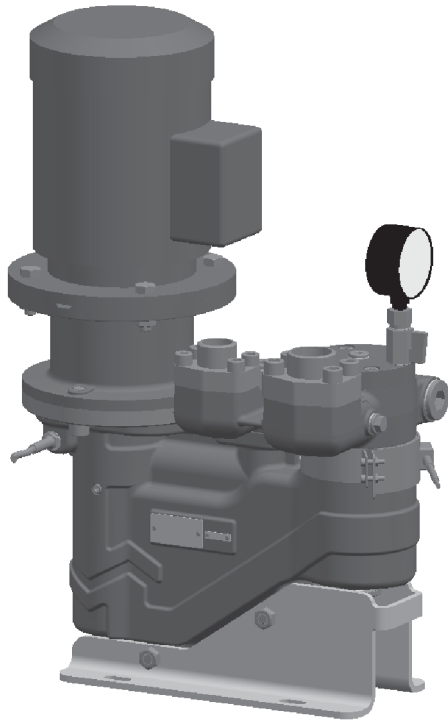
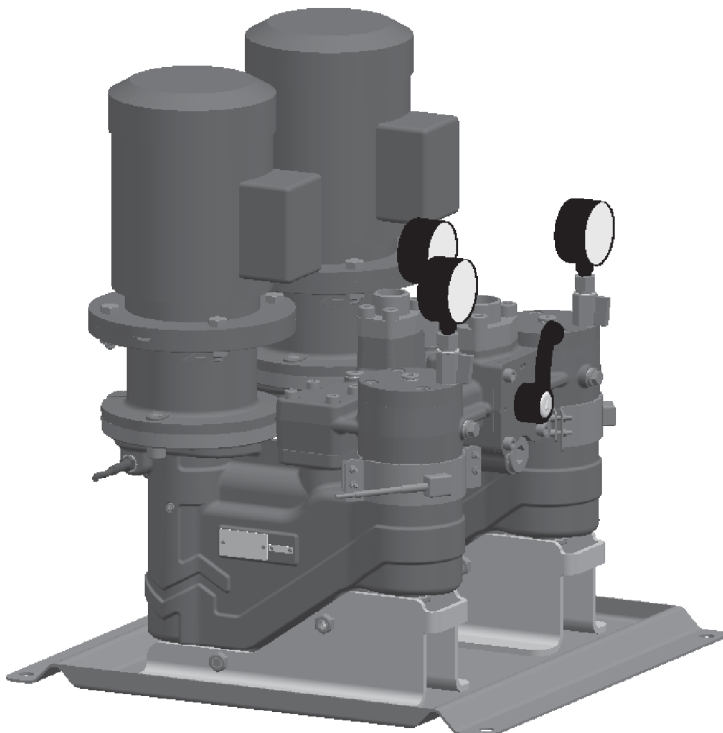


Screw pump

Series ALLFUEL® AFT-F/AFT-T



AFT-F Filter unit



AFT-T Twin unit with filter

Utilization

For pumping light and heavy fuel oil.

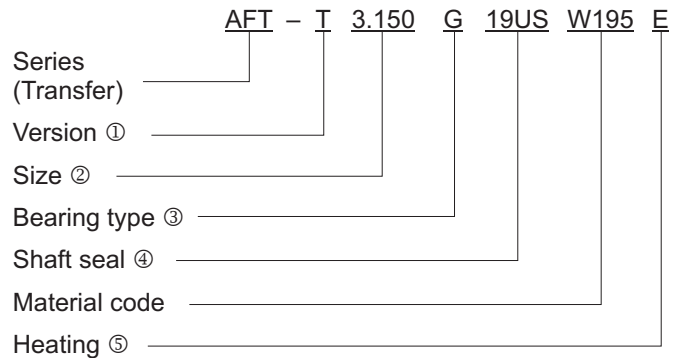
Main field of application

ALLFUEL Transfer (AFT) pumps are compact pump sets designed for closed-circuit and transfer applications in oil-fired systems. Also used to pump lubricating liquids in a variety of applications.

Design

Compact single or twin units, vertical design with integrated filter.

Abbreviation



- ① T = Twin unit with filter;
F = Single unit with filter
- ② Theoretical capacity Q [l/h] at differential pressure $\Delta p = 4$ bar and viscosity $\nu = 12$ mm²/s
- ③ G = internal plain bearing; U = antifriction bearing
- ④ Unheated, uncooled mechanical shaft seal
- ⑤ Version with electric heating of mechanical seal and filter housing available at additional charge

Structural design

Single unit AFT-F:

Internal-bearing, three-screw, self-priming screw pump. Hardened and polished spindles run in an exchangeable casing insert. The drive spindle is hydraulically balanced. A special starting screw absorbs the axial thrust of the idler screws. It is hydraulically driven. Only the torque resulting from liquid friction is transferred to the thread flanks. The thread flanks are therefore virtually free of loads and are not subject to wear. The pumped liquid lubricates all sliding parts and can be categorized as full fluid friction. In sizes 150 up to 3.150 a balancing piston running in the bearing ring provides radial and axial bearing of the drive spindle; in sizes 3.600 up to 6.450 a groove ball bearing fulfils this role.

A maintenance-free mechanical seal seals the shaft. A return bore connects the seal chamber and the suction area to each other. As a result, only suction pressure acts on the shaft seal, regardless of discharge pressure. A pump bracket connects the pump to the drive motor. Three sizes with 2 to 4 screw pitches options enable fine gradation of the entire capacity range.

Twin unit AFT-T:

Two AFT-F single units (as described above) are attached to a shared reversing valve housing. A ball valve, two non-return valves and the pressure relief valve are located in the reversing valve housing. This design lets the operator switch the individual pump units as desired or remove a pump without interrupting operation.

Functionality

Single unit AFT-F:

Specially-shaped thread flanks cause the three spindles to form sealed chambers; rotation of the spindles then causes the contents of the chambers to move continuously in the axial direction from the pump's suction side to its pressure side. Despite rotation of the spindles, no turbulence results. The uniform chamber volumes eliminate crushing forces.

Twin unit AFT-T:

Both pumps can be switched either manually or automatically (refer to "Operational monitoring/Switching device" for information on automatic switching). The working pressure building in the pressure area opens the non-return valve of the pump that is currently running and closes the same device on the stopped pump. This prevents the reserve pump from running backwards.

