HLA10VSO/32 系列变量柱塞泵

Variable Displacement Pump HLA10VSO/32

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HILEAD

宁波恒力液压股份有限公司

Ningbo Hilead Hydraulic Co.,Ltd

企业简介
Company Profile

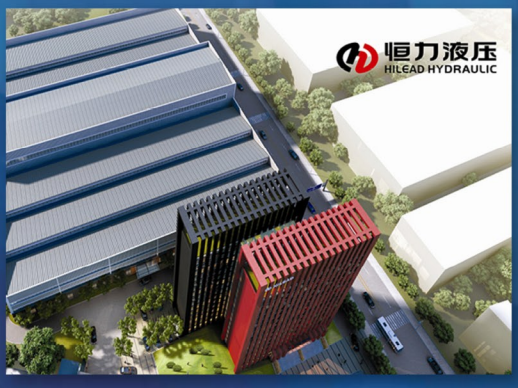
恒力液压创立于1967年，是一家致力于液压传动技术的研发与制造的高新技术企业。拥有各类先进加工和检测设备，公司始终以科技为先导，通过与权威科研机构深度合作，奠定了强大的自主研发基础，多项产品均为国内首创，填补了国内多项技术空白，力争做到中国液压领航者地位。

公司总部位于宁波高新区，生产基地位于宁波市鄞州区，两个厂区占地共100亩。目前公司的产品品类贯穿整个液压产业链，从液压泵，液压马达到液压成套系统设计制造。公司从德国进口四轴加工中心两台，拥有多台加工中心，大型数控镗铣床等各类设备80多台套。

公司从上世纪70年代起，就开始为中国海军提供配套产品。目前，公司已获得装备承制单位资格证书、武器装备科研生产许可证、三级保密认证、武器装备质量管理体系认证，公司归口于海装上海局，成为真正意义上的军工企业。公司长期配套与中船重工上海第七0四研究的各类甲板机械设备，通过数年应用无任何重大质量问题。

2010年公司投资2.1亿多新建油泵生产基地和液压机生产基地，总占地面积近100亩，年设计生产能力为5万台柱塞泵，能装配万吨以下的各类油压机，目前这两个基地都已完成投产。公司建有国内最先进功能最全的柱塞泵马达测试中心，可提供各类型号规格的柱塞泵马达检测任务。

公司是国内最早开发HL A4V柱塞泵的厂家之一，科研力量雄厚，与浙江大学、燕山大学、704所等多家科技机构开展广泛深入的科研合作。公司于2009年荣获国家高新技术企业称号，2010年，HL A4V高压轴向柱塞泵荣获国家科技部国家重点新产品称号。公司拥有博士2名、高级工程师2名、数十名研究生团队，公司拥有多项知识产权，截止目前已拥有6项发明专利和多项实用新型专利。



Founded in 1967, Hengli hydraulic is a high-tech enterprise dedicated to the research, development and manufacturing of hydraulic transmission technology. With all kinds of advanced processing and testing equipment, the company has always been guided by science and technology. Through deep cooperation with authoritative scientific research institutions, the company has laid a strong foundation for independent research and development. A number of products are the first in China, filling in a number of technical gaps in China, and striving to be the leader of China's hydraulic industry. Plunger hydraulic pump

The company is headquartered in Ningbo high tech Zone, and its production base is located in Yinzhou District, Ningbo City. The two factories cover an area of 100 mu. At present, the company's product categories run through the entire hydraulic industry chain, from hydraulic pump, hydraulic motor to hydraulic complete system design and manufacturing. The company imports two four-axis machining centers from Germany, with more than 80 sets of various equipment, such as multiple machining centers, large-scale CNC boring and milling machines.

Since the 1970s, the company has been providing supporting products for the Chinese navy. At present, the company has obtained the qualification certificate of equipment manufacturer, scientific research and production license of weapon equipment, three-level confidentiality certification, quality management system certification of weapon equipment. The company is under the jurisdiction of Shanghai Bureau of haizhuang, and has become a real military enterprise. The company has long supported all kinds of deck machinery and equipment researched by CSIC (Shanghai No.74), which has been applied for several years without any major quality problems.

In 2010, the company invested more than 210 million yuan to build a new oil pump production base and hydraulic press production base, covering a total area of nearly 100 mu, with an annual design production capacity of 50000 plunger pumps and the ability to assemble all kinds of hydraulic presses below 10000 tons. At present, both bases have been put into operation. The company has built the most advanced and functional plunger pump motor testing center in China, which can provide various types and specifications of plunger pump motor testing tasks.

The company is one of the earliest manufacturers to develop HL A4V plunger pump in China, with strong scientific research force. It has carried out extensive and in-depth scientific research cooperation with Zhejiang University, Yanshan University, 704 and other scientific and technological institutions. In 2009, the company won the title of national high-tech enterprise, and in 2010, hla4v high-pressure axial piston pump won the title of national key new product of the Ministry of science and technology. The company has 2 doctors, 2 senior engineers and dozens of graduate teams. The company has a number of intellectual property rights, and so far has 6 invention patents and a number of utility model patents.

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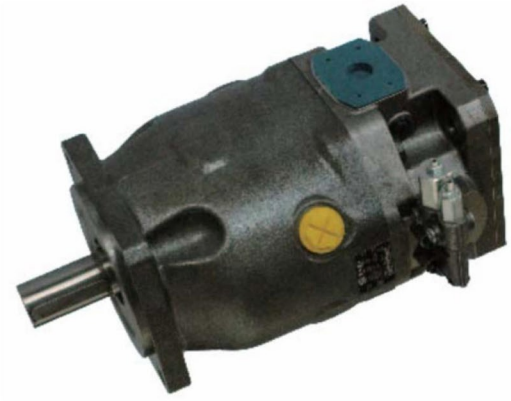


规格 Size 45~180

系列 series 32

额定压力 Nominal pressure 280Bar

峰值压力 Peak pressure 350Bar

斜盘式轴向柱塞泵 Swash plate design axial variable piston pump

特 点 Features

- 用于开式回路的斜盘式轴向柱塞泵。
  Swash plate design axial variable piston pump used in open circuit.
- 流量与传动速度和排量成比例。
  The flow is proportional to the drive speed and the displacement.
- 可通过调节旋转斜盘角度实现无级变量。
  The flow can be steplessly varied by adjustment of the swash plate angle.
- 对摇架轴承进行流体静力卸载。
  Hydrostatic unloading of cradle bearings.
- 泵出口设有压力传感器接口。
  Port for pressure transducer in pump outlet.
- 低噪音等级。
  Low noise level.
- 低压脉动。
  Low pressure pulsation.
- 高效率。
  High efficiency.
- 耐气穴、吸油压降及壳体压力峰值的能力强。
  High resistance against cavitation, suction pressure drops,and housing pressure peaks.
- 通用通轴驱动。
  Universal through drive.

一、 型号说明 Ordering Code

HLA10VS	0	71	DR	/	32	R	-	V	P	B	22U	99

泵型号：变量泵;斜盘式结构
Model Variable pump, Swashplate design
额定压力280bar
Rated pressure 280bar
峰值压力350bar
Peak pressure 350bar

运行模式：泵,开式回路
Mode of operation Pump, open circuit

规格排量: 45、71、100、140、180(ml/r)
Displacement 45、71、100、140、180(ml/r)

控制方式:

Controller	45	71	100	140	180
DG--两位控制 Two point, direct control					
DR--恒压控制 Pressure control	√	√	√	√	
DRG--远程恒压控制 Remote pressure control	√	√	√	√	
DRF (DFR)--压力/流量控制,X-T开启 Pressure and flow control X-T open	√	√	√	√	
DRS (DFR1)--压力/流量控制,X-T关闭 Pressure and flow control X-T closed	√	√	√	√	
LAXD(G)--压力/功率 控制 Power control with pressure cut off X 控制初始值 Beginning of power control					
LA5D below 50bar	√	√	√	√	
LA6D from 51 to 90 bar					
LA7D from 91 to 160 bar					
LA8D from 160 to 240 bar					
LA9D over 240 bar					
LAXDS--压力/流量/功率控制 Pressure, flow, power control	√	√	√	√	
LAXS--流量/功率控制 Power and flow control	√	√	√	√	

产品系列: 32系列
Series 32 Series

转向(从轴端看): R--顺时针 clockwise
Direction of Rotation L--逆时针 anti-clockwise

密封件:
Seals V--FKM（氟橡胶）flour-rubber

轴端型式:
Shaft end

	45	71	100	140	180
P--公制平键 Metric parallel with key	√	√	√	√	
S--SAE花键 SAE splined	√	√	√	√	
R--SAE花键(较高通轴驱动扭矩) SAE splined (higher through drive torque)	√	√			
K--SAE平键 SAE parallel with key	√	√	√	√	

安装法兰:
Mounting flange

	45	71	100	140	180
B--ISO 3019-2, 四螺栓 ISO 3019-2 - 4-bolt	√	√	√	√	
D--ISO 3019-1, 四螺栓 ISO 3019-1 - 4-bolt	√	√	√	√	

油口型式:
Port for service lines

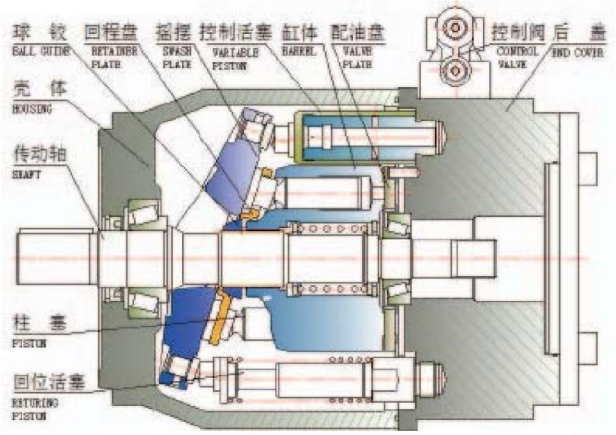
	45	71	100	140	180
12N--两侧SAE, 公制螺纹, 无通轴驱动 SAE flage on opposite side, fixing thread metric, without through drive	√	√	√	√	
22U--类似12N, 但带普通的通轴驱动 like 12N however with universal through drive	√	√	√	√	
62N--两侧SAE, UNC螺纹, 无通轴驱动 SAE flage on opposite side, fixing thread UNC, without through drive	√	√	√	√	
72U--两侧SAE, UNC螺纹 like 62N however with universal through drive	√	√	√	√	

通轴型式:
With through drive to accept an axial piston pump or a gear pump

	45	71	100	140	180	
不通轴 Without through drive	√	√	√	√		00
不能直接传动，带通轴传动轴，不带联接套，不带适配器法兰，带正确闭合的护盖 Without through drive, with shaft for through drive, without shaft coupler, without adapter flange, closed with cover		√	√	√		99

安装法兰 Mounting flage	轴/轴套 Shaft/coupling			用于安装 For the mounting of	45	71	100	140	180	
ISO 80,2 hole	3/4 in	11T	16/32DP	10,18 series 52/31(shaft S or R)	√	√	√	√		B2
ISO 100,2 hole	7/8 in	13T	16/32DP	28 series 31(shaft S or R)	√	√	√	√		B3
	1 in	15T	16/32DP	45 series 31(shaft S or R)	√	√	√	√		B4
ISO 125,4 hole	1 in	15T	16/32DP	45 series 32(shaft S or R)	√	√	√	√		E1
ISO 160,4 hole	1 1/4 in	14T	12/24DP	71 series 32(shaft S or R)		√	√	√		B8
ISO 180,4 hole	1 1/2 in	17T	12/24DP	100 series 32(shaft S)			√	√		B9
	1 3/4 in	13T	8/16DP	140 series 32(shaft S)				√		B7
SAE 82-2,2 hole	5/8 in	9T	16/32DP	External gear pump F(5 to 22)	√	√	√	√		01
	3/4 in	11T	16/32DP	10,18 series 52/31(shaft S)	√	√	√	√		52
SAE 101-2,2 hole	7/8 in	13T	16/32DP	28 series 31(shaft S or R)	√	√	√	√		68
	1 in	15T	16/32DP	45 series 31(shaft S or R)	√	√	√	√		04
SAE 127-4,4 hole	1 in	15T	16/32DP	45 series 32(shaft S or R)	√	√	√	√		E2
	1 1/4 in	14T	12/24DP	71 series 32(shaft S or R)		√	√	√		15
SAE 127-2,2 hole	1 1/2 in	17T	12/24DP	100 series 31(shaft S)			√	√		24
SAE 152-4,4 hole	1 1/2 in	17T	12/24DP	100 series 32(shaft S)			√	√		96
	1 3/4 in	13T	8/16DP	140 series 32(shaft S)				√		17

二、 结构图 Construction



三、 油液 Hydraulic fluid

- 适用于矿物油。The A10VS0 variable displacement pump is suitable for use with mineral oil.

- 工作粘度范围 Operating viscosity range

为了得到最佳的效率和寿命，我们推荐把油液的工作粘度（在相应的工作温度下）选择在以下范围内：In order to obtain optimum efficiency and service life ,we recommend that the operating viscosity(at operating temperature) be selected from within the range.

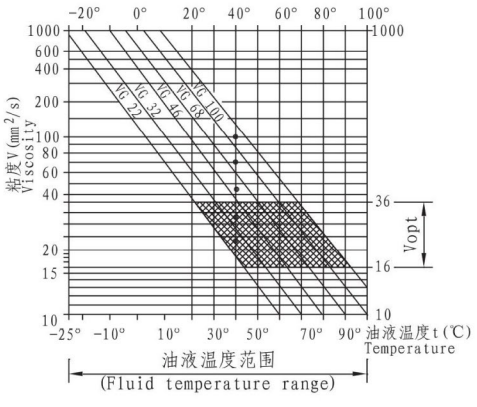
Vopt= 最佳工作粘度 opt. operating viscosity

16…36 mm^2/s

与油箱温度（开式油路）相关。

Referred to the reservoir temperature(open circuit).

- 选用图表 Selection diagram



- 粘度范围的限制 Viscosity limits

V_{min}=10mm^2/s 短时间在 90℃油温的最大泄漏情况下最大粘度 short term at a max. permissible drain of 90℃.

V_{max}=1000mm^2/s 短时间冷起动时 short term on cold start

- 温度范围 Temperature range (see selection diagram)：t=-25 ~ 90℃
- 选用油液的注意事项 Notes on the selection of the hydraulic fluid

为了正确地选用液压油，必须知道油箱中油液工作温度（开式回路）和环境温度的关系。In order to select the correct fluid , it is necessary to know the operating temperature in the tank (open loop) in relation to the ambient temperature. 根据选用图表，应确保在油液的工作温度范围内，油液的粘度在最佳粘度范围（Vopt 在阴影范围），并建议在同时可选用的不同等级中尽可能选较高粘度等级。The hydraulic fluid should be selected so that within the operating temperature range, the operating viscosity lies within the optimum range (ν opt) (see shaded section of the selection diagram). We recommend that the higher viscosity range should be chosen in each case.

- 油液的过滤 Filtration

滤油越精细，工作液体的清洁度越好，则泵的寿命越长。为了保证柱塞泵元件的正常功能，油液的清洁度至少为：NAS 1638.9 级别，ISO/DIS4406 的 18/15 级。

The finer the filtration the better the cleanliness of the pressure fluid and the longer the life of the axial piston unit.To ensure the functioning of the axial piston unit a minimum cleanliness level of: 9 to NAS 1638 18/15 to ISO/DIS 4406 is necessary.

四、主要参数 Parameter

进油口工作压力范围
Operating pressure range - inlet

进油口（S 口）的绝对压力
Absolute pressure at port S
$P_{abs\ min}$(size 45 - 100 at 1800 rpm)----------0.8 bar
$P_{abs\ min}$(size140-180 at 1800 rpm)---------- 1bar
$P_{abs\ max}$----------10 bar

出油口工作压力范围
Operating pressure range - outlet

出油口（B 口）压力 Pressure at port B
公称压力 Nominal pressure P_N----------280 bar
峰值压力 Peak pressure P_{max}----------350 bar
间隙工作压力（占 10% 循环周期）-------315 bar
Applications with intermittent operating pressures up to 315 bar at 10% duty are permissible.

壳体泄油压力 Case drain pressure

泄油口（L，L_1）最大允许压力：最高可比进油口压力高 0.5bar，但不得高于 2bar 的绝对压力。
Maximum permissible pressure of leakage fluid (at port L, L_1):Maximum 0,5 bar higher than the inlet pressure at port S, but nohigher than 2 bar absolute.

数据表（理论值）Table of values (theoretical values)

规格 Sizes				45	71	100	140	180
排量 Displacement		$V_{g\ max}$	cm^3	45	71	100	140	180
最高转速 Max speed		n_{max}	rpm	1800	1800	1800	1800	1800
最大流量 Max. flow	在in n_{max}	q_v	L/min	81	128	180	252	324
	在in1500r/min			67.5	106.5	150	210	270
最大功率(Δ p=280bar) Max. power	在in n_{max}	P_{max}	kW	38	59.7	84	118	151
	在in1500r/min			31	50	70	98	125
最大扭矩(Δ p=280bar) Max. torque	在 in $V_{g\ max}$	T_{max}	Nm	200	317	446	624	802
重量(无直接传动) Weight(without through drive)		m	Kg	30	47	69	73	78

参数关系：Parameter relations

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

驱动转矩 Drive Torque $T = \frac{V_g \cdot \Delta p}{20 \cdot \pi \cdot \eta_{mh}}$ [Nm]

驱动功率 Drive Power $P = \frac{T \cdot n}{9549} = \frac{2\pi \cdot T \cdot n}{60000} = \frac{q_v \cdot \Delta p}{600 \cdot \eta_t}$ [kW]

V_g = 每转几何排量 [cm^3] Geometry displacement each rotate
Δ p = 压差 [bar] Pressure drop/differential
n = 转速 [rpm] Rotary speed
η_v = 容积效率 Cubage's efficiency
η_{mh} = 机械-液压效率 Mechanical –Hydraulic efficiency
η_t = 总效率（$\eta_t = \eta_v \cdot \eta_{mh}$）Overall efficiency

五、安装注意事项 Installation Notes

在调试和运行过程中，轴向柱塞单元必须始终充满液压油并排放空气。在停用时间相对较长时，也应遵守上述注意事项，因为轴向柱塞单元通过液压管路排空。

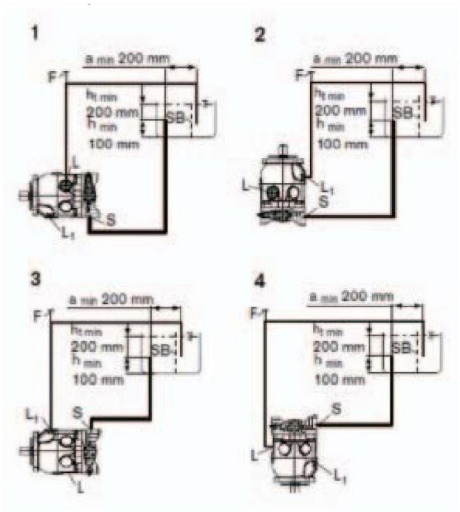
外壳内的壳体泄油必须通过最高壳体泄油口排放到油箱。为了获得有利的噪音值，应使用弹性元件分离所有连接管路，并避免在油箱上方安装。

在所有工况下，吸油管路和壳体泄油管路必须通入油箱中最低油位以下的位置。允许吸油高度 h_s 取决于总压力损失，但不会高于其最大值 ($h_{s\ max}$ = 800 mm)。在运转期间，油口 S 的最小吸油压力还不得降至 0.8 bar 以下。

安装位置请参见以下示例 1 至 12。 其它安装位置可应要求提供。

在油箱下方安装（标准）

在油箱下方安装意味着轴向柱塞单元安装在油箱外部，低于最低油位。



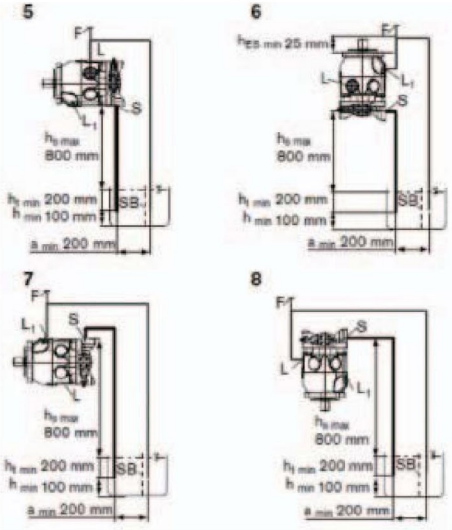
S 注油/排空
F 排放口
S 吸油口
L，L1 壳体泄油口
SB 隔板（挡板）
$h_{t\ min}$ 所需最低浸没深度（200 mm）
h_{min} 至油箱底部的最短距离（100 mm）
$h_{ES\ min}$ 为了防止轴向柱塞单元排空所需的最小高度(25 mm)。
$h_{s\ max}$ 最大允许吸油高度（800 mm）
a_{min} 吸油管路和壳体泄油管路之间的最小距离。

在油箱上方安装

在油箱上方安装意味着轴向柱塞单元安装在油箱的最低油位上方。

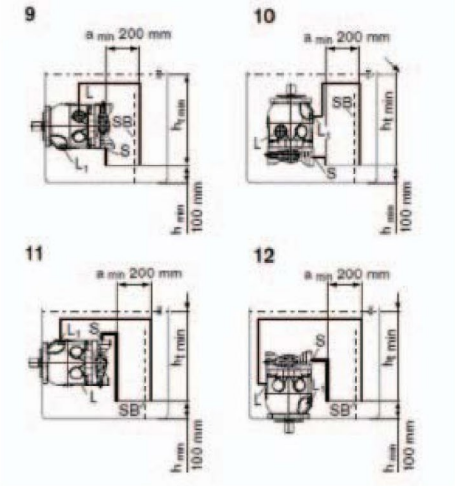
为了防止轴向柱塞单元排空，安装位置 6 至少需要 25 mm 的高度差 $h_{ES\ min}$。

遵守最大允许吸油高度 $h_{s\ max}$ = 800 mm 的要求。



油箱内安装

油箱内安装意味着在最低油箱油位范围内安装泵。



Installation notes

General

The axial piston unit must be filled with hydraulic fluid and air bled during commissioning and operation. This must also be observed following a longer standstill as the axial piston unit empty via the hydraulic lines.

