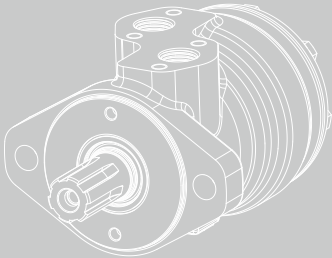


1.1

HRD series

Orbital hydraulic motor

HRD series orbital hydraulic motor, it is a spool distribution motor, adopts needle tooth ring and star design, low start-up pressure, high efficiency and smooth running.



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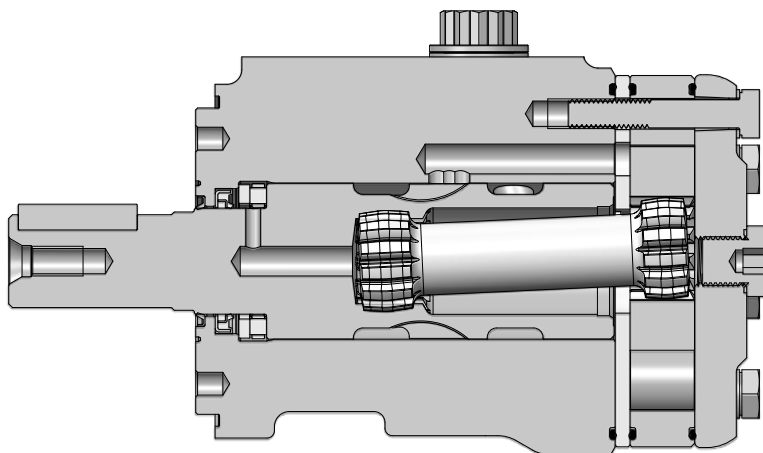
Overview

HRD series orbital hydraulic motor, it is a spool distribution motor, adopts needle tooth ring and star design, low start-up pressure, high efficiency and smooth running. High-pressure shaft seals and check valves are used as standard options, so the HRD series hydraulic motors can withstand high back pressure without the use of case drain ports, and have excellent use option performance in series circuits that require synchronous drive.

Advantages

- It adopts spool distribution structure, small size and light weight.
- The high-pressure shaft seal can carry high back pressure and allow series and parallel use.
- It adopts advanced rotary stator parameter design, low starting pressure, high efficiency, and smooth running.
- Multiple displacements and mounting sizes are available.

Standard structure



P-0061

Specification

Type		50	80	100	125	160	200	250	315	375
Displacement (cm ³ /rev.)		51.6	80.3	99.8	124.1	155.4	198.2	248.1	310.1	363.5
Max.speed (rpm)	Continuous	748	743	598	473	380	302	239	192	164
	Intermittent	942	921	739	595	476	374	302	240	206
Max.torque (N·m)	Continuous	111	226	273	338	382	399	411	417	389
	Intermittent	129	252	303	370	431	498	545	556	523
Max.output (kW)	Continuous	7.0	14.0	14.0	14.0	12.6	10.5	8.8	7.0	5.6
	Intermittent	8.8	15.8	17.5	17.5	15.8	13.1	10.5	8.9	7.8
Max. differential pressure (bar)	Continuous	150	200	200	200	180	150	125	100	80
	Intermittent	175	225	225	225	215	195	170	140	115
Max.flow (L/min)	Continuous	40	60	60	60	60	60	60	60	60
	Intermittent	50	75	75	75	75	75	75	75	75
Max.no-load starting pressure (bar)		10	10	10	10	10	10	7	7	7
Min.starting torque (N·m)	Max.continuous differential pressure	107	162	267	288	308	354	381	408	366
	Max.Intermittent differential pressure	124	189	298	319	371	456	500	537	504
Weight (kg)		7.1	7.3	7.7	7.9	8	8.5	8.9	9.3	9.7

T - 0042

- Intermittent working condition: The working time should be less than 6 seconds per minute under the intermittent working condition.
- It is not recommended for the motor to work at simultaneous maximum torque and maximum speed.
- The filtration standard of ISO 4406 cleaning standard 20/18/15 is recommended.
- High quality anti-wear hydraulic fluids are recommended.
- When the temperature is 50° C , the minimum viscosity of the oil is recommended to be 20mm²/s.
- The recommended maximum operating temperature is 82°C .
- To assure best motor life, run motor 10-15 minutes in low speed high torque mode at approximately 50% of continuous pressure and 50% of continuous flow.

Ordering information

HRD	050	A23	S2	A	N	A
①	②	③	④	⑤	⑥	⑦

Orbital Hydraulic Series

①	Orbital Hydraulic Motor	HRD
---	-------------------------	-----

Type

②	Type	050	080	100	125	160	200	250	315	375
---	------	-----	-----	-----	-----	-----	-----	-----	-----	-----

Mount, Port

③	SAE Type A 2-hole 2×Ø13.6 mount Ø106.4, pilot Ø82.5×2.7, port G1/2, drain port G1/4	A23
	SAE Type A 2-hole 2×Ø13.6 mount Ø106.4, pilot Ø82.5×5.2, port G1/2, drain port G1/4	A24
	SAE Type A 2-hole 2×Ø13.6 mount Ø106.4, pilot Ø82.5×2.8, port 7/8-14UNF, drain port 7/16-20UNF	A50
	SAE Type A 2-hole 2×Ø13.6 mount Ø106.4, pilot Ø82.5×2.8, port 7/8-14UNF, drain port 7/16-20UNF	A51
	4×Ø13.5 Magneto mount Ø106.4, pilot Ø82.5×2.7, port G1/2, drain port G1/4	M01
	4×Ø13.5 Magneto mount Ø106.4, pilot Ø82.5×2.7, port 7/8-14UNF, drain port 7/16-20UNF	M02
	4×Ø13.5 Magneto mount Ø106.4, pilot Ø82.5×2.7, port G1/2, drain port G1/4	M11
	4×Ø13.5 Magneto mount Ø106.4, pilot Ø82.5×2.7, port 7/8-14UNF, drain port 7/16-20UNF	M12
	SAE B 2×Ø13.1 Mount Ø146.05, pilot Ø101.5×6.1, port Ø10.4/Ø12.7 hole, drain port 7/16-20UNF	B22
	4×3/8-16UNC Square mount Ø82.55, pilot Ø44.4×2.6, port 7/8-14UNF, drain port 7/16-20UNF	F71
	4×M10 Square mount Ø82.55, pilot Ø44.4×2.6, port 7/8-14UNF, drain port 7/16-20UNF	F72
	SAE Type A 2-hole 2×Ø13.6 mount Ø106.4, pilot Ø82.5×5.2, port 7/8-14UNF, drain port 7/16-20UNF, screw hole 4×5/16-18UNC, with speed sensor hole	A29
	SAE Type A 2-hole 2×Ø13.6 mount Ø106.4, pilot Ø82.5×5.2, port G1/2, drain port G1/4, with speed sensor hole	A30

