

## Frese ALPHA HCR - Dynamic Balancing Valve

### Application

The Frese ALPHA HCR (High Corrosion Resistant) Valves are particularly designed and manufactured for automatic balancing in Marine, Industrial, Oil and Gas applications.

The Frese ALPHA HCR Cartridges - the third generation cartridges - are an integral part of the Frese ALPHA HCR Valve limiting the flow at the specified level even under fluctuating pressure conditions.

The patented design of these cartridges introduces a interchangeable orifice plate for design flexibility and a resistant diaphragm for high accuracy operation.

The high quality alloy ensures a long lifecycle and low maintenance in arduous applications such as seawater.

Available in sizes DN50 to DN450, Frese ALPHA HCR valve guarantees the hydraulic balance of the system regardless pressure fluctuations.

### Benefits

#### Design

- No requirement for balancing valves in the distribution lines and supply lines
- 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

#### Installation

- Minimized commissioning time due to automatic balancing of the system
- Cartridge solution makes flushing procedure very easy
- No need for oversized pumps and oversized control valves
- No requirements for straight diameters of pipe upstream and downstream of the valve
- Can be easily installed where space is limited

#### Operation

- Balancing of the system takes place automatically even under fluctuating pressure conditions
- Performance optimization
- Distribution/balancing optimization



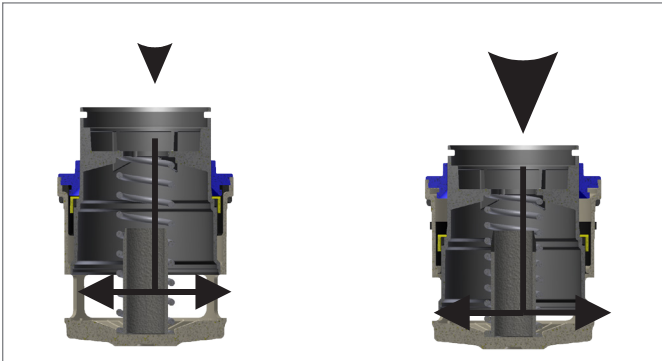
### Features

- Sizes from DN50 to DN450
- P/T plugs for differential pressure verification
- Modifications & extensions of the system do not affect the hydraulic balance in the other parts of the system
- Tamper resistant cartridge independent of flow regulation errors during commissioning and operation of the system
- Self-cleaning cartridge does not allow dirt to compromise the accuracy of the valve
- Resistant diaphragm between the moving parts of the cartridge eliminates friction, noise and impact from water hammer
- Delivered with 3.1 certificate as an option. Other certificates on request.
- Heat treatment acc. to 02747 Part 2#4 a+b
- Pressure test acc. to EN12266

## Frese ALPHA HCR - Dynamic Balancing Valve

### ALPHA HCR Cartridge Operation

When the pressure increases the spring will be compressed and thereby the piston will reduce the outlet area and vice versa. The result is a constant flow rate through the valve, independent of pressure fluctuations.



### Function

The following applies to all flow control valves:

$$Q = K_v \cdot \sqrt{\Delta p}$$

Q = Flow (m<sup>3</sup>/h)  
 K<sub>v</sub> = Opening area  
 Δp = Differential pressure (Bar)

The Frese ALPHA HCR cartridge reacts to pressure fluctuations in the system ensuring that the differential pressure across the pre-adjustment unit is kept constant. This ensures that the maximum flow limit is achieved in accordance with the design.

