

466, USVR, USV16/L Series

Relief valves

Technical Data Sheet



Description

466 (Thermatic), **USVR** and **USV16/L Series** valves are devices for differential pressure control between two points of a circuit, designed to overcome the problems typically associated with variable flow rate systems and ensure circulation between the flow and return lines that is proportional to the difference between the nominal pump head and the actual operating conditions.

466

THERMATIC.

Relief valve for systems with manual or automatic shut-off devices on the heat emitters (thermostatic valves, two-way zone valves).

CW617N brass body and ABS cap. PN10.

Overpressure: 10-15%. Max. operating temperature: 110°C.



Type	Part No.	DN	bar	Flow rates (l/h)	Weight (g)
466	4660C12	1/2" FF	0.05÷0.7	1,750	630
466	4662C1	1" FF	0.05÷0.7	7,000	1,180

USVR

Relief valve for systems with manual or automatic shut-off devices on the heat emitters (thermostatic valves, two-way zone valves). Female inlet and male union outlet connections. CW617N brass body and cap.

Adjustment: Position "0" = Fully open - Position "7" = Almost closed $\Delta p = 0.5$ bar.

Plastic knob. PN 6 bar. Overpressure: 10÷15%.

Max. operating temperature: 110°C.



Type	Part No.	DN	bar	Flow rates (l/h)	Weight (g)
USVR	0265216	3/4" FM	0.06÷0.36	3,000	400
USVR	0265220	3/4" FM	0.03÷0.50	3,000	500
USVR	0265225	1" FM	0.03÷0.55	5,700	900
USVR	0265232	1.1/4" FM	0.06÷0.46	12,000	1,050

USV16/L

Relief valve in straight execution for systems with automatic shut-off devices (thermostatic or electrothermal valves, two-way zone valves).

DN 3/4"F connections with union nut. CW617N brass body.

PN10 bar. Overpressure 10÷15%.

Max. operating temperature 110°C. Glycol concentration: max. 50%.



Type	Part No.	DN	bar	Weight (g)
USV16/L	0265118	3/4" F	0.03÷0.50	350

Technical features

Maximum operating pressure 466	10 bar
Maximum operating pressure USVR	6 bar
Overpressure	10÷15%
Maximum operating temperature	110°C

Materials

Valve body	CW617N
Setting springs	UNI 3823 steel
Disc	BT3 UNI EN 6362 aluminium
Packing	EPDM
Handwheel	ABS

Application

These valves are used in heating systems with thermostatic room temperature control, or systems equipped with thermostatic valves and/or two-way zone valves. The above-mentioned control systems control room temperature by adjusting the flow rate to the heat emitters. If a large number of valves are closed, this causes a big increase in flow rate through the valves that are left open. This often results in noise problems, caused by the high speed of the fluid flowing through the valves and pipes. Simultaneous closure of several valves can generate high levels of differential pressure in the valves left open. This forces the pump to vary its operating conditions continuously, which can result in substantial deviations from the initial head.

Operation

The bypass valves open, delivering a constant flow of water through the boiler (which is very important in the case of gas boilers) and increasing the return temperature to the boiler (which helps prevent corrosion). The reliability of the **466**, **USVR** and **USV16/L Series** relief valves is guaranteed by the fact that every single product undergoes testing.

Sizing

Valve selection is normally based on a bypass flow rate of 25-30% of the total flow rate of the mains water system to be protected, and an overpressure of 10-15% of the head expected at that point (check curve of electric pump if necessary). Set the opening pressure during commissioning.

Example with valve 466

- circuit flow rate 1,500 l/h;
- head at the point of installation of the bypass valve 4 m wg (0.4 bar);
- max. overpressure 0.5 m wg (0.05 bar).

Results:

- flow rate to be bypassed = $1,500 \times 0.3$ (30 % of total mains water system flow rate) = 450 l/h;
- set pressure (zero bypass flow rate) = 0.4 bar;
- max. pressure with bypass flow rate of 600 l/h = $0.4 + 0.05 = 0.45$ bar.

The setting flow curves show that the most appropriate **Thermatic** valve in this case is **item 4661C**, which bypasses 500 l/h for a pressure increase of 0.4 to 0.45 bar.

