

TECHNICAL SUBMITTAL SHEET

Project Name:	Digital Realty – LHR19		
Project No:	GB7102	Rev:	00
Tech Sub Ref:	GB7102-GBL-M-TS-0001		
Issued to:	Deems Consulting and DRT	Issue date:	06/03/2019
		Approval date:	12/03/2019
Description of equipment:	<u>Plate Heater Exchanger:</u> - PHE 2 in total - CIP – Clean in Place unit 1 total - Auto Purge filters Alf-30-B 2 in total		
Locations where equipment is to be used:	Dock Water Cooling Plant Room		
Manufacturer / Supplier:	Alfa Laval		
Specification clause references and deviations:	- LHR19 Building Services Specification - B01 Mechanical Services Project Particulars - LHR19 Building Services Specification - T61 Primary, Secondary Cooling Distribution - LHR19 Building Services Specification - Z03 Schedule of auto purge filters Z04 Schedule of clean in place (CIP) systems - LHR19 Building Services Specification - Z03 Schedule of auto purge filters - LHR19 Building Services Specification - Z13 Schedule of plate heat exchanger		
Drawing details:	- DE-SC-DRG-M-104_T01 - DE-BA-DRG-M-400_T01		
Enclosures / samples attached:	N/A		

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Project Name:	Digital Realty – LHR19		
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Additional information:			
APPROVALS			
Company	Date	Status (A-B-C)	Comments
MAIN CONTRACTOR:		Gratte Brothers	

TECHNICAL SUBMITTAL SHEET

Project Name:	Digital Realty – LHR19		
Project No:	GB7102	Rev:	00
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STATUS A-B-C	COMMENTS		
Signature:		Date:	
* The equipment described within this Technical Submittal is ROHS compliant			

Cas 2000-5.69
 /19/07/2018/09:17:45PM
 PPL PHE EUR 18.1
 Lund OM-SEI 18.1
 Application: AHRI LLHE PHE 1.2
 Automatic 1-Phase



Alfa Laval Plate Heat Exchanger Specification

Model : AQ8-FG

Item : PHX Opt 1-Shorter frame

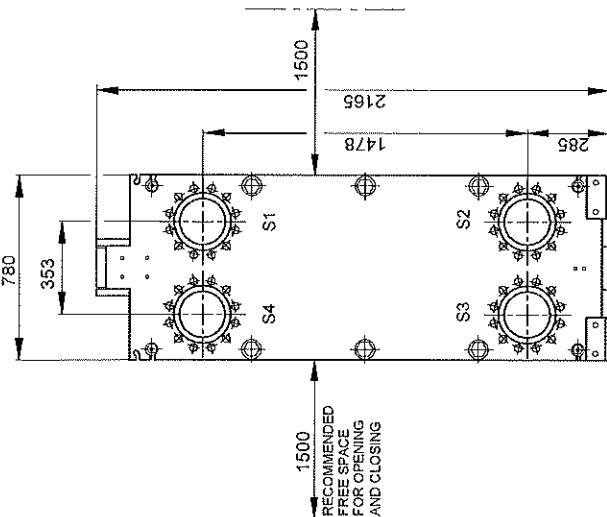
Date : 19/07/2018

Specification of 1 exchanger out of 4 connected in parallel

		<u>Hot side</u>	<u>Cold side</u>
Fluid		Water	Water
Density	kg/m ³	996.0	996.3
Specific heat capacity	kJ/(kg*K)	4.19	4.19
Thermal conductivity	W/(m*K)	0.610	0.609
Viscosity inlet	cP	0.836	0.983
Viscosity outlet	cP	0.960	0.855
Mass flow rate	kg/s	99.53	99.51
Inlet temperature	°C	28.0	21.0
Outlet temperature	°C	22.0	27.0
Pressure drop	kPa	98.8	99.1
Effective fouling resistance * 10000	m ² *K/W	0.0022	
Effective duty margin	%	0.1	
Heat Exchanged	kW	2500	
L.M.T.D.	K	1.0	
Heat transfer coefficient	W/(m ² *K)	6567	
Heat transfer area	m ²	380.7	
Relative directions of fluids		Countercurrent	
Number of plates		425	
Plate material and thickness		Ti 0.50 mm	
Gasket material and attachment		NBRB Clip-on	
Channel arrangements		1* (162H+50ML)	1* (162H+50MH)
Connections	mm	200	200
Number of passes		1	1
Design pressure	bar	10.0	10.0
Design temperature	°C	60.0	60.0
Overall length x width x height	mm	2400 x 780 x 2165	
Net weight, empty / operating	kg	2660 / 3450	
Nominal A-dimension	mm	1033.0	

This Heat Exchanger is certified by the AHRI Liquid to Liquid Heat Exchangers Certification Program, based on AHRI Standard 400. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahrirectory.org.

FRAME PLATE (FIXED)



REMARKS:

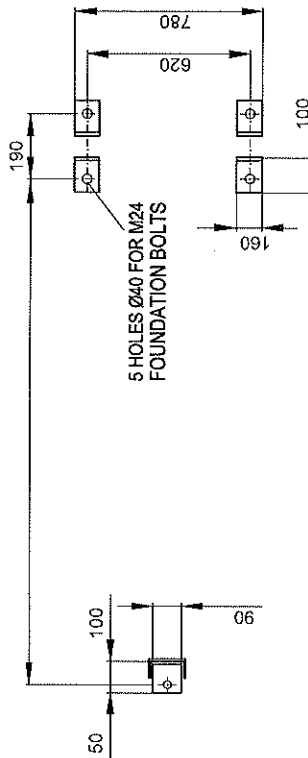
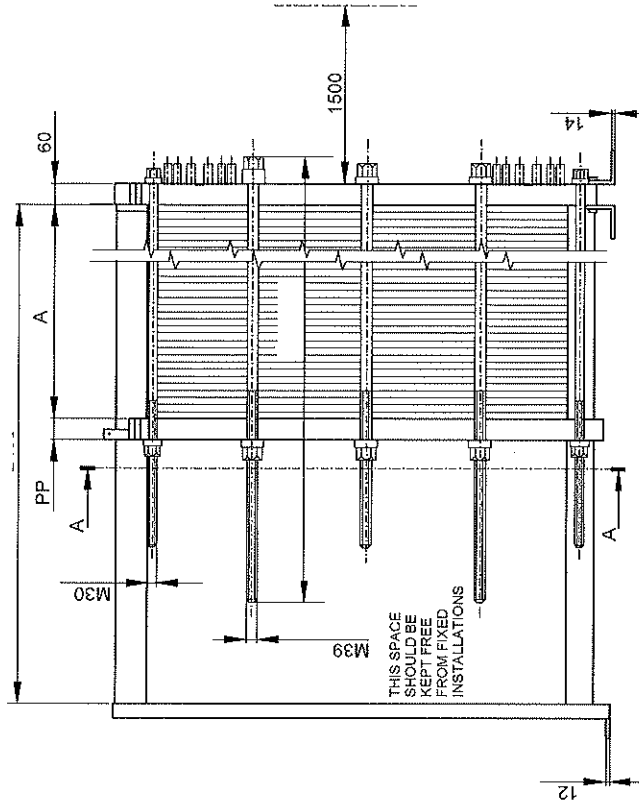
	SIDE 1	SIDE 2
TEST PRESSURE	14.3 bar	14.3 bar
DESIGN PRESSURE	10 bar	10 bar
MAX TEMPERATURE	60 °C	60 °C
MIN TEMPERATURE	0 °C	0 °C

GASKET
PLATE MATERIAL
PLATE THICKNESS

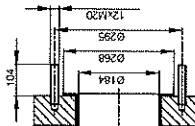
NBRB Clip-on
TI
0.50 mm

HEAT LOAD 2500 kW

PRESSURE PLATE (MOVABLE) SECTION A-A PP = 60



EN 1092-1 DN200 PN16
SHEET LINING
S5
S1, S2, S3, S4



TOTAL LENGTH 2400
TOTAL WIDTH 780
TOTAL HEIGHT 2165

Do not use this drawing for foundation bolting or piping layout.

