ICV - A MEMBER OF THE AVK GROUP

BALANCING VALVES

Flowmaster™
Flowmaster FC™
Deltamatic™
Deltaflow™







Total control inside buildings

HQ in Denmark

Introducing the company

ICV is a wholly-owned marketing subsidiary of AVK Valves, a company that has been designing, manufacturing and supplying the world's water, sewage and gas markets for over 50 years. AVK is a synonym for quality, and ICV continues that tradition in Asia.

From Durban to Dubai, Sheffield to Shanghai and Alaska to Adelaide, these Danish-made valves have been providing users with quality, reliability, peace of mind and efficiency in every type of project including pumping stations, treatment plants, distribution networks and building construction. Now, ICV will bring the same quality and reliability to the Asian Construction Industry, focusing on Building Services and HVAC.

These latest products in the ICV stable, described in full detail here, have been developed with the above building stake-holders in mind. They offer a guaranteed way of ensuring always that the correct flow of heating or cooling water gets to the terminal unit. No more complex commissioning of water pipework – now it's automatic! And you will save money too! Developers and contractor save on piping and pump size costs and the owners and users save on energy costs.

ICV has a mission – to become the best friend of the developer, the HVAC engineer and installer in Asia, through the supply of a carefully crafted set of building services products that are both *automatic*, (thus easy to understand, design into a building and install), and *economic* – the equipment cost-saving and energy saving benefits mean a truly green solution.

ICV have taken automatic balancing and control to a level previously unseen in the industry. The complexity of design results in a simplicity of function and use. It's truly a case of 'fit and forget'.

At ICV we define 'the customer' as anyone who benefits from the specification, purchase or use of our products. Developers, consultants, designers, contractors, owners and tenants – they are all within our consideration. For ICV, it is *really*, "all about you!"

Approvals

DS/EN ISO9001-2000

DS/EN ISO14001-2004

DS/OHSAS 18001-2008

Contents

Why Balance?

ICV - A Member of the AVK Group

Automatic flow control and full stroke modulation – the perfect balance

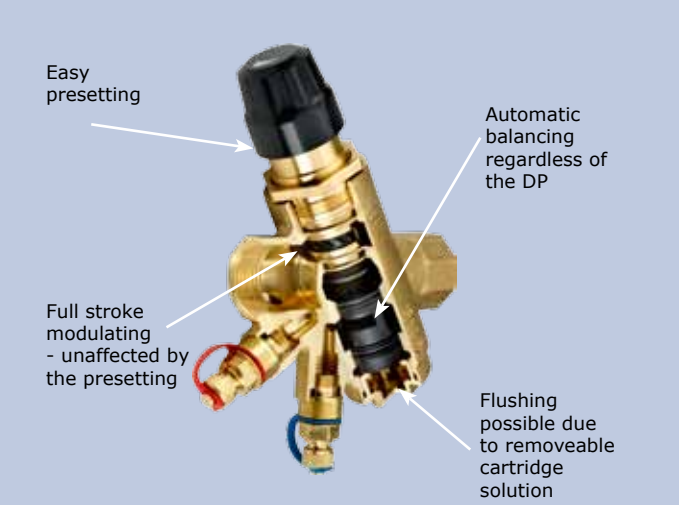
A heating or cooling distribution system is said to be in balance when flows in every part of the system are exactly in accordance with the design. Many designers assume that if the flow is too high, the two-way control valves will modulate and the flow will be adjusted. They believe that it is thus not necessary to balance a variable flow distribution system. This is wrong, as an overflow will not necessarily produce a significant temperature change, thus the control valve, which takes its signal from a temperature controller, will not operate to correct the overflow. Balancing is required.

The ICV Flowmaster incorporates a manual balancing valve that can be preset to ensure that the maximum design flow is not exceeded.

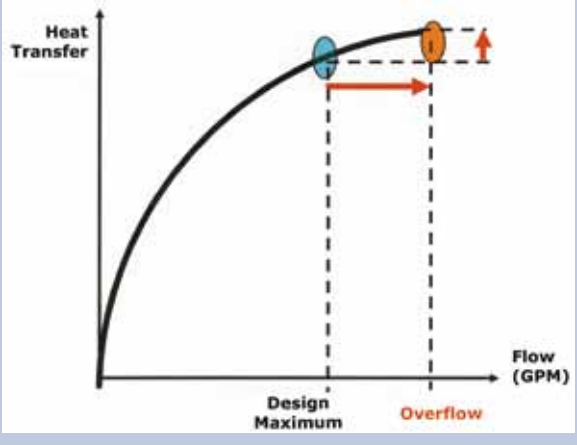
Futhermore, there will be significant variations in differential pressures across the Flowmaster, as the user demand in the system changes due to changes in set point and heat load. ICV Flowmaster incorporates a differential pressure controller that corrects the effect of these changes on the flow and allows the control valve to operate with full authority.

The new IC Flowmaster combines three control functions in one. Preset maximum flow control, differential pressure independence and a full authority control valve.

ICV's innovative design introduces an intelligent control valve that adjusts automatically to provide full modulating control. When the valve is preset to the maximum design flow the available stroke of the control valve remains the same thus providing 100% effective modulation of the control valve.



Coil flow rate versus heat transfer



- When control valves are oversized, exceeding design flow does not give proportional increase in heat transfer.
- 50% overflow only provides about 10% extra heat transfer.
- Under high load imbalance can continue for long periods.

Why *automatic* balancing?

- **Less technology and equipment** is required for commissioning and there is a **reduction in commissioning** time and labor. **Earlier project completion**.
- Allows **staging of project** and equipment **without need for rebalancing**. When an extension or new phase is connected, valves in existing phases will automatically adjust to pressure change and maintain flow and comfort.
- Can **change the flow** to any one unit **without having to rebalance** parallel circuits.
- **No valve adjustments** required – as is often the case for hundreds of valves in manually balanced systems.
- Unlike manual balancing valves, **a visit to each valve is unnecessary** after installation. However, valves are normally supplied with pressure test ports for simple on-site flow verification, if needed, at the commissioning stage.
- Even if valve cannot be accessed, **correct flow (balance) will still be assured**. Cartridges and orifices are **factory calibrated** to provide specified constant flow rate within the pressure differential range.
- Contractors are **not responsible for rebalancing** existing sections of the system.
- Accessible cartridge allows **easy debris removal** from system. Manual valves must be opened and then reset to the correct opening value.

ICV Flowmaster - Pressure independent two port modulating control & balancing valve

Application

The innovative design of ICV Flowmaster combines an externally adjustable tamper-resistant automatic balancing valve, a differential pressure control valve and a full authority modulating control valve. The maximum flow can be adjusted once the actuator is removed according to the required design flow. With the electrical actuator mounted, the balancing cartridge eliminates any flow above the design flow whilst the control component retains authority and full-stroke modulation at all times.

Due to the automatic balancing and full authority features, the ICV Flowmaster can be used for high precision temperature control on heating and cooling units such as fan-coils, air-handling units and other terminal units. Futhermore, the ICV Flowmaster combines all necessary features to ease the work of designers and installers: flushing is possible by temporary removal of the cartridge in the automatic balancing part of the valve; the wide (up to 400kPa) differential pressure range meets the requirements of the most applications; the compact design and the user-friendly presetting unit guarantee easy installation and commissioning.

