

HA7V 系列变量柱塞泵 Variable Displacement Pump HA7V

规格 size 20.....500

2.0/5.1 系列 series

额定压力可达 35MPa Nominal pressure 35MPa

峰值压力可达 40MPa Peak pressure 40MPa



目 录 Contents

一、型号说明 Ordering Code.....	2	六、恒 功 率 控 制 Constant horsepower control LV.....	8-9
二、结构图 Construction.....	3	七、恒压控制 Constant pressure control DR.....	10-11
三、油液 Hydraulic Fluid.....	4	八、电气比例控制 Electrical control EL.....	11-12
四、技术参数 Parameter.....	4-6	九、液压控制 Hydraulic control pressure HD.....	12-13
五、安装注意事项 Installation Notes.....	7	十、元件外形尺寸 Unit Dimensions.....	15-20

特 点 Features

- 1、HA7V 斜轴式轴向变量泵，适用于开式回路的静液压驱动
Variable Displacement Pump HA7V widely used for open circuit in hydrostatic transmission
- 2、适用于行走机械或工业领域
Suitable for walking mechanical or industrial areas
- 3、缸体与配油盘之间为球面配油，自吸性能好、效率高
Between cylinder and oil distribution plate for spherical oil distribution, excellent oil absorbency、high efficiency
- 4、耐冲击，长寿命，可靠性高
Resistant to shock,long service life and high reliability
- 5、外接控制油口多，可灵活加装功能阀
Many external control port to flexible installing of function valve
- 6、输出流量与驱动转速和排量成正比，在恒定转速下可实现无级变量
Its flow and speed is proportional to the displacement,Its can operate adjust displacement with stepless on constant speed
- 7、驱动轴能承受径向载荷
Drive shaft capable of accepting radial loading

一、型号说明 Type Code

H		A7V		160		LV		2.0		L		Z		F		O		O	
恒源液压 Hengyuan Hydraulic																辅助元件 Auxiliary Equipment			
泵型号 Pump type																无 None O			
变量泵 Variable Displacement Pump A7V																带遥控压力截流, 对 LV、EL、HD 和 HD with pressure cutoff built-on for LV,EL,HD and HD D			
排量 Displacement(Vgmin~Vgmax) 规格 Size																遥控恒压控制 constant pressure remote control F			
(0~20.5ml/r) 20																行程限位 Stroke Limiter			
(8.1~28.1ml/r) 28																无 None O			
(0~40ml/r) 40																机械行程限位 (用于 LV 和 DR) Stroke limiter mechanically adjustable (for LV,DR) M			
(15.8~54.8ml/r) 55																液压行程限位 (用于 LV) Stroke limiter ,hydraulic (for LV) H			
(0~58.5ml/r) 58																油口连接 Pipe Connections			
(23.1~80ml/r) 80																(规格 20~500) (series 20~500) F			
(0~78ml/r) 78																压力油口: SAE 法兰, 在侧面 Pressure port: SAE flange, on side			
(30.8~107ml/r) 107																吸油口: SAE 法兰, 在侧面 Suction port: SAE flange,on side			
(0~117ml/r) 117																(规格 20~160) (series 20~160) G			
(46.1~160ml/r) 160																压力油口: 螺纹连接, 在侧面 Pressure port: threaded, on side			
(0~250ml/r) 250																吸油口: SAE 法兰, 在侧面 Suction port: SAE flange,on side			
(0~355ml/r) 355																轴伸 Shaft End			
(0~500ml/r) 500																平键 GB1096-79 Keyed Shaft P			
变量方式 Control Device																花键 DIN5480 Splined Shaft Z			
恒功率控制 Constant horsepower control LV																花键 GB3478.1-83 Splined Shaft S			
恒压控制 Constant pressure control DR																旋向 (从轴尾看) Direction of Rotation(View on shaft end)			
电气比例控制 Electrical control EL																顺时针 clockwise R			
液压控制 Hydraulic control,pressure related HD																逆时针 anti-clockwise L			
手动控制 Manual control(wifh handwheel) MA																			
结构型式 Series																			
系列 2.0, 规格 20~160 Series2.0, size20~160 2.0																			
系列 5.1, 规格 250~500 Series5.1, size250~500 5.1																			

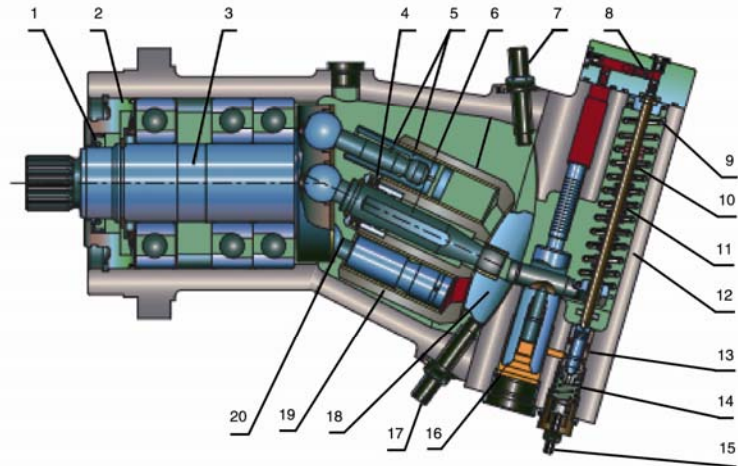
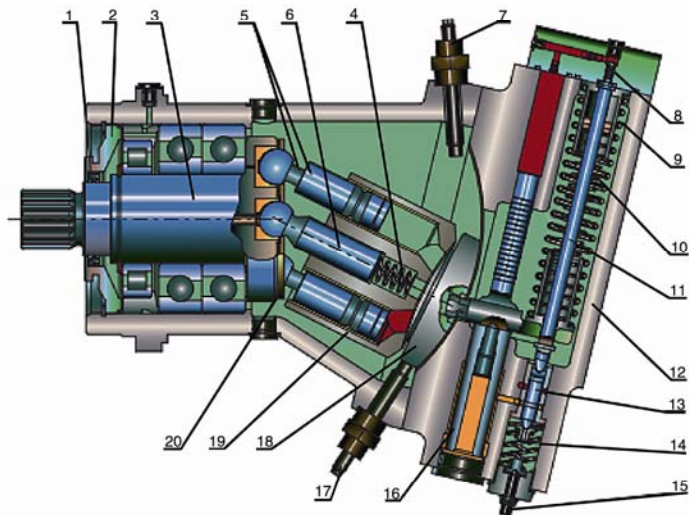
● 订货示例

A7V、160、LV、2.0、R、P、F、O、O
A7V 变量泵, 规格 160, 带恒功率 LV 控制, 2.0 系列
顺时针旋转, 平键 P, 侧面 SAE 法兰连接, 无辅助原件

● Ordering Example:

A7V、160、LV、2.0、R、P、F、O、O
Axial piston variable displacement pump A7V,size 160 ,with
constant horsepower control,series 2.0,clockwise rotation,
Keyed shaft , SAE side flange connections,
without auxiliary equipment.

二、结构图 Construction

 HA7V2.0 剖视图 规格 20 ~ 160
 HA7V2.0 Section Series20 ~ 160

 剖视图 规格 250 ~ 500
 HA7V5.1 Section Series250 ~ 500


1	骨架油封	Oil seal kit	11	导杆	Control rod
2	轴封盖	Front cover	12	变量壳体	Variable shell
3	传动轴	Shaft	13	先导组件	Assembly parts
4	中心弹簧	Centering spring	14	控制起点调节弹簧	Adjusting spring
5	柱塞组件	Piston	15	控制起点调节螺钉	Adjusting screw
6	中心杆	Center pin	16	变量活塞	Flow piston
7	小流量限位螺钉	Limiter screw	17	大流量限位螺钉	Limiter screw
8	先导阀芯	Pilot piston	18	配油盘	Valve plate
9	大功率弹簧	Bigger power spring	19	缸体组件	Cylinder block group
10	小功率弹簧	Smaller power spring	20	压板	Retainer

三、油 液 Fluid

●油温范围 Temperature Range: -25 ~ 80°C

●粘度范围 Viscosity Range:

t_{min} 10 mm²/s

t_{max}(短时 short periods)1000 mm²/s

最佳工作粘度 Opt.operating range:16 ~ 25 mm/s

油液型号的选择 choose the type of the hydraulic oil:

推荐使用 L-HM46 或 L-HM68

Recommend to use L-HM46 or L-HM68

●液压油的过滤 Filtration of Hydraulic Fluid:

推荐过滤精度为 10μm, 亦可使用 25 ~ 40μm 的,

但使用 10μm 的可延长使用寿命 (降低磨损)

Recommended filtration 10μm. Coarser filtration of 25

To 40μm is possible. However ionger service life is

achieved with filtration of 10μm(reduce wear)

●流动方向 Flow direction:

顺时针: S 到 B; 逆时针: S 到 A Clockwise: S to B; Anti-clockwise S to A

四、技术参数 Technical Data

●工作压力范围 Operation Pressure Range:

出油口 A 或 B 处的压力 Pressure at ports A or B:

额定压力 Rated pressure..... $P_n=35\text{MPa}$

最高压力 Peak pressure..... $P_{max}=40\text{MPa}$

吸油口 S 处的绝对压力 Inlet Operation Pressure at port S:

$P_{abs min}$ 0.08MPa

$P_{abs max}$ 0.2MPa

●参数关系 Parameter relations

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

驱动扭矩 Drive Torque $T = \frac{1.59 \times V_g \times \Delta_p}{10 \times \eta_{mh}} = \frac{V_g \times \Delta_p}{20 \times \pi \times \eta_{mh}}$ [N.m]

驱动功率 Drive Power $P = \frac{T \times n}{9549} = \frac{2\pi \times T \times n}{60000} = \frac{q_v \times \Delta_p}{600 \times \eta}$ [kW]

V_g = 每转几何排量 [cm³]

Δ_p = 压差 [bar]

n = 转速 [rpm]

η_v = 容积效率

η_{mh} = 机械—液压效率

η_t = 总效率 ($\eta_t = \eta_v \times \eta_{mh}$)

Geometry displacement each rotate

Pressure drop/differential

Rotary speed

Cubage' s efficiency

Mechanical—Hydraulic efficiency

Overall efficiency

技术参数表 (理论值, 未考虑机械效率与容积效率)
Technical data Form(theoretical values,without considering η_{mh} and η_v)

