

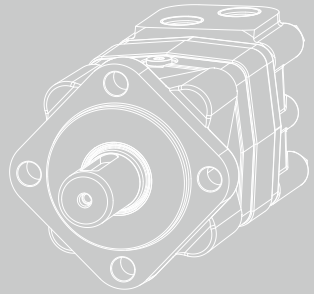
2.2



HSP series

Orbital hydraulic motor

The HSP 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.



Contents

Overview	02
Advantages	02
Standard structure	02
Specification	03
Displacement performance	04-08
Installation size	09-11
Length and weight	11
Shaft end dimensions	12-13
Allowable shaft load/bearing curve	14
Hydraulic diagram	15
Rotation direction	15
Ordering information	16



Overview

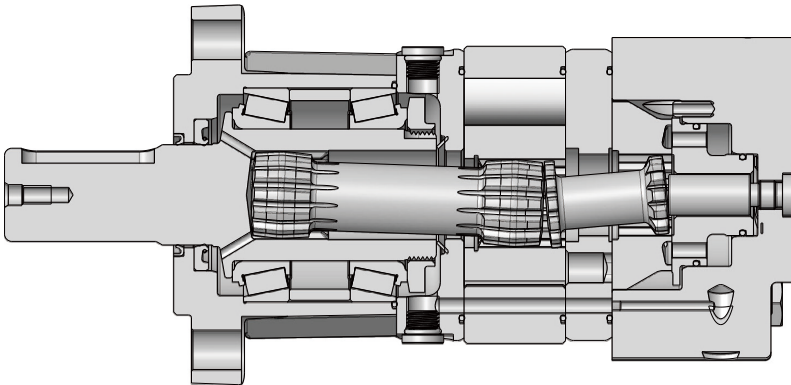
The HSP series orbital hydraulic motor, it is a low-speed and high-torque hydraulic motor, the end face distribution makes it to have characteristics of high working pressure, low starting pressure, high efficiency and high reliability. Customised product can be developed by different application requirement.

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.
- Optional relief valve, speed sensor.

Standard structure

HSP Orbital hydraulic motor



P-0137

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	760	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	225	225	225	225	225	225	225	225	175	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(Standard/Wheel) (kg)		11.7	11.9	12.1	12.5	12.9	13.3	13.5	14.2	15	15

T-0124

- 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
80		80cm ³ /rev.								
		Torque(Nm), Speed(rpm)								
Flow (L/min)	5	26	59	92	117	147				
		60	57	54	52	51				
	10	33	72	110	146	183	218	233	254	
		121	118	115	111	105	98	93	86	
	20	33	74	116	155	195	236	259	278	304
		243	239	235	231	225	217	204	203	186
	30	29	76	118	159	199	241	268	287	316
		367	362	357	352	345	335	330	319	303
	40	25	72	113	154	195	235	262	280	311
		489	483	479	473	465	455	434	438	421
Max.Cont	50		67	108	150	190	232	260		
			608	602	595	586	574	550		
65		66	105	146	189	230	259			
		773	766	758	747	733	696			
Max.Inter	80		62	102	143	185				
			982	974	964	953				

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

T-0125

		Pressure(bar)					Max.Cont		Max.Inter	
		35	70	105	140	175	210	225	250	275
100		100cm ³ /rev.								
		Torque(Nm), Speed(rpm)								
Flow (L/min)	5	36	80	121	159	197	232	257		
		48	47	46	44	42	38	34		
	10	37	82	125	166	227	257	276	306	337
		97	95	93	91	85	84	82	74	69
	20	39	90	139	187	235	280	299	326	352
		196	194	191	189	185	180	176	168	157
	30	41	93	143	193	244	292	316	352	383
		295	292	288	284	280	276	269	260	249
	40	41	92	143	193	245	297	320	356	390
		393	390	386	382	376	369	366	355	342
Max.Cont	50	37	88	140	192	241	293	316		
		494	488	485	481	474	466	463		
60	33	80	133	185	235	288	310			
	592	588	584	577	571	562	556			
Max.Inter	75	30	78	130	180	230	283	304		
		739	731	725	719	709	697	690		
90		71	123	172	223					
		892	885	876	867					