Ordering information

Output Shaft

④		A23/A24/A50/A51/M01/M02/ M11/M12/B22/F71/F72	A29/ A30	Code
	Ø25 Straight, parallel key 8×7×32	●		S2
	Ø25.4 Straight, parallel key 6.35×6.35×31.75	●		S4
	Ø25.4 Straight, parallel key 6.35×6.35×31.75	●		S6
	Ø22.22 Spline 13-DP16/32	●		R2
	Ø25.4, Spline SAE 6B, threaded M8*1.25	●		R1
	Ø25.4, Spline SAE 6B SAE 6B, threaded 1/4-20UNC	●		R8
	Ø25.4 Straight, parallel key 6.35×6.35×31.75, center hole M8, L=44.5		●	ST
	Ø25 Straight, parallel key 8×7×32, center hole M8		●	SY
	Ø25 Straight, parallel key 8×7×32, programme with bearings	●		SH
	Ø25 Straight, woodruff key 1/4x1", center hole 1/4-20UNC, short shaft, L=38.6, programme with bearings	●		SI

Rotation Direction

⑤	CW	A
	CCW	R

Paint Option

⑥	No Paint	N
	Black	B
	Hengli blue	C

Special Features

⑦		A23/A24/A50/A51/M01/M02/ M11/M12/B22/F71/F72	A29/ A30	代号
	Standard	●		A
	Free running	●		F
	High temperature	●		V
	Low temperature	●		S
	Speed sensor-3 loose wires out		●	S2

T - 0038

Note: ● =Available; When using the order information, the user can select the motor series, displacement, installation flange, port, shaft and other information. If the selected specification is not in the table or has special requirements, please contact us.

Displacement performance

		Pressure(bar)						Max.Cont	Max.Inter
50		30	60	80	100	120	140	150	175
51.6 cm ³ /rev.		Torque(N·m), Speed(rpm)							
Flow (L/min)	5	21	43	58	72	85	96		
	10	93	84	79	71	63	57		
	15	21	44	59	74	89	103	110	127
	20	187	178	170	164	156	145	140	121
	25	20	42	58	73	88	103	111	129
	30	282	273	266	258	249	239	233	216
	35	18	41	56	72	86	102	109	128
	40	378	367	361	352	344	332	326	308
	45	17	42	57	72	87	102	110	129
	50	472	463	456	448	439	429	421	405
Max.Cont	5	16	41	56	71	86	101	109	127
	10	566	557	549	539	529	518	511	493
	15	14	40	55	70	85	100	108	127
	20	660	653	644	635	623	610	604	585
	25		39	54	70	85	100	107	126
	30		748	739	729	720	707	700	682
	35		38	53	66	83	98	106	124
	40		844	835	827	813	800	793	775
	45		36	51	66	81	95	103	122
	50		942	930	920	907	894	887	869
Max.Inter	5								
	10								
	15								
	20								
	25								
	30								
	35								
	40								
	45								
	50								

Overall Efficiency: 70-100% ☐ 40-69% ☐ 0-39% ☐

T - 0068

		Pressure(bar)								Max.Cont	Max.Inter	
80		30	60	80	100	120	140	160	180	200	225	
80.3 cm³/rev.		Torque(N·m), Speed(rpm)										
Flow (L/min)	5	33	67	89	111	132						
		60	58	55	52	50						
	10	32	68	92	116	138	160	170	189			
		122	119	116	114	111	108	117	115			
	20	28	64	88	111	134	157	181	204	226	252	
		244	240	238	236	232	229	225	221	214	204	
	30	29	64	87	111	134	156	180	203	225	252	
		314	363	360	357	353	350	346	341	335	325	
	40	25	61	85	108	131	153	177	199	222	250	
		491	534	481	477	474	469	465	459	453	443	
Max.Cont	50	21	56	79	102	125	147	171	194	217	244	
		616	610	606	602	597	593	587	580	574	563	
	60	15	48	71	94	118	140	163	186	208	235	
		743	734	729	724	719	713	708	702	691	682	
	70		42	66	89	112	135	158	180	202	229	
			858	853	848	842	836	830	823	816	807	
	75		38	62	86	109	131	154	176	198	226	
			921	916	910	905	898	891	884	876	864	
	Max.Inter											

Overall Efficiency: 70-100% ☐ 40-69% ☐ 0-39% ☐

T - 0070

Displacement performance

		Pressure(bar)						Max.Cont	Max.Inter	
100		30	60	80	100	120	140	175	200	225
99.8 cm³/rev.		Torque(N·m), Speed(rpm)								
Flow (L/min)	5	41	83	110	137	161	184			
		49	47	44	41	39	34			
	10	41	84	113	141	168	195	241	272	
		98	95	93	91	87	82	70	60	
	20	36	80	109	138	165	193	240	273	303
		196	194	191	188	184	179	167	154	122
	30	36	79	108	136	164	192	238	270	301
		295	290	287	283	278	272	259	246	227
	40	32	75	104	132	161	188	235	268	298
		394	390	386	382	376	370	355	342	323
Max.Cont	50	24	68	96	124	152	180	228	262	293
		493	490	486	482	476	470	456	442	425
	60	16	58	86	114	143	170	217	250	281
		598	590	586	581	574	566	551	536	520
	70		50	79	107	135	162	211	244	276
			689	685	679	673	666	650	634	615
	75		45	74	102	130	158	205	239	272
			739	734	730	724	716	701	687	670
	Max.Inter									

