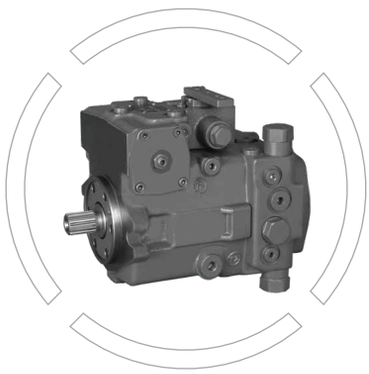
THM HYDRAULICS

A10VG

Variable displacement pump with
swashplate structure for closed circuits
Sizes: 28/45/53
Rated Pressure: 300 Bar
Max. Pressure: 350 Bar



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Features

- Axial piston variable pump in swash plate 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 swash plate swivels.
- The flow direction changes when the swash plate 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

Ordering Code

A10VG																	

Axial Piston Unit

Variable displacement pump with swashplate structure for closed circuits	**A10VG**

Displacement

Geometric displacement ml/r	28	45	53	

Variable Control Method

				28	45	53	
Hydraulic Control	Pilot Pressure control	No oil Supply filtration		○	●	●	HD1
		With oil Supply filter		●	●	●	HD3
	Mechanical Servo			●	●	●	HW
		With zero switch		○	●	●	HWL
		With brake valve normally open	U= 12V DC	○	●	●	HWO1
			U= 24V DC	●	●	●	HWO2
		With brake valve normally closed	U= 12V DC	○	○	○	HWC1
			U= 24V DC	○	○	○	HWC2
		With brake valve normally open & zero switch	U= 12V DC	○	○	○	HWO1L
			U= 24V DC	○	○	○	HWO2L
		With brake valve normally closed & zero switch	U= 12V DC	○	○	○	HWC1L
			U= 24V DC	●	○	○	HWC2L
Electrical Control	Proportional Electromagnet	No Oil Supply filtration	U= 12V DC	●	●	●	EP1
			U= 24V DC	●	●	●	EP2
		With Oil supply filtration	U= 12V DC	●	●	●	EP3
			U= 24V DC	●	●	●	EP4
	Solenoid with switch	No oil supply filtration	U= 12V DC	○	●	●	EZ1
			U= 24V DC	○	●	●	EZ2
		With Oil supply filtration	U= 12V DC	○	○	○	EZ3
			U= 24V DC	○	○	○	EZ4

Pressure Shut-off Valve

	28	45	53	
Without Pressure shut-off valve	●	●	●	No code
With Pressure shut-off valve	○	●	●	D

Stroke Limiter

	28	45	53	
Without Mechanical Travel limiter	●	●	●	No code
With Mechanical Travel limiter , Externally adjustable	○	●	●	M

Variable pressure port (X3/X4)

	28	45	53	
No Oil Port X3/X4	●	●	●	No code
With Oil port X3/X4	○	●	●	T

DA Control Valve

	28	45	53	
Without DA Control valve	●	●	●	1
With DA Control valve	—	—	—	2

Serial Number

Series	0

Ordering Code

Direction of Rotation (View from Shaft end)	28	45	53	
Clockwise	●	●	●	R
Counter-Clockwise	●	●	●	L

Seals	28	45	53	
Nitrile rubber (NBR) seal, Fluorine rubber (FKM) shaft seal	●	●	●	N
Nitrile rubber (NBR) seal, Nitrile rubber (NBR) shaft seal	●	●	●	P

Shaft Extension		28	45	53	
Spline shaft ANSI B92. 1-1976					
1" 15T 16/32 DP	For Single Pump	●	●	●	S
	With Connecting Flange	○	●	●	L
1 1/4" 14T 12/24 DP	The first pump for combination pump	○	●	●	T

Mounting flange	28	45	53	
SAE J744-101-2- (B) (2*Ø15, Ø101.6h8, 9.5)	●	●	●	C

Working oil port (Viewed from shaft end)		28	45	53	
Same side oil port	The Suction port faced downward and the working oil port faces left	●	●	●	10
	The Suction port faced upward and the working oil port faces Right	○	○	○	13

Charge pump and thru shaft drive				28	45	53	
Built-in Charge pump	Non-thru shaft drive			●	●	●	F00
	Flange SAE J744-82-2(A)	Spline sleeve 5/8"	9T 16/32 DP	●	●	●	F01
	Flange SAE J744-101-2(B)	Spline sleeve 7/8"	13T 16/32 DP	○	●	●	F02
		Spline Sleeve 1"	15T 16/32 DP	○	●	●	F04
No Built-in Charge pump	Non thru shaft drive			●	●	●	N00
	Flange SAE J744-82-2-(A)	Spline sleeve 5/8"	9T 16/32 DP	●	●	●	K01
	Flange SAE J744-101-2 (B)	Spline sleeve 7/8"	13T 16/32 DP	○	●	●	K02
		Spline Sleeve 1"	15T 16/32 DP	○	●	●	K04

High Pressure Relief Valve			28	45	53	
With high pressure relief valve direct acting (fixed set value)	350-450 Bar	No bypass valve	—	●	—	2
	250-350 Bar	No bypass valve	●	●	●	3
	100-250 Bar	No bypass valve	●	●	●	4
	250-350 Bar	with bypass valve	●	●	●	5
	100-250 Bar	with bypass valve	●	●	●	6
	350-450 Bar	with bypass valve	—	●	—	7

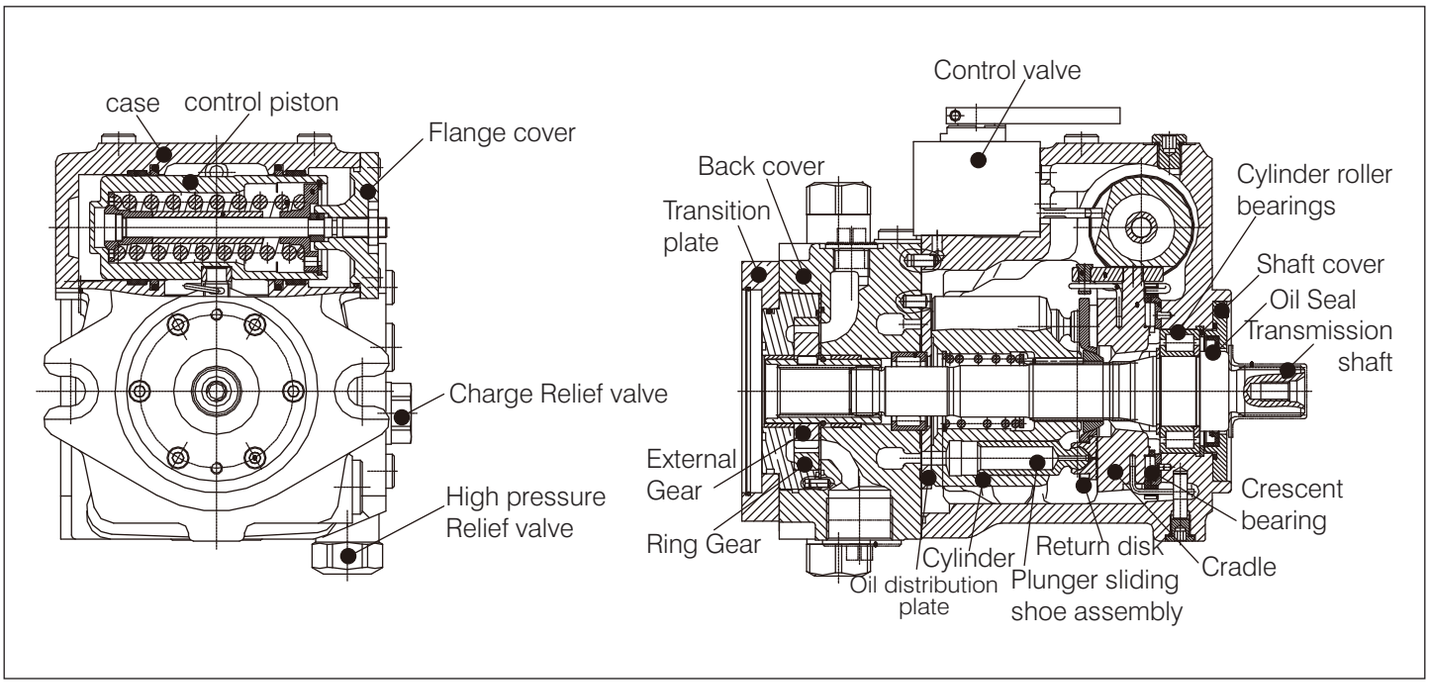
Filter	28	45	53	
External oil suction filter (not included in the scope of supply, customers can choose by themselves)	●	●	●	S
External pressure oil filter (not included in the scope of supply, customers can choose by themselves)	●	●	●	D
External oil supply (only for N00, K**)	●	●	●	E

Solenoid plug (EP/EZ control only)	28	45	53	
DEUTSCH plug, injection molding core, without suppression diode, connector type: Deutsch DT04-2P (for HW0/HWC/EP/EZ control)	●	●	●	P

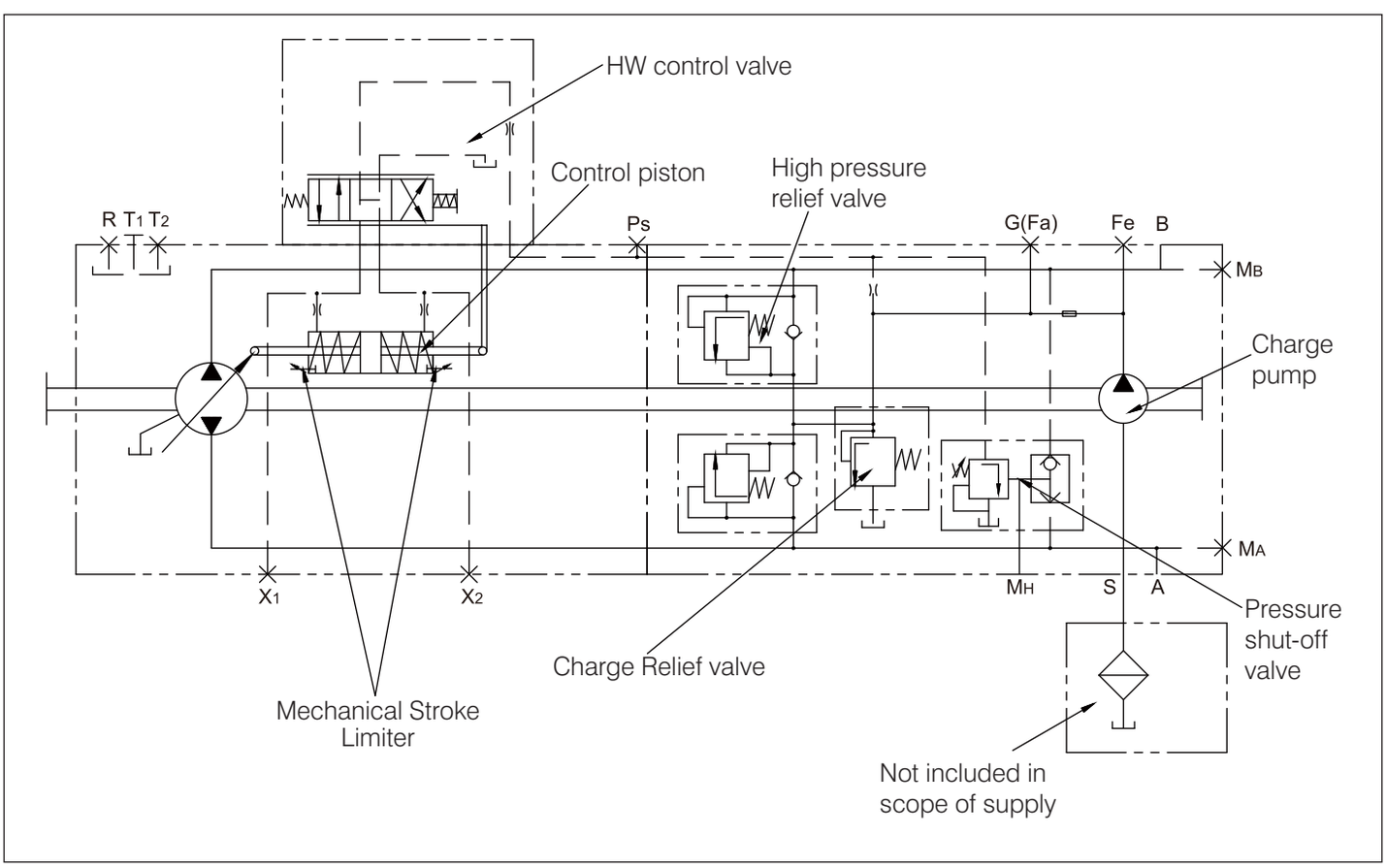
Special type	28	45	53	
No Special configuration	●	●	●	No code
Customized configuration	●	●	●	***

