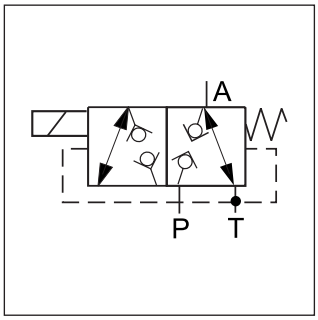
Notes

The directional valve type D1SE is equipped with a wet pin armature solenoid, drain free tapered poppet valve and compatible with the standards DIN NG06, CETOP 03, and NFPA D03. Due to the 3/2 way design, port A is either connected with P or discharged in the tank. The neutral position (solenoid not activated) is taken automatically by a return spring. This position remains until the solenoid is energized.

The valve poppet including activation lever and armature of the solenoid are located in the pressurized oil chamber of connection T. The valve poppet is designed such that there can be no differential area in its axial operational direction (opening, closing). Thus it is statically pressure-balanced so that the valve can be switched in both flow directions even under pressure.

The unit has an all-steel design, the important functional inner parts are hardened, the poppet and seat are grinded.



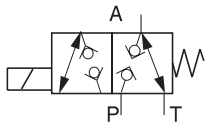
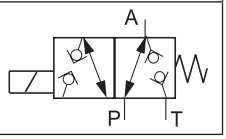
Technical data

General					
Design		Directional poppet valve			
Actuation		Solenoid			
Size		DIN NG6 / CETOP 03 / NFPA D03			
Mounting interface		DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03			
Mounting position		Unrestricted			
Ambient temperature	[°C]	-25...+50, observe permissible duty cycle			
Weight	[kg]	1.5			
Hydraulic					
Max. operating pressure P, A and T	[bar]	350			
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525			
Fluid temperature	[°C]	-25 ... +70			
Viscosity permitted	[cSt] / [mm²/s]	10...500			
Viscosity recommended	[cSt] / [mm²/s]	30...80			
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)			
Flow max.	[l/min]	20			
Static / Dynamic					
Step response	[ms]	Energized: approx. 50			
	[ms]	De-energized: approx. 60			
Electrical characteristics					
Duty ratio		See diagram			
Max. switching frequency	[1/h]	2000			
Protection class		IP65 in accordance with EN 60529 (plugged and mounted)			
	Code	K	J	U	G
Supply voltage	[V]	12 V =	24 V =	98 V =	205 V =
Tolerance supply voltage	[%]	±10	±10	±10	±10
Current consumption	[A]	1.95	1.1	0.25	0.13
Power consumption	[W]	23.4	26.4	24.3	26.6
Solenoid connection		Connector as per EN 175301-803			
Wiring min.	[mm²]	3 x 1.5 recommended			
Wiring length max.	[m]	50 recommended			

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

2

D	1	S	E		B			W	
Directional control valve	**Size DIN NG06 CETOP 03 NPPA D03**	**Seat valve**	**Wet pin armature solenoid, flanged**	**Spool type**	**Style**	**Seals**	**Solenoid voltage**	**Connector as per EN 175301-803 without plug [1]**	**Design Series** (not required for ordering)

Code	Spool type
30	
83	

Code	Seals
N	**NBR**
V	FPM

Code	Voltage
K	12V=
J	**24V=**
U [2]	98V=
G [2]	205V=

[2] To be used with rectifier plug when DC solenoids are used with AC input.

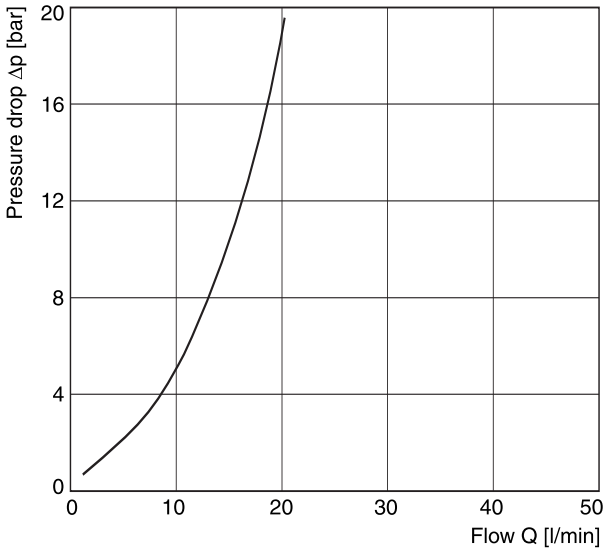
Bold letters =
Short-term availability

[1] Please order plug separately.

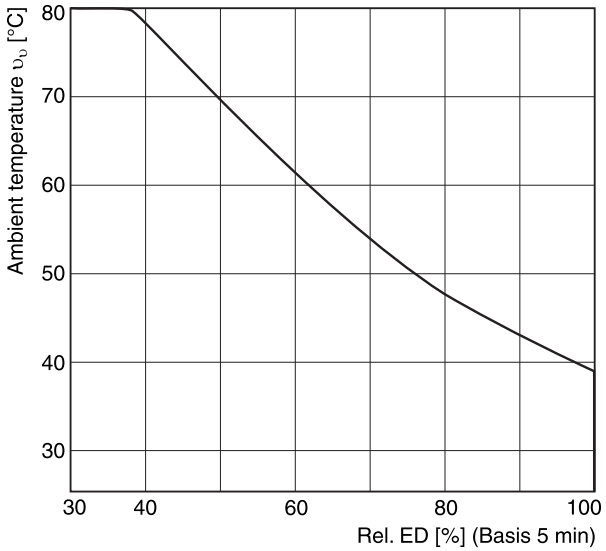
Solenoids for repair

Voltage	Ordering code
12V=	7329700 - 12V
24V=	7329700 - 24V
98V=	7329700 - 98V
205V=	7329700 - 205V

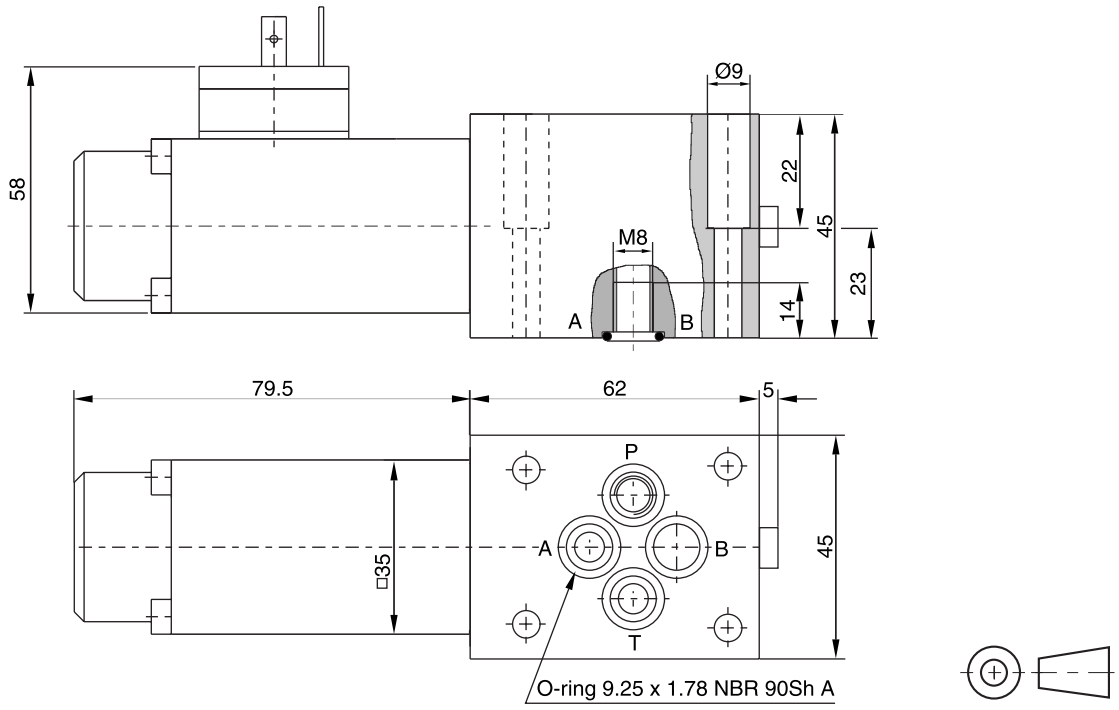
Performance curve Δp-Q



Duty cycle versus ambient temperature



Dimensions



Surface finish	Kit			Kit NBR
$\sqrt{R_{max}6.3}$ ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1SE-70** FPM: DK-D1SE-V70

Subplates and manifolds see chapter 12.

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

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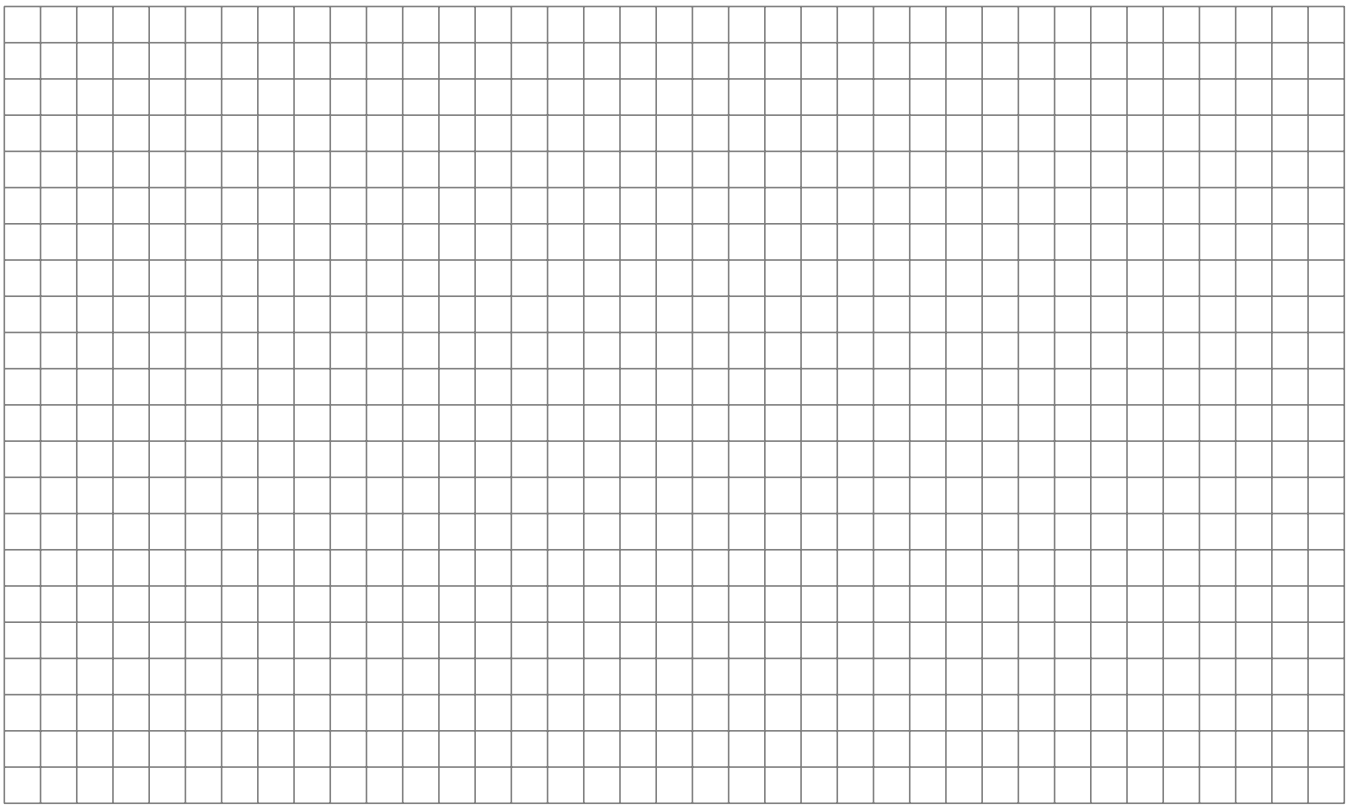
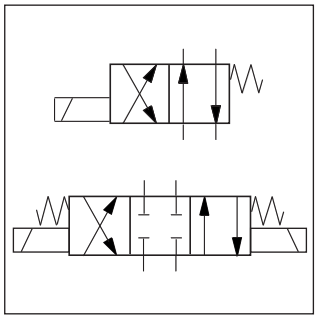
Hydraulic Controls Division
Kaarst, Germany

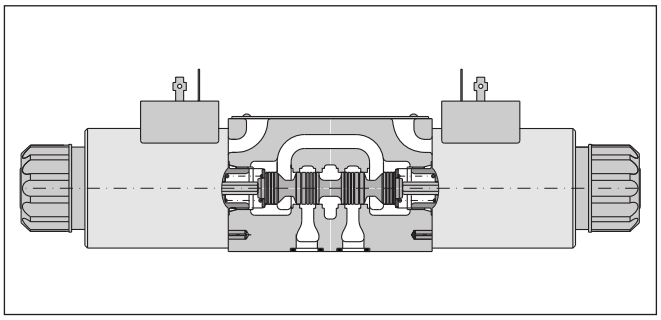
Notes



The D1VW is a solenoid operated directional control valve size NG06 in 3-chamber design. It is direct operated by wet pin solenoids.

The D1VW is available with a soft shift option for smooth operation. An additional orifice in the solenoid anchor dampens the shifting time.





Technical data

General							
Design			Directional spool valve				
Actuation			Solenoid				
Nominal size			DIN NG06 / CETOP 03 / NFPA D03				
Mounting interface			DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03				
Mounting position			unrestricted, preferably horizontal				
Ambient temperature		[°C]	-25...+50				
Weight		[kg]	1.5 (1 solenoid), 2.1 (2 solenoids)				
Hydraulic							
Max. operating pressure		[bar]	P, A B: 350				
		[bar]	T: 210 (DC), 105 (AC), 210 (AC Code “H“)				
Fluid			Hydraulic oil in accordance with DIN 51524 / 51525				
Fluid temperature		[°C]	-25 ... +70				
Viscosity permitted		[cSt] / [mm²/s]	2.8...400				
Viscosity recommended		[cSt] / [mm²/s]	30...80				
Filtration			ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)				
Flow max.		[l/min]	80				
Leakage at 50 bar		[ml/min]	Up to 10 per flow path, depending on spool				
Static / Dynamic							
Step response			see table response time				
Electrical characteristics							
Duty ratio			100% ED; CAUTION: coil temperature up to 150 °C possible				
Max. switching frequency		[1/h]	15000				
Protection class			IP 65 in accordance with EN 60529 (plugged and mounted)				
		Code	K	J	U	G	Y	T
Supply voltage		[V]	12 V =	24 V =	98 V =	205 V =	110 at 50Hz / 120 at 60Hz	230 at 50Hz / 240 at 60Hz
Tolerance supply voltage		[%]	±10	±10	±10	±10	±5	±5
Current consumption	hold	[A]	2.5	1.25	0.31	0.15	0.58 / 0.49	0.31 / 0.26
Current consumption	in rush	[A]	2.5	1.25	0.31	0.15	2.1 / 2.0	1.05 / 1.0
Power consumption	hold	[W]	30	30	30	30	64 / 59 [VA]	68 / 62 [VA]
Power consumption	in rush	[W]	30	30	30	30	231 / 240 [VA]	231 / 240 [VA]
Solenoid connection			Connector as per EN 175301-803, solenoid identification as per ISO 9461 (code W). Conduit box with plug-in coil and central plug M12x1 as per IEC 61076-2-101 (M12x1) (code G).					
Wiring min.		[mm²]	3 x 1.5 recommended					
Wiring length max.		[m]	50 recommended					

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

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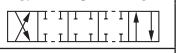
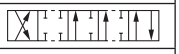
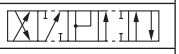
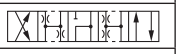
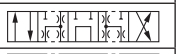
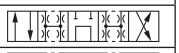
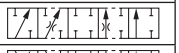
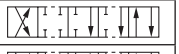
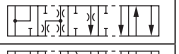
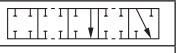
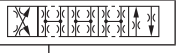
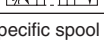
Kaarst, Germany

2

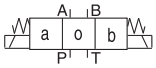
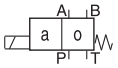
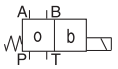
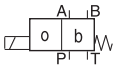
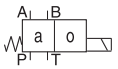
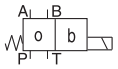
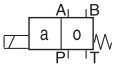
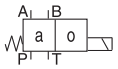
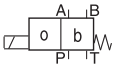
D	1	V	W			
Directional control valve	**Size DIN NG06 CETOP 03 NFPA D03**	**3-chamber valve**	**Wet pin armature solenoid, threaded in tube**	**Spool type**	**Spool position**	**Seals**

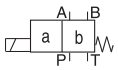
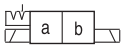
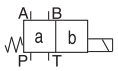
3 position spools	
Code	Spool type a 0 b
1	
2	
3	
4	
5	
6	
7	
8 [1]	
9 [1]	
10	
11	
14	
15	
16	
21	
22	
31	
32	
76	
78	
81	
82	
102	

2 position spools	
Code	Spool type a b
20	
26	
30	
101	

[1] 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 8 and 9	
E	 Operated in position “a“.	 Operated in position “b“.	**2 positions. Spring offset in position “0“.**
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	**2 positions. Spring offset in position “0“.**
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		**2 positions. Spring offset in position “b“. Operated in position “a“.**
D		**2 positions. Operated in position “a“ or “b“. No centre or offset position.**
H		**2 positions. Spring offset in position “a“. Operated in position “b“.**

Bold letters =
Short-term availability

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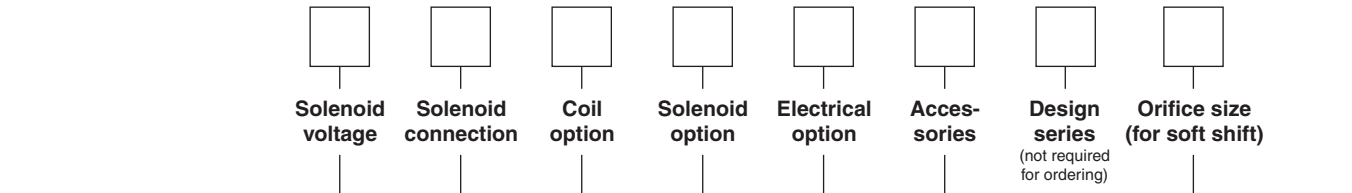
Hydraulic Controls Division
Kaarst, Germany



Code	Voltage
K	**12V =**
J	**24V =**
U [2]	98V =
G [2]	205V =
Y	110V 50Hz / 120V 60Hz
T	230V 50Hz / 240V 60Hz

[2] Rectifier needed for DC solenoid when used with AC input.

Code	Solenoid connection
G [3]	Conduit box with plug-in coil
W [4]	**Connector as per EN 175301-803, without plug**

[3] Only available for 24 VDC.
[4] Please order plug separately.

Code	Coil option
omit	**Standard valve (in combination with solenoid connection "W")**
M	Plug in coil (in combination with solenoid connection "G")

Code	Solenoid option
omit	**Standard solenoid with manual override**
H	High pressure solenoid tube for AC. Tank pressure up to 210bar
T	without manual override
S	**Soft shift with built in combination with orifice size XB07* (for DC only).**

Code	Orifice diameter
omit	Standard response
XB072	0.5 mm
XB073	0.75 mm
XB074	**1.0 mm**

Code	Accessories
omit	**Standard valve (in combination with solenoid connection "W")**
7W [5]	M12 x 1 plug (4pin) pin1: not connected pin2: solenoid A 24V pin3: common 0V pin4: solenoid B 24V
7Y [5]	M12 x 1 plug (4pin) pin1: not connected pin2: solenoid B 24V pin3: common 0V pin4: solenoid A 24V

[5] Only available for solenoid connection code "G".

Solenoid identification acc. to ISO 9461

Code	Electrical option
omit	**Standard valve (in combination with solenoid connection "W")**
J	Surge diode with LED, max. voltage peak 50V (only available in combination with solenoid conn. "G")

Further spool types and solenoid voltages on request.

2

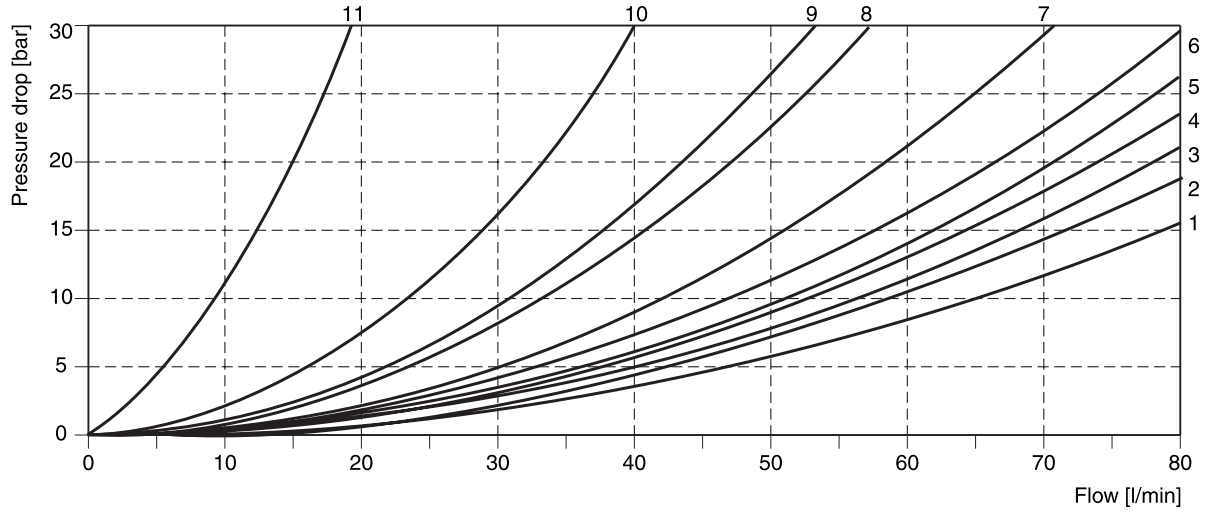
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	1	4	1	–	–	–	–	–	–
2	5	2	5	2	4	4	1	1	6	1
3	4	1	4	2	–	–	8	–	–	–
4	4	2	4	2	–	–	7	7	–	9
5	4	1	5	1	9	–	–	–	–	–
6	5	1	5	1	9	9	–	–	–	9
7	5	2	4	1	–	5	–	1	7	–
10	4	–	4	–	–	–	–	–	–	–
11	4	2	4	2	–	–	11	11	–	–
14	4	1	5	2	5	–	1	–	7	–
15	4	2	4	1	–	–	–	8	–	–
16	5	1	4	1	–	9	–	–	–	–
20	5	1	5	1	–	–	–	–	–	–
26	6	–	6	–	–	–	–	–	–	–
30	5	1	5	1	–	–	–	–	–	–
76	–	2	–	–	–	–	3	–	–	–
78	–	–	–	2	–	–	–	3	–	–
81	10	10	10	10	–	–	–	–	–	–
82	10	10	10	10	–	–	[1]	[1]	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
8	2	2	2	2	–	–	–	–	8	–
9	3	3	3	3	–	–	–	–	9	–

	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
21	3	3	3	6	1	
	P->A	B->T		P->A	P->B	A->B
22	6	1		3	3	3

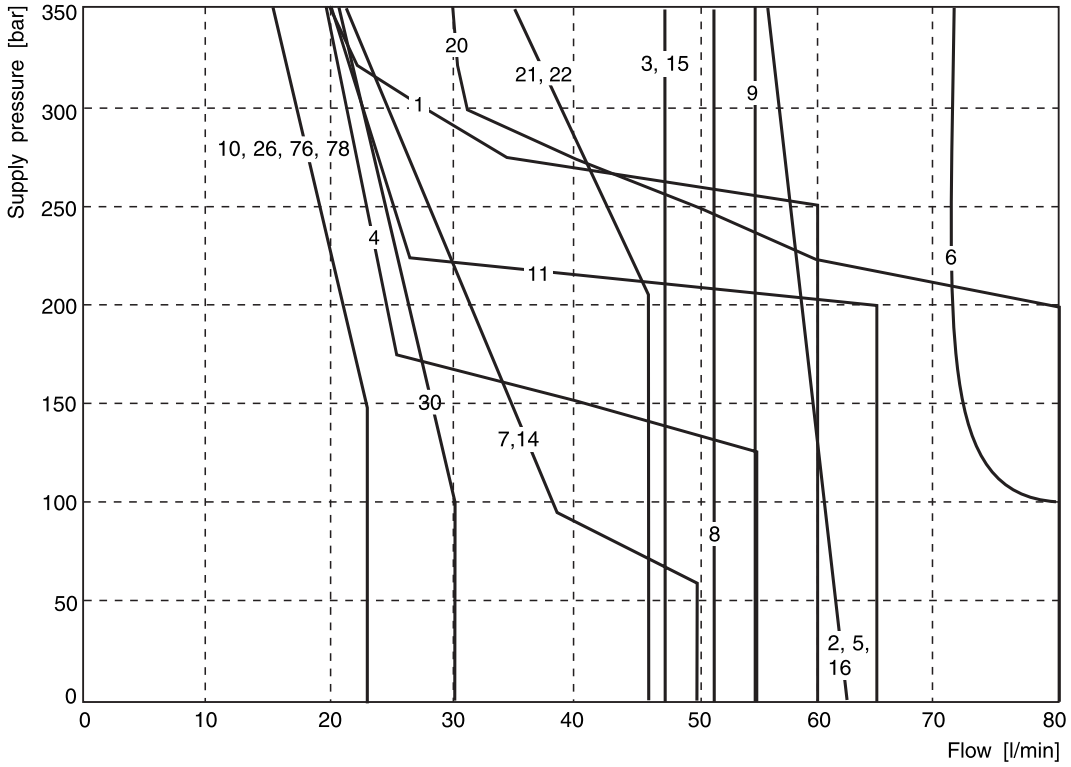
[1] Only for pressure compensation, no high flow possible.

Flow curve diagram

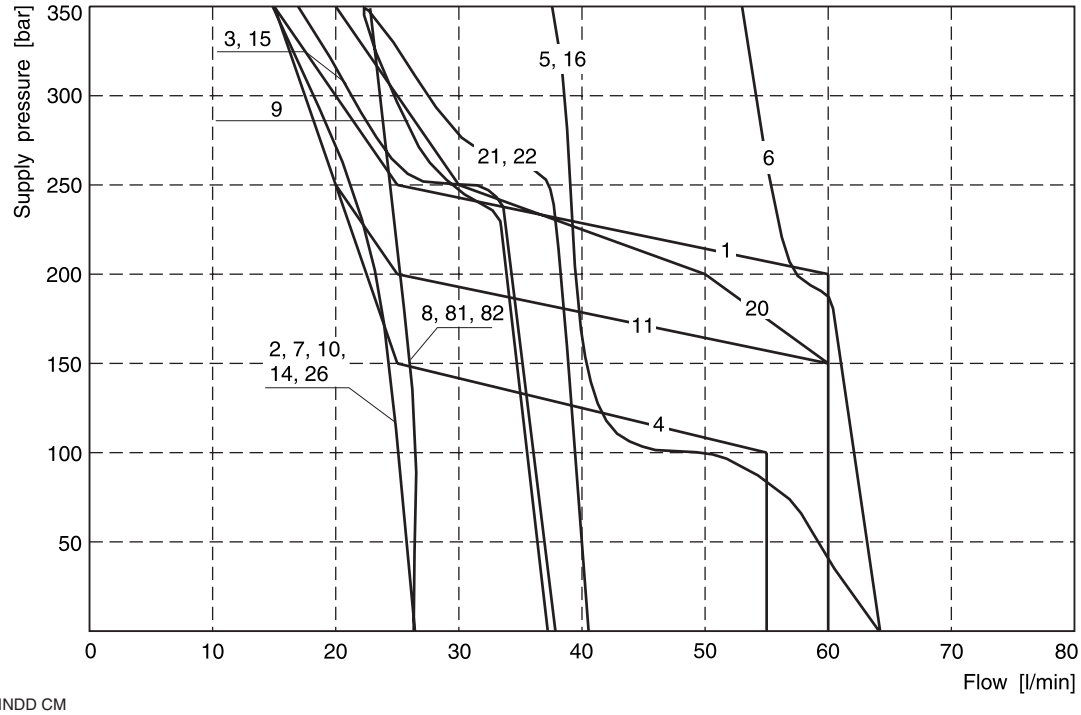


The diagram below specifies the shift limits for valves with DC solenoids. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity of 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

Shift limit diagram - Standard



Shift limit diagram - Soft shift



D1VW stand_UK.INDD CM

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

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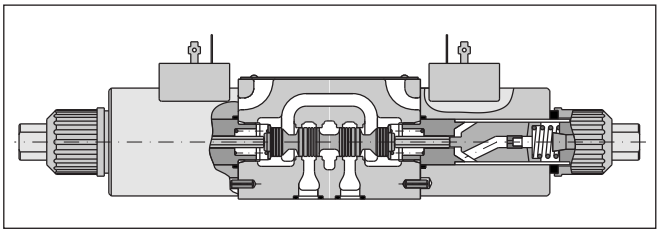
Response times D1VW Standard and Soft Shift

X-Number	Orifice size	3 positions: spool center condition				2 positions	
		Closed		Open			
		Energize	De-energize	Energize	De-energize	Energize	De-energize
(Standard)	–	32 (DC) 13 (AC)*	40 ms (DC) 20 ms (AC)*	32 ms (DC) 13 ms (AC)*	40 ms (DC) 20 ms (AC)*	32 ms (DC) 13 ms (AC)*	40 ms (DC) 20 ms (AC)*
XB072	0.50	200 ms	650 ms	700 ms	650 ms	175 ms	225 ms
XB073	0.75	125 ms	325 ms	550 ms	550 ms	100 ms	100 ms
XB074	1.00	100 ms	250 ms	500 ms	450 ms	75 ms	60 ms

* For AC input and soft shift use rectifier plug.

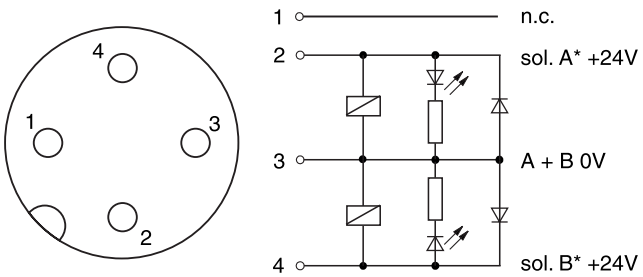
Step response times were obtained under the following conditions: υ = 35 mm²/s at 50°C with the valve operating at nominal pressure and flow. Published response times are nominal and may vary with spool, flow, pressure and temperature.

Acceleration for orifice size 1.00, code "XB074" (archived against a valve without soft shift)

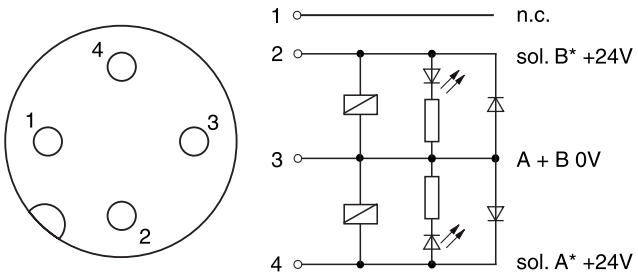


For even softer shifting, the proportional spools 81, 82, 101 and 102 can be used.

