

2.1

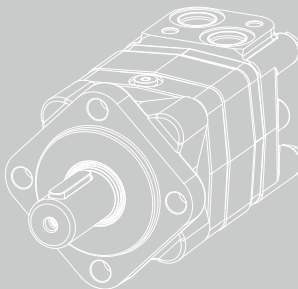
HSD series

Orbital hydraulic motor

The HSD series orbital hydraulic motor, it is a low-speed and high-torque hydraulic motor, the end face distribution makes it to have characteristics of high working pressure, low starting pressure, high efficiency and high reliability.

Hengli

®



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Bearingless motor

Standard mount

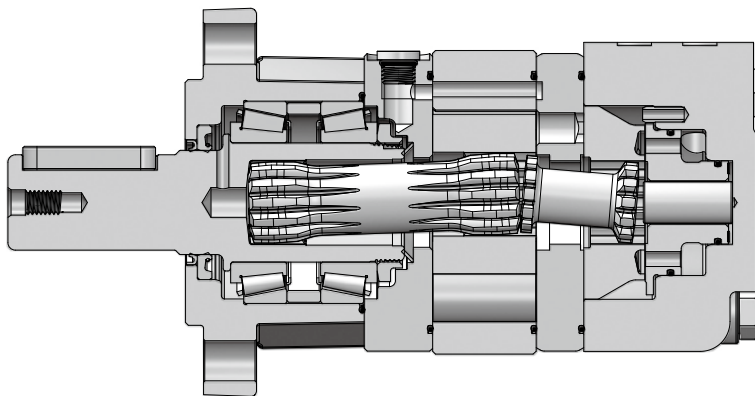
Overview

The HSD series orbital hydraulic motor, it is a low-speed and high-torque hydraulic motor, the end face distribution makes it to have characteristics of high working pressure, low starting pressure, high efficiency and high reliability. Customised product can be developed by different application requirement.

Advantages

- Using tapered roller bearing structure, can support larger axial and radial load.
- Advanced disc valve structure, high distribution accuracy, strong automatic compensation ability after wear, to ensure high volumetric efficiency, long life, efficient and stable work.
- Various displacements and installation dimensions are available.

Standard structure



P-0029

Specification

Type		80	100	125	160	200	230	250	315	400	500
Displacement (cm ³ /rev.)		80.2	99.6	124.9	159.2	199.4	232.1	249.3	314.0	391.9	488.3
Max.speed (rpm)	Continuous	773	739	592	465	372	318	298	236	188	153
	Intermittent	982	892	714	562	447	385	359	284	229	187
Max.torque (N·m)	Continuous	241	297	370	473	610	658	608	874	897	847
	Intermittent	316	390	485	580	727	812	855	987	1056	986
Max.output (kW)	Continuous	15.5	18.0	18.0	16.5	16.5	13.8	14.5	15.0	11.0	9
	Intermittent	19.5	22.5	22.5	23.0	22.0	17.2	18.0	17.0	12.5	10.5
Max.differential pressure (bar)	Continuous	210	210	210	210	210	200	200	200	160	120
	Intermittent	275	275	275	260	250	250	250	240	190	140
	Peak	295	295	295	280	270	270	270	260	210	160
Max.flow (L/min)	Continuous	65	75	75	75	75	75	75	75	75	75
	Intermittent	80	90	90	90	90	90	90	90	90	90
Max.no-load starting pressure (bar)		12	10	10	8	8	8	8	8	8	8
Min.starting torque (N·m)	Max.continuous differential pressure	145	215	283	359	460	530	554	734	796	781
	Max.Intermittent differential pressure	188	281	371	440	557	633	697	858	925	925
Weight (kg)	Bearingless	8.2	8.4	8.7	9	9.5	9.9	10.1	11.1	11.6	11.8
	Standard	9.9	10.1	10.4	10.7	11.2	11.6	11.8	12.8	13.3	13.5

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- Intermittent working condition: The working time should be less than 6 seconds per minute under the intermittent working condition.
- Peak differential pressure: At peak differential pressure, the operating time is less than 0.6 seconds per minute.
- 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°, 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

HSD	080	A3	H	S1	A	N	A
①	②	③	④	⑤	⑥	⑦	⑧

Orbital Hydraulic Series

①	Orbital Hydraulic Motor	HSD
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Type

②	Type	080	100	125	160	200	230	250	315	400	500
---	------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Mount

③	SAE Type A 2×Ø13.5 mount Ø106.4, pilot Ø82.5×6.1	A3
	SAE Type A 4×Ø13.5 mount Ø106.4, pilot Ø82.5×6.1	A2
	SAE Type B 2×Ø14.3 mount Ø106.4, pilot Ø101.6×9.4	B2
	6×Ø13.5 Magneto mount Ø106.4, pilot Ø82.5×2.6	M0
	4×Ø11.55 Square mount Ø106.4, pilot Ø82.5×6.1	F1
	4×Ø11 Round mount Ø125, pilot Ø100×6, bearingless motor	B0
	4×Ø13.5 Square mount Ø127, pilot Ø101.6×6.3, bearingless motor	F0

Port

④	Port G1/2, drain port G1/4	H
	Port 7/8-14UNF, drain port 7/16-20UNF	2
	Port M22×1.5, drain port M14×1.5	3

