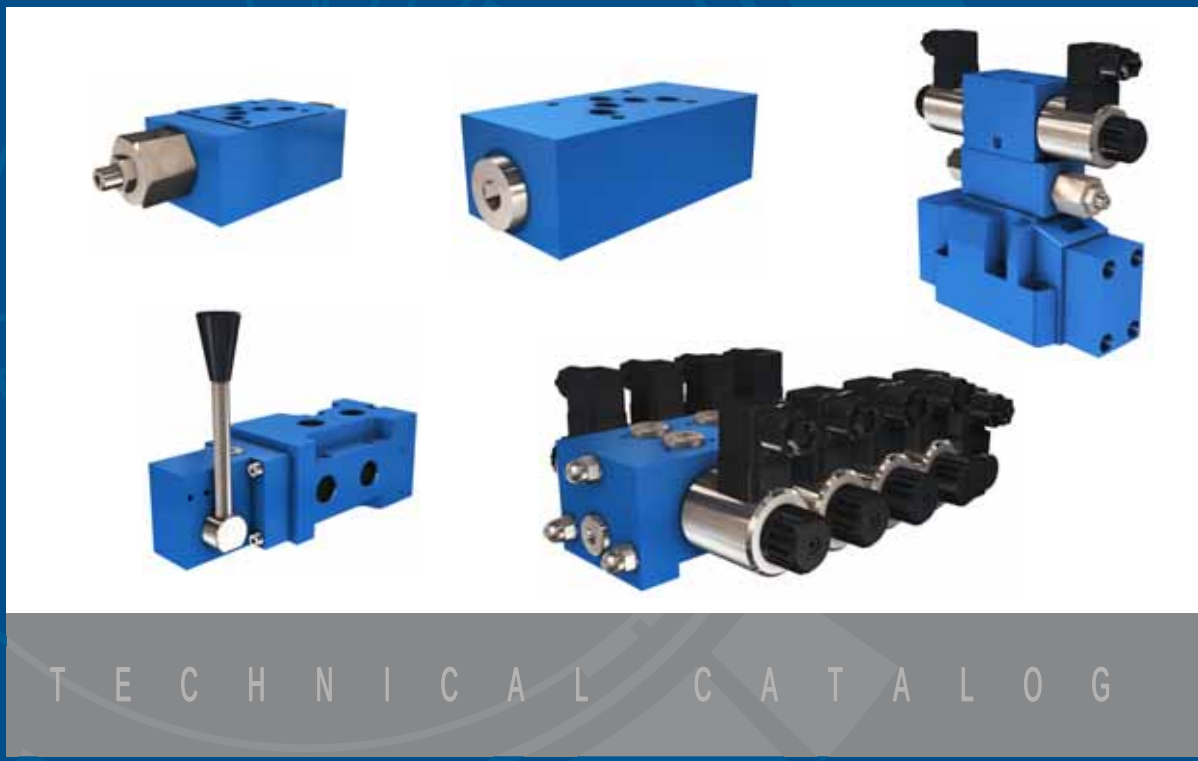
VALVES RANGE
FOR OPEN LOOPS



TECHNICAL CATALOG

POCLAIN Hydraulics

CONTENT

CHECK VALVES

CHECK VALVE VP-NV

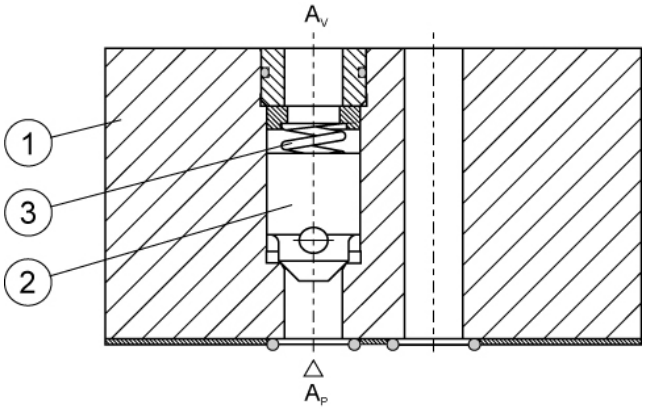
- NG 6, 10
- Up to 350 bar *[5 076 PSI]*
- Up to 100 L/min *[26,4 GPM]*

- Connecting dimensions to ISO 4401.
- For vertical stacking - sandwich plate design.
- Free hydraulic fluid flow in one direction.

VP-NV-6, VP-NV-10

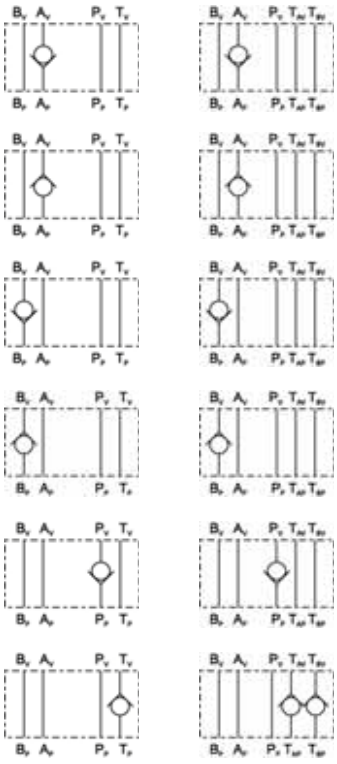
Operation

Check valves type VP-NV permit the hydraulic fluid flow in one direction, with a tight-off in the opposite direction. Sandwich plate design - for vertical stacking.
These valves consist of a housing (1), poppet (2), and a spring (3). A poppet valve can be fitted into the line P, T, A or B. It serves for shutting off the hydraulic fluid flow in one direction, permitting a free flow in the opposite direction. This is made possible by the poppet (2) which provides positive seating. The hydraulic fluid flow under cracking pressure 0,4 bar *[5.8 PSI]* causes the poppet to lift, thus freeing the flow. In the opposite direction, the spring (3) pushes the poppet (2) against the seat, shutting the hydraulic fluid flow off.



Hydraulic symbols

Size 6 Size 10

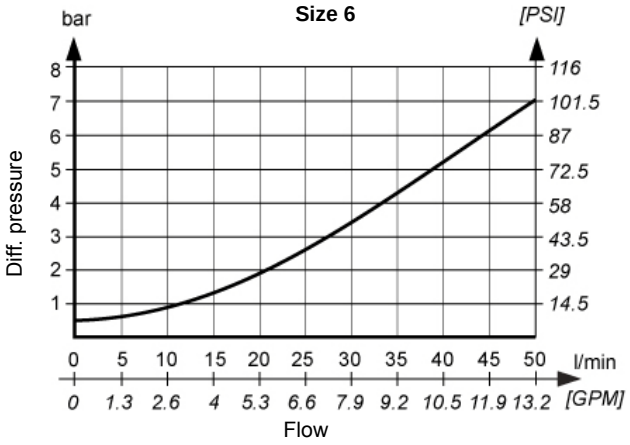


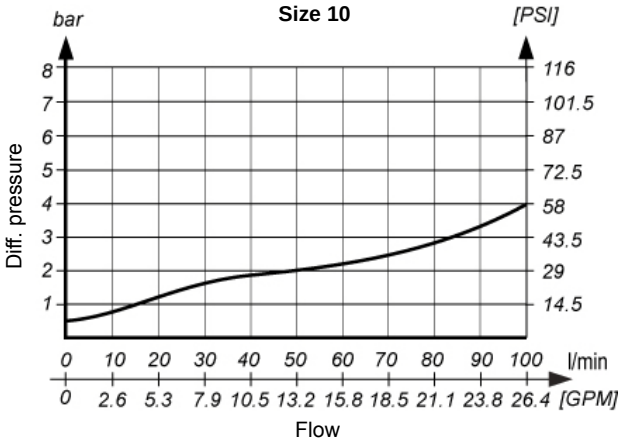
Features

Size		6	10
Flow rate	L/min *[GPM]*	50 *[13.2]*	100 *[26.4]*
Flow velocity	m/s	4	
Operating pressure	bar *[PSI]*	350 *[5 076]*	
Cracking pressure	bar *[PSI]*	0,4 *[5.8]*	
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*	
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69,5 to 1.760]*	
Filtration	NAS 1638	8	
Mass	kg *[lb]*	0,87 *[1.91]*	2,77 *[6.10]*

ΔP-Q Performance curves

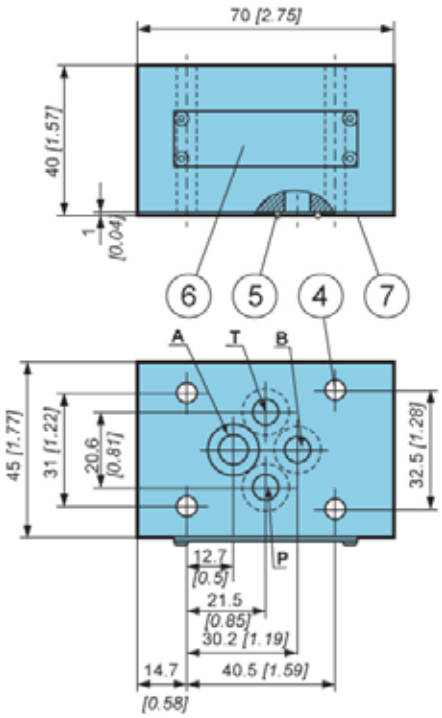
Measured at 50°C *[122°F]*
and viscosity of 32 mm^2/s *[148 SUS]*.





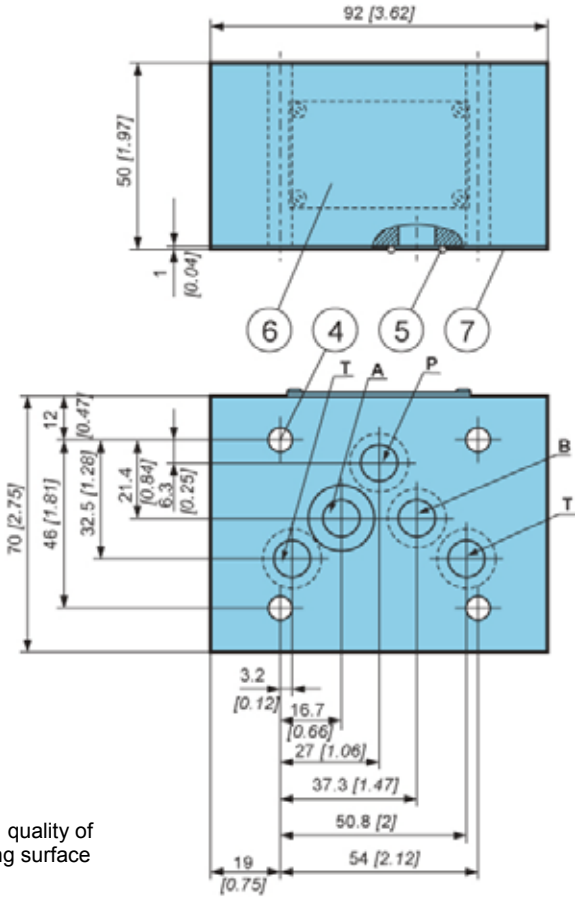
Dimensions

Size 6



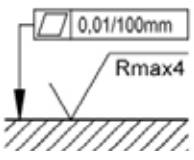
4. Bores for fixing screws M5
5. O-ring 9,25x1,78
6. Nameplate
7. O-ring plate

Size 10



4. Bores for fixing screws M6
5. O-ring 12,42x1,78
6. Nameplate
7. O-ring plate

Required quality of the mating surface



Model code

V P - N V - □ - □ - □ - *

Size

Size 6	**6**
Size 10	**10**

To be fitted into line...Flow direction

Size 6	Size 10	
A_p-A_v	A_p-A_v	**AP**
A_v-A_p	A_v-A_p	**AV**
B_p-B_v	B_p-B_v	**BP**
B_v-B_p	B_v-B_p	**BV**
P_p-P_v	P_p-P_v	**PP**
T_v-T_p	T_v-T_p	**TV**

Seals 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

CHECK VALVE NOV- ... -E

- NG 6, 10
- Up to 350 bar *[5 076 PSI]*
- Up to 50 L/min *[13.2 GPM]*

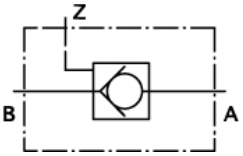
- Threaded connections to ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Flow shut-off in one service line.
- Direct in-line mounting.

NOV-6-E; NOV-10-E

Operation

Pilot operated check valves type NOV enable the hydraulic fluid flow in the service lines to be automatically shut-off and made free, respectively.
Free flow direction is from the valve port B to port A. In the opposite direction is blocked for the hydraulic fluid flow. Free flow from port A to port B is achieved by means of pressure in port Z.
To assure zero leakage there is necessary to discharge ports B and Z towards T in the zero position of the directional valve.

Hydraulic symbol



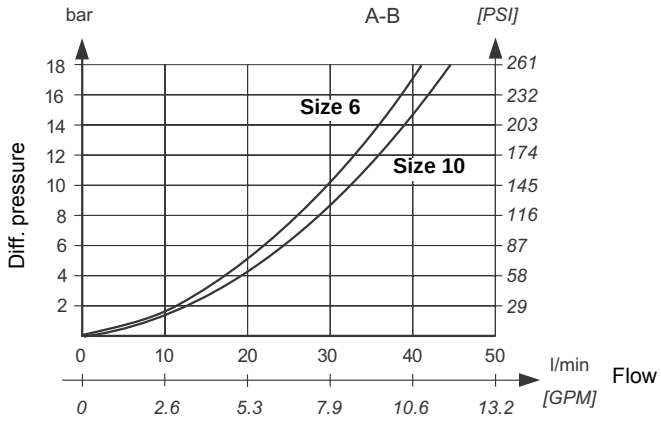
Features

Size		**6**	**10**
Flow rate	L/min *[GPM]*	35 *[9.2*	50 *[13.2]*
Operating pressure	bar *[PSI]*	350 *[5 076]*	
Cracking pressure (B-A)	bar *[PSI]*	0.5 *[7.2]*	
Area ratio		1:4	
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*	
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69,5 to 1.760]*	
Filtration	NAS 1638	8	
Mass	kg *[lb]*	0,5 *[1.10]*	0,65 *[1.43]*

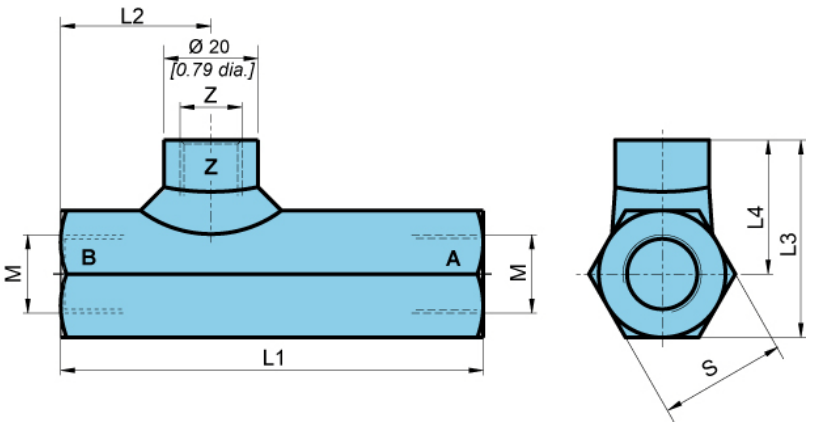
ΔP-Q Performance curves

Δp - Q Performance curves of the flow in direction A → B (check valve pilot opened).

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



Dimensions



Size	6	10
L1	90 *[3.54]*	94 *[3.70]*
L2	32 *[1.26]*	34 *[1.34]*
L3	42 *[1.65]*	45 *[1.77]*
L4	28,5 *[1.12*	30 *[1.18]*
S	27 *[1.06]*	30 *[1.18]*
M	G3/8	G1/2
Z	G1/4	G1/4

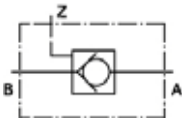
Model code

N O V - □ - E - □ - □ - □ - □ - ✱

Size

Size 6	**6**
Size 10	**10**

Symbol



E

Threaded connections

	Port A, B		Port Z	
Size 6	G3/8	**3/8**	G1/4	**1/4**
	9/16-18 UNF-2B	**SAE 6**	1/2-20 UNF-2B	**SAE 5**
Size 10	G1/2	**1/2**	G1/4	**1/4**
	7/8-14 UNF-2B	**SAE 10**	1/2-20 UNF-2B	**SAE 5**

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

CHECK VALVE NOV-6-D

- NG 6
- Up to 350 bar *[5 076 PSI]*
- Up to 60 L/min *[15.8 GPM]*

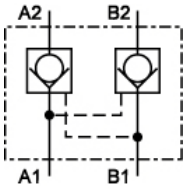
- Threaded connections to ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Flow shut-off in one service line.
- Direct in-line mounting.

NOV-6-D

Operation

Direct operated check valves type NOV enable the hydraulic fluid flow in the service lines to be automatically shut-off and made free, respectively.
Free flow direction is always from the valve side A1, B1 to side A2, B2. In the opposite direction is the valve blocked for the hydraulic fluid flow. Free flow in port A in direction A2 to A1 is achieved by means of pressure in port B, and vice versa.
To assure zero leakage there is necessary to discharge ports A1 and B1 towards T in the zero position of the directional valve.

Hydraulic symbol



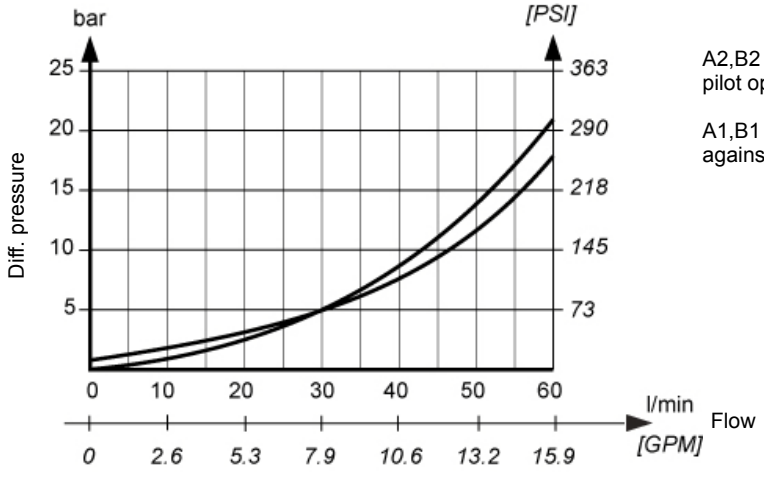
Features

Size		**6**
Flow rate	L/min *[GPM]*	60 *[15.8]*
Operating pressure	bar *[PSI]*	350 *[5 076]*
Cracking pressure	bar *[PSI]*	1 *[14.5]*
Area ratio		1:3,9
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69,5 to 1.760]*
Filtration	NAS 1638	8
Mass	kg *[lb]*	1,5 *[3.30]*

ΔP-Q Performance curves

Δp - Q Performance curves of the flow in direction A1, B1 ⟶ A2, B2 (through check valve) and in direction A2, B2 ⟶ A1, B1 (check valve pilot opened).

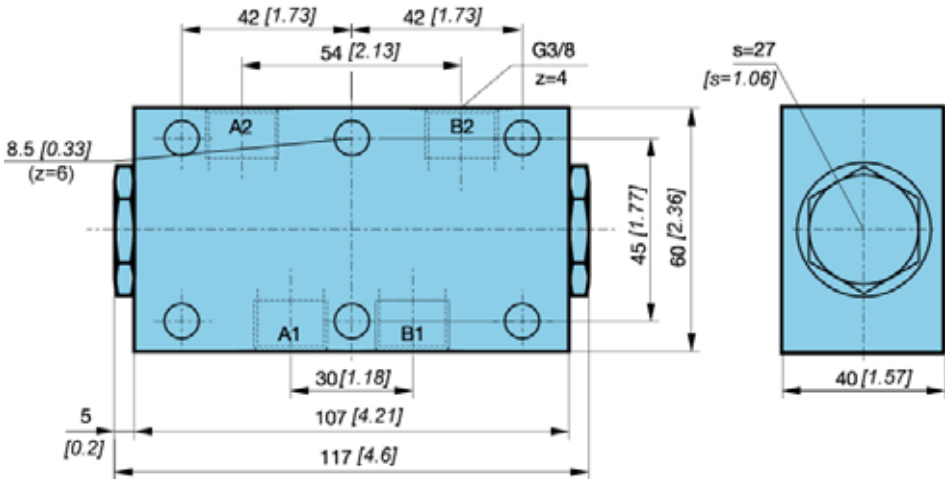
Measured at 50°C *[122°F]*
and viscosity of 32 mm^2/s *[148 SUS]*.



A2,B2 ⟶ A1,B1
pilot opened

A1,B1 ⟶ A2,B2
against spring force

Dimensions



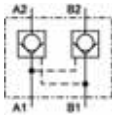
Model code

N O V - 6 - D - ☐ - ☐ - ✱

Size

Size 6	**6**

Symbol

	**D**

Threaded connections

G 3/8	**G**
9/16-18 UNF-2B	**SAE 6**

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

CHECK VALVE VP-NOV

- NG 6, 10
- Up to 350 bar *[5 076 PSI]*
- Up to 100 L/min *[26,4 GPM]*

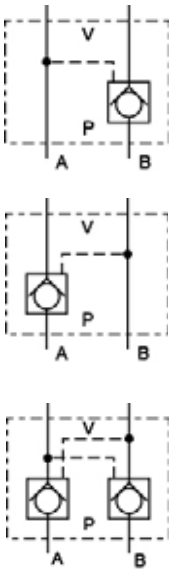
- Connecting dimensions to ISO 4401.
- Flow shut-off in both or one service line.
- For vertical stacking - sandwich plate design.
- Height and width of the valves to ISO 7790 norms.

VP-NOV-10-.., VP-NOV-6-..

Operation

Pilot operated check valves type VP-NOV enable the hydraulic fluid flow in the service lines to be automatically shut off and made free, respectively.
Free flow direction is always from the valve side "V" to the subplate side "P". In the opposite direction is the valve blocked for the hydraulic fluid flow. Free flow in port A in direction P to V is achieved by means of pressure in port B, and vice versa.
To assure zero leakage there is necessary to discharge ports A and B towards T in the zero position of the directional valve.

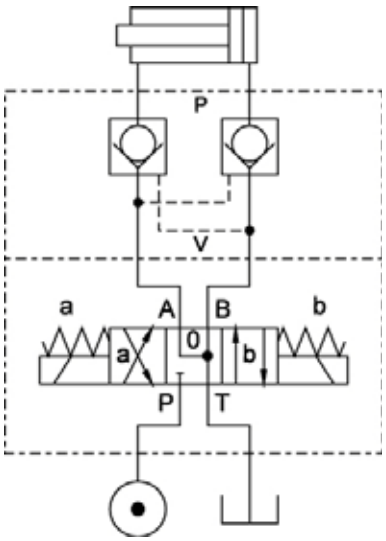
Hydraulic symbols



Features

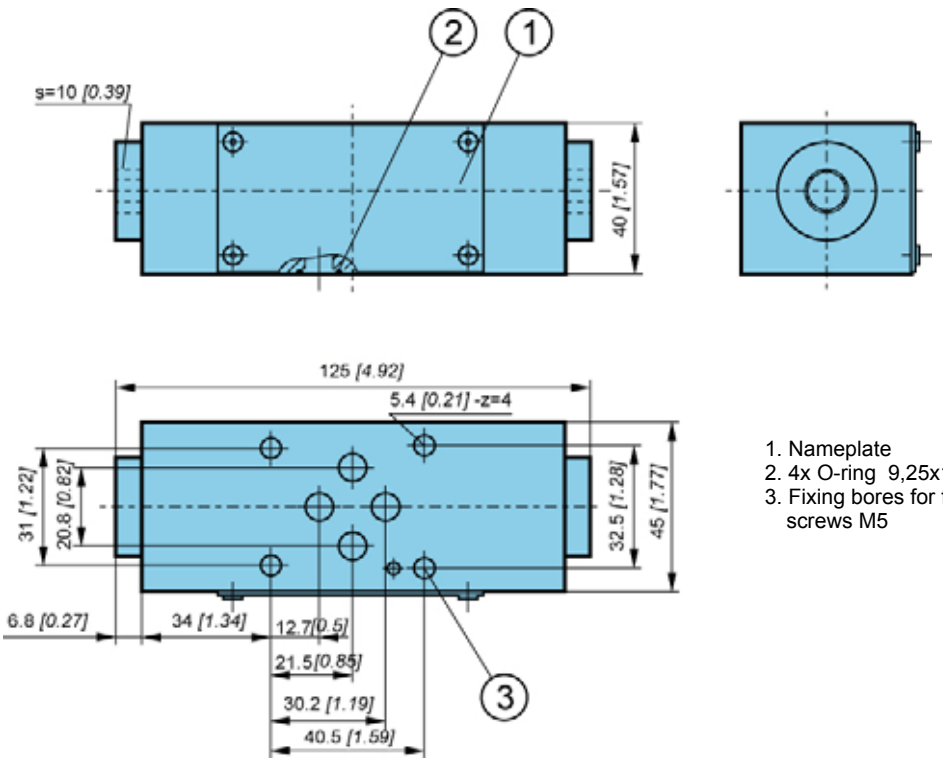
Size		6	10
Flow rate	L/min *[GPM]*	60 *[15.8]*	100 *[26.4]*
Operating pressure	bar *[PSI]*	350 *[5 076]*	
Cracking pressure	bar *[PSI]*	1 *[14.5]*	0,5 *[7.2]*
Area ratio		1:3,9	1:3,6
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*	
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69,5 to 1.760]*	
Filtration	NAS 1638	8	
Mass	kg *[lb]*	1,8 *[3.9]*	3,5 *[7.7]*

Mounting example



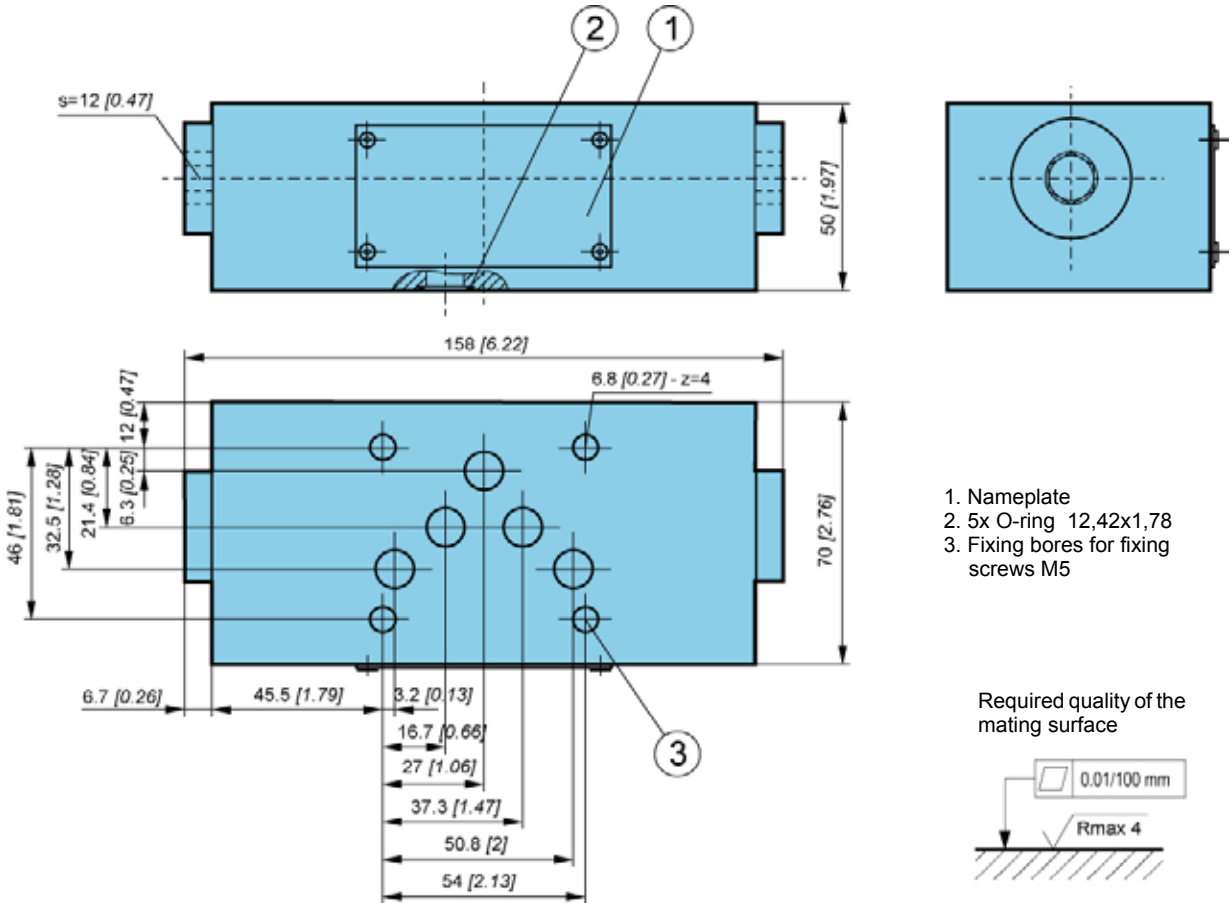
Dimensions

Size 6



1. Nameplate
2. 4x O-ring 9,25x1,78
3. Fixing bores for fixing screws M5

Size 10



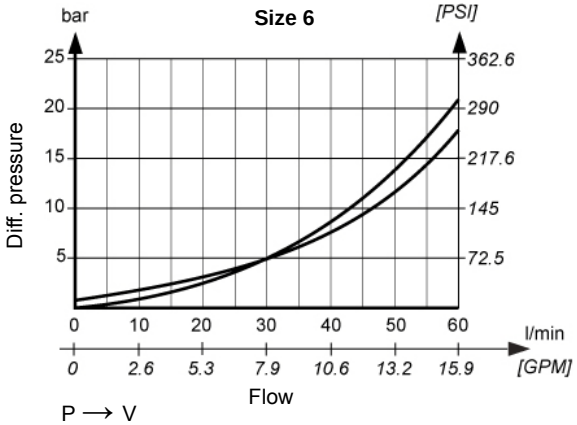
1. Nameplate
2. 5x O-ring 12,42x1,78
3. Fixing bores for fixing screws M5

Required quality of the mating surface

ΔP-Q Performance curves

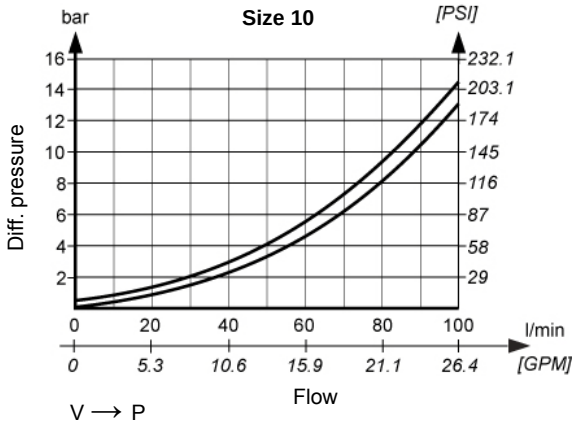
Δp - Q Performance curves of the flow in direction V to P (through check valve) and in direction P to V (check valve pilot opened with p_x =80 bar).

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



P ⟶ V
pilot opened

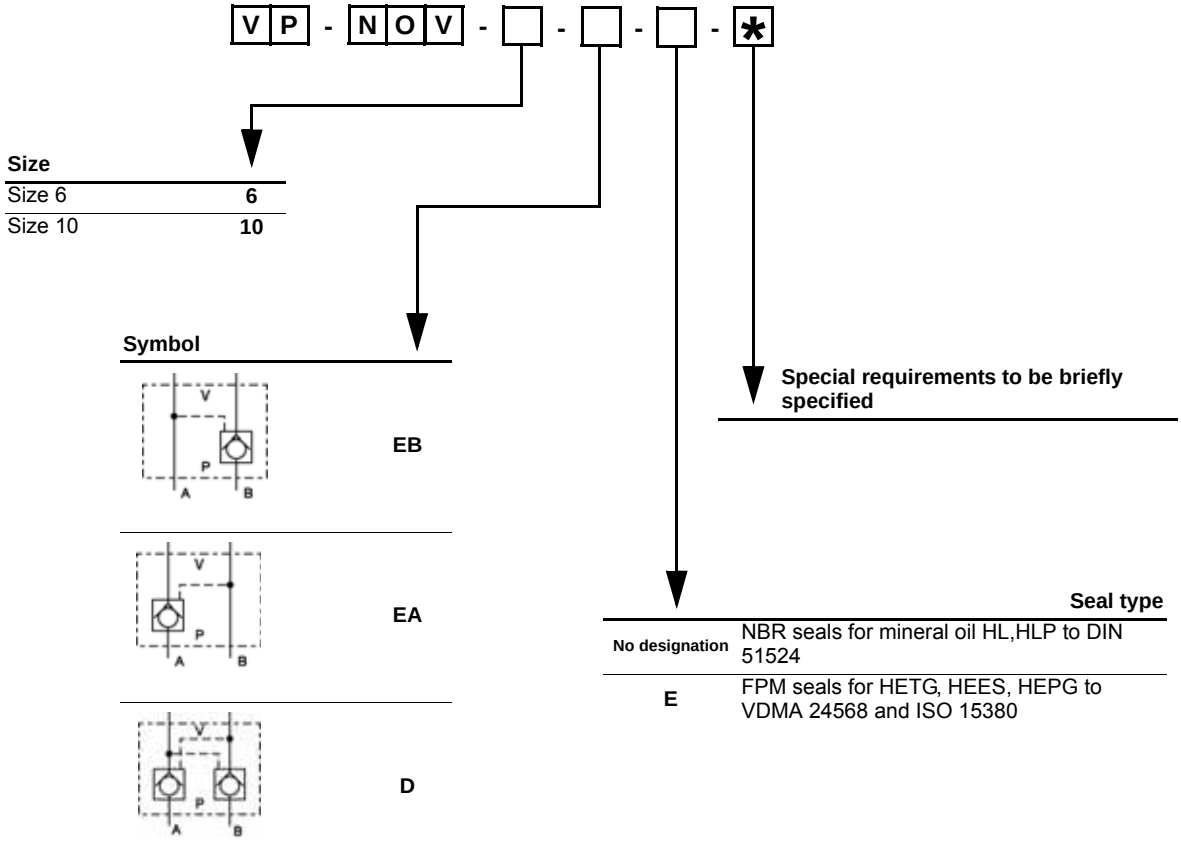
V ⟶ P
against spring force



V ⟶ P
against spring force

P ⟶ V
pilot opened

Model code



CHECK-Q-METER MODULAR VALVE VP-BZV

- NG 6
- Up to 270 bar *[3 916 PSI]*
- Up to 30 L/min *[7.9 GPM]*

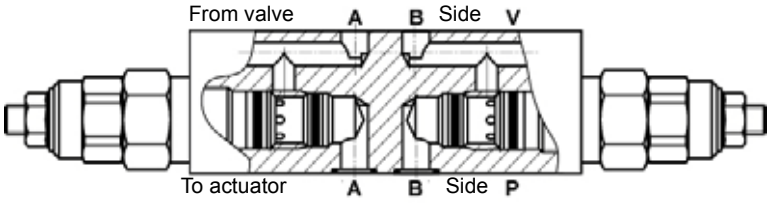
- Connecting dimensions to ISO 4401.
- Modular plate design for vertical stacking.
- Hight and width of the valve according to ISO 7790.

VP-BZV-6

Operation

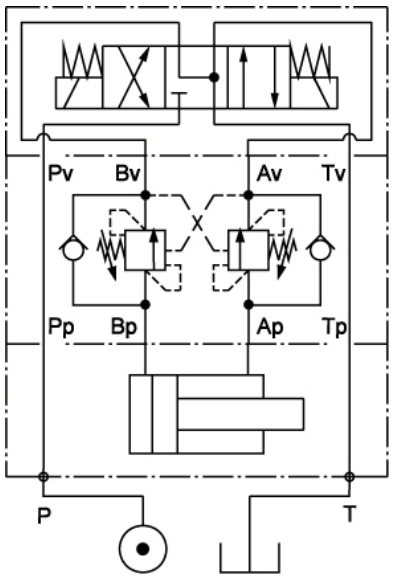
Modular check-Q-meter valve in combination with other stacking elements gives static and dynamic load control by regulating the flow into and out of hydraulic actuators. It prevents load uncontrol run away and allows thermal expansion relief of the hyd aulic fluid.
Flow in line B (A) from side P to V is allowed when the required pilot pressure in line A (B) is induced. For stabile valve function the valve must be set (Ps) at least 1.3 - times higher than maximum expected load pressure (P_L).

$$\text{Required pilot pressure } (P_R) = \frac{\text{Counterbalance valve setting (Ps) - load pressure } (P_L)}{\text{Pilot ratio (R)}}$$



Hydraulic symbol

Mounting example

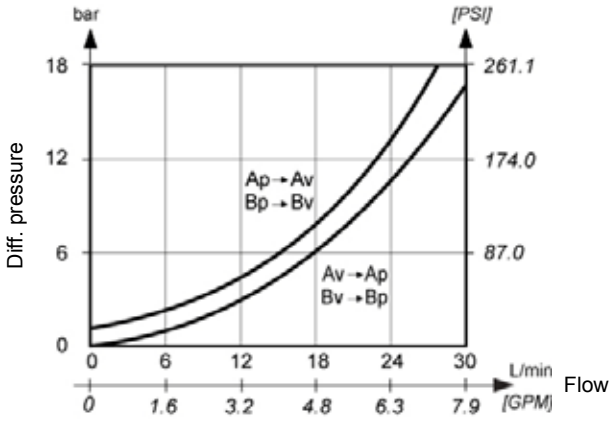


Features

Size		6 (single valve)	6 (double valve)
Flow rate	L/min *[GPM]*	30 *[7.9]*	
Operating pressure	bar *[PSI]*	270 *[3 916]*	
Cracking pressure	bar *[PSI]*	1 *[14.5]*	
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*	
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69,5 to 1.760]*	
Filtration	NAS 1638	8	
Mass	kg *[lb]*	1,3 *[2.9]*	1,8 *[4.00]*

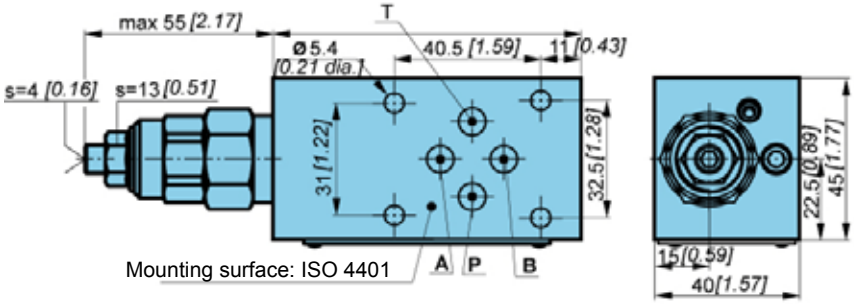
ΔP-Q Performance curves

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

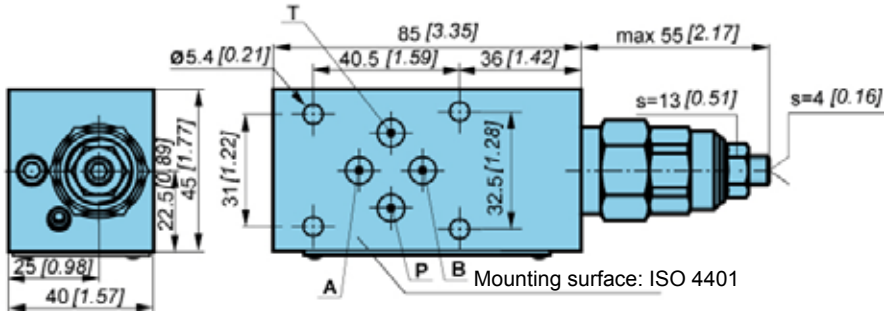


Dimensions

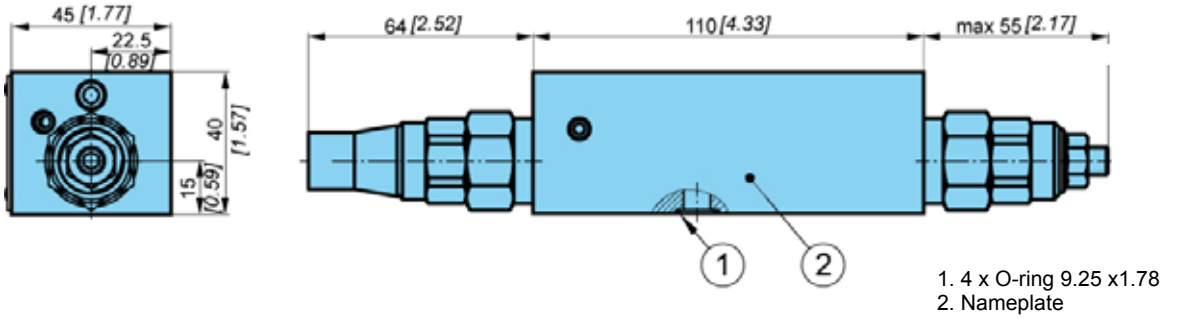
EAN, EAP, EAT



EBN, EBP, EBT

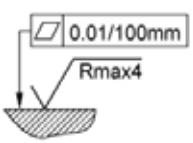


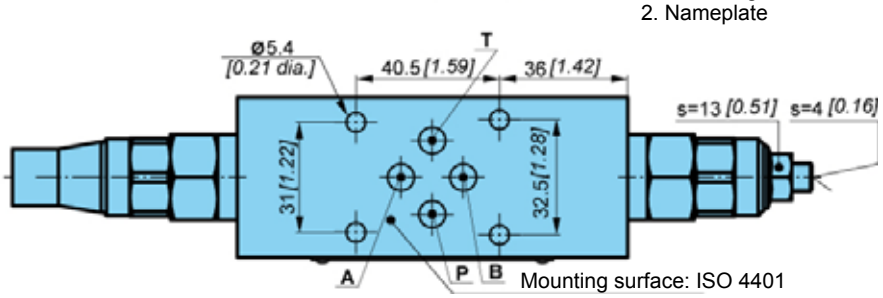
DN, DP, DT



1. 4 x O-ring 9.25 x1.78
2. Nameplate

Required quality of the mating surface





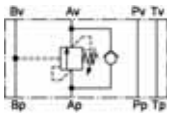
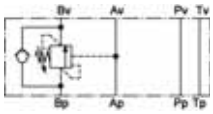
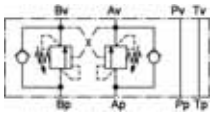
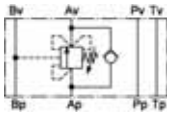
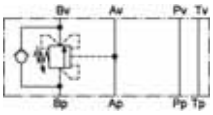
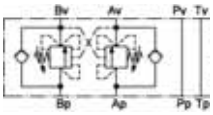
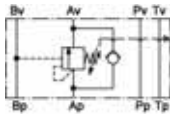
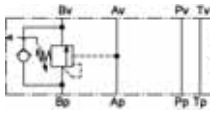
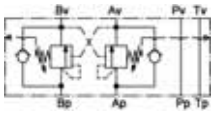
Model code

V P - B Z V - 6 - ☐ - ☐ - 04 - ☐ - ☐ - ✱

Size

Size 6	**6**

Symbol

Single standard valves		**EAN**
		**EBN**
Double standard valves		**DN**
Single relief compensated valves		**EAP**
		**EBP**
Double relief compensated valves		**DP**
Single atmospheric vented valves		**EAT**
		**EBT**
Double atmospheric vented valves		**DT**

Pressure setting range

	Adjusted pressure range bar *[PSI]*	Pressure increase bar *[PSI]* /turn	Standard setting bar *[PSI]* (Q= 5 l/min *[1,32 GPM]*)
20	100 to 210 *[1 450 to 3 045]*	109 *[1 580]*	200 *[2 900]*
35	200 to 350 *[2.900 to 5.076]*	137 *[1 987]*	350 *[5 076]*

Pilot ratio

04	4:1

Tamperproff cap

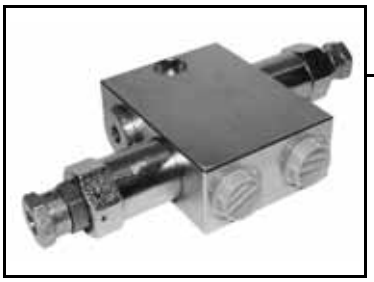
No designation	Without tamperproff cap
RC	With tamperproff cap

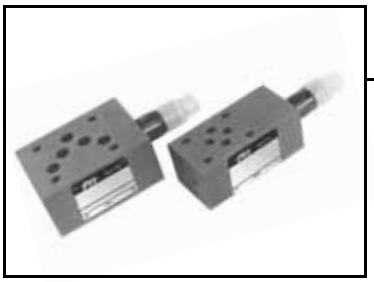
Seal type

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

Special requirements to be briefly specified

PRESSURE CONTROL VALVES





PRESSURE RELIEF VALVE VVP

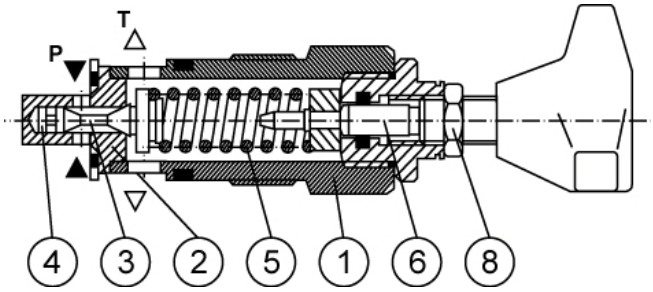
- NG 6, 10
- Up to 400 bar *[5 801 PSI]*
- Up to 120 L/min *[31.7 GPM]*

- For fitting into a block.
- For independent mounting (when assembled with connection block P-VVP).
- Two pressure setting elements (set screw, rotary knob).

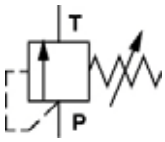
VVP-6, VVP-10

Operation

These valves consist of a housing (1), a hardened seat (2), a poppet (3), with a damping spool (4), a spring (5), and a pressure setting element (6).
The P-line of this pressure relief valve is connected with the hydraulic system. The pressure of the hydraulic fluid acts on the front side of the pilot poppet (3), and the force of the spring (5) set by the pressure setting element (6) is applied to the poppet from the opposite side. When the system pressure exceeds the valve of the spring set by the pressure setting element (6) the pilot poppet moves off the seat (2), and frees the flow of the hydraulic fluid in the direction from P towards T.
The damping spol (4) prevents vibrations of the pilot poppet when opening or closing the flow way of the hydraulic flow. Loosening of the pressure setting element is prevented by a counternut (8).



Hydraulic symbol



Direct operated pressure relief valves type VVP are used to maintain and limit the pressure in a hydraulic system.

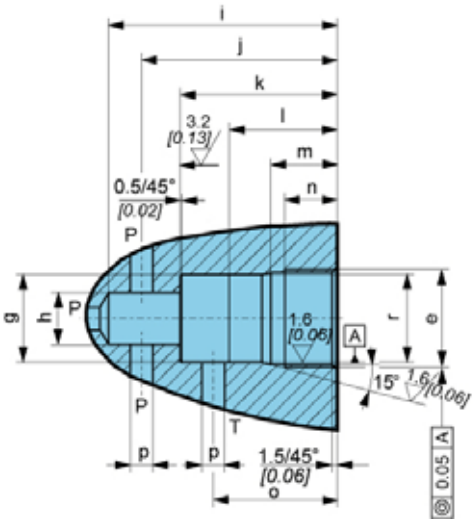
Features

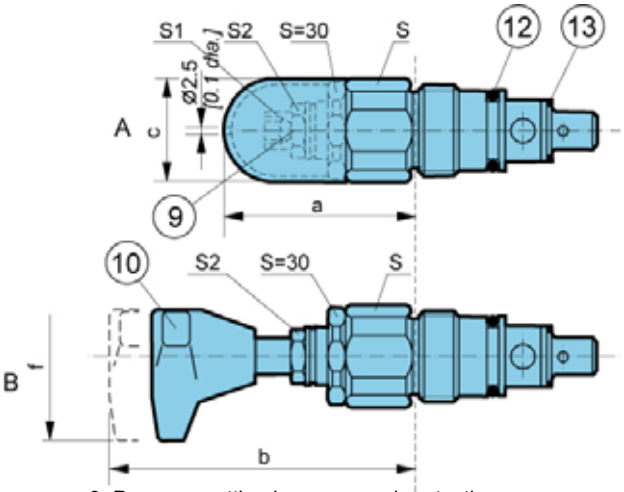
Size			**6**	**10**
Flow rate		L/min *[GPM]*	50 *[13.2]*	120 *[31.7]*
Pressure setting range		bar *[PSI]*	400 *[5 801]*	
Oil temperature range		°C *[°F]*	-30 to +70 *[-22 to + 158]*	
Viscosity range		mm^2/s *[SUS]*	2,8 to 380 *[12.9 to 1760]*	
Filtration		NAS 1638	8	
Mass	Execution A	kg *[lb]*	0,4 *[0.88]*	0,5 *[1.10]*
	Execution B		0,5 *[1.10]*	0,6 *[1.32]*

Dimensions

Tightening torque for fixing:
Nominal size 6 Md=80 Nm *[708 in.lbf]*.
Nominal size 10 Md=140 Nm *[1 239 in.lbf]*.

Customer specified setting can be secured by means of a stamp and a wire.





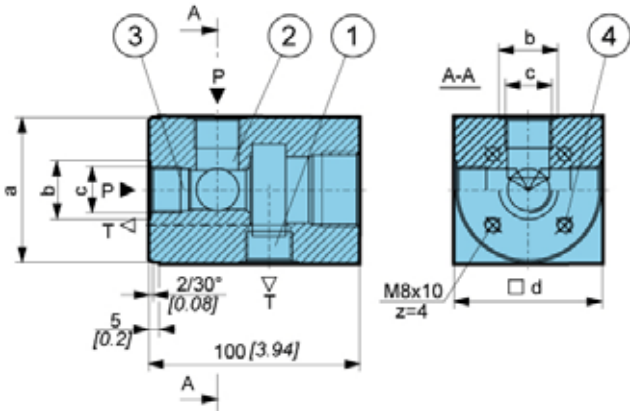
9. Pressure setting by screw and protective cap.
10. Pressure setting by rotary knob.
12. O-ring, nominal size 6, 19,2 x 3.
    O-ring, nominal size 10, 26 x 3.
13. Usit ring, nominal size 6, 17,4 x 24 x 1,5.
    Usit ring, nominal size 10, 24,7 x 31 x 2.

Type	a	b	Øc	e	Øf	Øg	Øh	i	j	k	l	m	n	o	Øp	Ør	s	s1	s2
VVP-6	72	94	34	M28x		24,9	15	65	56,5	45	30	19	15	35	6	25H9	32		
	[2.83]	*[3.70]*	*[1.34]*	1,5	60	*[0.98]*	*[0.59]*	*[2.56]*	*[2.22]*	*[1.77]*	*[1.18]*	*[0.75]*	*[0.59]*	*[1.38]*	*[0.24]*		*[1.26]*	6	19
VVP-10	68	90	38	M35x	*[2.36]*	31,9	18,5	80	67,5	52	35	23	18	41	10	32H9	36	*[0.24]*	*[0.75]*
	[2.67]	*[3.54]*	*[1.50]*	1,5		*[1.25]*	*[0.73]*	*[3.15]*	*[2.66]*	*[2.05]*	*[1.38]*	*[0.90]*	*[0.71]*	*[1.61]*	*[0.39]*		*[1.42]*		

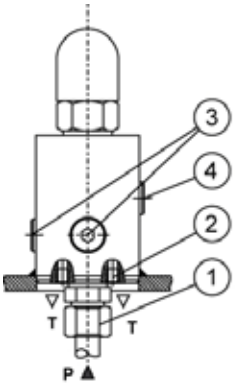
Connecting dimensions / connection P-VVP-6, P-VVP-10

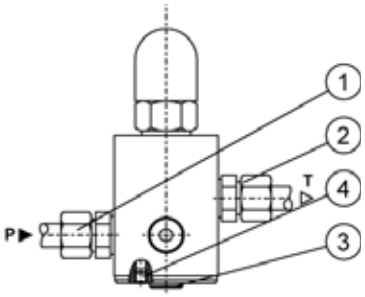
When fitting, the excess ports for oil supply and discharge must be closed by means of suitable screw.

1. Oil discharge when fitted independently.
2. Oil supply when fitted independently.
3. Oil supply when fitted on a tank cover.
4. Oil discharge when fitted on a tank cover.



Size	Øa	Øb	c	□d	Masse kg *[lb]*
6	59 d9	24	M18x1,5	60	2,5
	[2.32]	*[0.94]*		*[2.36]*	*[5.51]*
10	69 d9	28	M22x1,5	70	2,9
	[2.72]	*[1.10]*		*[2.76]*	*[6.39]*





1. Port "P".
2. Return line "T".
3. Locking screws - P line.
4. Locking screws - T line.

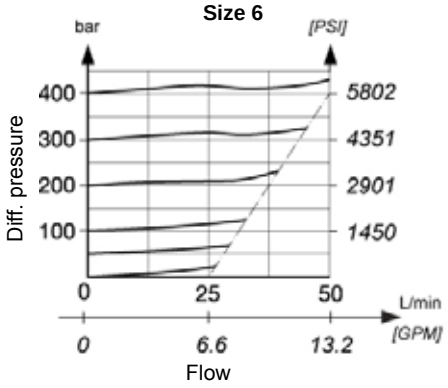
Model code

Size	
Size 6	**6**
Size 10	**10**

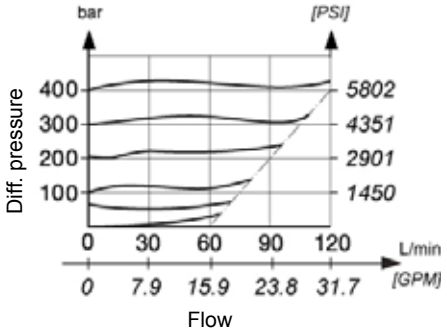
ΔP-Q Performance curves

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

Size 6



Size 10



Model code

V V P - □ - □ - □ - □ - ✱

Size

Size 6	**6**
Size 10	**10**

Pressure setting range bar *[PSI]*

To 50 *[725]*	**50**
To 100 *[1 450]*	**100**
To 200 *[2 900]*	**200**
To 315 *[4 568]*	**315**
To 400 *[5 801]*	**400**

Pressure setting element

Set screw with protective cap	**A**
Rotary knob	**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

PRESSURE RELIEF VALVE VVB2-10

- NG 6
- Up to 210 bar *[3,045 PSI]*
- Up to 60 L/min *[15,8 GPM]*

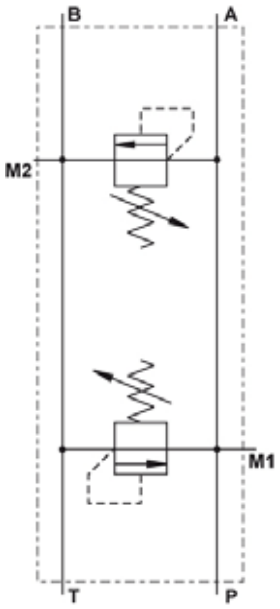
- Direct in-line mounting.
- hreaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas).
- Five different pressure setting elements.

VVB2-10-...

Features

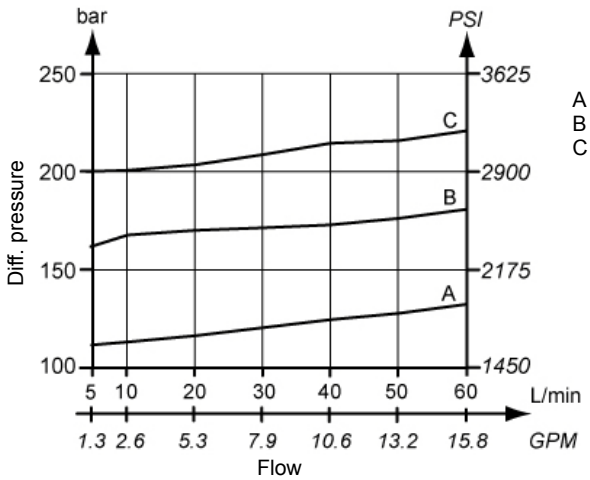
Size		**10**
Operating pressure	bar *[PSI]*	210 *[3 045]*
Flow rate	L/min *[GPM]*	60 *[15.8]*
Pressure setting range	bar *[PSI]*	120 *[1 740]*; 160*[2 320]*; 200 *[2 900]*
Oil temperature range	°C *[°F]*	-10 to +70 *[14 to + +158]*
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69.5 to + 1,760]*
Filtration	ISO 4406-1999	19/17/14
Mass	kg *[lb]*	1.85 *[4.08]*
Seal type	NBR seals for mineral oil HL, HLP, to DIN 51524	

Hydraulic symbol



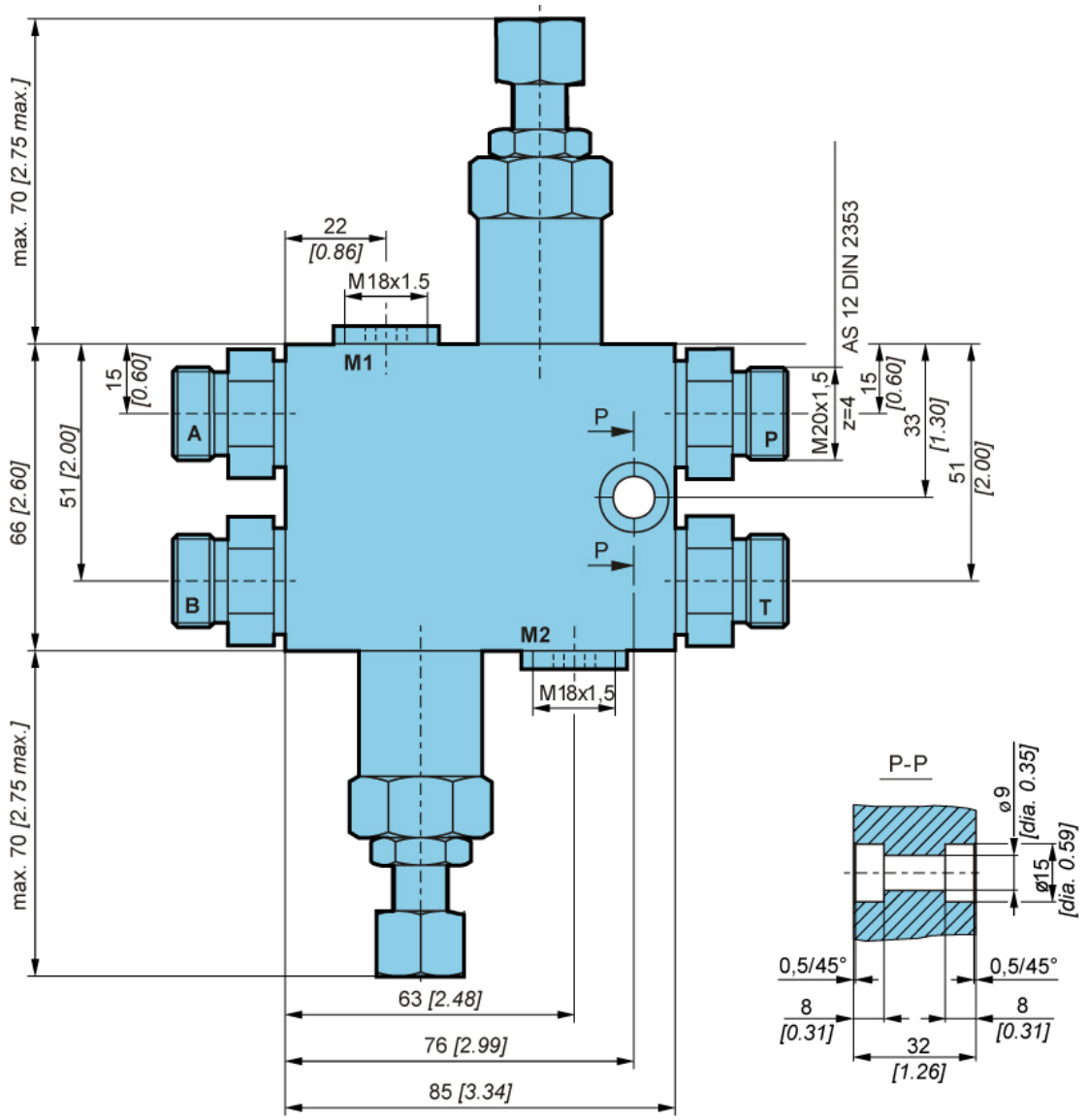
ΔP-Q Performance curves

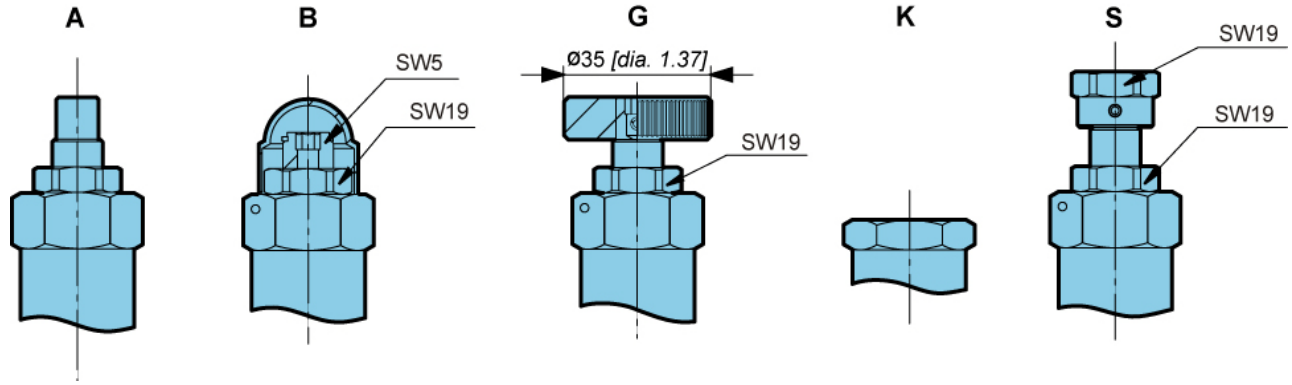
Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.



