

Solenoid Operated Poppet Valve

Model: M-SEW10...1XJ



01

- ◆ Size 10
- ◆ Maximum working pressure 420/630 bar
- ◆ Maximum working flow 40 L/min

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Features

- Direct operated solenoid directional poppet valve
- Closed port without leakage
- Switching flexibility even in high-pressure state long periods
- Air-gap DC solenoid with detachable coils (AC voltage available after rectification)
- The solenoid coil can be rotated by 90°
- Individual electrical connection

Function description,sectional drawing

3/2-way directional seat valve

General:

The M-SEW10 directional valve is solenoid operated poppet valve. It controls the opening, closing and direction of the fluid. The valve is mainly composed of valve body (1), solenoid (2), hardened valve system (3) and ball (4) as the closing element. The manual emergency operation (5) can be control the valve when the solenoid is not energized.

Basic function:

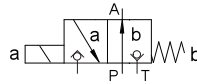
In the initial position, the spool (4) is pressed into the valve seat by the spring (9) and by the solenoid when in the switching position. The force of the solenoid (2) is applied to the actuating push rod (8) which is sealed on both sides through the lever (6) and the ball (7). The chamber between the two sealing elements is connected to the port P. Therefore, the valve system (3) is pressure compensated based on the actuating force (solenoid or spring). In this way, the valve can be used up to 630bar.

Note:

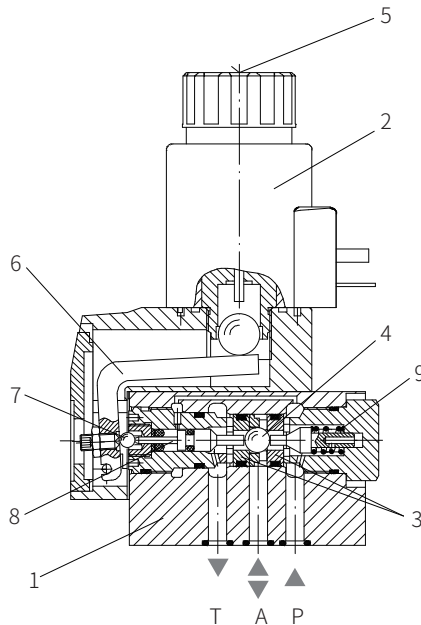
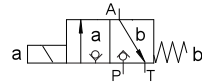
The 3/2-way poppet directional valve has "negative cover function". Therefore, the port T must be always connected. That means the ports P-A-T are connected to each during the switching process (from the starting of the opening of one valve seat to the closing of the other valve seat). But this process is completed in a very short time, so it is irrelevant in almost all applications. It must ensure that the specified maximum flow does not exceeded the performance limit of the valve.

If necessary, the cartridge throttle can be installed to limit the flow.

Symbol "U"



Symbol "C"

