

ACF5 Std Line



Product Description



Flow volume:	310 - 2900 l/min
Max differential pressure:	16 bar
Applications:	Circulation, lubrication and transfer

ALSO VALID FOR PUMP SERIES UCF Generation 5

1. Applications

1.1 Functionality

The ACF/UCF pumps are used for a number of different fluids:

Lubrication oil, fuel oil, vegetable oil, hydraulic oil and any non-aggressive fluid with sufficient lubricating properties.

If requested, the ACF/UCF pump may be certified according to any of following classification societies: DNV, BV, LRS, ABS, RS, GL, RINA, KR, NK, RMR or CCS.

Accuracy of performance according to VDMA 28284 group 2.

1.2 Applications

Typical applications are:

- Lubrication of diesel engines, gears, gas and steam turbines, hydro turbines and paper machines
- Main and prelube for diesel engines
- Circulation for cooling and filtration in large machineries and hydraulic systems
- Transformer oil for insulation in transformers
- Transfer onboard vessels, in power plants, oil factories, refineries, tank farms etc
- Filling of pressure chambers in hydraulic presses

1.3 Installation

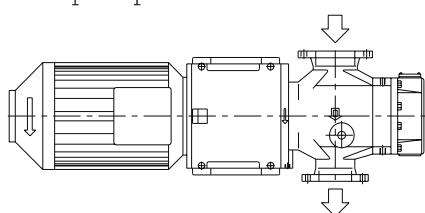
The pump is designed to be flange-mounted to its electric motor via a connecting frame and a flexible shaft coupling. By the connecting frame, the pump may be installed both horizontally and vertically. For vertical installations, a stand called TRIPOD can be supplied.

For pipe connections, standard for ACF series is DIN-type. For UCF, the standard is ANSI.

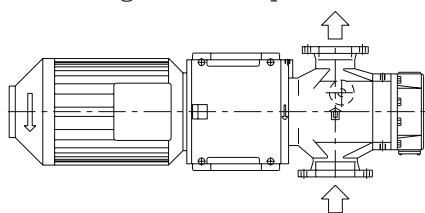
Note that for UCF, a version for vertical installation with feet are available (version xxRx). See section Pump Model code

As standard the pump is delivered with the discharge side to the left when seen from the pump rear end (see below).

For more information about installation, see Installation and Start-up instruction for low pressure pumps.



Mounting standard picture M93-0.



On request the pump can be delivered with opposite flow direction, M39-0.

2. Pump model code

**Pump series**

ACF/UCF

Size

Power rotor diameter [mm]
080, 090, 100, 110, 125

Lead

K and L = Low lead
N = Normal lead

Generation

Design generation 5

Material in pump body

I = Cast iron
N = Nodular cast iron

Shaft seal design

T = SiliconeCarbide, elastomers in viton

Mounting

B = Flange mounting
F = foot mounting*

Valve

P = Internal pressure relief valve
E = without internal pressure relief valve*

Special design

Code group omitted for standard design (A-number)
and/or numbering code
Std - without flanges included
001 - flanges included
002 - with TRIPOD, without flanges
003 - with TRIPOD and flanges

*Only valid for UCF series

3. Technical Data

3.1 Pressure Information

Pressure relief valve

The pump is equipped with an internal pressure relief valve with internal return, limiting the differential pressure across the pump and protecting the pump. Should the discharge line be blocked, the relief valve will open by the pressure. The valve is adjustable for different opening pressures.

The value of the pressure limit can be set at the factory and should be adjusted at installation (see Installation & Start-up instruction for low-pressure pumps).

The maximum pressure accumulation varies with pump size, speed and viscosity, but will normally not exceed 5 bar.

The valve has a maximum set pressure of 16 bar.

Inlet pressure

Minimum inlet pressure (suction capability) is dependent on fluid viscosity and rotation speed. It increases with decreasing viscosity and decreasing speed. Information about minimum inlet pressure for each individual duty case can be obtained from IMO AB or pump selection software WinPump.

Maximum inlet pressure is 7 bar.

Discharge pressure

Maximum discharge pressure is 16 bar.

Differential pressure

Maximum differential pressure is 16 bar but reduced at low viscosities according to table below

Viscosity [cSt]	1,4	2	6	10	>38
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Max. diff. pressure [bar]	4,3	5	7,7	9,5	16
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Refer to your IMO representative or use the pump selection software WinPump to determine the exact operating limits.

