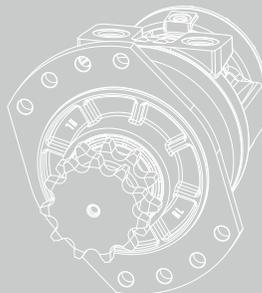1.3

HRP05 series
Radial piston hydraulic motor

The HRP05 series radial piston hydraulic motor, is a kind of low speed high torque hydraulic motor, disc valve structure, with high pressure, good stability at low speed, high volumetric efficiency and mechanical efficiency.
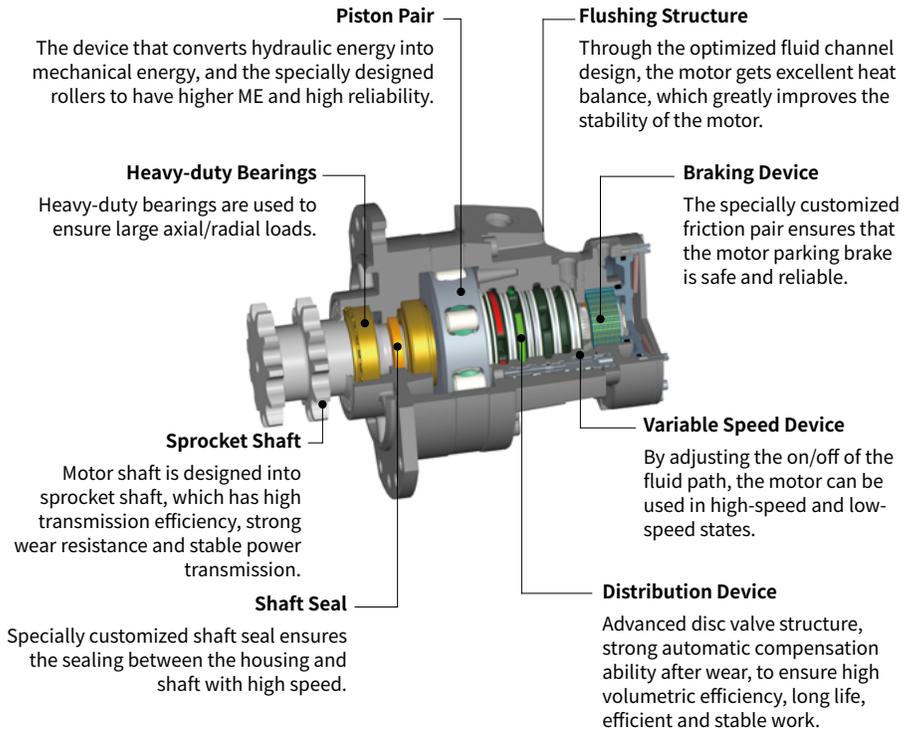
Contents

Overview

The HRP05 series radial piston hydraulic motor, is a kind of low speed high torque hydraulic motor, disc valve structure, with high pressure, good stability at low speed, high volumetric efficiency and mechanical efficiency, the motor can be equipped with a variety of functional modules.

Advantages

· Using tapered roller bearing structure, can support larger axial and radial load.

· Advanced disc valve structure, strong automatic compensation ability after wear, to ensure high volumetric efficiency, long life, high efficiency and stable work.

· Various function modules can be selected, such as flushing valve, brake, variable speed valve, speed sensor, etc., are available to meet the needs of users in various fields.

Standard structure

Piston Pair

The device that converts hydraulic energy into mechanical energy, and the specially designed rollers to have higher ME and high reliability.

Flushing Structure

Through the optimized fluid channel design, the motor gets excellent heat balance, which greatly improves the stability of the motor.

Heavy-duty Bearings

Heavy-duty bearings are used to ensure large axial/radial loads.

Braking Device

The specially customized friction pair ensures that the motor parking brake is safe and reliable.

Sprocket Shaft

Motor shaft is designed into sprocket shaft, which has high transmission efficiency, strong wear resistance and stable power transmission.

Variable Speed Device

By adjusting the on/off of the fluid path, the motor can be used in high-speed and low-speed states.

Shaft Seal

Specially customized shaft seal ensures the sealing between the housing and shaft with high speed.