ALL DIMENSIONS IN MILLIMETERS

SIDE	MEDIA	F.D.G.	INLET	TEMP.	OUTLET	TEMP.	FLOW RATE	PRESSURE DROP
1	Water	2	S1	28.0 °C	S2	22.0 °C	99.53 kg/s	98.82 kPa
2	Water	2	S3	21.0 °C	S4	27.0 °C	99.51 kg/s	99.08 kPa

SUPPLIER	REF.	ITEM NO.
AGENT / REF.		PHX Opt 1-Shorter frame
CUSTOMER NAME / REF. NO.		Deerns UK Ltd
SIGN.		RISK CATEGORY 0

PLATE HEAT EXCHANGER

AQ8-FG

PED

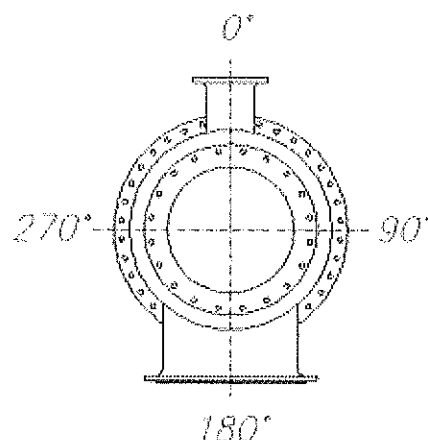
Telety City Canary Wharf GBCASCG-2846(b)	
DATE 2018-07-19	REV NO. 0

Filter



Specification ALF 30-R

Flow per Filter	720	m³/h
Number of Filters	1	pcs
Working Pressure	1	bar(g)
Working Temperature	50	°C
Filter Type	ALF 30-R	
Minimum Flow rate	400	m³/h
Maximum Flow rate	1240	m³/h
Flushing Flow rate	220	m³/h
Flushing Velocity	7.88	m/s
Minimum Temperature	0	°C
Maximum Temperature	65	°C
Minimum Pressure	0	bar(g)
Maximum Pressure	10	bar(g)



Pressure Drop	0.101	bar	Seen from Main Inlet
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Components

Quantity	Part Number	Description
1	9639102942	Filter Body EN design with DIN flanges
1	9639103203	Connections for pressure transducers (2 pcs) for EN/DIN Filter Body (R)
1	9639103274	Surface treatment: Indoor
1	9639103079	Top coating colour: Alfa Laval Blue
1	9639103032	Installation: Horizontal Support feet for horizontal installation Orientation main outlet: 180° (not same position as Flushing Outlet) Orientation flushing outlet: 0° (not same position as Main Outlet) Orientation diverter valve actuator: 0°
1	9639102816	Filter Basket ø1,5 Δ 2,33mm - EN 3.7025 (Titanium)
1	9639103001	Guide ring - EN 3.7025 (Titanium)
1	9680224871	Diverter Valve Kit - Shaft + Disc - EN 3.7035/Ti-Gr.2
1	9680201055	Flushing Valve - Value Valve DN100 - AISI 316/EPDM
1	9680200957	Actuator Color Sky ULLI 10-S (230V)
1	9680200958	Actuator Color Sky ULLI 25-S (230V)
2	9680204100	Pressure transducer 4-20mA, Endress + Hausers, Cerabar M PMC51
1	61299842-00	ALF Basic Control Panel 5001 (Electrical actuators)
1	9639103268	Wooden case - KD5630 approved material (seaworthy packing)

Note!

For delivery time of critical long lead items,
Please contact your Filter order handler
(ex. Titanium internal parts, JIS, WW basket,
EExd parts & parts acc to separate quote)

Technical Specification

9639102942 - Filter Body EN design with DIN flanges

Connection flushing outlet	DN100 / 4"
Connection main inlet/outlet	DN300 / 12"
Connection type	Flanges DIN2501, PN10
Material bearing house	EN 1.4547 / ASTM S31254 stainless steel (254 SMO)
Material body	Carbon steel, P265GH / ASTM A516 Gr60
Material body lining	Natural rubber 55 Shore A, min. 3mm
Material bolts & nuts	8.8 fzb (galvanized)
Material end cover	Carbon steel, P265GH / ASTM A516 Gr60
Material end cover gaskets	PTFE (teflon)
Material end cover lining	Natural rubber 55 Shore A, min. 3mm
Material flanges	C22.8
Max. differential flushing pressure	3,0bar(g) / 44 psi
Min. differential flushing pressure	0,3bar(g) / 4 psi
Net Weight	Approx. 325 kg
Pressure vessel design code	EN 13445
Test pressure	1,43 x design pressure
Volume	Approx. 0,265 m3

9639103203 - Connections for pressure transducers (2 pcs) for EN/DIN Filter Body (R)

Connection type	Flange DN25 / 1" + G3/4" female
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9639103274 - Surface treatment: Indoor

Surface treatment standard	ISO 12944-5, C2 high
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9639103079 - Top coating colour: Alfa Laval Blue

Alfa Laval product colour	NCS 3560-R75B (RAL 5002)
Touch up paint	included in shipment
Touch up paint brush	Included in shipment

9639103032 - Support feet for horizontal installation

No additional information available

9639102816 - Filter Basket $\varnothing$ 1,5 Δ 2,33mm - EN 3.7025 (Titanium)

Hole diameter / pitch	$\varnothing$ 1,5 / 2,33mm (triangular pitch, hole distance)
Material filter basket	EN 3.7025 / ASTM B265 Gr.1 (titanium)
Material hose clamp	EN 3.7025 / ASTM B265 Gr.1 (titanium)
Material rubber profile	EPDM 70 Shore A
Open area	40%
Plate thickness	1,5 mm

9639103001 - Guide ring - EN 3.7025 (Titanium)

Material guide ring	EN 3.7025 / ASTM B265 Gr.1 (titanium)
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9680224871 - Diverter Valve Kit - Shaft + Disc - EN 3.7035/Ti-Gr.2

Material Diverter bolts & nuts	Titanium
Material Diverter Disc	EN 3.7035 / Ti-Gr.2
Material Diverter Shaft	EN 3.7035 / Ti-Gr.2

9680201055 - Flushing Valve - Valve DN100 - AISI 316/EPDM

Flushing Valve Model	Value Valve 3530
Connection Type	Wafer - F07 / Square 11
Material Body	GG-25
Material Seat	EPDM
Material Disc/Ball	AISI 316

9680200957 - Actuator Color Sky ULLI 10-S (230V)

Actuator Model	Color Sky 10-S
Material Body	Aluminium
Power Supply	AC220-240V, 50/60Hz
Protection Class	IP 68
Operation Time	30 Sec.

9680200958 - Actuator Color Sky ULLI 25-S (230V)

Actuator Model	Color Sky ULLI 25-S
Material Body	Aluminium
Power Supply	AC220-240V, 50/60Hz
Protection Class	IP 68
Operation Time	30 Sec.

