PENTAIR

AURORA®

MODELS CBV-S/A GROOVED: 2.5" – 12"

(DN65 to DN300)

CIRCUIT BALANCING VALVES – GROOVED

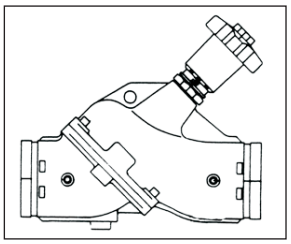
INSTALLATION AND OPERATION MANUAL

NOTE! To the installer: Please make sure you provide this manual to the owner of the equipment or to the responsible party who maintains the system.

Part # A-03-355 | © 2015 Pentair Ltd. | 01/01/15

MODEL CBV-S/A GROOVED

TYPICAL APPLICATIONS:



CBV-S/A Grooved 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 flow rate ranges, as defined in the corresponding product submittals.

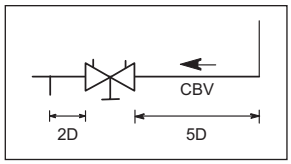
CALIFORNIA PROPOSITION 65 WARNING:

⚠WARNING This product and related accessories contain chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

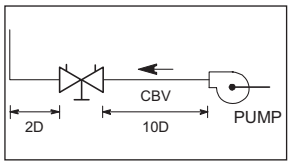
VARIABLE VS FIXED ORIFICE FLOW MEASUREMENT:

CBV-S/A Grooved 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:

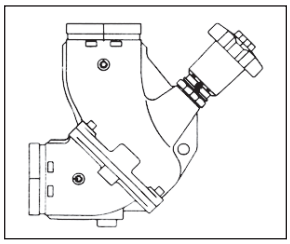


1. The CBV-S/A Grooved may be installed in vertical or horizontal piping.
2. Ensure the valve flow direction arrow matches the system fluid flow direction.
3. When desired, the valve may be converted to elbow configuration:
   a. To suit physical constraints.
   b. To eliminate the need for an additional 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, Aurora 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. Flange Adapters:

   a. When desired, one or both of the grooved valve connections may be fitted with an 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. 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-S/A Grooved performance charts or flow calculations to convert the differential pressure reading to the corresponding flow rate.
8. Adjust the CBV handle as required to read the required pressure drop measurement, using the appropriate flow coefficient 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 reopened, 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 are retained.
6. Insert and tighten the valve handle retaining bolt.
7. Close the valve and then reopen fully, to ensure it turns freely until it stops at the previously recorded calibration setpoint.

REPLACING GLAND PACKING UNDER PRESSURE:

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 depressurize 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, or else exercise extreme caution to avoid personal injury.
2. Record the valve handle turns corresponding to the calibrated setpoint.
3. If the calibration memory setting feature has been used, remove the handle as required to turn the memory stop fully counterclockwise 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 setpoint if the memory stop feature is used).
14. Return the valve handle to the calibrated setpoint.

WARRANTY

Seller warrants equipment (and its component parts) of its own manufacture against defects in materials and workmanship under normal use and service for one (1) year from the date of installation or start-up, or for eighteen (18) months after the date of shipment, whichever occurs first. Seller does not warrant accessories or components that are not manufactured by Seller; however, to the extent possible, Seller agrees to assign to Buyer its rights under the original manufacturer's warranty, without recourse to Seller. Buyer must give Seller notice in writing of any alleged defect covered by this warranty (together with all identifying details, including the serial number, the type of equipment, and the date of purchase) within thirty (30) days of the discovery of such defect during the warranty period. No claim made more than 30 days after the expiration of the warranty period shall be valid. Guarantees of performance and warranties are based on the use of original equipment manufactured (OEM) replacement parts. Seller assumes no responsibility or liability if alterations, non-authorized design modifications and/or non-OEM replacement parts are incorporated If requested by Seller, any equipment (or its component parts) must be promptly returned to Seller prior to any attempted repair, or sent to an authorized service station designated by Seller, and Buyer shall prepay all shipping expenses. Seller shall not be liable for any loss or damage to goods in transit, nor will any warranty claim be valid unless the returned goods are received intact and undamaged as a result of shipment. Repaired or replaced material returned to customer will be shipped F.O.B., Seller's factory. Seller will not give Buyer credit for parts or equipment returned to Seller, and will not accept delivery of any such parts or equipment, unless Buyer has obtained Seller's approval in writing. The warranty extends to repaired or replaced parts of Seller's manufacture for ninety (90) days or for the remainder of the original warranty period applicable to the equipment or parts being repaired or replaced, whichever is greater. This warranty applies to the repaired or replaced part and is not extended to the product or any other component of the product being repaired. Repair parts of its own manufacture sold after the original warranty period are warranted for a period of one (1) year from shipment against defects in materials and workmanship under normal use and service. This warranty applies to the replacement part only and is not extended to the product or any other component of the product being repaired. Seller may substitute new equipment or improve part(s) of any equipment judged defective without further liability. All repairs or services performed by Seller, which are not covered by this warranty, will be charged in accordance with Seller's standard prices then in effect.

