



1.1

# HP6V SERIES

Swash-plate Type  
Axial Piston Variable Displacement Pump

The HP6V series axial piston pumps are designed for high pressure open systems with a specially designed new power structure that is smaller and more resistant to pollution.

Apply to open hydraulic circuit							
Displacements (cc/rev):	18	28	47	65	76	85	105
Rated pressure (bar):	300	300	320	320	320	320	350
Peaking pressure (bar):	320	320	350	350	350	350	400



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## Features

- Variable pump in swash-plate design for open circuit.
- High continuous pressure.
- Exceptional self-priming capability.
- Available with American (SAE) and Japanese (JIS) mounting flanges and shafts.
- Excellent reliability and long life.
- High power to weight ratio.
- Variety of control options.
- Optional through drive.
- Quick control response.
- Low pressure pulsation and low noise.
- Developed for engineering, mobile vehicles, industrial, other industrial application and agricultural machinery.

Technical Data

Size		18	28	47	65	76	85	105
Displacement (cc/rev)		18	28	47	65	76	85	104.3
Pressure	Rated pressure (bar)	300	300	320	320	320	320	350
	Peak pressure (bar)	320	320	350	350	350	350	400
Rotation speed	Max for self-priming <sup>1</sup> (rpm)	3300	3000	2700	2600	2400	2400	2200
	Max <sup>2</sup> (rpm)	3900	3600	3250	3140	3000	3000	2600
Weight (Kg)		15.9	17	21.5	25	28	28	45
Quantity of oil to fill pump case (L)		0.4	0.55	0.6	0.6	0.8	0.8	1
Temperature Range (°C )		-20~95						
Viscosity Range (mm <sup>2</sup> /s)		10-1000 <sup>3</sup> (The best use of viscosity range 16~36 mm <sup>2</sup> /s)						

Permissible through drive torque							
Input shaft code	S	S0	S1	S2	S3	S4	S5
Input torque rating (Nm)	59	124	171	272	552	925	1470

- 1. Steady state suction pressure should be 0 bar and above(at normal condition);
- 2. If suction pressure less than 0 bar, Boost pressure should be required;
- 3. In case of 200-1000mm<sup>2</sup>/s, please allow system to warm up before using machine.

Type introduction

HP6V	65	/	A	V	00	R	B2	S2	M	G	DR	S
①	②		③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫

Product series

①	Product series	HP6V
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Displacement

②	Displacement	cc/rev	18	28	47	65	76	85	105
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Design series

③	Design series	A Series	A
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Seals

④	Seals	FKM (Viton rubber: DIN ISO 1629)	V
		NBR (Nitrile rubble :DIN ISO 1629)	N

Through Drive

⑤			18	28	47	65	76	85	105	Code
	Without through drive		●	●	●	●	●	●	●	00
	Without through drive, SAE flange ports, rear			●			●	●		N1
	Without through drive, Thread ports, rear									N2
	Standard configuration with gear pump 6cc/rev						●	●	○	X1
	Standard configuration with gear pump 10cc/rev						○	○	○	X2
	Mounting Flange	Spline shaft								
	SAE A 82-2	SAE J744-16-4 9T 16/32DP					●	●	●	A1
		SAE J744-19-4 11T 16/32DP					●	●	●	A2
	SAE B 101-2	SAE J744-22-4 13T 16/32DP					●	●	●	B1
		SAE J744-25-4 15T 16/32DP					●	●	●	B2
	SAE C 127-2	SAE J744-32-4 14T 12/24DP					●	●	●	C1
		SAE J744-38-4 17T 12/24DP							●	C2
	SAE C 127-4	SAE J744-32-4 14T 12/24DP					●	●	●	C3
		SAE J744-38-4 17T 12/24DP							●	C4

## Type introduction

### Direction of Rotation

	Viewed on drive shaft	18	28	47	65	76	85	105	Code
⑥	Clockwise	●	●	●	●	●	●	●	R
	Counter-clockwise	○	●	○	○	●	●	●	L

### Input Mounting flanges

	Mounting flanges size	18	28	47	65	76	85	105	Code
⑦	SAE B 82-2	●							A2
	SAE B 101-2		●	●	●	●	●		B2
	SAE C 127-2					●	●	●	C2
	SAE C 127-4					●	●	●	C4
	ISO 2 holes		●	●	●	●	●	●	A

### Input Shaft

	Shaft size	18	28	47	65	76	85	105	Code
⑧	SAE J744-16-4 9T 16/32 DP	●							S
	SAE J744-19-4 11T 16/32DP	●							S0
	SAE J744-22-4 13T 16/32DP		●		●				S1
	SAE J744-25-4 15T 16/32DP			●	●	●	●		S2
	SAE J744-32-4 14T 12/24DP				●	●	●		S3
	SAE J744-38-4 17T 12/24DP							●	S4
	SAE J744-44-4 13T 8/16DP							●	S5
	SAE J744-22-1 B6.35×28 straight shaft		●						K1
	SAE J744-25-1 B6.35×32 straight shaft			●	●				K2
	SAE J744-32-1 B7.94×44 straight shaft					●	●		K3
	ISO straight shaft (non through shaft)		●	●	●	●	●	●	P
	(used with flange A)								

