



Technical Catalogue



ZPG Series
Gear Pump

1. Operation Instruction

The ZPG gear pumps are designed for pumping and conveying thin and dense liquids at low operation pressures of up to 5kg/sq. cm and of up to 80°C temperature, having lubricating abilities and not containing fractions of solid or abrasive substances or impurities.

2. Application

The ZPG rotary gears pump are intended for pumping and handling of lubricating and engine oils, fuel, kerosene, edible fats and oils, suds, molasses, tar, varnishes, syrups, lyes, water glass and other viscous self-lubricating liquids in different machines and installations (machine tools, combustion engine, etc) for low-pressure drives and various other purposes.

3. Design

Two precision-milled gear wheels (driving and driven gears) rotate in the pump casing. During rotation, the gears lock the liquid in the suction casing between the pump casing and the teeth flute and convey it to the discharge branch.

The driving shaft is located above the driven shaft and ends on one side outside the casing with a cylindrical part with a key for fixing the coupling. Shaft at both ends are supported on bearing bushes lubricated by the liquid being pumped. The relief of the rotor from the radial thrust and the packing from the liquid pressure is attained by suitable inner modifications respecting the operation conditions of the individual pump types. The stuffing box with cord packing prevents the penetration of the pumped liquid around the driving shaft.

4. Safety Device

The ZPG pumps have the safety valves installed directly in the casing. On the rated pressure being exceeded, the safety valve will release the handled liquid back into the suction casing through the inner channel in the pump casing.

5. Drive

The ZPG gear pumps are designed basically for direct coupling usually to an electric motor, and located together on a common bedplate. At lower speeds, i.e., below 735rpm, the drives is provide either by an electric motor with built-in transmission in the shield, or by a special transmission box between the motor and pump. The driving shaft of the pump can be loaded by torque only. The radial and axial thrusts of the prime mover are eliminated

6. Direction of Rotation

The ZPG gear pumps rotate usually in the clockwise direction (viewed from the drive side). On special requirement, however, the pumps can be supplied in anti-clockwise execution, with opposite flow direction of the liquid. No pump can be used for both directions of rotation.

7. Material

The pumps are having the pumps casing of cast iron, and the gear wheels and shafts of steel. The bearing bushes of the ZPG type are made of bronze self-lubricating bearing.



