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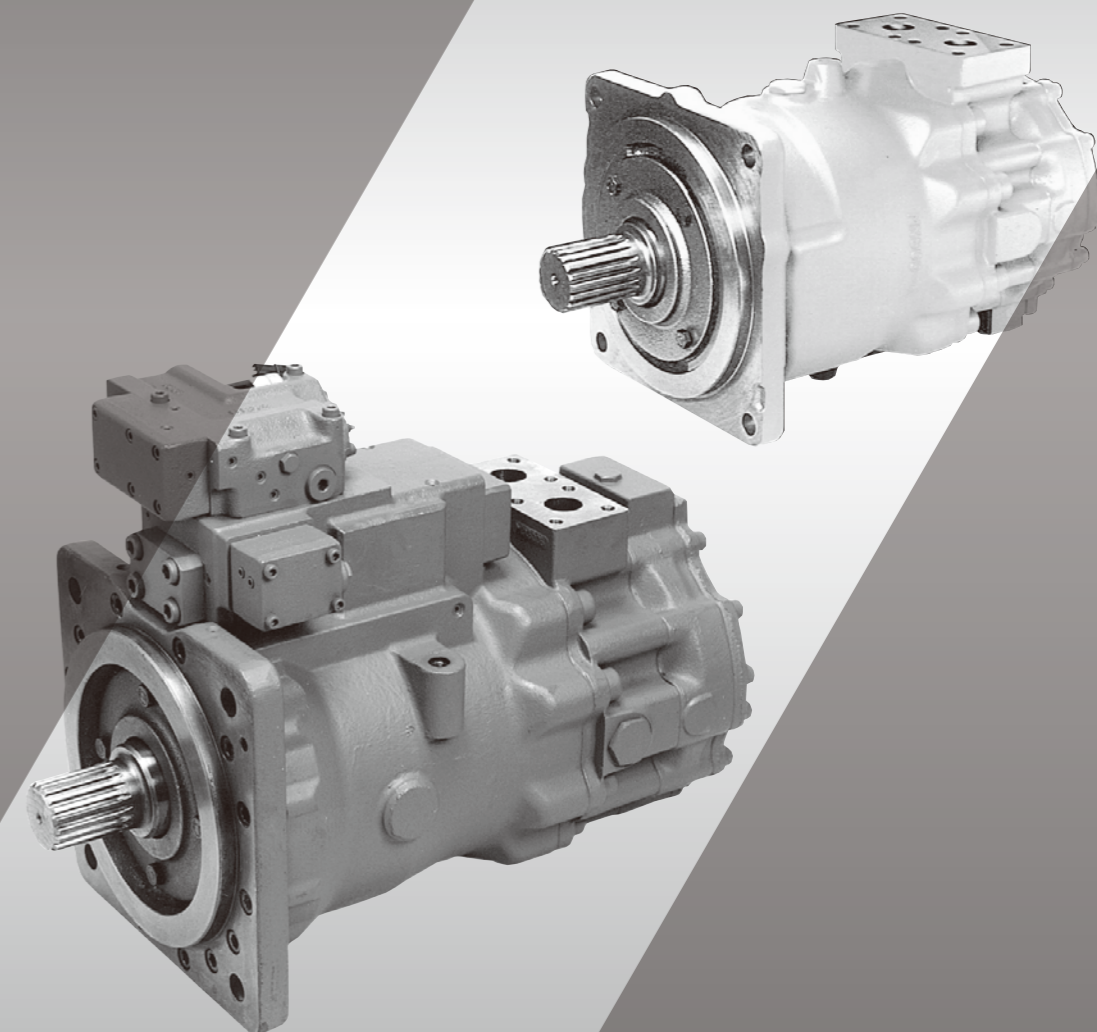
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# 一般产业机械用 轴向柱塞马达

## Axial Piston Motors for General Industrial Machinery



## 采用、使用本产品时

本公司的产品,虽设计基于充分的知识和长期的经验,和严格的质量管理下进行生产,但仍请考虑和照顾以下几点。到下列事项。

- 1 本产品目录刊载的产品,由于使用条件的多样性,有关产品系统适应性的决定,请由液压系统的设计者或规格的决定者,根据需要进行分析 and 试验后再作出判断。另外,请随时根据最新的产品目录和资料就规格进行研讨,考虑到机械故障的可能性状况,进行系统的构成。
- 2 在使用本产品时,请遵守安全注意事项,以正确的方法予以使用。
- 3 本产品目录记载的技术信息,是说明产品特性和性能的代表值,不是保证值。
- 4 在下列所示的条件和环境使用之际,请事前与本公司进行洽谈。
  - ① 明确记载的规格以外的条件和环境。
  - ② 用于原子能、航空、医疗、食品等用途时。
  - ③ 用于对人和财产有较大影响的用途,特别是有安全性要求的用途时。
- 5 本产品目录刊载的信息,有时会有变更,恕不预告。有关最新信息,请向本公司予以询问。

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## ON APPLICATION / USAGE OF THE PRODUCTS

Although our products are designed on the basis of our profound knowledge and long experience, and manufactured under the strict quality control system, the following must be taken into consideration in actual use.

- 1 The operating conditions of the products shown in this catalog vary depending upon each application. Therefore, the decision of the products' suitability to the system considered must be made by the designer of the hydraulic system and/or the person in charge of determining the specification after making analysis and conducting tests, if necessary. The study of the specification shall be done based on the latest catalog and technical documents, and the system must be composed taking into account situations regarding the possibility of machine failure.
- 2 Prior to use of the products, descriptions given in the SAFETY PRECAUTIONS must be observed for the proper use.
- 3 The technical information in this catalog represents typical characteristics and performance of the products, and is not guaranteed one.
- 4 In case the products are used in the following conditions or environments, please consult us prior to the use.
  - ① Unspecified conditions or environments
  - ② Use for atomic power, aviation, medical treatment, and/or food
  - ③ Use likely to affect human beings or assets significantly or requiring particular safety
- 5 The information described in this catalog is subject to change without notice. For updated information, please consult us.

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## 安全注意事项

为了安全使用本产品目录的产品,请充分理解下列“产品使用的注意事项”和该产品的使用说明书,认真遵守关联规格的安全法规等,予以使用。

### 产品使用的注意事项

- (1) 产品使用时的注意事项
  - ① 注意 使用产品时可能会受伤,请针对情况着用保护器具。
  - ② 注意 有时因产品的重量、作业姿势等,会造成夹手、腰痛等情况,请充分注意作业方法。
  - ③ 注意 请不要骑坐、敲打产品,也不要使产品掉落、施以外力冲击等,因为这样会引起运转不良、破损、漏油等。
  - ④ 注意 请将产品和地上附着的工作油充分擦净,避免出现产品掉落、滑倒受伤的情况。
  - ⑤ 警告 电气配线工程请务必将电源关闭再予以进行,避免触电。
  - ⑥ 注意 请将安装孔、安装面整理为到洁净的状态,螺栓的紧固不良、密封破损等,会造成破损和漏油等。
  - ⑦ 注意 产品安装时,请务必使用规定的螺栓,以规定的扭矩予以紧固,如果进行规定外的安装,会造成动作不良、破损、漏油等,请予以注意。
  - ⑧ 注意 产品除了产品目录、图纸、规格书等记载的规格以外,请不要使用。
  - ⑨ 注意 运转中,产品会因油温和电磁线圈温度上升等出现高温的情况,请注意不要用手和身体与之接触,以免烫伤。
  - ⑩ 注意 工作油请使用适当牌号的油,污染度也请根据推荐值予以管理,以免出现运转不良、破损。
- (2) 产品安装、拆卸时的注意事项
  - ① 注意 安装、拆卸、配管、配线等作业,请由具有专业知识者进行。  
\*具有专业知识者:液压调整技能士 2 级或接受过本公司培训中心进修者。
  - ② 警告 进行作业时,请务必将装置的电源关闭,就电动机、发动机等均已停止进行确认,另外,还请就液压管内压力为 0 进行确认。
  - ③ 警告 在有爆炸或燃烧危险性可能的场所,除了已采取对策的产品以外,绝对不要使用其他物品。
  - ④ 警告 泵和马达等的回转轴请务必安上保护罩,防止手和衣服等卷入。
  - ⑤ 警告 发生异常(异音、漏油、烟等)时应立即停止运转,采取必要的处置,避免破损、火灾、受伤等。
  - ⑥ 注意 装置初次运转时,应就液压回路、电气配线是否正确及连结部有无松弛等予以确认,然后再开始运转。
- (3) 运转时的注意事项
  - ① 危险 在有爆炸或燃烧危险性可能的场所,除了已采取对策的产品以外,绝对不要使用其他物品。
  - ② 警告 泵和马达等的回转轴请务必安上保护罩,防止手和衣服等卷入。
  - ③ 警告 发生异常(异音、漏油、烟等)时应立即停止运转,采取必要的处置,避免破损、火灾、受伤等。
  - ④ 注意 装置初次运转时,应就液压回路、电气配线是否正确及连结部有无松弛等予以确认,然后再开始运转。
- (4) 保养·保管的注意事项
  - ① 注意 请顾客绝对不要对产品进行改造。
  - ② 注意 请不要擅自对产品进行分解、改装,以免规定性能不能发挥,造成故障和事故。如果必须进行分解、改装时,应委托具有专业知识者进行。
  - ③ 注意 搬运、保管产品时,请注意周围温度、湿度等环境条件,确保防尘、防锈等。
  - ④ 注意 产品长期保管后再予使用时,需要对密封件类进行更换。

## SAFETY PRECAUTIONS

Before you use the product, you MUST read the operation or operators manual and MUST fully understand how to use the product. To use the product safely, you MUST carefully read all Warnings and Cautions in this manual. You MUST also observe the related regulations and rules regarding safety.

### ■ Cautions related to operation

- ① CAUTION Use the safety equipment to avoid the injury when you operate the product.
- ② CAUTION Pay enough attention on handling method to avoid pinching hands or back problems that may be caused by heavy weight of the product or handling posture.
- ③ CAUTION Do not step on the product, hit it, drop it or give strong outside force to it, as one of these actions may cause the failure of work, damage or oil leakage.
- ④ CAUTION Wipe the oil on the product or floor off completely, as the oil creates slippery conditions that may result in dropping the product or injuring.

### ■ Warnings and Cautions related to installation and removal of the product

- ① CAUTION Installation, removal, plumbing, and wiring must be done by the certified person.  
\*CERTIFIED PERSON: a person who has enough knowledge like a person who is trained by Kawasaki's hydraulic school.
- ② WARNING Make it sure that the power of the hydraulic power unit is turned off and that the electric motor or engine has completely stopped before starting installation or removal. You must also check the system pressure has dropped to zero.

- ③ WARNING Turn off the power before starting wiring or other works related to the electric power, otherwise you may be stuck by an electric shock.
- ④ CAUTION Clean the threads and mounting surface completely, otherwise you may experience damages or oil leakage caused by insufficient tightening torque or broken seal.
- ⑤ CAUTION Use the specified bolts and keep the specified tightening torque when you install the product. Usage of unauthorized bolts, lack of torque or excess of torque may create problems such as failure of work, damage and oil leakage.

### ■ Warnings and Cautions for operation

- ① DANGER Never use the product not equipped with anti-explosion protection in the circumstances of possible explosion or combustion.
- ② WARNING Shield the rotating part such as motor shaft and pump shaft to avoid injuries caused by being caught of fingers or
- ③ WARNING Stop the operation immediately if you find something wrong such as unusual noise, oil leakage or smoke, and fix it properly. If you continue operating, you may encounter damage, fire or injury.
- ④ CAUTION Make it sure that plumbing and wiring are correct and all the connection is tightened correctly before you start operating, especially if it is the first run.

- ⑤ CAUTION Use the product under the specification mentioned in the catalog, drawings and specification sheet.
- ⑥ CAUTION Keep your body off the product during the operations as it may become hot and burn your body.
- ⑦ CAUTION Use the proper hydraulic oil, and maintain the contamination in the recommended level, otherwise it may not work or be damaged.

### ■ Cautions related to maintenance

- ① CAUTION Never modify the product without approval of Kawasaki.
- ② CAUTION Do not disassemble and assemble without approval by Kawasaki. It may cause troubles and failure, or it may not work as specified. If it is necessary by all means to disassemble and assemble, it must be done by an authorized person.
- ③ CAUTION Keep the product from dust and rust by paying attention to the surrounding temperature and humidity when you transport or store the product.
- ④ CAUTION Replacing the seals may be required if you use the product after long time storage.



# Kawasaki的斜盘式马达对应“中速”马达的各种需求。 High-Performance Motors You Have Been Waiting for

## 川崎的斜盘式轴向柱塞马达 Kawasaki Swash-Plate Type Axial Piston Motors

排量 Displacement (cm <sup>3</sup> )	一般产业机械用 for General Use		产业车辆用 for Industrial Vehicles	
	一般用途 General	一般用途 General	回转用途 for Swing	行走用途 for Travel
	定量马达 Fixed	双速马达 Variable	定量马达 Fixed	双速马达 Variable
	P rated=31.4MPa (K3X series) 29.4MPa 20.6MPa (Reduction gear type)	P rated=29.4MPa 20.6MPa (Reduction gear type)	P rated=20.6MPa (size 22,45) 29.4MPa (size 63,210) 32.4MPa (size 130,180)	P rated=34.3MPa
	P max. = 34.3MPa	P max. = 34.3MPa	P max. = 24.5MPa (size 22,45) 34.3MPa (size 63,210) 39.2MPa (size 130,180)	P max. = 41.2MPa
50	K3X63		M2X63	
80	K3X80			
100	K3X90		M5X130	
150	K3X112		M5X180	
200	M3X200	M3B200	M2X210	MCB195
250	M3X280	M3B280		
500	M3X530	M3B530		MCB530
750	M3X800	M3B800		
1,000	M3X200-RG03S with Reduction Gear			
1,500	M3X280-RG06S with Reduction Gear	M3B280-RG06S with Reduction Gear	M2X63-RG06 with Reduction Gear P rated=28.0MPa	
3,000	M3X530-RG10S with Reduction Gear	M3B530-RG10S with Reduction Gear	M5X130-RG10 with Reduction Gear P rated=27.4MPa	
			M5X180-RG16 with Reduction Gear P rated=24.0MPa	
			M5X180-RG20 with Reduction Gear P rated=29.4MPa	
			M5X180-RG17C with Reduction Gear P rated=23.0MPa	
5,000	M3X800-RG16S with Reduction Gear	M3B800-RG16S with Reduction Gear	M5X180-RG23C with Reduction Gear P rated=24.5MPa	
20,000			M3X280-RG100C with Reduction Gear P rated=27.5MPa	

在上述机种中, 有关  范围内的产品, 在本说明书中予以介绍。  
This catalog introduces motors for general use. (Colored in  in the above table.)

## 特长 / FEATURES

### 1. 机种的选择范围大

- 定量马达M3X系列, 有4机种、10排量, 覆盖了149cm<sup>3</sup>~800cm<sup>3</sup>;带减速机则从845cm<sup>3</sup>~5120cm<sup>3</sup>, 并且, K3X系列还以4机种小排量域覆盖了63~111cm<sup>3</sup>整个范围。
- 变量马达M3B系列, 有4机种覆盖了195~800cm<sup>3</sup>;带减速机则覆盖了1512cm<sup>3</sup>~5120cm<sup>3</sup>,大排量和排量的组合丰富。另外, 还备有对应各种控制的调节器。

### 2. 卓越的自吸能力和转速 (M3X, M3B, K3X)

- 通过球面配油盘和最佳液压平衡实现了高自吸性能和高速旋转。

### 3. 基于实际业绩的高度可靠性 (M3X, M3B)

- 继承了大家长期爱顾的MX/MB系列的构造
- 在工程机械的卷扬用途中有很多实际业绩。

### 4. 任选零部件 (M3X, M3B)

- 在配油盖内藏有大容量停车制动器。
- 马达控制用的各种阀可以安装在马达上。

### 5. 其他马达

- 在工程机械的回转马达内装有必要的功能且紧凑化的M2X、M5X系列
- 工程机械行走用插装式马达MCB系列,带减速机壳体旋转式DNB系列
- 通用低速大扭矩径向柱塞马达

### 1. Wide variety variation

- Fixed Displacement Motors  
M3X series consists of 4 models and 10 displacement types ranging from 149cm<sup>3</sup> to 800cm<sup>3</sup>. M3X with reduction gear series covers a displacement range from 845cm<sup>3</sup> to 5,120cm<sup>3</sup>. K3X series is made up of 4 models with displacement range from 63cm<sup>3</sup> to 111cm<sup>3</sup>.

- Variable Displacement Motors  
M3B series consists of 4 models with displacement range from 195cm<sup>3</sup> to 800cm<sup>3</sup> and from 1,512cm<sup>3</sup> to 5,120cm<sup>3</sup> for those with reduction gears. Several combinations of large and small displacements are available along with a wide variation of regulators are also available for various control options.

### 2. Excellent self-priming capability and max. speed (M3X, M3B, K3X)

- A spherical surface type valve plate and full-balancing mechanism enhance self-priming capability and max. speed.

### 3. High reliability based on long experience (M3X, M3B)

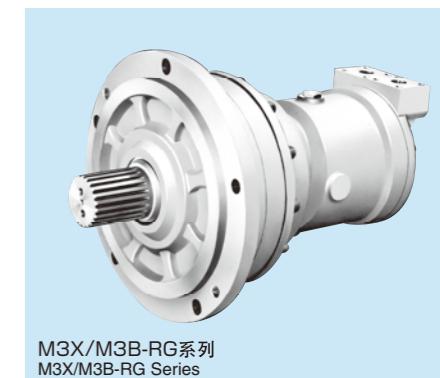
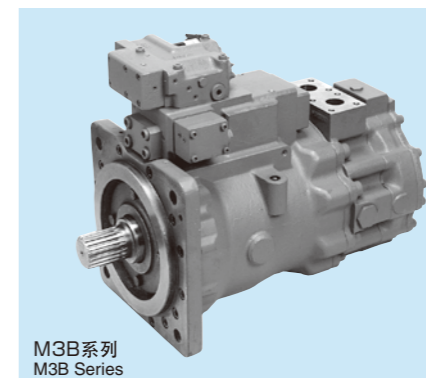
- Building on the knowledge and experiences of reputed MX/MB series, M3X/M3B series have been widely used especially as winch motors.

### 4. Optional parts (M3X, M3B)

- Built-in parking brake is available for M3X/M3B motors.
- Various control valves are available for M3X/M3B motors.

### 5. Other motors

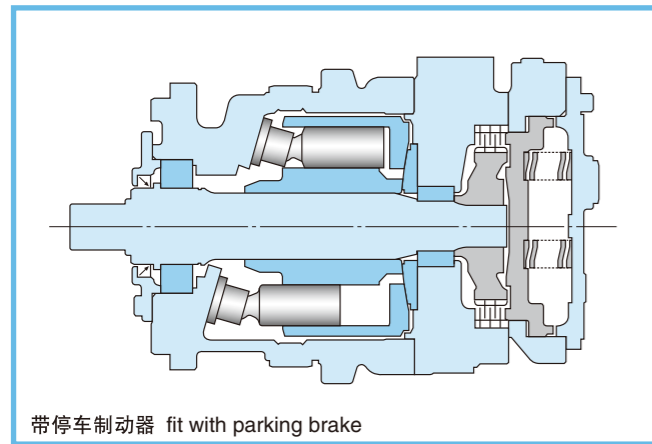
- M2X/M5X series motors are specifically designed for swing function of construction machinery.
- MCB series plug-in motors are available for traveling construction machinery.  
Low speed, high torque radial piston motors are prepared for general industrial use.



# 定量型轴向柱塞马达

Fixed-Displacement Type Axial Piston Motor

# M3X Series



M3X系列作为一般工业机械·工程机械用马达, 与建立了丰富实际业绩和可靠的MX系列技术一道, 实现了紧凑化和速度范围的扩大。

The M3X series are newly developed motors for construction machinery, industrial machinery or other applications. The design based on technology and experience of current MX series is more compact and enables a speed range.