Overall Efficiency: 70-100% ☐ 40-69% ☐ 0-39% ☐ T - 0071

		Pressure(bar)							Max.Cont	Max.Inter
125		30	60	80	100	120	140	175	200	225
124.1cm³/rev.		Torque(N·m), Speed(rpm)								
Flow (L/min)	5	51	105	140	173	206	236			
		39	38	36	34	30	26			
	10	52	106	142	177	211	228	302		
		78	76	74	72	69	64	50		
	20	47	101	138	173	208	226	300		
		157	154	152	149	144	138	120		
	30	47	101	137	173	208	242	301	338	370
		237	233	231	227	223	216	202	188	172
	40	41	94	130	165	199	233	290	329	368
		317	314	310	306	301	295	283	270	252
Max.Cont	50	33	86	122	156	191	225	284	322	359
		397	394	391	386	381	374	362	350	337
	60	24	72	108	143	177	211	269	309	347
		480	473	469	466	460	454	441	431	418
	70		64	98	133	168	201	259	300	338
			553	548	544	539	533	520	509	496
	75		57	93	128	162	197	254	295	334
			595	590	585	580	574	561	550	536
	Max.Inter									

Overall Efficiency: 70-100% ☐ 40-69% ☐ 0-39% ☐ T - 0072

Displacement performance

		Pressure(bar)						Max.Cont	Max.Inter	
160		30	60	80	100	120	140	160	180	215
155.4 cm ³ /rev.		Torque(N·m), Speed(rpm)								
Flow (L/min)	5	66	129	170	212	237				
		31	30	27	26	24				
	10	65	133	178	221	265	306	291		
		63	61	60	58	55	51	37		
	20	59	127	172	217	258	301	343		
		126	124	122	119	116	109	103		
	30	59	126	171	214	257	300	341	382	
		190	187	186	183	180	175	170	163	
	40	53	120	164	207	250	292	333	373	431
		253	251	249	247	244	239	232	223	209
50	41	108	151	194	236	277	317	357	423	
	318	316	314	311	308	303	297	290	275	
Max.Cont 60	27	92	135	178	221	261	302	342	407	
	382	380	378	375	371	367	361	354	340	
70	80	111	167	209	250	290	330	396		
	443	441	439	435	431	425	419	407		
Max.Inter 75	73	116	159	202	244	284	323	389		
		476	473	471	468	463	458	452	440	

Overall Efficiency: 70-100% ☐ 40-69% ☐ 0-39% ☐

T - 0073

		Pressure(bar)						Max.Cont	Max.Inter
		30	60	80	100	120	150	195	
200									
198.2cm ³ /rev.		Torque(N·m), Speed(rpm)							
Flow (L/min)	5	79	153	205	256	303			
		25	23	21	20	17			
	10	82	167	222	258	325			
		49	48	46	43	39			
	20	74	162	217	274	328	399	498	
		99	97	92	84	79	67	60	
	30	74	157	213	267	318	393	497	
		149	147	146	141	134	125	96	
	40	66	151	205	258	308	385	492	
		199	197	195	191	186	178	168	
Max.Cont	50	54	137	191	246	279	371	475	
		250	248	246	244	240	232	216	
Max.Cont	60	38	117	172	226	277	352	456	
		302	298	297	294	290	284	273	
Max.Inter	70		103	158	211	263	338	442	
			348	346	345	341	335	325	
Max.Inter	75		94	150	203	256	332	435	
			374	372	369	367	360	351	

Overall Efficiency: 70-100% ☐ 40-69% ☐ 0-39% ☐

T - 0074

Displacement performance

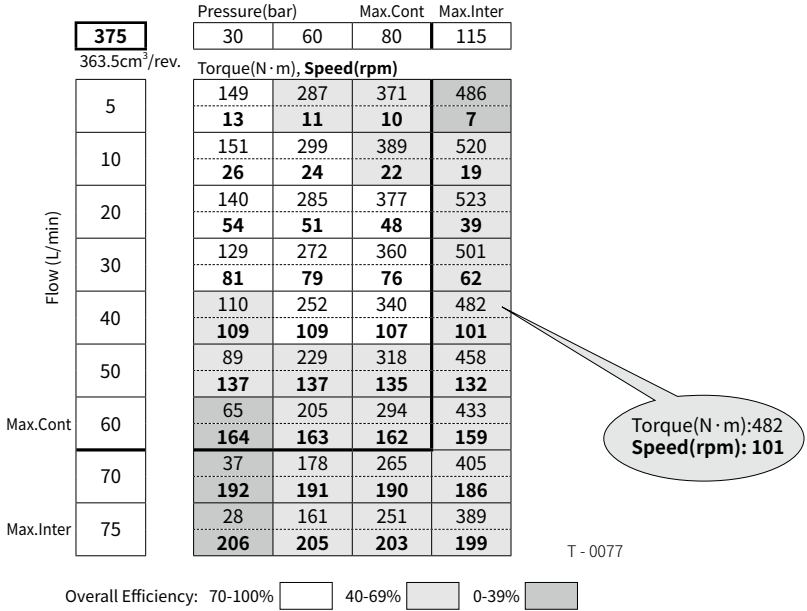
		Pressure(bar)				Max.Cont		Max.Inter	
		30	60	80	100	125	150	170	
250									
248.1cm ³ /rev.		Torque(N·m), Speed(rpm)							
Flow (L/min)	5	101 19	199 19	265 18	318 17	390 14			
	10	105 39	211 37	279 35	345 33	410 28	474 24		
	20	96 78	203 74	269 70	334 65	411 57	483 48	545 44	
	30	86 119	186 118	253 116	318 108	392 96	464 84	518 82	
	40	82 160	176 157	240 156	301 153	376 143	450 137	505 131	
	50	68 200	166 197	226 195	290 194	363 188	432 182	485 173	
	Max.Cont 60	52 239	145 238	206 236	268 236	343 231	415 219	467 217	
	70	26 280	123 275	185 277	248 273	322 270	392 266	446 263	
	Max.Inter 75	18 302	111 300	174 295	238 291	311 289	382 285	435 283	
Overall Efficiency:		70-100%		40-69%		0-39%			

