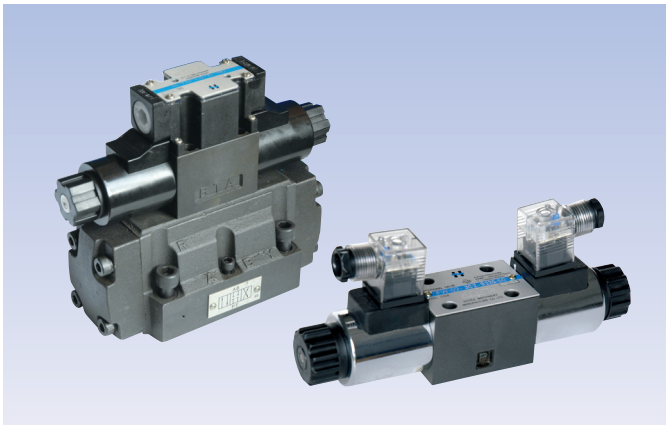
电磁换向阀 Electrical Operated Directional Control Valve



功能说明 Function Instruction

电磁换向阀是用电磁铁推动阀芯，从而变换流体流动方向的控制阀。

电磁换向阀可直接用在液压系统中，控制油路的通断和切换；也可作先导阀，用来操纵其它阀。

Electrical operated directional control valve uses solenoid to pull the spool and change the direction of the hydraulic oil. Electrical operated directional control valve can directly control the flow on-off and change. It also can be used as the pilot-operated valve, which could operate other valves.

型号说明 Model description

FW-X X-X-X X X/X X 50 *

电磁换向阀
Electrical operated directional control valve

规格Specification
02 6通径 NS6
03 10通径 NS10

接线形式
Connect type
省略 插座式
Omit Plug type
Z6 线盒式
Z6 Wire box type

滑阀机能
Function code
详见机能符号表
Details as following symbol table

工作电压Working voltage
D12 DC12V
D24 DC24V
A110 AC110V
A220 AC220V
B110 AC110V本整Rectified
B220 AC220V本整Rectified

Z4 方形插头Square connector
Z5 方形大插头Large square connector
Z5L 方形带灯插头Square connector with light

省略 无应急推杆
Omit without emergency push rod
N9 带应急推杆
N9 With emergency push rod

省略 无阻尼Omit No damp
08 ø0.8阻尼 Damp
10 ø1.0阻尼 Damp
12 ø1.2阻尼 Damp

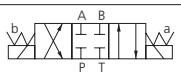
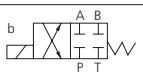
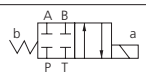
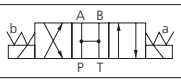
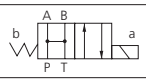
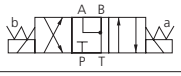
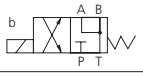
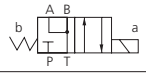
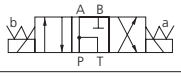
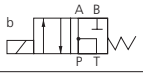
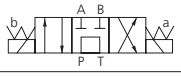
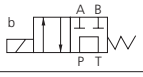
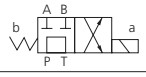
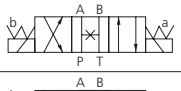
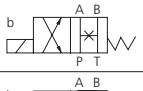
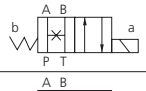
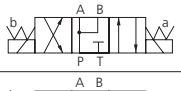
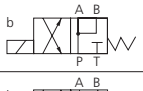
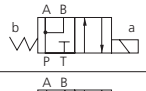
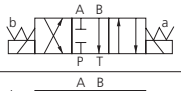
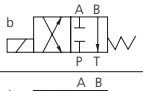
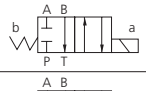
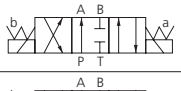
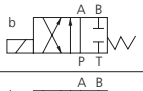
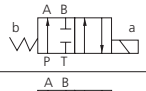
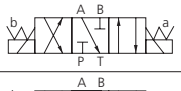
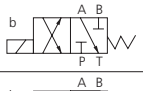
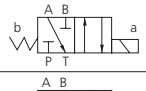
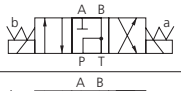
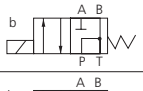
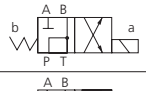
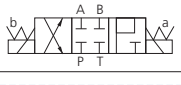
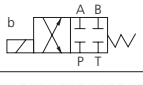
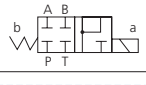
密封材料
Seal material
省略 NBR密封Omit NBRseal
V FPM密封 seal

