Bailey

CLASS TH Pressure Reducing Valve

CLASS TH Direct Acting Pressure Reducing Valve

The Class TH High Pressure Reducing Valve, has been developed to increase the outlet pressures available from the Class T range of valves.

The existing range utilises diaphragm technology to regulate the closing pressure. This technology relies on the flexibility of rolling rubber diaphragms, which limit the maximum outlet pressure due to the strength of the rubber.

Within the Class TH High Pressure Reducing Valve, the diaphragm is replaced with a piston (Y). The outlet pressure is sensed up through port (X) to the underside of the piston. This design allows much higher pressures to be accommodated and is less susceptible to pressure spikes and water hammer.

OPERATION

The Class TH pressure regulator is operated by a spring loaded piston and has a balanced main valve which ensures that the outlet dead-end pressure is unaffected by changes of inlet pressure.

The valve is opened by the load on the adjusting spring and closed by reduced pressure on the underside of the piston. Under normal working conditions, the balance of these two forces gives the degree of valve opening for the required reduced pressure.

CLASS TH

FEATURES AND BENEFITS

- Fully balanced piston - allows a constant outlet pressure to be maintained, irrespective of varying inlet pressure.
- Soft disc - for positive shut-off.
- Self actuation/regulation - requires no external power source.
- Simple design - enables the valve to be easily maintained and serviced without removal from the line.
- Minimum variation between ‘flow’ and ‘no-flow’ pressure.

CE MARKING

The Class TH has been certified to the requirements of the PED (Category II). Valve sizes below 32mm (1-1/ 4 inch), do not require, and hence, cannot be CE marked.

TECHNICAL SPECIFICATION

Size	25, 40 and 50 mm (1, 1-1/2 and 2 inch)
Connection	Flanged BS4504 PN16/40. BS 10 table ‘F’. Others available on request.
Material	Bronze
Temperature Range	-20 to 100^{o}C
Maximum Inlet Pressure	40 Barg
Maximum Outlet Pressure*	20 Barg
Minimum Outlet Pressure*	3 Barg

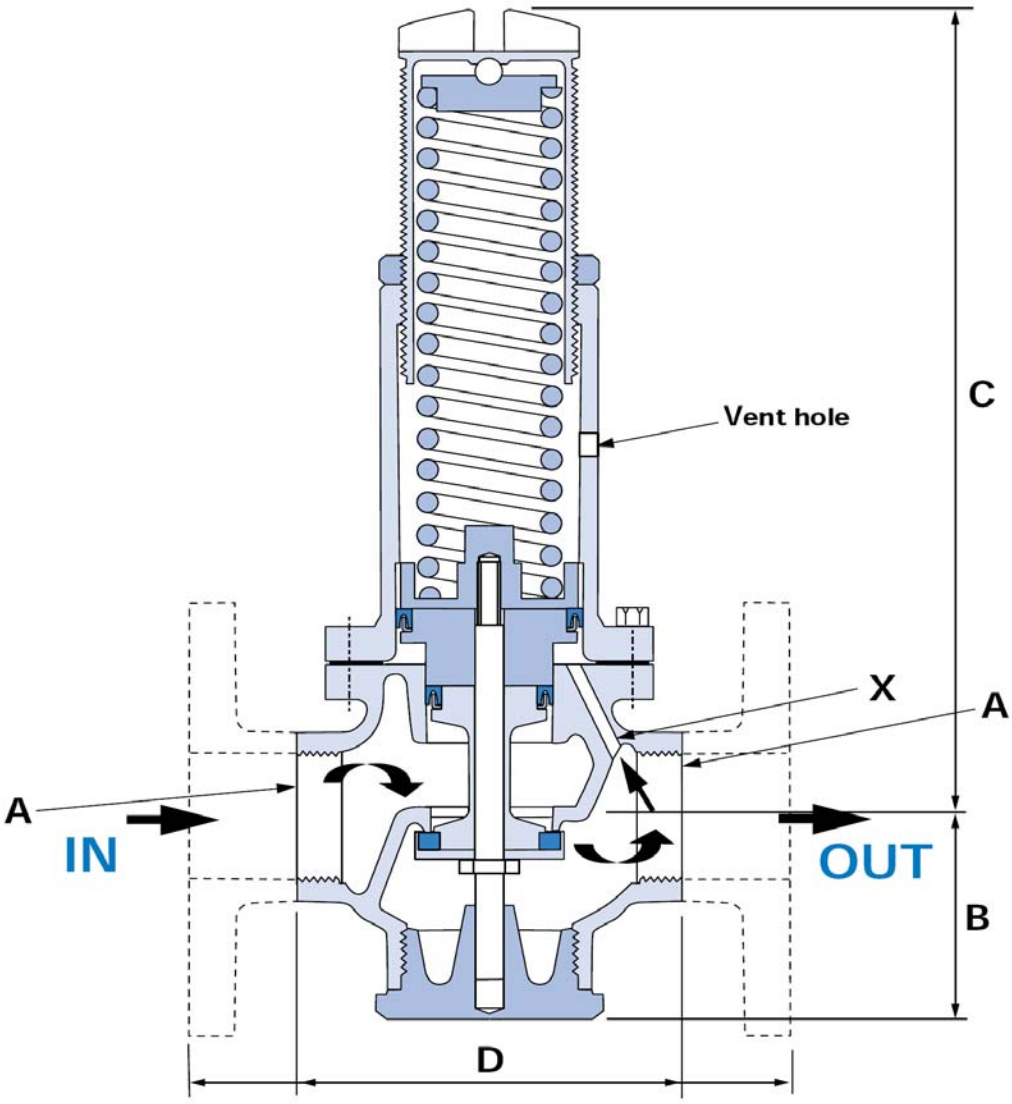
* Setting including rise at dead end.