Pin assignment code "7W"
M12 x 1 - conduit box

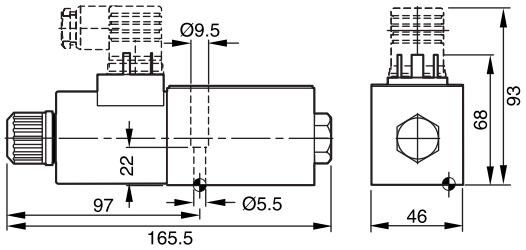


Pin assignment code "7Y"
M12 x 1 - conduit box

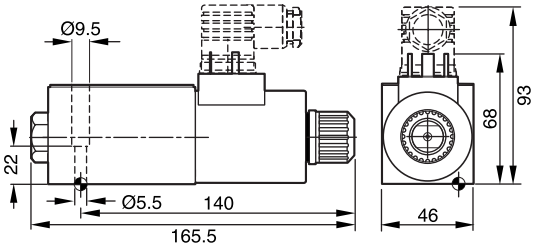


* Solenoid A: When energized, connects P to A.
Solenoid B: When energized, connects P to B.
(according to ISO 9461)

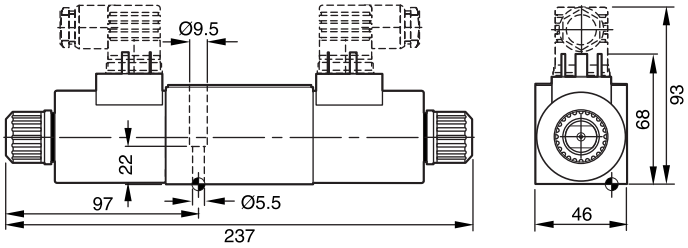
Interface EN 175301-803, DC solenoid B, E, F -style



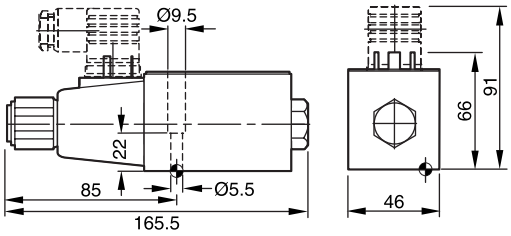
H, K, M -style



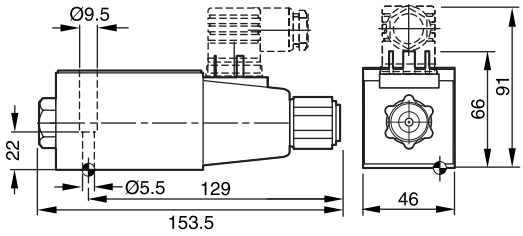
C, D -style



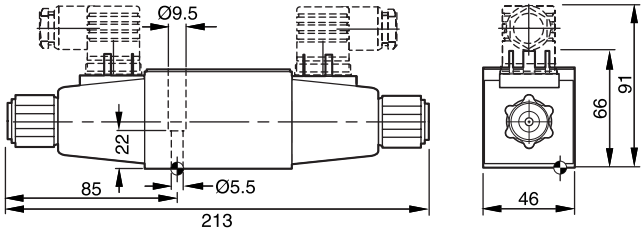
Interface EN 175301-803, AC solenoid B, E, F -style



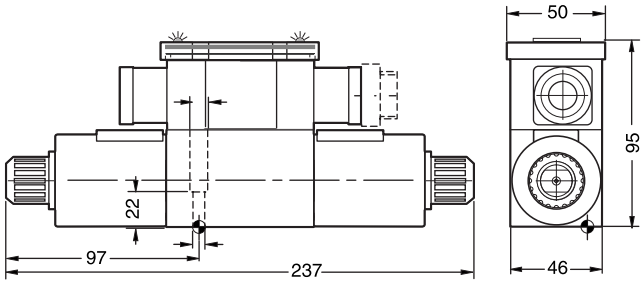
H, K, M -style



C, D -style



Conduit box (only C, D -style shown) DC solenoid



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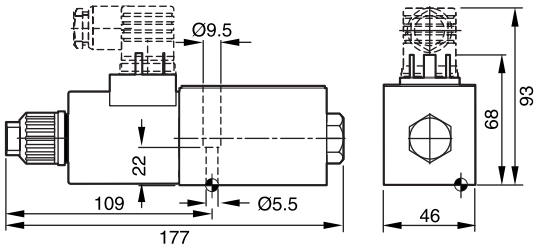
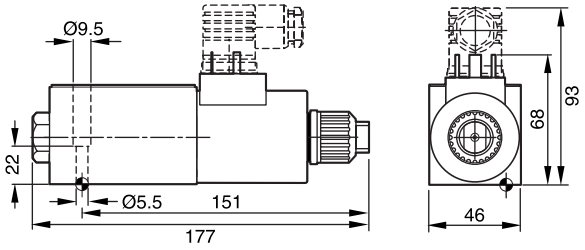
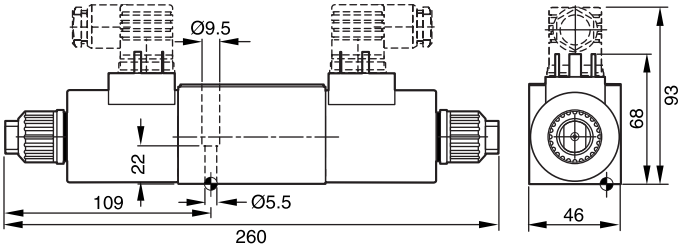
Interface EN 175301-803, DC solenoid B, E, F -style



H, K, M -style



C, D -style

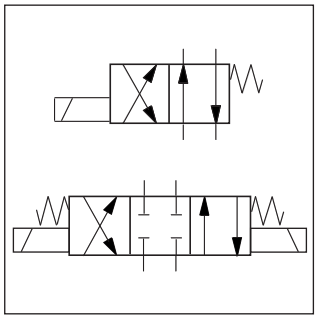


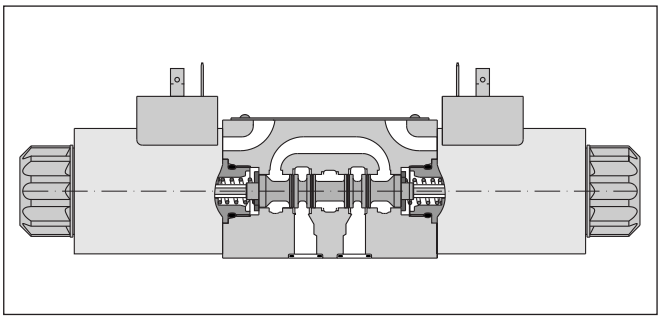
Surface finish	Kit			Kit NBR
R_{max}6.3 ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VW-70** FPM: SK-D1VW-V70

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

The Denison series 4D01 is a solenoid operated directional control valve size NG06 in 3-chamber design. It is direct operated by wet pin solenoids.

The 4D01 is available with a Soft Shift option for smooth operation. An additional orifice in the solenoid anchor dampens the shifting time.





Technical data

General					
Design		Directional spool valve			
Actuation		Solenoid			
Nominal size		DIN NG06 / CETOP 03 / NFPA D03			
Mounting interface		DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03			
Mounting position		Unrestricted, preferably horizontal			
Ambient temperature	[°C]	-25...+50			
Weight	[kg]	1 sol.: 1.4 (DC), 1.5 (AC) / 2 sol.: 1.7 (DC), 1.8 (AC)			
Hydraulic					
Max. operating pressure	[bar]	P, A B: 350			
	[bar]	T: 210 (DC), 140 (AC)			
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525			
Fluid temperature	[°C]	-25 ... +70			
Viscosity permitted	[cSt] / [mm²/s]	10...650			
Viscosity recommended	[cSt] / [mm²/s]	30			
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)			
Flow max.	[l/min]	80			
Leakage at 50 bar	[ml/min]	Up to 10 per flow path, depending on spool			
Static / Dynamic					
Step response at 95%	[ms]	Energized: 46 (DC), 20 (AC) / De-energized: 27 (DC), 18 (AC) / Quick energized: 30 (DC)			
Electrical characteristics					
Duty ratio		100% ED; CAUTION: coil temperature up to 180 °C possible			
Max. switching frequency	[1/h]	16000 (DC), 7200 (AC)			
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)			
	Code	G0R	G0Q	W06	W07
Supply voltage	[V]	12 V =	24 V =	150 at 50Hz	230 at 50Hz
Tolerance supply voltage	[%]	+5...-10	+5...-10	+5...-10	+5...-10
Power consumption hold	[W]	31	31	78	78
Power consumption in rush	[W]	31	31	264	264
Solenoid connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461.			
Wiring min.	[mm²]	3 x 1.5 recommended			
Wiring length max.	[m]	50 recommended			

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

2

4D01 – [ ] [ ] [ ] – [ ] [ ] – **B** [ ] [ ] – [ ]

Directional control valve size DIN NG06 CETOP 03	Body 3-chamber design	Control	Spool type	Spool position	End cap	Design series	Seals	Solenoid voltage	Options

Code	Control
1	1 solenoid
2	2 solenoids
7	2 solenoids and 2 pos. detents (only for spool types 11, 12, 51)

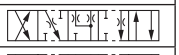
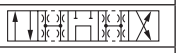
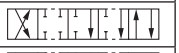
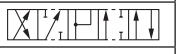
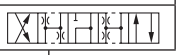
Code	Options
omit	Standard valve
G3	Soft shift with 1.0 mm orifice in anchor tube (for DC only)
32	Solenoid tube without manual override

Code	Solenoid voltage
G0R	12V =
G0Q	24V =
W06	115V / 50Hz
W07	230V / 50Hz

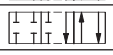
Code	Seals
1	NBR
5	FPM

Code	End cap
01	for control 1
02	for controls 2 and 7

3 position spools

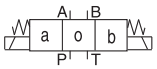
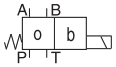
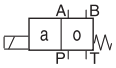
Code	Spool type (a 0 b)
01	
02	
03	
07	
08	
09	
10	
46	
55	
56	
64	
65	

2 position spools

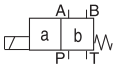
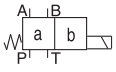
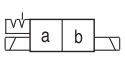
Code	Spool type (a b)
11	
12	
51	
52	
81 [1]	
81 [2]	

[1] Spool position code 01
[2] Spool position code 02

3 position spools

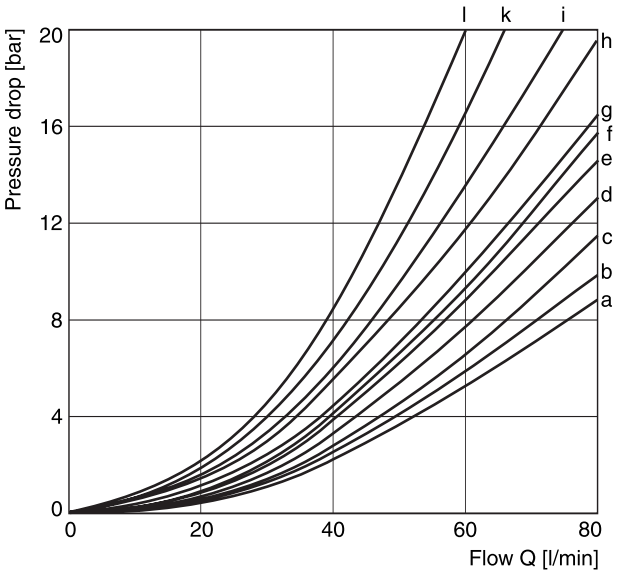
Code	Spool position	
03		3 positions. Spring centered to “0“.
05		2 positions. Spring centered to “0“. Energized to “b“.
06		2 positions. Spring centered to “0“. Energized to “a“.

2 position spools

Code	Spool position	
01		2 positions. Spring offset to “b“. Energized to “a“.
02		2 positions. Spring offset to “a“. Energized to “b“.
09		2 positions detent. Operated in “a“ or “b“. No centre or spring offset position.

Further spool types, position control, mechanical operation and solenoid voltages on request.

Pressure drop



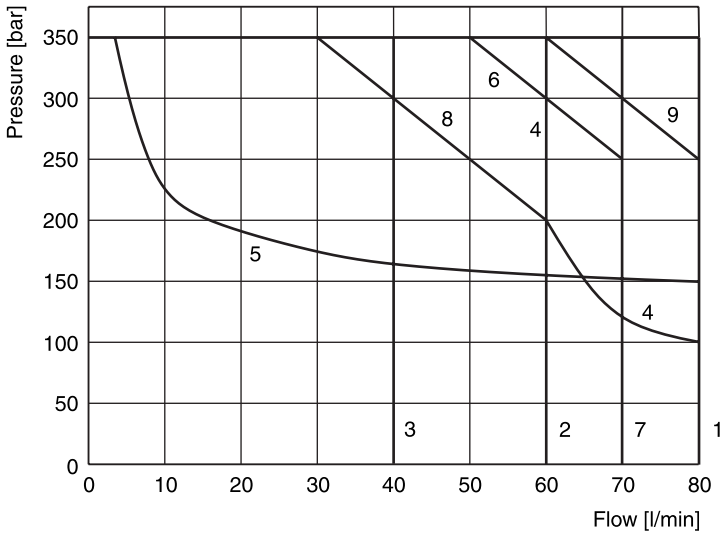
Oil temperature 50 °C; oil viscosity 40 cSt.

	Spool type																	
	01	**02**	**03**	**07**	**08**	**09**	**10**	**11**	**12**	**46**	**51**	**52**	**55**	**56**	**64**	**65**	**81**	**91**
P→A	a	e	d	l	d	c	c	c	h	a	e	f	g	g	h	l	b	i
P→B	a	e	d	l	d	c	c	c	h	a	e	f	g	g	l	h	b	i
P→T	b	-	-	i	-	-	-	-	-	-	-	-	-	-	k	k	-	-
A→T	c	c	d	l	a	e	a	d	-	g	g	-	f	-	k	l	e	d
B→T	c	c	d	l	b	a	e	d	-	g	g	-	-	f	l	k	e	d

The diagram below specifies the shift limits for valves solenoids. The specifications apply to a viscosity of 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

2

Valve with standard DC solenoid

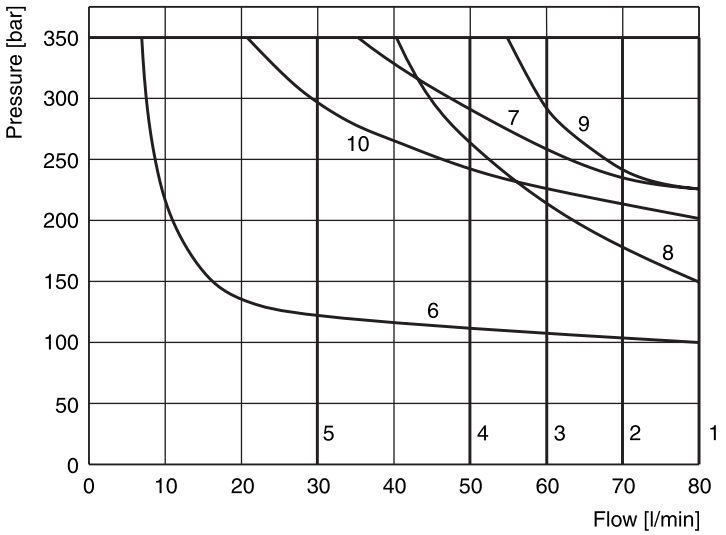


Spool type	DC Curve no	AC Curve no.
01 02 03	4 9 1	2 6 2
07 08 09	5 7 10	3 2 7
10 11 12 [1)]	10 2 (1) 6 (8)	7 1 (1) 5 (9)
46 51 52	3 2 (1) 6 (8)	4 2 (1) 5 (9)
55 56 64	9 9 5	9 9 3
65 81 91	5 3 (1)	3 1 (1)

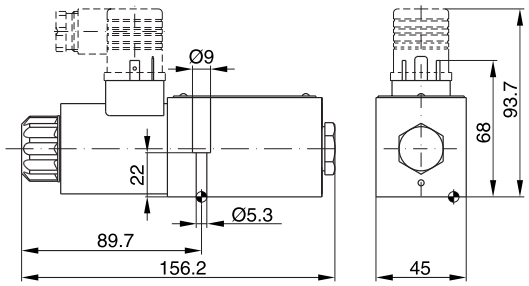
( ) Curves for spool with detents

[1)] Only if port A or B is closed

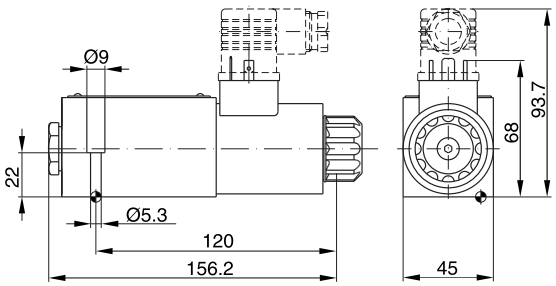
Valve with standard AC solenoid



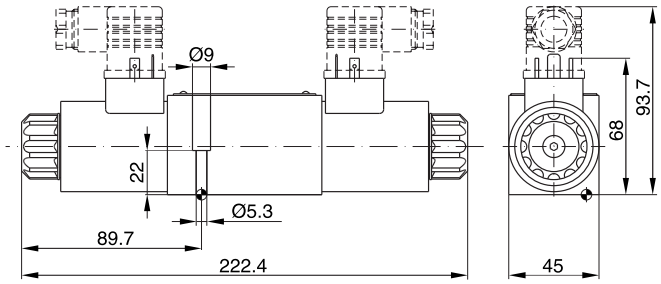
Interface EN 175301-803, DC solenoid
01, 06 -style



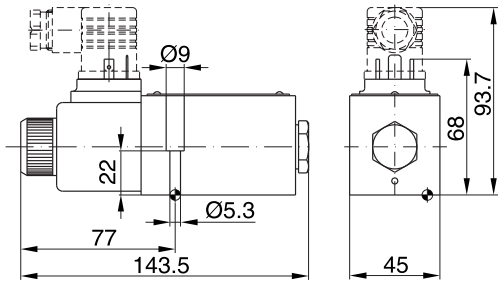
02, 05 -style



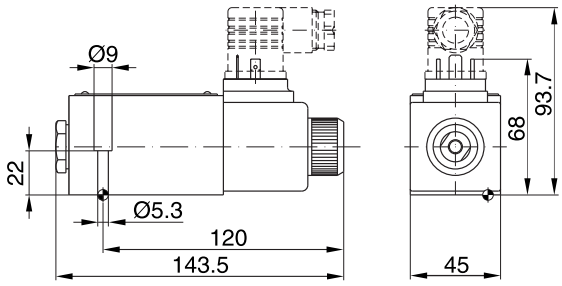
03, 09 -style



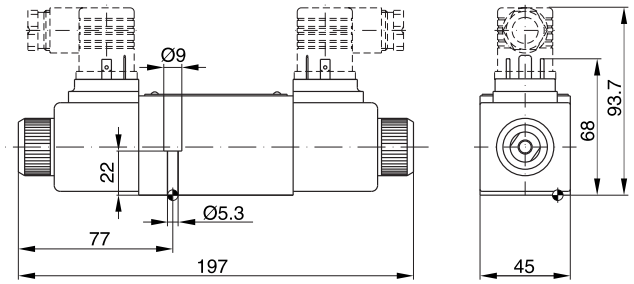
Interface EN 175301-803, AC solenoid
01, 06 -style



02, 05 -style



03, 09 -style



Surface finish	Kit			Kit NBR
$\sqrt{R_{max}6.3}$ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm	on request

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

4D01_UK.INDD CM

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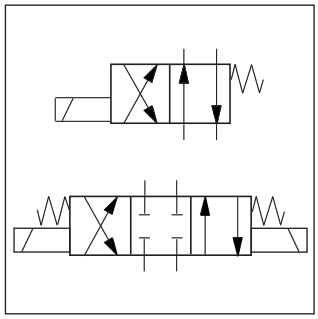
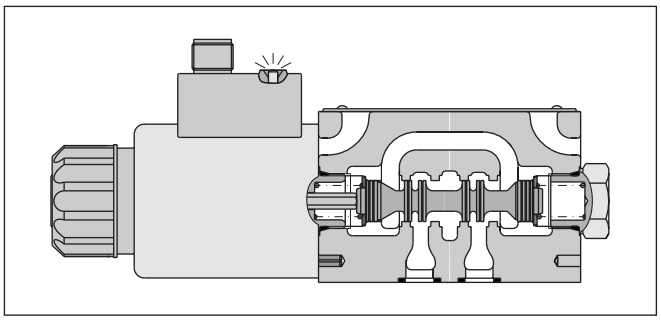
Hydraulic Controls Division
Kaarst, Germany

Notes

The D1VW 8 Watt series is based on the standard D1VW design. The low watt, low current (<0.5 A) solenoid allows direct connection to a PLC or a bus knot. The valves are offered with standard solenoid connection (as per EN175301-803), M12 x 1 connection and conduit box. The version with M12 x 1 connection and LEDs are conform to the DESINA standard (**D**istribut**E**d and **S**tandardised **IN**st**A**llation technology) for machine tools and manufacturing systems.





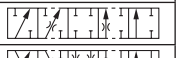
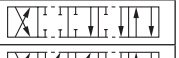
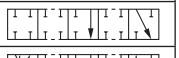
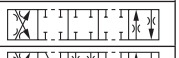
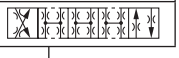
Technical data

General		
Design		Directional spool valve
Actuation		Solenoid
Size		DIN NG06 / CETOP 03 / NFPA D03
Mounting interface		DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03
Mounting position		unrestricted, preferably horizontal
Ambient temperature	[°C]	-25...+50
Weight	[kg]	1.5 (1 solenoid), 2.1 (2 solenoids)
Hydraulic		
Max. operating pressure	[bar]	P, A B: 350, T: 210
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525
Fluid temperature	[°C]	-25 ... +70
Viscosity permitted	[cSt] / [mm²/s]	2.8...400
Viscosity recommended	[cSt] / [mm²/s]	30...80
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)
Flow max.	[l/min]	45
Leakage at 50 bar	[ml/min]	Up to 10 per flow path, depending on spool
Static / Dynamic		
Step response at 95%	[ms]	Energized: 80...120 De-energized: 35...55
Electrical characteristics		
Duty ratio		100% ED; CAUTION: coil temperature up to 70 °C possible
Max. switching frequency	[1/h]	10000
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
	Code	J
Supply voltage	[V]	24 V =
Tolerance supply voltage	[%]	±10
Current consumption	[A]	0.33
Power consumption	[W]	8
Solenoid connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461 (code W). Plug M12x1 on coil as per IEC 61076-2-101 (code D). Conduit box with central plug as per IEC 61076-2-101 (M12x1) (code G).
Wiring min.	[mm²]	3 x 1.5 recommended
Wiring length max.	[m]	50 recommended

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

2

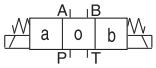
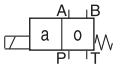
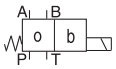
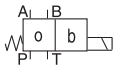
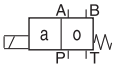
D	1	V	W			
Directional control valve	Size DIN NG06 CETOP 03 NFPA D03	3-chamber valve	Wet pin solenoid	Spool type	Spool position	Seals

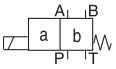
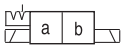
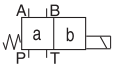
3 position spools	
Code	Spool type a 0 b
1	
2	
3	
4	
5	
6	
7	
8 [1]	
9 [1]	
10	
11	
14	
15	
16	
76	
78	
81	
82	
102	

2 position spools	
Code	Spool type a b
20	
26	
30	
101	

[1] Consider specific spool position.

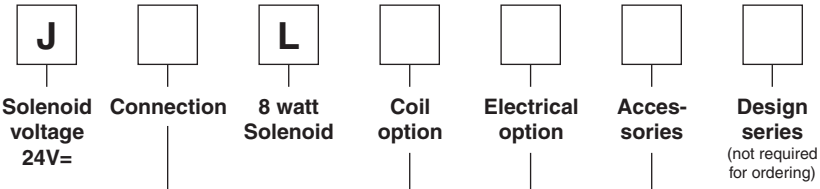
Code	Seals
N	**NBR**
V	FPM

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 8 and 9	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.

2 position spools		
Code	Spool position	
B		**2 positions. Spring offset in position “b“. Operated in position “a“.**
D [2]		**2 positions. Operated in position “a“ or “b“. No centre or offset position.**
H		**2 positions. Spring offset in position “a“. Operated in position “b“.**

[2] Only for spool 20 available.

Bold letters =
Short-term availability



Code	Connection
D [3]	M12x1 on coil without plug
G [3]	Conduit box with plug-in coil
W [3]	**Connector as per EN 175301-803, without plug**

[3] Please order plug separately.

Code	Coil option
omit	**Standard valve (in combination with solenoid connection "W" and "D")**
M	Plug in coil (in combination with solenoid connection "G")

Code	Accessories
omit	**Standard valve (in combination with solenoid connection "W")**
5	LED direct on coil. Only available for code "DLJ"
7W [4]	M12 x 1 plug (4pin) pin1: not connected pin2: solenoid A 24V pin3: common 0V pin4: solenoid B 24V
7Y [4]	M12 x 1 plug (4pin) pin1: not connected pin2: solenoid B 24V pin3: common 0V pin4: solenoid A 24V

[4] Only available for solenoid connection code "G".

Solenoid identification acc. to ISO 9461

Code	Electrical option
omit	**Standard valve (in combination with solenoid connection "W" and "D")**
J	Surge diode with LED, max. voltage peak 50V (only available in combination with solenoid conn. "G" and "D")

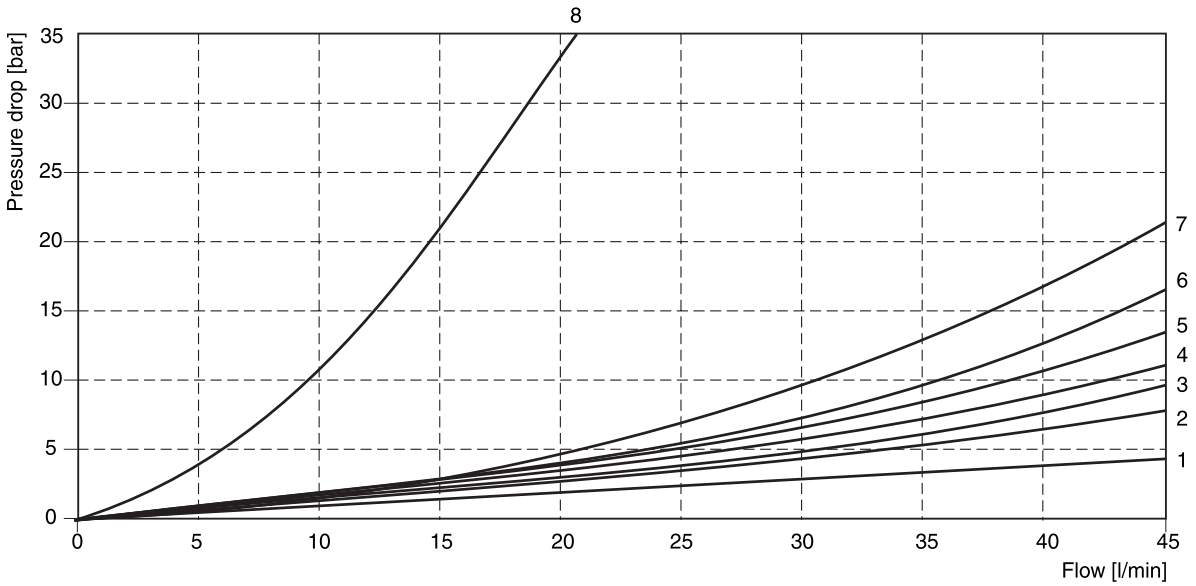
Further spool types on request.

To get a DESINA valve, order the combination: JDLJ5

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.

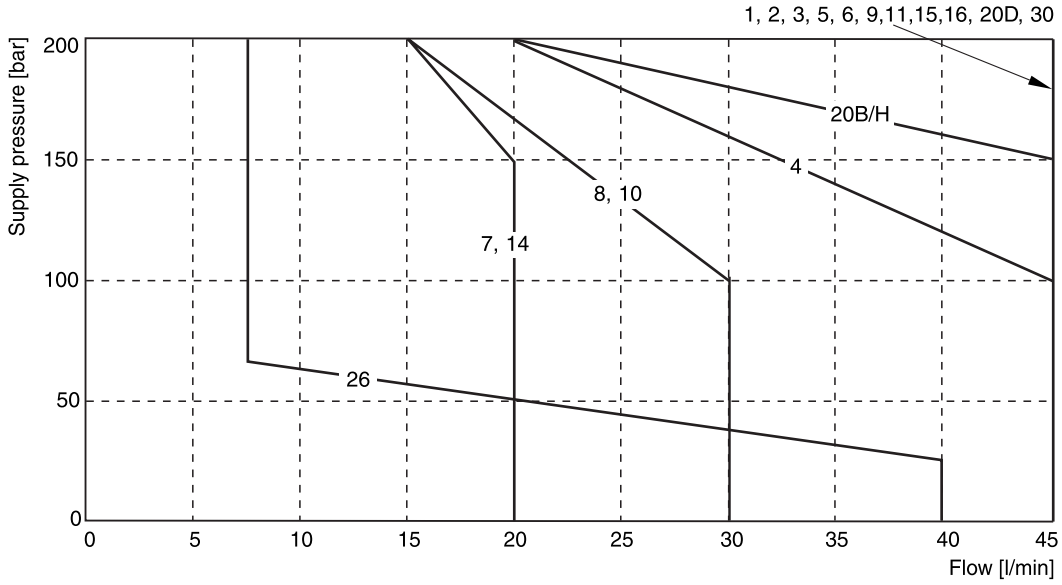
	Position „b“		Position „a“		Position „0“					
Spool	P ->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	3	1	3	1	–	–	–	–	–	–
2	2	1	2	1	2	2	1	1	2	1
3	5	1	5	1	–	–	1	–	–	–
4	4	1	4	1	–	–	1	1	–	8
5	4	2	5	2	7	–	–	–	–	–
6	2	4	2	4	7	7	–	–	–	7
7	6	1	4	2	–	2	–	1	4	–
10	6	–	5	–	–	–	–	–	–	–
11	6	2	6	2	–	–	8	8	–	–
14	4	2	6	1	2	–	1	–	4	–
15	5	1	5	1	–	–	–	1	–	–
16	5	2	4	2	–	7	–	–	–	–
20	5	3	5	3	–	–	–	–	–	–
26	6	–	6	–	–	–	–	–	–	–
30	3	1	3	1	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
8	6	6	6	6	–	–	–	–	7	–
9	6	7	6	7	–	–	–	–	3	–

Flow curve diagram

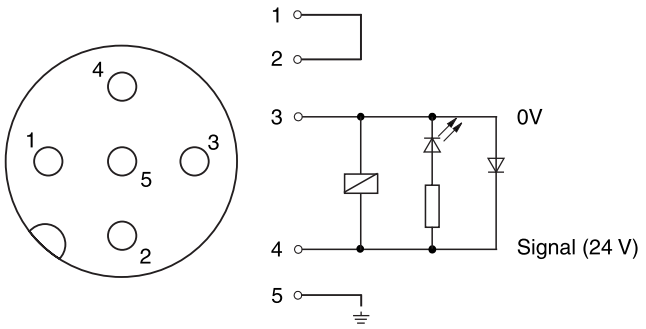


The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

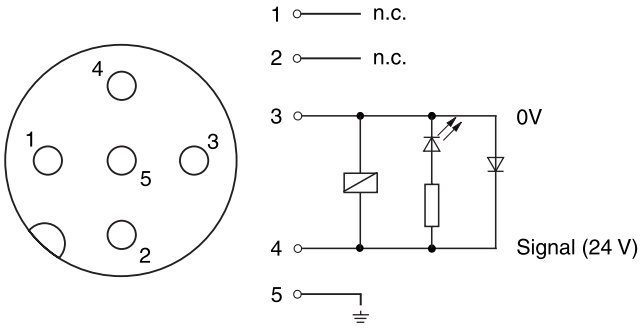
Shift limit



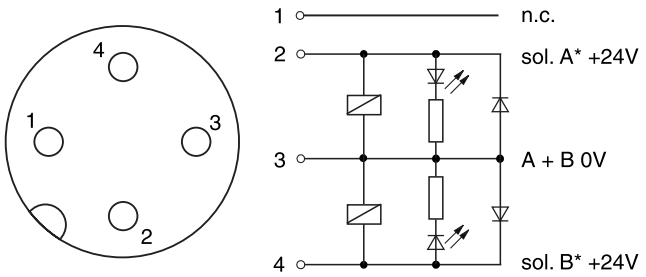
M12 pin assignment DESINA design (code „JDLJ5“), Pins 1 and 2 connected



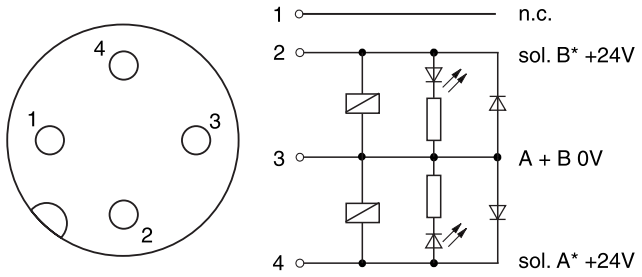
M12 pin assignment code “JDL“, Pins 1 and 2 not connected



Pin assignment code “7W“



Pin assignment code “7Y“



* Solenoid A: When energized, connects P to A.
Solenoid B: When energized, connects P to B.
(according to ISO 9461)

D1VW 8W_UK.INDD CM

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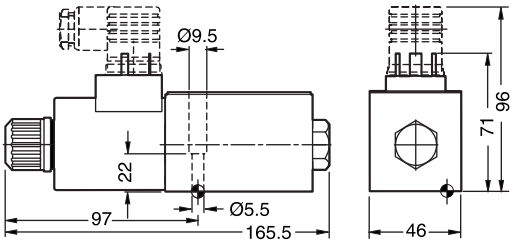
Kaarst, Germany

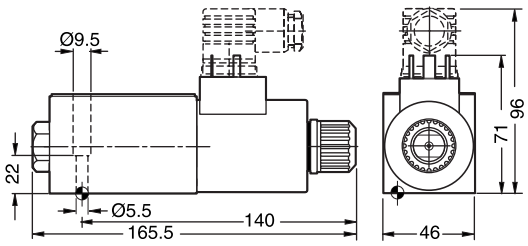
2

Interface EN 175301-803, DC solenoid

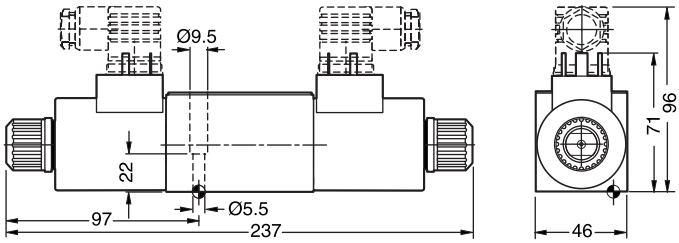
Style B, E



Style H, K

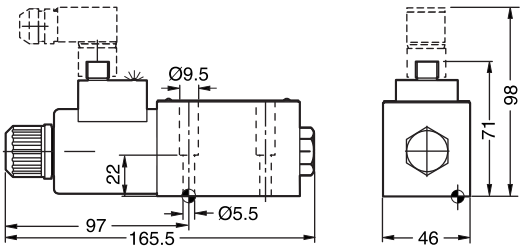


Style C, D

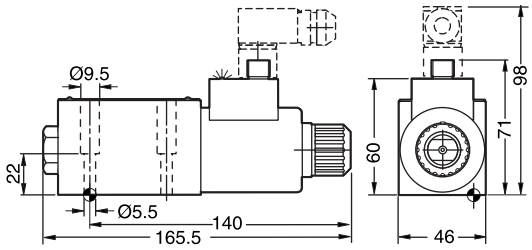


M12x1 connector, DC solenoid, JDLJ5 (DESINA) or JDL

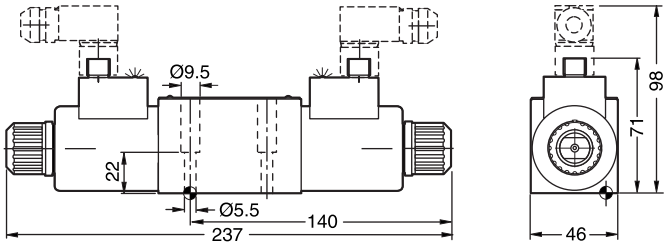
Style B, E



Style H, K

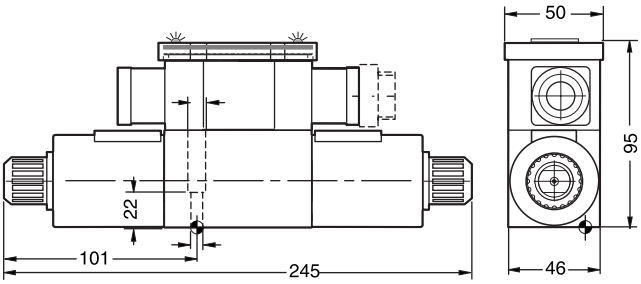


Style C, D



DESINA

Conduit box (only DC C, D -style shown)

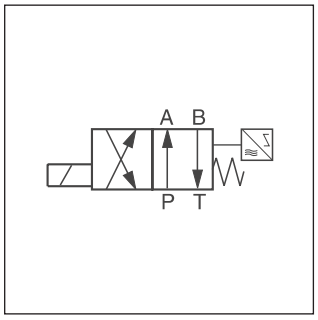


Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VW-70** FPM: SK-D1VW-V70

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

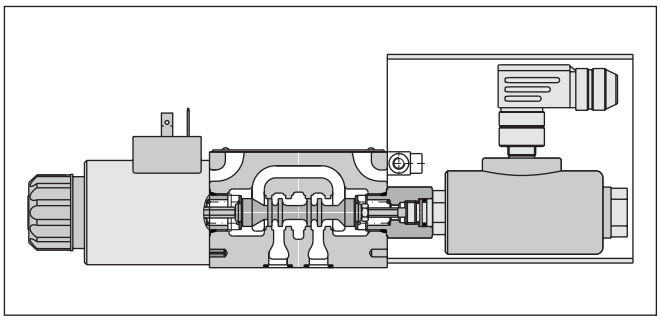
The 4/2 directional valves operated directly by solenoids with inductive position control are used as monitoring valves. The start or end position can be monitored. The position control is only available for single solenoid valves.