3.2 Driver information

Driver type

The pump is designed to be connected to an electrical motor via a flexible shaft coupling.

Under certain conditions, other types of drive can be permitted, e.g. gear or pulley drives, which create radial loads onto the shaft end.

For radial load requirements, contact IMO AB.

Speed

The maximum speed is 1800 rpm. Maximum operating speed may be reduced depending on inlet conditions. Contact IMO or use the pump selection software WinPump to find a corresponding speed limit in order to avoid cavitation problems. For information about cavitation see section IMO Tuning.

Rotation

The pump is designed to operate in one rotational direction only, as standard clockwise when facing the shaft end. Pumps for CCW operation can be delivered on special request.

For shorter periods of time, a few minutes for emptying a discharge line, the pump may be operated in reverse direction, provided the back pressure is limited to 3 bar.

3. Technical Data

3.3 Sound level

Typical pump sound levels refer to free field conditions at a distance of 1 m from the pump. Noise of driver excluded in the quoted figures. The sound levels are measured at a discharge pressure of 7 bar, speed 1450 rpm and viscosity 37 cSt.

Pump Size 080 090 100 110 125

Sound level dB[A] 73 74 75 76 77

3.4 Moment of Inertia

Size 080 090 100 110 125

[10^{-3} kgm 2] 5,3 8,2 17,2 24,6 43,9

3.5 Fluid viscosity

1,4 – 5000 cSt.

3.6 Fluid temperature

Cast Iron version (Ixxx): -20 – +90 °C

Nodular Cast Iron version (Nxxx): -20 – +130 °C

4. Design

4.1 Ball bearing

The pump is fitted with internal ball bearing which continuously is being greased by the handling media.