规格 Size		20	28	40	55	58	80	78	107	117	160	250	355	500
变量方式 Control Device														
LV 恒功率变量 Constant HP control		.	.	.	.	.	.	.	.	.	.	.	.	.
DR 恒压变量 Constant pressure control		.	.	.	.	.	.	.	.	.	.	.	.	.
EL 电气比例变量 Electrical control		.	.	.	.	.	.	.	.	.	.	.	.	.
HD 液控变量 Hydraulic control		.	.	.	.	.	.	.	.	.	.	.	.	.
MA 手动变量 Manual control		.	.	.	.	.	.	.	.	.	.	.	.	.
排量 V_{gmax} (ml/r)		20.5	28.1	40.1	54.8	58.5	80	78	107	117	160	250	355	500
Displacement V_{gmin} (ml/r)		0	8.1	0	15.8	0	23.1	0	30.8	0	46.1	0	0	0
最高转速 ③ Max speed	在 at 0.09MPa① n_{max} 0.09 (r/min)	3800	2800	3200	2360	2850	2120	2540	1900	2240	1650	1400	1250	1120
	在 at 0.10MPa① n_{max} 0.10 (r/min)	4100	3000	3400	2500	3000	2240	2700	2000	2360	1750	1500	1320	1200
	在 at 0.15MPa① n_{max} 0.15 (r/min)	4750	3600	3750	3000	3350	2750	3000	2450	2650	2100	1850	1650	1500
最高流量 ② Max flow	在 at n_{max} 0.09 Q_{max} 0.09 (l/min)	76	76	124	125	162	165	192	197	254	256	340	430	543
	在 at n_{max} 0.10 Q_{max} 0.10 (l/min)	82	82	132	133	170	174	204	208	268	272	364	455	582
	在 at n_{max} 0.15 Q_{max} 0.15 (l/min)	94	98	146	160	191	213	227	254	301	326	449	568	728
最大功率 Max power	在 at Q_{max} 0.09 下 P_{max} 0.09 (kW)	46	46	75	75	97	99	115	119	153	154	204	259	327
	在 at Q_{max} 0.10 下 P_{max} 0.10 (kW)	49	49	79	80	102	105	122	125	161	164	219	274	350
	在 at Q_{max} 0.15 下 P_{max} 0.15 (kW)	57	59	89	96	115	128	137	153	181	196	270	342	438
流量 Flow②	在 at $n_{E=1450r/min}$ 下 (l/min)	28.2	39.5	56.4	77.1	82.3	112.5	110	150.5	164.6	225	351.6	499	703
功率 Power	在 at $n_{E=1450r/min}$ 35MPa 下 (kW)	17	24	34	46	50	68	66	91	99	135	211	300	423
扭矩 Toraque M	在 at V_{gmax} $\Delta P=10MPa$ (N.m/10MPa)	32.6	44.7	63.8	87.1	93	127.2	124	170.1	186	254.4	397.5	364.5	795
	在 at V_{gmin} $\Delta P=10MPa$ (N.m/10MPa)	/	12.9	/	25.1	/	36.7	/	49	/	73.3	/	/	/
最大扭矩 Mmax.Torque	在 at V_{gmax} $\Delta P=35MPa$ (N.m)	114	156	233	305	326	445	434	595	651	890	1391	1976	2783
	在 at V_{gmin} $\Delta P=35MPa$ (N.m)	/	45	/	88	/	129	/	171	/	275	/	/	/
惯性矩 Moment J	(kgm ²)	0.0017	0.0017	0.0052	0.0052	0.0109	0.0109	0.0109	0.0167	0.0167	0.0322	0.088	0.16	0.27
重量 Weight	(kg)	19	19	28	28	44	44	53	53	76	76	105	165	245

注:

 ①所示值为吸油口 S 的绝对压力,且在 V_{gmax} 用矿物油工作时。

②以容积效率为 97% 计算所得。

 ③在各种工作状态下泵转速均不得超过吸油口 S 在 0.15MPa 下的最高转速。但对 $V_{gmin}>0$ 的规格: 28-20、55-40、80-58、107-78、160-117, 可通过减小排量 ($Vg<V_{gmax}$) 与维持最大流量的方法, 使最高转速提高到对应 $V_{gmin}=0$ 的那些规格的转速。例: 规格为 28, $V_{gmax}=28.1ml/r$, 将排量减小到 20.5ml/r, 保持最大流量为 94(L/min) 前提下, 对应最高转速可由 3600r/min, 提高到 4750r/min。

Note:

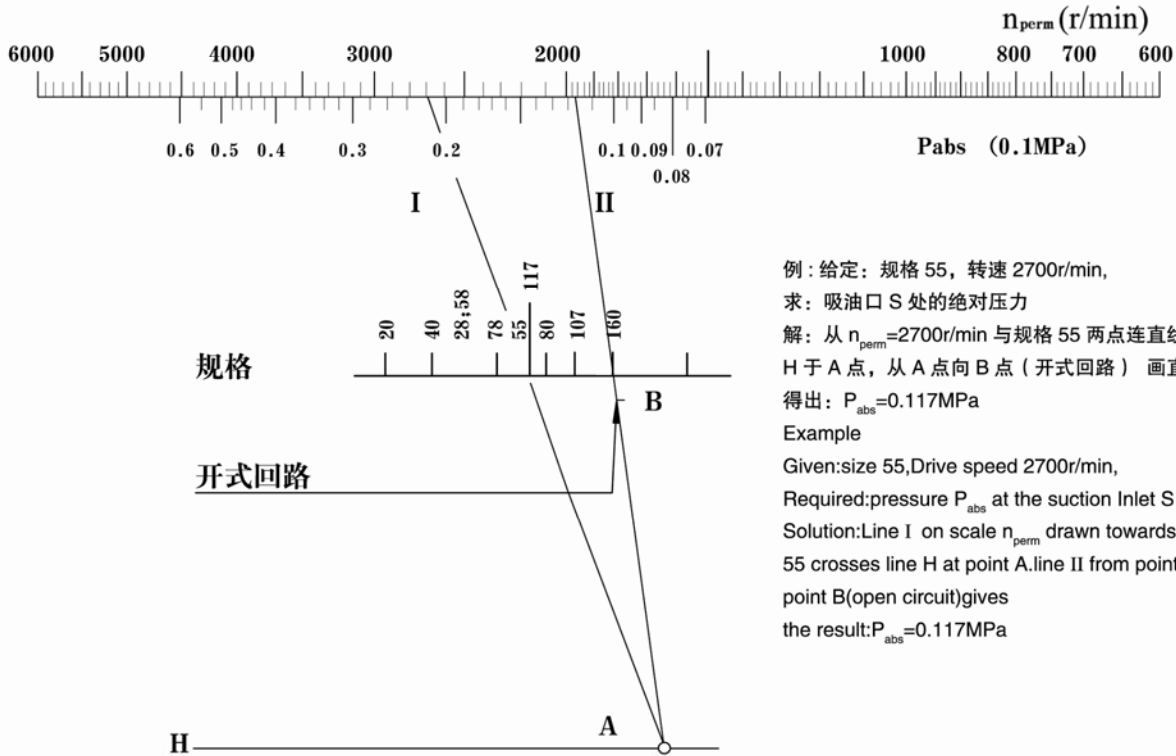
 ①The values shown are valid for V_{gmax} ,with an absolute pressure at suction inlet S and when operated on mineral oil.

②Calculated with a volumetric efficiency of 97%.

 ③Pump's speed don't exceed the permissible max. speed at 0.15MPa in suction S on those sizes with $V_{gmin}>0$,however the maximum speeds can be increased to the values for those sizes with $V_{gmin}=0$ by reducing the displacement($Vg<V_{gmax}$) and maintining max flow,the relevant sizes are 28-20、55-40、80-58、107-78、160-117、for example size 28, $V_{gmax}=28.1ml/r$,reduced the displacement to 20.5ml/r and keep the max flow is 94L/min,the max speed can be from 3600r/min to increase 4750r/min.

●允许转速 N_{perm} 和吸油口压力 P_{abs} 可由诺模图确定，不过必须考虑最高转速（见参数表）及最低和最高吸油压力。

●Permissible speed N_{perm} and suction pressure P_{abs} can be read from the nomograph. However, the max speeds (see table) and min, max suction pressure must be taken into account.

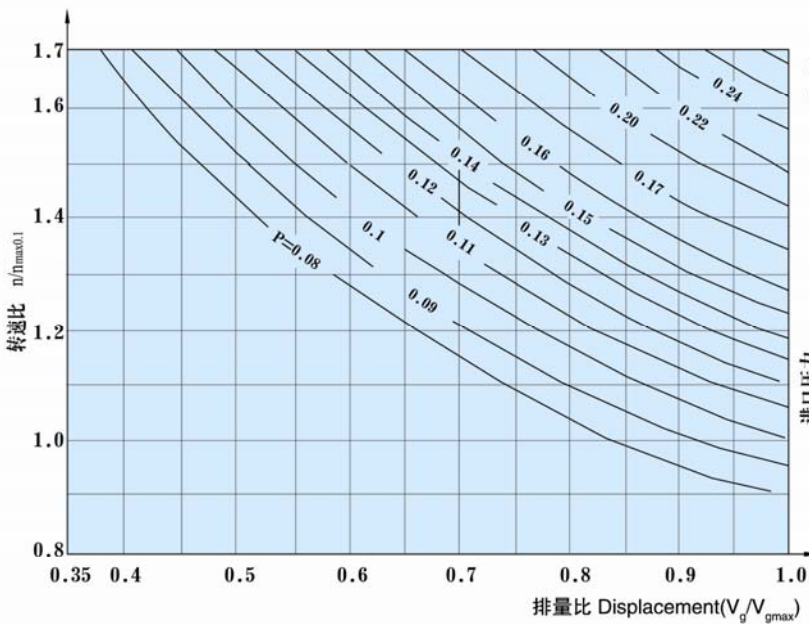


例：给定：规格 55，转速 2700r/min，
求：吸油口 S 处的绝对压力
解：从 $n_{perm}=2700r/min$ 与规格 55 两点连直线 I 交线 H 于 A 点，从 A 点向 B 点（开式回路）画直线 H，
得出： $P_{abs}=0.117MPa$

Example
Given: size 55, Drive speed 2700r/min,
Required: pressure P_{abs} at the suction Inlet S
Solution: Line I on scale n_{perm} drawn towards size 55 crosses line H at point A. line II from point A to point B (open circuit) gives the result: $P_{abs}=0.117MPa$

●规格 250~500 吸油口 S 处的绝对压力与转速增加、排量减小值的计算

Size 250~500 Calculation of Inlet Pressure P_{abs} at Suction Inlet S and of reduction in Displacement at Increased Speeds



示例：
给定：规格 500，驱动转速 1320r/min
求：吸油口 S 的压力 P_{abs}

解：转速比
$$\frac{n}{n_{max0.1}} = \frac{1320}{1200} = 1.1$$

在最大摆角下给出 $P_{abs}=0.12MPa$

如果对本例说仅在 $P_{abs}=0.1MPa$ 时能自流，则排量须减小到 87.6%。

Example:

Given: Size 500, Drive speed 1320rpm

Required: pressure P_{abs} at suction inlet s

Solution:

speed ratio
$$\frac{n}{n_{max0.1}} = \frac{1320}{1200} = 1.1$$

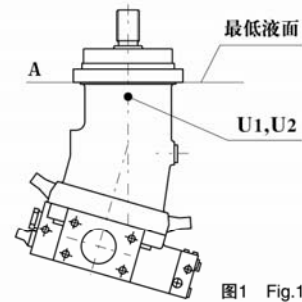
gives an inlet pressure of $P_{abs}=0.12MPa$ at full swivel.

If for example free flow is only possible with $P_{abs}=0.1MPa$, the displacement must be reduced to 87.6%.

