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### INTRODUCTION

#### CAUTION

Prior to installing, the instructions provided herein should be completely reviewed and understood before operating or repairing this equipment. All CAUTION and WARNING notes must be strictly observed to prevent personal injury or equipment damage.

#### Scope

This installation manual includes instructions and maintenance information for both Kimray pneumatic side mount and back mount level controllers.

Do not install, operate, or maintain a pneumatic GEN II without being fully trained and qualified with Kimray installation and maintenance manual. To avoid personal injury or property damage, it is important to carefully read, understand, and follow all the contents of this manual, including all safety cautions and warnings. If you have any questions about these instructions, contact your Kimray applications support group before proceeding.

#### Description

The GEN II side mount and back mount level controllers are designed for use in liquid level and liquid/liquid interface control applications. Both provide either a throttle modulating or snap on/off pneumatic output and can be set to operate in a direct increasing liquid level output signal or indirect mode increasing liquid level decreasing output signal.

The GEN II level controllers are equipped with a displacer or hanger for horizontal or vertical installation.



Side Mount



Back Mount

The side mounted is reversible for right hand or left hand installation. The back mount is center back mounted. Both models are standard with a 1/4" NPT tapped vent. No gas is released into the case.

Both models include a 40 micron filter located just downstream of the instrument gas inlet port.

#### WARNING

Do not exceed the maximum pressure specified on the controller nameplate. Under no circumstances should the controller supply pressure ever exceed the maximum psig.

#### Before beginning installation of the GEN II

- Read and follow instructions.
- Make sure all pressure has been removed from the vessel before opening any connections.

### Specification

Table 1 - General Specifications

Description:	Pneumatically Operated Level Controller.
Operating Pressure:	(0-4000) psig (276 Bar)
Connection Size:	2in. - 6in.
Body Material:	Steel
Connection Type:	NPT, Flg, Grv, HU Grooved
Actuation:	Snap, Throttle Adjustable
Control Range:	2 - 10 in.
Temperature:	-50° to 300° F -45° to 149° C

#### CAUTION

When ordered, the GEN II level controller configuration and construction materials were selected to meet specific pressure, temperature, pressure drop and fluid conditions. Since some body/trim material combinations are limited in their pressure drop and temperature ranges, do not subject the GEN II level controller to any other conditions without first contacting the Kimray Inc, sales office or a sales / applications representative.

#### WARNING

If a level controller 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.

#### 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.

### Side Mount

#### Side Mount Operation

A spring balances the weight of the displacer. As liquid level rises around the displacer, the net buoyancy of the displacer plus the balancing force of the spring lifts the waggle arm assembly. The opposite end of the waggle arm is forced downward, pulling down on the link and down on the tangent arm. On the opposite side of the pilot fulcrum, the tangent arm pushes up on the actuator in the pilot.

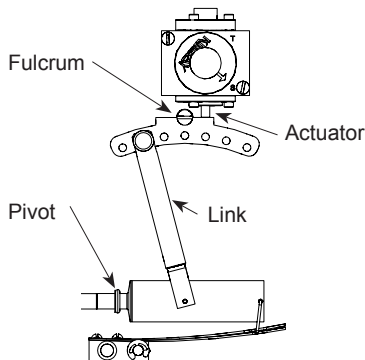


Figure 1

As the actuator travels in response to force from the tangent arm, it continually repositions a small three-way valve the pilot plug and seats which modulates the output pressure. This output is most often used to control diaphragm pressure in a control valve. Proper function can best be accomplished when the gas flowing through the pilot is clean and free of liquid.

#### CAUTION

If the level controller is installed on a vessel that is to be shipped to a different location, remove the displacer and rod extensions 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.

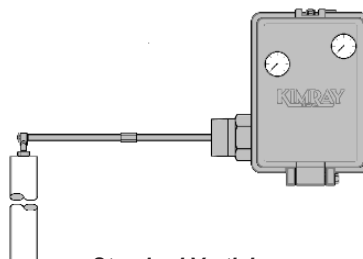
#### Note

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

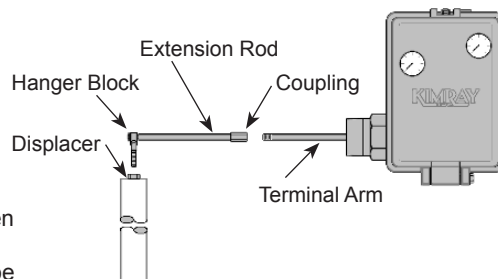
#### Horizontal Displacer Installation

The level controllers are shipped with the vertical adapter attached to the displacer. To mount the displacer for horizontal service.

