

Differential pressure by-pass valve

519 series



519709A



519566A

Function

The differential pressure by-pass valve is used in systems with a fixed speed circulating pump supplying several zones controlled by two way zone valves. This valve ensures that the head pressure of the pump is proportional to the number of two way valves being closed. It will by-pass the differential pressure created by the pump as the zone valves close, thus eliminating water hammer noise.

Product range

Code 519502A	Adjustable differential pressure by-pass valve with graduated scale, flow up to 9 gpm	connections 3/4" MNPT union inlet x 3/4" MNPT union outlet
Code 519566A	Adjustable differential pressure by-pass valve with graduated scale, flow up to 9 gpm	connections 3/4" press union inlet x 3/4" press union outlet
Code 519599A	Adjustable differential pressure by-pass valve with graduated scale, flow up to 9 gpm	connections 3/4" sweat union inlet x 3/4" sweat union outlet
Code 519600A	Adjustable differential pressure by-pass valve with graduated scale, flow up to 40 gpm	connections 1" FNPT inlet x 1" MNPT union outlet
Code 519609A	Adjustable differential pressure by-pass valve with graduated scale, flow up to 40 gpm	connections 1" FNPT x 1" sweat union outlet
Code 519700A	Adjustable differential pressure by-pass valve with graduated scale, flow up to 45 gpm	connections 1-1/4" FNPT inlet x 1-1/4" MNPT union outlet
Code 519709A	Adjustable differential pressure by-pass valve with graduated scale, flow up to 45 gpm	connections 1-1/4" FNPT inlet x 1-1/4" sweat union outlet

Technical specification

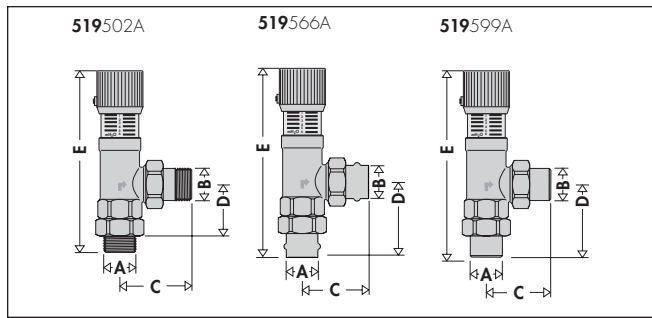
Materials - body:

- valve plug:	brass
- valve plug gasket:	brass
- O-Ring seals:	peroxide-cured EPDM
- union seals:	peroxide-cured EPDM
- control knob:	asbestos free NBR ABS
- spring:	stainless steel

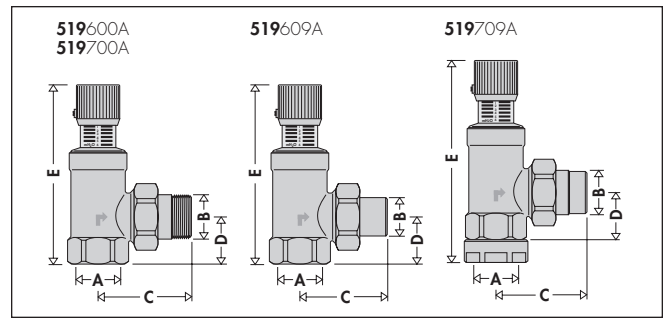
Performance

Suitable fluids:	water, glycol solutions
Max. percentage of glycol:	30%
Temperature range:	32–230°F (0–110°C)
Max. working pressure:	150 psi (10 bar)
Flow rates:	3/4" flow up to 9 gpm 1" flow up to 40 gpm 1-1/4" flow up to 45 gpm
Setting range:	1–6 m w.g. (2–10 psi)

Dimensions



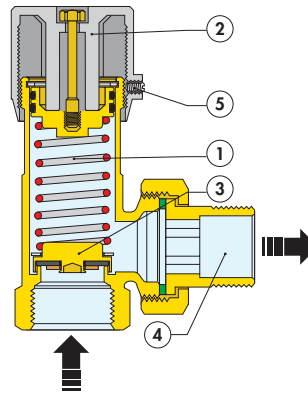
Code	A	B	C	D	E	Wt. (lb.)
519502A	3/4" MNPT	3/4" MNPT	2 1/4"	2 5/8"	5 11/16"	1
519566A	3/4" press	3/4" press	2 3/8"	2 3/4"	5 13/16"	1
519599A	3/4" SWT	3/4" SWT	2 1/8"	2 1/2"	5 9/16"	1



