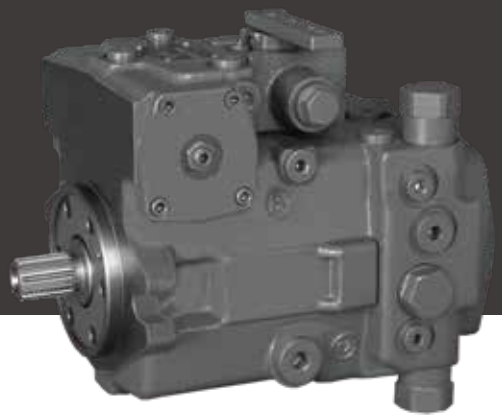
HYTEK

Axial Piston Variable Pump
HP4VC Series：0*

Closed circuits
Size：28/45/53 mL/r
Rated pressure：30 MPa
Max. pressure：35 MPa



Features

- Axial piston variable pump in swashplate design for hydrostatic drives in closed circuits
- The flow is proportional to the drive speed and displacement and is infinitely varied
- The output flow increases from zero to the maximum value as the swashplate swivels
- The flow direction changes when the swashplate is moved through the neutral position
- Various mutually compatible control options to provide diverse control and regulation functions
- Two pressure relief valves on each high-pressure side to prevent overload of hydrostatic drives (pump and motor)
- Pressure relief valve with boost function
- Integrated boost pump works as the boost and control pump
- Maximum boost pressure limited by integrated boost-pressure relief valve
- With integrated power cut-off valve as standard

Contents

Type Code

	A	B	D	E	F	H		J	K	M	N	P	R	S	T	U	V		Y
HP4VC							/	0*				C					P	—	

Axial piston unit

–	Swashplate design, variable, for closed circuits	HP4VC

Displacement

A	Geometric displacement, in mL/r	28	45	53	

Variable control

					28	45	53	
B	Hydraulic control	Pilot pressure control	Without inlet filtration		○	●	●	HD1
			With inlet filtration		●	●	●	HD3
		Mechanical servo			●	●	●	HW
			With neutral position switch		○	●	●	HWL
			With brake valve, NO	U=12V DC	○	●	●	HWO1
				U=24V DC	●	●	●	HWO2
			With brake valve, NC	U=12V DC	○	○	○	HWC1
				U=24V DC	○	●	●	HWC2
			With brake valve, NO &neutral position switch	U=12V DC	○	○	○	HWO1L
				U=24V DC	○	○	○	HWO2L
			With brake valve, NC &neutral position switch	U=12V DC	○	○	○	HWC1L
				U=24V DC	●	○	○	HWC2L
	Electric control	With proportional solenoid	Without inlet filtration	U=12V DC	●	●	●	EP1
				U=24V DC	●	●	●	EP2
			With inlet filtration	U=12V DC	●	●	●	EP3
				U=24V DC	●	●	●	EP4
		With switching solenoid	Without inlet filtration	U=12V DC	○	●	●	EZ1
				U=24V DC	○	●	●	EZ2
			With inlet filtration	U=12V DC	○	○	○	EZ3
				U=24V DC	○	○	○	EZ4

Pressure cut-off valve

		28	45	53	
D	Without pressure cut-off valve (without code)	●	●	●	
	With pressure cut-off valve(standard)	○	●	●	D

Stroke limiter

		28	45	53	
E	Without mechanical stroke limiter (without code)	●	●	●	
	With mechanical stroke limiter, externally adjustable	○	●	●	M

Type Code

	A	B	D	E	F	H		J	K	M	N	P	R	S	T	U	V		Y
HP4VC							/	0*				C					P	—	

Stroking chamber pressure port(X3/X4)

		28	45	53	
F	Without port X3/X4 (without code)	●	●	●	
	With port X3/X4	—	—	—	T

DA control valve

		28	45	53	
H	Without DA control valve	●	●	●	1
	With DA control valve	—	—	—	2

Series

		28	45	53	
J	Series 0*	●	●	●	0*

Direction of rotation (viewed on drive shaft)

		28	45	53	
K	CW (right-hand)	●	●	●	R
	CCW (left-hand)	●	●	●	L

Sealing material

		28	45	53	
M	Nitrile rubber (NBR) seal, shaft seal in fluoroelastomer (FKM)	●	●	●	N
	Nitrile rubber (NBR) seal, shaft seal in nitrile rubber (NBR)	●	●	●	P

Drive shaft

			28	45	53	
N	Splined shaft ANSI B92.1-1976					
	1″ 15T 16/32DP	For single pump	●	●	●	S
		With connecting flange	○	●	●	L
	1 1/4″ 14T 12/24DP	For the 1st pump of a combination pump	○	●	●	T

Mounting flange

		28	45	53	
P	SAE J744-101-2（B）(2*Φ15，Φ101.6h8，9.5)	●	●	●	C

Working ports (viewed on drive shaft)

		28	45	53	
R	Ports at same side				
	Suction port downwards, working port leftwards	●	●	●	10
	Suction port upwards, working port rightwards	○	○	○	13

Type Code

	A	B	D	E	F	H		J	K	M	N	P	R	S	T	U	V		Y
HP4VC							/	0*				C					P	—	

Boost pump and through drive

				28	45	53	
S	Integrated boost pump	Without through drive		●	●	●	F00
		Flange SAE J 744-82-2(A)	Hub for splined shaft 5/8″ 9T 16/32DP	●	●	●	F01
		Flange SAE J 744-101-2(B)	Hub for splined shaft 7/8″ 13T 16/32DP	●[1)]	●	●	F02
			Hub for splined shaft 1″ 15T 16/32DP	○	●	●	F04
	Without integrated boost pump	Without through drive		●	●	●	N00
		Flange SAE J 744-82-2(A)	Hub for splined shaft 5/8″ 9T 16/32DP	●	●	●	K01
		Flange SAE J 744-101-2(B)	Hub for splined shaft 7/8″ 13T 16/32DP	○	●	●	K02
			Hub for splined shaft 1″ 15T 16/32DP	○	●	●	K04

High-pressure relief valve

				28	45	53	
T	With high-pressure relief valve, direct operated, fixed setting	35-45MPa	Without bypass valve	—	●	—	2
		25-35MPa	Without bypass valve	●	●	●	3
		10-25MPa	Without bypass valve	●	●	●	4
		25-35MPa	With bypass valve	●	●	●	5
		10-25MPa	With bypass valve	●	●	●	6
		35-45MPa	With bypass valve	—	●	—	7

Filtration

		28	45	53	
U	External suction filter (not included in delivery, to be selected by customer)	●	●	●	S
	External pressure filter (not included in delivery, to be selected by customer)	●	●	●	D
	External fluid supply (optional, only for N00, K**)	●	●	●	E

Solenoid connector

		28	45	53	
V	DEUTSCH molded connector, 2-pin, without suppressor diode Connector model: Deutsch DT04-2p (for HWO/HWC/EP/EZ)	●	●	●	P

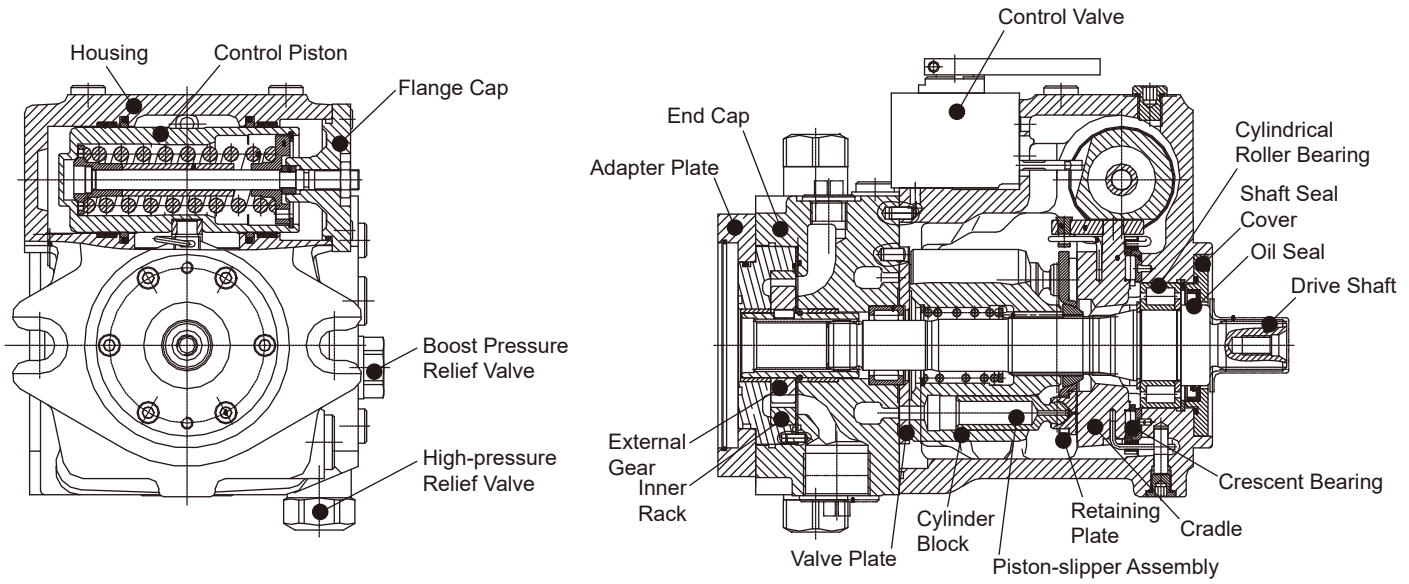
Special configuration

		28	45	53	
Y	Without special configuration(without code)	●	●	●	
	Special configuration	●	●	●	***

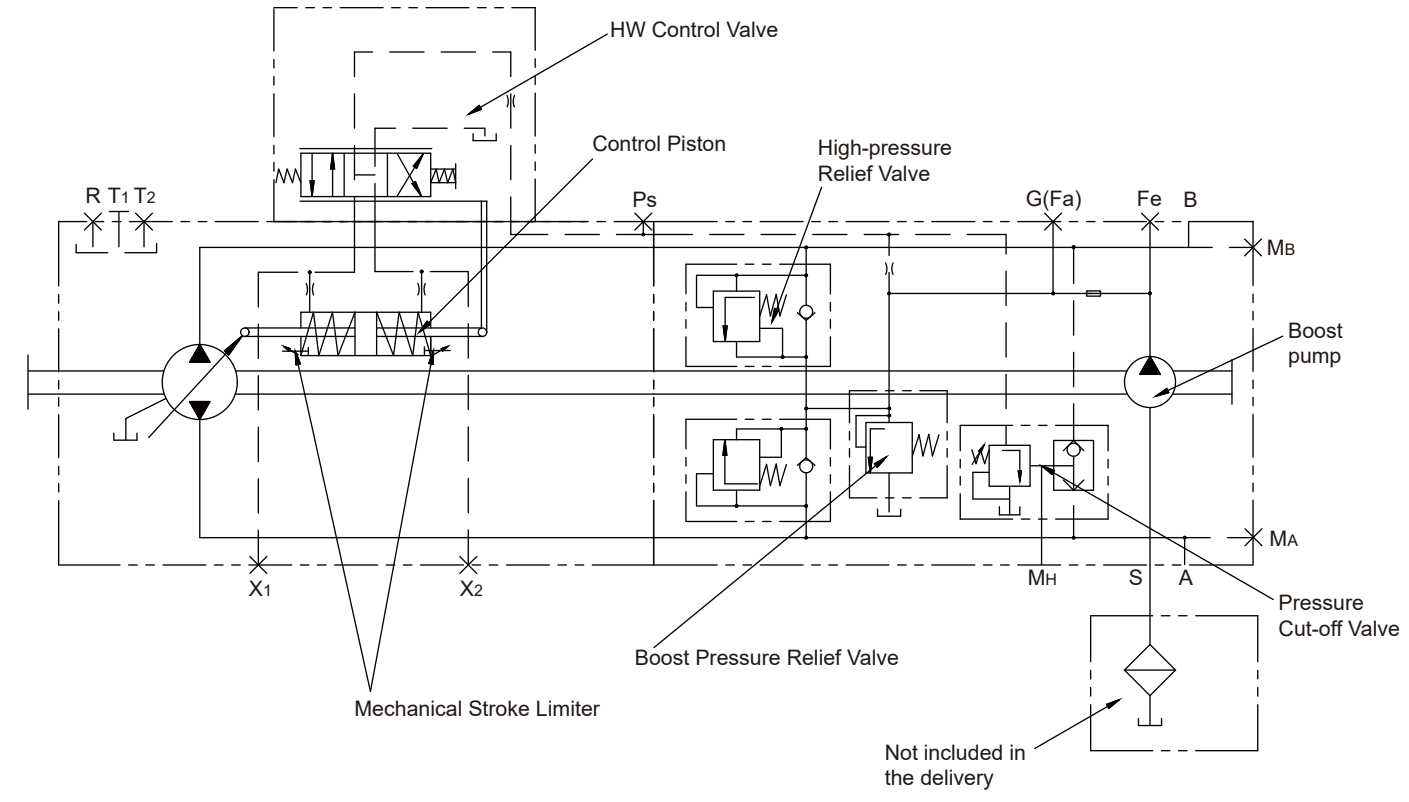
1) Splined shaft 7/8″13T 16/32DP Only used for 13.8mL/r Boost pump

Preferred program ● Available ○ On request — Not available

Product Structure



Hydraulic Schematic Diagram



Hydraulic Fluids

Mineral oil

Working Viscosity

In order for the optimum efficiency and service life, it is recommended to select the working viscosity at working temperature within the range below:

V_{opt}= optimal working viscosity 16...36 mm^2/s

It is subject to the temperature of a closed circuit.

