

ACF5 Std Line



Product Description



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

1. Applications

1.1 Functionality

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

Lubrication oil, fuel oil, vegetable oil, hydraulic oil and other hydraulic fluids, glycol, polymers, emulsions and any non-aggressive fluid with sufficient lubricating properties.

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

1.2 Applications

Typical applications are:

- Lubrication of diesel engines, gears, gas and steam turbines, hydro turbines and paper machines
- Main and pre-lube 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

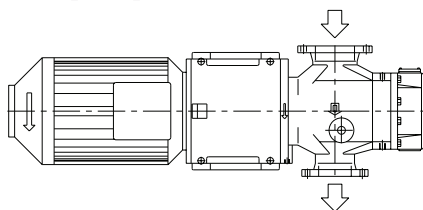
1.3 Installation

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.

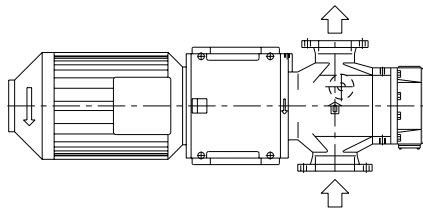
As standard, the pump is supplied without counter flanges (DIN type) but they can be included if requested.

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.

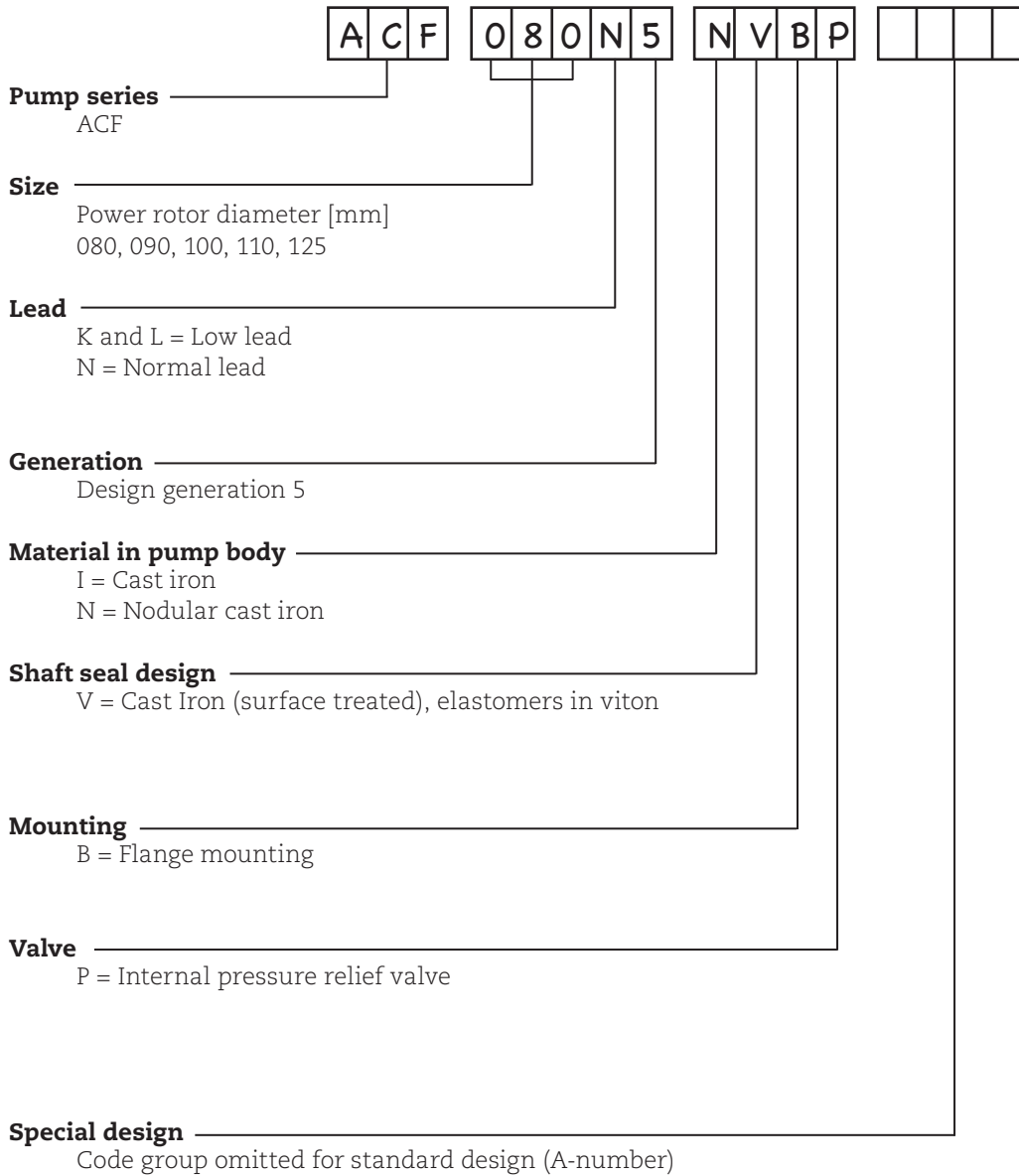


Mounting standard picture M93-0.



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

2. Pump model code



3. Technical Data

3.1 Pressure Information

Pressure relief valve

The pump is equipped with an integral 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
Max. diff. pressure [bar]	4,3	5	7,7	9,5	16

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 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 – 1500 cSt. Viscosity up to 5000 cSt after approval from IMO AB

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.