## ● 特长 / FEATURES

### 1. 优异的低速性能

通过降低泄漏油变动、和降低摩擦等、及新设计技术实现了低速域的扩大和顺畅的启动性能。

### 2. 高速化

通过采用富有滑动性的零部件, 实现了高速化。最高转速达到MX系列的约1.5倍。

### 3. 最佳组合

在149cm<sup>3</sup>~800cm<sup>3</sup>的范围, 汇集了4机种10排量的马达。可安装连接部与MX系列相同, 因此置换也很容易。另外, 通过与带减速机RG系列的组合, 进而可覆盖更大的排量(请参照23页)。

## ● 型号表示 / ORDERING CODE

**M3X 530 - A C N - 485 - 001A - D3**

M3X系列 M3X series

排量大小 size  
200 : 195cm<sup>3</sup>    530 : 533cm<sup>3</sup>  
280 : 280cm<sup>3</sup>    800 : 800cm<sup>3</sup>

任选功能代码 optional function code  
A : 标准 standard  
B : 带停车制动器 fit with a parking brake

轴形状 shaft code  
C : JIS渐开线花键(外齿) (标准)  
JIS involute spline (external) (standard)  
P : JIS渐开线花键(内齿)  
JIS involute spline (internal)  
1 : JIS直键  
JIS straight key

温度规格 oil temp. code

记号 marks	油温范围 oil temperature range	备注 remarks
V2	-20°C ≤ θ ≤ 90°C	全部密封材料为氟橡胶 all seal parts: fluoro-rubber
V1	-20°C ≤ θ ≤ 90°C	仅油封为氟橡胶 oil seal: fluoro-rubber
空白 blank	-20°C ≤ θ ≤ 90°C	
D1	-30°C ≤ θ ≤ 90°C	
D2	-45°C ≤ θ ≤ 80°C	

设计号码 design code

特殊排量 optional capacity  
只显示任选排量 showed only optional capacity

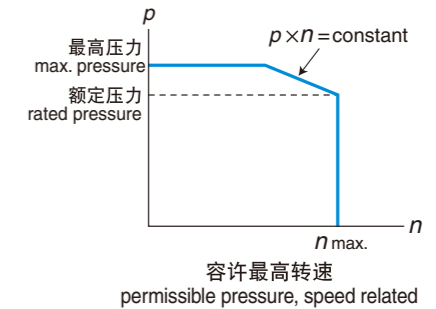
旋转方向(A接口高压, 从轴端看)  
direction of rotation (A port: high press., view from shaft end)  
N : 顺时针方向旋转(标准) clockwise rotation (standard)  
M : 逆时针方向旋转 anti-clockwise rotation

## ● 规格 / SPECIFICATIONS

型号 / model	M3X200	M3X280	M3X530	M3X800
排量 / displacement Vg cm <sup>3</sup>	195	280	533	800
压力 pressure MPa (kgf/cm <sup>2</sup> )	额定 rated 29.4 (300)			
	最高 max. 34.3 (350)			
最高转速 / max. speed nmax min <sup>-1</sup>	1,900	1,700	1,400	1,200
最大流量 / max. flow L/min	370	480	750	960
额定转矩 / rated torque N·m	910	1,310	2,500	3,750
额定功率 / rated power kW	180	230	370	470
油箱内油量 / case volume L	1.0	1.3	2.5	3.8
GD2值 / moment of inertia N·m <sup>2</sup>	1.4	3.0	7.3	14
质量 mass kg	标准 standard			
	带停车制动器 with parking brake			

## ◆ M3X设定排量表 / M3X Optional capacities

型号 model	排量 displacement (☆: 标准/standard) 最高转速 max. speed			
	Vg	☆	☆	☆
M3X200	Vg	☆195	149	cm <sup>3</sup>
	nmax.	1,900	2,140	min <sup>-1</sup>
M3X280	Vg	☆280	252	
	nmax.	1,700	1,770	
M3X530	Vg	☆533	499	(485) 467
	nmax.	1,400	1,400	1,420 1,450
M3X800	Vg	☆800	751	(737) 701
	nmax.	1,200	1,230	1,240 1,270

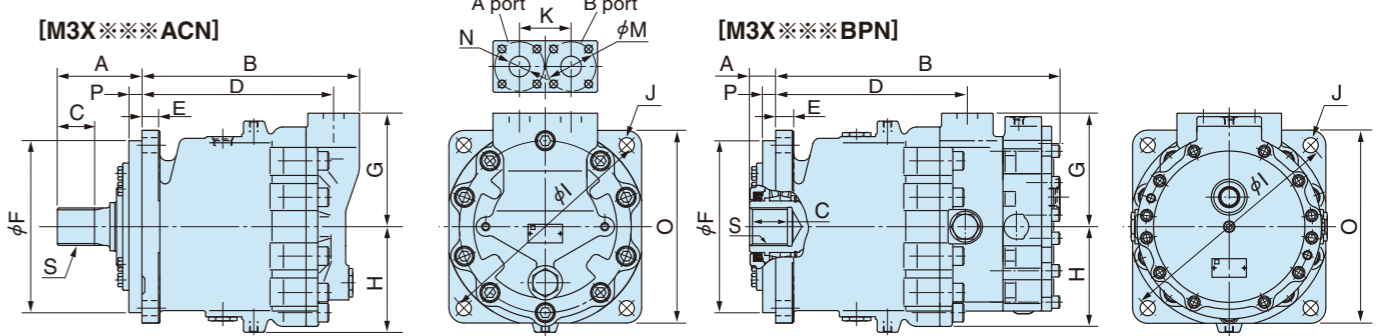


## ● 各参数选定计算式 / CALCULATION FORMULA

- 所需流量 L/min required input flow  $qv = \frac{Vg \cdot n}{1,000 \cdot \eta v}$
- 转速 min<sup>-1</sup> output speed  $n = \frac{qv \cdot 1,000 \cdot \eta v}{Vg}$
- 输出转矩 N·m (kgf·m) output torque  $T = \frac{Vg \cdot \Delta p \cdot \eta hm}{2 \cdot \pi}$
- 功率 kW (PS) output power  $P = \frac{2\pi \cdot T \cdot n}{60,000} = \frac{T \cdot n}{9,550} = \frac{qv \cdot \Delta p}{60} \cdot \eta t$

Vg	排量 displacement	cm <sup>3</sup>
T	转矩 torque	N·m
n	转速 speed	min <sup>-1</sup>
Δp	有效压力差 effective pressure difference	MPa (kgf/cm <sup>2</sup> )
ηv	容积效率 volumetric efficiency	
ηhm	机械效率 mechanical efficiency	
ηt	总效率 overall efficiency	

## ● 尺寸 / DIMENSIONS



尺寸 / size	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	S
M3X200ACN	107	263	50	225	20	160	115	110	224	4-φ18	75	2×4, M12-17.5	72	22	190	9	m=2.5, z=16
M3X200APN	49	263	35	225	20	160	115	110	224	4-φ18	75	2×4, M12-17.5	72	22	190	9	m=2.5, z=13
M3X280ACN	98	290	45	252	22	200	130	124	268	4-φ17	75	2×4, M12-17.5	72	25	230	11	m=2.5, z=16
M3X280BPN	33	290	44	252	22	200	130	124	268	4-φ17	75	2×4, M12-17.5	72	25	230	11	m=2.5, z=16
M3X530ACN	123	316	54	278.5	24	250	165	154	335	4-φ22	75	2×4, M12-17.5	72	30	280	19	m=2.5, z=20
M3X530BPN	38	413	55	278.5	24	250	165	154	335	4-φ22	75	2×4, M12-17.5	72	30	280	19	m=2.5, z=20
M3X800ACN	130	350	62	312.5	27	280	178	169	376	4-φ22	75	2×4, M12-17.5	72	28	310	16	m=3, z=19
M3X800BPN	45	461	62	325	27	280	178	169	376	4-φ22	102	2×4, M16-23	92	30	310	16	m=3, z=19



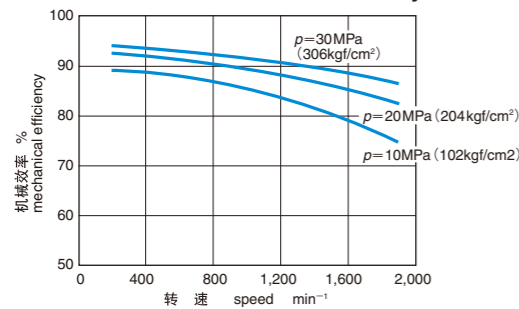
性能 / PERFORMANCE CURVE

图中数值为平均值, 而不是保证值。  
The values given in the below figures are mean ones, and not guaranteed ones.

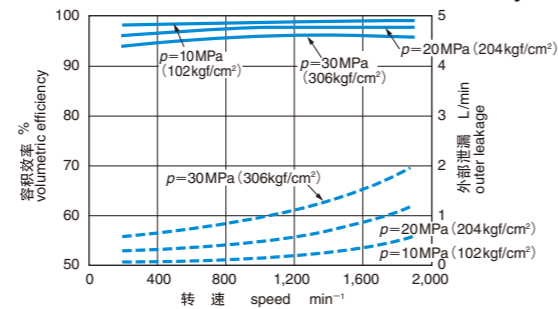
油温 / oil temperature: 50°C  
粘度 / oil viscosity: 32 mm<sup>2</sup>/s

M3X200

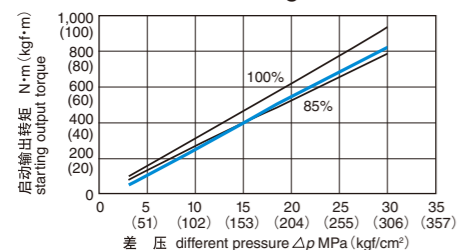
机械效率 / Mechanical efficiency (%)



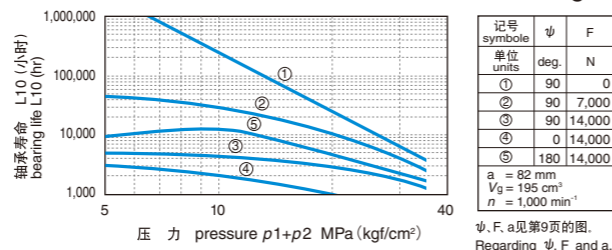
容积效率·外部泄漏 / Volumetric efficiency



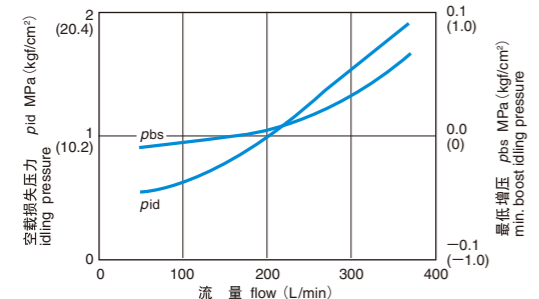
启动效率 / Starting mechanical efficiency



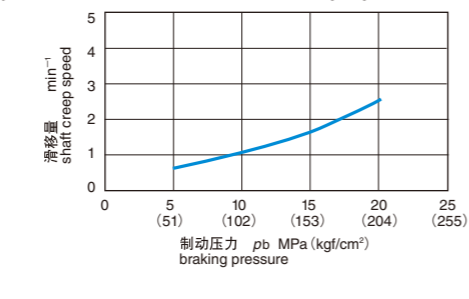
径向负载和轴承寿命 / Radial load and bearing life



空载损失压力曲线和最低增压曲线 / Idle & boost-graph

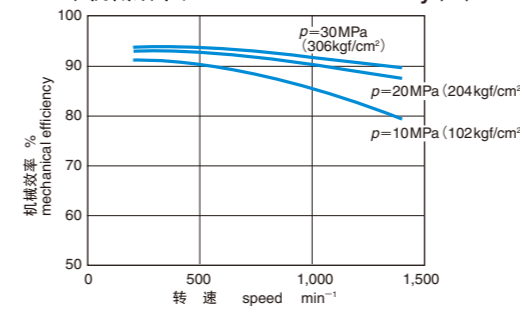


保持特性 / Shaft creep speed

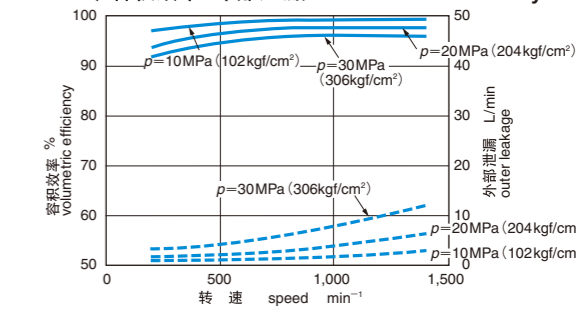


M3X530

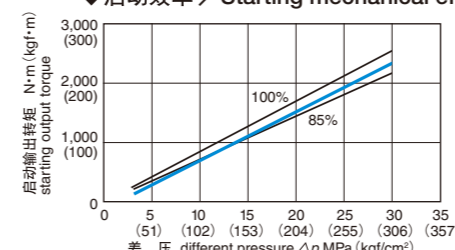
机械效率 / Mechanical efficiency (%)



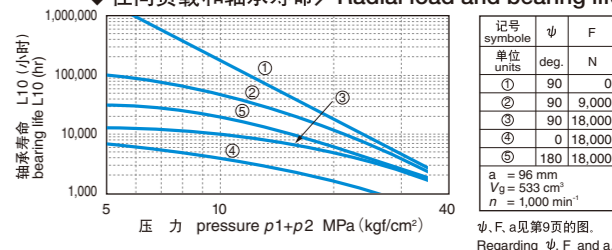
容积效率·外部泄漏 / Volumetric efficiency



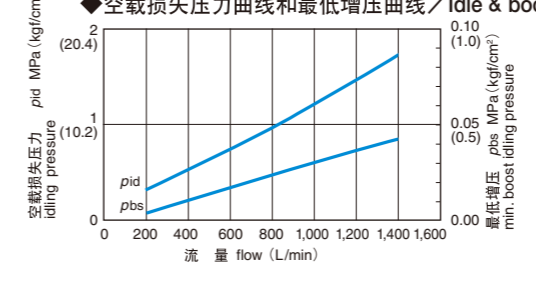
启动效率 / Starting mechanical efficiency



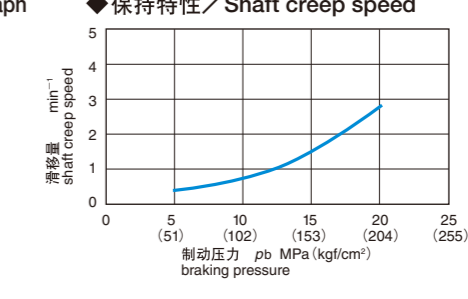
径向负载和轴承寿命 / Radial load and bearing life



空载损失压力曲线和最低增压曲线 / Idle & boost-graph

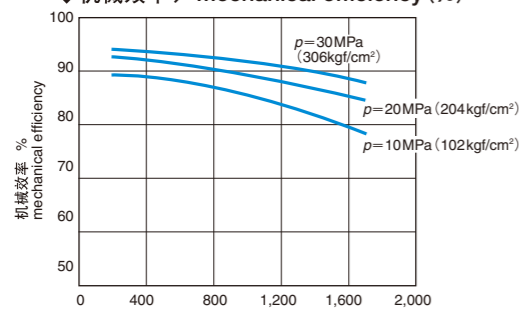


保持特性 / Shaft creep speed

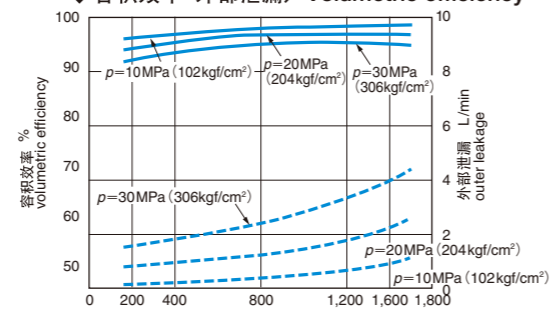


M3X280

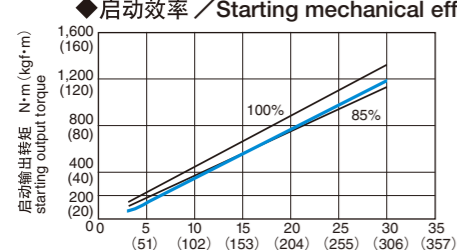
机械效率 / Mechanical efficiency (%)



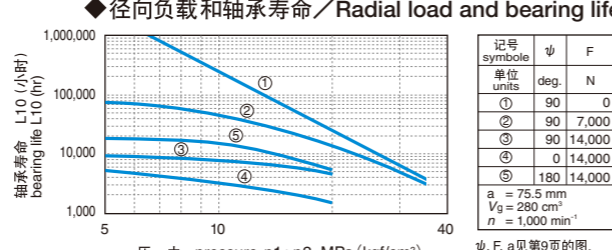
容积效率·外部泄漏 / Volumetric efficiency



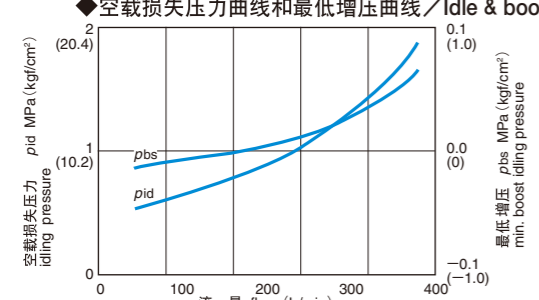
启动效率 / Starting mechanical efficiency



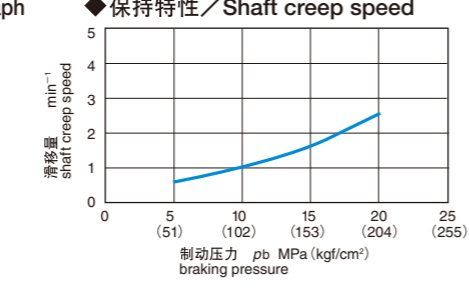
径向负载和轴承寿命 / Radial load and bearing life



空载损失压力曲线和最低增压曲线 / Idle & boost-graph

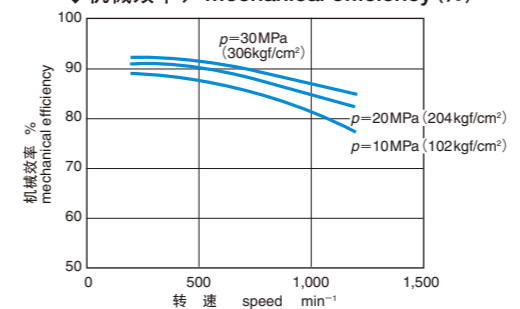


保持特性 / Shaft creep speed

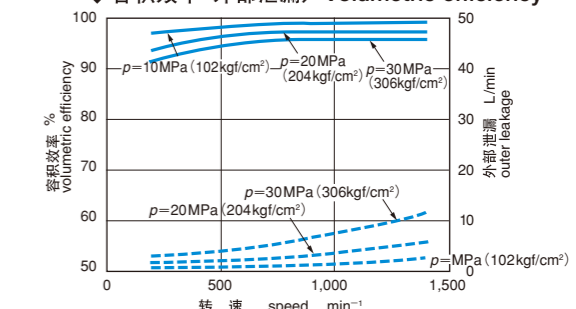


M3X800

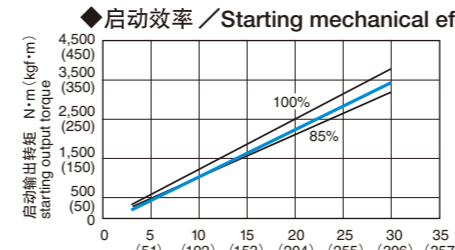
机械效率 / Mechanical efficiency (%)



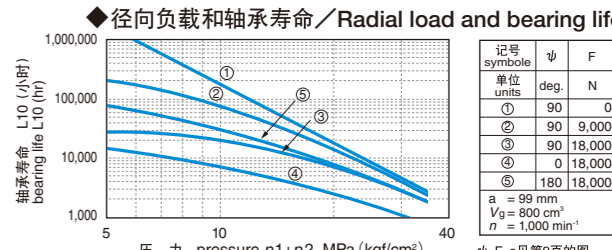
容积效率·外部泄漏 / Volumetric efficiency



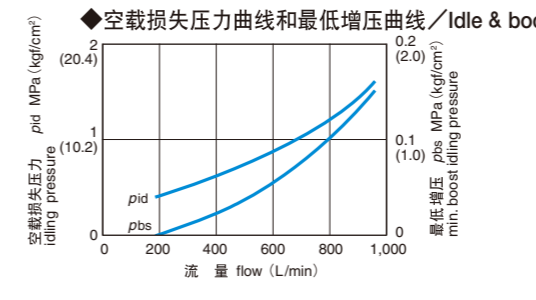
启动效率 / Starting mechanical efficiency



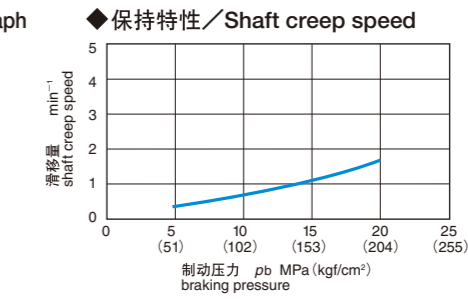
径向负载和轴承寿命 / Radial load and bearing life



空载损失压力曲线和最低增压曲线 / Idle & boost-graph



保持特性 / Shaft creep speed



## ● 轴承寿命 / BEARING LIFE

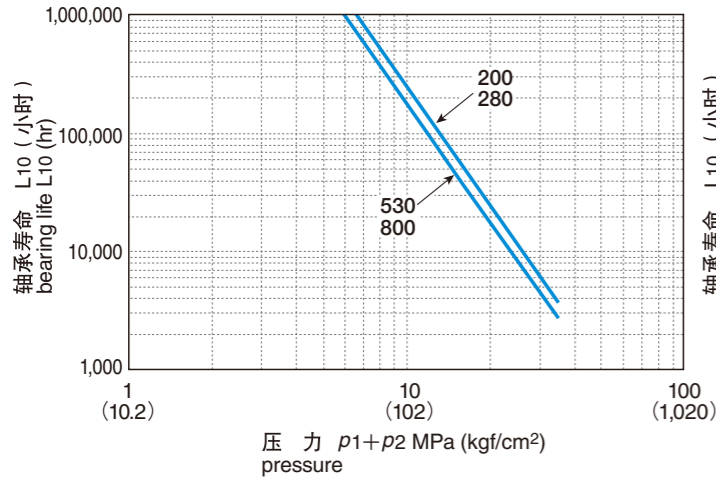
■ 本图表示转速  $N_0 = 1,000 \text{ min}^{-1}$  时的计算寿命 (B10 寿命)。任意转速  $N$  时的计算寿命用下计算式求得。

■ The calculated life (B10 life) shown in the graph is for speed  $N_0 = 1,000 \text{ min}^{-1}$ . Calculation of life for a random speed  $N$  is as follows.

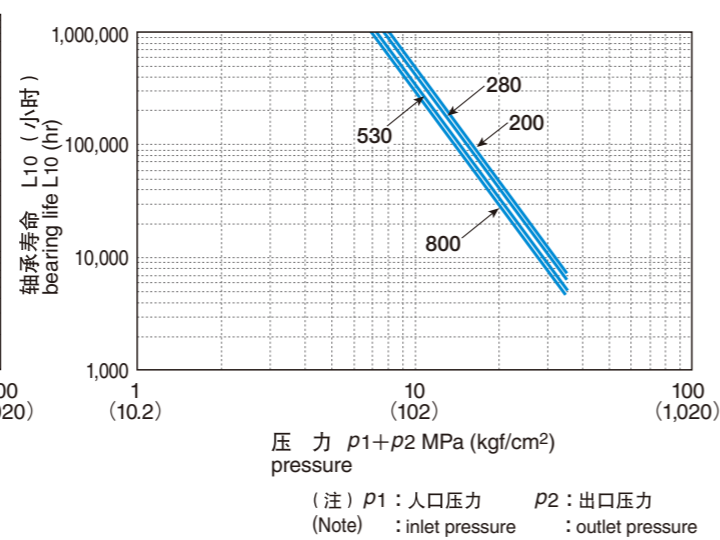
$$L = \frac{N_0}{N} \times L_0 \quad \left( L_0: \text{对 } N_0 \text{ 的计算寿命} \right)$$

(calculated life for  $N_0$ )

◆ M3X的前轴承寿命 / Front bearing life



◆ M3X的后轴承寿命 / Rear bearing life

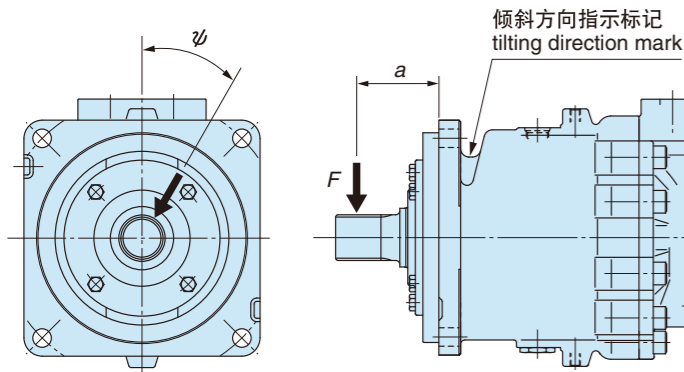


## ● 径向负载 / RADIAL LOAD

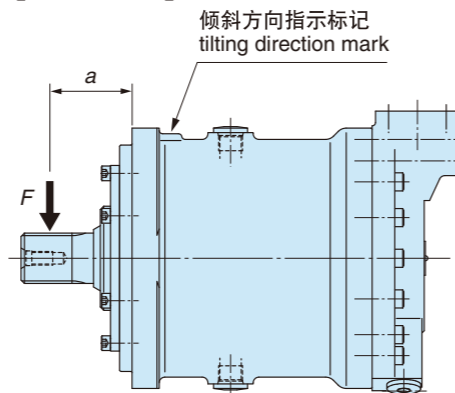
■ 对轴有径向负载作用时, 请按下图所示方向的作用予以安装。该负载方向的容许径向负载, 请参照各型号的表。

■ In case that radial load is applied, you are requested to install the motor so as to place the radial load toward the arrow direction shown in below. Please refer to the relevant list of each motor for allowable radial load.