系列号
Serial number
50 Rexroth type
60 Vickers type
70 Yuken type

附加说明
Remarks

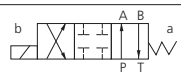
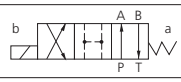
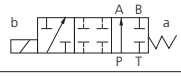
机能符号　Code symbol

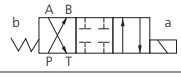
弹簧复位 Spring return

3C2		2B2B		2B2BL	
3C3		2B3B		2B3BL	
3C4		2B4B		2B4BL	
3C5		2B5B		2B5BL	
3C6		2B6B		2B6BL	
3C7		2B7B		2B7BL	
3C9		2B9B		2B9BL	
3C10		2B10B		2B10BL	
3C11		2B11B		2B11BL	
3C12		2B12B		2B12BL	
3C25		2B25B		2B25BL	
3C29		2B29B		2B29BL	

注：*D*(无弹簧机械定位)机能电磁换向阀水平安装。
其中03规格无2D2,2D3,2D8

Note: *D*(No return spring mechanical position) solenoid directional control valve should be installed horizontally.
Among these types, there are no 2D2,2D3,2D8

2B2	
2B3	
2B8	

2B2L	
2B3L	
2B8L	

机械定位 Mechanical position

2D2	
2D3	
2D8	

无复位弹簧无机械定位
No return spring and no mechanical positioning

2N2	
2N3	
2N8	

电磁铁命名　Name of solenoid

1. a动作时When movement a，P→A　B→T
2. b动作时When movement b，P→B　A→T
3. 3C5,3C6油液流通状况与上述方向相反
   Oil flow in the opposite direction with the above - mentioned movement for 3C5、3C6 sym60L　valle.

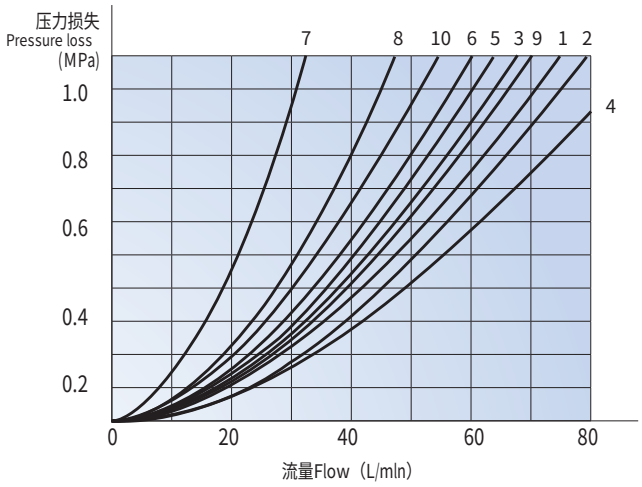
技术参数 Technical specification

		02		03	
工作压力(Mpa) Working voltage	油口PAB Oil port	31.5			
	油口T Oil port	10			
最大流量Maximum working flow(L/min)		80		120	
工作介质Working fluid		矿物质液压油、磷酸酯 Mineral oil, phosphate-ester			
介质温度范围Fluid temp(°C)		-20~70			
介质粘度范围Viscosity(mm^2/s)		2.8~380			
重量Weight(Kg)	单电磁铁 Single solenoid	1.45(直流) (DC)	1.4(交流) (AC)	5.1(直流) (DC)	4.3(交流) (AC)
	双电磁铁 Double solenoids	1.95(直流) (DC)	1.9(交流) (AC)	6.7(直流) (DC)	5.1(交流) (AC)
工作电压Working voltage(V)	直流 Direct current	12		24	
	交流 Alternating Current	110/50Hz 220/50Hz 110B 220B			
循环时间 Cycle time(ms)	开open	50~60(直流) (DC)		15~25(交流) (AC)	
	关 close	50~70(直流) (DC)		40~60(交流) (AC)	
切换频率(次/小时)Switch frequency (t/h)		15000(直流) (DC)		7200(交流) (AC)	
绝缘等级Insulation grade		IP65			