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

T-0126

Displacement performance

		Pressure(bar)						Max.Cont		Max.Inter	
		35	70	105	140	175	210	225	250	275	
125		125cm ³ /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-0127

		Pressure(bar)						Max.Cont		Max.Inter	
		35	70	105	140	160	175	210	225	260	
160		159cm ³ /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-0128

Displacement performance

		Pressure(bar)							Max.Cont	Max.Inter	
		35	70	105	140	160	175	210	225	260	
		200									
		199cm ³ /rev.									
		Torque(Nm), Speed(rpm)									
Flow (L/min)	5	71 24	163 24	257 23	368 23						
	10	78 49	178 49	276 48	371 47	432 47	469 46	573 43			
	20	85 98	188 96	291 95	396 93	459 90	501 89	604 82	646 76	713 68	
	30	88 147	192 146	297 144	401 142	462 140	505 139	610 133	656 129	727 111	
	40	75 197	181 194	285 192	390 190	451 188	494 187	600 181	644 176	716 169	
	50	65 246	170 244	273 242	379 240	438 238	484 236	588 230	633 226		
	60	53 297	159 294	262 291	368 289	426 287	472 285	576 279	622 276		
	Max.Cont	75	44 372	150 369	254 366	359 363	420 361	464 359	569 353	612 349	
	Max.Inter	90		138 447	254 442	343 438	401 435				

T-0129

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

		Pressure(bar)								Max.Cont	Max.Inter
		35	70	95	125	140	155	175	200	225	250
		230									
		232cm ³ /rev.									
		Torque(Nm), Speed(rpm)									
Flow (L/min)	5	88 21	187 20	258 18							
	10	101 42	215 41	303 40	397 38	441 37	491 35				
	20	102 84	219 82	305 80	407 79	450 79	509 77	577 76	658 74	736 71	812 66
	30	104 127	225 125	334 119	415 123	459 122	519 121	588 120	675 118	744 114	
	40	102 169	226 167	333 159	413 165	459 165	518 164	588 162	648 160	732 157	
	50	100 212	217 211	324 200	408 208	451 207	512 206	581 205			
	60	85 255	205 253	310 241	395 251	439 250	499 248	568 247			
	Max.Cont	75	76 256	197 318	300 302	387 315	430 314	488 312	498 310		
	Max.Inter	90		185 385	289 365	391 364	425 372				

T-0130

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

Displacement performance

		Pressure(bar)								Max.Cont	Max.Inter
		35	70	95	125	140	155	175	200	225	250
		249cm ³ /rev.									
		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				

T-0131

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

		Pressure(bar)								Max.Cont	Max.Inter
		35	70	100	120	140	160	175	200	225	250
		314cm ³ /rev.									
		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				

T-0132

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

Displacement performance

		Pressure(bar)						Max.Cont	Max.Inter	
		30	60	80	105	120	140	160	175	190
400		392cm ³ /rev.								
		Torque(Nm), Speed(rpm)								
Flow (L/min)	5	142 11	293 10							
	10	153 25	306 24	414 23	558 22					
	20	152 50	328 49	448 48	590 47	677 46	791 45	897 39	979 36	
	30	163 75	342 74	460 73	608 72	697 71	815 70	931 68	997 65	1056 60
	40	153 100	331 99	451 98	599 97	688 96	810 95	923 93	978 91	
	50	136 125	330 124	454 123	590 122	688 121	776 121			
	60	123 150	298 150	417 149	566 148	657 147	775 145			
	Max.Cont	75	96 188	278 188	399 187	544 185	635 185			
	Max.Inter	90	68 225	248 229	367 227	517 224				

T-0133

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

		Pressure(bar)					Max.Cont	Max.Inter
		25	50	80	90	105	120	140
500		488cm ³ /rev.						
		Torque(Nm), Speed(rpm)						
Flow (L/min)	10	160 20	329 20					
	20	152 41	333 40	547 40	616 39	722 34		
	30	160 57	342 57	561 56	633 56	740 56	847 55	986 54
	40	153 81	337 81	557 80	629 80	736 79	842 79	
	50	132 102	316 101	538 100	613 100	723 100	835 99	
	60	121 122	304 122	526 121	597 121	708 135		
Max.Cont	75	92 153	260 153	478 152	552 151	664 151		
Max.Inter	90	56 177	223 186	447 184	518 184			