The case drain fluid in the case interior must be directed to the reservoir via the highest case drain port.To achieve favorable noise values, decouple all connecting lines using elastic elements and avoid above-reservoir installation.

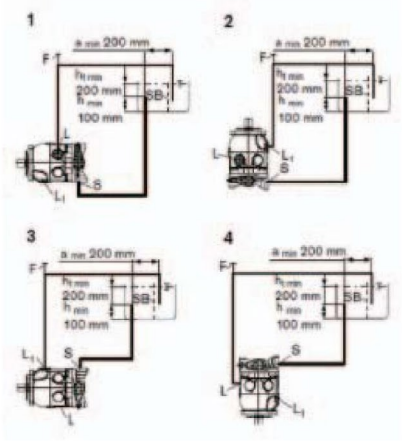
In all operating states, the suction line and case drain line must flow into the reservoir below the minimum fluid level .The permissible suction height h_s is a result of the overall pressure loss, but may not be greater than $h_{s\,max}$ = 800 mm.The minimum suction pressure at port S must also not fall below 12 psi (0.8 bar) absolute during operation.

Installation position.

See the following examples 1 to 12.Additional installation positions are available upon request.

Below-reservoir installation (standard)

Below-reservoir installation means the axial piston unit is installed outside of the reservoir below the minimum fluid level.



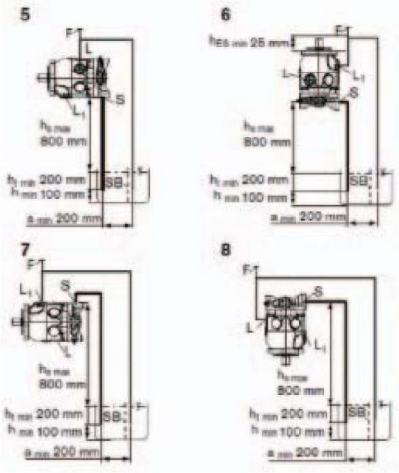
S Filling / air bleeding
F Air bleed port
S Suction port
L, L1 Case drain port
SB Baffle (baffle plate)
$h_{t\,min}$ Minimum necessary immersion depth (200 mm)
h_{min} Minimum necessary spacing to reservoir base(100 mm)
$h_{ES\,min}$ Minimum necessary height needed to protect the axial piston unit from draining (25 mm).
$h_{s\,max}$ Maximum permissible suction height (800 mm)
a_{min} When designing the reservoir, ensure adequate distance between the suction line and the case drain line.

Above-reservoir installation

Above-reservoir installation means the axial piston unit is installed above the minimum fluid level of the reservoir.

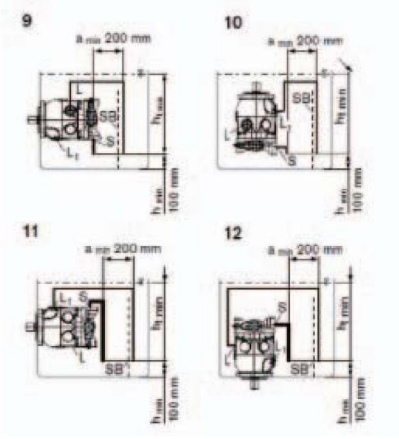
To prevent the axial piston unit from draining, a height difference $h_{ES\,min}$ of at least 25 mm is required in installation position 6

Observe the maximum permissible suction height $h_{s\,max}$ = 800 mm.

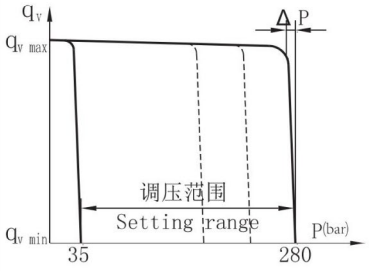
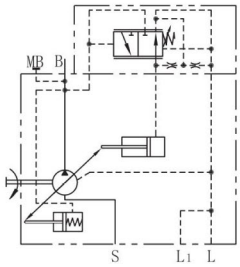
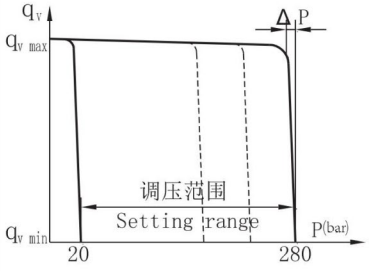
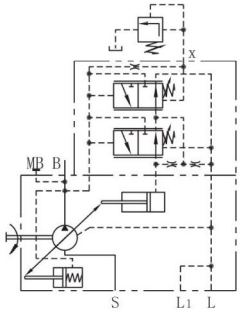
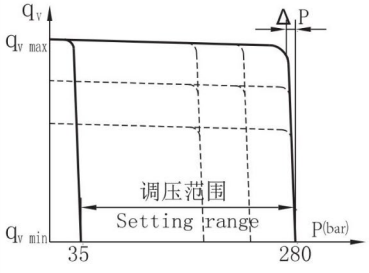
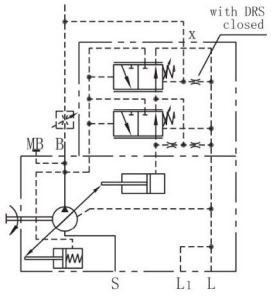


Inside-reservoir installation

Inside-reservoir installation means the pump is installed within the minimum reservoir fluid level.

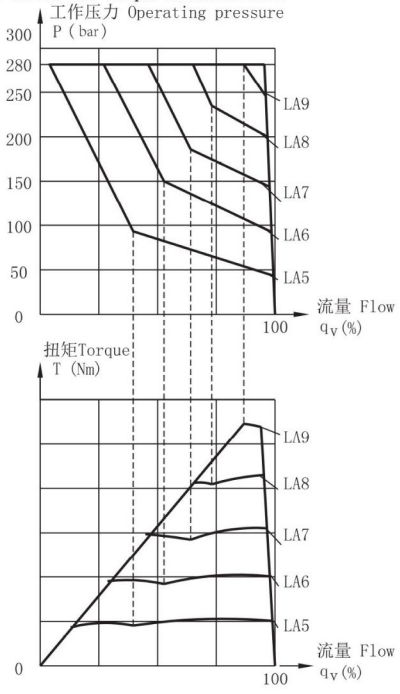


六、控制方式 Controller

变量特性曲线(Static characteristic)	液压原理(Circuit drawing)	
DR  **控制数据** Controller data: 控制液压油最大消耗量约 3 L/min Control fluid consumption max. approx. 3 L/min	 滞后和重复 ΔP max 3 bar Hysteresis and repeatability ΔP max 3 bar	恒压控制： 在控制范围内使液压系统中压力维持恒压，泵仅提供系统所需油量，压力可无级设定。 The pressure controller serves to maintain a constant pressure in a hydraulic system within the control range of the pump. The pump therefore supplies only the amount of hydraulic fluid required by the system. Pressure may be steplessly set at the control valve.
DRG  **控制数据** Controller data: 控制液压油最大消耗量约 4.5 L/min Control fluid consumption max. approx. 4.5 L/min	 滞后和重复 ΔP max 3 bar Hysteresis and repeatability ΔP max 3 bar DRG 控制阀芯的标准压差设定为20 bar The differential pressure at the DRG-control spool is set as standard to 20 bar.	远程恒压控制： 恒压的功能与装置与DR相同。 溢流阀接在X口作远程控制；溢流阀不在DRG控制的供货范围内。 Function and equipment as for DR. A pressure relief valve can be connected to port X for remote control applications; this is not included in the items supplied with the DRG control.
DRF/DRS (DFR/DFR1)  **控制数据** Controller data: 控制液压油最大消耗量DRF约3-4.5L/min,DRS约3L/min Control fluid consumption DRF max.approx.3-4.5 L/min Control fluid consumption DRS max. approx.3 L/min	 压差ΔP 标准设定：14 bar Differential pressure ΔP standard setting:14 bar	压力/流量控制： 除了恒压的功能外，借助于负载（如一节流孔）的压差可改变泵的流量。泵仅供执行机构所需流量。 对DRS，X-T关闭。 Function and equipment as for In addition to the pressure control function, the pump flow may be varied by means of a differential pressure over an orifice or valvespool,installed in the service line. The pump flow is equal to the actual required flow by the actuator. The DRS-valve has no connection between X and the tank.

变量特性曲线(Static characteristic)

静态曲线和扭矩特性
Static curves and torque characteristic



控制数据 Controller data:
控制液压油最大消耗量约 5.5 L/min
Control fluid consumption max. approx. 5.5 L/min

代码 Code	初始值(bar) Control begin	相应规格的扭矩(Nm) Torque T(Nm) for size 45	71	100	140	180
LA5	to 50	to 42	to 67	to 94	to 132	to 167
LA6	51 - 90	42.1-76	67.1-120	94.1-169	132.1-237	167.1-302
LA7	91 - 160	76.1-134	121.1-213	169.1-299	237.1-418	302.1-540
LA8	160 - 240	134.1-202	213.1-319	299.1-449	418.1-629	540.1-810
LA9	over 240	over 202	over 319	over 449	over 629	over 810

以功率表示的扭矩值转换 [kW]:
Conversion of the torque values in power (kW):

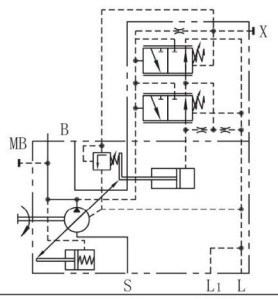
$$P = \frac{2\pi \cdot T \cdot n}{60000} \quad [kW]$$

$$P = \frac{T}{6.4} \quad [kW] \quad \text{(at 1500 rpm)}$$

	油口用途	Port for
B	工作管路	Service line
S	吸油管路	Inlet
L, L1	壳体泄油	Case drain (L1 plugged)
X	控制压力	Control pressure
MB	测量工作压力	Measuring operating pressure

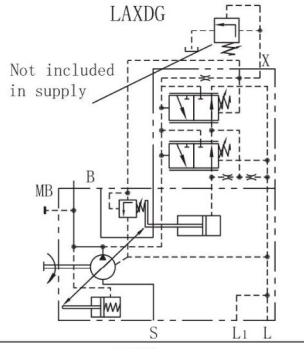
液压原理(Circuit drawing)

LAXD



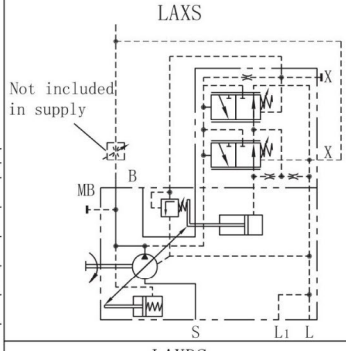
压力/功率控制:
为在各种工作压力下达到恒定驱动扭矩，泵的流量随之变化，从而达到流量与压力的积维持常数。带压力切断功能。
In order to achieve a constant drive torque with a varying operating pressure, the swivel angle and with it the output flow of the axial piston pump is varied so that the product of flow and pressure remains constant. Power control with pressure cut off.

LAXDG



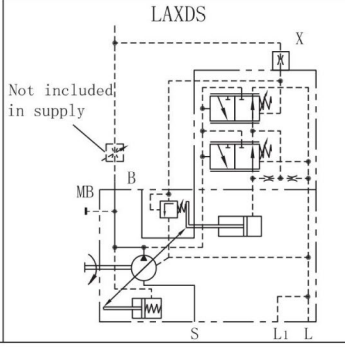
压力/功率控制:
为在各种工作压力下达到恒定驱动扭矩，泵的流量随之变化，从而达到流量与压力的积维持常数。带压力切断，可远程压力控制。
In order to achieve a constant drive torque with a varying operating pressure, the swivel angle and with it the output flow of the axial piston pump is varied so that the product of flow and pressure remains constant. Power control with pressure cut off, remotely operated.

LAXS



流量/功率控制:
为在各种工作压力下达到恒定驱动扭矩，泵的流量随之变化，从而达到流量与压力的积维持常数。恒功率曲线之下可进行流量控制。
In order to achieve a constant drive torque with a varying operating pressure, the swivel angle and with it the output flow of the axial piston pump is varied so that the product of flow and pressure remains constant. Constant flow control is possible below the power curve.

LAXDS

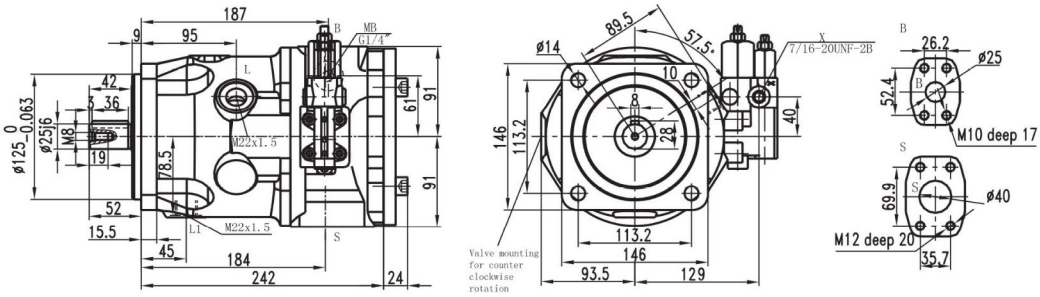


压力/流量/功率控制:
为在各种工作压力下达到恒定驱动扭矩，泵的流量随之变化，从而达到流量与压力的积维持常数。恒功率曲线之下可进行流量控制，带压力切断功能。
In order to achieve a constant drive torque with a varying operating pressure, the swivel angle and with it the output flow of the axial piston pump is varied so that the product of flow and pressure remains constant. Constant flow control is possible below the power curve, with pressure cut off.

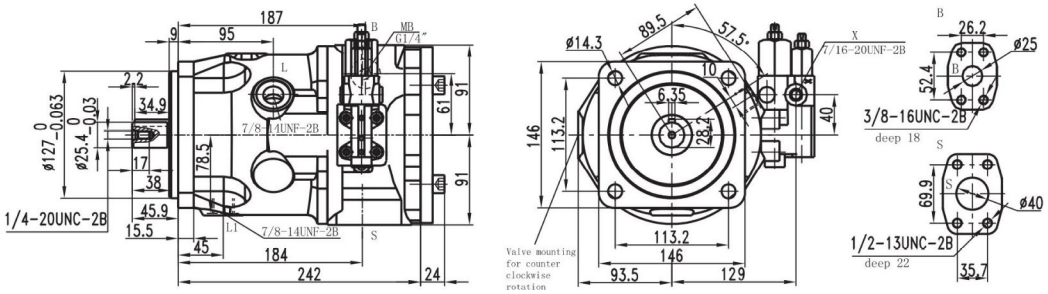
七、安装连接尺寸 Mounting Dimension

1. 规格 45 尺寸（Unit dimensions,size 45）

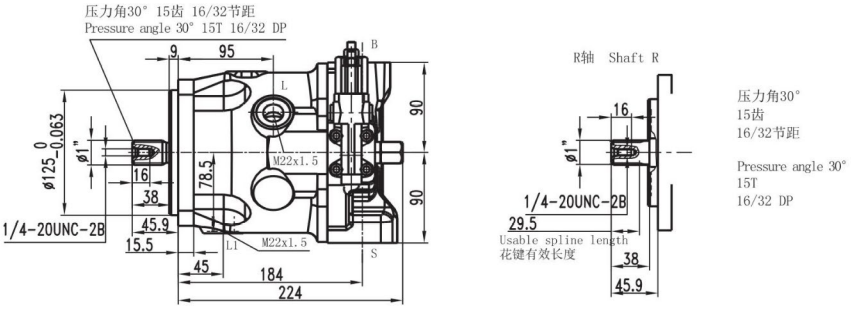
ExampleHLA10VSO45DRF/32R-VPB22U99



ExampleHLA10VSO45DRF/32R-VKD72U99

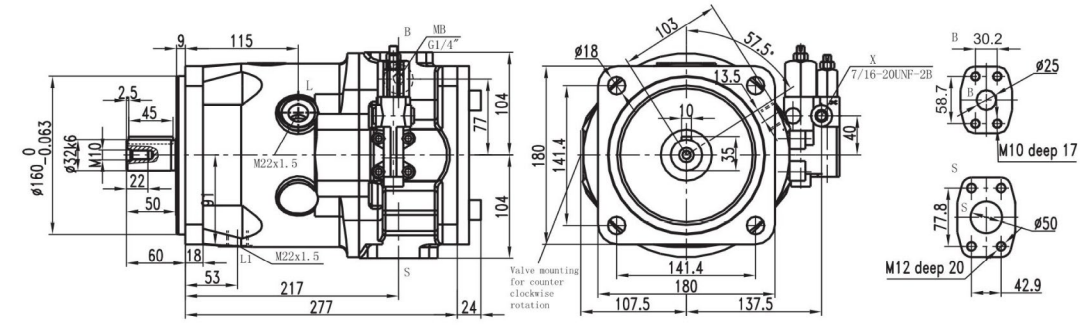


ExampleHLA10VSO45DRF/32R-VSB12N00)

