



普林斯液压  
BLINCE HYDRAULIC

## A2F定量泵 / 马达 Fixed Displacement Pump/Motor A2F

RC90100/10.2015

用于开式和闭式回路

斜轴式轴向柱塞结构

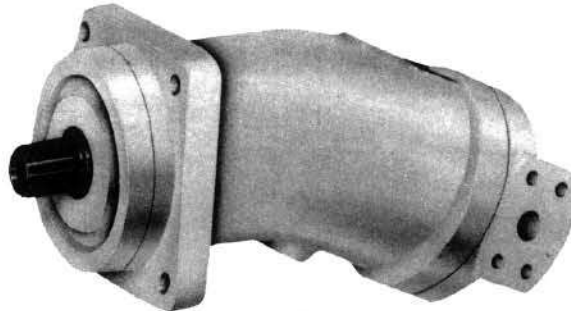
For open and closed circuits

axial tapered piston, bent axis design

规格 Size 10-500

高压范围 Peak pressure 至 up to 35MPa

替代: Replace RC90100/10.2015



### 说明:

- 弯轴结构的轴向柱塞元件，具有固定排量，在开式或闭式回路中用作静液传动的泵或马达。
- 当作为泵工作时，流量与驱动转速和排量成正比。
- 当作为马达工作时，输出转速与流量成正比而与排量成反比。输出扭矩随高压侧与低压侧之间的压差而加大。

### 特点:

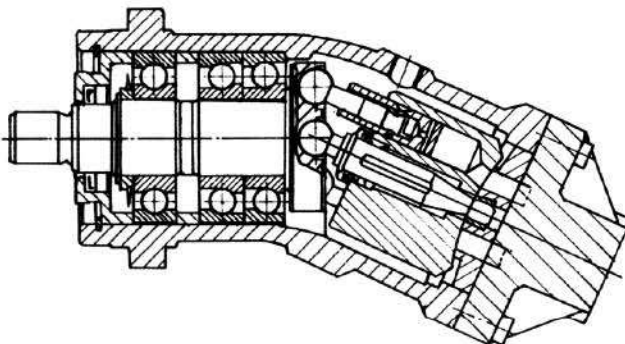
- 带有久经考验的球面配流盘的高性能旋转组件有自动对中、圆周速度低、效率高的优点。
- 耐用的球轴承和滚子轴承促进长工作寿命。
- 驱动轴能承受径向载荷。
- ISO安装法兰，从规格55起定量泵 / 马达和变量马达一致。
- 可使用抗燃液压油。
- 噪声低。

### 剖视图:

结构1-4, 规格10-160

### 剖视图:

结构5, 规格200-500



### Description:

Axial piston unit of bent axis design with fixed displacement, for use as either pump or motor in hydrostatic drivers, in open or closed circuit.

If operated as a pump, the flow is proportional to the drive speed and displacement.

If operated as a motor, the output speed is proportional to the swept volume and inversely proportional to displacement. The output torque increases with the pressure drop between the high and low pressure sides.

### Special Features:

High performance rotary group with well-proven spherical control area with the advantages: self-centering low peripheral speed, high efficiency.

Robust rolling bearings endure long service life.

Drive shaft capable of adopting radial loading.

ISO mounting flange, uniform for fixed displacement Pumps/motors and variable motors from size 55

May be used in conjunction with fire-resistant fluids.

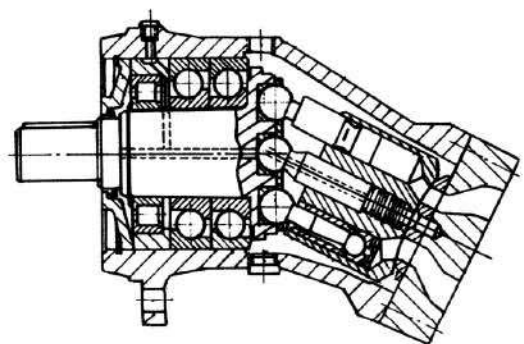
Low noises generation.