The fail-safe position of the directional valve during power failure is the spring offset position.



Attention

The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.



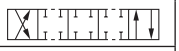
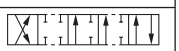
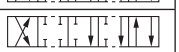
Technical data

General					
Design		Directional spool valve			
Actuation		Solenoid			
Size		DIN NG06 / CETOP 03 / NFPA D03			
Mounting interface		DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03			
Mounting position		unrestricted, preferably horizontal			
Ambient temperature	[°C]	0...+50			
Weight	[kg]	1.8 (1 solenoid)			
Hydraulic					
Max. operating pressure	[bar]	P, A B: 350 ; T: 210			
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525			
Fluid temperature	[°C]	-25 ... +70			
Viscosity permitted	[cSt] / [mm²/s]	2.8...400			
Viscosity recommended	[cSt] / [mm²/s]	30...80			
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)			
Flow max.	[l/min]	80			
Leakage at 50 bar	[ml/min]	Up to 10 per flow path, depending on spool			
Static / Dynamic					
Step response at 95%	[ms]	Energized: 32 ; De-energized: 40			
Electrical characteristics					
Duty ratio		100% ED; CAUTION: coil temperature up to 150 °C possible			
Max. switching frequency	[1/h]	15000			
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)			
	Code	K	J	U	G
Supply voltage	[V]	12 V =	24 V =	98 V =	205 V =
Tolerance supply voltage	[%]	±10	±10	±10	±10
Current consumption	[A]	2.5	1.25	0.31	0.15
Power consumption	[W]	30	30	30	30
Solenoid connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461.			
Wiring min.	[mm²]	3 x 1.5 recommended			
Wiring length max.	[m]	50 recommended			

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

2

D	1	V	W			
Directional control valve	**Size DIN NG06 CETOP 03 NFPA D03**	**3-chamber valve**	**Wet pin solenoid**	**Spool type**	**Spool position**	**Seals**

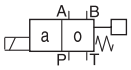
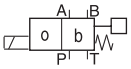
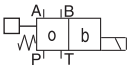
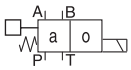
3 position spools	
Code	Spool type
	a 0 b
1	
2	
3 [1]	
4	
5	
15 [2]	
16	
76	
78	

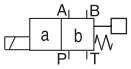
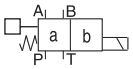
2 position spools	
Code	Spool type
	a b
20	
26	
30	

[1] Only avalable for spool position “E“ and “F“.

[2] Only avalable for spool position “K“ and “M“.

Code	Seals
N	**NBR**
V	FPM

3 position spools		
Code	Standard	
E	 Operated in position “a“.	**2 positions. Spring offset in position “0“.**
F	 Spring offset in position “b“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	**2 positions. Spring offset in position “0“.**
M	 Spring offset in position “a“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		**2 positions. Spring offset in position “b“. Operated in position “a“.**
H		**2 positions. Spring offset in position “a“. Operated in position “b“.**

Bold letters =
Short-term availability

	W			
Solenoid voltage	**Connector as per EN 175301-803, without plug** (please order plug separaetly)	**Manual override option**	**Position control**	**Design series** (not required for ordering)

Code	Voltage
K	12V=
J	**24V=**
U [3]	98V=
G [3]	205V=

[3] To be used with rectifier plug when DC solenoids are used with AC input.

Code	Spool position	Position control
11	E, F, B (Solenoid on a-side)	End position monitored side B
80 [4]		**Start position monitored side B**
10	K, M, H (Solenoid on b-side)	End position monitored side A
66 [4]		**Start position monitored side A**

Code	Manual override
omit	**Standard valve with manual override**
T [4]	without manual override

[4] For hydraulic presses according to the safety regulations EN 693, solenoid option "T" (without manual override) and accessories "66" or "80" (start position monitored) are required.

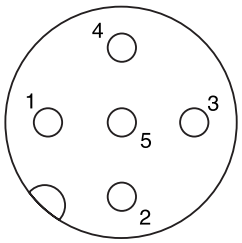
Further spool types and voltages on request.

2

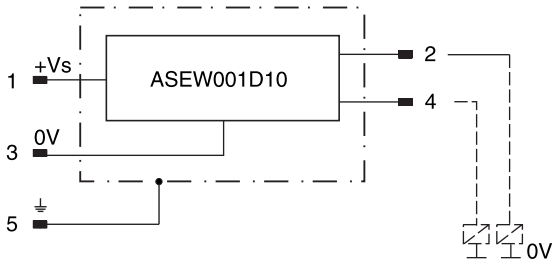
Electrical characteristics of position control as per IEC 61076-2-101 (M12x1)

Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
Ambient temperature	[°C]	0...+50
Supply voltage / ripple	[V]	18...42 / 10%
Current consumption without load	[A]	≤ 30
Max. output current per channel, ohmic	[mA]	400
Min. output load per channel, ohmic	[kOhm]	100
Max. output drop at 0.2A	[V]	≤ 1.1
Max. output drop at 0.4A	[V]	≤ 1.6
EMC		EN50081-1 / EN50082-2
Max. tolerance ambient field strength	[A/m]	<1200
Min. distance to next AC solenoid	[m]	>0.1
Interface		M12x1
Wiring min.	[mm²]	5 x 0.25 brad shield recommended
Wiring length max.	[m]	50 recommended

M12 pin assignment



1 + Supply 18...42V
2 Normally open
3 0V
4 Normally closed
5 Earth ground



Definitions

Start position monitored:

The valve is de-energized. The inductive switch gives a signal at the moment when the spool leaves the spring offset position (below 15% spool stroke).

The switch can only be located on the opposite side of the solenoid for direct operated valves.

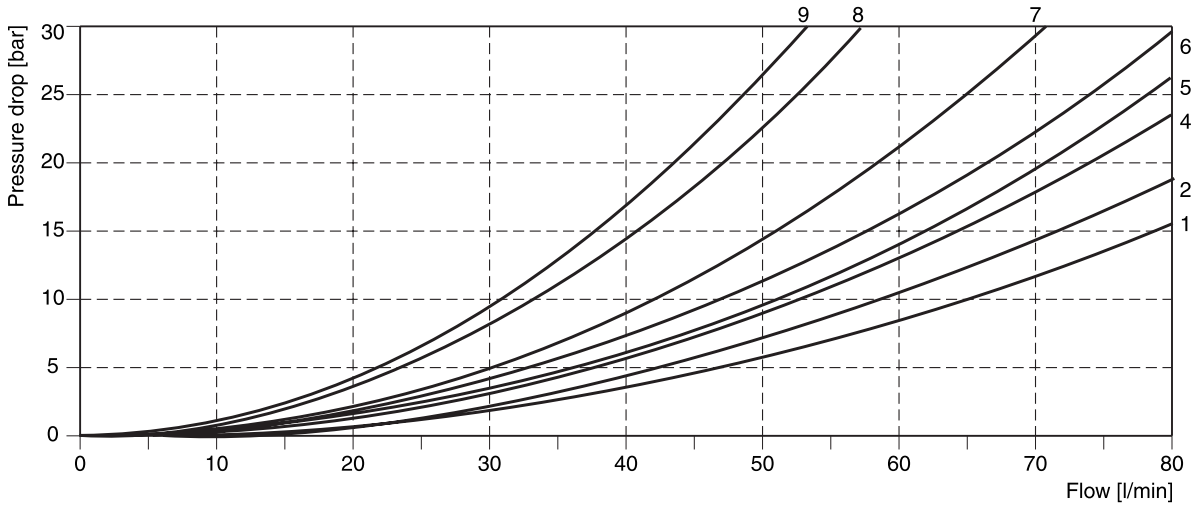
End position monitored:

The inductive switch gives a signal before the end position is reached (above 85% spool stroke).

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.

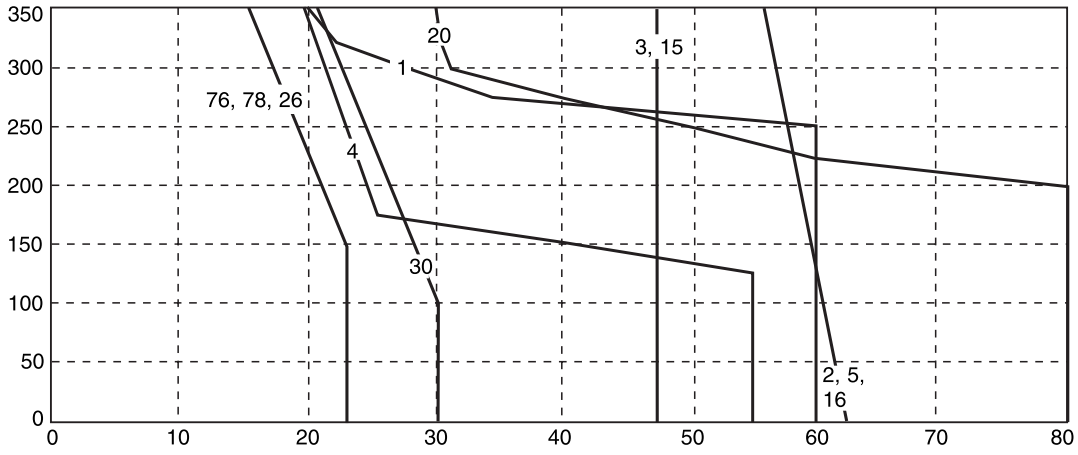
	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	1	4	1	–	–	–	–	–	–
2	5	2	5	2	4	4	1	1	6	1
3	–	–	4	2	–	–	8	–	–	–
4	4	2	4	2	–	–	7	7	–	9
5	4	1	5	1	9	–	–	–	–	–
15	4	2	–	–	–	–	–	8	–	–
16	5	1	4	1	–	9	–	–	–	–
20	5	1	5	1	–	–	–	–	–	–
26	6	–	6	–	–	–	–	–	–	–
30	5	1	5	1	–	–	–	–	–	–
76	–	2	–	–	–	–	3	–	–	–
78	–	–	–	2	–	–	–	3	–	–

Flow curve diagram



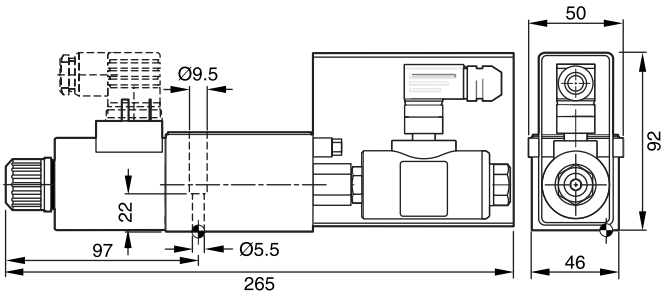
Shift limit diagram

The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

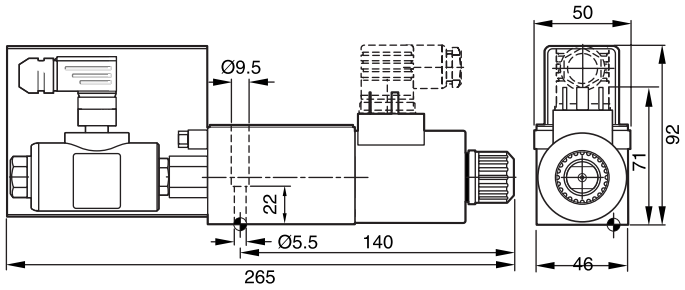


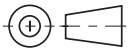
2

Interface EN 175301-803, DC solenoid, with plug M12x1*
B, E, F -style



H, K, M -style





* Delivery includes plug M12 x 1 (see accessories, plug M12x1; order no.: 5004109).

Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VW-70** FPM: SK-D1VW-V70

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

Attention

The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.

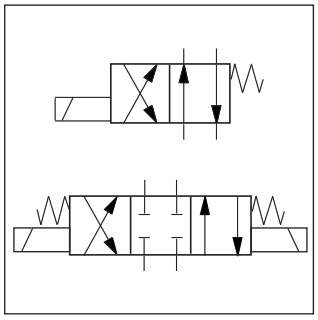
The D1VW is a 3-chamber, electrically controlled 4/3 or 4/2 way directional control valve. It is activated directly by solenoids with screwed-in wet pin armature.

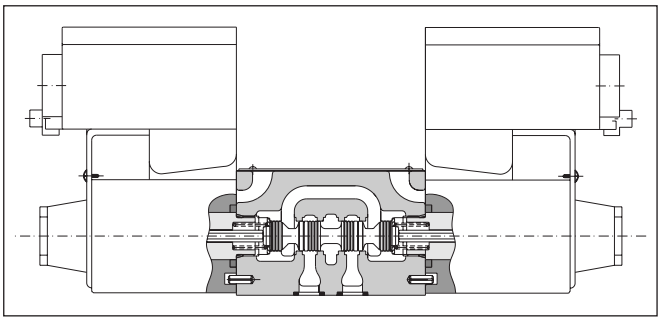
The explosion proof class is

CE Ex II 2 G
EEx me II T4

for use in zone 1.

All explosion proof solenoids are DC design. For AC (code P and N) the input voltage is internally rectified.





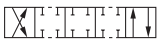
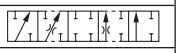
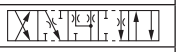
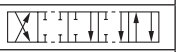
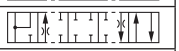
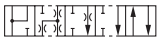
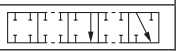
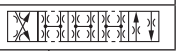
Technical data

General				
Design		Directional spool valve		
Actuation		Solenoid		
Size		DIN NG06 / CETOP 03 / NFPA D03		
Mounting interface		DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03		
Mounting position		unrestricted, preferably horizontal		
Ambient temperature	[°C]	-25...+50		
Weight	[kg]	1.8 (1 solenoid), 2.7 (2 solenoids)		
Hydraulic				
Max. operating pressure	[bar]	P, A B: 350 T: 210		
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525		
Fluid temperature	[°C]	-25 ... +60		
Viscosity permitted	[cSt] / [mm²/s]	2.8...400		
Viscosity recommended	[cSt] / [mm²/s]	30...80		
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)		
Flow max.	[l/min]	80		
Leakage at 50 bar	[ml/min]	Up to 10 per flow path, depending on spool		
Static / Dynamic				
Step response at 95%	[ms]	Energized: 32 (DC) De-energized: 40 (DC)		
Electrical characteristics				
Duty ratio		100% ED; CAUTION: coil temperature up to 130 °C possible		
Max. switching frequency	[1/h]	15000		
Protection class		CE Ex II 2 G , EEx me II T4, IP66		
	Code	J	P	N
Supply voltage / ripple	[V]	24 V =	110/50Hz	230/50Hz
Tolerance supply voltage	[%]	±10	±5	±5
Current consumption	[A]	1.25	0.32	0.15
Power consumption	[W]	30	30	30
Solenoid connection		Box with M20x1.5 entry for cable glands. Solenoid identification as per ISO 9461.		
Wiring min.	[mm²]	3 x 1.5 recommended		
Wiring length max.	[m]	50 recommended		

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

2

D	1	V	W					E	E	
Directional control valve	**Size DIN NG06 CETOP 03 NFPA D03**	**3-chamber valve**	**Wet pin solenoid**	**Spool type**	**Spool position**	**Seals**	**Solenoid voltage**	**Connection: Explosion proof with cable glands**	**Solenoid options: Explosion proof EEx me II**	**Design series** (not required for ordering)

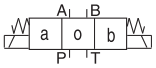
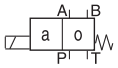
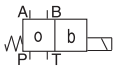
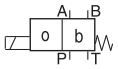
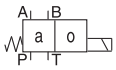
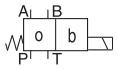
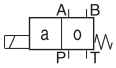
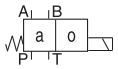
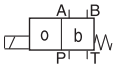
3 position spools	
Code	Spool type a 0 b
1	
2	
3	
4	
5	
6	
7	
8 [1]	
9 [1]	
10	
11	
14	
15	
16	
21	
22	
31	
32	
76	
78	
81	
82	
102	

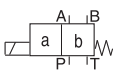
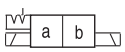
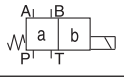
2 position spools	
Code	Spool type a b
20	
26	
30	
101	

[1] Consider specific spool position.

Code	Voltage
J	24V=
P	110V 50Hz
N	230V 50Hz

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 8 and 9	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		2 positions. Spring offset in position “b“. Operated in position “a“.
D		2 positions. Operated in position “a“ or “b“. No centre or offset position.
H		2 positions. Spring offset in position “a“. Operated in position “b“.

Further spool types, styles, and combinations on request.

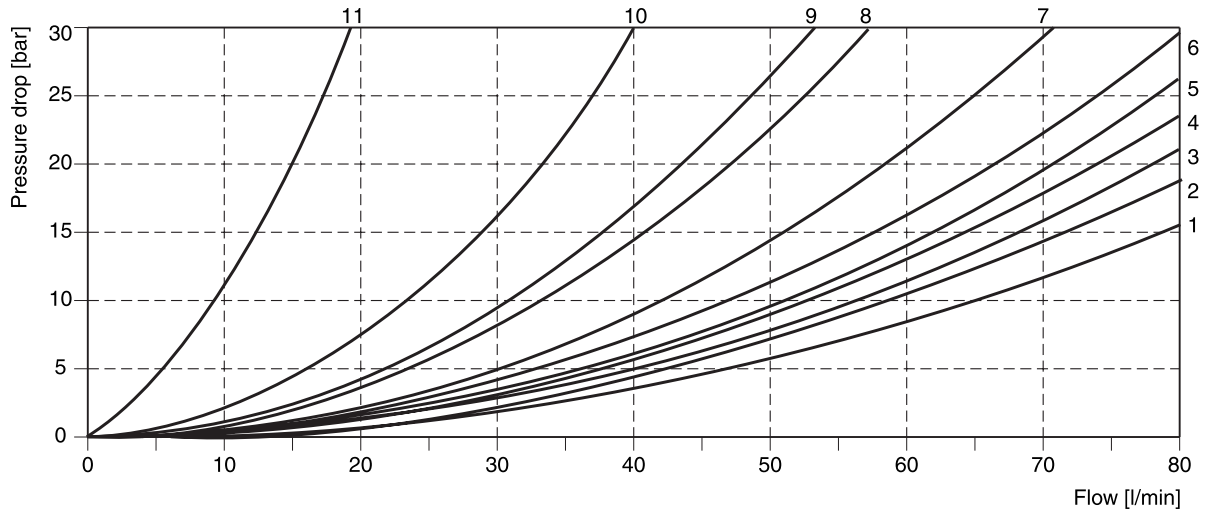
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	1	4	1	–	–	–	–	–	–
2	5	2	5	2	4	4	1	1	6	1
3	4	1	4	2	–	–	8	–	–	–
4	4	2	4	2	–	–	7	7	–	9
5	4	1	5	1	9	–	–	–	–	–
6	5	1	5	1	9	9	–	–	–	9
7	5	2	4	1	–	5	–	1	7	–
10	4	–	4	–	–	–	–	–	–	–
11	4	2	4	2	–	–	11	11	–	–
14	4	1	5	2	5	–	1	–	7	–
15	4	2	4	1	–	–	–	8	–	–
16	5	1	4	1	–	9	–	–	–	–
20	5	1	5	1	–	–	–	–	–	–
26	6	–	6	–	–	–	–	–	–	–
30	5	1	5	1	–	–	–	–	–	–
76	–	2	–	–	–	–	3	–	–	–
78	–	–	–	2	–	–	–	3	–	–
81	10	10	10	10	–	–	–	–	–	–
82	10	10	10	10	–	–	[1]	[1]	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
8	2	2	2	2	–	–	–	–	8	–
9	3	3	3	3	–	–	–	–	9	–

	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
21	3	3	3	6	1	
	P->A	B->T		P->A	P->B	A->B
22	6	1		3	3	3

[1] Only for pressure compensation, no high flow possible.

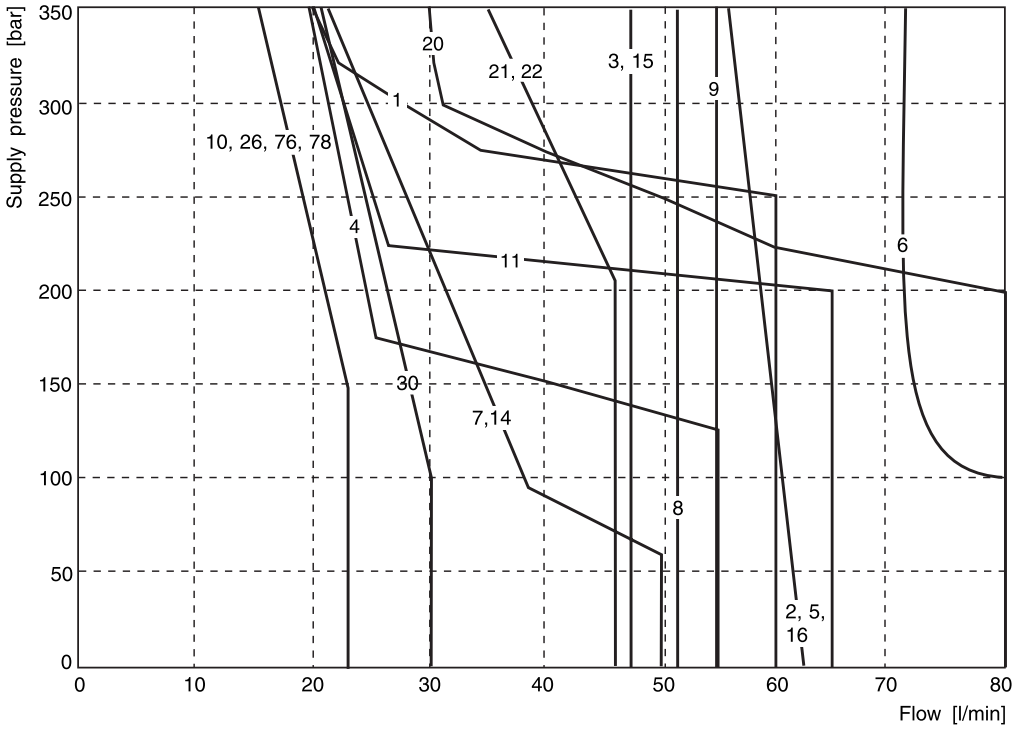
Flow curve diagram



The diagram below specifies the shift limits for valves with DC solenoids. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

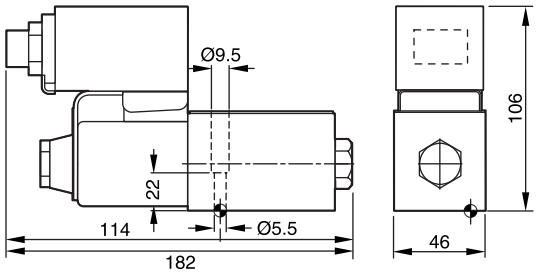
2

Shift limit diagram

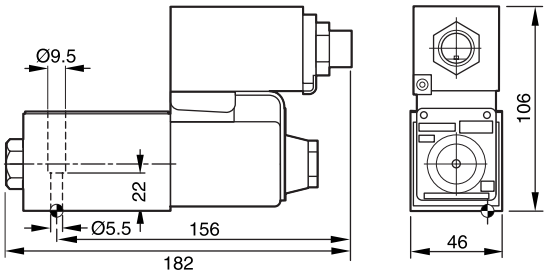


Dimensions

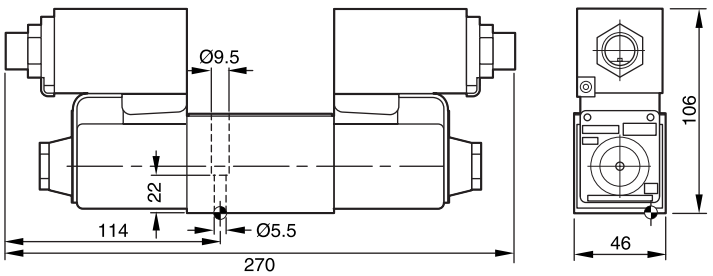
B, E, F -style



H, K, M -style



C, D -style



Surface finish	Kit			Kit NBR
$\sqrt{R_{max}6.3}$ ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VW-70** FPM: SK-D1VW-V70

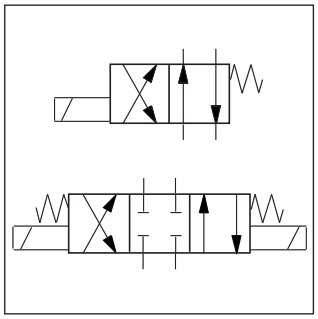
D1VW expl_UK.INDD CM

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

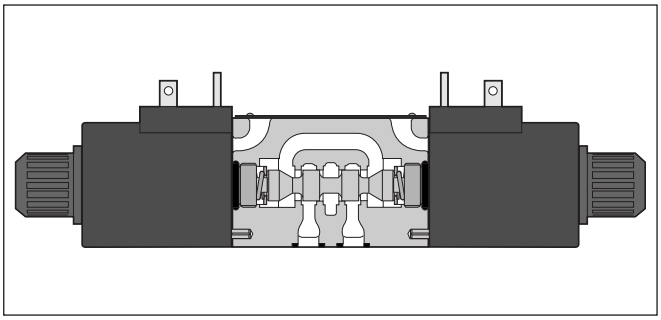
The D1MW is a solenoid operated directional control valve size NG06 in 3-chamber design. It is direct operated by wet pin solenoids.

The D1MW is designed for mobile and marine applications.

It is based on the D1VW series, but offers additional corrosion protection of the valve body, the solenoid coil and the anchor tube as well as the typical solenoid connections for the mobile market such as AMP Junior Timer and DP4 “Deutsch”.



With AMP Junior Timers



Technical features:

- High corrosion protection
- Solenoid connection:
  - Standard (as per EN175301-803)
  - AMP Junior Timer
  - DP4 2-pin “Deutsch”
- Robust design for rough applications

Technical data

General			
Design		Directional spool valve	
Actuation		Solenoid	
Size		DIN NG06 / CETOP 03 / NFPA D03	
Mounting interface		DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03	
Mounting position		Unrestricted, preferably horizontal	
Ambient temperature	[°C]	-25...+50	
Weight	[kg]	1.5 (1 solenoid), 2.1 (2 solenoids)	
Hydraulic			
Max. operating pressure	[bar]	P, A B: 350; T: 210	
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525	
Fluid temperature	[°C]	-25 ... +70	
Viscosity permitted	[cSt] / [mm²/s]	2.8...400	
Viscosity recommended	[cSt] / [mm²/s]	30...80	
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)	
Flow max.	[l/min]	80	
Leakage at 50 bar	[ml/min]	Up to 10 per flow path, depending on spool	
Static / Dynamic			
Step response at 95%	[ms]	Energized: 32 De-energized: 40	
Electrical characteristics			
Duty ratio		100% ED; CAUTION: coil temperature up to 150 °C possible	
Max. switching frequency	[1/h]	15000	
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)	
	Code	K	J
Supply voltage	[V]	12 V =	24 V =
Tolerance supply voltage	[%]	±10	±10
Current consumption hold	[A]	2.5	1.25
Power consumption hold	[W]	30	30
Solenoid connection		Connector as per EN 175301-803 (code W), AMP Junior Timer (code A), DP4 2-pin “Deutsch“ connector (code J). Solenoid identification as per ISO 9461.	
Wiring min.	[mm²]	3 x 1.5 recommended	
Wiring length max.	[m]	50 recommended	

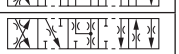
With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

D1MW_UK.INDD CM

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

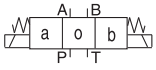
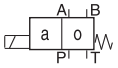
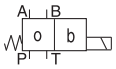
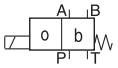
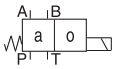
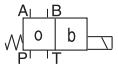
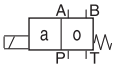
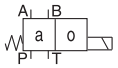
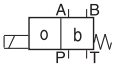
2

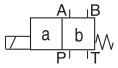
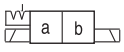
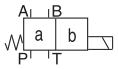
D	1	M	W			N
Directional control valve	Size DIN NG06 CETOP 03 NFPA D03	3-chamber valve for mobile and marine applications	Wet pin armature solenoid, threaded in tube	Spool type	Spool position	NBR Seal

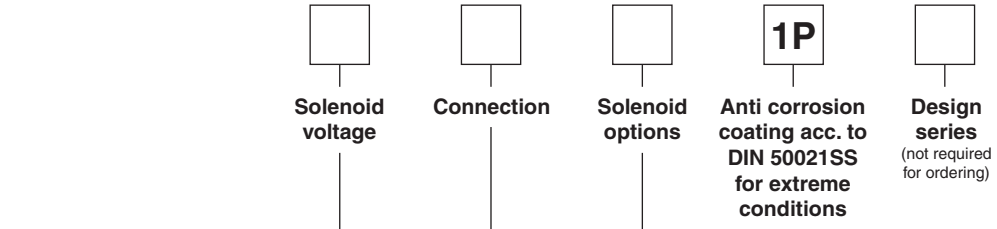
3 position spools	
Code	Spool type a 0 b
1	
2	
4	
6	
8 [1]	
11	
21	
22	
81	
82	

2 position spools	
Code	Spool type a b
20	
30	

[1] Consider specific spool position.

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 8	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		2 positions. Spring offset in position “b“. Operated in position “a“.
D		2 positions. Operated in position “a“ or “b“. No centre or offset position.
H		2 positions. Spring offset in position “a“. Operated in position “b“.



Code	Voltage
K	12V =
J	24V =

Code	Connection
W [2)]	Connector as per EN 175301-803
J [2)]	Connector “Deutsch“ DP4 2-pin
A [2)]	2-pin AMP Junior Timer

[2)] Please order plug separately.

Code	Solenoid option
omit	Standard solenoid
T	without manual override

Other spool types on request.

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.