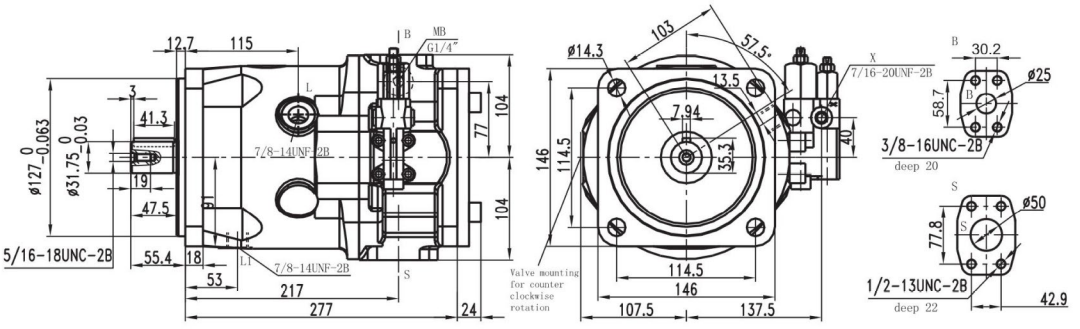


2. 规格 71 尺寸（Unit dimensions,size 71）

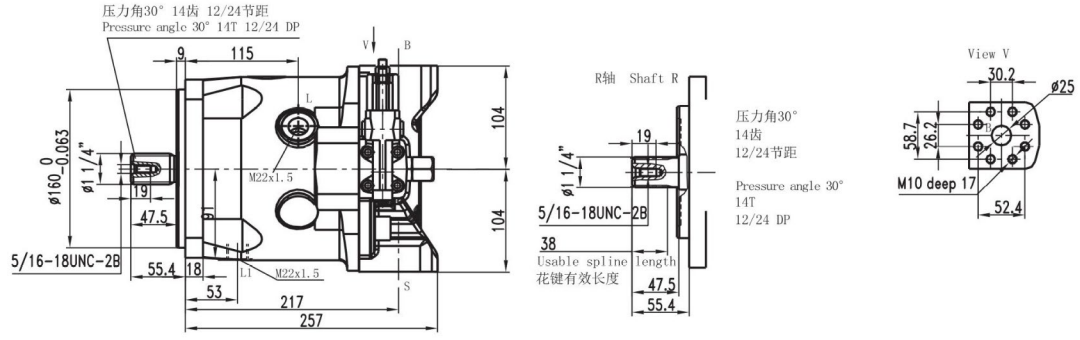
Example HLA10VSO71DRF/32R-VPB22U99



Example HLA10VSO71DRF/32R-VKD72U99)

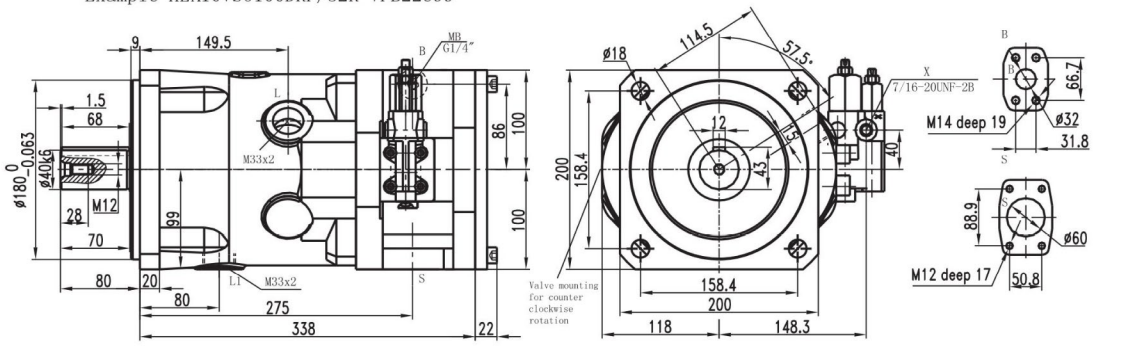


Example HLA10VSO71DRF/32R-VSB12N00)

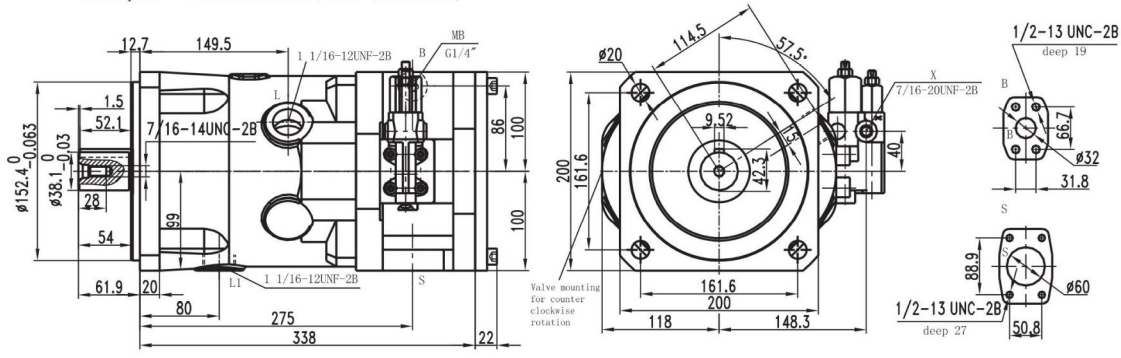


3. 规格 100 尺寸（Unit dimensions,size 100）

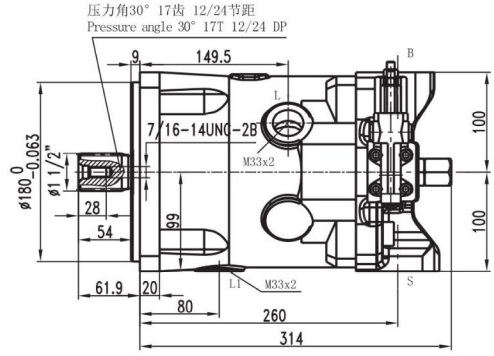
Example HLA10VSO100DRF/32R-VPB22U99



Example HLA10VSO100DRF/32R-VKD72U99)

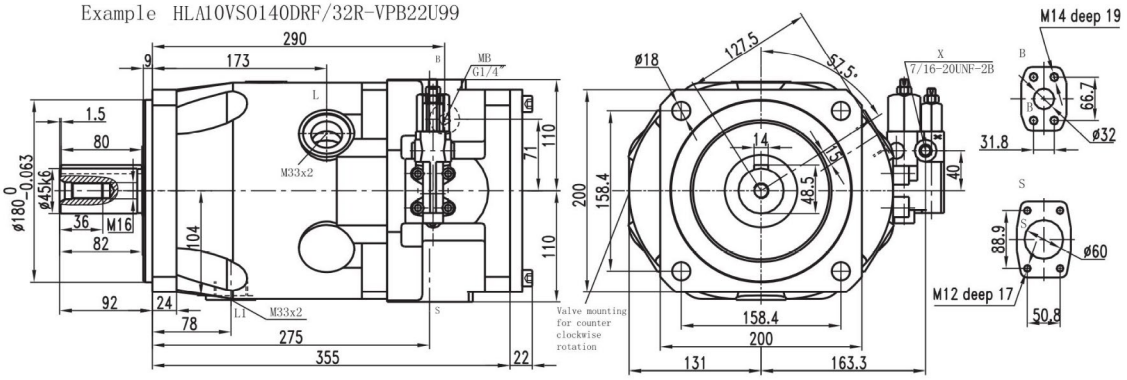


Example HLA10VSO100DRF/32R-VSB12N00)

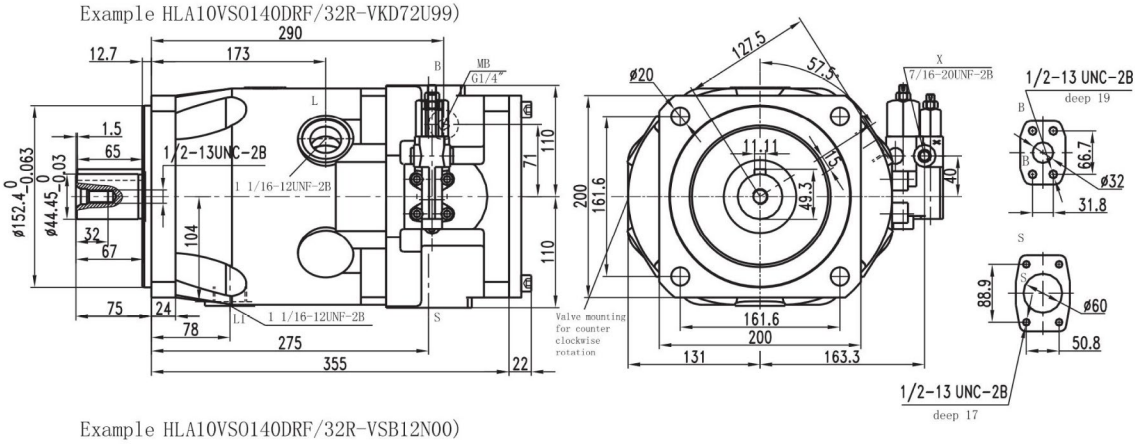


4. 规格 140 尺寸（Unit dimensions,size 140）

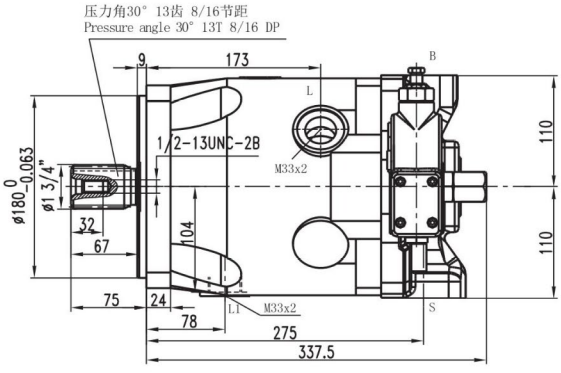
Example HLA10VSO140DRF/32R-VPB22U99



Example HLA10VSO140DRF/32R-VKD72U99)

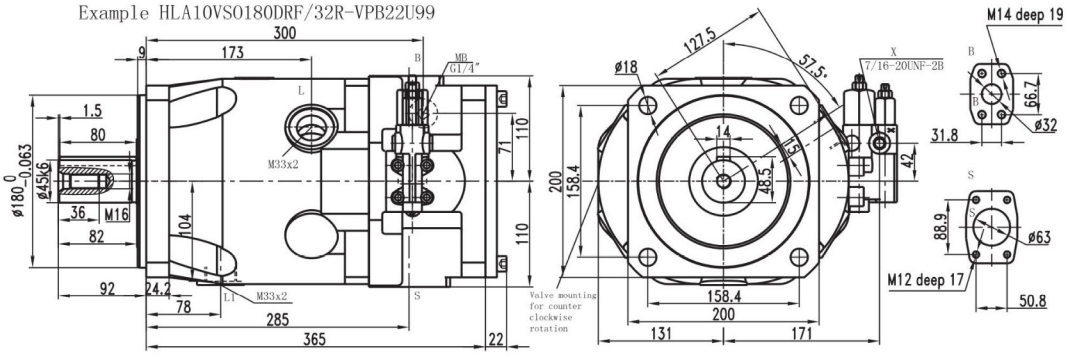


Example HLA10VSO140DRF/32R-VSB12N00)

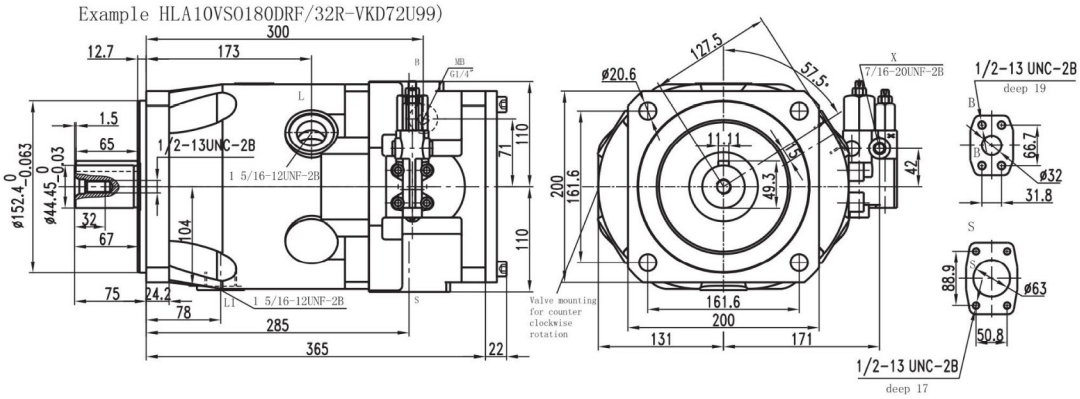


5. 规格 180 尺寸（Unit dimensions,size 180）

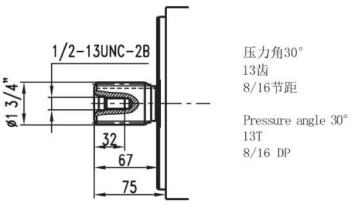
Example HLA10VSO180DRF/32R-VPB22U99



Example HLA10VSO180DRF/32R-VKD72U99)



S轴 Shaft S

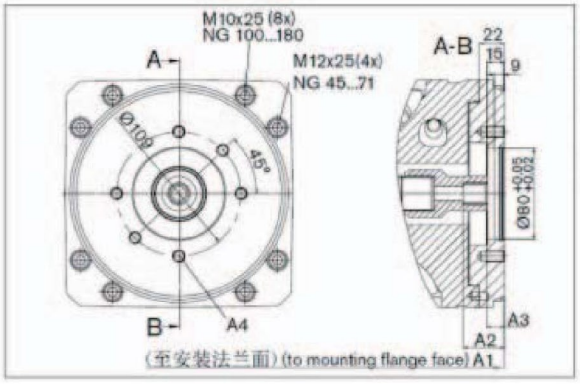


压力角30°
13齿
8/16节距

Pressure angle 30°
13T
8/16 DP

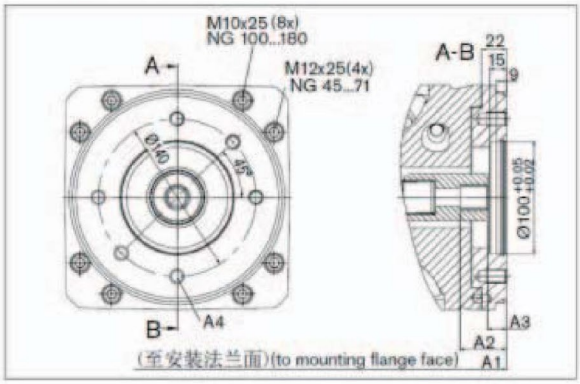
八、通轴尺寸 Dimensions through drive

B2 法兰 **Flange** ISO 3019-2 - 80 2-bolt
花键轴藕合器 **Coupler for splined shaft to** ANSI B92.1a-1996 3/4in 11T 16/32 DP (SAE J744 - 16-4 (A-B))



Size	A_1	A_2	A_3	A_4
45	264	38	15.5	M10 x 1.5; 16 deep
71	299	38	15.5	M10 x 1.5; 16 deep
100	360	38	15.5	M10 x 1.5; 16 deep
140	377	38	15.5	M10 x 1.5; 16 deep
180	387	38	15.5	M10 x 1.5; 16 deep

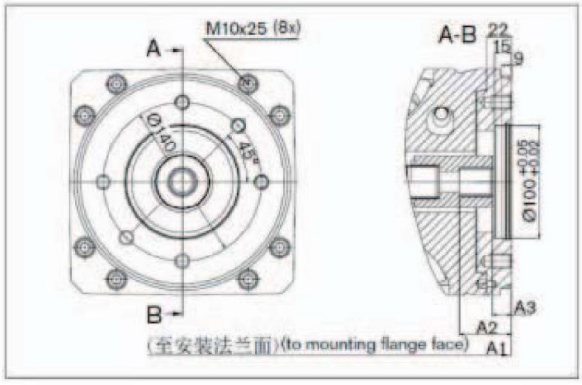
B3 法兰 **Flange** ISO 3019-2 - 100 2-bolt
花键轴藕合器 **Coupler for splined shaft to** ANSI B92.1a-1996 7/8in 13T 16/32 DP (SAE J744 - 22-4 (B))



Size	A_1	A_2	A_3	A_4 at U99
45	264	41	16.5	M12 x 1.75; 18 deep
71	299	41	16.5	M12 x 1.75; 18 deep
100	360	41	16.5	M12 x 1.75; 18 deep
140	377	41	16.5	M12 x 1.75; 18 deep
180	387	41	16.5	M12 x 1.75; 18 deep

Thread of all NG at U00 M12 x 1.75; 22 deep

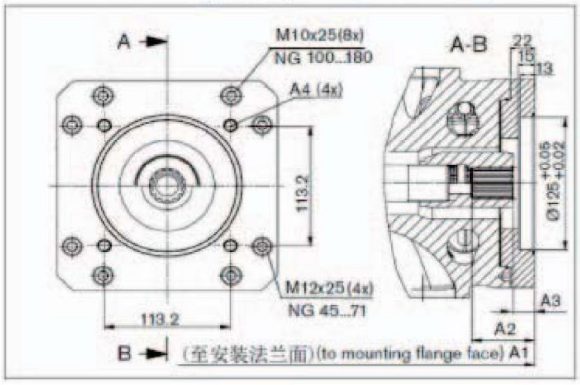
B4 法兰 **Flange** ISO 3019-2 - 100 2-bolt
花键轴藕合器 **Coupler for splined shaft to** ANSI B92.1a-1996 1in 15T 16/32 DP (SAE J744 - 25-4 (B-B))



Size	A_1	A_2	A_3	A_4 at U99
45	264	45.9	16.9	M12 x 1.75; 18 deep
71	299	45.9	16.9	M12 x 1.75; 18 deep
100	360	45.9	16.9	M12 x 1.75; 18 deep
140	377	45.9	16.9	M12 x 1.75; 18 deep
180	387	45.9	16.9	M12 x 1.75; 18 deep

Thread of all NG at U00 M12 x 1.75; 22 deep

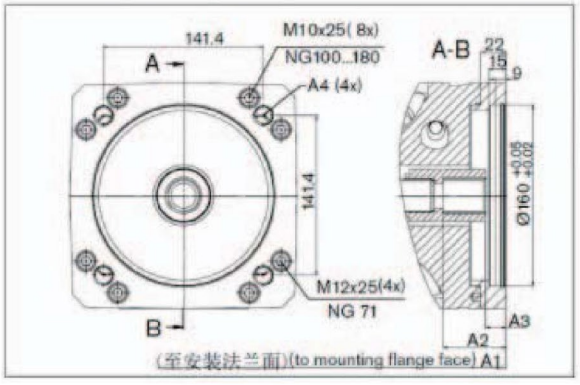
E1 法兰 Flange ISO 3019-2 - 125 4-bolt
花键轴耦合器 Coupler for splined shaft to ANSI B92.1a-1996 1 in 15T 16/32 DP (SAE J744 - 25-4 (B-B))



Size	A_1	A_2	A_3	A_4 at U99
45	264	45.9	16.9	M12 x 1.75; 22 deep
71	299	45.9	16.9	M12 x 1.75; 15 deep
100	360	45.9	16.9	M12 x 1.75; 15 deep
140	377	45.9	16.9	M12 x 1.75; 15 deep
180	387	45.9	16.9	M12 x 1.75; 22 deep

Thread of all NG at U00 M12 x 1.75; 22 deep

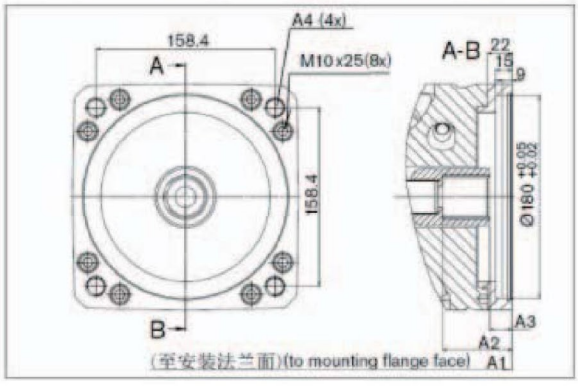
B8 法兰 Flange ISO 3019-2 - 160 4-bolt
花键轴耦合器 Coupler for splined shaft to ANSI B92.1a-1996 1 1/4in 14T 12/24 DP (SAE J744 - 32-4 (C))