[M3X200]  
[M3X530]  
[M3X800]



[M3X280]



## ● 停车制动器 / PARKING BRAKE

型 号 / model		M3B200			M3X280/M3B280			M3X530/M3B530			M3X800/M3B800			
制动转矩 / brake torque	N·m	1,400	1,050	530	1,750	1,320	660	3,770	2,820	1,410	5,010	3,770	1,880	
制动解除压力 brake release pressure MPa (kgf/cm <sup>2</sup> )	开启压力 cracking	1.8(18)	1.4(14)	0.7(7)	2.3(23)	1.8(18)	0.9(9)	2.4(25)	1.8(18)	0.8(8)	2.4(25)	1.8(18)	0.8(8)	
	行程终端 stroke end	2.3(23)	1.8(18)	0.9(9)	3.0(31)	2.3(23)	1.2(12)	3.1(32)	2.3(23)	1.2(12)	3.1(32)	2.3(23)	1.2(12)	
制动器规格代码 brake order code	外部解除 pilot release	低 压 low press.	L16-G (标准) (standard)	L12-G	L6-G	L16-G (标准) (standard)	L12-G	L6-G	L16-G (标准) (standard)	L12-G	L6-G	L16-G (标准) (standard)	L12-G	L6-G
		高 压 high press.	—	—	—	—	—	—	H16-G	H12-G	L6-G	H16-G	H12-G	H6-G
	制动阀解除 valve release	高 压 high press.	—	—	—	—	—	—	—	—	H6-B	—	—	H6-B

(注1) M3X系列用的机械制动器为停车用途专用。在马达旋转中请不要使之动作。

(Note1) The mechanical brakes of M3X/M3B series shall be used for parking only so please make sure not to apply the brakes when motors are driving.

(注2) 低压解除形供入行程末端压力以上7.8 MPa (80kgf/cm<sup>2</sup>) 以下的压力, 进行制动器解除。制动解除压力与泄漏压力的差压成为了有效压力, 请予以注意。

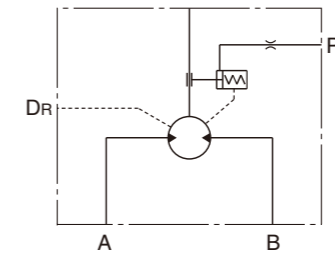
(Note2) In case of low pressure release type, brake release shall be conducted by providing hydraulic oil pressured more than stroke end pressure and less than 7.8 MPa (80kgf/cm<sup>2</sup>). Please note that effective pressure is the differential pressure between brake release and drain.

(注3) 规格代码 "H6-B" 是从行走用背压阀供入解除压力, 自动解除制动器。

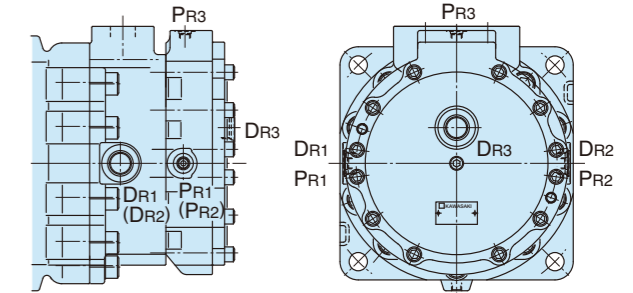
(Note3) In case of motors with H6-B as brake model code, release pressure is provided from traveling counterbalance valve, and the brake is automatically released.

### ◆ 回路图 / Hydraulic symbols

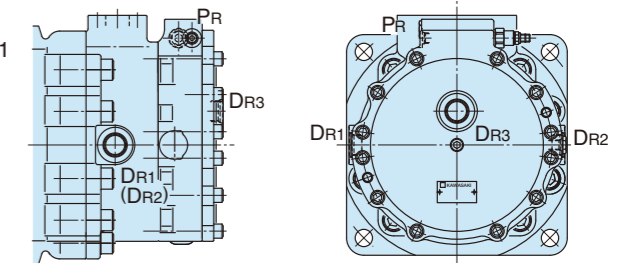
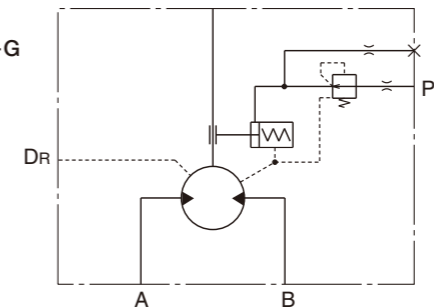
制动器规格代码 : L ※ ※ -G  
brake order code



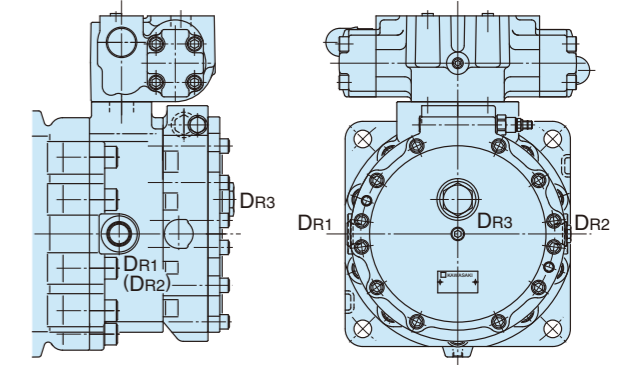
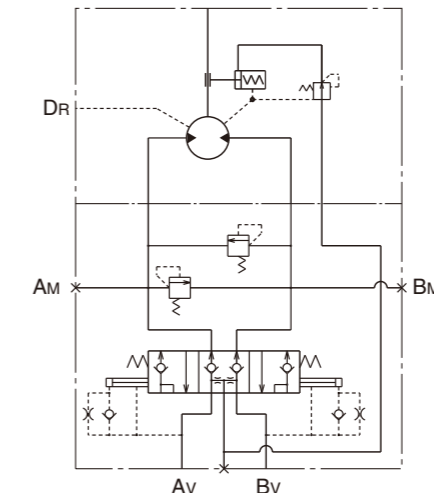
### ◆ 制动部外观 / Outline view of brake port



制动器规格代码 : H ※ ※ -G  
brake order code



制动器规格代码 : H6-B  
brake order code

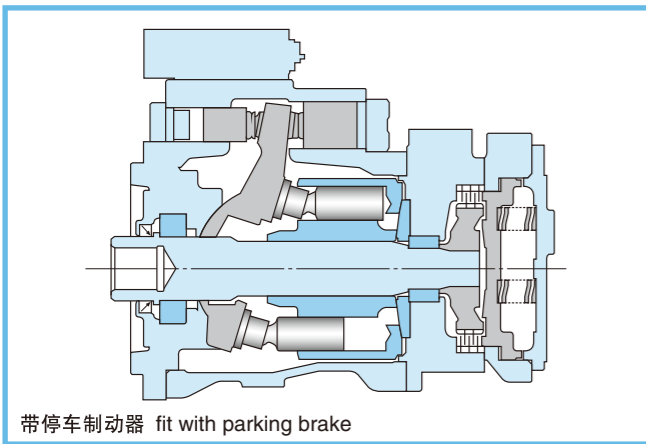




# 变量型轴向柱塞马达

Variable-Displacement Type Axial Piston Motor

# M3B Series



M3B系列, 其旋转部与M3X系列通用, 实现了优异的低速性能和高速化的双速型马达。变量机构是根据有实际业绩的MB马达技术, 同时使双速排量比扩大到3倍, 除3种类的双速控制以外, 电气控制也成为可能。

The M3B Series are variable displacement type motors with the same rotary components of M3X Series which enable the advanced low speed characteristic and high speed operation.

The design of various displacement control is based on current MB Series. The range of displacement is 100%~33% with 3 types of various displacement regulators. Electric displacement control is also possible.

## ● 特长 / FEATURES

### 1. 优异的低速性能

通过降低泄漏油变动、和降低摩擦等、及新设计技术实现了低速域的扩大和顺畅的启动性能。

### 2. 高速化的实现

通过采用滑动性优异的零部件和变量范围的扩大从而使高速化成为可能。大/小排量的排量比从旧型的MB型的2倍扩大到3倍。

### 3. 对应各种容量控制方法

- A: 双速换向阀
- B: 顺序阀
- C: 恒功率控制阀+排量无级控制阀 (具体请见次页)

### 4. 能通过电气进行排量控制

通过用电磁换向阀或电磁比例减压阀控制外部指令压的电气, 进行排量控制也是可能的。

## ● 型号表示 / ORDERING CODE

**M3B 530 - A C - 533 / 178 - 001A - D3**

- M3B系列 M3B series
- 规格大小 size
  - 200 : 195cm<sup>3</sup>~106cm<sup>3</sup>
  - 280 : 280cm<sup>3</sup>~ 93cm<sup>3</sup>
  - 530 : 533cm<sup>3</sup>~178cm<sup>3</sup>
  - 800 : 800cm<sup>3</sup>~267cm<sup>3</sup>
- 任选功能代码 optional function code
  - A : 标准 standard
  - B : 带停车制动器 fit with a parking brake
- 轴形状 shaft code
  - C : JIS渐开线花键 (外齿) JIS involute spline (external)
  - P : JIS渐开线花键 (内齿) (标准) JIS involute spline (internal) (standard)
  - 1 : JIS直键 JIS straight key

记号 marks	油温范围 oil temperature range	备注 remarks
V2	-20°C ≤ θ ≤ 90°C	全部密封材料为氟橡胶 all seal parts: fluoro-rubber
V1	-20°C ≤ θ ≤ 90°C	仅油封为氟橡胶 oil seal: fluoro-rubber
空白 blank	-20°C ≤ θ ≤ 90°C	
D1	-30°C ≤ θ ≤ 90°C	
D2	-45°C ≤ θ ≤ 80°C	

- 温度规格 oil temp. code
- 设计号码 design code
- 小排量 (cm<sup>3</sup>) small displacement
- 大排量 (cm<sup>3</sup>) large displacement

### 1. Advanced Low-Speed Characteristics

New design which reduces pressure ripple and friction enabling expanded lower speed limit and smooth starting characteristics.

### 2. High-Speed Operation

New materials and enlargement of variable displacement range have enabled the higher maximum speed. The ratio of large to small displacement is enlarged from 2 (old model/MB series) to 3.

### 3. Various Displacement Control Regulator (3 Type)

- A: Directional control valve
- B: Sequence control regulator
- C: Speed & CHP control regulator (Refer to next page)

### 4. Electric Displacement Control

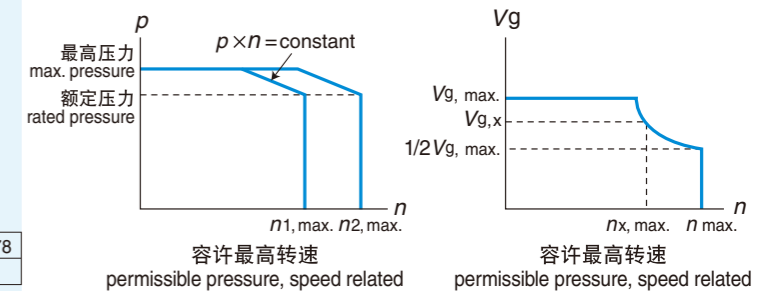
The pilot pressure can be controlled by a solenoid-operated directional control valve or a pressure-reducing valve.

## ● 规格 / SPECIFICATIONS

型号 / model	M3B200	M3B280	M3B530	M3B800
排量 displacement cm <sup>3</sup>	最大 max. Vg, max.	195	280	533
	最小 min. Vg, min.	106	93	178
压力 pressure MPa (kgf/cm <sup>2</sup> )	额定 rated	32.0	30.0	29.4 (300)
	最高 max.	35.0	35.0	34.3 (350)
最高转速 max. speed min <sup>-1</sup>	n1, max. at Vg, max.	1,900	1,700	1,400
	n2, max. at ≤ 1/2 Vg, max.	2,930	2,200	1,700
最大流量 / max. flow L/min	370	480	750	960
额定转矩 / rated torque N·m	990	1,340	2,500	3,750
额定功率 / rated power kW	200	240	370	470
油箱内油量 / case volume L	1.6	2.2	4.2	6.3
G D 2 值 / moment of inertia N·m <sup>2</sup>	1.4	3.0	7.3	14
质量 mass kg	标准 standard	72	93	147
	带停车制动器 with parking brake	88	110	189

### ◆ M3B设定排量表 / M3B Optional capacities

型号 model	排量 displacement (☆:标准/standard) cm <sup>3</sup>	最高转速 max. speed min <sup>-1</sup>
M3B200	Vg,1 ☆195	1,900
	Vg,2 127 ☆116 106	2,930
	n <sub>x,max.</sub> 2,790	2,930
M3B280	Vg,1 ☆280 252	1,700
	Vg,2 200 166 149 ☆140 132 115 99 93	2,200
	n <sub>x,max.</sub> 1,940 2,060 2,110	2,200
M3B530	Vg,1 ☆533 485 477	1,400
	Vg,2 370 340 327 315 280 ☆267 242 214 192 178	1,700
	n <sub>x,max.</sub> 1,580 1,630 1,640 1,660	1,700
M3B800	Vg,1 ☆800 751 737 653	1,200
	Vg,2 554 533 500 470 434 420 ☆400 369 321 267	1,500
	n <sub>x,max.</sub> 1,380 1,400 1,430 1,450 1,480 1,490	1,500

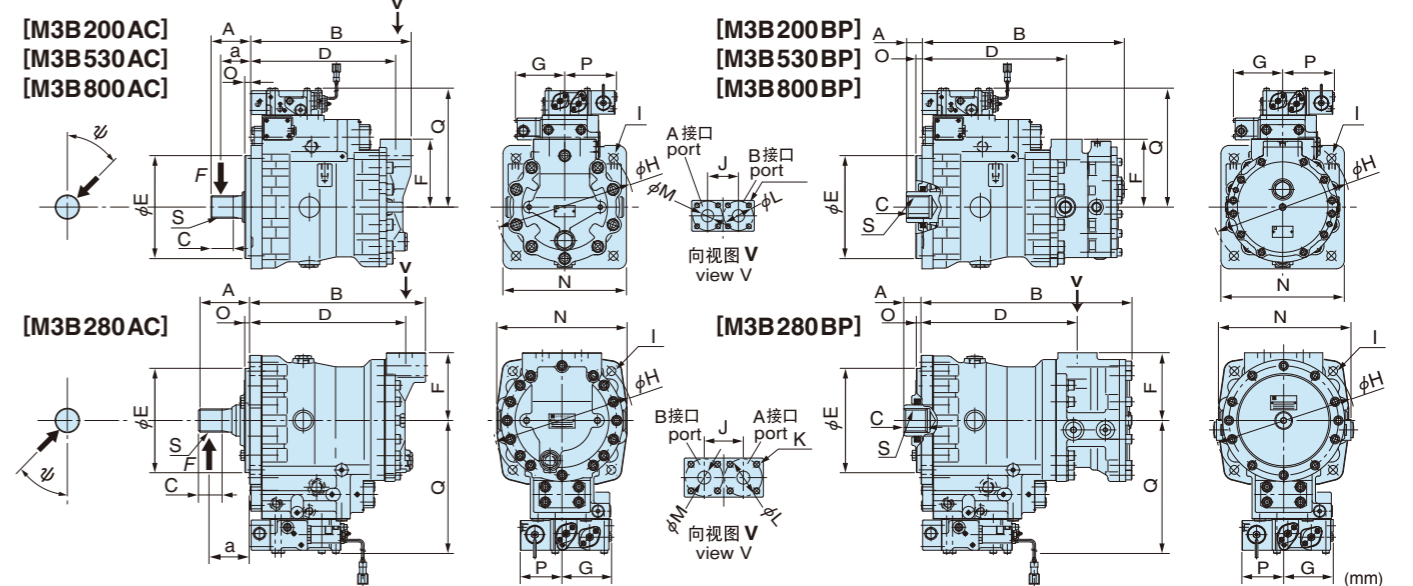


### ◆ 调节器 / Regulator

- A: 双速换向阀 根据外部指令压切换大/小排量。
- B: 顺序阀 根据负载的大小, 自动切换大/小排量。
- C: 恒功率阀+排量无级控制阀 无论负载怎样变动, 都能将输出功率保持在恒定的功能。对应外部指令压可任意地控制排量。另, 通过用电磁换向阀或电磁比例减压阀控制外部指令压的电气, 进行排量控制也是可能的。

- A: Directional control valve Shifts displacement small or large by remote control signal.
- B: Sequence control regulator Automatically shifts displacement small or large depending on the load.
- C: Speed & CHP control regulator Maintains constant horsepower regardless of the load. Controls displacement at any position by pilot pressure. The pilot pressure can be controlled by a solenoid-operated directional control valve or a pressure-reducing valve. CHP: Constant horsepower

## ● 尺寸 / DIMENSIONS



尺寸 / size	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	S
M3B200AP	40	286	56	249	200	144	70	250	4-φ22	75	2×4, M10-17.5	62	22	236	9	110	198	m=2.5, z=16
M3B200BP	40	368	56	249	200	144	70	250	4-φ22	75	2×4, M10-17.5	62	22	236	9	110	198	DP=12/24, z=17
M3B280AC	98	338	45	299.5	200	130	95	268	4-φ17	75	2×4, M12-17.5	72	25	250	9	80	255	m=2.5, z=16
M3B280BP	33	405	51	299.5	200	130	95	268	4-φ17	75	2×4, M12-17.5	72	25	250	9	80	255	m=2.5, z=16
M3B530AC	97	389	54	351.5	250	165	119	335	4-φ22	75	2×4, M12-17.5	72	30	300	15	126	289	m=2.5, z=20
M3B530BP	38	486.5	55	351.5	250	165	119	335	4-φ22	75	2×4, M12-17.5	72	30	300	15	126	289	m=2.5, z=20
M3B800AC	124	429	64	391.5	280	178	130	376	4-φ22	75	2×4, M12-17.5	72	28	345	16	133.5	330	m=3, z=19
M3B800BP	20	540	64	404	280	178	130	376	4-φ22	102	2×4, M16-23	92	30	345	16	133.5	330	m=3, z=19

性能 / PERFORMANCE CURVE

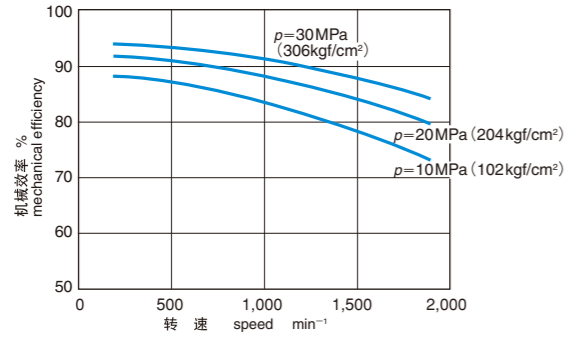
图中数值为平均值 而不是保证值  
The values given in the below figures are mean ones, and not guaranteed ones.

油温 / oil temperature: 50°C  
粘度 / oil viscosity: 32 mm<sup>2</sup>/s

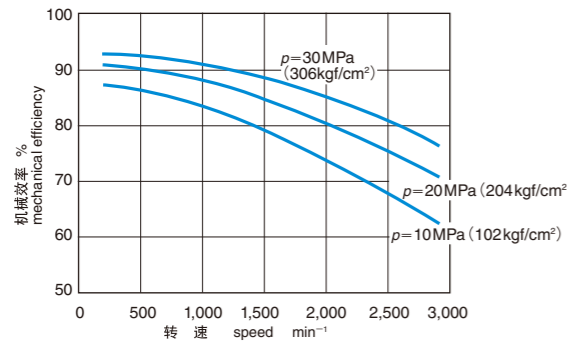
M3B200

机械效率 / Mechanical efficiency (%)

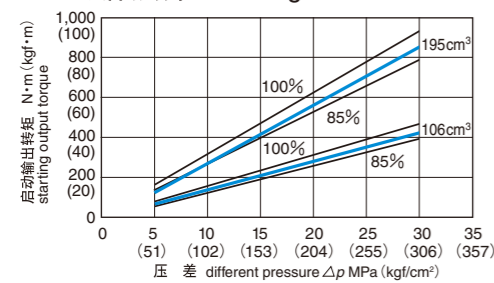
195cm<sup>3</sup>  
(100%)



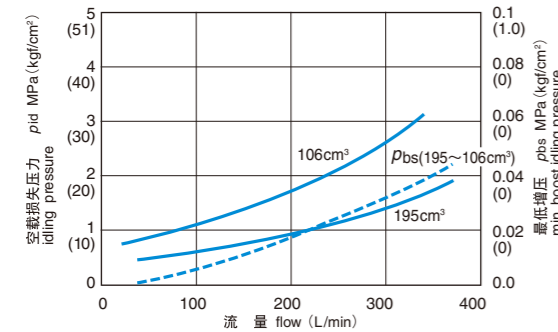
106cm<sup>3</sup>  
(59%)



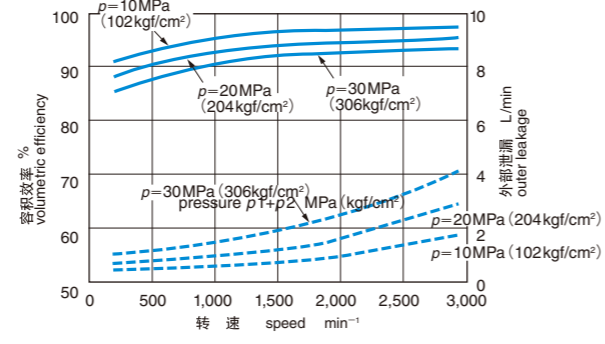
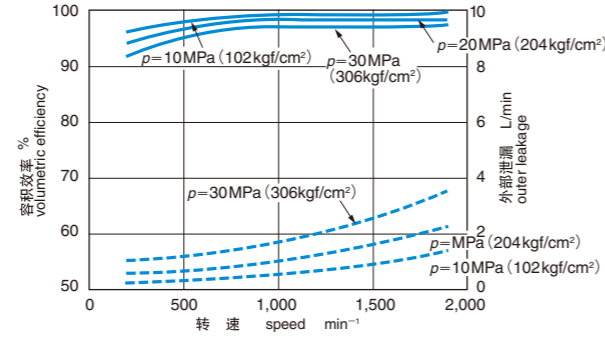
启动效率 / Starting mechanical efficiency



空载损失压力曲线和最低增压曲线 / Idle & boost-graph



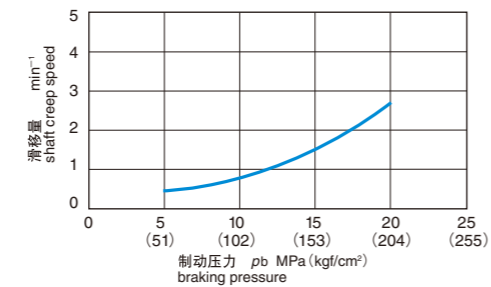
容积效率·外部泄漏 / Volumetric efficiency



径向负载 / Radial load

M3B200的输出轴不能施加径向负载。  
No radial load shall be applied to M3B200.