● = Available ○ = Supply upon Request — = Only Suitable for single pump

Product Structure



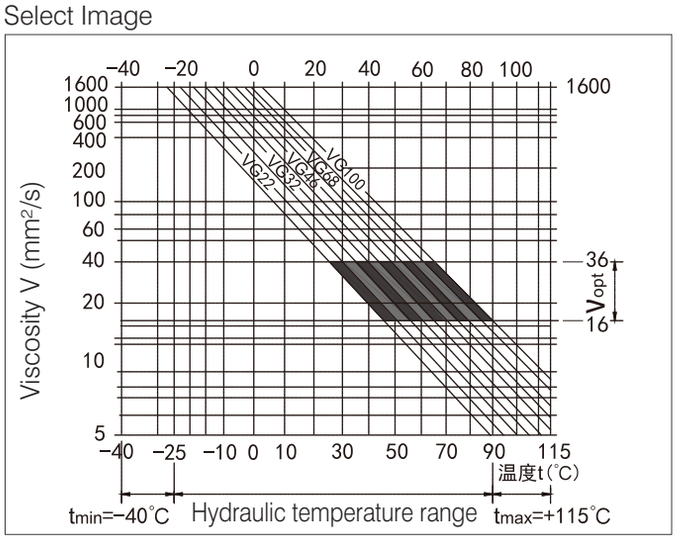
Hydraulic Schematic Diagram



Technical details

Hydraulic oil
mineral oil
Working viscosity range
For optimal efficiency and service life, it is recommended that the operating viscosity be selected within the following range when using the operating temperature:
V_{opt}=optimum operating viscosity 16...36mm²/s
depends on closed loop temperature.
Viscosity limit range
Viscosity limit value: V_{min}-5mm²/s
Short time (t<3min)
Maximum allowable temperature t_{max}=+115°C
V_{max} = 1600mm²/s
Short time (t<3min)
During cold start (p≤3Mpa, n≤1000rpm, tmin=-40°C)
Only Suitable for no-load start-up and must reach the optimal operating temperature within 15 minutes.

Select Image



Hydraulic oil selection instructions
In order to correctly select the Hydraulic oil, it is necessary to know the operating temperature in relation to the ambient temperature, which in closed circuits refers to the circuit temperature. The hydraulic oil should be selected with a viscosity in the optimal range (V_{opt}) within the working range (see the shaded area of the selection diagram).
It is recommended to select a hydraulic oil with a higher viscosity grade under the same conditions.
Example: At an ambient temperature of X℃, the operating temperature in the loop is 60℃. In the optimal working viscosity range (V_{opt}: shaded area), corresponding to the viscosity grade VG46 or VG68, VG68 should be selected.
Precautions:
The shell drain temperature is affected by pressure and rotation speed and is always higher than the circuit temperature. The temperature at any point in the system cannot exceed +115°C. If the above conditions cannot be maintained due to extreme operating parameters, please consult us.

Filter
The finer the oil is filtered and the cleaner the oil, the longer the service life of the axial piston element. To ensure proper functioning of the axial piston element, the oil cleanliness level must be at least:
According to IS04406 standard, cleanliness level 20/18/15
Depending on the system and application, for A4VG we recommend:
B20≥100 Filter, When the pressure difference of the filter element increases, it must not be reduced.
At higher oil temperatures (+90°C up to +115°C), the cleanliness level should be at least:
Comply with IS04406 standard, cleanliness level 19/17/14
If you cannot maintain the above level, please consult our company.

Working Pressure range
Input
Variable displacement pump (with external oil supply, E)
For controlling EP/HW/HD
Oil Charge pressure (n=2000rpm)P_{sp}_____= 1.8MPa
For Controlling DG
Oil Charge pressure (When n= 2000 rpm) P_{sp}___= 2.5MPa
Charge pump
Suction pressure $P_{s\,min}$ (V<30mm²/s)_____≥0.08MPa
During short cold start (t<3min)_____≥0.05MPa

Output
Pressure at port A or B
Nominal Pressure PNX_____35MPa
Maximum pressure Pmax_____40MPa
Total pressure (Pressure A+Pressure B)Pmax_____60MPa
Charge pump
Maximum pressure Psp max._____4MPa

Oil seal
allowable pressure load
The service life of the shaft sealing ring is affected by the speed of the pump and the drain pressure of the housing. It is recommended that the average long-lasting shell drain pressure at operating temperature should not exceed 0.3MPa absolute pressure (when the rotational speed decreases, the maximum allowable shell drain pressure is 0.6MPa), and the maximum allowed absolute pressure peak in a short time (t<0.1s) is 1MPa .The higher the frequency of pressure peaks, the shorter the service life of the shaft seal. The pressure inside the housing must be equal to or greater than the external pressure of the shaft seal
Temperature range
The operating temperature range of fluoro rubber shaft seal is -25°C to +115°C shell temperature. The operating temperature range of nitrile rubber shaft seal is -40°C to +90°C shell temperature.

Specifications

Sizes				28	45	53
Displacement	as	Vgmax	mL/r	28	45	52
	oil charge pump (Δp=2MPa)	Vg SP	mL/r	5.8	13.8	13.8
Rotating speed	Maximum speed at Vomax	Nmax	rpm	3900	3300	3300
	Limit maximum [1]	Nmin	rpm	4200	3550	3550
	Intermittent maximum [2]	Nmax	rpm	4500	3800	3800
	minimum value	Nmin	rpm	500	500	500
Flow	When max and Vmax	qvmax	L/min	113	149	172
Power [3]	When nmax and Vgmax, Δp=30MPa	Pmax	kW	57	75	86
Torque [3]	When Vgmax, Δp=30MPa	Tmax	Nm	139	215	248
	When Vmax, Δp= 10MPa	T	Nm	46	72	83
Moment of interia about drive shaft		J	Kgm^2	0.0017	0.0033	0.0042
Maximum angular acceleration [4]			rad/s^2	5500	4000	3500
Oil injection amount		V	L	0.64	0.75	0.75
Weight (Without thru-shaft drive)		m	Kg	25	27	29

1) When the power is half the angular power (for example, when Vg max and Pn/2)
2) During high-speed no-load operation; at overspeed: △p=7-15MPa and Vg max;
   at reverse peak load: △p<30MPa, t<0. 1s
3) No charge pump
4) Only suitable for single pump

Specification Calculation

Flow $qv = \frac{V_g \cdot n \cdot \eta_v}{1000}$ [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]

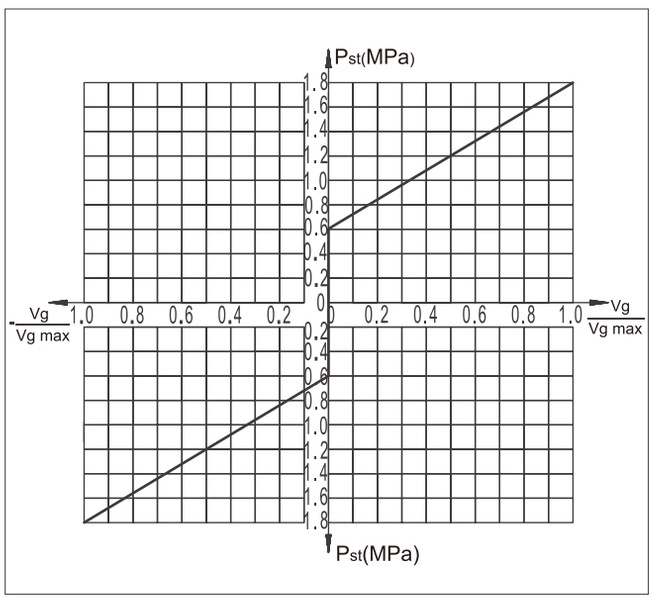
V_g = displacement mL/r
Δp = Pressure difference MPa
n = Speed rpm
η_v = Volumetric efficiency
η_{mh} = mechanical efficiency
η_t = total efficiency

HD Pressure control

Dependent on the difference between the pilot pressure Pst (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 6 bar

End of control 16.7 bar 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 ofthe 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.

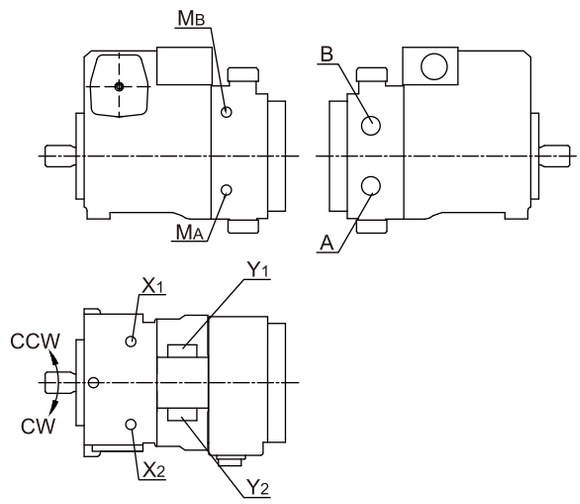
-Make sure the driven device can promptly reach a safety state (e.g. stop) with the emergency stop module.