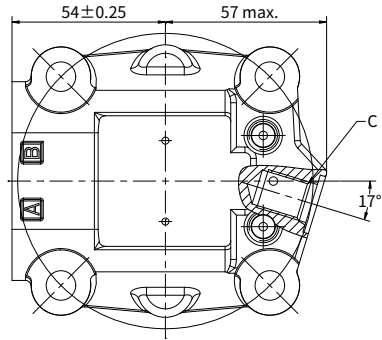
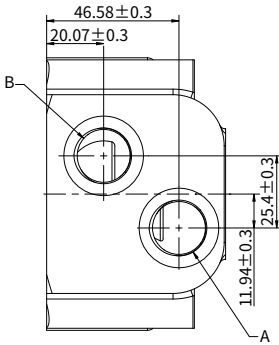
Torque(Nm):835
Speed(rpm): 99

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

T-0134

Installation size

Port size



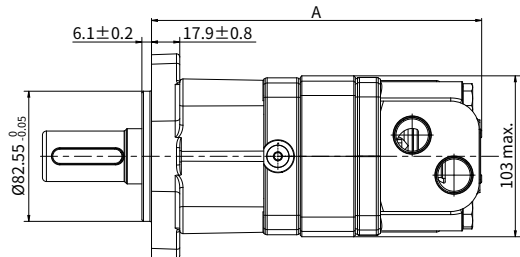
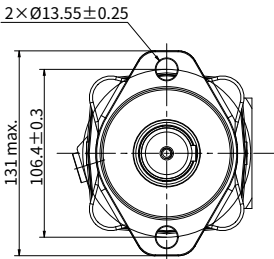
P - 0167

