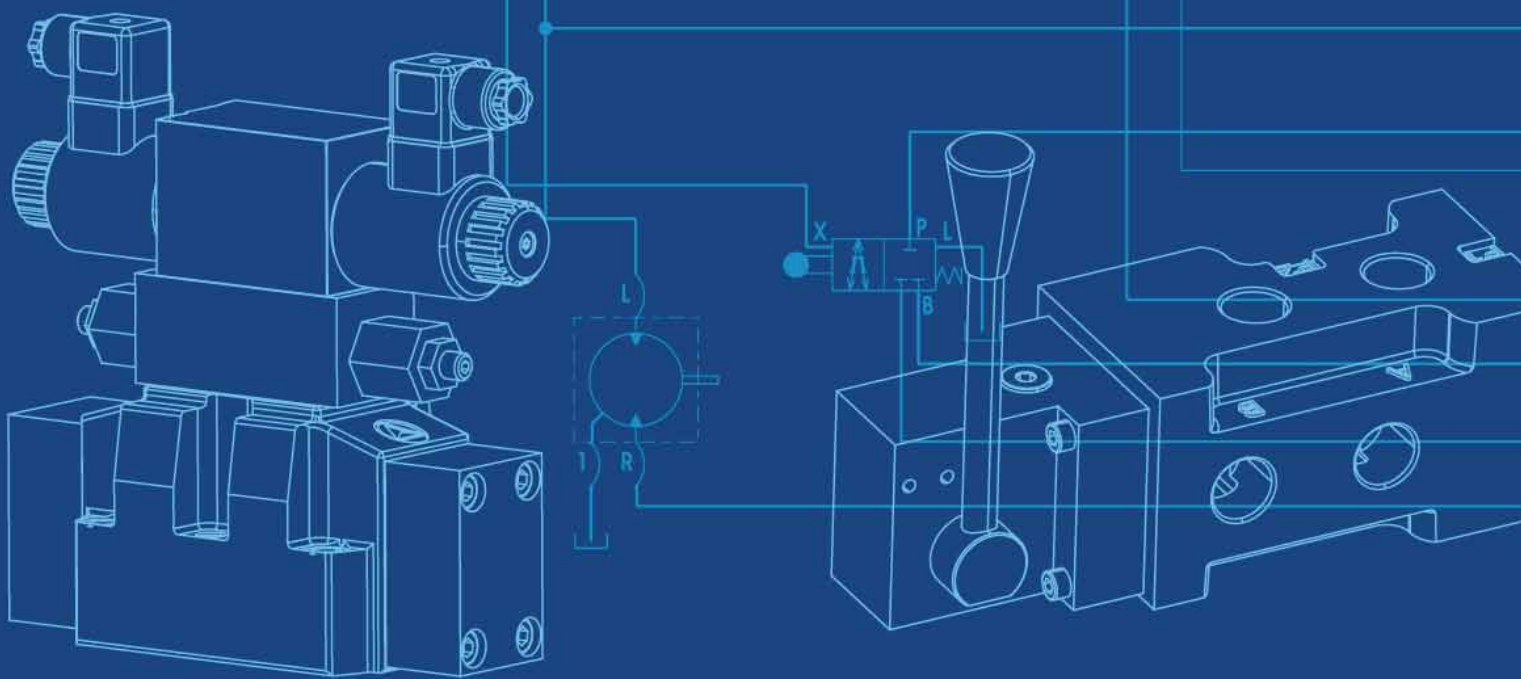


# ***DIRECTIONAL CONTROL VALVES***

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## ***HYDRAULIC COMPONENTS***



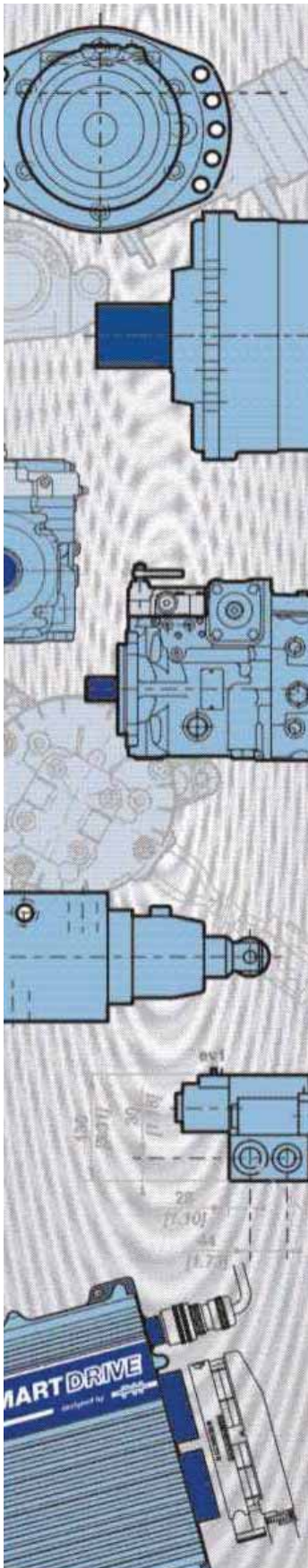
T E C H N I C A L C A T A L O G

**PH**  
**POCLAIN HYDRAULICS**





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Mechanically operated

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Hydraulically operated

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Electrically operated





## 2/2 WAY DIRECTIONAL VALVES KVC

- NG 6
- Up to 250 bar [3 625 PSI]
- Up to 35 L/min [9.2 GPM]



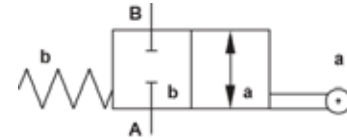
KVC-2/2-K

Mechanically operated

### Features

Size	6	
Flow rate	L/min [GPM]	35 [9.2]
Operating pressure	bar [PSI]	250 [3 625]
Viscosity range	mm <sup>2</sup> /s [SUS]	15 to 380 [69.5 to 1 760]
Oil temperature range	°C [°F]	-20 to +70[-4 to 158]
Filtration	ISO 4406-1999	19/17/14
Mass	Kg [lb]	1,2 [2.6]
Seal type	NBR seals for mineral oil HL, HLP, to DIN 51524	

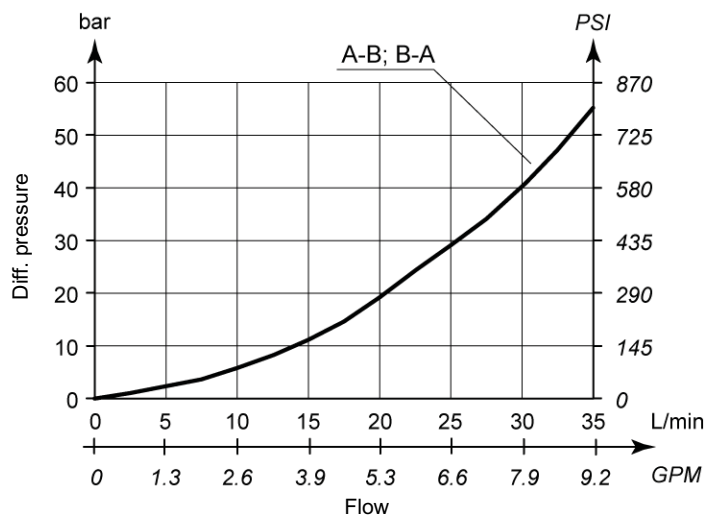
### Hydraulic symbol



Hydraulically operated

### ΔP-Q Performance curves

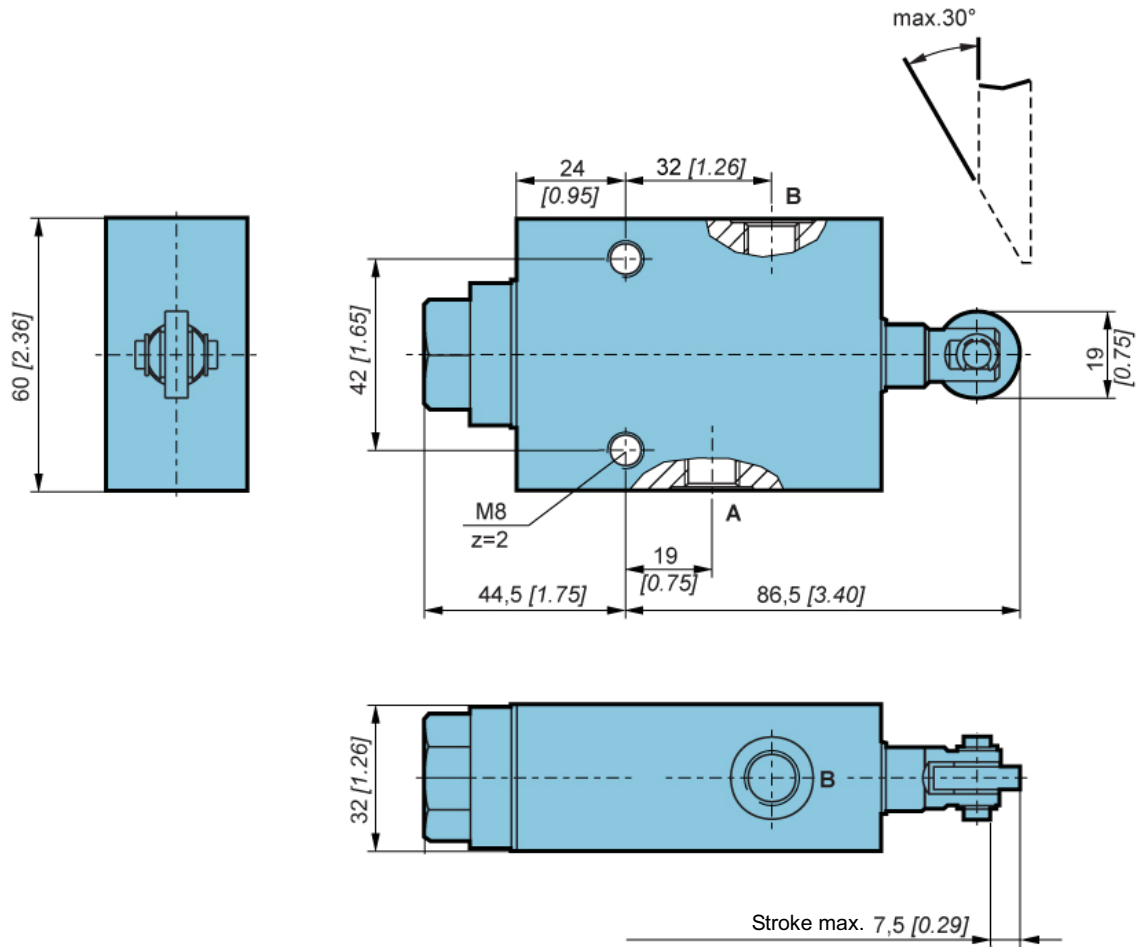
Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



Electrically operated



**Dimensions**



**Model code**

**K V C - 2 / 2 - K - □ - \***

**Threaded connections**

M12x1,5	No designation
G3/8	3/8

**Special requirements to be briefly specified**



## 2/2 WAY DIRECTIONAL VALVES KVC-NV

- NG 6
- Up to 250 bar [3 625 PSI]
- Up to 40 L/min [10.5 GPM]



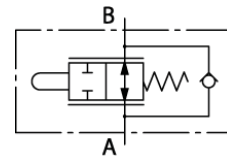
KVC-2/2-NV-T

Mechanically operated

### Features

Size	6	
Flow rate	L/min [GPM]	40 [10.5]
Operating pressure	bar [PSI]	210 [3 045]
Viscosity range	mm <sup>2</sup> /s [SUS]	15 to 380 [69.5 to 1 760]
Oil temperature range	°C [°F]	-20 to +70[-4 to 158]
Filtration	ISO 4406-1999	19/17/14
Mass	Kg [lb]	1,2 [2.6]
Seal type	NBR seals for mineral oil HL, HLP, to DIN 51524	

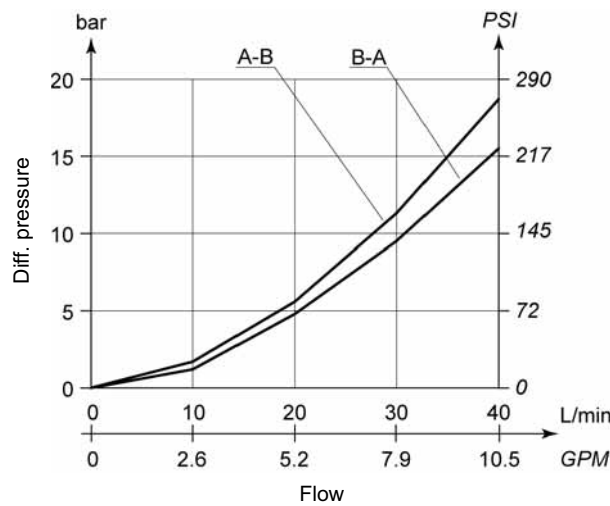
### Hydraulic symbol



Hydraulically operated

### ΔP-Q Performance curves

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].

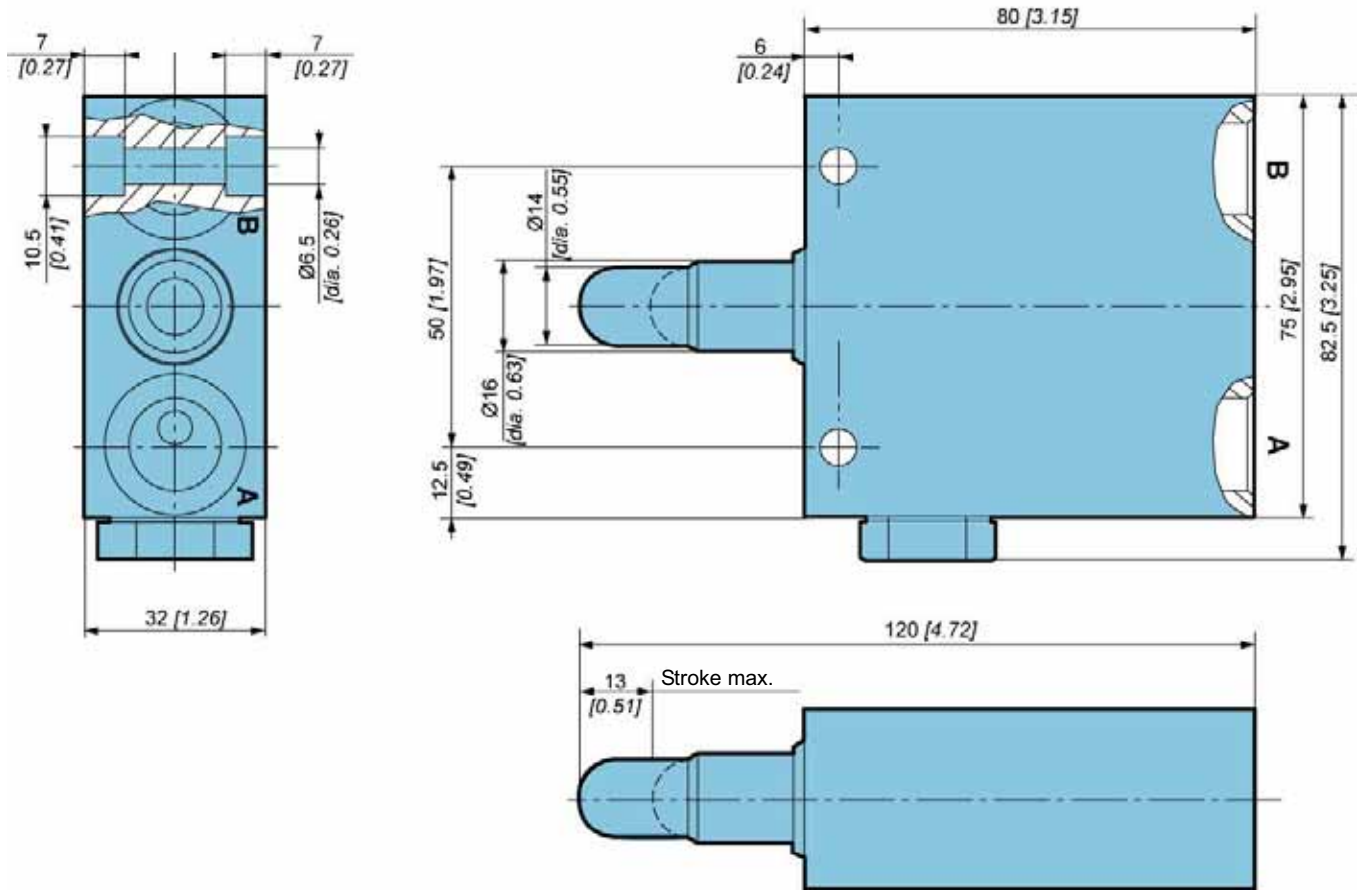


Electrically operated





**Dimensions**



**Model code**

**K V C - 2 / 2 - N V - T - [ ] - \***

**Threaded connections**

M12x1,5	No designation
G3/8	3/8

**Special requirements to be briefly specified**





## 4/2, 4/3 WAY DIRECTIONAL VALVES KV

- NG 6, 10
- Up to 350 bar [5 076 PSI]
- Up to 60 L/min [15.8 GPM] for NG 6
- Up to 100 L/min [26.4 GPM] for NG 10
- Connecting dimensions to ISO 4401.



KV-4/3-5KO-6-R, KV-4/3-5KO-10-R

Mechanically operated

### Operation

Directional valves type KV with direct mechanical operation by means of a lever control the direction of the hydraulic fluid medium flow.

These directional valves consist of a housing (1), control spool (2), control mechanism (3), and return spring (4). In 4/3-way directional valves the centre position of the control spool is the neutral position. The change-over to one of the operating positions "a" or "b" is done by moving the operating pin lever (5) in such a manner that its acts on the control spool (2) so as to clear corresponding flow ways and establish relevant links between ports, A, B, P, and T.

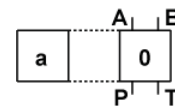
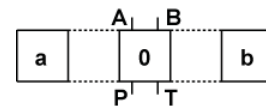
On ceasing to apply force to the control mechanism (3), the return spring (4) push the control spool into the neutral position.

### There are two types of operation:

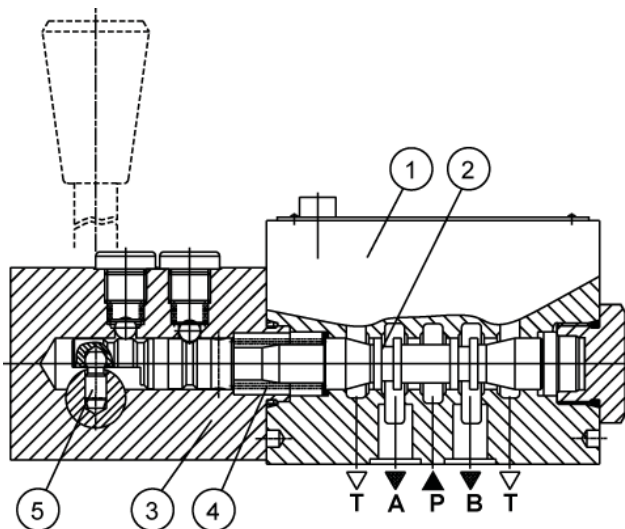
- 1/ With control spool not held in the operating position (the control spool returns to neutral position on ceasing to apply force to the control mechanism - type KV-...-R).
- 2/ With control spool held (detent) in the operating position (the control spool remains in the operating position on ceasing to apply force to the control mechanism lever - type KV-...-RA).

### Hydraulic symbols

Spool types



Hydraulically operated



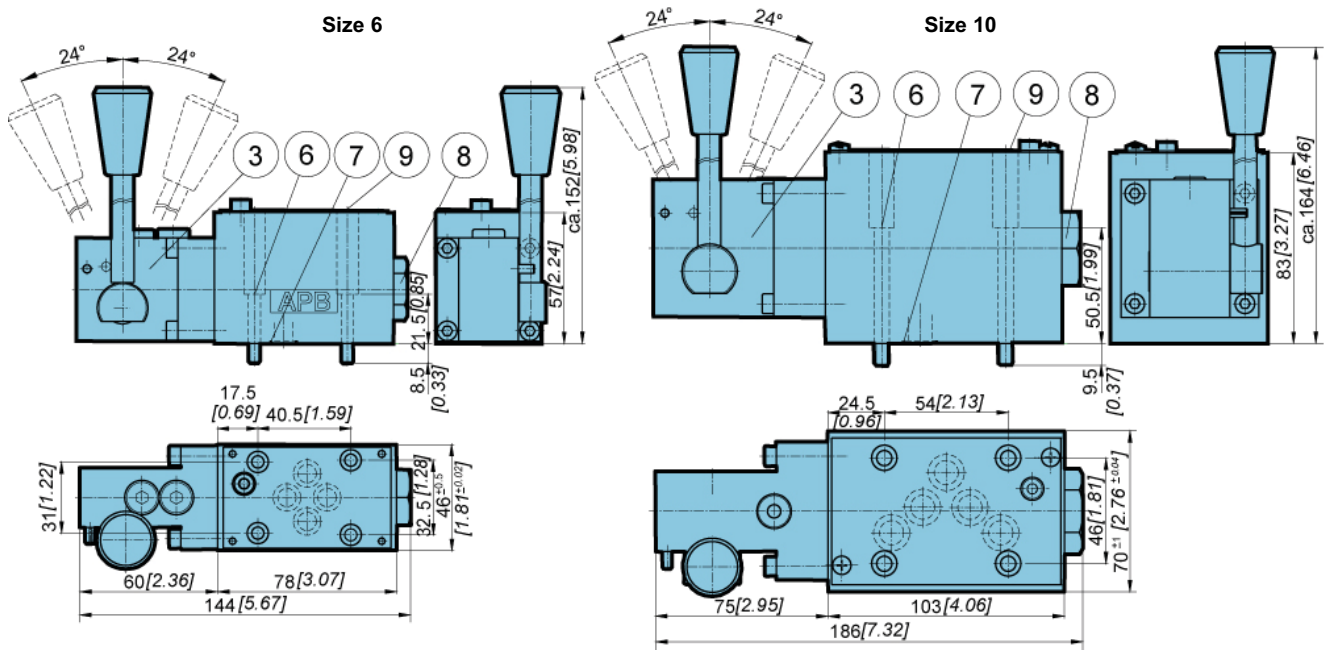
Electrically operated



**Features**

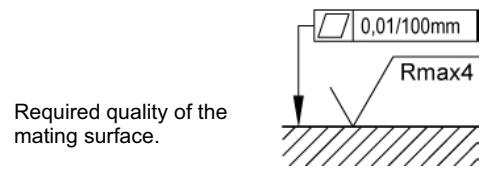
Size		6	10
Flow rate	L/min [GPM]	60 [15.8]	100 [26.4]
Operating pressure	P, A, B	bar [PSI]	
	T	bar [PSI]	
Viscosity range	mm <sup>2</sup> /s [SUS]	15 to 380 [69.5 to 1 760]	
Oil temperature range	°C [°F]	-20 to +70 [-4 to 158]	
Filtration		NAS 1638 8	
Mass	Kg [lb]	2,05 [4.52]	5,23 [11.53]
Mounting position		Optional	

**Dimensions**



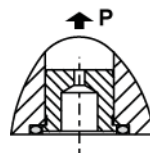
- 3. Control mechanism on side "a"  
4/3 valves  
4/2 valves, spool types 51A
- 6. Fixing screws 4 pcs M5x30 to ISO 4762-10.9 (by special order).  
Required tightening torque Md = 9 Nm.
- 7. O-ring 9.25x1.78
- 8. Valve cap.
- 9. Nameplate.

- 3. Control mechanism on side "a"  
4/3 valves  
4/2 valves, spool types 51A
- 6. Fixing screws 4 pcs M6x60 to ISO 4762-10.9 (by special order).  
Required tightening torque Md = 15 Nm.
- 7. O-ring 12.42x1.78
- 8. Valve cap.
- 9. Nameplate.



**Cartridge throttle**

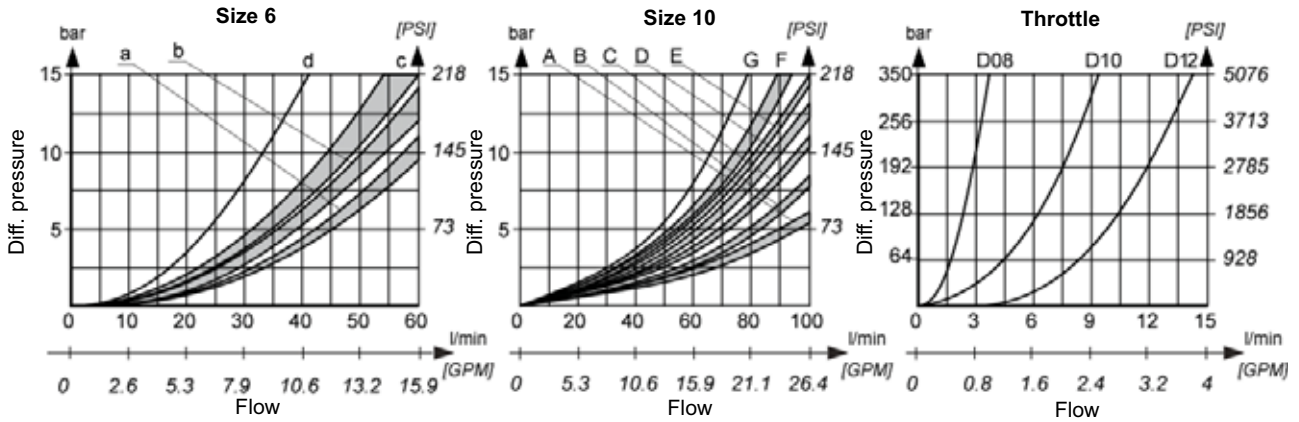
If flow rates greater than permissible occur during change-over, a cartridge throttle must be fitted into P-line of the directional valve.





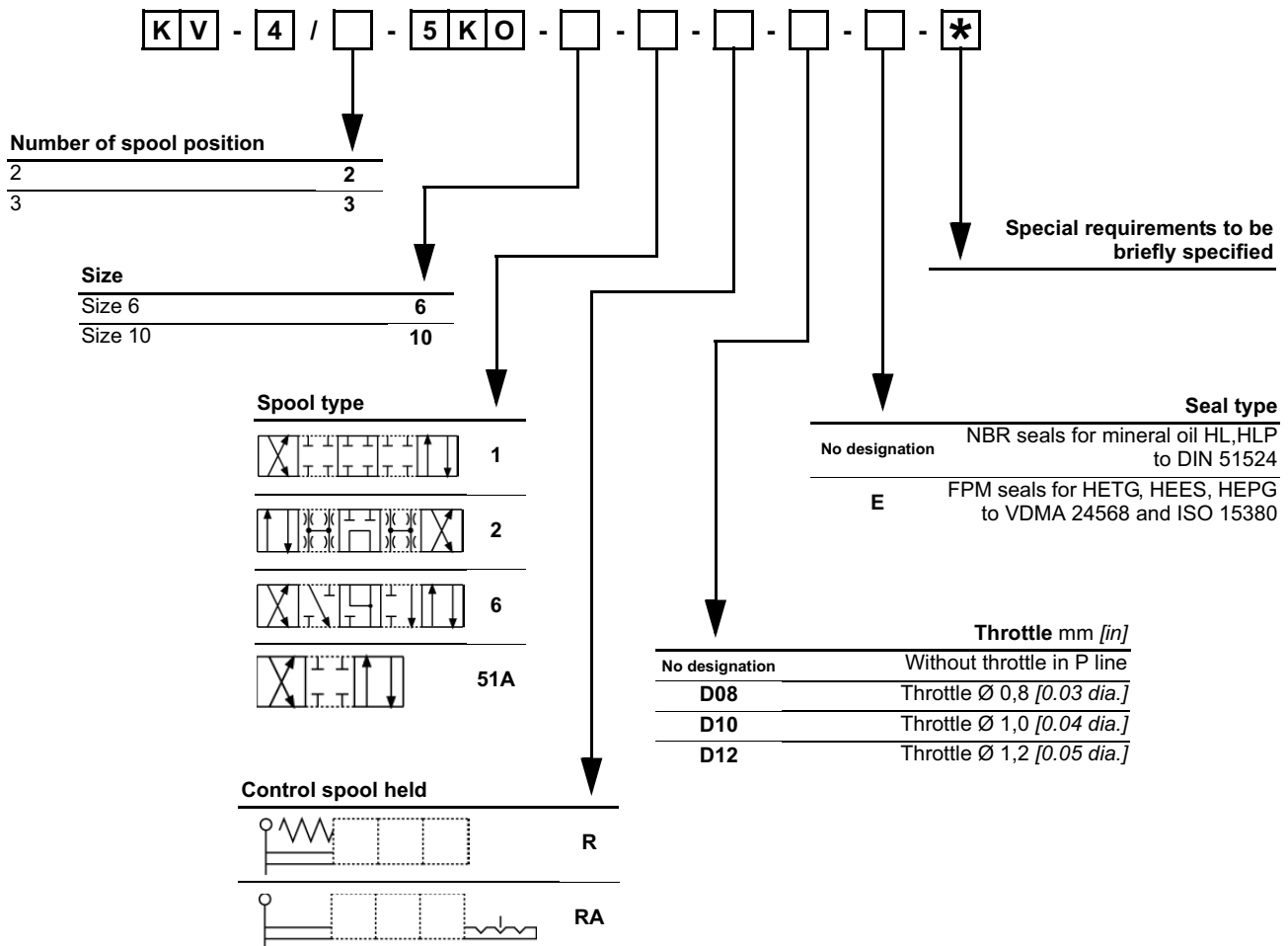
**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



Spool	P-A	P-B	A-T	B-T	P-T
1	b,D	b,D	c,B	c,C	-
2	c,B	c,B	c,A	c,A	d,G
6	b,E	b,E	a,B	a,B	-
51A	c,D	b,D	c,C	a,B	-

**Model code**



Mechanically operated

Hydraulically operated

Electrically operated





## 6/2 WAY DIRECTIONAL VALVES KV

- NG 6, 10
- Up to 350 bar [5 076 PSI]
- Up to 60 L/min [15.8 GPM] for NG 6
- Up to 120 L/min [31.7 GPM] for NG 10
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas).



KV-6/2-6-R..., KV-6/2-10-R...

### Operation

Directional valves type KV with direct mechanical operation by means of a lever control the direction of the hydraulic medium flow. They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

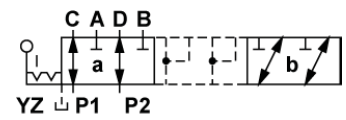
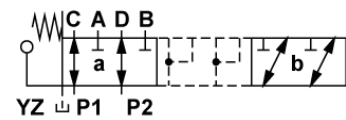
There are two types of operation:

1/ With control spool not held in the operating position (the control spool returns to position "a" on ceasing to apply force to the mechanism - type KV-...-R).

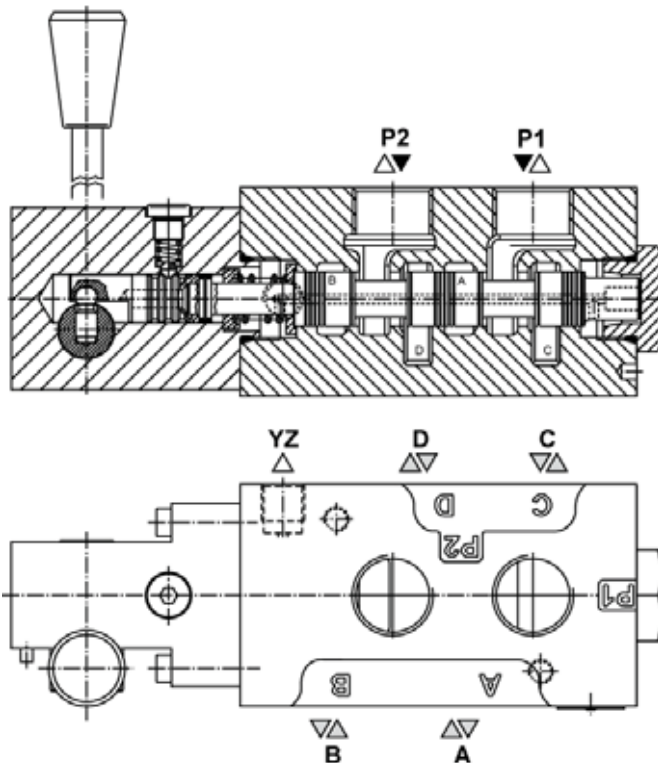
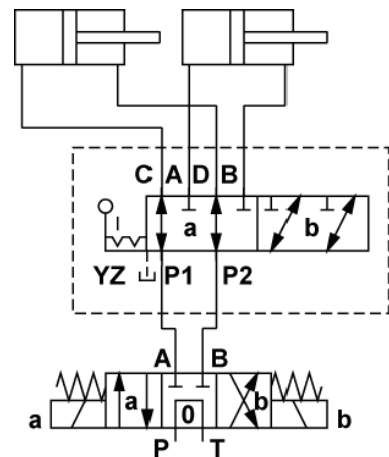
2/ With control spool held (detent) in the operating position (the control spool remains in the operating position on ceasing to apply force to the control mechanism lever - type KV-...-RA).

