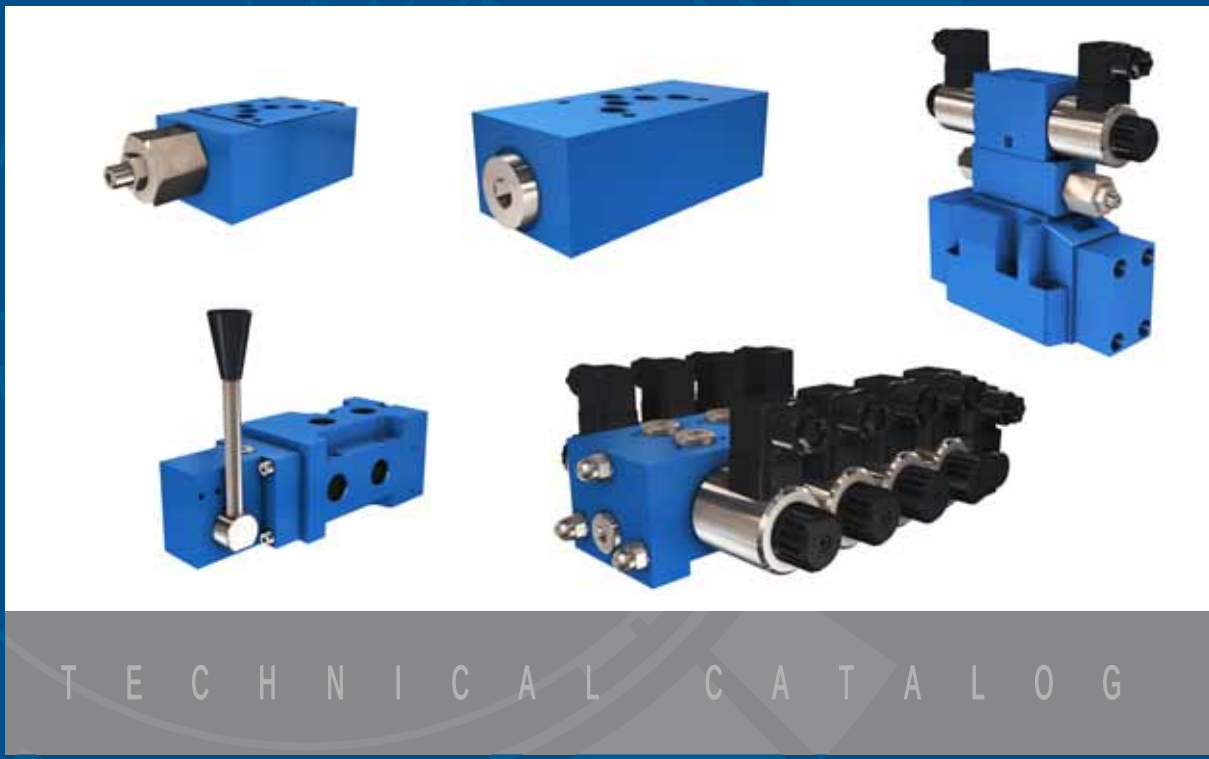
VALVES RANGE

FOR OPEN LOOPS



TECHNICAL CATALOG

POCLAIN HYDRAULICS

Poclain Driving Values for the Future

CONTENT

CHECK VALVES

CHECK VALVE VP-NV

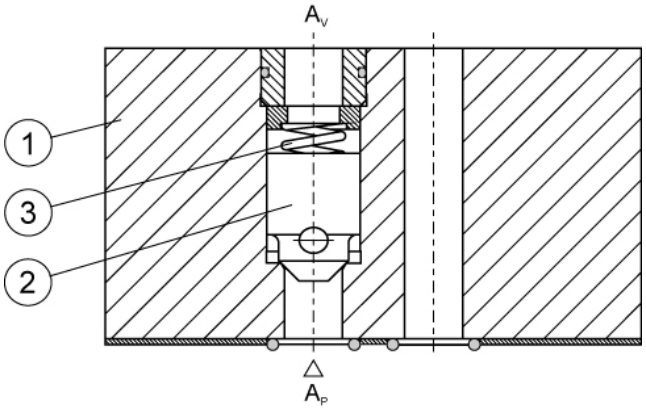
- NG 6, 10
- Up to 350 bar *[5 076 PSI]*
- Up to 60 l/min *[26,4 GPM]*

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

VP-NV-6, VP-NV-10

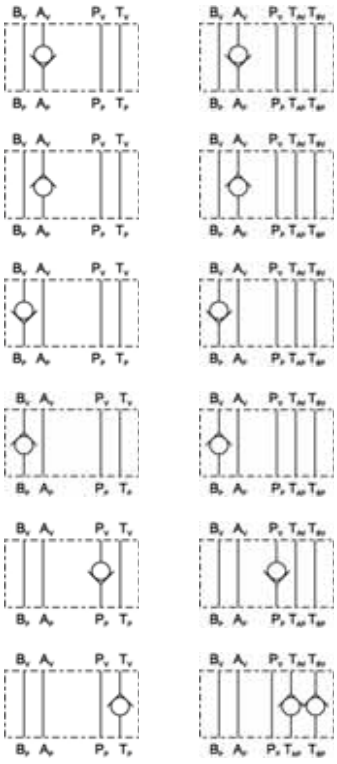
Operation

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

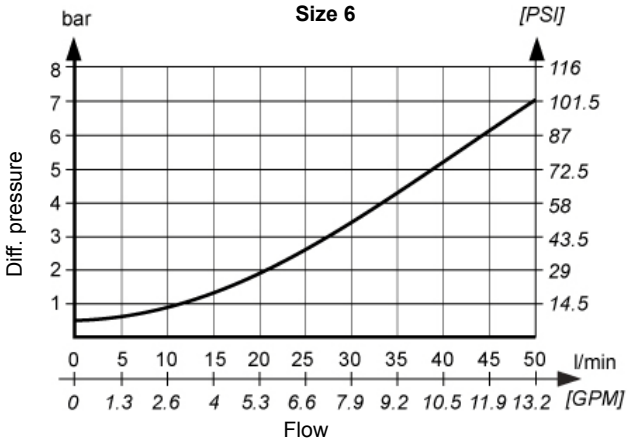


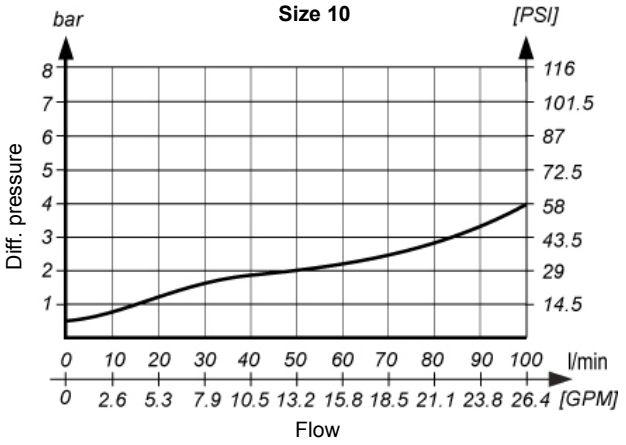
Features

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 *[lbs]*	0,87 *[1.91]*	2,77 *[6.10]*

ΔP-Q Performance curves

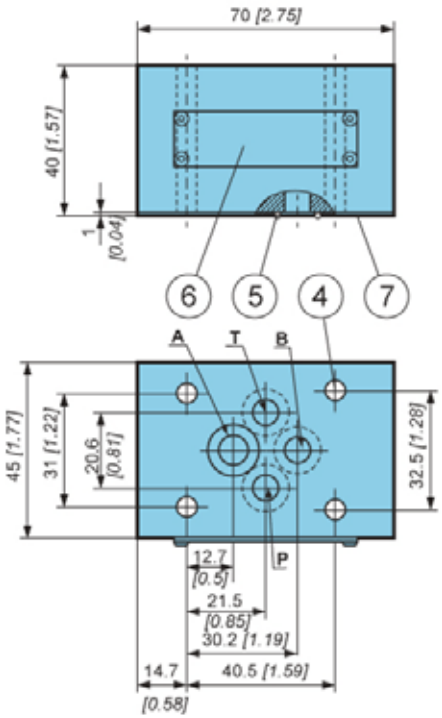
Measured at 50C *[122F]*
and viscosity of 32 mm^2/s *[148 SUS]*.





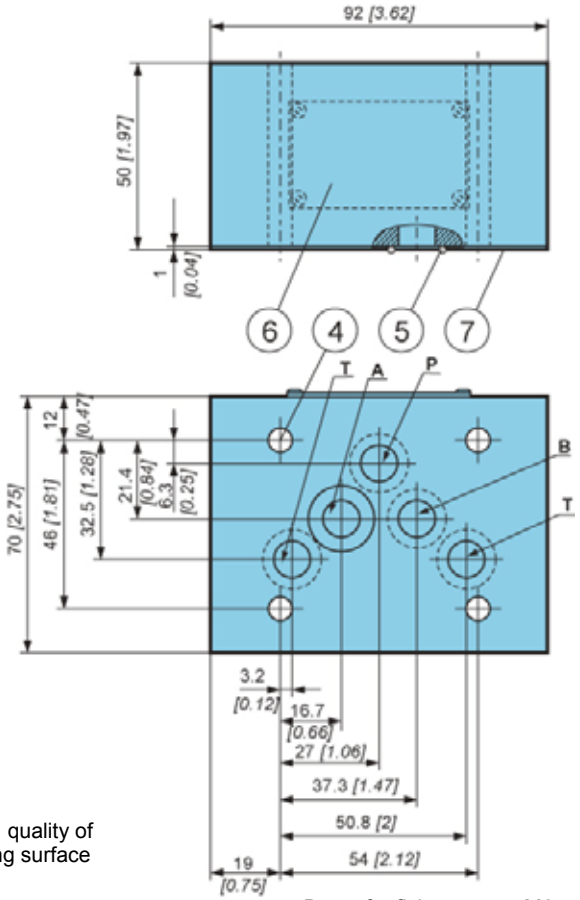
Dimensions

Size 6



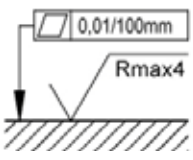
4. Bores for fixing screws M5
5. O-ring 9,25x1,78
6. Nameplate
7. O-ring plate

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]*

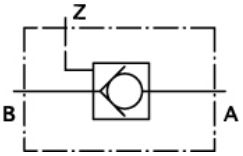
- Threaded connections to ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Flow shut-off in one service line.
- Direct in-line mounting.

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



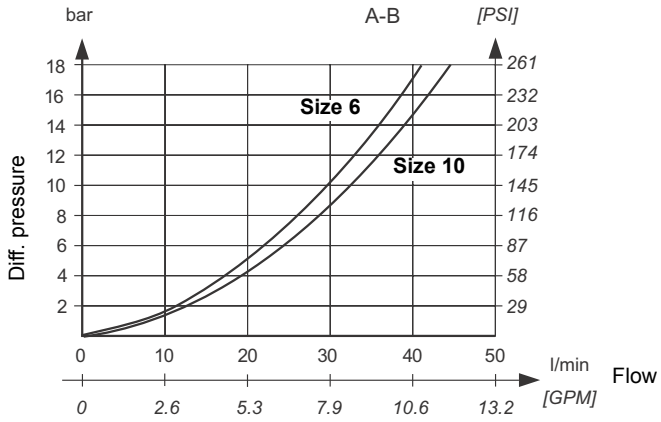
Features

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 *[lbs]*	0,5 *[1.10]*	0,65 *[1.43]*

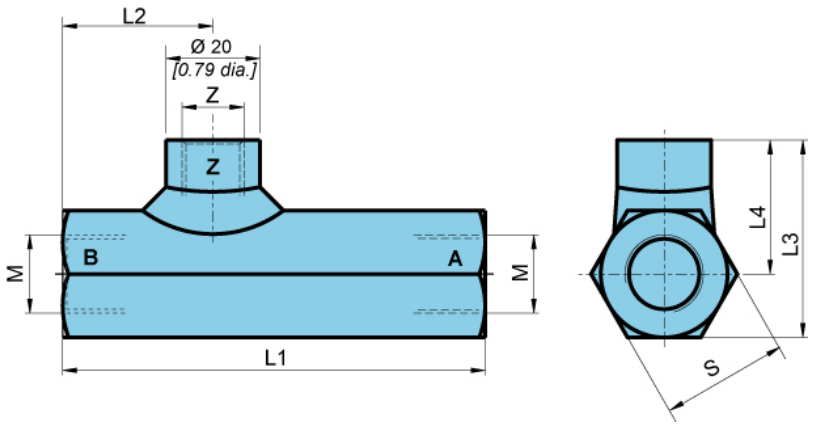
ΔP-Q Performance curves

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

Measured at 50C *[122F]*
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

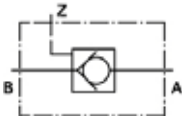
Model code

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]*

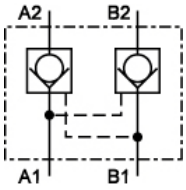
- Threaded connections to ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Flow shut-off in one service line.
- Direct in-line mounting.

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



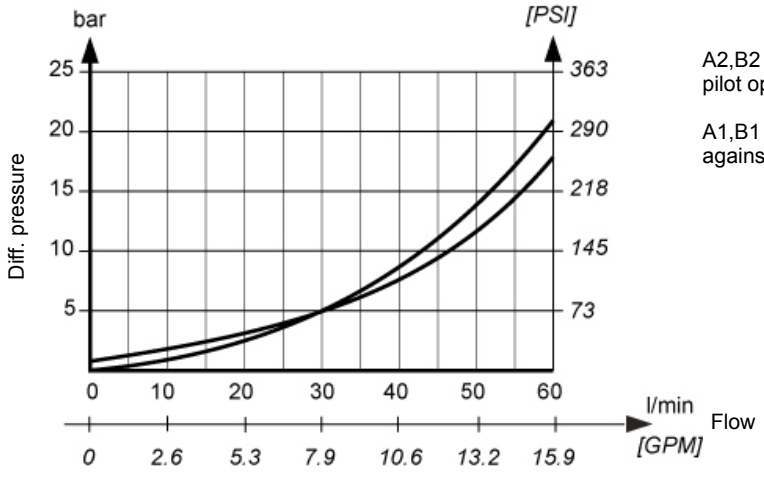
Features

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 *[lbs]*	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).

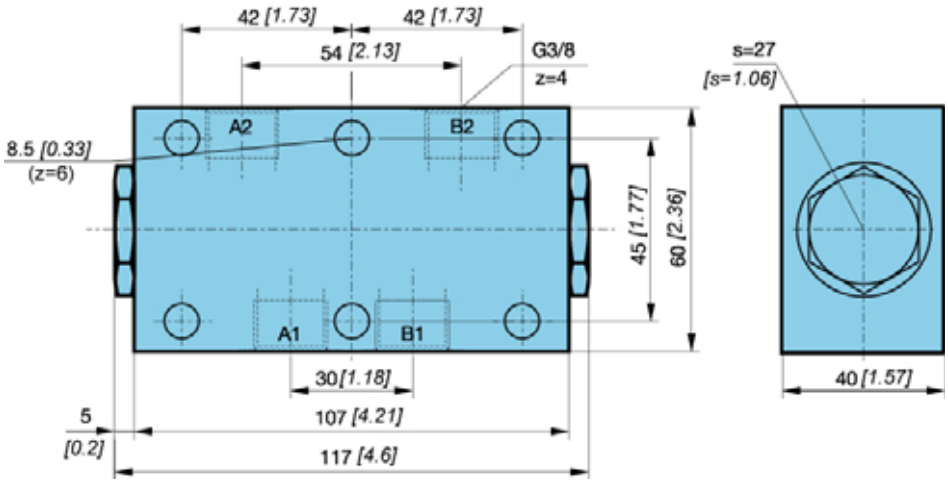
Measured at 50°C *[122°F]*
and viscosity of 32 mm^2/s *[148 SUS]*.



A2,B2 ⟶ A1,B1
pilot opened

A1,B1 ⟶ A2,B2
against spring force

Dimensions



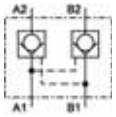
Model code

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 60 l/min *[26,4 GPM]*

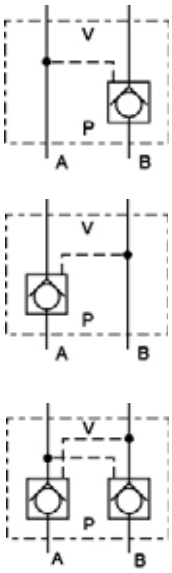
- Connecting dimensions to ISO 4401.
- Flow shut-off in both or one service line.
- For vertical stacking - sandwich plate design.
- Height and width of the valves to ISO 7790 norms.

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.

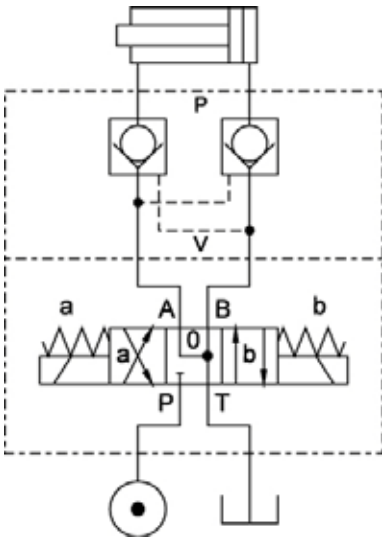
Hydraulic symbols



Features

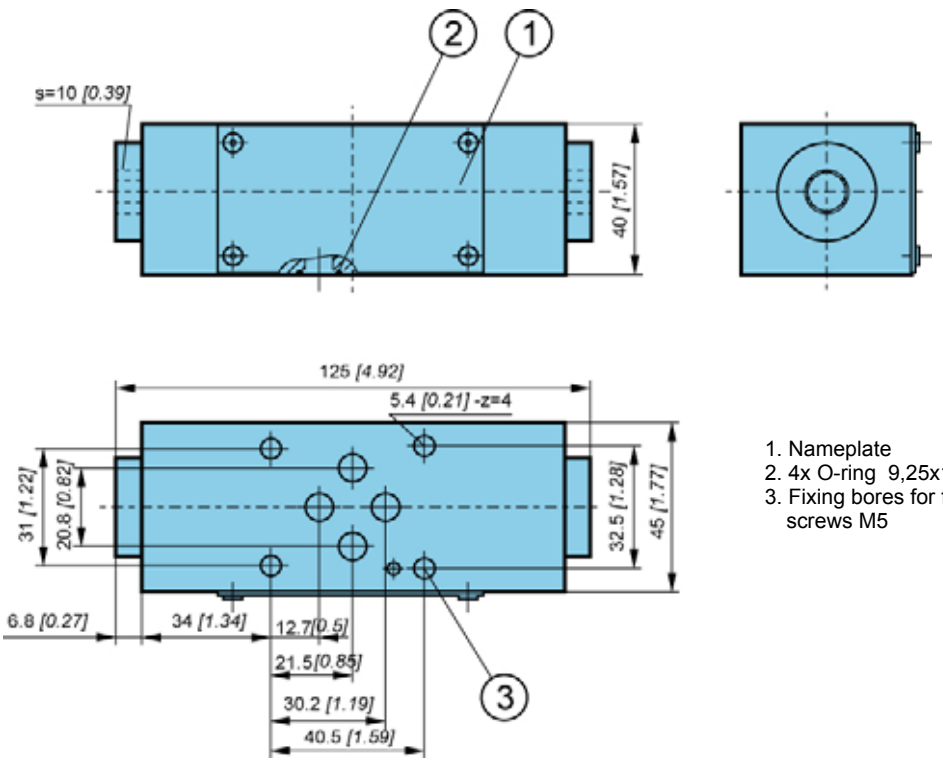
Size		6	10
Flow rate	l/min *[GPM]*	60 *[15.8]*	100 *[26.4]*
Operating pressure	Bar *[PSI]*	350 *[5 076]*	
Cracking pressure	bar *[PSI]*	1 *[14.5]*	0,5 *[7.2]*
Area ratio		1:3,9	1:3,6
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*	
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69,5 to 1.760]*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

Mounting example



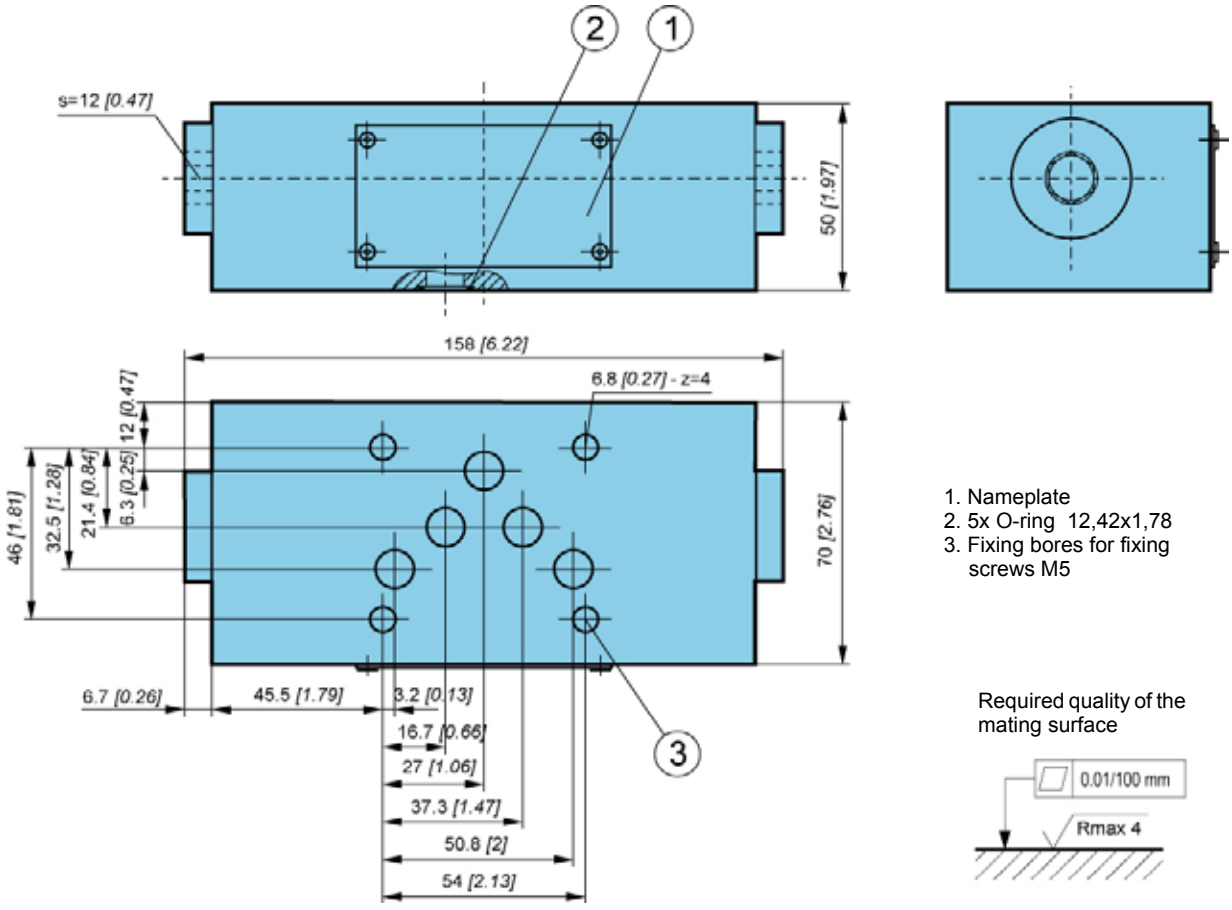
Dimensions

Size 6



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

Size 10



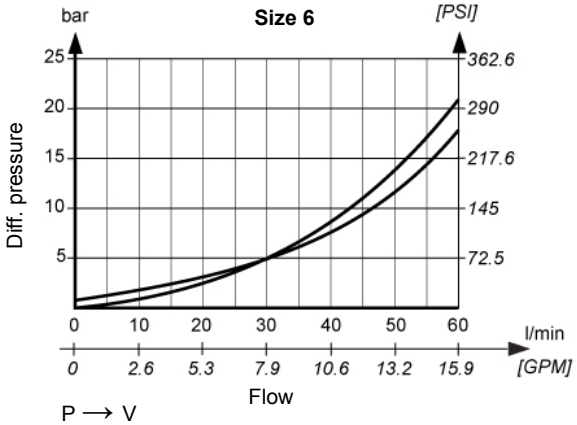
1. Nameplate
2. 5x O-ring 12,42x1,78
3. Fixing bores for fixing screws M5

Required quality of the mating surface

ΔP-Q Performance curves

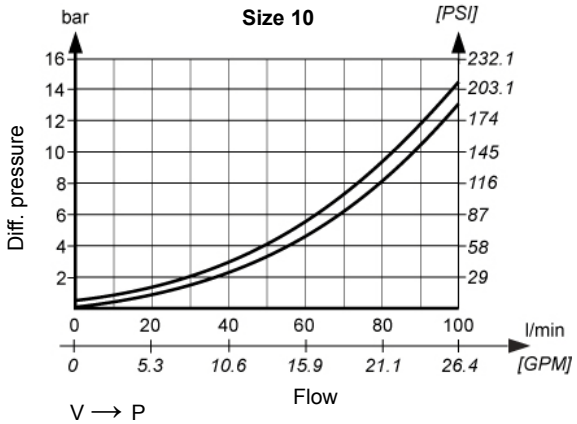
Δp - Q Performance curves of the flow in direction V to P (through check valve) and in direction P to V (check valve pilot opened with p_x =80 bar).

Measured at 50C *[122F]*
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

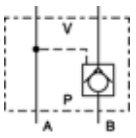
Model code

V P - N O V - □ - □ - □ - *

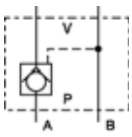
Size

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

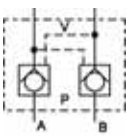
Symbol



EB



EA



D

Special requirements to be briefly specified

Seal type

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

CHECK-Q-METER BZV

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

- Hermetically sealing at closed flow path.
- Minimum pressure losses when the medium flows from port A towards port B.
- When the medium flows from port B towards port A the speed of load lowering is controlled with respect to the medium flow rate supplied to the opposite side of the hydraulic motor or cylinder. With operating cylinders the characteristic ratio of surface areas must be taken into account.
- For building into pipe-lines.
- Threaded connections to ISO 9974 (Metrisch), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).

BZV-6-D, BZV-6-E

Operation

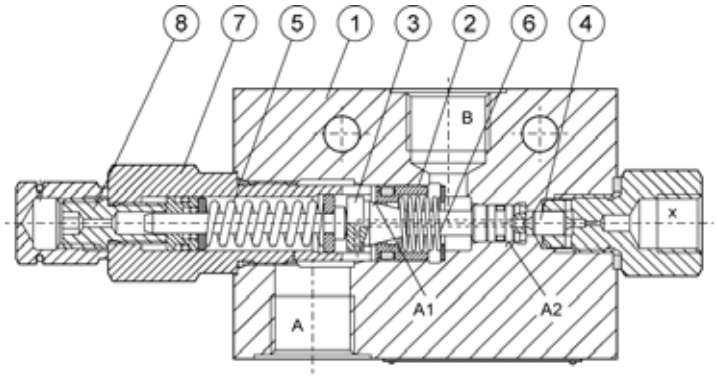
The check-Q-meter is used for maintaining constant speed during the lowering of loads by means of hydraulic cylinders or hydromotors in the systems where load changes with time. It prevents uncontrolled falling of load if defects occur in the pipeline between the directional control valve and the check-Q-meter or if there is no pilot pressure. When it is installed in combination with a directional control valve with negative change-over in intermediate positions, it has the function of a holding valve. If the load on hydraulic cylinders or hydromotors does not change the sign, a single check-Q-meter must be used. The check-Q-meter consists of a housing (1), main poppet (2), auxiliary spool (3), pilot poppet (4), spring (5), insert housing (7) and setting screw (8).

Lifting the load:
The hydraulic fluid flows from port A towards port B with minimum pressure losses, the main poppet (2) being lifted. In the case of a pressure drop and an interruption in the hydraulic fluid supply to port A, the main poppet (2) closes, holding the load in position. With the directional control valve in position (a) the hydraulic fluid flows to the annulus side of the hydraulic cylinder, which provokes a certain pilot pressure on the auxiliary spool (3). The check-Q-meter opens and thereby a free hydraulic fluid flow from port B towards port A occurs, when the main poppet (2) leans against the insert housing (7), where as the auxiliary spool (3) still performs a part of the controlled move which depends on the quantity of the hydraulic fluid supplied in a unit of time to the annulus side of the operating cylinder. In the opening direction, also the load pressure works on the circle of the predefined surface. The pilot pressure required for the opening of the check-Q-meter is:

$$\text{Required pilot pressure} = \frac{\text{safety valve setting - load pressure}}{4{,}25}$$

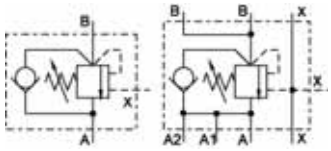
In case that the hydraulic cylinder piston starts to move faster than permitted by the hydraulic fluid supply, the pilot pressure on the port X drops and the auxiliary spool (3) under the effect of spring (5) moves in the valve closing and shutting-off direction, respectively.
Because of the reduction in flow cross-section the resistances increase, which causes an increase in the pilot pressure and thereby a larger opening of the check-Q-meter. In this manner, the check-Q-meter is continuously balanced during lowering. The spring (5) setting force must be set at least 1.3 -times higher than the maximum force due to the operating pressure (pressure due to load):

$$\text{Max. operating pressure} = \frac{350 \text{ Bar } [5076 \text{ PSI}]}{1{,}3} = 270 \text{ Bar } [3916 \text{ PSI}]$$

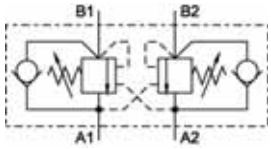


Hydraulic symbols

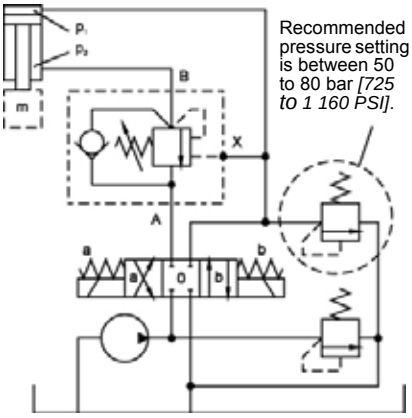
BZV-6-E



BZV-6-D



Mounting example



Recommended pressure setting is between 50 to 80 bar *[725 to 1 160 PSI]*.

Because of the multiplication of pressure in hydraulic cylinder by the difference of surface areas:

$p_2 = p_m + p_1 \times \varphi \qquad \varphi = A1/A2 > 1$

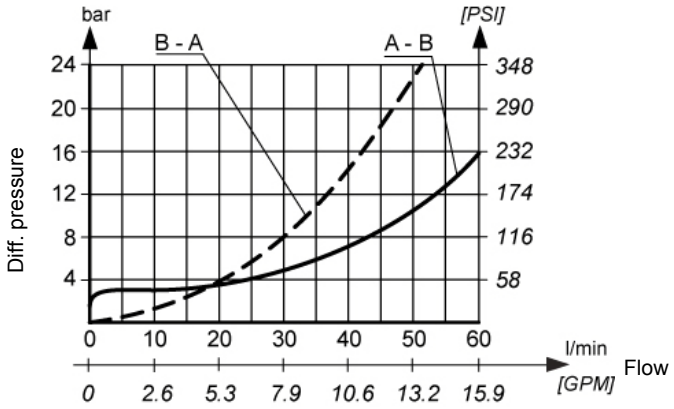
It is recommended to protect the circuit by means of a pressure relief valve, the cracking pressure of which is set with respect to the selected spring (5) in the BZV.

Features

Size			BZV-6-E	BZV-6-D
Flow rate		l/min *[GPM]*	60 *[15.8]*	
Operating pressure	spring 200 Bar *[2.900 PSI]*	Bar *[PSI]*	150 *[2 175]*	
	spring 350 Bar *[5076 PSI]*		270 *[3 916]*	
Pilot pressure	spring 200 Bar *[2.900 PSI]*	Bar *[PSI]*	4 to 50 *[58 to 725]*	
	spring 350 Bar *[5076 PSI]*		6 to 85 *[87 to 1.232]*	
Cracking pressure		Bar *[PSI]*	2,2 *[31.9]*	
Pilot ratio	R = A2/A1-A2		4,25	
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 *[lbs]*	1,5 *[3.30]*	2,4 *[5.29]*

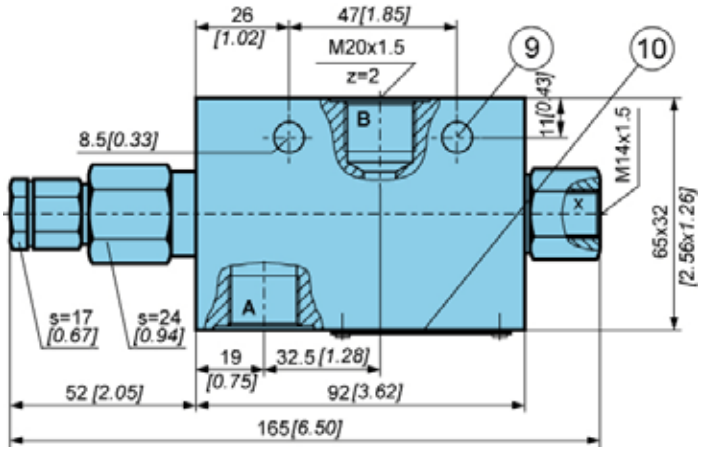
ΔP-Q Performance curves

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



Dimensions

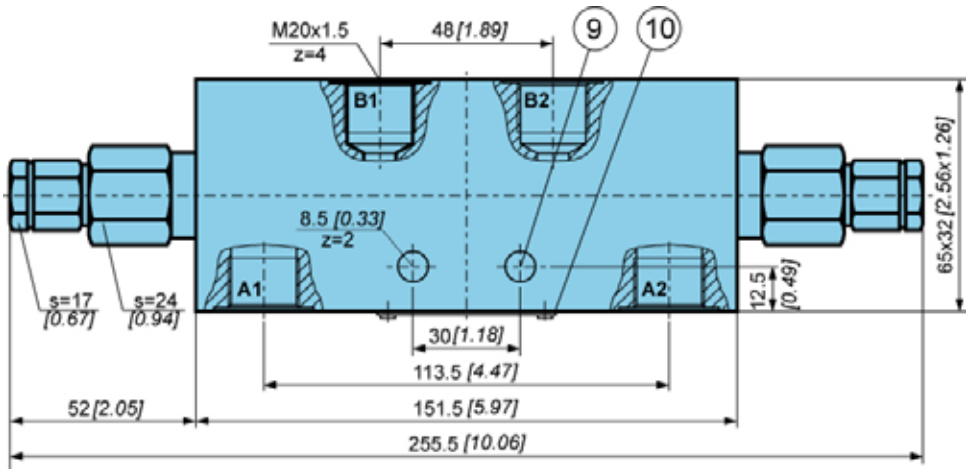
BZV-6-E-...-C



9. Fixing screw
10. Nameplate

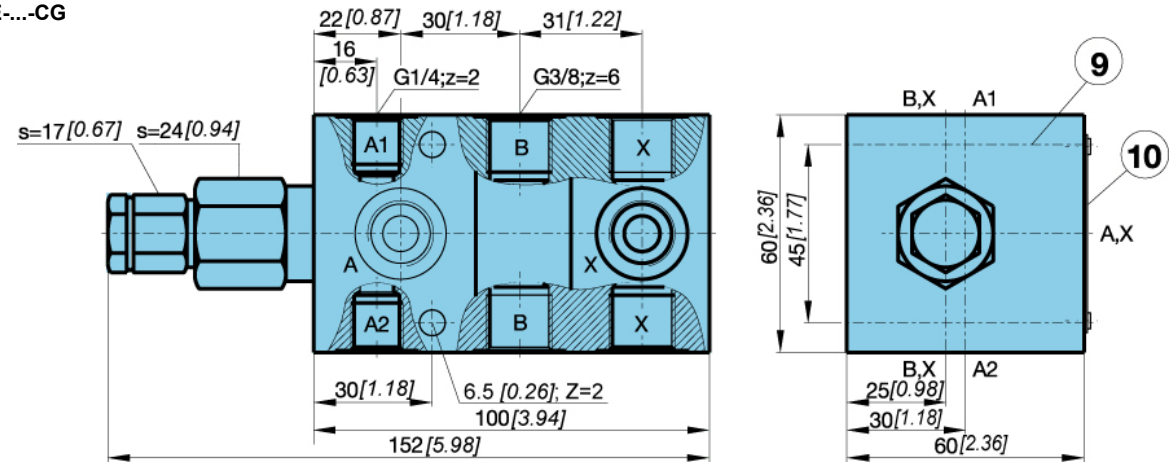
Dimensions

BZV-6-D-...-C



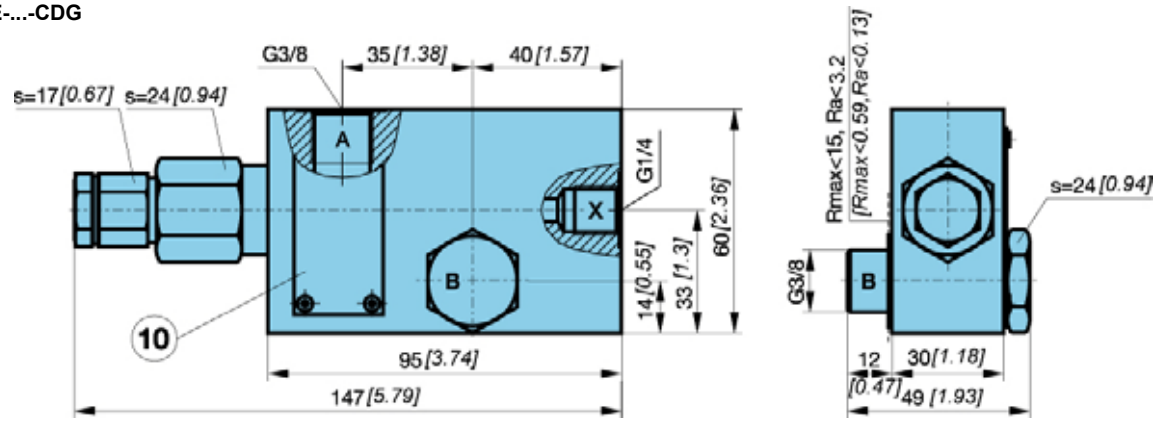
9. Fixing screw
10. Nameplate

BZV-6-E-...-CG



9. Fixing screw
10. Nameplate

BZV-6-E-...-CDG



10. Nameplate

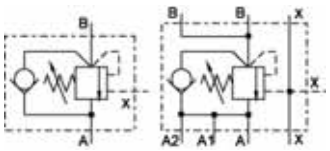
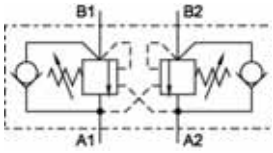
Model code

B Z V - 6 - □ - □ - □ - □ - ✱

Size

Size 6	**6**

Symbol

	**E**
	**D**

Control range

60 to 200 bar *[870 to 2 900 PSI]*	**200**
100 to 350 bar *[1.450 to 5.076 PSI]*	**350**

Mounting method

Building into pipeline (M20x1,5/M14x1,5)	**C**
Building into pipeline (G3/8)	**CG**
Building direct on hydraulic cylinder	**CDG**
Building into pipeline (SAE8)	**CUNF**

Seal type

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

Special requirements to be briefly specified

CHECK-Q-METER MODULAR VALVE VP-BZV

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

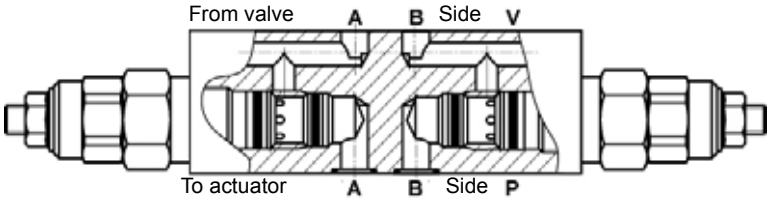
- Connecting dimensions to ISO 4401.
- Modular plate design for vertical stacking.
- Hight and width of the valve according to ISO 7790.

VP-BZV-6

Operation

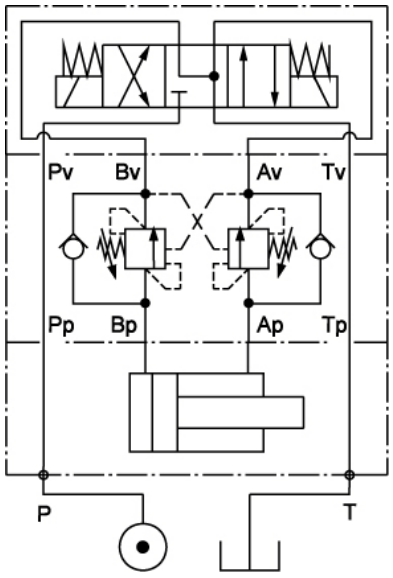
Modular check-Q-meter valve in combination with other stacking elements gives static and dynamic load control by regulating the flow into and out of hydraulic actuators. It prevents load uncontrol run away and allows thermal expansion relief of the hyd aulic fluid.
Flow in line B (A) from side P to V 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

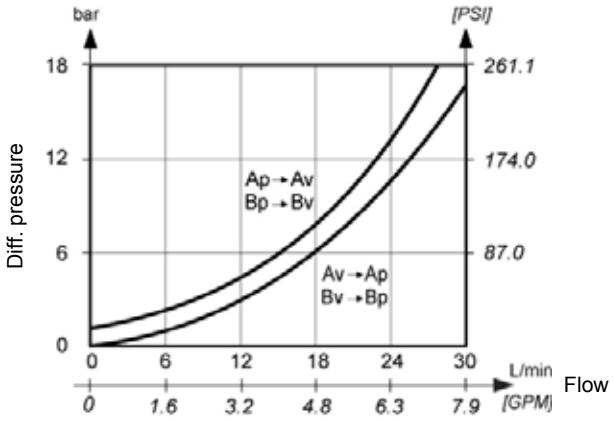


Features

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 *[lbs]*	1,3 *[2.9]*	1,8 *[4.00]*

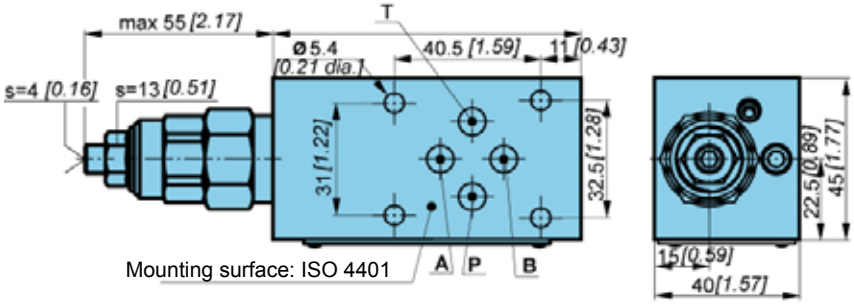
ΔP-Q Performance curves

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

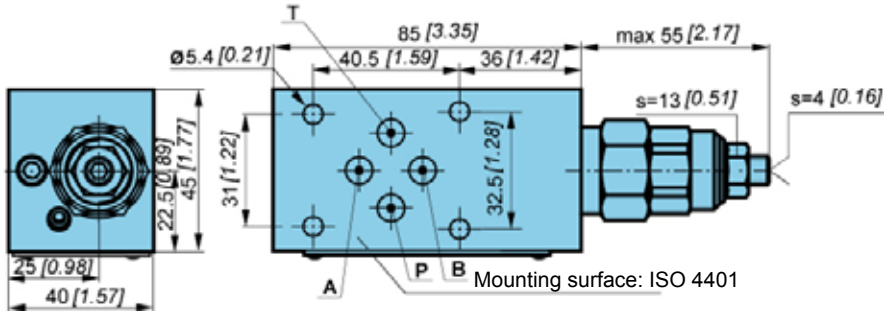


Dimensions

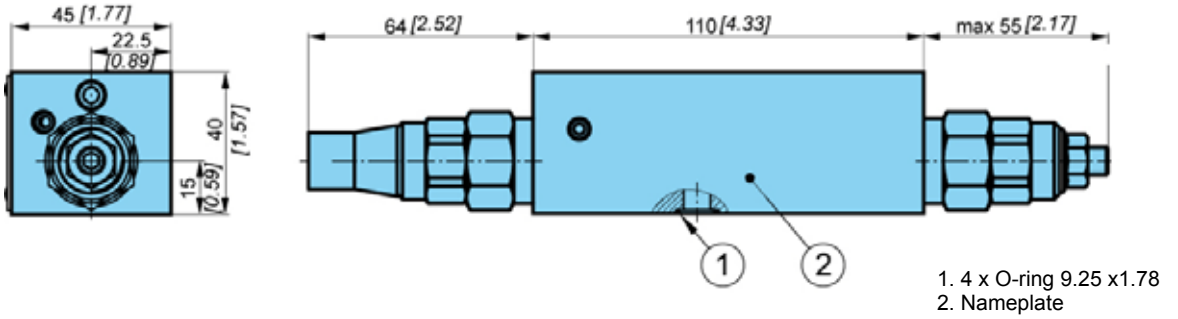
EAN, EAP, EAT



EBN, EBP, EBT

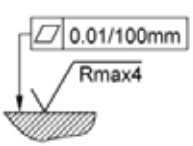


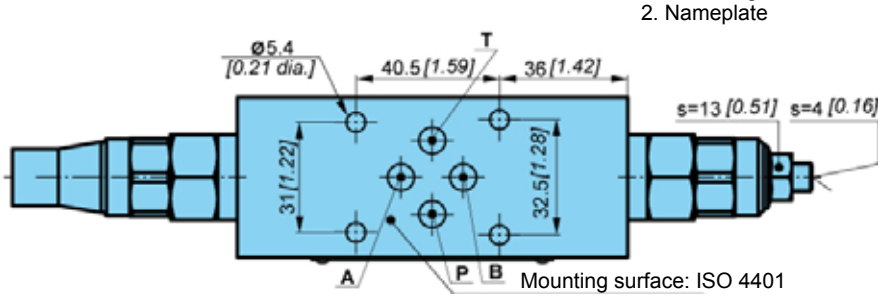
DN, DP, DT



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

Required quality of the mating surface





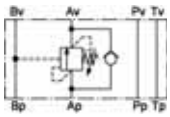
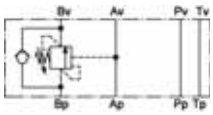
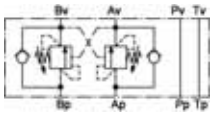
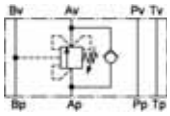
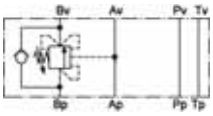
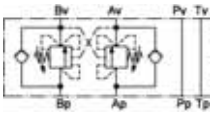
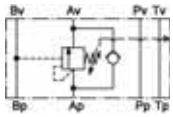
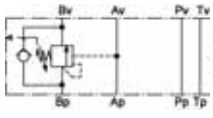
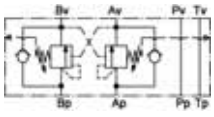
Model code

VP - BZV - 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**

Special requirements to be briefly specified

Seal type

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

Tamperproff cap

No designation	Without tamperproff cap
RC	With tamperproff cap

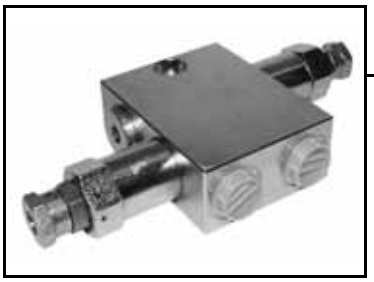
Pilot ratio

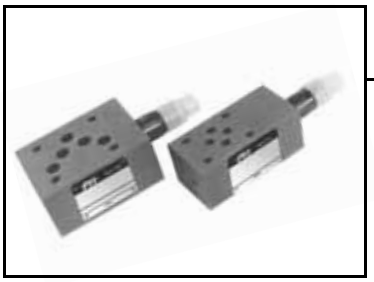
04	4:1

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]*

PRESSURE CONTROL VALVES





PRESSURE RELIEF VALVE VVP

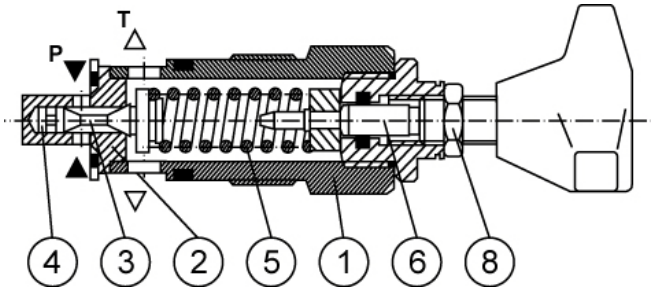
- NG 6, 10
- Up to 400 bar *[3,045 PSI]*
- Up to 60 L/min *[31.7 GPM]*

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

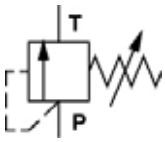
VVP-6, VVP-10

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.