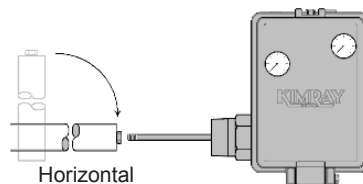
1. Remove displacer from hanger block.
2. Remove extension rod and coupling from terminal arm.
3. Thread the displacer all the way onto threads of terminal arm.



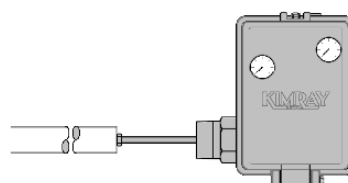
Standard Vertical  
Figure 2



Remove  
Figure 3



Install  
Figure 4



Final  
Figure 5

#### Installation

#### CAUTION

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

**NPT Connection:** Apply TFE tape or pipe compound to the male threads of the threaded body, or use appropriate gaskets for a flanged body. When installing a 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.

**Flanged Connection:** Flanged controllers are available on request. Use a suitable gasket between the body and the vessel connection flange.

#### Note

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

1. SUPP - Connect to a source of clean, dry instrument gas.
2. OUTPUT - Connect to the diaphragm housing on the control valve being operated.
3. VENT - Connect to a preferred location for vented supply gas, or to a vapor recovery system.

#### Changing Controller Mode or Action

#### 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.

### Changing Mode

The mode is selected with the switch plate. After shutting off and venting instrument gas pressure, loosen the selector knob approximately one half turn. Then turn the switch plate to "T" for throttle mode, or "S" for snap mode. Then tighten selector knob.

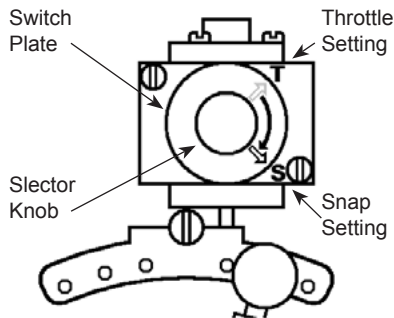
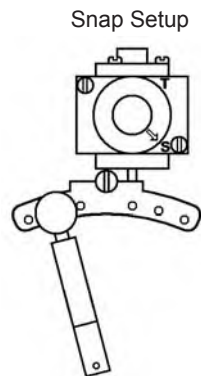


Figure 6

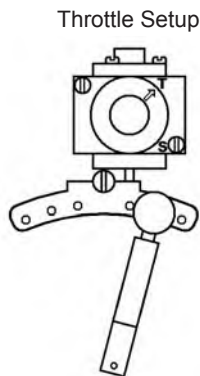
### Changing Action

1. Refer to the following diagram to determine the proper orientation of parts for the desired action **direct or indirect**.
2. Pull out the link knob, then move it to the desired setting and press into hole.



Left of pivot for PC valve  
Right of pivot for PO valve

Figure 8



Right of pivot for PC valve  
Left of pivot for PO valve

Figure 9

### CAUTION

*Liquids, with specific gravity less than 1.0 it is best to set the link for the most sensitive response. This will result in less span.*

*Calling for greater spans with low specific gravity can cause span to exceed the length of the displacer, resulting in loss of control.*

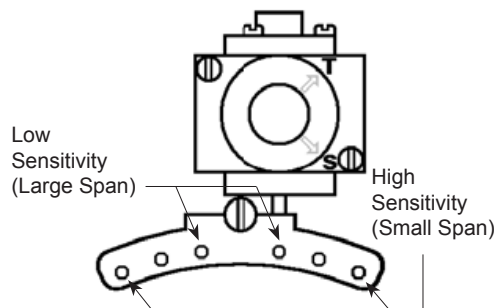
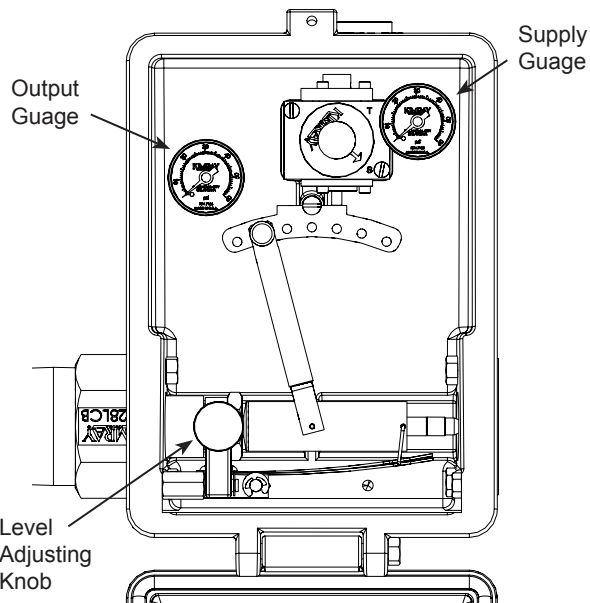


Figure 7

### Snap Operation Span Adjustment

1. Refer to the following diagram above to determine the proper orientation of parts for the desired span.
2. Pull out the link knob, move to the desired setting and press into hole.