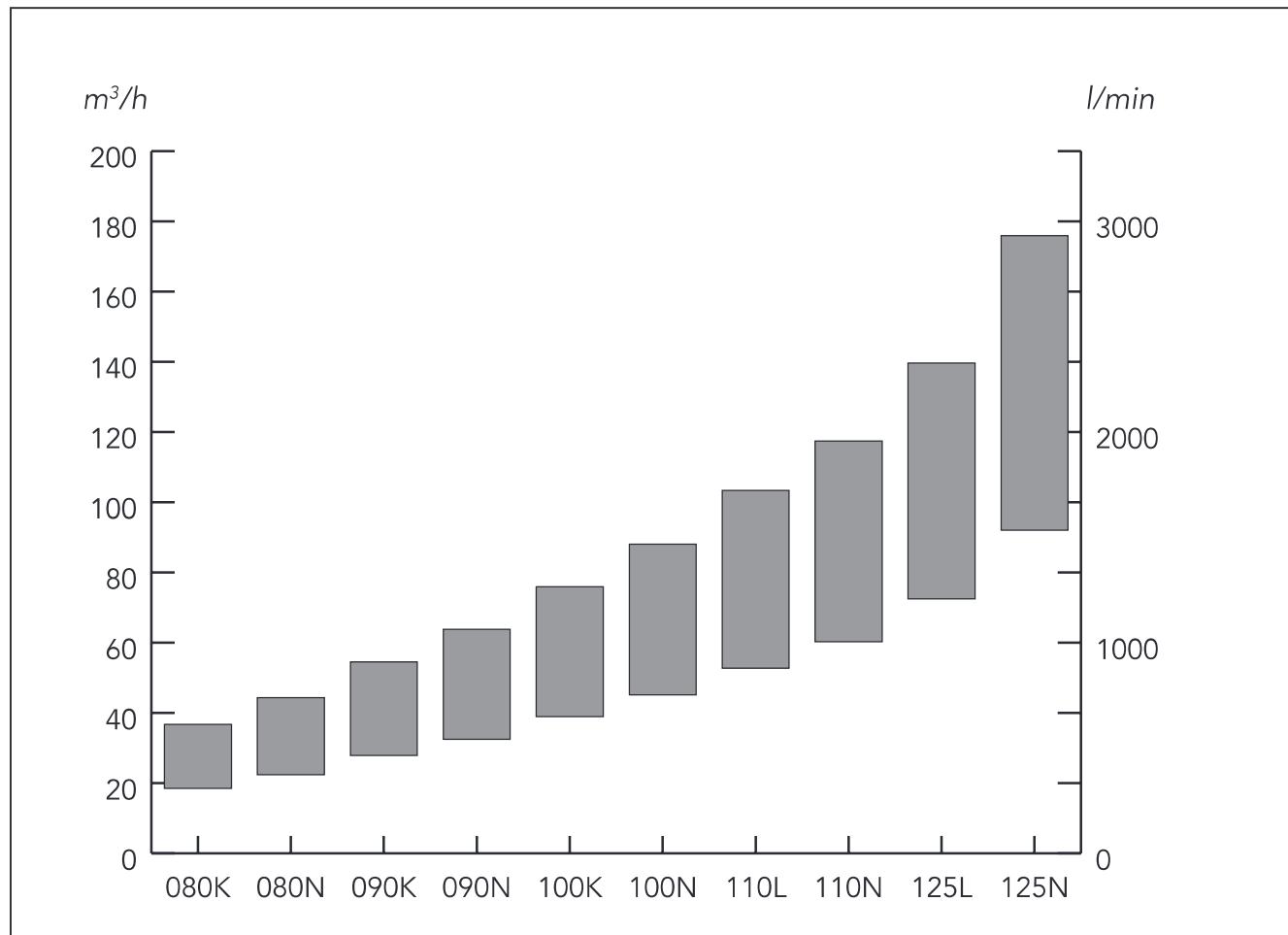
4.2 Material & design

Model	Material pump	Material rotor	Material idler	Material seal	Material Elastomers
ACF I/ UCF I	Grey cast iron	Structural steel, surface treated	Structural steel, surface treated	SiliconCarbide (SiC/SiC)	Viton
ACF N/ UCF N	Nodular (duc- tile) cast iron	Structural steel, surface treated	Structural steel, surface treated	SiliconCarbide (SiC/SiC)	Viton

For handling of fluids which may be aggressive to above materials, consult IMO AB.

