

Balancing valve PVM



Areas of use

Macon Balancing PVM is used to distribute the flow within different areas in heating and cooling systems.

Description

PVM is a dynamic valve unit developed to regulate pressure drop. A fully open STV mounted on the intake, and a PV differential pressure valve on the return. The pressure-compensating mains control valve ensures problem-free setting of the various mains. The PVM valve is equipped with a signaling circuit, cut-off valve, drain valve and measurement socket as standard.

The PVM valve guarantees 100% differential pressure regulation under all conditions, regardless of whether changes are made in the system.

The valve regulates the system and removes noise problems due to high pressure drop. After setting the valve no further adjustment to the valves is necessary.



Technical data

Max. temperature

248°F

Min. temperature

14°F

Material

Brass CW617N

Gaskets EPDM

1/2" 3/4" 1" 1 1/4" 1 1/2" 2"

Flow range - gpm

0.22 0.44 2.65 3.08 4.4 22

2.65 4.4 11 18.5 22 66

Presetting on delivery

1/2", 3/4" 5 turns

1" 8 turns

1 1/4", 1 1/2", 2" 2 turns

Max. pressure psi

58 psi

Min. pressure psi

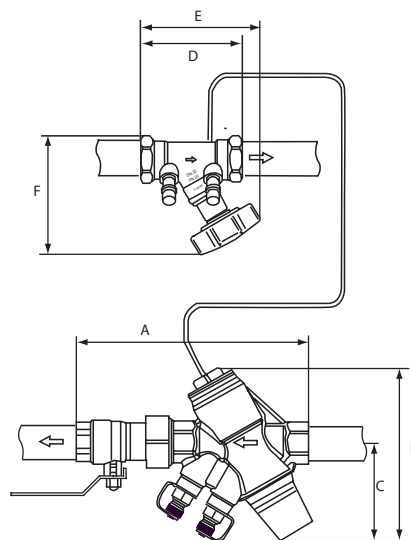
0.73-4.35 psi 1/2"-1", 2.9-11.6 psi 1 1/4"-2"

Pressure class

PN16

Dimensions (inches)

	Dim	A	B	C	D	E	F	Weight (lbs)
PVM	1/2"	6.57	5.83	3.78	3.39	4.37	3.74	5.811
PVM	3/4"	6.81	5.94	3.86	3.54	4.49	3.74	4.389
PVM	1"	7.95	6.1	4.02	4.02	4.72	3.78	5.884
PVM	1 1/4"	9.25	7.4	4.52	4.72	5	3.78	10.020
PVM	1 1/2"	10.12	8.11	4.69	5.2	5.47	4.25	13.348
PVM	2"	11.26	6.22	4.96	6.06	5.83	4.37	18.992

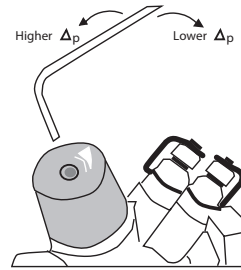


Setting

The valve is easy to set on the knob using a 4 mm Allen key. The setting is read off the pressure drop diagram for each dimension.

When presetting the valve, start by screwing the setting to minimum. Then open the valve to the required value according to the diagram.

The STV valve is used solely for shutting off and flow measurement, it must not be set in any position other than open.



Presetting

The PVM valve is preset according to the diagram.

The curves (the oblique lines that indicate the pressure in the main line) are shown in intervals of 0.73 psi to make it simple to take a reading. The curves can be moved so that the valve setting can be produced if, for example, 1.74 psi is selected in a pipe instead.

Example: We decide to maintain 1.74 psi differential pressure in the main at a flow of 2.2 gpm (2.2 gpm comes from the presetting on the radiators).

From the point where 1.74 psi cuts the horizontal line (flow 2.2 gpm) a vertical line is taken down to the x-axis.

It is then easy to read off that the valve should be set at approx. 7 turns. The minimum pressure drop will then be 0.28 psi over the valve.

