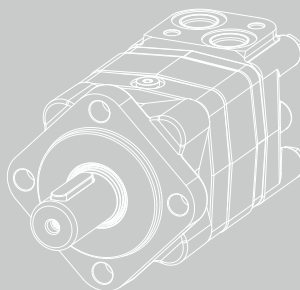


2.1

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

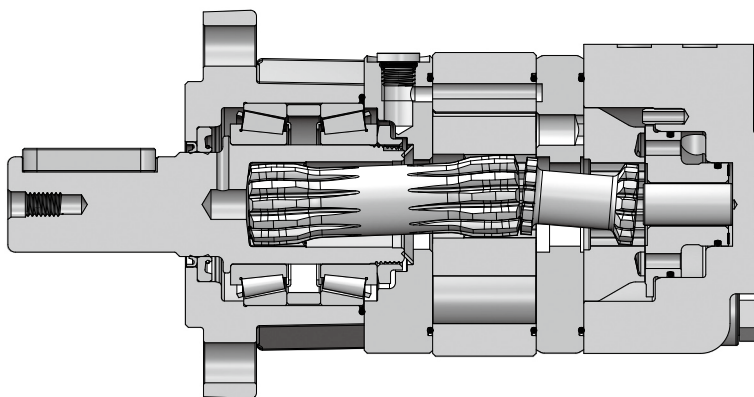
Overview

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 (Nm)	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 (Nm)	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

T - 0041

- 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.

Displacement performance

		Pressure(bar)					Max.Cont		Max.Inter	
		30	70	105	140	175	210	225	250	275
		Torque(Nm), Speed(rpm)								
Flow (L/min)	80	26	59	92	117	147				
	80.2 cm³/rev.	60	57	54	52	51				
	5	33	72	110	146	183	218	233	254	
	10	121	118	115	111	105	98	93	86	
	20	33	74	116	155	195	236	259	278	304
	20	243	239	235	231	225	217	204	203	186
	30	29	76	118	159	199	241	268	287	316
	30	367	362	357	352	345	335	330	319	303
	40	25	72	113	154	195	235	262	280	311
	40	489	483	479	473	465	455	434	438	421
Max.Cont	50		67	108	150	190	232	260		
	50		608	602	595	586	574	550		
	65		66	105	146	189	230	259		
Max.Inter	65		773	766	758	747	733	696		
	80		62	102	143	185				
	80		982	974	964	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(Nm), Speed(rpm)								
Flow (L/min)	100	36	80	121	159	197	232	257		
	99.6 cm³/rev.	48	47	46	44	42	38	34		
	5	37	82	125	166	227	257	276	306	337
	10	97	95	93	91	85	84	82	74	69
	20	39	90	139	187	235	280	299	326	352
	20	196	194	191	189	185	180	176	168	157
	30	41	93	143	193	244	292	316	352	383
	30	295	292	288	284	280	276	269	260	249
	40	41	92	143	193	245	297	320	356	390
	40	393	390	386	382	376	369	366	355	342
Max.Cont	50	37	88	140	192	241	293	316		
	50	494	488	485	481	474	466	463		
	60	33	80	133	185	235	288	310		
Max.Inter	60	592	588	584	577	571	562	556		
	75	30	78	130	180	230	283	304		
	75	739	731	725	719	709	697	690		
Max.Inter	90		71	123	172	223				
	90		892	885	876	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(Nm), 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% ☐

T - 0049

		Pressure(bar)					Max.Cont		Max.Inter		
160		35	70	105	140	160	175	210	225	260	
159.2cm³/rev.		Torque(Nm), 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% ☐

T - 0050

Displacement performance

		Pressure(bar)						Max.Cont		Max.Inter
		35	70	105	140	160	175	210	225	250
		Torque(Nm), Speed(rpm)								
Flow (L/min)	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
Max.Cont	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	
	Max.Inter	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(Nm), 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(Nm), 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(Nm), 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(Nm), 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