### Thread type of Flange Fixing Port

⑨	Thread type	Metric threads	M
		UNC threads	S

### Connection type (except inlet and outlet port)

⑩	UNC port, ISO 11926	A
	BSPPG thread, JIS B2351	G
	Metric port, ISO 9974	M

Type introduction

Control type

⑪	Control type		18	28	47	65	76	85	105	Code
	Apply to constant displacement pump		○	○	○	○	○	○	○	N
	Pressure cut-off	Only pressure control	●	●	○	●	●	●	●	DR
		Electro-hydraulic pressure control,negative control (without suppressor diode)	12V	○	●	○	○	●	●	ER1
			24V	○	●	○	○	●	●	ER2
		+Load sensing	●	●	○	●	●	●	●	L1
		Remotely operated	○	○	○	○	●	●	●	P0
		+Electric proportional displacement. Deutsch DT04-2P ; 2 contact pin, (without suppressor diode)	12V							ED1
			24V		○	○				ED2
	Power Control	Pressure cut-off+ Load sensing	●	●	○	●	●	●	●	LP1
		Remotely operated			○	○	○	○	○	LP0
		Electrically (negative control) +Pressure cut-off+ Load sensing. Deutsch DT04-2P ; 2 contact pin, (without suppressor diode)	12V	●	●	●	●	●	●	LE1

Standard / special version

⑫		18	28	47	65	76	85	105	Code
	Standard version	●	●	●	●	●	●	●	None
	Special version	○	○	○	○	○	○	○	S

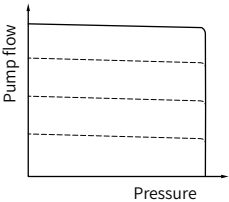
Remark: ● = available; ○ = On request;

⑧	Shaft size	S28	S45	45	S63	76	85	S85	105	Code
	SAE J744-22-4 13T 16/32DP	●	●	●	●					S1
	SAE J744-25-4 15T 16/32DP			●		●	●	●		S2
	SAE J744-32-4 14T 12/24DP					●	●		●	S3
	SAE J744-38-4 17T 12/24DP								●	S4
	SAE J744-44-4 13T 8/16DP								●	S5
	SAE J744-22-1 B6.35×28 straight shaft									K1
	SAE J744-25-1 B6.35×32 straight shaft			●						K2
	SAE J744-32-1 B7.94×44 straight shaft					●	●			K3
	ISO straight shaft (non through shaft) (used with flange A)			●		●	●		●	P

# Regulators introduction

Code: L1(DR)

- Control Type :
- 1. Load sensing**  
Standard setting: 15bar  
Adjustment range: 10bar-21bar  
(It can be set to 35 bar at most, but it is not recommended to set it too high. If you need other settings, please consult our company.)
  - 2. Pressure Cut-off**  
Standard setting: 320bar  
Adjustment range: 21bar-320bar



**Function and Features:** **Load sensing + Pressure Cut-off**

The load sensing control is a flow control option that operates as a function of the load pressure to regulate the pump displacement to match the actuator flow requirement. The load sensing control compares pressure before and after the sensing orifice and maintains the pressure drop across the orifice (differential pressure  $\Delta p$ ) and with it the pump flow constant.

If the differential pressure  $\Delta p$  increases, then the pump displacement decreases, and if the differential pressure  $\Delta p$  decreases, then the pump displacement increases until the pressure drop across the sensing orifice in the valve is restored.

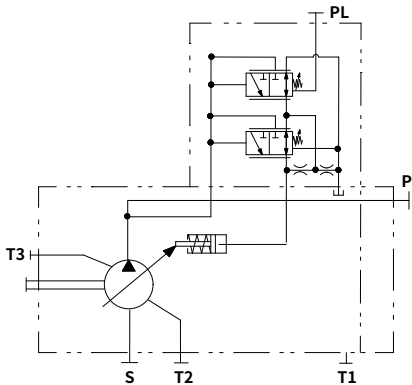
$\Delta p = P_p - P_L$

Pump displacement is controlled to match the flow requirement as a function of the system differential pressure (load pressure vs delivery pressure). In addition, there is a pressure cut off function incorporated into the control.

The pressure cut off control keeps the pressure in a hydraulic system constant within its control range even under varying flow conditions, the variable pump only moves as much hydraulic fluid as is required by the actuators. If the operating pressure exceeds the set point set at the pressure control valve, the pump displacement is automatically swivelled back until the pressure deviation is corrected.

"DR" control is on the basis of "L1" control, tighten the load sensitive valve adjust screw, and the load sensitive valve doesn't work.

## Hydraulic Circuit:

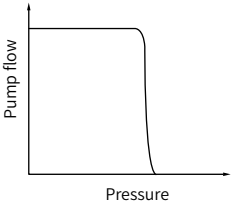


# Regulators introduction

**Code:** P0

**Control Type :**

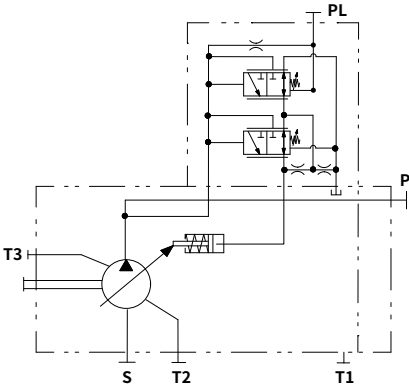
- 1. Load sensing**  
 Standard setting:15bar  
 Adjustment range:10bar-21bar  
 (It can be set to 35 bar at most, but it is not recommended to set it too high. If you need other settings, please consult our company.)
- 2. Pressure Cut-off**  
 Standard setting:320bar  
 Adjustment range:21bar-320bar



**Function and Features:** **P0 Pressure cut-off**  
 The Pressure Cut-off regulator monitors outlet pressure once the pressure reaches the cut-off setting, the pump will return to minimum displacement.

**Remote Control**  
 The pump can be remotely controlled by connecting a relief valve to the PL port of the regulator. The pump can also be unload at a low pressure continue standby condition by using a solenoid valve.

