



# Product Programme 2024

Valves for Marine & Industrial Applications



[www.frese.eu/marine](http://www.frese.eu/marine)

## Energy efficient flow control for the marine industry

As a system supplier of energy-optimised heating and cooling water systems for the marine industry, Frese has extensive knowledge of dynamic flow control, materials and energy-efficient and cost-conscious use in many different applications.

We offer our customers a range of products manufactured in materials, which are suitable for use in even the most demanding environments, including ballast water treatment, seawater cooling, desalination and offshore.

The family owned Frese Group was established in Denmark 1944. The company manufactures innovative flow control solutions for HVAC systems as well as Marine, Industry and District Energy markets all over the world.

Frese takes responsibility for future climate efforts and the green transition and does so with a solid focus on energy optimisation and sustainability.

KNOWLEDGE

QUALITY

INNOVATION

MANUFACTURING  
EXCELLENCE

CUSTOMER FOCUS

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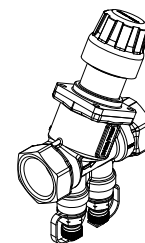
**PRESSURE INDEPENDENT CONTROL VALVES**

**OPTIMA Compact DN10-DN32**

**Female/Female with 1" P/T plugs**

Excl. actuator, 120°C, PN25, DZR

Category	Frese no.	Dimension DN	Stroke	Maximum flow l/h
G	53-1362	15 Low flow	2.5	30-200
G	53-1364	15 High flow	2.5	100-575
G	53-1372	20	2.5	100-575
G	53-1370	15 Low flow	5.0	65-370
G	53-1365	15 High flow	5.0	220-1,330
G	53-1368	20	5.0	220-1,330
G	53-1338	20	5.5	300-1,800
G	53-1339	25	5.5	280-1,800
G	53-1373	25L	5.5	600-3,609
G	53-1374	32	5.5	550-4,001

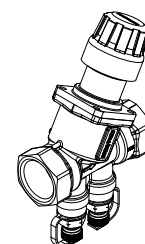


**OPTIMA Compact NPT 1/2" to 2"**

**Female/Female NPT with 1" P/T plugs**

Excl. actuator, 120°C, PN25, DZR

Category	Frese no.	Dimension DN	Stroke	Maximum flow l/h
G	53-1390	1/2" Low flow	2.5	30-200
G	53-1392	1/2" High flow	2.5	100-575
G	53-1394	3/4"	2.5	100-575
G	53-1391	1/2" Low flow	5.0	65-370
G	53-1393	1/2" High flow	5.0	220-1,330
G	53-1395	3/4"	5.0	220-1,330
G	53-1369	3/4"	5.5	300-1,800
G	53-1389	1"	5.5	280-1,800
G	53-1396	1"L	5.5	600-3,609
G	53-1397	1 1/4"	5.5	550-4,001



**OPTIMA Compact DN40-DN50**

**Female/Female with 1" P/T plugs**

120°C, PN25, GJS-400

Category	Frese no.	Dimension DN	Stroke	Maximum flow l/h
J	53-1375	40	15	9,500
J	53-1376	50	15	11,500



**Female/Female with 1" P/T plugs**

120°C, PN25, DZR

Category	Frese no.	Dimension DN	Stroke	Maximum flow l/h
J	53-1378	40	15	9,500
J	53-1379	50	15	11,500



**OPTIMA Compact NPT 1 1/2" - 2"**

**Female/Female NPT with 1" P/T plugs**

120°C, PN25, GJS-400

Category	Frese no.	Dimension inches	Stroke	Maximum flow l/h
J	53-1398	1 1/2"	15	1,370 - 9,500
J	53-1399	2"	15	1,400 - 11,500



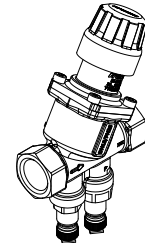
**PRESSURE INDEPENDENT CONTROL VALVES**

**OPTIMA Compact, Veriflow-series DN10-DN32**

**Female/Female with 1" P/T plugs**

Excl. actuator, 120°C, PN25, DZR Brass

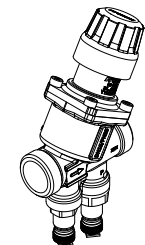
Category	Frese no.	Dimension DN	Stroke	Maximum flow l/h
J	53-5362	15 Low	2.5	30 - 200
J	53-5370	15 Low	5.0	65 - 370
J	53-5364	15 High	2.5	100 - 575
J	53-5365	15 High	5.0	220 - 1,330
J	53-5372	20 High	2.5	100 - 575
J	53-5368	20 High	5.0	220 - 1,330
J	53-5338	20 High	5.5	300 - 1,800
J	53-5339	25 Low	5.5	280 - 1,800
J	53-5373	25L High	5.5	600 - 3,609
	53-5374	32	5.5	550 - 4,001



**Male/Male with 1" P/T plugs**

Excl. actuator and couplings, 120°C, PN25, DZR Brass

Category	Frese no.	Dimension DN	Stroke	Maximum flow l/h
J	53-5320	10 Low	2.5	30 - 200
J	53-5329	10 Low	5.0	65 - 370
J	53-5322	15 Low	2.5	30 - 200
J	53-5330	15 Low	5.0	65 - 370
J	53-5324	15 High	2.5	100 - 575
J	53-5325	15 High	5.0	220 - 1,330
J	53-5332	20 High	2.5	100 - 575
J	53-5328	20 High	5.0	220 - 1,330
J	53-5331	20 High	5.5	300 - 1,800
J	53-5337	25 Low	5.5	280 - 1,800
J	53-5333	25L High	5.5	600 - 3,609
J	53-5334	32	5.5	550 - 4,001

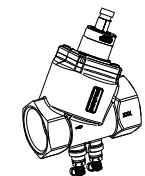


**OPTIMA Compact, Veriflow-series DN40-DN50**

**Female/Female with 1" P/T plugs**

120°C, PN25, GJS-400

Category	Frese no.	Dimension DN	Stroke	Maximum flow l/h
J	53-5375	40	15	1,370-9,500
J	53-5376	50	15	1,400-11,500



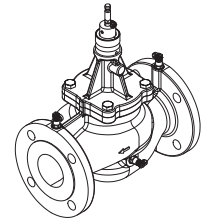
**PRESSURE INDEPENDENT CONTROL VALVES**

**OPTIMA Compact, Veriflow, Standard-series DN50-DN300**

**Flanged with 1" P/T plugs**

120°C (DN150, 110°C), PN16, GJL-250/GJS-400

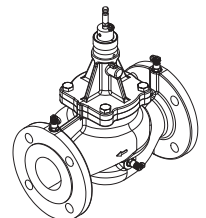
Category	Frese no.	Dimension DN	Stroke	Maximum flow l/h
J	53-5000	50 LF	20	15,000
J	53-5010	50 HF	20	24,000
J	53-5001	65 LF	20	25,000
J	53-5011	65 HF	20	35,000
J	53-5002	80 LF	20	34,000
J	53-5012	80 HF	20	43,000
J	53-5003	100 LF	40	68,000
J	53-5013	100 HF	40	90,000
J	53-5004	125 LF	40	110,000
J	53-5014	125 HF	40	135,000
J	53-5005	150 LF	43	148,000
J	53-5015	150 HF	43	195,000
J	53-5006	200 LF	43	210,000
J	53-5016	200 HF	43	280,000
J	53-5007	250 LF	48	475,000
J	53-5017	250 HF	48	600,000
J	53-5008	300 LF	48	475,000
J	53-5018	300 HF	48	600,000



**Flanged with 1" P/T plugs**

120°C (DN150, 110°C), PN25, GJL-250/GJS-400

Category	Frese no.	Dimension DN	Stroke	Maximum flow l/h
J	53-5020	50 LF	20	15,000
J	53-5030	50 HF	20	24,000
J	53-5021	65 LF	20	25,000
J	53-5031	65 HF	20	35,000
J	53-5022	80 LF	20	34,000
J	53-5032	80 HF	20	43,000
J	53-5023	100 LF	40	68,000
J	53-5033	100 HF	40	90,000
J	53-5024	125 LF	40	110,000
J	53-5034	125 HF	40	135,000
J	53-5025	150 LF	43	148,000
J	53-5035	150 HF	43	195,000
J	53-5026	200 LF	43	210,000
J	53-5036	200 HF	43	280,000
J	53-5027	250 LF	48	475,000
J	53-5037	250 HF	48	600,000
J	53-5028	300 LF	48	475,000
J	53-5038	300 HF	48	600,000



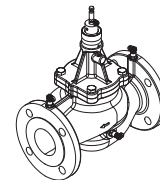
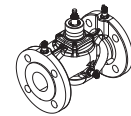
**PRESSURE INDEPENDENT CONTROL VALVES**

**OPTIMA Compact, Veriflow, Ultra-series DN50-DN125**

**Flanged with 1" P/T plugs**

120°C, PN16, GJL-250/GJS-400

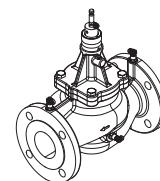
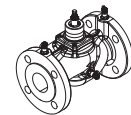
Category	Frese no.	Dimension DN	Stroke	Maximum flow l/h
J	53-5081	50 HF	15	11.500
J	53-5082	65 LF	20	16.000
J	53-5083	65 HF	20	24.000
J	53-5084	80 LF	20	25.000
J	53-5085	80 HF	20	35.000
J	53-5086	100 LF	20	34.000
J	53-5087	100 HF	20	43.000
J	53-5088	125 LF	40	68.000
J	53-5089	125 HF	40	90.000



**Flanged with 1" P/T plugs**

120°C, PN25, GJL-250/GJS-400

Category	Frese no.	Dimension DN	Stroke	Maximum flow l/h
J	53-5091	50 HF	15	11.500
J	53-5092	65 LF	20	16.000
J	53-5093	65 HF	20	24.000
J	53-5094	80 LF	20	25.000
J	53-5095	80 HF	20	35.000
J	53-5096	100 LF	20	34.000
J	53-5097	100 HF	20	43.000
J	53-5098	125 LF	40	68.000
J	53-5099	125 HF	40	90.000



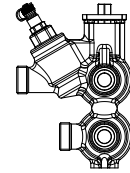
**PRESSURE INDEPENDENT CONTROL VALVES**

**COMBIFLOW - 6-Way Pressure Independent Control Valve**

**COMBIFLOW 6-Way Pressure Independent Control Valve**

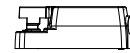
Without couplings and actuator.

