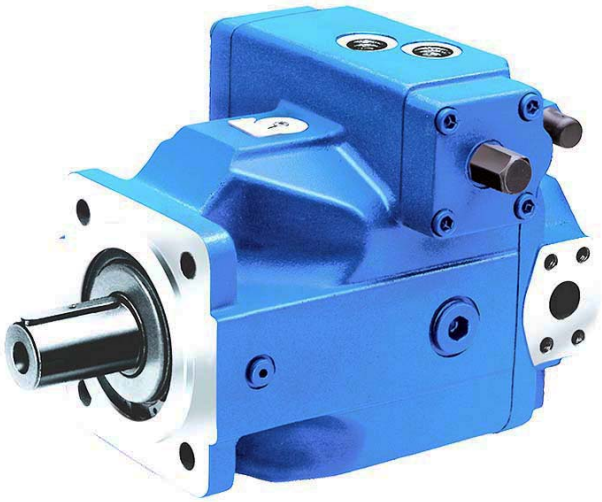


PA4VSO

Axial piston variable pump

Used for hydraulic drives in open loop circuits

Features:

- Swashplate axial piston pump.
- Adjust the angle of swashplate to realize the stepless variable.
- Good suction characteristic.
- Have the structural design of compact, light weight, low noise characteristics.
- The sensitivity of control system.
- Flow is proportional to the drivek speed and to the displacement.
- Nominal pressure reach to 35 Mpa.
- Long service life, high-precision bearings.
- Hydrostatic balance slipper, improve the life of pump.
- With swashplate angle indicator.

* Ordering Code

P	-		A4VS	O			/			-					
Prun Hydraulic		Hydraulic fluid	Axial piston unit	Type of operation	Size	Mode of operation		Series	Direction of rotation		Seals	Shaft end	Mounting flange	Service ports	Through drive

* Model Description

Prun Hydraulic	**P**

Hydraulic fluid

Mineral oils	
HF; HFB and HFC-Mediums	**E**

Axial piston unit

Variable displacement pump, industrial uses	**A4VS**

Type of operation

Pump, open circuits	**O**

Size

Displacement Vg max(ml/r)	40	71	125	180	250	355	500	

Mode of operation

Pressure control	**DR**	√	√	√	√	√	√	√	**DR...**
Power control with Hyperbolic open, curve	**LR**	√	√	√	√	√	√	√	**LR...**
Manual control	**MA**	√	√	√	√	√	√	√	**MA...**
Electronic control	**EO**	√	√	√	√	√	√	√	**EO...**
Hydraulic control, pilot pressure dependent	**HD**	√	√	√	√	√	√	√	**HD...**

Series

	√	√	–	–	–	√	–	10
	–	–	√	√	√	√	√	22
	–	√	√	√	√	√	√	30

Direction of rotation

With view on shaft end	Clockwise	R
	Counterclockwise	L

Seals

NBR Nitrile rubber	P
FKM Fluoro-rubber	V

Shaft end

Keyed parallel shaft	P
Splined shaft	Z

Mounting flange	40	71	125	180	250	355	500	
ISO 4 hole	√	√	√	√	√	√	–	B

Service ports

Port B and port S 90 degree offset; auxiliary pressure port B1 Metric fixing screws	√	√	√	√	√	√	√	13
Port B and port S 90 degree offset; preesure connection B1 connected by flange	√	√	√	√	√	√	√	25

Through drive

Without auxiliary pump, without through drive	√	√	√	√	√	√	√	N00

* Technical Data

Performance parameters(these figures did not consider the efficiency of mechanical and volumetric efficiency)

Size			40	71	125	180	250	355	500
Displacement ($V_{g\,max}$)		cm^3/r	40	71	125	180	250	355	500
Max.speed (n_{max})		rpm	2600	2200	1800	1800	1500	1500	1320
Max.Output flow	if $n = n_{max}$	L/min	104	156	225	324	375	532	600
	if n=1500rpm	L/min	60	107	186	270	375	532	–
Max.power	if $n = n_{max}$	KW	61	91	131	189	219	310	385
	if n=1500rpm	KW	35	62	109	158	219	310	–
Max.torque	(ΔP=35MPa)	N.m	223	395	696	1002	1391	1976	2783
Torque	(ΔP=10MPa)	N.m	64	113	199	286	398	564	795
Weight(approximately)		kg	40	54	87	103	186	206	318

Parameter calculation

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

Drive torque $T = \frac{1.59 \cdot V \cdot \triangle p}{1000 \cdot \eta_{mh}}$ [N m]

Drive power $P = \frac{2\pi \cdot T \cdot n}{60000} = \frac{T \cdot n}{9549} = \frac{q_v \cdot \triangle p}{600 \cdot \eta_t}$ [kW]

V_g = Geometry displacement each rotate [cm^3]

$\triangle p$ = Pressuredrop/differential [bar

n = Rotary speed [rpm]

η_v = Cubage's efficiency

η_{mh} = Mechanical hydraulic efficiency

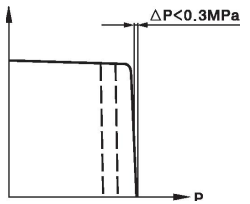
$\eta_t = (\eta_t \cdot \eta_{mh})$ Overall efficiency

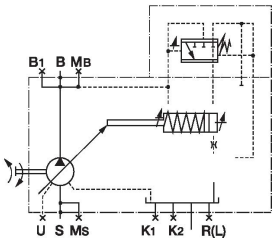
* Operation Mode

1. Outlined

DR/DRG
Pressure control DR
Remote pressure control DRG

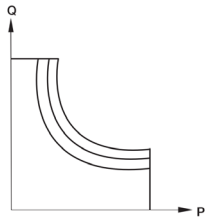
Maximum pressure adjustment in hydraulic system;
Set range 20...350 bar;
Option: remote control DRG

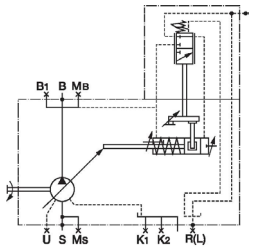




LR
Power control LR

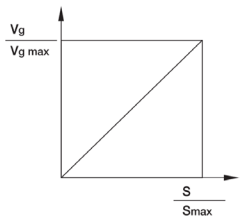
The hyperbolic power control is kept constant at the same input speed
Option: pressure control LR2D,
remote control LR2G;
Flow control LR2S, LR2F;
Hydraulic stroke limiter LR2H;
Mechanical stroke limiter LR2M;
Hydraulic two point control LR2Z;
Electrical discharge valve for help starting LR2Y.

