer for horizontal installation. An optional vertical displacer adapter is available

The ULC is configured for right hand installation. Instrument gas inlet, and pilot outlet are 1/4" NPT. The standard model vents valve actuator gas from the breather plug on the pilot. An optional body is available at the time of procurement which includes a 1/4" NPT tap for the vent.

**Level change required** for full change in output signal in 1.0 specific gravity liquid, with 30 psig (2.1 bar) supply pressure with standard displacer in horizontal orientation: 1-1/2" (38 mm)

### Standard Displacer Dimensions:

2 X 6 inches, 50.8 X 152 mm

### Vessel Connection:

1" or 2" NPT Standard

## AVAILABLE MODELS:

Model	Description & Control Modes
ULC	Side mount, Snap mode, Direct action

## SPECIFICATIONS:

**Normal Service:** Liquid level

**Instrument Gas:** Clean and dry Air, Nitrogen or Natural Gas

**Features:** Intermittent-bleed pilot (very low emissions)  
 Low friction trunnion shaft  
 Simple installation  
 Polyethylene displacement float  
 No adjustment required  
 Manual toggle for operational testing

**Tubing Connections:** 1/4 NPT Internal

### Normal Operating Temperature:

-20° to 200° F

-29° to 93° C

**Supply Pressure:** 10 - 30 psig (.7 - 2.0 bar)

**Operating pressure:** 0 - 1500 psig (103 bar)

**Specific Gravity:** Minimum detectable specific gravity: .65  
 An optional displacer is available for lower specific gravity.

### Construction Materials:

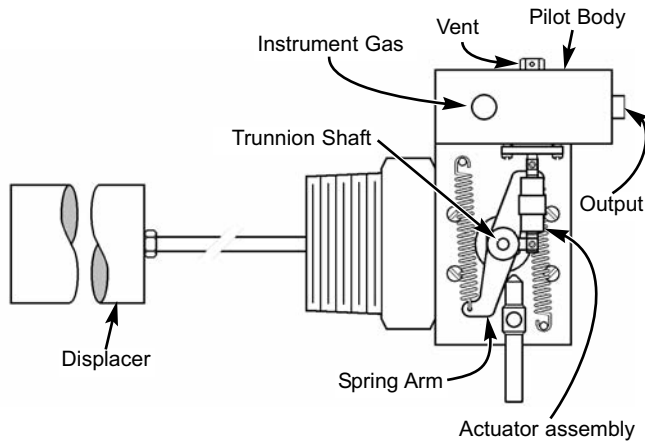
Body	Brass	Steel	Stainless Steel
Connection			
1" NPT	YES	YES	YES
2" NPT	NO	YES	YES
Displacer	Polyurethane		
Displacer Arm	Stainless Steel		
Pilot Body	Aluminum		
Pilot Internals	Stainless Steel		

### Options:

Displacer: Low density, High temperature

Elastomers: HSN, Viton®, Aflas®

Displacer Arm: Vertical adapter, Short Arm, Arm extensions



**OPERATION:** The ULC pilot consists of a displacement float for monitoring the liquid level, a trunnion and shaft to transmit float movement, and a pilot case which contains a pilot body, spring arm, and actuator assembly.

As the liquid level rises, the displaced volume of liquid plus the force of the counterbalance spring lifts the displacer rotating the trunnion and spring arm in a clockwise direction. This draws the actuator assembly downward, closing the vent and opening the connection between instrument supply and output to the actuator of the liquid dump valve.

As the liquid level lowers, the weight of the displacer forces the trunnion and spring arm in a counter clockwise direction. This pushes the actuator upward, closing the inlet and opening the vent, relieving diaphragm pressure from the actuator of the liquid dump valve.

**INSTALLATION:**

**BEFORE INSTALLATION:**

Be sure you fully understand the application, operation and connection of the device before installing.

**WARNING:**

Only trained personnel should install or service a liquid level control pilot or the devices to which it is connected. Pilots and other control devices should be installed, operated, and maintained in accordance with international codes and regulations, manufacturer's instructions, and proven best practices.

Personal injury, equipment damage, property damage, leakage or bursting of pressure-containing parts may result if the pilot is overpressured or installed where service conditions could exceed the limits given in the SPECIFICATIONS section.

Overpressure protection should also be provided if the pilot inlet pressure may exceed the safe working pressure of the equipment downstream.

To avoid injury or damage, install pressure-relieving or pressure limiting devices to prevent service conditions from exceeding those limits. Consult the appropriate code, regulations, or standards.

If a liquid level control pilot is used in a hazardous or flammable fluid service, personal injury and property damage could occur due to fire or explosion of vented fluid that may have accumulated. To prevent such injury or damage, install piping or tubing to vent the fluid to a safe, well-ventilated area or containment vessel. When venting a hazardous fluid, the piping or tubing should be located far enough away from any buildings or windows so as not to create further hazard. The vent opening should be protected against anything which could obstruct it, or it should be connected to exhaust tubing or tubing connected to a vapor recovery system.

