A7V











华德液压

Axial Piston-Bent Axis Design
Variable Displacement Pump

斜轴式轴向柱塞
变量泵

技术样本

☎ 销售服务热线 400-000-6987

本公司通过：

- 【ISO9001质量管理体系认证】
- 【ISO14001环境管理体系认证】
- 【OH SAS18001职业健康安全管理体系认证】
- 【CE认证】

编制： 华德液压技术中心

华德液压

北京华德液压工业集团有限责任公司
BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO., LTD.

2012 年 10 月编制

北京华德液压工业集团有限责任公司
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Variable Displacement Pump A7V

华德

注意事项

1．为了保证无故障的高效工作，在设计系统期间应根据工况仔细选择液压系统的液压油，所有矿物油基液压油均在某种程度上适用于轴向柱塞元件，它们的应用时基本划分取决于上述的水、粘度与温度关系，并考虑氧化和腐蚀保护、材料相容性、空气和水分离特性。

2．为了保证设备有长的使用寿命，必须进行良好而可靠的过滤。油液中的硬颗粒污染不得超过以下等级：

等级9——按 NAS1638

等级6——按 SAE

等级18/15——按 ISO/DIS 4406

在油液温度很高时，最低清洁度为：

等级8——按 NAS1638

等级5——按 SAE

等级17/14——按 ISO/DIS 4406

3．为了正确选择液压油，必须知道与环境温度有关的工作温度；在闭式回路中这是回路温度，在开式回路中这是油箱温度。

4．注意：漏油(壳体泄油)温度受压力和转速的影响，总是高于回路温度，然而要求回路中任何点温度不得超过90℃。

如果由于极端的工作参数或较高的环境温度，而不能维持上述条件，订货时请询问我公司。

5．泵的进油口压力(绝对压力)必须≥0.08MPa，及泄油压力(壳体内允许的最高压力)为0.2MPa(绝对压力)，壳体内压力值必须等于或高于作用在轴密封上的外部压力值。

6．安装位置：一般要求液压泵／马达安装位置、壳体上边缘低于油箱最低液面。若安装需在油面以上，请在订货时提出。

《样本》所述技术资料，仅供参考。若有特殊要求请与我集团公司技术部门咨询，若有更改，恕不通知。

The technical information in the catalog is for your reference. Please consult our technical Dept., if you have any special requirements.

NOTES

1. In order to guarantee trouble-free and efficient operation, the hydraulic fluid in a hydrostatic system should be selected carefully according to the actual working conditions during the design of the system. All mineral oil based fluids are suitable to a greater or lesser degree for application in axial piston units.
Their basic classification of application results from what has already been said due to the water, viscosity and temperature relationships,with consideration of oxidization and corrosion protection, material compatibility, air and water separation characteristics.

2. In order to guarantee a long service life for the installation, good and reliable filtration is necessary. The hard particle contamination of fluid may not exceed a level determined by:
Class 9 to NAS 1638
Class 6 to SAE
Class 18/15 to ISO/DIS 4406
When the fluid temperature is too high, the required minimum degree of cleanliness is:
Class 8 to NAS 1638
Class 5 to SAE
Class 17/14 to ISO/DIS 4406

3. In order to select the correct fluid, it is necessary to know the operating temperature in the circuit in relation to the ambient temperature-in an open circuit and the tank temperature.

4. Important:The leakage oil (case drain oil)temperature is influenced by pressure and pump speed and is always higher than the circuit temperature. However, at no point in the circuit may the temperature exceed 90℃。
If it is not possible to comply with the above conditions because of extreme operating parameters or high ambient temperatures, please consult us.

5. The minimum pressure at the suction port of the pump≥0.08 Mpa(absolute pressure), and the drain pressure(max.permissible casing pressure)is 0.2 MPa(absolute pressure). The pressure in the housing must be the same or greater than the external pressure on the shaft seal.

6. Installation position:in general, the upper point on the pump/motor housing must be below the minimum oil level of the tank. If you would like to install it above the minimum oil level, pleaseindicate when order.

北京华德液压工业集团有限责任公司
BEIJING HUADE HYDRAULIC INDUSTRIAL GROUP CO. ,LTD.

A7V变量泵 Variable Displacement Pump A7V

用于开式回路 For open circuits

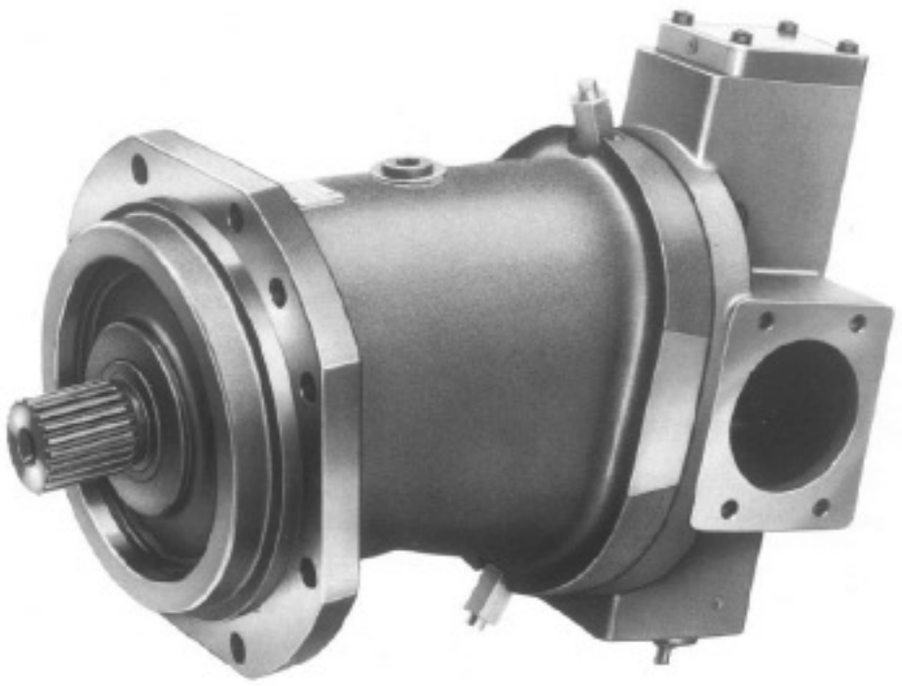
斜轴式轴向柱塞结构 axial tapered piston, bent axis design

RC92100/12.2004

规格 Size 20-500

高压范围 Peak pressure 至 up to 40MPa

替代： ReplaceRC92100/09.2003



说明：

- 斜轴式轴向柱塞泵，用于开式回路静液压传动中。
- 流量与驱动转速及排量成正比，在恒定驱动转速下，可以无级变化。
- 控制装置品种齐全，用于每种控制和调节功能。
- 用矿物油和抗燃液体工作。

Description

Variable displacement pump, axial piston, bent axis design, for hydrostatic transmissions in open circuits.
The flow if proportional to the drive speed and the displacement and is steplessly variable at constant drive speed.
comprehensive programme of control devices for every control and regulation function.
operation of both mineral, and fire-resistant fluids.

结构特点：

结构1

- 高性能的旋转组件及球面配油盘，可实现自动对中，低周速，高效率。
- 驱动轴能承受径向载荷。
- 长寿命。
- 低噪声级。

结构5.1

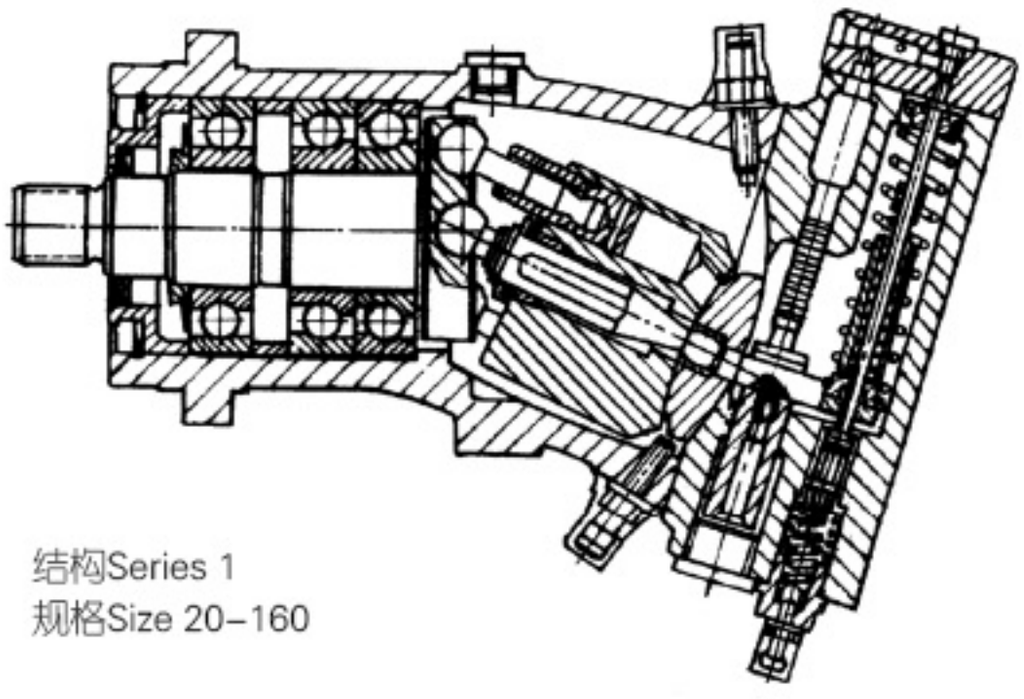
- 具有提高技术数据后的新型高性能旋转组件及经过考验的球面配油盘。
- 结构紧凑。

Special Features

series 1

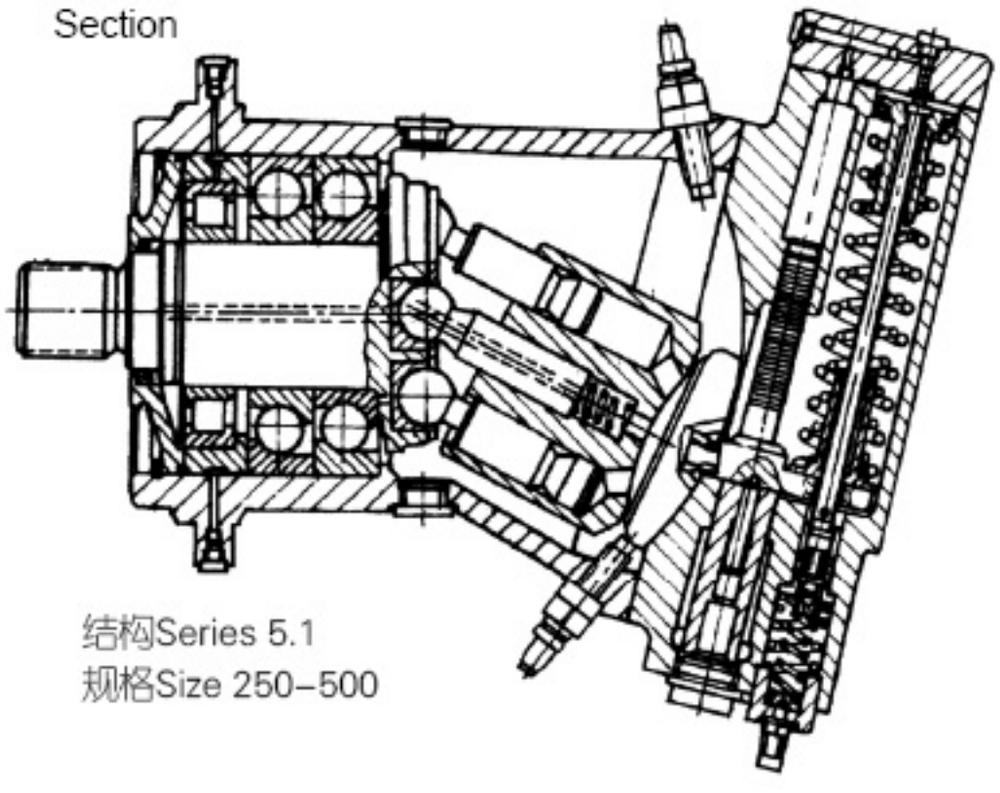
High performance rotary group with well-proven spherical control area offering the following advantages; self-centering, low peripheral speed, high efficiency.
Long service life robust rolling bearing.
Drive shaft will support radial loads.
Low noise level.
High duty roller bearing for inter-mittent high pressure operation.
For continuous duty hydrostatic bearing are available.

剖视图



结构Series 1
规格Size 20-160

Section



结构Series 5.1
规格Size 250-500

A7V变量泵 Variable Displacement Pump A7V

型号说明 Type Code

A7V	55	LV	1	L	Z	F	O	O

泵型号 Pimp Type

变量泵	Axial piston variable Displacement pump	A7V

规格 Size

0–20.5	20
8.1–28.1	28
0–40.1	40
15.8–54.8	55
0–58	58
23.1–80	80
0–78	78
30.8–107	107
0–117	117
46.2–160	160
0–250	250
0–355	355
0–500	500

(排量 Displacement V_{gmin}–V_{gmax} ml/r)

变量方式 Control Device

恒功率变量	Constant horsepower control	LV
恒压变量	Constant pressure control	DR
电控比例变量	Electrical control (with prop.solenoid)	EP
液控变量	Hydraulic control pressure related	HD
手动变量(带手轮)	Manual control (with handwheel)	MA
刹车变量	Brake control	SC
数字变量	Numerical control	NC

结构型式 Series

见剖视图	see section	1
		5.1

辅助元件 Auxiliary Equipment

没有	none	O

行程限位 Stroke Limiter

没有	none	O
机械行程限位 (用于LV和DR)	Stroke limiter mechanically adjustable (for LV and DR)	M
液压行程限位 (用于LV)	Stroke Limiter, hydraulic (for LV)	H

油口连接 Pipe Connections

压力油口： SAE法兰，在侧面	Pressure port： SAE flange,on side	F
吸油口： SAE法兰，在侧面	Suction port： SAE flange,on side	
压力油口： 螺纹连接，在侧面	Pressure port： threaded,on side	G
吸油口： SAE法兰，在侧面	Suction port： SAE flange,on side	

轴伸 Shaft End

花键	splined shaft DIN 5480	Z
花键	splined shaft GB 3478.1–83	S
平键	keyed shaft GB1096–79	P

转向(从轴端看) Direction of Rotation(Viewed of shaft end)

顺时针	clockwise	R
逆时针	anti–clockwise	L

订货示例，A7V.55.LV.1.L.Z.F.O.O

轴向柱塞变量泵A7V，规格55，恒功率控制，结构1逆时针旋转，花键，SAE法兰连接，没有行程限位器和辅助元件。

Ordering Example：A7V.55.LV.1.L.Z.F.O.O

Axial piston variable displacement pump A7V, size 55. With constant horsepower control, se–ries 1.
anti–clockwise rotation, splined shaft
SAE side flange connections, without auxiliary equipment.

A7V变量泵 Variable Displacement Pump A7V

技术参数表 **Technical Data**

(理论值，未考虑机械效率和容积效率) (theoretical values, without considering mech-hyd. and volumetric efficiency)

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			•	•	•	•	•	•	•	•	•	•	•	•	•
LVS 恒功率负荷传感变量	Constant HP control with load sending											•				
DR 恒压变量	Constant pressure control			•		•		•		•		•		•	•	•
DRS 恒压负荷传感变量	Constant pressure control with load sending											•				
HD 液控变量	Hydraulic control			•	•	•	•	•	•	•	•	•	•	•		•
EP 电控比便变量	Electric control(Proportional)					•	•	•	•	•	•	•	•	•		•
MA 手动变量	Manual control			•	•	•	•	•	•	•	•	•	•	•		
SC 刹车变量	Brake control											•	•	•		
排量	Displacement	V_{gmax}	mi/r	20.5	28.1	40.1	54.8	58.8	80	78	107	117	160	250	355	500
		V_{gmin}	mi/r	0	8.1	0	15.8	0	23.1	0	30.8	0	46.2	0	0	0
最高转速 Max.speed[3]	在 0.09MPa[1]	$n_{max}0.09$	r/min	3800	2800	3200	2360	2850	2120	2540	1900	2240	1650	1400	1250	1120
	在 0.1MPa[1]	$n_{max}0.1$	r/min	4100	3000	3400	2500	3000	2240	2700	2000	2360	1750	1500	1320	1200
	在 0.15MPa[1]	$n_{max}0.15$	r/min	4750	3600	3750	3000	3350	2750	3000	2450	2650	2100	1850	1650	1500
最大流量 Max.flow[2]	在 $n_{max}0.09$	$Q_{max}0.09$	L/min	76	76	124	125	161	164	192	197	254	256	340	430	543
	在 $n_{max}0.1$	$Q_{max}0.1$	L/min	82	82	132	133	170	174	204	208	267	271	364	455	582
	在 $n_{max}0.15$	$Q_{max}0.15$	L/min	94	98	146	160	190	213	227	254	300	326	449	568	728
最大功率 Max.Power	在 $Q_{max}0.09$	$P_{max}0.09$	KW	45	46	75	75	97	99	116	119	153	154	204	259	326
(△ p=35MPa)	在 $Q_{max}0.1$	$P_{max}0.1$	KW	49	49	80	80	102	105	123	125	161	163	218	273	350
	在 $Q_{max}0.15$	$P_{max}0.15$	KW	57	59	88	96	114	128	136	153	181	196	270	342	437
流量 Flow Q[2]	在 NE=1450r/min		L/min	28.8	39.5	56.4	77.1	82.3	112.5	109.7	150.5	164.6	225	–	–	–
功率 Power																
P(△ p=35MPa)	在 NE=1450r/min		KW	17	24	34	46	50	68	66	91	99	135	–	–	–
扭矩 Torque	在 V_{gmax}		Nm/10MPa	32.6	44.6	63.7	87	93.2	127.5	124	169.7	186	254	397.5	564.5	795
M(△ p=10MPa)	在 V_{gmin}		Nm/10MPa	–	12.9	–	25.1	–	36.8	–	49	–	73.5	–	–	–
最大扭矩 (△ p=35MPa)	在 V_{gmax}		Nm	114	156	223	305	326	446	431	594	651	889	1391	1975	2782
Max.torque M_{max}	在 V_{gmin}		Nm	–	45	–	88	–	129	–	171	–	257	–	–	–
惯性矩 Moment		J	kgm^2	0.0017	0.0017	0.0052	0.0052	0.0109	0.0109	0.0167	0.0167	0.0322	0.0322	0.0880	0.1600	0.270
重量 Weight			kg	19	19	28	28	44	44	53	53	76	76	105	165	245

1) 所示值为吸油口S的绝对压力，且在V_{gmax}用矿物油工作。

2) 以容积效率97%算出。

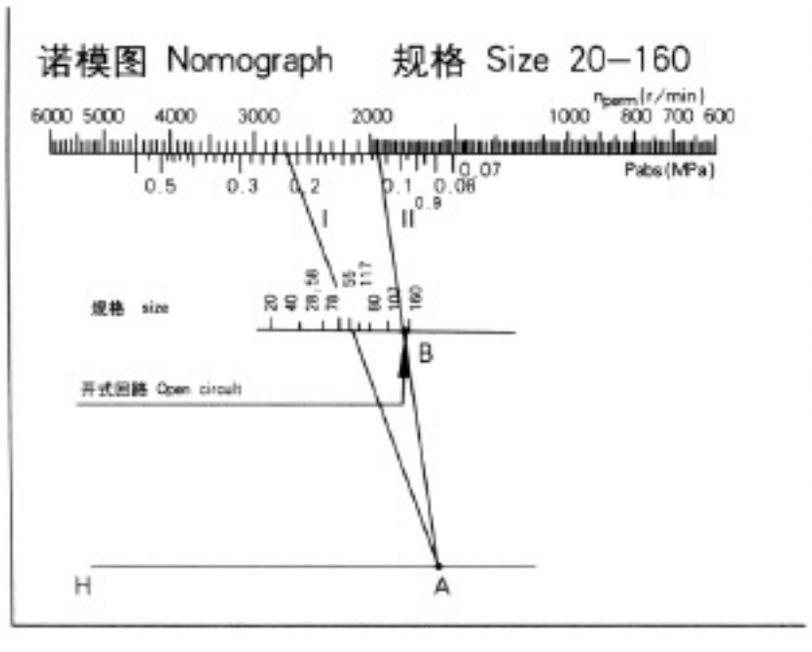
3) 即使在更高的负载下，最高转速不得超过0.15MPa时的数值，但对于$V_{gmin}>0$的那些规格：28-20，55-40，80-85，107-78，160-117，通过减少排量（$V_g<V_{gmax}$）和维持最大流量，最高转速可提高到Vgmin=0的那些规格的值。

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

2) Calculated with a volumetric efficiency of 97%.

3) The maximum speeds at 0.15MPa shown must not be exceeded, even with higher loading. On those sizes with $V_{gmin}>o$, however the maximum speeds can be increased to the values for those sizes with $V_{gmin}=0$ by reducing the displacement($V_g<V_{gmax}$)and maintaining max.flow.The relevant sizes are 28-20，55-40，80-85，107-78，160-117.

诺模图 Nomograph 规格 Size 20—160



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。

例：

给定：规格55，驱动转速2700r/min.

求：吸油口S处的绝对压力，P_{abs}.

解：从n_{perm}刻度向规格联直线与线H相交于A点，再从A点向B点连直线 Ⅱ 得到P_{abs}=0.117MPa.

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

Example: Given: size 55D rive speed 2700r/min Required: pressure P_{abs} at the suction inlet.

Solution: Line 1 on scale n_{perm} drawn towards size 55 crosses line Hat port A.

Line 11 from point A to point B(open circuit)gives the result P_{abs}=0.117MPa.