Total pressure drop:

To dimension the pump it will be:

$$\Delta P = \Delta P_s + \Delta P_v = 1.74 + 0.28 = 2.02 \text{ psi}$$

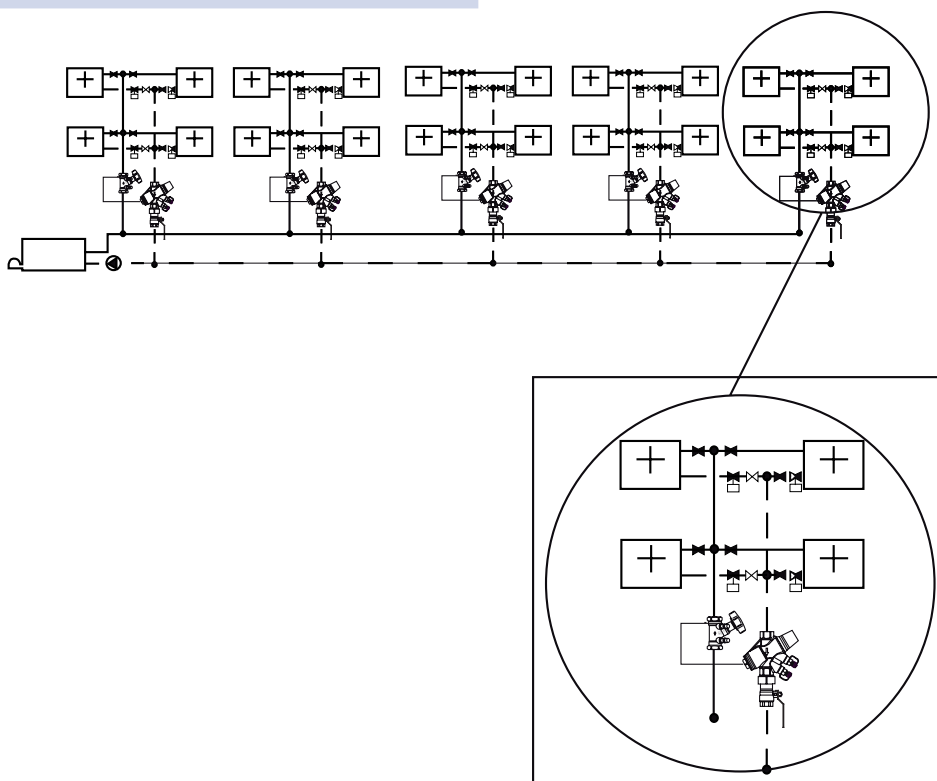
Also include the pipe pressure drop from the valve to the pump.

The pump can subsequently be adjusted optimally by measuring the differential pressure from PF to P- (ΔP pump). To verify the secondary pressure drop calculated, it can be checked by measuring PF to P+ and the result should then be 1.74 psi.

Installation example

Overview of a heating system with 5 staircases with 4 apartments on each one.

The critical valve, defined as the valve with the lowest pressure drop as a rule of thumb this will be the valve positioned furthest away from the pump, is used to lower the pump pressure so that the valve achieves the correct pressure. The lowest possible pressure is then obtained in the system. See dimensioning pump pressure.

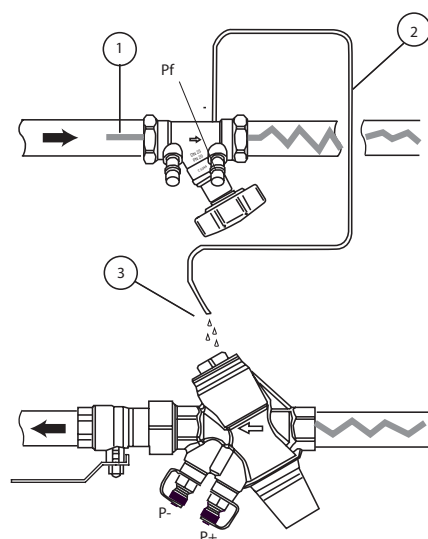


The critical point

Standard application

PVM is fitted in the intake, the signal pipe is to be connected at the low pressure side of the STV valve. The valve can be fitted irrespective of whether it is a straight length of pipe. Bends, tubes etc. can be installed immediately after the valve.

1. Flush the system before fitting signal pipe.
2. Install t-pipe with measurement socket on the STV valve.
3. Install signal pipe on the t-pipe and flush to ensure that there is no air in the signal pipe.
4. Install the signal pipe on the PVM valve on the return pipe.



Dimensioning

Selecting the right valve in an installation requires some data about the system.