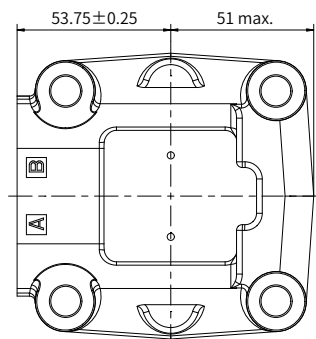
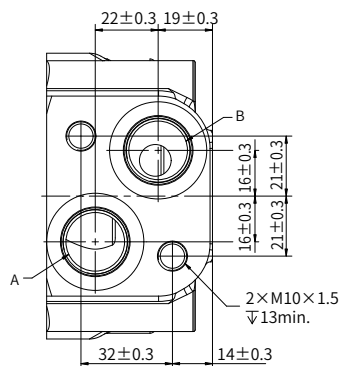
		Pressure(bar)						Max.Cont	Max.Inter
		25	50	80	90	105	120	140	
		Torque(Nm), Speed(rpm)							
Flow (L/min)	10	160	329						
		20	20						
	20	152	333	547	616	722			
		41	40	40	39	34			
	30	160	342	561	633	740	847	986	
		57	57	56	56	56	55	54	
	40	153	337	557	629	736	842		
		81	81	80	80	79	79		
	50	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 (Nm):835
Speed (rpm):99

Overall Efficiency: 70-100% ☐ 40-69% ☐ 0-39% ☐ T - 0056

Installation size

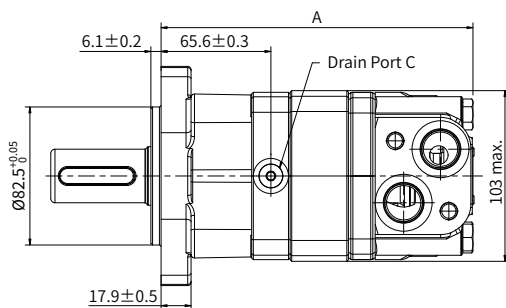
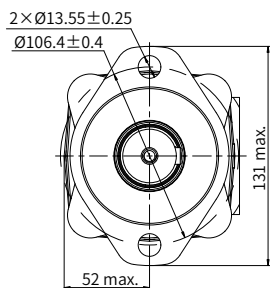
Port size



P - 0030

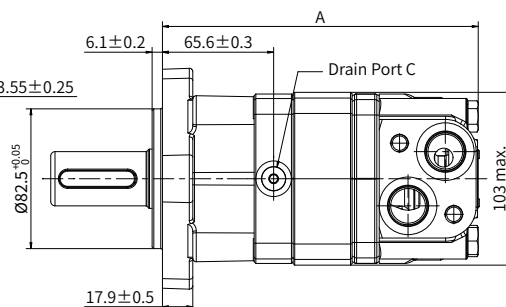
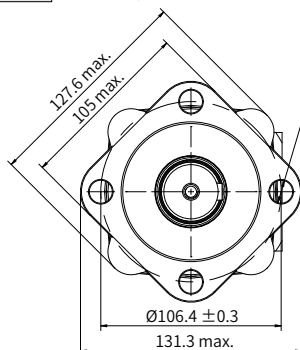
Port size: **1** Main PortA, B: G1/2
Drain PortC: G1/4 **2** Main PortA, B: 7/8-14UNF
Drain PortC: 7/16-20UNF **3** Main PortA, B: M22×1.5
Drain PortC: M14×1.5