Size	A_1	A_2	A_3	A_4 at U99
71	299	55.4	17.9	M16 x 2; 20 deep
100	360	55.4	17.9	M16 x 2; 20 deep
140	377	55.4	17.9	M16 x 2; 20 deep
180	387	55.4	17.9	M16 x 2; 20 deep

Thread of all NG at U00 M16 x 2; 22 deep

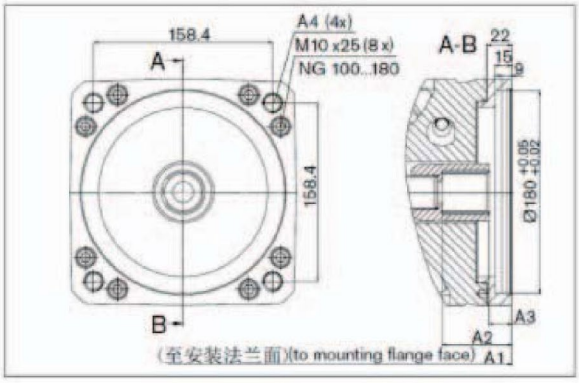
B9 法兰 Flange ISO 3019-2 - 180 4-bolt
花键轴耦合器 Coupler for splined shaft to ANSI B92.1a-1996 1 1/2in 17T 12/24 DP (SAE J744 - 38-4 (C-C))



Size	A_1	A_2	A_3	A_4 at U99
100	360	61.9	20.4	M16 x 2; 20 deep
140	377	61.9	20.4	M16 x 2; 20 deep
180	387	61.9	20.4	M16 x 2; 20 deep

Thread of all NG at U00 M16 x 2; 22 deep

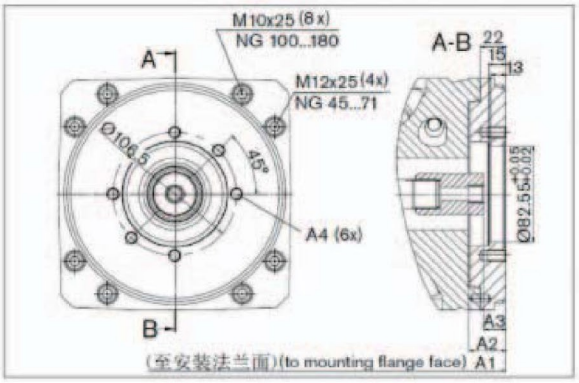
B7 法兰 **Flange** ISO 3019-2 - 180 4-bolt
花键轴耦合器 **Coupler for splined shaft to** ANSI B92.1a-1996 1 3/4in 13T 8/16 DP (SAE J744 - 44-4 (D))



Size	A_1	A_2	A_3	A_4 at U99
140	377	75	On request	M16 x 2; 20 deep
180	387	75	On request	M16 x 2; 20 deep

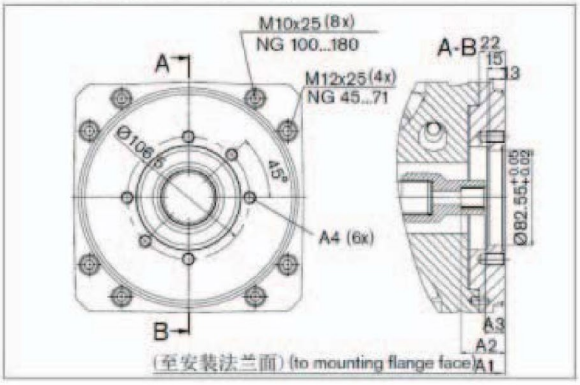
Thread of all NG at U00 M16 x 2; 22 deep

01 法兰 **Flange** ISO 3019-1 - 82-2 (A)
花键轴耦合器 **Coupler for splined shaft to** ANSI B92.1a-1996 5/8in 9T 16/32 DP (SAE J744 - 16-4 (A))



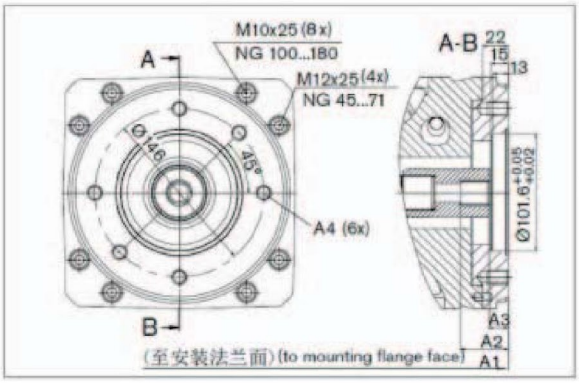
Size	A_1	A_2	A_3	A_4
45	264	31.8	19.3	M10 x 1.5; 16 deep
71	299	31.8	19.3	M10 x 1.5; 16 deep
100	360	31.8	On request	M10 x 1.5; 16 deep
140	377	31.8	On request	M10 x 1.5; 16 deep
180	387	31.8	On request	M10 x 1.5; 16 deep

52 法兰 **Flange** ISO 3019-1 - 82-2 (A)
花键轴耦合器 **Coupler for splined shaft to** ANSI B92.1a-1996 3/4in 11T 16/32 DP (SAE J744 - 19-4 (A-B))



Size	A_1	A_2	A_3	A_4
45	264	38	17.5	M10 x 1.5; 16 deep
71	299	38	17.5	M10 x 1.5; 16 deep
100	360	38	17.5	M10 x 1.5; 16 deep
140	377	38	17.5	M10 x 1.5; 16 deep
180	387	38	17.5	M10 x 1.5; 16 deep

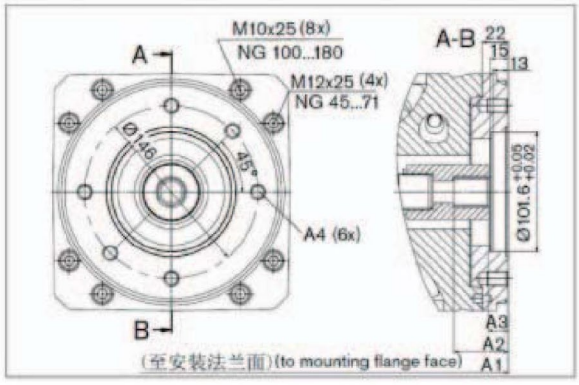
68 法兰 **Flange** ISO 3019-1 - 101-2 (B)
花键轴藕合器 **Coupler for splined shaft to** ANSI B92.1a-1996 7/8in 13T 16/32 DP (SAE J744 - 22-4 (B))



Size	A_1	A_2	A_3	A_4 at U99
45	264	41	16.5	M12 x 1.75; 22 deep
71	299	41	16.5	M12 x 1.75; 22 deep
100	360	41	16.5	M12 x 1.75; 18 deep
140	377	41	16.5	M12 x 1.75; 18 deep
180	387	41	16.5	M12 x 1.75; 18 deep

Thread of all NG at U00 M12 x 1.75; 22 deep

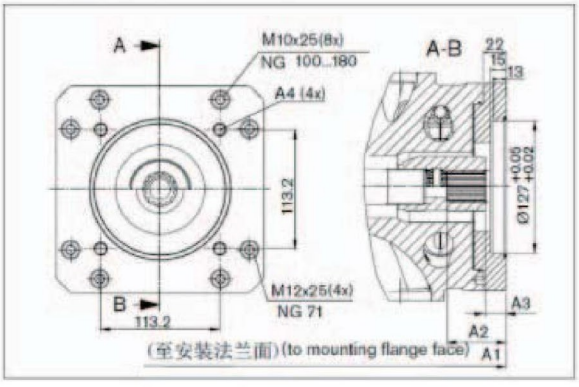
04 法兰 **Flange** ISO 3019-1 - 101-2 (B)
花键轴藕合器 **Coupler for splined shaft to** ANSI B92.1a-1996 1in 15T 16/32 DP (SAE J744 - 25-4 (B-B))



Size	A_1	A_2	A_3	A_4 at U99
45	264	45.9	16.9	M12 x 1.75; 22 deep
71	299	45.9	16.9	M12 x 1.75; 22 deep
100	360	45.9	16.9	M12 x 1.75; 18 deep
140	377	45.9	16.9	M12 x 1.75; 18 deep
180	387	45.9	16.9	M12 x 1.75; 18 deep

Thread of all NG at U00 M12 x 1.75; 22 deep

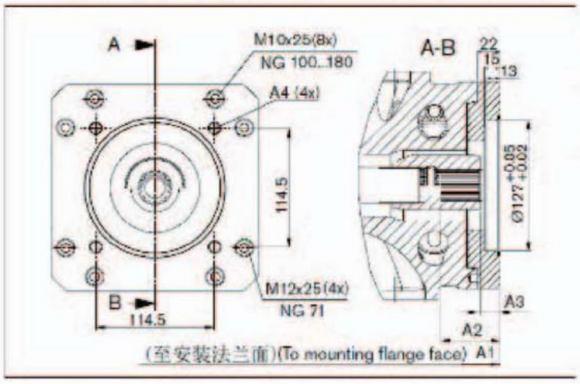
E2 法兰 **Flange** ISO 3019-1 - 127-4 (C)
花键轴藕合器 **Coupler for splined shaft to** ANSI B92.1a-1996 1 in 15T 16/32 DP (SAE J744 - 25-4 (B-B))



Size	A_1	A_2	A_3	A_4 at U99
45	264	45.9	16.9	M12 x 1.75; 22 deep
71	299	45.9	16.9	M12 x 1.75; 22 deep
100	360	45.9	16.9	M12 x 1.75; 22 deep
140	377	45.9	16.9	M12 x 1.75; 15 deep
180	387	45.9	16.9	M12 x 1.75; 22 deep

Thread of all NG at U00 M12 x 1.75; 22 deep

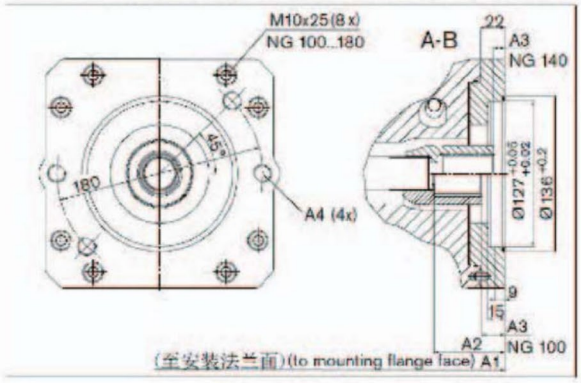
15 法兰 **Flange** ISO 3019-1 - 127-4 (C)
花键轴藕合器 **Coupler for splined shaft to** ANSI B92.1a-1996 1 1/4in 14T 12/24 DP (SAE J744 - 32-4 (C))



Size	A_1	A_2	A_3	A_4 at U99
71	299	55.4	17.9	M12 x 1.75; 22 deep
100	360	55.4	17.9	M12 x 1.75; 15 deep
140	377	55.4	17.9	M12 x 1.75; 15 deep
180	387	55.4	17.9	M12 x 1.75; 22 deep

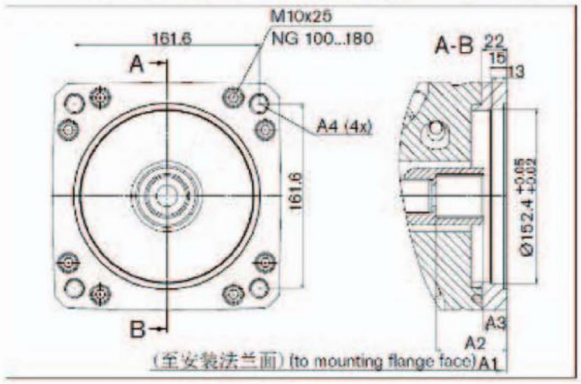
Thread of all NG at U00 M12 x 1.75; 22 deep

24 法兰 **Flange** ISO 3019-1 - 127-2 (C)
花键轴藕合器 **Coupler for splined shaft to** ANSI B92.1a-1996 1 1/2in 17T 12/24 DP (SAE J744 - 38-4 (C-C))



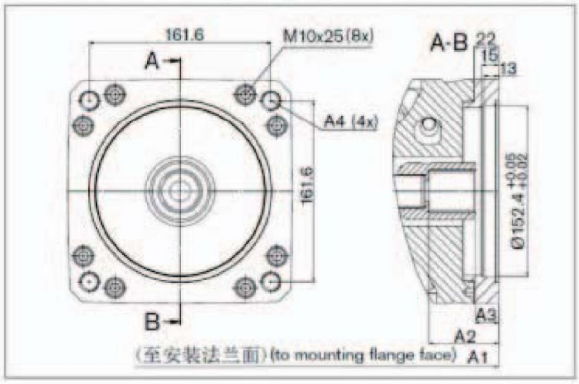
Size	A_1	A_2	A_3	A_4
100	360	61.9	20.4	M16 x 2; 22 deep
140	377	61.9	20.4	M16 x 2; 22 deep
180	387	61.9	20.4	M16 x 2; 22 deep

96 法兰 **Flange** ISO 3019-1 - 152-4 (D)
花键轴藕合器 **Coupler for splined shaft to** ANSI B92.1a-1996 1 1/2in 17T 12/24 DP (SAE J744 - 38-4 (C-C))



Size	A_1	A_2	A_3	A_4
100	360	61.9	20.4	M16 x 2; 22 deep
140	377	61.9	20.4	M16 x 2; 22 deep
180	387	61.9	20.4	M16 x 2; 22 deep

17 法兰 Flange ISO 3019-1 - 152-4 (D)
花键轴耦合器 Coupler for splined shaft to ANSI B92.1a-1996



1 3/4in 13T 8/16 DP (SAE J744 - 44-4 (D))

Size	A_1	A_2	A_3	A_4
140	377	75	On request	M16 x 2; 22 deep
180	387	75	On request	M16 x 2; 22 deep

组合泵 Combination pumps A10VSO + A10VSO

使用组合泵时，可以带有多个相互独立的油路，无需副变速机构。
在订购组合泵时，应通过“+”号将第一泵和第二泵的型号代码结合在一起。
When using combination pumps it is possible to have multiple, mutually independent circuits without the need for a splitter gear-box.
When ordering combination pumps the model codes for the first and the second pump must be joined by a “+”.

订货示例 Ordering example：A10VSO100DR/32R–VPB22UB8 + A10VSO71DRF/32R–VSB12N00

允许的弯矩 Permissible overhang moment
使用两个同尺寸的单级泵组合 (双联泵)，考虑 10g(98.1 m/s^2) 的质量加速力，无需额外的支撑架。
It is permissible to use a combination of two single pumps of the same size (Tandempump), considering a mass acceleration force of 10g (10x9.81 m/s2) without an additional support bracket.

规格 Size			45	71	100	140	180
允许的弯矩 Permissible overhang moment							
静态 static	T_m	Nm	1370	3000	4500	4500	4500
动态 dynamic at 10 g (98,1m/s^2)	T_m	Nm	137	300	450	450	450
重量 Weight	m	kg	30	47	69	73	78
重心矩 Distance to centre of gravity	l	mm	130	142	169	172	196

m_1, m_2, m_3 泵重量 Weight of pumps [kg]
l_1, l_2, l_3 重心矩 Distance centre of gravity [mm]

$$T_m = (m_1 \cdot l_1 + m_2 \cdot l_2 + m_3 \cdot l_3) \cdot \frac{1}{102} \text{ [Nm]}$$

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规格 Size 18~140

系列 series 31

额定压力 Nominal pressure 280bar

峰值压力 Peak pressure 350bar

斜盘式轴向柱塞泵 Swash plate design axial variable piston pump

特 点 Features

- 用于开式回路的斜盘式轴向柱塞泵。
  Swash plate design axial variable piston pump used in open circuit.
- 连续工作压力可达 280bar，瞬时最高工作压力可达 350bar。
  Continuous work pressure can reach 280bar,The highest instantaneous work pressure can reach 350bar.
- 流量正比于驱动转速和排量，并可通过调节斜盘倾角实现无级变量。
  The flow is directly proportional to the drive rotate speed and the displacement, and can make stepless variable come true by adjusting the obliquity of the swash plate.
- 有恒压、恒功率恒压、恒压恒流量等多种控制方式，且控制响应速度快。
  Wide range of controls such as DR,DFR,DFLR etc. Short response times.
- 低噪音、高效率、高可靠性、长寿命。
  Low noises level, High efficiency, High reliability and long time service life.
- 体积小、功率密度高。
  Small volume, High power density.
- 优良的吸油性能。
  Excellent oil absorbency.
- 驱动轴能承受轴向和径向负载。
  Axial and radial loading of drive shaft possible.
- SAE 及 ISO 安装法兰。
  SAE and ISO mounting flange.
- 可供通轴结构，用于多回路系统。
  Thru drive option for multi- circuit system.

一、 型号说明 Ordering Code

HLA10V(S)	O	28	DR	/	31	R	−	P	S	C	62	N00

通轴形式：见后页 Next page

油口型式：

Port for service lines

	18	28	45	71	100	140
11— 后面 SAE，公制螺纹 SAE flage rear, fixing thread metric		√	√	√	√	
61— 后面 SAE,UNC 螺纹 SAE flage rear, fixing thread UNC		√	√	√	√	
12— 两侧 SAE，公制螺纹 SAE flage on opposite side,fixing thread metric	√	√	√	√	√	√
62— 两侧 SAE, UNC 螺纹 SAE flage on opposite side,fixing thread UNC	√	√	√	√	√	√
41(91)— 后面 SAE，公制 (UNC) 螺纹 SAE flage rear, fixing thread metric(UNC)				√		
42(92)— 两侧 SAE，公制 (UNC) 螺纹 SAE flage on opposite side,fixing thread metric(UNC)				√		

安装法兰：

Mounting flange

	18	28	45	71	100	140
A--ISO 两孔 ISO 2-hole	√	√	√	√	√	
C--SAE 两孔 SAE 2-hole	√	√	√	√	√	
B--ISO 四孔 ISO 4-hole						√
D--SAE 四孔 SAE 4-hole						√

轴端型式：

Shaft end

	18	28	45	71	100	140
P— 公制平键 Metric parallel with key	√	√	√	√	√	√
S--SAE 花键 SAE splined	√	√	√	√	√	√
R--SAE 花键（较高通轴驱动扭矩） SAE splined (higher through drive torque)	√	√	√	√		
K--SAE 平键 SAE parallel with key	√	√	√	√	√	√
U--SAE 小花键 SAE splined,reduced dian, not for through drive	√		√		√	
W--SAE 小花键（较高不通轴驱动扭矩） Similar to shaft "U", higher input torque, not for through drive			√		√	

泵型号：变量泵；斜盘式结构

Model Variable pump,Swashplate design

额定压力 280bar

Rated pressure 280bar

峰值压力 350bar

Peak pressure 350bar

运行模式：泵，开式回路

Mode of operation Pump,open circuit

规格排量：18、28、45、71、100、140(ml/r)

Displacement 18.28.45.71.100.140(ml/r)

控制方式：

Controller

	18	28	45	71	100	140
DG— 两位控制 Two point,direct control						
DR— 恒压控制 Pressure control	√	√	√	√	√	√
DRG— 远程恒压控制 Remote pressure control	√	√	√	√	√	√
DFR— 压力 / 流量控制 Pressure and flow control	√	√	√	√	√	√
DFR1— 压力 / 流量控制，X 口关闭 Pressure and flow control Orifice in X-channel closed	√	√	√	√	√	√
DFLR— 压力 / 流量 / 功率控制 Pressure,flow,torque control		√	√	√	√	√