Distribution Device

Advanced disc valve structure, strong automatic compensation ability after wear, to ensure high volumetric efficiency, long life, efficient and stable work.

P - 0100

Specification

Series			HRP05				
Motor performance							
Displacement		cm^3/rev.	470	520	565	750	820
Max.torque		N·m	3366	3724	4047	4775	5220
Min.stable speed		rpm	5				
Max.speed	Displacement	rpm	385	350	320	240	220
	Variable displacement	rpm	465	420	385	290	265
Pressure	Max.differential pressure	bar	450			400	
Max.power		kW	29			35	
Weight	Single-speed	With brake	kg	54			
		Without brake	kg	43			
	Two-speed	With brake	kg	60			
		Without brake	kg	49			
Brake							
Static braking torque		N·m	2200				
Release pressure		bar	11 ~ 15				
Maximum pressure at brake port Z		bar	30				
Oil volume to operate brake		cm^3	23				

T - 0095

· Make sure the motor is full of oil before use.
· During motor running-in(at least 20 hours), it should not be operated without load at greater than 100rpm.
· 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 20mm^2/s.
· The recommended maximum operating temperature is 85° C.

01

Ordering information

HRP05	1	09	MD	S1	N	A1	B	AA
①	②	③	④	⑤	⑥	⑦	⑧	⑨

Radial Piston Series

①	Incurve multiple-action radial piston motor	HRP05

Single and Two Speed

②	Single speed	1
	Two speed, gear ratio 2:1	2

Displacement cm^3/rev.

	470, Standard piston	09
	520, Standard piston	10
③	565, Standard piston	11
	750, Step piston	14
	820, Step piston	15

Port Connection

		Single Speed:1	Two Speed:2	Code
	1-1/16-12UN(A, B), 3/4-16UNF(L), 3/4-16UNF(F)	●		M1
	1-1/16-12UN(A, B), 3/4-16UNF(L), 3/4-16UNF(F)	●		MD
	1-1/16-12UN(A, B), 3/4-16UNF(L), 3/4-16UNF(F)	●		MJ
	G3/4(A, B), G3/8(L), G1/2(F)	●		MF
	G3/4(A, B), G3/8(L), G1/2(F)	●		MG
④	G3/4(A, B), G3/8(L), G1/2(F)	●		ML
	G3/4(A, B), G3/8(L), G1/2(F)	●		MM
	G3/4(A, B), G3/8(L), G1/2(F)	●		MN
	G3/4(A, B), G3/8(L), G1/2(F)	●		M2
	1-1/16-12UN(A, B), 3/4-16UNF(L), 3/4-16UNF(F), 9/16-18UNF(X)		●	M6
	G3/4(A, B), G3/8(L), G1/2(F), G1/4(X)		●	M5
	1-1/16-12UN(A, B), 3/4-16UNF(L), 3/4-16UNF(F), 9/16-18UNF(X)		●	MP

Ordering information

Output Shaft

		M2	MD/MF/M1/MG/MJ/ML/MM/MN	M5/M6/MP	Code
⑤	Double-sprocket 9 teeth, Chain No. 100(GB/T 1243)		●		S1
	17 teeth spline DIN5480-W55×3×17×8f	●	●		S2
	17 teeth spline DIN5480-W55×3×17×8f			●	S3
	Double-sprocket 11 teeth, Chain No. 100(ISO 606)			●	S4
	Double-sprocket 11 teeth, Chain No. 100(ISO 606)		●		SA
	Double-sprocket 10 teeth, Chain No. 100(ISO 606)		●		S5
	56 teeth spline ANSIB92.1		●		S6
	Double-sprocket 10 teeth, Chain No. 16A(ISO606)		●		S9
	Ø50 straight shaft, parallel key 14×9×70		●		SJ
	17 teeth spline DIN5480-W55×3×17×8f		●		SL
	17 teeth spline DIN5480-W55×3×17×8h	●	●		SF
	56 teeth spline ANSIB92.1	●	●		SG
	56 teeth spline ANSIB92.1			●	SK
	Double-sprocket 10 teeth, Chain No. 16A(ISO606)			●	SM