Port size: **1** Main PortA, B: G1/2
Drain PortC: G1/4

4 Main PortA, B: M22 × 1.5
Drain PortC: M14 × 1.5

02

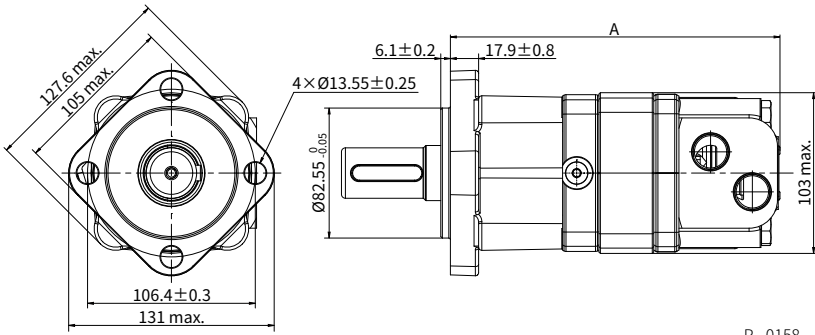
A3 2-HOLE, SAE A MOUNT



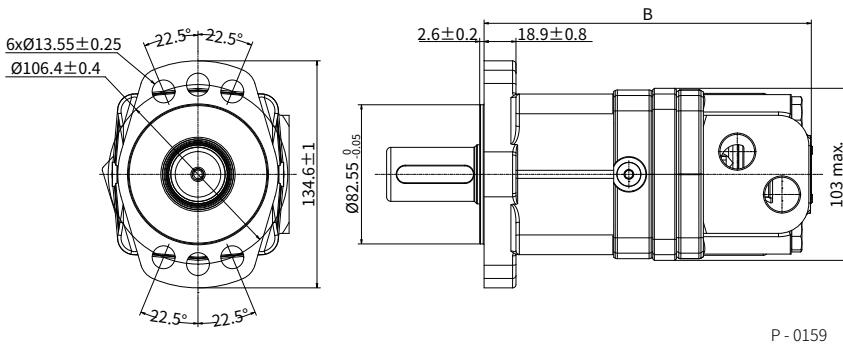
P - 0157

Installation size

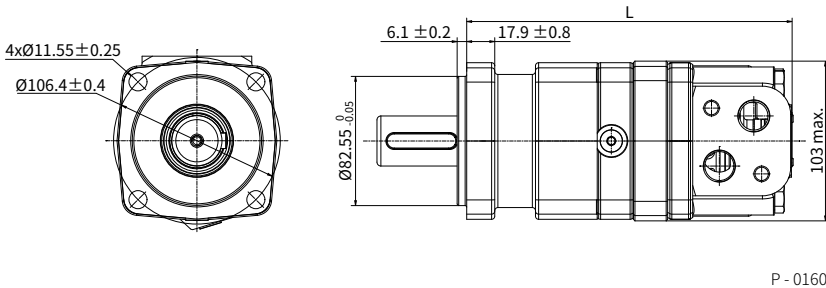
A2 4-HOLE, SAE A MOUNT



M0 6-HOLE, MAGNETO MOUNT

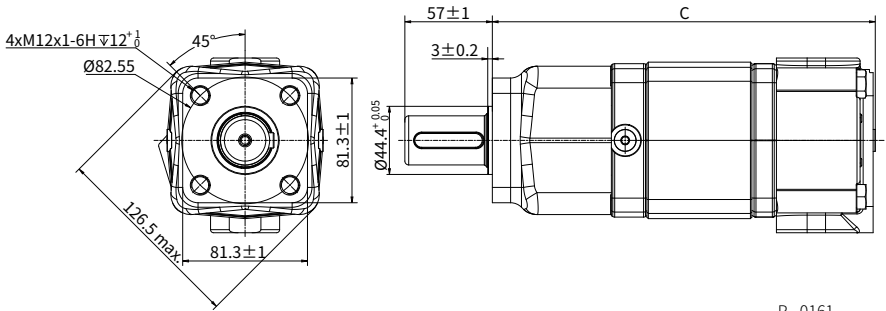


F1 FOUR-THROUGH HOLE SQUARE FLANGE



Installation size

F6 FOUR-THREADED HOLE SQUARE FLANGE



Length and weight

Displacement $\text{cm}^3/\text{rev.}$	L mm	A mm	B mm	C mm
80	199.9	188.0	193.9	194.7
100	203.3	191.4	197.3	198.1
125	207.7	195.8	201.7	202.5
160	213.7	201.8	207.7	208.5
200	220.7	208.8	214.7	215.5
230	226.4	214.5	220.4	221.2
250	229.4	217.5	223.4	224.2
315	240.7	228.8	234.7	235.5
400	254.3	242.4	248.3	249.1
500	254.3	242.4	248.3	249.1

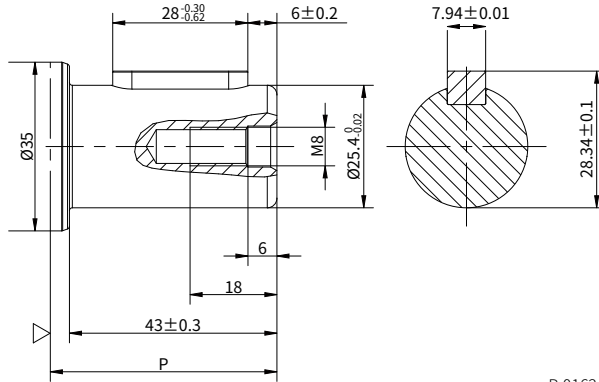
T-0136

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 $\pm 0.61 \text{ mm}$.

Shaft end dimensions

S4

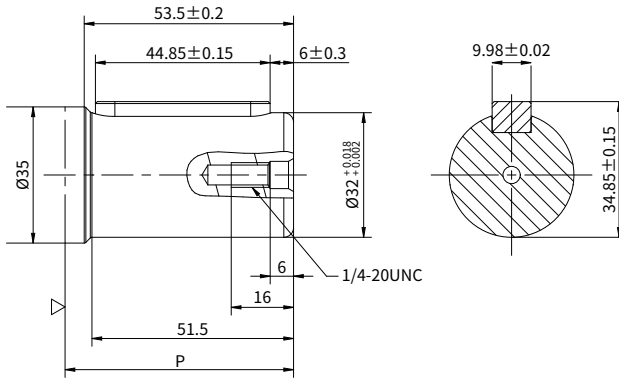
Φ25.4mm Straight
Parallel key 8×7×28
Max. Torque: 655Nm