Benefits

Design

- Less time to define the necesssary equipment for a hydraulic balanced system (only flow data required)
- No need to calculate valve authority
- Security that the specified flow is also the actual flow
- Automatic adjustment if the system is modified after the initial installation
- No need for oversized pumps

Installation

- No further regulating valves required in the distribution pipework when installed at terminals.
- Total number of valves minimized due to the 3-in-1 design
- Minimized commissioning time due to automatic balancing of the system
- Removable cartridge solution simplifies flushing procedure
- No minimum straight pipe lengths required before or after the valve.

Operation

- High comfort for the end-users due to high precision temperature control
- Longer life due to fewer movements of the actuator
- Less energy consumption due to faster response and increased system stability

Advantages

- The presetting function has no impact on the stroke; full stroke modulation at all times, regardless the preset flow or differential pressure
- The constant differential pressure control across the modulation control component guarantees full authority.
- Automatic balancing eliminates overflows, regardless of fluctuating pressure conditions in the system
- Flushing through the valve is possible due to the removable cartridge feature
- Electrical actuator 0-10 V, normally closed
- Differential pressure operating range up to 400 kPa
- High flows with minimal required differential pressure due to advanced design of the valve
- More accurate control due to long 5.5mm stroke
- Higher presetting precision due to stepless analogue scale

- Every building, regardless of location must be designed to provide a satisfactory indoor climate, especially if occupied by people, and over 97% are!
- Designers must keep efficiency in their minds when planning and specifying, to minimize the use of increasingly expensive energy
- Temperature control is a key part of indoor climate and comfort, and most systems use water to distribute energy
- Balancing isn’t an option – it’s a requirement

ICV Flowmaster - Pressure independent two port modulating control & balancing valve

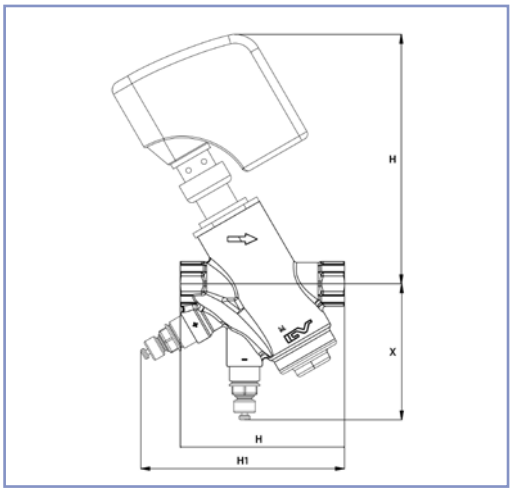
Technical Data

Valve

Material:	DZR brass to EN CW602N
DP-Valve:	PPS (Polyphenylene sulphide) with 40% glass
Flow setting:	PPO (Polyphenylene Oxide)
Spring:	Stainless steel
O-rings:	EPDM
Pressure class:	PN 25
Max. differential pressure:	400 kPa
Medium temperature:	0ºC to 120ºC

Actuator

Characteristics:	Electrical, normally closed
Protection class:	IP 43
Power supply:	24 V AC ±15%
Frequency:	50/60 Hz
Power consumption:	4 VA
Control signal:	0-10 V DC/4-20 mA
Actuating force:	250 N
Stroke:	5.5 mm
Running time:	80s
Ambient operating conditions:	0ºC to 50ºC
Cable length:	1m
Weight:	350g
CE compliance:	89/336/EEC, 93/68/EEC



Product Range

Dimensions	High Flow		Low Flow		H1	H	X	Y	Weight
Fem/Fem	Product No	Flow* (l/h)	Product No	Flow* (l/h)	mm	mm	mm	mm	kg
DN 15	951-015-20-12	244-1724	951-015-20-11	75-625	115	92	77	83	0.79
DN 20	951-020-20-12	292-2039	951-020-20-11	131-1050	115	92	77	83	0.80
DN 25	951-025-20-12	292-2039	951-025-20-11	231-1722	119	99	77	83	0.89
DN 32	951-032-20-12	465-3056			148	128	86	90	1.40
DN 40	951-040-20-12	2022-7105			219	144	87	90	2.55
DN 50	951-050-20-12	2204-8586			225	155	93	90	3.20

Modulating actuator (24 V/0 - 10 V)	951-000-9804
3-pos actuator (230 V)	951-000-9805

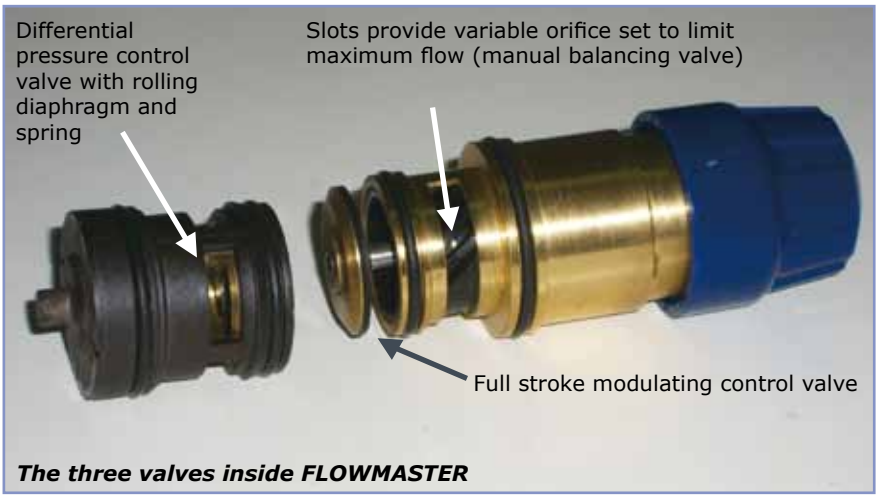
*(example: for high flow DN15, the maximum flow can be set between 244 and 1724l/h, according to design specifications)

Operation Principle

The innovative design of ICV Flowmaster introduces a modulating control component that retains 100% authority at all times.

With ICV Flowmaster, there are two independent movements for the presetting and the modulation function. During presetting, the inlet area moves circumferentially without interfering with the length of the stroke. During modulating, the inlet area moves linearly taking advantage of the full stroke. In the example below, the flow is modulated throughout the full range from 10 to 0V regardless of the preset flow (ie. 625 l/h or 300l/h)

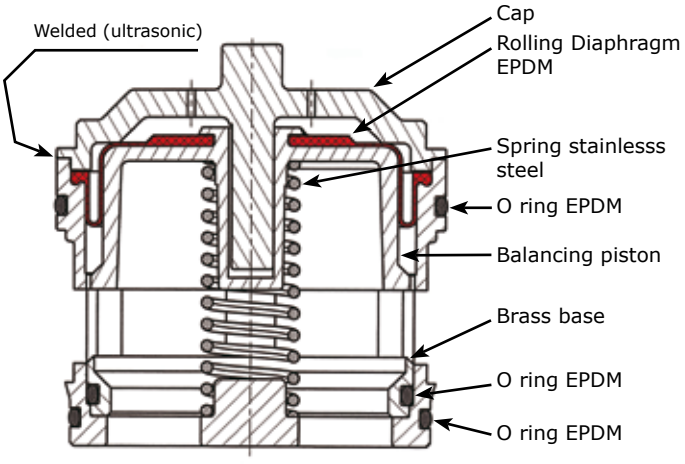
Whilst the control component provides proportional modulation irrespective of the preset flow, the automatic balancing cartridge guarantees that the flow will never exceed the maximum preset flow. Regardless of pressure fluctuations in the system, the maximum flow is kept constant up to a maximum differential pressure of 400kPa.