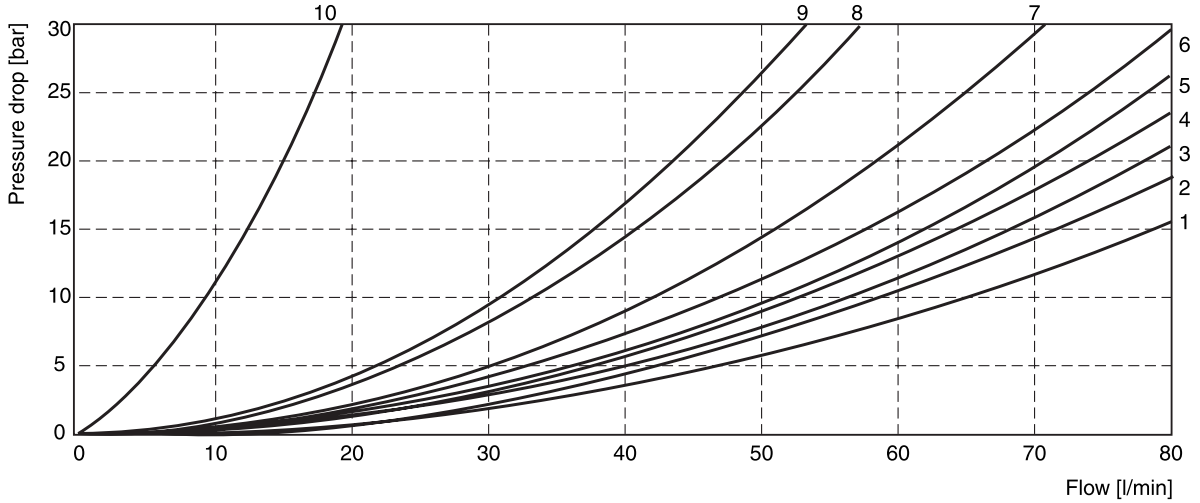
2

	Position „b“		Position „a“		Position „0“					
Spool	P ->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	3	1	3	1	–	–	–	–	–	–
2	2	1	2	1	2	2	1	1	2	1
4	4	1	4	1	–	–	1	1	–	9
6	2	4	2	4	7	7	–	–	–	7
11	6	2	6	2	–	–	9	9	–	–
20	5	3	5	3	–	–	–	–	–	–
30	3	1	3	1	–	–	–	–	–	–
81	10	10	10	10	–	–	–	–	–	–
82	10	10	10	10	–	–	[1]	[1]	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
8	2	2	2	2	–	–	–	–	8	–

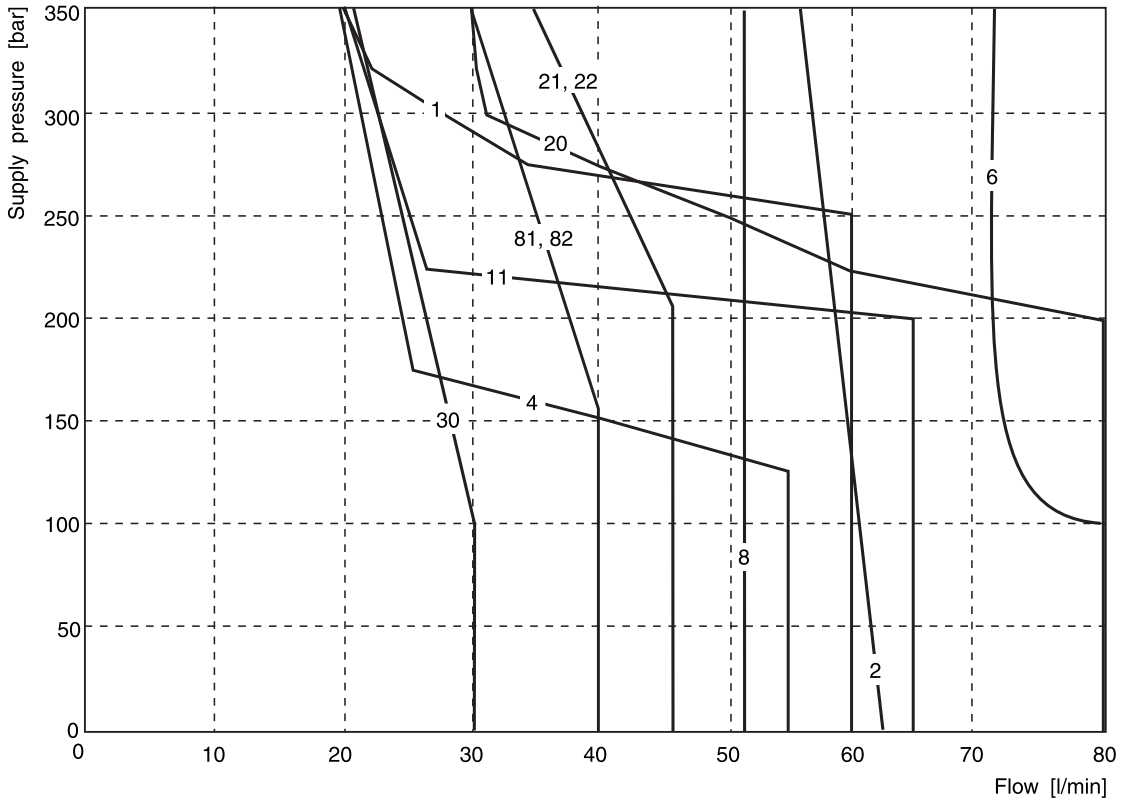
	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
21	3	3	3	6	1	
	P->A	B->T		P->A	P->B	A->B
22	6	1		3	3	3

[1] Only for pressure compensation, no higher flow possible.

Flow curve diagram



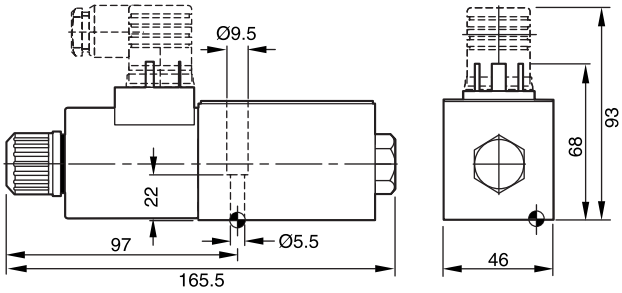
The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P port.



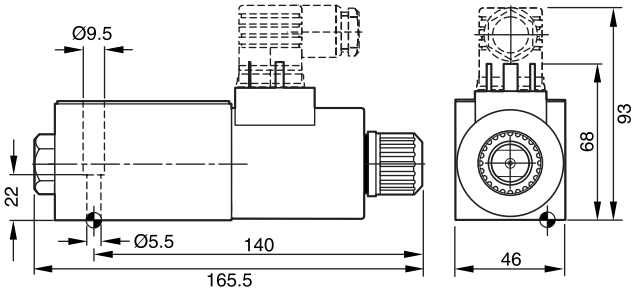
2

Dimensions with EN 175301-803 Connector

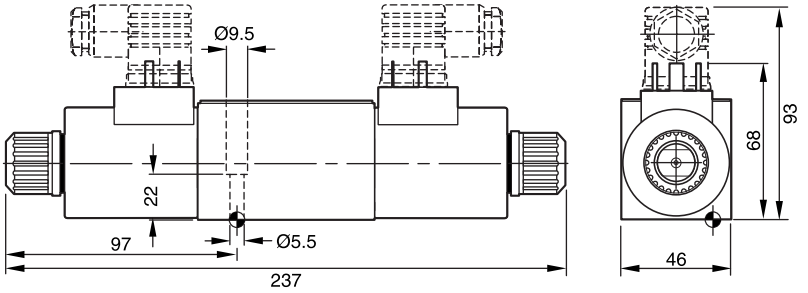
B, E, F -style



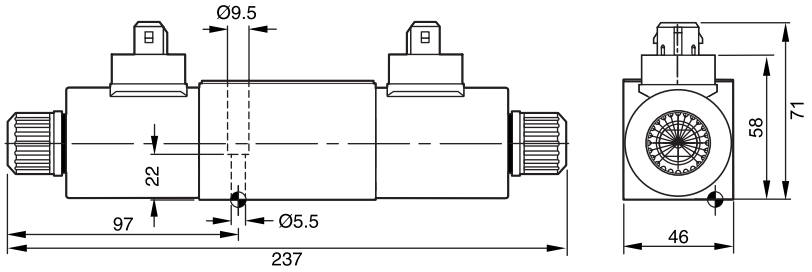
H, K, M -style



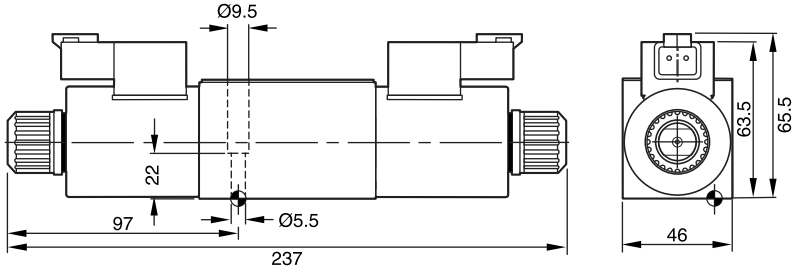
C and D -style



Dimensions with 2pin AMP Junior Timer Connector (only C and D -style shown)



Dimensions with "Deutsch" DP4 2pin Connector (only C and D -style shown)

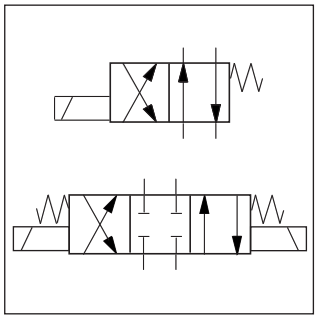


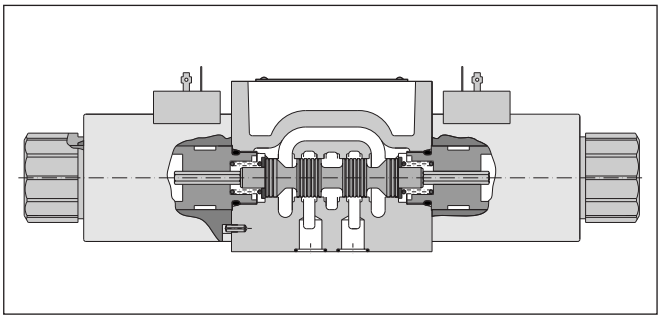
Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VW-70** FPM: SK-D1VW-V70

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

The direct operated directional control valve size NG10 is available with both Parker (series D3W) and Denison (series 4D02) model codes.

Both series are available with a soft shift option for smooth operation. An additional orifice in the solenoid anchor dampens the shifting time for D3W. For the 4D02 the orifice is located in the valve body.





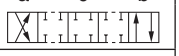
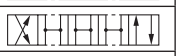
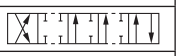
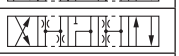
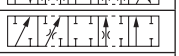
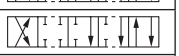
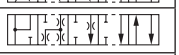
Technical data

General							
Design		Directional spool valve					
Actuation		Solenoid					
Size		DIN NG10 / CETOP 05 / NFPA D05					
Mounting interface		DIN 24340 A10 / ISO 4401 / CETOP RP 121-H / NFPA D05					
Mounting position		unrestricted, preferably horizontal					
Ambient temperature	[°C]	-25...+50					
Weight	[kg]	4.8 (1 solenoid), 6.3 (2 solenoids)					
Hydraulic							
Max. operating pressure	[bar]	P, A B: 350; T: 210 (DC), 105 (AC), 210 (AC Code “H“)					
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525					
Fluid temperature	[°C]	-25 ... +70					
Viscosity permitted	[cSt] / [mm²/s]	2.8...400					
Viscosity recommended	[cSt] / [mm²/s]	30...80					
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)					
Flow max.	[l/min]	150 (DC); 115 (AC)					
Leakage at 50 bar	[ml/min]	Up to 20 per flow path, depending on spool					
Static / Dynamic							
Step response		see table response time					
Electrical characteristics							
Duty ratio		100% ED; CAUTION: coil temperature up to 150 °C possible					
Max. switching frequency	[1/h]	10000					
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)					
	Code	K	J	U	G	Y	T
Supply voltage / ripple	[V]	12 V =	24 V =	98 V =	205 V =	110V at 50Hz/ 120V at 60Hz	230V at 50Hz/ 240V at 60Hz
Tolerance supply voltage	[%]	±10	±10	±10	±10	±5	±5
Current consumption hold	[A]	3	1.5	0.37	0.18	0.8 / 0.72	0.4 / 0.36
Current consumption in rush	[A]	3	1.5	0.37	0.18	3.41 / 3.31	1.75 / 1.7
Power consumption hold	[W]	36	36	36	36	88 / 86	88 / 86
Power consumption in rush	[W]	36	36	36	36	375 / 397	385 / 408
Solenoid connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461.					
Wiring min.	[mm²]	3 x 1.5 recommended					
Wiring length max.	[m]	50 recommended					

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

2

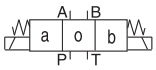
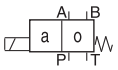
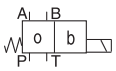
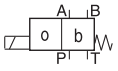
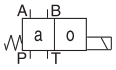
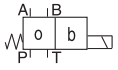
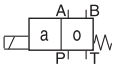
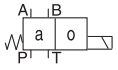
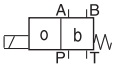
D	3	W			
Directional control valve	**Size DIN NG10 CETOP 05 NFPA D05**	**Wet pin solenoid**	**Spool type**	**Spool position**	**Seals**

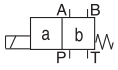
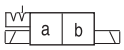
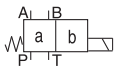
3 position spools		
Code	Spool type	
	a 0 b	
1		
2		
3		
4		
5		
6		
7		
8 [1]		
9 [1]		
10 [2]		
11		
12		
14		
15		
16		
21 [2]		
22 [2]		
31 [2]		
32 [2]		
81 [2]		
82 [2]		
102 [2]		

2 position spools	
Code	Spool type
	a b
20	
26	
30	
101 [2]	

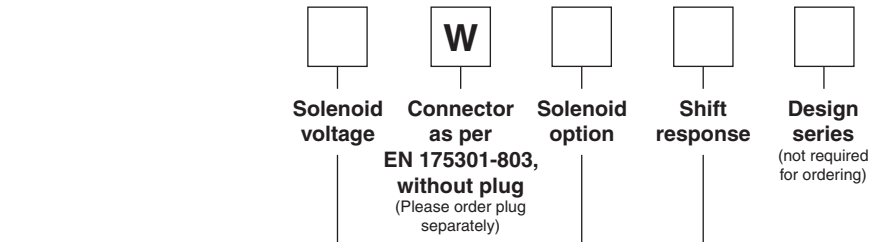
[1] Consider specific spool position.
[2] Only available for DC voltage.

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 8 and 9	
E	 Operated in position “a“.	 Operated in position “b“.	**2 positions.** **Spring offset in position “0“.**
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	**2 positions.** **Spring offset in position “0“.**
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		**2 positions.** **Spring offset in position “b“.** **Operated in position “a“.**
D		**2 positions.** **Operated in position “a“ or “b“.** **No centre or offset position.**
H		**2 positions.** **Spring offset in position “a“.** **Operated in position “b“.**

Bold letters =
Short-term availability



Code	Solenoid voltage
K	**12V =**
J	**24V =**
U [3]	98V =
G [3]	205V =
Y	110V 50Hz / 120V 60Hz
T	230V 50Hz / 240V 60Hz

[3] To be used with retifier plug when DC solenoids are used with AC input.

Code	Solenoid option
omit	**Standard solenoid with manual override**
H	High pressure solenoid tube for AC. Tank pressure up to 210bar
T	without manual override

Code	Shift response
omit	Standard response
S4 [4]	orifice diameter 1.0 mm
S7 [4]	orifice diameter 1.5 mm

[4] Only for DC

Further spool types and solenoid voltages on request.

2

4D02 – □ □ □ – □ □ – **C**

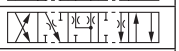
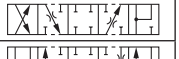
- **4D02** – Directional control valve size DIN NG10 CETOP 05 NFPA D05
- □ – Body
- □ – Control
- □ – Spool type
- □ – Spool position
- □ – End cap
- **C** – Design series

Code	Body
3	Standard 3-chamber
D	5-chamber for soft-shift (G3)

Code	Control
1	1 solenoid
2	2 solenoids
7	2 solenoids and 2 pos. detent (only for spool types 11 and 51)

Code	End cap
01	for control 1
02	for control 2 and 7

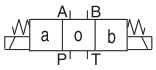
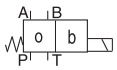
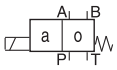
3 position spools

Code	Spool type (a 0 b)
01	
02	
03	
07	
08	
09	
10	
46	
55	
56	

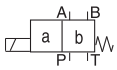
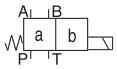
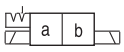
2 position spools

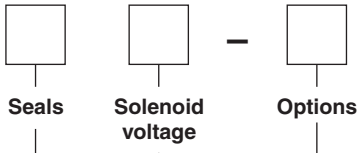
Code	Spool type (a b)
11	
12	
51	

3 position spools

Code	Spool position	
03		3 positions. Spring centered to “0“.
05		2 positions. Spring centered energized to “b“.
06		2 positions. Spring centered energized to “a“.

2 position spools

Code	Spool position	
01		2 positions. Spring offset to “b“ energized to “a“.
02		2 positions. Spring offset to “a“ energized to “b“.
09		2 positions detent. Operated in “a“ or “b“. No centre or spring offset position.



Code	Seals
1	NBR
5	FPM

Code	Solenoid voltage
G0R	12V =
G0Q	24V =
GAR *	98V =
GAG *	205V =
W30	110V 50Hz / 120V 60Hz
W31	230V 50Hz / 240V 60Hz

* To be used with retifier plug when DC solenoids are used with AC input.

Code	Options
omit	Solenoid connector as per EN 175301-803 without plug. With manual override
G3	Soft shift with orifice in body (for DC and body D only)
32	Without manual override

Further spool types and solenoid voltages on request.

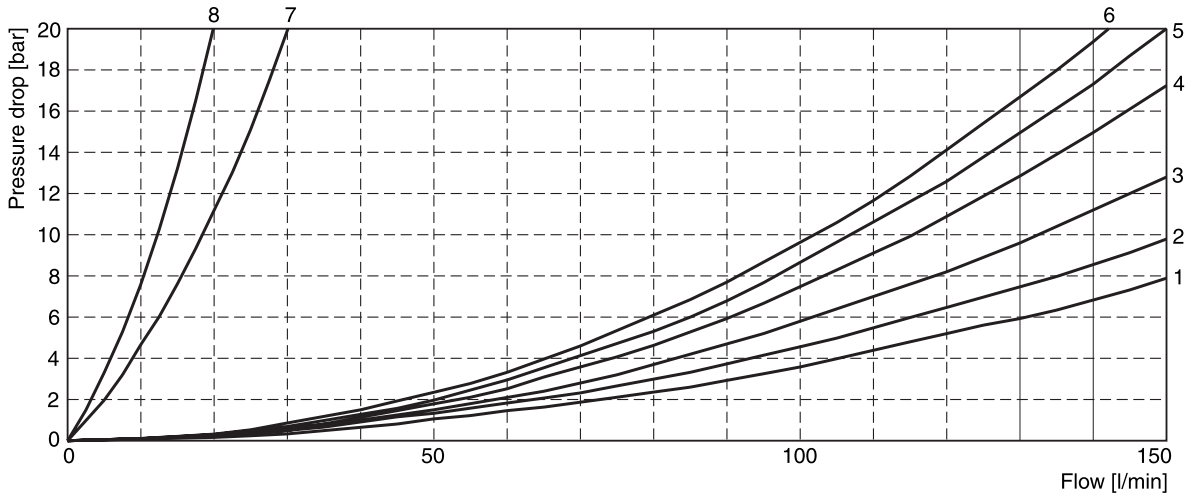
2

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

Spool		Position „b“		Position „a“		Position „0“					
D3W	4D02	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	**03**	4	3	4	3	–	–	–	–	–	–
2	**01**	4	1	4	1	3	3	1	1	5	1
3	**10**	4	3	5	2	–	–	4	–	–	–
4	**08**	4	2	4	2	–	–	3	3	–	5
5	–	4	3	5	3	5	–	–	–	–	–
6	**46**	4	3	4	3	6	6	–	–	–	6
7	–	5	1	4	3	–	4	–	2	6	–
10	–	4	–	4	–	–	–	–	–	–	–
11	**02**	4	3	4	3	–	–	8	8	–	–
12	–	4	3	4	3	7	7	7	7	8	8
14	–	4	3	5	1	4	–	2	–	6	–
15	**09**	5	2	4	3	–	–	–	4	–	–
16	–	5	3	4	3	–	5	–	–	–	–
20	**51**	4	3	4	3	–	–	–	–	–	–
26	**12**	4	–	4	–	–	–	–	–	–	–
30	**11**	4	2	4	2	–	–	–	–	–	–
		P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A->B
8	–	4	3	4	3	–	–	–	–	6	–
9	**07**	4	4	4	4	–	–	–	–	6	–

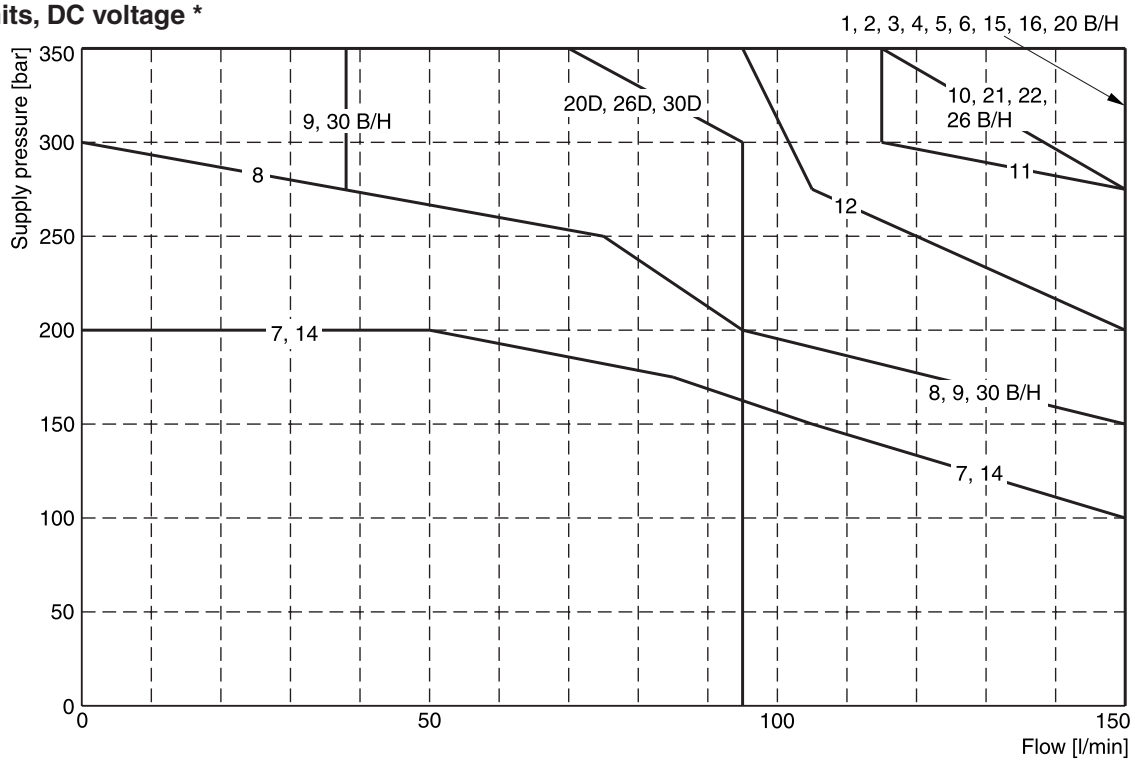
		Position „b“			Position „a“		
		P->A	P->B	A->B	P->B	A->T	
21	**55**	5	4	6	3	3	
		P->A	B->T		P->A	P->B	A->B
22	**56**	3	3		4	5	6

Flow curve diagram

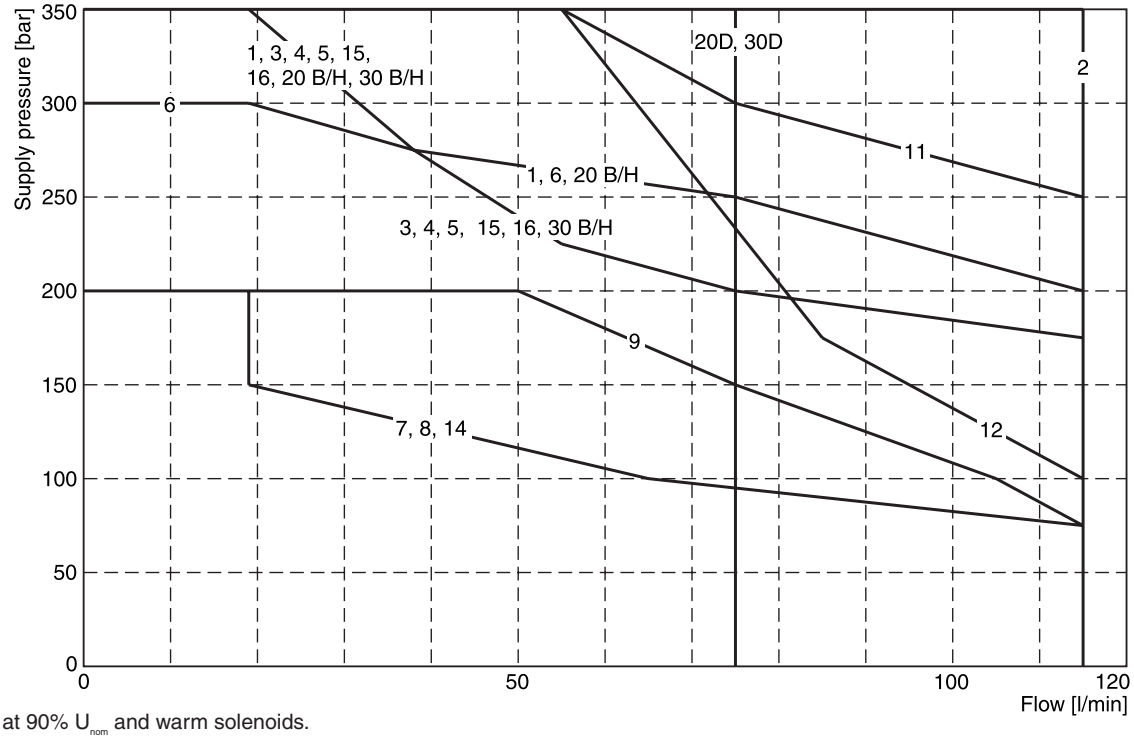


The diagram below specifies the shift limits for valves with DC and AC solenoids. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

Shift limits, DC voltage *



Shift limits, AC voltage *



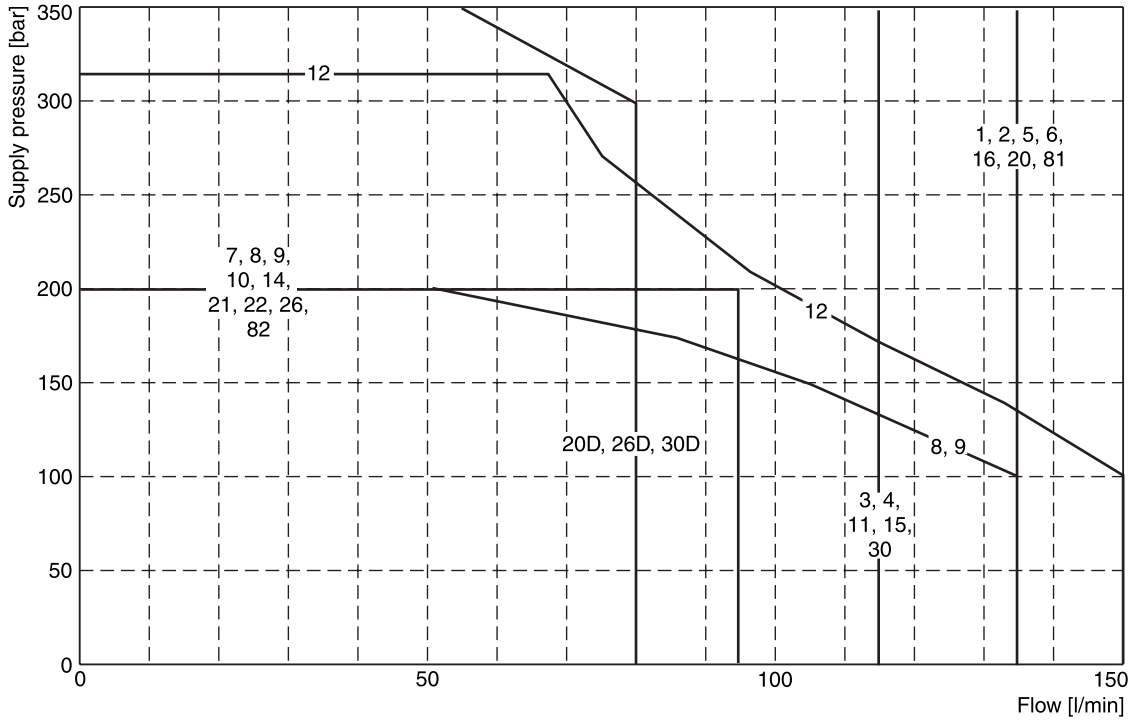
Measured at 90% U_{nom} and warm solenoids.

* For 4D02 spool code see flow curve table.

2

Shift limits soft shift

The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.



Measured at 90% U_{nom} and warm solenoids.

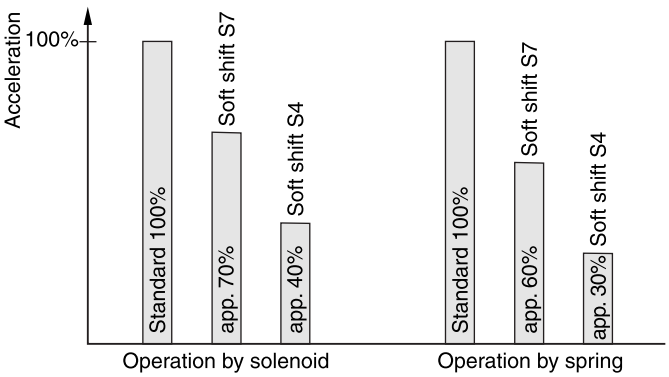
Response times D3W Soft Shift

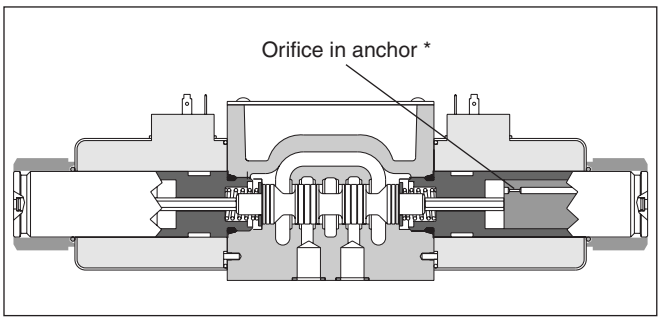
Code	Orifice size	Energize	De-energize
(Standard)	–	105 ms (DC) 21 ms (AC)*	85 ms (DC) 35 ms (AC)*
S4	1.0 mm	320 ms	550 ms
S7	1.75 mm	160 ms	370 ms

Step response times were obtained under the following conditions: υ = 35 mm²/s at 50°C with the valve operating at 175 bar and 65 l/min. Published response times are nominal and may vary with spool, flow, pressure and temperature.

* For AC input and soft shift use rectifier plug.

Acceleration for different orifice sizes (archived against a valve without soft shift)



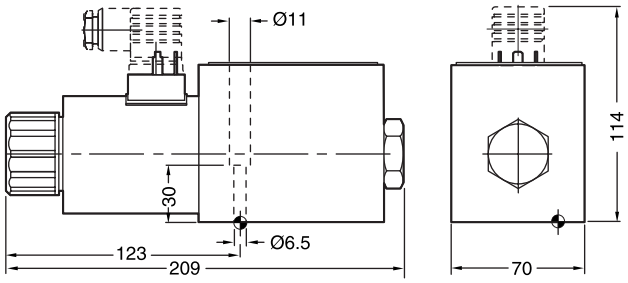


* Note: For 4D02 the orifice is located in the Z-channel of the valve body.

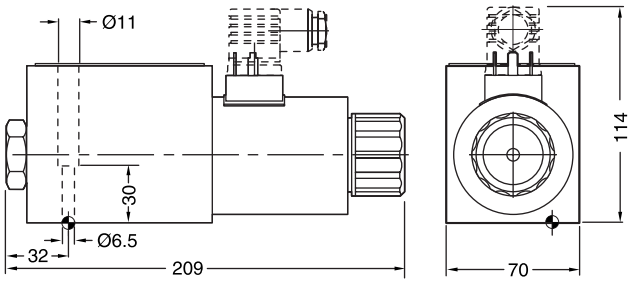
For even softer shifting, the proportional spools 81, 82, 101 and 102 can be used.