T - 0075

		Pressure(bar)				Max.Cont		Max.Inter	
		30	60	80	100	120	140		
315									
310.1cm ³ /rev.		Torque(N·m), Speed(rpm)							
Flow (L/min)	5	127 15	250 14	331 13	390 11				
	10	130 31	261 29	342 26	417 22	478 19	556 17		
	20	120 63	246 60	330 56	409 48	484 43	551 38		
	30	110 95	238 92	320 86	397 71	465 65	539 61		
	40	97 128	222 126	301 124	374 122	438 117	506 112		
	50	79 159	201 159	283 158	353 155	419 151	486 146		
	Max.Cont 60	59 192	182 190	263 189	339 187	405 183	469 180		
	70	36 224	159 223	234 221	309 219	378 216	446 213		
	Max.Inter 75	24 240	144 238	220 236	293 234	346 233	429 229		
Overall Efficiency:		70-100%		40-69%		0-39%			

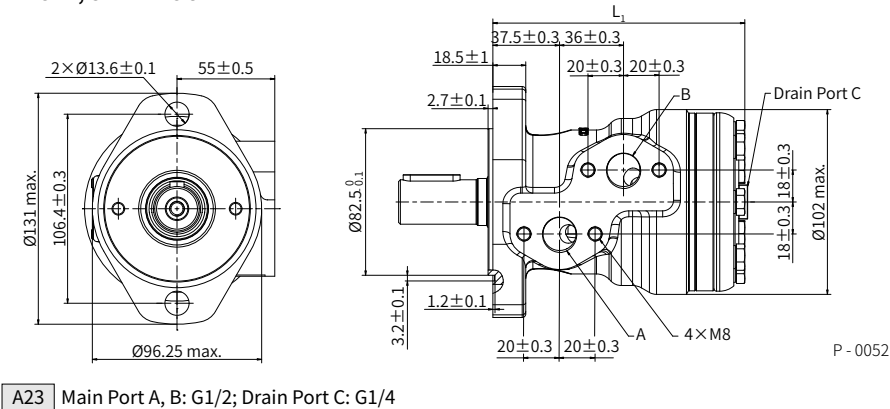
T - 0076

Displacement performance



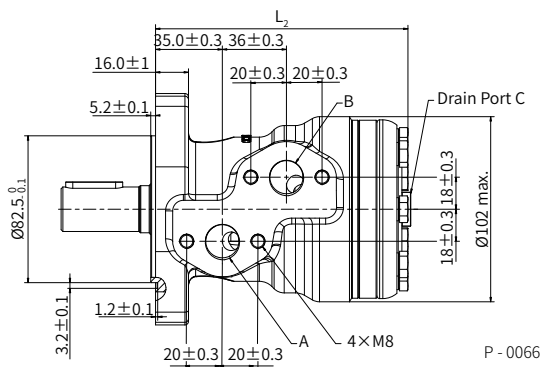
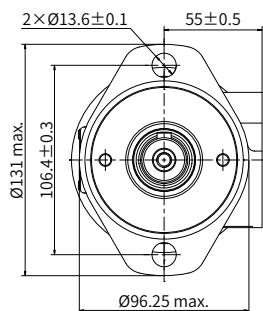
Installation size

2-HOLE, SAE A MOUNT



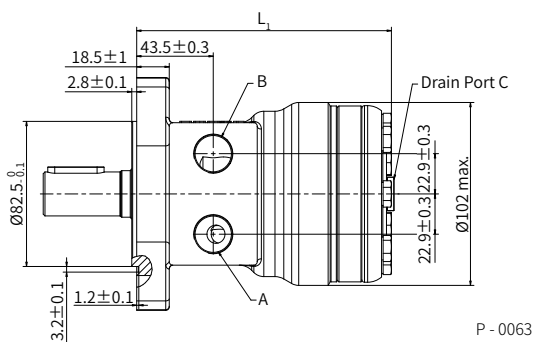
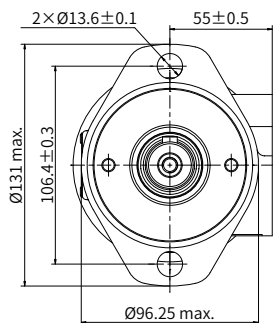
Installation size

2-HOLE, SAE A MOUNT



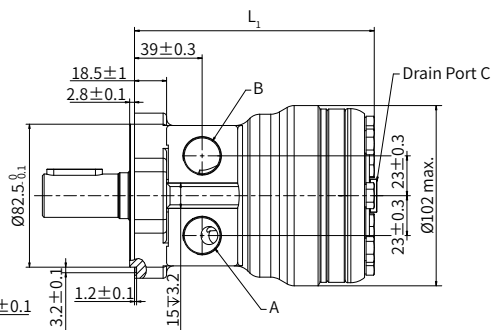
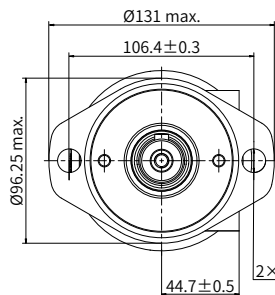
A24 Main Port A, B: G1/2; Drain Port C: G1/4

