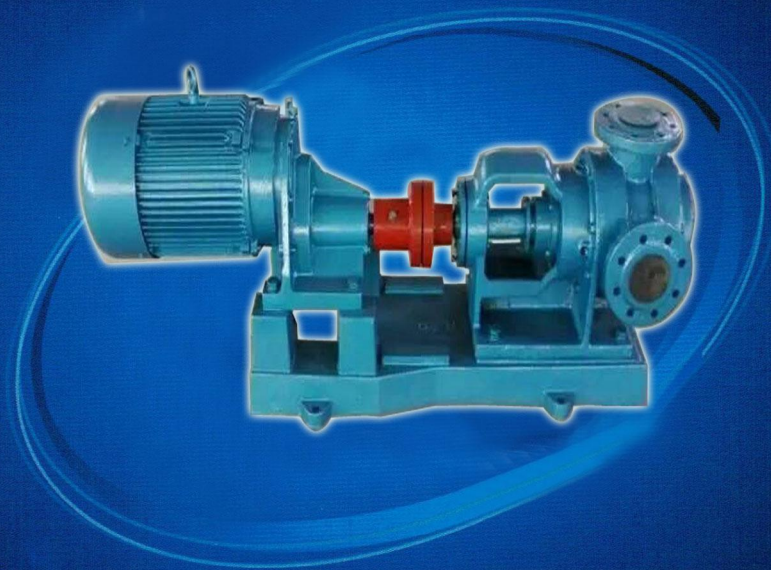


NYP型

NYP系列高粘度内齿泵

(NYP型内环式转子泵)

Use Specification | 使用说明书



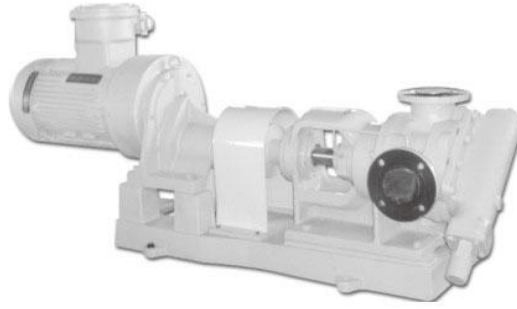
上海新光明泵业制造有限公司

地址：上海市武定路576号 电话：021-62586878/ 62583382
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NYP系列高粘度内齿泵

NYP SERIES INTERNAL GEAR PUMP

(NYP型内环式转子泵)



1. 概述

NYP系列内齿泵是根据石油、化工、涂料、油脂、医药、染料食品等行业的需求,研制开发的新型容积式泵,由于该产品可选用不同的材质和其独特的结构,因此广泛应用于不同性质,不同粘度的介质输送。

适用介质温度: $-10^{\circ}\text{C} \sim 200^{\circ}\text{C}$

适用介质粘度: $1.0\text{cSt} \sim 300,000\text{cSt}$

2. 结构型式 (如图1)

(1) 工作原理

具有内齿的驱动齿轮(外转子)带动内转子在全封闭的泵体内作同方向转动,泵体和前盖的月牙板使吸入口和排出口隔开。转动时在吸入口形成负压,液体被吸入,转子将液体带到排出口,受压排出泵体,完成了液体的输送。

(2) 结构

如图1,泵主要由内外转子、轴、泵体、前盖、托架、密封、轴承等组成。密封有机械密封和填料密封两种形式,对于高温、高粘稠度及腐蚀性较强的介质,选用填料密封(特殊要求,可选用磁力驱动,零泄漏结构)。

输送易结晶物料时,在前盖和泵体上可设计带有保温夹套,工作时通蒸汽保温融化。泵可配安全阀,当泵或管路系统超压时,安全阀打开,形成内部回流,保证系统安全。

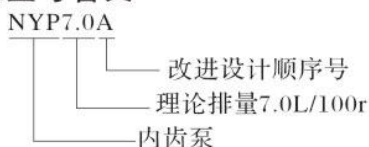
泵装置由泵、电机和底座组成。传动方式有桥式和直联式两种。

从电机端向泵看,为顺时针旋转,右进上出

3. 优点

- (1) 输送液体平稳、无脉动、振动小、噪音低。
- (2) 有很强的自吸性能。
- (3) 正确选用零件材料,可输送多种有腐蚀性的介质,使用温度可达 200°C 。
- (4) 内外转子转向相同,磨损小,使用寿命长。
- (5) 泵的转速与流量呈线性函数关系,可适当改变转速来改变泵的流量。
- (6) 特别适用高粘稠度介质的输送。

4. 型号含义



1、Brief Introduction

NYP series internal gear pump is a kind of new positive displacement pump, and is designed according to the different fields' requirements of petroleum, chemical industry, paint, medicine, foodstuff and so on. It widely applies to a variety of mediums with different property and viscosity because of special structure and selected different pump's materials.