Limit Viscosity

Limit viscosity：

V_{min}=5mm^2/s

Short-term operation(t＜3min)

Permissible maximum temperature t_{max}=+115℃

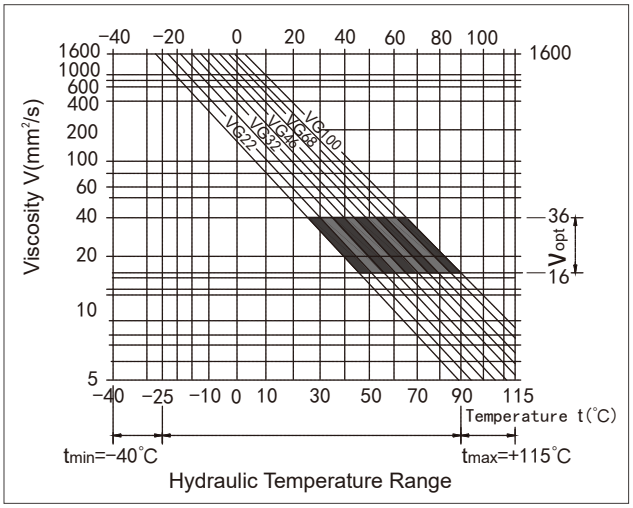
V_{max}=1600mm^2/s

Short-term operation(t＜3min)

Cold start(p≤3Mpa，n≤1000rpm，t_{min}=-40℃)

Only for no-load start, it must reach the optimum working temperature in 15 min.

Selection Diagram



Instructions on Selection of Hydraulic Fluid

The working temperature dependent on the ambient temperature is required for correct selection of hydraulic fluid. It refers to the circuit temperature of a closed circuit and the reservoir temperature of an open circuit.

The hydraulic fluid should be so selected that the working viscosity in the working range is within the optimum range (V_{opt} ,the shaded area on the selection diagram). The higher viscosity is recommended under the same conditions.

For example:

At an ambient temperature of X ℃, the working temperature of the circuit is 60 ℃. The viscosity within the optimum range (V_{opt} ,shaded area) is VG46 or VG68 and the latter should be selected.

Note:

The case drain temperature depends on the pressure and speed, and it is always higher than the circuit temperature. The temperature at any point within the system should not exceed +115 ℃. Please contact us if the above condition cannot be maintained due to extreme working conditions.

Filtration

Finer filtration improves the cleanliness level of the hydraulic fluid, thus increasing the service life of the axial piston unit. To ensure normal operation of the axial piston unit, a cleanliness level of at least 20/18/15 according to ISO 4406 is to be maintained.

Based on the system and application, we recommend for HP4VC:

filter element $\beta_{20} \geq 100$

β should not decrease as differential pressure of the filter element increases.

When the hydraulic fluid has a high temperature (+90 ℃ to +115 ℃), the cleanliness level should at least reach 19/17/14 according to ISO 4406.

Please contact us if the above cleanliness level cannot be maintained.

Working Pressure Range

Input

Variable pump (with external fluid supply,E)：

For EP, HW and HD controllers

Boost pressure(n=2000rpm)P_{sp} =1.8MPa

For DG controller

Boost pressure(n=2000rpm)P_{sp} =2.5MPa

Boost pump

Suction pressure $P_{s\,min}$(V≤30mm^2/s) ≥0.08MPa

At short-term cold start(t＜3min) ≥0.05MPa

Output

Variable pump：

Pressure at port A or B

Rated pressure P_{NX} 35MPa

Max. pressure P_{max} 40MPa

Total pressure(A+B)P_{max} 60MPa

Boost pump

Max. pressure $P_{sp\,max}$ 4MPa

Oil Seal

Permissible pressure load

The service life of the shaft seal depends on the pump speed and case drain pressure. It is recommended that the average lasting case drain pressure at working temperature is no greater than 0.3MPa absolute pressure (as the speed falls, the maximum permissible case drain pressure is 0.6MPa) and the short-term (t < 0.1s) permissible absolute pressure peak may reach 1MPa.

The service life of the shaft seal decreases with increasing frequency of pressure peaks.

The case pressure must be equal to or greater than the external pressure at the shaft seal.

Temperature range

The FKM shaft seal may be used for case temperatures from -25 ℃ to +115 ℃.

The NBR shaft seal may be used for case temperatures from -40 ℃ to +90 ℃.

Technical Data

Size			Unit	28	45	53
Displacement	Variable pump	$V_{g\,max}$	mL/r	29	45	52
	Boost pump(△p=2MPa)[1]	$V_{g\,SP}$	mL/r	5. 8	8. 6	8. 6
	Large displacement Boost pump(△p=2MPa)	$V_{g\,SP}$	mL/r	13. 8	13. 8	13. 8
Speed	Maximum speed at $V_{g\,max}$	$n_{max\ cont}$	rpm	3900	3300	3300
	Limit maximum[2]	$n_{min\ limit}$	rpm	4200	3550	3550
	Intermittent maximum[3]	$n_{max\ interm}$	rpm	4500	3800	3800
	Minimum	n_{min}	rpm	500	500	500
Flow	At $n_{max\ cont}$ and $V_{g\,max}$	$q_{v\,max}$	L/min	113	149	172
Power[4]	At $n_{max\ cont}$ and $V_{g\,max}$, △p=30MPa	P_{max}	KW	57	75	86
Torque[5]	At $V_{g\,max}$, △p=30MPa	T_{max}	Nm	139	215	248
	At $V_{g\,max}$, △p=10MPa	T	Nm	46	72	83
Moment of inertia of drive shaft		J	Kgm^2	0. 0017	0. 0033	0. 0042
Max. angular acceleration[4]			rad/s^2	5500	4000	3500
Case volume		V	L	0. 64	0. 75	0. 75
Weight (without through drive)		m	KG	25	27	29

1) Factory default
2) Power at half corner power (e.g. at $V_{g\,max}$ and $P_n/2$)
3) At high-speed no-load operation; at overspeed, Δp =7-15MPa and $V_{g\,max}$; at reverse peak load, Δp<30MPa, t<0.1s
4) Without boost pump
5) Only valid for a single pump

Specification Calculation

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

Torque $T = \frac{V_g \cdot \Delta p}{2 \cdot \pi \cdot \eta_{mh}}$ [Nm]

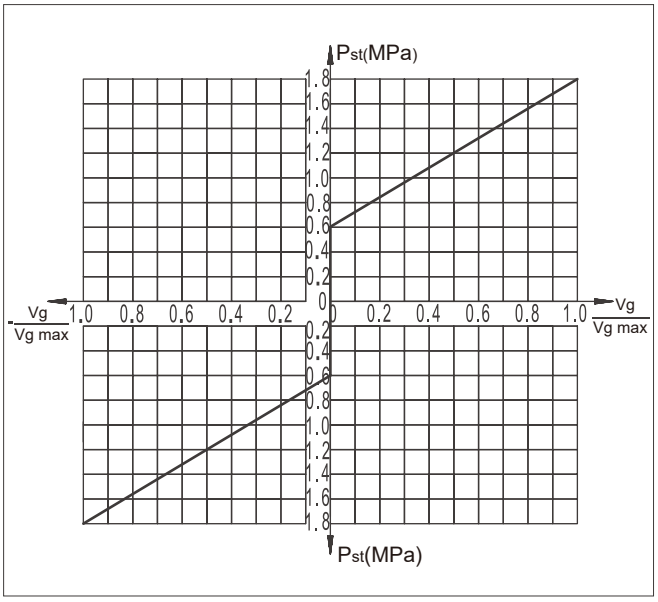
Power $P = \frac{2\pi \cdot T \cdot n}{60000} = \frac{q_v \cdot \Delta p}{60 \cdot \eta_t}$ [KW]

V_g = Displacement,mL/r
Δp = Differential pressure,MPa
n = Speed,rpm
η_v = Volumetric efficiency
η_{mh} = Mechanical-hydraulic efficiency
η_t = Total efficiency

HD - Pilot Pressure Control

Dependent on the difference between the pilot pressure P_{st} (at ports Y_1 and Y_2) of two control lines, the variable cylinder of the pump obtains control pressure via the HD controller so that the swashplate moves to infinitely adjust the displacement. Each control line corresponds to one flow direction.

HD1：without inlet filter
HD3：with inlet filter (standard)



V_g Displacement at P_{St-}=0.6MPa

$V_{g\,max}$ Displacement at P_{St}=1.67MPa

Pilot pressure at port Y_1 and Y_2 P_{St-}=0.6-1.67MPa

Start of control 0.6MPa

End of control 1.67MPa（maximum displacement $V_{g\,max}$）

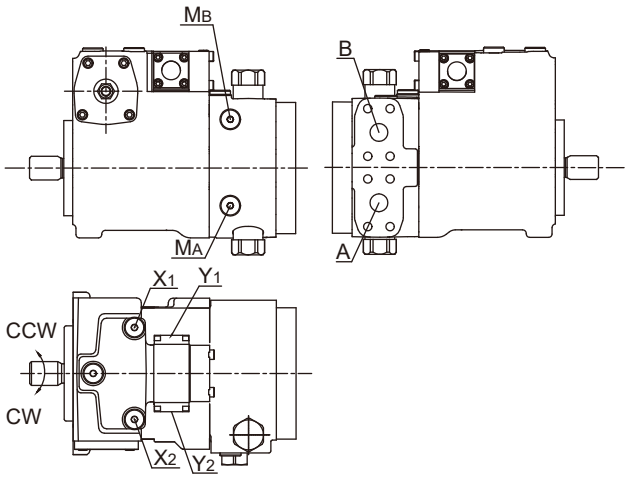
Note:
The HD controller must be unloaded to the neutral position with the external pilot control device on the reservoir.

Thread, control port	
14x1.5-6H	ED seal
9/16-18UNF-2B	ED seal
9/16-18UNF-2B	Corner seal

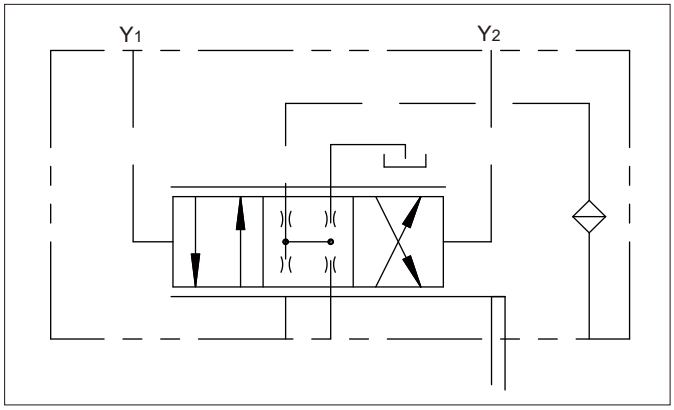
The spring at the center of the pilot control device is not a safety device.
The spool may get stuck at any position due to contamination of the control device, such as hydraulic fluid pollutant, wear debris and foreign matters in the system, etc.
In this case, the pump flow no longer observes the operator's instructions.
- Make sure the driven device can promptly reach a safety state (e.g. stop) with the emergency stop module.
- Always observe the cleanliness level according to ISO 4406: 20/18/15 (< 90 ˚C) or 19/17/14 (> 90 ˚C)

Correlation of Direction of rotation, Control and Flow direction

Direction of rotation (viewed on drive shaft)				
	Pilot Pressure	Control Pressure	Flow Direction	Working Pressure
CW	Y_1	X_1	A to B	M_B
	Y_2	X_2	B to A	M_A
CCW	Y_1	X_1	B to A	M_A
	Y_2	X_2	A to B	M_B

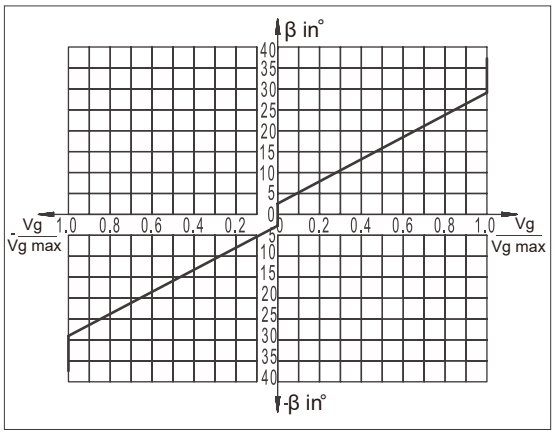


Hydraulic schematic diagram,HD3



HW - Mechanical Servo Control

Dependent on the moving direction a or b of the control lever, the variable cylinder of the pump obtains control pressure via the HW controller so that the swashplate moves to infinitely adjust the displacement. Each moving direction of the control lever corresponds to one flow direction.