### Hydraulic symbols

Spool types



### Mounting example



Mechanically operated

Hydraulically operated

Electrically operated

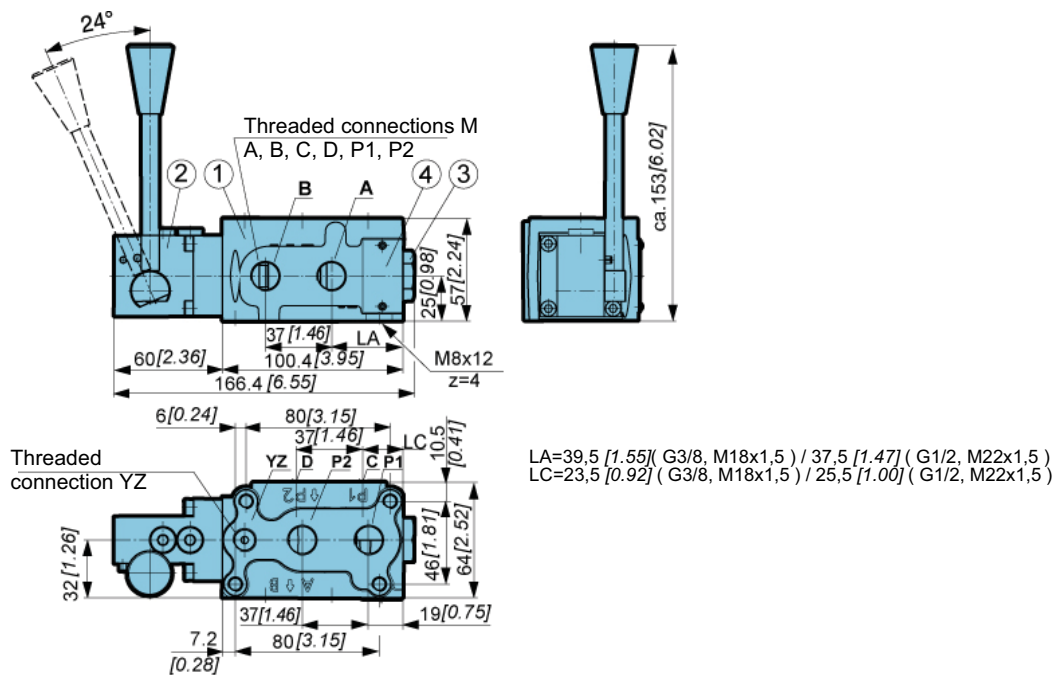


Features

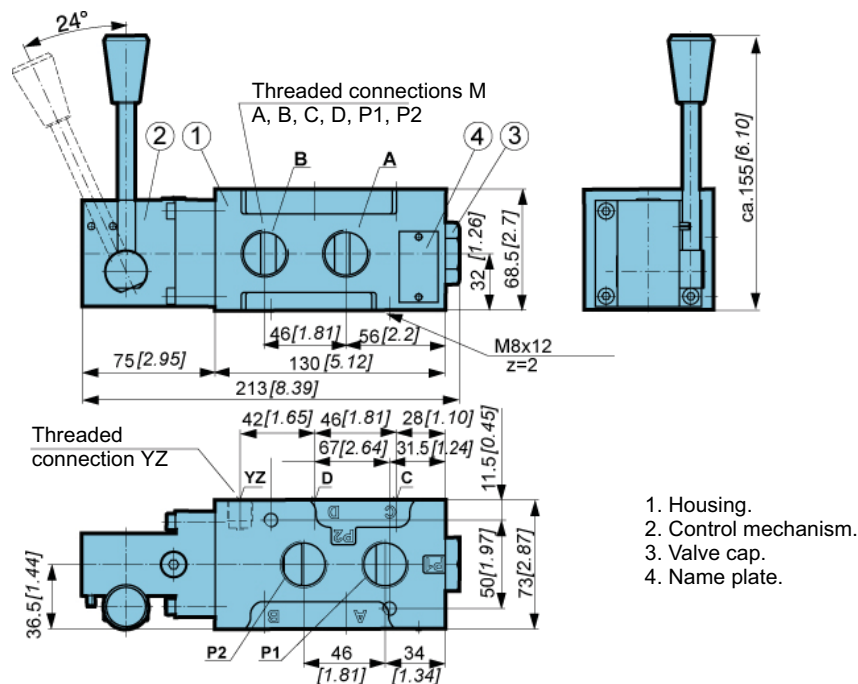
Size		6	10
Flow rate	L/min [GPM]	60 [15.8]	120 [31.7]
Operating pressure	With YZ	bar [PSI]	
	Without YZ	bar [PSI]	
Viscosity range	mm <sup>2</sup> /s [SUS]	15 to 380 [69.5 to 1 760]	
Oil temperature range	°C [°F]	-20 to +70 [-4 to 158]	
Filtration	NAS 1638	8	
Mass	Kg [lb]	2,4 [5.3]	5,3 [11.7]
Mounting position		Optional	

Dimensions

Size 6



Size 10

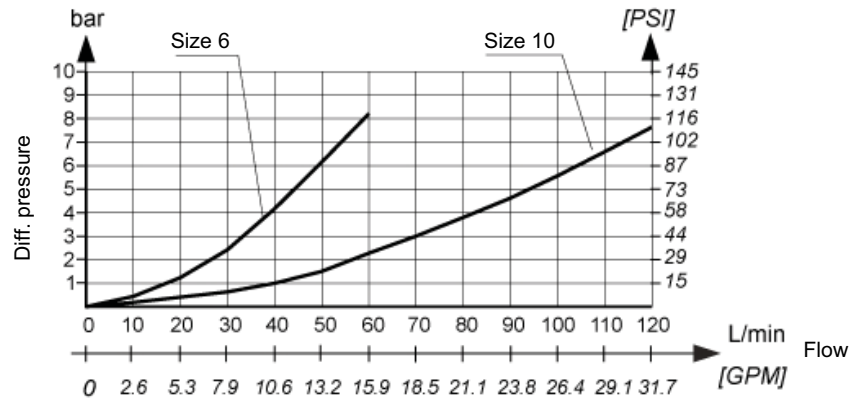


1. Housing.
2. Control mechanism.
3. Valve cap.
4. Name plate.



**ΔP-Q Performance curves**

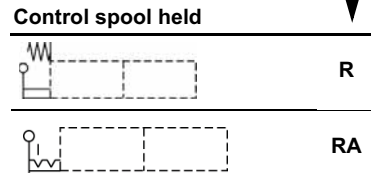
Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



**Model code**

**K V - 6 / 2 - [ ] - [ ] - [ ] - [ ] - [ ] - \***

Size	
Size 6	6
Size 10	10



Threaded connections (M ; YZ)	
Size 6	M18x1,5 ; M14x1,5 No designation
	M22x1,5 ; M14x1,5 M22
	G3/8 ; G1/4 G3/8
	G1/2 ; G1/4 G1/2
3/4-16 UNF-2B ; 9/16-18 UNF-2B 3/4-16UNF	
Size 10	M22x1,5 ; M14x1,5 No designation
	M27x1,5 ; M14x1,5 M27
	G1/2 ; G1/4 G1/2
	G3/4 ; G1/4 G3/4
7/8-14 UNF-2B ; 9/16-18 UNF-2B 7/8-14UNF	

Drainage	
Without YZ	No designation
With YZ	YZ

Seal type	
NBR seals for mineral oil HL, HLP to DIN 51524	No designation
FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380	E

**Special requirements to be briefly specified**

Mechanically operated

Hydraulically operated

Electrically operated







## 4/2 WAY AUTOMATIC DIRECTIONAL VALVES PKV

- NG 6, 10
- Up to 210 bar [3 045 PSI]
- Up to 60 L /min [15.8 GPM]

- Indirect hydraulic operation.
- Connecting dimensions to ISO 4401.
- Provision of pressure setting for change - over.
- Automatic change - over from the other operating position.

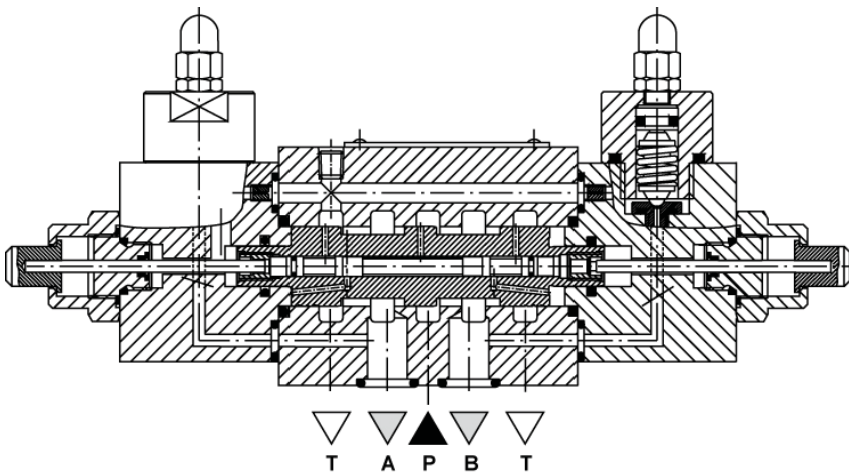
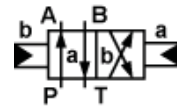


PKV-6, PKV-10

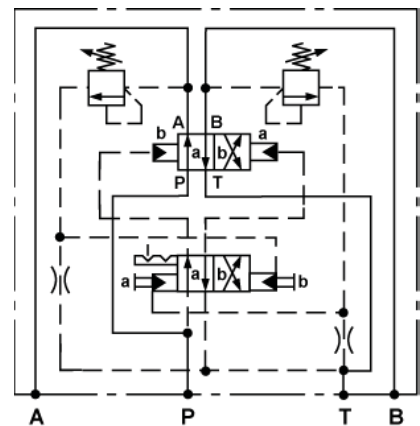
### Operation

Indirectly, hydraulic - operated directional valves type PKV are used to control the hydraulic fluid flow direction by an automatic change - over.

### Hydraulic symbol



### Mounting example



### Features

Size		6	10
Flow rate min/max	L/min [GPM]	1/25 [0.3/6.6]	1/60 [0.3/15.8]
Operating pressure	P, A, B	bar [PSI] To 210 [3 045]	
	T	bar [PSI] To 40 [580]	
Min. press. req. for autom. change over	bar [PSI]	50 [725]	
Change over pressure	bar [PSI]	50 to 210 [725 to 3 045]	
Viscosity range	mm <sup>2</sup> /s [SUS]	15 to 380 [69.5 to 1 760]	
Oil temperature range	°C [°F]	-20 to +70 [-4 to 158]	
Filtration	NAS 1638	8	
Mass	Kg [lb]	2,6 [5.7]	3,2 [7.0]

Mechanically operated

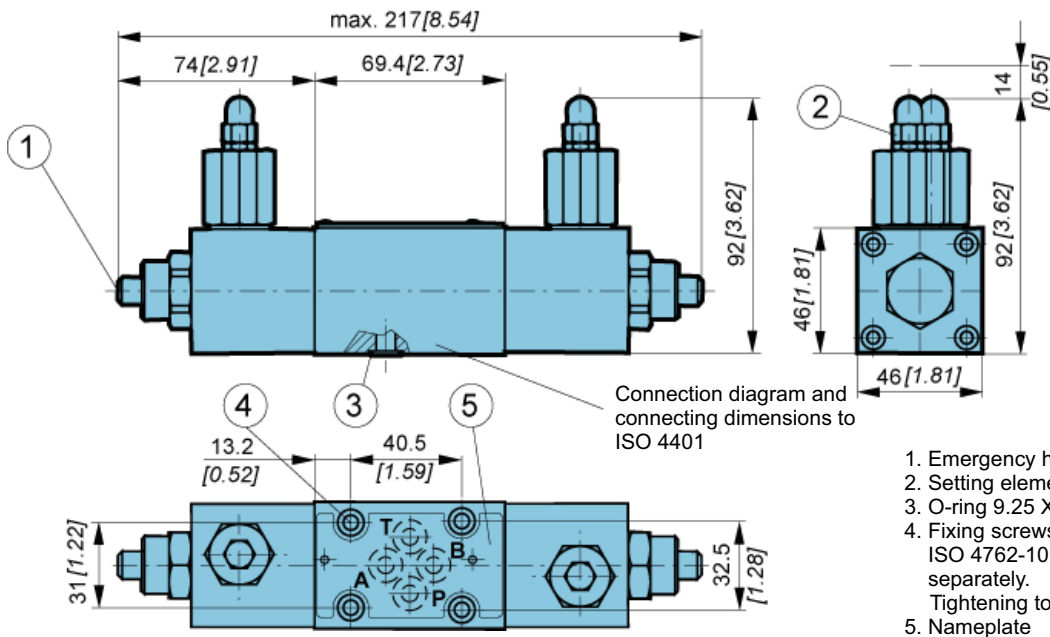
Hydraulically operated

Electrically operated



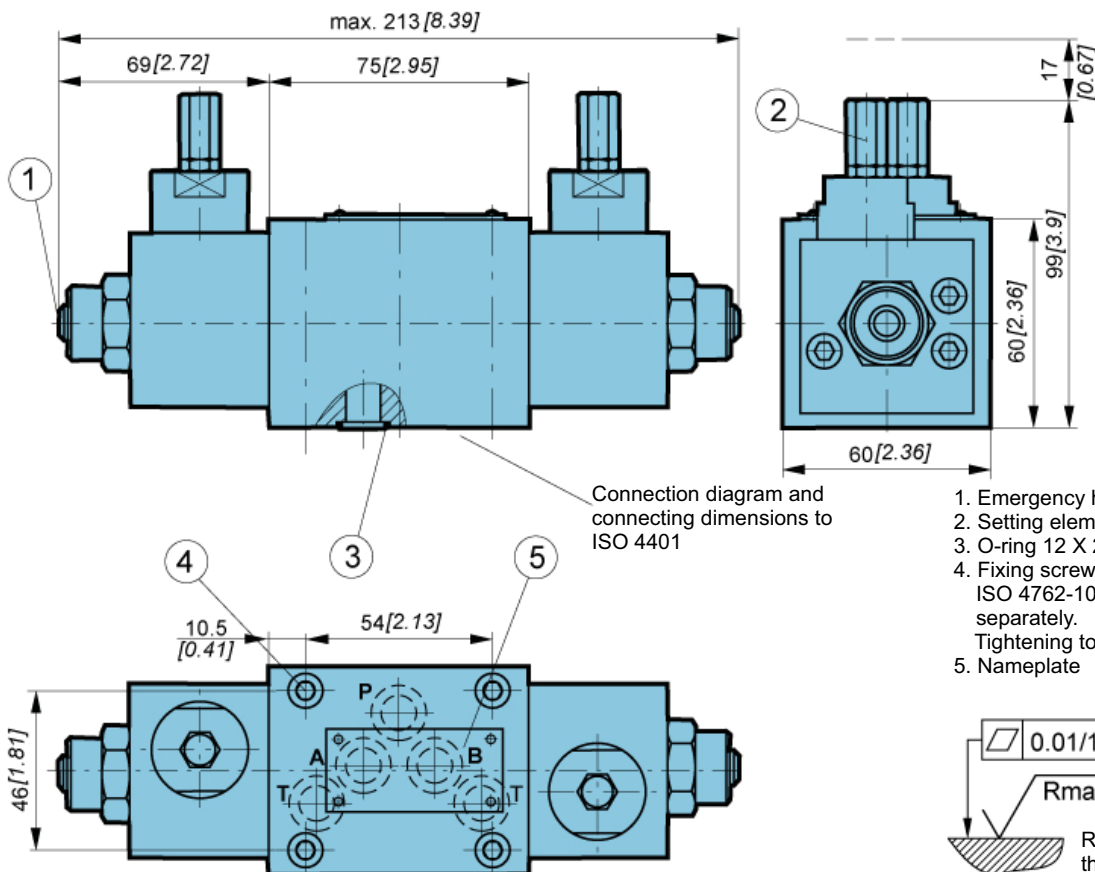
**Dimensions**

**Size 6**

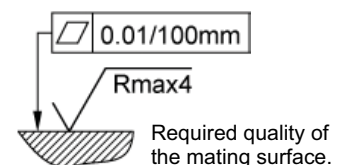


1. Emergency hand operator
2. Setting elements with protective cap
3. O-ring 9.25 X 1.78
4. Fixing screws: 4 pcs M5 x 45 to EN ISO 4762-10.9 must be ordered separately.  
Tightening torque  $M_d = 9Nm$
5. Nameplate

**Size 10**



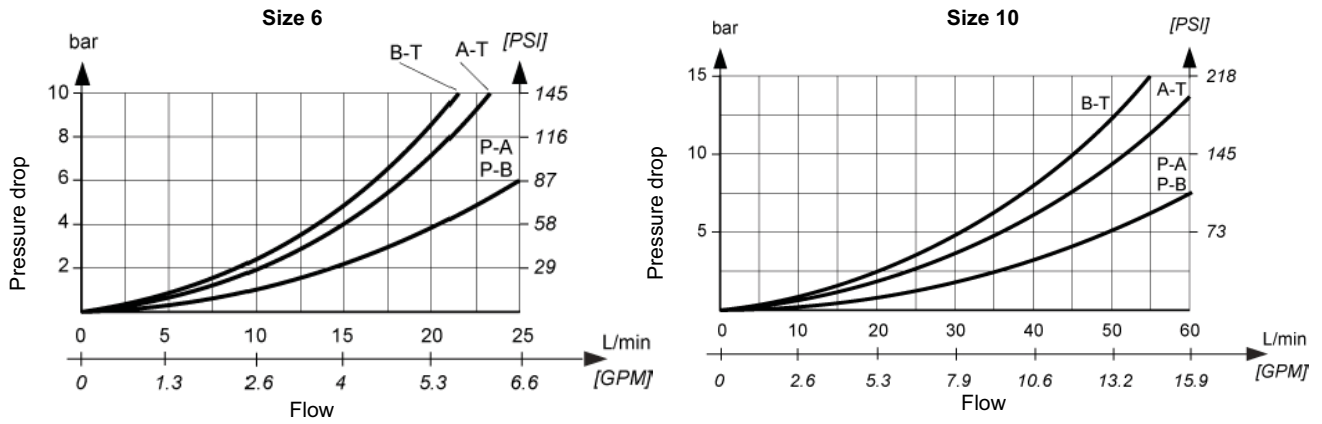
1. Emergency hand operator
2. Setting elements with protective cap
3. O-ring 12 X 2
4. Fixing screws: 4 cps M6 x 55 to EN ISO 4762-10.9 must be ordered separately.  
Tightening torque  $M_d = 14Nm$
5. Nameplate





**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



**Model code**

**P** **K** **V** -    -    - **\***

**Size**

Size 6	6
Size 10	10

**Seal type**

NBR seals for mineral oil HL, HLP, to DIN 51524	No designation
FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380	E

**Special requirements to be briefly specified**

Mechanically operated

Hydraulically operated

Electrically operated





# 4/2 WAY AUTOMATIC DIRECTIONAL VALVES PKV-...-T

- NG 6
- Up to 210 bar [3 045 PSI]
- Up to 30 L /min [7.9 GPM]
- Connecting dimensions to ISO 4401.
- Automatic, load - independent reversal.
- Predefined actuator direction at start - up.



PKV-6-T, PKV-6-T-G

## Operation

These valves reverse the movement of an actuator every time the flow through the valve stops. Preferential starting is P → B and A → T position. The spool is moved by two springs and locked by unbalanced pressure inside valve. When no more flow is crossing the valve, the spool changes the position inverting the direction of the actuator. These valves are mostly used to control the movement compactors or system where it is not possible to use electrical device.

### About the spindle for the PKV-6-T-G valves:

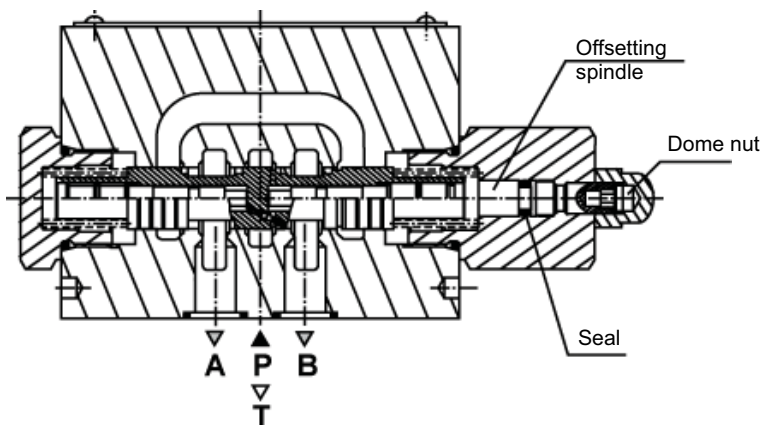
The spindle for the PKV-6-T-G valves is used just to set the system pressure limiter. To set the maximum pressure you have to block the self-reversing function.

### Procedure to set a pressure on the system pressure limiter:

- 1/ Switch off the pump or reduce pressure to minimum (10 bar max).
- 2/ To set the system pressure limiter first block the automatic reversal of the valve.  
Remove the dome nut and turn the offsetting spindle clockwise until it hits its inner end spool. The spool is now clamped P to B and A to T.
- 3/ Start the pump and set the required pressure.
- 4/ After that stop again the pump.
- 5/ Turn the offsetting spindle anticlockwise until it hits its outer end stop then put the dome nut back.



**Never turn the offsetting spindle when the valve is pressurized over 10 bar [145 PSI]. This can cause seal damage. If necessary switch off the pump.**

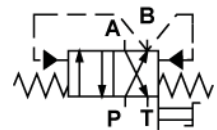


## Hydraulic symbol

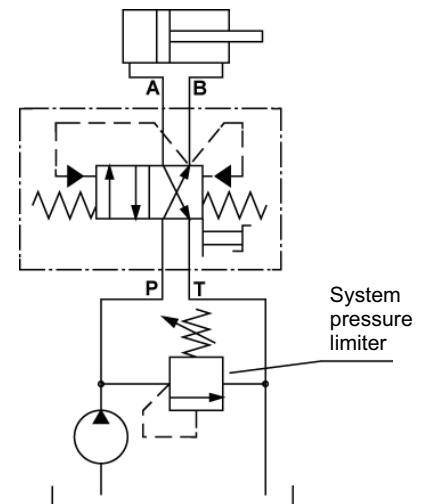
### PKV-6-T



### PKV-6-T-G



## Mounting example



Mechanically operated

Hydraulically operated

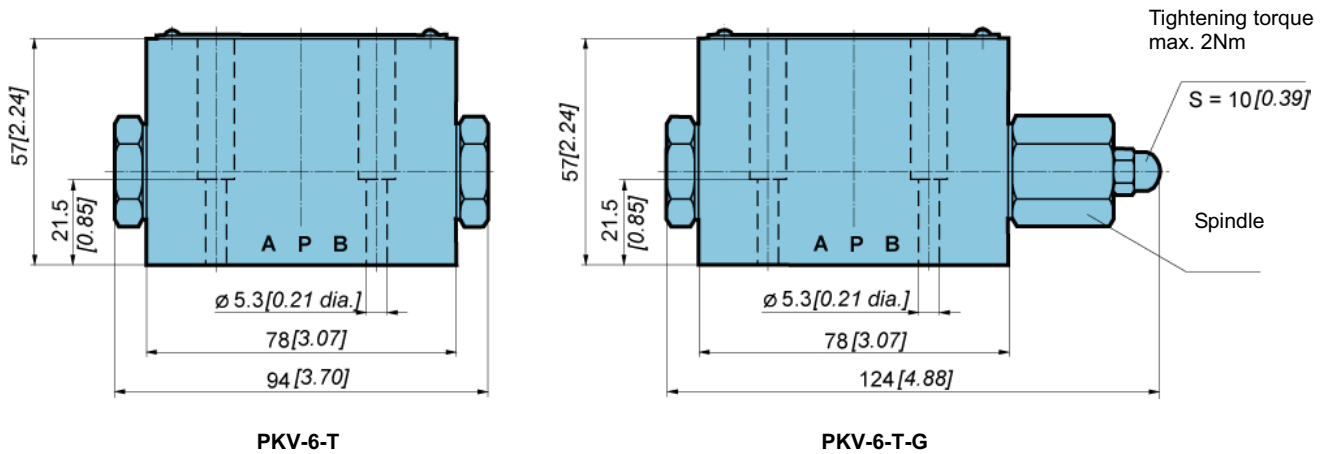
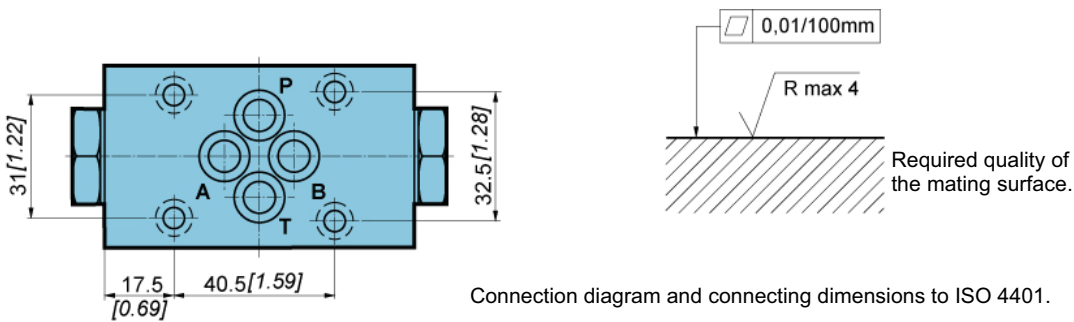
Electrically operated



**Features**

<b>Size</b>	<b>6</b>	
<b>Flow rate min/max</b>	L/min [GPM]	3/30 [0.8/7.9]
<b>Operating pressure P, A, B</b>	bar [PSI]	50 to 210 [725 to 3 045]
<b>Max. pressure T</b>	bar [PSI]	40 [580]
<b>Viscosity range</b>	mm <sup>2</sup> /s [SUS]	20 to 200 [92.7 to 926.8]
<b>Oil temperature range</b>	°C [°F]	-20 to +60 [-4 to 140]
<b>Filtration</b>	NAS 1638	8
<b>Mass</b>	PKV-6-T	1,3 [2.8]
	PKV-6-T-G	1,4 [3.1]

**Dimensions**



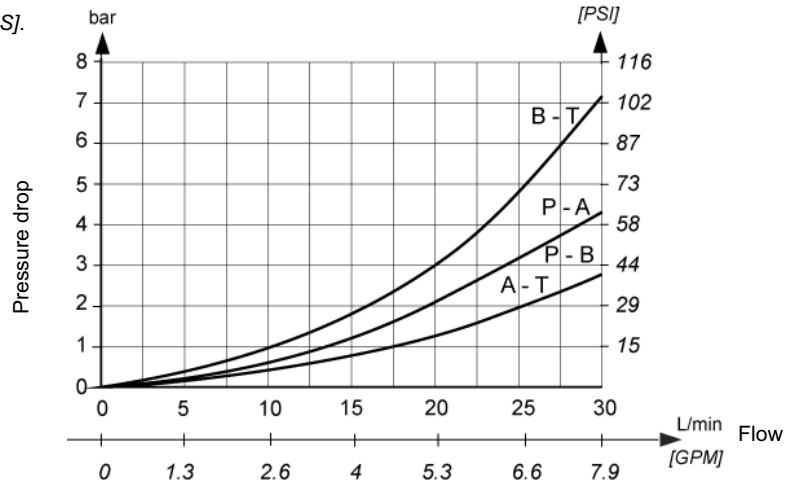
4 x fixing screws M5x30 to DIN EN ISO 4762-10.9 must be ordered separately.  
 Required tightening torque  $M_d = 9 \text{ Nm}$  [79.65 in.lbf].





**ΔP-Q Performance curves**

Measured at 50°C [122°F]  
and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



**Model code**

**P** **K** **V** - **6** - **T** -  -  - \*

**Offsetting spindle**

Without offsetting spindle	No designation
With offsetting spindle	<b>G</b>

**Seal type**

NBR seals for mineral oil HL, HLP to DIN 51524	No designation
FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380	<b>E</b>

**Special requirements to be briefly specified**

Mechanically operated

Hydraulically operated

Electrically operated





# 4/2, 4/3 WAY AUTOMATIC DIRECTIONAL VALVES KV

- NG 6, 10
- Up to 350 bar [5 076 PSI]
- Up to 80 L/min [21.1 GPM]
- Up to 130 L/min [34.3 GPM]
- Direct hydraulic operation.
- Connecting dimensions to ISO 4401.
- Threaded connections to ISO 1179.



KV-4/3-5KO-6-H, KV-4/3-5KO-10-H

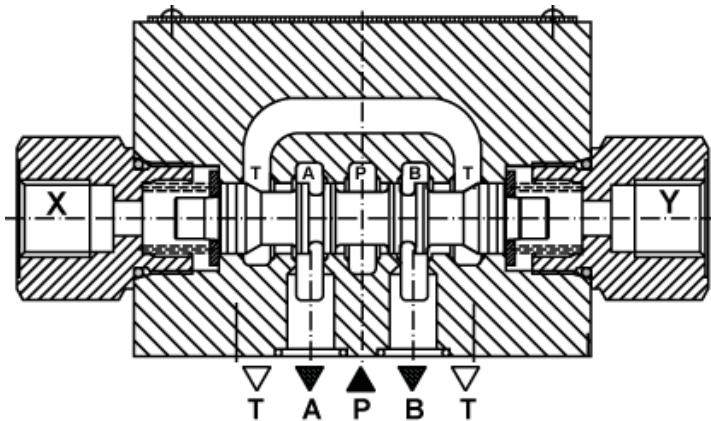
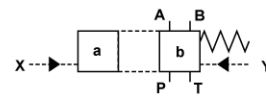
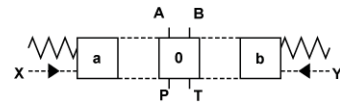
## Operation

The KV-...-H is a hydraulically controlled 4/3 or 4/2 way directional control valve. The valve is operated by the pilots ports X and Y via the connection of an external pilot pipe direct on the valve body.

The minimum pilot pressure must be ensured for all operating conditions of the directional valve.

## Hydraulic symbols

Spool types



## Features

Size		6	10
Flow rate	L/min [GPM]	80 [21.1]	130 [34.3]
Operating pressure	Ports A, B, P	bar [PSI] 350 [5 076]	
	Ports X, Y, T	bar [PSI] 210 [3 045]	
Pilot supply pressure min.	bar [PSI]	10 [145]	
Viscosity range	mm <sup>2</sup> /s [SUS]	15 to 380 [69.5 to 1 760]	
Oil temperature range	°C [°F]	-20 to +70 [-4 to 158]	
Filtration	NAS 1638	8	
Mass	Kg [lb]	1,4 [3.1]	4,0 [8.8]
Mounting position		Optional	

Mechanically operated

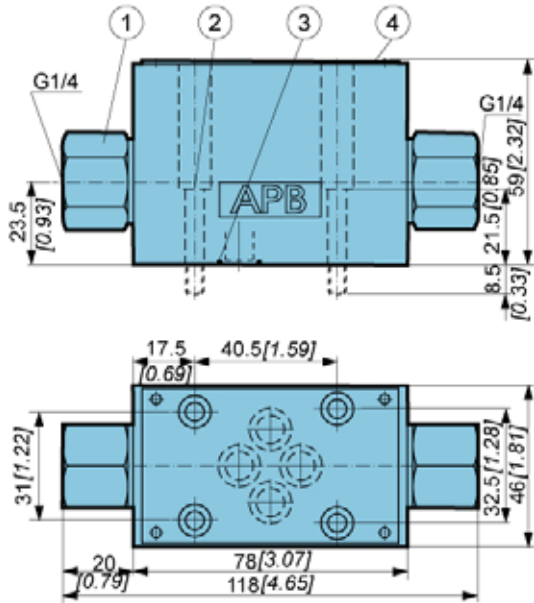
Hydraulically operated

Electrically operated



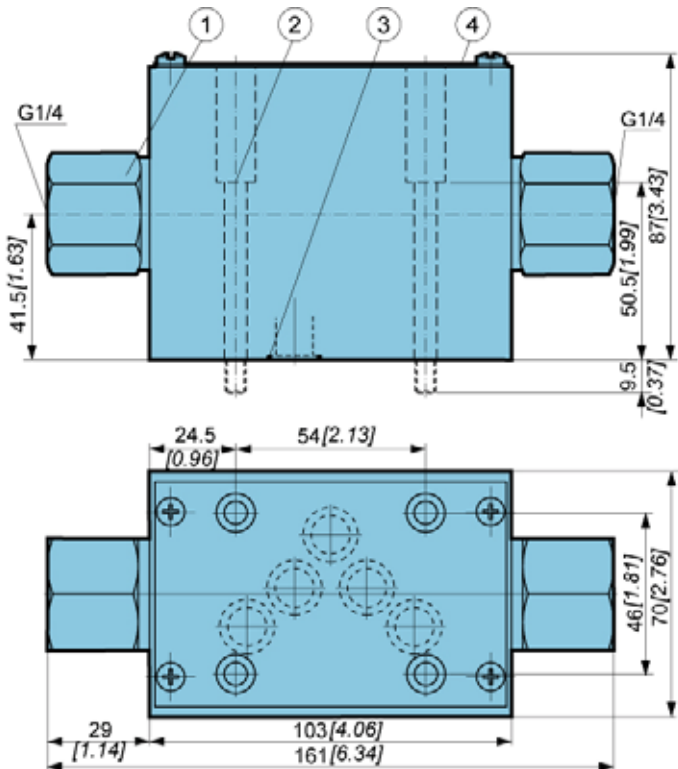
**Dimensions**

**Size 6**

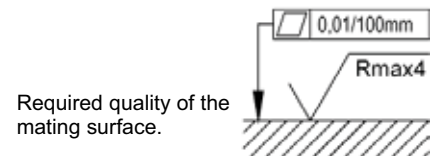


1. Threaded connection X (Y) - G1/4
2. Fixing screws 4 pcs M5x30 to ISO 4762-10.9 (by special order) Required tightening torque  $M_d = 9\text{Nm}$
3. O-ring 9.25 x 1.78
4. Nameplate.

**Size 10**

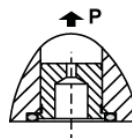


1. Threaded connection X (Y) - G1/4
2. Fixing screws 4 pcs M6x60 to ISO 4762-10.9 (by special order) Required tightening torque  $M_d = 15\text{Nm}$
3. O-ring 12.42 x 1.78
4. Nameplate.



**Cartridge throttle**

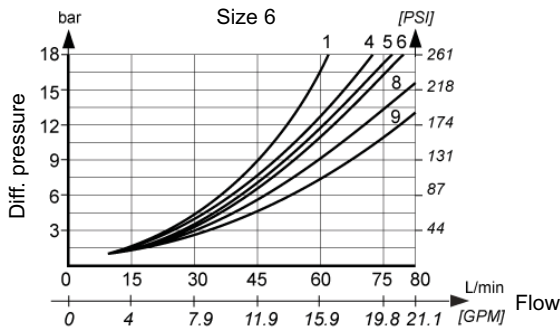
If flow rates greater than permissible occur during change-over, a cartridge throttle must be fitted into P-line of the directional valve.



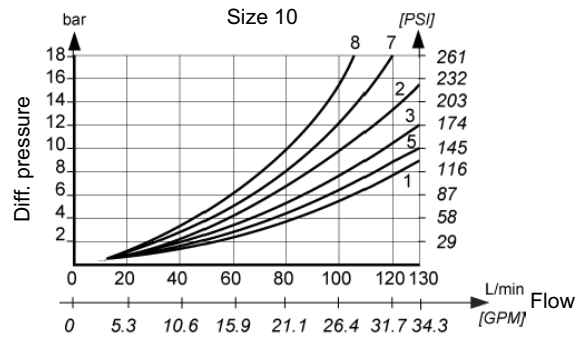


**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



Spool	P-A	P-B	A-T	B-T	P-T
1	8	8	6	6	-
2	5	5	4	4	1
6	5	5	9	9	-
51A	5	5	1	1	-



Spool	P-A	P-B	A-T	B-T	P-T
1	1	1	5	5	-
2	3	3	2	7	8
6	1	1	2	2	-
51A	1	1	3	3	-

**Model code**

**K V** - **4** / **□** - **5 K O** - **□** - **H □** - **□** - **□** - **\***

**Number of control spool position**

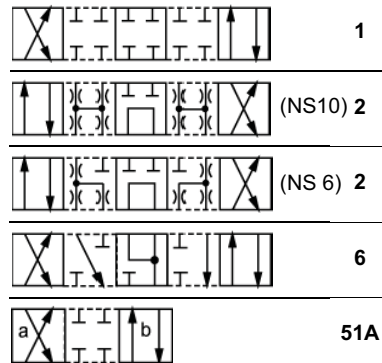
Two positions	2
Three positions	3

**Size**

Size 6	6
Size 10	10

Hydraulically operated

**Spool types**



Special requirements to be briefly specified

**Seal type**

No designation	NBR seals for mineral oil HL, HLP to DIN 51524
E	FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380

**Throttle mm [in]**

No designation	Without throttle in P line
D08	Throttle Ø 0,8 [0.03 dia.]
D10	Throttle Ø 1,0 [0.04 dia.]
D12	Throttle Ø 1,2 [0.05 dia.]

Mechanically operated

Hydraulically operated

Electrically operated





## 2/2 WAY DIRECTIONAL VALVES KV

- NG 6
- Up to 210 bar [3045 PSI]
- Up to 30 L/min [7.9 GPM]
- Direct in-line mounting.
- Threaded connections to ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Hermetically sealing at closed flow path.
- No STICK-SLIP effect even after a prolonged dwell time under pressure.
- Plug-in solenoid connector to ISO 4400.
- Protection of solenoid IP65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).



KV-2/2-6-S-..

### Operation

Directly-operated directional seat valves KV are used for the control of direction of hydraulic fluid.

