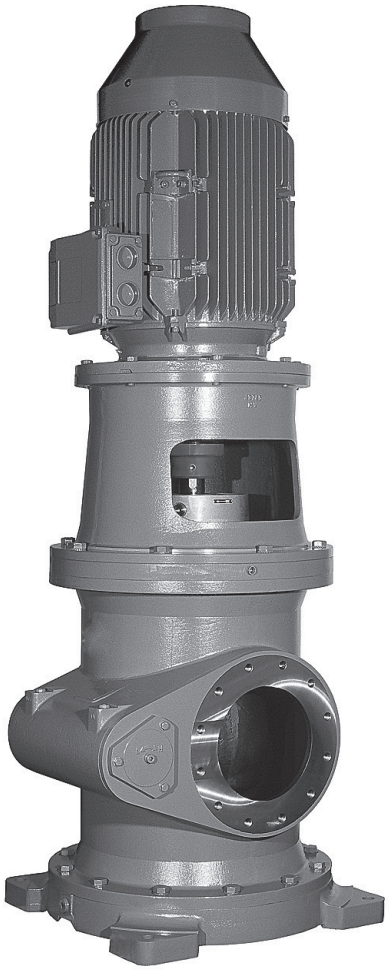
LPQ
Std Line

CIRCOR

IMO®

Product Description



ATEX-compliance

Flow volume:	**1450 - 8100 l/min**
Max differential pressure:	**16 bar**
Applications:	**Circulation, lubrication and transfer**

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1. Applications

1.1 Functionality

The LPQ 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 LPQ 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 and cooling of diesel engines
- Lubrication of steam and hydro turbines
- Transfer onboard ships, in oil factories, refineries, tank farms etc
- Loading/unloading of ships, railcars etc

1.3 Use in potentially explosive areas

The pump fulfils the requirements according to EU explosion-protection directive 2014/34/EU (ATEX 100a) for devices in device class II, category 2G.

Classification into temperature classes according to DIN EN 80079-36 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.

1.4 Installation

The pump is designed to be flange-mounted to its electrical motor via a connecting frame and a flexible shaft coupling.

The pump should be installed vertically.

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

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

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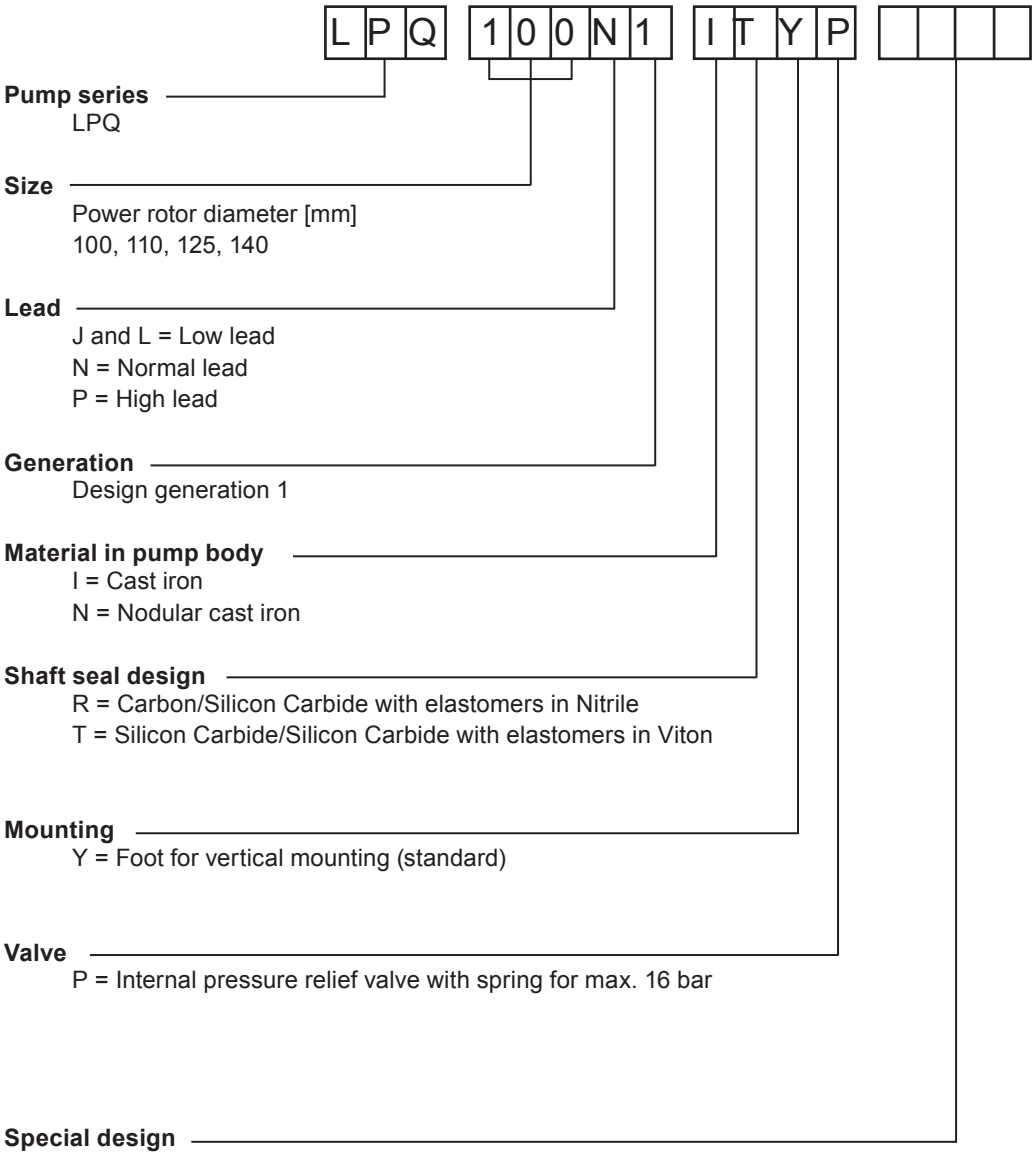
2. Pump model code