技术参数 Technical Data

进口工作压力(S口绝对压力) Inlet Operation Pressure
Absolute pressure at port S

$P_{abs\ min}$ 0.08MPa

$P_{abs\ max}$ 0.2MPa

出口工作压力范围 Operating Pressure Range–Outlet Side

额定压力 Nominal pressure P_N=35MPa

最高压力 Peak pressure P_{max}=40MPa

油温范围：Fluid Temperature Range

t_{min} –25℃

t_{max} +80℃

粘度范围：Viscosity Range：

V_{min} 10mm²/S

V_{max} (短时)(for short periods)1000mm²/s

最佳工作粘度：Optimum Operating Viscosity：

V_{opt} 16–36mm²/S

油液选择：Fluid Recommendation

工作温度 推荐粘度等级符合DIN51519
Operating Recommended Viscosity grade
temperature to DIN 51519
range ISO（VG）（在40℃时，at40℃）

30—40℃	VG22 · 22mm²/S
40—50℃	VG32 · 32mm²/S
50—60℃	VG46 · 46mm²/S
60—70℃	VG68 · 68mm²/S
70—80℃	VG100 · 100mm²/S

液压油的过滤：

推荐过滤精度为10μm。亦可使用25–40μm的，但使用μm的可以延长使用寿命，元件磨损减少。

安装位置

任选。泵壳内必须始终充满油液。当装于油箱内时，油口R的螺塞必须取下，此油口必须在顶部，并拧上一个90° 的弯头(以减少噪音)。驱动轴朝上垂直安装：对此必须定货带有油口U_1和U_2的型号（用文字说明带油口U_1和U_2）。最低液面不低于“A”线，如图1所示。

该泵装于油箱内时油口U_1和U_2和R的螺塞必须取下，当装于油箱外时，泵在启动前必须在油口U_1或U_2排气。

泵装于油箱顶部：

A7V变量泵装于油箱顶部应看作特殊安装，只能在特定的条件下实现订货时请注明：用于油箱顶部安装。

这种安装要求吸油口位于上方，吸油管尽可能短，管端至少低于最低液面200mm见图2。

吸油管的内径应保证油的流速在0.8至1m/s之间。

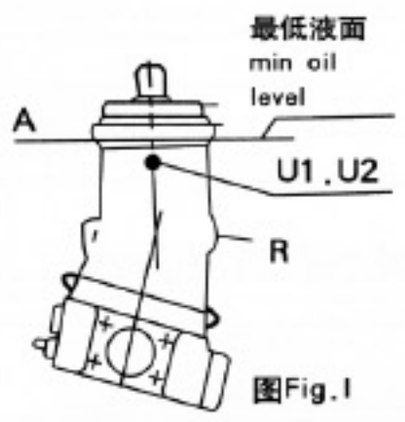
Filtration of Hydraulic Fluid

Recommended filtration 10μm
Coarser filtration of 25–40μm is possible, but longer component life, will be achieved using 10μm filtration due to lowest component wear.

Mounting Position

Optional, The pump housing must always 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 (noise reduction).

Note:
Vertical mounting with drive shaft pointing upwarda:for this case a model With portS U_1 and U_2 must be ordered (indicate in clear text: “with ports U_1 and U_2”). The minimum oil level must not fall below the “A” line, as shown is Fig1.



图Fig.1

Mounting on Top of Tank

when mounting outside a tank, the pump must be bled at port U1 or U2 prior to commissioning.

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

When ordering pumps for mounting on top of tank，state in clear text: “To Be Used for Above Tank Mounting”

This installation requires that the suction port be at the top and the suction pipe be kept as short as possible and the end of the pope be at least 200mm below minimum oil level，see Fig2.

The cross–cut of the suction pump should be so dimensioned to ensure that the flow velocity of the pressure fluid lies between 0.8 and 1m/s.

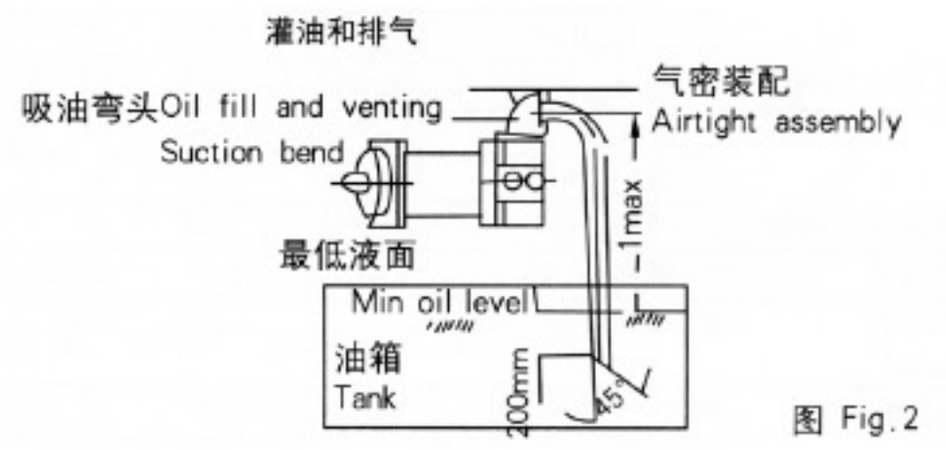


图 Fig.2

Size	Max speed n_{max} r/min	Max length of suction pipe L_{max}(mm)	Calculated suction pie 1.D. (mm)at flow velocity V=0.9m/s and V_{gmax}. speed 转速 n_{max}(r/min)	speed 转速 n_E=1450(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	52.3
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

1) 此数值仅适用于吸油口绝对压力为0.09MPa，排量为V_{gmax}及用矿物油工作时。

注：

A7V泵只能在泵处于最大摆角(V_{gmax})时启动，对于调节从V_{gmin}开始的泵，Q_{min}限位螺钉必须调到最小流量≥V_{gmax}5%处，以免在零位工作时吸油管放空。

1) The values shown are Valid for V_{gmax} with 0.09MPa absolute pressure at suction inlet S and when operated on mineral oil.

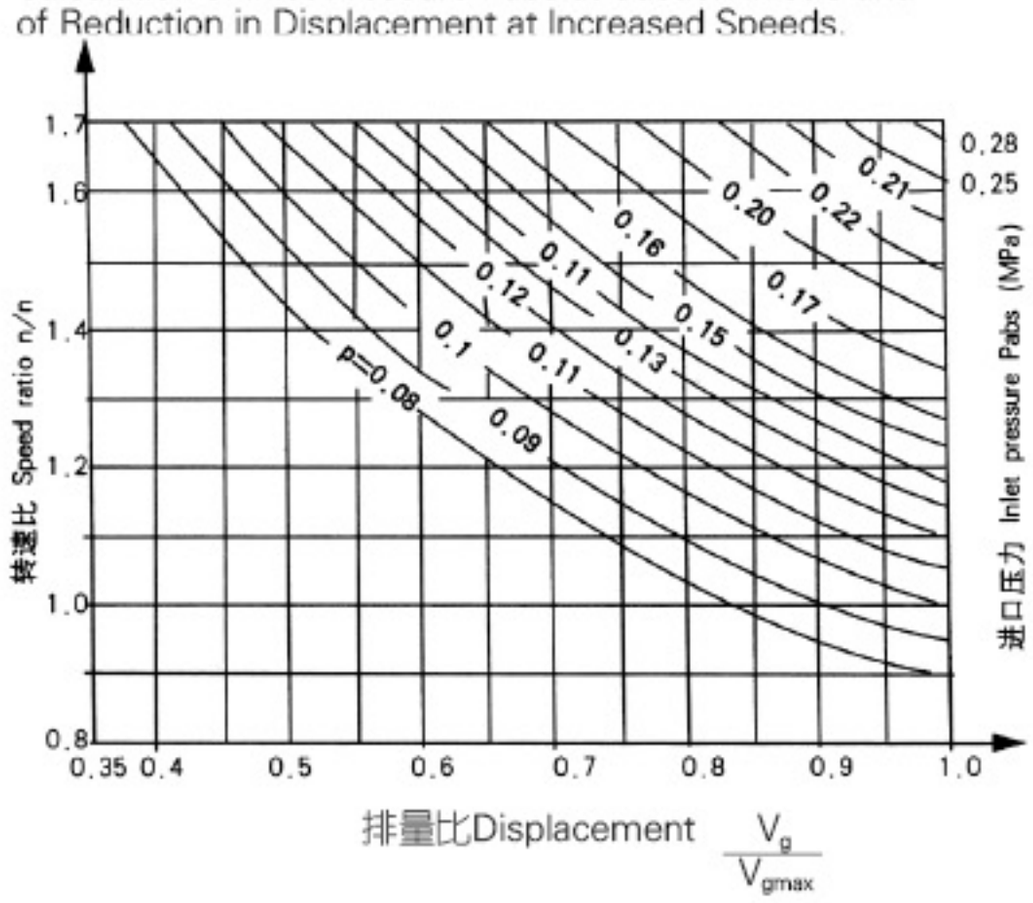
Note:

Start–up of the pump with all controls is only possible when the pump is at its full swivel angle (V_{gmax}), For pumps with minimum flow of≥5% of V_{gmax} in order to avoid emptying of the suction line during zero position operation.

规格Size 250–500

吸油口S处的绝对压力和转速增加时排量减少值的计算。

Calculation of Inlet Pressure Pabs at Suction Inlet S and of Reduction in Displacement at Increased Speeds.



规格Size	250	355	500
$n_{maxperm}$(T/min)	2500	2240	2000

示例

给定：规格500，驱动转速1320r/min

求：吸油口S的压力Pabs

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

在最大摆角下给出Pabs=0.12MPa

如果对本例说仅在Pabs=0.1MPa时能自流，则排量须减小87.6%。

Example:

Given:

Size 500

Drive speed 1320rpm

Required:

pressure Pabs at suction inlet S

Solution:speed ration

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

gives an inlet pressure of Pabs=0.12MPa

at full swivel for example free flow is only possible with Pabs=0.12MPa, the displacement must be reduced to 87.6%.

n_{max}=最高允许转速Max，perm speed.

规格计算 Calculation of Size

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

驱动扭矩 Drive Torque $M=\frac{1.59.V_g.\triangle P}{10.\eta_{mh}}$ [Nm]

驱动功率 Drive Power $P=\frac{M.n}{9549}=\frac{Q.\triangle P}{60\eta_t}$ [kW]

V_g=排量 geom.displacement per rev(ml/r)

△P=压差 differential pressure(MPa)

n=转速 speed(r/min)

η_v=容积效率 volumetric efficiencv

η_{mh}=机械效率 mech.hyd.efficiency

η_t=总效率 overall efficiencv

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

LV恒功率变量 Constant Horsepower Control

恒功率变量是与压力有关的控制流量，以保持液压功率恒定(当驱动转速恒定时)。

The constant HP control controls flow in relation to pressure. thereby maintaining hydraulic power constant. (Provided that the drive speed is constant.)

$P=\frac{P.Q}{60}$ =Constant

P=功率 power [KW]

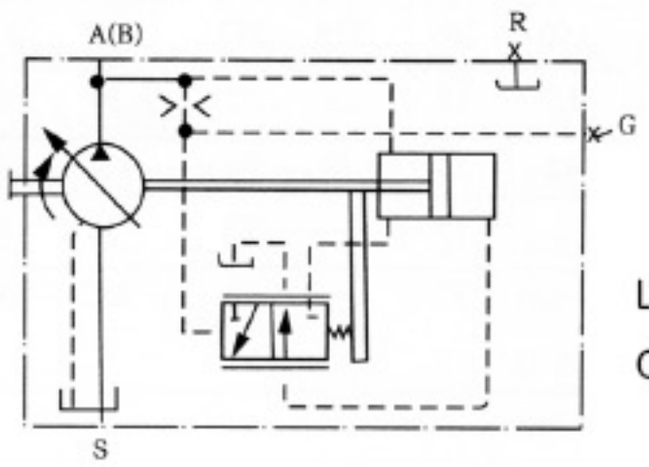
P=压力 pressure [MPa]

Q=流量flow [1/min]

变量起点 Commencement of control:min.5MPa

通过油口G的并联可实现总功率变量

Summation HP control possible by throttles via port G.



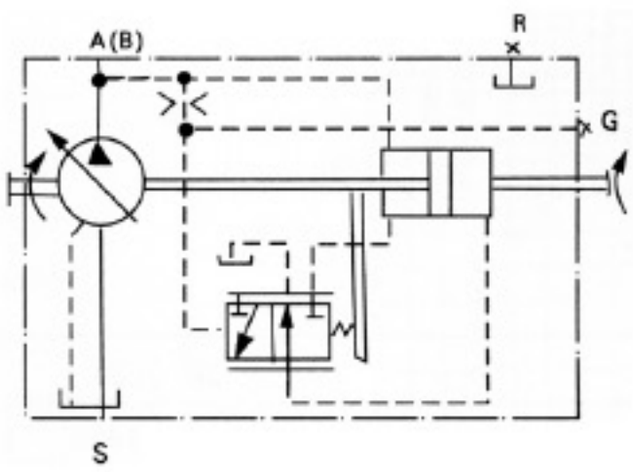
LV恒功率变量

Constant Hp control LV

行程限位器 Stroke Limiter:

通过机械行程限位器可无极的改变或限制最大排量，调节范围从V_{gmax}到V_{gmin}.

By means of a mechanical or hydraulic stroke limiter, the max.displacement can be infinitely varied or limited. Adjustment range from V_{gmax} to V_{gmin}.



LV带机械行程限位的恒功率变量

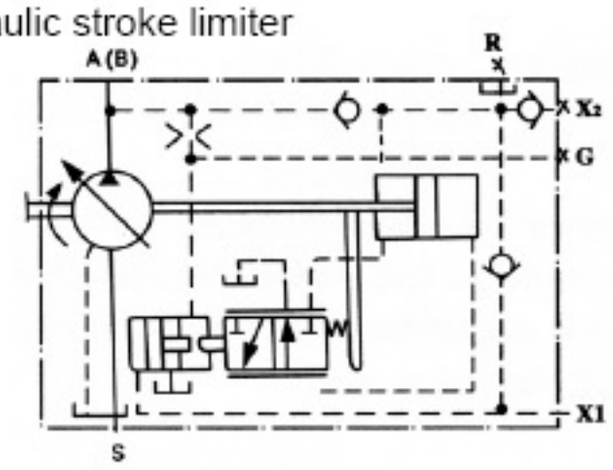
Constant Hp control LV with mechanical stroke limiter

规格 Size	20 28	40 55	58 80	78 107	117 160	250	355	500
螺杆转数 Spindle Revolutions	23	21	28	31	26	21.25	24	25
所需扭矩 Required Torque (approx.)Ncm	80	140	500	630	–	–	–	

液压行程限位器需要不小于工作压力10%的先导压力(X1油口)。油口X1的最高允许压力=20MPa(对所有规格)，如果需要限制工作压力＜5MPa时的流量，则需在油口X2施加不低于5MPa的供油压力(油口X1压力为5.10%=0.5MPa).

A Pilot pressure(port X1)of at least 10% of the operating pressure is required for the hydraulic stroke limiter Max. permissible 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 at port X2(at port X1 then，minl0%=0.5MPa

LV带液压行程限位的恒功率变量 Constant HP control LV with hydraulic stroke limiter



辅助元件：压力切断 Auxiliary Equipment:Pressure Cut-off

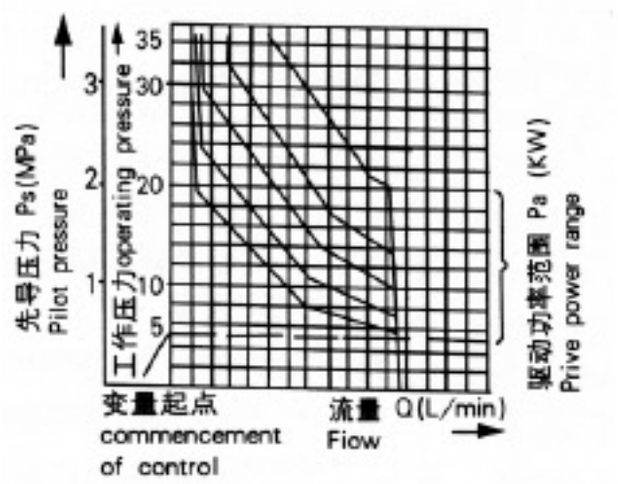
适用于V_{gmin}=0的所有规格。

压力切断是叠加在恒功率控制的恒压控制，它借助于顺序阀，当达到设定的最高压力时(调节范围到31.5MPa)，该阀打开，流量自动减小至Q=0.顺序阀与泵分开安装，可装于任何适当位置(遥控)的底板上。其连接管长(单管)不得大于5m，顺序阀与底板需要独订货。

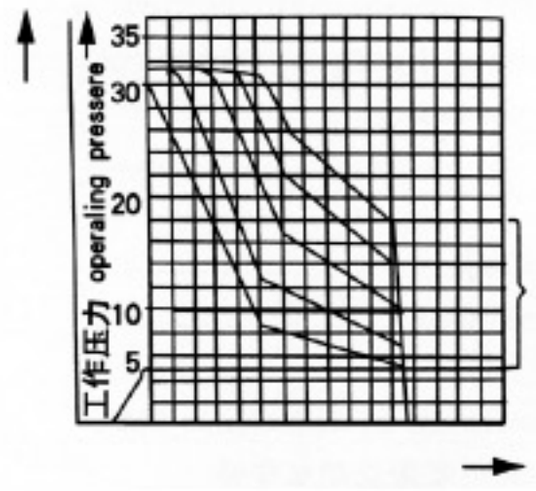
当采用带压力切断的恒功率变量时，泵变量时间将比恒压变量泵DR的长3倍。

注意：顺序阀油口T和先导回油口T1必须直接通回油箱。在零位连续工作见DR恒压变量。

LV的Q-P特性曲线 Characteristics
不带压力切断 without Pressure Cut-off



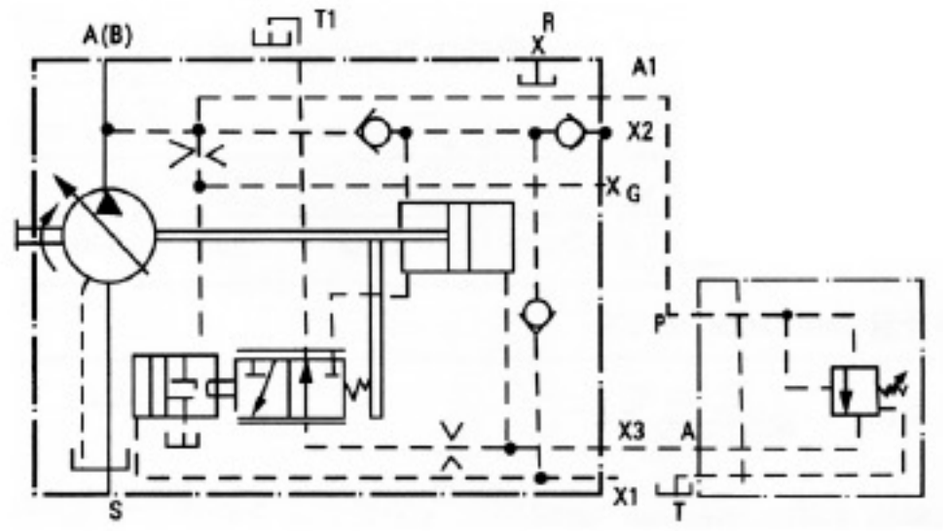
带压力切断
With Pressure Cut-Off
驱动功率范围Pa(KW)



For all sizes With V_{gmin}=0
The pressure cut-off is a constant pressure control superposed on the constant HP control and is carried out by means of a sequence Valve. when the set. maximum pressure is reached(adjustment range up to 315MPa)，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 one subplate(remote control).
The max./single pipe length must not exceed 5 m. order sequence valve and subplate separatelv.
When using the constant HP control with pressure cut-off，the pump control times，will be approximately 3 times longer than those obtained with the constant pressure control DR. Important:Port T form the sequence valve and pilot Oil return line T1 must be piped direct to tank(cooler)
Continuous operatipn in zero position see constant pressure control DR.

LV带压力切断(遥控)和液压行程限位的恒功率变量

Constant HP control LV with pressure cutoff(remote controlled)and hydraulic stroke limiter



接口connections
A.B工作油口service lines
S吸油口suction-line
G总功率控制油口port for summation HP control line
X1先导压力口 pilot pressure
X2遥控口remote contr.pressure
A1、X3遥控阀油口ports for remote control valve
T1先导回油口 pilot oil return
R排气口air bleed

规格 Size			20	28	40	55	58	80	78	107	117	160	250	355	500
转速 Speed	no	r/min	1450	1450	1450	1450	1450	1450	1450	1450	1450	1450	980	980	980
最大流量 Max.Flow Q在at no		L/min	28	39	57	77	81	110.5	110	150	165	225	237	337	475
驱动率范围不带压力切断		P_{omin}	3	4	5.5	7.5	7.5	11	11	15	15	22	22	30	45
Drive without pressure		P_{omax}	11	15	18.5	30	30	37	37	45	55	75	90	132	200
cut-off power 带压力切断		P_{omin}	3	–	5.5	–	7.5	–	11	–	15	–	22	30	45
range		P_{omax}	10	–	18.5	–	27	–	37	–	55	–	90	132	200
P.(KW) with pressure cut-off															

当转速为n时换算如下 Conversion to speeds n(rpm) other than n.
驱动功率 Drive power $P=P_o \frac{n}{no}$

1)以容积效率97%算出。
Calculated with a volumetric efficiency of 97%

改变型：恒功率负荷传感变量(LVS)

负荷传感阀是个流量控制阀，它工作时作为负载压力的函数来调节泵的排量以使之与负载的需求相匹配。在低于功率曲线的整个范围内，泵的流量受装在泵与负载之间的外部节流孔(控制块，节流阀)的影响，而不受负载压力的影响。该阀比较节流孔前后的压力并用节流孔压降(压差△P)把泵流量保持恒定。如果压差增大，则泵向V_{gmin}变化，如果压差减小，则泵向V_{gmax}变化，直到在阀中恢复平衡。

$\triangle P=P_{pump}-P_{serviced\ unit}$

△P可设定成14–25bar，标准设定18bar(请用文字说明所需设定值)。零行程工作(节流阀关闭)时的启动压力比△P设定值高出2bar。

恒功率控制和压力切断越权于负荷传感阀，既负荷传感功能在低于设定功率曲线设定压力时工作。节流阀不包括在标准供货中。

Variation:Constant HP Contril with Load Sensing

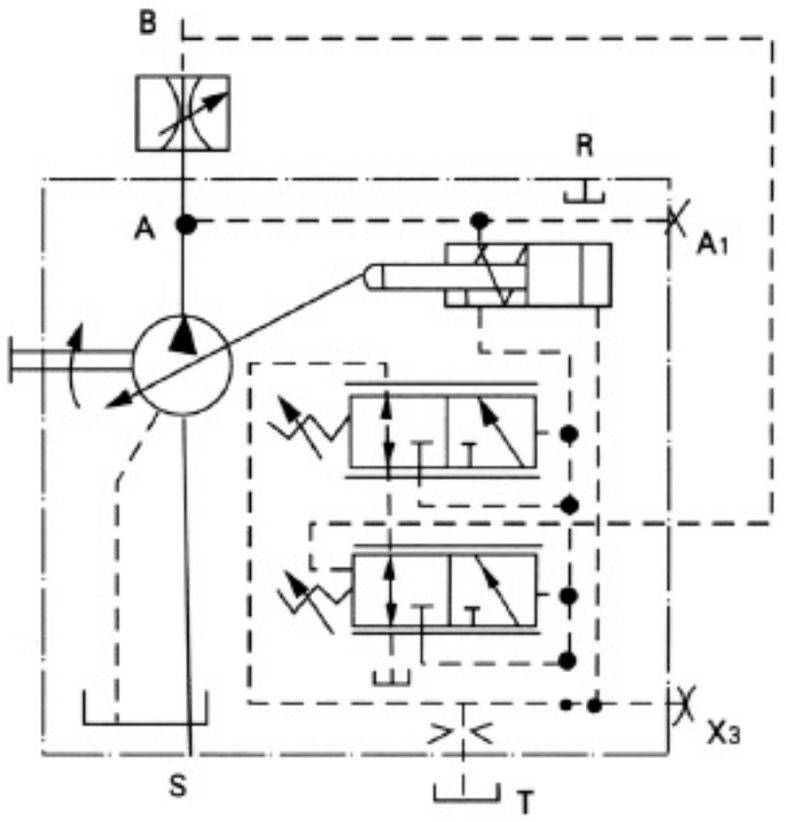
The load sensing Valve is a flow control valve which operates as function of the load pressure to regulate the pump displacement in order to match the requirement of the consumer unit.