Category	Frese no.	Dimension DN	Flow range l/h	Pressure range kPa
G	53-1839	15LF	35-830	15-400
G	53-1844	15	210-1,200	20- 400
G	53-1845	20	460-4,250	20- 400

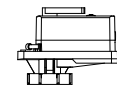


**Rotary Actuators for COMBIFLOW 6-Way**

Category	Frese no.	Type
D	48-5395	Multi Rotary Actuator, Modbus, BACnet, 0-10V, 4-20mA
D	48-5394	Multi Rotary Actuator, Modbus, BACnet, 0-10V, 4-20mA with cable

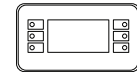


D	48-5397	Analog, 24V, 0-10V
D	48-5398	Modbus



**COMBIFLOW Modbus Programming Tool**

Category	Frese no.	Type
D	48-5399	Modbus for Actuator 48-5398

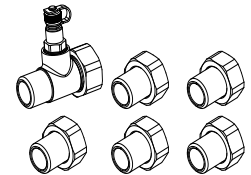


**COMBIFLOW Accessories**

**Couplings for COMBIFLOW 6-Way**

5 x Male ends ISO 7/1, 1 x Male end ISO 7/1 with P/T plug, DZR Brass

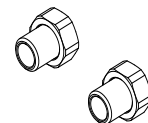
Category	Frese no.	Type	Pcs.
C	48-0081	DN15 (G 1/2 - R 3/4)	6
C	48-0082	DN20 (G 3/4 - R 3/4)	6
C	48-0083	DN20 (G 3/4 - R 1)	6
C	48-0084	DN25 (G 1 - R 1)	6



**Couplings for COMBIFLOW 6-Way**

Male ends ISO 7/1, DZR Brass

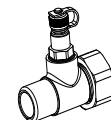
Category	Frese no.	Type	Pcs.
C	43-2330	DN15 (G 1/2 - R 3/4)	2
C	48-0042	DN20 (G 3/4 - R 3/4)	2
C	43-3330	DN20 (G 3/4 - R 1)	2
C	43-3331	DN25 (G 1 - R 1)	2



**Couplings for COMBIFLOW 6-Way**

Male end ISO 7/1 with P/T plug, DZR Brass

Category	Frese no.	Type	Pcs.
C	48-0038	DN15 (G 1/2 - G 3/4)	1
C	48-0041	DN20 (G 3/4 - G 3/4)	1
C	48-0039	DN20 (G 3/4 - G 1)	1
C	48-0040	DN25 (G 1 - G 1)	1



**Please note:** Six couplings (3x2 pcs.) are required to install the 6-port valve. One coupling with P/T plug should be used per valve for system commissioning (as standard, the second P/T plug is mounted in the valve)



**ACTUATORS FOR PRESSURE INDEPENDENT CONTROL VALVES**

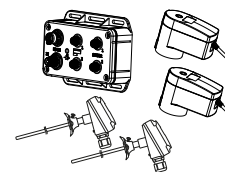
**Frese MODBUS System**

**Frese MODBUS Kit**

One kit with all parts needed for two modbus enabled OPTIMA Compacts and two temperature sensors. Valves need to be ordered separately.

Category Frese no. Type

O	58-8999	1 MODBUS converter, 2 actuators, 2 active sensors
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**Frese MODBUS Converter**

Suitable for two actuators and two active sensors, Protection Class IP54

Category Frese no. Type

O	58-8955	MODBUS converter
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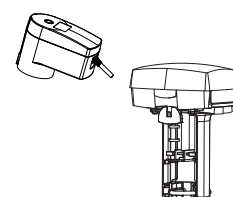


**Frese MODBUS System Actuators**

Category Frese no. Cable

Suitable for dimension

O	58-8910	1 m, halogen free, incl. connector	DN10-DN32
O	58-8911	3 m, halogen free, incl. connector	DN10-DN32
O	53-1296	Not included**	DN40-DN50
O	53-1297	Not included**	DN50-DN125
O	53-1298	Not included**	DN150-DN200



*\*Please contact Frese if MODBUS actuator for DN250-DN300 is needed.*

*\*\* Please order 58-8952*

**Temperature Sensor for Frese MODBUS System**

With 3 meter halogen free cable incl. M8 connector.

Category Frese no. Type

O	58-8954	Temperature Sensor 4-20 mA
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**Cables for Frese MODBUS System**

Including M8 connectors.

Category Frese no. Type

Suitable for

O	58-8952	Cable, halogen free, 5 m	Actuator DN40-DN200
O	58-8953	Extension Cable, halogen free, 5 m	Actuator & Sensors



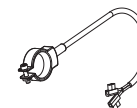
**Accessories - PICVs**

**Stem Heater**

Category Frese no. Type

Suitable for

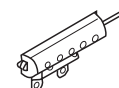
D	58-8956	24 V AC/DC, 10 W	OPTIMA Compact DN10-DN32
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Category Frese no. Type

Suitable for

D	58-8951	24 V AC/DC, 50W	actuators Type-01 to Type-07
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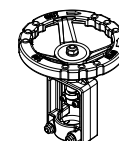


**Handwheel for OPTIMA Compact HCR**

Category Frese no. Type

Suitable for

J	01-2127	HCR, Aluminum	HCR DN15-80
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## PRESSURE INDEPENDENT CONTROL VALVES

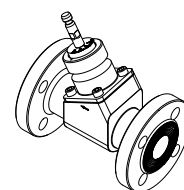


## OPTIMA Compact HCR DN15-DN40

**Flanged - HNBR (excluding actuator)**

120°C, 6 bar, PN16/25/40, EN 10088-2 1.4404, AISI 316L

Category	Frese no.	Dimension DN	Stroke	Flow l/h
M	58-8180	15	5,5	525-2,000
M	58-8181	20	5,5	525-2,000
M	58-8182	25	5,5	850-4,100
M	58-8183	32	5,5	850-4,100
M	58-8184	40	15	2,000-9,500

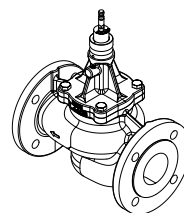


## OPTIMA Compact HCR DN50-DN80

**Flanged - EPDM (excluding actuator)**

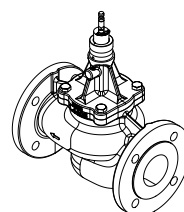
150°C, 12 bar, PN16, EN 10088-2 1.4401, AISI 316

Category	Frese no.	Dimension DN	Stroke	Flow l/h
M	58-8110	50	20	3,500-24,000
M	58-8111	65	20	6,000-35,000
M	58-8112	80	20	7,000-43,000

**Flanged - EPDM (excluding actuator)**

150°C, 12 bar, PN25, EN 10088-2 1.4401, AISI 316

Category	Frese no.	Dimension DN	Stroke	Flow l/h
M	58-8130	50	20	3,500-24,000
M	58-8131	65	20	6,000-35,000
M	58-8132	80	20	7,000-43,000



## LINEAR ACTUATORS

### Actuators for OPTIMA Compact DN10-DN32

#### Thermic actuator, On/Off with halogen free cables

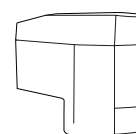
Category	Frese no.	Type	Suitable for valve stroke
D	58-8904	On/Off 230V NC	2.5
D	58-8905	On/Off 230V NC	5.0/5.5
D	58-8913	On/Off 230V NO	2.5/5.0/5.5
D	58-8914	On/Off 24V NO	2.5/5.0/5.5
D	58-8915	On/Off 24V NC	2.5/5.0/5.5



#### OPTIMA Compact Actuator, MO-series

Motric actuator MPV, modulating with halogen free cable,  
Supply Voltage : 24V AC/DC, Running time: 15 sec

Category	Frese no.	Type	Suitable for valve stroke
D	58-8900	4-20 mA DC, 1 m cable & Wieland Connector	up to 8.5 mm
D	58-8906	2-10 V DC, 3 m cable	up to 8.5 mm
D	58-8907	4-20 mA DC, 2 m cable	up to 8.5 mm
D	58-8909	0-10V DC, 1 m cable	up to 8.5 mm
D	53-1979	0-10V DC, 1 m cable, feedback	up to 8.5 mm
D	53-1980	0-10V DC, 1 m cable, feedback, failsafe open	up to 8.5 mm
D	53-1981	0-10V DC, 1 m cable, feedback, failsafe close	up to 8.5 mm



#### Thermostat with remote sensor for water and air

Suitable only for OPTIMA Compact with 2.5, 5.0 or 5.5 mm stroke

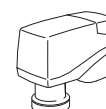
Category	Frese no.	Type	Suitable for valve stroke
D	53-1990	Thermostat w. remote sensor	2.5
D	53-1994	Thermostat w. remote sensor	5.0
D	53-1995	Thermostat w. remote sensor	5.5



### Digital Actuators

#### Frese MODBUS motoric actuators, 24 V

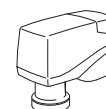
Category	Frese no.	Suitable for DN	Type	Power Supply
D	53-1975	10-32	Modbus	24 V AC/DC
D	53-1977	40-50	Modbus	24 V AC/DC



### LOGICA Digital, Energy-series

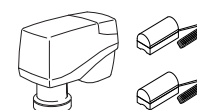
#### Modbus & BACnet motoric actuator, 24 V

Category	Frese no.	Suitable for DN	Type	Power Supply
	53-1976	10-32	Modbus/BACnet	24 V AC/DC
	53-1978	40-50	Modbus/BACnet	24 V AC/DC



#### Modbus & BACnet motoric actuator, 24 V with 2 temperatur sensors

Category	Frese no.	Suitable for DN	Type	Power Supply
	53-1973	10-32	Modbus/BACnet	24 V AC/DC
	53-1974	40-50	Modbus/BACnet	24 V AC/DC



ACTUATOR PROGRAMME · DN40-DN300

Image	Part Number	Power Supply	Control Signal	Feedback Signal	IP Class	Fail Safe Position	OPTIMA Compact HCR			OPTIMA Compact				
							DN 15-32	DN 40	DN 50-80	DN 40-50*** & Ultra DN50	DN 50-80 & Ultra DN65-100	DN 100-125 & Ultra DN125	DN 150-200	DN 250-300
	53-1954 Type 08	24V 230V*	0-10V 4-20mA 2/3-point 24V	0-10V	IP66	Up			•		•	•	•	
	53-1955 Type 09	24V 230V*	0-10V 4-20mA 2/3-point 24V	0-10V	IP66	Down			•		•	•	•	
	53-1956 Type 11	24V 230V*	0-10V 4-20mA 2/3-point 24V	0-10V	IP66	Up							•	•
	53-1957 Type 12	24V 230V*	0-10V 4-20mA 2/3-point 24V	0-10V	IP66	Down							•	•
	53-1299 Type 10	24V 230V*	0-10V 4-20mA 2/3-point 24V	0-10V	IP66	No							•	•
	58-8901	24V	4-20mA 0-10V	0-10V	IP54	No				•				
	58-8908	230V	3-point 230V	NA	IP54	No				•				
	53-1290	230V	3-point 230V	NA	IP54	No	•	•	•		•			
	53-1291	24V	3-point 24V	NA	IP54	No	•	•	•		•			
	58-8902	24V	4-20mA 0-10V	0-10V	IP54	No	•	•	•		•			
	53-1293	230V	3-point 230V	NA	IP54	No						•	•	
	53-1294	24V	3-point 24V	NA	IP54	No						•	•	
	58-8903	24V	4-20mA 0-10V	0-10V	IP54	No						•	•	
	53-1296 Type 1	24V	0-10V	2-10V	IP54	No				•				
	53-1297 Type 2	24V	0-10V	2-10V	IP54	No	•	•	•		•	•		
	53-1298 Type 3	24V	0-10V	2-10V	IP54	No							•	
	53-1950 Type 4	24V	0-10V	2-10V	IP54	Up				•				
	53-1951 Type 5	24V	0-10V	2-10V	IP54	Down				•				
	53-1952 Type 6	24V	0-10V	2-10V	IP54	Up	•	•	•		•			
	53-1953 Type 7	24V	0-10V	2-10V	IP54	Down	•	•	•		•			
	58-8923/ 58-8933	230V	0(2)-10V 0(4)-20mA 3-point	0-10V 4-20mA**	IP54/ IP65	No	•	•		•				
	58-8922/ 58-8932	24V	0(2)-10V 0(4)-20mA 3-point	0-10V 4-20mA**	IP54/ IP65	No	•	•		•				
	58-8921/ 58-8931	230V	0(2)-10V 0(4)-20mA 3-point	0-10V 4-20mA**	IP54/ IP65	No			•		•	•	•	
	58-8920/ 58-8930	24V	0(2)-10V 0(4)-20mA 3-point	0-10V 4-20mA**	IP54/ IP65	No			•		•	•	•	
	58-8925/ 58-8935	230V	0(2)-10V 0(4)-20mA 3-point	0-10V 4-20mA**	IP54/ IP65	No								•
	58-8924/ 58-8934	24V	0(2)-10V 0(4)-20mA 3-point	0-10V 4-20mA**	IP54/ IP65	No								•