### Section:

Series 1-4, sizes 10-160

### Section:

Series 5, Sizes 200-500



# A2F定量泵 / 马达 Fixed Displacement Pump / Motor A2F

## 型号说明 Type Code

A2F 55 R 2 P 1

### 泵 / 马达型号 Pump/Motor Type

定量泵 / 马达 A2F  
Fixed displacement  
pump/motor

### 规格 Size

(9.4)	<span style="border: 1px solid black; padding: 2px;">10</span>
(11.6)	<span style="border: 1px solid black; padding: 2px;">12</span>
(22.7)	<span style="border: 1px solid black; padding: 2px;">23</span>
(28.1)	<span style="border: 1px solid black; padding: 2px;">28</span>
(44.3)	<span style="border: 1px solid black; padding: 2px;">45</span>
(54.8)	<span style="border: 1px solid black; padding: 2px;">55</span>
(63.0)	<span style="border: 1px solid black; padding: 2px;">63</span>
(80.0)	<span style="border: 1px solid black; padding: 2px;">80</span>
(107)	<span style="border: 1px solid black; padding: 2px;">107</span>
(125)	<span style="border: 1px solid black; padding: 2px;">125</span>
(160)	<span style="border: 1px solid black; padding: 2px;">160</span>
(200)	<span style="border: 1px solid black; padding: 2px;">200</span>
(250)	<span style="border: 1px solid black; padding: 2px;">250</span>
(355)	<span style="border: 1px solid black; padding: 2px;">355</span>
(500)	<span style="border: 1px solid black; padding: 2px;">500</span>

(排量 displacement ml/r)

### 后盖 Port Plate

见下 below 后盖 Port Plate 1

后盖 Port Plate 2

后盖 Port Plate 3

后盖 Port Plate 4

### 轴伸 Shaft End

平键 keyed shaft GB1096-79 P

花键 splines shaft DIN 5480 Z

花键 splines shaft GB 3478.1-83 S

### 结构形式 Series

见下 see below 结构 Series 1

结构 Series 2

结构 Series 3

结构 Series 4

结构 Series 5

### 旋转方向 Direction of Rotation

从轴端看 viewed on drive shaft

顺时针 clockwise R

逆时针 anti-clockwise L

双向 alternating W

### 订货示例:


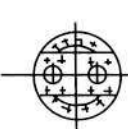


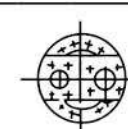

A2F.55.R.2.P.1  
A2F定量马达  
规格55, 顺时针旋转, 2结构, 平键  
1号后盖

### Ordering Example:

A2F.55.R.2.P.1  
Fixed displacement motor A2F  
size55, clockwise rotation, series 2,  
keyed shaft, port plate 1

(不适用于开式回路中的泵) (not for pumps in open circuit)

结构型式 Series		4		2/3		1/2		2		1/2		2		5			
规格	Size	10	12	23	28	45	55	63	80	107	125	160	200	250	355	500	
后盖	port plate 1	1	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
		2			●	●	●	●	●	●	●	●	●	●	●	●	
		3				●	●	●	●	●	●						
		4	●	●	●												

后盖 port plate 1		10-160				200-500				
规格	Size									
封闭式回路泵工况 和马达工况 pump operation in closed circuit and motor operation	1 螺纹 metric threads					1 法兰 Flange				
	2 SAE 法兰 Flange									
开式回路泵工况 pump operation in open circuit	3 法兰 Flange					2 法兰 Flange				
	4 螺纹 metric threads									

# A2F定量泵 / 马达 Fixed Displacement Pump / Motor A2F

## 技术数据 Technical Data

### 进口工作压力 Inlet Operating Pressure

#### 泵 Pump

S、A或B口最低压力

Minimum pressure at ports A or B

$P_{abs} \underline{\hspace{2cm}} 0.08\text{MPa}$

在闭式回路中，补油压力必须在0.2至0.6MPa之间，视泵的转速和液压油的粘度而定。

in closed circuits, the feed pressure must be between 0.2MPa and 0.6MPa, depending on pump speed and viscosity hydraulic fluid.

