Balancing valves

130 series

01251/14 GB

ISO 9001 FM 21654 ISO 9001 No. 0003

Function

Balancing valves are hydraulic devices used for accurately regulating the flow rate of the thermal medium supplying the terminal emitters of a system.
Correct balancing of the hydraulic circuits is essential to guarantee system operation according to design specifications, high thermal comfort and low energy consumption.

On 130 series threaded valves, the flow rate is measured with a Venturi device, housed inside the valve body. This devices guarantees balancing accuracy and is extremely practical to use during setting.

Product range

130 series Balancing valve with Venturi device. Threaded version ______ sizes DN 15 (1/2"), DN 20 (3/4"), DN 25 (1"), DN 32 (1 1/4"), DN 40 (1 1/2"), DN 50 (2")
130 series Balancing valve. Flanged version ______ sizes DN 65, DN 80, DN 100, DN 125, DN 150, DN 200, DN 250, DN 300

130 series Shell insulation for threaded balancing valves with Venturi device

Technical specifications

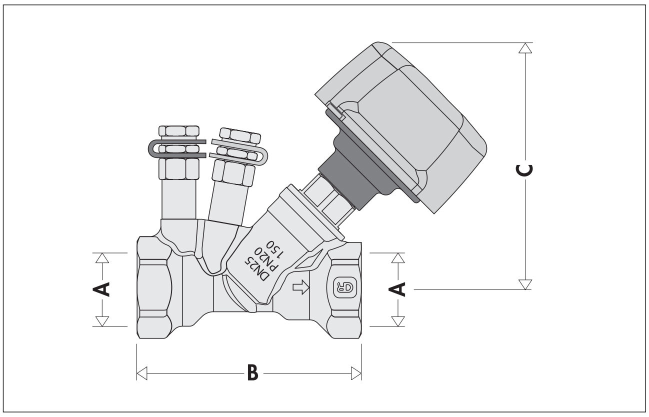
series	130 threaded	130 flanged
Materials		
Body:	dezincification resistant alloy CR EN 12165 CW602N	grey cast iron EN-GJL-250
Cover:	dezincification resistant alloy CR EN 12165 CW511L	grey cast iron EN-GJL-250
Control stem:	dezincification resistant alloy CR EN 12164 CW724R	brass EN 12164 CW614N
Obturator:	stainless steel (AISI 303)	PPS
Seal seat:	dezincification resistant alloy CR EN 12165 CW602N	grey cast iron EN-GJL-250
Hydraulic seals:	EPDM	EPDM
Obturator seal:	PTFE	EPDM
Knob:	PA6G30	- DN 65-80-100-200-250-300: PA - DN 125 and DN 150: stamped steel
Pressure test ports:	brass body with EPDM seal elements	brass body with EPDM seal elements
Performance		
Medium:	water and non-hazardous glycol solutions excluded from the guidelines of directive 67/548/EC	water and non-hazardous glycol solutions excluded from the guidelines of directive 67/548/EC
Maximum percentage of glycol:	50%	50%
Maximum working pressure:	16 bar	16 bar
Working temperature range:	-20–120°C	-10–140°C -10–120°C (DN 200 - DN 250 - DN 300)
Accuracy:	±10%	±10%
Number of adjustment turns:	5	DN 65: **6**; DN 80 and DN 100: **7**; DN 125: **12**; DN 150: **14**; DN 200, 250 and 300: **10**
Connections		
- main:	1/2"– 2" F (ISO 228-1)	DN 65, 80, 100, 125, 150, 200, 250, 300; PN 16 - EN 1092-2
- valve body pressure test ports:	1/4" F (ISO 228-1)	1/4" F (ISO 228-1)

Technical specifications of insulation

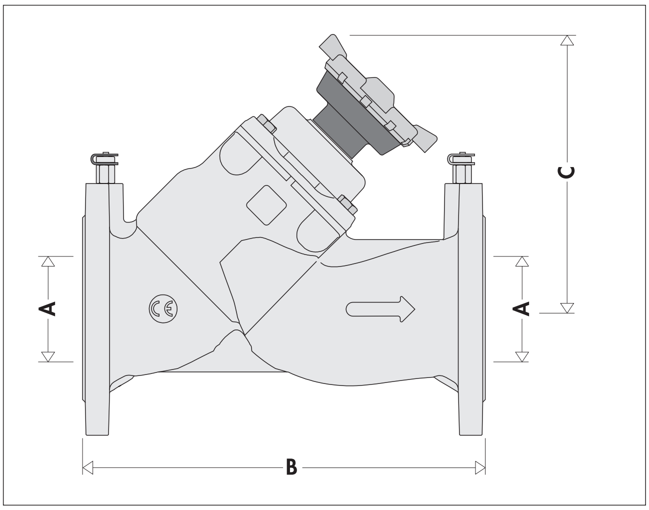
Material

Material:	closed cell expanded PE-X
Thickness:	15 mm
Density: - inner part:	30 kg/m³
- outer part:	80 kg/m³
Thermal conductivity (ISO 2581):	- at 0°C: 0,038 W/(m·K)
	- at 40°C: 0,045 W/(m·K)
Coefficient of resistance to the diffusion of water vapour (DIN 52615):	>1300
Working temperature range:	0–100°C
Reaction to fire (DIN 4102):	class B2

Dimensions



Code	DN	A	B	C	Mass (kg)
130400	15	1/2"	77	104	0,57
130500	20	3/4"	82	104	0,61
130600	25	1"	97	107	0,75
130700	32	1 1/4"	115	114	1,05
130800	40	1 1/2"	129	120	1,27
130900	50	2"	152	132	1,85

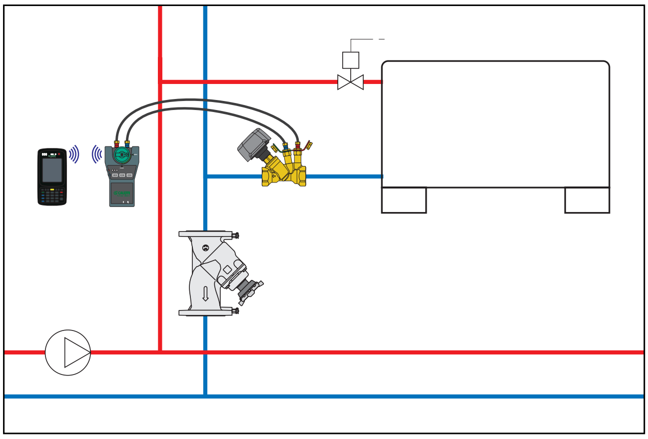


Code	A	B	C	Mass (kg)
130060	DN 65	290	225	13
130080	DN 80	310	235	15,5
130100	DN 100	350	245	21
130120	DN 125	400	350	32
130150	DN 150	480	380	45
130200	DN 200	600	480	115
130250	DN 250	730	525	160
130300	DN 300	850	535	210

Advantages of balanced circuits

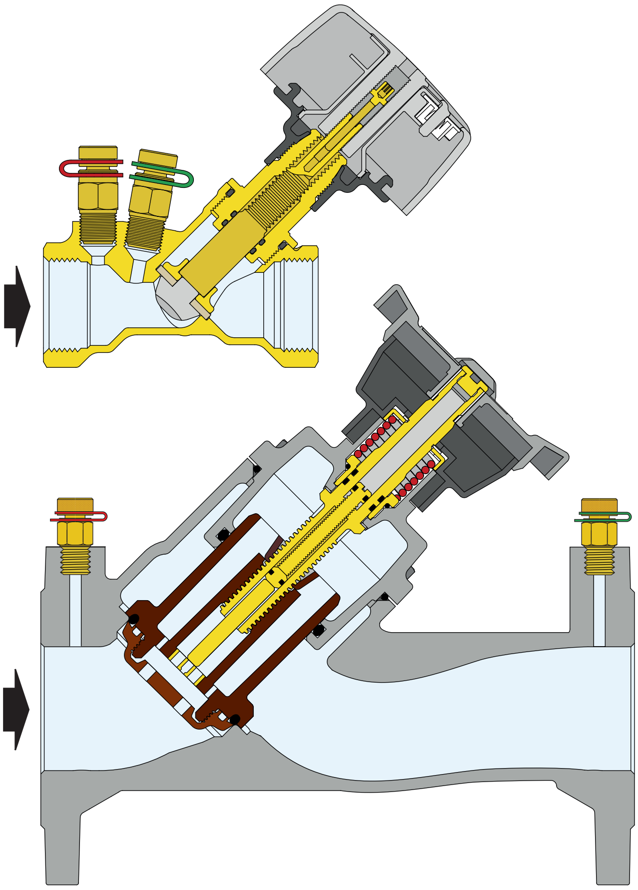
Balanced circuits have the following principal benefits:

1. The terminals of the system operate correctly in heating, cooling and dehumidification without wastage and provide better comfort.
2. The pumps run in their zone of highest efficiency, thus reducing the risk of overheating and excessive wear.
3. Too high medium speeds, which can result in noise and abrasion, are avoided.
4. The differential pressures acting on the regulation valves are limited in value, thus preventing faulty operation.



Operating principle

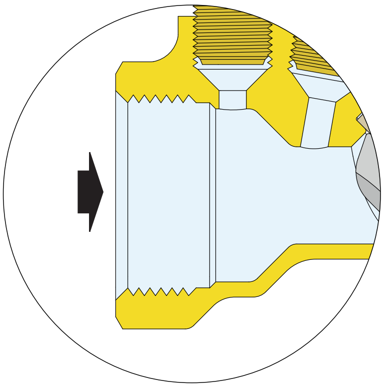
The balancing valve is an hydraulic device that allows to regulate the medium flow rate passing through.
Regulation is performed using a knob that governs the movement of an obturator, to regulate the flow of the medium. The flow rate is controlled according to the value of Δp that is measured with two piezometric connections suitably positioned on the valve.



130 series threaded connections

Construction details

Venturi device for flow rate measurement
The 130 series valves of size from 1/2" to 2" are equipped with a flow rate measuring device based on the Venturi principle. It is housed in the valve body and is located upstream of the valve's obturator, as shown in the figure below.



This system provides the following benefits:

1. Provides stable measurement during flow rate regulation. Balancing valves normally have their pressure test ports upstream and downstream of the valve obturator. This means that when the valve is closed to less than 50% of its full opening, the turbulence created downstream of the obturator causes instability in the pressure signal, causing significant measurement errors.