A = 120 bar *[1740 PSI]*
B = 160 bar *[2320 PSI]*
C = 200 bar *[2900 PSI]*

Dimensions





Inner hexagonal key

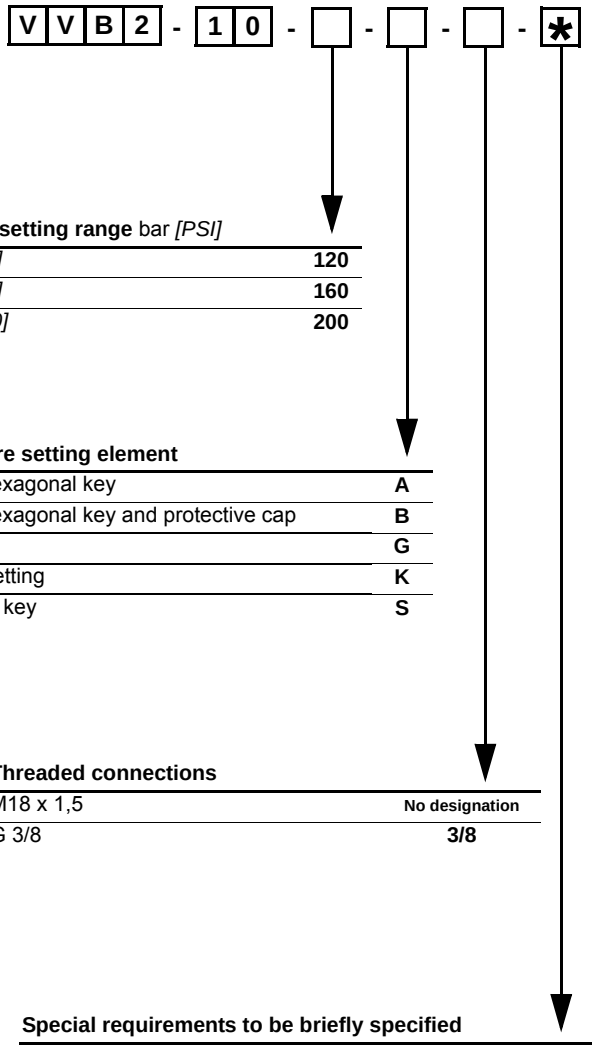
Inner hexagonal key and protective cap

Knob

Fixed setting

Exterior key

Model code


V V B 2 - 1 0 - □ - □ - □ - *
Pressure setting range bar [PSI]
120 [1740] 120
160[2 320] 160
200 [2 900] 200
Pressure setting element
Inner hexagonal key A
Inner hexagonal key and protective cap B
Knob G
Fixed setting K
Exterior key S
Threaded connections
M18 x 1,5 No designation
G 3/8 3/8
Special requirements to be briefly specified

PRESSURE RELIEF VALVE RT

- NG 4, 6, 10
- Up to 315 bar *[4 568 PSI]*
- Up to 100 L/min *[26.4 GPM]*

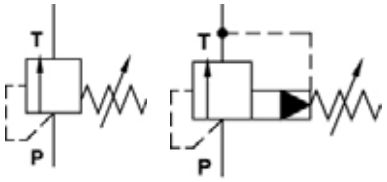
- For independent fitting into a block.
- Two pressure setting ranges.

RT-4, RT-6, RT-10

Operation

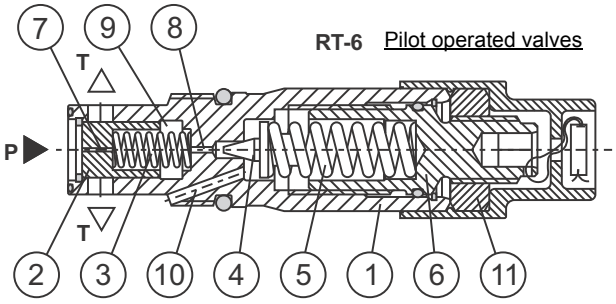
Pilot operated pressure relief valves type RT are used for maintaining and limiting the pressure in a hydraulic system.
These valves consist of a housing of cartridge design (1), main spool insert (2) with a spring (3), pilot poppet (4), spring (5) and pressure setting element (6).
The P-line of this pressure relief valve is connected with the hydraulic system. The hydraulic medium pressure acts on the front side of the main spool insert. The bores (7,8) permit the introduction of pilot oil into the pressure chamber (9) and the application of pressure to the opposite side of the main spool insert and the front side of the pilot poppet. The pressure balance in the system and pressure chamber holds this pressure relief valve in closed position till the pressure in system exceeds this value the pilot poppet moves off the valve seat, freeing the pilot oil discharge through the bore (10). A pressure drop in the pressure chamber rises the main spool insert, thus clearing the hydraulic medium flow way in the direction from P towards port T.
Loosening of the pressure setting element (6) is prevented by a counternut (11).

Hydraulic symbol

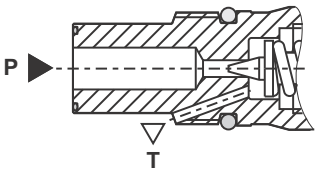


RT-4 RT-6, RT-10

RT-6 Pilot operated valves



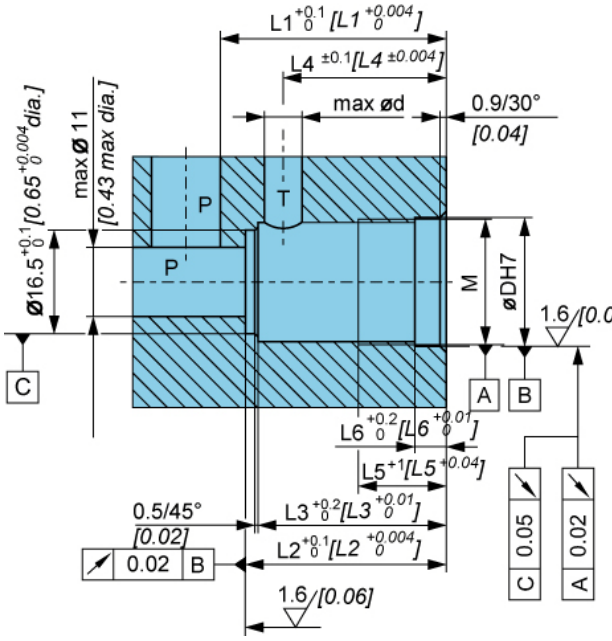
RT-4 Direct operated valves

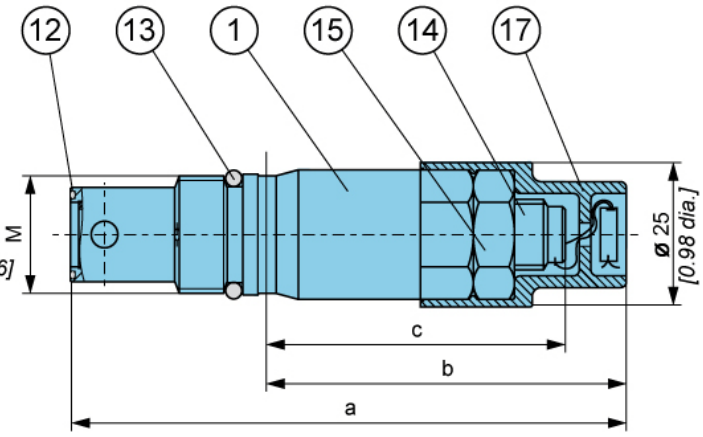


Features

Size		4	6	10
Flow rate	L/min *[GPM]*	4 *[1.1]*	60 *[15.8]*	100 *[26.4]*
Pressure setting range	bar *[PSI]*	315 *[4 568]*		
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to + 158]*		
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69.5 to + 1,760]*		
Filtration	NAS 1638	8		
Mass	kg *[lb]*	0,15 *[0.33]*		0,18 *[0.40]*

Dimensions





1. Housing.
12. O-ring 13x1.
13. O-ring, size 4,6 16.3x2,4.
size 10 20x2,5.
14. Pressure setting element.
15. Counternut.
17. PE cover.

Tightening torque for fixing Md=30 Nm.

The value set on the pressure setting element is protected by means of a lead stamp Ø11 and a wire Ø1,1 mm.

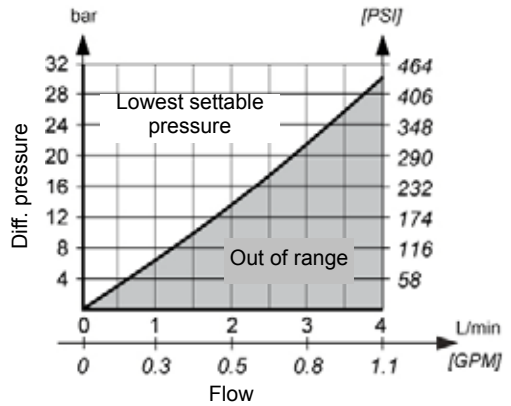
Note: Ports P and T can be located optionally at any place on the circumference.

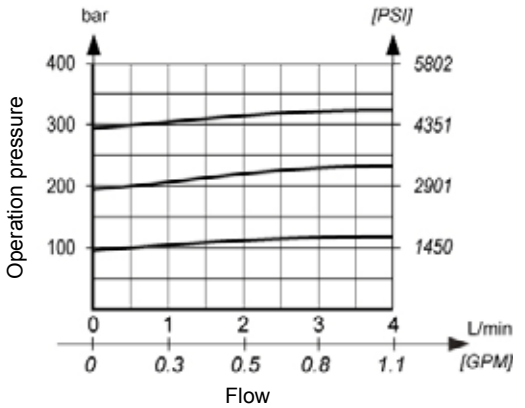
Size	a	b	c	d	D	L1	L2	L3	L4	L5	L6	M
4, 6	96 *[3.78]*	64 *[2.52]*	53 *[2.09]*	6 *[0.24]*	20,5 *[0.81]*	36 *[1.42]*	32 *[1.26]*	30 *[1.18]*	26 *[1.02]*	14 *[0.55]*	4,8 *[0.19]*	M20x1
10	97 *[3.82]*	61 *[2.40]*	50 *[1.97]*	10,5 *[0.41]*	24,5 *[0.96]*	40 *[1.57]*	36 *[1.42]*	34 *[1.34]*	29,7 *[1.17]*	15 *[0.59]*	5,2 *[0.20]*	M24x1

ΔP-Q Performance curves

Measured at 50°C *[122°F]* and viscosity of 32 mm²/s *[148 SUS]*.

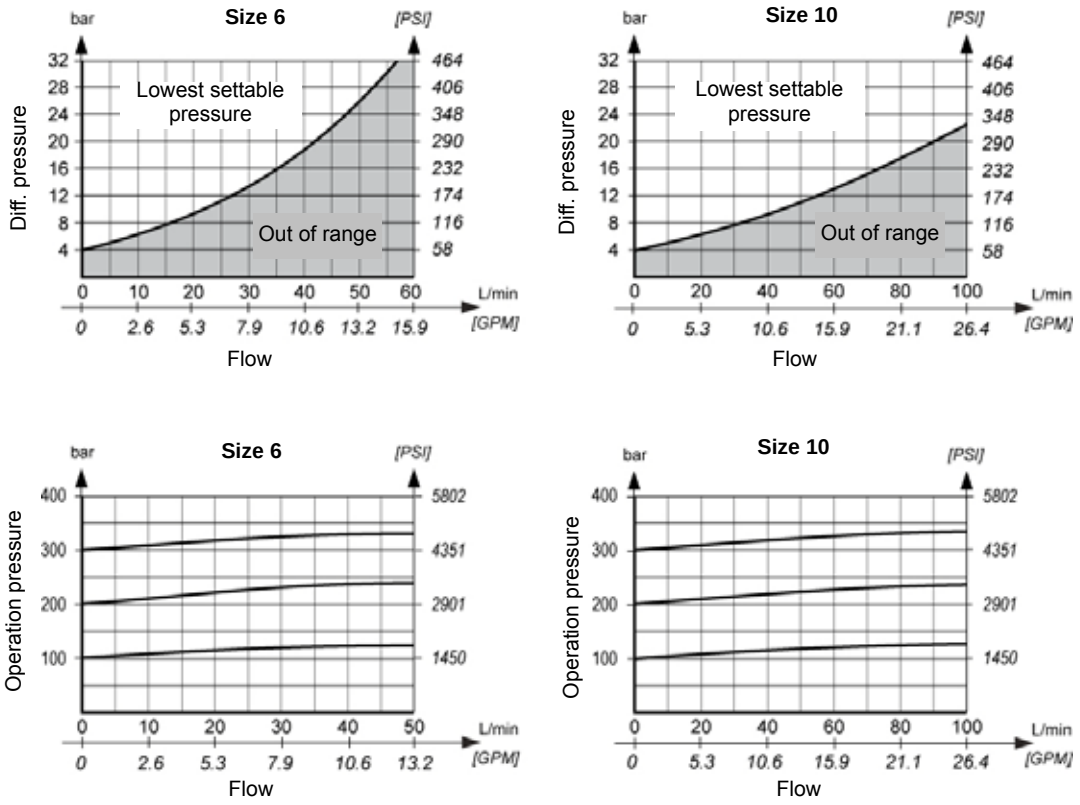
Size 4



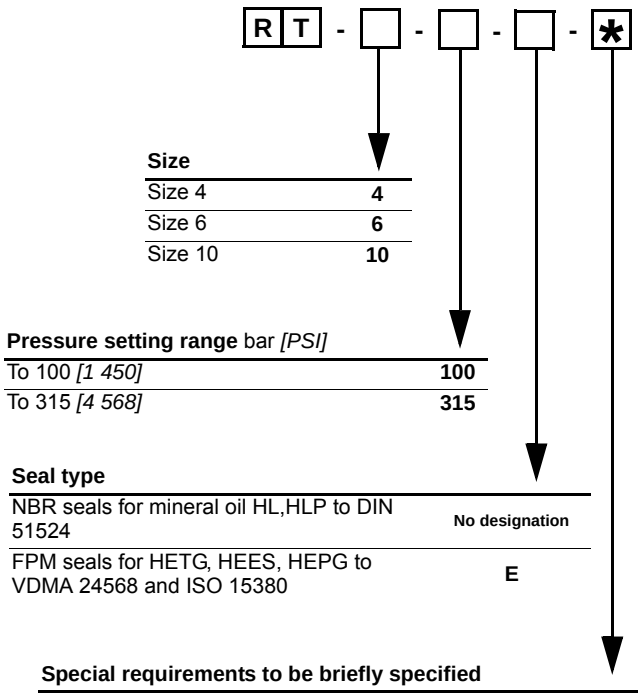


ΔP-Q Performance curves

Measured at 50°C *[122°F]* and viscosity of 32 mm²/s *[148 SUS]*.



Model code



PRESSURE RELIEF VALVE VP-RT

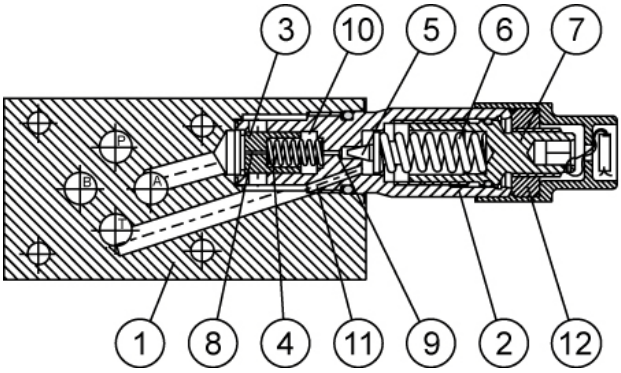
- NG 6, 10
- Up to 315 bar *[4 568 PSI]*
- Up to 100 l/min *[26.4 GPM]*

- Connecting dimensions to ISO 4401.
- For vertical stacking - sandwich plate design.
- Two pressure setting ranges.

VP-RT-10, VP-RT-6

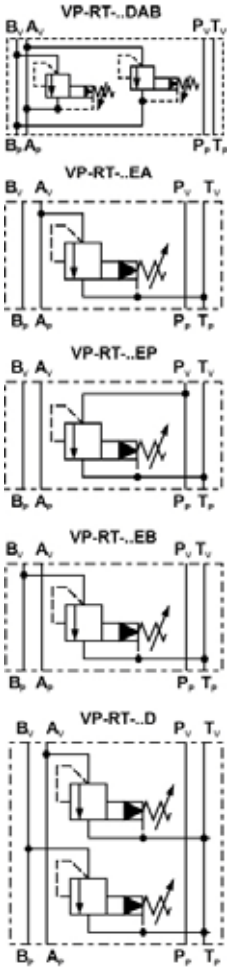
Operation

These valves consist of a stack plate (1), pressure relief valve housing (2), main spool insert (3) with a spring (4), pilot poppet (5), spring (6) and pressure setting element (7). The P-line of this pressure relief valve is connected with the hydraulic system. The hydraulic medium pressure acts on the front side of the main spool insert (3). The bores (8,9) permit the introduction of pilot oil into the pressure chamber (10) and the application of pressure to the opposite side of the main spool insert.
This pressure relief valve remains in closed position till the system pressure exceeds the valve set at the spring (6). A pressure rise in the system above the value set by the pressure setting element (7), provokes the movement of the pilot poppet (5) of the seat, freeing the pilot oil discharge through the bores (9) and (11). A pressure drop in the pressure chamber (10) rises the main spool insert (3), thus clearing the hydraulic medium flow in the direction from port P towards port T.
Loosening of the pressure setting element is prevented by a counternut (12).



Pilot operated pressure relief valves type VP-RT of sandwich plate design, for vertical stacking, are used for maintaining and limiting the maximum pressure in a hydraulic system.

Hydraulic symbol

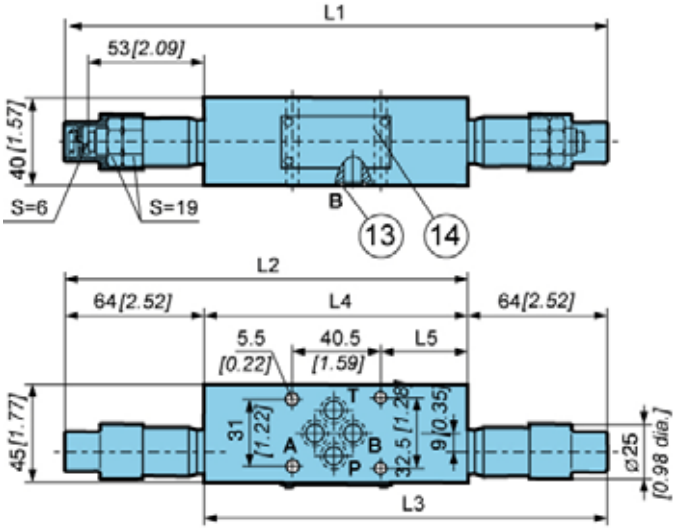


Features

Size		6	10
Flow rate	L/min *[GPM]*	50 *[13.2]*	100 *[26.4]*
Pressure setting range	bar *[PSI]*	315 *[4 568]*	
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to + +158]*	
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69.5 to + 1,760]*	
Filtration	NAS 1638	8	
Mass	kg *[lb]*	1,2 *[2,64]* - 1,7 *[3,75]* (D)	2,6 *[5.73]*

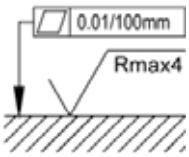
Dimensions

VP-RT-6



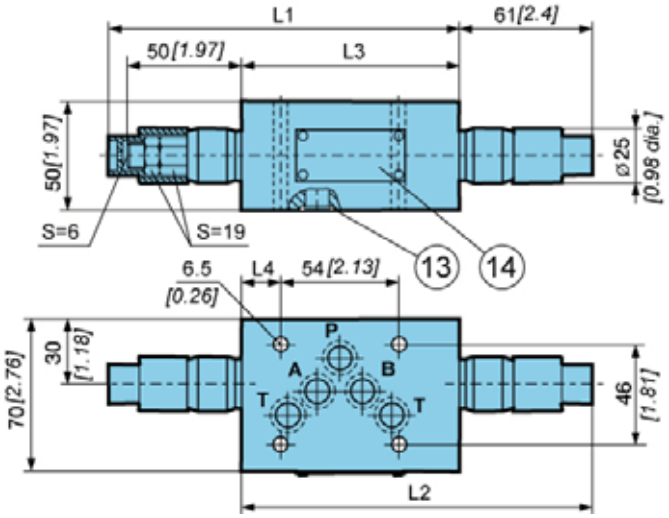
13. O-ring, Size 6: 9,25x1,78
    Size 10: 12x2.
14. Nameplate

The value set on the pressure setting element is protected by means of a lead stamp Ø11 *[0.43 dia.]* and a wire Ø1,1 *[0.04 dia.]*.



Required quality of the mating surface

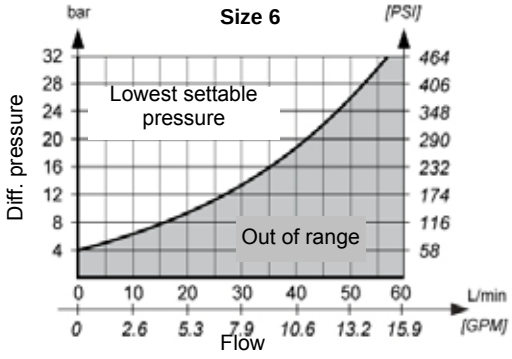
VP-RT-10

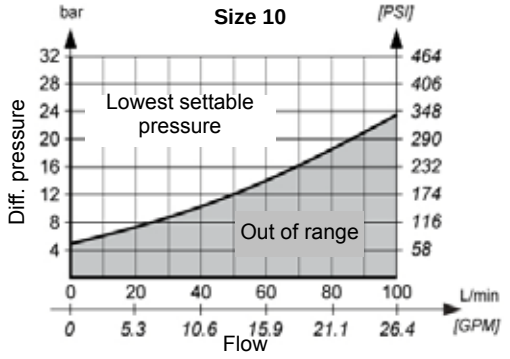


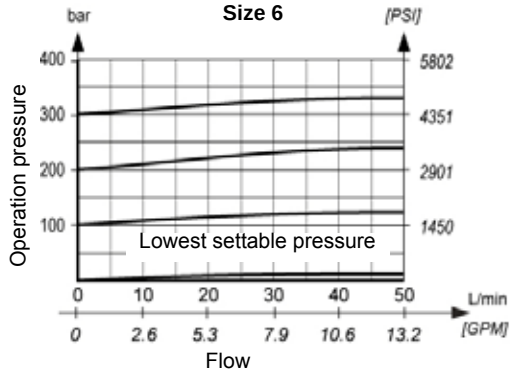
Size	L1	L2	L3	L4	L5
VP-RT-6-EA	-	154 *[6.06]*	-	90 *[3.54]*	9 *[0.35]*
VP-RT-6-EB	-	-	154 *[6.06]*		40,5 *[1.59]*
VP-RT-6-EP	-	-			
VP-RT-6-D	249 *[9.80]*	-	-	121 *[4.76]*	40 *[1.57]*
VP-RT-6-DAB	245 *[9.64]*	-	-	116,5 *[4.59]*	38 *[1.50]*
VP-RT-10-EP	156 *[6.14]*	-	95,5 *[3.76]*	28,5 *[1.12]*	-
VP-RT-10-EA	161 *[6.34]*	-	100,5 *[3.96]*		-
VP-RT-10-EB	-	161 *[6.34]*		18 *[0.71]*	-

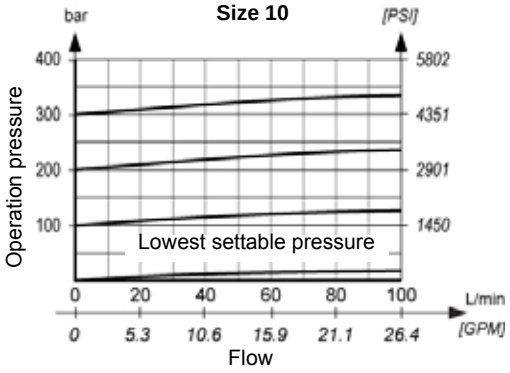
ΔP-Q Performance curves

Measured at 50°C *[122°F]* and viscosity of 32 mm²/s *[148 SUS]*.









Model code

V P - R T - ☐ - ☐ - ☐ - ☐ - *

Size

Size 6	**6**
Size 10	**10**

Relief function from ⟶ to

A ⟶ T	**EA**
B ⟶T	**EB**
P ⟶ T	**EP**
A ⟶ T and B ⟶T (only for size 6)	**D**
A ⟶ B and B ⟶A (only for size 6)	**DBA**

Pressure setting range bar *[PSI]*

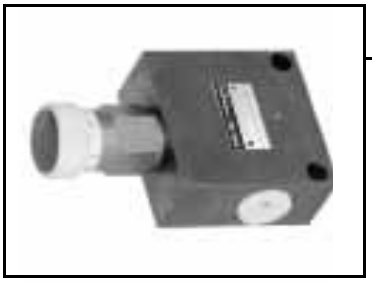
100 *[1 450]*	**100**
315 *[4 568]*	**315**

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

FLOW CONTROL VALVES



THROTTLE WITH CHECK VALVE VP-NDV

- NG 6, 10
- Up to 350 bar *[5 076 PSI]*
- Up to 100 L/min *[26.4 GPM]*

- Connecting dimensions to ISO 4401.
- For flow control in both service lines.
- For throttling in supply - and return lines.
- For vertical stacking - sandwich plate design.
- Height and width of the valves to ISO 7790 norms.

VP-NDV-10-.., VP-NDV-6-..

Operation

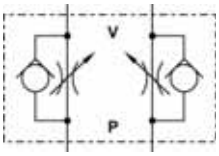
Throttle with check valves type VP-NDV are used for throttling the pilot and main flow of the hydraulic fluid in the line A and B.

These valves consist of two throttling spools with setting screws and two check valves which are built in a housing.

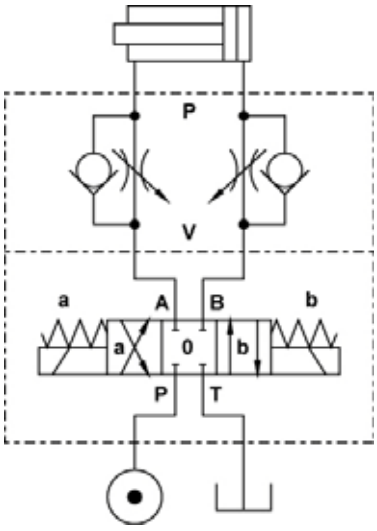
In direction V to P (see the hydraulic symbol) flows the hydraulic fluid with low pressure loss through the check valve.

In direction P to V is the hydraulic fluid flow throttled depending on adjustment of the throttling spool.

Hydraulic symbol



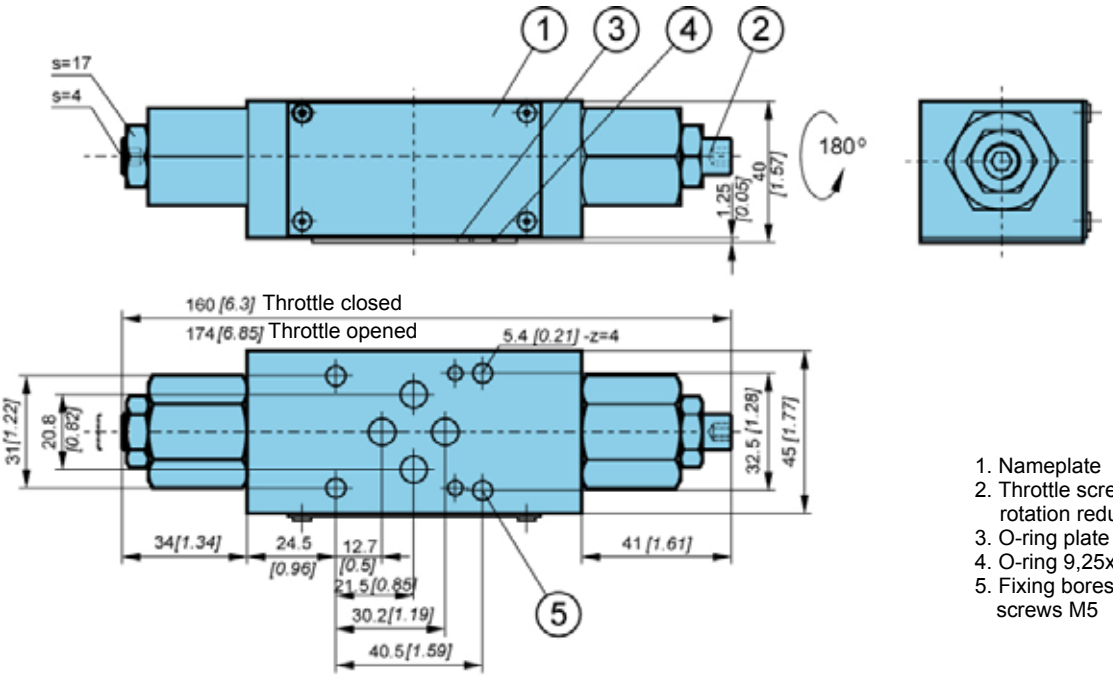
Mounting example



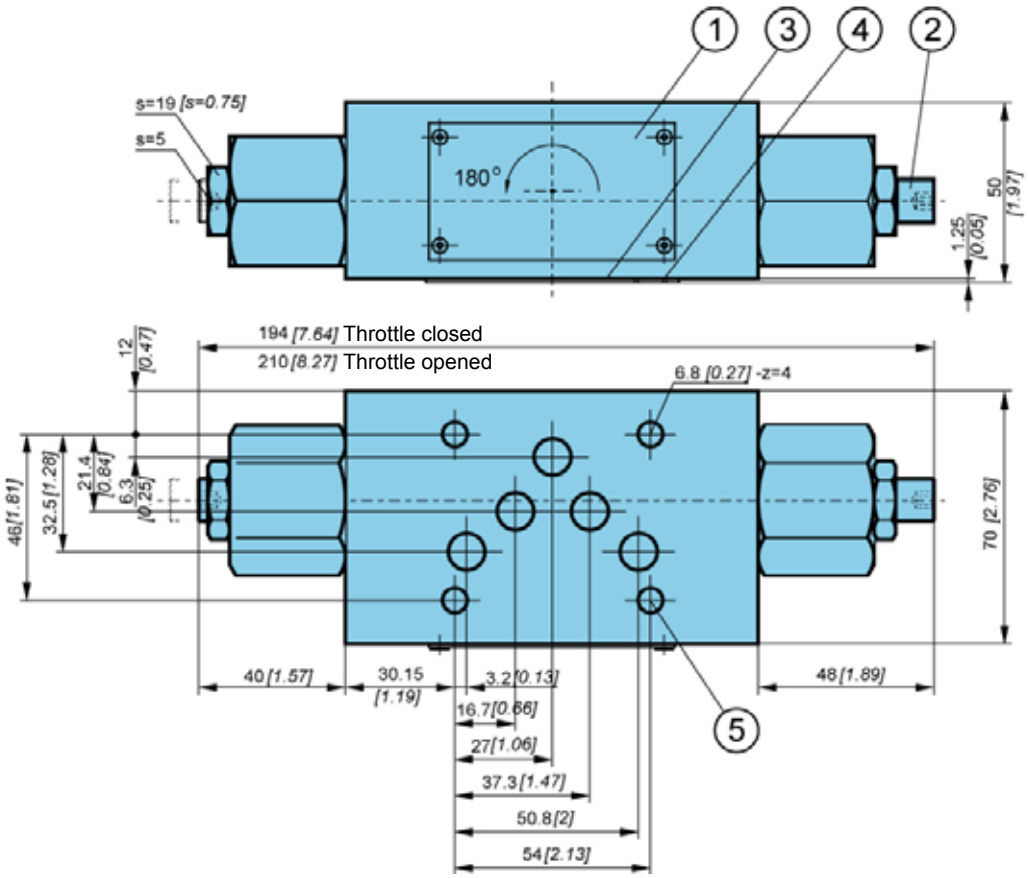
Features

Size		6	10
Flow rate	L/min *[GPM]*	60 *[15.8]*	100 *[26.4]*
Operating pressure	bar *[PSI]*	350 *[5 076]*	
Cracking pressure	bar *[PSI]*	0,4 *[5.8]*	
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*	
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69.5 to 1760]*	
Filtration	NAS 1638	8	
Mass	kg *[lb]*	1,45 *[3.20]*	3,3 *[7.28]*

Dimensions



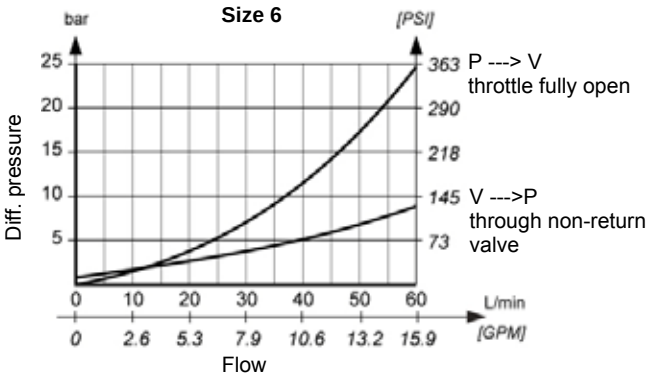
1. Nameplate
2. Throttle screw (clockwise rotation reduces the flow)
3. O-ring plate
4. O-ring 9,25x1,78-4 pcs
5. Fixing bores for fixing screws M5

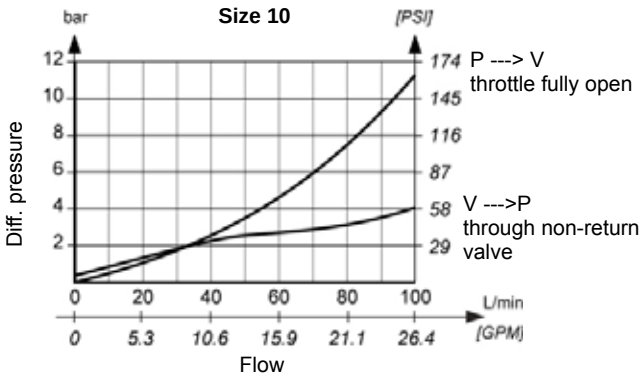


Assembly instructions

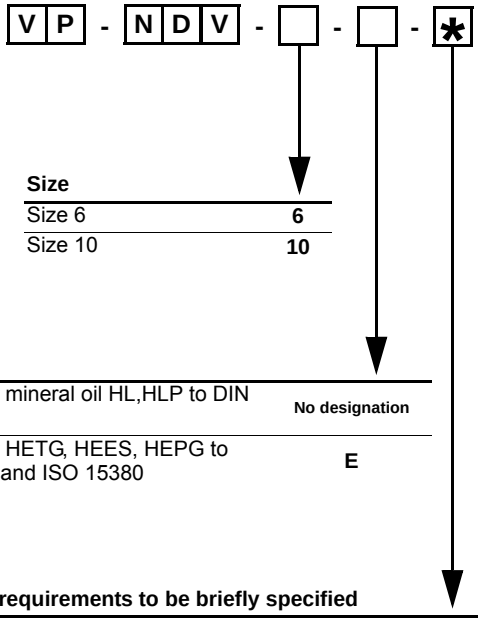
Throttle/check valves type VP-NDV are designed for vertikal stacking. With these valves there can be throttling of the hydraulic fluid flow in return line or supply line achieved. Direction of throttling can be selected by turning the installation position of the valve i.e. valves size 6 turning 180° around the longitudial axis; valves size 10 turning 180° around the lateral axis (see drawing above). The O-ring plate is always mounted on the subplate side.

ΔP-Q Performance curves





Model code



FLOW CONTROL VALVE TVTC

- NG 6
- Up to 350 bar *[5076 PSI]*
- Up to 50 L/min *[13.21 GPM]*

- Three-way pressure compensator.
- Operating element: rotary knob.
- Without built - in relief valve and non return valve.
- With built - in relief valve.
- With built-in non return valve.
- Threaded connections to ISO 1179 (BSPP/Gas), ISO 11926 (UNF).

TVTC-..

Operation

3-way compensated flow control valve enables setting of constant fluid flow on port A irrespective of the pressure variations.
The excessive flow rate is discharged to port B and can be used as a secondary working port or return port to a tank.

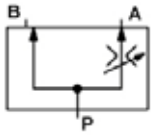
Whether the pressure in secondary circuit is higher than the regulated pressure the valve works as two-way regulator.

A pressure relief valve in valve type TVTC-..-VV limits the pressure in port A on the set valve. The excessive flow rate is discharged over port R to a tank.

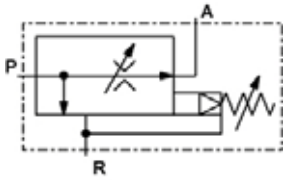
The non return valve in valve type TVTC -..-NV provides a free flow of the hydraulic fluid in the direction from A to P.

Hydraulic symbol

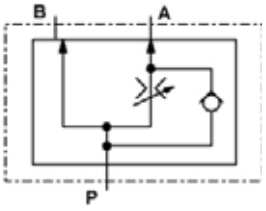
TVTC-..



TVTC-..-VV



TVTC-..-NV



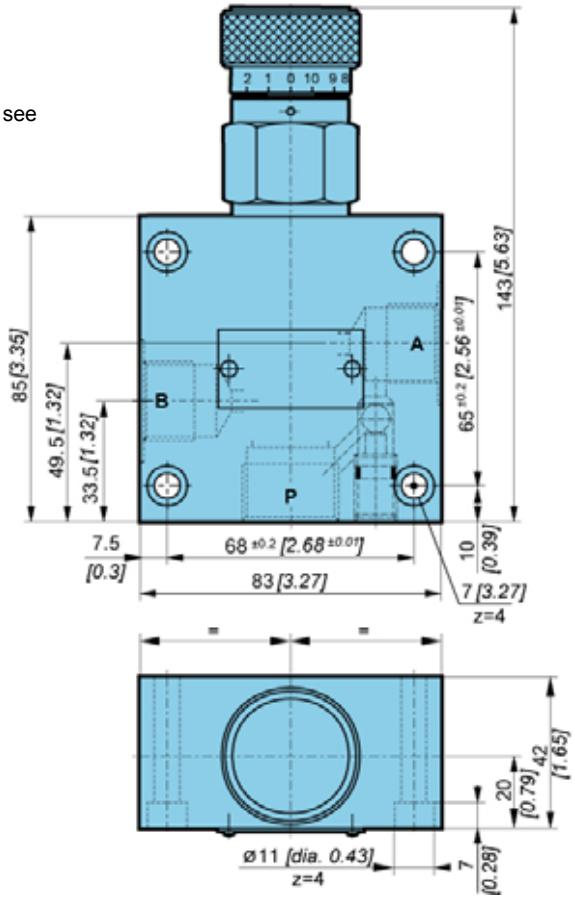
Features

Type			TVTC-12-...	TVTC-25-...	TVTC-50-...
Flow rate A	L/min *[GPM]*		1 to 12 *[0.26 to 13.17]*	1 to 25 *[0.26 to 6.60]*	1 to 50 *[0.26 to 13.21]*
Max. flow rate A	L/min *[GPM]*		32 *[8.45]*	65 *[17.17]*	
Operating pressure	bar *[PSI]*		5 to 350 *[72.52 to 5076.32]*		
Differential pressure	bar *[PSI]*		5,5 *[79.77]*		
Cracking pressure for non return valve	bar *[PSI]*		0,5 *[7.25]*		
Flow stability (5 to 350 Bar)	%		±5 (Q)		
Oil temperature range	°C *[°F]*		-20 to +70 *[-4 to +158]*		
Viscosity range	mm^2/s *[SUS]*		15 to 380 *[69.5 to 1760]*		
Filtration	NAS 1638		8		
Mass	kg *[lb]*	TVTC	2 *[4.41]*		
		TVTC-..-NV			
		TVTC-..-VV	3 *[6.61]*		

Dimensions

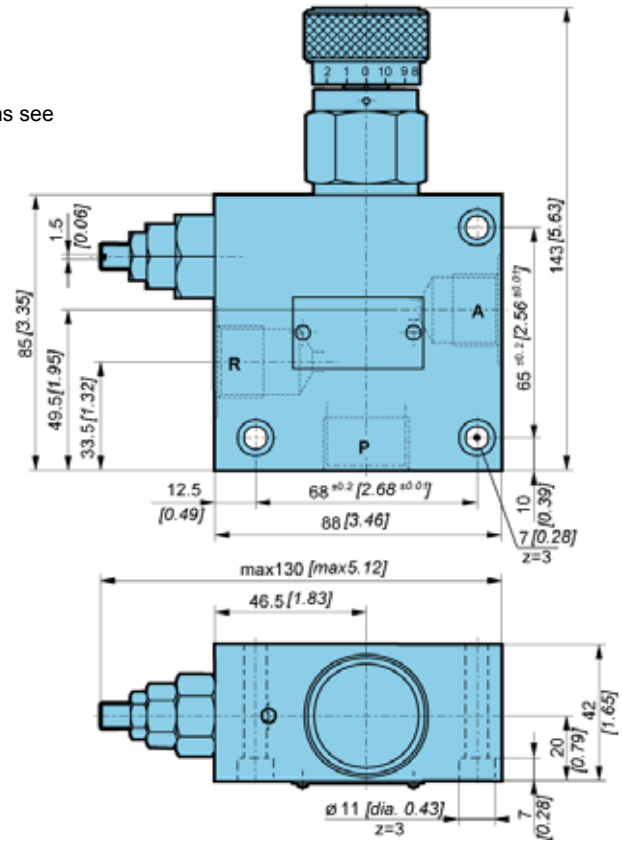
TVTC..; TVTC-..-NV

Threaded connections see Model code

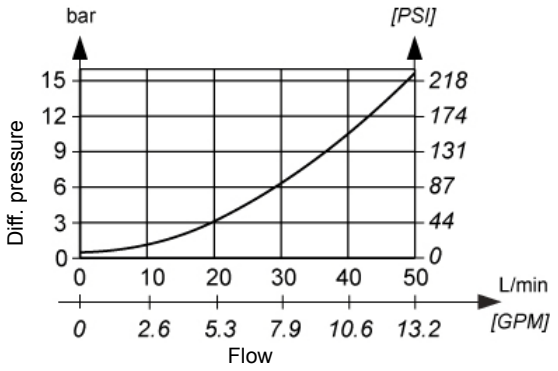


TVTC-..-VV

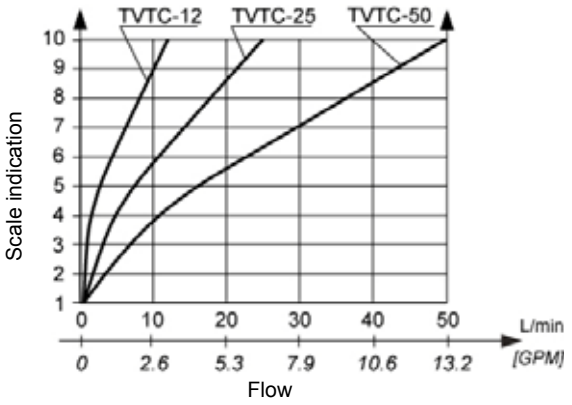
Threaded connections see Model code



ΔP-Q Performance curve for non return valve



Flow rate as a function of scale indication



Model code

T V T C - ☐ - ☐ - ☐ - ☐ - ☐ - ✱

Flow rate L/min *[GPM]*

1 to 50 *[0.26 to 13.21]*	**50**
1 to 25 *[0.26 to 6.60]*	**25**
1 to 12 *[0.26 to 3.17]*	**12**

Pressure relief valve or non return valve bar *[PSI]*

Without relief valve	**No designation**
With relief valve 4 to 175 *[58 to 2538]*	**VV17**
With relief valve 10 to 350 *[145 to 5076]*	**VV35**
With non return valve	**NV**

Threaded connections A, B, R

G1/2	**1/2**
7/8-14 UNF-2B	**SAE 10**

Threaded connection P

G3/4	**3/4**
1 1/16-12 UNF-2B	**SAE 12**

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

FLOW CONTROL VALVE TVTP-...-B-...

- NG 6, 10
- Up to 350 bar *[5076 PSI]*
- Up to 150 L/min *[39.63 GPM]*

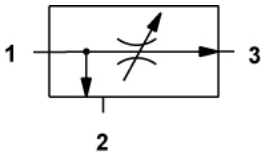
- Three-way pressure compensated.
- Operating element: rotary knob.
- For independent fitting into a block.
- For independent mounting (when assembled with connection block P-TVTP).

TVTP-...-B-...

Operation

TVTP three-way flow regulators are used to regulate the priority flow in outlet 3 to a maximum adjustable level largely independent of the load and pressure conditions. The surplus flow is diverted to the bypass port 2. The bypass flow may be used for a secondary circuit. Whether the pressure in secondary circuit is higher than the regulated pressure the valve works as two-way regulator.

Hydraulic symbol

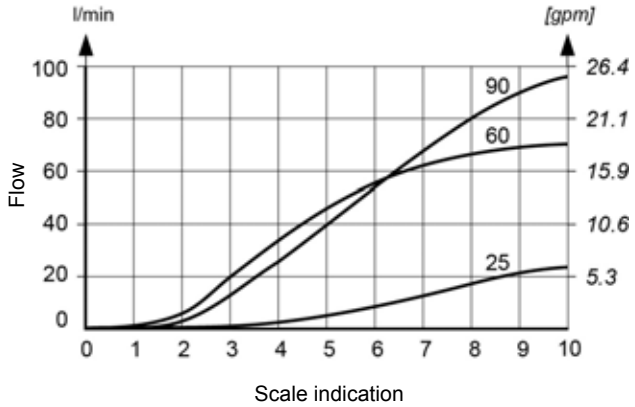


Features

Type		TVTP-25-B	TVTP-60-B	TVTP-90-B
Rated flow 3	L/min *[GPM]*	25 *[6.60]*	60 *[15.85]*	90 *[23.78]*
Flow rate 1 max.	L/min *[GPM]*	60 *[15.85]*	90 *[23.78]*	150 *[39.63]*
Operating pressure max.	bar *[PSI]*	350 *[5076]*		
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*		
Viscosity range	mm^2/s *[SUS]*	15 bis to 380 *[69.5 to 1760]*		
Filtration	NAS 1638	8		
Mass	kg *[lb]*	0,6 *[1.32]*		1 *[2.20]*

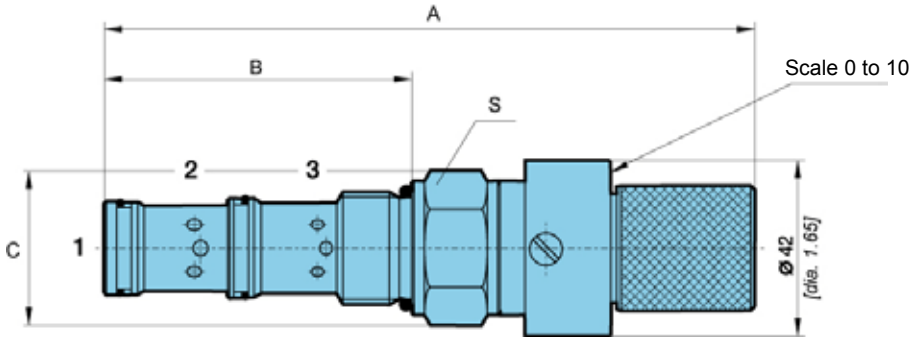
Flow rate as a function of scale indication

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



Dimensions

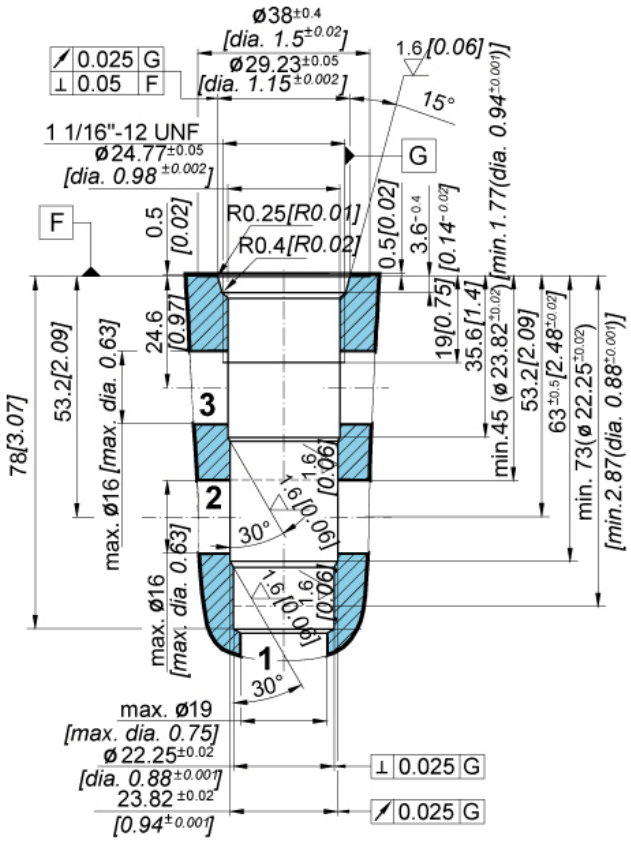
TVTP-...-B-...



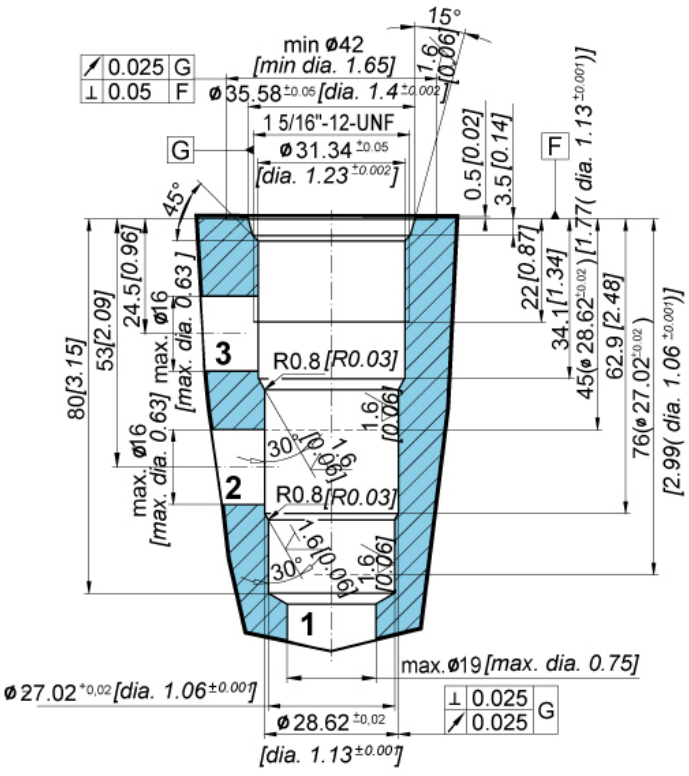
Typ	A mm *[Zoll]*	B mm *[Zoll]*	C mm *[Zoll]*	S	Torque into Cavity Nm *[in.lbf]*
TVTP-25-B	155 *[6,10]*	73,5 *[2,83]*	37 *[1,46]*	S32	60 - 65 *[531 - 575]*
TVTP-60-B					
TVTP-90-B	176 *[6,93]*	75 *[2,95]*	46 *[1,81]*	S41	70 - 75 *[619 - 664]*

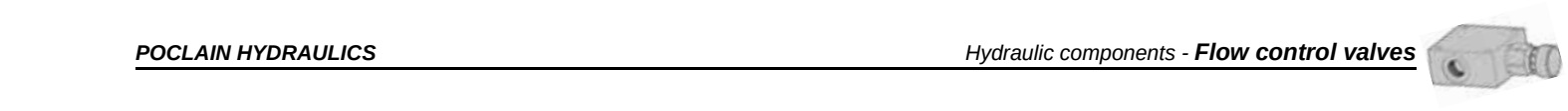
Dimensions of cavity

TVTP-25, TVTP-60

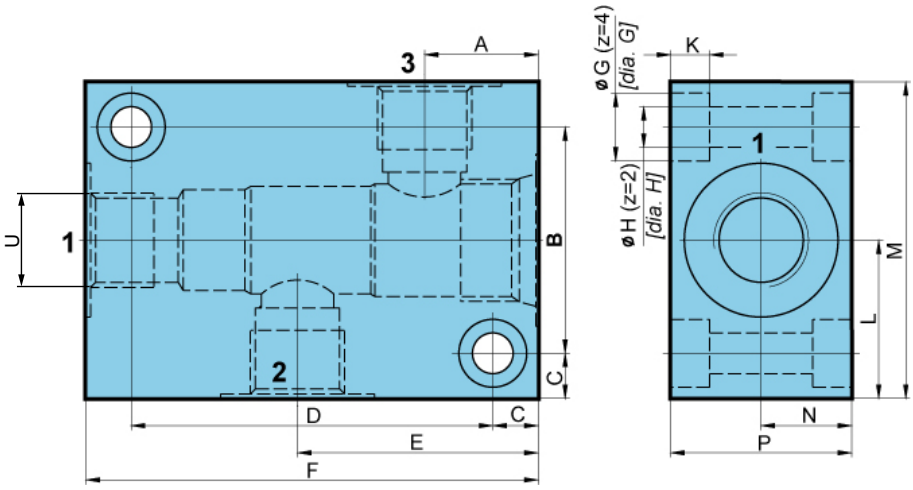


TVTP-90





Standard ported body - steel



	P-TVTP-50* mm *[Zoll]*	P-TVTP-90** mm *[Zoll]*
A	25,1 *[0,99]*	25 *[0,98]*
B	50 *[1,97]*	65 *[2,56]*
C	10 *[0,40]*	15 *[0,59]*
D	80 *[3,15]*	80 *[3,15]*
E	53,2 *[2,10]*	53,5 *[2,11]*
F	100 *[3,94]*	110 *[4,33]*
G	15 *[0,59]*	17 *[0,67]*
H	9 *[0,35]*	11 *[0,43]*
K	8,6 *[0,34]*	10,6 *[0,42]*
L	35 *[1,37]*	47,5 *[1,87]*
M	70 *[2,75]*	95 *[3,74]*
N	20 *[0,78]*	26 *[1,02]*
P	40 *[1,57]*	52 *[2,05]*
U	G 1/2	G 1

Threaded connections to ISO 1179-1.

Model code

P - T V T P - ☐

Size	
For TVTP-25-B; TVTP-50-B	**50**
For TVTP-90-B	**90**

*used for TVTP-25 and TVTP-60
** used for TVP-90

Model code

T V T P - ☐ - B - ☐ - ✱

Flow rate L/min *[GPM]*	
25 *[6.6]*	**25**
50 *[13.2]*	**60**
90 *[23.8]*	**90**

Operating element	
Rotary knob	**B**
Inner hexapanel key	**S**

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

FLOW CONTROL VALVE TVTP-...-P-...

- NG 6, 10
- Up to 210 bar *[3046 PSI]*
- Up to 150 L/min *[39.6 GPM]*

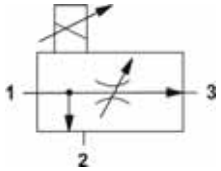
- Three-way pressure compensated.
- Operating element: proportional solenoid.
- Control electronics: Amplifier P/N: 1659574.
- For independent fitting into a block.
- For independent mounting (when assembled with connection block P-TVTP).
- Plug-in connector for solenoids to ISO 4400.
- Protection of solenoid IP 54 to EN 60529 / IEC 60529 (IP 65 on request).

TVTP-...-P-...

Operation

TVTP three-way flow regulators are used to regulate the priority flow in outlet 3 to a maximum adjustable level largely independent of the load and pressure conditions. The surplus flow is diverted to the bypass port 2. The bypass flow may be used for a secondary circuit.
Whether the pressure in secondary circuit is higher than the regulated pressure the valve works as two-way regulator.

Hydraulic symbol

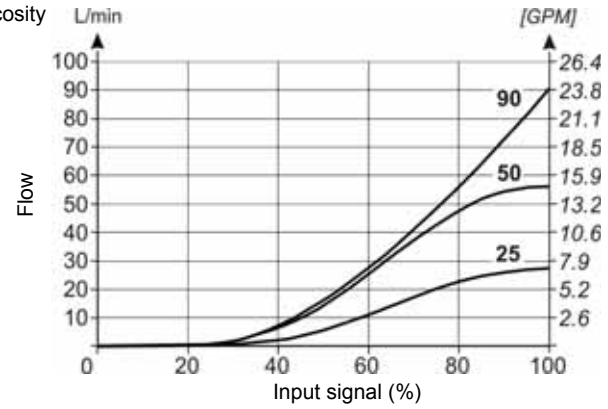


Features

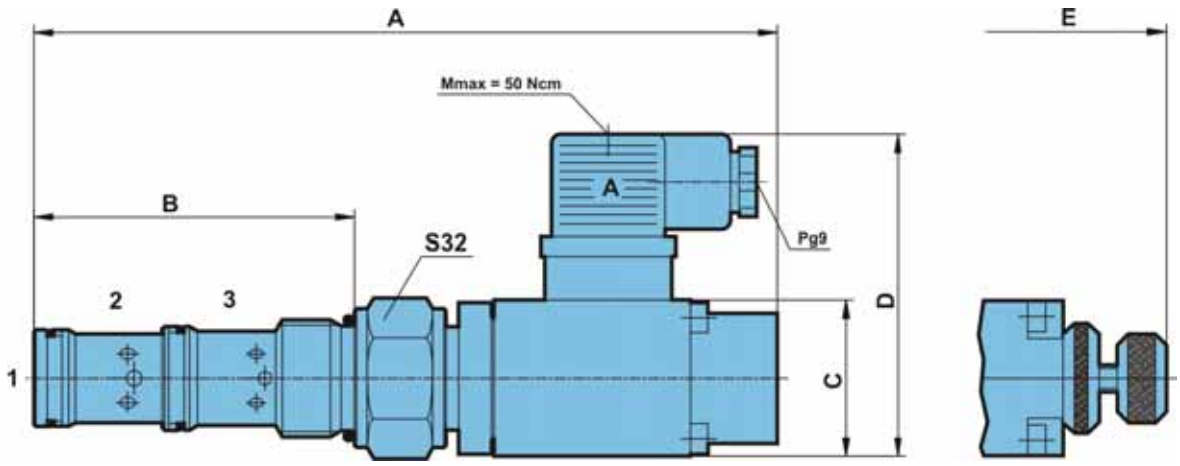
Type		TVTP-25	TVTP-50	TVTP-90
Rated flow 3	L/min *[GPM]*	25 *[6.6]*	50 *[13.2]*	90 *[23.8]*
Flow rate 1 max.	L/min *[GPM]*	60 *[15.9]*	90 *[23.8]*	150 *[39.6]*
Operating pressure max.	bar *[PSI]*	210 *[3 456]*		
Hysteresis	%	<5		
Flow constant according to load pressure	%	<±2		
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*		
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69.5 to 1 761]*		
Filtration	NAS 1638	7		
Mass	kg *[lb]*	1 *[2.2]* (TVTP-..)		1,6 *[3.5]* (TVTP-..)
		1,2 *[2.6]* (TVTP-..G)		2 *[4.4]* (TVTP-..G)
Power	W	17,4		20,8
Voltage	V	12 and 24 DC		
Rated current at 12 V	A	1,25		1,79
Rated current at 24 V	A	0,68		0,81
Coil resistance at 12 V; 20 °C *[68 °F]*	Ohm	7,2		4,3
Coil resistance at 24 V; 20 °C *[68 °F]*	Ohm	24,6		21
Rating ED	%	100		

Solenoid current / flow curves

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



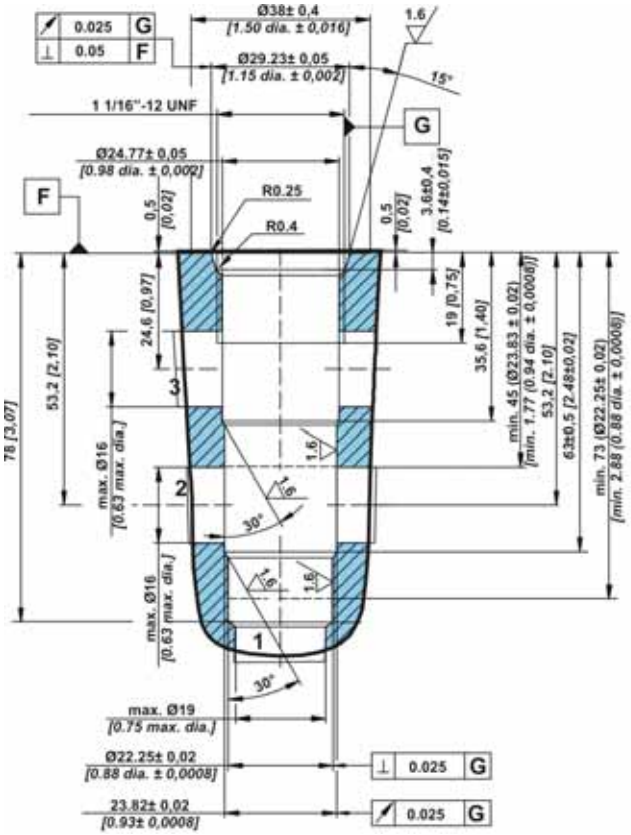
Dimensions



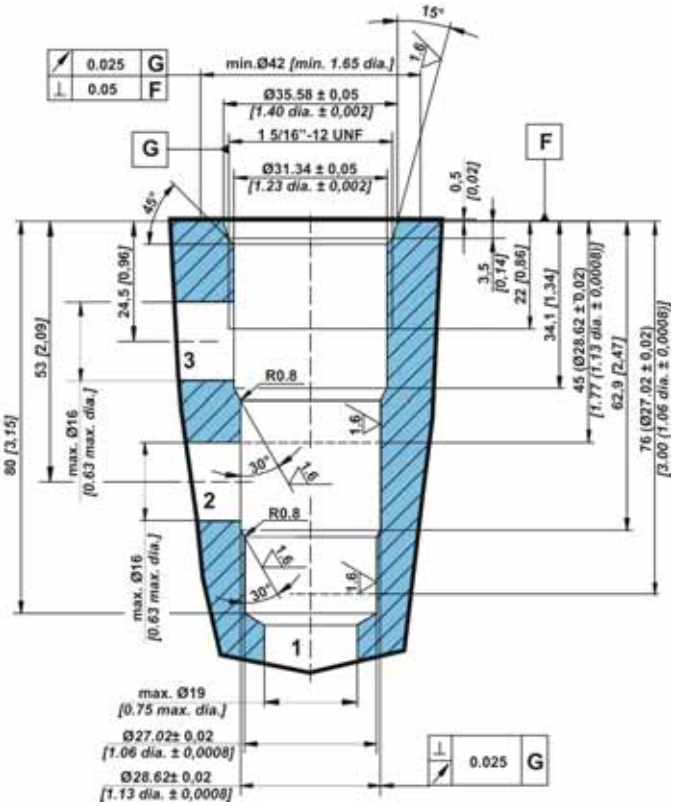
	A mm *[Zoll]*	B mm *[Zoll]*	C mm *[Zoll]*	D mm *[Zoll]*	E mm *[Zoll]*	S	Torque into cavity Nm *[in.lbf]*
TVTP-25-P	170 *[6,7]*	73,5 *[2,9]*	35 *[1,4]*	74 *[2,9]*	210 *[8,3]*	S32	60-65 *[531-575]*
TVTP-50-P							
TVTP-90-P	198 *[7,8]*	75 *[3,0]*	45 *[1,8]*	84 *[3,3]*	244 *[9,6]*	S41	70-75 *[619-664]*

Dimensions of cavity

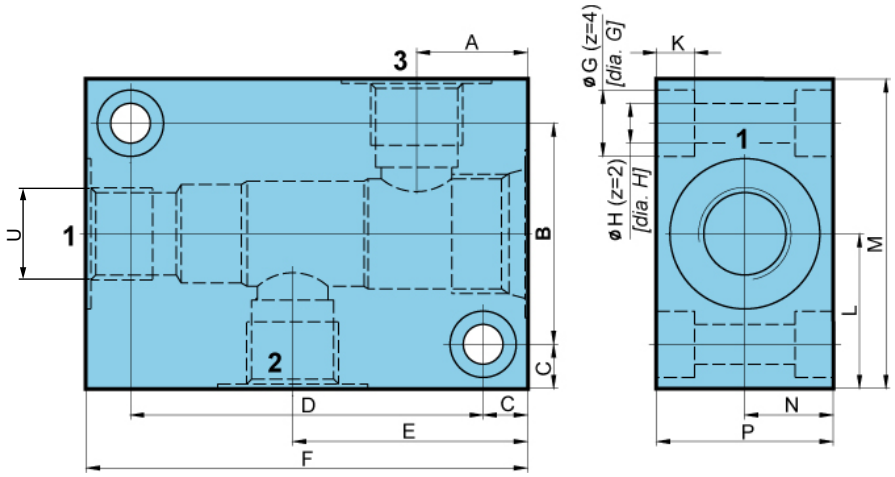
TVTP-25 and50



TVTP-90



Standard ported body - steel



	P-TVTP-50 mm *[Zoll]*	P-TVTP-90 mm *[Zoll]*
A	25,1 *[0,99]*	25 *[0,98]*
B	50 *[1,97]*	65 *[2,56]*
C	10 *[0,40]*	15 *[0,59]*
D	80 *[3,15]*	80 *[3,15]*
E	53,2 *[2,10]*	53,5 *[2,11]*
F	100 *[3,94]*	110 *[4,33]*
G	15 *[0,59]*	17 *[0,67]*
H	9 *[0,35]*	11 *[0,43]*
K	8,6 *[0,34]*	10,6 *[0,42]*
L	35 *[1,37]*	47,5 *[1,87]*
M	70 *[2,75]*	95 *[3,74]*
N	20 *[0,78]*	26 *[1,02]*
P	40 *[1,57]*	52 *[2,05]*
U	G 1/2	G 1

Threaded connections to ISO 1179-1.