Performance data

Capacity ①	Q	up to	6.480 l/h
Suction pressure	p_s	up to	5 bar
Underpressure, suction side	p_u	up to	0,6 bar
Discharge pressure ②	p_d	up to	6 bar
Liquid temperature ③	t	up to	150 °C

① Assuming $\Delta p = 4$ bar and $\nu = 12$ mm²/s; using 50-Hz-Motors

② Refer to the "Performance data" table for achievable discharge pressure based on viscosity and output of the assigned drive motor.

③ Higher temperatures upon request

Overload protection

A pressure relief valve is built into every pump for overload protection. Trigger pressure is set from the factory at 7 bar. If a lower trigger pressure is desired, please specify this in the order.

Noise level and pulsation

The design and operation of the screw pump enable a very low noise level and virtually pulsation-free pumping.

Installation

The pump/motor assemblies are of a vertical design and are delivered with mounting feet and oil sump (twin units only).

Filter

The pumps are delivered with an integrated radial screen filter for protection against contamination. The pump sucks the liquid through the filter, whereby the flow moves from inside the filter to outside. Filter mesh size 0,4 mm.

Flanges and connections

Feed and pressure ports as counter flange based on SAE (SAE J518C, hole pattern 3000 PSI). Welding neck flanges, bolts and seal rings in delivery included as required.

- Connections at present:
- B7 Draining
 - E7 Venting of pump
 - E8 Venting of filter
 - H7 Heating cartridge
 - M1, M2, M3 Pressure gauge

Shaft seal

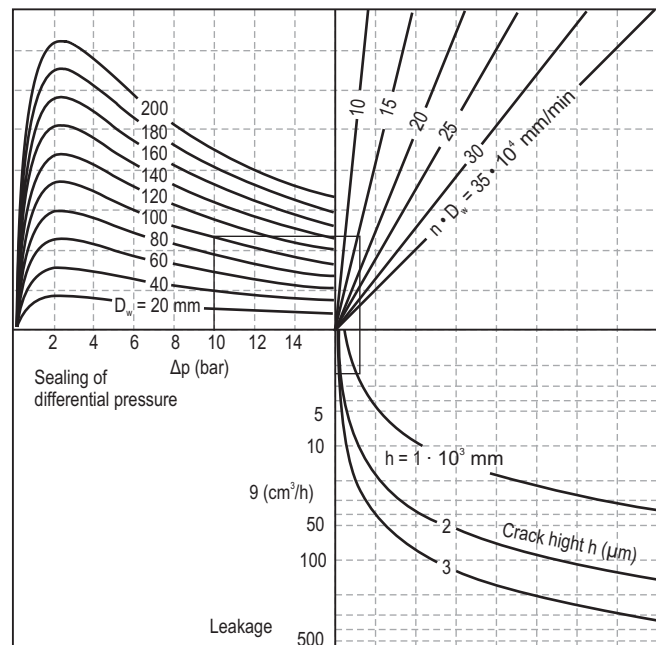
The shaft is sealed with a maintenance-free, unbalanced mechanical seal.

Part name Material design

Rotating ring	silicon carbide
Counter ring	silicon carbide
Seal ring	FPM (Viton)
Spring	CrNiMo steel
Metal parts	CrNiMo steel

Leaks

Formation of a lubricating film between the sliding surfaces is the most important factor in the functionality of a mechanical seal. This film is formed by the liquid being sealed. Due to elevated pressure inside the suction chamber, a small amount of liquid/lubricant will be continuously pushed out through the sliding surfaces. This "standard leak" of a few ml/h is essential for maintaining lubrication of the sliding surfaces. Absence or inadequate formation of a lubricating film is a common cause of damage (see following diagram).



Theoretical average leak rate depending on mechanical oscillations, fluid properties, condition of the sliding surfaces, etc. (Source: Burgmann ABC der Gleitringdichtungen)

When pumping liquids with low volatility, such as HFO, the user must therefore expect increasing deposits on the atmosphere side as time passes. As a result, it is physically not possible to achieve a 100% seal with a mechanical seal.

If this is not acceptable, the magnetically-coupled version of ALLFUEL will be the right choice.

Heating

If heating is required, these pumps can be delivered with electric heating cartridges for the mechanical seal chamber and heating shells for the filter housing (subject to additional cost).

Pump size	Connection for	Heating cartridge output (pressure side)	Heating shell output (filter)
150 bis 1.650	230 V	160 W	165 W
2.250 bis 3.150	230 V	200 W	205 W
3.600 bis 6.450	230 V	-	265 W

Heating capacity is dimensioned so that the heater must operate for at least 60 minutes in order to achieve an outlet temperature of 20 °C. When temperatures are lower (below 0 °C), a correspondingly longer heat-up time will be required. Heating is not designed to achieve noticeably higher liquid temperatures during operation.


Materials

Denomination	Material design	
	W195	W196
Pump casing	EN-GJL-250	EN-GJS-400-15
Casing insert	AlMgSi1	AlMgSi1
Pump cover, drive side	EN-GJL-250	EN-GJS-400-15
Bush	AlMgSi1	AlMgSi1
Drive screw	16MnCrS5	16MnCrS5
Idler screw		
Reversing valve housing ①	EN-GJL-250	EN-GJS-400-15
Valve casing ②		

① AFT-T only

② AFT-F only

Explosion protection

 The pump fulfills the requirements according to EU explosion-protection directive 94/9/EC (ATEX 100a) for devices in device class II, category 2 G. Classification into temperature classes according to EN 13463-1 depends on the temperature of the pumped liquid. Refer to the proposal or order documentation for the maximum permissible liquid temperature for the respective temperature classes.

Note: When operating the pump in category 2, suitable measures must be provided to prevent impermissible warming of the pump surfaces in the event of disturbance.

Drive

The following motor versions are normally provided with delivery of complete pump/motor assemblies: Surface-cooled three-phase squirrel-cage motors, IMV 1 design type, IP 55 protection class according to IEC standard, insulation class F utilized according to B, output and main dimensions according to DIN 42 677. Motors configured for 50 Hz may also be operated in 60 Hz networks.

- Voltage/connection:

Frequency [Hz]	Voltage [V]	Areas of usage
50	220-240/380-420	Europe
50	380-420/660-720	Europe
50	500	Europe
60	254-277/440-480	USA
60	440-480	USA
60	318-346/550-600	Canada
60	220-240/380-420	Asia, S.-Am.