02规格 D03 Specification

特性曲线Performance curve

（试验条件 Test condition：在υ=41mm^2/s和t=50°C下测得Test under υ=41mm^2/s and t=50°C）



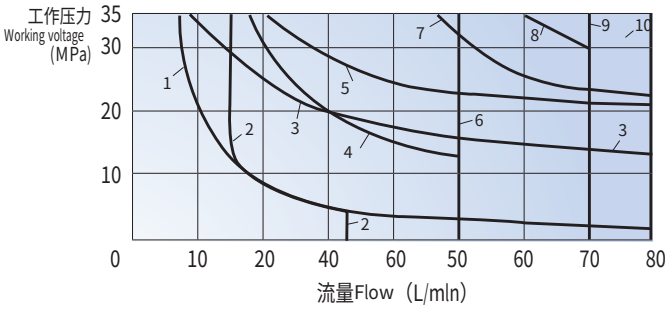
滑阀机能 Function code	流向Direction			
	P→A	P→B	A→T	B→T
2B8,2B8L	3	3	-	-
2B3	1	1	3	1
2B2,2B2L	5	5	3	3
3C2	3	3	1	1
3C5	1	3	1	1
3C6	10	10	9	9
3C3	2	4	2	2
3C4	1	1	2	1
3C10,3C12	3	3	4	9
3C9	2	3	3	3
3C25	3	1	1	1
3C29	5	5	4	-
3C7	1	2	1	1

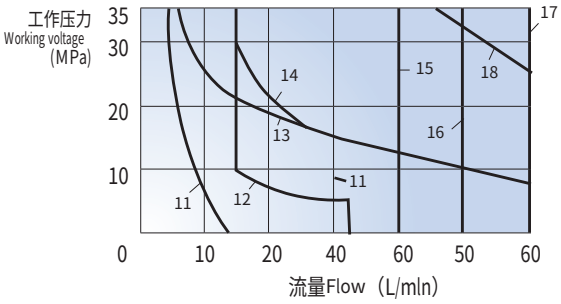
工作极限（在电磁铁发热和欠电压10%情形下测得）
Working limit (tested when solenoid is in the heat and lack of 10% voltage)

由于阻塞的原因，阀的切换性能取决于过滤。为了获得图示的最大流量值，推荐采用25μm的全流量过滤。阀内部液动力也影响流量特性，因此对于四通阀，图示流量数据适用于按有（P A B T）
A口或B口堵死而作三通阀用时，在严重的情况下，流量可能降低很大。

Because of block, the switching performance of the valve depends on the filtration. In order to obtain the maximum flow as in the curve, we recommend to use full-flow filter 25μm. Otherwise the flow maybe decrease a lot.

直流电磁铁操作DC solenoid operation D24, D12, B220, B110		交流电磁铁操作AC solenoid operation A110, A220, 50HZ	
曲线 Curve	符号 Symbol	曲线 Curve	符号 Symbol
1	2B8 2B8L1)	11	2B8 2B8L1)
2	3C7	12	3C7
3	2B8 2B8L	13	2B8 2B8L
4	3C5 3C25	14	3C5 3C25
5	3C4	15	3C6
6	3C6 3C3	16	3C3
7	2N8 2D8 3C10 3C12	17	2N8 2D8 2N3 2D3
8	2B3 2B2 2B2L		2N2 2D2 3C2 3C4 3C10
9	3C9		3C9 3C29 2) 3C12
10	3C2 3C29 2) 2N3 2D3 2N2 2D2	18	2B3 2B2 2B2L





