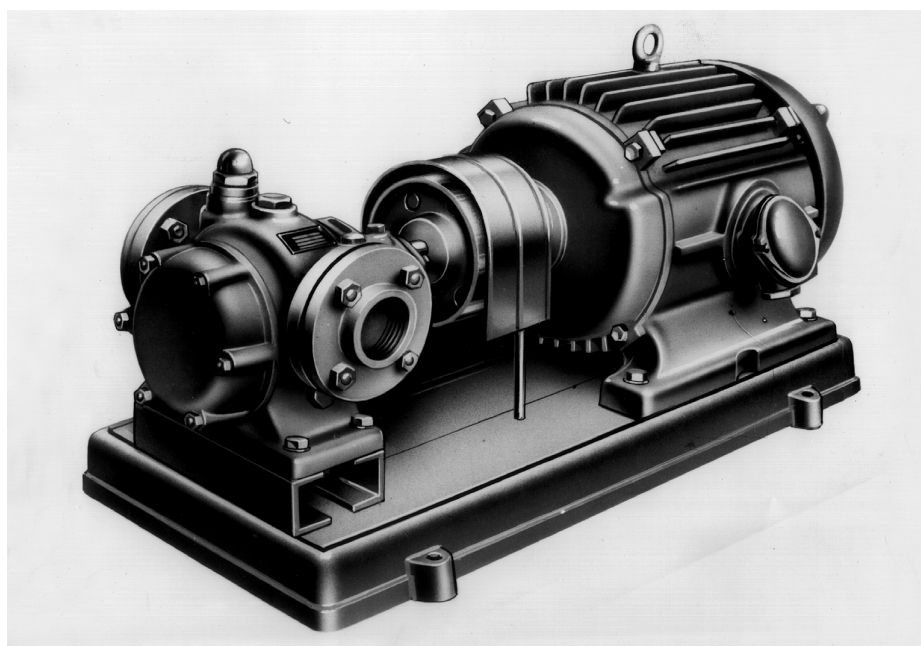




SIGMA PUMPY HRANICE



LOW-PRESSURE
GEAR PUMPS

ZPG

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426	21.05
3.99	

Application

In general the low-pressure gear pumps ZPG are intended for delivery of liquids with lubricating capacity without content of mechanical abrasive solids.

Max. temperature of pumped liquid 80 °C
Max. delivery pressure of pump 6 bar

Above all these pumps are available for pumping all kinds of oils, petroleum, diluents, emulsions, suds, molasses, tars, lyes, varnishes, soluble glass, etc.

They are also applicable for lubricating and cooling systems of various machines and equipments, for low-pressure hydraulic drives, etc.

Design

Gear pumps ZPG are of horizontal foot-mounted type with external gearing.

Gear wheels are fastly gripped on shafts, which are on their other side supported on bearing bushes lubricated by a liquid being delivered. Rotor relieving from radial forces and a stuffing box relieving from a liquid pressure may be gained by realization of interior modifications conformed to working conditions of the pump.

Stuffing box with cord packing prevents penetration of a liquid being pumped around the driving shaft.

Safety devices

Pumps ZPG are provided with a relief valve, that - with exceeding of nominal resp. maximal pressures - should transfer a liquid being delivered back to the suction space through an internal passage provided in the pump casing.

Drive

On principle, it is of a direct type with transfer of torsional moment (T.D.) through a flexible coupling. Pumps are delivered equipped with very usual types of electric motors on common bed plates as the pump-set of a standard type.

With lower speed drives there are reduction geared motors used or a special gearbox placed between the motor and the pump.

Sense of rotation

Standard workmanship of pumps is **clockwise**, viewing from the drive side.

