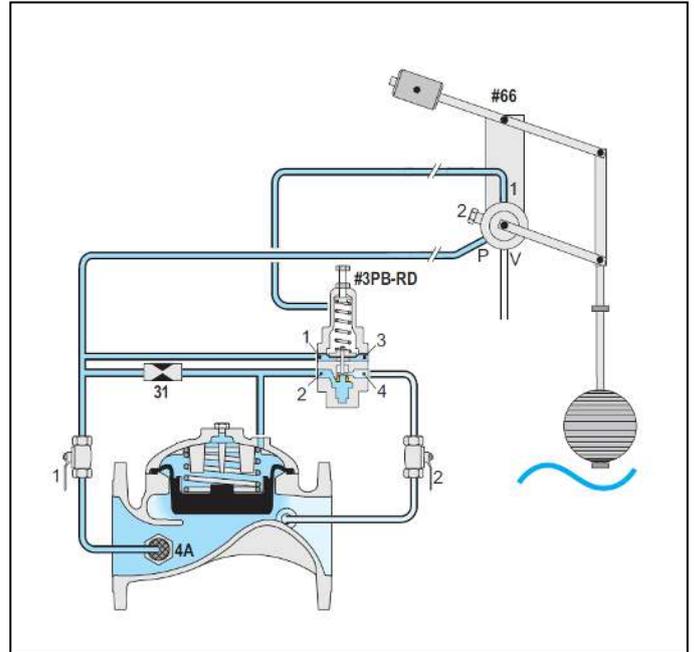


## Level Control and Pressure Sustaining Valve with Bi Level Vertical Float

(Sizes 1.5"- 16"; DN40-400)

### Description:

The BERMAD Model IR-453-66 Level Control and Pressure Sustaining Valve with Bi-Level Vertical Float is a hydraulically operated, diaphragm actuated control valve that controls reservoir filling, opening at preset reservoir low level, and shutting at preset high level. During filling, it sustains minimum upstream pressure regardless of fluctuating flow or reservoir level.



### Installation:

1. Ensure enough space around the valve assembly for future maintenance and adjustments.
2. Prior to valve installation, flush the pipeline to insure flow of clean fluid through the valve.
3. For future maintenance, install Isolation gate valves upstream and downstream from Bermad control valve.
4. Install the valve in the pipeline with the valve flow direction arrow in the actual flow direction. Use the lifting ring provided on the main valve for installing the valve.
5. For best performance, it is recommended to install the valve horizontally and upright. For different valve position-consult Bermad.
6. It is highly recommended to install a strainer Bermad model 70F upstream from the pressure reducing valve, to prevent debris from damaging valve operation.
7. After installation carefully inspect/correct any damaged accessories, piping, tubing, or fittings.
8. Install the float pilot assembly either at an external balancing tank or at an internal stilling tank (refer to the enclosed "Float #66" catalog page).
9. Pull three parallel  $\frac{1}{2}$ " or  $\frac{3}{8}$ " control tubes, from the valve to the float. Mark each of the tubes at both sides for identification.
10. Determine the desired rod length according to level differential between the float assembly and reservoir lowest level.
11. Assemble the extension rods to the upper rod and to one another. Apply glue ("Loctite 200" or equivalent) and screw tight. Be careful not to damage the rod.
12. Install the upper & lower stoppers on the rod without the float ball. Use  $\frac{3}{16}$ " Allen-Key to lock the stoppers on the rod
13. Screw the upper rod to its place at the bottom of the lever system & tighten the lock nut by  $\frac{1}{2}$ " spanner.
14. Balance the float assembly by moving the weight against the rod and stoppers (without the float ball). After reaching equilibrium, tighten the balancing-weight screw and its lock-nut by  $\frac{7}{16}$ " spanner.
15. Remove the lower stopper to enable threading-in the float ball. Reassemble the lower stopper & lock it in its place.  
**Note:** You may have to pull out the whole rod, in order to reach the lower stopper. If so, release the rod lock-nut, unscrew the installed rod (with its extensions & the stoppers) and pull it up from the stilling tank. After threading-in the float ball and locking the lower stopper back in its place, reassemble the installed rod.
16. Connect the control tubes ends, using  $\frac{3}{8}$ " copper or reinforced plastic tube, according to control drawing.