Power is transferred over an elastic coupling. Additional radial forces may not act on the drive spindle.

Operational monitoring

Suction side: Pressure-vacuum gauge

Pressure side: Pressure gauge (included with delivery as required)

The pressure-vacuum gauges display the pressure downstream of the filters. This enables measurement of pressure loss in the filter and detection of impermissible contamination. In addition, connections M1 and M3 permit precise detection of differential pressure.

A switching device is available at extra cost. It provides operational monitoring and is designed to automatically switch on the reserve pump if the operational pump fails. Signal lamps indicate current operational statuses.

Switching device **U1** for motors up to 3 kW (400 V operational voltage) for switching on pump directly, consisting of:

- 1 steel casing, IP55 protection class, dimensions: width 320 mm, height 320 mm, depth 160 mm
 - 2 three-phase air-gap relays with overload relay
 - 1 selector switch (pump 1, pump 2 and OFF)
 - 2 green signal lamps "Normal operation"
 - 1 red signal lamp "Disturbance"
- control fuse, connection terminals for all incoming and outgoing lines

Performance table

Size	Pump	Frequency	Capacity [l/h] at 6 bar and 12 mm ² /s	Power requirement [kW] at 6 bar and 380 mm ² /s	Installed motor output [kW]	Rated speed [1/min]	Permissible discharge pressure [bar] 12 mm ² /s, 150 mm ² /s,	Permissible discharge pressure [bar] 380 mm ² /s
150	10-28	50 Hz	154	0,12	0,25	910	6	6
		60 Hz	183	0,15	0,26	1050	6	6
250	10-28	50 Hz	258	0,22	0,37	1400	6	6
		60 Hz	319	0,28	0,40	1680	6	6
350	10-38	50 Hz	396	0,25	0,37	1400	6	6
		60 Hz	486	0,31	0,40	1680	6	6
550	10-46	50 Hz	533	0,27	0,37	1400	6	6
		60 Hz	653	0,34	0,40	1680	6	6
850	10-38	50 Hz	848	0,63	1,10	2800	6	6
		60 Hz	1054	0,84	1,20	3440	6	6
1.150	10-46	50 Hz	1134	0,68	1,10	2800	6	6
		60 Hz	1410	0,9	1,20	3440	6	6
1.650	10-56	50 Hz	1596	0,76	1,10	2800	6	6
		60 Hz	1981	1,00	1,20	3440	6	5
2.250	20-46	50 Hz	2250	1,06	1,50	2800	6	6
		60 Hz	2754	1,37	1,70	3400	6	6
3.150	20-56	50 Hz	3162	1,22	1,50	2800	6	6
		60 Hz	3867	1,56	1,70	3400	6	6
3.600	40-38	50 Hz	3574	1,53	2,20	2800	6	6
		60 Hz	4432	2,01	2,40	3450	6	6
4.750	40-46	50 Hz	4777	1,73	2,20	2800	6	6
		60 Hz	5922	2,26	2,40	3450	6	6
6.450	40-54	50 Hz	6433	2,02	2,20	2800	6	6
		60 Hz	7972	2,38	2,40	3450	6	5

Note: Refer to the proposal or order documentation for exact performance data for individual operating points.

Benefits

► **Impressive service life**
Hydrodynamic axial thrust compensation minimizes loads on the screws and extends service life.

► **Extraordinary flexibility**
A wide range of available materials makes it possible to adapt to special operating conditions and various liquids.

► **Continuous operation (*)**
The non-return valve makes it possible to maintain and remove a pump while the reserve pump ensures that the process continues without interruption.
(*) For AFT-T only

► **Optimized control**
The pressure-vacuum gauge monitors the cleanliness of the radial screen filter to ensure continuous flow.

► **Rapid exchanges**
Vertical filter installation lets the operator exchange the filter without draining the oil.

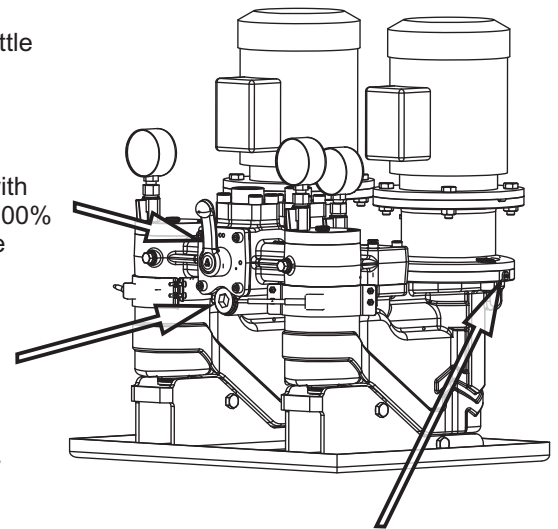
► **A clean solution**
The inside-out flow keeps particles of dirt inside the filter. An integrated magnet also keeps metal chips on the floor of the filter.

► **Reliable suction behavior**
Large filter surfaces promote excellent suction behavior and extend maintenance intervals.