### Flow Calculation

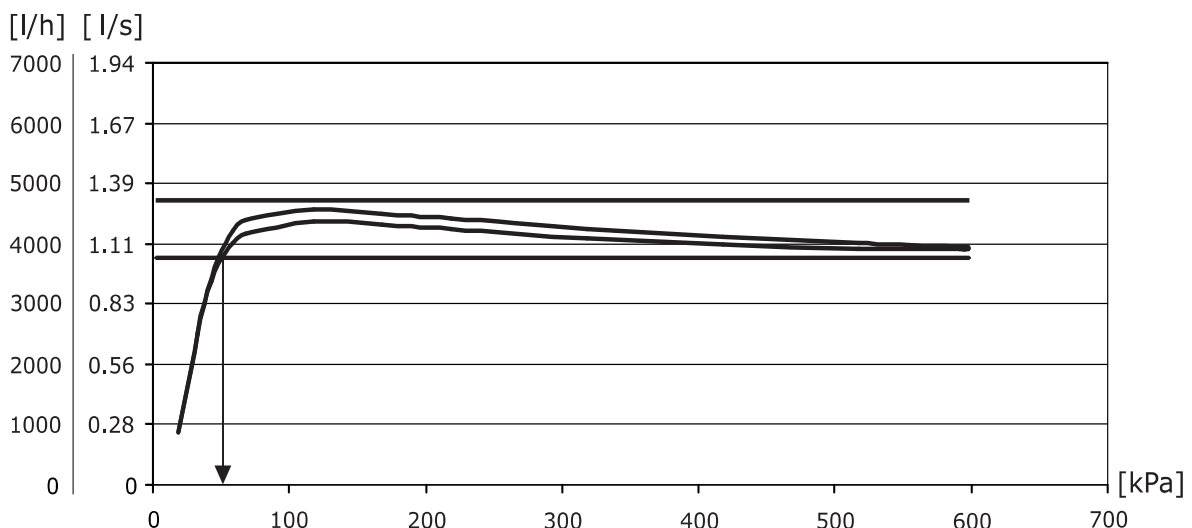
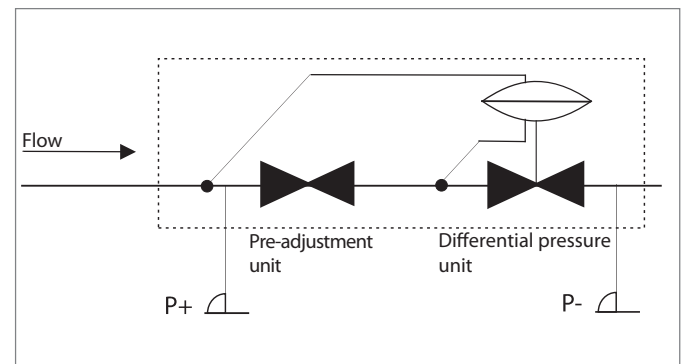
The flow through the valve can be identified by measuring the differential pressure (Δp) across the valve:

If the measured differential pressure is above the minimum Δp, the flow is the one stated on the graph for the valve.

If the measured differential pressure is below the minimum Δp, the flow can be found by using the formulas below.

Flow Calculation	
$Q = K_v \cdot \sqrt{\Delta p}$	Q = m <sup>3</sup> /h Δp = Bar
$Q = K_v \cdot 100 \cdot \sqrt{\Delta p}$	Q = l/h Δp = kPa
$Q = \frac{K_v}{36} \cdot \sqrt{\Delta p}$	Q = l/s Δp = kPa

### Simplified Outline



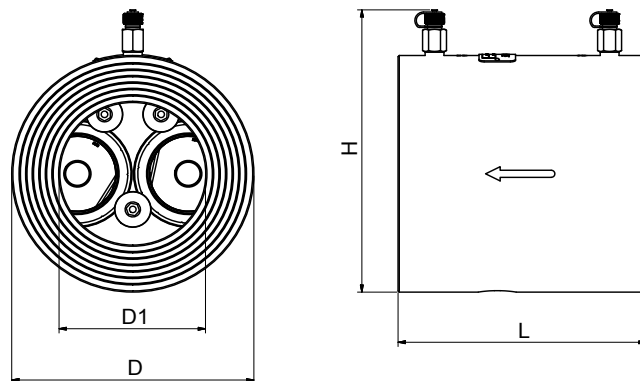
Schematic view of the flow characteristic for cartridge type Frese no. 58-65120. Nominal flow 1.111 l/s / 4.000 l/h. The cartridge enters the pressure range at 47 kPa and maintains the flow at a constant level to 600 kPa.

## Frese ALPHA HCR - Dynamic Balancing Valve

### Technical Data ALPHA HCR Valve Housing

A wafer-type valve can contain up to 33 Frese ALPHA HCR cartridges, depending on the size and the design flow.

<b>Valve housing:</b>	Nickel Aluminium Bronze EN 1982 CC333G-GC, ASTM B505 C95800
<b>P/T plugs:</b>	Nickel Aluminium Bronze EN 1982 CC333G-GC
<b>Fasteners:</b>	Duplex Steel
<b>Pressure class:</b>	PN16
<b>Temperature:</b>	-20 to +32°C
<b>Flow range:</b>	3.8 m <sup>3</sup> /h - 1,584 m <sup>3</sup> /h



The pipe system shall be properly ventilated to avoid risk of air pockets. Strainer is recommended.