Setting

There are two different ways to set **466 Series** valves:

- you can determine the valve setting, in bar, from the pump design data with the aid of the flow curves shown on later pages;
- for existing systems, where the pump flow curve is not available, you can determine the setting by measuring the pump head with a pressure gauge, or by gradually adjusting the valve until you reach satisfactory operating conditions (limited overpressure and no noise).
Fix the setpoint by fully tightening the handwheel fastening screw.

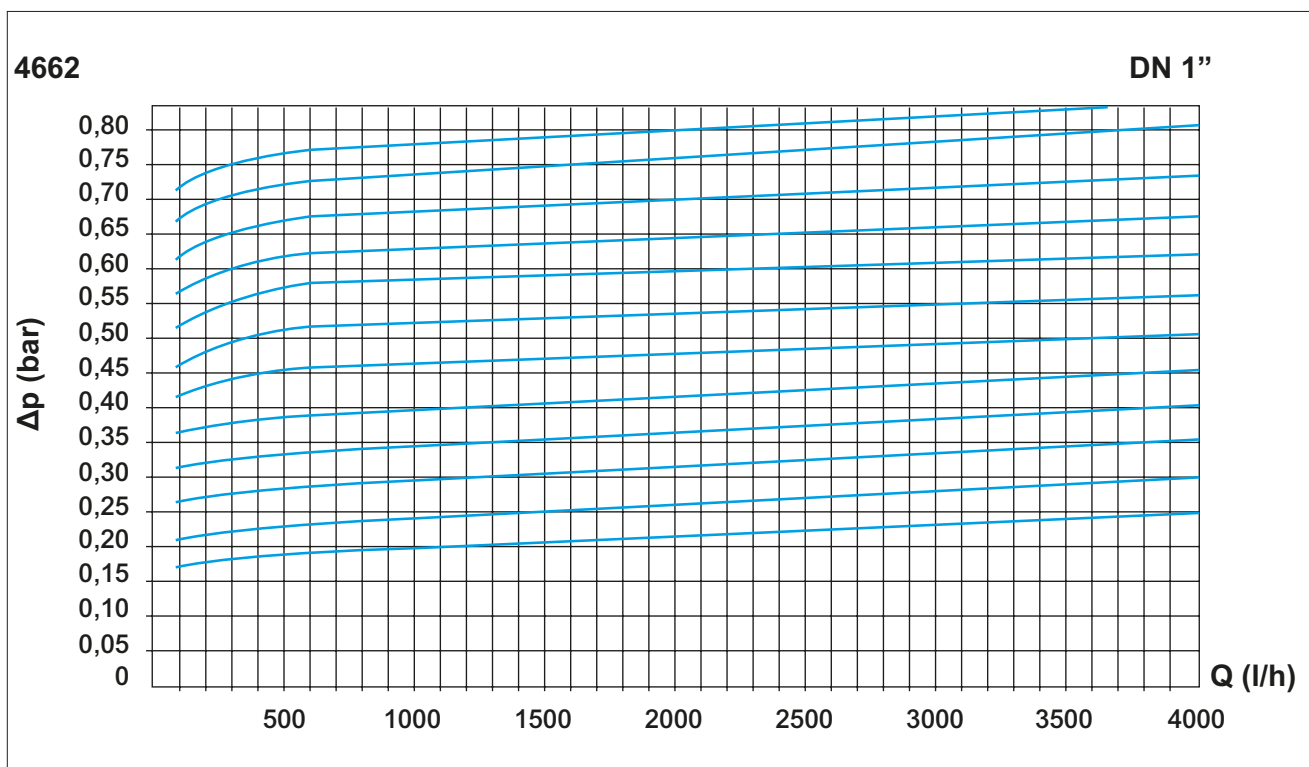
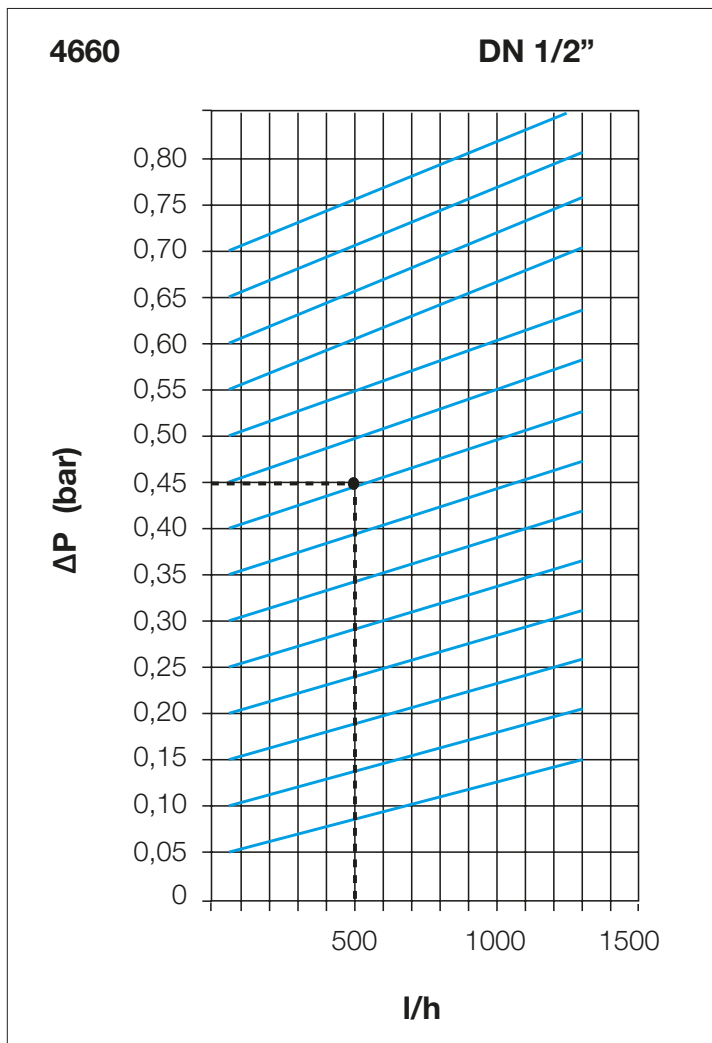
To set **USVR** and **USV16/L Series** valves, proceed as follows:

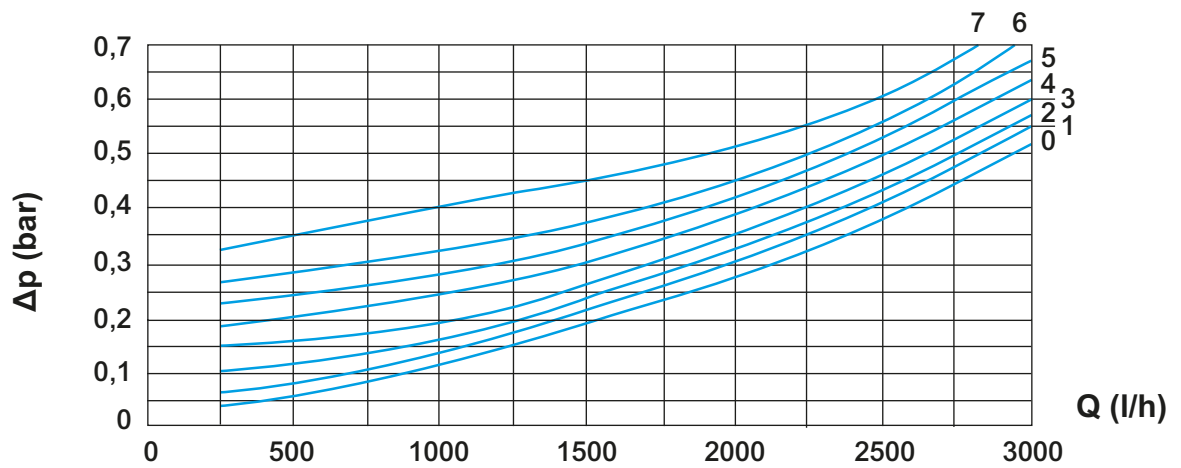
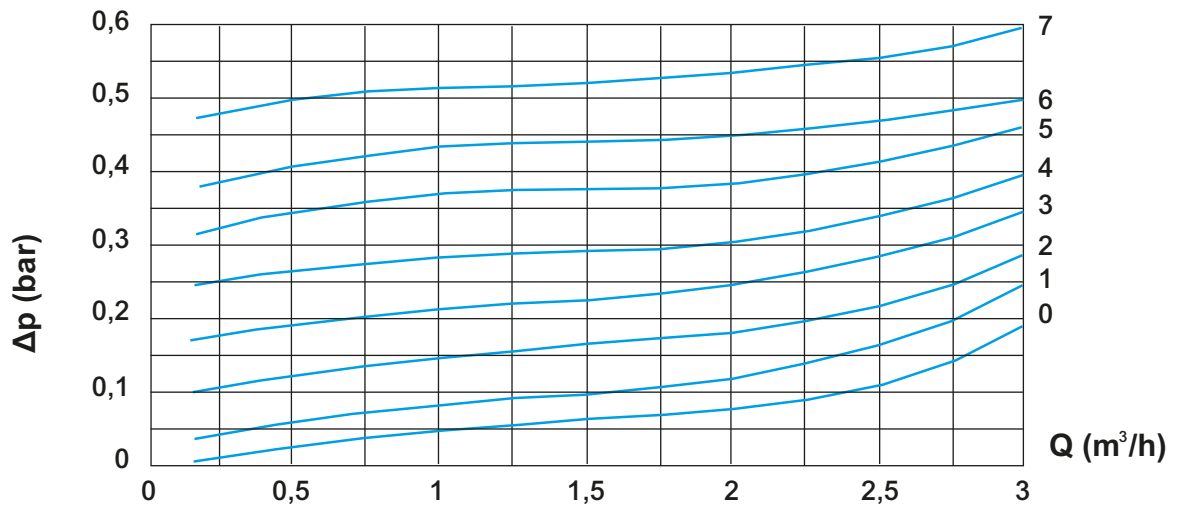
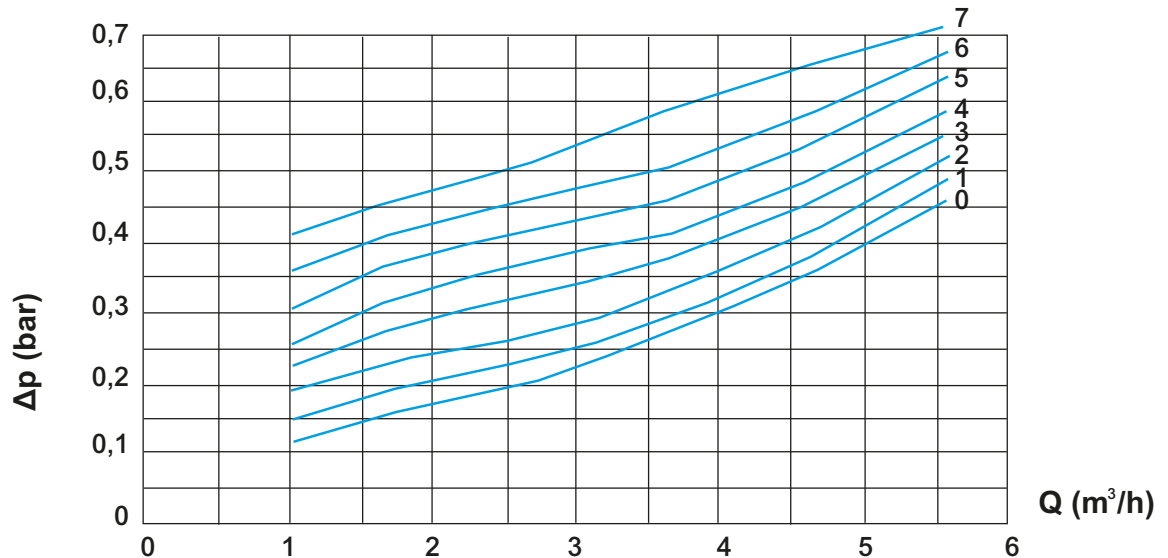
- unscrew the handwheel fastening screw (1) (see overall dimensions);
- set the valve to the differential opening pressure Δp by turning the handwheel (2) (see overall dimensions).
The differential opening pressure must exceed the overall pressure drop of the user circuit (at nominal flow rate) by approximately 20%. This increase prevents premature opening of the valve.
When the user circuit is fully shut off (closed), the USVR valve must be fully open;
- the setpoint pressure should be determined from the flow curves on the basis of the flow rate, and corresponds to a diameter commensurate with the number on the scale (3) to which the handwheel is set (see overall dimensions);
- on completion of the setting process, re-tighten the fastening screw (1).