保持特性 / Shaft creep speed



轴承寿命 / Bearing life

本图表示转速 No = 1,000 min<sup>-1</sup> 时的计算寿命 (B10寿命)。任意转速 N、排量 Vg、x 时的计算寿命用下列计算式求得。

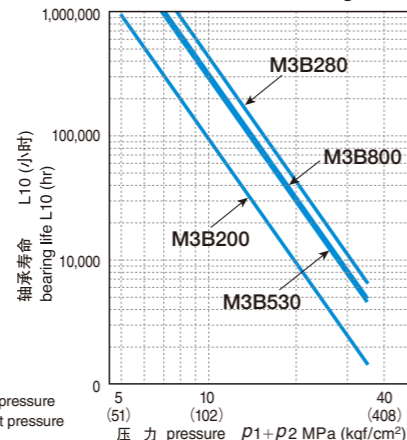
The calculated life (B10 life) shown in the graph is for speed No = 1,000 min<sup>-1</sup>. Calculation of life for a random speed N and a random displacement is as follows.

$$L_x = \frac{Vg \cdot 1}{Vg \cdot x} \cdot \frac{N_0}{N^2} \times L_0$$

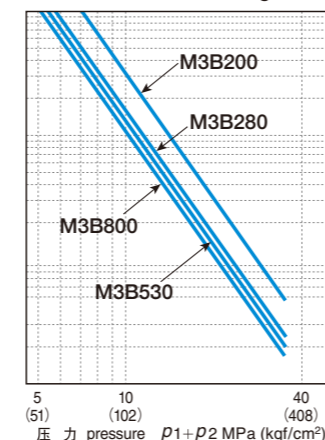
L<sub>0</sub> : 见右表 refer to this graph  
Vg.1 : 最大排量 max. displacement

(注 Note)  
P1 : 入口压力 inlet pressure  
P2 : 出口压力 outlet pressure

前轴承寿命 / Front bearing life



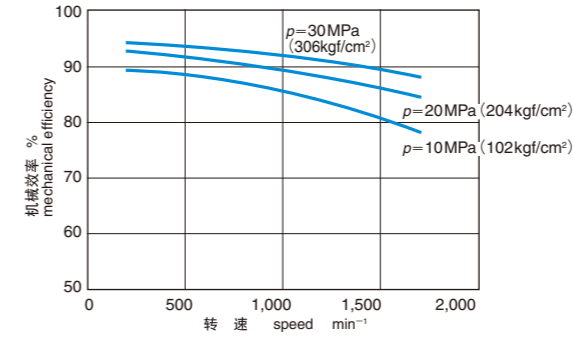
后轴承寿命 / Rear bearing life



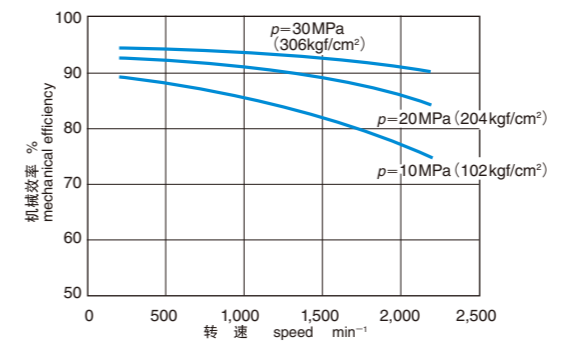
M3B280

机械效率 / Mechanical efficiency (%)

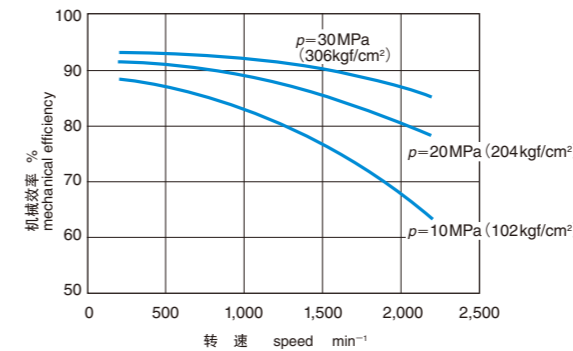
280cm<sup>3</sup>  
(100%)



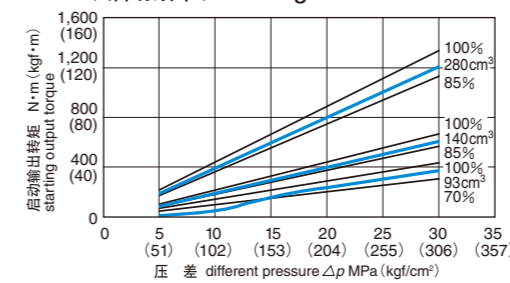
140cm<sup>3</sup>  
(50%)



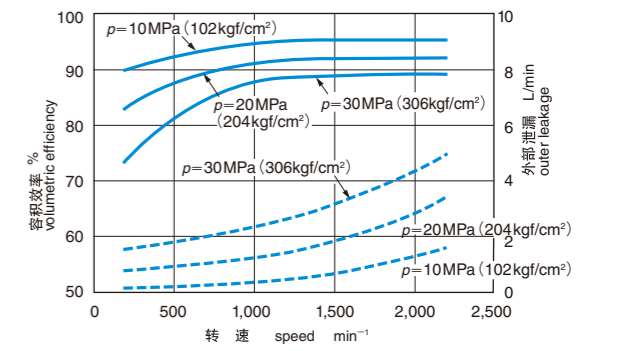
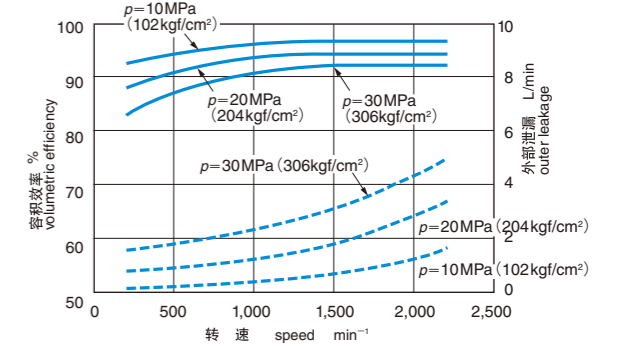
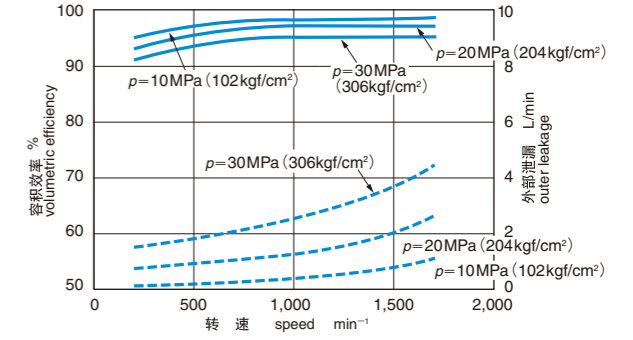
93cm<sup>3</sup>  
(33%)



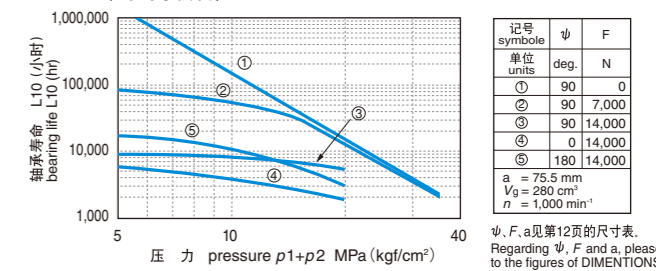
启动效率 / Starting mechanical efficiency



容积效率·外部泄漏 / Volumetric efficiency



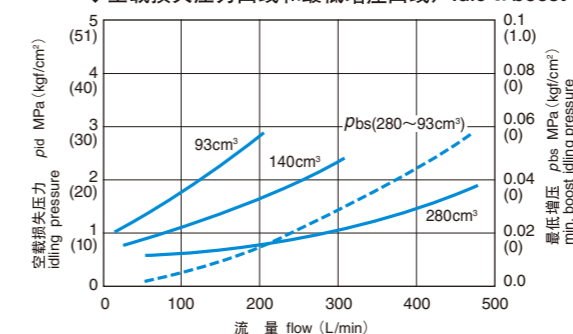
径向载荷 / Radial load



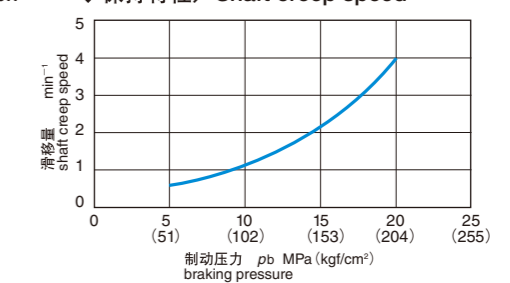
记号	ψ	F
①	90	0
②	90	7,000
③	90	14,000
④	90	14,000
⑤	180	14,000

ψ, F, a 见第12页的尺寸表。  
Regarding ψ, F and a, please refer to the figures of DIMENSIONS in page 12.

空载损失压力曲线和最低增压曲线 / Idle & boost-graph



保持特性 / Shaft creep speed



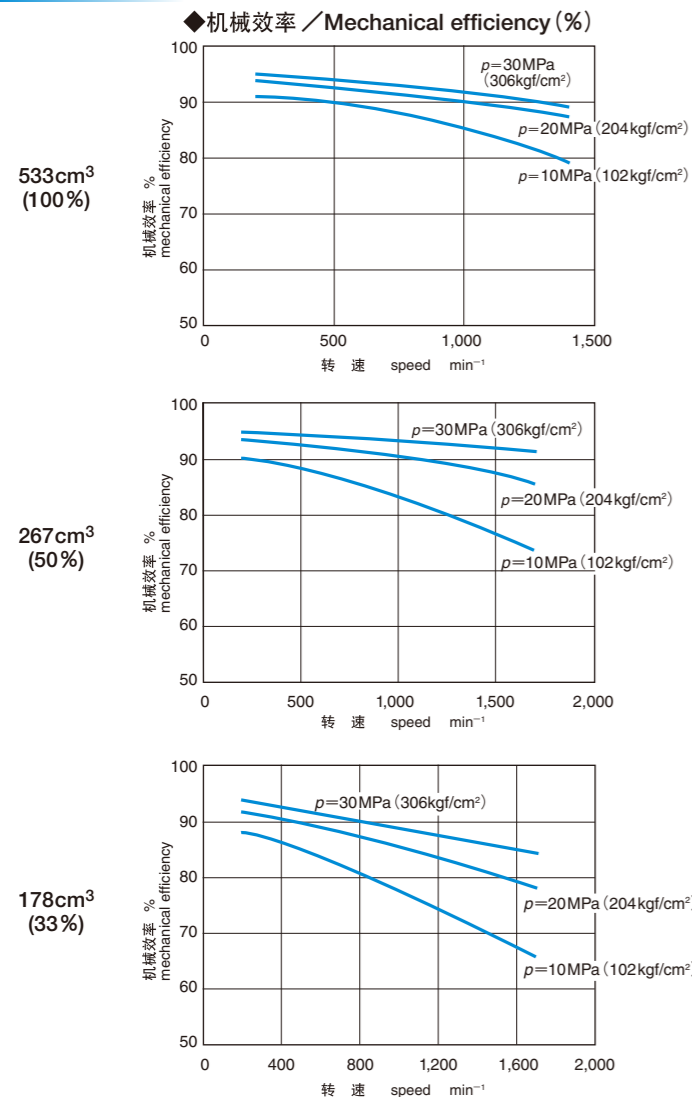


性能 / PERFORMANCE CURVE

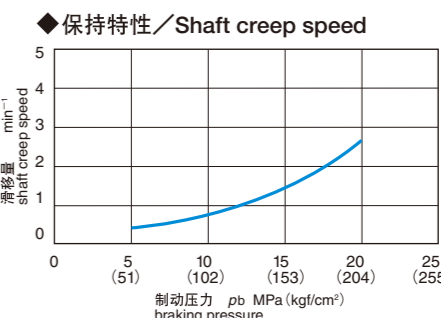
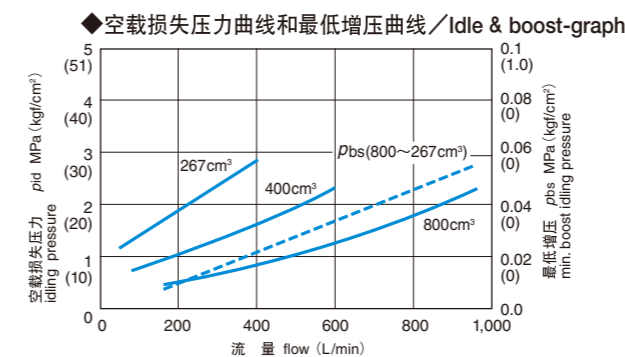
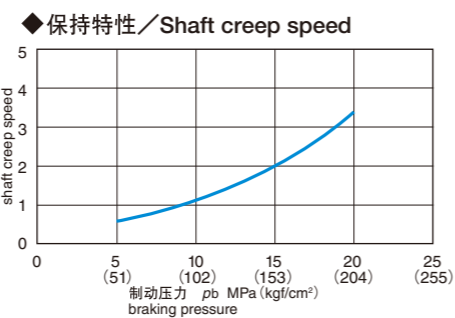
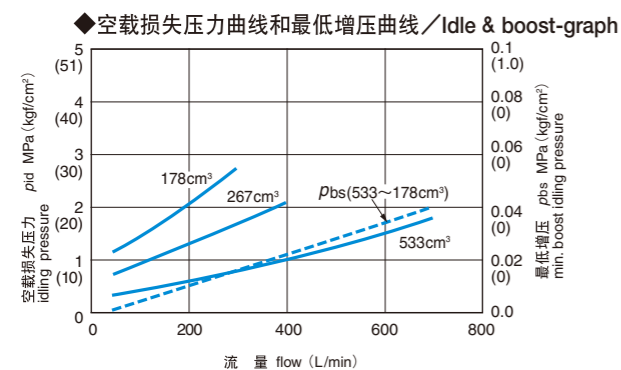
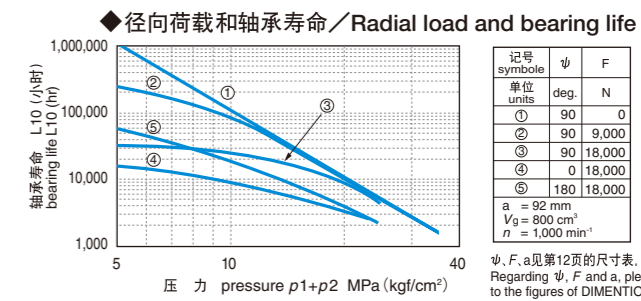
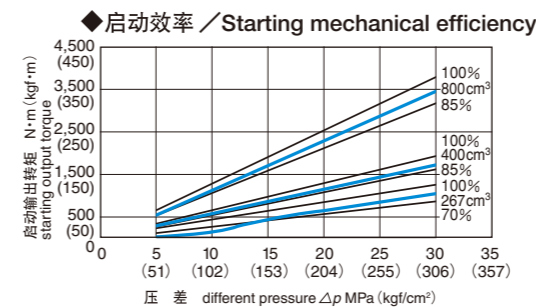
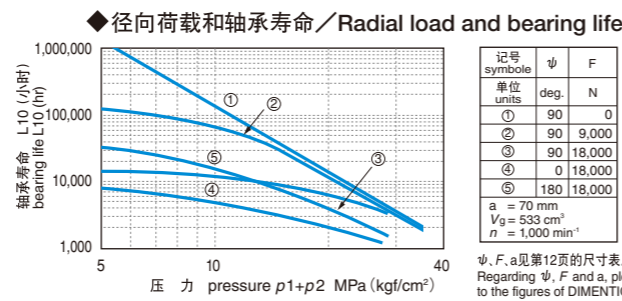
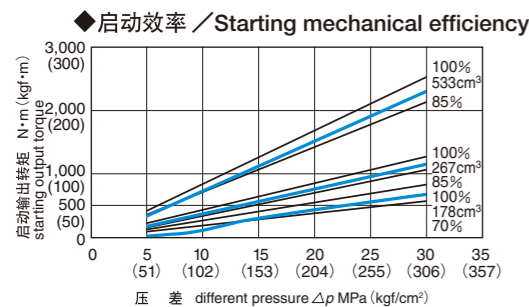
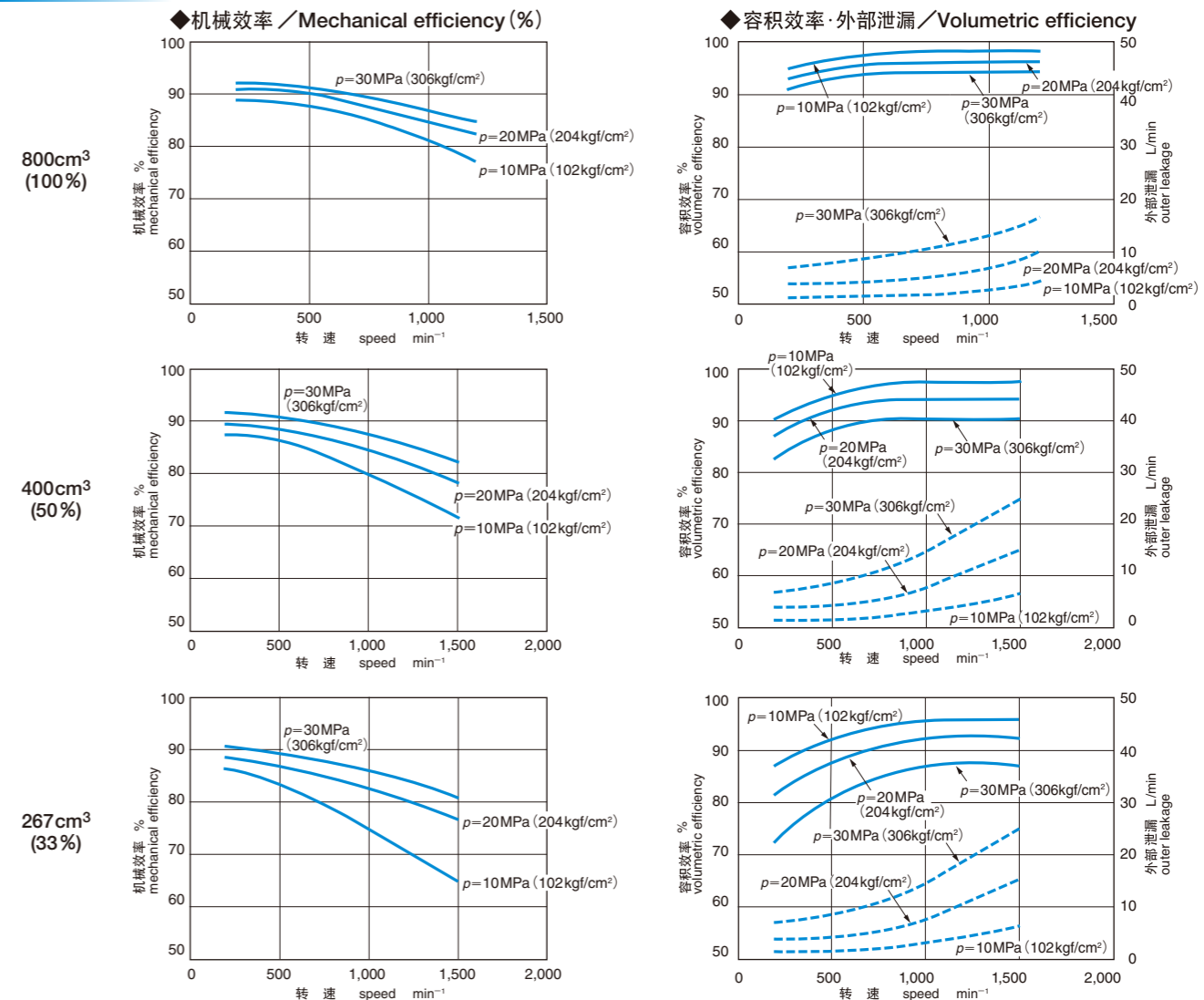
图中数值为平均值 而不是保证值  
The values given in the below figures are mean ones, and not guaranteed ones.