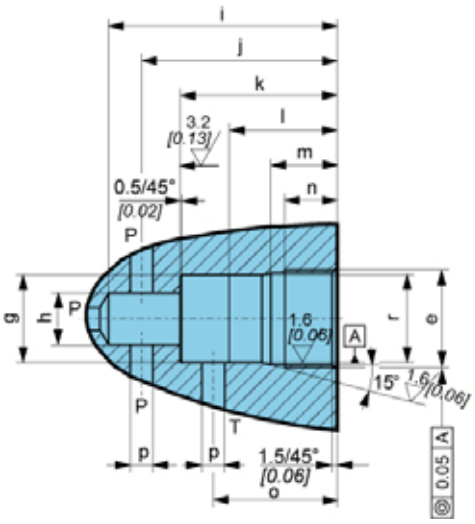
Features

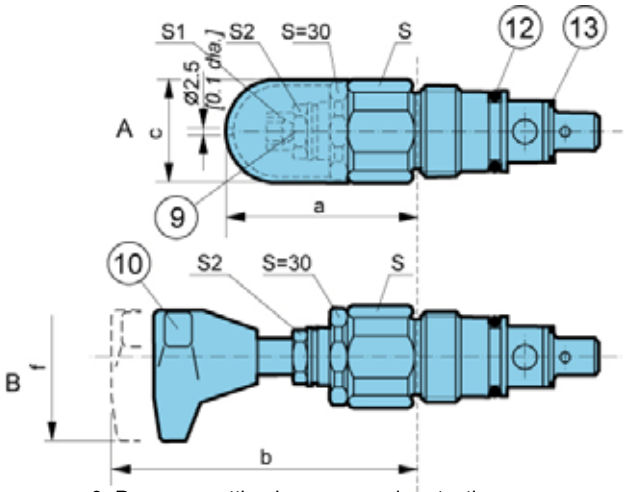
Size			**6**	**10**
Flow rate		L/min *[GPM]*	50 *[13.2]*	120 *[31.7]*
Pressure setting range		bar *[PSI]*	400 *[5 801]*	
Oil temperature range		°C *[°F]*	-30 to +70 *[-22 to + 158]*	
Viscosity range		mm^2/s *[SUS]*	2,8 to 380 *[12.9 to 1760]*	
Filtration		NAS 1638	8	
Mass	Execution A	kg *[lbs]*	0,4 *[0.88]*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





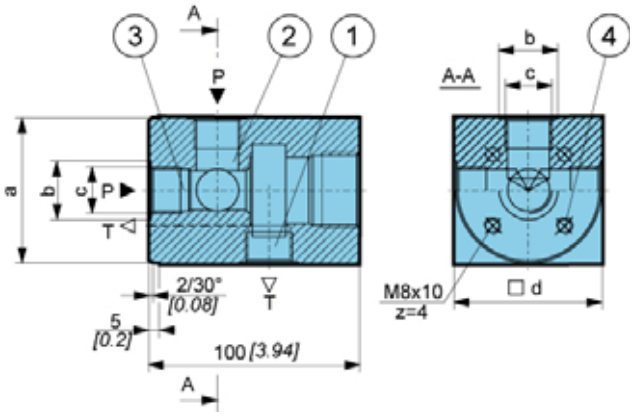
9. Pressure setting by screw and protective cap.
10. Pressure setting by rotary knob.
12. O-ring, nominal size 6, 19,2 x 3.
    O-ring, nominal size 10, 26 x 3.
13. Usit ring, nominal size 6, 17,4 x 24 x 1,5.
    Usit ring, nominal size 10, 24,7 x 31 x 2.

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]*		

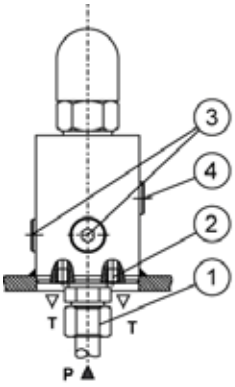
Connecting dimensions / connection P-VVP-6, P-VVP-10

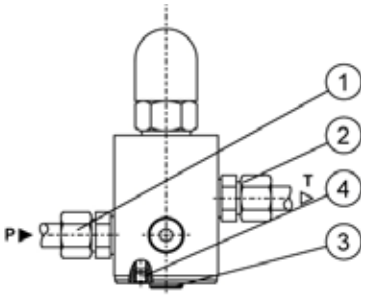
When fitting, the excess ports for oil supply and discharge must be closed by means of suitable screw.

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.

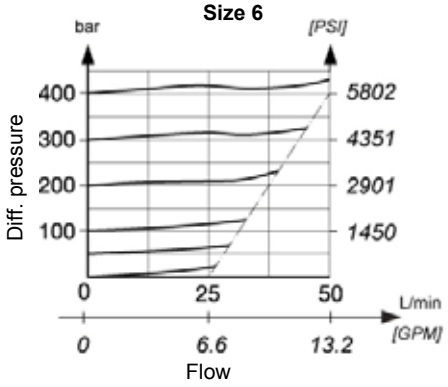
Model code

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

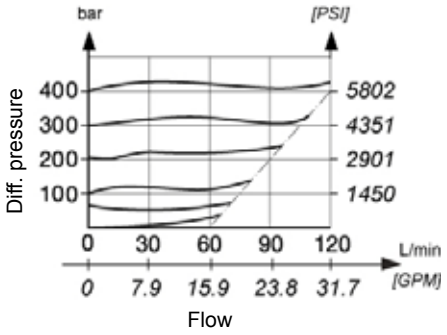
ΔP-Q Performance curves

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 *[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]*

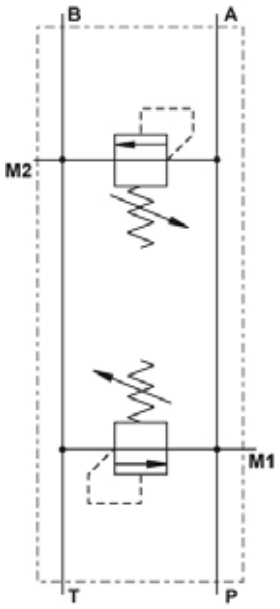
- Direct in-line mounting.
- hreaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas).
- Five different pressure setting elements.

VVB2-10-...

Features

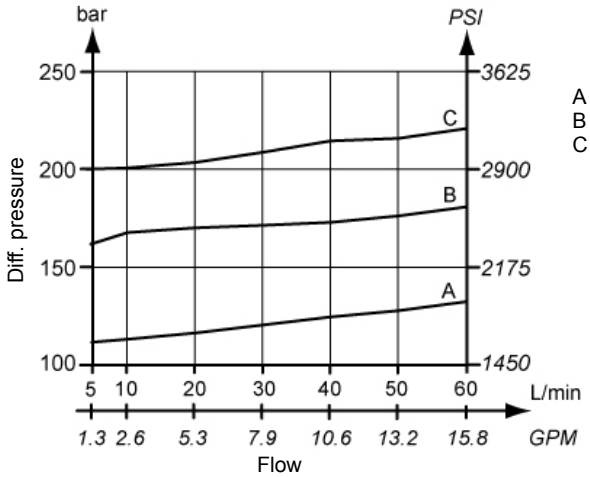
Size		6
Operating pressure	Bar *[PSI]*	210 *[3 045]*
Flow rate	L/min *[GPM]*	60 *[15.8]*
Pressure setting range	bar *[PSI]*	120 *[1 740]*; 160*[2 320]*; 200 *[2 900]*
Oil temperature range	°C *[°F]*	-10 to +70 *[14 to + +158]*
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69.5 to + 1,760]*
Filtration	ISO 4406-1999	19/17/14
Mass	kg *[lbs]*	1.85 *[4.08]*
Seal type	NBR seals for mineral oil HL, HLP, to DIN 51524	

Hydraulic symbol



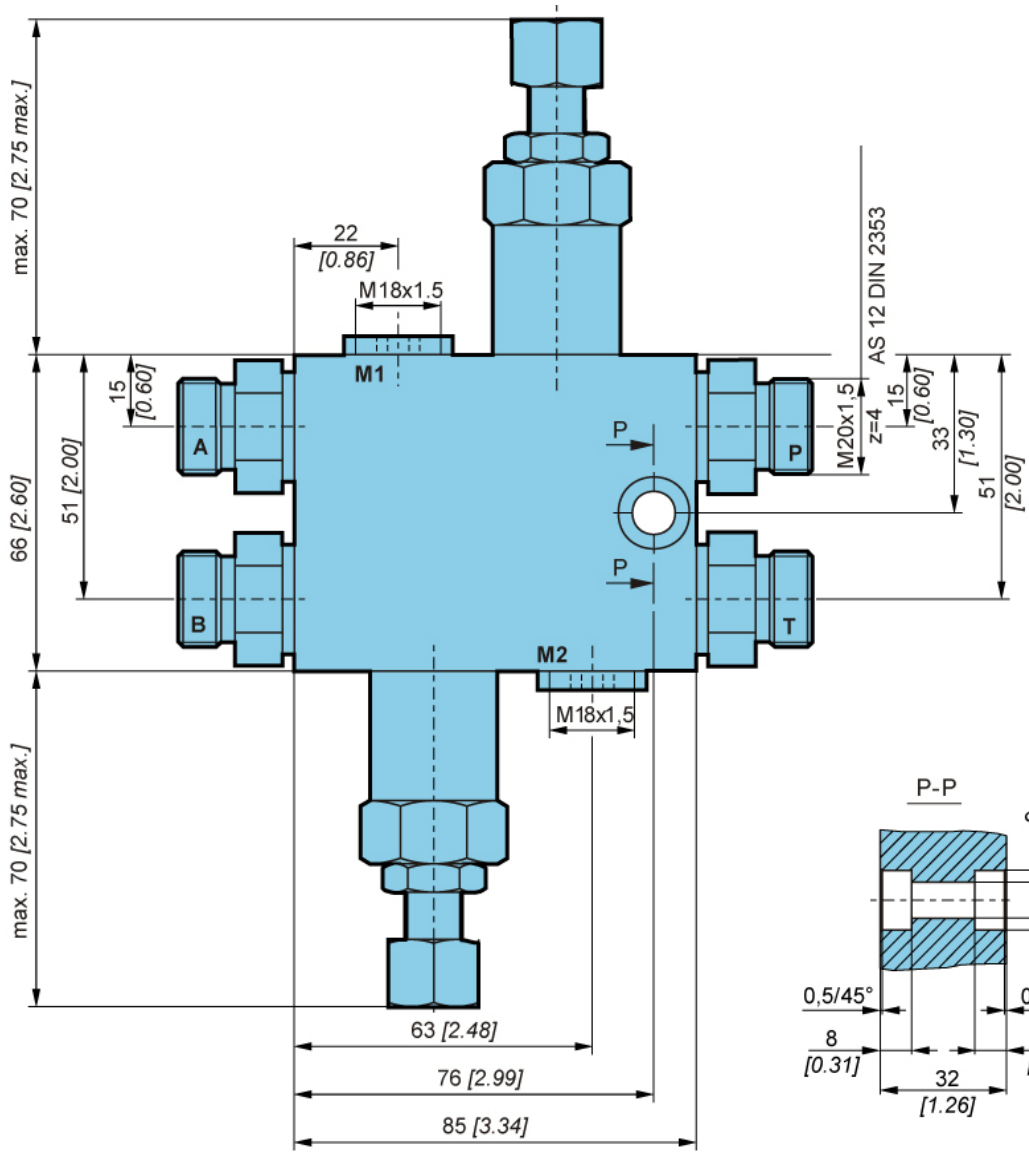
ΔP-Q Performance curves

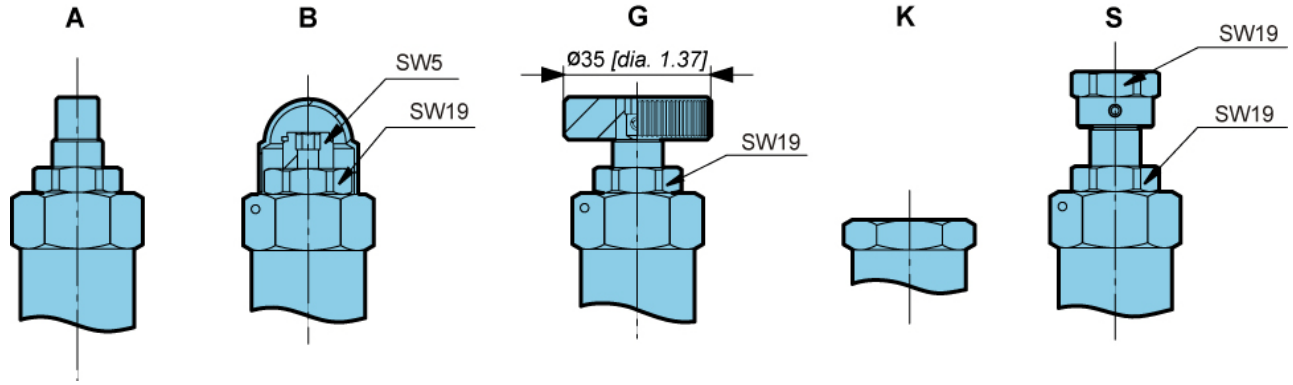
Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.



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

Dimensions





Inner hexagonal key

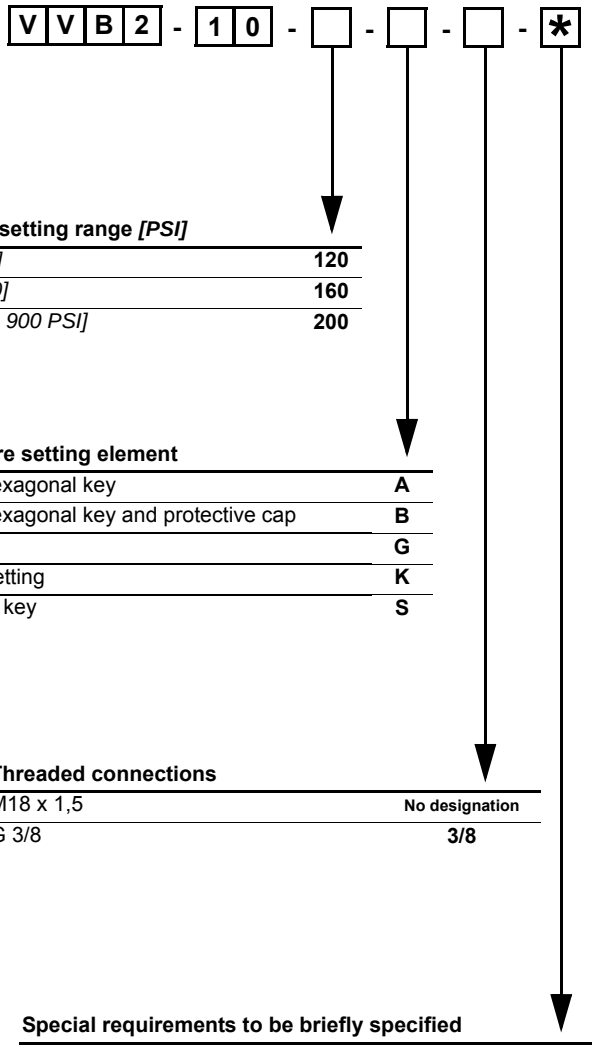
Inner hexagonal key and protective cap

Knob

Fixed setting

Exterior key

Model code


V V B 2 - 1 0 - □ - □ - □ - *
Pressure setting range [PSI]
120 [1740] 120
160 [2 320] 160
200 Bar [2 900 PSI] 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 350 bar *[3,045 PSI]*
- Up to 60 L/min *[26.4 GPM]*

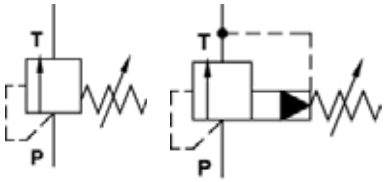
- For independent fitting into a block.
- Two pressure setting ranges.

RT-4, RT-6, RT-10

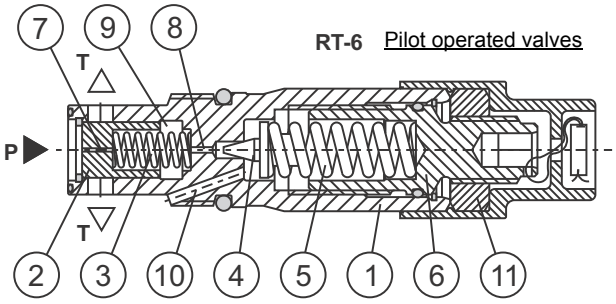
Operation

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).

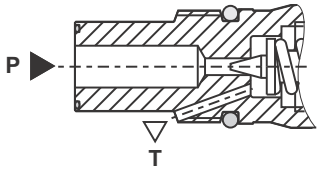
Hydraulic symbol



RT-4 RT-6, RT-10



RT-6 Pilot operated valves

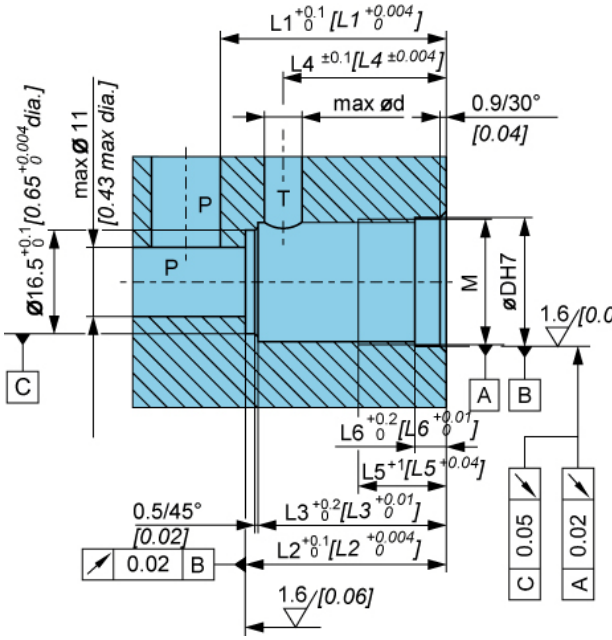


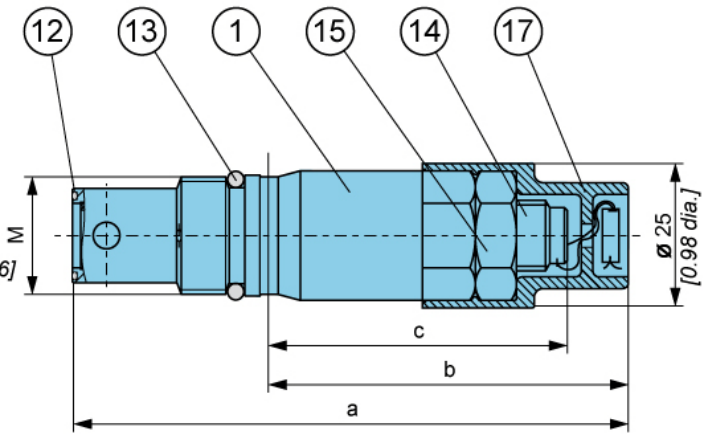
RT-4 Direct operated valves

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 *[lbs]*	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.

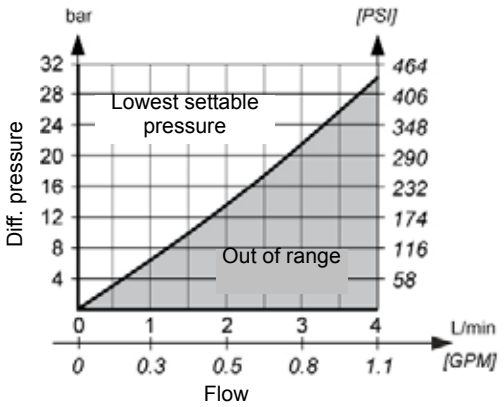
Note: Ports P and T can be located optionally at any place on the circumference.

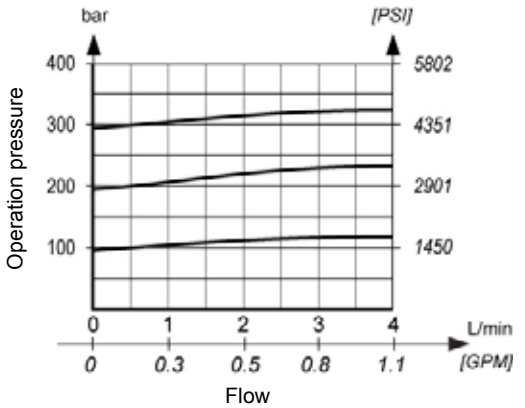
Size	a	b	c	d	D	L1	L2	L3	L4	L5	L6	M
4, 6	96 *[3.78]*	64 *[2.52]*	53 *[2.09]*	6 *[0.24]*	20,5 *[0.81]*	36 *[1.42]*	32 *[1.26]*	30 *[1.18]*	26 *[1.02]*	14 *[0.55]*	4,8 *[0.19]*	M20x1
10	97 *[3.82]*	61 *[2.40]*	50 *[1.97]*	10,5 *[0.41]*	24,5 *[0.96]*	40 *[1.57]*	36 *[1.42]*	34 *[1.34]*	29,7 *[1.17]*	15 *[0.59]*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

ΔP-Q Performance curves

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

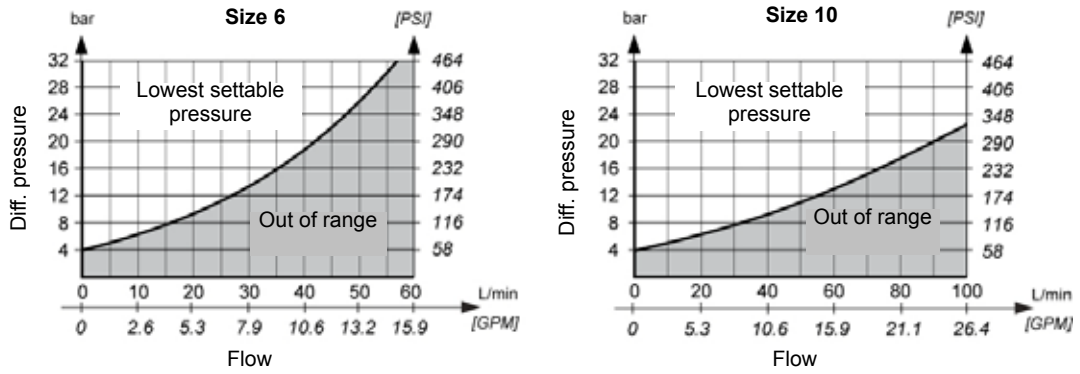
Size 4

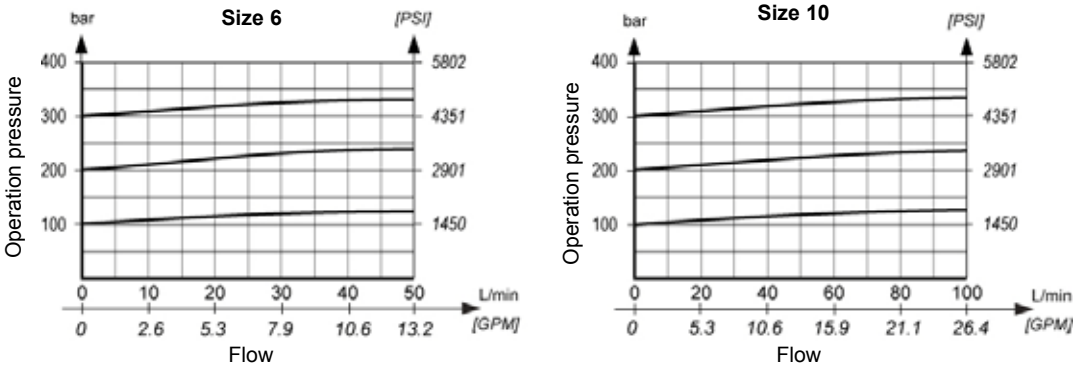




ΔP-Q Performance curves

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





Model code

R T - □ - □ - □ - *

Size

Size 4	**4**
Size 6	**6**
Size 10	**10**

Pressure setting range *[PSI]*

To 100 *[1 450]*	**100**
To 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

PRESSURE RELIEF VALVE VP-RT

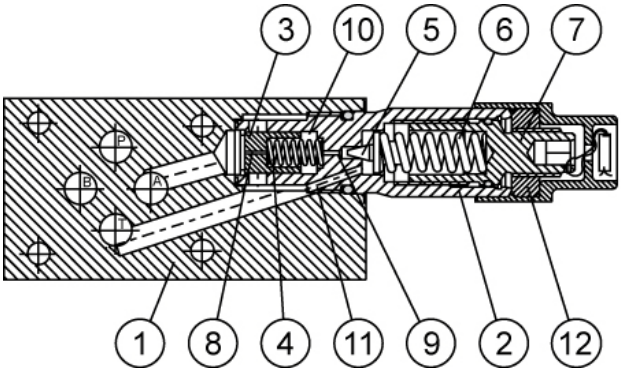
- NG 6, 10
- Up to 350 Bar *[3,045 PSI]*
- Up to 100 l/min *[26.4 GPM]*

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

VP-RT-10, VP-RT-6

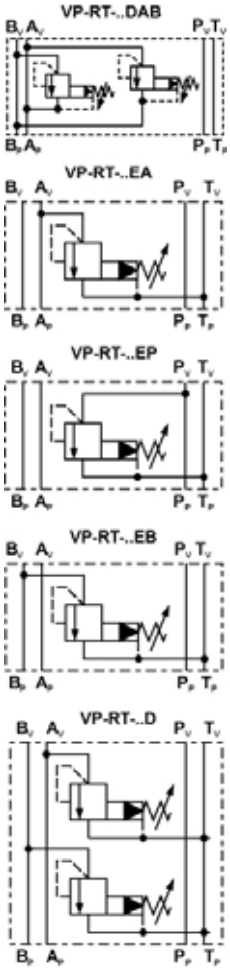
Operation

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

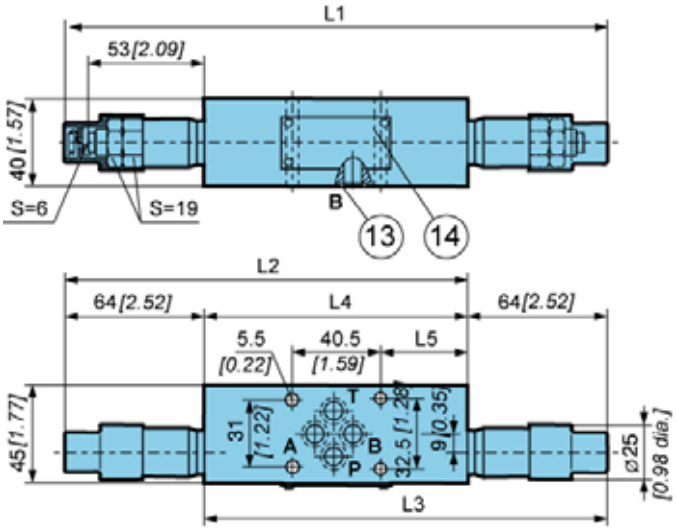


Features

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 *[lbs]*	1,2 *[2,64]* - 1,7 *[3,75]* (D)	2,6 *[5.73]*

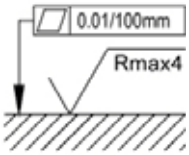
Dimensions

VP-RT-6



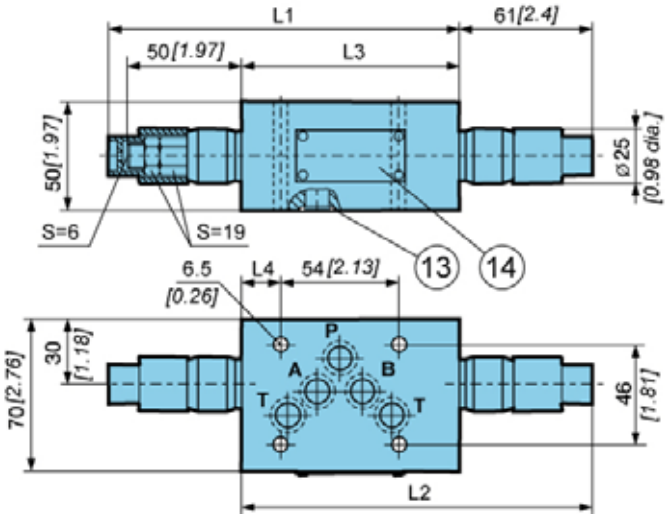
13. O-ring, Size 6: 9,25x1,78
Size 10: 12x2.
14. Nameplate

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

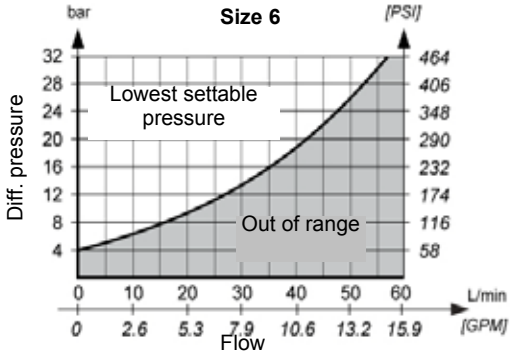
VP-RT-10

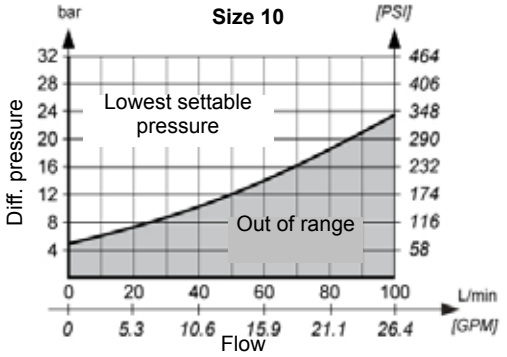


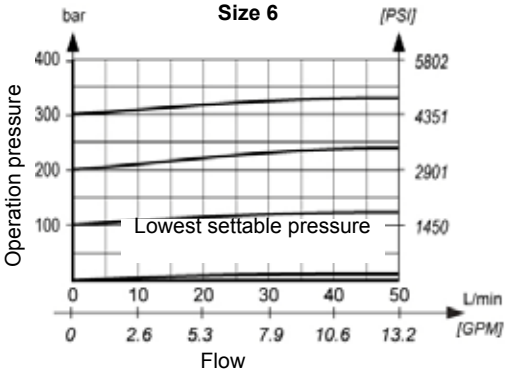
Size	L1	L2	L3	L4	L5
VP-RT-6-EA	-	154 *[6.06]*	-	90 *[3.54]*	9 *[0.35]*
VP-RT-6-EB	-	-	154 *[6.06]*		40,5 *[1.59]*
VP-RT-6-EP	-	-			
VP-RT-6-D	249 *[9.80]*	-	-	121 *[4.76]*	40 *[1.57]*
VP-RT-6-DAB	245 *[9.64]*	-	-	116,5 *[4.59]*	38 *[1.50]*
VP-RT-10-EP	156 *[6.14]*	-	95,5 *[3.76]*	28,5 *[1.12]*	-
VP-RT-10-EA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

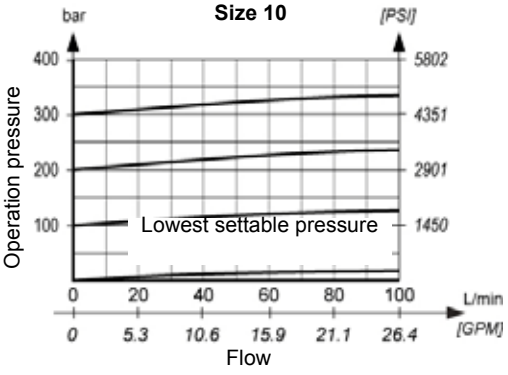
ΔP-Q Performance curves

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

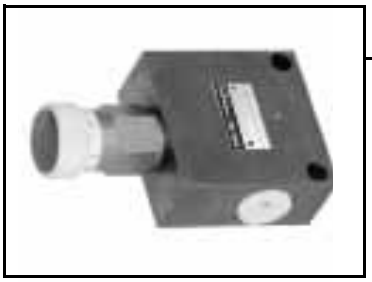
100 *[1 450]*	**100**
315 *[4 568]*	**315**

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

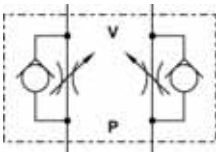
Throttle with check valves type VP-NDV are used for throttling the pilot and main flow of the hydraulic fluid in the line A and B.

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

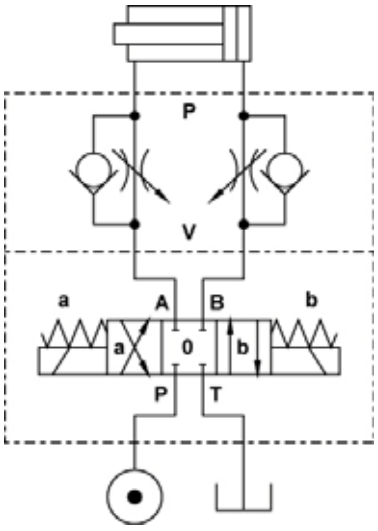
In direction V to P (see the hydraulic symbol) flows the hydraulic fluid with low pressure loss through the check valve.

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

Hydraulic symbol



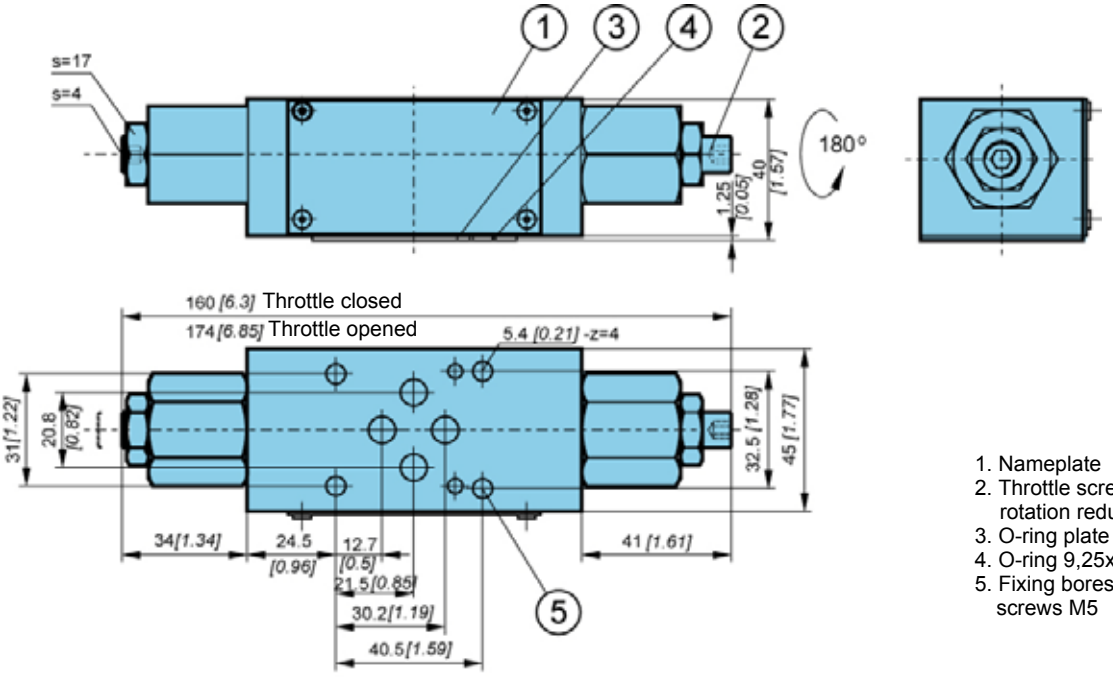
Mounting example



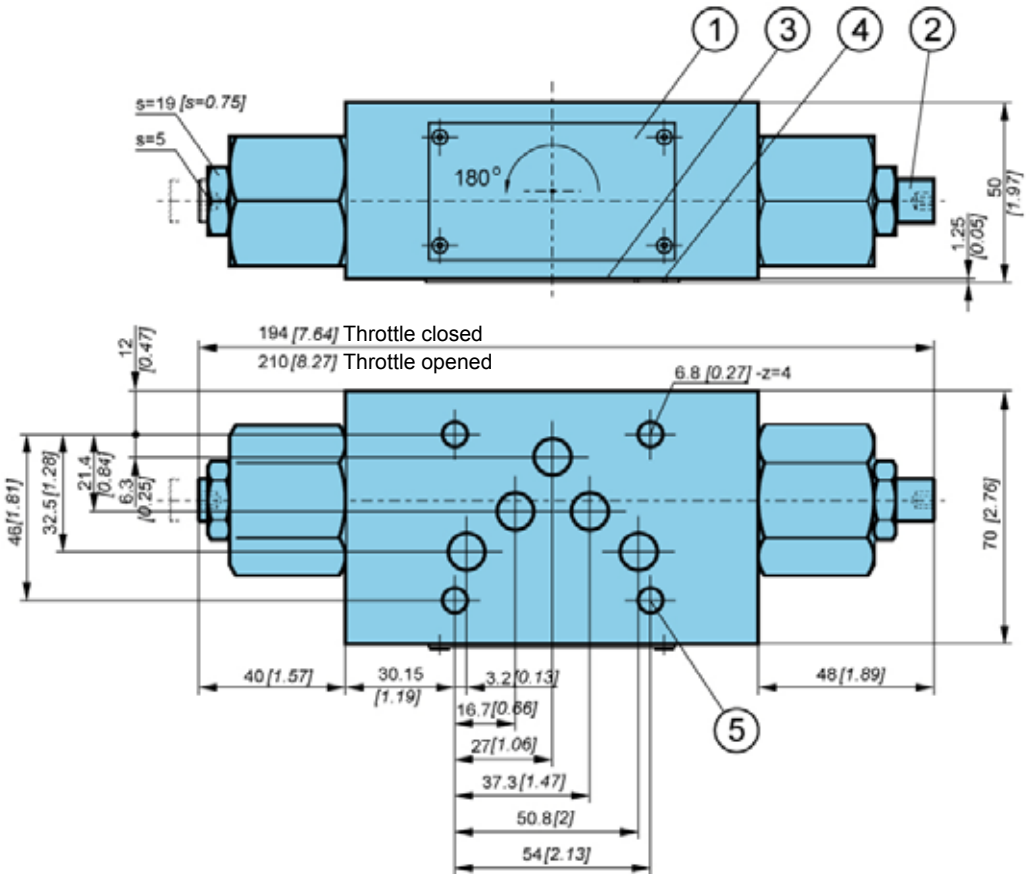
Features

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 *[lbs]*	1,45 *[3,20]*	3,3 *[7,28]*

Dimensions



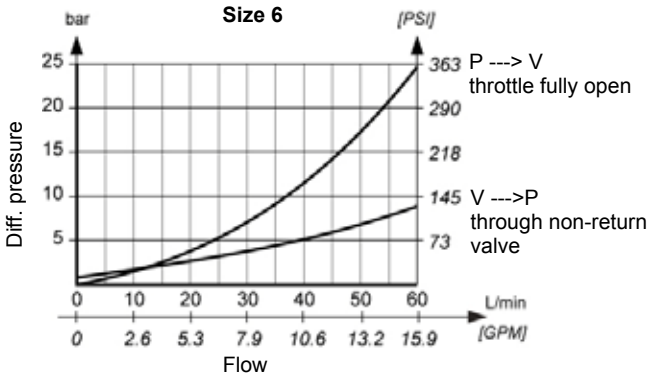
1. Nameplate
2. Throttle screw (clockwise rotation reduces the flow)
3. O-ring plate
4. O-ring 9,25x1,78-4 pcs
5. Fixing bores for fixing screws M5

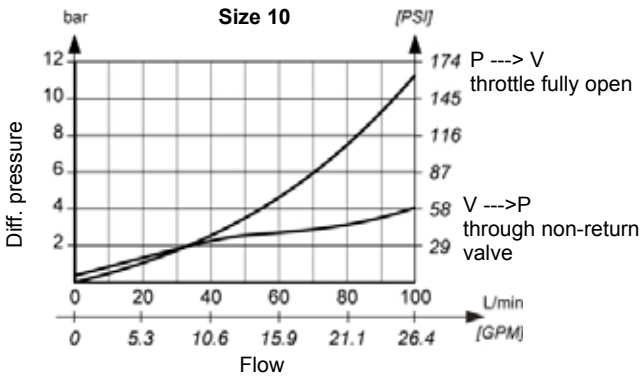


Assembly instructions

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

V P - N D V - ☐ - ☐ - *

Size

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

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

FLOW CONTROL VALVE TVD

- NG 6
- Up to 350 Bar *[5076 PSI]*
- Up to 16 l/min *[4,23 GPM]*

- Two - way pressure compensated.
- Connecting dimensions to ISO 6264.
- Operating elements: rotary knob / roller.
- With built - in non-return valve.
- Without built - in non-return valve.

TVD-6

Operation

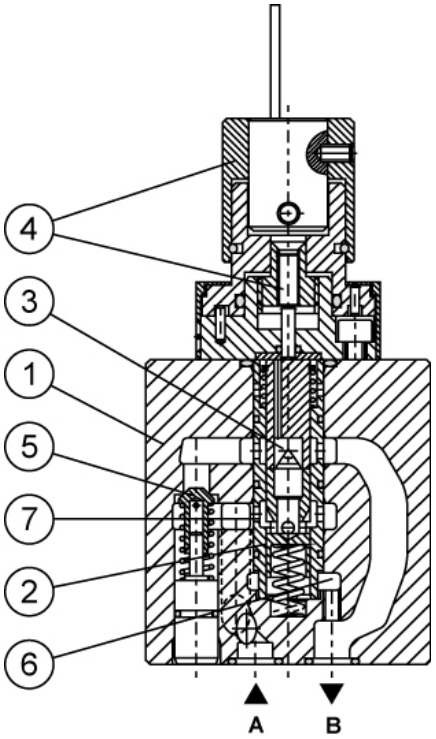
Flow control valves type TVD are used to set the flow of the hydraulic fluid. The flow depends neither on inlet nor on outlet pressures, which means that the flow setpoint valve remains constant also with a change of the pressure drop.

These valves consist of a housing (1), a pressure compensator (2), an orifice (3), a setting element (4), and a non-return valve (5).

The hydraulic fluid flow is adjusted by a setting element (4) which moves the orifice (3) to the corresponding open position. The flow of the fluid is throttled in the direction from A to B. Maintaining of the constant flow towards the user is provided by the pressure compensator (2). The fluid flows through the bore (6) under the pressure compensator, acting on it by the pressure of the line B. From the opposite side, the pressure compensator is acted upon by the pressure which is before the orifice (3). The pressure compensator shifts the working position. A pressure built - up in the line B provokes the movement of the pressure compensator to the increased open position. This enlarges the gap between the bores (7), the orifice (3) and the user. On the contrary, the pressure compensator shifts to the closed position if there is a pressure rise in the line A. The hydraulic fluid flow is constant, and does not depend on the loads on the user.

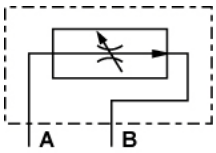
The non-return valve (5) provides a free flow of the hydraulic fluid in the direction from B to A.

The flow control valve without the non-return valve (5) provides operation of the valve only in the direction of the flow from A to B..

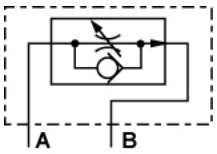


Hydraulic symbol

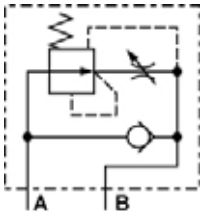
TVD-6



TVD-6-NV



Detailed

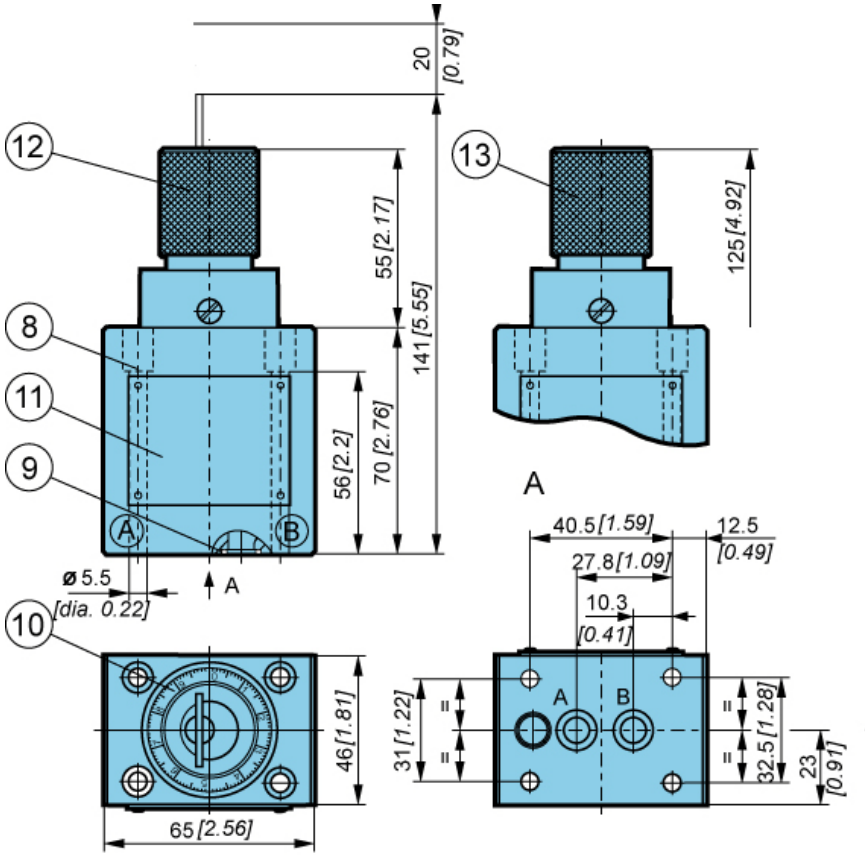


Features

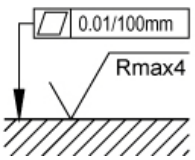
Type		TVD-6-0,9	TVD-6-2	TVD-6-4	TVD-6-8	TVD-6-16
Flow rate	l/min *[GPM]*	0,9 *[0,23]*	2 *[0,53]*	4 *[1,06]*	8 *[2,11]*	16 *[4,23]*
Operating pressure	Bar *[PSI]*	100 *[1450,38]*			350 *[5076,32]*	
Min. pressure drop	Bar *[PSI]*	4 *[58,01]*		10-12 *[145-174]*	10-14 *[145-203]*	10-16 *[145-232]*
Oil temperature 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 *[lbs]*	1,6 *[3,53]*				

Dimensions

Lockable rotary knob **Rotary knob**



8. 4 pcs fixing screws M5 x 65 to ISO 4762-10.9 tightening torque Md=9 Nm
9. O-ring 9,25 x 1,78
10. Scale for setting read - out
11. Nameplate
12. Lockable rotary knob
13. Rotary knob

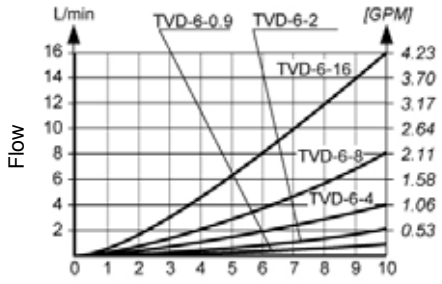


Required quality of the mating surface

ΔP-Q Performance curves

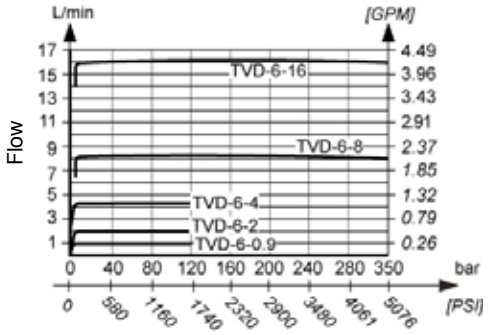
Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.

Flow rate as a function of scale setting



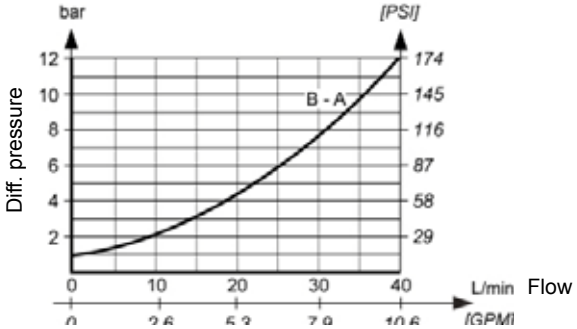
Scale indicator

Flow rate as function of inlet pressure



Inlet pressure

Non-return valve with orifice closed



Model code

T	V	D	-	6	-	☐	-	☐	-	☐	-	☐	✱

Flow rate l/min *[GPM]*

0,9 *[0,24]*	**09**
2 *[0,53]*	**2**
4 *[1,06]*	**4**
8 *[2,11]*	**8**
16 *[4,23]*	**16**

Non-return valve

without non-return valve	**No designation**
with non-return valve	**NV**

Operating element

Lockable rotary knob	**No designation**
Rotary knob	**R**

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

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.

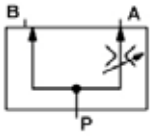
When the port B is used as a secondary working port the pressure must not exceed the pressure on port A.

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.

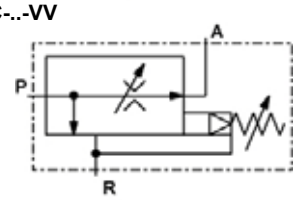
The non return valve in valve type TVTC -..-NV provides a free flow of the hydraulic fluid in the direction from A to P.

Hydraulic symbol

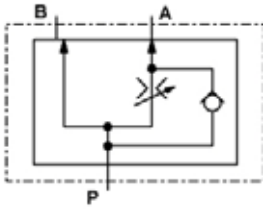
TVTC-..