产品系列： 31 系列；

Series 31 Series

转向（从轴端看）： R— 顺时针 clockwise

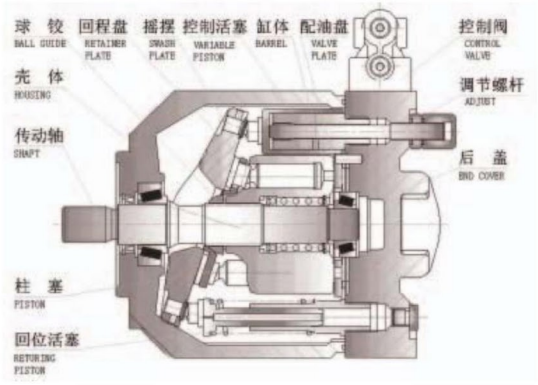
Direction of Rotation L— 逆时针 anti-clockwise

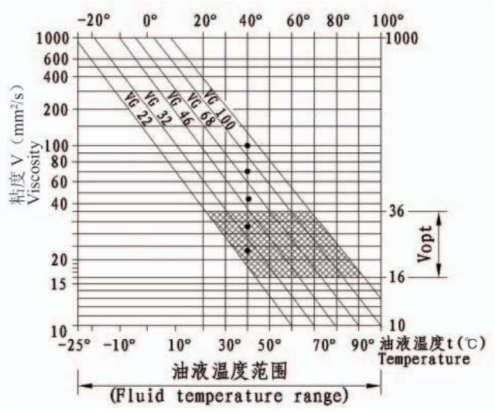
密封件：P— 丁腈橡胶 Perbunan

Seals V— 氟橡胶 Viton

通轴型式： With through drive to accept an axial piston pump or a gear pump				18	28	45	71	100	140	
不通轴 Without through drive				√	√	√	√	√	√	N00
安装法兰 Mounting flage	轴 / 轴套 Shaft/coupling		用于安装 For the mounting of							
ISO 80,2 hole	3/4"	19-4(SAE A-B)	HLA10VSO10-18(shaft S or R)	√	√	√	√	√	√	KB2
ISO 100,2 hole	7/8"	22-4(SAE B)	HLA10VSO28(shaft S or R)		√	√	√	√	√	KB3
ISO 100,2 hole	1"	25-4(SAE B-B)	HLA10VSO45(shaft S or R)			√	√	√	√	KB4
ISO 125,2 hole	1 1/4"	32-4(SAE-C)	HLA10VSO71(shaft S or R)				√	√	√	KB5
ISO 125,2 hole	1 1/2"	38-4(SAE C-C)	HLA10VSO100(shaft S)					√	√	KB6
ISO 180,4 hole	1 3/4"	44-4(SAE D)	HLA10VSO140(shaft S)						√	KB7
SAE 82-2,2 hole	5/8"	16-4(SAE A)	HLA10VSO10-18(shaft U),1PF2G2,PGF2	√	√	√	√	√	√	K01
SAE 82-2, 2 hole	3/4"	19-4(SAE A-B)	HLA10VSO10-18(shaft S or R)	√	√	√	√	√	√	K52
SAE 101-2, 2 hole	7/8"	22-4(SAE B)	1PF2G3		√	√	√	√	√	K02
SAE 101-2, 2 hole	7/8"	22-4(SAE B)	HLA10VSO28(shaft S or R),PGF3		√	√	√	√	√	K68
SAE 101-2, 2 hole	1"	25-4(SAE B-B)	HLA10VSO45(shaft S or R),PGH4			√	√	√	√	K04
SAE 127-2, 2 hole	1 1/4"	32-4(SAE C)	HLA10VSO71(shaft S or R)				√	√	√	K07
SAE 127-2,2 hole	1 1/2"	38-4(SAE C-C)	HLA10VSO100(shaft S),PGH5					√	√	K24
SAE 152-4,4 hole	1 3/4"	44-4(SAE D)	HLA10VSO140(shaft S)						√	K17
ISO 80-2	Key shaft Φ18		HLA10VSO18(Shaft P)	√	√	√	√	√	√	K51
SAE A 82-2	Key shaft Φ19.05		HLA10VSO18(Shaft K)	√	√	√	√	√	√	K40
ISO 100-2	Key shaft Φ22		HLA10VSO28(Shaft P)		√	√	√	√	√	K25
SAE B 101-2	Key shaft Φ22.225		HLA10VSO28(Shaft K)		√	√	√	√	√	K03
ISO 100-2	Key shaft Φ25		HLAJ10VSO45(Shaft P)			√	√	√	√	K26
SAE B 101-2	Key shaft Φ25.4		HLA10VSO45(Shaft K)			√	√	√	√	K05
ISO 125-2	Key shaft Φ32		HLA10VSO71(Shaft P)				√	√	√	K27
SAE B 127-2	Key shaft Φ31.75		HLA10VSO71(Shaft K)				√	√	√	K08
ISO 125-2	Key shaft Φ40		HLA10VSO100(Shaft P)					√	√	K37
SAE C 127-2	Key shaft Φ38.1		HLA10VSO100(Shaft K)					√	√	K38
ISO 180-4	Key shaft Φ45		HLA10VSO140(Shaft P)						√	K59
SAE B 152-4	Key shaft Φ44.45		HLA10VSO140(Shaft K)						√	K21

二、 结构图 Construction





三、 油液 Hydraulic fluid

- 适用于矿物油。

TheHLA10VSO variable displacement pump is suitable for use with mineral oil.

- 工作粘度范围 Operating viscosity range

为了得到最佳的效率和寿命，我们推荐把油液的工作粘度（在相应的工作温度下）选择在以下范围内：

In order to obtain optimum efficiency and service life ,we recommend that the operating viscosity(at operating temperature) be selected from within the range.

Vopt= 最佳工作粘度 opt. operating viscosity

16…36 mm^2/s

与油箱温度（开式油路）相关。

Referred to the reservoir temperature(open circuit).

- 粘度范围的限制 Viscosity limits

Vmin=10mm^2/s 短时间在 90℃油温的最大泄漏情况下最大粘度 short term at a max. permissible drain of 90℃ .

Vmax=1000mm^2/s 短时间冷起动时 short term on cold start

- 温度范围 Temperature range (see selection diagram):t=−25 ～ 90℃

- 选用油液的注意事项 Notes on the selection of the hydraulic fluid.

为了正确地选用液压油，必须知道油箱中油液工作温度（开式回路）和环境温度的关系。In order to select the correct fluid , it is necessary to know the operating temperature in the tank (open loop) in relation to the ambient temperature. 根据选用图表，应确保在油液的工作温度范围内，油液的粘度在最佳粘度范围（V opt 在阴影范围），并建议在同时可选用的不同等级中尽可能选较高粘度等级。The hydraulic fluid should be selected so that within the operating temperature range, the operating viscosity lies within the optimum range (Vopt) (see shaded section of the selection diagram). We recommend that the higher viscosity range should be chosen in each case.

- 油液的过滤 Filtration

滤油越精细，工作液体的清洁度越好，则泵的寿命越长。为了保证柱塞泵元件的正常功能，油液的清洁度至少为： NAS 1638 9 级，ISO/DIS4406 的 18/15 级。

The finer the filtration the better the cleanliness of the pressure fluid and the longer the life of the axial piston unit.To ensure the functioning of the axial piston unit a minimum cleanliness level of: 9 to NAS 1638 18/15 to ISO/DIS 4406 is necessary.

四、机械排量限制器 Mechanical displacement limiter

机械排量限制器仅能用于不通轴的 N00 系列泵，通轴泵则不能用。
Mechanical displacement limiter is possible on the nonthrough-drive model, N00 series but not for the model with through-drive.
Vg max： 用于规格 18~140； for sizes 18 to 140
设定范围从 Vg max 到 50% Vg max，无级变化； Setting range Vg max to 50% Vg max stepless
Vg min： 用于规格 100、140；for sizes 100 and 140
设定范围从 Vg min 到 50% Vg max，无级变化；Setting range Vg min to 50% Vg max stepless

五、主要参数 Parameter

进油口工作压力范围
Operating pressure range - inlet

进油口（S 口）的绝对压力
Absolute pressure at port S
$P_{abs\ min}$----------0.8 bar
$P_{abs\ max}$----------30 bar

出油口工作压力范围
Operating pressure range - outlet

出油口（B 口）压力 Pressure at port B
公称压力 Nominal pressure P_N----------280 bar
峰值压力 Peak pressure P_{max}----------350 bar
间隙工作压力（占 10% 循环周期）--------315 bar
Applications with intermittent operating pressures up to 315 bar at 10% duty are permissible.

壳体泄油压力 Case drain pressure

泄油口（L，L_1）最大允许压力：最高可比进油口压力高 0.5bar，但不得高于 2bar 的绝对压力。
Maximum permissible pressure of leakage fluid (at port L, L_1):Maximum 0,5 bar higher than the inlet pressure at port S, but nohigher than 2 bar absolute.

规格 Sizes				18	28	45	71	100	140
排量 Displacement	$V_{g\ max}$ cm^3			18	28	45	71	100	140
最高转速 Max speed	n_{max} rpm			3300	3000	2600	2200	2000	1800
最大流量 Max. flow	在 in n_{max}	q_v	L/min	59.4	84	117	156	200	252
	在 in 1500 r/min			27	42	68	107	150	210
最大功率（Δp=280bar） Max. power	在 in n_{max}	P_{max}	kW	27.7	39	55	73	93	118
	在 in 1500 r/min			12.6	20	32	50	70	98
最大扭矩（Δp=280bar） Max. torque	在 in $V_{g\ max}$	Tmax	Nm	80.1	125	200	316	445	623
重量 Weight		m	Kg	12	15	21	33	45	60

参数关系：Parameter relations

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

驱动转矩 Drive Torque $T = \frac{1.59 \cdot V_g \cdot \Delta p}{100 \cdot \eta_{mh}} = \frac{V_g \cdot \Delta p}{20 \cdot \pi \cdot \eta_{mh}}$ [Nm]

驱动功率 Drive Power $P = \frac{T \cdot n}{9549} = \frac{2\pi \cdot T \cdot n}{60000} = \frac{q_v \cdot \Delta p}{600 \cdot \eta_t}$ [kW]

V_g = 每转几何排量 [cm^3] Geometry displacement each rotate
Δp = 压差 [bar] Pressure drop/differential
n = 转速 [rpm] Rotary speed
η_v = 容积效率 Cubage' s efficiency
η_{mh} = 机械－液压效率 Mechanical-Hydraulic efficiency
η_t = 总效率（$\eta_t = \eta_v \times \eta_{mh}$）Overall efficiency

六、安装注意事项

流量 160L/min 及以上的泵不建议安装在油箱上，以下的泵可安装于油箱上，但要确保油箱盖有足够的刚度。与原动机的输出轴安装精度 (同心度、垂直度) ≤ 0.05mm。在试运行前，泵内必须灌满油液并在工作时保持充满。为了减低噪声，提高系统的可靠性，建议所有油泵尽可能下置于油箱安装。进油管路不允许安装滤网，建议系统采用出油或系统回油管路过滤。

1、垂直安装（轴端向上）

1.1 安装于油箱内

安装前先灌满油液并使其处于水平位置。

a) 当油箱的最低液面高于或等于安装法兰面时，将 “L” 堵死，而将 “L_1” 和进油口 “S” 打开，建议按图 1 配管。

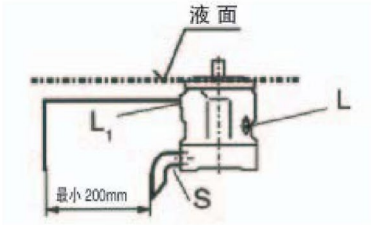


图 1

b) 如果油箱的最低液面低于泵的安装法兰面，则封闭泄油口 “L”，泄油口 “L_1” 及进油口 “S” 按图 2 配管，并参见 1.2.1 节。

1.2 安装在油箱外面

在安装前泵置于水平位置并灌满油液。如安装于油箱的上方，参见图 2。

1.2.1 在静态和动态情况下泵的最低吸油压力均为 P_{absmin}=0.8bar。

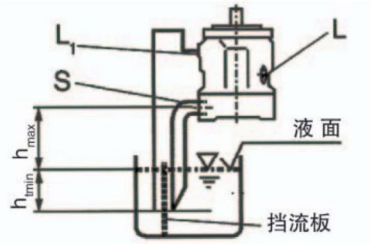


图 2

1.2.2 此种方法安装时最大吸油口高度 h_{max}=500mm；具体视吸油管路的阻力损失而定。阻力损失较大时，吸油高度尽量要小，吸油口的最小浸没深度 h_{tmin}=200mm。

2、水平安装（轴端水平）

水平安装时应确保泄油口 “L” 或 “L_1” 处于顶部。

2.1 安装在油箱内

a) 当油箱的最低液面在泵顶端之上时，把泄油口 “L_1” 堵住，泄油口 “L”、进油口 “S” 配管参见图 3。

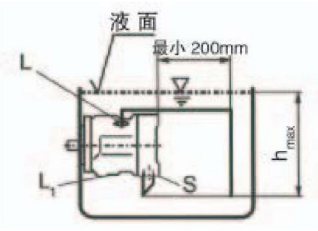


图 3

b) 当油箱的最低液面低于泵的顶部时，将泄油口 “L_1” 堵住，泄油口 “L”、进油口 “S” 的配管要求参见图 4，注意 h_{tmin}=200mm, h_{max}=500mm。

2.2 安装在油箱外面

将位于下面的泄油口 “L” 或 “L_1” 堵住，将壳体内灌满油。

a) 安装在油箱上，泄油口 “L” 及进油口 “S” 配管请参见图 4。

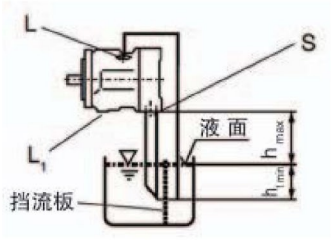


图 4

b) 如安装在油箱下，泄油口 “L_1” 及进油口 “S” 配管请参见图 5。

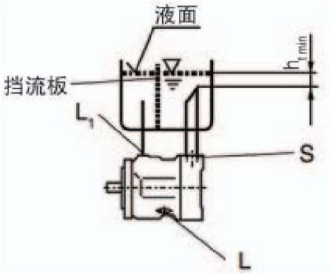


图 5

Installation Notes

Optional installation position. The pump housing must be filled with fluid during commissioning and remain full when operating. In order to attain the lowest noise level, all connections (suction,pressure, case drain ports) must be linked by flexible couplings to tank.
Avoid placing a check valve in the case drain line.

1. Vertical installation (shaft end upwards)
The following installation conditions must be taken into account:

1.1. Arrangement in the reservoir

Before installation fill pump housing, keeping it in a horizontal position.

a) If the minimum fluid level is equal to or above the pump mounting face close port "L"plugged, leave ports"L_1" and "S" open; L_1 piped and recommendation S piped (see Fig.1).

b) If the minimum fluid level is below the pump mounting face pipe port "L_1" and "S" according to Fig. 2.

Close port "L" with respect taking into consideration

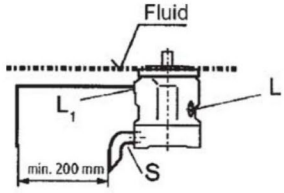


Fig. 1

1.2. Arrangement outside the reservoir

Before installation fill the pump housing, keeping it in a horizontal position. For mounting above reservoir see Fig. 2.

Limiting condition:

1.2.1. Minimum pump inlet pressure $p_{abs\ min}$ = 0.8 bar under both static and dynamic conditions.

Note: Avoid mounting above reservoir wherever possible in order to achieve a low noise level.

The permissible suction height h comes from the overall pressure loss, but may not be bigger than h_{max} = 500 mm (immersion depth $h_{t\ min}$ = 200 mm).

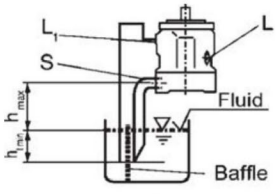


Fig. 2

Overall pressure loss

$\triangle p_{tot} = \triangle p1 + \triangle p2 + \triangle p3 \leqslant (1\text{-}P_{abs\ min}) = 0.2bar$

$\triangle$ p1: Pressure loss in pipe due to accelerating column of fluid

$\triangle p1 = \rho \times l \times (dv/dt)\ 10^{-5}(bar)$ ρ =density(kg/m^3)

l=pipe lenght(m)

dv/dt = rate of change in fluid velocity (m/s^2)

$\triangle$ p2=Pressure loss due to static head

$\triangle p2 = h \times \rho \times g \times 10^{-5}(bar)$ h=height(m)

ρ =density(kg/m^3)

g = gravity = 9.81 m/s^2

$\triangle$ p3: Line losses (elbows etc.)

2. Horizontal installation

The pump must be installed, so that "L" or "L_1" is at the top.

2.1. Arrangement in the reservoir

a) If the minimum fluid level is above the top of the pump, port "L_1" closed, "L" and "S" should remain open, L piped and recommendation S piped (see Fig. 3)

b) If the minimum fluid level is equal to or below the top of the pump, pipe ports "L" and possibly "S" as Fig. 4.; close port "L_1".

The conditions according to item 1.2.1.

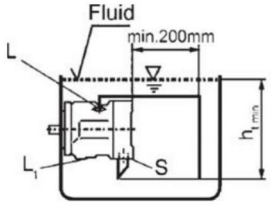


Fig. 3

2.2. Installation outside the reservoir

Fill the pump housing before commissioning.

Pipe ports "S" and the higher port "L" or "L_1".

a) When mounting above the reservoir, see Fig. 4.

Conditions according to 1.2.1.

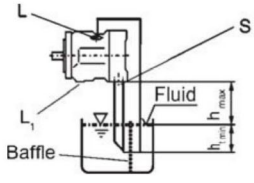


Fig. 4

b) Mounting below the reservoir

Pipe ports "L_1" and"S" according to Fig.5, close port "L".

