

Frese OPTIMA Compact DN50-DN150 - 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 Air Handling Units, Heat Exchangers or Mixing Circuits.

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.

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 the units
- 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

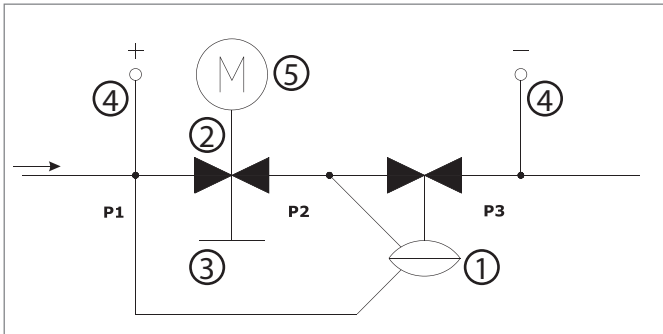
- High comfort for the end-users due to high precision temperature control
- Longer life due to less movements of the actuator



Features

- The presetting function has no impact on the stroke; Full stroke modulation at all times, regardless the preset flow
- Regulation characteristic remains unchanged regardless of 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
- Motoric actuator 0-10 V and 3 point control
- Differential pressure operating range up to 600 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

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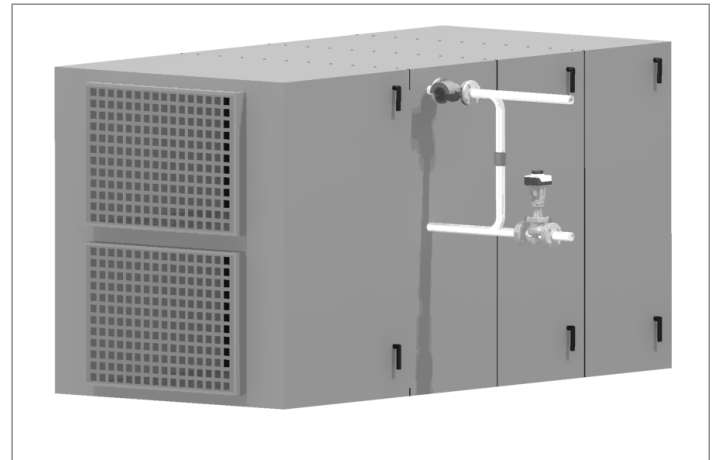
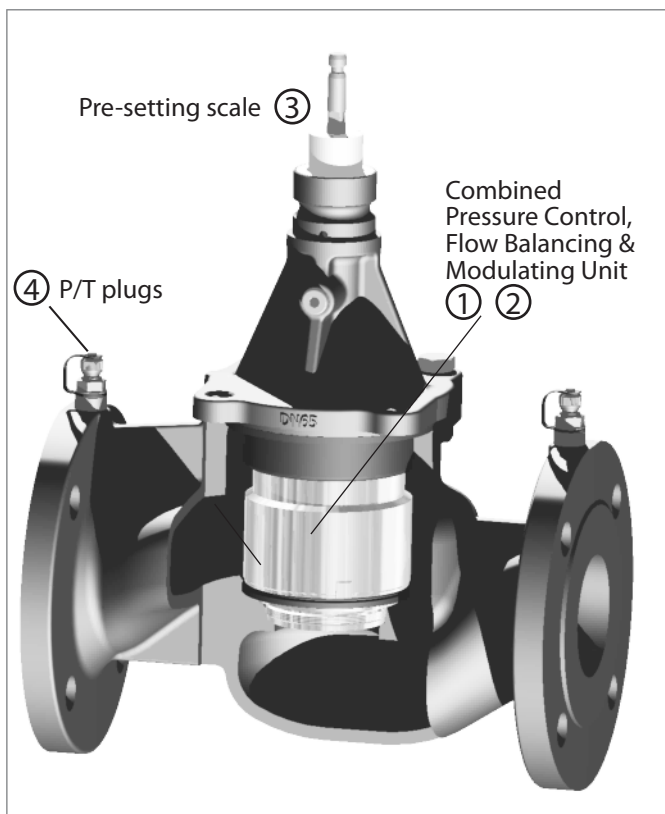
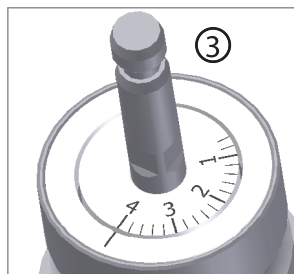


Design

The design of Frese OPTIMA Compact combines high performance and a compact design.