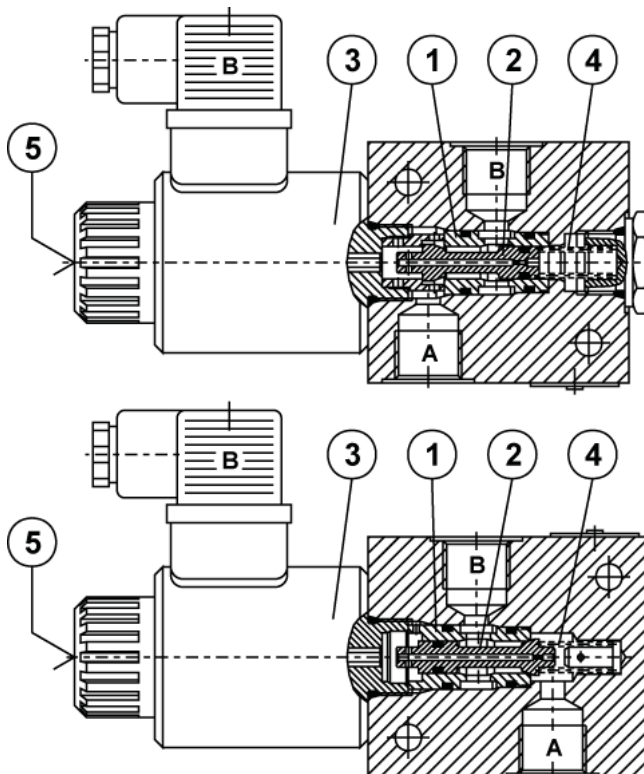
#### KV-2/2-6-S-A-...

In the start control position a, the return spring (4) holds the ball (2) in its open position, thus freeing the flow path between ports A and B. The change-over into the control position b is accomplished by energizing the solenoid (3), whereby the ball (2) is pushed against the seat (1). The hydraulic fluid on port A is under pressure.

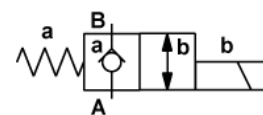
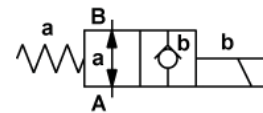
#### KV-2/2-6-S-B-...

The hydraulic fluid on port A in the start control position a is under pressure. The return spring (4) pushes the ball (2) against its seat (1). The change-over to the control position b is performed by energizing the solenoid (3), thus freeing the flow path between ports A and B.

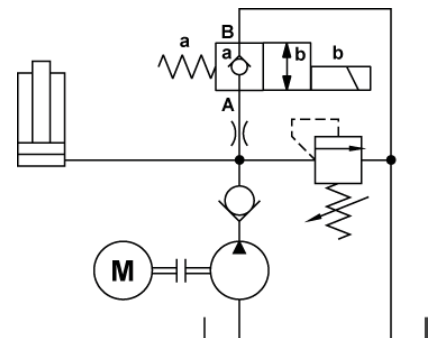
The change-over can also be done manually by pressing the emergency hand operator (5).



### Hydraulic symbols



### Mounting example



Mechanically operated

Hydraulically operated

Electrically operated





**Features**

**Hydraulic**

<b>Size</b>	6	
<b>Flow rate</b>	L/min [GPM]	30 [7,93]
<b>Operating pressure</b>	bar [PSI]	210 [3045,79]
<b>Oil temperature range</b>	°C [°F]	-20 to +70 [-4 to +158]
<b>Viscosity range</b>	mm <sup>2</sup> /s [SUS]	15 to 380 [3.24 to 82]
<b>Filtration</b>	NAS 1638	8
<b>Mass</b>	Kg [lb]	2,2 [4,85]

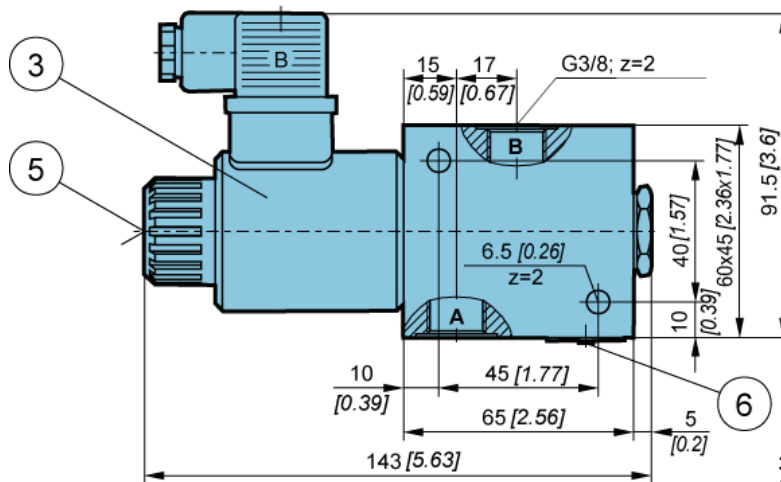
**Electrical**

<b>Supply voltage</b>	V	12, 24, 48, 110, 230 DC or AC
<b>Power</b>	W	29*
<b>Intermittence</b>	continuous	
<b>Ambient temperature</b>	°C [°F]	To +50 [To +122]
<b>Coil temperature</b>	°C [°F]	To +180 [To +356]
<b>Duty cycle</b>	min <sup>-1</sup>	250

\* 12V supply voltage - 36W

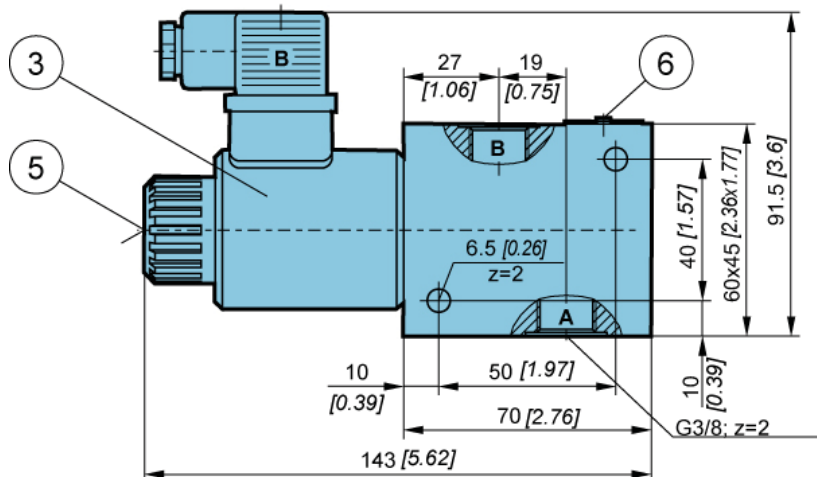
**Dimensions**

KV-2/2-6-S-A-



- 3. Solenoid "b" MR-045.
- 5. Emergency hand operator.
- 6. Nameplate.

KV-2/2-6-S-B-

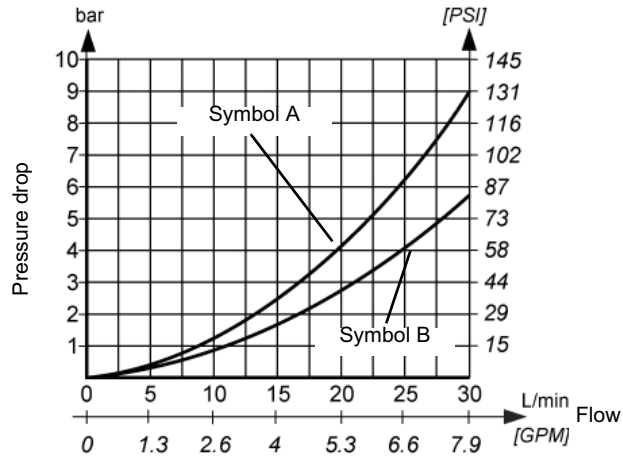




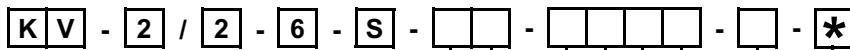
**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].

Valid for flow direction A to B.



**Model code**

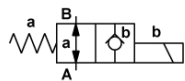


**Manual override option**

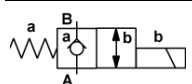
Emergency manual override	No designation
Manual override with rubber cover	G

Special requirements to be briefly specified

**Spool type**



A



B

**Seal type**

No designation	NBR seals for mineral oil HL, HLP, to DIN 51524
E	FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380

**Supply voltage**

	Direct voltage	Alternating voltage
12V	12DC	12AC
24V	No designation	24AC
48V	48DC	48AC
110V	110DC	110AC
220V	220DC	-
230V	-	230AC*

**Threaded connections**

No designation	G 3/8
3/4-16UNF	3/4-16 UNF-2B

**Overvoltage protection**

No designation	Without overvoltage protection
T	With overvoltage protection

- Alternating voltage solenoids are fitted with a bridge rectifier.  
 - With solenoids of over 48 V an earthing clamp to ISO 4400 must be connected.  
 To fulfil EMC (89/336/EEC) a capacitor must be built in

**Connector type**

EN 175301-803 without signal lamp	No designation
EN 175301-803 with signal lamp	L
EN 175301-803 without connector	K
AMP junior timer without connector	M

Mechanically operated

Hydraulically operated

Electrically operated





## 3/2 WAY DIRECTIONAL VALVES KVC

- NG 4
- Up to 160 bar [2 320 PSI]
- Up to 16 L/min [4.2 GPM]
- Plug-in connector for solenoids to ISO 4400.
- Optimized flow paths for low losses of pressure.
- Wet pin solenoid with interchangeable coil.
- Manual emergency control.
- Protection of solenoid IP 65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).



KVC2-3/2-47B, KVC-3/2-47B

### Features

Hydraulic		
Size		4
Flow rate	L/min [GPM]	16 [4.2]
Operating pressure	bar [PSI]	160 [2 320]
Viscosity range	mm <sup>2</sup> /s [SUS]	15 to 380 [69.5 to 1 760]
Oil temperature range	°C [°F]	-20 to +70 [-4 to 158]
Filtration	ISO 4406-1999	19/17/14
Mass	KVC-3/2-4	1,6 [3.5]
	KVC2-3/2-4	3,5 [7.7]

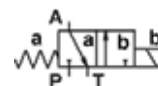
Electrical		
Supply voltage	V	12, 24
Power	W	29*
Switch-on time**	ms	50 to 80
Switch-off time**	ms	30 to 55
Switching frequency	1/h	15 000
Ambient temperature	°C [°F]	to 50 [122]
Coil temperature	°C [°F]	to 180 [356]
Duty cycle		Continuous

\* 12 V supply voltage - 36 W.

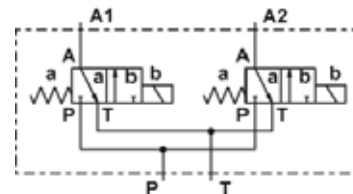
\*\* The switching-on and off times apply to 24 V DC solenoids.

### Hydraulic symbol

Single: KVC-3/2-4-47B



Double: KVC2-3/2-4-47B



Mechanically operated

Hydraulically operated

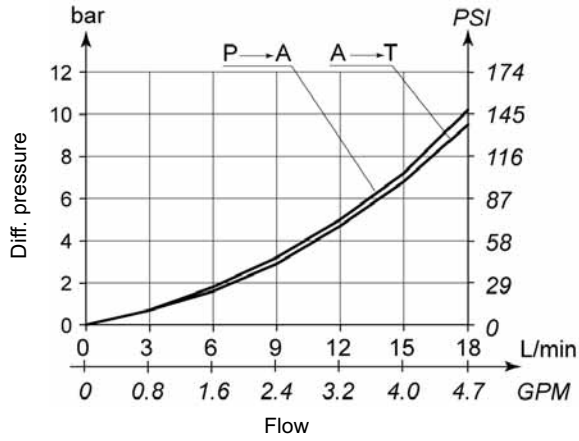
Electrically operated



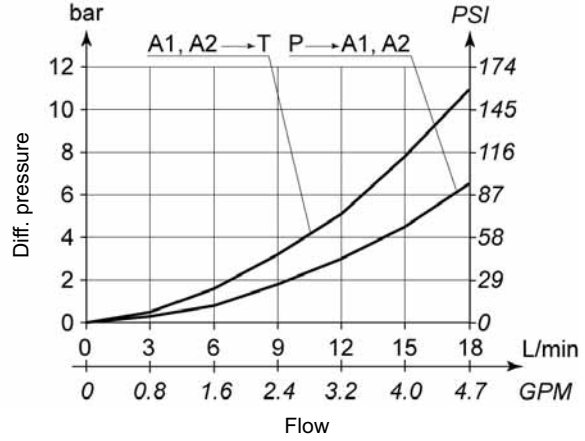
**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].

KVC-3/2-4

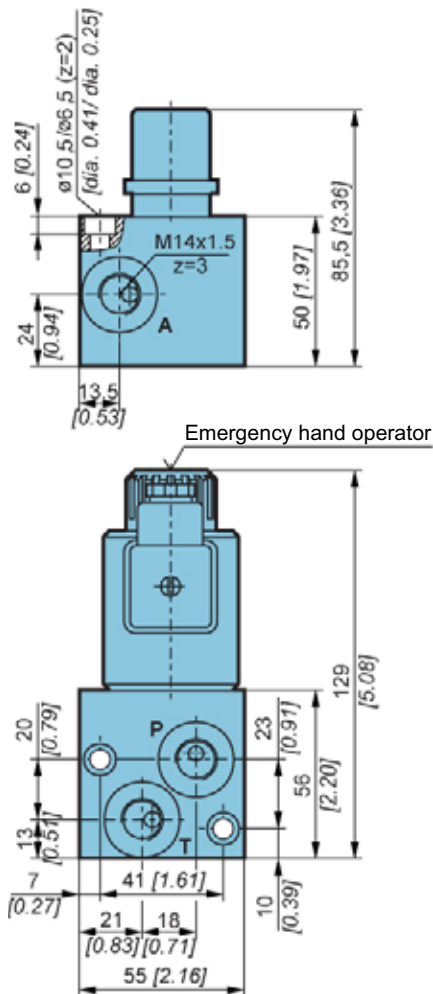


KVC2-3/2-4

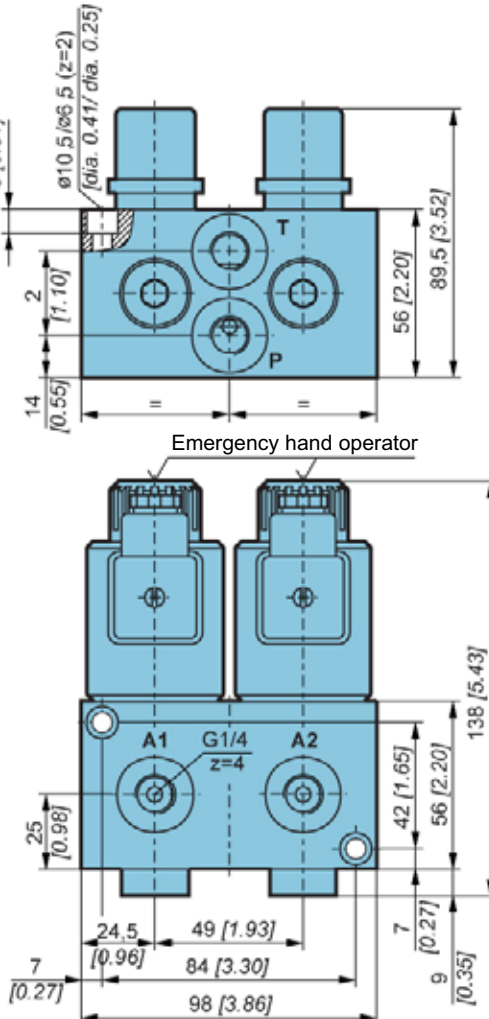


**Dimensions**

KVC-3/2-4-47B

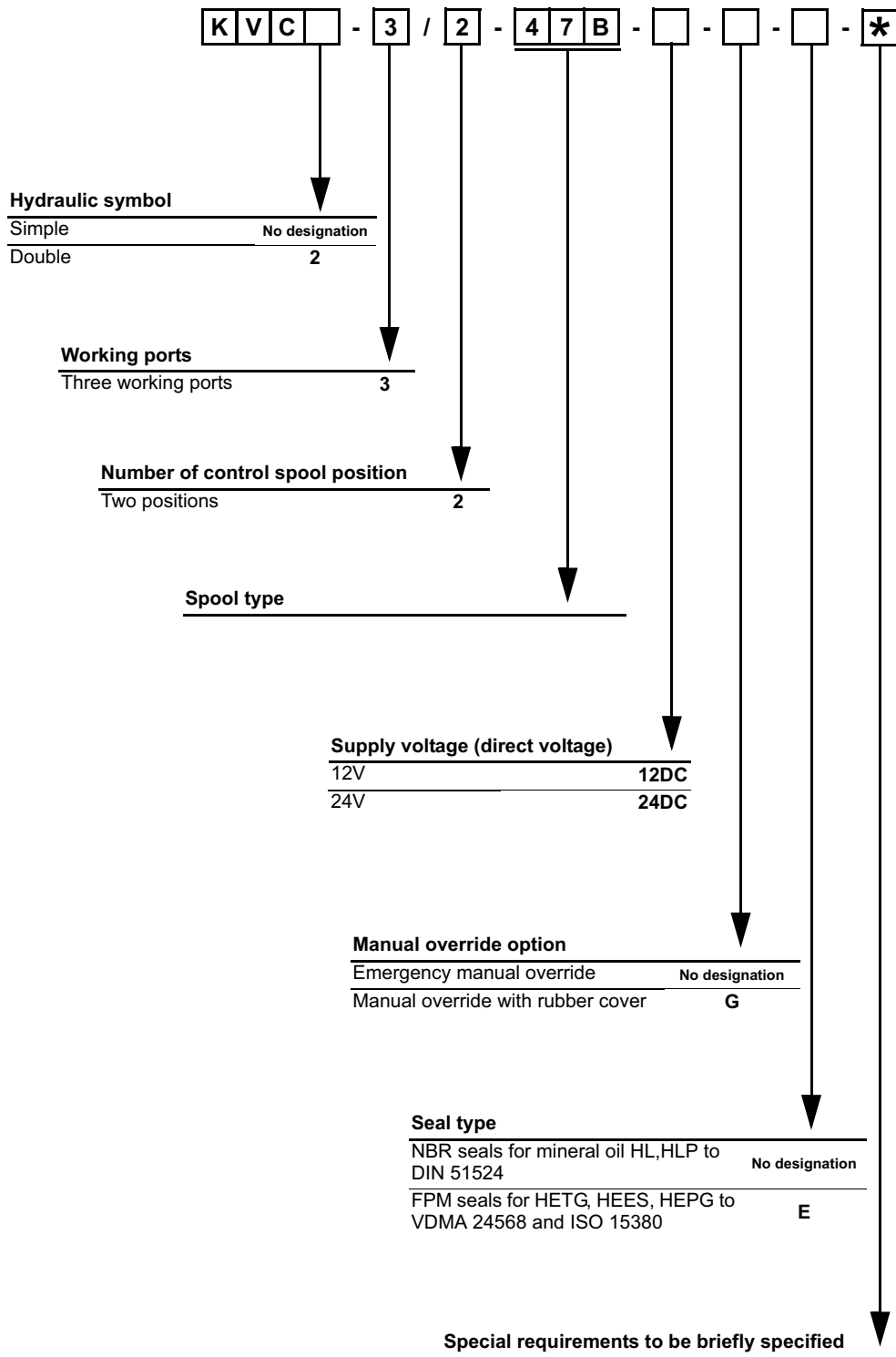


KVC2-3/2-4-47B





Model code



Mechanically operated

Hydraulically operated

Electrically operated

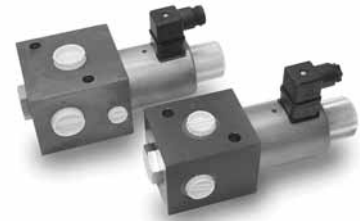






## 3/2 WAY DIRECTIONAL VALVES KVC

- NG 10
- Up to 350 bar [5 076 PSI]
- Up to 100 L/min [26.4 GPM]
- Direct in-line mounting.
- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Protection of solenoid IP65 to EN 50529 / IEC 60529.



KVC-3/2-10

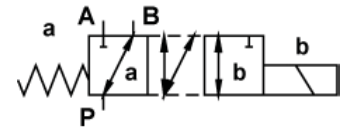
### Operation

Directional valves type KVC-3/2-10 with direct solenoid operation are used to control the direction of hydraulic fluid flow.  
 Type KVC-3/2-10 is a reduced version of type KV-6/2. It is used for alternate control of two one-pipe working units (e.g. Plunger) with common, main directional valve.

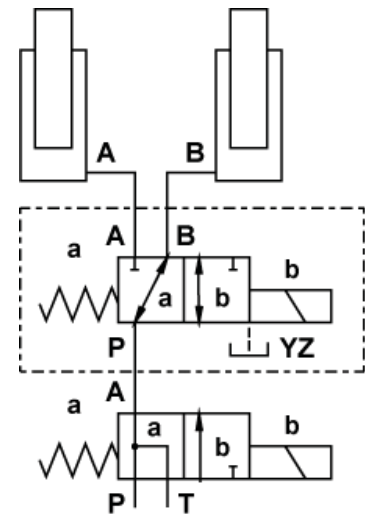
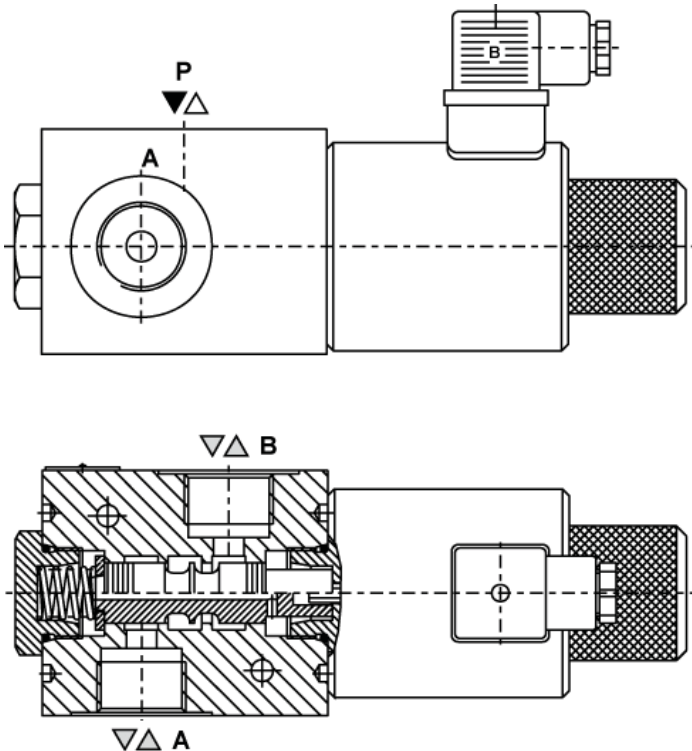
It is also very proper as bypass valve.

The change-over can also be done manually by pressing the emergency hand operator.

### Hydraulic symbol



### Mounting example



Mechanically operated

Hydraulically operated

Electrically operated



**Features**

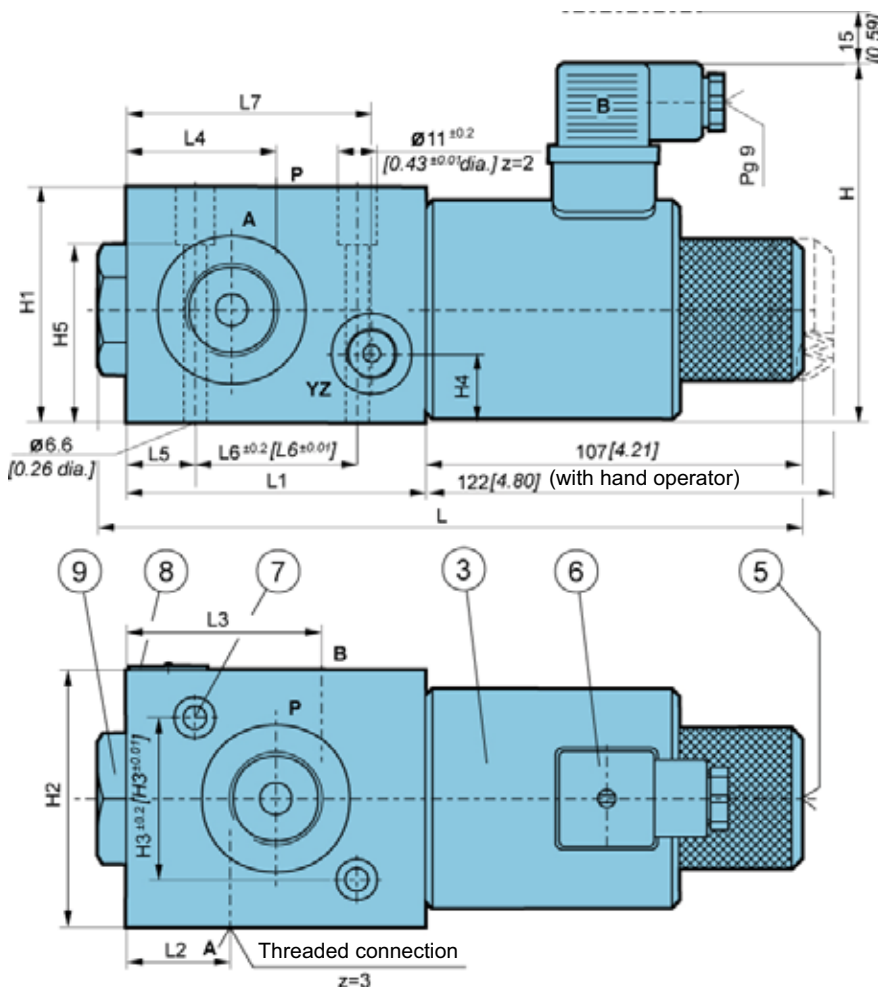
**Hydraulic**

<b>Size</b>		<b>10</b>
<b>Flow rate</b>	Without drainage	60 [15.8]
	With drainage	100 [26.4]
<b>Operating pressure</b>	Without drainage	250 [3 625]
	With drainage	350 [5 076]
<b>Oil temperature range</b>	°C [°F]	-20 to +70 [-4 to +158]
<b>Viscosity range</b>	mm <sup>2</sup> /s [SUS]	15 to 380 [3.24 to 82]
<b>Mounting position</b>		Optional
<b>Mass</b>	Without drainage	5,6 [12.34]
	With drainage	7,1 [15.65]
<b>Filtration</b>	NAS 1638	8

**Electrical**

<b>Supply voltage</b>	V	12, 24 DC
<b>Power</b>	W	45
<b>Switching frequency</b>	1/h	15000
<b>Ambient temperature</b>	°C [°F]	to +50 [to +122]
<b>Coil temperature</b>	°C [°F]	to +180 [to +356]
<b>Duty cycle</b>		Continuous

**Dimensions**



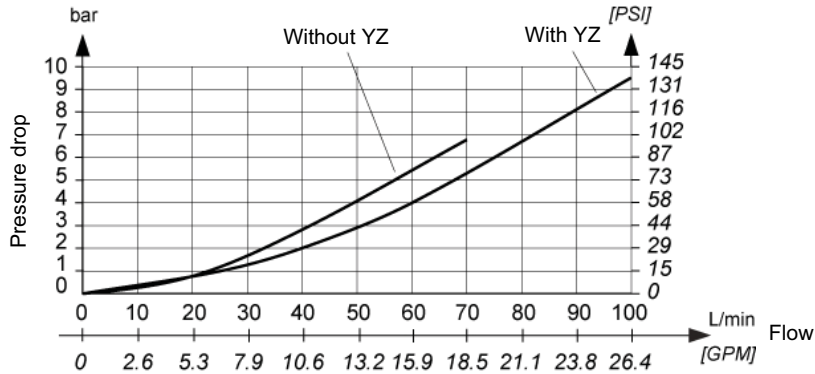
Dimensions	Without YZ	With YZ
L	200 [7.87]	209 [8.22]
L1	85 [3.34]	94 [3.70]
L2	29,5 [1.16]	31,5 [1.24]
L3	55,5 [2.18]	62,5 [2.46]
L4	42,5 [1.67]	47 [1.85]
L5	19,5 [0.76]	18 [0.71]
L6	46 [1.81]	40 [1.57]
L7	-	79,5 [3.13]
H	104 [4.09]	105 [4.13]
H1	67 [2.63]	74 [2.91]
H2	73 [2.87]	90 [3.54]
H3	46 [1.81]	66 [2.60]
H4	-	33 [1.30]
H5	50,5 [1.98]	31 [1.22]

- 3. Solenoid "b" MR-060
- 5. Emergency hand operator
- 6. Plug-in connector "b" -black
- 7. Fixing screws:  
-without YZ: 2 x M6x60 to ISO 4762-10.9  
-with YZ: - 2 x M6x40 to ISO 4762-10.9
- 8. Nameplate
- 9. Valve cap

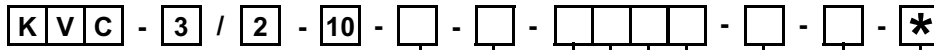


**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



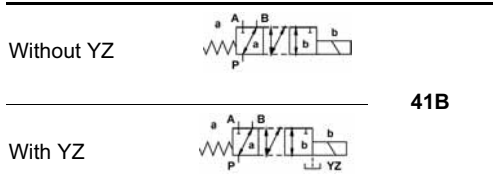
**Model code**



**Hand operator**

- Without hand operator: No designation
- With hand operator: G

**Spool type**



**Supply voltage**

- Direct voltage 24V: No designation
- Direct voltage 12V: 12 DC

**Connector type**

- EN 175301-803 without signal lamp: No designation
- EN 175301-803 with signal lamp: L
- EN 175301-803 without connector: K
- AMP Junior timer without connector: M

**Overvoltage**

- Without overvoltage protection: No designation
- With overvoltage protection: T

Special requirements to be briefly specified

**Seal type**

- No designation: NBR seals for mineral oil HL, HLP to DIN 51524
- E: FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380

**Drainage**

- No designation: Without YZ
- YZ: With YZ

**Threaded connections A,B,P ; YZ**

No designation	M18x1,5 ; -
M22	M22x1,5 ; -
M20	M20x1,5 ; -
3/8	G3/8 ; -
1/2	G1/2 ; -
3/4	G3/4 ; -
3/4	G3/4 ; G1/4
1 1/16-12UNF	1 1/16-12 UNF-2B ; 9/16-18 UNF-2B

Mechanically operated

Hydraulically operated

Electrically operated



## 4/2, 4/3 WAY DIRECTIONAL VALVE KV

- NG 6
- Up to 350 bar [5 076 PSI]
- Up to 75 L/min [19.8 GPM]
- Connection diagram and connecting dimensions to ISO 4401.
- Plug-in connector for solenoids to ISO 4400.
- 5-chamber model with good spool guidance.
- Optimized flow paths for low losses of pressure.
- Adjustment of the switching time.
- Wet pin solenoid with interchangeable coil.
- Manual emergency control.
- Protection of solenoid IP 65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).



KV-4/3-5KO-6

### Operation

Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow.

These directional valves consist of a housing (1), a control spool (3), and one solenoid (2) with two return springs (4) in 4/2-way directional valves, and two solenoids (2) with two return springs (4) in 4/3-way directional valves. In 4/3-way directional valves the centre position of the control spool is the neutral position. The change-over to the operating position (a) and (b) is done by energizing the solenoids (2) "a" and "b" respectively, whereby the solenoid plunger acts on the control spool (3) via the operating pin (5), thus clearing the corresponding flow ways and establishing relevant links between ports A, B, P, and T.

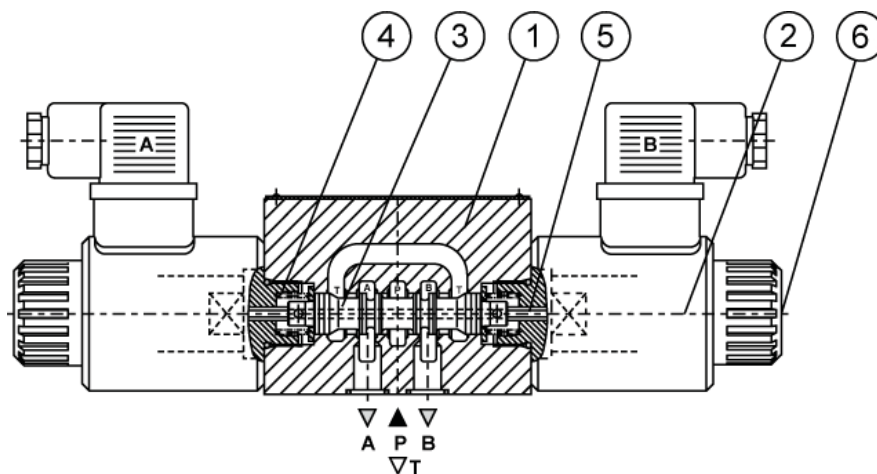
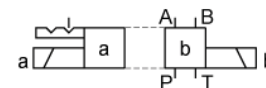
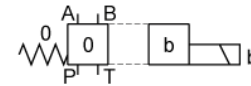
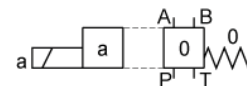
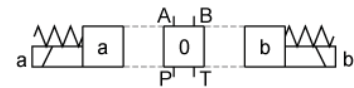
When the solenoid (2) is de-energized, the control spool (3) is returned to its neutral position by the return spring (4). The change-over can be done manually by pressing the emergency hand operator (6).

### KV-4/2-5KO-6-81

Directional valve with two operating position, two solenoids without springs allow the control spool to be held in the operating position (detent). The control spool remains in the operation position also when the solenoids are de-energized.

### Hydraulic symbols

Spool types





**Features**

**Hydraulic**

<b>Size</b>	<b>6</b>	
<b>Flow rate</b>	L/min [GPM]	see ΔP-Q curves
<b>Operating pressure</b>	Ports A, B, P	bar [PSI] 350 [5 076]
	Port T	bar [PSI] 250 [3 625]
<b>Viscosity range</b>	mm <sup>2</sup> /s [SUS]	15 to 380 [69.5 to 1 760]
<b>Oil temperature range</b>	°C [°F]	-20 to +70[-4 to 158]
<b>Filtration</b>	NAS 1638	8
<b>Mass</b>	4/2	Kg [lb] 1,9 [4.2]
	4/3	2,7 [5.9]
<b>Mounting position</b>	Optional	

**Electrical**

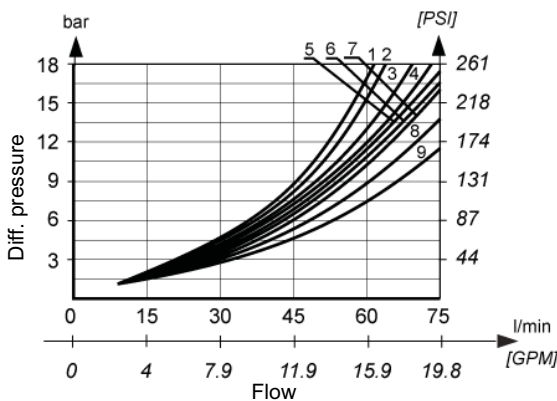
<b>Supply voltage</b>	Direct	V	12, 24, 48
	Alternating		110, 230
<b>Power</b>	W		29*
<b>Switch-on time**</b>	ms		50 to 80
<b>Switch-off time**</b>	ms		30 to 55
<b>Switching frequency</b>	1/h		15 000
<b>Ambient temperature</b>	°C [°F]		to 50 [122]
<b>Coil temperature</b>	°C [°F]		to 180 [356]
<b>Duty cycle</b>	Continuous		

\* 12 V supply voltage - 36 W.

\*\* The switching-on and off times apply to 24 V DC solenoids.