Output Shaft

⑤		A3/A2/B2/M0/F1	B0/F0	代号
	Ø25.4 Straight, parallel key 6.35×6.35×31.75	●		S1
	Ø31.75 Straight, parallel key 7.96×7.96×31.75	●		S5
	Ø32 Straight, parallel key 10×8×45	●		S3
	Ø22 Spline 13-DP16/32	●		R2
	Ø25.4 Shaft, spline SAE 6B, center hole 1/4-20UNC	●		R1
	Ø31.75 Spline 14-DP12/24, center hole 3/8-16UNC	●		R4
	Ø31.75 Spline 14-DP12/24, center hole M8	●		R5
	Ø31.75 Tapered, parallel key 7.96×7.96×31.75	●		T2
	Cardan		●	C1

Ordering information

Rotation Direction

⑤	CW	A
	CCW	R

Paint Option

⑥	No Paint	N
	Black	B
	Hengli blue	C

Special Features

⑦	Standard	A
	Free running	F
	High temperature	V
	Low temperature	S
	Speed sensor, DT04-4P connector	S2

Note: ● =Available;

- 1) The B0, F0 options are bearingless motor,and the shaft option is C1.
- 2) 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.

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02

Displacement performance

		Pressure(bar)					Max.Cont		Max.Inter	
		30	70	105	140	175	210	225	250	275
		Torque(N · m), Speed(rpm)								
Flow (L/min)	5	26 60	59 57	92 54	117 52	147 51				
	10	33 121	72 118	110 115	146 111	183 105	218 98	233 93	254 86	
	20	33 243	74 239	116 235	155 231	195 225	236 217	259 204	278 203	304 186
	30	29 367	76 362	118 357	159 352	199 345	241 335	268 330	287 319	316 303
	40	25 489	72 483	113 479	154 473	195 465	235 455	262 434	280 438	311 421
	50		67 608	108 602	150 595	190 586	232 574	260 550		
	65		66 773	105 766	146 758	189 747	230 733	259 696		
	80		62 982	102 974	143 964	185 953				
Overall Efficiency:		70-100%		40-69%		0-39%		T - 0047		

		Pressure(bar)					Max.Cont		Max.Inter	
		35	70	105	140	175	210	225	250	275
		Torque(N · m), Speed(rpm)								
Flow (L/min)	5	36 48	80 47	121 46	159 44	197 42	232 38	257 34		
	10	37 97	82 95	125 93	166 91	227 85	257 84	276 82	306 74	337 69
	20	39 196	90 194	139 191	187 189	235 185	280 180	299 176	326 168	352 157
	30	41 295	93 292	143 288	193 284	244 280	292 276	316 269	352 260	383 249
	40	41 393	92 390	143 386	193 382	245 376	297 369	320 366	356 355	390 342
	50	37 494	88 488	140 485	192 481	241 474	293 466	316 463		
	60	33 592	80 588	133 584	185 577	235 571	288 562	310 556		
	75	30 739	78 731	130 725	180 719	230 709	283 697	304 690		
	90		71 892	123 885	172 876	223 867				
Overall Efficiency:		70-100%		40-69%		0-39%		T - 0048		

Displacement performance

		Pressure(bar)					Max.Cont		Max.Inter		
		35	70	105	140	175	210	225	250	275	
125											
124.9cm³/rev.		Torque(N · m), Speed(rpm)									
Flow (L/min)	5	51	109	166	226	281	333				
		39	38	38	36	35	34				
	10	57	120	182	244	301	353	373	405		
		78	77	76	74	73	69	67	62		
	20	54	119	179	244	306	367	395	437	473	
		158	156	155	153	150	145	143	135	123	
	30	50	115	177	243	306	370	396	441	483	
		237	235	234	231	214	209	206	198	189	
	40	44	109	174	238	303	367	395	441	485	
		318	315	313	310	305	299	296	288	277	
	50	41	106	170	234	298	364	392			
		394	396	392	389	384	377	373			
	60	38	96	168	232	297	363	390			
		480	476	472	468	463	454	452			
	Max.Cont	75	29	96	161	227	291	355	383		
			592	592	588	583	578	570	564		
Max.Inter	90		91	156	221	286					
			714	709	703	694					

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

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		Pressure(bar)					Max.Cont		Max.Inter		
		35	70	105	140	160	175	210	225	260	
160											
159.2cm³/rev.		Torque(N·m), Speed(rpm)									
Flow (L/min)	5	63	131	200	291	332	358				
		31	29	28	28	28	27				
	10	70	151	229	306	343	368	437	466		
		61	60	59	58	56	57	56	54		
	20	67	145	226	308	355	388	467	498		
		123	122	120	119	118	117	113	109		
	30	65	147	229	311	357	391	473	506	580	
		185	184	182	180	179	178	173	171	169	
	40	61	143	224	306	353	386	467	501	579	
		247	245	243	241	240	238	233	229	219	
	50	52	136	218	298	345	379	461	496		
		310	307	305	302	301	299	293	289		
	60	46	127	208	289	335	369	450	486		
		373	370	367	347	361	359	353	347		
	Max.Cont	75	39	113	193	275	321	356	439	473	
			465	458	455	451	448	446	438	433	
Max.Inter	90	26	103	183	265	312					
		560	562	558	552	549					