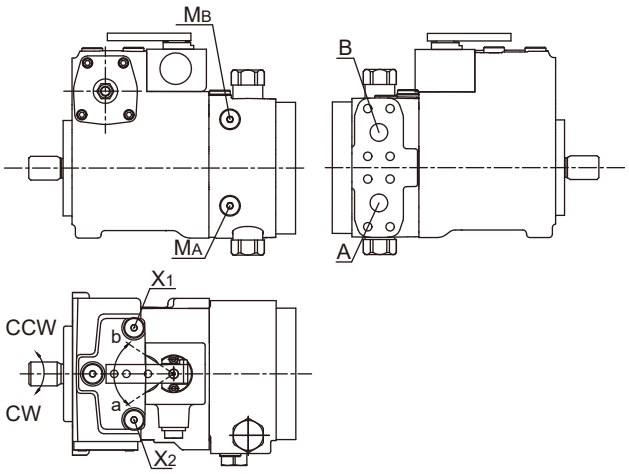
Swivel angle β of control lever：
Start of control β=3°
End of control β=29°(maximum displacement $V_{g\,max}$)
Mechanical limit：±40°

The maximum required torque at the control lever is 170 Ncm.
The rotation of HW control lever must be limited with an external position sensor (set point device).

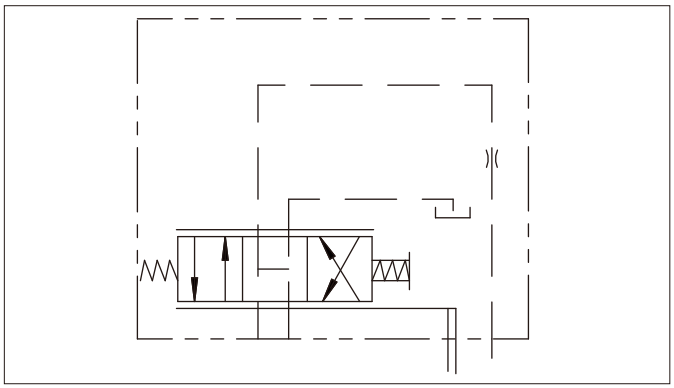
Note:
When there is no torque on the HW control lever, spring centering enables the pump to move automatically to the neutral position (V_g = 0) (independent of swivel angle).

Correlation of Direction of rotation, Control and Flow direction

Direction of rotation (viewed on drive shaft)				
	Pilot Pressure	Control Pressure	Flow Direction	Working Pressure
CW	a	X_2	B to A	M_A
	b	X_1	A to B	M_B
CCW	a	X_2	A to B	M_B
	b	X_1	B to A	M_A



Hydraulic schematic diagram,HW



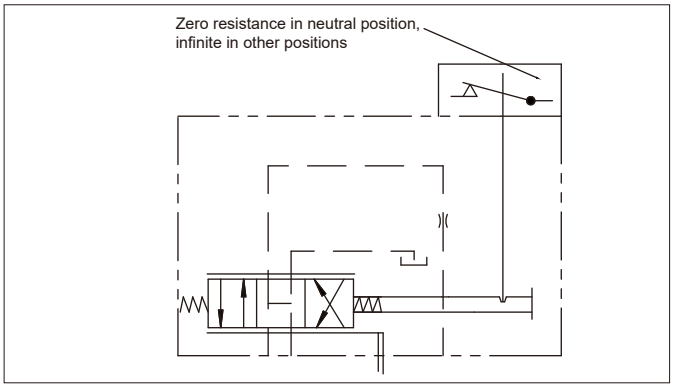
HW - Mechanical Servo Control

Variant I:With Neutral Position Switch, HWL

The neutral position switch is closed when the control lever on the HW control valve is in its neutral position. The switch opens when the control lever is moved out of the neutral position in either direction. The neutral position switch protects the systems that required zero flow under certain working conditions, such as starting the engine.

Technical data, neutral position switch	
Switching capacity	5A/12V&3A/24V
Type of connector	AMP DJ7021-1.8-20

Hydraulic schematic diagram,HWL

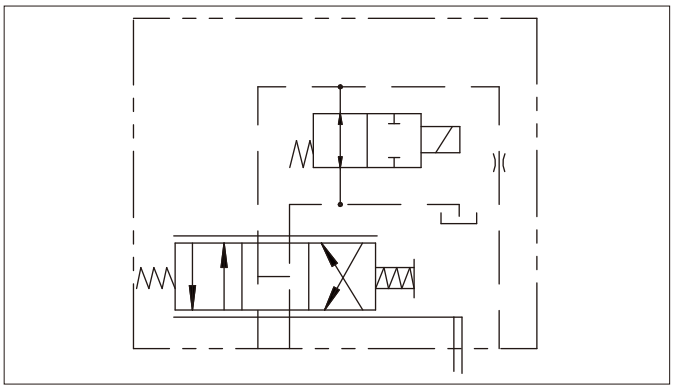


Variant II:ith Brake Valve Switch,HWO/HWC

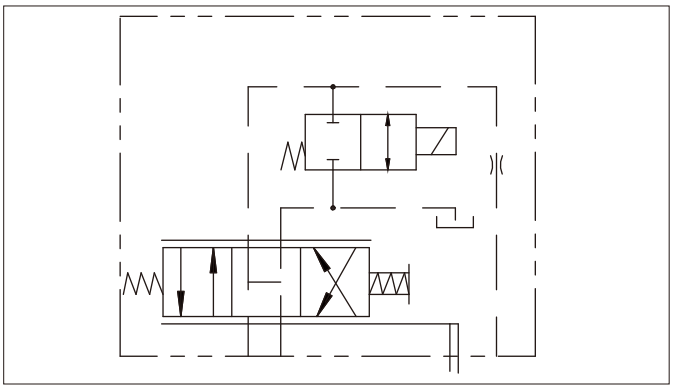
HWO：
with normally open brake valve; brake valve actuated when de-energized
HWC：
with normally closed brake valve; brake valve actuated when energized

Technical data, solenoid	HWO(C)1	HWO(C)2
Voltage	12V DC±1.8V	24V DC±3.6V
Nominal resistance(20℃)	9Ω	36Ω
Rated power	18W	18W
Minimum required current	1.5A	0.75
Type of connector	DEUTSCH DT04-2P	
Duty cycle	100%	
Type of protection	IP67	

Hydraulic schematic diagram,HWO
With NO Brake Valve

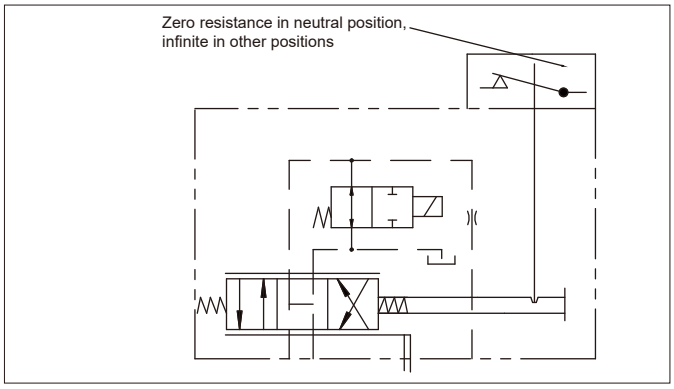


Hydraulic schematic diagram,HWC
With NC Brake Valve

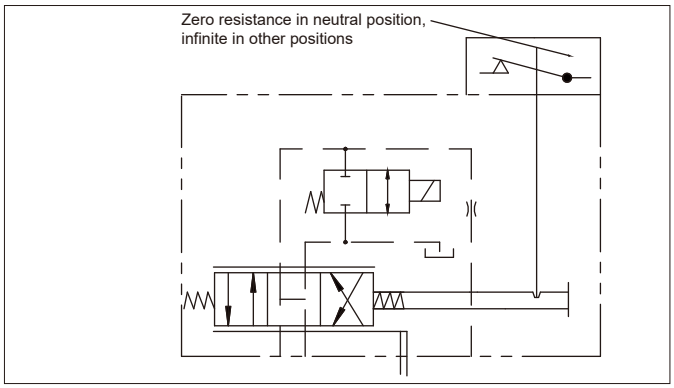


Variant III:With Brake Valve & Neutral Position Switch, HWOL/HWCL

Hydraulic schematic diagram,HWOL
With NO Brake Valve & Neutral Position Switch



Hydraulic schematic diagram,HWCL
With NO Brake Valve & Neutral Position Switch

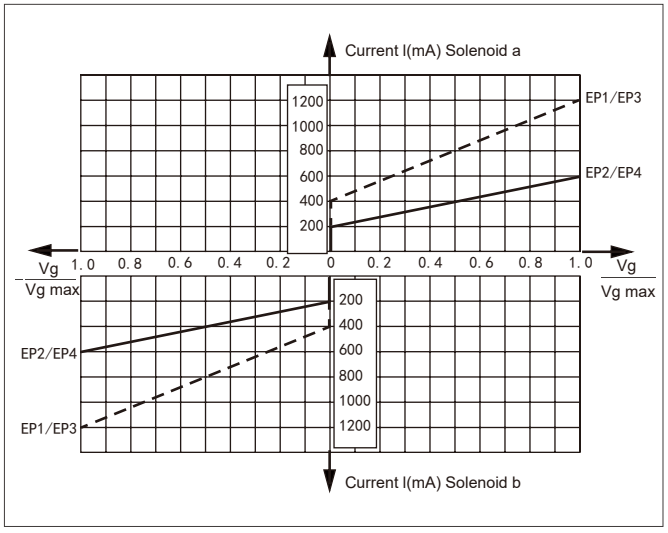


EP - Electric Control with Proportional Solenoid

Dependent on the preset current I of the two proportional solenoids (a and b), the variable cylinder of the pump obtains control pressure via the EP controller so that the swashplate moves to infinitely adjust the displacement. Each proportional solenoid corresponds to one flow direction.

Technical data, solenoid	EP1/EP3	EP2/EP4
Voltage	12V DC±20%	24V DC±20%
Start of control V_{g0}	400mA	200mA
End of control $V_{g\,max}$	1200mA	600mA
Current limit	1.54A	0.77A
Nominal resistance (20℃)	5.5Ω	22.7Ω
Dither frequency	100Hz	
Type of connector	DEUTSCH DT04-2P	
Duty cycle	100%	
Type of protection	IP67	

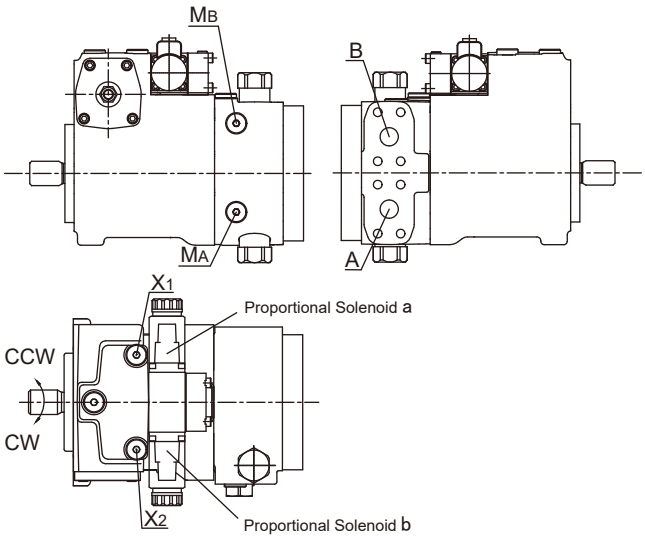
EP1\EP2：without inlet filter (Not for new projects!)
EP3\EP4：with inlet filter (standard)



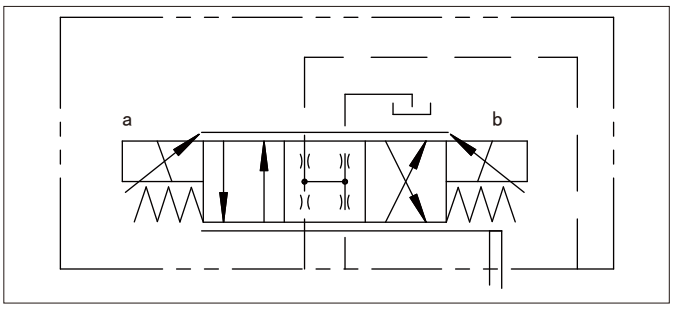
Note:
The spring at the center of the pilot control device is not a safety device. The spool may get stuck at any position due to contamination of the control device, such as hydraulic fluid pollutant, wear debris and foreign matters in the system, etc.
In this case, the pump flow no longer observes the operator's instructions.
- Make sure the driven device can promptly reach a safety state (e.g. stop) with the emergency stop module.
- Always observe the cleanliness level according to ISO 4406: 20/18/15 (< 90 ℃) or 19/17/14 (> 90 ℃)