The main components of the valve are:

- ① Differential pressure control
- ② Modulating control component
- ③ Presetting scale
- ④ P/T Plugs
- 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

Actuators

The actuator can be operated by the manual handle.



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Operation principle

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

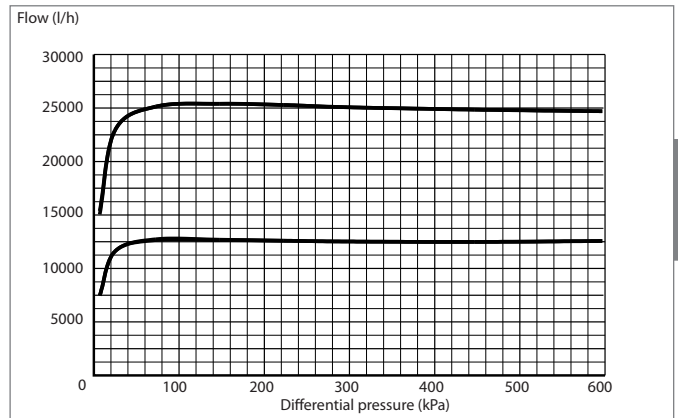
With the Frese OPTIMA Compact there are two independent movements for the presetting and the modulating function. During presetting, the inlet area moves radially without interfering with the length of the stroke. During modulating, the inlet area moves axial taking advantage of the full stroke.

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 600kPa.

Flow rate vs. Differential Pressure

Preset flow: 25000 l/h, 12500 l/h



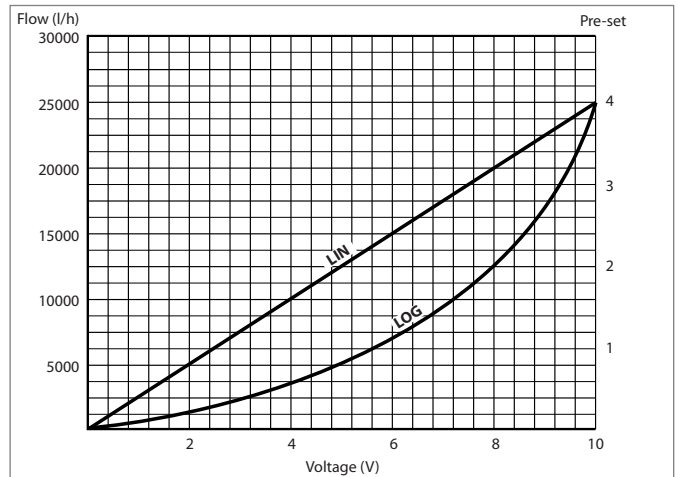
Flow rate vs. Voltage

Preset flow: 25000 l/h

Valve Characteristic:

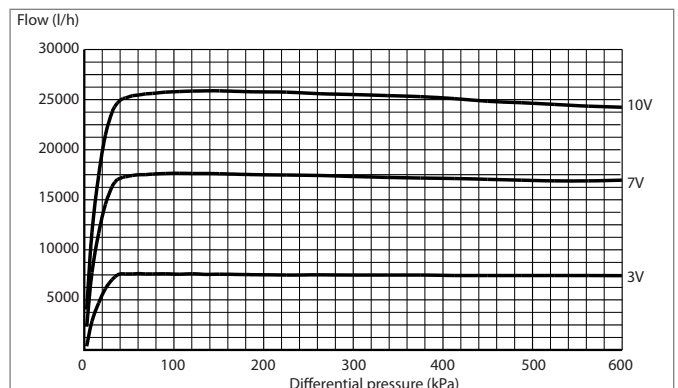
Frese OPTIMA Compact valve design has a linear control characteristic. The control characteristic is independent of the flow setting and available pressure.

Because of the independent characteristic the actuator setting can be used to change the valve response from linear to logarithmic (Equal Percentage).