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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 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 4 bar.

The characteristic of the valve allows the valve to be used as pressure regulating valve when not too high demands on pressure modulation are required. 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 3 bar.

Discharge pressure

Maximum discharge pressure is 16 bar.

Differential pressure

Maximum differential pressure is 10 bar but reduced at low viscosities according to table below.

Viscosity [cSt]	2	20	100	180
Lub. Oil, max. diff. pressure [bar]	4	9	10	10
Fuel oil, max. diff. pressure [bar]	2	4,6	8,2	10

Contact IMO 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 by a flexible shaft coupling.

Speed

The maximum speed is 1800 rpm (1500 rpm for sizes LPQ 140N and LPQ 140P). Max. 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.

Rotation

The pump is designed to operate in one rotational direction only, as standard clockwise when facing the shaft end.

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.

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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 4 bar, speed 1450 rpm and viscosity 37 cSt.

Size	100	110	125	140
Sound level dB [A]	74	76	78	84

3.4 Moment of Inertia

Moment of intertia [10^{-3} kgm^2]

Size	100	110	125	140
Value	29,3	38,4	58,8	101

3.5 Fluid viscosity

2 – 800 cSt. Viscosity up to 5000 cSt after approval from IMO AB.

3.6 Fluid temperature

-20 – +90 °C for all types of seal and material.

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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
LPQ IR	Cast iron	Structural steel	Structural steel	Carbon/Silicon Carbide	Nitrile
LPQ IT	Cast iron	Structural steel	Structural steel	Silicon Carbide/ Silicon Carbide	Viton
LPQ NR	Nodular cast iron	Structural steel	Structural steel	Carbon/Silicon Carbide	Nitrile
LPQ NT	Nodular cast iron	Structural steel	Structural steel	Silicon Carbide/ Silicon Carbide	Viton