THIS WARRANTY IS THE SOLE WARRANTY OF SELLER AND SELLER HEREBY EXPRESSLY DISCLAIMS AND BUYER WAIVES ALL OTHER WARRANTIES EXPRESSED, IMPLIED IN LAW OR IMPLIED IN FACT, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Seller's sole obligation under this warranty shall be, at its option, to repair or replace any equipment (or its component parts) which has a defect covered by this warranty, or to refund the purchase price of such equipment or part. Under the terms of this warranty, Seller shall not be liable for (a) consequential, collateral, special or liquidated losses or damages; (b) equipment conditions caused by normal wear and tear, abnormal conditions of use, accident, neglect, or misuse of said equipment; (c) the expense of, and loss or damage caused by, repairs or alterations made by anyone other than the Seller; (d) damage caused by abrasive materials, chemicals, scale deposits, corrosion, lightning, improper voltage, mishandling, or other similar conditions; (e) any loss, damage, or expense relating to or resulting from installation, removal or reinstallation of equipment; (f) any labor costs or charges incurred in repairing or replacing defective equipment or parts, including the cost of reinstalling parts that are repaired or replaced by Seller; (g) any expense of shipment of equipment or repaired or replacement parts; or (h) any other loss, damage or expense of any nature.

The above warranty shall not apply to any equipment which may be separately covered by any alternate or special warranties.

PERFORMANCE: In the absence of Certified Pump Performance Tests, equipment performance is not warranted or guaranteed. Performance curves and other information submitted to Buyer are approximate and no warranty or guarantee shall be deemed to arise as a result of such submittal. All testing shall be done in accordance with Seller's standard policy under Hydraulic Institute procedures.

LIABILITY LIMITATIONS: Under no circumstances shall the Seller have any liability under the Order or otherwise for liquidated damages or for collateral, consequential or special damages or for loss of profits, or for actual losses or for loss of production or progress of construction, regardless of the cause of such damages or losses. In any event, Seller's aggregate total liability under the Order or otherwise shall not exceed the contract price.

ACTS OF GOD: Seller shall in no event be liable for delays in delivery of the equipment or other failures to perform caused by fires, acts of God, strikes, labor difficulties, acts of governmental or military authorities, delays in transportation or procuring materials, or causes of any kind beyond Seller's control.

COMPLIANCE WITH LAW: Seller agrees to comply with all United States laws and regulations applicable to the manufacturing of the subject equipment. Such compliance shall include: The Fair Labor Standards Acts of 1938, as amended; Equal Employment Opportunity clauses of Executive Order 11246, as amended; Occupational Safety and Health Act of 1970 and the standards promulgated thereunder, if applicable. Since compliance with the various Federal, State, and Local laws and regulations concerning occupational health and safety, pollution or local codes are affected by the use, installation and operation of the equipment and other matters over which Seller has no control, Seller assumes no responsibility for compliance with those laws and regulations, whether by way of indemnity, warranty, or otherwise. It is incumbent upon the Buyer to specify equipment which complies with local codes and ordinances.

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