\*with accessory: 07-2925

\*\*with accessory: 07-2939

\*\*\*threaded version

**LINEAR ACTUATORS**

**Motoric Actuators for OPTIMA Compact DN40-DN50 (DN50 Ultra)**

**OPTIMA Compact Actuator, SI-series**

IP54. Please refer to Actuator Programme page 12 for appropriate dimensions and variants.

Category	Frese no.	Type	Actuating force
O	58-8901	24V AC/DC, 4-20 mA 0-10V	200 N
O	58-8908	230V AC, 3-P	200 N



**OPTIMA Compact Actuator**

IP54. Please refer to Actuator Programme page 12 for appropriate dimensions and variants.

Category	Frese no.	Type	Actuating force
O	53-1296	24V AC/DC, 0-10V Type-01	400N



**Motoric Actuators for OPTIMA Compact DN50-DN300 (DN65-DN125 Ultra)**

**OPTIMA Compact Actuator, SI-series**

IP54. Please refer to Actuator Programme page 12 for appropriate dimensions and variants.

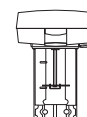
Category	Frese no.	Type	Actuating force
O	58-8902	24V AC/DC, 4-20 mA 0-10V	800 N
O	53-1294	24V AC/DC, 3-P 24 V	1100 N



**OPTIMA Compact Actuator**

IP54. Please refer to Actuator Programme page 12 for appropriate dimensions and variants.

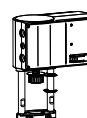
Category	Frese no.	Type	Actuating force	Type
O	53-1297	24V AC/DC, 0-10V	800N	02
O	53-1298	24V AC/DC, 0-10V	1500N	03



**OPTIMA Compact Actuator, SA-series**

IP66. Please refer to Actuator Programme page 12 for appropriate dimensions and variants.

Category	Frese no.	Type	Actuating force	Type
O	53-1299	24V AC/DC, 0-10V DC, 4-20 mA DC, 3-P fl.	2500N	10

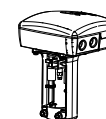


**Motoric Actuators, Spring Return for OPTIMA Compact DN50-DN300**

**OPTIMA Compact Actuator - Spring return**

IP54. Please refer to Actuator Programme page 12 for appropriate dimensions and variants.

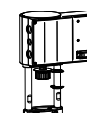
Category	Frese no.	Type	Actuating force	Type	Stem
O	53-1950	24V AC/DC, 0-10V	600N	04	Up
O	53-1951	24V AC/DC 0-10V	600N	05	Down
O	53-1952	24V AC/DC, 0-10V	900N	06	Up
O	53-1953	24V AC/DC, 0-10V	900N	07	Down



**OPTIMA Compact Actuator, SA-series - Spring return**

IP66, 24V AC/DC, IP66. Please refer to Actuator Programme page 12 for appropriate dimensions and variants.

Category	Frese no.	Type	Actuating force	Type	Stem
O	53-1954	0-10V DC, 4-20 mA DC/3-P/2-P fl.	1100N	08	Up
O	53-1955	0-10V DC, 4-20 mA DC/3-P/2-P fl.	1100N	09	Down
O	53-1956	0-10V DC, 4-20 mA DC/3-P/2-P fl.	2000N	11	Up
O	53-1957	0-10V DC, 4-20 mA DC/3-P/2-P fl.	2000N	12	Down



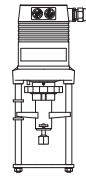
**LINEAR ACTUATORS**

**Motoric Actuators HO-series for OPTIMA Compact Flanged DN15-DN300**

**HO-Series, 24V AC/DC, IP54**

Suitable for OPTIMA Compact og OPTIMA Compact HCR with flanged connections

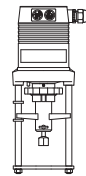
Category	Frese no.	Type	Suitable for OPTIMA Compact HCR	Suitable for OPTIMA Compact
O	58-8922	4-20 mA, 0-10V, 3-P	DN15-DN40	DN40-DN80
O	58-8920	4-20 mA, 0-10V, 3-P	DN50-DN80	DN100-DN200
O	58-8924	4-20 mA, 0-10V, 3-P	N/A	DN250-DN300



**HO-Series, 230V AC, IP54**

Suitable for OPTIMA Compact og OPTIMA Compact HCR with flanged connections

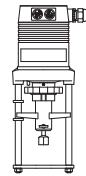
Category	Frese no.	Type	Suitable for OPTIMA Compact HCR	Suitable for OPTIMA Compact
O	58-8923	4-20 mA, 0-10V, 3-P	DN15-DN40	DN40-DN80
O	58-8921	4-20 mA, 0-10V, 3-P	DN50-DN80	DN100-DN200
O	58-8925	4-20 mA, 0-10V, 3-P	N/A	DN250-DN300



**HO-Series, 24V AC/DC, IP65**

Suitable for OPTIMA Compact og OPTIMA Compact HCR with flanged connections

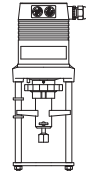
Category	Frese no.	Type	Suitable for OPTIMA Compact HCR	Suitable for OPTIMA Compact
O	58-8932	4-20 mA, 0-10V, 3-P	DN15-DN40	DN40-DN80
O	58-8930	4-20 mA, 0-10V, 3-P	DN50-DN80	DN100-DN200
O	58-8934	4-20 mA, 0-10V, 3-P	N/A	DN250-DN300



**HO-Series, 230V AC, IP65**

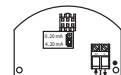
Suitable for OPTIMA Compact og OPTIMA Compact HCR with flanged connections

Category	Frese no.	Type	Suitable for OPTIMA Compact HCR	Suitable for OPTIMA Compact
O	58-8933	4-20 mA, 0-10V, 3-P	DN15-DN40	DN40-DN80
O	58-8931	4-20 mA, 0-10V, 3-P	DN50-DN80	DN100-DN200
O	58-8935	4-20 mA, 0-10V, 3-P	N/A	DN250-DN300



**HO-Series, Accessory**

Category	Frese no.	Type	Suitable for
O	07-2939	4-20 mA feedback module	HO-Series Actuators



3-WAY ROTARY CONTROL VALVES

OMEGA Compact

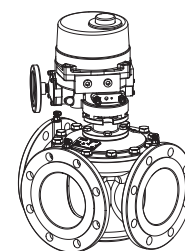
**OMEGA Compact, Leakguard-series, 3-way Rotary Control Valve, flanged**

100°C, PN16 (DN65 - DN300), PN10 (DN350 - DN800), EN-GJS-400-18LT

Leakage rate: M DN65-DN350: Class IV (0.01 %) acc. to EN1349, DN400-DN800: Max. 0.2 % of Kvs

Category	Frese no.	Dimension DN
M	58-A065-XXXXX-XX*	65
M	58-A080-XXXXX-XX*	80
M	58-A100-XXXXX-XX*	100
M	58-A125-XXXXX-XX*	125
M	58-A150-XXXXX-XX*	150
M	58-A200-XXXXX-XX*	200
M	58-A250-XXXXX-XX*	250
M	58-A300-XXXXX-XX*	300
M	58-A350-XXXXX-XX*	350
M	58-A400-XXXXX-XX*	400
M	58-A450-XXXXX-XX*	450
M	58-A500-XXXXX-XX*	500
M	58-A550-XXXXX-XX*	550
M	58-A600-XXXXX-XX*	600
M	58-A650-XXXXX-XX*	650
M	58-A700-XXXXX-XX*	700
M	58-A800-XXXXX-XX*	800

\*Please see technote or contact Frese for configuration

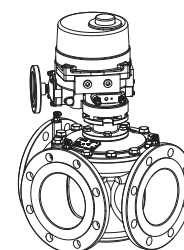


**OMEGA Compact, Standard-series, 3-way Rotary Control Valve, flanged**

100°C, PN16 (DN65 - DN300), PN10 (DN350 - DN800), EN-GJS-400-18LT

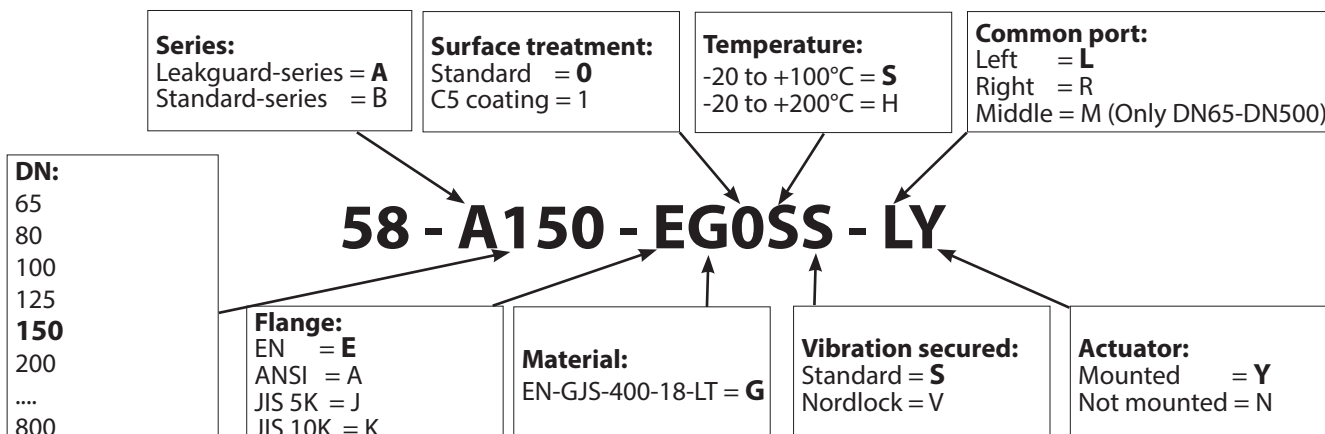
Category	Frese no.	Dimension DN
M	58-B065-XXXXX-XX*	65
M	58-B080-XXXXX-XX*	80
M	58-B100-XXXXX-XX*	100
M	58-B125-XXXXX-XX*	125
M	58-B150-XXXXX-XX*	150
M	58-B200-XXXXX-XX*	200
M	58-B250-XXXXX-XX*	250
M	58-B300-XXXXX-XX*	300
M	58-B350-XXXXX-XX*	350
M	58-B400-XXXXX-XX*	400
M	58-B450-XXXXX-XX*	450
M	58-B500-XXXXX-XX*	500
M	58-B550-XXXXX-XX*	550
M	58-B600-XXXXX-XX*	600
M	58-B650-XXXXX-XX*	650
M	58-B700-XXXXX-XX*	700
M	58-B800-XXXXX-XX*	800

