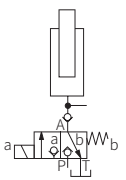
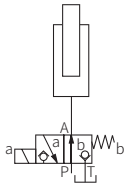
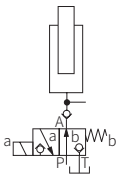
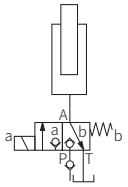
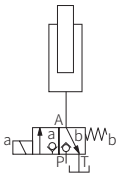
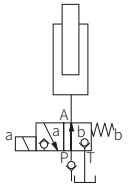
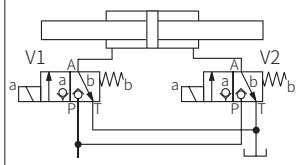
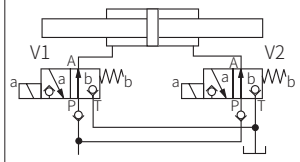
Application examples

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!		

Solenoid Operated Poppet Valve

Model: M-SEW10...1XJ

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

Contents

Function description,sectional drawing	02-03
Models and specifications	04
Technical parameters	05
Characteristic curve	06
Characteristic limit	06
Component size	07-09
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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.

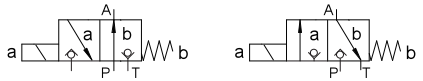
Basic function:

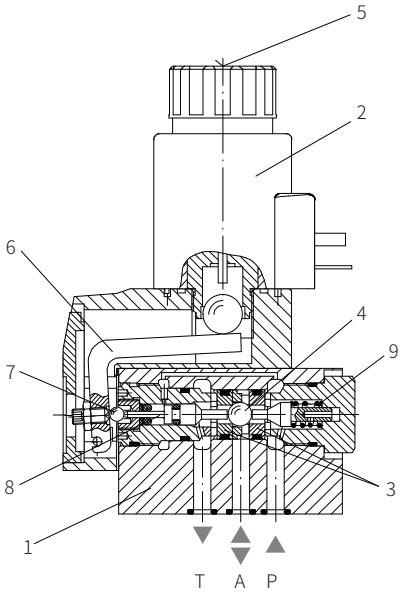
In the initial position, the spool (4) is pressed into the valve seat by the spring (9) and by the solenoid when in the switching position. The force of the solenoid (2) is applied to the actuating push rod (8) which is sealed on both sides through the lever (6) and the ball (7). The chamber between 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"



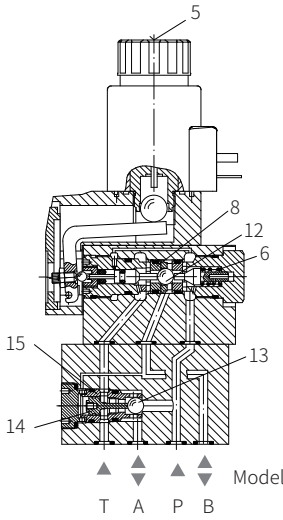


Model M-3SEW10U...XJ/

Function description, sectional drawing

4/2-way poppet directional valve

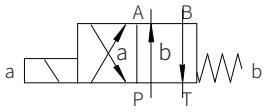
Initial position: When the solenoid is not energized, the force of the spring (6) keeps the ball spool (12) on the left valve seat (8). The port P is connected with A. The pump pressure oil acts on the large area of the control piston (15) through the control line from port A. The steel ball (13) is 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 additional, 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.



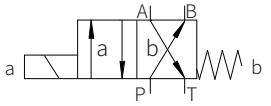
Model M-4SEW10Y...1XJ/

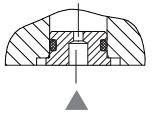
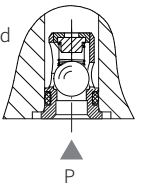
The seat valve with plus-1 plate as bellow:

Symbol "D"



Symbol "Y"



Cartridge throttle	Cartridge check valve
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.	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
4 working ports=4

poppet valve

size 10 =10

working port
Functional symbols

3	4	
●	–	= U
●	–	= C
–	●	= D
–	●	= Y

●=available

10 to 19 series =1X
(10 to 19 series installation and connection size unchanged)