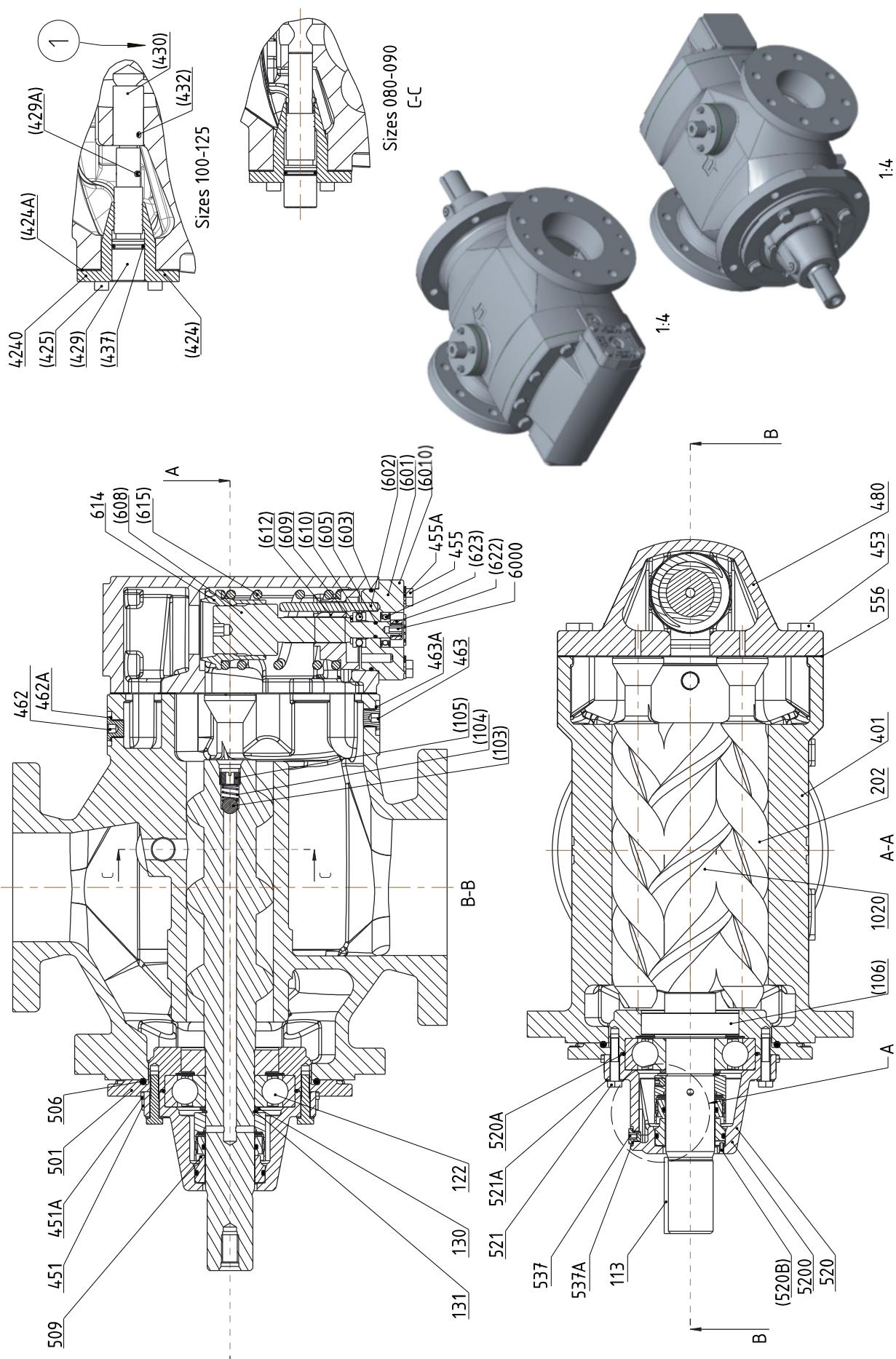
5. Performance Guide

Typical performance values at 5 bar
Flow calculated at 26 cSt, power at 260 cSt.



rpm	080K			080N			090K			090N		
	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	l/min	kW	l/min
950	308	4,7		373	5,7		464	6,9		541	8,1	
1150	384	5,9		465	7,1		575	8,6		672	10,2	
1450	498	7,8		602	9,4		742	11,4		868	13,4	
1750	612	9,8		739	11,8		908	14,3		1 064	16,8	
rpm	100K			100N			110L			110N		
	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	l/min	kW	l/min
950	649	9,5		752	11,1		880	9,5		1 004	11,1	
1150	803	12,0		931	13,9		1 090	12,0		1 242	13,9	
1450	1 034	15,8		1 200	18,4		1 406	15,8		1 600	18,4	
1750	1 265	19,9		1 468	23,1		1 722	19,9		1 957	23,1	
rpm	125L			125N								
	l/min	kW	l/min	l/min	kW	l/min	l/min	kW	l/min	l/min	kW	l/min
950	1 208	9,5		1 533	11,1							
1150	1 488	12,0		1 883	13,9							
1450	1 908	15,8		2 407	18,4							
1750	2 328	19,9		2 932	23,1							

