BAYARD
BY TALIS

MONOSTAB pressure sustaining/relief valve
Series K1 25

Monostab pressure sustaining/relief valve - General

Pressure sustaining/relief valve for maintaining the pressure of a network upstream of the unit

Compliance with standards:

- Tested according to standard EN 12266
- NF EN 1074-5
- Face-to-face dimensions ISO 5752-1
- French Sanitary Compliance Certificate (A.C.S.)

Compliance with EC directives:

- Drinking water 98/63/EC
- Construction products 89/106/EC
- Pressure equipment directive 97/23/EC (networks for the supply, distribution and discharge of water and associated equipment are not covered by this directive, as mentioned in Article 1 paragraph 3.2). This exclusion means that we are not required to apply the CE conformity marking on this product.

Compliance with the REACH Regulations (EC 1907/2006).

1 - General

1 - 1. Functions, applications:

This spring-actuated pressure sustaining/relief valve:

- Transfers excess pressure from an upstream network to a lower pressure downstream network, to a reservoir or to a discharge as soon as the upstream pressure exceeds the set value
- Maintains a setpoint pressure (mounted on-line on the pipe) to:
  - Provide a minimum pressure at a high point or towards a service connection with high head loss
  - Avoid too great a pressure drop when supplying a reservoir and spread out filling the reservoir over time
  - Maintain a minimum pressure on a pump and thus limit the flow to prevent it operating in the cavitation zone
- Relieves the pressure above a given setpoint pressure (mounted as a tap-off of the pipe) to:
  - Avoid overpressure in a network when closing a shutoff device
  - Provide a minimum pressure at a pump outlet in the event of low or zero consumption

Applications:

- Public or private water distribution networks
- Domestic, industrial or fire fighting water networks
- Irrigation networks
- Etc.

1 - 2. Specifications:

- Modern design
- Simple construction
- Robust construction
- Safe operation and reduced maintenance
- Unaffected by variations in downstream pressure and transferred flow
- Friction-free operation and no risk of blockage
- Manufactured since 1982
- Last improvements made in 2011 (drain plug under the lower guide)
- Body and bonnet made of ductile iron
- Powder epoxy coating applied by cataphoresis approved for contact with drinking water
- Stainless steel bolting
- Seize-resistant setting system (galvanised steel-brass)
- Removable stainless steel seat
- Upper guide protected from contact with water
- Lower guide coated with a scale inhibitor
- PN 16 bar
- Can be dismantled from above without having to disconnect the pipe
- Spare parts readily available
- Pressure gauges not included (option)

Hydraulic engineer's notes:

- *The pressure sustaining adjustment function can be summarised as management of the temporary shortfall of water in relation to demand. The flow and pressure availability downstream of a pressure sustaining valve is subject to the upstream and downstream consumption demands:*
- *If the upstream pressure is greater than the setting of the Monostab pressure sustaining/relief valve, then the downstream pressure can be equal to the upstream pressure.*
- *If the upstream pressure is the same as the setting of the Monostab pressure sustaining/relief valve, then the downstream pressure can be equal to or less than the upstream pressure. In some cases the pipe may not be full.*
- *If the upstream pressure is lower than the set pressure of the Monostab pressure sustaining/relief valve, the device will be closed and there may not be any water downstream.*
- *In view of these operating scenarios, it is essential to provide the following when necessary:*
- *Protection of the downstream network against excessive pressure*
- *The option of a secondary supply for the downstream network*
- *An air inlet device (Vannair) downstream of the unit*
- *The pressure sustaining/relief function is not suitable for protecting submersible pumps with high drawdown*
- *If you are in any doubt, contact your Bayard representative or Bayard CTS*