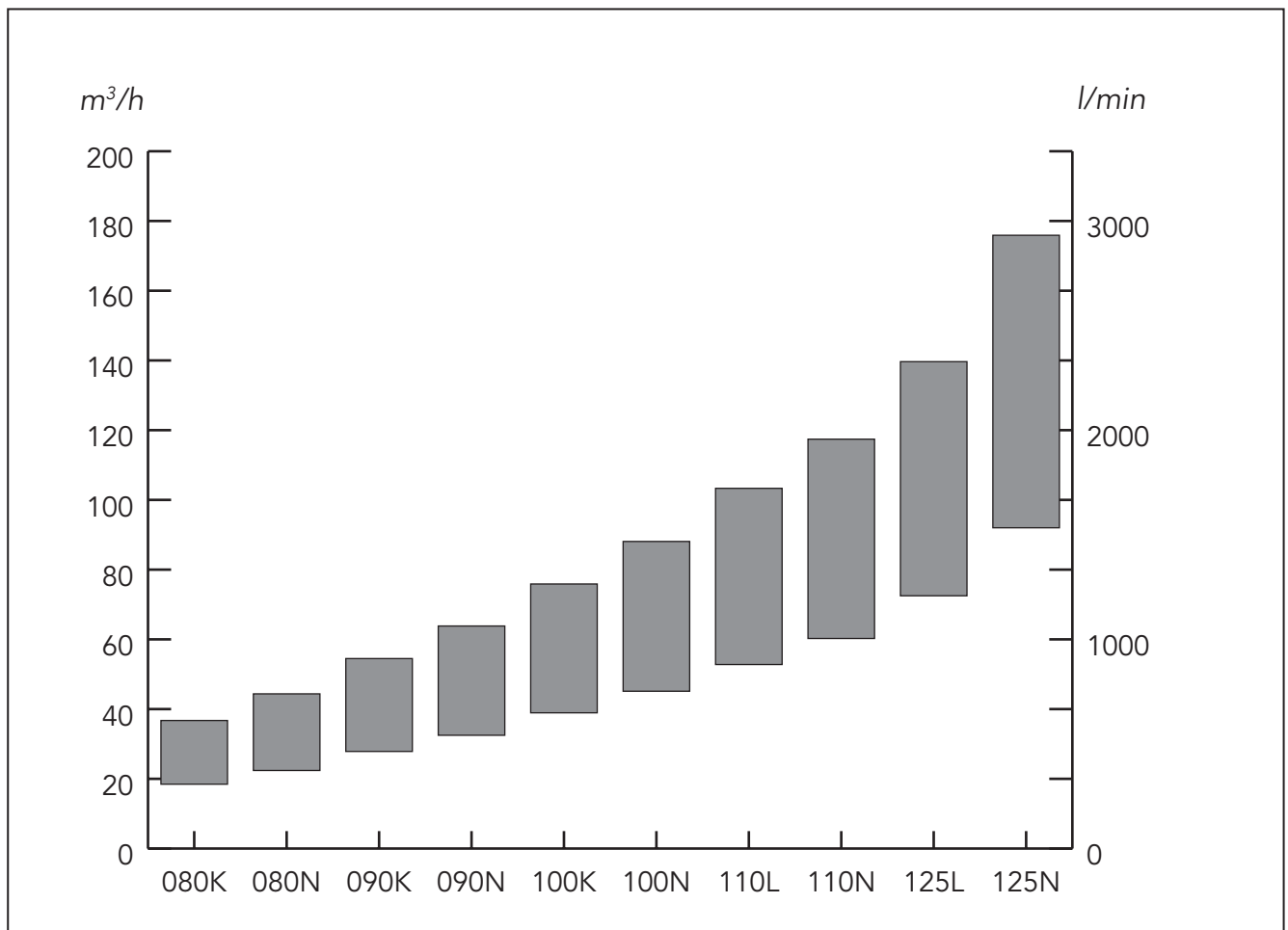
4.2 Material & design

Model	Material pump	Material rotor	Material idler	Material seal	Material Elastomers
ACF I	Grey cast iron	Carbon steel, surface treated	Carbon steel, surface treated	Cast iron, surface treated	Viton
ACF N	Nodular cast iron	Carbon steel, surface treated	Carbon steel, surface treated	Cast iron, surface treated	Viton