-Always observe the cleanliness level according to ISO 4406:

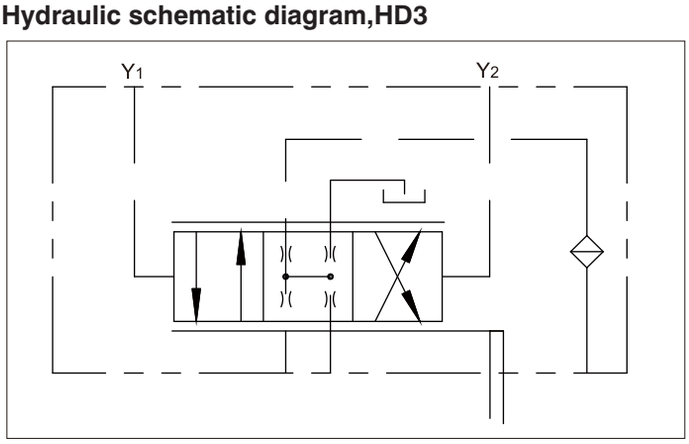
20/18/15 (<90°C) or 19/17/14 (>90°C)

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

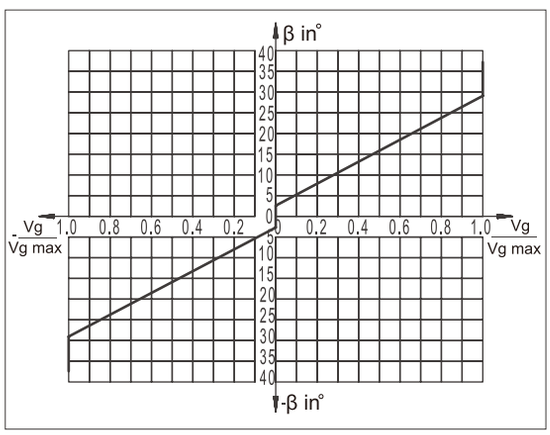


Hydraulic schematic diagram,HD3



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 sothat the swashplate moves to infinitely adjust the displacement. Each moving direction of the control lever corresponds to one flow direction.



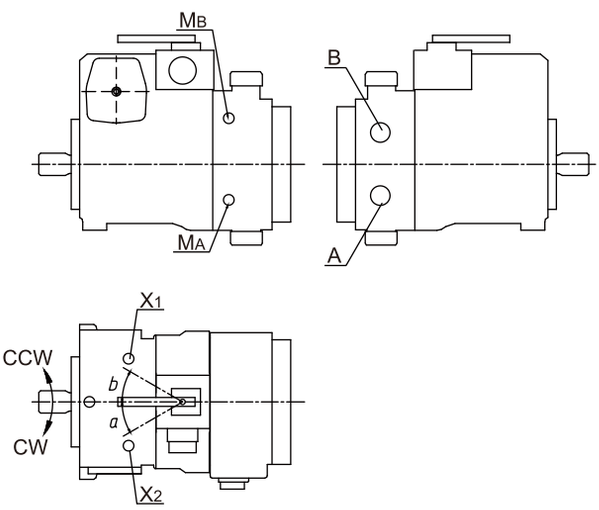
Swivel angle B of control lever:
Start of control B=3°
End of control B=29°(maximum displacement $V_{g\,max}$)
Mechanical limit: ±40°

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).

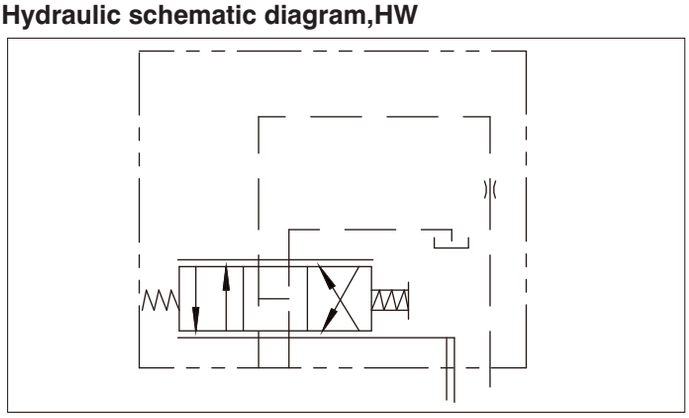
Note:
When there is no torque on the HW control lever, spring centering enables the pump to move automatically to the neutral position (V_g=0)(independent of swivel angle).

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



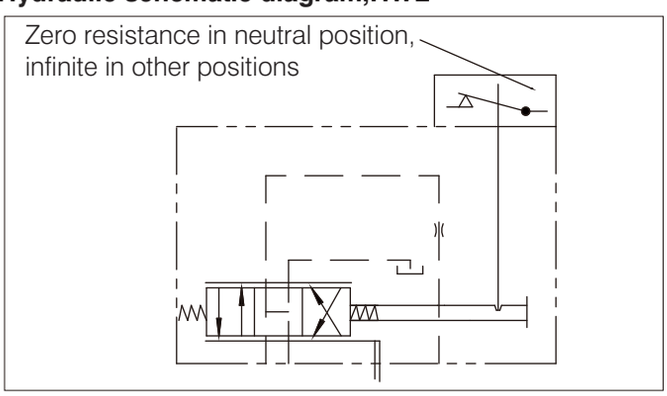
HW-Mechanical Servo Control

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

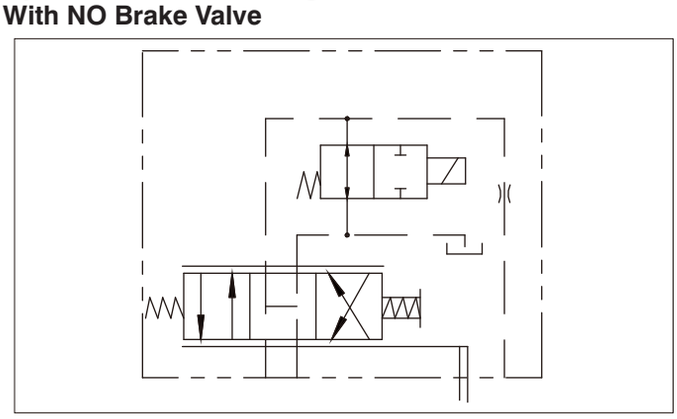


Variant II:ith Brake Valve Switch,HWO/HWC

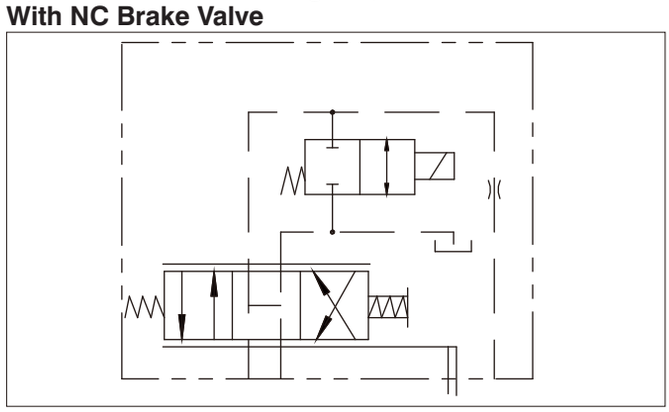
HWO:
with normally open brake valve; brake valve actuated when de energized
HWC:
with normally closed brake valve: brake valve actuated when energized

Technical data, solenoid	HWO(C)1	HWO(C)2
Voltage	12V DC±1.8V	24V DC±3.6V
Normal resistance(20°C)	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

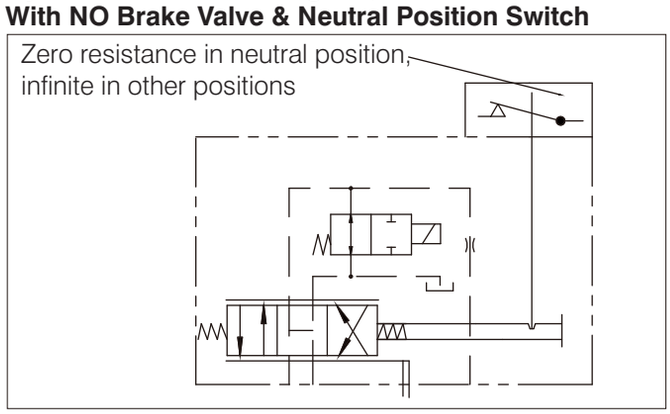


Hydraulic schematic diagram,HWC
With NC Brake Valve

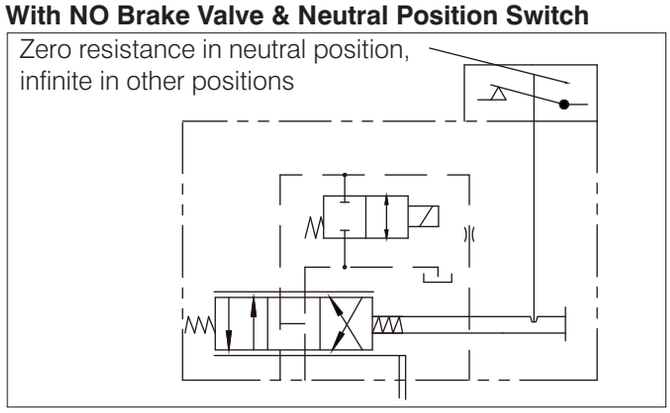


Variant III:With Brake Valve & Neutral Position Switch, HWOL/HWCL

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



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

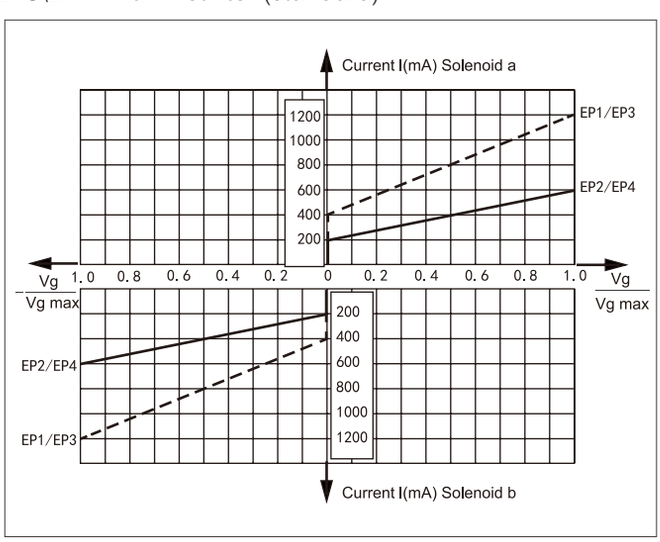


EP-Electric control with Proportional Solenoid

Dependent on the preset current 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
Normal resistance(20°C)	**5.5Ω**	**22.7Ω**
Dither frequency	100Hz	
Type of connector	DEUTSCH DT04-2P	
Duty cycle	100%	
Type of protection	IP67	

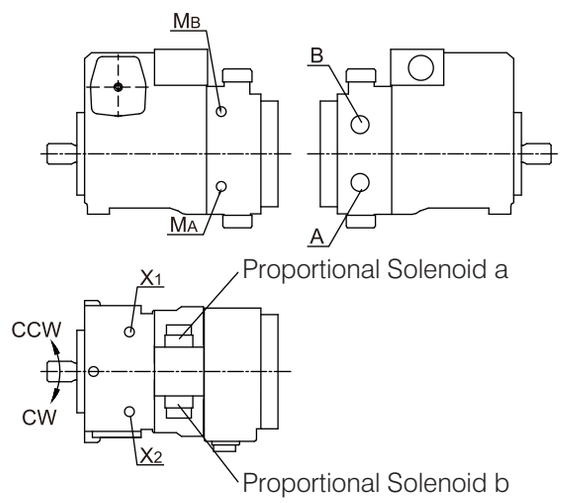
EP1\EP2: without inlet filter (Not for new projects)
EP3\EP4: with inlet flter (standard)