TVTC-..-VV



TVTC-..-NV



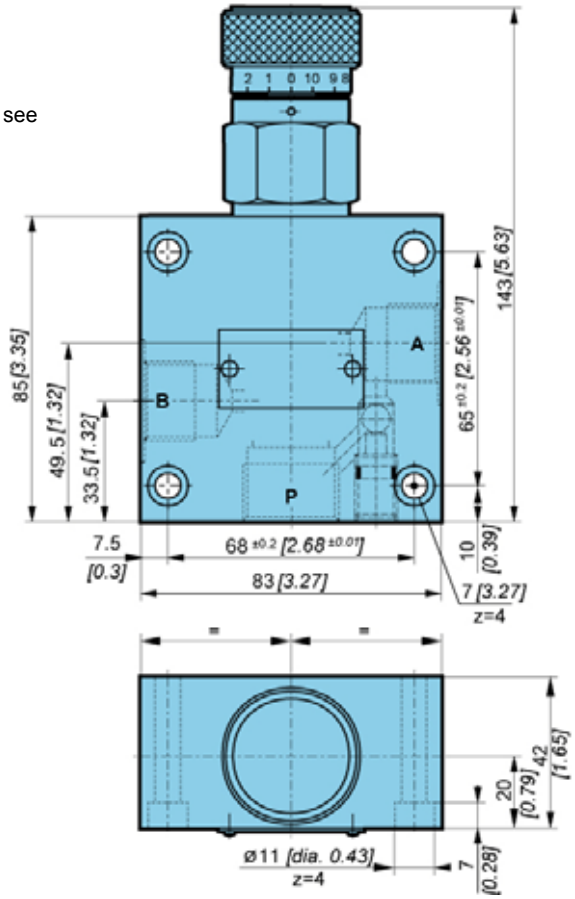
Features

Type			TVTC-12-...	TVTC-25-...	TVTC-50-...
Flow rate A	l/min *[GPM]*		1 to 12 *[0,26 tobis 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		
Cracking pressure for non return valve	Bar *[PSI]*		0,5		
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 *[lbs]*	TVTC TVTC-..-NV	2 *[4,41]*		
		TVTC-..-VV	3 *[6,61]*		

Dimensions

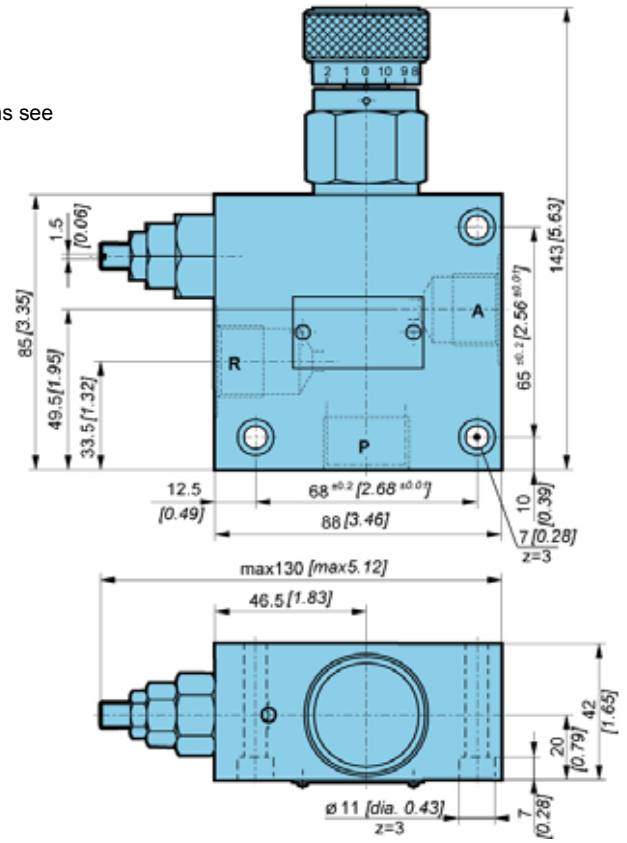
TVTC..; TVTC-..-NV

Threaded connections see Model code

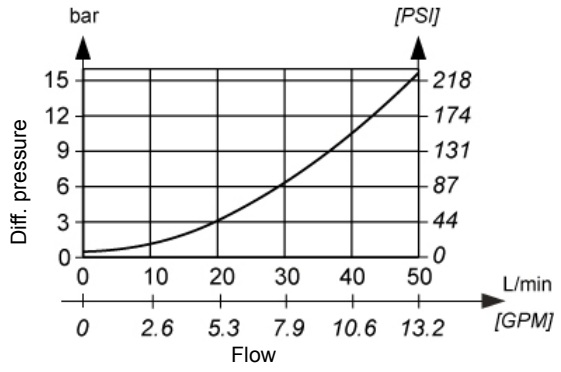


TVTC-..-VV

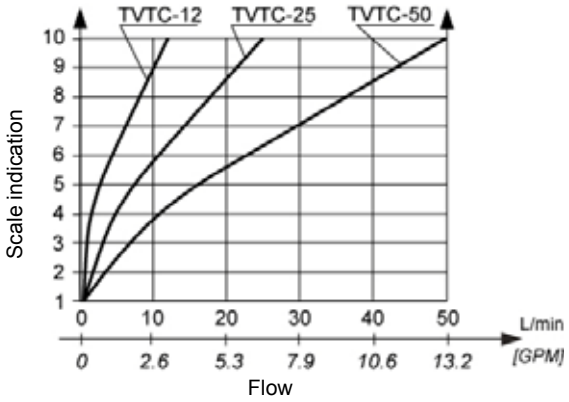
Threaded connections see Model code



ΔP-Q Performance curves



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 90 l/min *[23,78 GPM]*

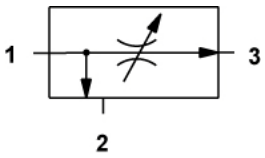
- Three-way pressure compensated.
- Operating element: rotary knob.
- For independent fitting into a block.
- For independent mounting (when assembled with connection block P-TVTP).

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

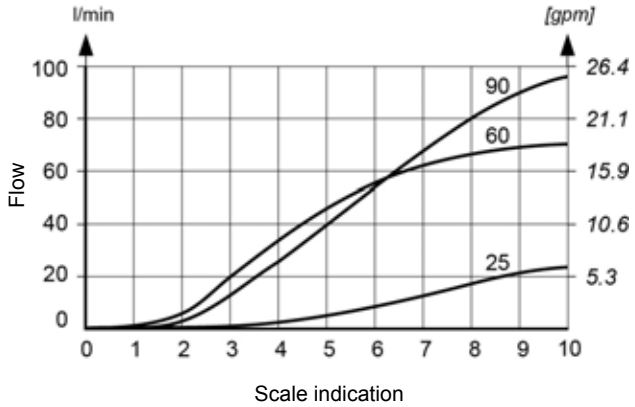


Features

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 *[lbs]*	0,6 *[1,32]*		1 *[2,20]*

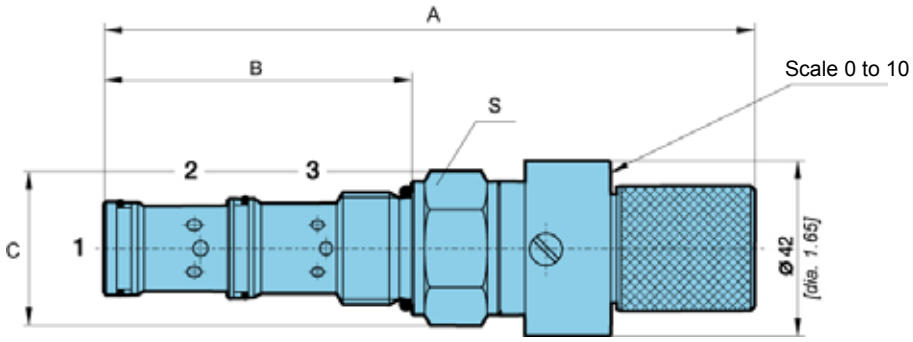
Flow rate as a function of scale indication

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



Dimensions

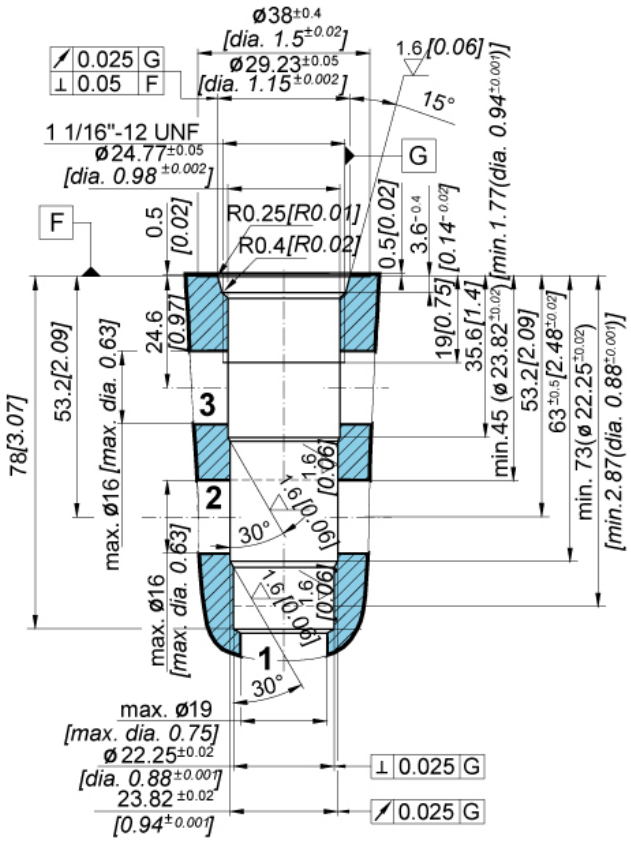
TVTP-...-B-...



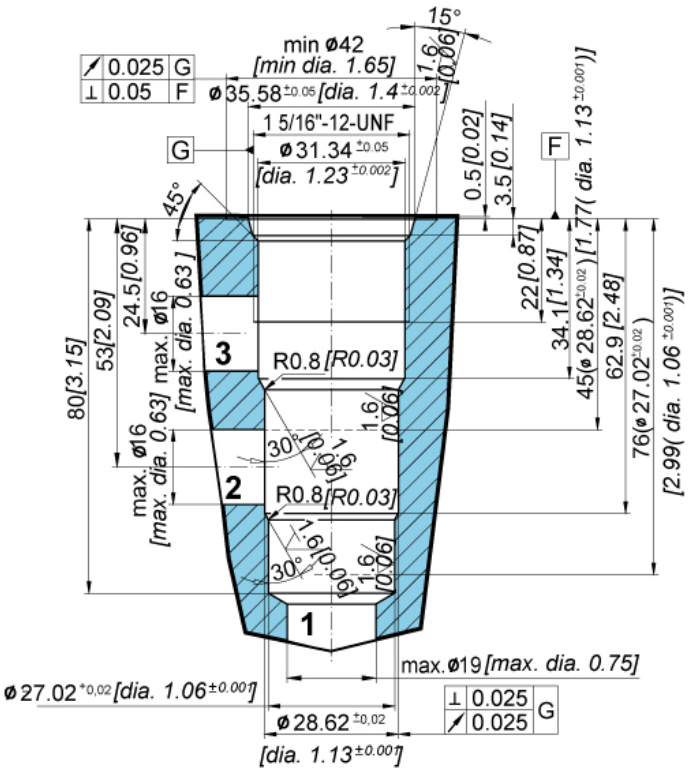
Typ	A mm *[Zoll]*	B mm *[Zoll]*	C mm *[Zoll]*	S	Torque into Cavity Nm *[in.lbf]*
TVTP-25-B	155 *[6,10]*	73,5 *[2,83]*	37 *[1,46]*	S32	60 - 65 *[531 - 575]*
TVTP-60-B					
TVTP-90-B	176 *[6,93]*	75 *[2,95]*	46 *[1,81]*	S41	70 - 75 *[619 - 664]*

Dimensions of cavity

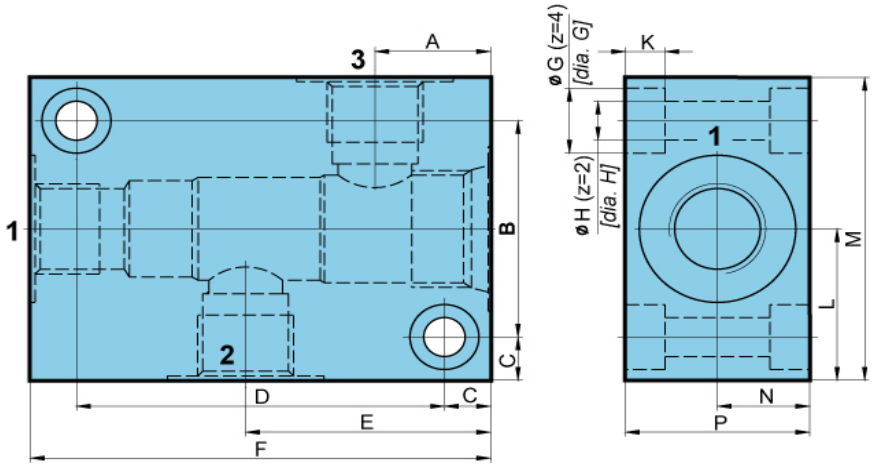
TVTP-25, TVTP-60



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**

Model code

T V T P - ☐ - B - ☐ - *

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

Operating element	
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

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

- NG 6, 10
- Up to 210 Bar *[3046 PSI]*
- Up to 90 l/min *[23,8 GPM]*

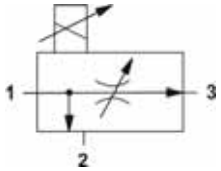
- Three-way pressure compensated.
- Operating element: proportional solenoid.
- Control electronics: Amplifier P/N: 1659574.
- For independent fitting into a block.
- For independent mounting (when assembled with connection block P-TVTP).
- Plug-in connector for solenoids to ISO 4400.
- Protection of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

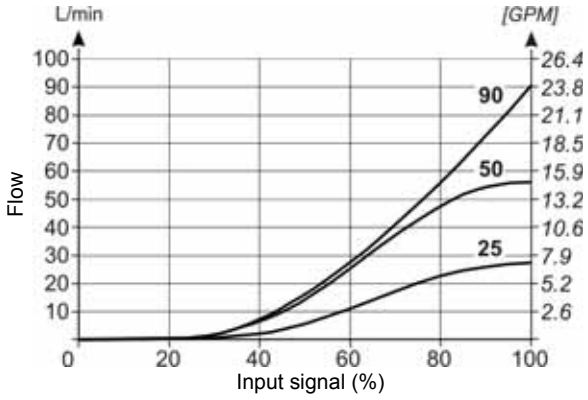


Features

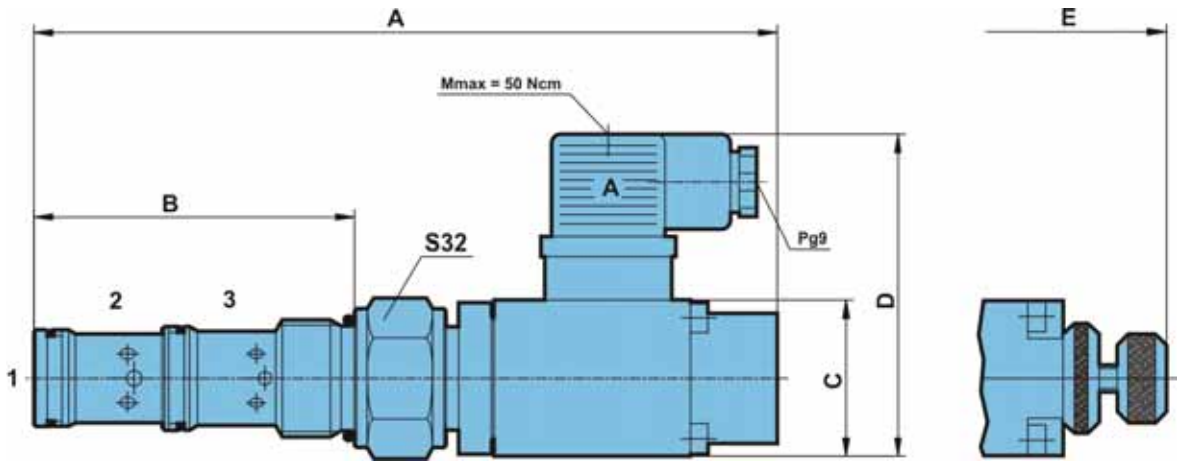
Type		TVTP-25	TVTP-50	TVTP-90
Rated flow 3	l/min *[GPM]*	25 *[6,6]*	50 *[13,2]*	90 *[23,8]*
Flow rate 1 max.	l/min *[GPM]*	60 *[15,9]*	90 *[23,8]*	150 *[39,6]*
Operating pressure max.	Bar *[PSI]*		210 *[3045,8]*	
Hysteresis	%		<5	
Flow constant according to load pressure	%		<±2	
Oil temperature range	°C *[°F]*		-20 to +70 *[-4 to +158]*	
Viscosity range	mm^2/s *[SUS]*		15 to 380 *[69,5 to 1761]*	
Filtration	NAS 1638		7	
Mass	kg *[lbs]*	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]*.



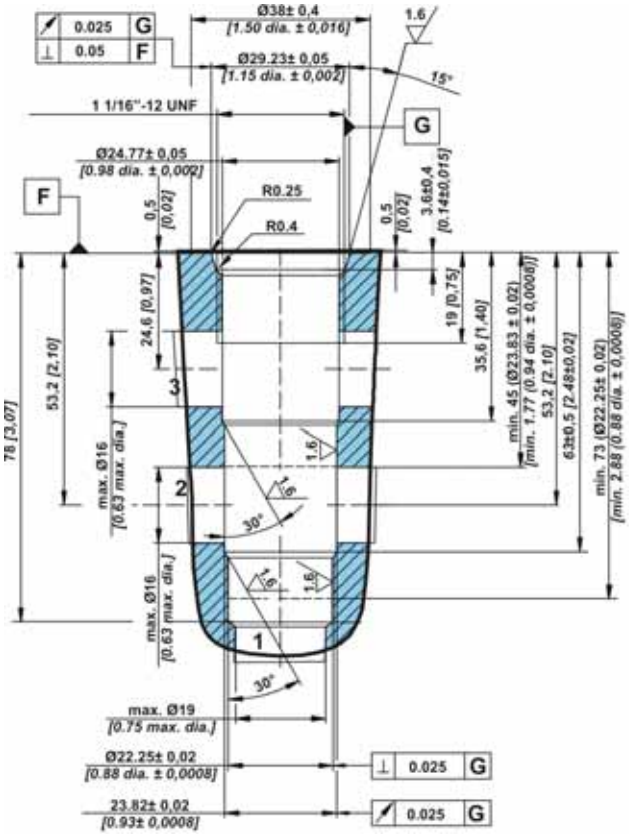
Dimensions



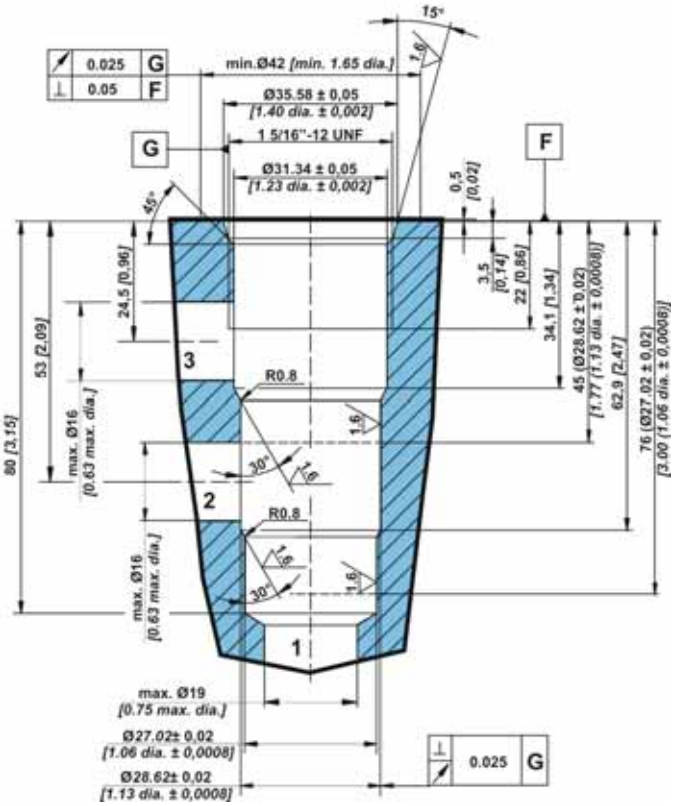
	A mm *[Zoll]*	B mm *[Zoll]*	C mm *[Zoll]*	D mm *[Zoll]*	E mm *[Zoll]*	S	Torque into cavity Nm *[in.lbf]*
TVTP-25-P	170 *[6,7]*	73,5 *[2,9]*	35 *[1,4]*	74 *[2,9]*	210 *[8,3]*	S32	60-65 *[531-575]*
TVTP-50-P							
TVTP-90-P	198 *[7,8]*	75 *[3,0]*	45 *[1,8]*	84 *[3,3]*	244 *[9,6]*	S41	70-75 *[619-664]*

Dimensions of cavity

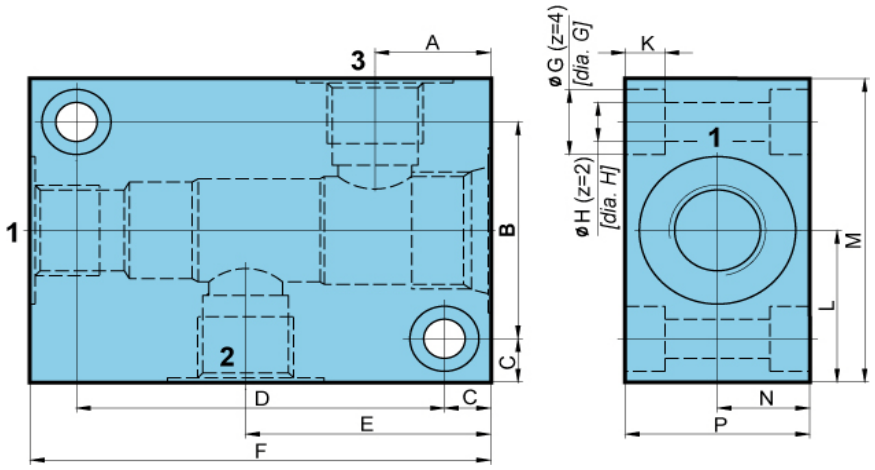
TVTP-25 and50



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 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

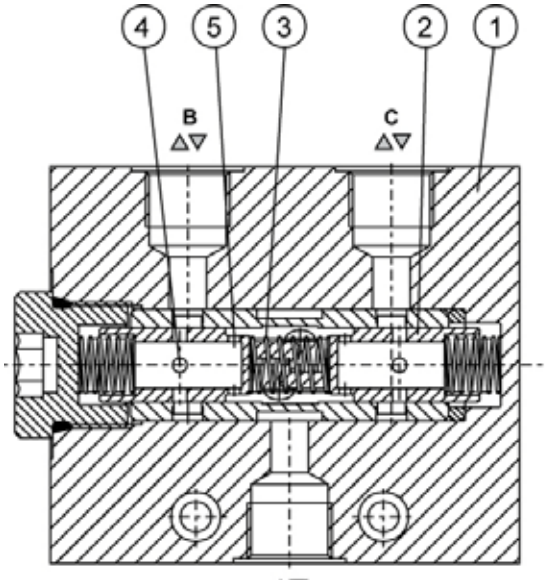
The flow divider DTP has two functions, dividing and combining of fluid flow. The regulator divides the fluid flow in the direction from A to B and C, and combines flows in the direction from B and C to A. The dividing / combining ratio is 50 % : 50 %, independent of pressure in respective pipeline,B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

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

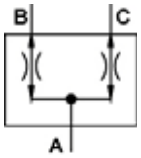
Division of flow: The fluid flow in the direction from A to B and C.
The flow in chamber A is divided and flows through the orifices (5) with constant cross-section and throttles (4) into chambers B and C. The pressure drop through the orifices (5) depends on the pressure load. The increase of flow towards 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

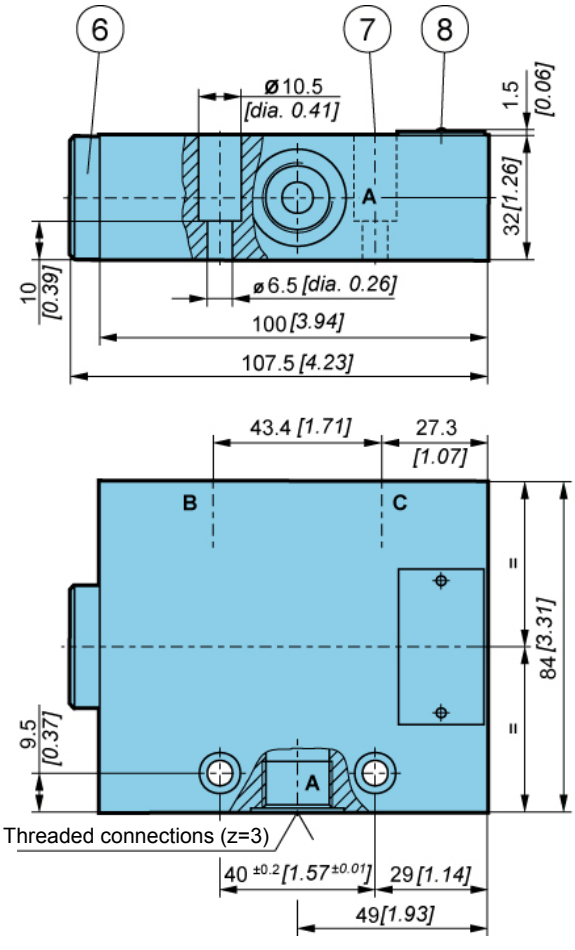


Features

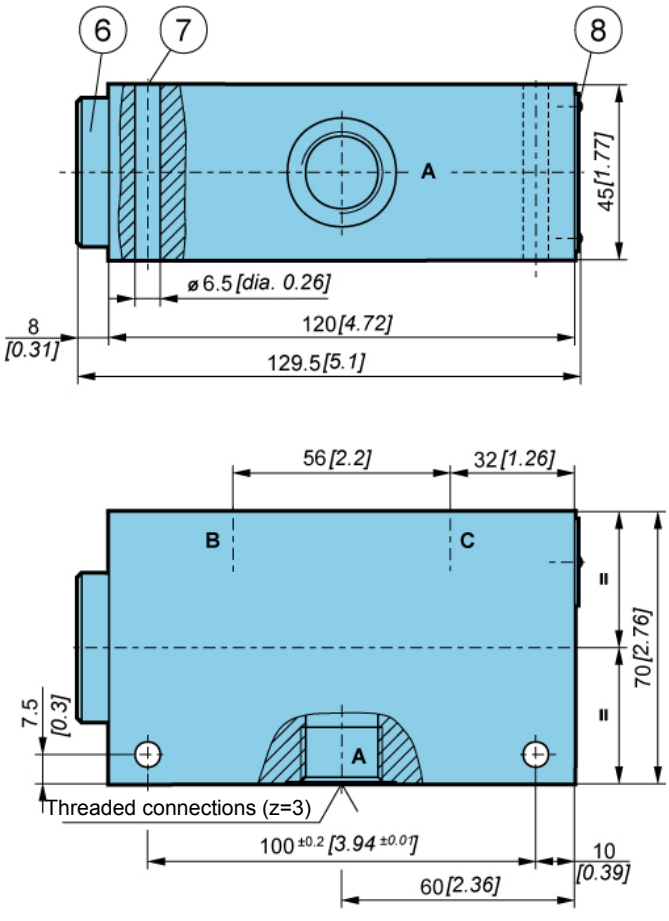
Type		DTP-6-20	DTP-6-35	DTP-6-50	DTP-10-70
Min. flow rate	l/min *[GPM]*	8 *[2,11]*	12 *[3,17]*	16 *[4,23]*	35 *[9,25]*
Max. flow rate	l/min *[GPM]*	20 *[5,28]*	35 *[9,25]*	50 *[13,21]*	70 *[18,49]*
Max. pressure range	Bar *[PSI]*	350 *[5076]*			
Dividing	%	50 : 50			
Flow dividing accuracy	%	±5			
Oil 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 *[lbs]*	1,7 *[3,75]*			*2,65 [5,84]*

Dimensions

DTP-6



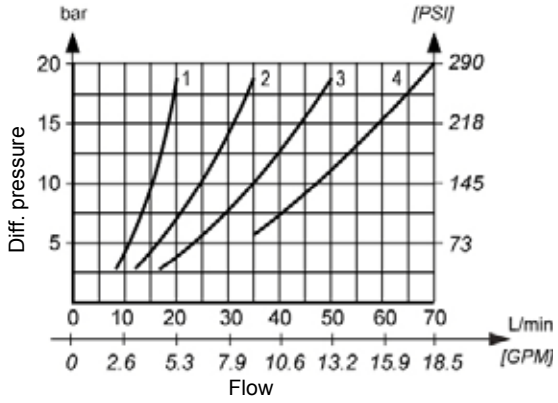
DTP-10



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

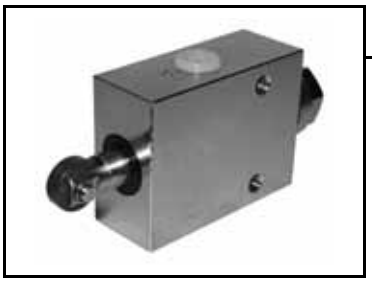
DTP-6	M 18x15	**No designation**
	G 3/8	**G 3/8**
	3/4-16 UNF-2B	**SAE 8**
DTP-10	M 22x1,5	**M 22**
	G 1/2	**G 1/2**
	7/8-14 UNF-2B	**SAE 10**

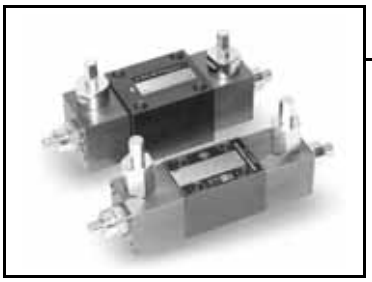
Seal type

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





2/2 way directional valves KVC

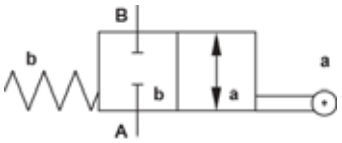
- NG 6
- Up to250 bar *[3 625 PSI]*
- Up to35 L/min *[9.2 GPM]*

KVC-2/2-K

Features

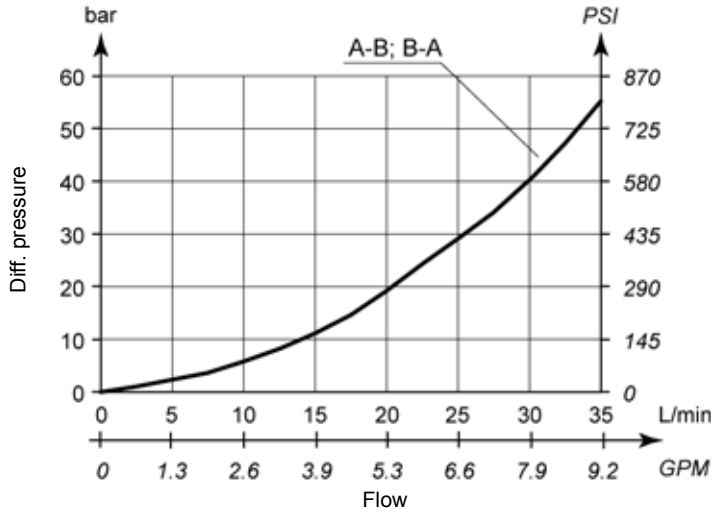
Size		**6**
Flow rate	L/min *[GPM]*	35 *[9.2]*
Operating pressure	bar *[PSI]*	250 *[3 625]*
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69.5 to 1 760]*
Oil temperature range	°C *[°F]*	-20 to +70*[-4 to 158]*
Filtration	ISO 4406-1999	19/17/14
Mass	kg *[lb]*	1,2 *[2.6]*
Seal type	NBR seals for mineral oil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

Hydraulic symbol

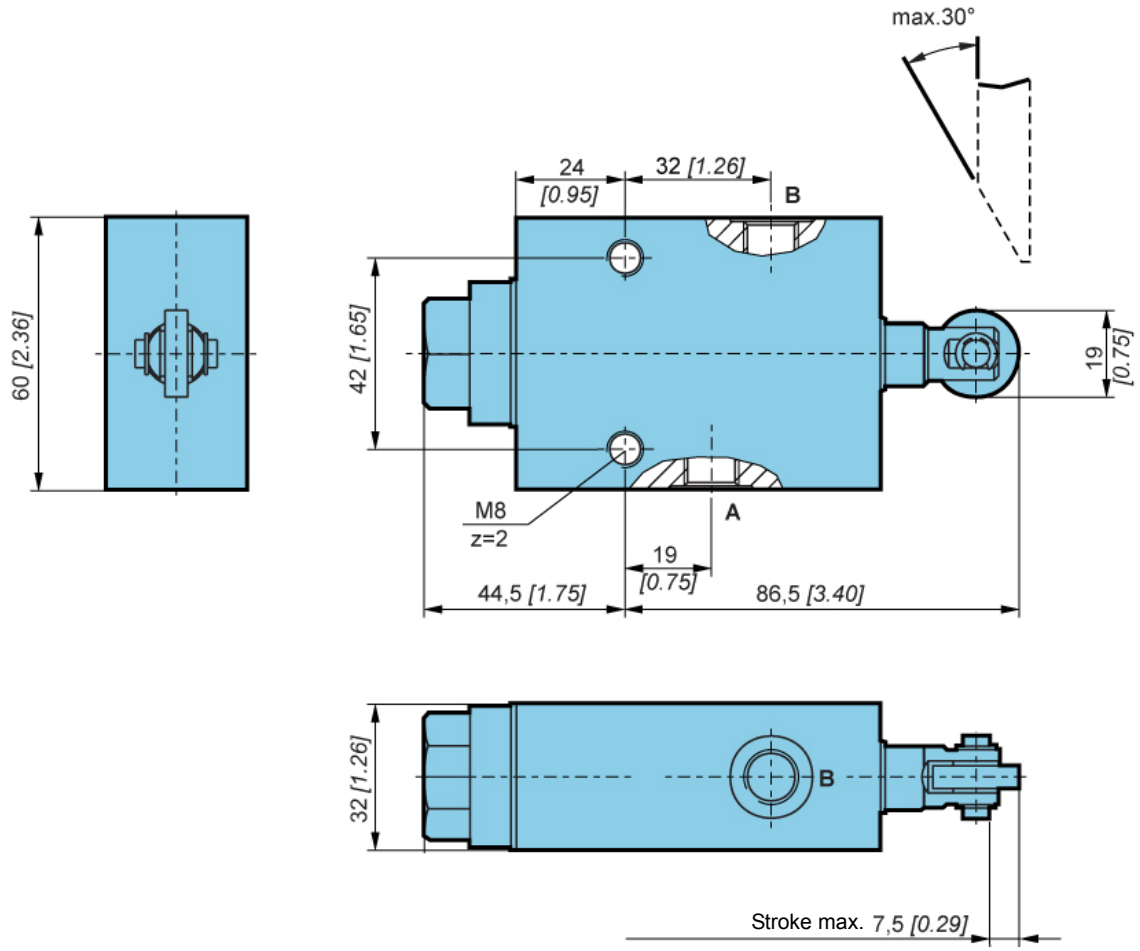


ΔP-Q Performance curves

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



Dimensions



Model code

K V C - 2 / 2 - K - ☐ - *

Threaded connections

M12x1,5	**No designation**
G3/8	**3/8**

Special requirements to be briefly specified

2/2 WAY DIRECTIONAL VALVES KVC-NV

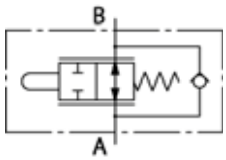
- NG 6
- Up to 250 bar *[3 625 PSI]*
- Up to 40 L/min *[10.5 GPM]*

KVC-2/2-NV-T

Features

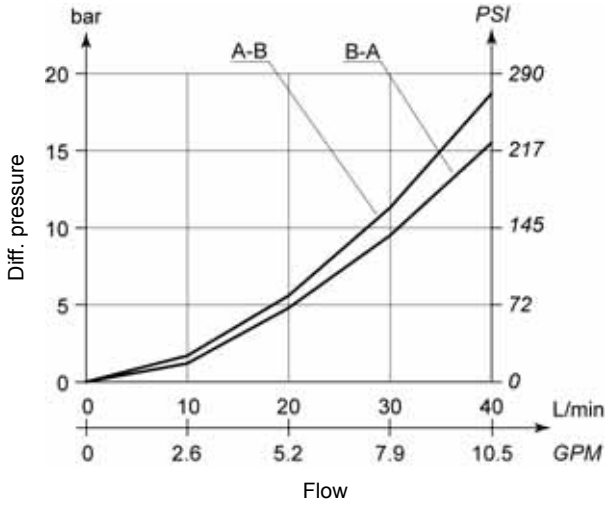
Size		**6**
Flow rate	L/min *[GPM]*	40 *[10.5]*
Operating pressure	bar *[PSI]*	210 *[3 045]*
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[69.5 to 1 760]*
Oil temperature range	°C *[°F]*	-20 to +70*[-4 to 158]*
Filtration	ISO 4406-1999	19/17/14
Mass	kg *[lb]*	1,2 *[2.6]*
Seal type	NBR seals for mineral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

Hydraulic symbol

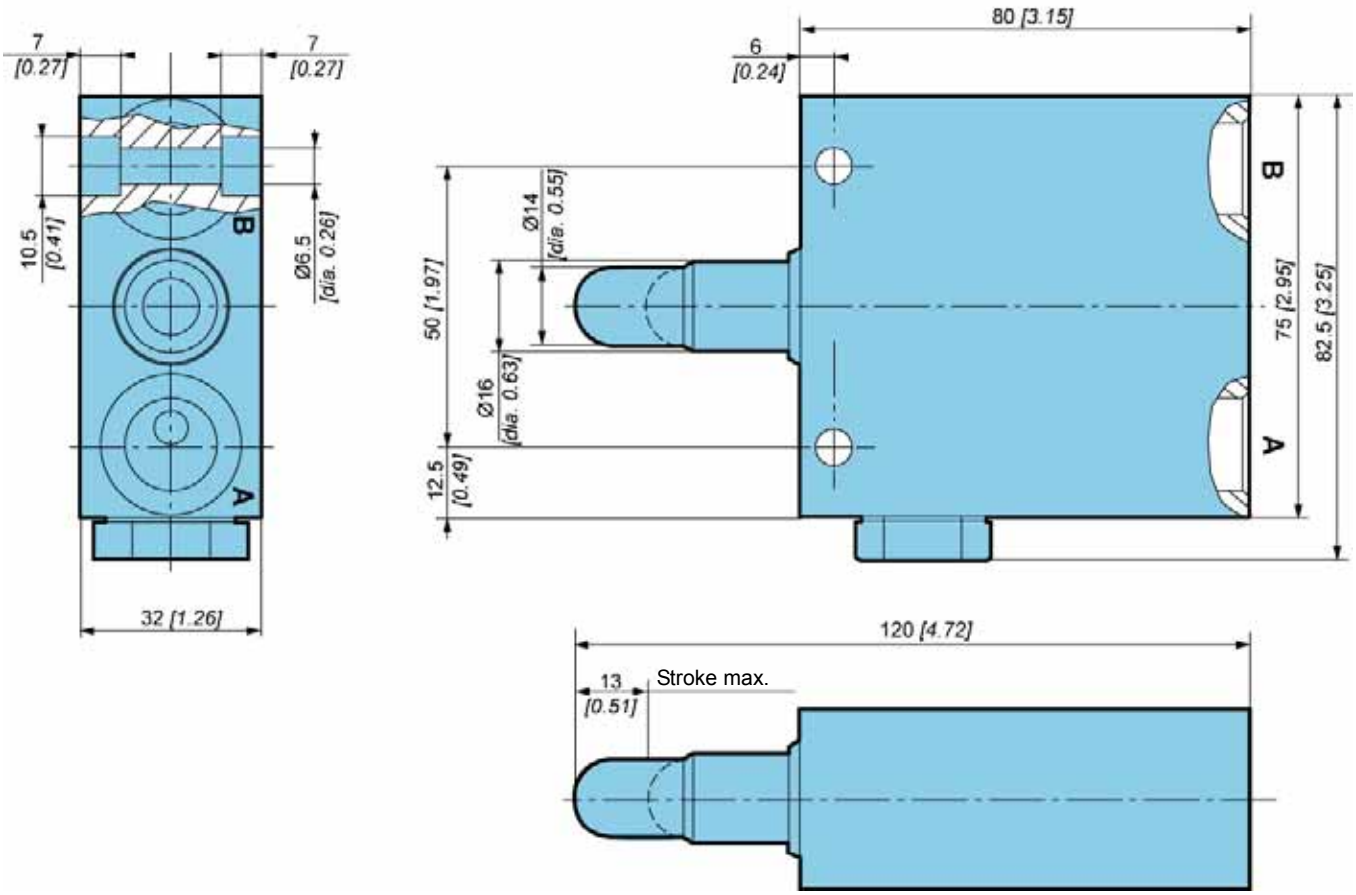


ΔP-Q Performance curves

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



Dimensions



Model code

K V C - 2 / 2 - N V - T - ☐ - ✱

Threaded connections

M18x1,5	**No designation**
G3/8	**3/8**

Special requirements to be briefly specified

4/2, 4/3 WAY DIRECTIONAL VALVES KV

- NG 6, 10
- Up to 350 bar *[5 076 PSI]*
- Up to 60 L/min *[15.8 GPM]* for NG 6Up 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

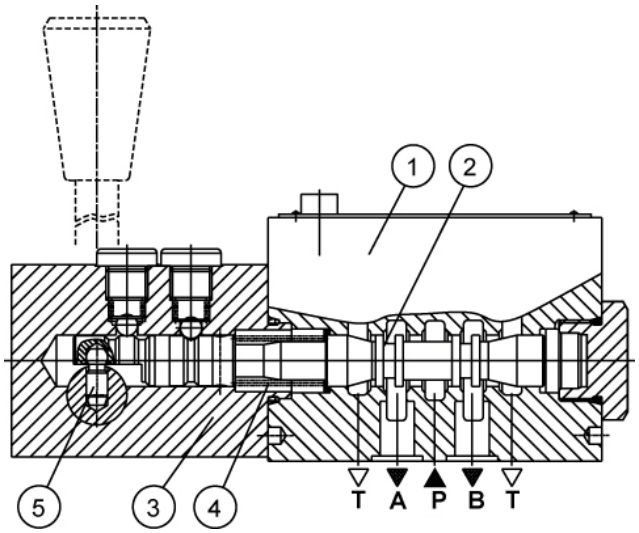
Operation

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:

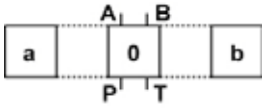
1/ With control spool not held in the operating position (the control spool returns to neutral position on ceasing to apply force to the control mechanism - type KV-../..-R).

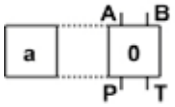
2/ With control spool held (detent) in the operating position (the control spool remains in the operating position on ceasing to apply force to the control mechanism lever - type KV-../..-RA).



Hydraulic symbols

Spool types



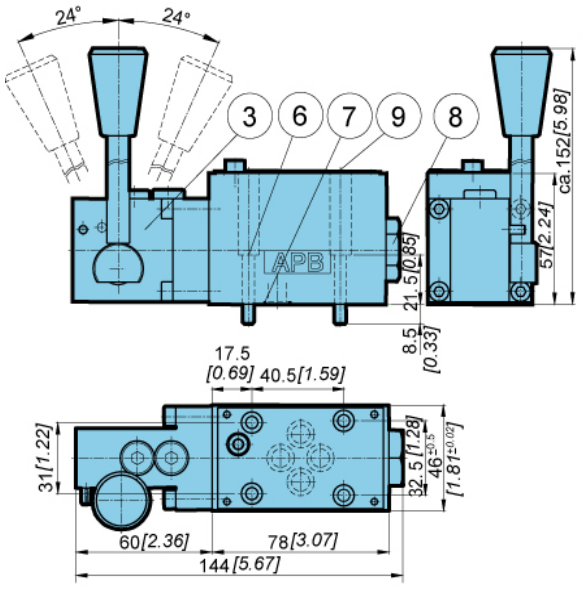


Features

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	

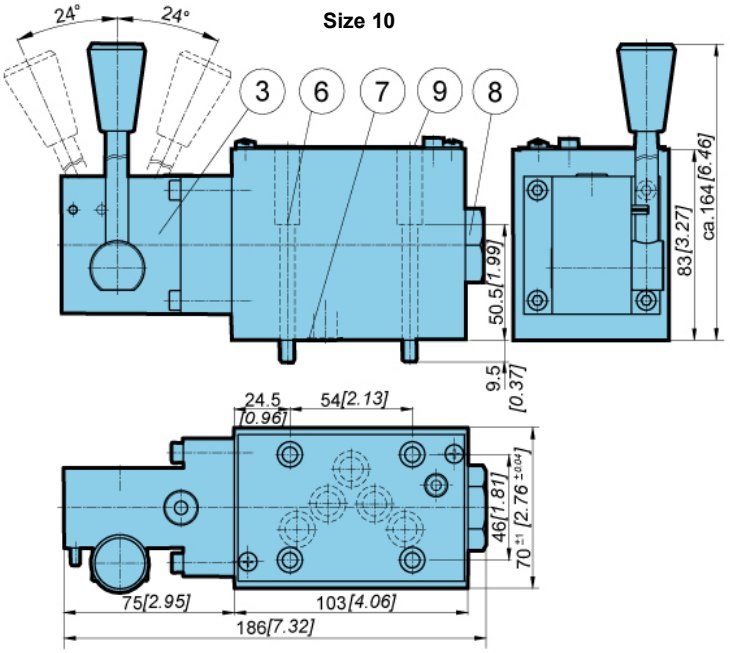
Dimensions

Size 6



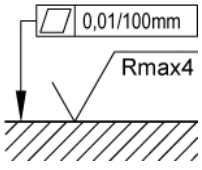
3. Control mechanism on side ''a''
   4/3 valves
   4/2 valves, spool types 51A
6. Fixing screws 4 pcs M5x30 to ISO 4762-10.9
   (by special order).
   Required tightening torque Md = 9 Nm.
7. O-ring 9.25x1.78
8. Valve cap.
9. Nameplate.

Size 10



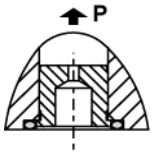
3. Control mechanism on side ''a''
   4/3 valves
   4/2 valves, spool types 51A
6. Fixing screws 4 pcs M6x60 to ISO 4762-10.9
   (by special order).
   Required tightening torque Md = 15 Nm.
7. O-ring 12.42x1.78
8. Valve cap.
9. Nameplate.

Required quality of the mating surface.



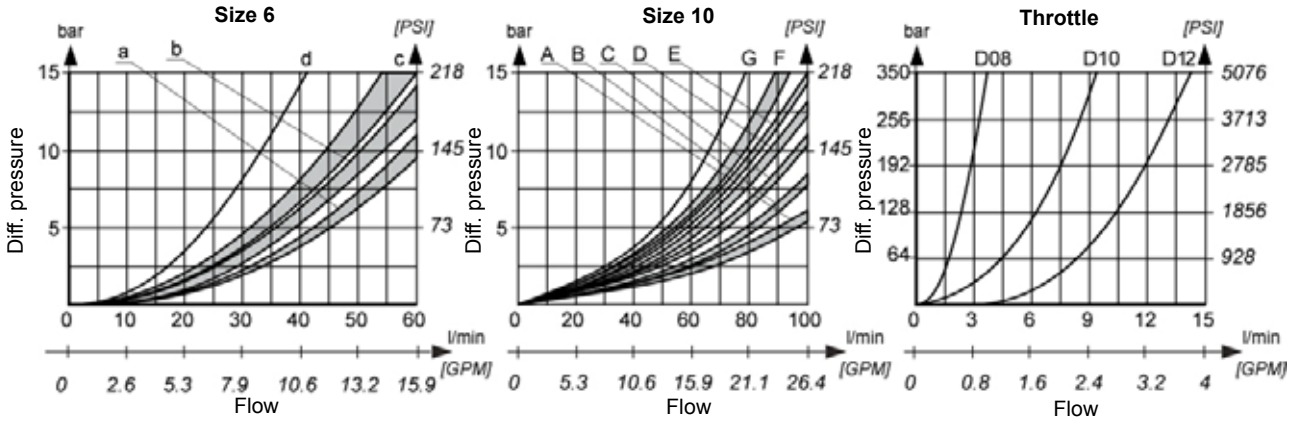
Cartridge throttle

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

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

Number of spool position

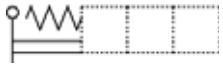
2	**2**
3	**3**

Size

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

Special requirements to be briefly specified

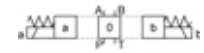
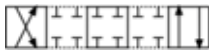
Control spool held

	**R**
	**RA**

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

Spool type

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

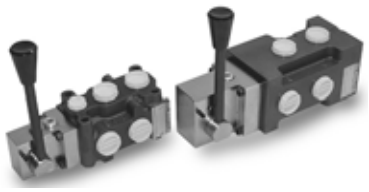
Throttle mm *[in]*

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.]*

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...

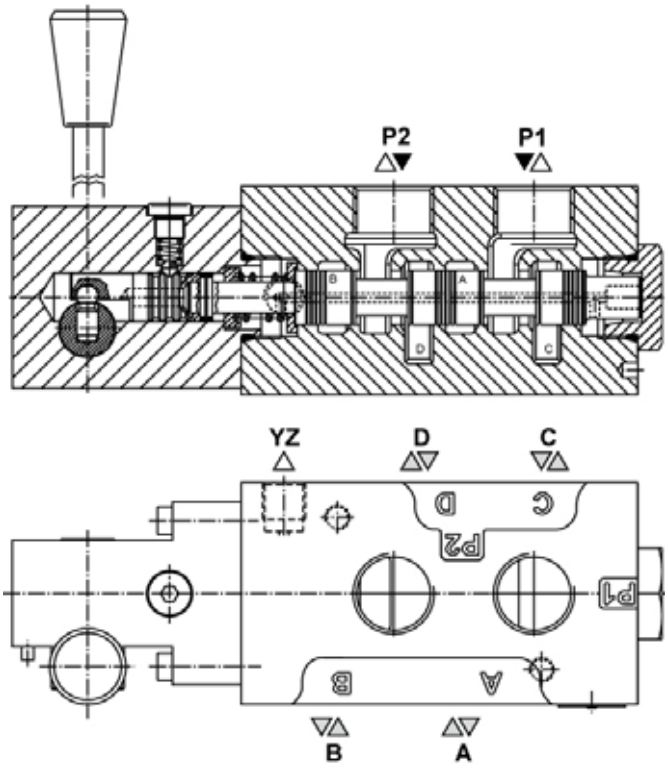
Operation

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:

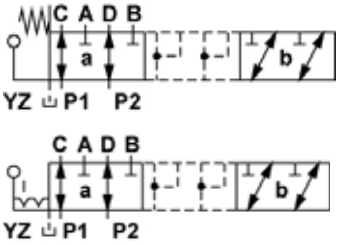
1/ With control spool not held in the operating position (the control spool returns to position ''a'' on ceasing to apply force to the mechanism - type KV-../..-R).

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).