The pump flow is influenced by the external orifice(control black, throttle) fitted between pump and serviced unit, ber curve. The valve compares pressure before and after the orifice and maintains the pressure before and after the orifice and maintains the pressure drop (differential pressure △P)across the orifice–and therefore the pump flow–constant. if differential pressure △P increases, the pump is swiivelled back towards V_{gmin}, and if △P decreases the pump is swivelled out towards V_{gmax}, until a balance is restored Within the valve.

$\triangle P=P_{serviced\ unit}$

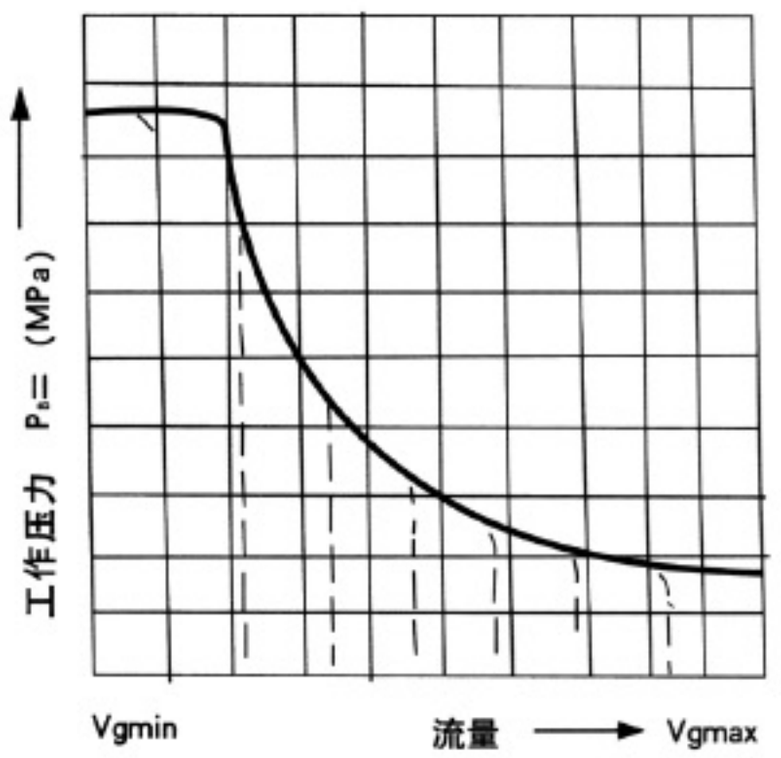
△P may be set With the range 14 bar to 25 bar. The standard Setting is 18 bar (please state required setting in clear text). The stand by pressure for zero stroke operation(orifice close)is aPProx.2 bar above the △P setting.

The constant power control and the pressure cut –off are super imposed on the load sensing valve, for example the set power hyperbola and set pressure the orifice is not included in the standard in the standard supply.



LVS恒功率负荷传感变量

Constant HP control with load Sensing



DR恒压变量

恒压变量在其变量范围内保持系统压力恒定不受泵流量变化的影响，变量泵仅供应工作必须的油液体积。如果压力超过设定值，则泵自动摆回小角度。

所需压力可直接在泵上设定(阀内装，标准型)，也可在用于带遥控型单独的顺序阀上设定。

设定范围5–31.5MPa。

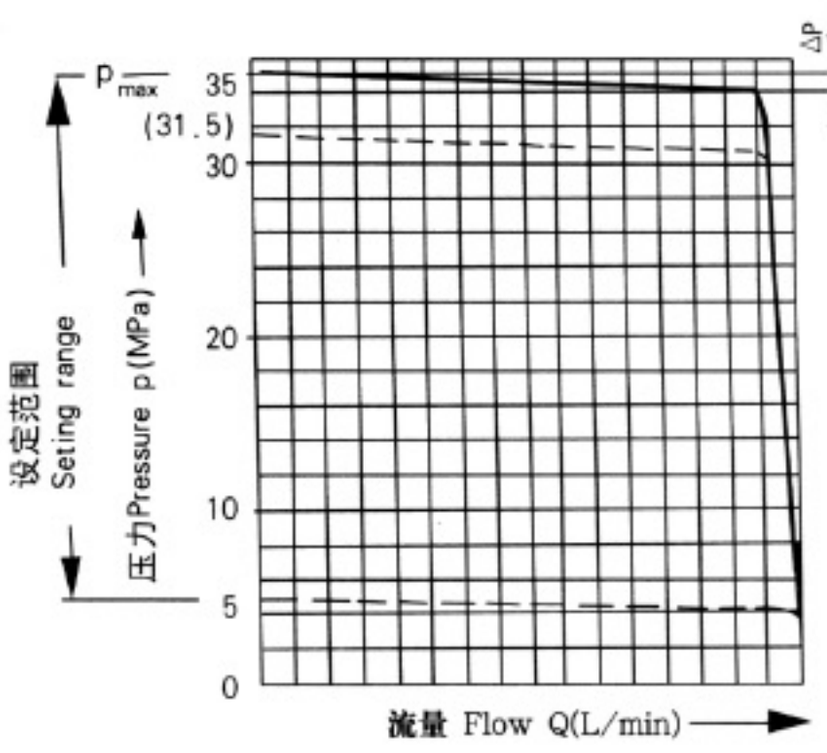
遥控的设定范围5–31.5MPa。

Constant Pressure Control

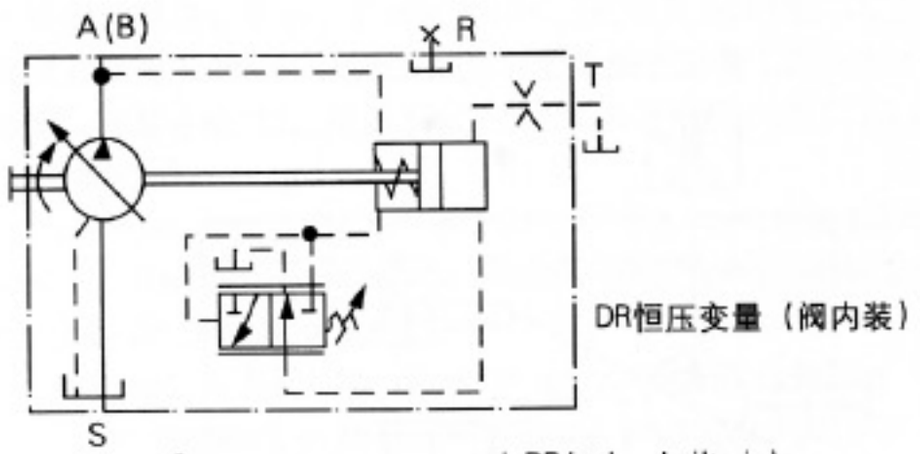
The constant pressure control maintains the pressure in a hydraulic system constant within its control range in spite of changing pump flow requirements . The variable pump supplies only the volume of fluid required by the services, Should operating pressure exceed the set pressure, the pump is automatically swivelled back tp 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.

Setting range from 5 to 31.5MPa.

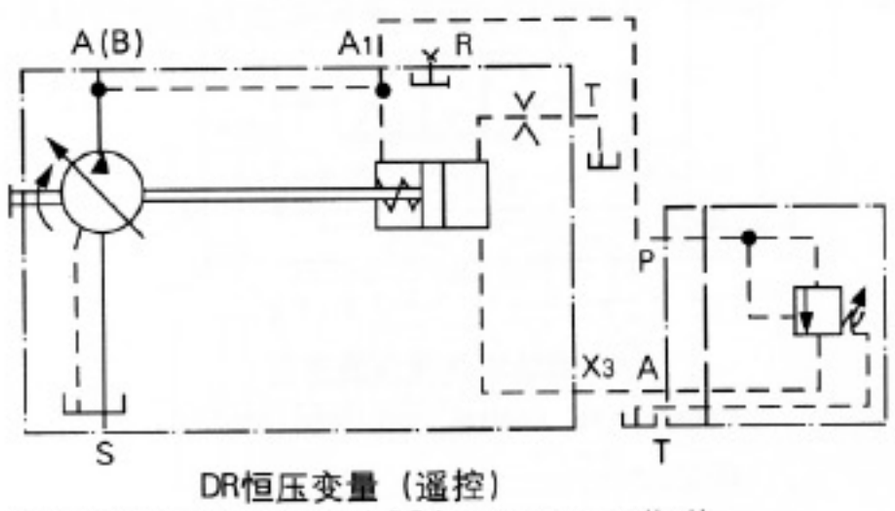
Setting range for remote control 5 to 31.5MPa.



规格 Size	20–17	250–500
△P Max (MPa)	1	1.4



Constant pressure control DR(valve built—in)



DR恒压变量（遥控）

Constant pressure control DR(remote controlled)

行程限位

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

Stroke Limiter

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

在零位连续工作

不带体冲洗的零行程工作

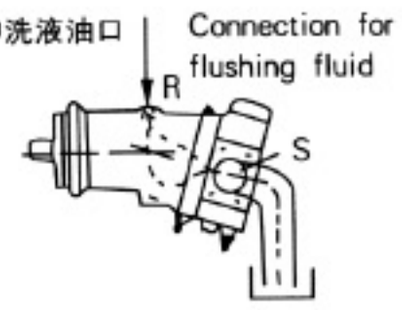
Continuous Operation in Zero Position

Zero stroke operation without flushing of housing.

短期short periods < 10min(~50%ED)		长期long periods	
最高允许压力 max.perm pressure P_{max}(MPa)	最高允许温度 max.perm tank temperature t_{max}(℃)	最高允许压力 max.perm pressure P_{max}(MPa)	最高允许温度 max.perm tank temperature t_{max}(℃)
31.5	50	20	50

带壳体冲洗的零行程工作
Zero stroke operation with flushing of housing

长期long periods	
最高允许压力 max.perm pressure P_{max}(MPa)	最高允许温度 max.perm tank temperature t_{max}(℃)
31.5	50



注：

顺序阀和底板须单独定货。
最大遥控管单根长度不超过5m。
顺序阀油口T须单独接回油箱。
装于系统中用于压力保护的安全阀，其压力设定必须比恒压变量的压力设定值高2MPa。

Note:

Order sequence valve subplate separately. The max.single pipe length should not exceed 5m.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.

冲洗流量 Flushing flow

规格 Size	20	40	58	78	117	250	355	500
流量 flow Qsp 1/min	2	4	6	8	12	12.5	16	25

冲洗液温度≤油箱温度

注：当所A7V泵装于油箱顶部在Pmax为31.5MPa下长时间零行程工作时，必须提供≥上表对应规格的冲洗流量对壳体冲洗。

Temperature of flushing fluid≤ tank temperature

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

调节时间 Adjustment times						
规格 Size		20	40	58	78	117
$V_{gmin}-V_{gmax}$	te(S)	0.16	0.2	0.25	0.25	0.3
卸压 35—5MPa Pressure unloading						
$V_{gmax}-V_{gmin}$	ta(S)	0.03	0.04	0.05	0.05	0.06
升压 5—35MPa Pressure built—up						

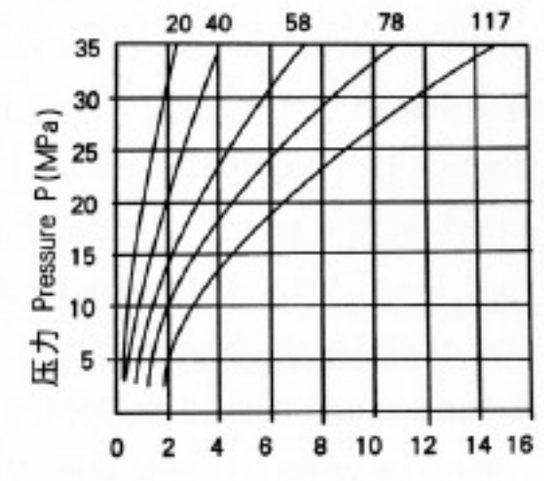
对于遥控，表中数值增大3倍。
The values in the table are increased by 3 times for remote control.

并联工作 Parallel 0peration

几台A7V恒压变量泵并联工作时，其恒压曲线较徒。在订货时请注明“并联工作”。
并联工作时每台泵需要各自的顺序阀。

For parallel operation of several A7V pumps with constant pressure control. a steeper curve is used for the constant pressure control.
please indicate this requirement in text after the type code when order in("parallel operation").
For parallel operation each individual pump requires its own sequence valve.

零行程时的功率Power at Zero Stroke



规格Size
在转速n=1450r/min油温t=50℃时的典型曲线
Typical values at speed n=1450rpm
fluid temperature=50℃
零行程时的功率(KW)
Power at zero stroke(KW)

改变型：恒压负荷传感变量(DRS)

负荷传感阀是个流量控制阀，它工作时作为负载压力的函数来调节泵的排量以使之与负载的要求相匹配。在低于设定压力的整个范围内，泵的流量受装在泵与负载之间的外部节流孔(控制块，节流阀)的影响，该阀比较节流孔前后的压力并用节流孔压降(压差)ΔP使泵流量保持恒定。

如果压差ΔP加大，则泵向V_{gmin}变量，而如果ΔP减小，则泵向V_{gmax}变量，直到在阀中恢复平衡。

$\Delta P=P_{pump}-P_{serviced\ unit}$

ΔP可设定为14–25bar，标准设定为18bar(请用文字注明所需设定值)。

零行程工作时(节流阀关闭)，启动压力约比ΔP设定值高出2bar。

恒压力控制越权于负荷传感阀，即负荷传感功能在低于设定压力时工作。

节流阀不包抱在标准供货中。

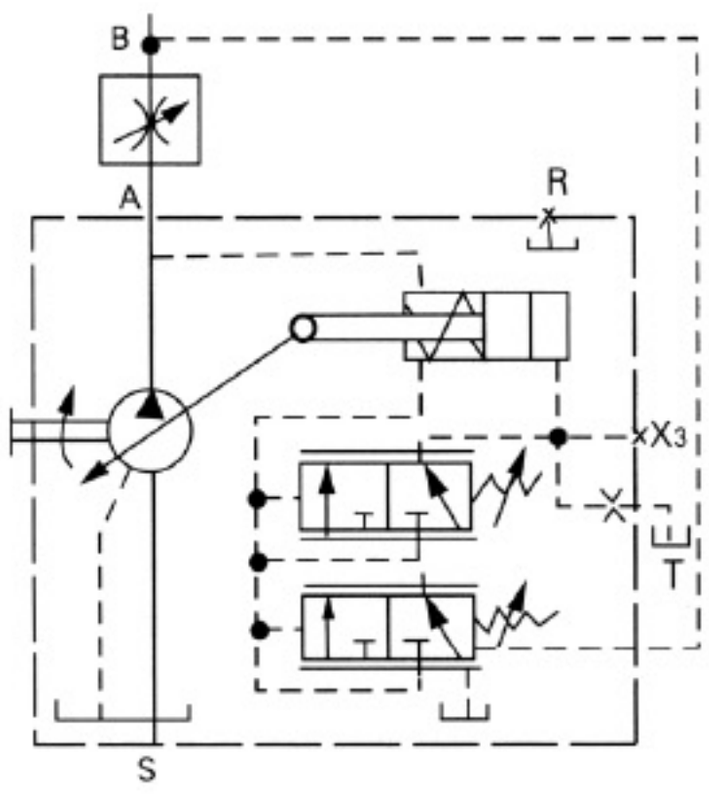
Variation：Constant Pressure control With Load sensing

The load sensing valve is a flow control valve which operates as function of the load pressure to regulate the pump displacement in order to match the requirement of the consumer unit. The pump flow is influenced by the external orifice(control black, throttle)fitted between pump and serviced unit, but is not affected by load pressure throughout the range below the power curve. The valve compares pressure before and after the orifice and maintains the pressure before and after the orifice and maintains the pressure drop(differential pressure ΔP) across the orifice–and therefore the pump flow–constant. if differential pressure ΔP increases, the pump is swivelled back towards V_{gmin}, and if ΔP decreases the pump is swivelled out towards V_{gmax}, until a balance is restored with in the valve.

$\Delta P=P_{Pump}-P_{serviced\ unit}$

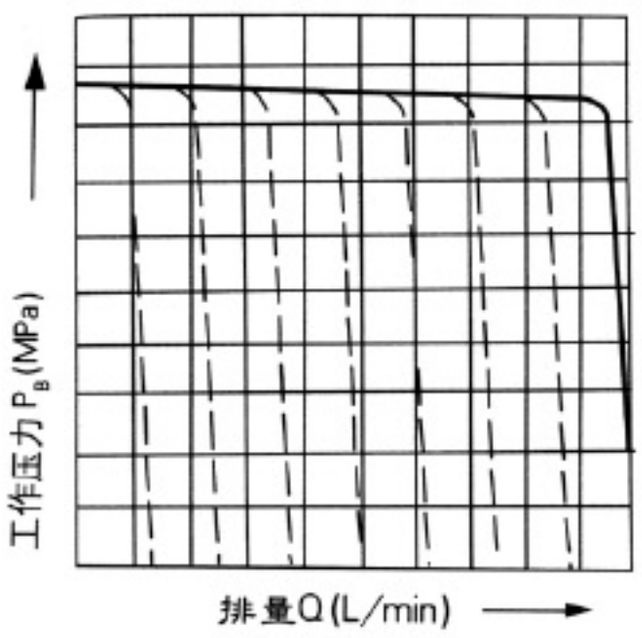
ΔP may be set with the range 14 bar to 25 bar. The standard setting is 18 bar(please state required setting in clear text). The stand by pressure for zero stroke operation(orifice close)is approx.2 bar above the ΔP setting.

The constant pressure control is superimposed on the load sensing valve, i, e, the load sensing function operates below the set pressure. The orifice is not included in the standard supply.



DRS 恒压带负荷传感变量

Constant pressure control with load sensing valve.



EP电控比例变量

电控比例变量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，即与电磁铁的电流成正比。变量活塞上的控制力由比例电磁铁产生。

比例电磁铁需要一个电流为300～630mA(600～1260mA)的24V(12V)，直流电源。

变量起点约在300mA(600mA)

变量终点约在630mA(1260mA)

调节从V_{gmin}至V_{gmax}.如果需要反向控制(V_{gmax}至V_{gmin})请询问我厂。

如果泵在零位启动或工作压力＜4MPa，则油口G须接入4MPa的先导压力。

Electric Proportional control

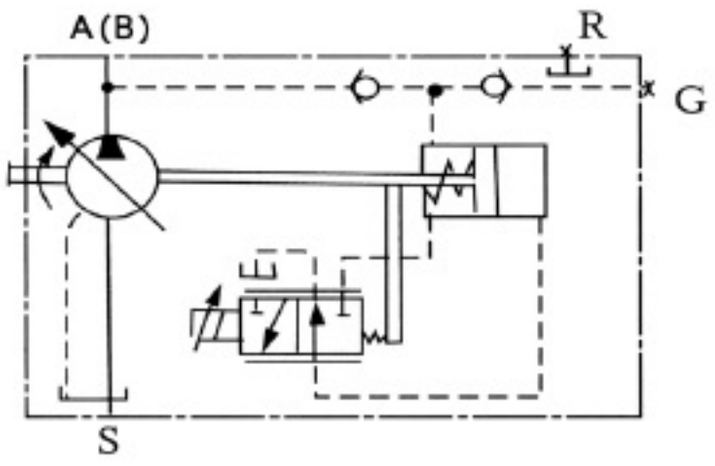
The electric control permits stepless and programmable adjustment of the solenoid force i.e.the strength of solenoid current. The control force on the control piston is generated by a proportional solenoid.

The proportional solenoid need a 24V(12V)DC power supply that the current is 300_630mA(600_1260mA).

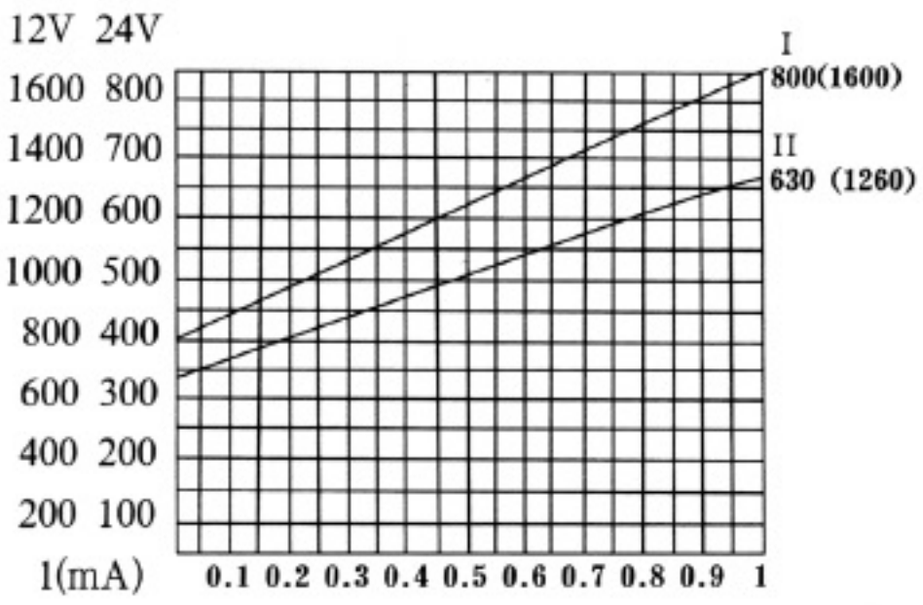
commencement of control at approx.300mA(600mA).