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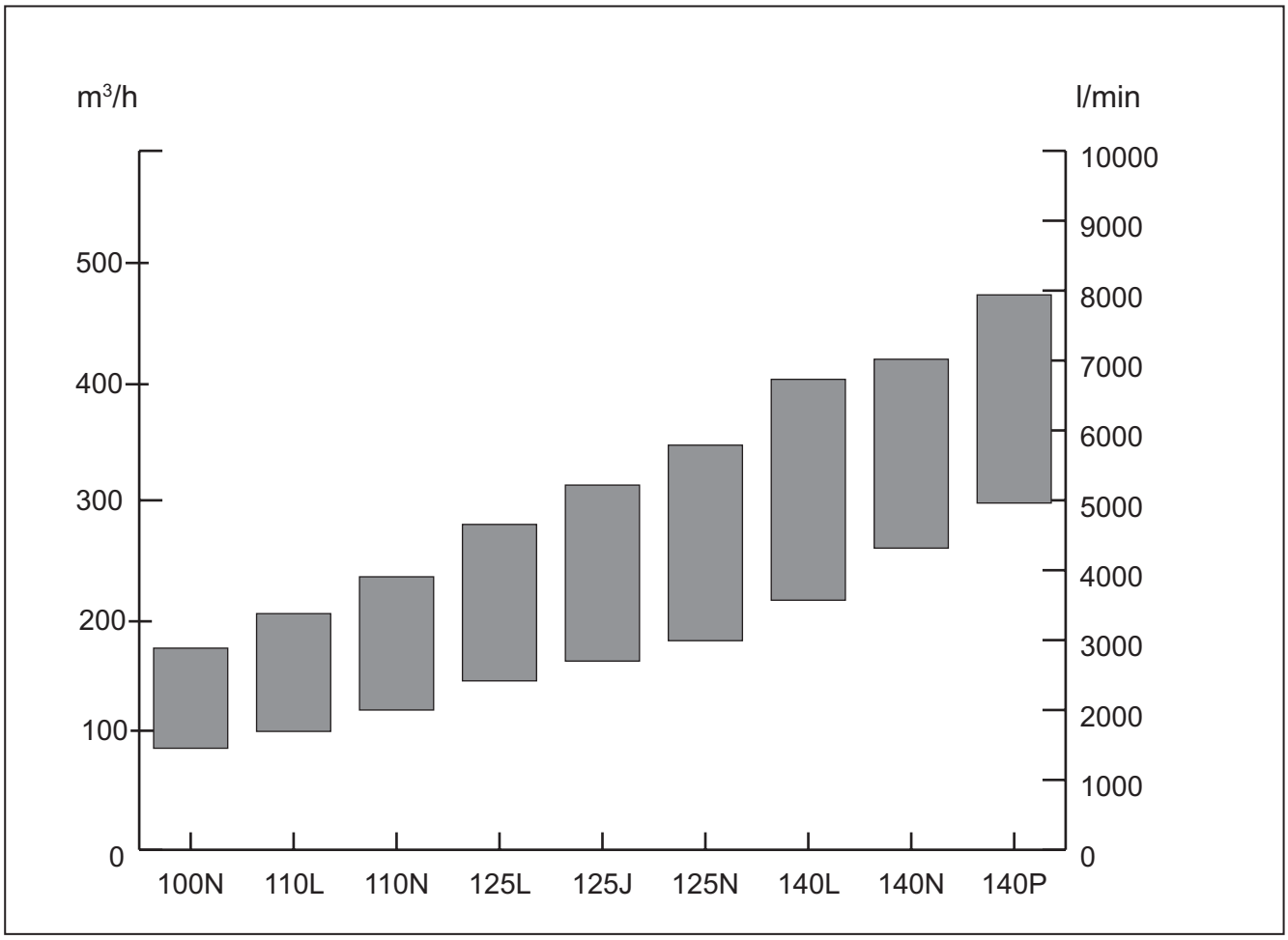
5. Performance Guide

Typical performance values at 5 bar
Flow calculated at 26 cSt, power at 260 cSt.
Pump performance established according to EN 14343.



	100N		110L		110N	
rpm	l/min	kW	l/min	kW	l/min	kW
950	1 453	20,9	1 694	25,3	2 000	27,9
1150	1 811	26,2	2 115	31,7	2 476	34,8
1450	2 348	34,4	2 747	41,7	3 191	45,7
1750	2 885	43,0	3 379	52,3	3 905	57,2

	125L		125J		125N	
rpm	l/min	kW	l/min	kW	l/min	kW
950	2 417	33,6	2 700	37,3	2 992	40,9
1150	2 977	42,1	3 330	46,6	3 692	51,1
1450	3 816	55,4	4 274	61,4	4 740	67,1
1750	4 655	69,4	5 218	76,9	5 789	84,0

	140 L		140N		140P	
rpm	l/min	kW	l/min	kW	l/min	kW
950	3 571	46,2	4 316	57,4	4 691	63,3
1150	4 361	57,7	5 298	71,8	6 044	79,1
1450	5 46	75,9	6 772	94,3	7 668	104
1500	6 731	94,9	7 017*	98,2	7 939*	108

* Calculated at max speed 1500 rpm.