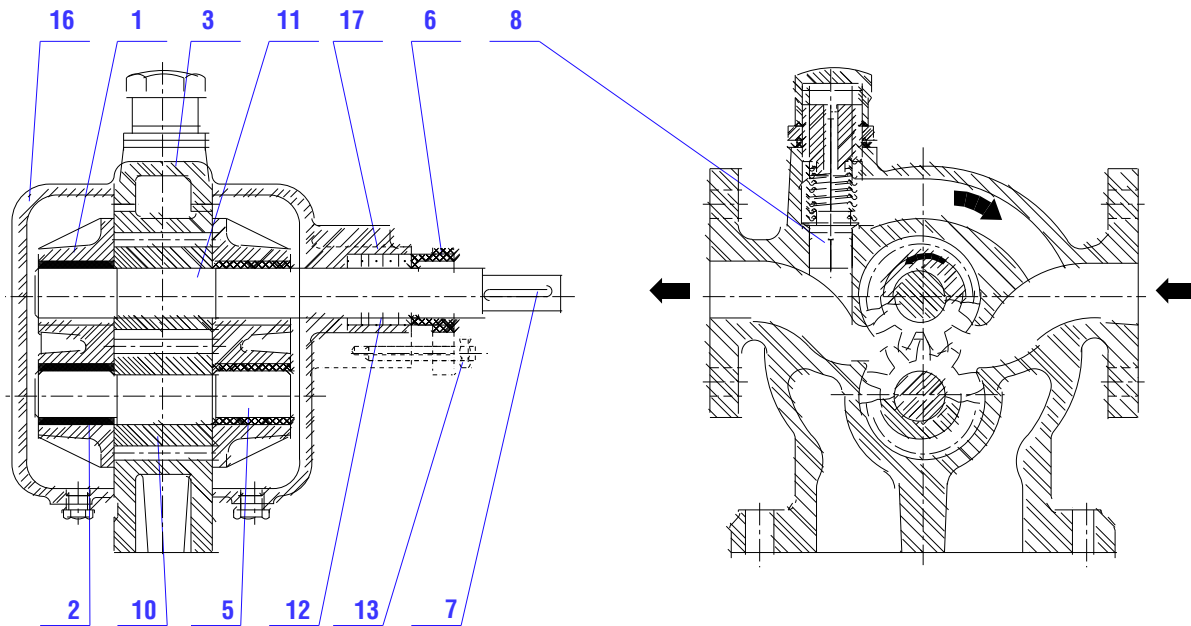
On a special application pumps may be supplied as counter-clockwise ones, but with reverse direction of delivered liquid. It is not possible to use same pump in both direction of rotation.

Materials

Material version designated as "LO" may be considered as a standard one, with main parts from following materials:

- pump casing, shields/covers, stuffing box housing are from grey cast iron;
- gear wheels and shafts are from carbon steel;
- bearing bushes are from carbon steel with bronze lining.

Informative Pump Section - with mechanical seal



- 1. Shield
- 2. Bearing bush
- 3. Pump casing
- 5. Driven shaft
- 6. Gland
- 7. Coupling key
- 8. Relief valve

- 10. Gear wheel
- 11. Drive shaft
- 12. Gland packing
- 13. Stuffing box screw
- 16. Cover
- 17. Stuffing box housing