End of control at approx.630 mA (1260mA).Adjustment is from V_{gmin} to V_{gmax}. please consult us if control in the opposite direction (V_{gmax} to V_{gmin})is required.

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



EP 电控比例变量 Electric pro.Control



变量起点在Commencement of control at V_{gmin} $\frac{V_g}{V_{gmax}}$

注：

曲线 I 适用于V_{gmax}≥250ml/r；曲线 II 适用于V_{max}＜250ml/r.

Line I adapts for V_{gmax}≥250ml/r，Line II adapts for V_{gmax}＜250ml/r.

调节时间 Adjustment Times

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

※所示值仅适用于工作压力P_b=20MPa时。

※The values shown are valid for operating pressure P_b=20MPa.

滞环

由于电气／液压控制(对于V_{min}至V_{gmax}的整个调节范围内)，在控制中约有2.5～4%的滞环。当从同一方向启动时泵位置的重复精度约为2～4%。

Hysteresis

A hysteresis of ± 2.5 to 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 2–4%.

注：

只有当使用矿物油箱内最高油温不大于80℃时才能把EP变量泵装在油箱内。(如果把泵浸在油中，请在订货时说明)。

Note:

Mounting of the pump with EP. control inside the oil tank is possible. only when using mineral hydraulic oils and with a max. oil temperature in the tank of 80℃. if the pump is to be submersed in oil, please indicate in clear text when ordering). Auxiliary Equipment:Pressure Cut–Off

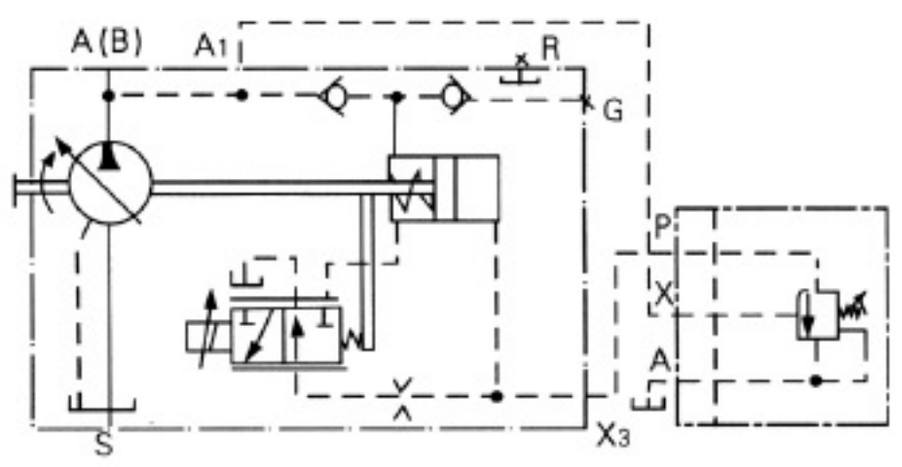
For all sizes with V_{gmin}=0.

For description see control device HD.

Order sequence valve and subplate separately

辅助元件：压力切断

用于V_{gmin}=0的所有规格。说明见HD变量。顺序阀和底板需单独订货。



EP带压力切断的电控比例变量接口

A.B工作油口

S.吸油口

G.遥控压力口

R.排气口

A_1，X_3，遥控阀油口

Electric Pro. Control with Pressure cut–off Connections

Service lines

suction line

remote control pressure

air bleed

ports for remote control valve

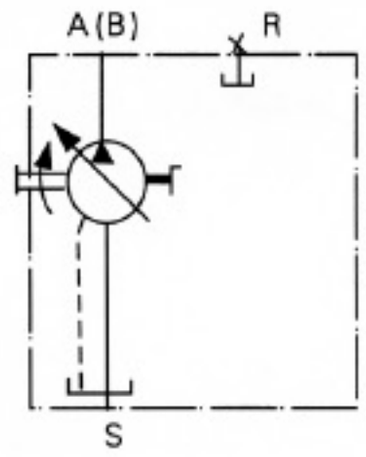
A7V变量泵 Variable Displacement Pump A7V

MA手动变量

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

Manual Control

By turning the handwheel, a piston is is moved in an axial direction bv means of a threaded spindle.A carrier pin moves the control lens on its sliding plane, thus permitting stepless variation of the pump displacement in the range V_{gmin} to V_{gmax}. The pump position indicator is located in the handwheel.



接口 Connections

A,B	工作油口	service lines
S	吸油口	suction line
R	排气口	air bleed

MA 手动变量 Manual Control

HD液控变量

液控变量可按先导压力无级地调节泵的排量，调节量与油口X1的先导压力成正比。

当用HD作2位变量时(V_{gmin}至V_{gmax})，X1口的先导压力不得超过4MPa调节从V_{gmin}至V_{gmax}.

在整个变量范围内(min–max)先导压力升高1MPa．变量起点的设定范围为0.4–1.5MPa。所需的控制油从高压回路取得，要求的最低工作压力为4MPa。若低于此值，需在油口X2通人4MPa的先导压力。

先导口X1处的供油量约为0.5L/min。

Hydraulic Control, Pressure Related

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 ax 2–position control(V_{gmin} to V_{gmax}). the pilot oil pressure on port X1 must not exceed 4MPa.

Adjustmerit is from V_{gmin} to V_{gmax}.

The increase in pilot pressure over the complere adjustment range(min–max)is 1MPa.

The setting range for commencement of control is between 0.4 and 1.5MPa. The necessary control oil i taken from the high pressure circuit, and a minimum operating pressure of 4MPa is required. If necessary apply pilot pressure of 4MPa at port X2.

The 0il flow at pilot X1 is approx 0.5L/min.

附加功能：压力切断

用于V_{gmin}=0的所有规格。

压力切断用来把流量限制成高压的函数，以便不超过设定的工作压力。此功能由顺序阀实现。

达到设定的最高压力(调节范围达31.5MPa)时，该阀打开，流量自动减小(到Q=0)。

顺序阀离开泵单独安装，借助于底板可装于任何适当的位置(遥控)。最大单管长度不大于5m。

顺序阀与底板须单独订货。

Additional Function:Pressure cut-Off

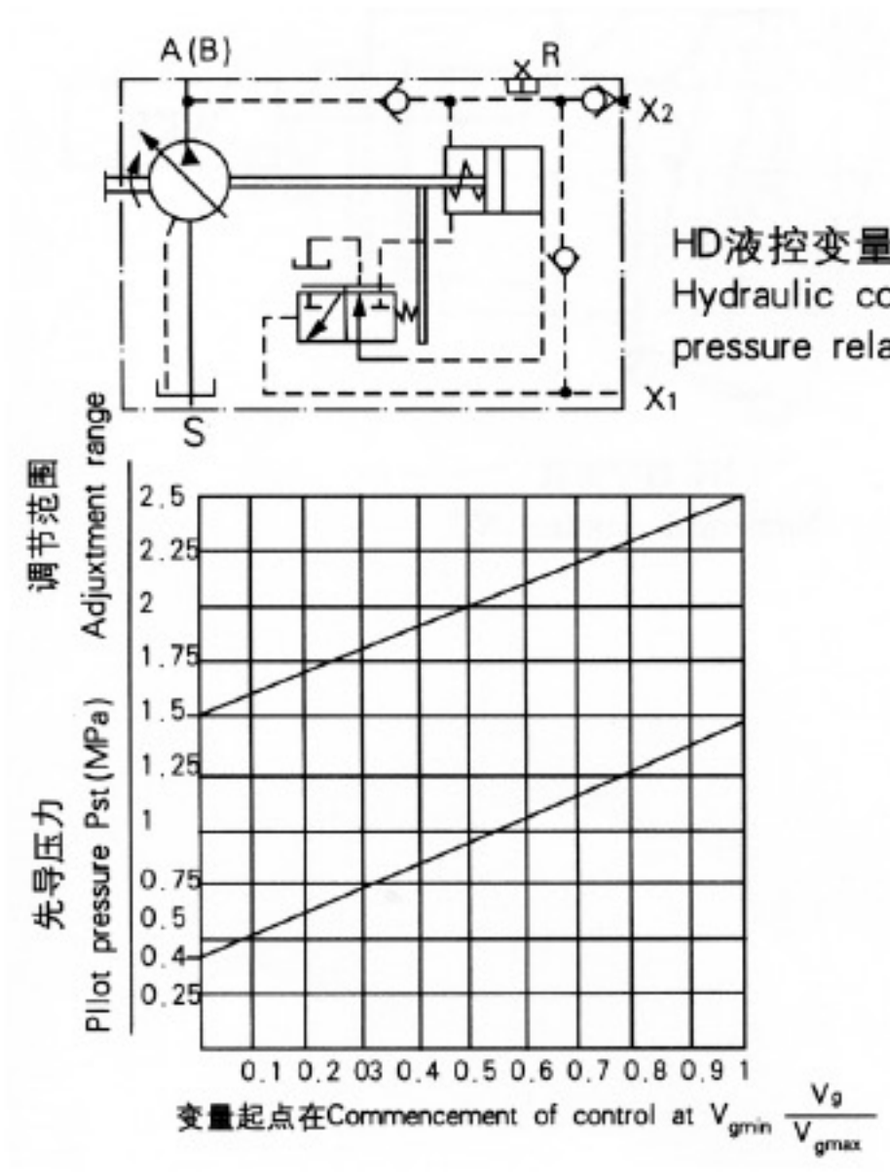
For all sizes with V_{gmin}=0.

The pressure cut–off serves to limit the flow as a function of the high pressure so that a predetermined operating pressure is not exceeded.

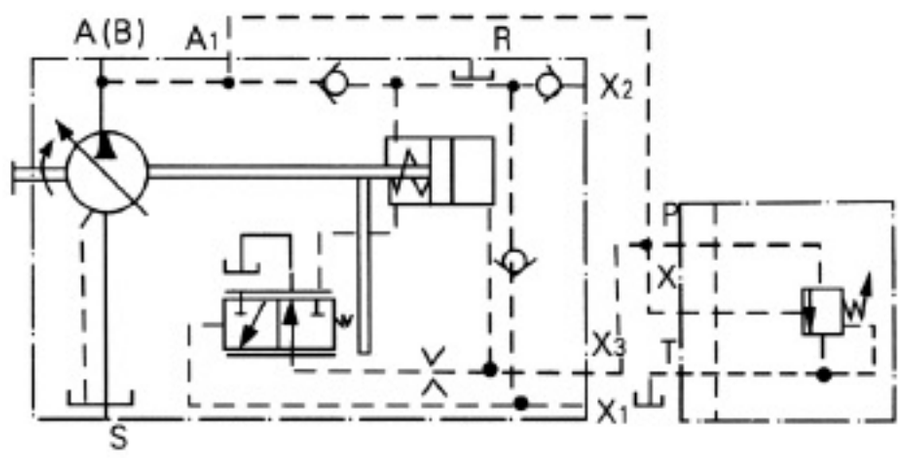
This function is carried out bv a sequence valve. On reaching the set maximum pressure(adjustment range up to 31.5MPa), the valve opens and the flow is automatically reduced(to Q=0).

The sequence valve is mounted separately from the pump in any suitable location by means of a subplate(remote control). The max, Single pipe length should not exceed 5m.

Ordersequence valve and subplate separately.



HD液控变量
Hydraulic control, pressure related, HD



HD带压力切断的液控变量

注意： 顺序阀油口T必须单独通油箱

在零位连续工作： 详见DR恒压变量。

Hydraulic Control, pressure related, HD With pressure cut–off

Important:port T from the sequence valve must be piped separately to tank.

Continuous Operations is Zero position

For details see constant pressure control DR.

接口

A，B工作油口
S. 吸油口
X_1先导压力油口
X_2遥控压力油口
A_1，X_3，遥控阀油口
R. 排气口

Connectiono

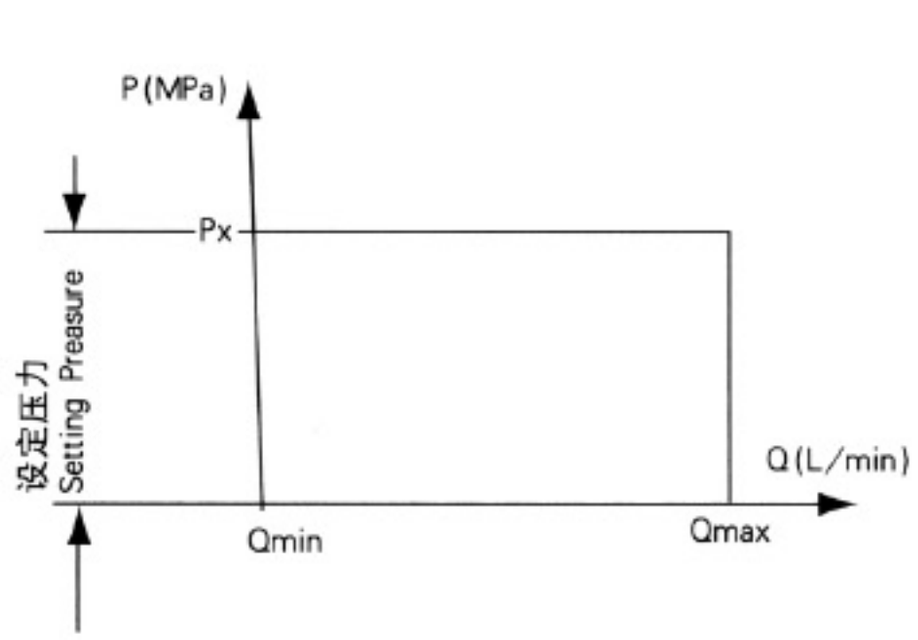
service lines
suction line
pilot pressure
remote control pressure
ports for remote control valve
air bleed

SC刹车变量

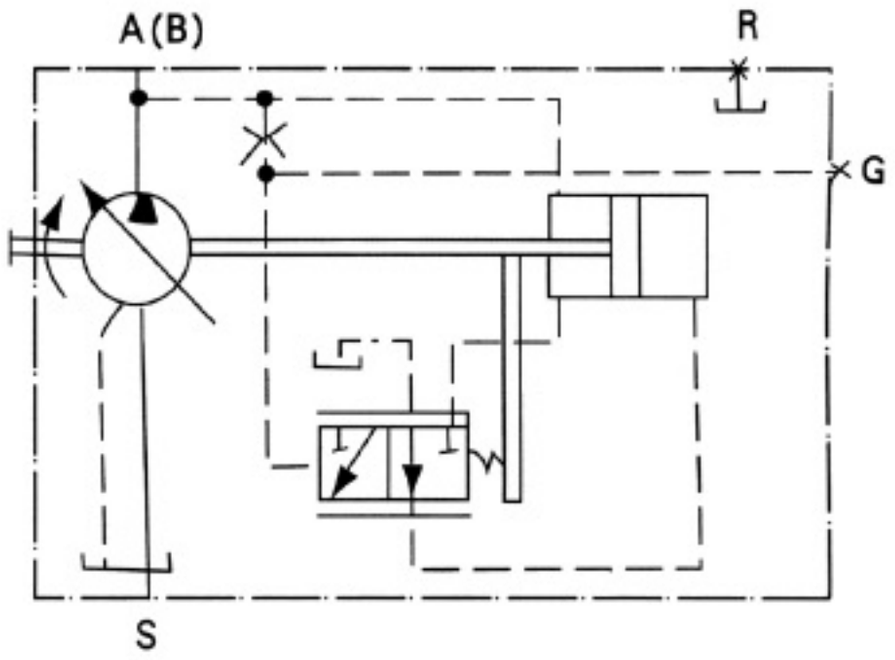
用于刹车系统，当系统压力达到一定值后(P_x≥4MPa)，立刻使泵达到大摆角，即大流量，大扭矩。

Brake Control

When operating pressure goes up to the setting pressure(P_x≥4MPa)，the flow is max，and the torque is max.



SC的P–Q特性曲线Characteristics



SC刹车变量

Brake control.SC

NC数字变量

用步进电机来驱动泵变量，可通过控制装置随意设定工作曲线。(如LV，DR，EP等)

调节时间不大于3秒。

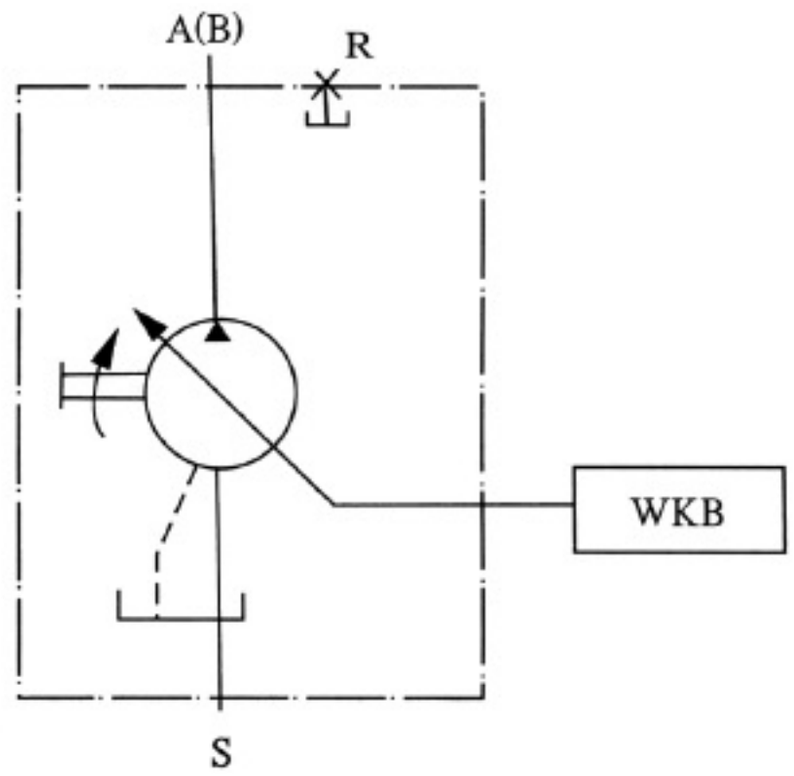
Numerical Control

Varied displacement is driven by electric stepping motor.

The working curve is set optionally by control apparatus.

(i.e.LV.DR.EP.etc.)

Adjustment time is not longer than 3s.

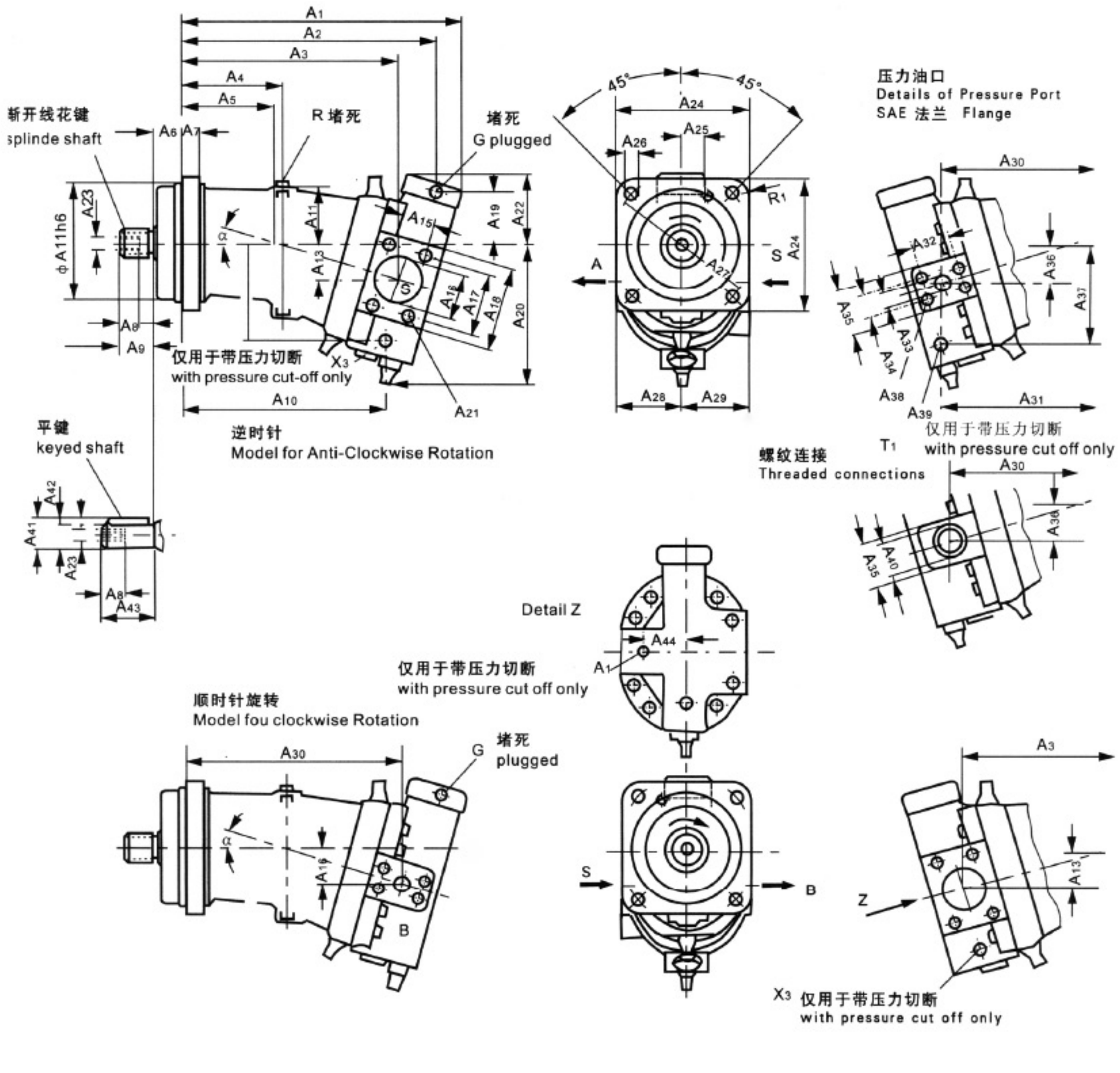


NC数字变量

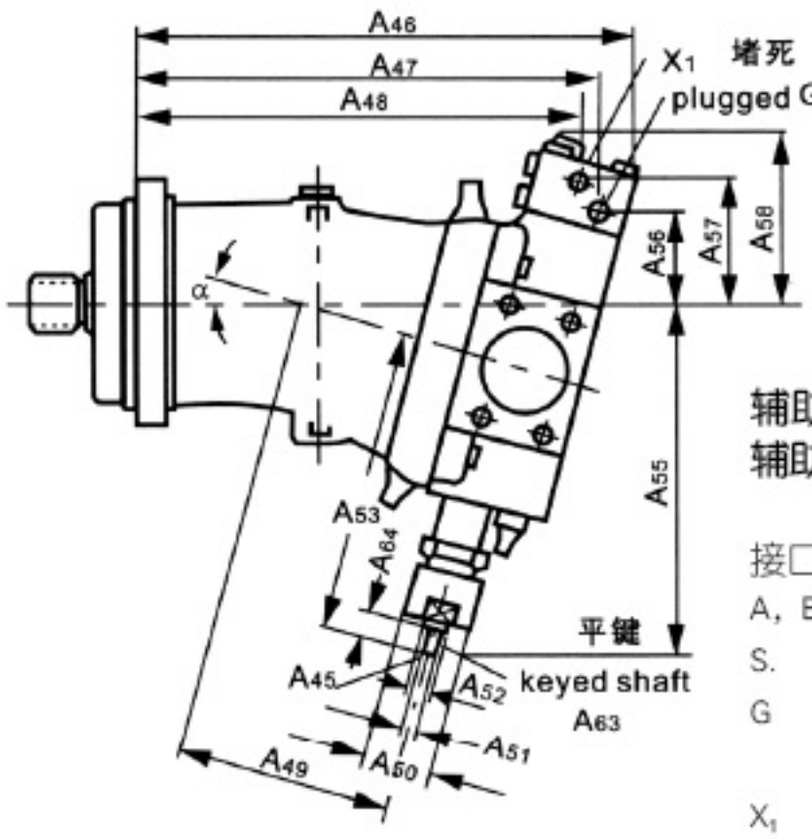
Numerical control.NC

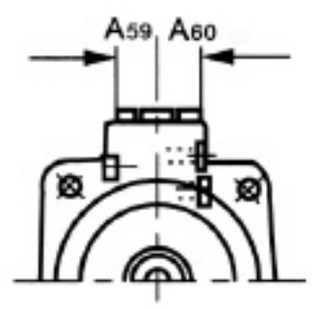
元件尺寸Unit dimensions 规格Size 20–160

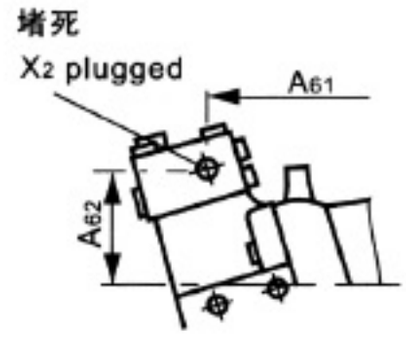
LV： 恒功率变量 Constant HP control



A7V变量泵 Variable Displacement Pump A7V







辅助元件：液压行程限位（用于LV）
辅助元件：机械行程限位（用于LV和DR）

Auxiliary equipment：hydraulic stroke limiter(for LV)
Auxiliary equipment：mechanical stroke limiter(for LV-and DR)

