

Hydraulically operated directional control valves are available in 5 sizes:

- D1VP*4L NG06 – operated via end caps
- D1VP*90 NG06 – operated via end caps and mounting interface (X, Y)
- D3DP NG10 – operated via mounting interface (X, Y)
- D4P NG16 – operated via mounting interface (X, Y)
- D9P NG25 – operated via mounting interface (X, Y)
- D11P NG32 – operated via mounting interface (X, Y)

Size NG06 (D1VP) is available in two different designs:

- D1VP*4L for operating pressure >10bar (over tank pressure) with control ports in the end caps.
- D1VP*90 for operating pressure >15bar with control ports in the end caps and mounting interface (X, Y).

All other series are operated only via mounting interface (X, Y).

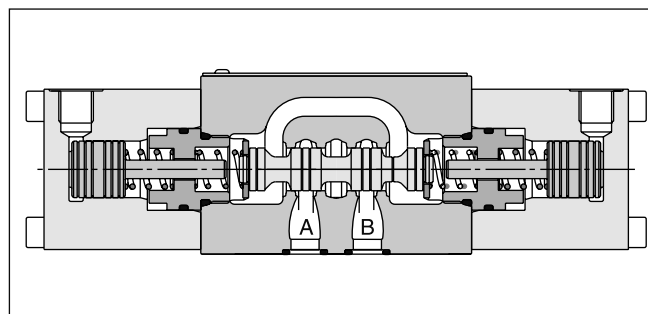
The shifting time is depending on the pilot pressure. For safe operation the minimum pilot pressure has to be ensured in all operating conditions. The maximum pilot pressure varies from the maximum operating pressure in some sizes.



D1VP*B*4L



D1VP*90



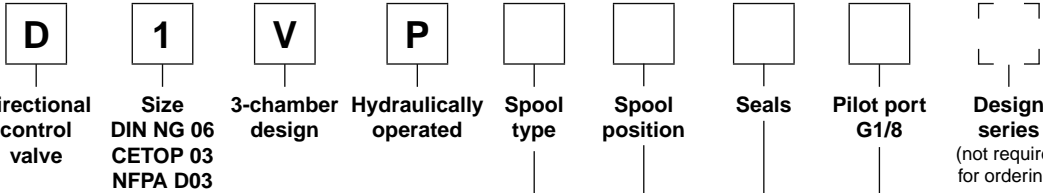
D1VP*C*4L

Technical data

General						
Design	Directional spool valve					
Actuation	Hydraulic					
Series	D1VP*4L	D1VP*90	D3DP	D4P	D9P	D11P
Size	NG06	NG06	NG10	NG16	NG25	NG32
Weight [kg]	1.3	1.3	3.7	9.0	17.0	66.0
Mounting interface	DIN 24340 A06	DIN 24340 A06	DIN 24340 A10	DIN 24340 A16	DIN 24340 A25	DIN 24340 A32
	ISO 4401 NFA D03	ISO 4401 NFA D03	ISO 4401 NFA D05	ISO 4401 NFA D07	ISO 4401 NFA D08	ISO 4401 NFA D10
CETOP RP 121-H						
Mounting position	unrestricted, preferably horizontal					
Ambient temperature [°C]	-25...+50					
MTTF _p value [years]	150					
Hydraulic						
Max. operating pressure [bar]	P, A B: 350; T: 140	P, A B, T: 350; X, Y: 210	P, A B, T: 350; X, Y: 210	P, A B, T: 350; X, Y: 350 ¹⁾	P, A B, T: 350; X, Y: 350 ¹⁾	P, A B, T: 350; X, Y: 350 ¹⁾
Fluid	Hydraulic oil in accordance with DIN 51524 / 51525					
Fluid temperature [°C]	-25 ... +70					
Viscosity permitted [cSt] / [mm ² /s]	2.8...400					
Viscosity recommended [cSt] / [mm ² /s]	30...80					
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)					
Flow max. [l/min]	60*	60*	130	300	700	2000
* depending on spool, see shift limits						
Leakage at 350 bar (per flow path)	up to 60*	up to 60*	up to 100*	up to 200*	up to 800*	up to 5000*
* depending on spool						
Operating pressure (min/max) [bar]	10* / 210	15 / 210	15 / 210	5 / 350 ¹⁾	5 / 350 ¹⁾	5 / 350 ¹⁾
* >tank pressure						
Pilot volume [cm ³]	1.2	0.7				
Pilot flow [l/min]	10	10				
Static / Dynamic						
Step response	The response times depend on the pilot oil pressure and on the speed of the increase / decrease of the pilot pressure.					