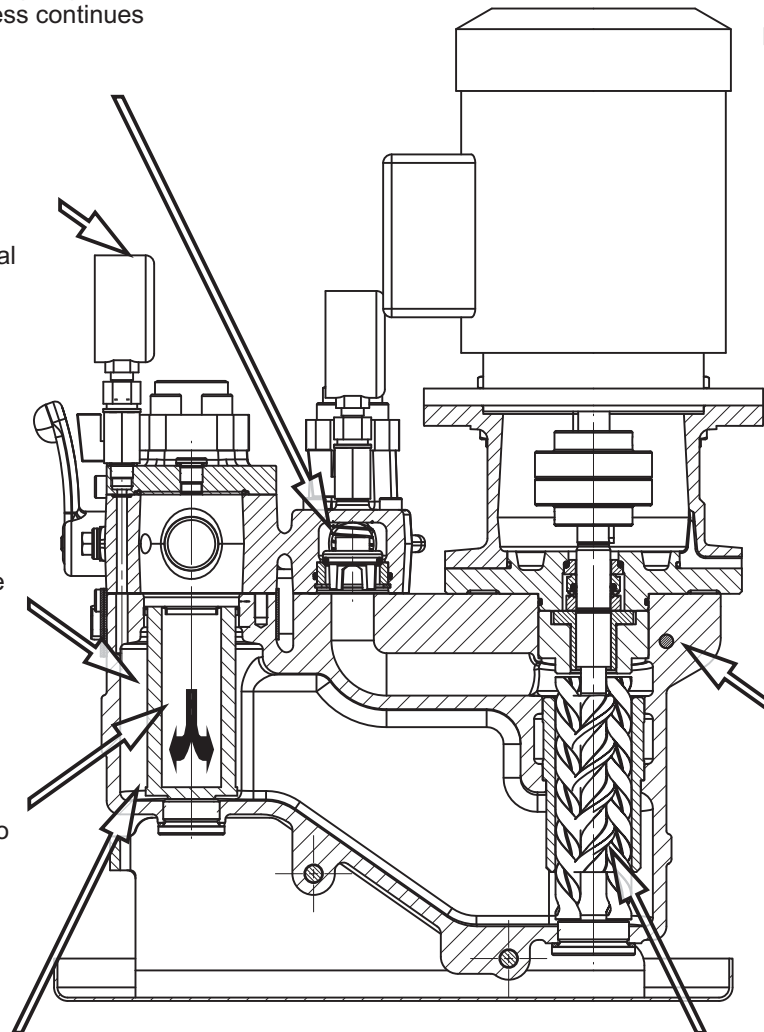
► **Economical use of space**
The installed pump requires little space.

► **Save operation (*)**
The advanced valve casing with only one ball valve provides 100% security when switching to the reserve pump.
(*) For AFT-T only

► **Outstanding reliability**
The conical valve provides permanent protection against impermissibly high pressures.



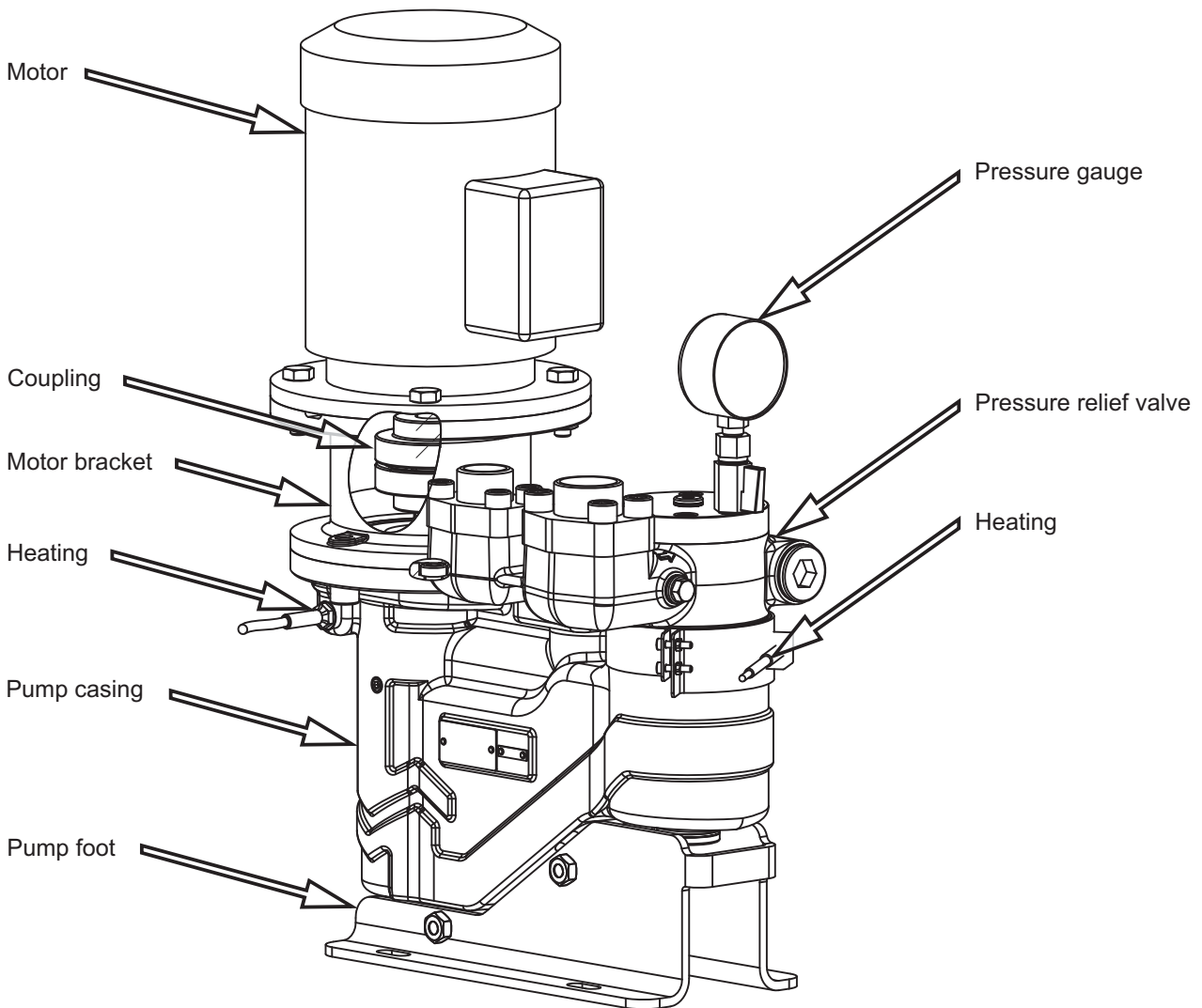
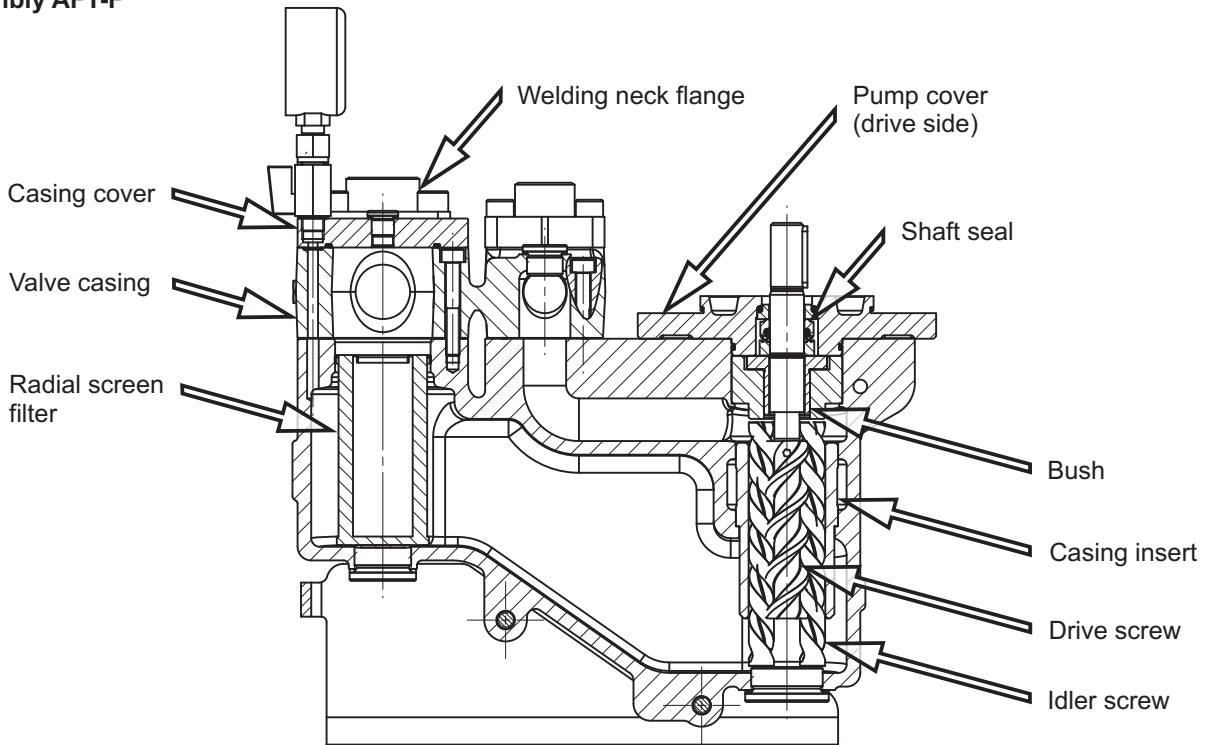
► **Flawless start-up**
The vent screw ensures the best possible venting of the mechanical seal chamber each time the pump is started, even when installed vertically.