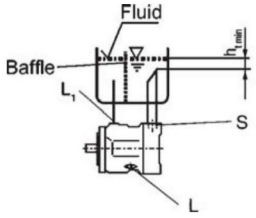
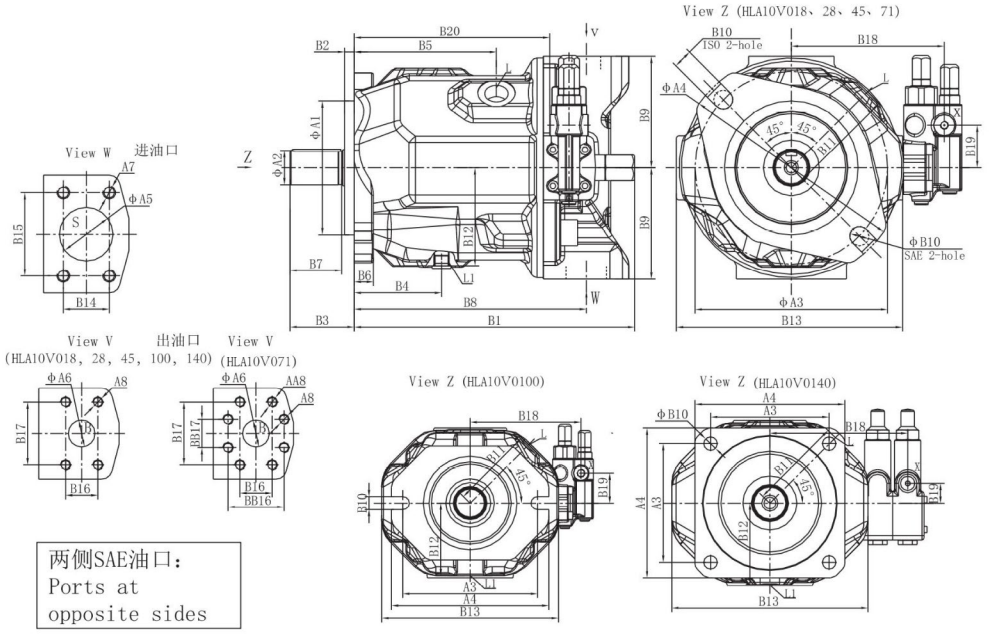
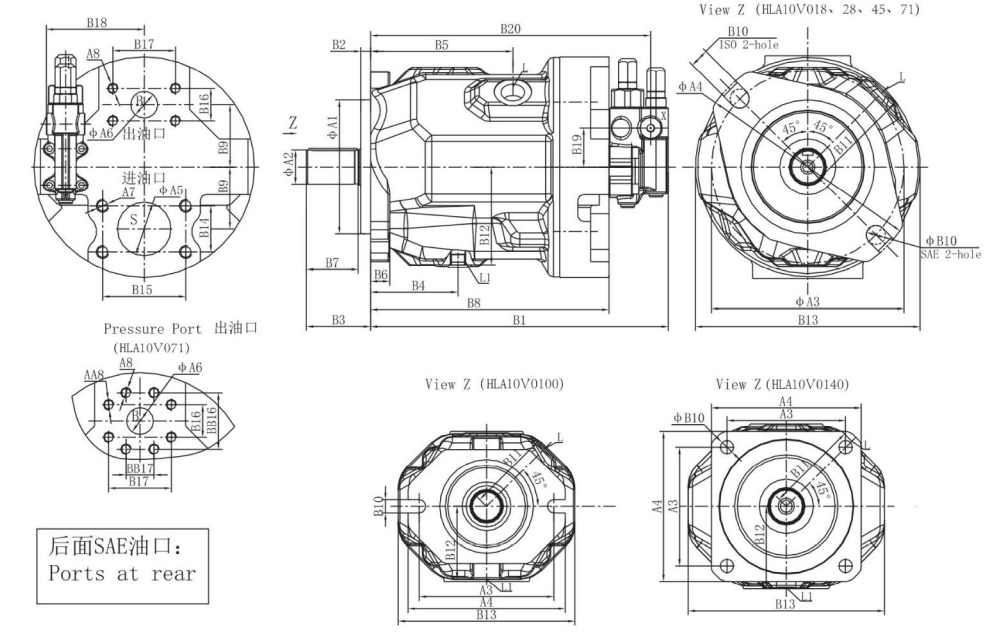


Fig. 5

七、安装连接尺寸 Mounting Dimension

1. 规格 18–140 尺寸图 (Size 18 to 140)





安装法兰——相关尺寸：
Dimensions-Mounting flange

排量 Size	安装法兰 A(B) ISO 2(4)-hole					安装法兰 C(D) SAE 2(4)-hole					A4	A5	A6
	A1	A3	B2	B10	L(L1)	A1	A3	B2	B10	L(L1)			
18	80h8	109	7	11	M16×1.5	82.55h8	106.4	6.3	11	9/16-18UNF	134	25	20
28	100h8	140	9	14	M18×1.5	101.6h8	146	9.5	Φ14	3/4-16UNF	174	32	20
45	100h8	140	9	14	M22×1.5	101.6h8	146	9.5	Φ14	7/8-14UNF	174	40	25
71	125h8	180	9	18	M22×1.5	127h8	181	12.7	Φ18	7/8-14UNF	210	50	25
100	125h8	180	9	17.5	M27×2	127h8	181	12.7	17.5	1 1/16-12UNF	210	60	32
140	180h8	158.4×158.4	9	Φ18	M27×2	152.4h8	161.6×161.6	12.7	Φ20	1 1/16-12UNF	200×200	63	32

油口型式——相关尺寸：
Dimensions-Ports for service lines

排量 Size	两侧 SAE 油口 (Ports at opposite sides)						后面 SAE 油口 (Ports at rear)						公制 (UNC) 螺纹 Metric(UNC) threads		
	B1	B8	B9	B18	B19	B20	B1	B8	B9	B18	B19	B20	A7	A8	AA8
18	195	145	63	109	40	130							M10(3/8-16UNC)	M10(3/8-16UNC)	
28	206	164	80	119	40	140	225	170	45	73	43	209	M10(7/16-14UNC)	M10(3/8-16UNC)	
45	224	184	90	129	40	155	244	189	50	81.5	40	228	M12(1/2-13UNC)	M10(3/8-16UNC)	
71	259	217	104	143	40	183	278	223	58	91.5	40	262	M12(1/2-13UNC)	M10(3/8-16UNC)	M10(7/16-14UNC)
100	329	275	100	148	40	250	344	288	55	99	40	327	M12(1/2-13UNC)	M14(1/2-13UNC)	
140	337.5	275	110	183	27	222	379	293	60	140	27	353	M12(1/2-13UNC)	M14(1/2-13UNC)	

轴端型式——相关尺寸：
Dimensions-shaft end

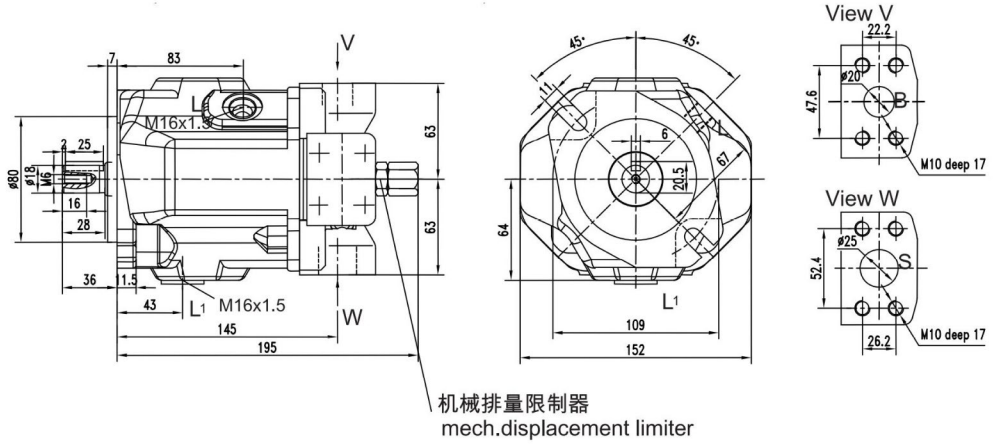
排量 Size	U，W轴 Shaft A2	B3	B7	P轴 Shaft A2	B3	B7	S，R轴 Shaft A2	B3	B7	k轴，Shaft A2	B3	B7
18	Φ15.875(16/32DP;9T)	31.8	23.8	Φ18(键 key6×25)	36	28	Φ19.05(16/32DP;11T)	38	30	Φ19.05(键 key4.76×28.6)	41	33
28				Φ22(键 key6×32)	46	36	Φ22.225(16/32DP;13T)	41	33.1	Φ22.225(键 key6.35×28.6)	41.3	33.3
45	Φ22.225(16/32DP;13T)	41	33.1	Φ25(键 key8×36)	52	42	Φ25.4(16/32DP;15T)	45.9	38	Φ25.4(键 key6.35×34.9)	45.9	38.1
71				Φ32(键 key10×45)	60	50	Φ31.75(12/24DP;14T)	55.4	47.5	Φ31.75(键 key7.94×41.3)	55.4	47.5
100	Φ31.75(12/24DP;14T)	55.4	47.5	Φ40(键 key12×68)	80	70	Φ38.1(12/24DP;17T)	61.9	54	Φ38.1(键 key9.52×52.1)	61.9	54
140				Φ45(键 key14×80)	92	82	Φ44.45(8/16 DP;13T)	75	67	Φ44.45(键 key11.11×65)	75	67

通用尺寸：
Dimensions

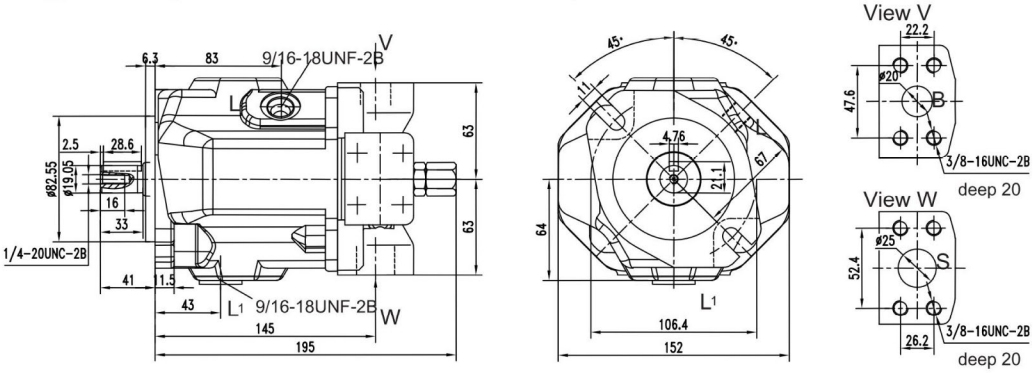
排量 Size	B4	B5	B6	B11	B12	B13	B14	B15	B16	B17	BB16	BB17	X	B	S
18	43	83	11.5	67	64	152	26.2	52.4	22.2	47.6			7/16-20UNF	3/4″	1″
28	40	90	13	74	75	164	30.2	58.7	22.2	47.6			7/16-20UNF	3/4″	1 1/4″
45	45	96	13	83	80.5	184	35.7	69.9	26.2	52.4			7/16-20UNF	1″	1 1/2″
71	53	115	17	98	92	210	42.9	77.8	30.2	58.7	52.4	26.2	7/16-20UNF	1″	2″
100	95	175	20	106	95	236	50.8	88.9	31.8	66.7			7/16-20UNF	1 1/4″	2 1/2″
140	78	173	21	118.5	108	262	50.8	88.9	31.8	66.7			M14×1.5	1 1/4″	2 1/2″

2. 规格 18 尺寸 (Unit dimensions,size 18)

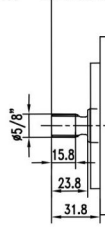
ISO 法兰 Flange ISO
P 轴 Shaft P (HLA10VSO 18 XXX/31X–PPA12N00)



SAE 法兰 Flange SAE
K 轴 Shaft K (HLA10VSO 18 XXX/31X–PKC62N00)



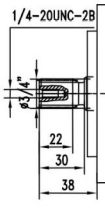
U 轴 Shaft U



压力角 30°
9 齿
16/32 节距

Pressure angle 30°
9T
16/32 DP

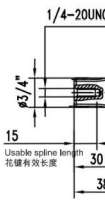
S 轴 Shaft S



压力角 30°
11 齿
16/32 节距

Pressure angle 30°
11T
16/32 DP

R 轴 Shaft R

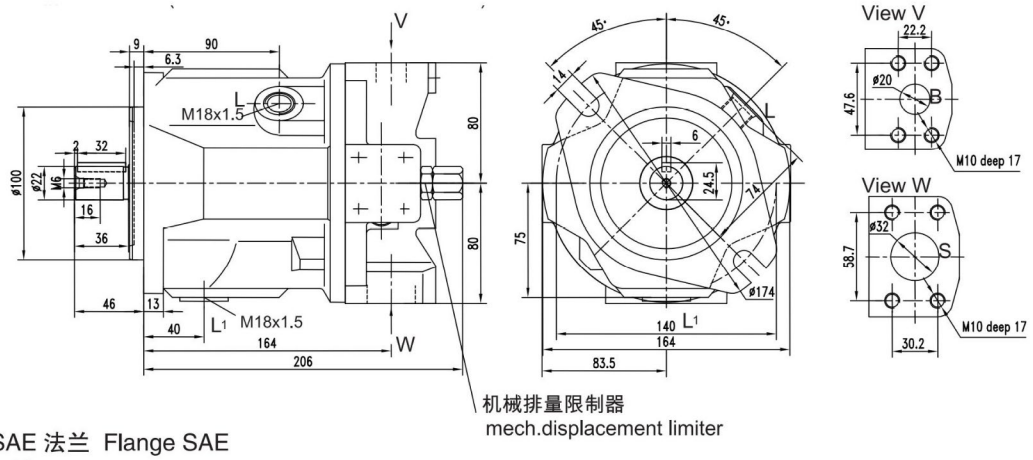


压力角 30°
11 齿
16/32 节距

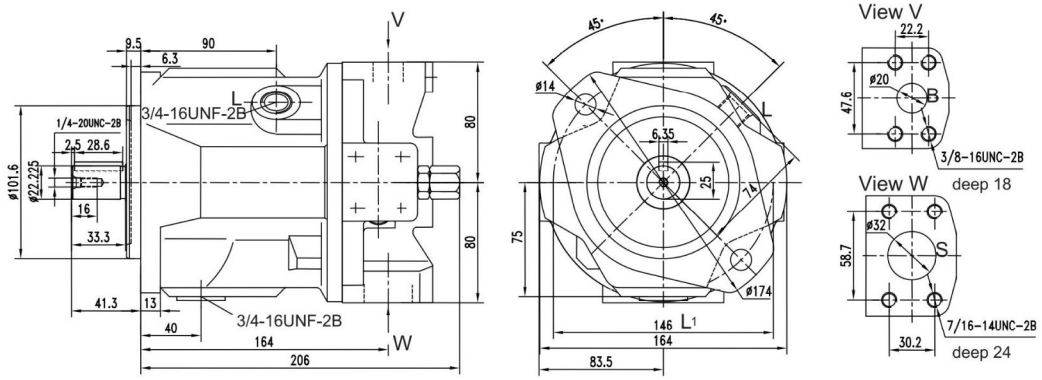
Pressure angle 30°
11T
16/32 DP

3. 规格 28 尺寸（Unit dimensions,size 28）

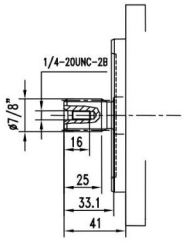
ISO 法兰 Flange ISO
P 轴 Shaft P (HLA10VSO 28 XXX/31X–PPA12N00)



SAE 法兰 Flange SAE
K 轴 Shaft K (HLA10VSO 28 XXX/31X–PKC62N00)



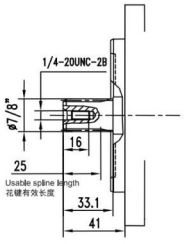
S 轴 Shaft S



压力角 30°
13 齿
16/32 节距

Pressure angle 30°
13T
16/32 DP

R 轴 Shaft R

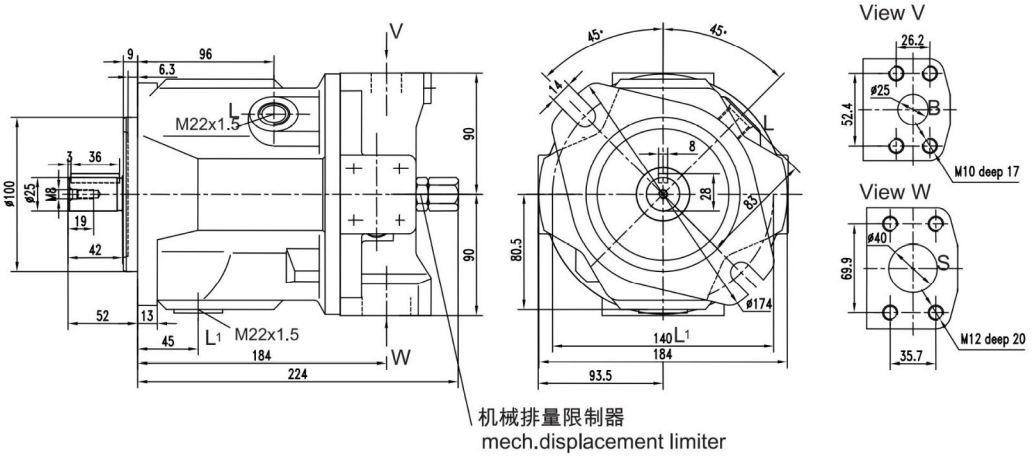


压力角 30°
13 齿
16/32 节距

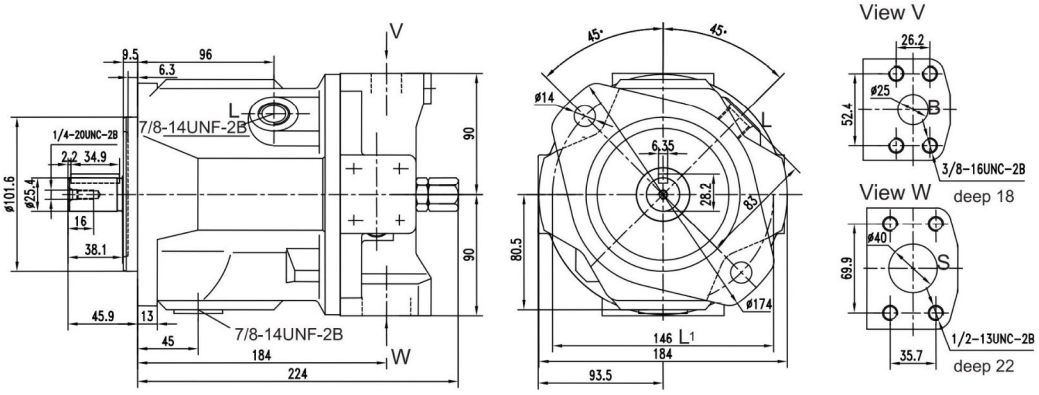
Pressure angle 30°
13T
16/32 DP

4. 规格 45 尺寸（Unit dimensions,size 45）

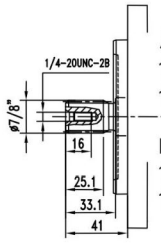
ISO 法兰 Flange ISO
P 轴 Shaft P (HLA10VSO 45 XXX/31X–PPA12N00)



SAE 法兰 Flange SAE
K 轴 Shaft K (HLA10VSO 45 XXX/31X–PKC62N00)



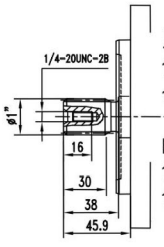
U 轴 Shaft U



压力角 30°
13 齿
16/32 节距

Pressure angle 30°
13T
16/32 DP

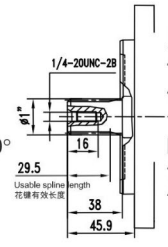
S 轴 Shaft S



压力角 30°
15 齿
16/32 节距

Pressure angle 30°
15T
16/32 DP

R 轴 Shaft R

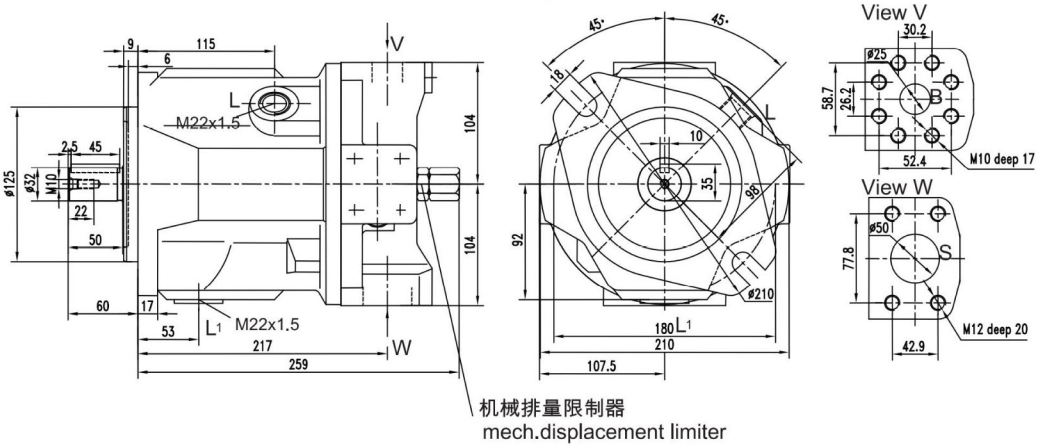


压力角 30°
15 齿
16/32 节距

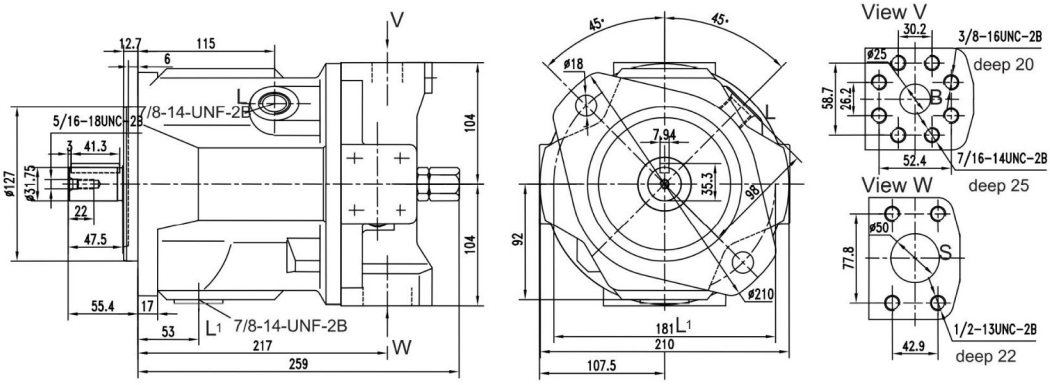
Pressure angle 30°
15T
16/32 DP

5. 规格 71 尺寸（Unit dimensions,size 71）

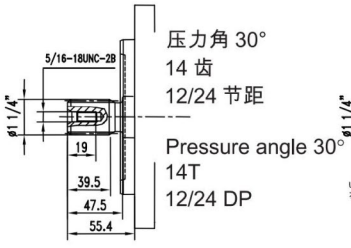
ISO 法兰 Flange ISO
P 轴 Shaft P (HLA10VSO 71 XXX/31X–PPA12N00)