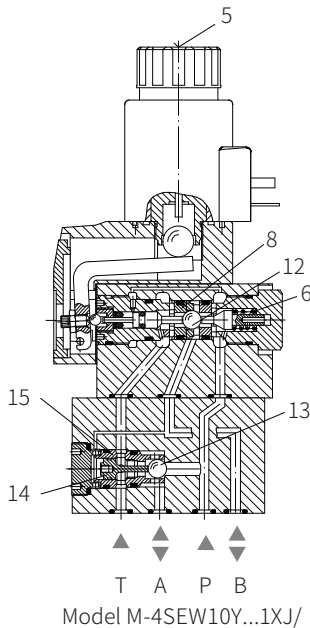


Model M-3SEW10U...XJ/

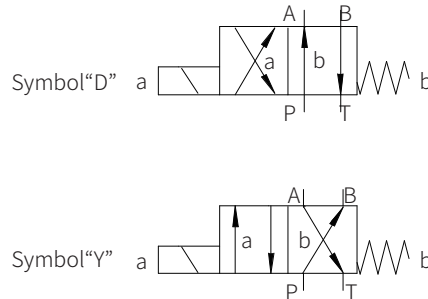
Function description,sectional drawing

4/2-way poppet directional valve

Initial position: When the solenoid is not energized, the force of the spring (6) keeps the ball spool (12) on the left valve seat (8). The port P is connected with A. The pump pressure oil acts on the large area of the control piston (15) through the control line from port A. The steel ball (13) is pushed to the other side of the valve seat (14), so the oil port P is connected to A and B to T. **Switching position:** After the solenoid is energized, the oil port A is connected to T. In addition, the control line from the oil port A acts on the large area of the control piston (15) to unload to the tank. The pressure oil provided from the oil port P pushes the steel ball (13) to the valve seat (14). At this time, the oil port P is connected to B.



The seat valve with plus-1 plate as bellow:

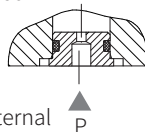


Cartridge throttle

Due to the working conditions limitations, it may occur that the flow exceeds the performance limit of the valve during the switching process, then the use of a throttle is required.

Example:

- Accumulator operation
- Used as a pilot valve with internal pilot oil supply



3/2-way poppet valve

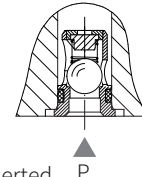
The throttle is inserted into the port P of the directional valve.

4/2-way poppet valve

The throttle is inserted into the oil port P of the plus-1 plate.

Cartridge check valve

The cartridge check valve allows free flow from P to A and leak-free closure from A to P.



3/2-way poppet valve

The cartridge check valve is inserted into the oil port P of the directional valve.

4/2-way poppet valve

The cartridge check valve is inserted into port P of the plus-1 plate.

Models and specifications

M	SEW	10	-1X	J	M	K4	*
3 working ports	=3						more information
4 working ports	=4						in text
poppet valve							sealing material
size 10	=10						No code= NBR seals
working port							V= FKM seals
Functional symbols	3	4					(consult for other seals)
	●	-	= U				No code= without cartridge
	●	-	= C				check valve and cartridge throttle
	-	●	= D				P= with cartridge check valve
	-	●	= Y				B12= throttle Ø1.2mm
							B15= throttle Ø1.5mm
							B18= throttle Ø1.8mm
							B20= throttle Ø2.0mm
							B22= throttle Ø2.2mm
							electrical connection
							K4= no insert plug
							Z5L= large right angle lamp plug
							N9= with hidden manual
							emergency operation
							No code= no manual
							emergency operation
10 to 19 series			=1X				
(10 to 19 series installation and connection size unchanged)							
Rekith			=J				
working pressure up to 420 bar (fixing screw M6)			=420				
working pressure up to 630 bar (fixing screw M8)			=630				
solenoid with detachable coil (air-gap)			=M				
24VDC			=G24				
205V DC			=G205				

Technical parameters

Overview			
Installation position		Optional	
Environment temperature range °C		-30 to +50 (NBR seal) -20 to +50 (FKM seal)	
Weight	3/2-way valve	kg	2.0
	4/2-way valve	kg	3.5
Hydraulic			
Maximum working pressure		bar	See characteristic limit
Maximum flow		L/min	40
Pressure medium		Mineral oil (HL, HLP) ¹⁾ in accordance with DIN 51524; Fast living organisms degraded oil according to VDMA 24568; HETG (Rapeseed oil) ¹⁾ ; HEPG (Polyethyleneglycol) ²⁾ ; HEES (Synthetic Fats) ²⁾	
Pressure medium temperature range °C		-30 to +80 (NBR seal) -20 to +80 (FKM seal)	
Viscosity range		mm ² /s	2.8 to 500
Cleanliness of oil ⁴⁾		The maximum allowable pollution level of oil is ISO4406 Class 20/18/15	

