Frese OPTIMA Compact DN10-DN50 - pressure independent balancing & control valve

Application

Frese OPTIMA Compact pressure independent balancing & control valve (PIBCV) is used in heating and cooling systems in applications with Fan Coil Units, Chilled Beams or other terminal unit applications.

Frese OPTIMA Compact provides modulating control with full authority regardless of any fluctuations in the differential pressure of the system.

Frese OPTIMA Compact combines an externally adjustable automatic balancing valve, a differential pressure control valve and a full authority modulating control valve.

Frese OPTIMA Compact makes it simple to achieve 100% control of the water flow in the building, while creating high comfort and energy savings at the same time.
An additional benefit is that no balancing is required if further stages are added to the system, or if the dimensioned capacity is changed.

Energy saving due to optimal control, lower flow and pump pressure. Maximized ΔT due to faster response and increased system stability.

5

Benefits

Design
- Less time to define the necessary equipment for a hydraulic balanced system (only flow data are required)
- No need to calculate valve authority. Always one.
- Flexibility if the system is modified after the initial installation

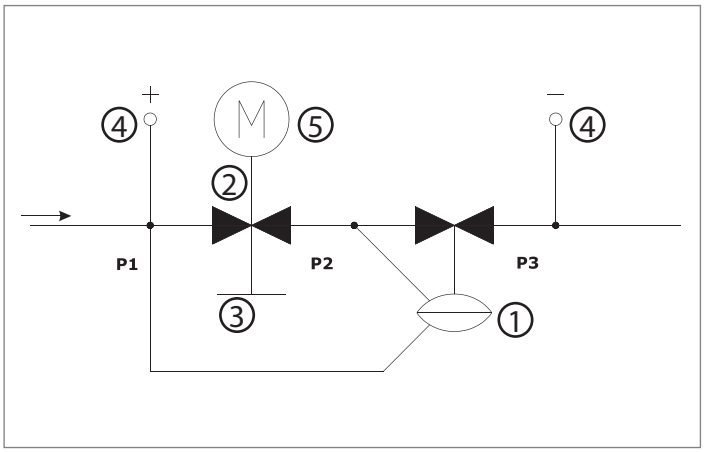
Installation
- No further regulating valves required in the distribution pipework when Frese OPTIMA Compact is installed at terminals.
- Total number of valves minimized due to the 3-in-1 design
- Minimized commissioning time due to automatic balancing of the system
- No minimum straight pipe lengths required before or after the valve.

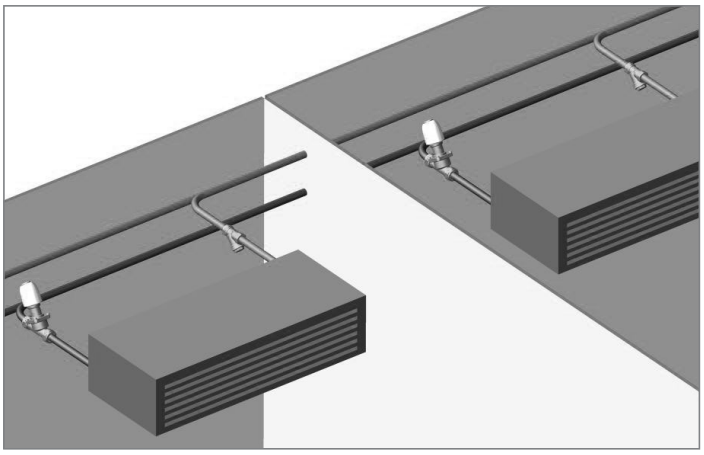
Operation
- High comfort for the end-users due to high precision temperature control
- Longer life due to less movements of the actuator

Features

- The presetting function has no impact on the stroke; Full stroke modulation at all times, regardless the preset flow.
- The constant differential pressure across the modulating control component guarantees 100% authority.
- Automatic balancing eliminates overflows, regardless of fluctuating pressure conditions in the system.
- Thermal actuator On/Off or 0-10V, normally closed.
- Motoric actuator 0-10V, (Linear or Logarithmic) or 3 point control, normally closed.
- Differential pressure operating range up to 400 kPa
- High flows with minimal required differential pressure due to advanced design of the valve
- Small dimensions due to compact housing
- Higher presetting precision due to stepless analogue scale