A3 2-HOLE, SAE A MOUNT



P - 0033

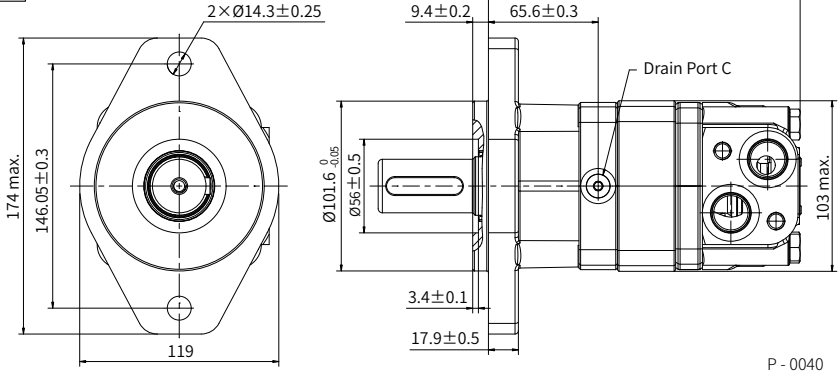
A2 4-HOLE, SAE A MOUNT



P - 0034

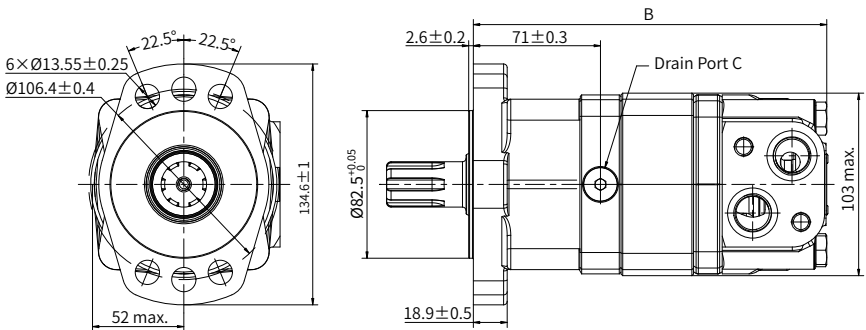
Installation size

B2 2-HOLE, SAE B MOUNT



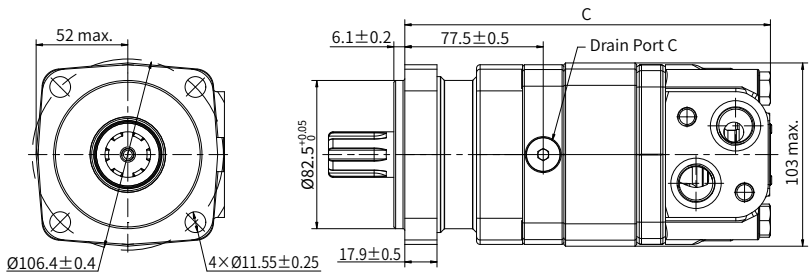
P - 0040

M0 6-HOLE, MAGNETO MOUNT



P - 0035

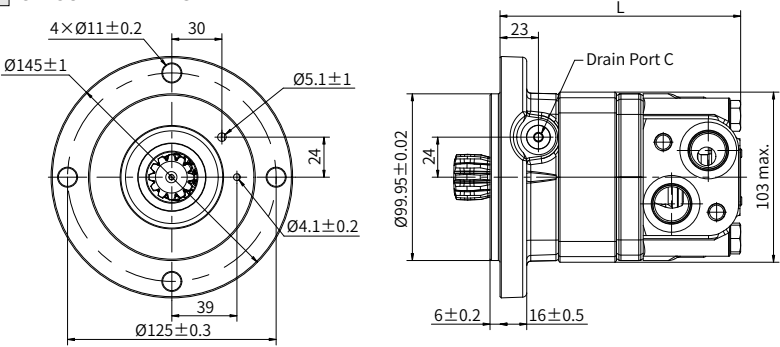
F1 SQUARE MOUNT



P - 0041

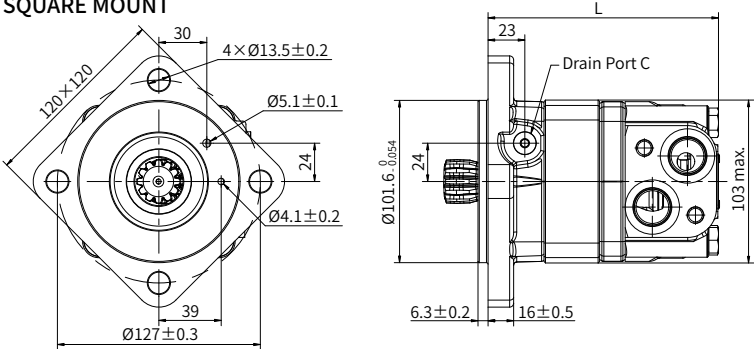
Installation size

B0 CIRCULAR FLANGE



P - 0031

F0 SQUARE MOUNT



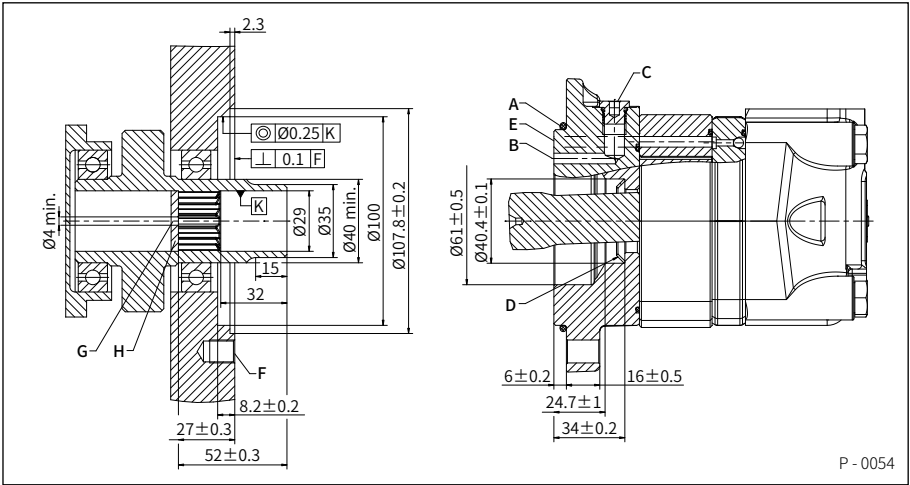
P - 0032

Displacement cm ³ /rev.	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

T - 0058