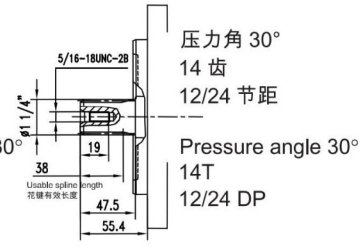
SAE 法兰 Flange SAE
K 轴 Shaft K (HLA10VSO 71 XXX/31X–PKC62N00)



S 轴 Shaft S

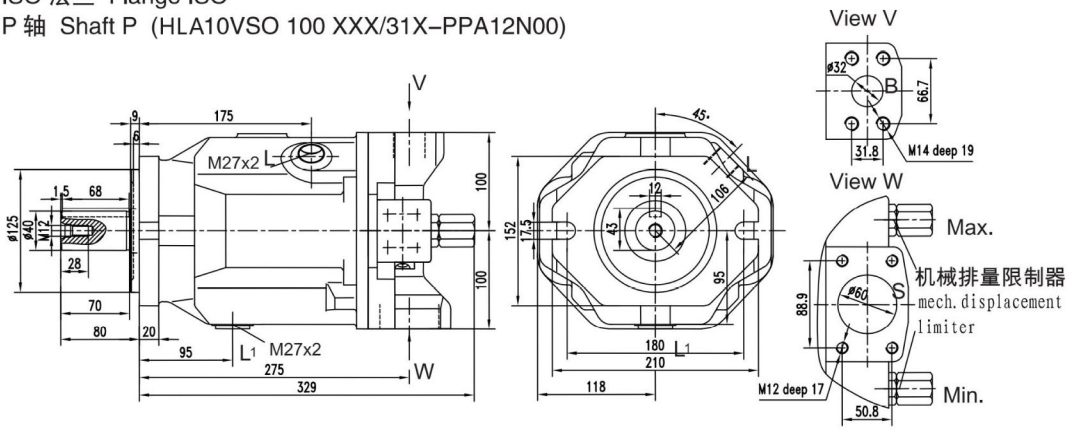


R 轴 Shaft R

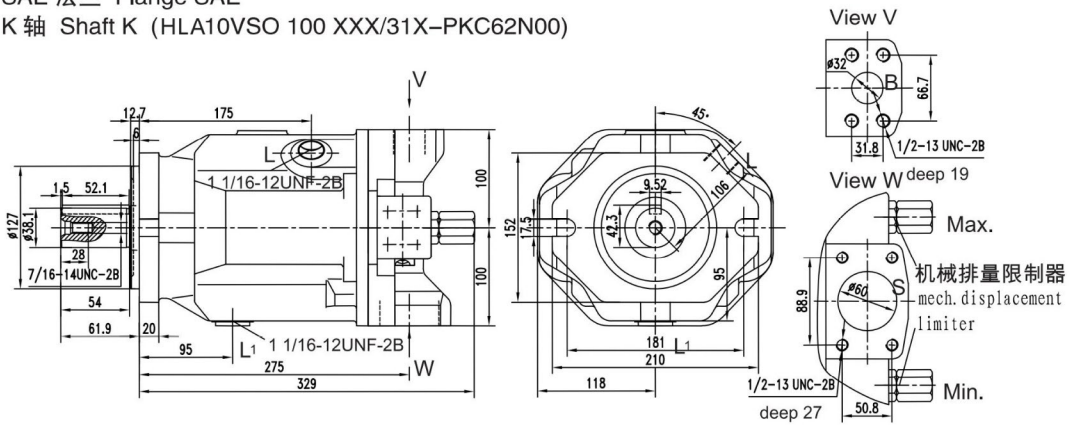


6. 规格 100 尺寸（Unit dimensions,size 100）

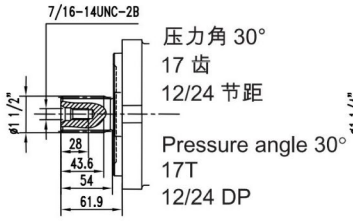
ISO 法兰 Flange ISO
P 轴 Shaft P (HLA10VSO 100 XXX/31X–PPA12N00)



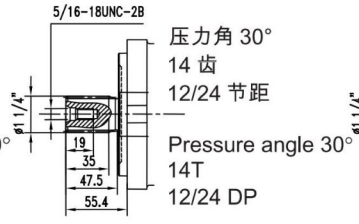
SAE 法兰 Flange SAE
K 轴 Shaft K (HLA10VSO 100 XXX/31X–PKC62N00)



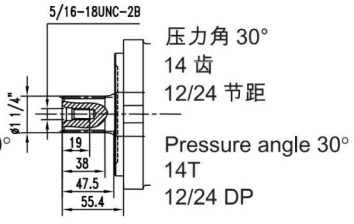
S 轴 Shaft S



U 轴 Shaft U

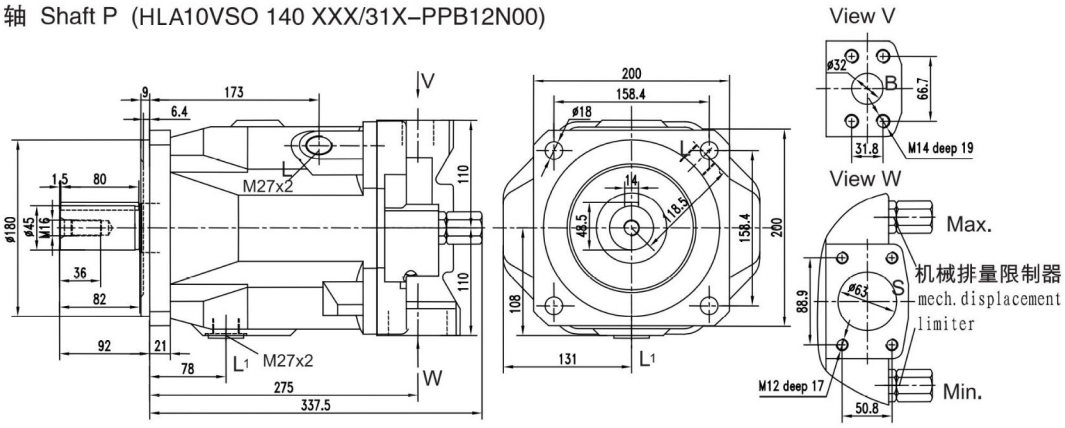


W 轴 Shaft W

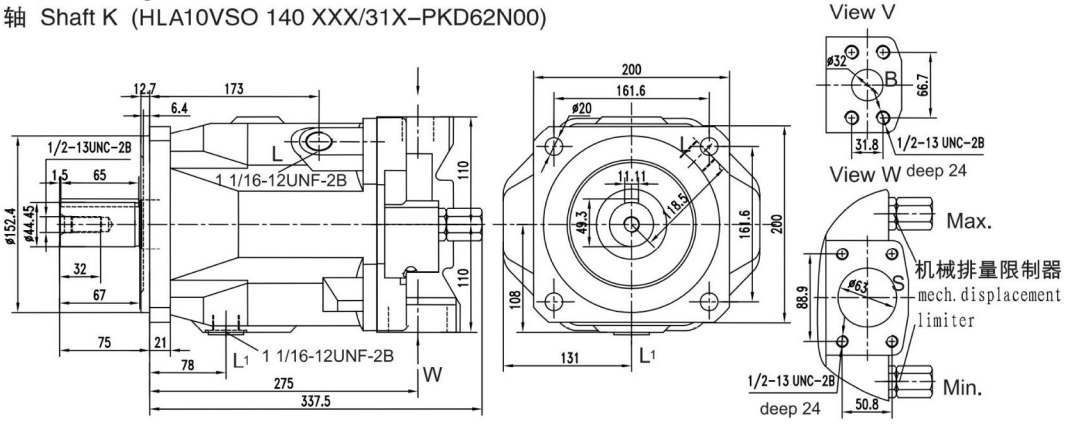


7. 规格 140 尺寸（Unit dimensions,size 140）

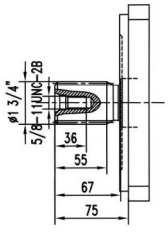
ISO 法兰 Flange ISO
P 轴 Shaft P (HLA10VSO 140 XXX/31X–PPB12N00)



SAE 法兰 Flange SAE
K 轴 Shaft K (HLA10VSO 140 XXX/31X–PKD62N00)



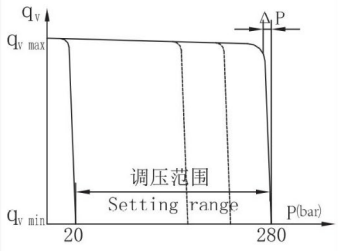
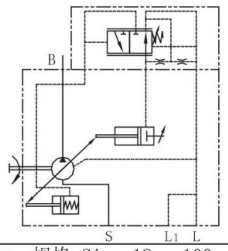
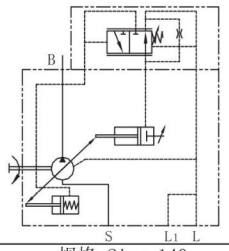
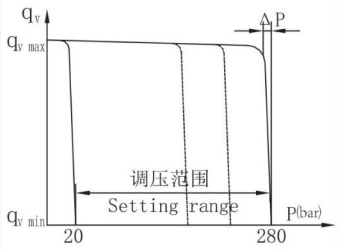
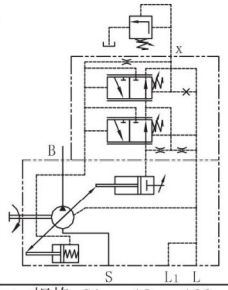
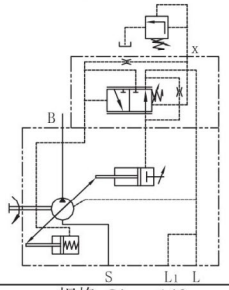
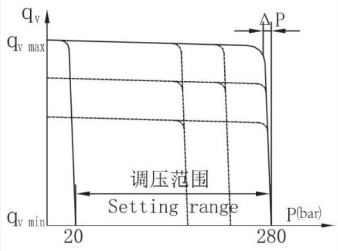
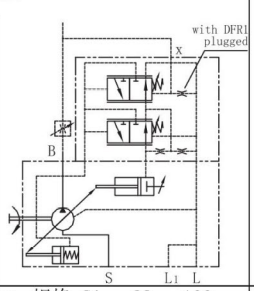
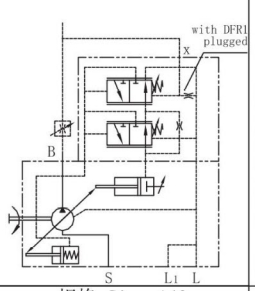
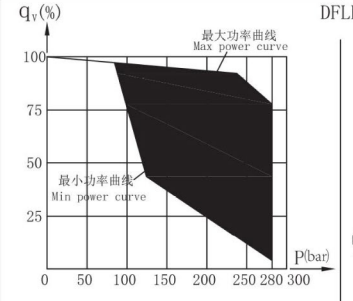
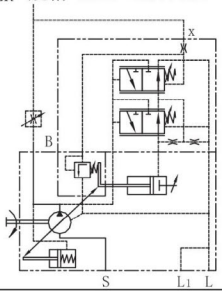
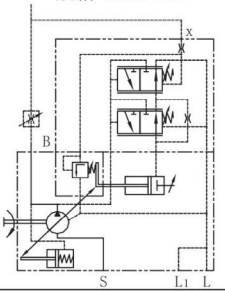
S 轴 Shaft S



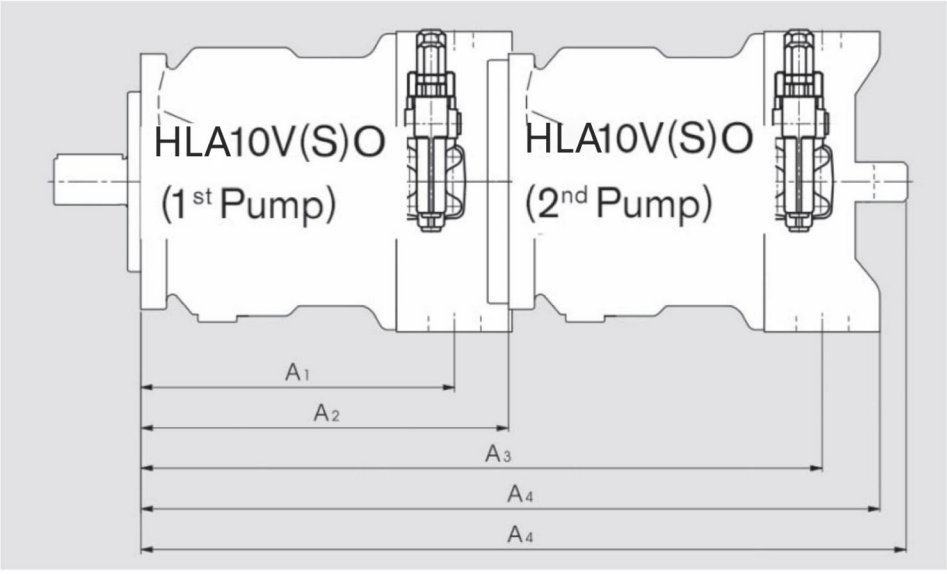
压力角 30°
13 齿
8/16 节距

Pressure angle 30°
13T
8/16 DP

八、控制方式 Controller

变量特性曲线(Static characteristic)	液压原理(Circuit drawing)		
	DR 规格 Size 18...100	规格 Size 140	
			恒压控制： 在控制范围内使液压系统中压力维持恒压，泵仅提供系统所需油量，压力可无级设定。 The pressure controller serves to maintain a constant pressure in a hydraulic system within the control range of the pump. The pump therefore supplies only the amount of hydraulic fluid required by the system. Pressure may be steplessly set at the control valve.
	DRG 规格 Size 18...100	规格 Size 140	
			远程恒压控制： 恒压的功能与装置与DR相同。 溢流阀接在X口作远程控制；溢流阀不在DRG控制的供货范围内。 Function and equipment as for DR. A pressure relief valve can be connected to port X for remote control applications; this is not included in the items supplied with the DRG control.
	DFR/DFR1 规格 Size 18...100	规格 Size 140	
			压力/流量控制： 除了恒压的功能外，借助于负载（如一节流孔）的压差可改变泵的流量。泵仅供执行机构所需流量。对DFR1，X口节流孔堵死。 Function and equipment as for In addition to the pressure control function, the pump flow may be varied by means of a differential pressure over an orifice or valvespool,installed in the service line. The pump flow is equal to the actual required flow by the actuator. The DFR1-valve has no connection between X and the tank.
	DFLR 规格 Size 28...100	规格 Size 140	
			压力/流量/功率控制： 为在各种工作压力下达到恒定驱动扭矩，泵的流量随之变化，从而达到流量与压力的积维持常数。 恒功率曲线之下可进行流量控制。 In order to achieve a constant drive torque with a varying operating pressure, the swivel angle and with it the output flow of the axial piston pump is varied so that the product of flow and pressure remains constant. Constant flow control is possible below the power curve.

九、通 轴 Through drive



HLA10V(S)O (1.Pump)

HLA10V(S)O (2.Pump)	HLA10VSO18 A_1 A_2 A_3 A_4	HLA10VSO28 A_1 A_2 A_3 A_4	HLA10VO 45 A_1 A_2 A_3 A_4	HLA10VSO71 A_1 A_2 A_3 A_4	HLA10VO 100 A_1 A_2 A_3 A_4	HLA10VO 140 A_1 A_2 A_3 A_4
HLA10VSO18	5.71 7.17 12.87 14.84 (145)(182)(327)(377)	6.50 8.30 13.74 15.71 (165)(204)(349)(399)	7.24 9.02 14.72 16.69 (184)(229)(374)(424)	8.54 10.51 16.22 18.19 (217)(267)(412)(462)	10.83 13.31 19.02 20.98 (275)(338)(483)(533)	10.83 13.78 19.49 21.46 (275)(350)(495)(545)
HLA10VSO28	– – – –	6.50 8.03 14.53 15.67 (165)(204)(369)(398)	7.24 9.02 15.51 16.65 (184)(229)(394)(423)	8.54 10.51 17.01 18.15 (217)(267)(432)(461)	10.83 13.31 19.80 20.94 (275)(338)(503)(532)	10.83 13.78 20.28 21.42 (275)(350)(515)(544)
HLA10VSO45	– – – –	– – – –	7.24 9.02 16.30 17.64 (184)(229)(413)(448)	8.54 10.51 17.76 19.36 (217)(267)(415)(486)	10.83 13.31 20.55 21.93 (275)(338)(522)(557)	10.83 13.78 21.02 22.40 (275)(350)(534)(569)
HLA10VSO71	– – – –	– – – –	– – – –	8.54 10.51 19.06 20.63 (217)(267)(484)(524)	10.83 13.31 21.85 23.43 (275)(338)(555)(595)	10.83 13.78 22.32 23.90 (275)(350)(567)(607)
HLA10VSO100	– – – –	– – – –	– – – –	– – – –	10.83 13.31 24.13 25.79 (275)(338)(613)(655)	10.83 13.78 24.61 26.26 (275)(350)(625)(667)
HLA10VSO140	– – – –	– – – –	– – – –	– – – –	– – – –	10.83 13.78 24.61 26.26 (275)(350)(625)(667)

1. 如果两台泵需要组装供货，则两个订货型号要用“+”号连接起来。

If a second pump must be factory mounted the two individual model codes must be combined with a “+”.

Model code pump 1+ model code pump 2.