**ΔP-Q Performance curves**

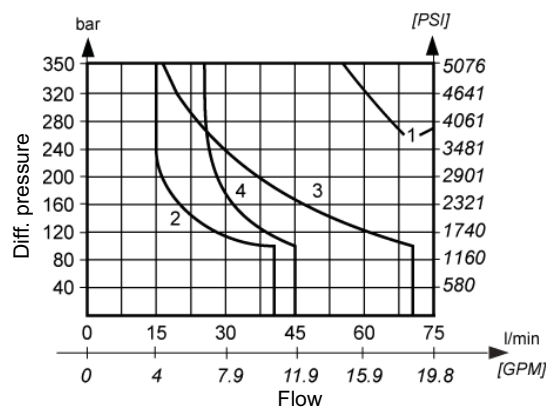
Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



Spool	Flow path				
	P-A	P-B	A-T	B-T	P-T
1	8	8	6	6	-
2	5	5	4	4	1
3	8	8	7	7	-
6	5	5	9	9	-
81	5	5	1	1	-
51A, 51B	5	5	1	1	-
41A, 41B	7	7	-	-	-

**ΔP-Q Operating limits**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



Spool	curve
1	1
2	4
3	3
6	3
81	1
51A, 51B	1
41A, 41B	2

The operating limits of the valve are determined at a voltage 10% below the nominal rating. The curves refer to application with symmetrical flow through the valve (P-A and B-T). In the case of asymmetric flow (e.g. one part not used) reduced values may result.

Note: For valves with adjustment of the switching time reduced values of the operating limits may result.

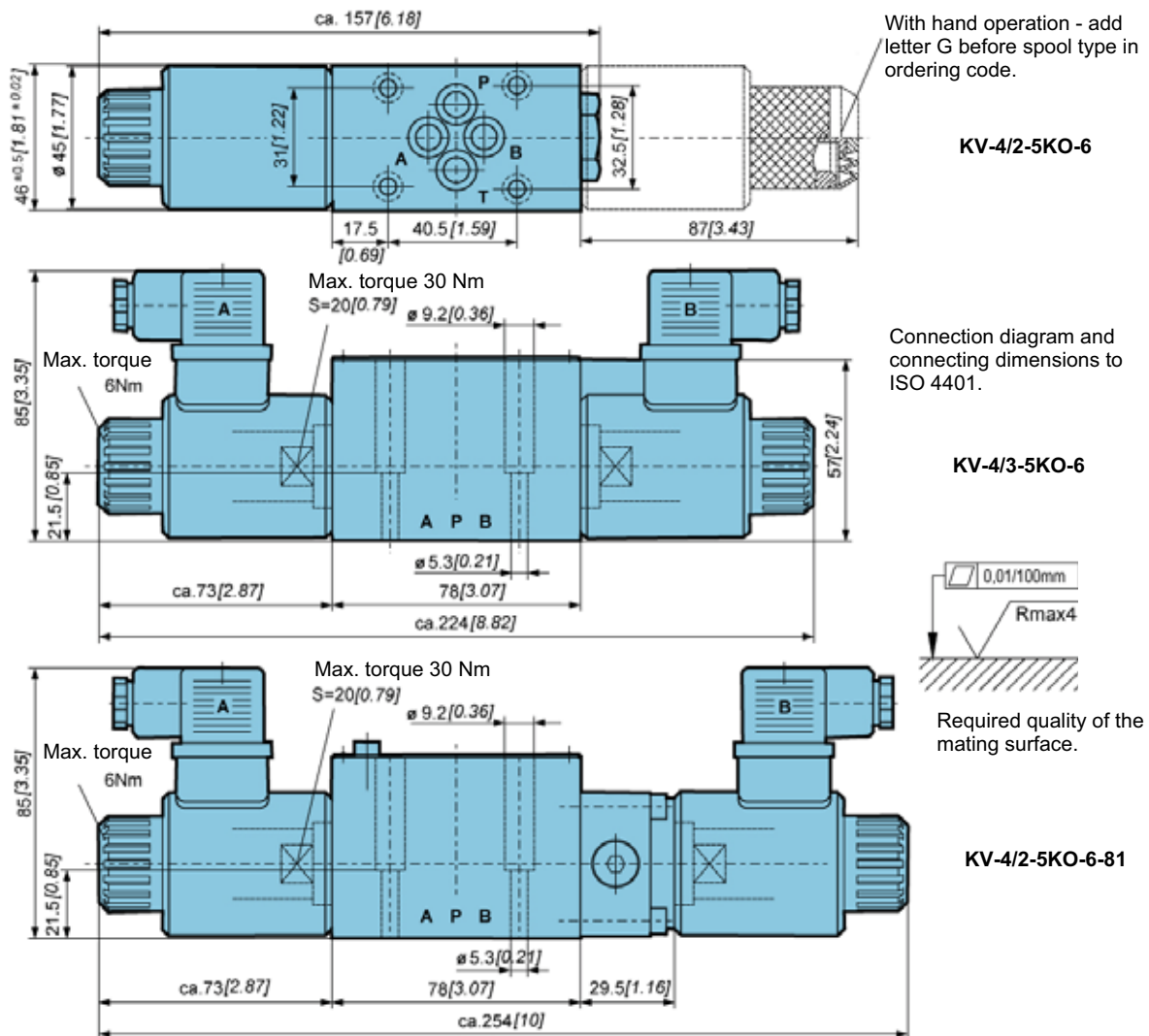
Mechanically operated

Hydraulically operated

Electrically operated

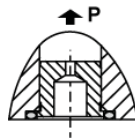


**Dimensions**



**Cartridge throttle**

If flow rates greater than permissible occur during change-over, a cartridge throttle must be fitted into P-line of the directional valve.



**Installation**

The directional control valve must be installed horizontally (Nameplate on top). If this is not the case, the valve must be removed for venting. Unscrew the vent screw. Move the spool alternately to the switching positions a and b until no more bubbles appear at the screw hole. The oil must be visible at the screw hole. Missing oil should be refilled with an oilcan, drop by drop. Screw in the vent screw.

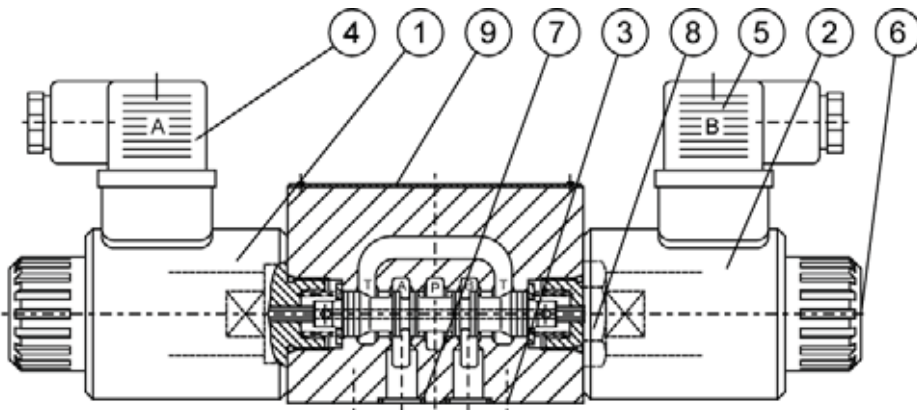
A constant or short time static oil pressure of at least > 4 bar must prevail at connection T of the directional control valve to maintain the oil pressure in the spring chambers. If this is not the case, the preloaded oil volume of the restricted valve would leak into the T channel through the leakage section of the control spool shoulders.

The dampening constancy also depends on the constancy of the oil viscosity. For this reason the dampening effect should always be adjusted with the system at operational temperature.



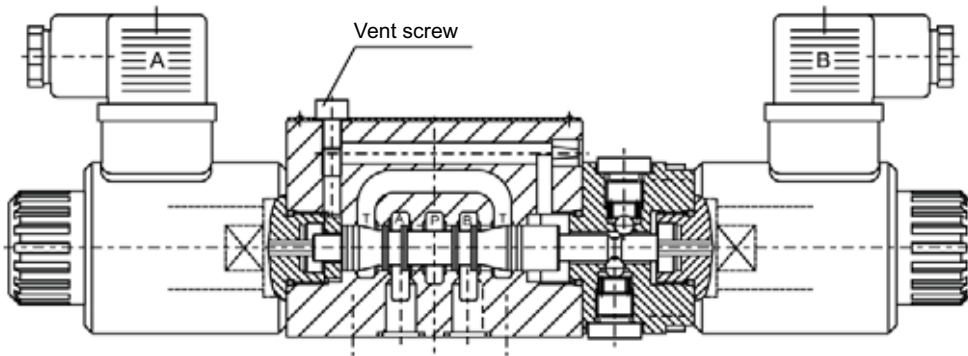


Function drawing



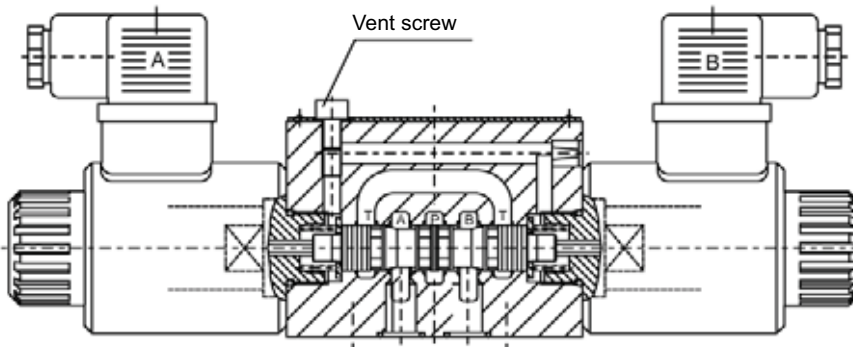
**KV-4/3-5KO-6**  
(KV-4/2-5KO-6)

Mechanically operated

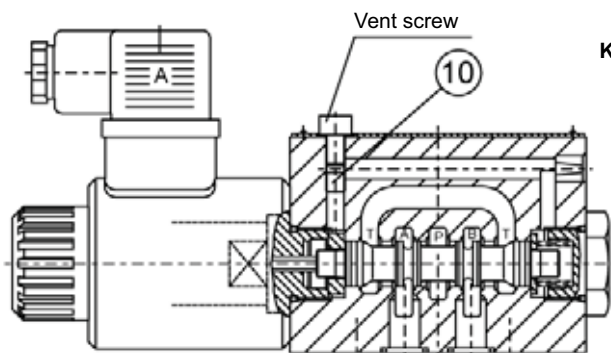


**KV-4/2-5KO-6-81**

Hydraulically operated



**KV-4/3-5KO-6-2**



**KV-4/2-5KO-6-UD**

- 1. Solenoid "a" - MR-045
- 2. Solenoid "b" - MR-045
- 3. Fixing screws 4 pcs M5 x 30 to ISO 4762  
-10.9 must be ordered separately.  
Required tightening torque Md = 9 Nm
- 4. Plug-in connector "a" - grey
- 5. Plug-in connector "b" - black
- 6. Emergency hand operator
- 7. O-ring 9,25 x 1,78
- 8. Valve cap
- 9. Nameplate
- 10. Constant action restrictor

Electrically operated



**Model code**

**K V** -  /  - **5 K O** - **6** -

**Working ports**

Three working ports	<b>3</b>
Four working ports	<b>4</b>

**Number of control spool positions**

Two positions	<b>2</b>
Three positions	<b>3</b>

**Manual override option**

Emergency manual override	<b>No designation</b>
Manual override with rubber cover	<b>G</b>

**Spool types**

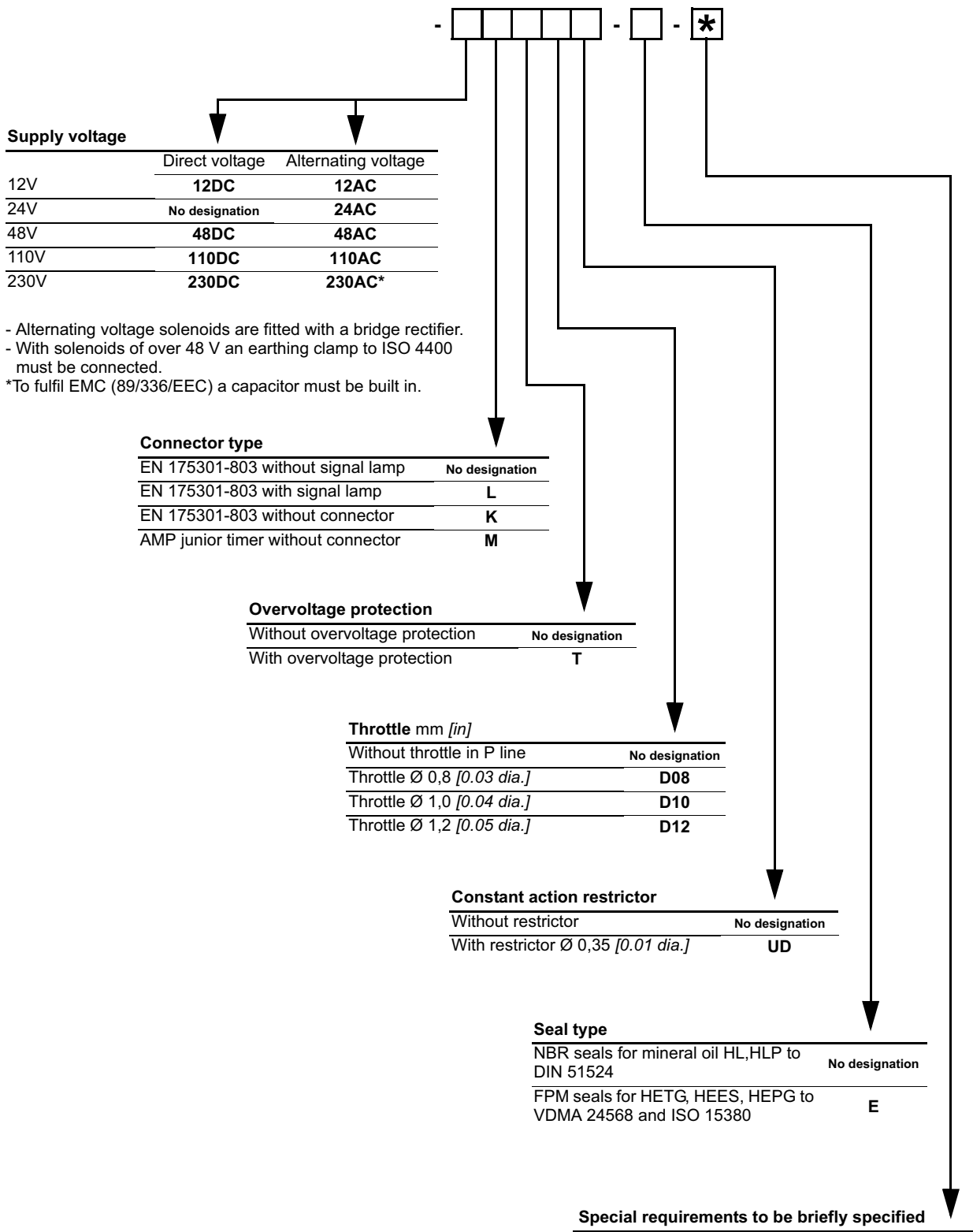
<b>1</b>	<b>1A</b>	<b>1B</b>	<b>81</b>
<b>2</b>	<b>2A</b>	<b>2B</b>	
<b>3</b>	<b>3A</b>	<b>3B</b>	
<b>6</b>	<b>6A</b>	<b>6B</b>	
	<b>51A</b>	<b>51B</b>	
	<b>41A</b>	<b>41B</b>	

Port T in the valves with spool type 41A and 41B to be used as leakage line.



Valves with adjustment of the switching time - a constant or short - time static oil pressure of at least  $\geq 4$  bar [58 PSI] must prevail at connection T of the directional control valve to maintain the pressure in the spring chambers.





Mechanically operated

Hydraulically operated

Electrically operated



## 4/2, 4/3 WAY DIRECTIONAL VALVE KV

- NG 10
- Up to 350 bar [5 076 PSI].
- Up to 120 L/min [31.7 GPM].
- Connection diagram and connecting dimensions to ISO 4401.
- Plug-in connector for solenoids to ISO 4400.
- 5-chamber model with good spool guidance.
- Optimized flow paths for low losses of pressure.
- Adjustment of the switching time.
- Wet pin solenoid with interchangeable coil.
- Manual emergency control.
- Protection of solenoid IP 65 to EN 60529 / IEC 60529.



KV-4/3-5KO-10

### Operation

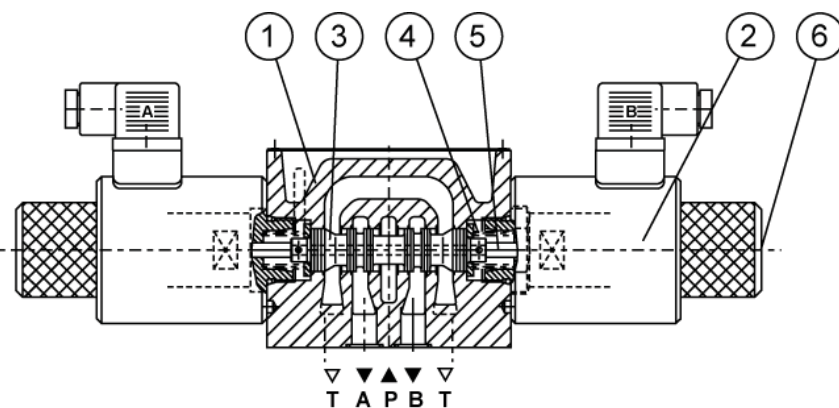
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow.

These directional valves consist of a housing (1), a control spool (3), and one solenoid (2) with two return springs (4) in 4/2-way directional valves, and two solenoids (2) with two return springs (4) in 4/3-way directional valves. In 4/3-way directional valves the centre position of the control spool is the neutral position. The change-over to the operating position (a) and (b) is done by energizing the solenoids (2) "a" and "b" respectively, whereby the solenoid plunger acts on the control spool (3) via the operating pin (5), thus clearing the corresponding flow ways and establishing relevant links between ports A, B, P, and T.

When the solenoid (2) is de-energized, the control spool (3) is returned to its neutral position by the return spring (4). The change-over can be done manually by pressing the emergency hand operator (6).

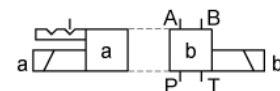
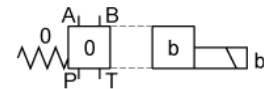
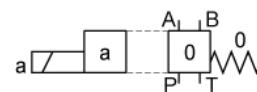
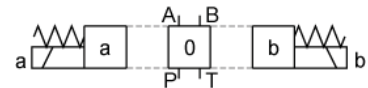
#### KV-4/2-5KO-10-81

Directional valve with two operating position, two solenoids without springs allows the control spool to be held in the operating position (detent). The control spool remains in the operation position also when the solenoids are de-energised.



### Hydraulic symbol

Spool types





**Features**

<b>Hydraulic</b>			
<b>Size</b>			<b>10</b>
<b>Flow rate</b>		L/min [GPM]	see ΔP-Q curves
<b>Operating pressure</b>	Ports A, B, P	bar [PSI]	350 [5 076]
	Port T	bar [PSI]	250 [3 625]
<b>Viscosity range</b>		mm <sup>2</sup> /s [SUS]	15 to 380 [69.5 to 1 760]
<b>Oil temperature range</b>		°C [°F]	-20 to +70[-4 to 158]
<b>Filtration</b>		NAS 1638	8
<b>Mass</b>	4/2	Kg [lb]	6,5 [14.3]
	4/3		7,3 [16.1]
<b>Mounting position</b>			Optional

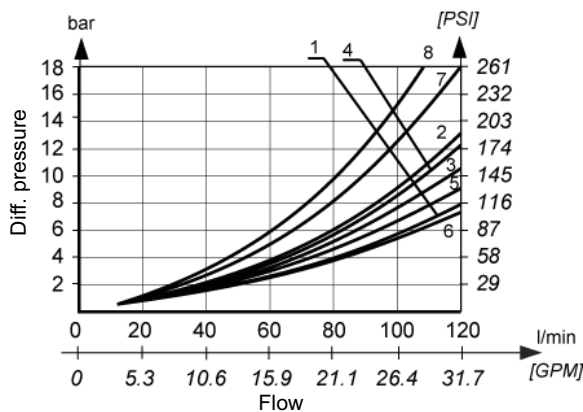
**Electrical**

<b>Supply voltage</b>	Direct	V	12, 24, 48
	Alternating		110, 230
<b>Power</b>		W	45
<b>Switch-on time*</b>		ms	70 to 95
<b>Switch-off time*</b>		ms	40 to 80
<b>Switching frequency</b>		1/h	15 000
<b>Ambient temperature</b>		°C [°F]	to 50 [122]
<b>Coil temperature</b>		°C [°F]	to 180 [356]
<b>Duty cycle</b>			Continuous

\* The switching-on and off times apply to 24 V DC solenoids.

**ΔP-Q Performance curves**

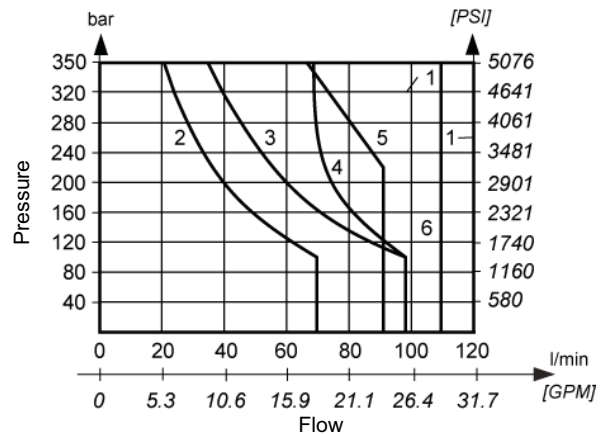
Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



Spool	Flow path			
	P-A	P-B	A-T	B-T
1	1	1	5	5
2	3	3	2	7
3	6	6	3	4
6	1	1	2	2
9	6	6	2	2
81	1	1	3	3
51A, 51B	1	1	3	3
41A, 41B	6	6	-	-

**ΔP-Q Operating limits**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



Spool	curve
1	1
2	4
3	5
6	3
9	6
81	1
51A, 51B	1
41A, 41B	2

The operating limits of the valve are determined at a voltage 10% below the nominal rating. The curves refer to application with symmetrical flow through the valve (P-A and B-T). In the case of asymmetric flow (e.g. one part not used) reduced values may result.

Note: For valves with adjustment of the switching time reduced values of the operating limits may result.

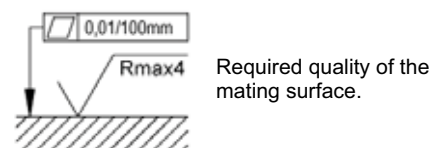
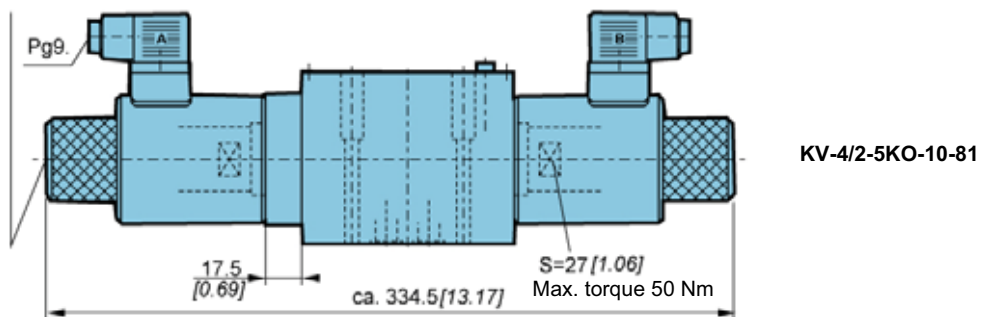
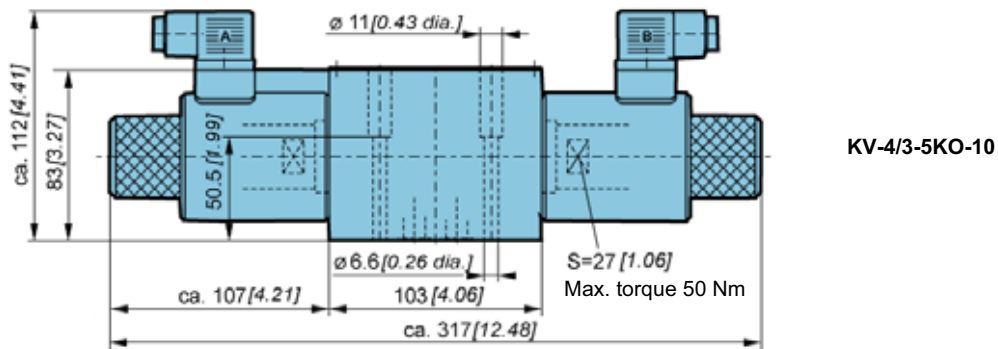
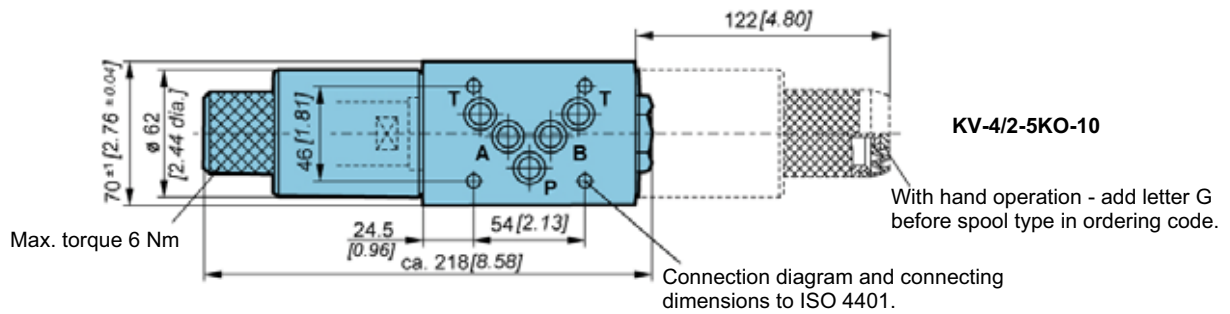
Mechanically operated

Hydraulically operated

Electrically operated

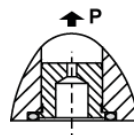


**Dimensions**



**Cartridge throttle**

If flow rates greater than permissible occur during change-over, a cartridge throttle must be fitted into P-line of the directional valve.



**Installation**

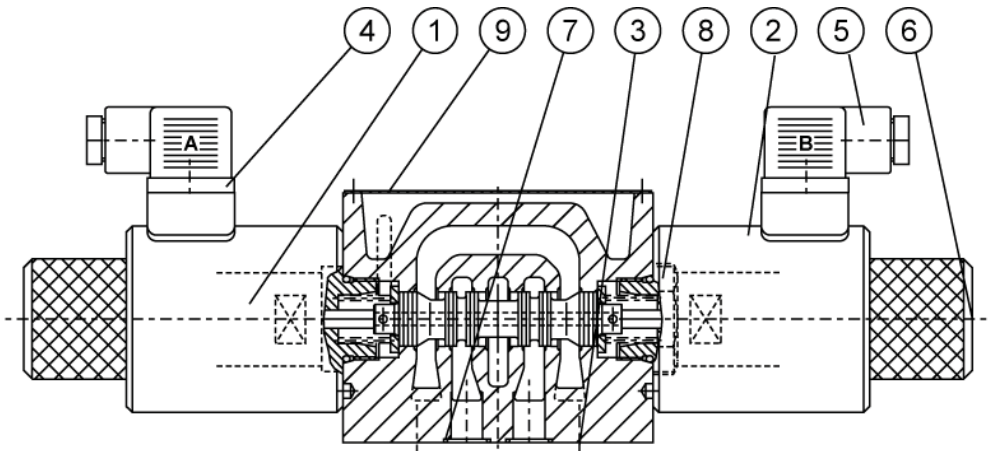
The directional control valve must be installed horizontally (Nameplate on top). If this is not the case, the valve must be removed for venting. Unscrew the vent screw. Move the spool alternately to the switching positions a and b until no more bubbles appear at the screw hole. The oil must be visible at the screw hole. Missing oil should be refilled with an oilcan, drop by drop. Screw in the vent screw.

A constant or short time static oil pressure of at least > 4 bar must prevail at connection T of the directional control valve to maintain the oil pressure in the spring chambers. If this is not the case, the preloaded oil volume of the restricted valve would leak into the T channel through the leakage section of the control spool shoulders.

The dampening constancy also depends on the constancy of the oil viscosity. For this reason the dampening effect should always be adjusted with the system at operational temperature.

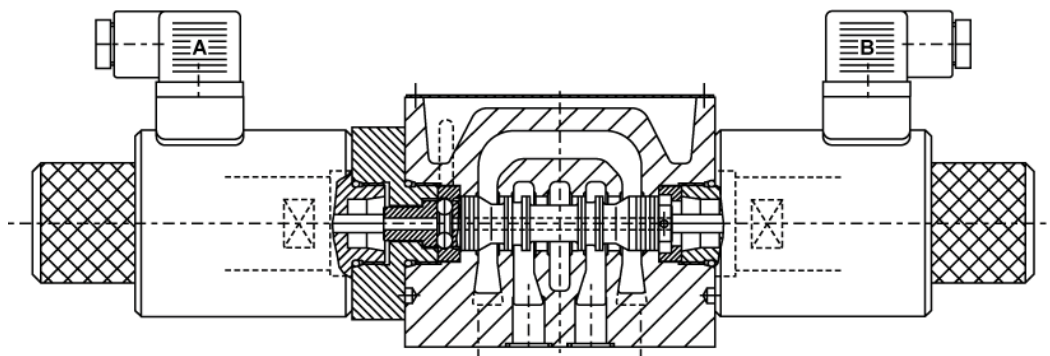


Function drawing

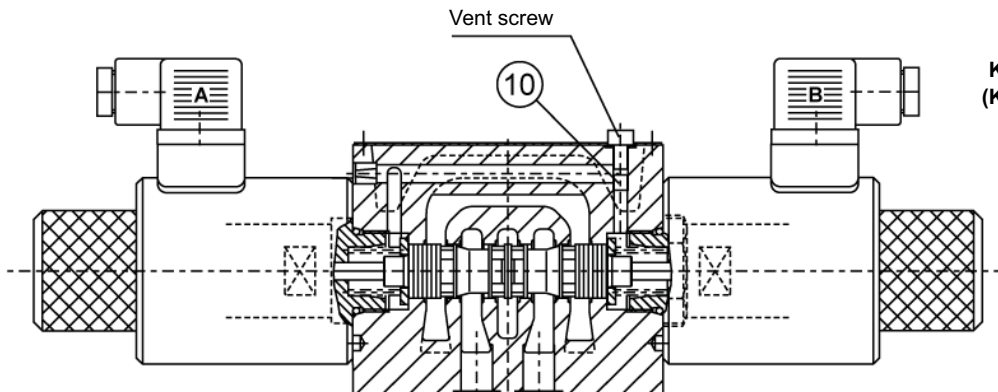


KV-4/3-5KO-10  
(KV-4/2-5KO-10)

- |  |                                  |
|--|----------------------------------|
| 1. Solenoid "a" - MR-060   | 4. Plug-in connector "a" - grey  |
| 2. Solenoid "b" - MR-060   | 5. Plug-in connector "b" - black |
| 3. Fixing screws 4 pcs M6 x 60 to ISO 4762 -10.9 must be ordered separately. Required tightening torque Md = 15 Nm | 6. Emergency hand operator       |
|  | 7. O-ring 12,42 x 1,87           |
|  | 8. Valve cap                     |
|  | 9. Nameplate                     |
|  | 10. Constant action restrictor   |



KV-4/2-5KO-10-81



KV-4/3-5KO-10-2-UD  
(KV-4/2-5KO-10-2-UD)

Mechanically operated

Hydraulically operated

Electrically operated



**Model code**

**K V** -  /  - **5 K O** - **10** -

**Working ports**

Three working ports	<b>3</b>
Four working ports	<b>4</b>

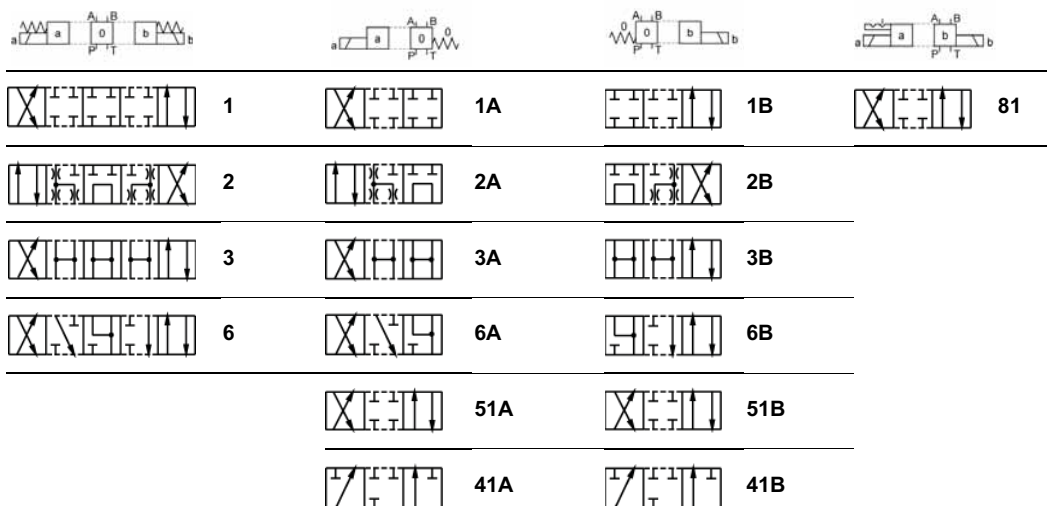
**Number of control spool position**

Two positions	<b>2</b>
Three positions	<b>3</b>

**Manual override option**

Emergency manual override	<b>No designation</b>
Manual override with rubber cover	<b>G</b>

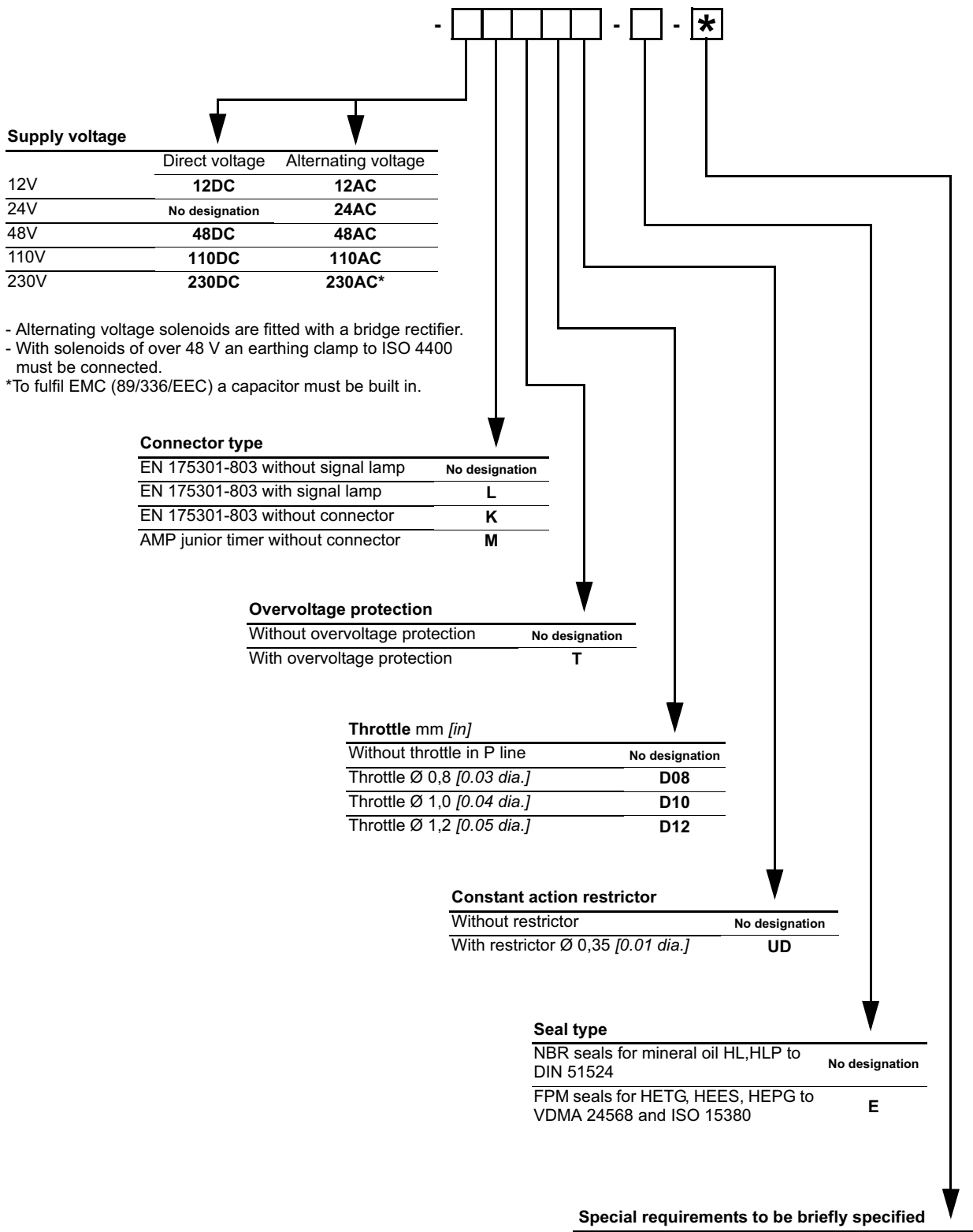
**Spool types**



Port T in the valves with spool type 41A and 41B to be used as leakage line.



