

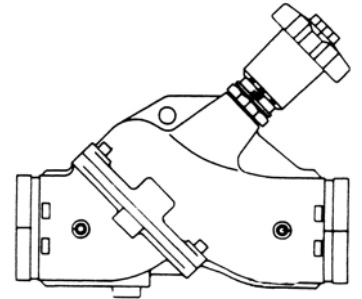
## INSTALLATION AND OPERATING INSTRUCTIONS

# ARMflo Circuit Balancing Valves – Grooved

## CBV-G: 2.5" – 12" (DN65 to DN300)

### TYPICAL APPLICATIONS

ARMflo CBV-G circuit balancing valves are rugged, double regulating valves for balancing hydronic fluid flow in HVAC heating and chiller systems. These valves combine the functions of positive shut-off, precise flow regulation, and variable orifice flow measurement. Ensure application requirements are compatible with materials of construction, temperature and pressure ratings, and flowrate ranges, as defined in the corresponding product submittals.

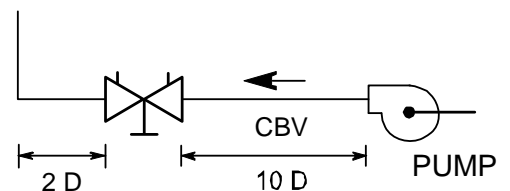
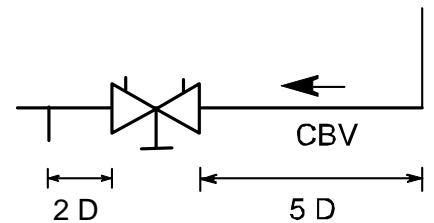


### VARIABLE VS FIXED ORIFICE FLOW MEASUREMENT:

ARMflo CBV-G circuit balancing valves are equipped with PT Ports across the valve seat for basic variable orifice pressure drop to flow correlation. When installed as prescribed, flow measurement accuracy to +/- 5% is achievable when the valve is wide open. For higher accuracy, especially at high turndown, the CBV may be used in conjunction with a fixed orifice flowmeter. Refer to fixed orifice flowmeter instructions for additional requirements, if applicable.

### LOCATION:

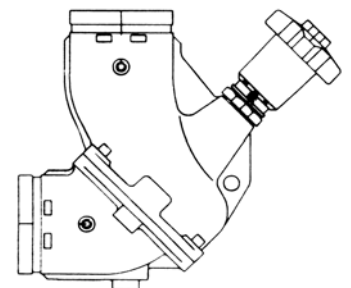
1. The ARMflo CBV-G may be installed in vertical or horizontal piping.
2. Ensure the valve flow direction arrow matches the system fluid flow direction.
3. When desired, the valve may be converted to elbow configuration:
  - a. To suit physical constraints.
  - b. To eliminate the need for an additional discrete elbow.
4. For optimum flow measurement accuracy and when practical, locate the valve:
  - a. 5 pipe diameters downstream of a fitting.
  - b. 2 pipe diameters upstream of a fitting.
  - c. 10 pipe diameters upstream or downstream of a pump.
5. Ensure sufficient clearance is provided for:
  - a. Handle operation / removal
  - b. PT port access
  - c. Drain port access
6. Ensure the valve is mounted such that the:
  - a. PT Ports are pointing up so they will not become clogged with dirt that may be present in the hydronic fluid.
  - b. Drain ports are pointing down so they will effectively drain fluid from the valve.
  - c. If necessary, exchange the positions of the PT Ports and drains.



### CONVERSION TO ELBOW CONFIGURATION:

To change the valve from straight to elbow configuration:

1. Open the valve handle one complete turn.
2. Remove the 4 hex cap bolts holding the split-case halves together.
3. Rotate one half of the casing 180 degrees, taking care not to dislodge or damage the casing O-ring.
4. Ensure the valve halves are properly seated.
5. Insert the 4 hex cap bolts, and tighten evenly starting with opposite corners.



## SYSTEM CONNECTIONS:

Before making system connections, ensure adjacent piping is free and clear of burrs and debris.

### 1. Grooved Connections:

- a. For lowest cost installation and minimum off-axis loading, Armstrong grooved products may be connected to the system piping (or another component) by the industry standard groove connections, using any compatible grooved coupling.
- b. Follow the coupling manufacturer's instructions for making reliable connections.

### 2. ARMgrip™ Flange Adapters:



Fig.1

Fig.2

Fig.3

- a. When desired, one or both of the grooved valve connections may be fitted with an ARMgrip flange adapter as required to suit the system connections.
- b. Place the two halves of the flange adapter onto the groove.
- c. Ensure the tab on the flange adapter is between the two locking lugs of the valve body.
- d. Apply silicone to the inner and outer diameters of the flange adapter gasket.
- e. Press the gasket, printed side in, firmly between the valve body and flange adapter.
- f. Position the assembly to the mating flange, and insert all flange bolts.
- g. Tighten all flange bolts evenly, using a standard flange tightening pattern.
- h. Ensure the flange adapter gasket flat face (not printed) contacts the mating flange surface squarely.
- i. ARMgrip flange adapter gaskets are not interchangeable with other flange adapters.