Frese OPTIMA Compact DN10-DN50 - pressure independent balancing & control valve





Design

The design of Frese OPTIMA Compact combines high performance with small size and compact construction. The main components of the valve are:

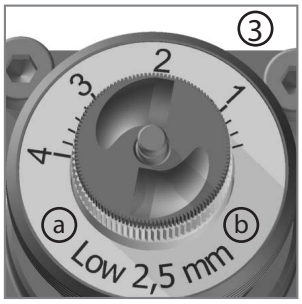
① Differential pressure control

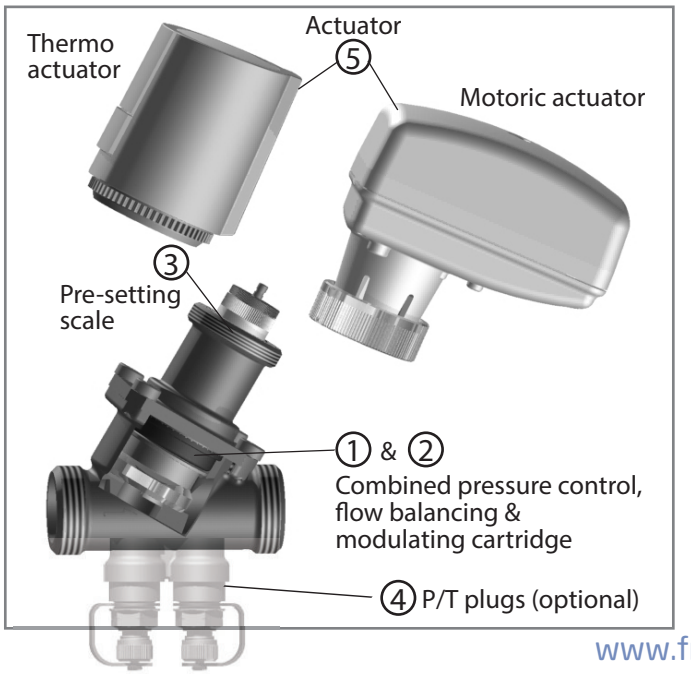
② Modulating control component

③ Presetting scale (not accessible when the actuator is mounted)
- ⓐ Flow range: Low-High
- ⓑ Stroke: 2,5 - 5,0 - 5,5mm

④ P/T Plugs (Optional)

⑤ Actuator





Function

Frese OPTIMA Compact can be flushed and commissioned before the actuator is installed.

The presetting of the dial is user-friendly requiring only a simple flow vs. presetting graph.

Once the flow is set, the actuator can be mounted and the valve ready to operate.

For lowest energy consumption, check the differential pressure at the index valve to set the pump at minimum speed.

Manual operation

Motoric actuators
The actuator can be operated manually with the help of a 3mm hex key.

Note
If the operation is performed manually without disconnecting from the power, the supply must be disconnected and then reconnected, whereby the actuator will start the calibration process and correctly adjust itself.

Frese OPTIMA Compact DN10-DN50
- pressure independent balancing & control valve

Operation principle

The innovative design of Frese OPTIMA Compact features a modulating control component that retains 100% authority at all times.

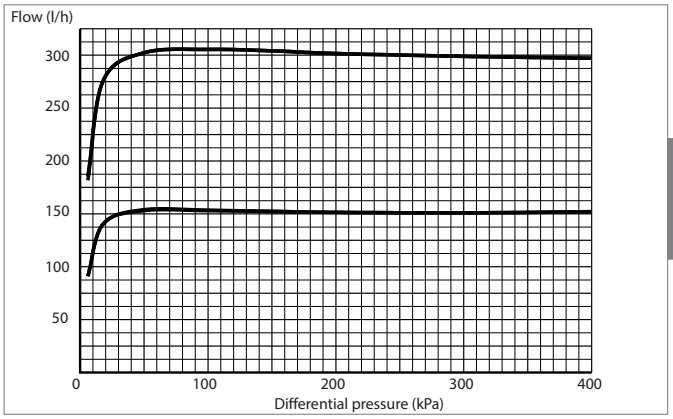
With the Frese OPTIMA Compact, there are two independent movements for the presetting and the modulating function. During presetting, the inlet area moves radially without interfering with the length of the stroke. During modulating, the inlet area moves axial taking advantage of the full stroke.