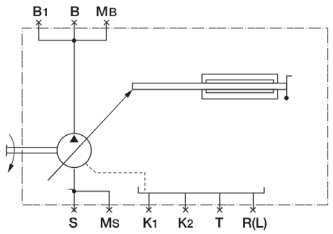




Manual control MA

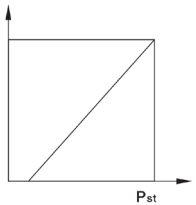
Stepless adjustment of flow through the hand wheel

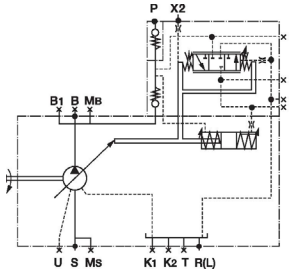




Hydraulic control HD

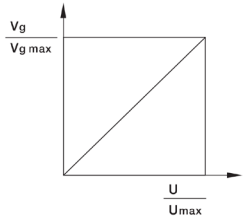
Pump flow(displacement) of the stepless regulation and the pilot pressure.
Adjust the proportion of the applied lead pressure.
Option: pilot pressure characteristic curve,
HD1, HD3, HD2;
pressure control HD.B, remote control HD.GB;
Power control DH1P;
Electrical lead pressure control HD1T;





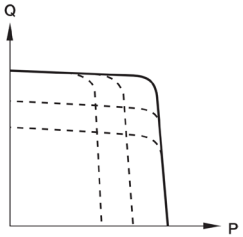
EO
Hydraulic displacement control EO

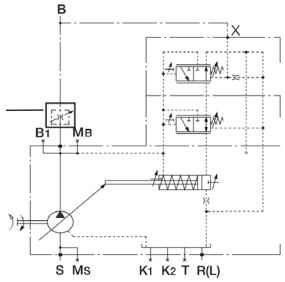
Through the angel of the electronic feedback of the proportional valve to achieve stepless displacement adjustment.
Electronic control
Available options: EO1K, EO2K
No valve EO1E, EO2E



DFR
Pressure and flow control DFR

This control can be kept constant in the constant flow rate of the pump under the condition of constant change.
Mechanical adjustable pressure control is preferred.
Available options: the throttle hole in the x of the oil port DFR1





2. The code of control section and technical parameter

- Hydraulic control HD

Outline
HD Hydraulic control of displacement dependent on pilot pressure signal. The displacement is proportional to the pilot pressure. The mechanical pivot angle limit setting range is 50%--100%Vgmax.

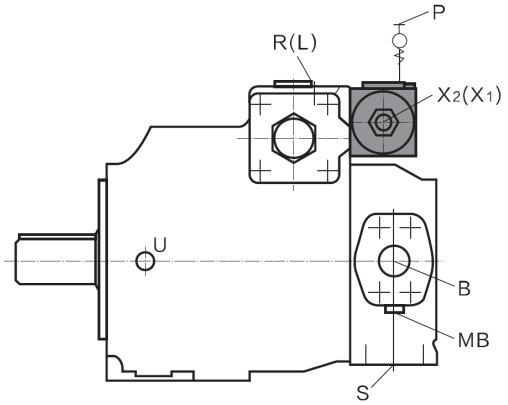
The ordering code number as following form

Pilot pressure characteristic	40	71	125	180	250	355	500	
1-4.5 Mpa	Δ	Δ	Δ	Δ	Δ	Δ	Δ	1
1-2.8 Mpa	Δ	Δ	Δ	Δ	Δ	Δ	Δ	2
0.55-1.9 Mpa	Δ	Δ	Δ	Δ	Δ	Δ	Δ	3
Closed loop pressure control								
Control at A port	Δ	Δ	Δ	Δ	Δ	Δ	Δ	A
Control at B port	Δ	Δ	Δ	Δ	Δ	Δ	Δ	B
Without pressure control/need not fill the code								

HD

Note: √ available; Δ in preparation

Outline drawing



Technical parameter

Size		40	71	125	180	250	355	500
Control moving distance	mm	14.2	17.3	20.7	20.7	25.9	25.9	32.6
Control area	cm^2	3.9	6.4	9	9	14.4	14.4	18.8
Control volume	cm^3	5.5	11	18.7	18.7	37.3	37.3	61.4
Min.control pressure	Mpa	3	3	5	5	5	5	5
Control time 20Mpa pressure	s	0.1	0.1	0.1	0.1	0.2	0.2	0.8

- Hydraulic displacement control HD

Outline

In the EO electric control work, the pump flow could set by proportion direction valve. Mean while, pump's current flow through inductance type position transducer feedback signal. This pump could reset the cylinder's zero position by the spring controls in the situation of normal pressure.

Do not reset at high-pressured work. Simultaneously, in order to reduce controls cylinder's loss flow, all size of hydraulic pressure fluid cylinder cavity is sealed.