Correlation of Direction of rotation, Control and Flow direction

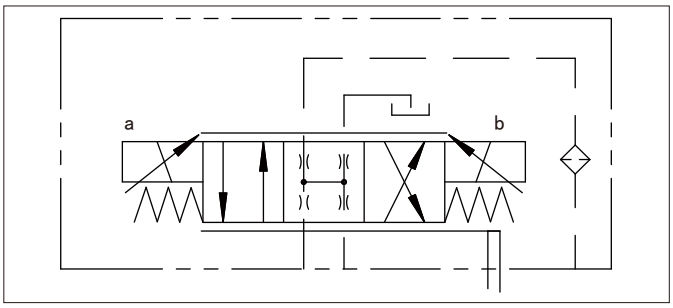
Direction of rotation (viewed on drive shaft)				
	Proportional Solenoid	Control Pressure	Flow Direction	Working Pressure
CW	a	X_1	A to B	M_B
	b	X_2	B to A	M_A
CCW	a	X_1	B to A	M_A
	b	X_2	A to B	M_B



Hydraulic schematic diagram,EP1/2



Hydraulic schematic diagram,EP3/4



EZ - Electric Control with Switching Solenoid

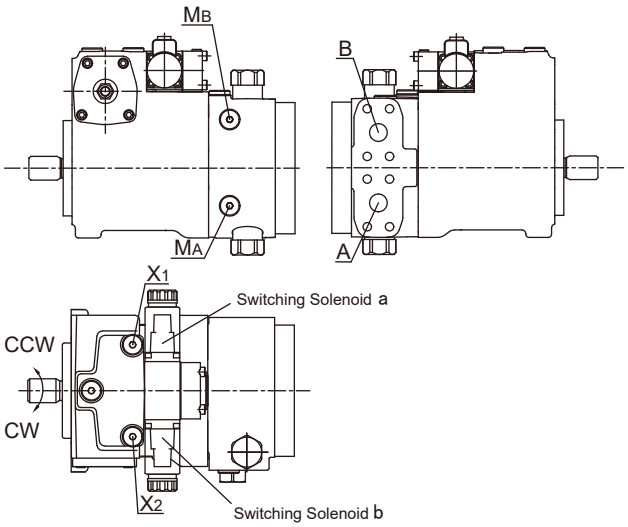
By switching on or off the switching solenoid a or b, the control cylinder of the pump obtains control pressure via the EZ controller so that the swashplate realizes adjustment between V_g=0 and $V_{g\ max}$.
Each solenoid corresponds to one flow direction.

Technical data, solenoid	EZ1/3	EZ2/4
Voltage	12V DC(±20%)	24V DC(±20%)
Neutral position V_g=0	断电	断电
Position $V_{g\ max}$	通电	通电
Nominal resistance(20°C)	5.5Ω	21.7Ω
Rated power	26.2W	26.5W
Minimum required current	1.32A	0.67A
Type of connector	DEUTSCH DT04-2P	
Duty cycle	100%	
Type of protection	IP67	

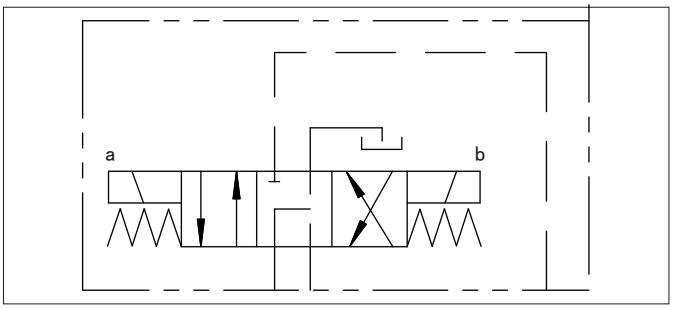
Standard: switching solenoid without manual emergency control.
The manual emergency control realized by returning spring may be provided as required.

Correlation of Direction of rotation, Control and Flow direction

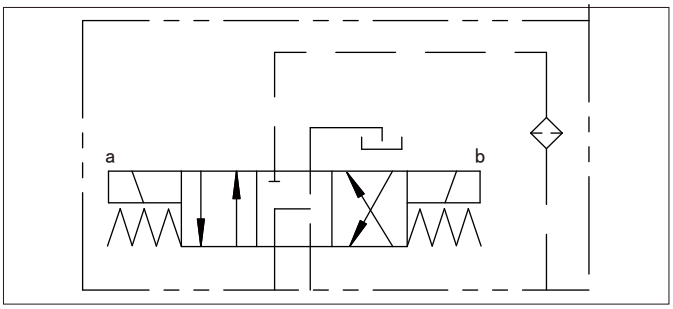
Direction of rotation (viewed on drive shaft)				
	Proportional Solenoid	Control Pressure	Flow Direction	Working Pressure
CW	a	X_2	B to A	M_A
	b	X_1	A to B	M_B
CCW	a	X_2	A to B	M_B
	b	X_1	B to A	M_A



Hydraulic schematic diagram,EZ1/2



Hydraulic schematic diagram,EZ3/4



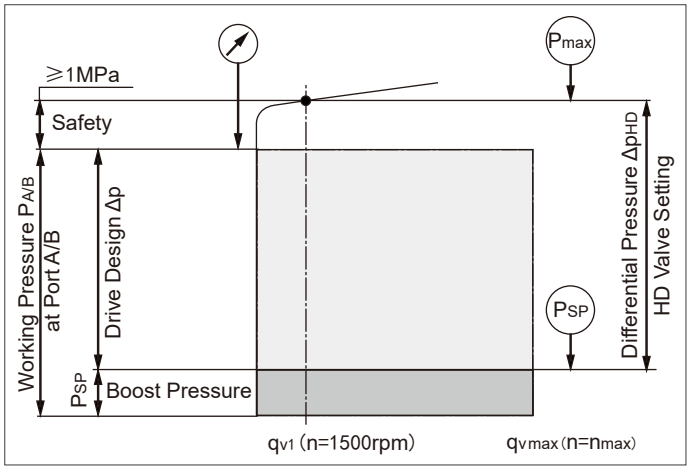
High-pressure Relief Valve

Setting range

High-pressure relief valve, direct operated (size 28/45/53)	Differential pressure setting Δp_{HP}
Setting range valve 2 Δp=35−45MPa	36MPa
	38MPa
	40MPa
	42MPa
	44MPa
Setting range valve 3 Δp=25−35MPa	26MPa
	28MPa
	30MPa
	32MPa
	34MPa
Setting range valve 4 Δp=10−25MPa	10MPa
	12MPa
	14MPa
	16MPa
	18MPa
	20MPa
	22MPa
	24MPa
Setting range valve 5 Δp=25−35MPa	26MPa
	28MPa
	30MPa
	32MPa
	34MPa
Setting range valve 6 Δp=10−25MPa	10MPa
	12MPa
	14MPa
	16MPa
	18MPa
	20MPa
	22MPa
	24MPa
Setting range valve 7 Δp=35−45MPa	36MPa
	38MPa
	40MPa
	42MPa
	44MPa

Standard differential pressure setting.
Values when no special remarks are made when ordering.

Pressure setting diagram



Note: The high-pressure relief valve is set at n =1500rpm and $V_{g\,max}$ (q_{v1}).
Hint: boost pressure 2MPa, working pressure 29MPa
Working pressure $P_{A/B}$ - Pressure P_{SD}
= differential pressure $\triangle p_{HP}$ (29-2=27MPa)

Bypass function

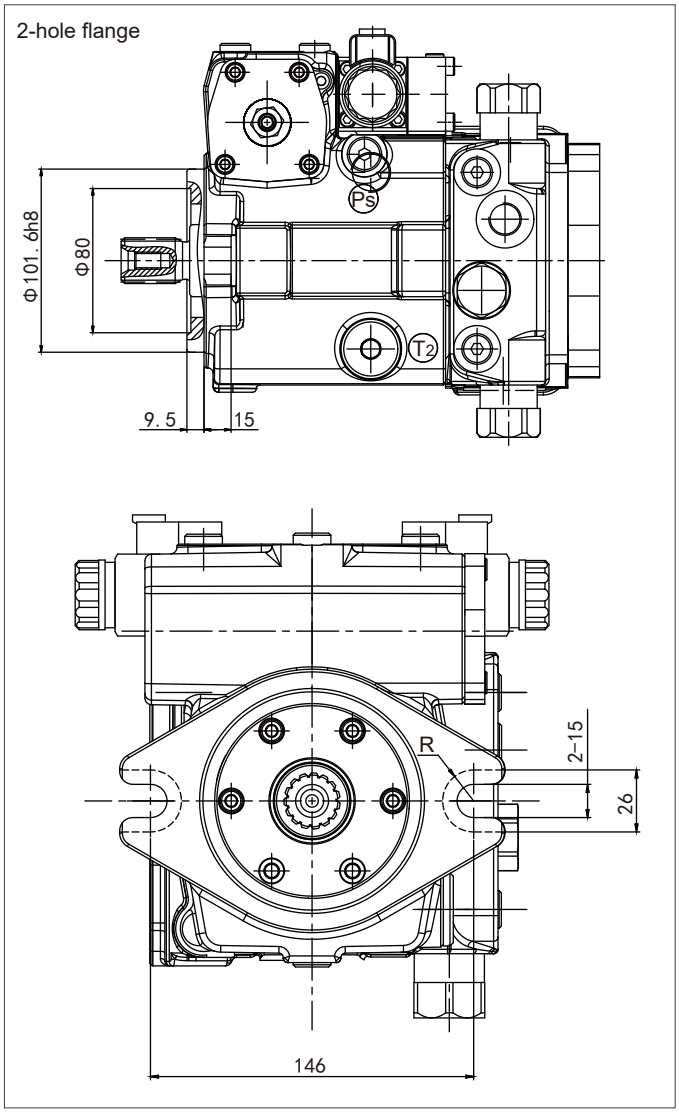
Valves 5/6/7 have the bypass function,The bypass function is only intended for short-term operation at reduced displacement, for example to tow a vehicle out of a danger zone.

Pressure Cut-off Valve，D

The pressure cut-off is a pressure control which adjusts the displacement of the pump to $V_{g\,min}$ after the set pressure is reached.
The pressure cut-off valve prevents the operation of the high-pressure relief valve during acceleration or deceleration.
The high-pressure relief valve protects against pressures occurring during fast swiveling of the swashplate and maximum pressure in the system.
The setting range of the pressure cut-off valve may be anywhere within the entire working pressure range.
However, the range must be set 3 MPa lower than the setting of the high-pressure relief valve.

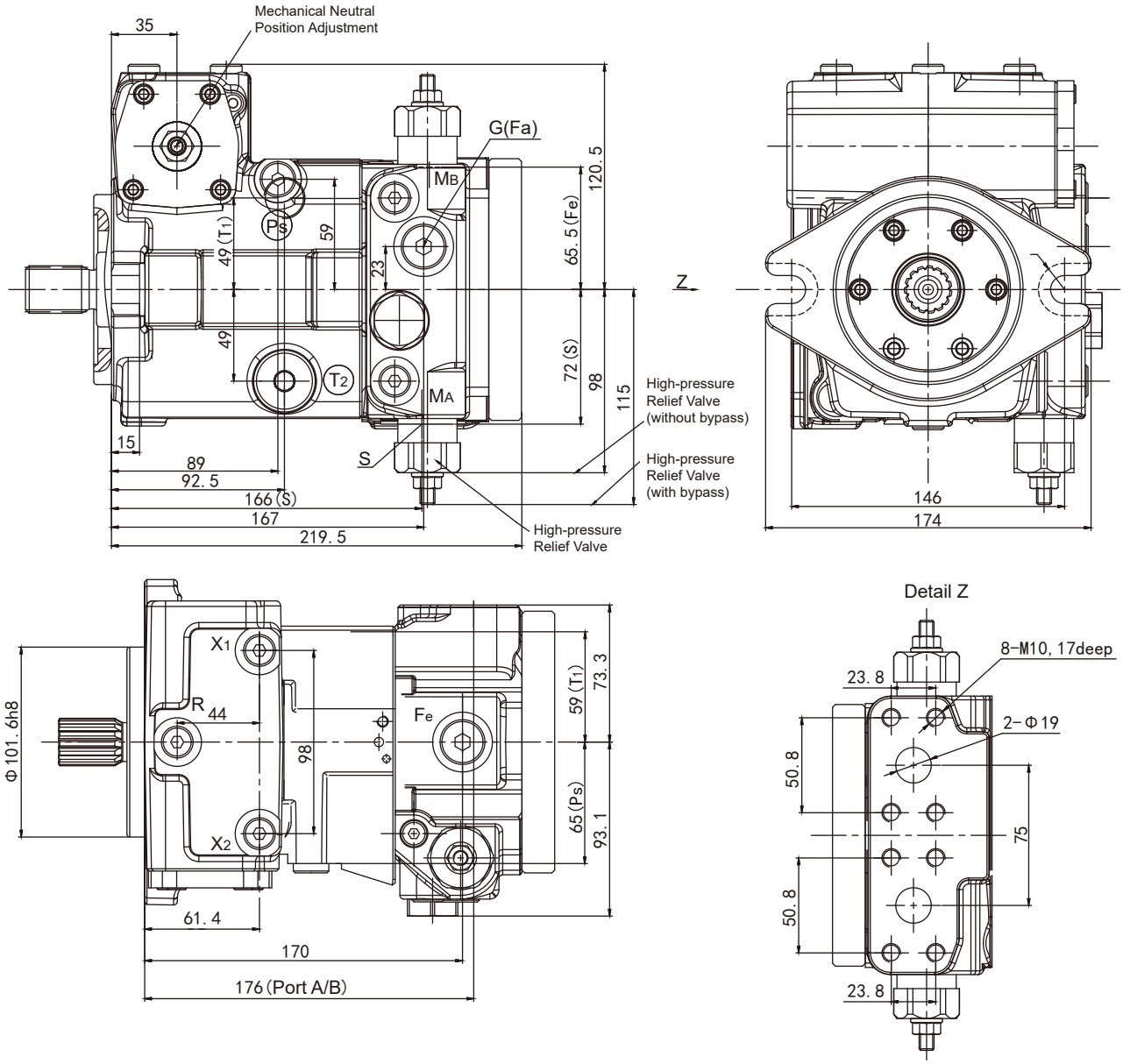
Mechanical Stroke Limite，M

The mechanical stroke limiter is an auxiliary function for continual reduction of the maximum displacement of the pump, regardless of the control device used.
Two adjusting screws are used to limit the stroke of the stroking cylinder and thus the maximum swivel angle of the pump.