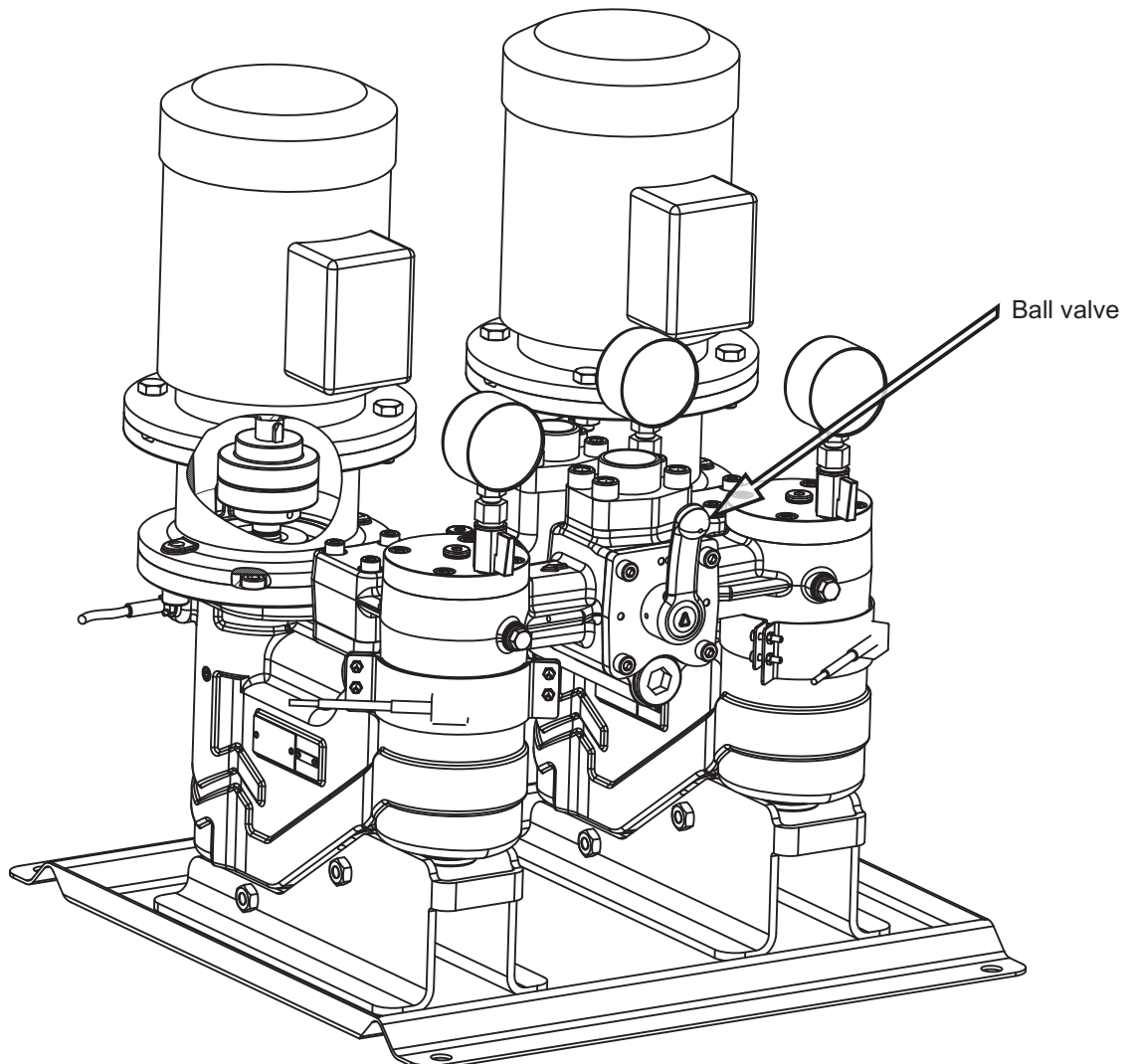
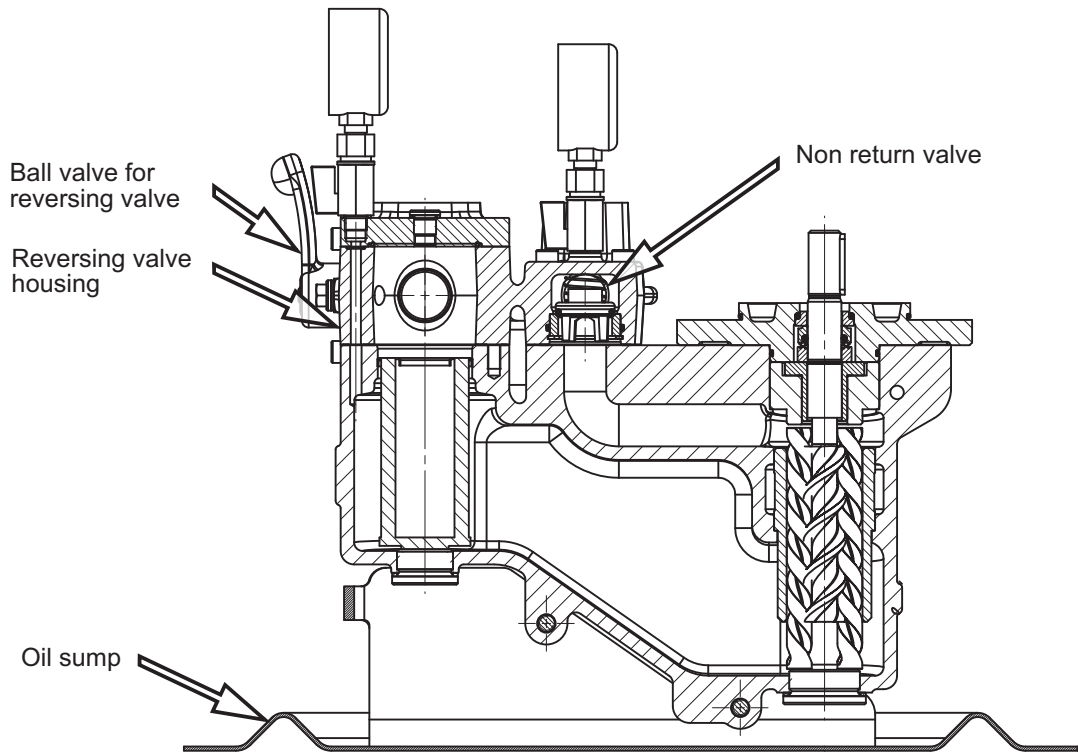
► **Flawless pump starting**
Optional heating of the filter and mechanical seal ensure that the pump starts without issue even when the ambient temperature is low.