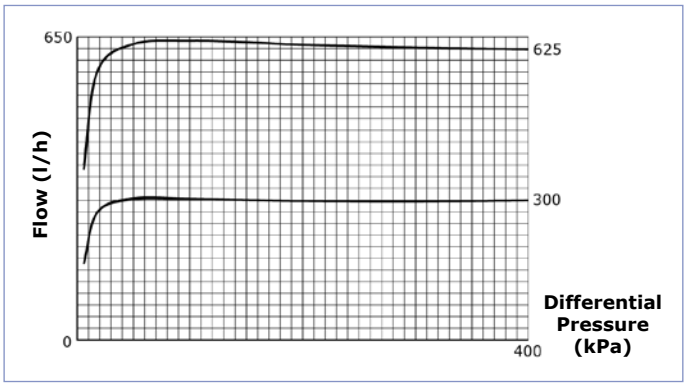


The three valves inside FLOWMASTER

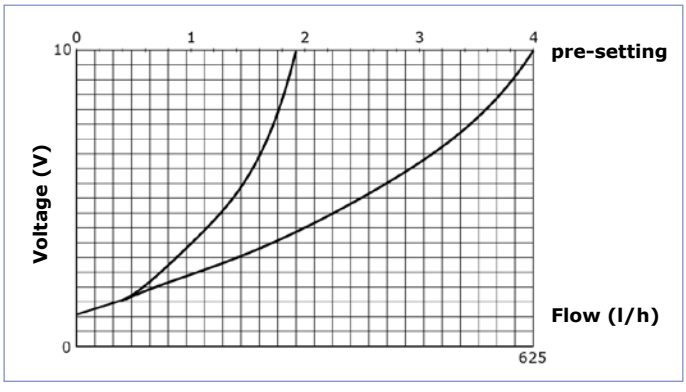
Dial under actuator used to set limit to maximum flow

Detail of ΔP valve

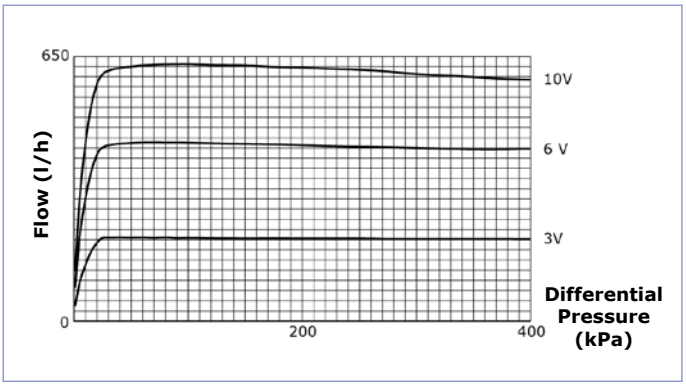




Flow rate vs. Differential Pressure
(Preset flow: 625 l/h, 300l/h)



Flow rate vs. Voltage
(Preset flow: 625 l/h, 300l/h)



Flow rate vs. Differential Pressure
(Voltage: 10V, 6V, 3V)

ICV Flowmaster - Pressure independent two port modulating control & balancing valve

Application

The ICV Flowmaster can be used in many different heating/cooling applications when automatic balancing and precise temperature control is required.

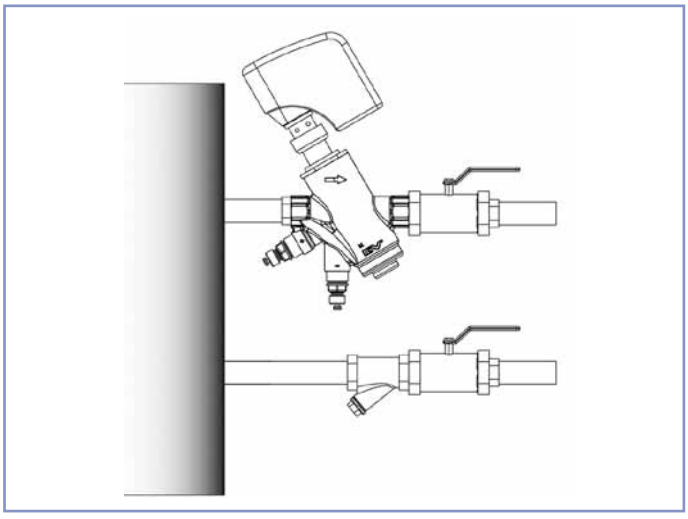
Design

The design of ICV Flowmaster combines high performance with small size and compact construction. The main components of the valve are:

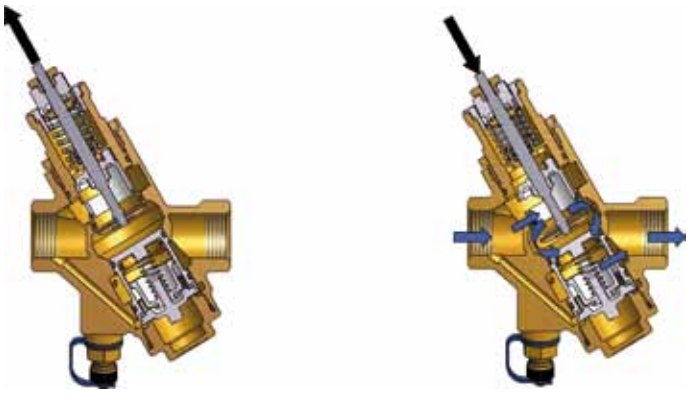
- automatic balancing cartridge
- modulating control component
- presetting scale (not accessible when the actuator is mounted)
- P/T plugs
- electrical actuator (0-10V)

Function

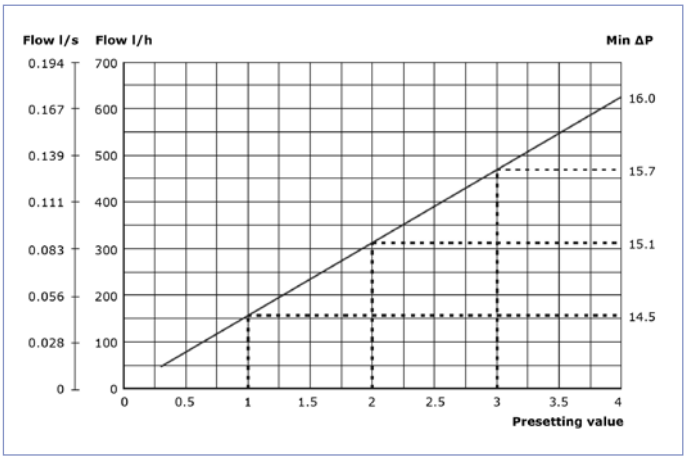
The ICV Flowmaster is delivered with a 'First Open' plastic cap allowing the flow to pass through the valve before the actuator is installed. The First Open and cartridge removal features allow flushing through the valve before commissioning the system. After flushing, the balancing cartridge is reinserted into the valve and the First Open cap can be discarded allowing the user to adjust the presetting dial to the design flow. The presetting of the dial is user-friendly requiring only a simple flow vs. presetting graph, included in the instruction leaflet. Once the flow is set, the actuator can be mounted making the presetting tamper resistant and the valve ready to operate.