Types review and main technical data

50 Hz

Pump type	DN of noy/les mm		Max. deliverz pressure bar	Viscositz of pumped liquid mm².s ⁻¹										Speed min ⁻¹	Max. speed min ⁻¹	Pump weight kg										
	suck	discharge		37.4		76		152		380		760														
				Q l.s ⁻¹	P kW	Q l.s ⁻¹	P kW	Q l.s ⁻¹	P kW	Q l.s ⁻¹	P kW	Q l.s ⁻¹	P kW													
ZPG-4	32	32	2 4 6					0.466 0.400 0.333	0.33 0.45 0.58	0.483 0.433 0.383	0.40 0.55 0.70	0.491 0.450 0.408	0.45 0.62 0.82	280	1 000	32										
			2 4 6			0.850 0.791 0.733	0.45 0.70 1.00	0.866 0.816 0.775	0.55 0.85 1.10	0.875 0.841 0.800	0.70 0.93 1.20	0.883 0.858 0.833	0.80 1.05 1.03	480												
			2 4 6	1.233 1.100 0.950	0.6 0.9 1.3	1.266 1.166 1.050	10.70 1.05 1.40	1.283 1.216 1.160	0.82 1.15 1.50	1.300 1.250 1.183	0.93 1.26 1.60	1.316 1.266 1.216	1.07 1.40 1.70	720												
			2 4 6	1.666 1.483 1.300	0.85 1.25 1.70	1.721 1.566 1.433	1.00 1.45 1.85	1.733 1.633 1.533	1.20 1.60 2.05	1.750 1.683 1.616	1.4 1.8 2.2			930												
			ZPG-5	40	40	2 4 6					0.750 0.700 0.666	0.5 0.7 1.0	0.766 0.733 0.700	0.60 0.85 1.10			0.783 0.758 0.733	0.70 0.95 1.20	280	1 000	37					
						2 4 6			1.283 1.183 1.083	0.70 1.05 1.40	1.300 1.2116 1.150	0.80 1.15 1.50	1.316 1.250 1.200	1.0 1.3 1.6			1.333 1.283 1.233	1.2 1.4 1.7	480							
						2 4 6	1.866 1.666 1.500	0.85 1.40 2.00	1.916 1.750 1.600	1.05 1.55 2.10	1.950 1.833 1.700	1.20 1.70 2.25	1.966 1.883 1.783	1.35 1.85 2.40			1.983 1.916 1.833	1.50 2.00 2.55	720							
						2 4 6	2.416 2.200 2.000	1.1 1.8 2.5	2.483 2.333 2.160	1.3 2.0 2.7	2.533 2.400 2.283	1.55 2.20 2.90	2.566 2.466 2.383	1.75 2.40 3.10					930							
						ZPG-6	50	50	2 4 6			1.033 0.933 0.833	0.60 0.80 1.05	1.050 0.966 0.833			0.70 0.90 1.15	1.058 1.000 0.933	0.85 1.10 1.25			1.066 1.016 0.966	1.10 1.20 1.35	300	1 000	52
									2 4 6	1.716 1.550 1.383	0.8 1.2 1.6	1.750 1.600 1.466	1.00 1.40 1.75	1.766 1.650 1.533			1.2 1.5 1.9	1.800 1.700 1.600	1.4 1.7 2.0			1.816 1.750 1.66	1.7. 1.9 2.3	500		
									2 4 6	2.500 2.266 2.033	1.1 1.7 2.4	2.550 2.360 2.200	1.35 1.90 2.50	2.583 2.433 2.300			1.6 2.1 2.7	2.600 2.500 2.400	1.9 2.4 2.9			2.633 2.550 2.450	2.2 2.7 3.2	720		
									2 4 6	3.333 3.083 2.833	1.7 2.5 3.4	3.416 3.200 3.000	2.00 1.75 3.60	3.500 3.333 3.166			2.5 3.1 3.9							960		
ZPG-7	65	65							2 4 6	1.333 1.166 1.000	0.65 0.90 1.20	1.358 1.216 1.083	0.80 1.05 1.30	1.383 1.266 1.150	0.92 1.20 1.40	1.400 1.316 1.233	1.10 0.85 1.50	1.416 1.350 1.283	1.35 1.55 1.70			300	1 000	67		
									2 4 6	2.250 2.000 1.750	1.0 1.5 2.0	2.283 2.100 1.883	1.25 1.70 2.20	2.316 2.150 1.966	1.5 1.9 2.4	2.350 2.200 2.066	1.75 2.15 2.60	2.383 2.283 2.200	2.1 2.4 2.8			500				
									2 4 6	3.250 2.933 2.600	1.4 2.2 2.9	3.333 3.083 2.833	1.75 2.40 3.10	3.366 3.150 2.933	2.1 2.7 3.3	3.416 3.250 3.083	2.4 3.0 3.6					720				
									2 4 6	4.416 4.000 3.583	1.80 2.80 3.85	4.466 4.166 3.833	2.2 3.2 4.2	4.500 4.333 4.083	2.75 3.60 4.50							960*)				