Interface EN 175301-803, DC solenoid

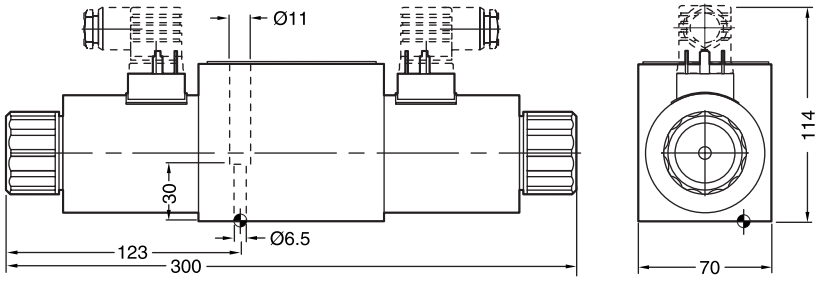
B, E, F -style



H, K, M -style

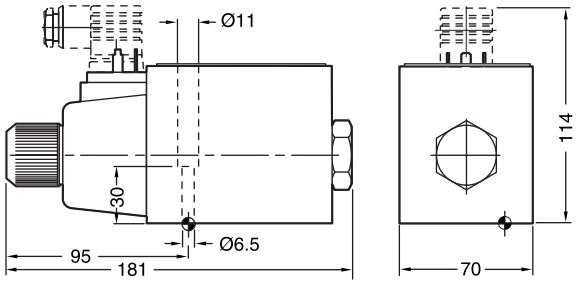


C, D -style

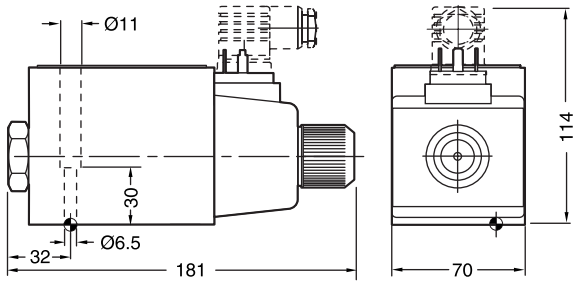


Interface EN 175301-803, AC solenoid

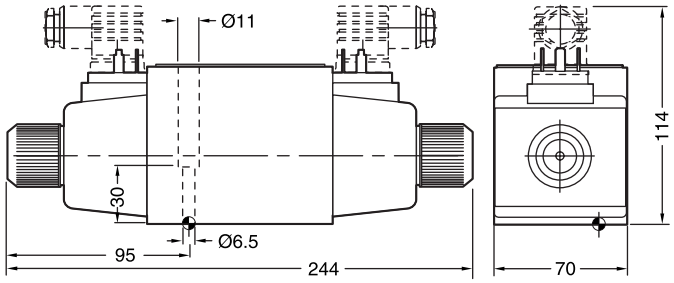
B, E, F -style



H, K, M -style



C, D -style



Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ ⏥ 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D3W-30** FPM: SK-D3W-V30

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

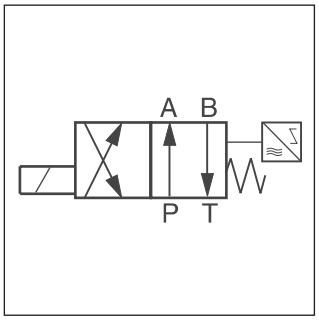
D3W stand_UK.INDD CM

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

Notes

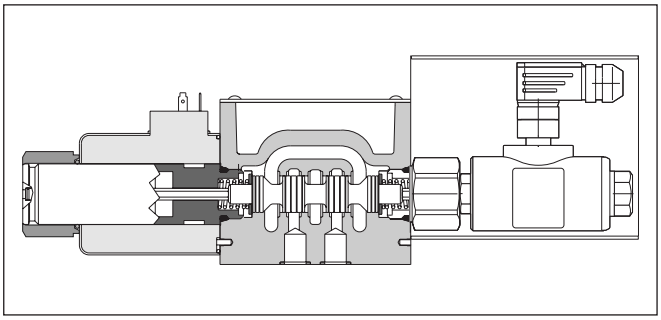
The 4/2 directional valves operated directly by solenoids with inductive position control are used as monitoring valves. The start or end position can be monitored. The position control is only available for single solenoid valves.

The fail-safe position of the directional valve during power failure is the spring offset position.



Attention

The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.



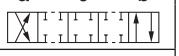
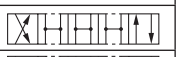
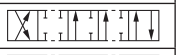
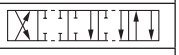
Technical data

General					
Design		Directional spool valve			
Actuation		Solenoid			
Size		DIN NG10 / CETOP 05 / NFPA D05			
Mounting interface		DIN 24340 A10 / ISO 4401 / CETOP RP 121-H / NFPA D05			
Mounting position		unrestricted, preferably horizontal			
Ambient temperature	[°C]	0...+50			
Weight	[kg]	5.2			
Hydraulic					
Max. operating pressure	[bar]	P, A, B: 350; T: 210			
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525			
Fluid temperature	[°C]	0 ... +70			
Viscosity permitted	[cSt] / [mm²/s]	2.8...400			
Viscosity recommended	[cSt] / [mm²/s]	30...80			
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)			
Flow max.	[l/min]	150			
Leakage at 50 bar	[ml/min]	Up to 20 per flow path, depending on spool			
Static / Dynamic					
Step response at 95%		Energized: 105; De-energized: 85			
Electrical characteristics					
Duty ratio		100% ED; CAUTION: coil temperature up to 150 °C possible			
Max. switching frequency	[1/h]	10000			
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)			
	Code	K	J	U	G
Supply voltage / ripple	[V]	12 V =	24 V =	98 V =	205 V =
Tolerance supply voltage	[%]	±10	±10	±10	±10
Current consumption hold	[A]	3	1.5	0.37	0.18
Power consumption hold	[W]	36	36	36	36
Solenoid connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461.			
Wiring min.	[mm²]	3 x 1.5 recommended			
Wiring length max.	[m]	50 recommended			

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

2

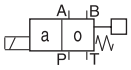
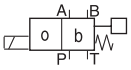
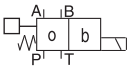
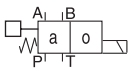
D	3	W			
Directional control valve	**Size DIN NG10 CETOP 05 NFPA D05**	**Wet pin solenoid**	**Spool type**	**Spool position**	**Seals**

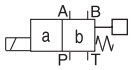
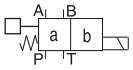
3 position spools	
Code	Spool type
	a 0 b
1	
2	
3 [1]	
4	
5 [2]	
15 [2]	
16 [1]	
21 [1]	
22 [2]	

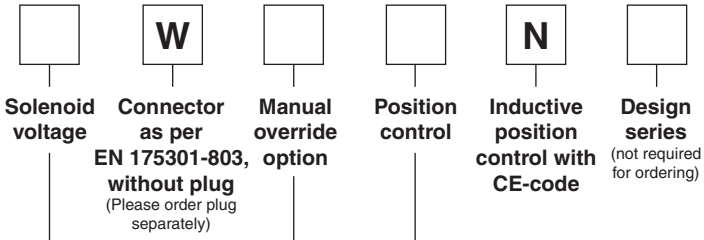
2 position spools	
Code	Spool type
	a b
20	
26	
30	

[1] Only available for spool pos. “K“ and “M“
[2] Only available for spool pos. “E“ and “F“

Code	Seals
N	NBR
V	FPM

Code	3 position spools	
E		2 positions. Spring offset in position “0“. Operated in position “a“.
F		2 positions. Spring offset in position “b“. Operated in position “0“.
K		2 positions. Spring offset in position “0“. Operated in position “b“.
M		2 positions. Spring offset in position “a“. Operated in position “0“.

2 position spools	
Code	Spool position
B	 2 positions. Spring offset in position “b“. Operated in position “a“.
H	 2 positions. Spring offset in position “a“. Operated in position “b“.



Code	Solenoid voltage
K	12V =
J	24V =
U [3]	98V =
G [3]	205V =

[3] For alternating current use plug with rectifier.
Please order rectifier plug separately.

Code	Solenoid option
omit	Standard valve without options
T [4]	without manual override

[4] For hydraulic presses according to the safety regulations EN 693, solenoid option "T" (without manual override) and accessories "66" or "80" (start position monitored) are required.

Code	Spool position	Position control
I2	E, F, B (Solenoid on a-side)	End position monitored side B
I5 [4]		Start position monitored side B
I1	K, M, H (Solenoid on b-side)	End position monitored side A
I4 [4]		Start position monitored side A

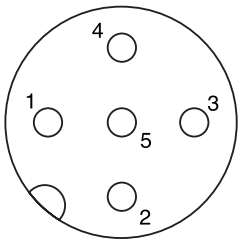
Further spool types and solenoid voltages on request.

2

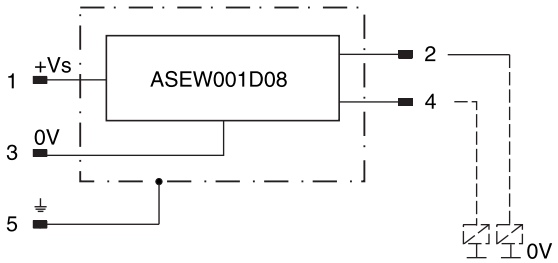
Electrical characteristics of position control as per IEC 61076-2-101 (M12x1)

Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
Ambient temperature	[°C]	0...+50
Supply voltage / ripple	[V]	18...42 / 10%
Current consumption without load	[A]	≤ 30
Max. output current per channel, ohmic	[mA]	400
Min. output load per channel, ohmic	[kOhm]	100
Max. output drop at 0.2A	[V]	≤ 1.1
Max. output drop at 0.4A	[V]	≤ 1.6
EMC		EN50081-1 / EN50082-2
Max. tolerance ambient field strength	[A/m]	<1200
Min. distance to next AC solenoid	[m]	>0.1
Interface		M12x1
Wiring min.	[mm²]	5 x 0.25 brad shield recommended
Wiring length max.	[m]	50 recommended

M12 pin assignment



1 + Supply 18...42V
2 Normally open
3 0V
4 Normally closed
5 Earth ground



Definitions

Start position monitored:

The valve is de-energized. The inductive switch gives a signal at the moment when the spool leaves the spring offset position (below 15% spool stroke).

The switch can only be located on the opposite side of the solenoid for direct operated valves.

End position monitored:

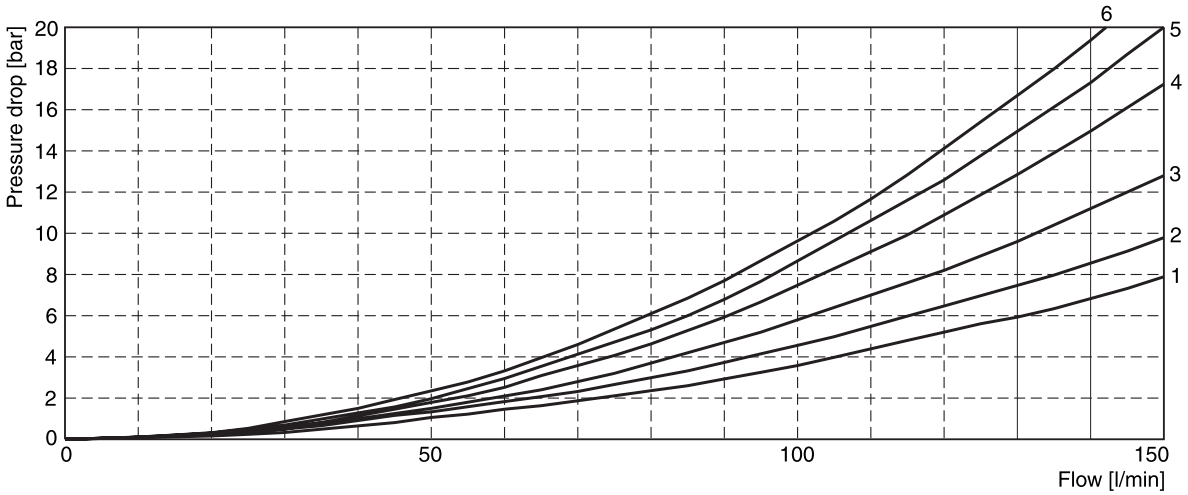
The inductive switch gives a signal before the end position is reached (above 85% spool stroke).

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.

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	3	4	3	–	–	–	–	–	–
2	4	1	4	1	3	3	1	1	5	1
3	4	3	–	–	–	–	4	–	–	–
4	4	2	4	2	–	–	3	3	–	5
5	–	–	5	3	5	–	–	–	–	–
15	–	–	4	3	–	–	–	4	–	–
16	5	3	–	–	–	5	–	–	–	–
20	4	3	4	3	–	–	–	–	–	–
26	4	–	4	–	–	–	–	–	–	–
30	4	2	4	2	–	–	–	–	–	–

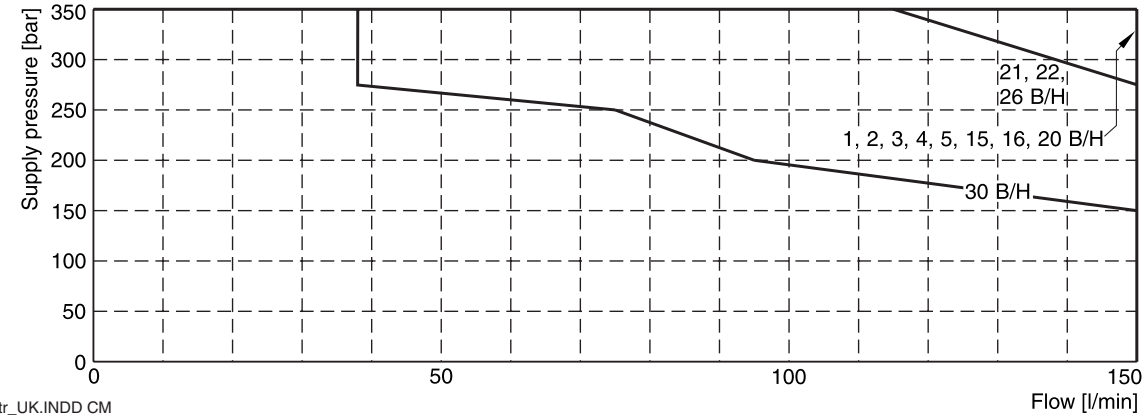
	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
21	5	4	6	–	–	
	P->A	B->T		P->A	P->B	A->B
22	–	–		4	5	6

Flow curve diagram



Shift limit diagram

The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

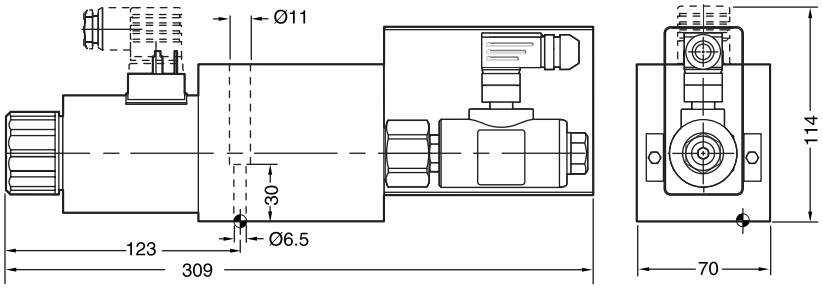


D3W poscontr_UK.INDD CM

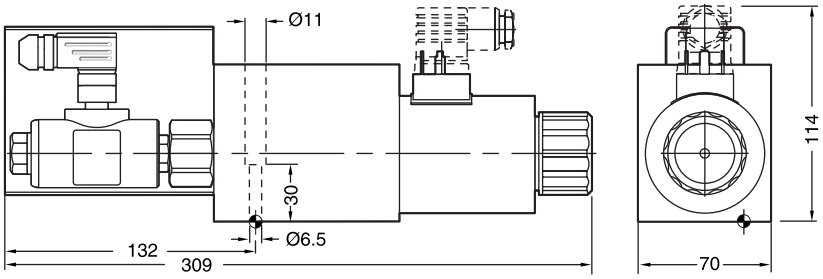
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

2

Interface EN 175301-803, DC solenoid, with plug M12x1*
B, E, F -style



H, K, M -style



* Delivery includes plug M12 x 1 (see accessories, plug M12x1; order no.: 5004109).

Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D3W-30** FPM: SK-D3W-V30

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

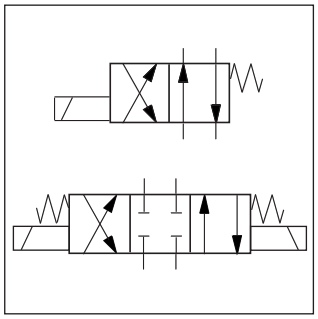
Attention

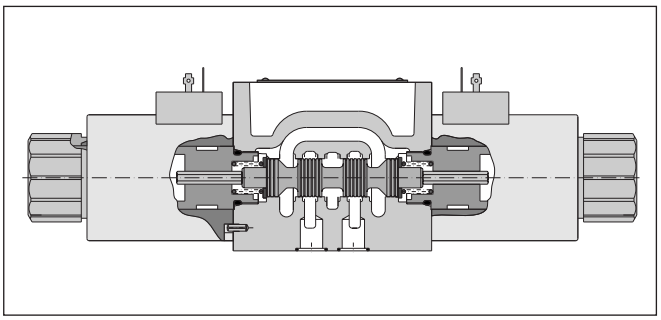
The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.

The D3MW is a solenoid operated directional control valve size NG10 in 3-chamber design. It is direct operated by wet pin solenoids.

The D3MW is designed for mobile and marine applications.

It is based on the D3W series, but offers additional corrosion protection of the valve body, the solenoid coil and the anchor tube as well as the typical solenoid connections for the mobile market such as AMP Junior Timer.





Technical features:

- High corrosion protection
- Solenoid connection:
  - Standard (as per EN175301-803)
  - AMP Junior Timer
- Robust design for rough applications

Technical data

General			
Design		Directional spool valve	
Actuation		Solenoid	
Size		DIN NG10 / CETOP 05 / NFPA D05	
Mounting interface		DIN 24340 A10 / ISO 4401 / CETOP RP 121-H / NFPA D05	
Mounting position		unrestricted, preferably horizontal	
Ambient temperature	[°C]	-25...+50	
Weight	[kg]	4.8 (1 solenoid), 6.3 (2 solenoids)	
Hydraulic			
Max. operating pressure	[bar]	P, A B: 350; T: 210	
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525	
Fluid temperature	[°C]	-25 ... +70	
Viscosity permitted	[cSt] / [mm²/s]	2.8...400	
Viscosity recommended	[cSt] / [mm²/s]	30...80	
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)	
Flow max.	[l/min]	150	
Leakage at 50 bar	[ml/min]	Up to 20 per flow path, depending on spool	
Static / Dynamic			
Step response at 95%	[ms]	Energized: 105	
		De-energized: 85	
Electrical characteristics			
Duty ratio		100% ED; CAUTION: coil temperature up to 150 °C possible	
Max. switching frequency	[1/h]	10000	
Protection class		IP 65 in accordance with EN60529 (plugged and mounted)	
	Code	K	J
Supply voltage / ripple	[V]	12 V =	24 V =
Tolerance supply voltage	[%]	±10	±10
Current consumption	[A]	3	1.5
Power consumption	[W]	36	36
Solenoid connection		Connector as per EN 175301-803, AMP Junior Timer, Solenoid ident. as per ISO 9461.	
Wiring min.	[mm²]	3 x 1.5 recommended	
Wiring length max.	[m]	50 recommended	

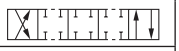
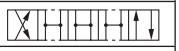
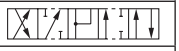
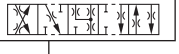
With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

D3MW_UK.INDD CM

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

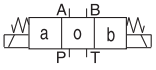
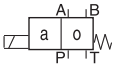
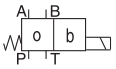
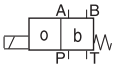
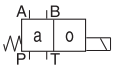
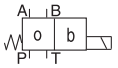
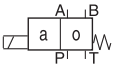
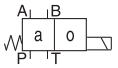
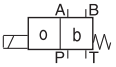
2

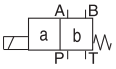
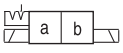
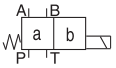
D	3	M	W			N
Directional control valve	Size DIN NG 10 CETOP 05 NFPA D05	3-chamber valve for mobile and marine applications	Wet pin solenoid	Spool type	Spool position	NBR Seal

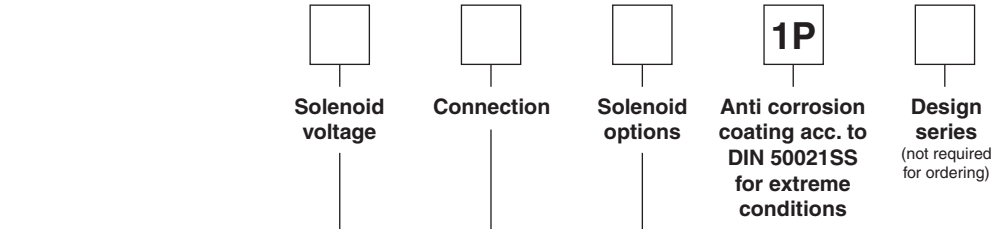
3 position spools	
Code	Spool type a 0 b
1	
2	
4	
6	
8 [1]	
11	
21	
22	
81	
82	

2 position spools	
Code	Spool type a b
20	
30	

[1] Consider specific spool position.

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 8 and 9	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		2 positions. Spring offset in position “b“. Operated in position “a“.
D		2 positions. Operated in position “a“ or “b“. No centre or offset position.
H		2 positions. Spring offset in position “a“. Operated in position “b“.



Code	Voltage
K	12V =
J	24V =

Code	Connection
W [2]	Connector as per EN 175301-803
A [2]	2-pin AMP Junior Timer

[2] Please order plug separately.

Code	Solenoid option
omit	Standard solenoid
T	without manual override

Further spool types on request.

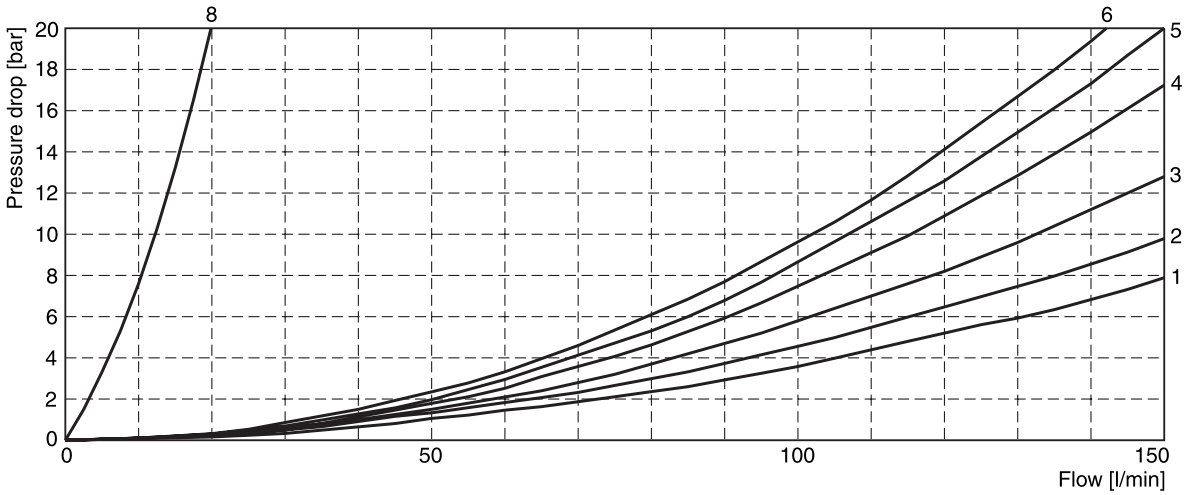
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

2

	Position „b“		Position „a“		Position „0“					
Spool	P ->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	3	4	3	–	–	–	–	–	–
2	4	1	4	1	3	3	1	1	5	1
4	4	2	4	2	–	–	3	3	–	5
6	4	3	4	3	6	6	–	–	–	6
11	4	3	4	3	–	–	8	8	–	–
20	4	3	4	3	–	–	–	–	–	–
30	4	2	4	2	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
8	4	3	4	3	–	–	–	–	6	–

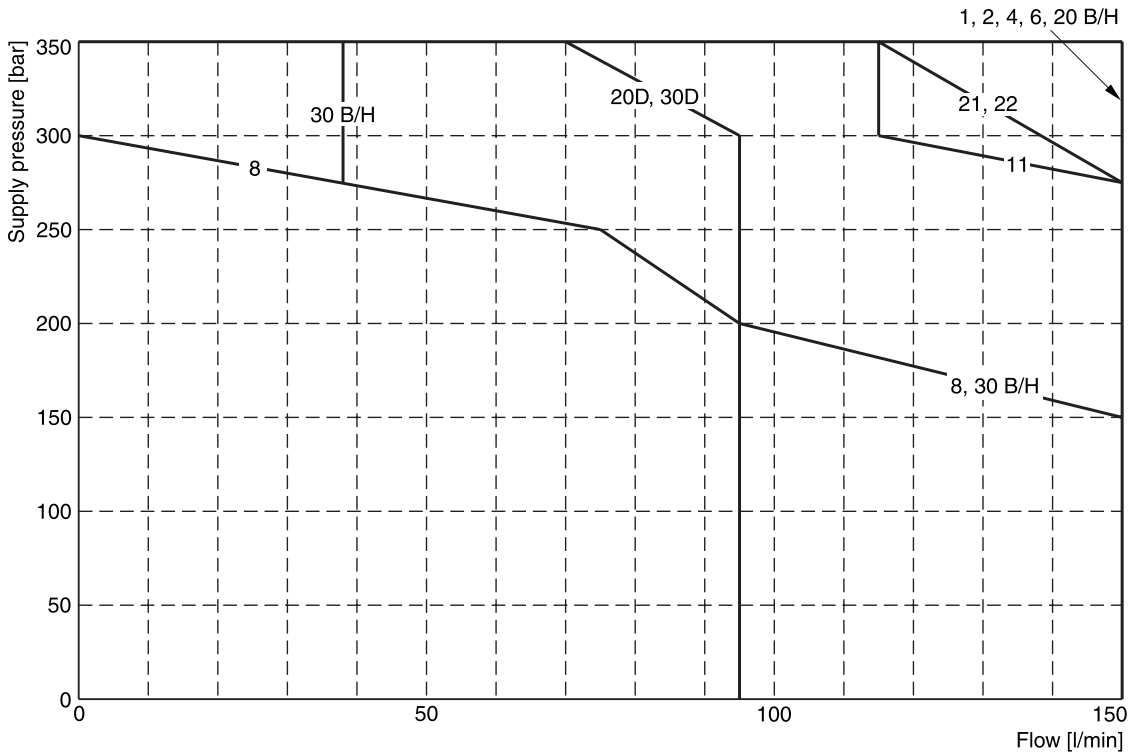
	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
21	5	4	6	3	3	
	P->A	B->T		P->A	P->B	A->B
22	3	3		4	5	6

Flow curve diagram



The diagram below specifies the shift limits for valves with DC solenoids. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

Shift limits, DC voltage

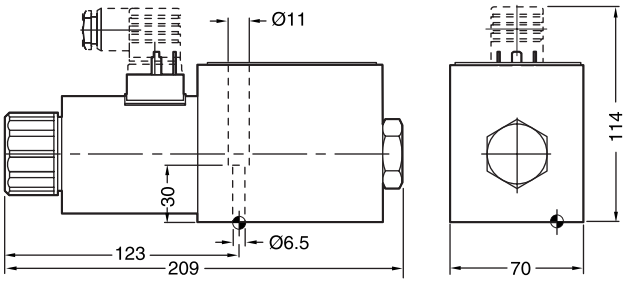


Measured at 90% U_{nom} and warm solenoids.

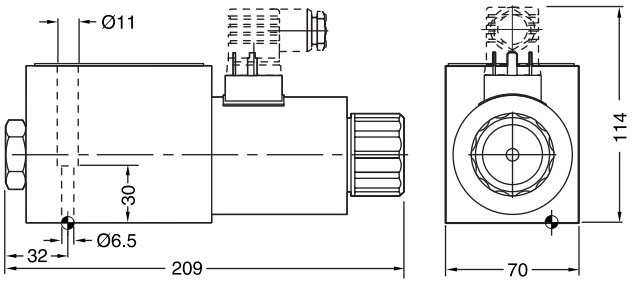
2

Interface EN 175301-803, DC solenoid

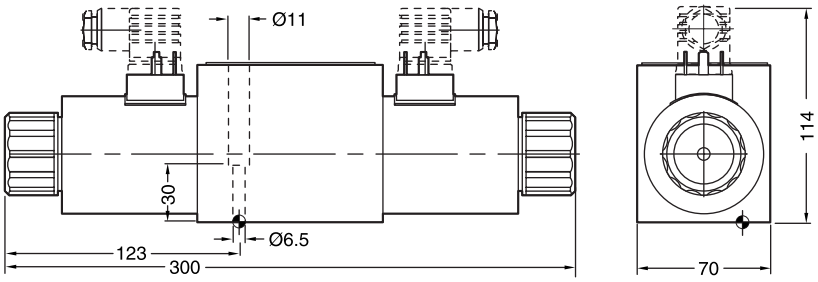
B, E, F -style



H, K, M -style

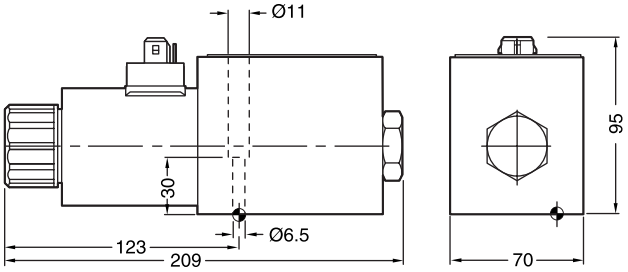


C, D -style

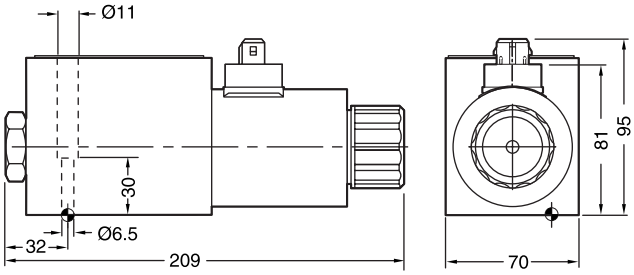


Dimensions with AMP Connector

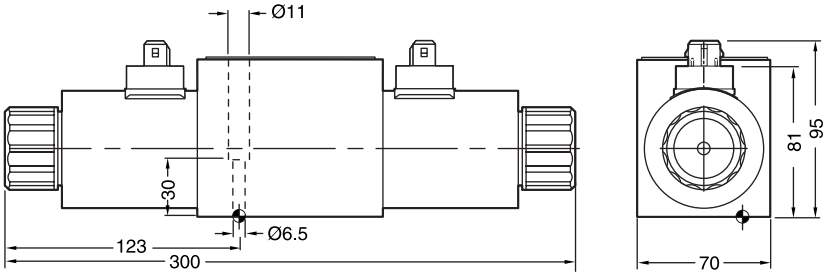
B, E, F -style



H, K, M -style



C, D -style



Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D3W-30** FPM: SK-D3W-V30

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

D3MW_UK.INDD CM

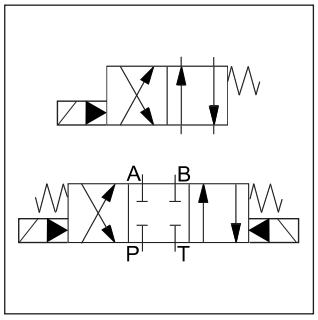
Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

The D31, D41, D81, D91 and D111 are electrically controlled 4/3 or 4/2 way directional control valves. The valves are pilot operated by an NG6 valve.

Pressure and flow of the pilot oil have a significant influence on the response time of the spool in the main stage.

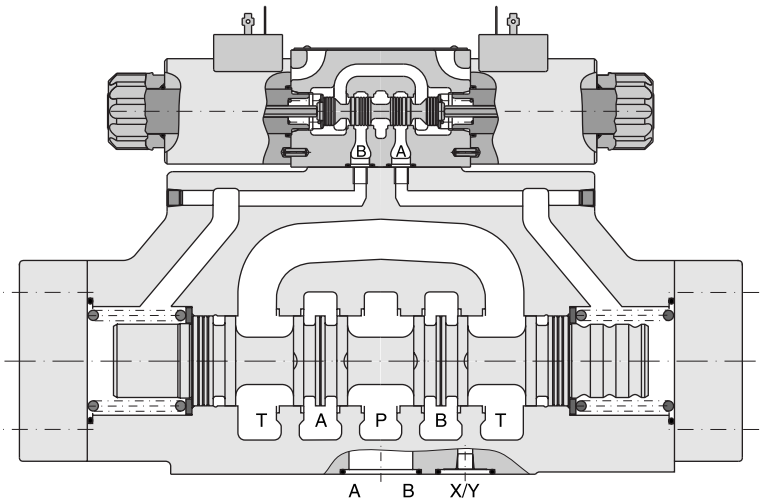
In order to guarantee a save switching of the spool please choose the appropriate pilot oil supply and drain option. (Spools with a connection P to T need an external pressure supply or an integral check valve. For spools with negative cross-over position the same options are recommended.)