* with monitor switch: 105 bar

2



3 position spools	
Code	Spool type
	a 0 b
001	
002	
004	
006	
008 *	
009 *	

2 position spools	
Code	Spool type
	a b
020	
026	
030	

* Consider specific spool position.

Code	Pilot port G1/8
4L	High tank pressure, indirect via pilot spool
90	Direct via X, Y port or pipe thread G1/8

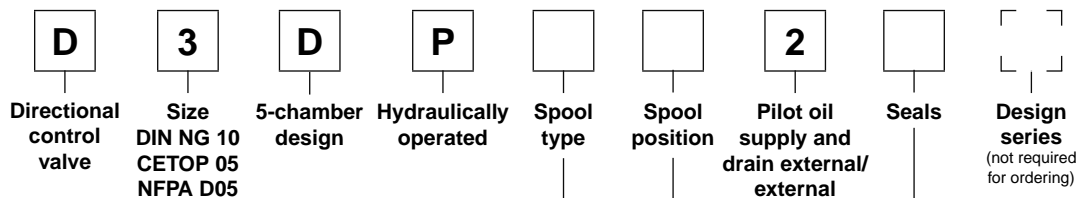
Code	Seals
N	NBR
V	FPM

3 position spools		
Code	all 3 position spools	
C		3 positions. Spring offset in position "0". Operated in position "a" or "b".
	Standard	Spool type 008 and 009
E	 Operated in position "a".	 Operated in position "b".
F	 Spring offset in position "b".	 Spring offset in position "a".
K	 Operated in position "b".	 Operated in position "a".
M	 Spring offset in position "a".	 Spring offset in position "b".

2 position spools		
Code	Spool position	
B		Spring offset in position "b". Operated in position "a".
D		Detent, operated in position "a" or "b". No centre or offset position.
H		Spring offset in position "a". Operated in position "b".

Further spool types and styles on request.

**Bold letters =
 Short-term availability**



3 position spools	
Code	Spool type
	a 0 b
001	
002	
003	
004	
005	
006	
007	
008 *	
009 *	
010	
011	
014	
015	
016	
021	
022	
031	
032	
081	
082	
102	

2 position spools	
Code	Spool type
	a b
020	
026	
030	
101	

* Consider specific spool position.

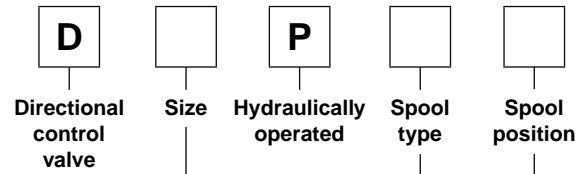
Code	Seals
N	NBR
V	FPM

3 position spools		
Code	all 3 position spools	
C		3 positions. Spring offset in position "0". Operated in position "a" or "b".
	Standard	Spool type 008 and 009
E		2 positions. Spring offset in position "0".
F		2 positions. Operated in position "0".
K		2 positions. Spring offset in position "0".
M		2 positions. Operated in position "0".

2 position spools		
Code	Spool position	
B		Spring offset in position "b". Operated in position "a".
D		Detent, operated in position "a" or "b". No center or offset position.
H		Spring offset in position "a". Operated in position "b".

Further spool types and styles on request.