9680204100 - Pressure transducer 4-20mA, Endress + Hausers, Cerabar M PMC51

Product code	PMC51-AA12QA1SDJGMJJ
Electrical Connection	Gland M20, IP66/68 NEMA4X/6P
Material body	Stainless Steel
Material membrane	Ceraphire
Measuring range	-1.0 to +16.0 bar, 4 - 20mA
Pressure Transducer model	Cerabar M PMC51
Protection class	IP66

61299842-00 - ALF Basic Control Panel 5001 (Electrical actuators)

Components standard	CE+UL approved, for Electrical operated actuators
Control voltage / Signal voltage	24V DC
Dimensions	Height x Width x Depth: 500 x 400 x 200mm
Max. supply current	16A (Ik: 10kA)
Operating voltage	110-240 VAC, 50-60Hz
Panel enclosure model	AES 504020
Panel material	Carbon steel
PLC model	B&R BB22
Protection class	IP65 (NEMA 4)
Status display	4 line display
Surface treatment	Powder painting, Grey, RAL 7035
Weight	Max 15kg
Junction box	(for long distance between filter and control panel)
Zeener barrier box	,
Relay control panel	,

9639103268 - Wooden case - KD5630 approved material (seaworthy packing)

Dimensions Alt. 1	Length x Width x Height: 1800 x 1000 x 1400 mm
Dimensions Alt.2	Length x Width x Height: 1800 x 1400 x 1000 mm
Material casing	Wood



CIP Module Data Sheet

Module Type : CIP 800L

Machine No.: 5810XXX

Date of issue: 2013-08-08

Specification number: 969953-00

Process liquid: Chemical Cleaning Agent

Power supply: 3 Phase / 380-415VAC / 50Hz

Application: Cleaning in place of Heat Exchangers

Tank & Trolleys

Material of construction:	AISI 304
Tank Capacity	800L

Pump

Type:	Centrifugal
Capacity	41.2 M ³ /hr
Motor KW	5.5
Wetted parts material	SS316

Hoses

Hose Type	Chemical hoses Inner layer black UPE with outer Green smooth layer EPDM
Hose lengths/QTY	4 meters/2Pcs
End connection	SMS Union

Valves

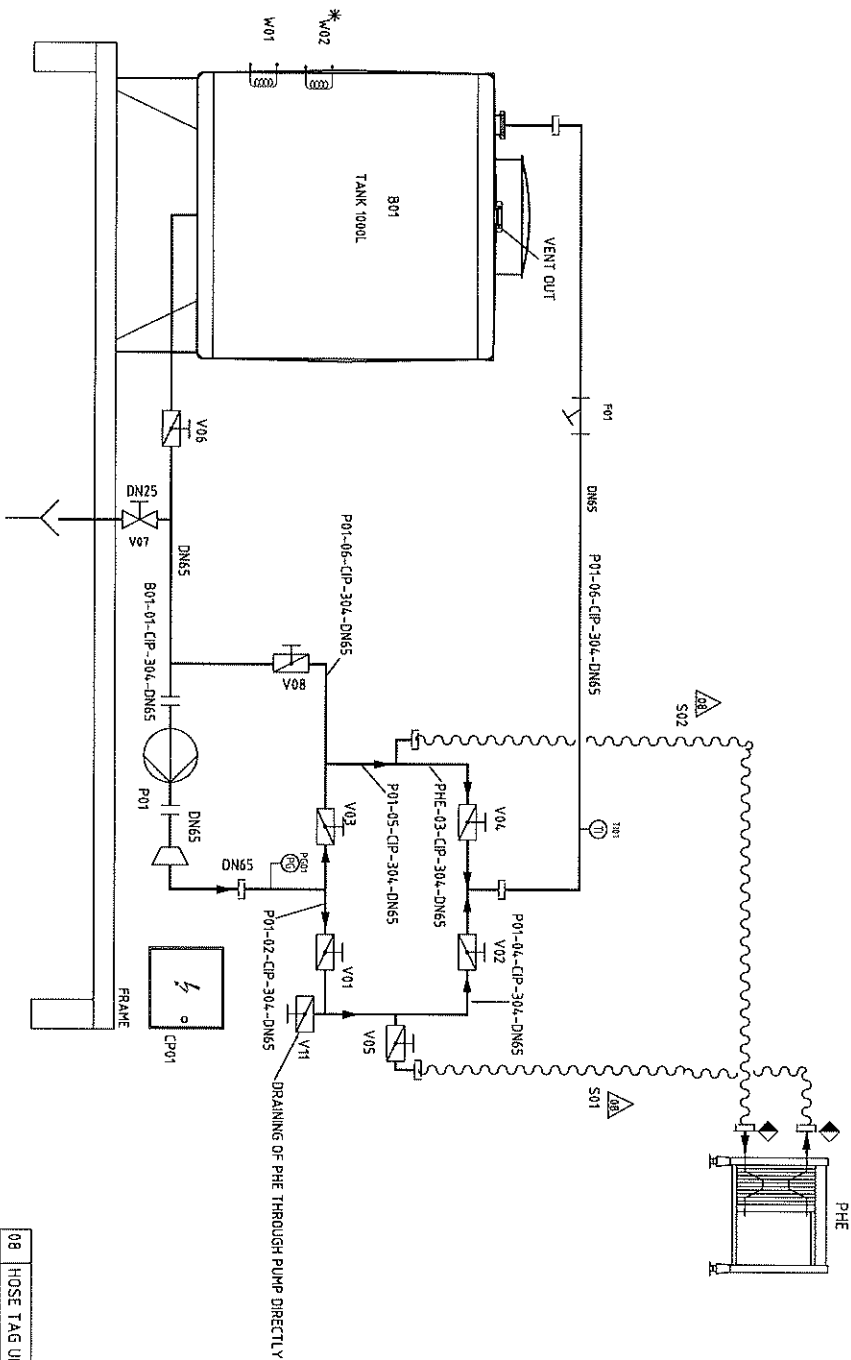
Material	AISI 304
Type	Butterfly Valves Manual Operation

Heater

Type:	Immersion heater
kW	12 kW Each
Number of heaters	One

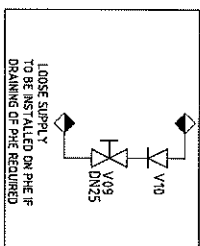
Control Panel

Pump & Heater Control Panel – Drawing no.	96815467_53
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LINE TAG:
X00 -00-VC-S5-XXX

PIPE SIZE
PIPE MATERIAL
MEDIA
SEQUENCE NUMBER
EQUIPMENT TAG / UTILITY PIPING NUMBER



* OPTIONAL
W02 - APPLICABLE FOR CIP PARTNUMBER
96995310 & 96995311

	BUTTERFLY VALVE
	FLEXIBLE CONNECTION WITH SMS
	CENTRIFUGAL PUMP
	SCOPE OF SUPPLY
	HEATER
	TANK
	PUMP
	VALVE
	BALL VALVE
	CONTROL PANEL
	STRAINER
	FLANGES
	SMS UNION
	REDUCER
	HOSES
	PHE PLATE HEAT EXCHANGER
	CHECK VALVE
	TEMPERATURE INDICATOR
	PRESSURE GAUGE

08	HOSE TAG UPDATED	31/03/2017	INP/YSK	INP/YSK
07	CHECK VALVE POSITION UPDATED	01/07/2016	INP/YSK	INP/YSK
06	HOSE TAG NUMBER UPDATED	26/04/2016	INP/YSK	INP/YSK
05	VALVE ADDED	03/03/2016	INP/YSK	INP/YSK
04	TI & PG ADDED	26/02/2015	INP/YSK	INP/YSK
03	PIPING UPDATED, LOOSE SUPPLY PIPE & VALVE ADDED	16/02/2015	INP/YSK	INP/YSK
Rev	Revision text	Date	Drawn	Checked
No				Appr.

[Signature]

P&ID DIAGRAM
FOR CIP 800L

Location	Proj. No	Proj. Type	Proj. Name
Alfa Laval Copenhagen A/S		CP	
Date	Drawn	Scale	Dimensions without tolerances:
12.07.2012	INP/YSK	1:1	ISO 15920-B, ISO 2768-M
		Sheet	Drawing No
		01	6129965108



Alfa Laval CIP 800L

Stainless steel Cleaning in Place unit for heat exchangers



A problem frequently encountered in almost all applications is the build-up of deposits on heat transfer surfaces. Alfa Laval supplies a wide range of cleaning agents suitable for removing most of these troublesome deposits and restoring performance to optimal levels. The time-consuming work of opening plate heat exchangers can thus often be avoided by using an Alfa Laval Cleaning in Place (CIP) unit. These are available in a wide range of standard sizes that include reversible flow capability. Alfa Laval CIP units can be used for all types of heat exchangers, including spiral heat exchangers, shell-and-tube heat exchangers and gasketed, welded and brazed plate heat exchangers.