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



D41VW

D81VW



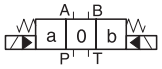
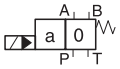
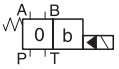
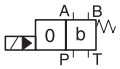
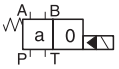
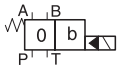
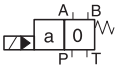
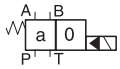
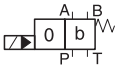
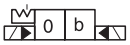
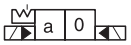
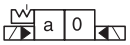
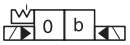
2

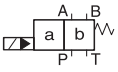
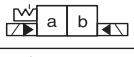
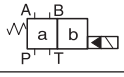
D		1		W			
Directional control valve	Series	Pilot NG 06	Style	Electrically operated	Spool type	Spool position	Seals

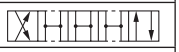
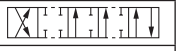
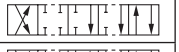
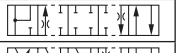
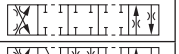
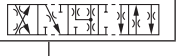
Code	Bore	Size
3	**Ø11mm**	**NG10**
4	**Ø20mm**	**NG16**
8	**Ø26mm**	**NG25**
9	Ø32mm	NG25
11	Ø50mm	NG32

Code	Seals
N	**NBR**
V	FPM

Code	Style
D	**D3**
V	**D4, D8/9, D111**

3 position spools		
Code	all 3 position spools	
C [2]		**3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.**
	Standard / Spool type 9	
E [2]	 Operated in position “a“. /  Operated in position “b“.	2 positions. Spring offset in position “0“.
F [2]	 Spring offset in position “b“. /  Spring offset in position “a“.	2 positions. Operated in position “0“.
K [2]	 Operated in position “b“. /  Operated in position “a“.	2 positions. Spring offset in position “0“.
M [2]	 Spring offset in position “a“. /  Spring offset in position “b“.	2 positions. Operated in position “0“.
R [3]	 No centre in offset position. /  No centre in offset position.	2 positions, detent. Operated in position “0“ or “b“.
S [3]	 No centre in offset position. /  No centre in offset position.	2 positions, detent. Operated in position “0“ or “a“. No centre in offset position.

2 position spools	
Code	Spool position
B [2]	 **Spring offset in position “b“. Operated in position “a“.**
D [3]	 Detent, operated in position “a“ or “b“. No centre or offset position.
H [2]	 Spring offset in position “a“. Operated in position “b“.

3 position spools	
Code	Spool type a 0 b
1 [2]	
2 [2]	
3 [3]	
4 [3]	
5 [3]	
6 [3]	
7 [3]	
9 [1] [2]	
11 [3]	
14 [3]	
15 [3]	
16 [3]	
21 [3]	
22 [3]	
31 [5]	
32 [5]	
54 [4]	
81 [2]	
82 [2]	

2 position spools	
Code	Spool type a b
20 [2]	
26 [3]	
30 [2]	

[1] Consider specific spool position.
[2] All sizes (D31, D41, D81, D 91, D111) available
[3] Only D31, D41, D81, D91 available
[4] Only D41, D81, D91, D111 available
[5] Only D31, D81, D91 available

D3-D11_UK.INDD CM

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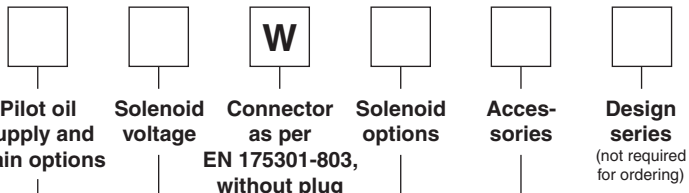
Hydraulic Controls Division
Kaarst, Germany



Code	Inlet	Outlet
1	**Internal**	**External**
2	External	External
3 [6]	Integral check valve	External
4 [7]	**Internal**	**Internal**
5 [6]	External	Internal
6	Integral check valve	Internal

[6] Only D41, D81 available.
[7] Not for spools 2, 7, 9, 14, 30, 31, 32, 54 available.

Code	Voltage
K	12V =
J	**24V =**
U [8]	98V =
G [8]	205V =
Y	110V 50Hz / 120V 60Hz
T	230V 50Hz / 240V 60Hz

[8] For AC voltage use plug with rectifier.
Please order rectifier plug separately.

Code	Solenoid option
omit	**Standard solenoid without options**
T	without manual override

Code	Accessories
omit [9]	**Standard valve w/o accessories**
2 [9]	Pilot with press. reducing valve
7 [9]	Pilot choke, meter-out
8 [10]	Stroke adjustment side B
9 [10]	Stroke adjustment side A
60 [9]	Pilot choke, meter-in
89 [10]	Stroke adjustment side A and B

[9] All sizes (D31, D41, D81, D91, D111) available.
[10] Only D31, D41, D81, D91 available.

Bold letters =
Short-term availability

Further spool types and solenoid voltages on request.
Explosion proof solenoids EEx me II on request.

2

With inductive position control

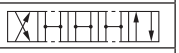
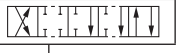
D		1		W			
Directional control valve	Series	Pilot NG 06	Style	Electrically operated	Spool type	Spool position	Seals

Code	Bore	Size
3	Ø11mm	NG10
4	Ø20mm	NG16
8	Ø26mm	NG25
9	Ø32mm	NG25
11	Ø50mm	NG32

Code	Style
D	D3
V	D4, D8/9, D111

Code	Seals
N	NBR
V	FPM

3 position spools

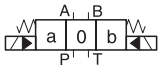
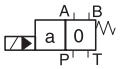
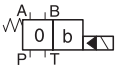
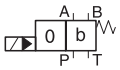
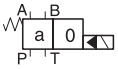
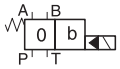
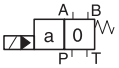
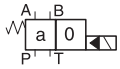
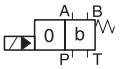
Code	Spool type a 0 b
1 [2]	
2 [5]	
3 [3]	
4 [3]	
7 [5]	
9 [1] [4]	
11 [5]	
14 [5]	
15 [3]	

2 position spools

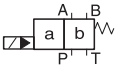
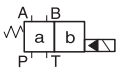
Code	Spool type a b
20 [2]	
30 [5]	

[1] Consider specific spool position.
[2] All sizes (D31, D41, D81, D91, D111) available
[3] Only D31, D41, D81, D91 available
[4] Only D41, D81, D91, D111 available
[5] Only D41, D81, D91 available

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“.	2 positions. Spring offset in position “0“.
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools

Code	Spool position	
B		Spring offset in position “b“. Operated in position “a“.
H		Spring offset in position “a“. Operated in position “b“.

		W			
Pilot oil supply and drain options	**Solenoid voltage**	**Connector as per EN 175301-803, without plug** (Please order plug separately.)	**Solenoid options**	**Acces-sories**	**Design series** (not required for ordering)

Code	Inlet	Outlet
1	Internal	External
2	External	External
3 [6]	Integral check valve	External
4 [7]	Internal	Internal
5	External	Internal
6 [6]	Integral check valve	Internal

[6] Only D41, D81 available.
[7] Not for spools 2, 7, 9, 14, 30 available.

Code	Voltage
K	12V =
J	24V =
U [8]	98V =
G [8]	205V =

[8] For AC voltage use plug with rectifier.
Please order rectifier plug separately.

Code	Solenoid option
omit	Standard solenoid without options
T [9]	without manual override

[9] For hydraulic presses according to the safety regulations EN 693, solenoid option “T“ (without manual override) and accessories “66“, “80“ or “88“ (start position monitored) are required.

Code	Spool position	Position control
55	C	End position monitored, side A and B
88 [9]		Start position monitored, side A and B
11	C, B, E, F (all spools) C, K, M (spool 9)	End position monitored, side B
80 [9]		Start position monitored, side B
10	C, H, K, M (all spools) C, E, F (spool 9)	End position monitored, side A
66 [9]		Start position monitored, side A

The plug M12 x 1 for the position control is included. The monitor switch has to be located on the side to which the spool moves from the spring offset position.

Attention

The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.

2

General							
Design			Directional spool valve				
Actuation			Solenoid				
Series			**D31**	**D41**	**D81/91**	**D111**	
Size			NG10	NG16	NG25	NG32	
Weight (1/ 2 solenoids)		[kg]	6.0 / 6.6	9.7 / 10.3	17.9 / 18.6	67.4 / 68.0	
Mounting interface			DIN 24340 A10	DIN 24340 A16	DIN 24340 A25	DIN 24340 A32	
			ISO 4401	ISO 4401	ISO 4401	ISO 4401	
			NFPA D05	NFPA D07	NFPA D08	NFPA D10	
			CETOP RP 121-H				
Mounting position			unrestricted, preferably horizontal				
Ambient temperature		[°C]	-25...+50 (without inductive position control)				
		[°C]	0...+50 (with inductive position control)				
Hydraulic							
Max. operating pressure		[bar]	Pilot drain internal: P, A B, X: 350; T, Y: 105				
			Pilot drain external: P, A B, T, X: 350; Y: 105				
Fluid			Hydraulic oil in accordance with DIN 51524 / 51525				
Fluid temperature		[°C]	-25 ... +70				
Viscosity permitted		[cSt] / [mm²/s]	2.8...400				
Viscosity recommended		[cSt] / [mm²/s]	30...80				
Filtration			ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)				
Flow max.		[l/min]	150	300	700	2000	
Leakage at 350 bar (per flow path)		[ml/min]	up to 100*	up to 200*	up to 800*	up to 5000*	
*depending on spool							
Opening pressure integral check valve		[bar]	n.a.	see p/Q diagram	see p/Q diagram	n.a.	
Minimum pilot supply pressure		[bar]	5				
Static / Dynamic							
Step response at 95%		[ms]	Energized / De-energized				
DC solenoids	Pilot pressure	50 bar	60 / 40	95 / 65	150 / 170	470 / 390	
		100 bar	55 / 40	75 / 65	110 / 170	320 / 390	
		250 bar	55 / 40	60 / 65	90 / 170	210 / 390	
		350 bar	55 / 40	60 / 65	85 / 170	200 / 390	
AC solenoids	Pilot pressure	50 bar	40 / 30	75 / 55	130 / 155	450 / 375	
		100 bar	35 / 30	65 / 55	90 / 155	300 / 375	
		250 bar	35 / 30	40 / 55	70 / 155	190 / 375	
		350 bar	35 / 30	40 / 55	65 / 155	180 / 375	

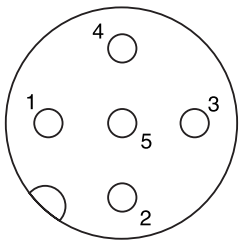
Electrical characteristics								
Duty ratio			100% ED; CAUTION: coil temperature up to 150 °C possible					
Protection class			IP 65 in accordance with EN 60529 (plugged and mounted)					
		Code	K	J	U	G	Y	T
Supply voltage / ripple		[V]	12 V =	24 V =	98 V =	205 V =	110V at 50Hz/ 120V at 60Hz	230V at 50Hz/ 240V at 60Hz
Tolerance supply voltage		[%]	±10	±10	±10	±10	±5	±5
Current consumption	hold	[A]	2.5	1.25	0.31	0.15	0.58 / 0.49	0.31 / 0.26
Current consumption	in rush	[A]	2.5	1.25	0.31	0.15	2.1 / 2.0	1.05 / 1.0
Power consumption	hold	[W]	30	30	30	30	64 / 59 VA	68 / 62 VA
Power consumption	in rush	[W]	30	30	30	30	231 / 240 VA	231 / 240 VA
Solenoid connection			Connector as per EN 175301-803, solenoid identification as per ISO 9461.					
Wiring min.		[mm²]	3 x 1.5 recommended					
Wiring length max.		[m]	50 recommended					

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

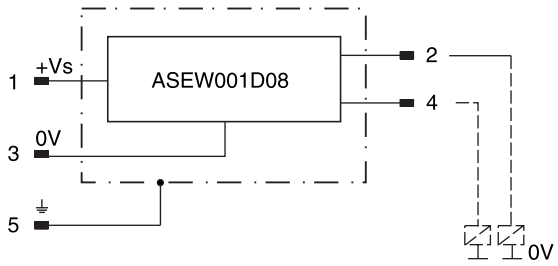
Electrical characteristics of position control M12x1

Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)
Ambient temperature	[°C]	0...+50
Supply voltage / ripple	[V]	18...42 / 10%
Current consumption without load	[A]	≤ 30
Max. output current per channel, ohmic	[mA]	400
Min. output load per channel, ohmic	[kOhm]	100
Max. output drop at 0.2A	[V]	≤ 1.1
Max. output drop at 0.4A	[V]	≤ 1.6
EMC		EN50081-1 / EN50082-2
Max. tolerance ambient field strength	[A/m]	<1200
Min. distance to next AC solenoid	[m]	>0.1
Interface		M12x1
Wiring min.	[mm²]	5 x 0.25 brad shield recommended
Wiring length max.	[m]	50 recommended

M12 pin assignment



1 + Supply 18...42V
2 Normally open
3 0V
4 Normally closed
5 Earth ground



Definitions

Start position monitored:

The valve is de-energized. The inductive switch gives a signal at the moment (below 15% spool stroke) when the spool leaves the spring offset position.

End position monitored:

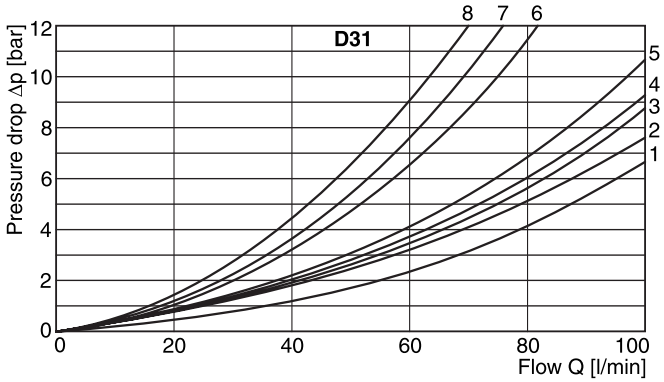
The inductive switch gives a signal before the end position is reached. (above 85% spool stroke).

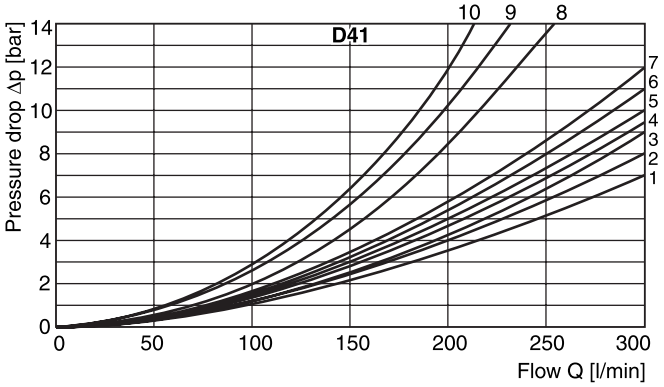
2

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.

D31DW and D41VW

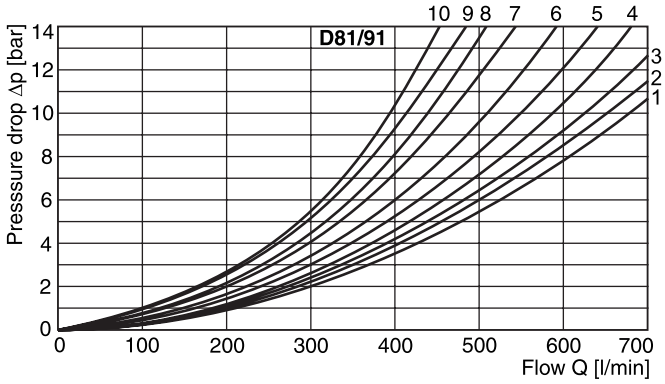
Spool Code	Curve number									
	P-A		P-B		P-T		A-T		B-T	
	D3	D4	D3	D4	D3	D4	D3	D4	D3	D4
1	3	1	3	1	–	–	1	4	1	5
2	3	1	3	2	4	6	1	4	1	6
3	3	1	4	2	–	–	1	5	1	6
4	3	1	3	1	–	–	1	5	1	5
5	3	2	4	2	–	–	1	3	1	5
6	3	1	3	2	–	–	1	3	1	6
7	4	1	3	1	–	6	1	4	1	5
9	3	2	3	9	8	8	1	7	1	10
11	3	1	3	1	–	–	1	4	1	5
14	3	1	4	1	–	6	1	4	1	5
15	4	1	3	2	–	–	1	4	1	6
16	4	2	3	2	–	–	1	3	1	5
20	3	3	4	5	–	–	1	3	1	5
21	4	2	3	8	–	–	1	2	–	–
22	3	8	4	2	–	–	–	–	1	3
26	3	3	3	5	–	–	–	–	–	–
30	3	2	1	3	–	–	1	6	1	7
54	–	2	–	3	–	–	–	6	–	7

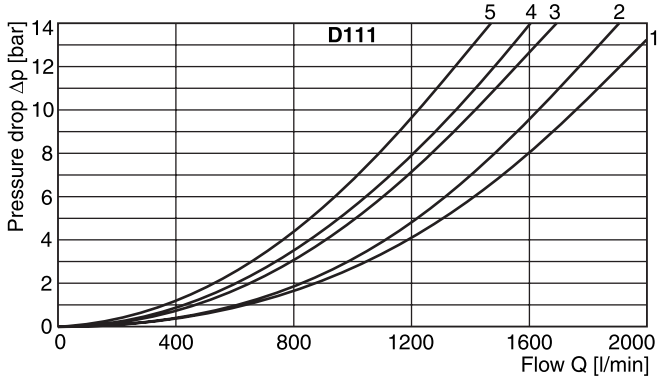




D81/D91VW and D111VW

Spool Code	Curve number									
	P-A		P-B		P-T		A-T		B-T	
	D8/9	D11	D8/9	D11	D8/9	D11	D8/9	D11	D8/9	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	1
21	5	–	10	–	–	–	3	–	–	–
22	10	–	5	–	–	–	–	–	5	–
26	6	–	5	–	–	–	–	–	–	–
30	3	5	2	5	–	–	3	4	5	1
54	4	5	3	5	–	–	3	4	5	1



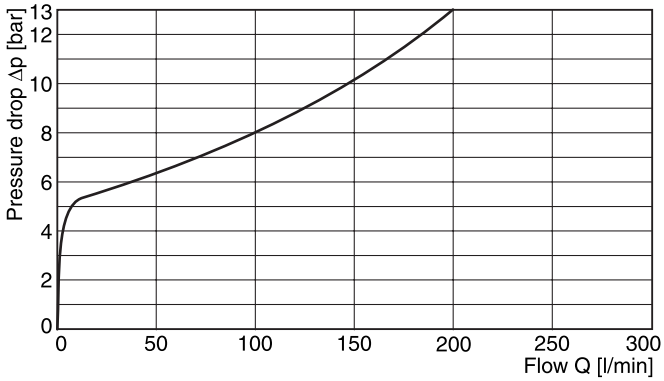


2

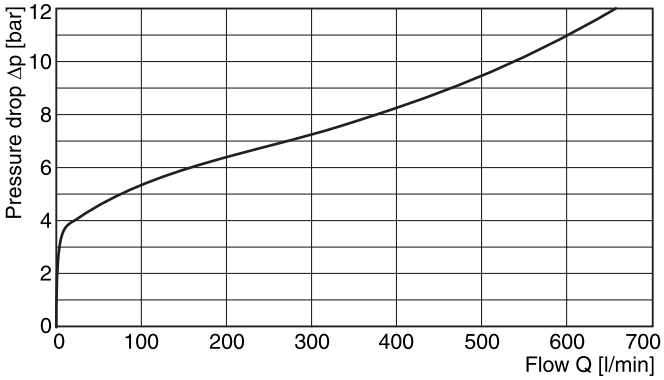
Integral check valve in the P port

Mounting an integral check valve in the P port is necessary to build up pilot pressure for valves with P to T connection and internal pilot oil supply. The pressure difference at the integral check valve (see performance curves) is to be added to all flow curves of the P-port of the main valve. Directional valves with an integral check valve are available for the series D41 and D81.

Flow curve D41VW

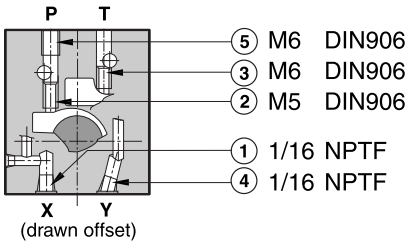


Flow curve D81VW



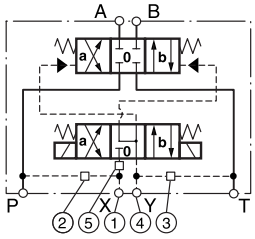
Pilot oil inlet (supply) and outlet (drain)

Series D31DW

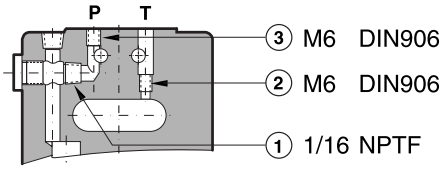


○ open, ● closed

Pilot oil Inlet	Outlet	1	2	3	4	5
internal	external	●	○	●	○	Orifice Ø1.2
external	external	○	●	●	○	Orifice Ø1.2
internal	internal	●	○	○	●	Orifice Ø1.2
external	internal	○	●	○	●	Orifice Ø1.2

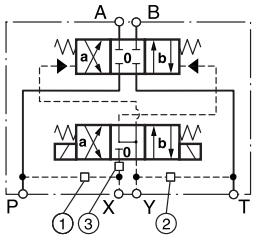


Series D41VW

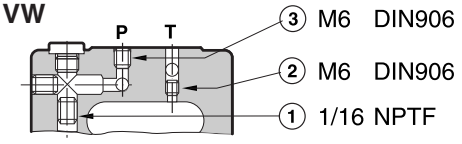


○ open, ● closed

Pilot oil Inlet	Outlet	1	2	3
internal	external	○	●	Orifice Ø1.5
external	external	●	●	Orifice Ø1.5
internal	internal	○	○	Orifice Ø1.5
external	internal	●	○	Orifice Ø1.5

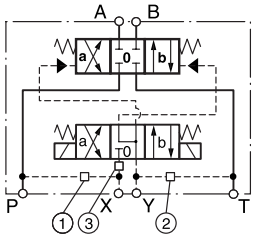


Series D81/91VW

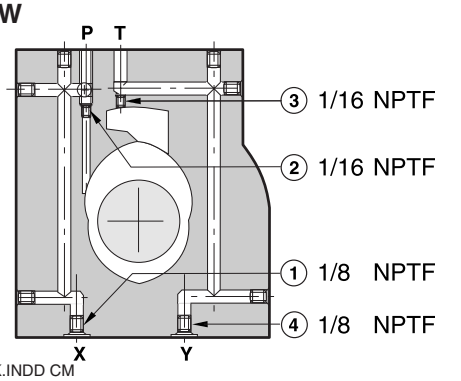


○ open, ● closed

Pilot oil Inlet	Outlet	1	2	3
internal	external	○	●	Orifice Ø1.5
external	external	●	●	Orifice Ø1.5
internal	internal	○	○	Orifice Ø1.5
external	internal	●	○	Orifice Ø1.5

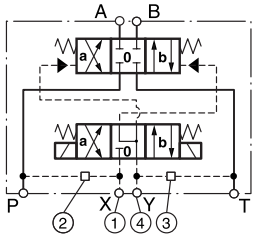


Series D111VW



○ open, ● closed

Pilot oil Inlet	Outlet	1	2	3	4
internal	external	●	Orifice Ø1.5	●	○
external	external	Orifice Ø1.5	●	●	○
internal	internal	●	Orifice Ø1.5	○	●
external	internal	Orifice Ø1.5	●	○	●



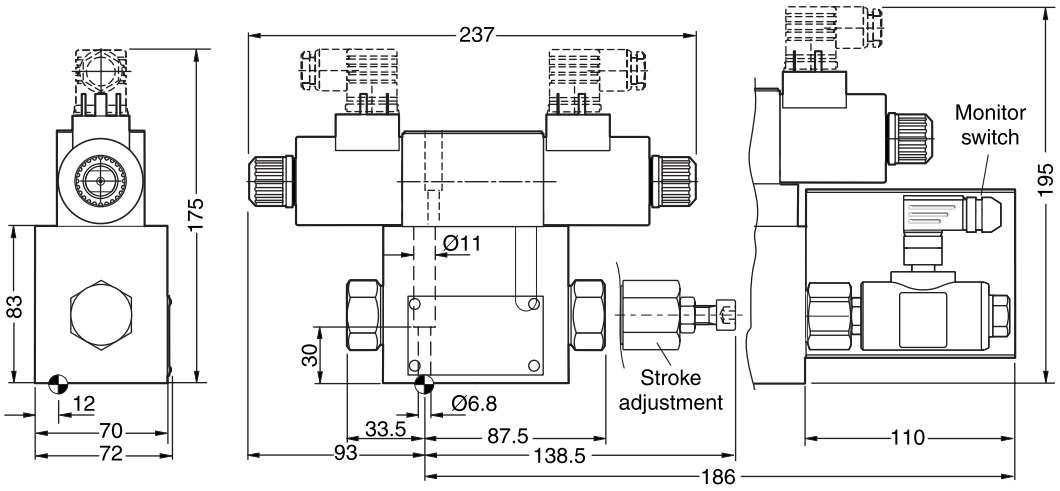
All orifice sizes for standard valves

D3-D11_UK.INDD CM

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

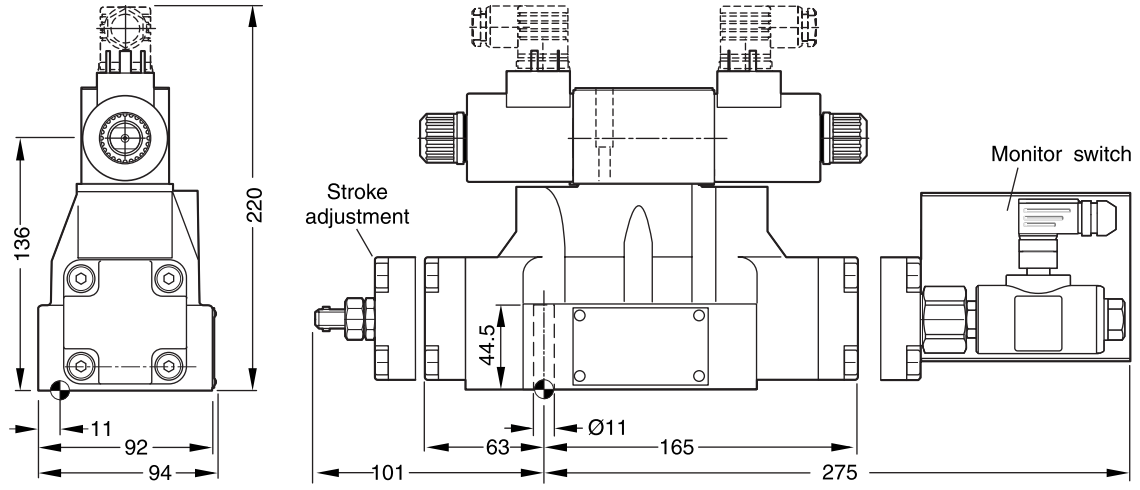
2

D31DW



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D31DW-75** FPM: SK-D31DW-V75

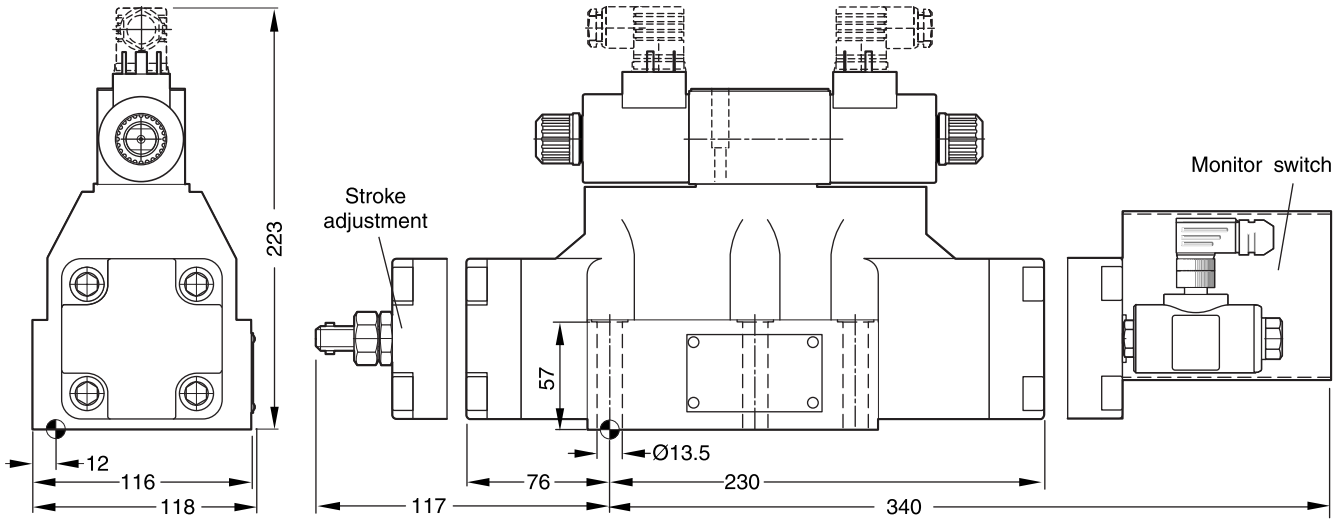
D41VW



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK320	4x M10x60 2x M6x55 DIN 912 12.9	63 Nm ±15% 13.2 Nm ±15%	**NBR: SK-D41DW-70** FPM: SK-D41DW-V70

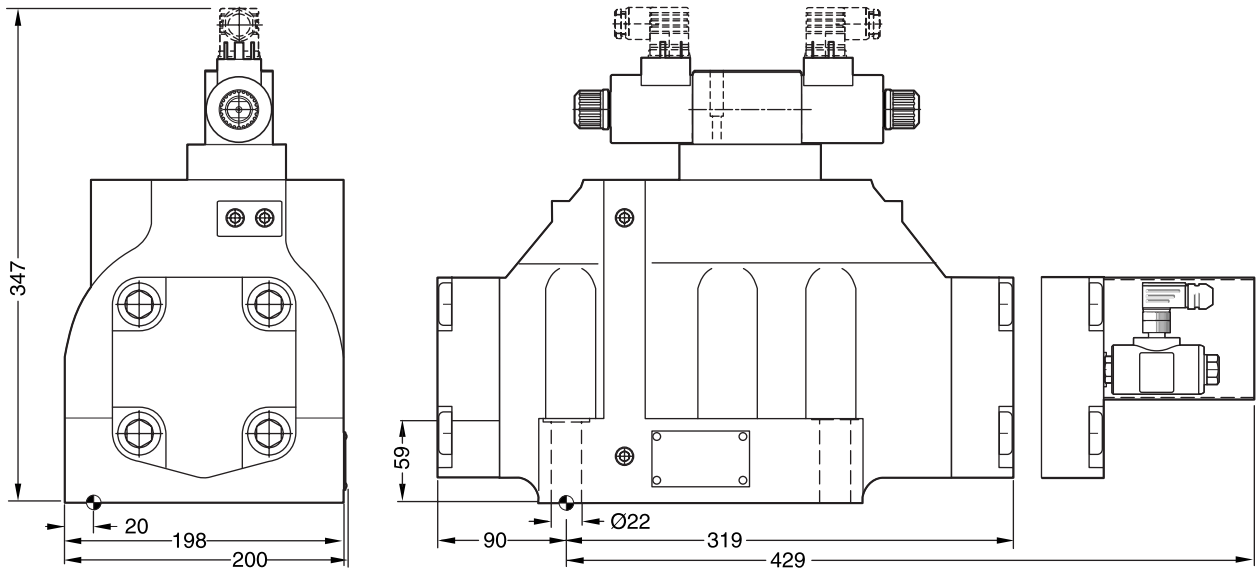
The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

D81/91VW



Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	**NBR: SK-D81VW-70 / SK-D91VW-70** FPM: SK-D81VW-V70 / SK-D91VW-V70

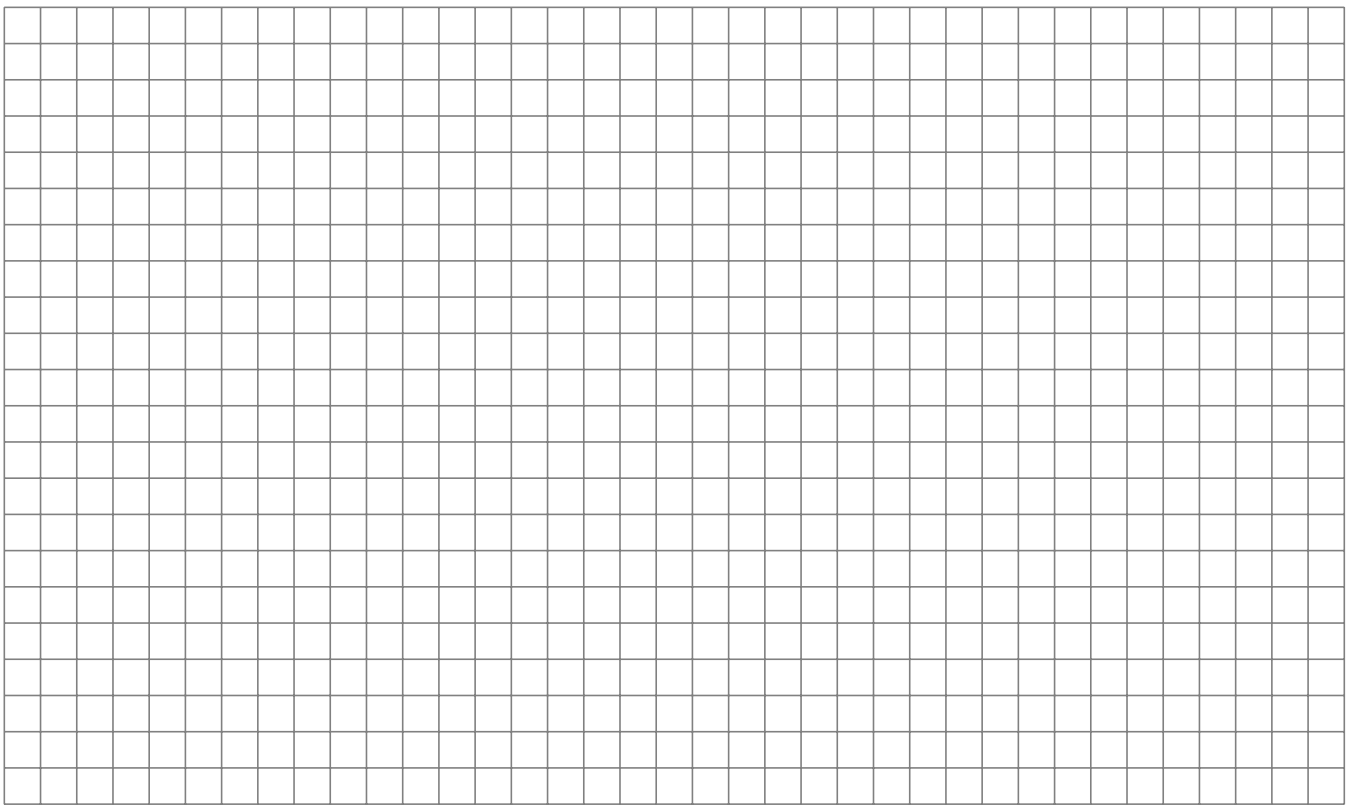
D111VW



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

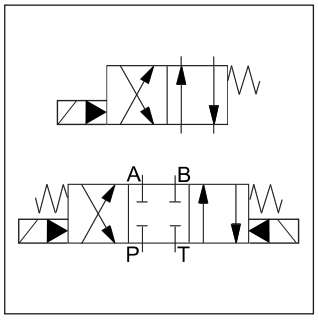
The space necessary to remove the plug as per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

Notes

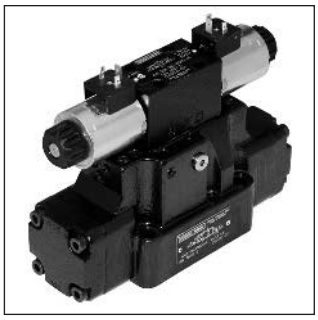


The pilot operated directional valves 4D02V (NG10), 4D03 (NG16) and 4D06 (NG25) are offered under Denison brand name. The 4D02V is a high flow version with a maximum flow up to 170 l/min.