► **Reliable process stability**
Specially-shaped thread flanks produce virtually pulsation-free, low-noise pumping action.

Assembly AFT-F

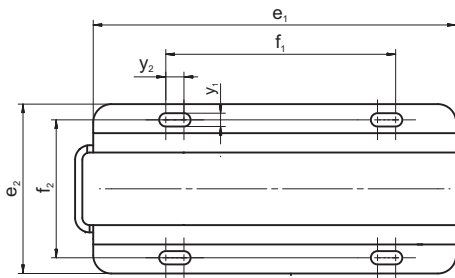


Assembly AFT-T

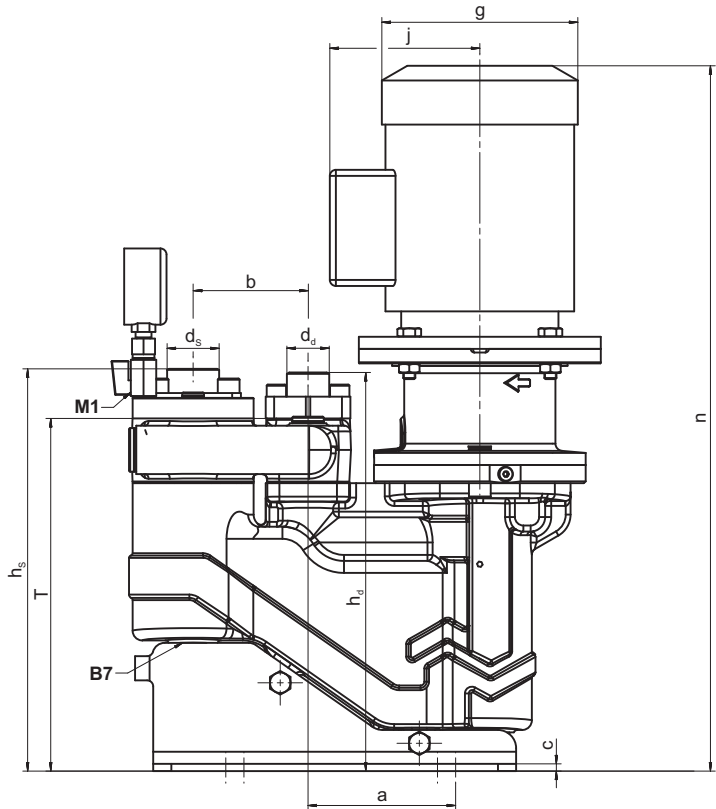
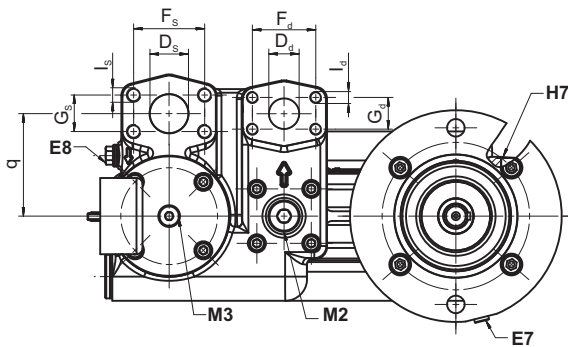


Main dimensions AFT-F

Pumpfoot



Top view without motor/bracket



AFT-F size	Unit dimensions													
	a	b	c	e ₁	e ₂	f ₁	f ₂	g ②	j ②	n ②	q	y ₁	y ₂	T
150	97	95	6	280	140	190	114	145	129	516	85	11	15	264
250				162				209	618					
350				181				218	658					
550				181				218	778					
850	97	95	6	280	140	190	114	162	209	618	85	11	15	264
1.150	97	95	6	280	140	190	114	162	209	618	85	11	15	264
1.650	122			300				181	218	658				292
2.250	122			300				181	218	658				292
3.150	122			300				181	218	658				292
3.600	128			330				181	218	778				342
4.750	128			330				181	218	778				342
6.450	128			330				181	218	778				342