Concept

Alfa Laval CIP units are simplicity itself:

- Connect the Alfa Laval CIP unit to the heat exchanger
- Mix the cleaning agent with water in the tank and heat it up
- Circulate the cleaning solution a couple of hours
- Drain and rinse
- Disconnect the CIP unit
- The heat exchanger is back to full performance capacity

Alfa Laval CIP units are a cost-effective way to achieve better performance, and the cleaning agents used are, of course, environmentally friendly.

In addition to boosting the performance of all kinds of heat exchangers, Alfa Laval cleaning agents extend the operating time between cleaning cycles as well as prolonging the overall lifetime of the heat exchangers, without damaging the plates or gaskets.

Features and benefits

- Connected directly to inlet and outlet. This avoids any need to open the heat exchanger, which in turn minimizes downtime and prolongs the working life of the gasket.
- Wetted parts in the operating unit, as well as the pump and valves, are made of AISI 304 or AISI 316 stainless steel to ensure maximum working life.
- Rapid cleaning at optimal temperatures, due to built-in electric heaters.
- Valve arrangement for reversible flow direction. This makes it possible to remove the solid particles rapidly, and is easy to operate without needing to rearrange the connection hoses.

Technical specifications

Alfa Laval CIP 800L	
Circulation pump	Centrifugal sanitary
Pump capacity max. at 30 m head	40 m³/h
Voltage	380–420V/3-phase/50 Hz 440–480V/3-phase/60 Hz
Pump motor size (50/60Hz)	5.5/5.5 kW
Total heating power	12 kW alt. 24 kW
Heating time in tank, approx.	12 kW/4 h alt. 24 kW/2 h
Max. operating temperature	85°C (185°F)
Volume	800 litres (212 US gallons)
Weight empty module	300 kg
Size module (H x W x L)	1735 x 2160 x 1260 mm
Number of hoses	2
Hose length	4 m
Hose material inside/outside	UPE/EPDM
Connection standard	DIN 11851/DN 65
Material for wetted parts	Stainless steel AISI 304/316
Pump gaskets	EPDM
Pump seal	C/SiC
Hose connection gaskets	EPDM
Eexd (explosion-proof)	On request

Optionals

Item no	
96994900-05	Welding piece for CIP connection to PHE pipe $\geq$ DN65
96995310-14	Spanner DN 65 DIN union
96995310-16	Adapter DN 65/BSP 2 1/2"
96995310-17	Isolation valve at PHE pipe connection DN65 butterfly valve AISI 304
96995310-18	Manometer 0–10 bar
96995310-19	Thermometer 0–200°C
96995310-20	Hose DN65, 6 m

How to contact Alfa Laval

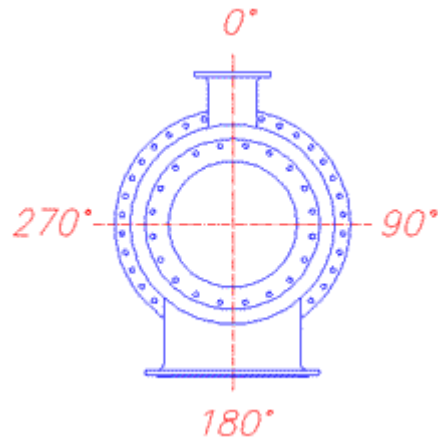
Up-to-date Alfa Laval contact details
for all countries are always available on
our website at www.alfalaval.com

Filter



Specification ALF 30-B

Flow per Filter	720	m ³ /h
Number of Filters	2	pcs
Working Pressure	1	bar(g)
Working Temperature	50	°C
Filter Type	ALF 30-B	
Minimum Flow rate	400	m ³ /h
Maximum Flow rate	1240	m ³ /h
Flushing Flow rate	220	m ³ /h
Flushing Velocity	7.88	m/s
Minimum Temperature	0	°C
Maximum Temperature	65	°C
Minimum Pressure	0	bar(g)
Maximum Pressure	10	bar(g)



Pressure Drop	0.101	bar	Seen from Main Inlet
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Components

Quantity	Part Number	Description
2	9680218452	Filter Body EN design with EN flanges
2	9639102817	Filter Basket $\varnothing 1,5 \Delta 2,33\text{mm}$ - EN 1.4547 (SMO)
2	9680201055	Flushing Valve - Value Valve DN100 - AISI 316/EPDM
2	9680200957	Actuator Color Sky ULLI 10-S (230V)
2	9680200979	Actuator Color Sky ULLI 10-S (230V)
2	61299842-00	ALF Basic Control Panel 5001 (Electrical actuators)
2	100000030602	ALF 2Touch - A4 Analog in card
2	9639103268	Wooden case - KD5630 approved material (seaworthy packing)

Note!

For delivery time of critical long lead items,
Please contact your Filter order handler
(ex. Titanium internal parts, JIS, WW basket,
EExd parts & parts acc to separate quote)

Technical Specification

9680218452 - Filter Body EN design with EN flanges

Connection flushing outlet	DN100
Connection main inlet/outlet	DN300
Connection type	Flanges DN 1092-1, PN10
Material bearing house	En 1.4547 / ASTM S31254 stainless steel (254 SMO)
Material body	Carbon steel, P355GH / ASTM A516 Gr70
Material body lining	Natural rubber 55 Shore A, min. 2,5mm
Material bolts & nuts	8.8 fzb (galvanized)
Material end cover	Carbon steel, P265GH / ASTM A516 Gr60
Material end cover gaskets	EPDM
Material end cover lining	Natural rubber 55 shore A, min. 2,5mm
Material flanges	P265GH
Max. differential flushing pressure	3,0bar(g) / 44 psi
Min. differential flushing pressure	0,3 bar(g) / 4 psi
Net Weight	Approx. 255,5 kg
Pressure vessel design code	EN 13445
Test pressure	1,43 x design pressure
Volume	Approx. 0,265 m3
-	-
Surface treatment	Outdoor ISO 12944-5, C5 high
Top coating colour	NCS 3560-R75B (RAL 5002)
Touch up paint	included in shipment
Touch up paint brush	included in shipment
-	-
Horizontal Installation	Standard
Connections for pressure transducers	1/2"
-	-
Pressure transducers	PMC51-AA12QA1SDJGMJJ
Electrical Connection	Gland M20, IP 66/68 NEMA 4X/6P
Material body	Stainless Steel
Material membrane	Ceraphire
Measuring range	-1.0 to + 16.0 bar, 4 - 20 mA
Pressure Transducer model	Cerabar M PMC51
Protection class	IP66
-	-
Orientation main Outlet	180 degree
Orientation Flushing Outlet	0 degree
Orientation Diverter Valve Actuator	0 degree

9639102817 - Filter Basket ø1,5 Δ 2,33mm - EN 1.4547 (SMO)

Hole diameter / pitch	Ø1,5 / 2,33mm (triangular pitch, hole distance)
Material filter basket	EN 1.4547 / ASTM S31254 stainless steel (254 SMO)
Material hose clamp	EN 1.4547 / ASTM S31254 stainless steel (254 SMO)
Material rubber profile	EPDM 70 Shore A
Open area	40%
Plate thickness	1,5 mm

xxxxxxx004 - Flushing valve

No additional information available

9680201055 - Flushing Valve - Value Valve DN100 - AISI 316/EPDM

Flushing Valve Model	Value Valve 3530
Connection Type	Wafer - F07 / Square 11
Material Body	GG-25
Material Seat	EPDM
Material Disc/Ball	AISI 316

9680200957 - Actuator Color Sky ULLI 10-S (230V)

Actuator Model	Color Sky 10-S
Material Body	Aluminium
Power Supply	AC220-240V, 50/60Hz
Protection Class	IP 68
Operation Time	30 Sec.