4D03 and 4D06 are based on the Parker D41 and D81 main stage with Denison 4D01 pilot valve.



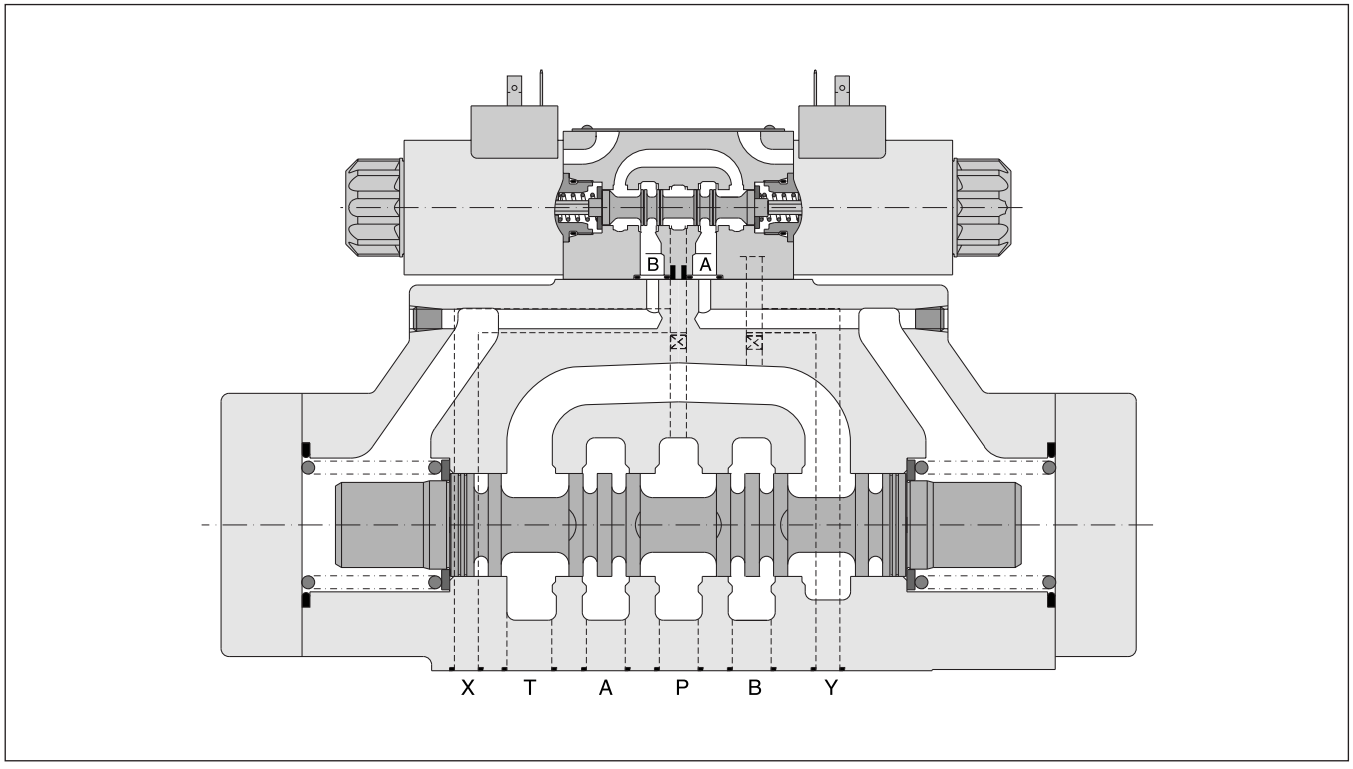
4D02V



4D03

4D06

4D06



2

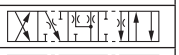
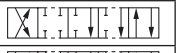
4D □ – □ □ □ – □ □

Directional control valve | **Size** | **Body** | **Control** | **Spool type** | **Spool position** | **End cap**

Code	Size
02	NG10
03	NG16
06	NG25

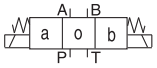
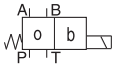
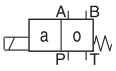
Code	Body
V	for 4D02
3	for 4D03/06

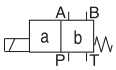
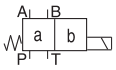
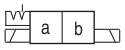
Code	Control
A	1 solenoid
B	2 solenoids
C	2 solenoids and 2 pos. detent pilot valve

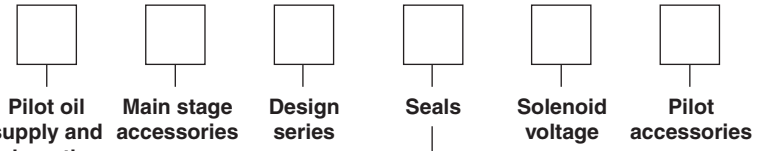
3 position spools	
Code	Spool type a 0 b
01	
02	
03	
07	
08	
09	
10	
13	
14	
46	
55	
56	

2 position spools	
Code	Spool type a b
11	
51	

End cap	
Code	End cap
03	Standard
09	With stroke adjustment on both sides

3 position spools		
Code	Spool position	
03		3 positions. Spring centered to “0“.
05		2 positions. Spring centered to “0“. Energized to “b“.
06		2 positions. Spring centered to “0“. Energized to “a“.

2 position spools		
Code	Spool position	
01		2 positions. Spring offset to “b“. Energized to “a“.
02		2 positions. Spring offset to “a“. Energized to “b“.
04		2 positions detent. Operated in “a“ or “b“. No centre or spring offset position.



Code	Inlet	Outlet
1	Internal	Internal
2	Internal	External
3	External	Internal
4	External	External

Code	Accessories
omit	Without
1	Shifting time adjustment (meter-in)
2	Shifting time adjustment (meter-out)
4	Integral check valve in P
5	Shifting time adjustment (meter-in) integral check valve in P
8	Shifting time adjustment (meter-out) integral check valve in P

Code	Pilot accessories
10 *	1.0 mm orifice (Standard for 4D02V)
15 *	1.5 mm orifice (Standard for 4D03/06)

* in P port of pilot valve

Code	Solenoid voltage
G0R	12V =
G0Q	24V =
GAR	98V =
GAG	205 =
W06	115V / 50Hz
W07	230V / 50Hz

Code	Seals
1	NBR
5	FPM

Code	Design series
A	4D02V
B	4D03, 4D06

Further spool types, solenoid voltages, position control, hydraulic and mechanical operation on request.

2

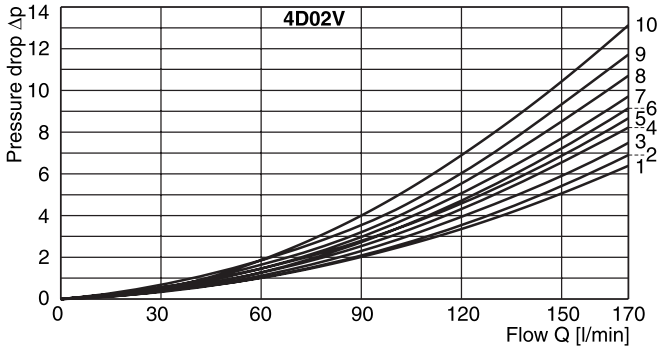
General							
Design			Directional spool valve				
Actuation			Solenoid				
Series			**4D02V**	**4D03**	**4D06**		
Size			NG10	NG16	NG25		
Weight (1/ 2 solenoids)		[kg]	7.6 / 8.1	9.6 / 9.9	17.8 / 18.2		
Mounting interface			DIN 24340 A10 ISO 4401 NFPA D05	DIN 24340 A16 ISO 4401 NFPA D07	DIN 24340 A25 ISO 4401 NFPA D08		
			CETOP RP 121-H				
Mounting position			Unrestricted, preferably horizontal				
Ambient temperature		[°C]	-20...+50				
Hydraulic							
Max. operating pressure		[bar]	Pilot drain internal: P, A B, X: 350; T, Y: 105 (4D02V: P, A, B, X: 315; T, Y: 140) Pilot drain external: P, A B, T, X: 350; Y: 105 (4D02V: P, A, B: 315; T, X: 315; Y: 140)				
Fluid			Hydraulic oil in accordance with DIN 51524 / 51525				
Fluid temperature		[°C]	-20 ... +80				
Viscosity permitted		[cSt] / [mm²/s]	10...650				
Viscosity recommended		[cSt] / [mm²/s]	30				
Filtration			ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)				
Flow max.		[l/min]	170	300	700		
Leakage at 350 bar (per flow path)		[ml/min]	72...422	up to 200*	350...800		
*depending on spool							
Opening pressure integral check valve		[bar]	n.a.	see p/Q diagram	see p/Q diagram		
Minimum pilot supply pressure		[bar]	12 for spool with open centre position 13 for spool with closed centre position	5	5		
Static / Dynamic							
Step response at 95%		[ms]	Energized / De-energized				
DC solenoids	Pilot pressure	50 bar	50 / 60	95 / 65	150 / 170		
		100 bar	(150 bar) 50 / 60	75 / 65	110 / 170		
		250 bar	50 / 50	60 / 65	90 / 170		
AC solenoids	Pilot pressure	50 bar	30 / 50	75 / 55	130 / 155		
		100 bar	(150 bar) 30 / 50	65 / 55	90 / 155		
		250 bar	30 / 50	40 / 55	65 / 155		
Electrical characteristics							
Duty ratio			100% ED; CAUTION: coil temperature up to 180 °C possible				
Protection class			IP 65 in accordance with EN 60529 (plugged and mounted)				
		Code	G0R	G0Q	GAR	GAG	W06	W07
Supply voltage / ripple		[V]	12 V =	24 V =	98 V =	205 V =	115V at 50Hz	230V at 50Hz/
Tolerance supply voltage		[%]	+5...-10	±10	+5...-10	+5...-10	±5	±5
Power consumption	hold	[W]	31	31	31	31	264 VA	264 VA
Power consumption	in rush	[W]	31	31	31	31	264 VA	264 VA
Solenoid connection			Connector as per EN 175301-803, solenoid identification as per ISO 9461.					
Wiring min.		[mm²]	3 x 1.5 recommended					
Wiring length max.		[m]	50 recommended					

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

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.

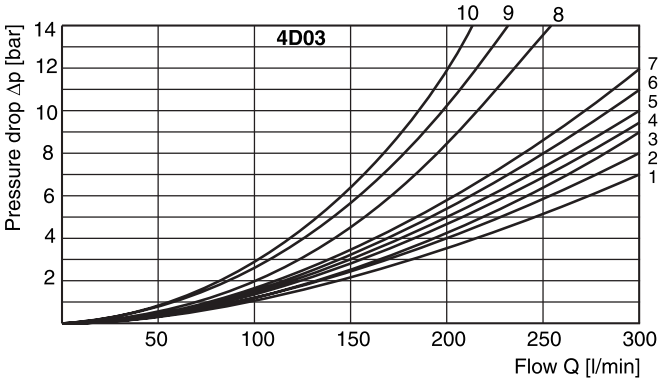
4D02V

Spool Code	Curve number				
	P-A	P-B	P-T	A-T	B-T
01	3	3	7	4	3
02	3	3	–	2	4
03	3	3	–	2	5
07	4	6	6	4	10
08	2	3	–	4	4
09	2	2	–	1	4
10	2	3	–	4	4
11	5	3	–	2	5
13	2	4	–	1	4
14	4	3	–	2	4
46	8	9	–	7	9
51	6	4	–	3	6
55	–	7	–	8	–
56	4	–	–	9	–



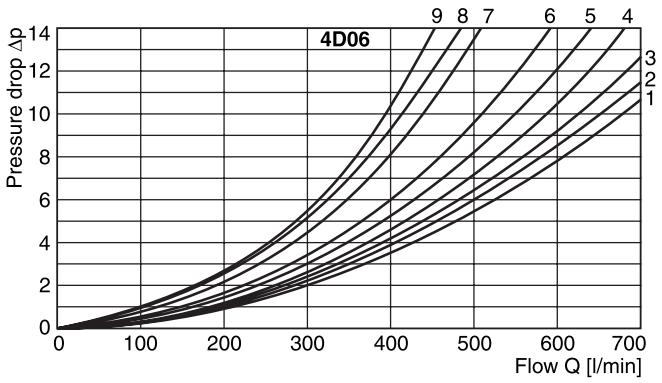
4D03

Spool Code	Curve number				
	P-A	P-B	P-T	A-T	B-T
01	1	2	6	4	6
02	1	1	–	4	5
03	1	1	–	4	5
07	2	9	8	7	10
08	1	1	–	5	5
09	1	2	–	4	6
10	1	2	–	5	6
11	2	3	–	6	7
13	2	2	–	3	5
14	2	2	–	3	5
46	1	2	–	3	6
51	3	5	–	3	5
55	2	8	–	2	–
56	8	2	–	–	3



4D06

Spool Code	Curve number				
	P-A	P-B	P-T	A-T	B-T
01	2	1	1	3	5
02	3	2	–	3	5
03	3	2	–	3	5
07	4	8	9	4	10
08	4	3	–	3	5
09	3	3	–	4	5
10	4	2	–	3	6
11	3	2	–	3	5
13	1	2	–	4	5
14	3	3	–	4	5
46	2	2	–	4	6
51	6	5	–	6	8
55	5	10	–	3	–
56	10	5	–	–	5

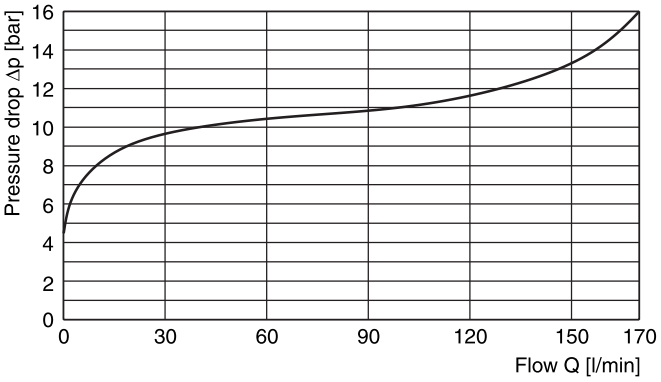


2

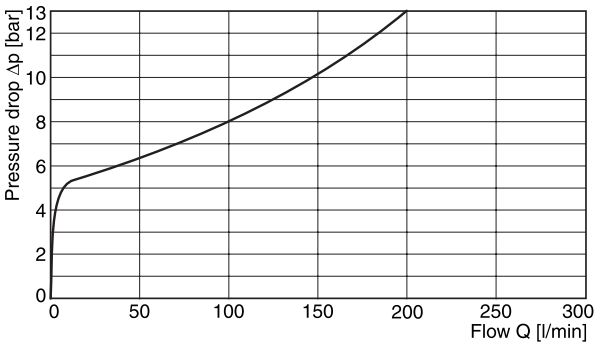
Integral check valve in the P port

Mounting an integral check valve in the P port is necessary to build up pilot pressure for valves with P to T connection and internal pilot oil supply. The pressure difference at the integral check valve (see performance curves) is to be added to all flow curves of the P port of the main valve. Directional valves with an integral check valve are available for the series 4D02V, 4D03 and 4D06.

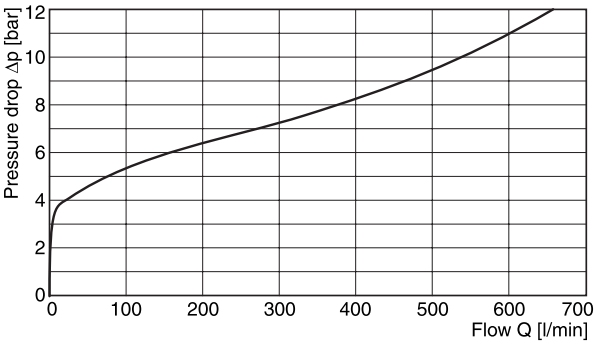
Flow curve 4D02V



Flow curve 4D03

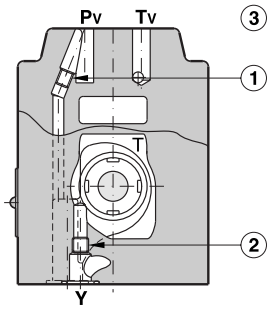


Flow curve 4D06



Pilot oil inlet (supply) and outlet (drain)

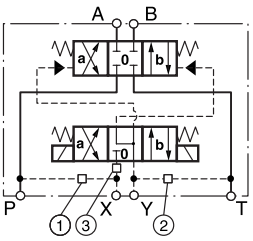
Series 4D02V



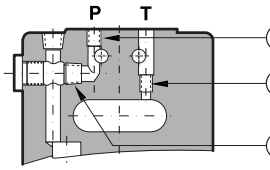
③ Slip-in orifice in pilot p-port
① M6 DIN906
② M6 DIN906

○ open, ● closed

Pilot oil Inlet	Outlet	1	2	3
internal	external	○	●	Orifice Ø1.0
external	external	●	●	Orifice Ø1.0
internal	internal	○	○	Orifice Ø1.0
external	internal	●	○	Orifice Ø1.0



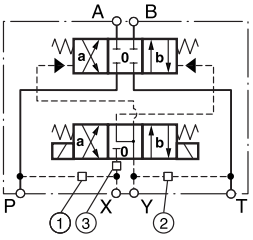
Series 4D03



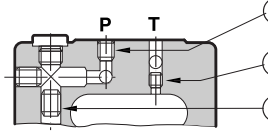
③ M6 DIN906
② M6 DIN906
① 1/16 NPTF

○ open, ● closed

Pilot oil Inlet	Outlet	1	2	3
internal	external	○	●	Orifice Ø1.5
external	external	●	●	Orifice Ø1.5
internal	internal	○	○	Orifice Ø1.5
external	internal	●	○	Orifice Ø1.5



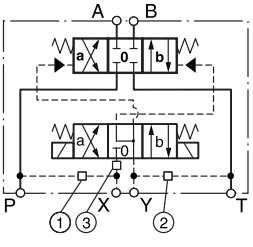
Series 4D06



③ M6 DIN906
② M6 DIN906
① 1/16 NPTF

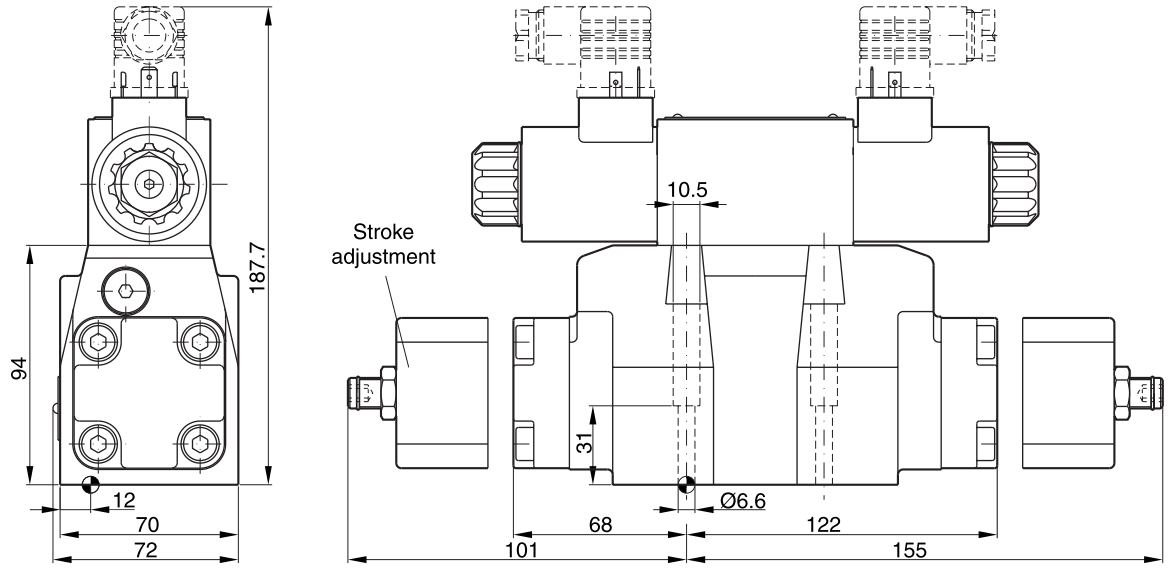
○ open, ● closed

Pilot oil Inlet	Outlet	1	2	3
internal	external	○	●	Orifice Ø1.5
external	external	●	●	Orifice Ø1.5
internal	internal	○	○	Orifice Ø1.5
external	internal	●	○	Orifice Ø1.5



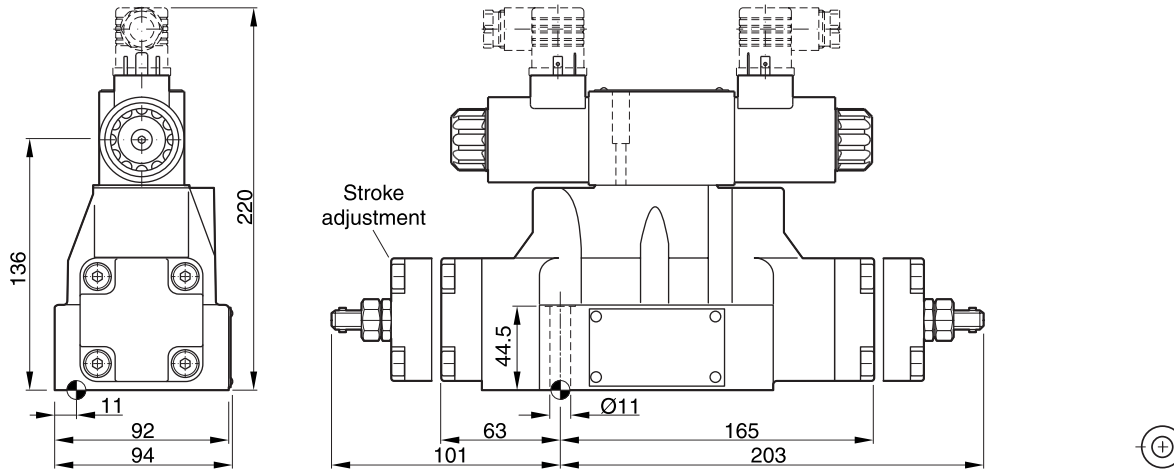
2

4D02V



Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm	on request

4D03

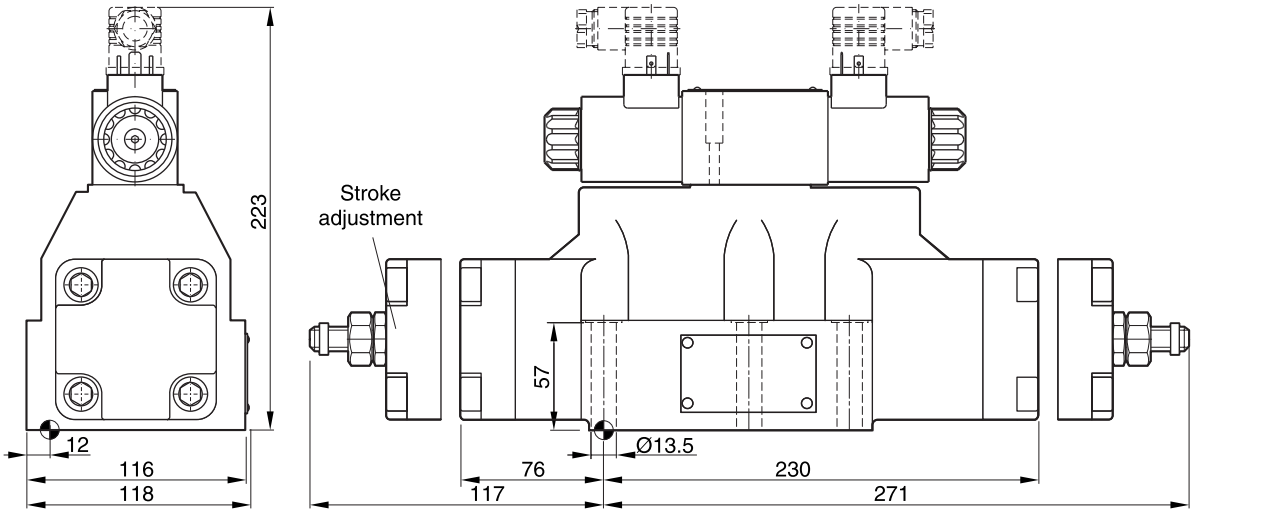


Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK320	4x M10x50 2x M6x55 DIN 912 12.9	63 Nm ±15% 13.2 Nm ±15%	on request

The space necessary to remove the plug as per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

2

4D06



Surface finish	Kit			Kit
R_{max}6.3 ▱ 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	on request

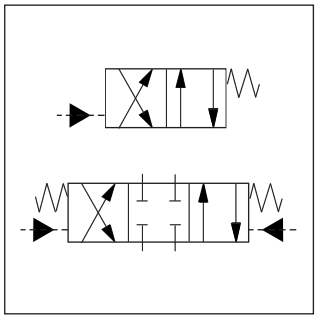
The space necessary to remove the plug as per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

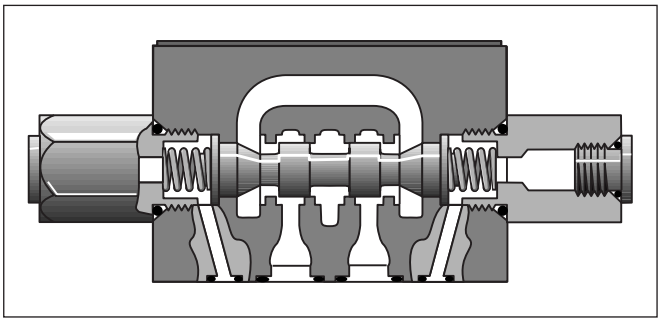
The D1VP is a hydraulically controlled 4/3 or 4/2 way directional control valve. The valve can be operated either by the pilot ports X and Y via the subplate or by the connection of an external pilot pipe directly on the valve body.

The D3DP, D4P, D9P and D11P are hydraulically controlled 4/3 or 4/2 way directional control valves. The valves are operated by the pilot ports X and Y via the subplate.

Pressure and flow of the pilot oil have a significant influence on the response time of the spool.

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





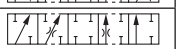
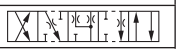
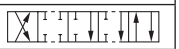
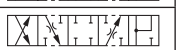
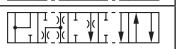
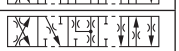
Technical data

General						
Design		Directional spool valve				
Actuation		Hydraulic				
Series		**D1VP**	**D3DP**	**D4P**	**D9P**	**D11P**
Size		NG06	NG10	NG16	NG25	NG32
Weight	[kg]	1.3	3.7	9.0	17.0	66.0
Mounting interface		DIN 24340 A06 ISO 4401 NFPA D03	DIN 24340 A10 ISO 4401 NFPA D05	DIN 24340 A16 ISO 4401 NFPA D07	DIN 24340 A25 ISO 4401 NFPA D08	DIN 24340 A32 ISO 4401 NFPA D10
		CETOP RP 121-H				
Mounting position		unrestricted, preferably horizontal				
Ambient temperature	[°C]	-25...+50				
Hydraulic						
Max. operating pressure	[bar]	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] / [mm²/s]	2.8...400				
Viscosity recommended	[cSt] / [mm²/s]	30...80				
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)				
Flow max.	[l/min]	80	130	300	700	2000
Leakage at 350 bar (per flow path) * depending on spool	[ml/min]	up to 60*	up to 100*	up to 200*	up to 800*	up to 5000*
Pilot supply pressure (min/max)	[bar]	15 /210	15 /210	5 / 350 [1]	5 / 350 [1]	5 / 350 [1]
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.				
Recommended values are (act./deact.)	[ms]	13 / 28	20 / 30	50 / 60	100 / 150	300 / 370

[1] with monitor switch: 105 bar

2

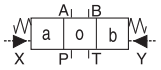
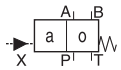
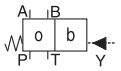
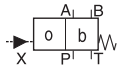
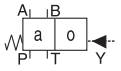
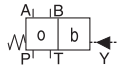
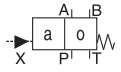
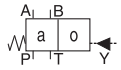
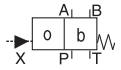
D	1	V	P				90	
Directional control valve	**Size DIN NG 06 CETOP 03 NFPA D03**		**Hydraulically operated**	**Spool type**	**Spool position**	**Seals**	**Pilot port with G1/8 pipe thread**	**Design series** (not required for ordering)

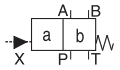
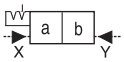
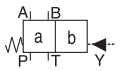
3 position spools	
Code	Spool type
	a 0 b
1	
2	
3	
4	
5	
6	
7	
8 *	
9 *	
10	
11	
14	
15	
16	
21	
22	
31	
32	
76	
78	
81	
82	
102	

2 position spools	
Code	Spool type
	a b
20	
26	
30	
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 8 and 9	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Spring offset in position “a“.	 Spring offset in position “b“.	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 centre or offset position.**
H		**Spring offset in position “a“. Operated in position “b“.**

Bold letters =
Short-term availability

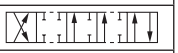
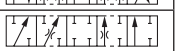
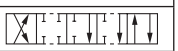
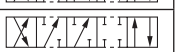
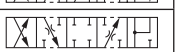
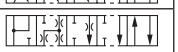
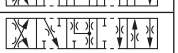
Further spool types and styles on request.

DVP_UK.INDD CM

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

D	3	D	P				2	
Directional control valve	Size DIN NG 10 CETOP 05 NFPA D05		Hydraulically operated	Spool type	Spool position	Seals	Pilot oil supply and drain external/ external	Design series (not required for ordering)

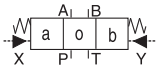
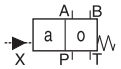
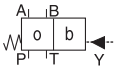
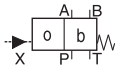
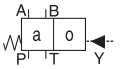
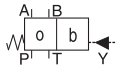
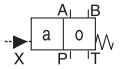
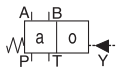
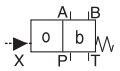
2

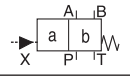
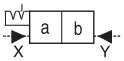
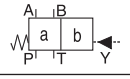
3 position spools		
Code	Spool type	
	a 0 b	
1		
2		
3		
4		
5		
6		
7		
8 *		
9 *		
10		
11		
14		
15		
16		
21		
22		
31		
32		
76		
78		
81		
82		
102		

2 position spools	
Code	Spool type
	a b
20	
26	
30	
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 8 and 9	
E	 Operated in position “a“.	 Operated in position “b“.	2 positions. Spring offset in position “0“.
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Spring offset in position “a“.	 Spring offset in position “b“.	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 centre or offset position.
H		Spring offset in position “a“. Operated in position “b“.

Further spool types and styles on request.