**Hydraulic Circuit:**

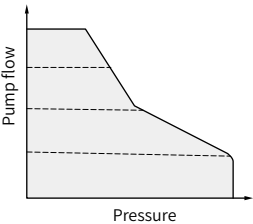


# Regulators introduction

Code: LP ☐

## Control Type :

- 1. Load sensing**  
Standard setting: 15bar  
Adjustment range: 10bar-21bar  
(It can be set to 35 bar at most, but it is not recommended to set it too high. If you need other settings, please consult our company.)
- 2. Pressure Cut-off**  
Standard setting: 320 bar  
Adjustment range: 21 bar-320 bar
- 3. Torque limiting**

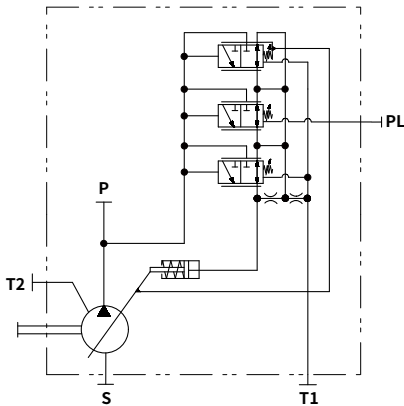


## Function and Features: LP Load Sense and Pressure Cut-off with Torque limiting

The L1 control functions as previously noted. In response to a rise in delivery pressure the swash plate angle is decreased, restricting the input torque. This regulator prevents excessive load against the prime mover.

The torque limit control module is comprised of two springs that oppose the spool force by the system pressure. By turning an outer and inner spring adjustment screw, the appropriate input torque limit can be set.

## Hydraulic Circuit:



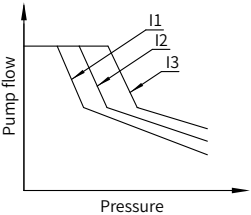


Regulators introduction

Code: LE □

Control Type :

- 1. Load sensing  
Standard setting:15bar  
Adjustment range:10bar-21bar  
(It can be set to 35 bar at most, but it is not recommended to set it too high. If you need other settings, please consult our company.)
- 2. Pressure Cut-off  
Standard setting: 280bar(HP6V18)  
Adjustment range: 21bar~215bar(HP6V18)
- 3. Port Pr pressure: 20bar~45bar
- 4. Electromagnet characters



300bar(HP6V65)  
21bar~320bar(HP6V65)

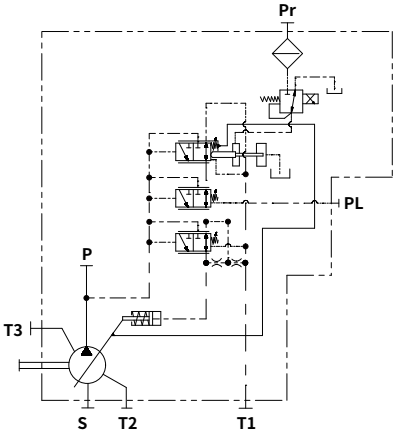
Code	Voltage(V)	Current(A)	Resistance(Ω)	Insulation grade
LE1	12	0.80	7.3±10%(20℃)	H(180℃)

5. Connector (deutsch)  
DEUTSCH: DT04-2P

Function and Features: LE Load Sense and Pressure Cut-off with Torque limiting

The L1 control functions as previously noted. It controls the input torque of the pump by changing different current, specific current is related to certain input torque, thus satisfy needs of different torque on excavator

Hydraulic Circuit:



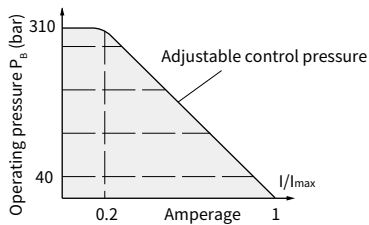
Regulators introduction

Code: ER □

Control Type : Negative electro-proportional pressure control

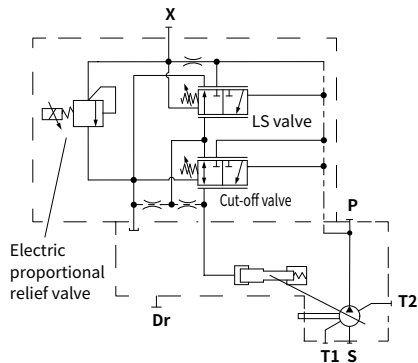
The ER2 valve is set to a certain pressure by a specified variable solenoid current. This causes an increase or decrease in the pump swivel angle (flow) in order to maintain the electrically set pressure level. The pump thus only delivers as much hydraulic fluid as the consumers can take. The desired pressure level can be set steplessly by varying the solenoid current. As the solenoid current signal drops towards zero, the pressure will be limited to Pmax by an adjustable hydraulic pressure cut-off to secure fail safe function

Static current-pressure characteristic curve ER2  
(negative characteristic curve measured with pump in zero stroke)

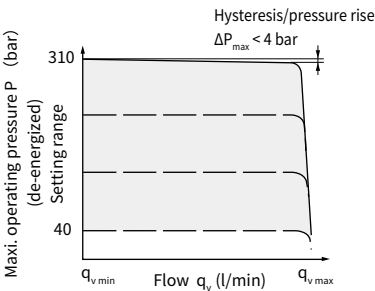


- Hysteresis static < 3 bar

Circuit diagram:



Flow-pressure characteristic curve



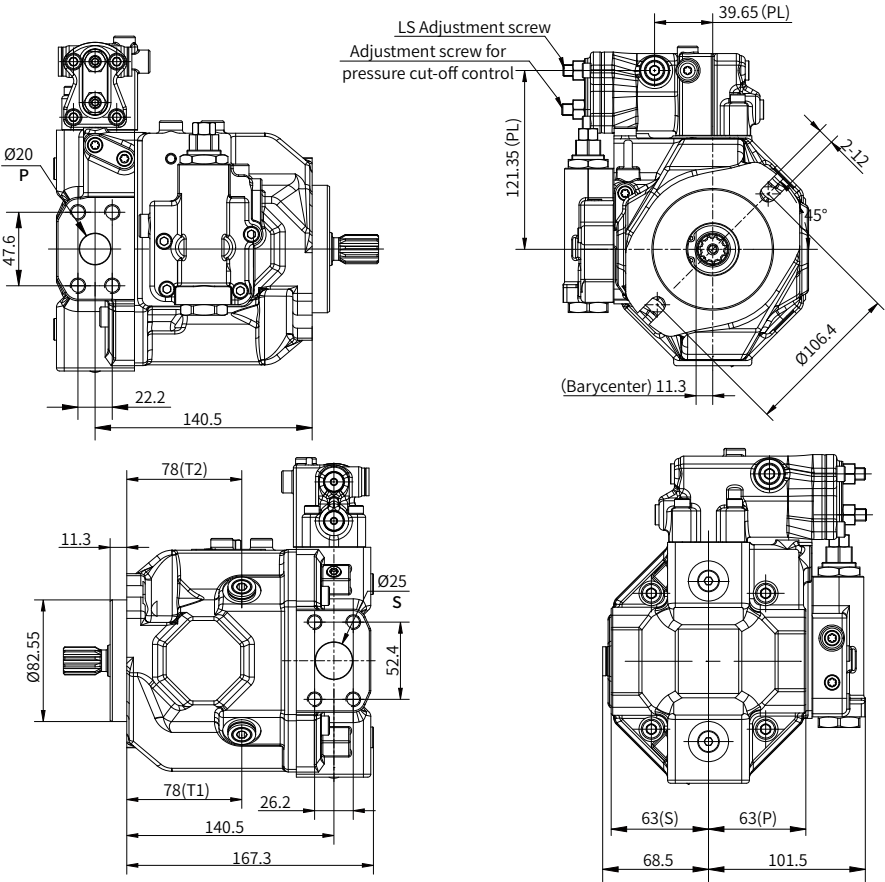
- Characteristic curves valid for  
n<sub>1</sub> = 1500 rpm and t<sub>fluid</sub> = 50 °C .

Electric proportional		
Voltage	12 V	24 V
Magnetic hysteresis at 200Hz PWM	5%	
Maximum current (A)	1.30	0.65
Electric resistance (Ω) @20° C	7.1 ± 3%	28.5 ± 5%
Inductance coefficient (mH)	160	560

Installation size

**HP6V18 installation size**

Displacement is adjustable  
HP6V18 with Cut-off/Load Sense Control with torque limit  
(Clockwise Rotation)  
For the CCW pump just reverse the inlet and outlet port.

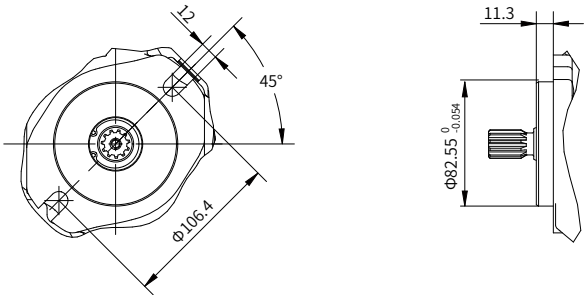


Port Details

	Port Name	Port Size and Description			Tightening Torque (N·m)
P	Working port	3/4"SAE J518C code 61 (5000psi)	M(metric)	M10×1.5 (depth 17mm)	57
S	Suction port	1"SAE J518C code 61 (3000psi)	M(metric)	M10×1.5 (depth 17mm)	57
T1、T2	Case drain port	ISO 6149 ( M14×1.5 )			45
PL	LS Control port	ISO 6149 ( M14×1.5 )			45