油温 / oil temperature: 50°C  
粘度 / oil viscosity: 32 mm<sup>2</sup>/s

M3B530



M3B800



# 调节器一览 / REGULATORS

## ◆先导控制 / Pilot Control

代码 code	控制型式 control type	控制线图 control curve	功能及特长	function & features
1	2位置负排量的切换 (液压控制) two position negative displacement shifts (pressure control type)		通过先导压力, 用负控制切换预先设定的2级排量。 需供入2.5~5.0MPa的先导压力。	Two prior set displacements are shifted negatively by varying pilot pressure. Hydraulic pressure from 2.5 to 5.0 MPa shall be provided as pilot pressure.
2	2位置负排量的切换 (电控制) two position negative displacement shifts (electrical control type)		用负控制切换预先设定的2级排量。 需供入2.5~5.0MPa的先导压力。	Two prior set displacements are shifted negatively by varying voltage. Hydraulic pressure from 2.5 to 5.0 MPa shall be provided as pilot pressure.
3	2位置间负排量的控制 two position negative displacement control		与输入电流成反比例, 能用负控制任意切换预先设定的2级排量之间的排量。 需供入4.0~5.0MPa的先导压力。 标准设定: ① 356mA (1.2 MPa), Vg,1 (100%) ② 644mA (3.5 MPa), Vg,2 (33%)	Displacement is determined between two prior set volumes in inverse proportion to electric current. Hydraulic pressure from 4.0 to 5.0 MPa shall be provided as pilot pressure. Standard set conditions: ① 356mA (1.2 MPa), Vg,1 (100%) ② 644mA (3.5 MPa), Vg,2 (33%)
4	3位置负排量的控制 three position negative displacement control		与输入电流成反比例, 能用负控制任意切换预先设定的3级排量之间的排量。 需供入4.0~5.0MPa的先导压力。 标准设定: ① 319mA (0.9 MPa), Vg,1 (100%) ② 393mA (1.5 MPa), Vg,x (50%) ③ 581mA (3.0 MPa), Vg,x (50%) ④ 626mA (3.4 MPa), Vg,2 (33%)	Displacement is determined among three prior set volumes in inverse proportion to electric current. Hydraulic pressure from 4.0 to 5.0 MPa shall be provided as pilot pressure. Standard set conditions: ① 319mA (0.9 MPa), Vg,1 (100%) ② 393mA (1.5 MPa), Vg,x (50%) ③ 581mA (3.0 MPa), Vg,x (50%) ④ 626mA (3.4 MPa), Vg,2 (33%)
5	2位置正排量的切换 (电控制) two position positive displacement shifts (electrical control type)		通过电压指令, 用正控制切换预先设定的2级排量。 需供入2.5~5.0MPa的先导压力。	Two prior set displacements are shifted positively by varying voltage. Hydraulic pressure from 2.5 to 5.0 MPa shall be provided as pilot pressure.
6	2位置正排量的控制 two position positive displacement control		与输入电流成正比例, 能用正控制任意切换预先设定的2级排量之间的排量。 需供入4.0~5.0MPa的先导压力。 标准设定: ① 100mA (3.5 MPa), Vg,2 (33%) ② 509mA (1.2 MPa), Vg,1 (100%)	Displacement is determined between two prior set volumes in proportion to electric current. Hydraulic pressure from 4.0 to 5.0 MPa shall be provided as pilot pressure. Standard set conditions: ① 100mA (3.5 MPa), Vg,2 (33%) ② 509mA (1.2 MPa), Vg,1 (100%)
7	2位置正排量的控制 three position positive displacement control		与输入电流成正比例, 能用正控制任意切换预先设定的3级排量之间的排量。 需供入4.0~5.0MPa的先导压力。 标准设定: ① 156mA (3.4 MPa), Vg,2 (33%) ② 244mA (3.0 MPa), Vg,x (50%) ③ 469mA (1.5 MPa), Vg,x (50%) ④ 539mA (0.9 MPa), Vg,1 (100%)	Displacement is determined among three prior set volumes in proportion to electric current. Hydraulic pressure from 4.0 to 5.0 MPa shall be provided as pilot pressure. Standard set conditions: ① 156mA (3.4 MPa), Vg,2 (33%) ② 244mA (3.0 MPa), Vg,x (50%) ③ 469mA (1.5 MPa), Vg,x (50%) ④ 539mA (0.9 MPa), Vg,1 (100%)

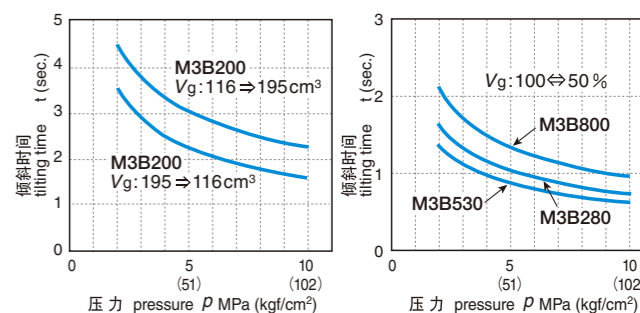
- (注1) M3B马达的调节器通过选择A或B接口的高压侧的压力进行动作。但, 因2Mpa以下不能控制故必须供入伺服压力油。另, 为缩短排量切换时间, 必须供入适当伺服压力(参照下图)
- (注2) M3B马达先导控制部负控制先导二次压力。代码No.2-4负排量的控制不用电磁换向阀或电磁比例减压阀, 可直接供给先导二次压力进行使用。
- (注3) 使用自动控制功能时必须用预先先导控制侧小排量指令。自动控制功能优先于先导控制功能。
- (注4) 代码No.b,c的自动控制, 选择A或B接口的高压侧的压力进行动作。作为任选功能也有用A、B接口的压差|p1-p2|持续(表示绝对值)动作的调节器。希望时请予以洽谈。

- (Note1) The regulator in M3B motor operates choosing the higher pressure port between A and B port. If the servo pressure does not hold more than 2 MPa, servo pressure must be provided. If you need to shorten the time of shifting displacement, proper servo pressure must be provided. (Refer to below fig.)
- (Note2) Pilot control section in M3B motor controls pilot second pressure negatively. Negative displacement control of Code No.2-4 may be conducted by providing pilot second pressure directly without using solenoid operated switching valve or solenoid operated proportional valve.
- (Note3) Small displacement instruction must be provided on the pilot control side before using automatic control operation. Automatic control operation precedes pilot control operation.
- (Note4) The automatic controller of Code No. b and c operates choosing the higher pressure port between A and B port. The regulator operated by the differential pressure |p1-p2| is also available as optional function and if necessity arises, please contact us.

## ◆自动控制 / Automatic Control

代码 code	控制型式 control type	控制线图 control curve	功能及特长	function & features
a	不带自动控制功能 without automatic control	—	—	—
b	顺序控制 sequence control		在小排量使用时, 当负载变大且达到所规定的压力时, 即会自动切换成大排量。然后, 直到下降到规定压力为止保持大排量。 标准设定: p2-1 = 25 MPa, p1-2 = 4.3 MPa	During small displacement operation, when the load increases and the pressure reaches to a certain point, the motor shifts into large displacement operation. Since then the motor maintains the large displacement operation until the pressure declines to a certain point. Standard set conditions: p2-1 = 25 MPa, p1-2 = 4.3 MPa
c	恒功率控制 constant horsepower control		为对应负载, 在达到规定压力后, 通过变化排量来实现。在以下压力为小排量、规定以上压力则为大排量。 标准设定: p2-1 = 25 MPa	Displacement varies in order to maintain the pressure in line with the load. The motor maintains small displacement operation until the pressure increases to a certain point, and then shifting into a large displacement operation. Standard set conditions: p2-1 = 25 MPa

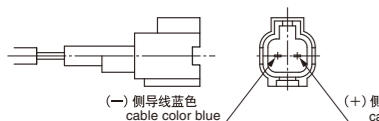
## ◆压力和倾斜时间 / Tilting time, pressure related



### 电磁换向阀规格 Solenoid operated switching valve specifications

最高使用压力 max. pressure	13.7MPa
额定电压 rated voltage	DC24V
额定消费电压 rated consuming electric power	≤17W (24V, 20°C)
标准连接器 standard connector	三菱电线 Z02M-GY (2P) Mitsubishi Cable Co.,

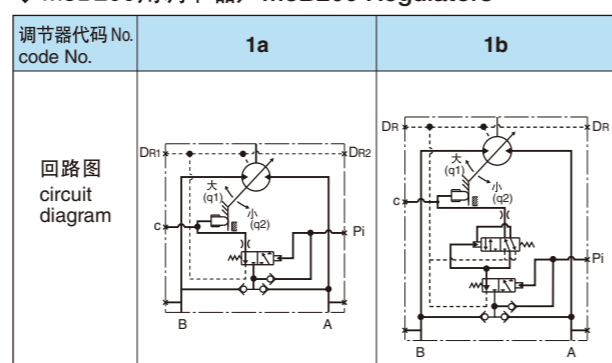
### ◆连接器形状 / connector shape



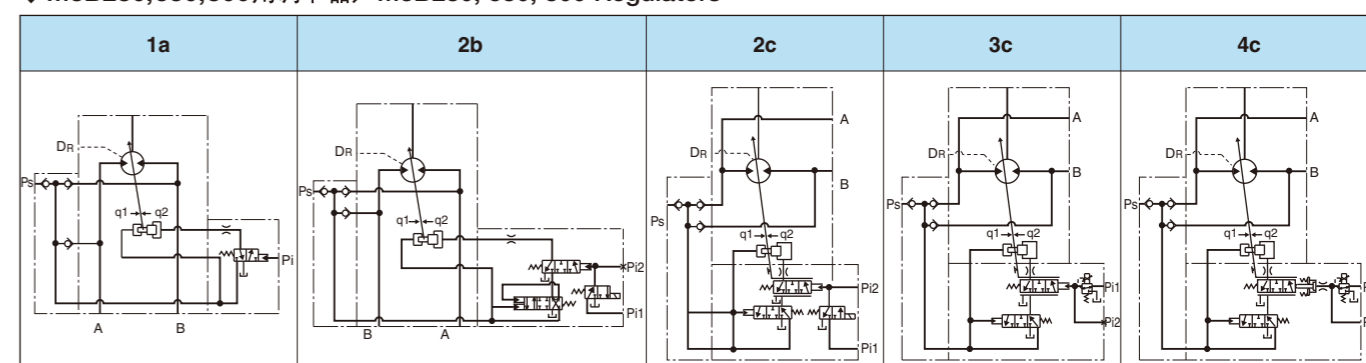
### 电磁比例减压阀规格 Solenoid operated proportional valve specifications

最高使用压力 max. pressure	13.7MPa (反比例为3.9MPa) (3.9MPa in case of inverse proportion)
额定电流 rated electric current	700mA
推荐高频振动 recommended dither power	80Hz/200mA <sub>p-p</sub>
线圈电阻值 coil resistance value	17.5Ω (20°C)
标准连接器 standard connector	三菱电线 Z02M-GY (2P) Mitsubishi Cable Co.,

## ◆M3B200用调节器 / M3B200 Regulators



## ◆M3B280,530,800用调节器 / M3B280, 530, 800 Regulators





● 马达控制用各种控制阀 / VARIOUS VALVES to CONTROL MOTORS

■ M3X, M3B系列马达备有可以直接安装在马达管道法兰盘上的各种控制控制阀。

■ Various control valves, attachable direct to flanges of M3X/M3B series, are available.

(注) 需根据马达与控制阀组合的情况, 变换连接板。

(Note) Some combinations of motors and valves need conversion plates.

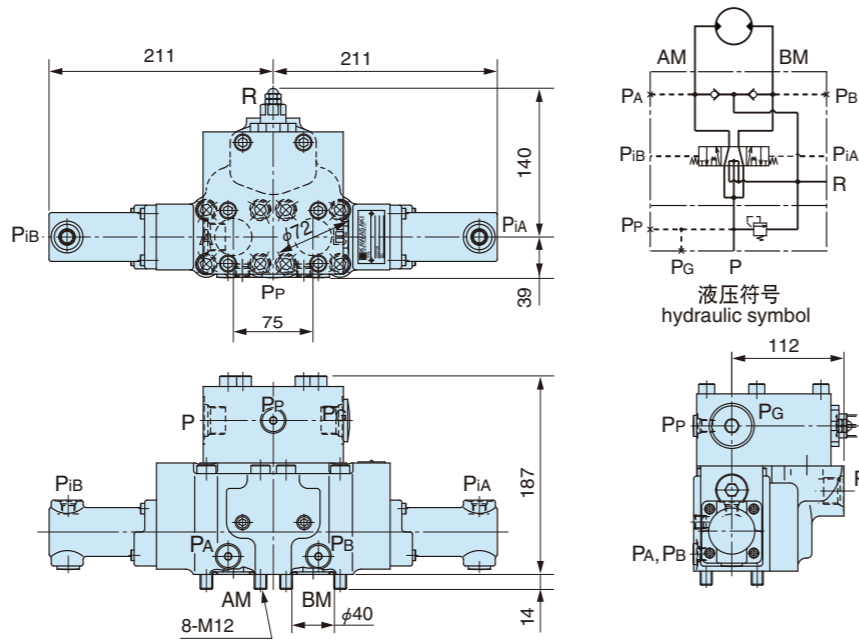
回转控制阀 / Swing control valve  
KSC

◆ KSC19  
中立自由式回转控制阀。  
Swing control valve of neutral free type.

阀规格 / Valve specifications

最高使用压力 max. pressure	30.9MPa (315kgf/cm <sup>2</sup> )
标准流量 rated flow	200 L/min
主溢流阀设定压力范围 set pressure range of main relief valve	14.7~30.9MPa (150~315kgf/cm <sup>2</sup> )
容许油箱背压 allowable back pressure	1.5MPa (15kgf/cm <sup>2</sup> )
先导压力 pilot pressure	0.29~2.51MPa (3~25.6kgf/cm <sup>2</sup> )

PA, PB, PIA, PB, PP: G1/4  
P, PG, R: G3/4



◆ KSC19L  
可切换中立自由和锁紧的回转控制阀。  
Swing control valve able to switch neutral free and lock.

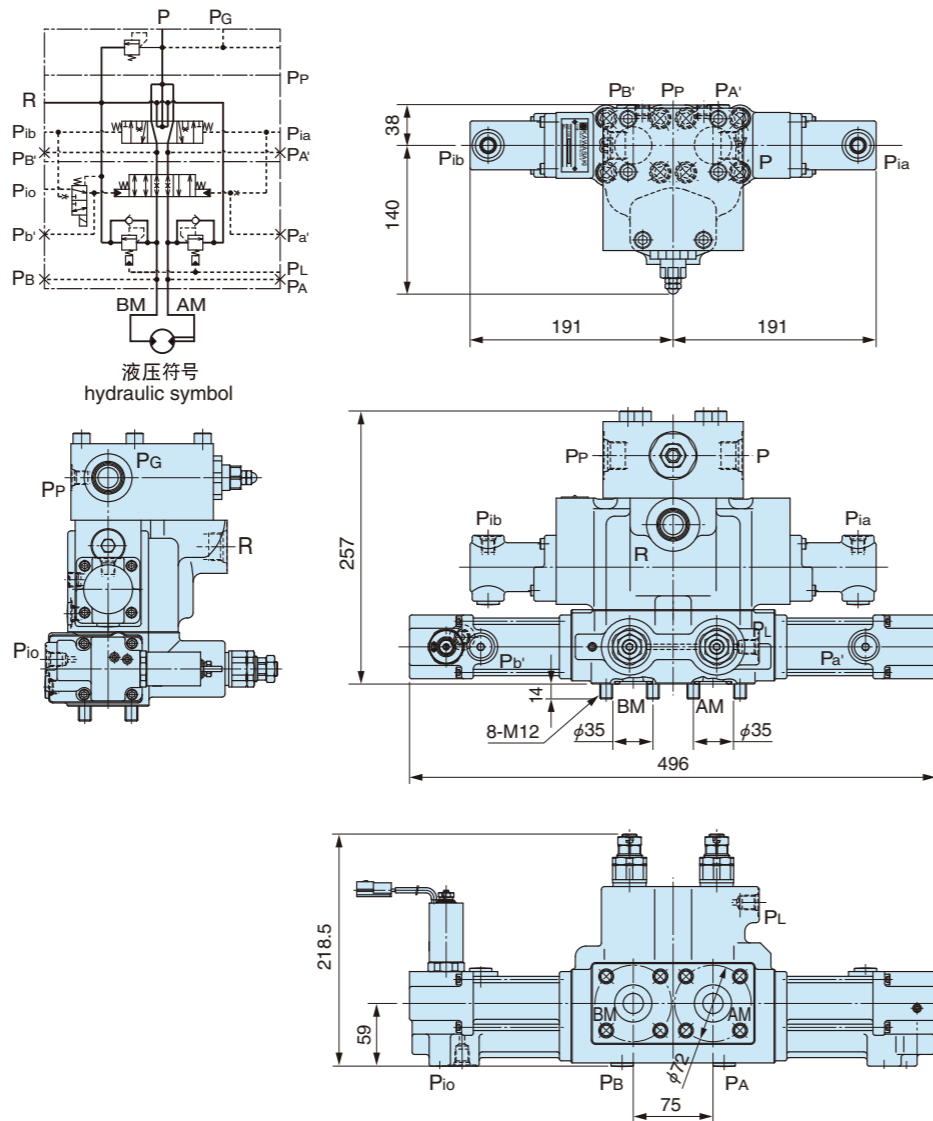
阀规格 / Valve specifications

最高使用压力 max. pressure	30.9MPa (315kgf/cm <sup>2</sup> )
标准流量 rated flow	200 L/min
主溢流阀设定压力范围 set pressure range of main relief valve	14.7~30.9MPa (150~315kgf/cm <sup>2</sup> )
容许油箱背压 allowable back pressure	1.5MPa (15kgf/cm <sup>2</sup> )
滑阀弹簧力 (自由) spool spring force (free)	0.5~1.6MPa (5~16kgf/cm <sup>2</sup> )
滑阀弹簧力 (锁紧) spool spring force (lock)	0.5~2.4MPa (5~16kgf/cm <sup>2</sup> )
接口溢流切换动作压力 switch operation pressure of port relief	2.5~4.9MPa (25~50kgf/cm <sup>2</sup> )
自由模式切换接口 (Pio) 压力 pressure for free mode switch port (Pio)	(Pio)max. + 2.9MPa (30kgf/cm <sup>2</sup> ) 以上

电磁阀部规格 / Solenoid valve specifications

最高使用压力 max. pressure	8.3MPa (85kgf/cm <sup>2</sup> )
泄漏量 leakage	36cc/min 以下 (at 28cst, 2.9MPa(30kgf/cm <sup>2</sup> ))
电磁线圈额定电压 solenoid rated voltage	DC24V
额定电压变动范围 voltage variation range	20.4~29V
带过电压限制器 with anti surge	

PA, PB, PA', PB', PA', PB', PIA, PIB, Pio, PP: G1/4  
P, PG, R: G3/4

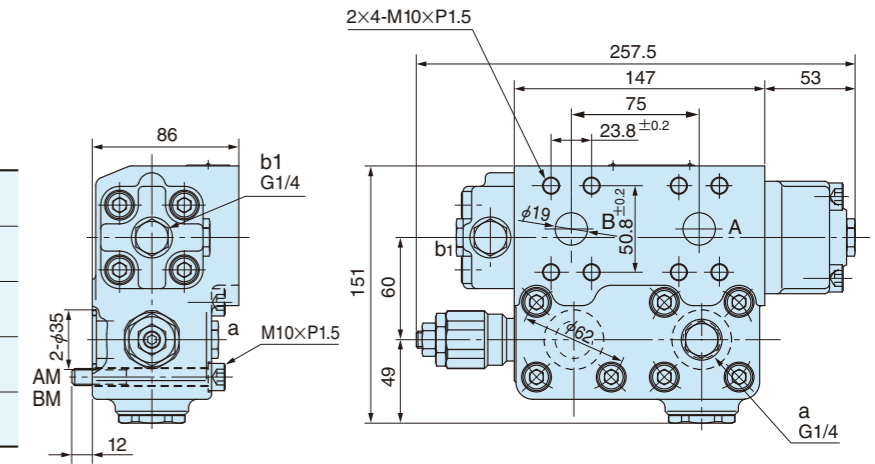


绞车用背压阀 / Counter balance valve for winch  
KDC

◆ KDC28MR  
适用马达: M3X/B 200  
Applicable to M3X/B 200

阀规格 / Valve specifications

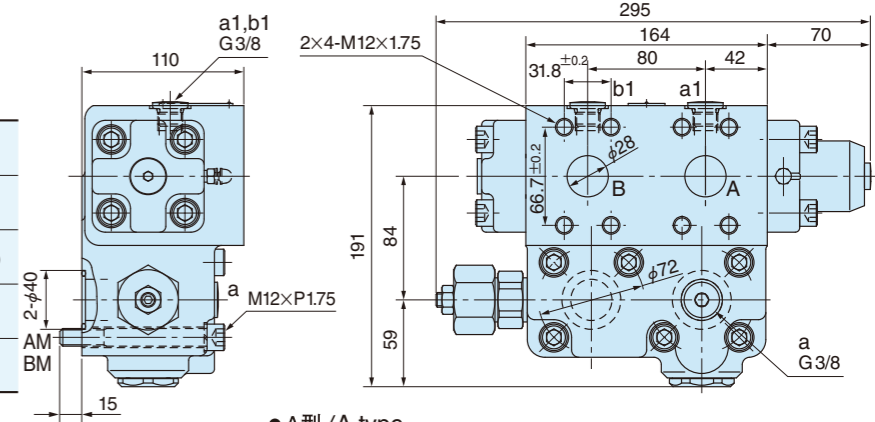
最高使用压力 max. pressure	34.3MPa (350kgf/cm <sup>2</sup> )
最大流量 max. flow	350 L/min
溢流阀设定压力 (30L/min时) set pressure of relief valve (at 30L/min)	14.7~30.9MPa (150~315kgf/cm <sup>2</sup> )
先导开启压力 cracking pressure of spool	0.7MPa (7kgf/cm <sup>2</sup> )
单向阀开启压力 cracking pressure of check valve	0.7MPa (7kgf/cm <sup>2</sup> )



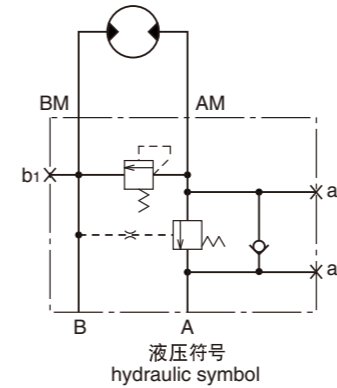
◆ KDC30MR  
适用马达: M3X/B 280, 530, 800  
Applicable to M3X/B 200, 530, 800