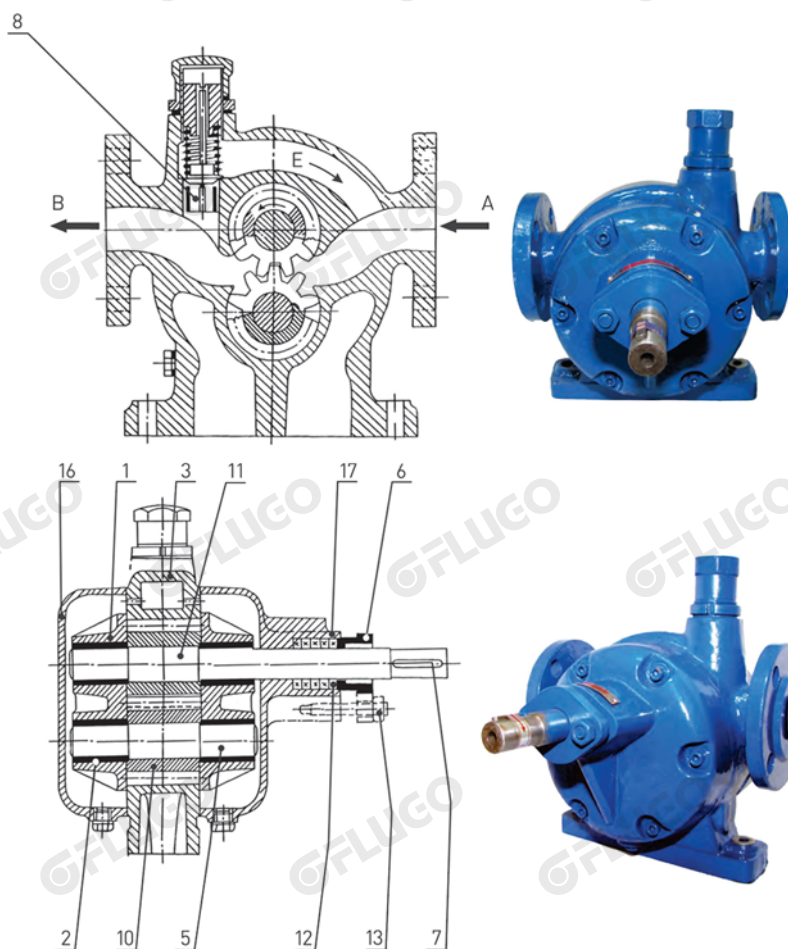
8. Selectio of Speed

General rules

- Lower revolutions will be required for denser liquids with higher viscosity, for liquids with lower lubricating ability and longer working periods.
- Higher speeds are permissible for thinner liquids with low viscosity and good lubricating ability to benefit from the maximum pump pressure.

The approximate range of speeds for different liquids according to the size of the pump and working pressure is as follows :

- Max. 1000rpm for current lubricating and cooling oils and other thin self-lubricating liquids up to a viscosity of approx. 40-10°E (330-87Cst) (in order of smallest to largest type of pump)
- Max. 750rpm for denser self-lubricating liquids up to a viscosity of approx. 150-30°E (1100-220Cst) (same order).
- Max. 500-200rpm for heavy oils, tar, molasses, glue, varnishes, syrups, and other liquids of higher viscosities (same order).



1 Shield	7 Coupling key	13 Stuffing box screw
2 Bearing bush	8 Safety valve	16 Cover lid
3 Pump casing	10 Gear wheel	17 Stuffing box housing
5 Driven shaft	11 Driving shaft	A Suction
6 Gland	12 Packing for stuffing box	B Discharge
		E By-pass channel

Types review and main technical data

50 Hz

Pump type	DN of noyyles mm		Max. deliverz pressure bar	Viscositz of pumped liquid mPa·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	1.233	0.6	1.266	10.70	1.283	0.82	1.300	0.93	1.316	1.07	720		
			4	1.100	0.9	1.166	1.05	1.216	1.15	1.250	1.26	1.266	1.40			
			6	0.950	1.3	1.050	1.40	1.160	1.50	1.183	1.60	1.216	1.70			
			2	1.666	0.85	1.721	1.00	1.733	1.20	1.750	1.4			930		
			4	1.483	1.25	1.566	1.45	1.633	1.60	1.683	1.8					
			6	1.300	1.70	1.433	1.85	1.533	2.05	1.616	2.2					
ZPG-5	40	40	2					0.750	0.5	0.766	0.60	0.783	0.70	280	1 000	37
			4					0.700	0.7	0.733	0.85	0.758	0.95			
			6					0.666	1.0	0.700	1.10	0.733	1.20			
			2			1.283	0.70	1.300	0.80	1.316	1.0	1.333	1.2	480		
			4			1.183	1.05	1.2116	1.15	1.250	1.3	1.283	1.4			
			6			1.083	1.40	1.150	1.50	1.200	1.6	1.233	1.7			
			2	1.866	0.85	1.916	1.05	1.950	1.20	1.966	1.35	1.983	1.50	720		
			4	1.666	1.40	1.750	1.55	1.833	1.70	1.883	1.85	1.916	2.00			
			6	1.500	2.00	1.600	2.10	1.700	2.25	1.783	2.40	1.833	2.55			
			2	2.416	1.1	2.483	1.3	2.533	1.55	2.566	1.75			930		
			4	2.200	1.8	2.333	2.0	2.400	2.20	2.466	2.40					
			6	2.000	2.5	2.160	2.7	2.283	2.90	2.383	3.10					
ZPG-6	50	50	2			1.033	0.60	1.050	0.70	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			0.833	1.05	0.833	1.15	0.933	1.25	0.966	1.35			
			2	1.716	0.8	1.750	1.00	1.766	1.2	1.800	1.4	1.816	1.7	500		
			4	1.550	1.2	1.600	1.40	1.650	1.5	1.700	1.7	1.750	1.9			
			6	1.383	1.6	1.466	1.75	1.533	1.9	1.600	2.0	1.66	2.3			
			2	2.500	1.1	2.550	1.35	2.583	1.6	2.600	1.9	2.633	2.2	720		
			4	2.266	1.7	2.360	1.90	2.433	2.1	2.500	2.4	2.550	2.7			
			6	2.033	2.4	2.200	2.50	2.300	2.7	2.400	2.9	2.450	3.2			
			2	3.333	1.7	3.416	2.00	3.500	2.5					960		
			4	3.083	2.5	3.200	1.75	3.333	3.1							
			6	2.833	3.4	3.000	3.60	3.166	3.9							
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	1.0	2.283	1.25	2.316	1.5	2.350	1.75	2.383	2.1	500		
			4	2.000	1.5	2.100	1.70	2.150	1.9	2.200	2.15	2.283	2.4			
			6	1.750	2.0	1.883	2.20	1.966	2.4	2.066	2.60	2.200	2.8			
			2	3.250	1.4	3.333	1.75	3.366	2.1	3.416	2.4			720		
			4	2.933	2.2	3.083	2.40	3.150	2.7	3.250	3.0					
			6	2.600	2.9	2.833	3.10	2.933	3.3	3.083	3.6					
			2	4.416	1.80	4.466	2.2	4.500	2.75					960*)		
			4	4.000	2.80	4.166	3.2	4.333	3.60							
			6	3.583	3.85	3.833	4.2	4.083	4.50							