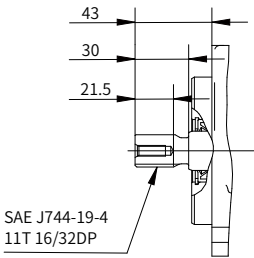
Installation size

HP6V18 Mounting Flange



SAE "A2" type

HP6V18 Input Shaft type



"S0" type spline shaft

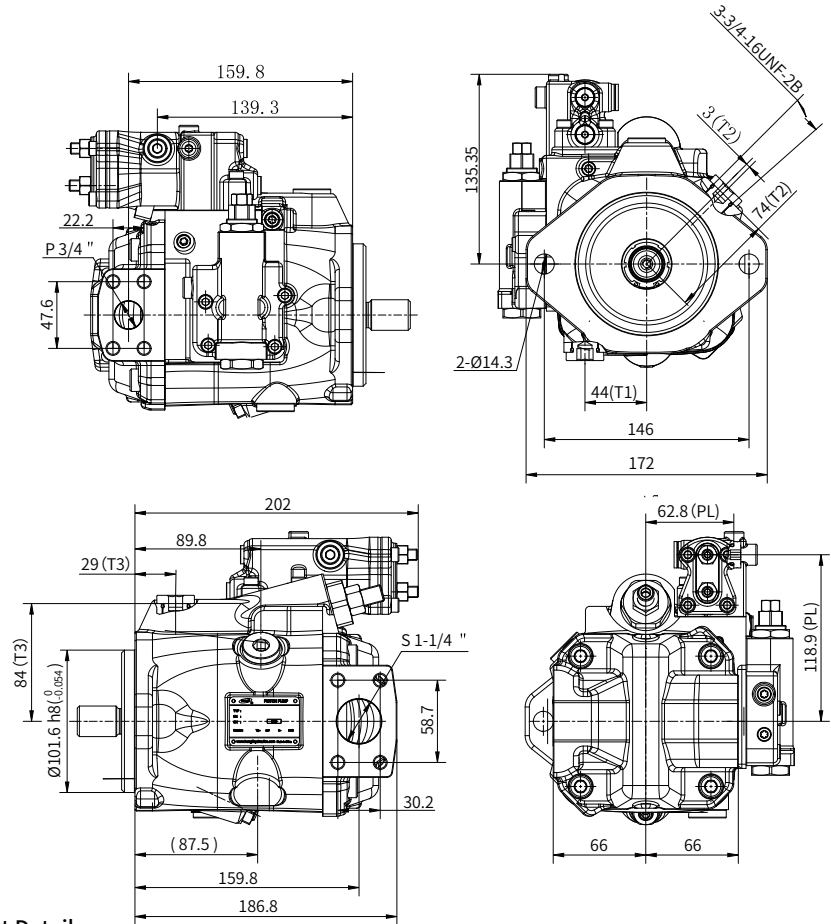
Installation size

HP6V28 installation size

Displacement is adjustable

HP6V28 with Cut-off/Load Sense Control with torque limit  
(Clockwise Rotation)

For the CCW pump just reverse the inlet and outlet port.

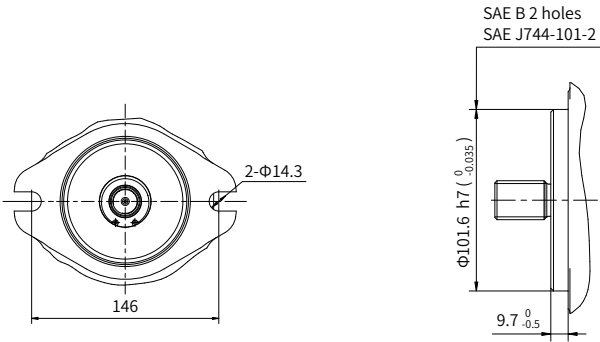


Port Details

	Port Name	Port Size and Description			Tightening Torque (N·m)
P	Working port	3/4"SAE J518C code 61 (5000psi)	M(metric)	M10×1.5 (depth 17mm)	57
S	Suction port	1-1/4"SAE J518C code 61 (3000psi)	M(metric)	M10×1.5 (depth 17mm)	57
T1、T2、T3	Case drain port	ISO 11926 ( 3/4"-16UNF-2B )			98
PL	LS Control port	ISO 11926 ( 7/16"-20UNF-2B )			12
Pr	Pilot port	ISO 11926 ( 7/16"-20UNF-2B )			12

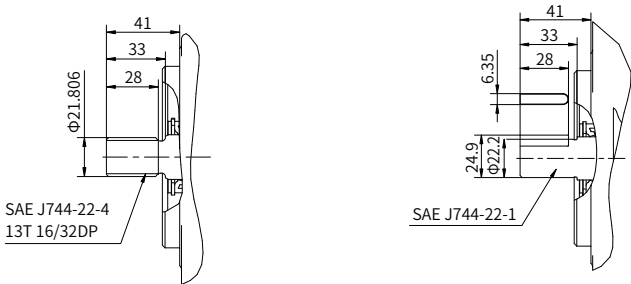
Installation size

HP6V28 Mounting Flange



SAE "B2" type

HP6V28 Input Shaft type



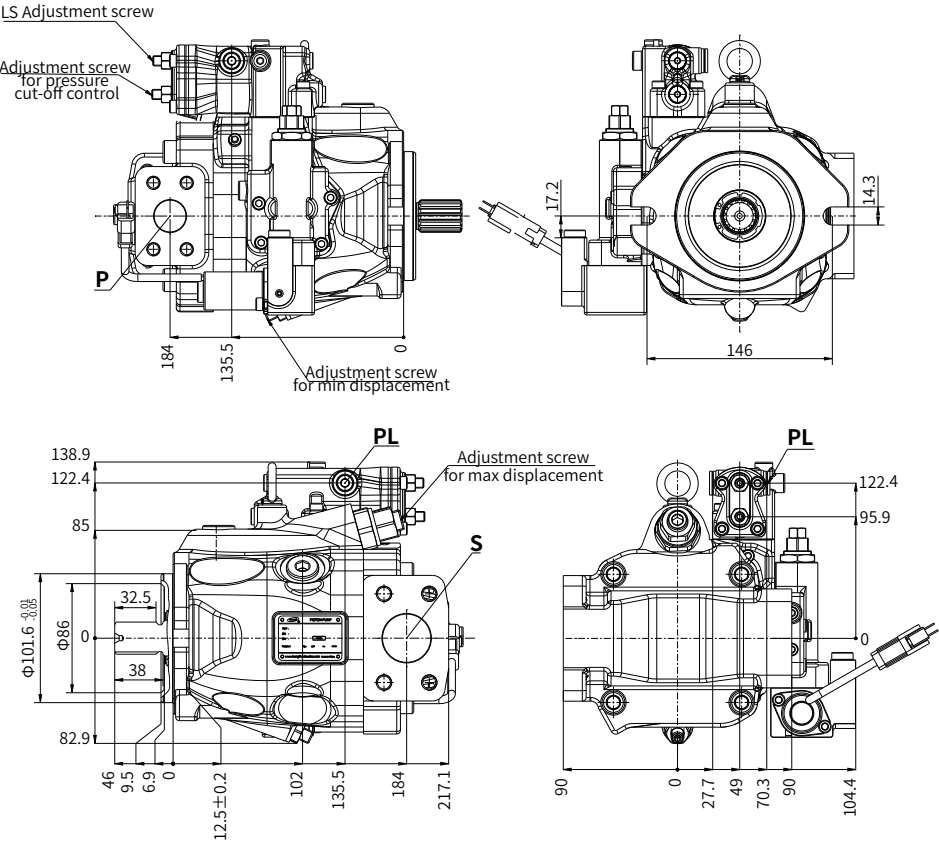
"S1" type spline shaft

"K1" type straight shaft

Installation size

**HP6V47 installation size**

Displacement is adjustable  
HP6V47 with Cut-off/Load Sense Control with torque limit  
(Clockwise Rotation)  
For the CCW pump just reverse the inlet and outlet port.