\*Please see technote or contact Frese for configuration



OMEGA Compact Part numbers

OMEGA Compact part numbers are generated from the following specifications:



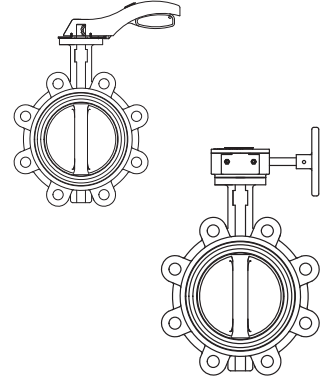
## BUTTERFLY VALVES, BALL VALVES, STRAINER

### Frese Butterfly Valves DN50-DN600

#### Manual Butterfly Valve, Lug type

110/120°C, valve body: EN-GJS-450/10, disc: AISI316, seat: EPDM, PN16

Category	Frese no.	Dimension DN	Operation
C	38-3000	50	Manual Handle
C	38-3001	65	Manual Handle
C	38-3002	80	Manual Handle
C	38-3003	100	Manual Handle
C	38-3004	125	Manual Handle
C	38-3005	150	Manual Handle
C	38-3006	200	Manual Gear
C	38-3007	250	Manual Gear
C	38-3008	300	Manual Gear
C	38-3009	350	Manual Gear
C	38-3010	400	Manual Gear
C	38-3011	450	Manual Gear
C	38-3012	500	Manual Gear
C	38-3013	600	Manual Gear

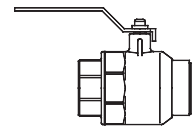


### Frese Ball Valves DN15-DN50

#### Full flow ball valves Female/Male with handle

120°C, PN16, DZR

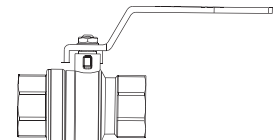
Category	Frese no.	Dimension DN
C	38-5020	15
C	38-5022	20
C	38-5024	25
C	38-5026	32
C	38-5028	40
C	38-5030	50



#### Full flow ball valves Female/Female with handle

120°C, PN16, DZR

Category	Frese no.	Dimension DN
C	38-5032	15
C	38-5033	20
C	38-5034	25
C	38-5035	32
C	38-5036	40
C	38-5037	50



### Accessories

#### Spindle extension for full flow ball valves

Category	Frese no.	Dimension DN
C	46-1072	15/20
C	46-1073	25
C	46-1074	32/40
C	46-1075	50

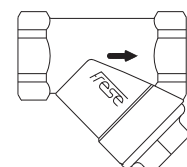


### Frese Strainers DN15-DN50

#### Female/Female strainer, 32 Mesh

120°C, PN16, DZR

Category	Frese no.	Dimension DN
C	41-1132	15
C	41-1142	20
C	41-1152	25
C	41-1162	32
C	41-1172	40
C	41-1182	50





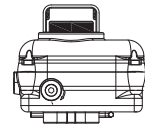
**ROTARY ACTUATORS FOR 3-WAY ROTARY CONTROL VALVES & BUTTERFLY VALVES**

**Frese Electric Rotary Actuators - ROL-series**

**ROL-series, 24V AC/DC, IP 67**

Suitable for OMEGA Compact and Frese Butterfly Valves

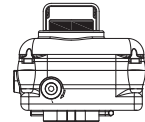
Category	Frese no.	Type	Control
M	58-8936	ROL-S 005	2-P, 3-P
M	58-8938	ROL-S 005	4-20mA, 0-10V
M	58-8940	ROL-S 009	2-P, 3-P
M	58-8942	ROL-S 009	4-20mA, 0-10V



**ROL-series, 110-230V AC/DC, IP 67**

Suitable for OMEGA Compact and Frese Butterfly Valves

Category	Frese no.	Type	Control
M	58-8937	ROL-S 005	2-P, 3-P
M	58-8939	ROL-S 005	4-20mA, 0-10V
M	58-8941	ROL-S 009	2-P, 3-P
M	58-8943	ROL-S 009	4-20mA, 0-10V

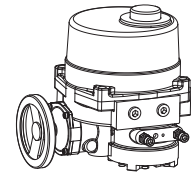


**ROL-series, 230V AC, IP 67**

Suitable for OMEGA Compact and Frese Butterfly Valves

Category	Frese no.	Type	Torque
M	58-89A009-XXXX*	ROL-L	90
M	58-89A015-XXXX*	ROL-L	150
M	58-89A028-XXXX*	ROL-L	280
M	58-89A060-XXXX*	ROL-L	600
M	58-89A100-XXXX*	ROL-L	1000
M	58-89A200-XXXX*	ROL-L	2000
M	58-89A250-XXXX*	ROL-L	2500
M	58-89A300-XXXX*	ROL-L	3000

*\*Please see technote or contact Frese for configuration*

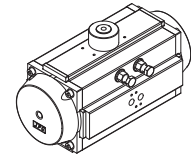


**Frese Pneumatic Rotary Actuators - ROP-series**

**ROP-series, Single Acting**

Pneumatic actuator, single acting, suitable for OMEGA Compact

*Please refer to technote or contact us for Frese Rotary Pneumatic actuator programme suitable for Frese OMEGA Compact.*



## DYNAMIC FLOW LIMITING VALVES · CARTRIDGE SOLUTION

### ALPHA HCR Cartridges type 50 and 60 - PPS and AISI316

#### ALPHA HCR Cartridge with orifice plate

Category	Dimension DN	Pressure range kPa	Material
M	50-450 (1000)	47-600 (300)	PPS Glass
M	50-450 (1000)	13-600	AISI316



#### ALPHA HCR Orifice plates

Category	Dimension DN	Material
M	50-450 (1000)	PPS Glass
M	50-450 (1000)	AISI316



#### ALPHA HCR orifice plate removal tool

Category	Frese no.	Suitable for
M	08-0289	ALPHA HCR PPS cartridges



### ALPHA HCR Cartridges type 20 - Super Duplex

#### ALPHA HCR Cartridge with orifice plate

Category	Dimension DN	Pressure range kPa	Material
M	25-40	22-600	EN 1.4410



#### ALPHA HCR Orifice plates

Category	Dimension DN	Material
M	25-40	EN 1.4410



### ALPHA HCR Cartridges · Flow Settings

ALPHA HCR Cartridge Type 50 · AISI316						ALPHA HCR Cartridge Type 60 · AISI316					
Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv	Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
51-55179	3,820	1.061	16.82	13	10.6	51-66285	17,037	4.733	75.02	34	29.2
51-55184	3,931	1.092	17.31	13	10.9	51-66292	18,148	5.041	79.90	34	31.1
51-55189	4,049	1.125	17.83	13	11.2	51-66301	18,797	5.221	82.75	35	31.8
51-55194	4,199	1.167	18.50	13	11.7	51-66305	19,467	5.408	85.72	35	32.9
51-55200	4,399	1.222	19.37	13	12.2	51-66312	20,464	5.684	90.09	35	34.6
51-55206	4,640	1.289	20.43	14	12.4	51-66319	21,527	5.980	94.79	36	35.9
51-55213	4,951	1.375	21.79	14	13.2	51-66326	22,449	6.236	98.84	36	37.4
51-55220	5,310	1.475	23.38	14	14.2	51-66332	23,482	6.523	103.39	36	39.1
51-55227	5,700	1.583	25.09	14	15.2	51-66338	24,531	6.815	108.02	37	40.3
51-55235	6,209	1.725	27.34	14	16.6	51-66344	25,621	7.117	112.81	38	41.6
51-55243	6,511	1.808	28.66	14	17.4	51-66349	26,528	7.369	116.80	38	43.0
51-55251	7,081	1.967	31.18	14	18.9	51-66356	27,686	7.690	121.89	38	44.9
51-55260	7,901	2.194	34.78	15	20.4	51-66362	29,157	8.099	128.37	38	47.3
51-55269	8,900	2.472	39.18	16	22.3	51-66367	29,954	8.320	131.88	39	48.0
51-55279	10,399	2.889	45.79	19	23.9	51-66373	30,976	8.605	136.39	39	49.6
51-55287	11,355	3.154	49.99	22	24.2	51-66379	32,260	8.961	142.04	40	51.0
51-55292	12,491	3.470	55.00	23	26.1	51-66385	33,565	9.324	147.79	40	53.0
51-55298	13,399	3.722	59.00	24	27.4	51-66391	34,953	9.709	153.89	40	55.3
51-55303	14,762	4.100	64.99	27	28.4	51-66393	36,336	10.093	159.98	42	56.1
51-55308	15,999	4.444	70.44	29	29.7	51-66398	37,685	10.468	165.92	43	57.5
						51-66400	38,607	10.724	169.98	44	58.2
						51-66407	40,971	11.381	180.39	46	60.4
						51-66407H	45,000	12.500	198.13	49	64.3