Dimensions

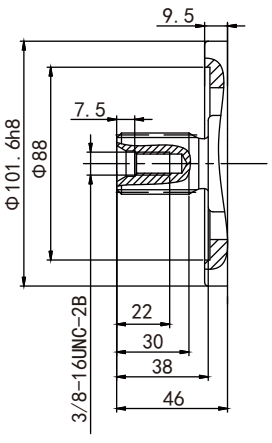
Size 28
Without control valve



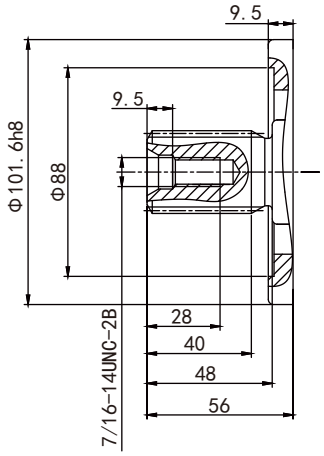
Ports

A/B	Working port (high pressure series)	SAEJ518 3/4"
	Fastening thread	DIN13 M10x1.5, 17deep
T_1	Case drain port or filling port	DIN3852 M22x1.5, 14deep
T_2	Case drain port	DIN3852 M22x1.5, 14deep
M_A/M_B	Measuring port pressure	DIN3852 M12x1.5, 12deep
R	Air bleed port	DIN3852 M12x1.5, 12deep
S	Boost suction port	DIN3852 M33x2, 18deep
X_1/X_2	Control pressure port	DIN3852 M12x1.5, 12deep
G(Fa)	Pressure port, auxiliary circuit	DIN3852 M18x1.5, 12deep
P_s	Control pressure inlet port	DIN3852 M14x1.5, 12deep
F_e	Filter outlet	DIN3852 M18x1.5, 12deep

Drive shaft S
SAE J744-25-4(B-B)
Φ1" 15T 16/32DP

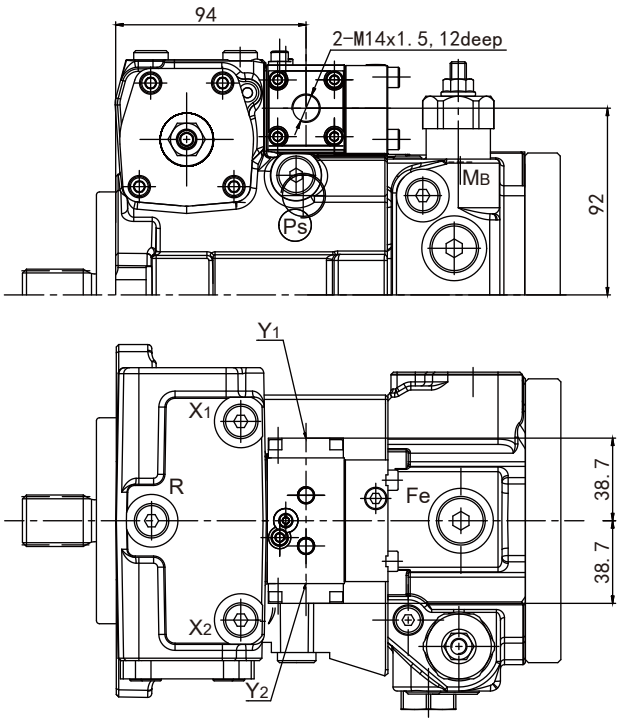


Drive shaft T
SAE J744-32-4(C)
Φ1 1/4" 14T 12/24DP

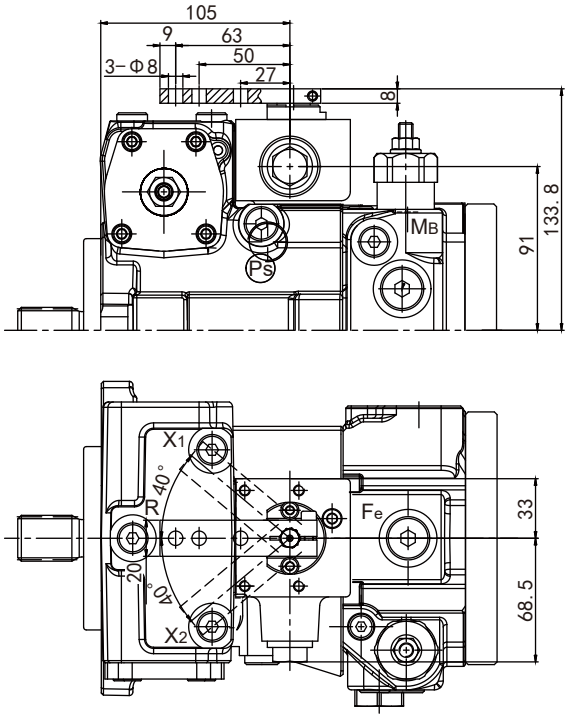


Dimensions

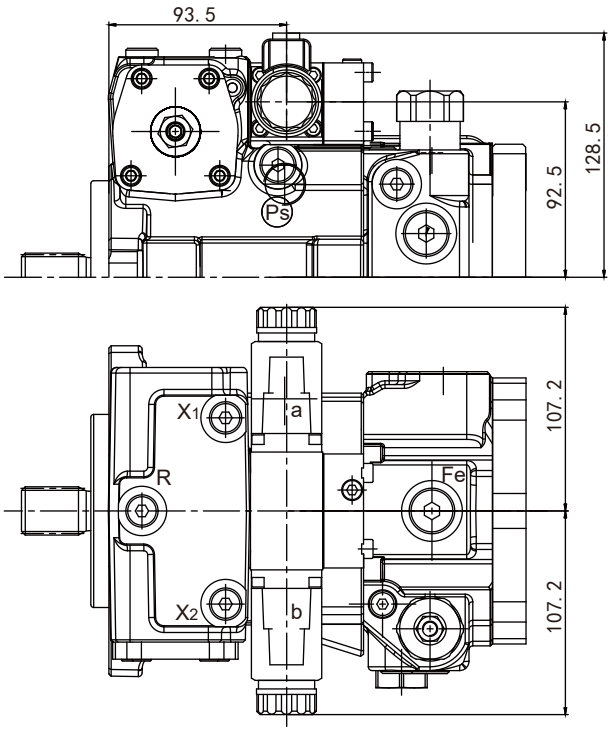
HD hydraulic control, pilot pressure related