1) 无手动应急操作
2) 回油从执行器至油箱

1) No manual emergency operation
2) Oil return from actuator to oil tank

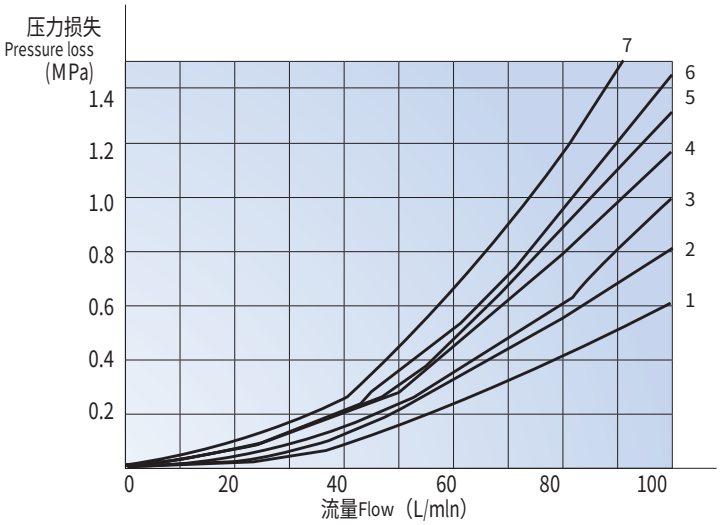
03规格 D05 Specification

特性曲线Performance curve

（试验条件 Test condition：在 υ =41mm²/s和t=50℃下测得Test under υ =41mm²/s and t=50℃）

7阀芯符号3C29处于切换位置A～B
4阀芯符号3C6处于中位P～T

7 Spool symbol 3C29 in the shifting position A～B
4 Spool symbol 3C6 in the median position P～T



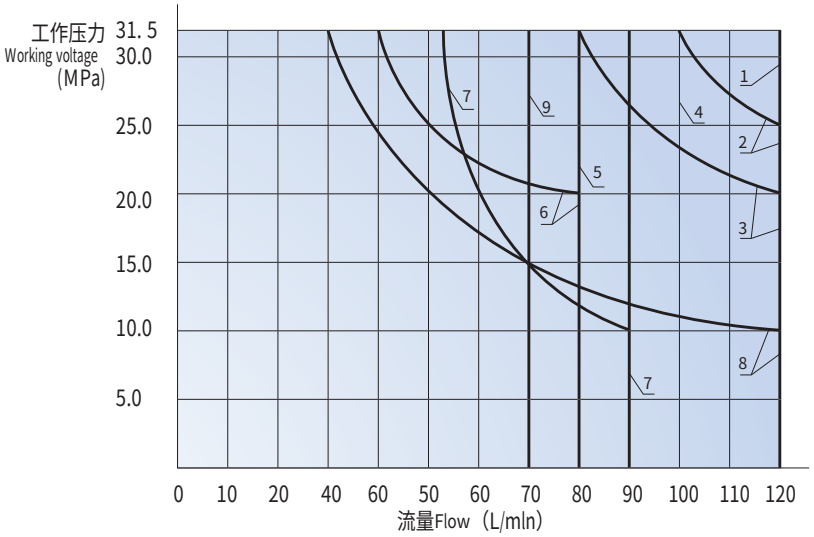
阀芯型式 Spool type	流向Direction			
	P→A	P→B	A→T	B→T
2B8 2B8L	2	2	-	-
2B3 2B2 2B2L	2	2	3	3
3C2 3C7	2	2	4	4
3C5	2	3	3	5
3C6	3	3	4	6
3C3	1	1	4	5
3C10 3C12	2	2	3	5
3C9	1	1	5	1
3C25	3	2	5	3
3C29	2	4	3	-

工作极限（在电磁铁发热和欠电压10%且回油箱无负载的情况下测得的）
Working limit (tested when solenoid is in the heat and lack of 10% voltage)