Technical parameters

Electrical			
Voltage type		DC	AC
Available voltage ³⁾	V	24, 205	Only available via rectifier
Allowable voltage tolerance (nominal voltage)	%	±10	
Power consumption	W	30	
Continuous power on time	%	100	
Switch time to ISO 6403		See below table	
Switching frequency	T/h	15000 (working pressure ≤ 350bar)/3600 (working pressure ≥ 350bar)	
Protection type to DIN 40050		IP65 with plug installed and fixed	
Maximum coil temperature	°C	150	

- 1) For NBR and FKM seal
- 2) Only for FKM seal
- 3) The oil must meet the cleanliness degree requested by the components in the hydraulic system.
Effective oil filtration can prevent failure and increase the service life of the components.
- 4) Please inquire for special voltages

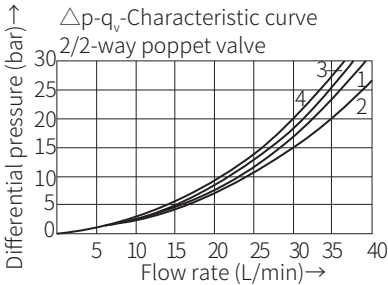
Electrical protective conductor(PE ≠)
must be connected properly as rules

Switching time t_{ms} (Installation position: solenoid installed horizontally)

Pressure P bar	Flow q _v L/min	DC Solenoid						AC Solenoid + Rectifier							
		Functional symbol U, C, D, Y						Functional symbol U, C, D, Y							
		t _{on} No tank pressure				t _{off}		t _{on} No tank pressure				t _{off}			
		U	C	D	Y	U/C	D/Y	U	C	D	Y	U	C	D	Y
140	40	20	40	20	40	12	17	20	40	20	40	60	45	40	50
280	40	25	45	20	45	12	17	20	45	25	45	60	45	45	55
320	40	25	45	20	45	12	17	25	45	25	45	60	45	45	55
420	40	30	45	20	50	12	17	25	45	25	50	60	45	45	55
500	40	30	45	20	50	12	17	30	50	30	50	65	50	60	60
600	40	30	50	20	50	12	17	30	50	30	50	65	50	60	60

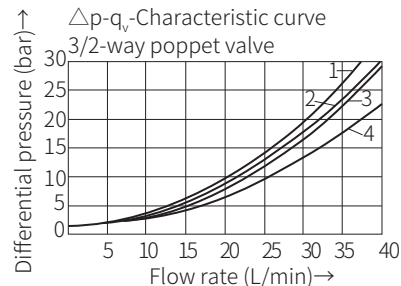
Characteristic curve

(Measured when using HLP46, $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$)



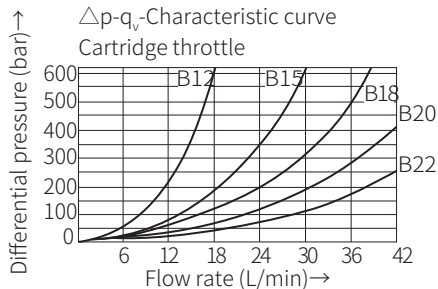
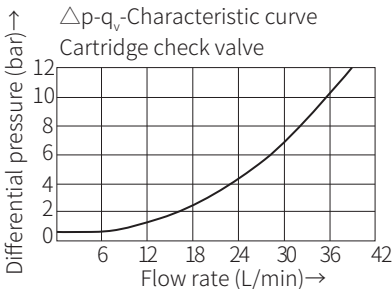
1 M - 3SEW10C..., P→A 3 M - 3SEW10U..., P→A