HW hydraulic control, mechanical servo

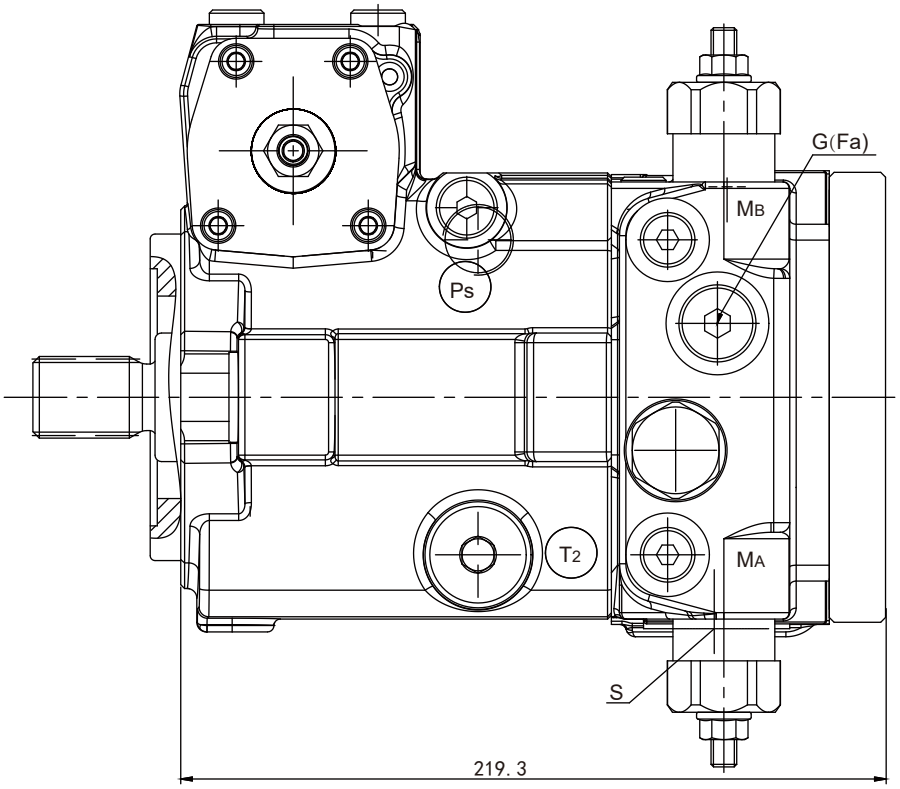


EP electric control, with proportional solenoid

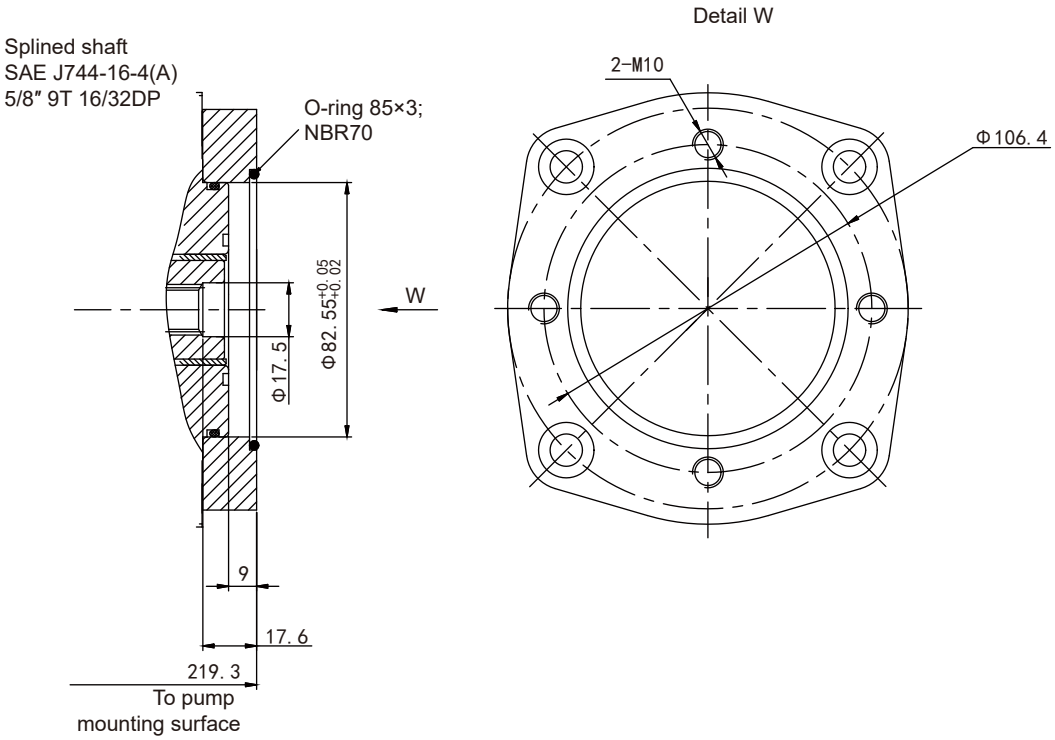


Dimensions

Without through drive F00/N00

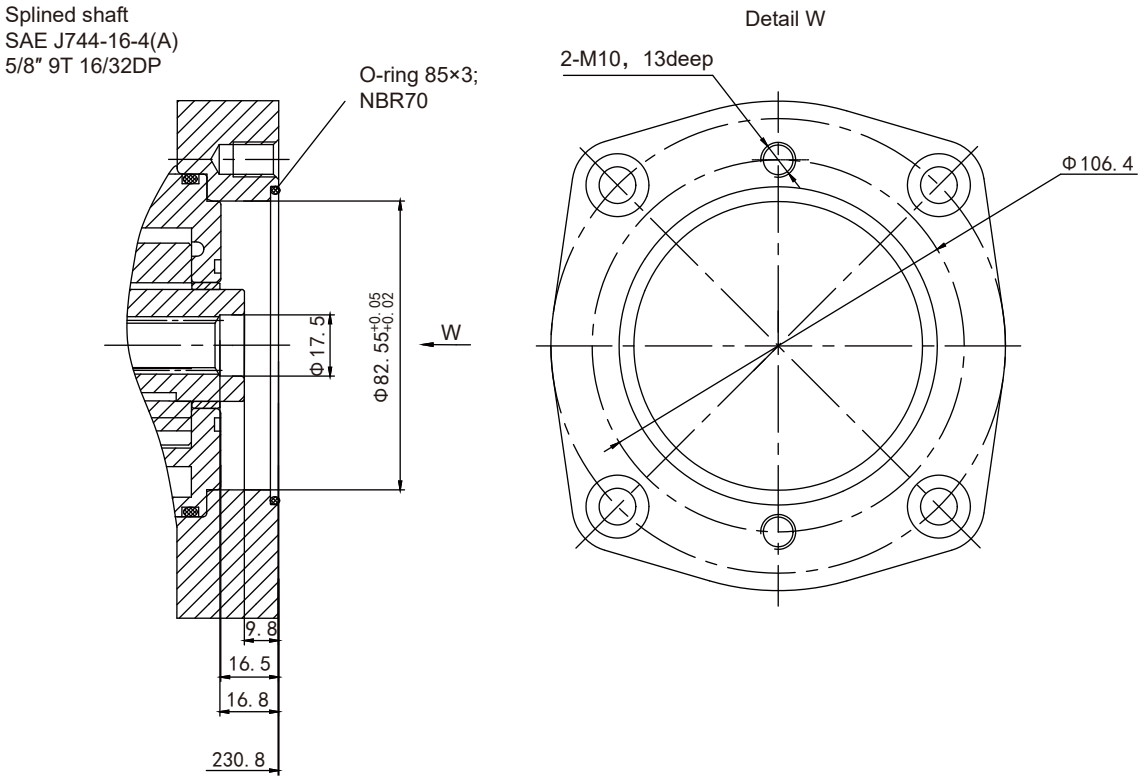


With through drive F01/K01(5.8mL/r boost pump)
Flange SAE J744-82-2(A)

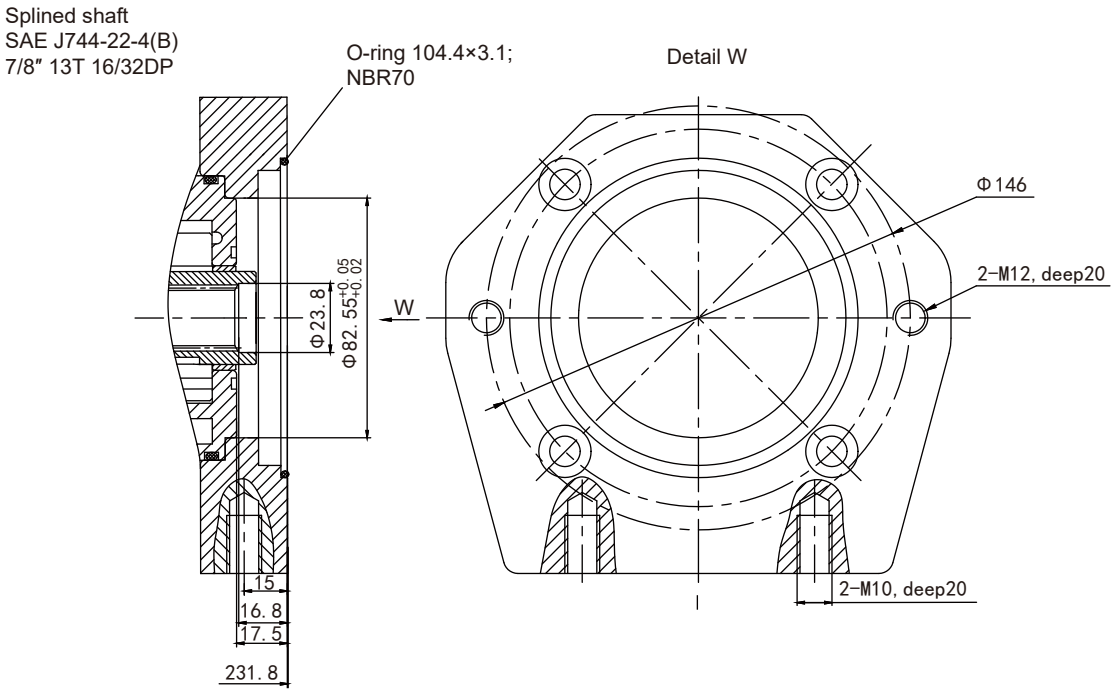


Dimensions

With through drive F01/K01(13.8mL/r boost pump)
Flange SAE J744-82-2(A)

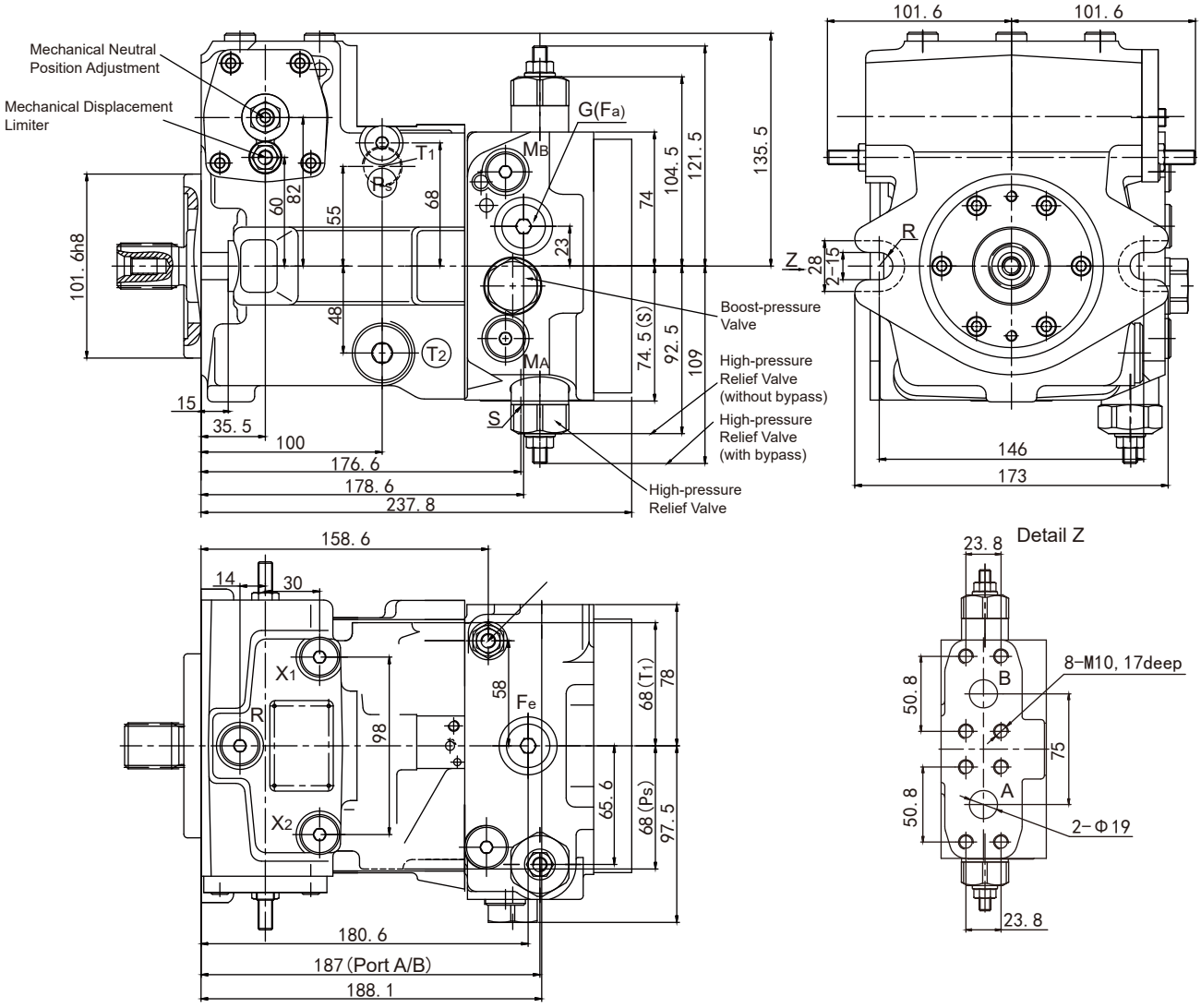


With through drive F02/K02(13.8mL/r boost pump)
Flange SAE J744-101-2(B)



Dimensions

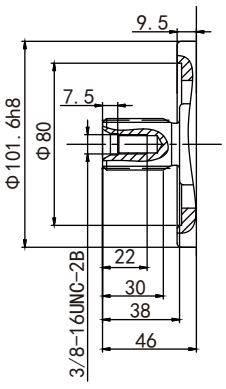
Size 45/53
Without control valve



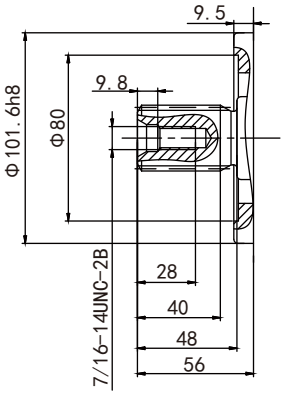
Ports

A/B	Working port (high pressure series)	SAEJ518 3/4″
	Fastening thread	DIN13 M10x1. 5, 17deep
T_1	Case drain port or filling port	DIN3852 M22x1. 5, 14deep
T_2	Case drain port	DIN3852 M22x1. 5, 14deep
M_A/M_B	Measuring port pressure	DIN3852 M12x1. 5, 12deep
R	Air bleed port	DIN3852 M12x1. 5, 12deep
S	Boost suction port	DIN3852 M33x2, 18deep
X_1/X_2	Control pressure port	DIN3852 M12x1. 5, 12deep
G(Fa)	Pressure port, auxiliary circuit	DIN3852 M18x1. 5, 12deep
P_S	Control pressure inlet port	DIN3852 M14x1. 5, 12deep
F_e	Filter outlet	DIN3852 M18x1. 5, 12deep