Types review and main technical data

50 Hz

Pump type	DN of nozzles mm		Max. delivery pressure bar	Viscosity of pumped liquid mm².s⁻¹										Speed min⁻¹	Max. speed min⁻¹	Pump weight kg
	suck	discharge		37.4		76		152		380		760				
				Q l.s⁻¹	P kW	Q l.s⁻¹	P kW	Q l.s⁻¹	P kW	Q l.s⁻¹	P kW	Q l.s⁻¹	P kW			
ZPG-8	80	80	2	3.166	1.4	3.216	1.7	3.250	2.1	3.300	2.4	3.333	2.9	300	750	88
			4	2.833	2.1	3.000	2.3	3.050	2.6	3.116	2.9	3.166	3.2			
			6	2.583	2.8	2.750	3.0	2.833	3.2	2.933	3.4	3.000	3.6			
			2	5.333	2.4	5.433	2.8	5.500	3.4	5.533	3.8	5.583	4.4	500		
			4	4.833	3.6	5.116	3.9	5.216	4.4	5.333	4.7	5.416	5.2			
			6	4.416	4.8	4.800	5.1	4.950	5.4	5.083	5.7	5.250	6.0			
			2	7.750	3.3	7.833	3.8	7.916	4.7	8.000	5.4			720		
			4	7.250	5.2	7.500	5.6	7.666	6.3	7.750	6.8					
			6	6.800	7.0	7.083	7.3	7.333	7.8	7.500	8.2					
ZPG-9	100	100	2	4.000	1.6	4.033	2.0	4.083	2.5	4.300	2.9	4.160	3.3	300	750	105
			4	3.583	2.5	3.750	2.8	3.833	3.2	3.916	3.5	4.000	3.9			
			6	3.166	3.4	3.416	3.7	3.583	3.9	3.666	4.2	3.750	4.5			
			2	8.833	2.8	6.916	3.3	7.000	4.1	7.066	4.70	7.083	5.3	500		
			4	6.250	4.3	6.500	4.7	6.666	5.4	6.833	5.85	6.916	6.4			
			6	5.666	5.8	6.083	6.2	6.333	6.7	6.583	7.00	6.666	7.4			
			2	9.833	4.0	10.000	4.7	10.166	5.8					720		
			4	9.166	6.3	9.583	6.8	9.833	7.7							
			6	8.500	8.6	9.166	9.0	9.500	9.8							
ZPG-10	100	100	2	7.000	3.4	7.250	4.0	7.333	4.8	7.416	5.5	7.500	6.3	300	750	160
			4	6.250	5.2	6.750	5.7	6.966	6.3	7.166	7.0	7.333	7.7			
			6	5.500	6.9	6.250	7.4	6.583	7.9	6.833	8.6	7.083	9.1			
			2	12.00	5.5	12.25	6.8	12.41	9.1	12.50	11.2			500		
			4	11.00	8.3	11.50	9.4	11.83	10.8	12.08	12.5					
			6	10.08	11.8	10.83	11.8	11.25	12.6	11.66	13.7					
			2	17.50	6.7	17.83	7.7	18.00	11.0					720*)		
			4	16.41	11.0	17.00	11.5	17.50	14.6							
			6	15.41	18.0	16.25	18.0	16.91	18.0							

Q..... pump capacity

P..... pump power required

*) For heavy working conditions there is speed selection limited to max. 720 min⁻¹ - type ZPG-7 and to max. 500 min⁻¹ - type ZPG-10.

Speed selection

In general it is true:

- lower speed should be selected for liquids with higher viscosity and lower lubricating capacity and with longer operation of pumps;
- higher speed should be selected for diluted liquids with low viscosity and good lubricating capacity, especially with max. delivery pressure of the pump application.