Proper medium temperature: $-10^{\circ}\text{C} \sim 200^{\circ}\text{C}$

Proper medium viscosity: $1.0\text{cSt} \sim 300,000\text{cSt}$

2、Type of structure (As figure 1)

(1) Work principle

Driving gear (outside rotor) with internal tooth drives the internal rotor and turns in same direction in the full closed pump body. The pump casing and crescent of the front cover separate the inlet from the outlet. When it turns, negative pressure formed at the suction port, the liquid inhaled and being take to the outlet by rotor, then the liquid is expelled from the discharge port as the gears mesh. The transportation of liquid finished.

(2) Structure Feature

As figure 1, The pumps are mainly composed of internal rotor, outside rotor, shaft, pump casing, front cover, seal, bearing etc.

The pump's seal adopts packing seal or mechanical seal. When the delivered medium is high temperature, high visc or strong corrosion, packing seal should be adopted.

When the delivered medium is easy crystalline, we can design the heat preservation jacket in pump casing and front cover in order to melt the medium with steam when working. The pump can be also fitted with the safety valve.

The pump set is composed of the pump, motor and baseplate. the direction way is belt wheel driving or coupling driving.

The direction of rotation is clockwise viewed from coupling end.

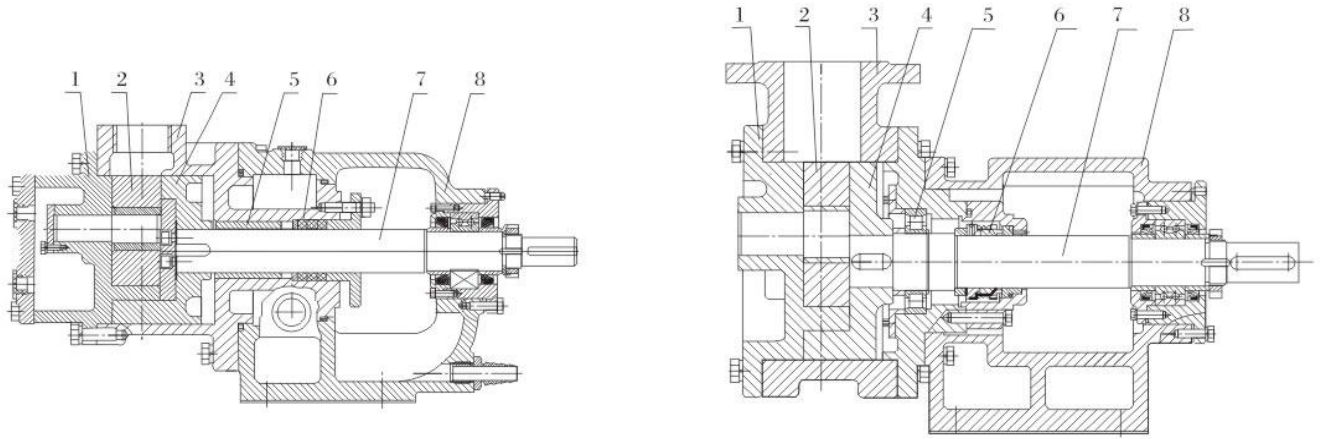
Seen from the electric motor to the pump, it rotates clockwise, enters from the right side and exits from the upper side.

3、Advantages

- (1) Steady delivery without pulsation, little vibration and noise.
- (2) Outstanding self-priming ability.
- (3) The pump can deliver the varied corrosion mediums if the proper material of parts selected. In addition, the working temperature can reach 200°C
- (4) The same rotary direction of internal rotor and outside rotor results in little wear and long operation life.
- (5) The pump's flow capacity can be changed through adjusting the speed.
- (6) It's specially suited to deliver high visc medium.

4、Model Explanations





- | | | |
|-------------------|---|-------------------|
| 1.前盖Front Cover | 4.外转子Outside Rotor | 7.主轴Driving Shaft |
| 2.内转子Inside Rotor | 5.滑动轴承或滚动轴承Sliding Bearing or Rolling Bearing | 8.托架Bracket |
| 3.泵体Pump Casing | 6.填料密封或机械密封Packing Seal or Mechanical Seal | |

图1

5.性能参数 (PERFORMANCE DATA)