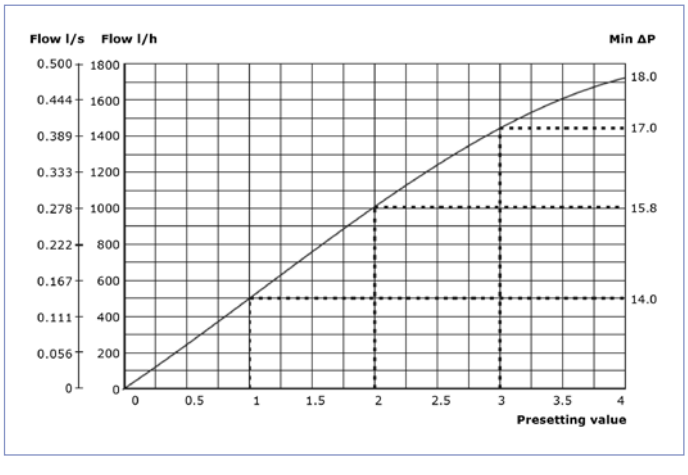
An ICV strainer ball valve in the supply line combined with ICV Flowmaster in the return line of a cooling/heating unit.



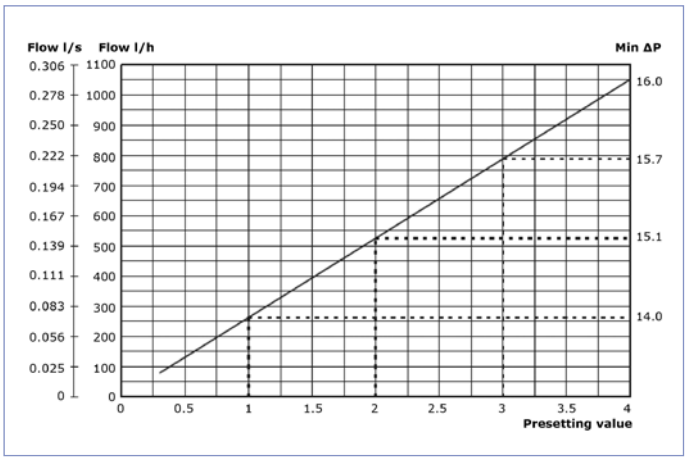
When the control valve opens, the flow passes through the preset orifice, through the control valve and then through the ΔP control element which adjust flow automatically to compensate for variable differential pressures across the valve.



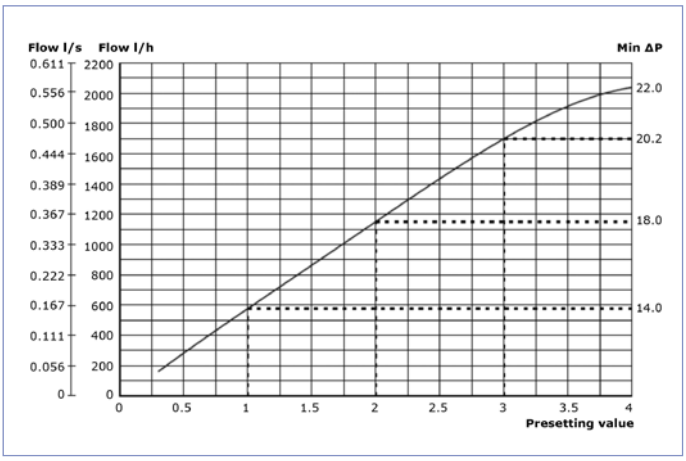
ICV Flowmaster DN 15 Low Flow



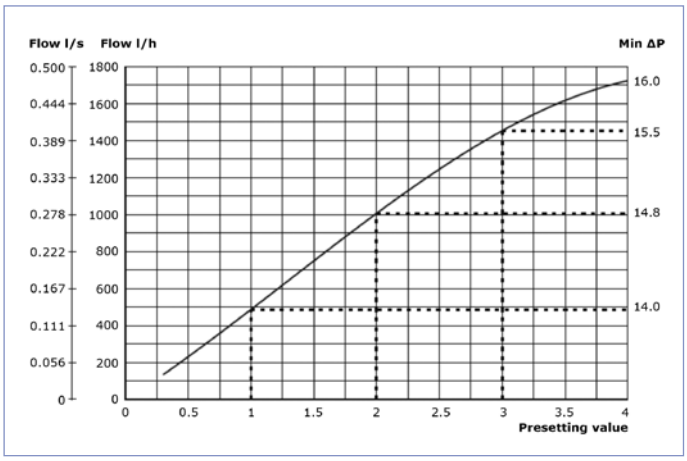
ICV Flowmaster DN 15 High Flow



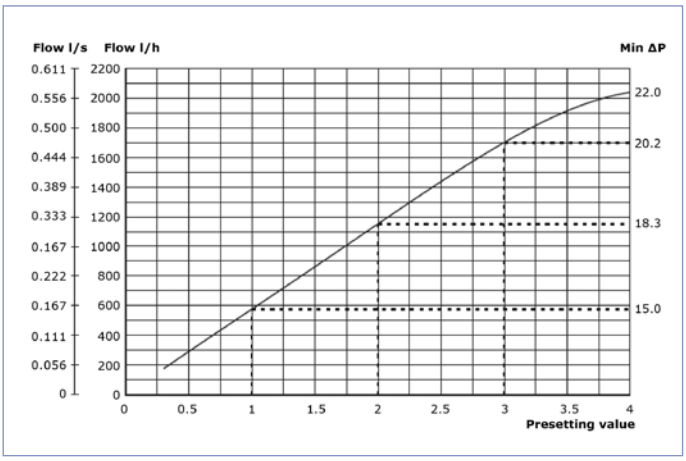
ICV Flowmaster DN 20 Low Flow



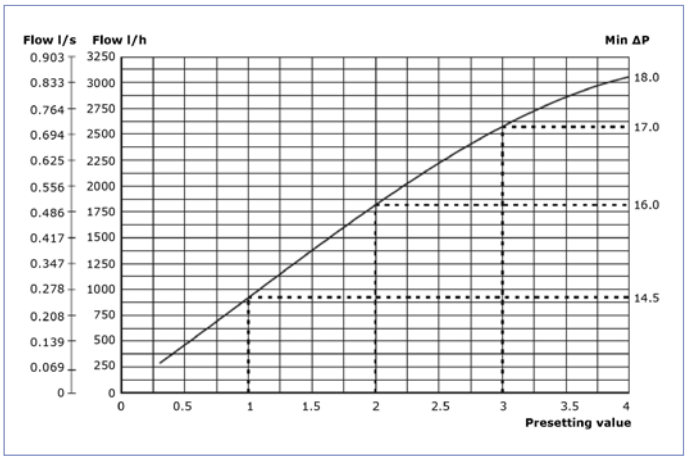
ICV Flowmaster DN 20 High Flow



ICV Flowmaster DN 25 Low Flow



ICV Flowmaster DN 25 High Flow



ICV Flowmaster DN 32 Flowgraph

[More flow charts available on request.]

ICV Flowmaster - Pressure independent modulating control & balancing valve, DN40 - 200

Application

For use in heating/air conditioning piping systems to control water (glycol) flows to preset but changeable levels, to prevent overflows in terminal units and provide full control valve authority.