Flow rate vs. Differential Pressure

Voltage: 10V, 7V, 3V
(Linier actuator characteristic)



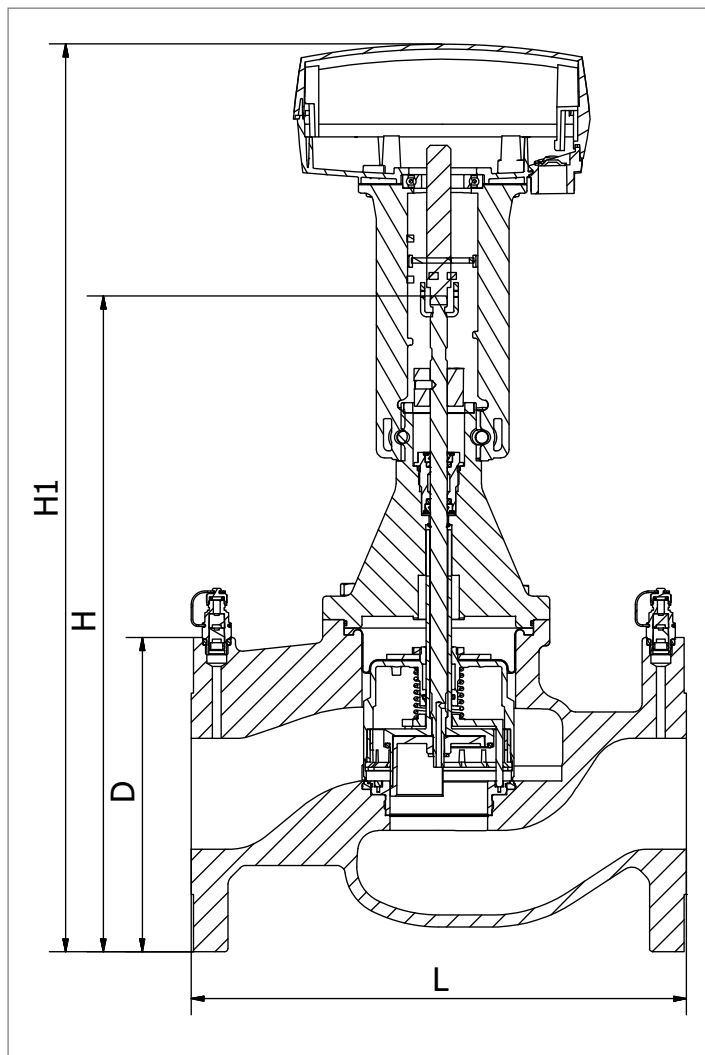
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Technical data DN50 - DN80

Valve

Valve housing:	GJL-250 PN16 GJS-400 PN25
DP controller:	Stainless steel
Spring:	Stainless steel
Diaphragm:	Reinforced EPDM
O-rings:	EPDM
Pressure class:	PN16/25
Stroke:	20 mm
Flange connections:	ISO 7005-2 / EN 1092-2
Max. differential pressure:	600 kPa
Medium temperature range:	0°C to 120°C

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



Dimension & Weight DN50-DN80

Valve Size		DN50	DN65	DN80
		ISO	ISO	ISO
Dimensions	L	230	290	310
	H	347	384	413
	H1	508	525	554
	D	165	185	200
Weight kg	PN16	13.9	18.5	24.8
	PN25	13.7	18.9	26.8

Flow

Valve Size		DN50		DN65		DN80	
Type Cartridge		LF	HF	LF	HF	LF	HF
Flow	l/h	2480 - 15000	3920 - 24000	4380 - 25000	5950 - 35000	5340 - 34000	7020 - 43000
	l/s	0.689 - 4.167	1.089 - 6.667	1.216 - 6.945	1.654 - 9.724	1.484 - 9.450	1.951 - 11.954
	gpm	10.92 - 66.03	17.28 - 105.65	19.27 - 110.06	26.21 - 154.11	25.53 - 149.78	30.92 - 189.47