由于阻塞的原因，阀的切换性能取决于过滤。为了获得图示的最大流量值，推荐采用25μm的全流量过滤。阀内部作用力也影响流量特性，因此，对于四通阀，(P A B T)需要一个流动方向，例如将四通阀的A口或B口堵死而作三通阀用时，在严重的情况下，最大流量可能很小。

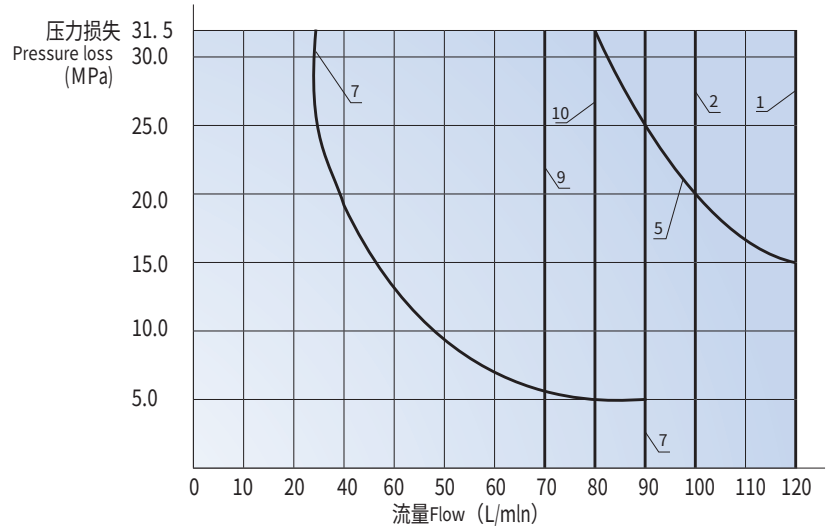
If only one flow direction is needed, for example: A four port valve,a port A or B of which is closed , used as three-way valve, the Maximum flow may be very small in the serious condition.

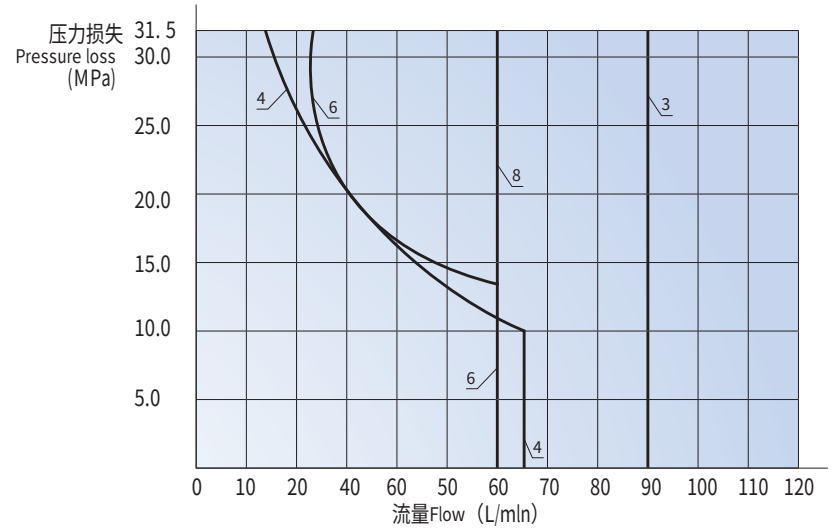
带直流电磁铁阀
With DC solenoid



曲线Curve	符号Symbol
1	2B3 2N3 2D3 2B2 2N2 2D2 2B2L 3C9
2	3C2
3	2N8 2D8 3C10 3C12 3C4
4	3C3
5[1)]	3C29
6	3C6
7	3C5 3C25
8	2B8 2B8L
9	3C7
1)	回路 (与面积比无关)