The ordering code number as following form

						40	71	125	180	250	355	500	
Hydraulic control with proportion valve	EO	1				Δ	Δ	Δ	Δ	Δ	Δ	Δ	EO1
	EO	1		E		Δ	Δ	Δ	Δ	Δ	Δ	Δ	EO1E
	EO	1			K	Δ	Δ	Δ	Δ	Δ	Δ	Δ	EO1K
	EO		2			Δ	Δ	Δ	Δ	Δ	Δ	Δ	EO2
	EO		2	E		Δ	Δ	Δ	Δ	Δ	Δ	Δ	EO2E
	EO		2		K	Δ	Δ	Δ	Δ	Δ	Δ	Δ	EO2K

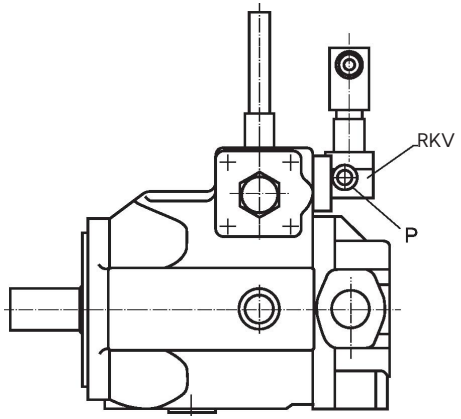
Max.setting pressure 10Mpa

Max.setting pressure 35Mpa

Bypass valve

Withour valve

Outline drawing



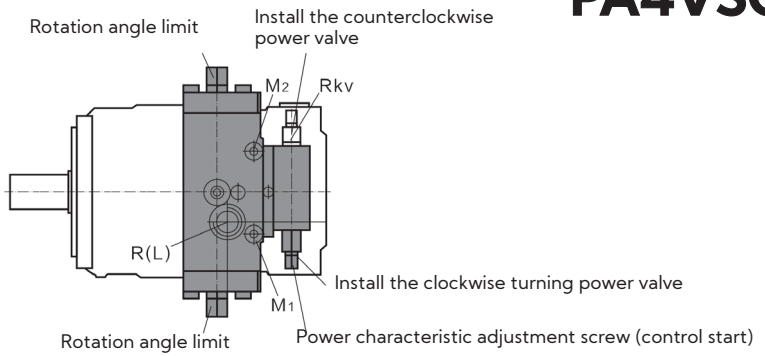
Specification of oil ports:

P Pressure port: M22 x 1.5 deep 16

RKV Case drain port : M22 x 1.5 deep 16

Technical parameter

Size		40	71	125	180	250	355	500
Control cylinder's moving distance	mm	14.2	17.3	20.7	20.7	25.9	25.9	32.8
Control cylinder area	cm^2	8.1	12.6	18.1	16.1	28.3	28.3	38.2
Control volume	cm^3	11.4	21.5	37.5	37.5	37.3	73.2	124.5
Min.control pressure	Mpa	10	10	10	12.5	12.5	12.5	15
Max.control pressure	Mpa	31.5	31.5	31.5	31.5	31.5	31.5	31.5
Control time	s	0.1	0.12	0.2	0.2	0.25	0.25	0.3

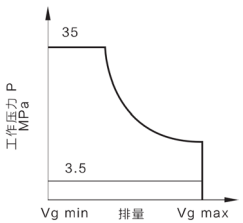


- Power control LR

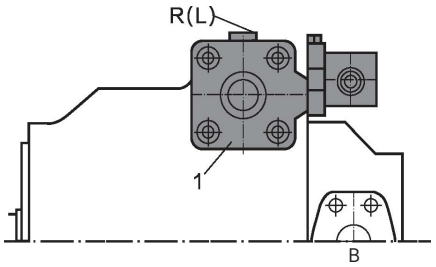
Outline

At the very beginning, the control scope could use the mechanical way to set, the setting value scope could use the spring and screw to adjust. When the pressure decreases, we could adjust spring and enter its starting position, the setting range of preset value:3.5Mpa--35Mpa. The smallest and the biggest angle of rotation's limit can use the mechnical way, adjustment to Vgmax 50%.

Characteristic curv



Outline drawing



The ordering code number as following form

Used for hydraulic drives in open loop circuits
with the hyperbolic curve characteristic power adjuster, basic setting value Vgmax

Power regulation	40	71	125	180	250	355	500	
The machinery adjust	√	√	√	√	√	Δ	Δ	2
Remote hydraulic control	Δ	Δ	Δ	Δ	Δ	Δ	Δ	3
Pressure control								
With pressure control	√	√	√	√	√	Δ	Δ	D
With pressure control, remote hydraulic control	√	√	√	√	√	Δ	Δ	G
Without pressure control/need not fill the code								
Flow control, limit								
With mechanical traveling sched-ule limit	Δ	Δ	Δ	Δ	Δ	Δ	Δ	M
Without flow control, limit, need not fill the code								

LR

Note: √ available; Δ in preparation

Used for hydraulic drives in open, semi-close and close loop circuits
with the hyperbolic curve characteristic power adjuster, basic setting value Vgmax depend on control pressure

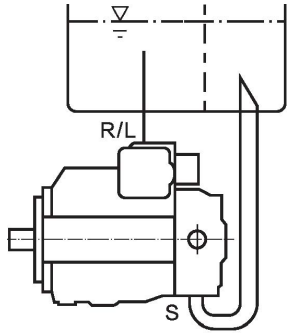
Power regulation	40	71	125	180	250	355	500	
The machinery adjust	Δ	Δ	Δ	Δ	Δ	Δ	Δ	2
Remote hydraulic control	Δ	Δ	Δ	Δ	Δ	Δ	Δ	3
Pressure control								
With pressure control	Δ	Δ	Δ	Δ	Δ	Δ	Δ	D
With pressure control, remote hydraulic control	Δ	Δ	Δ	Δ	Δ	Δ	Δ	G
Without flow control, limit, need not fill the code								

LR N

Note: √ available; Δ in preparation

The hydraulic pump installed outside a tank
If the pump installed below the tank, drain pipe and port S must be piped, as right diagram.