SPRING SELECTION

Dead End Setting Barg	Spring Number DN25 (1")	DN40 (1.5")	DN50 (2")	Springs Colour Code
3 to 15	C2957-425	C2954-425	C2960-425	White
>7 to 20	C3019-425	C2959-425	C2961-425	Yellow

Dead End Setting = Flowing outlet pressure + Rise to dead end

PARTS



DIMENSIONS

Screwed			
SIZE	**DN25**	**DN40**	**DN50**
A BSPF	1"	1-1/2"	2"
B	56	68	79
C	222	292	324
D	111	133	165
Kg	4	8	11

Flanged			
SIZE	**DN25**	**DN40**	**DN50**
A	1"	1-1/2"	2"
B	61	70	83
C	222	292	324
D	160	200	230
Kg	6.5	13	17

All dimensions in mm.

SIZING GUIDELINES FOR AIR AND GAS DUTIES

The capacity sizing charts are for:

1) Critical pressure drop sizing.
2) Air.
3) Temperature of 15°C.
4) Units l/s.
5) Standard rise at dead end setting.

The following instructions will assist when the actual service conditions differ from the above criteria.

1) **Critical Pressure Drop**

The air capacity charts are based on critical pressure drop sizing. To achieve these flows, it is critical that the correct pipe sizes are used.

2) **Other Gases**

If you wish to use the valve on other compatible gases, the chart opposite can be used, l however the capacity will change depending on the specific gravity of the flowing gas. Divide the valve air capacity by $\sqrt{SG}$ to give the gas capacity (SG = specific gravity, relative to air = 1)

3) **Other Temperatures**

If the flowing temperature is not 15°C the chart capacity will need to be divided by $\sqrt{(T/288)}$
where: T= flowing temperature °C + 273°K

4) **Useful Conversions**

m^3/h = l/s x 3.6
CFM = l/s x 2.12

5) **Non-Standard Rise at Dead End**

For a definition of rise at dead-end. To calculate capacities at a different rise at dead end multiply chart capacity by the below figures.