Valves with adjustment of the switching time - a constant or short - time static oil pressure of at least > 4 bar [58 PSI] must prevail at connection T of the directional control valve to maintain the pressure in the spring chambers.



Mechanically operated

Hydraulically operated

Electrically operated







## 4/2, 4/3 WAY DIRECTIONAL VALVES TYPE KV

- NG 16
- To 350 bar [5 076 PSI]
- To 300 L/min [79 GPM]

- Indirect, solenoid, and mechanical (by lever) operation.
- Connection diagram and connecting dimensions to ISO 4401.
- Plug-in solenoid connector to ISO 4400.
- Protection of solenoid IP 65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).



KV-4/3-16-

### Operation

Directional valves type KV with indirect, solenoid-hydraulic operation control the hydraulic fluid flow direction.

These valves consist of the main valve (1), a control spool (2), two return springs (3) in 4/3-way valves and none in 4/2-way valves, a double throttle check/valve (4) and a pilot valve (5).

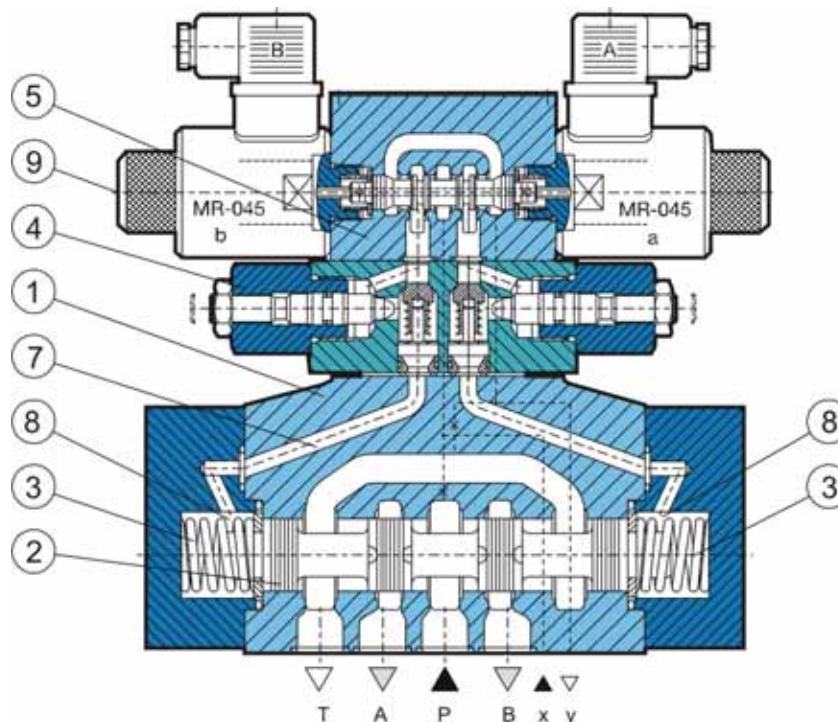
The pilot valve (5) is connected with the pressure chambers (8) via the pilot line (7). Feeding of the pilot valve oil is either or external (via the port "x"). Change-over of the control spool to one of the operating position is activated by the introduction of oil via the pilot valve (5) into one of the pressure chambers (8). A pressure rise in chambers provokes the movement of the control spool (2). Suitable links between ports A,B,P,T according to spool types are established as set forth in the table.

When the solenoid of the pilot valve (5) are de-energized a link between the pressure chamber (8) and the return line "y" for the pilot oil discharge is established. A pressure drop in the chamber provokes the movement of the return spring (3) which automatically return the control spool to the neutral position.

Discharge of the return pilot oil from the pressure chambers is either internal or external (via the port "y").

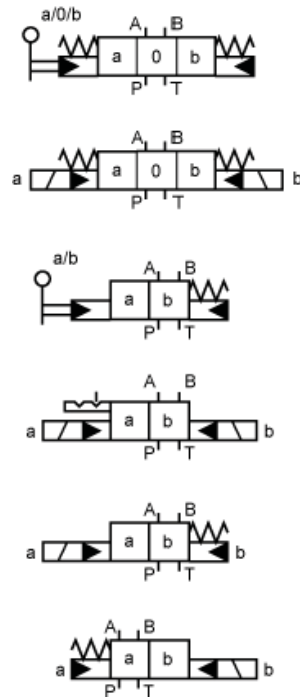
Manual change-over of the main valve is also possible by pressing the emergency hand operator (9).

Indirect directional valves can also be provided with a manual pilot valve. These valves are manually operated by moving the operating lever.



### Hydraulic symbols

Spool types



Mechanically operated

Hydraulically operated

Electrically operated



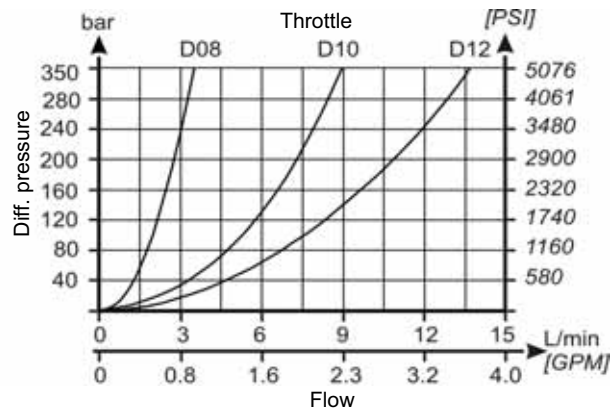
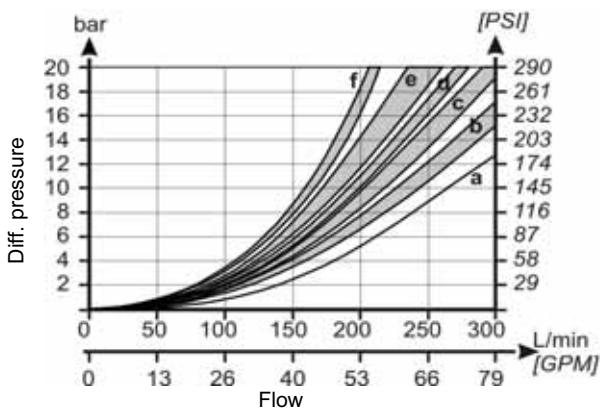
**Features**

<b>Flow rate</b>	l/min [GPM]	300 [79.2]	
<b>Operating pressure</b>	bar [PSI]	Ports A, B, P	350 [5076.3]
		Port T	250 [3625.9]
<b>Pilot oil pressure (x-external)</b>	bar [PSI]	50-250 [725.2-3625.9]	
<b>Pilot oil pressure (x-internal)</b> Pre-load valve is fitted into P-port of the main valve Without Pre-load valve in the P-port of the main valve		In valve types with internal pilot oil supply (x) the spool types 2, 3, and 4 are possible only when the oil flow in the direction from P towards T achieves the flow rate Q = 150 L/min [39.6 GPM], with the control spool in the centre position.	
<b>Oil temperature range</b>	°C [°F]	-20 to +70 [-4 to 158]	
<b>Viscosity range</b>	mm <sup>2</sup> /S	15 to 380	
<b>Required pilot oil volume</b>	cm <sup>3</sup> [cu.in]	2 positions valve	7,8 [0.47]
		3 positions valve	3,9 [0.24]
		Main valve	8 [17.6]
		4/3 pilot valve	2,5 [5.5]
		4/2 pilot valve	2,2 [4.8]
<b>Mass</b>	Kg [lb]	Throttle/check valve	1,45 [3.2]
		Pressure reducing valve	1,70 [3.7]
<b>Mounting position</b>		Optional, horizontal for spool types 4/2	
<b>Switch-on time</b>	(ms)	3 positions valve	60
<b>Solenoid change-over from the operating to the centre position</b>		2 positions valve	85
<b>Switch-off time</b>	(ms)	3 positions valve	45
<b>Solenoid change-over from the operating to the centre position</b>		2 positions valve	50
<b>Filtration</b>	NAS 1638	8	
<b>Ambient temperature range</b>	°C [°F]	+50 [122]	
<b>Coil temperature range</b>	°C [°F]	+180 [356]	
<b>Power</b>	W	29 (12V supply voltage - 36W)	
<b>Voltage</b>	V	12, 24, 48, 110, 230	

The switch-on and switch-off times apply to 24 V DC solenoids.

**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



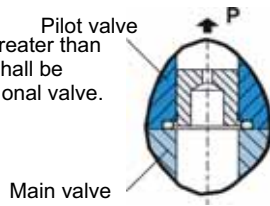
Spool type	P-A	P-B	A-T	B-T	P-T
1, R1, 51B, 51A, F51, R51	e	e	e	f	-
2, R2	a	b	c	e	f
3, R3	b	b	c	d	-
4, R4	b	c	c	e	-
5, R5	b	c	c	e	-
6, R6	b	c	d	e	-

See Model Code for spool type choice.



**Cartridge throttle**

If the pilot oil supply rate (x) is greater than permissible a cartridge throttle shall be fitted into the P line of the directional valve.



**Pre-load valve**

In valves with a low pressure bypass and internal pilot oil feed, minimum pilot pressure is obtained by installing a pre-load valve in the P-port of the main valve.  
The cracking pressure is approx. 4,5 to 6 bar [65 to 87 PSI].



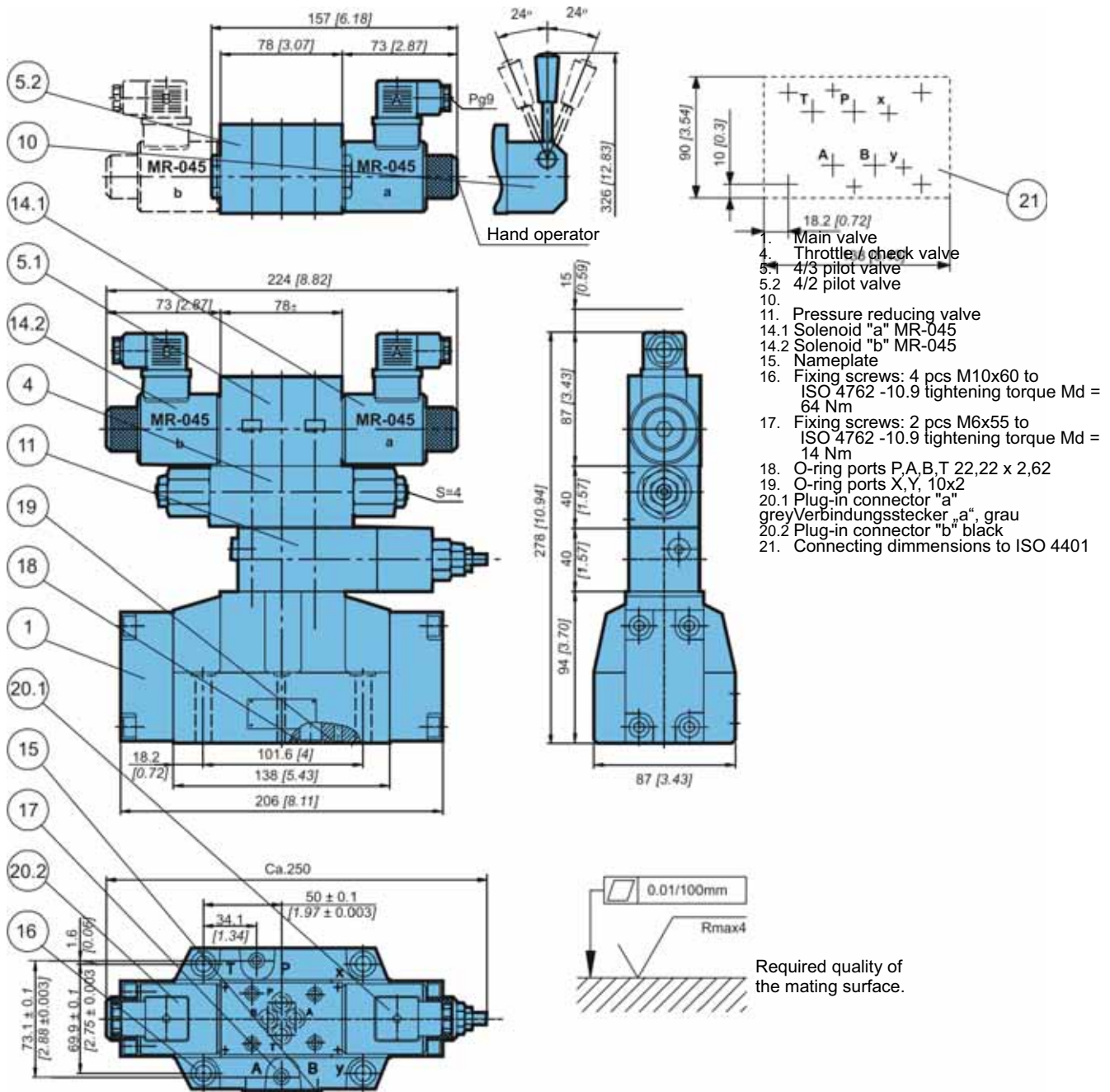
**Pressure reducing valve**

The pressure reducing valve used when the pilot oil "X" pressure exceeds the permissible limit  $p = 250 \text{ bar}$  [3 626 PSI].

**Throttle check valve**

The throttle check valve used for setting the supply flow rate of the pilot oil to the pressure chambers. Simultaneously, the change-over speed of the main control spool is adjusted. In this way a smoother change-over, without hydraulic shocks is provided.

**Dimensions**



Mechanically operated

Hydraulically operated

Electrically operated



**Model code**

**K V** - **4** /    **1 6** -    -    -   

**Number of control spool positions**

Two positions

Three positions

3

**Manual override option**

Emergency manual override

Manual override with rubber cover

No designation

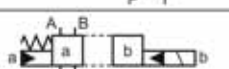
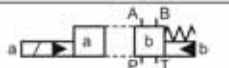
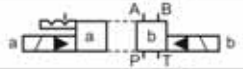
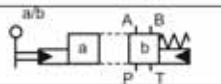
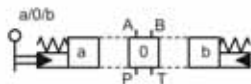
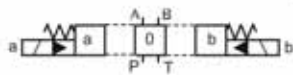
G

**Pilot oil supply and discharge**

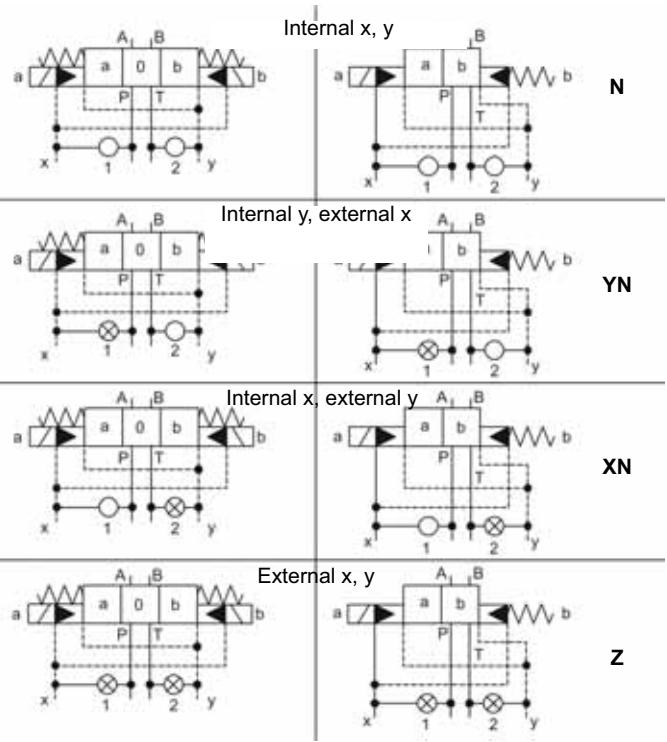
Three positions

Two positions

**Spool types**

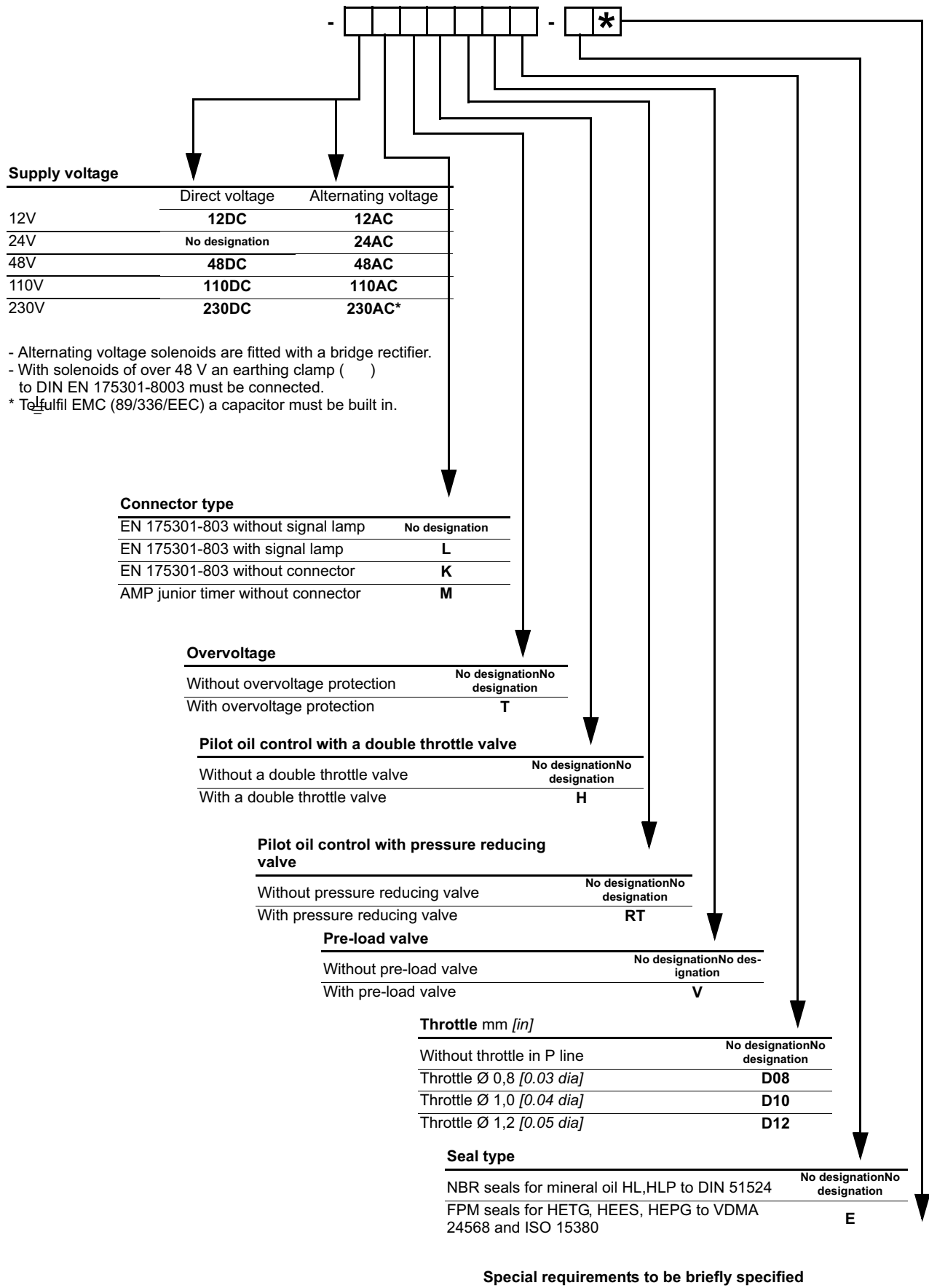


- 1
- 2
- 3
- 4
- 5
- 6
- R1
- R2
- R3
- R4
- R5
- R6
- R51
- F51
- 51A
- 51B



For supply and discharge with spool type 2 and 3, refer to the features table.





Mechanically operated

Hydraulically operated

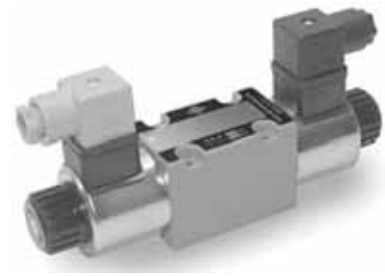
Electrically operated





## 4/2, 4/3 WAY DIRECTIONAL VALVE KV-3KO

- NG 6
- Up to 250 bar [5 625 PSI]
- Up to 40 L/min [10.6 GPM]
- Connection diagram and connecting dimensions to ISO 4401.
- Different types of plug-in connectors.
- 3-chamber model.
- Optimized flow paths for low losses of pressure.
- Wet pin solenoid with interchangeable coil.
- Manual emergency control.
- Protection of solenoid IP 65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).



KV-4/3-3KO-6

### Operation

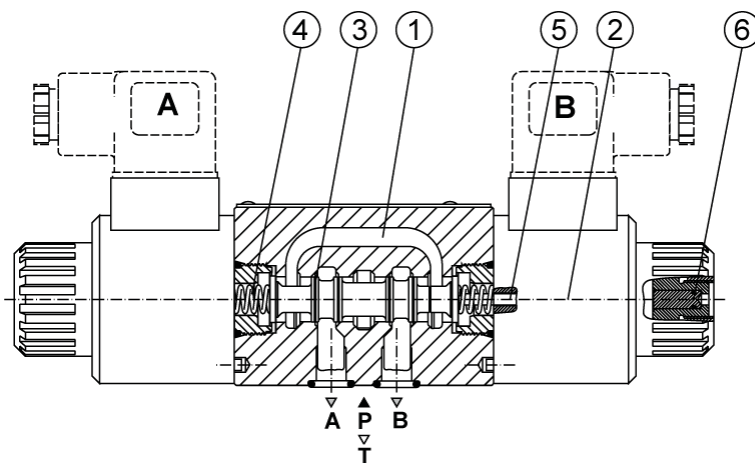
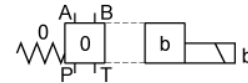
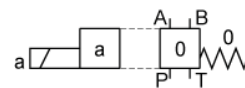
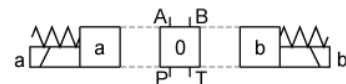
Directional valves type KV-3KO with direct solenoid operation control the direction of the hydraulic medium flow.

These directional valves consist of a housing (1), a control spool (3), and one solenoid (2) with two return springs (4) in 4/2-way directional valves, and two solenoids (2) with two return springs (4) in 4/3-way directional valves. In 4/3-way directional valves the centre position of the control spool is the neutral position. The change-over to the operating position (a) and (b) is done by energizing the solenoids (2) "a" and "b" respectively, whereby the solenoid plunger acts on the control spool (3) via the operating pin (5), thus clearing the corresponding flow ways and establishing relevant links between ports A, B, P, and T.

When the solenoid (2) is de-energized, the control spool (3) is returned to its neutral position by the return spring (4). The change-over can be done manually by pressing the emergency hand operator (6).

### Hydraulic symbols

Spool types



Mechanically operated

Hydraulically operated

Electrically operated



**Features**

**Hydraulic**

<b>Size</b>	<b>6</b>		
<b>Flow rate</b>		L/min [GPM]	see ΔP-Q curves
<b>Operating pressure</b>	Ports A, B, P	bar [PSI]	250 [3 625]
	Port T	bar [PSI]	
<b>Viscosity range</b>		mm <sup>2</sup> /s [SUS]	15 to 380 [69.5 to 1 760]
<b>Oil temperature range</b>		°C [°F]	-20 to +70[-4 to 158]
<b>Filtration</b>		NAS 1638	8
<b>Mass</b>	4/2	Kg [lb]	1,3 [2.9]
	4/3		1,8 [3.9]
<b>Mounting position</b>	Optional		

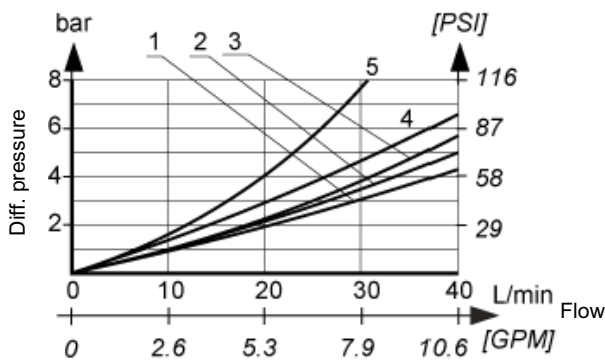
**Electrical**

<b>Supply voltage</b>	Direct	V	12, 24, 48
	Alternating		110, 230
<b>Power</b>		W	26
<b>Switch-on time*</b>		ms	50 to 80
<b>Switch-off time*</b>		ms	30 to 55
<b>Switching frequency</b>		1/h	15 000
<b>Ambient temperature</b>		°C [°F]	to 50 [122]
<b>Coil temperature</b>		°C [°F]	to 180 [356]
<b>Duty cycle</b>	Continuous		

\* The switching-on and off times apply to 24 V DC solenoids.

**ΔP-Q Performance curves**

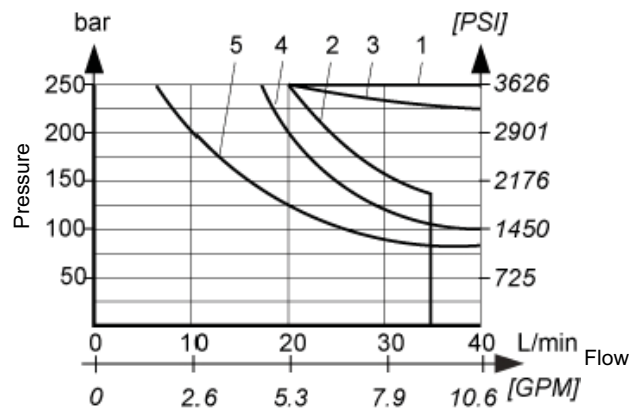
Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



Spool	Flow path				
	P-A	P-B	A-T	B-T	P-T
1	1	1	2	2	-
2	3	3	3	3	5
3	1	1	4	4	-
6	1	1	1	1	-
51A, 51B	1	1	3	3	-
41A, 41B	3	3	-	-	-

**ΔP-Q Operating limits**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



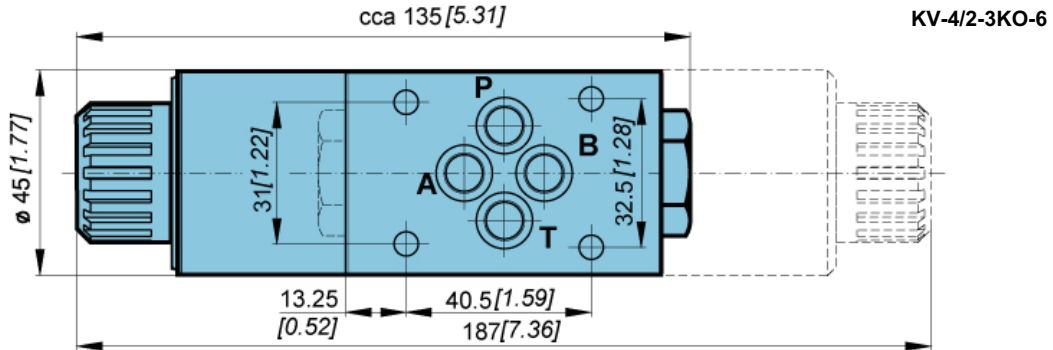
Spool	curve
1	1
2	2
3	3
6	4
51A, 51B	1
41A, 41B	5





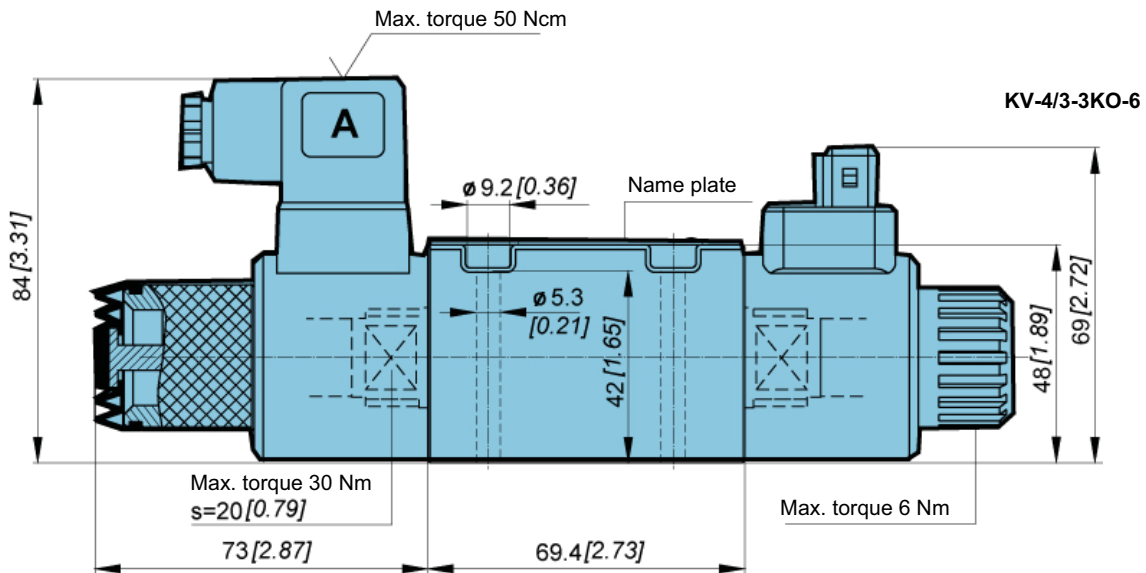
**Dimensions**

Connection diagram and connecting dimensions to ISO 4401.



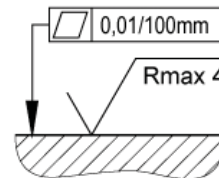
Option: Plug-in connector to ISO 4400

Option: AMP JUNIOR connector



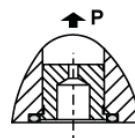
4 x Fixing screws M5x50 to ISO 4762- 10.9 must be ordered separately. Required tightening torque Md= 7Nm.

Required quality of the mating surface.



**Cartridge throttle**

If flow rates greater than permissible occur during change-over, a cartridge throttle must be fitted into P-line of the directional valve.



Mechanically operated

Hydraulically operated

Electrically operated



**Model code**

**K V** -  /  - **3 K O** - **6** -

**Working ports**

Three working ports	<b>3</b>
Four working ports	<b>4</b>

**Number of control spool positions**

Two positions	<b>2</b>
Three positions	<b>3</b>

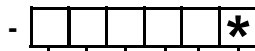
**Manual override option**

Emergency manual override	<b>No designation</b>
Manual override with rubber cover	<b>G</b>

**Spool types**

<b>1</b>	<b>1A</b>	<b>1B</b>
<b>2</b>	<b>2A</b>	<b>2B</b>
<b>3</b>	<b>3A</b>	<b>3B</b>
<b>6</b>	<b>6A</b>	<b>6B</b>
	<b>51A</b>	<b>51B</b>
	<b>41A</b>	<b>41B</b>

Port T in the valves with spool type 41A and 41B to be used as leakage line when working pressure is higher than 210 bar [3 045 PSI].



**Supply voltage**

	Direct voltage	Alternating voltage
12V	<b>12DC</b>	<b>12AC</b>
24V	No designation	<b>24AC</b>
48V	<b>48DC</b>	<b>48AC</b>
110V	<b>110DC</b>	<b>110AC</b>
230V	<b>230DC</b>	<b>230AC</b>

- Alternating voltage solenoids are fitted with a bridge rectifier.
- With solenoids of over 48 V an earthing clamp to ISO 4400 must be connected.

**Connector type**

EN 175301-803 without signal lamp	No designation
EN 175301-803 with signal lamp	<b>L</b>
EN 175301-803 without connector	<b>K</b>
AMP junior timer without connector	<b>M</b>

**Overvoltage protection**

Without overvoltage protection	No designation
With overvoltage protection	<b>T</b>

**Throttle mm [in]**

Without throttle in P line	No designation
Throttle Ø 0,8 [0.03 dia.]	<b>D08</b>
Throttle Ø 1,0 [0.04 dia.]	<b>D10</b>
Throttle Ø 1,2 [0.05 dia.]	<b>D12</b>

**Seal type**

NBR seals for mineral oil HL,HLP to DIN 51524	No designation
FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380	<b>E</b>

**Special requirements to be briefly specified**

Mechanically operated

Hydraulically operated

Electrically operated





# 4/2, 4/3 WAY DIRECTIONAL PROPORTIONAL VALVE KVP

- NG 6
- Up to 350 bar [5 076 PSI]
- Up to 30 L/min [7.9 GPM]
- Plug-in connector for solenoids to ISO 4400.
- Connection diagram and connection dimensions to ISO 4401.
- 5 chamber models with good spool guidance.
- Optional control electronics: Amplifier R59209NP221.
- Protection of solenoid IP 65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).