**DYNAMIC FLOW LIMITING VALVES · CARTRIDGE SOLUTION**
**ALPHA HCR Cartridges · Flow Settings**

ALPHA HCR Cartridge Type 60 · PPS						ALPHA HCR Cartridge Type 20 · Super Duplex EN 1.4410					
Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv	Frese no.	Flow [l/h]	Flow [l/s]	Flow [gpm]	Min. ΔP [kPa]	Kv
58-65120	4,000	1.111	17.61	47	5.8	58-20170	56	0.016	0.25	21	0.12
58-65132	4,500	1.250	19.81	47	6.6	58-20230	102	0.028	0.45	21	0.22
58-65140	5,000	1.389	22.02	47	7.3	58-20260	129	0.036	0.57	21	0.28
58-65148	5,500	1.528	24.22	47	8.0	58-20300	180	0.050	0.79	21	0.39
58-65156	6,000	1.667	26.42	47	8.8	58-20350	236	0.066	1.04	21	0.51
58-65168	6,750	1.875	29.72	47	9.8	58-20400	321	0.089	1.41	22	0.68
58-65175	7,500	2.083	33.02	47	10.9	58-20460	422	0.117	1.86	22	0.90
58-65200	8,500	2.361	37.42	47	12.4	58-20510	499	0.139	2.20	22	1.06
58-65208	9,200	2.556	40.51	47	13.4	58-20540	584	0.162	2.57	22	1.25
58-65220	10,000	2.778	44.03	47	14.6	58-20580	668	0.186	2.94	22	1.42
58-65235	11,000	3.056	48.43	47	16.0	58-20620	750	0.208	3.30	22	1.60
58-65240	12,500	3.472	55.03	47	18.2	58-20660	874	0.243	3.85	22	1.86
58-65252	13,800	3.833	60.76	47	20.1	58-20700	1,020	0.283	4.49	22	2.17
58-65264	15,300	4.250	67.36	47	22.3	58-20740	1,081	0.300	4.76	22	2.30
58-65274	16,300	4.528	71.77	47	23.8	58-20770	1,195	0.332	5.26	22	2.55
58-65280	18,000	5.000	79.25	47	26.3	58-20820	1,335	0.371	5.88	23	2.78
58-65303	19,000	5.278	83.66	47	27.7	58-20860	1,483	0.412	6.53	23	3.09
58-65313	20,300	5.639	89.38	47	29.6	58-20880	1,581	0.439	6.96	23	3.30
58-65320	21,500	5.972	94.66	47	31.4	58-20920	1,774	0.493	7.81	24	3.62
58-65333	23,200	6.444	102.15	47	33.8	58-20940	1,833	0.509	8.07	24	3.74
58-65341	24,300	6.750	106.99	47	35.4	58-20990	2,080	0.578	9.16	25	4.16
58-65349	25,300	7.028	111.39	47	36.9	58-21030	2,251	0.625	9.91	26	4.41
58-65356	27,000	7.500	118.88	47	39.4	58-21060	2,319	0.644	10.21	27	4.46
58-65362	28,500	7.917	125.49	47	41.6	58-21090	2,448	0.680	10.78	28	4.63
58-65365	30,500	8.472	134.29	47	44.5	58-21090H	3,000	0.833	13.21	46	4.42
58-65385	32,000	8.889	140.90	47	46.7						
58-65396	34,000	9.444	149.70	49	48.6						
58-65409	37,500	10.417	165.11	49	53.6						
58-65413	38,500	10.694	169.52	50	54.4						
58-65417	39,500	10.972	173.92	50	55.9						
58-65420	40,500	11.250	178.32	52	56.2						
58-65425	41,750	11.597	183.83	53	57.3						
58-65430	43,000	11.944	189.33	54	58.5						
58-65433	44,000	12.222	193.73	55	59.3						
58-65440	48,000	13.333	211.34	60	62.0						

## DYNAMIC FLOW LIMITING VALVES • CARTRIDGE SOLUTION

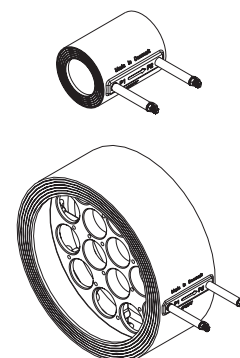
### ALPHA HCR Wafer - Nickel Aluminium Bronze

#### Nickel-Aluminium-Bronze Valves

For Flanges with 4" P/T-plugs, 110°C, PN16/PN25, EN 1982 CC333G-GS. Installation of cartridges included. Please select from cartridge catalogue and order under individual numbers

Category	Frese no.	Dimension DN	PN	Cartridges
M	58-9038T-01	25	25	1
M	58-9058T-01	40	25	1
M	58-9073T-01	50	25	1
M	58-9083T-01	65	25	1
M	58-9093T-01	80	25	1
M	58-9103T-01	100	16*	2
M	58-9163T-01	125	16*	3
M	58-9113T-01	150	16*	4
M	58-9123T-01	200	16*	7
M	58-9133T-01	250	16*	12
M	58-9143T-01	300	16*	15
M	58-9153T-01	350	16*	19
M	58-9173T-01	400	16*	26
M	58-9183T-01	450	16*	33

\*PN25 on request



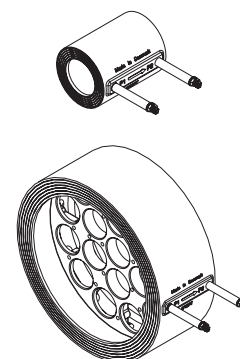
### ALPHA HCR Wafer - Stainless Steel 316L

#### Stainless Steel 316L Valves

For Flanges with 4" P/T-plugs, 110°C, PN16/PN25, EN 10088-2 1.4404. Installation of cartridges included. Please select from cartridge catalogue and order under individual numbers

Category	Frese no.	Dimension DN	PN	Cartridges
M	58-9038L-01	25	25	1
M	58-9058L-01	40	25	1
M	58-9073L-01	50	25	1
M	58-9083L-01	65	25	1
M	58-9093L-01	80	25	1
M	58-9103L-01	100	16*	2
M	58-9163L-01	125	16*	3

\*PN25 on request



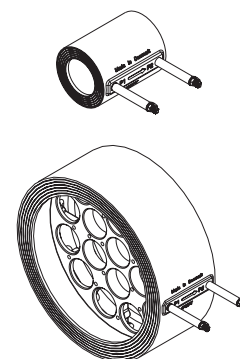
### ALPHA HCR Wafer - Stainless Steel 316

#### Stainless Steel 316 Valves

For Flanges with 4" P/T-plugs, 110°C, PN16/PN25, EN 10088-2 1.4401. Installation of cartridges included. Please select from cartridge catalogue and order under individual numbers

Category	Frese no.	Dimension DN	PN	Cartridges
M	58-9113M-01	150	16*	4
M	58-9123M-01	200	16*	7
M	58-9133M-01	250	16*	12
M	58-9143M-01	300	16*	15
M	58-9153M-01	350	16*	19
M	58-9173M-01	400	16*	26
M	58-9183M-01	450	16*	33

\*PN25 on request



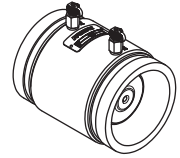
## DYNAMIC FLOW LIMITING VALVES • CARTRIDGE SOLUTION

### ALPHA HCR Grooved End

#### Nickel Aluminium Bronze Valves

For grooved piping systems with 1" P/T-plugs, -20°C to 32°C, PN16, EN 1982 CC333G-GS. Installation of cartridges included. Please select from cartridge catalogue and order under individual numbers

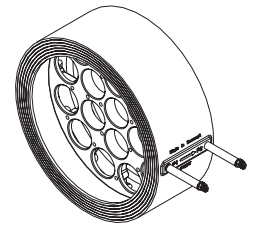
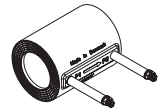
Category	Frese no.	Dimension DN	Cartridges
M	58-9107T-01	100	1
M	58-9117T-01	150	2
M	58-9127T-01	200	4



### ALPHA HCR Wafer - Other Materials

ALPHA HCR Wafers in sizes DN25-DN450 are also available in below listed materials. Please contact Frese for price and availability

Suffix	Material name	Material Standard
U	CC4921K (RG7)	EN 1982 CC492K-GC
P	Low Carbon Steel	ASTM A350 LF2
L	Stainless Steel 316L	EN 10088-2 1.4404
K	Stainless Steel 316Ti	EN 10088-2 1.4571
M	Stainless Steel 316	EN 10088-2 1.4401
N	SMO 254	EN 10088-2 1.4547

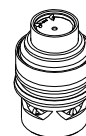


**DYNAMIC FLOW LIMITING VALVES • CARTRIDGE SOLUTION**

**ALPHA High-Pressure Cartridges**

**ALPHA Cartridge with orifice plate**

Category	Type	Dimension DN	Pressure range kPa	Material
E	10, 11, 20	15/20/25	7-600	Brass DZR
E	30, 40	25L/32/40/50	12-600	Brass DZR
F	50, 60	50-1000	12-600	Stainless Steel AISI 304



**Orifice plates**

Category	Type	Dimension DN	Material
E	10, 11, 20	15/20/25	Brass DZR
E	30, 40	25L/32/40/50	Brass DZR
F	50, 60	50-1000	Stainless Steel AISI 304



**ALPHA Cartridge without orifice plate**

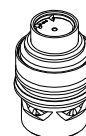
Category	Type	Dimension DN	Pressure range kPa	Material
E	10, 11, 20	15/20/25	7-600	Brass DZR
E	30, 40	25L/32/40/50	12-600	Brass DZR
F	50, 60	50-1000	12-600	Stainless Steel AISI 304



**ALPHA Low-Pressure Cartridges**

**ALPHA Cartridge with orifice plate**

Category	Type	Dimension DN	Pressure range kPa	Material
E	10, 11, 20	15/20/25	7-350	Brass DZR
E	30, 40	25L/32/40/50	12-350	Brass DZR



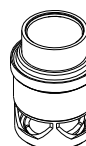
**Orifice plates**

Category	Type	Dimension DN	Material
E	10, 11, 20	15/20/25	Brass DZR
E	30, 40	25L/32/40/50	Brass DZR



**ALPHA Cartridge without orifice plate**

Category	Type	Dimension DN	Pressure range kPa	Material
E	10, 11, 20	15/20/25	7-350	Brass DZR
E	30, 40	25L/32/40/50	12-350	Brass DZR



**Blind cap for wafer valves**

Category	Frese no.	Dimension DN	Material
F	51-05000	100-1000	Stainless Steel AISI 304



DYNAMIC FLOW LIMITING VALVES • CARTRIDGE SOLUTION

ALPHA Cartridges • Flow Settings

ALPHA Cartridge Type 10 · DN15-DN25					
High Pressure Frese no. Max. Δp 600 kPa	Low Pressure Frese no. Max. Δp 350 kPa	Flow [l/h]	Flow [l/s]	Min. ΔP [kPa]	Kv
	50-11150	25	0.007	7	0.09
	50-11170	36	0.010	7	0.14
	50-11190	43	0.012	7	0.16
49-11210	50-11210	55	0.015	7	0.21
49-11230	50-11230	75	0.021	8	0.27
49-11260	50-11260	84	0.024	9	0.28
49-11290	50-11290	104	0.029	10	0.33
49-11300	50-11300	114	0.032	10	0.36
49-11320	50-11320	129	0.036	11	0.39
49-11350	50-11350	154	0.043	11	0.46
49-11370	50-11370	175	0.049	12	0.51
49-11400	50-11400	204	0.057	12	0.59
49-11430	50-11430	241	0.067	12	0.70
49-11460	50-11460	279	0.078	12	0.81
49-11490	50-11490	320	0.089	13	0.89
49-11510	50-11510	350	0.097	13	0.97
49-11540	50-11540	400	0.111	13	1.11
49-11570	50-11570	477	0.132	14	1.27
49-11620	50-11620	545	0.151	14	1.46