型号 Model	通径 Nominal Size	理论排量 Displacement L/100rev	粘度 Viscosity cSt	转速 Speed r/min	压差Differential Pressure(MPa)				连接形式 Connection
					0.4	0.6	0.8	1.0	
					轴功率Power(kW) / 流量Capacity(L/min)				
NYP0.78	15	0.78	20	1390	0.17 / 9.3	0.23 / 9.0	0.28 / 8.8	0.32 / 8.6	G1 / 2
			60	1390	0.18 / 9.5	0.24 / 9.2	0.28 / 9.0	0.33 / 8.9	
			200	1390	0.31 / 10.4	0.35 / 10.2	0.39 / 10.0	0.43 / 9.9	
			600	1390	0.39 / 10.4	0.44 / 10.3	0.48 / 10.3	0.52 / 10.2	
			2000	910	0.23 / 6.8	0.27 / 6.8	0.30 / 6.8	0.33 / 6.7	
			6000	720	0.24 / 5.4	0.31 / 6.1	0.38 / 6.8	0.40 / 6.8	
NYP2.3	25	2.3	20	1400	0.38 / 28.4	0.49 / 27.5			G1
			60	1400	0.59 / 29.2	0.65 / 28.8			
			200	1400	0.61 / 30.0	0.72 / 29.6			
			600	1400	0.92 / 31.9	0.96 / 31.7			
			2000	910	0.61 / 19.9	0.68 / 19.7			
			6000	720	0.77 / 16.32	0.83 / 16.2			
NYP3.6	40	3.6	20	1450	0.69 / 46.7	0.94 / 45.9	1.18 / 45	1.44 / 43.4	法兰 Flange
			60	1450	0.81 / 47.5	1.09 / 46.7	1.37 / 45.9	1.57 / 44.7	
			200	1450	1.06 / 49.7	1.31 / 49.2	1.56 / 48.8	1.79 / 48.3	
			600	1450	1.45 / 49.9	1.61 / 49.6	1.77 / 49.3	1.93 / 49	
			2000	960	1.28 / 34.3	1.41 / 33.8	1.54 / 33.7	1.65 / 33.6	
			6000	640	1.08 / 23.0	1.18 / 22.9	1.28 / 22.9	1.37 / 22.8	
			20000	583	1.22 / 20.5	1.24 / 20.4	1.25 / 20.4	1.38 / 20.3	
			60000	455	0.84 / 16.3	0.91 / 16.2	0.98 / 16.1	1.01 / 16	

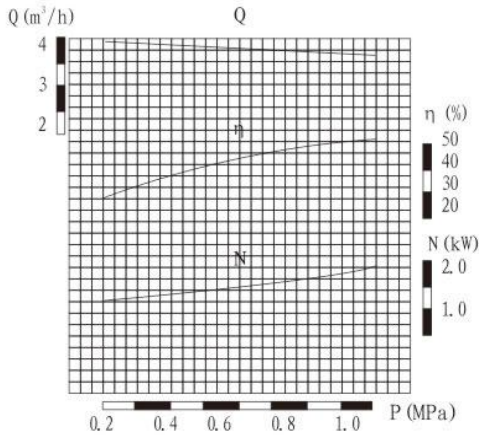
型号 Model	通径 Nominal Size	理论排量 Displacement L/100rev	粘度 Viscosity cSt	转速 Speed r/min	压差Differential Pressure(MPa)				连接形式 Connection
					0.4	0.6	0.8	1.0	
					轴功率Power(kW) / 流量Capacity(L/min)				
NYP7.0 NYP7.0A (原型号 Old Model: NYP3 NYP3A)	40	7.0	20	1450	1.36 / 98.1	1.8 / 96	2.0 / 94.7	2.4 / 93	螺纹 Thread
			60	1450	1.45 / 99	1.9 / 97	2.2 / 96.4	2.6 / 95	
			200	1450	1.62 / 99.8	2.0 / 98	2.3 / 97.5	2.7 / 97	
			600	960	1.4 / 62	1.6 / 65	1.8 / 64.5	2.0 / 64	
			2000	960	1.8 / 67	2.0 / 66	2.3 / 65	2.6 / 65	
			6000	640	1.5 / 44.5	1.7 / 44	1.8 / 44	2.0 / 44	
			20000	583	1.6 / 40.5	1.8 / 40	2.1 / 40	2.2 / 40	
			60000	455	1.46 / 31.5	1.8 / 31	1.9 / 31	2.0 / 31	
NYP24	50	24	20	720	1.8 / 165	2.3 / 161	2.8 / 158	3.4 / 155	法兰 Flange
			60	720	2.0 / 166	2.6 / 164	3.1 / 162	3.7 / 158	
			200	610	1.9 / 143	2.5 / 141	3.0 / 139	3.5 / 136	
			600	541	2.1 / 127	2.6 / 125	3.0 / 124	3.5 / 122	
			2000	475	2.2 / 112	2.6 / 111	2.9 / 110	3.4 / 109	
			6000	357	2.0 / 85	2.3 / 84	2.6 / 83	2.9 / 83	
			20000	303	1.9 / 72	2.2 / 72	2.4 / 72	2.6 / 71	
			60000	228	1.6 / 54	1.8 / 54	2.0 / 54	2.3 / 54	
NYP52 NYP52A (原型号 Old Model: NYP10 NYP10A)	50	52	20	720	4.3 / 362	5.8 / 355	6.9 / 348	8.1 / 340	螺纹 Thread
			60	720	4.7 / 364	6.2 / 358	7.3 / 352	7.5 / 346	
			200	610	4.6 / 309	5.9 / 304	6.9 / 300	8.0 / 294	
			600	541	4.9 / 275	6.0 / 271	6.8 / 268	7.8 / 264	
			2000	475	5.0 / 243	5.9 / 238	6.6 / 237	7.6 / 235	
			6000	357	4.1 / 184	4.9 / 182	5.3 / 181	6.2 / 180	
			20000	303	3.8 / 157	4.6 / 156	5.1 / 155	5.6 / 155	
			60000	228	3.1 / 119	3.7 / 118	4.0 / 118	4.5 / 118	
NYP80	80	80	20	615	5.2 / 471	6.9 / 461	8.5 / 451	10.0 / 433	法兰 Flange
			60	615	5.5 / 474	7.2 / 465	8.8 / 457	10.5 / 448	
			200	544	5.7 / 421	7.2 / 414	8.6 / 408	10.1 / 401	
			600	479	6.0 / 372	7.3 / 367	8.5 / 362	9.8 / 356	
			2000	417	6.5 / 326	7.7 / 322	8.9 / 319	10.1 / 315	
			6000	305	5.6 / 239	6.6 / 237	7.5 / 326	8.4 / 233	
			20000	228	5.5 / 180	6.4 / 179	6.9 / 178	7.7 / 177	
			60000	188	5.5 / 149	6.1 / 149	6.7 / 149	7.2 / 148	
NYP111 NYP111A (原型号 Old Model: NYP30 NYP30A)	80	111.4	20	615	6.7 / 660	9.2 / 647	11.2 / 634	13.6 / 622	法兰 Flange
			60	615	6.9 / 664	9.4 / 652	11.5 / 642	13.9 / 631	
			200	544	7.1 / 589	9.3 / 580	11.0 / 573	13.2 / 563	
			600	479	7.3 / 521	9.5 / 514	11.1 / 508	13.1 / 502	
			2000	417	7.7 / 455	9.7 / 450	11.0 / 447	12.7 / 442	
			6000	305	6.9 / 335	8.4 / 332	9.4 / 331	10.6 / 328	
			20000	228	6.3 / 251	7.5 / 250	8.2 / 249	9.2 / 248	
			60000	188	6.2 / 209	7.1 / 208	7.6 / 208	8.5 / 207	
NYP160	100	160	20	600	8.9 / 930	12.1 / 916	15.3 / 902	17.5 / 888	法兰 Flange
			60	600	9.4 / 935	12.6 / 922	15.8 / 910	19.0 / 898	
			200	550	12.3 / 866	15.3 / 859	18.3 / 852	21.3 / 845	
			600	480	10.2 / 754	12.8 / 747	15.4 / 740	18.0 / 737	
			2000	355	9.1 / 560	11.1 / 556	13 / 552	15.1 / 548	
			6000	319	10.0 / 505	11.7 / 502	13.5 / 500	15.2 / 497	