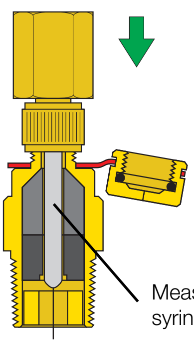
2. It is allowed to install the valves without keeping excessively long straight sections of pipe downstream.

3. The Venturi system makes for a faster process of measurement and manual circuit balancing. The flow rate is now only a function of the Δp measured upstream and downstream of the fixed orifice of the Venturi meter, upstream of the obturator, and no longer through the entire valve. In practical terms, the only data required for measuring the flow rate in the valves is now Δp and no longer Δp and the position of the knob.

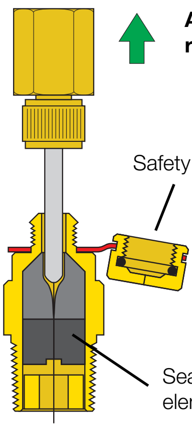
4. It makes the flow rate pass through the valve quieter. This is no small advantage when we consider the fact that the threaded balancing valve is frequently used in terminals such as fan coil units, installed directly in dwellings.

Quick-fit pressure test ports
The valves are equipped with quick-fit pressure test ports. Measurement is fast and precise with this type of port, using Caleffi 100 series syringe fittings. When removing the measuring syringe, the port closes automatically, preventing water leakage.

Pressure measurement

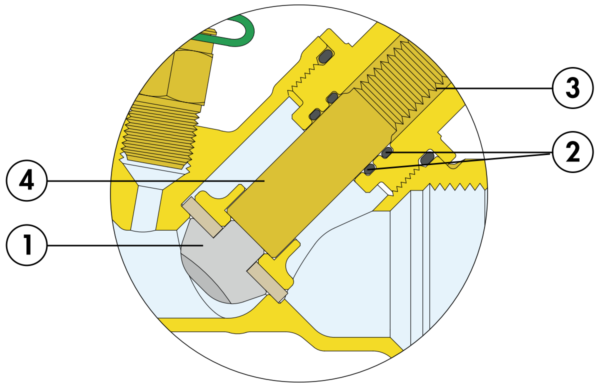


Automatic reclosure



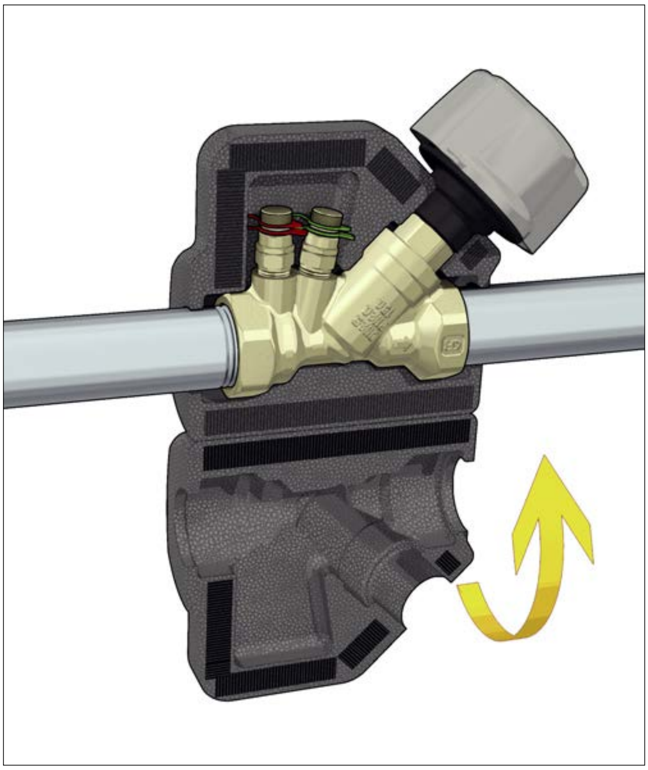
Corrosion-proof materials
130 series balancing valves are made using dezincification resistant alloy, a material that is highly resistant to corrosion and ensures the best performance over time.

Stainless steel obturator
The valve obturator (1) is made of stainless steel. This material offers high resistance to corrosion and deterioration due to friction caused by the continuous flow of water.



Double internal O-Ring
The double O-Ring hydraulic seal (2) prevents the water from coming into contact with the screw thread (3). This mechanism allows the stem (4) to slide linearly in order to accurately adjust the setting of the obturator (1). Keeping the sliding between the valve stem and body hydraulically insulated keeps the flow rate regulation action and the operation of the knob intact over time.

Insulation
For the threaded balancing valve there is also, available as an accessory, hot pre-formed shell insulation, with Velcro closing. It ensures perfect thermal insulation and tightness against water vapour getting inside from the ambient when using chilled water.



Adjustment knob

The shape of the adjustment knob is the outcome of research into ergonomics to ensure the greatest operator comfort and accurate adjustment.

- The range of adjustment with 5 complete turns permits great accuracy when balancing hydraulic circuits.
- The micrometric scale graduations are large and clear and make it easy to refine the flow rate adjustment.
- The knob is made of high-strength, corrosion-proof, reinforced polymer.

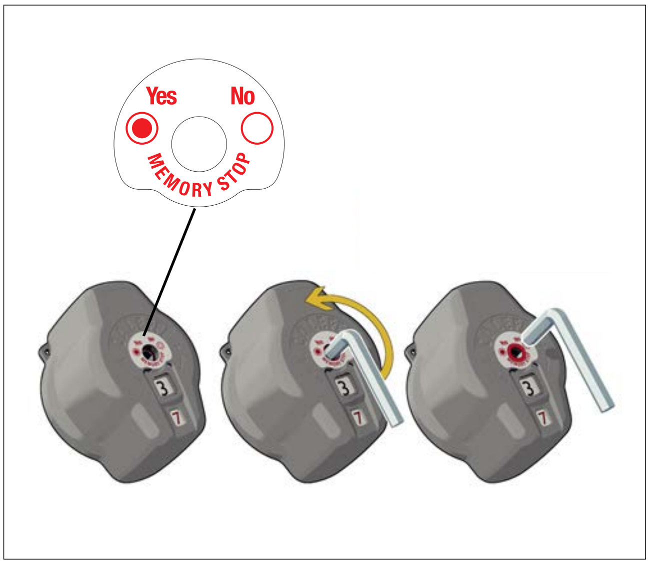
Reference scale for adjustment

Each 360° clockwise turn of the knob moves the red indicator by one step, from position 0 (valve closed) to position 6 (valve fully open). In addition, the decimal graduations of the black micrometric scale enable further refining of the adjustment.

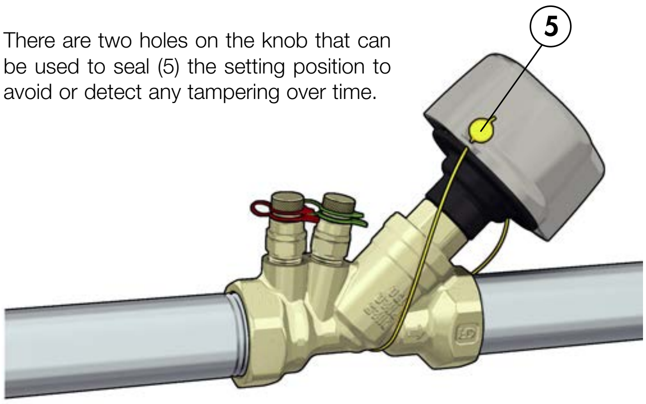
Memory stop/Sealing locking

The valves are equipped with an adjustment position memory system that, after full closure which can be necessary for various reasons, allows easy re-opening at the initial position.

Insert a 2,5 mm hexagonal spanner in the hole, turn counter-clockwise until the red indicator, initially not visible, is aligned with the top edge of the knob, without forcing it.



There are two holes on the knob that can be used to seal (5) the setting position to avoid or detect any tampering over time.



USING AND SETTING THE BALANCING VALVE

The balancing valve is used considering the fluid dynamic characteristics produced by the relationship between the head loss, flow rate and adjustment position of the obturator control knob.

Pre-adjustment

Knowing the value of the head loss Δp that needs to be created by the valve with a certain flow rate G, you can obtain the adjustment position number for the knob (PRESETTING). To make this choice you can use the characteristic diagram for each valve size. Or, analytically, you can calculate the corresponding Kv by applying the formula:

$$Kv = \frac{G}{\sqrt{\Delta p}} \qquad (1,1)$$

where: G = flow rate in m³/h
Δp = head loss in bar (1 bar = 100 kPa, 10.000 mm w.g.)
Kv = flow rate in m³/h through the valve, which corresponds to a head loss of 1 bar

and you compare the value obtained with the typical values for each valve size.

It is recommended to choose the valve size so it is pre-set on a medium opening position in order to have room for both opening and closing.

Flow rate measurement

Connect a differential pressure measuring station to the valve's Venturi device pressure test ports. Reading Δp on the measuring device, to obtain the flow rate G you can refer to the characteristic Venturi diagram of the valve being used.

Or, analytically, you can calculate the flow rate by applying the equation:

$$G = Kv_{Venturi} \times \sqrt{\Delta p_{Venturi}} \qquad (1.2)$$

Note: The diagram used in this phase is not the one used for pre-adjustment as it refers to the characteristics of $\Delta p_{Venturi}$-Flow rate of the Venturi device located upstream of the valve and not those of the entire valve (including the obturator), which instead are indicated in the diagrams used for pre-adjustment.

Manual flow rate adjustment

To manually set the flow rate through the valve, adjust the position of the knob until the differential pressure, indicated by the measurement device, corresponds to the desired flow rate on the characteristic Venturi diagram of the valve that you are using.

Or analytically calculate the head loss of the Venturi device by applying the equation:

$$\Delta p_{Venturi} = \frac{G^2}{Kv_{Venturi}^2} \qquad (1.3)$$

Then turn the adjustment knob until you reach the value of Δp calculated theoretically with the formula (1.3) indicated above.

Note: The diagram used in this phase is not the one used for pre-adjustment as it refers to the characteristics of $\Delta p_{Venturi}$ - Flow rate of the Venturi device inserted in the valve and not those of the entire valve (including the obturator), which instead are indicated in the diagrams used for pre-adjustment.

Correction for liquids with different densities

The following notes apply to liquids with viscosity ≤3°E (water and glycol mixtures, for example).