P-0162

S3

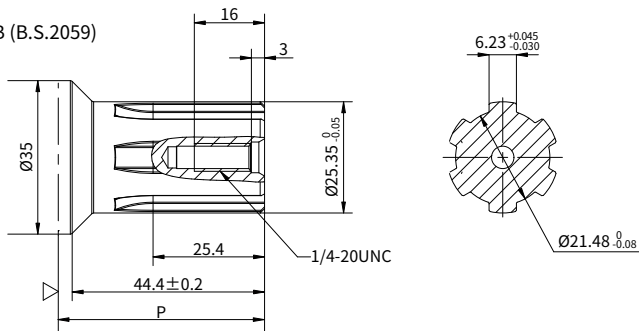
Φ32mm Straight
Parallel key 10×8×45
Max. Torque: 881Nm



P-0163

R1

Φ25.4mm Spline SAE 6B (B.S.2059)
Max. Torque: 678Nm

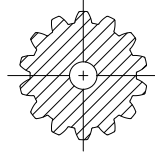
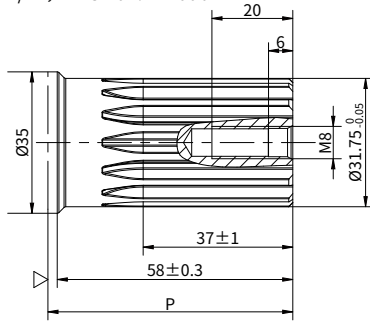


P-0166

Shaft end dimensions

R5

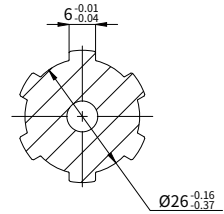
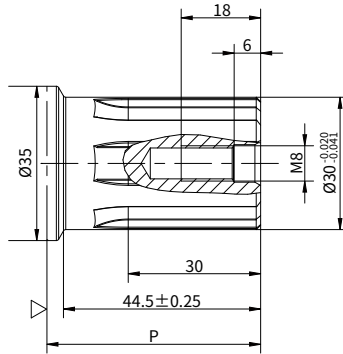
Φ31.75mm Spline 14-DP12/24, ANS B92.1 - 1996
 Max. Torque: 881Nm



P-0165

R9

Φ30mm Spline SAE 6B
 Max. Torque: 881Nm



P-0164

P mm	SAE Mount	Magneto Mount	Square Mount
S4	51.1	45.7	39.0
S3	69.2	63.8	57.1
R1	55.0	49.6	42.9
R9	52.6	47.2	40.5
R5	66.0	60.6	53.9

T-0137

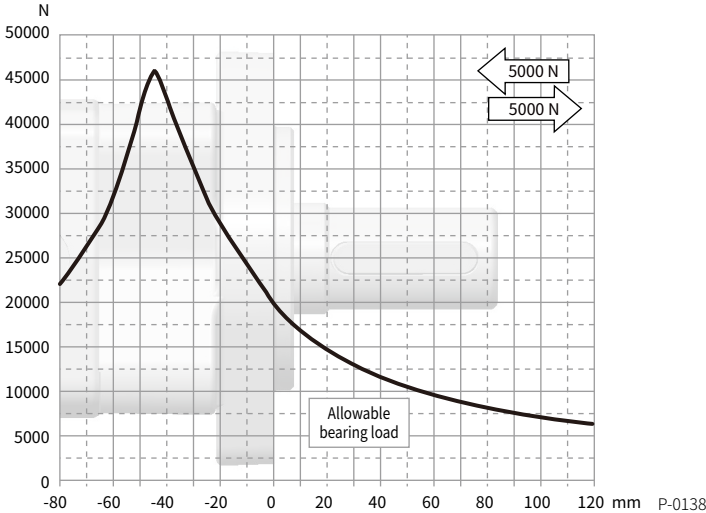
Note: Dimension P is the overall distance from the flange mounting surface to the end of the shaft, and the tolerance is ± 0.97 mm.