五、安装注意事项 Install Caution

●安装位置 Mounting position:

任选，泵内必须充满液压油；当油泵装在油箱里时油口 R 的堵塞应取下，此油口应在顶部。为减小噪音油口应旋入 90° 弯头。
 Optional.Pump's housing must be filled with oil;When Mounting within a-tank the plug must be removed form port R and this port must be at the top. 90° pipe bend to be screwed in.



装在油箱里时，油口 U1, U2 和 R 的堵塞应取下；当装在油箱外面时，泵在启动前必须在油口 U1 或 U2 排气。

●驱动轴向上的垂直安装 Drive Shaft Up Vertical Setting

对此必须订货带有 U1 和 U2 的型号（用文字说明：“带油口 U1 和 U2”）。最低液面不得低于“A”线，如图 1 所示。

For this case a model with ports U1 and U2 must be ordered(indicate In clear text: “with ports U1 and U2”).The minimum oil level must not Fall below the “A” line,as shown in Fig.1.

●安装在油箱顶部 Mounting on top of oil tank

A7V 变量泵装于油箱顶部的安装为特殊安装，只能在特定条件下实现。

1) 带各种控制的油泵，只能在泵处于最大摆角 (V_{gmax}) 时启动，对调节从最小排量 V_{gmin} 开始的泵 ($V_{gmin}=0$ 的油泵)，最小流量的限位螺钉必须调到最小流量 \geq 最大流量 $V_{gmax} \times 5\%$ 处，防止油泵在零流量运转，使吸油管放空。

2) 安装在油箱顶部时，订货时需用文字说明“用于油箱上面安装”。

3) 油泵吸油口须在上方，且吸油管应尽可能短，管端至最低液面应低于 200mm，吸油管内应保证流速在 0.8 ~ 1.0m/s 之间。

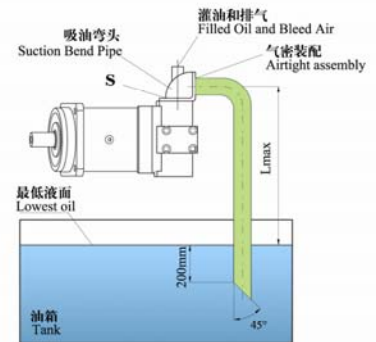
安装示意图见图 2

Mounting of the A7V pump above tank must be considered as a special pump installation and should only be realized under specific conditions

1)With various control device,pump's angel is max.(V_{gmax}) before start. Further to adjustment form V_{gmin} before start($V_{gmin}=0$).The min.flow screw limiter must be operation at $Q=0$

2)Pump equipped at top of oil tank,when ordering need description “use for set on oil tank” .

3)Pump's suction port should be located up. And also the suction pipe is possible shorter. The pipe end should be low 200mm than oil. The flow speed in suction pipe should keep speed between 0.8 ~ 1.0m/s. Mounting as Fig.2.



A7V 变量泵 2.0 系列，安装在油箱顶部，各规格转速、管长及对应内径表：

A7V pump 2.0 series,mounting on top of oil tank,different Size and speed、pipe length and watch for inner Diameter

规格 Size	最高转速 Max.speed $n_{max}(r/min)$	吸油管最大长度 Max.length of suction pipe $L_{max}(mm)$	在流速 $V=0.9m/s$ 和 V_{gmax} 下算出的吸油管径 (mm) Calculated suction pipe(mm) at flow velocity= $0.9m/s$ and V_{gmax}	
			速度 speed $n_{max}(r/min)$	速度 speed $n_{E=1450max}(r/min)$
20	3610	600	41.8	26.5
28	2660	600	42	31
40	3040	750	53.6	37
55	2240	750	53.8	43.3
58	2700	750	61.3	45
80	2015	750	61.6	52
78	2410	750	66.6	51.6
107	1800	750	67.5	60.5
117	2125	850	76.6	63.3
160	1565	850	77	74

六、恒功率控制 LV Constant Horsepower Control

LV 控制是输入转速不变时，根据负载压力来控制流量，使油泵输出的液压功率恒定即：

$$P = \Delta P \times Q / 60 = \text{常数}$$

式中：P 功率 (kW)、 ΔP 压差 (MPa)、Q 流量 (L/min) 工作压力作用在先导阀芯上，通过导杆压向控制起点调节弹簧，使先导油进入变量活塞，油泵的摆角从 V_{gmax} 向 V_{gmin} 摆动，使供油量减小 (参见第 3 页结构剖视图)。

LV Constant horsepower control regulates flow in relation to pressure and makes out-put power constant that is:

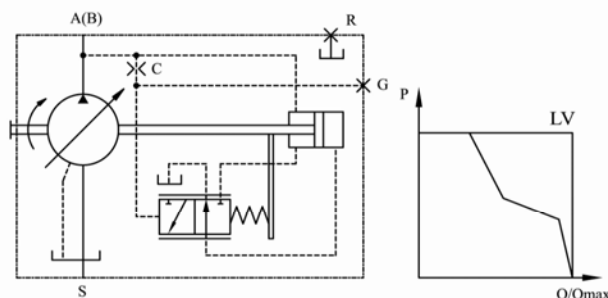
$$P = \Delta P \times Q / 60 = \text{Constance}$$

P:Power(kW)、 ΔP :Pressure difference between input and output(MPa)、Q:Flow(L/min),Hydraulic pilot force acts on a side of pilot piston.When it overcomes a pilot spring force arranged on the other side of the pilot piston,the pilot oil is fed into the cave of control piston.The pump swivel angle from V_{gmax} to V_{gmin} swing.Then the displacement will be reduced(Viewed on Page three Section).

●控制起点为 5MPa 的恒功率控制 Start of control at 5MPa

通过油口 G 及节流口 C 可以叠加 HP 控制

Through port G via throttle port C can carry on high pressure control(summation HP control)

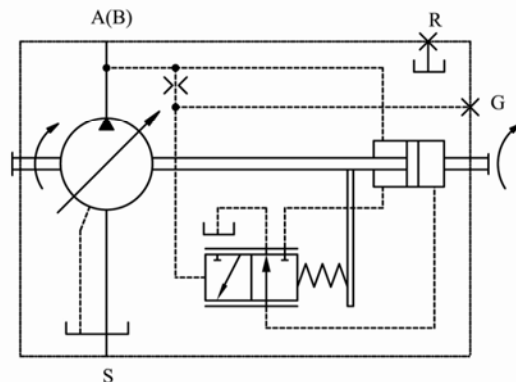


●带机械行程限位器的恒功率控制

Constant HP control with stroke limiter

借助于机械行程限位位置，可以无级改变或限制最大排量，根据需要调节范围可从 V_{gmax} 到 V_{gmin} 。

By means of a mechanical stroke limiter,The max,displacement can be infinitely varicd or limited,Adjusted range from V_{gmax} to V_{gmin} .

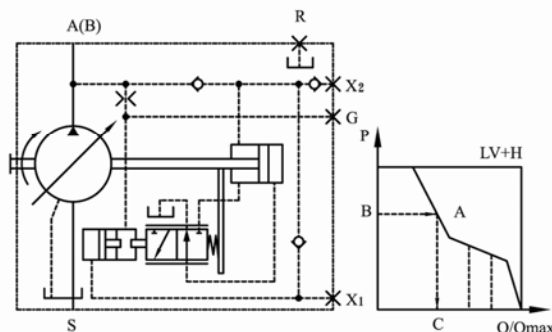


●带液压行程限位器的恒功率控制

Constant HP control with hydraulic stroke limiter

液压行程限位器需要至少工作压力 10% 的先导压力 (X1 口)，对所有规格 X1 口的最大允许压力为 20MPa。如要限制工作压力小于 5MPa 时的流量，则需在油口 X2 处加入不小于 5MPa 的供油压力，这时在油口 X1 需要的压力为 $5 \times 10\% = 0.5$ (MPa)。

A pilot pressure(port X1)of at least 10% of the operating pressure is required for the hydraulic stroke limiter,max.permissble pressure at port X1=20MPa(for all sizes). If it is required to limit the flow at an operating pressure < 5MPa then a boost pressure of min.5MPa must be applied port X2(at port X1 then,min,10%=0.5MPa).



●带压力截流的恒功率控制

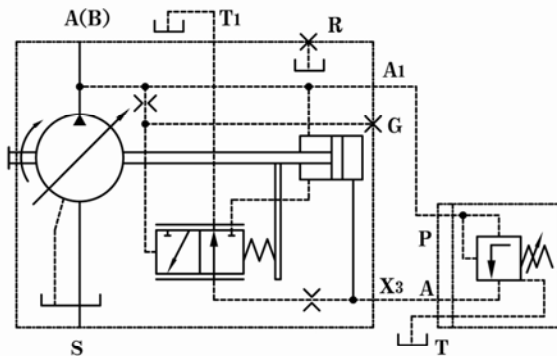
Constant HP control with pressure cut-off

适用于 $V_{gmin}=0$ 的所有规格压力截流是在恒功率控制基础上叠加一个恒压控制，它借助于顺序阀来实现。当压力达到设定压力的最高值时（调节范围到 31.5MPa），顺序阀打开，流量便自动减小到 $Q=0$ 。

Be used for all kinds of size $V_{gmin}=0$, Pressure cut-off is base on constant horsepower control carry on a constant pressure control. It realized operating by order valve. When pressure up to setting pressure(max), (adjusting pressure range to 31.5MPa), the order valve will be opened, then the flow will be reduced to $Q=0$.

顺序阀与泵分开安装 规格 20~117

Order valve and pump separately fixed. Size 20~117



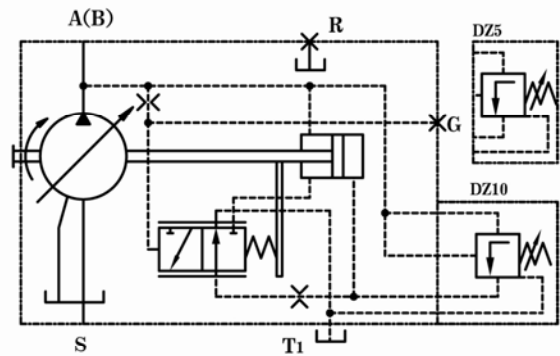
DZ5 用于规格 250, DZ10 用于规格 355~500

在零位连续工作请见恒压 DR 控制

注意：顺序阀油口 T 与先导阀油口 T1 必须直接通油箱（冷却器）。

顺序阀与泵分开安装 规格 250~500

Order valve and pump separately fixed. Size 250~500



DZ5 used for size 250, DZ10 used for size 355~500

Continous operation in zero position please view the constant pressure control DR

Note: Order valve port T and pilot valve port T1 must be connected with oil tank(cooker).

●带压力截流（遥控）和液压行程限位的恒功率控制 Constant HP control with pressure cut-off(remote) and hydraulic stroke limiter

顺序阀与泵分开安装，它可以装在底板上任何适当的部位（遥控），连接单管最长不得超过 5m，顺序阀与底板须单独订货。

The sequence valve is mounted separately from the pump in any suitable location on a subplate(remote control), The max/sigle pipe length must not exceed 5m, Order sequence valve and subplate separately.