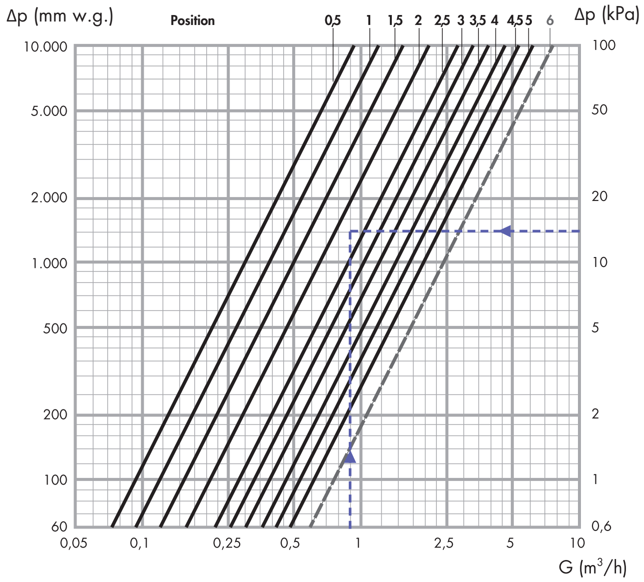
If using liquids with a density different to that of water at 20°C (ρ = 1 kg/dm³), the head loss value Δp measured may be corrected using the formula:

$$\Delta p' = \Delta p/\rho'$$

where: Δp' = reference head loss
Δp = measured head loss
ρ' = liquid density in kg/dm³

The value Δp' is used when pre-adjusting or measuring the flow rate using the diagrams or the formulas.

Code 130600 1"



DN 25	Position									Kvs
Size 1"	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	6
Kv (m^3/h)	0,93	1,19	1,52	2,07	2,60	3,30	3,88	4,61	5,29	6,10	7,63

Example of pre-adjustment

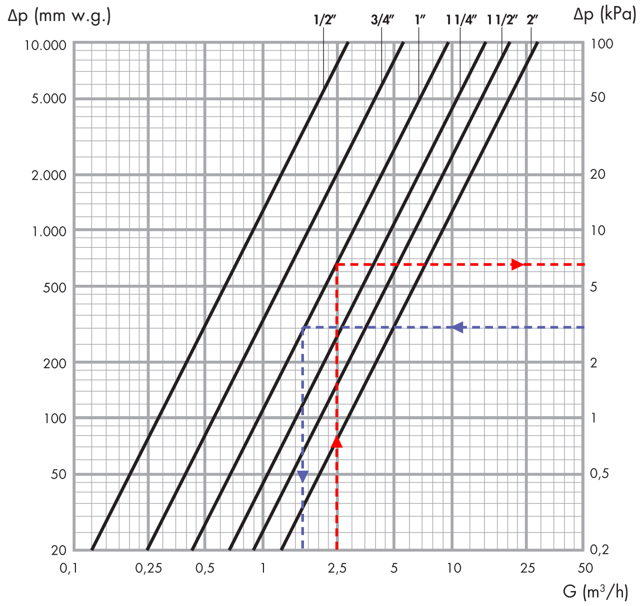
A flow rate G = 900 l/h must create a head loss Δp = 14 kPa.
Choosing the diagram of the valve code 130600 size 1" gives an adjustment position ≈ 2,3 (blue line).

Or, analytically, applying the formula (1.1) gives the value
$Kv = 0{,}9 / \sqrt{0{,}14} = 2{,}40$.
From the table for the valve code 130600 1" you choose a corresponding adjustment position ≈ 2,3 (value coinciding with or nearest the one required).

Example of correction for liquid with different density

Liquid density ρ' = 1,1 kg/dm^3
Measured (or desired) head loss Δp = 14 kPa.
Reference head loss Δp' = 14/1,1 = 12,72 kPa
With this value you use the graph or the formula (1.1) and as a result you obtain the adjustment position for the flow rate G (new position ≈ 2,5).

Venturi



DN	15	20	25	32	40	50
Size	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Kv Venturi (m^3/h)	2,80	5,50	9,64	15,20	20,50	28,20

Example of flow rate measurement

Reading a $\Delta p_{Venturi}$ of 3 kPa on a 1" valve, using the characteristic Venturi diagram for the valve at issue, on the abscissa we read a flow rate value equal to ≈ 1,7 m^3/h (blue line).

Whereas, if we want to proceed analytically, using the equation (1.2), the measurement of a $\Delta p_{Venturi}$ equal to 3 kPa, bearing in mind that $Kv_{Venturi}$ of the valve 130600 size 1" is equal to 9,64, leads to calculating a flow rate $G = 9{,}64 \times \sqrt{0{,}03} = 1{,}67$ m^3/h.

Example of correction for liquid with different density

Liquid density ρ' = 1,1 kg/dm^3
Measured head loss $\Delta p_{Venturi}$ = 3 kPa
Reference head loss Δp' = 3/1,1 = 2,72 kPa
With this value you use the valve's Venturi diagram or the formula (1.2) and obtain the corresponding flow rate G (= 1,59 m^3/h).

Example of manual flow rate adjustment

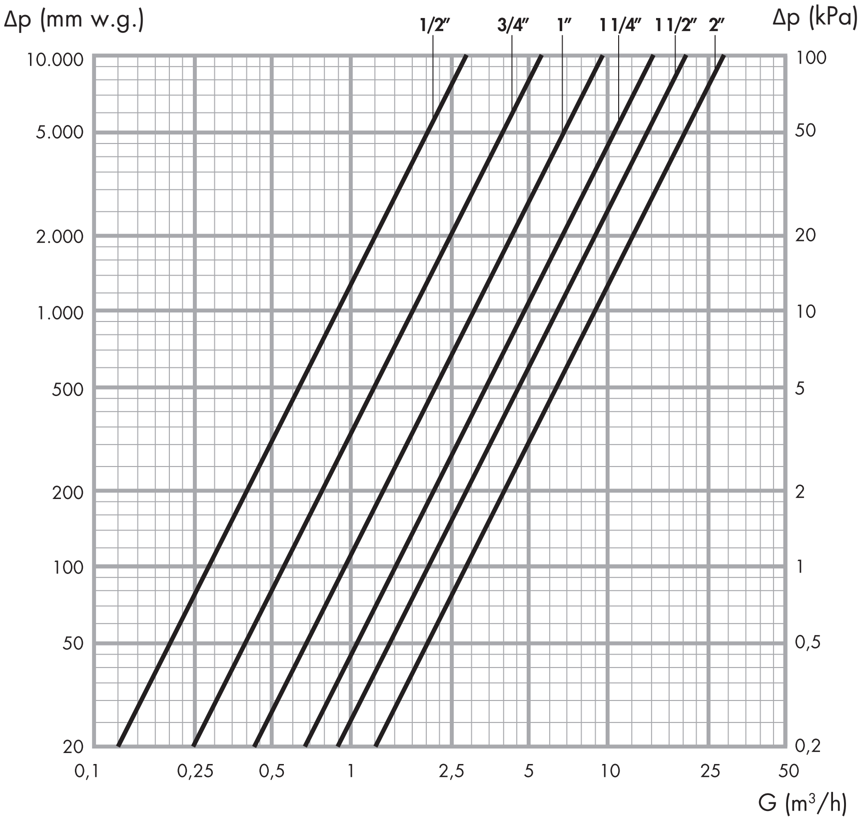
Considering a 1" valve, we would like to adjust the flow rate on a value of 2500 l/h.
Turn the knob of the valve onto the fully open position, then gradually close the valve, keeping under control $\Delta p_{Venturi}$ read off the measuring device. As shown in the diagram alongside, on reaching the differential value of ≈ 6,7 kPa (red line), the flow rate of the medium that will flow through the valve will be the desired one of 2500 l/h.

Using the analytical method with a flow rate value equal to G = 2500 l/h and with $Kv_{Venturi}$ = 9,64 for the valve 130600 size 1" at issue, using the formula (1.3) we have $\Delta p_{Venturi} = 2{,}5^2/9{,}64^2 = 6{,}72$ kPa. Regulate the valve accordingly until you reach $\Delta p_{Venturi}$ as calculated.

Example of correction for liquid with different density

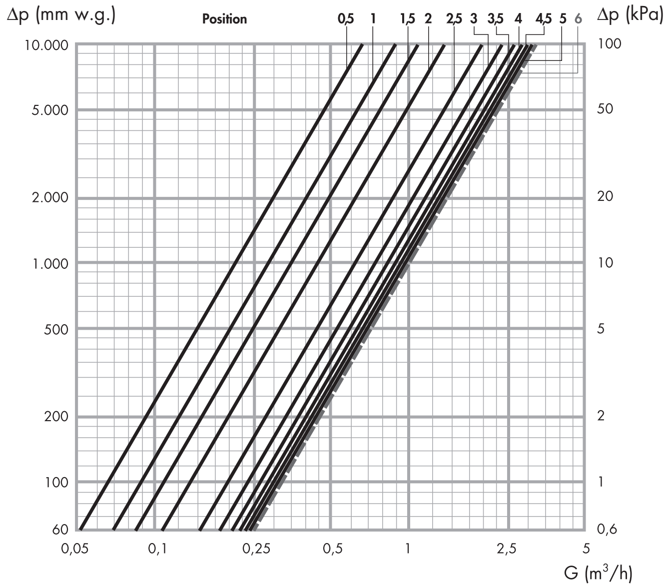
Desired liquid flow rate G = 2.500 l/h.
Wit the formula (1.3) or the Venturi graph, we obtain the reference head loss $\Delta p' = 2{,}5^2/9{,}64^2 = 6{,}72$ kPa.
If the density of the liquid used is ρ' = 1,1 kg/dm^3 the head loss $\Delta p_{Venturi}$ that we need to read off the measuring device, to have the desired flow rate, will be given by the equation:
$\Delta p_{Venturi} = \rho' \times \Delta p' = 1{,}1 \times 6{,}72 = 7{,}39$ kPa.