2-HOLE, SAE A MOUNT



A50 Main Port A, B: 7/8-14UNF; Drain Port C: 7/16-20UNF

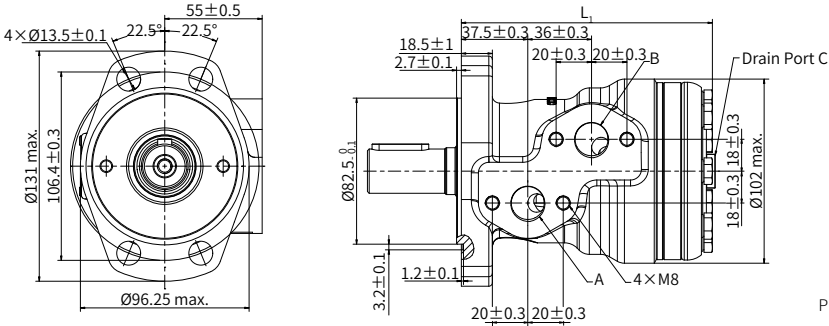
2-HOLE, SAE A MOUNT



A51 Main Port A, B: 7/8-14UNF; Drain Port C: 7/16-20UNF

Installation size

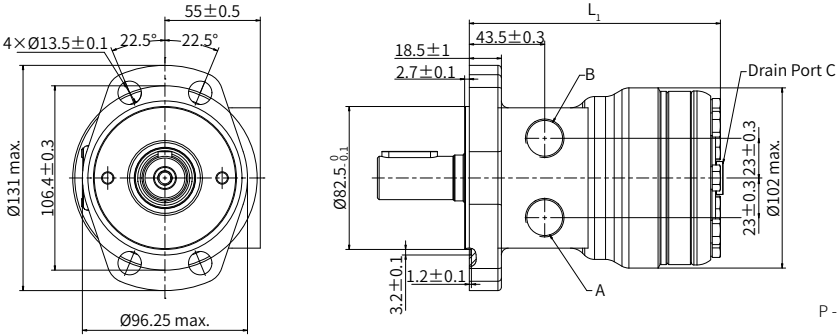
4-HOLE, MAGNETO MOUNT



P - 0065

M01 Main Port A, B: G1/2; Drain Port C: G1/4 **M02** Main Port A, B: 7/8-14UNF; Drain Port C: 7/16-20UNF

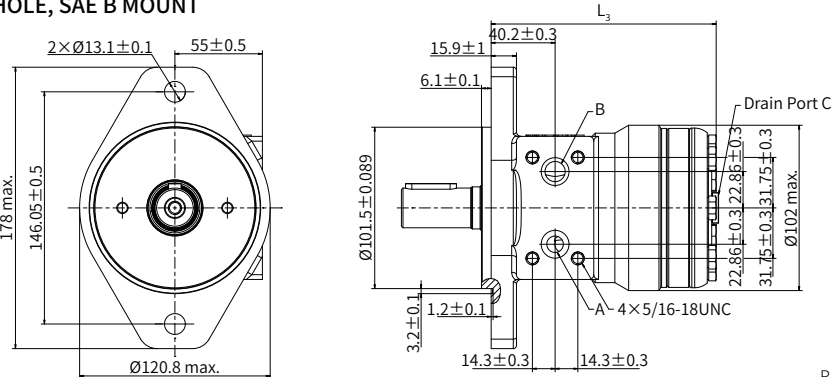
4-HOLE, MAGNETO MOUNT



P - 0067

M11 Main Port A, B: G1/2; Drain Port C: G1/4 **M12** Main Port A, B: 7/8-14UNF; Drain Port C: 7/16-20UNF