型号 Model	通径 Nominal Size	理论排量 Displacement L/100rev	粘度 Viscosity cSt	转速 Speed r/min	压差Differential Pressure(MPa)				连接形式 Connection
					0.4	0.6	0.8	1.0	
					轴功率Power(kW) / 流量Capacity(L/min)				
NYP220	125	220	20	430	8.8 / 902	11.9 / 880	15.0 / 858	8.0 / 836	法兰 Flange
			60	430	9.0 / 909	12.0 / 890	15.0 / 871	18.0 / 852	
			200	355	8.5 / 753	11.1 / 739	13.7 / 726	16.3 / 713	
			600	320	9.4 / 682	11.8 / 671	14.1 / 660	16.5 / 649	
			2000	254	9.1 / 544	11.0 / 537	13.0 / 530	15.1 / 523	
			6000	244	10.1 / 483	11.9 / 478	13.6 / 473	15.4 / 468	
			20000	160	9.1 / 347	10.5 / 345	11.9 / 343	13.3 / 341	
			60000	117	8.4 / 256	9.4 / 255	10.4 / 254	11.4 / 253	
NYP320	125	320	20	430	13.0 / 1306	18.0 / 1270	22.0 / 1235	26.0 / 1200	法兰 Flange
			60	430	13.0 / 1316	18.5 / 1285	22.0 / 1255	26.5 / 1225	
			200	355	11.8 / 1091	15.5 / 1068	19.1 / 1046	22.8 / 1024	
			600	320	13.2 / 987	16.5 / 968	19.7 / 950	22.9 / 932	
			2000	284	14.2 / 881	17.4 / 867	20.6 / 854	23.8 / 841	
			6000	222	13.7 / 693	16.2 / 684	18.7 / 675	21.2 / 666	
			20000	168	13.2 / 529	15.3 / 525	17.3 / 522	19.4 / 519	
			60000	125	12.0 / 397	13.7 / 396	15.3 / 395	16.9 / 394	
NYP650	150	650	20	315	19.0 / 1921	26.0 / 1857	33.0 / 1794		法兰 Flange
			60	315	20.0 / 1940	26.4 / 1886	33.2 / 1832		
			200	284	17.9 / 1756	24.0 / 1711	30.4 / 1666		
			600	253	17.6 / 1572	22.7 / 1534	28.9 / 1500		
			2000	196	15.7 / 1225	20.6 / 1201	24.5 / 1176		
			6000	160	16.0 / 1008	19.8 / 993	22.6 / 978		
			20000	117	13.6 / 745	16.5 / 738	19.2 / 731		
			60000	100	15.0 / 645	17.2 / 643	19.5 / 640		
NYP727 (原型号 OldModel: NYP50)	150	727	20	315	21.5 / 2135	29.4 / 2058	37.3 / 1980		法兰 Flange
			60	315	22.4 / 2157	29.8 / 2090	37.3 / 2026		
			200	280	19.6 / 1928	26.7 / 1874	33.5 / 1820		
			600	245	19.6 / 1696	25.1 / 1652	31.2 / 1611		
			2000	200	18.7 / 1394	23.3 / 1363	28.5 / 1334		
			6000	170	19.2 / 1195	23.3 / 1175	27.9 / 1155		
			20000	125	17.0 / 888	20.1 / 878	23.3 / 868		
			60000	100	16.8 / 720	19.5 / 717	22.3 / 713		
NYP1670	200	1670	20	250	38.0 / 3852	52.0 / 3690	66.0 / 3529		法兰 Flange
			60	250	40.0 / 3900	54.0 / 3763	68.0 / 3626		
			200	225	37.5 / 3535	50.0 / 3424	62.5 / 3313		
			600	195	37.0 / 3079	48.0 / 2990	58.6 / 2900		
			2000	160	35.0 / 2547	44.0 / 2485	53.0 / 2422		
			6000	135	34.6 / 2177	42.0 / 2138	50.0 / 2100		
			20000	112	35.0 / 1830	41.5 / 1810	48.0 / 1790		
			60000	85	36.0 / 1405	35.7 / 1400	40.6 / 1392		