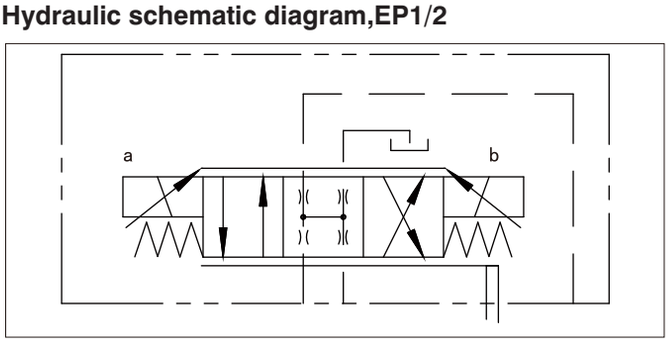
Note:
The spring at the center of the pilot control device is not a safety device. The spool may get stuck at any position due to contamination of the control device, such as hydraulic fluid pollutant, wear debris and foreign matters in the system, etc.
In this case, the pump flow no longer observes 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°C)or 19/17/14 (>90°C)

Correlation of Direction of rotation, Control and Flow direction

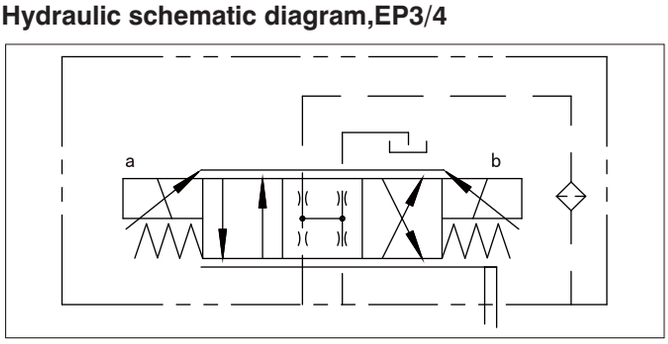
Direction of rotation (viewed on drive shaft)				
	Proportional Solenoid	Control Pressure	Flow Direction	Working Pressure
CW	a	X_1	A to B	M_B
	b	X_2	B to A	M_A
CCW	a	X_1	B to A	M_A
	b	X_2	A to B	M_B



Hydraulic schematic diagram,EP1/2



Hydraulic schematic diagram,EP3/4



EZ - Electric Control with Switching Solenoid

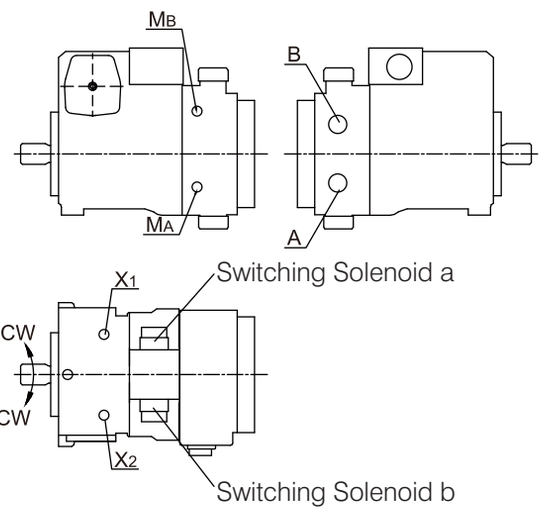
By switching on or off the switching solenoid a or b, the control cylinder of the pump obtains control pressure via the E Z controller so that the swash plate realize adjustment between $V_g = 0$ and $V_{g\,max}$. Each solenoid corresponds to one flow direction.

Technical data, solenoid	EZ1/3	EZ2/4
Voltage	12V Dc(±20%)	24V (Dc±20%)
Neutral position $V_g = 0$	400mA	200mA
Position V_g max	1200mA	600mA
Normal 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	

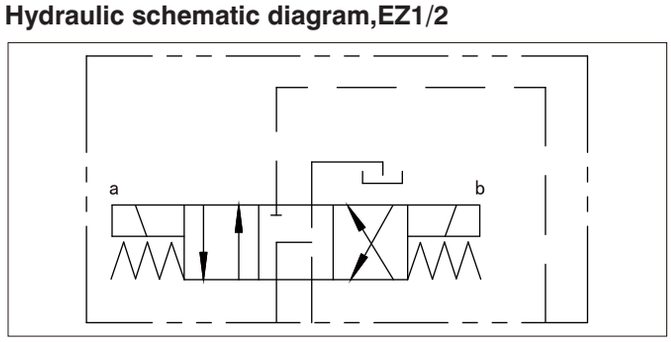
Standard: switching solenoid without manual emergency control. The manual emergency control realized by returning spring may be provided as required.

Correlation of Direction of rotation, Control and Flow direction

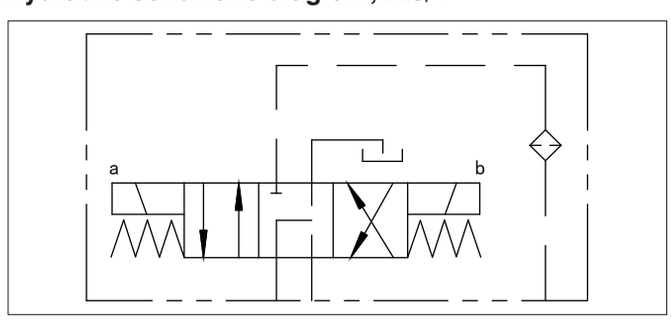
Direction of rotation (viewed on drive shaft)				
	Proportional Solenoid	Control Pressure	Flow Direction	Working Pressure
CW	a	X_2	B to A	M_A
	b	X_1	A to B	M_B
CCW	a	X_2	A to B	M_B
	b	X_1	B to A	M_A



Hydraulic schematic diagram,EZ1/2



Hydraulic schematic diagram,EZ3/4



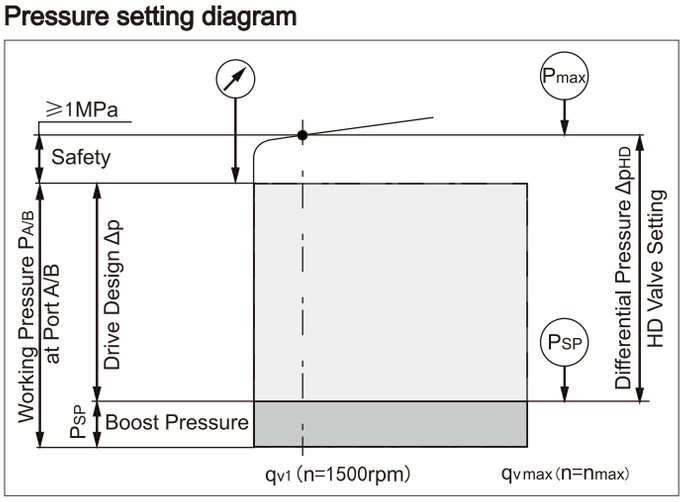
High Pressure Relief Valve

Setting range

High-pressure relief valve, direct operated (size 28/45/53)	Differential pressure setting Δp_{HP}
Setting range valve 2 Δ p=35−45MPa	36MPa
	38MPa
	40MPa
	42MPa
	44MPa
Setting range valve 3 Δ p=25−35MPa	26MPa
	28MPa
	30MPa
	32MPa
	34MPa
Setting range valve 4 Δ p=10−25MPa	10MPa
	12MPa
	14MPa
	16MPa
	18MPa
	20MPa
	22MPa
	24MPa
Setting range valve 5 Δ p=25−35MPa	26MPa
	28MPa
	30MPa
	32MPa
	34MPa
Setting range valve 6 Δ p=10−25MPa	10MPa
	12MPa
	14MPa
	16MPa
	18MPa
	20MPa
	22MPa
	24MPa
Setting range valve 7 Δ p=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 Δp_{HP} (29-2=27MPa)

Bypass function

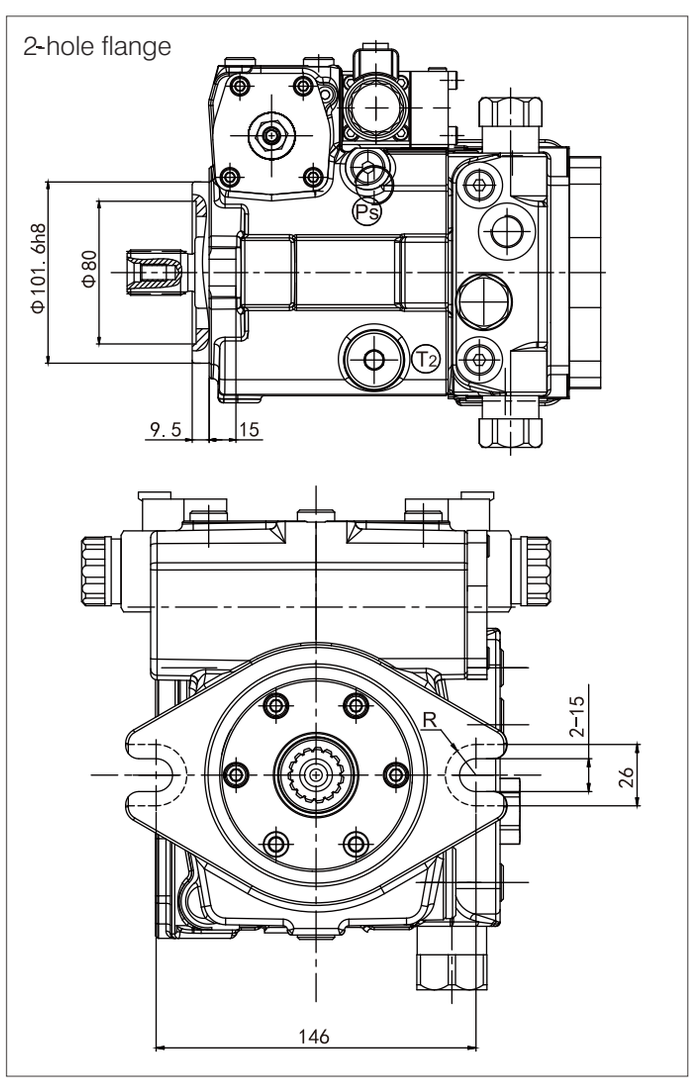
Valves 5/6/7 have the bypass function, The bypass function is only intended for short-term operation at reduced displacement, for example to tow a vehicle out of a danger zone.

Pressure Cut-off Valve, D

The pressure cut-off is a pressure control which adjust 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 swash plate 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.