接口
A，B　工作油口
S.　吸油口
G　遥控压力口
(总功率控制油口)
X_1　先导压力油口
X_2　遥控压力口(HD)
A_1，X_3，　遥控阀油口
T　先导油回油口
T_1　先导油回油口
R.　排气口

Connections
service lines
suction line
remote control pressure M14 × 1.5
(connection for summation HP control)
pilot pressure M14 × 1.5
remote control pressure(HD)M14 × 1.5
ports for remote control valve
pilot oil return line M12 × 1.5
pilot oil return line
air bleed

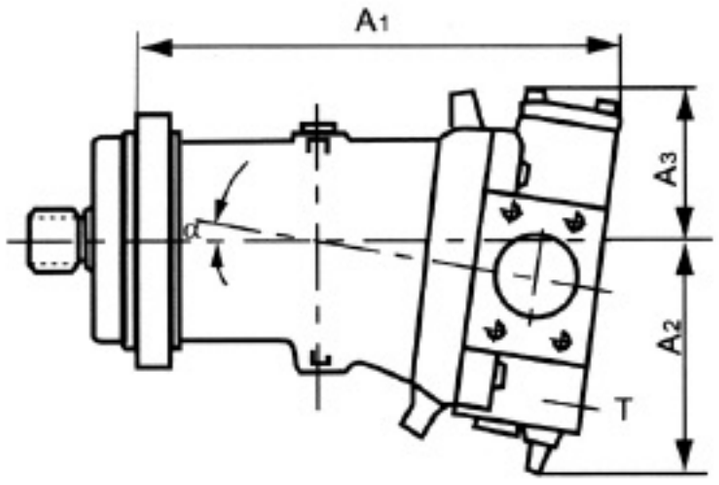
规格 Size	a	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	A_{17}	A_{18}	A_{19}	A_{20}	A_{21}	深 deep	A_{22}	A_{23}	A_{24}	A_{25}	A_{26}	A_{27}
20	9	251	224	199	107	75	25	16	19	43	160	100	85	20	52	35.7	38	69.9	94	78	132	M12	20	95	M8	118	23.5	11	125
28	16	260	232	195	107	75	25	16	19	43	149	100	95	34	50	37.5	38	69.9	94	59	145	M12	20	80	M8	118	23.5	11	125
40	9	317	287	255	123	108	32	20	28	35	244	125	95	23	63	42.9	50	77.8	102	87	166	M12	20	109	M12	150	29	13.5	160
55	16	327	296	251	123	108	32	20	28	35	–	125	–	41	63	42.9	50	77.8	102	64	182	M12	20	91	M12	150	29	13.5	160
58	9	374	337	304	152	137	32	23	28	40	295	140	106	26.5	77	50.8	63	88.9	115	93	168	M12	20	113	M12	165	33	13.5	180
80	16	385	347	300	152	137	32	23	28	40	–	140	–	48	77	50.8	63	88.9	115	68	194	M12	20	120	M12	165	33	13.5	180
78	9	381	347	310	145	130	40	25	28	45	298	160	113	29	80	50.8	63	88.9	115	101	180	M12	20	120	M12	190	33	17.5	200
107	16	393	358	305	145	130	40	25	28	45	–	160	–	50	80	50.8	63	88.9	115	73	200	M12	20	98	M12	190	33	17.5	200
117	9	443	402	364	214	156	40	28	36	50	350	180	130	33	93	61.9	75	106.4	135	114	195	M16	24	137	M16	210	34	17.5	224
160	16	454	414	359	213	156	40	28	36	50	–	180	–	58	88	61.9	75	106.4	135	83	222	M16	21	112	M16	210	34	17.5	224

规格 Size	A_{28}	A_{29}	A_{30}	A_{31}	A_{32}	A_{33}	A_{34}	A_{35}	A_{36}	A_{37}	A_{38}	深 deep	(T1) A_{39}	A_{40}	A_{41}	A_{42}	A_{43}	A_{44}	A_{45}	深 deep	A_{46}	A_{47}	A_{48}	A_{49}	A_{50}	A_{51}	A_{52}
20	58	58	193	–	50.8	19	23.8	46	19	–	M10	17	–	M27 × 2	27.9	25	50	38	M3	9	257	226	230	108	42	8.8	8
28	58	58	189	–	50.8	19	23.8	46	33	–	M10	17	–	M27 × 2	27.9	25	50	38	M3	9	269	234	242	0 108	42	8.8	8
40	71	81	253	261	50.8	19	23.8	53	23	98	M10	17	M18 × 1.5	M33 × 2	32.9	30	60	40	M4	10	323	290	279	134	–	11.2	10
55	71	81	249	–	50.8	19	23.8	53	40	–	M10	17	–	M33 × 2	32.9	30	60	40	M4	10	337	299	292	134	–	11.2	10
58	86	92	301	313	57.2	25	27.8	64	26	109	M12	18	M18 × 1.5	M42 × 2	38	35	70	62	M5	12	378	344	330	155.5	52	18	16
80	86	92	297	–	57.2	25	27.8	64	47	–	M12	18	–	M42 × 2	38	35	70	62	M5	12	391	354	343	155.5	52	18	16
78	89	93	306	318	57.2	25	27.8	64	28	119	M12	18	M18 × 1.5	M42 × 2	43.1	40	80	55	M5	12	385	342	338	169	52	18	16
107	89	93	301	–	57.2	25	27.8	64	19	–	M12	18	–	M42 × 2	43.1	40	80	55	M5	12	400	363	351	169	52	18	16
117	104	113	359	369	66.7	32	31.8	70	32	136	M14	19	M18 × 1.5	M48 × 2	48.5	45	90	65	M5	12.5	445	408	384	192	65	18	16
160	104	113	354	–	66.7	32	31.8	70	57	–	M14	19	–	M48 × 2	48.5	45	90	65	M5	12.5	461	420	399	192	65	18	16

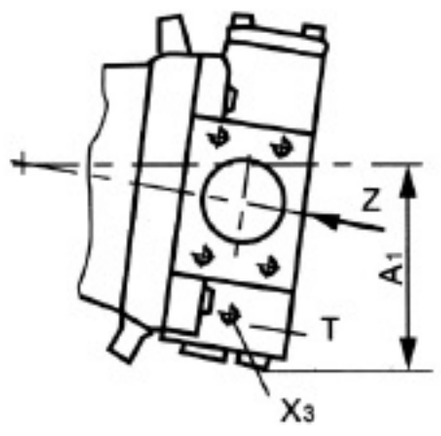
规格 size	A_{53}	A_{54}	A_{55}	A_{56}	A_{57}	A_{58}	A_{59}	A_{60}	A_{61}	A_{62}	平键 A63 Keyed GB1096–79	平键 Keyed GB1096–79	花键 Splined DIN5180	花键 Splined GB3478.1–83	R_1	油口 Connection R	油口 Connection A_1X_3	重量 Weight kg
20	161	14	176	77	104	129	35	30	228	92	键 2 × 10	键 8 × 40	W25 × 1.25 × 18 × 9g	EXT18Z × 1.25m × 30R × 5f	12	M16 × 1.5	M12 × 1.5	19
28	161	14	186	58	84	144	35	30	238	73	键 2 × 10	键 8 × 40	W25 × 1.25 × 18 × 9g	EXT18Z × 1.25m × 30R × 5f	12	M16 × 1.5	M12 × 1.5	19
40	184	16	204	85	117	147	30	30	276	104	键 3 × 10	键 8 × 50	W30 × 2 × 14 × 9g	EXT14Z × 2m × 30R × 5f	12	M18 × 1.5	M12 × 1.5	28
55	184	16	215	62	98	128	30	30	288	83	键 3 × 10	键 8 × 50	W30 × 2 × 14 × 9g	EXT14Z × 2m × 30R × 5f	12	M18 × 1.5	M12 × 1.5	28
58	228	24	251	91	116	142	33	33	328	104	键 5 × 16	键 10 × 56	W35 × 2 × 16 × 9g	EXT16Z × 2m × 30R × 5f	12	M18 × 1.5	M18 × 1.5	44
80	228	24	265	65	91	120	33	33	339	80	键 5 × 16	键 10 × 56	W35 × 2 × 16 × 9g	EXT16Z × 2m × 30R × 5f	12	M18 × 1.5	M18 × 1.5	44
78	236	24	261	99	124	150	33	33	336	112	键 5 × 16	键 12 × 63	W40 × 2 × 18 × 9g	EXT18Z × 2m × 30R × 5f	12	M18 × 1.5	M18 × 1.5	53
107	236	24	276	71	97	126	33	33	348	86	键 5 × 16	键 12 × 63	W40 × 2 × 18 × 9g	EXT18Z × 2m × 30R × 5f	12	M18 × 1.5	M18 × 1.5	53
117	266	24	294	111	137	164	34	34	382	125	键 5 × 16	键 14 × 70	W45 × 2 × 21 × 9g	EXT21Z × 2m × 30R × 5f	12	M22 × 1.5	M20 × 1.5	76
160	266	24	310	79	108	137	34	34	396	96	键 5 × 16	键 14 × 70	W45 × 2 × 21 × 9g	EXT21Z × 2m × 30R × 5f	12	M22 × 1.5	M20 × 1.5	76

DR恒压变量 Constant Pressure Control

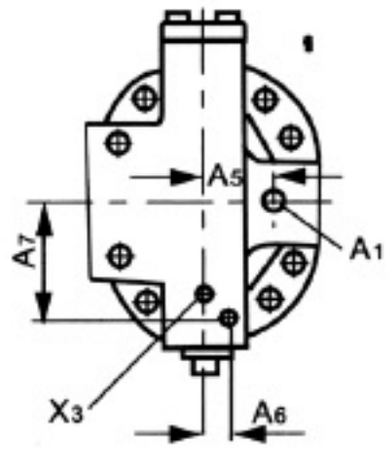
标准型 Standard Model



遥控 Remote Control



Z 向 Detail z



规格

Size	a	A_1	A_2	A_3	A_4	A_5	A_6	A_7
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
117	9°	441	199	132	165	65	14	83

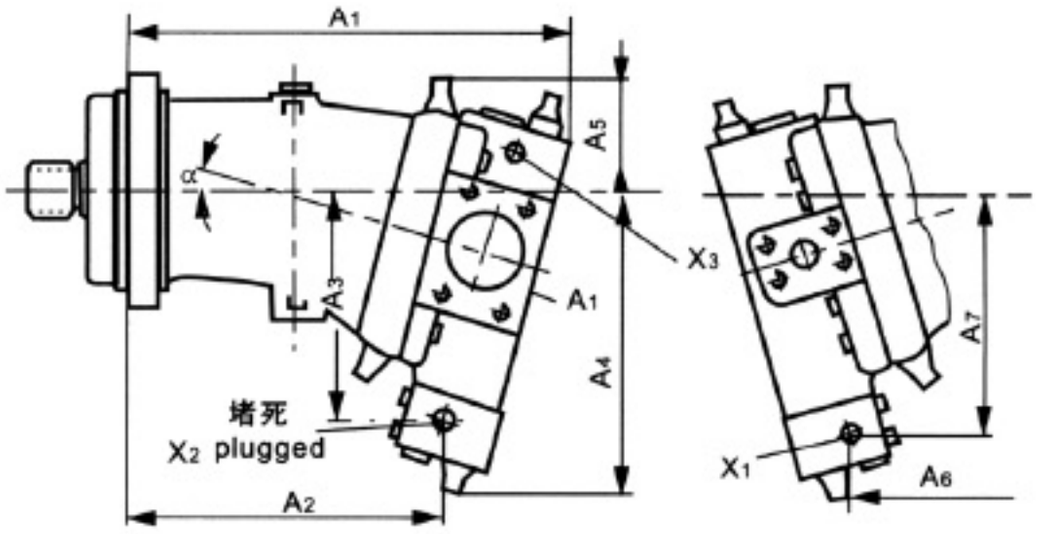
A1和X3仅用于遥控A_1 and X_3 only for remote control
其余尺寸见LV. Other dimensions see LV.
T1:M12×1.5

HD液控变量 Hydraulic Control, Pressure Related

规格

Size	a	A_1	A_2	A_3	A_4	A_5	A_6	A_7
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	170	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

其余尺寸见LV Other dimensions see LV.



A_1和X_3仅用于带压力切断 A_1 and X_3 with pressure cut-off only

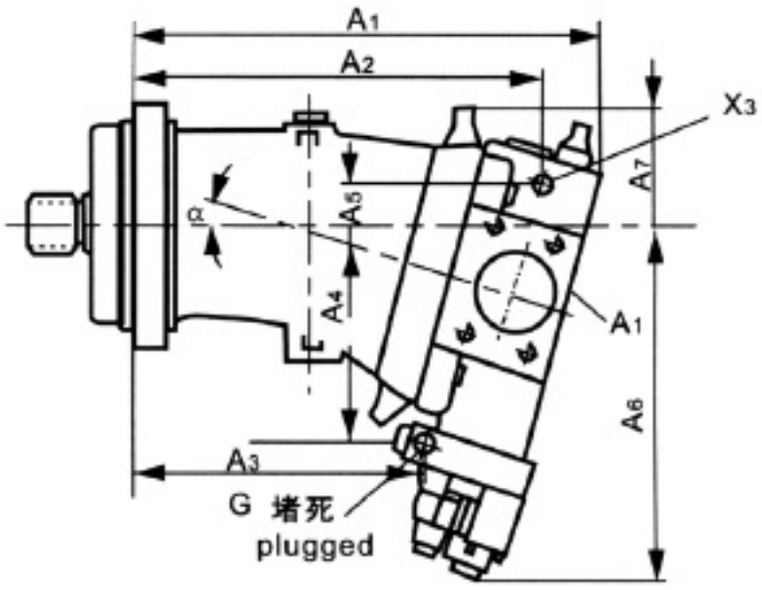
EP电控比例变量 electric Proportional Control

规格

Size	a	A_1	A_2	A_3	A_4	A_5	A_6	A_7
20	9°	248	182	144	113	54	216	75
28	16°	252	188	130	121	41	229	75
40	9°	312	267	201	130	49	234	110
55	16°	318	217	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

其余尺寸见LV Other dimensions see LV.

标准型 Standard Model

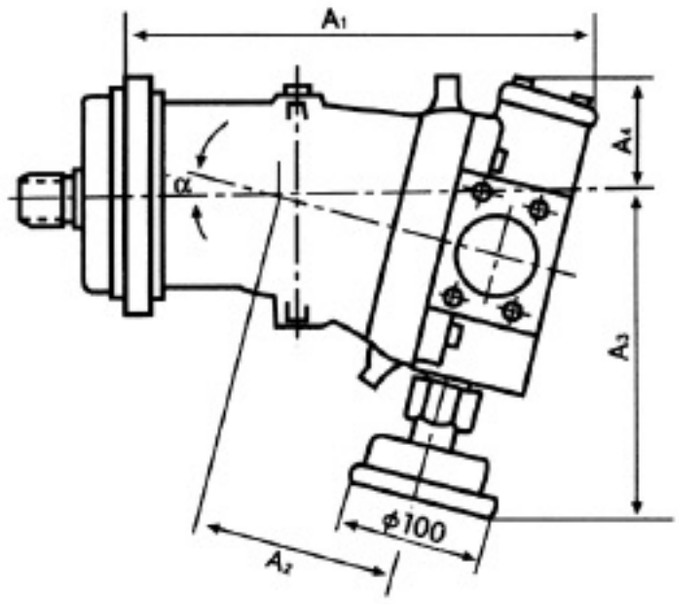


A_1和X_3仅用于带压力切断A_1 and X_3 with pressure cut—off oldy

MA 手动变量 Manual Control

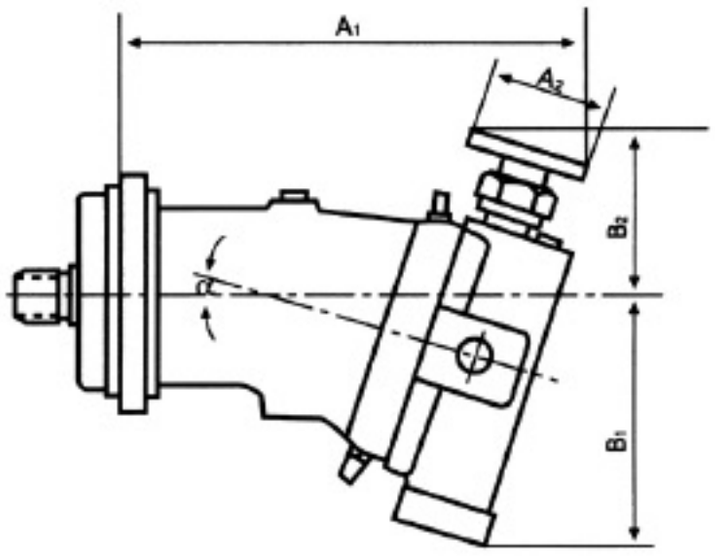
手动朝下 handwheel downwards

规格 Size	a	A_1	A_2	A_3	A_4
20	9°	251	108	175	95
28	16°	260	108	190	80
40	9°	315	134	197	108
55	16°	323	134	215	89
58	9°	327	155.5	215	107
80	16°	380	155.5	235	86
78	9°	355	169	198	138
107	16°	390	169	270	92
117	9°	441	192	261	132
160	16°	450	192	285	107



手动朝上 handwheel upwards

规格 Size	a	A_1	A_2	B_1	B_2
20	9°	–	–	–	–
28	16°	–	–	–	–
40	9°	317	100	175	132.5
55	16°	327.5	100	132.5	175
58	9°	316	100	168	166.5
80	16°	385	100	188	150
78	9°	315	100	180	157.5
107	16°	383	100	270.5	132.5
117	9°	430	100	210	201
160	16°	445	100	225	143
250	26.5	584	140	320	230

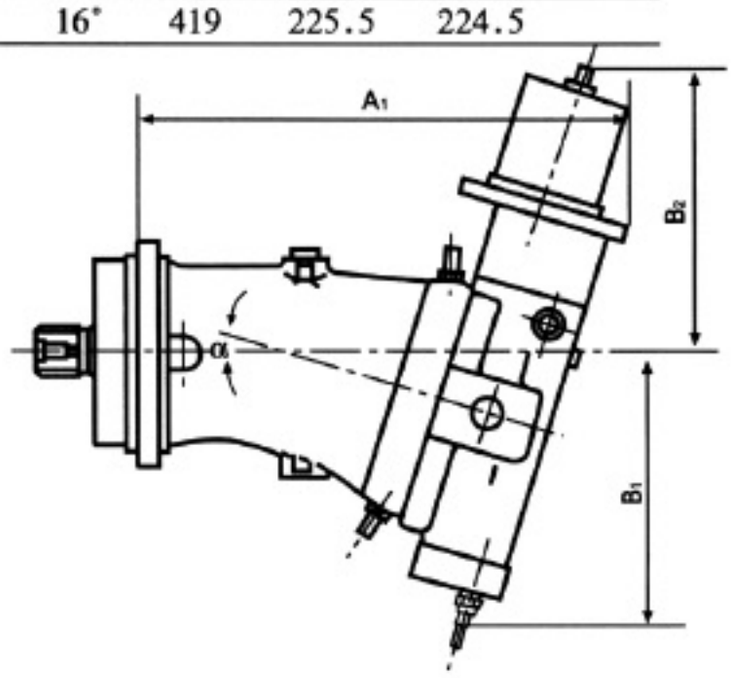


注：手轮朝上或朝
订货时请说明。

Please give clear indic
of the handwheels
upwards or downwa
when you order goods!