注：对于粘度更高的介质，所应选用的转速和驱动电机功率，请与制造厂联系。

Note: Please contact the manufacturer when you select the speed and power to higher viscosity liquid.

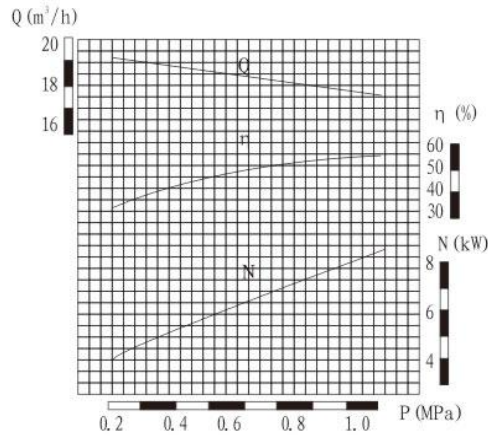
6.性能曲线 (PERFORMANCE CURVE)



NYP7.0/1.0 性能曲线图

($n = 960\text{rpm}$ $v = 200\text{cSt}$)

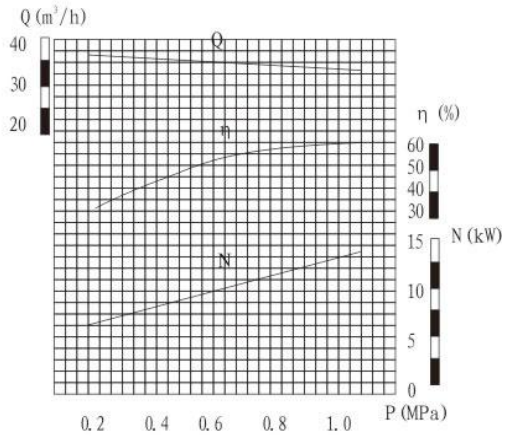
Diagram of Performance Curve
of Model NYP7.0/1.0



NYP52/1.0 性能曲线图

($n = 610\text{rpm}$ $v = 200\text{cSt}$)

Diagram of Performance Curve
of Model NYP52/1.0



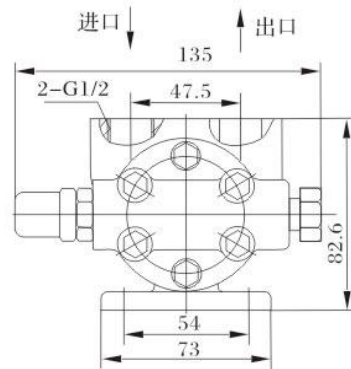
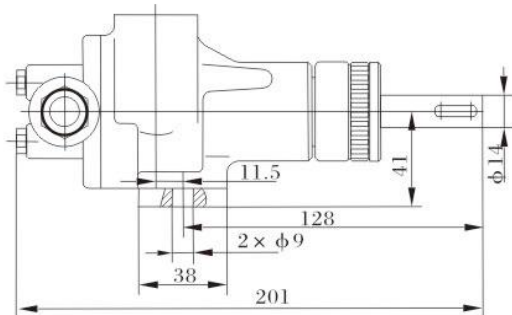
NYP111/1.0 性能曲线图

($n = 544\text{rpm}$ $v = 200\text{cSt}$)

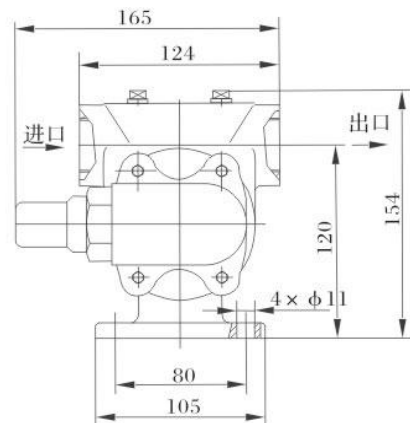
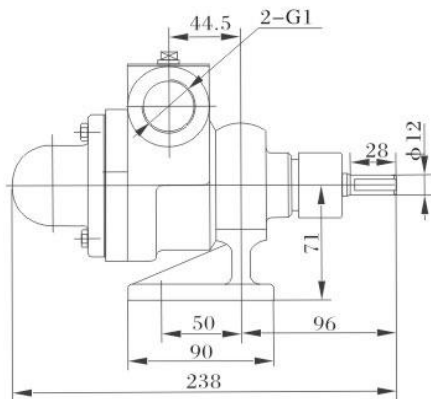
Diagram of Performance Curve
of Model NYP111/1.0