Venturi



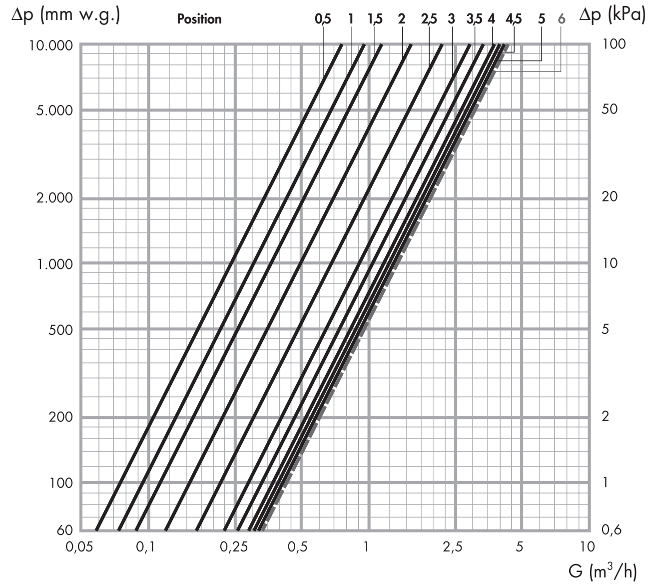
DN	15	20	25	32	40	50
Size	1/2″	3/4″	1″	1 1/4″	1 1/2″	2″
Kv Venturi (m^3/h)	2,80	5,50	9,64	15,20	20,50	28,20

Code 130400 1/2"



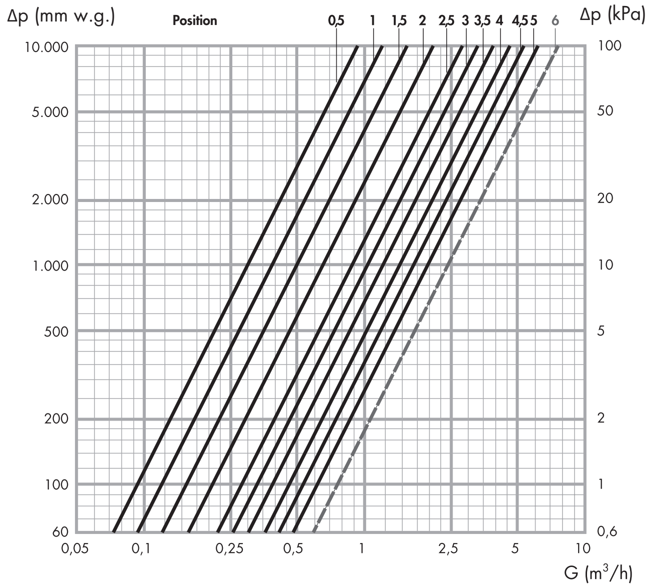
DN 15	Position										Kvs
Size 1/2"	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	6
Kv (m^3/h)	0,66	0,89	1,07	1,37	1,96	2,33	2,60	2,79	2,95	3,06	3,17

Code 130500 3/4"



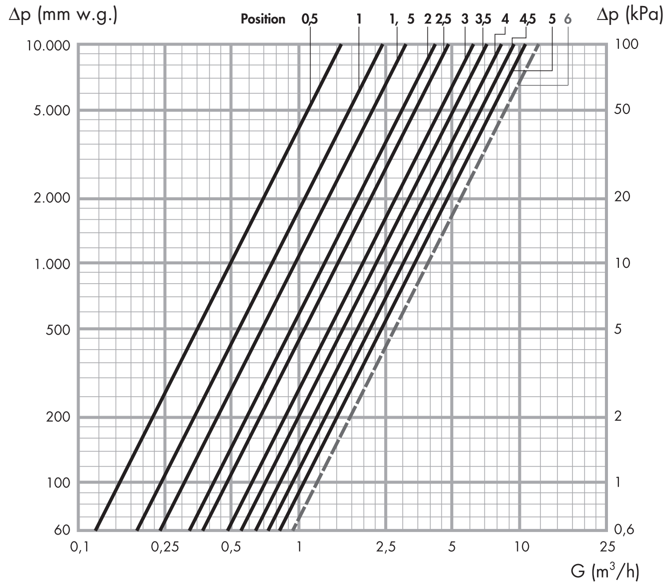
DN 20	Position										Kvs
Size 3/4″	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	6
Kv (m^3/h)	0,73	0,95	1,14	1,57	2,18	2,78	3,31	3,73	3,95	4,15	4,46

Code 130600 1"



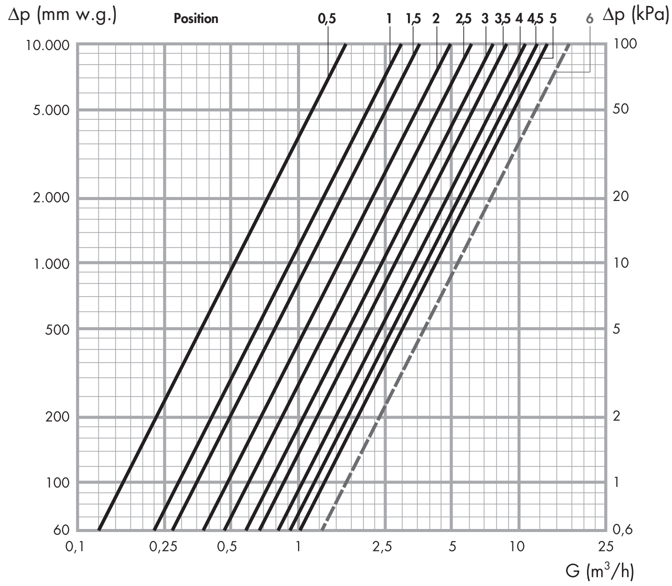
DN 25	Position									Kvs
Size 1"	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	6
Kv (m^3/h)	0,93	1,19	1,52	2,07	2,60	3,30	3,88	4,61	5,29	6,10	7,63

Code 130700 1 1/4"



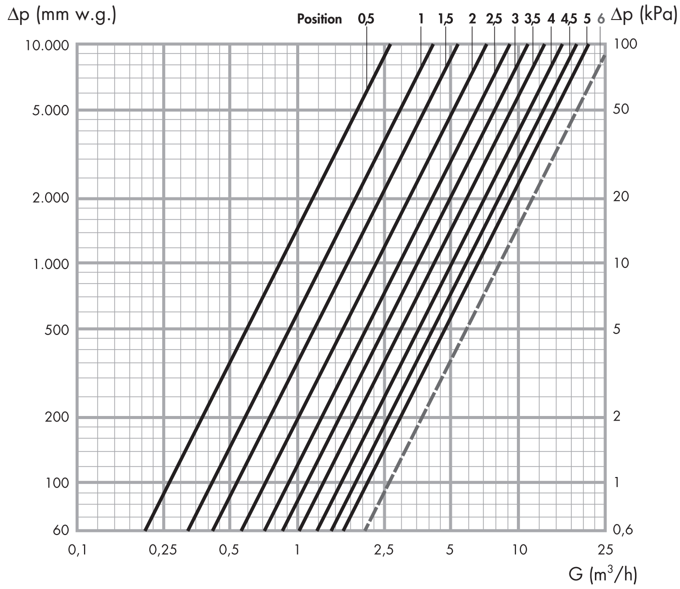
DN 32	Position										Kvs
Size 1 1/4"	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	6
Kv (m^3/h)	1,52	2,47	3,18	4,22	4,91	6,23	7,15	8,28	9,16	10,37	12,10

Code 130800 1 1/2"



DN 40	Position										Kvs
Size 1 1/2"	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	6
Kv (m^3/h)	1,63	2,79	3,50	4,95	5,97	7,50	8,58	10,58	11,77	13,78	17,00

Code 130900 2"



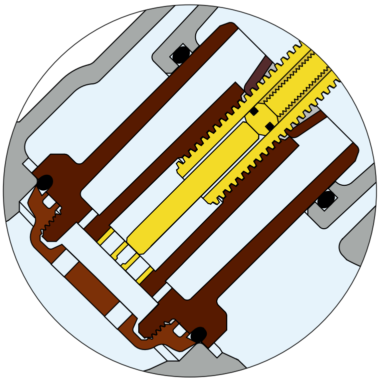
DN 50	Position										Kvs
Size 2"	0,5	1	1,5	2	2,5	3	3,5	4	4,5	5	6
Kv (m^3/h)	2,66	4,18	5,32	7,28	9,20	11,30	13,20	15,90	18,20	21,10	26,30

130 Series flanged connections

Construction details

Obturator made of technopolymer plastic

The obturator for this series of valves is made of technopolymer plastic. This material is particularly resistant to abrasion due to the flow of water.



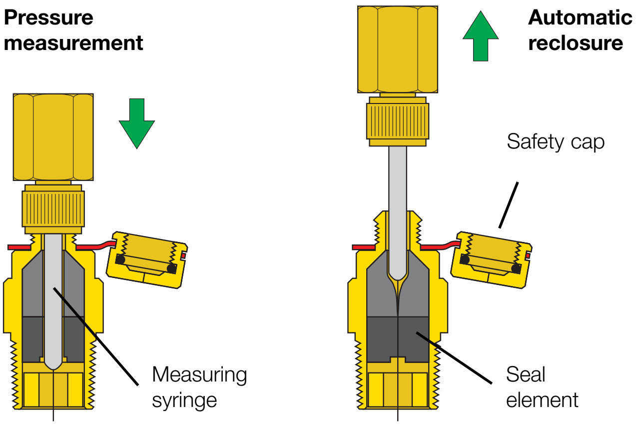
Adjustment knob

The shape of the adjustment knob is the outcome of research into ergonomics to ensure the greatest operator comfort and accurate adjustment.

- The range of adjustment with a number of complete turns permits great accuracy when balancing hydraulic circuits.
- The micrometric scale graduations are large and clear and make it easy to refine the flow rate adjustment.
- The knob is made of corrosion-proof technopolymer, for the sizes from DN 65 to DN 100; it is made of stamped steel, for sizes DN 125 and DN 150, as handwheel for easier adjustment of medium/large sized devices.

Quick-fit pressure test ports

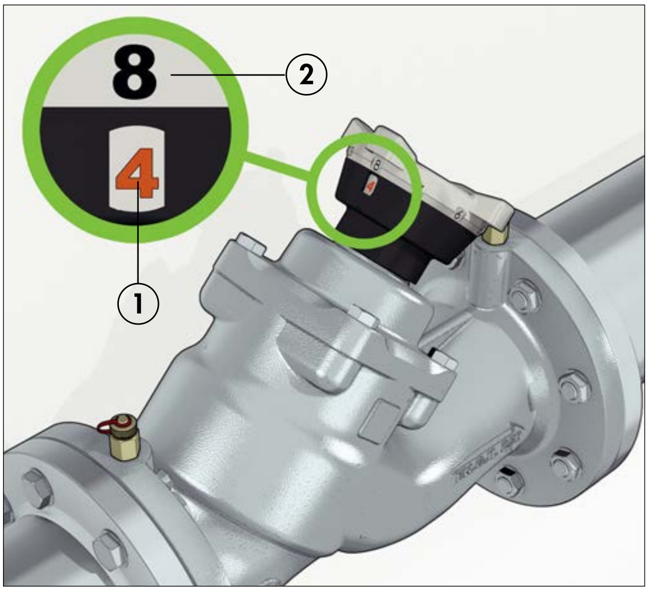
The valves are equipped with quick-fit pressure test ports. Measurement is fast and precise with this type of port, using Caleffi 100 series syringe fittings. When removing the measuring syringe, the port closes automatically, preventing water leakage.