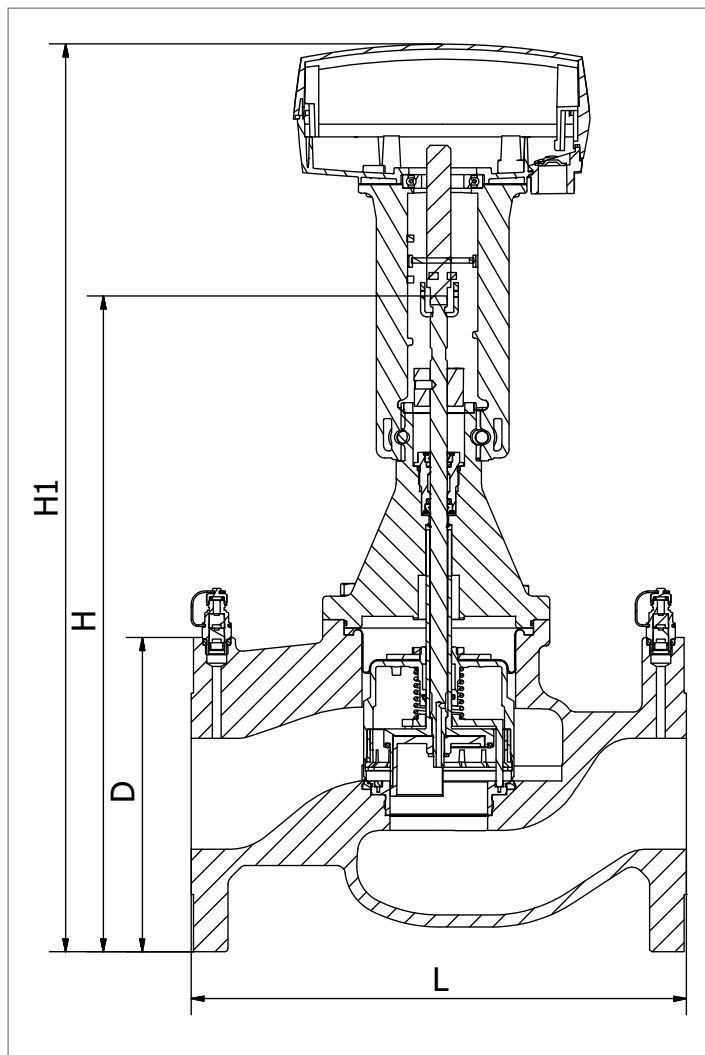
Frese OPTIMA Compact DN50-DN150 - pressure independent balancing & control valve

Technical data DN100 - DN150

Valve

Valve housing DN100:	GJS-400 PN16/PN25
Valve housing DN125 & 150:	GJL-250 PN16 GJS-400 PN25
DP controller:	Stainless steel
Spring:	Stainless steel
Diaphragm:	Reinforced EPDM
O-rings:	EPDM
Pressure class:	PN16/25
Stroke:	40 mm
Flange connections:	ISO 7005-2 / EN 1092-2
Max. differential pressure:	600 kPa
Medium temperature range:	0°C to 120°C

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



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Dimension & Weight DN100 - DN150

Valve Size		DN100	DN125	DN150
		ISO	ISO	ISO
Dimensions	L	350	400	480
	H	539	586	607
	H1	700	747	768
	D	235	270	285
Weight kg	PN16	48.5	69.7	96.1
	PN25	48.5	69.7	96.1

Flow

Valve Size		DN100		DN125*		DN150*	
Type Cartridge		LF	HF	LF	HF	LF	HF
Flow	l/h	12100-68000	14800-90000	16500-110000	20250-135000	24000-160000	30000-200000
	l/s	2.917 - 19.444	3.750 - 25.000	4.583 - 30.556	5.625 - 37.500	6.667 - 44.444	8.333 - 55.556
	gpm	46.23-308.20	59.44-396.26	72.65-484.32	89.16-594.39	105.67-704.46	132.09-880.57

* Values are provisional and may be subject to change

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Technical data actuators

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:	800 N/1500 N
Stroke max:	52 mm, selfcalibrating
Running time:	30 s
Ambient operating conditions:	-10°C to 50°C
Manual operation:	Manual handle
Cable:	Not included
Weight:	1.80 kg



Types and operation data actuators

Type	Valve Dimension	Function	Supply voltage	Power Consumption
Type-02	DN50-125	0..10V / 3-pos	24 V AC +25%/- 35%	15 VA
Type-03	DN150	0..10V / 3-pos	24 V AC +25%/- 20%	24 VA

Product program

Size	Type	Flow l/h	PN16	PN25
DN50	Low Flow	2480 - 15000	53-1200-02	53-1220-02
	High Flow	3920 - 24000	53-1210-02	53-1230-02
DN65	Low Flow	4380 - 25000	53-1201-02	53-1221-02
	High Flow	5950 - 35000	53-1211-02	53-1231-02
DN80	Low Flow	5340 - 34000	53-1202-02	53-1222-02
	High Flow	7020 - 43000	53-1212-02	53-1232-02
DN100	Low Flow	12100-68000	53-1203-02	53-1223-02
	High Flow	14800-90000	53-1213-02	53-1233-02
DN125*	Low Flow	16500-110000	53-1204-02	53-1224-02
	High Flow	20250-135000	53-1214-02	53-1234-02
DN150*	Low Flow	24000-160000	53-1205-03	53-1225-03
	High Flow	30000-200000	53-1215-03	53-1235-03

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