Rexroth =J

working pressure up to 420 bar =420
(fixing screw M6)
working pressure up to 630 bar =630
(fixing screw M8)

solenoid with detachable coil (air-gap) =M

G24= 24VDC
G205= 205VDC

No code= no manual emergency operation
N9= with hidden manual emergency operation

electrical connection
K4= no insert plug
Z5L= large right angle lamp plug

No code= without cartridge check valve and cartridge throttle
P= with cartridge check valve
B12= throttle Ø1.2mm
B15= throttle Ø1.5mm
B18= throttle Ø1.8mm
B20= throttle Ø2.0mm
B22= throttle Ø2.2mm

sealing material
No code= NBR seals
V= FKM seals
(consult for other seals)

more information in text

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			-30 to +80 (NBR seal)	
			-20 to +80 (FKM seal)	
Viscosity range		mm^2/s	28 to 500	
Cleanliness of oil[4]			The maximum allowable pollution level of oil is IS04406 Class 20/18/15	
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		times/hour	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 seal and FKM seal
2) Only for FKM seal
3) Please consult for special voltage

4) The oil must meet the cleanliness degree requested by the components in the hydraulic system.
Effect oil filtration can prevent failure and increase the service life of the components.

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

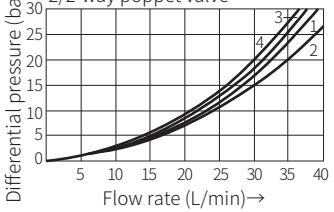
Switching time tms (Installation position: solenoid installed horizontally)

Pressure P bar	Flow q_v L/min	DC Solenoid Functional symbol U, C, D, Y						AC Solenoid + Rectifier 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

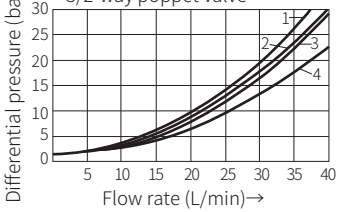
Characteristic curve

(Measured when using HLP46, ϑ_{oil}=40°C ± 5°C)

p-q_v- characteristic curve
2/2-way poppet valve



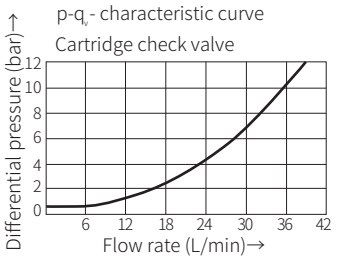
p-q_v- characteristic curve
3/2-way poppet valve



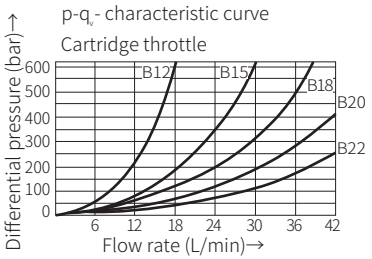
1 M - 3SEW10C..., P to A 3 M - 3SEW10U..., P to A
2 M - 3SEW10C..., A to T 4 M - 3SEW10U..., A to T

1 M - 4SEW10$^{D}_{Y}$..., A to T 3 M - 4SEW10$^{D}_{Y}$..., P to B
2 M - 4SEW10$^{D}_{Y}$..., P to A 4 M - 4SEW10$^{D}_{Y}$..., B to T

p-q_v- characteristic curve
Cartridge check valve



p-q_v- characteristic curve
Cartridge throttle



Characteristic limit

(Measured when using HLP46, ϑ_{oil}=40°C ± 5°C)

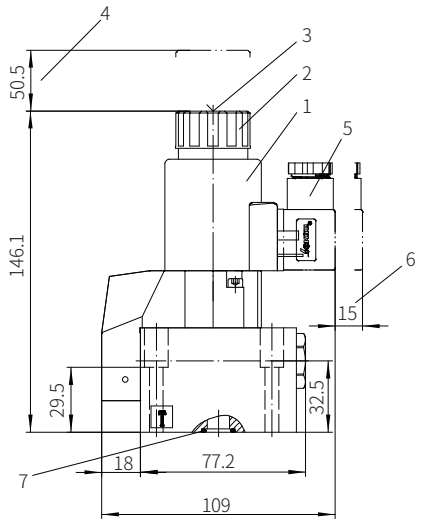
	Functional symbol	Comment	Working pressure bar P	A	B	T	Flow L/min
Three-way circuit	"U"	Oil port pressure P≥A≥T	420/630	420/630		100	40
	"C"		420/630	420/630		100	40
Two-way circuit (only for unloading function)	"U"	Pressure must be maintained in port A before switching from the original position to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