Whilst the control component provides proportional modulation irrespective of the preset flow, the automatic balancing 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.

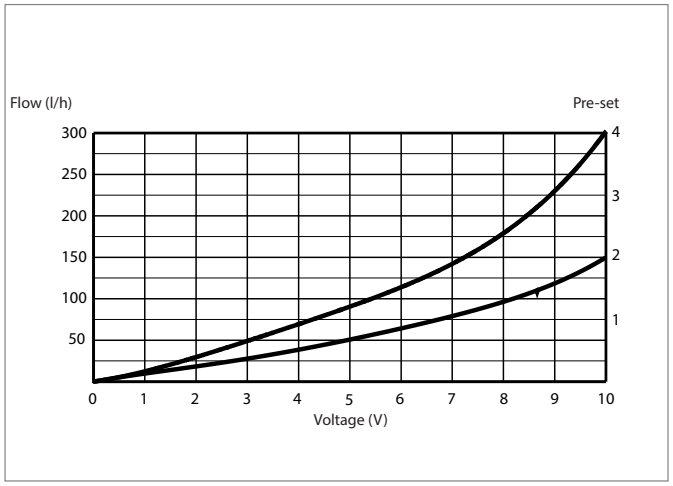
Flow rate vs. Differential Pressure

(Preset flow: 300 l/h, 150 l/h)



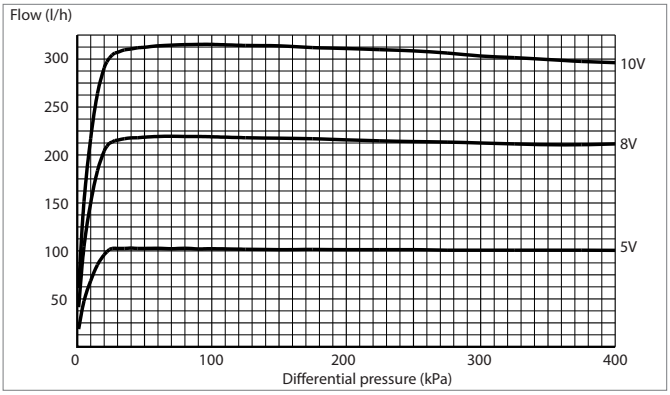
Flow rate vs. Voltage

(Preset flow: 300 l/h, 150 l/h)



Flow rate vs. Differential Pressure

(Voltage: 10V, 8V, 5V)



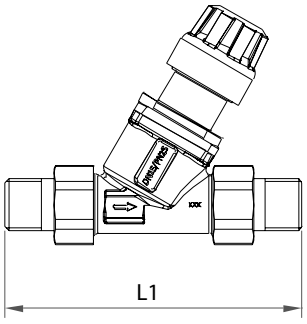
5

Frese OPTIMA Compact DN10-DN50
- pressure independent balancing & control valve

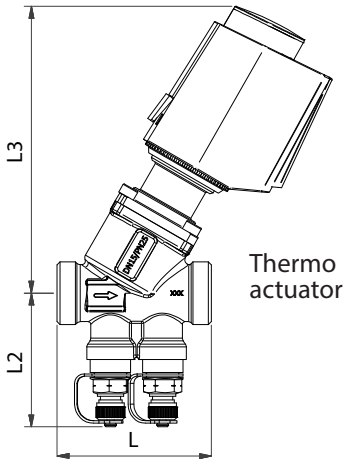
Technical data

The pipe system shall be properly ventilated to avoid risk of air pockets. Glycolic mixtures up to 50% are applicable (both ethylene and propylene).
Frese A/S can accept no responsibility if another actuator is used instead of the Frese actuator