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

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Displacement performance

		Pressure(bar)						Max.Cont	Max.Inter	
200		35	70	105	140	160	175	210	225	250
199.4cm³/rev.		Torque(N·m), Speed(rpm)								
5		71	163	257	368					
		24	24	23	23					
10		78	178	276	371	432	469	573		
		49	49	48	47	47	46	43		
20		85	188	291	396	459	501	604	646	713
		98	96	95	93	90	89	82	76	68
30		88	192	297	401	462	505	610	656	727
		147	146	144	142	140	139	133	129	111
40		75	181	285	390	451	494	600	644	716
		197	194	192	190	188	187	181	176	169
50		65	170	273	379	438	484	588	633	
		246	244	242	240	238	236	230	226	
60		53	159	262	368	426	472	576	622	
		297	294	291	289	287	285	279	276	
75		44	150	254	359	420	464	569	612	
		372	369	366	363	361	359	353	349	
90			138	254	343	401				
			447	442	438	435				

Overall Efficiency: 70-100% ☐ 40-69% ☐ 0-39% ☐ T - 0051

		Pressure(bar)						Max.Cont	Max.Inter		
230		35	70	95	125	140	155	175	200	225	250
232.1cm³/rev.		Torque(N·m), Speed(rpm)									
5		88	187	258							
		21	20	18							
10		101	215	303	397	441	491				
		42	41	40	38	37	35				
20		102	219	305	407	450	509	577	658	736	812
		84	82	80	79	79	77	76	74	71	66
30		104	225	334	415	459	519	588	675	744	
		127	125	119	123	122	121	120	118	114	
40		102	226	333	413	459	518	588	648	732	
		169	167	159	165	165	164	162	160	157	
50		100	217	324	408	451	512	581			
		212	211	200	208	207	206	205			
60		85	205	310	395	439	499	568			
		255	253	241	251	250	248	247			
75		76	197	300	387	430	488	498			
		256	318	302	315	314	312	310			
90			185	289	391	425					
			385	365	364	372					

Overall Efficiency: 70-100% ☐ 40-69% ☐ 0-39% ☐ T - 0052

Displacement performance

		Pressure(bar)							Max.Cont		Max.Inter
		35	70	95	125	140	155	175	200	225	250
		Torque(N · m), Speed(rpm)									
Flow (L/min)	5	87 20									
	10	101 39	208 37	288 36	364 33	421 30	506 28				
	20	103 78	229 76	315 74	417 73	463 72	513 70				
	30	95 118	223 116	313 115	421 113	473 112	538 111	603 108	675 91	749 85	855 70
	40	83 157	213 155	304 154	414 152	467 151	538 149	608 147	676 142	760 135	
	50	68 197	199 195	290 194	401 192	460 191	541 189	613 187			
	60	51 238	180 235	273 234	384 232	439 230	529 229	600 226			
	Max.Cont	75	21 298	150 296	241 294	353 295	408 290	519 288			
	Max.Inter	90		110 359	203 356	321 358	369 350				

Overall Efficiency: 70-100% ☐ 40-69% ☐ 0-39% ☐ T - 0053

		Pressure(bar)							Max.Cont		Max.Inter
		35	70	100	120	140	160	175	200	225	240
		Torque(N · m), Speed(rpm)									
Flow (L/min)	5	127 15	254 14	339 14							
	10	133 31	272 30	393 28	465 26	547 24	609 22				
	20	141 62	305 61	441 59	528 58	613 55	669 50				
	30	144 93	310 92	453 91	545 89	635 87	721 81	783 74	874 66	969 53	987 50
	40	134 125	297 123	440 122	535 121	627 119	719 116	785 113	873 102	949 95	
	50	129 156	291 155	434 153	529 152	623 151	717 148	784 145			
	60	108 188	272 186	414 185	509 184	604 182	697 180	767 177			
	Max.Cont	75	85 236	254 234	395 232	490 231	585 229	679 226			
	Max.Inter	90		60 284	228 283	370 281	464 279	559 277			

Overall Efficiency: 70-100% ☐ 40-69% ☐ 0-39% ☐ T - 0054

Displacement performance

		Pressure(bar)					Max.Cont		Max.Inter	
400		30	60	80	105	120	140	160	175	190
391.9cm³/rev.		Torque(N·m), Speed(rpm)								
5	142	293								
	11	10								
10	153	306	414	558						
	25	24	23	22						
20	152	328	448	590	677	791	897	979		
	50	49	48	47	46	45	39	36		
30	163	342	460	608	697	815	931	997	1056	
	75	74	73	72	71	70	68	65	60	
40	153	331	451	599	688	810	923	978		
	100	99	98	97	96	95	93	91		
50	136	330	454	590	688	776				
	125	124	123	122	121	121				
60	123	298	417	566	657	775				
	150	150	149	148	147	145				
75	96	278	399	544	635					
	188	188	187	185	185					
90	68	248	367	517						
	225	229	227	224						