NC 数字变量 Numerical Control

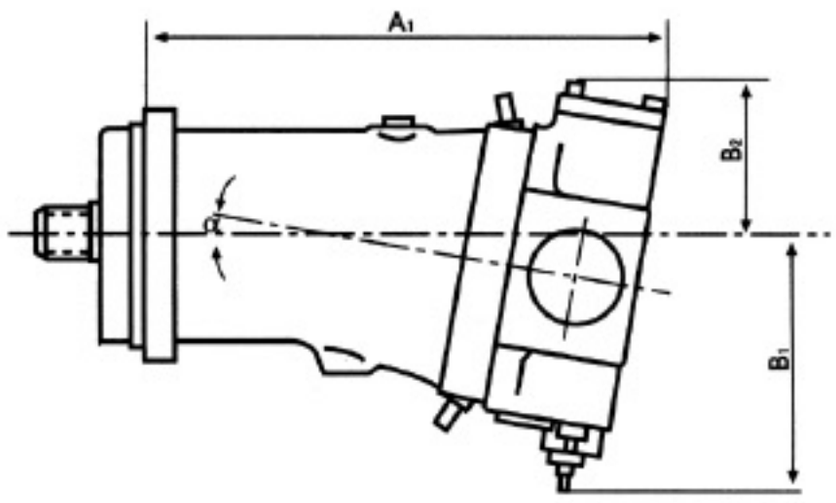
规格 Size	a	A_1	B_1	B_2
107	16°	419	225.5	224.5



LVS 恒 功率负荷传感变量

Constant HP Control with Load Sensing

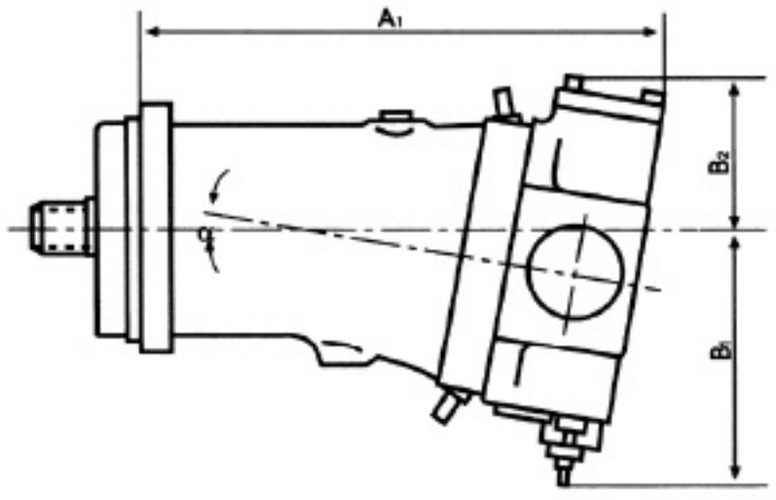
规格 Size	a	A_1	B_1	B_2
117	9°	443	215	137



DRS 恒压负荷传感变量

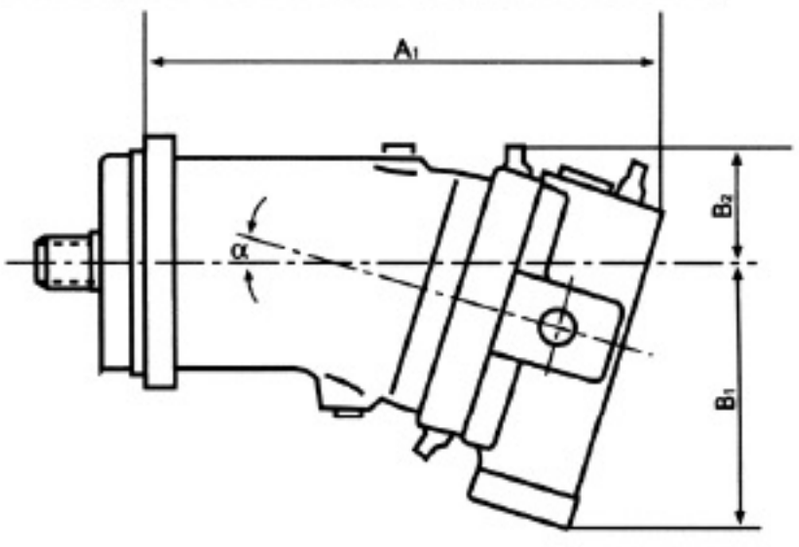
Constant Pressure Control with Load Sensing SC

规格 Size	a	A_1	B_1	B_2
117	9°	441	214	132



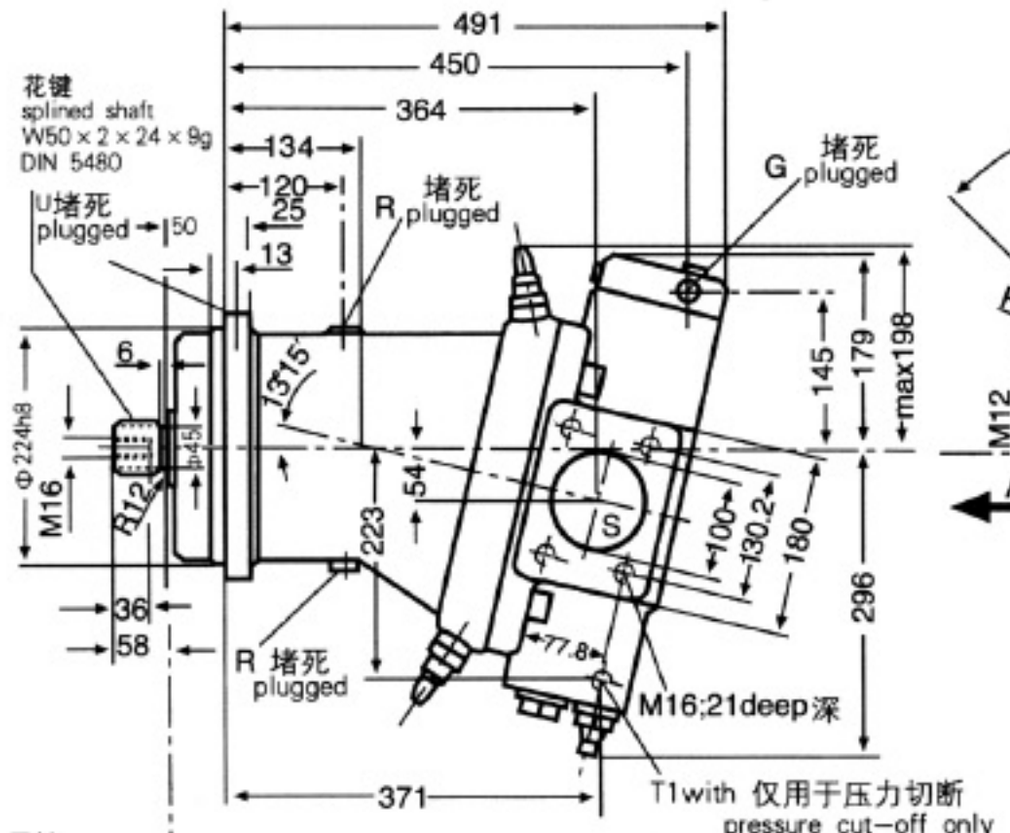
SC 刹车变量 Brake Control

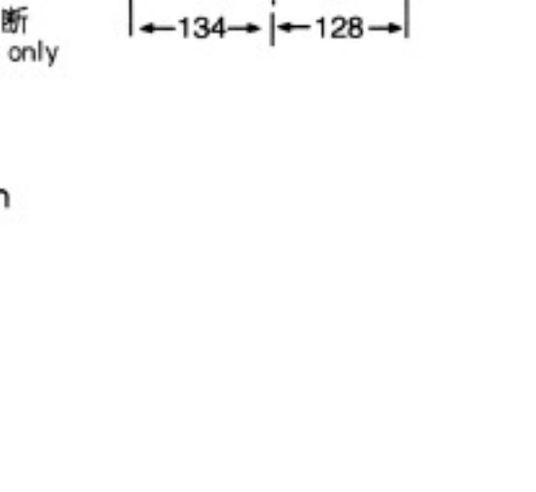
规格 Size	a	A_1	B_1	B_2
160	16°	441	230	98

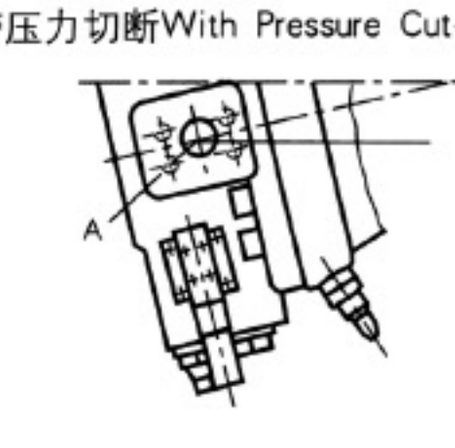


元件尺寸 Unit dimensions　规格 Size–250

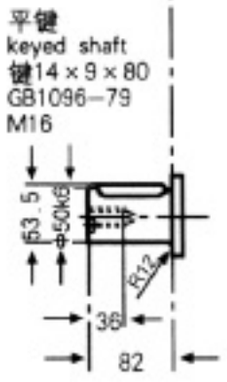
LV恒功率变量 Constant HP control





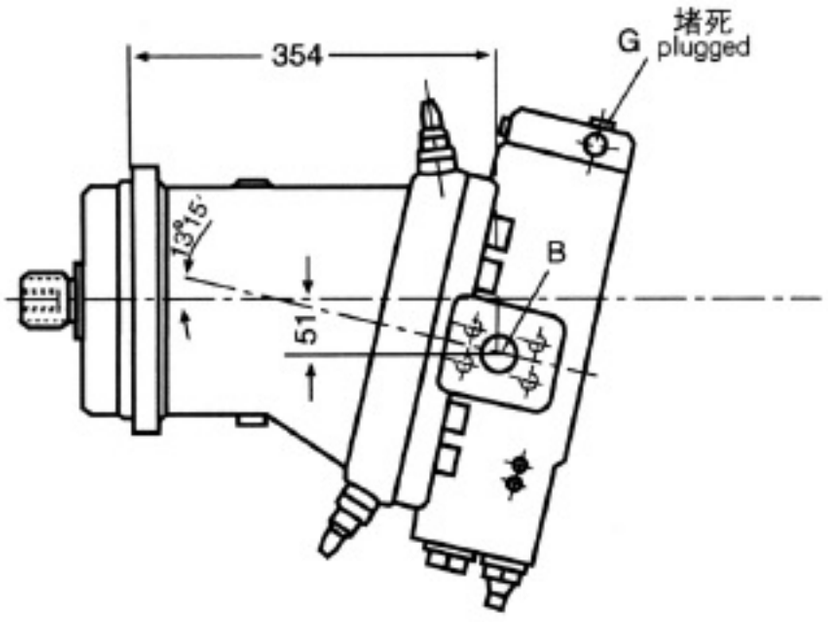


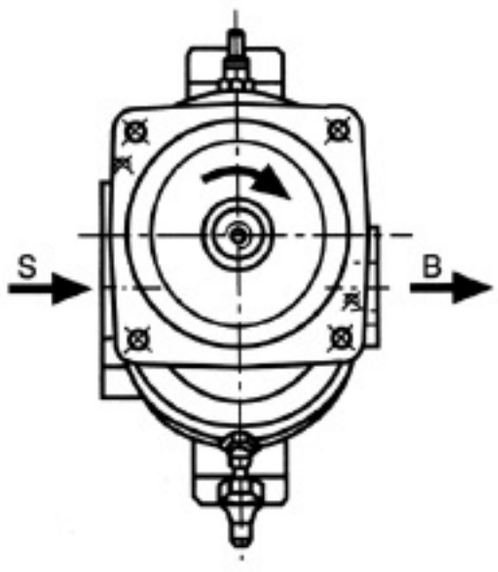
带压力切断With Pressure Cut–Off

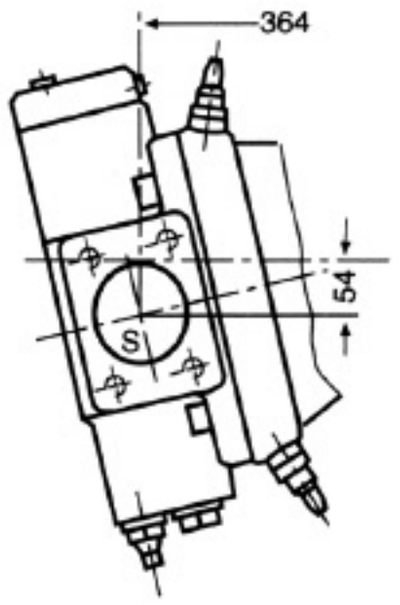


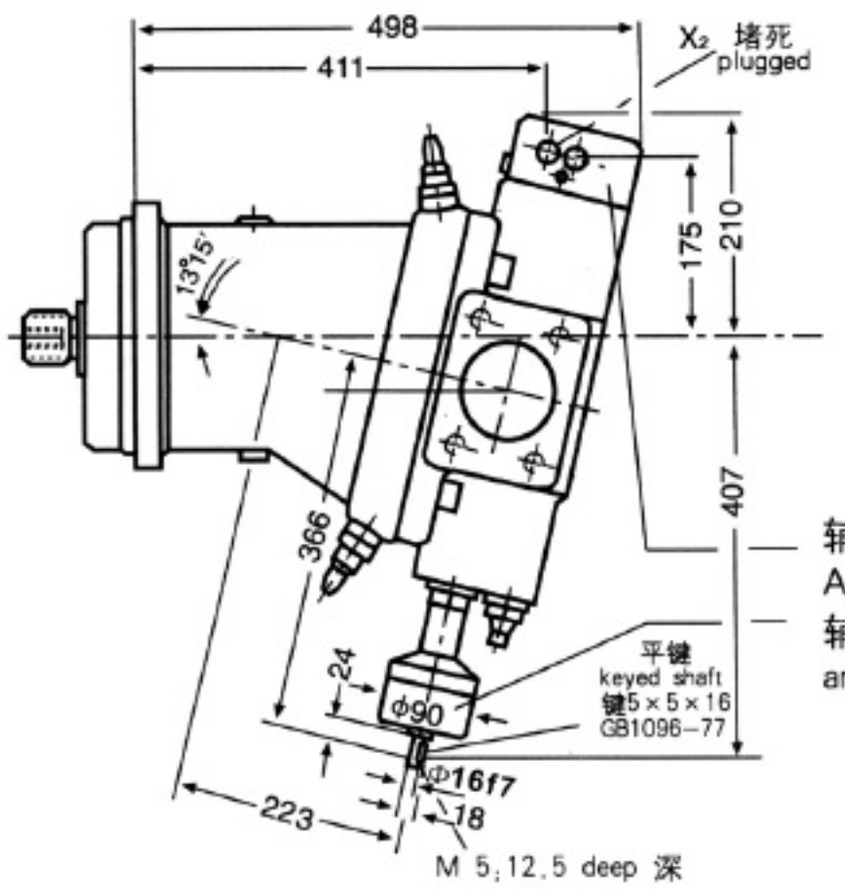
逆时针旋转
Model for Anti–Clockwise Rotation

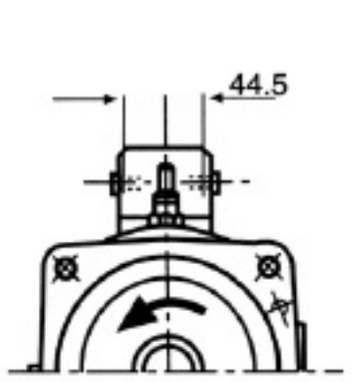
顺时针旋转
Model for Clockwise Rotation

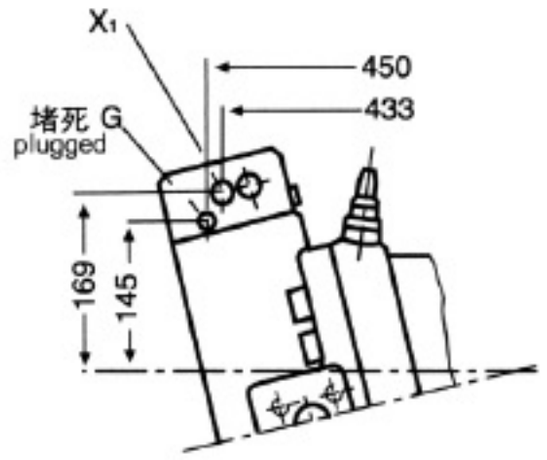










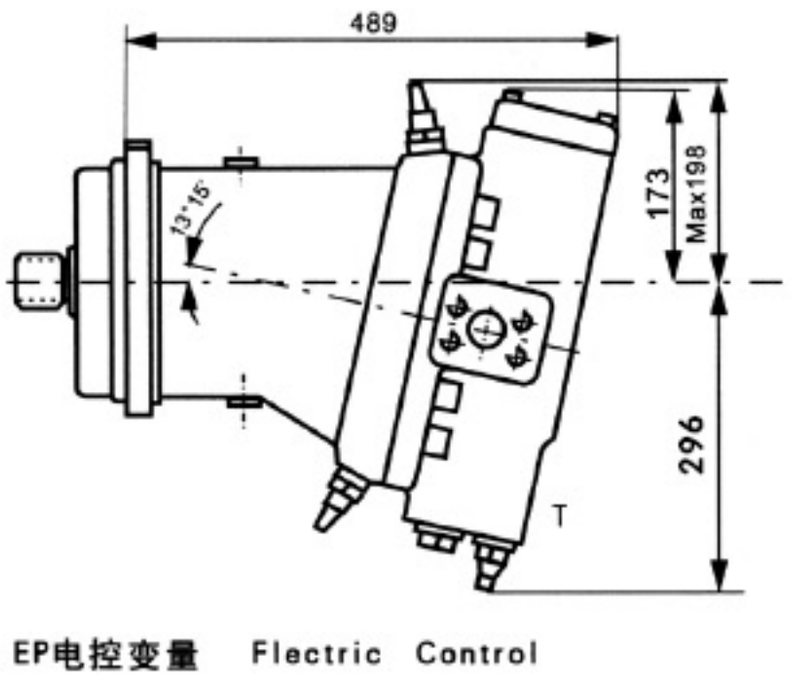


辅助元件：液压行程限位（用于LV）
Auxiliary equipment：hydraulic stroke limiter(for LV)
辅助元件：机械行程限位（用于LV和DR）
anxiliary equipment：mechanical stroke limiter(for LV and DR)

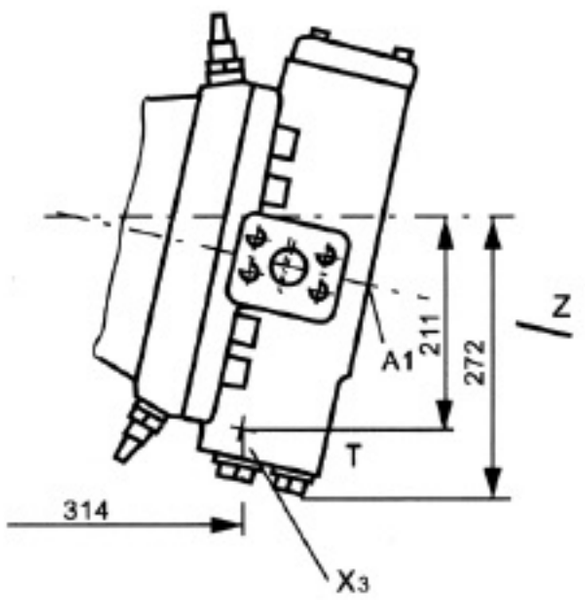
重量，规格250：约105公斤
Weight，size 250：approx.105kg