Paint Option

⑥	No Paint	N
	Black	B
	Hengli blue	C
	Yellow	Y

Brake

		M2	MD/MF/M1/MG/MJ/ML/MM/MN	M5/M6/MP	Code
⑦	No brakes	●	●	●	AA
	Static braking torque 2200N·m, port Z G1/4		●		A1
	Static braking torque 2200N·m, port Z 9/16-18UNF			●	A2
	Static braking torque 2200N·m, port Z G1/4			●	A3
	Static braking torque 4200N·m, port Z G1/4	●			A5
	Static braking torque 2200N·m, port Z 9/16-18UNF		●		A6

Ordering information

Flushing Valve

		M2/MF/M5/ MJ/ML	MD/M6/M1/MG/MM/ MN/MP	Code
⑧	No flushing valve	●		A
	There is a flushing valve with a flow rate of 5L/min		●	B
	There is a flushing valve with a flow rate of 7L/min		●	C
	There is a flushing valve with a flow rate of 10L/min		●	D
	There is a flushing valve with a flow rate of 12.5L/min		●	E
	There is a flushing valve with a flow rate of 13.5L/min		●	F

Special Features

		M2	MD/MF/M5/M1/MG/ MJ/MM/MN/MP	M6/ML	Code
⑨	High temperature, FKM	●	●	●	V1
	Speed sensor cavity, High temperature, FKM			●	S4
	Speed sensor, High temperature, FKM			●	S3
	Speed sensor (with direction judgement), High temperature, FKM	●			S7

T - 0094

Note: ● =Available; For the other types of port forms, output forms and brake port orienttations, please contact Hengli's application engineer for consultation.

Installation size

· Single speed shaft output: Take HRP05114MFSJBAAAV1 for example
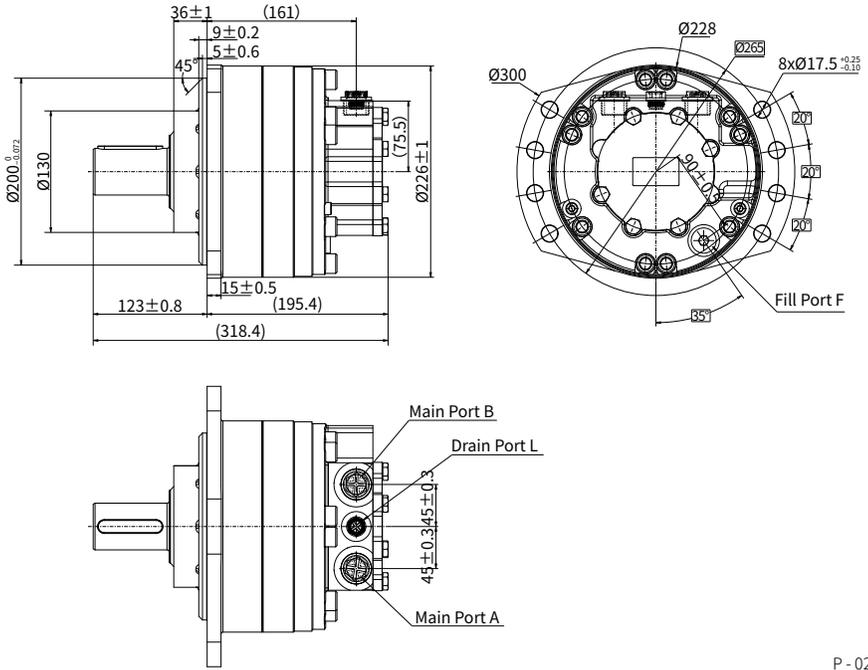
P - 0201

Note: The weight of the connection shown in the figure is 46.8kg.

Name	Port Function	M1/MD/MJ	MF/MG/ML/MM/MN
A, B	Main Port	1-1/16-12UN	G3/4
L	Drain Port	3/4-16UNF	G3/8
F	Fill Port	3/4-16UNF	G1/2

T - 0170

Installation size

· Single speed without flushing valve: Take HRP05114M2S2AAAAS7 for example

P - 0288

Note: The weight of the connection shown in the figure is 45.6kg.