Connections

Draining	Venting		Heating cartridge	Pressure gauge	
B7	E7	E8	H7	M1/M2	M3
G 1	M8x1	G ¼	M12x1	G ¼	G ½

AFT-F size	Connection dimensions													
	SAE suction flange ①							SAE pressure flange ①						
	Inch.	D _s	F _s	G _s	I _s	d _s	h _s	Inch.	D _d	F _d	G _d	I _d	d _d	h _d
150 up to 550	1 ¼	32	58,72	30,18	4 x M12	43	305	1	25	52,37	26,19	4 x M10	35	302
850 up to 1.650							305							302
2.250 up to 3.150							333							330
3.600 up to 6.450							383							380

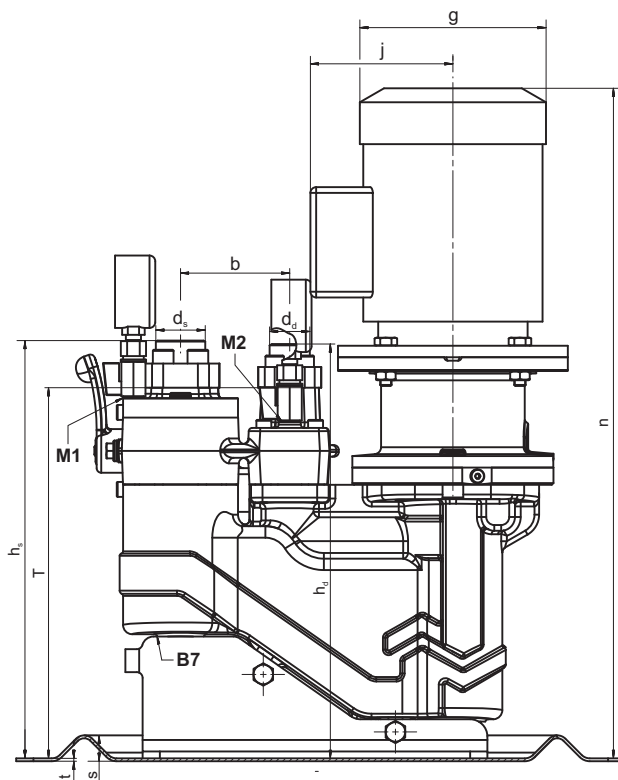
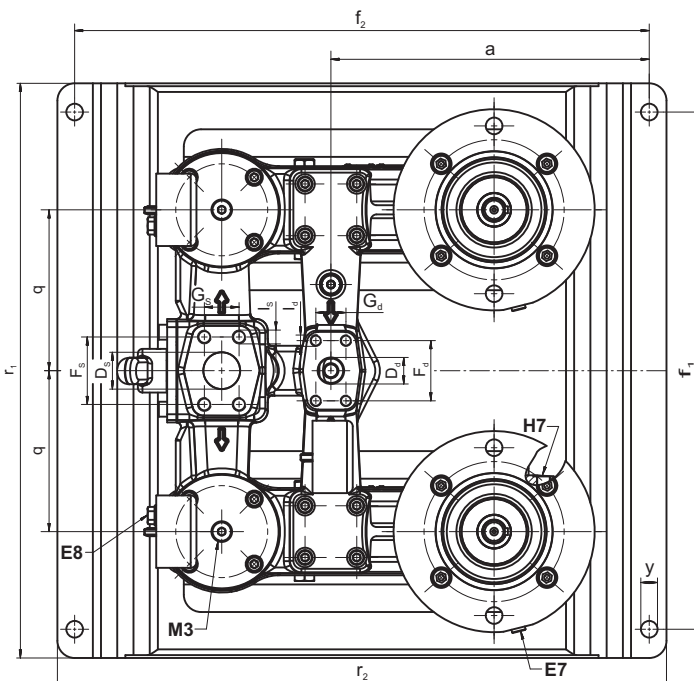
Dimensions in mm,
Direction of rotation:
Clockwise as seen from the
drive side

① SAE J518C, hole pattern
3.000 PSI

② Dimensions are reference
only and may deviate
depending on motor
manufacturer

Main dimensions AFT-T

Top view without motor/bracket



AFT-T size	Unit dimensions																
	a	b	f ₁	f ₂	g ②	j ②	n ②	q	r ₁	r ₂	s	t	y	T			
150	252	95	450	500	145	129	516	115	500	530	23	3	14,5	295			
250																	
350																	
550																	
850	277				162	209	618								295		
1.150																	
1.650																	
2.250	298				181	218	658									323	
3.150																	
3.600	298				181	218	778										373
4.750																	
6.450																	

Connections

Draining	Venting	Heating cartridge	Pressure gauge
B7	E7	E8	H7
G 1	M8x1	G ¼	M12x1
			G ¼

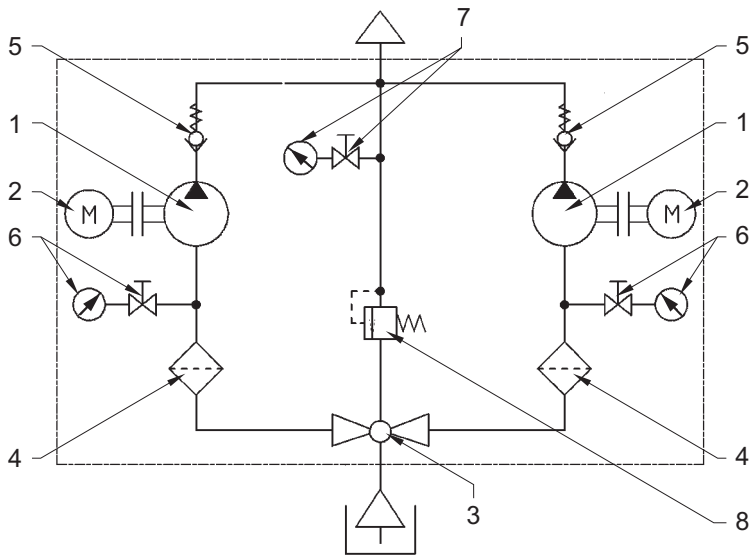
AFT-T size	Connection dimensions													
	SAE suction flange ①							SAE pressure flange ①						
	Inch.	D _s	F _s	G _s	I _s	d _s	h _s	Inch.	D _d	F _d	G _d	I _d	d _d	h _d
150 up to 550	1 ¼	32	58,72	30,18	4 x M12	43	336	1	23	52,37	26,19	4 x M10	35	333
850 up to 1.650							336							333
2.250 up to 3.150							364							361
3.600 up to 6.450							414							411