### 马达 Motor

A或B口的压力 Pressure at port A or B

额定压力 Nominal pressure  $P_N = 31.5\text{MPa}$

最高压力 Peak pressure  $P_{max} = 35\text{MPa}$

A口和B口压力之和不得超过63MPa(每侧压力最高35MPa)

The sum of the pressures at ports A and B must not exceed 63MPa(individual pressure on either side max. 35MPa)

### 出口工作压力 Outlet Operating Pressure

泵 Pump

额定压力 Nominal pressure  $P_N = 31.5\text{MPa}$

最高压力 Peak pressure  $P_{max} = 35\text{MPa}$

壳体压力 Case pressure

### 允许最高壳体压力(油口T)

Maximum permissible case pressure(at port T)

$P_{abs} \underline{\hspace{2cm}} 0.2\text{MPa}$

### 油温范围 Oil Temperature Range

$t_{min} \underline{\hspace{2cm}} -25^\circ\text{C}$

$t_{max} \underline{\hspace{2cm}} +80^\circ\text{C}$

### 粘度范围 Viscosity Range

$V_{min} \underline{\hspace{2cm}}$  (短期) (for short periods)  $10\text{mm}^2/\text{s}$

$V_{max} \underline{\hspace{2cm}}$  (短期) (for short periods)  $1000\text{mm}^2/\text{s}$

### 最佳工作粘度 Optimum Operating Viscosity

$V_{opt} \underline{\hspace{2cm}} 16\text{--}36\text{mm}^2/\text{s}$

### 规格计算 Calculation of Size

#### 泵 pump

流量 Flow  $Q = \frac{V_g \cdot n \cdot \eta_v}{1000}$  [L/min]

扭矩 Torque  $M = \frac{1.59 \cdot V_g \cdot \Delta p}{10 \cdot \eta_{mh}}$  [Nm]

功率 Power  $P = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta p}{60 \cdot \eta_t}$  [kW]

#### 马达 Motor

流量 Flow  $Q = \frac{V_g \cdot n}{1000 \eta_v}$  [L/min]

扭矩 Torque  $M = \frac{1.59 \cdot V_g \cdot \Delta p \cdot \eta_{mh}}{10}$  [Nm]

功率 Power  $P = \frac{M \cdot n}{9549} = \frac{Q \cdot \Delta p \cdot \eta_t}{60}$  [kW]

转速 Speed  $n = \frac{Q \cdot 1000 \cdot \eta_v}{V_g}$  [r/min]

$V_g$  = 排量 geom.displacement(ml / r)

$\Delta p$  = 压差 pressure differential(MPa)

$n$  = 转速 speed(rpm)

$\eta_v$  = 容积效率 volumetric efficiency

$\eta_{mh}$  = 机械效率 mech—hydr. efficiency

$\eta_t$  = 总效率 overall efficiency

$$[\eta_t = \eta_v \cdot \eta_{mh}]$$

## 油液选择 Fluid Recommendations

### 工作温度范围 推荐粘度等级 符合 DIN51519 ISO(VG)

Operating temperature range	Recommended viscosity grade to DIN 51 519 ISO(VG)	在 at	
30—40°C	VG22 $\Delta$ 22mm <sup>2</sup> / s	在 at	40°C
40—50°C	VG32 $\Delta$ 32mm <sup>2</sup> / s	在 at	40°C
50—60°C	VG46 $\Delta$ 46mm <sup>2</sup> / s	在 at	40°C
60—70°C	VG68 $\Delta$ 68mm <sup>2</sup> / s	在 at	40°C
70—80°C	VG100 $\Delta$ 100mm <sup>2</sup> / s	在 at	40°C

### 液压油的过滤

推荐过滤精度为10  $\mu\text{m}$ ，25—40  $\mu\text{m}$ 的较粗的过滤是可以使用，但是10  $\mu\text{m}$ 过滤可以延长使用寿命(降低磨损)。

### Filtration of Hydraulic Fluid

Recommended filtration: 10  $\mu\text{m}$  Coarser filtration of 25—40  $\mu\text{m}$ , is available, but with filtration of 10  $\mu\text{m}$  longer service life is obtained(reduced wearing).