ALPHA Cartridge Type 11 · DN15-DN25					
High Pressure Frese no. Max. Δp 600 kPa	Low Pressure Frese no. Max. Δp 350 kPa	Flow [l/h]	Flow [l/s]	Min. ΔP [kPa]	Kv
49-11725	50-11725	615	0.171	14	1.64
49-11730	50-11730	670	0.186	14	1.79
49-11735	50-11735	736	0.204	14	1.97
49-11740	50-11740	799	0.222	16	2.00
49-11745	50-11745	870	0.242	19	2.00
49-11750	50-11750	936	0.260	21	2.04

ALPHA Cartridge Type 20 · DN15-DN25					
High Pressure Frese no. Max. Δp 600 kPa	Low Pressure Frese no. Max. Δp 350 kPa	Flow [l/h]	Flow [l/s]	Min. ΔP [kPa]	Kv
49-20700	50-20700	1020	0.283	22	2.17
49-20740	50-20740	1081	0.300	22	2.30
49-20770	50-20770	1195	0.332	22	2.55
49-20820	50-20820	1335	0.371	23	2.78
49-20860	50-20860	1483	0.412	23	3.09
49-20880	50-20880	1581	0.439	23	3.30
49-20920	50-20920	1774	0.493	24	3.62
49-20940	50-20940	1833	0.509	24	3.74
49-20990	50-20990	2080	0.578	25	4.16
49-21030	50-21030	2251	0.625	26	4.41
49-21060	50-21060	2319	0.644	27	4.46
49-21090	50-21090	2448	0.680	28	4.63

ALPHA Cartridge Type 30 · DN25L-DN50					
High Pressure Frese no. Max. Δp 600 kPa	Low Pressure Frese no. Max. Δp 350 kPa	Flow [l/h]	Flow [l/s]	Min. ΔP [kPa]	Kv
49-33073	50-33073	674	0.188	12	1.95
49-33082	50-33082	861	0.239	12	2.49
49-33089	50-33089	1020	0.283	12	2.94
49-33094	50-33094	1136	0.316	12	3.28
49-33096	50-33096	1190	0.331	12	3.44
49-33098	50-33098	1272	0.353	13	3.53
49-33102	50-33102	1349	0.375	13	3.74
49-33107	50-33107	1485	0.413	13	4.12
49-33111	50-33111	1567	0.435	14	4.19
49-33112	50-33112	1631	0.453	14	4.36
49-33118	50-33118	1815	0.504	14	4.85
49-33124	50-33124	2001	0.556	15	5.17
49-33125	50-33125	2044	0.568	16	5.11
49-33129	50-33129	2171	0.603	16	5.43
49-33132	50-33132	2271	0.631	17	5.51
49-33135	50-33135	2380	0.661	17	5.77
49-33138	50-33138	2498	0.694	18	5.89
49-33142	50-33142	2639	0.733	18	6.22
49-33148	50-33148	2871	0.797	19	6.59
49-33156	50-33156	3191	0.886	21	6.96
49-33161	50-33161	3407	0.946	22	7.26
49-33163	50-33163	3486	0.968	22	7.43

ALPHA Cartridge Type 40 · DN25L-DN50					
High Pressure Frese no. Max. Δp 600 kPa	Low Pressure Frese no. Max. Δp 350 kPa	Flow [l/h]	Flow [l/s]	Min. ΔP [kPa]	Kv
49-44148	50-44148	3634	1.009	20	8.13
49-44152	50-44152	3680	1.072	21	8.03
49-44156	50-44156	4088	1.136	21	8.92
49-44164	50-44164	4315	1.199	21	9.42
49-44168	50-44168	4542	1.262	22	9.68
49-44173	50-44173	4769	1.325	22	10.17
49-44176	50-44176	4996	1.388	23	10.42
49-44182	50-44182	5450	1.514	24	11.12
49-44191	50-44191	5905	1.640	25	11.81
49-44194	50-44194	6539	1.816	26	12.82
49-44200	50-44200	6813	1.893	27	13.11
49-44205	50-44205	7267	2.019	28	13.73
49-44211	50-44211	7721	2.145	30	14.10
49-44217	50-44217	8176	2.271	31	14.68
49-44222	50-44222	8630	2.397	33	15.02
49-44229	50-44229	9084	2.523	34	15.58
49-44235	50-44235	9538	2.650	36	15.90
49-44241	50-44241	9990	2.776	38	16.21
49-44248	50-44248	10445	2.902	40	16.51
49-44250	50-44250	10900	3.028	42	16.82
49-44262	50-44262	11355	3.154	44	17.12

ALPHA Cartridge Type 50 · DN50-DN1000				
AISI 304 Frese no. Max. Δp 600 kPa	Flow [l/h]	Flow [l/s]	Min. ΔP [kPa]	Kv
52-55179	3820	1.061	13	10.6
52-55184	3931	1.092	13	10.9
52-55189	4049	1.125	13	11.2
52-55194	4199	1.167	13	11.7
52-55200	4399	1.222	13	12.2
52-55206	4640	1.289	14	12.4
52-55213	4951	1.375	14	13.2
52-55220	5310	1.475	14	14.2
52-55227	5700	1.583	14	15.2
52-55235	6209	1.725	14	16.6
52-55243	6511	1.808	14	17.4
52-55251	7081	1.967	14	18.9
52-55260	7901	2.194	15	20.4
52-55269	8900	2.472	16	22.3
52-55279	10,399	2.889	19	23.9
52-55287	11,355	3.154	22	24.2
52-55292	12,491	3.470	23	26.1
52-55298	13,399	3.722	24	27.4
52-55303	14,762	4.100	27	28.4
52-55308	15,999	4.444	29	29.7

ALPHA Cartridge Type 60 · DN50-DN1000				
AISI 304 Frese no. Max. Δp 600 kPa	Flow [l/h]	Flow [l/s]	Min. ΔP [kPa]	Kv
52-66285	17,037	4.733	34	29.2
52-66292	18,148	5.041	34	31.1
52-66301	18,797	5.221	35	31.8
52-66305	19,467	5.408	35	32.9
52-66312	20,464	5.684	35	34.6
52-66319	21,527	5.980	36	35.9
52-66326	22,449	6.236	36	37.4
52-66332	23,482	6.523	36	39.1
52-66338	24,531	6.815	37	40.3
52-66344	25,621	7.117	38	41.6
52-66349	26,528	7.369	38	43.0
52-66356	27,686	7.690	38	44.9
52-66362	29,157	8.099	38	47.3
52-66367	29,954	8.320	39	48.0
52-66373	30,976	8.605	39	49.6
52-66379	32,260	8.961	40	51.0
52-66385	33,565	9.324	40	53.0
52-66391	34,953	9.709	40	55.3
52-66393	36,336	10.093	42	56.1
52-66398	37,685	10.468	43	57.5
52-66400	38,607	10.724	44	58.2
52-66407	40,971	11.381	46	60.4
52-66407H	45,000	12.500	49	64.3

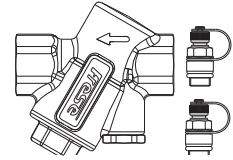
**DYNAMIC FLOW LIMITING VALVES • CARTRIDGE SOLUTION**

**ALPHA DN15-DN50**

**Female/Female with 1" P/T-plugs**

120°C, PN25, DZR

Category	Frese no.	Dimension DN	Cartridge Type
A	49-9001	15	10, 11, 20
A	49-9011	20	10, 11, 20
A	49-9021	25	10, 11, 20
A	49-9031	25L	30, 40
A	49-9041	32	30, 40
A	49-9051	40	30, 40
A	49-9061	50	30, 40

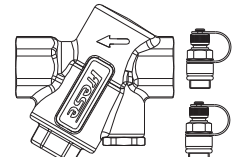


**ALPHA NPT 1/2"-2"**

**Female/Female NPT thread with 1" P/T-plugs**

120°C, PN25, DZR Brass

Category	Frese no.	Dimension DN	Cartridge Type
A	49-8001	1/2"	10, 11, 20
A	49-8011	3/4"	10, 11, 20
A	49-8021	1"	10, 11, 20
A	49-8031	1" L	30, 40
A	49-8041	1 1/4"	30, 40
A	49-8051	1 1/2"	30, 40
A	49-8061	2"	30, 40



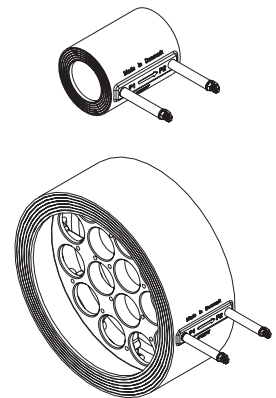
**ALPHA Wafer DN50-DN1000**

**Ductile Iron Valves**

For Flanges with 4" P/T-plugs, 110°C, PN16

Installation of cartridges included. Flow cartridges are selected from cartridge catalogue and ordered under individual numbers

Category	Frese no.	Dimension DN	Cartridges
B	49-9103-01	100	2
B	49-9163-01	125	3
B	49-9113-01	150	4
B	49-9123-01	200	7
B	49-9133-01	250	12
B	49-9143-01	300	15
B	49-9153-01	350	19
B	49-9173-01	400	26
B	49-9183-01	450	33
B	49-9193-01	500	40
B	49-9203-01	600	56
B	49-9213-01	800	85
B	49-9233-01	900	112
B	49-9223-01	1000	136

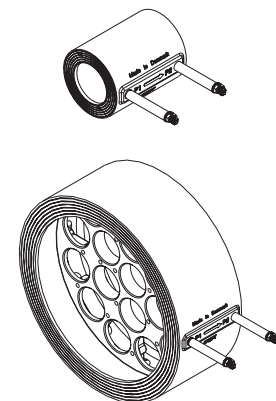


**Ductile Iron Valves**

For Flanges with 4" P/T-plugs, 110°C, PN25

Installation of cartridges included. Flow cartridges are selected from cartridge catalogue and ordered under individual numbers

Category	Frese no.	Dimension DN	Cartridges
B	49-9073-01	50	1
B	49-9083-01	65	1
B	49-9093-01	80	1
B	49-9540-01	100	2
B	49-9541-01	125	3
B	49-9542-01	150	4
B	49-9543-01	200	7
B	49-9544-01	250	12
B	49-9545-01	300	15
B	49-9546-01	350	19
B	49-9547-01	400	26
B	49-9548-01	450	33
B	49-9549-01	500	40
B	49-9550-01	600	56



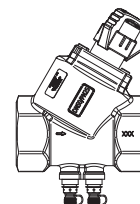
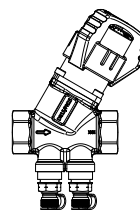


**DYNAMIC FLOW LIMITING VALVES • EXTERNALLY ADJUSTABLE**

**SIGMA Compact DN15-DN50**

**Female/Female with 1" P/T-plugs, 120°C, PN25, DZR**

Category	Frese no.	Dimension DN	Flow range l/h	Pressure range kPa
L	53-2200	15 Low flow	40 - 900	10 - 400
L	53-2201	15 High flow	60 - 1,080	14 - 400
L	53-2202	20 Low flow	86 - 1,550	10 - 400
L	53-2203	20 High flow	102 - 1,930	16 - 400
L	53-2208	25 Low flow	95 - 2,000	10 - 400
L	53-2209	25 High flow	137 - 2,400	14 - 400
L	53-2205	32	200 - 5,000	16 - 400
L	53-2230	40	719 - 7,400	10 - 400
L	53-2231	50	900 - 10,350	10 - 400