Model code

P - T V T P - □

Size	
For TVTP-25-P; TVTP-50-P	**50**
For TVTP-90-P	**90**

Model code

T V T P - □ - P - □ - □ - □ - ✱

Flow rate L/min *[GPM]*	
25 *[6,6]*	**25**
50 *[13,2]*	**50**
90 *[23,8]*	**90**

Operating element	
Proportional solenoid	**P**

Supply voltage	
12 V direct voltage	**12DC**
24 V direct voltage	**24DC**

Hand operation of solenoid	
Without hand operation	**No designation**
With hand operation	**G**

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

FLOW CONTROL VALVE TVTP-...-PO-...

- NG 6
- Threaded cartridge valve
- Up to 210 bar *[3046 PSI]*
- Up to 90 L/min *[23.8 GPM]*
- Maximum regulated flow 60 L/min *[15.9 GPM]*

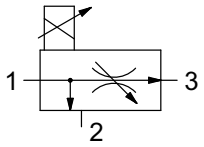
- Three-way pressure compensated
- Operating element: proportional solenoid
- Solenoid coil with terminal for connector EN 175301 or Deutsch
- Surface protection: Zn coated DIN 50979 - Fe/Zn8/Cn/T2

TVTP-...-PO-...

Operation

Pressure compensated three-way flow control valves are used to regulate the priority flow in outlet 3 to a maximum adjustable level largely independent of the load and pressure conditions.
The surplus flow is diverted to the bypass port 2.The bypass flow may be used for a secondary circuit.
Whether port 2 is plugged or the pressure in the secondary circuit is higher than the regulated pressure the valve works as two-way flow control valve.

Hydraulic symbol

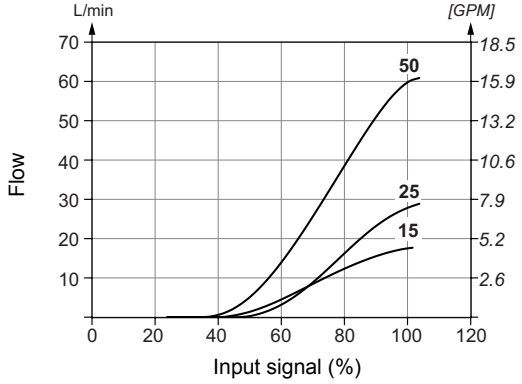


Features

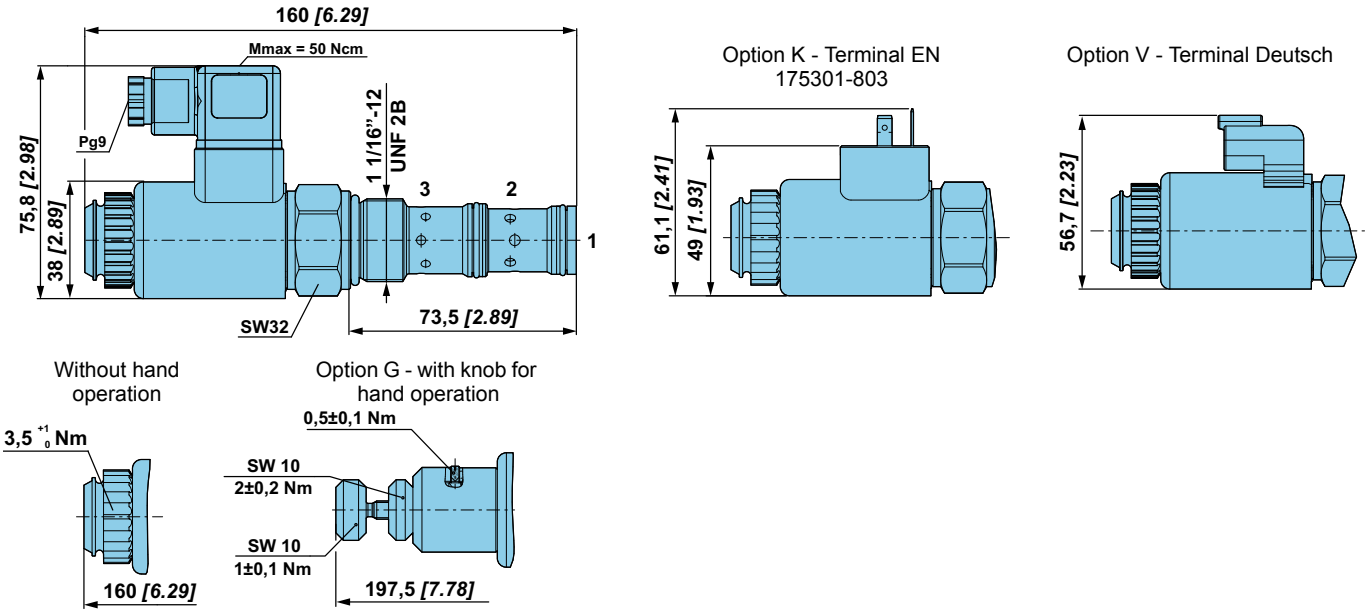
Type		TVTP-15-PO	TVTP-25-PO	TVTP-50-PO
Rated flow 3	L/min *[GPM]*	18 *[4.76]*	27 *[7.13]*	60 *[15.85]*
Flow rate 1 max.	L/min *[GPM]*	60 *[15.85]*	60 *[15.85]*	90 *[23.78]*
Operating pressure max.	bar *[PSI]*		210 *[3 456]*	
Hysteresis	%		< ±5	
Flow constant according to load pressure	%		< ±2	
Oil temperature range	°C *[°F]*		-20 to +70 *[-4 to +158]*	
Viscosity range	mm^2/s *[SUS]*		15 to 380 *[69.5 to 1 760]*	
Filtration	ISO 4406:1999		19/17/14	
Mass	kg *[lb]*		1 *[2.64]*	
Electrical				
Power	W		17,4	
Voltage	V		12 and 24 DC	
Rated current at 12 V	A		1,25	
Rated current at 24 V	A		0,68	
Coil resistance at 12 V; 20 °C *[68 °F]*	Ohm		7,1	
Coil resistance at 24 V; 20 °C *[68 °F]*	Ohm		26,0	
Recommended PWM dither frequency	Hz		100 - 140	
Duty cycle	%		100	
Protection class to EN 505/ IEC 60529	connector type: ISO 4400		IP65	
	connector type: Deutsch		IP69K	

Solenoid current / flow curves

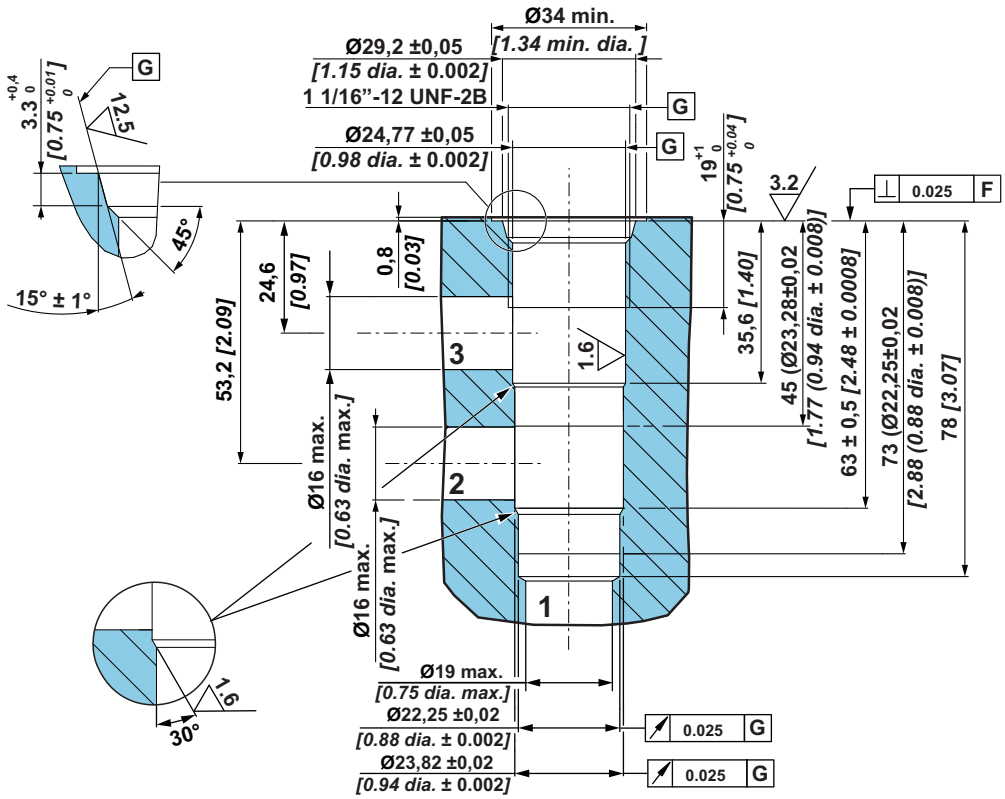
Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.



Dimensions



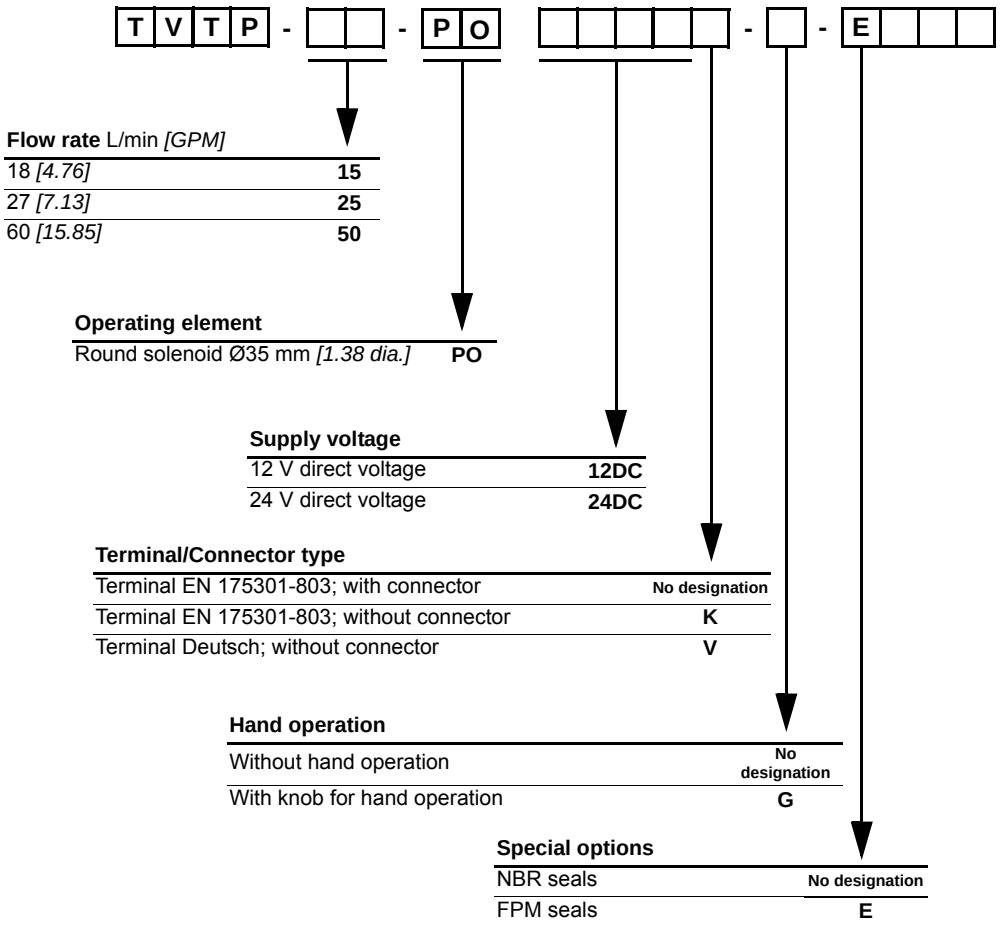
Dimensions of cavity



For independent mounting use connection block type P-TVTP-50.

Installation torque is 60 ± 5 Nm.

Model code


T V T P - - P O - E
Flow rate L/min [GPM]
18 [4.76] 15
27 [7.13] 25
60 [15.85] 50
Operating element
Round solenoid Ø35 mm [1.38 dia.] PO
Supply voltage
12 V direct voltage 12DC
24 V direct voltage 24DC
Terminal/Connector type
Terminal EN 175301-803; with connector No designation
Terminal EN 175301-803; without connector K
Terminal Deutsch; without connector V
Hand operation
Without hand operation No designation
With knob for hand operation G
Special options
NBR seals No designation
FPM seals E

FLOW DIVIDER DTP

- NG 6, 10
- Up to 350 bar *[5.076 PSI]*
- Up to 70 L/min *[18,49 GPM]*

- Dividing and combining of flow independent of pressure.
- Dividing and combining ratio: 50 %/ 50 %
- Direct in-line mounting.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).

DTP-10, DTP-6

Operation

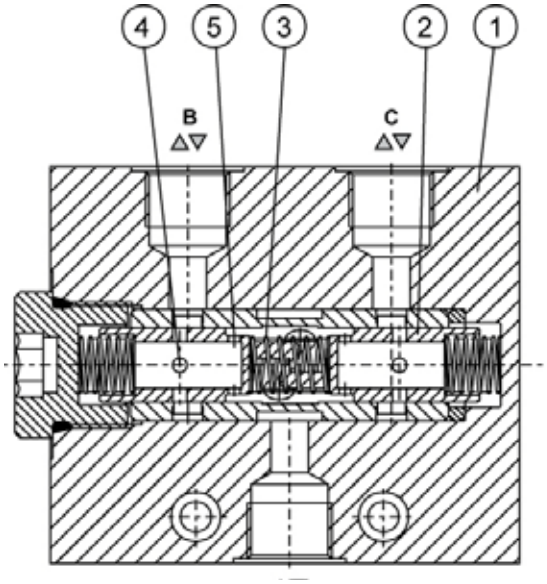
The flow divider DTP has two functions, dividing and combining of fluid flow. The regulator divides the fluid flow in the direction from A to B and C, and combines flows in the direction from B and C to A. The dividing / combining ratio is 50 % : 50 %, independent of pressure in respective pipeline,B or C.

The regulator consists of a housing (1), two dividing spools (2) and three weak springs (3).

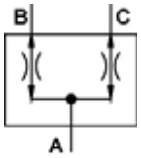
Division of flow: The fluid flow in the direction from A to B and C.
The flow in chamber A is divided and flows through the orifices (5) with constant cross-section and throttles (4) into chambers B and C. The pressure drop through the orifices (5) depends on the pressure load. The increase of flow towards one of both chambers provokes increased pressure drop through the orifices. The pressure drop generates the pressure force which shifts both spools (2). Consequently, the throttles (4) are reduced, and the pressure drop of fluid through the throttles increases. The spools keep on moving until the pressure drops through the orifices (5) are balanced. Consequently, both fluid flows are balanced, too.

Combining of flows: The oil flow in the direction from B and C to A. The operation is identical as at dividing of flow. The divider combines both flows in the ratio 50% to 50%.

.The principle of operation depends on the pressure drop, which again depends on the fluid flow. For this reason the divider functions properly only within the defined flow range. Limitation of maximal flow - rate of pressure drop, limitation of minimal pressure - dividing and combining accuracy



Hydraulic symbol

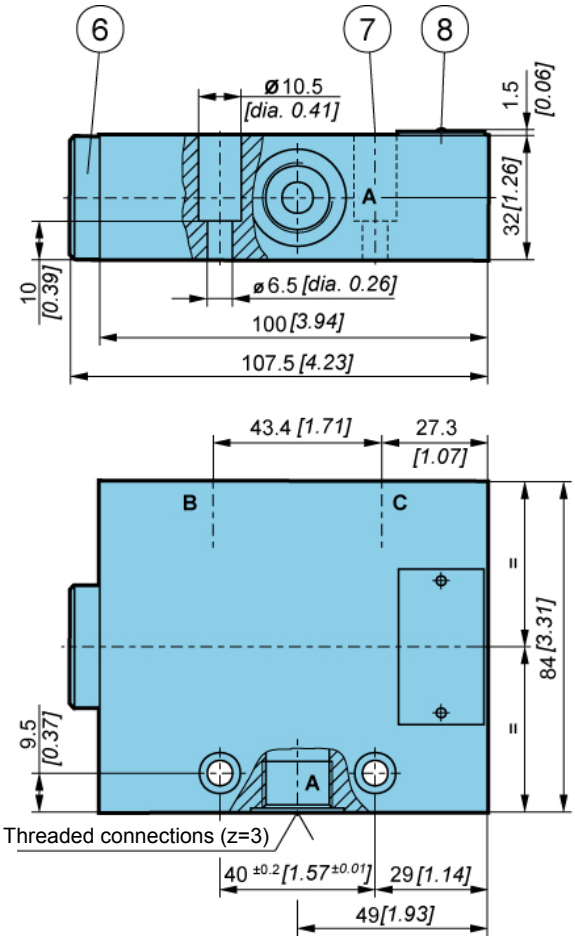


Features

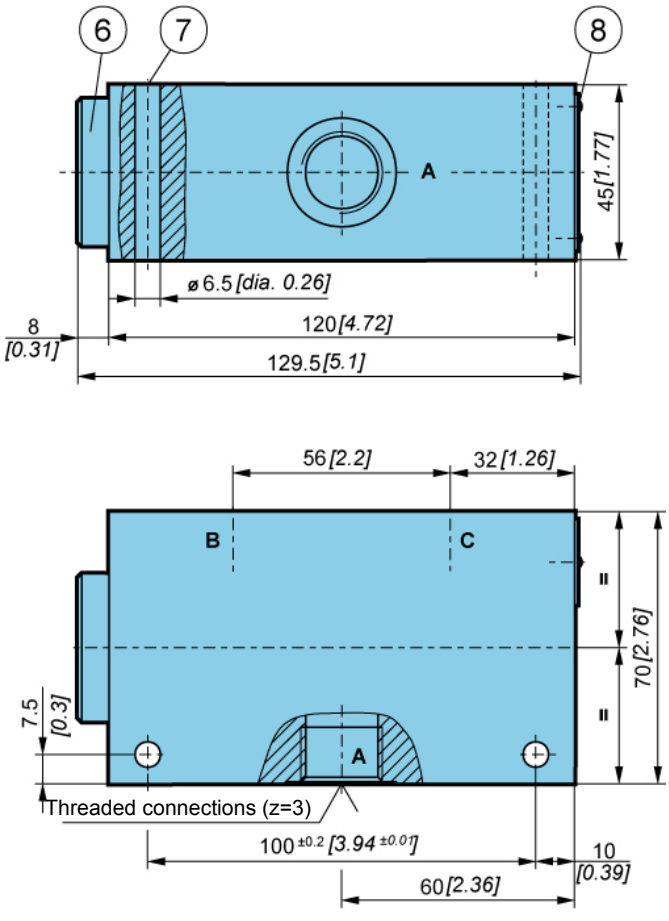
Type		DTP-6-20	DTP-6-35	DTP-6-50	DTP-10-70
Min. flow rate	L/min *[GPM]*	8 *[2.11]*	12 *[3.17]*	16 *[4.23]*	35 *[9.25]*
Max. flow rate	L/min *[GPM]*	20 *[5.28]*	35 *[9.25]*	50 *[13.21]*	70 *[18.49]*
Max. pressure range	bar *[PSI]*	350 *[5 076]*			
Dividing	%	50 : 50			
Flow dividing accuracy	%	±5			
Oil temperature range	°C *[°F]*	*-20* to *+70 [-4 to +158]*			
Viscosity range	mm^2/s *[SUS]*	*15* to *380 [59 to 716]*			
Filtration	NAS 1638	8			
Mass	kg *[lb]*	1,7 *[3.75]*			*2,65 [5.84]*

Dimensions

DTP-6



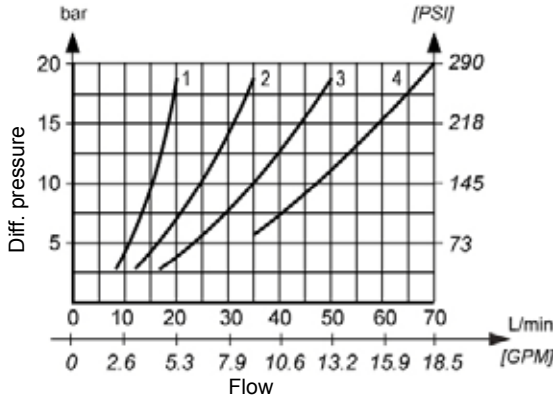
DTP-10



6. Valve cap
7. Two fixing holes for screws ISO 4762
   DTP-6 = M6 x 20-10.9
   DTP-10 = M6 x 55-10.9
   Tightening torque Md = max.15 Nm
8. Nameplate

ΔP-Q Performance curves

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



1. DTP-6-20
2. DTP-6-35
3. DTP-6-50
4. DTP10-70

Model code

D	T	P	-	☐	-	☐	-	☐	-	☐	-	*

Size

Size 6	**6**
Size 10	**10**

Flow rate L/min *[GPM]*

DTP-6	8 - 20 *[2.11 - 5.28]*	**20**
	12-35 *[3.17 - 9.25]*	**35**
	16 - 50 *[4.23 - 13.21]*	**50**
DTP-10	35 - 70 *[9.25 - 18.49]*	**70**

Threaded connection

DTP-6	M 18x15	**No designation**
	G 3/8	**G 3/8**
	3/4-16 UNF-2B	**SAE 8**
DTP-10	M 22x1,5	**M 22**
	G 1/2	**G 1/2**
	7/8-14 UNF-2B	**SAE 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

DIRECTIONAL CONTROL VALVES

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

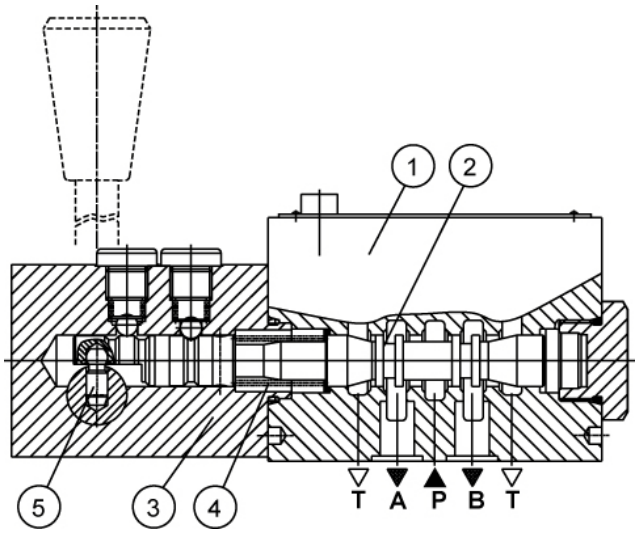
Operation

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:

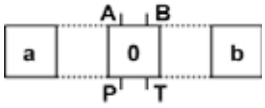
1/ With control spool not held in the operating position (the control spool returns to neutral position on ceasing to apply force to the control mechanism - type KV-../..-R).

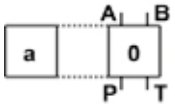
2/ With control spool held (detent) in the operating position (the control spool remains in the operating position on ceasing to apply force to the control mechanism lever - type KV-../..-RA).



Hydraulic symbols

Spool types



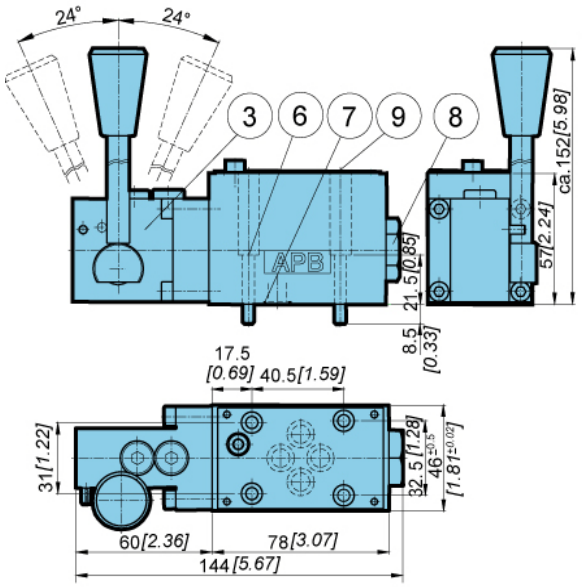


Features

Size			6	10
Flow rate		L/min *[GPM]*	60 *[15.8]*	100 *[26.4]*
Operating pressure	P, A, B	bar *[PSI]*	350 *[5 076]*	
	T	bar *[PSI]*	160 *[2 320]*	
Viscosity range		mm^2/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	

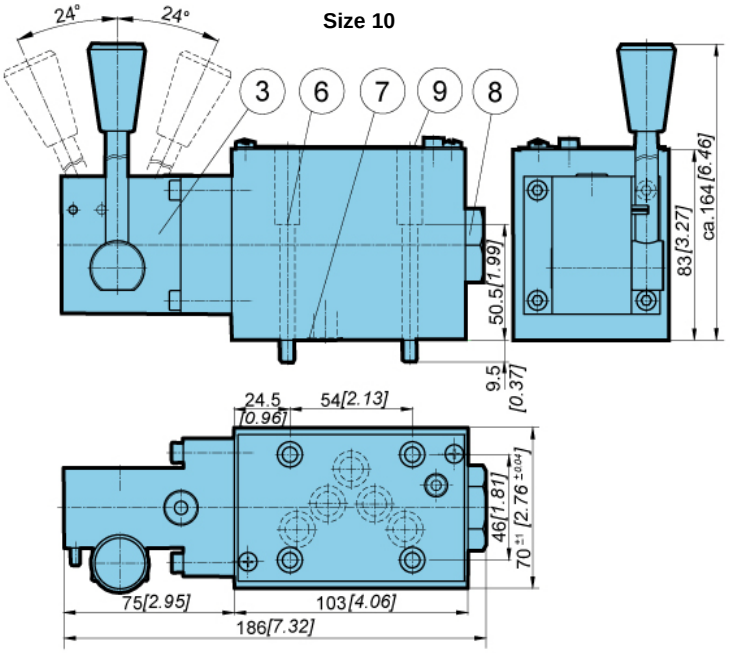
Dimensions

Size 6



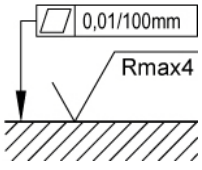
3. Control mechanism on side ''a''
   4/3 valves
   4/2 valves, spool types 51A
6. Fixing screws 4 pcs M5x30 to ISO 4762-10.9
   (by special order).
   Required tightening torque Md = 9 Nm.
7. O-ring 9.25x1.78
8. Valve cap.
9. Nameplate.

Size 10



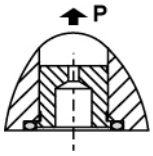
3. Control mechanism on side ''a''
   4/3 valves
   4/2 valves, spool types 51A
6. Fixing screws 4 pcs M6x60 to ISO 4762-10.9
   (by special order).
   Required tightening torque Md = 15 Nm.
7. O-ring 12.42x1.78
8. Valve cap.
9. Nameplate.

Required quality of the mating surface.



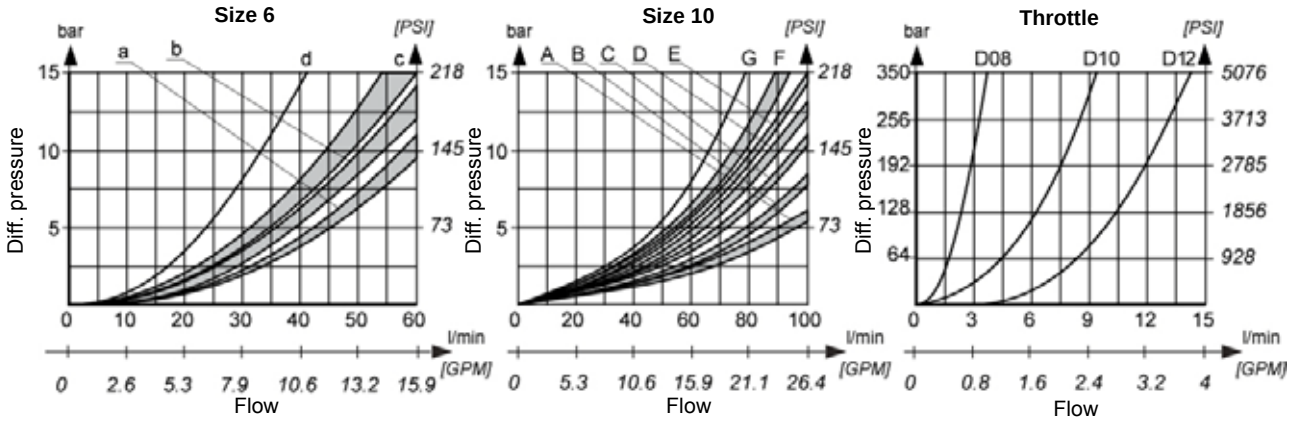
Cartridge throttle

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



ΔP-Q Performance curves

Measured at 50°C *[122°F]* and viscosity of 32 mm^2/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

KV - 4 / ☐ - 5KO - ☐ - ☐ - ☐ - ☐ - ☐ - ✱

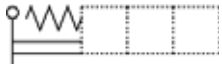
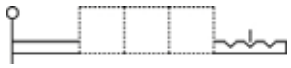
Number of spool position

2	**2**
3	**3**

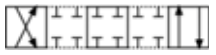
Size

Size 6	**6**
Size 10	**10**

Control spool held

	**R**
	**RA**

Spool type

	
	**1**
	**2**
	**6**
	**51A**

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.]*

Seal type

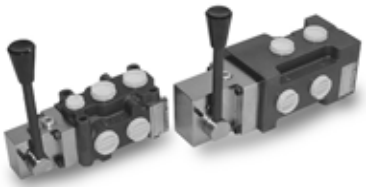
No designation	NBR seals for mineral oil HL,HLP to DIN 51524
E	FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380

Special requirements to be briefly specified

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...

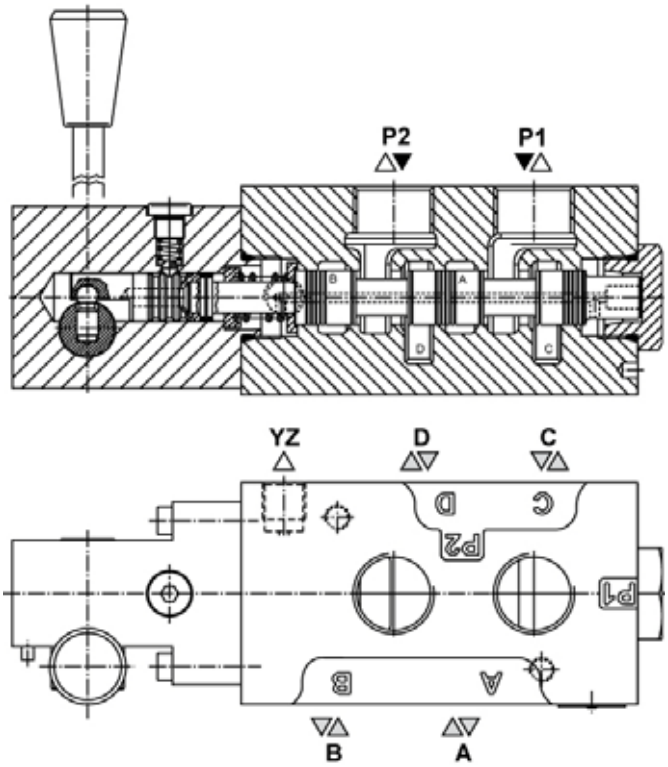
Operation

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:

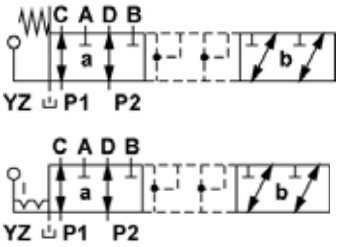
1/ With control spool not held in the operating position (the control spool returns to position ''a'' on ceasing to apply force to the mechanism - type KV-../..-R).

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).

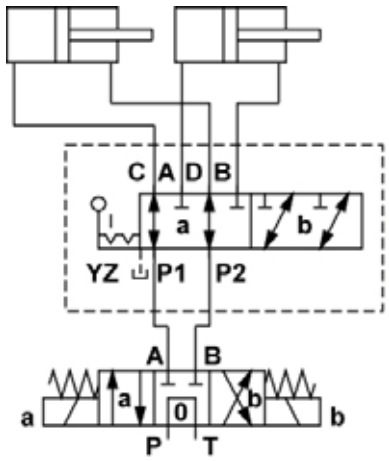


Hydraulic symbols

Spool types



Mounting example

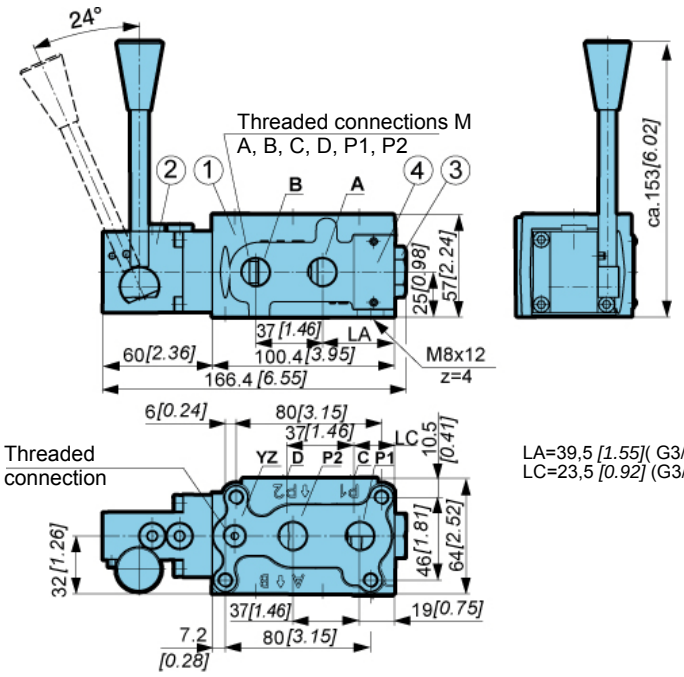


Features

Size			**6**	**10**
Flow rate		L/min *[GPM]*	60 *[15.8]*	120 *[31.7]*
Operating pressure	With YZ	bar *[PSI]*	350 *[5 076]*	
	Without YZ	bar *[PSI]*	160 *[2 320]*	
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[69,5 to1 760]*	
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to158]*	
Filtration		NAS 1638	8	
Mass		kg *[lb]*	2,4 *[5.3]*	5,3 *[11.7]*
Mounting position			Optional	

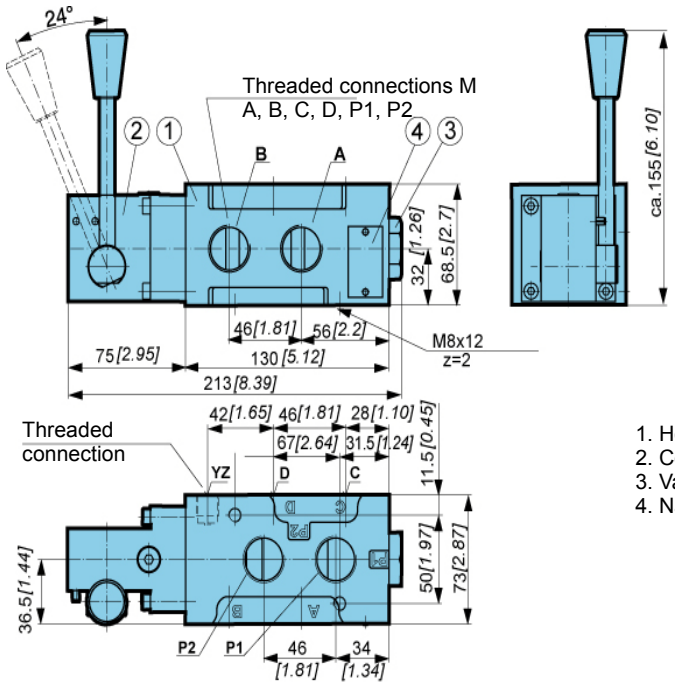
Dimensions

Size 6



LA=39,5 *[1.55]*(G3/8, M18x1,5)/37,5 *[1.47]* (G1/2, M22x1,5)
LC=23,5 *[0.92]* (G3/8, M18x1,5)/25,5*[1.00]* (G1/2, M22x1,5)

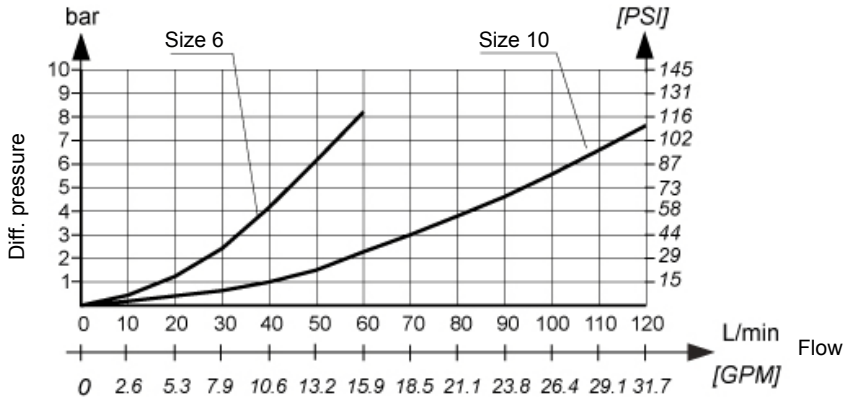
Size 10



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^2/s *[148 SUS]*.



Model code

K V - 6 / 2 - □ - □ - □ - □ - □ - *

Size

Size 6	**6**
Size 10	**10**

Control spool held

	**R**
	**RA**

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	**SAE 8**
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	**SAE 10**

Drainage

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

Seal type

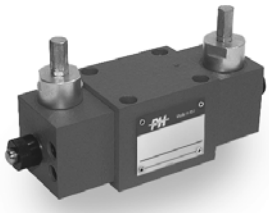
NBR seals for mineral oil HL,HLP to DIN 51524	**No designation**
FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380	**E**

Special requirements to be briefly specified

4/2 WAY AUTOMATIC DIRECTIONAL VALVES PKV

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

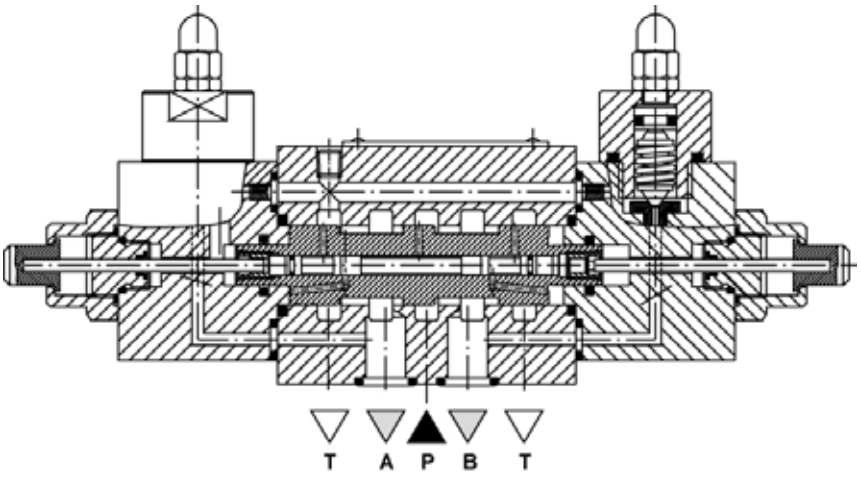
- Indirect hydraulic operation.
- Connecting dimensions to ISO 4401.
- Provision of pressure setting for change - over.
- Automatic change - over from the other operating position.



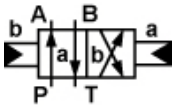
PKV-10

Operation

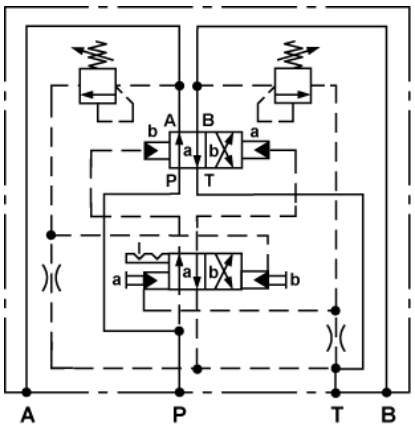
Indirectly, hydraulic - operated directional valves type PKV are used to control the hydraulic fluid flow direction by an automatic change - over.



Hydraulic symbol



Detailed schematics of the valve

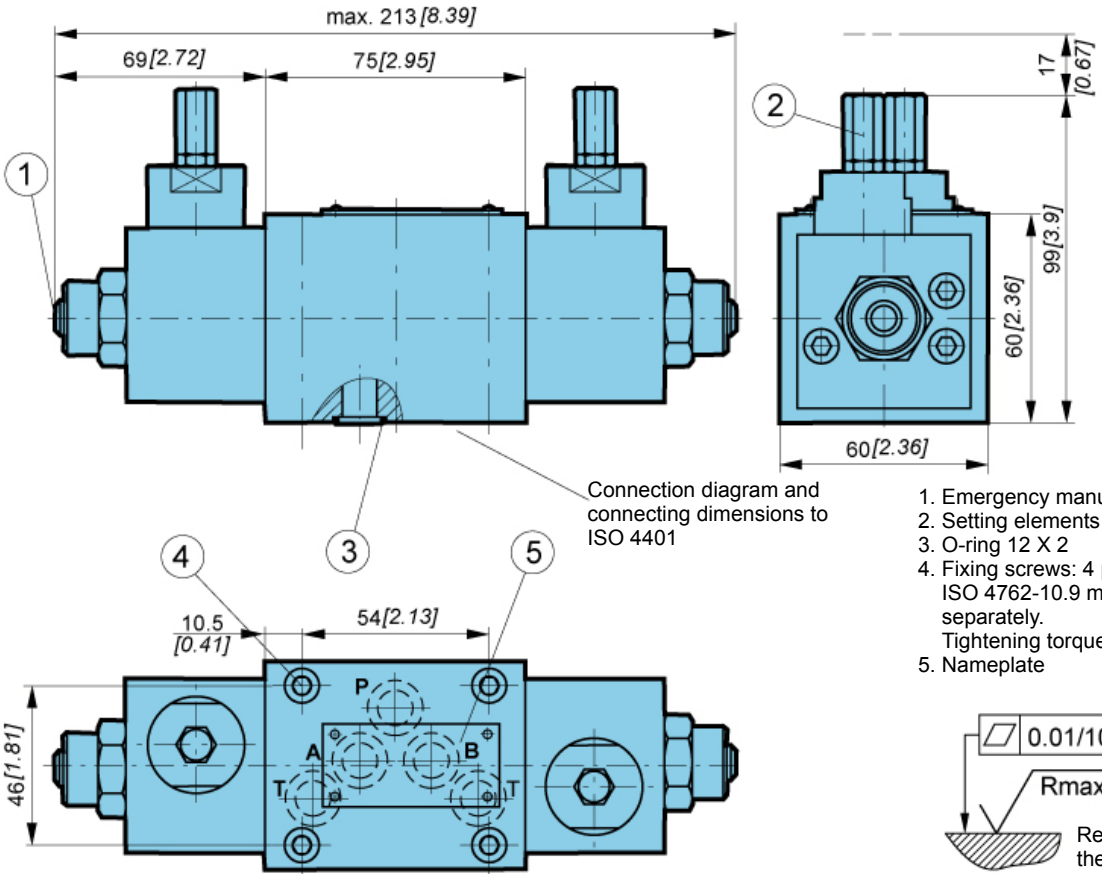


Features

Size			**10**
Flow rate min/max		L/min *[GPM]*	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 to210 *[725 to3 045]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[69.5 to 1 760]*
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to158]*
Filtration		NAS 1638	8
Mass		kg *[lb]*	2,6 *[5.7]* 3,2 *[7.0]*

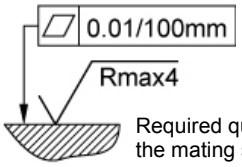
Dimensions

Size 10



Connection diagram and connecting dimensions to ISO 4401

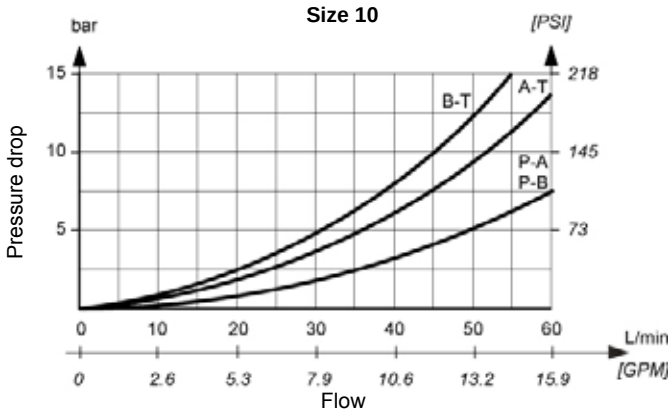
1. Emergency manual override
2. Setting elements with protectivecap
3. O-ring 12 X 2
4. Fixing screws: 4 pcs M6 x 55 to EN ISO 4762-10.9 must be ordered separately.
   Tightening torque Md = 14Nm
5. Nameplate



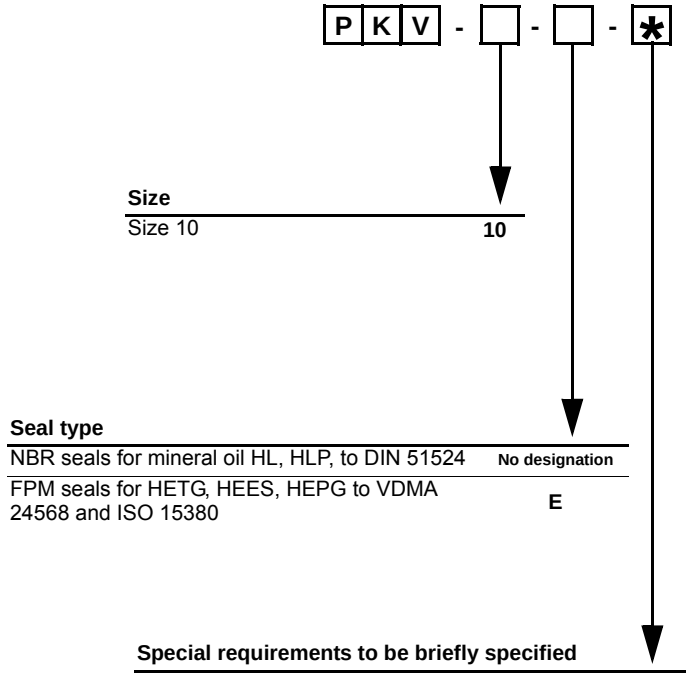
Required quality of the mating surface.

ΔP-Q Performance curves

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



Model code



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 timethe flow through the valve stops. Preferential starting is P → Band A → T position. The spool is moved by two springs andlocked by unbalanced pressure inside valve. When no moreflow is crossing the valve, the spool changes the positioninverting the direction of the actuator. These valves are mostlyused to control the movement compactors or system where it isnot possible to use electrical device.

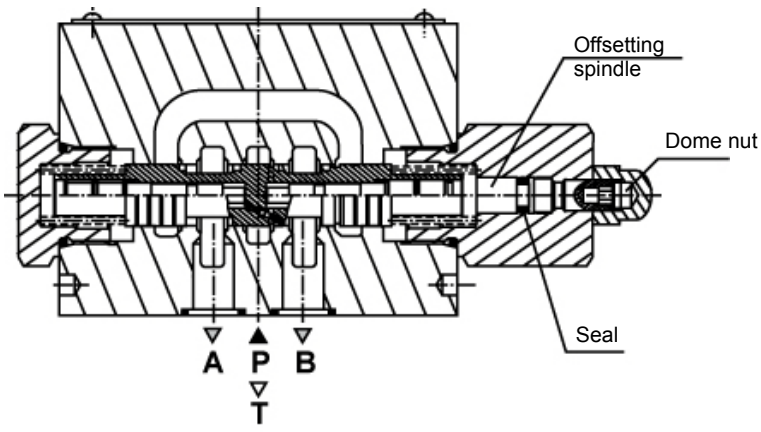
About the spindle for the PKV-6-T-G valves:

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.

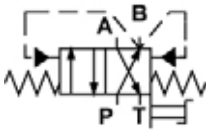
Never turn the offsetting spindle when the valve is pressurized over 10 bar *[145 PSI]*. This can cause seal damage. If necessary switch off the pump.



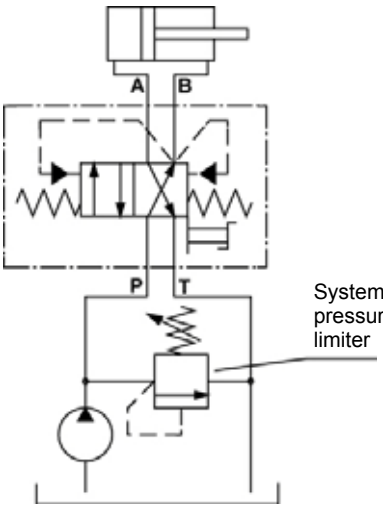
Hydraulic symbol

PKV-6-T

PKV-6-T-G



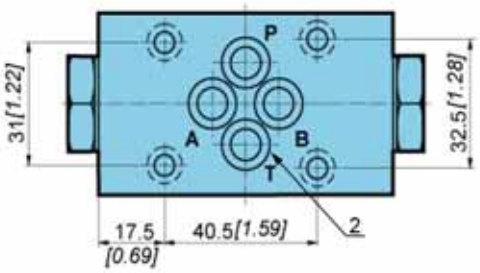
Detailed schematics of the valve

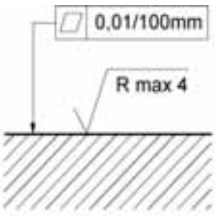


Features

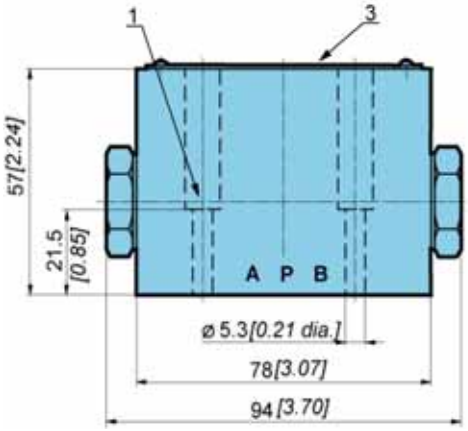
Size			**6**
Flow rate min/max		L/min *[GPM]*	3/30 *[0.8/7.9]*
Operating pressure P, A, B		bar *[PSI]*	50 to 210 *[725 to 3 045]*
Max. pressure T		bar *[PSI]*	40 *[580]*
Viscosity range		mm^2/s *[SUS]*	20 to 200 *[92.7 to 926.8]*
Oil temperature range		°C *[°F]*	-20 to +60 *[-4 to 140]*
Filtration		NAS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

Dimensions



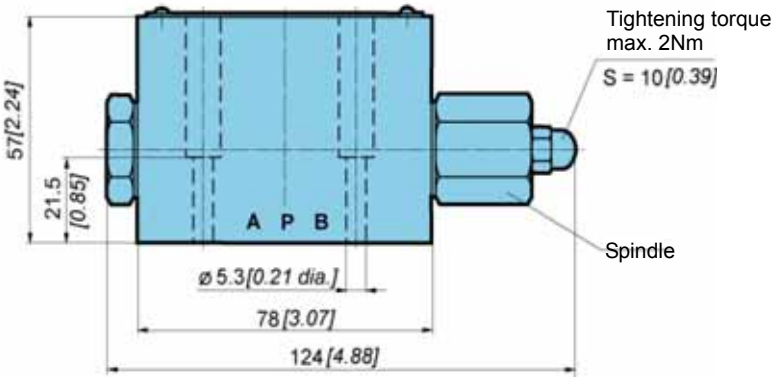


Required quality of the mating surface.



PKV-6-T

Connection diagram and connecting dimensions to ISO



PKV-6-T-G

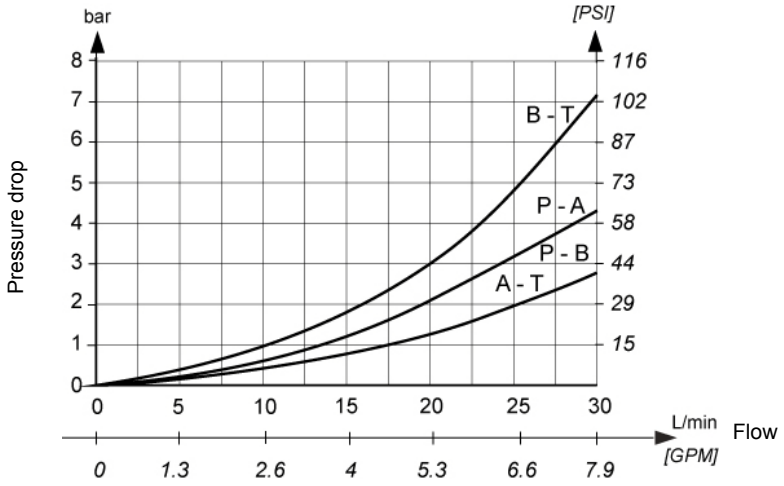
1. 4 x fixing screws M5x30 to DIN EN ISO 4762-10.9 must be ordered separately.
Required tightening torque Md = 9 Nm *[79.65 in.lbf]*.

2. O-ring 9,25 x 1,78

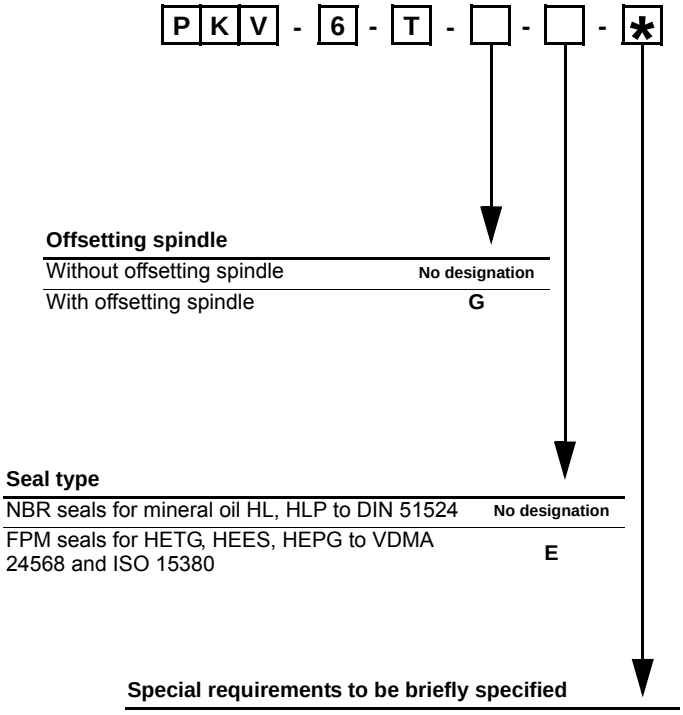
3. Nameplate

ΔP-Q Performance curves

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



Model code



4/3 WAY DIRECTIONAL VALVES KV

- NG 10
- Up to 350 bar *[5 076 PSI]*
- Up to 80 L/min *[21.1 GPM]*
- Up to 130 L/min *[34.3 GPM]*

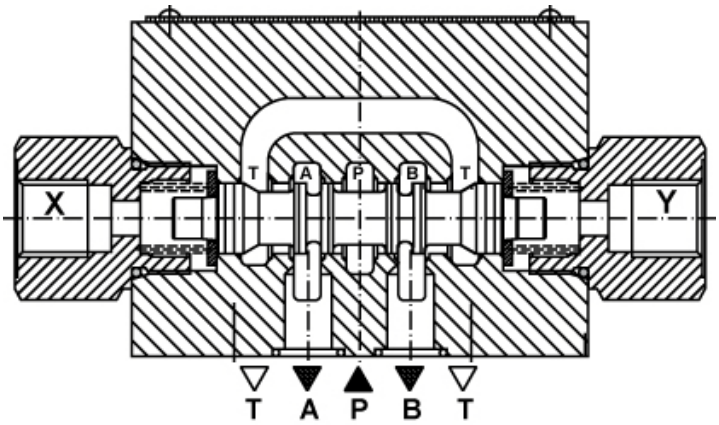
- Direct hydraulically operation.
- Connecting dimensions to ISO 4401.
- Threaded connections to ISO 1179.

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

Operation

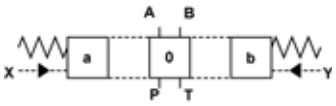
The KV-...-H is a hydraulically controlled 4/3 way directional control valve. The valve is operated by the pilots ports X and Y via the connection of an external pilot pipe direct on the valve body.

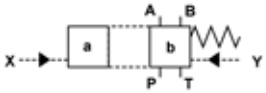
The minimum pilot pressure must be ensured for all operating conditions of the directional valve.



Hydraulic symbols

Spool types



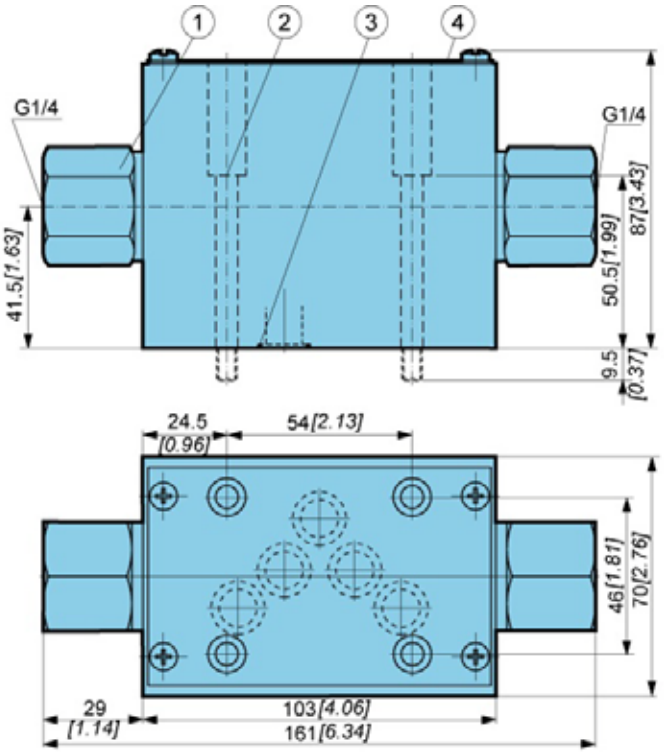


Features

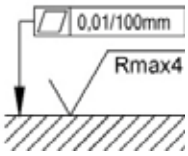
Size			**10**
Flow rate		L/min *[GPM]*	130 *[34.3]*
Operating pressure	Ports A, B, P	bar *[PSI]*	350 *[5 076]*
	Ports X, Y, T	bar *[PSI]*	210 *[3 045]*
Pilot supply pressure min.		bar *[PSI]*	10 *[145]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[69.5 to 1 760]*
Oil temperature range		°C *[°F]*	-20 to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

Dimensions

Size 10



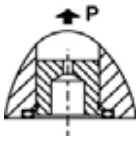
1. Threaded connection X (Y) - G1/4
2. Fixing screws 4 pcs M6x60 to ISO 4762-10.9 (by special order) Required tightening torque Md = 15Nm
3. O-ring 12.42 x 1.78
4. Nameplate.



Required quality of the mating surface.

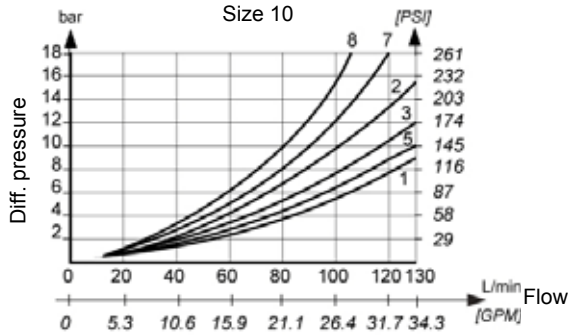
Cartridge throttle

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



ΔP-Q Performance curves

Measured at 50°C *[122°F]* and viscosity of 32 mm²/s *[148 SUS]*.



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

Three positions	**3**

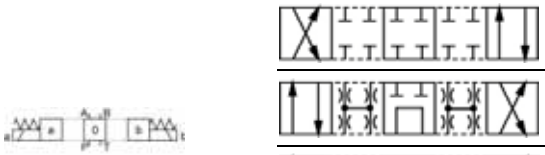
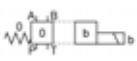
Size

Size 10	**10**

Special requirements to be briefly specified

Hydraulically operated

Spool types

	**1**
	(NS10) **2**
	(NS 6) **2**
	6
	**51A**
	**51B**

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.]*

6/2 WAY DIVERTER VALVES KV - HIGH PRESSURE

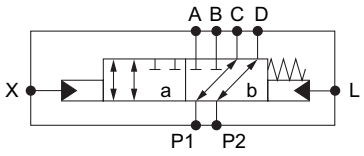
- NG 16
- Up to 450 bar *[6 527 PSI]*
- Up to 300 L/min *[79.25 GPM]*
- Hydraulically operated

KV-6/2-16-H

Operation

6/2 directional valves are normally used for selection between two consumers or two hydraulic circuits which are not operated simultaneously. Control spool is operated by pilot pressure acting on port X. Return of the spool to the initial position is assured by the return spring.