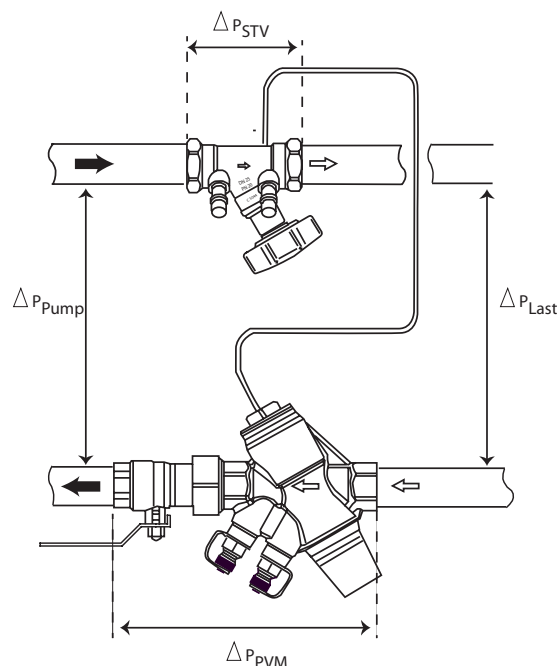
- ΔP pump available differential pressure from pump
- ΔP load differential pressure for circulation
- ΔP STVP pressure drop over valve fully open (diagram)
- ΔP PVM pressure drop over the PVM valve (diagram)

Example:

Calculated value for a valve is 6.34 gpm.
7.25 psi is available differential pressure for circulation ΔP load 2.9 psi is required for the main.

We find the minimum differential pressure required for the PVM valve to achieve minimum working pressure in the diagram.

Two valves can deliver 6.34 gpm 1" and 1 1/4".



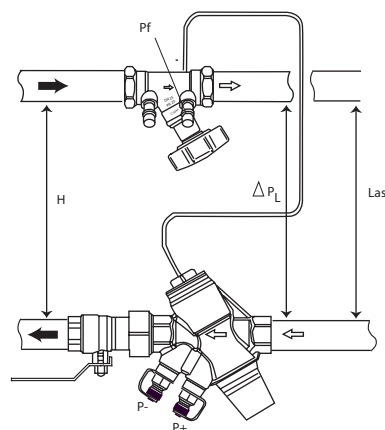
Adjustment and measuring

When adjusting, the differential pressure on the PVM valve is measured and adjusted to 10 kPa. At least one radiator valve needs to be slightly open.

When measuring of the flow use the STV valve and a measuring tool. To be able to measure the flow may the STV valves wheel be set lower to have a higher differential pressure over the STV valve. Note that the differential pressure over the STV valve will not be too high so that the min differential pressure over the PVM valve will be too low and the PVM valve stop to regulate. After the measuring of the flow open the STV valve fully again.