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.

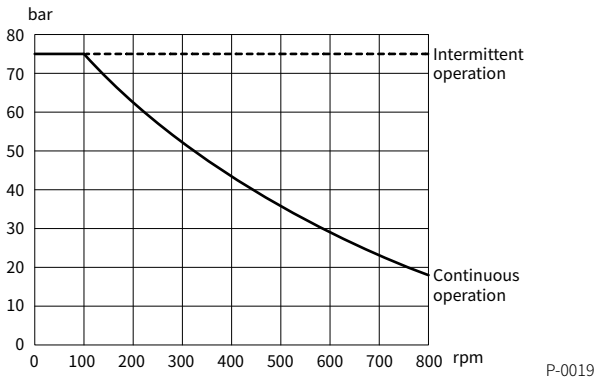
Any shaft load exceeding the values quoted in the curve will involve a risk of failure.



Permissible shaft seal pressure

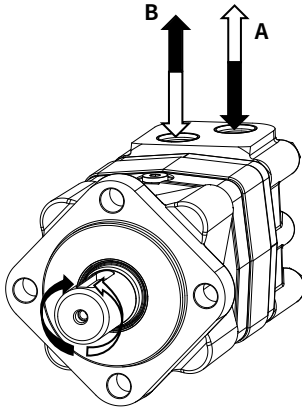
When case drain port is not working, the pressure on the output shaft seal is slightly higher than the pressure in the return line.

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.



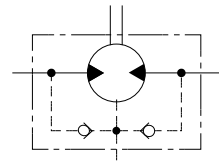
Rotation direction: CW

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



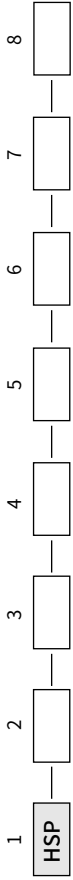
P-0028

Hydraulic diagram



P-0020

Ordering information



Pos.1	2	3	4	5	6	7	8
Series code	Displacement	Mount	Port	Output shaft	Rotation direction	Paint option	Special features
HSP	080 100 125 160 200 230 250 315 400 500	A3 SAE A 2 × Ø13.5 Mount Ø106.4, pilot Ø82.5 × 6.1 A2 SAE A 4 × Ø13.5 Mount Ø106.4, pilot Ø82.5 × 6.1 M0 6 × Ø13.5 Magneto Mount Ø106.4, pilot Ø82.5 × 2.6 F1 4 × Ø11.55 Square Mount Ø106.4, pilot Ø82.5 × 6.1 F6 4 × M12x1 Square Mount Ø82.55, pilot Ø44.4 × 3	1 Port G1/2, Drain Port G1/4 4 Port M22 × 1.5, Drain Port M14 × 1.5	S4 Ø25.4 Straight, Parallel key 8 × 7 × 28 S3 Ø32 Straight, Parallel key 10 × 8 × 45 R1 Ø25.4, Spline SAE 6B R9 Ø30, Spline SAE 6B R5 Ø31.75 Spline 14-DP12/24	A R	N No Paint B Black C Hengli blue	A Standard F Free running V High temperature S Low temperature R Mount rotation 90°

T - 0135

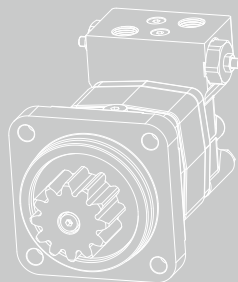
Note: When using the order information, the user can select the motor series, displacement, installation flange, port, shaft and other information. If the selected specification is not in the table or has special requirements, please contact us.