Hydraulic symbol



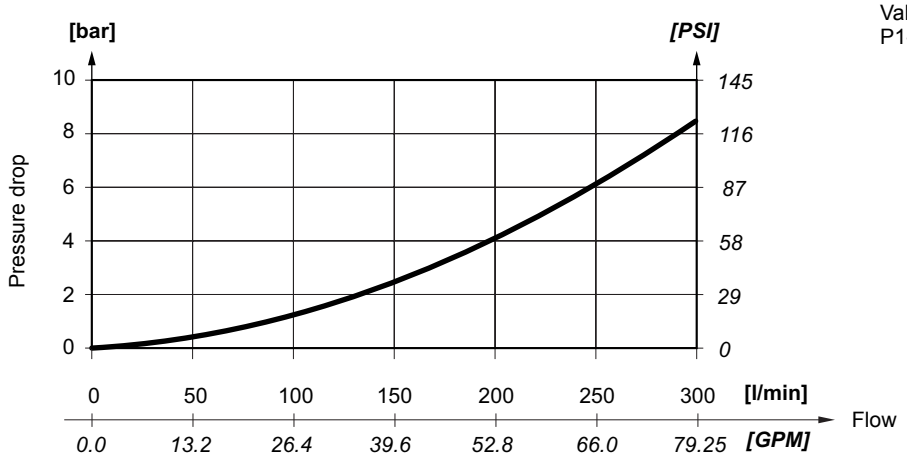
Features

Max pressure	bar *[PSI]*	450 *[6 527]*
Minimal pilot pressure X for spool shift*	bar *[PSI]*	36 *[522]*
Max pressure on port X and L	bar *[PSI]*	210 *[3 045]*
Max flow range	L/min *[GPM]*	300 *[79.25]*
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to 158]*
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69.5 to 1760]*
Fluid contamination	ISO 4406: 1999	19/17/14
Mass	kg *[lb]*	16,8 *[37.04]*

* Valid for operation at flow 250 L/min *[66.0 GPM]* and pressure 450 bar *[6 527 PSI]*. At lower p-Q load the pilot pressure can be also lower.

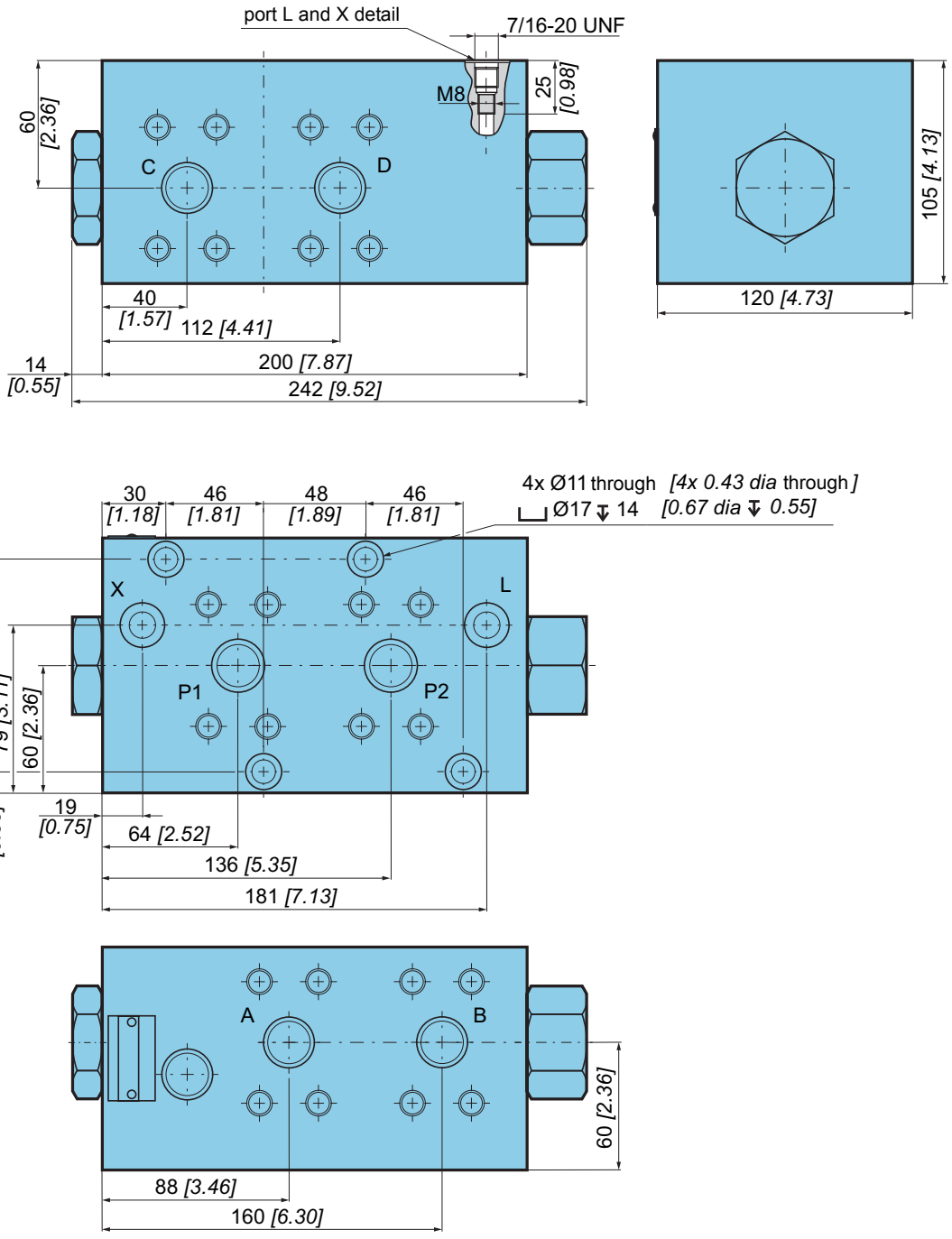
ΔP-Q Performance curves

Measured at 50 °C *[122 °F]* and viscosity 32 mm^2/s *[148 SUS]*.



Valid for flow directions:
P1-C, D-P2, P1-A, B-P2

Dimensions



Installation

Mounting position: Indifferent

	Class	(*) N.m [lb.ft]
4xM10	8.8	49 [36]

(*) As per standard DIN 912

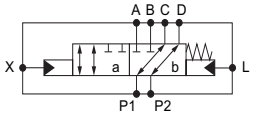
Model code

KV - 6 / 2 - 16 - H - □ - SAE1 - 450 - □ - RAL - *

Operation

Hydraulically operated	**H**

Spool type



No designation

Special requirements

To be briefly specified

Ports

P1, P2, A, B, C, D - SAE, 6000 PSI
X, L - 7/16-20 UNF — **SAE1**

Max working pressure bar *[PSI]*

450 *[6 527]*	**450**
350 *[5 076]*	**No designation**

Surface protection

No designation	Phosphated
RAL	Painted RAL 9005
ZN	Zinc coated

Seal type

No designation	NBR seals for mineral oil HL, HLP
E	FMM seals for HETG, HEES, HEPG

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).
• Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF)

KVC2-3/2-4-47B, KVC-3/2-4-47B

Features

Hydraulic			
Size			**4**
Flow rate		L/min *[GPM]*	16 *[4.2]*
Operating pressure		bar *[PSI]*	160 *[2 320]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[69.5 to 1760]*
Oil temperature range		°C *[°F]*	-20 to+70 *[-4 to 158]*
Filtration		ISO 4406-1999	19/17/14
Mass	KVC-3/2-4	kg *[lb]*	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]*	to50 *[122]*
Coil temperature		°C *[°F]*	to 180 *[356]*
Duty cycle			Continuous

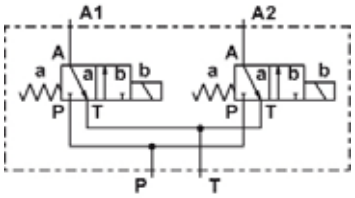
* 12 V supply voltage - 36 W.

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

Hydraulic symbol

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

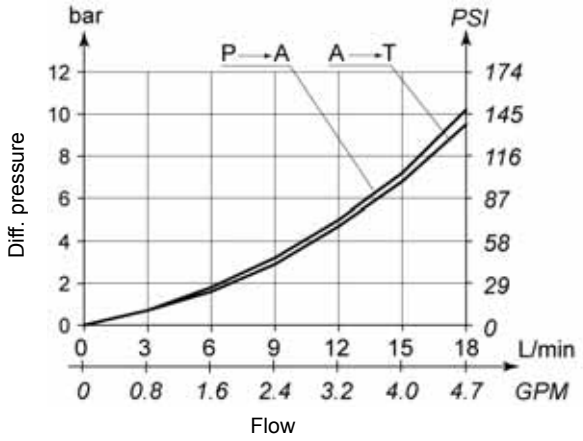
Double: KVC2-3/2-4-47B



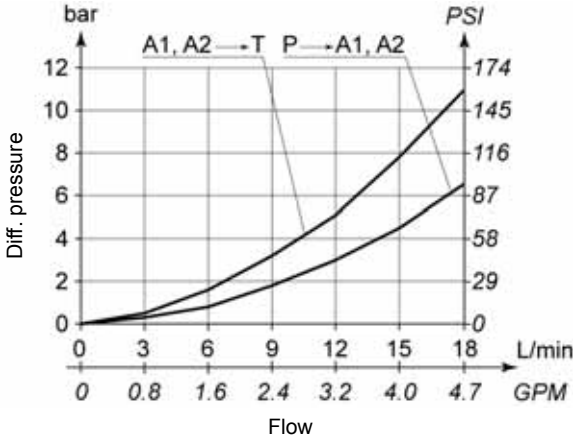
ΔP-Q Performance curves

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

KVC-3/2-4

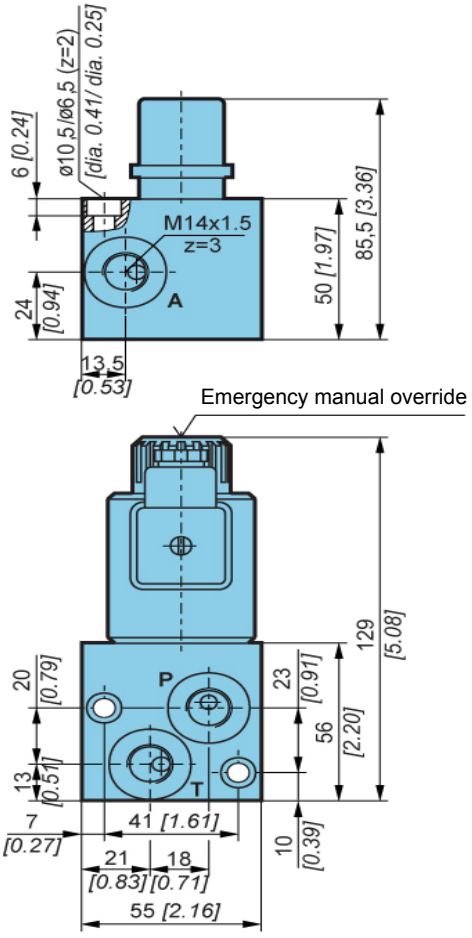


KVC2-3/2-4

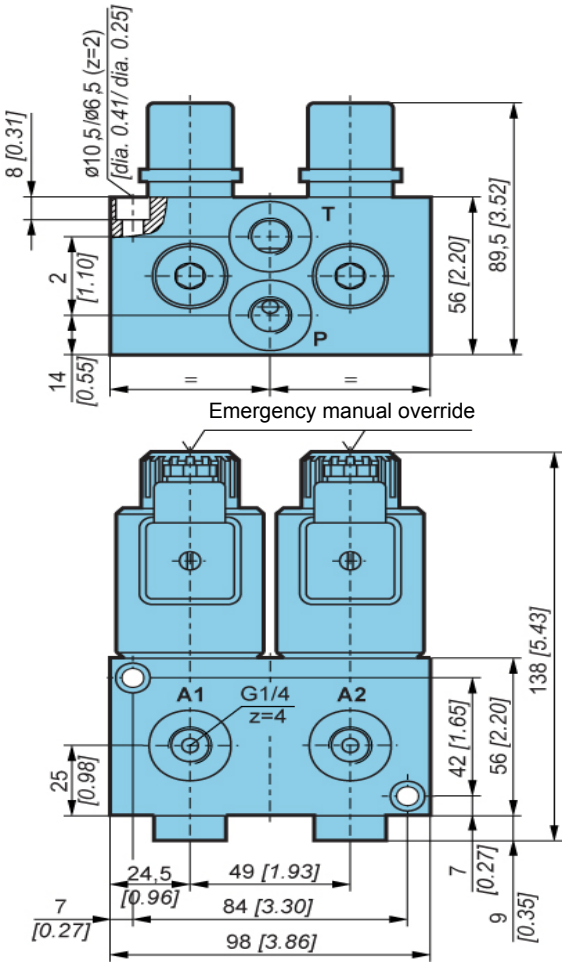


Dimensions

KVC-3/2-4-47B



KVC2-3/2-4-47B



Model code

K V C ☐ - 3 / 2 - 4 - 4 7 B - ☐ ☐ ☐ ☐ - ☐ - ☐ - ✱

Hydraulic symbol

Simple	**No designation**
Double	**2**

Working ports

Three working ports	**3**

Number of control spool position

Two positions	**2**

Size

Size	**4**

Spool type

Supply voltage

Direct voltage 24V	**24 DC**
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**
Deutsch	**V**

Overvoltage

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

Threaded connections A, B, P

M14x1,5; -	**No designation**
G1/4 ; -	**1/4**
9/16-18 UNF-2B ; 9/16-18 UNF-2B	**SAE 6**

Manual override option

No designation	Emergency manual override
G	Manual override with rubber cover
C	Lockable manual override

Seal type

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

Special requirements to be briefly specified

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

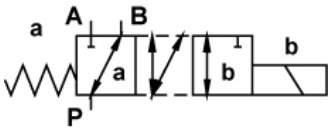
Operation

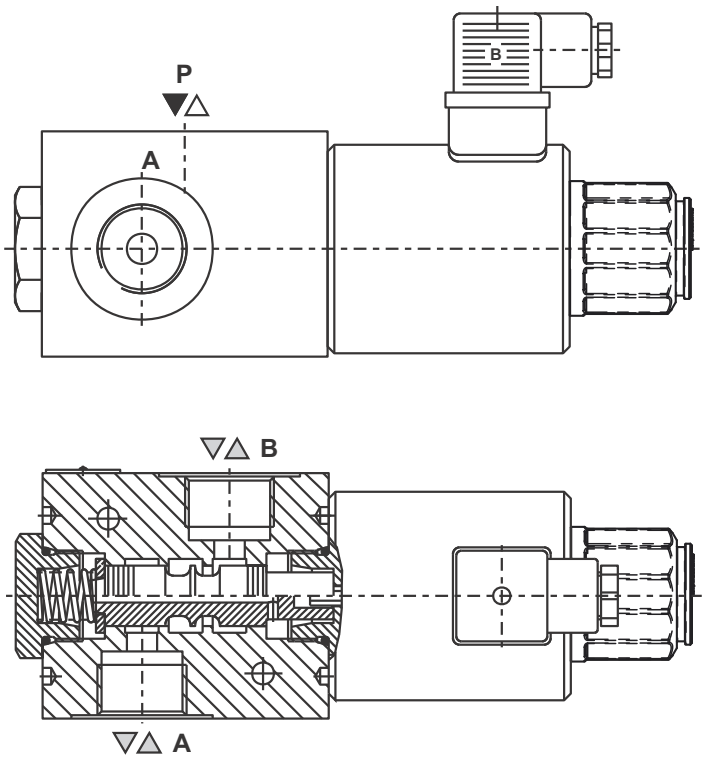
Directional valves type KVC-3/2-10 with direct solenoid operation are used to control the direction of hydraulic fluid flow.
Type KVC-3/2-10 is a reduced version of type KV-6/2. It is used for alternate control of two one-pipe working units (e.g. Plunger) with common, main directional valve.

It is also very proper as bypass valve.

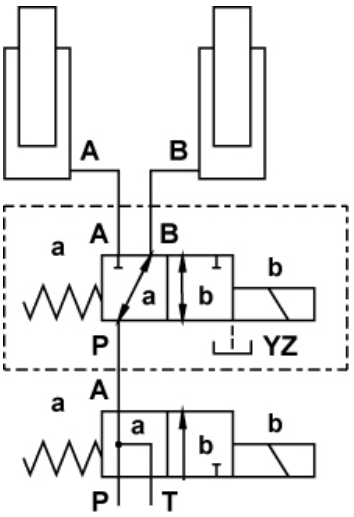
The change-over can also be done manually by pressing the emergency manual override.

Hydraulic symbol





Mounting example

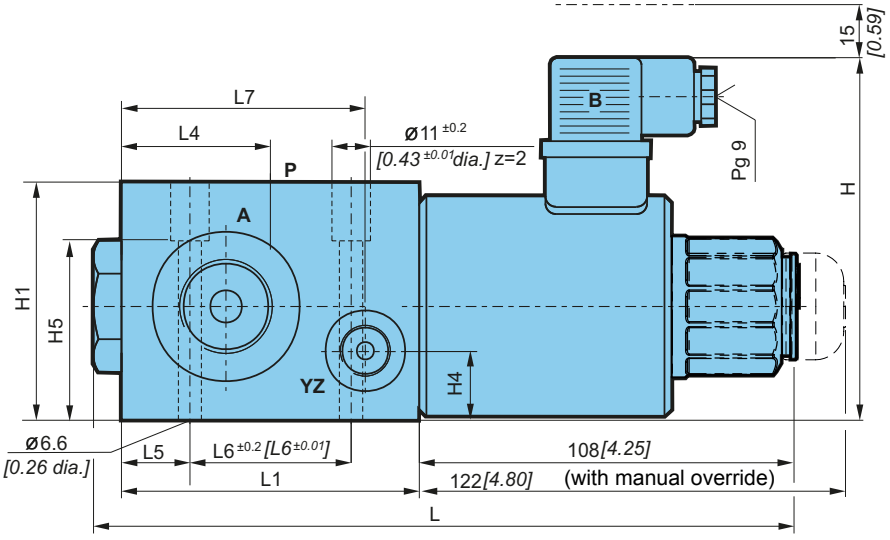


Features

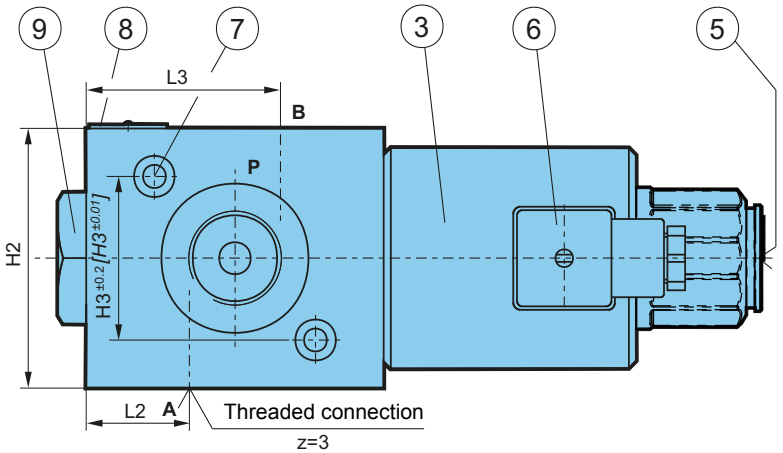
Hydraulic			
Size			**10**
Flow rate	Without drainage	L/min *[GPM]*	60 *[15.8]*
	With drainage		100 *[26.4]*
Operating pressure	Without drainage	bar *[PSI]*	250 *[3 625]*
	With drainage		350 *[5 076]*
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to +158]*
Viscosity range		mm^2/s *[SUS]*	15 to 380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

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

Dimensions



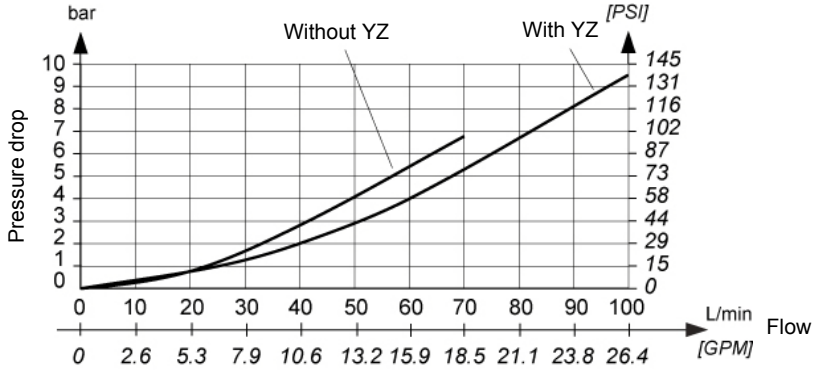
Dimensions	Without YZ	With YZ
L	201 *[7.91]*	210 *[8.27]*
L1	85 *[3.34]*	94 *[3.70]*
L2	29,5 *[1.16]*	31,5 *[1.24]*
L3	55,5 *[2.18]*	62,5 *[2.46]*
L4	42,5 *[1.67]*	47 *[1.85]*
L5	19,5 *[0.76]*	18 *[0.71]*
L6	46 *[1.81]*	40 *[1.57]*
L7	-	79,5 *[3.13]*
H	104 *[4.09]*	105 *[4,13]*
H1	67 *[2.63]*	74 *[2,91]*
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 manual override
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^2/s *[148 SUS]*.



Model code

K V C - 3 / 2 - 10 - ☐ - 41B - ☐☐☐ - ☐ - ☐ - ☐ - ✱

Manual override option

Emergency manual override	**No designation**
Manual override with rubber cover	**G**
Lockable manual override	**C**

Special requirements to be briefly specified

Spool type

41B

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

Drainage

No designation		Without YZ
YZ		With YZ
YZP		With YZ plugged

Connector type

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**
Deutsch	**V**

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
SAE 12	1 1/16-12 UNF-2B; 9/16-18 UNF-2B
SAE 10	7/8-14 UNF-2B; 9/16-18 UNF-2B

Overvoltage

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

4/2, 4/3 WAY DIRECTIONAL VALVE KV-5KL

- NG 6
- Up to 350 bar *[5 076 PSI]*
- Up to 80 L/min *[21 GPM]*
- Connection diagram and connecting dimensions ISO 4401
- 5-chamber model with good spool guidance
- Optimized flow paths for low losses of pressure
- Low internal leakage
- Wet pin solenoid with interchangeable coil
- Manual emergency control
- Fulfil EMC (89/336/EEC)
- Packaging in carton box

KV-4/3-5KL-6

Operation

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

A valve basically consists of a housing (1), one or two solenoids (2a, 2b), control spool (3) and return spring (4).

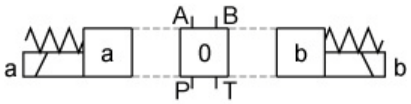
In 4/3 way directional valves the centre position of the spool is defined by 4 return springs which hold the spool in the neutral position. The change over to the operating position (a) or (b) is done by energizing the solenoids (2a/ 2b) respectively, whereby the solenoid plunger acts on the control spool (3) via the operating pin (5), thus clearing the corresponding flow ways and establishing relevant links between ports P, A, B and T. When the solenoid (2a/ 2b) is deenergized, the control spool (3) is returned to neutral position by the return spring (4).
In 4/2 way directional valves the centre position of the spool is defined by return spring on the opposite side of the solenoid (2a or 2b).

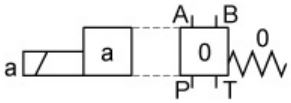
Change-over of the control spool (3) can be done manually by pressing the pin (6) for emergency manual override in the solenoid core.

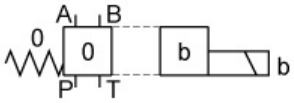
Solenoid coil is fastened to the solenoid core (7) by retaining nut (8). Position of the coil (orientation of the connector) is pre-defined by the positioning hole on the valve housing and by the fixation pin (9) on the coil.

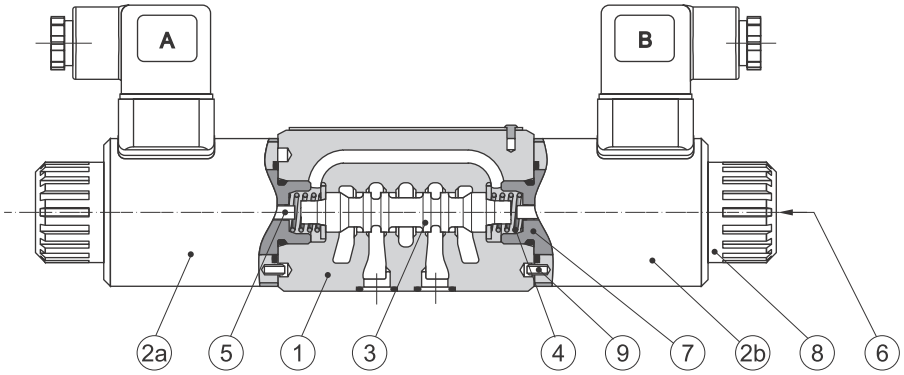
Hydraulic symbols

Spool types









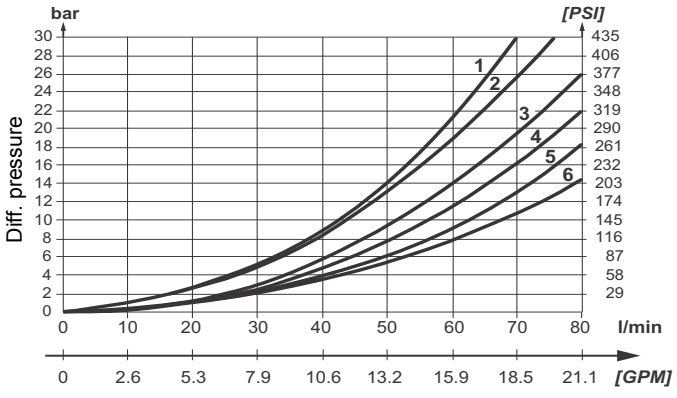
Features

Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	see ΔP-Q curves
Operating pressure	Ports A, B, P	bar *[PSI]*	350 *[5 076]*
	Port T	bar *[PSI]*	250 *[3 625]*
Viscosity range		mm^2/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	4/2	kg *[lb]*	1,6 *[3.6]*
	4/3		2,2 *[4.9]*
Mounting position			Optional
Electrical			
Supply voltage	Direct	V	12, 24, 48
	Alternating		110, 230
Max. allowable voltage variation			+/- 10 %
Power		W	31
Switch-on time*		ms	200 to 260
Switch-off time*		ms	100 to 120
Switching frequency		1/h	15 000
Ambient temperature		°C *[°F]*	to 50 *[122]*
Coil temperature		°C *[°F]*	to180 *[356]*
Duty cycle			Continuous
Protection class to EN 50529 / IEC 60529			
	- Connector EN 175301		- IP65
	- Connector AMP		- IP65
	- Connector Deutsch		- IP69K

* Measured on unloaded valve

ΔP-Q Performance curves

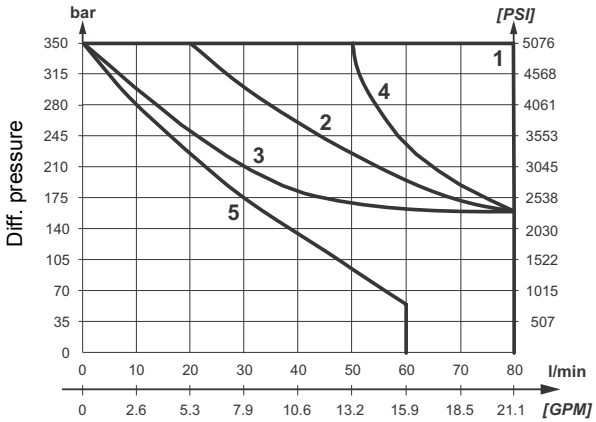
Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.



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

ΔP-Q Operating limits

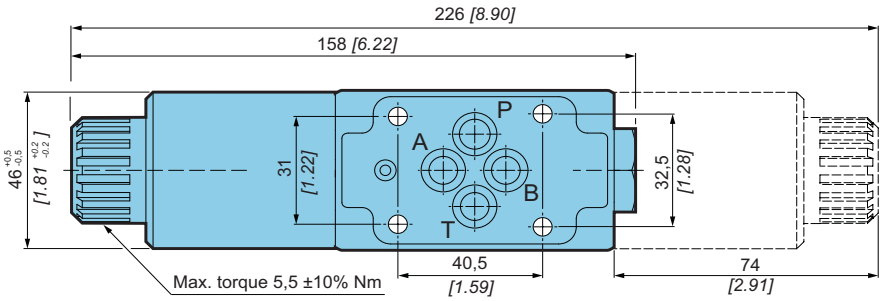
Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.



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

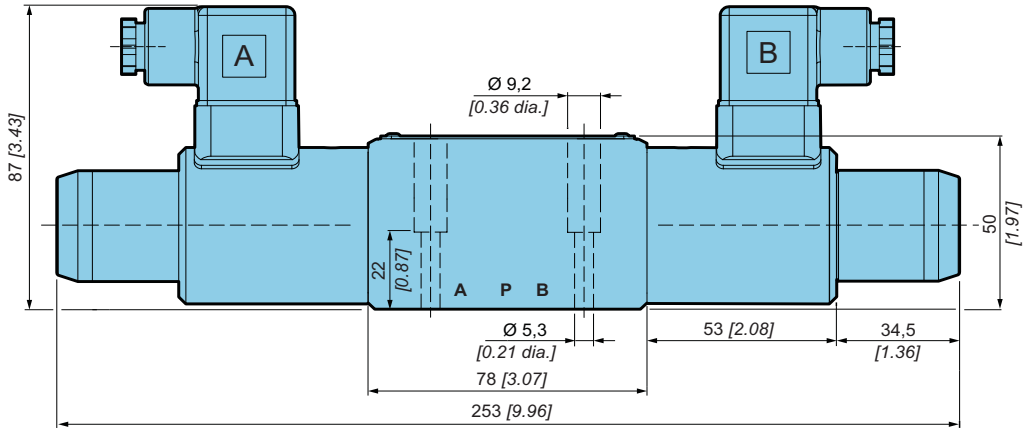
The operating limits of the valve are determined at a voltage 10% below the nominal rating. The curves refer to application with symetrical flow throw the valve (P-A and B-T). In the case of asymetric flow (e.g. one part not used) reduced values may result.

Dimensions



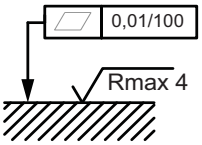
KV-4/2-5KL-6

Connection diagram and connecting dimensions to ISO 4401.

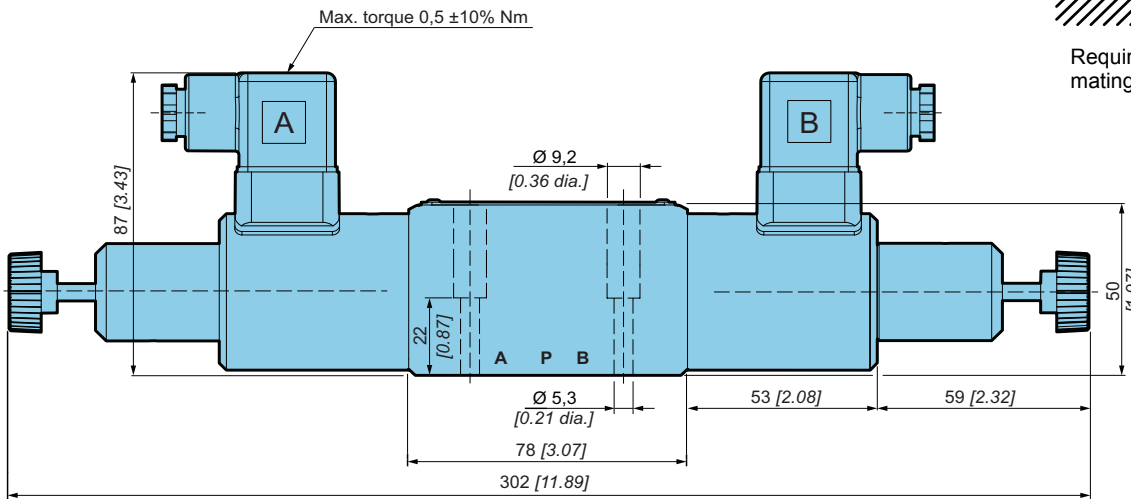


KV-4/3-5KL-6-G-...

Manual override with ruber cover



Required quality of the mating surface.

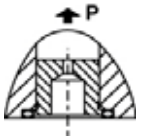


KV-4/3-5KL-6-C-...

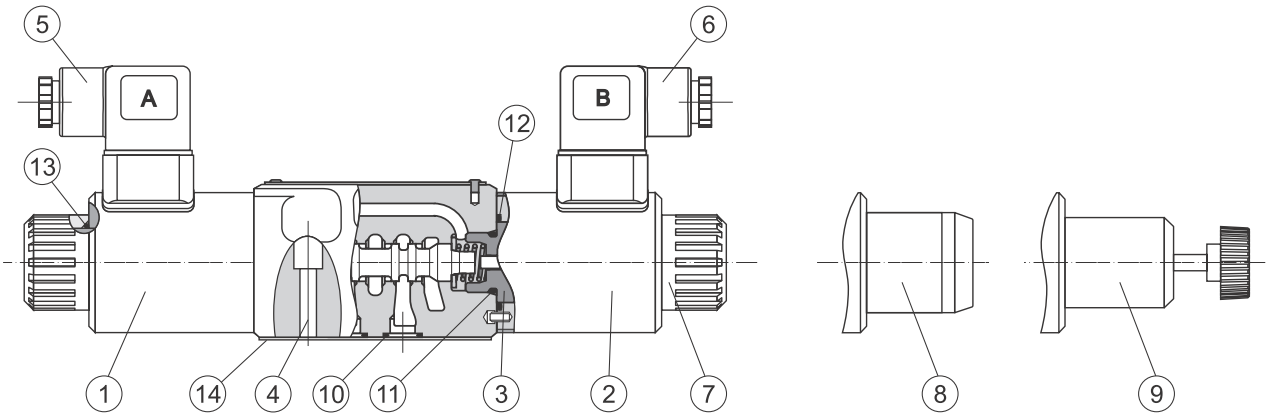
Lockable manual override

Cartridge throttle

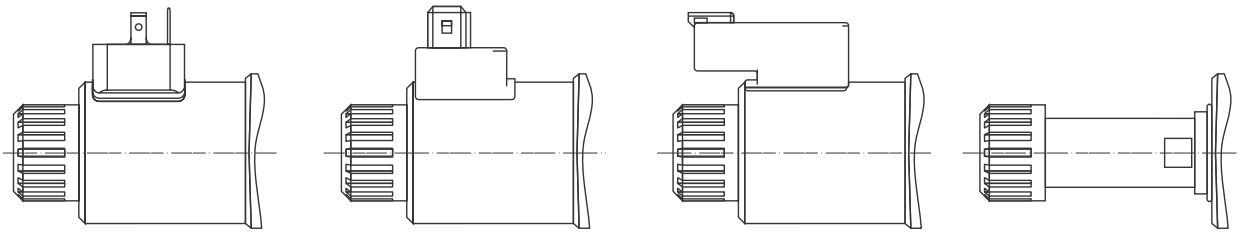
If flow rates greater than permissible occur during change-over, a cartridge throttle must be fitted into P-line of the directional valve. (option D08/D10/D12 in the model code)

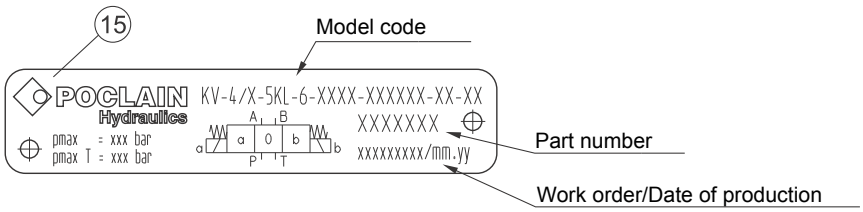


Valve assembly- spare parts



EN 175301-803 connector | AMP Junior timer connector | Deutsch connector | Without coil

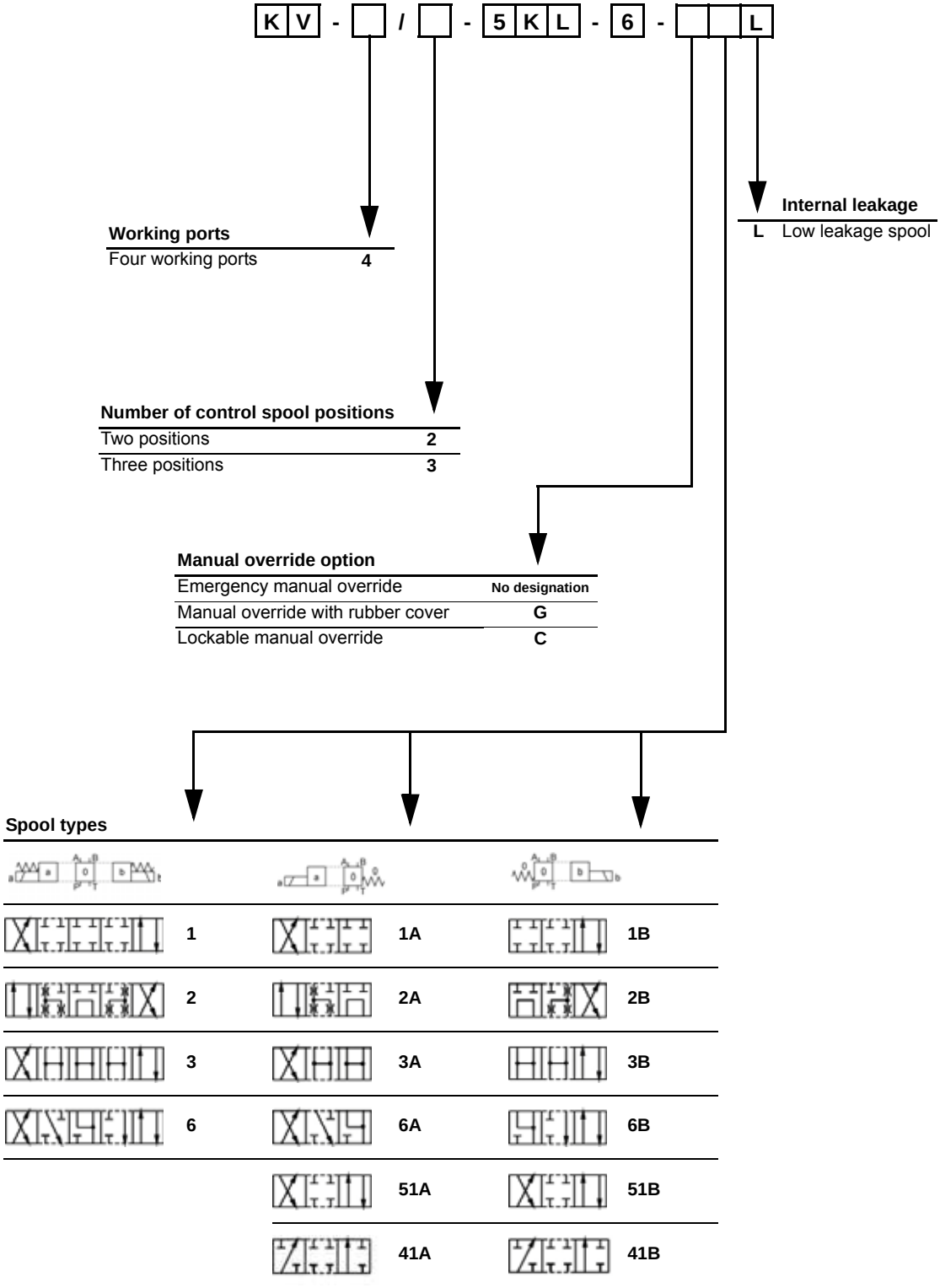




1. Solenoid coil “a” - Type **MR-045-O** (by default) or type **SR-045-O** (option S1 in model code)
2. Solenoid coil “b” - Type **MR-045-O** (by default) or type **SR-045-O** (option S1 in model code)
3. Solenoid core - Type **MR-045-O** (by default) or type **ACTUATOR SR-045** (option S1 in model code)
4. Fixing screws 4 pcs **M5x30 to ISO 476210.9**, not supplied eith the valve; must be ordered separately
Required tightening torque: $9^{+/-\ 10\%}$Nm - steel tapped holes, $7^{+/-\ 10\%}$ Nm - aluminium tapped holes
5. Plug-in connector EN 175301-803 “a” - grey - Type **MR-K-A**
6. Plug-in connector EN 175301-803 “b” - black - Type **MR-K-B**
7. Retaining nut - Type **MR-045-M** (by default) or type **SR-045-M** (option S1 in model code)
8. Retaining nut for manual override with rubber cover - Type **MR-045-M-G** (by default) or type **SR-045-M-G** (option S1 in model code)
9. Retaining nut for lockable manual override - Type **MR-045-M-C** (by default) or type **SR-045-M-C** (option S1 in model code)
10. **O-ring FI 9,25x1,78**
11. **O-ring FI 17x2**
12. **O-ring FI 26x2**
13. **O-ring FI 22x1,5**
14. Protection plate
15. Nameplate

Detail technical data regarding the solenoids and Model codes for ordering are available in catalogue chapter SOLENOIDS.

Model code



Port T in the valves with spool type 41A and 41B must be used as leakage line when working pressure is over 250 bar *[3 625 PSI]*.

- □□□ - □ - □ - *

Supply voltage

	Direct voltage	Alternating voltage
12 V	**12 DC**	**12 AC**
24 V	**No designation**	**24 AC**
48 V	**48 DC**	**48 AC**
110 V	**110 DC**	**110 AC**
230 V	**230 DC**	**230 AC***
Without coil	**WC**	**WC**

Alternating voltage solenoids must be used with connector with integrated rectifire bridge.
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.

Coil terminal

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**
Deutsch without connector	**V**

Overvoltage protection

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

Throttle mm *[in]*

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

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 options

Phosphate coated	**-**
Zinc coated	**ZN**
Solenoid type SR-045	**S1**
Painted	**S3**

4/2, 4/3 WAY DIRECTIONAL VALVE KV-5KO

- 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

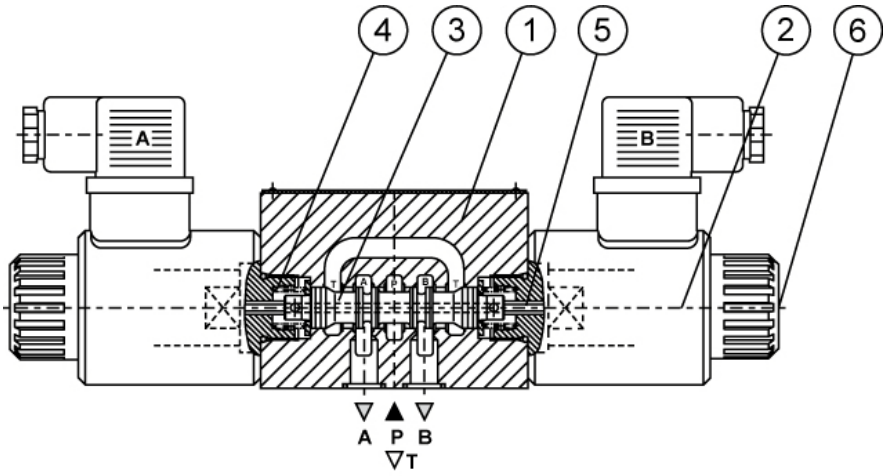
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow.

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 manual override (6).

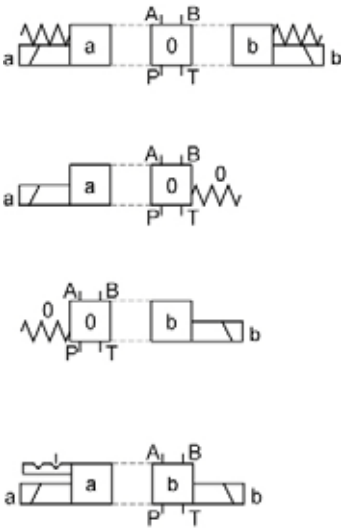
KV-4/2-5KO-6-81

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

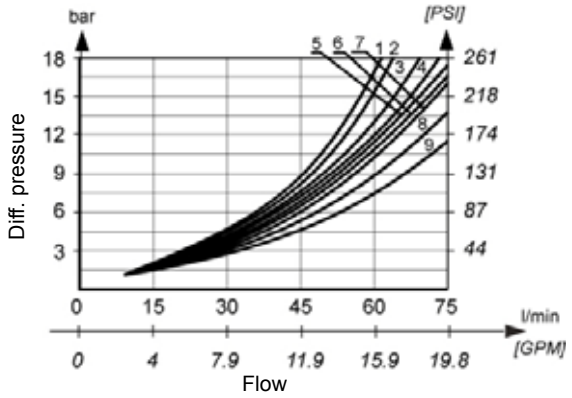
Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	see ΔP-Q curves
Operating pressure	Ports A, B, P	bar *[PSI]*	350 *[5 076]*
	Port T	bar *[PSI]*	250 *[3 625]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[69.5 to 1 760]*
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to 158]*
Filtration		NAS 1638	8
Mass	4/2	kg *[lb]*	1,9 *[4.2]*
	4/3		2,7 *[5.9]*
Mounting position			Optional
Electrical			
Supply voltage	Direct	V	12, 24, 48
	Alternating		110, 230
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]*	to180 *[356]*
Duty cycle			Continuous

* 12 V supply voltage - 36 W.

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

ΔP-Q Performance curves

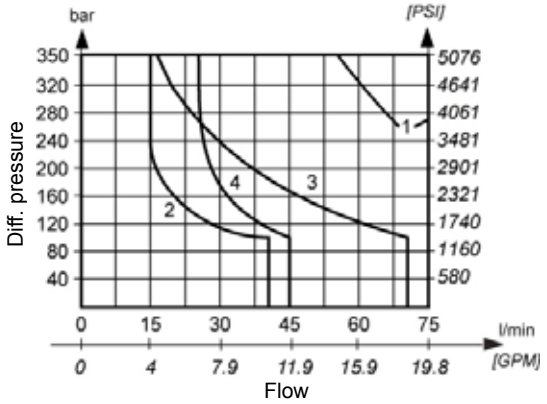
Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.



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	2
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^2/s *[148 SUS]*.

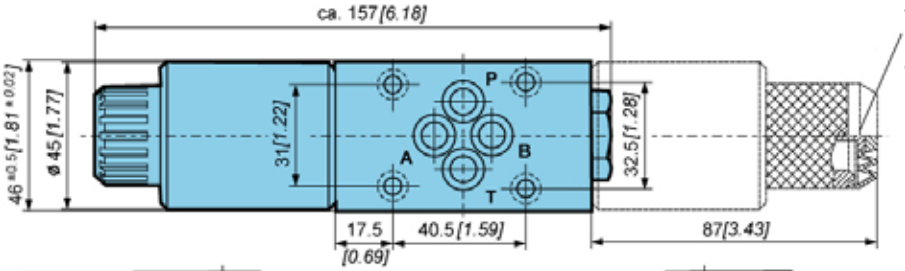


Spool	Curve
1	1
2	4
3	3
6	3
81	1
51A, 51B	1
41A, 41B	2

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

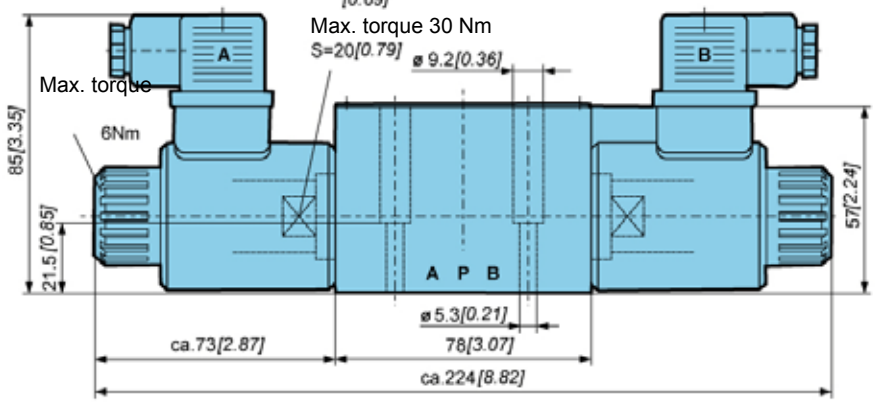
Note: For valves with adjustment of the switching time reduced values of the operating limits may result.

Dimensions



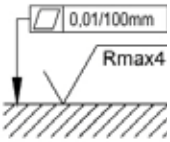
With hand operation - add letter G before spool type in ordering code.

KV-4/2-5KO-6

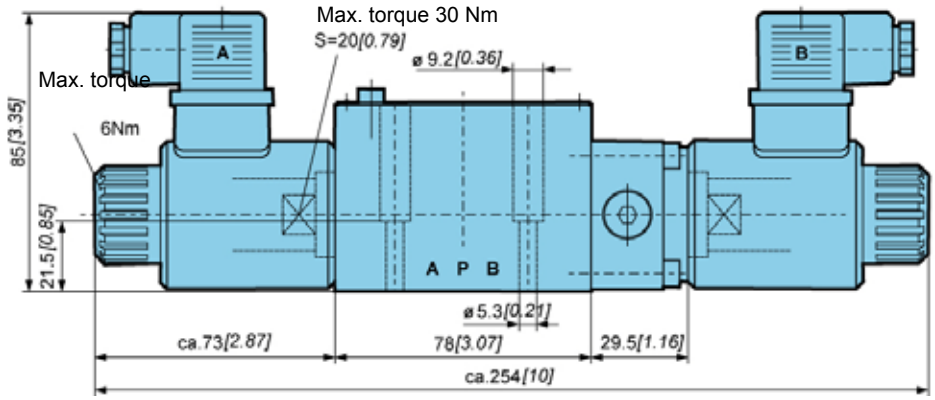


Connection diagram and connecting dimensions to ISO 4401.

KV-4/3-5KO-6



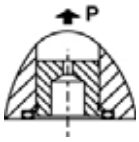
Required quality of the mating surface.



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

Cartridge throttle

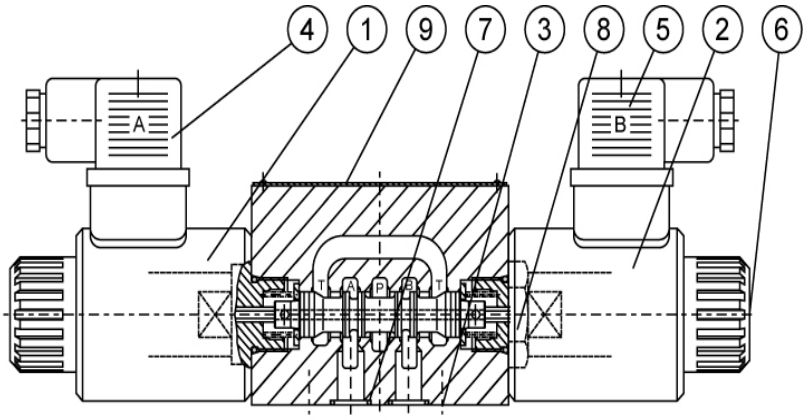
If flow rates greater than permissible occur during change-over, a cartridge throttle must be fitted into P-line of the directional valve.



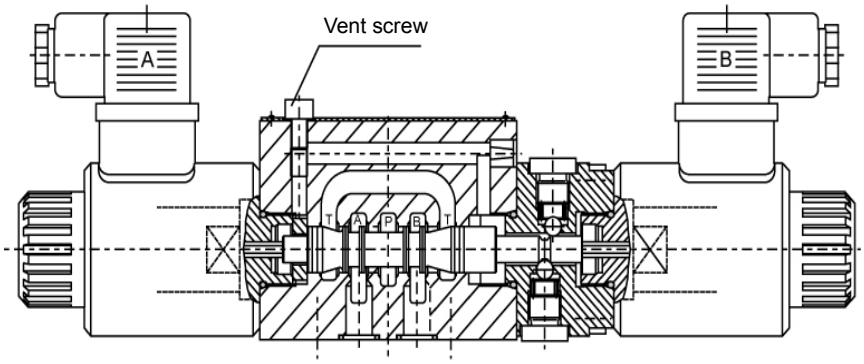
Installation-important for option with restrictor-type ... “UD”

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 refielled 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.

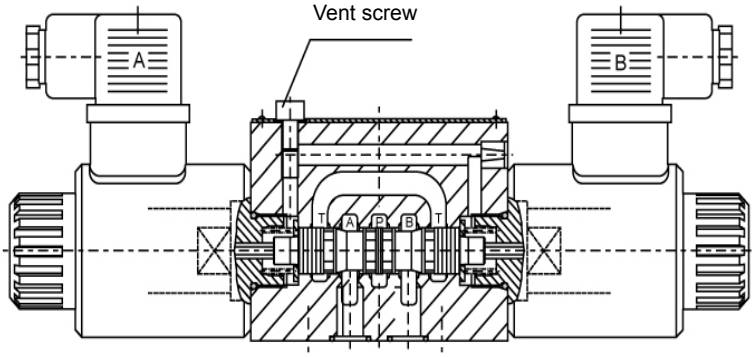
Function drawing



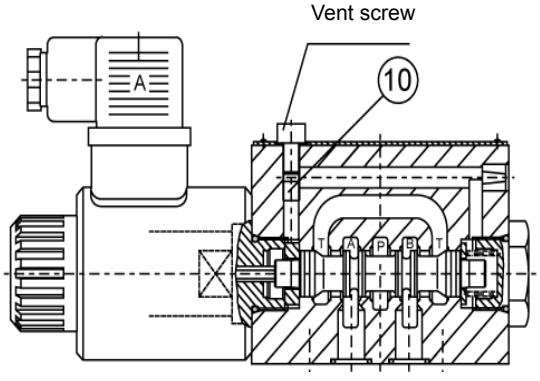
KV-4/3-5KO-6
(KV-4/2-5KO-6)



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



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 manual override
7. O-ring 9,25 x 1,78
8. Valve cap
9. Nameplate
10. Constant action restrictor

Model code

Working ports	
Three working ports	3
Four working ports	4

Number of control spool positions	
Two positions	2
Three positions	3

Manual override option	
Emergency manual override	No designation
Manual override with rubber cover	G
Lockable manual override	C
Auxiliary control lever on valve side A	FA
Auxiliary control lever on valve side B	FB

Spool types

 1	 1A	 1B	 81
 2	 2A	 2B	
 3	 3A	 3B	
 6	 6A	 6B	
	 51A	 51B	
	 41A	 41B	

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

- □□□ - □ - □ - □ - *

Supply voltage

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

Alternating voltage solenoids are fitted with a bridge rectifier
With solenoids of over 48 V an earthing clampto 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**
Deutsch	**V**

Overvoltage protection

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

Throttle mm *[in]*

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

Constant action restrictor

Without restrictor	**No designation**
With restrictor Ø 0,35 *[0.01 dia.]*	**UD**

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

4/2, 4/3 WAY DIRECTIONAL VALVE KV-5KO

- 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

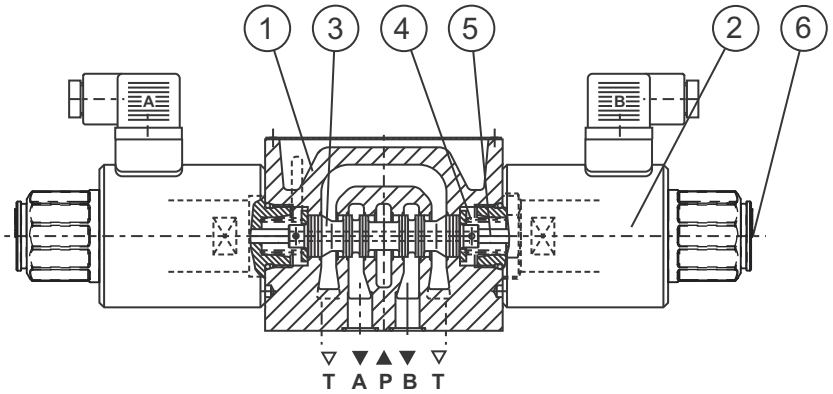
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow.

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 manual override (6).

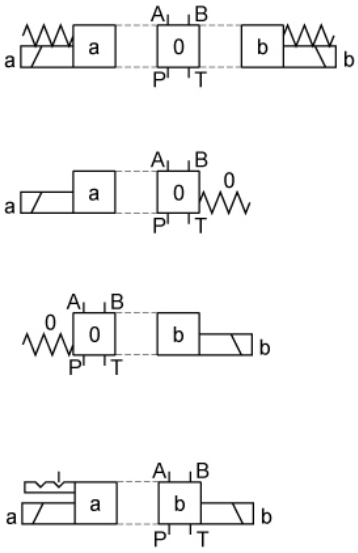
KV-4/2-5KO-10-81

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

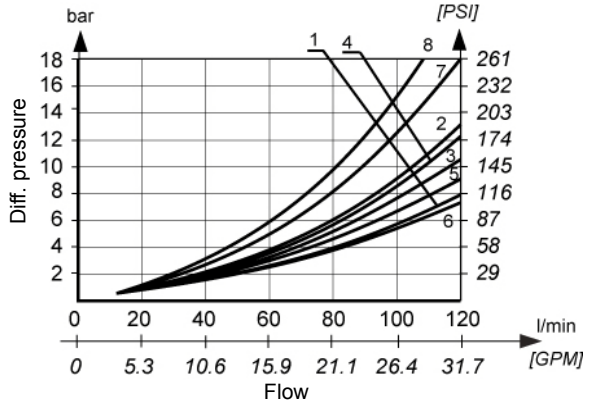
Hydraulic			
Size			**10**
Flow rate		L/min *[GPM]*	see ΔP-Q curves
Operating pressure	Ports A, B, P	bar *[PSI]*	350 *[5 076]*
	Port T	bar *[PSI]*	250 *[3 625]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[69.5 to 1 760]*
Oil temperature range		°C *[°F]*	-20 to+70 *[-4 to 158]*
Filtration		NAS 1638	8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

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

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

ΔP-Q Performance curves

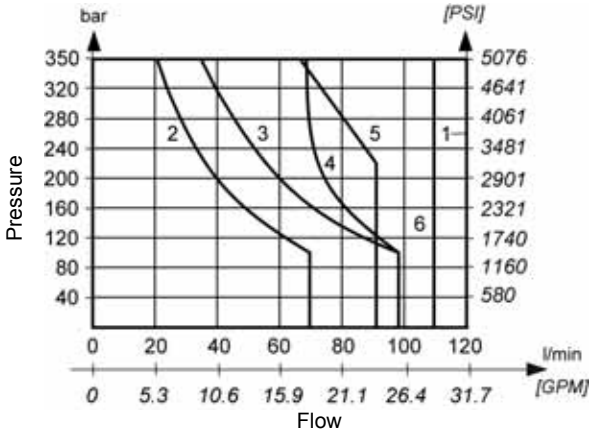
Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.



Spool	Flow path				
	P-A	P-B	A-T	B-T	P-T
1	1	1	5	5	-
2	3	3	2	7	8
3	6	6	3	4	7
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^2/s *[148 SUS]*.

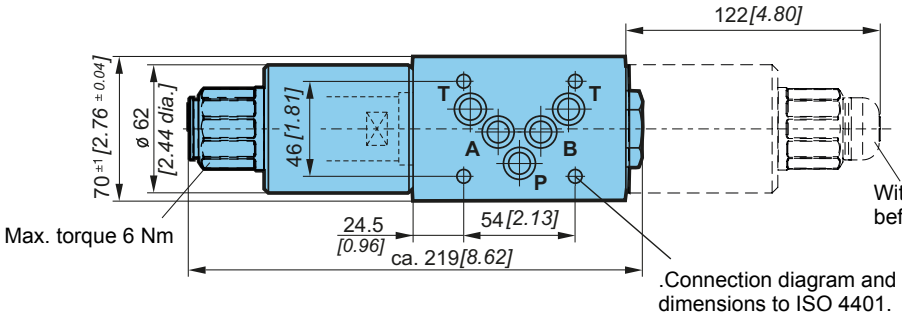


Spool	Curve
1	1
2	4
3	5
6	3
9	6
81	1
51A, 51B	1
41A, 41B	2

The operating limits of the valve are determined at a voltage 10% below the nominal rating. The curves refer to application with symetrical flow throw the valve (P-A and B-T). In the case of asymetric 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.

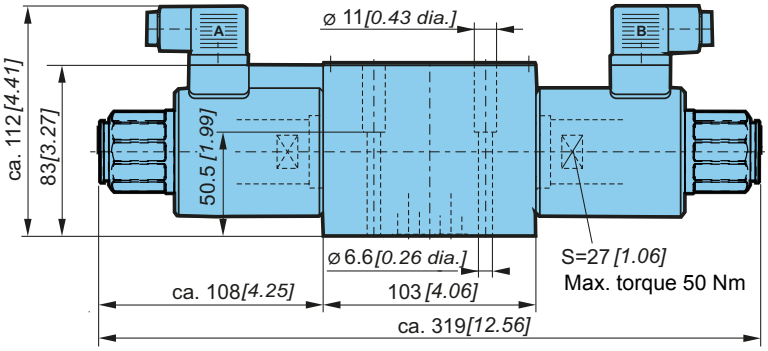
Dimensions



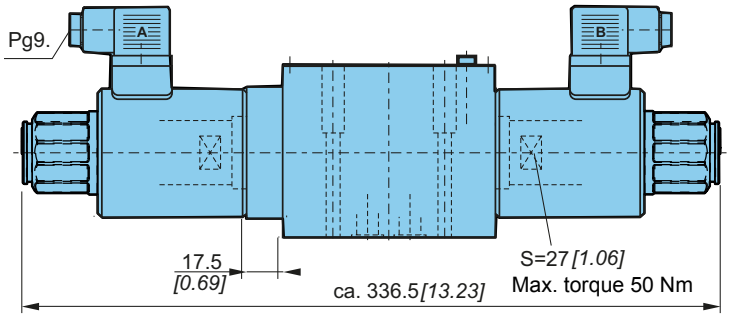
KV-4/2-5KO-10

With hand operation - add letter G before spool type in ordering code.

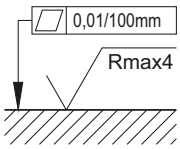
.Connection diagram and connecting dimensions to ISO 4401.



KV-4/3-5KO-10



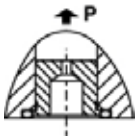
KV-4/2-5KO-10-81



Required quality of the mating surface.

Cartridge throttle

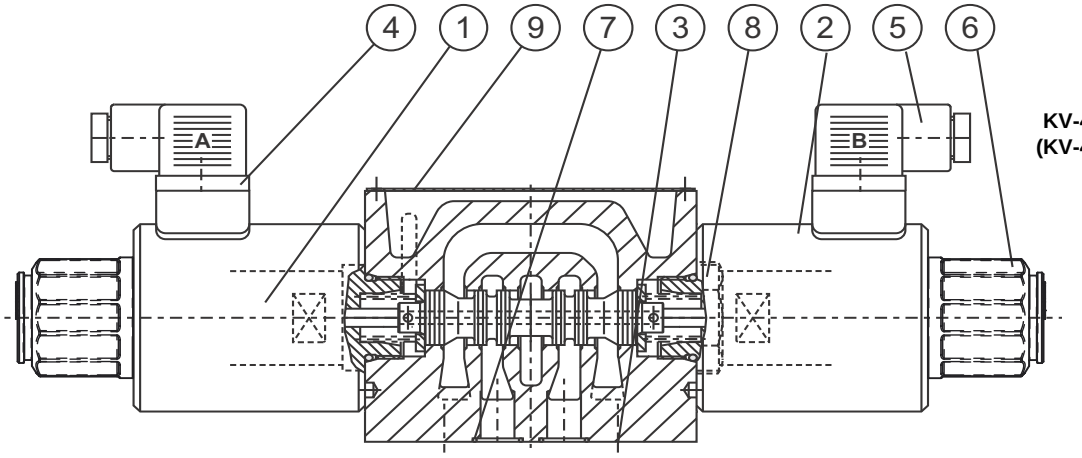
If flow rates greater than permissible occur during change-over, a cartridge throttle must be fitted into P-line of the directional valve.