9680200979 - Actuator Color Sky ULLI 10-S (230V)

Actuator Model	Color Sky ULLI 10-S
Material Body	Aluminium
Power Supply	AC220-240V, 50/60Hz
Protection Class	IP 68
Operation Time	30 Sec.

61299842-00 - ALF Basic Control Panel 5001 (Electrical actuators)

Components standard	CE+UL approved, for Electrical operated actuators
Control voltage / Signal voltage	24V DC
Dimensions	Height x Width x Depth: 500 x 400 x 200mm
Max. supply current	16A (Ik: 10kA)
Operating voltage	110-240 VAC, 50-60Hz
Panel enclosure model	AES 504020
Panel material	Carbon steel
PLC model	B&R BB22
Protection class	IP65 (NEMA 4)
Status display	4 line display
Surface treatment	Powder painting, Grey, RAL 7035
Weight	Max 15kg
Junction box	(for long distance between filter and control panel)
Zeener barrier box	,
Relay control panel	,

100000030602 - ALF 2Touch - A4 Analog in card

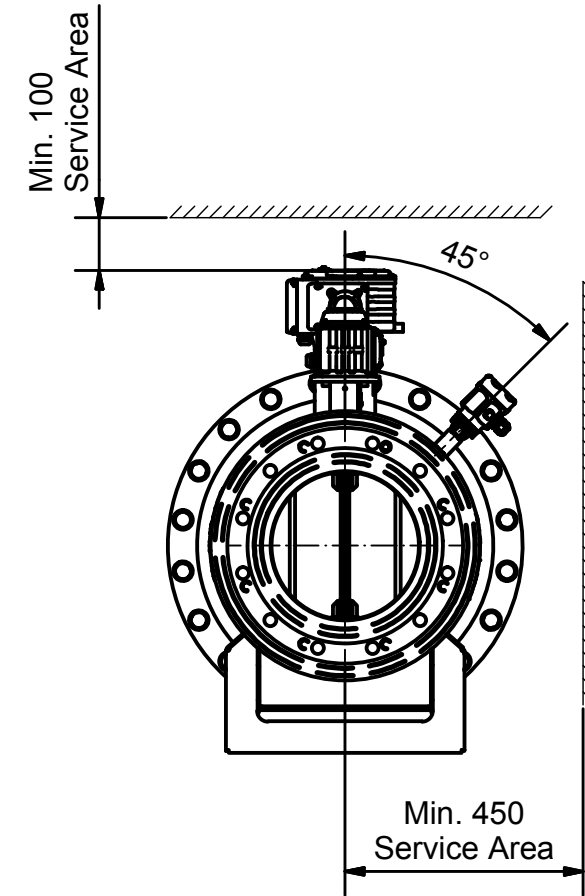
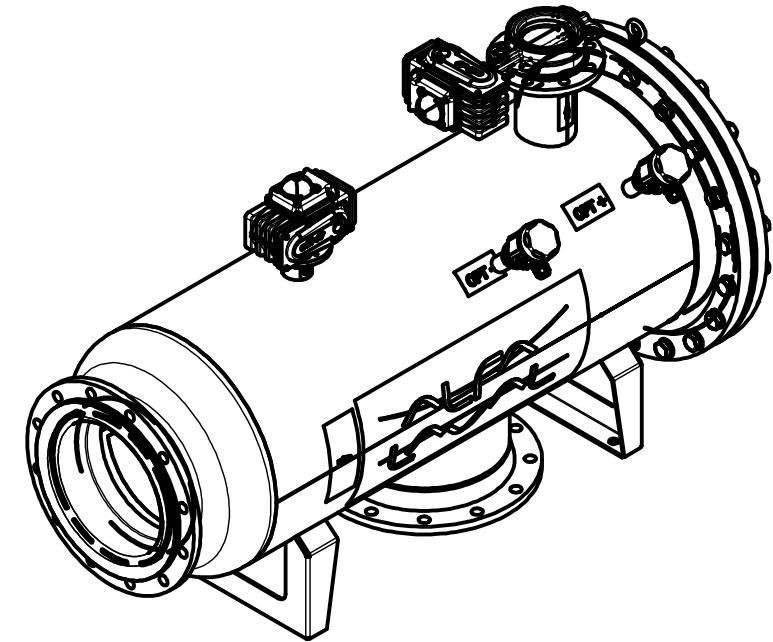
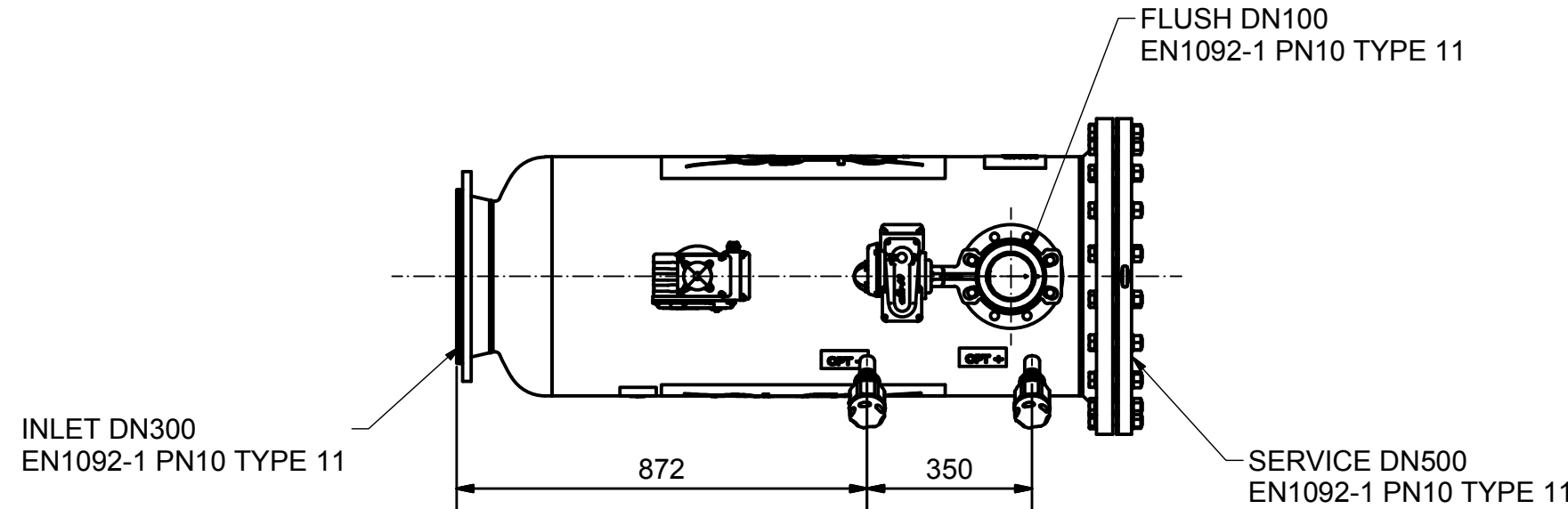
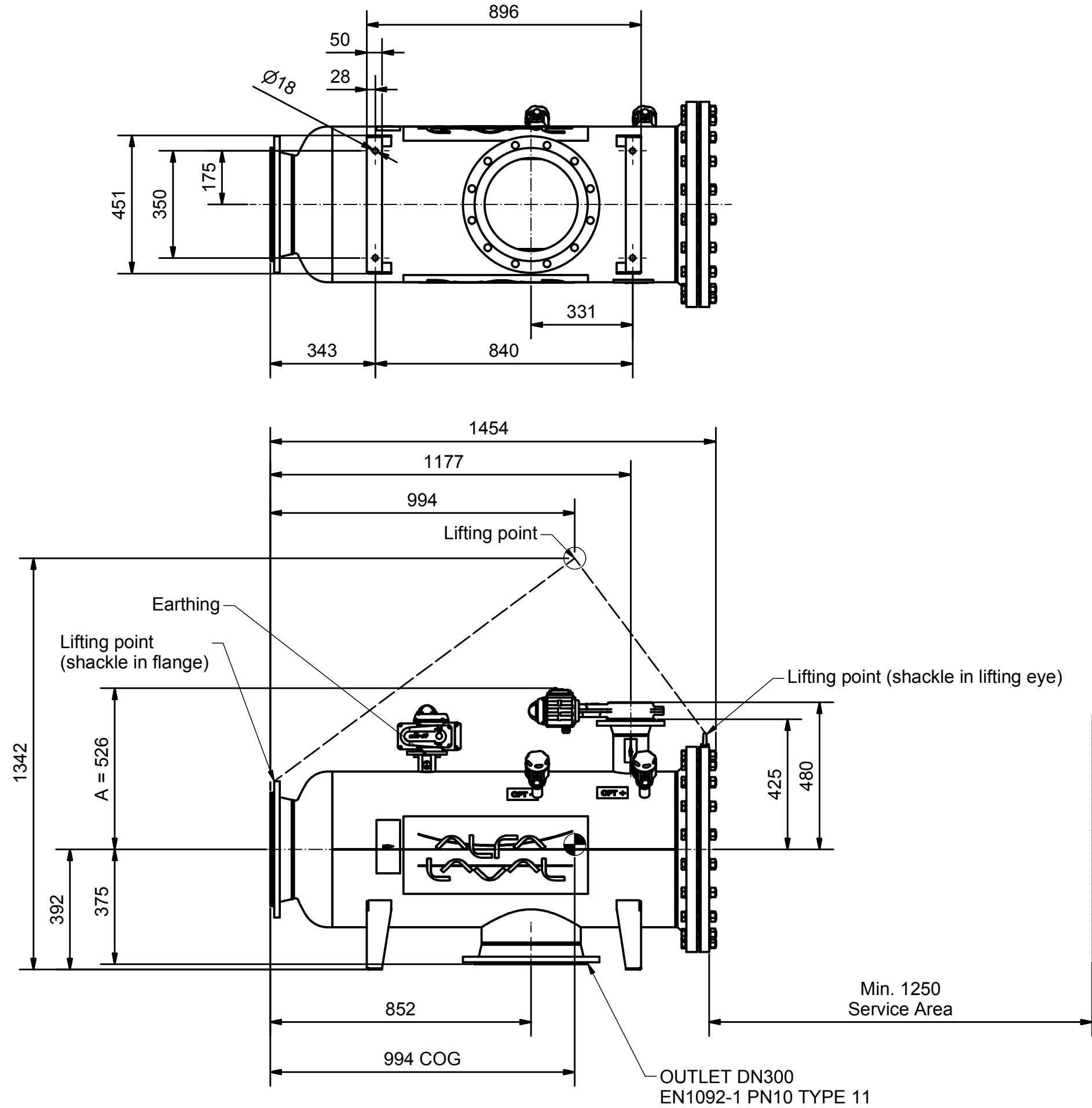
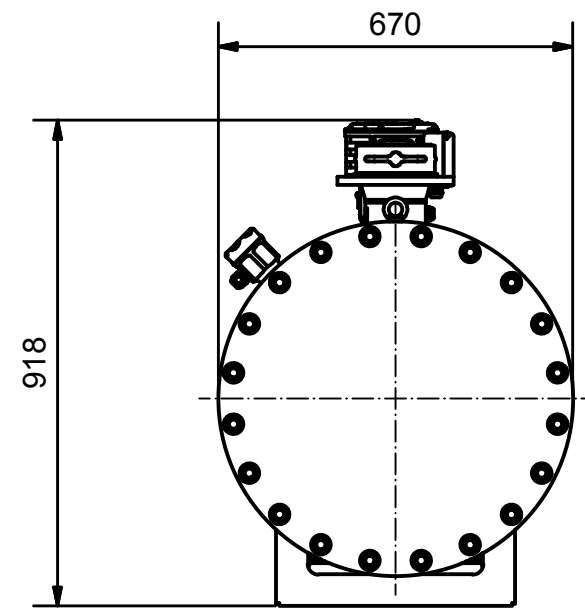
ALF 2Touch - A4 Analog in card	(Shall always be chosen with pressure transmitters)
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9639103268 - Wooden case - KD5630 approved material (seaworthy packing)