2



Code	Bore	Size
4	Ø20mm	NG16
9	Ø32mm	NG25
11	Ø50mm	NG32

3 position spools		D4	D9	D11
Code	Spool type			
1		•	•	•
2		•	•	•
3		•	•	
4		•	•	
5		•	•	
6		•	•	
7		•	•	
9 ¹⁾		•	•	•
11		•	•	
14		•	•	
15		•	•	
16		•	•	
21		•	•	
22		•	•	
31			•	
32			•	
54		•	•	•
81		•	•	•
82		•	•	•

2 position spools		D4	D9	D11
Code	Spool type			
20		•	•	•
26		•	•	
30		•	•	•

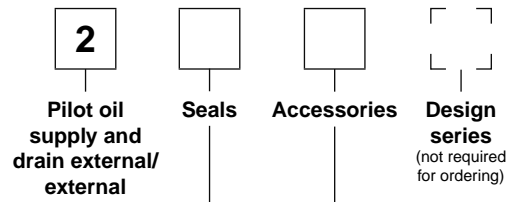
¹⁾ Consider specific spool position
²⁾ Only D4 and D9 available

Further spool types and position control on request.

3 position spools		
Code	all 3 position spools	
C		3 positions. Spring offset in position "0". Operated in position "a" or "b".
	Standard	Spool type 9
E	 Operated in position "a".	 Operated in position "b".
F	 Spring offset in position "b".	 Spring offset in position "a".
K	 Operated in position "b".	 Operated in position "a".
M	 Spring offset in position "a".	 Spring offset in position "b".
R ²⁾	 No centre in offset position.	 No centre in offset position.
S ²⁾	 No centre in offset position.	 No centre in offset position.

2 position spools		
Code	Spool position	
B		Spring offset in position "b". Operated in position "a".
D ²⁾		Detent, operated in position "a" or "b". No center or offset position.
H		Spring offset in position "a". Operated in position "b".





Code	Accessories
omit	Standard valve w/o accessories
7	Pilot choke, meter-out
8 ²⁾	Stroke adjustment side B
9 ²⁾	Stroke adjustment side A
60	Pilot choke, meter-in
89 ²⁾	Stroke adjustment side A and B

Code	Seals
N	NBR
V	FPM

2

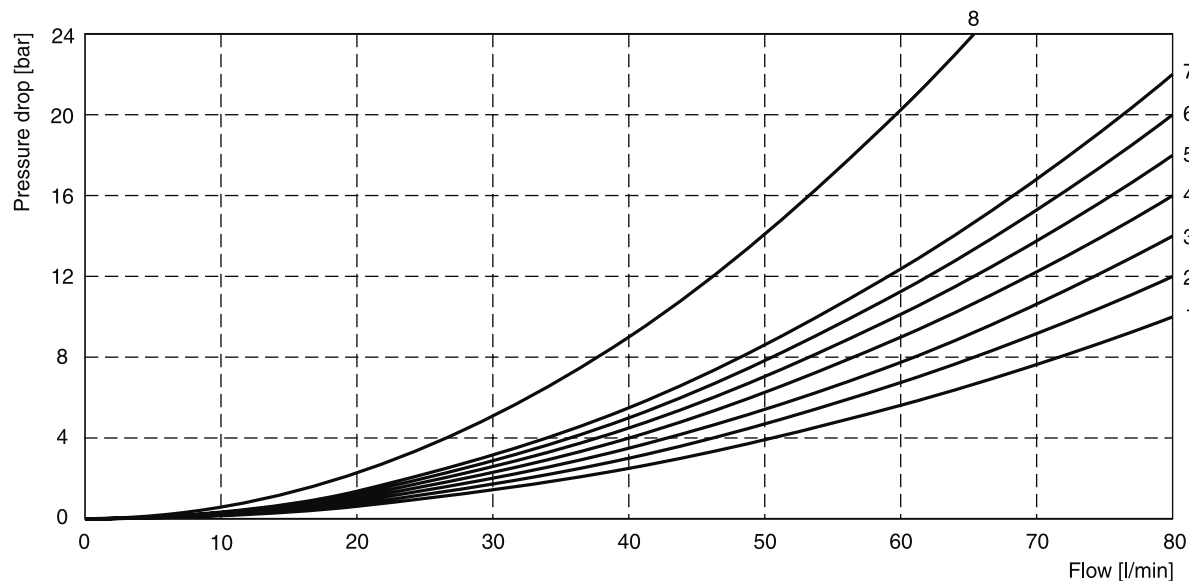
Flow Curve Diagrams / Shift Limits

The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number

for each spool type, operating position and flow direction is given in the table below.