2-HOLE, SAE B MOUNT

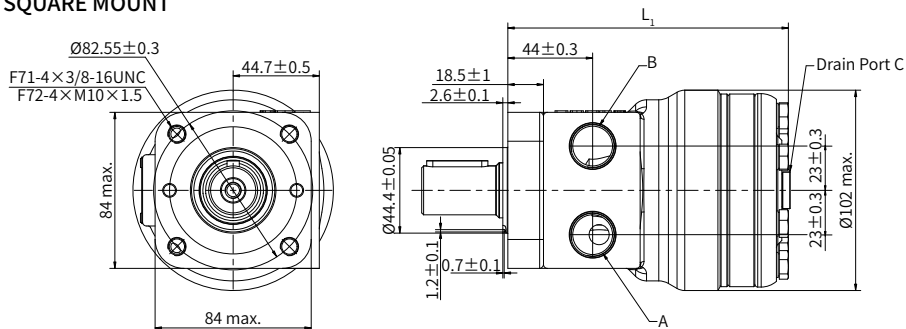


P - 0068

B22 Main Port A, B: Ø10.4/Ø12.7 Hole; Drain Port C: 7/16-20UNF

Installation size

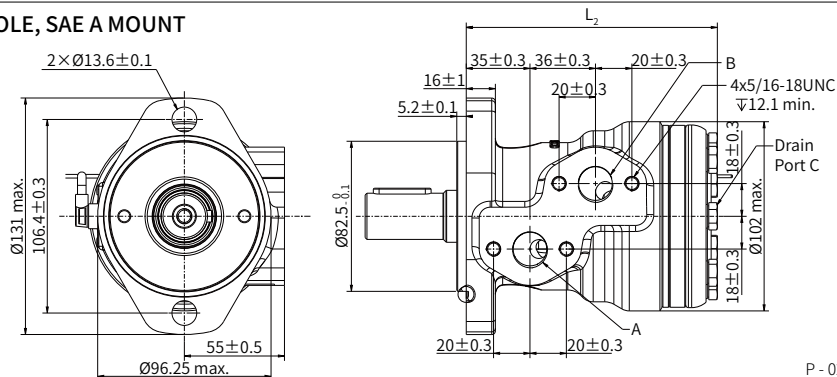
SQUARE MOUNT



F71 **F72** Main Port A, B: 7/8-14UNF; Drain Port C: 7/16-20UNF

P - 0069

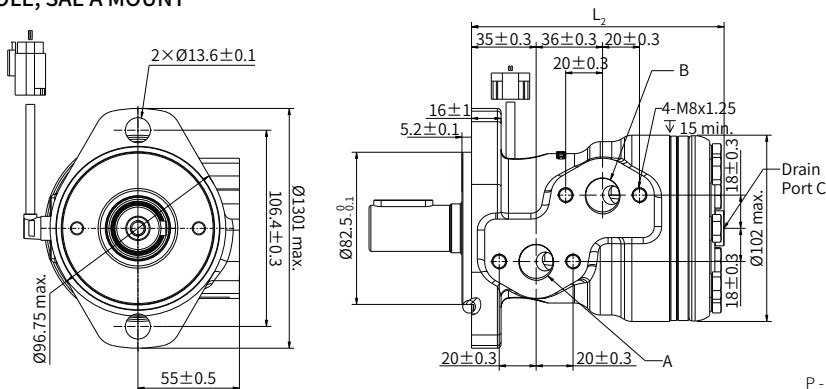
2-HOLE, SAE A MOUNT



A29 Main Port A, B: 7/8-14UNF; Drain Port C: 7/16-20UNF

P - 0251

2-HOLE, SAE A MOUNT



A30 Main Port A, B: G1/2; Drain Port C: G1/4

P - 0252

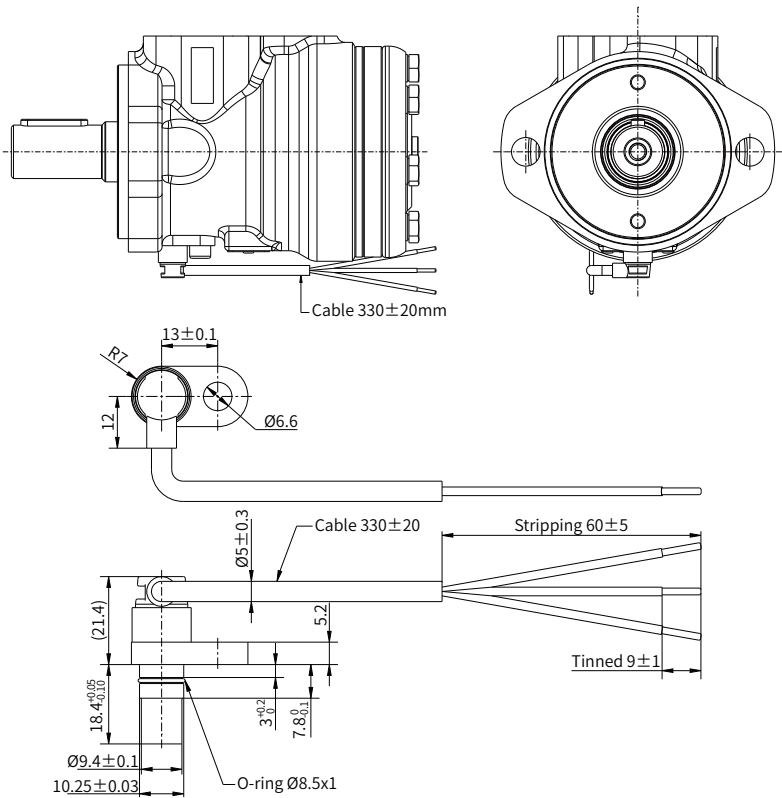
Installation size

Displacement cm ³ /rev.	L ₁ mm	L ₂ mm	L ₃ mm
50	140.4	137.9	137.0
80	145.5	143.0	142.1
100	145.5	143.0	142.1
125	148.9	146.4	145.5
160	153.3	150.8	149.9
200	159.2	156.7	155.8
250	166.2	163.7	162.8
315	174.9	172.4	171.5
375	182.4	179.9	179.0

T - 0079

Note: Dimensions L₁、L₂、L₃ are the length from the flange mounting surface to the rear end of the motor, and the tolerance is $\pm 0.8\text{mm}$.

Speed sensor



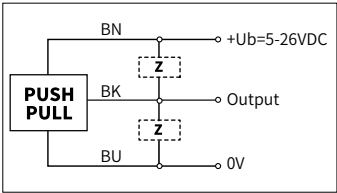
P - 0239

Speed sensor

Dimensions	Ø10.25 /L=18.4mm
Voltage	5-26VDC
Input Current	<15mA
Sensing distance	0.2~1.7mm
Power reverse protection (Y/N)	Yes
Power input overcurrent and overvoltage protection (Y/N)	Yes
Maximum output current	40mA
Voltage drop	< 3VDC
Working frequency	0-20KHz
Output signal	Impulse(HTL)
Operating temperature	-40°C ~125°C
Protection	IP67/IP69K
Shell material	Stainless steel/plastic
Pressure resistance of measuring surface	175bar
Connector	Cable 0.33m
Number of counting teeth	30