If the pump installed above the tank, drain pipe and port S must be piped, refer.

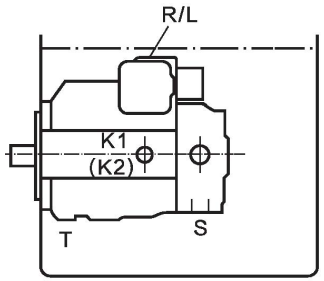


* Installation Postion

Horizontal installation

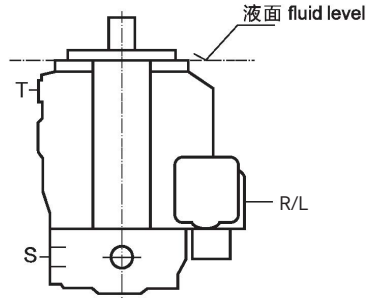
The hydraulic pump installed within a tank
If the minimum fluid level is level above the top of pump, case drain ports and port S are open, as right diagram.

If the minimum fluid level falls the top of pump, case drain ports and port S must be piped, as following diagram.

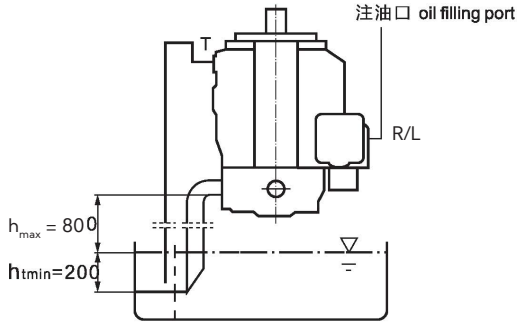


Vertical installation

The hydraulic pump installed within a tank
If the minimum fluid level is level with of above the pump, mounting flange case drain ports T, S and port R/L are open, as right diagram.

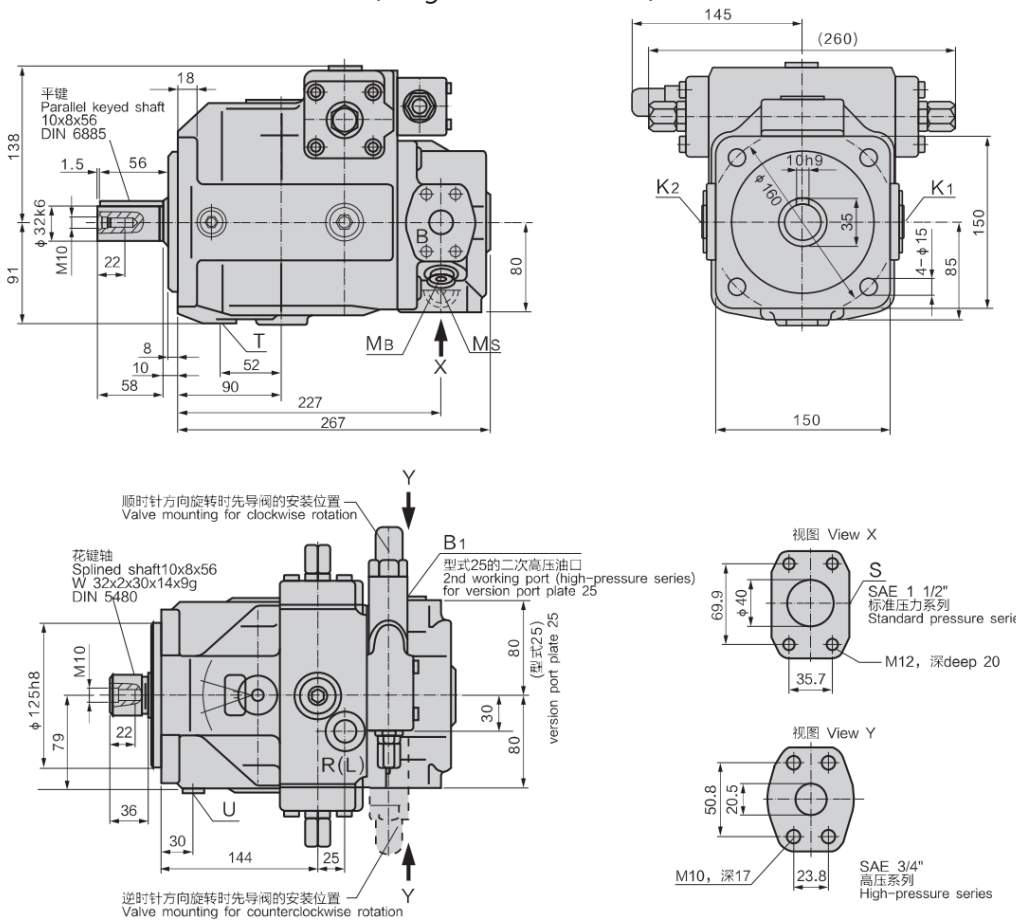


If the minimum fluid level fall below the pump mounting flange, case drain ports T, S and port P/L must be piped, as right diagram.