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 $\pm 0.61\text{mm}$.

Installation size



A: O-ring: 100×3

D: Conical seal ring

G: Oil circulation hole

B: External drain channel

E: Internal drain channel

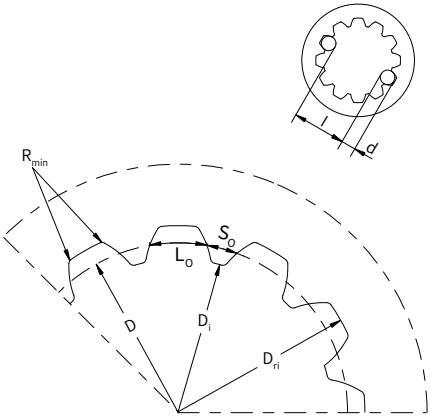
H: Hardened stop plate

C: Drain connection 12mm

F: 15 mm deep

Spline 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	l	17.62 ^{+0.15} ₀



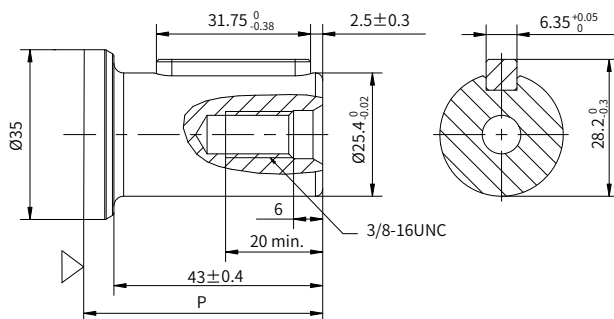
T - 0059

P - 0055

Shaft end dimensions

S1

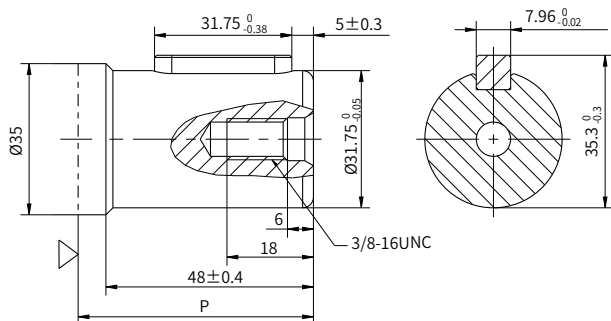
Ø25.4mm Straight
Parallel key $6.35 \times 6.35 \times 31.75$
Max. Torque: 655Nm