Overall Efficiency: 70-100% ☐ 40-69% ☐ 0-39% ☐ T - 0055

		Pressure(bar)					Max.Cont	Max.Inter
		25	50	80	90	105	120	140
		Torque(N·m), Speed(rpm)						
Flow (L/min)	10	160	329					
		20	20					
	20	152	333	547	616	722		
		41	40	40	39	34		
	30	160	342	561	633	740	847	986
		57	57	56	56	56	55	54
	40	153	337	557	629	736	842	
		81	81	80	80	79	79	
	50	132	316	538	613	723	835	
		102	101	100	100	100	99	
Max.Cont	60	121	304	526	597	708		
		122	122	121	121	135		
Max.Inter	75	92	260	478	552	664		
		153	153	152	151	151		
	90	56	223	447	518			
		177	186	184	184			

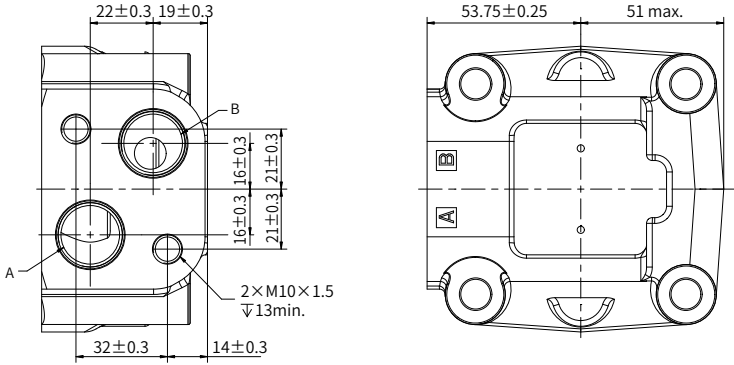
Torque (N·m):835
Speed (rpm):99

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

T - 0056

Installation size

Port size



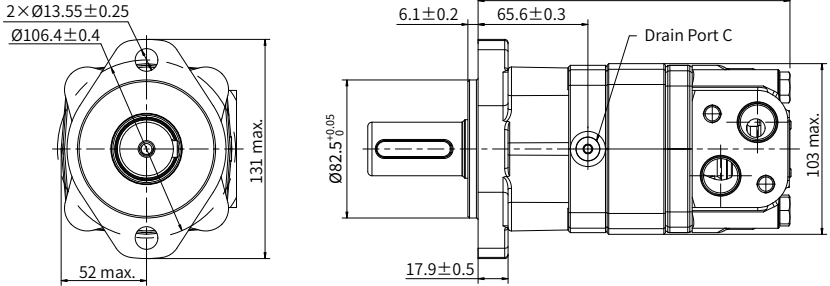
P - 0030

Port size: **H** Main Port A, B: G1/2
Drain Port C: G1/4

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

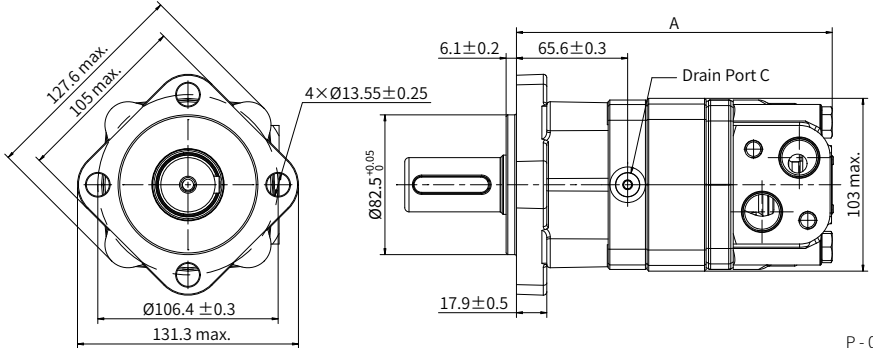
3 Main Port A, B: M22×1.5
Drain Port C: M14×1.5