T - 0193

■ WIRING DIAGRAM



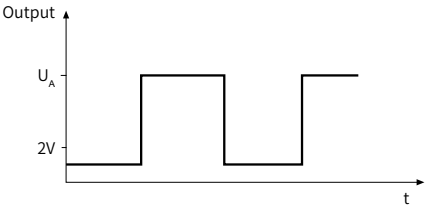
P - 0240

■ TERMINAL ASSIGNMENT

Signal		+Ub	0V	Output
Color		BN	BU	BK

P - 0241

■ OUTPUT SIGNAL



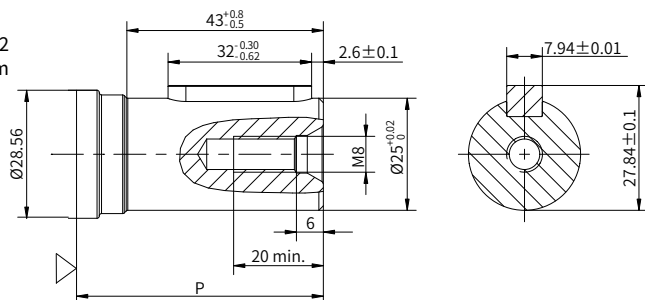
P - 0242

01

Shaft end dimensions

S2

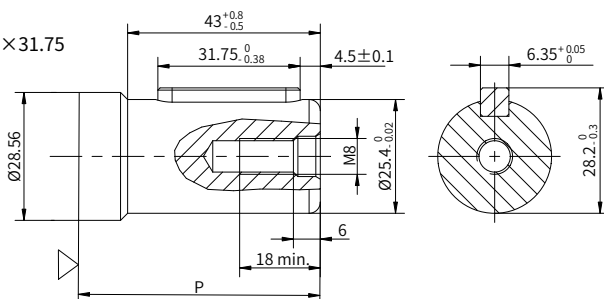
Ø25mm Straight
Parallel key: 8×7×32
Max. Torque: 678N·m



P - 0070

S4

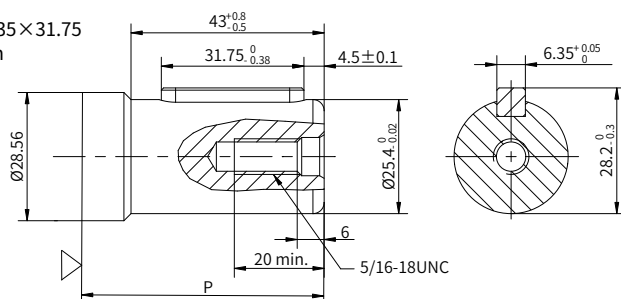
Ø25.4mm Straight
Parallel key: 6.35×6.35×31.75
Max. Torque: 655N·m



P - 0071

S6

Ø25.4mm Straight
Parallel key: 6.35×6.35×31.75
Max. Torque: 655N·m



P - 0072

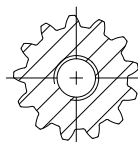
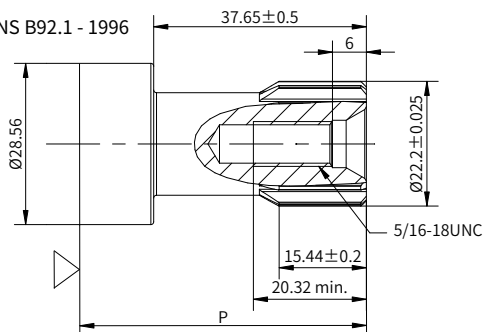
Shaft end dimensions

R2

Ø22.2mm Shaft

Spline: 13-DP16/32, ANS B92.1 - 1996

Max. Torque: 170N·m



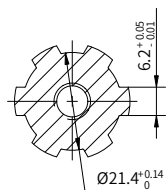
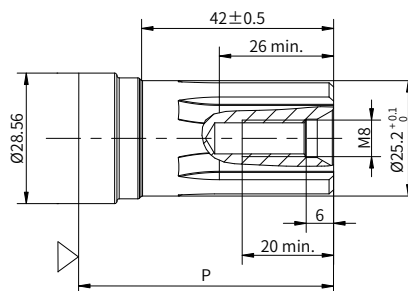
P - 0075

R1

Ø25.4mm Shaft

Spline: SAE 6B (B.S.2059)

Max. Torque: 678N·m



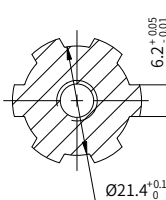
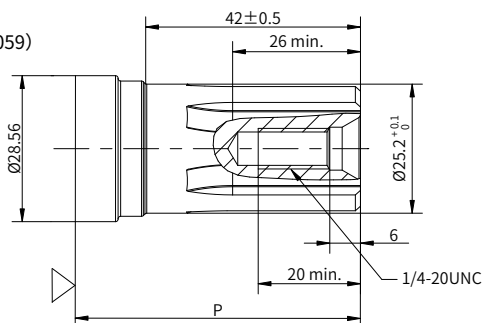
P - 0073

R8

Ø25.4mm Shaft

Spline: SAE 6B (B.S.2059)

Max. Torque: 678N·m

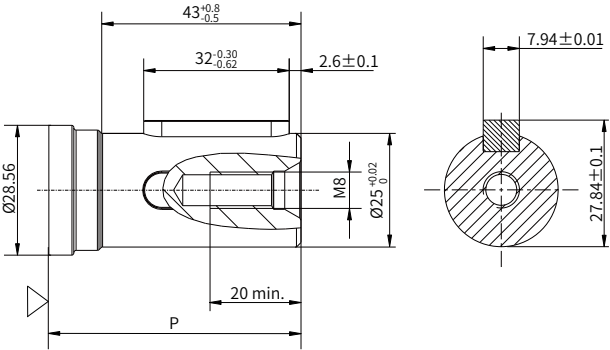


P - 0074

Shaft end dimensions

SY

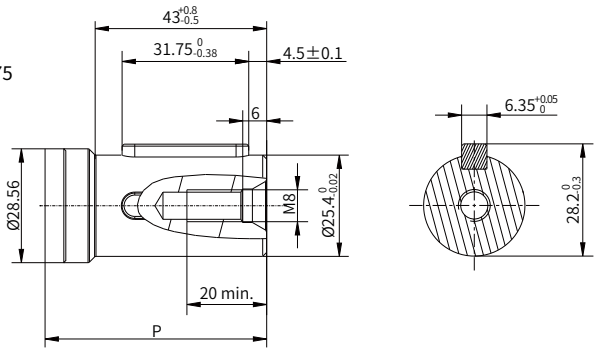
Ø25mm Straight
Parallel key: 8×7×32
Max. Torque: 678N·m