Speed range for various liquids according to the pump size and pressure is as follows:

max. 1,000 min⁻¹ for common lubricating and cooling oils and other diluted self-lubricating liquids with viscosity ranging from 304 to 76 mm².s⁻¹ - in sequence from the smallest to the greatest pump types;

max. 750 min⁻¹ for thicker self-lubricating liquids up to viscosity ranging from 1,140 up to 228 mm².s⁻¹ - the sequence is the same as with speed 1,000 min⁻¹;

max. 500 min⁻¹ for heavy oils, tar, molasses, varnishes and other liquids with higher viscosity - the sequence is the same as with speed 1,000 min⁻¹.

Types review and main technical data

60 Hz

Pump type	DN of noyyles mm		Max. deliverz pressure bar	Viscositz of pumped liquid mm ² .s ⁻¹										Speed min ⁻¹	Max. speed min ⁻¹	Pump weight kg
	suck	discharge		37.4		76		152		380		760				
				Q l.s ⁻¹	P kW	Q l.s ⁻¹	P kW	Q l.s ⁻¹	P kW	Q l.s ⁻¹	P kW	Q l.s ⁻¹	P kW			
ZPG-4	32	32	2					0.466	0.33	0.483	0.40	0.491	0.45	280	1 000	32
			4					0.400	0.45	0.433	0.55	0.450	0.62			
			6					0.333	0.58	0.383	0.70	0.408	0.82			
			2			0.850	0.45	0.866	0.55	0.875	0.70	0.883	0.80	480		
			4			0.791	0.70	0.816	0.85	0.841	0.93	0.858	1.05			
			6			0.733	1.00	0.775	1.10	0.800	1.20	0.833	1.03			
			2	1.198	0.58	1.231	0.68	1.248	0.80	1.263	0.90	1.280	1.04	700		
			4	1.070	0.87	1.135	1.02	1.183	1.12	1.215	1.23	1.231	1.36			
			6	0.923	1.26	1.021	1.36	1.085	1.46	1.150	1.56	1.183	1.65			
			2	1.548	0.79	1.580	0.93	1.610	1.11	1.625	1.30			864		
			4	1.378	1.16	1.455	1.35	1.516	1.49	1.563	1.67					
			6	1.208	1.58	1.331	1.72	1.425	1.90	1.501	2.04					
ZPG-5	40	40	2					0.750	0.50	0.766	0.60	0.783	0.70	280	1 000	37
			4					0.700	0.70	0.733	0.85	0.758	0.95			
			6					0.666	1.00	0.700	1.10	0.733	1.20			
			2			1.283	0.70	1.300	0.80	1.316	1.00	1.333	1.20	480		
			4			1.183	1.05	1.216	1.15	1.250	1.30	1.283	1.40			
			6			1.083	1.40	1.150	1.50	1.200	1.60	1.233	1.70			
			2	1.815	0.83	1.863	1.02	1.896	1.17	1.911	1.31	1.928	1.46	700		
			4	1.620	1.36	1.701	1.51	1.781	1.65	1.931	1.80	1.863	1.94			
			6	1.458	1.94	1.555	2.04	1.653	2.19	1.733	2.33	1.781	2.48			
			2	2.245	1.02	2.306	1.21	2.353	1.44	2.385	1.63			864		
			4	2.043	1.67	2.168	1.86	2.230	2.04	2.291	2.23					
			6	1.858	2.32	2.013	2.51	2.121	2.69	2.215	2.88					
ZPG-6	50	50	2			1.033	0.60	1.050	1.70	1.058	0.85	1.066	1.10	300	1 000	52
			4			0.933	0.80	0.966	0.90	1.000	1.10	1.016	1.20			
			6			0.838	1.05	0.883	1.15	0.933	1.25	0.966	1.35			
			2	1.716	0.80	1.750	1.00	1.766	1.20	1.800	1.40	1.816	1.70	500		
			4	1.550	1.20	1.600	1.40	1.650	1.50	1.700	1.70	1.750	1.90			
			6	1.383	1.60	1.466	1.75	1.533	1.90	1.600	2.00	1.666	2.30			
			2	2.430	1.07	2.480	1.31	2.511	1.56	2.528	1.85	2.560	2.14	700		
			4	2.203	1.65	2.301	1.85	2.365	2.04	2.430	2.33	2.480	2.63			
			6	1.976	2.33	2.138	2.43	2.236	2.63	2.333	2.82	2.381	3.11			
			2	3.000	1.53	3.075	1.80	3.150	2.25					864		
			4	2.775	2.25	2.880	2.47	3.000	2.79							
			6	2.550	3.06	2.700	3.24	2.850	3.51							
ZPG-7	65	65	2	1.333	0.65	1.358	0.80	1.383	0.92	1.400	1.10	1.416	1.35	300	1 000	67
			4	1.166	0.90	1.216	1.05	1.266	1.20	1.316	0.85	1.350	1.55			
			6	1.000	1.20	1.083	1.30	1.150	1.40	1.233	1.50	1.283	1.70			
			2	2.250	1.00	2.283	1.25	2.316	1.50	2.350	1.75	2.383	2.10	500		
			4	2.000	1.50	2.100	1.70	2.150	1.90	2.200	2.15	2.283	2.40			
			6	1.783	2.00	1.883	2.20	1.966	2.40	2.066	2.60	2.200	2.80			
			2	3.160	1.36	3.240	1.70	3.273	2.04	3.321	2.33			700		
			4	2.851	2.14	2.998	2.33	3.063	2.63	3.160	2.92					
			6	2.528	2.82	2.755	3.01	2.851	3.21	2.998	3.50					
			2	3.975	1.62	4.020	1.98	4.095	2.47					864*)		
			4	3.600	2.52	3.750	2.88	3.900	3.24							
			6	3.225	3.46	3.450	3.78	3.675	4.05							