Reference scale for adjustment

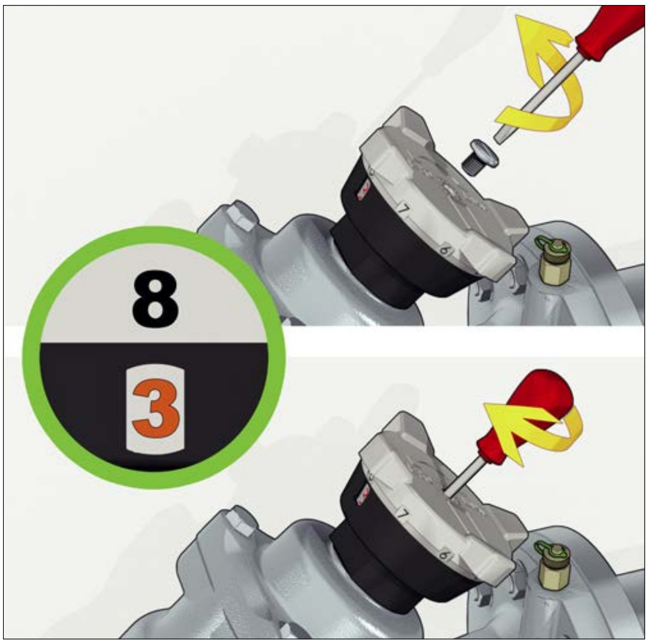
The opening position is indicated by two numbered indicators:

- The turn indicator (1) shows an adjustment scale from 0 (closure) to maximum adjustment (6, 7, 10, 12 and 14 depending on the size of the valve) in red.
  Turning the knob manually through 360° causes the indicator to click by one unit.
- The micrometric adjustment indicator (2) shows numbers in black from 0 to 9.
  Each change in the numerical position represents 1/10 of an opening/closing turn of the valve with respect to the turn indicator (1).



Memory stop

The valves are equipped with an adjustment position memory system that, after full closure, which may be necessary for various reasons, allows easy re-opening at the initial position.
Locking the position to be saved needs no special tools and is protected, to avoid improper use. Unscrew the threaded protective cap with a screwdriver, then insert the screwdriver in the knob and fully turn the internal screw clockwise



For sizes DN 200–DN 300, the internal hexagonal screw (6 mm) of the “memory stop” is located under the central protective cap.

USING AND ADJUSTING THE BALANCING VALVE

The balancing valve is used considering the fluid dynamic characteristic produced by the relationship between the head loss measured at the piezometric connections, the flow rate and the obturator adjustment position.

Pre-adjustment

Knowing the value of the head loss Δp that needs to be created by the valve with a certain flow rate G, you can obtain the adjustment position number for the knob (PRESETTING).
To make this choice you can use the characteristic diagram for each valve size.
Or, analytically, you can calculate the corresponding Kv by applying the formula:

$$Kv = \frac{G}{\sqrt{\Delta p}} \quad (1.1)$$

where:
G = flow rate in m^3/h
Δp = head loss in bar
(1 bar = 100 kPa = 10.000 mm w.g.)
Kv = flow rate in m^3/h for a head loss of 1 bar

and you compare the value obtained with the typical values for each valve size.
It is recommended to choose the valve size so it is pre-set on a medium opening position in order to have room for both opening and closing.

Flow rate measurement

By measuring Δp on the valve for a given adjustment position you can obtain the flow rate value G flowing through the valve itself. You can use the diagram or, analytically, you can calculate the flow rate by applying the equation:

$$G = Kv \cdot \sqrt{\Delta p} \quad (1.2)$$

Correction for liquids of different density

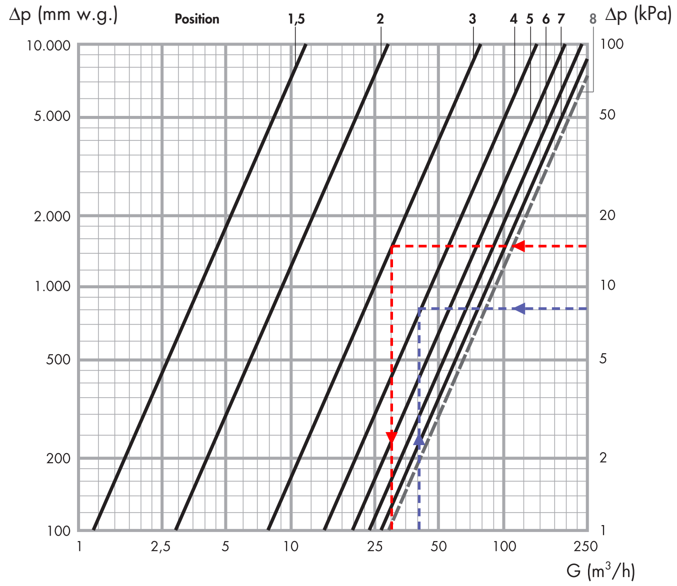
The following notes apply to liquids with viscosity ≤ 3°E (water and glycol mixtures, for example).
If using liquids with a density different to that of water at 20°C (ρ = 1 kg/dm^3), the head loss value Δp measured may be corrected using the formula:

$$\Delta p' = \frac{\Delta p}{\rho'}$$

where:
Δp' = reference head loss
Δp = measured head loss
ρ' = liquid density in kg/dm^3

The value Δp' is used when pre-adjusting or measuring the flow rate using the diagrams or the formulas.

Code 130100 DN 100



	Position							Kvs
DN 100	1,5	2	3	4	5	6	7	8
Kv (m^3/h)	12	29	78	142	195	234	265	296

Example of pre-adjustment

A flow rate G = 40 m^3/h must create a head loss Δp = 8 kPa.
Choosing the diagram of the straight valve code 135100 DN 100 gives an adjustment position ≈ 4 (blue line).

Or, analytically, applying the formula (1.1) gives the value $Kv = 40 / \sqrt{0{,}08} = 141{,}84$.
From the table for the valve code 135100 DN 100 you choose a corresponding adjustment position ≈ 4 (value nearest the one required).

Example of correction for liquid with different density

Liquid density ρ' = 1,1 kg/dm^3
Measured (or desired) head loss Δp = 8 kPa.
Reference head loss Δp' = 8/1,1 = 7,27 kPa
With this value you use the diagram or the formula (1.1) and obtain the corresponding adjustment position for the flow rate G (new position ≈ 4,2).

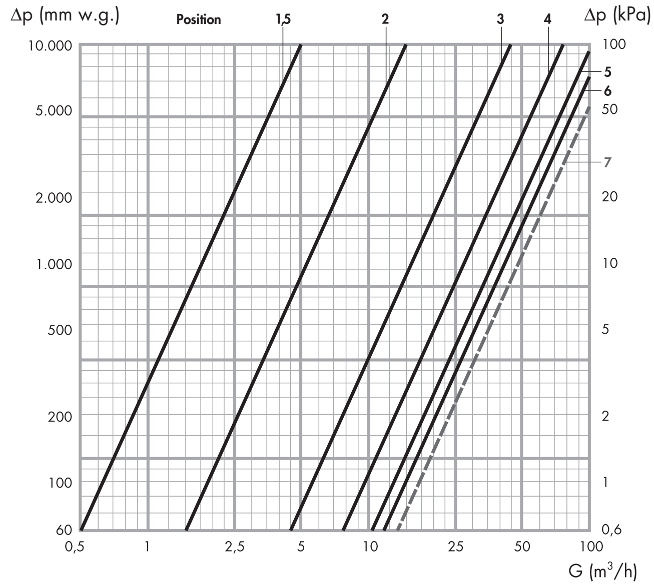
Example of flow rate measurement

You have the valve code 130100 DN 100 with the adjustment knob positioned on 3 (corresponding to Kv = 78 in the table) and you measure a head loss Δp= 15 kPa.
Using the diagram you obtain a flow rate value of G of approximately 30 m^3/h (red line).
$G = 78 \times \sqrt{0{,}15} \approx 30\ m^3/h$

Example of correction for liquid with different density

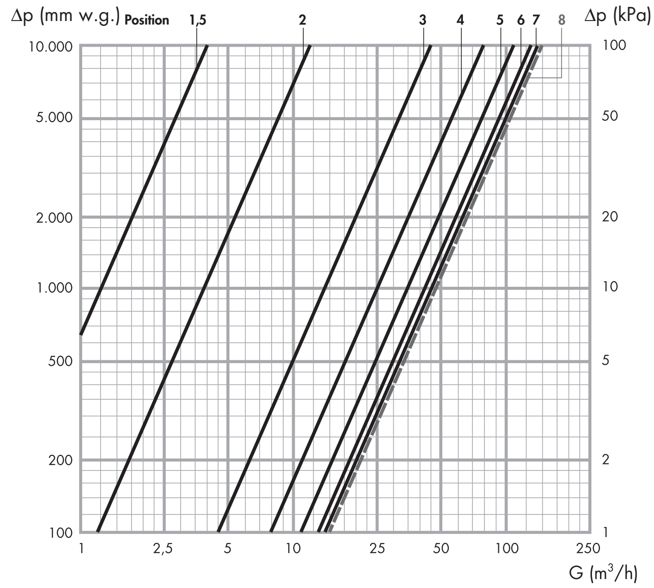
Liquid density ρ' = 1,1 kg/dm^3
Measured head loss Δp = 15 kPa
Reference head loss Δp' = 15/1,1 = 13,63 kPa
With this value you use the valve's Venturi diagram or the formula (1.2) and obtain the corresponding flow rate G (≈ 28,7 m^3/h).