6. Sectional view



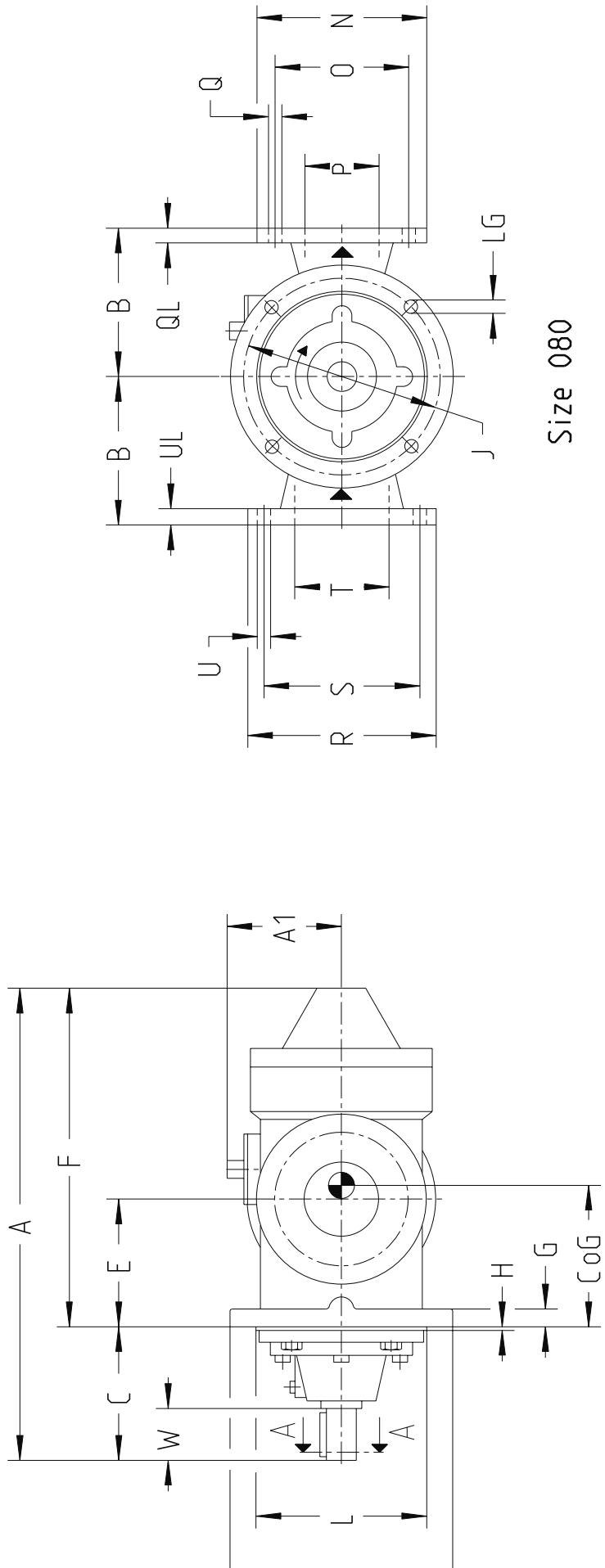
7. List of Components

Pos No	Denomination	Pos No	Denomination
1020	Complete power rotor	451	Screw
(103)	Ball	451A	Washer
(104)	Spring	453	Screw
(105)	Hole	455	Screw
(106)	Balancing piston	455A	Washer
113	Key	462	Plug
122	Ball bearing	462A	Sealing washer
130	Support ring	463	Plug
131	Retaining ring	463A	Sealing washer
202	Idler rotor	480	Valve housing
401	Pump body	501	Front cover
4240	Complete tuning element	506	O-ring
(424)	Cover	509	Complete shaft seal
(424A)	Gasket	S1	Stationary seat
(425)	Screw	S2	Stationary seat O-ring
(429)	Guiding screw	S4	Seal ring
(429A)	Tension pin	S5	Seal ring carrier
(430)	Piston	S6	Seal ring O-ring
(432)	Tension pin	5200	Complete cover
(437)	O-ring	(520)	Cover
		(520B)	Tension pin
		(537)	Deaeration plug
		(537A)	Sealing washer
		520A	O-ring
		521	Screw
		521A	Washer
		556	Gasket
		6000	Complete valve element
		(6010)	Complete valve cover
		(602)	Pin
		(603)	O-ring
		(605)	O-ring
		(608)	Valve spindle
		(609)	Washer
		(610)	Ball bearing
		(612)	Regulating nut
		(614)	Valve piston
		(615)	Valve spring
		(622)	Nut
		(623)	Ball Bearing

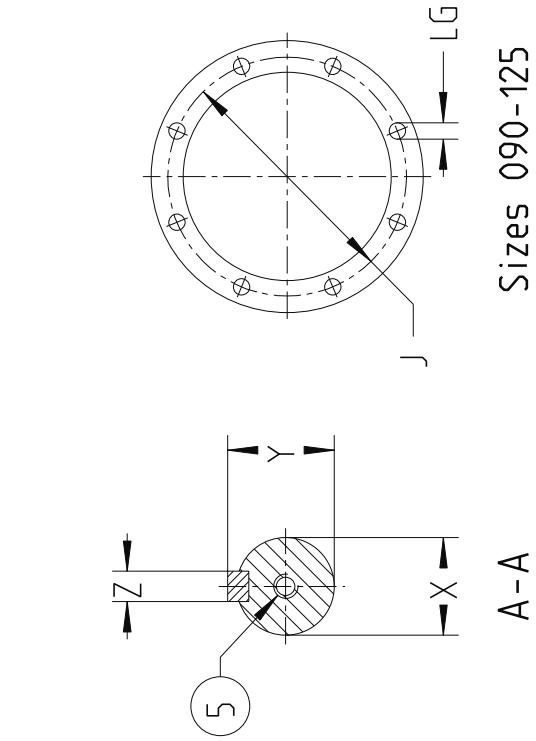
Drawing remarks:
(1) Applicable for sizes 100-125