### 转速范围

最低转速 $n_{min}$ 没有限制，如果要求高度旋转均匀性，则 $n_{min}$ 不得低于50rpm。关于最高转速 $n_{max}$ 请见第4页的表。

### Speed Range

No limitation on minimum speed  $n_{min}$ . If high uniformity of rotation is required,  $n_{min}$  should not be less than 50 rpm. See table on page 4 for maximum speed  $n_{max}$ .

### 安装位置

任选。壳体必须始终充满油液

### Mounting Position

Optional. The housing must always be filled with oil.

# A2F定量泵 / 马达 Fixed Displacement Pump / Motor A2F

技术参数表 理论值·未考虑  $\eta_{mh}$  和  $\eta_v$ , 数值经过圆整

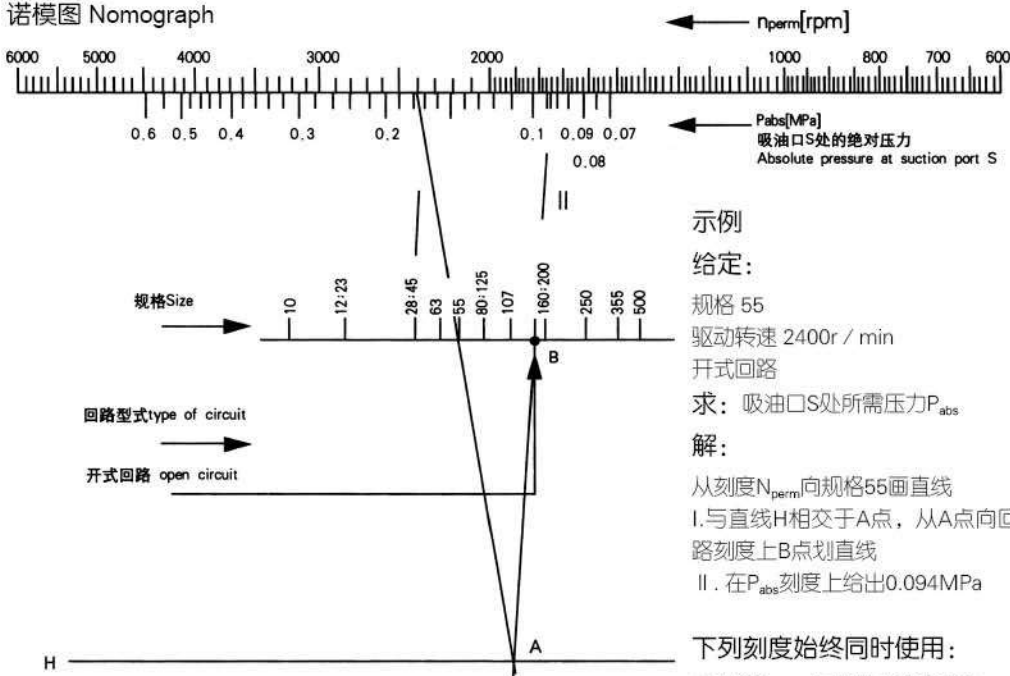
Technical Data theoretical values, without considering  $\eta_{mh}$  and  $\eta_v$  values rounded off