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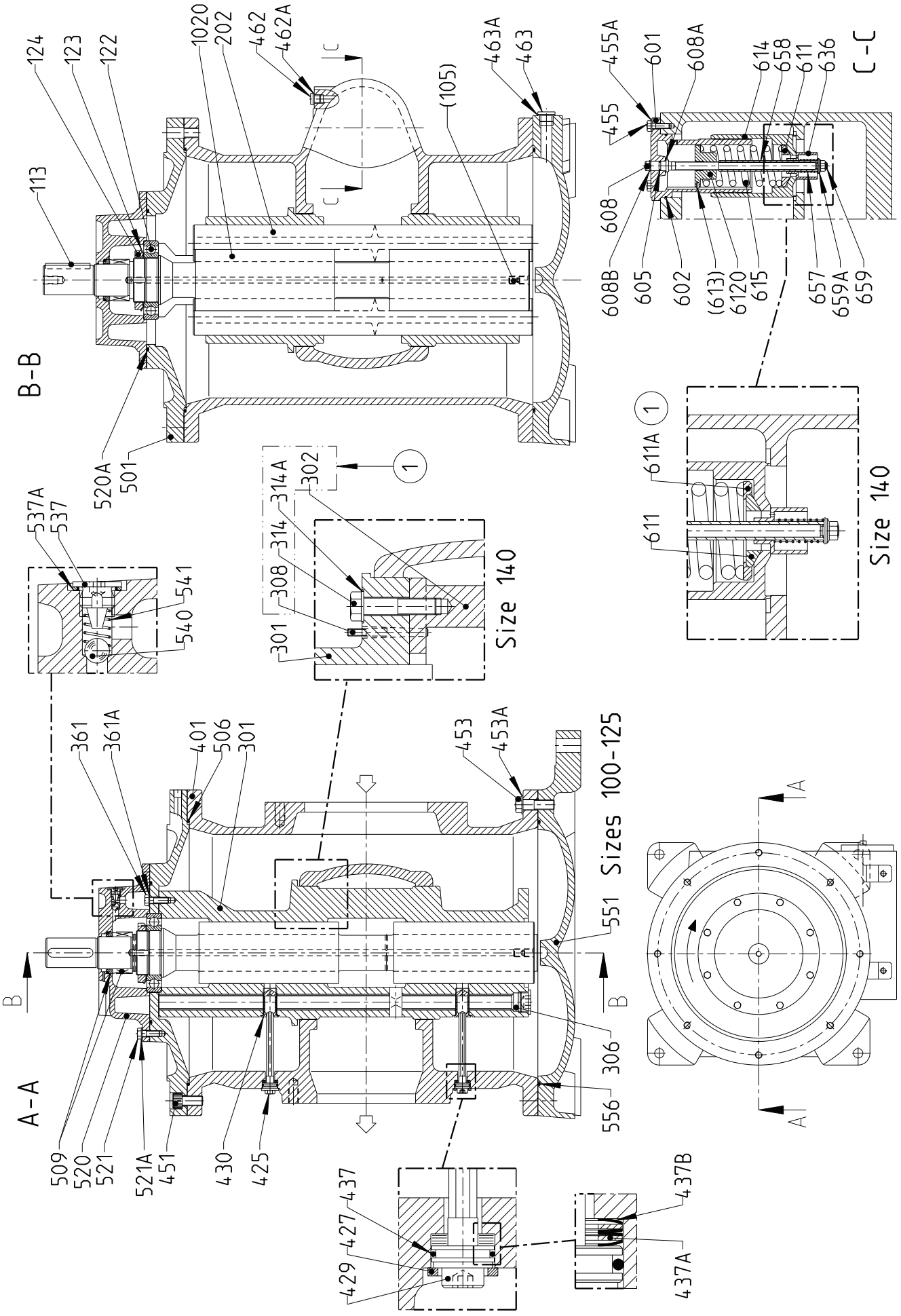
6. Sectional view