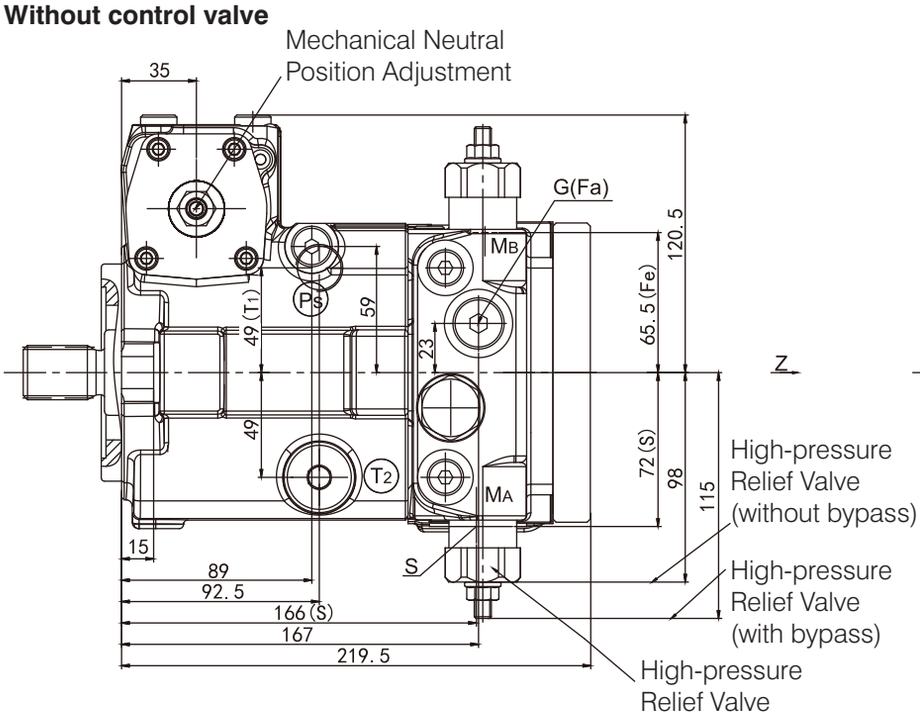
Mechanical Stroke Limite, M

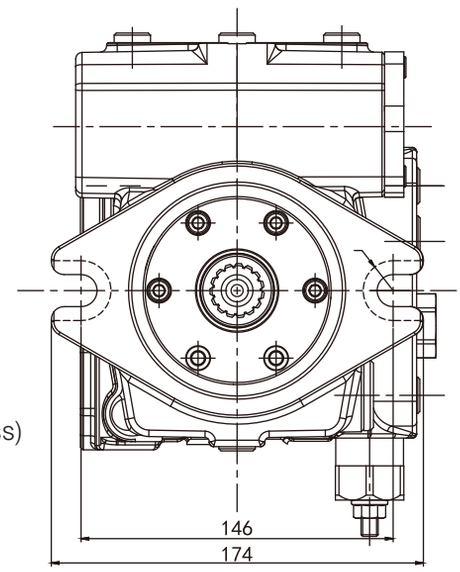
The mechanical stroke limiter is an auxiliary function for continual reduction of the maximum displacement of the pump, regardless of the control device used.
Two adjusting screws are used to limit the stroke of the stroking cylinder and thus the maximum swivel angle of the pump.

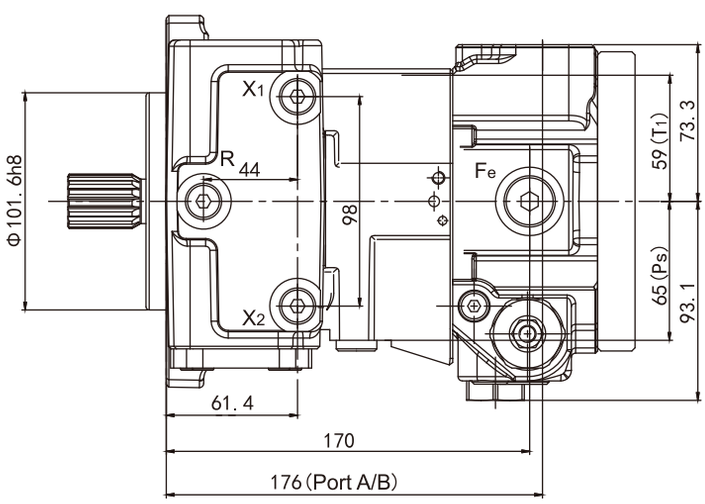


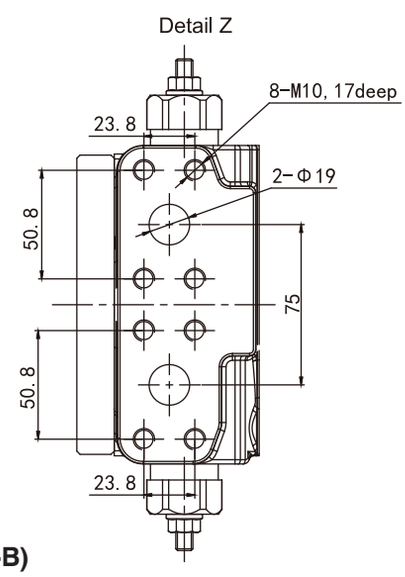
Unit Dimensions (Dimensions in mm)

Size 28
Without control valve





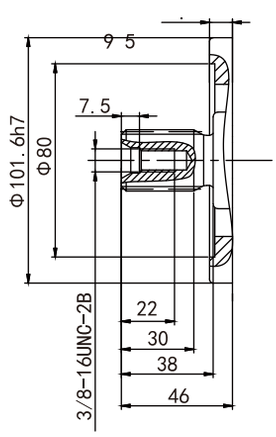




Drive shaft S
SAE J744-25-4(B-B)
Ø1”15T 16/32DP

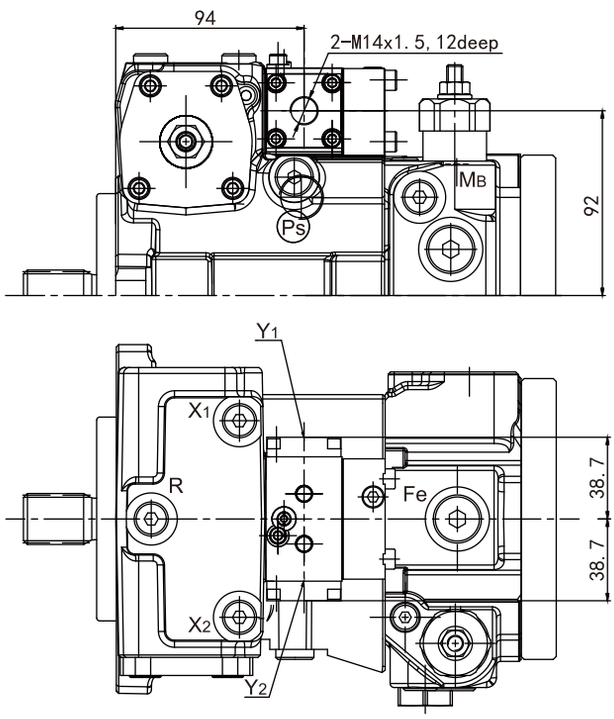
Ports

A/B	Working port (high pressure series)	SAEJ518 3/4”
	Fastening thread	D1N13 M10x1.5, 17 deep
T_1	Case drain port or filling port	D1N3852 M22x1.5, 14 deep
T_2	Case drain port	D1N3852 M22x1.5, 14 deep
M_A/M_B	Measuring port pressure	D1N3852 M12x1.5, 12 deep
R	Air bleed port	D1N3852 M12x1.5, 12 deep
S	Boost suction port	D1N3852 M33x2, 18 deep
X_1/X_2	Control pressure port	D1N3852 M12x1.5, 12 deep
G(Fa)	Pressure port, auxiliary circuit	D1N3852 M18x1.5, 12 deep
P_S	Control pressure inlet port	D1N3852 M14x1.5, 12 deep
F_e	Filter outlet	D1N3852 M18x1.5, 12 deep

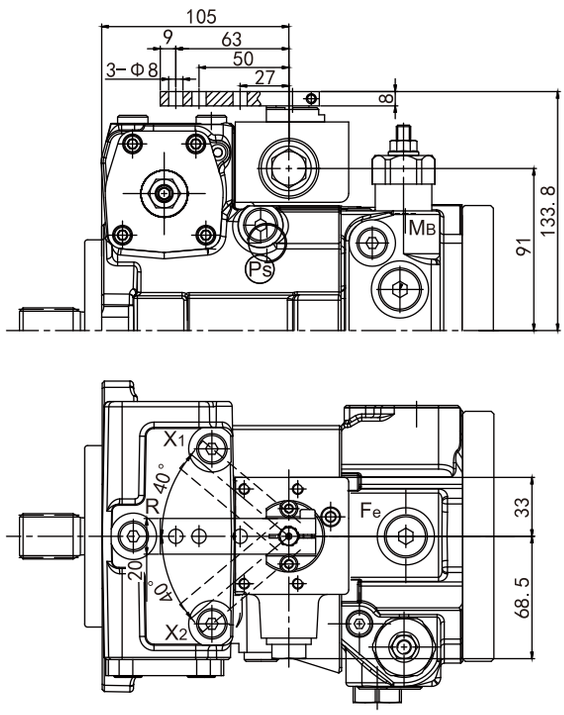


Unit Dimensions (Dimensions in mm)

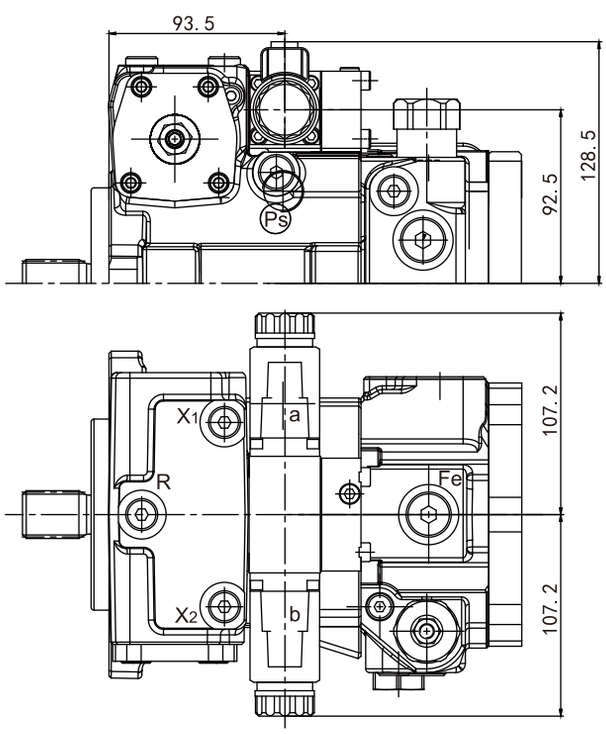
HD hydraulic control, pilot pressure related