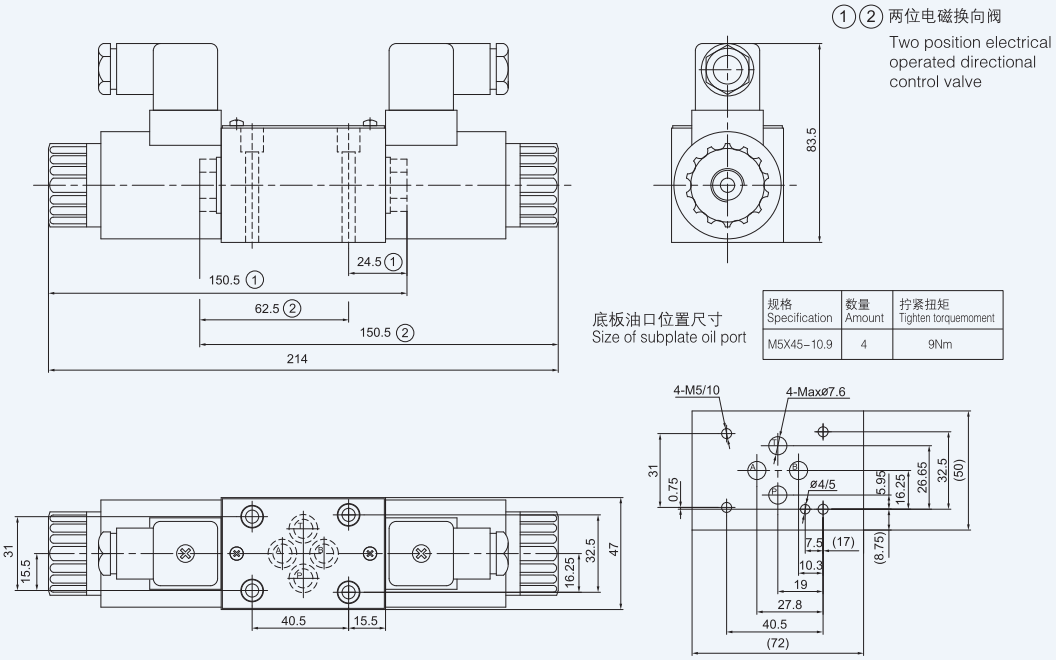
带交流电磁铁阀
With AC solenoid



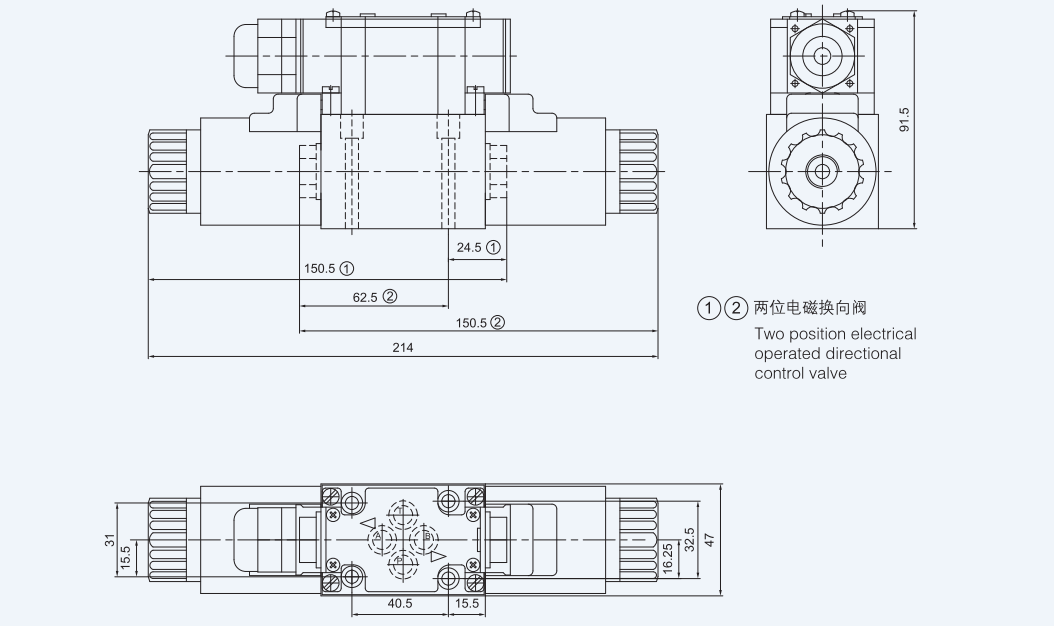


110V,50Hz;120V,60Hz; 220V,50Hz;240,60Hz;	
曲线 Curve	符号 Symbol
1	2B3 2N3 2D3 2B2 2N2 2D2 2B2L
2	3C2 3C10 3C12
3	3C9
4	2B8 2B8L
5	2N8 2D8 3C4
6	3C6
7	3C5 3C25
8	3C7
9	3C3
10	3C29