### Product Programme

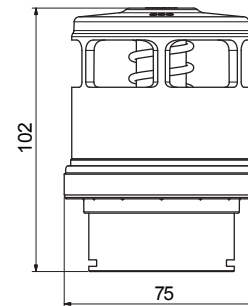
Frese no. (PN16)	Dimensions	L [mm]	D [mm]	D1 [mm]	H [mm] 1" P/T plugs	Cart./Valve (Pcs.)	Max. flow rate m <sup>3</sup> /h
58-9073T	DN50	170	100	80	132	1	48
58-9083T	DN65	170	119	80	151	1	48
58-9093T	DN80	170	131	80	163	1	48
58-9103T	DN100	170	163	100	195	2	96
58-9163T	DN125	170	193	125	225	3	144
58-9113T	DN150	170	216	150	248	4	192
58-9123T	DN200	170	271	200	303	7	336
58-9133T	DN250	170	326	260	354	12	576
58-9143T	DN300	170	383	315	415	15	720
58-9153T	DN350	170	443	355	475	19	912
58-9173T	DN400	170	496	405	528	26	1,248
58-9183T	DN450	170	545	455	577	33	1,584

## Frese ALPHA HCR - Dynamic Balancing Valve

### Technical Data ALPHA HCR cartridge

**HCR cartridge material:** PPS glass-reinforced  
**O-rings:** EPDM 281  
**Spring:** Hastelloy C276  
 (high corrosion resistant)  
**Diaphragm:** HNBR reinforced  
**Medium temperature:** -20 to +32°C (Seawater)  
**Diff. pressure range:** 47 - 600 kPa  
 (max 300 kPa recommended)

### Dimensions ALPHA HCR Cartridge

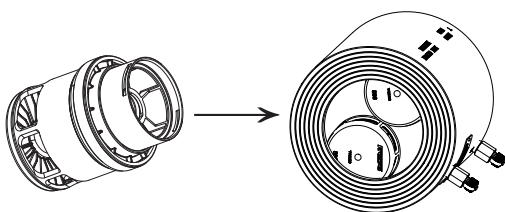


### Product Programme HCR Cartridge

Frese ALPHA HCR Cartridge					
Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
58-65120	4000	1.111	17.61	47	5.8
58-65175	7500	2.083	33.02	47	10.9
58-65200	8500	2.361	37.42	47	12.4
58-65240	12500	3.472	55.03	47	18.2
58-65280	18000	5.000	79.25	47	26.3
58-65320	21500	5.972	94.66	47	31.4
58-65365	30500	8.472	134.28	47	44.5
58-65385	32000	8.889	140.89	47	46.7
58-65409	37500	10.417	165.10	49	53.6
58-65413	38500	10.694	169.51	50	54.4
58-65417	39500	10.972	173.91	50	55.9
58-65420	40500	11.250	178.31	52	56.2
58-65425	41750	11.597	183.82	53	57.3
58-65430	43000	11.944	189.32	54	58.5
58-65433	44000	12.222	193.72	55	59.3
58-65440	48000	13.333	211.33	60	62.0

### Documentation

Frese ALPHA HCR		
Documentation	Standard	On request
2.1 Certificate - EN 10204		X
3.1 Certificate - EN 10204		X
3.2 Certificate - EN 10204		X
Corrosion test		X
Dye Penetrant		X
PMI (Magneflux)		X
Ultra Sonic (NDT)		X
Surface treatment		X
Class Society review or inspection		X
Pressure test acc. to EN12266	X	
Heat treatment acc. to 02747 Part 2#4 a+b	X	



## Frese ALPHA HCR - Dynamic Balancing Valve

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### Specification Text - Frese ALPHA HCR Dynamic Balancing Valve

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The valve shall comply with flanges according to EN/ANSI standards

The pressure class for the valve housing shall be PN16

The valve housing shall be made of Nickel Aluminium Bronze - EN 1982 CC333G-GC

The valve shall contain pressure independent flow cartridges

The valve shall operate up to a maximum differential pressure of 600 kPa

The temperature medium (sea water applications) working range for the valve shall be -20 to +32°C

The valve shall be supplied with 1" PT plugs

The PT plugs shall be made of Nickel Aluminium Bronze

The fasteners shall be made of duplex steel

The valve shall be fitted with the Frese ALPHA HCR pressure independent flow cartridge

The Frese ALPHA HCR cartridge should be made of PPS glass-reinforced

The flow rate should be defined by interchangeable orifice plate within the cartridge

The cartridge diaphragm should be made of reinforced HNBR

The cartridge O-rings should be made of EPDM 281

The cartridge spring shall be made of Hastelloy C276 stainless steel

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