Dimensions Alt. 1	Length x Width x Height: 1800 x 1000 x 1400 mm
Dimensions Alt.2	Length x Width x Height: 1800 x 1400 x 1000 mm
Material casing	Wood

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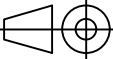


02

02

	A
Electrical Actuator	526
Pneumatic Actuator	500

Note :
- This drawing is showing Electrical Actuators
- Weight 311 kg

02	Updated for electrical and pneumatic actuators. Table added. Note added.		12-04-2017	INPAAPR	DKSOKSR	DKSOKSR
01	Earthing point added		05-07-2016	DKSOPVN	DKSOMMN	DKSOMMN
00	INITIAL DRAWING		17-02-2016	DKSOPVN	DKSOMMN	DKSOMMN
Rev No	Revision text		Date	Drawn	Checked	Approved
			Title			
			ALF 30-B			
			Outline Dimensional Drawing			
Location			Proj. No	Proj. Type	Proj. Name	
Alfa Laval Copenhagen A/S			Q1785	ALF	ALF Baseline	
Date			ISO Method E	Size	Dimensions without tolerances:	
				A2	ISO 2768-M or ISO 13920-B	
				Scale	1:15	
Drawn			Sheet	Drawing No		Rev
28-01-2016			1 / 1	9680042454		02
INPAAPR						



ALF - Alfa Laval Filter

Filtration for cooling systems using low-quality water



Closed-loop cooling systems where the secondary circuit is cooled using inexpensive water from the sea, lakes or rivers are widely used in many industries.

Such installations require large quantities of clean cooling water. With an ever-diminishing supply of high-quality cooling water, the need for cost-effective solutions to eliminate clogging, fouling and corrosion becomes ever-greater. In a cooling system incorporating a heat exchanger and an Alfa Laval Filter, even polluted or corrosive water can be used to cool the most sensitive process equipment.

The Alfa Laval Filter (ALF) operates as an integral part of a cooling system to remove debris that can foul and clog plate heat exchangers, tubular condensers, cooling tower spray nozzles or any similar equipment. In spite of effective screening at the water intake, mussels, seaweed and other forms of marine life can settle on the heat transfer surfaces. Conditions are ideal for the growth of these forms of life and they multiply rapidly as a result. This causes less effective heat transfer and possibly the complete breakdown of heat exchangers or other equipment.

If these kinds of blockages are severe, measures such as pesticides or chlorination are often no longer sufficient. In some cases these cannot be used because they are prohibited by environmental legislation.

This is where Alfa Laval Filter technology comes in. It protects a wide range of sensitive equipment from clogging and fouling, and prevents blockages in the cooling water system. An Alfa Laval Filter removes debris and marine life, and is automatically backflushed at regular intervals to keep it clean.

Several thousand ALF filters are in operation in cooling systems around the world. Characterized by its effectiveness, fully automatic operation and low maintenance requirements, ALF filters have become popular in many different applications including power plants, processing industries, district heating, sea vessels and comfort cooling systems

Operation and design

The Alfa Laval Filter is a pressure filter with an automatic flushing arrangement. The design features a pressure vessel casing made of stainless steel (ALF-S), fibreglass reinforced polyester (ALF-P) or rubber-lined carbon steel (ALF-R and ALF-B). Along with other wetted parts, the internal cylindrical filter basket is usually made of stainless steel, super stainless steel (SMO) or titanium.

ALF-B is a standardized model aimed at tasks where special options are not required. Just as the other models it offers reliable protection for your heat exchangers and fully automatic operation (backflushing).

Apart from the standard range of ALF filters, we can supply special versions that can handle pressures up to 16 bar and temperatures up to 100°C (212°F). We also provide N and U stamp certificates.