Types review and main technical data

60 Hz

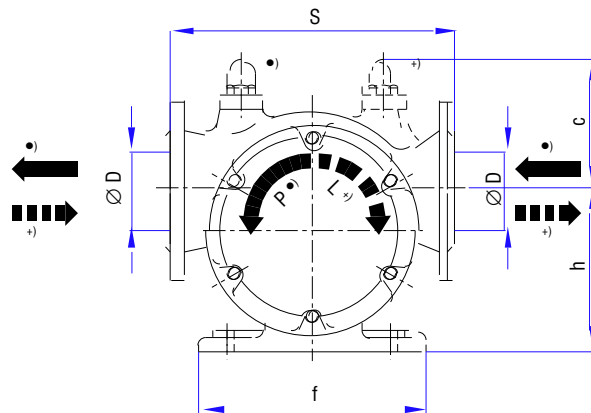
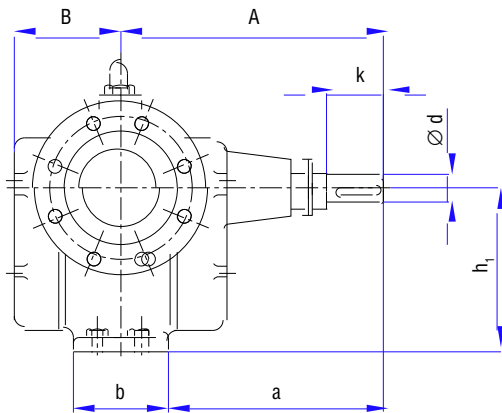
Pump type	DN of nozzles mm		Max. deliverz pressure bar	Viscositz of pumped liquid mm².s ⁻¹										Speed min ⁻¹	Max. speed min ⁻¹	Pump weight kg
	suck	discharge		37.4		76		152		380		760				
				Q l.s ⁻¹	P kW	Q l.s ⁻¹	P kW	Q l.s ⁻¹	P kW	Q l.s ⁻¹	P kW	Q l.s ⁻¹	P kW			
ZPG-8	80	80	2	3.166	1.40	3.216	1.70	3.250	2.10	3.300	2.40	3.333	2.90	300	750	88
			4	2.833	2.10	3.000	2.30	3.050	2.60	3.116	2.90	3.166	3.20			
			6	2.583	2.80	2.750	3.00	2.833	3.20	2.933	3.40	3.000	3.60			
			2	5.333	2.40	5.433	2.80	5.500	3.40	5.533	3.80	5.583	4.40	500		
			4	4.833	3.60	5.116	3.90	5.216	4.40	5.333	4.70	5.416	5.20			
			6	4.416	4.80	4.800	5.10	4.950	5.40	5.083	5.70	5.250	6.00			
			2	7.535	3.21	7.615	3.69	7.696	4.57	7.778	5.25			700		
			4	7.048	5.06	7.291	5.44	7.453	6.13	7.535	6.61					
			6	6.611	6.81	6.886	7.10	7.130	7.58	7.291	7.97					
ZPG-9	100	100	2	4.000	1.60	4.033	2.00	4.083	2.50	4.300	2.90	4.160	3.30	300	750	105
			4	3.583	2.50	3.750	2.80	3.833	3.20	3.916	3.50	4.000	3.90			
			6	3.166	3.40	3.416	3.70	3.583	3.90	3.666	4.20	3.750	4.50			
			2	8.833	2.80	6.916	3.30	7.000	4.10	7.066	4.70	7.083	5.30	500		
			4	6.250	4.30	6.500	4.70	6.666	5.40	6.833	5.85	6.916	6.40			
			6	5.666	5.80	6.083	6.20	6.333	6.70	6.583	7.00	6.666	7.40			
			2	9.560	3.89	9.721	4.57	9.885	5.64					700		
			4	8.911	6.13	9.316	6.61	9.560	7.49							