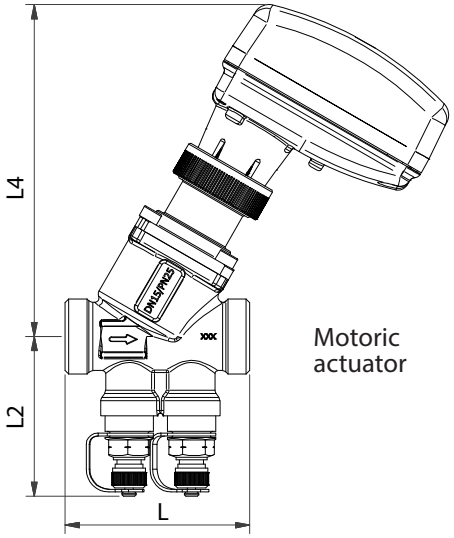
Valve housing:	
DN10-15-20-25-32	DZR Brass
DN40-50	Ductile Iron
DP controller:	PPS 40% glass
Spring:	Stainless steel
Diaphragm:	HNBR
O-rings:	EPDM
Pressure class:	PN25
Max. differential pressure:	400 kPa
Medium temperature range:	0°C to 120°C
Thread	ISO 228



M/M with couplings



Thermo actuator



Motoric actuator

Dimension & Weight

Valve Size		DN10		DN15		DN20		DN25		DN32		DN40	DN50
Type	Thread	M/M	F/F	M/M	F/F	M/M	F/F	M/M	F/F	M/M	F/F	F/F	F/F
Length	L	65	-	65	75	70	79	104	100	104	104	138	138
	L1	114	-	122	-	131	-	-	-	-	-	-	-
	L2	57	57	57	57	57	57	63	63	68	68	71	77
	L3	121	121	121	121	121	121	139	139	139	139	-	-
	L4	117	117	117	117	117	117	135	135	135	135	304	304
Weight kg	Basic	0.36	-	0.38	0.42	0.40	0.45	1.02	1.04	1.17	1.17	-	-
	P/T plugs	0.45	-	0.47	0.52	0.50	0.54	1.12	1.14	1.27	1.27	3.28	3.71

Flow

		DN10 - DN15 - DN20				DN25	DN32	DN40	DN50
Type Cartridge		Low		High		-	-	-	-
Stroke	mm	2.5	5.0	2.5	5.0	5,5	5,5	15	15
Flow	l/h	30 - 200	65 - 370	100 - 575	220 - 1330	600-3609	550-4001	1370-9500	1400-11500
	l/s	0.008-0.056	0.018-0.103	0.028-0.160	0.061-0.369	0.167-1.003	0.153-1.111	0.381-2.639	0.389-3.194
	gpm	0.13 - 0.88	0.29 - 1.63	0.44 - 2.53	0.97 - 5.85	2.64-15.89	2.42-17.62	6.03-41.83	6.16-50.63

Frese OPTIMA Compact DN10-DN50
- pressure independent balancing & control valve

Technical data actuators DN 10-15-20-25-32

Characteristics: Thermo actuators, normally closed
Protection class: IP 54 to EN 60529
Frequency: 50/60 Hz
Control signal: 0-10V AC-DC or On/Off
Actuating force: 100 N
Stroke: 2.5 - 5.0 - 5.5 mm
Running time: 120 s 0-10V/180 s On/Off
Ambient operating conditions: 0°C to 60°C
Cable length: 1.0 m
Weight: 100 g

On/Off actuator 2.5 mm stroke, 24V AC-DC/ On/Off 180s	48-5525
On/Off actuator 2.5 mm stroke 230V AC/ On/Off 180s	48-5526
On/Off actuator 5.0-5.5 mm stroke, 24V AC-DC/ On/Off 180s	48-5527
On/Off actuator 5.0-5.5 mm stroke 230V AC/ On/Off 180s	48-5528
Modulating actuator 2.5-5.0-5.5 mm stroke 24V AC/0-10V DC 30 s/min	48-5529

Characteristics: Electrical, modulating
Protection class: IP 43 to EN 60529
Frequency: 50/60 Hz
Control signal: 0-10V DC or 3 position
Actuating force: 120 N
Stroke max: 5.5 mm (Dip switch setting 2.5-5.0-5.5mm)
Running time 5.5 mm: 75 s 0-10V / 150 s 3-pos
Ambient operating conditions: +1°C to 50°C
Cable length: 1.5 m
Weight: 215 g