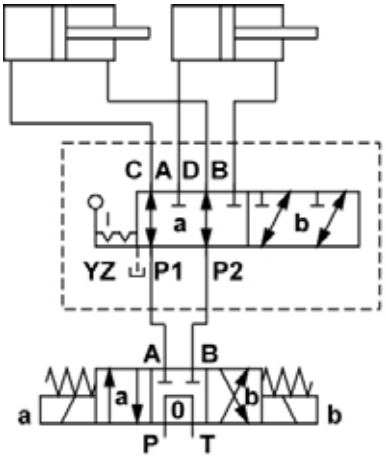


Hydraulic symbols

Spool types



Mounting example

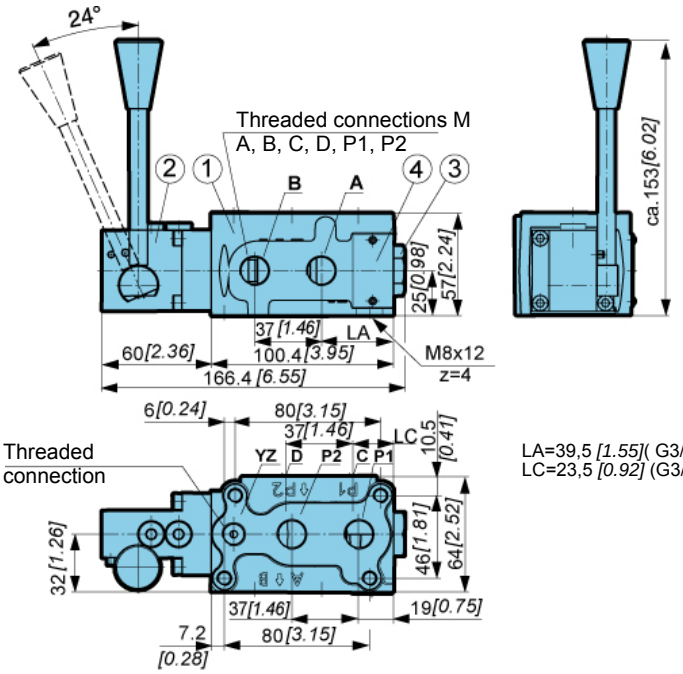


Features

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	

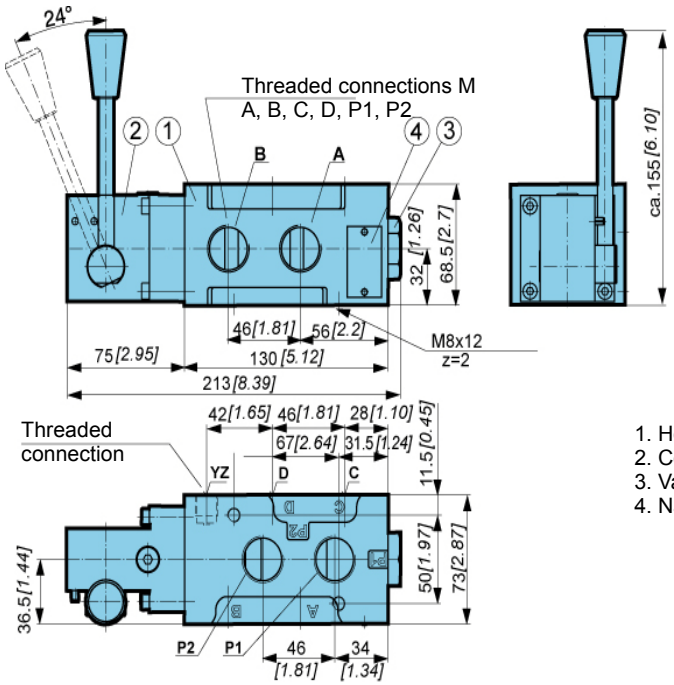
Dimensions

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)

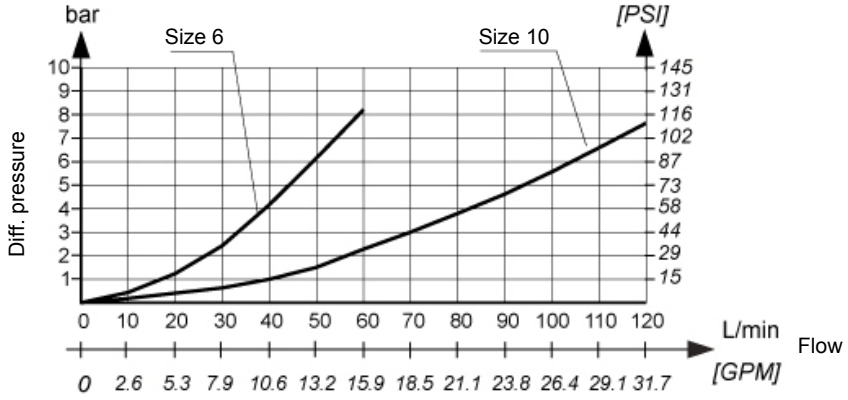
Size 10



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

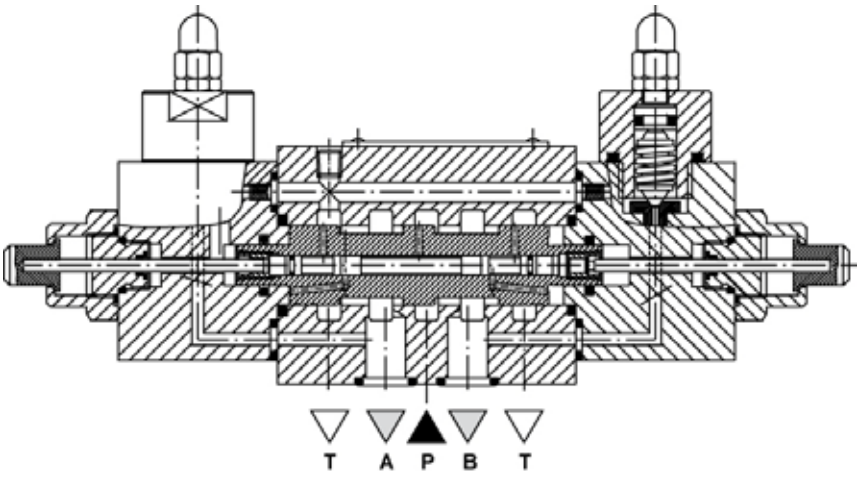
- NG 6, 10
- Up to 210 *bar [3 045 PSI]*
- Up to60 L /min *[15.8 GPM]*

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

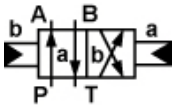
PKV-6, PKV-10

Operation

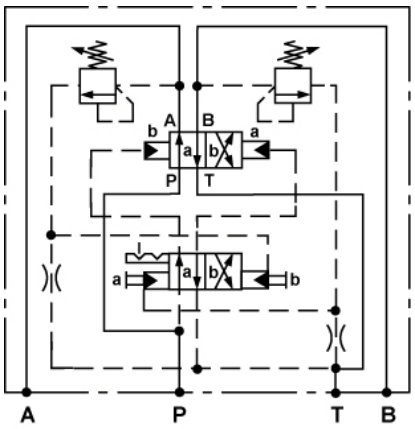
Indirectly, hydraulic - operated directional valves type PKV are used to control the hydraulic fluid flow direction by an automatic change - over.



Hydraulic symbol



Mounting example

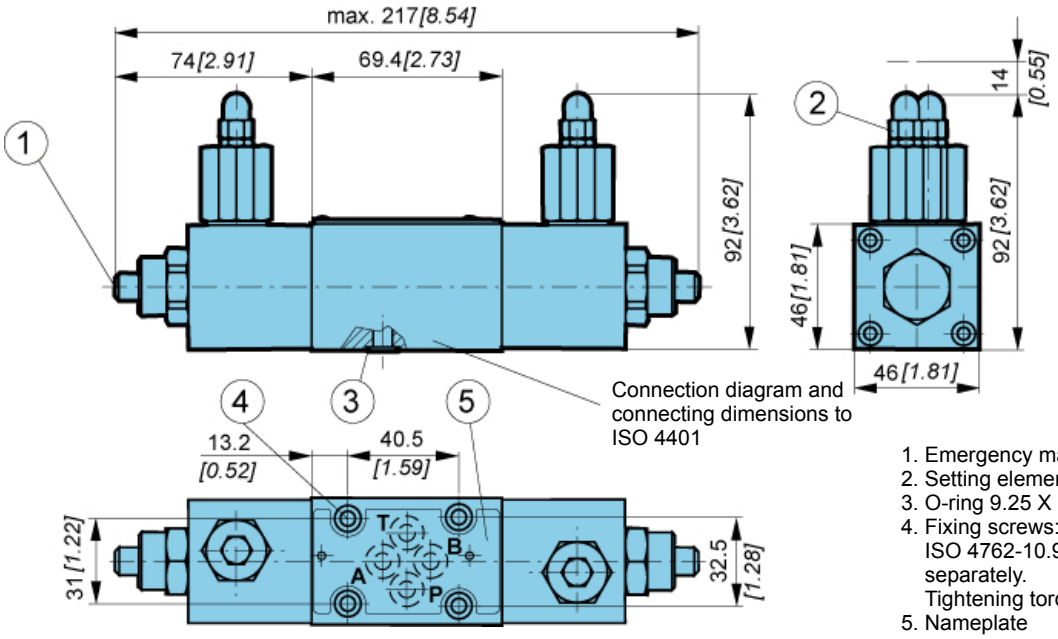


Features

Size			6	10
Flow rate min/max		L/min *[GPM]*	1/25 *[0.3/6.6]*	1/60 *[0.3/15.8]*
Operating pressure	P, A, B	bar *[PSI]*	To 210 *[3 045]*	
	T	bar *[PSI]*	To 40 *[580]*	
Min. press. req. for autom. change over		bar *[PSI]*	50 *[725]*	
Change over pressure		bar *[PSI]*	50 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

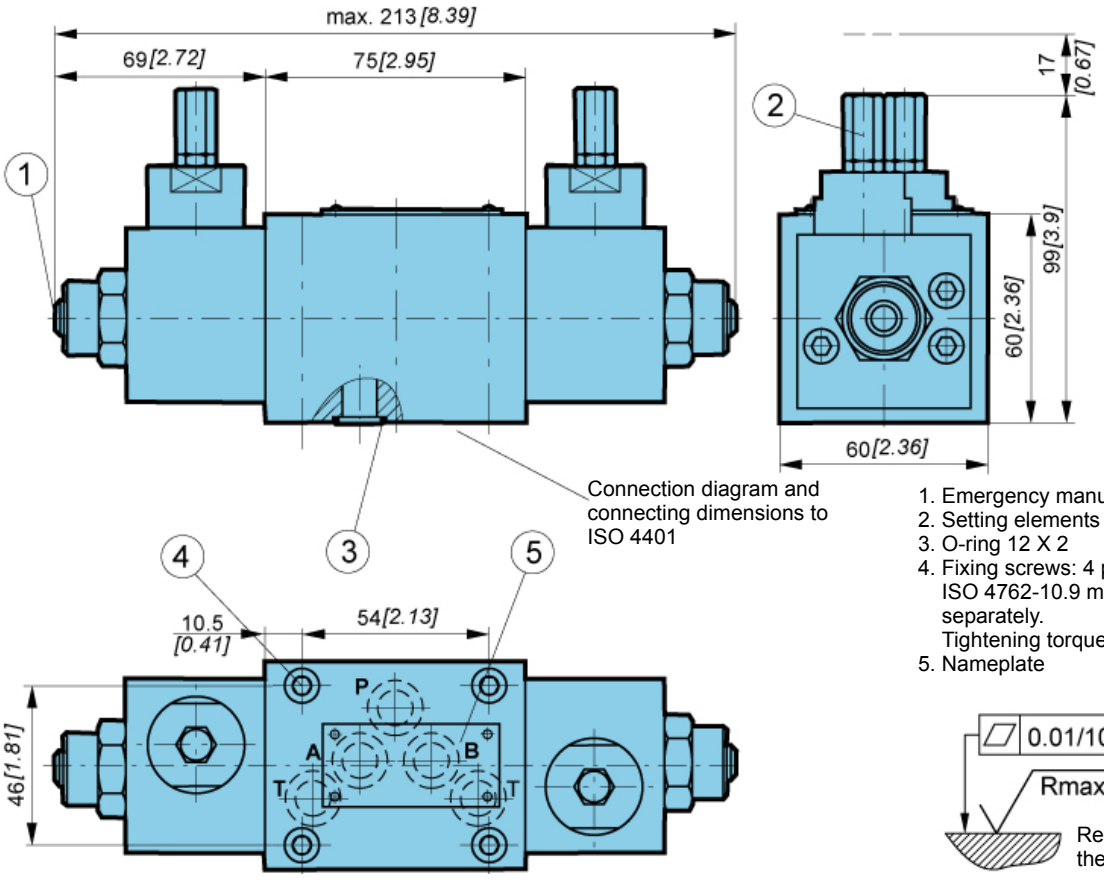
Size 6



Connection diagram and connecting dimensions to ISO 4401

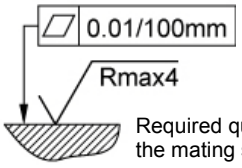
1. Emergency manual override
2. Setting elements with protectivecap
3. O-ring 9.25 X 1.78
4. Fixing screws: 4 pcs M5 x 45 to EN ISO 4762-10.9 must be ordered separately.
   Tightening torque Md = 9Nm
5. Nameplate

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

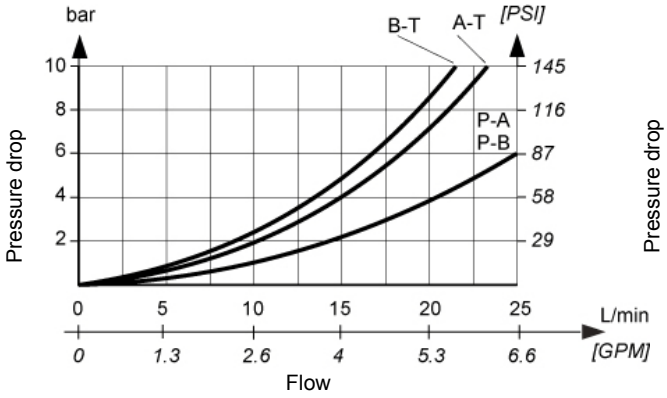


Required quality of the mating surface.

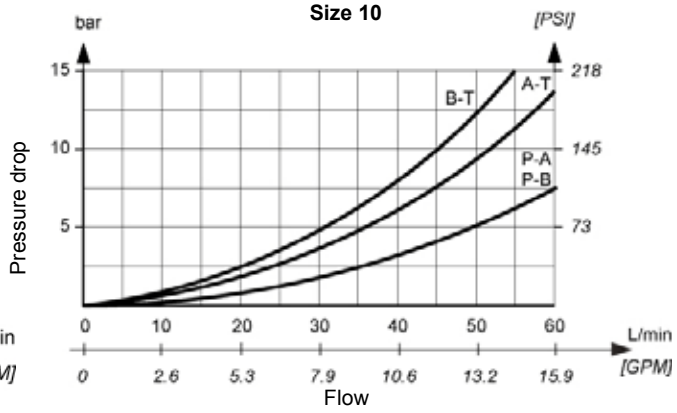
ΔP-Q Performance curves

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

Size 6



Size 10



Model code

P K V - □ - □ - *

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

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

Special requirements to be briefly specified

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.

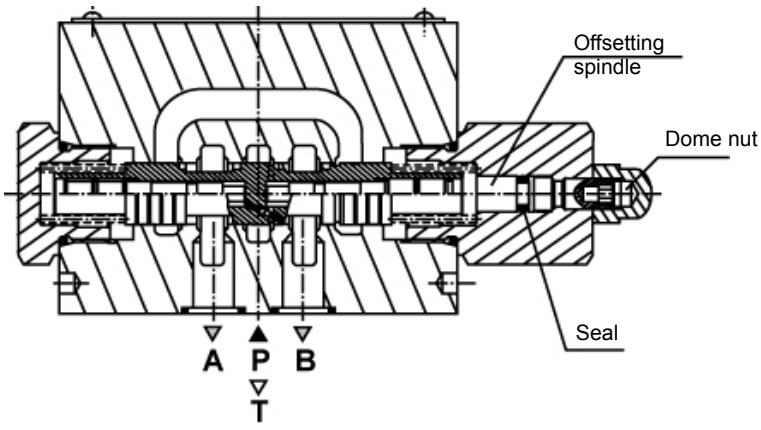
About the spindle for the PKV-6-T-G valves:

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.

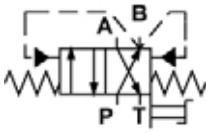
Never turn the offsetting spindle when the valve is pressurized over 10 bar *[145 PSI]*. This can cause seal damage. If necessary switch off the pump.



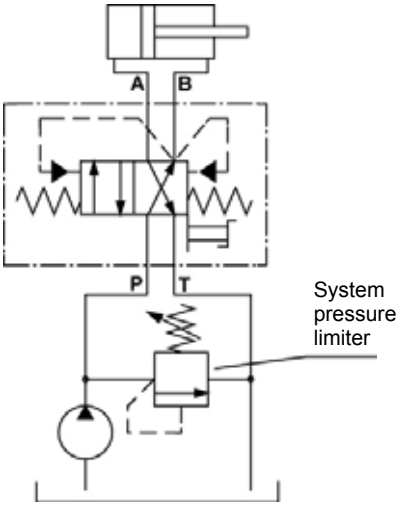
Hydraulic symbol

PKV-6-T

PKV-6-T-G



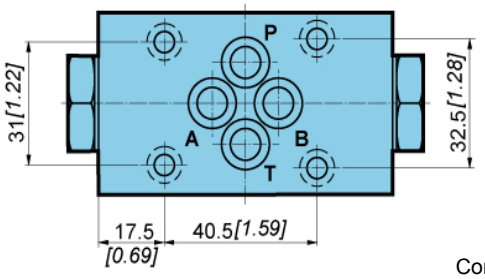
Mounting example

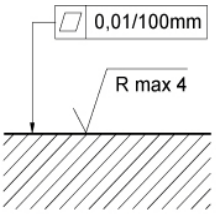


Features

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 to3 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]*

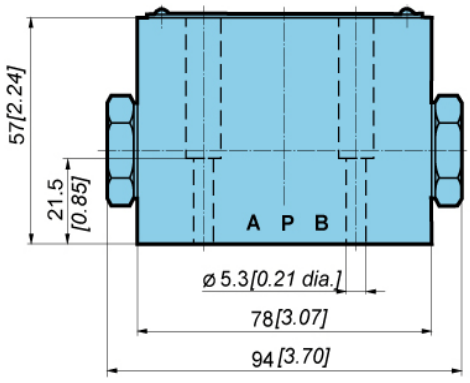
Dimensions



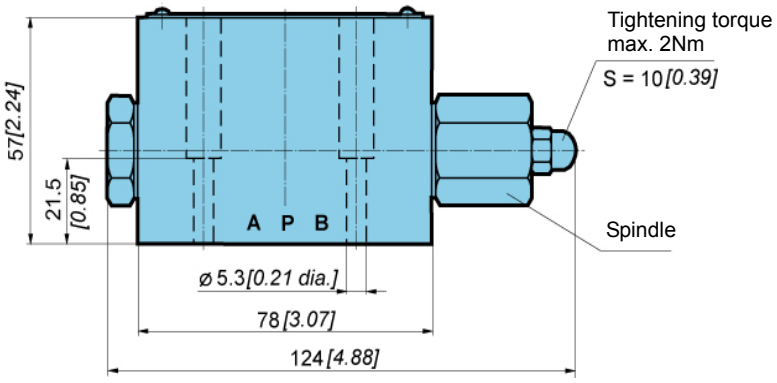


Required quality of the mating surface.

Connection diagram and connecting dimensions to ISO 4401.



PKV-6-T

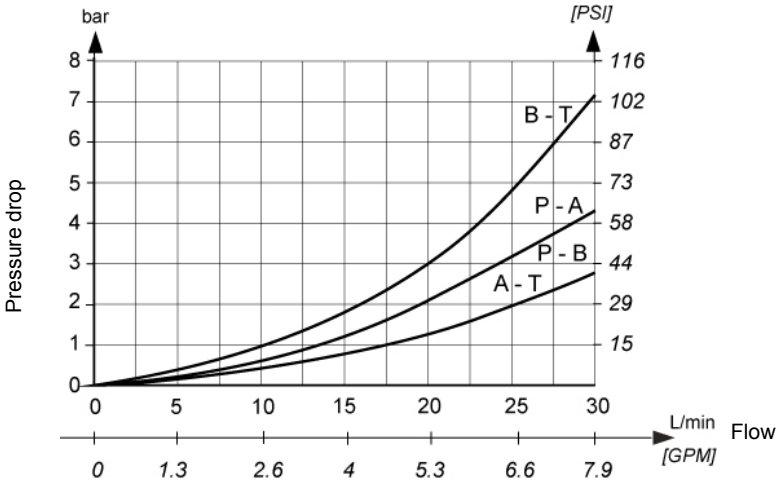


PKV-6-T-G

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]*.

ΔP-Q Performance curves

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



Model code

P K V - 6 - T - ☐ - ☐ - *

Offsetting spindle

Without offsetting spindle	**No designation**
With offsetting spindle	**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

4/2, 4/3 WAY DIRECTIONAL VALVES KV

- NG 6, 10
- Up to 350 bar *[5 076 PSI]*
- Up to 80 L/min *[21.1 GPM]*
- Up to 130 L/min *[34.3 GPM]*

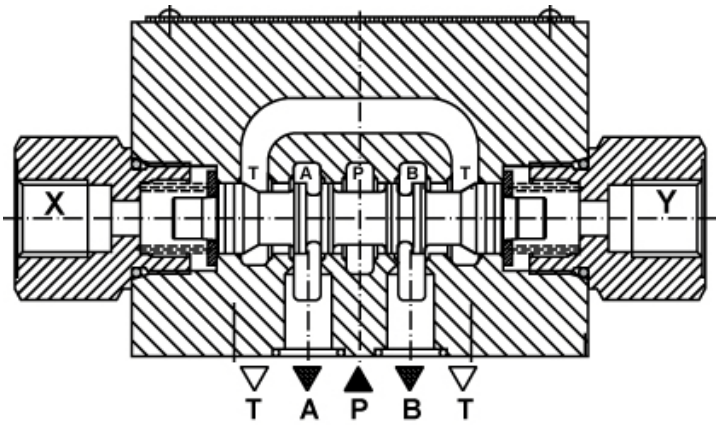
- Direct hydraulically operation.
- Connecting dimensions to ISO 4401.
- Threaded connections to ISO 1179.

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

Operation

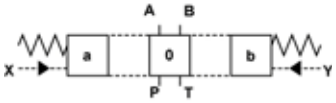
The KV-...-H is a hydraulically controlled 4/3 or 4/2 way directional control valve. The valve is operated by the pilots ports X and Y via the connection of an external pilot pipe direct on the valve body.

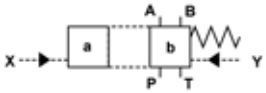
The minimum pilot pressure must be ensured for all operating conditions of the directional valve.



Hydraulic symbols

Spool types



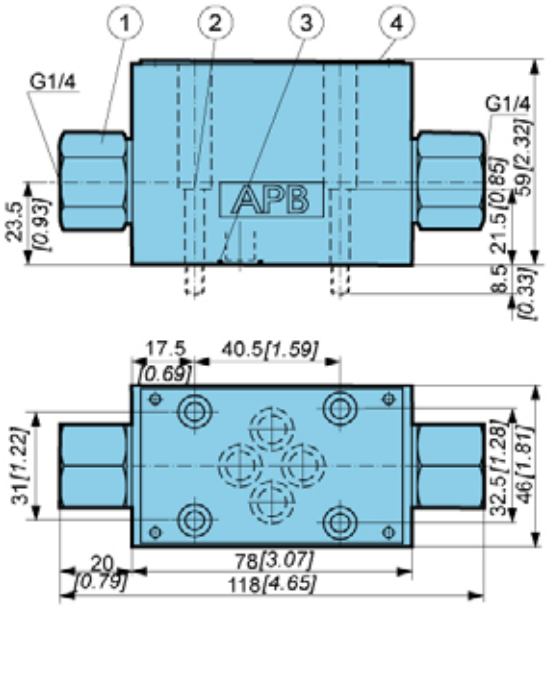


Features

Size			6	10
Flow rate		L/min *[GPM]*	80 *[21.1]*	130 *[34.3]*
Operating pressure	Ports A, B, P	bar *[PSI]*	350 *[5 076]*	
	Ports X, Y, T	bar *[PSI]*	210 *[3 045]*	
Pilot supply pressure min.		bar *[PSI]*	10 *[145]*	
Viscosity range		mm^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]*	1,4 *[3.1]*	4,0 *[8.8]*
Mounting position			Optional	

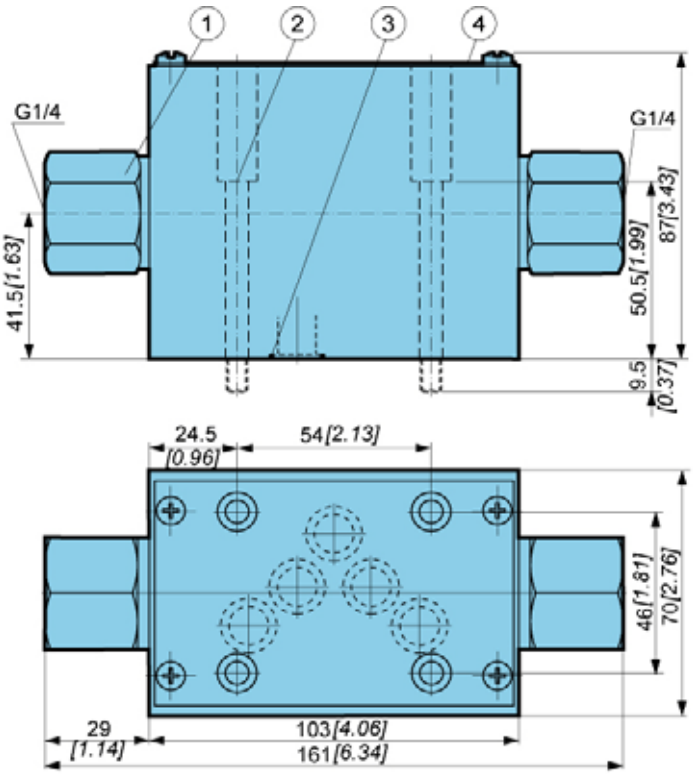
Dimensions

Size 6



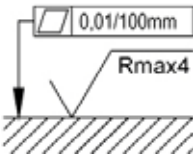
1. Threaded connection X (Y) - G1/4
2. Fixing screws 4 pcs M5x30 to ISO 4762-10.9 (by special order) Required tightening torque Md = 9Nm
3. O-ring 9.25 x 1.78
4. Nameplate.

Size 10



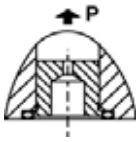
1. Threaded connection X (Y) - G1/4
2. Fixing screws 4 pcs M6x60 to ISO 4762-10.9 (by special order) Required tightening torque Md = 15Nm
3. O-ring 12.42 x 1.78
4. Nameplate.

Required quality of the mating surface.



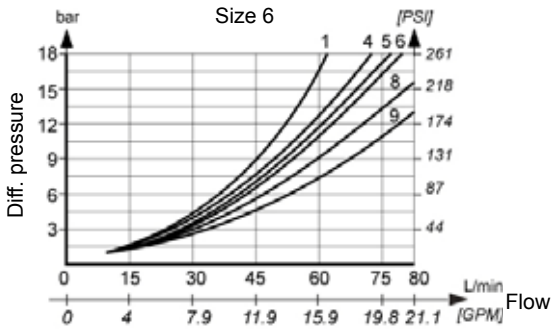
Cartridge throttle

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

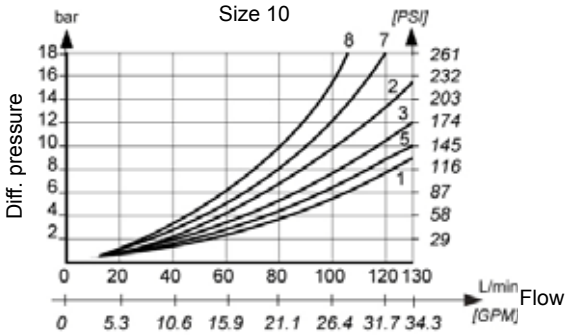


ΔP-Q Performance curves

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



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



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

Model code

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

Number of control spool position

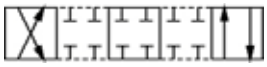
Two positions	**2**
Three positions	**3**

Size

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

Hydraulically operated

Spool types

	**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

Special requirements to be briefly specified

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.]*

2/2 WAY DIRECTIONAL VALVES KV

- NG 6
- Up to 210 *bar [3045 PSI]*
- Up to 30 L/min *[7.9 GPM]*

- Direct in-line mounting.
- Threaded connections to ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Hermetically sealing at closed flow path.
- No STICK-SLIP effect even after a prolonged dwell time under pressure.
- Plug-in solenoid connector to ISO 4400.
- Protection of solenoid IP65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).

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

Operation

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

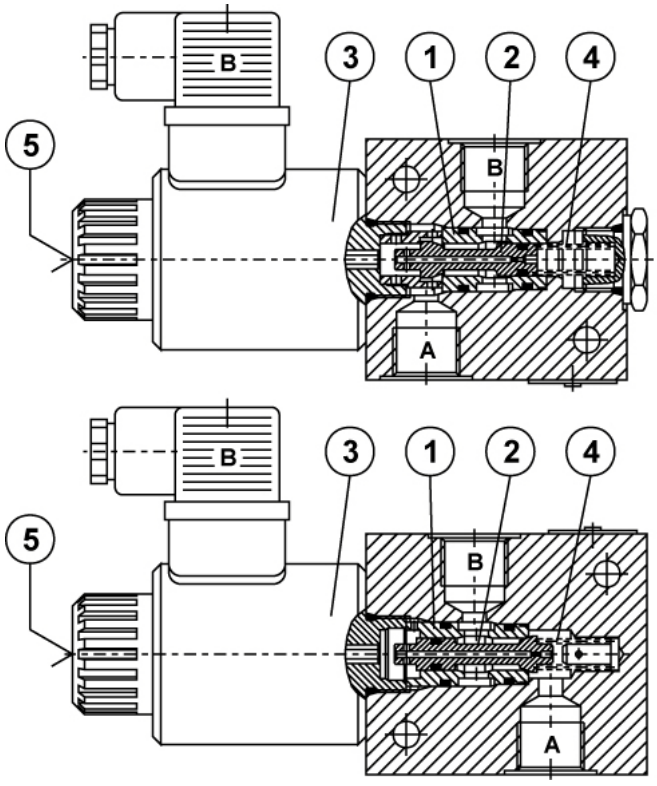
KV-2/2-6-S-A-...

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

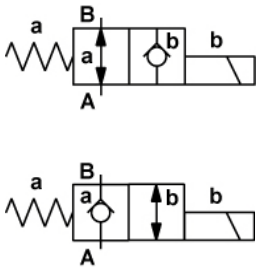
KV-2/2-6-S-B-...

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

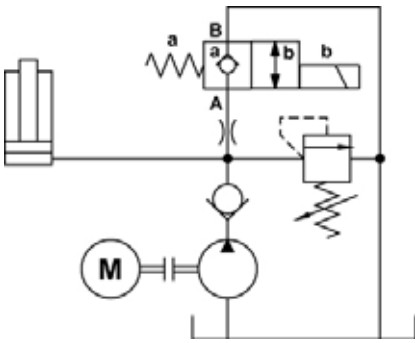
The change-over can also be done manually by pressing theemergency manual override (5).



Hydraulic symbols



Mounting example



Features

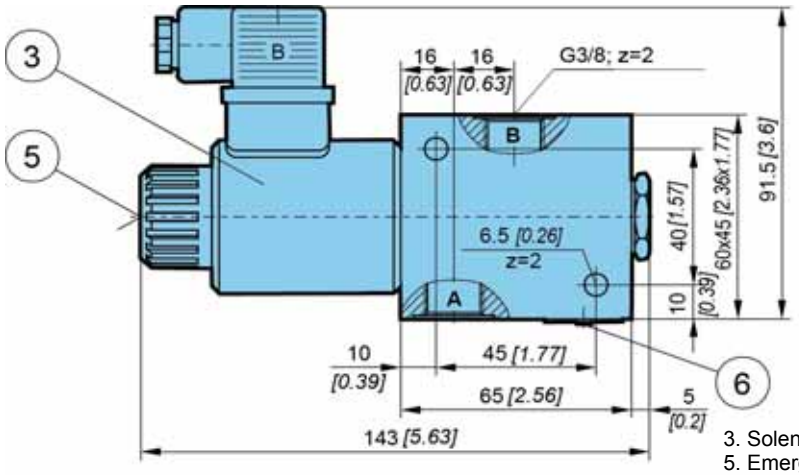
Hydraulic		
Size		6
Flow rate	L/min *[GPM]*	30 *[7,93]*
Operating pressure	bar *[PSI]*	210 *[3045,79]*
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[3.24 to 82]*
Filtration	NAS 1638	8
Mass	kg *[lb]*	2,2 *[4,85]*

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

* 12V supply voltage - 36W

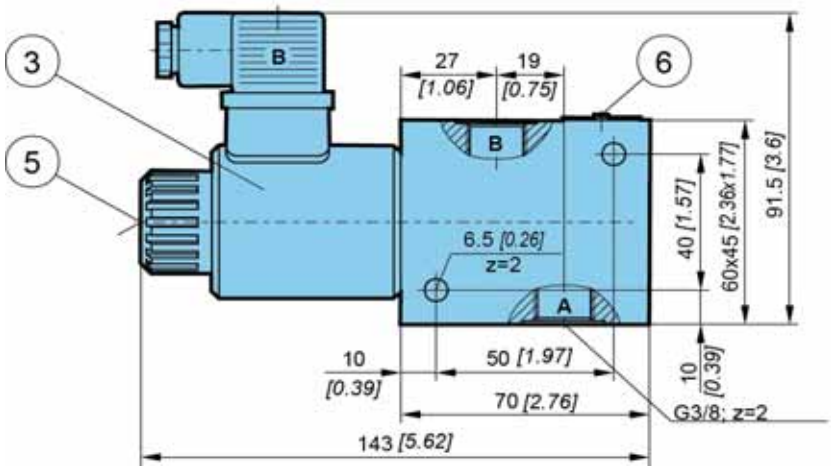
Dimensions

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



3. Solenoid ”b” MR-045.
5. Emergency manual override.
6. Nameplate.

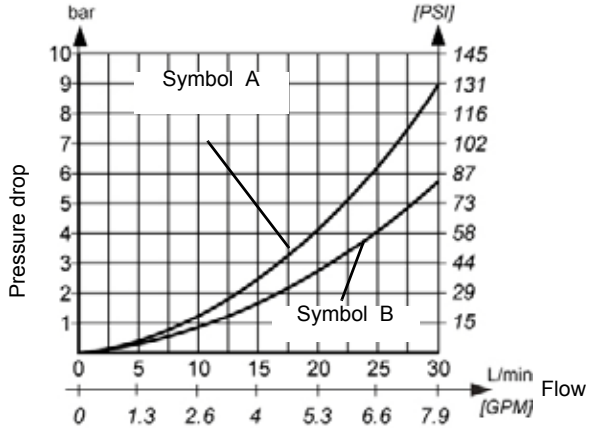
KV-2/2-6-S-B-



ΔP-Q Performance curves

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

Valid for flow direction A to B.



Model code

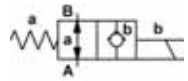
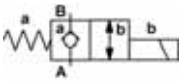
K V - 2 / 2 - 6 - S - □□ - □□□□ - □ - *

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

	**A**
	**B**

Seal type

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

Supply voltage

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

Threaded connections

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

Overvoltage protection

No designation	overvoltage protection
T	With overvoltage protection

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**

3/2 WAY DIRECTIONAL VALVES KVC

- NG 4
- Up to 160 bar *[2 320 PSI]*
- Up to 16 L/min *[4.2 GPM]*

- Plug-in connector for solenoids to ISO 4400.
- Optimized flow paths for low losses of pressure.
- Wet pin solenoid with interchangeable coil.
- Manual emergency control.
- Protection of solenoid IP 65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).

KVC2-3/2-4-47B, 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 *[69.5to 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

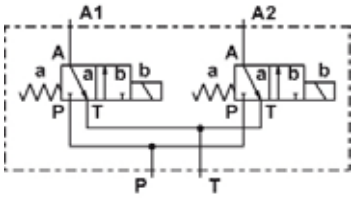
* 12 V supply voltage - 36 W.

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

Hydraulic symbol

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

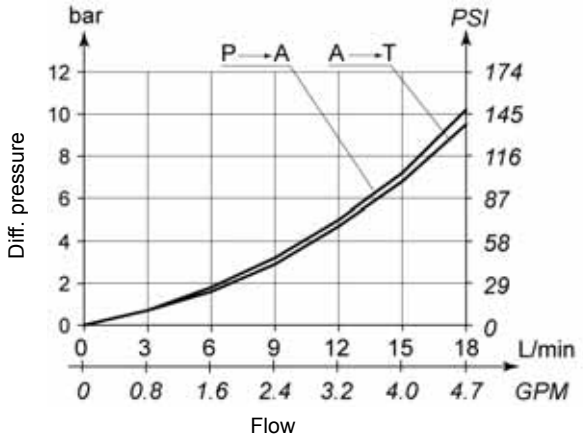
Double: KVC2-3/2-4-47B



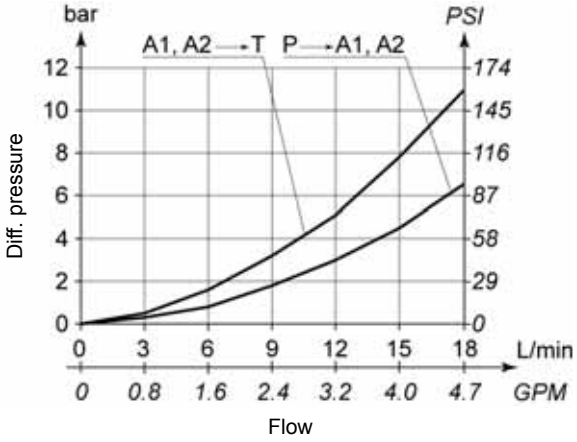
ΔP-Q Performance curves

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

KVC-3/2-4

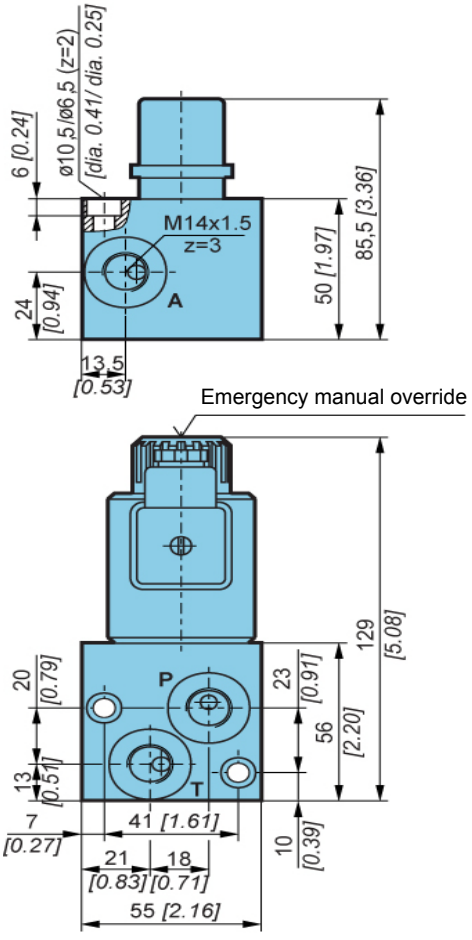


KVC2-3/2-4

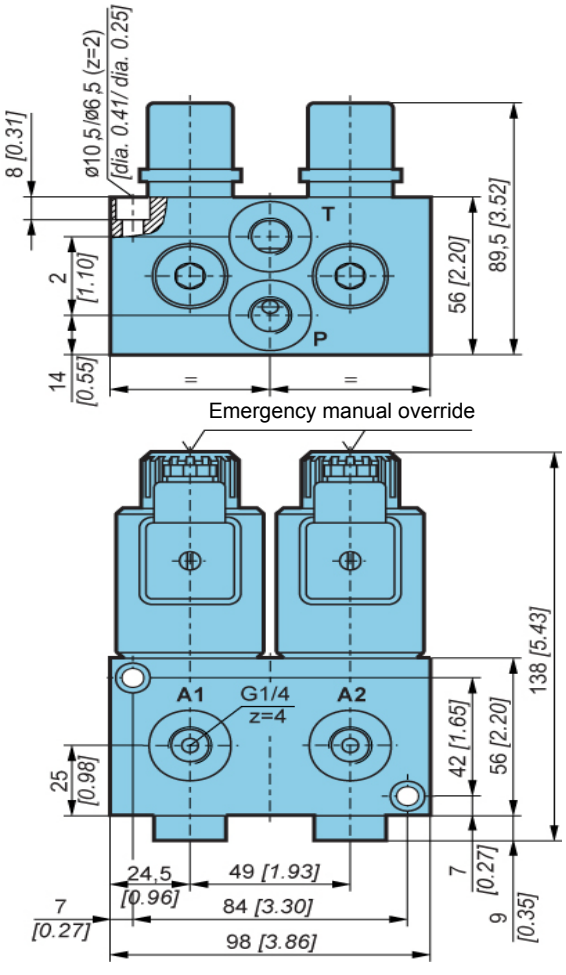


Dimensions

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

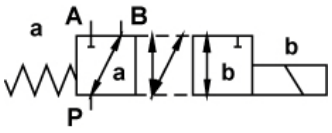
Operation

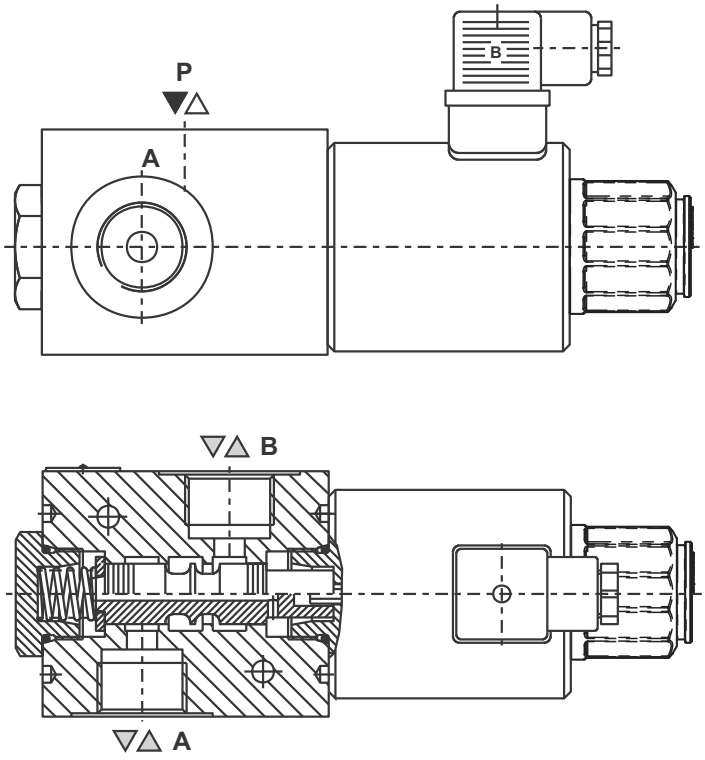
Directional valves type KVC-3/2-10 with direct solenoid operation are used to control the direction of hydraulic fluid flow.
Type KVC-3/2-10 is a reduced version of type KV-6/2. It is used for alternate control of two one-pipe working units (e.g. Plunger) with common, main directional valve.

It is also very proper as bypass valve.

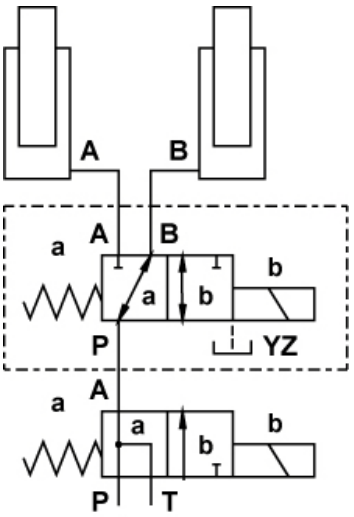
The change-over can also be done manually by pressing the emergency manual override.

Hydraulic symbol





Mounting example

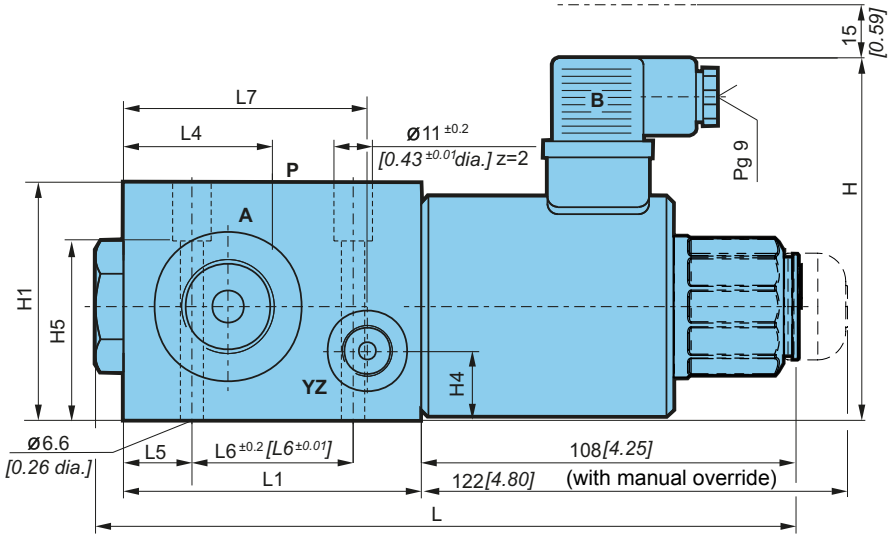


Features

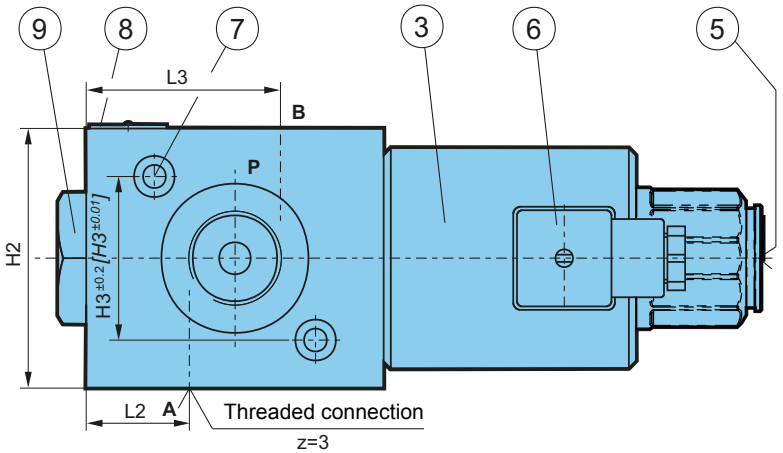
Hydraulic			
Size			**10**
Flow rate	Without drainage	L/min *[GPM]*	60 *[15.8]*
	With drainage		100 *[26.4]*
Operating pressure	Without drainage	bar *[PSI]*	250 *[3 625]*
	With drainage		350 *[5 076]*
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to+158]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[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



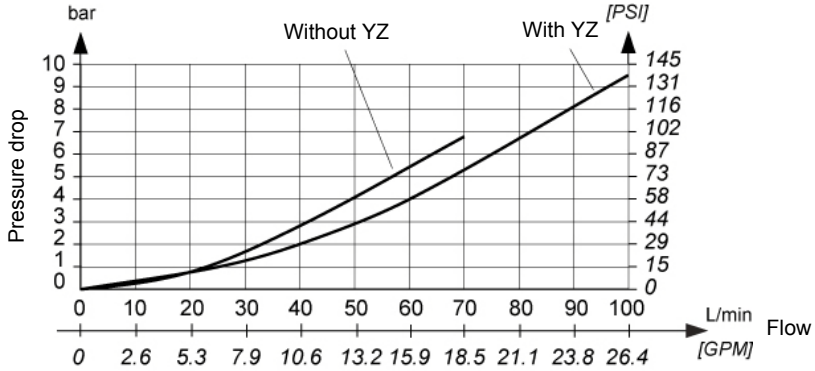
Dimensions	Without YZ	With YZ
L	201 *[7.91]*	210 *[8.27]*
L1	85 *[3.34]*	94 *[3.70]*
L2	29,5 *[1.16]*	31,5 *[1.24]*
L3	55,5 *[2.18]*	62,5 *[2.46]*
L4	42,5 *[1.67]*	47 *[1.85]*
L5	19,5 *[0.76]*	18 *[0.71]*
L6	46 *[1.81]*	40 *[1.57]*
L7	-	79,5 *[3.13]*
H	104 *[4.09]*	105 *[4,13]*
H1	67 *[2.63]*	74 *[2,91]*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

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**

Overvoltage

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

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

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

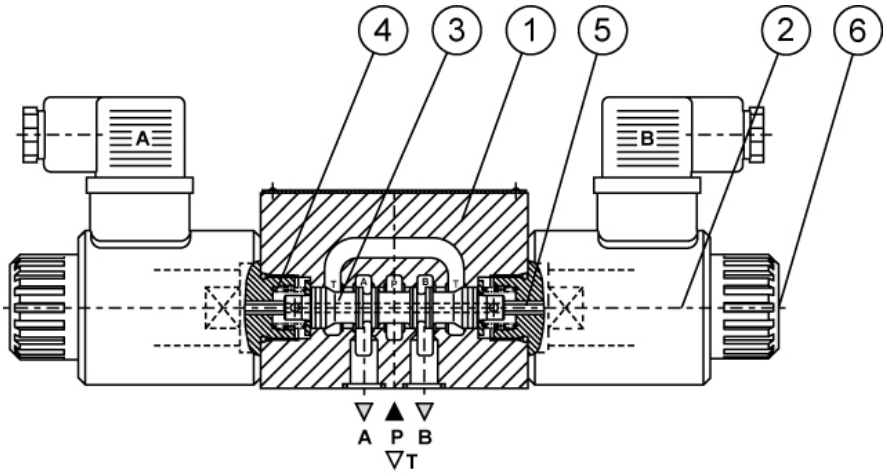
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow.

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).

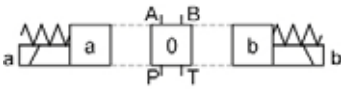
KV-4/2-5KO-6-81

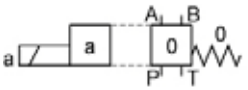
Directional valve with two operating position, two solenoids without springs allow the control spool to be held in the operating position (detent). The control spool remains in the operation position also when the solenoids are de-energized.