阀规格 / Valve specifications

最高使用压力 max. pressure	34.3MPa (350kgf/cm <sup>2</sup> )
最大流量 max. flow	500 L/min
溢流阀设定压力 (30L/min时) set pressure of relief valve (at 30L/min)	34.3MPa (350kgf/cm <sup>2</sup> )
先导开启压力 cracking pressure of spool	0.7MPa (7kgf/cm <sup>2</sup> )
单向阀开启压力 cracking pressure of check valve	0.03MPa (0.3kgf/cm <sup>2</sup> )



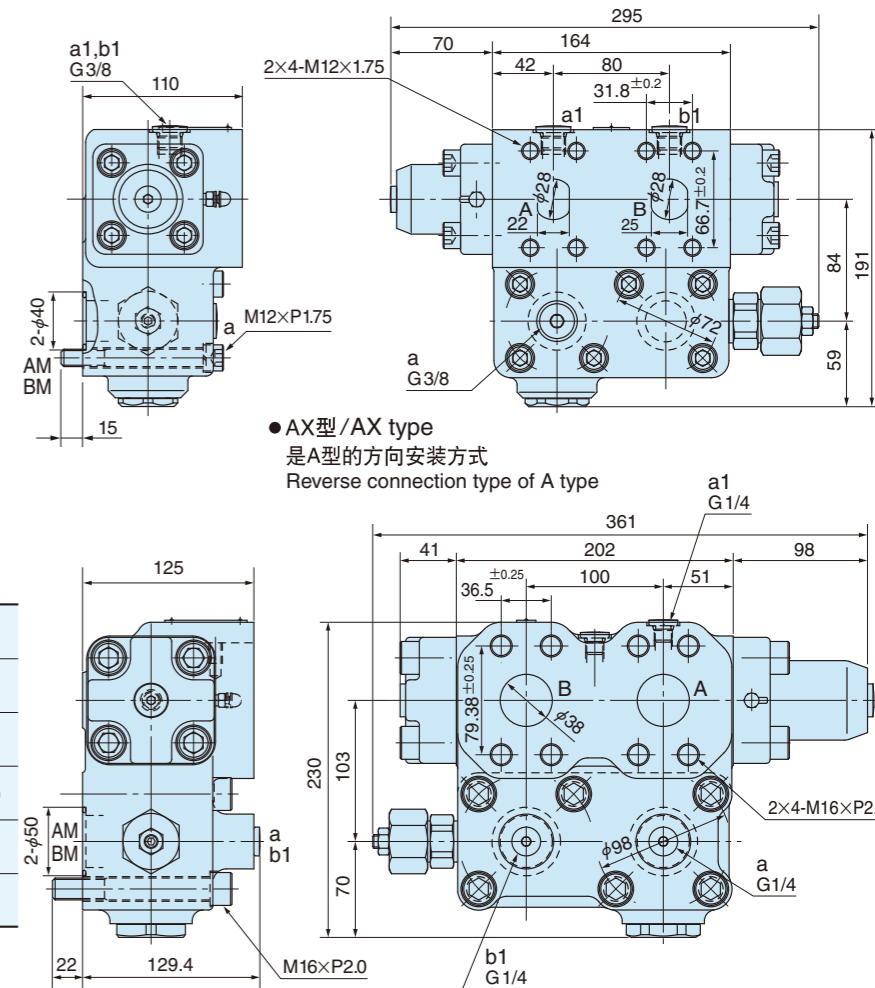
● A型 / A type



◆ KDC40MR  
适用马达: M3X/B 530, 800  
Applicable to M3X/B 530, 800

阀规格 / Valve specifications

最高使用压力 max. pressure	34.3MPa (350kgf/cm <sup>2</sup> )
最大流量 max. flow	780L/min
溢流阀最大流量 max. flow of relief valve	300L/min
溢流阀设定压力 (0.4~0.6L/min时) set pressure of relief valve (at 0.4~0.6L/min)	27.5MPa (280kgf/cm <sup>2</sup> )
先导开启压力 cracking pressure of spool	0.69MPa (7kgf/cm <sup>2</sup> )
单向阀开启压力 cracking pressure of check valve	0.03MPa (0.3kgf/cm <sup>2</sup> )



● AX型 / AX type  
是A型的方向安装方式  
Reverse connection type of A type

行走用背压阀/Counter balance valve for driving

**B**

内装有能够缓冲停止时冲击的无冲击溢流阀。另外，用阀自动解除马达的负制动。

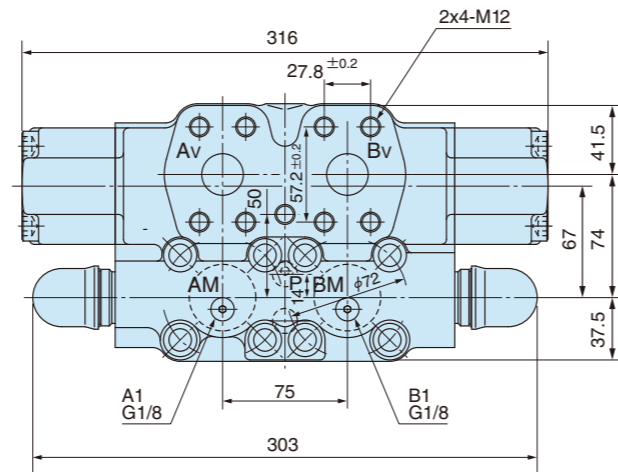
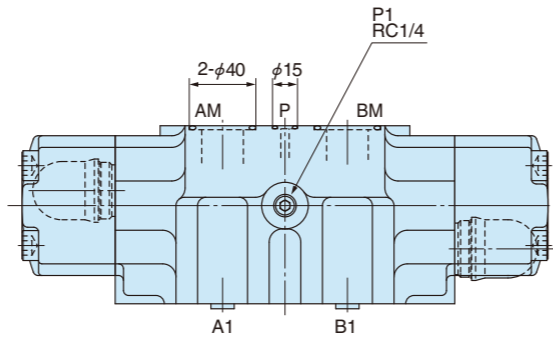
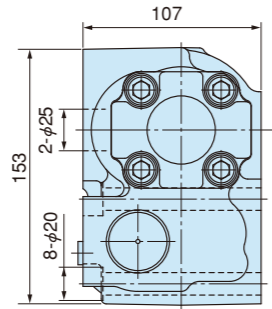
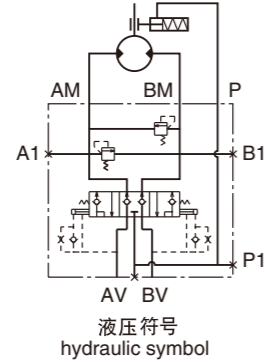
Built-in shock-less relief valve enables smooth deceleration. This valve also automatically releases negative break in motor.

◆B25C

适用马达:M3X/B 530, 800  
Applicable to M3X/B 530, 800

阀规格/Valve specifications

额定流量 rated flow	240 L/min
最大流量 max. flow	350 L/min
最高使用压力 max. pressure	30.9MPa (315kgf/cm <sup>2</sup> )
溢流阀设定压力 set pressure of relief valve	Ps=30.9MPa (315kgf/cm <sup>2</sup> )
滑阀切换压力 spool shifting pressure	开启压力 cracking:0.91MPa (9.3kgf/cm <sup>2</sup> ) 复位压力 reset:0.78MPa (8.0kgf/cm <sup>2</sup> )

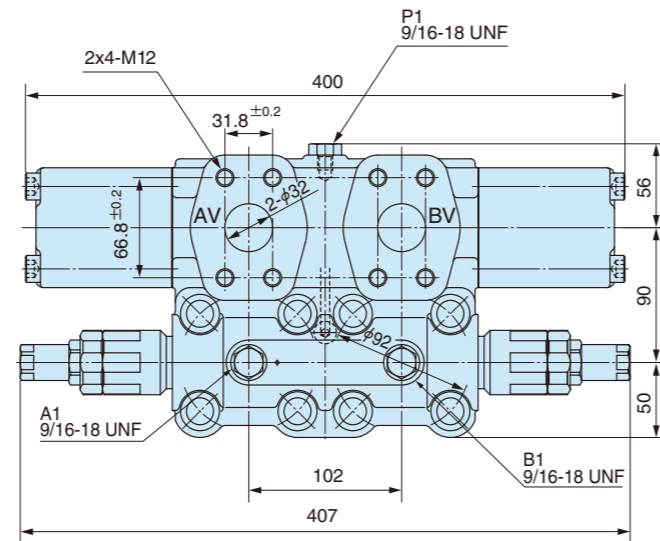
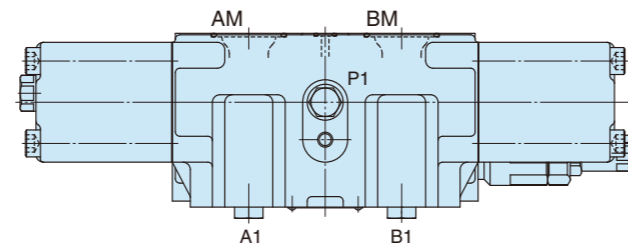
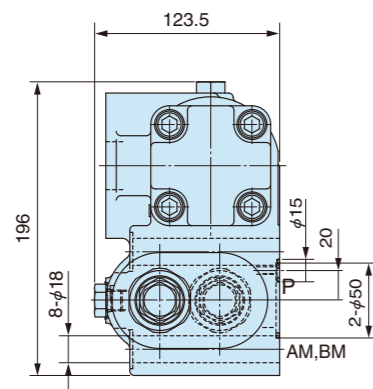


◆B35C

适用马达:M3X/B 530, 800  
Applicable to M3X/B 530, 800

阀规格/Valve specifications

额定流量 rated flow	380 L/min
最大流量 max. flow	500 L/min
最高使用压力 max. pressure	34.3MPa (350kgf/cm <sup>2</sup> )
溢流阀设定压力 set pressure of relief valve	Ps=36.3MPa (370kgf/cm <sup>2</sup> )
滑阀切换压力 spool shifting pressure	开启压力 cracking:0.78MPa (8.0kgf/cm <sup>2</sup> ) 复位压力 reset:0.69MPa (7.0kgf/cm <sup>2</sup> )



单向阀阀块/Check valve block

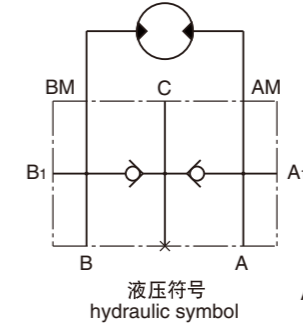
**VB**

为防止气蚀而使用。  
This valve prevents cavitation.

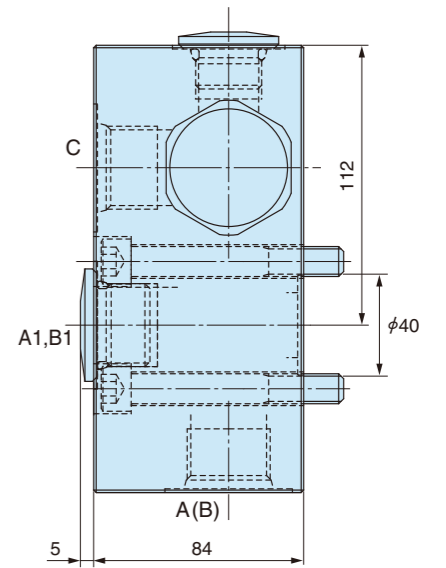
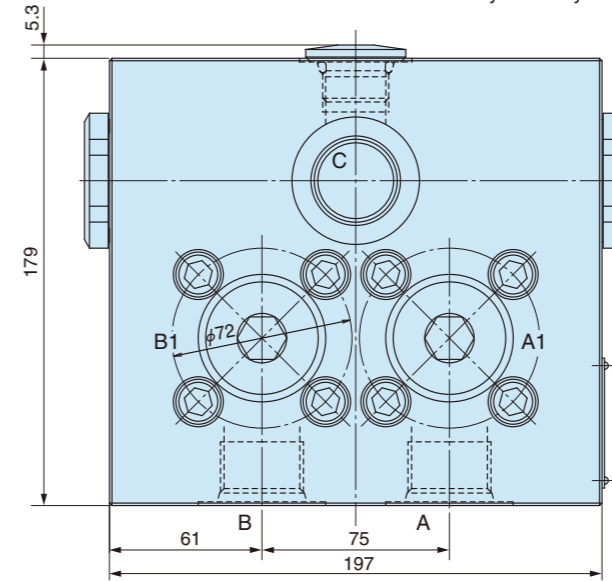
◆VBS-199

阀规格/Valve specifications

最高使用压力 max. pressure	34.3MPa (350kgf/cm <sup>2</sup> )
最大流量 max. flow	780 L/min
单向阀开启压力 cracking pressure of check valve	0.03MPa (0.3kgf/cm <sup>2</sup> )



A, B, A1, B1, C: G1





# 带减速机轴向柱塞马达

Axial Piston Motor with Reduction Gear

# M3X/M3B-RG Series

## 规格 / SPECIFICATIONS

型号 / model	M3X200-RG03S5.7	M3X280-RG06S6.4 M3B280-RG06S6.4	M3X530-RG10S5.7 M3B530-RG10S5.7	M3X800-RG16S6.4 M3B800-RG16S6.4
排量 / displacement	cm <sup>3</sup> 149	252	533	800
额定压力 / rated pressure	MPa (kgf/cm <sup>2</sup> ) 21.9 (223)	20.6 (210)	20.6 (210)	19.6 (199)
最高转速 / max. speed	min <sup>-1</sup> 270	190	150	130
最大流量 / max. flow	L/min 230	310	450	670
理论输出转矩 / theoretical output torque	N·m 2,930	5,280	9,870	16,000
减速比 / gear ratio	5.65	6.40	5.65	6.4
等效排量 / total displacement	cm <sup>3</sup> 840	1,610	3,010	5,120
容许径向负载 / allowable radial force	L 58,800	88,300	118,000	157,000
负载位置 / load point	mm 89	95	113	126
质量 / mass	kg 98	150	243	420

■ 额定压力·最高转速根据减速机的规格决定。请在减速机温度低于80℃的范围内使用。

■ 绞车马达的连续运转时间较短的用途时，可以超出表示的额定压力·最高转速予以使用。请就使用条件与本公司联系。

■ 作用轴端的径向负载W，请按照下列公式算出。

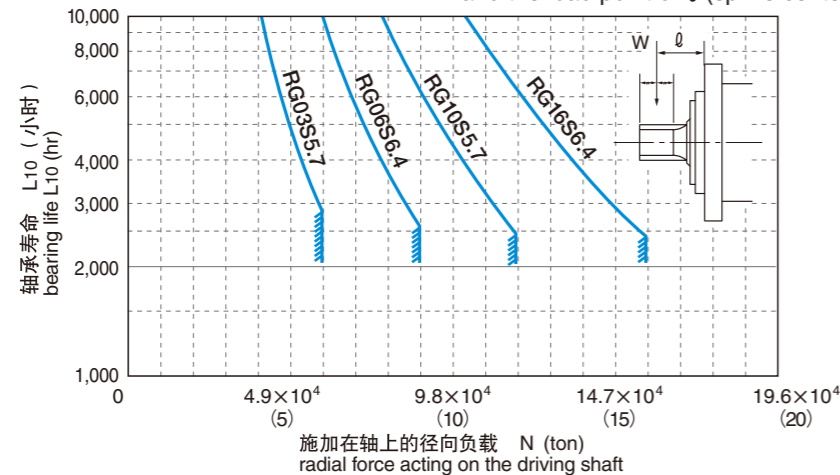
$$W = \frac{2 \times T \times 10^3 N}{m \times Z \times \cos \alpha}$$

T: 理论输出转矩 N·m  
m: 模数 mm  
Z: 齿数  
α: 压力角 deg.

■ 表内所示的容许径向负载，由安装法兰盘面到负载中心的距离决定。

## 轴承寿命 / BEARING LIFE

■ 本图所示为转速50min<sup>-1</sup>、负载作用点Q（花键有效齿宽的中央）时的数值。



(注1) 寿命与转速成反比例。  
(注2) Q的数值增大时，寿命即降低。

### 其他注意事项

(注1) 齿轮强度根据使用压力而变化。请向本公司询问。

(注2) 齿轮油请使用相当于API使用分类的GL-3或GL-4产品

■ Max. pressure and Max. speed are determined by RG specification. Please make sure the temperature of the RG shall not rise beyond 80℃.

■ If the motor is used for the short operating periods such as used as winch motor and so on, the operating conditions may be beyond the rate pressure or max. speed mentioned above. In this case please inform us of the specific operating conditions.

■ The theoretical radial force W acting on the driving shaft is calculated by the following formula.

$$W = \frac{2 \times T \times 10^3 N}{m \times Z \times \cos \alpha}$$

T: theoretical output torque N·m  
m: module mm  
Z: number of teeth  
α: standard pressure angle of cutter deg.

■ Allowable theoretical force shown in the table depends on the distance of load center from mount flange.

■ The life obtained in this graph is for the speed of 50 min<sup>-1</sup> and the load point of Q (spline center)

(Note 1) The bearing life is in inverse proportion to the speed.  
(Note 2) If Q is larger, the bearing life becomes shorter.

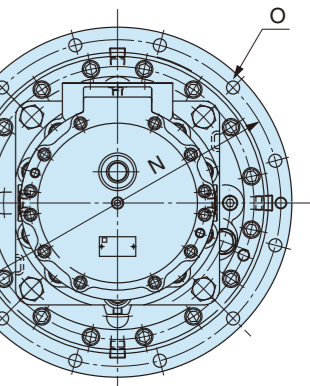
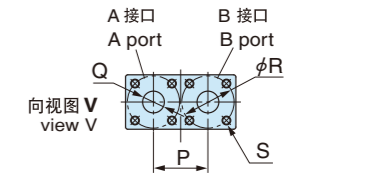
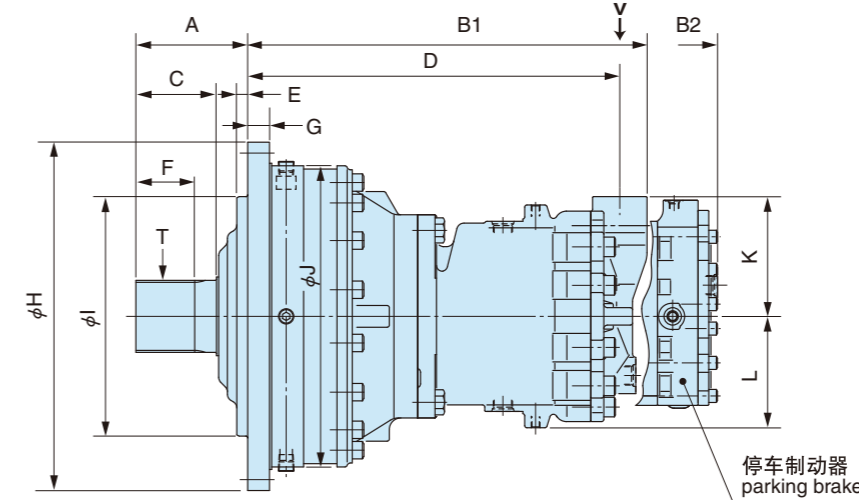
### Other caution

(Note 1) The life of the gears is influenced by the operating pressure. Please consult us, if necessary.

(Note 2) Use gear oil equivalent to GL-3 or GL-4 of API classification.

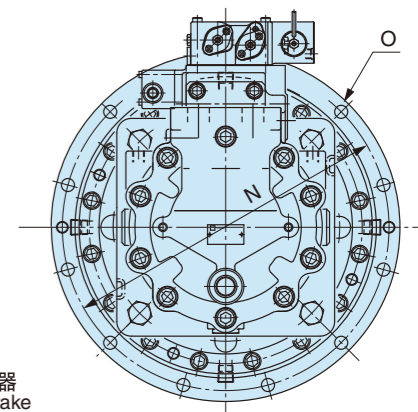
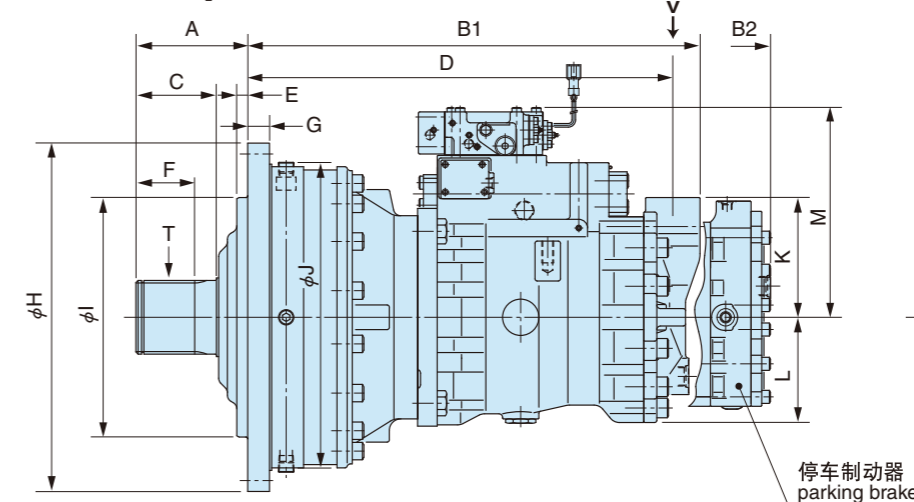
## 尺寸 / DIMENSIONS

[M3X\*\*\*\*-RG]



带停车制动器  
fit with parking brake

[M3B\*\*\*\*-RG]



不带停车制动器  
no parking brake

尺寸 / size	A	B1	B2	C	D	E	F	G	H	I	J	K	L	M	N
M3X200AP-RG03S5.7	119	443	—	85	405	13	60	22	360	260 f7	268	122	103	—	320
M3X280※P-RG06S6.4 M3B280※P-RG06S6.4	130	501 549	569 616	95	463 511	14	70	25	394	320 f7	318	130	117	— 255	360
M3X530※P-RG10S5.7 M3B530※P-RG10S5.7	154	550 623	550 720	111	513 586	15	81	30	480	330 f7	415	165	154	— 289	450
M3X800AP-RG16S6.4 M3X800BP-RG16S6.4	164	623	739	108	586 598	20	75	179	460	380 f7	460	178	169	—	424
M3B800AP-RG16S6.4 M3B800BP-RG16S6.4	201	655	771	141	618 630	15	114	32	570	390 f7	464	178	169	332	520

尺寸 / size	O	P	Q	R	S	T
M3X200AP-RG03S5.7	6-φ22 (6×60°)	75	25	72	2×4-M12×1.75	m=2.5, z=20 (JIS D2001)
M3X280※P-RG06S6.4 M3B280※P-RG06S6.4	10-φ22 (10×36°)	75	25	72	2×4-M12×1.75	m=2.5, z=20 (JIS D2001)
M3X530※P-RG10S5.7 M3B530※P-RG10S5.7	12-φ18 (12×30°)	75	30	72	2×4-M12×1.75	m=3.75, z=26 (JIS D2001)
M3X800AP-RG16S6.4 M3X800BP-RG16S6.4	16-φ20 (16×22.5°)	75 102	30 32	72 92	2×4-M12×1.75 2×4-M16×2	m=3.75, z=29 (JIS D2001)
M3B800AP-RG16S6.4 M3B800BP-RG16S6.4	12-φ22 (12×30°)	75	30	72	2×4-M12×1.75 2×4-M16×2	DP=6/12, z=26 (SAE)

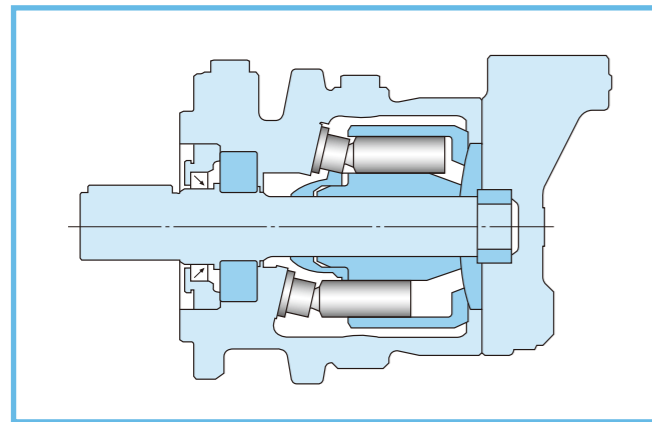
M3系列马达的法兰盘可以与本公司背压阀KDC30MR、制动阀B25C等直接连接。

Counter balance valve KDS30MR or brake valve B25C is directly attachable to M3 series motors.