2.2

HSP relief valve series

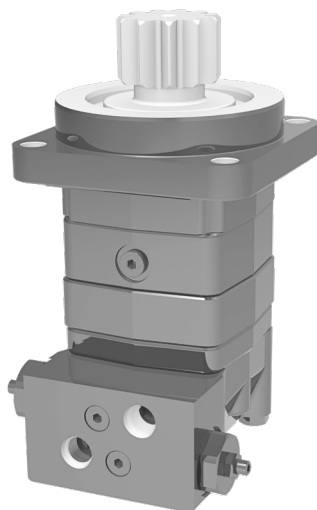
Orbital hydraulic motor

HSP relief valve orbital hydraulic motor is a kind of disc distribution cycloidal hydraulic motor, which can achieve high volumetric efficiency, high starting efficiency and good load retention under high pressure conditions, and is suitable for the rotary drive of mini excavator.


Hengli®


Contents

Overview	02
Advantages	02
Applications	02
Specification	03
Installation size	04
Length and weight	04
Allowable shaft load/bearing curve	05
Hydraulic diagram	06
Rotation direction	06
Ordering information	07



Overview

HSP relief valve orbital hydraulic motor is a kind of disc distribution cycloidal hydraulic motor, which can achieve high volumetric efficiency, high starting efficiency and good load retention under high pressure conditions, and is suitable for the rotary drive of mini excavator. The integrated relief valve group design can be selected to ensure the safety of the motor during use. Hydraulic relief valves down to 5Mpa are available.

Advantages

- Variety of pinion shafts are available.
- Bigger bearing and longer distance between two bearings for high side load capability.
- Spline parameters improved from 12/24 to 11/22 in the diameter section.
- Better anti-pollution.
- Patented axial clearance adjustment design to improve the wearing of drive for high reliability .

Applications

- Mast Aerial Work Platform
- Mini excavator
- Wood grabber machines

Specification

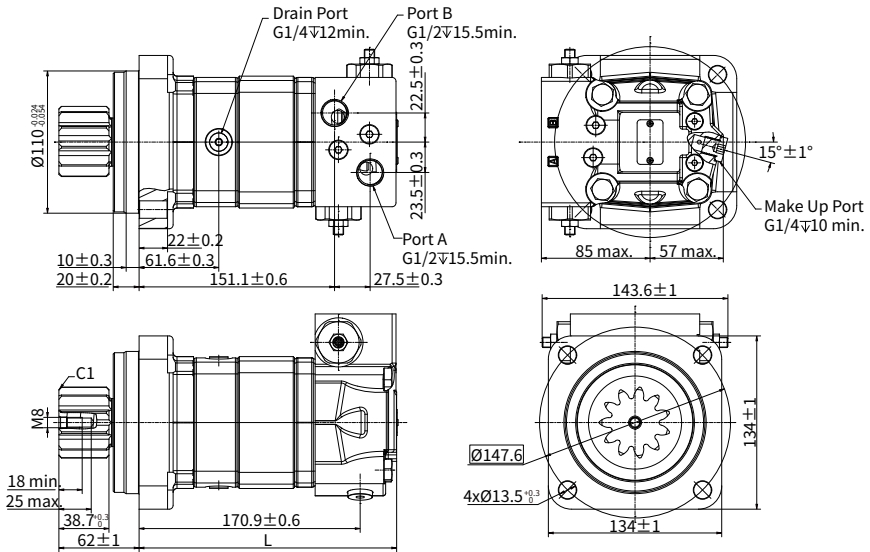
Type	HSP-160	HSP-200	HSP-250
Displacement (cm ³ /rev.)	160	195	245
Max. output torque (Nm)	395	425	429
Max.differential pressure (bar)	147	137	137
Max. speed (rpm)	80	80	80
Mechanical brake torque (Nm)	—	—	—
Make up pressure (Bar)	5~10	5~10	5~10
Valve Set Pressure(Bar)	147	137	137
Mini-Excavator(Ton)	0.5~1.0	1.2~1.5	1.5~2.0

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- 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.
- The maximum pressure is the set pressure of the safety valve.
- External make up port is required (make up pressure 5-10 Bar).