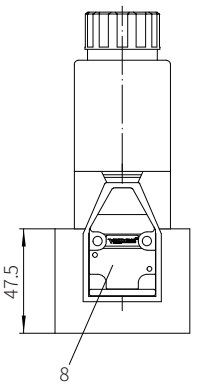
The characteristic limit is measured when the solenoid is at operating temperature, at 10% below the standard voltage and without tank preloading.

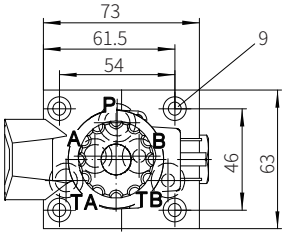
Component size

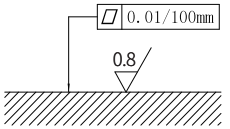
Size unit: mm

3/2-way poppet directional valve, 420 bar





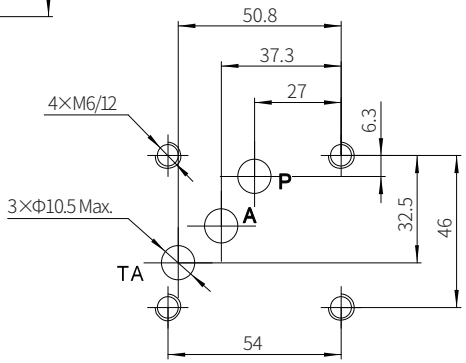




Required surface finishing of mating components

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

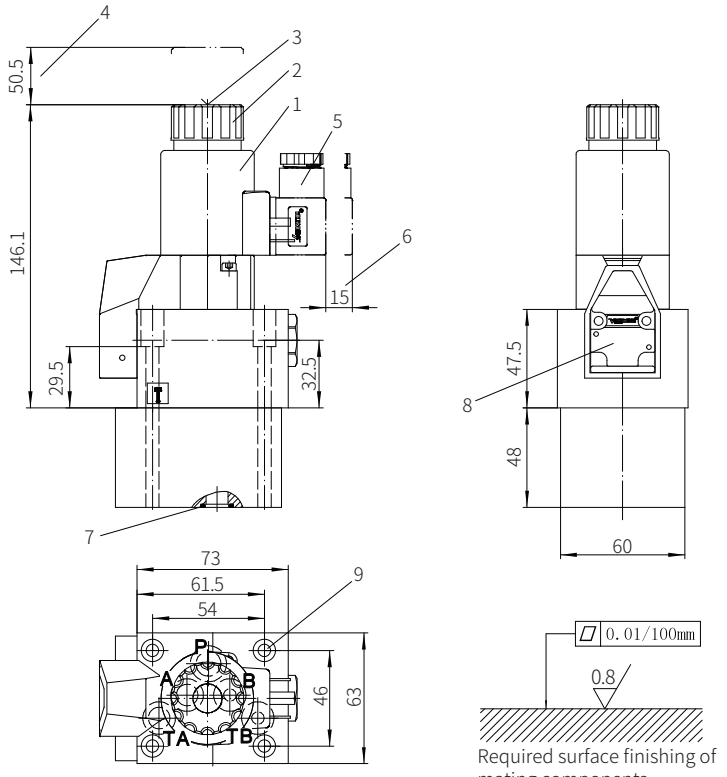
Valve fixing screw
M6x40-10.9 grade GB/T70.1-2000
Tightening torque M_A=13.7Nm