Monostab pressure sustaining/relief valve - General

Fig. I

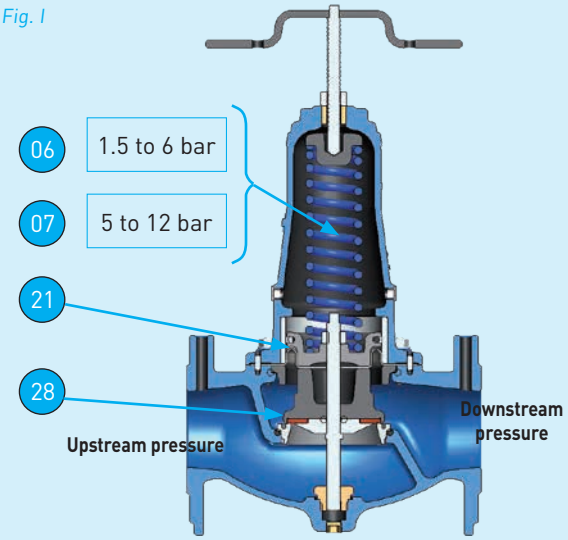
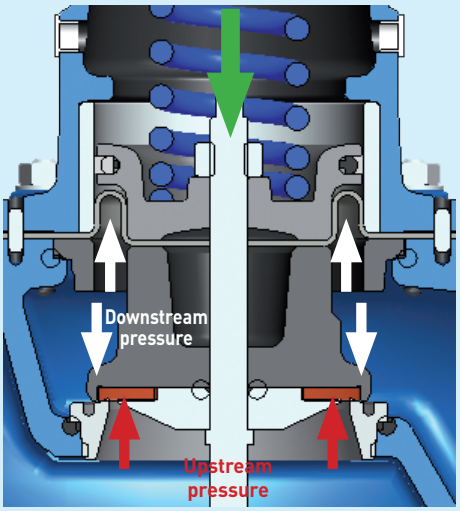


Fig. II



1 - 3. Operation:

- This pressure sustaining valve consists of a valve disc (28), compensated by a spring (06) or (07) and balanced against downstream pressure by a rolling diaphragm (14) (equips Monostab pressure reducing valve PN 25 bar).
- The effect of the downstream pressure (white arrows) on the top of the valve disc is counteracted by the effect of the same pressure below the rolling diaphragm. The effects cancel each other out and the assembly is thus unaffected by variations in the downstream pressure.
- The effect of the upstream pressure below the valve disc assembly (red arrows) is compensated by the adjustable compression of the spring (green arrow).
- When the upstream pressure drops below the set pressure, the force exerted by the spring becomes predominant. The mobile unit moves downwards and the device closes, preventing the water passing through, in order to maintain the setpoint pressure. The device is watertight at zero flow, and the downstream pipe can be empty or supplied by another source.
- Conversely, if the upstream pressure increases towards the set pressure, the force below the mobile assembly exceeds that of the spring. The mobile unit rises and the device opens to a greater or lesser extent, allowing the water through while maintaining the setpoint pressure upstream. The downstream pipe can be partly filled or at a pressure between 0 bar and the setpoint pressure, or supplied by another source.
- When the upstream pressure is greater than the set pressure, the force exerted below the mobile unit becomes predominant. The mobile unit rises fully, allowing maximum flow. The pressure in the downstream pipe can be equal to the pressure read upstream.

Hydraulic engineer's notes:

A) *As with **all devices on the market that are directly actuated by a spring**, the accuracy of adjustment between zero flow and maximum flow is directly related to the travel of this spring. In order to be watertight, the valve disc must move down. To do this:*

1. The spring must relax

2. Its resistance decreases

3 The upstream pressure below the valve disc must increase.

- *Conversely, to reach maximum flow rate, the valve disc must move up as far as it will go:*

1 The spring must compress

2 Its resistance increases

3 The upstream pressure below the valve disc must increase.

- *Because of this mechanical law, devices with springs are not transparent and lead to head loss*
- *To provide more accurate adjustment, in particular on a pump with a "flat" curve, we have designed the Hydrobloc system for which the hydraulic operation is more transparent. Your Bayard representative is at your disposal to discuss the system with you.*