规格 Size				10	12	23	28	45	55	63	80	107	125	160	200	250	355	500	
排量 Displacement		$V_g$	ml/r	9.4	11.6	22.7	28.1	44.3	54.8	63	80	107	125	160	200	250	355	500	
最高转速 Max. speed	闭式回路 close circuit	$n_{max}$	r/min	7500	6000	5600	4750	3750	3750	3350	3350	3000	3150	2650	2500	2500	2240	2000	
	开式回路 open circuit	在 0.09MPa 下 <sup>1)</sup>	$n_{0.09}$	r/min	4700	3750	3750	2800	2360	2360	2550	2120	1900	2120	1650	1700	1400	1250	1120
		在 0.15MPa 下 <sup>1)</sup>	$n_{0.15}$	r/min	5000	4000	4000	3000	2500	2500	2700	2240	2000	2240	1750	1800	1500	1320	1200
最大流量 Max. flow	闭式回路 close circuit	$Q_{max}$	l/min	71	70	127	133	166	206	252	268	321	394	424	500	625	795	1000	
	开式回路 open circuit	在 $n_{0.09}$ 下 <sup>2)</sup>	$Q_{0.09}$	l/min	43	42	83	76	122	125	156	164	197	257	256	330	340	430	543
		在 $n_{0.15}$ 下 <sup>2)</sup>	$Q_{0.15}$	l/min	46	45	88	82	129	133	165	174	208	272	272	349	364	455	582
最大功率 Max. power	闭式回路 close circuit	$P_{max}$	KW	41	41	74	78	97	120	147	156	187	230	247	292	365	464	583	
	开式回路 open circuit	在 $Q_{0.09}$ 下	$P_{0.09}$	KW	26	26	50	46	71	75	93	99	119	154	154	198	204	259	326
		在 $Q_{0.15}$ 下	$P_{0.15}$	KW	27	27	53	49	75	80	99	105	125	163	163	210	218	273	350
电机转速 speed	流量 flow	闭式 close	Q	l/min	13.6	16.8	32.9	40.7	64.2	79.5	91.3	116	155	181.2	232				
Electric motor flow	开式 <sup>2)</sup> open	Qo	l/min	13.2	16.3	31.9	39.5	62.3	77.1	88.6	112.5	150.5	175.8	225					
功率 power		P	KW	8	10	19	24	38	46	53	68	91	106	135					
n=1450rpm ( $\Delta p=35\text{MPa}$ )																			
扭矩 Torque	$\Delta p=10\text{MPa}$	M	Nm	15	18.5	36	44.6	70.4	87	100	127.5	169.7	198	254	318.5	397.9	565	795.7	
	$\Delta p=35\text{MPa}$	$M_{max}$	Nm	52.5	64.5	126	156	247	305	350	446	594	693	889	1114	1393	1978	2785	
近似重量 Weight(approx.)		kg		5	5	12	12	23	23	33	33	44	63	63	88	88	138	185	

1) 这些数值适用于吸油管S有绝对压力并用矿物油工作时

These values are valid provided there is an absolute pressure at suction inlet S and when operated on mineral oil.

## 诺模图 Nomograph



### 示例

给定:

规格 55  
驱动转速 2400r / min  
开式回路

求: 吸油口S处所需压力  $P_{abs}$

解:

从刻度  $N_{perm}$  向规格 55 画直线 I. 与直线 H 相交于 A 点, 从 A 点向回路刻度上 B 点划直线 II. 在  $P_{abs}$  刻度上给出 0.094MPa

下列刻度始终同时使用:

1. 刻度  $P_{abs}$ 、回路形式和直线 H
2. 直线 H、规格刻度和  $N_{perm}$

当进口压力  $P_{abs} > 0.1\text{MPa}$  时开式回路(自吸工况)的允许转速可以提高, 但当  $P_{abs} < 0.1\text{MPa}$  时必须降低。

### Example

Given: Size. 55  
Drive speed 2400r / min  
Open circuit  
Required:  
Required pressure  $P_{abs}$  at suction port

Solution:  
Line I. on scale  $N_{perm}$  to size 55 meets line H at point A.  
Line II from point A to point B on circuit scale gives 0.094MPa on scale  $P_{abs}$ .  
The following are always used together: 1. Scales  $P_{abs}$ , type of circuit and line H.  
2. Line H, size scale and  $n_{perm}$

The permissible speed in open circuit (self-priming operation) may be increased when inlet pressure  $P_{abs} > 0.1\text{MPa}$  but must be reduced when  $P_{abs} < 0.1\text{MPa}$

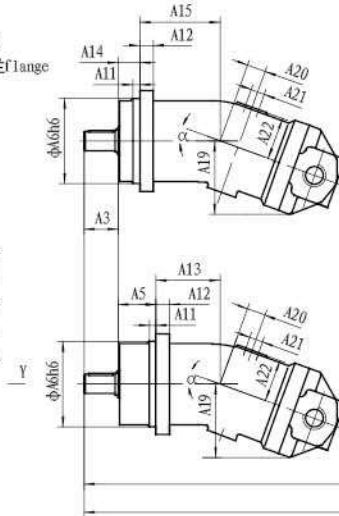
允许转速  $N_{perm}$  可由诺模图确定。在马达工况, 闭式回路或补油工况的允许转速也适用于开式回路。  
The permissible speed  $N_{perm}$  can be determined from the nomograph. In motor operation the permissible speeds for closed circuit and feed operation are also valid for open circuit.