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

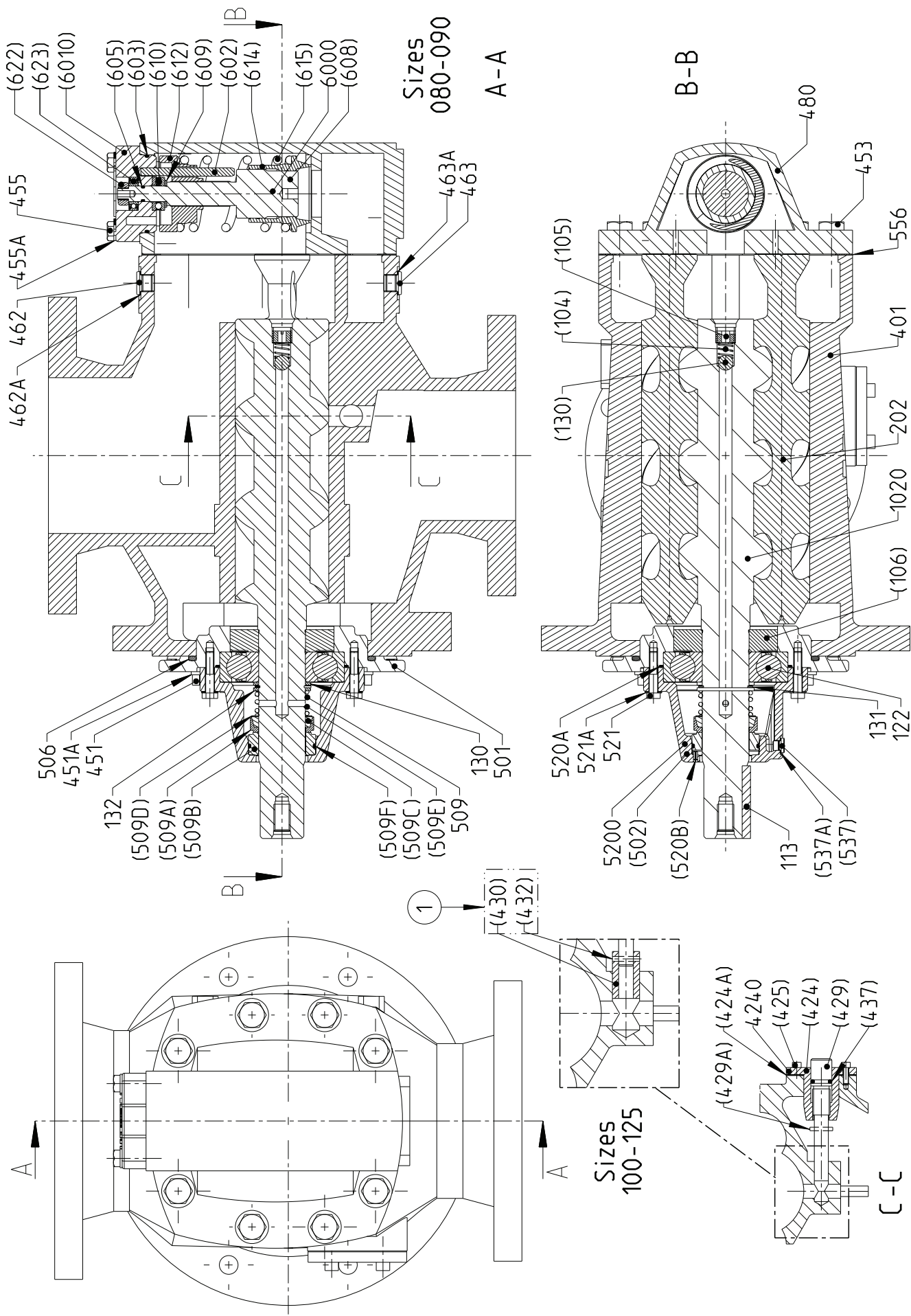
5. Performance Guide

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



080K			080N			090K			090N		
rpm	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW	
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			
100K			100N			110L			110N		
rpm	l/min	kW	l/min	kW	l/min	kW	l/min	kW	l/min	kW	
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			
125L			125N								
rpm	l/min	kW	l/min	kW							
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	Pos No	Denomination
1020	Complete power rotor	451	Screw	(520B)	Tension pin
(103)	Ball	451A	Washer	(537)	Deaeration plug
(104)	Spring	453	Screw	(537A)	Sealing washer
(105)	Hole	455	Screw	520A	O-ring
(106)	Balancing piston	455A	Washer	521	Screw
113	Key	462	Plug	521A	Washer
122	Ball bearing	462A	Sealing washer	556	Gasket
130	Support ring	463	Plug	6000	Complete valve element
131	Retaining ring	463A	Sealing washer	(6010)	Complete valve cover
132	Support ring	480	Valve housing	(602)	Pin
202	Idler rotor	501	Front cover	(603)	O-ring
401	Pump body	506	O-ring	(605)	O-ring
4240	Complete tuning element	509	Complete shaft seal	(608)	Valve spindle
(424)	Cover	(509A)	Seal ring	(609)	Washer
(424A)	Gasket	(509B)	Seat	(610)	Ball bearing
(425)	Screw	(509C)	Ring	(612)	Regulating nut
(429)	Guiding screw	(509D)	Washer	(614)	Valve piston
(429A)	Tension pin	(509E)	Spring	(615)	Valve spring
(430)	Piston	(509F)	O-ring	(622)	Nut
(432)	Tension pin	5200	Complete cover	(623)	Ball Bearing
(437)	O-ring	(520)	Cover		