Spool	Position „b“		Position „a“		Position „0“				
	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T
001	2	2	2	2	-	-	-	-	-
002	1	4	1	4	1	1	5	5	2
004	2	3	2	3	-	-	7	7	-
006	1	4	1	4	7	7	-	-	-
020	4	4	2	3	-	-	-	-	-
026	4	-	4	-	-	-	-	-	-
030	2	3	1	2	-	-	-	-	-
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T
008	4	5	4	5	-	-	-	-	8
009	5	5	6	7	-	-	-	-	7

Flow curve



All characteristic curves measured with HLP46 at 50°C.

Shift limits

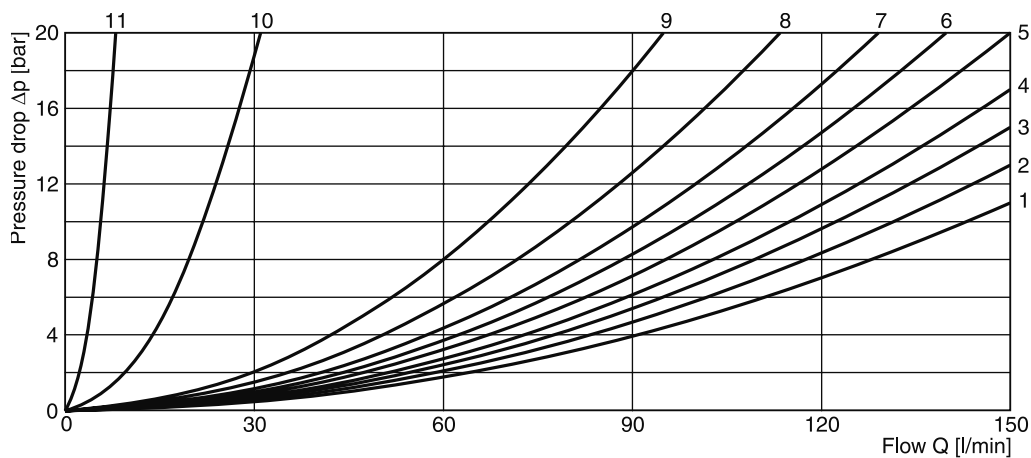
Spool	Shift limit [l/min]
001	60
002	
004	
006	
020	
030	
08	40
09	
026	20

The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

Spool	Position „b“		Position „a“		Position „0“						
	P-A	B-T	P-B	A-T	P-A	P-B	A-T	B-T	P-T	A-B	
001	4	3	4	3	–	–	–	–	–	–	
002	2	4	3	3	2	2	1	2	3	4	
003	2	2	4	1	–	–	5	–	–	–	
004	4	3	3	2	–	–	5	5	–	6	
005	1	3	4	2	4	–	–	–	–	–	
006	2	4	3	3	5	5	–	–	–	6	
007	4	2	2	2	–	2	–	2	5	–	
010	2	–	2	–	–	–	–	–	–	–	
011	3	3	2	3	–	–	10	10	–	11	
014	2	3	4	2	2	–	2	–	5	–	
015	4	2	2	2	–	–	–	4	–	–	
016	4	2	1	1	–	4	–	–	–	–	
020	4	4	4	4	–	–	–	–	–	–	
026	3	–	3	–	–	–	–	–	–	–	
030	4	3	3	3	–	–	–	–	–	–	
081	6	7	6	7	–	–	–	–	–	–	
082	7	7	6	5	–	–	11	11	–	11	
101	9	9	9	9	–	–	–	–	–	–	
102	2	2	2	1	6	6	3	5	6	6	
	P-B	A-T	P-A	B-T	P-A	P-B	A-T	B-T	P-T	A-B	
008	4	2	5	6					8		
009	2	5	2	6	–	–	–	–	8	–	
	Position „b“		Position „a“		Position „0“						
	P-A	B-T	A-B	P-B	A-T		A-T				
021	3	5	6	4	2	–	–	–			
031	3	5	6	4	1	–	9	–			
	P-A	B-T		P-A	P-B	A-B		B-T			
022	5	4	–	5	2	6	–	–			
032	5	2	–	5	2	6	–	9			