Drive shaft S
SAE J744-25-4(B-B)
Φ1″ 15T 16/32DP

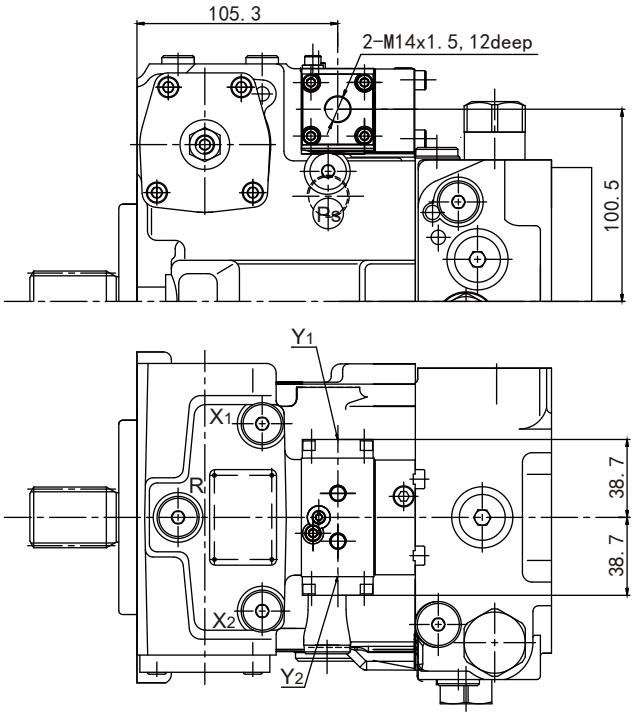


Drive shaft T
SAE J744-32-4(C)
Φ1 1/4″ 14T 12/24DP

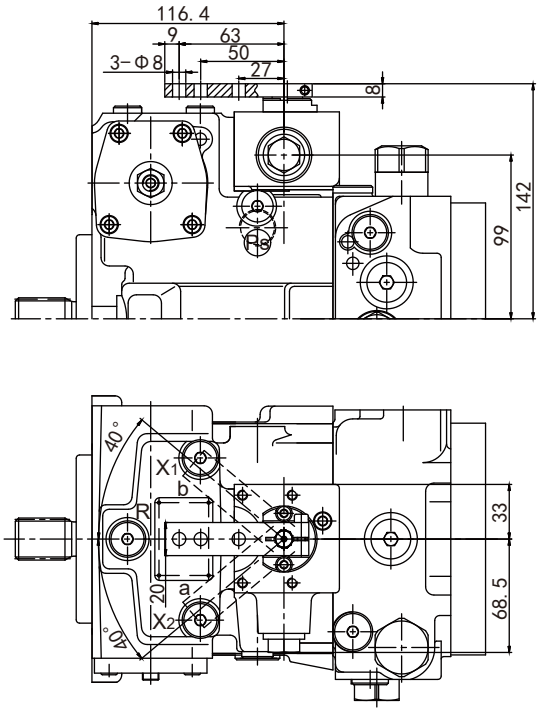


Dimensions

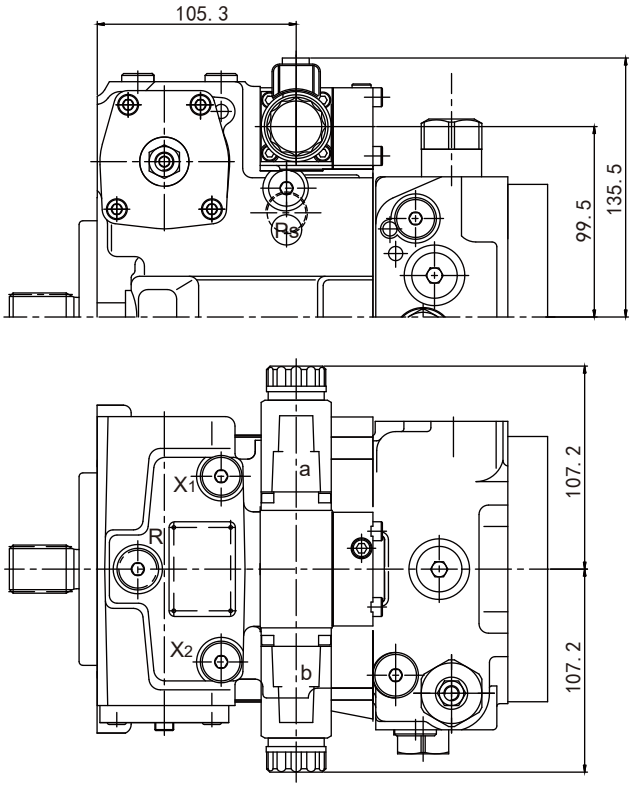
HD hydraulic control, pilot pressure related



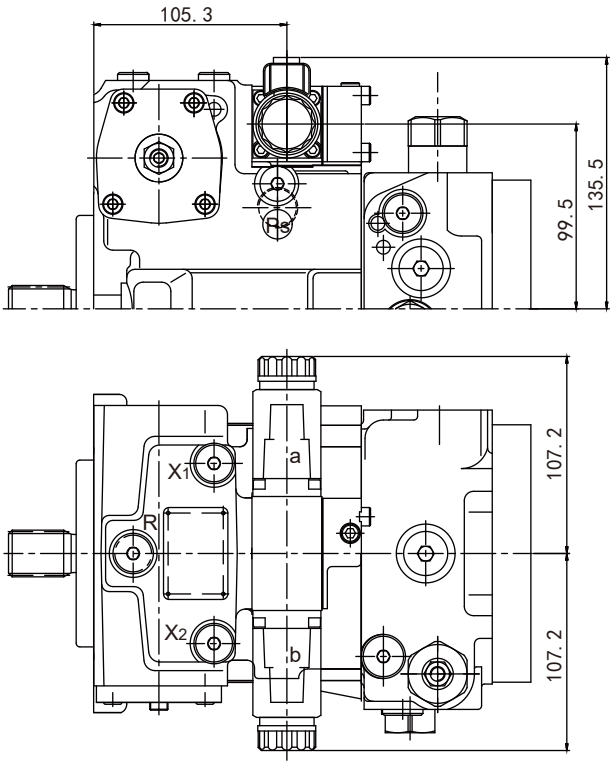
HW hydraulic control, mechanical servo



EP electric control, with proportional solenoid

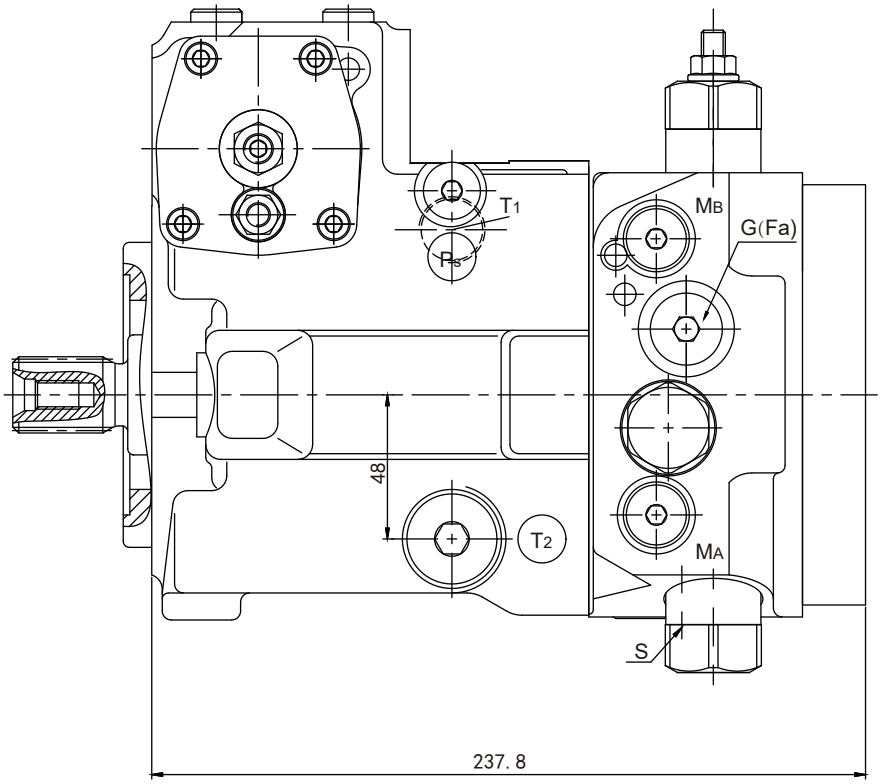


EZ electric control, with switching solenoid

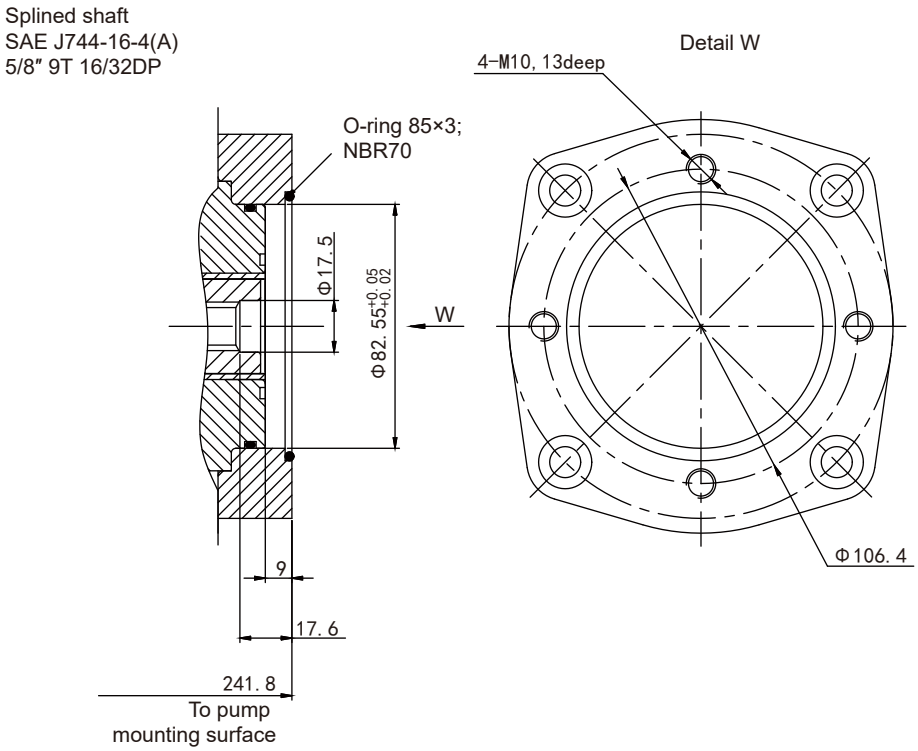


Dimensions

Without through drive F00/N00



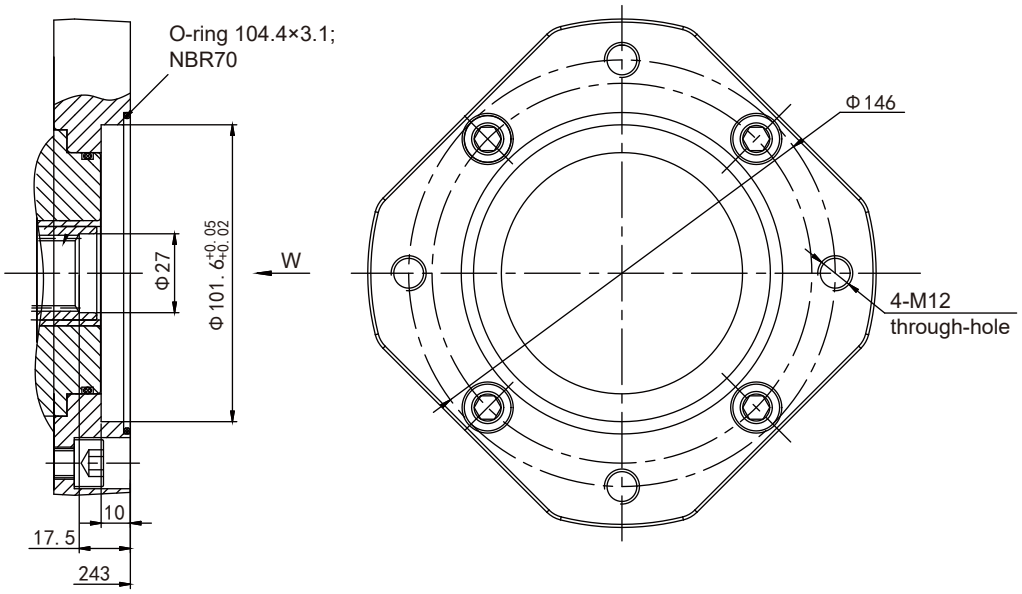
With through drive F01/KO1
Flange SAE J744-82-2(A)



Dimensions

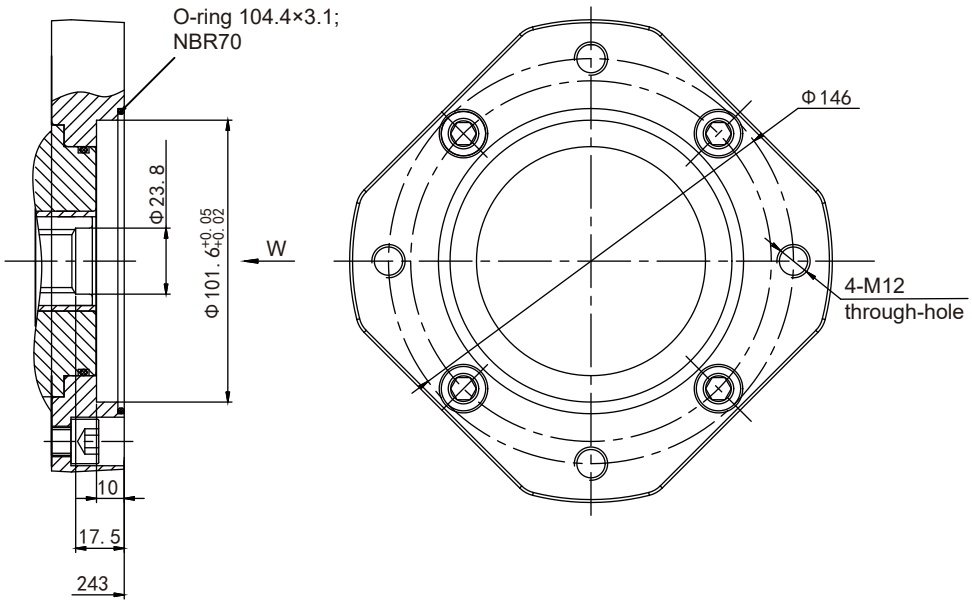
With through drive F04/K04
Flange SAE J744-101-2(B)

Splined shaft
SAE J744-25-4(B-B)
1″ 15T 16/32DP



With through drive F02/K02
Flange SAE J744-101-2(B)

Splined shaft
SAE J744-101-2(B)
7/8″ 13T 16/32DP



Filtration

Standard: Filtration in Boost Pump Suction Line,S

Standard type (preferred)

Type of filter： filter without bypass

Recommendation： with contamination indicator

Flow resistance at filter element：

$V=30mm^2/s$时，$n=n_{max}$ _____ $\Delta p \le 0.1bar$

$V=1000mm^2/s$时，$n=n_{max}$ _____ $\Delta p \le 0.3bar$

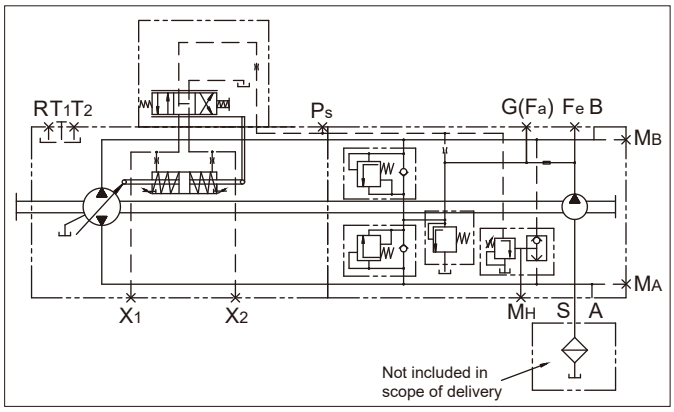
Pressure at suction port S：

$V=30mm^2/s$时，$n=n_{max}$ _____ $\Delta p \ge 0.8bar$

Cold start ($V=1600mm^2/s$时，$n \le 1000rpm$ _____ $\Delta p \ge 0.5bar$

The filter is not included in the scope of delivery.