Code	A	B	C	D	E	Wt. (lb.)
519600A 519700A	1" FNPT	1" MNPT	3 13/16"	2 1/16"	6 5/8"	1.4
519609A	1" FNPT	1" SWT	2 13/16"	2 1/16"	6 5/8"	1.4
519700A	1 1/4" FNPT	1 1/4" MNPT	3 15/16"	2 1/16"	7 3/8"	1.5
519709A	1 1/4" FNPT	1 1/4" MNPT	3"	2 1/16"	7 3/8"	1.5

Operating principal

When the spring (1) compression is adjusted using the control knob (2), the force balance acting on the valve plug (3) changes, modifying the threshold pressure value of the valve. The valve plug opens, activating the by-pass circuit, only when it is subjected to a differential pressure sufficient to generate a thrust greater than the thrust exerted by the spring. This allows the flow discharge through the outlet (4), limiting the difference in pressure between the two points in the system where the valve is installed.

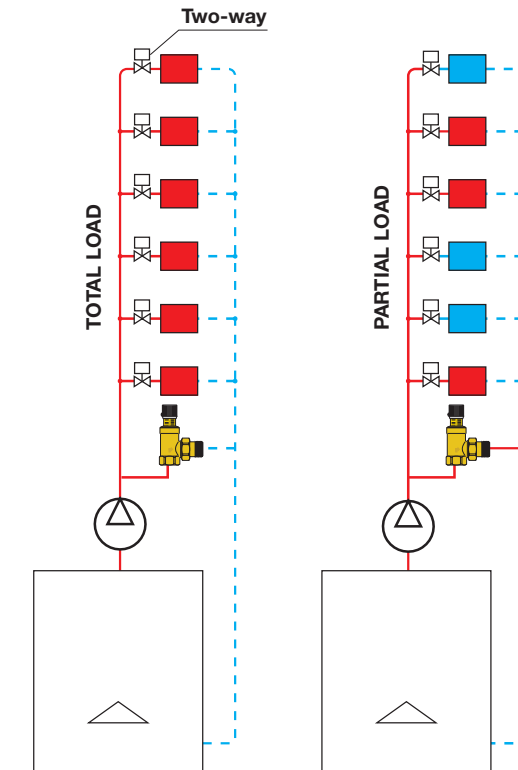
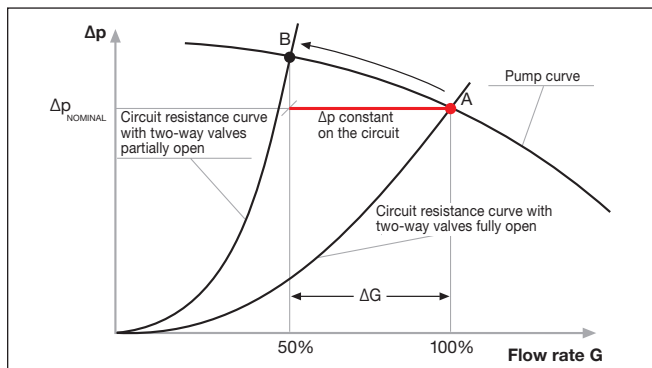


System operation

The purpose of the differential pressure by-pass valve is to maintain the pump operating point as close as possible to its nominal value (point A on the graph shown below). If the by-pass valve is not used, when the flow rate in the circuit decreases due to partial closure of the two-way zone valves, the head loss in the circuit increases, point B.

The by-pass valve, set to the nominal head value of the pump, limits the increase in pressure, by-passing the flow rate ΔG . This occurs at any closing condition of the system two-way zone valves. In fact, once the position of the valve control knob has been determined, the threshold pressure value is more or less constant as the discharge flow rate varies (see hydraulic characteristic diagrams).