Installation-important for option with restrictor-type... “UD”

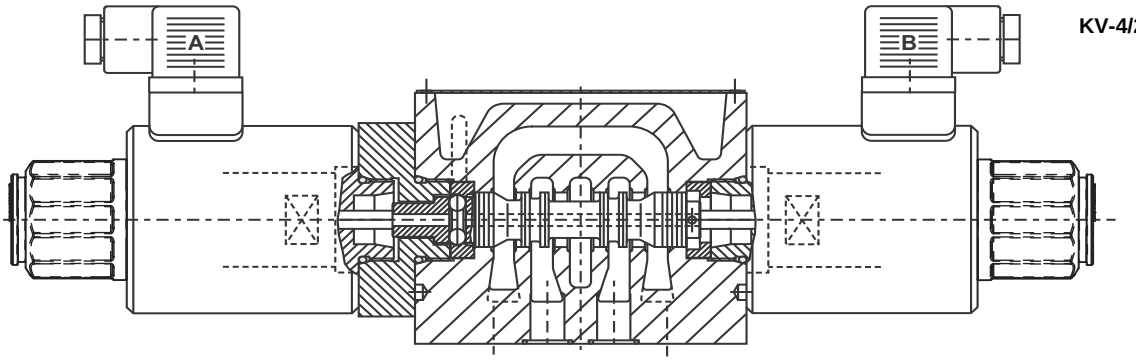
The directional control valve must be installed horizontally (Nameplate on top). If this is not the case, the valve must be removed for venting. Unscrew the vent screw. Move the spool alternately to the switching positions a and b until no more bubbles appear at the screw hole. The oil must be visible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

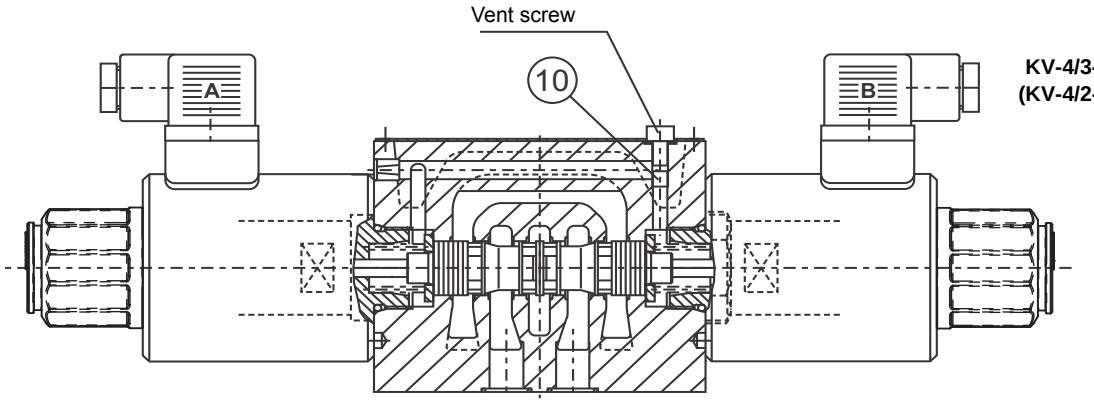


KV-4/3-5KO-10
(KV-4/2-5KO-10)

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

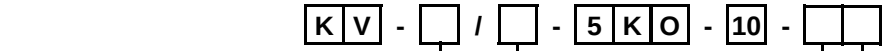


KV-4/2-5KO-10-81



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

Model code



Working ports	
Three working ports	3
Four working ports	4

Number of control spool position	
Two positions	2
Three positionsTwo positions	3

Manual override option	
Emergency manual override	No designation
Manual override with rubber cover	G
Lockable manual override	C

Spool types

1	1A	1B	81
2	2A	2B	
3	3A	3B	
6	6A	6B	
	51A	51B	
	41A	41B	

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

- □□□ - □ - □ - □ - *

Supply voltage

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

- 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**
Deutsch	**V**

Overvoltage protection

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

Throttle mm *[in]*

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

Constant action restrictor

Without restrictor	**No designation**
With restrictor Ø 0,35 *[0.01 dia.]*	**UD**

Seal type

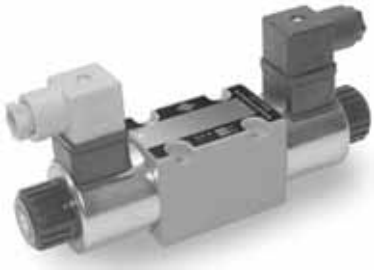
NBR seals for mineral oil HL,HLP to DIN 51524	**No designation**
FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380	**E**

Special requirements to be briefly specified

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

- NG 6
- Up to 250 bar *[3 625 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

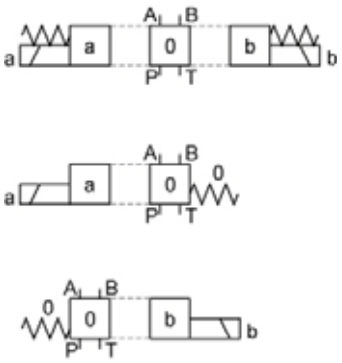
Directional valves type KV-3KO with direct solenoid operation control the direction of the hydraulic medium flow.

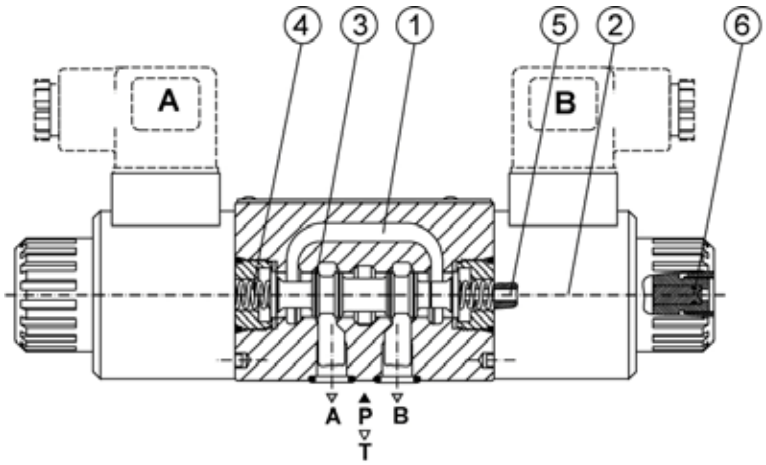
These directional valves consist of a housing (1), a control spool (3), and one solenoid (2) with two return springs (4) in 4/2-way directional valves, and two solenoids (2) with two return springs (4) in 4/3-way directional valves. In 4/3-way directional valves the centre position of the control spool 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 manual override (6).

Hydraulic symbols

Spool types





Features

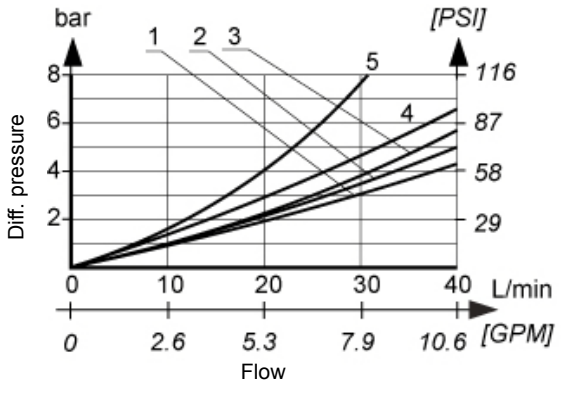
Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	see ΔP-Q curves
Operating pressure	Ports A, B, P	bar *[PSI]*	250 *[3 625]*
	PortT	bar *[PSI]*	
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[69.5 to 1 760]*
Oil temperature range		°C *[°F]*	-20 to +70*[-4 to 158]*
Filtration		NAS 1638	8
Mass	4/2	kg *[lb]*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

Electrical			
Supply voltage	Direct	V	12, 24, 48
	Alternating		110, 230
Power		W	26
Switch-on time*		ms	50 to 80
Switch-off time*		ms	30 to 55
Switching frequency		1/h	15 000
Ambient temperature		°C *[°F]*	to50 *[122]*
Coil temperature		°C *[°F]*	to180 *[356]*
Duty cycle			Continuous

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

ΔP-Q Performance curves

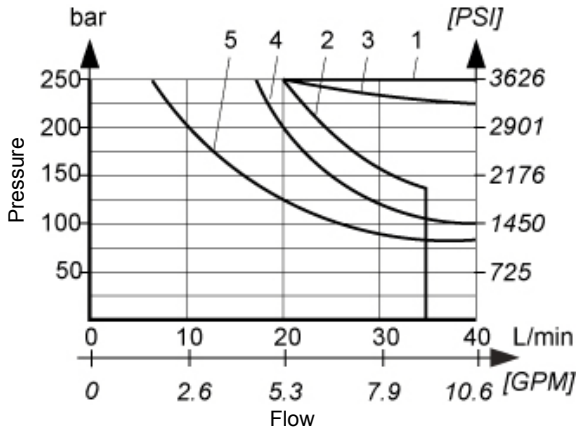
Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.



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^2/s *[148 SUS]*.

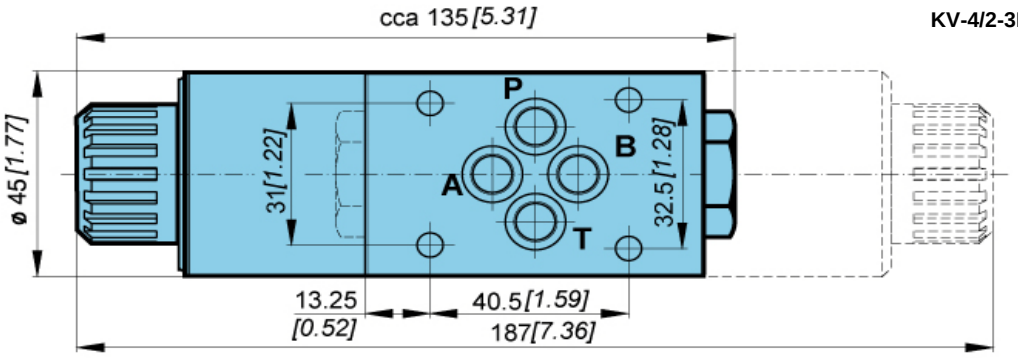


Spool	curve
1	1
2	2
3	3
6	4
51A, 51B	1
41A, 41B	5

Dimensions

Connection diagram and connecting dimensions to ISO 4401.

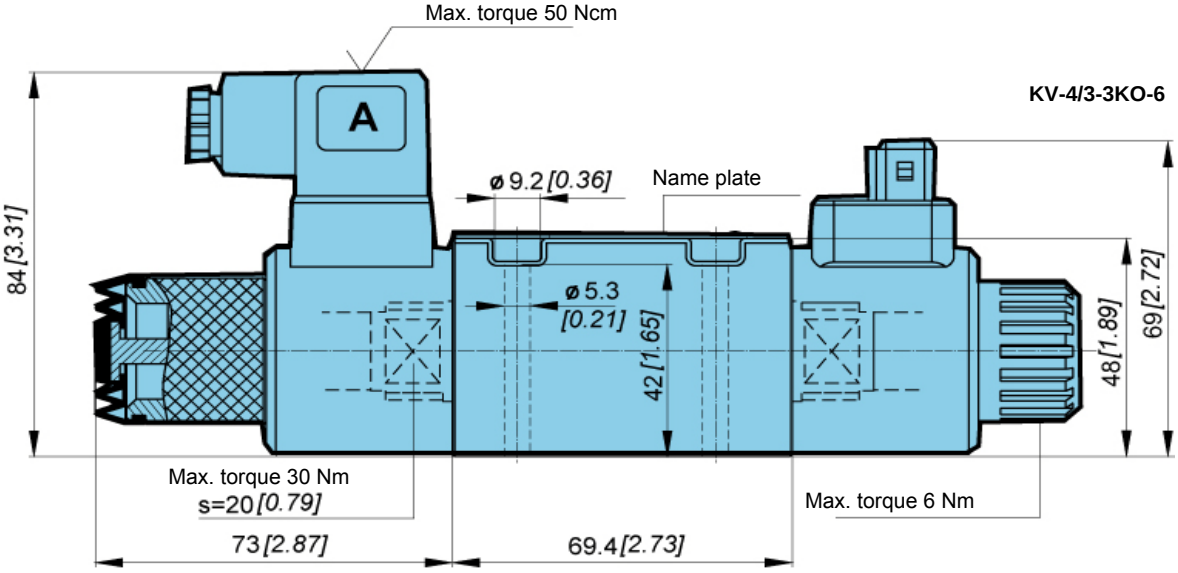
KV-4/2-3KO-6



Option: Plug-in connector to ISO 4400

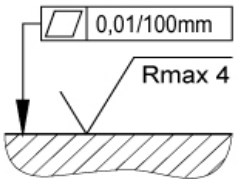
Option: AMP JUNIOR connector

KV-4/3-3KO-6



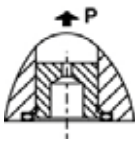
4 x Fixing screws M5x50 to ISO 4762- 10.9 must be ordered separately.
Required tightening torque Md= 7Nm.

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.



Model code

Working ports	
Three working ports	3
Four working ports	4

Number of control spool positions	
Two positions	2
Three positions	3

Manual override option	
Emergency manual override	No designation
Manual override with rubber cover	G
Lockable manual override	C

Spool types

1	1A	1B
2	2A	2B
3	3A	3B
6	6A	6B
	51A	51B
	41A	41B

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

Supply voltage

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

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

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**
Deutsch	**V**

Overvoltage protection

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

Throttle mm *[in]*

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

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

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]*

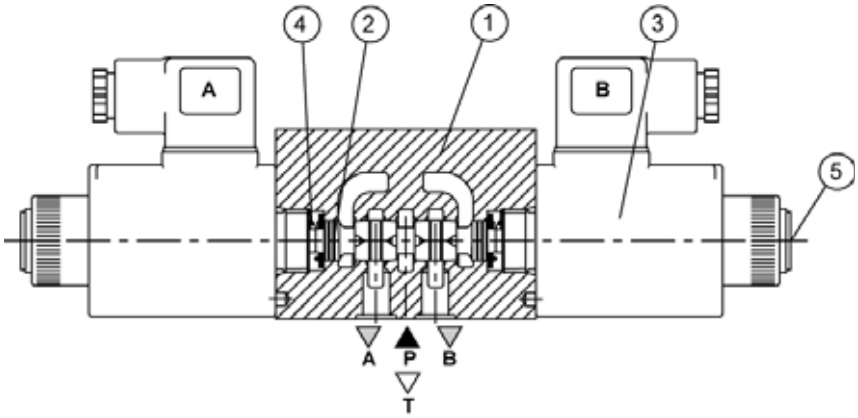
• Plug-in connector for solenoids to ISO 4400.Connection diagram and connection dimensions to ISO 4401.
• 5 chamber models with good spool guidance.Optional control electronics: Amplifier P/N: 1659574.
• Protection of solenoid IP 65 to EN 60529 / IEC 60529.
• Fulfil EMC (89/336/EEC).

KVP-4/3-5KO-6

Operation

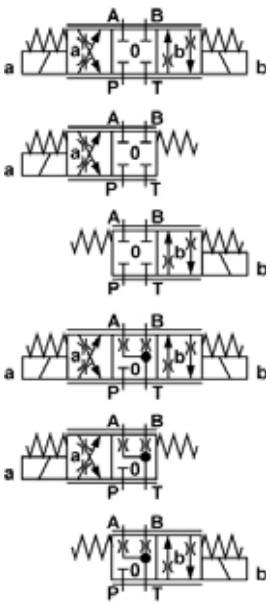
The KVP directional control valve is a proportional valve providing variable flow rates. This valve is used with control electronics. Typical applications are soft switching via adjustable ramps for the reduction of hydraulic and mechanical shocks, and electrically adjustable flow rates - speeds for 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 manual override (5).



Hydraulic symbols

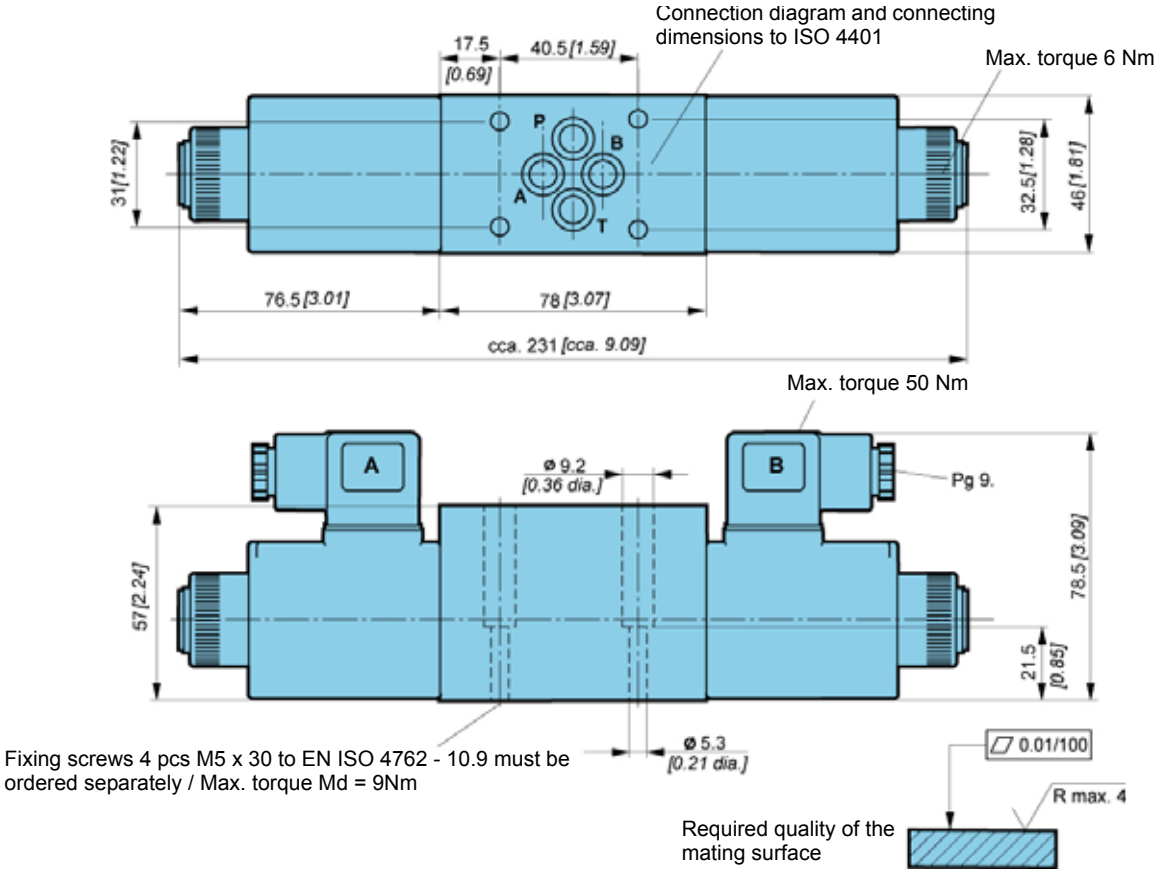
Spool type



Features

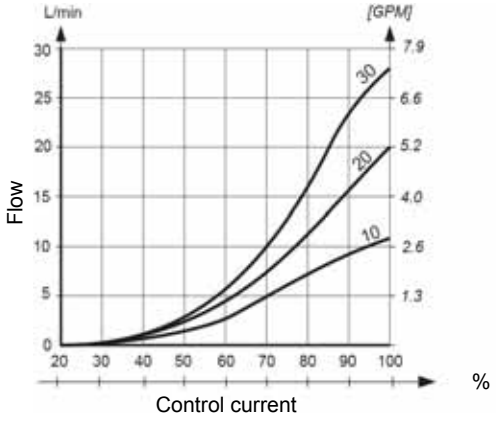
Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	10, 20, 30 *[2.6 - 5.2 - 7.9]*
Operating pressure	A, B, P	bar *[PSI]*	350 *[5 076]*
	T		250 *[3 625]*
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to +158]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[3.24 to 82]*
Mounting position			Optional
Mass	4/2	kg *[lb]*	1,65 *[3.63]*
	4/3		2,2 *[4.85]*
Filtration		NAS 1638	7
Proportional			
Hysteresis			5% of max. flow rate
Nominal current	12 DC	A	2
	24 DC		1
Electrical			
Supply voltage		V	12, 24 DC
Power		W	36
Ambiant temperature		°C *[°F]*	to+50 *[to +122]*
Coil temperature		°C *[°F]*	to +180 *[to +356]*
Duty cycle			Continuous

Dimensions



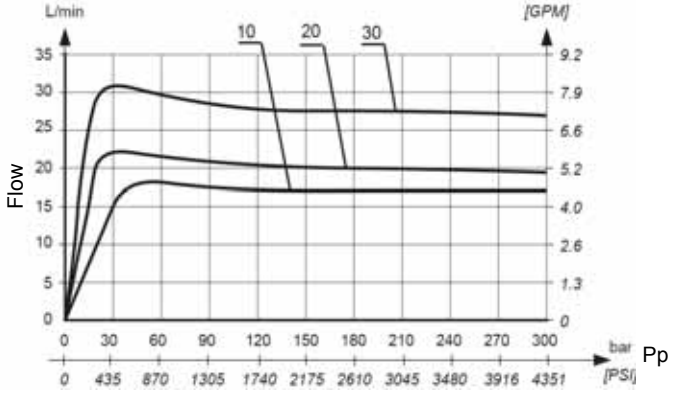
Input signal curves / Flow rate

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.



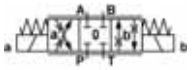
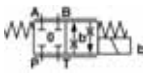
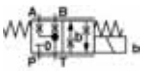
Model code

K	V	P	-	4	/		-	5	K	O	-	6	-						

Number of spool positions

Two positions	**2**
Three positions	**3**

Spool types

	**1**
	**1A**
	**1B**
	**6**
	**6A**
	**6B**

Special requirements to be briefly specified

FA	Auxiliary control lever on valve side A
FB	Auxiliary control lever on valve side 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

Connector type

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

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**

Supply voltage

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

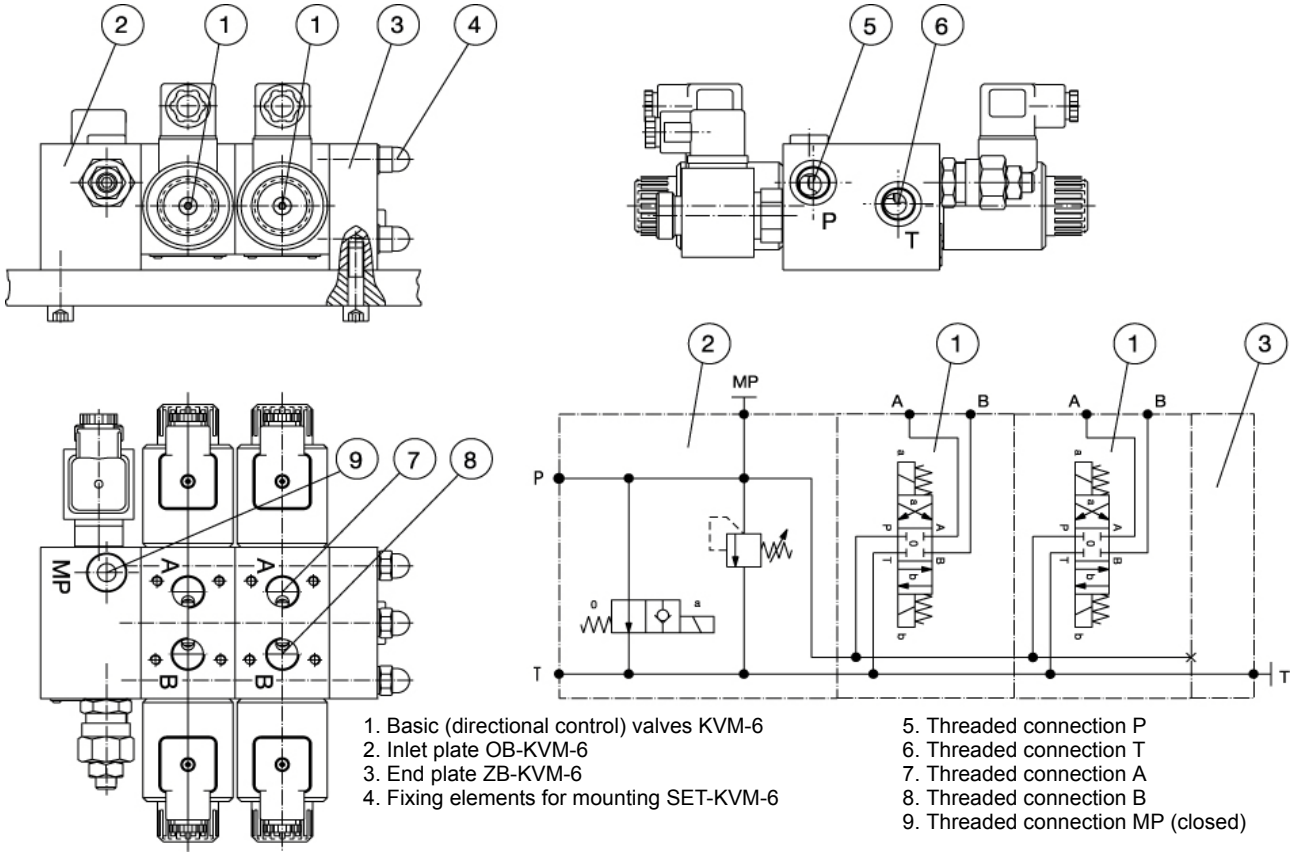
4/2, 4/3 WAY BANKABLE DIRECTIONAL VALVES KVM

- NG 6
- Up to 350 bar *[5 076PSI]*
- Up to 40 L/min *[10.6 GPM]*

- Threaded connection to ISO 9974 (Metric), ISO1179 (BSPP/Gas).
- Series or parallel connections.
- Inlet plate possbility with pressure relief valve, pump unloading valve or flow control valve.
- Possibility to use standard components for vertical stacking.

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

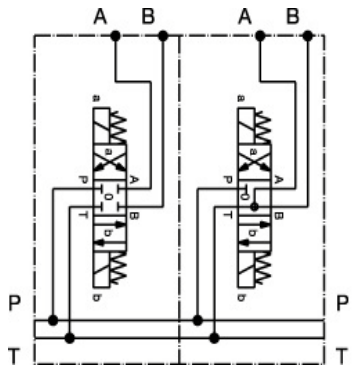
Basic concept



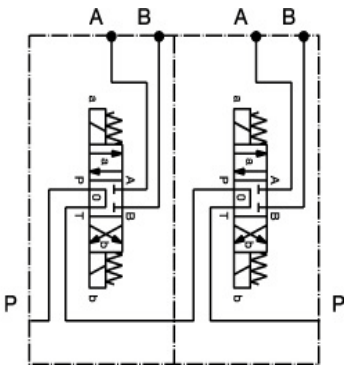
1. Basic (directional control) valves KVM-6
2. Inlet plate OB-KVM-6
3. End plate ZB-KVM-6
4. Fixing elements for mounting SET-KVM-6
5. Threaded connection P
6. Threaded connection T
7. Threaded connection A
8. Threaded connection B
9. Threaded connection MP (closed)

Type of connection

Parallel (KVM-P)



Series (KVM-S)



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]*

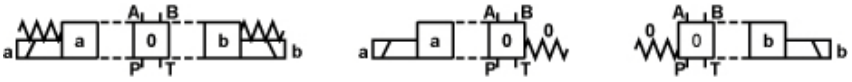
- Parallel or series connection.
- Plug-in connection for solenoids to ISO 4400.
- 5-chamber model with good spool guidance.
- Wet pin solenoid with interchangeable coil.
- Manual emergency control.
- Protection of solenoid IP 65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).
- Threaded connections 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

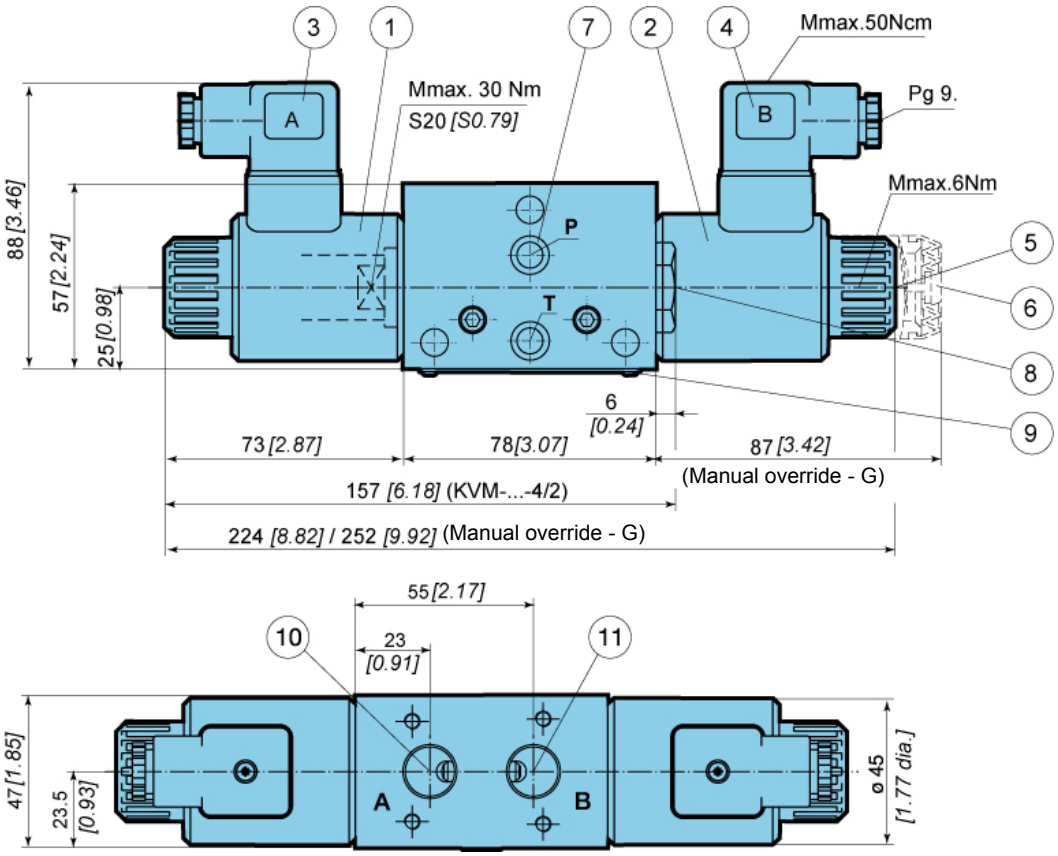
Hydraulic

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

Electrical

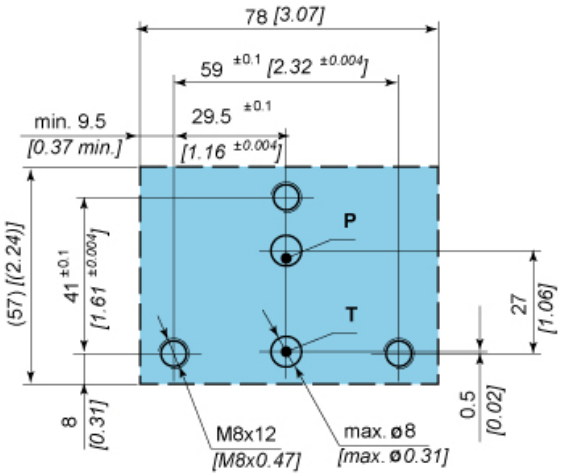
Supply voltage		V	12, 24 DC
Power		W	29
	(12 V DC supply voltage)		36
Switching frequency		1/h	15 000
Ambiant temperature		°C *[°F]*	to +50 *[to +122]*
Coil temperature		°C *[°F]*	to +180 *[to +356]*
Duty cycle			Continuous

Dimensions

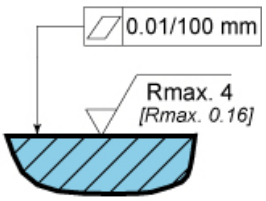


1. Solenoid ”a” / MR-045-O
2. Solenoid ”b” / MR-045-O
3. Plug-in connector «a» -grey
4. Plug-in connector «b» -black
5. Emergency manual override
6. Manual override with rubber (G)
7. O-ring 9,25 x 1,78
8. Valve cap (KVM-...-4/2)
9. Nameplate
10. Threaded connection A-M torque = max. 100 Nm
11. Threaded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

Connection dimensions for KVM-6



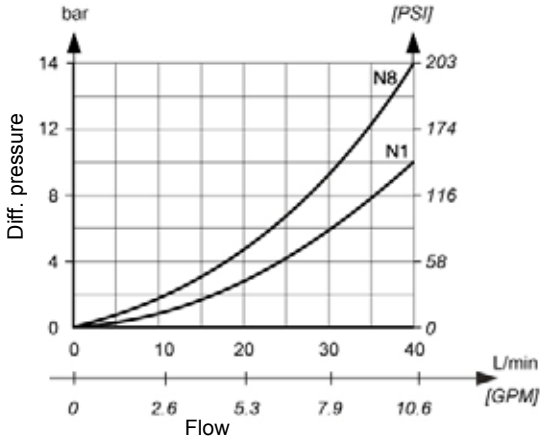
Required quality of the mating surface



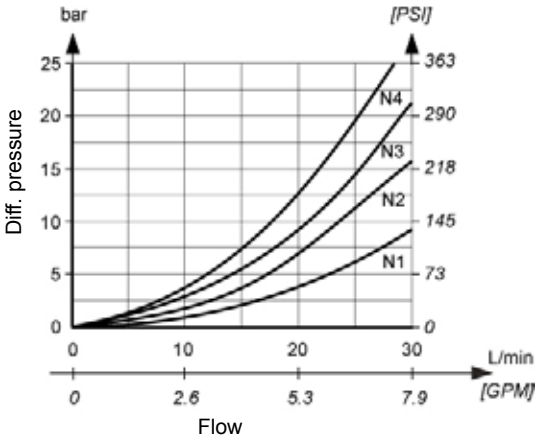
ΔP-Q Performance curves

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

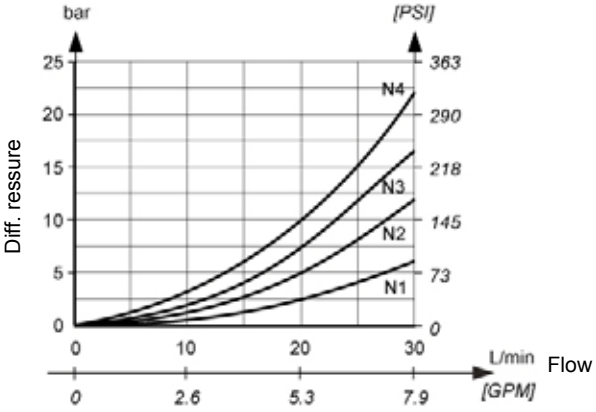
Parallel connection -KVM-P (N1 to N8)

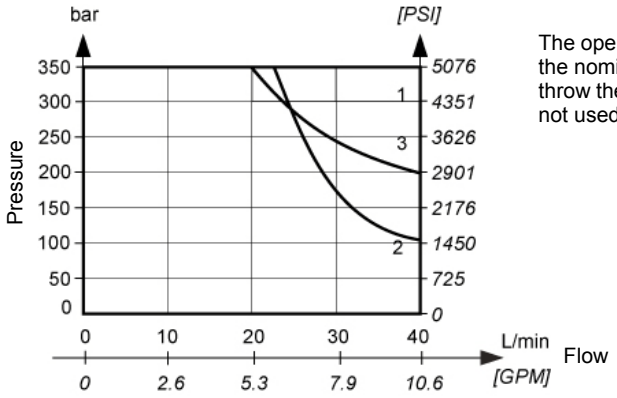


.Series connection -KVM-S (P to T).



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





The operating limits of the valve shall be determined at a voltage 10% bellow the nominal rating. The curves refer to application with symmetrical flow throw 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

Model code

K V M - □ - 4 / □ - 6 - □□

Type of connection

Series connection	**S**
Parallel connection	**P**

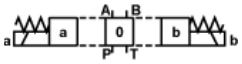
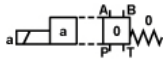
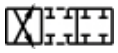
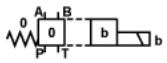
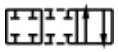
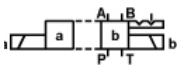
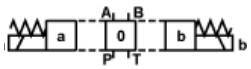
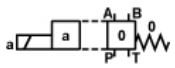
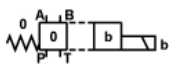
Number of control spool positions

Two positions	**2**
Three positions	**3**

Manual override option

Emergency manual override	**No designation**
Manual override with rubber	**G**
Lockable manual override	**C**
Auxiliary control lever on valve side A	**FA**
Auxiliary control lever on valve side B	**FB**

Spool type

Parallel connection (KVM-P)		 **1**
		 **3**
		 **6**
		 **1A**
		 **3A**
		 **6A**
		 **51A**
		 **1B**
		 **3B**
		 **6B**
		 **51B**
		 **81**
Series connection (KVM-S)		 **2**
		 **2A**
		 **2B**

- ☐☐☐ - ☐ - ☐✱

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**
Deutsch	**V**

Overvoltage protection

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

Threaded connections

M18 x1,5	**No designation**
G3/8	**3/8**
9/16-18 UNF-2B	**SAE 6**

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

VERTICAL STACKING FOR KVM VALVES

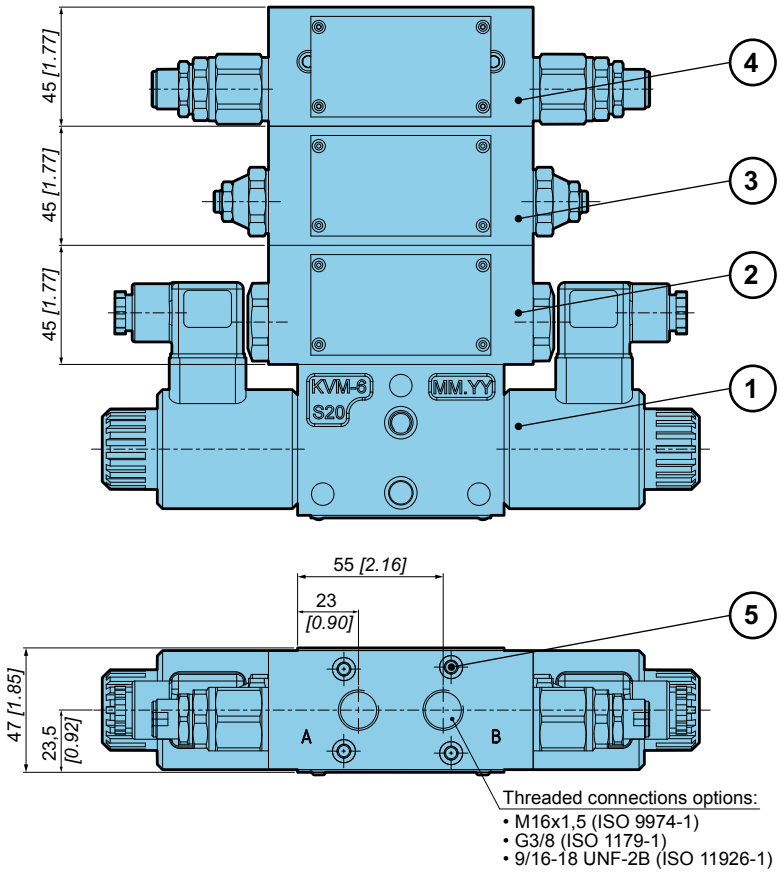
- NG 6
- Up to 350 bar *[5076 PSI]*
- Up to 40 l/min *[10.56 GPM]*

- Threaded connections to ISO 9974, ISO 1179 or ISO 11926.
- Possibility of stacking one, two or three vertical stacking components.

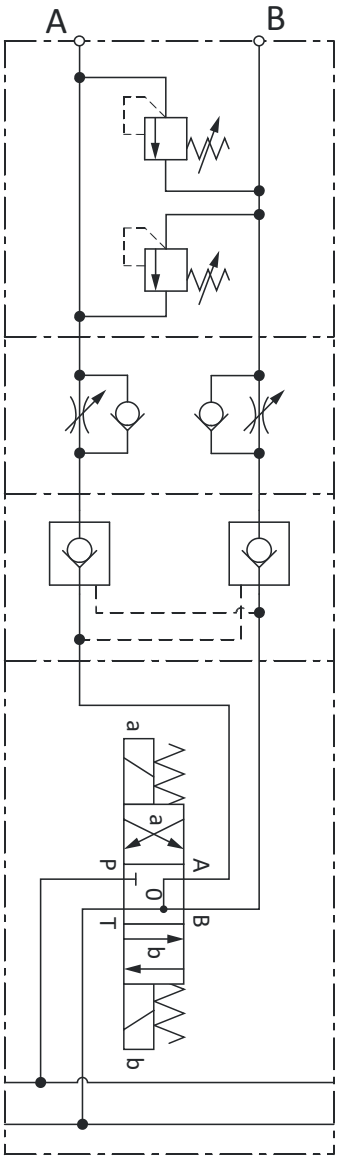
Mounting example

1. Bankable directional valve KVM-6
2. First stacking component (KVM-NOV-6)
3. Second stacking component (KVM-NDV-6)
4. Third stacking component (KVM-VV-6)
5. Mounting screws for vertical stacking components:
   - M5x55, ISO 4762-10.9 (for one stacking component) - ordering code: 1114573
   - M5x95, ISO 4762-10.9 (for two stacking components) - ordering code: 1253603
   - M5x135, ISO 4762-10.9 (for three stacking components) - ordering code: 1668356

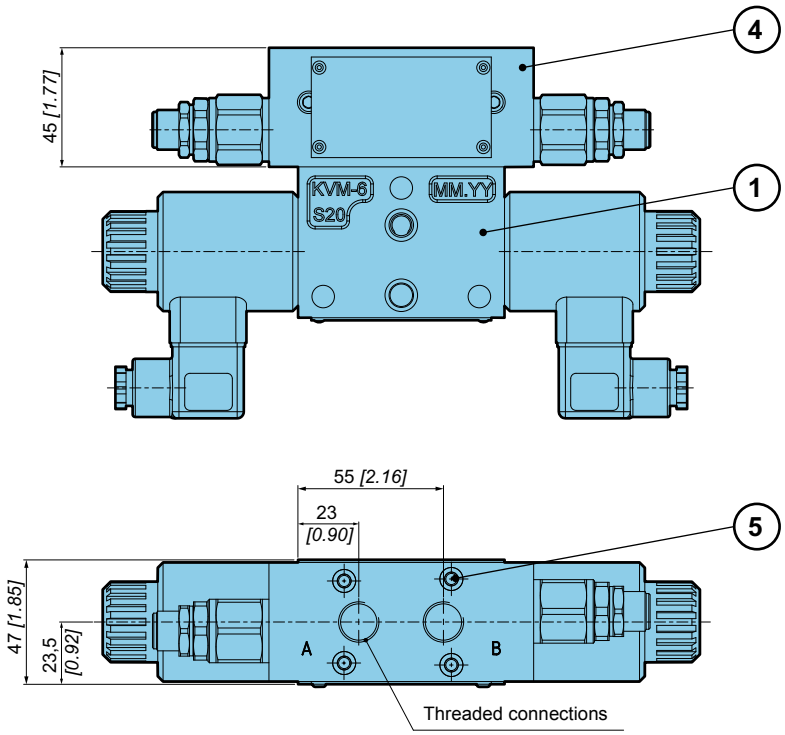
Mounting screws tightening torque: max. 9 Nm *[79.6 in.lbf]*



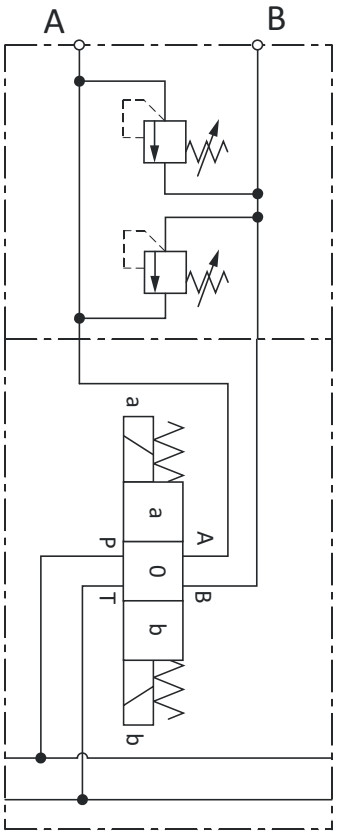
Hydraulic symbol



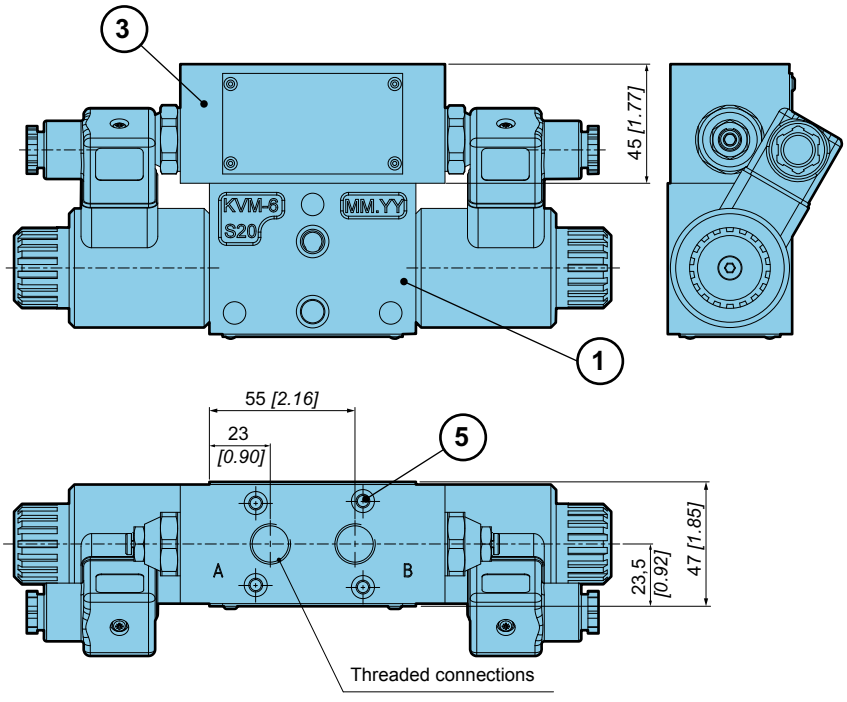
Directional valve KVM and KVM-VV-6 relief valve mounting example



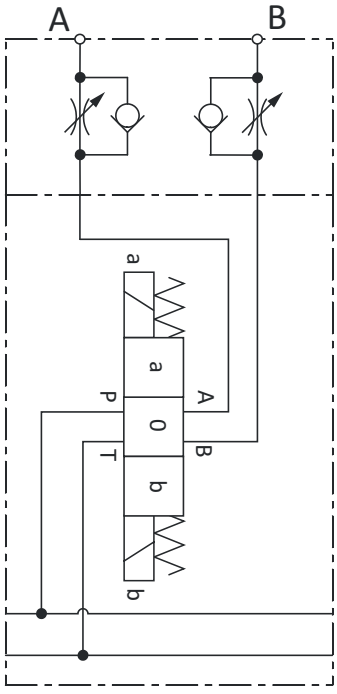
Hydraulic symbol



Directional valve KVM and KVM-NDV-6 throttle valve mounting example

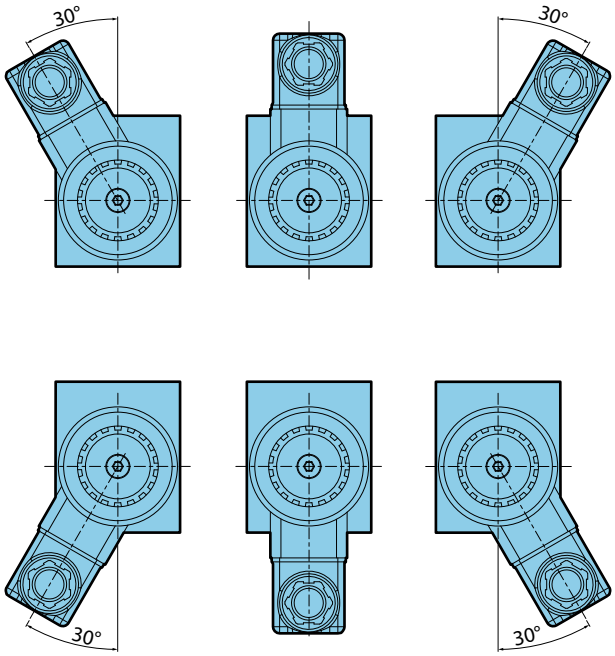


Hydraulic symbol

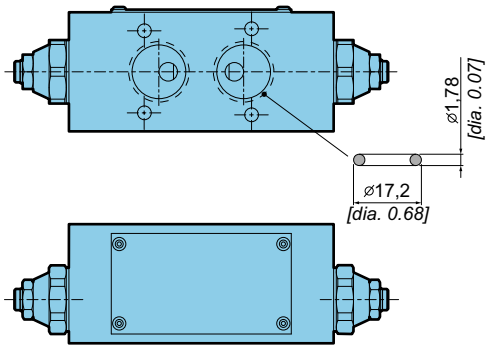


Solenoid orientation options

Six different orientation options:



Sealing between stacking elements



CHECK VALVE KVM-NOV-6

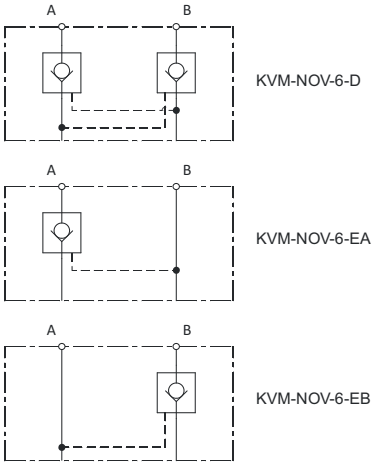
- Up to 350 bar *[5 076 PSI]*
- Up to 40 l/min *[10.6 GPM]*

- Flow shut-off in both or one service line.
- For vertical stacking on KVM directional valves.

Operation

Pilot operated check valves type KVM-NOV-6 enables the hydraulic fluid flow in the service lines to be automatically shut off and made free, respectively.
Free flow direction is always from the valve side to the ports side. In the opposite direction is the valve blocked for the hydraulic fluid flow. Free flow in port A in direction from ports to valve side is achieved by means of pressure in port B and vice versa.
To assure zero leakage there is necessary to discharge ports A and B towards port T in the zero position of the directional valve.

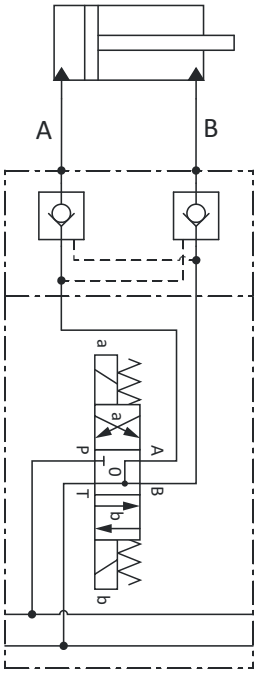
Hydraulic symbols



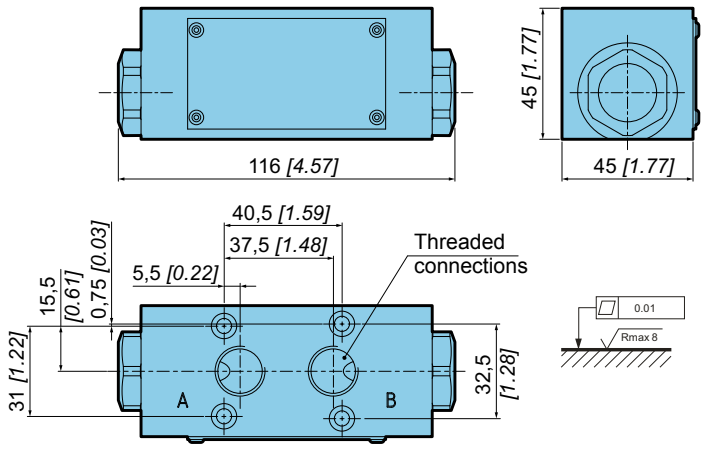
Features

Size		6
Flow rate	l/min *[GPM]*	40 *[10.5]*
Operating pressure	bar *[PSI]*	350 *[5 076]*
Cracking pressure	bar *[PSI]*	1 *[14.5]*
Area ratio		1:3,9
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69.5 to 1760]*
Filtration	ISO 4406: 1999	19/17/14
Mass	kg *[lbs]*	1,4 *[3.0]*

Mounting example

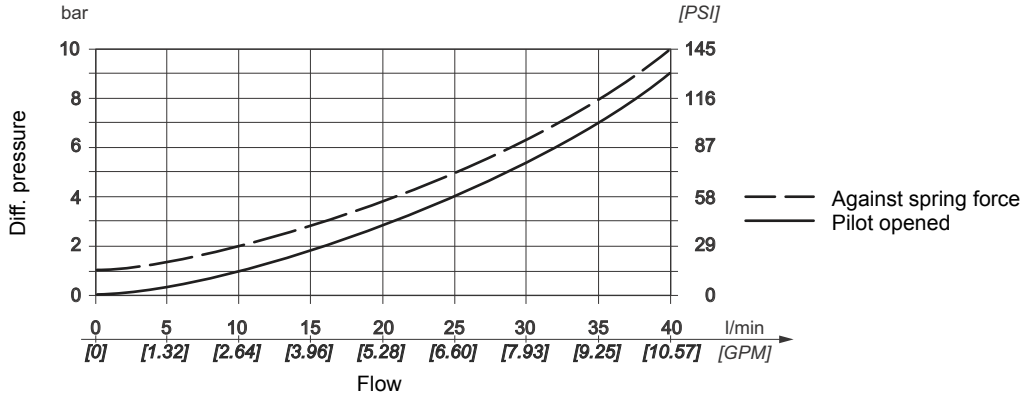


Dimensions



ΔP-Q Performance curves

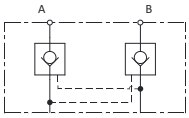
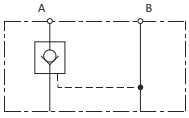
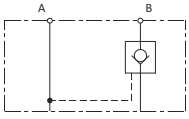
Measured at 50°C *[122°F]*
and viscosity of 32 mm^2/s *[148 SUS]*.



Model code

K V M - N O V - 6 - □ - □ - □ - ✱

Symbol

	**D**
	**EA**
	**D**

Threaded connections

M16 x 1,5 (ISO 9974-1)	**No designation**
G3/8 (ISO 1179-1)	**3/8**
9/16-18 UNF-2B (ISO 11926-1)	**SAE6**

Special requirements to be briefly specified

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**

THROTTLE WITH CHECK VALVE KVM-NDV-6

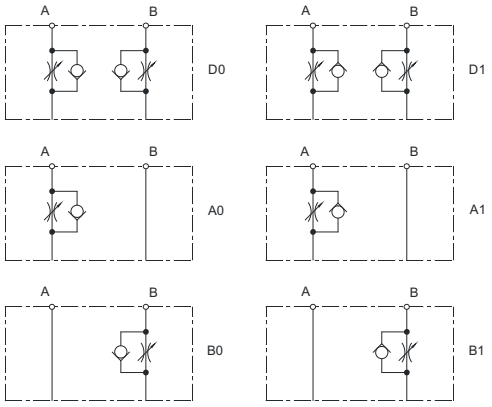
- Up to 350 bar *[5 076 PSI]*
- Up to 40 l/min *[10.6 GPM]*

- Flow control in both or one service line.
- For flow throttling in supply and/or return lines.
- For vertical stacking on KVM directional valves.

Operation

Throttle with check valves type KVM-NDV-6 are used for throttling flow of the hydraulic fluid in lines A and/or B. The KVM-NDV-6 valves are allowing free flow in one direction through check valve and throttled flow in reversed direction. Hydraulic fluid flow is throttled depending od adjustment of the throttling screw.

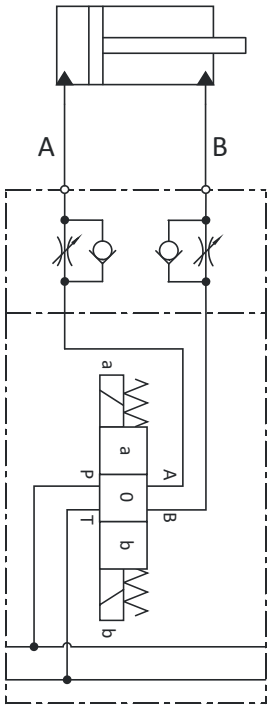
Hydraulic symbols



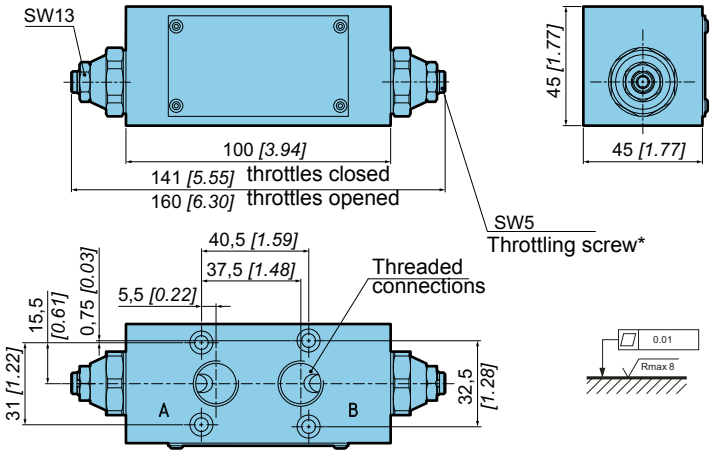
Features

Size		6
Flow rate	l/min *[GPM]*	40 *[10.6]*
Operating pressure	bar *[PSI]*	350 *[5 076]*
Cracking pressure	bar *[PSI]*	0,5 *[7.2]*
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69.5 to 1760]*
Filtration	ISO 4406: 1999	19/17/14
Mass	kg *[lbs]*	1,5 *[3.3]*

Mounting example



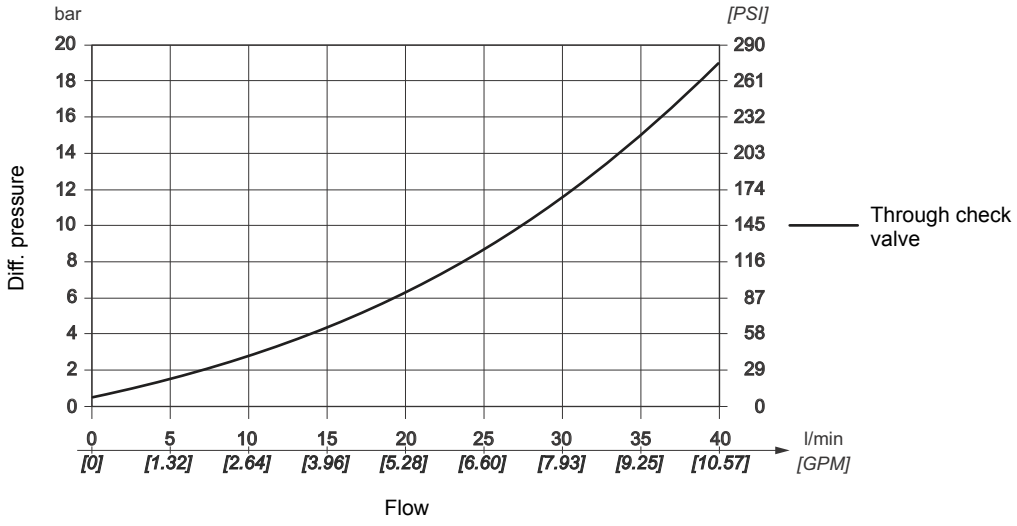
Dimensions



* Clockwise rotation reduces the hydraulic fluid flow.It is recommended that the valve is set at zero pressure in setting line.

ΔP-Q Performance curve

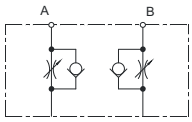
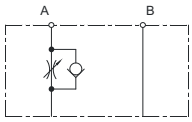
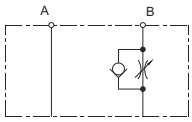
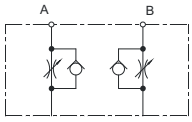
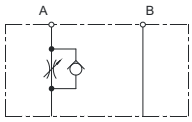
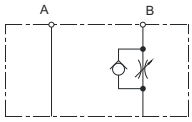
Measured at 50°C *[122°F]*
and viscosity of 32 mm^2/s *[148 SUS]*.



Model code

K V M - N D V - 6 - ☐ - ☐ - ☐ - *

Symbol

	**D0**
	**A0**
	**B0**
	**D1**
	**A1**
	**B1**

Threaded connections

M16 x 1,5 (ISO 9974-1)	**No designation**
G3/8 (ISO 1179-1)	**3/8**
9/16-18 UNF-2B (ISO 11926-1)	**SAE6**

Special requirements to be briefly specified

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**

PRESSURE RELIEF VALVE KVM-VV-6

- Up to 350 bar *[5 076 PSI]*
- Up to 40 l/min *[10.6 GPM]*

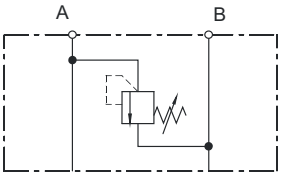
- Direct operated.
- For vertical stacking on KVM directional valves.
- Multiple pressure setting ranges.
- Various hydraulic symbols.

Operation

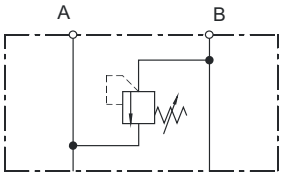
Throttle with check valves type KVM-NDV-6 are used for throttling flow of the hydraulic fluid in lines A and/or B. The KVM-NDV-6 valves are allowing free flow in one direction through check valve and throttled flow in reversed direction. Hydraulic fluid flow is throttled depending od adjustment of the throttling screw.