Code 130060 DN 65



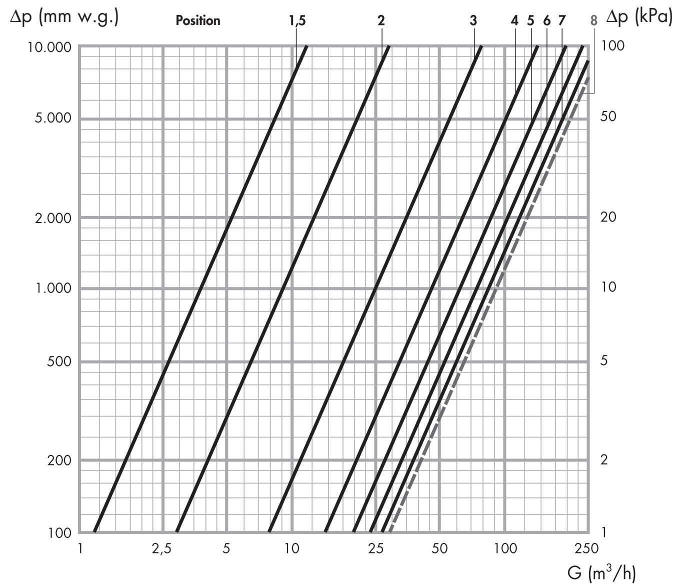
	Position						Kvs
DN 65	1,5	2	3	4	5	6	7
Kv (m^3/h)	5	15	45	79	103	118	129

Code 130080 DN 80



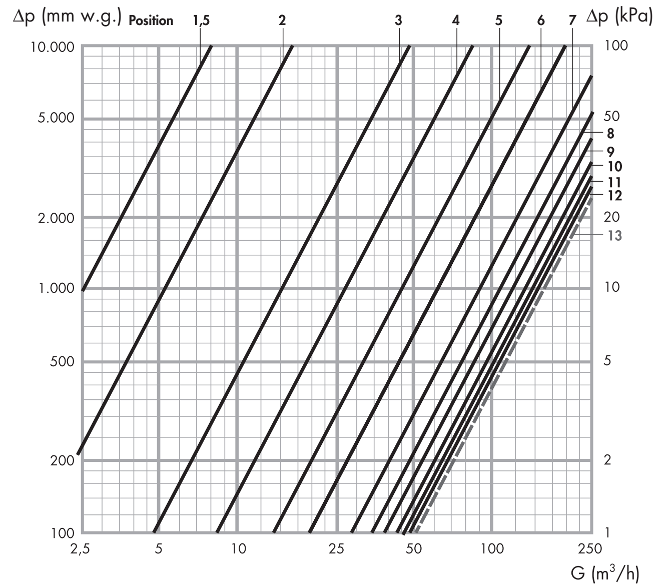
	Position							Kvs
DN 80	1,5	2	3	4	5	6	7	8
Kv (m^3/h)	4	12	45	79	107	127	140	148

Code 130100 DN 100



	Position							Kvs
DN 100	1,5	2	3	4	5	6	7	8
Kv (m^3/h)	12	29	78	142	195	234	265	296

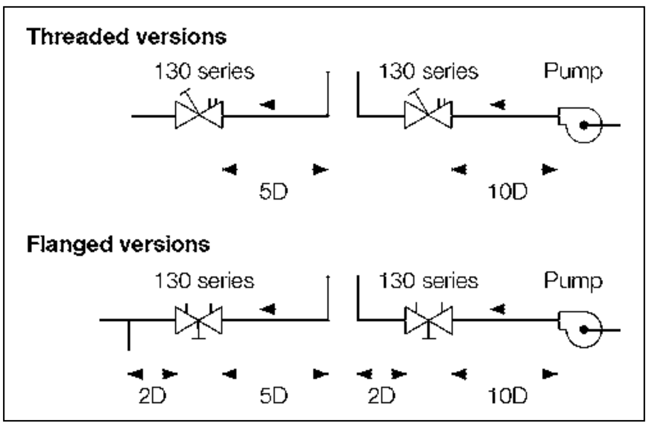
Code 130120 DN 125



	Position												Kvs
DN 125	1,5	2	3	4	5	6	7	8	9	10	11	12	13
Kv (m^3/h)	8	16	48	84	144	197	270	346	389	436	454	482	509

Installation

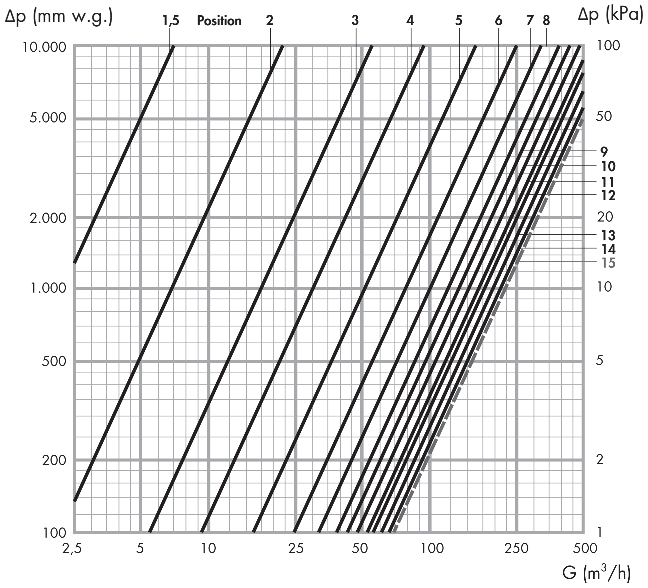
The balancing valves must be installed in such a way as to ensure free access to the pressure test ports, drain cocks and the adjustment knob. The valves can be fitted on either horizontal or vertical pipes. We recommend keeping the upstream and downstream sections of pipe straight, as shown in the illustrations below, to ensure accurate flow measurement. It is necessary to respect the flow direction shown on the valve body.



Circuit sizing with balancing valves

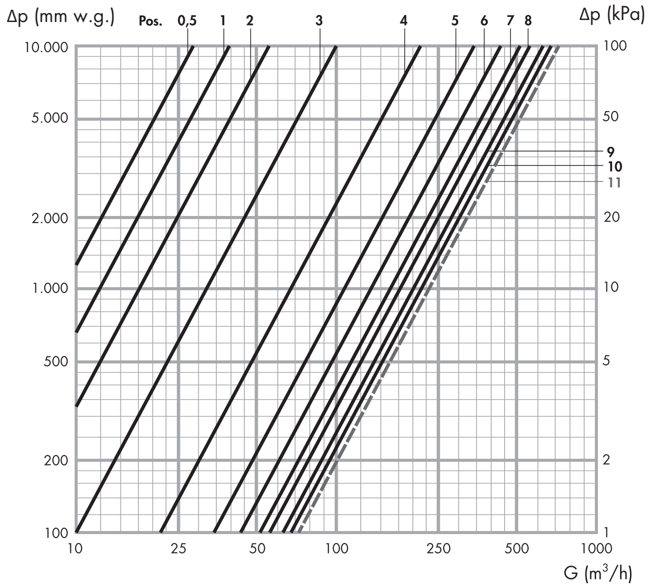
To obtain more detailed information on sizing a circuit with balancing valves, please refer to the 2nd volume of the Caleffi Handbooks. It gives numerical examples and notes on the application of the devices in circuits.

Code 130150 DN 150



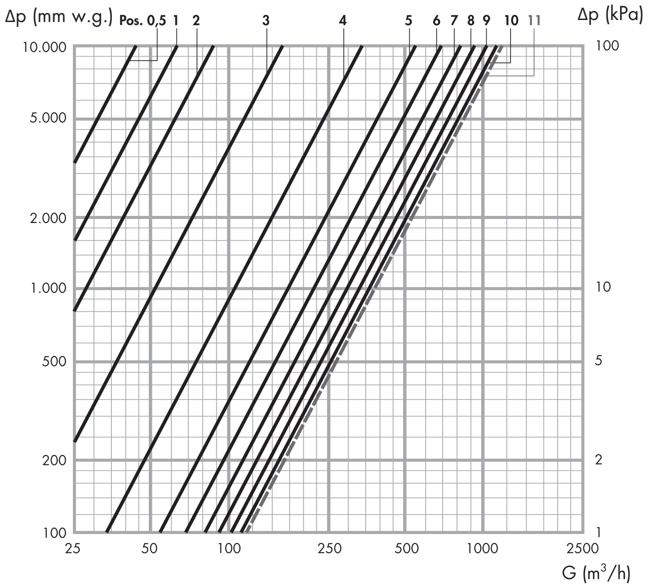
	Position														Kvs
DN 150	1,5	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Kv (m³/h)	7	22	53	93	160	250	322	390	435	482	517	556	606	651	699

Code 130200 DN 200



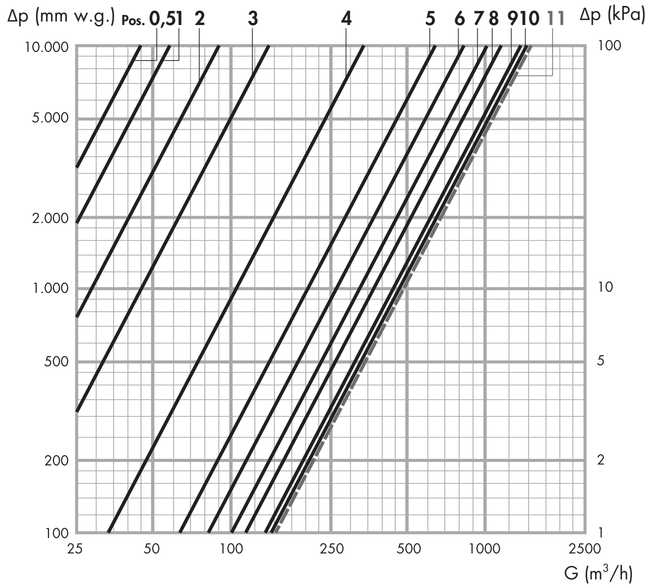
	Position										Kvs
DN 200	0,5	1	2	3	4	5	6	7	8	9	10	11
Kv (m³/h)	28	39	55	100	216	341	430	508	561	619	667	710

Code 130250 DN 250



	Position											Kvs
DN 250	0,5	1	2	3	4	5	6	7	8	9	10	11
Kv (m³/h)	44	62	87	164	345	543	694	824	925	1022	1110	1188

Code 130300 DN 300



	Position											Kvs
DN 300	0,5	1	2	3	4	5	6	7	8	9	10	11
Kv (m³/h)	45	57	90	141	332	634	825	1018	1170	1285	1394	1504

Accessories

100010

Tech. broch. 01041

Pair of fittings with quick-fit syringe for connection of pressure test ports to measuring instruments.
Female 1/4” threaded connection.
Max. working pressure: 10 bar.
Max. working temperature: 110°C.