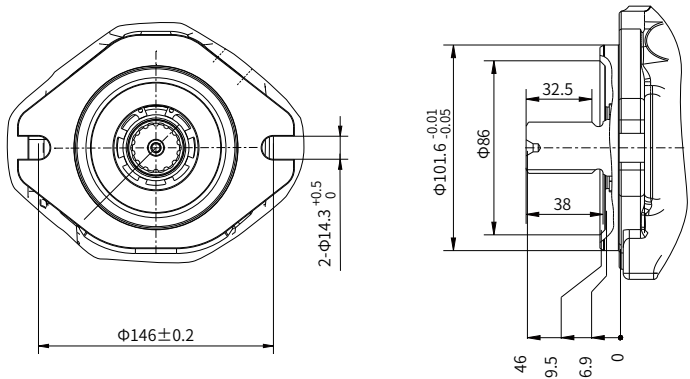


Port Details

	Port Name	Port Size and Description			Tightening Torque (N·m)
P	Working port	3/4"SAE J518C code 61 (5000psi)	M(metric)	M10×1.5 (depth 17mm)	57
S	Suction port	1-1/4"SAE J518C code 61 (3000psi)	M(metric)	M10×1.5 (depth 17mm)	57
T1、T2、T3	Case drain port	ISO 11926 ( 3/4"-16UNF-2B )			98
PL	LS Control port	ISO 11926 ( 7/16"-20UNF-2B )			12

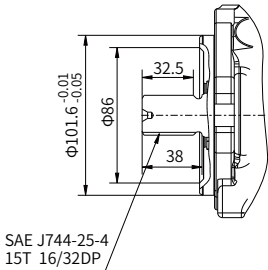
Installation size

HP6V47 Mounting Flange



SAE "B2" type

HP6V47 Input Shaft type



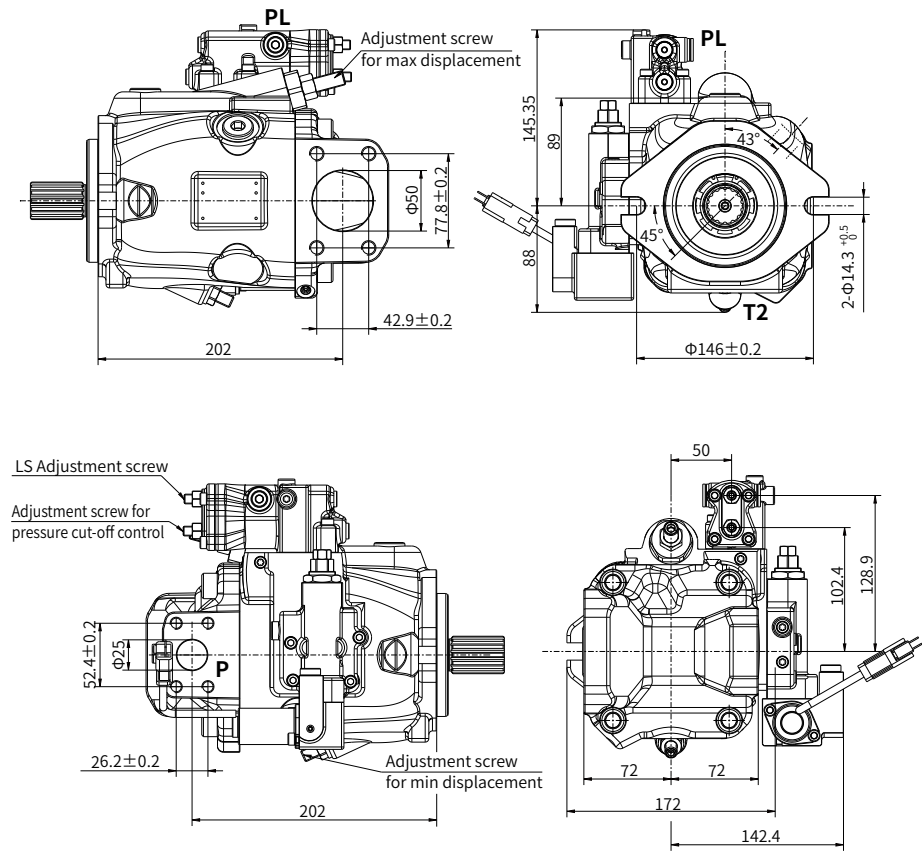
"S2" type spline shaft



Installation size

**HP6V65 installation size**

HP6V65 with Cut-off/Load Sense Control with torque limit  
(Clockwise Rotation)  
For the CCW pump just reverse the inlet and outlet port.

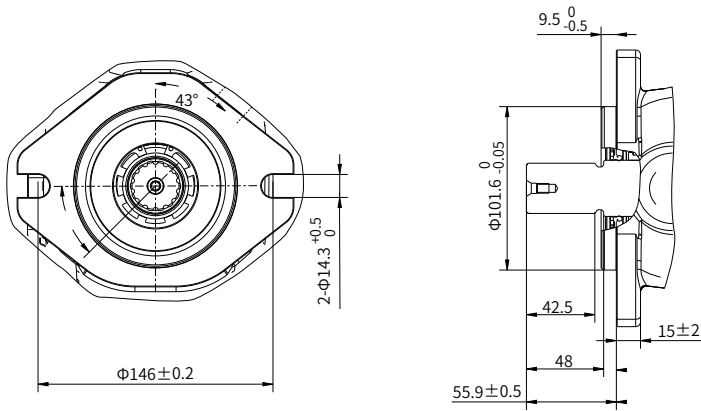


Port Details

	Port Name	Port Size and Description			Tightening Torque (N·m)
P	Working port	1" SAE J518C Code 61 (5000psi)	M (metric)	M10×1.5 (depth 17mm)	57
S	Suction Port	1-1/2" SAE J518C Code 61 (3000psi)	M (metric)	M12×1.75 (depth 20mm)	98
T1、T2	Case drain Port	ISO 11926 ( 7/8-14UNF-2B ) depth 13mm			120
PL	LS Control Port	ISO 11926 ( 7/16-20UNF-2B ) depth 11.5mm			12
Pr	Pilot port	ISO 11926 ( 7/16"-20UNF-2B )			12