Optimising pump pressure

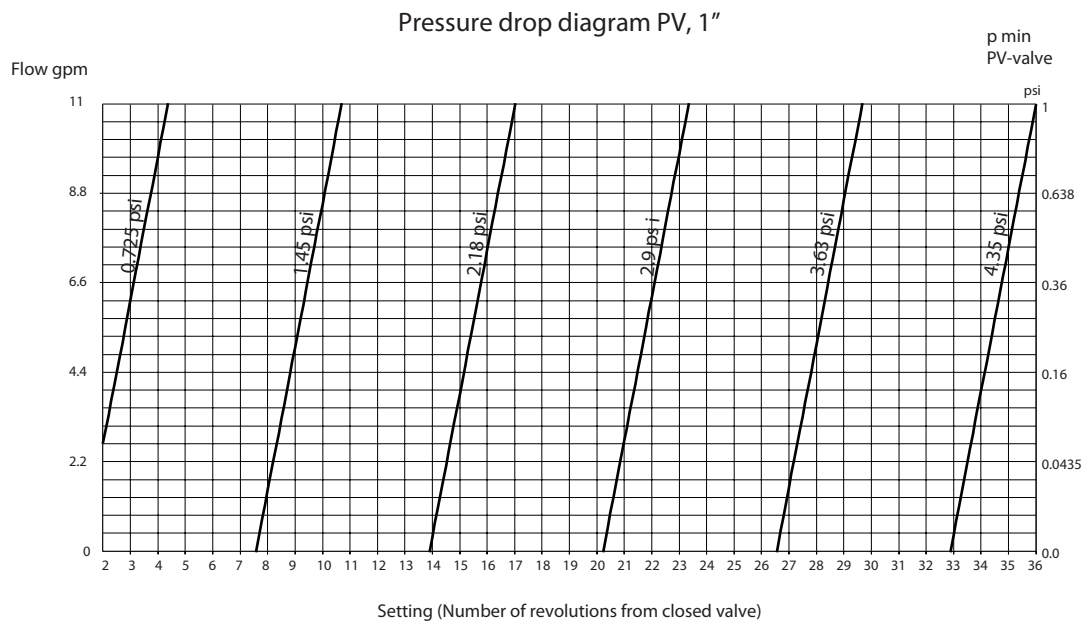
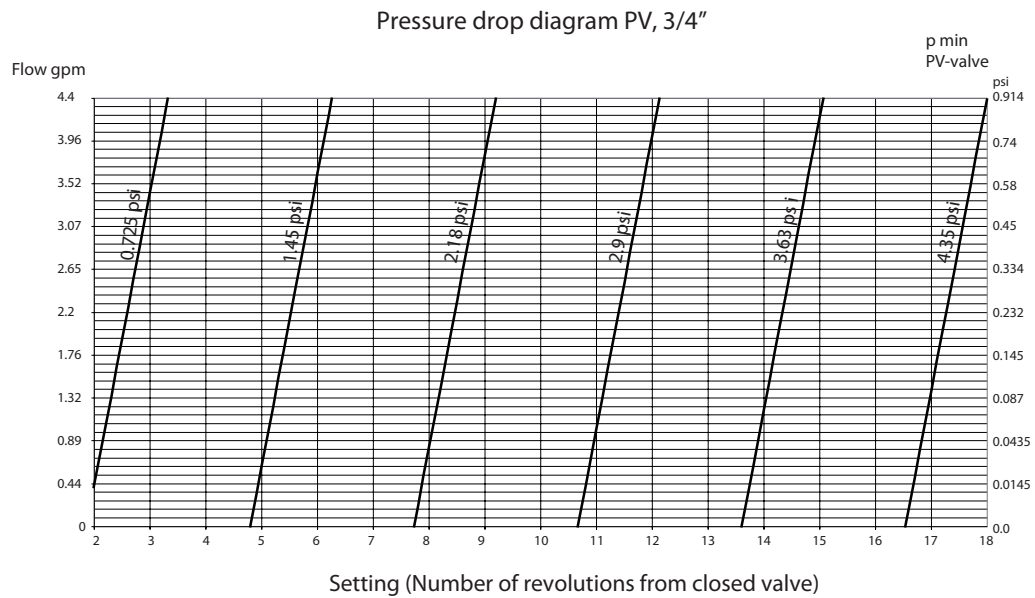
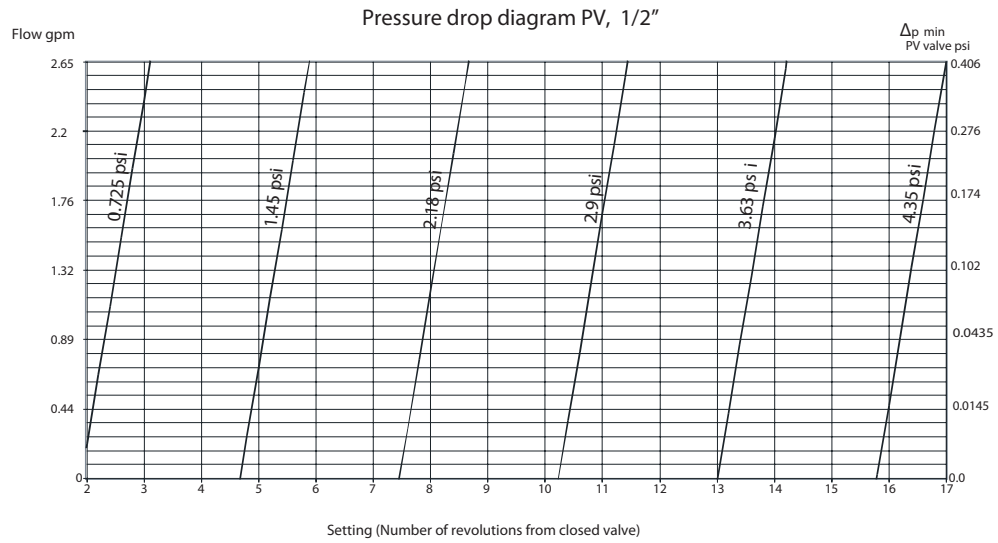
Lowering to minimum possible pump differential pressure is carried out by measuring at the PVM valve and obtaining at least 1.91 psi, this is the pump's lowest level at which the PVM can be regulated.