Technical data

Valve	
Body:	Cast iron GG25
Spring:	Stainless steel AISI 304
Diaphragm:	EPDM
Cartridge:	Brass/Stainless steel
DP range:	30 ~ 300 kPa
Pressure rating:	PN16
Actuator	
Housing:	ABS
Gear:	POM (DN40 - 80) Cast iron (DN100 - 200)
Bracket:	Alu alloy
Protection class:	IP54
Power supply:	24 V AC
Power consumption:	12 W
Actuating force:	1800 N (DN40 - 80) 2700 N (DN100 - 200)
Control signal:	0 ~ 10 V/4 ~ 20 mA
Running time:	210 s (DN40 - 80) 240 s (DN100 - 200)
Ambient temp.:	-10 ~ 50℃
Medium temp.:	0 ~ 150℃
Weight:	2.4 kgs

Product No.	DN	Flow rate (m^3/h)
951004015	40	1 ~ 7.7
951005015	50	2 ~ 12.1
951006515	65	3 ~ 20.4
951008015	80	5 ~ 30.8
951010015	100	10 ~ 45.3
951012515	125	15 ~ 70.7
951015015	150	20 ~ 101.8
951020015	200	50 ~ 360

[Flowgraph and full details can be found in ICV Datasheet and the website: www.icvalves.cn]

DN40 - 80

DN100 - 200

ICV Flowmaster FC - on/off control & automatic balancing valve

Application

The *ICV Flowmaster FC* has been designed especially for the balancing and control of cooling and heating fan coil units.

With its simple but reliable on/off control the valve can be used for several different control applications, with the advantage that dynamic control is always assured.

By means of *ICV Flowmaster FC* the design flow rate is assured in each control area with no possibility of wasteful overflow, despite pressure fluctuations in the system. A control area may be fan coils for hotel rooms or a calorifier for a sports centre.

Benefits

- Time consuming adjustment of the system is eliminated
- The valve automatically ensures the hydraulic balance, regardless of changing pressure conditions in the system

System Design

- No need to use balancing valves in the mains, risers or branches
- Less time to define the necessary equipment for a hydraulic balanced system
- No impact if the calculated distribution of pressure in the installation is inaccurate
- Security that the specified maximum flow is also the real one
- No requirements on pipe lengths before and after the valve

Installation

- Minimized commissioning time due to automatic balancing of the system
- No need for oversized pumps and oversized control valves – savings in capital cost

Operation

- Energy savings due to elimination of overflows
- Higher comfort due to correct distribution of water in the system and to optimized function of the control valves

Features

- Two valves in one. Replaces both the manual balancing valve and two way control valve
- No requirement on pipe lengths before and after the valve
- Small compact product
- Built-in on/off function for thermo-electric operated actuator, normally closed, (or electromechanical actuator on request)
- The valve can easily be fitted into the system
- Integral self-sealing P/T plugs for needle system

Function

The balancing occurs by means of a flow rate cartridge that keeps the differential pressure constant across an orifice.

In the desired control range the pump supplies sufficient differential pressure to affect the spring and rolling diaphragm of the cartridge.

ICV Flowmaster FC ensures the optimum flow in each control zone to maintain the rated heat/cool transfer. This flow is maintained regardless of pressure fluctuations in the system.

Technical data

Valve housing:	DZR Brass, CW602N
O-rings:	EPDM
Pressure rating:	PN25
Size:	DN20, DN25
Medium temp.:	0 - 95°C
Ambient temp.:	0 - 50°C
Flow range:	Same as cartridge for Delta matic DN15-25 (see page 10)
Max. diff. pressure:	400 kPa
Weight:	700 g

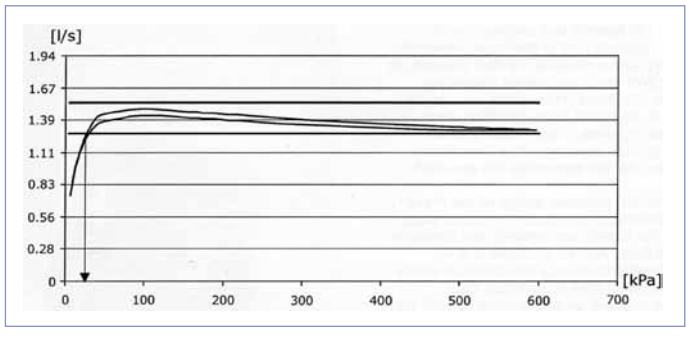
Thermo-electric actuator

Actuator housing:	ABS
Actuating force:	80 N ~ 130 N
Running time:	2.5 ~ 4 mins (25°C)
Stroke:	2.15 mm
Protection class:	IP40
Power consumption:	1.1 VA
Power supply:	24/110/230 V
Weight:	110 g

ICV Deltamatic - Automatic flow control valve DN15 - 50/DN50 - 800

ICV Deltamatic is a balancing valve that automatically adjusts to control flow to a constant and highly accurate fixed level. Each valve is factory set to a predetermined limit of flow by correct selection of the cartridge style, (high/low pressure), and then the addition of a removable orifice plate with varying hole sizes. The cartridge comes preassembled for the flow rate specified and then it's a case of 'fit and forget'!

Cartridges of this type (from other manufacturers), perform much less accurately due to leakage between the piston and the body. ICV Deltamatic cartridges come with a rolling diaphragm built into the gap between the piston and the body, which means zero leakage. All the flow is controlled by the positioning of the piston. Zero leakage past the piston sides also means zero possibility of dirt entry or film build-up which can adversely affect the continuous operation of other brands of valve, where the zero leakage feature doesn't exist.



Schematic view of the flow development for cartridge type 40, 952-000-4014176. Nominal flow 1.388 l/s. The cartridge enters the pressure range at 23 kPa and maintains the flow at a constant level all the way till 600 kPa.

Application

- The ICV Deltamatic Cartridges are designed and manufactured for the automatic balancing of heating and cooling circuits. They are integral part of the ICV family of Automatic Balancing Products keeping the flow constant at the specified level even under fluctuating pressure conditions. From small size valves (DN15) to big wafer types (DN800), from small heating units to district cooling applications, there is a ICV Deltamatic Cartridge that can ***guarantee*** the specified flow to +/– 5% of that specified and +/- 10% for large sizes.
- The advanced patented design of the ICV Deltamatic Cartridges introduces the orifice plate concept for higher performance and flexibility. With ICV Deltamatic Cartridges it is no longer necessary to change the cartridge every time the design flow is modified. Each cartridge contains an orifice plate specific to the desired flow that can be easily removed and replaced by another one if design criteria change after purchase. Replacement cartridges will be held in stock locally.

Advantages

- Only one differential pressure operating range (up to 600kPa) making the sizing of the cartridge very easy, (depending only on the design flow).
- Complete, broad and well-balanced distribution of flows for the full range of heating and cooling applications, (from 0.007 l/s and 7 kPa minimum ΔP, to 11.381 l/s, per cartridge).
- Minimised friction and noise due to the patented cartridge design – the rolling diaphragm prevents metal-metal contact as the piston moves in and out, giving totally silent operation. This is a unique and extremely important feature.
- Improved response to water hammer due to shock absorption of the rubber diaphragm within the cartridge.
- No impact of debris on the performance of the cartridge. The design of the inlet and the outlet areas makes the accumulation of particles inside the cartridge very difficult.

Benefits

Design

- Less time to define the necessary equipment for a hydraulic balanced system.
- No impact if the calculated distribution of pressure in the installation is not accurate.
- Security that the specified flow is also the real one. Flexibility if the system is modified after the initial installation.

Installation

- Cartridge solution makes flushing procedure very easy.
- Quick and easy installation of the cartridge in the valve.
- Minimized commissioning time due to automatic balancing of the system.

Operation

- Unproblematic performance even with high concentration of debris.
- Noiseless operation.
- High comfort for the end-users – provides accurate temperature control.