2 M - 3SEW10C..., A→T 4 M - 3SEW10U..., A→T



1 M - 4SEW10^D..., A→T 3 M - 4SEW10^D..., P→B

2 M - 4SEW10^D..., P→A 4 M - 4SEW10^D..., B→T



Characteristic limit

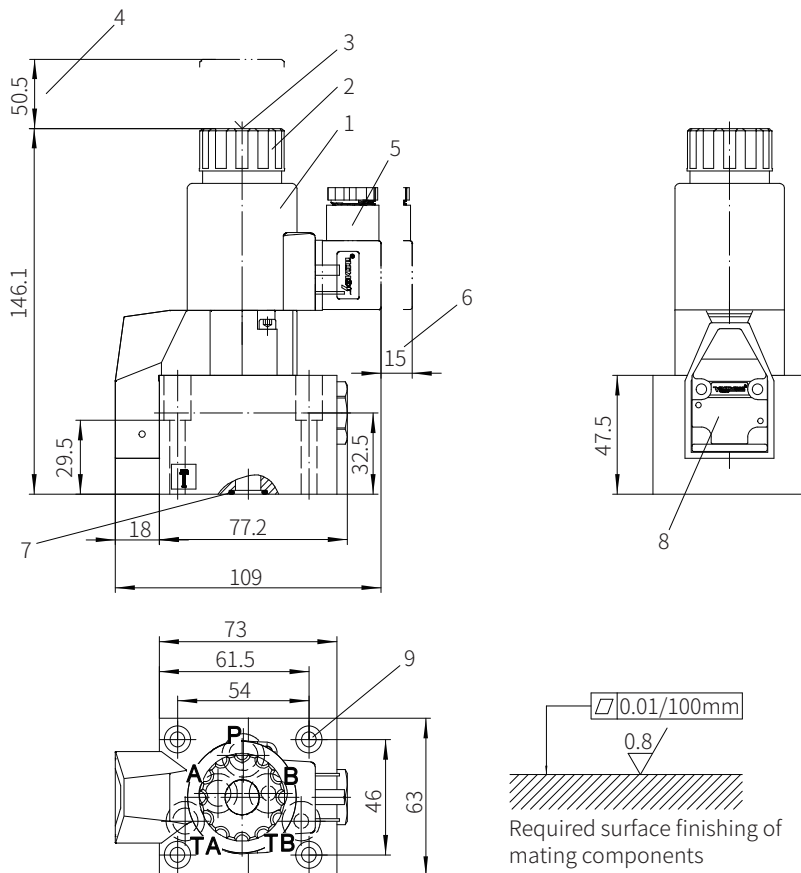
(Measured when using HLP46, $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$)

	Functional symbol	Comment	Working pressure bar				Flow L/min
			P	A	B	T	
Three-way circuit		Oil port pressure $P \geq A \geq T$	420/630	420/630		100	40
			420/630	420/630		100	40
Two-way circuit (only for unloading function)		Pressure must be maintained in port A before switching from the original position to the switching position. Oil port pressure $A \geq T$		420/630		100	40
		Oil port pressure $A \geq T$		420/630		100	40
Four-way circuit (flow only in the direction of the arrow)		Single poppet valve (symbol "U") with plus-1 plate $P \geq A \geq B \geq T$	420/630	420/630	420/630	100	40
		Double poppet valve (symbol "C") with plus-1 plate $P \geq A \geq B \geq T$	420/630	420/630	420/630	100	40

The characteristic limit is measured when the solenoid is at operating temperature, at 10% below the standard voltage and without tank preloading.

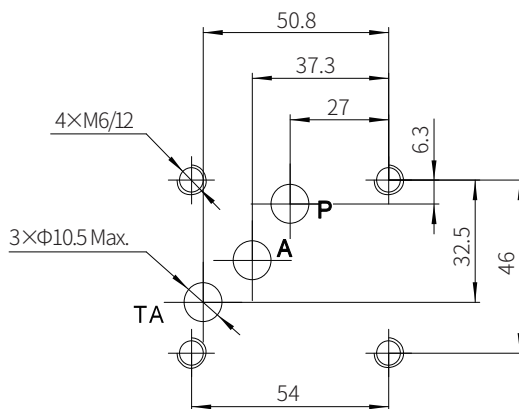
Component size
Size unit: mm

3/2-way poppet directional valve, 420 bar



- 1 Solenoid
- 2 Solenoid nut
- 3 Hidden emergency button
- 4 Space required to remove nut
- 5 Plug
- 6 Space required to remove plug
- 7 O ring 12x2 (for oil port A, B, T)
- O ring 14.2x1.78 (for oil port P)
- 8 Name plate
- 9 Valve connection hole