* Dimentions & Size

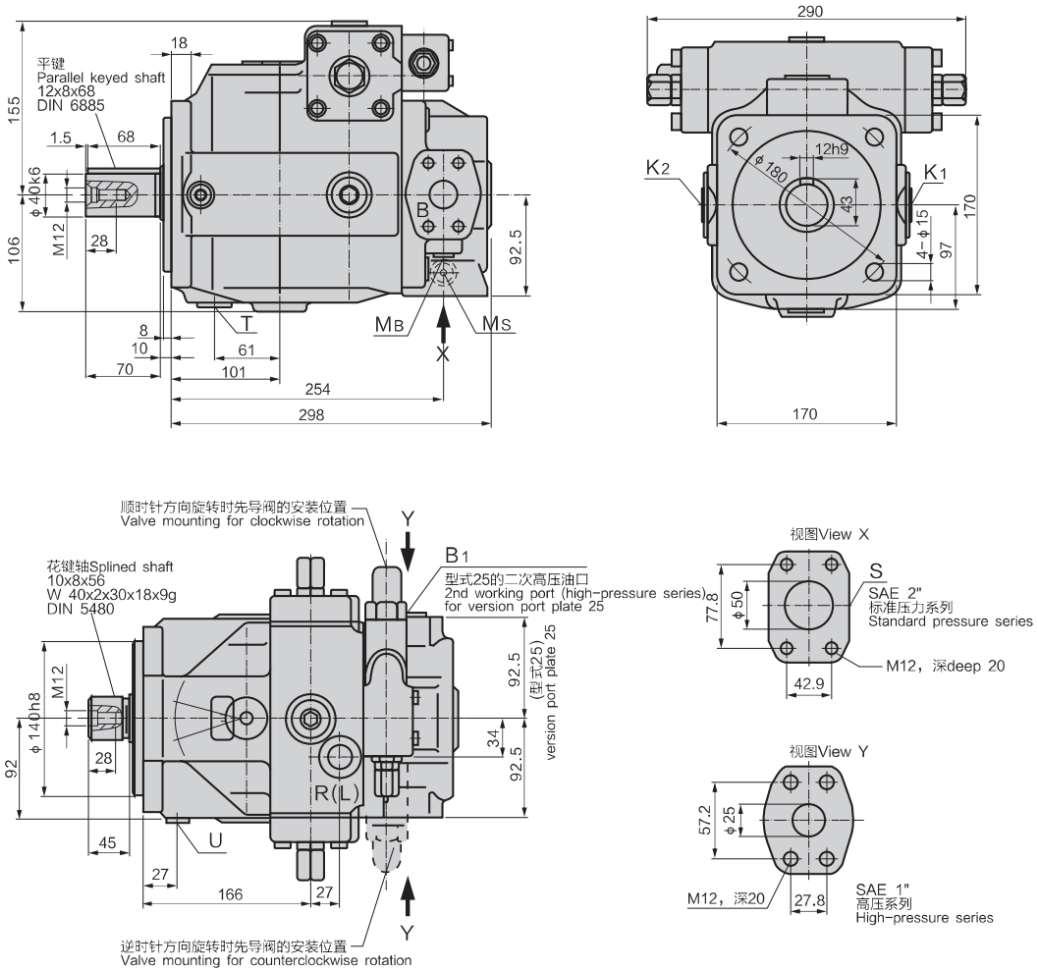
Dimensions, Size PA4VSO-40 (Diagram: DR Variable)



B	Pressure port	ø20.5
B1	Auxiliary pressure port When the working port type is 25, B1 port correspondingviewed on Y direction.	M22 x 1.5 deep 16
S	Suction port	ø40
T	Case drain port	M22 x 1.5 deep 16
R(L)	R(L) Fluid fill and air bleed port	M22 x 1.5
M_B M_S	Test port	M14 x 1.5 deep 12
K_1 K_2	Flushing port	M22 x 1.5 deep 14
U	Bearing flushing port	M14 x 1.5 deep 12 plugged

* Dimentions & Size

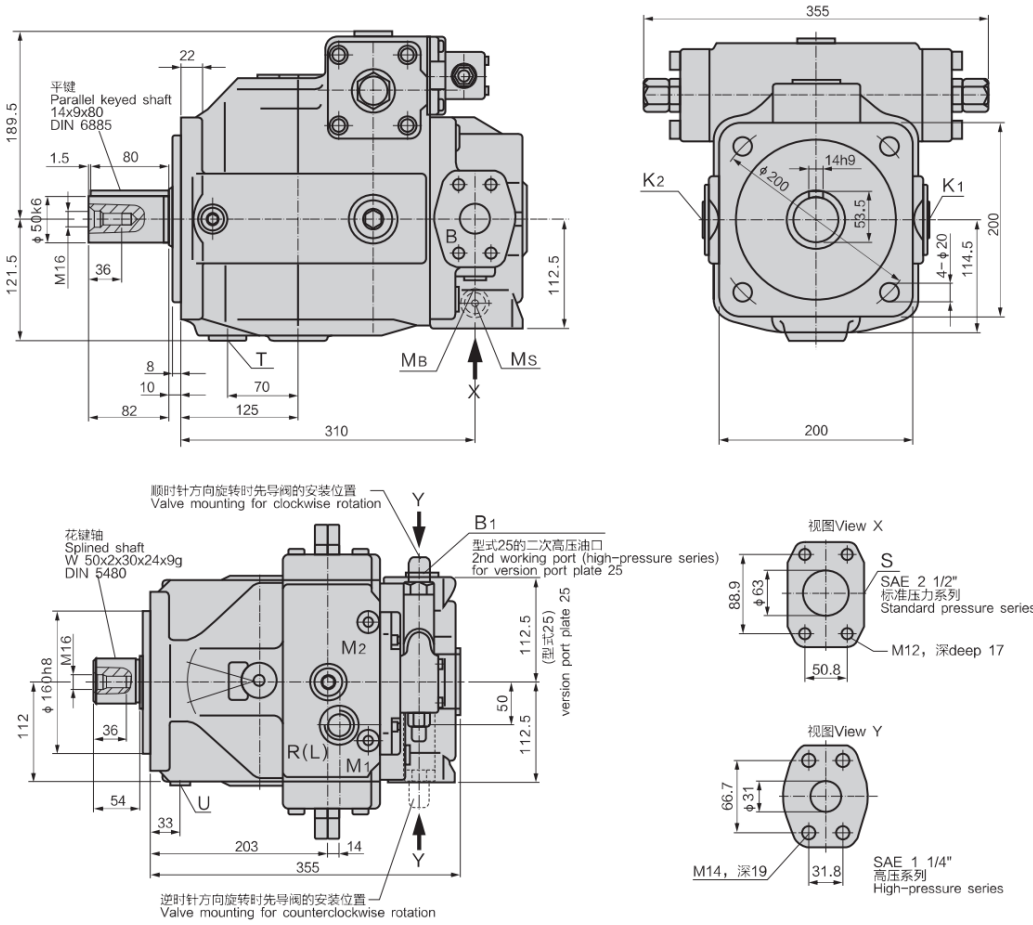
Dimensions, Size PA4VSO-71 (Diagram: DR Variable)