## HANDLE TURNS INDICATOR POSITION:

To adjust the handle turns indicator position to enable easier access for viewing:

1. Fully close the valve.
2. Remove the handle retaining bolt at the hub of the handle.
3. Pull the handle straight from the valve stem (tap gently with a soft mallet if required).
4. For models with:
  - a. Plastic handles; rotate the handle and turns indicator assembly, (retaining a turns indication of 0.0) and replace the handle onto the valve stem.
  - b. Cast iron handles; loosen the brass knurled turns indicator retaining ring, rotate the turns indicator to desired position, retighten the retaining ring by hand (do not over-tighten), and replace the handle on the valve stem.
5. Insert and tighten the valve handle retaining bolt.
6. Open the valve to ensure the handle turns freely, and turns indicator reads properly.

## **OPERATION:**

1. If an alternate technology flowmeter is used, refer to the instructions supplied for taking flow measurements.
2. For variable orifice flow measurement using the differential pressure developed across the valve seat, remove the PT Port caps from the valve using caution to avoid contact with the hydronic fluid.
3. Insert and tighten the manometer high pressure probe to the PT Port closest to supply, and the low pressure probe to the PT Port closest to return.
4. Ensure there are no leaks at any meter probe connections.
5. Take the differential pressure measurement.
6. If the value is negative, ensure the meter connections are not reversed. Otherwise, check the fluid flow direction in that piping section.
7. Use the corresponding CBV-G performance charts or flow calculations to convert the differential pressure reading to the corresponding flowrate.
8. Adjust the CBV handle as required to read the required pressure drop measurement, using the appropriate flow co-efficient for the handle setting.
9. When finished, carefully remove the meter probes to avoid contact with the hydronic fluid, and replace the PT Port caps.

## **CALIBRATION MEMORY SETTING:**

If desired, the memory setting may be used so that if the valve is throttled or shut-off during use or servicing, when the valve is fully re-opened, it returns precisely to the calibrated setpoint.

1. Record the valve handle turns corresponding to the calibrated setpoint.
2. Remove the handle retaining bolt at the hub of the handle.
3. Pull the handle straight from the valve stem (tap gently with a soft mallet if required).
4. Without turning the valve stem, for models with:
  - a. Plastic handles:
    - i. Turn the plastic memory stop clockwise until it bottoms (finger tight only).
    - ii. While holding the memory stop position, turn the lock collar clockwise until it stops against the valve bonnet.
  - b. Cast iron handles:
    - i. Turn the brass memory stop ring until the aluminum bar contacts the step on the valve stem (finger tighten only.)
5. Replace the handle on the valve stem, ensuring the previously recorded turns indicator reading, and desired orientation is retained.
6. Insert and tighten the valve handle retaining bolt.
7. Close the valve and then re-open fully, to ensure it turns freely until it stops at the previously recorded calibration setpoint.

## **REPLACING GLAND PACKING UNDER PRESSURE**

Armstrong CBVs should provide many years of reliable service with little or no maintenance. However, a regular schedule of inspection for leaks is recommended. Should the valve gland packing develop a leak, it can be replaced under pressure, avoiding the need to de-pressurize and drain the system, as follows.

1. Always take necessary precautions to avoid contact with hydronic fluid. Allow the system fluid to adjust to room temperature if possible, else exercise extreme caution to avoid personal injury.
2. Record the valve handle turns corresponding to the calibrated set-point.
3. If the calibration memory setting feature has been used, remove the handle as required to turn the memory stop fully counter-clockwise so that the valve can be completely opened.
4. Open the valve fully, (torque not to exceed 45 ft lbs).
5. The metal to metal service seal is now engaged. (This is not a drip tight seal).
6. Carefully remove the valve packing nut very slowly, ensuring system pressure is retained. Some escape of hydronic fluid is normal. Be careful to avoid contact.
7. Clean the exposed portion of the valve stem, taking care not to scratch it.
8. Remove the o-ring and gasket and replace with new and same.
9. Replace the packing nut and tighten as required to ensure a leak-tight seal.
10. Replace the turns indicator and memory stop mechanisms.
11. Replace the valve handle and tighten the handle retaining nut.
12. Close the handle slightly while ensuring the valve packing retains pressure and is drip-free.
13. Ensure the valve closes completely, reading 0.0, and opens fully (or to the calibrated set-point if the memory stop feature is used.)
14. Return the valve handle to the calibrated set-point.

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