HW hydraulic control, mechanical servo

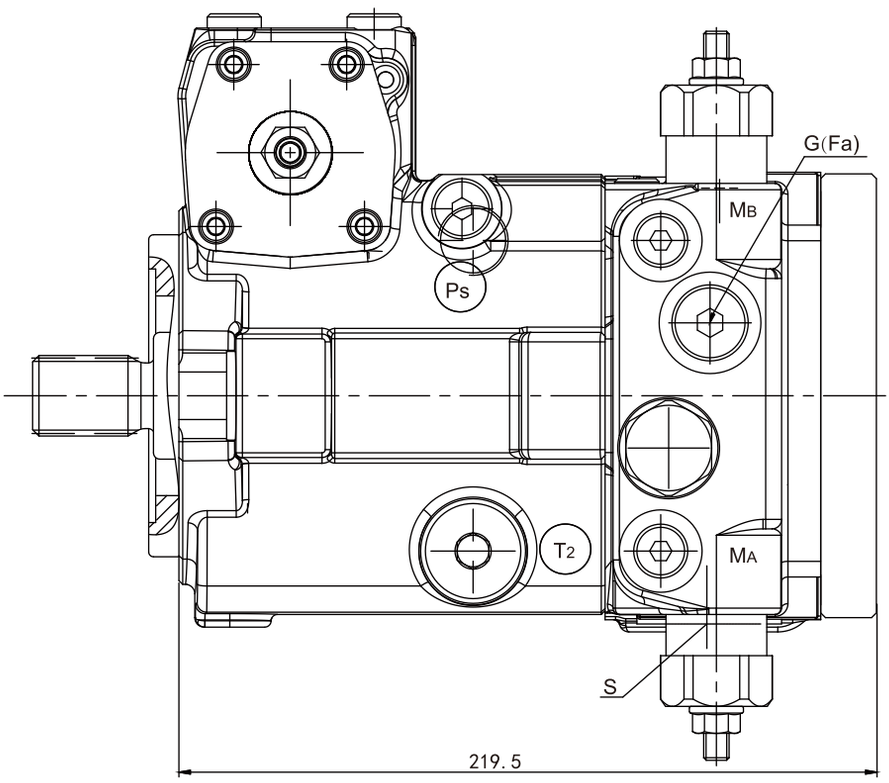


EP electric control, with proportional solenoid

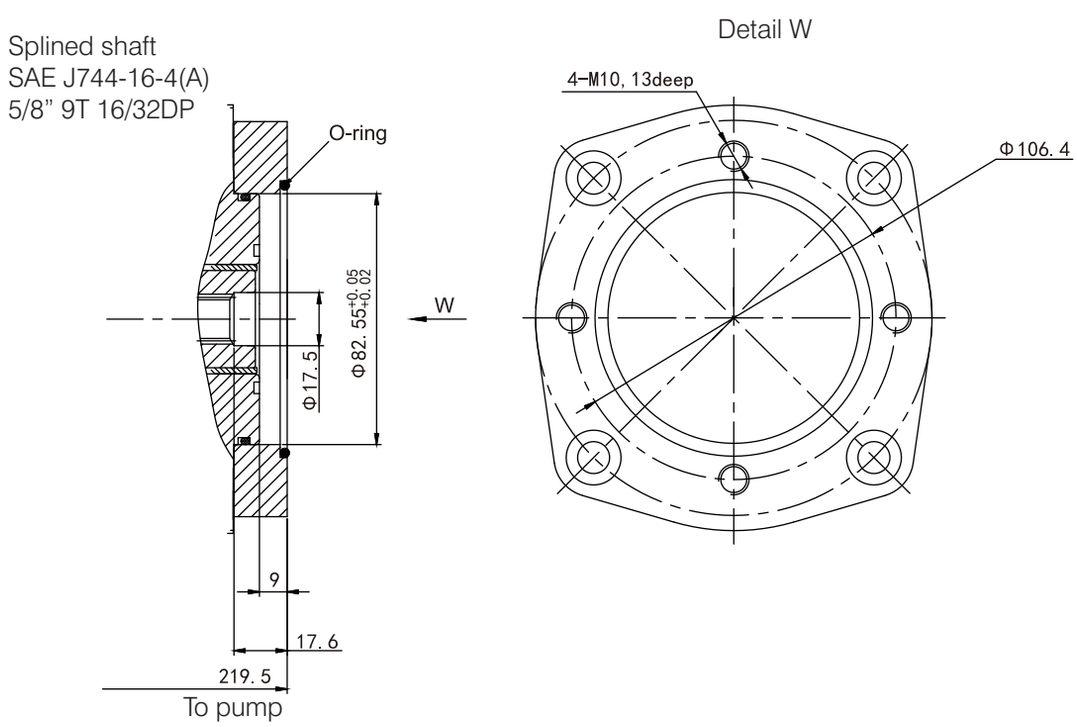


Unit Dimensions (Dimensions in mm)

Without through drive F00/NOO

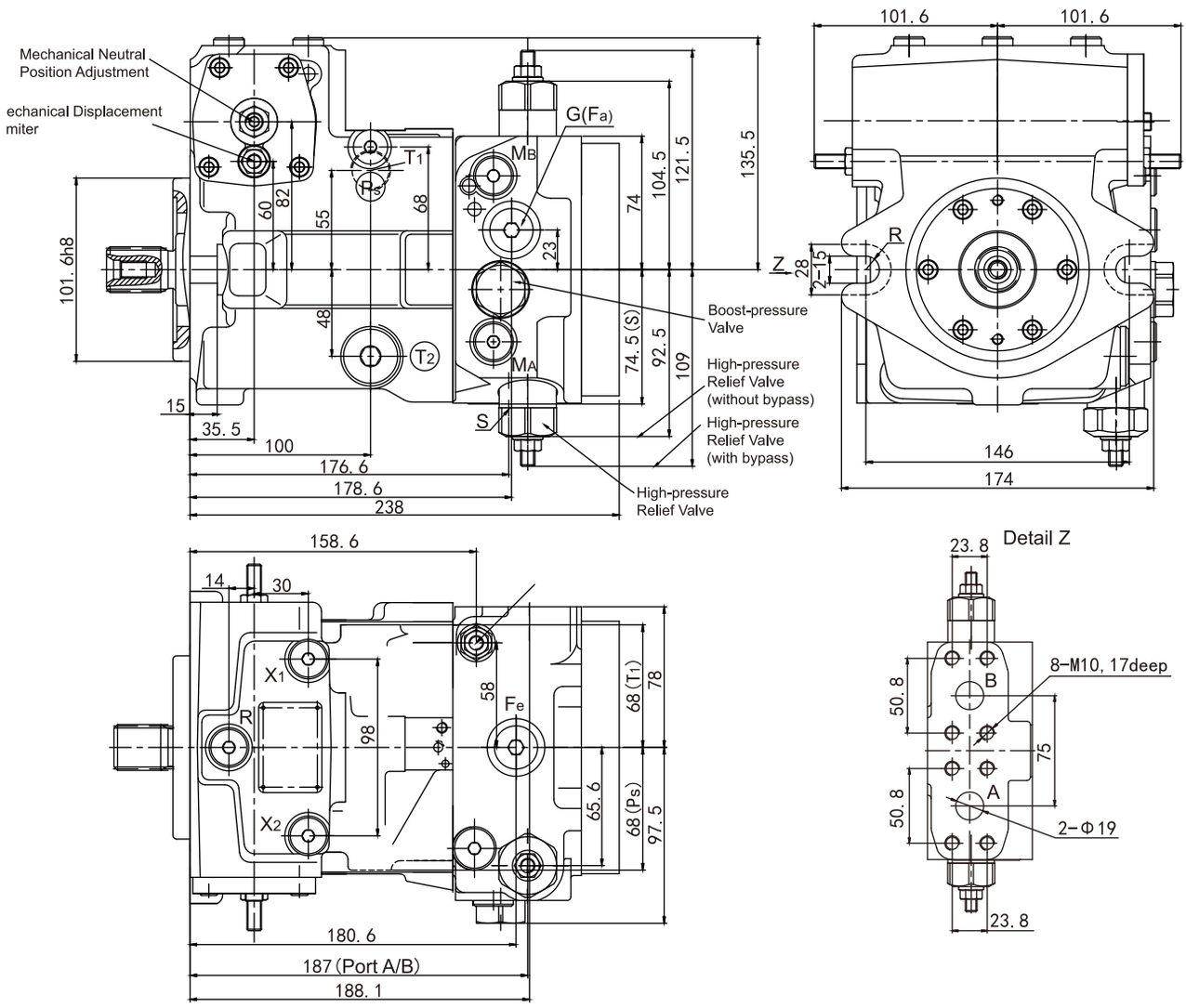


With through drive F01/KO1
Flange SAE J744-82-2(A)



Unit Dimensions (Dimensions in mm)

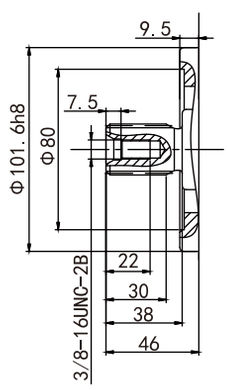
Size 45/53
Without control valve



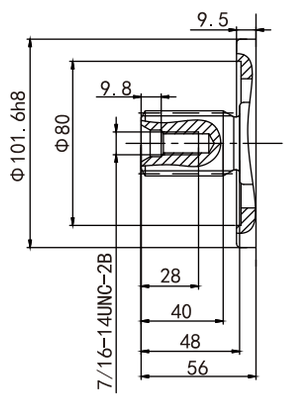
Ports

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)
Ø1"15T 16/32DP

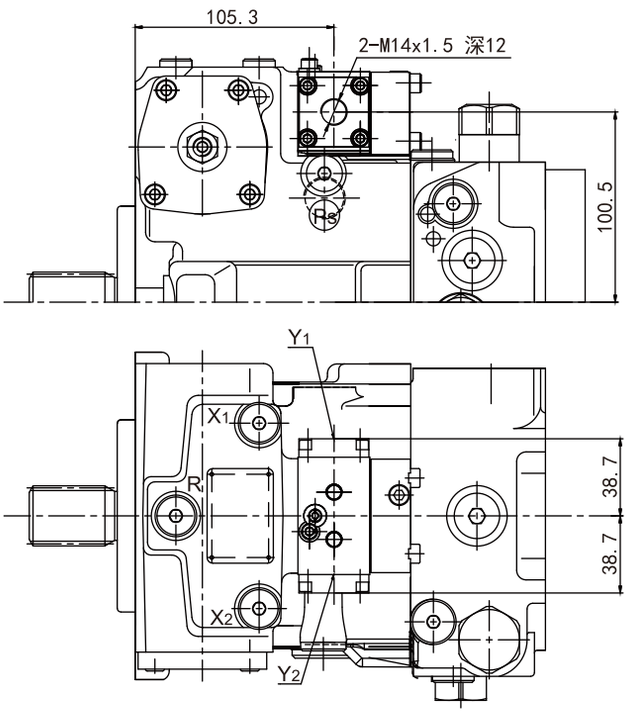


Drive shaft T
SAE J744-32-4(C)
Ø1 1/4"14T 12/24DP

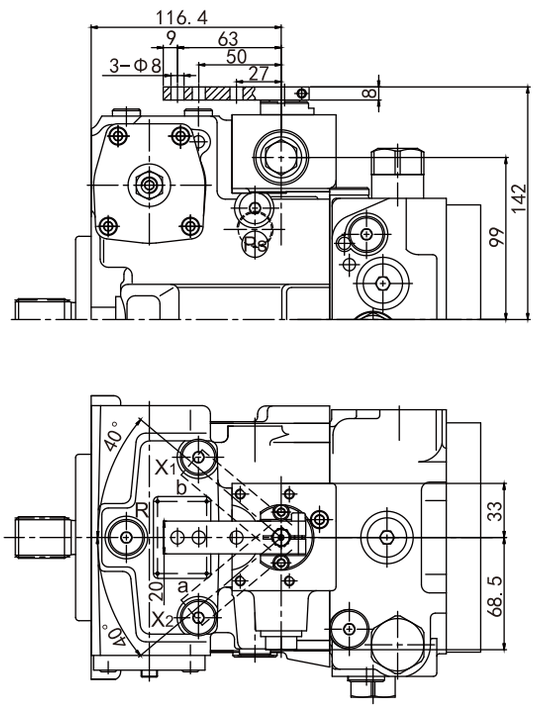


Unit Dimensions (Dimensions in mm)