●带压力截流和液压行程限位的恒功率控制

Constant HP control with pressure cut-off and hydraulic stroke limiter

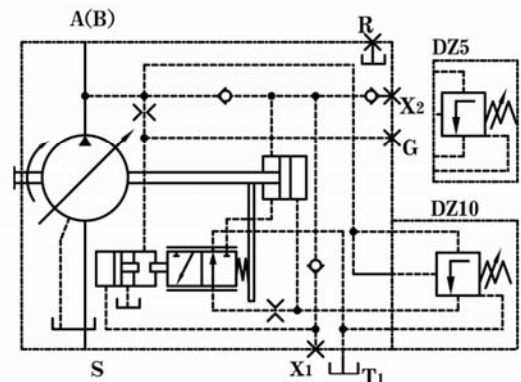
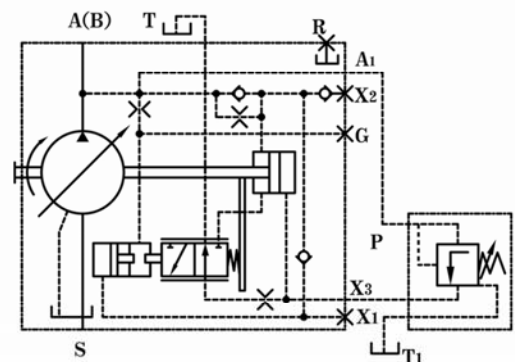
A,B	工作油口	Perating port
G	叠加 HP 控制的油口	Summation HP control port
R	排气口	Port o drain air
S	吸油口	Suction port
T1	先导油回油口	Pilot port
X1	先导压力口	Pilot pressure
X2	遥控压力口	Remote pressure
A1, X3	遥控阀油口	Ports for remote control valve

顺序阀直接装在泵上，规格 250~500

DZ5 用于规格 250, DZ10 用于规格 355~500

Order valve fixed on pump directly Size 250~500

DZ5 used for size 250. DZ10 used for size 355~500



七、恒压控制 DR Constant Pressure Control DR

恒压控制是在所控制的范围内，保持系统压力恒定不受油泵流量变化的影响，变量泵仅根据工作负载所需供应流量，当工作压力超过设定压力时，油泵会自动将摆角调小使供油量减少。标准型是所需压力在泵上设定（阀内装），而另一种用于遥控型号是将所需的压力单独设在顺序阀上。

The constant pressure control remains the pressure in a hydraulic system constant within its control range in spite of changing pump flow requirements. The variable pump supplies only the volume of fluid required by the services. Should operating pressure exceed the set pressure, the pump is automatically swivelled back to a smaller angle. The required pressure is set either direct at the pump (valve built-in, standard model), or at the separate sequence valve for the model with remote control.

压力设定范围：标准型 5-35MPa、遥控型 5-31.5MPa。

规格 Size	20~117	250~500
P_{max} (MPa)	1	1.4

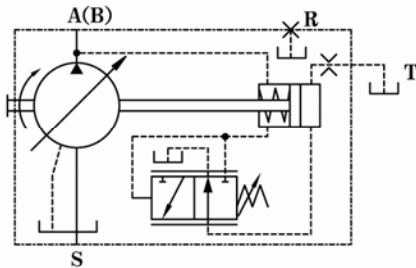
Pressure Setting Ranger:

Standard model: Set pressure from 5MPa to 35MPa.

Remote model: Set pressure from 5MPa to 31.5MPa.

●DR 恒压变量（阀内装），标准型

Constant pressure control (valve built-in), Standard



注：顺序阀和底板单独订货。

顺序阀油口 T 须单独通油箱（冷却器）。

系统中所装的高压保护溢流阀的压力须设定比恒压控制的设定值高 2MPa。

遥控油管最大长度不得超过 5m。

Note: Order sequence valve and subplate separately.

Port T from the sequence valve must be piped separately to tank A pressure relief valve installed in the system for protection of the max. pressure must be set 2MPa above the setting of the constant pressure control.

The max. single pipe length should not exceed 5m.

●并联工作 Parallel Operation

并联工作：几台 A7V 恒压变量泵并联工作时，其恒压特性曲线的 $\Delta P=1.5\text{MPa}$ 。关联工作时，每台泵需有各自的顺序阀，在订货时请注明“并联工作”。

For parallel operation of several A7V pumps with constant pressure control. A steeper curve is used for the constant pressure control ($\Delta P=1.5\text{MPa}$).

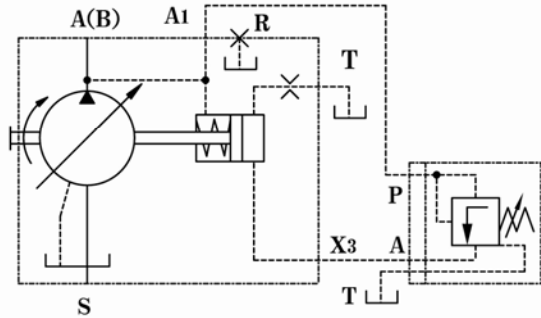
please indicate this requirement in text after the type code when ordering “parallel operation” .

●行程限位 Stroke Limiter

借助于机械行程限位器可把最大排量无级地控制在 $V_{gmax}-V_{gmin}$ 之间，详见 LV 变量。

●DR 恒压变量，遥控型

Constant pressure control ,remote



规格 20~117 的调节时间

Size 20~117 Adjustment times

规格 Size	20	40	58	78	117
$V_{gmin}-V_{gmax}$ te(s) 卸压 pressure unloading 35~5MPa	0.16	0.2	0.25	0.25	0.3
$V_{gmin}-V_{gmax}$ te(s) 回升 pressure built-up 5~35MPa	0.03	0.04	0.05	0.05	0.06

对于遥控所需时间是上表中时间的 3 倍

The valves in the table are increased by 3 times.

A,B	工作油口	Perating port
R	排气口	Port o drain air
S	吸油口	Suction port
T	先导油回油口	Pilot port
A1,X3	遥控阀油口	Ports for remote control valve

The max. displacment can be steplessly limited between V_{gmax} to V_{gmin} by means of a mechanical stroke limiter For details see control device LV.

●零行程连续工作

Contionous Operation in zero position

在油泵转速为 1450r/min 情况下, 泵壳体内不外加油散热, 在零行程连续工作时间、最高压力及允许温度表:

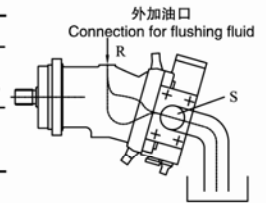
The indicated values applicable at the pump speed of 1450r/min.zero stroke operation without flushing of housing.

短时间运转 Short periods < 10min		长时间运转 Long periods	
最高允许压力 Max.pressure	最高允许温度 Max.Temperature	最高允许压力 Max.pressure	最高允许温度 Max.Temperature
P_{max} (MPa)	t_{max} (°C)	P_{max} (MPa)	t_{max} (°C)
31.5	50	20	50

壳体外加油散热的零行程工作

Zero stroke operation with flushing of housing

长时间运转 Long periods	
最高允许压力 Max.pressure	最高允许温度 Max.Temperature
P_{max} (MPa)	t_{max} (°C)
31.5	50



规格 Size	20	40	58	78	117	250	355	500
散热流量 (L/min) Flushing flow	2	4	6	8	12	12.5	16	25

外加油的油温需小于油箱油温。

Temperature of flushing fluid \leq tank temperature.

注: 当把 A7V 泵装于油箱顶部在 P_{max} 为 31.5MPa 下长时间零行程工作时, 必需提供 \geq 上表对应规格的流量对壳体冲洗。

Note: When mounting the A7V on top of tank and at zero stroke operation for longer periods of time at pressure up to P_{max} 31.5MPa a min.folw \geq corresponding to flushing folw as indicated for each size in the above table must be set instead of case flushing.

八、电控比例控制 EL Electric Proportional Control EL

电控比例控制可以无级地按程序控制泵的排量。泵排量与电磁铁吸力成正比, 即与电磁铁的电流强度成正比。

对于规格 20~160

控制电磁铁要一个电压为 24V (12V), 电流为 300~630mA (600~1260mA) 的直流电源。

控制起点约 300mA(600mA)

控制终点约 630mA(1260mA)。

对于规格 250~500

控制电磁铁的电压为 24V, 电流为 350~800mA 的直流电源。

控制起点约 350mA

控制终点约 800mA, 调节从 V_{gmin} 到 V_{gmax} , 如需反向控制 (V_{gmax} 到 V_{gmin}) 请向我公司询问。如泵在零位起动或工作压力 < 4MPa, 则油口 G 须有 4MPa 的先导压力。

The electric control permits stepless and programmable adjustment of the pump displacement.pump displacement is proportional to the solenoid force, i.e, the strength of solenoid current.

For to size20~160

Control solenoid valve need a DC 24V(12V)and current 300~630mA(600~1260mA).

Start of control current apporx.300mA(600mA)

End of cocontrol current apporx.630mA(1260mA)

For to size250~500

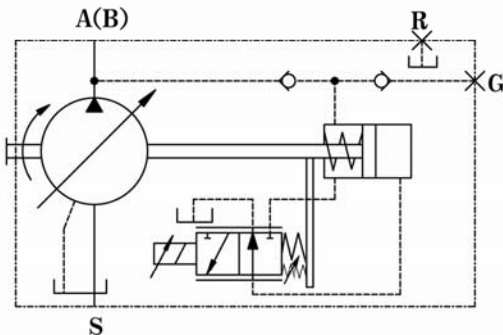
Control solenoid valve need a DC 24V and current 350~800mA

Start of control current apporx.350mA.

End of control current apporx.800mA

Control adjust from V_{gmax} if need anti-control(from V_{gmin} to V_{gmin}) please inquiry from HengYuan company.

If pump is to be moved out of the zero position($V_g=0$)or the operating pressure < 4MPa,a pilot pressure of 4MPa is necessary at port G.



●调节时间 Time For Adjustment

规格 Size	20	40	58	78	117
	28	55	80	107	160
$V_{gmin} - V_{gmax}$ t_{min} (s)	0.16	0.2	0.25	0.25	0.3
$V_{gmax} - V_{gmin}$ t_{min} (s)	0.12	0.16	0.2	0.2	0.25

注: 表内所示时间是在工作压力 $P_o=20$ MPa 时成立。

Note:The viewed time in form is pump' s operating pressure $P_o=20$ MPa.

●滞后量 Hysteresis

由于电气 / 液压控制(对 V_{gmin} 到 V_{gmax} 的整个调节范围内)在控制中约有 $\pm 2.5\sim 4\%$ 的滞后量,当从同一方向起动时,泵位置的重复精度约为 $2\sim 4\%$ 。

注:只有在使用矿物油且在油箱里的最高油温不大于 80°C 时,才可以将带有 EL 控制的泵装在油箱内。(若将泵浸在油中,请订货时加以说明)

A hysteresis of $\pm 2.5\sim 4\%$ (approx.) is present in the control because of the electric/hydraulic control(referred to the complete adjustment range V_{gmin} to V_{gmax}).The repeatability of the pump position.when starting from the same direction is around $2\sim 4\%$.