2

Flow curve



All characteristic curves measured with HLP46 at 50°C.

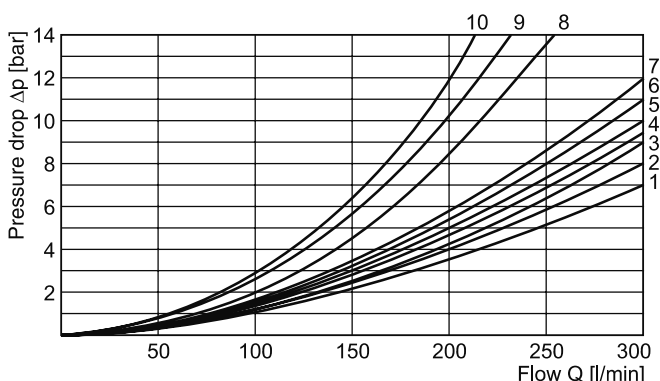
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number

for each spool type, operating position and flow direction is given in the table below.

D4P

Spool Code	Curve number				
	P-A	P-B	P-T	A-T	B-T
1	1	1	-	4	5
2	1	2	6	4	6
3	1	2	-	5	6
4	1	1	-	5	5
5	2	2	-	3	5
6	1	2	-	3	6
7	1	1	6	4	5
9	2	9	8	7	10
11	1	1	-	4	5
14	1	1	6	4	5
15	1	2	-	4	6
16	2	2	-	3	5
20	3	5	-	3	5
21	2	8	-	2	-
22	8	2	-	-	3
26	3	5	-	-	-
30	2	3	-	6	7
54	2	3	-	6	7