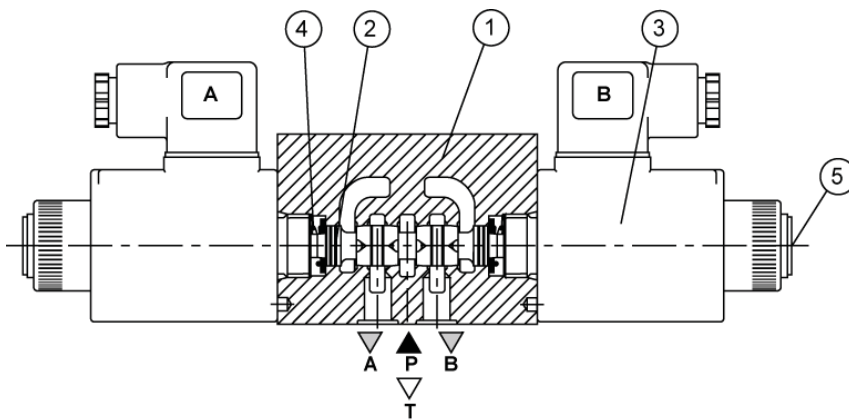


KVP-4/3-5KO-6

## Operation

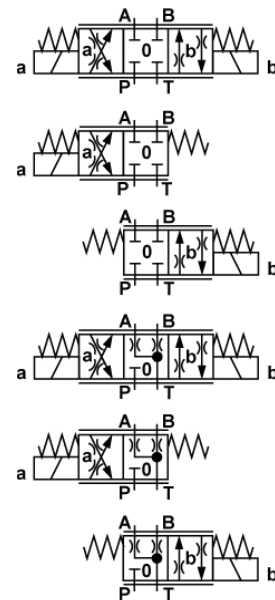
The KVP directional control valve is a proportional valve providing variable flow rates. This valve is used with control electronics. Typical applications are soft switching via adjustable ramps for the reduction of hydraulic and mechanical shocks, and electrically adjustable flow rates - speeds for automating machine functions.

This directional valves consist of a housing (1), a control spool (2), one or two proportional solenoids (3) and two return springs (4). The change-over can be done manually by pressing the emergency hand operator (5).



## Hydraulic symbols

Spool type



Mechanically operated

Hydraulically operated

Electrically operated



**Features**

**Hydraulic**

<b>Size</b>			<b>6</b>
<b>Flow rate</b>		L/min [GPM]	10, 20, 30 [2.6 - 5.2 - 7.9]
<b>Operating pressure</b>	A, B, P	bar [PSI]	350 [5 076]
	T		250 [3 625]
<b>Oil temperature range</b>		°C [°F]	-20 to +70 [-4 to +158]
<b>Viscosity range</b>		mm <sup>2</sup> /s [SUS]	15 to 380 [3.24 to 82]
<b>Mounting position</b>			Optional
<b>Mass</b>	4/2	Kg [lb]	1,65 [3.63]
	4/3		2,2 [4.85]
<b>Filtration</b>	NAS 1638		7

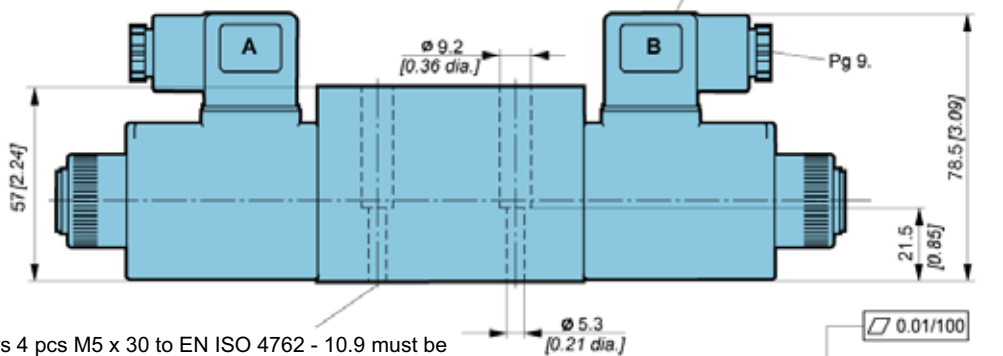
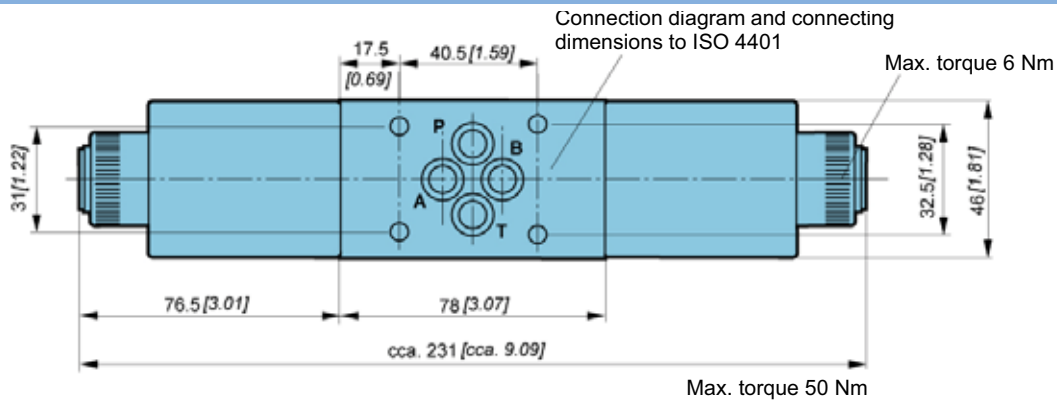
**Proportional**

<b>Hysteresis</b>			5% of max. flow rate
<b>Nominal current</b>	12DC	A	2
	24DC		1

**Electrical**

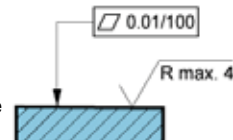
<b>Supply voltage</b>	V	12, 24 DC
<b>Power</b>	W	36
<b>Ambiant temperature</b>	°C [°F]	to +50 [to +122]
<b>Coil temperature</b>	°C [°F]	to +180 [to +356]
<b>Duty cycle</b>	Continuous	

**Dimensions**



Fixing screws 4 pcs M5 x 30 to EN ISO 4762 - 10.9 must be ordered separately / Max. torque Md = 9Nm

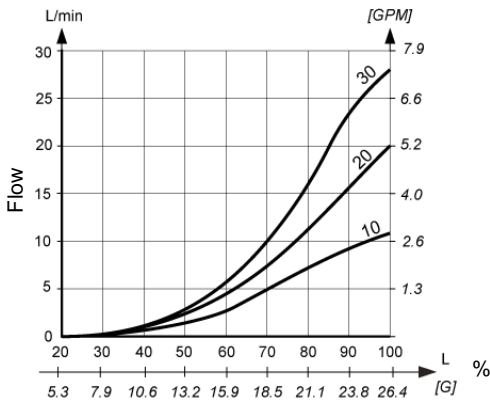
Required quality of the mating surface





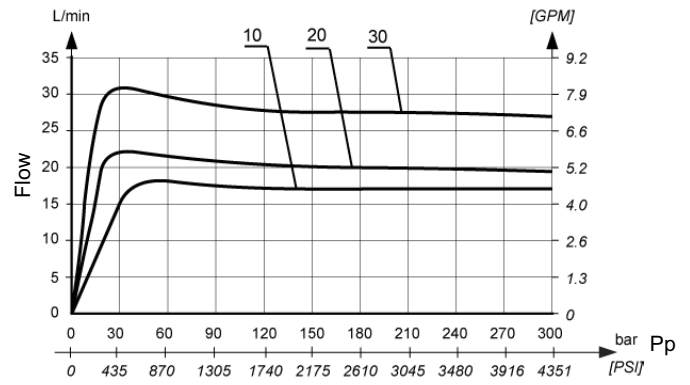
**Input signal curves / Flow rate**

Measured at 40°C [104°F] and viscosity of 32 mm²/s.  
 ΔP=5 bar [72.5PSI] P-A or P-B



**Power limits transmitted**

Measured at 40°C [104°F] and viscosity of 32 mm²/s.



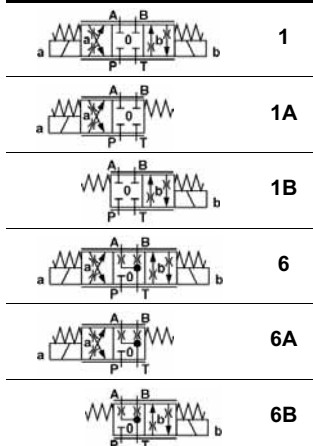
**Model code**

**KVP** - 4 / [ ] - 5 **KO** - 6 - [ ] [ ] [ ] [ ] [ ] [ ] \*

**Number of spool positions**

Two positions	2
Three positions	3

**Spool types**



Special requirements to be briefly specified

**Seal type**

No designation	NBR seals for mineral oil HL, HLP, to DIN 51524
E	FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380

**Regulated flow rate (ΔP=5 bar [72.1 PSI] / P-A or P-B)**

0-10 L/min [0-2.6 GPM]	10
0-20 L/min [0-5.2 GPM]	20
0-30 L/min [0-7.9 GPM]	30

**Connector type**

No designation	EN 175301-803 without signal lamp
L	EN 175301-803 with signal lamp
K	EN 175301-803 without connector

**Supply voltage**

Direct voltage 24V	No designation
Direct voltage 12V	12 DC

Mechanically operated

Hydraulically operated

Electrically operated







## 4/2, 4/3 WAY BANKABLE DIRECTIONAL VALVES KVM

- NG 6
- Up to 350 bar [5 076 PSI]
- Up to 40 L/min [10.6 GPM]
- Parallel or series connection.
- Plug-in connection for solenoids to ISO 4400.
- 5-chamber model with good spool guidance.
- Wet pin solenoid with interchangeable coil.
- Manual emergency control.
- Protection of solenoid IP 65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).



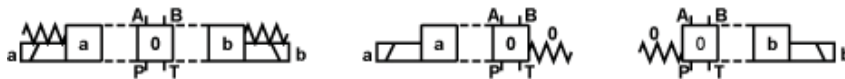
KVM-P-4/3-6-1-1-12DC-3/8

### Hydraulic symbol

#### Spool types - Parallel connection (KVM-P)



#### Spool types - Series connection (KVM-S)



### Features

#### Hydraulic

		KVM-P	KVM-S
Size		6	6
Flow rate	L/min [GPM]	40 [10.6]	30 [7.9]
Operating pressure	A, B, P	350 [4 568]	250 [3 626]
	T	250 [3 626]	250 [3 626]
Oil temperature range	°C [°F]	-20 to +70 [-4 to +158]	
Viscosity range	mm <sup>2</sup> /s [SUS]	15 to 380 [3.24 to 82]	
Mass	4/2	1,85 [4.08]	
	4/3	2,4 [5.29]	
Filtration	NAS 1638	8	

#### Electrical

Supply voltage	V	12, 24 DC
Power	W	29
	(12 V DC supply voltage)	36
Switching frequency	1/h	15 000
Ambiant temperature	°C [°F]	to +50 [to +122]
Coil temperature	°C [°F]	to +180 [to +356]
Duty cycle		Continuous

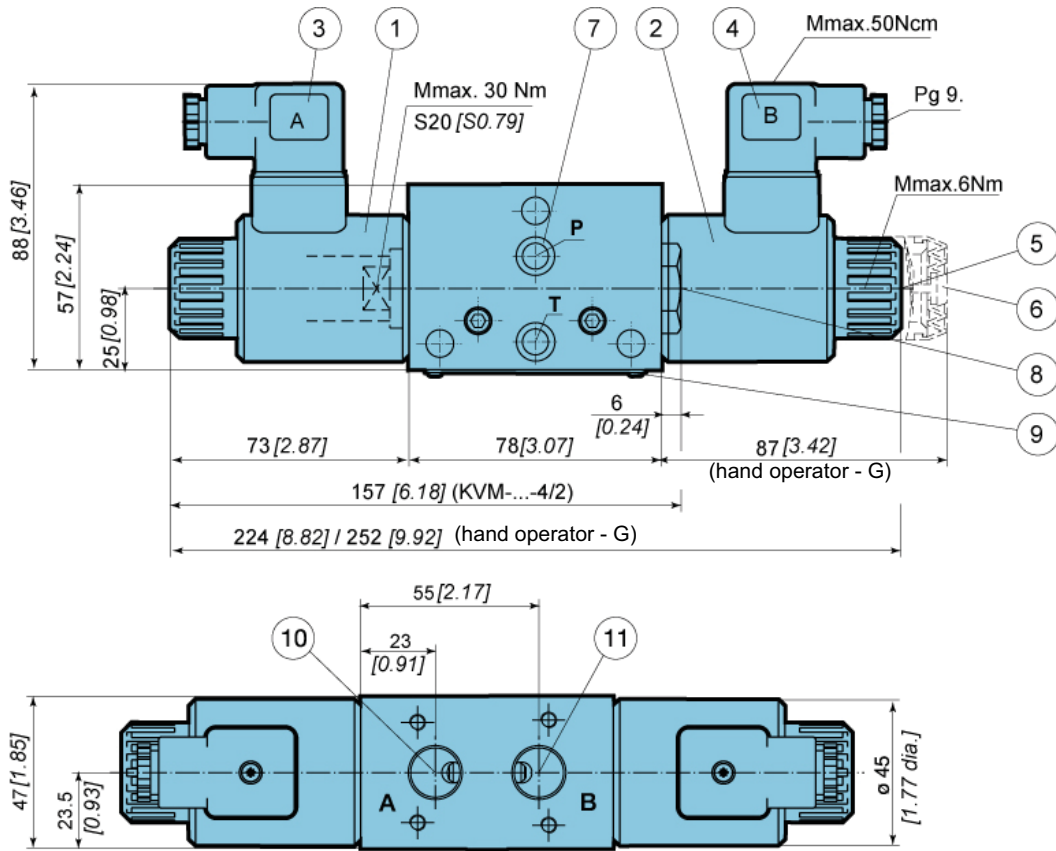
Mechanically operated

Hydraulically operated

Electrically operated

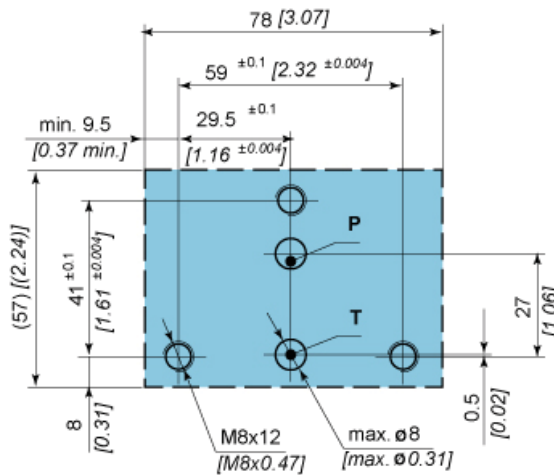


Dimensions

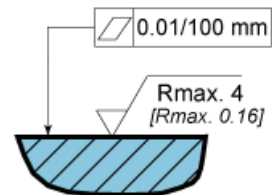


1. Solenoid "a" / MR-045-O
2. Solenoid "b" / MR-045-O
3. Plug-in connector «a» -grey
4. Plug-in connector «b» -black
5. Emergency hand operator
6. Hand operator with rubber (G)
7. O-ring 9,25 x 1,78
8. Valve cap (KVM-...-4/2)
9. Nameplate
10. Threaded connection A-M torque = max. 100 Nm
11. Threaded connection B-M torque = max. 100 Nm

Connection dimensions for KVM-6



Required quality of the mating surface

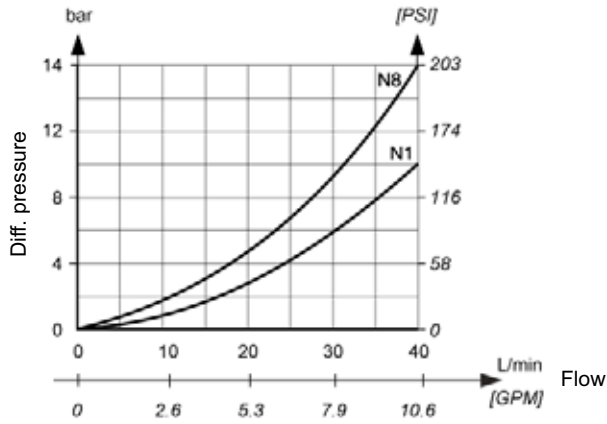




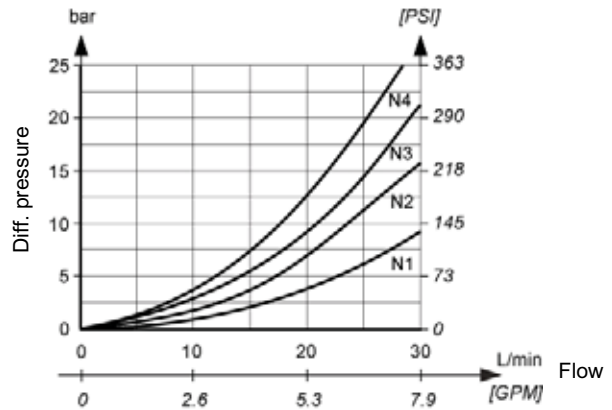
**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].

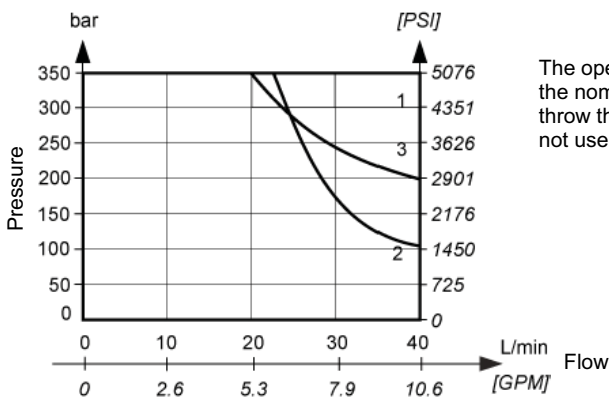
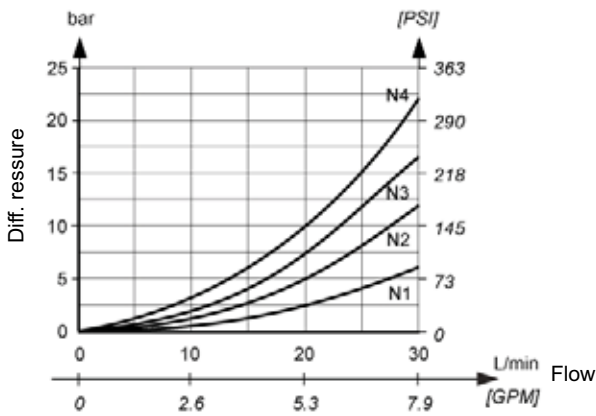
Parallel connection -KVM-P (N1 to N8)



Series connection -KVM-S (P to T).



Series connection -KVM-S (P to A(B)).



The operating limits of the valve shall be determined at a voltage 10% below the nominal rating. The curves refer to application with symmetrical flow through the valve (P-A and B-T). In the case of asymmetrical flow (e.g. one part not used) reduced values may result.

Spool type	Curve
1	1
2	2
3,6	3

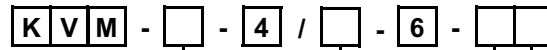
Mechanically operated

Hydraulically operated

Electrically operated



**Model code**



**Type of connection**

Series connection	<b>S</b>
Parallel connection	<b>P</b>

**Number of control spool positions**

Two positions	<b>2</b>
Three positions	<b>3</b>

**Hand operator**

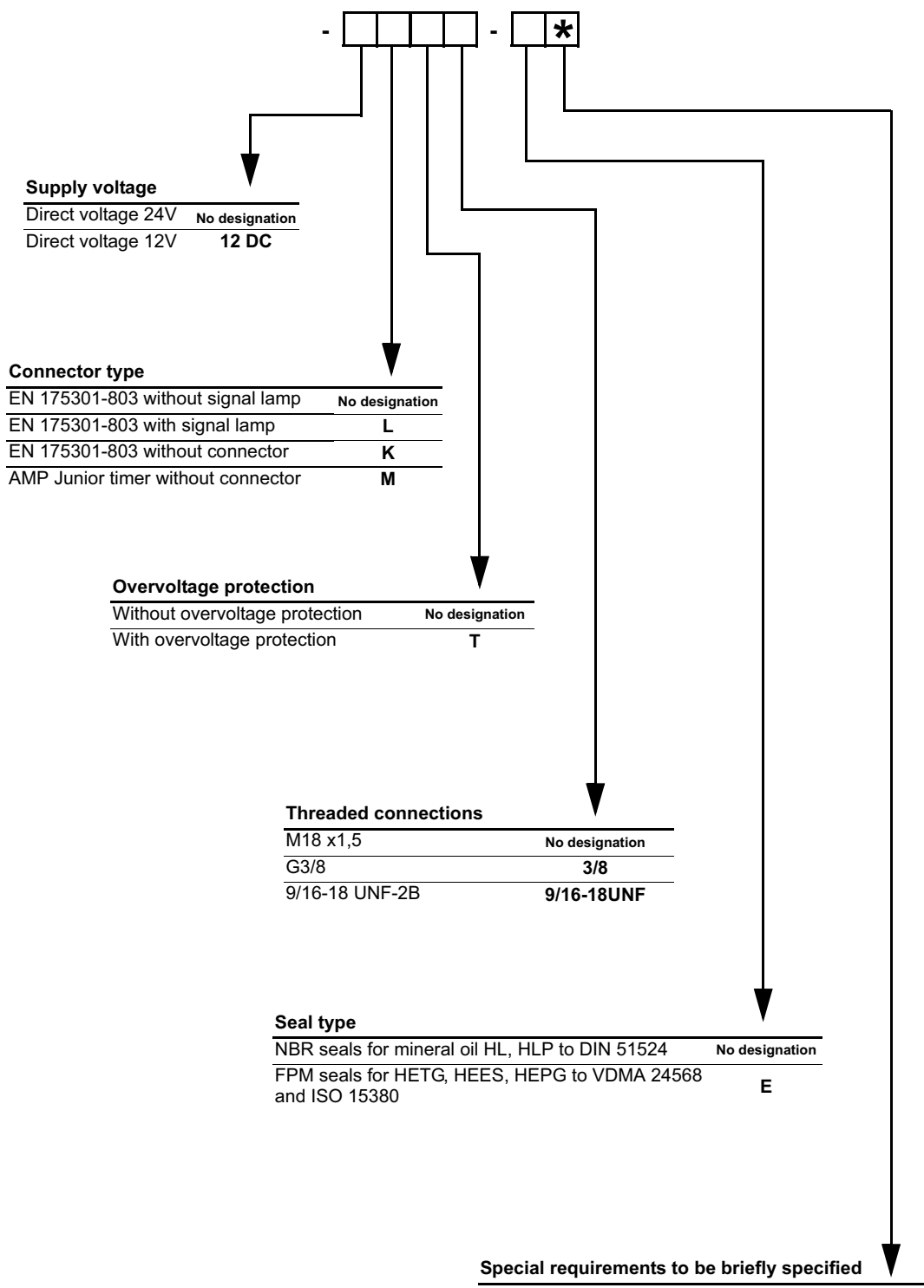
Emergency hand operation	<b>No designation</b>
Hand operator with rubber	<b>G</b>

**Spool type**

		<b>1</b>
		<b>3</b>
		<b>6</b>
		<b>1A</b>
		<b>3A</b>
		<b>6A</b>
		<b>51A</b>
		<b>1B</b>
		<b>3B</b>
		<b>6B</b>
		<b>51B</b>
		<b>81</b>
		<b>2</b>
		<b>2A</b>
		<b>2B</b>

Parallel connection (KVM-P)

Series connection (KVM-S)



Mechanically operated

Hydraulically operated

Electrically operated





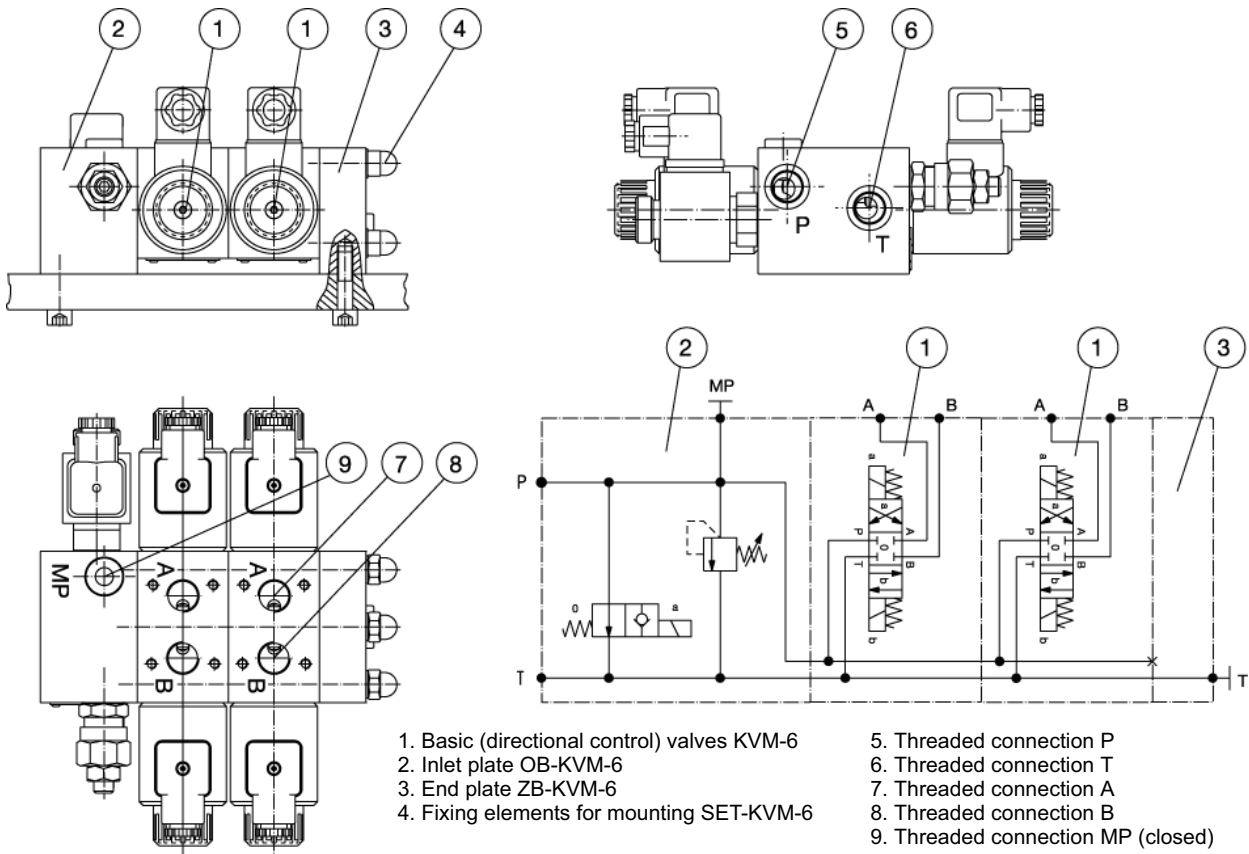
# 4/2, 4/3 WAY BANKABLE DIRECTIONAL VALVES KVM

- NG 10
- Up to 350 bar [4 568 PSI]
- Up to 40 L/min [10 GPM]
- Threaded connection to ISO 9974 (Metric), ISO1179 (BSPP/Gas).
- Series or parallel connections.
- Inlet plate possibility with pressure relief valve, pump unloading valve or flow control valve.
- Possibility to use standard components for vertical stacking.

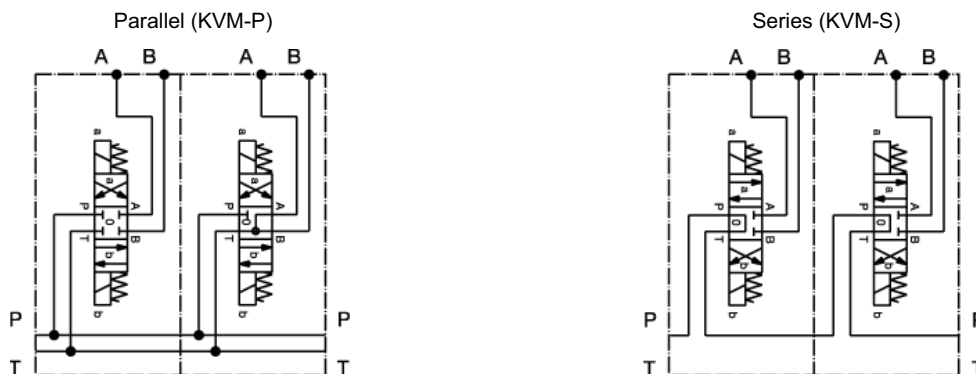


KVM-6-...-VV-KV-N4

## Basic concept



## Type of connection



Mechanically operated

Hydraulically operated

Electrically operated







## 6/2 WAY DIRECTIONAL VALVE KV

- NG 6
- Up to 350 bar [5 076 PSI]
- Up to 50 L/min [13.2 GPM]
- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Protection of solenoid IP 65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).



KV-6/2-6-S50

### Operation

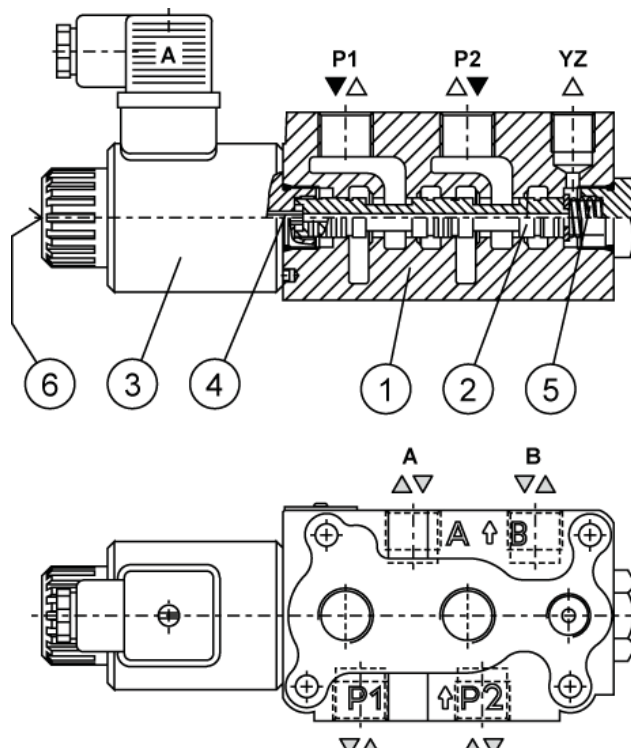
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

The KV type directional valves consist of a housing (1), a control spool (2), a solenoid (3) and a return spring (5).

Change-over to the operating position is done by energizing the solenoid (3), whereby the solenoid plunger acts on the control spool (2) via the operating pin (4), thus clearing the corresponding flow ways and establishing respective links between the ports P1, A, B and P2.

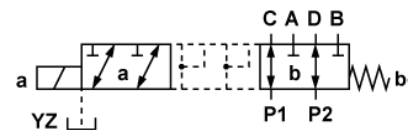
When the solenoid (3) is de-energized, the control spool (2) is returned to its neutral position by the return spring (5), thus establishing again the links between ports P1, C, D and P2.

The change-over can also be done manually by pressing the emergency hand operator (6).

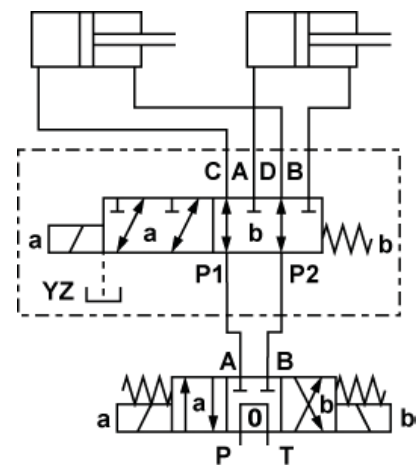


### Hydraulic symbol

Spool type



### Mounting example



Mechanically operated

Hydraulically operated

Electrically operated

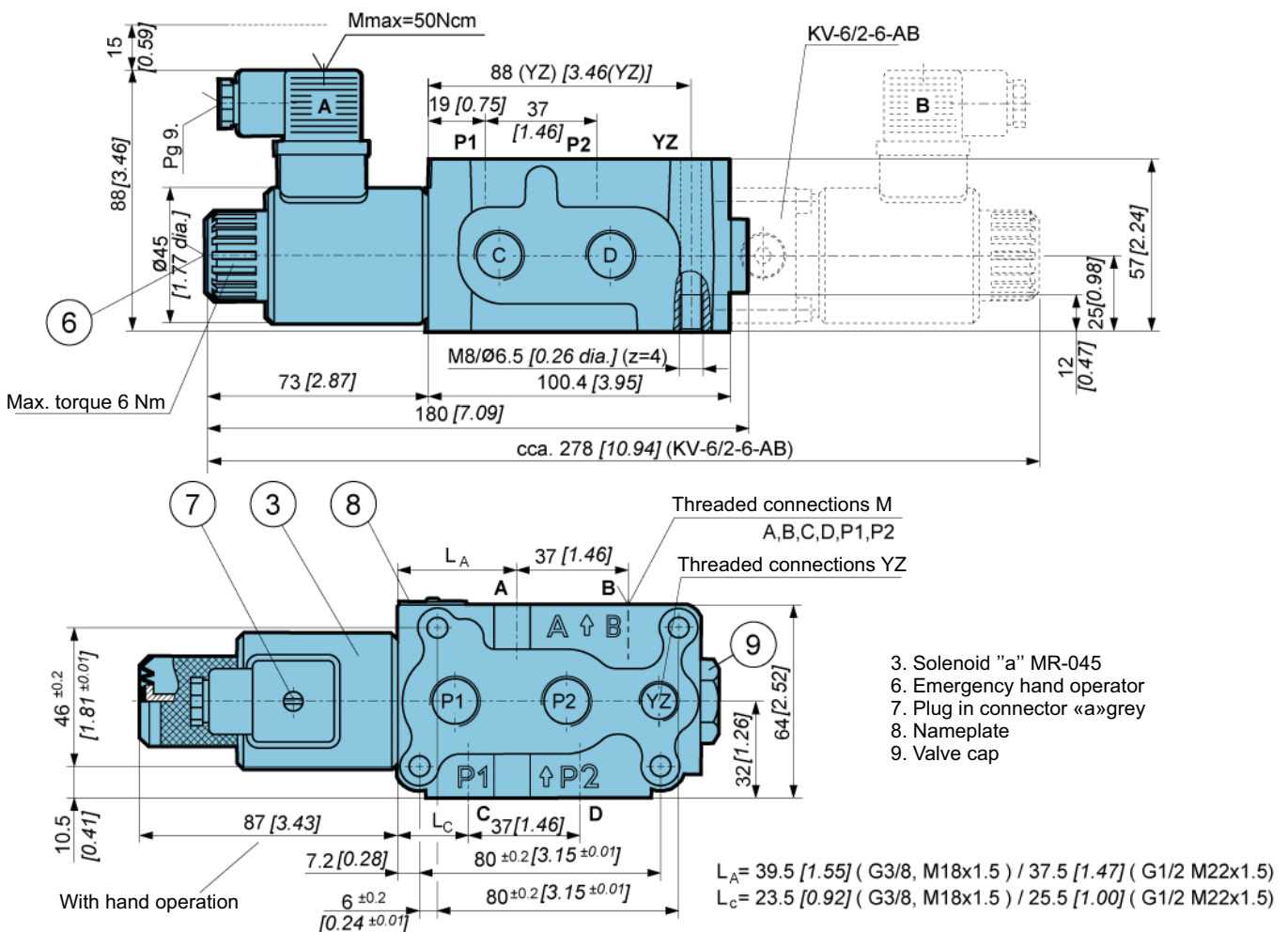


Features

Hydraulic			
Size	6		
Flow rate	L/min [GPM]		50 [13.2]
Operating pressure	With YZ	bar [PSI]	350 [5 076]
	Without YZ		250 [3 625]
Oil temperature range	°C [°F]		-20 to +70 [-4 to +158]
Viscosity range	mm <sup>2</sup> /s [SUS]		15 to 380 [3.24 to 82]
Mounting position	Optional		
Mass	Kg [lb]		2,5 [5.51]
Filtration	NAS 1638		8
Electrical			
Supply voltage	V		12, 24 DC
Power	W		29*
Switching frequency	1/h		15 000
Ambiant temperature	°C [°F]		to +50 [to +122]
Coil temperature	°C [°F]		to +180 [to +356]
Duty cycle	Continuous		

\* 12 V supply voltage - 36 W.