Installation size

Mount port: F3; Main shaft: G2



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Length and weight

Displacement cm ³ /rev.	L mm	Weight kg
160	183.8	16.048
200	190.4	16.647
250	199.1	17.1

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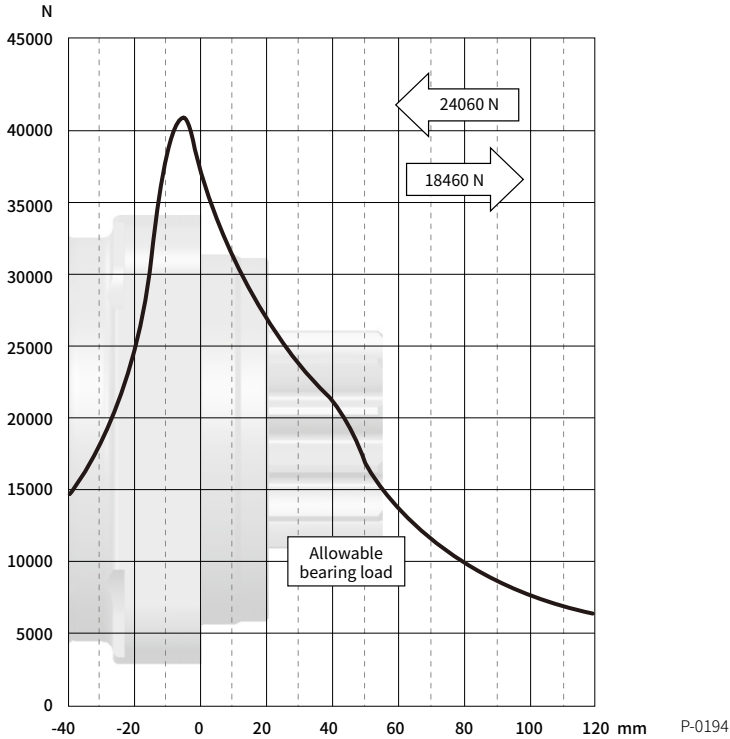
Note: Dimensions L are the length from the flange mounting surface to the rear end of the motor, and the tolerance is ±1mm.

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 50 RPM with rated output torque.

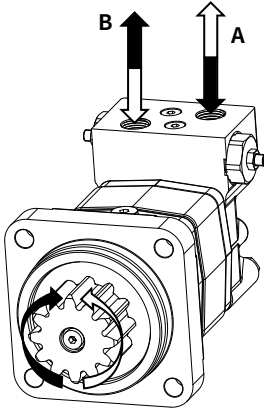
Any shaft load exceeding the values quoted in the curve will involve a risk of failure.



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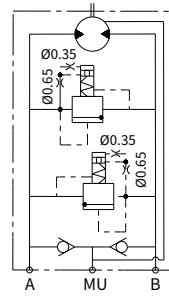
Rotation direction: CW

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



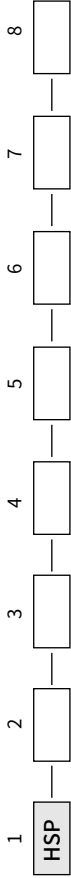
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Hydraulic diagram



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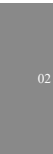
Ordering information



Pos.1	2	3	4	5	6	7	8		
Series code	Displacement	Mount	Port	Output shaft	Rotation direction	Paint option	Special features		
HSP	160	F3 4×φ13.5 Square mount φ147.6, pilot φ110×10.	R	G1	12 Teeth, 4.5 Modulus, Gear wheel shaft, Modification coefficient 0.5, Center hole G1/8.	A	T	Low temperature + Integrated relief valve 137bar Low temperature + Integrated relief valve 50bar	
			S	G2					11Teeth, 4 Modulus, Gear wheel shaft, Modification coefficient 0.4, Center hole M8.
	200	F4 4×φ13.5 Square mount φ155, pilot φ125×20.	S	G4	11Teeth, 3.5Modulus, Gear wheel shaft, Modification coefficient 0.5, Center hole M8.	CW	N		Low temperature + Integrated relief valve 50bar
			T	G5	11 Teeth, 4 Modulus, Modulus, Modification coefficient 0.55, Center hole M8.	CCW	B C		
	250	F4 4×φ13.5 Square mount φ155, pilot φ125×20.	T	G6	11 Teeth, 4.5 Modulus, Gear wheel shaft, Modification coefficient 0.55, Center hole M8.		C		

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Note: 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.



02