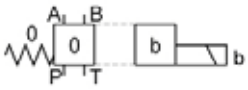


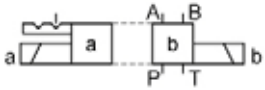
Hydraulic symbols

Spool types









Features

Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	siehe ΔP-Q-Kurven
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

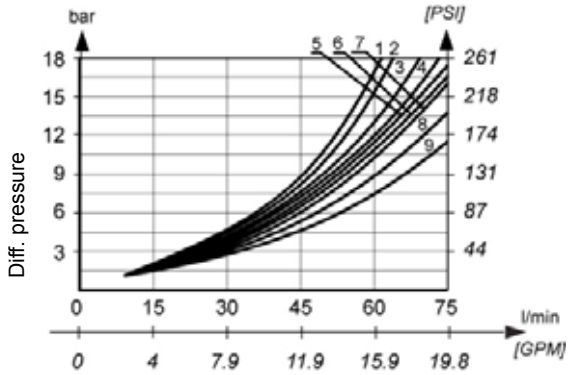
Electrical			
Supply voltage	Direct	V	12, 24, 48
	Alternating		110, 230
Power		W	29 *
Switch-on time**		ms	50 to 80
Switch-off time**		ms	30 to 55
Switching frequency		1/h	15 000
Ambient temperature		°C *[°F]*	to 50 *[122]*
Coil temperature		°C *[°F]*	to180 *[356]*
Duty cycle			Continuous

* 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]*.

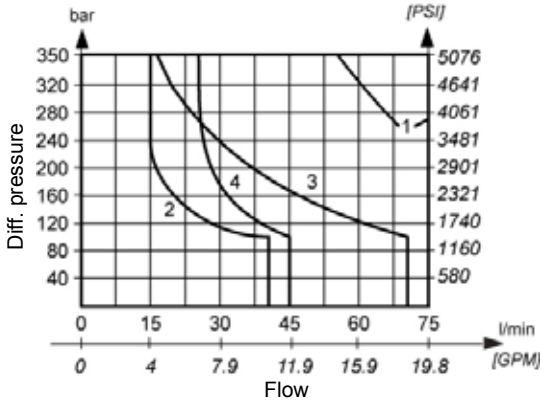


Flow

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

ΔP-Q Operating limits

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



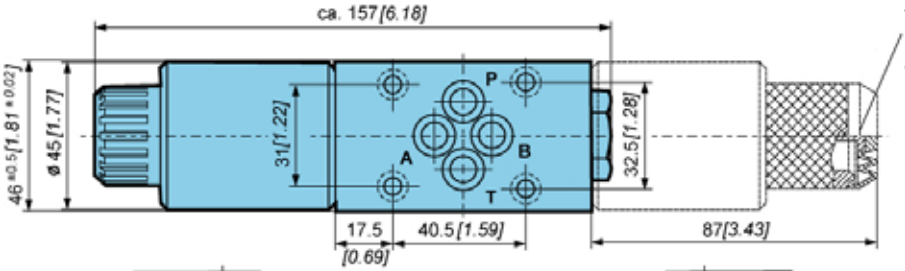
Flow

Spool	Kurve
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.

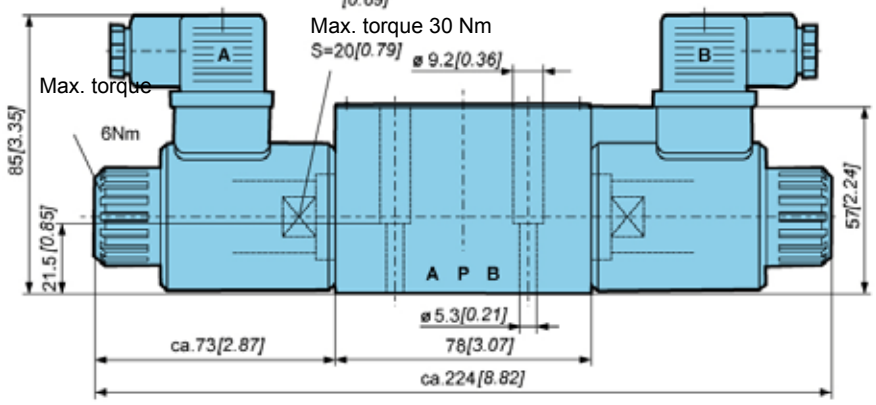
Note: For valves with adjustment of the switching time reduced values of the operating limits may result.

Dimensions



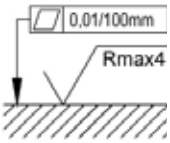
With hand operation - add letter G before spool type in ordering code.

KV-4/2-5KO-6

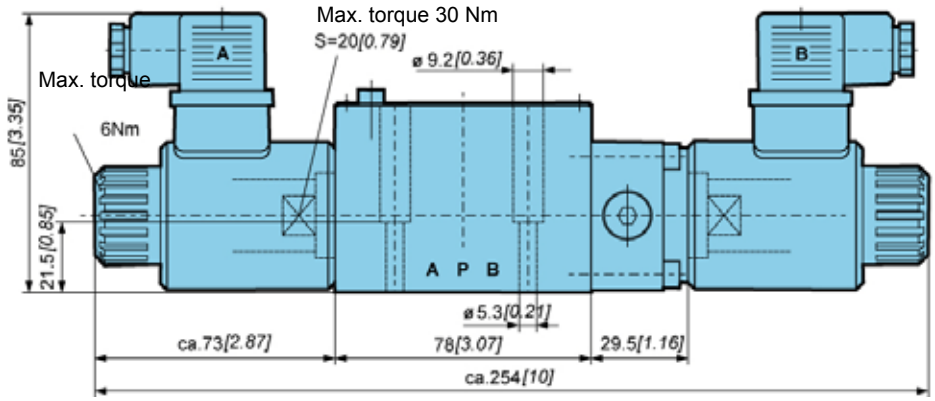


Connection diagram and connecting dimensions to ISO 4401.

KV-4/3-5KO-6



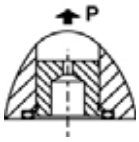
Required quality of the mating surface.



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

Cartridge throttle

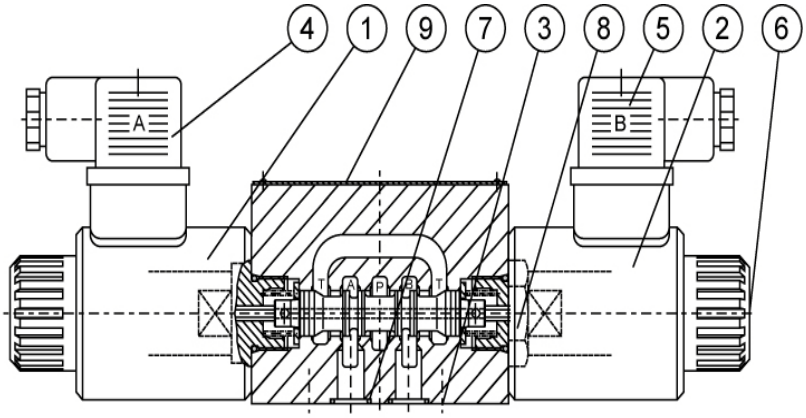
If flow rates greater than permissible occur during change-over, a cartridge throttle must be fitted into P-line of the directional valve.



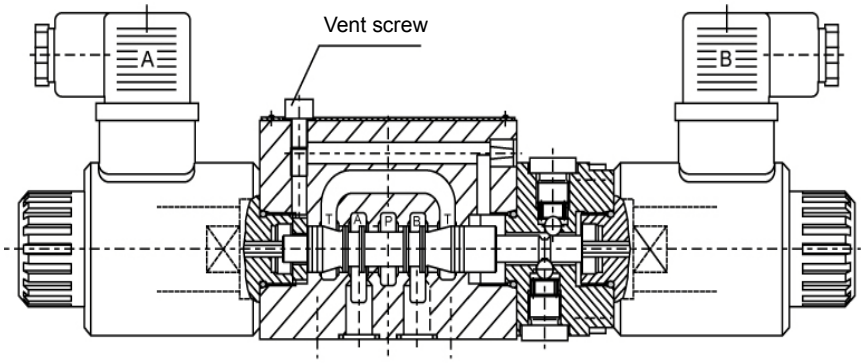
Installation

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.

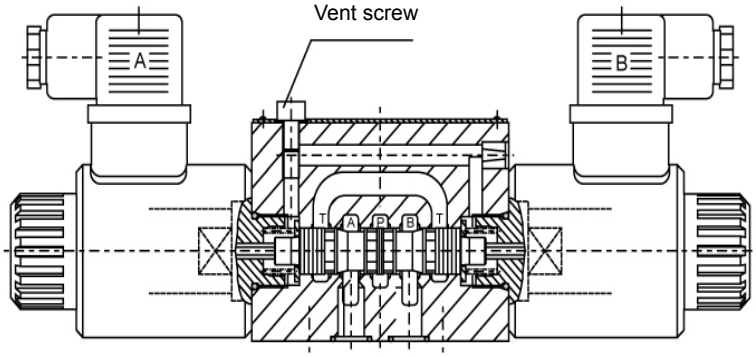
Function drawing



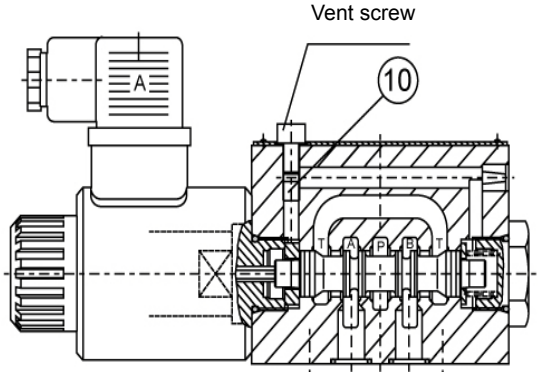
KV-4/3-5KO-6
(KV-4/2-5KO-6)



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



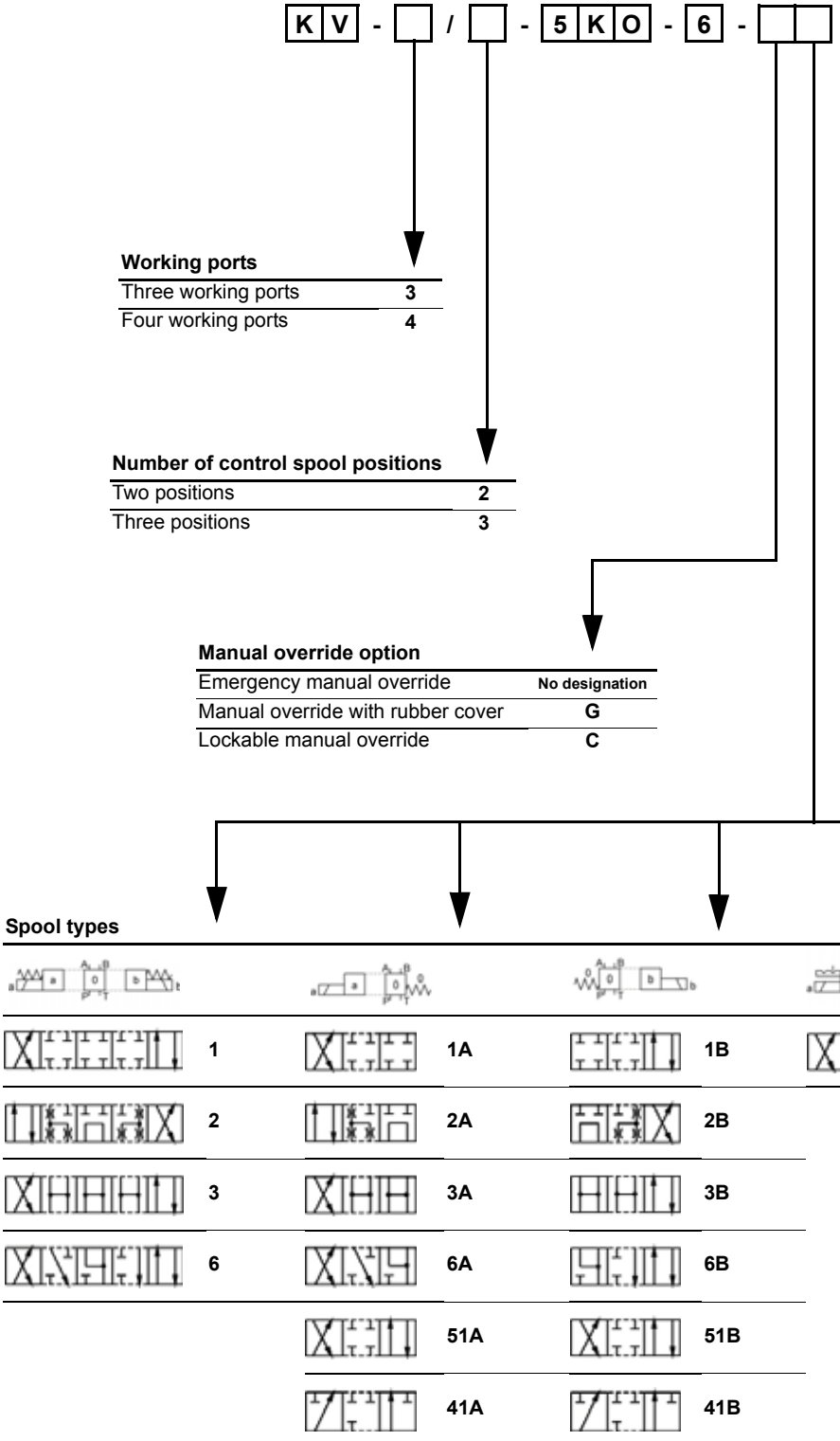
KV-4/3-5KO-6-2



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



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

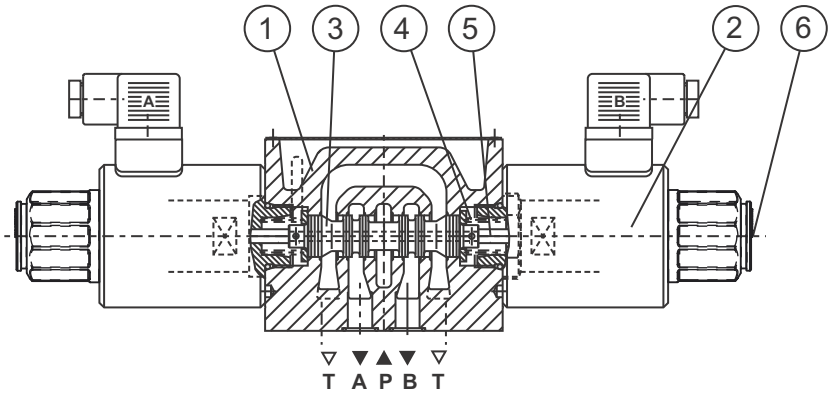
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow.

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).

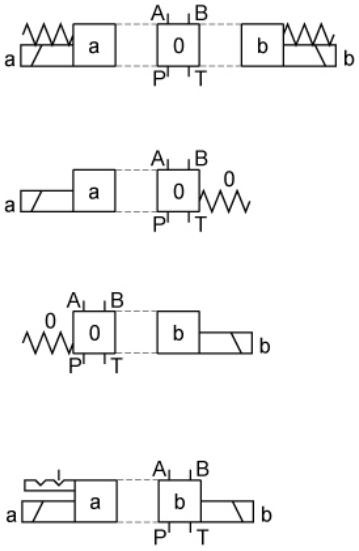
KV-4/2-5KO-10-81

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

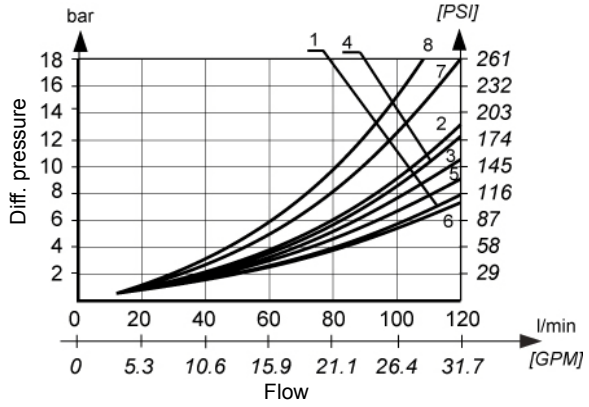
Hydraulic			
Size			**10**
Flow rate		L/min *[GPM]*	see ΔP-Q curves
Operating pressure	Ports A, B, P	bar *[PSI]*	350 *[5 076]*
	Port T	bar *[PSI]*	250 *[3 625]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[69.5 to 1 760]*
Oil temperature range		°C *[°F]*	-20 to+70 *[-4 to 158]*
Filtration		NAS 1638	8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

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

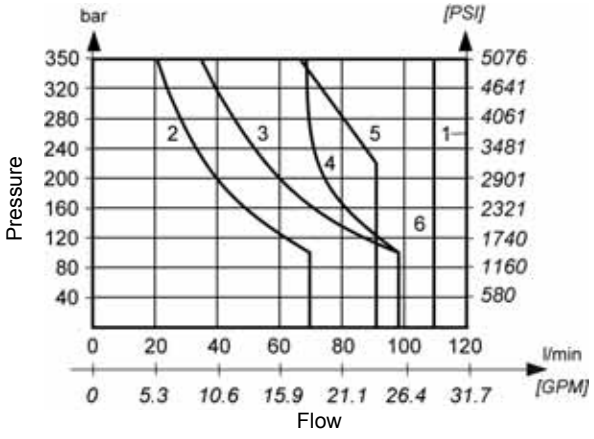
Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.



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

ΔP-Q Operating limits

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

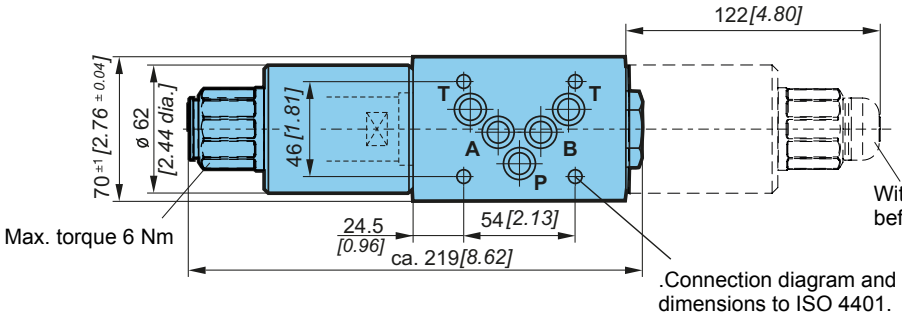


Spool	curve
1	1
2	4
3	5
6	3
9	6
81	1
51A, 51B	1
41A, 41B	2

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.

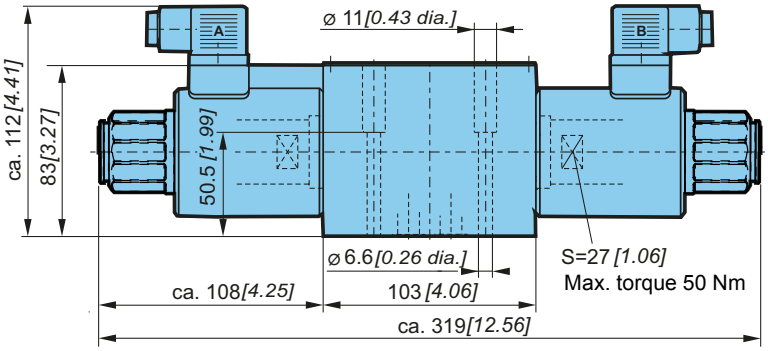
Dimensions



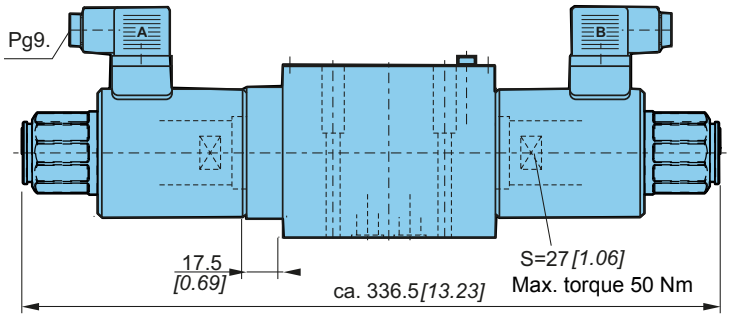
KV-4/2-5KO-10

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

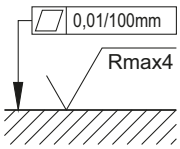
.Connection diagram and connecting dimensions to ISO 4401.



KV-4/3-5KO-10



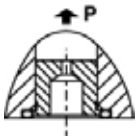
KV-4/2-5KO-10-81



Required quality of the mating surface.

Cartridge throttle

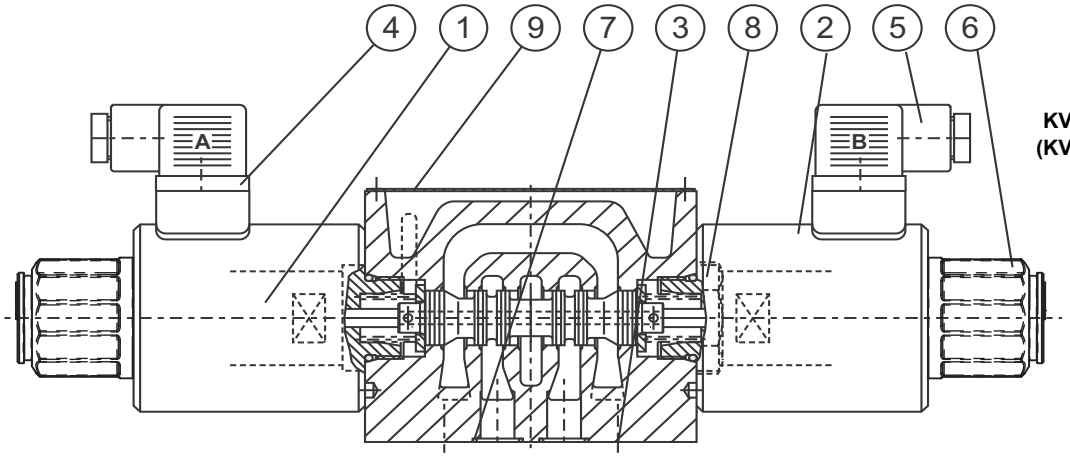
If flow rates greater than permissible occur during change-over, a cartridge throttle must be fitted into P-line of the directional valve.



Installation

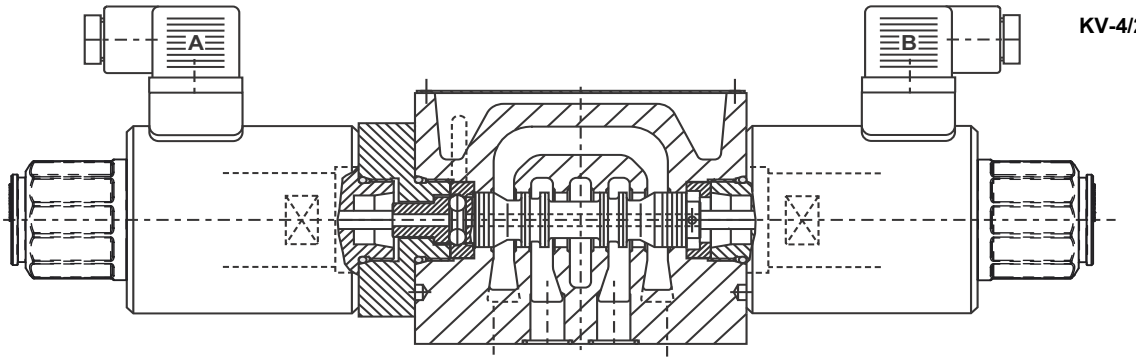
The directional control valve must be installed horizontally (Nameplate on top). If this is not the case, the valve must be removed for venting. Unscrew the vent screw. Move the spool alternately to the switching positions a and b until no more bubbles appear at the screw hole. The oil must be visible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

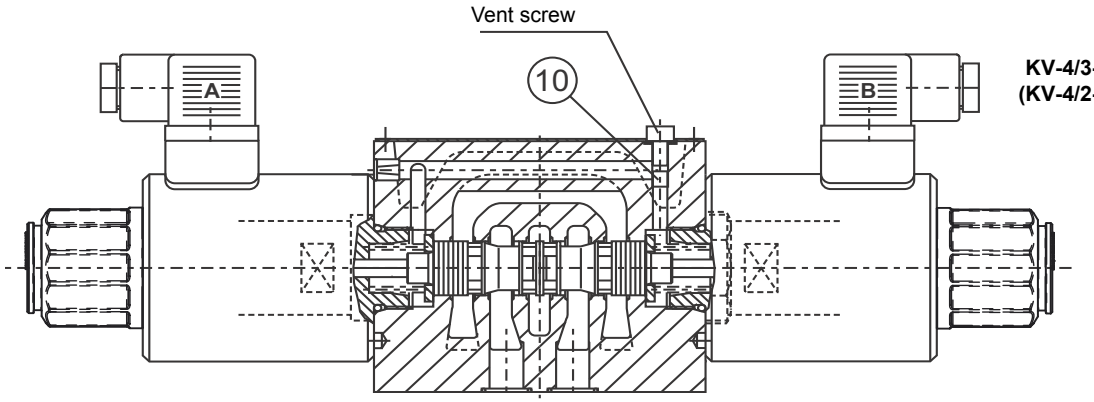


KV-4/3-5KO-10
(KV-4/2-5KO-10)

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 VALVES TYPE KV

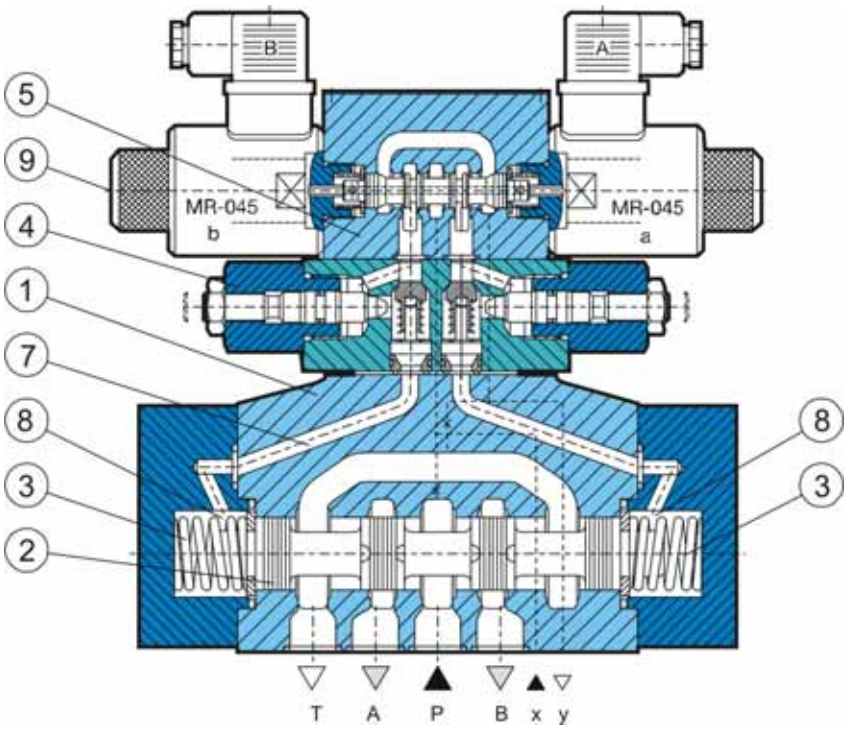
- NG 16
- To 350 bar *[5 076 PSI]*
- To 300 L/min *[79 GPM]*

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

KV-4/3-16-

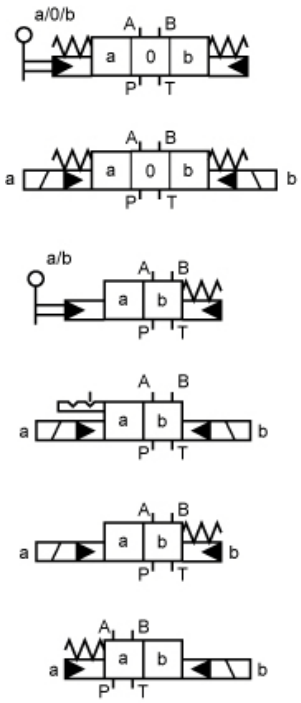
Operation

Directional valves type KV with indirect, solenoid-hydraulic operation control the hydraulic fluid flow direction.
These valves consist of the main valve (1), a control spool (2), two return springs (3) in 4/3-way valves and none in 4/2-way valves, a double throttle check/valve (4) and a pilot valve (5).
The pilot valve (5) is connected with the pressure chambers (8) via the pilot line (7).
Feeding of the pilot valve oil is either or external (via the port "x"). Change-over of the control spool to one of the operating position is activated by the introduction of oil via the pilot valve (5) into one of the pressure chambers (8). A pressure rise in chambers provokes the movement of the control spool (2). Suitable links between ports A,B,P,T according to spool types are established as set forth in the table.
When the solenoid of the pilot valve (5) are de-energized a link between the pressure chamber (8) and the return line "y" for the pilot oil discharge is established. A pressure drop in the chamber actuates the main valve return spring (3) which automatically return the control spool to the neutral position.
Dischange of the return pilot oil from the pressure chambers is either internal or external (via the port "y").
Manual change-over of the main valve is also possible by pressing the emergency manual override (9).
Indirect directional valves can also be provided with a manual pilot valve. These valves are manually operated by moving the operating lever.



Hydraulic symbols

Spool types



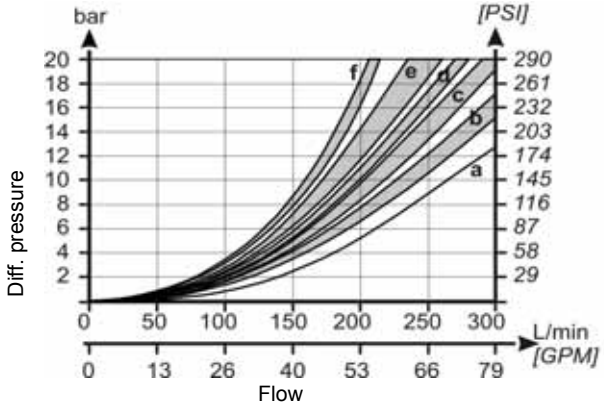
Features

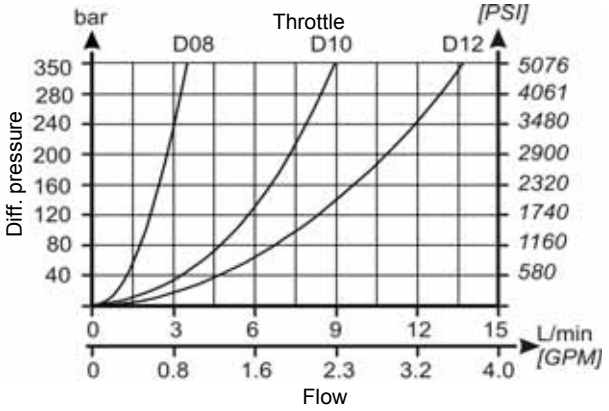
Flow rate	l/min *[GPM]*		300 *[79.2]*
Operating pressure	bar*[PSI]*	Ports A, B, P	350 *[5076.3]*
		Port T	250 *[3625.9]*
Pilot oil pressure (x-external)	bar *[PSI]*		50-250 *[725.2-3625.9]*
Pilot oil pressure (x-internal) **Pre-load valve is fitted into P-port of the main valve** **Without Pre-load valve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

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

ΔP-Q Performance curves

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



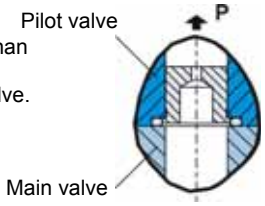


Spool type	P-A	P-B	A-T	B-T	P-T
1, R1, 51B, 51A, F51, R51	e	e	e	f	-
2, R2	a	b	c	e	f
3, R3	b	b	c	d	-
4, R4	b	c	c	e	-
5, R5	b	c	c	e	-
6, R6	b	c	d	e	-

See Model Code for spool type choice.

Cartridge throttle

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



Pre-load valve

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

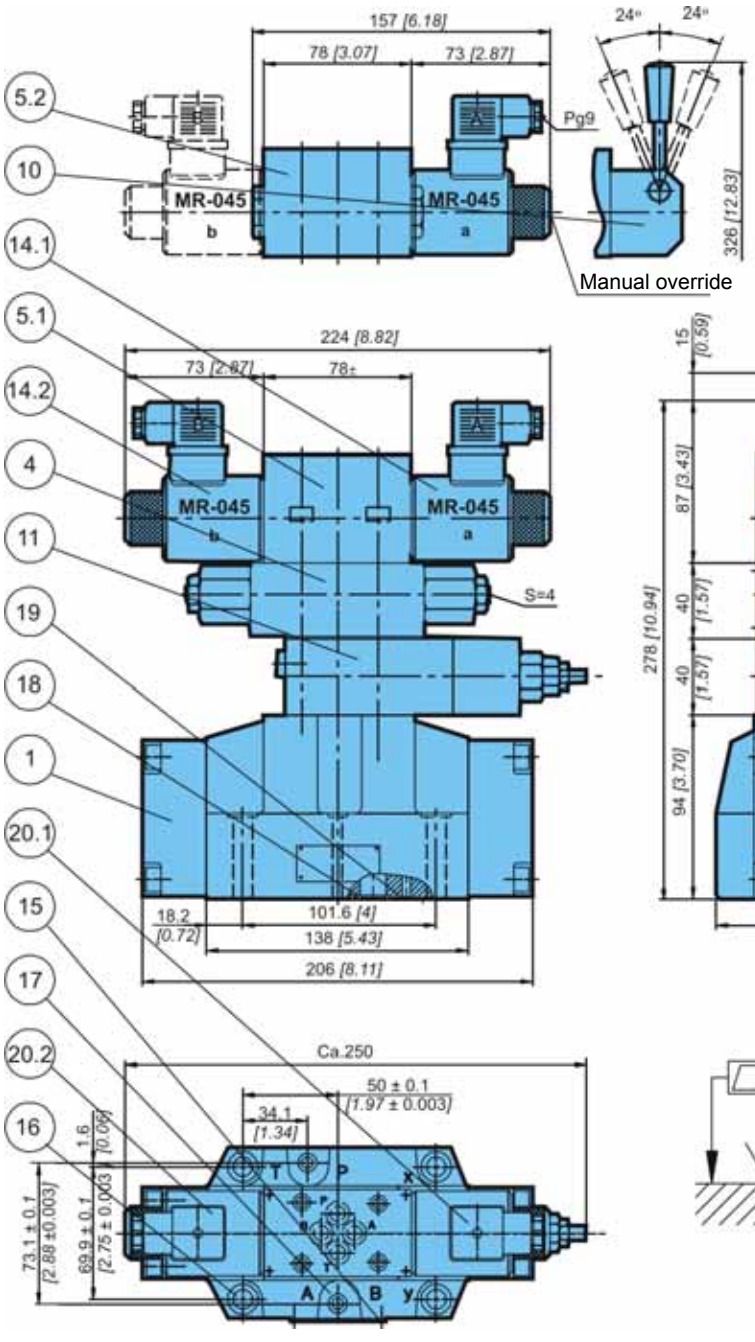
Pressure reducing valve

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

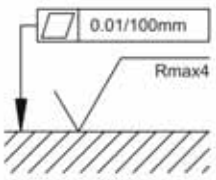
Throttle check valve

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

Dimensions



1. Main valve
4. Throttle / check valve
5.1 4/3 pilot valve
5.2 4/2 pilot valve
10. Control mechanism
11. Pressure reducing valve
14.1 Solenoid "a" MR-045
14.2 Solenoid "b" MR-045
15. Nameplate
16. Fixing screws: 4 pcs M10x60 to ISO 4762 -10.9 tightening torque Md = 64 Nm
17. Fixing screws: 2 pcs M6x55 to ISO 4762 -10.9 tightening torque Md = 14 Nm
18. O-ring ports P,A,B,T 22,22 x 2,62
19. O-ring ports X,Y, 10x2
20.1 Plug-in connector "a" grey
20.2 Plug-in connector "b" black
21. Connecting dimmensions to ISO 4401



Required quality of the mating surface.

Model code

K V - 4 / ☐ 1 6 - ☐ - ☐ - ☐

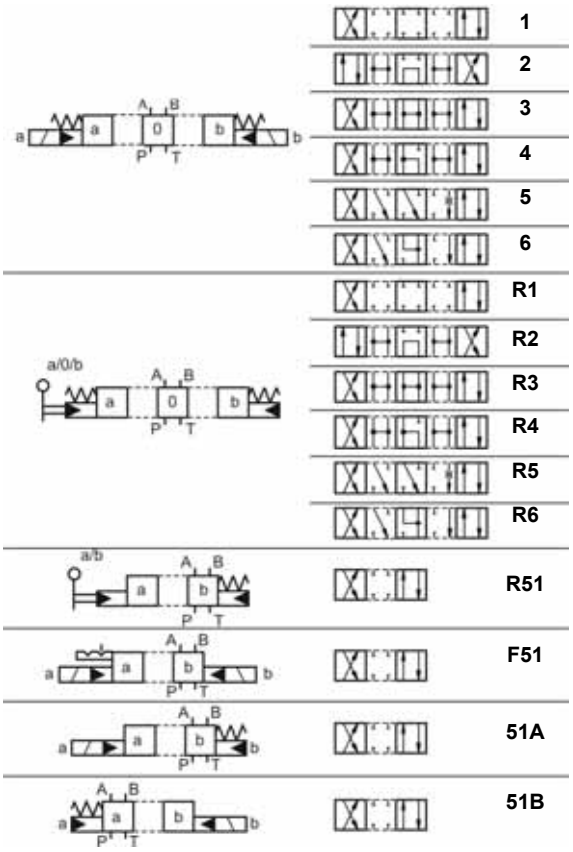
Number of control spool positions

Two positions	2
Three positions	3

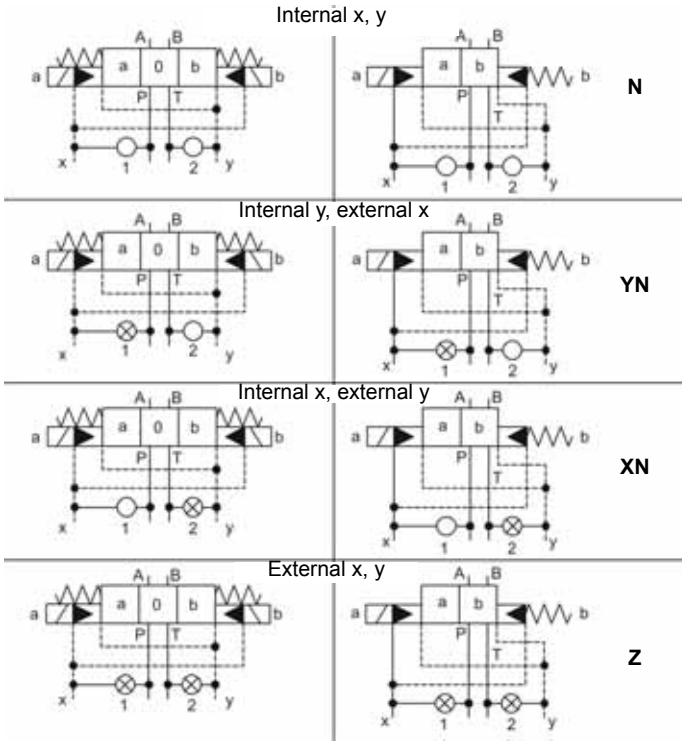
Manual override option

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

Spool types



Pilot oil supply and discharge



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

- ☐☐☐ - ☐☐☐ - ☐ - ☐*

Supply voltage

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

- Alternating voltage solenoids are fitted with a bridge rectifier.
- With solenoids of over 48 V an earthing clamp (⏚) to DIN EN 175301-8003 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

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

Pilot oil control with a double throttle valve

Without a double throttle valve	**No designation**
With a double throttle valve	**H**

Pilot oil control with pressure reducing valve

Without pressure reducing valve	**No designation**
With pressure reducing valve	**RT**

Pre-load valve

Without pre-load valve	**No designation**
With pre-load valve	**V**

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

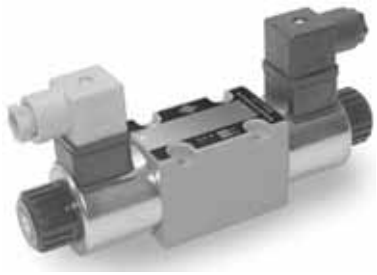
NBR seals for mineral oil HL,HLP to DIN 51524	**No designation**
FPM seals for HETG, HEES, HEPG to VDMA 24568 and ISO 15380	**E**

Special requirements to be briefly specified

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

- NG 6
- Up to 250 bar *[5 625 PSI]*
- Up to 40 L/min *[10.6 GPM]*[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

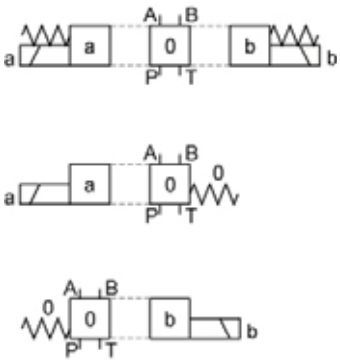
Directional valves type KV-3KO with direct solenoid operation control the direction of the hydraulic medium flow.

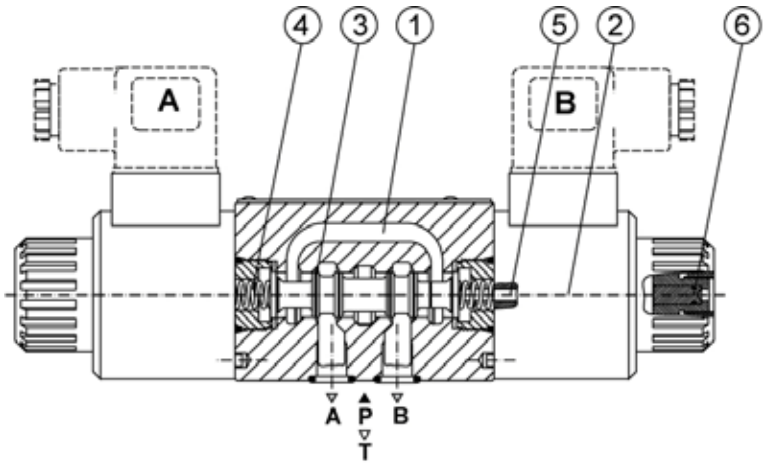
These directional valves consist of a housing (1), a control spool (3), and one solenoid (2) with two return springs (4) in 4/2-way directional valves, and two solenoids (2) with two return springs (4) in 4/3-way directional valves. In 4/3-way directional valves the centre position of the control spool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

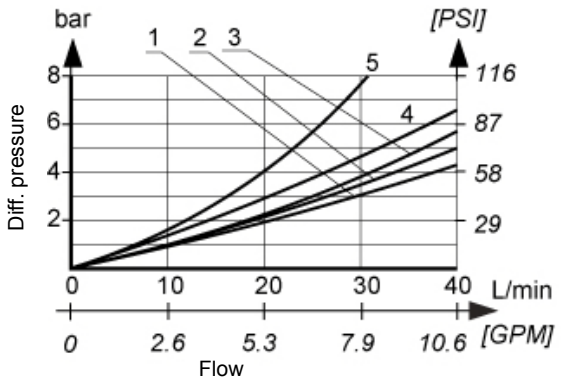
Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	see ΔP-Q curves
Operating pressure	Ports A, B, P	bar *[PSI]*	250 *[3 625]*
	PortT	bar *[PSI]*	
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[69.5 to 1 760]*
Oil temperature range		°C *[°F]*	-20 to +70*[-4 to 158]*
Filtration		NAS 1638	8
Mass	4/2	kg *[lb]*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

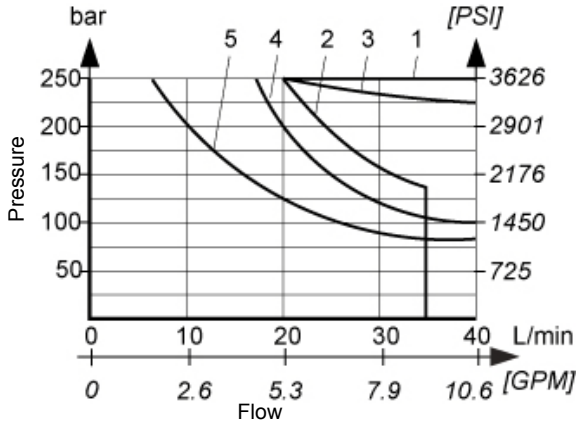
Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.



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]*.

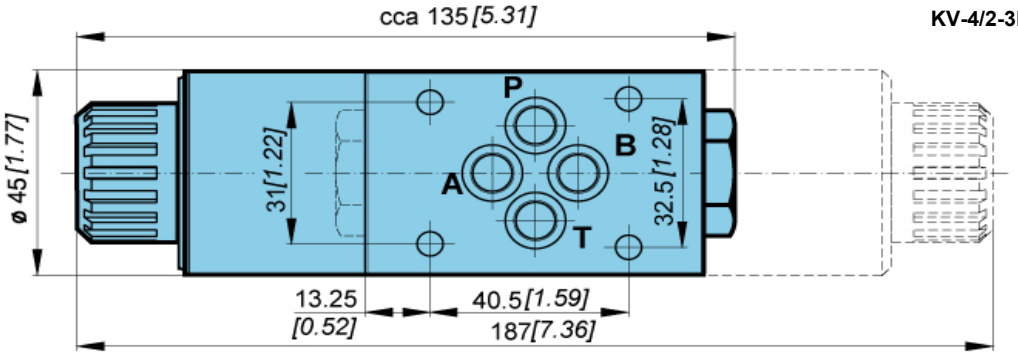


Spool	curve
1	1
2	2
3	3
6	4
51A, 51B	1
41A, 41B	5

Dimensions

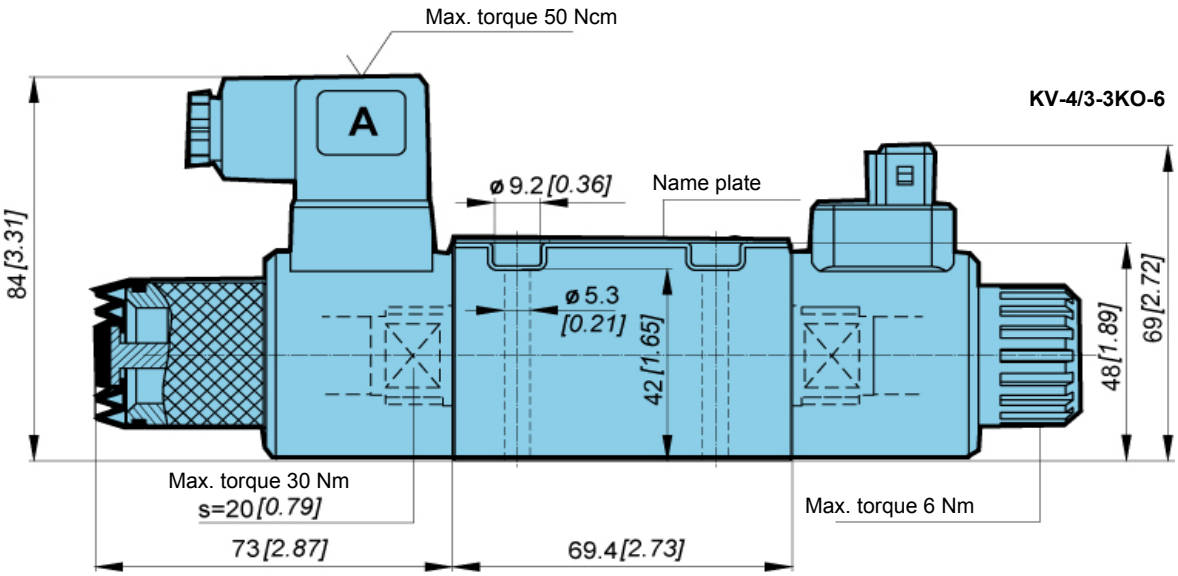
Connection diagram and connecting dimensions to ISO 4401.

KV-4/2-3KO-6



Option: Plug-in connector to ISO 4400

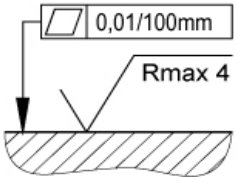
Option: AMP JUNIOR connector



KV-4/3-3KO-6

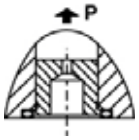
4 x Fixing screws M5x50 to ISO 4762- 10.9 must be ordered separately.
Required tightening torque Md= 7Nm.

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

K V - ☐ / ☐ - 3 K O - 6 - ☐☐

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]*

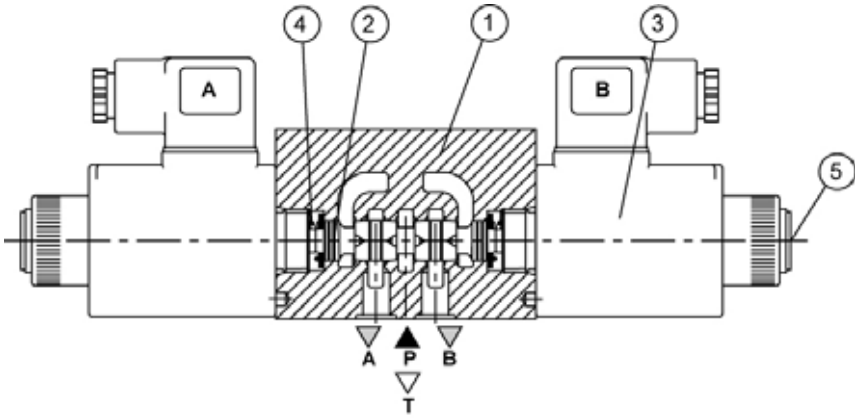
• Plug-in connector for solenoids to ISO 4400.Connection diagram and connection dimensions to ISO 4401.
• 5 chamber models with good spool guidance.Optional control electronics: Amplifier P/N: 1659574.
• Protection of solenoid IP 65 to EN 60529 / IEC 60529.
• Fulfil EMC (89/336/EEC).