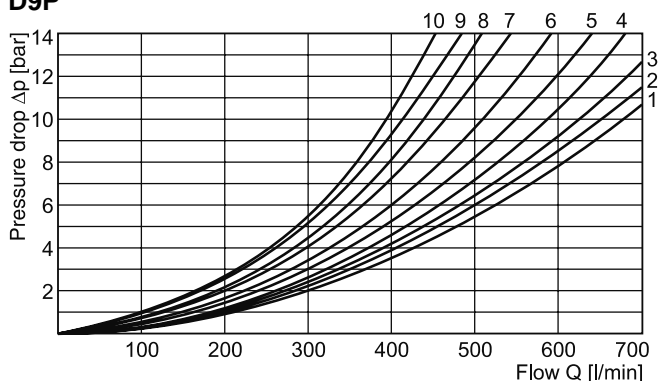
D4P



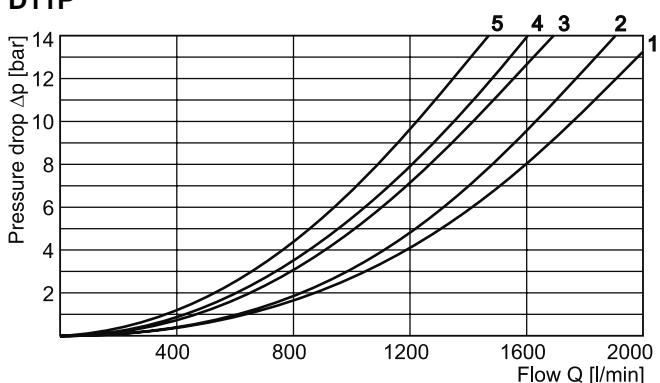
D9P and D11P

Spool Code	Curve number									
	P-A		P-B		P-T		A-T		B-T	
	D9	D11	D9	D11	D9	D11	D9	D11	D9	D11
1	3	5	2	5	-	-	3	4	5	1
2	2	5	1	5	1	5	3	4	5	1
3	4	-	2	-	-	-	3	-	6	-
4	4	-	3	-	-	-	3	-	5	-
5	1	-	2	-	-	-	4	-	5	-
6	2	-	2	-	-	-	4	-	6	-
7	3	-	1	-	7	-	3	-	5	-
9	4	3	8	3	9	2	4	3	10	1
11	3	-	2	-	-	-	3	-	5	-
14	1	-	2	-	8	-	3	-	5	-
15	3	-	3	-	-	-	4	-	5	-
16	3	-	3	-	-	-	4	-	5	-
20	6	5	5	5	-	-	6	3	8	-
21	5	-	10	-	-	-	3	-	-	-
22	10	-	5	-	-	-	-	-	5	-
26	6	-	5	-	-	-	-	-	-	-
30	3	5	2	5	-	-	3	4	5	1
54	-	5	-	5	-	-	-	4	-	1