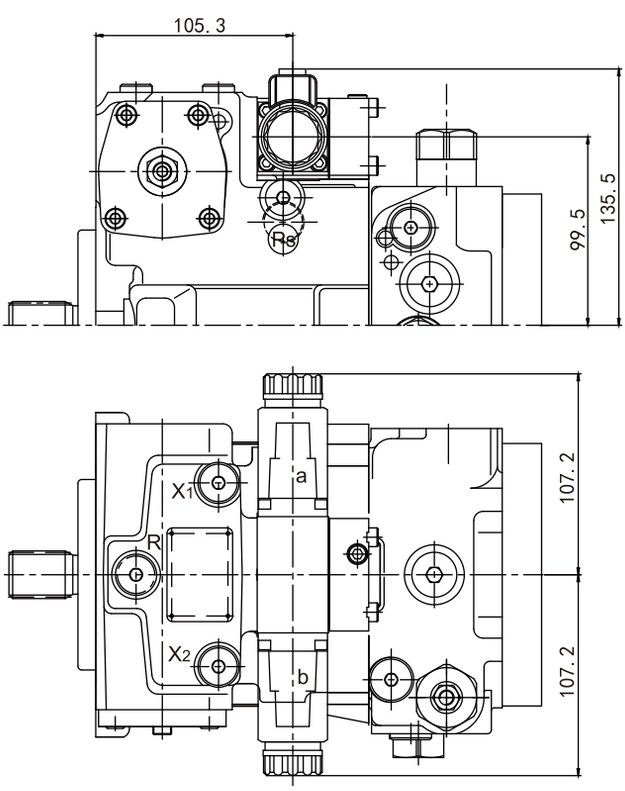
HD hydraulic control, pilot pressure related



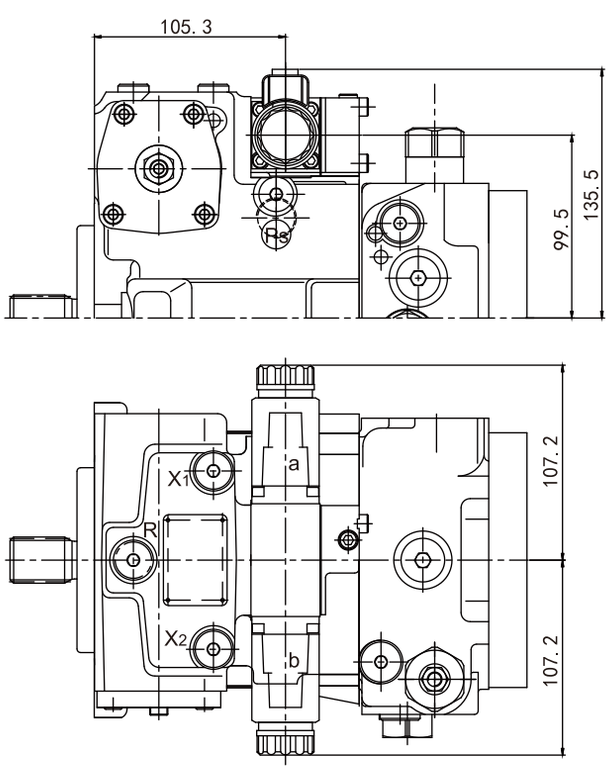
HW hydraulic control, mechanical servo



EP electric control, with proportional solenoid

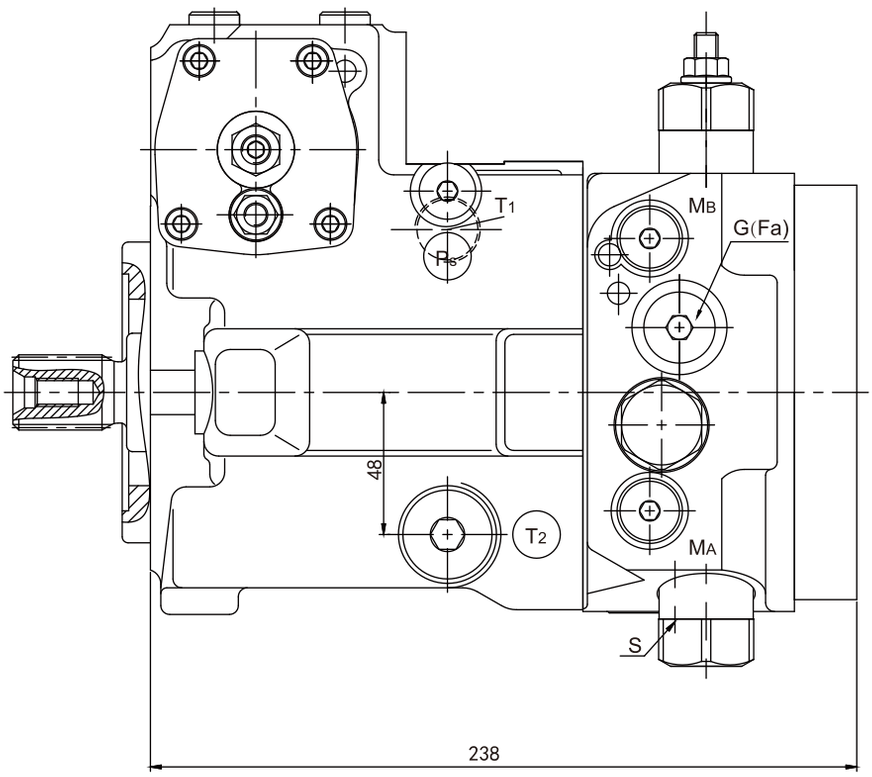


EZ electric control, with switching solenoid



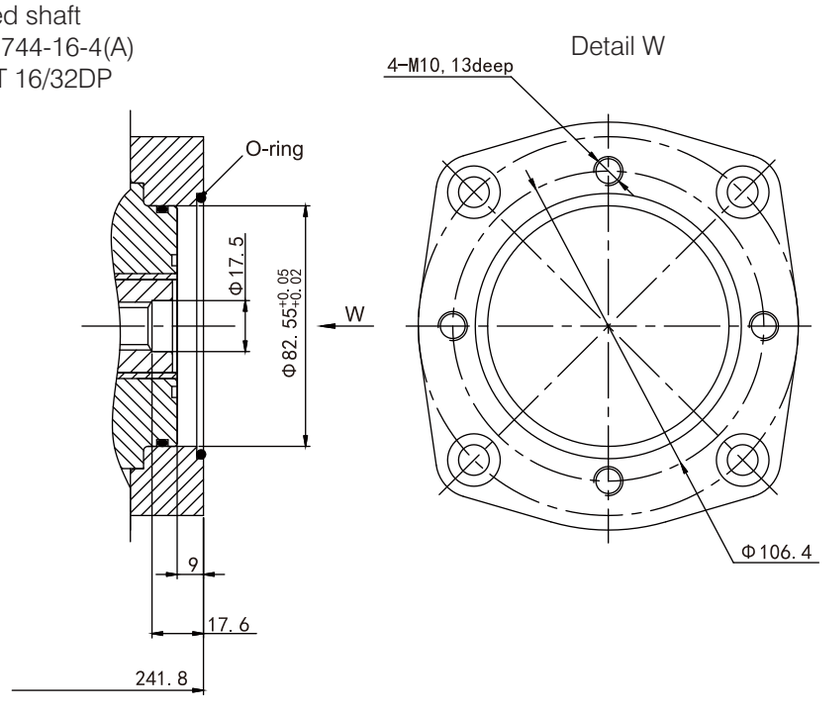
Unit Dimensions (Dimensions in mm)

Without through drive F00/NOO



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

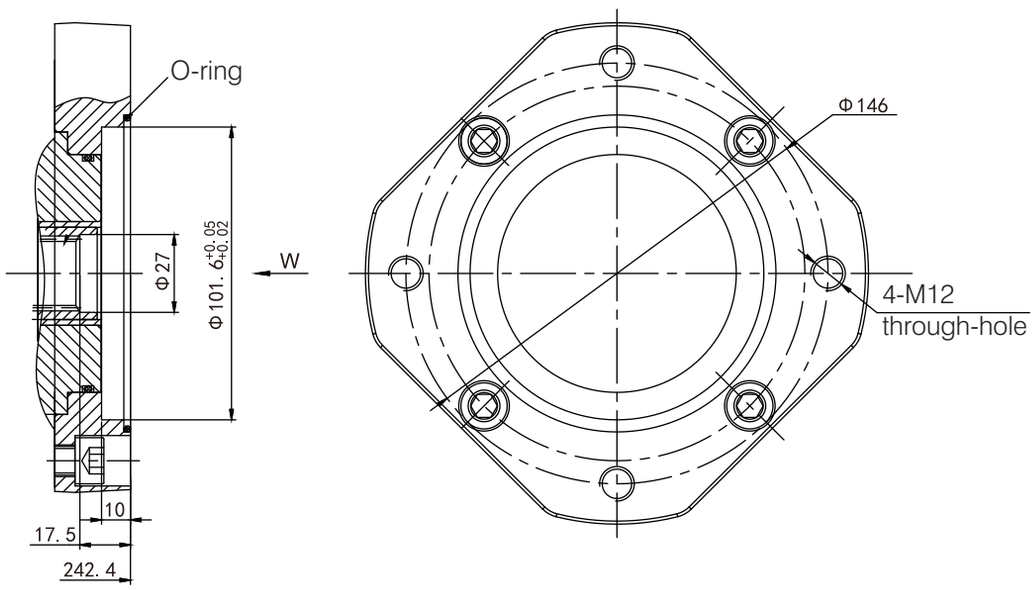
Splined shaft
SAE J744-16-4(A)
5/8”9T 16/32DP



Unit Dimensions (Dimensions in mm)

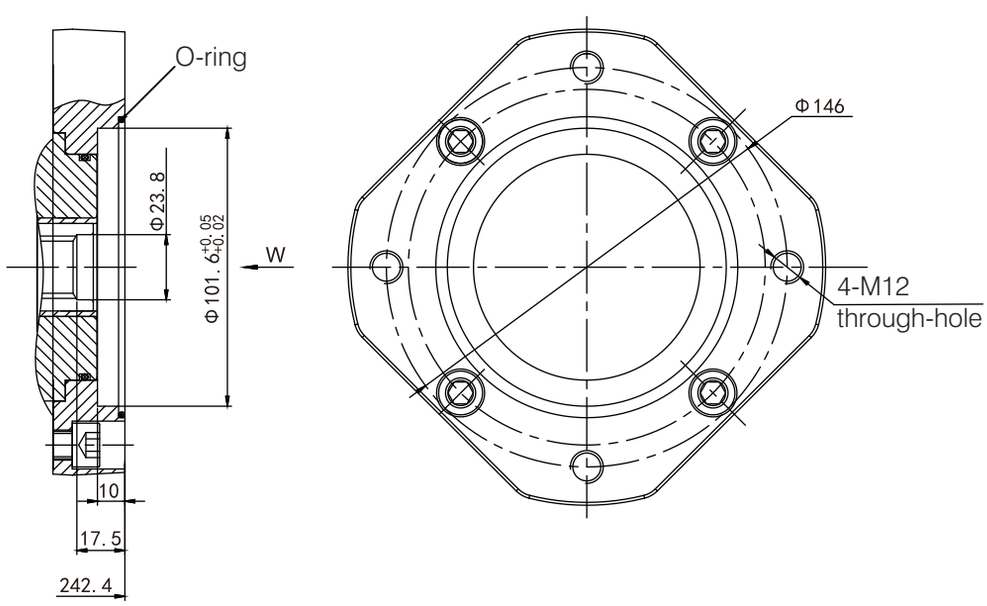
With through drive F04/KO4
Flange SAE J744-101-2(B)