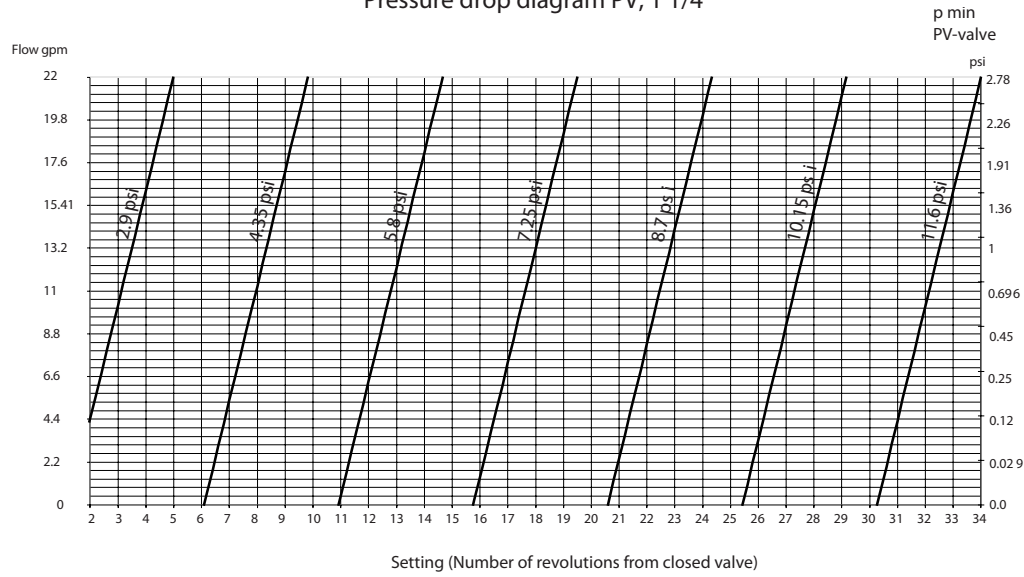
cv-value the STV valve

Number of turns	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
1	0.21	0.39	0.55	0.91	1.39	2.31
2	0.37	0.69	0.89	1.53	2.37	4.16
3	0.52	0.96	1.19	2.08	3.24	6.01
4	0.72	1.31	1.73	3.12	4.74	8.79
5	0.99	1.79	2.66	4.74	7.17	13.76
6	1.35	2.43	4.16	6.82	10.29	19.31
7	1.87	3.35	5.78	9.02	13.87	24.51
8	2.95	4.45	7.51	11.21	16.99	28.90
9	3.64	5.20	9.13	13.30	19.77	33.06
10	4.10	5.90	10.17	15.14	22.54	36.42

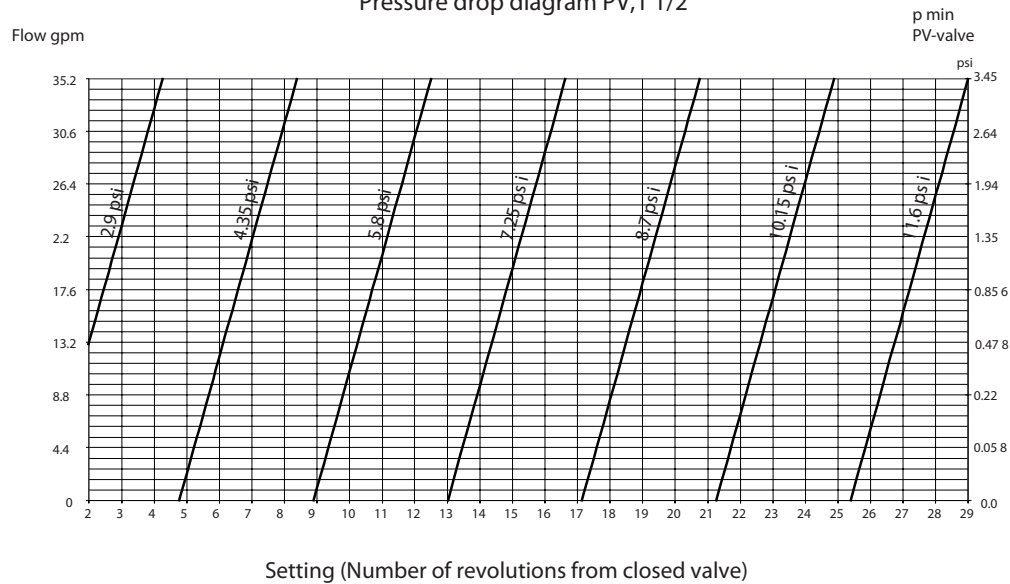
We reserve the right to alter information without notice.



Pressure drop diagram PV, 1 1/4"



Pressure drop diagram PV, 1 1/2"



Pressure drop diagram PV, 2"