Clockwise to raise level  
Counter Clockwise to lower level

Figure 10

### Start-Up

**Throttle-** (No liquid on displacer)

**PO Valve:** At 0 psig turn adjusting knob counter clockwise to produce 10 psig, then turn clockwise one turn to 0 psig.

**PC Valve:** At 0 psig turn adjusting knob clockwise to produce 20 to 30 psig.

**Snap-** (No liquid on displacer)

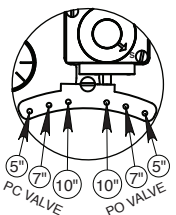
**PO Valve:** At 0 psig turn adjusting knob clockwise to snap ON, then turn clockwise two turns to 0 psig.

**PC Valve:** At 20 to 30 psig turn adjusting knob counter clockwise to snap OFF, then turn clockwise two turns from 20 to 30 psig.

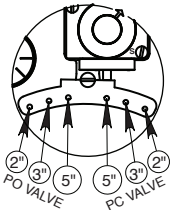
### Interface:

Cover displacers with the lighter fluid. Heavier fluid must be below the displacer. Then adjust same as above.

PROPORTIONAL BAND  
SNAP MODE



PROPORTIONAL BAND  
THROTTLE MODE



## Installation and Maintenance

### Back Mount

#### Back Mount Operation

A spring balances the weight of the displacer. As liquid level rises around the displacer, the net buoyancy of the displacer plus the balancing force of the spring lifts the waggle arm assembly. The opposite end of the waggle arm is forced downward, pulling down on the link and down on the tangent arm. On the opposite side of the pilot fulcrum, the tangent arm pushes up on the actuator in the pilot.

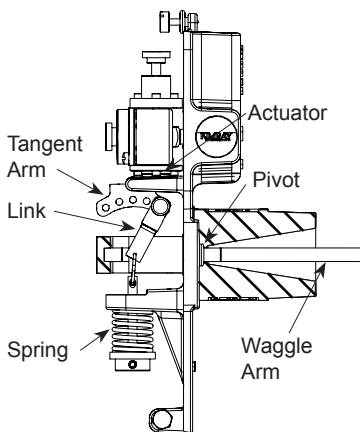


Figure 1

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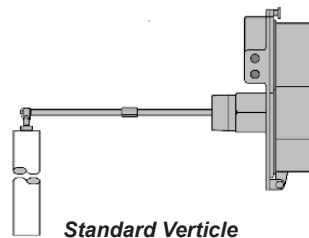
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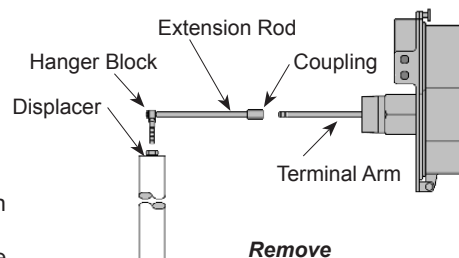
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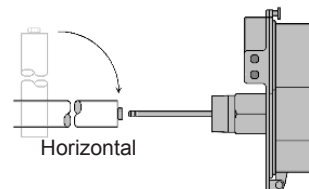
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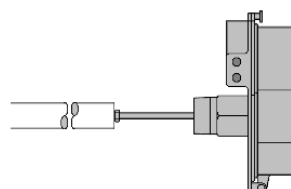
Standard Vertical  
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Final  
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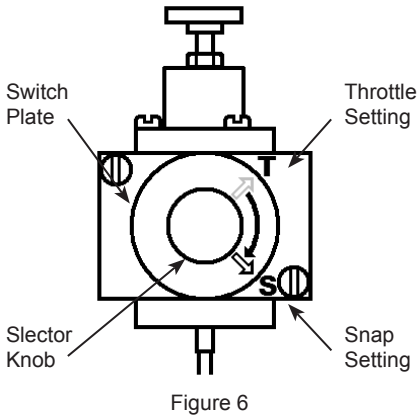