Modulating actuator 5.0 - 5.5 mm, 24V AC-DC/ 0-10V DC/ 8 s/mm	53-1180
Modulating actuator 2.5 - 5.0 - 5.5 mm, 24 V AC/ 3 pos / 13 s/mm	53-1181
Modulating actuator 2.5 - 5.0 - 5.5 mm, 230 V AC/ 3 pos. / 13 s/mm	53-1182
Modulating actuator 2.5 mm, 24V AC-DC/ 0-10V DC/ 8 s/mm	53-1183

Technical data actuator DN 40-50
- actuator included with the valve

Characteristics: Electrical, modulating, normally closed
Protection class: IP 54 to EN 60529
Frequency: 50/60 Hz
Supply voltage: 24V AC
Control signal: 0-10V DC or 3 position
Actuating force: 400 N
Stroke max: 32 mm, selfcalibrating
Running time: 60 s
Ambient operating conditions: -10°C to 50°C
Manual operation: Manual handle
Cable: Not included
Weight: 1.80 kg

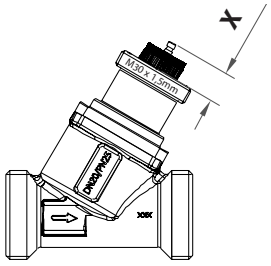
Frese OPTIMA Compact DN10-DN50 - pressure independent balancing & control valve

Actuator requirements DN 10-15-20-25-32

Dimension "X" in closed position
2.5 mm stroke = 11.4 mm
5.0 mm stroke = 9.3 mm
5.5 mm stroke = 8.8 mm

Actuator minimum force: 100N

Actuator connection: M30 x 1,5mm



Combination matrix: Frese OPTIMA Compact DN10-15-20-25-32 / Actuators

Frese OPTIMA Compact can be combined with both Thermo actuators and Motoric actuators.

The design of the valve, combined with the Frese actuator, produces a perfect control characteristic that utilises the full control range of the system.

					Thermo Actuators					Motoric Actuators			
													
					On/Off				0.....10V	0.....10V		3-pos	
Male/Male ISO 228	Type	Stroke	Flow l/h	Dim	24 V 2,5mm	230V 2,5mm	24V 5,0 - 5,5mm	230V 5,0 - 5,5mm	24V 2,5 - 5,0 - 5,5 mm	24V 2,5 mm	24V 5,0 - 5,5mm	24V	230V
 	DN10 M/M LOW 2.5	2.5	30-200	DN10	●	●			●	●		●	●
	DN10 M/M LOW 5.0	5.0	65-370	DN10			●	●	●		●	●	●
	DN15 M/M LOW 2.5	2.5	30-200	DN15	●	●			●	●		●	●
	DN15 M/M LOW 5.0	5.0	65-370	DN15			●	●	●		●	●	●
	DN15 M/M HIGH 2.5	2.5	100-575	DN15	●	●			●	●		●	●
	DN20 M/M HIGH 2.5	2.5	100-575	DN20	●	●			●	●		●	●
	DN20 M/M HIGH 5.0	5.0	220-1330	DN20			●	●	●		●	●	●
	DN25 M/M 5.5	5.5	600-3609	DN25			●	●	●		●	●	●
	DN32 M/M 5.5	5.5	550-4001	DN32			●	●	●		●	●	●
Female/Female ISO 228	Type	Stroke	Flow l/h	Dim									
	DN15 F/F LOW 2.5	2.5	30-200	DN15	●	●			●	●		●	●
	DN15 F/F LOW 5.0	5.0	65-370	DN15			●	●	●		●	●	●
	DN15 F/F HIGH 2.5	2.5	100-575	DN15	●	●			●	●		●	●
	DN20 F/F HIGH 2.5	2.5	100-575	DN20	●	●			●	●		●	●
	DN20 F/F HIGH 5.0	5.0	220-1330	DN20			●	●	●		●	●	●
	DN25 F/F 5.5	5.5	600-3609	DN25			●	●	●		●	●	●
	DN32 F/F 5.5	5.5	550-4001	DN32			●	●	●		●	●	●