Cutaway picture of the cartridge showing rolling diaphragm - prevents side leakage and reduces noise - no metal/metal contact.

ICV Deltamatic – Cartridges

Cartridges for valves from DN15 to DN50

Materials of construction

Body:

*High pressure:	Tin/nickel plated DZR Brass to EN CW 602N
*Low pressure:	DZR Brass to EN CW 602N
O-rings:	EPDM
Diaphragm:	Reinforced HNBR
Max. differential pressure:	600 kPa (HP); 350 kPa (LP)
Medium temperature:	-20ºC to +120ºC
Medium:	water (or with added glycol)

Cartridges for Automatic Balancing Valve DN15-25, Deltamatic

Low pressure **0.007 l/s to 0.151 l/s**

Article no	Flow (l/s)	Min ΔP (kPa)
952-10 1 1150	0.007	7
952-10 1 1170	0.010	7
952-10 1 1190	0.012	7
952-10 1 1210	0.015	7
952-10 1 1230	0.021	8
952-10 1 1260	0.024	9
952-10 1 1290	0.029	10
952-10 1 1300	0.032	10
952-10 1 1320	0.036	11
952-10 1 1350	0.043	11
952-10 1 1370	0.049	12
952-10 1 1400	0.057	12
952-10 1 1430	0.067	12
952-10 1 1460	0.078	12
952-10 1 1490	0.089	13
952-10 1 1510	0.097	13
952-10 1 1540	0.111	13
952-10 1 1570	0.132	14
952-10 1 1620	0.151	14

Low pressure **0.171 l/s to 0.260 l/s**

Article no	Flow (l/s)	Min ΔP (kPa)
952-11 1 1725	0.171	14
952-11 1 1730	0.186	14
952-11 1 1735	0.204	14
952-11 1 1740	0.222	16
952-11 1 1745	0.242	19
952-11 1 1750	0.260	21

Low pressure **0.283 l/s to 0.680 l/s**

Article no	Flow (l/s)	Min ΔP (kPa)
952-20 1 2070	0.283	22
952-20 1 2074	0.300	22
952-20 1 2077	0.332	22
952-20 1 2082	0.371	23
952-20 1 2086	0.412	23
952-20 1 2088	0.439	23
952-20 1 2092	0.493	24
952-20 1 2094	0.509	24
952-20 1 2099	0.578	25
952-20 1 2103	0.625	26
952-20 1 2106	0.644	27
952-20 1 2109	0.680	28

High pressure **0.007 l/s to 0.151 l/s**

Article no	Flow (l/s)	Min ΔP (kPa)
952-10 2 1210	0.015	7
952-10 2 1230	0.021	8
952-10 2 1260	0.024	9
952-10 2 1290	0.029	10
952-10 2 1300	0.032	10
952-10 2 1320	0.036	11
952-10 2 1350	0.043	11
952-10 2 1370	0.049	12
952-10 2 1400	0.057	12
952-10 2 1430	0.067	12
952-10 2 1460	0.078	12
952-10 2 1490	0.089	13
952-10 2 1510	0.097	13
952-10 2 1540	0.111	13
952-10 2 1570	0.132	14
952-10 2 1620	0.151	14

High pressure **0.171 l/s to 0.260 l/s**

Article no	Flow (l/s)	Min ΔP (kPa)
952-11 2 1725	0.171	14
952-11 2 1730	0.186	14
952-11 2 1735	0.204	14
952-11 2 1740	0.222	16
952-11 2 1745	0.242	19
952-11 2 1750	0.260	21

High pressure **0.283 l/s to 0.680 l/s**

Article no	Flow (l/s)	Min ΔP (kPa)
952-20 2 2070	0.283	22
952-20 2 2074	0.300	22
952-20 2 2077	0.332	22
952-20 2 2082	0.371	23
952-20 2 2086	0.412	23
952-20 2 2088	0.439	23
952-20 2 2092	0.493	24
952-20 2 2094	0.509	24
952-20 2 2099	0.578	25
952-20 2 2103	0.625	26
952-20 2 2106	0.644	27
952-20 2 2109	0.680	28

Designers' Specifications Text Assistance

High pressure cartridges for valves DN15-DN50

- The cartridge (for the ICV Deltamatic automatic balancing valve) should be made of tin/nickel plated DZR brass
- There should be only one differential pressure range up to 600kPa
- The flow rate should be defined by replaceable orifice plate
- There shall be an internal rolling diaphragm made of reinforced HNBR
- The O-rings should be made of EPDM

Low pressure cartridges for valves DN15-DN50

- The cartridge (for the ICV Deltamatic automatic balancing valve) should be made of DZR brass
- There should be only one differential pressure range up to 350kPa
- The flow rate should be defined by replaceable orifice plate
- There shall be an internal rolling diaphragm made of reinforced HNBR
- The O-rings should be made of EPDM

Cartridges for Automatic Balancing Valve DN32-50, Deltamatic

Low pressure **0.188 l/s to 0.968 l/s**

Article no	Flow (l/s)	Min ΔP (kPa)
952-30 1 3073	0.188	12
952-30 1 3082	0.239	12
952-30 1 3089	0.283	12
952-30 1 3094	0.315	12
952-30 1 3096	0.331	12
952-30 1 3098	0.353	13
952-30 1 3102	0.375	13
952-30 1 3107	0.413	13
952-30 1 3111	0.435	14
952-30 1 3112	0.453	14
952-30 1 3118	0.504	14
952-30 1 3124	0.556	15
952-30 1 3125	0.568	16
952-30 1 3129	0.603	16
952-30 1 3132	0.631	17
952-30 1 3135	0.661	17
952-30 1 3138	0.694	18
952-30 1 3142	0.733	18
952-30 1 3148	0.797	19
952-30 1 3156	0.886	21
952-30 1 3161	0.946	22
952-30 1 3163	0.968	22

High pressure **0.188 l/s to 0.968 l/s**

Article no	Flow (l/s)	Min ΔP (kPa)
952-30 2 3073	0.188	12
952-30 2 3082	0.239	12
952-30 2 3089	0.283	12
952-30 2 3094	0.315	12
952-30 2 3096	0.331	12
952-30 2 3098	0.353	13
952-30 2 3102	0.375	13
952-30 2 3107	0.413	13
952-30 2 3111	0.435	14
952-30 2 3112	0.453	14
952-30 2 3118	0.504	14
952-30 2 3124	0.556	15
952-30 2 3125	0.568	16
952-30 2 3129	0.603	16
952-30 2 3132	0.631	17
952-30 2 3135	0.661	17
952-30 2 3138	0.694	18
952-30 2 3142	0.733	18
952-30 2 3148	0.797	19
952-30 2 3156	0.886	21
952-30 2 3161	0.946	22
952-30 2 3163	0.968	22

Low pressure **1.009 l/s to 3.154 l/s**

Article no	Flow (l/s)	Min ΔP (kPa)
952-40 1 4148	1.009	20
952-40 1 4152	1.072	21
952-40 1 4156	1.136	21
952-40 1 4164	1.199	21
952-40 1 4168	1.262	22
952-40 1 4173	1.325	22
952-40 1 4176	1.388	23
952-40 1 4182	1.514	24
952-40 1 4191	1.640	25
952-40 1 4194	1.766	26
952-40 1 4200	1.893	27
952-40 1 4205	2.019	28
952-40 1 4211	2.145	30
952-40 1 4217	2.271	31
952-40 1 4222	2.397	33
952-40 1 4229	2.523	34
952-40 1 4235	2.650	36
952-40 1 4241	2.776	38
952-40 1 4248	2.902	40
952-40 1 4250	3.028	42
952-40 1 4262	3.154	44