DR恒压变量 Constant Pressure Control

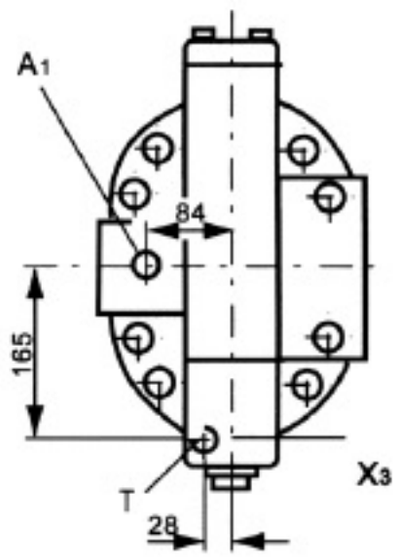
标准型 Standard Model



遥控 Remote Control



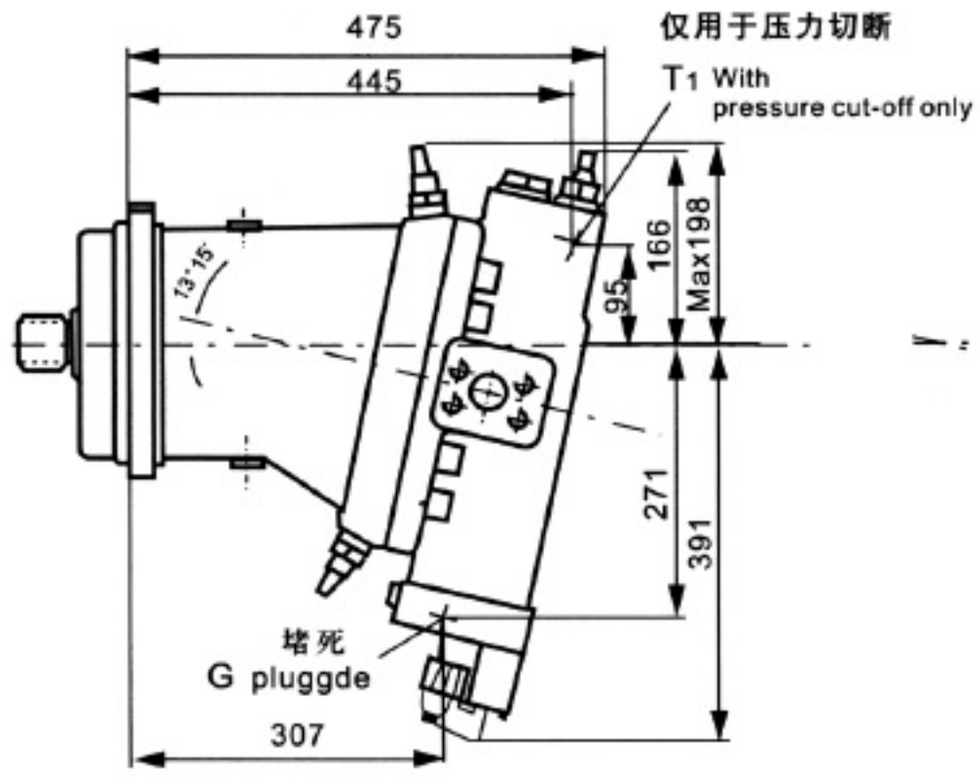
Z 向 Detail z



A1and X3 only for remote conrtol

A1和X3仅限于遥控

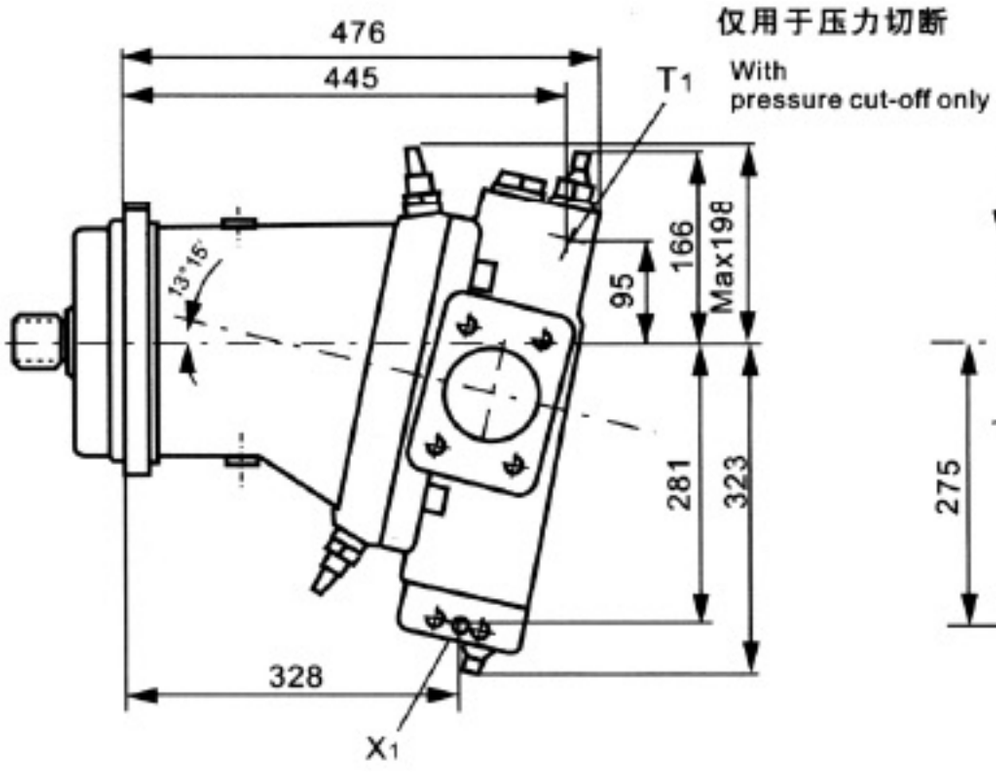
EP电控变量 Flectric Control



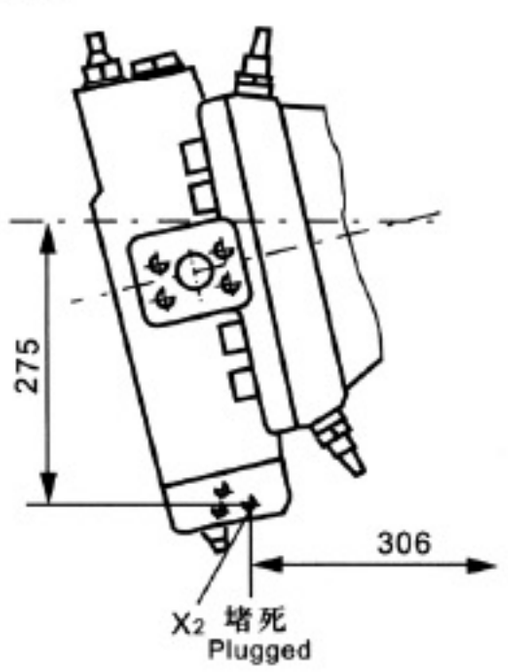
带压力切断
With Pressure Cut -off



HD液控变量 Hydraulic Control, Pressure Rclatcd



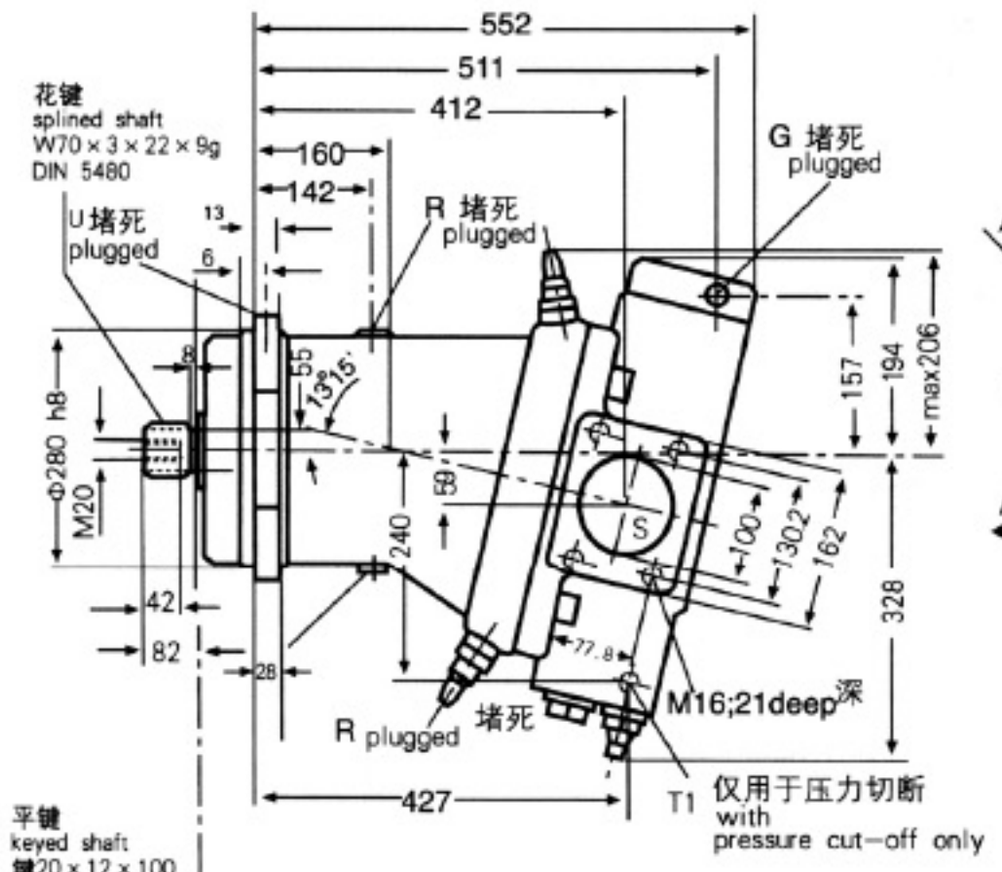
带压力切断
With pressure cut-off only

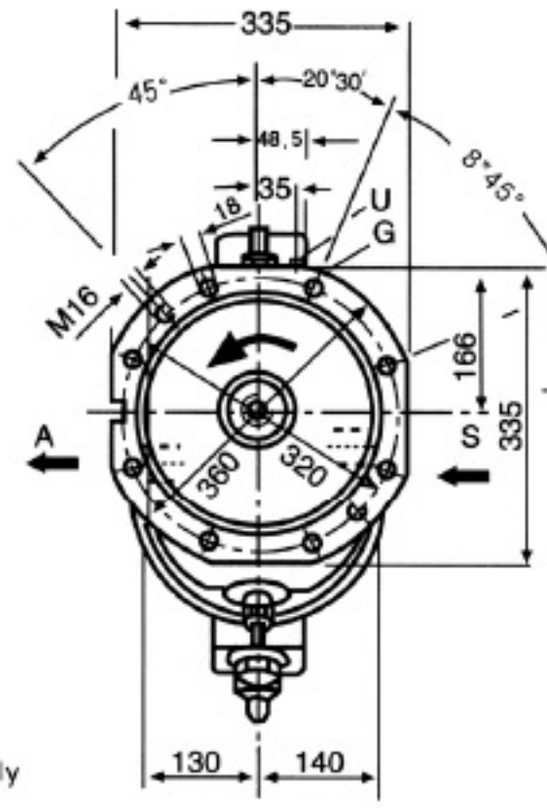


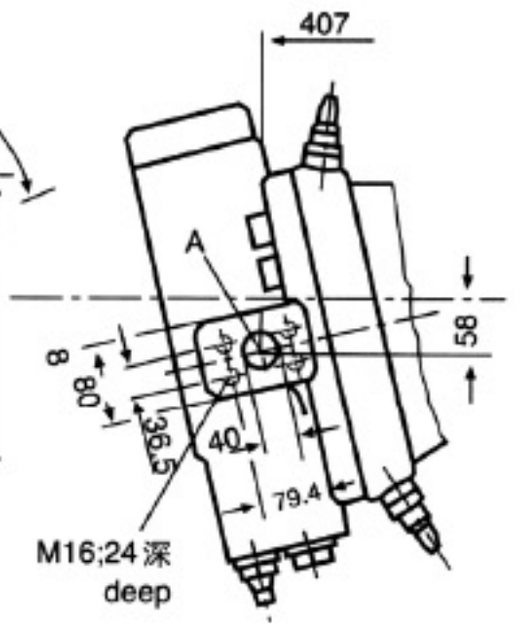
A，B	压力油口	service lines	X_1	先导压力口	pilot pressure M14×1.5
S	吸油口	suction line	X_2	遥控压力口	remote control pressure(HD)M14×1.5
G	遥控压力口	remote control pressure M14×1.5	T	先导油回油口	pilot oil return line M16×1.5
	(总功率控制油口)(connection for summation HP control)		T_1	先导油回油口	pilot oil return line M22×1.5
A_1,X_3	遥控阀油口	ports for remote control valve M16×1.5	R.	排气口	air bleed M22×2
U	冲洗口	flushing port M14×1.5			

元件尺寸 Unit dimensions 规格 Size–355

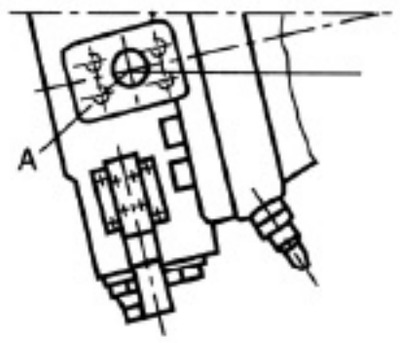
LV恒功率变量 Constant HP control

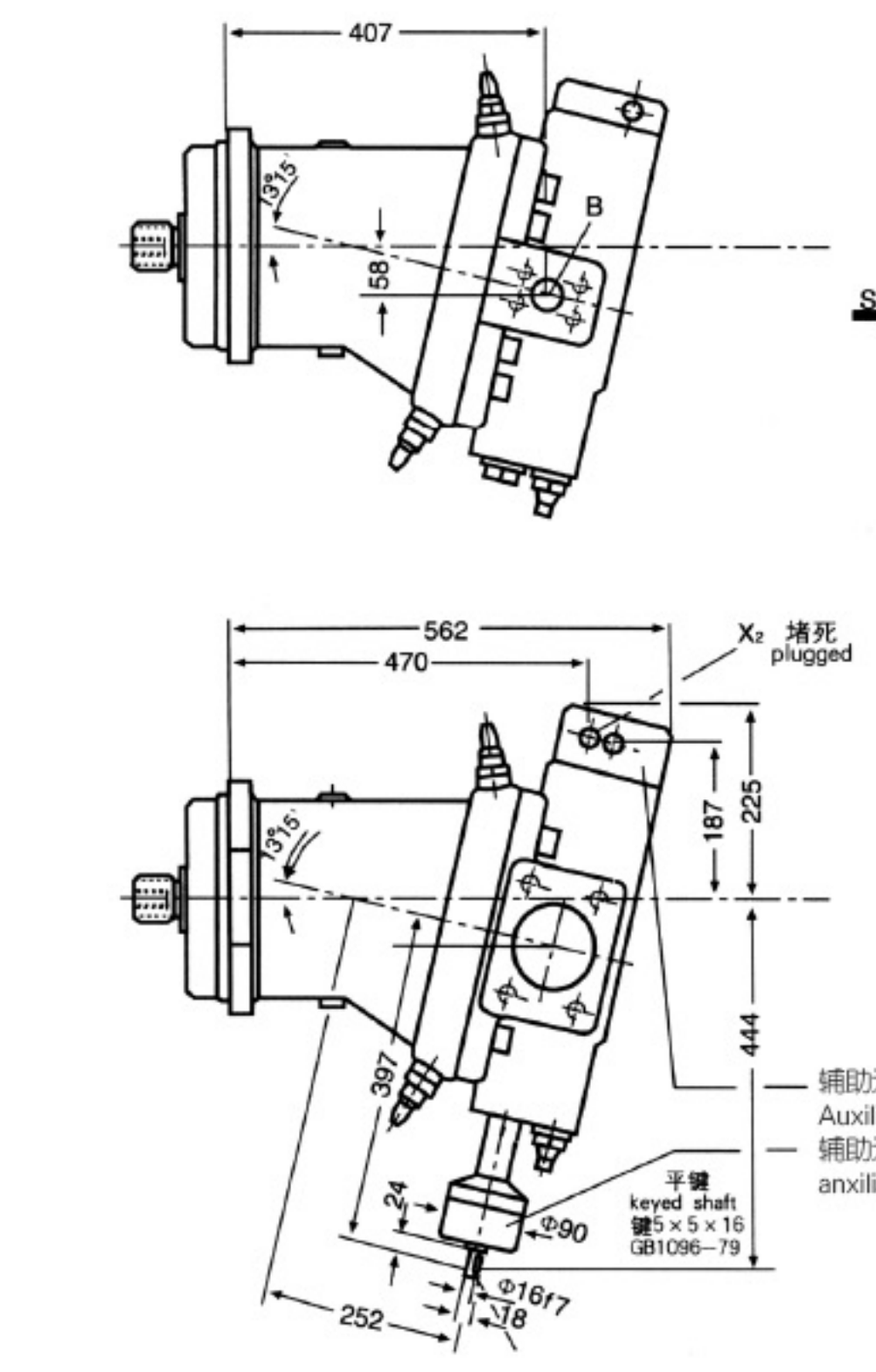


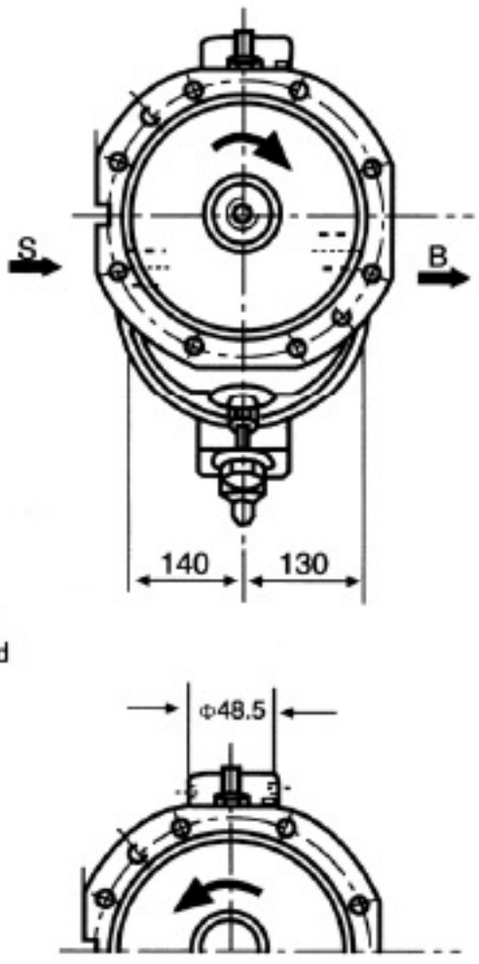


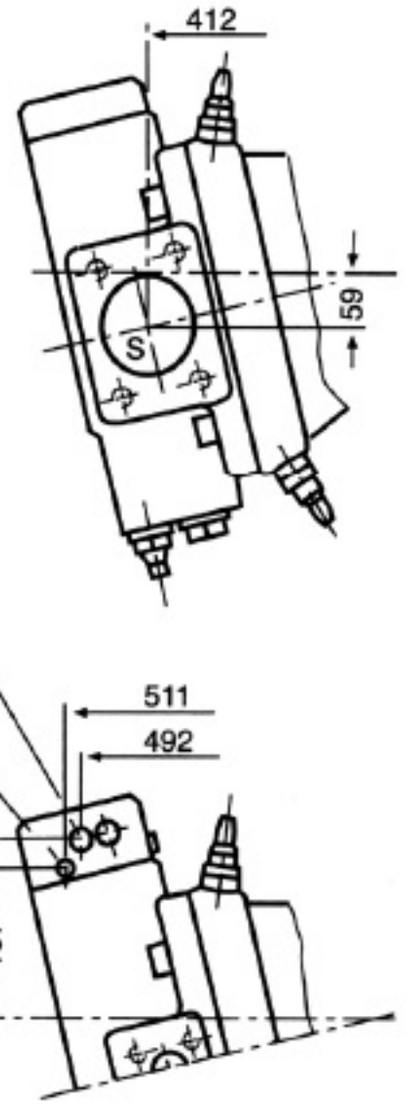


带压力切断
With Pressure Cut–Off







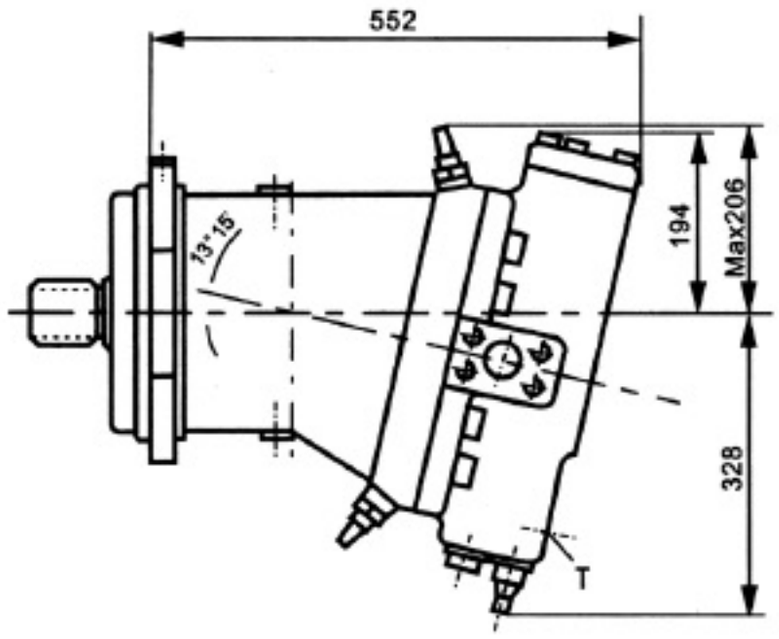


辅助元件：液压行程限位(用于LV)
Auxiliary equipment：hydraulic stroke limiter(for LV)
辅助元件：机械行程限位(用于LV和DR)
anxiliart equipment：mechanical stroke limiter(fpr LV and DR)

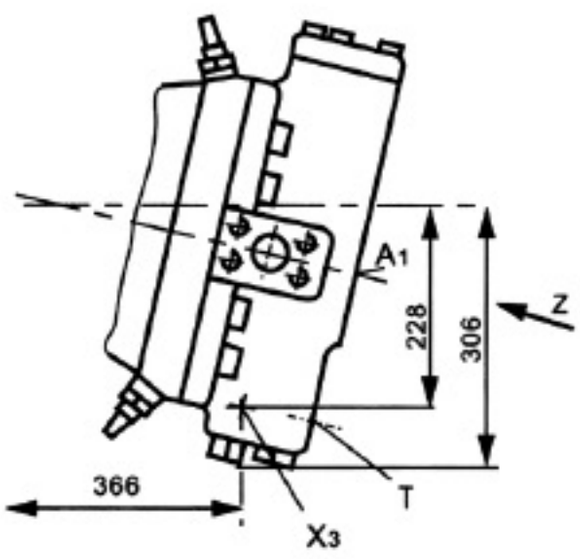
重量，规格355：约165公斤
Weight，size 355：approx.165kg