KVP-4/3-5KO-6

Operation

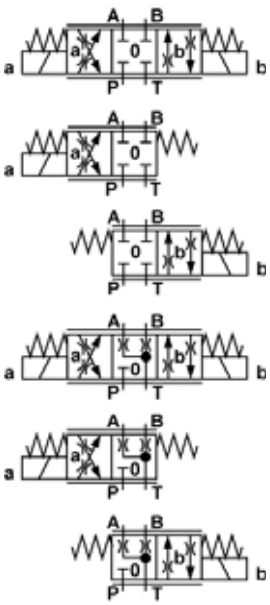
The KVP directional control valve is a proportional valve providing variable flow rates. This valve is used with control electronics. Typical applications are soft switching via adjustable ramps for the reduction of hydraulic and mechanical shocks, and electrically adjustable flow rates - speeds for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

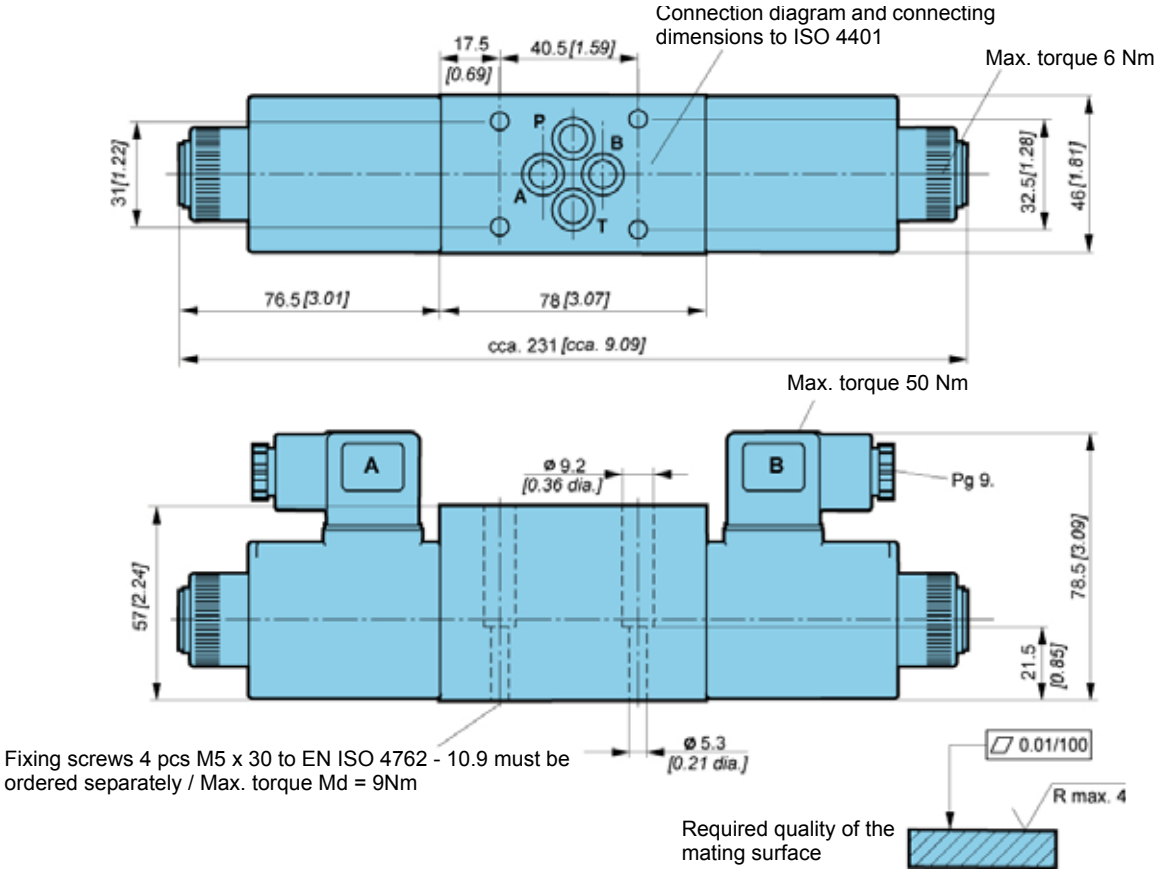
Spool type



Features

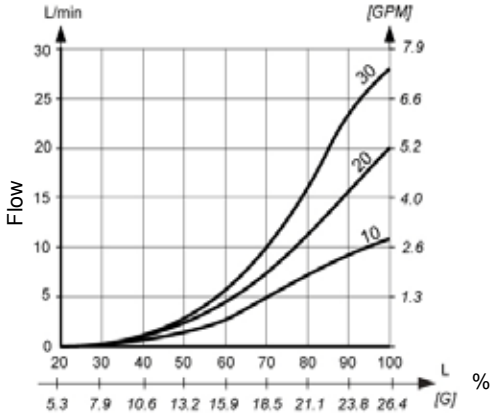
Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	10, 20, 30 *[2.6 - 5.2 - 7.9]*
Operating pressure	A, B, P	bar *[PSI]*	350 *[5 076]*
	T		250 *[3 625]*
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to +158]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[3.24to82]*
Mounting position			Optional
Mass	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



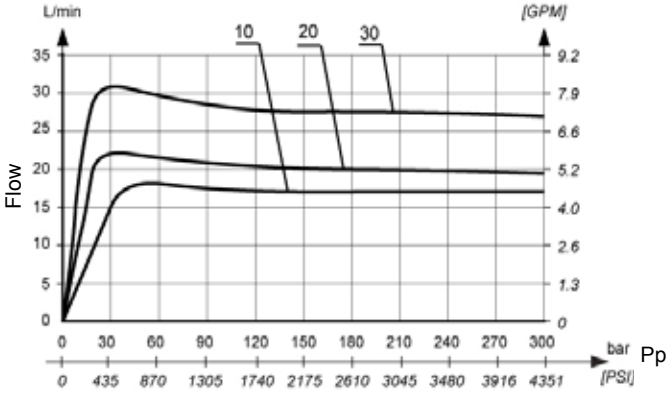
Input signal curves / Flow rate

Measured at 40°C *[104°F]* and viscosity of 32 mm^2/s.
ΔP=5 bar *[72.5PSI]* P-A or P-B



Power limits transmitted

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



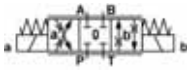
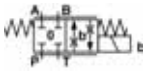
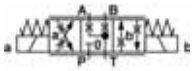
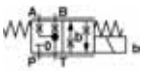
Model code

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

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**

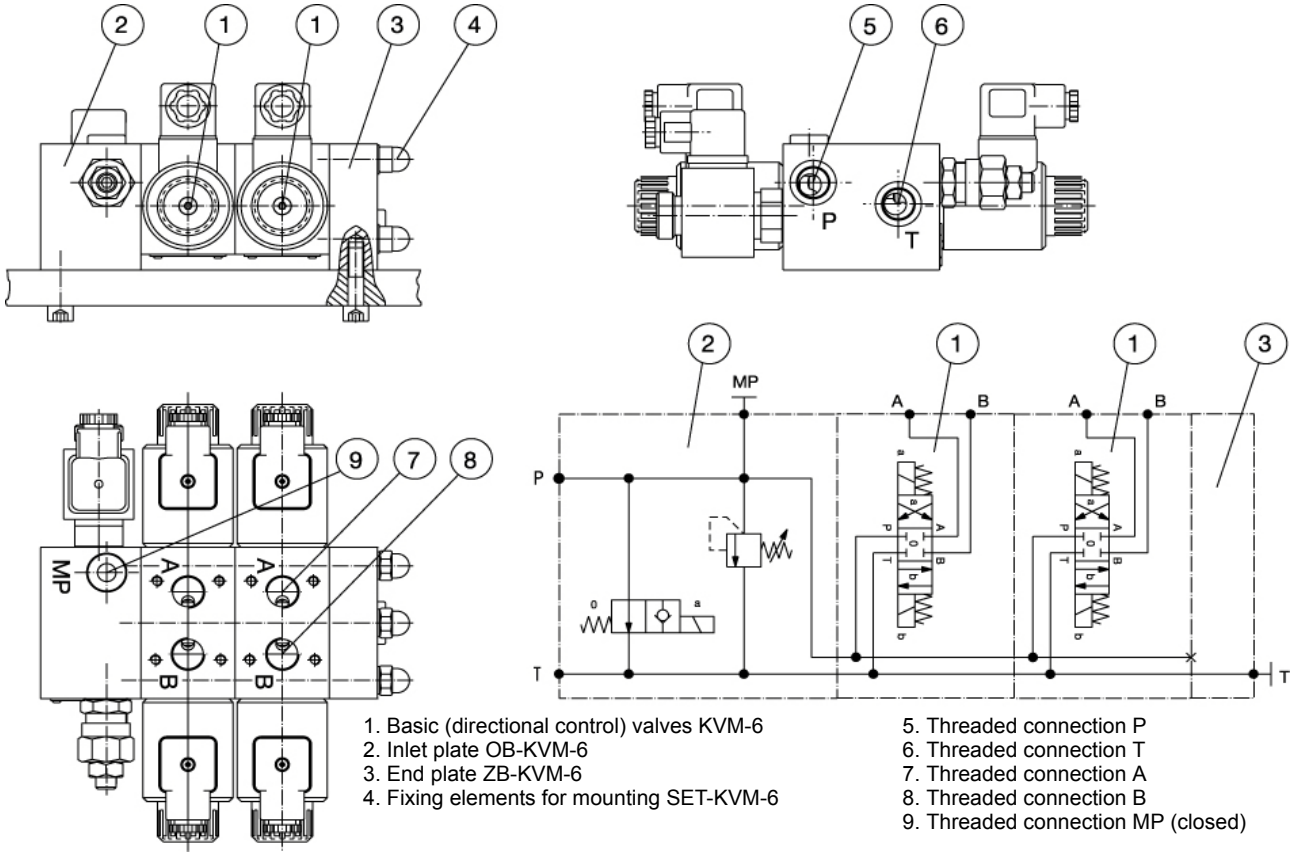
4/2, 4/3 WAY BANKABLE DIRECTIONAL VALVES KVM

- NG 6
- Up to 350 bar *[4 568 PSI]*
- Up to 40 L/min *[10 GPM]*

- Threaded connection to ISO 9974 (Metric), ISO1179 (BSPP/Gas).
- Series or parallel connections.
- Inlet plate 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

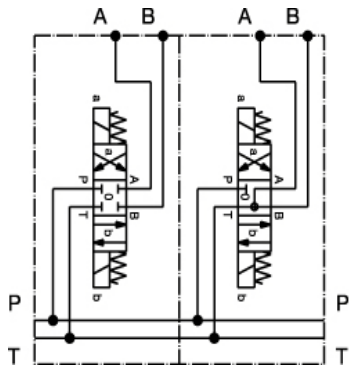
Basic concept



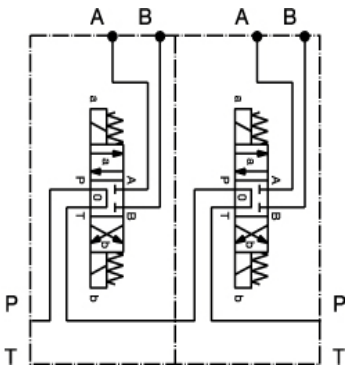
1. Basic (directional control) valves KVM-6
2. Inlet plate OB-KVM-6
3. End plate ZB-KVM-6
4. Fixing elements for mounting SET-KVM-6
5. Threaded connection P
6. Threaded connection T
7. Threaded connection A
8. Threaded connection B
9. Threaded connection MP (closed)

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]*

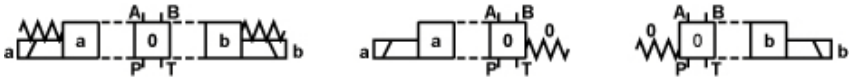
- Parallel or series connection.
- Plug-in connection for solenoids to ISO 4400.
- 5-chamber model with good spool guidance.
- Wet pin solenoid with interchangeable coil.
- Manual emergency control.
- Protection of solenoid IP 65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).
- Threaded connections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

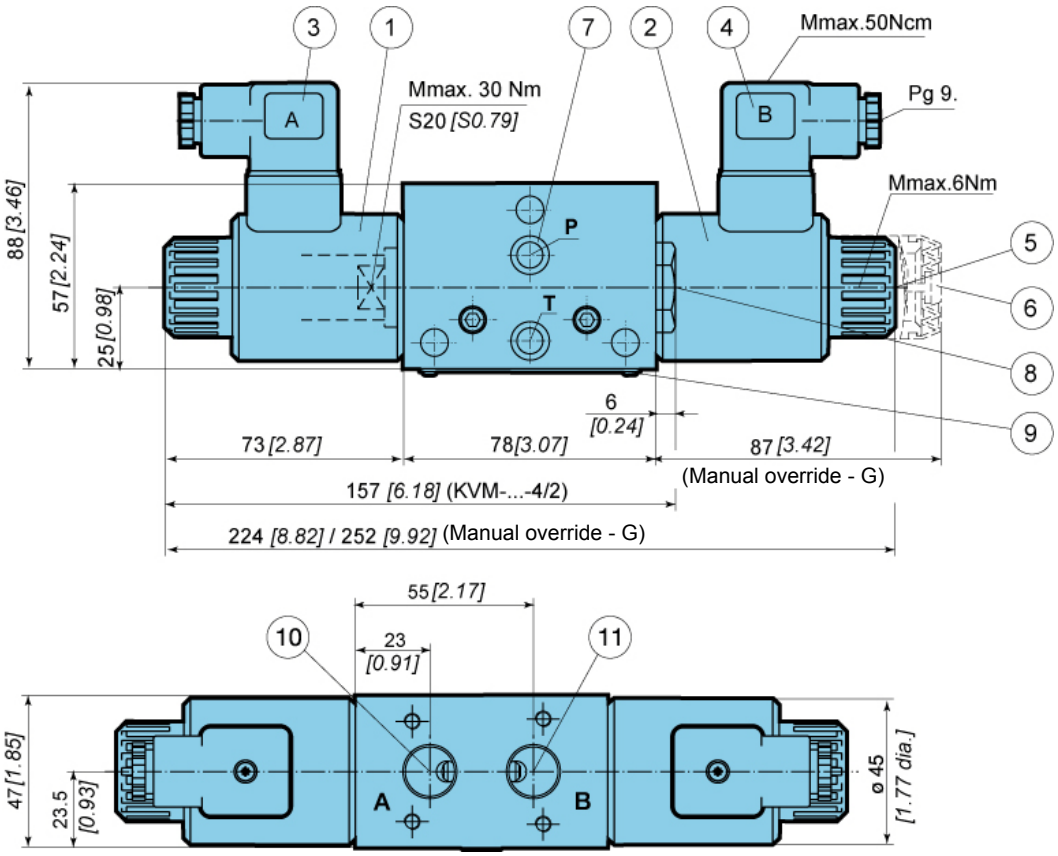
Hydraulic

			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

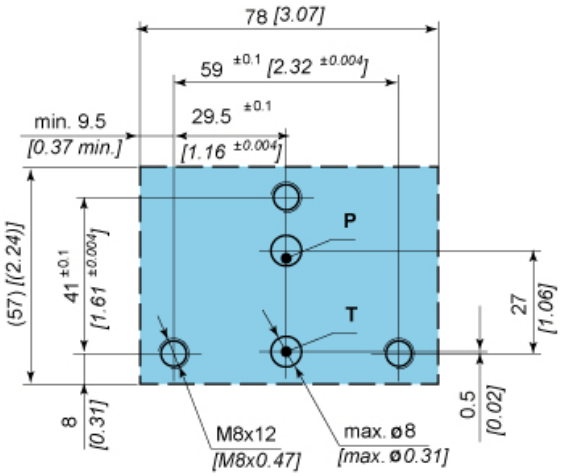
Supply voltage		V	12, 24 DC
Power		W	29
	(12 V DC supply voltage)		36
Switching frequency		1/h	15 000
Ambiant temperature		°C *[°F]*	to +50 *[to +122]*
Coil temperature		°C *[°F]*	to +180 *[to +356]*
Duty cycle			Continuous

Dimensions

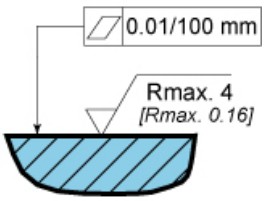


1. Solenoid ”a” / MR-045-O
2. Solenoid ”b” / MR-045-O
3. Plug-in connector «a» -grey
4. Plug-in connector «b» -black
5. Emergency manual override
6. Manual override with rubber (G)
7. O-ring 9,25 x 1,78
8. Valve cap (KVM-...-4/2)
9. Nameplate
10. Threaded connection A-M torque = max. 100 Nm
11. Threaded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

Connection dimensions for KVM-6



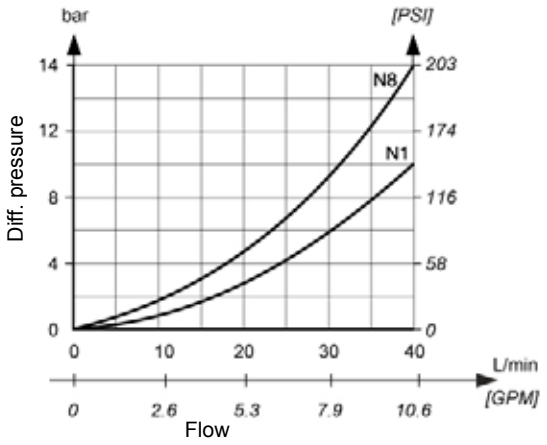
Required quality of the mating surface



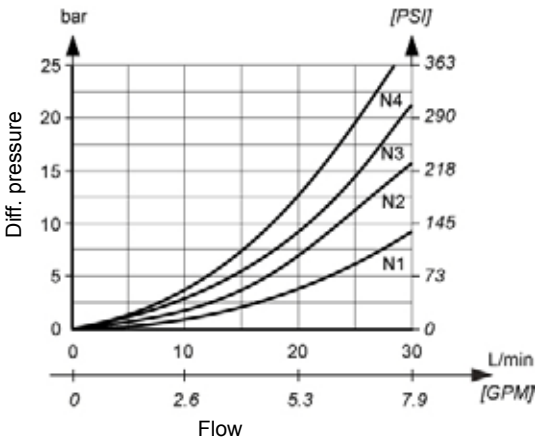
ΔP-Q Performance curves

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

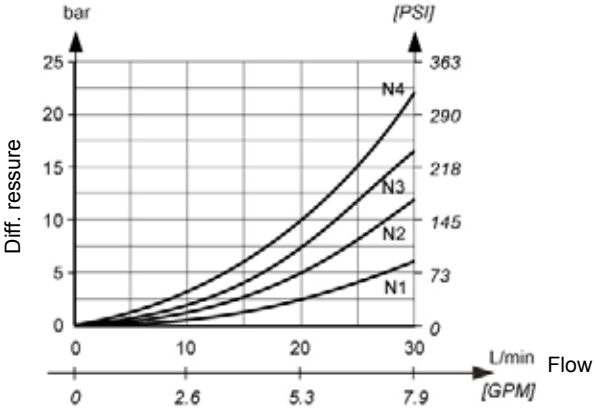
Parallel connection -KVM-P (N1 to N8)

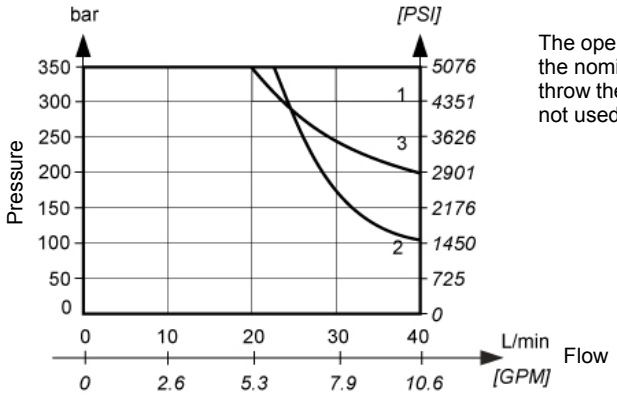


.Series connection -KVM-S (P to T).



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**

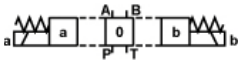
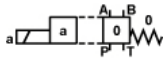
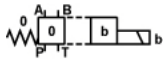
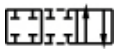
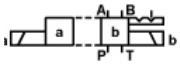
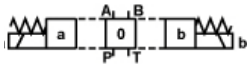
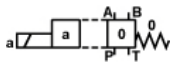
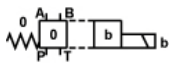
Number of control spool positions

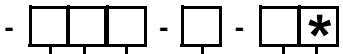
Two positions	**2**
Three positions	**3**

Manual override option

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

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 ON VALVES KVM

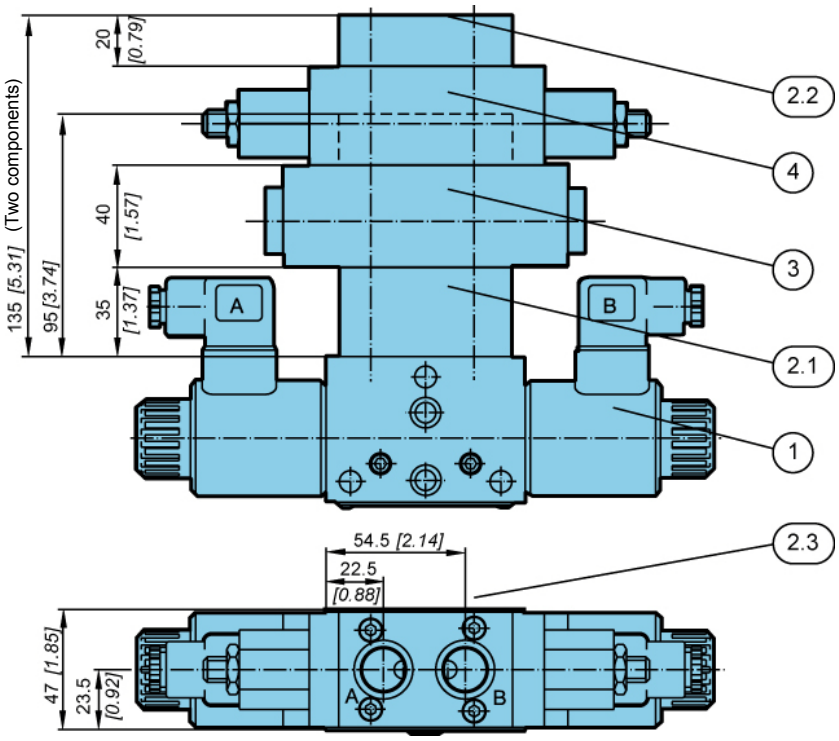
- NG 6
- Up to 350 bar *[5076 PSI]*
- Up to 40l/min *[10,57 GPM]*

- 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)

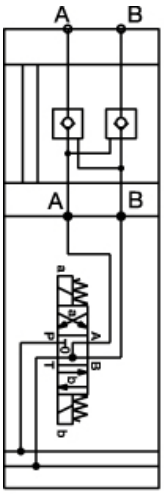


Mtorque = max. 9Nm *[79.6 in.lbf]*

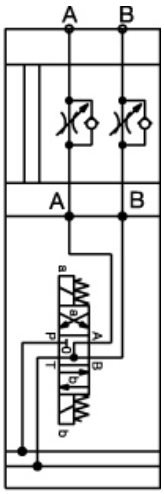
Hydraulic symbol

One standard component

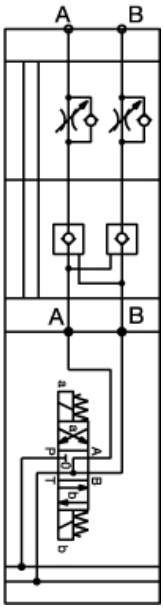
VP-NOV-6



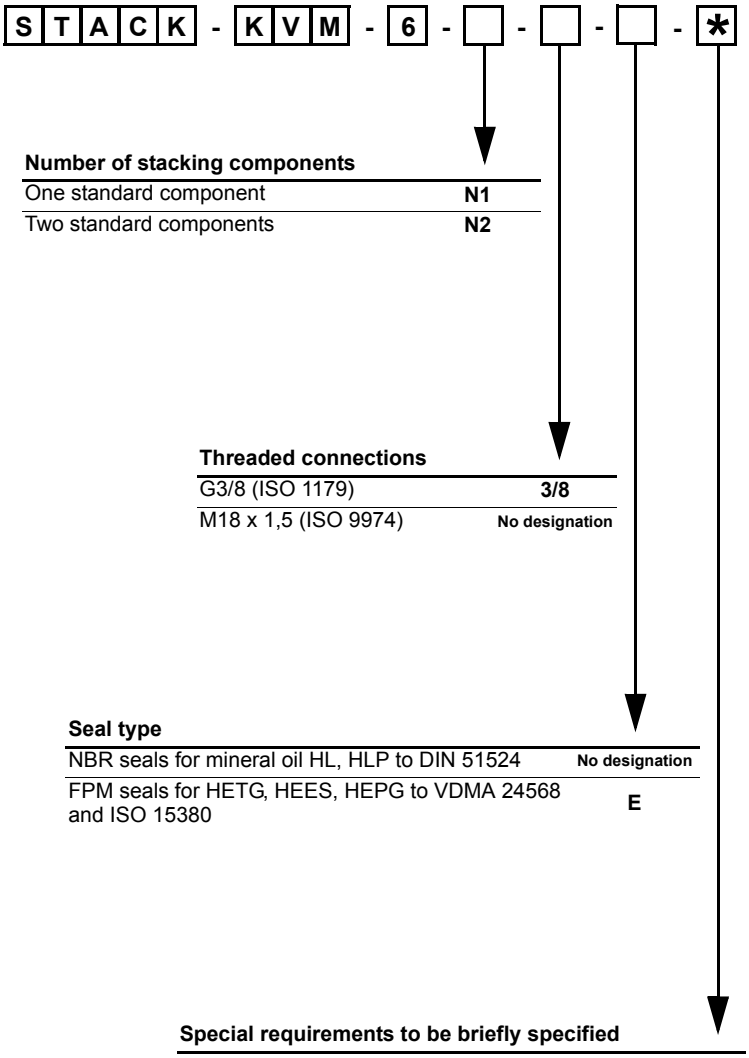
VP-NDV-6



Two standard components



Model code


S T A C K - K V M - 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

INLET PLATE OB-KVM-6

- NG 6
- Up to 350 Bar *[5076 PSI]*
- Up to 40 L/min *[10,6 GPM]*

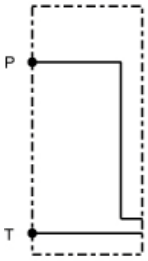
- Provide pressure relief valve.
- Provide pump unloading valve.
- Provide flow control valve.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).

OB-KVM-6-VV20-KVO

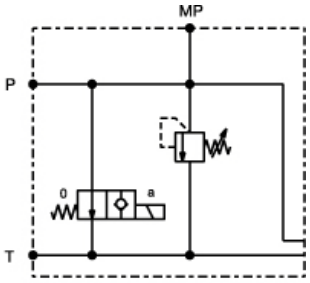
OB-KVM-6-VV20-TVTPG

Hydraulic symbol

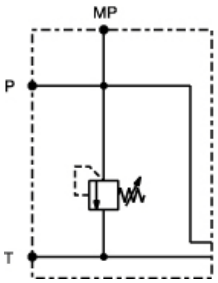
OB-KVM-6



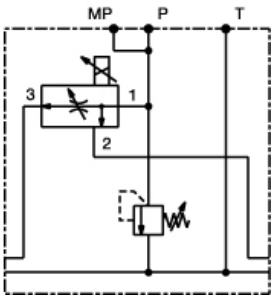
OB-KVM-6-VV20-KV1



OB-KVM-6-VV35



OB-KVM-6-VV20-TVTP



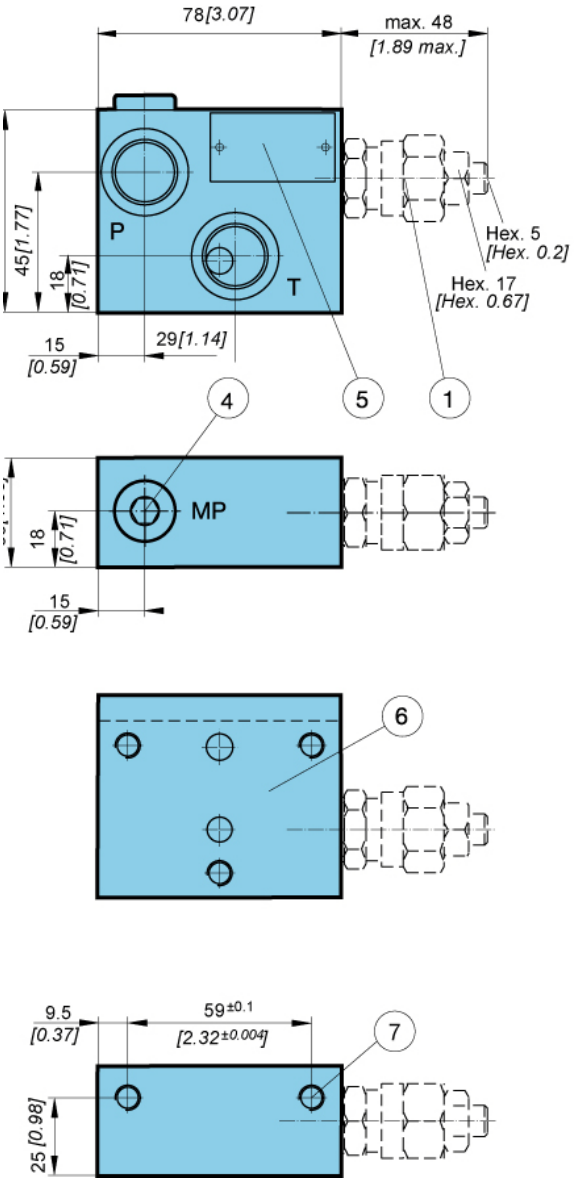
By-pass way

Features

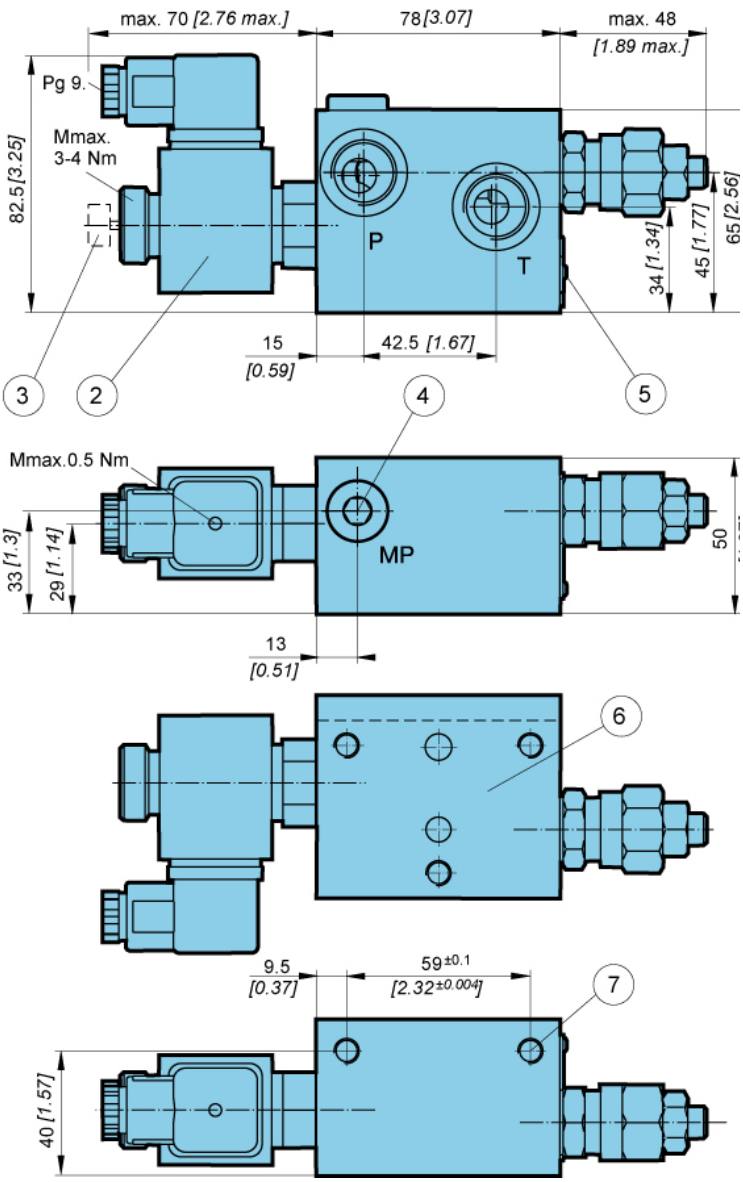
		OB-KVM-6	OB-KVM-6-VV	OB-KVM-VV-KV	OB-KVM-VV-TVTP
Oil temperature range	°C *[°F]*	-20 to +70 *[-4 to +158]*			
Viscosity range	mm^2/s *[SUS]*	15 to 380 *[3.24 to 82]*			
Filtration	NAS 1638	8			
Mass	kg *[lbs]*	1,25 *[2.76]*	1,35 *[2.98]*	2,2 *[4.85]*	4,5 *[9.92]*
Flow rate	l/min *[GPM]*	/	40 *[10.6]*		
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



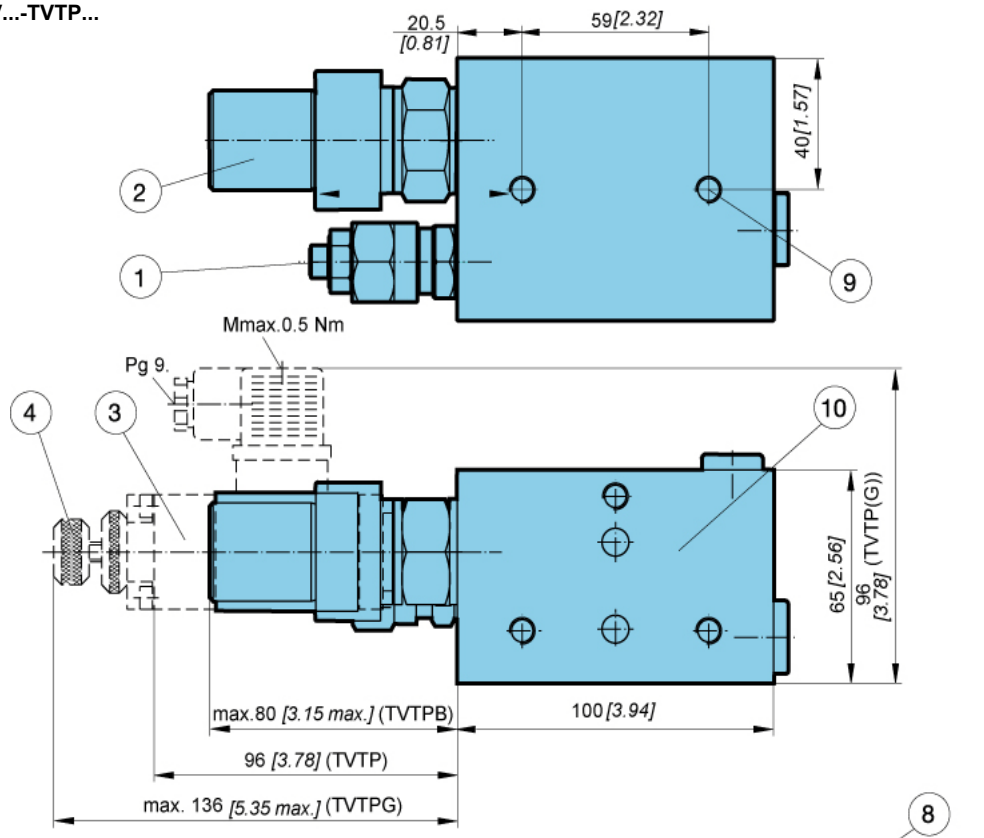
OB-KVM-6-VV...-KV...



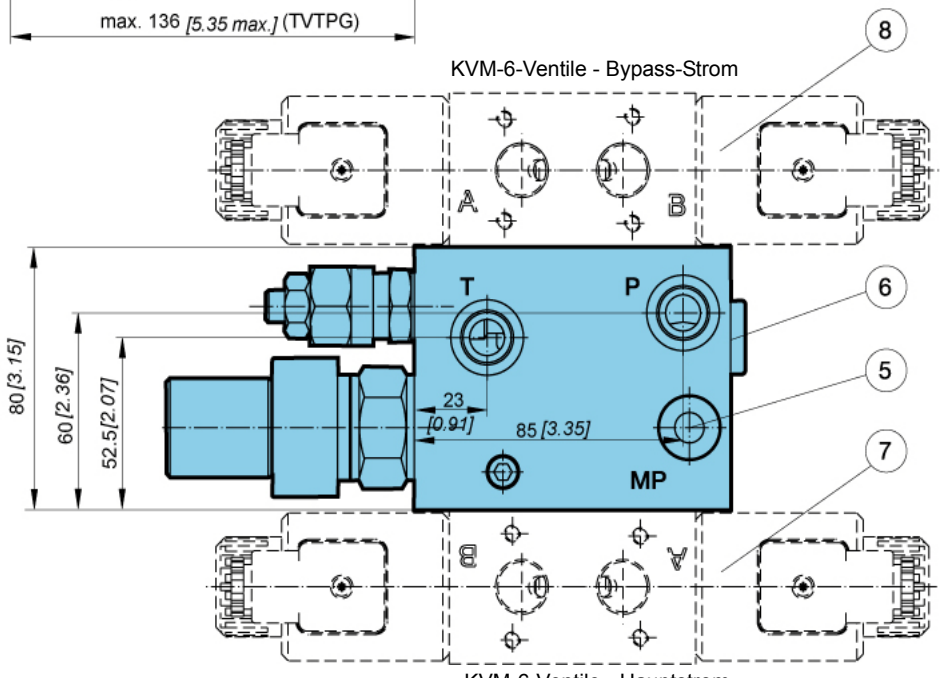
1. Pressure relief valve
2. Pump unloading valve
3. Manual override with knob
4. Threaded connection MP - G1/4 (closed)
6. Connection dimensions for KVM-6
7. Fixing hole (M8 X 12) for mounting assembly

Dimensions

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



KVM-6-Ventile - Bypass-Strom



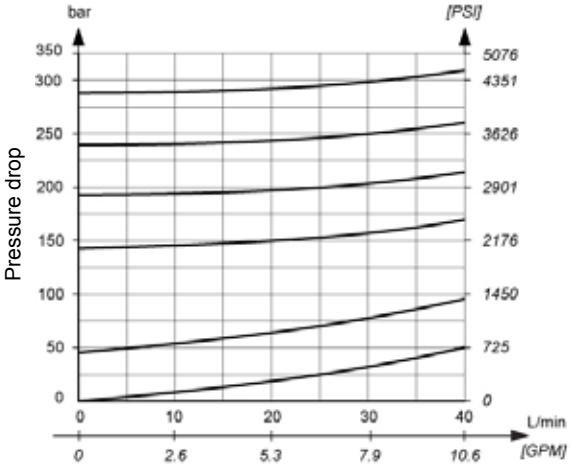
KVM-6-Ventile - Hauptstrom

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

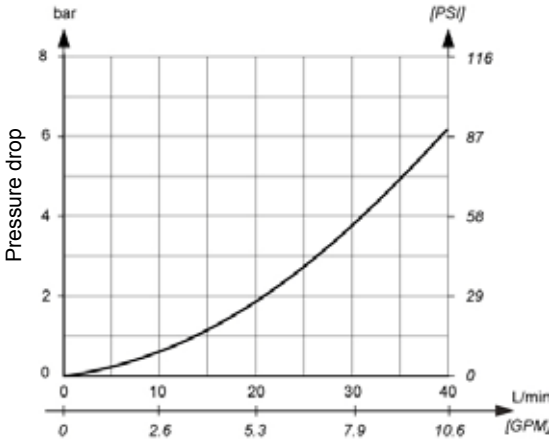
Measured at 50°C *[122°F]* and viscosity of 28 mm^2/s *[148 SUS]*.

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



Flow

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



Flow

Model code

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

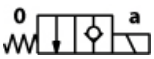
Pressure relief valve

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**

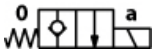
Pump unloading valve

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**

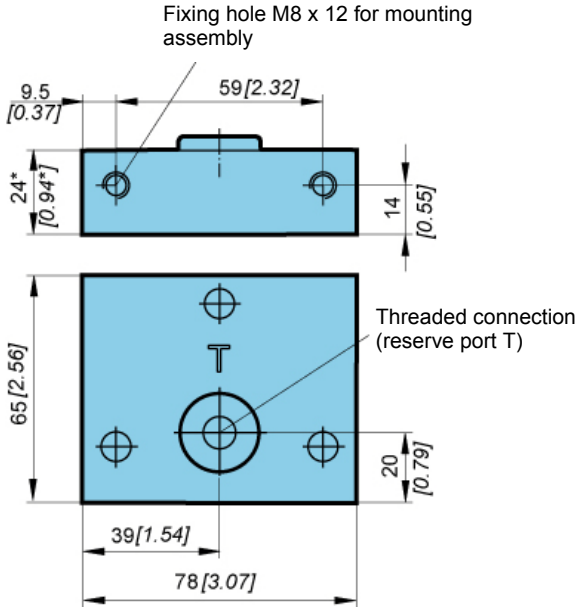
Seal type

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

END PLATE ZB-KVM-6

Dimensions



ZB-KVM-6

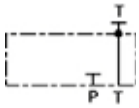
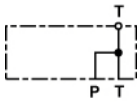
* ZB-KVM-6-PT-1/2(M22) = 27

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

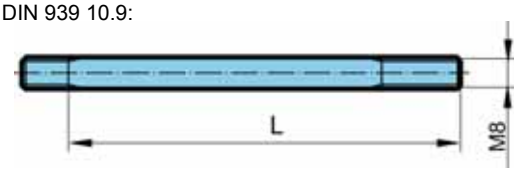
FIXING ELEMENTS FOR MOUNTING

• 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).

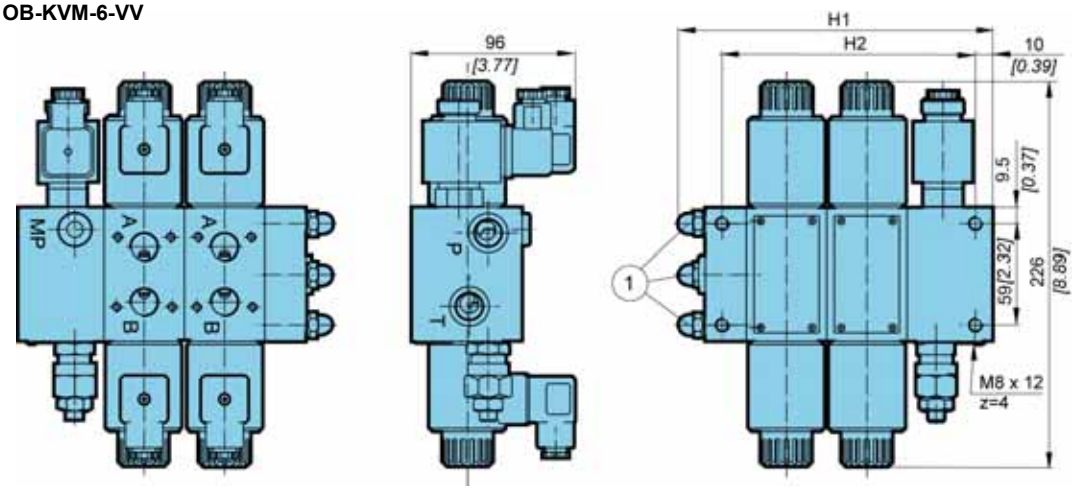
Model code

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**

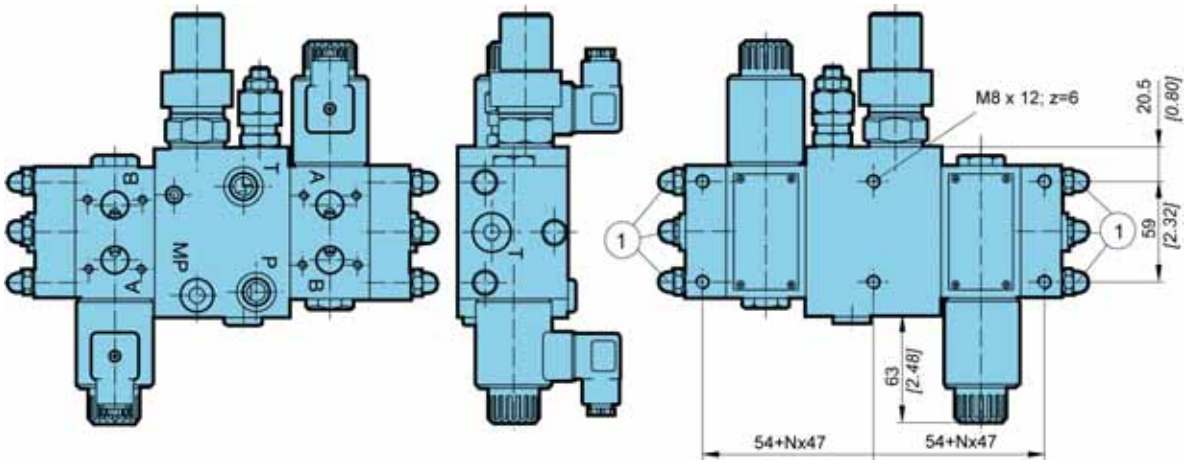
Dimensions

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 to50 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

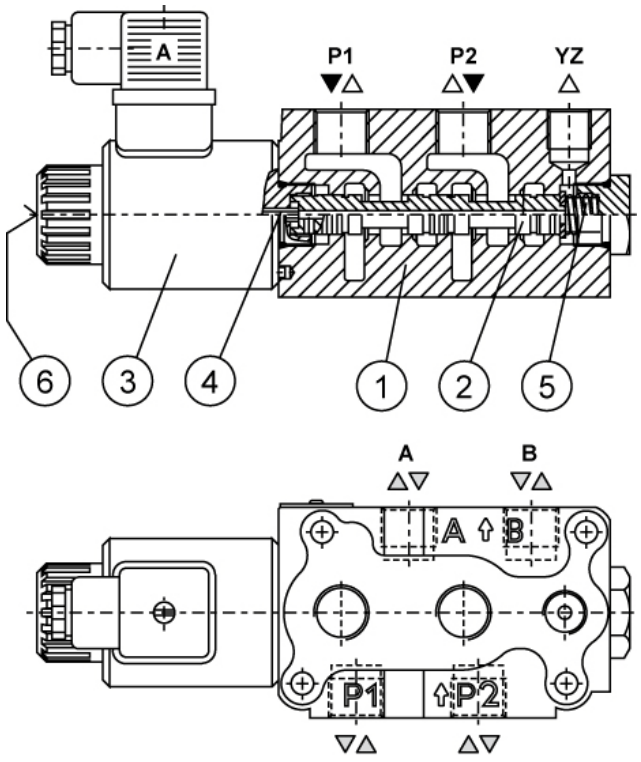
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

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.

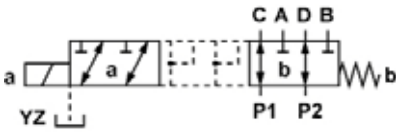
When the solenoid (3) is de-energized, the control spool (2) is returned to its neutral position by the return spring (5), thus establishing again the links between ports P1, C, D and P2.

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

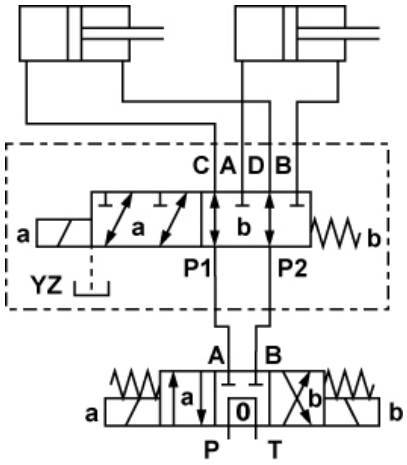


Hydraulic symbol

Spool type



Mounting example



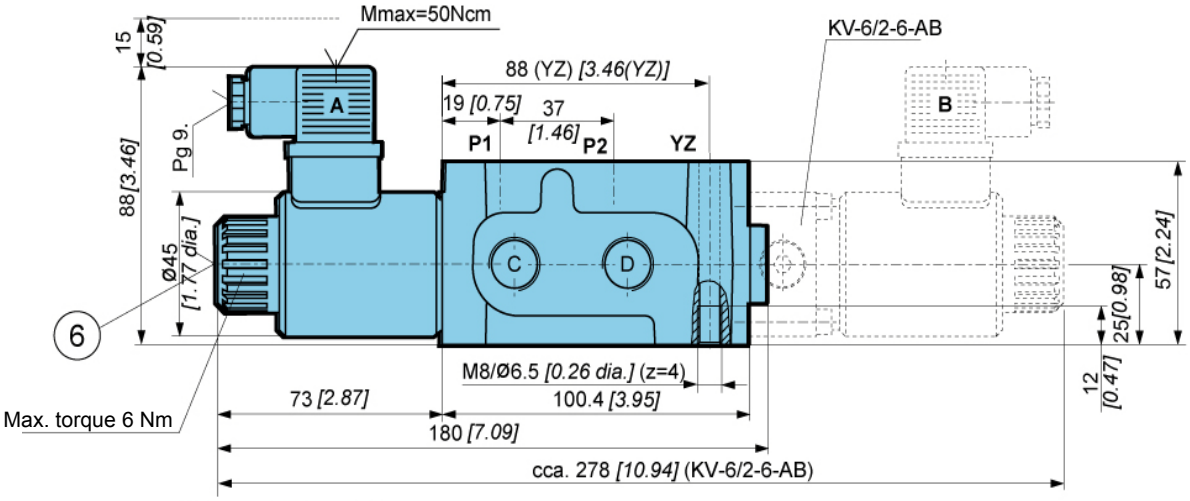
Features

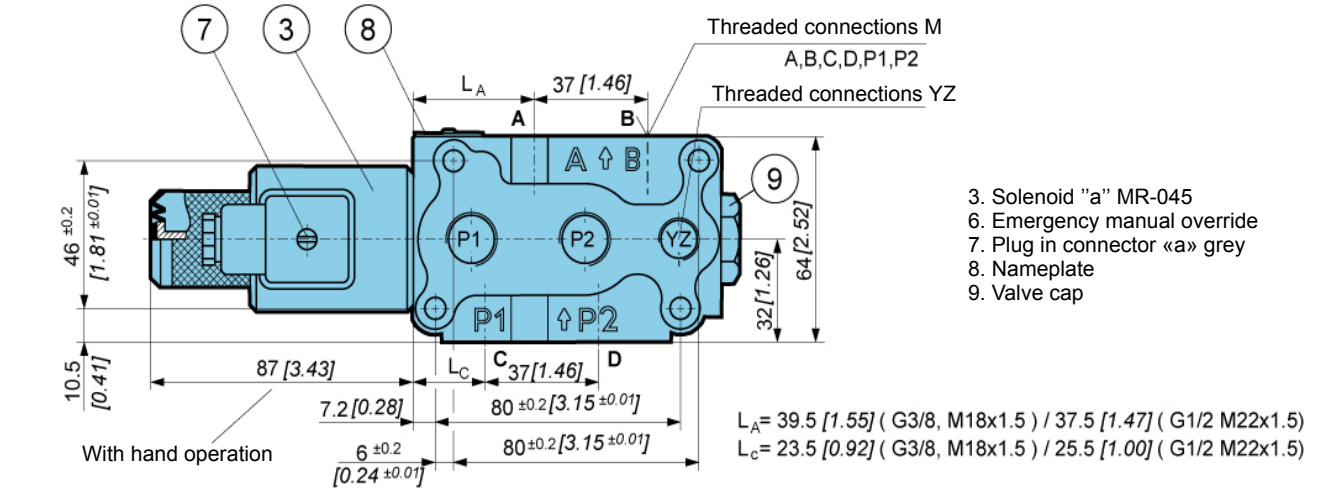
Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	50 *[13.2]*
Operating pressure	With YZ	bar *[PSI]*	350 *[5 076]*
	Without YZ		250 *[3 625]*
Oil temperature range		°C *[°F]*	-20 to +70 *[-4 to+158]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[3.24 to 82]*
Mounting position			Optional
Mass		kg *[lb]*	2,5 *[5.51]*
Filtration		NAS 1638	8

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

* 12 V supply voltage - 36 W.