High pressure **1.009 l/s to 3.154 l/s**

Article no	Flow (l/s)	Min ΔP (kPa)
952-40 2 4148	1.009	20
952-40 2 4152	1.072	21
952-40 2 4156	1.136	21
952-40 2 4164	1.199	21
952-40 2 4168	1.262	22
952-40 2 4173	1.325	22
952-40 2 4176	1.388	23
952-40 2 4182	1.514	24
952-40 2 4191	1.640	25
952-40 2 4194	1.766	26
952-40 2 4200	1.893	27
952-40 2 4205	2.019	28
952-40 2 4211	2.145	30
952-40 2 4217	2.271	31
952-40 2 4222	2.397	33
952-40 2 4229	2.523	34
952-40 2 4235	2.650	36
952-40 2 4241	2.776	38
952-40 2 4248	2.902	40
952-40 2 4250	3.028	42
952-40 2 4262	3.154	44

ICV Deltamatic – Cartridges

Cartridges for valves from DN50 to DN800 (Wafer type)

Material:	AISI 304/AISI 316 (higher resistance to corrosion)
O-rings:	EPDM
Spring:	AISI 304/AISI 316 (higher resistance to corrosion)
Diaphragm:	Reinforced HNBR
Max. differential pressure:	600 kPa
Medium temperature:	-20ºC to +120ºC

SERIES 953
ICV Automatic Balancing Valve DN50-800, Deltamatic Wafer type

St St 304 Article no	St St 316 Article no	Flow (l/s)	Min ΔP (kPa)
953-50 1 5179	953-50 2 5179	1.061	13
953-50 1 5184	953-50 2 5184	1.092	13
953-50 1 5189	953-50 2 5189	1.125	13
953-50 1 5194	953-50 2 5194	1.167	13
953-50 1 5200	953-50 2 5200	1.222	13
953-50 1 5206	953-50 2 5206	1.289	14
953-50 1 5213	953-50 2 5213	1.375	14
953-50 1 5220	953-50 2 5220	1.475	14
953-50 1 5227	953-50 2 5227	1.583	14
953-50 1 5235	953-50 2 5235	1.725	14
953-50 1 5243	953-50 2 5243	1.808	14
953-50 1 5251	953-50 2 5251	1.967	14
953-50 1 5260	953-50 2 5260	2.194	15
953-50 1 5269	953-50 2 5269	2.472	16
953-50 1 5279	953-50 2 5279	2.889	19
953-50 1 5287	953-50 2 5287	3.154	22
953-50 1 5292	953-50 2 5292	3.470	23
953-50 1 5298	953-50 2 5298	3.722	24
953-50 1 5303	953-50 2 5303	4.100	27
953-50 1 5308	953-50 2 5308	4.444	29

St St 304 Article no	St St 316 Article no	Flow (l/s)	Min ΔP (kPa)
953-60 1 6285	953-60 2 6285	4.733	34
953-60 1 6292	953-60 2 6292	5.041	34
953-60 1 6301	953-60 2 6301	5.221	35
953-60 1 6305	953-60 2 6305	5.408	35
953-60 1 6312	953-60 2 6312	5.684	35
953-60 1 6319	953-60 2 6319	5.980	36
953-60 1 6326	953-60 2 6326	6.236	36
953-60 1 6332	953-60 2 6332	6.523	36
953-60 1 6338	953-60 2 6338	6.815	37
953-60 1 6344	953-60 2 6344	7.117	38
953-60 1 6349	953-60 2 6349	7.369	38
953-60 1 6356	953-60 2 6356	7.690	38
953-60 1 6362	953-60 2 6362	8.099	38
953-60 1 6367	953-60 2 6367	8.320	39
953-60 1 6373	953-60 2 6373	8.605	39
953-60 1 6379	953-60 2 6379	8.961	40
953-60 1 6385	953-60 2 6385	9.324	40
953-60 1 6391	953-60 2 6391	9.709	40
953-60 1 6393	953-60 2 6393	10.093	42
953-60 1 6398	953-60 2 6398	10.468	43
953-60 1 6400	953-60 2 6400	10.724	44
953-60 1 6407	953-60 2 6407	11.381	46

Product Range for Valves DN50-DN800 flanged
The minimum required differential pressure is measured using the measurement outlets on the valve housing. In pressure ranges from 0 to 400 kPa the flow rate is +/– 5% of nominal flow. In pressure ranges 400kPa to 600kPa the flow rate is +/– 10% of nominal flow. For nominal flow below 0.06 l/s the flow rate is accurate to 0.003 l/s.

High pressure cartridges for valves DN50-DN800
The cartridge for automatic balancing valve (wafer type) should be made of stainless steel; There should be only one differential pressure control range up to 600kPa. The flow rate should be defined by replaceable orifice plate. The diaphragm should be made of reinforced HNBR; the O-rings should be made from EPDM.

ICV will normally determine the arrangement and number of cartridges to be included for any customer-defined flow rate. In the event that blanking plates are used in certain holes, instead of cartridges, due to the flow rate being less than the capacity of a fully loaded valve, then the price will reflect that situation.

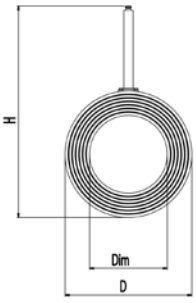
Flanged ductile iron

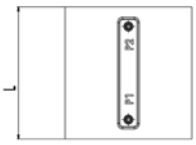
A wafer-type valve containing, depending on the size and the design flow, up to 85 Deltamatic cartridges.

Technical Data

Valve housing:	Ductile iron DIN 1693 GGG-40
O-rings:	EPDM
Fasteners:	AISI 306
Pressure class:	PN16 (PN25)
Temperature:	-20ºC to 110ºC
Diff. differential pressure:	13-600 kPa

Dimensions	L (mm)	D (mm)	H (mm)	Net Weight (kg)	Max. Cartr./Valve (Pcs)
DN50	170	100	218	3.4	1
DN65	170	119	237	4.9	1
DN80	170	131	249	4.7	1
DN100	170	163	281	6.9	2
DN125	170	193	311	9.0	3
DN150	170	216	334	11.7	4
DN200	170	271	389	18.7	7
DN250	170	326	440	23.4	12
DN300	170	383	501	33.4	15
DN350	170	443	561	44.2	19
DN400	170	496	614	51.6	26
DN450	170	545	663	57.4	33
DN500	170	601	719	67.7	40
DN600	170	715	833	88.9	56
DN800	170	880	998	127.3	85





Blind Caps can be fitted instead of cartridges if the full flow capacity is not required. ICV will deliver the valve with the cartridges installed. Valves are delivered with 4" P/T-Plugs. From DN100 the valves are delivered with an eye bolt.

Glycolic mixtures (both ethylene and propylene) in all solutions are applicable with Deltamatic. A strainer is recommended. The pipe system should be properly ventilated to avoid the risk of air-pockets.

Specification text

The valve shall operate by means of automatic balancing stainless steel cartridges with replaceable orifice plate and internal EPDM diaphragm. The pressure class of the valve shall be PN16/PN25. The valve housing shall be made of ductile iron type GGG 40. The valve shall comply with flanges according to EN/ANSI standards.