A3 2-HOLE, SAE A MOUNT



P - 0033

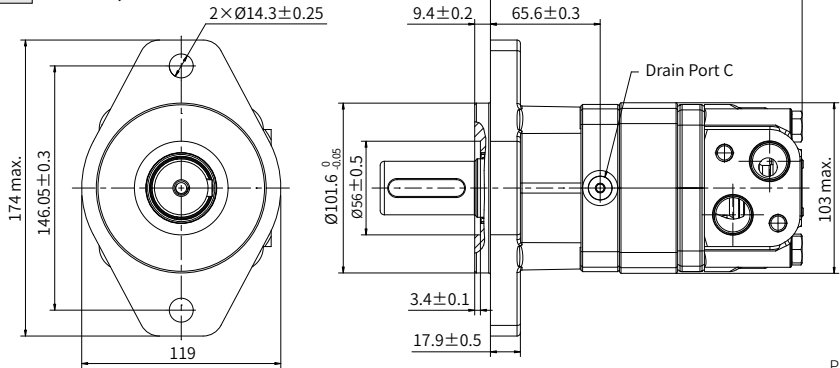
A2 4-HOLE, SAE A MOUNT



P - 0034

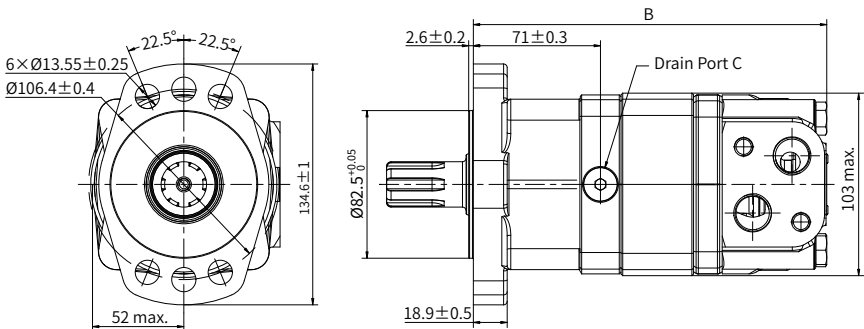
Installation size

B2 2-HOLE, SAE B MOUNT



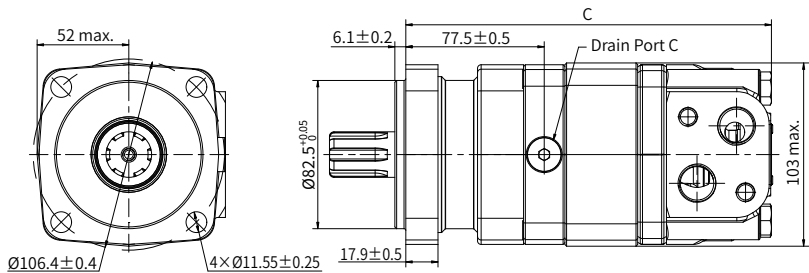
P - 0040

M0 6-HOLE, MAGNETO MOUNT



P - 0035

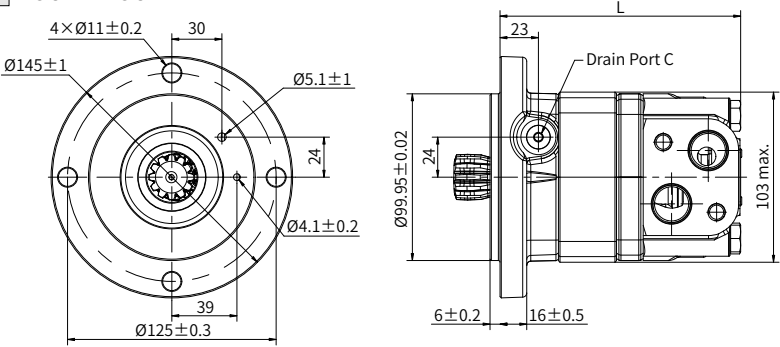
F1 SQUARE MOUNT



P - 0041

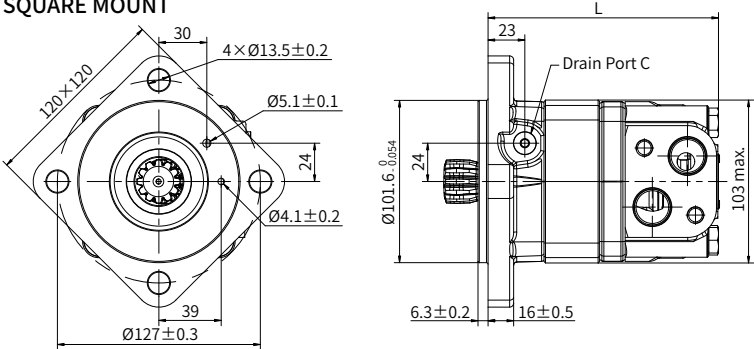
Installation size

B0 ROUND MOUNT



P - 0031

F0 SQUARE MOUNT



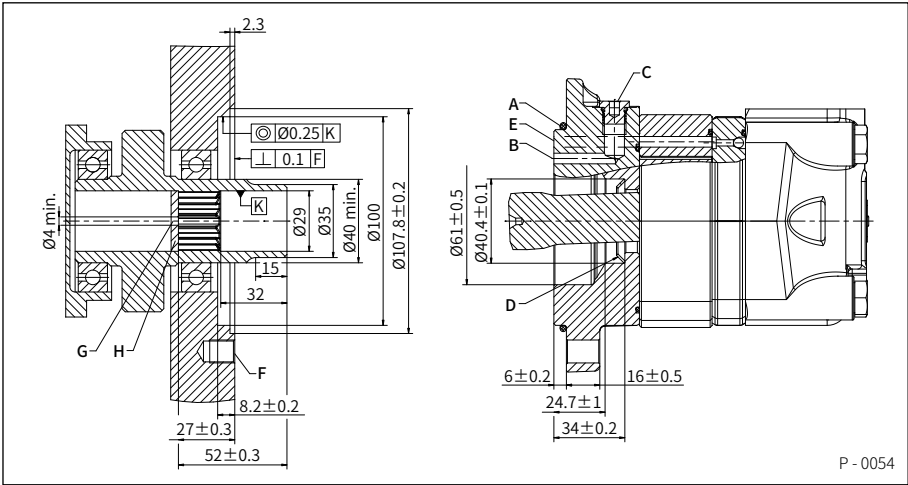
P - 0032

Type	L mm	A mm	B mm	C mm
80	123.4	165.5	170.9	177.4
100	126.8	168.9	174.3	180.8
125	131.2	173.3	178.7	185.2
160	137.2	179.3	184.7	191.2
200	144.2	186.3	191.7	198.2
230	149.9	192.0	197.4	203.9
250	152.9	195.0	200.4	206.9
315	164.2	206.3	211.7	218.2
400	177.8	219.9	225.3	231.8
500	177.8	219.9	225.3	231.8

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Note: Dimensions L, A, B, C are the length from the flange mounting surface to the rear end of the motor, and the tolerance is ± 0.61 mm.