Dimensions



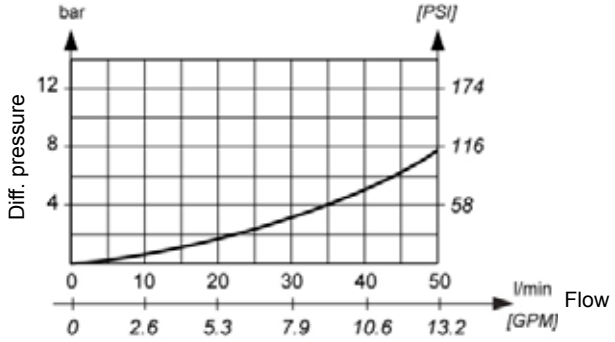


3. Solenoid ''a'' MR-045
6. Emergency manual override
7. Plug in connector «a» grey
8. Nameplate
9. Valve cap

L_A= 39.5 *[1.55]* (G3/8, M18x1.5) / 37.5 *[1.47]* (G1/2 M22x1.5)
L_C= 23.5 *[0.92]* (G3/8, M18x1.5) / 25.5 *[1.00]* (G1/2 M22x1.5)

Δp-Q Performance curve

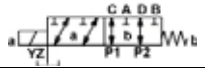
Measured at 40°C *[104°F]* and viscosity of 32 mm^2/s *[148 SUS]*.



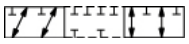
Model code

K V - 6 / 2 - 6 - □ - □ - □ - □ □ □ - □ - □ - □ - S 5 0 - ✱

Spool type

	**No designation**
	**AB**

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 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**

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

Drainage

No designation	Without YZ
YZ	With YZ

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 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

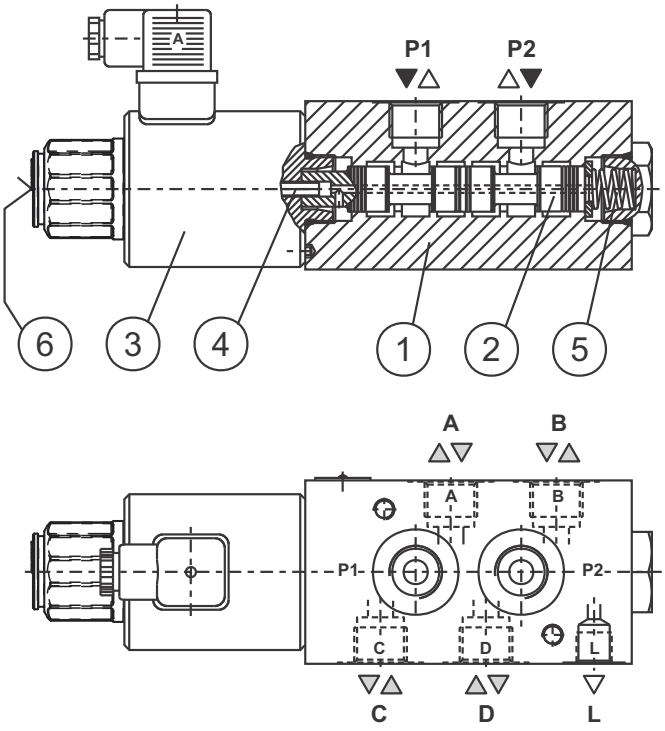
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

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

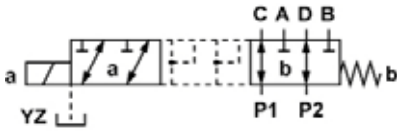
Change-over to the operating position is done by energizing the solenoid (3), whereby the solenoid plunger acts on the control spool (2) via the operating pin (4), thus clearing the corresponding flow ways and establishing respective links between the ports P1, A,B and P2.

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.

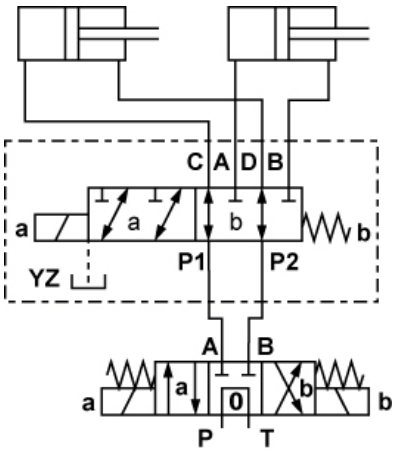
The change-over can also be done manually by pressing the emergency manual override (6).



Hydraulic symbol



Mounting example

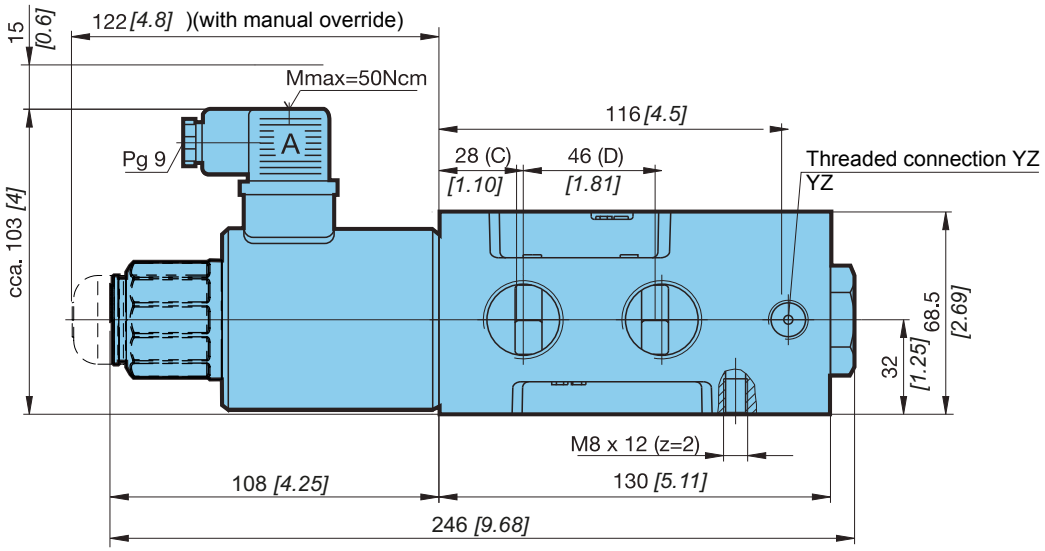


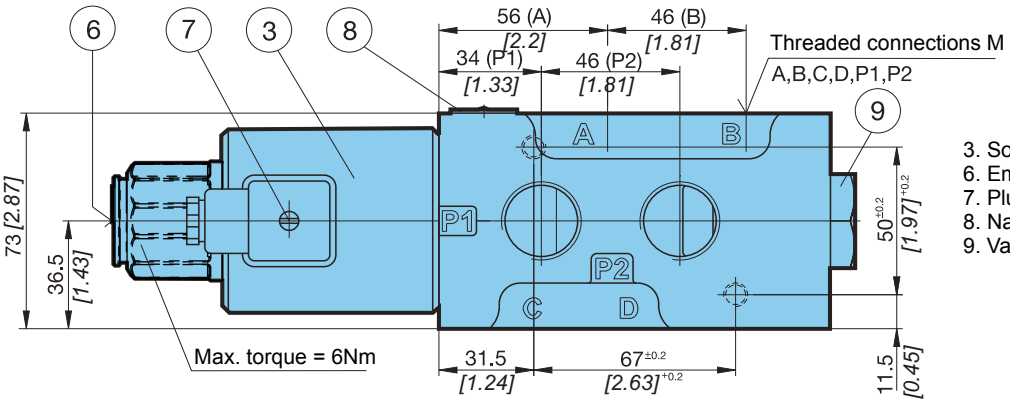
Features

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

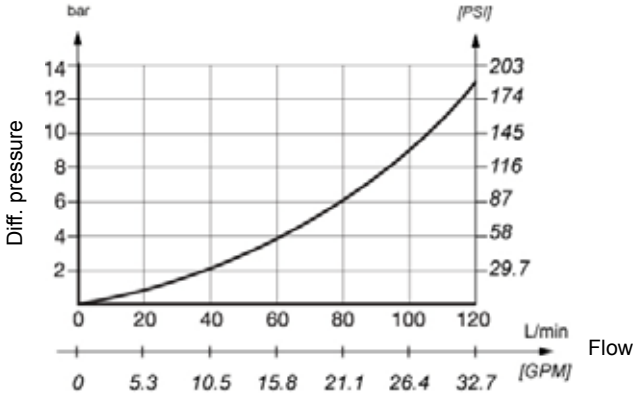




3. Solenoid ''a'' MR-060
6. Emergency manual override
7. Plug-in connector «a» - grey
8. Nameplate
9. Valve cap

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

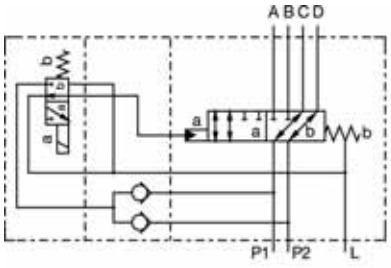
- NG 16
- Up to 350 bar *[5 076 PSI]*
- Up to 250 L/min *[66.04 GPM]*

- 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.

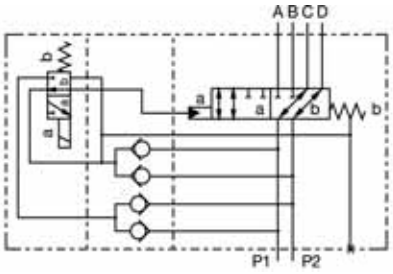
KV-6/2-16-XN

Hydraulic symbol

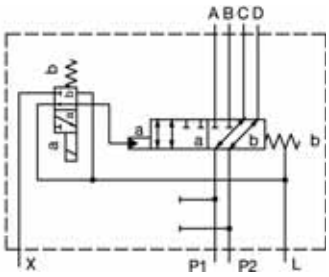
KV-6/2-16-...-XN



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



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

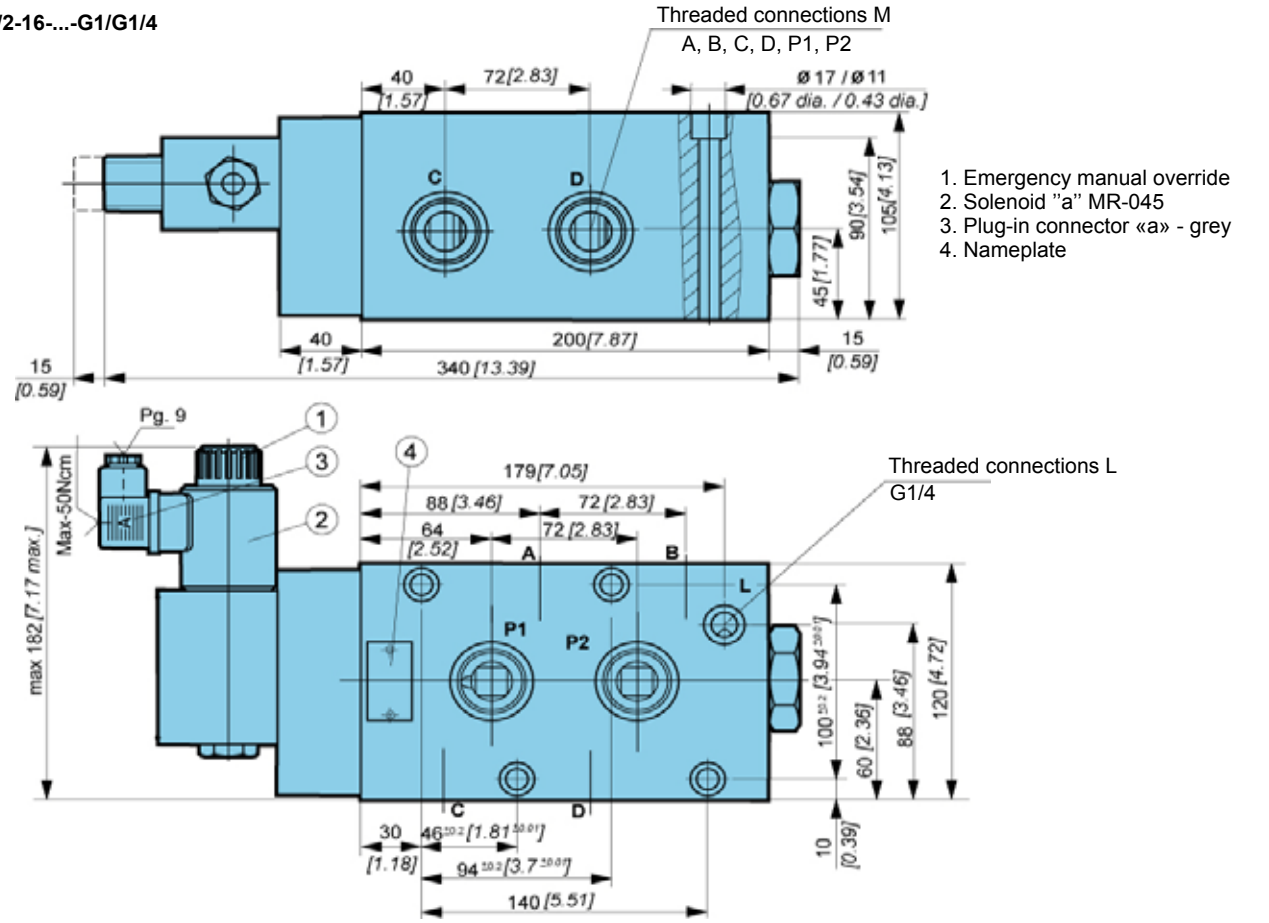


Features

Hydraulic			
Size			**16**
Flow rate		L/min *[GPM]*	250 *[31.7]*
Operating pressure		bar *[PSI]*	15 to 350 *[217.56 to 5076.32]*
	(in port L or in return way)	bar *[PSI]*	250 *[3625.94]*
Oil temperature range		°C *[°F]*	-20 to +70*[-4 to 158]*
Viscosity range		mm^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

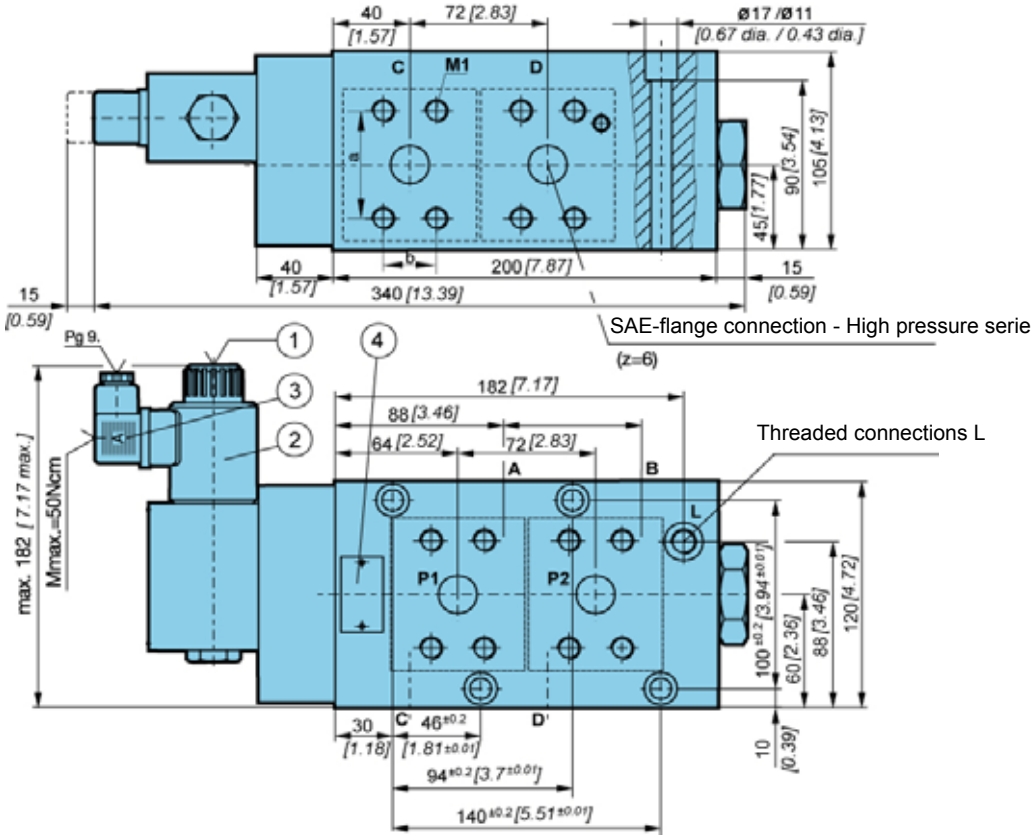
KV-6/2-16-...-G1/G1/4



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

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

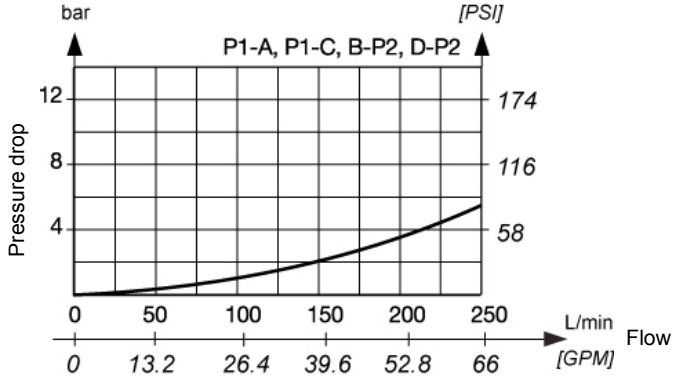
	Size	
	SAE 3/4	**SAE 1**
a	50.8 *[2]*	57.2*[2.25]*
b	23.8 *[0.94]*	27.8 *[1.09]*
M1	M10	M12



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**

Threaded connections M ; L

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 DIRECTIONAL VALVES KV-6K

- NG 6
- Up to 250 bar *[3 625 PSI]*
- Up to 50 L/min *[13.2 GPM]*

- Direct in-line mounting.
- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Protection of solenoid IP65 to EN 60529 / IEC 60529.
- Fulfil EMC (89/336/EEC).

KV-6K/2-6

Operation

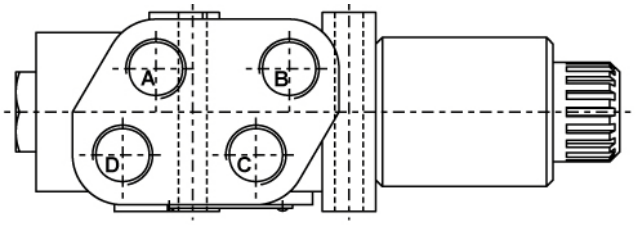
Directional valves type KV-6K/2-6 with direct solenoid operation control the direction of the hydraulic medium flow.
They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

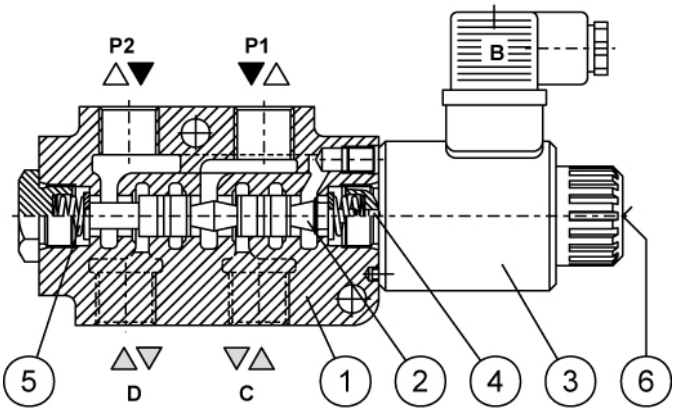
The KV-6K/2-6 type directional valves consist of a housing (1), a control spool (2), and a solenoid (3) with return spring (5).

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

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

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

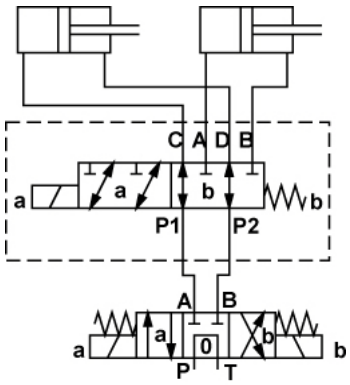




Hydraulic symbol

Spool type

Mounting example

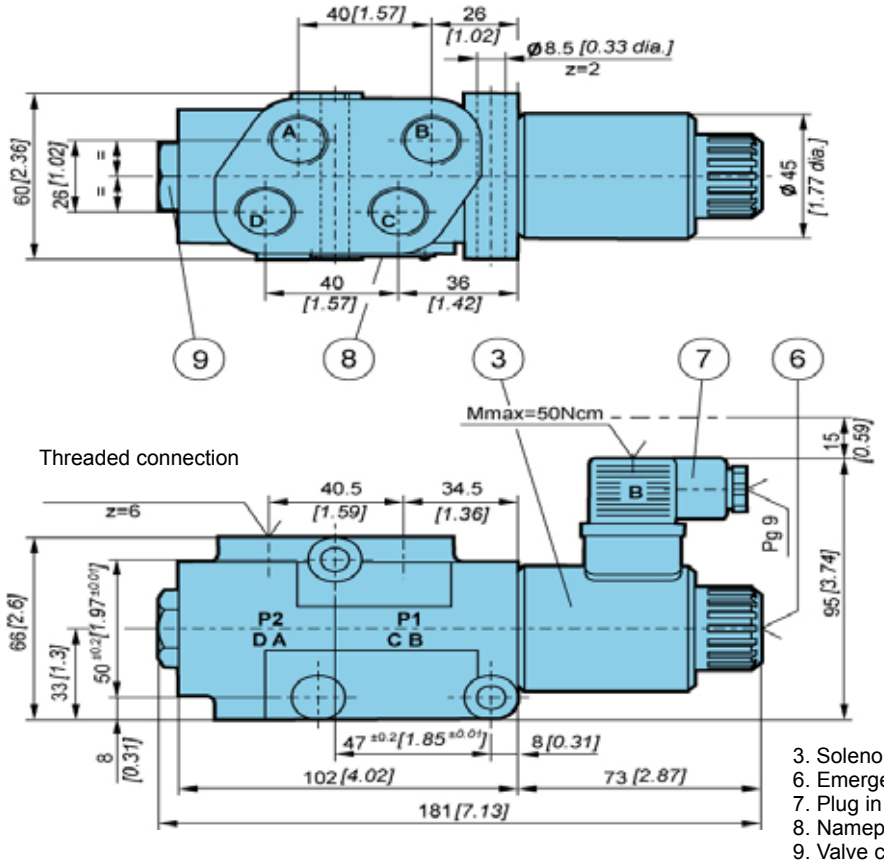


Features

Hydraulic		
Size		**6**
Flow rate	L/min *[GPM]*	50 *[13.2]*
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]*	2,5 *[5.51]*
Filtration	NAS 1638	8

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

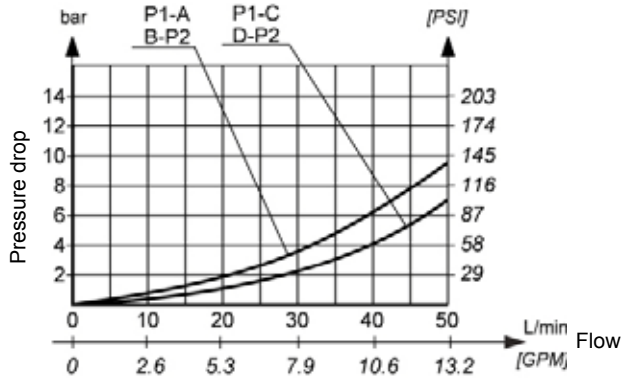
Dimensions



3. Solenoid ”b” MR-045
6. Emergency manual override
7. Plug in connector «b» black
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 K / 2 - 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**
VDirect voltage 12V	**12 DC**

Special requirements to be briefly specified

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**
G 3/8	**G3/8**
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**

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

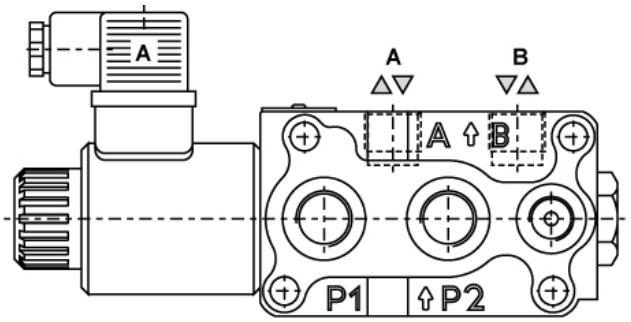
Directional valves type KVH with direct solenoid operation control the direction of the hydraulic medium flow.
They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

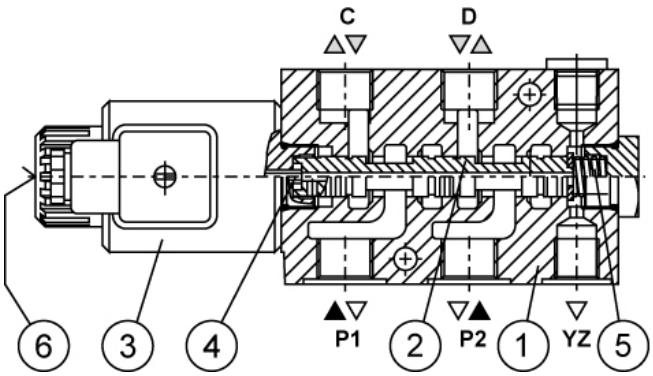
The KVH type directional valves consist of a housing (1), a control spool (2), and a solenoid (3) with return spring (5).

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.

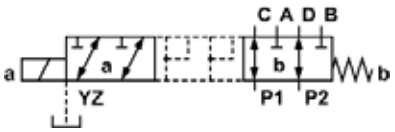
When the solenoid (3) is de-energized, the control spool (2) is returned to its neutral position by the return spring (5), thus establishing again the links between ports P1, C, D and P2.

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

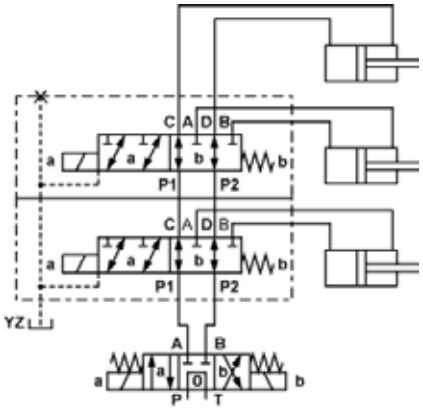




Hydraulic symbol



Mounting example

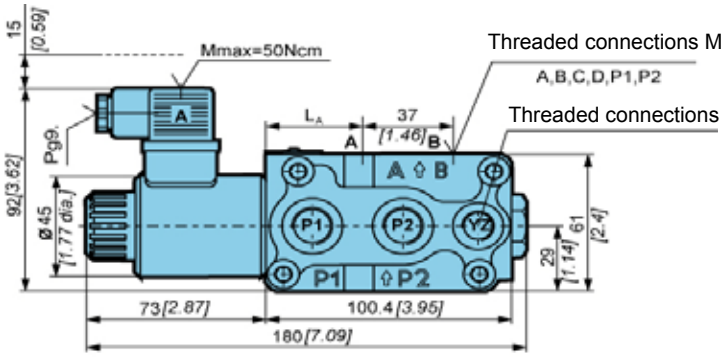


Features

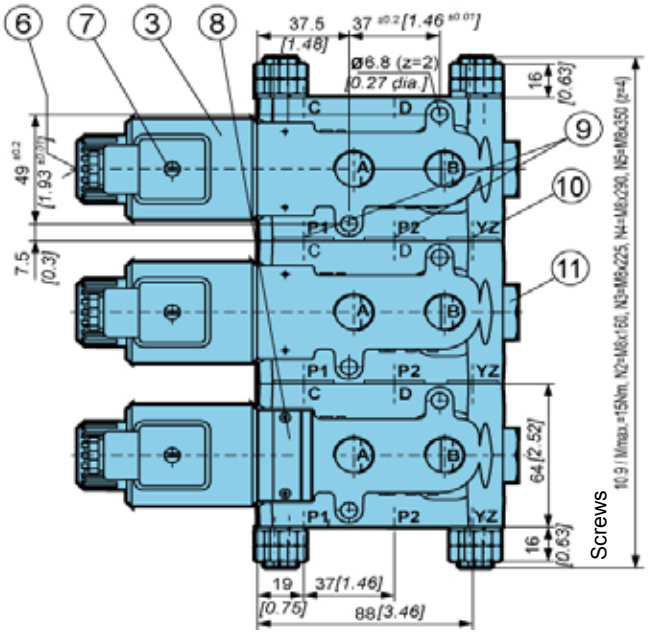
Hydraulic			
Size			**6**
Flow rate		L/min *[GPM]*	50 *[13.21]*
Operating pressure	With YZ	bar *[PSI]*	315 *[4 568]*
	Without YZ		250 *[551]*
Oil temperature range		°C *[°F]*	-20 to +70 *to +158]*
Viscosity range		mm^2/s *[SUS]*	15 to 380 *[3.24 to 82]*
Mounting position			Optional
Mass		kg *[lb]*	2,7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

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

Dimensions



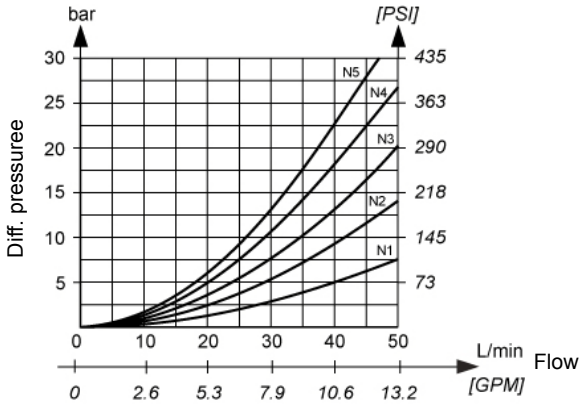
LA= 39,5 (G3/8, M18x1,5)
37,5 *[1.47]* (G1/2, M22x1,5)



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

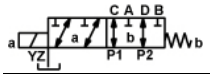
.Measured at 50°C *[122°F]* and viscosity of 32 mm^2/s *[148 SUS]*.]



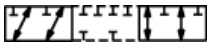
Model code

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 VALVES KVH

- NG 10
- Up to 315 bar *[5 076* PSI]
- Up to 120 L/min *[31.70 GPM]*

- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Protection of solenoid IP 65 to EN 50529 / IEC 60529.

KVH-6/2-10-N2

Operation

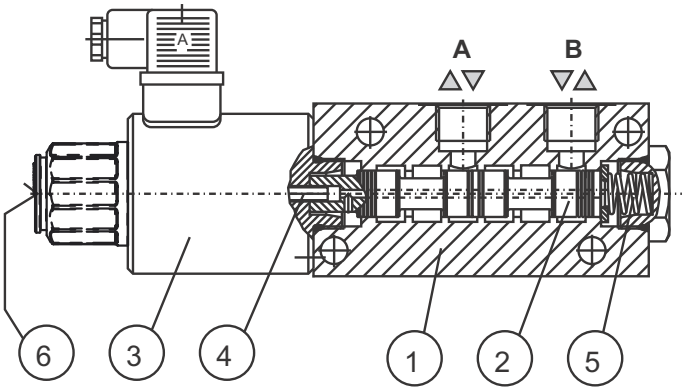
Directional valves type KVH with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between two consumers and the basic directional valve, when we want to control both consumers alternately by means of one basic directional valve.

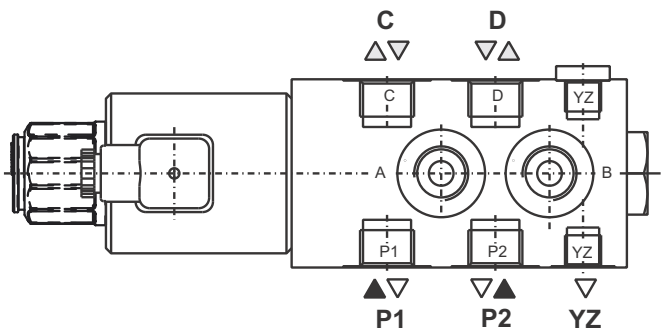
The KVH type directional valves consist of a housing (1), a control spool (2), and a solenoid (3) with return spring (5).

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

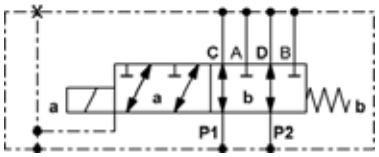
When the solenoid (3) is de-energized, the control spool (2) is returned to its neutral position by the return spring (5), thus establishing again the links between ports P1, C, D and P2.

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

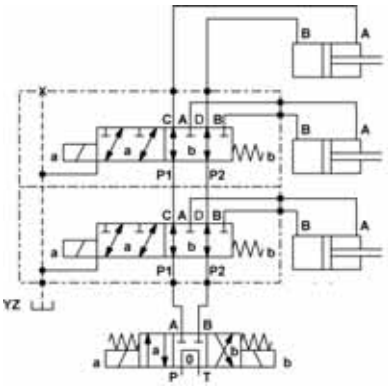




Hydraulic symbol



Mounting example

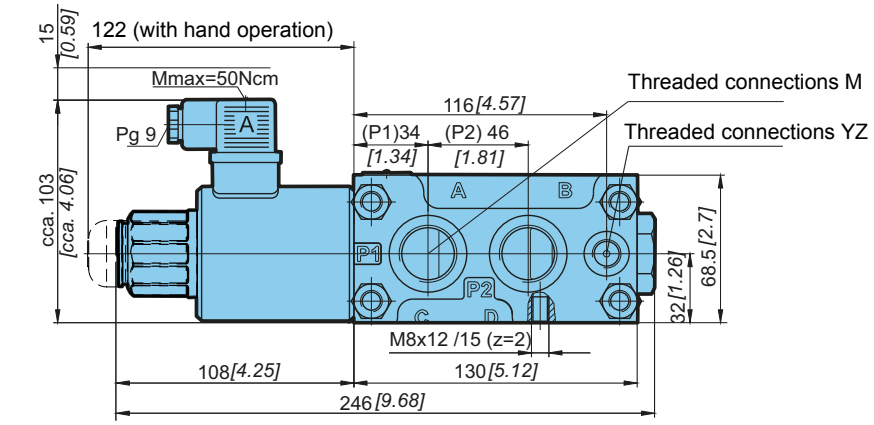


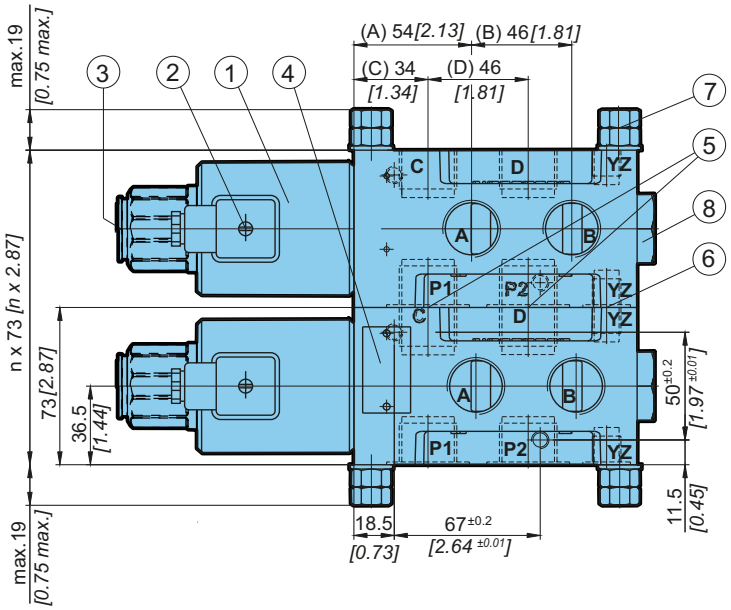
Features

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



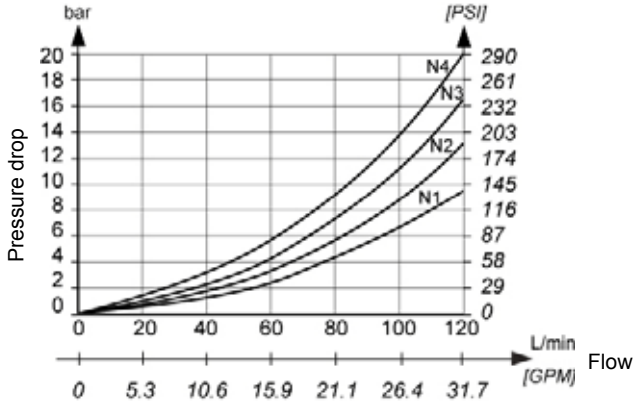


Mmax. = 20Nm

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 mm^2/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

6/3 WAY DIRECTIONAL VALVES KV

- NG 4
- Up to 210 bar *[3045 PSI]*
- Up to 7 L/min *[1.8 GPM]*

- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas).
- Manual emergency control.
- Fulfil EMC (89/336/EEC).

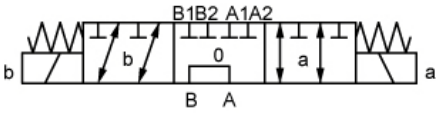
KV-6K/3-4

Features

Hydraulic		
Size		**4**
Flow rate	L/min *[GPM]*	6 *[1.6]*
Operating pressure	bar *[PSI]*	210 *[3 045]*
Viscosity range	mm^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]*	1,6 *[3.5]*
Seal type	NBR seals for mineral oil HL, HLP, to DIN 51524	

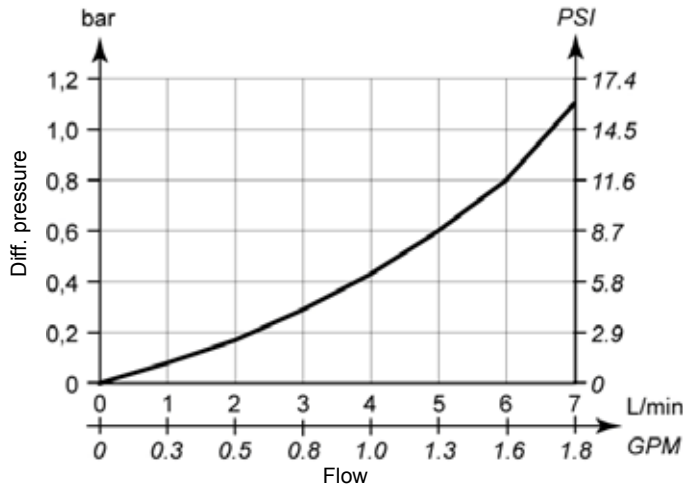
Electrical		
Supply voltage	V	12, 24
Power	W	25
Switching frequency	1/h	15 000
Ambient temperature	°C *[°F]*	to 50 *[122]*
Coil temperature	°C *[°F]*	to 180 *[356]*
Duty cycle		Continuous

Hydraulic symbol

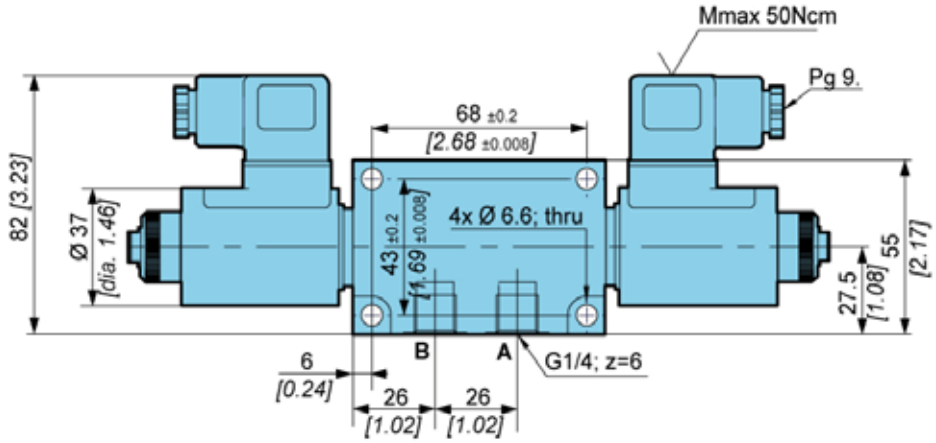


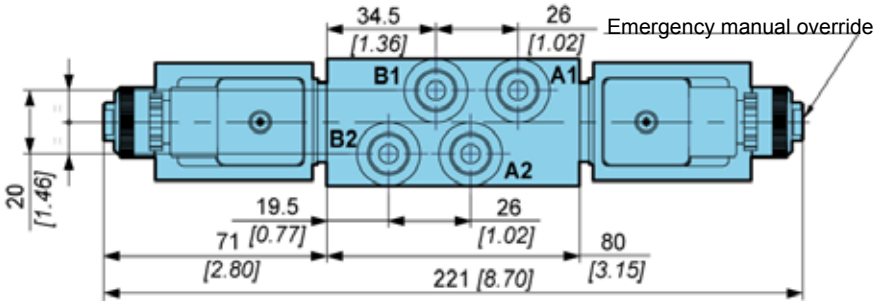
ΔP-Q Performance curves

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



Dimensions





Model code

K V - 6 K / 3 - 4 - [ ][ ][ ] - [ ] - *

Working ports

Six working ports	**6**

Number of control spool position

Three positions	**3**

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

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

Special requirements to be briefly specified

8/3 WAY DIRECTIONAL VALVES KV

- NG 6
- Up to 250 bar *[5 076 PSI]*
- Up to 50 L/min *[31.7 GPM]*

- Plug-in connector for solenoids to ISO 4400.
- Threaded connections to ISO 9974 (Metric), ISO 1179 (BSPP/Gas), ISO 11926 (UNF).
- Protection of solenoid IP65 to EN 50529 / IEC 60529.
- Fulfil EMC (89/336/EEC).

KV-8/3-6

Operation

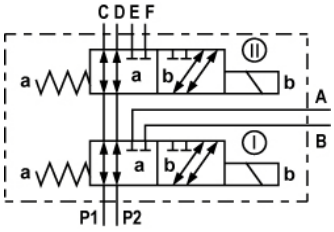
Directional valves type KV with direct solenoid operation control the direction of the hydraulic medium flow. They are mostly used as link between three consumers and the basic directional valve, when we wish to control both consumers alternately by means of one basic directional valve.

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

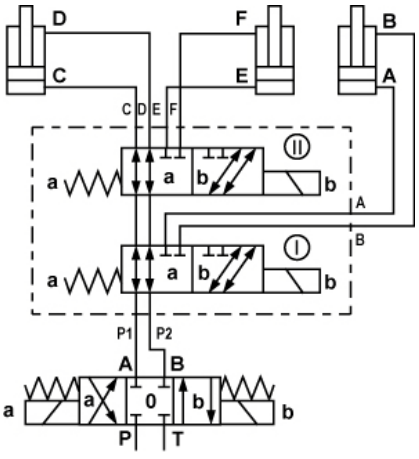
When the solenoid (4,5) is de-energized, the control spool (2.3) is returned to their neutral position by the return spring (6,7).

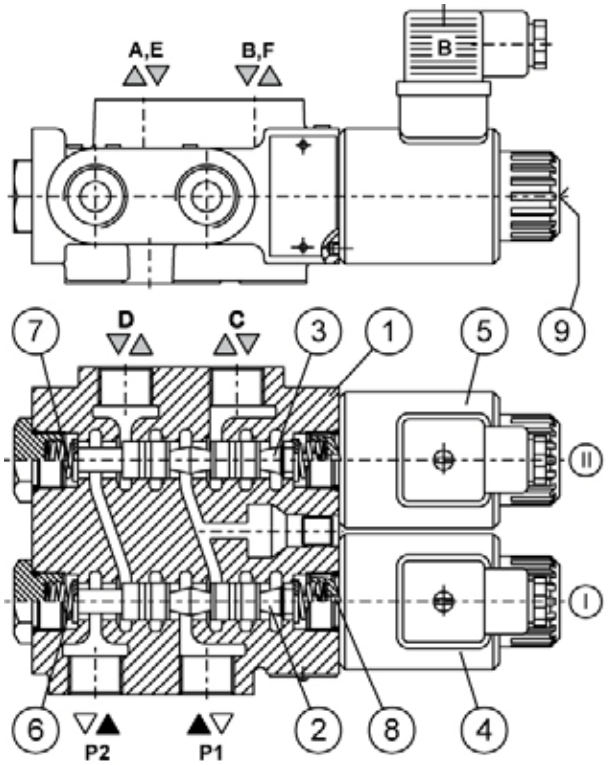
The change-over can also be done manually by pressing the emergency manual override (9).