# 斜盘式轴向柱塞马达

## Swash-Plate Type Axial Piston Motor

# K3X Series



K3X系列,与作为工程机械·一般产业机械用泵且有丰富实际业绩的K3V系列技术一道,是适用于一般产业机械用的新系列马达。

The K3X series are newly developed motors for industrial machinery.

The design is based on technology and experience of current K3V series for construction machinery or industrial machinery.

## ● 特长 / FEATURES

### 1. 高效率 and 可靠性

作为工程机械·一般工业用机械,通过使用具有丰富实际业绩的K3V泵的旋转机构,实现了优异的效率和可靠性。

### 2. 径向负载容许

在轴端能承受径向负载。但是,会降低轴承寿命。

### 3. 轴向上可以使用

备有为了使驱动轴朝上状态能使用的泄漏油接口。

## ● 型号标记 / ORDERING CODE

**K3X 112 S-1 0 0 M-D1**

K3X系列 / K3X series

排量规格 size: 63: 64cm<sup>3</sup> 90: 89cm<sup>3</sup> 80: 82cm<sup>3</sup> 112: 111cm<sup>3</sup>

输出规格、轴形状 power code, shaft code

- 0: 标准输出, 键轴 / standard type, key 标准 / standard
- 1: 标准输出, 渐开线花键轴 / standard type, involute spline
- 5: 高速规格, 键轴 / high power type, key
- 6: 高速规格, 渐开线花键轴 / high power type, involute spline

温度规格 oil temp. code

记号 marks	油温范围 oil temperature range	备注 remarks
V2	-20°C ≤ θ ≤ 90°C	全部密封材料为氟橡胶 all seal parts: fluoro-rubber
V1	-20°C ≤ θ ≤ 90°C	仅油封为氟橡胶 oil seal: fluoro-rubber
空白 blank	-20°C ≤ θ ≤ 90°C	
D1	-30°C ≤ θ ≤ 90°C	
D2	-45°C ≤ θ ≤ 80°C	

配油盖代码和旋转方向 (A接口高压, 从轴端看) valve cover code and direction of rotation (A port: high press., view from shaft end)

- 0: 分开式法兰盘, 顺时针方向旋转 / split flange and clockwise rotation 标准 / standard
- 1: 螺纹式法兰盘, 顺时针方向旋转 / thread flange and clockwise rotation
- 2: 分开式法兰盘, 逆时针方向旋转 / split flange and anti-clockwise rotation
- 3: 螺纹式法兰盘, 逆时针方向旋转 / thread flange and anti-clockwise rotation

## ● 尺寸 / DIMENSIONS

[M3X112S]

尺寸 / size	A	B	C	ΦD	E	F	G	H	I	J	ΦK	L	M	N	O	P	Q
K3X63	146.5	114.5	198	127	12.7	14	55.5	234	102	91	16	M10	66	23.8	50.8	66	SAE3/4", 1-1/16"-12UN-2B
K3X80/90/112	202.0	161.6	234	152.4	9.0	17	75.0	276	113	104	20	M12	75	27.8	57.2	70	SAE1", 1-5/16"-12UN-2B

## ● 规格 / SPECIFICATIONS

型号 / model	标准规格 standard type				高速规格 high speed type			
	K3X63	K3X80	K3X90	K3X112	K3X63	K3X80	K3X90	K3X112
排量 / displacement Vg cm <sup>3</sup>	64	82	89	111	64	82	89	111
压力 / pressure MPa (kgf/cm <sup>2</sup> )	额定 rated				31.4 (320)*1			
	最高 max.				34.3 (350)			
最高转速 / max. speed nmax min <sup>-1</sup>	2,400	2,200			3,000			3,000*2
最大流量 / max. flow L/min	154	181	200	244	192	247	268	333
额定转矩 / rated torque N·m	250	411	450	554	250	411	446	554
额定功率 / rated power kW	63	95	100	128	79	129	140	174
油箱内油量 / case volume L	0.3	0.5			0.3	0.5		
G D 2 值 / moment of inertia N·m <sup>2</sup>	0.3	0.6			0.3	0.6		
质量 / mass kg	23	40			23	40		

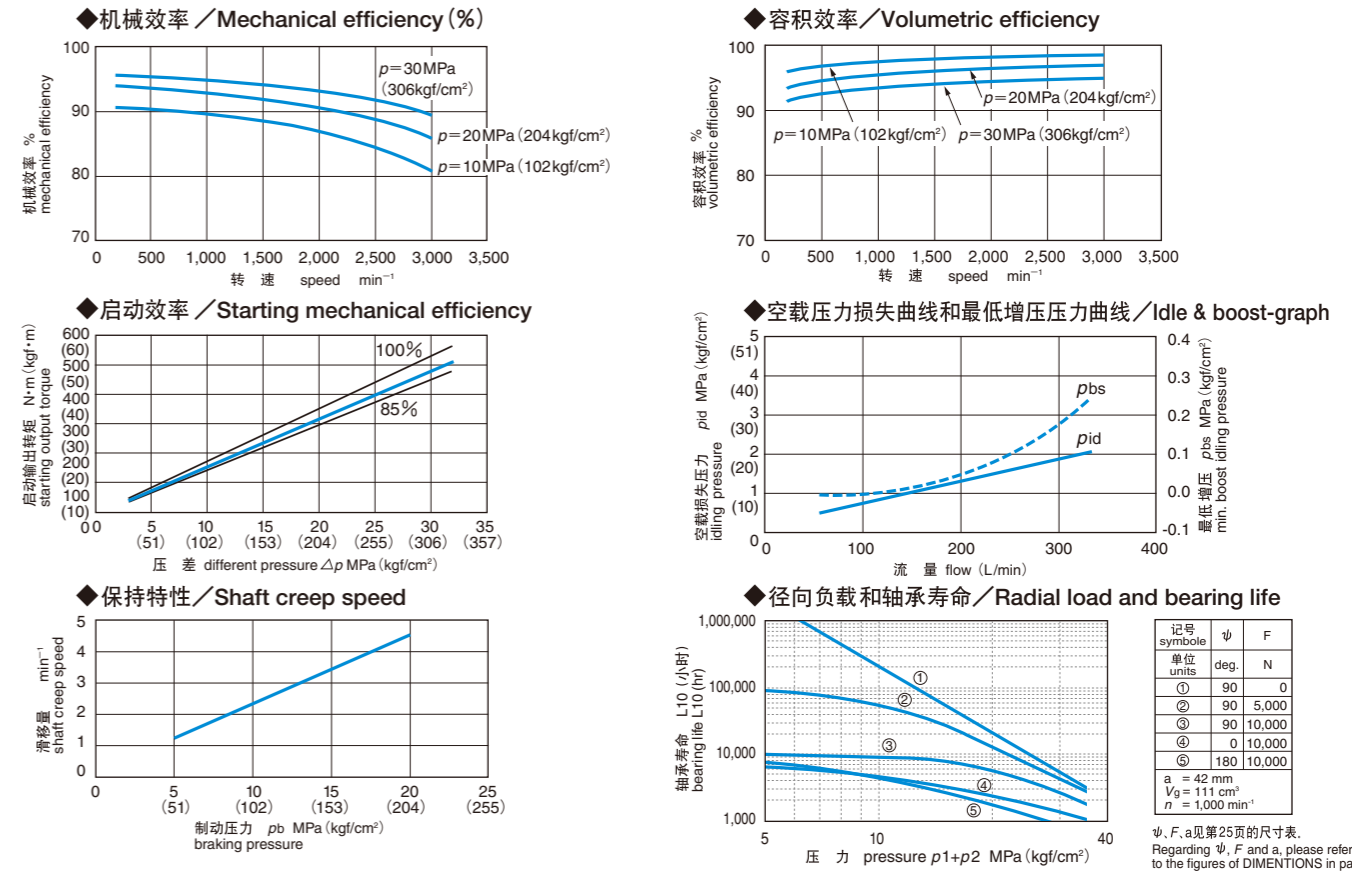
\*1 K3X63S的键轴规格时, 额定压力成为24.5MPa (250kgf/cm<sup>2</sup>), For K3X63S with key type shaft, rated pressure is 24.5 MPa (250 kgf/cm<sup>2</sup>).

\*2 以最高转速3,000min<sup>-1</sup>使用时, 额定压力成为25.1MPa (255kgf/cm<sup>2</sup>), 以额定压力31.4MPa (320kgf/cm<sup>2</sup>)使用时, 最高转速成为2,400min<sup>-1</sup>. In case that the motor is used at the max. speed of 3,000min<sup>-1</sup>, rated pressure is 25.1 MPa (255 kgf/cm<sup>2</sup>), and at the rated pressure of 31.4 MPa (320 kgf/cm<sup>2</sup>), max. speed is 2,400min<sup>-1</sup>.

## ● 性能 / PERFORMANCE CURVE

油温 / oil temperature: 50°C 粘度 / oil viscosity: 32mm<sup>2</sup>/s

[K3X112] 图中数值为平均值 而不是保证值 / The values given in the below figures are mean ones, and not guaranteed ones.



## ■ 轴承寿命 / Bearing life

本图表示转速 No = 1,000 min<sup>-1</sup> 时的计算寿命 (B10寿命)。任意转速 N 时的计算寿命用下列计算式求得。

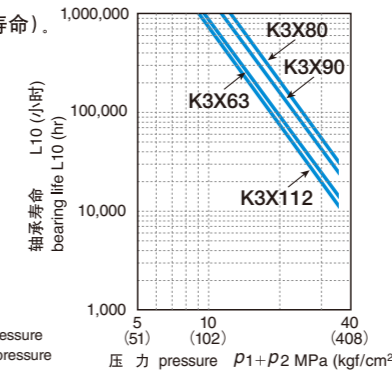
The calculated life (B10 life) shown in the graph is for speed No=1,000min<sup>-1</sup>. Calculation of life for a random speed N is follows.

$$L = \frac{N_0}{N} \times L_0 \quad \left( L_0: \text{对 } N_0 \text{ 的计算寿命} \right)$$

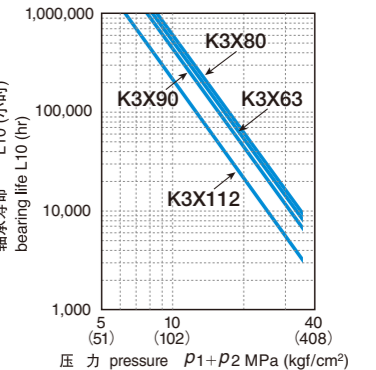
calculated life for No

(注 Note)  
P1: 入口压力 inlet pressure  
P2: 出口压力 outlet pressure

### ◆ 前轴承寿命 / Front bearing life



### ◆ 后轴承寿命 / Rear bearing life





## ■ 动作原理 / OPERATION PRINCIPLE

如右图所示, 高压油通过进口接口(a)流入缸体(2), 于是液压力作用到柱塞(4)上, 并在轴向产生F力。此力又通过滑靴(5)将矢量分解成与斜盘(7)呈垂直的F1力和与轴呈垂直的F2力。而该F2力则通过柱塞(5)被传递到缸体(4), 从而使输出轴产生旋转力偶。

在缸体(2)上均匀分布有9根柱塞(4), 通过高压油的进口接口(a)连通数根柱塞(5), 并依次连续地将旋转扭矩传递给输出轴。当油的进出口的方向相反时, 输出轴的旋转也相反。理论输出扭矩T(N·m)如下式。

$$T = \frac{\Delta p \times Vg}{6.28}$$

$T$ : 理论输出转矩 N·m  
 $\Delta p$ : 有效差压 MPa  
 $Vg$ : 转一圈所需流量 cm<sup>3</sup>

1 N·m = 0.10197 kgf·m

As shown in the right, the high pressure oil passes through the inlet port (a) and flows into the cylinder block (2). Hydraulic force thus acts upon the piston (4), generating an axial force F. This force F is vector-analyzed through the shoe (5) into force F1 which is perpendicular to the swash plate (7), and force F2 which is a vertical force with respect to the output shaft. The reaction force of force F2 is transmitted via the piston (5) to the cylinder block (4), generating a rotational force which turns the output shaft.

These are 9 equally spaced pistons in the cylinder block. The pistons connected to the high pressure inlet port transmit rotational torque sequentially to the output shaft.

Reversing the flow of operating oil causes the output shaft to rotate in reverse.

The theoretical output torque (T) is obtained by the following formula.

$$T = \frac{\Delta p \times Vg}{6.28}$$

$T$ : Theoretical output torque N·m  
 $\Delta p$ : Effective pressure difference MPa  
 $Vg$ : Displacement per revolution cm<sup>3</sup>

1 MPa = 10.197 kgf/cm<sup>2</sup>

## ■ 停车制动器 (可选) / PARKING BRAKE (Option)

本制动器为负式(即平时处于制动中, 当输入液压力油时便被解除)的多片湿式制动器。制动活塞室与马达的壳体内相通, 摩擦片(14)通过泄漏油冷却。

在摩擦片(14)上设有的内花键, 并与驱动轴(1)上被花键连接在一起的联轴器(11)的外花键嵌合。而分离片(13)上设有外花键并与配油盖(8)的内花键嵌合在一起。摩擦片(14)与分离片(13)呈交错状复数片地装入。制动活塞室(15)在没有供入压力油的状态时通过弹簧(3)将制动活塞(10)压向左方, 因摩擦片(14)与分离片(13)通过此压紧力使驱动轴不能旋转, 于是起到了制动作用。当从解除口供入的压力油能够克服弹簧的弹力的压力时, 制动活塞(10)返回右方, 于是摩擦片(14)与分离片(13)之间产生间隙, 这样驱动轴便能旋转了, 制动即解除。

This is a negative type, oil-lubricated, multi-disc parking brake. Friction plates are cooled and lubricated by the drain oil of the hydraulic motor. The braking operation is as follows.

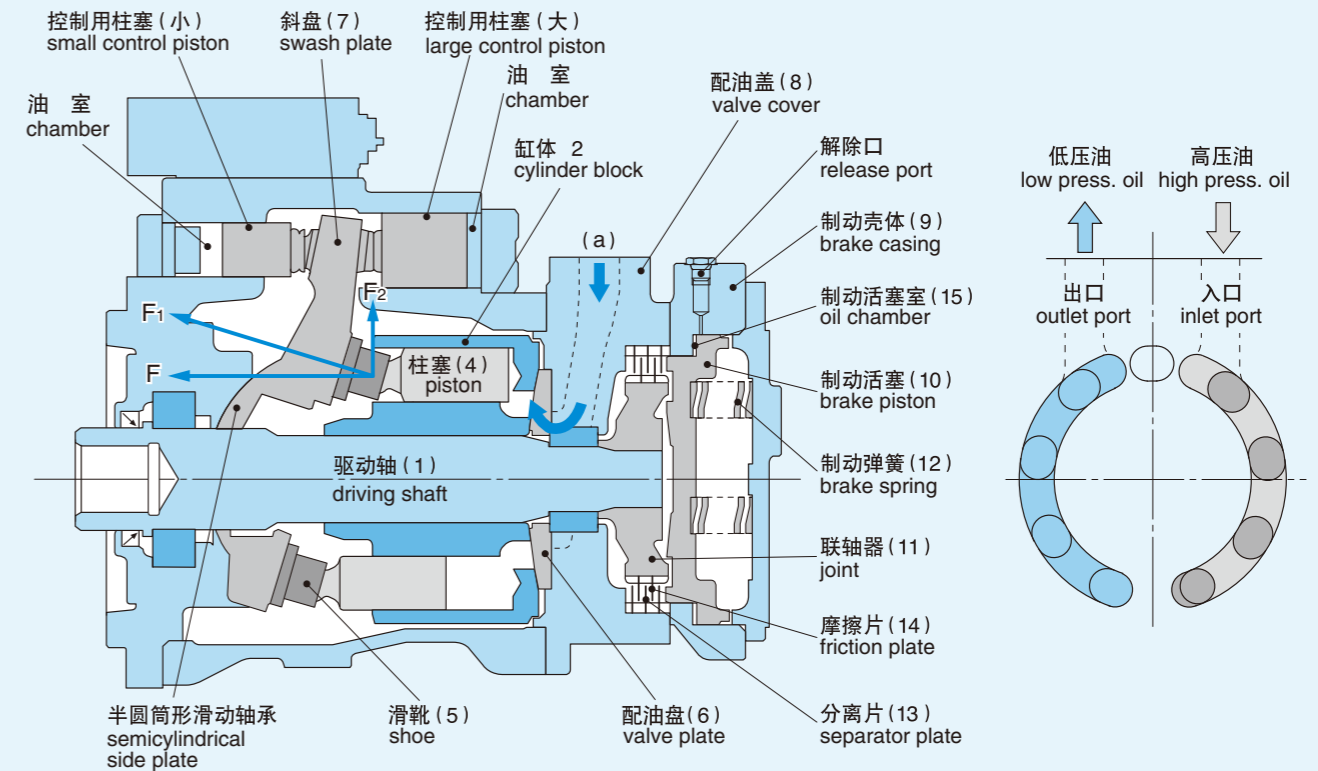
The friction plates (14) which are splined to the joint (11) and the separator plates (13) which are splined to the valve cover (8) are placed alternately. If not in operation, the brake piston (10) is pushed leftward by the springs (3) and the resultant friction force between the friction and the separator plates restricts the driving shaft to rotate. On the other hand, a release pressure larger than the spring force is applied to the oil chamber (15) through the release port, the brake piston (10) moves rightward and clearance is formed between the plates. So the brake is released and the driving shaft can rotate freely.

## ■ M3B马达的变量机构 / DISPLACEMENT CHANGING MECHANISM OF M3B SERIES

### ◆ M3B280, 530, 800

在斜盘的支撑机构上, 通过采用在斜盘两端侧配置大致为半圆筒状的滑动轴承支撑负载的方式。在斜盘两侧对向配置了2个控制倾斜角用的柱塞, 用控制流入此油室油的出入, 使斜盘的倾角改变进行变量。

The semi cylindrical slide plate, positioned at the both sides of the swash plate, supports the load, as a swash plate supporting mechanism. Two control pistons push swash plate opposite to each other. Displacement is changed by controlling the oil supply to the chambers to adjust the tilting angle of the swash plate.



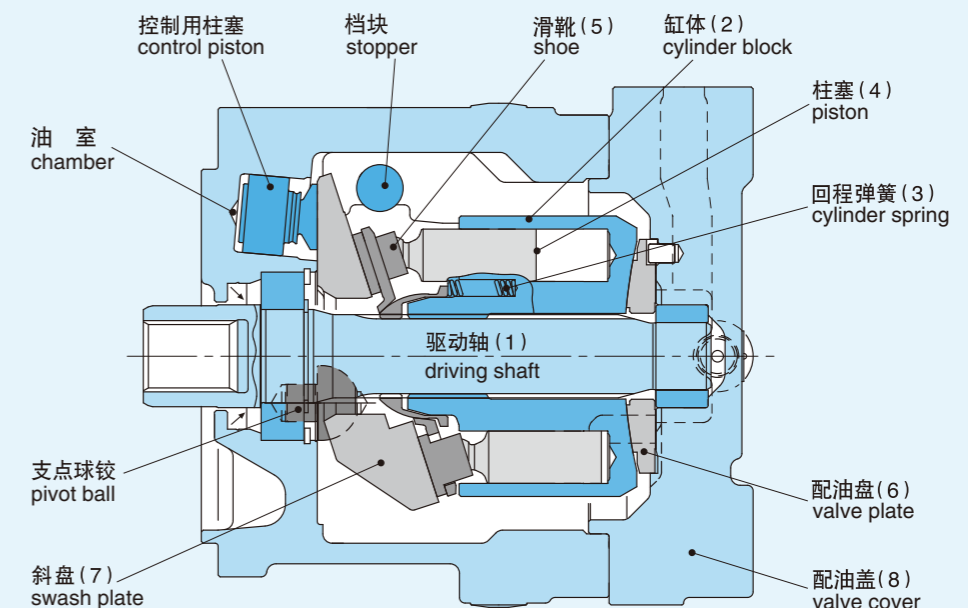
### ◆ M3B200

在斜盘的支撑机构上, 通过采用在斜盘两端侧配置大致为半圆筒状的支点球铰支撑负载的方式。

在斜盘上配置了1个控制倾斜角用的柱塞, 通过向油室供入压力油使斜盘的倾斜角变小。当不供压力油时, 通过柱塞合力和回程弹簧的弹力斜盘被推回, 此时倾角最大。

The semi spherical pivot ball, positioned at the both sides of the swash plate, supports the load, as a swash plate supporting mechanism.

The tilting angle of the swash plate diminishes by supplying the oil to the chamber of a control piston positioned at the swash plate. On the other hand, when oil is not supplied to the chamber, swash plate is retreated by the forces applied to the pistons and by the cylinder spring and the tilting angle becomes maximum.