# A2F定量泵 / 马达 Fixed Displacement Pump / Motor A2F

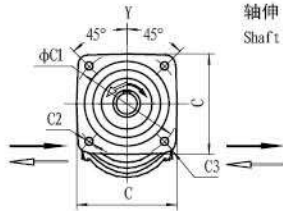
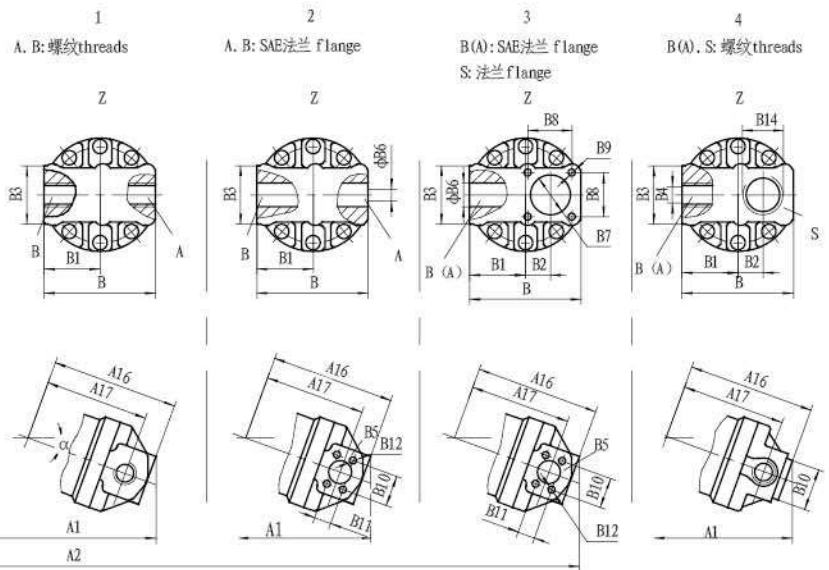
外形尺寸 Unit Dimensions  
规格 Size 10~160

结构2  
Series  
ISO法兰flange

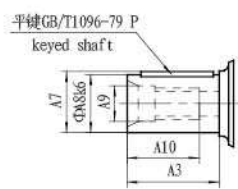
结构1  
Series  
结构3  
Series  
结构4  
Series



后盖 Port Plates

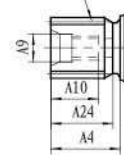


轴伸  
Shaft Ends



平键GB/T1096-79 P  
keyed shaft

花键GB3478.1-83 Z (Splined shaft GB3478.1-83)  
花键DIN5480 S (Splined shaft DIN 5480)



★A5, A13不用于结构2. A5, A13 not for series 2  
A14, A15不用于结构1. A14, A15 not for series 1

规格 Size	结构形式 Series	后盖型式 Port Plates	A1	A2
α20° α25°	Series	Port Plates	α20° α25°	α20° α25°
10 12	4	1, 4	235 232	— —
23 28	3, 2	1, 4	296 293	— —
45 55	1.2	1, 2, 3	384 381 378 376	60 35 63 125
63 80	2	1, 2, 3	452 450 447 444	70 40 — 140
87 107	2, 1	1, 2, 3	480 476 473 468	80 45 80 160
125 160	2	1, 2, 3	552 547 547 540	90 50 — 180