Hydraulic symbols

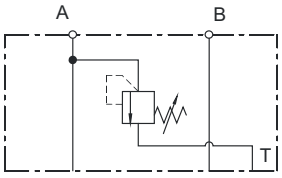
KVM-VV-6-AB



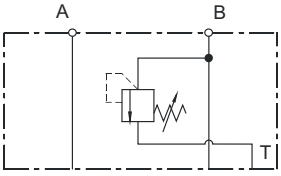
KVM-VV-6-BA



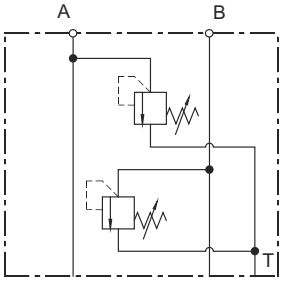
KVM-VV-6-AT



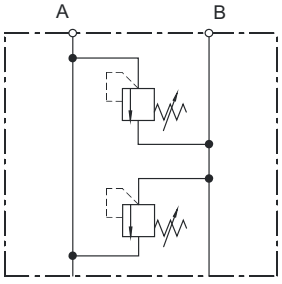
KVM-VV-6-BT



KVM-VV-6-DT



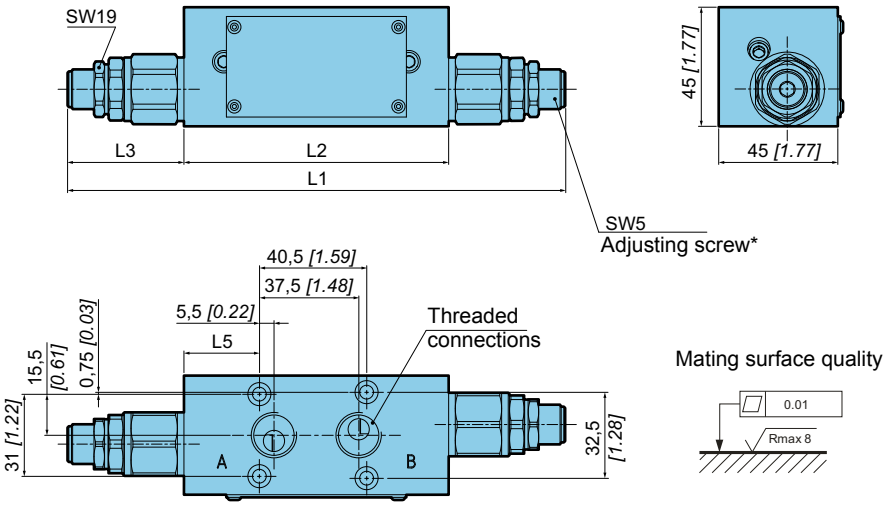
KVM-VV-6-DD



Features

Size		**6**
Flow rate	l/min *[GPM]*	40 *[10.6]*
Pressure setting range	bar *[PSI]*	15 - 350 *[270 - 5 076]*
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69.5 to 1760]*
Filtration	ISO 4406: 1999	19/17/14
Mass	kg *[lbs]*	1,1 - 1,8 *[2.4 - 4.0]*

Dimensions

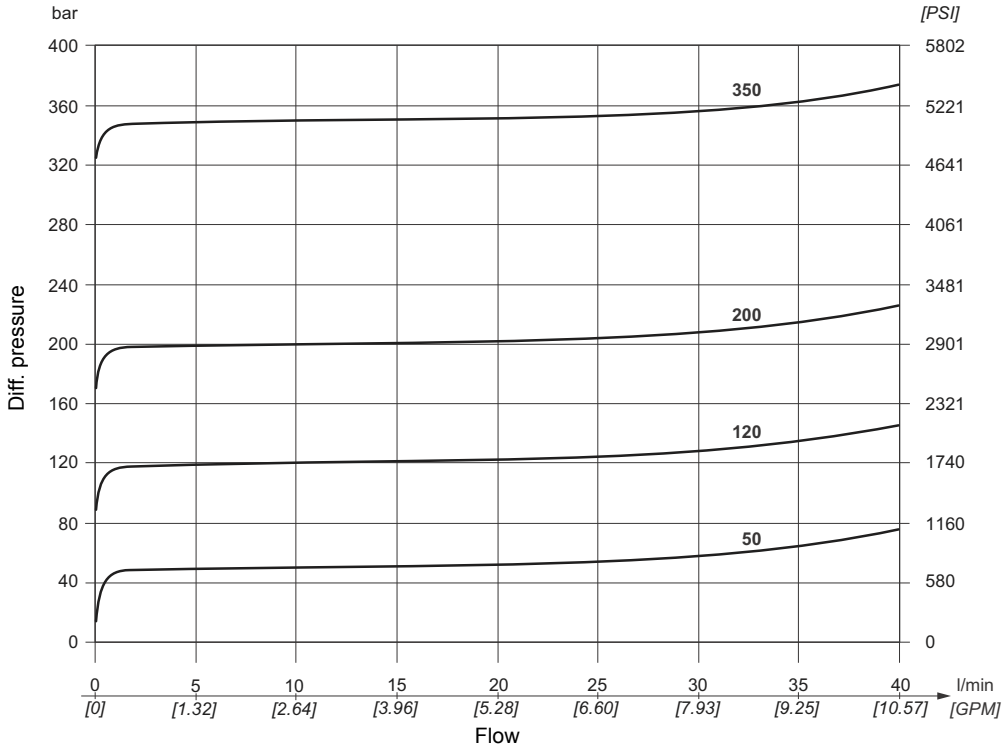


* Clockwise rotation increases pressure rise at the inlet port of pressure relief valve.

Option	L1 mm *[inch]*	L2 mm *[inch]*	L3 mm *[inch]*	L4 mm *[inch]*	L5 mm *[inch]*	Mass kg *[lbs]*
KVM-VV-6-AB	109 *[4.29]*	70 *[2.76]*	0	39 *[1.53]*	13,5 *[0.53]*	1,1 *[2.42]*
KVM-VV-6-BA	109 *[4.29]*	70 *[2.76]*	39 *[1.53]*	0	13,5 *[0.53]*	1,1 *[2.42]*
KVM-VV-6-AT	144 *[5.67]*	100 *[3.94]*	44 *[1.73]*	0	29 *[1.14]*	1,6 *[3.53]*
KVM-VV-6-BT	121,5 *[4.78]*	80 *[3.15]*	0	41,5 *[1.63]*	8,5 *[0.33]*	1,3 *[2.87]*
KVM-VV-6-DT	188 *[7.40]*	100 *[3.94]*	44 *[1.73]*	44 *[1.73]*	28,5 *[1.12]*	1,8 *[3.97]*
KVM-VV-6-DD	188 *[7.40]*	100 *[3.94]*	44 *[1.73]*	44 *[1.73]*	28,5 *[1.12]*	1,8 *[3.97]*

ΔP-Q Performance curves

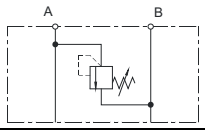
Measured at 50°C *[122°F]*
and viscosity of 32 mm^2/s *[148 SUS]*.



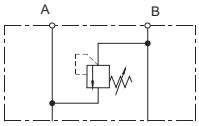
Model code

K V M - V V - 6 - □ - □ - □ - *

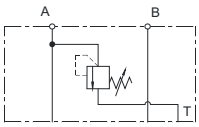
Symbol



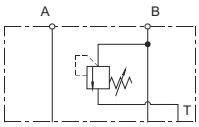
AB



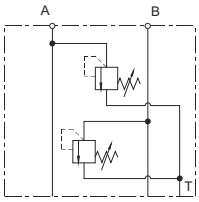
BA



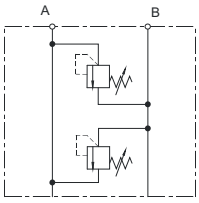
AT



BT



DT



DD

Threaded connections

M16 x 1,5 (ISO 9974-1)	**No designation**
G3/8 (ISO 1179-1)	**3/8**
9/16-18 UNF-2B (ISO 11926-1)	**SAE6**

Special requirements to be briefly specified

Pressure setting range
bar *[PSI]*

15 - 50 *[217 - 725]*	**50**
51 - 120 *[740 - 1740]*	**120**
121 - 200 *[1755 - 2900]*	**200**
201 - 350 *[2915 - 5076]*	**350**

VERTICAL STACKING ON VALVES KVM WITH STANDARD SANDWICH VALVES TO ISO 4401

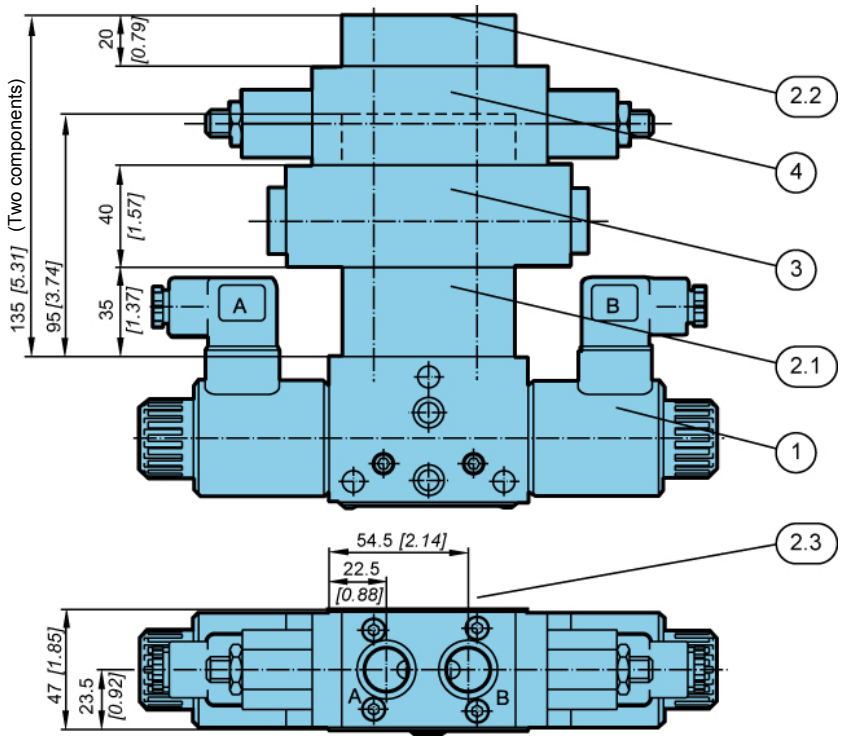
- NG 6
- Up to 350 bar *[5076 PSI]*
- Up to 40l/min *[10.57 GPM]*

- Use standard components for vertical stacking.
- Threaded connections to ISO 9974 or ISO 1179.
- Possibility of stacking one or two standard components.

KVM-P-4/3-5KO-6 and VP-NOV-6 for stacking

Description

1. Bankable directional valve KVM-6
2. STACK-KVM-6 consist of:
   - 2.1 Adapter plate and two O-rings 18,77 x 1,78
   - 2.2 End plate and two O-rings 9,25 x 1,78
   - 2.3Fixing screws M5x100 ISO 4762-10.9 (for one stacking component) or M5x140 ISO 4762-10.9 (for two stacking components)
3. First stacking component (standard VP-NOV-6 or VP-NDV-6)
4. Second stacking component (standard VP-NDV-6)

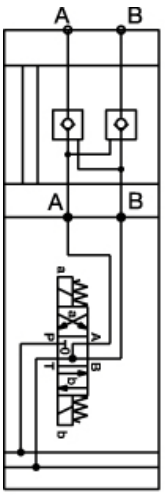


Mtorque = max. 9Nm *[79.6 in.lbf]*

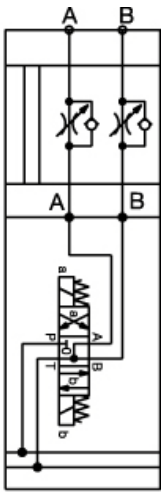
Hydraulic symbol

One standard component

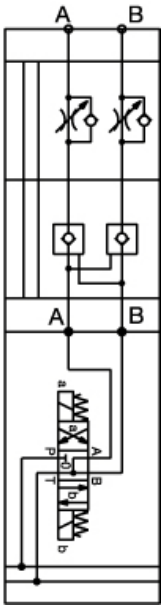
VP-NOV-6



VP-NDV-6



Two standard components



Model code

STACK - KVM - 6 - □ - □ - □ - *

Number of stacking components

One standard component	**N1**
Two standard components	**N2**

Threaded connections

G3/8 (ISO 1179)	**3/8**
M18 x 1,5 (ISO 9974)	**No designation**

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

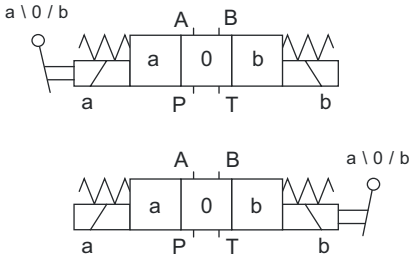
AUXILIARY CONTROL LEVER

- Compatible with KV-5KO-6, KVM-6 and KVP-5KO-6 directional valves
- Without impact on valve´s performance.
- Up to 250 bar *[3 625 PSI]* on T port.

Description

The optional auxiliary control lever module offers solenoid or manual operation of directional valves. Control lever provides mechanical connection with main control spool without significant impact on valve's performance. Auxiliary control lever module is mounted between the valve housing and solenoid. During solenoid operation, hand lever remains in neutral position. Modular and robust design of auxiliary control lever enables installation on A or B side of various types of directional valves and operating pressure range up to 250 bar *[3 625 PSI]* on T port.

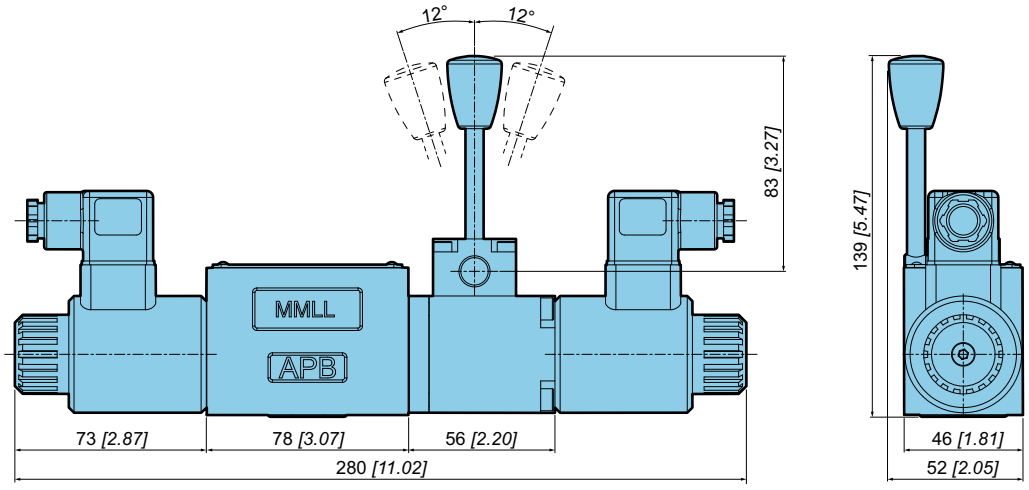
Hydraulic symbols



Features

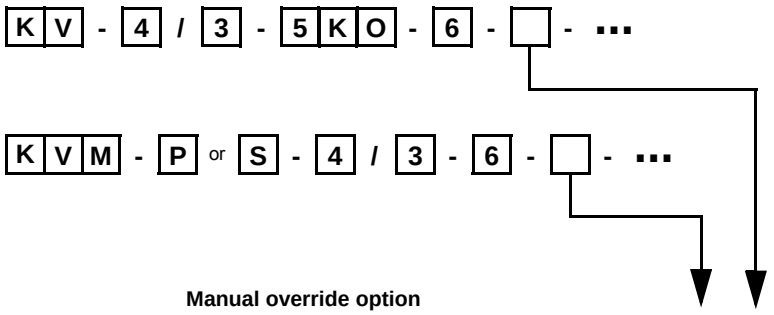
Size			**6**
Operating pressure	Ports A, B, P	bar *[PSI]*	350 *[5 076]*
	Port T	bar *[PSI]*	250 *[3 626]*
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to +158]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[69.5 to 1760]*
Filtration		ISO 4406: 1999	19/17/14
Lever actuating force (end stroke)		N *[lbf]*	40 *[9.0]*
Mass (ACL module)		kg *[lb]*	0,9 *[1.98]*

Dimensions



Model code

The auxiliary control lever on valves KV-5KO-6 and KVM-6 is defined by the designation in the manual override option field.



Manual override option	
Emergency manual override	**No designation**
Manual override with rubber	**G**
Lockable manual override	**C**
Auxiliary control lever on valve side A	**FA**
Auxiliary control lever on valve side B	**FB**

The auxiliary control lever on valves KVP-6 is defined by the designation FA or FB in the special requirements field.

INLET PLATE OB-KVM-6

- NG 6
- Up to 350 bar *[5076 PSI]*
- Up to 40 L/min *[10.6 GPM]*

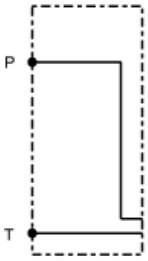
- Provide pressure relief valve.
- Provide pump unloading valve.
- Provide flow control valve.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).

OB-KVM-6-VV20-KVO

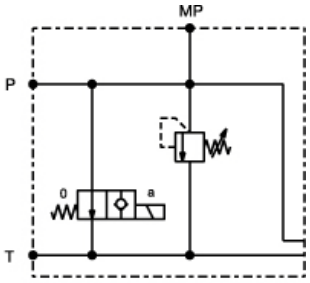
OB-KVM-6-VV20-TVTPG

Hydraulic symbol

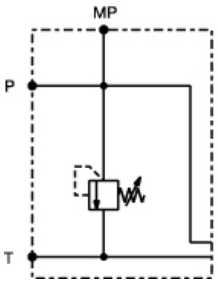
OB-KVM-6



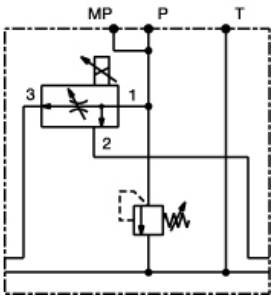
OB-KVM-6-VV20-KV1



OB-KVM-6-VV35



OB-KVM-6-VV20-TVTP



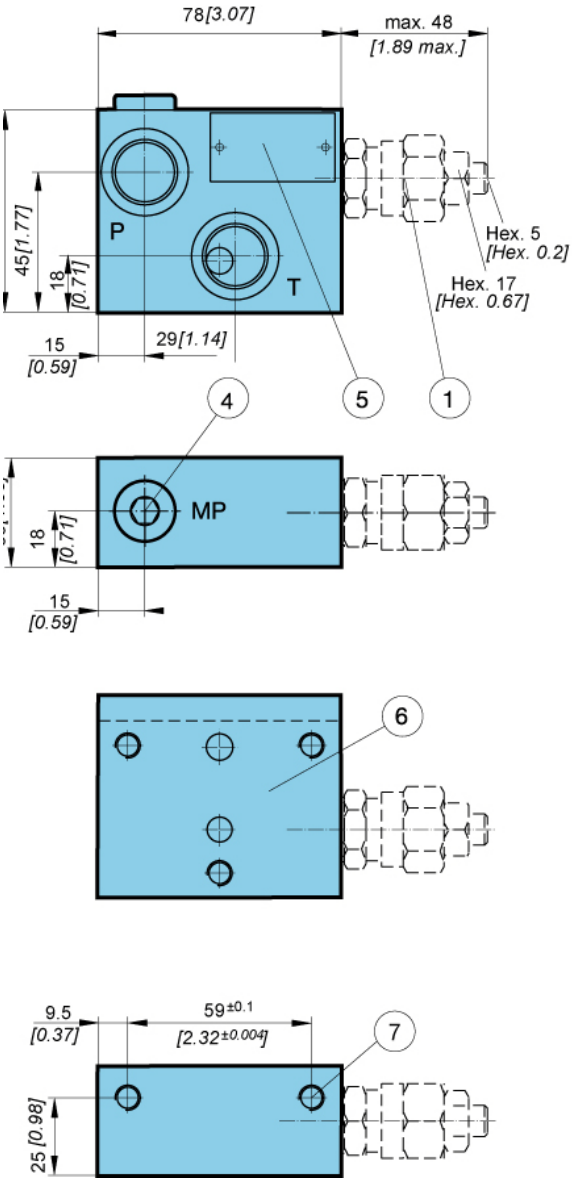
By-pass way

Features

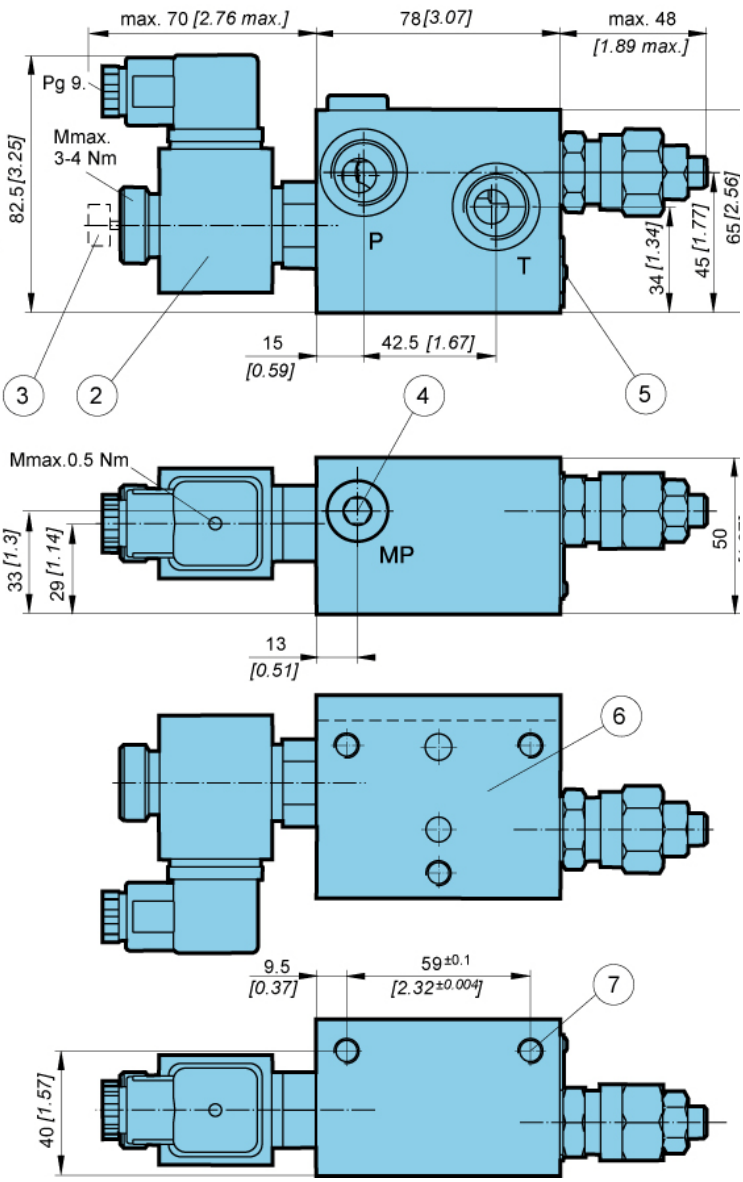
		OB-KVM-6	OB-KVM-6-VV	OB-KVM-VV-KV	OB-KVM-VV-TVTP
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*			
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[3.24 to 82]*			
Filtration	NAS 1638	8			
Mass	kg *[lb]*	1,25 *[2.76]*	1,35 *[2.98]*	2,2 *[4.85]*	4,5 *[9.92]*
Flow rate	L/min *[GPM]*	/	40 *[10.6]*		
Press Setting	bar *[PSI]*	/	50-210 *[13-55]*		
		/	100-350 *[26-92]*		
Adjustments		/	allen key		
Max. pressure	bar *[PSI]*	/	/	350 *[5 076]*	210 *[3 045]*
Supply voltage	V DC	/	/	12, 24	/
Power	W	/	/	17	/
Flow - inlet	L/min *[GPM]*	/	/	/	max. 50 *[max. 13,21]*
Flow - priority way	L/min *[GPM]*	/	/	/	0 - 25 *[0 - 6.6]*
Flow - bypass	L/min *[GPM]*	/	/	/	max. 40 *[max. 10,6]*

Dimensions

OB-KVM-6
OB-KVM-6-VV



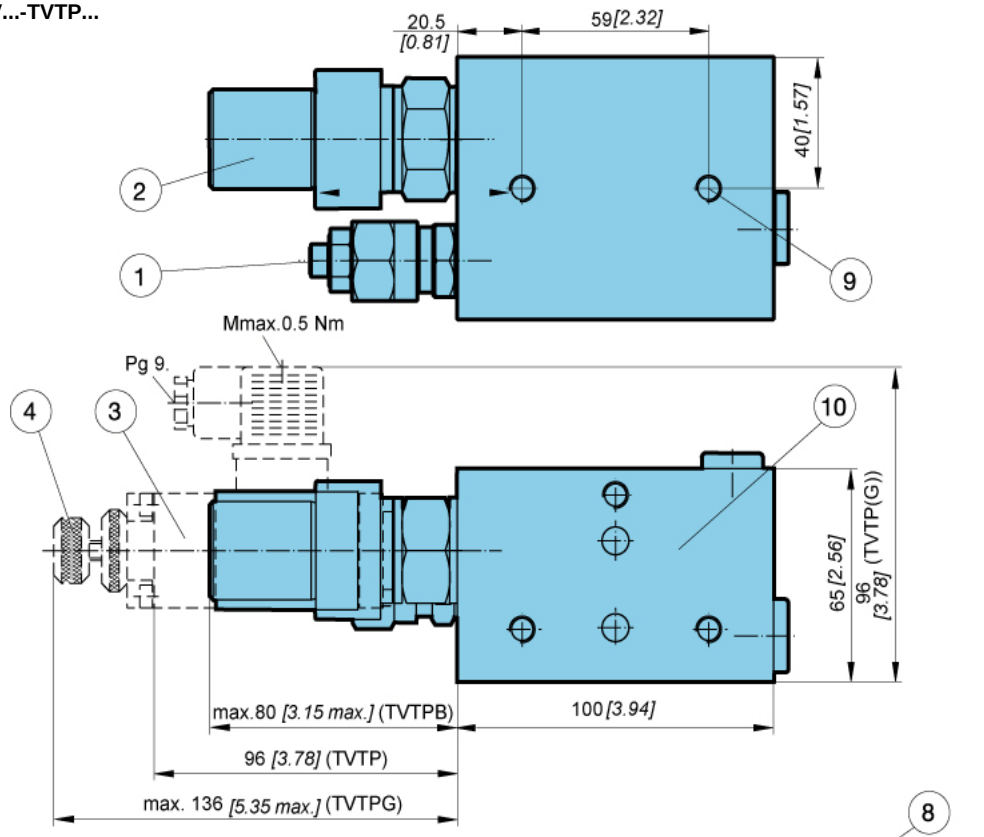
OB-KVM-6-VV...-KV...



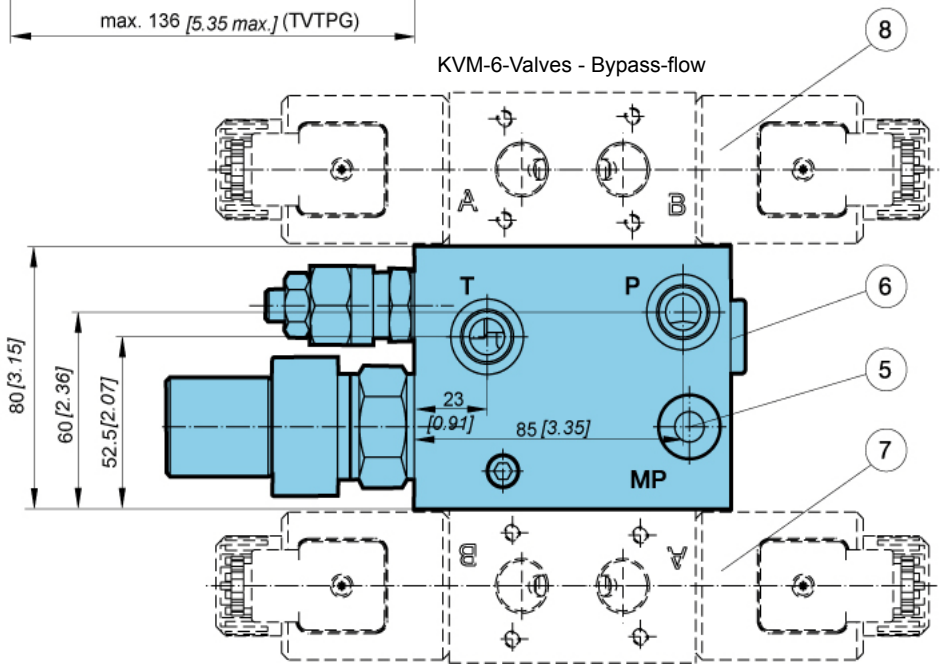
1. Pressure relief valve
2. Pump unloading valve
3. Manual override with knob
4. Threaded connection MP - G1/4 (closed)
6. Connection dimensions for KVM-6
7. Fixing hole (M8 X 12) for mounting assembly

Dimensions

OB-KVM-6-VV...-TVTP...



KVM-6-Valves - Bypass-flow



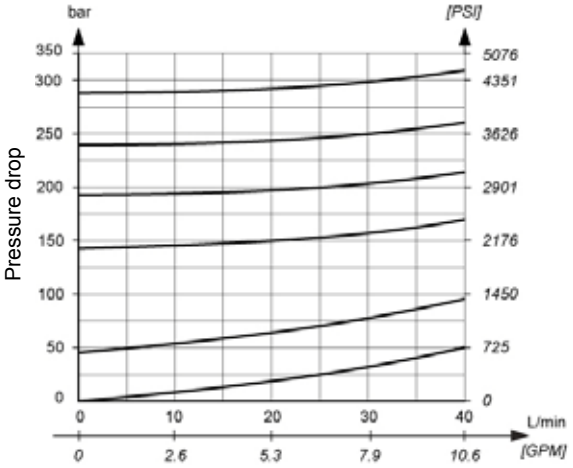
KVM-6-Valves - Priority flow

1. Pressure relief valve
2. Flow control valve - rotary knob -TVTPB
3. Flow control valve - proportional solenoid - TVTP
4. Flow control valve - proportional solenoid with manual override - TVTPG
5. Threaded connection MP - G1/4 (closed)
6. Nameplate
7. Bankable directional valves KVM-6 Priority flow
8. Bankable directional valves KVM-6 Bypass flow
9. Fixing hole (M8 x 12) for mounting assembly
10. Connection dimensions for KVM-6 (see page 12.11.3)

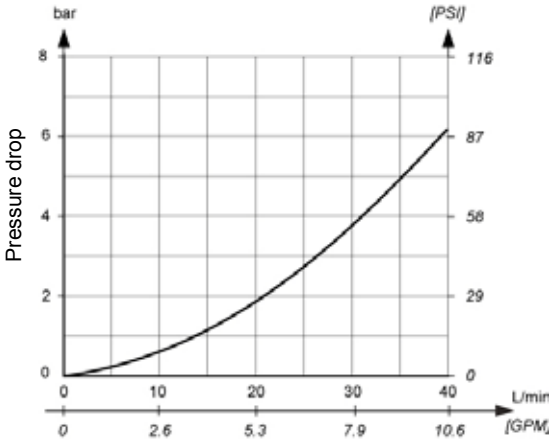
ΔP-Q Performance curves

Measured at 50°C *[122°F]* and viscosity of 28 mm^2/s *[148 SUS]*.

.OB-KVM-6-VV (pressure relief valve- flow P to T.



OB-KVM-6-KV (pump unloading valve- flow P to T.



Model code

OB - KVM - 6 - ☐ - ☐ - ☐ - ☐ - ☐ - ☐ - ☐ ✱

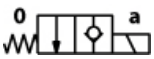
Pressure relief valve

Without pressure relief valve	No designation
Pressure relief valve range 50-210 bar *[725-3045 PSI]*	**VV20**
Pressure relief valve range 100-350 bar *[1450-5076 PSI]*	**VV35**

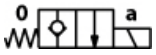
Pump unloading valve

Without pump unloading valve	No designation
Pump unloading valve - normally closed	**KV0**
Pump unloading valve - with manual override - knob	**KVG0**
Pump unloading valve - normally open	**KV1**
Pump unloading valve - with manual override - knob	**KVG1**

Normally open



Normally closed



Flow control valve

Without flow control valve	No designation
Flow control valve - rotary knob - TVTP-25-B	**TVTPB**
Flow control valve - prop. solenoid - TVTP-25-P	**TVTP**
Flow control valve - with manual override - knob	**TVTPG**

supply voltage

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

Threaded connections

M18 x 1,5 (ISO 9974)	No designation
M22 x 1,5 (ISO 9974)	**M22**
G1/2 (ISO 1179)	**1/2**
G3/8 (ISO 1179)	**3/8**
3/4-16 UNF-2B	**SAE 8**

Plug-in connector

Without signal lamp	No designation
With signal lamp	**L**
Deutsch	**V**

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

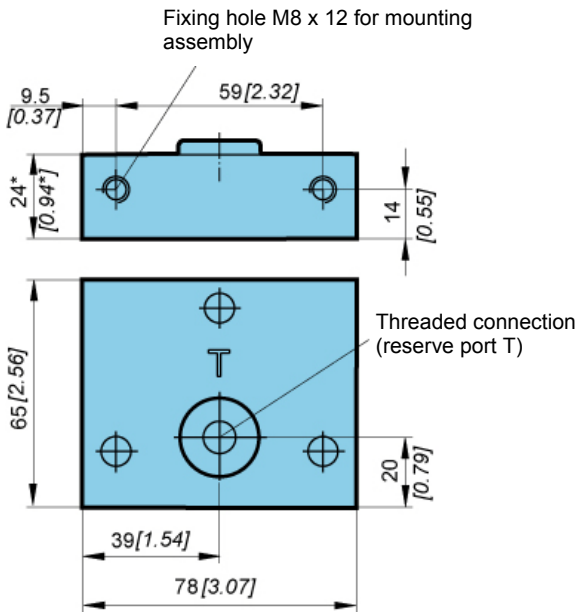
Mechanically operated

Hydraulically operated

Electrically operated

END PLATE ZB-KVM-6

Dimensions



ZB-KVM-6

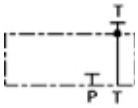
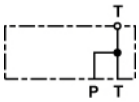
* ZB-KVM-6-PT-1/2(M22) = 27

Mass = 0,8 kg

Model code

Z B - K V M - 6 - ☐ - ☐ - ☐ - ✱

Symbol

	**No designation**
	**PT**

((It is necessary to use this end plate by series connections KVM-S)(

Threaded connections

M18 x 1,5 (ISO 9974)	**No designation**
M22 x 1,5 (ISO 9974)	**M22**
G1/2 (ISO 1179)	**1/2**
G3/8 (ISO 1179)	**3/8**
3/4-16 UNF-2B	**3/4-16UNF**

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

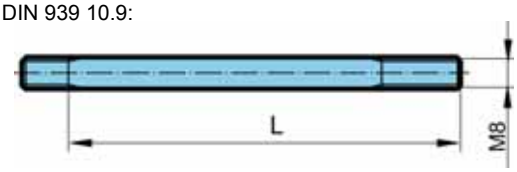
FIXING ELEMENTS FOR MOUNTING

• SET-KVM-6 consists of:
  a) Nuts: 3 x M8 DIN 1587
  b) Washers: 3 x A8 DIN 6798-J
  c) Screws: 3 x M8 DIN 939 10.9

SET-KVM-6-N3

Description

Screw M8 DIN 939 10.9:



	L mm *[in]*
N1	80 *[3,15]*
N2	127 *[4,99]*
N3	174 *[6,85]*
N4	221*[8,70]*
N5	268 *[10,55]*
N6	315 *[12,40]*
N7	362 *[14,25]*
N8	409 *[16,10]*

:**Max. number of bankable valves KVM:**

a) parallel connection (KVM-P) = eight valves (max. N8).

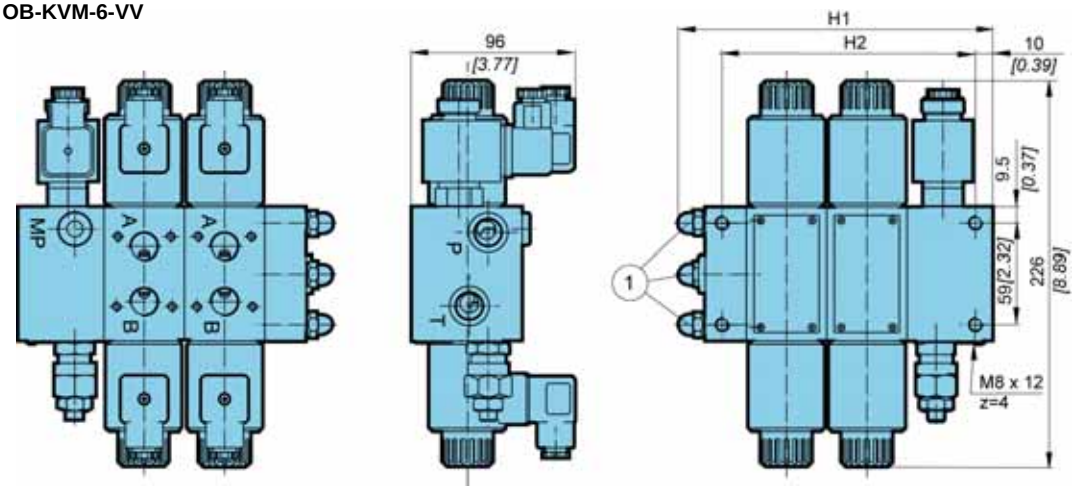
Model code

S E T - K V M - 6 - ☐

Number of bankable directional valves KVM-6	
One valves KVM-6	**N1**
Two valves KVM-6	**N2**
Three valves KVM-6	**N3**
Four valves KVM-6	**N4**
Five valves KVM-6	**N5**
Six valves KVM-6	**N6**
Seven valves KVM-6	**N7**
Eight valves KVM-6	**N8**

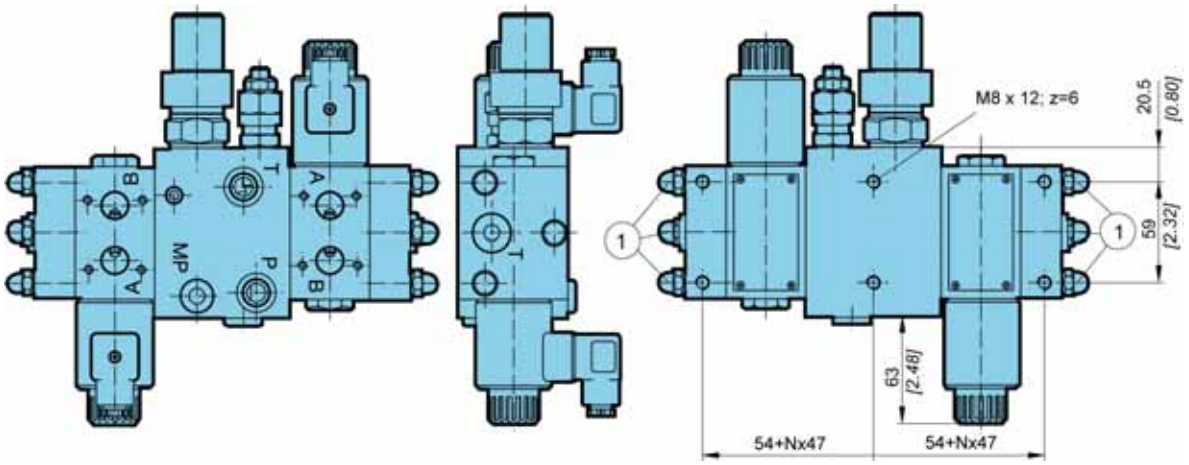
Dimensions

OB-KVM-6, OB-KVM-6-VV



	H1	H2
OB-KVM-6 or OB-KVM-6-VV...	75+Nx47 (N = 1 to 8)	39+Nx47 (N = 1 to 8)
OB-KVM-6-VV...-KV...	90+Nx47 (N = 1 to 8)	54+Nx47 (N = 1 to 8)

OB-KVM-6-VV...-TVTPB...



1. *[141 in.lbf]*Mtorque / Parallel connection (KVM-P) - max. 20Nm *[177 in.lbf]* / Series connection (KVM-S) - max. 16 Nm

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

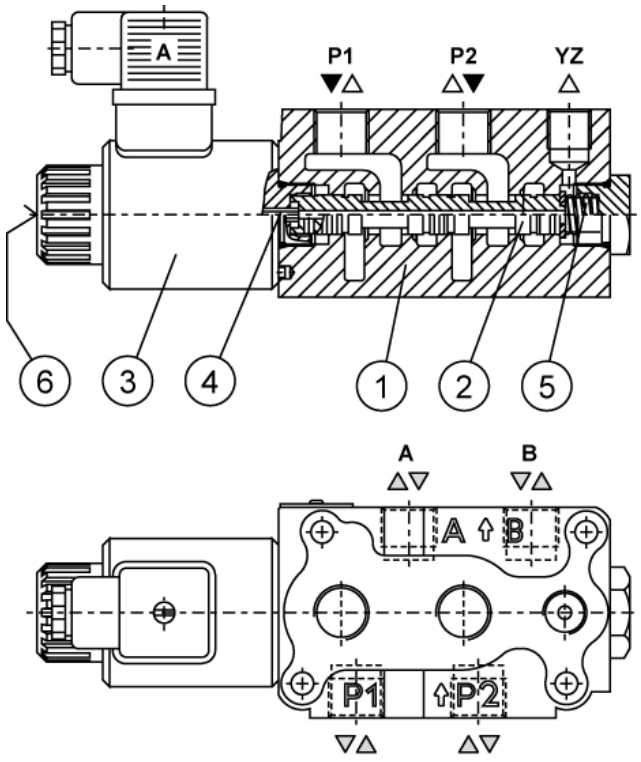
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

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.

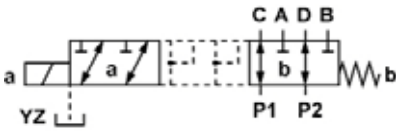
When the solenoid (3) is de-energized, the control spool (2) is returned to its neutral position by the return spring (5), thus establishing again the links between ports P1, C, D and P2.

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

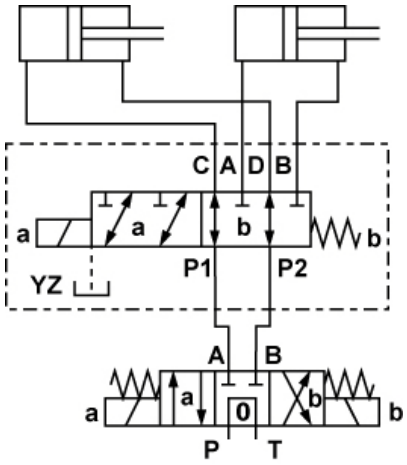


Hydraulic symbol

Spool type



Mounting example

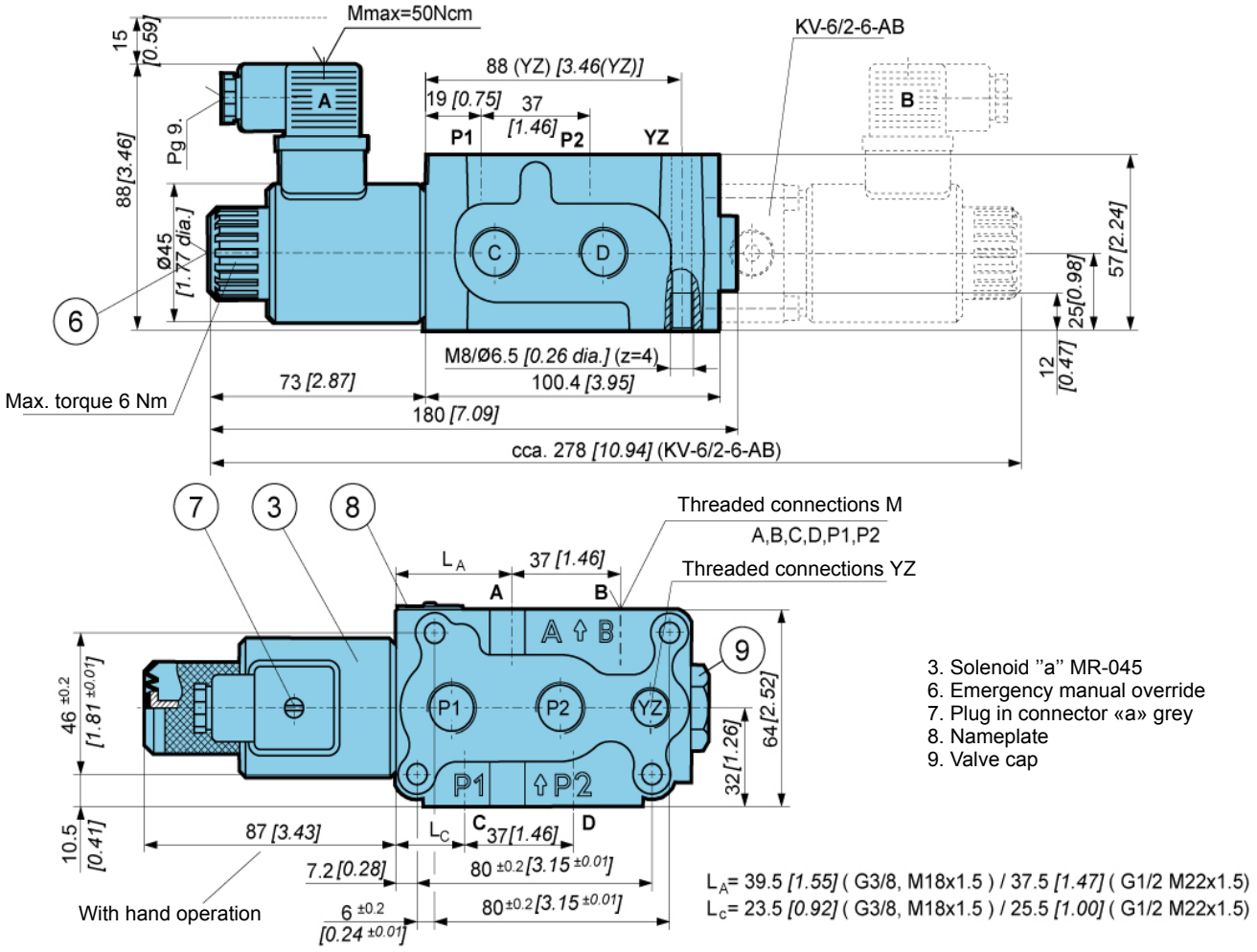


Features

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^2/s *[SUS]*	15 to 380 *[3.24 to 82]*
Mounting position			Optional
Mass		kg *[lb]*	2,5 *[5.51]*
Filtration		NAS 1638	8

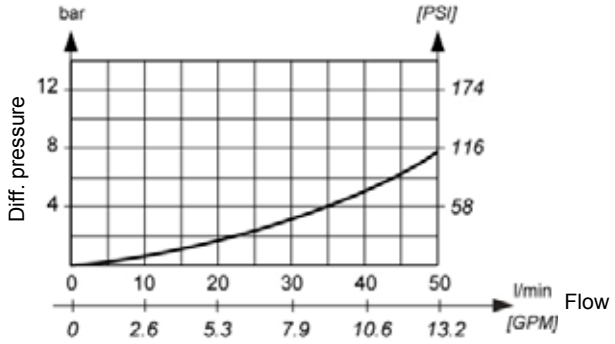
Electrical		
Supply voltage	V	12, 24 DC
Power	W	31
Switching frequency	1/h	15 000
Ambiant temperature	°C *[°F]*	to +50 *[to +122]*
Coil temperature	°C *[°F]*	to +180 *[to +356]*
Duty cycle		Continuous

Dimensions



ΔP-Q Performance curve

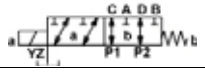
Measured at 40°C *[104°F]* and viscosity of 32 mm^2/s *[148 SUS]*.



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**

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

Manual override option

Emergency manual override	**No designation**
Manual override with rubber cover	**G**
Lockable manual override	**C**

Drainage

No designation	Without YZ
YZ	With YZ

Supply voltage

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

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)
SAE 8	3/4-16 UNF-2B; 9/16-18 UNF-2B

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**
Deutsch	**V**

Overvoltage protection

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

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

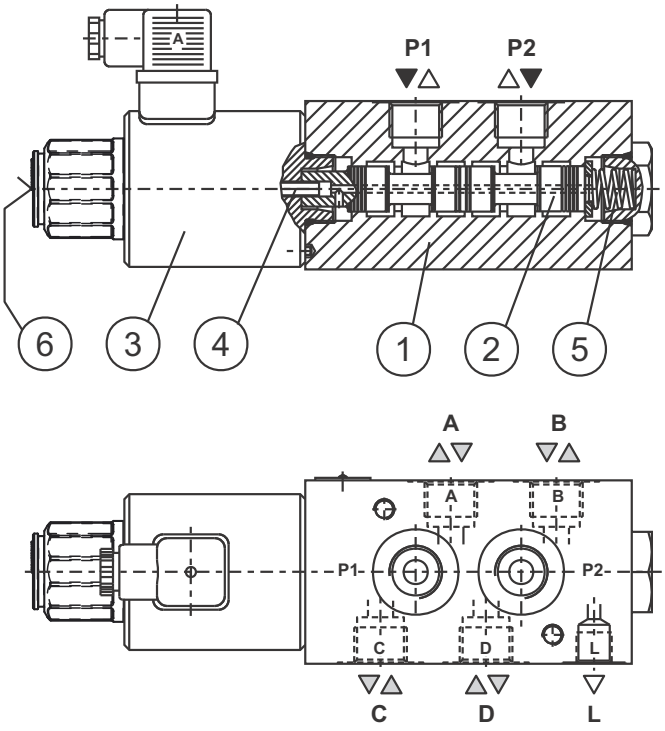
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

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

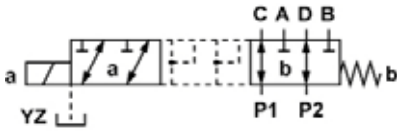
Change-over to the operating position is done by energizing the solenoid (3), whereby the solenoid plunger acts on the control spool (2) via the operating pin (4), thus clearing the corresponding flow ways and establishing respective links between the ports P1, A,B and P2.

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.

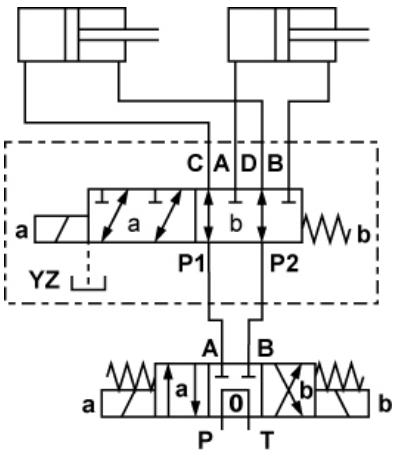
The change-over can also be done manually by pressing the emergency manual override (6).



Hydraulic symbol



Mounting example

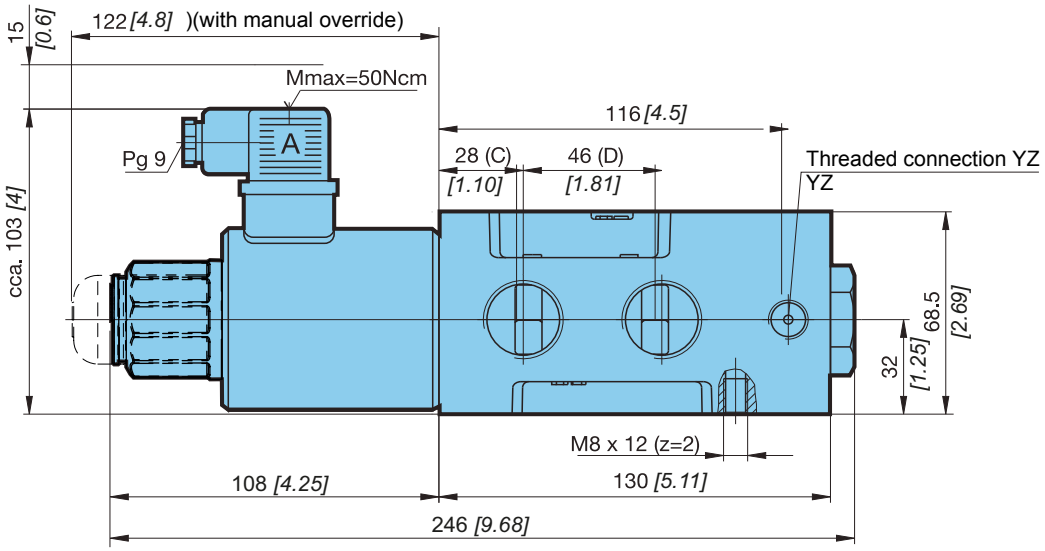


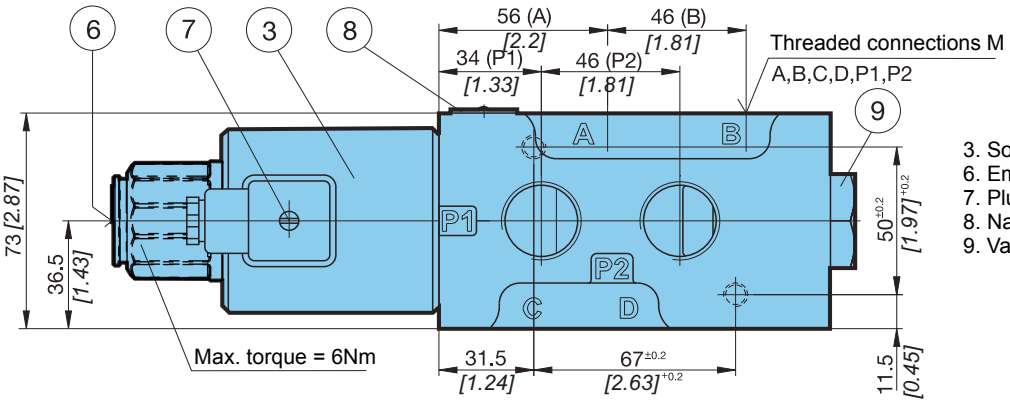
Features

Hydraulic			
Size			**10**
Flow rate		L/min *[GPM]*	120 *[31.7]*
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^2/s *[SUS]*	15 to 380 *[3.24 to 82]*
Mounting position			Optional
Mass		kg *[lb]*	5,5 *[12.12]*
Filtration		NAS 1638	8

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

Dimensions

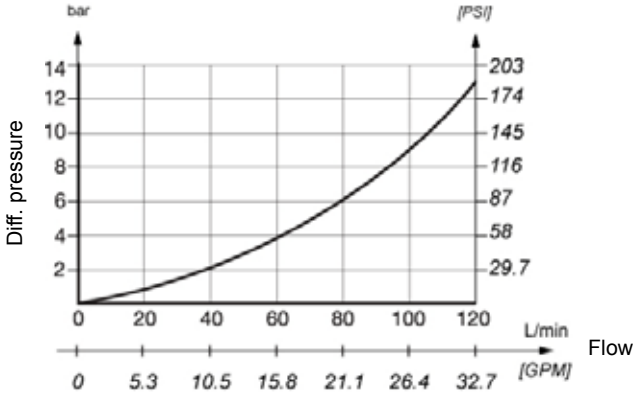




3. Solenoid ''a'' MR-060
6. Emergency manual override
7. Plug-in connector «a» - grey
8. Nameplate
9. Valve cap

ΔP-Q Performance curves

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



Model code

K V - 6 / 2 - 10 - ☐ - ☐☐☐ - ☐ - ☐ - ☐ - ✱

Manual override option

Emergency manual override	No designation
Manual override with rubber cover	G
Lockable manual override	C

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
Deutsch	V

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	SAE 10

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

6/2 WAY DIRECTIONAL VALVES KV

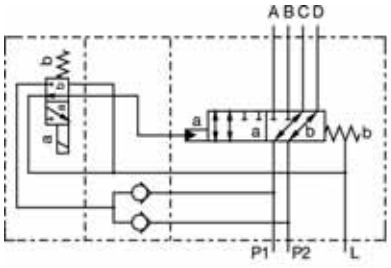
- NG 16
- Up to 350 bar *[5 076 PSI]*
- Up to 250 L/min *[66.04 GPM]*

- 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.

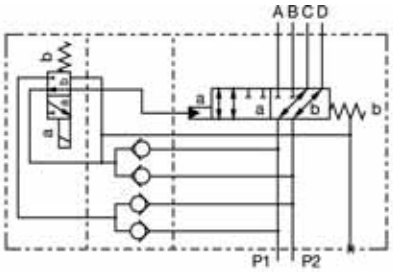
KV-6/2-16-XN

Hydraulic symbol

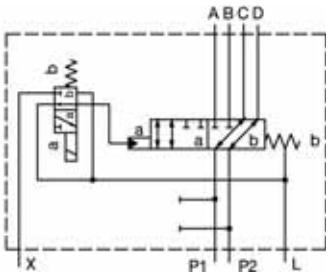
KV-6/2-16-...-XN



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



KV-6/2-16-...-Z

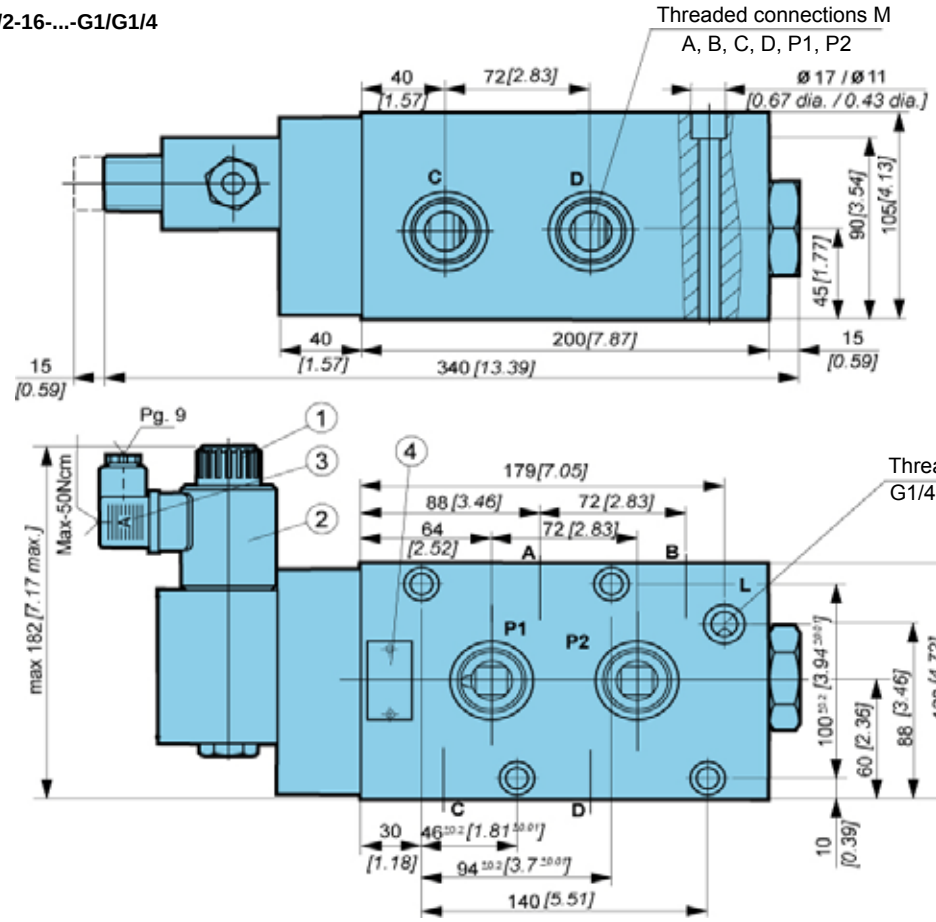


Features

Hydraulic			
Size			**16**
Flow rate		L/min *[GPM]*	250 *[66]*
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^2/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

Dimensions

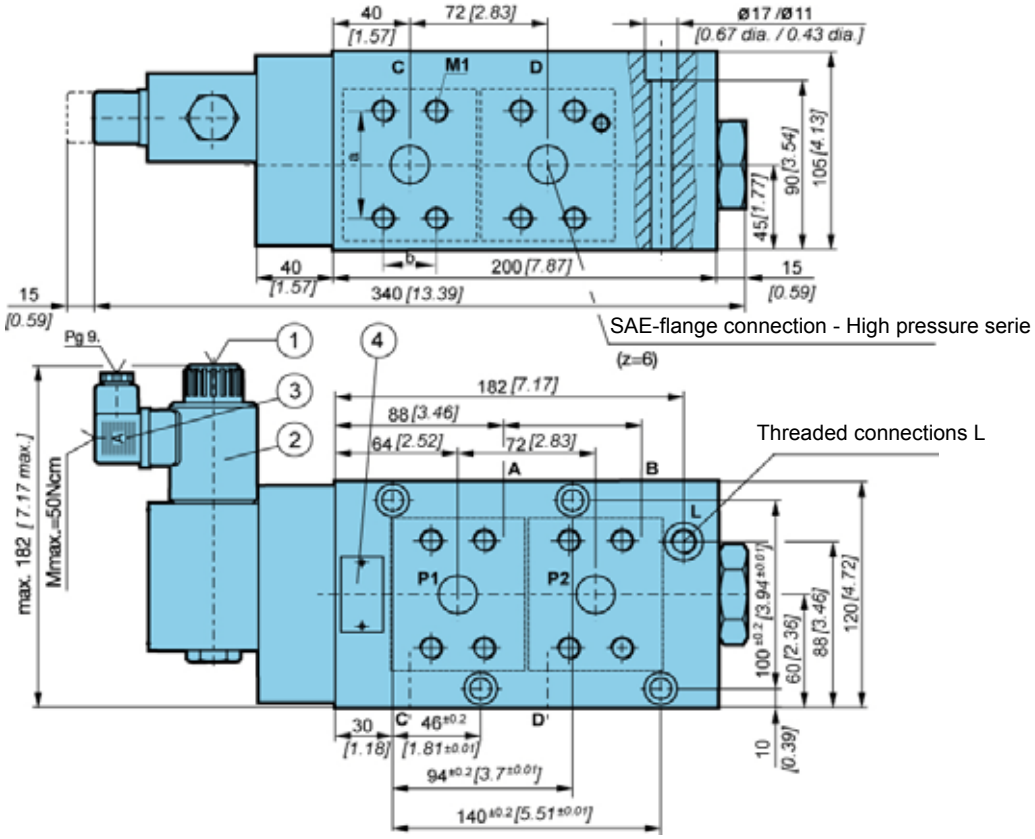
KV-6/2-16-...-G1/G1/4



1. Emergency manual override
2. Solenoid ''a'' MR-045
3. Plug-in connector «a» - grey
4. Nameplate

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

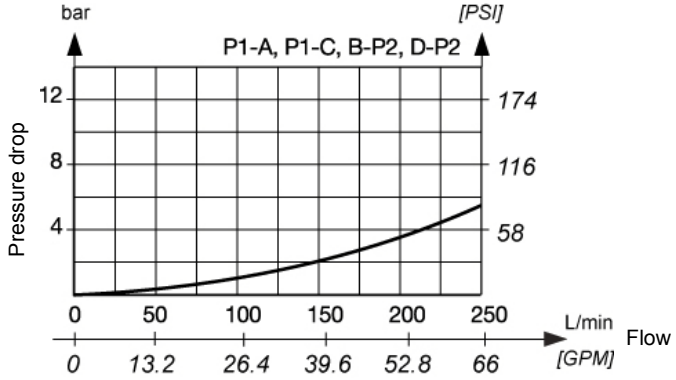
	Size	
	SAE 3/4	**SAE 1**
a	50.8 *[2]*	57.2*[2.25]*
b	23.8 *[0.94]*	27.8 *[1.09]*
M1	M10	M12



1. Emergency manual override
2. Solenoid ''a'' MR-045
3. Plug-in connector «a» - grey
4. Nameplate

ΔP-Q Performance curves

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



Model code

K V - 6 / 2 - 16 - □ - □ - □ - □□□ - □ - *

Pilot oil supply and discharge

Internal x, y	**N**
Internal, external y (port L)	**XN**
external, external	**Z**

Connections

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

Manual override option

Emergency manual override	**No designation**
Manual override with rubber cover	**G**
Lockable manual override	**C**

supply voltage

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

Connector type

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

Overvoltage protection

without overvoltage protection	**No designation**
with overvoltage protection	**T**

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

6/2 WAY CIRCUIT SELECTOR VALVES KV6K2

- NG 6, 8
- Up to 350 bar *[5 076 PSI]*
- Up to 90 L/min *[23.8 GPM]*

- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF)
- Solenoids fulfil EMC (89/336/EEC)
- Plug-in connector for solenoids to ISO 4400 / AMP / Deutsch
- With internal or external drain release
- For pipe connection (all ports) or flange connection ports A, B, C, D
- With coils type SR-045, MR-045 for NG 6, or MR-060 for NG 8 (see page 223).