B	Pressure port	ø25
B1	Auxiliary pressure port When the working port type is 25, B1 port correspondingviewed on Y direction.	M27 x 2 deep 16
S	Suction port	ø50
T	Case drain port	M27 x 2 deep 16
R(L)	R(L) Fluid fill and air bleed port	M27 x 2
K_1 K_2	Flushing port	M27 x 2 deep 16

* Dimentions & Size

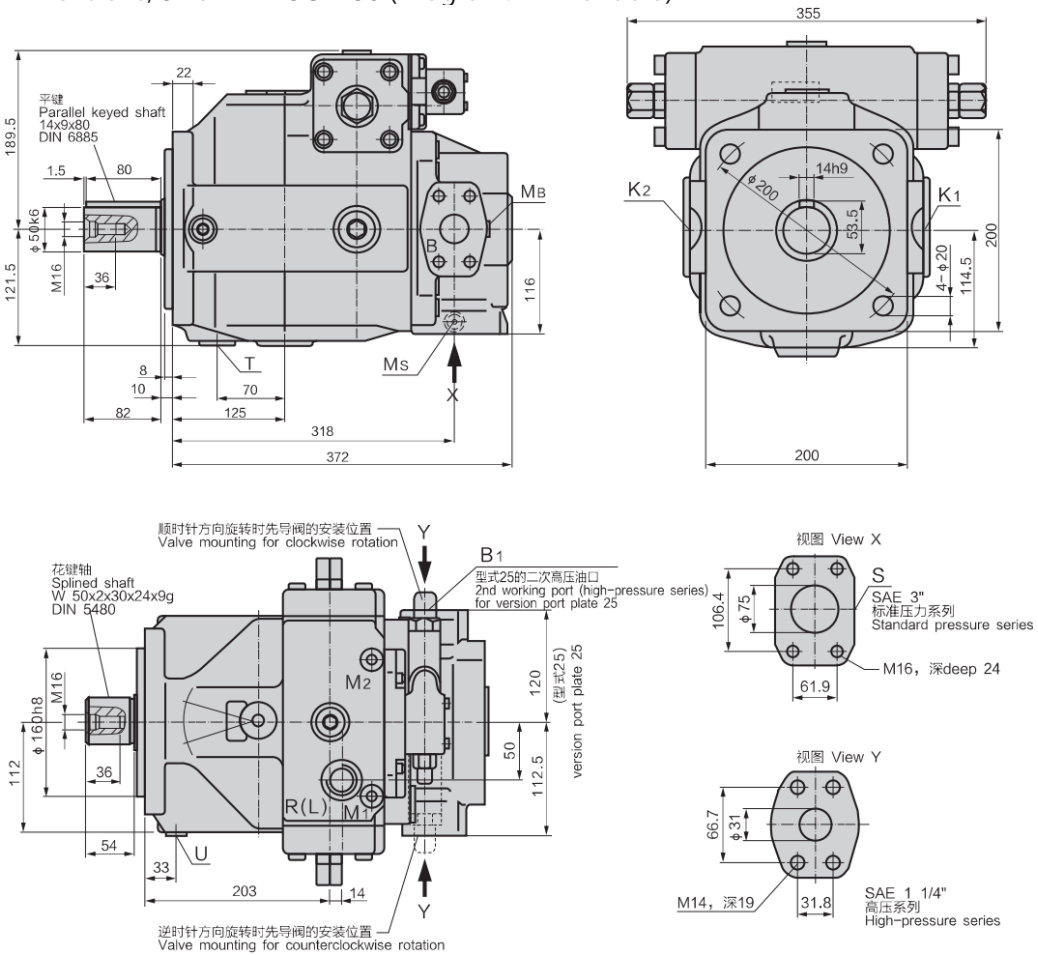
Dimensions, Size PA4VSO-125 (Diagram: DR Variable)



B	Pressure port	ø31
B1	Auxiliary pressure port When the working port type is 25, B1 port correspondingviewed on Y direction.	M32 x 2 deep 18
S	Suction port	ø63
T	Case drain port	M33 x 2 deep 18
R(L)	R(L) Fluid fill and air bleed port	M33 x 2
M_B M_S	Test port	M14 x 1.5 deep 12
K_1 K_2	Flushing port	M33 x 2 deep 18
U	Bearing flushing port	M14 x 1.5 deep 12 plugged