P - 0044

S5

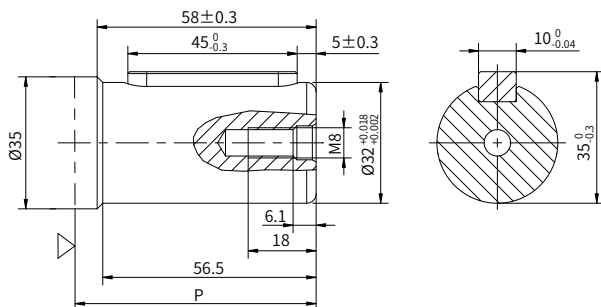
Ø31.75mm Straight
Parallel key $7.96 \times 7.96 \times 31.75$
Max. Torque: 881Nm



P - 0045

S3

Ø32mm Straight
Parallel key $10 \times 8 \times 45$
Max. Torque: 881Nm

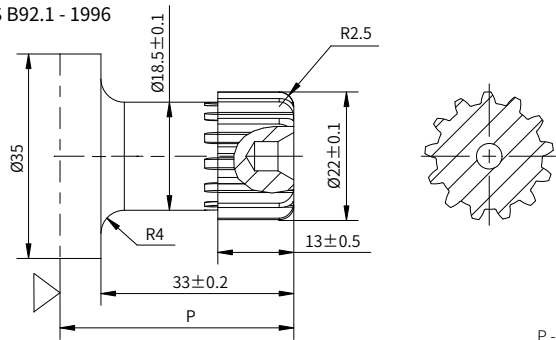


P - 0043

Shaft end dimensions

R2

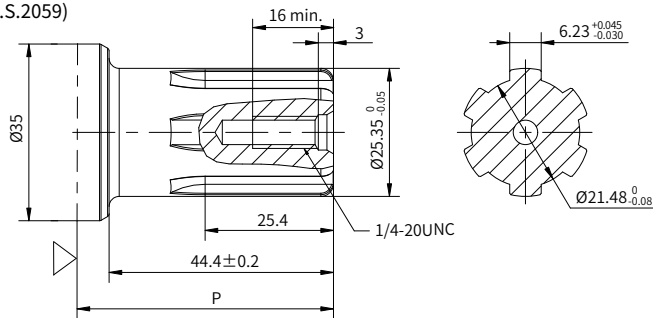
Ø22mm Spline 13-DP16/32, ANS B92.1 - 1996
Max. Torque: 170Nm



P - 0049

R1

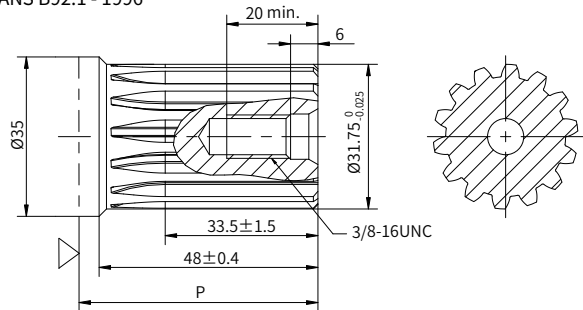
Ø25.4mm Spline SAE 6B (B.S.2059)
Max. Torque: 678Nm