KV6K2-6

Operation

Valves type KV6K2 with direct solenoid operation control the direction of the hydraulic medium flow. They are used as circuit selector valve between two consumers controlled by means of one basic directional control valve.

The valve basically consists 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 operating pin (4), thus clearing the corresponding flow ways and establishing respective links between the ports P1-A and P2-B.

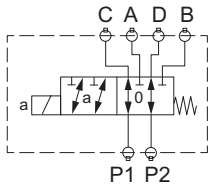
When the solenoid (3) is de-energized, the control spool (2) is returned to its neutral position by the return spring (5), thus establishing again the links between ports P1-C and P2-D.
The change-over can also be done manually by pressing the pin for emergency manual override (6).

Solenoid coil is fastened to the core by the retaining nut (7).

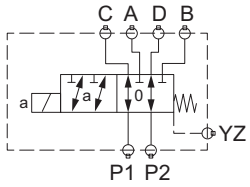
Wet pin tube of the solenoid core is loaded by working pressure.
When the valve is used at pressure over 250 bar the pressure in the tube must be released by external drain port (8) to tank (option Z), or internally over the check valves (9) to the lower pressure port – alternatively P1/P2 (option N).

Hydraulic symbol

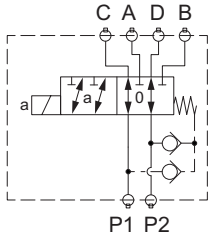
Without drainage

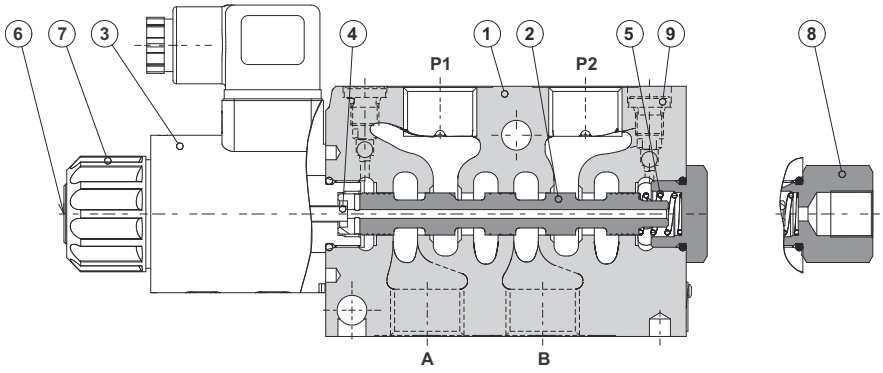


With external drain

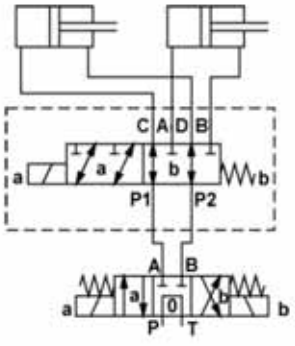


With internal drain





Mounting example



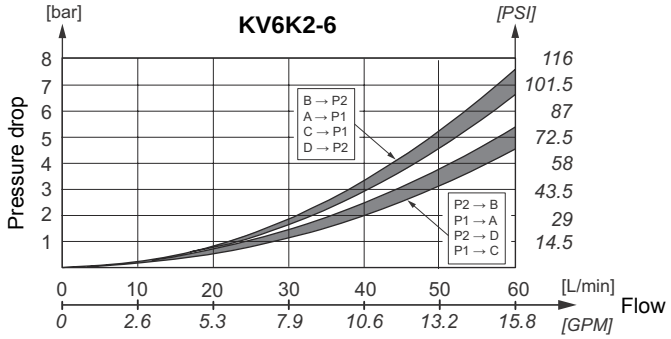
Features

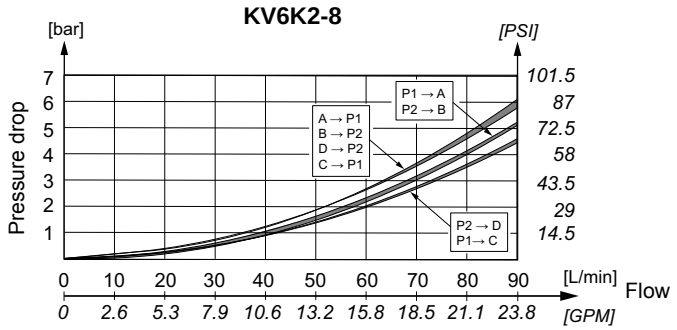
Hydraulic				
Size			**6**	**8**
Flow rate		L/min *[GPM]*	60 *[15.8]*	90 *[23.8]*
Operating pressure	without drain release	bar *[PSI]*	250 *[3 625]*	
	with YN or YZ		350 *[5 076]*	
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to +158]*	
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[3.24 to 82]*	
Mounting position			Optional	
Mass		kg *[lb]*	2,9 *[6.4]*	4,8 *[10.6]*
Filtration		ISO 4406:1999	19/17/14	
Electrical				
Supply voltage		V	12, 24 DC	
Max. allowable voltage variation		%	+/- 10	
Power		W	31	45
Ambient temperature		°C *[°F]*	to +50 *[to +122]*	
Coil temperature		°C *[°F]*	to +180 *[to +356]*	
Duty cycle			Continuous	
Protection class to EN 50529 / IEC 60529	connector type ISO 4400		IP65	
	connector type AMP		IP65	
	connector type Deutsch		IP69K	

See chapter Solenoids (page 223) for more detailed technical info.

ΔP - Q Performance curves

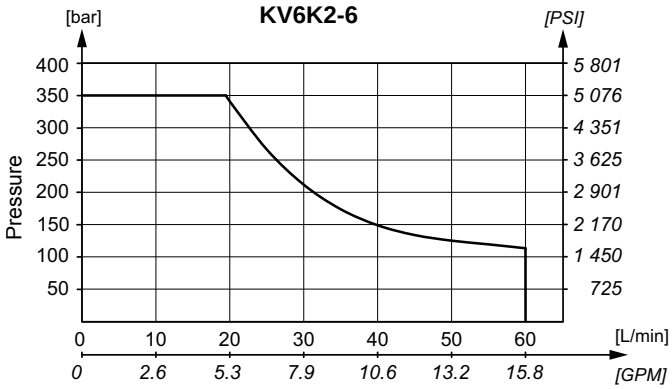
Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.

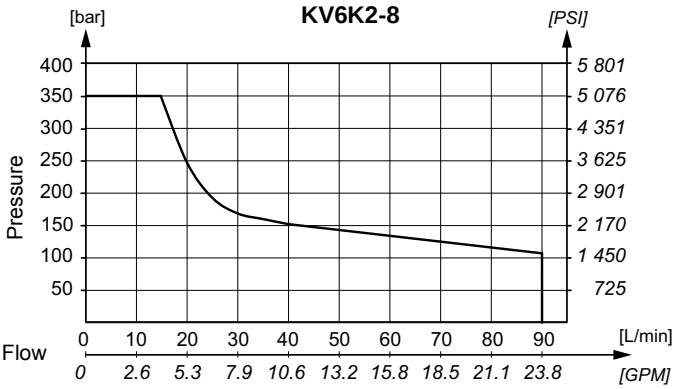




Pressure drop curves for flow in one direction, measured on the valves with ports G1/2 and spool with negative overlapping.

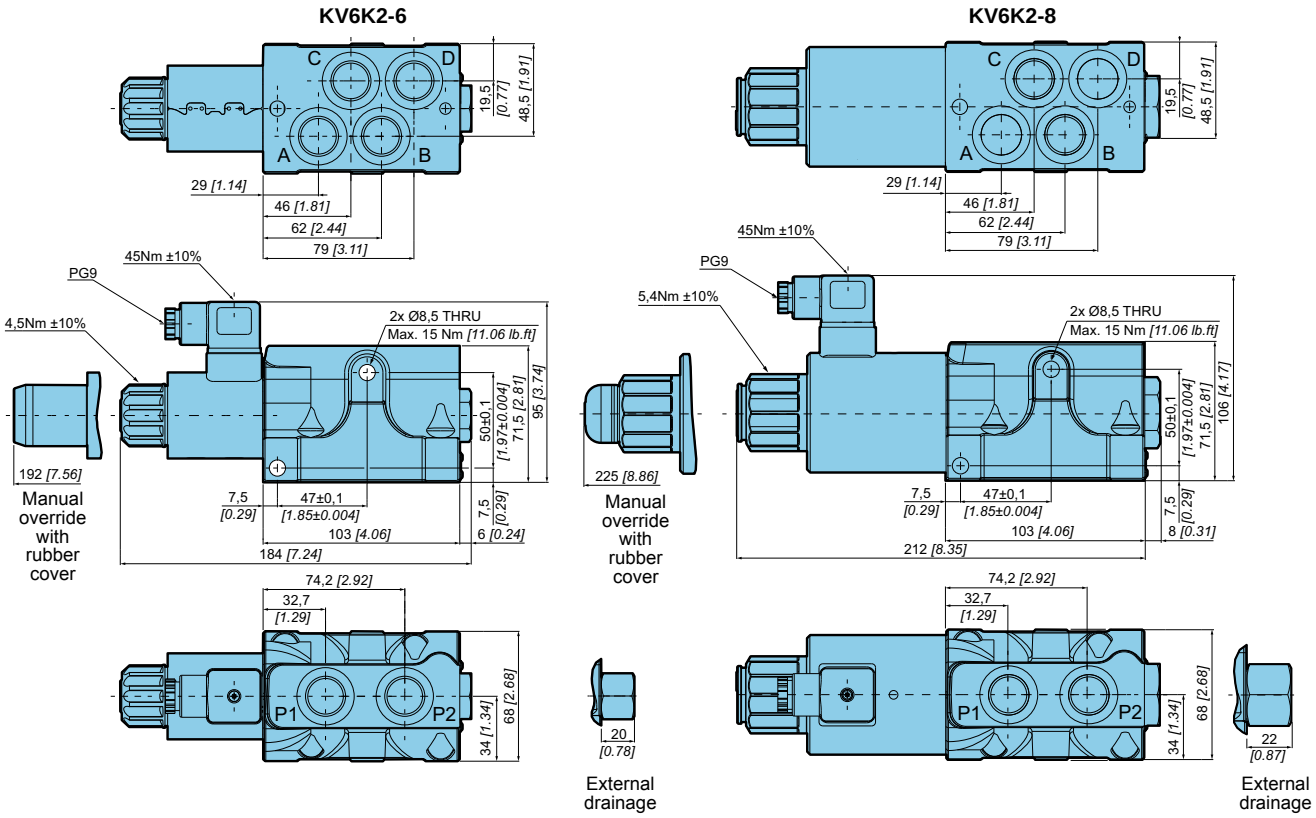
p - Q operating limits





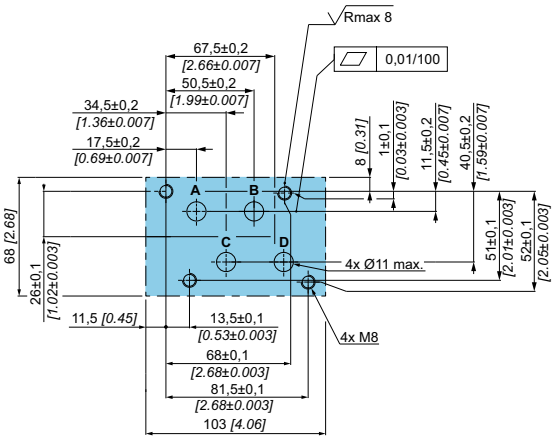
Given operating limits are valid for the worst case flow direction. Change-over of the spool is assured in the p-Q range below the operating limit curves.
Stability of the spool in position “a” or “0” is assured in the whole p-Q range up to 350 bar and up to 60l/min - size 6 and up to 90l/min - size 8.

Dimensions

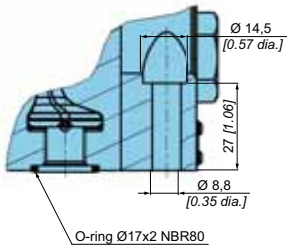


Coil can be assembled in any position with span 90° around the axis. See chapter Solenoids (page 223) for detailed information regarding coil options.

Mounting surface for flange connection



Seals and screws for flange connection



Mounting screws *		4x ISO 4762: M8x40 - 10.9
Tightening torque	Steel tapped holes	15 Nm +/- 10%
	Aluminium tapped holes	11 Nm +/- 10%

* Not included

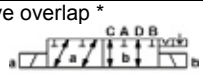
Model code

	S	H	M						B					S			
	1	1	1	2	3	4	5	6	1	2	3	4	5	1	2	3	4
K V 6 K 2 -		-		-						-					-			

S1 - Size

Nominal size 6 (solenoid 045, max. flow 60 l/min)	**6**
Nominal size 8 (solenoid 060, max. flow 90 l/min)	**8**

H1 - Spool type

Negative overlap 	**0**
Positive overlap 	**P**
Detent spool, negative overlap * 	**A**

* Available only on valve size 6.

M1 - Emergency override

Basic emergency override	**0**
Manual override with rubber cover	**G**

M2 - M4 Supply voltage *

12V DC	**12D**
24V DC	**24D**
48V DC	**48D**
Without coil	**0WC**

* Other voltages available on request.

M5 - Terminal / Connector type

Connector EN 175301-803 without signal lamp	**0**
Connector EN 175301-803 with signal lamp	**L**
Terminal EN 175301-803 without connector	**K**
Terminal AMP Junior timer without connector	**M**
Terminal Deutsch without connector	**V**

M6 - Overvoltage protection

Without overvoltage protection	**0**
With overvoltage protection (transil diode)	**T**

B1 - B3 - Threaded connections

G3/8 (BSPP) *	**G38**
G1/2 (BSPP)	**G12**
9/16-18 UNF (SAE) *	**S06**
3/4-16 UNF (SAE)	**S08**

* Available only on valve size 06.

B4 - Connection

Pipe connection P1, P2, A, B, C, D	**C**
Flange connection A, B, C, D Pipe connection P1, P2	**F**

B5 - Drainage

Without drainage	**0**
Internal release to P1/P2	**N**
External release to tank	**Z**

S1 - S4 - Special options

Without *	**0**
Solenoid type SR-045 **	**S1**
Low leakage spool	**L**
Painted RAL 9005	**D**
Phosphate coated housing	**G**
FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380	**E**
Customer name plate	**P**
Warning (model code does not describe the final product - check documentation)	**F**

* Standard surface protection is Zinc coating, unless otherwise required.
** Available only on valve size 06.

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-S50-N3

Operation

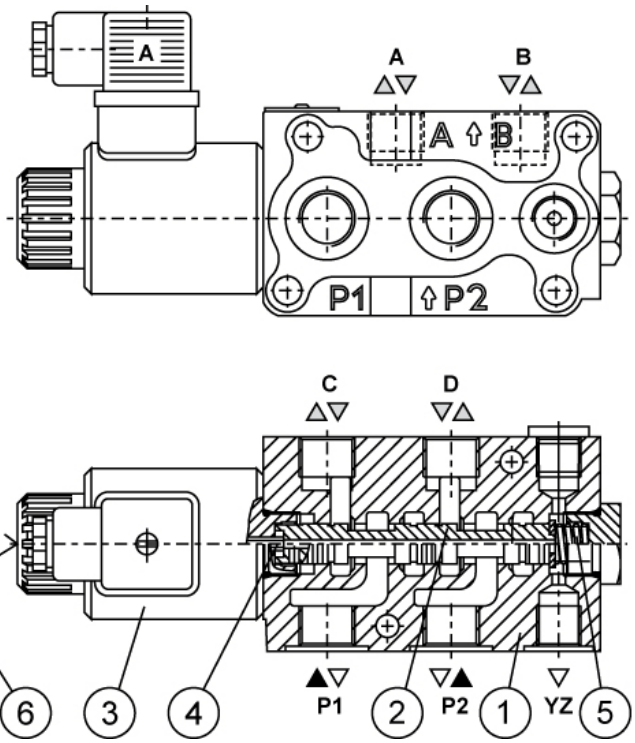
Directional valves type KVH with direct solenoid operation control the direction of the hydraulic medium flow.
They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

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

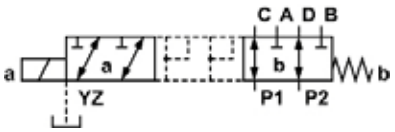
Change-over to the operating position is done by energizing the solenoid (3), whereby the solenoid plunger acts on the control spool (2) via the operating pin (4), thus clearing the corresponding flow ways and establishing respective links between the ports P1, A, B and P2.

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.

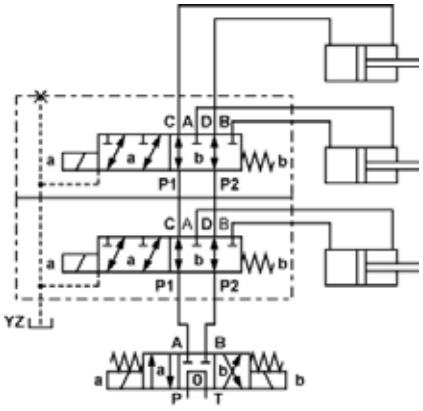
The change-over can also be done manually by pressing the emergency manual override (6).



Hydraulic symbol



Mounting example

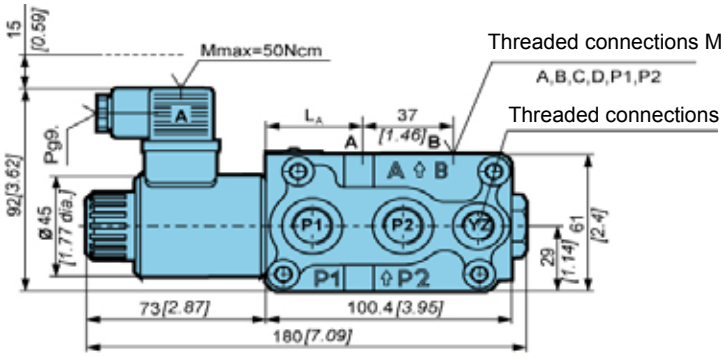


Features

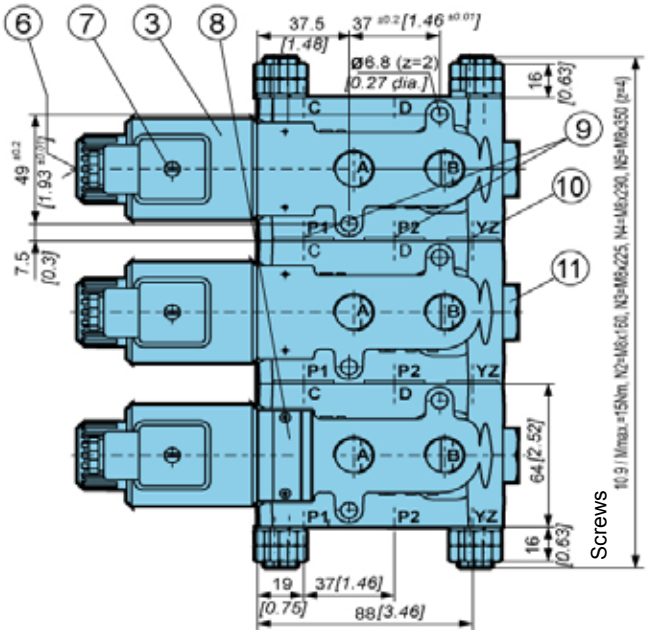
Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	50 *[13.21]*
Operating pressure	With YZ	bar *[PSI]*	315 *[4 568]*
	Without YZ		250 *[551]*
Oil temperature range		°C *[°F]*	-20 to +70 *to +158]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[3.24 to 82]*
Mounting position			Optional
Mass		kg *[lb]*	2,7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

Electrical			
Supply voltage		V	12, 24 DC
Power	(12 V DC supply voltage)	W	29
			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



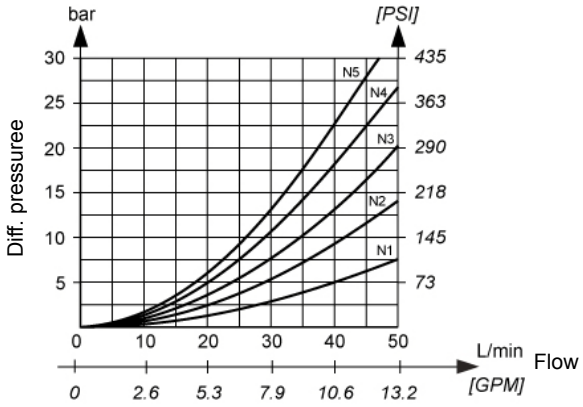
LA= 39,5 (G3/8, M18x1,5)
37,5 *[1.47]* (G1/2, M22x1,5)



3. Solenoid ''a'' MR-045
6. Emergency manual override
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

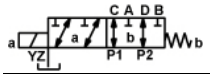
.Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.]



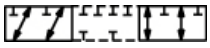
Model code

K V H - 6 / 2 - 6 - ☐ - ☐ - ☐ - ☐☐☐ - ☐ - ☐ - S 5 0 - ☐ - ☐ - ✱

symbol

	**No designation**
	**AB**

Overlap

	**No designation**
	**P**

Manual override option

Emergency manual override	**No designation**
Manual override with rubber cover	**G**
Lockable manual override	**C**

Supply voltage

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

Connector type

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

Overvoltage protection Without 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
SAE 8	3/4-16 UNF-2b; 9/16-18 UNF-2B

6/2 WAY DIRECTIONAL VALVE KVH

- NG 8
- Up to 350 bar *[5 076 PSI]*
- Up to 90 L/min *[23.8 GPM]*
- Threaded connections to ISO 9947 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF)
- Fulfil EMC (89/336/EEC)
- Plug-in connector for solenoids to ISO 4400/AMP/Deutch
- With internal or external drain release
- For single use or series assembly of 2 to 6 sections

KVH-6/2-8

Operation

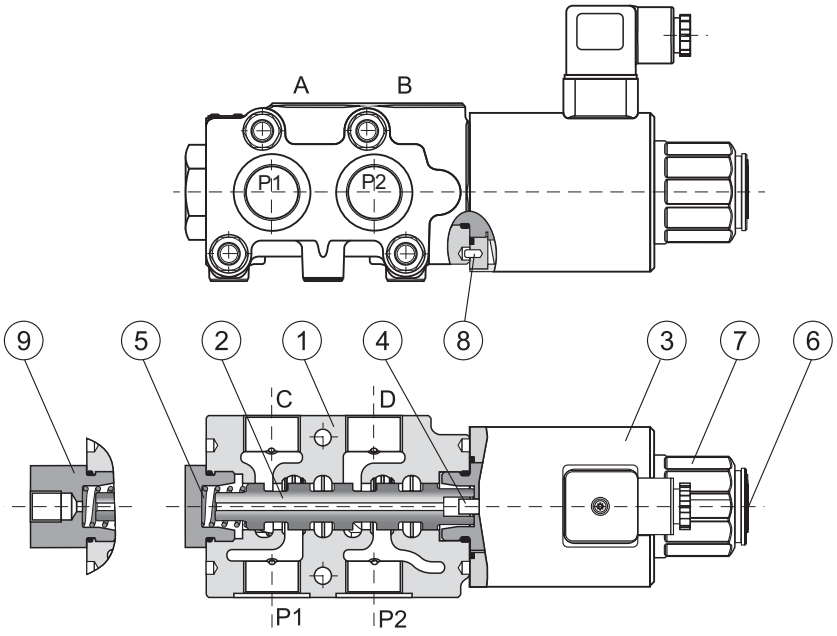
Directional valves type KVH with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as circuit selector valve between two (or more) consumers when we want to control two (or more) consumers by means of one basic directional control valve.

A valve basically consists 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 operating pin (4), thus clearing the corresponding flow ways and establishing respective links between the ports P1-A and P2-B.

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 betweeen ports P1-C and P2-D.
The change-over can also be done manually by pressing the pin for emergency manual override on the solenoid core (6).

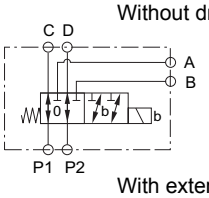
Solenoid coil is fastened to the core by retaining nut (7).
Position of the coil is pre-defined by a pin on the coil (8) and fixation hole on the valve housing.

Wet pin tube of the solenoid core is loaded by working pressure.
When the valve is used at pressure over 250 bar the pressure in the tube must be released by external drain port (9) to tank (option YZ), or internally over the check valves to the lower pressure port - alternatively P1/P2 (option YN).

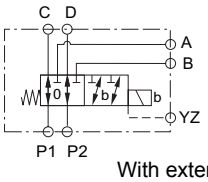


Hydraulic symbols

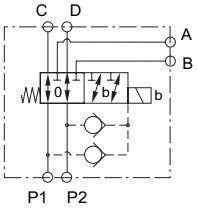
Without drain



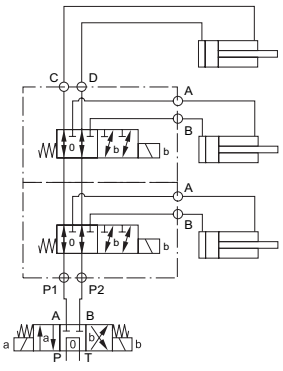
With external drain YZ



With external drain YN



Mounting example

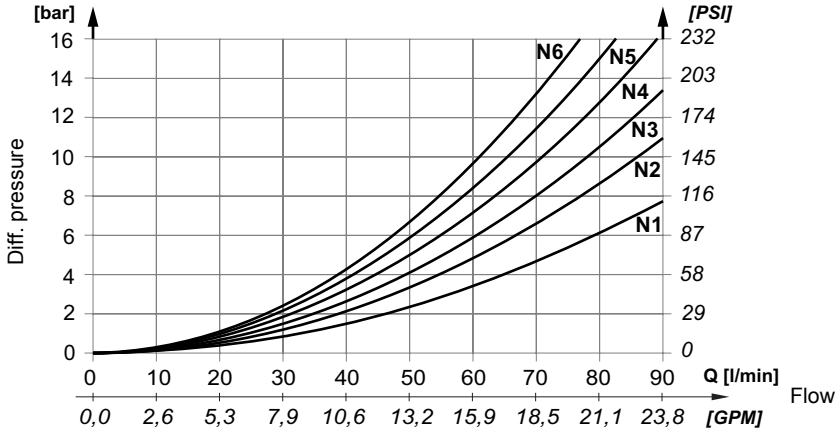


Features

Hydraulic			
Size			**8**
Flow rate		L/min *[GPM]*	90 *[24]*
Operating pressure	with YN or YZ	bar *[PSI]*	350 *[5 076]*
	without drain release	bar *[PSI]*	250 *[3 625]*
Viscosity range		mm^2/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]*	3,8 *[7.71]*
Mounting position			Optional
Electrical			
Supply voltage		V	12 DC, 24 DC
Max. allowable voltage variation			+/- 10 %
Power		W	45
Ambient temperature		°C *[°F]*	to 50 *[122]*
Coil temperature		°C *[°F]*	to 180 *[356]*
Duty cycle			Continuous
Protection class to EN 50529 / IEC 60529			

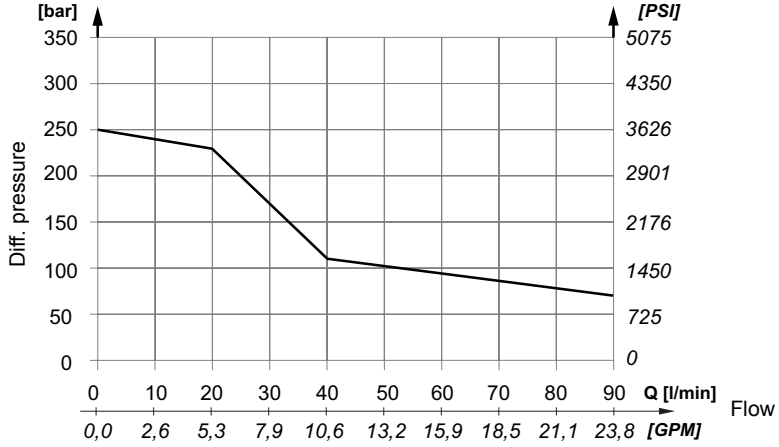
- Connector ISO 4400 - IP65
- Connector AMP - IP65
- Connector Deutsch - IP69K

ΔP-Q Performance curves



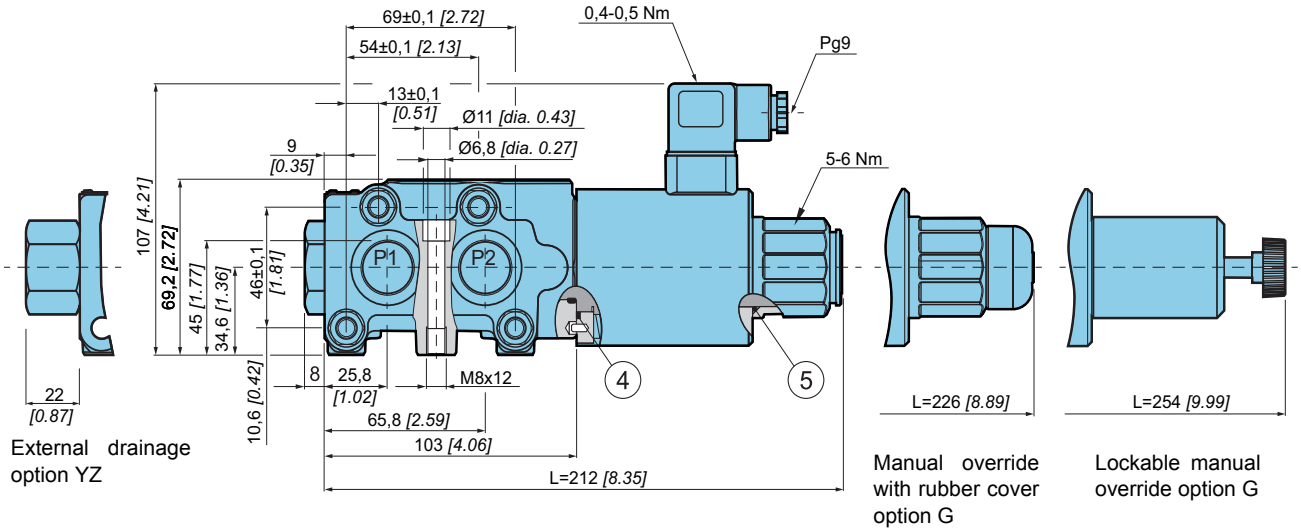
Pressure drop curves for flow in one direction, measured on the valves with ports M22x1,5 and spool with negative overlapping.

P-Q Operating limits



Change-over of the spool is assured in the p-Q range below the operating limit curve.
However, stability of the spool in position “0” or “b” is assured in the whole p-Q range up to 350 bar and up to 90 l/min *[23.8 GPM]*.

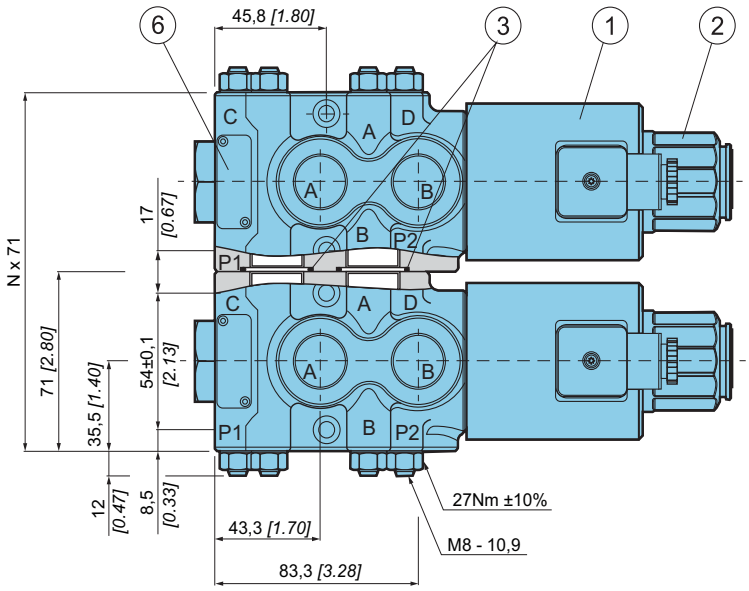
Dimensions



External drainage option YZ

Manual override with rubber cover option G

Lockable manual override option G

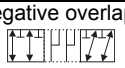


1. Solenoid coil - MR-060-O...
2. Retaining nut - MR-060-M...
3. O-ring FI 26x2
4. O-ring FI 35x2
5. O-ring FI 31x2
6. Nameplate

Model code

K V H - 6 / 2 - 8 - ☐ - ☐ - ☐☐☐ - ☐ - ☐ - ☐ - ☐ - ☐

Spool/Overlap

negative overlap 	**No designation**
positive overlap 	**P**

Manual override option

Emergency manual override	**No designation**
Manual override with rubber cover	**G**
Lockable manual override	**C**

Supply voltage

24V DC	**No designation**
12V DC	**12DC**
without coil	**WC**

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**
Deutch without connector	**V**

Overvoltage protection

Without protection	**No designation**
With overvoltage protection (transil diode)	**T**

Threaded connections P1, P2, A, B, C, D (YZ)

M22x1,5 (M12x1,5)	**M22**
G1/2 (G1/4)	**1/2**
3/4 - 16 UNF (9/16 - 18 UNF)	**SAE8**

Seal type

NBR seals for mineral oil HL, HPL to DIN 51524	**No designation**
FPM seals for HETG, HEES, HEPG to VDMA 24 568 and ISO 15 380	**E**

Drainage (see hydraulic symbol)

Without drain	**No designation**
Internal drain release to P1/P2*	**YN**
External drain port on plug**	**YZ**

* Functional when the valve is used in standalone application

** On series assembly of 2 or more sections YZ port has to be released to tank from every section with working pressure over 250 bar

Number of units

1 unit	**No designation**
X units (2 to 6)	**NX**

Special options

Zinc coated surface	**No designation**
Phosphate coated	**PF**
Painted with RALXXXX	**RALXXXX**
Low leakage spool	**LL**
Without identification plate	**S4**
Identification plate with customer logo	**S5**
Customer marking on the identification plate	**S6**
Solenoid on the opposite side	**I**

6/2 WAY DIRECTIONAL VALVES KVH

- NG 10
- Up to 315 bar *[4 568* 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

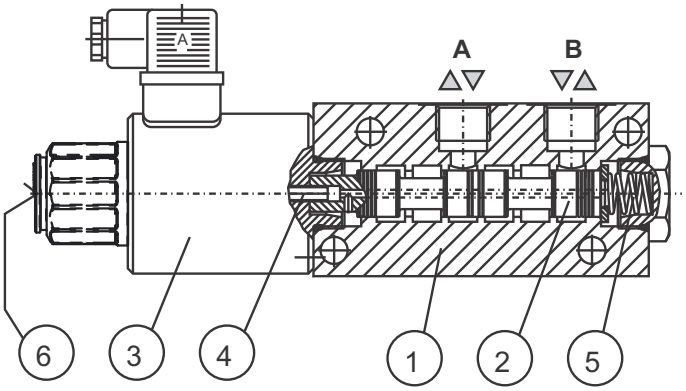
Directional valves type KVH with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

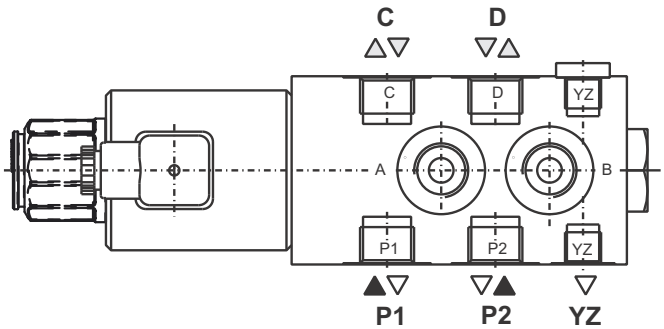
The KVH type directional valves consist of a housing (1), a control spool (2), and a solenoid (3) with return spring (5).

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.

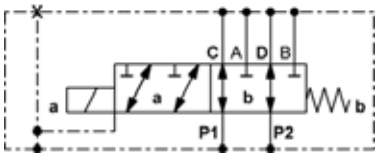
When the solenoid (3) is de-energized, the control spool (2) is returned to its neutral position by the return spring (5), thus establishing again the links between ports P1, C, D and P2.

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

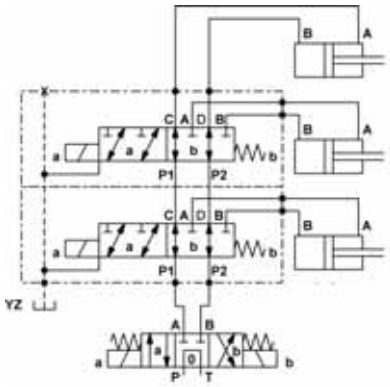




Hydraulic symbol



Mounting example

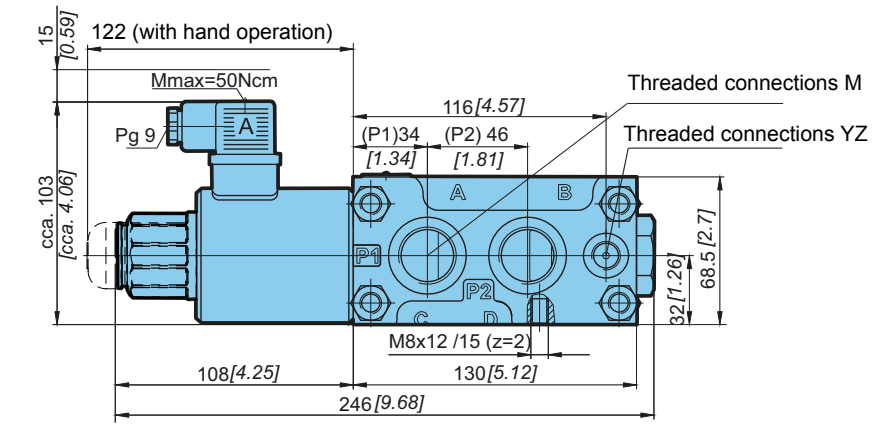


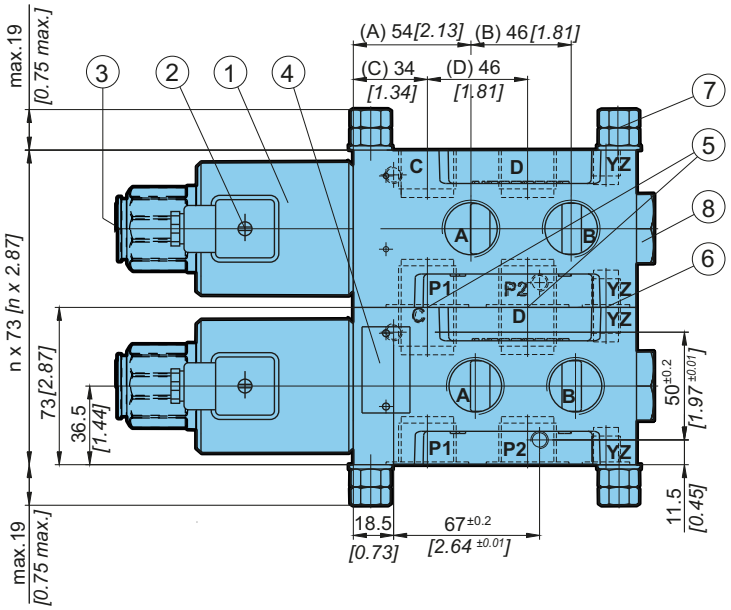
Features

Hydraulic			
Size			**10**
Flow rate		L/min *[GPM]*	120 *[31.70]*
Operating pressure	With YZ	bar *[PSI]*	315 *[4 568]*
	Without YZ		250 *[551]*
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to+158]*
Viscosity range		mm^2/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



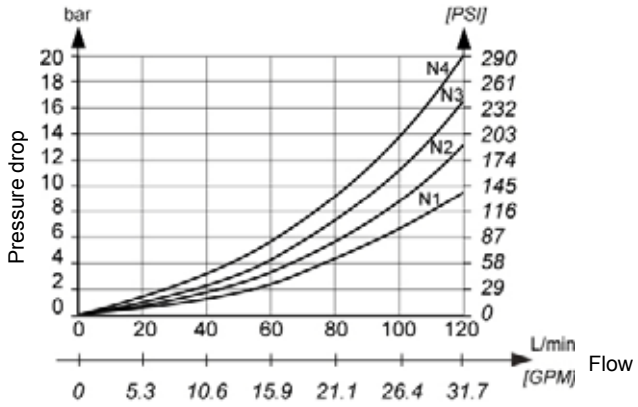


Mmax. = 20Nm

1. Solenoid ”a” MR-060
2. Plug-in connector «a» - grey
3. Emergency manual override
4. Nameplate
5. O-Ring ; 26x2 = KVH-6/2-10-G1/2 (M22)
   31x2 = KVH-6/2-10-G3/4 (M27)
6. O-Ring 17x2
7. Screws M10 - 10.9 (z=4)
8. Valve cap

ΔP-Q Performance curves

Measured at 50°C *[122°F]* and viscosity of 32 mm²/s *[148 SUS]*.



Model code

K V H - 6 / 2 - 10 - □ - □ □ □ - □ - □ - S 4 0 - □ - □ - ✱

Manual override option

Emergency manual override	**No designation**
Manual override with rubber cover	**G**
Lockable manual override	**C**

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**
175301-803 without connector	**K**
AMP Junior timer without connector	**M**
Deutsch	**V**

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	**SAE 10**

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

N1	One
N2	Two
N3	Three
N4	Four
N5	Five

7/2 WAY DIRECTIONAL VALVE KV-7/2-6

• NG 6
• Up to 350 bar *[5 076 PSI]*
• Up to 50 L/min *[13.2 GPM]*
• Threaded connections to ISO 1179-1-N (BSPP/Gas) / ISO 9974 (metric) / ISO 11926 (SAE)

• Protection of solenoid:
IP 65 to EN 60529 / IEC 60529 - ISO and AMP Junior timer connector
IP 69 to EN 60529 / IEC 60529 - Deutsch connector

• Fulfill EMC (89/336/EEC)
• Zinc coated

KV-7/2-6

Operation

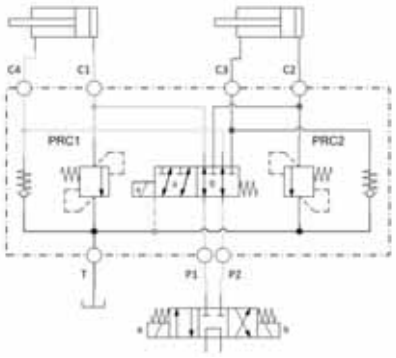
Valves KV-7/2-6 are used as diverter between two hydraulic cylinders which are not operated simultaneously. Two hydraulic cylinders can be controlled by one directional control valve.

Integrated pressure relief valves prevent hydraulic system against pressure peeks on working ports C1 and C2.

The valve is ideal solution for all applications where pressure peeks appear because of mechanical shocks acting on hydraulic cylinder(s).

The oil from pressure relief valves can be released over T port to tank or to accumulator assembled on T port.

Hydraulic symbol



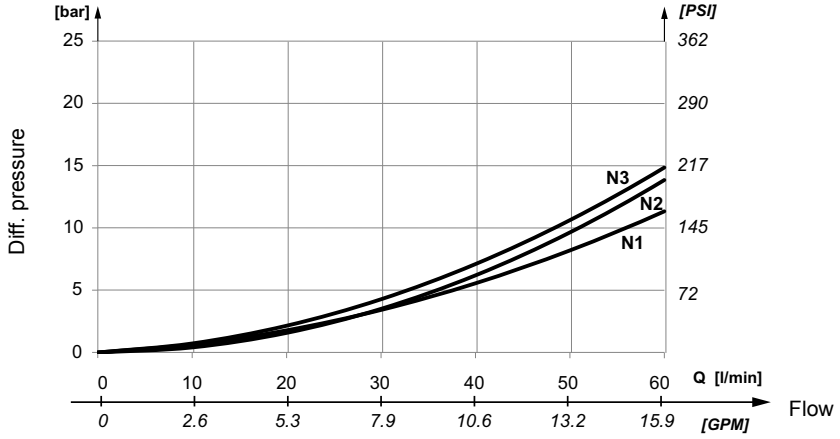
Features

Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	50 *[13.2]*
Operating pressure	Ports P1, P2, C1, C2, C3, C4	bar *[PSI]*	350 *[5 076]*
	port T	bar *[PSI]*	250 *[3 626]*
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to 158]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[75 to 1 760]*
Fluid contamination		ISO 4406:1999	19/17/14
Mass		kg *[lb]*	3,6 *[7.94]*

Electrical		
Supply voltage	V	12 DC, 24 DC, 48 DC
Power	W	31
Coil temperature	°C *[°F]*	to 180 *[to 356]*
Duty cycle		Continuous

Δ P- Q performance curves

Measured at 50 °C *[122 °F]* and viscosity 32 mm²/s *[148 SUS]*



N1: P1-C2 and P2-C4

N2: P1-C2

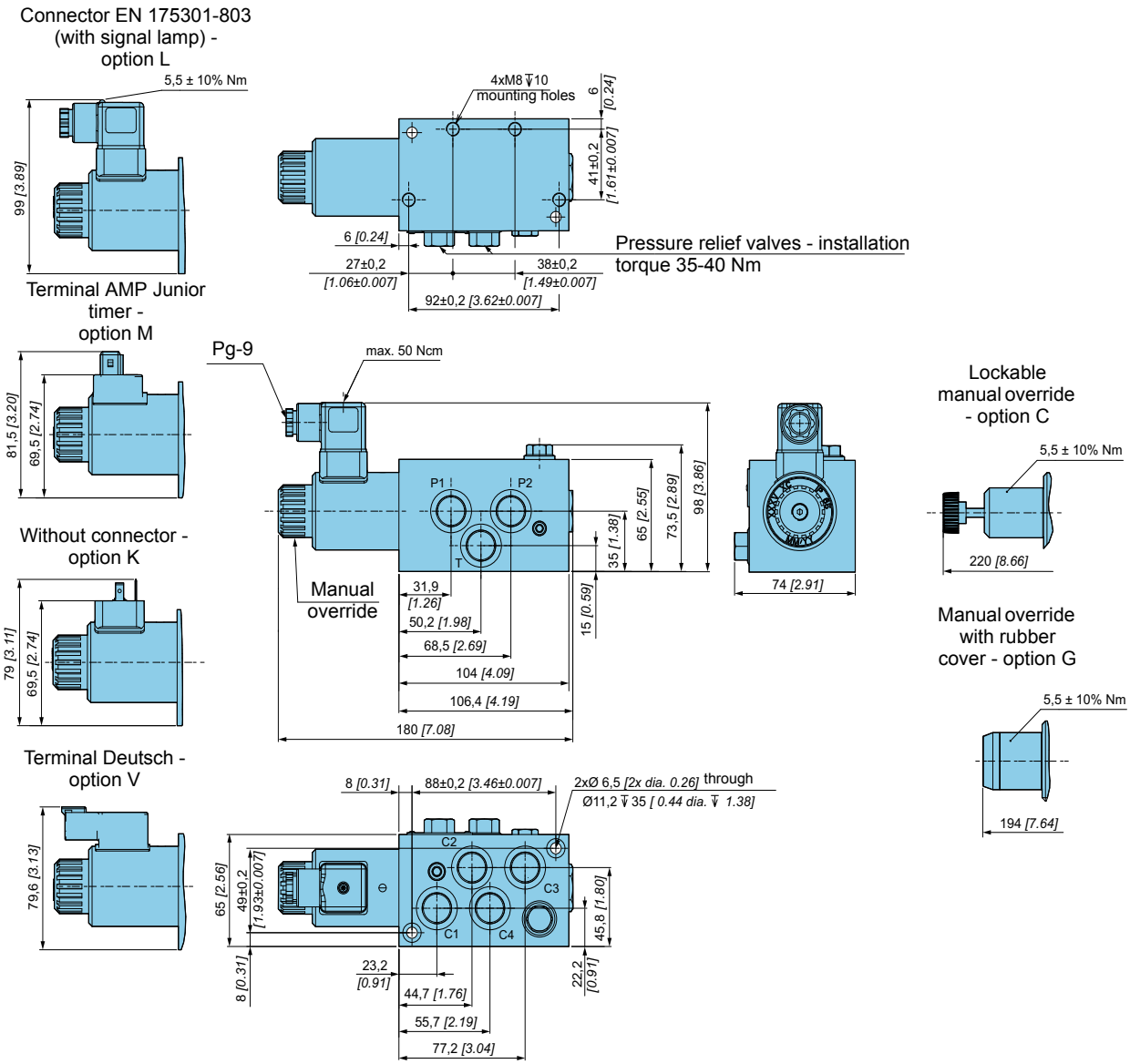
N3: P2-C3

p/Q operating limits

Measured at 50 °C *[122 °F]* and viscosity 32 mm²/s *[148 SUS]*

Valve operates stable for all flow directions - spool position 0, a and b at flow up to 100 l/min *[26.4 GPM]* and pressure up to 350 bar *[5 076 PSI]*.

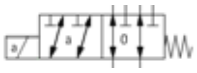
Dimensions



Model code

K V - 7 / 2 - 6 - 2 - □□□□□□□ -

Spool type



	2

Manual override option

Emergency manual override	**No designation**
Manual override with rubber cover	**G**
Lockable manual override	**C**

Supply voltage

12V DC	**12DC**
24V DC	**24DC**
48V DC	**48DC**

Terminal/connector type

Connector EN 175301-803	**No designation**
Connector EN 175301-803 with signal lamp	**L**
Terminal EN 175301-803 w/o connector	**K**
Terminal AMP Junior timer w/o connector	**M**
Terminal Deutsch w/o connector	**V**

Overvoltage protection

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

Surface protection

No designation	Zn coated
P5	Painted RAL 9005

Seal type

No designation	NBR seals for mineral oil HL, HLP
E	FPM seals for HETG, HEES, HEPG

Fix pressure setting

XXX	XXX bar*

Pressure setting established at flow 10l/min *[0.26 GPM]*
* Standard fix pressure setting options are 70-350 bar *[1 015-5 076 PSI]*
with span 10 bar *[145 PSI]*

Threaded connections

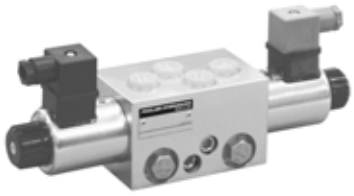
No designation	M18x1,5
3/8	G3/8 -N
SAE6	9/16-18 UNF

7/3 WAY DIRECTIONAL VALVE KV-7/3-6

- NG 6
- Up to 350 bar *[5 076 PSI]*
- Up to 50 L/min *[13.2 GPM]*
- Threaded connections to ISO 1179-1-N (BSPP/Gas) / ISO 9974 (metric) / ISO 11926 (SAE)

- Protection of solenoid:
  IP 65 to EN 60529 / IEC 60529 - ISO and AMP Junior timer connector
  IP 69 to EN 60529 / IEC 60529 - Deutsch connector

- Fulfill EMC (89/336/EEC)
- Zinc coated surface



KV-7/3-6-1

Operation

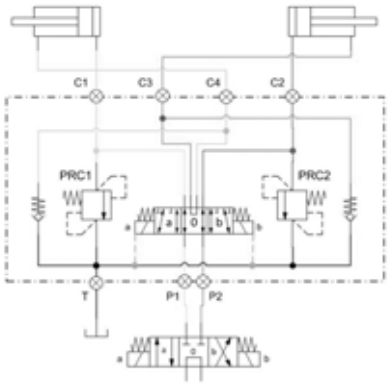
The valve has been designed especially for use on variable V-blade snow plows. Each of two blades are connected to hydraulic cylinder.

Valve KV-7/3-6 allows to switch between tilting each blade individually (spool pos. "a" and "b") or both simultaneously (spool pos. "0").

Integrated pressure relief valves prevent hydraulic system against pressure peeks on working ports C1 and C2. The oil from pressure relief valves can be released over T port to tank or to accumulator assembled on T port.

Hydraulic accumulator absorbs impact energy, and return it back to system through check valves.

Hydraulic symbol



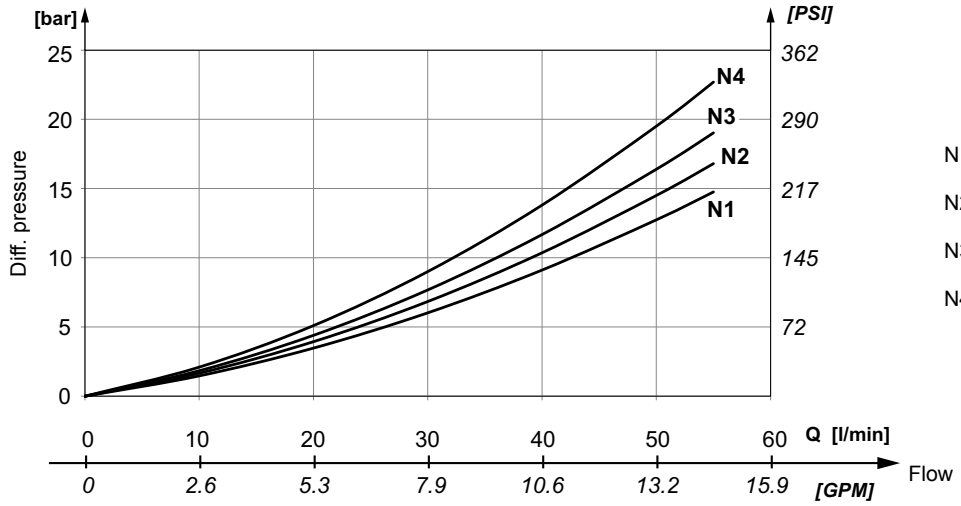
Features

Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	50 *[13.2]*
Operating pressure	Ports P1, P2, C1, C2, C3, C4	bar *[PSI]*	350 *[5 076]*
	port T	bar *[PSI]*	250 *[3 626]*
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to 158]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[75 to 1 760]*
Fluid contamination		ISO 4406:1999	19/17/14
Mass		kg *[lb]*	3,6 *[7.94]*

Electrical			
Supply voltage		V	12 DC, 24 DC
Power		W	31
Coil temperature		°C *[°F]*	to 180 *[to 356]*
Duty cycle			Continuous

ΔP- Q Performance curves

Measured at 50 °C *[122 °F]* and viscosity 32 mm²/s *[148 SUS]*



N1: P2-C2 (a)

N2: P1-C1 (b) and P2-C2 (0)

N3: P2-C4 (b) and P1-C1 (0)

N4: C3-C4 (0) and P1-C3 (a)

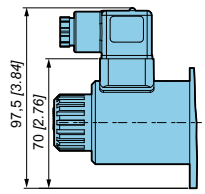
p/Q Operating limits

Measured at 50 °C *[122 °F]* and viscosity 32 mm²/s *[148 SUS]*

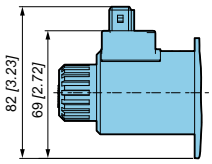
Valve operates stable for all flow directions - spool position 0, a and b at flow up to 100 l/min *[26.4 GPM]* and pressure up to 350 bar *[5 076 PSI]*.

Dimensions

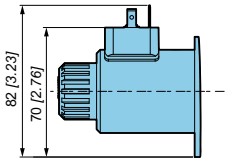
Connector EN 175301-803 (with signal lamp) - option L



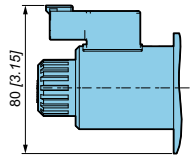
Terminal AMP Junior timer - option M

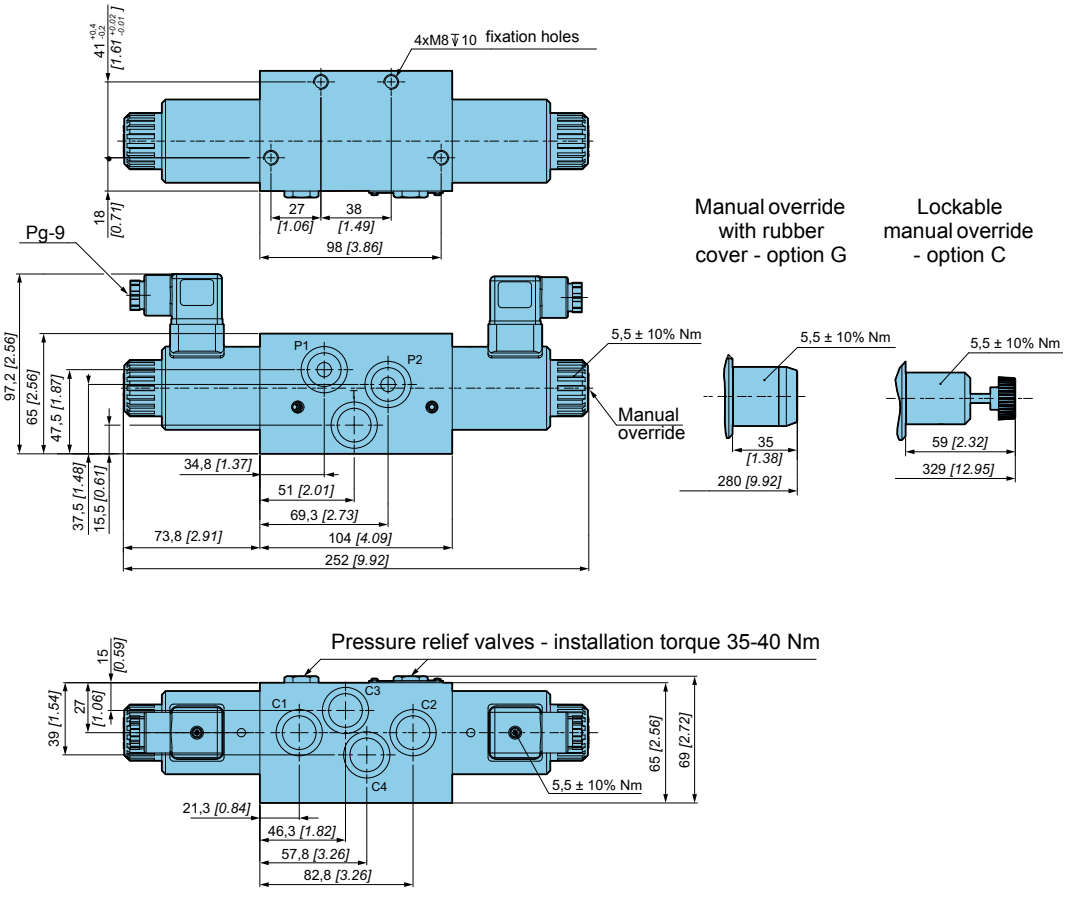


Without connector - option K



Terminal Deutsch - option V





Model code

K V - 7 / 3 - 6 - 1 - [ ][ ][ ][ ][ ][ ][ ] -

Spool type

	1

Manual override option

Emergency manual override	**No designation**
Manual override with rubber cover	**G**
Lockable manual override	**C**

Supply voltage

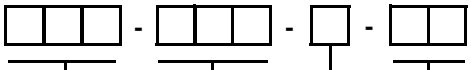
12V DC	**12DC**
24V DC	**24DC**

Terminal/connector type

Connector EN 175301-803	**No designation**
Connector EN 175301-803 with signal lamp	**L**
Terminal EN 175301-803 w/o connector	**K**
Terminal AMP Junior timer w/o connector	**M**
Terminal Deutsch w/o connector	**V**

Overvoltage protection

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



Surface protection

No designation	Zn coated
P5	Painted RAL 9005

Seal type

No designation	NBR seals for mineral oil HL, HLP
E	FPM seals for HETG, HEES, HEPG

Fix pressure setting

XXX	XXX bar*

Pressure setting established at flow 10l/min *[0.26 GPM]*
* Standard fix pressure setting options are 70-350 bar *[1 015-5 076 PSI]* with span 10 bar *[145 PSI]*

Threaded connections

No designation	M18x1,5
3/8	G3/8 -N
SAE6	9/16-18 UNF

8/3 WAY DIRECTIONAL VALVES KV

- NG 6
- Up to 250 bar *[3 625 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).

KV-8/3-6

Operation

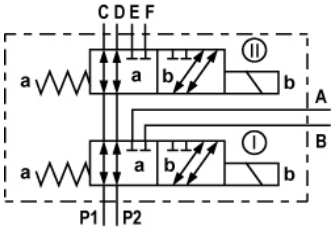
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between three consumers and the basic directional valve, when we wish to control both consumers alternately by means of one basic directional valve.

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.

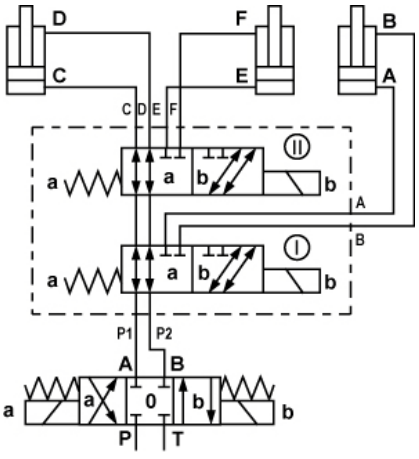
When the solenoid (4,5) is de-energized, the control spool (2.3) is returned to their neutral position by the return spring (6,7).

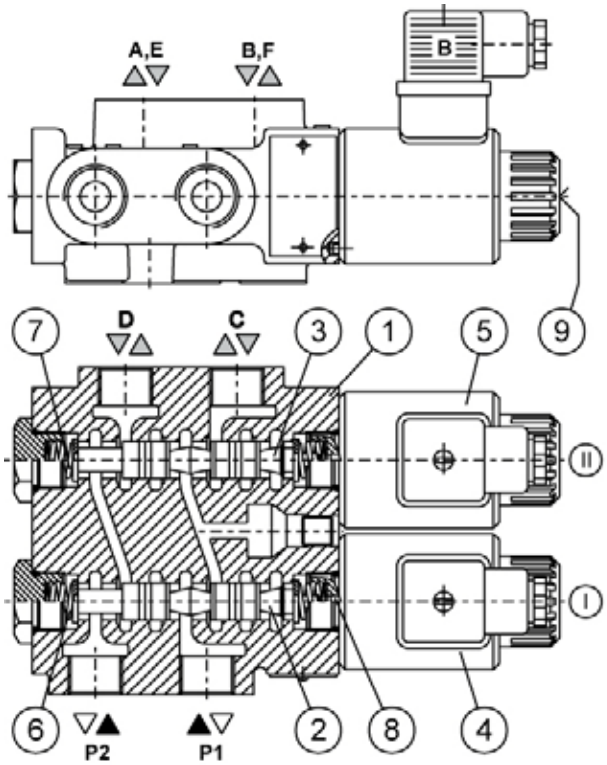
The change-over can also be done manually by pressing the emergency manual override (9).