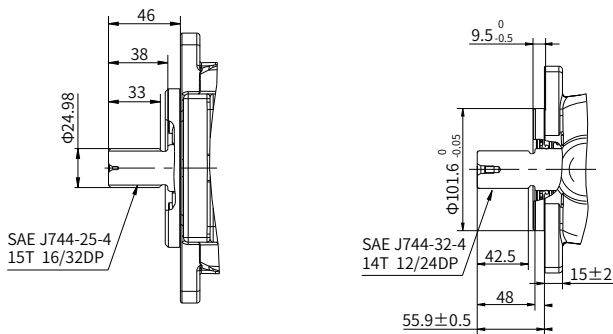
Installation size

HP6V65 Mounting Flange



SAE "B2" type

HP6V65 Input Shaft type



"S1" type spline shaft

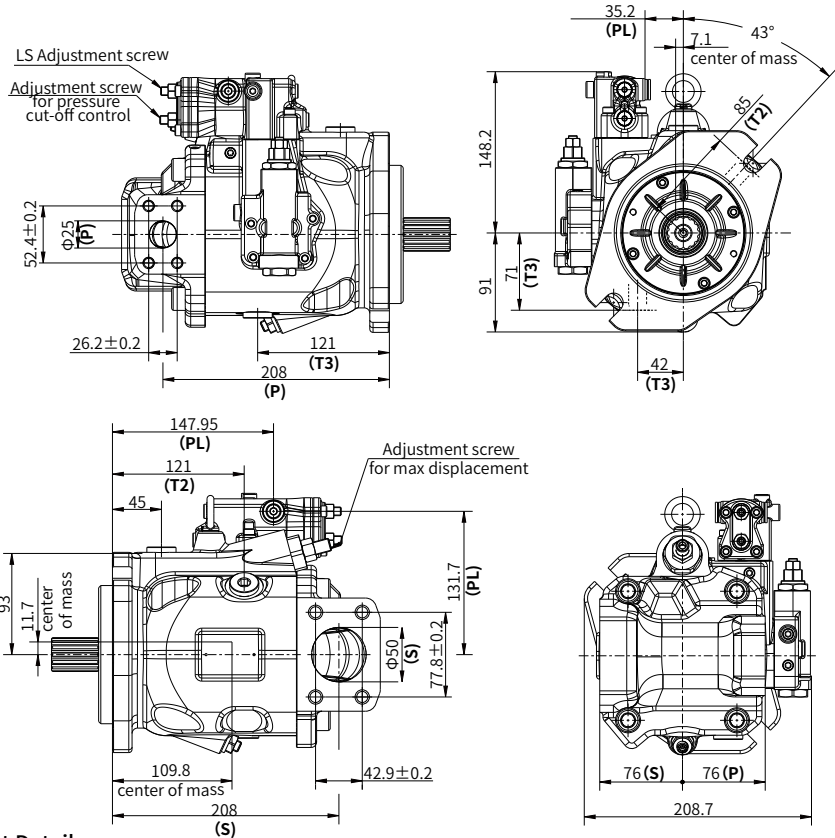
"S3" type spline shaft

Installation size

### HP6V76/85 installation size

HP6V76/85 with Cut-off/Load Sense Control with torque limit  
(Clockwise Rotation)

For the CCW pump just reverse the inlet and outlet port.

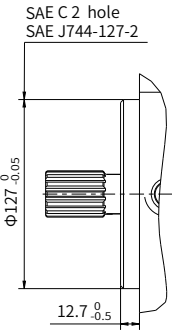
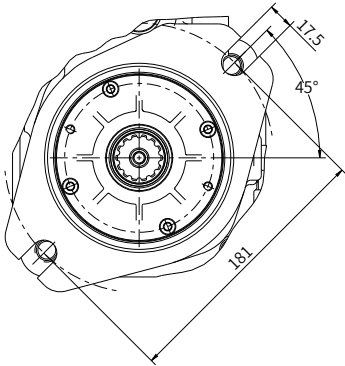


Port Details

Port Name		Port Size and Description			Tightening Torque (N-m)
P	Working port	1"SAE J518C Code 61 (5000psi)	M (metric)	M10×1.5 (depth 17mm)	57
S	Suction Port	2"SAE J518C Code 61 (3000psi)	M (metric)	M12X1.75 (depth 20mm)	98
T1、T2、T3	Case drain Port	SAE J1926/1 ( 3/4-16UNF-2B) (depth 16 mm)			98
PL	LS Control Port	SAE J1926/1 ( 7/16-20UNF-2B) (depth 11.5mm)			12
Pr	Electronic control or Hydraulic control pilot	SAE J1926/1 ( 7/16-20UNF-2B) depth 11.5mm			12