Types review and main technical data

50 Hz

Pump type	DN of nozzles mm		Max. deliverz pressure bar	Viscositz of pumped liquid mPa·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 mPa·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 mPa·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 nozzles mm		Max. deliverz pressure bar	Viscositz of pumped liquid mPa·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

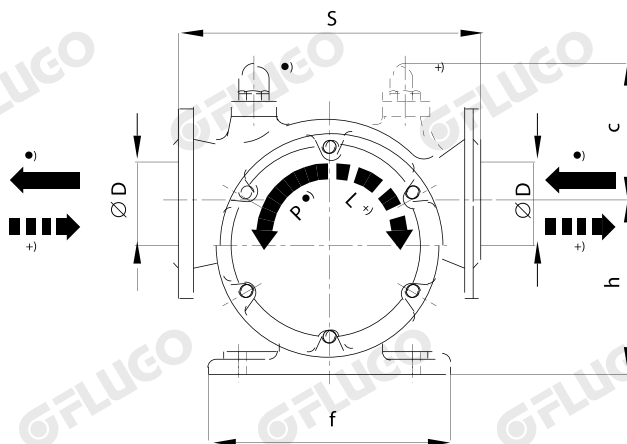
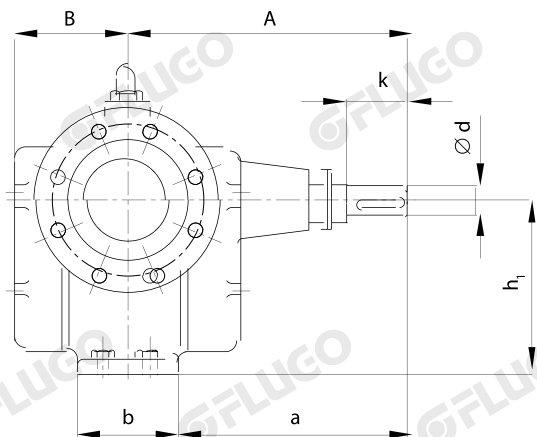
60 Hz

Pump type	DN of nozzles mm		Max. deliverz pressure bar	Viscositz of pumped liquid mPa·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 type ZPG-7 and to max. 500 min type ZPG-10.



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 marked¹⁾

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



ZPG Series - Gear Pump

Authorized Distributor