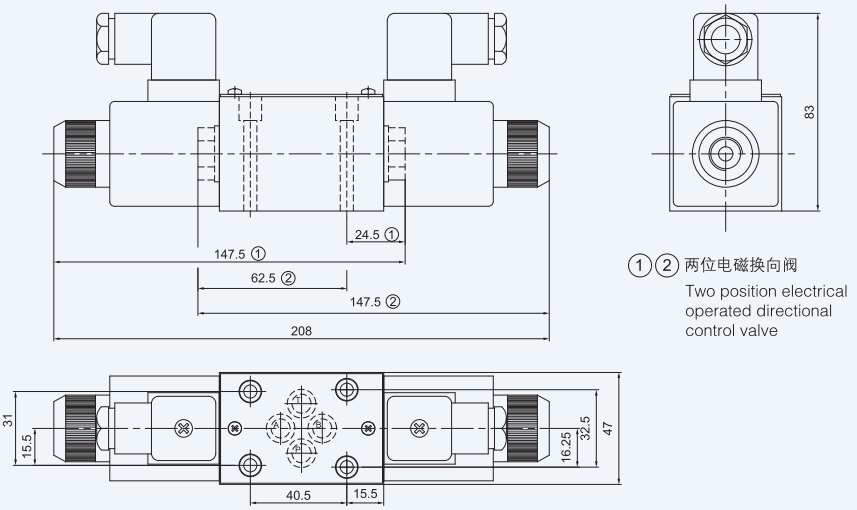
02直流插座式　D03 Direct current plug type



02直流线盒式　D03 Direct current wire box type

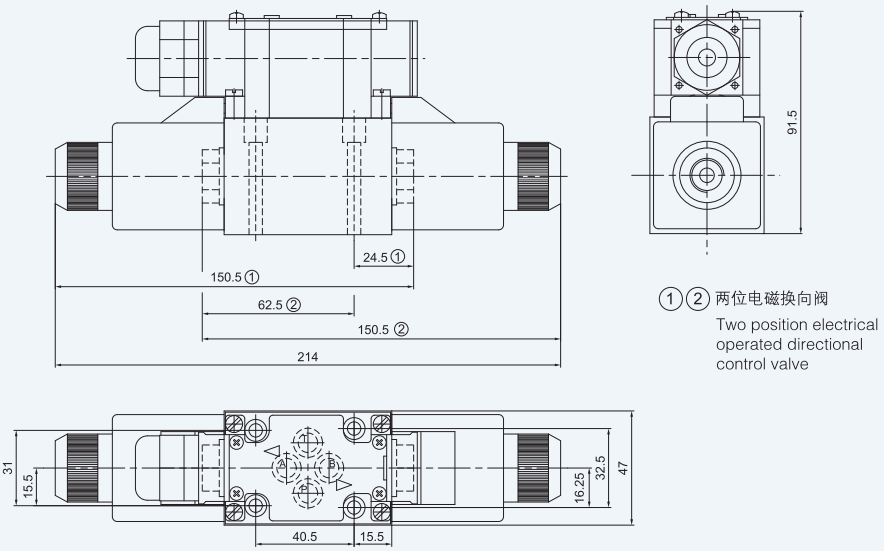


02交流插座式　D03 Alternating current plug type



①② 两位电磁换向阀
Two position electrical operated directional control valve

02交流线盒式　D03 Alternating current wire box type

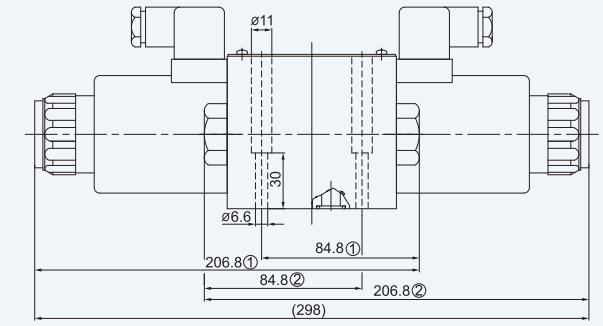


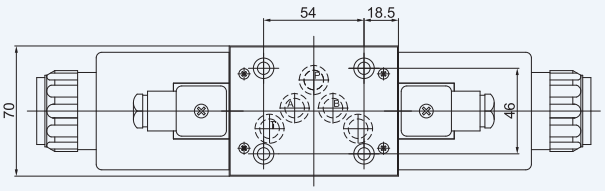
①② 两位电磁换向阀
Two position electrical operated directional control valve

说明事项supplementary explanation

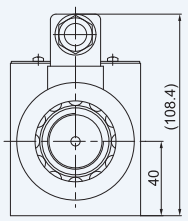
1.产品可任意安装，优先考虑水平位置。
When Installing the product, considering horizontal position firstly.
2.液压系统所用介质必须过滤，过滤精度至少20μm。
The medium used in the hydraulic system must be filtered, its accuracy at least 20μm.
3.固定螺钉请按样本中所列参数选用。