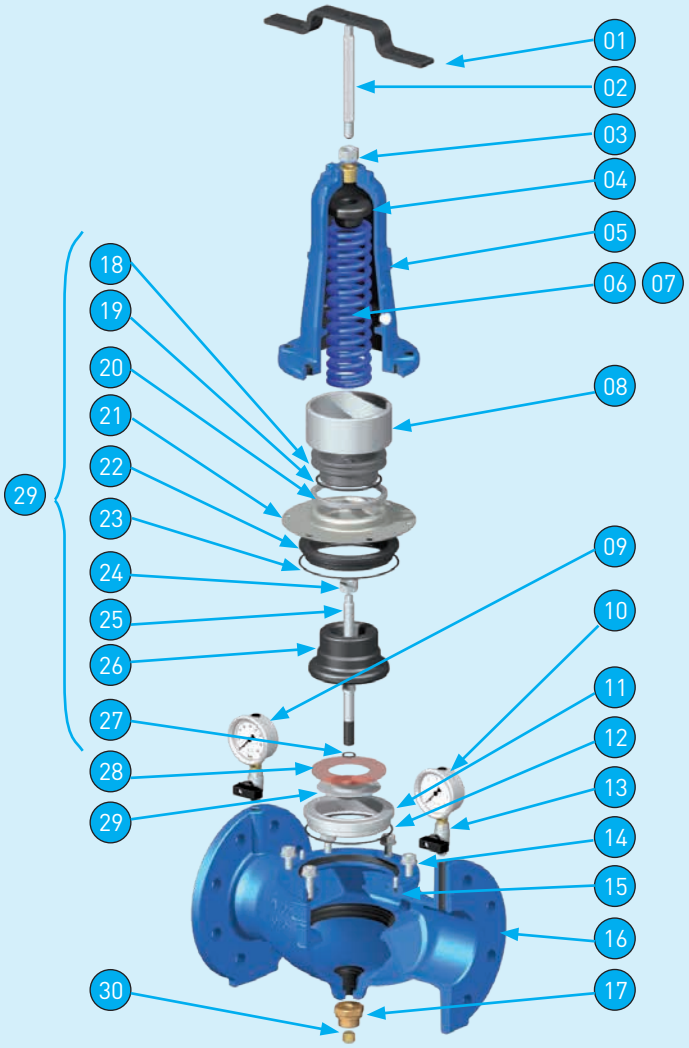
Safety and environment:

All installation, maintenance and repair operations must comply with current local regulations concerning occupational safety and the environment. Ensure that those carrying such operations wear appropriate personal protective equipment. Ensure that all lifting equipment and electrical tools used comply with current regulations, and that they are used correctly.

All installation, maintenance and repair work must be carried out by qualified, trained and authorised personnel, in accordance with current legislation.

From an environmental perspective, the device is recyclable. Recommend that the cardboard box or wooden crate is placed in a recycling container. The packing foam is a neutral waste product, and can be taken to a waste treatment centre for incineration.

Monostab pressure sustaining/relief valve - General



1 - 4. Conditions of use PN 16 bar:

- Upstream control pressures:

1. Spring B, red = 1.5 to 6 bar

2. Spring B, red = 5 to 12 bar

For other adjustment ranges, contact your Bayard representative.

- Minimum supply pressure 2 bar, to obtain an upstream pressure setting of 1.5 bar
- Accuracy of adjustment = 0.5 to 1 bar according to the upstream pressure setting
- Operating temperature: + 1°C to + 65°C
- Drinking water or screened raw water (2 mm)
- Range:

- DN 40/50 to 150, PN 16, ISO PN 10 and 16

Item	Part name	No.	Materials	Standards
01	Calibrating key	1	Steel/S235JR	NF EN 10025
02	Calibrating screw + item 03	1	Stainless steel/X20Cr13	NF EN 10088
03	Nut	1	A2 stainless steel	NF EN ISO 3506
04	Base plate	1	Ductile iron GL/EN-GJL-250	NF EN 1561
05	Bonnet subassembly + threaded ring	1	Ductile iron GS/EN-GJS-450-10	NF EN 1563
06	Calibrating spring 1.5 to 6 bar (blue)	1	Coated steel	DIN 17223
07	Calibrating spring 5 to 12 bar (red)	1	Coated steel	DIN 17223
08	Cylinder O-ring	1	EPDM	_
09	Pressure gauge 0-40 bar (option)	1	Stainless steel/X5CrNi 18-10	NF EN 10088
10	Pressure gauge 0-16 bar (option)	1	Stainless steel/X5CrNi 18-10	NF EN 10088
11	Seat + gasket (item 12)	1	Stainless steel/X2CrNi 18-9	NF EN 10088
12	Seat gasket	1	EPDM	_
13	Pressure gauge isolating valve	2	Nickel-plated brass	_
14	Bonnet retaining nut (4 to 8 acc. to DN)	1 set	A2 stainless steel	NF EN ISO 3506
15	Alignment pin	2	A2 stainless steel	NF EN ISO 3506
16	Body	1	Ductile iron GS/EN-GJS-450-10	NF EN 1583
17	Stem guide	1	Aluminium bronze/CuAl9Ni3Fe2	NF EN ISO 1982
18	Upper diaphragm holder	1	Ductile iron GL/EN-GJL-250	NF EN 1561
19	Upper diaphragm holder O-ring	1	EPDM	_
20	Segment	1	HDPE	_
21	Diaphragm	2	Textile reinforced elastomer/CR	_
22	Lower cylinder	1	Ductile iron GL/EN-GJL-250	NF EN 1561
23	Lower cylinder O-ring	1	EPDM	_
24	Locking nut	1	A2 stainless steel	NF EN ISO 3506
25	Stem	1	Stainless steel/ X8CrNiS 18-9	NF EN 10088
26	Valve disc plate	1	Ductile iron GL/EN-GJL-250	NF EN 1561
27	Centre stem O-ring	1	EPDM	_
28	Resilient valve disc	1	PUR	_
29	Valve disc holder	1	Ductile iron GL/EN-GJL-250	NF EN 1561
30	Plug	1	Aluminium bronze/CuAl9Ni3Fe2	NF EN 1982
31	Mobile subassembly items 18 to 29	1	_	_
32	Maintenance kit, items 08-12-19-20-21-23-24-27-28	1	_	_

Monostab pressure sustaining/relief valve - Establishing a project

2 -Establishing a project

2 - 1. General, practical advice:

- Mounted on-line on the pipe, this unit is ideal for maintaining a minimum pressure in the upstream pipe in order to supply a point with high head loss (pressure sustaining function)
- Mounted as a tap-off of the pipe, this unit will relieve the excess pressure and discharge the flow towards an outlet (pressure relief function)
- Its simple, robust design simplifies maintenance

2 - 2. Choosing the diameter:

- The choice of diameter is based on the velocity of the water in the unit according to its function:
  - Pressure sustaining function, recommended velocity 1.5 to 3 m/s
  - Pressure relief function, recommended velocity 4 m/s

The table below gives a flow in l/s for each **DN** according to the velocity in the unit.

Velocity DN	40/50	60/65	80	100	150	Function
1.5 m/s	2.9	5.0	7.8	11.8	26.5	Sustaining valve
2 m/s	4.0	6.6	10.1	15.7	35.3	Sustaining valve
3 m/s	5.9	10.0	15.0	23.6	53	Sustaining valve
4 m/s	7.9	13.3	20.0	31.4	70.7	Relief

- It is difficult to determine the flow which may pass through the unit. It depends directly on the capabilities of the network and the upstream and downstream requirements. Briefly, it can be estimated that a velocity of 1.50 m/s in the pipe corresponds to the maximum flow passing through the unit.
- Example: in a pipe with DN 100, a velocity of 1.50 m/s creates a flow rate of 12 l/s.
  - DN 80 is recommended for the pressure sustaining function (12 l/s = 2 to 3 m/s)
  - DN 65 is adequate for the pressure relief function (12 l/s = 3 to 4 m/s)
- The environment in which the unit is installed must be taken into consideration according to the various possible operating stages. The table below gives an example broken down into these stages:

Pressure setting	Upstream pressure	Downstream pressure	Status of unit	Notes
5 bar	10 bar	X to 10 bar	Open	If necessary protect downstream pipe with Monostab press. red. valve
5 bar	5 bar	0 to 5 bar	Controlling	A Vannair downstream is necessary and provide a secondary supply for the downstream pipe if necessary
5 bar	4.8 bar	0	Closed	

Bayard can provide you with sizing software:

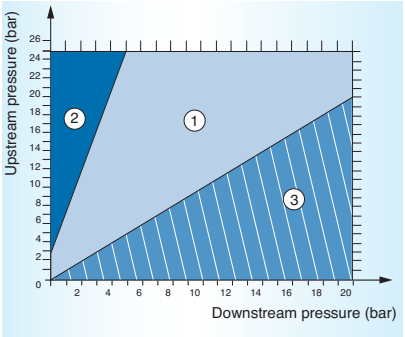
2 - 3. Choosing the setting range:

- Spring A = 1.5 to 6 bar
- Spring B = 5 to 12 bar

Hydraulic engineer's notes:

- *Outstanding Kv values*
- *Average velocities in the intake section between 1.5 and 4 m/s, making it possible to reduce the unit's diameter relative to the diameter of the pipe*
- *No risk of blockage: upper guide not in the water and lower guide coated with a scale inhibitor*
- *No risk of malfunction: the pressure sustaining/relief valve cannot become blocked as it is protected by a strainer box*
- *If there is a diaphragm leak, the water flows through the holes in the bonnet and the unit continues to perform its function. The leakage alerts the operator that maintenance is required*

***Cavitation diagram** used to check the operating conditions of the unit.*

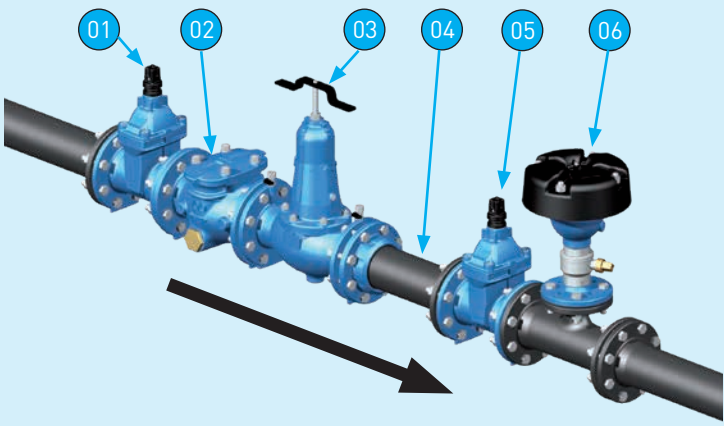


Area 1 = normal working conditions
***Area 2 = cavitation**, reduce the pressure in stages with two units in series, or contact your Bayard representative.*
Area 3 = not possible

Bayard CTS has engineers and technicians who have vast experience of networks. Discuss your project with your Bayard representative.

Monostab pressure sustaining/relief valve - Establishing a project

On-line mounting



Approximate dimensions of the manhole:
Length = 2.00 m to 3.00 m depending on diameter
Width = 2.00 m
Height = 1.70 m minimum

01 - Upstream valve
02 - Strainer box
03 - Monostab pressure sustaining/ relief valve
04 - Dismantling joint
05 - Downstream valve
06 - Vannair

Bayard has a library of 2D and 3D plans available for your use. Request these from your Bayard representative.

Hydraulic engineer's notes:

- *The Monostab pressure sustaining/relief valve can be used as a channelled relief valve. Its hydromechanical operation causes very little inertia on opening. Contact Bayard CTS.*

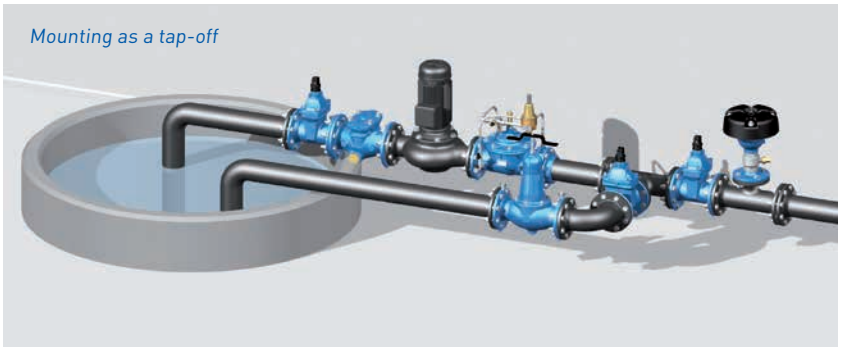
2 - 4. Installation instructions:

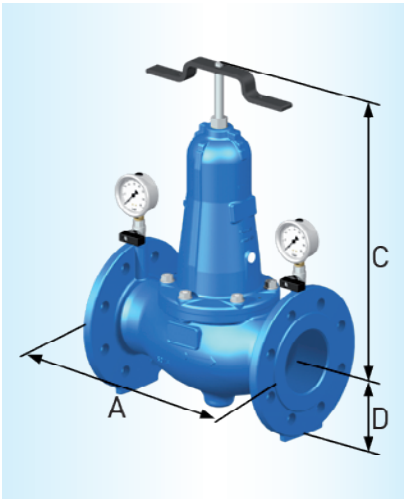
Project:

- Ensure that the room is large enough to be able to work safely on the unit. Unobstructed clearance of 1.00 m around, 1.50 m above and 0.30 m below the pipe is considered reasonable. Remember also that the room must have suitable drainage, and ventilation for the operation of the Vannair.
- Provide a restraining system if necessary, or a self-restrained assembly and a support beneath the installation.

- **Ensure that the pressure sustaining/relief valve** is equipped with an upstream (01) and a downstream (05) valve. These elements are essential for safe commissioning, easy adjustment and controlled filling of the downstream network. Using a very high flow rate for adjusting the upstream setpoint pressure, with no valve upstream to create an artificial head loss, is very difficult in practice and may be dangerous.
- Install a strainer box **(02)** to stop foreign bodies before they enter the unit. A "Y"filter may seem less costly, but it will be less easy to clean and require a large amount of space below the pipe in order to remove the filter strainer.
- A dismantling joint **(04)** will allow the assembly to be self-restrained and dismantled.
- Install a **Vannair (06)** immediately downstream of any pressure sustaining/ relief unit, in particular if the pipe is likely to drain itself.
- On a pipe that is **horizontal or rising** towards the unit (less common), **install an air valve or Vannair** immediately upstream of the pressure sustaining/relief valve. This will improve hydraulic performance and prevent unwanted noise and pressure fluctuations due to air trapped upstream of the valve.
- The unit can be mounted in any position. Remember to provide air ventilation according to the position of the unit and direction of fluid flow.

Mounting as a tap-off





2 - 5. Dimensions and weights:

DN	ISO PN drilling	A mm	C mmm	D mm	C+D mm	Weight kg
40/50	40/50	230	430	86	516	18
60/65	60/65	290	420	100	520	22
80	4/8 holes	310	450	112	562	25
100	10/16	350	450	112	562	31.3
150	10/16	480	550	145	695	66

Monostab pressure sustaining/relief valve - Establishing a project

3 - Project implementation

3 - 1. Definition of the equipment:

• Assistance with product names when ordering

3 - 2. Alternative equipment:

A pressure reducing valve from the HYDROBLOC family is a good replacement for the MONOSTAB spring-actuated pressure sustaining/ relief valve. Following a detailed study, this type of pressure reducing valve can be specified with one or two smaller diameters. It will be more suitable for the operating conditions in cavitation areas and can be upgraded in line with any changes in the network's specifications. Contact Bayard for more information.

3 - 3. Installation - Operation:

Even the most well thought-out design can only be satisfactory if a minimum of good engineering practice is applied to its installation and operation.

Storage, handling:

• Store for a maximum of one year, at a temperature not exceeding 65°C, and protected from humidity and impacts
• Handle with care, using appropriate lifting equipment attached to the lifting eyes or the flanges

Package contents:

• A pressure sustaining valve (PN 16)
• A calibrating key with the calibrating screw and locknut
• After-Sales Service Manual W
• Two pressure gauges, as required (optional)

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TALIS is the undisputed Number One for water transport and water flow control. TALIS has the best solutions available in the fields of water and energy management as well as for industrial and communal applications. We have numerous products for comprehensive solutions for the whole water cycle - from hydrants, butterfly valves and knife gate valves through to needle valves. Our experience, innovative technology, global expertise and individual consultation processes form the basis for developing long-term solutions for the efficient treatment of the vitally important resource “water”.

BAYARD
ZI - 4 avenue Lionel Terray
CS 70047
69881 Meyzieu cedex France
TEL. + 33 (0)4 37 44 24 24
FAX + 33 (0)4 37 44 24 25
WEBSITE : www.bayard.fr

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