Frese ALPHA HCR
Dynamic Balancing Valve

Application

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

An integral part of the Frese ALPHA HCR Valve is the ALPHA Flow Cartridge, whichs limits the flow to a specified level at all times, including under fluctuating pressure conditions.

The patented design of the stainless steel ALPHA flow cartridge introduces a interchangeable orifice plate for design flexibility and a resistant diaphragm for high accuracy operation.

The ALPHA HCR valve can also be installed with the HCR cartridge for other highly corrosive applications such as seawater.

Available as standard up to DN125 with other sizes available on request., 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

- Valve housing manufactured in a range of stainless steels for industrial applications
- 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 in accordance with EN 10204 as an option. Other certificates on request
- Pressure test according to EN12266

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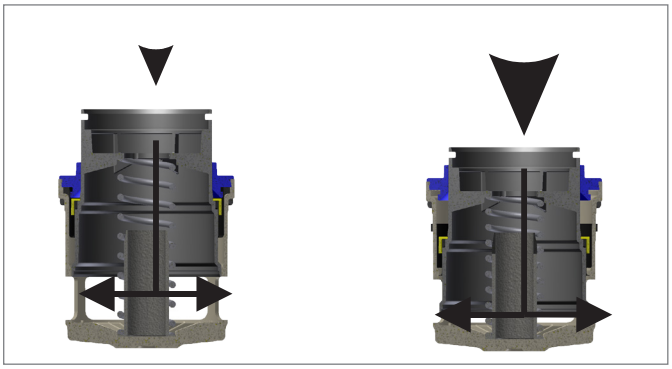
ALPHA & ALPHA HCR Cartridge Operation

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:

$$Q = Kv * \sqrt{\Delta p}$$

Q = Flow (m^3/h)
Kv = Opening area
Δp = Differential pressure (Bar)

The Frese ALPHA 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

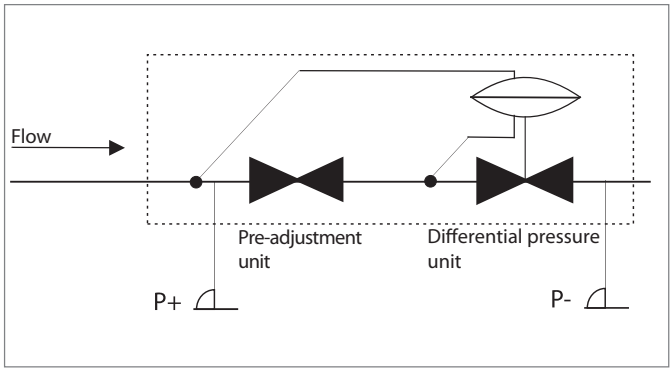
The flow through the valve can be identified by measuring the differential pressure (Δp) across the valve:

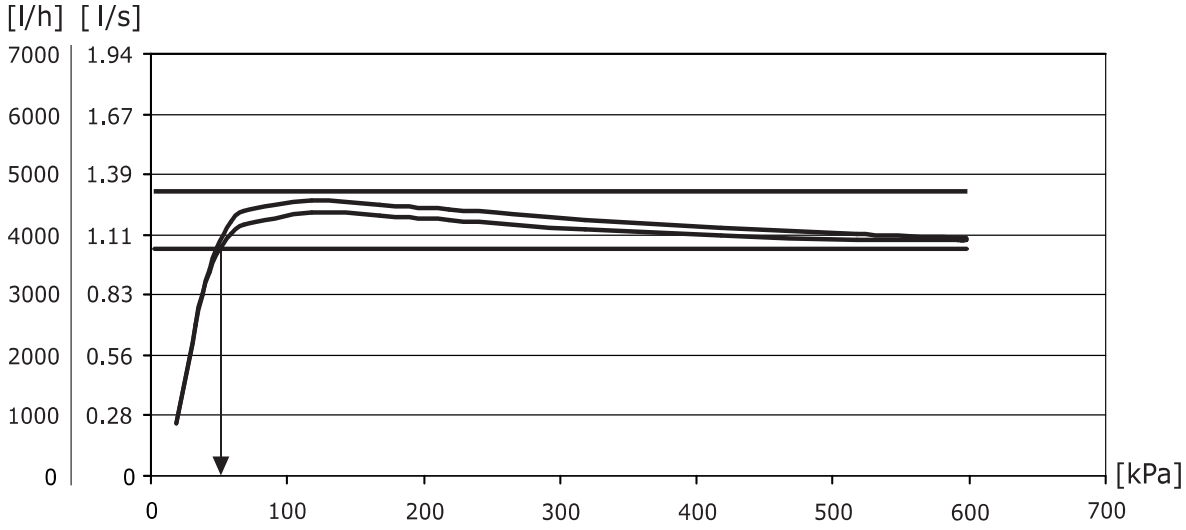
If the measured differential pressure is above the minimum Δp, the flow is the one stated on the graph for the valve.

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

Flow Calculation	
$Q = Kv \cdot \sqrt{\Delta p}$	Q = m3/h Δp = Bar
$Q = Kv \cdot 100 \cdot \sqrt{\Delta p}$	Q = l/h Δp = kPa
$Q = \frac{Kv}{36} \cdot \sqrt{\Delta p}$	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.