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



With through drive F02/KO2
Flange SAE J744-101-2(B)

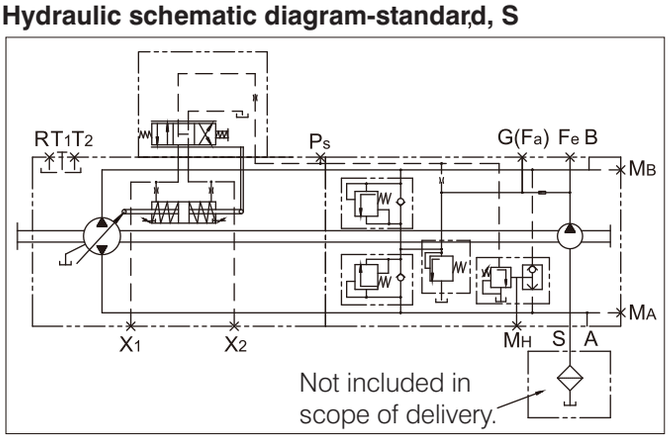
Splined shaft
SAE J744-101-2(B)
7/8”13T 16/32DP



Filter

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:
When $V=30mm^2/s$, $n=n_{max}$ $\Delta p \leq 0.1bar$
When $V=1000mm^2/s$, $n=n_{max}$ $\Delta p \leq 0.3bar$
Pressure at suction port S:
When $V=30mm^2/s$, $n=n_{max}$ $\Delta p \geq 0.8bar$
When Cold start ($V=1600mm^2/s$, $n=n_{max}$ $\Delta p \geq 0.5bar$
The filter is not included in the scope of delivery.

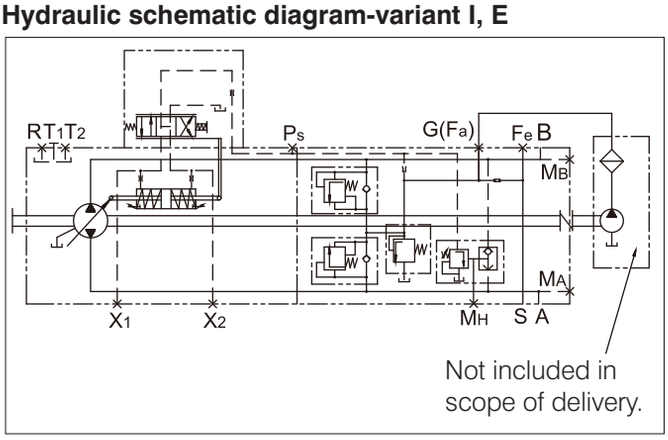
Hydraulic schematic diagram-standard, S



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 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

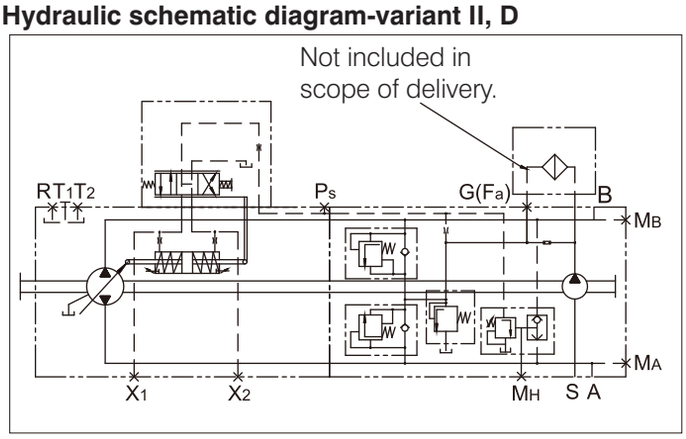


Variant II: Filtration in Boost Pump Pressure Line with Ports for External Boost Circuit Filtration, D

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



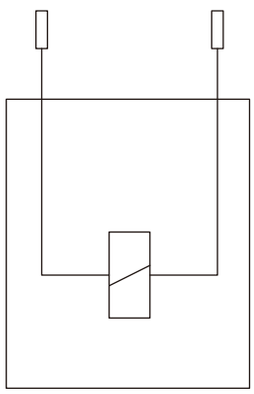
Connector for Solenoid

DEUTSCH DT04-2P-EP04, 2-pin
Molded, without bidirectional suppressor_____P

The following type of protection ensures with the installed mating connector:
IP67(DIN EN 60520)
IP69(DIN 60050-9)

Switching symbol

without bidirectional suppressor diode



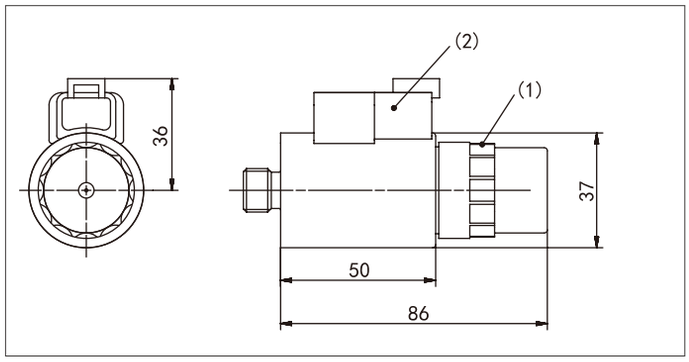
Mating connector

DEUTSCH DT06-2S-EP04

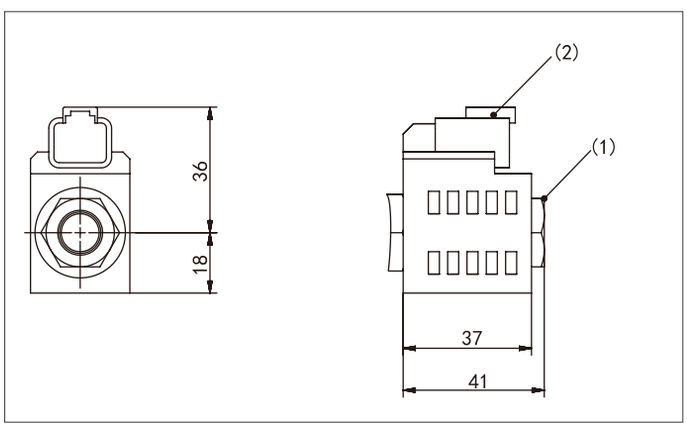
Consisting of	DT designation
1 housing	DT06-2S-EP04
1 wedge	W2S
2 sockets	0462-201-16141

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 operations.
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 posotions

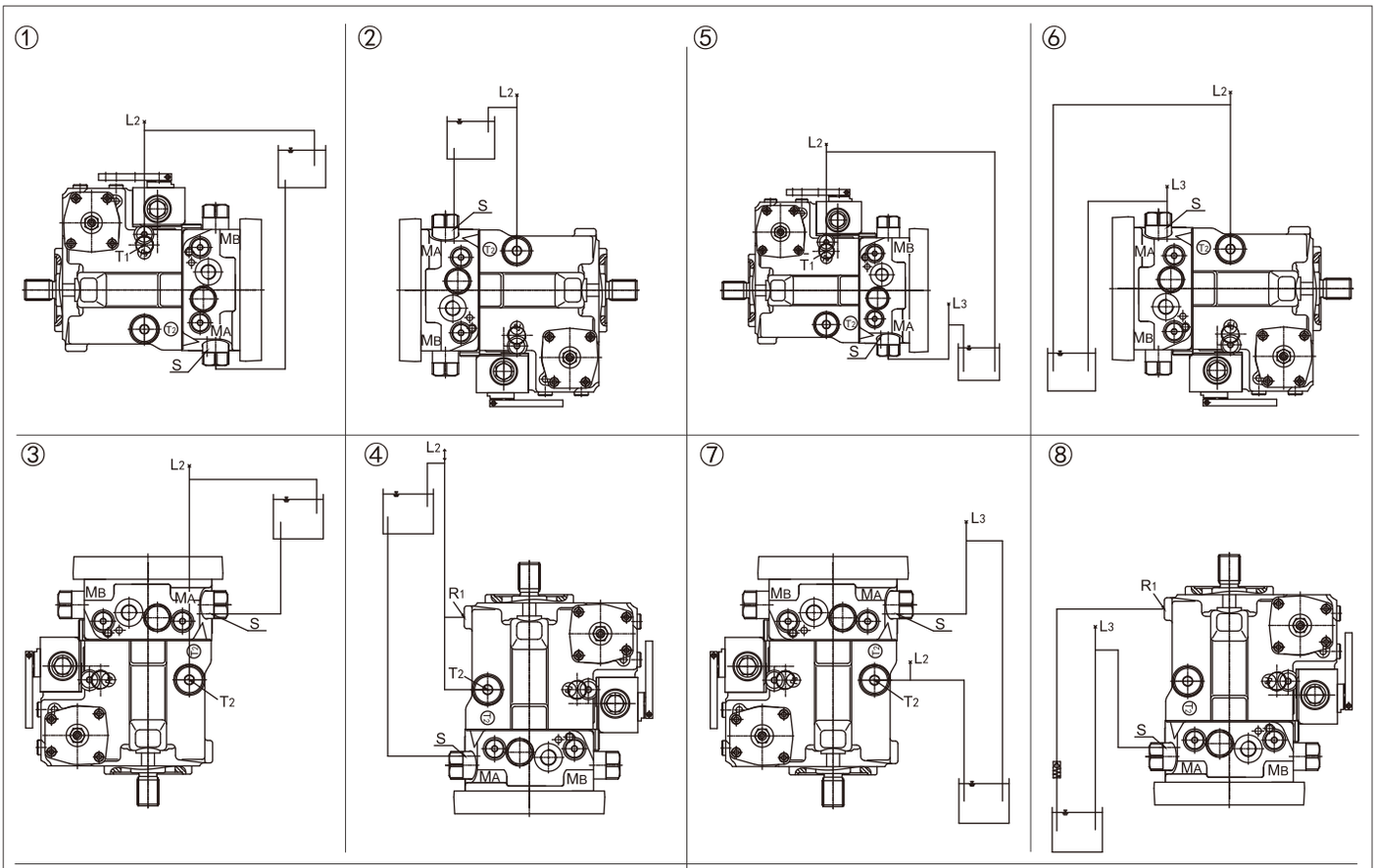
See the examples below. Other installation positions may be provided as required.

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):
Drawing 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+T_1(L_2)
2	L_2	S+T_2(L_2)
3	L_2	S+T_2(L_2)
4	R+L_2	S+T_2(L_2)

Installation position	Air bleed	Filling Port
5	R	T_1+L_3
6	L_2	S(L_3)+T_2
7	$L_{2+}L_3$	S(L_3)+T_2(L_2)
8	R+L_3	S(L_3)+T_2

The specified data is for product description purposes only and may not be deemed to be guaranteed unless expressly confirmed in the contract.

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