Consideration should be given to the potential risk of injury or property damage due to escaping fluid. To avoid such risks, install the regulator in a safe location.

Inspect the openings in the pilot for foreign material and clean the connecting lines to remove scale, chips and debris.

**VENT:**

Periodically check the vent opening or the end of the remote vent pipe, if one is required. Be certain they are clear. If a vent should become blocked the pilot could lose control.

**Warning:** If a hazardous or flammable gas is being used for instrument gas, and the pilot is in an enclosed area, personal injury or property damage could result from accumulated gas being released through the vent. To avoid potential risk provide adequate ventilation or pipe away the vented gas.

**CAUTION:**

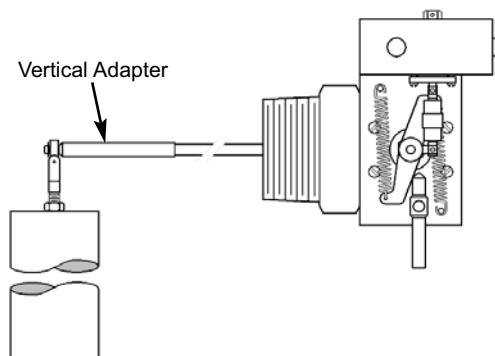
If the ULC Level Controller is installed on a vessel that is to be shipped to a different location, remove the displacer before shipment. Failure to do so could result in damage to the displacer, the displacer rod, or even to the pilot, due to vibration and impact during shipment. After the vessel is in its final location, reassemble the displacer and displacer rod extension.

Check clearances to be sure there are no obstructions inside the tank that will interfere with displacer installation or operation.

**VERTICAL DISPLACER INSTALLATION:** ULC Level Controls are shipped with the displacer installed for horizontal.

To mount the displacer for vertical service:

1. Obtain part number 1394V vertical adapter
2. Remove displacer and jam nut from float rod.
3. Install vertical adapter onto float rod.
4. Thread the jam nut and displacer onto threads of float rod.





### INSTALLING THE LEVEL CONTROL

**CAUTION:** Do not pick up the controller or carry the controller by using the displacer arm or displacer as a handle.

**NPT CONNECTION:** Apply TFE tape or pipe compound to the male threads of the threaded body. Tighten sufficiently to seal the threads. Use a wrench on the flats of the body. Do not use the pilot case to tighten the connection. Make sure the pilot case is vertical when finished.

Remove the plastic plugs from the 1/4" NPT openings. 1/4" or 3/8" tubing (not provided) must be installed:

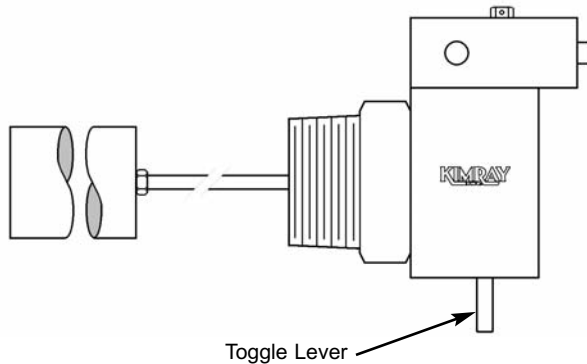
1. SUPPLY - Connect to a source of clean, dry instrument gas.
2. OUTPUT - Connect to the diaphragm housing on the control valve being operated.
3. VENT - Is a small breather plug unless the optional body was ordered which includes a 1/4" NPT adapter. If the optional body is present, connect to a preferred location for vented supply gas, or to a vapor recovery system.

**CAUTION:** To avoid personal injury caused by a sudden release of pressure, shut off the instrument gas supply pressure and bleed pressure from the supply lines before performing any change between snap and throttle mode.

**ADJUSTMENT:** The Universal Level Control is not adjustable. It is chosen because of its simplicity.

### START-UP & TEST:

With installation completed and appropriate relief and check valves installed and set, turn on the source of instrument gas. Before applying pressure to the vessel, move the toggle at the bottom of the pilot case to the right. Output gas should open the liquid dump valve. Release the toggle, and the liquid dump valve should close. With this test complete, slowly open the upstream and downstream shutoff valves to the vessel.



### MAINTENANCE:

Maintenance should be performed on a regular basis. An initial inspection interval of 12 months is recommended. Depending on the service conditions and the condition of the valve, the inspection interval may be decreased or increased.

**Warning:** If the pilot vents fluid or a leak develops in the system, it indicates that service is required. Failure to take the regulator out of service immediately may create a hazardous condition.