Example:

Chart air capacity = 100 l/s
SG of gas = 0.8
Gas capacity of valve will be
$100 \div \sqrt{0.8}$ = 111.8 l/s (gas)

Example:

Chart air capacity = 100 l/s
Air temperature = 50°C (T = 323°K)
Actual Air capacity at temperature will be:
$100 \div \sqrt{323/288}$ = 94.4 l/s (@ 50°C)

Example:

Chart air capacity = l/s
Valve type Class T
Required rise at dead end 0.35 Barg
Actual air capacity will become
1000 x 0.54 = 540 l/s

WATER CAPACITIES

TH		Water Capacity - l/s		
Pressure Differential (Barg)	**Rise to Dead End**	**25mm**	**40mm**	**50mm**
2.00	**1.20 Bar**	2.56	4.34	7.50
3.00	**1.40 Bar**	2.74	4.64	7.83
4.00	**1.60 Bar**	2.92	4.95	8.17
5.00	**1.65 Bar**	3.10	5.25	8.50
6.00	**1.75 Bar**	3.28	5.55	8.83
7.00	**1.80 Bar**	3.45	5.85	9.16
8.00	**1.85 Bar**	3.63	6.16	9.50
9.00	**1.95 Bar**	3.81	6.46	9.83
10.00	**2 Bar**	3.99	6.76	10.16
15.00	**2 Bar**	4.12	6.98	10.50
20.00	**2 Bar**	4.25	7.21	10.84
25.00	**2 Bar**	4.39	7.43	11.17
30.00	**2 Bar**	4.52	7.66	11.51
35.00	**2 Bar**	4.65	7.88	11.85

SIZING GUIDELINES FOR WATER AND OTHER LIQUIDS

The capacity sizing charts are for:

1) Water.
2) Units l/s.
3) Standard rise at dead end setting.

The following instructions will assist when the actual service conditions differ from the above criteria.

1) **Other Liquids**

If you wish to use the valve on other compatible liquids, the sizing chart opposite can be used.
However, the valve capacity will change depending on the specific gravity of the flowing liquid. Divide the valve water capacity by $\sqrt{SG}$ to give the liquid capacity.
(SG = specific gravity, relative to water =1.)

2) **Useful Conversions**

Igpm = l/s x 13.33
m^3/min = l/s x 0.06

3) **Non-Standard Rise at Dead End**

For a definition of rise at dead end.

Standard rise at dead end is 1 barg.

To determine the capacity at a different rise at dead end, multiply the water capacity by the following factors.
Note. The capacity is unaffected by changes in temperature.

Example:

Chart water capacity = 2 l/s
SG of liquid = 0.8
Liquid capacity of valve will be
$2 \div \sqrt{0.8}$ = 2.24 l/s (liquid).

TYPE & SIZE	RISE AT DEAD END		
	0.35 Bar	0.7 Bar	1.4 Bar
TH	Other rises are not available		

Note. The capacity is unaffected by changes in temperature.

INSTALLATION OF PRESSURE REGULATING VALVES

Installation

1) Mount the valve with the spring centre line vertical and with the adjusting screw uppermost.
2) Ensure the valve and pipework is adequately supported and that the pipe does not impose strain onto the valve.
3) Provide adequate headroom or adjustment and space underneath to remove the bottom cover or plug, to give access for dismantling.
4) It is recommended to fit pressure gauges downstream of the valve.
5) Isolating valves and line strainers are advisable.
6) The downstream (outlet) system should be protected by a correctly sized safety relief valve, set at a pressure not less than 1 barg or 15% (whichever is the greater) above the dead end setting of the regulator.
7) Flush the pipework to ensure that it is clear of dirt and debris.
8) For valves on air, gas and steam. The outlet piping should be expanded to accommodate the increased volume.
9) Ensure correct orientation of the valve, with respect to the direction of flow. Each valve is marked with a flow direction arrow.
10) Ensure that the correct spring is fitted for the required downstream (outlet) pressure, including the ‘rise at dead end’

Setting

All direct acting regulating valves should be set against a ‘Dead end’, allowing for a ‘rise at dead end’. For definitions of these terms please refer to Page 90.
1) Remove all the load from the spring by unscrewing the adjusting screw (see item 12 on individual valve drawings).
2) Provide a downstream (outlet) ‘Dead end’ complete with pressure gauge, by closing a suitable isolating valve.
3) Admit upstream (inlet) pressure.
4) Commence adding load to the spring by screwing the adjusting screw (item 12). Stop when the required downstream (outlet) dead end setting pressure has been achieved.
5) Open the downstream isolating valve slowly to allow flow through the valve. On steam applications
it is important that the down stream system is allowed to clear any condensate and to warm through gradually.
6) If necessary, reset the pressure by turning the adjusting screw and then checking the new dead end setting.