DR恒压变量 Constant Pressure Control

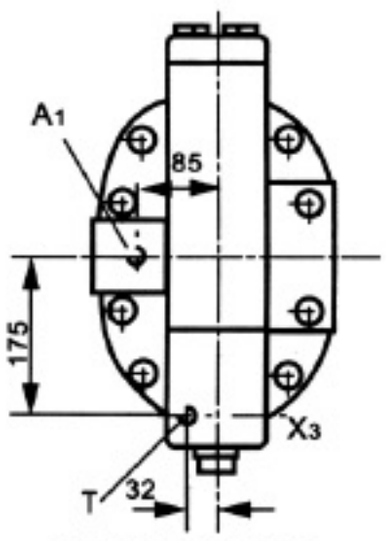
标准型 Standard Model



遥控 Remote Control



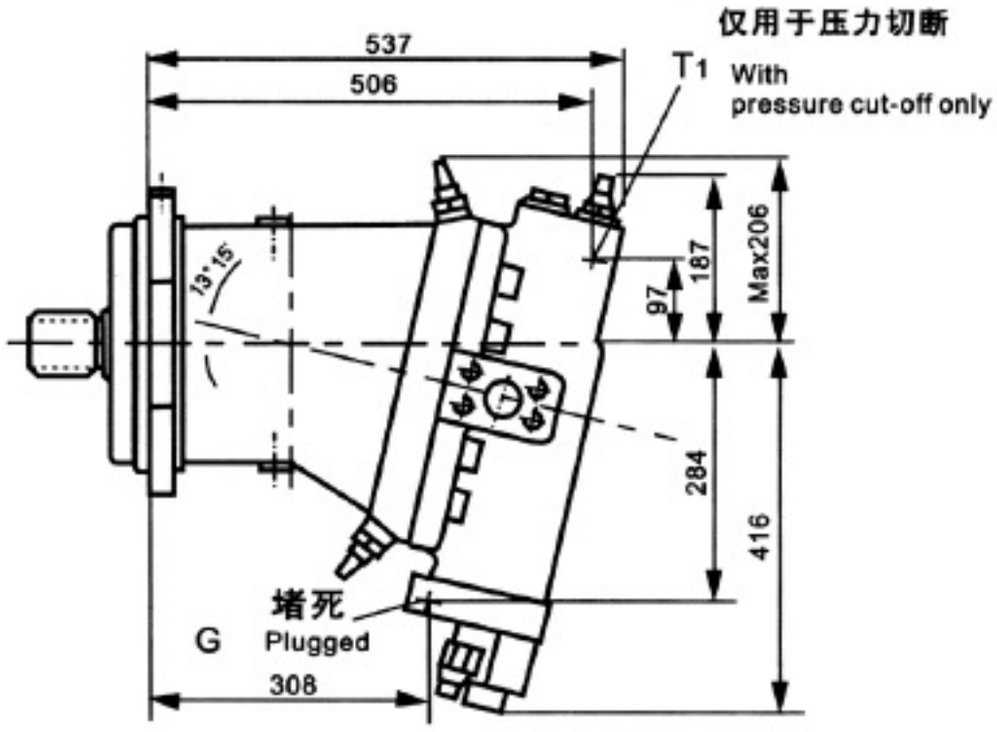
Z 向 Detail z



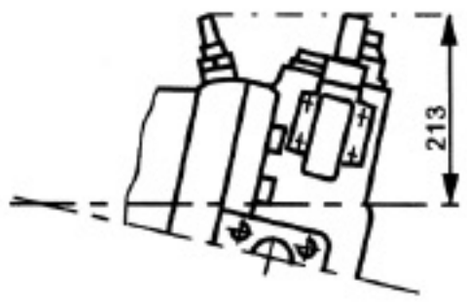
A1和X3仅限于遥控

A1and X3 only for remote conrtol

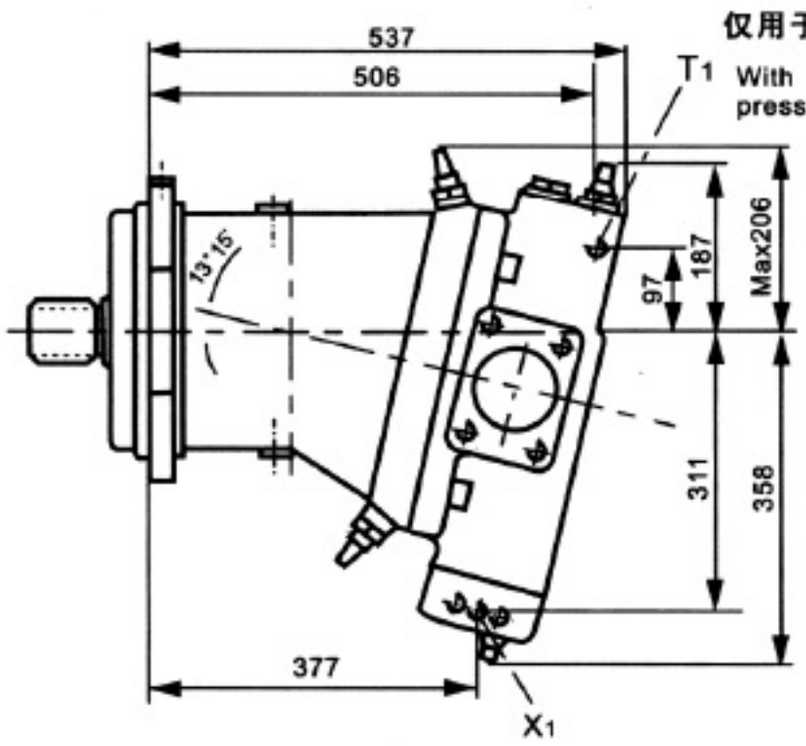
EP电控变量 Flectric Control

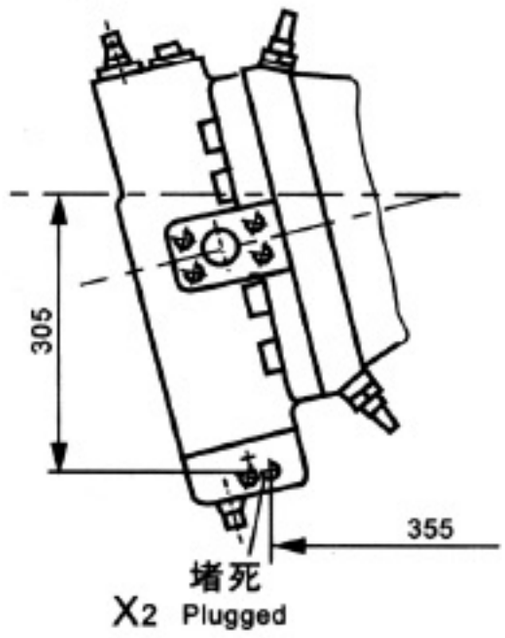


带压力切断
With Pressure Cut -off



HD液控变量 Hydraulic Control, Pressure Rclatcd





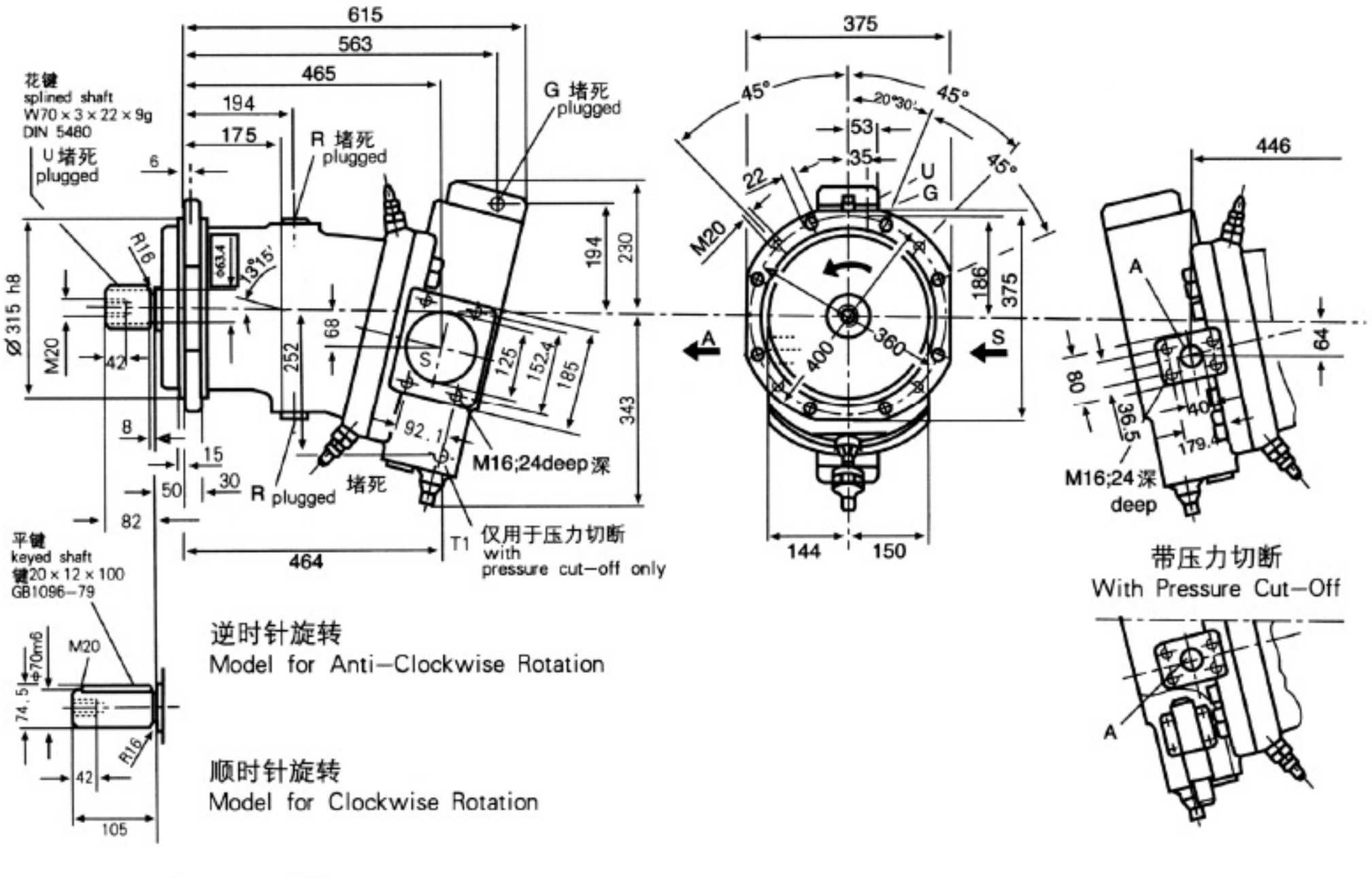
仅用于压力切断
With pressure cut-off only

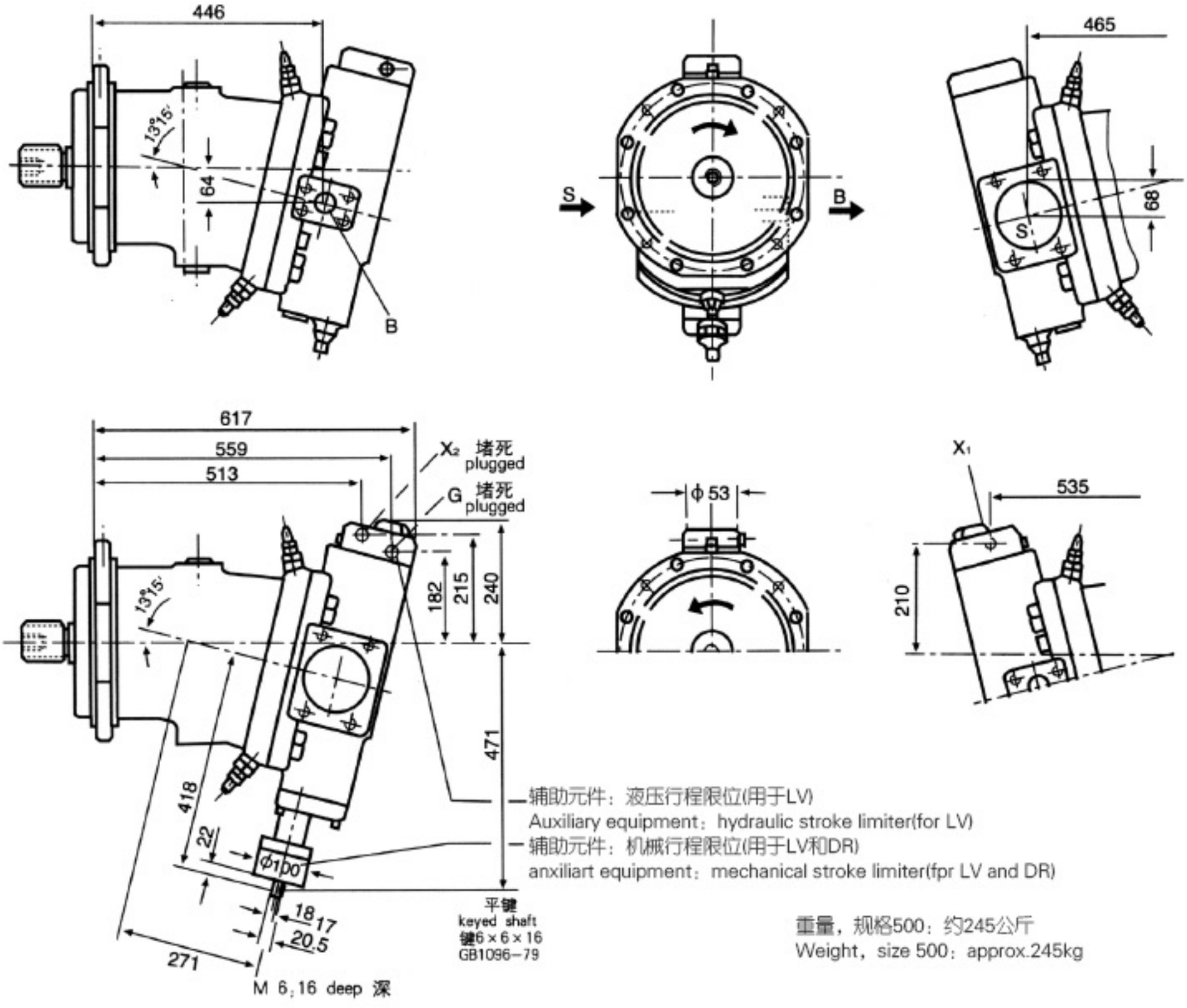


A，B	压力油口	service lines			
S	吸油口	suction line			
G	遥控压力口	remote control pressure M14×1.5	A_1,X_3	遥控阀油口	ports for remote control valve M22×1.5
	(总功率控制油口)(connection for summation HP control)		T	先导油回油口	pilot oil return line M16×1.5
X_1	先导压力口	pilot pressure M16×1.5	T_1	先导油回油口	pilot oil return line M22×1.5
X_2	遥控压力口	remote control pressure(HD)M16×1.5	R	排气口	air bleed M22×2
			U	冲洗口	flushing port M14×1.5

元件尺寸 Unit dimensions 规格 Size–500

LV恒功率变量 Constant HP control

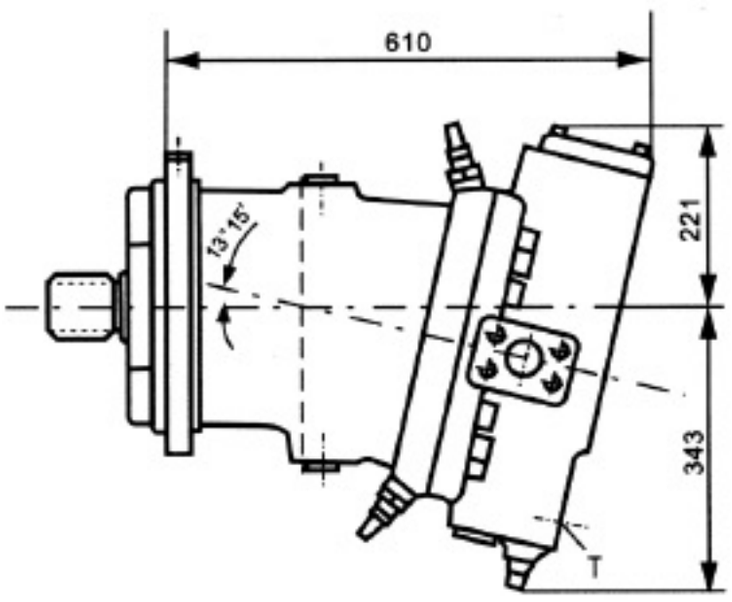




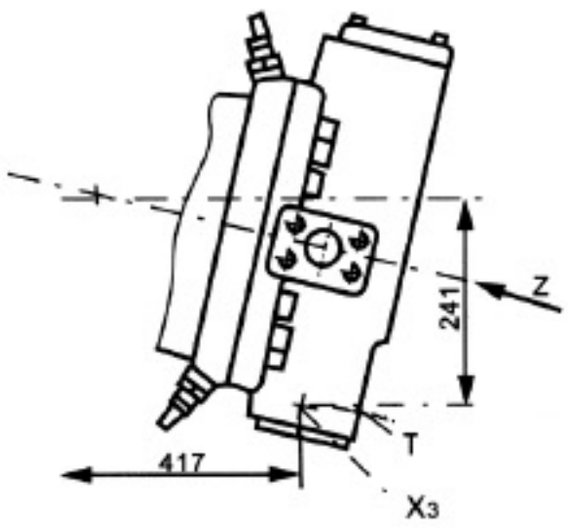
重量，规格500：约245公斤
Weight，size 500：approx.245kg

DR恒压变量 Constant Pressure Control

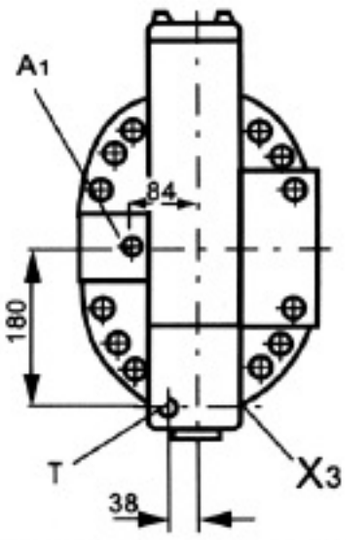
标准型 Standard Model



遥控 Remote Control



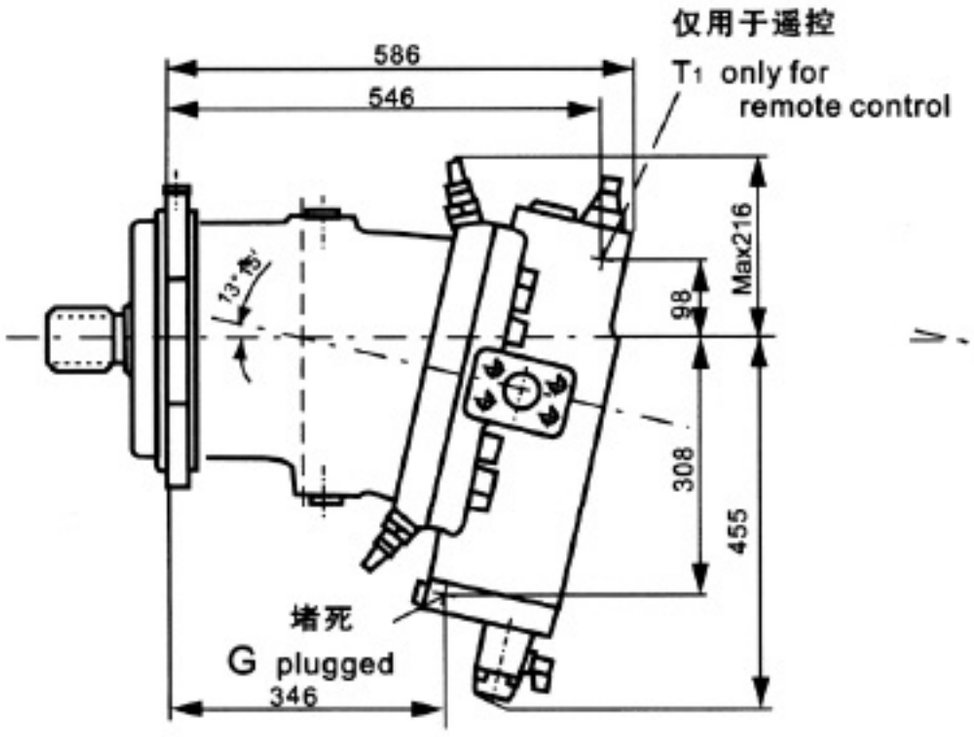
Z 向 Detail z



A1and X3 only for remote conrtol

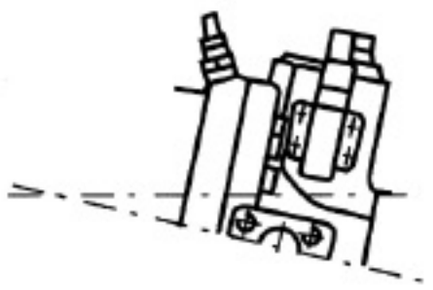
A1和X3仅限于遥控

Ep电控变量 Electric Control

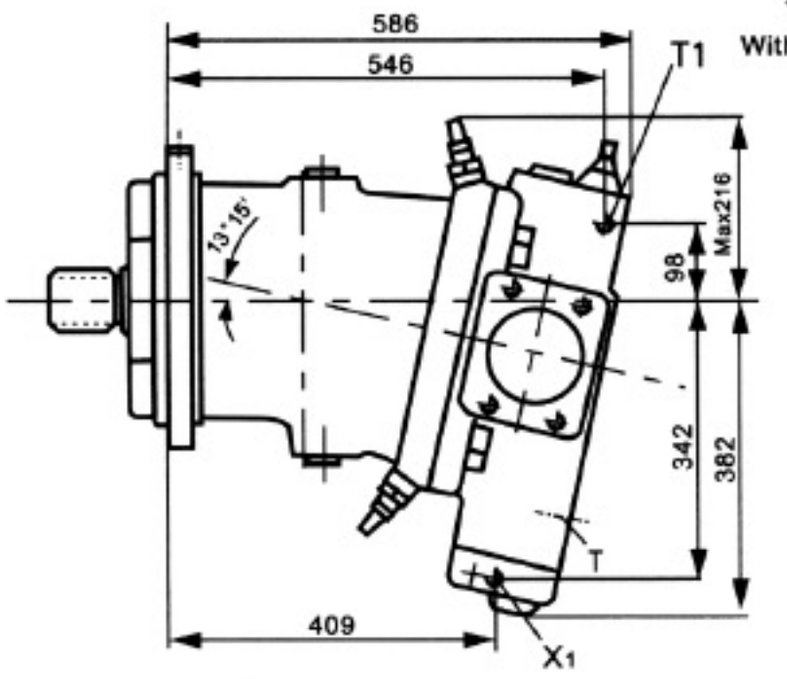


带压力切断

With Pressure Cut -off

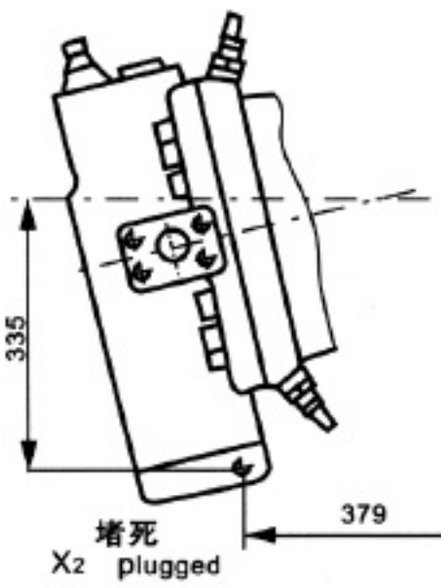


Hp液控变量 Hydraulic Control, Pressure Rclatcd



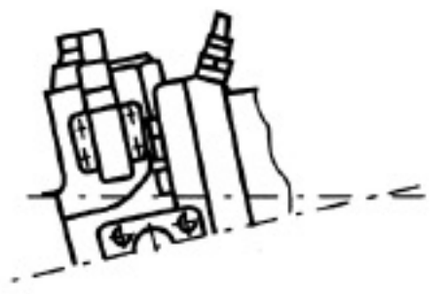
仅用于压力切断

With pressure cut-off only



带压力断切

With Pressure Cut-Off



A，B	压力油口	service lines
S	吸油口	suction line
G	遥控压力口	remote control pressure
	(总功率控制油口)(connection for summation HP control)	
	M16×1.5	
X_1	先导压力口	pilot pressure M16×1.5
X_2	遥控压力口	remote control pressure(HD)M16×1.5
A_1,X_3	遥控阀油口	ports for remote control valve M22×1.5
T	先导油回油口	pilot oil return line M16×1.5
T_1	先导油回油口	pilot oil return line M22×1.5
R	排气口	air bleed M33×2
U	冲洗口	flushing port M14×1.5