Hydraulic symbol



Mounting example

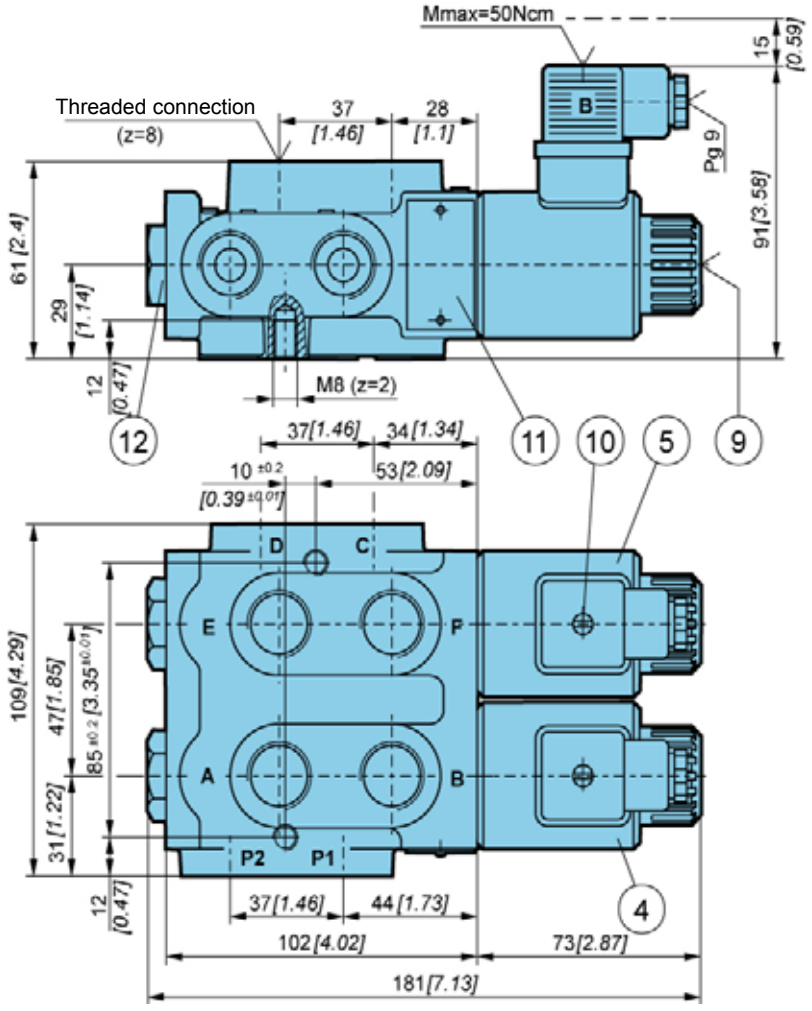




Features

Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	50 *[13.21]*
Operating pressure		bar *[PSI]*	250 *[3 625]*
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to +158]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[3.24 to 82]*
Mounting position			Optional
Mass		kg *[lb]*	3,8 *[8.38]*
Filtration		NAS 1638	8
Electrical			
Supply voltage		V	12, 24 DC
Power		W	29
	(12 V DC supply voltage)		36
Switching frequency		1/h	15000
Ambient temperature		°C *[°F]*	to +50 *[to +122]*
Coil temperature		°C *[°F]*	to +180 *[to +356]*
Duty cycle			Continuous

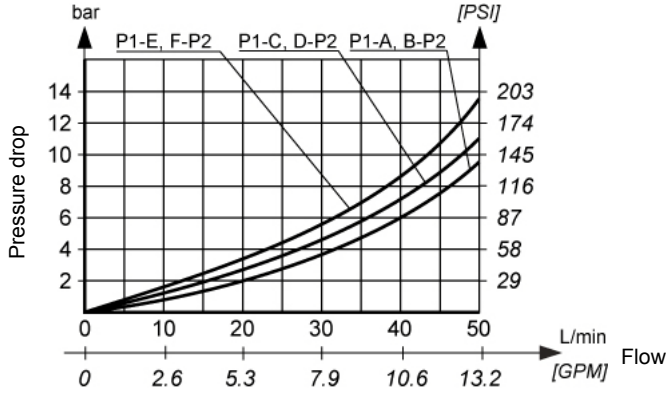
Dimensions



4.5. Solenoid ''b'' MR-045
9. Emergency manual override
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^2/s *[148 SUS]*.



Model code

KV - 8 / 3 - 6 - ☐ - ☐☐☐ - ☐ - ☐ - ✱

Manual override option

Emergency manual override	**No designation**
Manual override with rubber cover	**G**
Lockable manual override	**C**

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**
Deutsch	**V**

Overvoltage

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

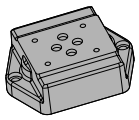
Threaded connections

M18x1,5	**No designation**
M22x1,5	**M22**
M20x1,5	**M20**
G3/8	**G3/8**
G1/2	**G1/2**
3/4-16 UNF-2B	**SAE 8**

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



CONNECTING COMPONENTS

SUBPLATES

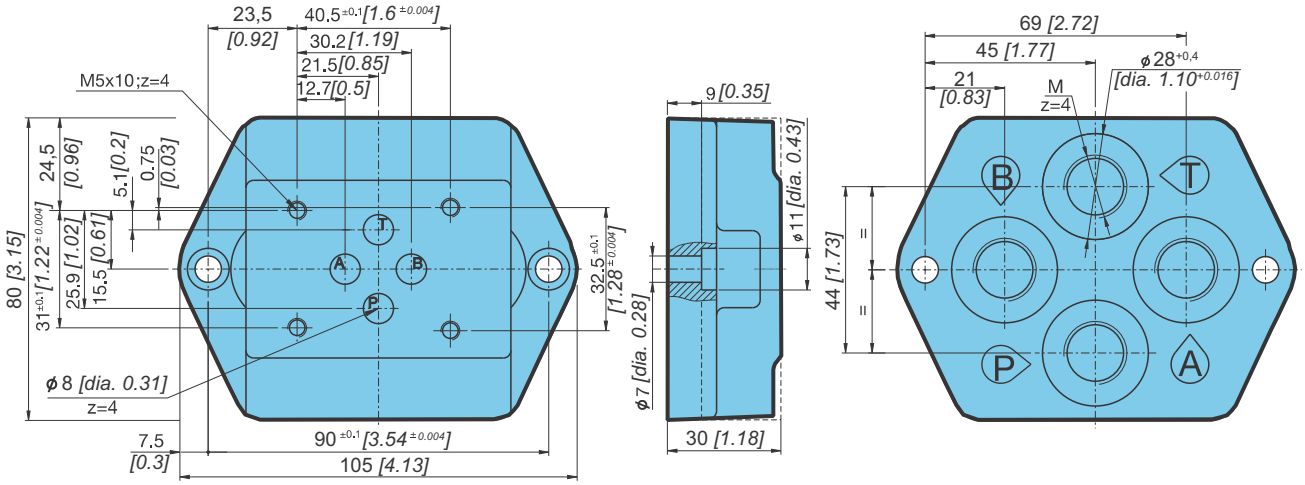
- NG 6, 10, 16
- Up to 350 bar *[5076 PSI]*
- Up to 300 l/min *[79.3 GPM]*

- Connecting dimensions to ISO 4401.
- Threaded connection to ISO 1179 (BSPP/Gas).

PP-KV-6, PP-KV-10, PP-KV-16

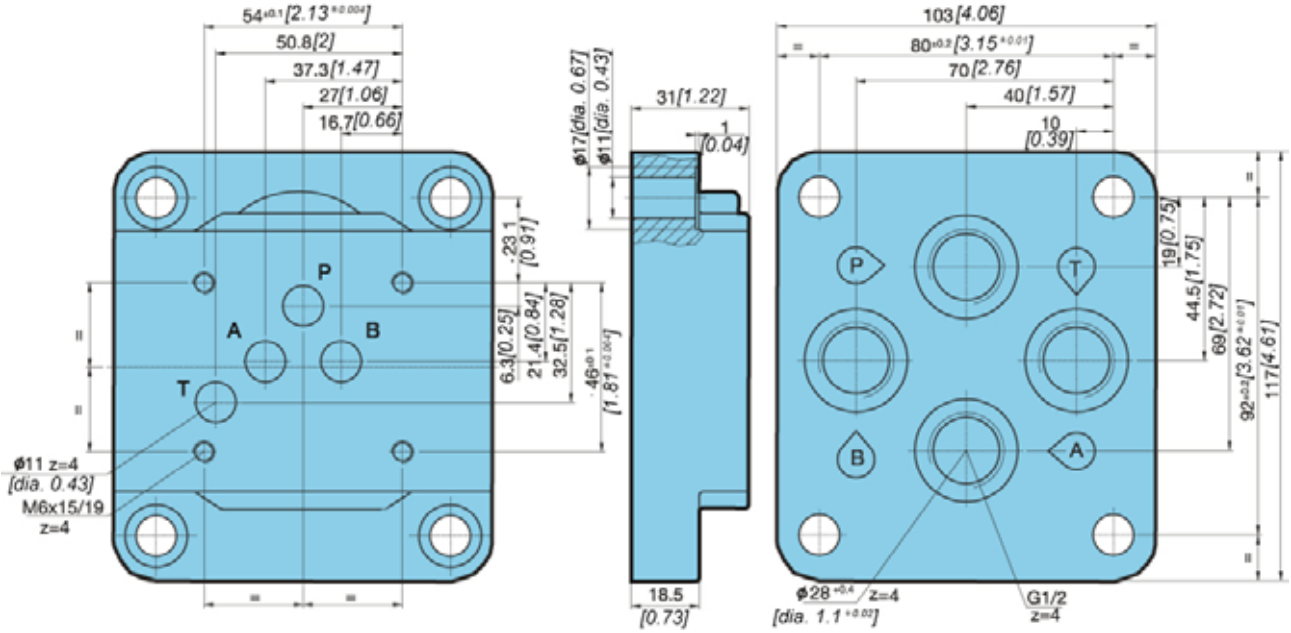
Dimensions

Subplate, type PP-KV-6-...



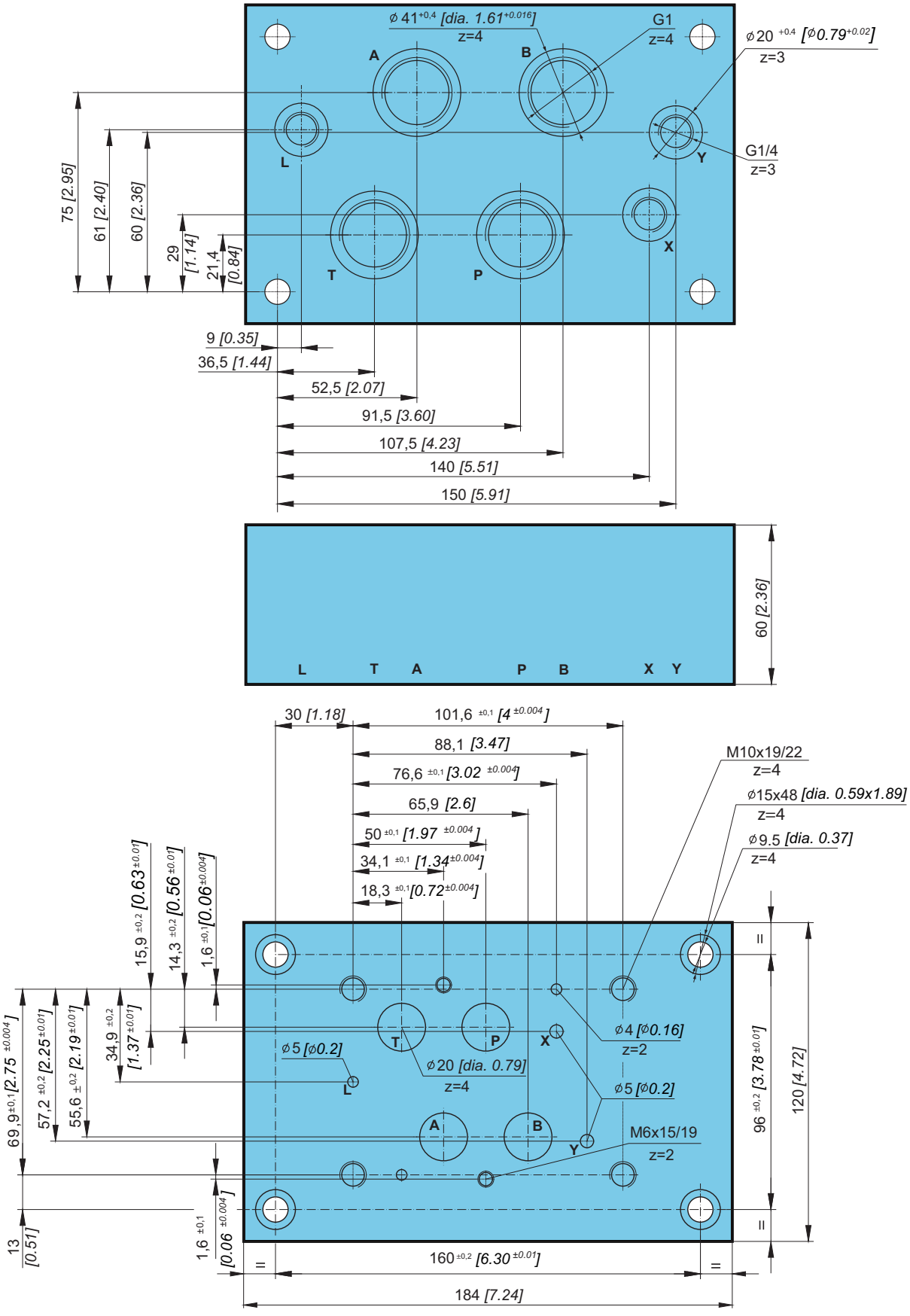
Type	PP-KV-6-2-G3/8-Ø28-L mm *[Zoll]*	PP-KV-6-2-G3/8-Ø28-L-ZN mm *[Zoll]*	PP-KV-6-2-G1/2-Ø28-L mm *[Zoll]*
M	G3/8	G3/8	G1/2
Surface protection	Phosphated	Zinc - plated	Phosphated

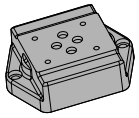
Subplate type PP-KV-10-G1/2-Ø28L Surface protection - Phosphated



Dimensions

Subplate, type PP-KV-16-G1-Ø41





MANIFOLD BLOCKS BP

BP-6-4-S

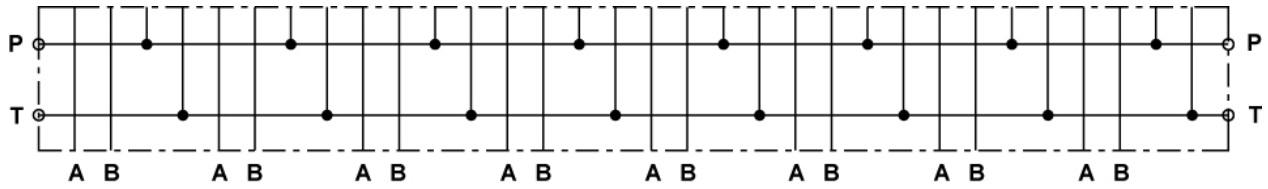
- NG 6, 10
- Up to 350 bar *[5076 PSI]*

- .Connecting dimensions to ISO 4401.
- .Threaded connection to ISO 1179-1 (BSPP/Gas).
- .Mounting position unrestricted (valve axis preferably horizontal).
- Because of the large drilling diameters the pressure drop through the manifolds is very low.

Operation

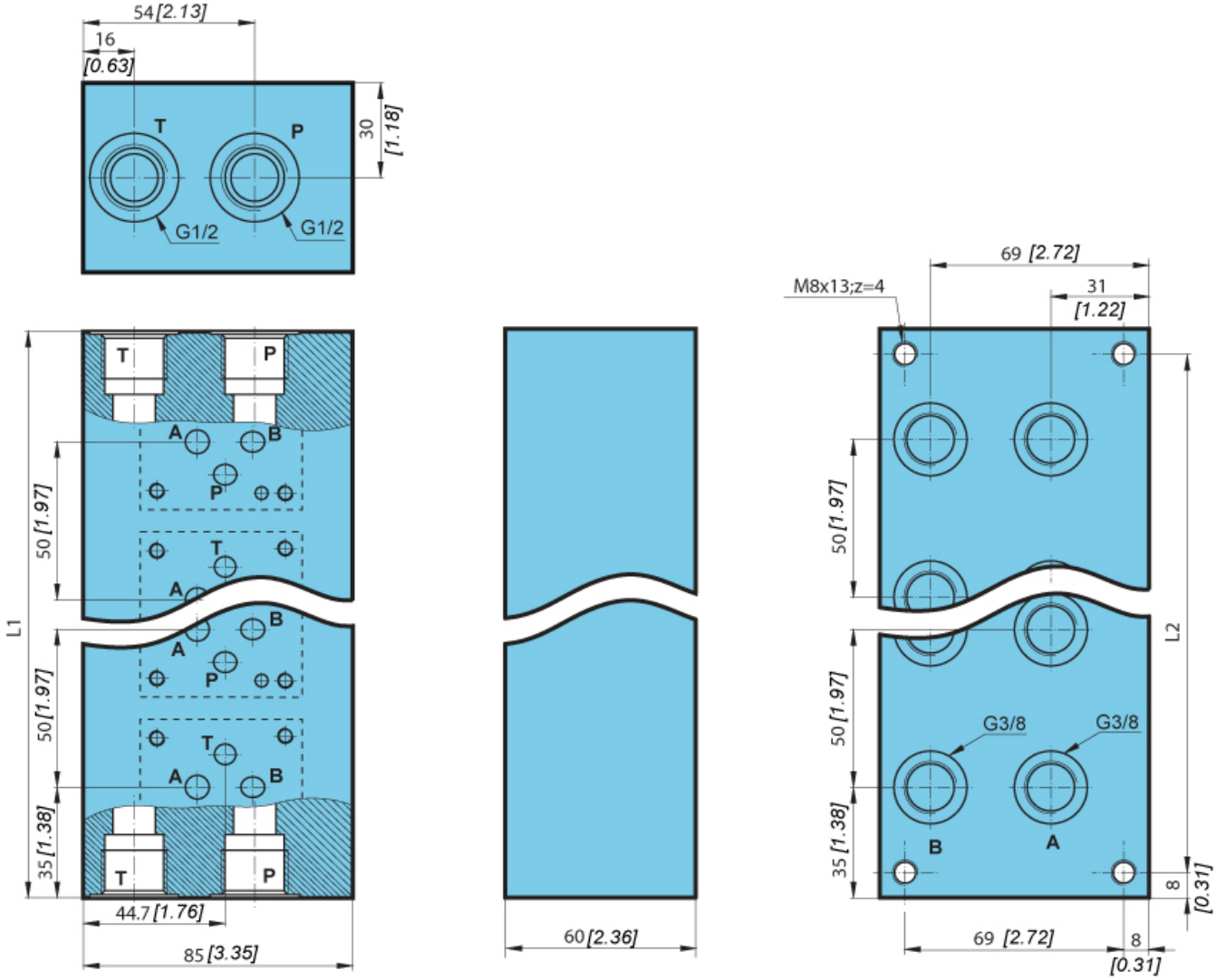
Manifold blocks serve for transmission of hydraulic fluid from source to valves. On the block can be two or up to seven valves (NS 10) or up to eight valves (NS 6) mounted in parallel connection.
Manifold blocks are used for easily realizing of hydraulic circuits without piping between valves and minimal overall dimensions.

Hydraulic symbol

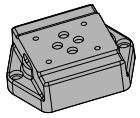


Dimensions

BP-6-...-

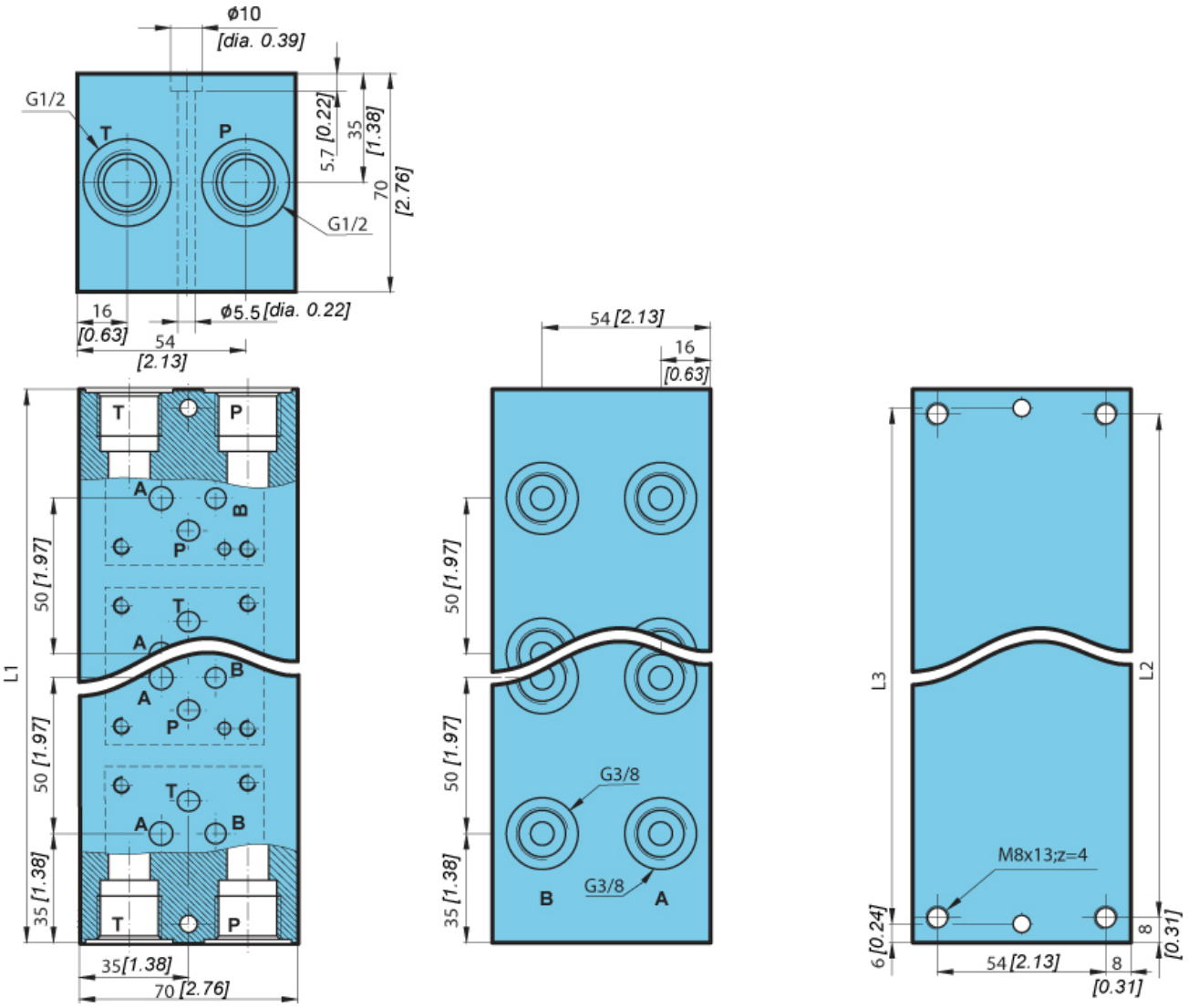


Type	Nominal size	Stations	L1 mm *[Zoll]*	L2 mm *[Zoll]*	Ports size P-T	Ports size A-B	Mass kg *[lb]*
BP-6-1	6	1	70 *[2.75]*	54 *[2.12]*	G1/2	G3/8	2,3 *[5.07]*
BP-6-2		2	120 *[4.72]*	104 *[4.09]*			3,9 *[8.60]*
BP-6-3		3	170 *[6.69]*	154 *[6.06]*			5,5 *[12.12]*
BP-6-4		4	220 *[8.66]*	204 *[8.03]*			7,2 *[15.87]*
BP-6-5		5	270 *[10.63]*	254 *[10.00]*			8,8 *[19.40]*
BP-6-6		6	320 *[12.60]*	304 *[11.97]*			10,5 *[23.15]*
BP-6-7		7	370 *[14.56]*	354 *[13.93]*			12,1 *[26.67]*
BP-6-8		8	420 *[16.53]*	404 *[15.90]*			13,7 *[30.20]*



Dimensions

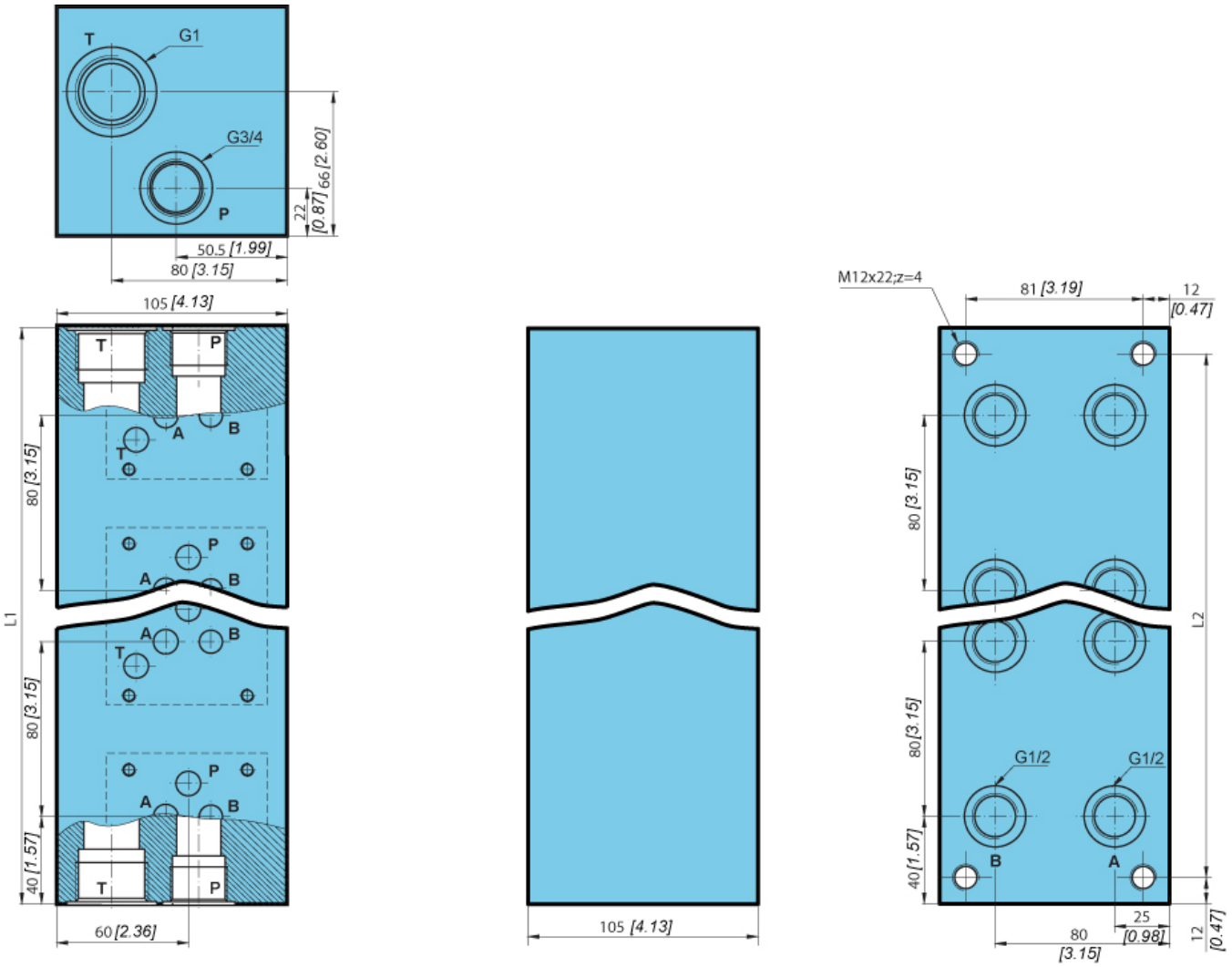
BP-6-...-S



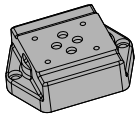
Type	Nominal size	Stations	L1 mm *[Zoll]*	L2 mm *[Zoll]*	L3 mm *[Zoll]*	Ports size P-T	Ports size A-B	Mass kg *[lb]*
BP-6-1-S	6	1	70 *[2.75]*	54 *[2.12]*	58 *[2.28]*	G1/2	G3/8	2,3 *[5.07]*
BP-6-2-S		2	120 *[4.72]*	104 *[4.09]*	108 *[4.25]*			3,9 *[8.60]*
BP-6-3-S		3	170 *[6.69]*	154 *[6.06]*	158 *[6.22]*			5,5 *[12.12]*
BP-6-4-S		4	220 *[8.66]*	204 *[8.03]*	208 *[8.19]*			7,2 *[15.87]*
BP-6-5-S		5	270 *[10.63]*	254 *[10.00]*	258 *[10.15]*			8,8 *[19.40]*
BP-6-6-S		6	320 *[12.60]*	304 *[11.97]*	308 *[12.12]*			10,5 *[23.15]*
BP-6-7-S		7	370 *[14.56]*	354 *[13.93]*	358 *[14.09]*			12,1 *[26.67]*
BP-6-8-S		8	420 *[16.53]*	404 *[15.90]*	408 *[16.06]*			13,7 *[30.20]*

Dimensions

BP-10-...-...

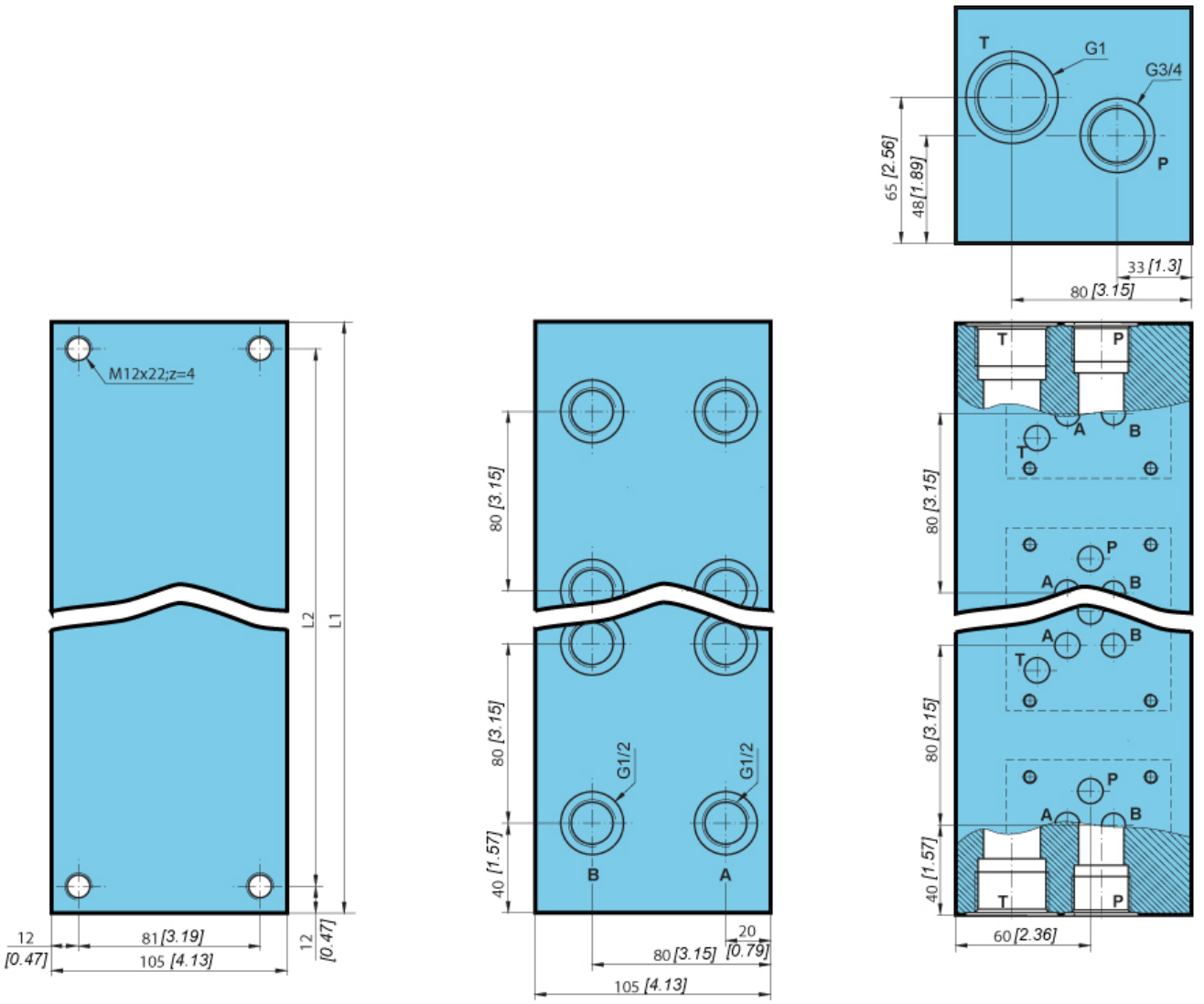


Type	Nominal size	Stations	L1 mm *[Zoll]*	L2 mm *[Zoll]*	Ports size P	Ports size A-B	Ports size T	Mass kg *[lb]*
BP-10-1	10	1	80 *[3.15]*	56 *[2.20]*	G3/4	G1/2	G1	5,9 *[13.00]*
BP-10-2		2	160 *[6.30]*	136 *[5.35]*				11,8 *[26.01]*
BP-10-3		3	240 *[9.45]*	216 *[8.50]*				17,7 *[39.02]*
BP-10-4		4	320 *[12.60]*	296 *[11.65]*				23,5 *[51.80]*
BP-10-5		5	400 *[15.74]*	376 *[14.80]*				29,4 *[64.81]*
BP-10-6		6	480 *[18.90]*	456 *[17.95]*				35,3 *[77.82]*
BP-10-7		7	560 *[22.04]*	536 *[21.10]*				41,2 *[90.83]*



Dimensions

BP-10-...-S



Type	Nominal size	Stations	L1 mm *[Zoll]*	L2 mm *[Zoll]*	Ports size P	Ports size A-B	Ports size T	Mass kg *[lb]*
BP-10-1-S	10	1	80 *[3.15]*	56 *[2.20]*	G3/4	G1/2	G1	5,9 *[13.00]*
BP-10-2-S		2	160 *[6.30]*	136 *[5.35]*				11,8 *[26.01]*
BP-10-3-S		3	240 *[9.45]*	216 *[8.50]*				17,7 *[39.02]*
BP-10-4-S		4	320 *[12.60]*	296 *[11.65]*				23,5 *[51.80]*
BP-10-5-S		5	400 *[15.74]*	376 *[14.80]*				29,4 *[64.81]*
BP-10-6-S		6	480 *[18.90]*	456 *[17.95]*				35,3 *[77.82]*
BP-10-7-S		7	560 *[22.04]*	536 *[21.10]*				41,2 *[90.83]*

Model code

B P - □ - □ - □ - *

Manifold block

Nominal size

Size 6 (CETOP 3) A+B = G3/8; spotface Ø 28/1 P+T = G1/2; spotfaceØ 34/1	**6**
Size 10 (CETOP 5) A+B = G1/2; spotface Ø 34/1 P = G3/4; spotface Ø 42/1 T = G1; spotfaceØ 47/1	**10**

Stations

1 station	**1**
2 stations	**2**
3 stations	**3**
4 stations	**4**
5stations	**5**
6 stations	**6**
7 stations	**7**
8 stations	**8**

Ports position

Rear	**No designation**
Side	**S**

Special requirements to be briefly specified

Max. pressure depends on type of used seals.

ELECTRIC AND ELECTRONIC COMPONENTS

PRESSURE SWITCH TS-4

- NG 4
- Up to 400 bar *[5801 PSI]*

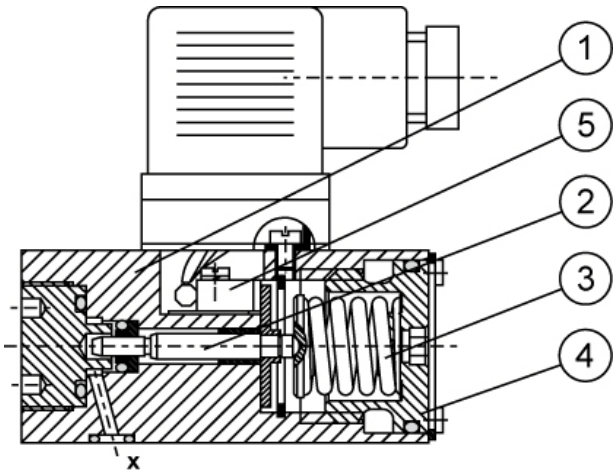
- Minimal dimensions.
- Four pressure ranges.
- Three mounting methods (horizontal, vertical, built into pipeline).
- Three pressure setting methods (by means of Allan key, knob, or lockable knob).
- Lockable pressure setting.
- Operation supervision by means of signal lamp.
- Plug-in connector for solenoids to ISO 4400.

TS-4

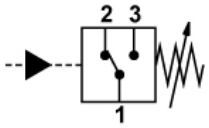
Operation

Pressure switches type TS are used for switching electric circuits on and off, respectively, depending on the pressure rate in the hydraulic system. These switches can be mounted as control or monitoring elements. When the pressure switch is used as monitoring element, the operation of hydraulic systems can be supervised by means of light or sound signals.

The TS type pressure switch consist of a housing (1), a piston (2), a spring (3), a setting knob (4) and a microswitch (5). Pressure acts on the piston (2), pushing it against the spring (3). When the piston force excedes the preset tension of the spring, the microswitch (5) turns the electric power on, or respectively, off. The tension and thereby the switching - on and off pressure rates can be preset by means of the setting knob (4).

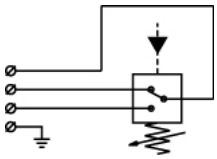


Symbol

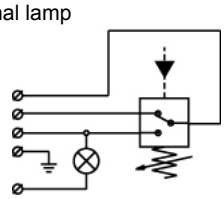


Circuit diagram

Without signal lamp

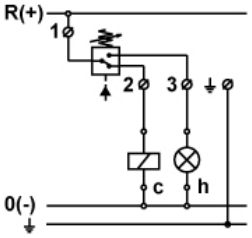


With signal lamp

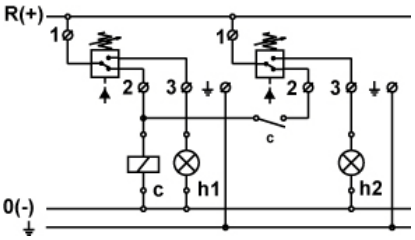


Mounting example

One pressure switch



Two pressure switches



h, h1, h2 = Control lamps.
c = Relay (contactor).

Features

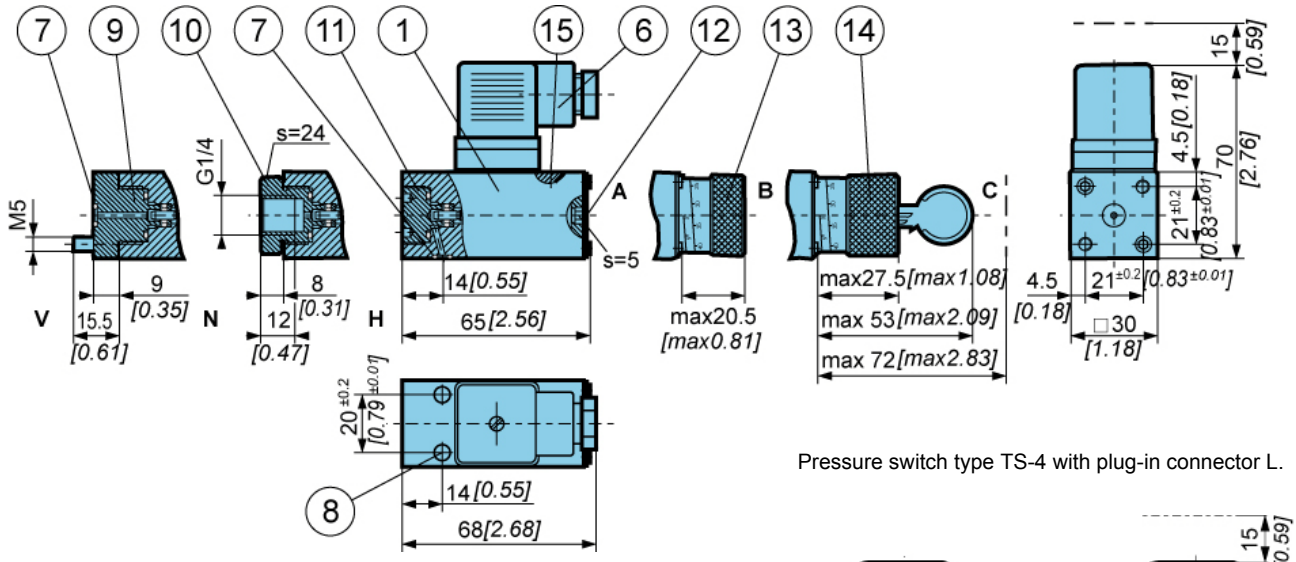
Hydraulic

Type		TS-4-70	TS-4-160	TS-4-250	TS-4-400
Size				4	
Min. pressure at pressure rise	bar *[PSI]*	< 9 *[< 131]*	< 17 *[< 247]*	< 20 *[< 290]*	< 25 *[< 363]*
Max. pressure at pressure rise	bar *[PSI]*	70 ±2 *[1 015 ±29]*	160 ±4 *[2 320 ±58]*	250 ±6 *[3 625 ± 87]*	400 ±10 *[5 801± 145]*
Hysteresis at min. pressure	bar *[PSI]*	≤ 4 *[? 58]*	≤ 8 *[? 116]*	≤ 10 *[? 145]*	≤ 13 *[? 189]*
Hysteresis at max. pressure	bar *[PSI]*	≤ 8,5 *[? 123]*	≤ 15 *[? 218]*	≤ 20 *[? 290]*	≤ 25 *[? 363]*
Max. pressure	bar *[PSI]*	400 *[5 801]*		500 *[7 251]*	
Repeating accuracy	%			< ±1	
Shift frequency	min^{-1}			120	
Oil temperature range	°C *[°F]*			-20 to +70 *[-4 to +158]*	
Viscosity range	mm^2/s *[SUS]*			15 to 380 *[3.24 to 82]*	
Filtration	NAS 1638			8	
Mass	kg *[lb]*			0,2 to 0.4 *[0.44 to 0.88]*	

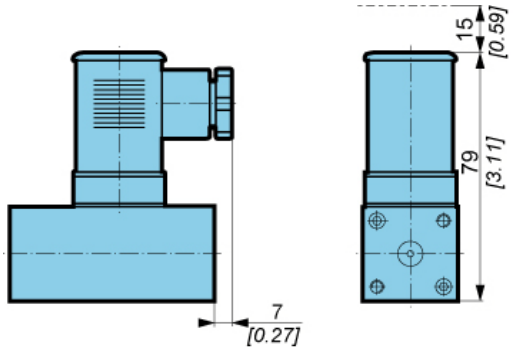
Electrical

Switching capacity	Alternating current	Voltage	V	125; 250
		Ohm load	A	5
		Inductive load	A	5
	Direct current	Voltage	V	30; 50; 75; 125; 250
		Ohm load	V	5; 2; 1; 0,5; 0,25
		Inductive load	A	5; 2; 1; 0,06; 0,03

Dimensions



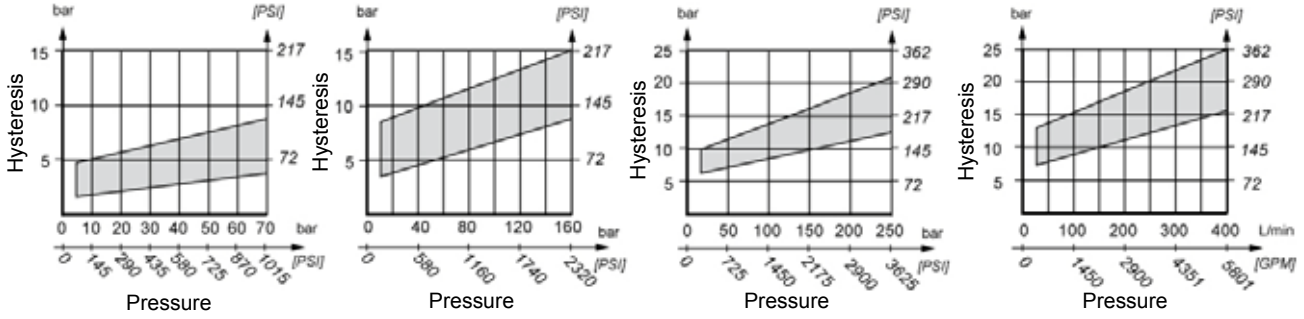
Pressure switch type TS-4 with plug-in connector L.



1. Pressure switch body
6. Plug-in connector
7. O-ring 5x1,5
8. Fixing screws holes, 2 pcs M5x40 to ISO 4762-10.9
   Tightening torque Md=9 Nm (not included)
9. Fixing the switch to stacking sandwich plate
10. Instalation into line
11. Fixing the switch to subplate
12. Pressure setting by means of Allan key
13. Pressure setting by means of knob
14. Pressure setting by means of lockable knob
15. Screw for protection of the seat pressure

Opening pressure

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



Model code

T S - 4 - ☐ - ☐ - ☐ - ☐ - ☐ - ✱

Pressure setting range

To 70 bar *[1,015 PSI]*	**70**
ToTo 160 bar *[2,320 PSI]*	**160**
ToTo 250 bar *[3,625 PSI]*	**250**
ToTo 400 bar *[5,801 PSI]*	**400**

Mounting method

Vertical	**V**
Horizontal	**H**
Built-in	**N**

Pressure setting element

Allan key	**A**
Knob	**B**
Lockable key	**C**

Plug-in connector

Without signal lamp		**No designation**
With signal lamp	12; 24 V	**L24**
	48 V	**L48**
	110; 230 V	**L230**

Seals 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

STACKING SANDWICH PLATE VP-TS-4

- NG 6, 10
- Up to 400 bar *[5801 PSI]*

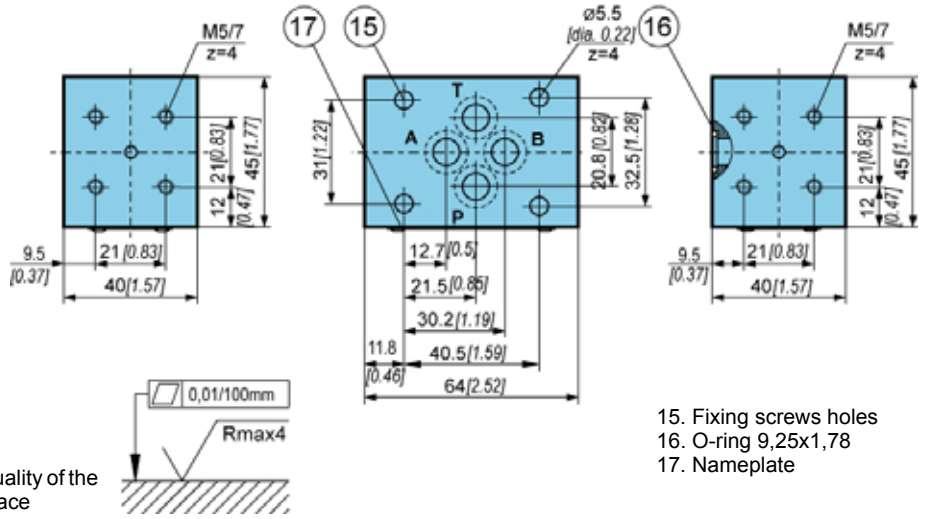
VP-TS-4-...

Features

Size		6	10
Flow rate	L/min *[GPM]*	80 *[21.1]*	120 *[31.7]*
Operating pressure	bar *[PSI]*	400 *[5 801]*	
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*	
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[3.24 to 82]*	
Filtration	NAS 1638	8	
Mass	kg *[lb]*	0,9 *[1.98]*	2,1 *[4.63]*

Dimensions

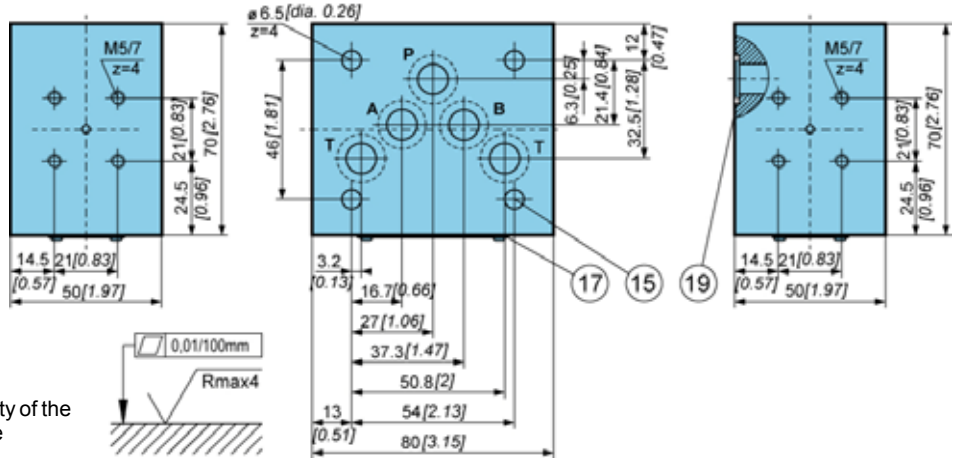
VP-TS-4-6



Required quality of the mating surface

15. Fixing screws holes
16. O-ring 9,25x1,78
17. Nameplate

VP-TS-4-10

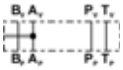
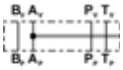
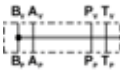
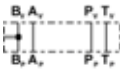
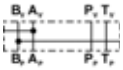
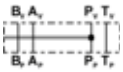
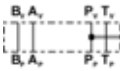
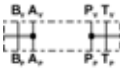
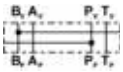
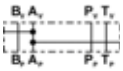
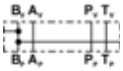
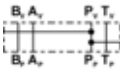


Required quality of the mating surface

Model code

V P - T S - 4 - ☐ - ☐ - ☐ - ✱

Size	
Size 6	**6**
Size 10	**10**

Symbol	
	**A**
	**AI**
	**B**
	**BI**
	**AB**
	**P**
	**PI**
	**AP**
	**BP**
	**AA**
	**BB**
	**PP**

Seals 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

DIRECT CURRENT SOLENOIDS FOR HYDRAULICS MR

- Fast and simple instalation.
- Reliable functioning in every position.
- Long life span.
- Solenoid screws into valve block.
- Removable coil.
- Corresponding to VDE 0580 recommendations.
- Plug-in connector corresponding to EN 175301-803 standards.
- MR - 045 fulfil EMC (89/336/EEC).
- Protection of solenoid: IP 69 for Deutsch connector
  IP 65 to EN 50529 / IEC 60529 for AMP connector

MR - 060, MR - 045, MR - 045/1

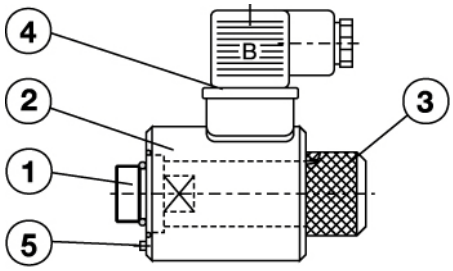
Operation

A piston that can move freely lengthwise, is placed in an oiltight core (1). A coil (2) protected by housing surrounds the core. The plug-in connector (4) is fixed to the housing. The coil is fixed on the core by retaining nut (3) and protected against rotation with a pin (5).

This type of solenoid is used for controlling of directional control valves.

They are activated by passing electric current through the solenoid's coil. For manually operation of the solenoid, there is the emergency switch at the back of the solenoid. Solenoids are of «push-design». When the solenoid is activated the piston pushes the piston rod out of it. The force with which the piston pushes at various points of its stroke (solenoid's movement) is given in the tables. The solenoids are designed for direct current. If a rectifier bridge is added, the alternating current can also be used. They are built for voltages of 12, 24, 48, 110 and 230V. Allowed deviation from the nominal voltage is within -10 to +5%. Their intermittence is 100% at the ambient temperature of 40°C *[104°F]*. When the ambient temperature is increased the intermittence is correspondingly lowered.

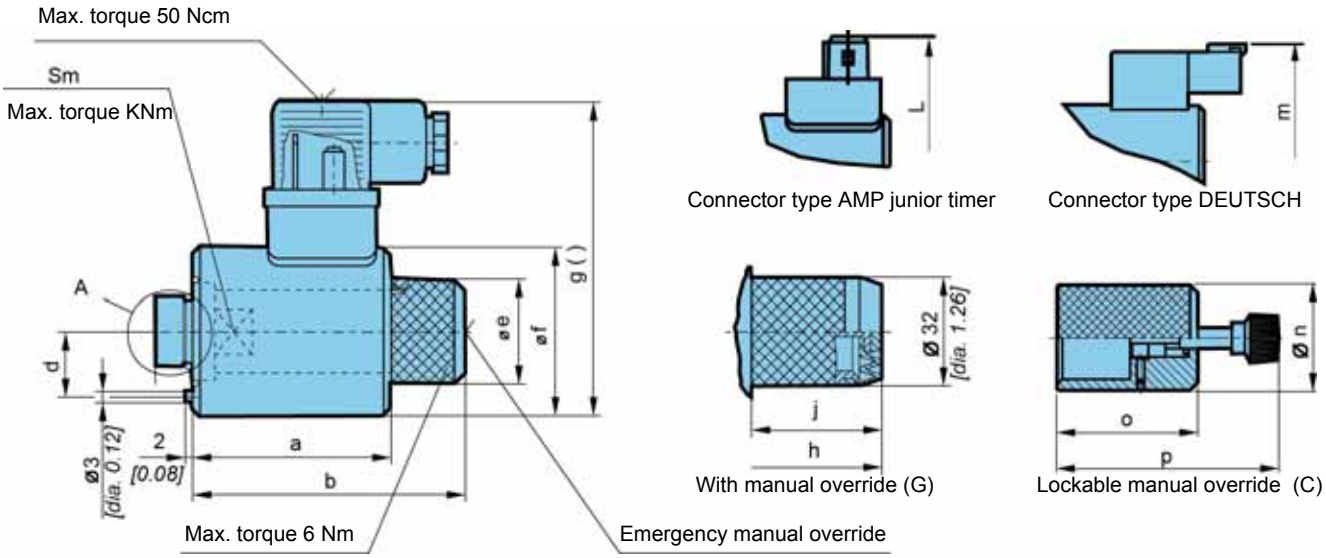
If the buyer so wishes, solenoids have the degree of protection of enclosures IP 65.
They are tested to the pressure of 250 bar *[3 626 PSI]*.
Their life span in normal working conditions is 10^7 operations.



Features

	Strokemm *[Zoll]*		MR-045 for NG6 5KO	MR-045/1 for NG6 3KO	MR-060 for NG10
Force F at 90% Un, and working temperature when ED is 100% (* 230 V AC supply voltage)	0 *[0]*	N *[lbf]*	100 *[22.5]*	90 *[20.2]*	240 *[53.9]*
	1 *[0.04]*		75 *[16.9]* / 70* *[15.7]**	50 *[11.2]*	130 *[29.2]*
	2 *[0.08]*		60 *[13.5]* / 50* *[11.2]**	35 *[7.9]*	140 *[31.5]*
	3 *[0.12]*		30 *[6.7]* / 20* *[4.5]**	20 *[4.5]*	
	4 *[0.16]*		20 *[4.5]* / 10* *[2.2]**	10 *[2.2]*	85 *[19.1]*
	5 *[0.20]*		8 *[1.8]* / 5* *[1.1]**	5 *[1.1]*	50 *[11.2]*
	6 *[0.24]*		5 *[1.1]* / 3* *[0.7]**	3 *[0.7]*	35 *[7.9]*
	7 *[0.28]*		-	-	23 *[5.2]*
	8 *[0.31]*		-	-	18 *[4.0]*
	9 *[0.35]*		-	-	13 *[2.9]*
Power (** 12V supply voltage - 36W)		W	29**	26	45
Pression		Bar *[PSI]*	250 *[3 626]*		
Intermittence		%	100		
Mass		kg *[lbs]*	0,6 *[1.32]*	0,45 *[0.99]*	1,6 *[3.52]*

Dimensions

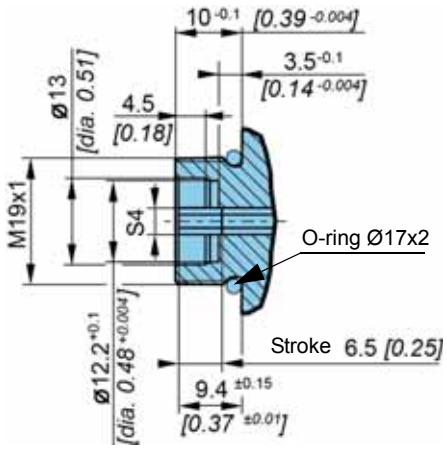


	a	b	D$^{+0,1}$	Øe	Øf	g	h	j
MR-045	53 *[2.08]*	73 *[2.87]*	17,5 *[0.69]*	30 *[1.18]*	45 *[1.77]*	85 *[3.35]* / 91* *[3.58]**	87 *[3.42]*	34 *[1.34]*
MR-045/1	38 *[1.49]*	58 *[2.28]*					72 *[2.83]*	
MR-060	72 *[2.83]*	108 *[4.25]*	23,9 *[0.94]*	40 *[1.57]*	62 *[2.44]*	103 *[4.05]* / 109* *[4.29]**	122 *[4.80]*	50 *[1.97]*

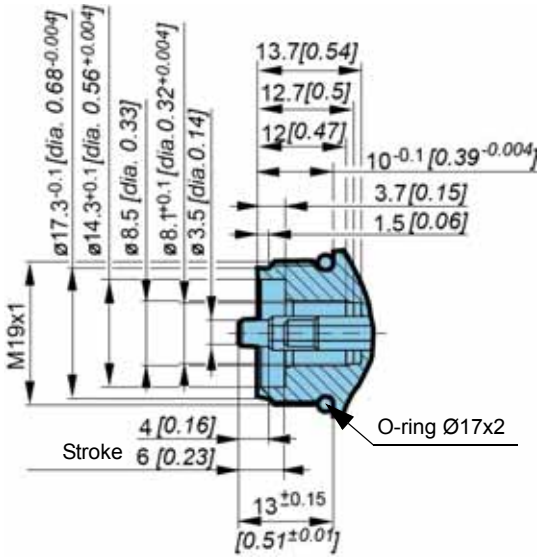
* AC supply voltage

	k	L	Sm	m	n	o	p
MR-045	30 *[1.18]*	69 *[2.72]*	20 *[0.78]*	67*[2.64]*	28 *[1.10]*	35*[1.38]*	61 *[2.40]*
MR-045/1							
MR-060	50 *[1.97]*	86 *[3.38]*	27 *[1.06]*	82*[3.23]*	40 *[1.57]*	54 *[2.13]*	79,5 *[3.13]*

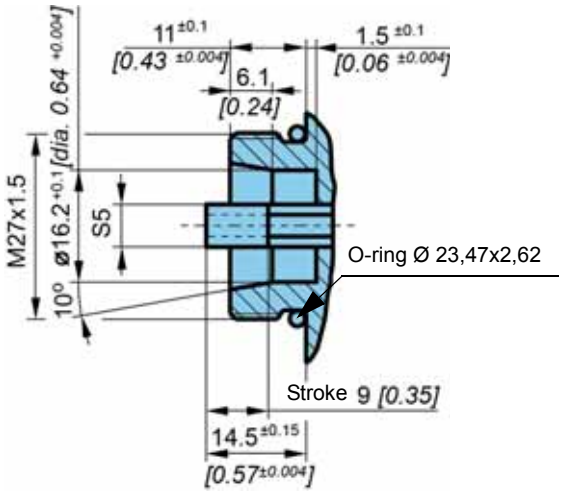
A MR-045



A MR-045/1



A MR-060



Model code (Every part of solenoid has to be ordered separately)

Core

M R - ☐ - J

Size mm *[Zoll]*

Ø 45 *[1.77 dia]* / Lenght 73 *[2.87]*	**045**
Ø 45 *[1.77 dia]* / Lenght 58 *[2.28]*	**045/1**
Ø 60 *[2,36 dia]* / Lenght 108 *[4,25]*	**060**

For DC and AC voltage the same core is used.

Retaining nut

M R - ☐ - M - ☐

Size mm *[Zoll]*

Ø 45 *[1.77 dia]* / Lenght 73 *[2.87]*	**045**
Ø 45 *[1.77 dia]* / Lenght 58 *[2.28]*	**045/1**
Ø 60 *[2,36 dia]* / Lenght 108 *[4,25]*	**060**

Hand operation of solenoid

Without	**No designation**
Manual override	**G**
Lockable manual override	**C**

Coil

M R - ☐ - O - ☐ - ☐ - ☐

Size mm *[Zoll]*

Ø 45 *[1.77 dia]* / Lenght 73 *[2.87]*	**045**
Ø 45 *[1.77 dia]* / Lenght 58 *[2.28]*	**045/1**
Ø 60 *[2,36 dia]* / Lenght 108 *[4,25]*	**060**

Supply voltage

	Direct voltage	Alternating voltage
12V	**12 DC**	**12 AC**
24V	**24 DC**	**24AC**
48V	**48DC**	**48AC**
110 V	**110DC**	**110AC**
230V	**230DC**	**230AC***

* To fulfil EMC (89/336/EEC) a capacitor must be built in.

Connector type

EN 175301-803	**No designation**
AMP Junior Timer	**AMP**
DEUTSCH	**DEU**

Overvoltage

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

Plug-in connector

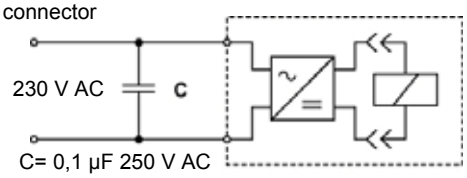
M R - K - ☐ - ☐ - ☐

Supply voltage

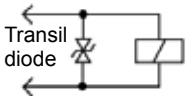
	Direct voltage	Alternating voltage
12V	**12 DC**	**12 AC**
24V	**No designation**	**24AC**
48V	**48DC**	**48AC**
110 V	**110DC**	**110AC**
230V	**230DC**	**230AC***

* To fulfil EMC (89/336/EEC) a capacitor must be built in.

Solenoid with rectifier bridge built in connector



Solenoid with overvoltage protection



Colour signal lamp

Grey without signal lamp	**A****
Black without signal lamp	**B**
Transparent with signal lamp	**L****

Cable gland**

S. 9	**No designation**
S. 11	**11**

** not valid for AMP and DEUTSCH

POCLAIN
Hydraulics

10/09/2020
A52142B
B00497P

www.poclain-hydraulics.com