## Commissioning & Calibration:

1. Confirm that cock's valves (1+2) are open. (Handle parallel to cock- valve body).
2. Confirm that the pressure supply is typical.
3. Adjust water levels by setting the stoppers:
  - 3.1. Hold the lever system at its upper position & set the upper stopper to 100 mm below desired upper level (but not higher than 150 mm below over-flow level).
  - 3.2. Hold the lever system at its lower position & set the lower-stopper to 100 mm above desired lower level.
4. Open upstream and downstream isolating valves. Allow the 453-66 to open (ensuring the lever system is at its lower position) and fill-up the reservoir.
  - 4.1. Calibrating the Pressure Sustaining Pilot & Venting air from the valve control loop:

The Model 453-66 is factory set to the system minimum allowed pressure. The set pressure is marked on the pilot's label. If the set pressure is either different from the design or the requirement have been changed, follow the below steps:

    - 4.1.1. Close the upstream isolating valve to reduce 453-66 inlet pressure. Ensure that the 453-66 sustains the upstream pressure, preventing it from decreasing below setting, even when the upstream isolating is almost closed.
    - 4.1.2. Unlock the pilot locking nut and slowly turn the pilot adjusting screw clock wise to increase set pressure and counter clock wise to decrease it.
    - 4.1.3. After the pressure is stabilized, lock the pilot locking nut and open fully the upstream isolating valve.
    - 4.1.4. During filling the reservoir move the lever –system manually upper position, forcing the valve to close, then to its lower position, forcing the valve to open. At each position, vent air from the valve control loop by loosening tube fitting at the highest point (float ports [P], [C1 & [C2]] and at valve & pilot covers) allowing the air to bleed. Retighten the fittings eyebolts.
  - 4.2. Calibrating shutting upper-level:

Ensure that the 453-66 close as the water level reaches the upper set-level. If the 453-66 has not closed, move the lever-system **manually** to its upper position, forcing the valve to close. Change the upper stopper location down, to lower level setting or up to raise it, until the valve closes **automatically** at the desired upper-level.
  - 4.3. Calibrating opening lower-level:

Allow the water level to drop by consuming from the reservoir or by draining it. Ensure the 453-66 remains closed until water level reaches the desired lower-level, switches at that point and open fully. Change the lower stopper location down, to lower level setting or up to raise it, until the valve opens **automatically** at the desired lower-level.

**Note:** for switching valve tendency from closing to opening and vice versa, change manually the lever system position up to close & down to open.
5. The restriction [31] enables the 2 way control & reduces closing speed.

## Trouble-Shooting:

Symptoms	Cause	Remedy
<b>Valve fails to open</b>	<ol style="list-style-type: none"> <li>1. Cock valves (1+2) are closed.</li> <li>2. Not sufficient inlet pressure.</li> <li>3. Not sufficient flow.</li> <li>4. Confirm float &amp; pilot setting.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm cock-valves (1+2) are open</li> <li>2. Check for sufficient inlet pressure-</li> <li>3. Create demand/flow, confirm pilot setting-</li> <li>4. Check the float&amp; Pilot adjusting setting.</li> </ol>
<b>Valve fails to close</b>	<ol style="list-style-type: none"> <li>1. Cock valve (1) is closed.</li> <li>2. Adjusting screws.</li> <li>3. Control circuit is clogged.</li> <li>4. Debris-</li> <li>5. Diaphragm-</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm Cock valve (1) is open.</li> <li>2. Check the Pilot adjusting screw setting.</li> <li>3. Check for any debris trapped in the valve control circuit.</li> <li>4. Check for any debris trapped in the valve body.</li> <li>5. Check diaphragm is not leaking-</li> </ol>
<b>Valve fails to regulate</b>	<ol style="list-style-type: none"> <li>1. Not sufficient inlet pressure.</li> <li>2. Not sufficient flow.</li> <li>3. Pilot setting.</li> <li>4. Air trapped in the control-chamber-</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for sufficient inlet pressure.</li> <li>2. Create demand/flow, confirm pilot setting.</li> <li>3. Check Pilot setting-</li> <li>4. Release air trapped in the control chamber by loosening cover tube fitting at the highest point.</li> </ol>

## Preventive Maintenance:

1. System operating conditions that effect on the valve should be checked periodically to determent the required preventative maintenance schedule.
2. Maintenance instructions:
  - 2.1. Tools required:
    - 2.1.1. Metric and imperial wrenches
    - 2.1.2. Anti-seize grease
    - 2.1.3. Visual inspection to locate leaks and external damages
  - 2.2. Functional inspection including: closing, opening and regulation.
  - 2.3. Close upstream and downstream isolating valves (and external operating pressure when used)
  - 2.4. Once the valve is fully isolated vent pressure by loosening a plug or a fitting.
  - 2.5. Open the screw nuts and remove the cover unit from the valve body. Disassemble necessary control tubs.
  - 2.6. It is highly recommended to stock a reserve parts assembly for each size. This allows minimum system field work. Disassemble the cover and examine the inside parts carefully for signs of wear, corrosion, or any other abnormal conditions.
  - 2.7. Replace worn parts and all the Elastomers. Lubricate the bolts and screws threads with Anti seize grease.
  - 2.8. Winterizing /freezing prevention: drain the valve & the valve accessories (pilot, solenoid) on time.

## Spare Parts

Bermad has a convenient and easy to use ordering guide for valve spare-parts and control system components. For solenoid valves refer to model and S/N on solenoid tags.

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