**Female/Female with 1" P/T-plugs, 120°C, PN25, Ductile Iron**

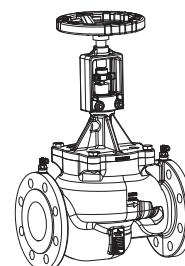
Category	Frese no.	Dimension DN	Flow range l/h	Pressure range kPa
L	53-2206	40	719 - 7,400	10 - 400
L	53-2207	50	900 - 10,350	10 - 400

**SIGMA Compact DN50-DN300**

**Flanged with 1" P/T plugs**

DN50-DN125 120°C (DN150-DN300, 110°C), PN16, GJL-250/GJS-400

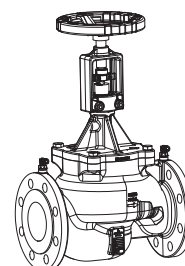
Category	Frese no.	Dimension DN	Flow range l/h
J	53-2400	50 Low flow	2,480 - 15,000
J	53-2410	50 High flow	3,920 - 24,000
J	53-2401	65 Low flow	4,380 - 25,000
J	53-2411	65 High flow	5,950 - 35,000
J	53-2402	80 Low flow	5,340 - 34,000
J	53-2412	80 High flow	7,020 - 43,000
J	53-2403	100 Low flow	12,100 - 68,000
J	53-2413	100 High flow	14,800 - 90,000
J	53-2404	125 Low flow	18,500 - 110,000
J	53-2414	125 High flow	23,000 - 135,000
J	53-2405	150 Low flow	25,600 - 148,000
J	53-2415	150 High flow	32,000 - 195,000
J	53-2406	200 Low flow	95,000 - 210,000
J	53-2416	200 High flow	130,000 - 280,000
J	53-2407	250 Low flow	190,000 - 475,000
J	53-2417	250 High flow	245,000 - 600,000
J	53-2408	300 Low flow	190,000 - 475,000
J	53-2418	300 High flow	245,000 - 600,000



**Flanged with 1" P/T plugs**

DN50-DN125 120°C (DN150-DN300, 110°C), PN25, GJL-250/GJS-400

Category	Frese no.	Dimension DN	Flow range l/h
J	53-2420	50 Low flow	2,480 - 15,000
J	53-2430	50 High flow	3,920 - 24,000
J	53-2421	65 Low flow	4,380 - 25,000
J	53-2431	65 High flow	5,950 - 35,000
J	53-2422	80 Low flow	5,340 - 34,000
J	53-2432	80 High flow	7,020 - 43,000
J	53-2423	100 Low flow	12,100 - 68,000
J	53-2433	100 High flow	14,800 - 90,000
J	53-2424	125 Low flow	18,500 - 110,000
J	53-2434	125 High flow	23,000 - 135,000
J	53-2425	150 Low flow	25,600 - 148,000
J	53-2435	150 High flow	32,000 - 195,000
J	53-2426	200 Low flow	95,000 - 210,000
J	53-2436	200 High flow	130,000 - 280,000
J	53-2427	250 Low flow	190,000 - 475,000
J	53-2437	250 High flow	245,000 - 600,000
J	53-2428	300 Low flow	190,000 - 475,000
J	53-2438	300 High flow	245,000 - 600,000



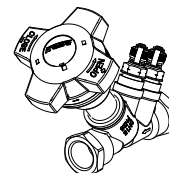
**MANUAL BALANCING VALVES**

**Frese VODRV DN15-DN500**

**Frese VODRV (Variable Orifice Double Regulating Valve)**

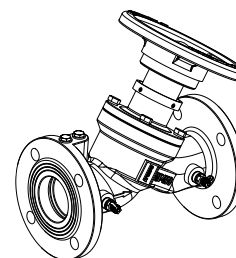
Threaded, PN25, DZR Brass

Category	Frese no.	Dimension DN	Kv
K	53-2560	15	3.5
K	53-2561	20	6.5
K	53-2562	25	10.5
K	53-2563	32	21
K	53-2564	40	26
K	53-2565	50	40



Flanged, PN16, Ductile Iron

Category	Frese no.	Dimension DN	Kv
K	53-2506	65	64.1
K	53-2507	80	85.4
K	53-2508	100	119
K	53-2509	125	203
K	53-2510	150	263
K	53-2511	200	504
K	53-2512	250	912
K	53-2513	300	1,099
K	53-2514	350	2,085
K	53-2515	400	2,189
K	53-2516	450	2,526
K	53-2517	500	3,381



**SENSORS AND INSTRUMENTATION**

**ELCO-100 Electric Local Controller**

**ELCO-100**

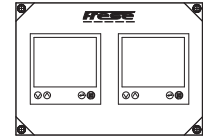
Category	Frese no.	Type
M	58-8958	Electric Local Controller, Marine type approval



**ELCO-100 Cabinets**

Cabinet with ELCO-100 Electric Local Controller

Category	Frese no.	Type	No. of ELCO-100 mounted
M	58-8972	Cabinet with ELCO-100	1
M	58-8974	Cabinet with ELCO-100	2
M	58-8976	Cabinet with ELCO-100	3



**Differential Pressure Transmitter**

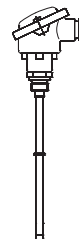
**APR-200ALW Differential Pressure Transmitter**

Category	Frese no.	Type	Measuring set range
	58-8969	APR-200ALW Bar	0-3 Bar
	07-21405	APR Manifold	

**RTD Temperature Sensors**

**RTD Temperature Sensor**

Category	Frese no.	Sensor type	Sensor length [mm]
M	58-8961	PT100	50
M	58-8962	PT100	100
M	58-8963	PT100	150
M	58-8964	PT100	200
M	58-8965	4-20 mA	50
M	58-8966	4-20 mA	100
M	58-8967	4-20 mA	150
M	58-8968	4-20 mA	200

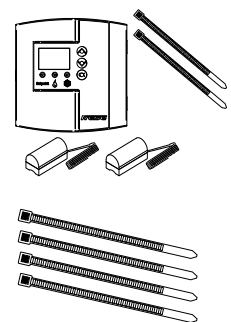


**Frese DELTA T Control System**

**Frese DELTA T Control System**

Including 2 temperature sensors with 2 m cable and 2 cable ties for pipe dimensions up to D

Category	Frese no.	Power Supply	Temperature range
G	48-5548	24V AC/DC, 1.5VA	0°C-110°C



**Cable ties for Frese DELTA T Control System temperature sensors mounting**

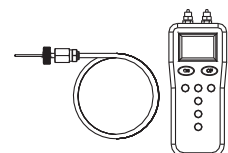
Category	Frese no.	Length	Pcs
G	07-2823	600 mm	4

**Differential Pressure Manometer and Accessories**

**Differential Pressure Manometer Kit**

Including Frese Manometer 2023P

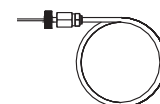
Category	Frese no.	Dimension
D	48-0022	6mm x 1,500mm



**Differential Pressure Hose Kit**

Fits Frese Manometer 2023P

Category	Frese no.	Dimension
C	48-0016	6mm x 1,500mm



## MANUAL BALANCING VALVES

### Material Certificates

#### Material Certificates

Certificates available upon request

Category	Frese no.	Description	For types
M	93251	3.1 Certificate acc. EN 10204	Flanged OPTIMA & SIGMA Compact, All HCR Range valves
M	93252	2.2 Certificate acc. EN 10204	All Frese valves
M	93270*	Certificate on Pressure test acc. to EN12266	All Frese valves

\*Included in 93251 and 93252 for OPTIMA Compact HCR and ALPHA Wafer HCR

### Extra Services

#### Services

Category	Frese no.	Service
D	G3	Cartridges mounted in valve
D	G4	Frese Tagging Service (Per Valve)
D	G5	Cartridge packaging in box
	58-8998	Metal Tag (Wire Mounted)

## General Conditions of Sale and Delivery for products supplied by Frese A/S

(in the following referred to as Frese).

The following General Conditions of Sale and Delivery shall apply to all products supplied by Frese, unless otherwise specified in writing between the parties.

Frese Code of Conduct: The Frese Code of Conduct in force can be found at [www.frese.eu](http://www.frese.eu) and clarifies the standards Frese adheres to and also expect from our suppliers and other collaborators. We expect our suppliers and other collaborators to adhere to our code of conduct or to their own similar code of conduct. The standards in the code of conduct are not intended to conflict with or modify the General Conditions of Sale and Delivery or any other contract with Frese.

Frese assumes no responsibility for errors, if any, in catalogues, brochures, and other printed matter. Frese reserves the right to modify its products without prior notice, including already ordered, if this can occur without changing already stated specifications. All registered trademarks in this material are the property of Frese. All rights reserved.

### 1. Offers

Offers are not binding on Frese unless accepted by the Buyer within the period of validity stipulated in the offer. If no period of validity is stipulated in the offer, the offer is not binding on Frese until the Buyer's order is accepted by Frese by order confirmation. If Frese's order confirmation does not comply with the purchases additions, amendments, or reservations and this is not acceptable to the Buyer, the Buyer is obliged to notify Frese hereof within a week from receiving the order confirmation. Otherwise Frese's order confirmation shall apply.

### 2. Delivery - Passing of Risk

If no trade term is specifically agreed on, delivery shall be Ex Works on the address specified by Frese. Where a trade term has been agreed on, it shall be interpreted in accordance with the INCOTERMS in force at the time of entering into the agreement. The risk for the products shall pass to the Buyer upon delivery.

### 3. Packing

In the absence of another agreement the prices stated in quotation and contract shall include Frese's standard packing.

### 4. Quantity, Weight

Reservation regarding variations of the ordered weight or quantity shall be subject to the previous distinct agreement between the parties.

### 5. Product information

The information given in product specifications such as catalogues, circulars, advertisements and illustrated matter constitutes an approximate guide. These data shall not be binding on Frese save to the extent that they are by reference expressly included in the contract between the parties.

Any drawings, rating instructions, application information and documents the Buyer may receive from Frese either before or after entering into the contract whether the information consists of written documents or in electronic form shall remain the property of Frese. Such information and documents are not without Frese's consent to be used for any other purpose than the application and maintenance of the supplied products and must not be copied, reproduced or handed over to any unauthorised third party or in any other way be brought to the knowledge of any unauthorised third party.

The Buyer has the sole responsibility to ensure that the Buyer's computer equipment has the necessary programmes installed to prevent virus. Frese is not liable if electronic instructions may cause danger to the Buyer's computer programmes.

### 6. Installation and Application Information

The Buyer is under an obligation to follow all instructions and directions, Frese gives concerning the correct application, installation and dimensioning of the products. Furthermore, the Buyer is obliged to pass on any such information to its customers in the same way as it was received.