Notes:
- Components with Pos No within parenthesis are parts of subassembly

8. Pump Dimensions

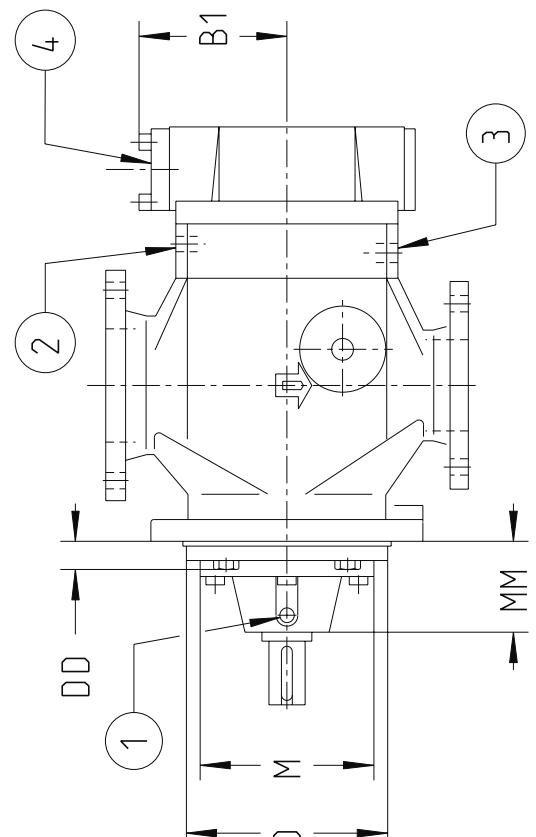


Size 080



Sizes 090-125

A-A



8. Pump Dimensions

Pump Size	Main Dimensions										Flange Dimensions					Outlet					Inlet					Shaft			Weight						
	A	A1	B	B1	C	D	DD	E	F	M	M'	G	H	J	K	L ¹	L _G	N	A(C)U(C)F	P	A(C)U(C)F	Q	QL	R	A(C)U(C)F	T	A(C)U(C)F	U	UL	W	X ²	Y	Z	Cog	kg
080	638	154	200		169	180	227	172	458			265	300	230	4 _x	229	180	191	100	8 _x	25	25 ₄	210	216	125	8 _x	18	70	42	45	12	180	100		
090	669	157	225		237	32	188	489			300	350	250	8 _x	254	210	216	125	18	27	285	240	241	150	8 _x	22	8 _x	22	27	70	42	45	12	195	130
100	769	250		193			209	549		137	30																					235	165		
110	816	198	260		220	290	32	240	596	210	129	5	350	400	300	8 _x	285	240	241	150	8 _x	22	34 ₃	295	298	200	12 _x	22	31	85	59	16	255	205	
125	921		265	213							127	35																				27	90	300	275

Drawing remarks:
 (1) Denaeration plug
 (2) Inlet gauge. ISO
 (3) Outlet gauge. IS

4) Relief valve. Turn clockwise to increase opening pressure
 5) 5/8" UNC. Depth 32

Notes:

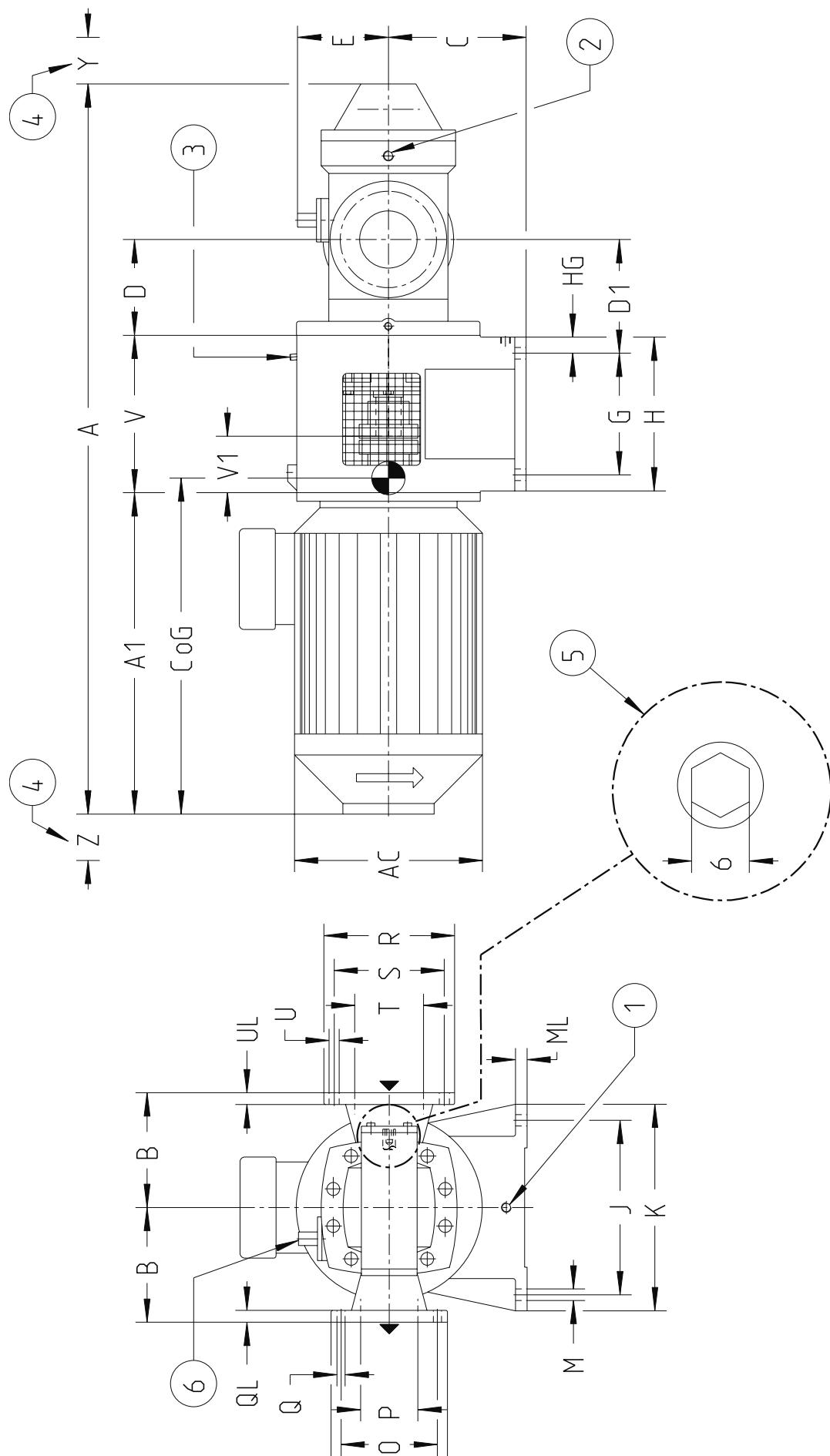
- Dim
- Dim
- Wei

Tolerances ISO h7
UCF = ASME B16.5 150#

Tolerances ISO 1

Dimensions in mm
Dimension A1 is a maximal value
Weight is an approximate value

9. Pump Unit dimensions



9. Pump Unit dimensions

Pump size	IEC Frame Size	Main Dimensions												Flange Dimensions												Outlet															
		A	A1	A2	B	C	D	D1	E	V	V1	G	H	HG	J	K	M	ML	N	ACF	UCF	P	ACF	UCF	QL	R	ACF	UCF	S	T	ACF	UCF	U	UL	Y	Z	CoG	kg			
132	F265	1102	371	255	200	250	172	214	154	273	93	190	260	35	340	400	22	25	229	180	191	100	8x	8x	25	254	210	216	125	8x	8x	27	200	145	115	600	175				
160	F300	1256	495	314	200	250	172	214	154	303	123	220	290																									630	220		
180	F300	1318	557	358																																			650	260	
200	F350	1438	677	381																																			640	420	
160	F300	1287	495	314																																			675	250	
180	F300	1349	557	358																																			690	285	
200	F350	1469	677	381																																			835	450	
225	F400	1587	775	448																																			165	770	535
160	F300	1387	495	314																																			770	295	
180	F300	1449	557	358																																			145	760	330
200	F350	1569	677	381																																			730	490	
225	F400	1687	775	448																																			165	790	590
250	F500	1777	845																																				185	700	635
280	F500	1862	930	508																																			750	875	
160	F300	1434	495	314																																			810	340	
180	F300	1496	557	358																																			820	370	
200	F350	1616	677	381																																			145	770	510
225	F400	1734	775	448																																			165	805	630
110	F400	1824	845	448																																			770	660	
250	F500	1909	930	508																																			185	780	900
280	F500	1539	495	314																																			840	415	
160	F300	1601	557	358																																			145	900	435
180	F300	1721	677	381																																			860	600	
225	F400	1839	775	448																																			165	890	700
250	F500	1929	845	448																																			980	750	
280	F500	2014	930	508																																			185	800	975

Drawing remarks:

(1) Drain connection ISO G1/2

(2) Outlet gauge ISO G3/8
Other side: Inlet gauge ISO G3/8

(3) Deaeration plug

(4) Space for dismantling

(5) Relief valve. Turn clockwise to increase opening pressure. Use hexagon head socket screw key = 6 mm

(6) Control for Tuning

Notes:

Dimensions in mm

Dimensions valid for standard motors from IMO AB

Weight is an approximate value

10. Accessories

A bare shaft pump (Fig. 1) can be ordered with the accessories in fig. 2-7.