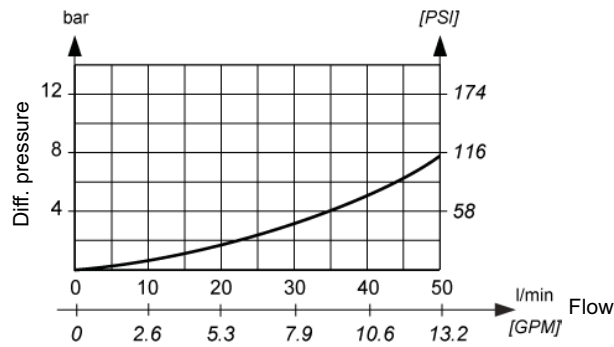
Dimensions





**Δp-Q Performance curve**

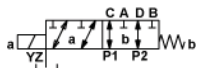
Measured at 40°C [104°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



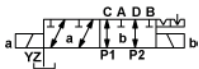
**Model code**

**K V - 6 / 2 - 6 - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - S 5 0 - \***

**Spool type**



No designation



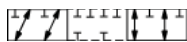
AB

Special requirements to be briefly specified

**Overlap**



No designation



P

**Hand operator**

Without hand operator No designation  
With hand operator G

**Supply voltage**

Direct voltage 24V No designation  
Direct voltage 12V 12 DC

**Connector type**

EN 175301-803 without signal lamp No designation  
EN 175301-803 with signal lamp L  
EN 175301-803 without connector K  
AMP Junior timer without connector M

**Overvoltage protection**

Without protection No designation  
With protection T

**Seal type**

No designation NBR seals for mineral oil HL, HLP to DIN 51524  
E FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380

**Drainage**

No designation Without YZ  
YZ With YZ

**Threaded connections M ; YZ**

No designation M18x1,5 ; M14x1,5  
M22 M22x1,5 ; M14x1,5  
3/8 G3/8 ; G1/4  
1/2 G1/2 ; G1/4  
3/4-16UNF 3/4-16 UNF-2B ; 9/16-18 UNF-2B

Mechanically operated

Hydraulically operated

Electrically operated





## 6/2 WAY DIRECTIONAL VALVES KV

- NG 10
- Up to 350 bar [5 076 PSI]
- Up to 120 L/min [31.7 GPM]
- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Protection of solenoid IP65 to EN 50529 / IEC 60529.



KV-6/2-10

### Operation

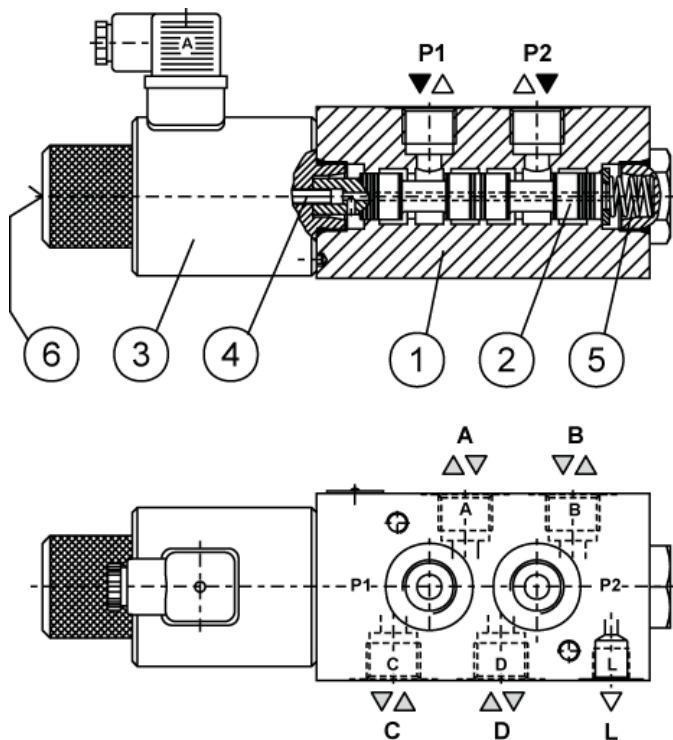
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

The KV type directional valves consist of a housing (1), a control spool (2), a solenoid (3) and a return spring (5).

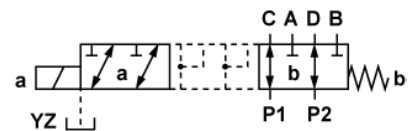
Change-over to the operating position is done by energizing the solenoid (3), whereby the solenoid plunger acts on the control spool (2) via the operating pin (4), thus clearing the corresponding flow ways and establishing respective links between the ports P1, A,B and P2.

When the solenoid (3) is de-energized, the control spool (2) is returned to its neutral position by the return spring (5), thus establishing again the links between ports P1, C,D and P2.

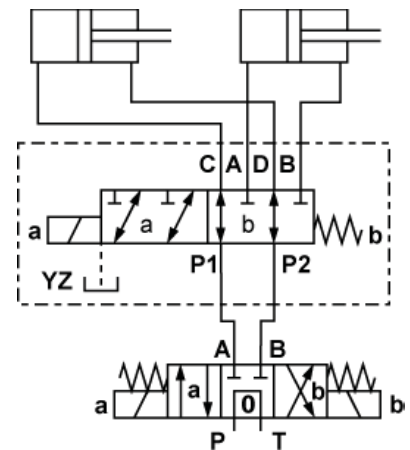
The change-over can also be done manually by pressing the emergency hand operator (6).



### Hydraulic symbol



### Mounting example



Mechanically operated

Hydraulically operated

Electrically operated



**Features**

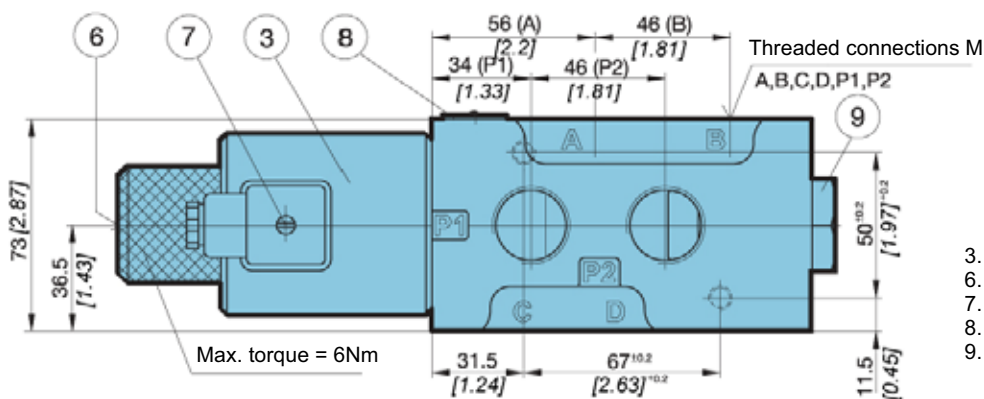
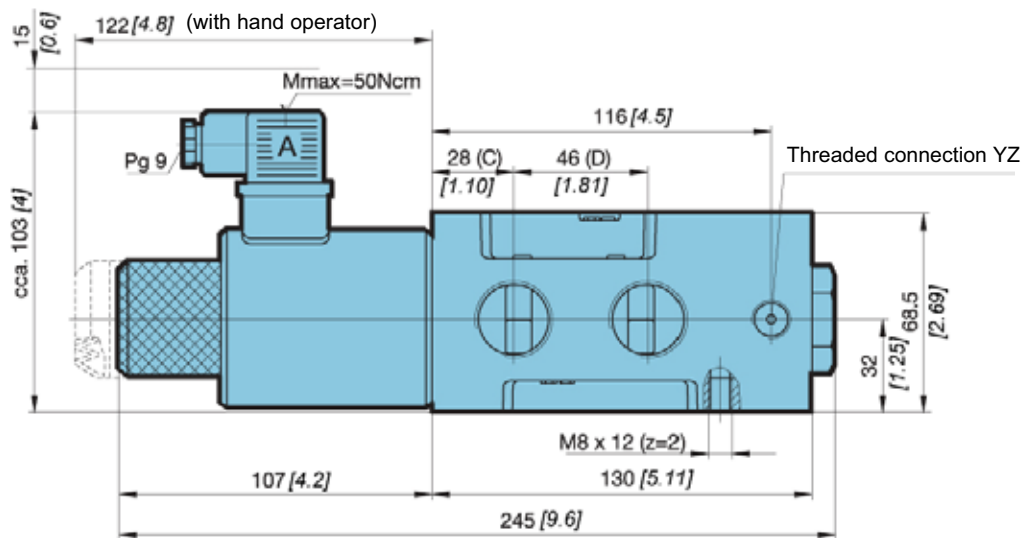
**Hydraulic**

<b>Size</b>			<b>10</b>
<b>Flow rate</b>	L/min [GPM]		120 [31.7]
<b>Operating pressure</b>	With YZ	bar [PSI]	350 [5 076]
	Without YZ		250 [3 625]
<b>Oil temperature range</b>	°C [°F]		-20 to +70 [-4 to +158]
<b>Viscosity range</b>	mm <sup>2</sup> /s [SUS]		15 to 380 [3.24 to 82]
<b>Mounting position</b>			Optional
<b>Mass</b>	Kg [lb]		5,5 [12.12]
<b>Filtration</b>	NAS 1638		8

**Electrical**

<b>Supply voltage</b>	V	12, 24 DC
<b>Power</b>	W	45
<b>Switching frequency</b>	1/h	15000
<b>Ambient temperature</b>	°C [°F]	to +50 [to +122]
<b>Coil temperature</b>	°C [°F]	to +180 [to +356]
<b>Duty cycle</b>	Continuous	

**Dimensions**

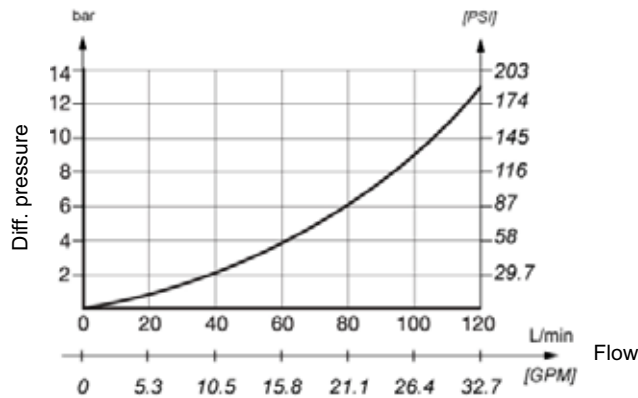


- 3. Solenoid "a" MR-060
- 6. Emergency hand operator
- 7. Plug-in connector «a» - grey
- 8. Nameplate
- 9. Valve cap



**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



**Model code**

**K V** - **6** / **2** - **10** - [ ] - [ ] [ ] [ ] - [ ] - [ ] - \*

**Hand operator**

Without hand operator: No designation  
 With hand operator: **G**

**Supply voltage**

Direct voltage 24V: No designation  
 Direct voltage 12V: **12 DC**

**Connector type**

EN 175301-803 without signal lamp: No designation  
 EN 175301-803 with signal lamp: **L**  
 EN 175301-803 without connector: **K**  
 AMP Junior timer without connector: **M**

**Overvoltage**

Without overvoltage protection: No designation  
 With overvoltage protection: **T**

**Threaded connections M ; YZ**

M22x1,5 ; M14x1,5: **M22**  
 M27x2 ; M14x1,5: **M27**  
 G1/2 ; G1/4: **1/2**  
 G3/4 ; G1/4: **3/4**  
 7/8-14 UNF-2B ; 9/16-18 UNF-2B: **7/8-14UNF**

**Drainage**

Without YZ: No designation  
 With YZ: **YZ**

**Seal type**

NBR seals for mineral oil HL, HLP to DIN 51524: No designation  
 FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380: **E**

**Special requirements to be briefly specified**

Mechanically operated

Hydraulically operated

Electrically operated







## 6/2 WAY DIRECTIONAL VALVES KV

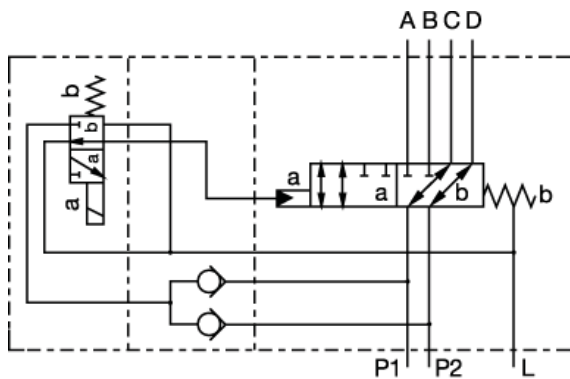
- NG 16
- Up to 350 bar [5 076 PSI]
- Up to 250 L/min [66.04 GPM]
- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Flange ports to ISO 6162-2.
- Fulfil EMC (89 / 336 / EEC).
- Protection of solenoid IP 65 to EN 60529 / IEC 60529.



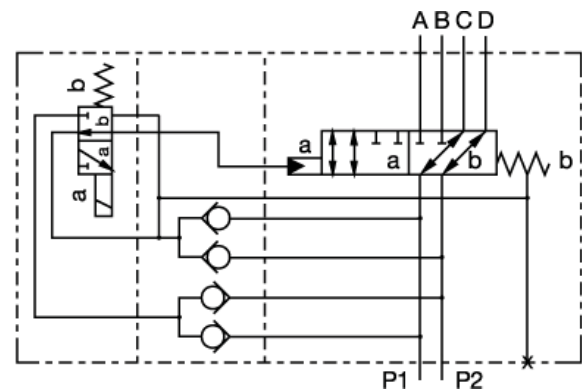
KV-6/2-16-XN

### Hydraulic symbol

KV-6/2-16-...-XN



KV-6/2-16-...-N



### Features

Hydraulic		
Size		16
Flow rate	L/min [GPM]	250 [31.7]
Operating pressure	bar [PSI]	15 to 350 [217.56 to 5076.32]
	(in port L or in return way) bar [PSI]	250 [3625.94]
Oil temperature range	°C [°F]	-20 to +70 [-4 to 158]
Viscosity range	mm <sup>2</sup> /s [SUS]	15 to 380 [3.24 to 82]
Mounting position		Optional
Mass	Kg [lb]	22 [48.50]
Filtration	NAS 1638	8
Electrical		
Supply voltage	V	12, 24 DC
Power	W	29
	(12 V DC supply voltage)	36
Switching frequency	1/h	15 000
Ambiant temperature	°C [°F]	to +50 [to +122]
Coil temperature	°C [°F]	to +180 [to +356]
Duty cycle		Continuous

Mechanically operated

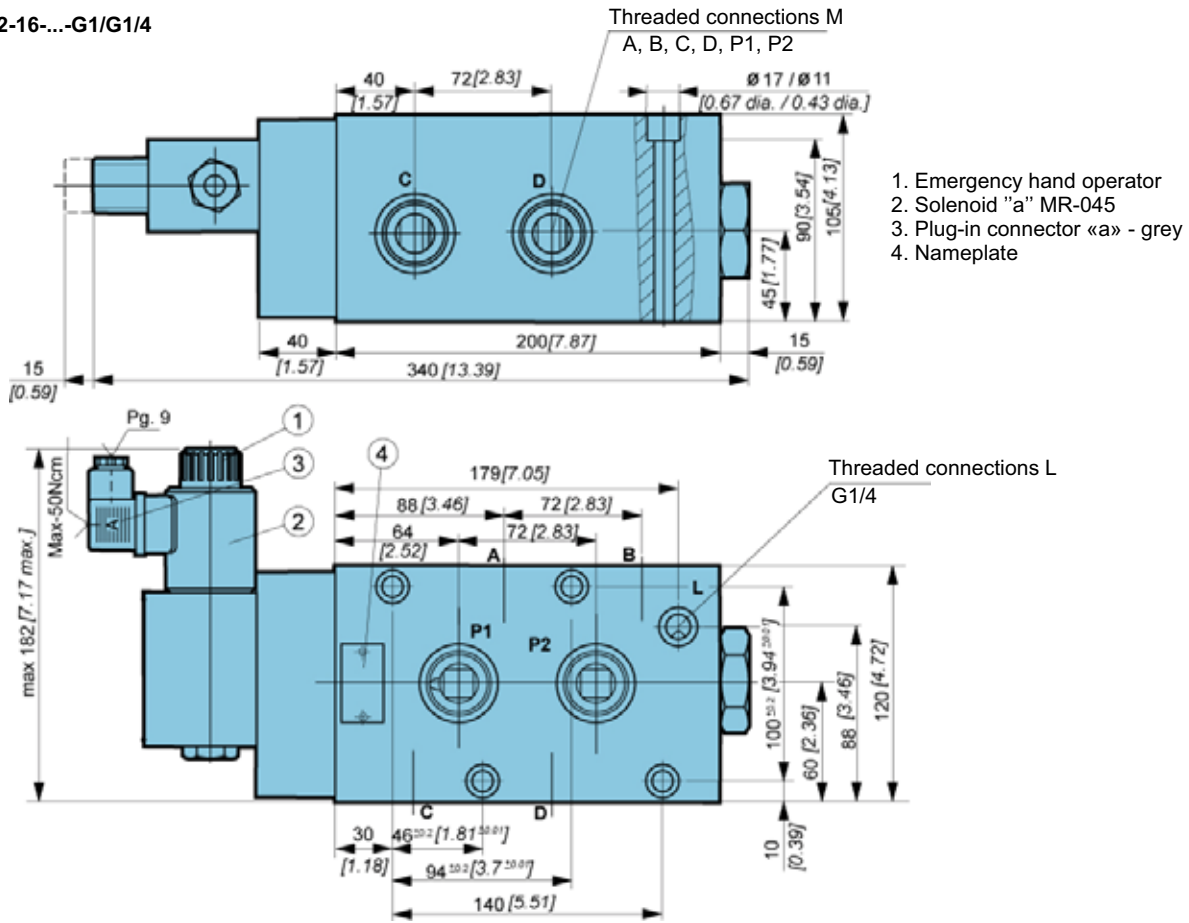
Hydraulically operated

Electrically operated



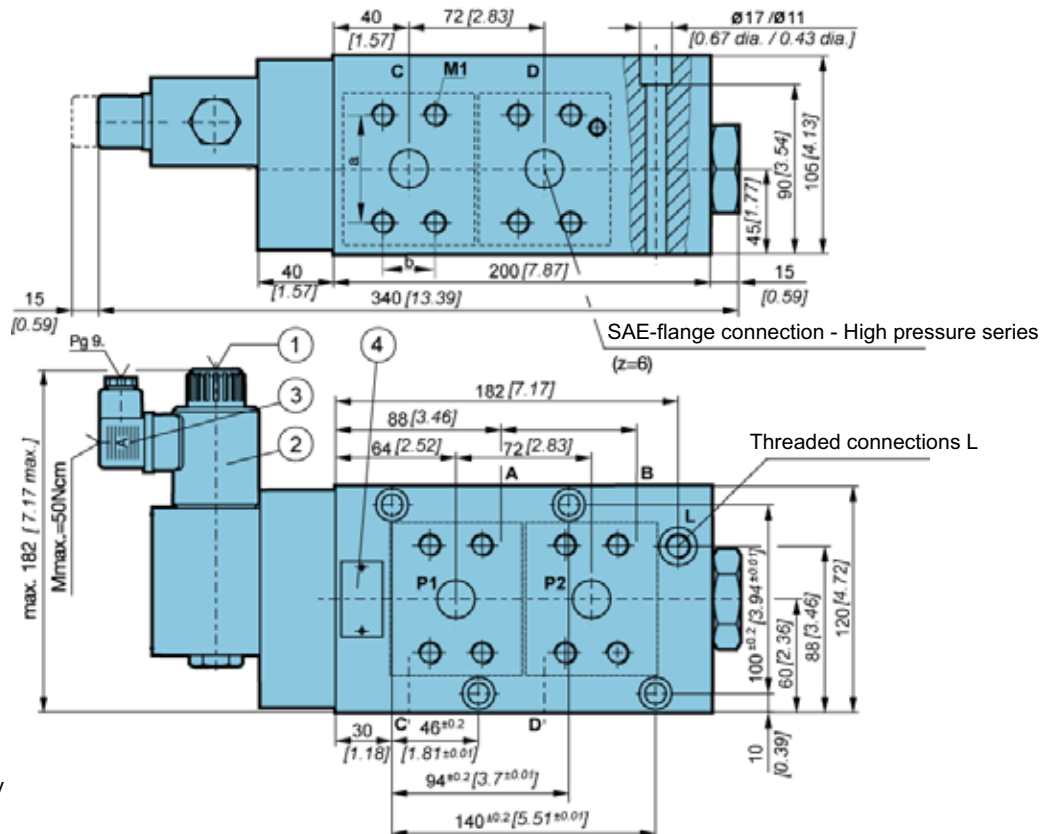
**Dimensions**

**KV-6/2-16-...-G1/G1/4**



**KV-6/2-16-...-SAE...**

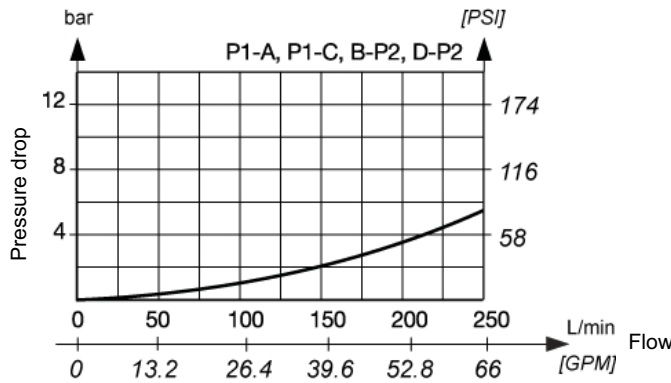
	Size	
	SAE 3/4	SAE 1
a	50.8 [2]	57.2 [2.25]
b	23.8 [0.94]	27.8 [1.09]
M1	M10	M12



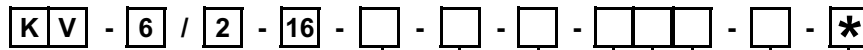


**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



**Model code**



**Pilot oil supply and discharge**

Internal x, y	<b>N</b>
Internal, external y (port L)	<b>XN</b>

**Threaded connections M ; L**

G1 ; G1/4	<b>G1/G1/4</b>
1 5/16-12 UNF-2B ; 9/16-18 UNF-2B	<b>1 5/16-12UNF</b>
SAE-Flange connections 3/4 - high pressure series	<b>SAE3/4</b>
SAE-Flange connections 1 - high pressure series	<b>SAE1</b>

**Hand operation**

without hand operator	No designation
with hand operator	<b>G</b>

**supply voltage**

direct voltage 24 V	No designation
direct voltage 12 V	<b>12 DC</b>

**Connector type**

EN 175301-803 without signal lamp	No designation
EN 175301-803 with signal lamp	<b>L</b>
G1/2 (YZ=G1/4) without connector	<b>K</b>
AMP junior timer without connector	<b>M</b>

**Overvoltage protection**

without overvoltage protection	No designation
with overvoltage protection	<b>T</b>

**Seal type**

NBR seals for mineral oil HL, HLP to DIN 51524	No designation
FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380	<b>E</b>

**Special requirements to be briefly specified**

Mechanically operated

Hydraulically operated

Electrically operated





## 6/2 WAY DIRECTIONAL VALVES KV-6K (NG 6)

- NG 6
- Up to 250 bar [3625 PSI]
- Up to 50 L/min [13.2 GPM]
- Direct in-line mounting.
- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Protection of solenoid IP65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).



KV-6K/2-6

### Operation

Directional valves type KV-6K/2-6 with direct solenoid operation control the direction of the hydraulic medium flow.

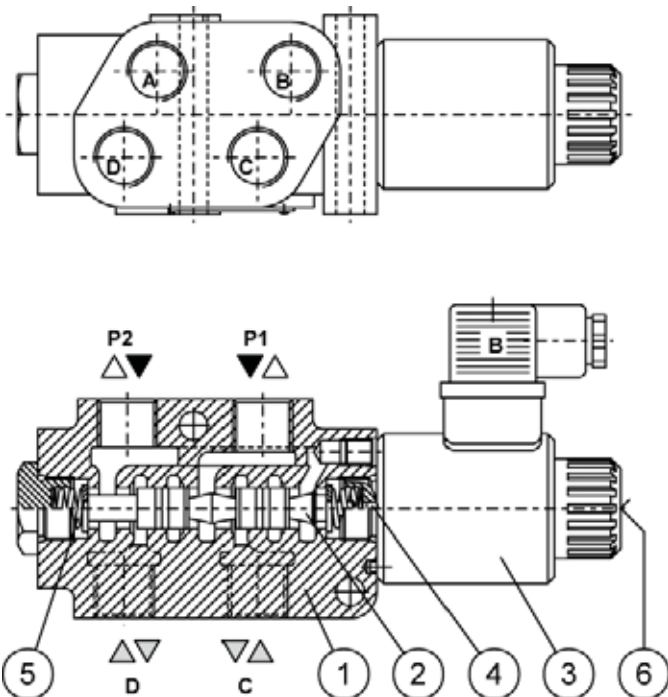
They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

The KV-6K/2-6 type directional valves consist of a housing (1), a control spool (2), and a solenoid (3) with return spring (5).

Change-over to the operating position is done by energizing the solenoid (3), whereby the solenoid plunger acts on the control spool (2) via the operating pin (4), thus clearing the corresponding flow ways and establishing respective links between the ports P1, A,B and P2.

When the solenoid (3) is de-energized, the control spool (2) is returned to its neutral position by the return spring (5), thus establishing again the links between ports P1, C,D and P2.

The change-over can also be done manually by pressing the emergency hand operator (6).

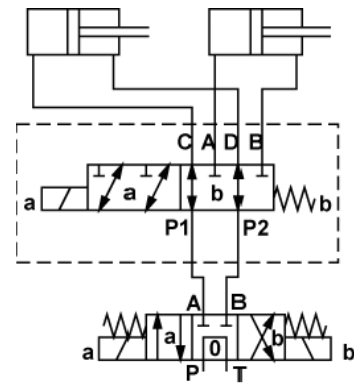


### Hydraulic symbol

Spool type



### Mounting example



Mechanically operated

Hydraulically operated

Electrically operated



**Features**

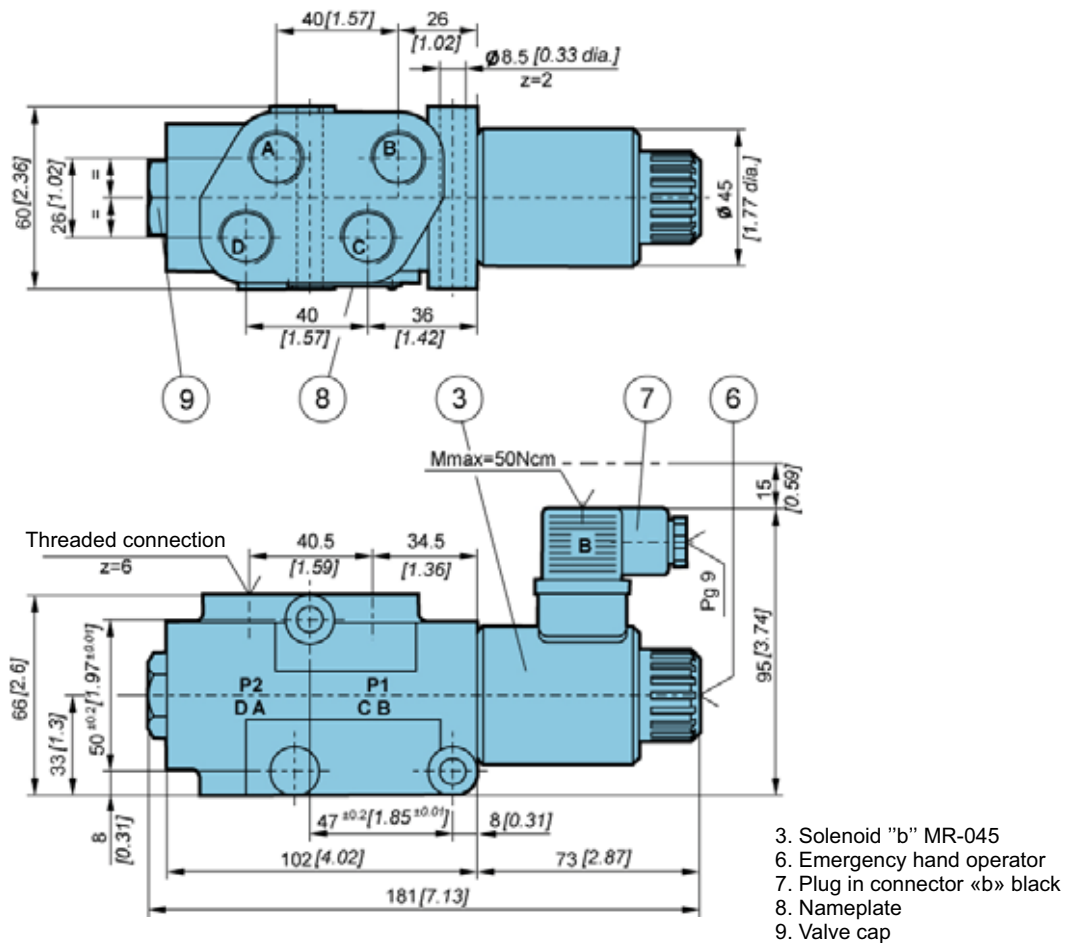
**Hydraulic**

<b>Size</b>	<b>6</b>	
<b>Flow rate</b>	L/min [GPM]	50 [13.2]
<b>Operating pressure</b>	bar [PSI]	250 [3 625]
<b>Oil temperature range</b>	°C [°F]	-20 to +70 [-4 to +158]
<b>Viscosity range</b>	mm <sup>2</sup> /s [SUS]	15 to 380 [3.24 to 82]
<b>Mounting position</b>	Optional	
<b>Mass</b>	Kg [lb]	2,5 [5.51]
<b>Filtration</b>	NAS 1638	8

**Electrical**

<b>Supply voltage</b>	V	12, 24 DC
<b>Power</b>	W	29
<b>(12 V DC supply voltage)</b>	W	36
<b>Switching frequency</b>	1/h	15000
<b>Ambient temperature</b>	°C [°F]	to +50 [to +122]
<b>Coil temperature</b>	°C [°F]	to +180 [to +356]
<b>Duty cycle</b>	Continuous	

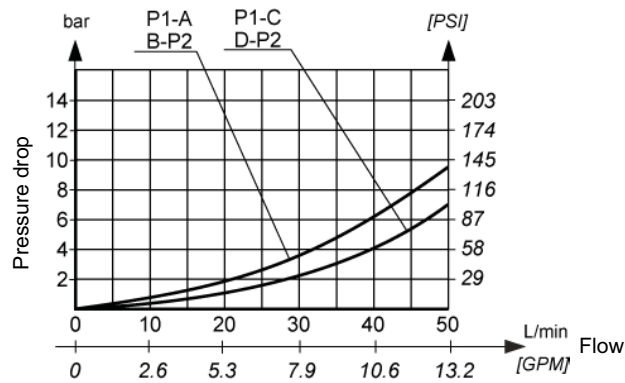
**Dimensions**





**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



**Model code**

**K V** - **6 K** / **2** - **6** -   -   -   -   -   -   - **\***

**Hand operator**

Without hand operator No designation  
 With hand operator **G**

**Supply voltage**

Direct voltage 24V No designation  
 Direct voltage 12V **12 DC**

**Connector type**

EN 175301-803 without signal lamp No designation  
 EN 175301-803 with signal lamp **L**  
 EN 175301-803 without connector **K**  
 AMP Junior timer without connector **M**

**Overvoltage**

Without overvoltage protection No designation  
 With overvoltage protection **T**

**Threaded connections**

M18x1,5 No designation  
 G 3/8 **G3/8**  
 9/16-18 UNF-2B **9/16-18UNF**

**Seal type**

NBR seals for mineral oil HL, HLP to DIN 51524 No designation  
 FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380 **E**

Special requirements to be briefly specified

Mechanically operated

Hydraulically operated

Electrically operated







## 6/2 WAY DIRECTIONAL VALVES KVH

- NG 6
- Up to 315 bar [4 568 PSI]
- Up to 50 L/min [13.2 GPM]
- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Protection of solenoid IP65 to EN 50529 / IEC 60529.
- Fulfil EMC (89/336/EEC).
- For stacking (1-5 units).



KVH-6/2-6-N3-S50

### Operation

Directional valves type KVH with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

The KVH type directional valves consist of a housing (1), a control spool (2), and a solenoid (3) with return spring (5).

Change-over to the operating position is done by energizing the solenoid (3), whereby the solenoid plunger acts on the control spool (2) via the operating pin (4), thus clearing the corresponding flow ways and establishing respective links between the ports P1, A, B and P2.

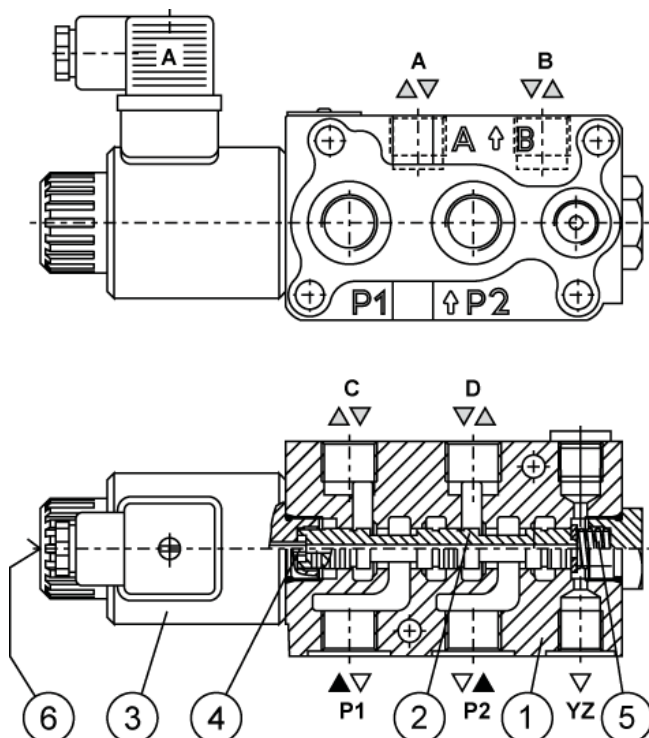
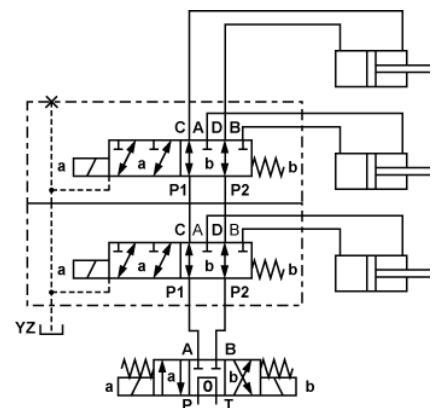
When the solenoid (3) is de-energized, the control spool (2) is returned to its neutral position by the return spring (5), thus establishing again the links between ports P1, C, D and P2.

The change-over can also be done manually by pressing the emergency hand operator (6).