规格 Size	深 deep	A19	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep
α20° α25°	A17 A18 α20° α25°	A20 A21 A22 A23 A24 B B1 B2 B3 B4	deep	B5 (SAE 法兰) Flange	B6 B7 B8															
10 12	90 — 69 75	10 M12 × 1.5 40 — 22 89 42.5 18 40 M22 × 1.5 14	—	—	—															
23 28	118 — 88 95	25 M16 × 1.5 50 — 28 106 53 25 47 M27 × 2 16	1/2"	13	—															
45 55	150 178 110 118	31.5 M18 × 1.5 63 115 28 132 63 29 53 M33 × 2 18	3/4"	19	50 48															
63 80	173 208 126 140	36 M18 × 1.5 77 173 33 156 75 35.5 63 M42 × 2 20	1"	25	56 60															
87 107	190 225 138 149	40 M18 × 1.5 80 190 37.5 165 80 35.5 66 M42 × 2 20	1"	25	63 60															
125 160	212 257 159 173.5	45 M22 × 1.5 93 212 42.5 195 95 42.2 70 M48 × 2 22	1 1/4"	32	70 75															

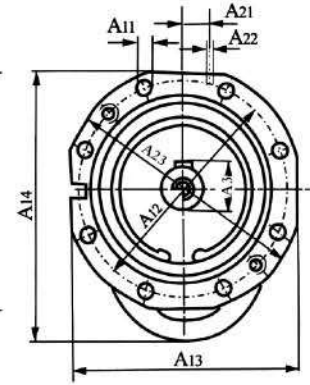
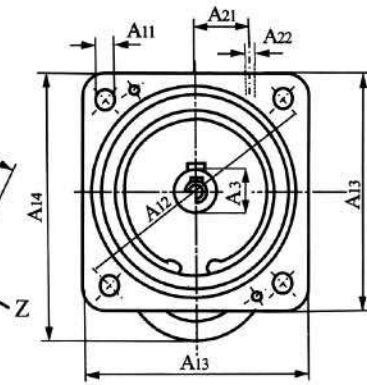
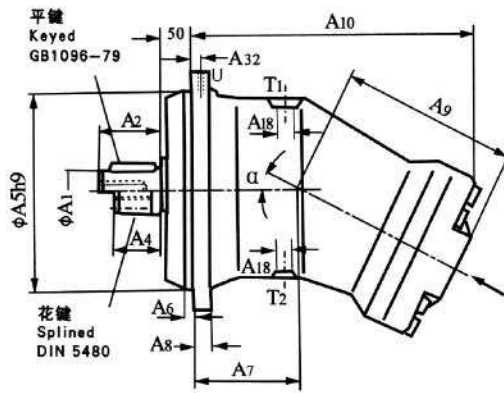
规格 Size	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	深 deep	重量 Weight kg
α20° α25°	B9 deep	B10 B11 B12	deep	B13 B14	deep	B15 C C1 C2 C3	平键 keyed GB1096-79	花键 Splined DIN5480	花键 Splined GB3478.1-83	重量 Weight kg											
10 12	— — —	— — —	42	M33 × 2 18	— 95 100 9 10	键 6 × 32 W20 × 1.25 × 14 × 9g	EXT14Z × 1.25m × 30R × 5f	5.5													
23 28	— — 40.5 18.2	M8 15 53	M42 × 2 20	120 118 125 11 12	键 8 × 40 W25 × 1.25 × 18 × 9g	EXT18Z × 1.25m × 30R × 5f	12.5														
45 55	M10 16 50.8 23.8	M10 16 — —	— — —	126 150 160 13.5 16	键 8 × 50 W30 × 2 × 14 × 9g	EXT14Z × 2m × 30R × 5f	23														
63 80	M12 18 57.1 27.8	M12 16 — —	— — —	156 165 180 13.5 16	键 10 × 56 W35 × 2 × 16 × 9g	EXT16Z × 2m × 30R × 5f	33														
87 107	M12 18 57.1 27.8	M12 18 — —	— — —	160 190 200 17.5 20	键 12 × 63 W40 × 2 × 18 × 9g	EXT18Z × 2m × 30R × 5f	42														
125 160	M16 24 66.7 31.8	M14 21 — —	— — —	190 210 224 17.5 20	键 14 × 70 W45 × 2 × 21 × 9g	EXT21Z × 2m × 30R × 5f	63														