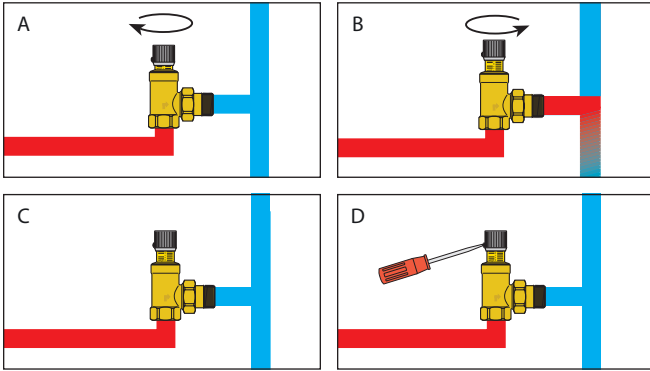
The valve must provide a sufficient flow rate by-pass to keep the pump at its nominal operating point in all system operating conditions, for example when the first zone valves are closed.



Setting

To adjust the valve, turn the knob to the required differential pressure on the graduated scale: the values correspond to the differential pressure in psi or meters w.g. to open the by-pass.

For a quick setup adjustment of the differential pressure by-pass valve, use the following manual method. As an example, a hydronic system with several zone valves: the system must be operating, the zone valves must be fully open and the by-pass valve must be set to the maximum value (a) (clockwise). Gradually open the differential pressure by-pass valve using the control knob (counterclockwise). Use a thermometer, or simply your hand, to check that the hot water is flowing into the by-pass circuit (b). As soon as a rise in the temperature is noted, turn control knob (clockwise) one half turn closed so hot water stops flowing into the by-pass (c). Lock the knob in this position (d) with the locking screw.



Installation

The differential pressure by-pass valve can be installed in any position, following the flow direction indicated by the arrow on the valve body.

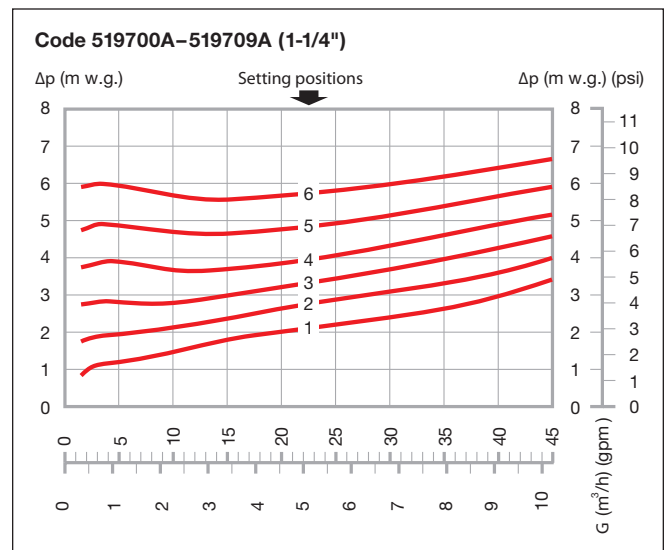
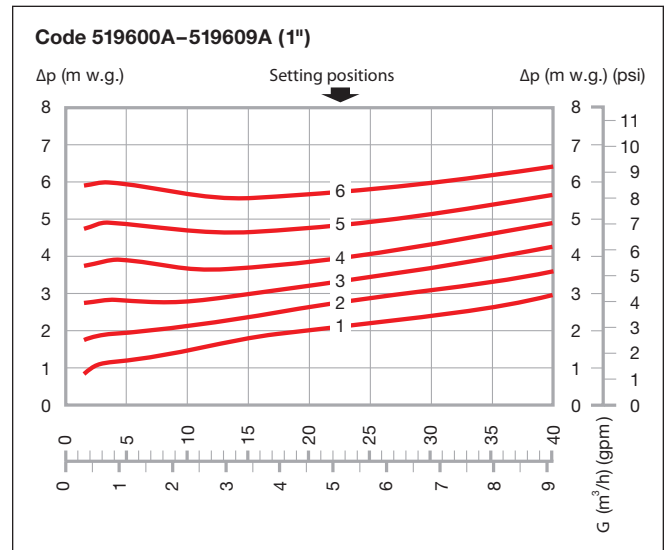
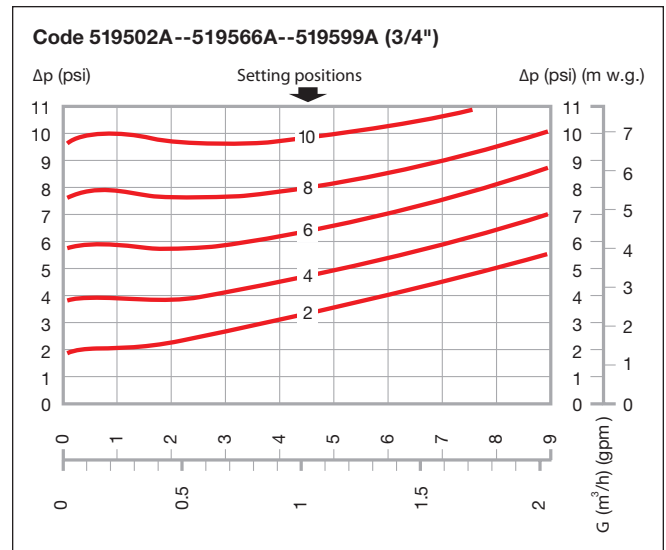
For small to medium size systems:

Differential pressure by-pass valves are connected between the supply and return headers of a zoned system. The differential pressure by-pass valve can be connected at the beginning of the headers, between the pump discharge and first zone circuit. Alternately, the ends of the headers often provide a convenient installation location.

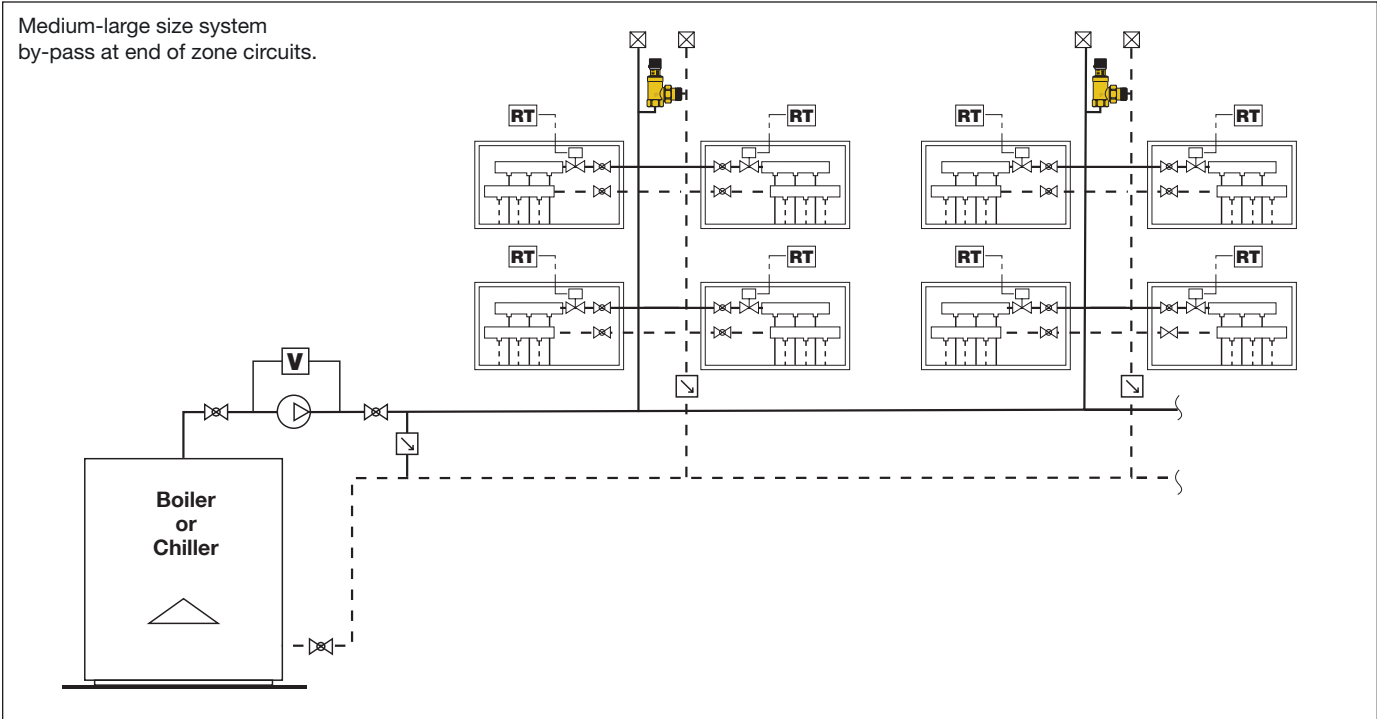
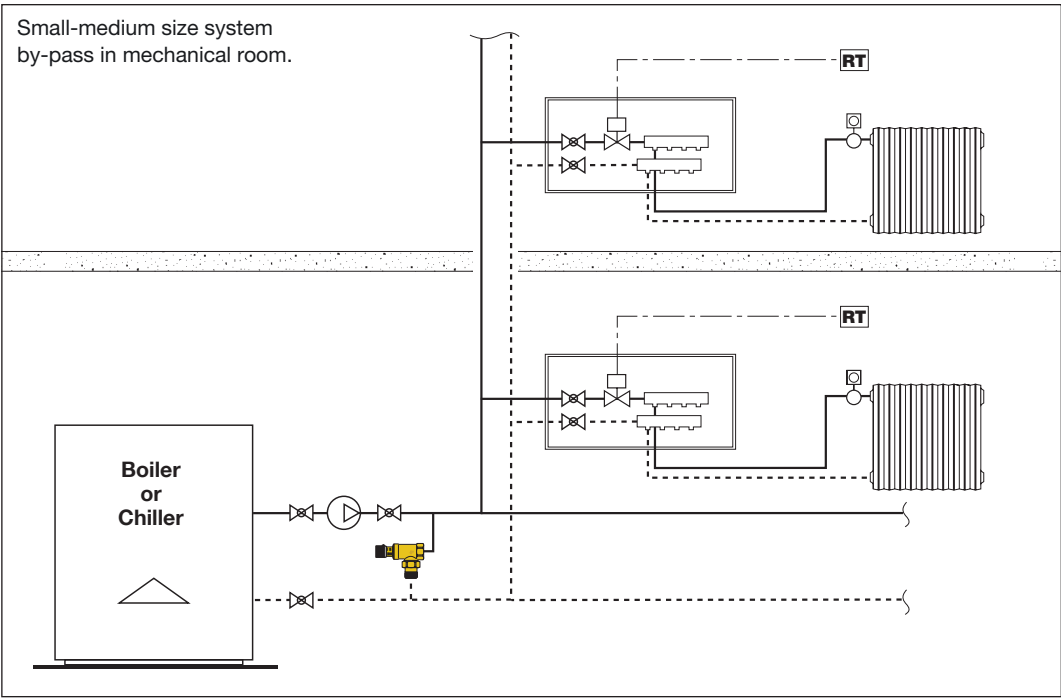
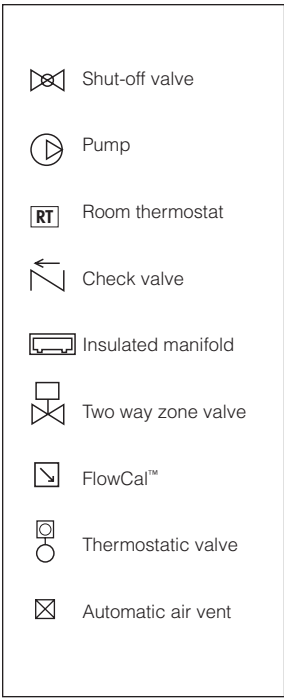
For medium to large size systems:

If the system flow rate is greater than the capacity of a single differential pressure bypass valve, install the valve between the supply and return ends of each zone circuit, rather than installing a number of valves in parallel at the central boiler.

Hydraulic characteristics



Application diagrams



SPECIFICATION SUMMARIES

519 series

Differential pressure by-pass valve. Union connections: 3/4" MNPT union inlet x 3/4" MNPT union outlet, 3/4" union press inlet x 3/4" union press outlet, 3/4" sweat union inlet x 3/4" sweat union outlet, 1" FNPT inlet x 1" MNPT union outlet, 1" FNPT inlet x 1" sweat union outlet, 1-1/4" FNPT inlet x 1-1/4" MNPT union outlet and 1-1/4" FNPT inlet x 1-1/4" sweat union outlet. Brass body. Brass valve plug. Peroxide-cured EPDM valve plug gasket. Peroxide-cured EPDM O-Ring seals. Asbestos free NBR union seals. ABS control knob. Stainless steel spring. Suitable fluids: water, or 30% glycol solution. Temperature range 32–230°F (0–110°C). Maximum working pressure 150 psi (10 bar). Setting range is 1–6 m w.g. (2–10 psi) and flow rates 3/4" flow up to 9 gpm, 1" flow up to 40 gpm and 1-1/4" flow up to 45 gpm.

We reserve the right to change our products and their relevant technical data, contained in this publication, at any time and without prior notice.



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