Figure 6

### CAUTION

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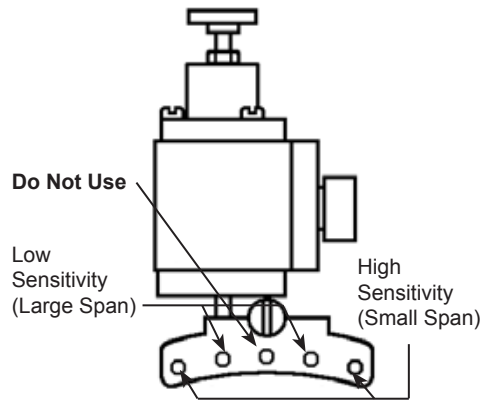


Figure 7

### Start-Up

**Throttle-** (No liquid on displacer)

**PO Valve:** At 0 psig turn adjusting knob right to produce 10 psig, then turn left one turn to 0 psig.

**PC Valve:** At 0 psig turn adjusting knob left to produce 20 to 30 psig.

**Snap-** (No liquid on displacer)

**PO Valve:** At 0 psig turn adjusting knob right to snap ON, then turn left two turns to 0 psig.

**PC Valve:** At 20 to 30 psig turn adjusting knob right to snap OFF, then turn left two turns from 20 to 30 psig.

### Interface:

Cover displacers with the lighter fluid. Heavier fluid must be below the displacer. Then adjust same as above.

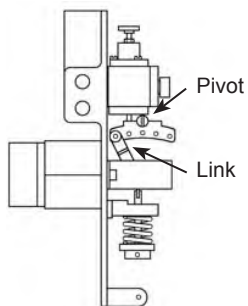
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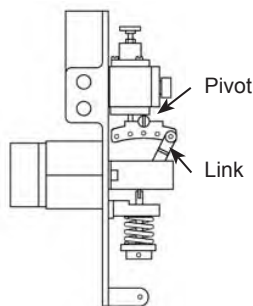
### Snap Setup



Right of pivot for PC valve  
Left of pivot for PO valve

Figure 8

### Throttle Setup



Left of pivot for PC valve  
Right of pivot for PO valve

Figure 9

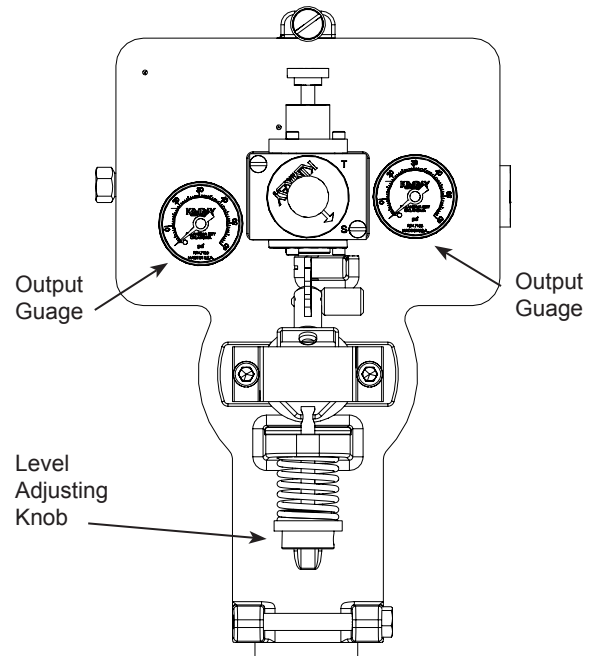


Figure 10



### Maintenance

Maintenance should be performed on a regular basis. An initial inspection interval of 6 months is recommended. Depending on the service conditions of the controller, the inspection interval may be decreased or increased.

#### WARNING

*Before any service, be certain that the valve is fully isolated and that all pressure upstream and downstream has been relieved. Use bypass valves or fully shut off the process.*

The controller can be repaired without being removed from the piping.

Repair kits are available. Consult the Kimray catalog, section Y:175, or the packing slip which is enclosed with each controller for the correct repair kit number.

#### WARNING

*A leaking controller indicates that service is required. Failure to take the valve out of service immediately may create a hazardous condition.*

#### Repair Tips

- If pilot bleeds gas continuously, the pilot plug seat may be dirty.
- Evenly tighten the screws which hold the bonnet on.
- Diaphragms will harden with age.

Inspection Schedule	
Body	Under normal conditions, the body will last for years. Severe conditions will require inspection more frequently. The body should be inspected every time valve trim is inspected.

Trouble Shooting		
Problem	Possible Cause(s)	Possible Solution
Check for leaks between upper and lower flanges.	Check for any damage to flange o-ring.	Clean the lower flange groove so it is free of debris.



# Float Operated Level Controllers

Models Pneumatic GEN II

## Installation and Maintenance

### Related Publications:

See Catalog Page - C1:01.2, C1:01.4

Kimray is an ISO 9001- certified manufacturer.  
Kimray quality assurance process maintains strict controls  
of materials and the certification of parts used in Kimray GEN II controllers.