Component size

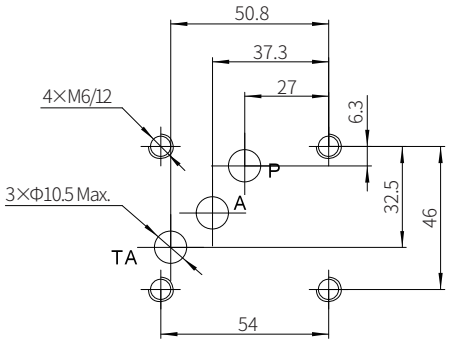
Size unit: mm

4/2-way poppet directional valve, 420 bar



Required surface finishing of mating components

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

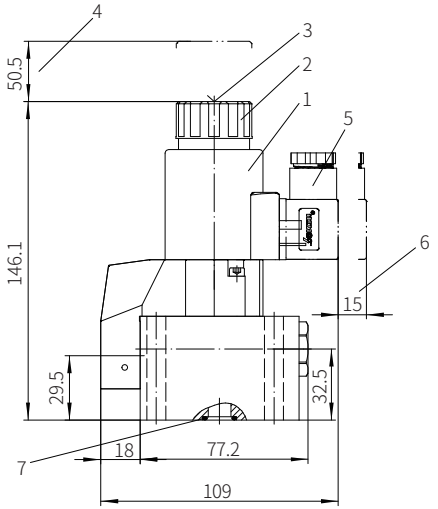


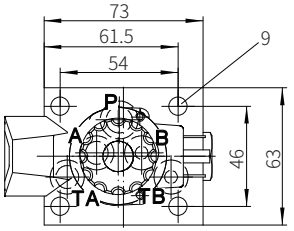
Valve fixing screw
M6x90-10.9 grade GB/T70.1-2000
Tightening torque M_A=13.7Nm

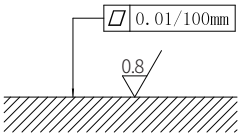
Component size

Size unit: mm

3/2-way poppet directional valve, 630 bar

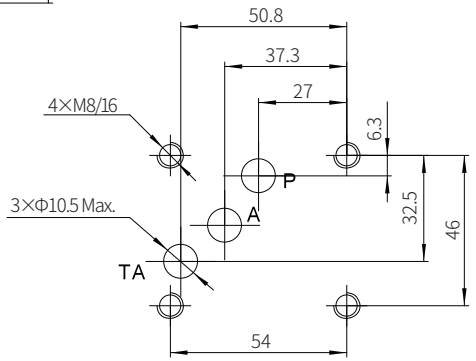






Required surface finishing of mating components

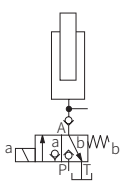
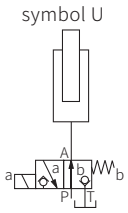
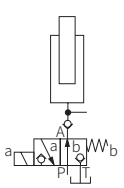
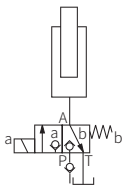
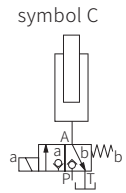
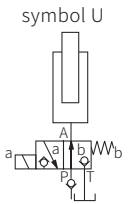
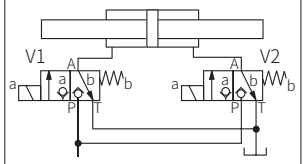
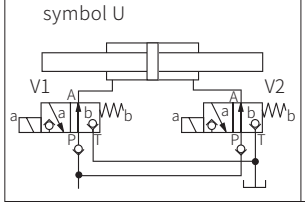
1 Solenoid
2 Solenoid nut
3 Hidden emergency operation
4 Space required to remove nut
5 Plug
6 Space required to remove plug
7 O ring 12x2 (for oil port A, B, T)
O ring 14.2x1.78 (for oil port P)
8 Name plate
9 Valve connection hole



Valve fixing screw
M8x60-10.9 grade GB/T70.1-2000
Tightening torque M_A=34.3Nm

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 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 is 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 P The check valve is installed at port P of the 3/2-way poppet valve. Initial position: Descending Switching 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 Switching 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 switching position: the piston moves to the left. V1 in switching position: the piston moves to the right. V1 and V2 in 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 switching position: the piston moves to the right. V1 in switching position: the piston moves to the left. V1 and V2 in switching position: both ends of the cylinder are connected with the oil tank port. 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!		

Solenoid Operated Poppet Valve

Model: M-SED6...1XJ

- Size 6
- Maximum working pressure 350 bar
- Maximum working flow 25 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
- Wet-pin DC solenoid with detachable coil (AC voltage available via rectifier)
- The coil can be rotated by 90°
- Replace the coil without opening the pressure chamber
- Individual electrical connection