# A2F定量泵 / 马达 Fixed Displacement Pump / Motor A2F

## 元件尺寸 Unit Dimensions

规格 Sizes 200-250

规格 Sizes 355-500



Z向  
Viewed on Z

后盖

Port Plate

用于马达工况 for motor operation  
用于泵工况 for pump operation  
(闭式回路) (closed circuit)

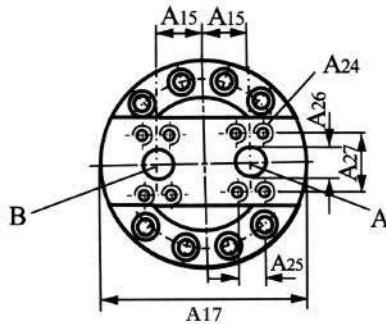
1

后盖

Port Plate

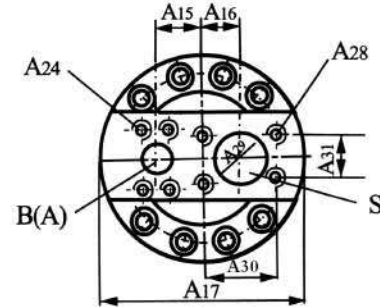
用于泵工况 for pump operation  
(开式回路) (open circuit)

2



油口 Ports A, B:  
SAE法兰 flange 6000 psi  
见 A19  
(see dimension A19)

油口 Port B(A):  
SAE法兰 flange 6000 psi  
见尺寸 A19  
(see dimension A19)



油口 Port S: SAE法兰 flange  
规格 Sizes 200-355; 2500psi  
规格 Sizes 500 | 200psi  
见尺寸 A20  
(see dimension A20)

逆时针旋转后盖 2 旋转 180°

For anti-clockwise rotation  
port plate 2 is rotated 180°

### 规格

Size	$\alpha$	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	A <sub>4</sub>	A <sub>5</sub>	A <sub>6</sub>	A <sub>7</sub>	A <sub>8</sub>	A <sub>9</sub>	A <sub>10</sub>	A <sub>11</sub>	A <sub>12</sub>	A <sub>13</sub>	A <sub>14</sub>	A <sub>15</sub>	A <sub>16</sub>	A <sub>17</sub>	A <sub>18</sub>	A <sub>19</sub>	A <sub>20</sub>
200	21°	50 <sub>K6</sub>	82	53.5	58	224	9	134	25	232	368	22	280	252	300	55	45	216	M22 × 1.5	1 1/4"	2 1/2"
250	26.5°	50 <sub>K6</sub>	82	53.5	58	224	9	134	25	232	370	22	280	252	314	55	45	216	M22 × 1.5	1 1/4"	2 1/2"
355	26.5°	60 <sub>m6</sub>	105	64	82	280	15	160	28	260	422	18	320	335	380	60	50	245	M33 × 2	1 1/2"	2 1/2"
500	26.5°	70 <sub>m6</sub>	105	74.5	82	315	15	175	30	283	462	22	360	375	420	65	55	270	M33 × 2	1 1/2"	3"

### 规格

规格	A <sub>21</sub>	A <sub>22</sub>	A <sub>23</sub>	A <sub>24</sub>	深	A <sub>25</sub>	A <sub>26</sub>	A <sub>27</sub>	A <sub>28</sub>	深	A <sub>29</sub>	A <sub>30</sub>	A <sub>31</sub>	A <sub>32</sub>	keyed Shaft GB1096-79	Splined Shaft DIN5480	(kg)
200	70	M14 × 1.5		M14	22	31.8	32	66.7	M12	18	63	88.9	50.8	13	键 14 × 80	W50 × 2 × 24 × 9g	88
250	70	M14 × 1.5		M14	22	31.8	32	66.7	M12	18	63	88.9	50.8	13	键 14 × 80	W50 × 2 × 24 × 9g	88
355	35	M14 × 1.5	360	M16	24	36.6	40	79.4	M12	18	63	88.9	50.8	14	键 18 × 100	W60 × 2 × 28 × 9g	138
500	35	M18 × 1.5	400	M16	24	36.6	40	79.4	M16	24	75	106.4	62	15	键 20 × 100	W70 × 3 × 22 × 9g	185