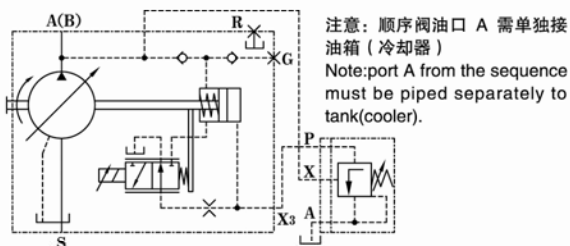
Note:mounting of the pump with EL control inside the oil tank is possible,only when using mineral hydraulic oils and with a max.oli temperature in the tank of 80°C .(If the pump is to be submersed in oil,please indicate in cleat text when ordering)

●带压力截流的电气比例控制 EL Electric control EL with pressure cut-off

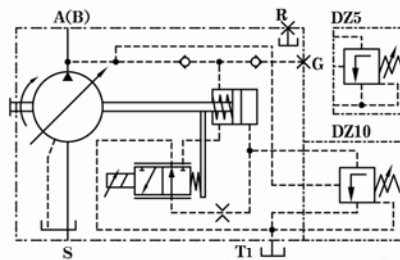
用于所有 $V_{gmin}=0$ 规格,说明见 HD 控制,顺序阀和底板需单独订货。

For all sizes with $V_{gmin}=0$,for description see control device HD,Order sequence valve and subplate separately.

用于规格 20~160 For size 20~160



用于规格 250~500 For size 250~500



DZ5 用于规格 250,
DZ10 用于规格 355~500
DZ5 used for size 250,
DZ10 used for size 355~500

油口	Port
A, B	工作油口 Perating port
S	吸油口 Suction port
A1, X3	遥控阀油口 Ports for remote control valve

在零位连续工作的工况请见恒压控制 DR
For details see constant pressure control DR

G	遥控压力口 Remote pressure port
R	排气口 Port drain air
T	先导油回油口 Pilot port

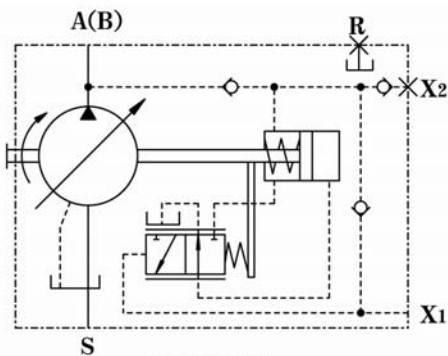
九、液压控制 HD Hydraulic control, pressure related HD

液压控制是按先导压力大小无级地调节泵的排量,调节量与油口 X1 的先导压力值成正比。当用 HD 作 2 位变量时 (V_{gmin} 到 V_{gmax}),油口 X1 的先导压力不得超过 4MPa,调节从 V_{gmin} 到 V_{gmax} 在整个变量范围内 (V_{gmin} 到 V_{gmax}) 先导压力升高 1MPa,变量起点的设定范围从 0.4~1.5MPa,所需的控制油从高压回路取得。要求最低的工作压力为 4MPa,当工作压力低于此值时,需在油口 X2 接入 4MPa 的先导压力。先导 X1 处的供油量约为 0.5L/min,以补充此处的泄漏。

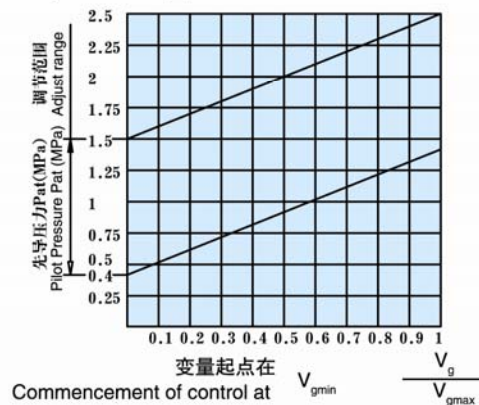
The hydraulic control, pressure related, permits the stepless adjustment of the pump displacement in relation to pilot pressure, Adjustment is proportional to the pilot pressure at port X1. When using the HD control as 2-Position control(V_{gmin} to V_{gmax}),the pilot oil pressure on port X1 must not exceed 4MPa.

Adjustment is from V_{gmin} to V_{gmax}

The increase in pilot pressure over the complete adjustment range is 1MPa.The setting range for commencement of control of is 0.4MPa to 1.5MPa. The necessary control oil is taken from the high pressure circuit, and a minimum operating pressure of 4MPa is required. If necessary apply pilot pressure of 4MPa and port X2. The oil flow at pilot X1 is approx 0.5L/min.



HD 液控变量
Hydraulic control-pressure relate,HD



●带压力截流的液控变量 HD Hydraulic control, pressure related with cut-off

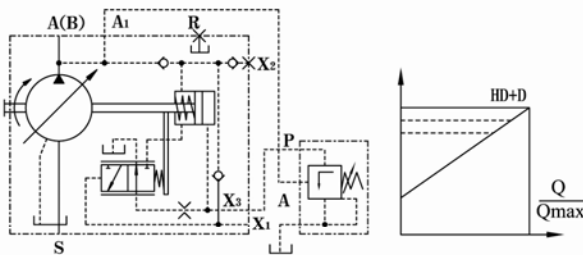
用于所有 $V_{gmin}=0$ 规格

带压力截流时把流量限制成高压的函数，以便不超过预置的工作压力，此功能由顺序阀来实现。当工作压力达到设定值 31.5MPa 时，该阀打开，使油泵流量自动下降到 $Q=0$ 。当顺序阀、泵单独安装时，可借助于底板装于任何合适的部位进行控制，最大单管长度不得大于 5m。顺序阀与底板需单独订货。

For all sizes with $V_{gmin}=0$

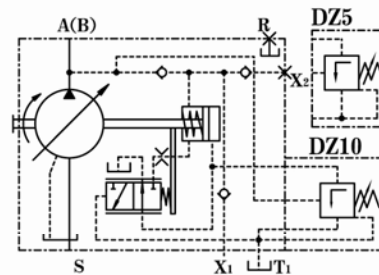
The pressure cut-off serves to limit the flow as a function of high pressure so that a predetermined Operating pressure is not exceeded. This function is not carried out by a sequence valve. On reaching the set max. pressure (adjustment range up to 31.5MPa), the valve opens and the flow is automatically reduced to $Q=0$. The sequence valve is mounted separately from the pump in any suitable location by means of a single pipe length should not exceed 5 m. Order sequence valve and subplate separately.

用于规格 20~117, For Sizes 20~117



注意：顺序阀油口 A 需单独接油箱（冷却器）
 Note: port A from the sequence must be piped separately to tank (cooler).

用于规格 250~500, For Sizes 250~500



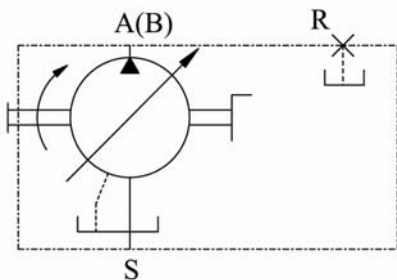
DZ5 用于规格 250,
 DZ10 用于规格 355~500
 DZ5 used for size 250,
 DZ10 used for size 355~500

在零位连续工作的工况请见恒压控制 DR
 For details see constant pressure control DR

●手动控制 MA Manual Control MA

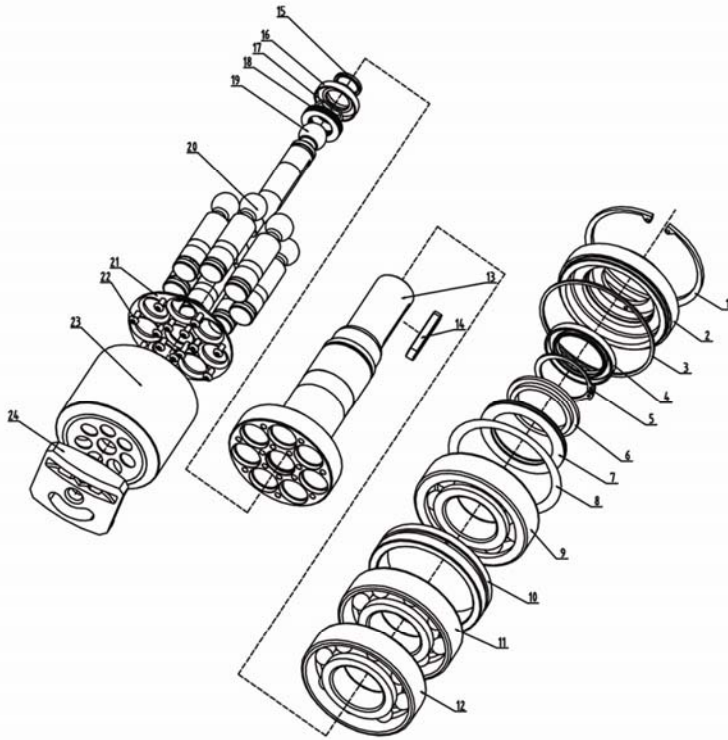
通过转动手轮借助于螺杆使变量活塞沿轴向运动，并经作用销杆使配油盘沿其滑动面运动，从而使泵在 V_{gmin} 至 V_{gmax} 范围内无级地改变其排量。

By turning the handwheel, a piston is moved in an axial direction by means of a threaded spindle. A carrier pin moves the port plate on its sliding plate, thus permitting stepless variation of the pump displacement at the range V_{gmin} to V_{gmax} .



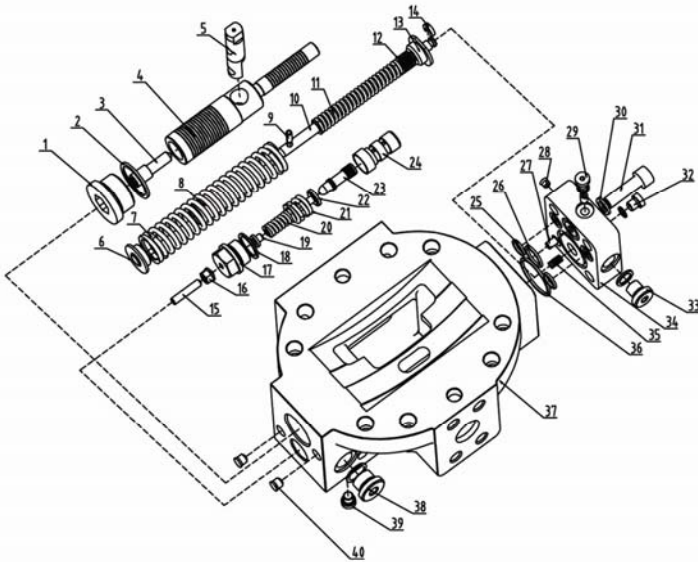
油口	Oil port:
A,B	工作油口 Operating port
S	吸油口 Suction port
R	排气口 Port drain air
T1	先导油回油口 Pilot oil return line
X1	先导压力口 Pilot pressure port
X2	遥控压力口 Remote pressure port
A1,X3	遥控阀油口 Ports for remote control valve