### 7. Prices

Frese's prices shall appear from Frese's price list currently in force at the time of entering into the contract. Frese reserves its rights to change the prices in case of material changes in the exchange rate of the currency agreed on, or changing prices on raw material or prices from sub-suppliers. Prices quoted as "NET PRICES" are sold Ex Works and exclusive of all taxes, value added tax, duty and levies.

### 8. Terms of Payment

Frese's terms of payment are 30 days net after the date of the invoice unless otherwise agreed in writing.

In case the Buyer does not affect payment in due time and in accordance with the agreement, Frese shall be entitled to claim penalty interest as from the date of maturity at Frese's usual interest rate, which is at present 1.5% per month. The Buyer is not entitled to withhold payment or deduct any counterclaim against Frese as security for any claims that the Buyer may have on Frese.

If the Buyer fails to pay the due amount in due time, Frese shall be entitled by written notice to terminate the agreement and claim penalty interest at Frese's usual interest rate as well as liquidated damages from the Buyer for any loss Frese may have suffered.

A handling fee of Euro/USD 125 will be charged on orders under Euro/USD 700.

### 9. Delivery Time - Delay

The time for delivery is stated by Frese in the offer or the order confirmation to the best of Frese's judgement. If, instead, the parties have agreed on a period of time within which delivery shall take place, such period shall start to run at the time of entering into the contract.

If Frese realizes that Frese will not be able to deliver the products at the agreed delivery time, Frese shall forthwith notify the Buyer thereof stating the reason for the delay and the time when delivery can be expected.

Frese is only responsible for delayed delivery if it has been specifically agreed and if the Buyer has fulfilled its contractual obligations. In no event shall Frese be liable for any special, indirect, consequential, punitive or exemplary damages or losses arising out of any delay irrespective of the cause, including but not limited to loss of profit, loss of production, loss of income, loss of goodwill and loss of data.

### 10. Exemption from Liability in Case of Force Majeure Events

Frese is not responsible for delayed delivery if the delay is caused by any of the circumstances stated in clause 18 in these general conditions of sale and delivery (force majeure). Frese shall immediately notify the Buyer if Frese intends to invoke force majeure as a reason for delayed delivery, and Frese has to inform the Buyer about the reason for the delayed delivery and when delivery can be expected.

Frese as well as the Buyer are entitled to terminate the contract by written notice to the other party without being liable if performance of the contract by any of the said reasons is delayed more than three months after the originally agreed delivery time.

### 11. Retention of Ownership until Payment is Made

The products shall remain the property of Frese until payment

has been made in full.

## 12. Liability for Defects and Limited Product Warranty

The Frese A/S Terms and Conditions for Limited Product Warranty in force at time of purchase of the product shall apply and the remedies in the applying warranty terms shall constitute the only remedies available for Buyer in case of defects and warranty claims. Frese disclaims any other warranties with regard to the sold products.

In no event shall Frese be liable for any special, indirect, consequential, punitive or exemplary damages or losses arising out of any breach of contract, breach of warranty, faulty products, delay in delivery, product liability, failure to warn or recall, or otherwise irrespective of the cause, including but not limited to loss of profit, loss of production, loss of income, loss of goodwill, loss of data.

## 13. Disclaim of Liability

In no event shall Frese be liable for any special, indirect, consequential, punitive or exemplary damages or losses arising out of any breach of contract, breach of warranty, faulty products, delay in delivery, product liability, failure to warn or recall, or otherwise irrespective of the cause, including but not limited to loss of profit, loss of production, loss of income, loss of goodwill, loss of data.

## 14. Notification

In any case of Frese's failing to comply with the contract, the Buyer is obliged to notify Frese in writing immediately without any delay after delivery time has expired or the defect has become apparent or should have become apparent and in no case later than a week hereafter. The notification shall be substantiated.

If the Buyer fails to notify Frese in compliance with the above, the Buyer forfeits his right to make any claim in respect of the defects or the delayed delivery.

## 15. Return of Products

Any return of products is to occur not later than six months after the invoice date, and in each case upon the previous agreement with Frese. Only merchantable products in intact, original packing may be returned with reference to invoice no. or delivery note no.

The return of products shall occur at the Buyer's own risk. Frese reserves the right to charge a handling fee of minimum 30%.

## 16. Product Liability (liability for damage to goods caused by the product)

The Buyer shall indemnify Frese in case Frese is made liable to any third party for any such damage or any such loss caused by the sold products, for which Frese is not liable to the Buyer.

In no event shall Frese be liable for any special, indirect, consequential, punitive or exemplary damages or losses arising out of any product liability, failure to warn or recall irrespective of the cause, including but not limited to loss of profit, loss of production, loss of income, loss of goodwill, loss of data. If any third party makes a claim for damages from either party under this clause, then this party shall immediately inform the other party hereof.

Frese and the Buyer shall be mutually liable to be sued in any law-court or court of arbitration that may be trying a claim for damages against any of the parties due to any defect or loss allegedly caused by the supplied products. Still, the mutual relations between the Buyer and Frese must at all times be settled by the Maritime and Commercial Court in Copenhagen in accordance with clause 19.

## 17. Marketing

The Customer agrees to the use of their company name,

and reference to the products and/or solutions purchased, in Frese Marketing material. The Customer also agrees to receive various Frese Marketing material from time to time, including newsletters and mail shots, etc... unless the Customer specifically declines this in writing.

## 18. Exemption from Liability (force majeure)

The following circumstances shall result in exemption from liability in case they prevent the performance of the contract or make the performance unreasonably onerous:

Labour dispute or any other circumstance beyond the control of the parties, e.g. fire, war, mobilization, or substantial military call-ups, requisitions, confiscations, exchange restrictions, riots and unrest, lack of transportation equipment, general shortage of goods, fuel restrictions, and defective or delayed supplies from sub-suppliers due to any of the circumstances mentioned in this clause.

The said circumstances shall only result in exemption if their influence on the performance of the contract was unforeseeable on the commencement date of the contract.

Either party who may want to exempt from liability for any circumstance mentioned in clause 18 must immediately inform the other party in writing, about the occurrence and conclusion of any such circumstance.

In case the exemption from liability does not expire within three months, either party shall have the right to give the other party written notice to cancel the contract.

## 19. Disputes - Applicable Law - Venue

Disputes regarding the contract or any circumstances connected herewith shall be governed by Danish law and the venue for legal action for the parties shall be the Maritime and Commercial Court in Copenhagen.

Any legal dispute that may arise under this contract shall be settled in accordance with the laws of Denmark.

**Frese A/S  
Sorøvej 8  
4200 Slagelse  
Denmark**

**Phone: +45 58 56 00 00  
E-mail: info@frese.dk**

## Frese A/S Terms and Conditions for Limited Product Warranty

(Frese A/S in the following referred to as Frese).

### 1. Frese Branded Products

**For OPTIMA Compact pressure independent control valves, SIGMA Compact and ALPHA dynamic flow limiting valves, PV Compact differential pressure control valves, and MODULA bypass units, the following terms apply:**

Frese warrants that the products will be free from defects in material and workmanship under normal use for a period of 36 months commencing from the date of purchase. Hereinafter referred to as the "Warranty Period".

In the event that the customer in writing can prove a later date of installation than the date of purchase, the 36 months Warranty Period will commence from such later date of installation.

The Warranty Period will always end at the latest 5 years from the date of purchase regardless of commence date.

Date of installation shall mean the date where the product has been installed in a pipe system or fitted together with another product first time regardless of when operation of the system starts.

**For Frese branded actuators, the following terms apply:**

Frese warrants that the products will to be free from defects in material and workmanship under normal use for a period of 36 months commencing from the date of purchase.

**For all other Frese Branded products, the following terms apply:**

Frese warrants that the products will to be free from defects in material and workmanship under normal use for a period of 24 months commencing from the date of purchase.

### 2. Non-Frese Branded Products

For non-Frese branded products sold by Frese, Frese refers to the warranty terms applying from the producers of such products and devices. Please contact Frese for further information on warranty terms applying to such products and devices.

### 3. Warranty Claims

In the event of defects covered by this limited warranty, Frese shall in writing be informed of such alleged defects, together with the customers documentation for normal use and operation of the defective product in accordance with the technical documentation and specifications for the product and information regarding the problem encountered within 30 days from the customer or user discovering the alleged defect. Proof of purchase date or proof of installation date if a later commencement date for the Warranty Period is claimed, shall be submitted together with the warranty claim. The defective product shall upon request from Frese be sent to Frese or to any other address designated by Frese with freight paid by the sender. Any warranty claim received by Frese without proper documentation or received after end of the Warranty Period will be rejected.

If Frese accepts that alleged defect is covered under this warranty and the claim has been filed within the Warranty Period, Frese will at its sole discretion replace, repair free of charge, or credit such defective product. If the product is replaced or repaired by Frese, Frese will at its own cost send the new or repaired product to the buyer or user and Frese will reimburse freight costs incurred in sending defective products to Frese.

Repaired or replaced products will be warranted hereunder for the remaining portion of the Warranty Period for the original product plus 2 months.

If the returned product is not defective as covered under this limited warranty, Frese may return the product at buyer or users cost and risk, and may charge a fee for the time and materials used in examining the returned product.

### 4. Limitations on and Exceptions from Warranty

This limited warranty does not extend to any product that has been damaged or rendered defective as a result of (a) modification, repair, alteration or improper installation, (b) unreasonable or improper use or storage, use beyond or outside rated conditions or specifications, operation outside Frese's instructions, or being otherwise subjected to improper maintenance, negligence or accidents including acts of nature (c) because of any use of the product after user has, or should have, knowledge of any defect in the Product.

A buyer is immediately upon delivery obliged to examine the products for defects. If a product is found to be defect, the buyer shall immediately notify Frese in writing. If the Buyer fails to do so, the buyer or any other user of such product shall not at a later date be entitled to complain about defects that were or would have been ascertained by such an examination. Replacement, repair free of charge or credit of the defective product upon Frese's sole discretion shall constitute the sole and only remedy for the customer under this warranty.

Frese's warranty liability shall not exceed the original purchase price of the defective product. In no event shall Frese be liable for any special, indirect, consequential, punitive or exemplary damages or losses arising out of any defects, breach of warranty or faulty products irrespective of the cause or reason for such liability, including but not limited to loss of profit, loss of production, loss of income, loss of goodwill, loss of data.

**The limited warranty provided by Frese is exclusive and in lieu of all other warranties, express or implied including warranties of merchantability and fitness for a particular purpose, whether pertaining to the Product and whether arising by law, custom, conduct, usage or trade. The aforementioned shall not apply to the extent warranty cannot be excluded under applicable law.**

**Frese A/S  
Sorøvej 8  
4200 Slagelse  
Denmark**

**Phone: +45 58 56 00 00  
E-mail: info@frese.dk**



[www.frese.eu/marine](http://www.frese.eu/marine)



[marine@frese.dk](mailto:marine@frese.dk)



+45 58 56 00 00