7.泵头外形尺寸图 (OUTLINE DIMENSIONS OF PUMP)

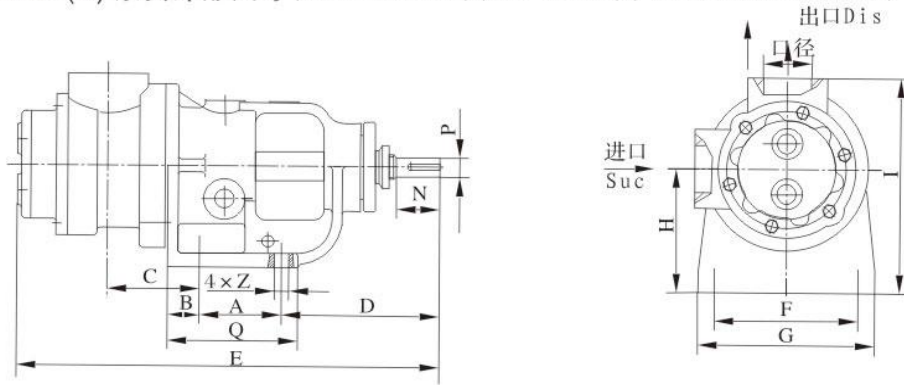
NYP0.78 泵头外形尺寸 (OUTLINE DIMENSIONS OF PUMP)



NYP2.3 泵头外形尺寸 (OUTLINE DIMENSIONS OF PUMP)

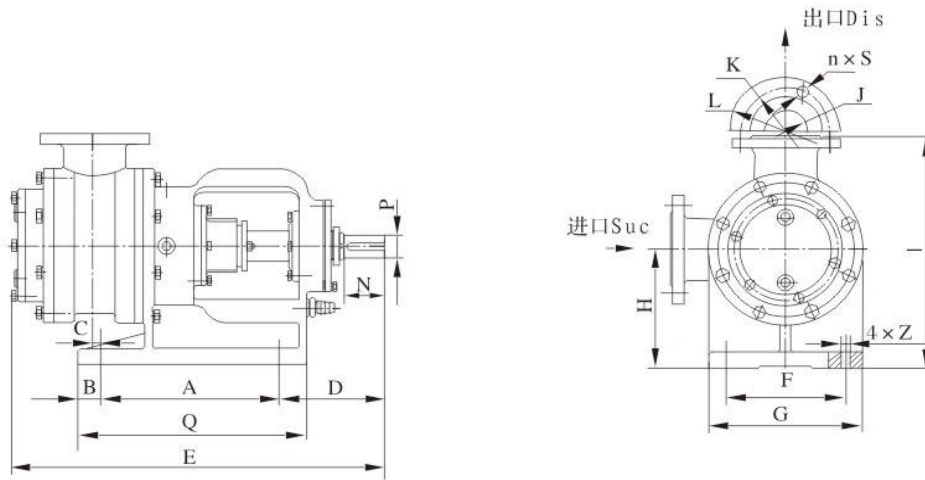


NYP7.0(A),NYP52(A) 泵头外形尺寸 (Model NYP7.0(A) and NYP52(A) OUTLINE DIMENSIONS)



型号 Model	代号 Code 理论排量 L/100r Displacement	A	B	C	D	E	F	G	H	I	Q	N	P	Z	口径 Port
		NYP7.0A (原NYP3A)	7.0	80	31	90	154	413	140	172	100	190	127	43	φ19
NYP52A (原NYP10A)	52	120	30	130	200	580	200	240	160	290	180	57	φ30	φ18	M60×2
NYP7.0 (原NYP3)	7.0	58	16	99	147	375	140	172	88	178	90	43	φ19	φ13	G1" / 2
NYP52 (原NYP10)	52	70	17	95	257	523	204	235	140	270	102	57	φ30	φ15	G2

NYP3.6,NYP24,NYP80,NYP111(A),NYP727泵头外形尺寸 (Model NYP3.6, NYP24, NYP80, NYP111(A), NYP727 OUTLINE DIMENSIONS)