Name	Port Function	M2
A, B	Main Port	G3/4
L	Drain Port	G3/8
F	Fill Port	G3/8

T - 0220

Installation size

·Two speed shaft output: Take HRP05211M6S4BA2FV1 for example

P - 0095
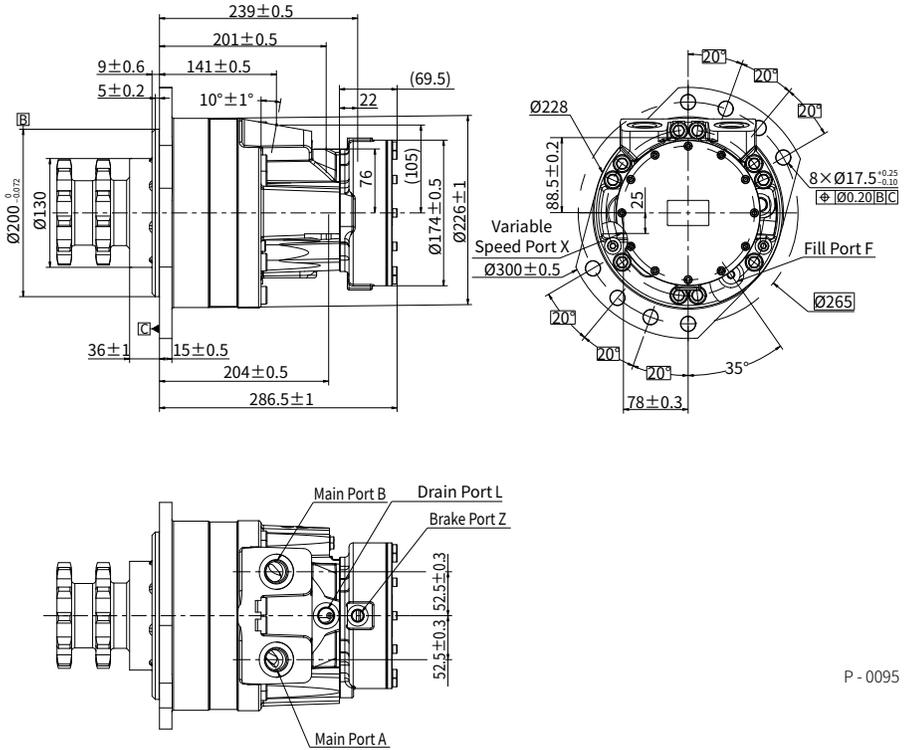
Note: The weight of the connection shown in the figure is 60kg.

Name	Port Function	M5	M6/MP
A, B	Main Port	G3/4	1-1/16-12UN
L	Drain Port	G3/8	3/4-16UNF
F	Fill Port	G1/2	3/4-16UNF
X	Variable Speed Port	G1/4	9/16-18UNF

T - 0096

Speed sensor

· Speed sensor: S7
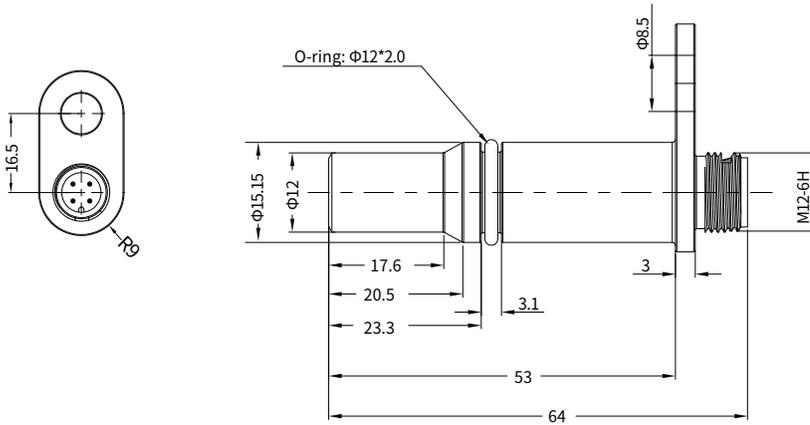
P - 0268

| Dimensions	Ø12 /L=53mm
Voltage	8-32VDC
Input Current	<20mA
Sensing distance	0.2~1.15mm
Output circuitry	Push-Pull
Output overcurrent protection（Y/N）	Yes
Maximum output current	≤ 200mA
Voltage drop	≤ 3.5VDC
Working frequency	0-15KHz
Output signal	A, B
Operating temperature	-40℃ ~+125℃
Protection	IP67
Shell material	Copper/plastic
Pressure resistance of measuring surface	10bar
Connector	M12
Weight	55g
Installation depth	53mm
Reverse polarity protection	Yes
Dielectric strength	500VDC