### Hydraulic symbol



### Mounting example



Mechanically operated

Hydraulically operated

Electrically operated



Features

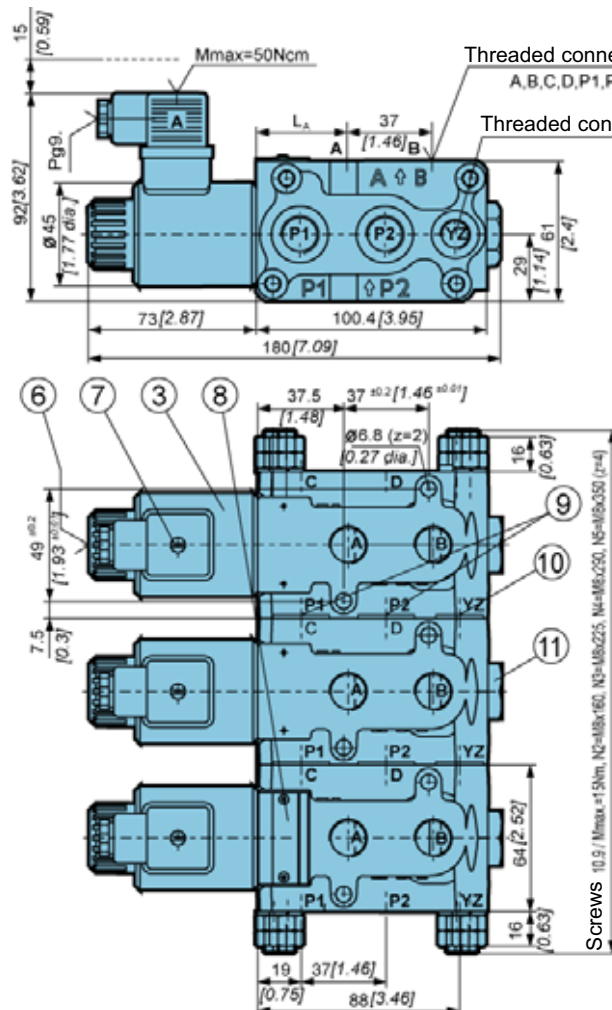
Hydraulic

Size	6	
Flow rate	L/min [GPM]	50 [13.21]
Operating pressure	With YZ	315 [4 568]
	Without YZ	250 [551]
Oil temperature range	°C [°F]	-20 to +70 [-4 to +158]
Viscosity range	mm <sup>2</sup> /s [SUS]	15 to 380 [3.24 to 82]
Mounting position	Optional	
Mass	Kg [lb]	2,7 [5.95] (N1)
Filtration	NAS 1638	8

Electrical

Supply voltage	V	12, 24 DC
Power		29
	(12 V DC supply voltage)	36
Switching frequency	1/h	15 000
Ambient temperature	°C [°F]	to +50 [to +122]
Coil temperature	°C [°F]	to +180 [to +356]
Duty cycle	Continuous	

Dimensions



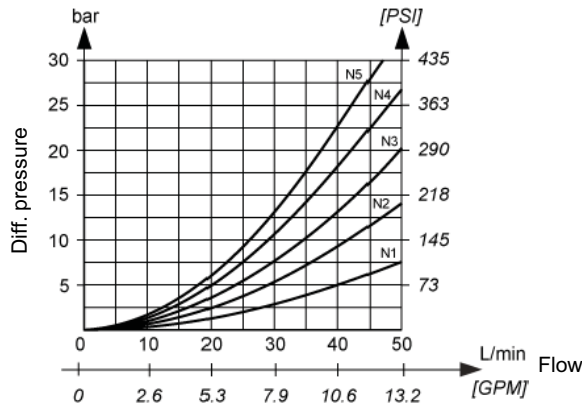
LA= 39,5 [1.55] (G3/8, M18x1,5)  
37,5 [1.47] (G1/2, M22x1,5)

- 3. Solenoid "a" MR-045
- 6. Emergency hand operator
- 7. Plug-in connector «a» - grey
- 8. Nameplate
- 9. O-Ring ; M18x1,5 / G3/8 = Ø21x2  
M22x1,5 / G1/2 = Ø26x2
- 10. O-Ring ; M14x1,5 / G1/4 = Ø17x2
- 11. Valve cap



**ΔP-Q Performance curves**

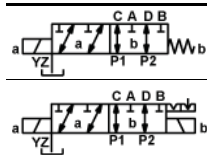
Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



**Model code**

**K V H - 6 / 2 - 6 - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - [ ] - S 5 0 - [ ] - [ ] - \***

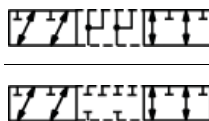
**symbol**



No designation

AB

**Overlap**



No designation

P

**Hand operator**

without hand operator

No designation

With hand operator

G

**Supply voltage**

Direct voltage 24V

No designation

Direct voltage 12V

12 DC

**Connector type**

EN 175301-803 without signal lamp

No designation

EN 175301-803 with signal lamp

L

EN 175301-803 without connector

K

AMP Junior timer without connector

M

**Overvoltage protection**

Without overvoltage protection

No designation

With overvoltage protection

T

Special requirements to be briefly specified

**Number of units**

N1	One
N2	Two
N3	Three
N4	Four
N5	Five

**Seal type**

No designation	NBR seals for mineral oil HL, HLP to DIN 51524
E	FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380

**Drainage**

No designation	Without YZ
YZ	With YZ

**Threaded connections M ; YZ**

No designation	M18x1,5 ; M14x1,5
M22	M22x1,5 ; M14x1,5
3/8	G3/8 ; G1/4
1/2	G1/2 ; G1/4
3/4-16UNF	3/4-16 UNF-2b ; 9/16-18 UNF-2B

Mechanically operated

Hydraulically operated

Electrically operated





## 6/2 WAY DIRECTIONAL VALVES KVH

- NG 10
- Up to 315 bar [5 076 PSI]
- Up to 120 L/min [31.70 GPM]
- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Protection of solenoid IP 65 to EN 50529 / IEC 60529.



KVH-6/2-10-N2

### Operation

Directional valves type KVH with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

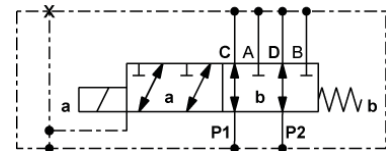
The KVH type directional valves consist of a housing (1), a control spool (2), and a solenoid (3) with return spring (5).

Change-over to the operating position is done by energizing the solenoid (3), whereby the solenoid plunger acts on the control spool (2) via the operating pin (4), thus clearing the corresponding flow ways and establishing respective links between the ports P1, A, B and P2.

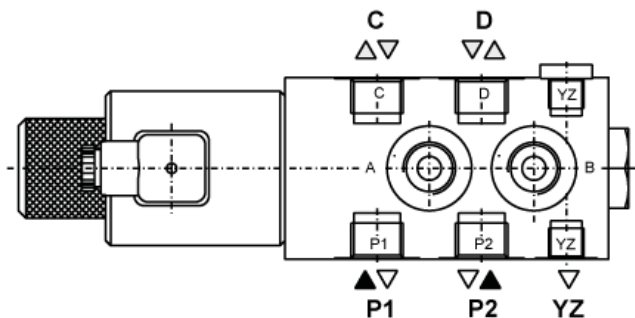
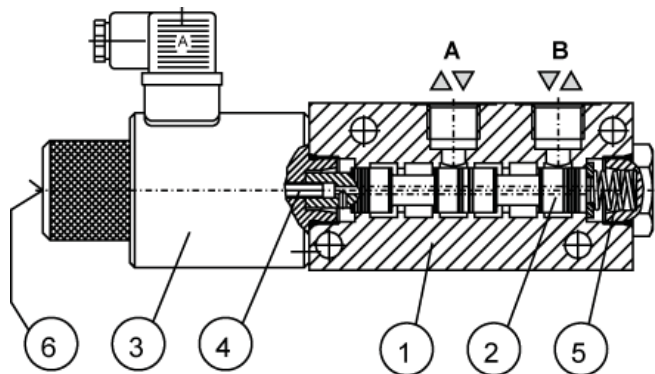
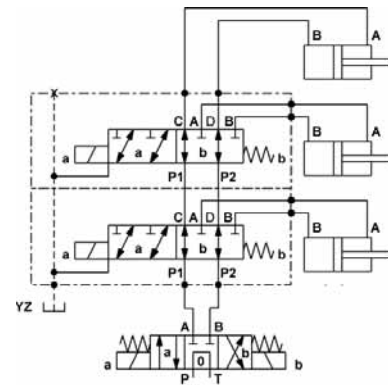
When the solenoid (3) is de-energized, the control spool (2) is returned to its neutral position by the return spring (5), thus establishing again the links between ports P1, C, D and P2.

The change-over can also be done manually by pressing the emergency hand operator (6).

### Hydraulic symbol



### Mounting example



Mechanically operated

Hydraulically operated

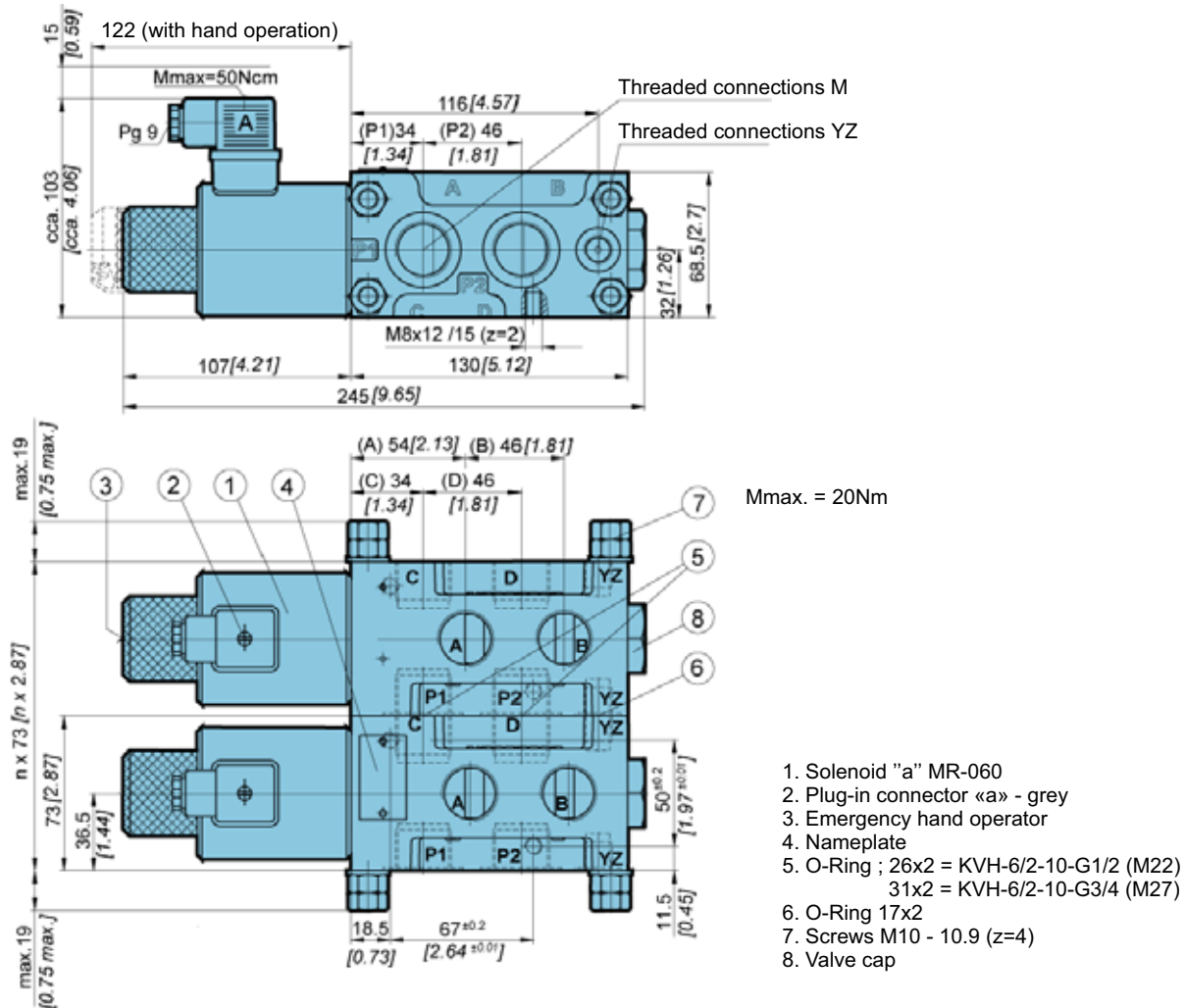
Electrically operated



**Features**

Hydraulic		
Size	<b>10</b>	
Flow rate	L/min [GPM]	120 [31.70]
Operating pressure	With YZ	315 [4 568]
	Without YZ	250 [551]
Oil temperature range	°C [°F]	-20 to +70 [-4 to +158]
Viscosity range	mm <sup>2</sup> /s [SUS]	15 to 380 [3.24 to 82]
Mounting position	Optional	
Mass	Kg [lb]	5,5 [12.12]
Filtration	NAS 1638	8
Electrical		
Supply voltage	V	12, 24 DC
Power	W	45
Switching frequency	1/h	15 000
Ambient temperature	°C [°F]	to +50 [to +122]
Coil temperature	°C [°F]	to +180 [to +356]
Duty cycle	Continuous	

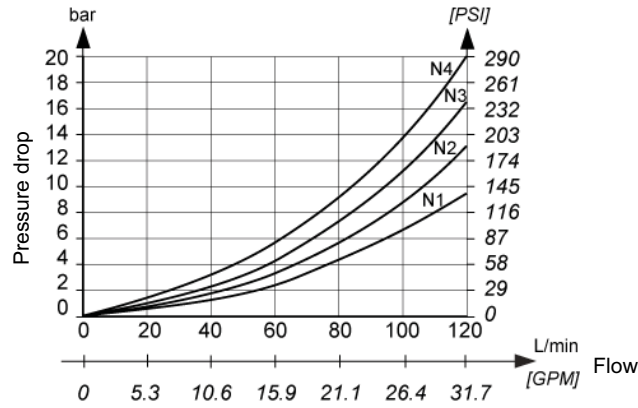
**Dimensions**





**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



**Model code**



**Hand operator**  
 without hand operator No designation  
 With hand operator **G**

**Supply voltage**  
 Direct voltage 24V No designation  
 Direct voltage 12V **12 DC**

**Connector type**  
 EN 175301-803 without signal lamp No designation  
 EN 175301-803 with signal lamp **L**  
 EN 175301-803 without connector **K**  
 AMP Junior timer without connector **M**

**Overvoltage protection**  
 Without overvoltage protection No designation  
 With overvoltage protection **T**

**Threaded connections M ; YZ**  
 M22x1,5 ; M14x1,5 **M22**  
 M27x2 ; M14x1,5 **M27**  
 G1/2 ; G1/4 **G1/2**  
 G3/4 ; G1/4 **G3/4**  
 7/8-14 UNF-2B ; 9/16-18 UNF-2B **7/8-14UNF**

**Drainage**  
 Without YZ No designation  
 With YZ **YZ**

**Seal type**  
 NBR seals for mineral oil HL, HLP to DIN 51524 No designation  
 FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380 **E**

Special requirements to be briefly specified

Number of units	
<b>N1</b>	One
<b>N2</b>	Two
<b>N3</b>	Three
<b>N4</b>	Four
<b>N5</b>	Five

Mechanically operated

Hydraulically operated

Electrically operated







## 6/3 WAY DIRECTIONAL VALVES KV

- NG 4
- Up to 210 bar [3 045 PSI]
- Up to 7 L/min [1.8 GPM]
- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas).
- Manual emergency control.
- Fulfil EMC (89/336/EEC).



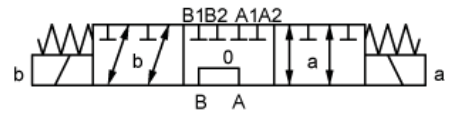
KV-6K/3-4

### Features

#### Hydraulic

Size	4	
Flow rate	L/min [GPM]	6 [1.6]
Operating pressure	bar [PSI]	210 [3 045]
Viscosity range	mm <sup>2</sup> /s [SUS]	15 to 380 [69.5 to 1 760]
Oil temperature range	°C [°F]	-20 to +70 [-4 to 158]
Filtration	ISO 4406-1999	19/17/14
Mass	Kg [lb]	1,6 [3.5]
Seal type	NBR seals for mineral oil HL, HLP, to DIN 51524	

### Hydraulic symbol

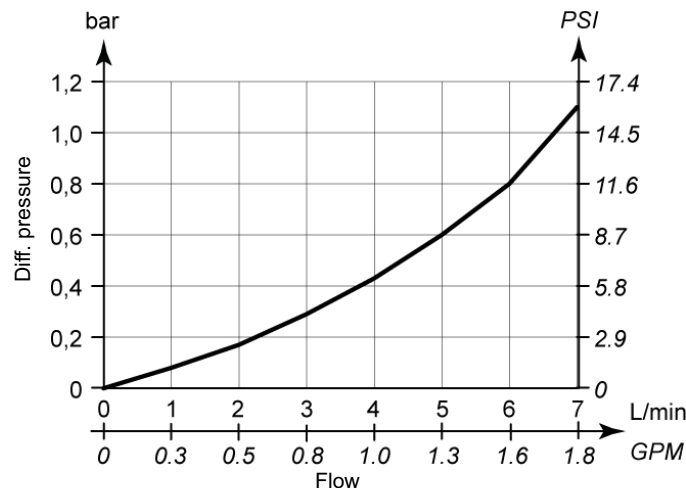


#### Electrical

Supply voltage	V	12, 24
Power	W	25
Switching frequency	1/h	15 000
Ambient temperature	°C [°F]	to 50 [122]
Coil temperature	°C [°F]	to 180 [356]
Duty cycle	Continuous	

### ΔP-Q Performance curves

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



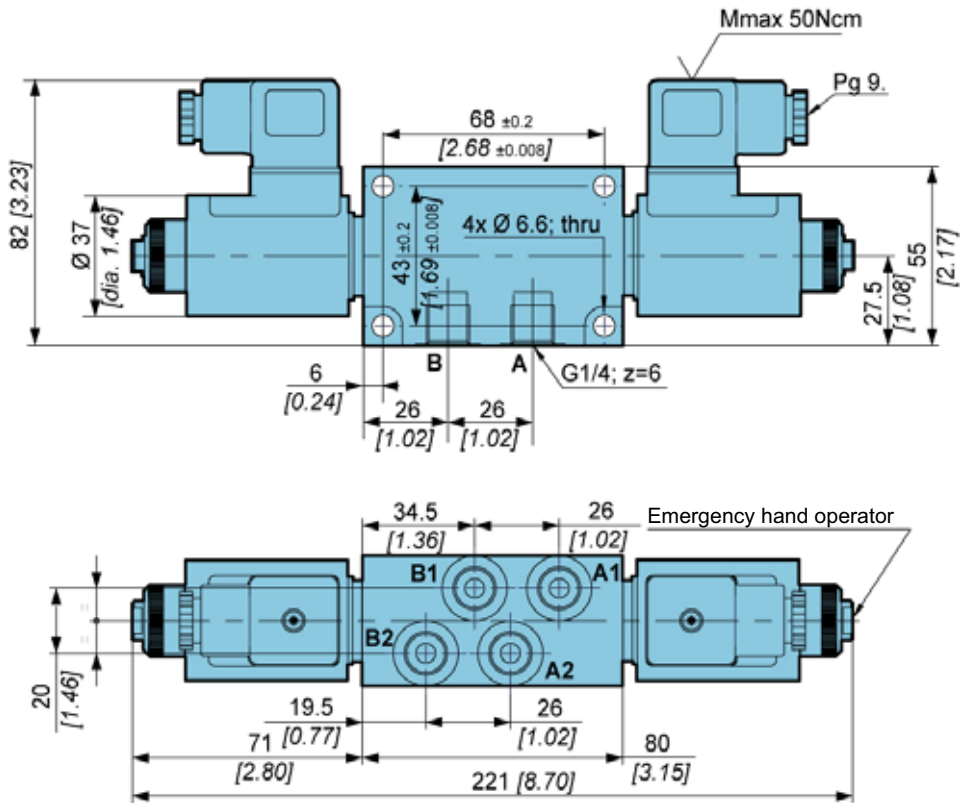
Mechanically operated

Hydraulically operated

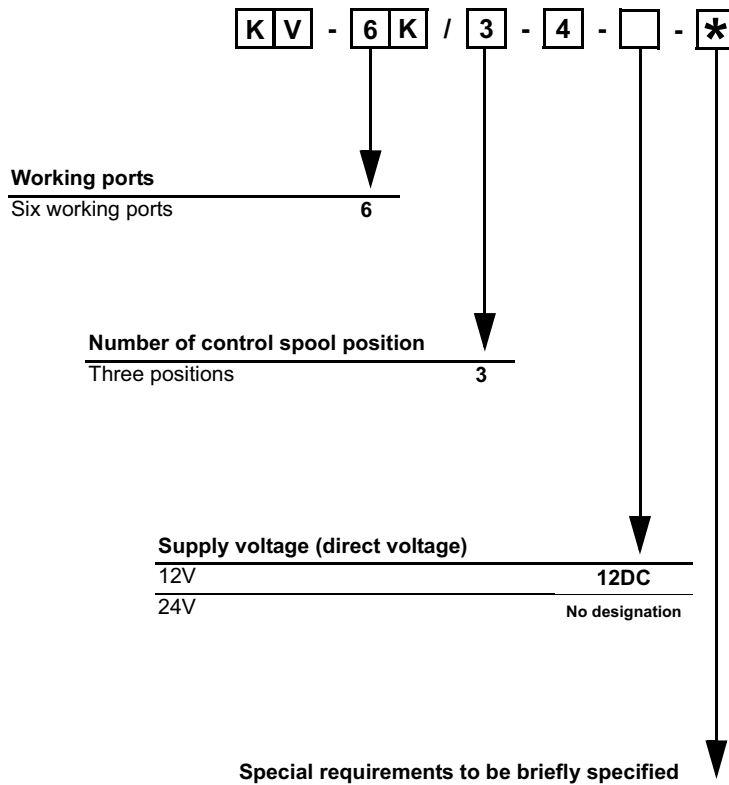
Electrically operated



**Dimensions**



**Model code**





## 8/3 WAY DIRECTIONAL VALVES KV

- NG 6
- Up to 250 bar [5 076 PSI]
- Up to 50 L/min [31.7 GPM]
- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Protection of solenoid IP65 to EN 50529 / IEC 60529.
- Fulfil EMC (89/336/EEC).



KV-8/3-6

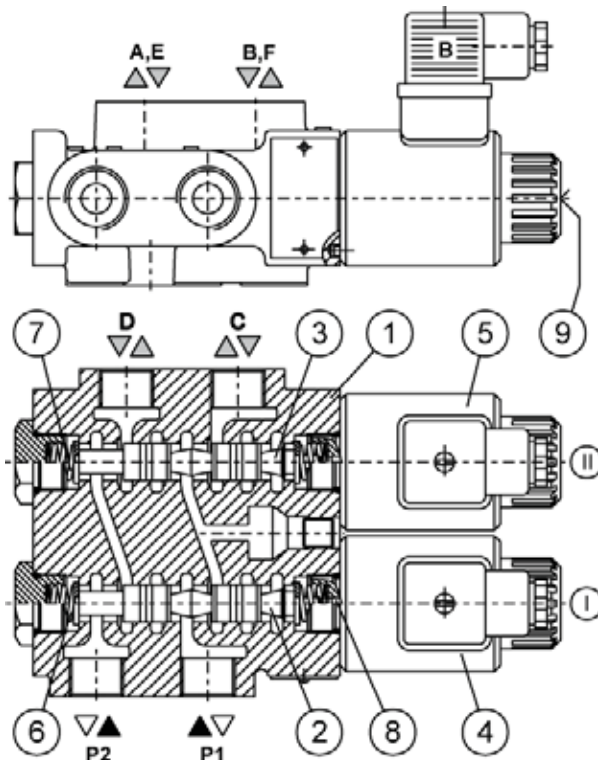
### Operation

Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between three consumers and the basic directional valve, when we wish to control both consumers alternately by means of one basic directional valve.

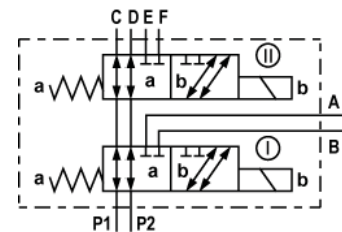
The KV type directional valves consist of a housing (1), a control spool (2,3), two solenoids (4,5) with return spring (6,7). Change-over to one of the operating positions is done by combination of operation of solenoids (4,5), whereby the solenoid plunger acts on the control spool (2,3) via the operating pin (8), thus clearing the corresponding flow ways and establishing respective links between the ports P1, A, B, C, D, E, F and P2, as seen forth in the schematic diagram of a mounting example.

When the solenoid (4,5) is de-energized, the control spool (2,3) is returned to their neutral position by the return spring (6,7).

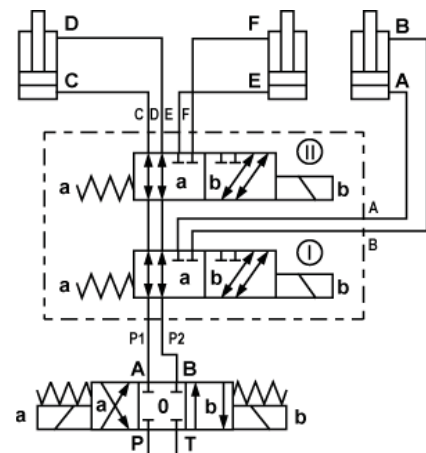
The change-over can also be done manually by pressing the emergency hand operator (9).



### Hydraulic symbol



### Mounting example



Mechanically operated

Hydraulically operated

Electrically operated



**Features**

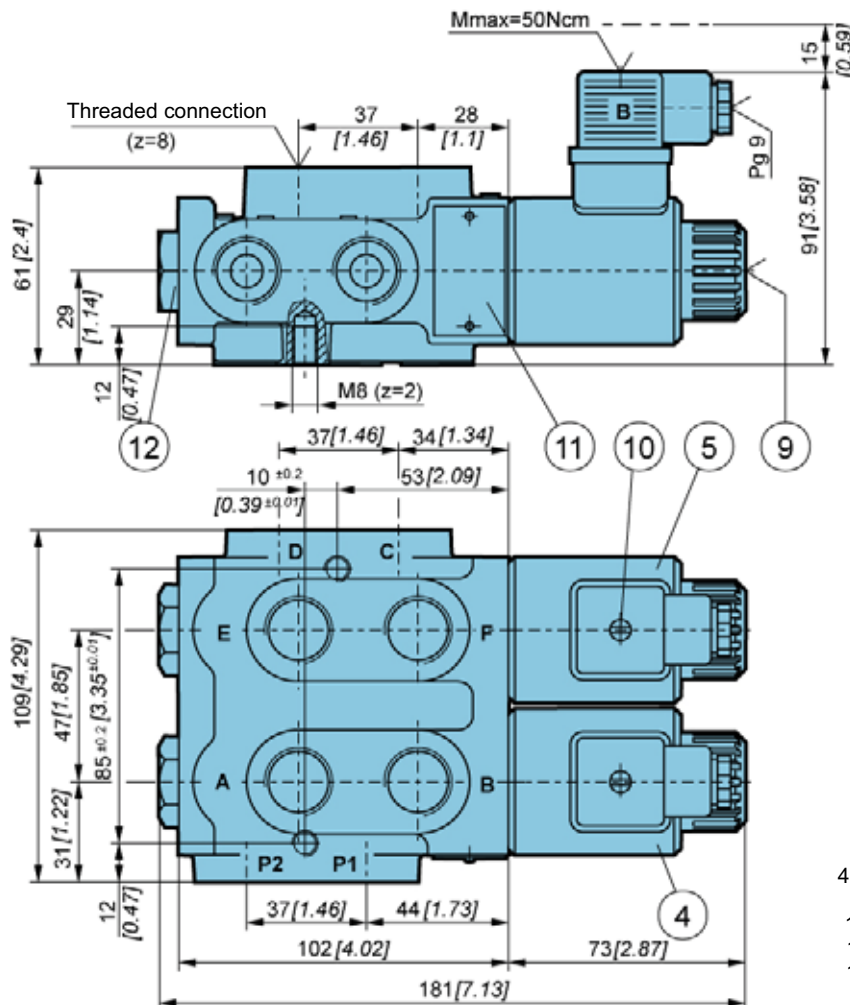
**Hydraulic**

<b>Size</b>		<b>6</b>
<b>Flow rate</b>	L/min [GPM]	50 [13.21]
<b>Operating pressure</b>	bar [PSI]	250 [3 625]
<b>Oil temperature range</b>	°C [°F]	-20 to +70 [-4 to +158]
<b>Viscosity range</b>	mm <sup>2</sup> /s [SUS]	15 to 380 [3.24 to 82]
<b>Mounting position</b>		Optional
<b>Mass</b>	Kg [lb]	3,8 [8.38]
<b>Filtration</b>	NAS 1638	8

**Electrical**

<b>Supply voltage</b>	V	12, 24 DC
<b>Power</b>	W	29
	(12 V DC supply voltage)	36
<b>Switching frequency</b>	1/h	15 000
<b>Ambient temperature</b>	°C [°F]	to +50 [to +122]
<b>Coil temperature</b>	°C [°F]	to +180 [to +356]
<b>Duty cycle</b>		Continuous

**Dimensions**

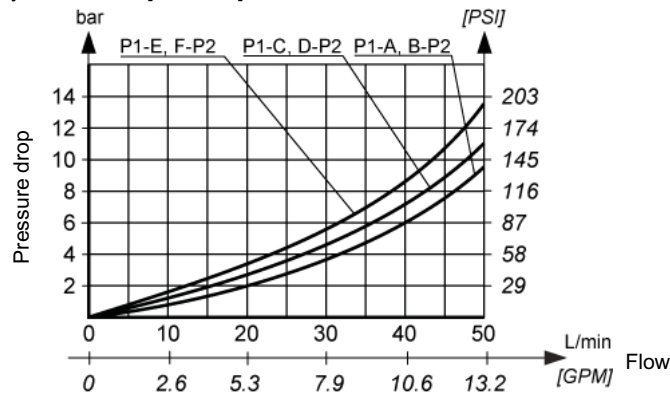


- 4.5. Solenoid "b" MR-045
- 9. Emergency hand operator
- 10. Plug-in connector «b» - black
- 11. Nameplate
- 12. Valve cap

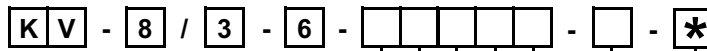


**ΔP-Q Performance curves**

Measured at 50°C [122°F] and viscosity of 32 mm<sup>2</sup>/s [148 SUS].



**Model code**



**Hand operator**

- Emergency manual override **No designation**
- Manual override with rubber cover **G**

**Supply voltage**

- Direct voltage 24V **No designation**
- Direct voltage 12V **12 DC**

**Connector type**

- EN 175301-803 without signal lamp **No designation**
- EN 175301-803 with signal lamp **L**
- EN 175301-803 without connector **K**
- AMP Junior timer without connector **M**

**Overvoltage**

- Without overvoltage protection **No designation**
- With overvoltage protection **T**

**Threaded connections**

- |               |                       |
|---------------|-----------------------|
| M18x1,5       | <b>No designation</b> |
| M22x1,5       | <b>M22</b>            |
| M20x1,5       | <b>M20</b>            |
| G3/8          | <b>G3/8</b>           |
| G1/2          | <b>G1/2</b>           |
| 3/4-16 UNF-2B | <b>3/4-16UNF</b>      |

**Seal type**

- NBR seals for mineral oil HL, HLP, to DIN 51524 **No designation**
- FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380 **E**

**Special requirements to be briefly specified**

Mechanically operated

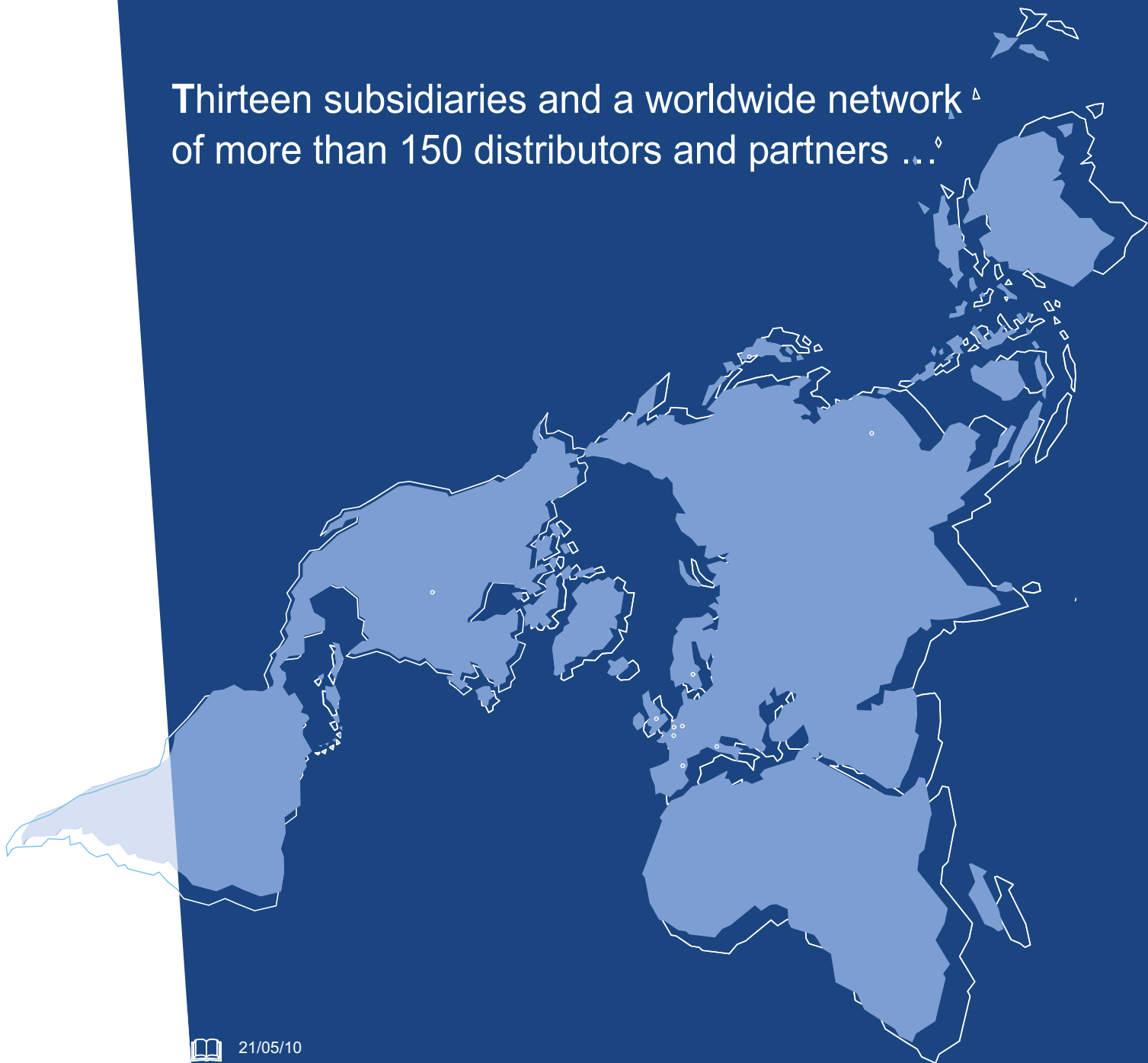
Hydraulically operated

Electrically operated





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