* Dimentions & Size

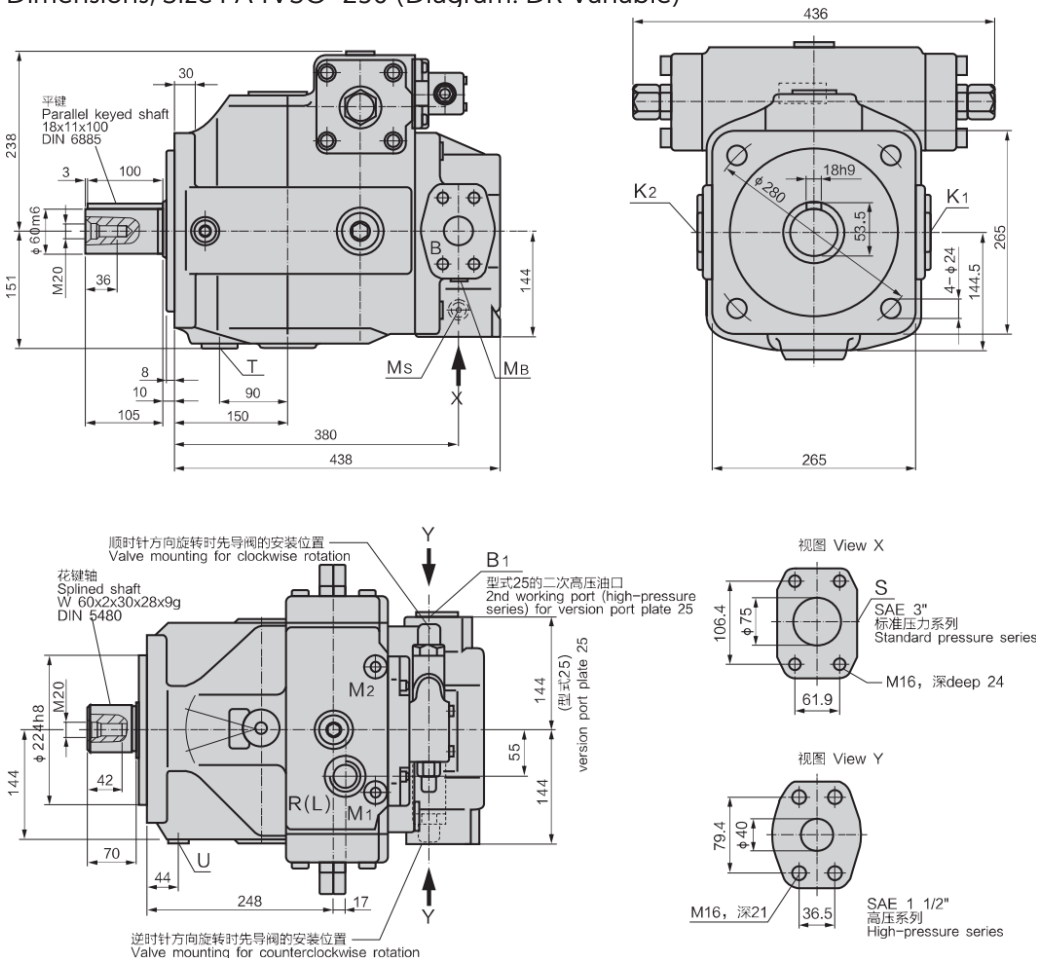
Dimensions, Size PA4VSO-180 (Diagram: DR Variable)



B	Pressure port	ø31
B1	Auxiliary pressure port When the working port type is 25, B1 port correspondingviewed on Y direction.	M33 x 2 deep 18
S	Suction port	ø75
T	Case drain port	M33 x 2 deep 18
R(L)	R(L) Fluid fill and air bleed port	M33 x 2
M_B M_S	Test port	M14 x 1.5 deep 12
K_1 K_2	Flushing port	M33 x 2 deep 18
U	Bearing flushing port	M14 x 1.5 deep 12 plugged

* Dimentions & Size

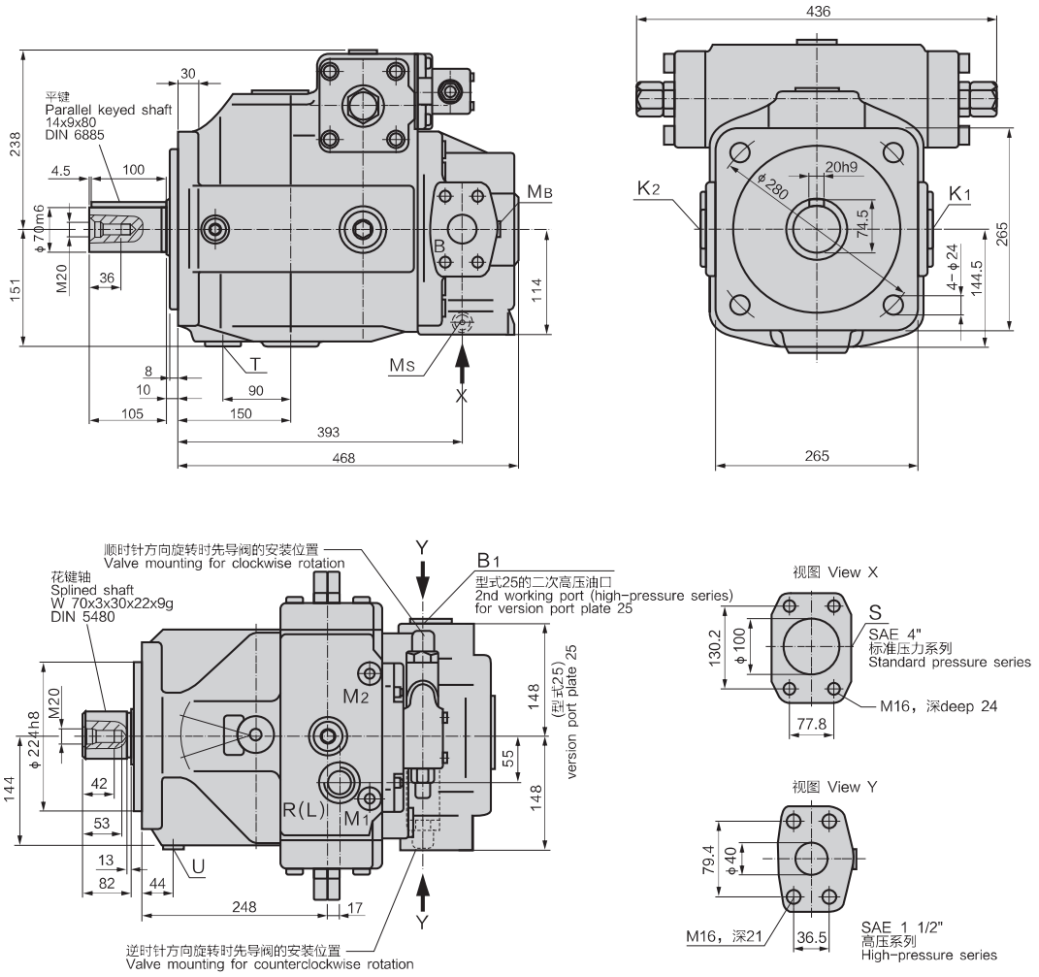
Dimensions, Size PA4VSO-250 (Diagram: DR Variable)