			6	8.263	8.36	8.911	8.75	9.236	9.53							
ZPG-10	100	100	2	7.000	3.40	7.250	4.00	7.333	4.80	7.416	5.50	7.500	6.30	300	750	160
			4	6.250	5.20	6.750	5.70	6.966	6.30	7.166	7.00	7.333	7.70			
			6	5.500	6.90	6.250	7.40	6.583	7.90	6.833	8.60	7.083	9.10			
			2	12.000	5.50	12.250	6.80	12.416	9.10	12.500	11.20			500		
			4	11.000	8.30	11.500	9.40	11.833	10.80	12.083	12.50					
			6	10.083	11.80	10.833	11.80	11.250	12.60	11.666	13.70					
			2	17.013	6.51	17.338	7.49	17.500	10.69					700*)		
			4	15.960	10.69	16.528	11.18	17.013	14.19							
			6	14.988	17.50	15.798	17.50	16.449	17.50							

Q..... pump capacity

P..... pump power required

*) For heavy working conditions there is speed selection limited to max. 700 min⁻¹ - type ZPG-7 and to max. 500 min⁻¹ - type ZPG-10.

Low-Pressure Gear Pumps ZPG



Type of pump	Standard version											
	a	b	c	$\varnothing d$	f	h	h_1	k	A	B	$\varnothing D$	S
ZPG-4	170	60	115	22	220	150	150	40	230	85	32	250
ZPG-5	155	90	115	22	220	150	150	40	245	100	40	250
ZPG-6	170	100	145	28	275	175	175	50	275	110	50	300
ZPG-7	155	135	165	28	275	175	175	50	290	130	65	300
ZPG-8	196	115	150	35	275	190	190	60	311	130	80	340
ZPG-9	211	115	150	35	275	190	190	60	326	140	100	340
ZPG-10	248	115	200	50	400	280	280	80	363	145	100	500

P clockwise workmanship

L counterclockwise workmanship - direction of liquid flowing marked ')

Connecting dimensions of flanges of suction and delivery nozzles „D“ are meant for PN 10 with a raised face.