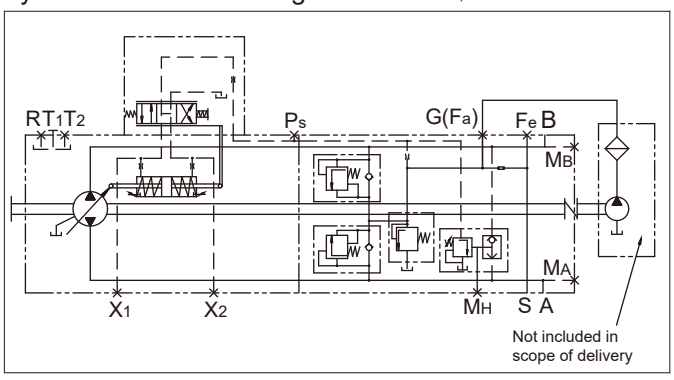
Hydraulic Schematic Diagram-Standard, S



Variant I:External Fluid Supply,E

This version is used for models without integrated boost pump, N00 or K...
Port S plugged, fluid supply from port F_a or F_{a1}.
Filter arrangement: separately installed to ensure stable functioning and fluid cleanliness level at port F_a or F_{a1} (see “Technical Data - Filter”).

Hydraulic Schematic Diagram-Variant I, E



Variant II:Filtration in Boost Pump Pressure Line, with Ports for External Boost Circuit Filtration, D

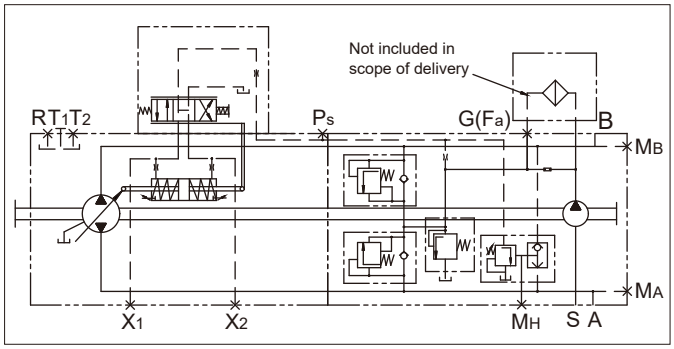
Filter inlet: port F_e

Filter outlet: port F_a

Type of filter：
- Filters with bypass are not recommended
- Filters with contamination indicator are recommended

The filter is not included in our scope of delivery.

Hydraulic Schematic Diagram-Variant II,D

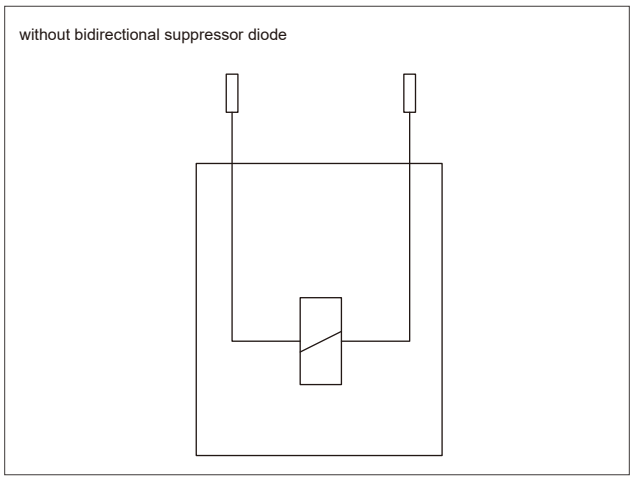


Connector for Solenoids

DEUTSCH DT04-2P-EP04，2-pin
Molded，without bidirectional suppressor diode_____P

The following type of protection ensues with the installed mating connector:
IP67(DIN EN 60520)
IP69K(DIN 60050-9)

Switching symbol

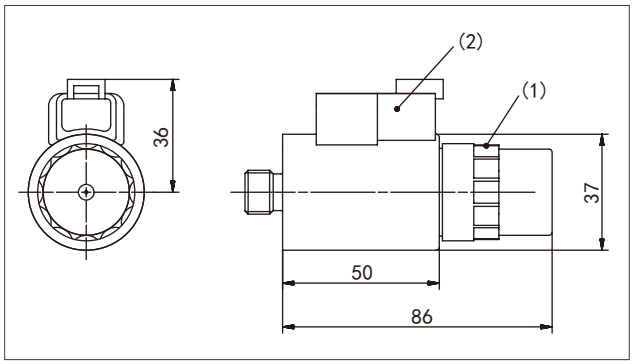


Mating connector
DEUTSCH DT06-2S-EP04

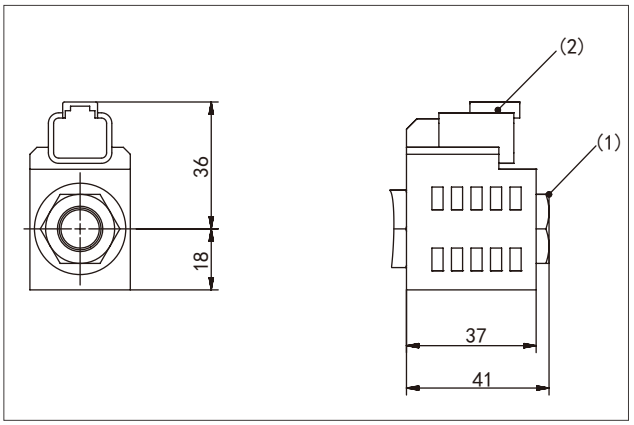
Consisting of	DT designation
1 housing	DT06-2S-EP04
1 wedge	W2S
2 sockets	0462-201-16141

The mating connector is not included in the scope of delivery.

With emergency start and spring reset for Solenoid(EP/EZ)



Brake Valve Solenoid (HWC/O)



Notice

Manual emergency operation (emergency start) can be used in case of electrical system failure.
If necessary, you can change the position of the connector by turning the solenoid.
The position of the connectors varies of delivery.

Installation instructions

General

The axial piston unit must be always be filled with hydraulic fluid and air bled during commissioning and operation.
This must also be observed following a longer standstill as the system may empty via the hydraulic lines.
The leakage in the housing must be directed to the reservoir via the highest drain port.
The minimum suction pressure at port S must not fall below 0.08 MPa absolute pressure (or 0.05 MPa absolute pressure at cold start).
Under all operating conditions, the suction line and case drain line must flow into the reservoir below the minimum fluid level.

Installation positions

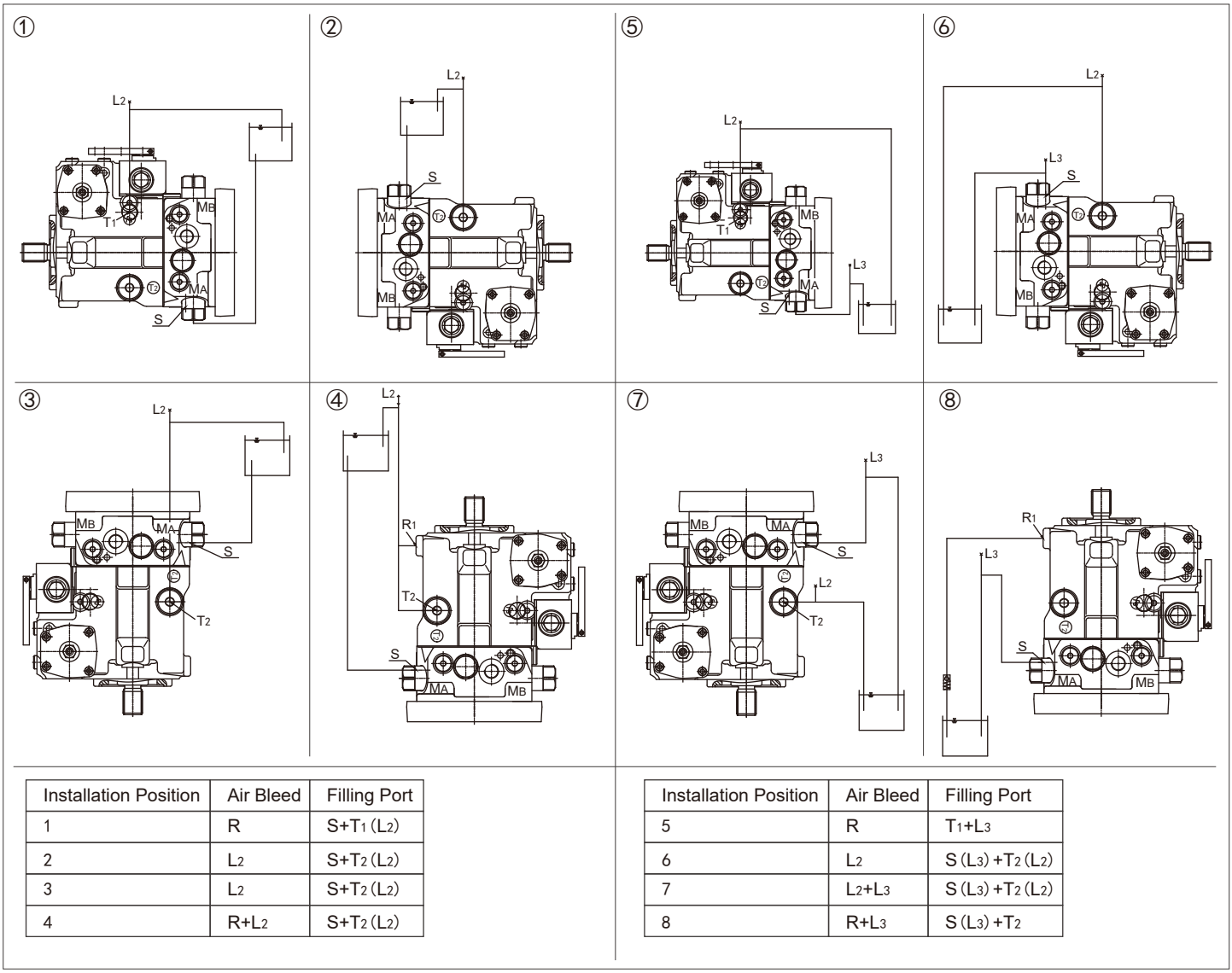
See the examples below. Other installation positions may be provided as required.

Below-reservoir installation (standard)

Pump below the minimum fluid level of the reservoir. Recommended installation positions: 1 and 2.

Above-reservoir installation

Pump above the minimum fluid level of the reservoir. Do not exceed the maximum permissible suction height h_{max}=800mm。
Recommendation for installation position 8 (shaft upwards):
Draining inside the housing may be prevented by installing a check valve (cracking pressure 0.05 MPa) in the drain line.



Installation Position	Air Bleed	Filling Port
1	R	S+T1 (L2)
2	L2	S+T2 (L2)
3	L2	S+T2 (L2)
4	R+L2	S+T2 (L2)

Installation Position	Air Bleed	Filling Port
5	R	T1+L3
6	L2	S (L3) +T2 (L2)
7	L2+L3	S (L3) +T2 (L2)
8	R+L3	S (L3) +T2

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Provides professional hydraulic transmission control products and solutions for construction machinery, road machinery, material handling machinery, agricultural and forestry machinery, industrial equipment and other fields.
After more than 20 years of continuous R&D, technological innovation, market development and application services, technical level and the scale of production and sales have been on the forefront of the industry.
Hytek has been committed to helping the development of subdivided industries with innovative hydraulic technology, "focusing on the challenges and pressures of customers, providing competitive products and solutions, reducing costs and increasing efficiency for customers, and continuously creating maximum value".

Product Series

- Open Circuit Pump
- Closed Circuit Pump
- Fixed Piston Motor
- Variable Piston Motor
- Hydrostatic Transmission Unit
- Internal Gear Pump
- Vane Pump
- Industrial Hydraulic Valve/ Proportional valve group

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Version No.HYTEK-REV1.0 08/24
No further notifications will be given for any changes in the contents or specifications of this manual.