The filter system is available with connections ranging from 100 mm/4" to 800 mm/32" and is designed to be placed directly in the pipe system. ALF filters can be installed in almost any position, horizontally or vertically thanks to the flexible nozzle orientation and because the automatic regeneration process is run by the inlet pressure.

The inlet is placed at one end and the main outlet at a 90° angle, making it suitable for installation on any 90° pipe bend close to the equipment to be protected. The inspection/service opening is placed on the opposite side of the inlet, providing easy service access with no need to remove the pipe connection.

Backflushing is carried out automatically at regular intervals without interrupting the filtering process. The flushing valve and a flow diverter valve are controlled by a PLC in the control panel, which can be installed close to the filter.

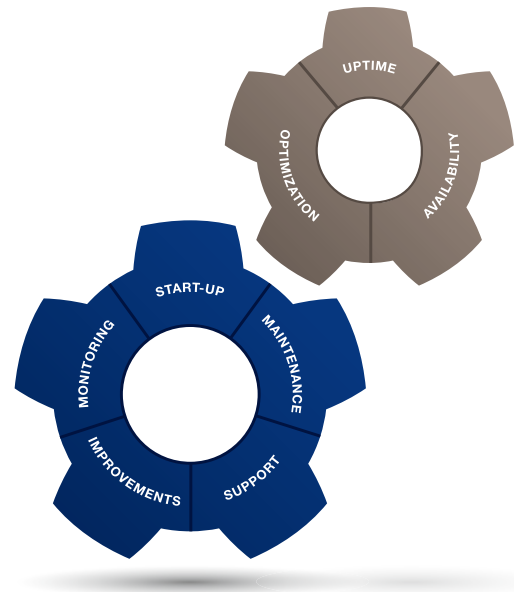
The filter is divided into two sections by the flow diverter valve, the inlet section and the outlet section. A flushing valve for discharging the debris is located at the end of the outlet section.

Installation

ALF units can be installed upstream of heat exchangers with shut-off valves placed upstream of the filter and downstream of the heat exchanger. This enables flexible servicing if many units are installed in parallel – for instance in a duty/standby installation or when installed on a bypass pipe, allowing the filter to be taken out of service separately.

Depending on pipe dimensions, flow rate and permissible pressure drop, one ALF filter can be installed to protect several heat exchangers. The filter(s) should preferably be mounted close to the heat exchanger(s) in order to minimize the risk of biological growth in the pipe system connecting the components.

We recommend connecting the flushing outlet to the heat exchanger outlet when possible, and returning the debris to the natural water source. It is important that the filter is installed downstream of the feed pump(s), operating as a pressure filter.



Extending performance with the Alfa Laval 360° Service Portfolio

Our extensive service offer ensures top performance throughout the lifetime of your Alfa Laval equipment. Excellent availability of parts and the commitment and expertise of our team bring you peace of mind.

Start-up

- Installation
- Installation Supervision
- Commissioning

Maintenance

- Service kits and spare parts
- Preventive maintenance
- Repairs

Support

- Troubleshooting
- Telephone support
- Training

Improvements, monitoring

- Equipment upgrades
- Replacement and retrofit

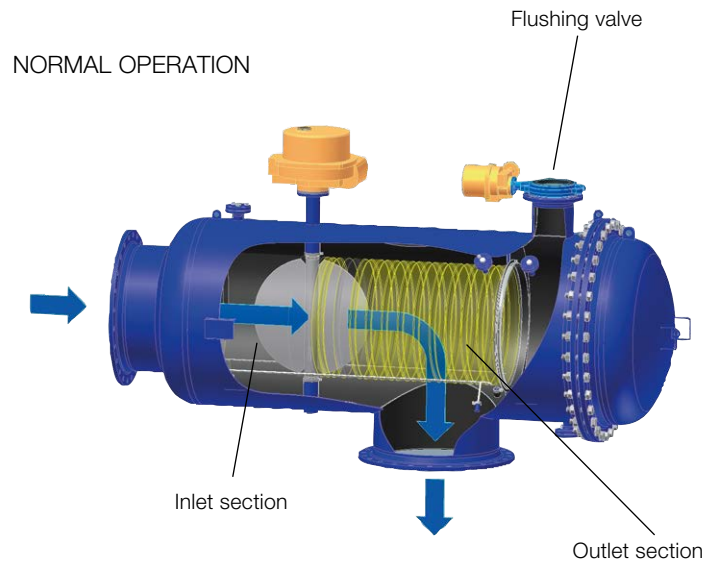
We can also create a Performance Agreement – a customized service agreement for you that includes any or all of the above services..



Standard control panel with PLC for one filter. Alternative configurations are available for controlling multiple filters. Options for remote control or high protection classes, such as ATEX, are also available.

Normal operation

During normal operation, liquid passes through the inlet into the filter basket. The flow diverter valve is open and the flushing valve closed. The liquid passes through the filter basket prior to being discharged at the main outlet.



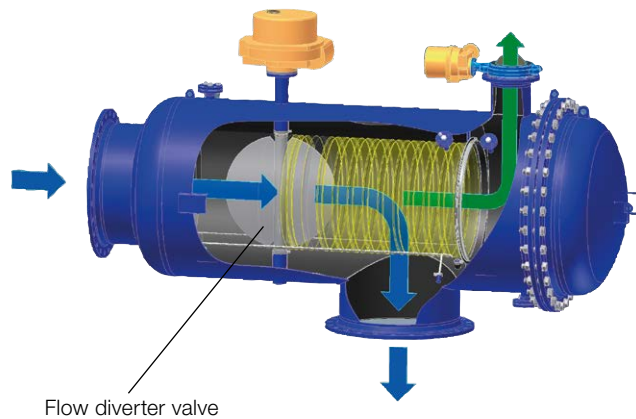
Regeneration

ALF units can be cleaned either automatically, using a timer, at predetermined intervals, or manually by pushing a button on the control panel. An optional differential pressure control system is available as a back-up and for monitoring the filter status.

1. Primary flushing

The flushing valve opens, reducing the pressure drop and increasing velocity and total flow through the filter. Any debris sticking to the filter basket is dislodged and flushed out through the flushing valve. The velocity of the liquid is sufficient to remove any debris embedded in the inlet section of the basket.

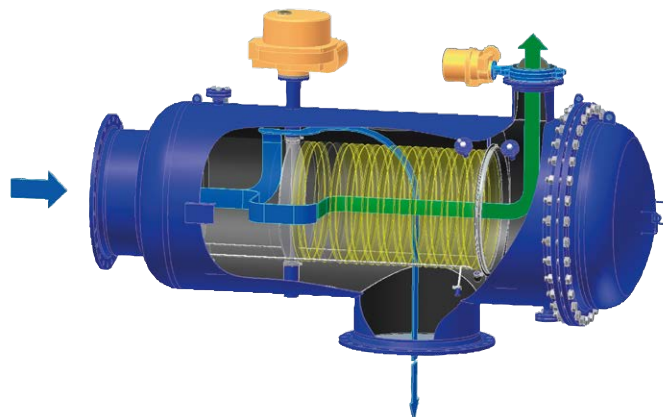
REGENERATION – primary flushing



2. Secondary flushing (backflushing)

The flow diverter valve closes while the flushing valve remains open. The flow is diverted and forced to pass through the filter basket in the inlet section. The majority of the liquid is discharged through the main outlet, but the pressure in the filter draws part of the flow from the exterior to the interior of the outlet section. This provides a backflushing effect in this section of the filter. Any dislodged remnants are discharged through the flushing valve.