Dimensions in mm,
Direction of rotation:
Clockwise as seen from the
drive side

① SAE J518C, hole pattern
3.000 PSI

② Dimensions are reference
only and may deviate
depending on motor
manufacturer

Connection diagram AFT-T



AFT-T connection diagram	
Part No.	Description
1	Operation and reserve pump
2	Three-phase motor
3	Ball valve
4	Radial screen filter
5	Non return valve
6	Pressure gauge with ball valve
7	Pressure gauge with ball valve
8	Pressure relief valve

Centrifugal Pumps

► Features

Pump capacities acc. to DIN EN 733 or DIN EN 22 858. Additional sizes enlarge the EN-performance range. Series construction acc. to the modular system. Single-stage or multistage pumps in block- or inline-design; pumps with magnetic coupling, pumps for heat transfer oil and hot water.

► Pumped liquids

Neutral or aggressive, pure, with solids content or contaminated, cold or hot, toxic or harmful to the environment.

► Performance data

Q up to 2,400 m³/h, H up to 250 m.

Propeller Pumps

► Features

For large flows at relatively small delivery heads. Horizontal, vertical, submerged and elbow casing pumps.

► Pumped liquids

Neutral or aggressive, pure or contaminated, cold or hot.

► Performance data

Q up to 50,000 m³/h, H up to 20 m.

Self-Priming Side Channel Pumps

► Features

Self-priming side channel segmental-type pumps.

► Pumped liquids

Neutral or aggressive, pure or contaminated, cold or hot, toxic, harmful to the environment.

► Performance data

Q up to 35 m³/h, H up to 350 m.

Three-Screw Pumps

► Features

Three-screw, self-priming, very good efficiencies, very low noise level. The pumping process is continuous, nearly without pulsation and without turbulences. Self-priming, for horizontal and vertical installation, submerged pumps and pumps with magnetic drive.

► Pumped liquids

Oils or other lubricating, not lubricating or sparsely lubricating liquids.

► Performance data

Q up to 7,500 l/min, p_d up to 280 bar.

Two-Screw Pumps

► Features

Two-screw, double-entry, self-priming, high suction power due to low NPSH-values, adapted for dry running.

► Pumped liquids

Oils or other lubricating, not lubricating or sparsely lubricating liquids.

► Performance data

Q up to 1,300 m³/h, p_d up to 40 bar.

Progressing Cavity Pumps

► Features

Single-stage or multistage, self-priming. The pumping is continuous, nearly without pulsation and without turbulences, crushing or demixing.

► Pumped liquids

For pumping and dosing liquids of low to high viscosity; pasty, neutral or aggressive, pure or abrasive, gaseous or tending to froth, also with fibrous and so-lids content.

► Performance data

Q up to 7,500 l/min, p_d up to 36 bar.

Rotary Lobe Pumps

► Features

Hermetically sealed pumps with no welded parts, sealing systems adapted to the liquid, sterile cleaning possible.

► Pumped liquids

For pumping and dosing liquids of low to high viscosity; pasty, neutral or aggressive, pure or abrasive, especially in the food and pharma industry.

► Performance data

Q up to 1,666 l/min, p_d up to 20 bar.

Peristaltic Pumps

► Features

Dry self-priming, without seals and valves.

► Pumped liquids

For pumping and dosing liquids of low to high viscosity; pasty, neutral or aggressive, pure or abrasive, gaseous or tending to froth, also with fibrous and solids content.

► Performance data

Q up to 60 m³/h, p_d up to 16 bar.

Macerators

► Features

Impeller with exchangeable, highly wear resistant milling cutters.

► Pumped liquids

For milling of fibres and solids (wood, textiles, glass etc.) that are contained in the liquids to be pumped and making them pumpable.

► Performance data

Q up to 160 m³/h, p_d up to 10 bar.

Successful in important branches

Decades of experience and branch-specific know-how ensure solutions that are practical and dependable. In addition to individual units with a motor or with a free shaft end, you can get complete systems and customer-specific cast parts from ALLWEILER AG. You are not just investing in machines with ALLWEILER AG. You are also profiting from decades of know-how about applications and processes in your branch.

You will find pumps and systems by ALLWEILER AG in the following sectors:

► Marine and Offshore

Made of particularly corrosion-resistant, saltwater-proof materials and in accordance with specific standards (shock testing, national marine, international classifications etc.).

► Power Generation

Block and twin units for fuel and water injection in gas and steam turbines.
For fuel supply, injection and lubricating oil supply in power plants.

► Water and Wastewater

Pumps for water treatment (dry substance up to 45 %), macerators, which make it possible to pump liquids that are high in fibre and solids.

► Bioenergy

Materials resistant to aggressive intermediate and final products. Pumps for every step in the process.

► Process Engineering and Chemical Industry (ATEX-conformity)

Shaft bearing, shaft seal and material designs in accordance with the chemical characteristics of the pumped liquid. Magnetic coupling for hermetically sealed pumps.

► Oil and Gas

Pumps with a wide viscosity range, high pressure and large capacity.

► Building Industry

Special units for oil furnace and lift systems. Oil submersible pumps for all types of hydraulic machines.

► Food and Pharmaceutical

Stainless steel pumps with CIP and SIP design, EHEDG and FDA certified. Especially for the careful pumping and dosing of even sticky, pasty and solids-rich liquids.

► Machine Tool

Designed for large capacity or a high discharge pressure; resistant to contaminants and foreign matters. Especially for cooling lubricant supply.

► Pulp and Paper

Pumps with extremely high availability (24 hours; 365 days) and many sizes, starting with small dosing pumps and ranging to large kaolin feeding pumps.

► Heat Transfer

In supply circuits, circulating systems and heating circuits for pumping of hot water and heat transfer oil up to 207 °C and 450 °C.

Subject to alterations.

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