Screw should be according to the parameters in catalogue.
4.与阀连接的表面，粗糙度要求Ra0.8，平面度要求0.01/100mm。
The surface, connecting with the valve, should be Ra0.8 roughness, and 0.01/100mm flatness.

03直流插座式　D03 Direct current plug type



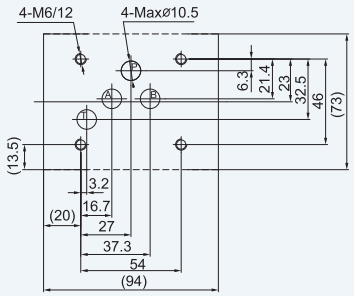


①② 两位电磁换向阀
Two position electrical operated directional control valve

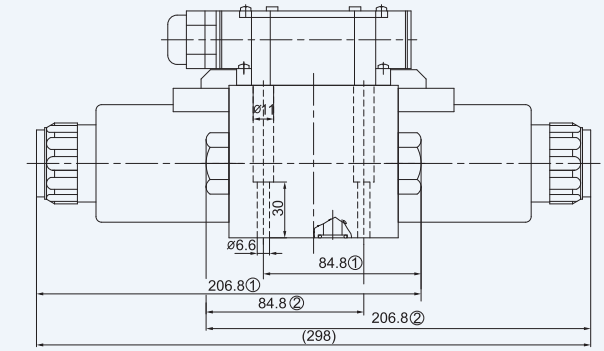


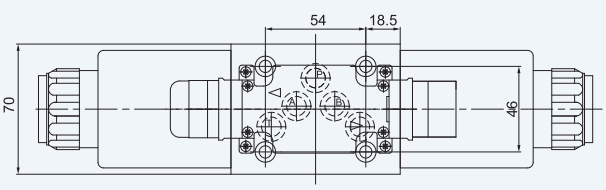
底板油口位置尺寸
Size of subplate oil port

规格 Specification	数量 Amount	拧紧扭矩 Tighten torquemoment
M6X40-10.9	4	15Nm

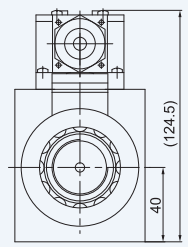


03交流插座式　D05 Alternating current plug type





①② 两位电磁换向阀
Two position electrical operated directional control valve



底板油口位置尺寸
Size of subplate oil port

规格 Specification	数量 Amount	拧紧扭矩 Tighten torquemoment
M6X40-10.9	4	15Nm