T - 0207

01

Speed sensor

· Speed sensor: S7

■ OUTPUT SIGNAL

↻ The measured gear rotates clockwise   ↻ The measured gear rotates counterclockwise
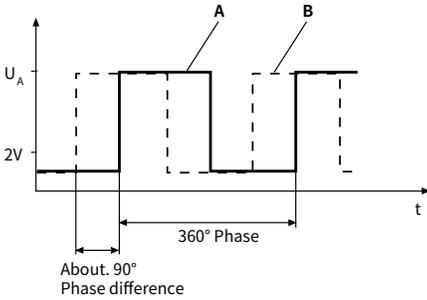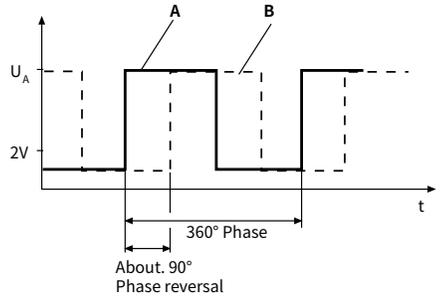
P - 0273

■ TERMINAL ASSIGNMENT

Signal ⊓_⊓_⊓	+Ub	0V	A	B
4 core plug DT04	1	3	4	2

P - 0274

■ WIRING DIAGRAM
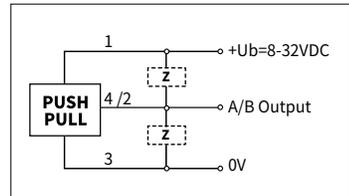
P - 0275

Speed sensor

· Speed sensor: S3
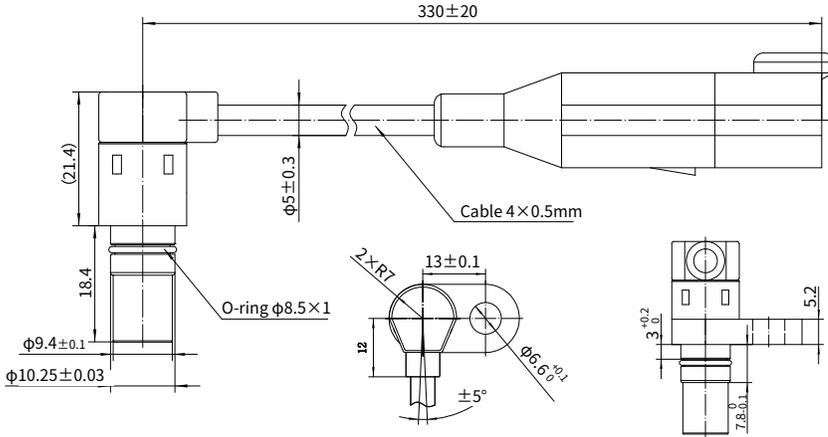
P - 0272

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℃ ~+125℃
Protection	IP67/IP69K
Shell material	Copper/plastic
Pressure resistance of measuring surface	10bar
Connector	Cable 0.33m, Injection 4-core DEUTSCH DT04-4P-EP04 plug

T - 0208

Speed sensor

· Speed sensor: S3

■ OUTPUT SIGNAL

◠ The measured gear rotates clockwise
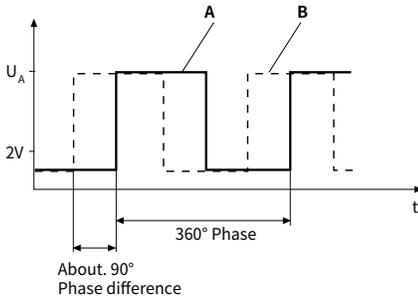
◠ The measured gear rotates counterclockwise
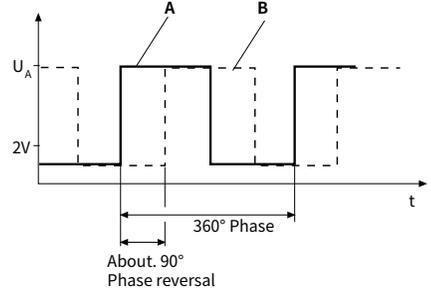
P - 0273