P - 0253

ST

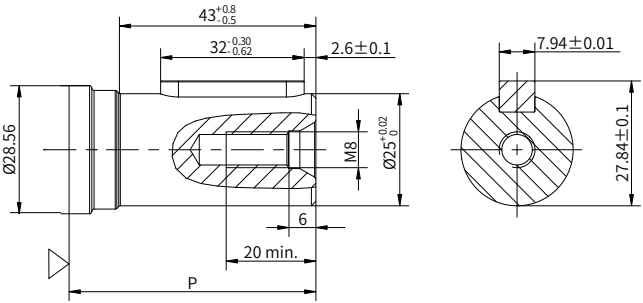
Ø25.4mm Straight
Parallel key: 6.35×6.35×31.75
Max. Torque: 655N·m



P - 0254

SH

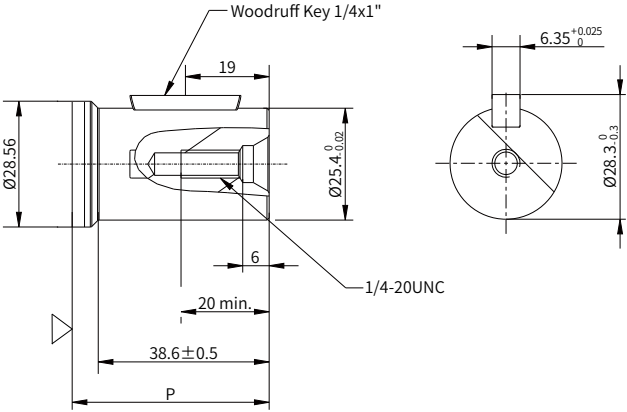
Ø25mm Straight
Parallel key: 8×7×32
Max. Torque: 678N·m



P - 0280

Shaft end dimensions

SI
Ø25.4mm Straight
Woodruff key: 1/4x1"
Max. Torque: 360N·m



P - 0281

P mm	Pilot 3mm	Pilot 5.2mm	Pilot 6.1mm
S2	53.0	55.5	56.4
S4	53.0	55.5	56.4
S6	53.0	55.5	56.4
R1	48.0	50.5	51.4
R2	40.7	43.2	44.1
R8	48.0	50.5	51.4
SH	53.0	55.5	56.4
SI	44.9	47.1	48

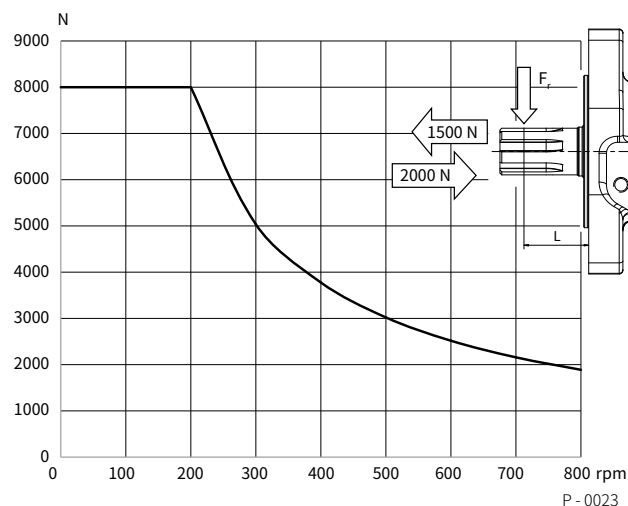
T - 0085

Note: Dimension P is the overall distance from the flange mounting surface to the end of the shaft, and the tolerance is $\pm 0.8\text{mm}$.

Allowable shaft load/bearing curve

HRD series products adopt optimized output shaft design, improve the wear resistance between output shaft and housing, when not exceeding its rated load for continuous operation, the life of dynamic pressure bearings can fully meet customer use.

Note: For frequent start-stop working conditions, you need to contact Hengli's sales or technical personnel for consultation. In the fixed position, the comparison between the side load and the rotational speed is referred to the figure below.



$$F_r = \frac{800}{n} \cdot \frac{250000}{102.4 + L} \text{ N}$$

F_r = Radial force (N)

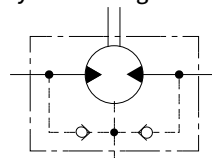
L = Distance (mm)

n = Speed (rpm)

Diamond flange $L=30\text{mm}$

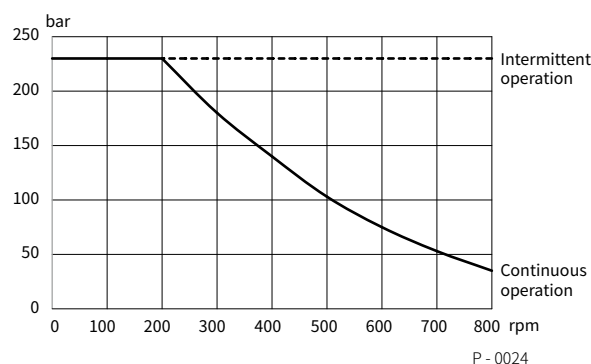
Square mount $L=24\text{mm}$

Hydraulic diagram



P - 0021

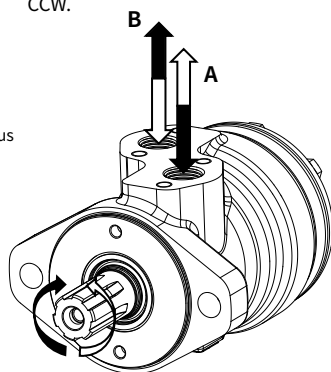
Permissible shaft seal pressure



When case drain port is not working, the pressure on the output shaft seal is slightly higher than the pressure in the return line. When using a drain line, the pressure on the shaft seal of the output shaft is the same as the pressure in the drain line.

Rotation direction: CW

When facing the motor shaft extension direction, port A is high pressure oil, the output shaft rotates CW; Otherwise, it rotates CCW.



P - 0060