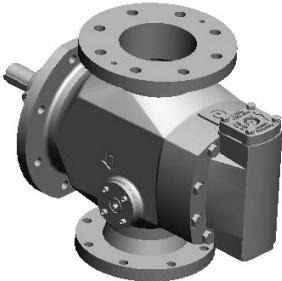


Fig. 1 Bare shaft pump



Fig. 2 Set of counter flanges



Fig. 3 Connecting frame

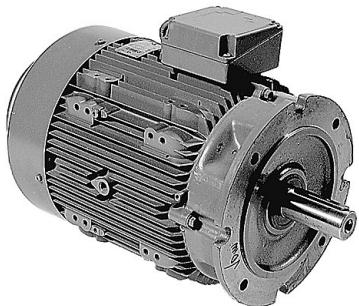


Fig. 4 Electric motor



Fig. 5 Shaft coupling

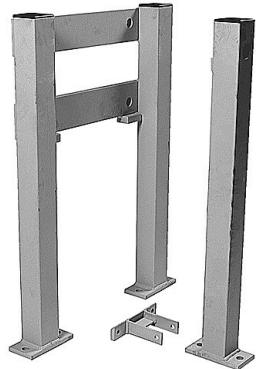


Fig. 6 Tripod



Fig. 7 Gauge panel

11. Maintenance and Service

Spare parts for these pumps are easily available from stock. For detailed information and know-how about service, see the Maintenance & Service Instruction for ACF5/UCF5 pumps or contact IMO AB.

12. IMO AB Tuning

The tuning® valves, which are standard on the ACF/UCF series, make it possible to pump oil containing free air, with a minimum of disturbing vibration noise.

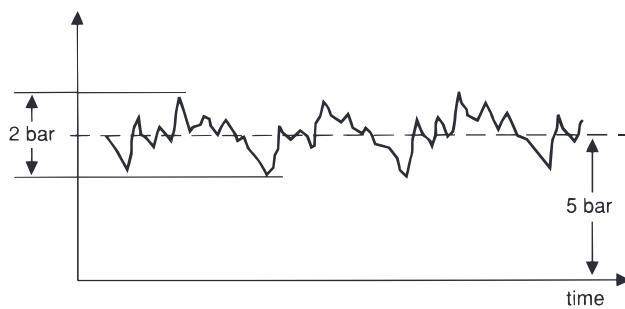
Low volume lube oil systems and additives that prolong deaeration time are the main reasons for having an excessive amount of free air in the oil. Free air is the main source of vibration and noise in pump systems as the air entrained oil is compressible and air bubbles expands and decreases in size very rapidly. By throttling the tuning® valve, the correct amount of fluid, depending on air content and pressure, is fed from the pressure side into the rotor bores.

The effect this has on the air bubbles is that they will gradually decrease in size rather than collapse when exposed to the full pressure on the discharge side.

12.1 Effect of tuning® Pressure fluctuations

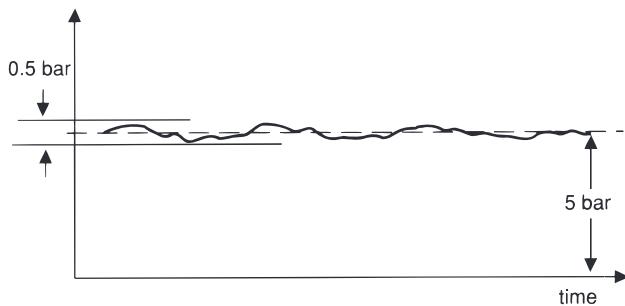
Without tuning

Pressure fluctuations are rapid and cover a wide band which produces a loud rattling noise.



With tuning

Pressure fluctuations are highly reduced in speed and magnitude leading to low noise level. Diagram refers to tests at 1800 rpm, delivery pressure 5 bar, inlet pressure -0,5 bar, viscosity 75 cSt and 6 % free air.



The two tuning® valves on the pump are easily adjusted individually (by turning the tuning spindles with an Allen key to a position where the noise level comes to a minimum) while the pump is working under normal operating conditions.

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