### WARNING:

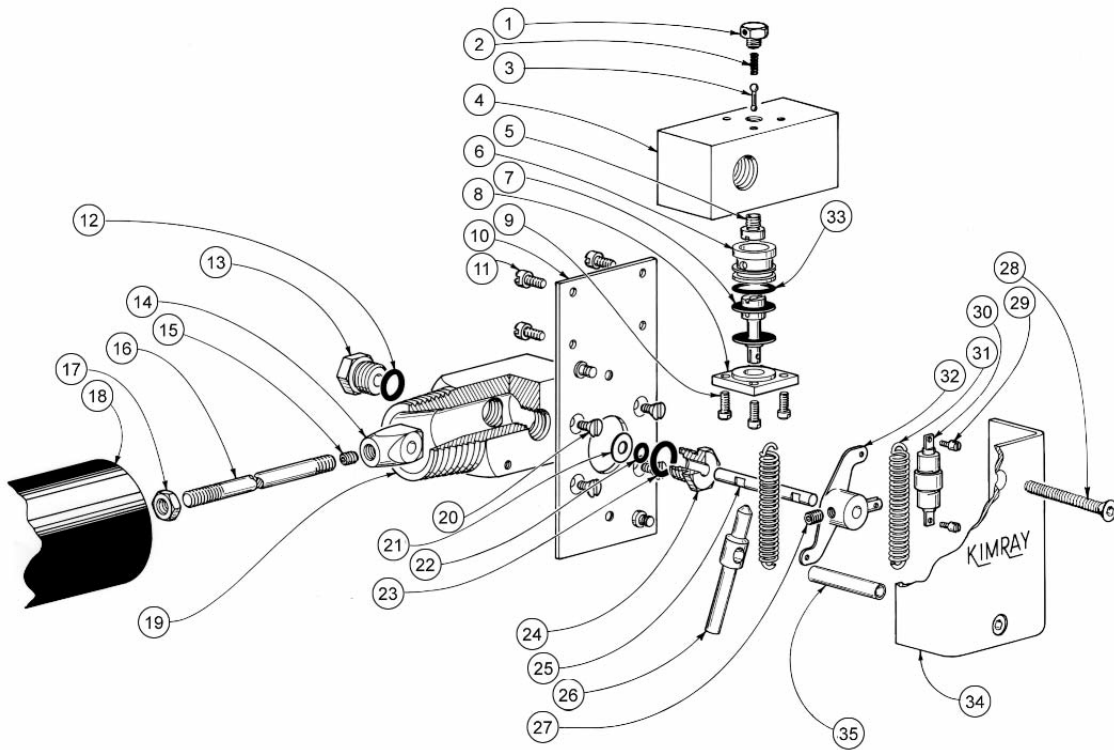
Before performing any service be sure that the level controller is fully isolated and that all pressure has been relieved.

Be sure that any operating or instrument gas lines have been disconnected.

Never tighten any fitting or the main connections to the level controller while there is pressure on the line.

Detailed repair instructions are available for your specific level controller.

Repair Kits are available. Consult the Kimray Catalog, Section C1, or the packing slip which is enclosed with each regulator for the correct Repair Kit number.



This is a general representation of the ULC Liquid Level Controller. For specific parts and their orientation refer to the Kimray Catalog, Section C1, or the packing slip which is enclosed with level controller.

**Key Description**

- 1 Breather Plug, stainless steel
- 2 Spring
- 3 Pilot Plug, stainless steel
- 4 Pilot Body, aluminum
- 5 Pilot Seat, stainless steel
- 6 Spool, stainless steel
- 7 Actuator Assembly, stainless steel, nitrile
- 8 Pilot Cap, aluminum
- 9 Screw, plated steel
- 10 Base Plate, plated steel
- 11 Screw, plated steel
- 12 O-Ring, nitrile

**Key Description**

- 13 Trunnion Plug, stainless steel or brass
- 14 Float Arm Hub, stainless steel
- 15 Set Screw, stainless steel
- 16 Float Rod, stainless steel
- 17 Nut, stainless steel
- 18 Displacement Float, polyethylene
- 19 Body, brass, steel, or stainless steel
- 20 Screw, plated steel
- 21 Washer, plated steel
- 22 O-Ring, nitrile
- 23 O-Ring, nitrile
- 24 Trunnion Sleeve, Brass or stainless steel

**Key Description**

- 25 Trunnion Shaft, stainless steel
- 26 Toggle Lever, stainless steel
- 27 Set Screw, stainless steel
- 28 Screw, plated steel
- 29 Link Screw, stainless steel
- 30 Actuator Link, aluminum
- 31 Spring
- 32 Spring Hub, steel
- 33 O-Ring
- 34 Cover, aluminum
- 35 Toggle Lever Bushing, stainless steel