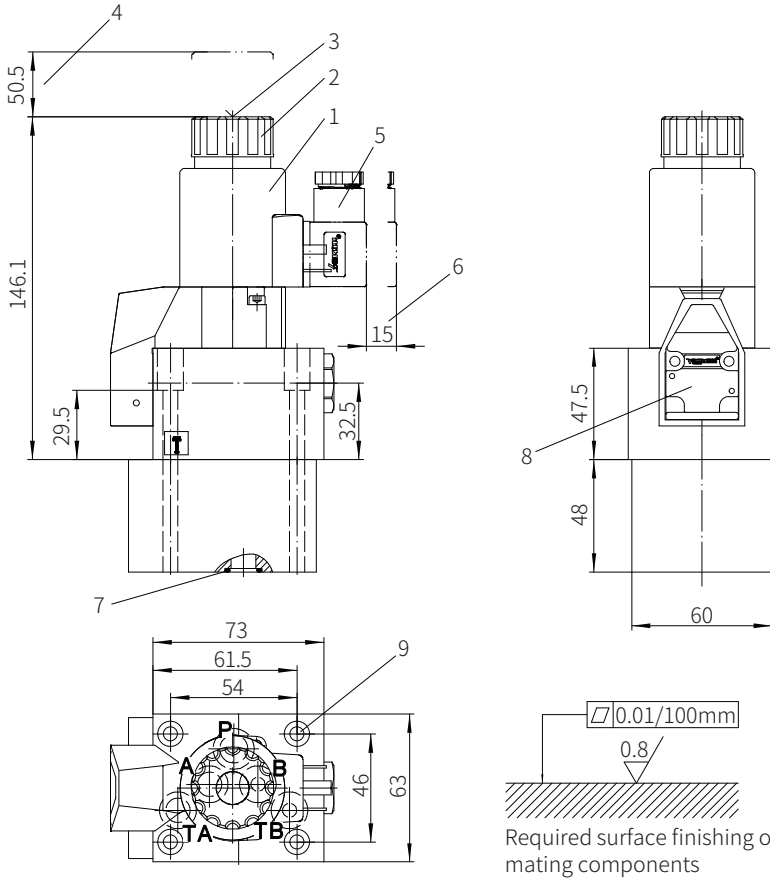
Valve fixing screw
 M6x40-10.9 grade GB/T70.1-2000
 Tightening torque $M_A=13.7\text{Nm}$