Installation size



P - 0054

A: O-ring: 100×3

B: External drain channel

C: Drain connection 12mm

D: Conical seal ring

E: Internal drain channel

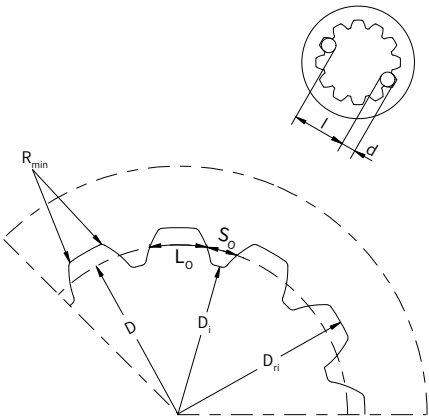
F: 15 mm deep

G: Oil circulation hole

H: Hardened stop plate

Splines parameters

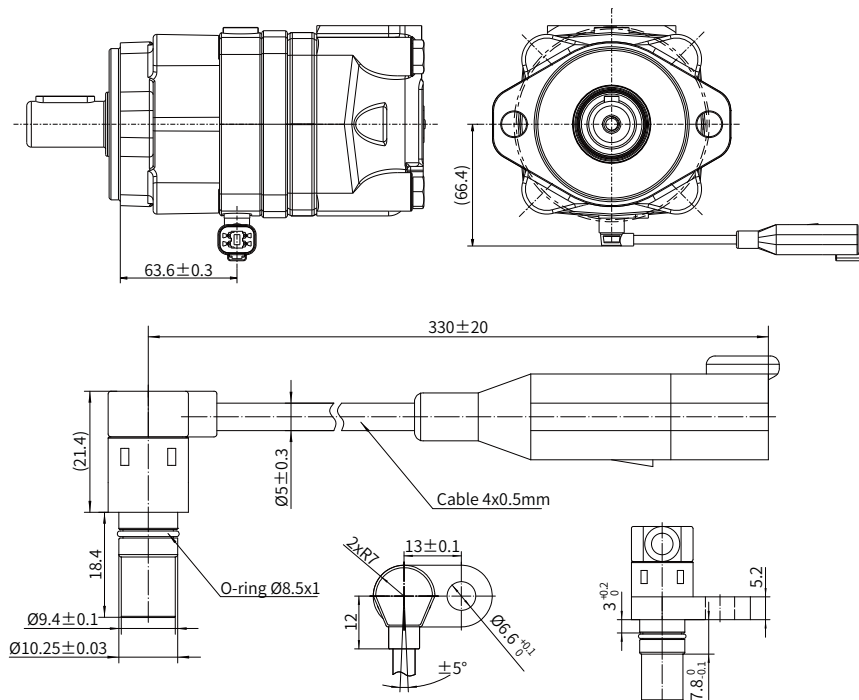
Side Fit		mm
Number of teeth	Z	12
Pitch	DP	12/24
Pressure angle	α_0	30°
Pitch dia	D	Ø25.4
Major dia	D_{ri}	Ø28 ⁰ _{-0.1}
Minor dia	D_i	Ø23 ^{+0.033} ₀
Tip radius	R_{min}	0.2
Tooth thickness	S_0	2.341
Space width	L_0	4.308±0.02
Pin dia	d	4.835±0.001
Dimension between two pins	I	17.62 ^{+0.15} ₀



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Speed sensor



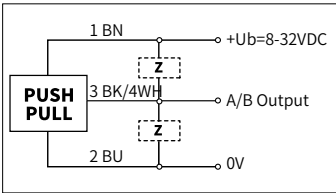
P - 0235

Dimensions	Ø10.25 /L=18.4mm
Voltage	8-32VDC
Input Current	<15mA
Sensing distance	0.2~2mm
Power reverse protection (Y/N)	Yes
Power input overcurrent and overvoltage protection (Y/N)	Yes
Maximum output current	50mA
Voltage drop	≤ 3VDC
Working frequency	0-20KHz
Output signal	A, B
Operating temperature	-40°C ~ +125°C
Protection	IP69K
Shell material	Copper/plastic
Pressure resistance of measuring surface	10bar
Connector	Cable 0.33m, Injection 4-core DEUTSCH DT04-4P-EP04 plug
PPR	28