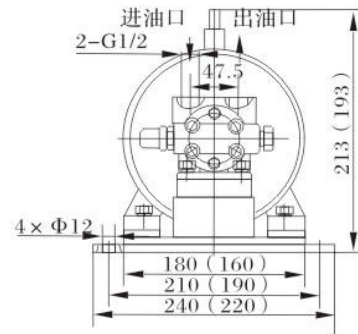
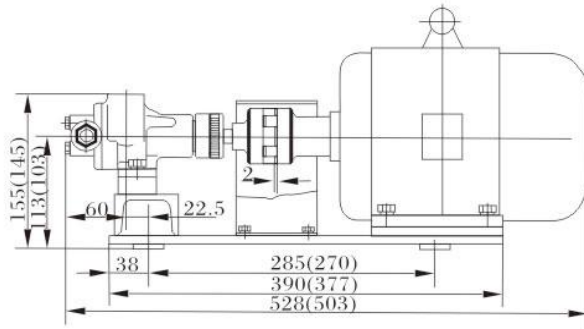


型号 Model	代号 Code 理论排量 L/100r Displacement	A	B	C	D	E	F	G	H	I	J	K	L	N	P	Q	n×S	Z
		NYP3.6	3.6	80	31	89	154	398	140	172	100	220	φ40	φ110	φ150	43	φ19	127
NYP24	24	120	30	94	196	518	200	240	160	320	φ50	φ125	φ165	57	φ30	180	4×φ18	φ18
NYP80	80	170	27.5	138.5	183.5	592	220	255	180	390	φ80	φ160	φ200	75	φ42	225	8×φ18	φ15
NYP111 (原NYP30)	111	170	25	142	188	616	220	255	180	390	φ80	φ160	φ200	58	φ40	225	8×φ18	φ15
NYP111A (原NYP30A)	111	340	30	3	198	688	220	280	220	430	φ80	φ160	φ200	75	φ42	420	8×φ18	φ20
N80A	80	340	30	-14	198	662	220	280	220	430	φ80	φ160	φ200	75	φ42	420	8×φ18	φ20
N160	160	280	40	145	208	746	280	350	260	520	φ100	φ190	φ235	100	φ55	360	8×φ22	φ22
NYP320	320	340	35	125.5	268	849	330	400	260	520	φ125	φ210	φ250	120	φ65	410	8×φ18	φ22
NYP727 (原NYP50)	727	410	40	170	260	1060	370	450	360	680	φ150	φ240	φ285	120	φ80	530	8×φ22	φ22

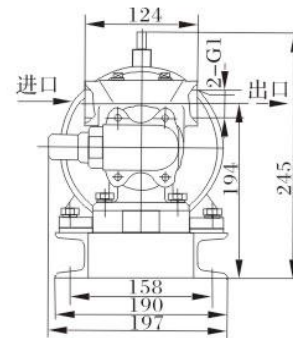
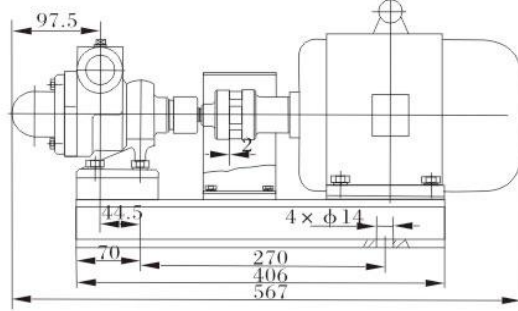
8. 整机外形与安装尺寸 (OUTLINE DIMENSIONS OF PUMP SET)

(1) 与电机直联配焊接底座 (Connected Directly With Motor And Equipped With Weld Baseplate)

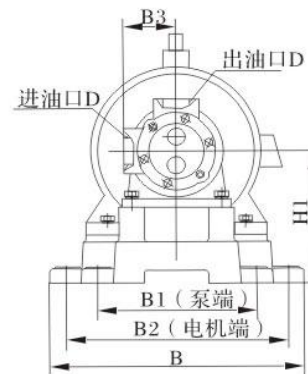
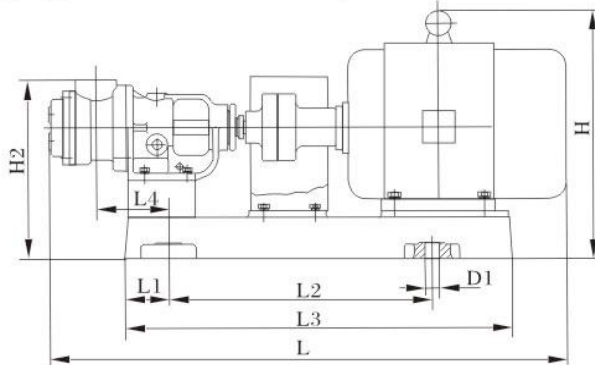
NYP0.78配Y90S(Y80¹/₂)电机 (NYP0.78Equipped Y90S(80¹/₂)Motor)



NYP2.3配Y90S电机 (NYP2.3Equipped Y90S Motor)