B	Pressure port	ø40
B1	Auxiliary pressure port When the working port type is 25, B1 port correspondingviewed on Y direction.	M33 x 2 deep 18
S	Suction port	ø75
T	Case drain port	M42 x 2 deep 18
R(L)	R(L) Fluid fill and air bleed port	M42 x 2
M_B M_S	Test port	M14 x 1.5 deep 12
K_1 K_2	Flushing port	M42 x 2 deep 18
U	Bearing flushing port	M14 x 1.5 deep 12 plugged

* Dimentions & Size

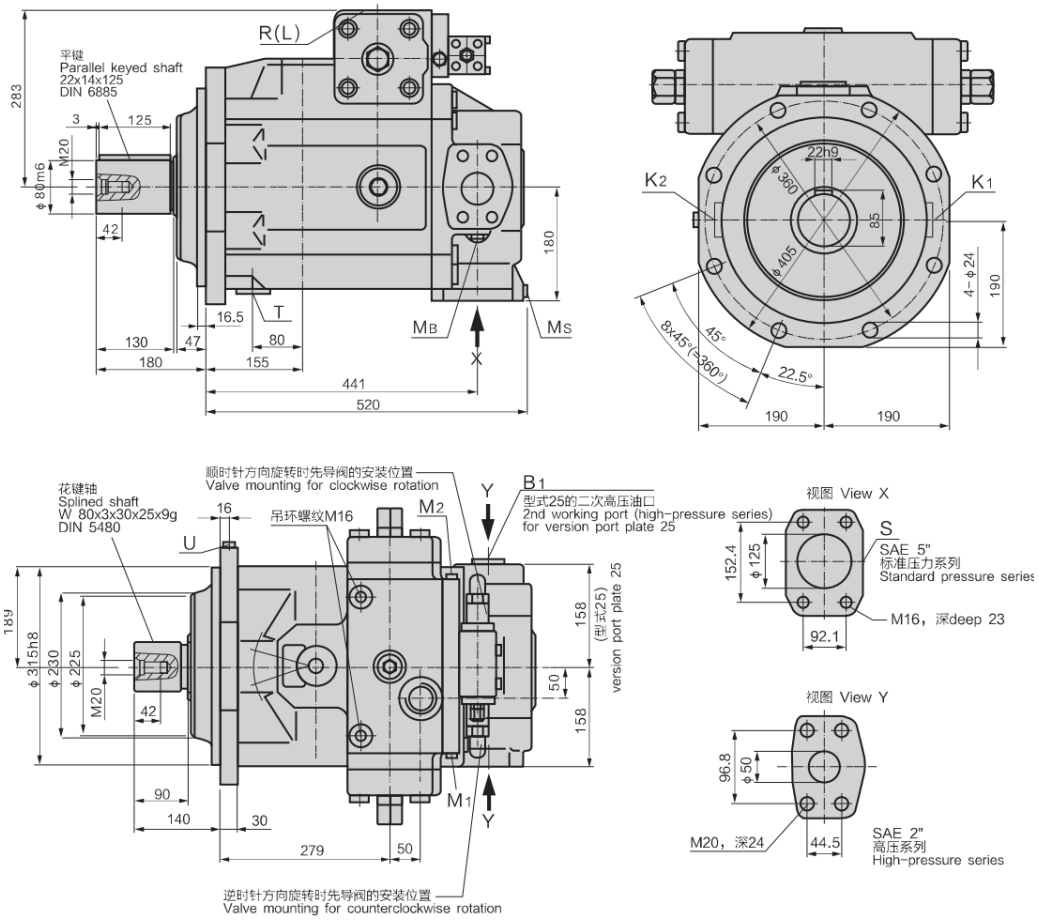
Dimensions, Size PA4VSO-355 (Diagram: DR Variable)



B	SAE 1 1/2'' M42 x 2	
B1	4'' M42 x 2 M14 x 1.5 M24 x 2	M18 x 1.5 M18 x 1.5
S	Suction port	ø100

* Dimentions & Size

Dimensions, Size PA4VSO-500 (Diagram: DR Variable)



B	Pressure port	SAE2n''
B1	Auxiliary pressure port When the working port type is 25, B1 port correspondingviewed on Y direction.	M48 x 2 deep 22
S	Suction port	SAE5n''
T	Case drain port	M48 x 2 deep 22
R(L)	R(L) Fluid fill and air bleed port	M48 x 2
M_B M_S	Test port	M18 x 2 deep 12
K_1 K_2	Flushing port	M48 x 2 deep 12
U	Bearing flushing port	M18 x 1.5 deep 12