T - 0192

Speed sensor

■ WIRING DIAGRAM



P - 0236

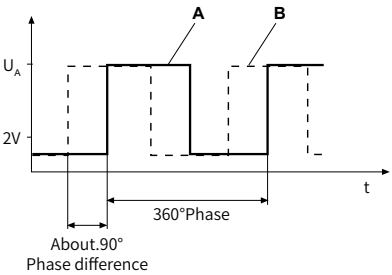
■ TERMINAL ASSIGNMENT

Signal		+Ub	0V	A	B
Color		BN	BU	BK	WH
4 core plug DT04		1	2	3	4

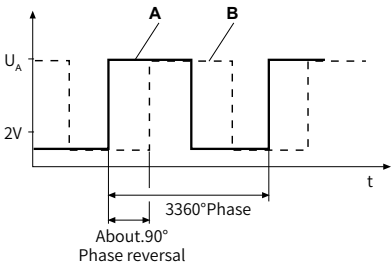
P - 0237

■ OUTPUT SIGNAL

⌚ The measured gear rotates clockwise



⌚ The measured gear rotates counterclockwise



P - 0238

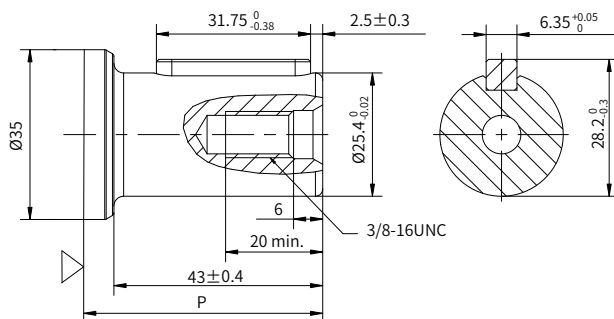
Shaft end dimensions

S1

Ø25.4mm Straight

Parallel key: $6.35 \times 6.35 \times 31.75$

Max. Torque: $655\text{N} \cdot \text{m}$



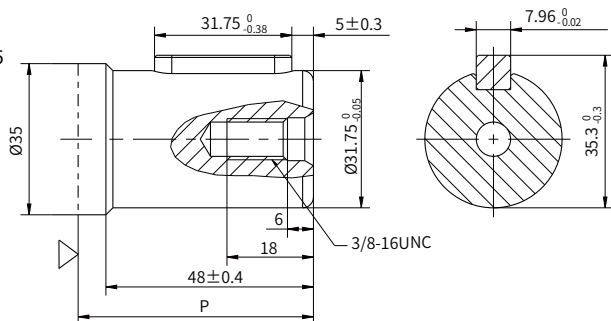
P - 0044

S5

Ø31.75mm Straight

Parallel key: $7.96 \times 7.96 \times 31.75$

Max. Torque: $881\text{N} \cdot \text{m}$



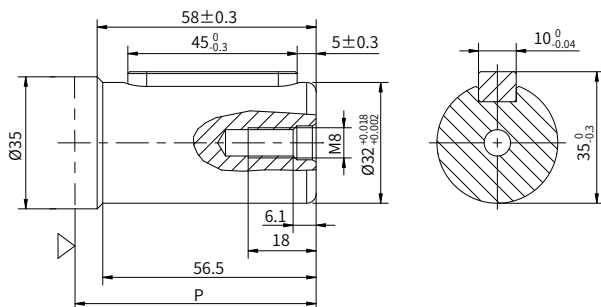
P - 0045

S3

Ø32mm Straight

Parallel key: $10 \times 8 \times 45$

Max. Torque: $881\text{N} \cdot \text{m}$



P - 0043

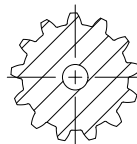
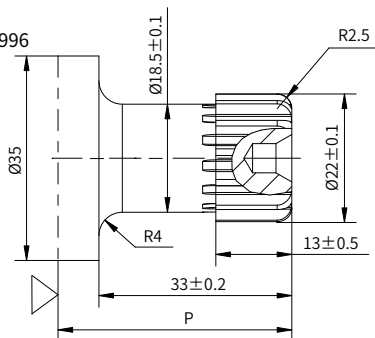
Shaft end dimensions

R2

Ø22mm

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

Max. Torque: 170N·m



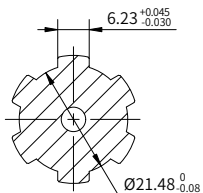
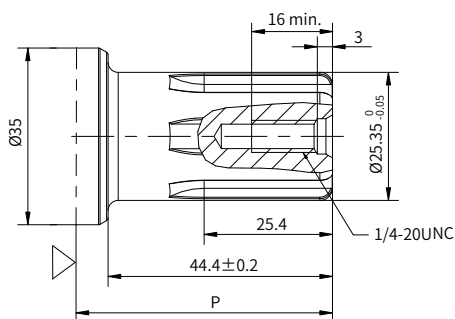
P - 0049

R1

Ø25.4mm

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

Max. Torque: 678N·m



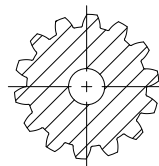
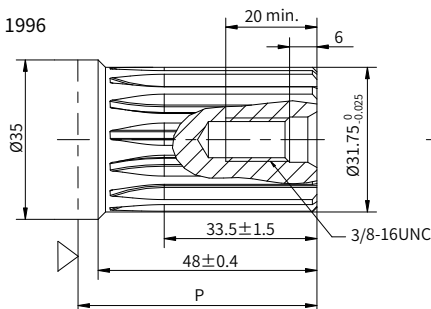
P - 0048