Example:

- system flow rate: 2,500 l/h;
- differential pressure between flow and return: 0.25 bar;
- bypass valve setpoint differential pressure: $0.25 \text{ bar} + 20\% = 0.3 \text{ bar}$;
- valve selected: USVR20 set to No. 3 (see diagram).

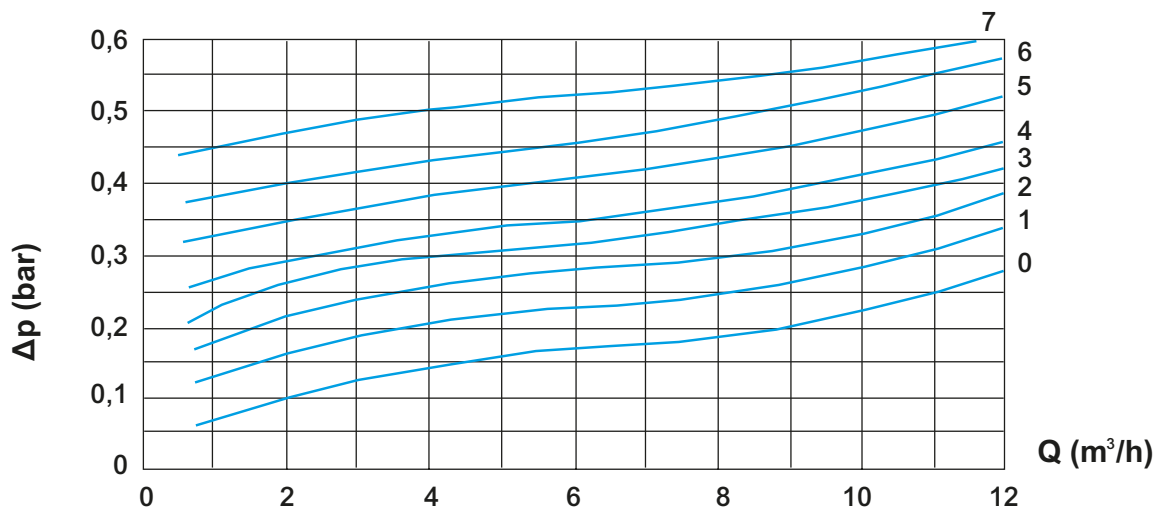
Charts



USVR16
DN 3/4"

USVR20
DN 3/4"

USVR25
DN 1"


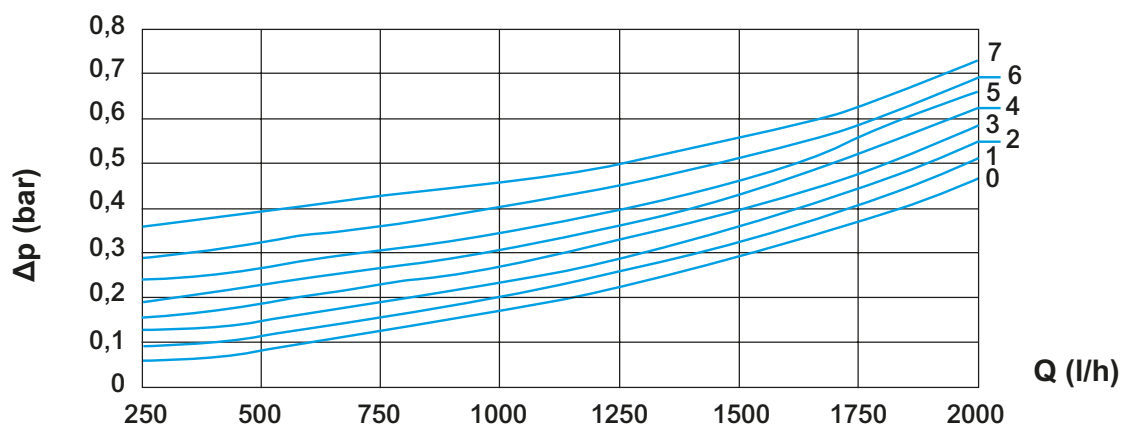
USVR32

DN 1.1/4"