Female/Female threaded

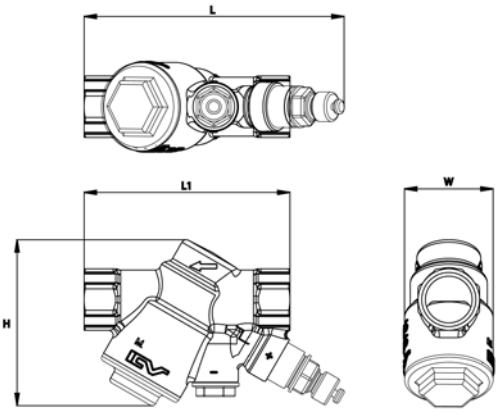
ICV will select and supply the correct cartridge according to the customer supplied details on size (DN), min and max Δp, and design maximum flow rate, for each valve location.

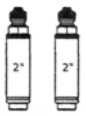
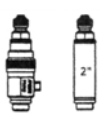
Technical Data

Valve housing:	DZR Brass to EN CW602N
O-rings:	EPDM
Pressure class:	PN25
Temperature:	-20ºC to 120ºC
Diff. differential pressure:	7-600 kPa
Thread:	ISO 228

Specification text

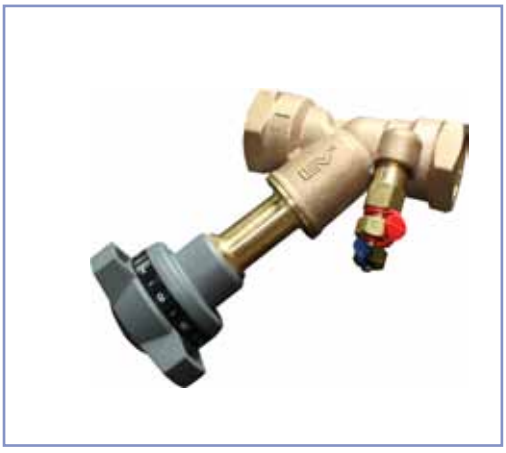
The valve shall operate by means of automatic balancing DZR Brass to EN CW 602N cartridges with replaceable orifice plate and internal diaphragm. The pressure class of the valve shall be PN25. The valve housing shall be made of DZR Brass to EN CW602N.



Accessories																					L, L1, W & H are stated in (mm)
	2 pcs 1" P/T-Plugs				2 pcs 2" P/T-Plugs				Plug and drain valve				Combi-drain and 2" P/T-Plug				2 pcs Plugs				Approx Net Weight (kg)
Dimensions	L	L1	W	H	L	L1	W	H	L	L1	W	H	L	L1	W	H	L	L1	W	H	
DN 15/20	106	84	36	88	175	84	36	168	102	84	36	68	175	84	36	168	88	84	36	68	0.38
DN 25	111	93	36	88	180	93	36	168	111	93	36	73	180	93	36	168	93	93	36	68	0.38
DN 32/40	140	123	62	120	210	123	62	200	140	123	62	111	210	123	62	200	123	123	62	111	1.27
DN 50	141	131	62	120	216	131	62	200	147	131	62	111	216	131	62	200	123	123	62	111	1.27

Glycolic mixtures (both ethylene and propylene) in all solutions are applicable with Deltamatic. A strainer is recommended. The pipe system should be properly ventilated to avoid the risk of air-pockets.

Deltaflow - Manual Balancing Valve



Description:
Manual balancing valve in Bronze with test ports across the orifice and digital hand wheel.

Application:
For use in heating/aircon piping systems. To balance water (glycol) flows in each zone and prevent overflows in terminal units.

Operation:
Balancing valves should be installed in each main, riser and branch, and at the outlet side of each terminal unit.

Specification

Body:	Bronze to EN CC491K
Bonnet:	DZR Brass to EN CW602N
Seat:	P.T.F.E.
Cone:	DZR Brass to EN CW602N
O ring:	EPDM
Pressure rating:	PN25
Pipe thread:	Female/Female to BS 21

[Full details can be found in the ICV datasheet S908-2 or on the website www.icvalves.com]

Description:
Manual balancing valve in ductile iron with test ports across the orifice and a vernier scale on the spindle housing. EPDM moulded coating in cone ensures exact kV repeatability within valve construction and offers abrasion resistance.

Application:
For use in heating/aircon piping systems. To balance water (glycol) flows in each zone and prevent overflows in terminal units.

Operation:
Balancing valves should be installed in mains and risers and set during commissioning.

Specification

Body:	Ductile iron GGG50
Bonnet:	Ductile iron GGG50
Seat:	P.T.F.E.
Cone:	Cast iron with EPDM coating
Stem:	Stainless steel AISI 304
Disc nut:	Brass
Pressure rating:	PN16/25
Flange:	To BS EN 1092-2

[Full details can be found in the ICV datasheet S908-1 or on the website www.icvalves.com]

ICV Control Valves Series 920

ICV focuses on *Automatic* Balancing and Control to ensure correct flows to each terminal unit. In larger sizes, ICV also offers manual balancing valves and control valves to ensure that no overflows are present in the system.

These valves are manufactured under ICV's strict quality control regime and the resulting products are reliable and guaranteed.

Series 920 Control Valves are fully modulating (or three position) two-way/three-way control valves with multiple power and signal options for maximum flexibility in design.

920-3/4 Two ways/three ways control valve
Modulating/3 pos actuator for option

DN32 - 50
DZR brass body
Thread end

DN65 - 200
Cast iron body
Flange end

920-1 Two ways/three ways control valve
On/off actuator
For FCU

DN15 - 25
DZR brass body
Thread end

920-5 Thermostat

[Further details available in the ICV General Valves brochure]

ICV PFM ONE

Application
A new commissioning instrument covering all possible balancing needs for heating and cooling systems.

The PFM ONE features are:
- Wireless connection (bluetooth)
- Graphical presentation
- Big battery capacity
- Easy upgrade
- Hold function

The manometer is easily operated by means of the enclosed, detailed instructions for use.

Technical Data

Operating temperature:	From 10ºC to 40ºC (ambient temperature) *Please note: The manometer should not be exposed to frost*
Pressure range:	2500 kPa
DP range:	0 - 1000 kPa
Operating time:	Hand terminal - 8 hours Sensor - 35 hours *Continuous duty*
Measurement deviation:	< 0.1%
Open space range:	200 m
IP class:	Sensor - IP65

ICV Self-acting DP controller

Application
ICV S908-3 series self-acting DP controller has a full size range from DN15 to DN350, which is suitable for stabilising the differential pressure across riser, branch, control valve and other applications.

Benefit
The self-acting DP controller can stabilise the differential pressure and make circuits independent from each others, which brings three benefits:
- More accurate and stable for modulating control
- Less movement, less noise from control valve
- Easier balancing and commissioning

Technical Date

Size range:	DN15 - 350
Pressure rating:	PN16/25
Working temp.:	100ºC
Materials	
Body/bonnet:	DZR brass/Cast iron
Tube/union:	Brass H62
Control kit:	Brass H62 + Stainless steel 304
Diaphragm:	EPDM
Spring:	Stainless steel 304

[Full details can be found in the ICV General Valves brochure or on the website www.icvalves.com]

Contact us

China: IC Valves (Nanjing) Co., Ltd.
Address: Rm704, Longshi Centre, 2 Guangzhou Rd, Nanjing, China 210008
Tel: 025-8320 0010/8320 0020
Fax: 025-8320 5225
Website: WWW.ICVALVES.COM
WWW.AVKVALVES.COM
Email: INFO@ICVALVES.CN

818132CS/2011-6-30