R4

Ø31.75mm

Spline: 14-DP12/24, ANS B92.1 - 1996

Max. Torque: 881N·m

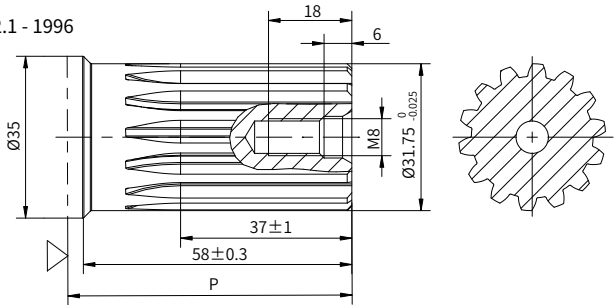


P - 0046

Shaft end dimensions

R5

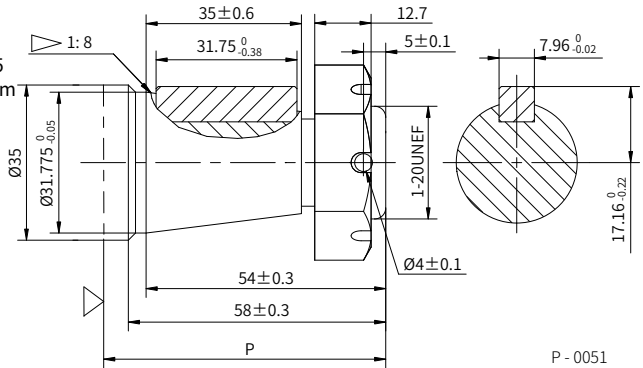
Ø31.75mm
Spline: 14-DP12/24, ANS B92.1 - 1996
Max. Torque: 881N·m



P - 0047

T2

Ø31.75mm Tapered
Parallel key: 7.96×7.96×31.75
Tightening torque: 200±10N·m
Max. Torque: 881N·m



P - 0051

P mm	SAE Mount	Magneto Mount	Square Mount
S1	51.0	45.6	39.1
S5	56.0	50.6	44.1
S3	66.0	60.6	54.1
R2	41.0	35.6	29.1
R1	53.9	48.5	42.0
R4	56.0	50.6	44.1
R5	66.0	60.6	54.1
T2	66.0	60.6	54.1
T8	66.0	60.6	54.1
R8	108.0	102.6	96.1

T - 0064

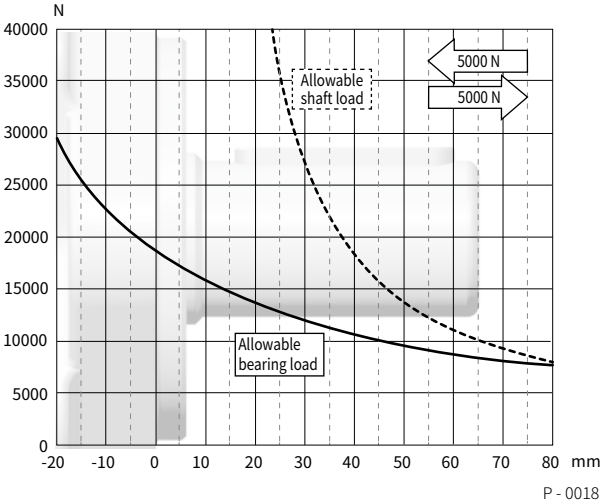
Note: Dimension P is the overall distance from the flange mounting surface to the end of the shaft, and the tolerance is ±0.97mm.

Allowable shaft load/bearing curve

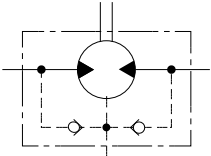
As shown in the figure, when the axial load is 0, the radial allowable load of the output shaft is related to the distance from the flange mounting surface to the load action point.

The solid line shows the allowable radial load of the bearing. It is based on L_{10} bearing life 2000 hrs at 100 RPM with rated output torque.

The dash line shows max radial shaft load. Any shaft load exceeding the values quoted in the curve will involve a risk of failure.



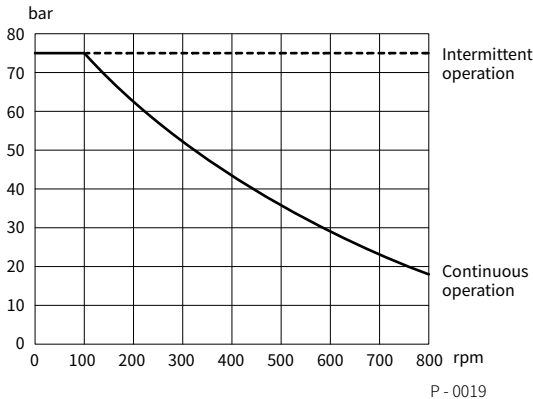
Hydraulic diagram



P - 0018

P - 0020

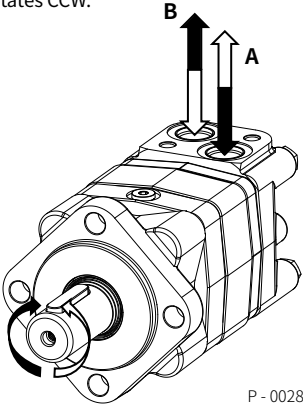
Permissible shaft seal pressure



P - 0019

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 - 0028

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.