P - 0048

R4

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

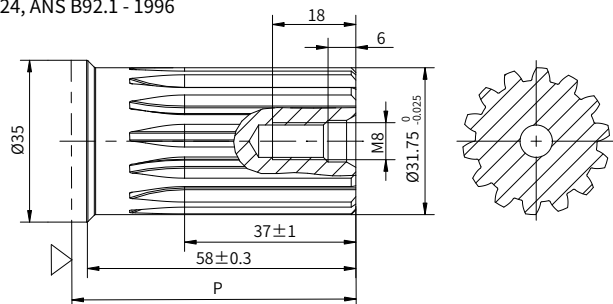


P - 0046

Shaft end dimensions

R5

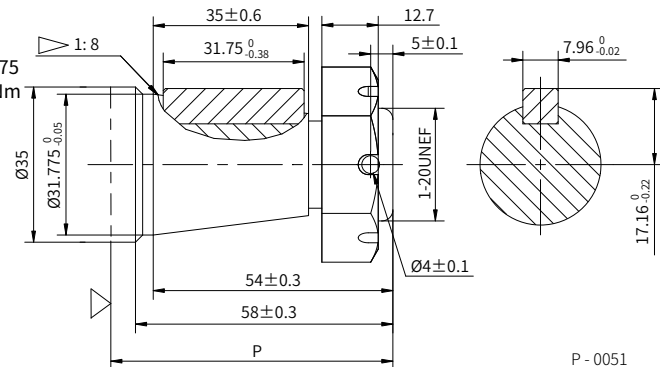
Ø31.75mm Spline 14-DP12/24, ANS B92.1 - 1996
Max. Torque: 881Nm



P - 0047

T2

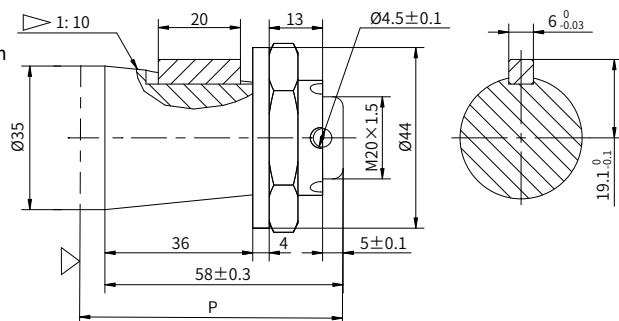
Ø31.75mm Tapered
Parallel key 7.96 × 7.96 × 31.75
Tightening torque 200 ± 10Nm
Max. Torque: 881Nm



P - 0051

T8

Ø35mm Tapered
Parallel key 6 × 6 × 20
Tightening torque 200 ± 10Nm
Max. Torque: 881Nm

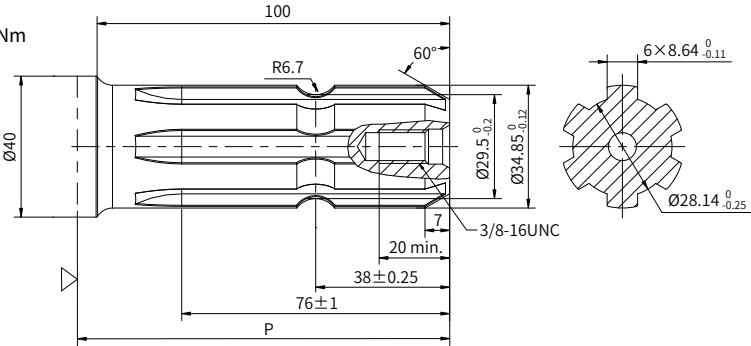


P - 0050

Shaft end dimensions

R8

Ø34.85mm Spline 6B PTO
DIN 9611 Form 1
Max. Torque: 881Nm



P - 0053

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

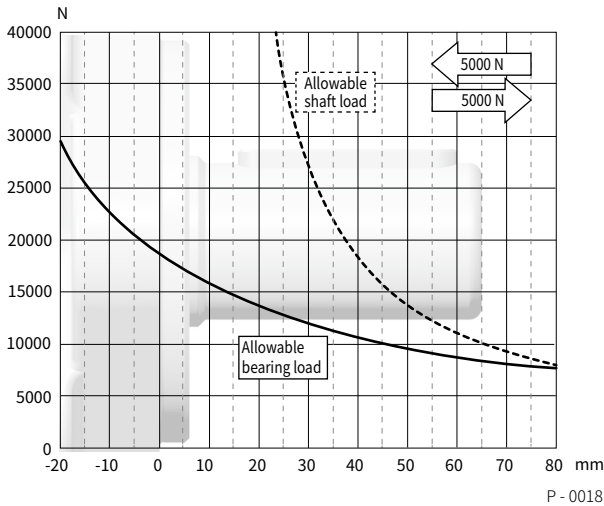
Note: Dimension P is the overall distance from the flange mounting surface to the end of the shaft, and the tolerance is $\pm 0.97\text{mm}$.