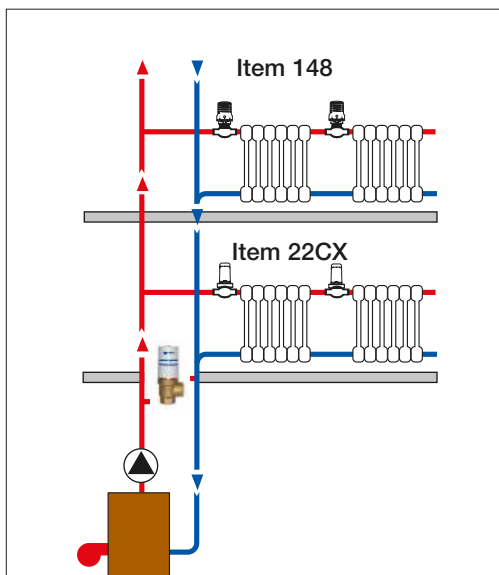
USV16/L

DN 3/4"



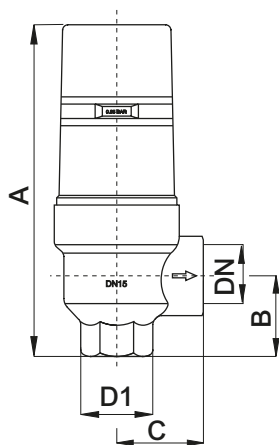
Installation

Install **466** and **USVR Series** valves downstream of the pump pressure port, connecting the flow pipe to the return pipe. Observe the direction of flow indicated on the valve body.



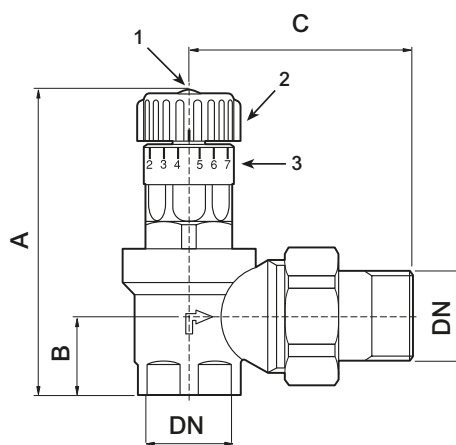
Overall dimensions (mm)

466



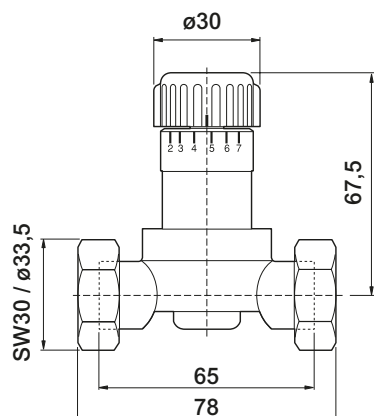
DN	A	B	C
1/2"	135	32	36
3/4"	141	35	41
1"	195	41	46

USVR



DN	A	B	C
3/4"	88	23	62.5
3/4"	120	26	70
1"	138	33	83.5
1.1/4"	148	39	100

USV16/L



Specification text

466 Series

Relief valve THERMATIC **466 Series** – WATTS brand – for systems with manual or automatic shut-off devices on the heat emitters (thermostatic valves, two-way zone valves). Diameters from 1/2" to 1" with FF connections. CW617N brass body and ABS cap. PN10. Overpressure: 10-15%. Maximum operating temperature: 110°C.

USVR Series

Relief valve **USVR Series** – WATTS brand – for systems with manual or automatic shut-off devices on the heat emitters (thermostatic valves, two-way zone valves). Diameters from 3/4" to 1.1/4" F inlet connections and M union outlet connections. CW617N brass body and cap. Adjustment: Position "0" = Fully open - Position "7" = Almost closed $\Delta p = 0.5$ bar. Plastic knob. Maximum operating pressure: 6 bar. Overpressure: 10-15%. Maximum operating temperature: 110°C.

USV16L Series

Straight relief valve **USV16L Series** – WATTS brand – for systems with automatic shut-off devices (thermostatic or eletrothermal valves, two-way zone valves). DN 3/4"F connections with union nut. CW617N brass body. Maximum operating pressure: 10 bar. Overpressure: 10-15%. Maximum operating temperature: 110°C. Glycol concentration: max. 50%.



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