●HA7V 旋转部分爆炸图 HA7V rotating part explosive view



- | | |
|----------|-------------------------|
| 1、孔用弹性挡圈 | Retainer ring |
| 2、轴封盖 | Shaft cap |
| 3、O型圈 | O-Ring |
| 4、骨架油封 | Shaft seal |
| 5、轴用弹性挡圈 | Shaft retainer ring |
| 6、前碟簧座 | Front disc spring |
| 7、轴承碟簧 | Bearing spring |
| 8、轴承调整垫 | Bearing washer |
| 9、球轴承 | Ball bearing |
| 10、轴承隔套 | Bearing spacer bush |
| 11、球轴承 | Ball bearing |
| 12、球轴承 | Ball bearing |
| 13、传动轴 | Drive shaft |
| 14、平键 | Key |
| 15、中心卡键 | Center snap key |
| 16、中心碟簧座 | Center snap spring seat |
| 17、中心调整垫 | Center washer seat |
| 18、中心碟簧 | Center spring |
| 19、中心杆 | Center pin |
| 20、柱塞组件 | Plunger component |
| 21、压板 | Retainer plate |
| 22、螺钉 | Screw bolt |
| 23、缸体组件 | Cylinder block |
| 24、配油盘组件 | Valve plate |

●HA7V-LV 变量部分爆炸图 HA7V-LV variable part explosive view

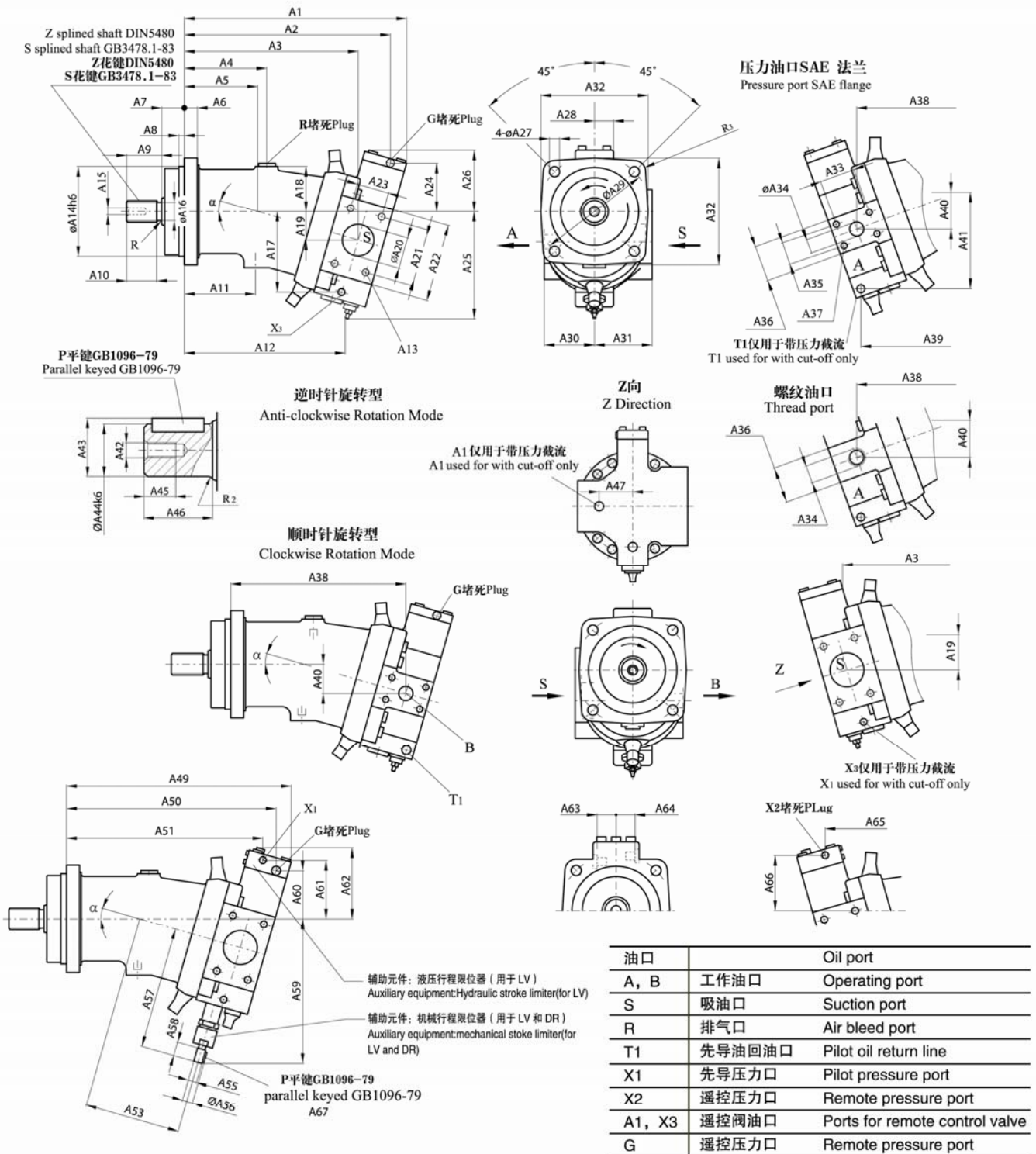


- | | | | |
|------------|-------------------------|----------|---------------------|
| 1、密封螺塞 | Sealing plug | 21、定位弹簧 | Set spring |
| 2、密封圈 | Seal ring | 22、阀芯弹簧座 | Spool spring seat |
| 3、紧定螺杆 | Screw | 23、先导阀芯 | Pilot spool |
| 4、变量活塞 | Variable piston | 24、先导阀套 | Pilot bush |
| 5、作用销杆 | Pin rod | 25、O型圈 | O-Ring |
| 6、销杆弹簧座 | Pin rod spring seat | 26、O型圈 | O-Ring |
| 7、恒功率大弹簧 | Big Spring | 27、阻尼 | Damping |
| 8、导向套 | Pilot bush | 28、螺塞 | Plug |
| 9、弹性圈桩销 | Retainer pin | 29、密封螺塞 | Sealing plug |
| 10、导杆 | Pilot pin | 30、弹性垫圈 | Washer |
| 11、恒功率小弹簧 | Small spring | 31、螺钉 | Bolt |
| 12、弹簧调整垫圈 | Spring adjust washer | 32、密封螺塞 | Sealing plug |
| 13、盖板弹簧座 | Cover plate spring seat | 33、密封螺塞 | Sealing plug |
| 14、U型卡键 | U type snap ring | 34、控制盖 | Control cover plate |
| 15、调节杆 | Adjust screw | 35、先导活塞 | Pilot piston |
| 16、密封螺母 | Sealing nut | 36、O型圈 | O-Ring |
| 17、调节座 | Adjust seat | 37、变量壳体 | Housing |
| 18、密封圈 | Seal ring | 38、密封螺塞 | Sealing plug |
| 19、调节弹簧座 | Adjust spring seat | 39、密封螺塞 | Sealing plug |
| 20、起始变量点弹簧 | Start variable spring | 40、螺塞 | Plug |

十、元件外形尺寸 Unit Dimensions

元件外形尺寸系列 2.0 规格 20-160 Unit Dimensions Series 2.0 size 20-160

●恒功率控制 LV Constant horsepower control LV



●恒功率控制 LV 系列 2.0 规格 20-160 外形尺寸表

Constant horsepower control LV series 2.0 Size 20-160 Data Form

规格Size	α°	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	深Deep	A14	A15	A16	A17	A18	A19	A20
20	9	251	224	199	107	75	16	25	8	43	28	80	160	M12	20	100	M8	21.5	85	52	20	38
28	16	260	232	195	107	75	16	25	8	43	28	80	149	M12	20	100	M8	21.5	95	50	34	38
40	9	317	287	255	123	108	20	32	10	35	28	123	244	M12	20	125	M12	25	95	63	23	50
55	16	327	296	251	123	108	20	32	10	35	28	123	/	M12	20	125	M12	25	/	63	41	50
58	9	374	337	304	152	137	23	32	10	40	33	152	295	M12	18	140	M12	30	106	77	26.5	63
80	16	385	351	300	152	137	23	32	10	40	33	152	/	M12	18	140	M12	30	/	77	48	63
78	9	381	347	310	145	130	25	40	10	45	37.5	145	298	M12	17	160	M12	35	113	80	29	63
107	16	393	358	305	145	130	25	40	10	45	37.5	145	/	M12	17	160	M12	35	/	80	50	63
117	9	443	402	364	214	156	28	40	12	50	43	174.5	350	M16	24	180	M16	40	130	93	33	75
160	16	454	414	359	213	156	28	40	12	50	43	174.5	/	M16	24	180	M16	40	/	88	58	75

规格Size	A21	A22	A23	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	深Deep	A38	A39	A40	A41
20	69.9	94	35.7	78	132	95	11	23.5	125	58	58	118	50.8	19	23.8	46	M10	17	193	/	19	/
28	69.9	94	35.7	59	145	80	11	23.5	125	58	58	118	50.8	19	23.8	46	M10	17	189	/	33	/
40	77.8	102	42.9	87	166	109	13.5	29	160	71	81	150	50.8	19	23.8	53	M10	17	253	261	23	98
55	77.8	102	42.9	64	182	91	13.5	29	160	71	81	150	50.8	19	23.8	53	M10	17	249	/	40	/
58	88.9	115	50.8	93	168	113	13.5	33	180	86	92	165	57.2	25	27.8	64	M12	18	301	313	26	109
80	88.9	115	50.8	68	194	/	13.5	33	180	86	92	165	57.2	25	27.8	64	M12	17	300	/	48	/
78	88.9	115	50.8	101	180	120	17.5	34	200	89	93	190	57.2	25	27.8	64	M12	17	306	318	28	119
107	88.9	115	50.8	73	200	98	17.5	34	200	89	93	190	57.2	25	27.8	64	M12	17	301	/	49	/
117	106.4	135	61.9	114	195	137	17.5	36	224	104	113	210	66.7	32	31.8	70	M14	19	359	369	32	136
160	106.4	135	61.9	83	212	112	17.5	36	224	104	113	210	66.7	32	31.8	70	M14	19	354	/	57	/

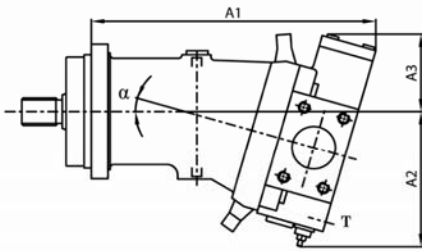
规格Size	A42	A43	A44	A45	A46	A47	A48	A49	A50	A51	A52	深Deep	A53	A54	A55	A56	A57	A58	A59	A60	A61
20	M8	27.9	25	19	50	38	M27×2	257	226	23	M3	9	108	8	8.8	42	161	14	176	77	104
28	M8	27.9	25	19	50	38	M27×2	269	234	242	M3	9	108	8	8.8	42	161	14	186	58	84
40	M12	33	30	28	60	40	M33×2	323	290	279	M4	10	134	10	11.2	/	184	16	204	85	117
55	M12	33	30	28	60	40	M33×2	337	299	292	M4	10	134	10	11.2	/	184	16	215	62	98
58	M12	38	35	28	70	62	M42×2	378	344	330	M5	12	155.5	16	18	52	228	24	251	91	116
80	M12	38	35	28	70	62	M42×2	391	354	343	M5	12	155.5	16	18	52	228	24	265	65	91
78	M12	43	40	28	80	55	M42×2	385	352	338	M5	12	169	16	18	52	236	24	261	99	124
107	M12	43	40	28	80	55	M42×2	400	363	351	M5	12	169	16	18	52	236	24	276	71	98
117	M16	48.5	45	36	90	65	M48×2	445	408	384	M5	12.5	192	16	18	65	266	24	294	111	137
160	M16	48.5	45	36	90	65	M48×2	461	420	399	M5	12.5	192	16	18	65	266	24	310	79	108