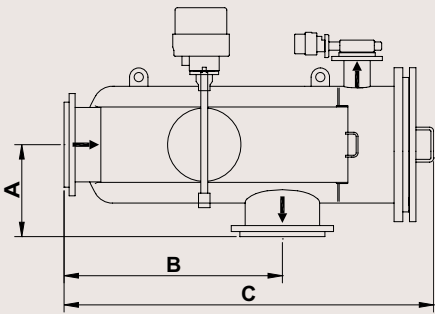
REGENERATION – secondary flushing (backflushing)



Dimensions



ALF-R with filter casing made of rubber-lined carbon steel

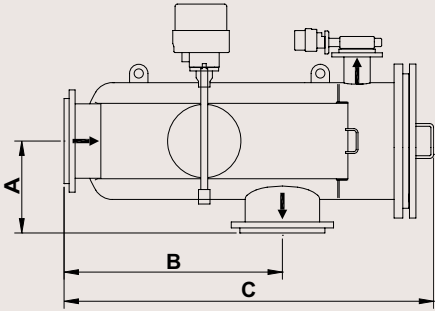


ALF-R

	A	B	C
ALF 20R	325	720	1,230
ALF 30R	425	950	1,610
ALF 40R	496	1,150	1,961
ALF 50R	600	1,400	2,380
ALF 60R	700	1,650	2,605
ALF 80R	905	2,080	3,720



ALF-S with filter casing made of stainless steel

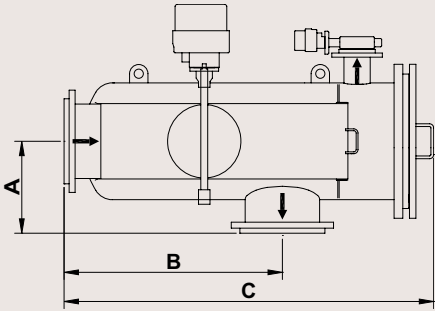


ALF-S

	A	B	C
ALF 10S	175	450	740
ALF 15S	250	595	975
ALF 20S	300	720	1,180
ALF 30S	400	950	1,610



ALF-P with filter casing made of fibreglass reinforced polyester

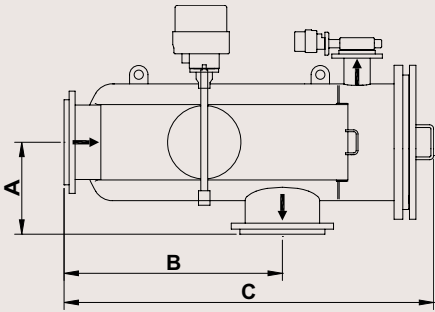


ALF-P

	A	B	C
ALF 10P	250	530	890
ALF 15P	300	685	1,150
ALF 20P	350	840	1,400
ALF 30P	520	1,130	1,820
ALF 40P	570	1,150	2,110



ALF-B with filter casing made of rubber-lined carbon steel



ALF-B

	A	B	C
ALF 10B	146	411	696
ALF 15B	210	567	948
ALF 20B	242	649	1,107
ALF 30B	340	852	1,454

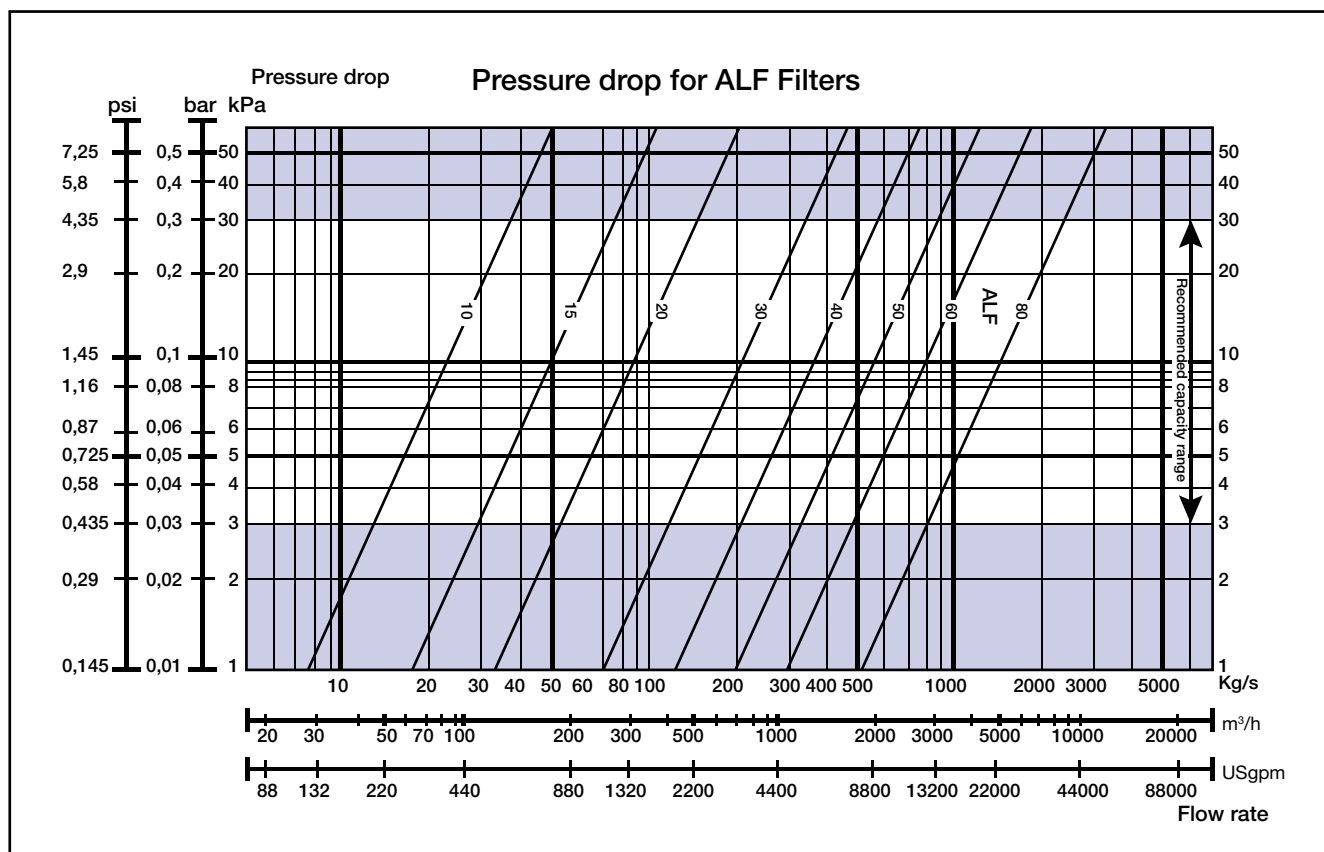


Fig. 3 Recommended pressure drop and capacity range

Technical data

Connections	EN 1092.1/PN10	DN100-DN800
	ANSI B16.5/B16.47, B series, # 150	4"-32"
		DN100-DN800
Operation	Pneumatic, electric	Actuator controlled valves
Mesh size	Perforated plate design (Ø hole)	1.0-1.5-2.0-2.5 mm
	Wedge wire design (slot size)	0.1-0.3-0.5-1.0 mm
Materials	Filter body (ALF-R)	Rubber-lined carbon steel EN P265 GH/ASTM A516 Gr60
	Filter body (ALF-S)	Stainless steel EN 1.4404 ASTM 316L
	Filter body (ALF-P)	Fibreglass reinforced polyester (GRP/FRP)
	Filter body (ALF-B)	Rubber-lined carbon steel P355GH / ASTM A516 Gr 70
	Internal parts (wetted)	Stainless steel EN 1.4404 ASTM 316L
	Internal parts (wetted)	Super stainless steel, EN 1.4547 / ASTM S31254 (SMO)
	Internal parts (wetted)	Titanium, EN 3.7025 / ASTM B265 Grade 2
Design code	EN13445 / ASME VIII, div.1/div.2	ALF-R / ALF-S
Design code	ADM N1	ALF-P
Design code	EN13445	ALF-B
Design pressure	10 bar (g) / 150 psi	Alternatives on request
Design temperature	60°C / 149°F	Alternatives on request
Control panel	PLC-based	Power supply: 1~ 110-230 V, 50-60 Hz
Required service area	X x Y m (Z x W ft)	

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com