Accessories

Electronic flow rate and differential pressure measuring station 130 series

The electronic measuring station makes it possible to measure the water flow rate in air-conditioning systems.
The system is composed of a Δp measuring sensor and a remote control unit (terminal) including the Caleffi Balance programming software. The terminal can be supplied already in the package or you can use your own Android® device by downloading the special app.
The sensor measures the differential pressure and communicates with the terminal via Bluetooth®.
May be used for flow rate measurement of 130, 131, 135 series balancing valves and of 683 series flow rate metering device.
May be used for Δp measurements on automatic flow rate regulators.
The software also contains the data of most of the commercially available balancing valves.

CE

Product range

Code 130006 Electronic flow rate and differential pressure measuring station complete with remote control unit
Code 130005 Electronic flow rate and differential pressure measuring station without remote control unit, with Android® app

Technical specifications

Range of measurement

Differential pressure:	0–1000 kPa
Static pressure:	< 1000 kPa
System temperature:	-30–120°C

Measurement accuracy

Differential pressure:	< 0,1% of full scale

Sensor

Battery capacity:	6600 mAh
Operating time:	35 hours of continuous operation
Charging time:	6 hours
IP class:	IP 65

Ambient temperature of the instrument

During operation and charging:	0–40°C
During storage:	-20–60°C
Ambient humidity:	maximum 90% relative humidity
Sensor weight:	540 g
Full case:	2,8 kg

Characteristic components

- Measuring sensor
- 2 measuring pipes
- 2 measuring needles
- Touchscreen terminal with active licence and accessories
- Sensor battery charger
- Terminal battery charger
- Communication cable between terminal and PC
- Instructions with licence to download the Android® app (for code 130005)
- Instructions manual
- CD containing the instructions manual, measurement and balancing software, valve database and the report viewing tool.
- Calibration protocol. The sensor is supplied with a specific calibration protocol drawn up by a certified laboratory

Operating principle

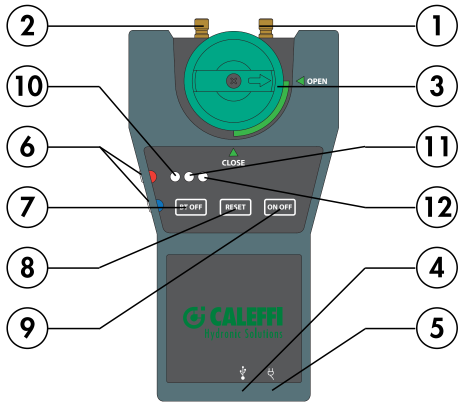
The operator chooses the balancing valve from the list on the terminal (manufacturer, model, size and position with the corresponding Kv). The data of the valve, together with the measured Δp, are the basis for calculating the flow rate that is displayed on the terminal screen. If the valve on which you are making the measurement is not available in the database, it is still possible to enter the Kv value manually.

Methods of measurement

The complete device allows to choose 3 methods of measurement:

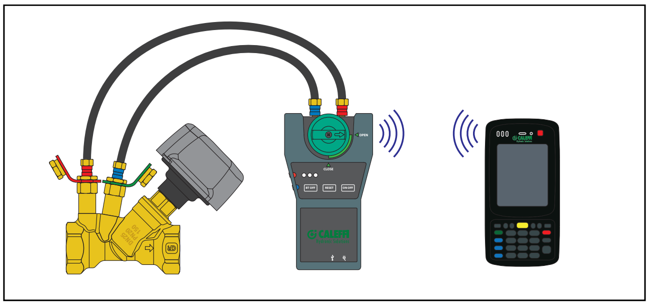
1) Measurement with set position. The display shows the flow rate calculated by the device in relation to the chosen valve and assigned position.
2) Measurement with set flow rate. The position is calculated to assign to the valve in order to obtain the desired flow rate.
3) Simple measurement Δp. The screen shows the differential pressure value measured by the sensor.

Characteristic components of the Δp measuring station



1. Upstream pressure test port
2. Downstream pressure test port
3. Setting by-pass knob
4. Mini USB port
5. Socket for charging
6. Ports for temperature probes *(optional)*
7. Bluetooth OFF
8. Reset button
9. ON/OFF button
10. Bluetooth indicator ON
11. Battery charging indicator
12. ON/OFF indicator

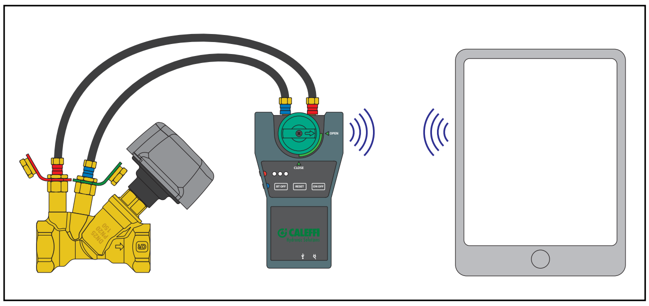
Transmission via Bluetooth to the terminal with Windows Mobile®



The terminal provided in the package is already equipped with the Caleffi Balance software which is loaded with all the data relating to Caleffi balancing valves and the main balancing valves that are commercially available.

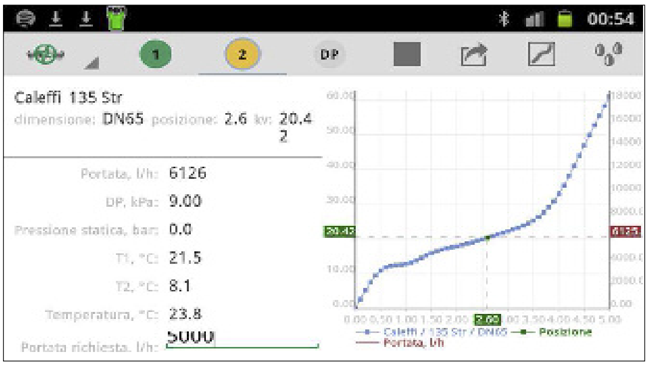
The device lets you make measurements using the methods described above, see the results and save them.

Transmission via Bluetooth® to Smartphone/Tablet with Android® app



Following the procedure described in the package you can download the Caleffi Balance app onto your terminal running the Android® operating system (Smartphone or Tablet).
It includes all the data relating to Caleffi balancing valves and the main balancing valves that are commercially available.

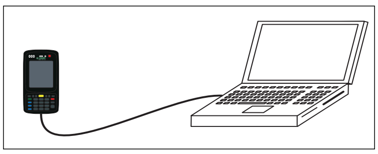
The device lets you make measurements using the methods described above, see the results and save them.
In addition it enables a graphic display of the results.



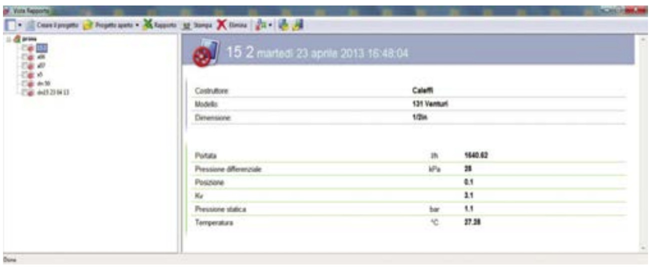
PC connection

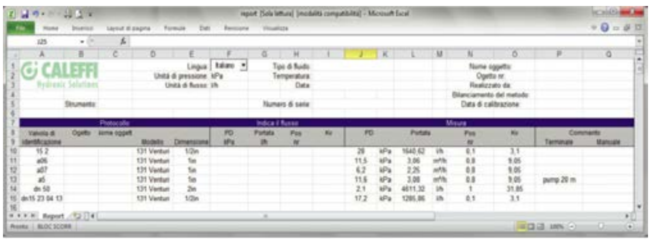
The values obtained with the measurements, and the corresponding valve data, can be saved and viewed directly on the terminal screen or sent to a PC for later processing.

The Report Viewer software supplied on the CD-ROM in the package can be installed on a PC. It enables collecting the measured data and drafting a report. In addition, this software lets you load the project before making any measurements and export the data on the terminal to help save the measurements in an orderly fashion.



The CD-ROM also contains the Valve Browser software which provides a simulation of the measurement in order to estimate the behaviour of the various valves during the design phase.



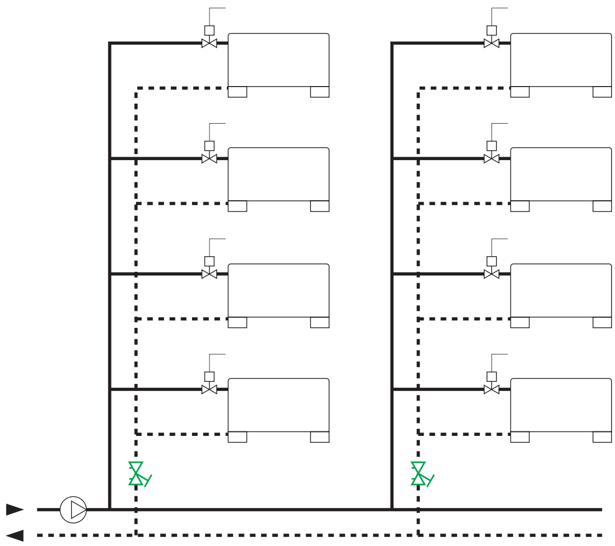


SPECIFICATION SUMMARY

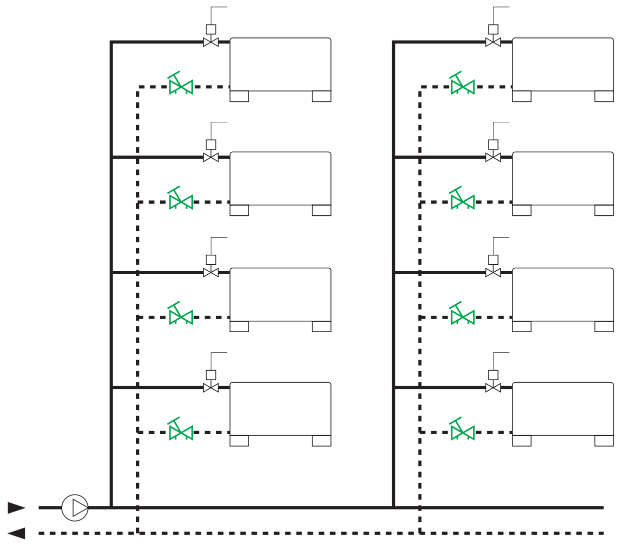
Code 130006
Electronic flow rate and differential pressure measuring station with remote control unit and with Bluetooth® transmission. Supplied complete with shut-off valves and connection fittings. Differential pressure 0–1000 kPa. Static pressure: < 1000 kPa. System temperature: -30–120°C.