Allowable shaft load/bearing curve

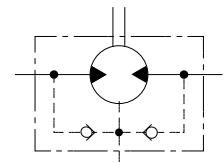
As shown in the figure, when the axial load is 0, the radial allowable load of the output shaft is related to the distance from the flange mounting surface to the load action point.

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.

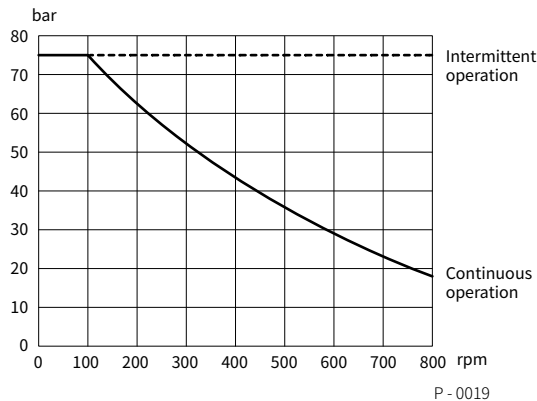
The dash line shows max radial shaft load. Any shaft load exceeding the values quoted in the curve will involve a risk of failure.



Hydraulic diagram



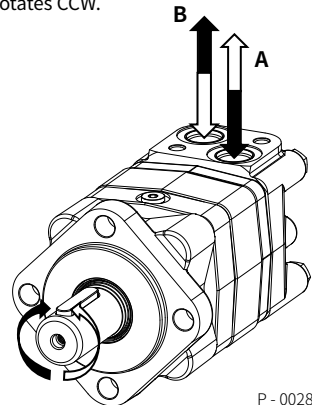
Permissible shaft seal pressure



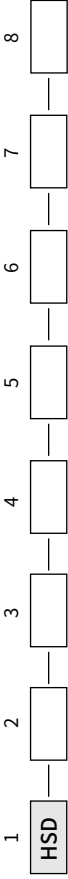
When case drain port is not working, the pressure on the output shaft seal is slightly higher than the pressure in the return line. When using a drain line, the pressure on the shaft seal of the output shaft is the same as the pressure in the drain line.

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.



Ordering information



Pos.1	2	3	4	5	6	7	8
Series code	Displacement	Mount	Port	Output shaft	Rotation direction	Paint option	Special features
HSD	080 100 125 160 200 230 250 315 400 500	A3 SAE A 2×Ø13.5 Mount Ø106.4, pilot Ø82.5×6.1	H Port G1/2, Drain Port G1/4 2 Port 7/8-14UNF, Drain Port 7/16-20UNF 3 Port M22×1.5, Drain Port M14×1.5	S1 Ø25.4 Straight, Parallel key 6.35×6.35×31.75	A CW R CCW	N No Paint B Black C Hengli blue	A Standard F Free running V High temperature S Low temperature
		A2 SAE A 4×Ø13.5 Mount Ø106.4, pilot Ø82.5×6.1		S5 Ø31.75 Straight, Parallel key 7.96×7.96×31.75			
		B2 SAE B 2×Ø14.3 Mount Ø106.4, pilot Ø101.6×9.4		S3 Ø32 Straight, Parallel key 10×8×45			
		M0 6×Ø13.5 Magneto Mount Ø106.4, pilot Ø82.5×2.6		R2 Ø22 Spline 13-DP16/32			
		F1 4×Ø11.55 Square Mount Ø106.4, pilot Ø82.5×6.1		R1 Ø25.4, Spline SAE 6B			
		B0 4×Ø11 Circular Mount Ø125, pilot Ø100×6		R4 Ø31.75 Spline 14-DP12/24			
		F0 4×Ø13.5 Square Mount Ø127, pilot Ø101.6×6.3		R5 Ø31.75 Spline 14-DP12/24			
				T2 Ø31.75 Tapered, Parallel key 7.96×7.96×31.75			
				T8 Ø35 Tapered, Parallel key 6×6×20			
				R8 Ø34.85 6B Spline PTO C1 Cardan			

Note: 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.

T - 0067