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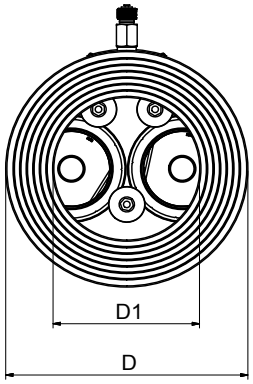
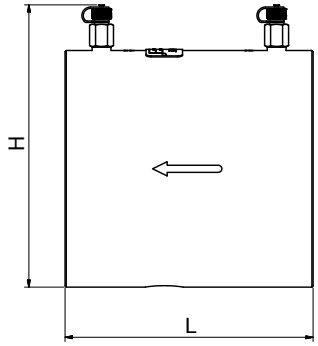
Technical Data ALPHA HCR Valve Housing

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

Valve housing: See material table below
P/T plugs: AISI 316
Fasteners: Duplex Steel
Pressure class: PN16
Temperature: -20 to +110°C
Flow range: Refer to cartridge programme





Material	Code	Suffix (X)* See product programme below
AISI 304	EN 10088-2 1.4301	J
AISI 316 TI	EN 10088-2 1.4571	K
AISI 316 L	EN 10088-2 1.4404	L
AISI 254 SMO	EN 10088-2 1.4547	N
Steel	ASTM A350 LF2	P
Gunmetal	CC492K-GS	R

The pipe system shall be properly ventilated to avoid risk of air pockets.
Glycolic mixtures up to 50% are applicable (both ethylene and propylene).
Strainer is recommended.
Recommendation: Water treatment to VDI 2035.

Product Programme

Frese no. (PN16)	Dimensions	L [mm]	D [mm]	D1 [mm]	H [mm] 1" P/T plugs	Cart./Valve (Pcs.)
58-9038(X)*	DN25	62	62	32	78	1
58-9053(X)*	DN40	62	73	40	84	1
58-9073(X)*	DN50	170	100	80	132	1
58-9083(X)*	DN65	170	119	80	151	1
58-9093(X)*	DN80	170	131	80	163	1
58-9103(X)*	DN100	170	163	100	195	2
58-9163(X)*	DN125	170	193	125	225	3
58-9113(X)*	DN150	Sizes available on request				
58-9123(X)*	DN200					
58-9133(X)*	DN250					
58-9143(X)*	DN300					
58-9153(X)*	DN350					
58-9173(X)*	DN400					
58-9183(X)*	DN450					

Frese ALPHA HCR
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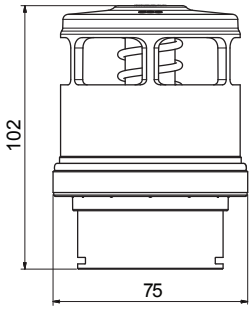
Technical Data ALPHA HCR cartridge

HCR cartridge material: PPS 40% glass-reinforced
O-rings: EPDM 281
Spring: Hastelloy C276 (high corrosion resistant)
Diaphragm: HNBR reinforced
Medium temperature: -20 to +110°C
Diff. pressure range: 47 - 600 kPa
For Valve Housing: DN50 to DN450

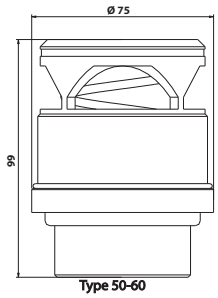
Technical Data ALPHA cartridge

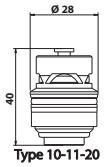
Cartridge material: DZR Brass CW602N
AISI 304 (Type 50-60)
O-rings: EPDM 281
Spring: Stainless Steel 1.4310 (low pressure & high pressure cartridges)
AISI 316 (Type 50-60 cartridges)
Diaphragm: HBNR (low pressure cartridges)
HNBR reinforced (high pressure cartridges)
Medium temperature: -20 to +120°C
Diff. pressure range: 7 - 600 kPa
For Valve Housing: DN25 (Type 10-11-20)
DN50 - DN450 (Type 50-60)

Dimensions ALPHA HCR Cartridge



Dimensions ALPHA Cartridge



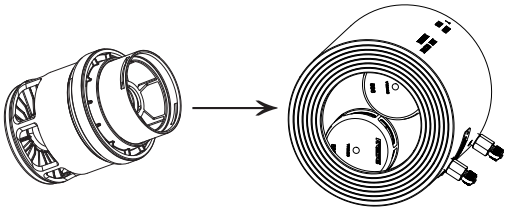


Product Programme HCR Cartridge

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

Product Programme Cartridge

Frese ALPHA Cartridge		
Cartridge Material	Availability	Programme
Composite	Standard	Refer to HCR programme
Stainless Steel AISI 304	Standard	Refer to ALPHA technote
Stainless Steel AISI 316	On request	
SMO	On request	



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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	

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Specification Text - Frese ALPHA HCR Dynamic Balancing Valve

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

The pressure class for the valve housing shall be PN16

The valve shall contain pressure independent flow cartridges

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

The temperature medium working range for the valve shall be -20 to +110°C (ALPHA HCR Cartridge) and -20 to +120°C (ALPHA Cartridge)

The valve shall be supplied with 1" PT plugs

The PT plugs shall be made of Stainless steel AISI 316

The fasteners shall be made of duplex steel

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

The Frese ALPHA HCR cartridge should be made of PPS 40% glass-reinforced , Fortron 1140L4 Black

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

Specification text - ALPHA HCR Cartridge

The Frese ALPHA HCR cartridge should be made of PPS glass-reinforced , 1140L4 Black

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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Frese ALPHA HCR
Dynamic Balancing Valve

Specification text - ALPHA Cartridge

High pressure cartridges (DN25)

The cartridge (for automatic balancing valve) should be made of DZR brass CW602N

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 of EPDM

Low pressure cartridges (DN25)

The cartridge (for automatic balancing valve) should be made of DZR brass CW602N

There should be only one differential pressure control range up to 350kPa

The flow rate should be defined by replaceable orifice plate

The diaphragm should be made of HNBR

The O-rings should be made of EPDM

High pressure cartridges (DN50 - DN450)

The cartridge for automatic balancing valve (flanged housing) 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 of EPDM

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