规格Size	A62	A63	A64	A65	A66	平键Keyed GB10196-79	平键Keyed GB1096-79	花键Spline DIN5480	花键Spline DIN3478.1-83	R1	R2	R3
20	129	35	30	228	92	Keyed 2×10	Keyed 8×40	W25×1.25×18×9g	EXT18Z×1.25m×30R×5f	1.2	0.8	12
28	114	35	30	238	73	Keyed 2×10	Keyed 8×40	W25×1.25×18×9g	EXT18Z×1.25m×30R×5f	1.2	0.8	12
40	147	30	30	276	104	Keyed 3×10	Keyed 8×50	W30×2×14×9g	EXT14Z×2m×30R×5f	1.6	1.5	16
55	128	30	30	288	83	Keyed 3×10	Keyed 8×50	W30×2×14×9g	EXT14Z×2m×30R×5f	1.6	1.5	16
58	142	33	33	328	104	Keyed 5×16	Keyed 10×56	W35×2×16×9g	EXT16Z×2m×30R×5f	1.6	1.6	16
80	120	33	33	339	80	Keyed 5×16	Keyed 10×56	W35×2×16×9g	EXT16Z×2m×30R×5f	1.6	1.6	16
78	150	33	33	336	112	Keyed 5×16	Keyed 12×63	W40×2×18×9g	EXT18Z×2m×30R×5f	2.5	1.6	20
107	126	33	33	348	86	Keyed 5×16	Keyed 12×63	W40×2×18×9g	EXT18Z×2m×30R×5f	2.5	1.6	20
117	164	34	34	382	125	Keyed 5×16	Keyed 14×70	W45×2×21×9g	EXT21Z×2m×30R×5f	2.5	2.5	20
160	137	34	34	396	96	Keyed 5×16	Keyed 14×70	W45×2×21×9g	EXT21Z×2m×30R×5f	2.5	2.5	20

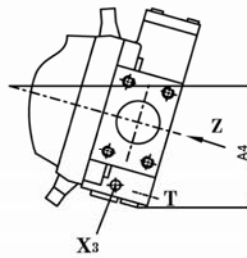
规格Size	油口 Port								重量	
	X1,X2	A1,X3	T	T1	R	G	A,B	S	Wight(kg)	
20	M14×1.5	M12×1.5	M12×1.5	M12×1.5	M16×1.5	M14×1.5	SAE3/4' OR M27×2	SAE11/2'	19	
28	M14×1.5	M12×1.5	M12×1.5	M12×1.5	M16×1.5	M14×1.5	SAE3/4' OR M27×2	SAE11/2'	19	
40	M14×1.5	M18×1.5	M12×1.5	M18×1.5	M18×1.5	M14×1.5	SAE3/4' OR M33×2	SAE2'	28	
55	M14×1.5	M18×1.5	M12×1.5	M18×1.5	M18×1.5	M14×1.5	SAE3/4' OR M33×2	SAE2'	28	
58	M14×1.5	M18×1.5	M12×1.5	M18×1.5	M18×1.5	M14×1.5	SAE1' OR M42×2	SAE21/2'	44	
80	M14×1.5	M18×1.5	M12×1.5	M18×1.5	M18×1.5	M14×1.5	SAE1' OR M42×2	SAE21/2'	44	
78	M14×1.5	M18×1.5	M12×1.5	M18×1.5	M18×1.5	M14×1.5	SAE1' OR M42×2	SAE21/2'	53	
107	M14×1.5	M18×1.5	M12×1.5	M18×1.5	M18×1.5	M14×1.5	SAE1' OR M42×2	SAE21/2'	53	
117	M14×1.5	M20×1.5	M12×1.5	M18×1.5	M22×1.5	M14×1.5	SAE11/4' OR M48×2	SAE3'	76	
160	M14×1.5	M20×1.5	M12×1.5	M18×1.5	M22×1.5	M14×1.5	SAE11/4' OR M48×2	SAE3'	76	

●恒压控制 DR Constant pressure control DR

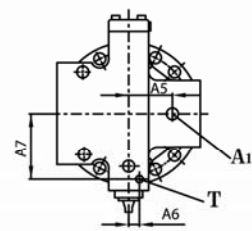
标准型 Standard Model



遥控型 Remote Model



Z向 Z direction



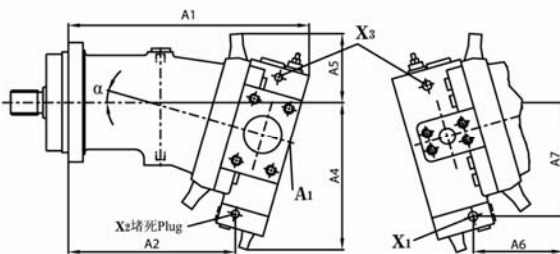
规格 20 A1 和 X3 仅用于带压力截流

其余规格 A1 和 X3 用于遥控

Size 20 A1 and X3 used for with pressure cut-off only

Other sizes A1 and X3 used for remote control

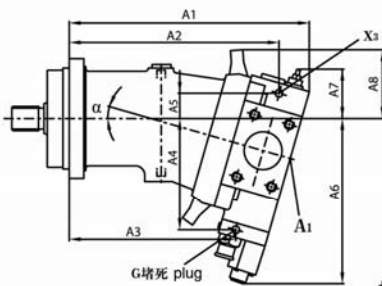
规格 Size	α°	A1	A2	A3	A4	A5	A6	A7
20	9	251	134	95	106	38	-	-
40	9	315	166	107	127	40	14	53
58	9	372	160	107	138	62	15	69
78	9	380	180	114	147	60	14	70
107	9	441	199	132	165	65	14	83

●液压控制 HD Hydraulic Control HD


A1 和 X3 仅用于带压力截流

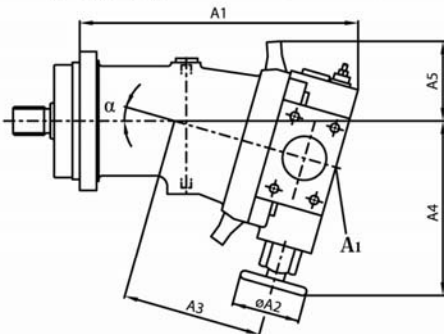
A1 and X3 used for with pressure cut-off only

规格 Size	α°	A1	A2	A3	A4	A5	A6	A7
20	9	248	175	132	182	75	190	147
28	16	253	158	143	195	75	172	160
40	9	312	236	151	206	110	233	166
55	16	318	217	166	220	84	212	180
58	9	367	287	158	213	110	285	170
80	16	373	266	175	232	105	263	186
78	9	375	292	107	225	122	290	182
107	16	382	270	188	245	106	266	200
117	9	434	333	188	250	132	331	200
160	16	442	308	209	272	114	305	220

●电气比例控制 EL Electric proportional Control EL

 规格 20 A1 和 X3 仅用于带压力截流
 其余规格 A1 和 X3 用于遥控

规格 Size	α°	A1	A2	A3	A4	A5	A6	A7	A8
20	9	248	182	144	113	54	216	75	91
28	16	252	188	130	121	41	229	75	-
40	9	312	267	201	130	49	234	-	110
55	16	318	271	184	140	29	249	-	84
58	9	367	320	249	141	52	245	110	-
80	16	373	325	231	154	29	264	105	-
78	9	374	325	254	153	55	257	122	-
107	16	381	330	234	167	31	277	106	-
117	9	434	381	294	172	64	279	132	-
160	16	442	387	272	187	36	298	114	-

 Size 20 A1 and X3 used for with pressure cut-off only
 Other sizes A1 and X3 used for remote control

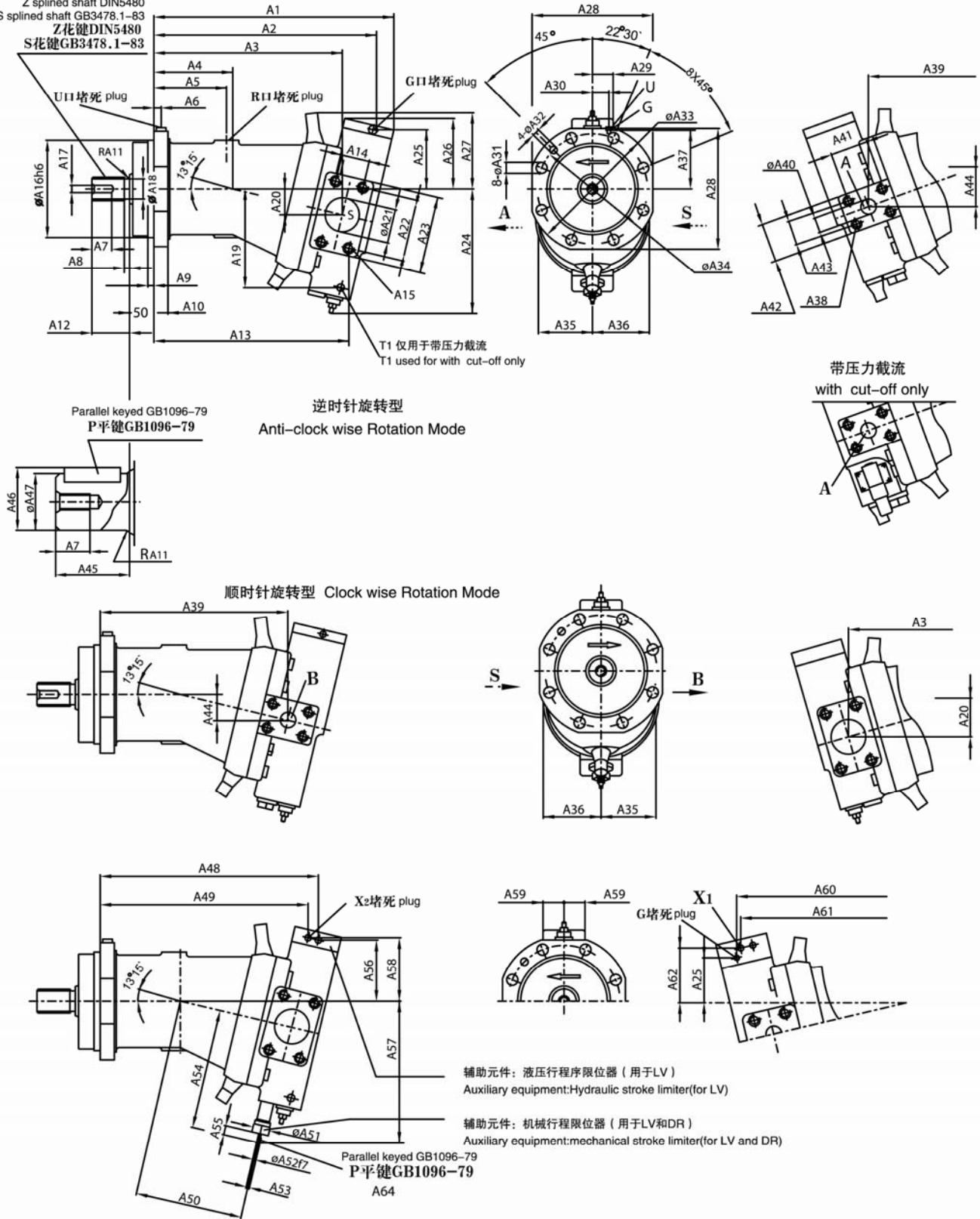
●手动控制 MA Manual Control MA


规格 Size	α°	A1	A2	A3	A4
20	9	251	100	108	175
28	16	260	100	108	190
40	9	315	102	134	197
55	16	323	102	134	215
58	9	372	102	155.5	215
80	16	380	102	155.5	235
78	9	380	125	169	246
107	16	390	125	169	270
117	9	441	125	192	261
160	16	450	125	192	285