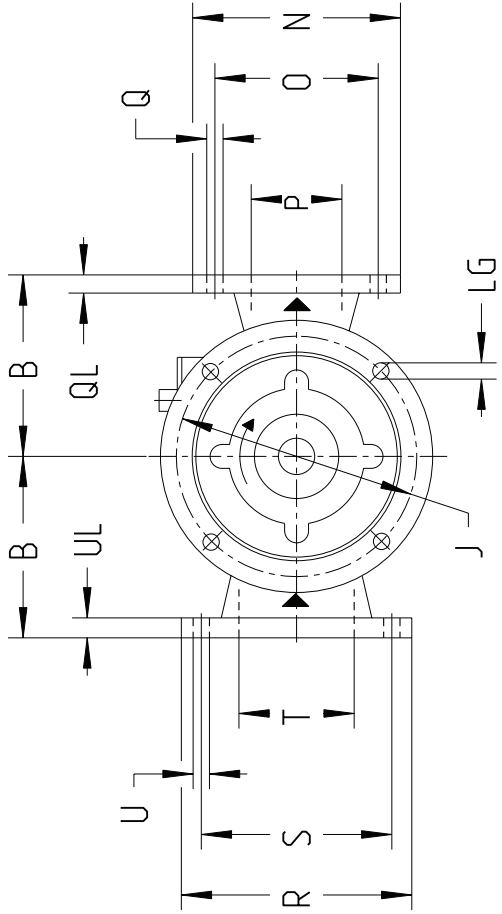
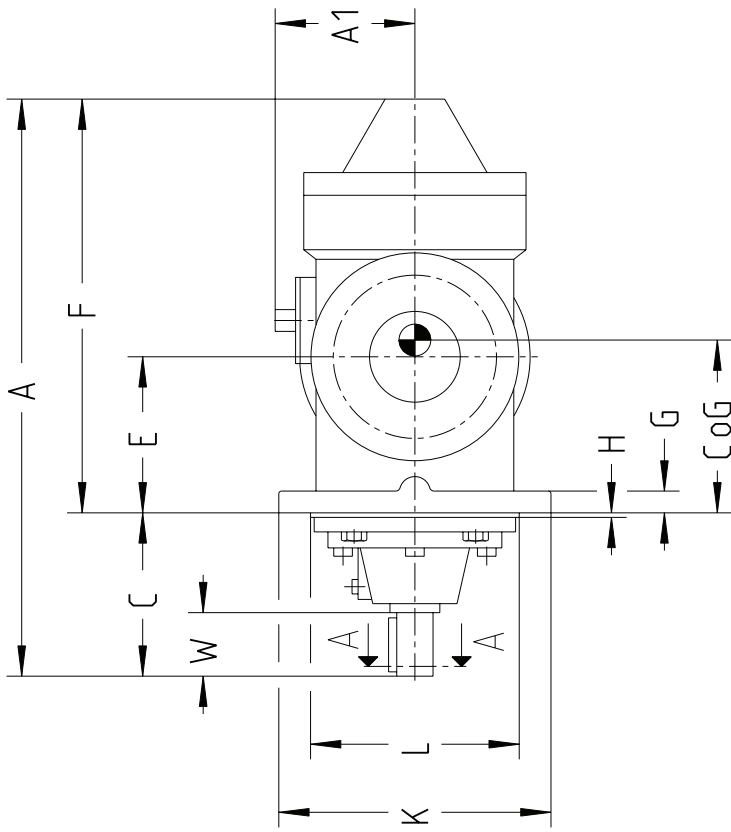
Drawing remarks:

(1) Applicable for sizes 100-125

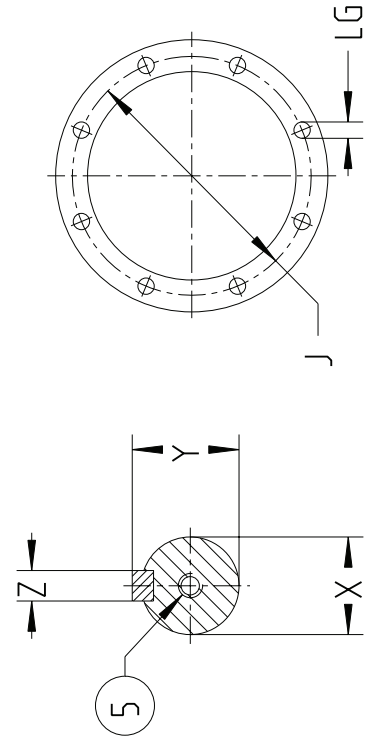
Notes:

- Components with Pos No within parenthesis are parts of subassembly

8. Pump Dimensions

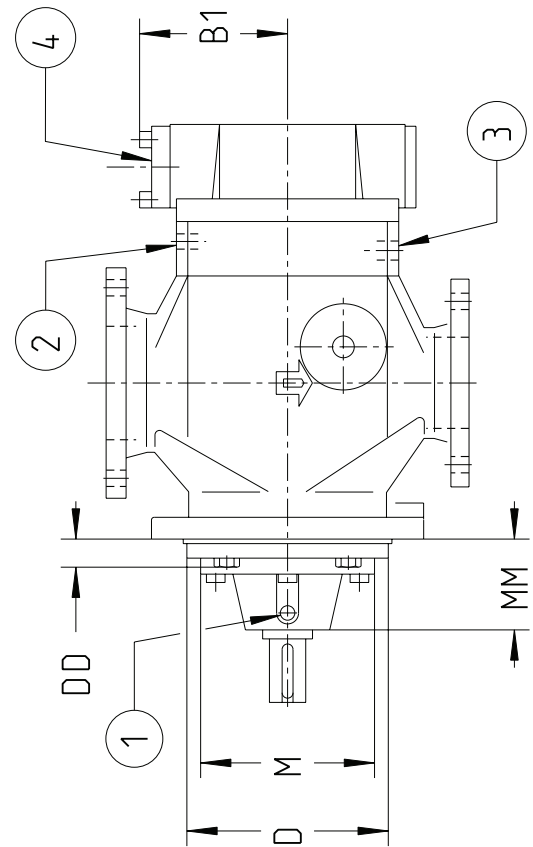


Size 080



A-A

Sizes 090-125



8. Pump Dimensions

Pump size	Main dimensions										Flange dimensions					Outlet					Inlet			Shaft			Weight							
	A	A1	B	B1	C	D	DD	E	F	M	MM	G	H	J	K	L ¹⁾	LG	N	O	P	Q	QL	R	S	T	U	UL	W	X ²⁾	Y	Z	CoG	kg	
080	638	154	200			227		172	458					265	300	230	4x ∅18	229	180	100		25	254	210	125	8x ∅18							180	100
090	669	157	225	169	180	237	32	188	489	158	107	24	5	300	350	250	8x ∅18	254	210	125	8x ∅18		285	240	150	8x ∅22	27	70	42	45	12	195	130	
100	769		250					209	549		137										27						80				235	165		
110	816	198	260	193		220	290	240	596	210	129	5	350	400	300		8x ∅18	285	240	150	8x ∅22		343	295	200	12x ∅22	31	85	55	59	16	255	205	
125	921		265	213				270	701		127	35									23						90				300	275		

Drawing remarks:

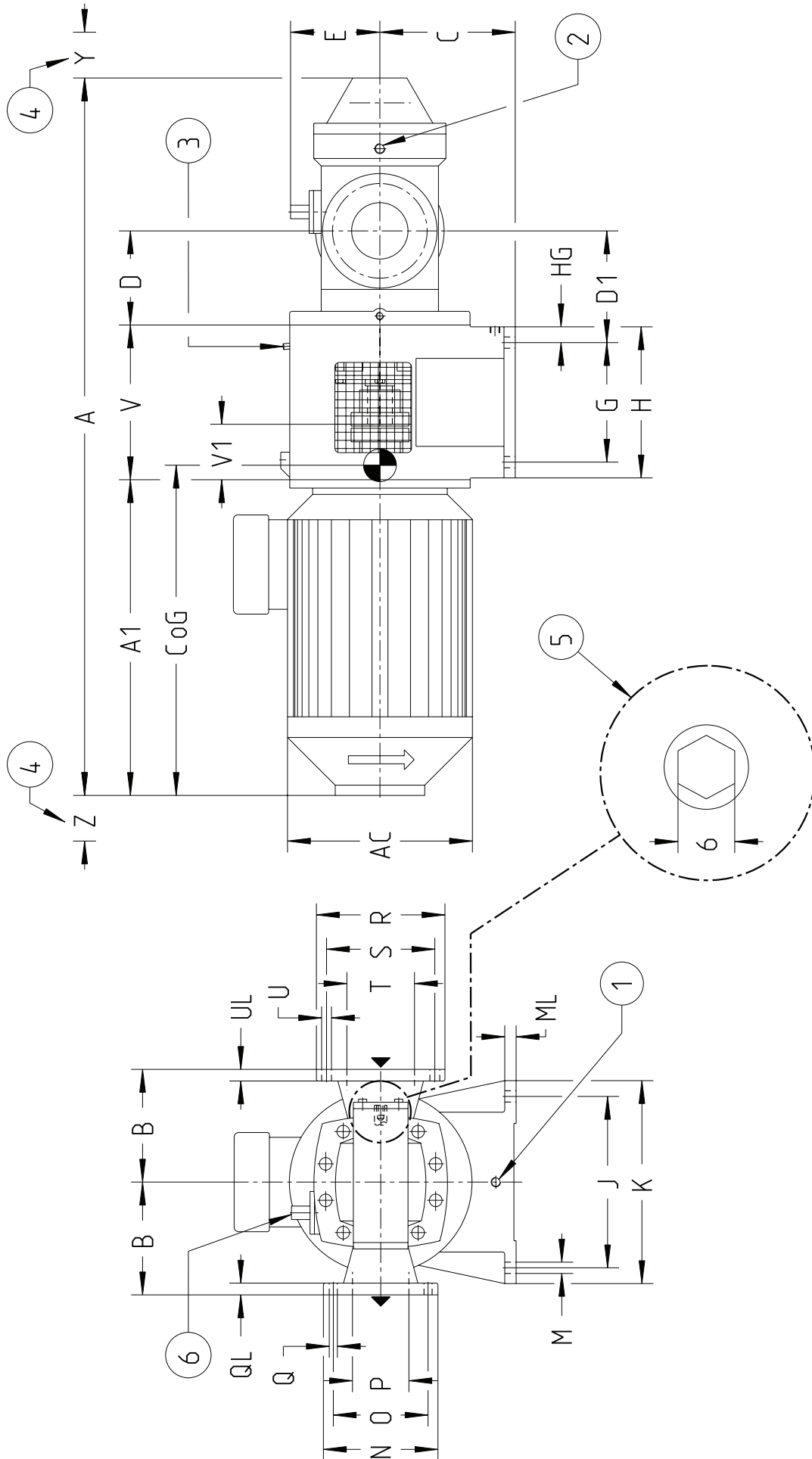
- (1) Deaeration plug
- (2) Inlet gauge. ISO G3/8
- (3) Outlet gauge. ISO G3/8

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

Notes:

- Dimensions in mm
- Dimension A1 is a maximal value
- Counter flanges according to DIN2633/ND16
- Weight is an approximate value
- 1) Tolerances ISO h7
- 2) Tolerances ISO j6

9. Pump Unit dimensions



9. Pump Unit dimensions

Pump size	IEC No	Frame size	Main dimensions										Flange dimensions							Outlet						Inlet			Dism.		Weight				
			A	A1	AC	B	C	D	D1	E	V	V1	G	H	HG	J	K	M	ML	N	O	P	Q	QL	R	S	T	U	UL	Y		Z			
080	132	F265	1102	371	255					273	93	190	260																		115			600	175
	160	F130	1256	495	314					303	123	220	290	35	340	400	22	25	229	180	100	8x ∅18	25	254	210	125	8x ∅18	27	200				630	220	
	180	F350	1318	557	358	200	250	172	214	154																					145			650	260
	200	F350	1438	677	381																												640	420	
090	160	F300	1287	495	314																											675	250		
	180	F350	1349	557	358	225	250	188	234	157	303	123	220	288	35	340	400	22	25	254	125	27	285	240	150	8x ∅22	27	200			145		690	285	
	200	F400	1469	677	381																												835	450	
	225	F400	1587	775	448						323	143	230	300																	165		770	535	
100	160	F300	1387	495	314																											770	295		
	180	F350	1449	557	358																											760	330		
	200	F400	1569	677	381	250	300	209	248	198	343	123	265	335	35	380	450	25	25	254	125	27	285	240	150	8x ∅22	27	240			145		730	490	
	225	F400	1687	775	448						363	143	285	375																		700	635		
110	250	F500	1777	845	508																											750	875		
	280	F300	1862	930	508																											810	340		
	160	F350	1434	495	314																											820	370		
	180	F400	1496	557	358																											770	510		
125	200	F350	1616	677	381	260	300	240	279	198	363	143	285	375	35	430	500	25	35	285	150	27	343	295	200	12x ∅22	31	240			165		805	630	
	225	F400	1734	775	448																											780	660		
	250	F500	1824	845	508																											780	900		
	280	F300	1909	930	508																											840	415		
125	160	F300	1539	495	314																											900	435		
	180	F350	1601	557	358																											860	600		
	200	F400	1721	677	381	265	300	270	309	198	363	143	285	375	35	430	500	25	35	285	150	23	343	295	200	12x ∅22	27	240			165		890	700	
	225	F500	1839	775	448																											980	750		
125	250	F500	1929	845	508																											800	975		
	280	F500	2014	930	508																											800	975		