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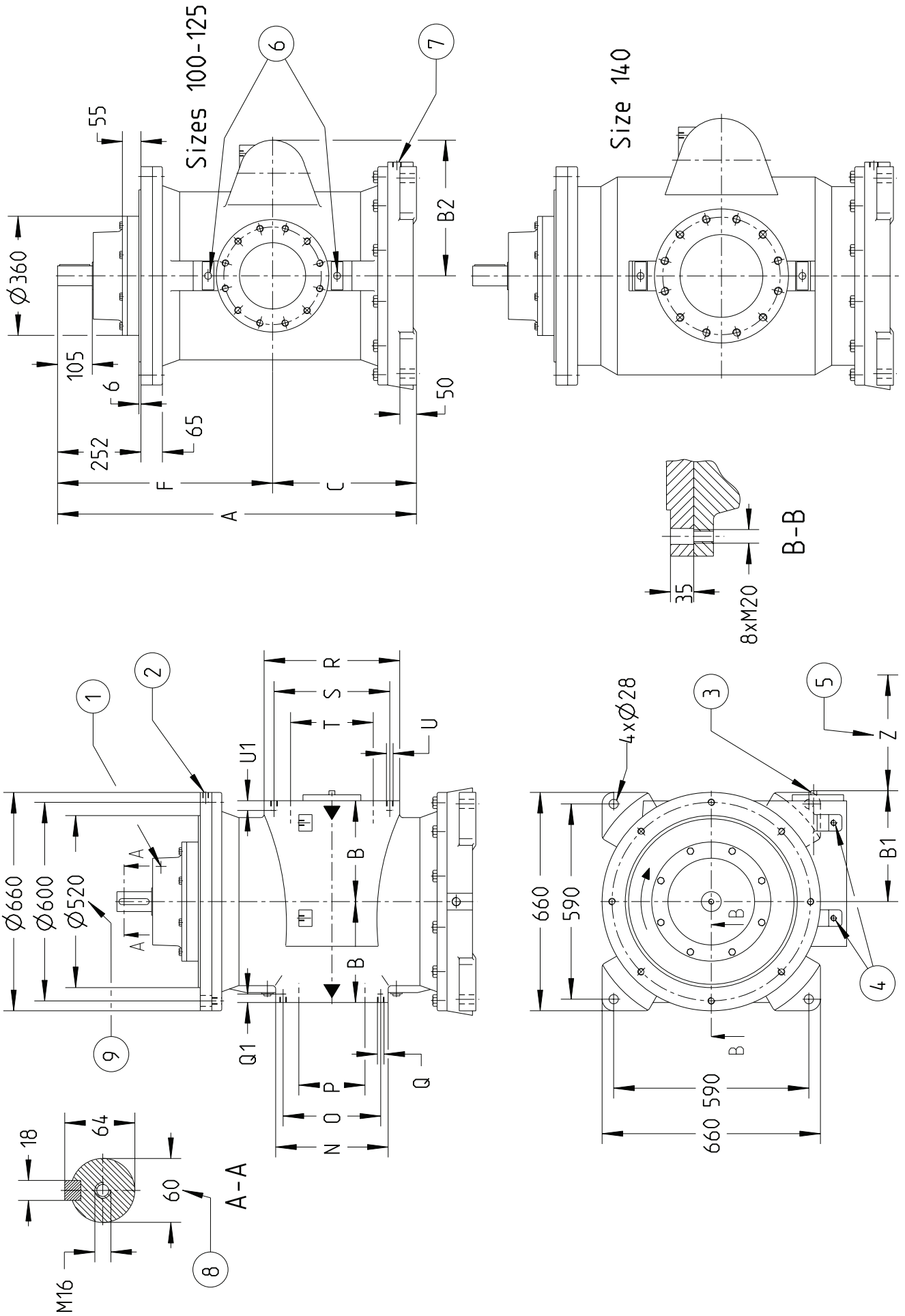
Pos No	Denomination
1020	Complete power rotor
(105)	Screw
113	Key
122	Ball bearing
123	Locking washer
124	Bearing nut
202	Idler rotor
301	Sleeve
302	Sleeve
306	Plug
308	Guide pin
314	Screw
314A	Washer
361	Screw
361A	Washer
401	Pump body
425	Screw
427	Tuning cover
429	Spindle
430	Tuning piston
437	O-ring
437A	Washer
437B	Cup spring
451	Screw
453	Screw
453A	Washer
455	Screw
455A	Washer
462	Plug
462A	T-ring
463	Drain plug
463A	T-ring
501	Top cover
506	O-ring
509	Shaft seal
520	Seal cover
520A	O-ring
521	Screw
521A	Washer
537	Deaeration plug
537A	T-ring
540	Ball
541	Spring
551	Foot
556	O-ring
601	Valve cover
602	O-ring
605	O-ring
608	Valve spindle
608A	Support ring
608B	Retaining ring
611	Washer
611A	Washer
6120	Complete regulating nut
(613)	Pin
614	Valve piston
615	Valve spring
636	Damping bush
657	Spring
658	Distance sleeve
659	Locking nut
659A	Support ring