■ TERMINAL ASSIGNMENT

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

P - 0274

■ WIRING DIAGRAM
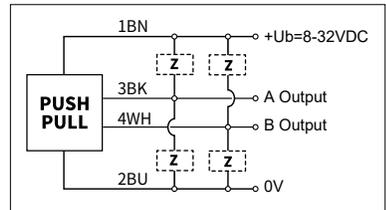
P - 0275

Shaft end dimensions

· Double-sprocket Shaft
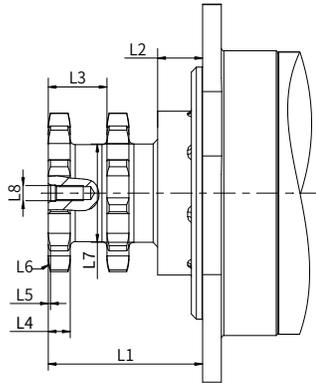
P - 0094

Code	L1	L2	L3	L4	L5	L6	L7	L8
S1	119.5±0.5	31±1	54±0.2	$2 \times 17.5_{-0.35}^{0}$	4x4.128	4xR31.75	Ø51±0.2	
S4/SA	123.6±0.8	36±1	47±0.2	$2 \times 17.58_{-0.35}^{0}$	4x1.8	4xR31.75	Ø77±0.2	
S5	118.9±0.8	31±1	50±0.2	$2 \times 17.6_{-0.35}^{0}$	4x4.128	4xR31.75	Ø62±0.2	M12⤓28 min.
S9	113.9±0.8	36±1	43±0.2	$2 \times 14.8_{-0.35}^{0}$	4x3.3	4xR25.4	Ø50±0.2	
SM	113.9±0.8	36±1	43±0.2	$2 \times 14.8_{-0.35}^{0}$	4x3.3	4xR25.4	Ø50.8±0.2	

T - 0221

· Straight Shaft
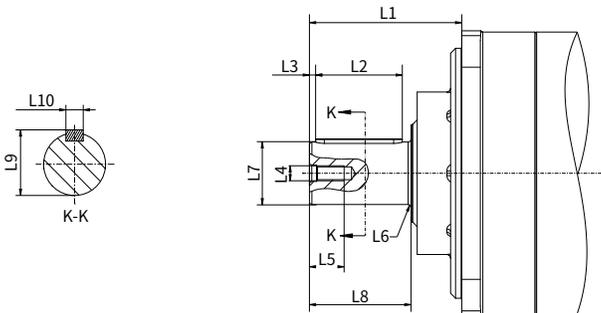
P - 0202

Code	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
SJ	123±0.8	$70_{-0.62}^{0}$	5±0.1	M12	28 min.	R2	$Ø50_{0}^{+0.016}$	82	$52.5_{-0.3}^{0}$	$14_{-0.043}^{0}$

T - 0222

Shaft end dimensions

· Spline Shaft
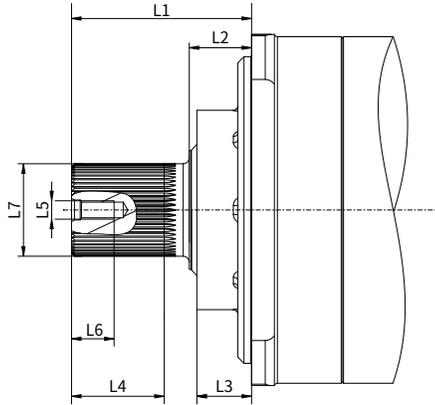
P - 0228

Code	L1	L2	L3	L4	L5	L6	L7
S6/SG/SK	118.5±0.8	41±1	36±0.5	61 min.	M12	28 min.	Ø59.267