D9P

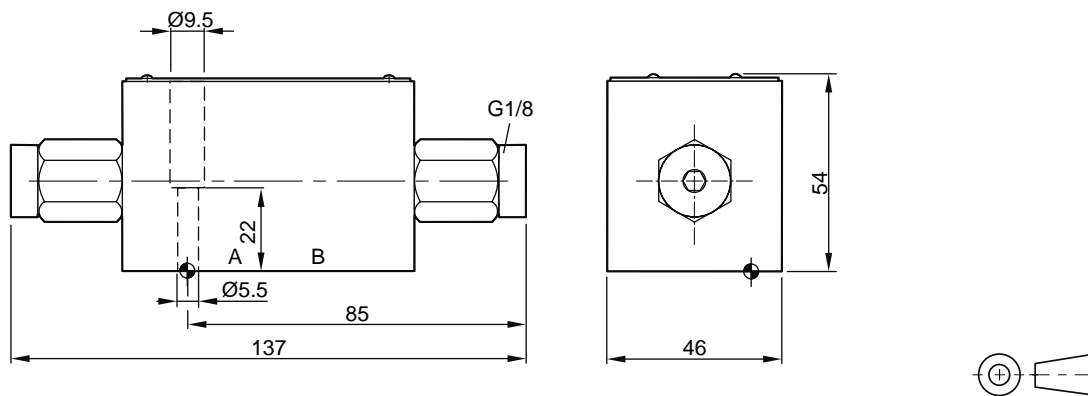


D11P



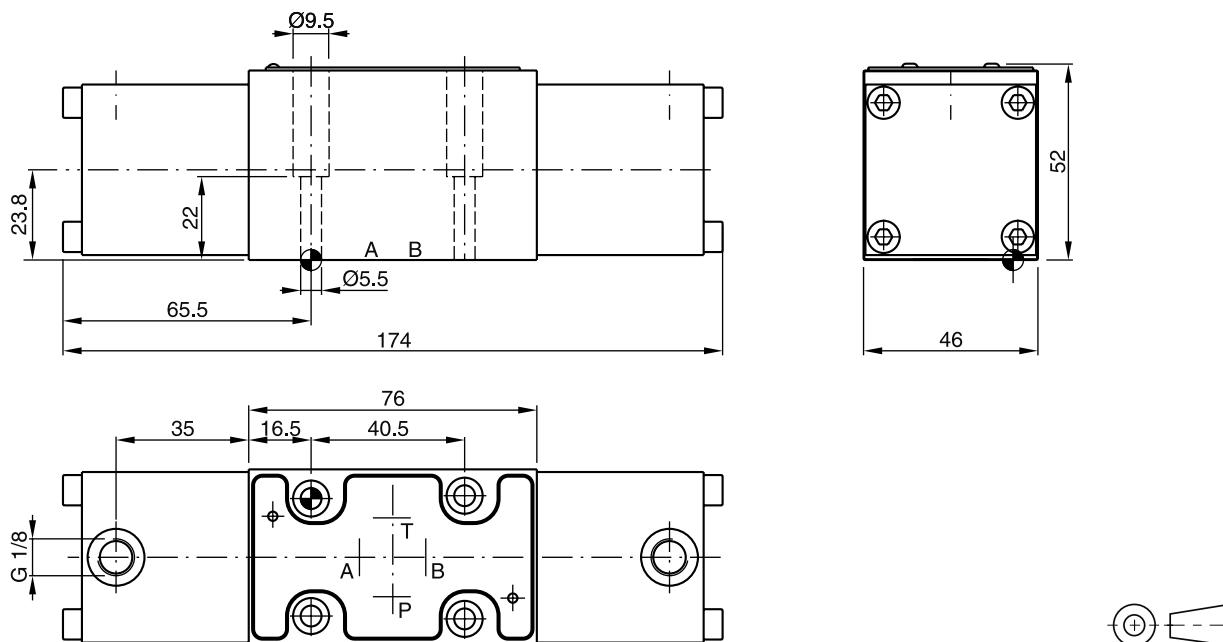
All characteristic curves measured with HLP46 at 50°C.

D1VP*90



Surface finish	Kit	Kit	Kit	Kit
	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	NBR: SK-D1VP-N-87 FPM: SK-D1VP-V-87

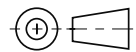
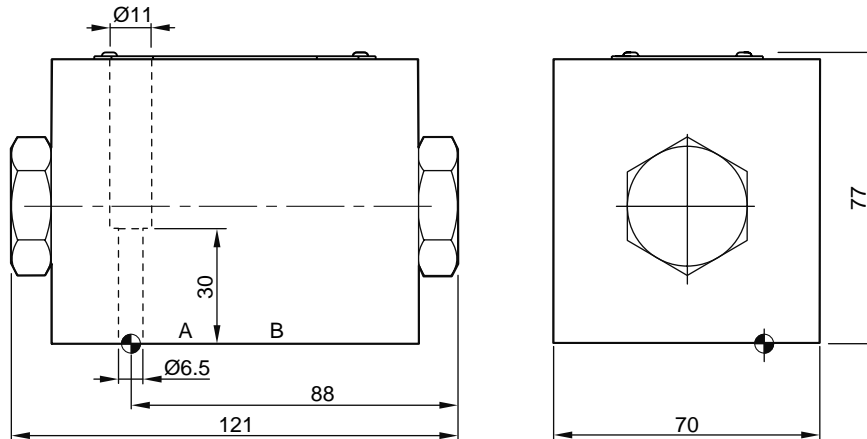
D1VP*4L



Surface finish	Kit	Kit	Kit	Kit
	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	NBR: SK-D1VP-N4L-91 FPM: SK-D1VP-V4L-91

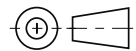
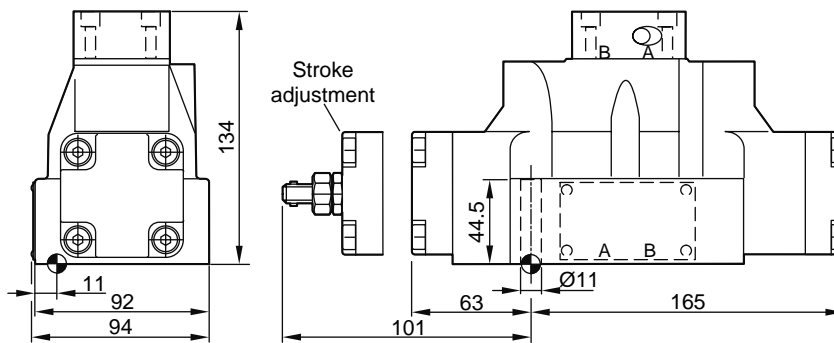
D3DP