Drawing remarks:
(1) Applicable for size 140

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

8. Pump Dimensions



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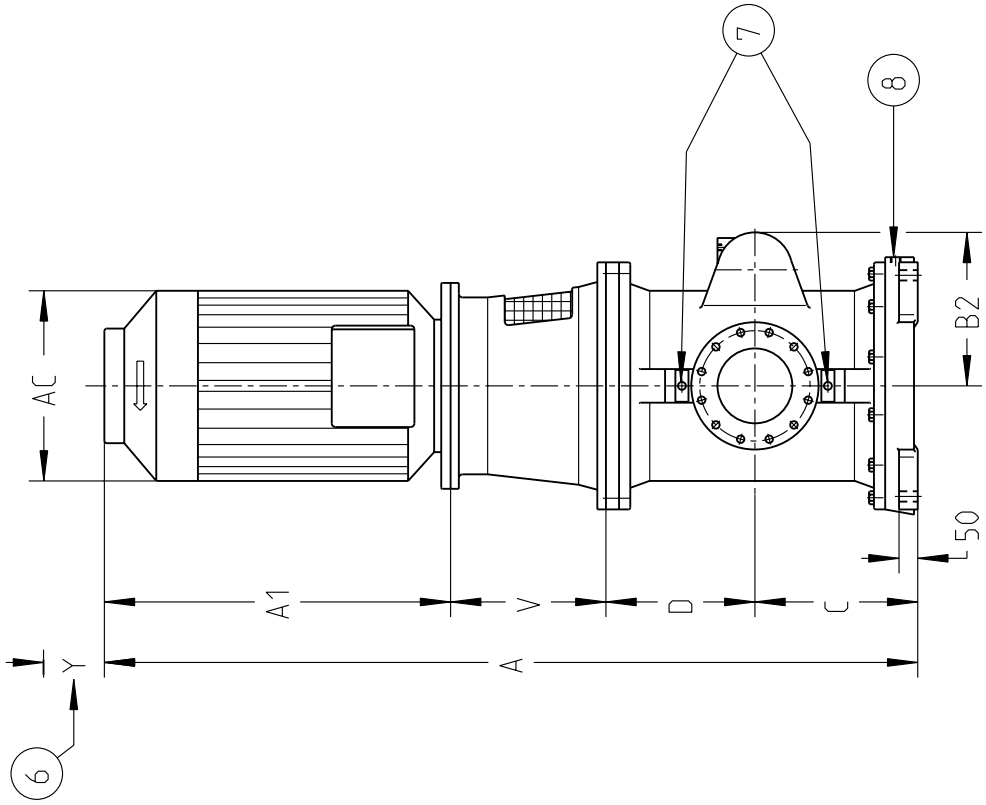
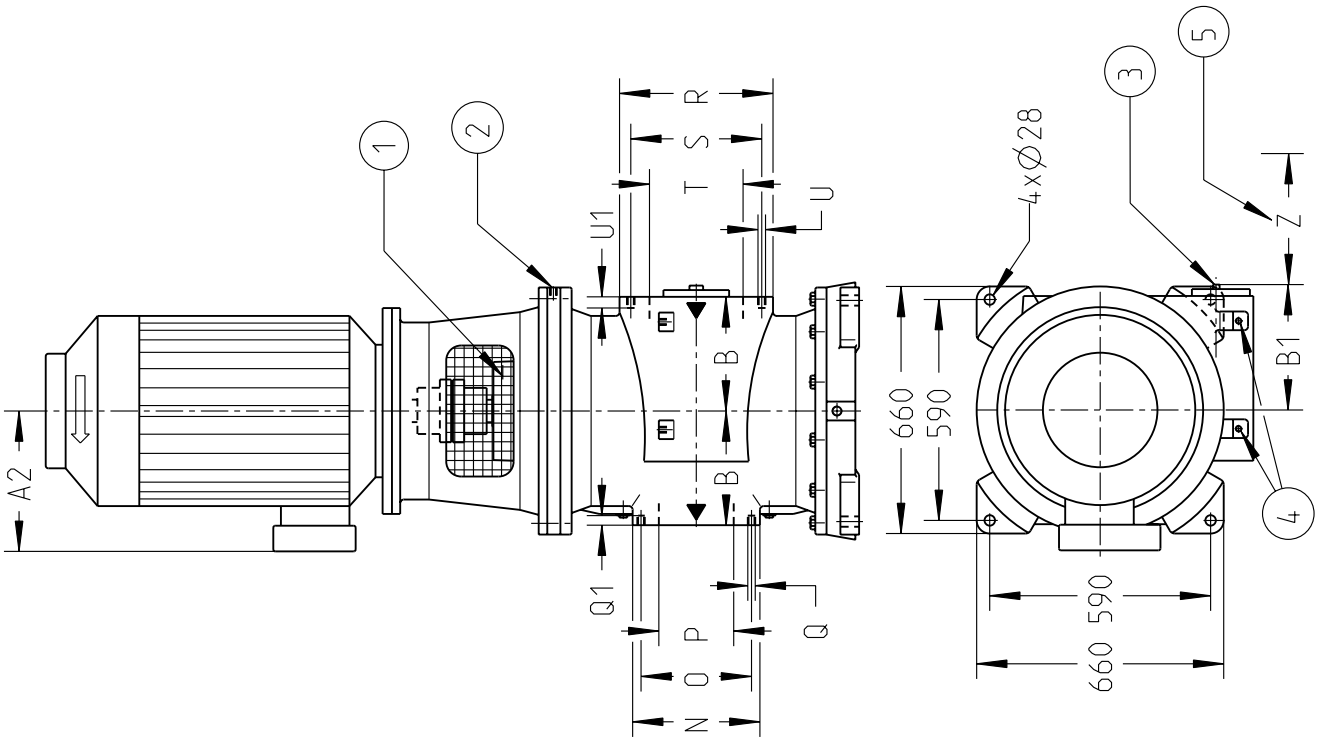
Pump size	Main dimensions						Outlet					Inlet					Dism.	Weight
	A	B	B1	B2	C	F	N	O	P	Q	Q1	R	S	T	U	U1	Z	kg
100	1085	305	335	410	435	650	340	295	200	12xM20	37	410	350	250	12xM20	37	350	620
110																		640
125																		675
140	1271	350	390	475	519	752	405	355	250	12xM24	45	480	400	300	12xM20	37	400	900