Code 130005
Electronic flow rate and differential pressure meter with no remote control unit, with Android® app. Supplied complete with shut-off valves and connection fittings. Differential pressure 0–1000 kPa. Static pressure: < 1000 kPa. System temperature: -30–120°C.

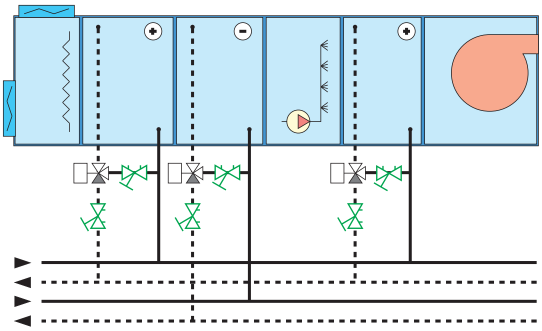
Application diagrams



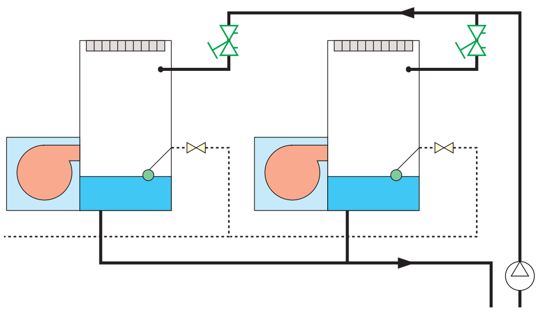
To adjust the flow rate to each riser



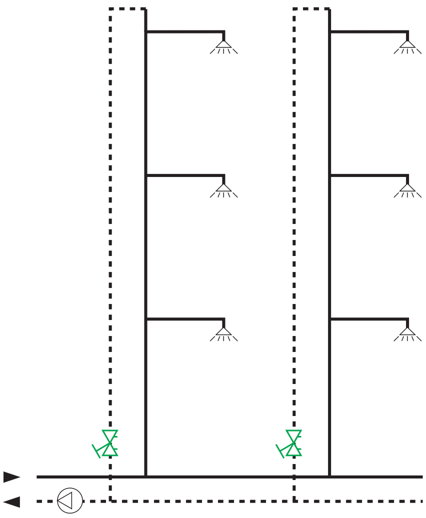
To adjust the flow rate to each terminal



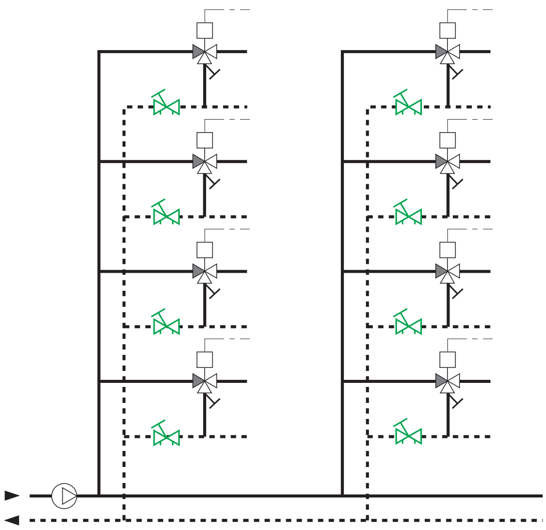
To balance circuits serving air conditioning units



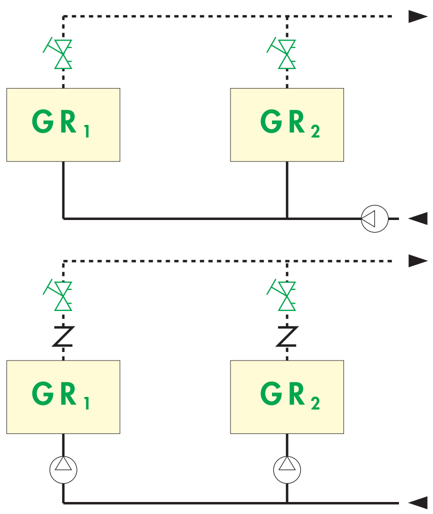
To balance circuits that serve cooling towers



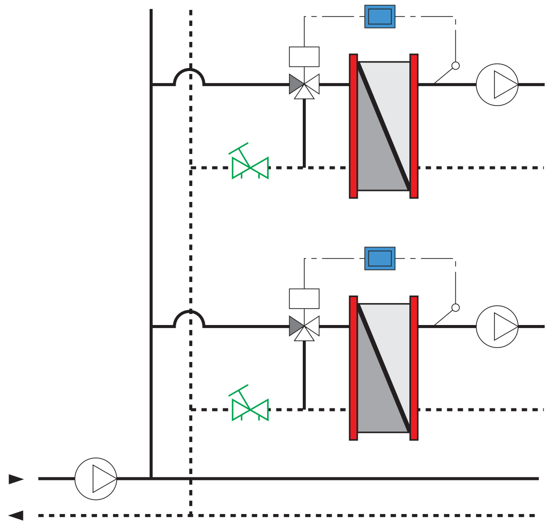
To balance sanitary water distribution circuits



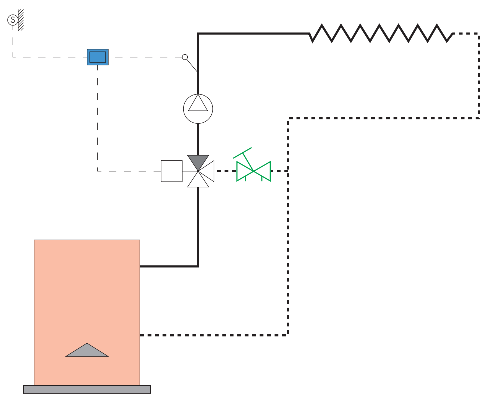
To balance zone branches in circuits with three-way valves



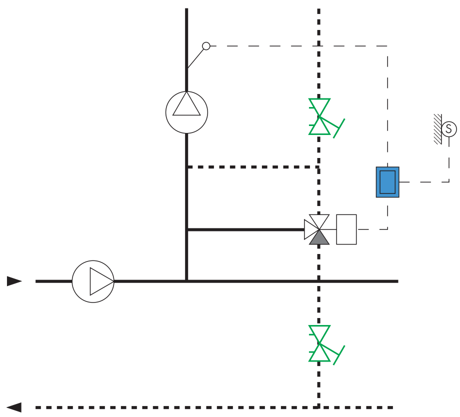
To balance the circuits that serve chiller unit evaporators or condensers



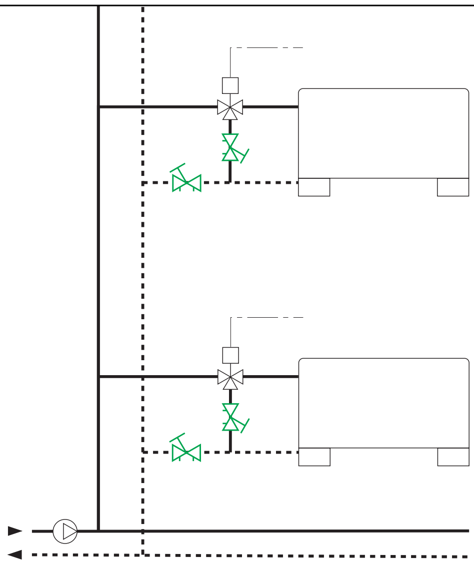
To balance the various substations in district heating systems



To balance the by-pass line of outside compensated temperature regulation circuits



To balance circuits in primary secondary coupling.



To balance by-pass and direct lines in circuits with three-way valves

SPECIFICATION SUMMARY

130 series threaded version

Balancing valve with Venturi device, threaded version. Size DN 15 (from DN 15 to DN 50). Main connections 1/2” (from 1/2” to 2”) F (ISO 228-1). Quick-fit pressure test port connections on valve body 1/4” F (ISO 228-1). Body, control stem and seal seat made of dezincification resistant alloy, stainless steel obturator. EPDM hydraulic seals. PA6G30 control knob. Medium water and glycol solutions; maximum percentage of glycol 50%. Maximum working pressure 16 bar. Working temperature range -20–120°C. Accuracy ±10%. Knob with micrometric indicator. Number of adjustment turns 5. Locking/sealing and saving the adjustment position. Complete with quick-fit pressure test ports made of brass with EPDM seal elements.

130 series flanged version

Balancing valve, flanged version. Size DN 65 (from DN 65 to DN 300). Quick-fit pressure test port connections on valve body 1/4” F (ISO 228-1). Body and cover made of grey cast iron. Brass control stem, PPS obturator. EPDM hydraulic seals. PA knob for size DN 65 (DN 80, 100, 200, 250 and 300), stamped steel for size DN 125 (and DN 150). Medium water and glycol solutions; maximum percentage of glycol 50%. Maximum working pressure 16 bar. Working temperature range -10–140°C (-10–120°C for DN 200, 250 and 300) Accuracy ±10%. Knob with micrometric indicator. Number of adjustment turns 6 for size DN 65 (7 DN 80 and 100; 12 DN 125; 14 DN 150; 10 from DN 200 to DN 300). Saving of the adjustment position. Complete with quick-fit pressure test ports made of brass with EPDM seal elements.

130 Series insulation

Hot pre-formed shell insulation for balancing valves with threaded connections, 130 series. For heating and air-conditioning. Material closed cell expanded PE-X. Thickness: 15 mm. Density: inner part 30 kg/m³, outer part 80 kg/m³; thermal conductivity (ISO 2581): at 0°C 0,038 W/(m·K), at 40°C 0,045 W/(m·K). Coefficient of resistance to the diffusion of water vapour (DIN 52615): >1300. Working temperature range: 0–100°C. Reaction to fire (DIN 4102): class B2.

CALEFFI Hydronic Solutions

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