T - 0223
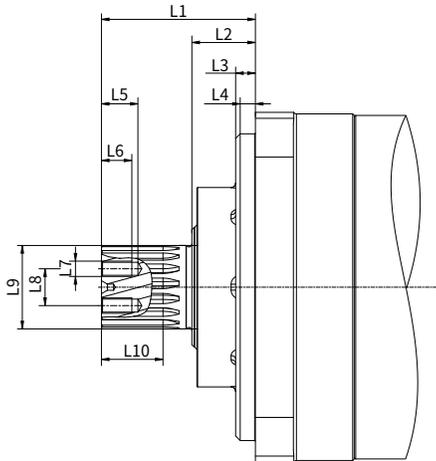
P - 0226

Code	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
S2	101.3±0.8	41.8±1	13±0.5	10±0.5						
S3	101.2±0.8	41.7±1	9±0.6	5±0.2	2x24	2x20 min.	2xM10	24±0.1	Ø54.4	40.5 min.
SL	103.5±0.8	44±1	9±0.6	5±0.2						
SF	100	40±0.5	13	10						

T - 0224

Hydraulic diagram
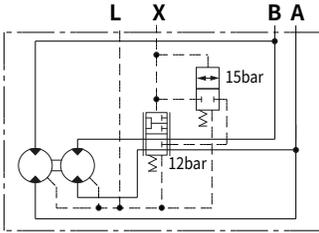
· Motor without brakes
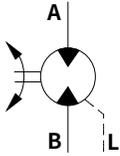
P - 0085

· Motor with parking brake
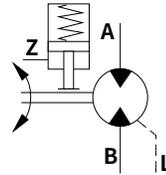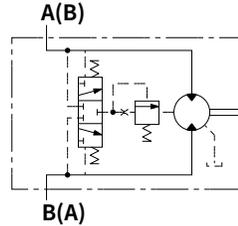

P - 0086

· Schematic diagram of a two-speed motor

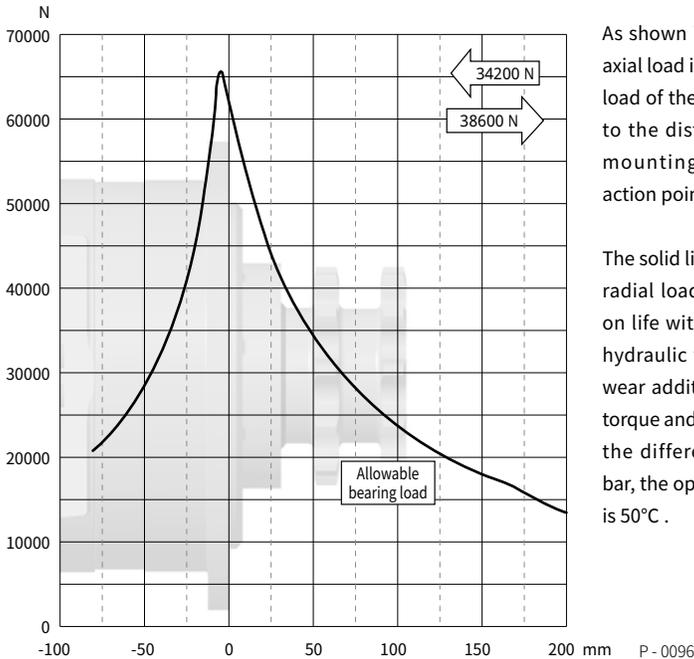

15bar

12bar

P - 0087

· Flushing valve schematic

P - 0088

Allowable shaft load/bearing curve

34200 N
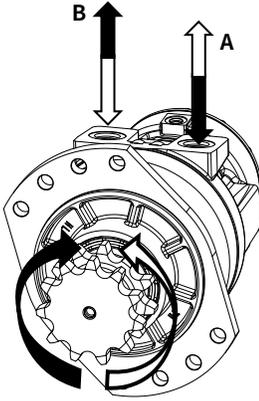
38600 N

Allowable bearing load

P - 0096

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 based on life with 2000hrs. Denote use hydraulic fluids containing anti-wear additives, and rated output torque and motor speed of 50rpm, the differential pressure is 250 bar, the operating oil temperature is 50°C .

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 - 0098

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01