Notes:
 - Dimensions in mm
 - Dimensions valid for Brook Crompton motors type WU-DA, WP-UDF
 - Weight is an approximate value

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

10. Accessories

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

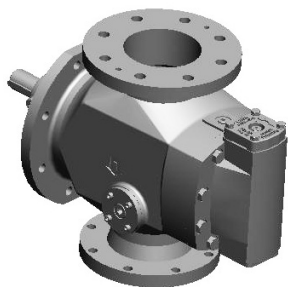


Fig. 1 Bare shaft pump



Fig. 2 Set of counter flanges

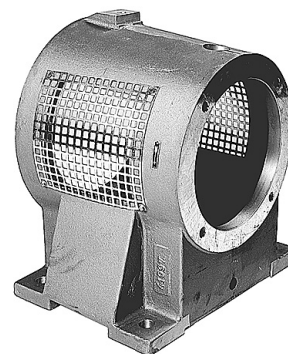


Fig. 3 Connecting frame

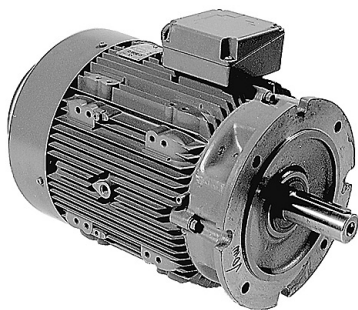


Fig. 4 Electric motor



Fig. 5 Shaft coupling

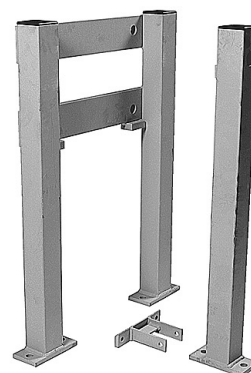


Fig. 6 Tripod



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 pumps or contact IMO AB.

12. IMO AB Tuning

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

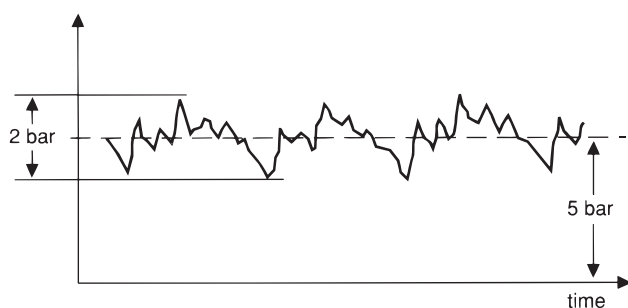
Low volume lube oil systems and additives that prolong deaeration time are the main reasons for having an excessive amount of free air in the oil. Free air is the main source of vibration and noise in pump systems as the air entrained oil is compressible and air bubbles expand and decrease in size very 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

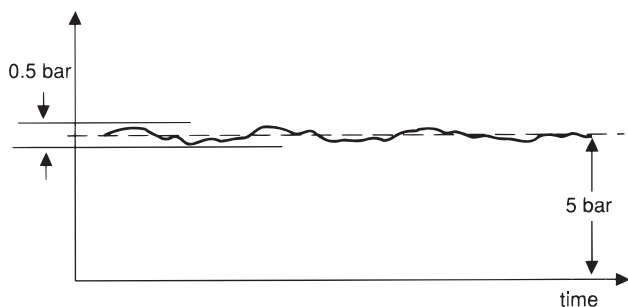
Without tuning

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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