Drawing remarks
(1) Deaeration
(2) Drain. ISO G3/8
(3) Control for relief valve
(4) Gauge connection. ISO G3/8
(5) Space for dismantling relief valve
(6) Controls for “Tuning”
(7) Drain. ISO G3/4
(8)Tolerances ISO j6
(9)Tolerances ISO h7

Notes:
- Dimensions in mm
- Counter flange for Outlet is according to DIN2633/ND16
- Counter flange for Inlet is according to DIN2632/ND10
- Weight is an approximate value

9. Pump Unit dimensions





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Pump size	Motor size	Frame size	Main dimensions										Outlet					Inlet					Dism.		Weight
			A	A1	A2	AC	B	B1	B2	C	D	V	N	O	P	Q	Q1	R	S	T	U	U1	Z	Y	kg
100	200	F350	1875	677	301	381	305	335	410	435	398	365	340	295	200	12xM20	37	410	350	250	12xM20	37	350	140	985
	225	F400	2023	775	345	448						415												185	1095
	250	F500	2093	845	345	448																			1150
	280		2178	930	375	508																			1390
110	200	F350	1875	677	301	381	305	335	410	435	398	365	340	295	200	12xM20	37	410	350	250	12xM20	37	350	140	1005
	225	F400	2023	775	345	448						415												185	1115
	250	F500	2093	845	345	448																			1170
	280		2178	930	375	508																			1410
125	200	F350	1875	677	301	381	305	335	410	435	398	365	340	295	200	12xM20	37	410	350	250	12xM20	37	350	140	1040
	225	F400	2023	775	345	448						415												185	1150
	250	F500	2093	845	345	448																			1210
	280		2178	930	375	508																			1450
	315	F600	2403	1145	560	640						425												195	2100
140	250	F500	2279	845	345	448	350	390	475	519	500	415	405	355	250	12xM24	45	480	400	300	12xM20	37	400	185	1430
	280		2364	930	375	508																			1670
	315	F600	2589	1145	560	640						425												195	2340