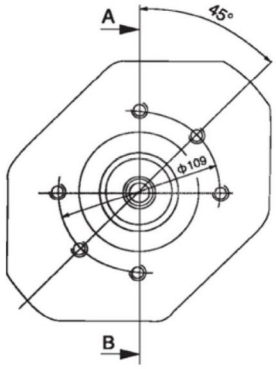
订货示例 Ordering example :

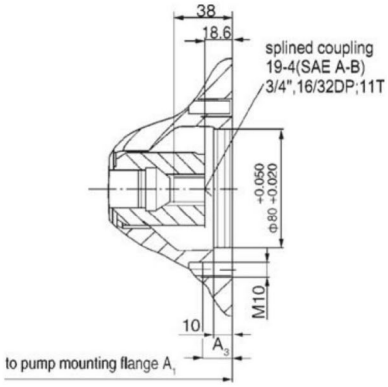
HLA10VO100DR/31R-PSC12K07 +HLA10VO71DR/31R-PSC12N00

通轴 KB2 元件尺寸 Unit Dimensions Through Drives KB2

法兰 ISO 80，2 孔，用于添加HLA10VSO10(花键轴 S，A 型安装法兰) 或HLA10VSO18(花键轴 S 或 R，A 型安装法兰)。
Flange ISO 80, 2-hole for built-onHLA10VSO 10 (splined shaft S, mounting flange A) orHLA10VSO 18 (splined shaft S or R, mounting flange A)

订货型号 Order code KB2



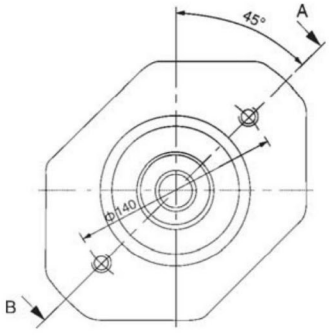


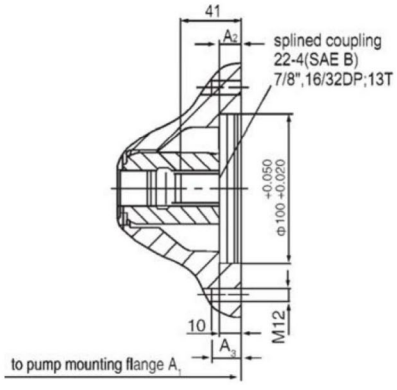
Size main pump	A_1	A_3
18	182	14.5
28	204	16
45	229	16
71	267	20

通轴 KB3 元件尺寸 Unit Dimensions Through Drives KB3

法兰 ISO100,2 孔，用于添加HLA10VSO28 泵 (花键轴 S 或 R)
Flange ISO 100, 2-hole for built-onHLA10VSO28 (splined shaft S or R);

订货型号 Order code KB3



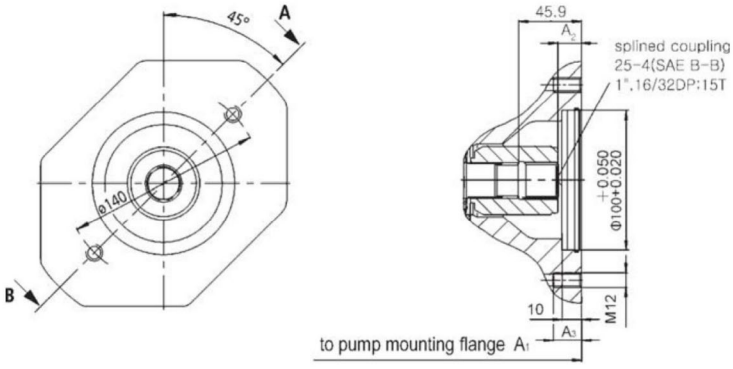


Size main pump	A_1	A_2	A_3
28	204	19.2	14
71	267	16.5	18
100	338	17.6	18
140	350	18.2	24

通轴 KB4 元件尺寸 Unit Dimensions Through Drives KB4

法兰 ISO 100，2 孔，用于添加HLA10VSO45 泵 (花键轴 S 或 R)
Flange ISO 100, 2-hole for built-onHLA10VSO 45 (splined S or R);

订货型号 Order code KB4

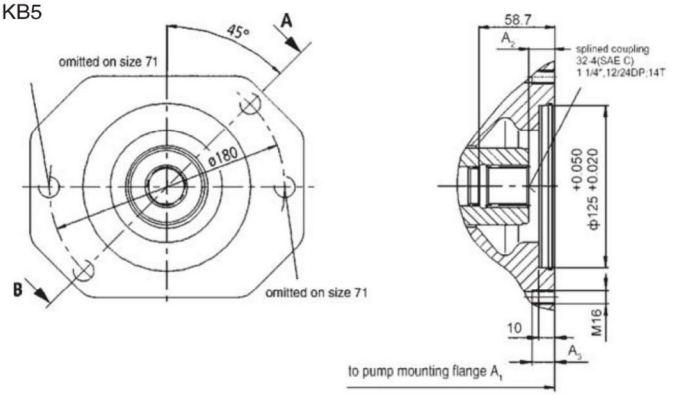


Size main pump	A_1	A_2	A_3
45	229	17.2	14
71	267	17.2	18
100	338	18.2	20
140	350	18.2	24

通轴 KB5 元件尺寸 Unit Dimensions Through Drives KB5

法兰 ISO 125，2 孔，用于添加HLA10VSO71 泵 (花键轴 S 或 R)
Flange ISO 125, 2-hole for built-on HLA10VSO 71 (splined shaft S or R);

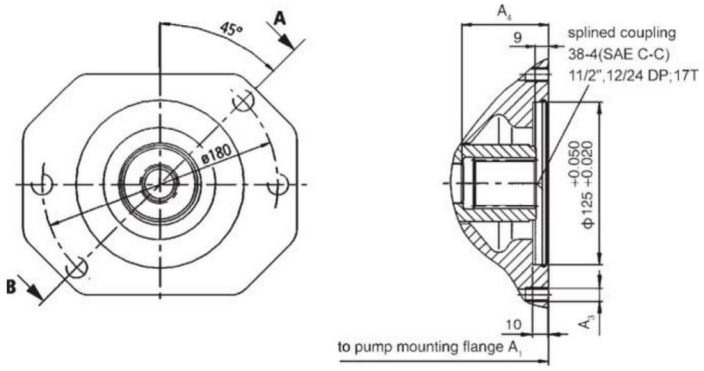
订货型号 Order code KB5



Size main pump	A_1	A_2	A_3
71	267	20	18.5
100	338	20	25
140	350	21	32

通轴 KB6 元件尺寸 Unit Dimensions Through Drives KB6

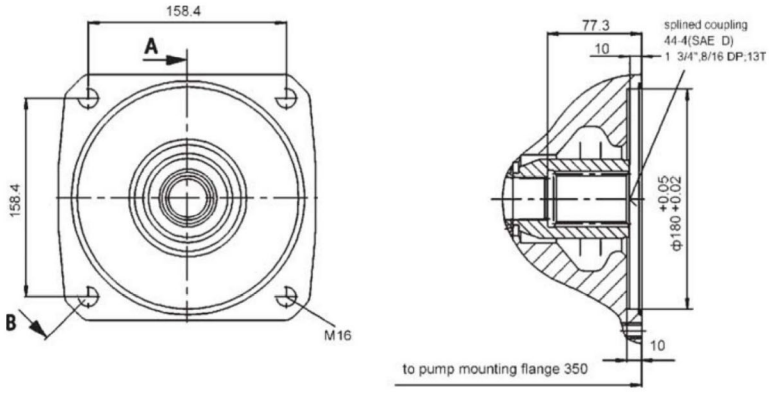
法兰 ISO 125，2 孔，用于添加HLA10VSO100 泵 (花键轴 S)
Flange ISO 125, 2-hole for built-onHLA10VSO 100 (splined shaft S);
订货型号 Order code KB6



Size main pump	A_1	A_3	A_4
100	338	M16;25deep	65
140	350	M16;32deep	77.3

通轴 KB7 元件尺寸 Unit Dimensions Through Drives KB7

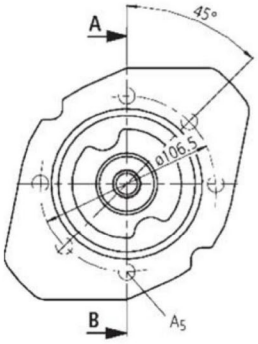
法兰 ISO 180，4 孔，用于添加HLA10VSO140 泵 (花键轴 S)
Flange ISO 180, 4-hole for built-onHLA10VSO 140 (splined shaft S);
订货型号 Order code KB7

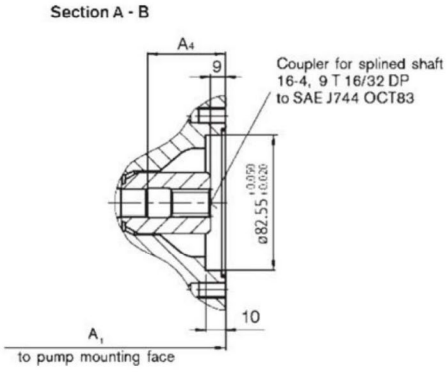


通轴 K01 元件尺寸 Unit Dimensions Through Drives K01

法兰 SAE82-2，(SAE A，2 孔)，用于添加外齿轮泵 1PF2G2, 用于添加HLA10VS018 泵 (轴 U, 法兰 C)
Flange SAE 82-2, SAE A 2-hole for built-on external gear pump 1PF2G2 orHLA10VSO 18 (shaft U,flange C);

订货型号 Order code K01



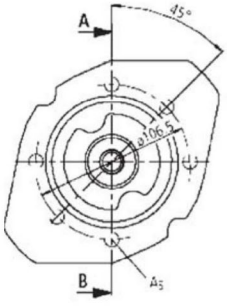


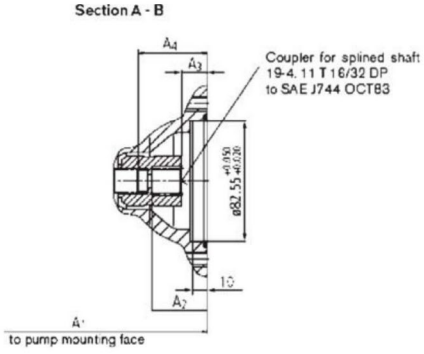
Size main pump	A_1	A_4	A_5
18	182	42	M10;14 deep
28	204	47	M10;14.5 deep
45	229	53	M10;14.5 deep
71	267	61	M10;17 deep
100	338	65	M10;17 deep
140	350	77	M10;17 deep

通轴 K52 元件尺寸 Unit Dimensions Through Drives K52

法兰 SAE 82-2，(SAE A，2 孔)，用于添加HLA10VSO 10 泵或用于添加HLA10VSO18 泵（轴 S 或 R，法兰 C）
Flange SAE 82-2, SAE A 2-hole for built-onHLA10VSO10(shaft S，flange C) orHLA10VSO18(shaft S or R，flange C);

订货型号 Order code K52

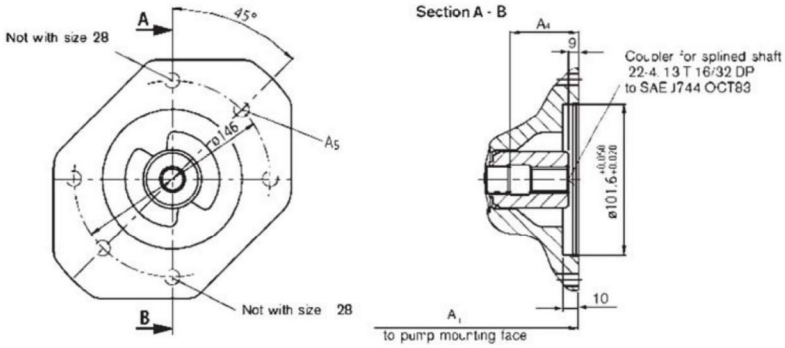




Size main pump	A_1	A_2	A_3	A_4	A_5
18	182	40	17.5	43	M10;16 deep
28	204	39	17.5	47	M10;16 deep
45	229	40.5	17.5	53	M10;16 deep
71	267	40	17.5	61	M10;20 deep
100	338	40	17.5	65	M10;20 deep
140	350	41	17.5	77	M10;20 deep

通轴 K02 元件尺寸 Unit Dimensions Through Drives K02

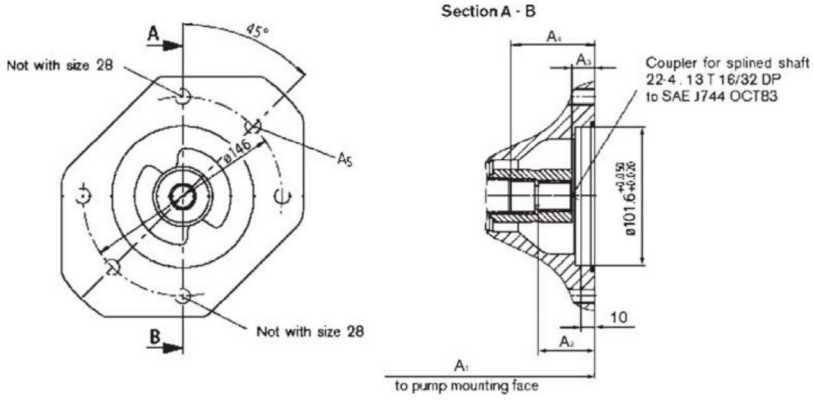
法兰 SAE 101-2，(SAE B , 2 孔)，用于添加外齿轮泵 1PF2G3
Flange SAE 101-2, SAE B 2-hole for built-on external gear pump 1PF2G3
订货型号 Order code K02



Size main pump	A_1	A_4	A_5
28	204	47	M12;15 deep
45	229	53	M12;18 deep
71	267	61	M12;20 deep
100	338	65	M12;20 deep
140	350	77	M12;20 deep

通轴 K68 元件尺寸 Unit Dimensions Through Drives K68

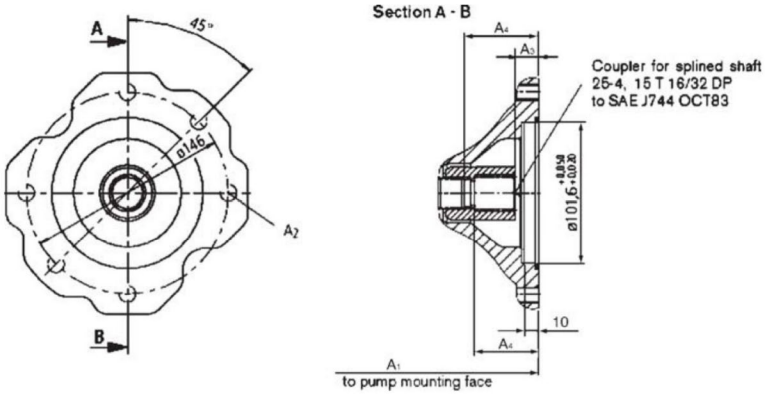
法兰 SAE 101-2，(SAE B, 2 孔)，用于添加HLA10VSO28 泵 (轴 S 或轴 R，法兰 C)
Flange SAE 101-2, SAE B 2-hole for built-onHLA10VSO28(shaft S or RŁ¬flange C)
订货型号 Order code K68



Size main pump	A_1	A_2	A_3	A_4	A_5
28	204	43	16.5	47	M12;15 deep
45	229	42	16.5	53	M12;18 deep
71	267	43	16.5	61	M12;20 deep
100	338	41	16.5	65	M12;20 deep
140	350	44	16.5	77	M12;20 deep

通轴 K04 元件尺寸 Unit Dimensions Through Drives K04

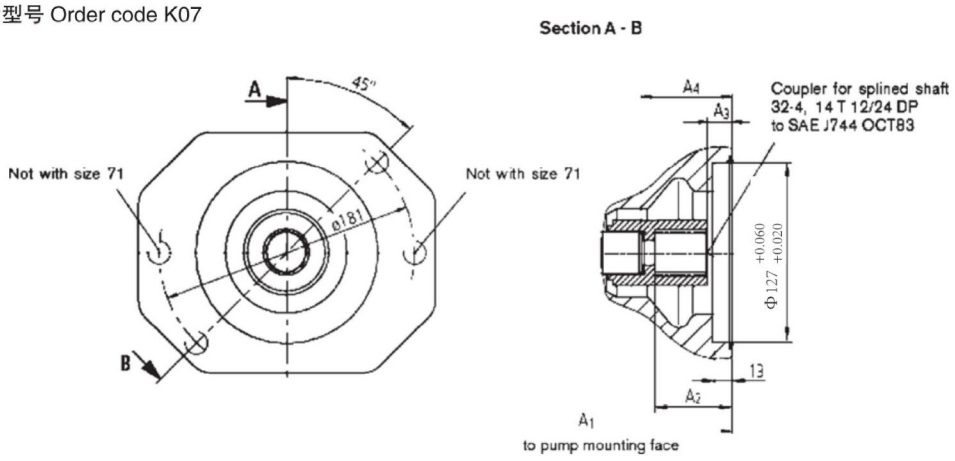
法兰 SAE 101-2，(SAE B，2 孔)，用于添加HLA10VSO45 泵（轴 S 或轴 R，法兰 C）
Flange SAE 101-2, SAE B 2-hole for built-onHLA10VSO45(shaft S or R , flange C)
订货型号 Order code K04



Size main pump	A_1	A_2	A_3	A_4	A_5
45	229	47.5	16.9	53	M12;18deep
71	267	47.5	16.9	61	M12;20deep
100	338	47.5	16.9	65	M12;20deep

通轴 K07 元件尺寸 Unit Dimensions Through Drives K07

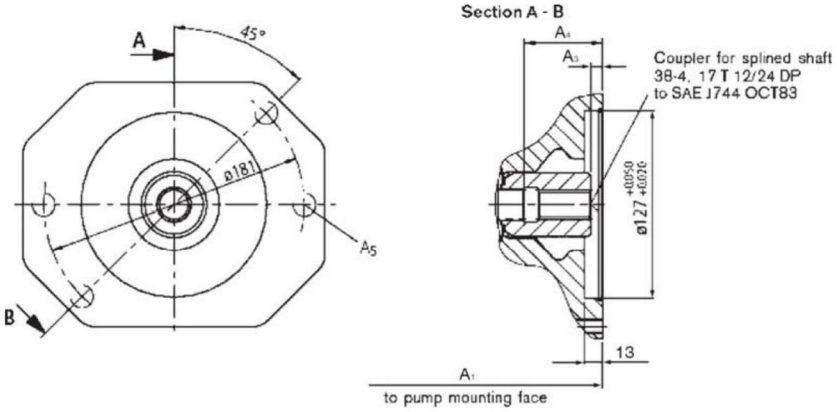
法兰 SAE 127-2，(SAE C，2 孔)，用于添加HLA10VSO71 泵（轴 S 或轴 R，法兰 C）
Flange SAE 127-2, SAE C 2-hole for built-onHLA10VSO71(shaft S or R ， flange C)
订货型号 Order code K07



Size main pump	A_1	A_2	A_3	A_4	A_5
71	267	55.5	17.9	61	M16;18deep
100	338	57	17.9	65	M16;25deep
140	350	60	17.9	77	M16;32deep

通轴 K24 元件尺寸 Unit Dimensions Through Drives K24

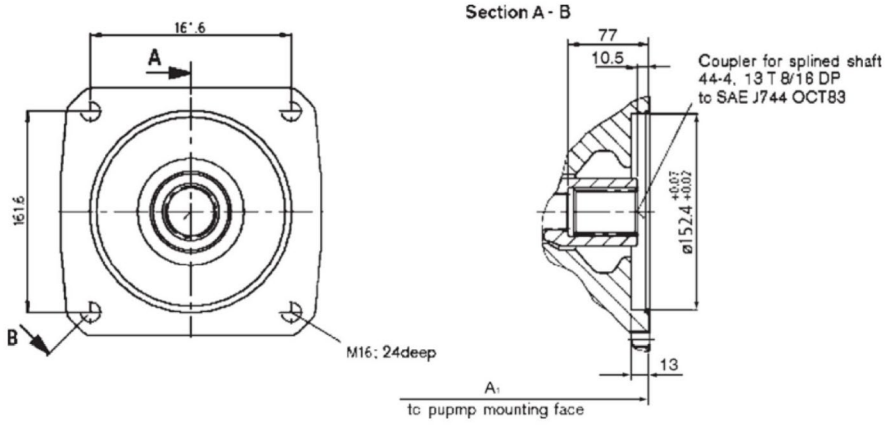
法兰 SAE 127-2，(SAE C，2 孔)，用于添加HLA10VSO100 泵（轴 S，法兰 C）
Flange SAE 127-2, SAE C 2-hole for built-onHLA10VSO100(shaft S , flange C)
订货型号 Order code K24



Size main pump	A_1	A_3	A_4	A_5
100	338	8	65	M16;20deep
140	350	9	77.3	M16;32deep

通轴 K17 元件尺寸 Unit Dimensions Through Drives K17

法兰 SAE 154-4，(SAE D，4 孔)，用于添加HLA10VSO140 泵（轴 S，法兰 D）
Flange SAE 154-4, SAE D 4-hole for built-onHLA10VSO140(shaft S ,flange D)
订货型号 Order code K17



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