Component size

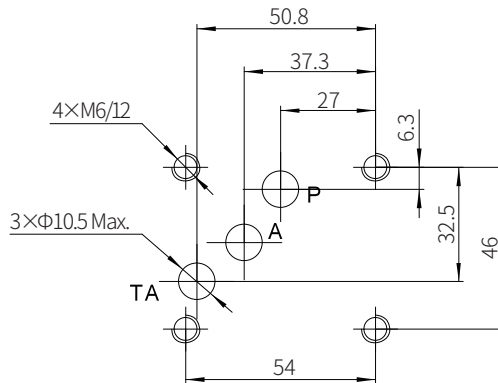
Size unit: mm

4/2-way poppet directional valve, 420 bar



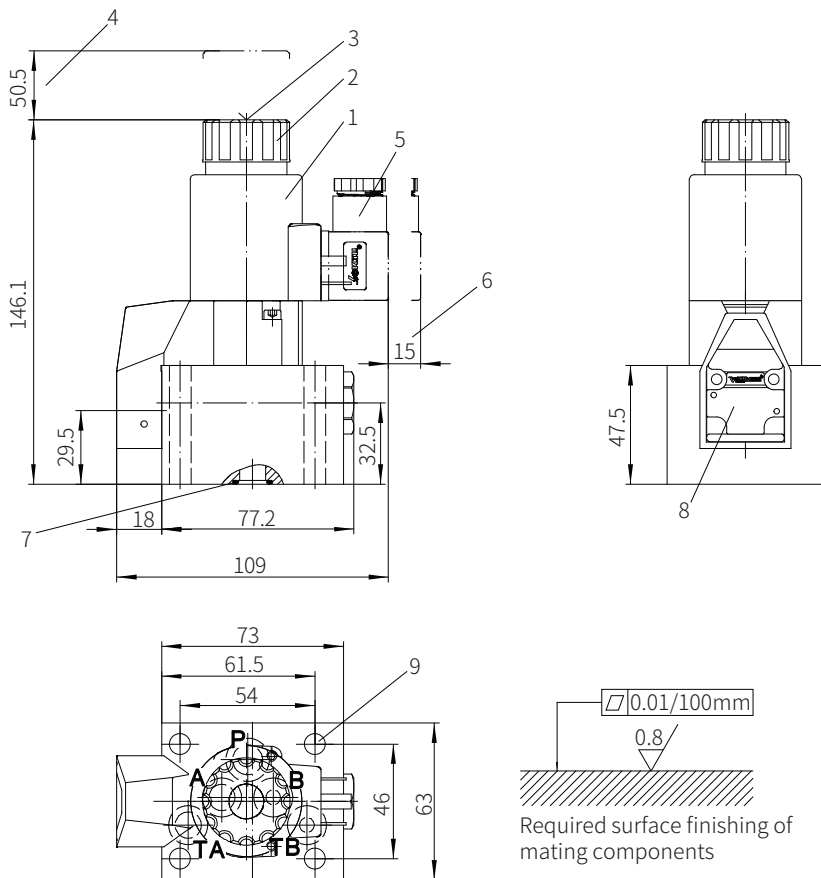
- 1 Solenoid
- 2 Solenoid nut
- 3 Hidden emergency button
- 4 Space required to remove nut
- 5 Plug
- 6 Space required to remove plug
- 7 O ring 12x2 (for oil port A, B, T)
- O ring 14.2x1.78 (for oil port P)
- 8 Name plate
- 9 Valve connection hole

Valve fixing screw
M6x90-10.9 grade GB/T70.1-2000
Tightening torque $M_A=13.7\text{Nm}$



Component size
Size unit: mm

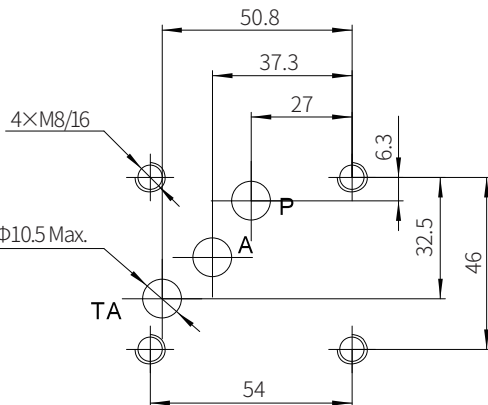
3/2-way poppet directional valve, 630 bar