Drawing remarks:
(1) Deaeration
(2) Drain. ISO G3/8
(3) Control for relief valve
(4) Gauge connection. ISO G3/8
(5) Space for dismantling relief valve
(6) Space for dismantling
(7) Controls for “Tuning”
(8)Drain. ISO G3/4

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

10. Accessories

A bare shaft pump (Fig. 1) can be ordered with the accessories in fig. 2-5.

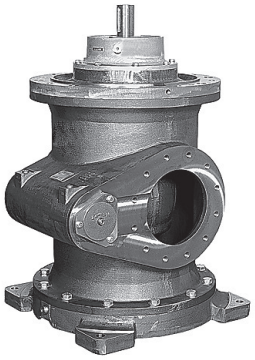

Fig. 1 Bare shaft pump

Fig. 2 Two sets of counter flanges

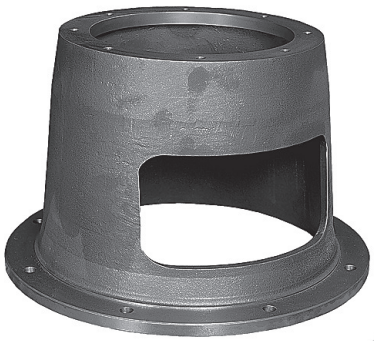

Fig. 3 Connecting frame

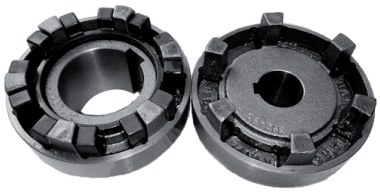

Fig. 4 Shaft coupling

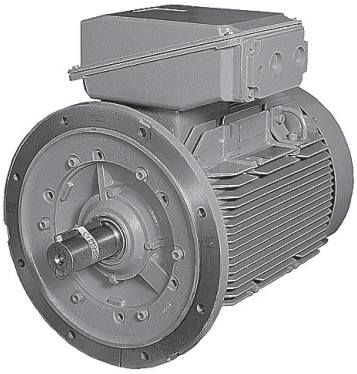

Fig. 5 Electric motor

11. Maintenance and Service

Spare parts for these pumps are easily available from stock. For detailed information and know-how about service, see the Original Operating Manual for LPQ pumps or contact IMO AB.

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12. IMO Tuning®

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

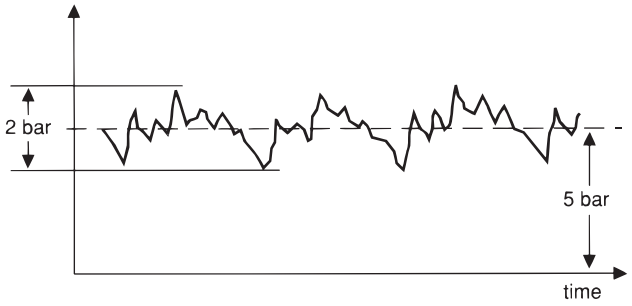
Low volume lube oil systems and additives that prolong deaeration time are the main reasons for having an excessive amount of free air in the oil. Free air is the main source of vibration and noise in pump systems as the air entrained oil is compressible and air bubbles expands and decreases in size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

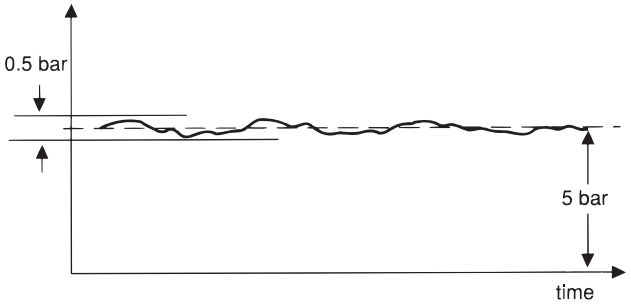
Without tuning

Pressure fluctuations are rapid and cover a wide band which produces a loud ratting 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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Adress:

IMO AB
PO Box 42090, 126 14 Stockholm
Sweden

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