元件外形尺寸 系列 5.1 规格 250 Unit Dimensions Series 5.1 size 250

●恒功率控制 LV Constant horsepower control LV

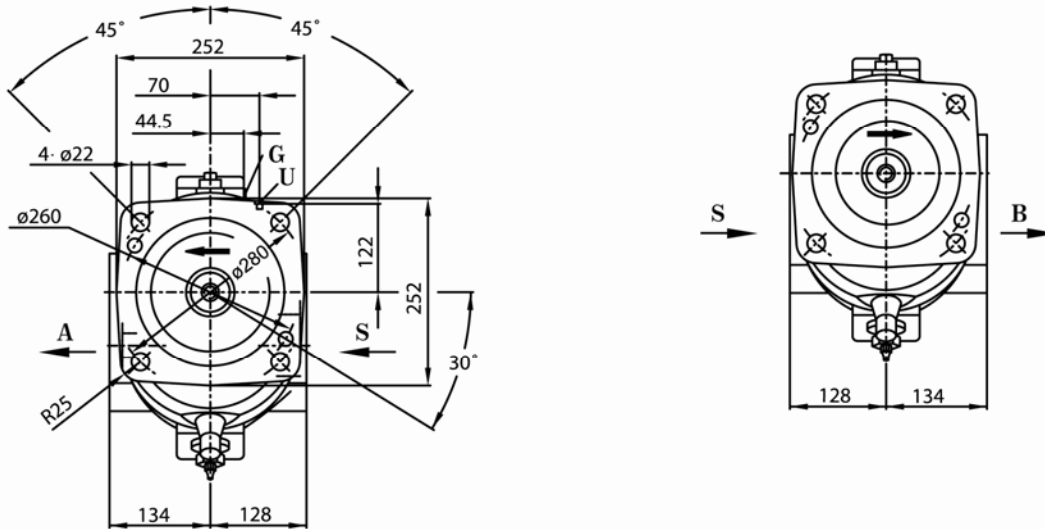
Z splined shaft DIN5480
S splined shaft GB3478.1-83
Z花键DIN5480
S花键GB3478.1-83



元件外形尺寸 系列 5.1 规格 250 Unit Dimensions Series 5.1 size 250

逆时针旋转型 Anti-clockwise Rotation Mode

顺时针旋转型 Clockwise Rotation Mode


恒功率控制 LV 系列 5.1 规格 250~500 外形尺寸表
Constant HP control Series 5.1 Size 250~500 Table of Values for Unit Dimensions

规格 Size	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	Deep	A16	A17	A18	A19	A20	A21	A22	A23
250	491	450	364	134	120	13	36	6	12	25	1.2	58	371	77.8	M16	21	224	M16	45	223	54	100	130.2	180
355	552	511	412	160	142	13	42	8	15	28	1.6	82	427	77.8	M16	21	280	M20	55	240	59	100	130.2	162
500	615	563	465	194	175	15	42	8	15	30	1.6	82	464	92.1	M16	24	315	M20	63	252	68	125	152.4	185

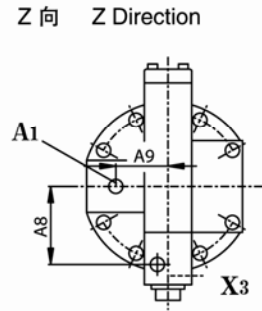
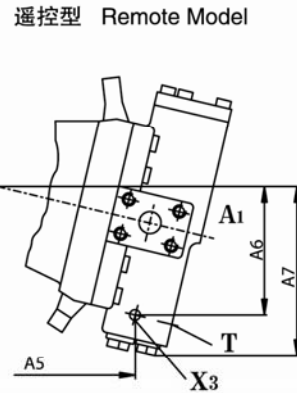
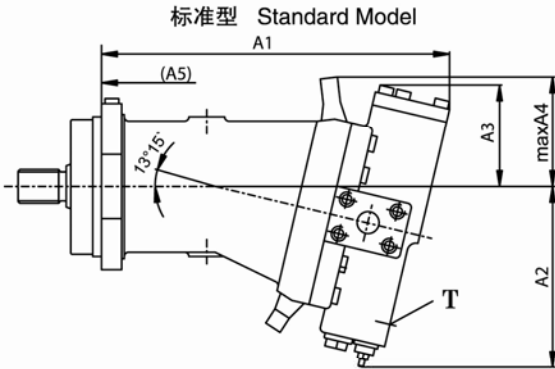
规格 Size	A24	A25	A26	A27	A28	A29	A30	A31	A32	A33	A34	A35	A36	A37	A38	Deep	A39	A40	A41	A42	A43	A44	A45
250	296	145	179	198	252	44.5	70	-	-	-	-	-	-	-	M14	19	354	32	66.7	95	31.8	57	82
355	328	157	194	206	335	48.5	35	18	M16	360	320	130	140	166	M16	21	407	40	79.4	80	36.5	58	105
500	343	194	230	-	375	53	35	22	M20	400	360	144	150	186	M16	24	446	40	79.4	80	36.5	64	105

规格 Size	A46	A47	A48	A49	A50	A51	A52	A53	A54	A55	A56	A57	A58	A59	A60	A61	A62	A63	深 Deep	Weight(kg)
250	53.5	50k6	498	411	223	90	16	18	366	24	175	407	210	44.5	450	433	169	M5	12.5	105
355	64	60m6	562	470	252	90	16	18	397	24	187	444	225	48.5	511	492	182	M5	12.5	165
500	74.5	70m6	617	513	271	100	18	20.5	418	22	215	471	240	53	-	535	210	M6	16	245

规格 Size	平键 A64 Keyed GB1096-79	平键 Keyed GB1096-79	花键 Splined DIN5480	油口 Oil Ports								
				A,B	S	G	X1,X2	A1,X3	T	T1	R	U
250	键 keyed 5 × 16	14 × 80	W50 × 2 × 24 × 9g	SAE11/4"	SAE4"	M14 × 1.5	M14 × 1.5	M16 × 1.5	M16 × 1.5	M22 × 1.5	M22 × 2	M14 × 1.5
355	键 keyed 5 × 16	18 × 100	W60 × 2 × 28 × 9g	SAE11/2"	SAE4"	M16 × 1.5	M16 × 1.5	M22 × 1.5	M16 × 1.5	M22 × 1.5	M33 × 2	M14 × 1.5
500	键 keyed 5 × 16	20 × 100	W20 × 3 × 22 × 9g	SAE11/2"	SAE5"	M16 × 1.5	M16 × 1.5	M22 × 1.5	M16 × 1.5	M22 × 1.5	M33 × 2	M18 × 1.5

元件外形尺寸 系列 5.1 规格 250-500 Unit Dimensions Series 5.1 Size 250-500

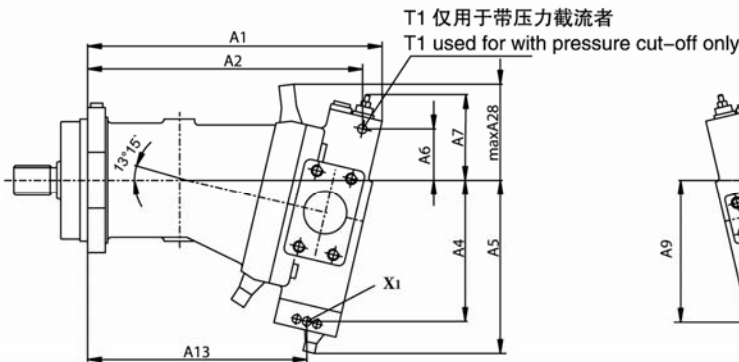
●恒压控制 DR Constant Pressure Control DR



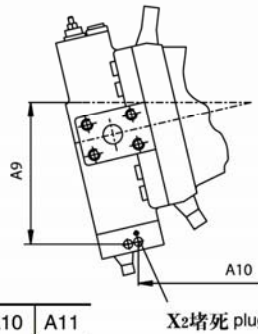
规格 Size	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10
250	489	296	173	198	314	211	272	165	84	28
355	552	328	194	206	366	228	306	175	85	32
500	610	343	221	-	417	241	-	180	84	38

A1 及 X3 仅用于带压力遥控者
A1 and X3 used for with pressure remote only

●液压控制 HD Hydraulic Control, Pressure Related HD

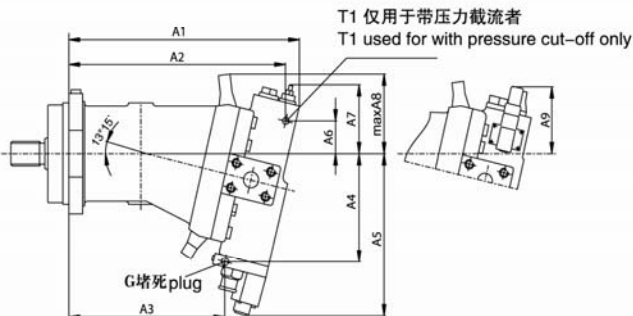


带压力截流
used for with pressure cut-off only



规格 Size	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
250	476	445	328	281	323	95	166	198	275	306	-
355	537	506	377	311	358	97	187	206	305	355	213
500	586	546	409	382	382	98	-	216	335	379	-

●电气比例控制 EL Electric Proportional Control EL



油口 Oil ports

油口	Oil ports
A.B 工作油口	Operating port
S 吸油口	Suction port
G 遥控压力口 (总功率控制)	Remote pressure port (Port for summation HP control)
X1 先导压力口	Pilot pressure port
X2 遥控压力口	Remote pressure port
A1 X3 遥控阀油口 (HD)	Ports for remote control valve(HD)
T 先导油口	pilot oil return line
T1 先导油回油口	Pilot oil return line
R 排气口	Air bleed port
U 冲洗口	Flushing port

规格 Size	A1	A2	A3	A4	A5	A6	A7	A8	A9
250	476	445	307	271	391	95	166	198	-
355	537	506	308	284	416	97	187	206	213
500	586	546	346	308	455	98	-	216	-