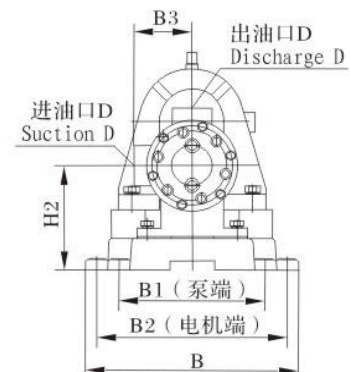
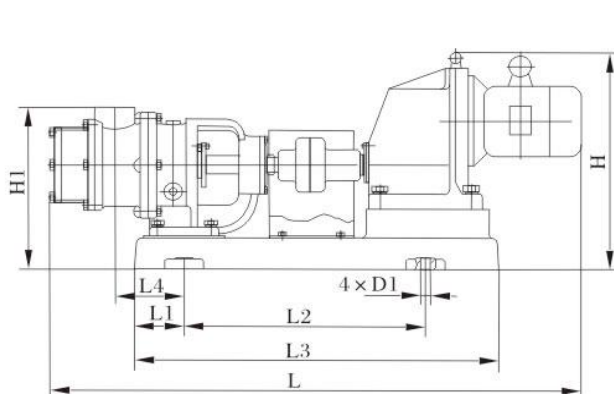


配铸铁底座 (Equipped with Cast Iron Baseplate)



型号 Model	L	L1	L2	L3	L4	H	H1	H2	B	B1	B2	B3	D	4×D1	配套电机Motor	
															型号Model	功率Power
NYP7.0	913	85	399	600	164	365	182	272	385	225	335	90	G1 ¹ / ₂	Φ22	Y132S-6	3kW
NYP7.0A	905	72	439	636	127.5	390	207	297	396	248	346	90	M48×2	Φ22	Y132S-6	3kW

(2) 配减速电机 (Equipped with The Decelerator)



型号 Model	L	L1	L2	L3	L4	H	H1	H2	B	B1	B2	B3	D	D1	减速器 Decelerator		
															型号 Model	功率kW Power	转速 Speed r/min
NYP7.0	1028	91	384	590	115	327	253	163	270	225	225	90	G1/2	Φ20	YCJ71	3	583 455
NYP52	1361	67	576	790	130	480	355	225	400	308	340	130	G2	Φ22	YCJ112	7.5	228
	1351	67	576	790	130	533	355	225	400	308	340	130	G2	Φ22	YCJ100	7.5	303 357
	1436	67	576	790	130	533	355	225	400	308	340	130	G2	Φ22	YCJ100	11	475
NYP111	1500	154	558	890	227	585	495	285	525	385	475	210	Φ80	Φ22	YCJ112	15	305 417 479
NYP160	1820	190	640	995	288.5	680	675	415	420	368	368	260	Φ100	Φ24	YCJ225	22	373
NYP320	2125	265	690	1203	325.5	690	660	400	690	500	620	260	Φ125	Φ23	YCJ280	22	320
NYP727	2423	200	950	1259	330	825	890	570	580	520	520	320	Φ150	Φ28	YCJ315	37	128

型号 Model	L	L1	L2	L3	L4	H	H1	H2	B	B1	B2	B3	D	D1	减速器 Decelerator		
															型号 Model	功率kW Power	转速 Speed r/min
NYP3.6	1050	91	384	590	131	339	295	175	270	225	225	120	Φ40	Φ20	YCJ71	2.2	587
NYP7.0A	1066	91	384	590	131	339	265	175	270	225	225	90	M48×2	Φ20	YCJ71	3	583 455
NYP24	1250	111	540	815	154	490	395	235	476	326	426	160	Φ50	Φ22	YCJ100	4	226
NYP52A	1480	111	540	815	190	543	365	235	476	326	426	130	M60×2	Φ22	YCJ112	7.5	228
	1489	111	540	815	190	490	365	235	476	326	426	130	M60×2	Φ22	YCJ100	7.5	303 357
	1574	111	540	815	190	490	365	235	476	326	426	130	M60×2	Φ22	YCJ100	11	475
NYP80	1654	154	558	890	223.5	618	495	285	525	385	475	210	Φ80	Φ22	YCJ112	15	479
NYP111A	1750	240	654	1076	173	625	527	317	508	378	458	210	Φ80	Φ22	YCJ112	15	305 417 479

9、WHEN YOU PLACE AN ORDER, PLEASE NOTE:

- (1) To indicate lubricity, cleanliness and corrosivity of the medium.
- (2) To indicate the viscosity and temperature of the medium.
- (3) To indicate the pump's suction pressure, discharge pressure and installation height.
- (4) The explosion-proof requirement of working situation.
- (5) To indicate pump's model, working pressure, speed, Medium's viscosity, temperature, explosion-proof grade of the motor and medium's name.
- (6) In addition, we can specially design and manufacture according to client's specific requirements.

9.选泵时应考虑的主要事项

- (1)介质的润滑性、清洁度、腐蚀性。
- (2)介质的粘稠度，温度。
- (3)泵进口压力及出口压力，安装高度。
- (4)使用场合的防爆要求。
- (5)订货时请注明泵型号，设计使用压力，转速，介质粘度，温度，电机防爆级别，介质名称。
- (6)对于本样本所列以外的特殊工况条件，可按用户要求单独设计供货。

注意事项

- 1、严禁泵腔内无液空转；
- 2、检查电机转向是否正确，严禁长时间倒转；
- 3、禁止泵在汽蚀状态下长期运行；
- 4、进水管必须严格密封不得漏水、漏气；
- 5、严禁在低扬程、大流量工况下电机长时间超负荷运行。