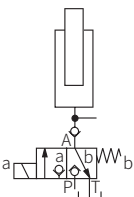
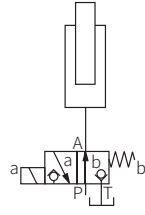
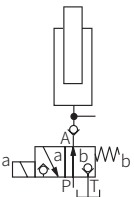
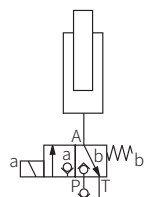
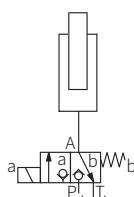
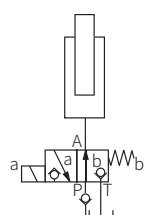
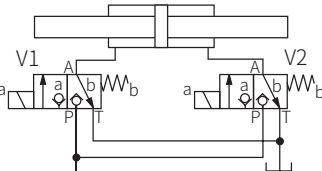
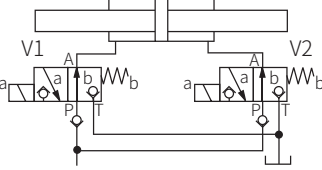
- 1 Solenoid
- 2 Solenoid nut
- 3 Hidden emergency button
- 4 Space required to remove nut
- 5 Plug
- 6 Space required to remove plug
- 7 O ring 12x2 (for oil port A, B, T)
- O ring 14.2x1.78 (for oil port P)
- 8 Name plate
- 9 Valve connection hole

Valve fixing screw

M8x60-10.9 grade GB/T70.1-2000

 Tightening torque $M_A=34.3\text{Nm}$


Application examples

These examples only indicate some applications of the poppet valve but not include all functions.			
Symbol C 	2/2-way circuit with two poppet valves and check valve at port A The check valve must be installed on the pipeline. Initial position: the flow is blocked and the maximum pressure is allowed. Due to the check valve at port A, the pressure is held in the actuator even when the pump is turned off. Switching position: The fluid flows freely and the maximum pressure is allowed. The oil is drained via port T. The only oil leakage occurring is that the oil flows to port T during the switching process.	Symbol U 	3/2-way circuit with a single poppet valve Initial position: Lifting The maintenance of position only depends on the stroke limit and the pressure at port P. Switching position: Descending
Symbol U 	2/2-way circuit with a single poppet valve and check valve at port A The check valve must be installed on the pipeline. Initial position: The fluid flows freely and the maximum pressure is allowed. Due to the check valve at port A, the pressure is held in the actuator even when the pump is turned off. Switching position: The flow blocked and the maximum pressure is allowed. The oil is drained via port T. The only oil leakage occurring is that the oil flows to port T during the switching process.	Symbol C 	3/2-way circuit with two poppet valves and cartridge check valve at port A The check valve is installed at port P of the 3/2-way directional poppet valve. Initial position: Descending Switch position: Lifting The load can be held in any position when the pump is turned off and the solenoid is energized.
Symbol C 	3/2-way circuit with two poppet valves Initial position: Descending Switch position: Lifting The maintenance of position only depends on the stroke limit and the pressure at port P.	Symbol U 	3/2-way circuit with a single poppet valve and cartridge check valve at port P The check valve is installed at port P of the 3/2-way poppet valve. Initial position: Lifting The load can be held in any position when the pump is turned off. Switching position: Descending
Symbol C 	4/3-way (4/4-way) circuit with two poppet valves V1 and V2 in the initial position: both ends of the cylinder are connected to the oil tank port. V2 in the switching position: the piston moves to the left. V1 in the switching position: the piston moves to the right. V1 and V2 in the switching position: both ends of the cylinder are connected to the pump port. The fast movement is possible when a single rod cylinder with an area ratio of 2:1 is used. Attention! When using single rod cylinders, the performance limit (double flow) of the valve and the maximum permissible working pressure (overpressure) must be taken into account!		
Symbol U 	4/3-way (4/4-way) circuit with two poppet valves and cartridge check valve at port P of the 3/2-way poppet valve V1 and V2 in the initial position: the piston is locked externally to prevent oil flow. V2 in the switching position: the piston moves to the right. V1 in the switching position: the piston moves to the left. V1 and V2 in the switching position: both ends of the cylinder are connected to the tank port. Attention! When using single rod cylinders, the performance limit (double flow) of the valve and the maximum allowable working pressure (overpressure) must be taken into account!		