Hydraulic symbol



Mounting example

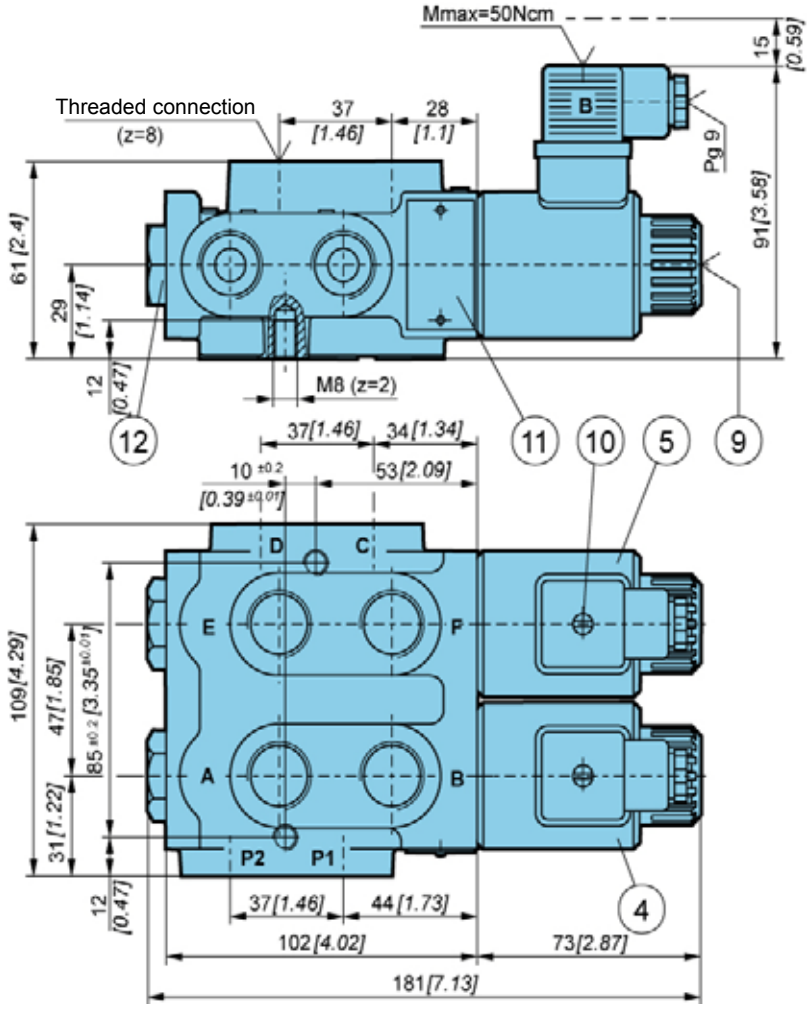




Features

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

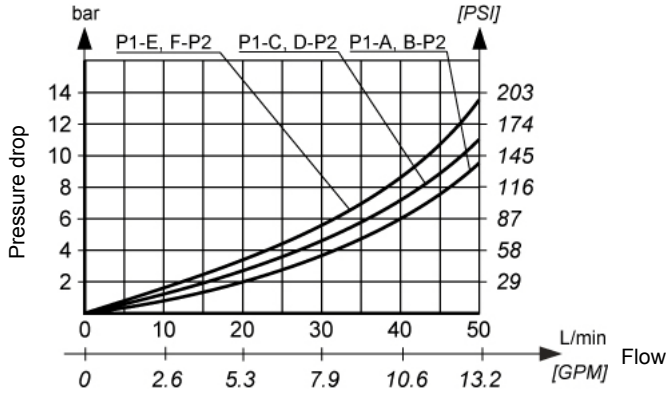
Dimensions



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

K V - 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**

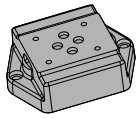
Threaded connections

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

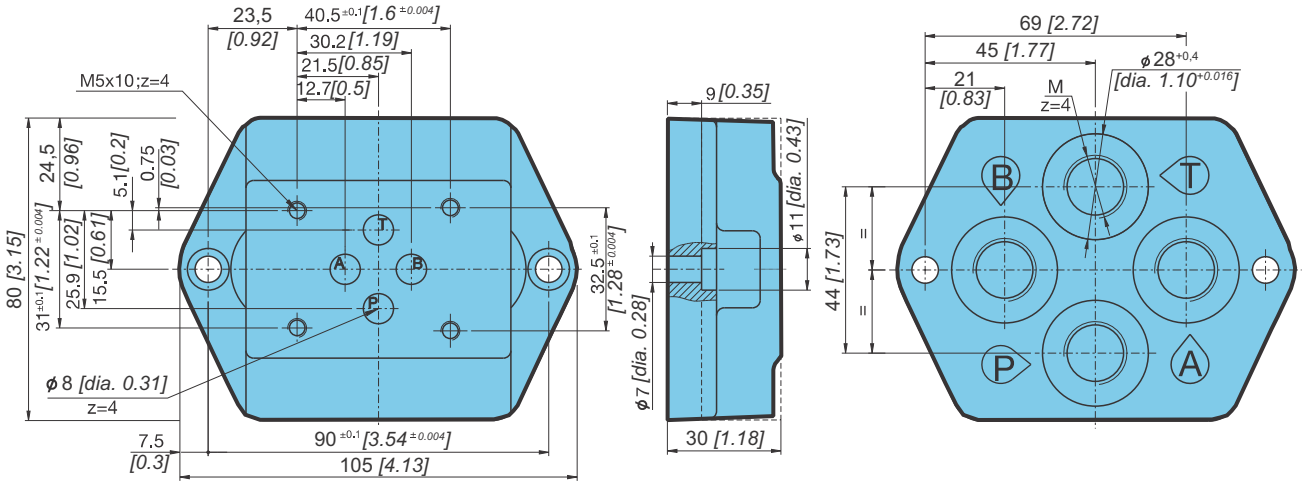
- NG 6, 10, 16
- Up to 350 bar *[5076 PSI]*
- Up to 300 L/min *[31,7 GPM]*

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

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

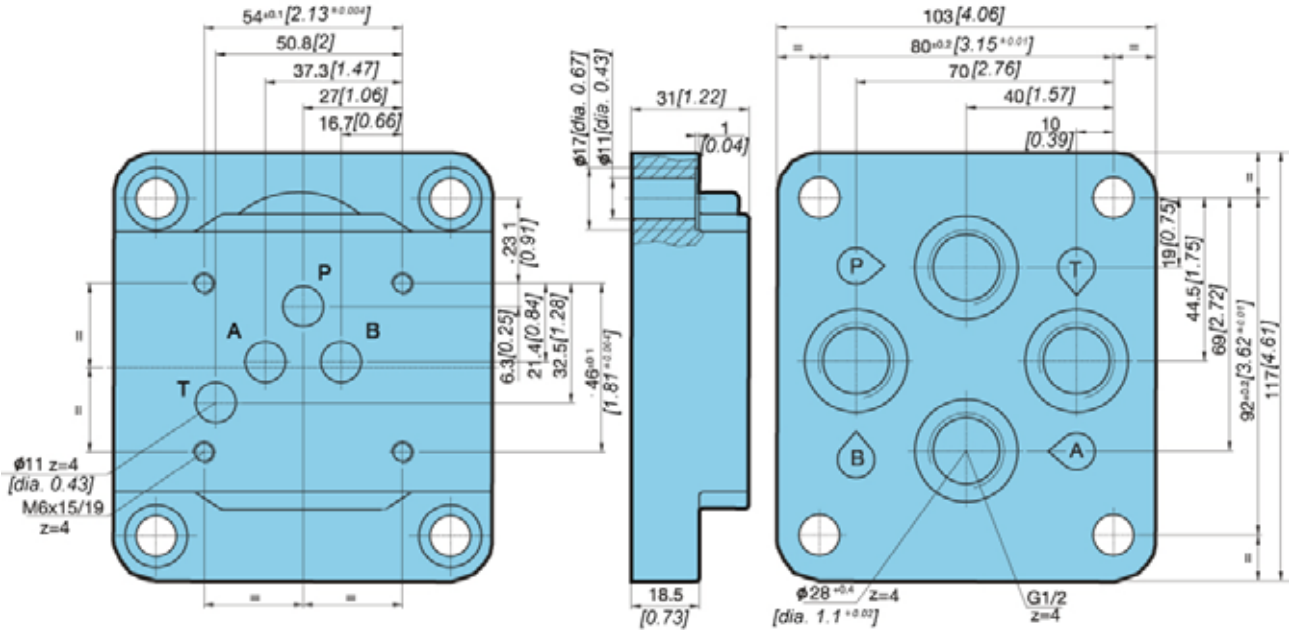
Dimensions

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



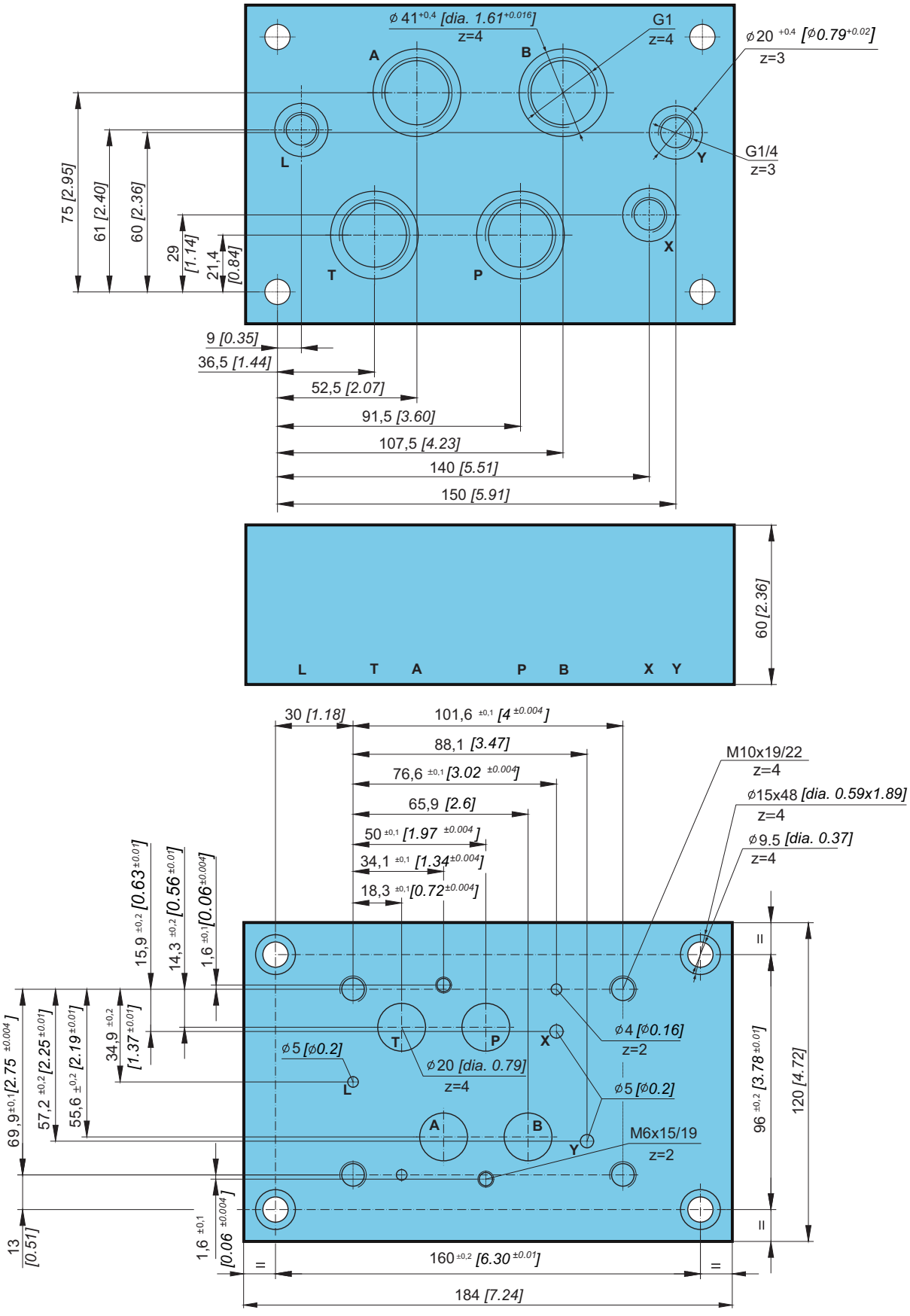
Type	PP-KV-6-2-G3/8-Ø28-L mm *[Zoll]*	PP-KV-6-2-G3/8-Ø28-L-ZN mm *[Zoll]*	PP-KV-6-2-G1/2-Ø28-L mm *[Zoll]*
M	G3/8	G3/8	G1/2
Surface protection	Phosphated	Zinc - plated	Phosphated

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



Dimensions

Subplate, type PP-KV-16-G1-Ø41



MANIFOLD BLOCKS BP

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

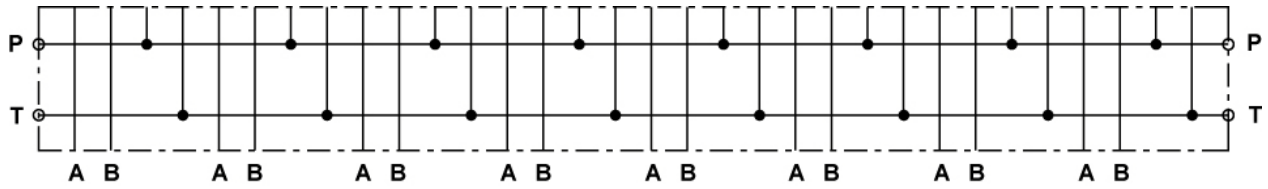
- .Connecting dimensions to ISO 4401.
- .Threaded connection to ISO 1179-1 (BSPP/Gas).
- .Mounting position unrestricted (valve axis preferably horizontal).
- Because of the large drilling diameters the pressure drop through the manifolds is very low.

BP-6-4-S

Operation

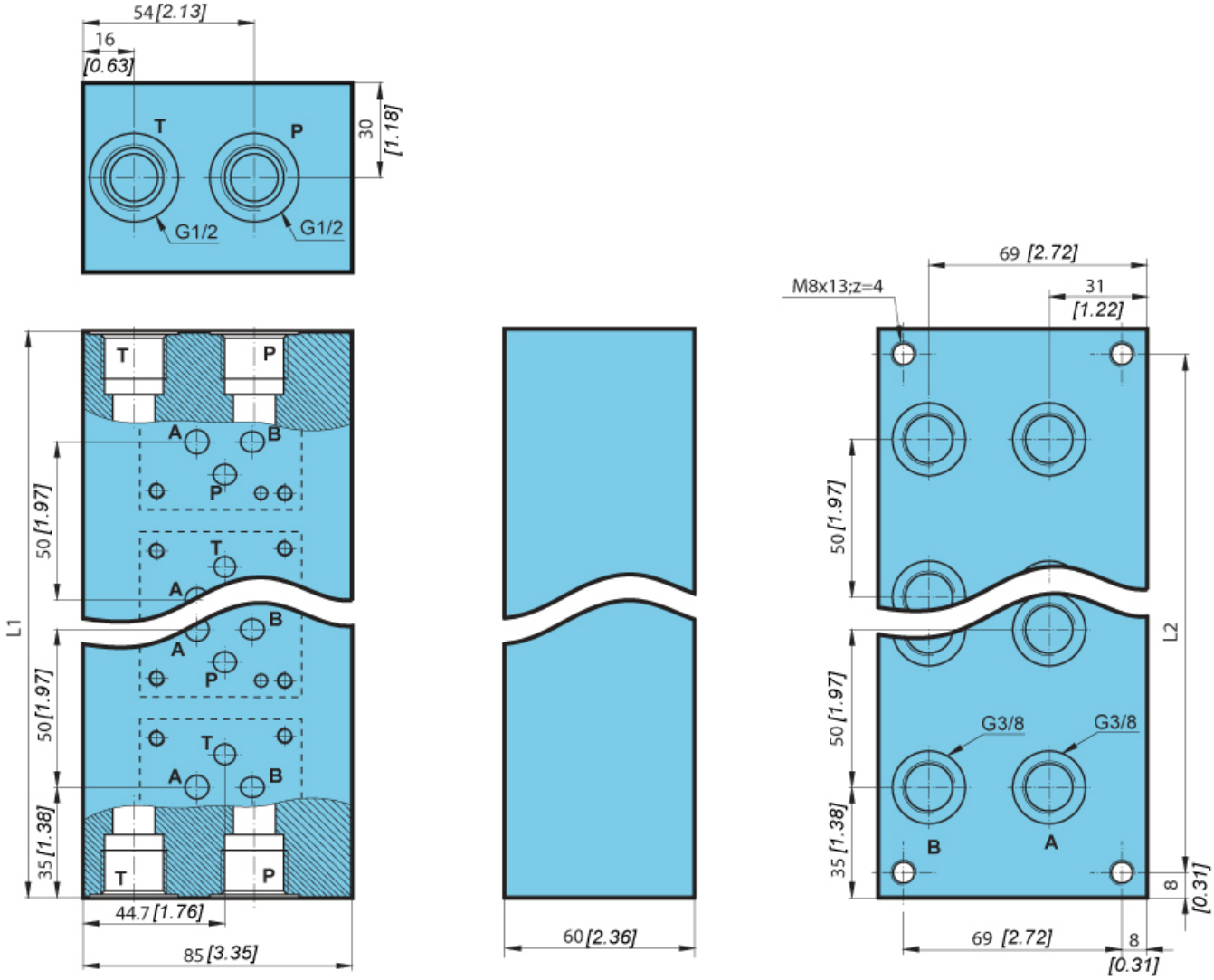
Manifold blocks serve for transmission of hydraulic fluid from source to valves. On the block can be two or up to seven valves (NS 10) or up to eight valves (NS 6) mounted in parallel connection.
Manifold blocks are used for easily realizing of hydraulic circuits without piping between valves and minimal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

Hydraulic symbol

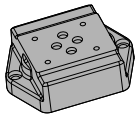


Dimensions

BP-6-...-

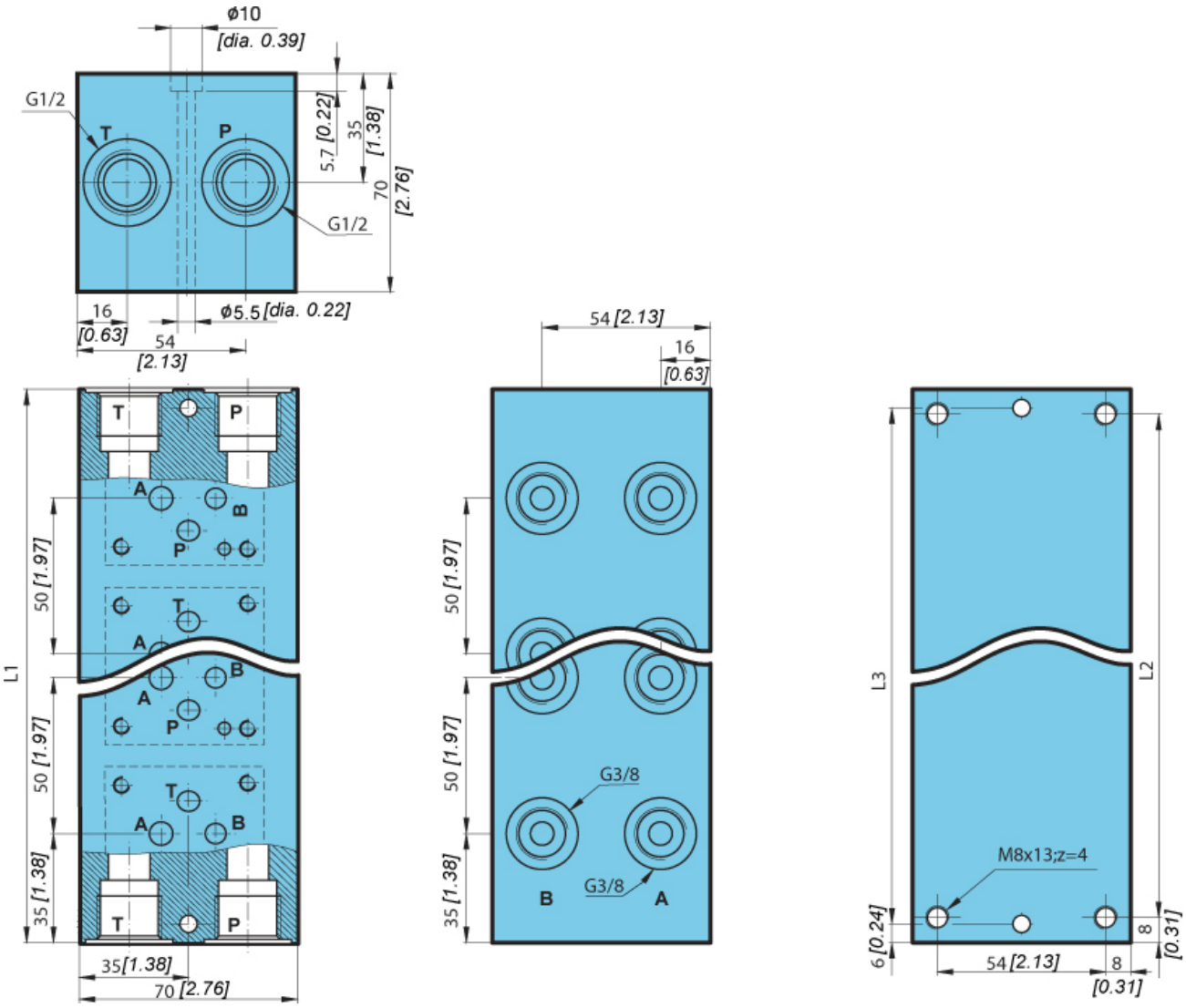


Type	Nominal size	Stations	L1 mm *[Zoll]*	L2 mm *[Zoll]*	Ports size P-T	Ports size A-B	Mass kg *[lb]*
BP-6-1	6	1	70 *[2.75]*	54 *[2.12]*	G1/2	G3/8	2,3 *[5.07]*
BP-6-2		2	120 *[4.72]*	104 *[4.09]*			3,9 *[8.60]*
BP-6-3		3	170 *[6.69]*	154 *[6.06]*			5,5 *[12.12]*
BP-6-4		4	220 *[8.66]*	204 *[8.03]*			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

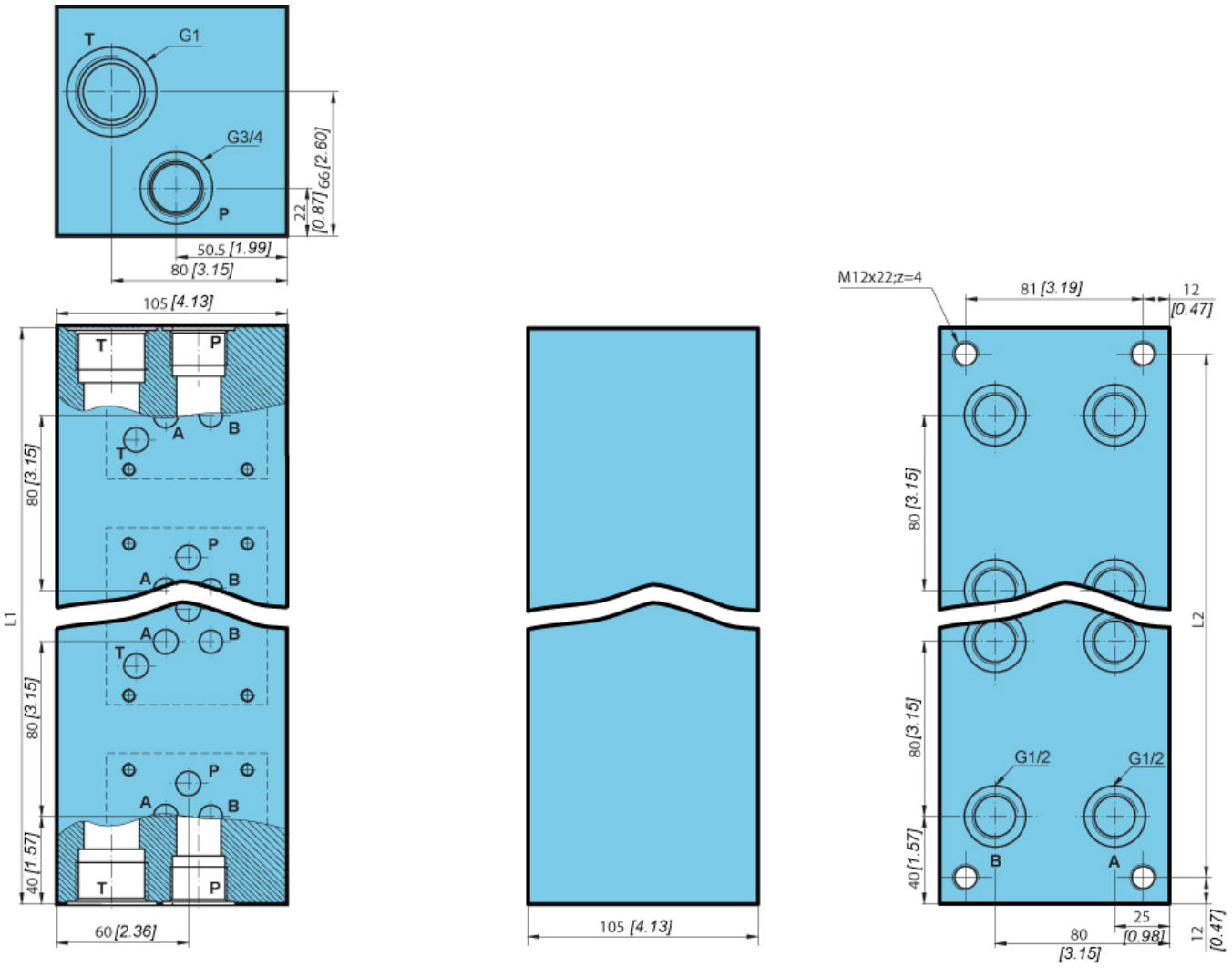
BP-6-...-S



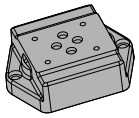
Type	Nominal size	Stations	L1 mm *[Zoll]*	L2 mm *[Zoll]*	L3 mm *[Zoll]*	Ports size P-T	Ports size A-B	Mass kg *[lb]*
BP-6-1-S	6	1	70 *[2.75]*	54 *[2.12]*	58 *[2.28]*	G1/2	G3/8	2,3 *[5.07]*
BP-6-2-S		2	120 *[4.72]*	104 *[4.09]*	108 *[4.25]*			3,9 *[8.60]*
BP-6-3-S		3	170 *[6.69]*	154 *[6.06]*	158 *[6.22]*			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-...-...

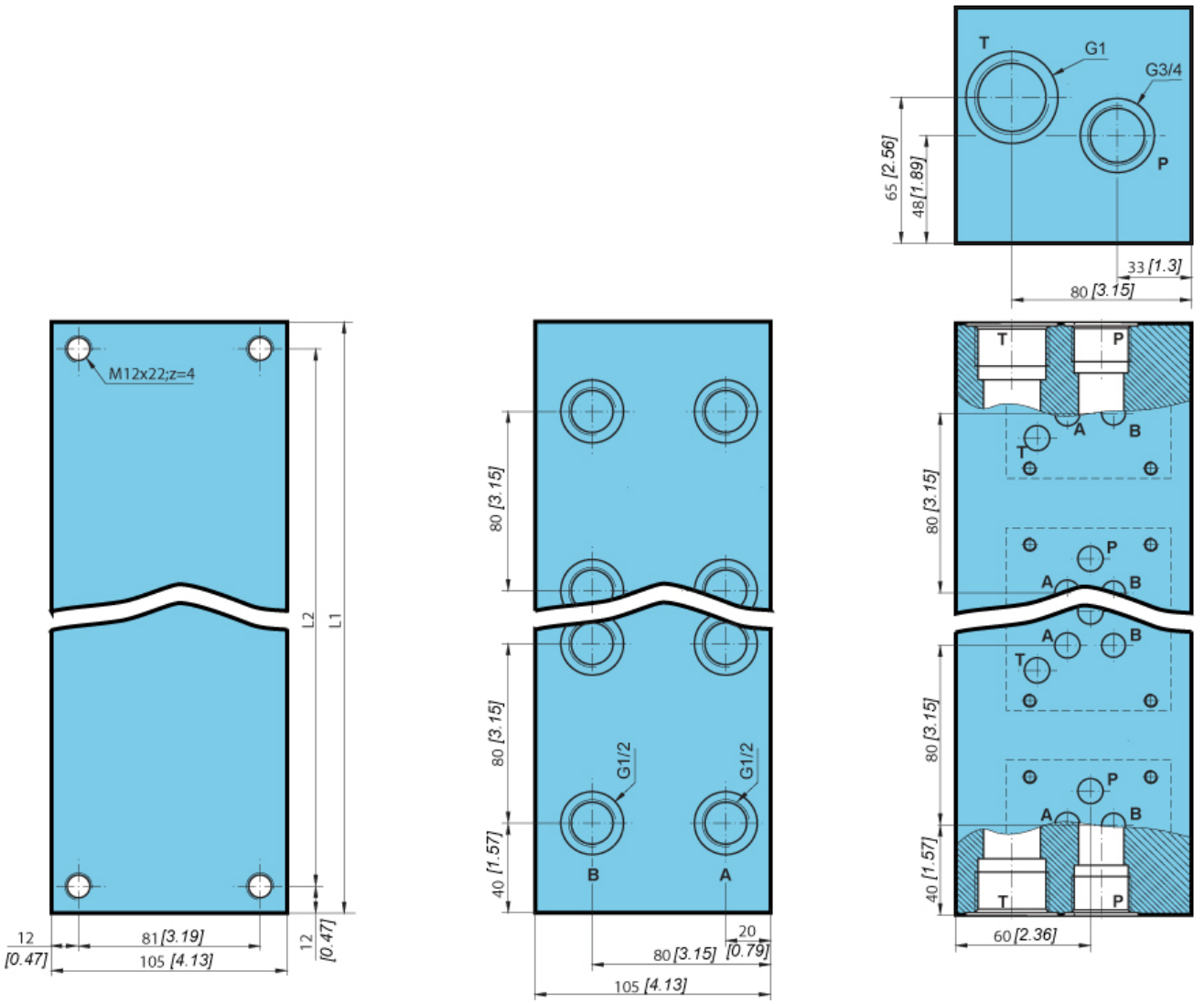


Type	Nominal size	Stations	L1 mm *[Zoll]*	L2 mm *[Zoll]*	Ports size P	Ports size A-B	Ports size T	Mass kg *[lb]*
BP-10-1	10	1	80 *[3.15]*	56 *[2.20]*	G3/4	G1/2	G1	5,9 *[13.00]*
BP-10-2		2	160 *[6.30]*	136 *[5.35]*				11,8 *[26.01]*
BP-10-3		3	240 *[9.45]*	216 *[8.50]*				17,7 *[39.02]*
BP-10-4		4	320 *[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]*

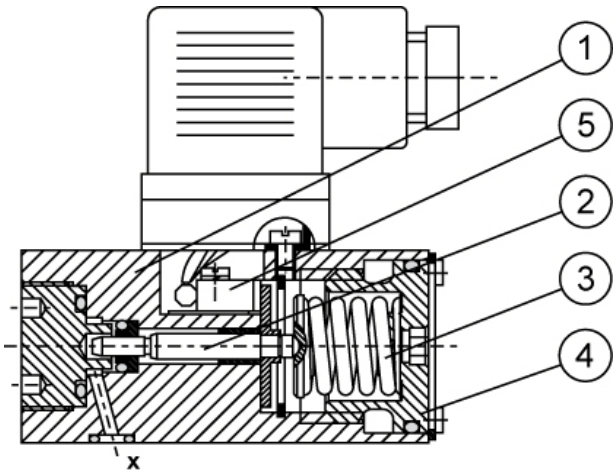
- Minimal dimensions.
- Four pressure ranges.
- Three mounting methods (horizontal, vertical, built into pipeline).
- Three pressure setting methods (by means of Allan key, knob, or lockable knob).
- Lockable pressure setting.
- Operation supervision by means of signal lamp.
- Plug-in connector for solenoids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

TS-4

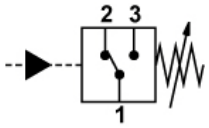
Operation

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).

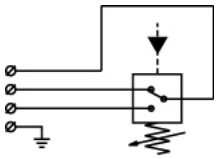


Symbol

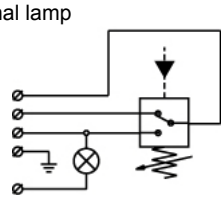


Circuit diagram

Without signal lamp

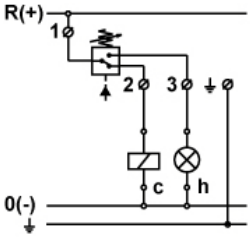


With signal lamp

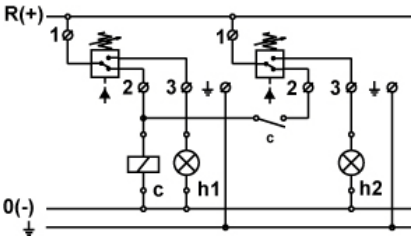


Mounting example

One pressure switch



Two pressure switches



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

Features

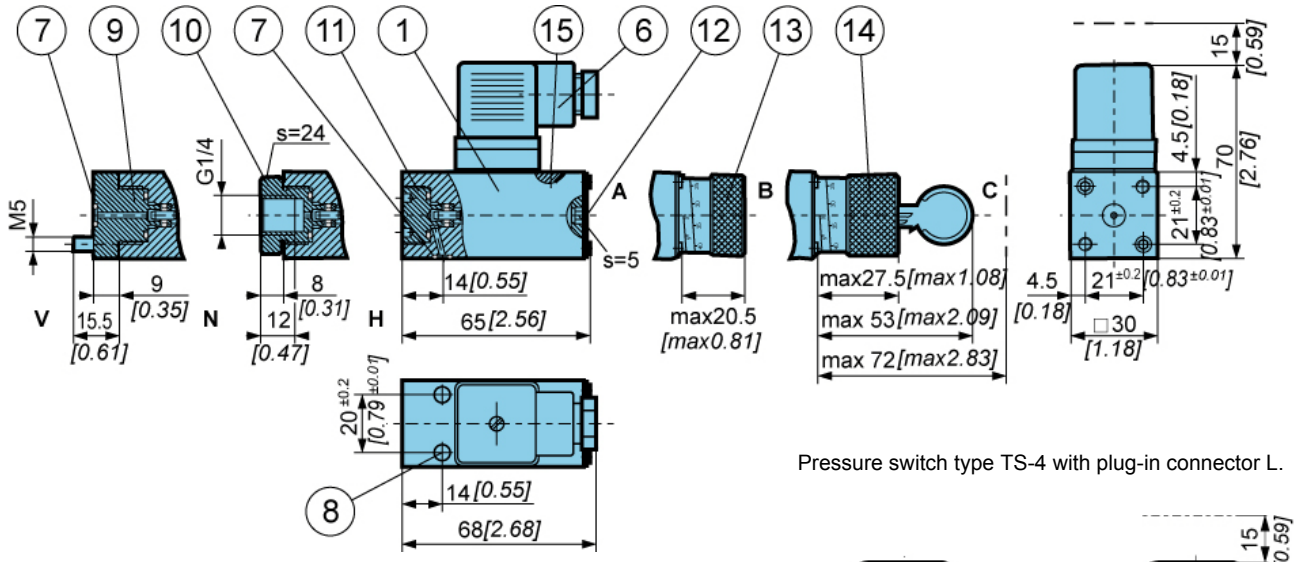
Hydraulic

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 *[lbs]*			0,2 to 0.4 *[0.44 to 0.88]*	

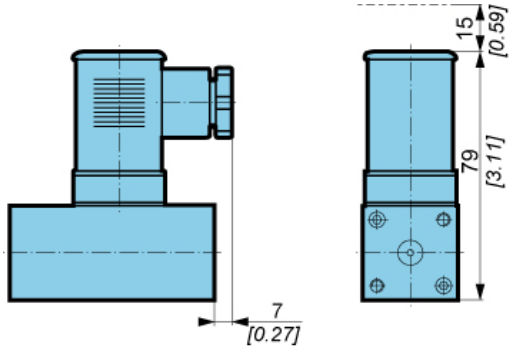
Electrical

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

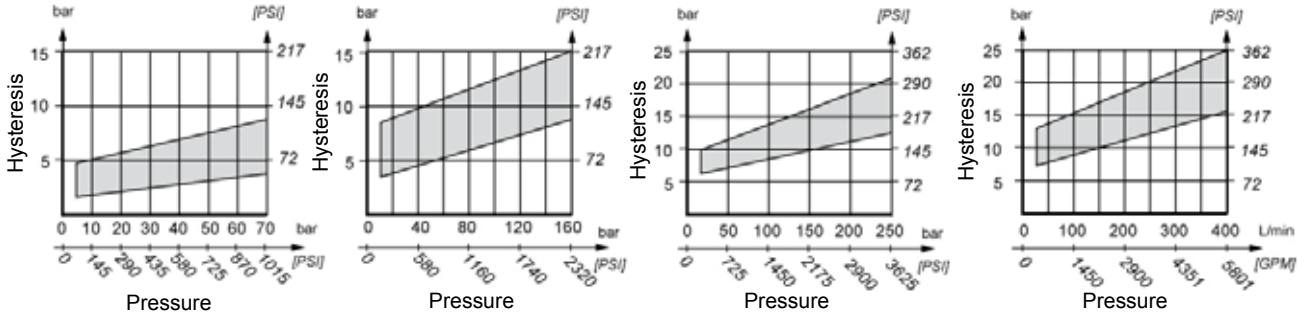


Pressure switch type TS-4 with plug-in connector L.



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

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]*

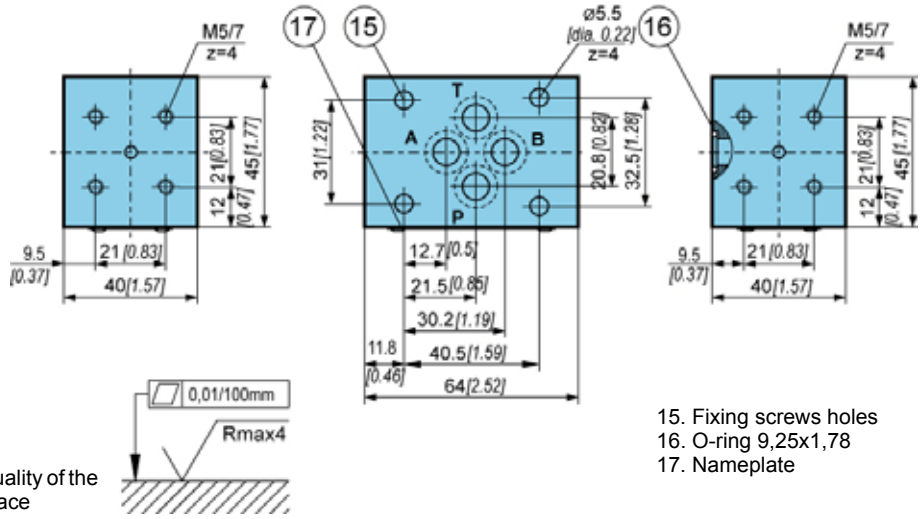
VP-TS-4-...

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 *[lbs]*	0,9 *[1.98]*	2,1 *[4.63]*

Dimensions

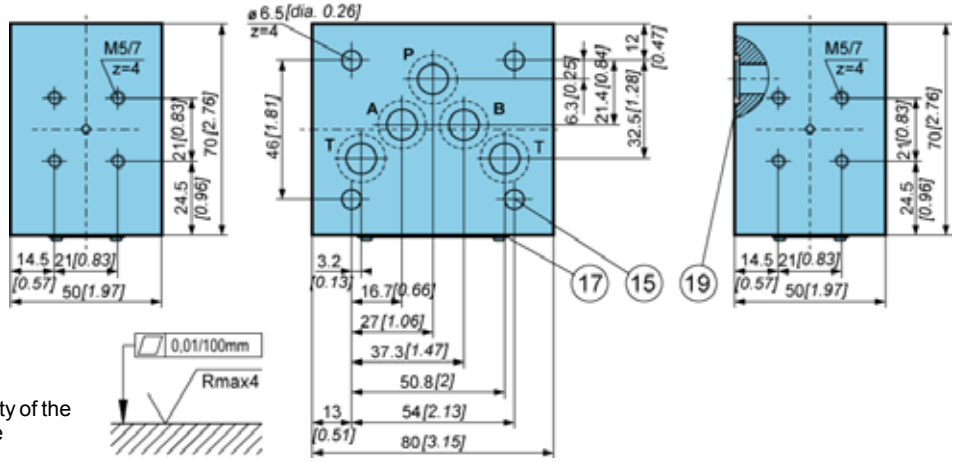
VP-TS-4-6



Required quality of the mating surface

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

VP-TS-4-10

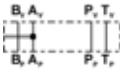
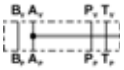
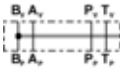
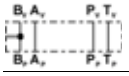
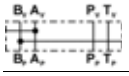
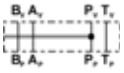
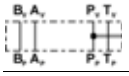
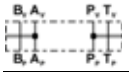
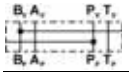
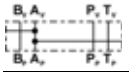
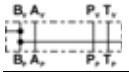
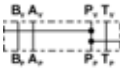


Required quality of the mating surface

Model code

VP - TS - 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

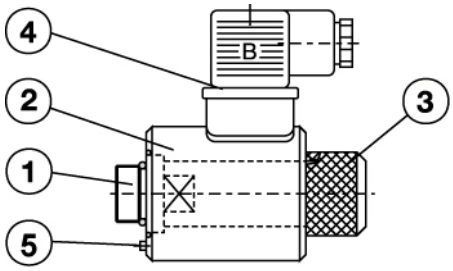
Operation

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.

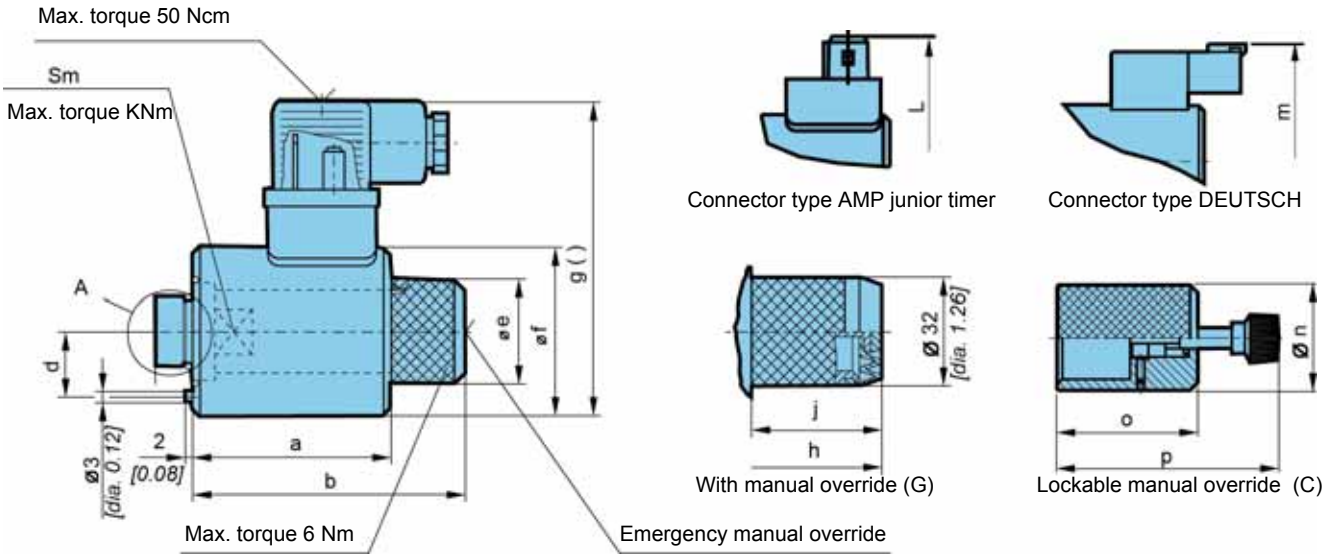
If the buyer so wishes, solenoids have the degree of protection of enclosures IP 65.
They are tested to the pressure of 250 bar *[3 626 PSI]*.
Their life span in normal working conditions is 10^7 operations.



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

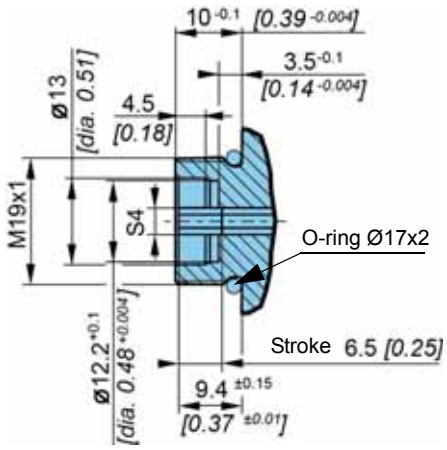


	a	b	D$^{+0,1}$	Øe	Øf	g	h	j
MR-045	53 *[2.08]*	73 *[2.87]*	17,5 *[0.69]*	30 *[1.18]*	45 *[1.77]*	85 *[3.35]* / 91* *[3.58]**	87 *[3.42]*	34 *[1.34]*
MR-045/1	38 *[1.49]*	58 *[2.28]*					72 *[2.83]*	
MR-060	72 *[2.83]*	108 *[4.25]*	23,9 *[0.94]*	40 *[1.57]*	62 *[2.44]*	103 *[4.05]* / 109* *[4.29]**	122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

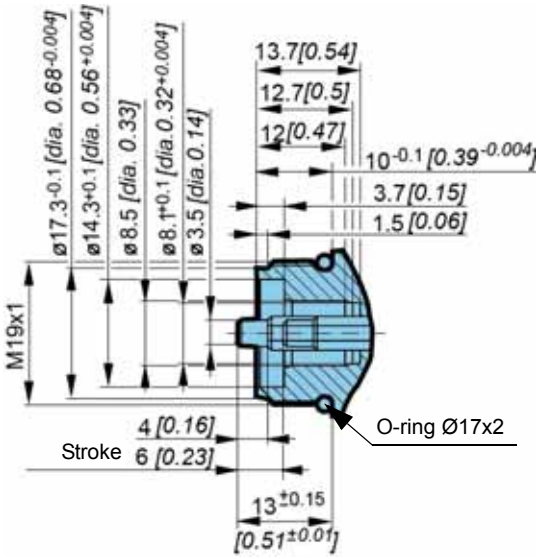
* AC supply voltage

	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]*

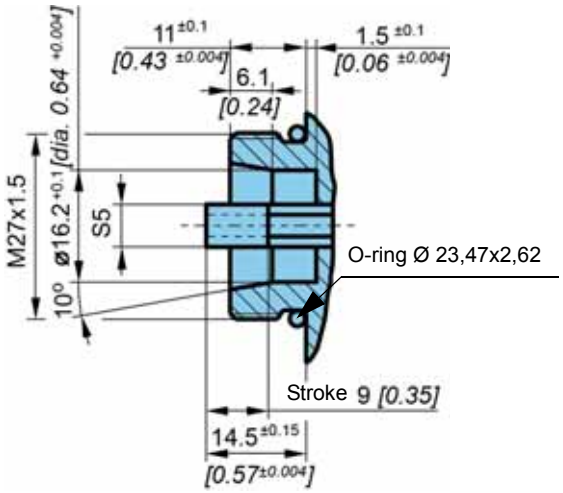
A MR-045



A MR-045/1



A MR-060



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

Core

MR - ☐ - J

Sizemm *[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

MR - ☐ - M - ☐

Sizemm *[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

MR - ☐ - O - ☐ - ☐ - ☐

Sizemm *[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	**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.

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

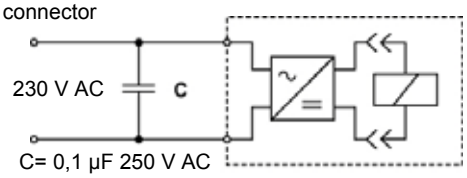
MR - K - ☐ - ☐ - ☐

Supply voltage

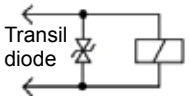
	Direct voltage	Alternating voltage
12V	**12 DC**	**12 AC**
24V	**No designation**	**24AC**
48V	**48DC**	**48AC**
110 V	**110DC**	**110AC**
230V	**230DC**	**230AC***

* 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

JOYSTICK WITH TWO SWITCHES KRSS

- Switching capacity 5 A by 12 V.
- Fast and simple installation.

KRSS-CO10-B

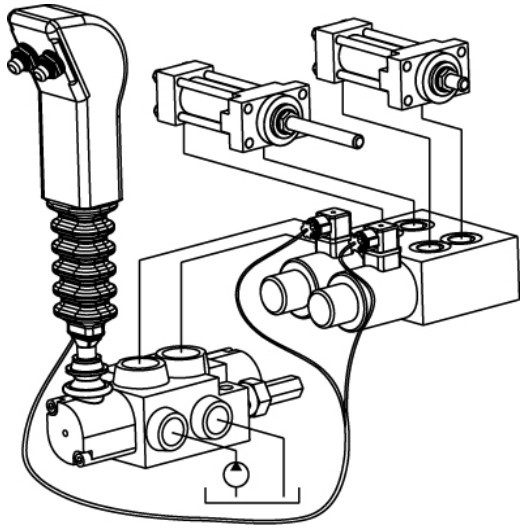
Operation

Control lever with switches provides control of the valve with direct mechanical operation and optional control of valves with direct solenoid operation. The lever is usually mounted on the operating pin lever of the valve with direct mechanical operation. The optional thumb switches mounted on the control lever have to be connected with power supply and solenoids on solenoid valves. The valve with direct mechanical operation is activated by deflection of the control lever. The solenoid valves are activated by pressing of thumb switches mounted on the control lever.

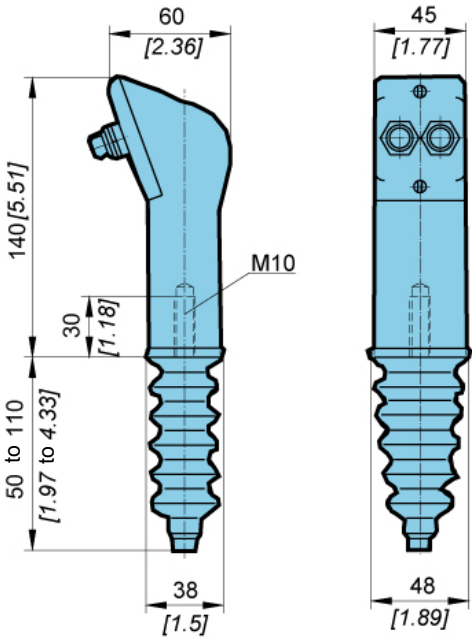
Features

Switching capacity	5A by 12 V
Element terminals	FASTON A6, 3-0, 8 EN 61210
Mounting	Inner thread M10
Material	Black plastic

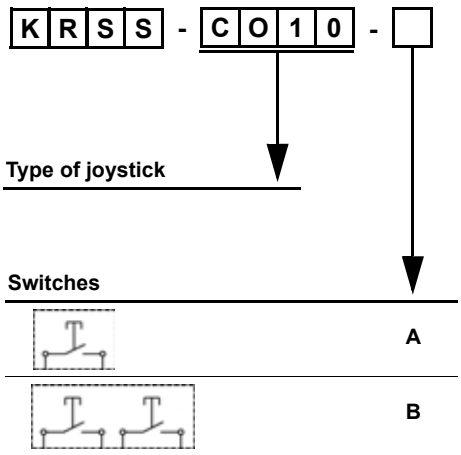
Mounting example



Dimensions



Model code



AMPLIFIER FOR SUPPLY OF THE PROPORTIONAL SOLENOID 1659574

• Plug-in connector for solenoids to ISO 4400

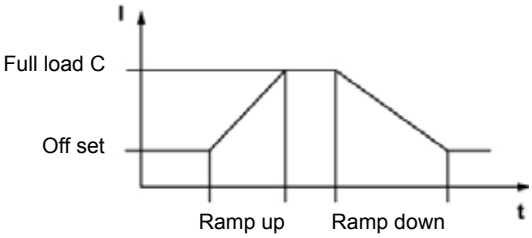
1659574

Operation

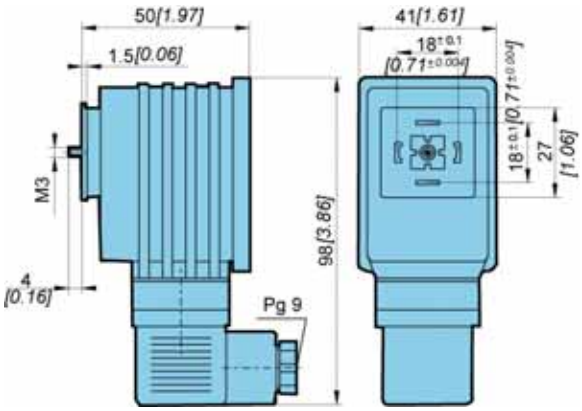
These switch mode units provide stepless control for proportional valves. Start current (OFF.SET) and full load current (FLC) can be individually preset. The current in the solenoid is substantially independent of changes in solenoid resistance and supply voltage variation. The inherent Dither, due to switch-mode operation helps to overcome friction effects in the solenoid. Ramp controls are fitted to give up to 10 seconds for the current in the solenoid to built up to its full load value, or to return to the offset point.

Features

Switching frequency		HZ	100 to 500
Two reg. ramp up and down		s	0 to 10
Power supply voltage		V DC	9 to 30
Control signal		V DC	0 to 10
Full load current		mA	1 800
Offset range	12 V	mA	0 to 900
	24 V		0 to 600
Operating temperature range		°C *[°F]*	-5 to 80 *[23 to 176]*
Storage temperature range		°C *[°F]*	-45 to 100 *[-49 to 212]*

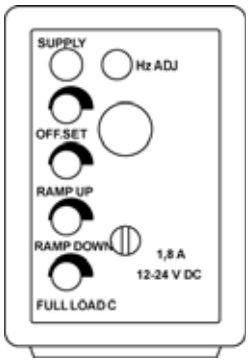


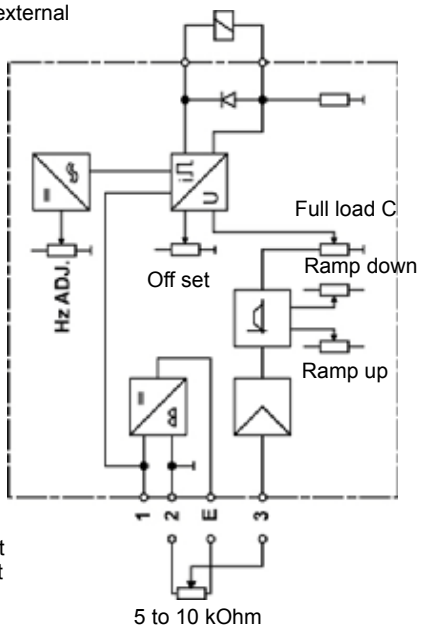
Dimensions



Connection and adjustement elements

Connection of external potentiometer





Pin 1 = +V supply input
Pin 2 = 0V supply input
Pin 3 = Control signal input
Pin E = Ref. voltage output

POCLAIN HYDRAULICS

Poclain Driving Values for the Future

29/08/2013

A52142B

B00497P

www.poclain-hydraulics.com