2



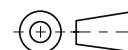
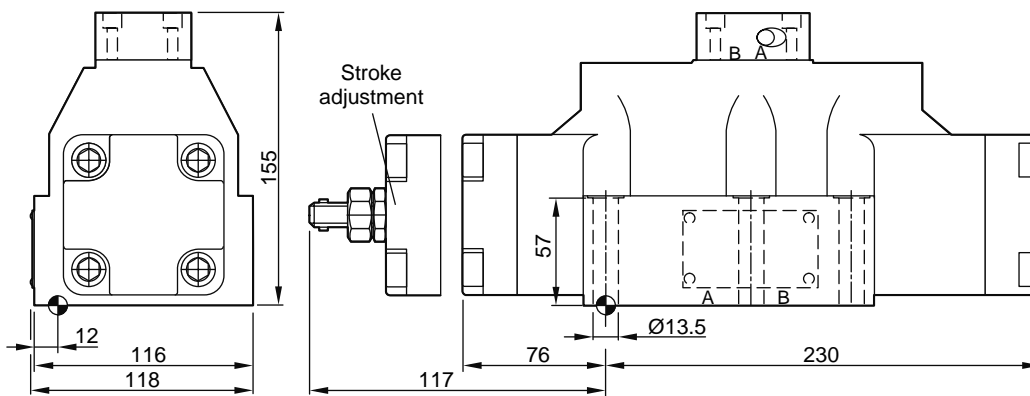
Surface finish	Kit	Kit	Kit	Kit
	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	NBR: SK-D3DP-42 FPM: SK-D3DP-V42

D4P



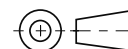
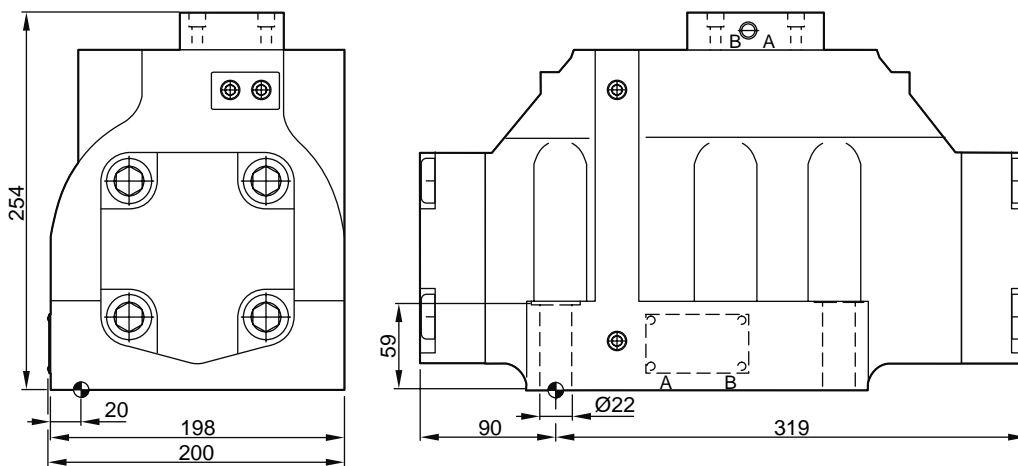
Surface finish	Kit	Kit	Kit	Kit
	BK320	4x M10x60 2 x M6x55 DIN 912 12.9	63 Nm ±15% 13.2 Nm ±15%	NBR: SK-D41VW-70 FPM: SK-D41VW-V70

D9P



Surface finish	Kit			Kit
$\sqrt{R_{max} 6.3}$ $\square 0.01/100$	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	NBR: SK-D91VW-70 FPM: SK-D91VW-V70

D11P



Surface finish	Kit			Kit
$\sqrt{R_{max} 6.3}$ $\square 0.01/100$	BK386	6x M20x90 DIN 912 12.9	517 Nm ±15%	NBR: SK-D111VW-70 FPM: SK-D111VW-V70