Installation size

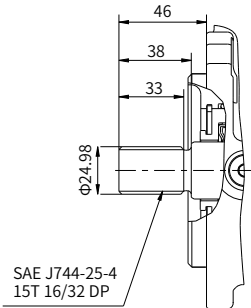
HP6V76/85 Mounting Flange



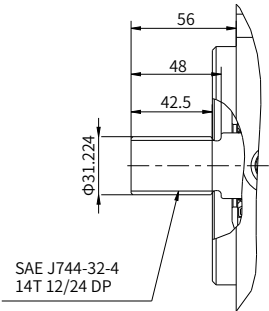
SAE "C2" type

Installation size

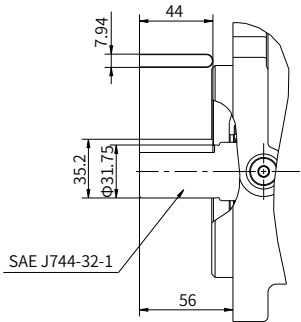
HP6V76/85 Input Shaft type



"S2" type spline shaft



"S3" type spline shaft

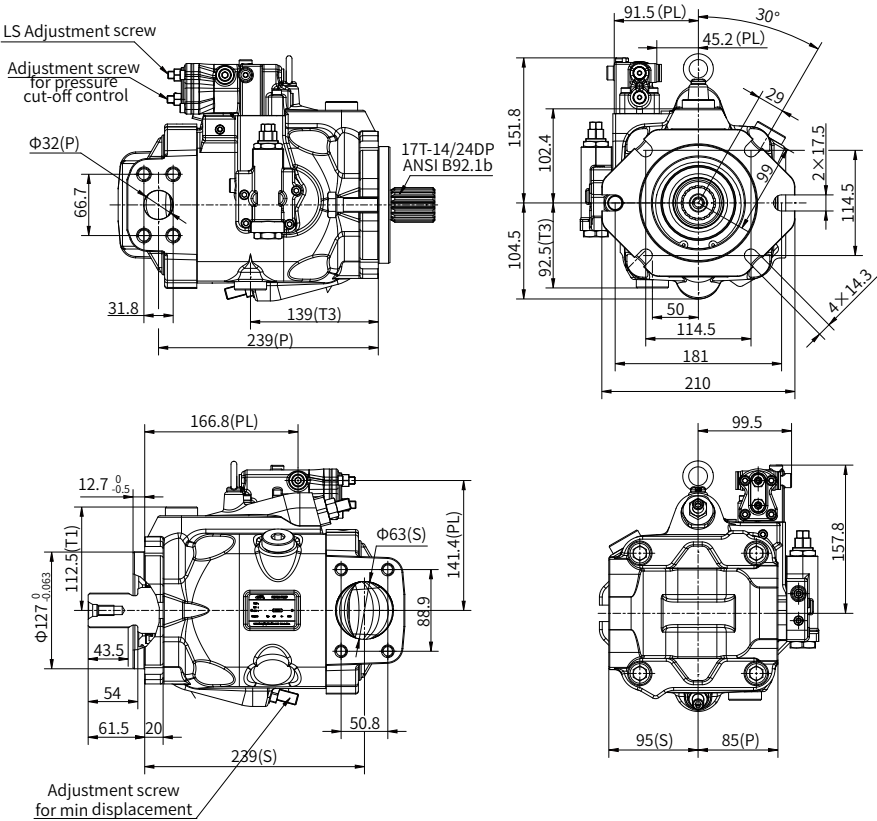


"K3" type straight shaft

Installation size

HP6V105 installation size

HP6V105 with Cut-off/Load Sense Control with torque limit  
(Clockwise Rotation)  
For the CCW pump just reverse the inlet and outlet port.

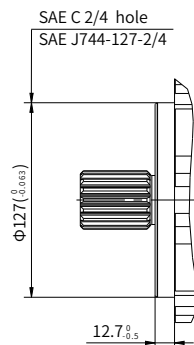
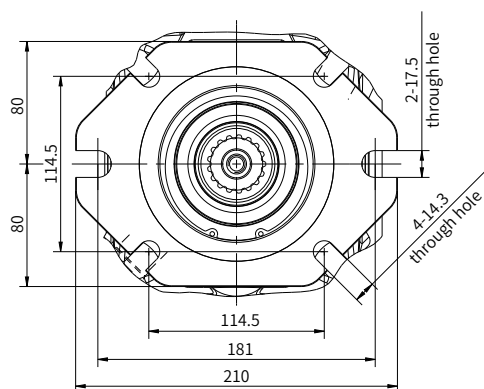


Port Details

	Port Name	Port Size and Description			Tightening Torque (N·m)
P	Working port	1 1/4"SAE J518C code 62 (5000psi)	M (metric)	M14×2 (depth 19mm)	157
			S(UNC)	1/2-13UNC-2B (depth 22mm)	
S	Suction Port	2 1/2"SAE J518C code 61 (2500psi)	M (metric)	M12×1.75 (depth 17mm)	98
			S(UNC)	1/2-13UNC-2B (depth 22mm)	
T1、T2、T3	Case drain port	SAE J1926/1 ( 1 1/16-12UN-2B depth 15mm)			167
PL	LS Control port	SAE J1926/1 ( 7/16-20UNF-2B depth 15mm)			12

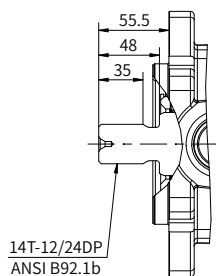
## Installation size

### HP6V105 Mounting Flange

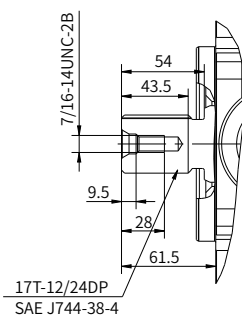


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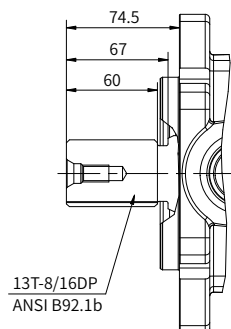
### HP6V105 Input Shaft type



"S3" type spline shaft



"S4" type spline shaft



"S5" type spline shaft

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