# ■使用注意事项 / CAUTION FOR HANDLING



注意

## 1. 工作油和温度范围

- ① 工作油请使用抗磨性工作油。
- ② 工作油请在粘度:10~1,000mm<sup>2</sup>/s (cSt)、温度:-20~+90℃的范围内使用。
- ③ 使用磷酸酯类、水-乙二醇类、脂肪酯类等抗燃类工作油及生物油时,请事前与本公司予以洽谈。



注意

## 2. 滤油器

马达的寿命受污染的影响很大。油箱内的工作油请按NAS9级以内的洁净状态进行管理。另,请在各执行机构的回油回路上设置10μm的滤油器。



警告

## 3. 安装

- ① 马达的安装方向请参照下表。有关任选规格,请与本公司予以洽谈。
- ② 与被驱动物的定心请十分准确地进行。中心偏移请控制在0.05mm以下。

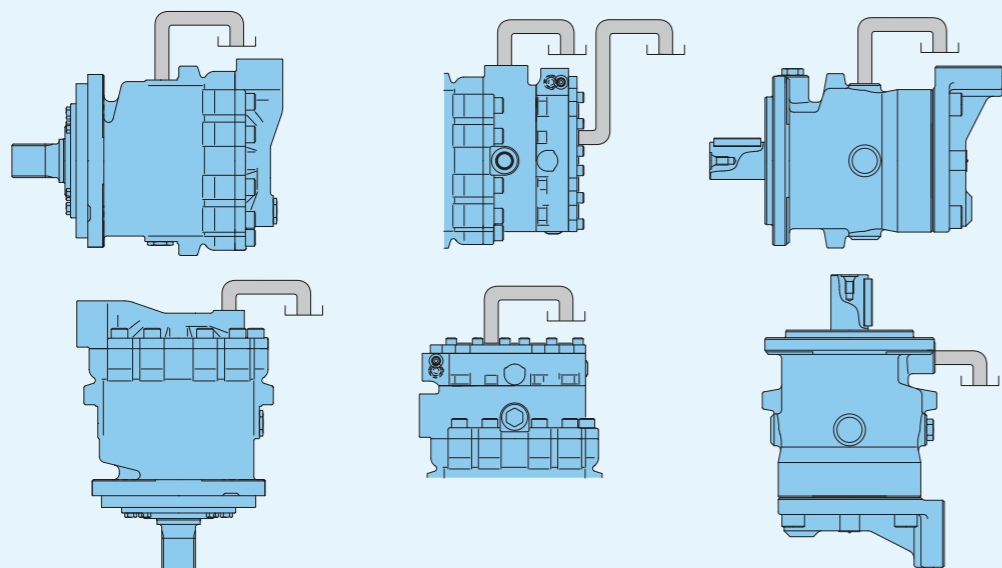
轴方向	M3X/M3B	M3X/M3B-RG	K3X
水平	标准	标准	标准
向下	任选	任选	任选
向上	—	—	标准



警告

## 4. 泄漏油的排管

- ① 马达泄漏油管道的排管如下图,请设置在能使马达壳体内充满油的位置。
- ② 泄漏油管道要使用比马达泄漏油接口尺寸还要粗大的管道,壳体内压请控制在常用0.2MPa (2kgf/cm<sup>2</sup>)以下,峰值时也不要超过0.6MPa (6kgf/cm<sup>2</sup>)的水平。



CAUTION

## 1. Operating fluid and temperature range

- ① Please use antiwear hydraulic fluid as operating fluid.
- ② The allowable ranges of operating fluid are as follows.  
Viscosity:10~1,000mm<sup>2</sup>/s(cSt)  
Temperature:-20~+80℃
- ③ In case of using special fluid (Phosphate ester compounds, water-glycol fluid, fatty acid ester compounds, etc.) please consult Kawasaki for instructions prior to use.



CAUTION

## 2. Filtration

For satisfactory service life of these motors application, the operating fluid should be controlled cleaner than the cleanliness level of NAS1638 Class9. Install a 10μm filter in the return circuit of respective actuators.



WARNING

## 3. Mounting

- ① Regarding the mounting direction, please refer to the below list. In case of the "Option" mentioned in the list, please consult Kawasaki.
- ② Alignment should be so carried out that the parallel error may be held within ±0.05mm.

Direction of the shaft	M3X/M3B	M3X/M3B-RG	K3X
Horizontal	Standard	Standard	Standard
Down ward	Option	Option	Option
Up ward	—	—	Standard



WARNING

## 4. Drain piping

- ① The motor's drain port, as shown in the following figure, should be so located that the casing can be filled with oil.
- ② Use a drain tube bigger in size than the motor's port. Keep the casing pressure normally below 0.2MPa (2kgf/cm<sup>2</sup>) and below 0.6MPa (6kgf/cm<sup>2</sup>) even at the peak.



警告

## 5. 油的灌满和排气

运转前,请务必从泄漏油口向马达壳体内加满油,另,请充分进行马达壳体内及液压回路中的排气工作。如没有工作油时,因润滑不良有可能造成内部的零部件发热而烧粘。油箱内油量如规格表所示。



警告

## 6. 停车制动器

制动器为停车专用,不能作为一般制动器使用。使用制动延迟阀等,在惯性体停止前,请不要使停车制动器动作。



警告

## 7. 轴向载荷

- ① 马达输出轴上能承受的径向载荷及轴承寿命的代表值请参照各型号的性能表。载荷点位置和载荷方向不同时,请向本公司询问。
- ② 马达输出轴上不能承受轴向载荷
- ③ 减速机输出轴可以承受径向载荷、轴向载荷。径向载荷和轴承寿命的关系请参照23页。



注意

## 8. 气蚀的防止

因负载使马达转动时,为了不发生气蚀,需要向吸入口施加增压压力。各型号的性能数据中的最低增压压力表示的是在稳定状态时的数值。流量有剧变时,需供入图示以上的增压压力,此点请注意。



注意

## 9. 高背压条件的使用

主接口的低压侧,请控制在2.5MPa (25kgf/cm<sup>2</sup>)以下。超过2.5MPa (25kgf/cm<sup>2</sup>)使用时,功能上会发生问题,请与本公司予以洽谈。



WARNING

## 5. Oil filling and air venting

Before operation, be sure to fill the casing with oil through the drain port. Vent all air out of the motor and hydraulic circuit prior to operation. The insufficient amount of oil may cause the lubrication failure, resulting in the seizure of internal parts. The volume of the oil is shown in the SPECIFICATIONS as case volume.



WARNING

## 6. Parking brake

This brake should be used only for parking, are not for dynamic braking. In case of driving inertial load, measures such as the adoption of the time delay valve should be taken to prevent the parking brake from being activated before the inertial mass stops.



WARNING

## 7. Radial and thrust load

- ① Bearing life against the radial load applied to the shaft is shown in the Performance curve for each motor type. If load point or load direction is different, please consult us.
- ② Do not apply thrust load to the shaft of these motors.
- ③ Radial and thrust load may be applied to the output shaft of the reduction gears. Please refer to P23 for the relations between the radial load and the bearing life.



CAUTION

## 8. Cavitation

When the motor is operating in an overrunning (pumping) mode, then to prevent the occurrence of cavitation, a positive boost pressure is required at the suction port. The minimum boost pressure requirement shown in the model performance data is based on the regular operation. In case of a rapid change of the flow volume, more boost pressure must be applied.



CAUTION

## 9. Back pressure

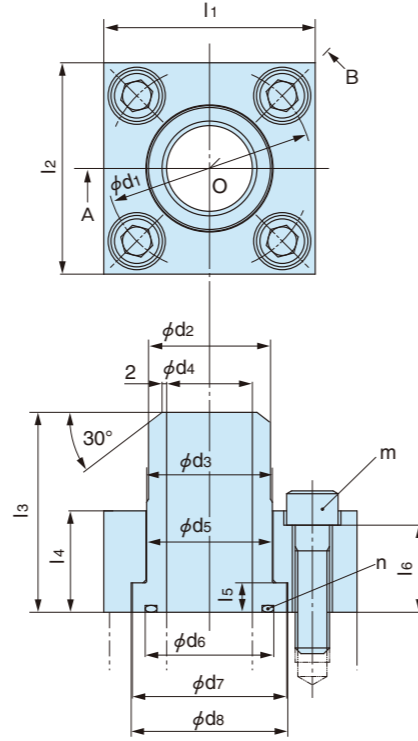
The lower of the two main motor ports pressures should always be less than 2.5MPa (25kgf/cm<sup>2</sup>). Pressure higher than this could cause a possible reduction in motor performance. In case of any doubt please consult us.



# 管道/PIPING

## ■ 管道尺寸/Piping size

型号 model	主接口 main port	泄漏油接口 drain port	先导接口·测量接口等 pilot port, gage port, etc.
M3X200	特殊 special	G3/8	
M3X280	特殊 special	G1/2	G1/4
M3X530	特殊 special	G3/4	G1/4
M3X800A	特殊 special	G3/4	G1/4
M3X800B	特殊 special	G3/4	G1/4
M3B200	特殊 special	G1/2	G1/4
M3B280	特殊 special	G1/2	G1/4
M3B530	特殊 special	G3/4	G1/4
M3B800A	特殊 special	G3/4	G1/4
M3B800B	特殊 special	G3/4	G1/4
K3X63	SAE 3/4"	SAE 1/2"	G1/4
K3X80,90,112	SAE 1"	SAE 1/2"	G1/4
KSC19	G3/4		
KSC19L	G3/4		
KDC28MR	SAE 3/4"		G1/4
KDC30MR	SAE 1-1/4"		G3/8
KDC40MR	SAE 1-1/2"		G1/4
B25C	SAE 1"		G1/8
B35C	SAE 1-1/4"		SAE 3/8"
FV30	SAE 1-1/4"		G1/4, G3/4
VBS-199	G1		G1



主接口用法兰盘  
Flange for main ports

## ■ 主接口用法兰盘/Flange for main ports

能够直接安装在马达主接口上的法兰盘。

These flanges are attachable directly to the main ports of motors.

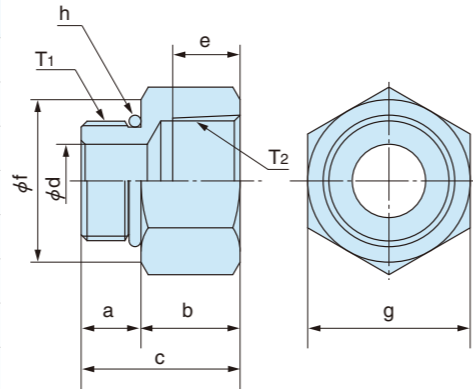
型号 model	l1	l2	l3	l4	l5	l6	d1	d2	d3	d4	d5	d6	d7	d8	m	n	本公司法兰盘副的产品编号(1台马达用) flange-sub KPM parts list (for one motor)
M3B200	64	64	60	30	8.8	25	62	34.0	35	22	35.5	35	44.5	45.2	2×4×M10-40	G30	3703580-1668
M3X200 M3X/B280	74	74	60	30	9.5	25	72	34.0	38	22	38.9	40	47.6	48.4	2×4×M12-45	G35	3703580-1669
M3X/B530 M3X/B800A	74	74	70	35	10.3	30	72	42.7	44	30	44.5	45	54.0	54.8	2×4×M12-45	G40	3703580-1670
M3X/B800B	94	94	70	35	10.3	30	92	42.7	44	30	44.5	45	54.0	54.8	2×4×M16-50	G40	3703580-1671

## ■ 带O形密封圈内螺纹管接头/O-ring type thread connector

将马达的泄漏油接口、先导接口、附属阀的管道接口等转换成PT螺纹管接头。

These connectors are used to convert the drain ports, pilot ports, attached valves' piping ports, etc. into PT screws.

尺寸 size	T1	T2	a	b	c	d	e	f	g	h	本公司带密封圈内螺纹管接头的产品编号(带O形密封圈) connector KPM parts list (with o-ring)
JIS 1/4"	G1/4	RC1/4	12	17	29	5	11	19	19	P11	PSTB 1124-6
JIS 3/8"	G3/8	RC3/8	12	19	31	8	12	22	22	P14	PSTB 1124-9
JIS 1/2"	G1/2	RC1/2	16	22	38	10	15	27	27	P18	PSTB 1124-12
JIS 3/4"	G3/4	RC3/4	17	25	42	16	17	36	36	P24	PSTB 1124-19
JIS 1"	G1	RC1	21	27	48	22	19	41	41	P29	PSTB 1124-25
SAE 3/8"	9/16-18UNF	RC3/8	9.9	19	28.9	7.0	12	17.4	22	906 <sup>(*)</sup>	PSTB 4043-6
SAE 1/2"	3/4-16UNF	RC1/2	11.1	22	33.1	10.0	15	22.2	26	908 <sup>(*)</sup>	PSTB 4043-8
SAE 3/4"	1-1/16-12UN	RC3/4	15.0	25	40.0	15.5	17	31.7	35	912 <sup>(*)</sup>	PSTB 4043-12
SAE 1"	1-5/16-12UN	RC1	15.0	27	42.0	22.0	19	38.0	41	916 <sup>(*)</sup>	PSTB 4043-16



(\*) SAE AS 586

## ■ 主接口SAE转换用油路连接板/Manifold for conversion into SAE flange

将马达的主接口转换成SAE法兰盘用的油路连接板。

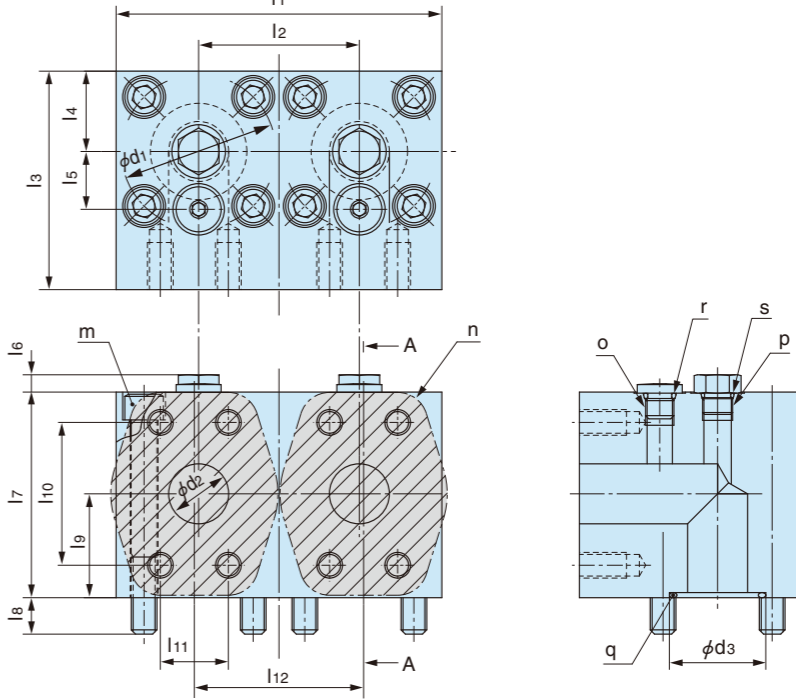
These manifolds are used to convert motor main ports into SAE flanges.

型号 model	l1	l2	l3	l4	l5	l6	l7	l8	l9	l10	l11	l12	d1	d2	d3	m	n	o	p	q	r	s	本公司法兰盘副的产品编号(1台马达用) plate-sub KPM parts list (for one motor)
M3B200	150	75	100	37.5	27	9	82	14	41.0	57.2	27.8	75	62	25	35	2×4×M10-85	1 <sup>(*)</sup>	G1/4	9/16-18UNF <sup>(*)</sup>	G30	P11	906 <sup>(*)</sup>	3724750-0615
M3X200 M3X/B280	150	75	102	37.5	27	9	82	16	41.0	57.2	27.8	75	72	25	35	2×4×M12-85	1 <sup>(*)</sup>	G1/4	9/16-18UNF <sup>(*)</sup>	G30	P11	906 <sup>(*)</sup>	3724750-0616
M3X/B530 M3X/B800A	152	75	102	37.5	27	9	96	17	48.5	66.7	31.8	79	72	28	45	2×4×M12-100	1-1/4 <sup>(*)</sup>	G1/4	9/16-18UNF <sup>(*)</sup>	G40	P11	906 <sup>(*)</sup>	3724750-0617
M3X/B800B	202	102	120	50.0	27	9	96	21	48.5	66.7	31.8	102	92	30	45	2×4×M16-100	1-1/4 <sup>(*)</sup>	G1/4	9/16-18UNF <sup>(*)</sup>	G40	P11	906 <sup>(*)</sup>	3724750-0618

(\*)1 SAE high pressure series flange 6000 psi/metric screw

(\*)2 SAE 3/8"

(\*)3 SAE AS 586



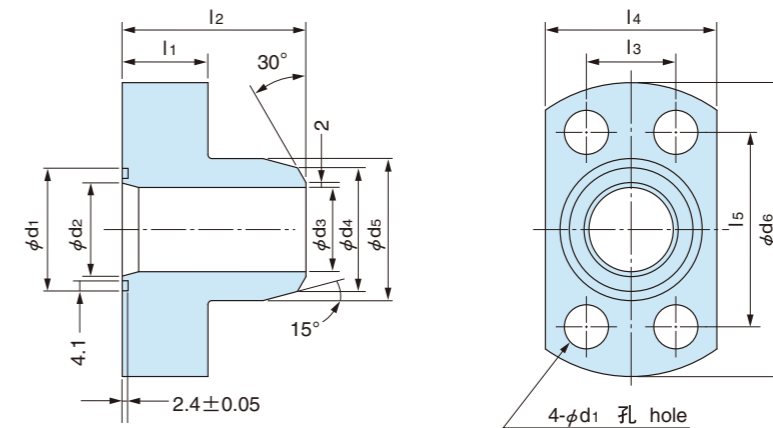
## ■ 主接口用法兰盘(SAE规格)/Flange for main ports (SAE standard)

是SAE规格的管道法兰盘。M3系列马达需用SAE转换油路连接板。

These flanges are based on SAE standard. SAE conversion manifolds are necessary for M3 series.

法兰盘尺寸 flange size	l1	l2	l3	l4	l5	d1	d2	d3	d4	d5	d6	d7	m	n	o	本公司法兰盘副的产品编号(1台马达用) flange-sub KPM parts list (for one motor)
3/4" (*)1	20	50	24	48	51	30	19	16.2	27.2	36	74	11	3/4"	4×M10-35	G25	3703580-1804
1" (*)1	25	55	27.8	54	57.2	40	26	21.2	34.0	43	82	11	1"	4×M10-40	G35	3703580-1805
1-1/4" (*)1	30	65	31.8	61	66.7	45	32	29.9	42.7	50	96	14	1-1/4"	4×M12-45	G40	3703580-1806
1-1/2" (*)1	35	75	36.5	70	79.4	50	38	34.4	48.6	58	115	18	1-1/2"	4×M16-55	G45	3703580-1807

(\*)1 SAE high pressure series flange (6000 psi)



川崎斜盘式轴向柱塞马达  
询问用规格表

文件号码

顾客：\_\_\_\_\_ 主机型号：\_\_\_\_\_ 日期：\_\_\_\_\_ 外形尺寸图纸号码  
用途：\_\_\_\_\_ 马达型号：\_\_\_\_\_

项 目	单 位	所 需 规 格	元 件 规 格	判 定	备 注
排 量	cm <sup>3</sup>				
减速机	—	要・不要			
等效排量(需要减速机时)	cm <sup>3</sup>				
压 力					
额定	MPa(kgf/cm <sup>2</sup> )				
最高	MPa(kgf/cm <sup>2</sup> )				
流 量					
额定	L/min				
最大	L/min				
实际输出转矩	N·m(kgf-m)				
最高转速	min <sup>-1</sup>				
输出轴径向负载和负载点	N(kgf), mm				法兰盘
停车制动器	—	要・不要			
制动力矩	N·m(kgf-m)				
供入的解除压力					
额 定	MPa(kgf/cm <sup>2</sup> )				
最 高	MPa(kgf/cm <sup>2</sup> )				
所需轴承寿命	小时				
at $V_g =$ cm <sup>3</sup> , $p =$ MPa, $n =$ min <sup>-1</sup> , 其他					
工作油:ISO等级·牌号	—				
使用油温范围	°C				
使用工作油粘度	mm <sup>2</sup> /S(cSt)				

项 目	使用条件和负载周期及其他(请尽可能详细记述)
■附属阀·调节器的规格	
■其他需要规格	

【备忘录】

	时 期	数 量
试制		
批量生产		

	营 业 部	技 术 部
<b>株式会社川崎精機</b>		

本规格表流程



KAWASAKI SWASH-PLATE TYPE AXIAL PISTON MOTOR SERIES  
SPECIFICATION STUDIES.

No.

Customer : \_\_\_\_\_ Machine Model : \_\_\_\_\_ Date : \_\_\_\_\_  
Application : \_\_\_\_\_ Motor Model : \_\_\_\_\_ Installation DWG. No.

ITEMS	UNITS	REQUIREMENTS	PRODUCT SPECIFICATION	JUDGMENT	REMARKS
Displacement	cm <sup>3</sup>				
Reduction Gear	—	Necessary・Unnecessary			
Total Displacement (if Necessary)	cm <sup>3</sup>				
Pressure					
Rated	MPa (kgf/cm <sup>2</sup> )				
Max.	MPa (kgf/cm <sup>2</sup> )				
Flow					
Rated	L/min				
Max.	L/min				
Actual Output Torque	N·m (kgf-m)				
Max. Speed	min <sup>-1</sup>				
Radial Load and Load Point	N (kgf), mm				from Flange
Parking Brake	—	Necessary・Unnecessary			
Brake Torque	N·m (kgf-m)				
Release Pressure					
Rated	MPa (kgf/cm <sup>2</sup> )				
Max.	MPa (kgf/cm <sup>2</sup> )				
Required Bearing Life	hours				
at $V_g =$ cm <sup>3</sup> , $p =$ MPa, $n =$ min <sup>-1</sup> , etc.					
Hydraulic Fluid ISO Grade, Brand	—				
Oil Temperature Range	°C				
Oil Viscosity Range	mm <sup>2</sup> /S (cSt)				

ITEM	USE CONDITION, DUTY CYCLE etc. (DESCRIBE in DETAIL)
■ Optional Valve and Regulator Requirements	
■ Other Requirements	

【Note】

	DATE	QUANTITY
Sample		
Mass Production		

	Sales Department	Machinery Engineering Dept
<i>Kawasaki Precision Machinery Ltd.</i>		

Flow of this specification sheet