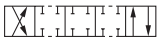
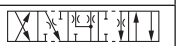
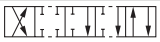
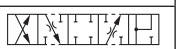
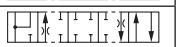
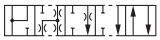
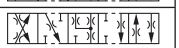
2

D		P			
Directional control valve	Size	Hydraulically operated	Spool type	Spool position	Seals

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

Code	Seals
N	NBR
V	FPM

3 position spools

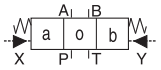
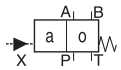
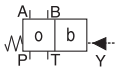
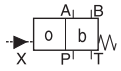
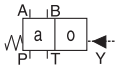
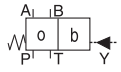
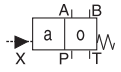
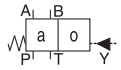
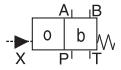
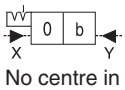
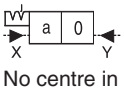
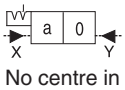
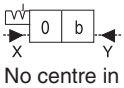
Code	Spool type a 0 b
1 [2]	
2 [2]	
3 [3]	
4 [3]	
5 [3]	
6 [3]	
7 [3]	
9 [1] [2]	
11 [3]	
14 [3]	
15 [3]	
16 [3]	
21 [3]	
22 [3]	
31 [4]	
32 [4]	
54 [2]	
81 [2]	
82 [2]	

2 position spools

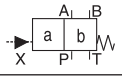
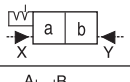
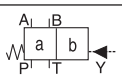
Code	Spool type a b
20 [2]	
26 [3]	
30 [2]	

[1] Consider specific spool position
[2] All sizes (D4, D9, D11) available
[3] Only D4 and D9 available
[4] Only D9 available

3 position spools

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

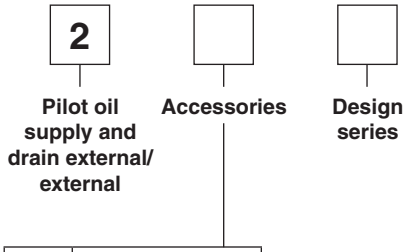
2 position spools

Code	Spool position	
B		Spring offset in position “b“. Operated in position “a“.
D [3]		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 position control on request.

DVP_UK.INDD CM

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany



Code	Accessories
omit [2]	Standard valve w/o accessories
7 [2]	Pilot choke, meter-out
8 [3]	Stroke adjustment side B
9 [3]	Stroke adjustment side A
60 [2]	Pilot choke, meter-in
89 [3]	Stroke adjustment side A and B

2

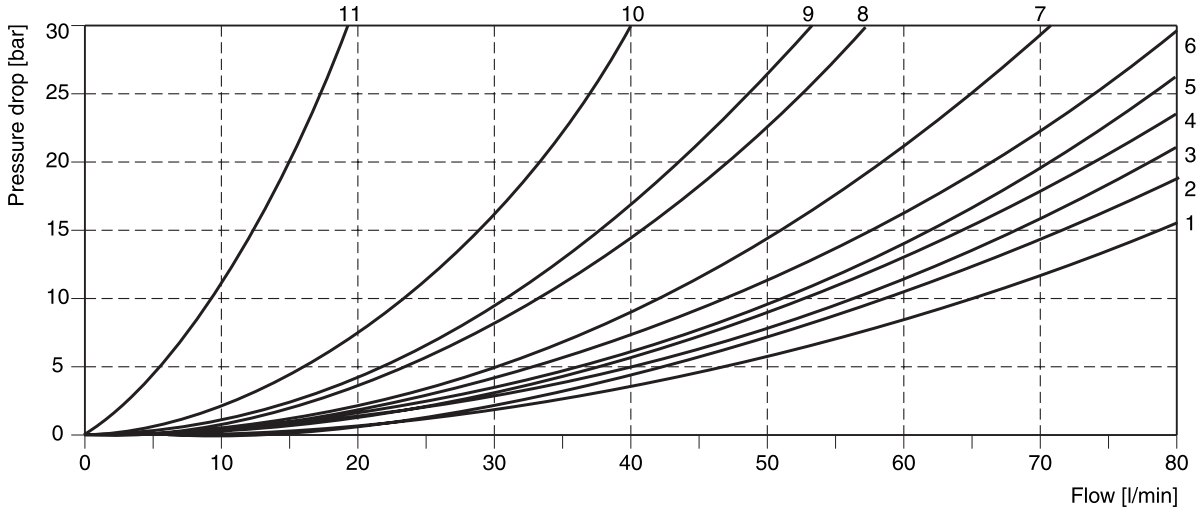
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	1	4	1	–	–	–	–	–	–
2	5	2	5	2	4	4	1	1	6	1
3	4	1	4	2	–	–	8	–	–	–
4	4	2	4	2	–	–	7	7	–	9
5	4	1	5	1	9	–	–	–	–	–
6	5	1	5	1	9	9	–	–	–	9
7	5	2	4	1	–	5	–	1	7	–
10	4	–	4	–	–	–	–	–	–	–
11	4	2	4	2	–	–	11	11	–	–
14	4	1	5	2	5	–	1	–	7	–
15	4	2	4	1	–	–	–	8	–	–
16	5	1	4	1	–	9	–	–	–	–
20	5	1	5	1	–	–	–	–	–	–
26	6	–	6	–	–	–	–	–	–	–
30	5	1	5	1	–	–	–	–	–	–
76	–	2	–	–	–	–	3	–	–	–
78	–	–	–	2	–	–	–	3	–	–
81	10	10	10	10	–	–	–	–	–	–
82	10	10	10	10	–	–	*	*	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
8	2	2	2	2	–	–	–	–	8	–
9	3	3	3	3	–	–	–	–	9	–

	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
21	3	3	3	6	1	
	P->A	B->T		P->A	P->B	A->B
22	6	1		3	3	3

* Only for pressure compensation, no high flow possible.

Flow curve

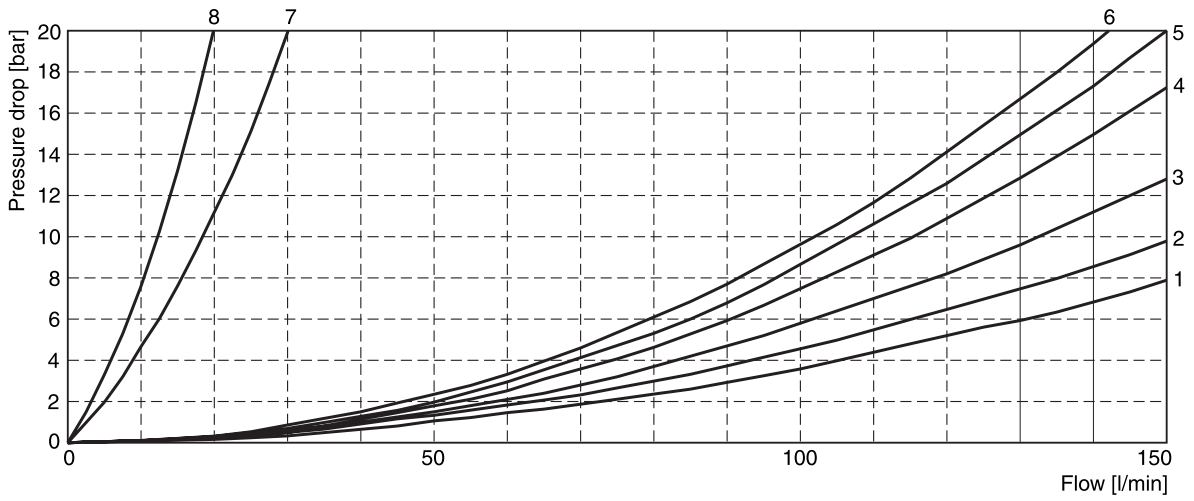


The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	3	4	3	–	–	–	–	–	–
2	4	1	4	1	3	3	1	1	5	1
3	4	3	5	2	–	–	4	–	–	–
4	4	2	4	2	–	–	3	3	–	5
5	4	3	5	3	5	–	–	–	–	–
6	4	3	4	3	6	6	–	–	–	6
7	5	1	4	3	–	4	–	2	6	–
10	4	–	4	–	–	–	–	–	–	–
11	4	3	4	3	–	–	8	8	–	–
12	4	3	4	3	7	7	7	7	8	8
14	4	3	5	1	4	–	2	–	6	–
15	5	2	4	3	–	–	–	4	–	–
16	5	3	4	3	–	5	–	–	–	–
20	4	3	4	3	–	–	–	–	–	–
26	4	–	4	–	–	–	–	–	–	–
30	4	2	4	2	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
8	4	3	4	3	–	–	–	–	6	–
9	4	4	4	4	–	–	–	–	6	–

	Position „b“			Position „a“		
	P->A	P->B	A->B	P->B	A->T	
21	5	4	6	3	3	
	P->A	B->T		P->A	P->B	A->B
22	3	3		4	5	6

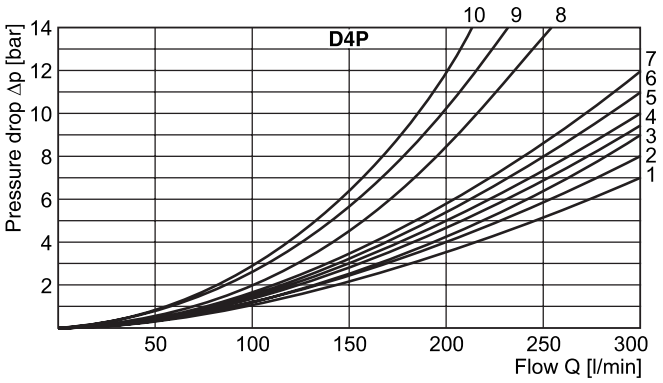
Flow curve



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.

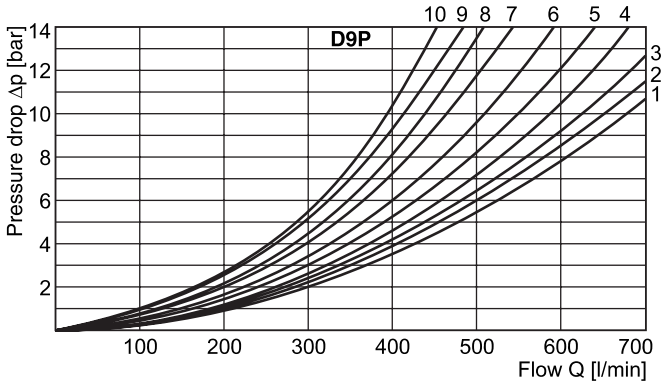
D4P

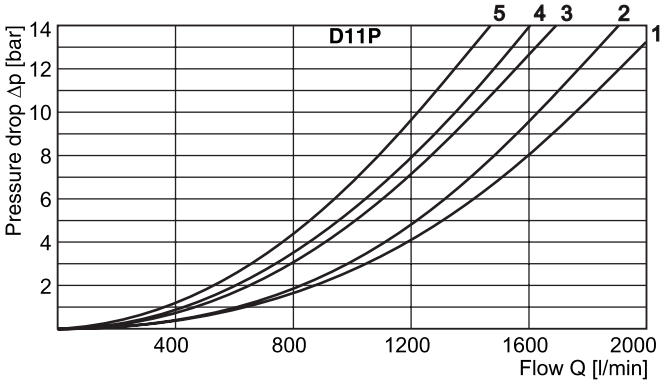
Spool Code	Curve number				
	P-A	P-B	P-T	A-T	B-T
1	1	1	–	4	5
2	1	2	6	4	6
3	1	2	–	5	6
4	1	1	–	5	5
5	2	2	–	3	5
6	1	2	–	3	6
7	1	1	6	4	5
9	2	9	8	7	10
11	1	1	–	4	5
14	1	1	6	4	5
15	1	2	–	4	6
16	2	2	–	3	5
20	3	5	–	3	5
21	2	8	–	2	–
22	8	2	–	–	3
26	3	5	–	–	–
30	2	3	–	6	7
54	2	3	–	6	7



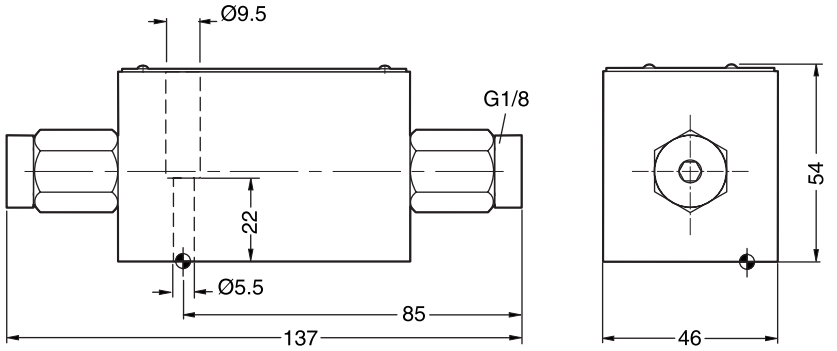
D9P and D11P

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



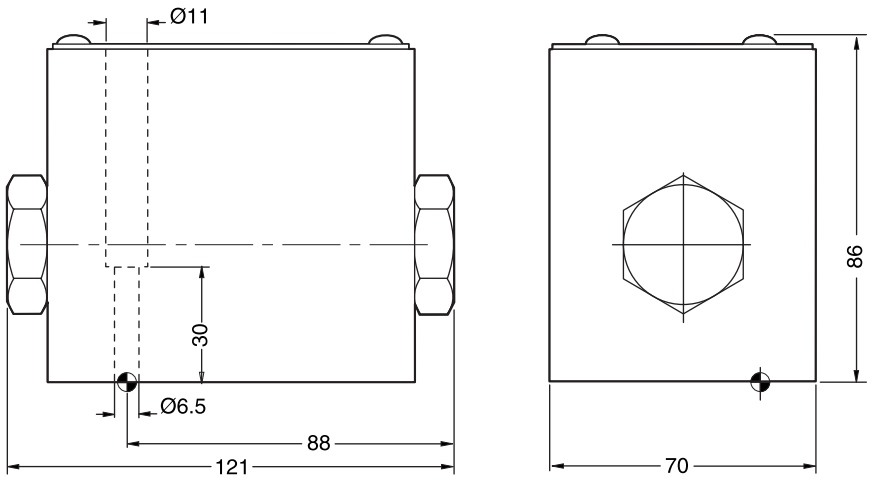


D1VP



Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1VP-70** FPM: SK-D1VP-V70

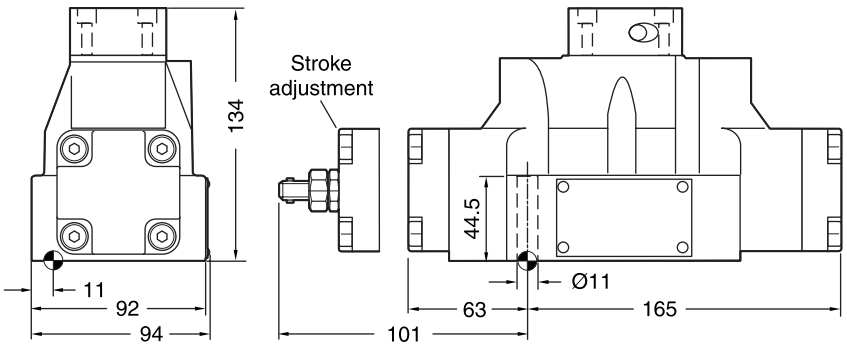
D3DP



Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D3DP-35** FPM: SK-D3DP-V35

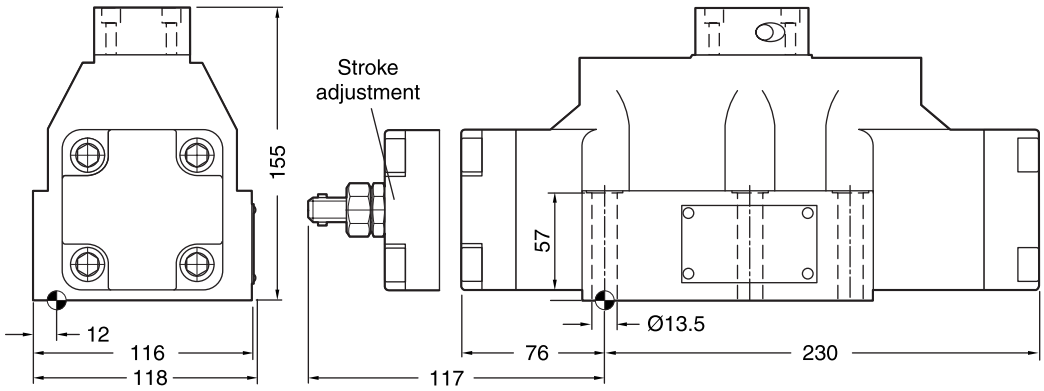
2

D4P



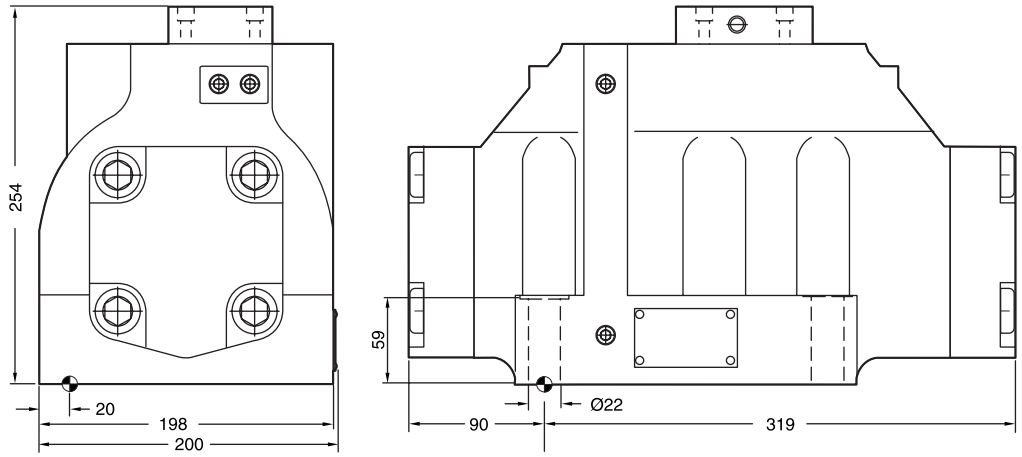
Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK320	4x M10x60 2 x M6x55 DIN 912 12.9	63 Nm ±15% 13.2 Nm ±15%	**NBR: SK-D41VW-70** FPM: SK-D41VW-V70

D9P



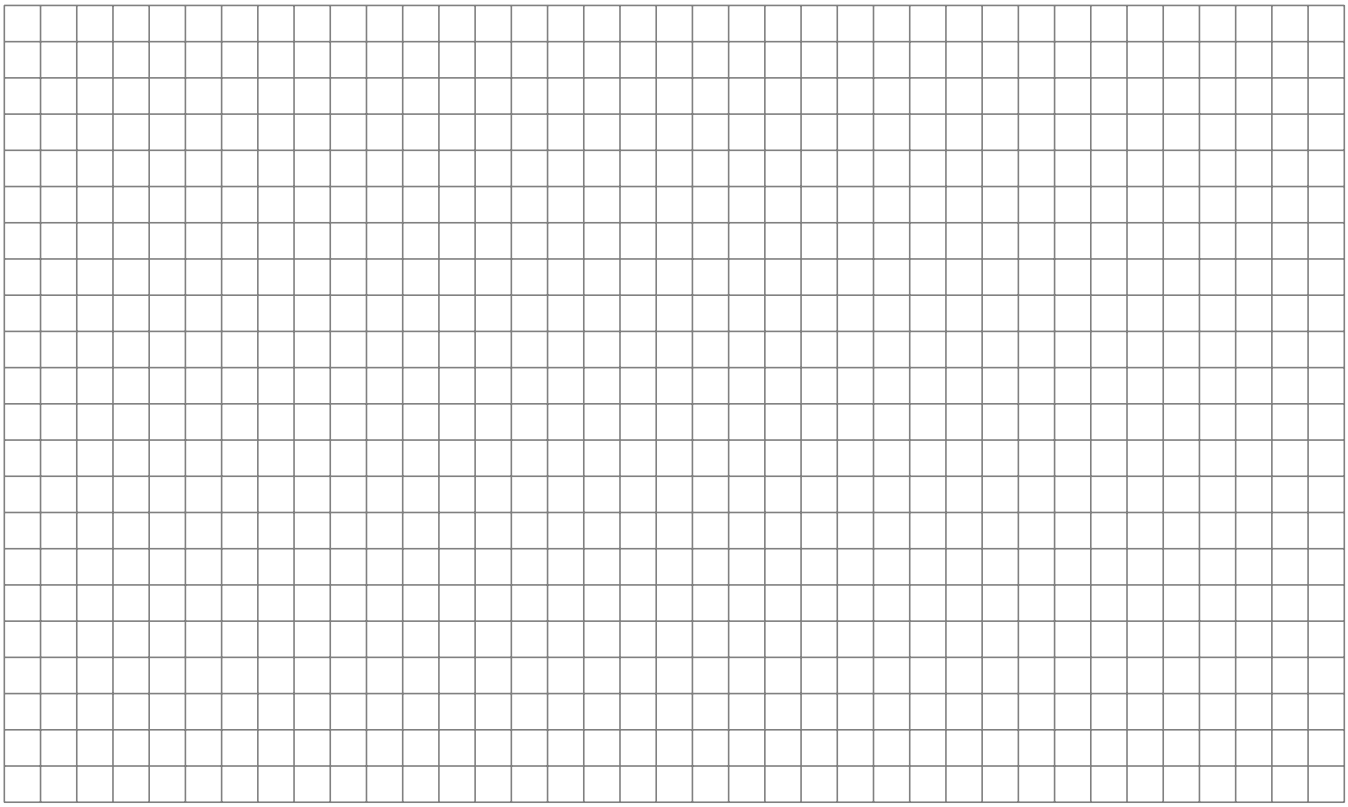
Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	**NBR: SK-D91VW-70** FPM: SK-D91VW-V70

D11P



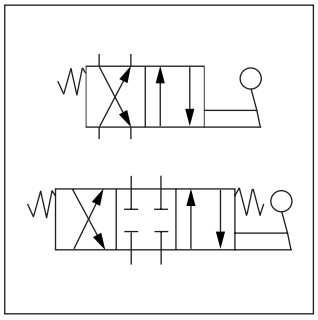
Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK386	6x M20x90 DIN 912 12.9	517 Nm ±15%	**NBR: SK-D111VW-70** FPM: SK-D111VW-V70

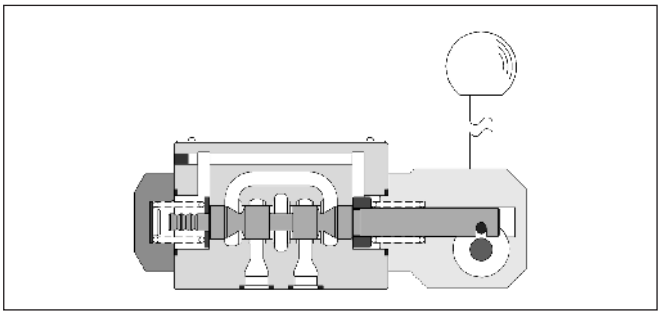
Notes



The D1DL, D3DL, D4L and D9L are 5 chamber 4/3 or 4/2 way directional control valves. They are operated by a hand lever which is directly connected to the spool.

The hand lever can be located either on the A or B side. Spring offset and detent designs are available.





Technical data

General					
Design		Directional spool valve			
Actuation		Lever			
Series		**D1DL**	**D3DL**	**D4L**	**D9L**
Size		NG06	NG10	NG16	NG25
Weight	[kg]	1.4	3.7	9.0	17.0
Mounting interface		DIN 24340 A06 ISO 4401 NFPA D03	DIN 24340 A10 ISO 4401 NFPA D05	DIN 24340 A16 ISO 4401 NFPA D07	DIN 24340 A25 ISO 4401 NFPA D08
		CETOP RP 121-H			
Mounting position		unrestricted, preferably horizontal			
Ambient temperature	[°C]	-25...+50			
Hydraulic					
Max. operating pressure	[bar]	P, A B: 350; T: 10	P, A B: 350; T: 10	external drain P, A B, T: 350; X, Y: 10 internal drain P, A B: 350; T, X, Y: 10	external drain P, A B, T: 350; X, Y: 10 internal drain P, A B: 350; T, X, Y: 10
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525			
Fluid temperature	[°C]	-25 ... +70			
Viscosity permitted	[cSt] / [mm²/s]	2.8...400			
Viscosity recommended	[cSt] / [mm²/s]	30...80			
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)			
Flow max.	[l/min]	80	130	300	700
Leakage at 350 bar (per flow path)	[ml/min]	up to 60*	up to 100*	up to 200*	up to 800*
* depending on spool					

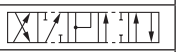
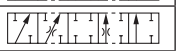
D		D					
Directional control valve	**Size**	**5-chamber valve**	**Actuation**	**Spool type**	**Spool position**	**Seals**	**Design series** (not required for ordering)

Code	Size
1	**DIN NG06, CETOP03 NFPA D03**
3	**DIN NG10, CETOP05 NFPA D05**

Code	Actuation
L	**Hand lever side B**
LB	**Hand lever side A**

Code	Seals
N	**NBR**
V	FPM

3 position spools

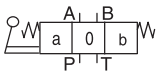
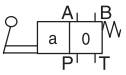
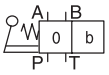
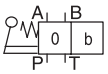
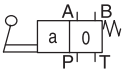
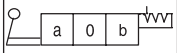
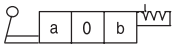
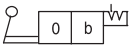
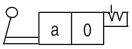
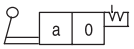
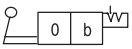
Code	Spool type a 0 b
1	
2	
4	
6 [1]	
9 [3]	
10 [1]	
42 [2]	

2 position spools

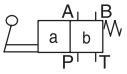
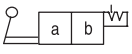
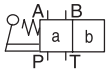
Code	Spool type a b
20 [1]	

[1] Only available for D3DL
[2] Only available for D1DL
[3] Consider specific spool position.

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“.	2 positions. Spring offset in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
N	 No centre in offset position.	 No centre in offset position.	3 positions, detent. Operated in position “a“, “0“or “b“.
R	 No centre in offset position.	 No centre in offset position.	2 positions, detent. Operated in position “0“ or “b“.
S	 No centre in offset position.	 No centre in offset position.	2 positions, detent. Operated in position “0“ or “a“. No centre in offset position.

2 position spools

Code	Spool position	
B [4]		**Spring offset in position “b“. Operated in position “a“.**
D		Detent, operated in position “a“ or “b“. No centre or offset position.
H [5]		Spring offset in position “a“. Operated in position “b“.

[4] For D1D only operation LB available
For D3D operation L and LB available
[5] For D1D only operation L available
For D3D operation L and LB available

Bold letters =
Short-term availability

Further spool types on request.

D							
Directional control valve	**Size**	**Actuation**	**Spool type**	**Spool position**	**Pilot oil drain**	**Seals**	**Design series** (not required for ordering)

Code	Bore	Size
4	Ø20mm	NG16
9	Ø32mm	NG25

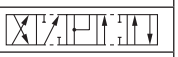
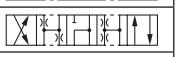
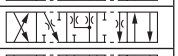
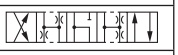
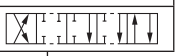
Code	Actuation
L	Lever side B
LB	Lever side A

Code	Seals
N	NBR
V	FPM

Code	Inlet	Outlet
2 [3]	External	External
5 [4]	External	Internal

[3] Pressure T-port < 10 bar
[4] Pressure T-port > 10 bar

3 position spools

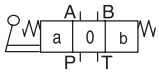
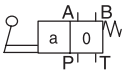
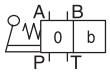
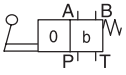
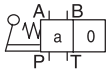
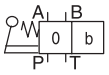
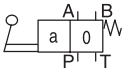
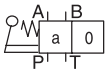
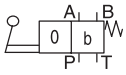
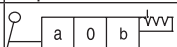
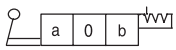
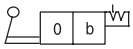
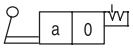
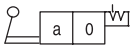
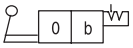
Code	Spool type (a 0 b)
1	
2	
3	
4	
6 [1]	
7	
9 [2]	
11	
14	
15	

2 position spools

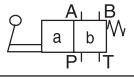
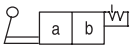
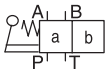
Code	Spool type (a b)
20	
30	

[1] Only available for D4L
[2] Consider specific spool position.

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“.	2 positions. Spring offset in position “0“.
F	 Operated in position “0“.	 Operated in position “0“.	2 positions. Spring offset in position “b“.
K	 Operated in position “b“.	 Operated in position “a“.	2 positions. Spring offset in position “0“.
M	 Operated in position “0“.	 Operated in position “0“.	2 positions. Spring offset in position “a“.
N	 No centre in offset position.	 No centre in offset position.	3 positions, detent. Operated in position “a“, “0“or “b“.
R	 No centre in offset position.	 No centre in offset position.	2 positions, detent. Operated in position “0“ or “b“.
S	 No centre in offset position.	 No centre in offset position.	2 positions, detent. Operated in position “0“ or “a“. No centre in offset position.

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 on request.

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Kaarst, Germany

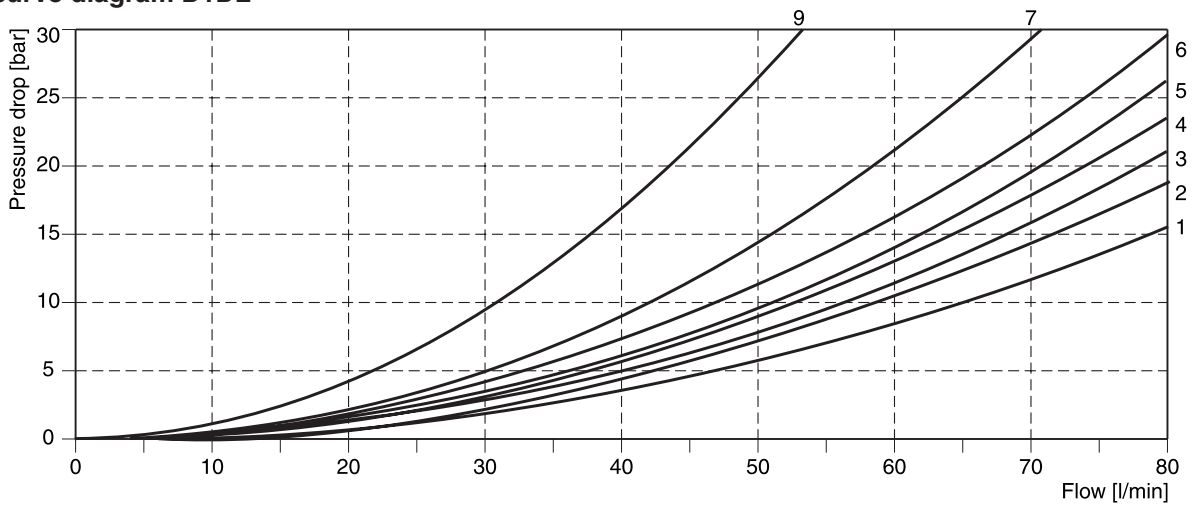
2

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.

D1DL

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	1	4	1	–	–	–	–	–	–
2	5	2	5	2	4	4	1	1	6	1
4	4	2	4	2	–	–	7	7	–	9
20	5	1	5	1	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
9	3	3	3	3	–	–	–	–	9	–

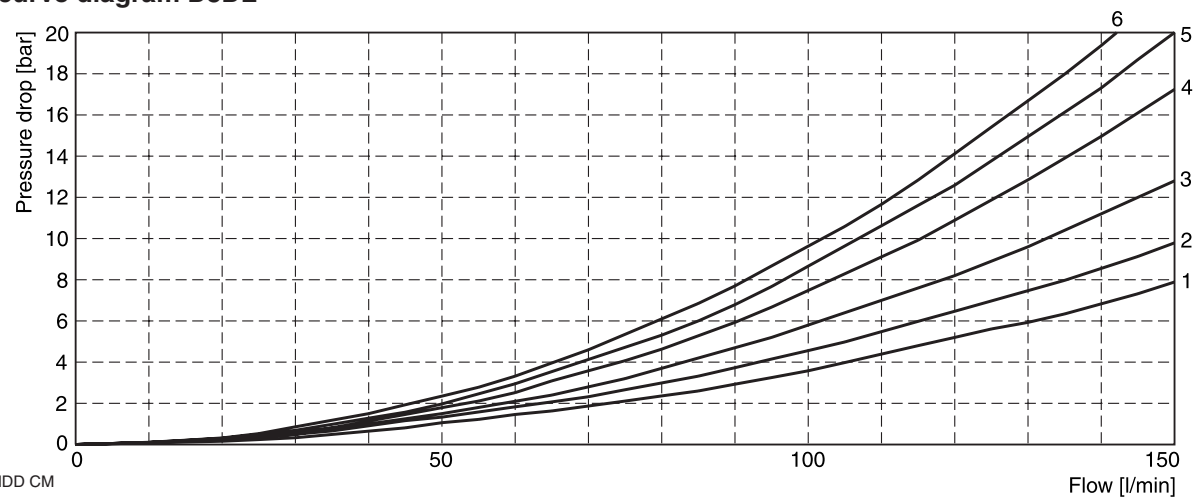
Flow curve diagram D1DL



D3DL

	Position „b“		Position „a“		Position „0“					
Spool	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	4	3	4	3	–	–	–	–	–	–
2	4	1	4	1	3	3	1	1	5	1
4	4	2	4	2	–	–	3	3	–	5
6	4	3	4	3	6	6	–	–	–	6
10	4	–	4	–	–	–	–	–	–	–
20	4	3	4	3	–	–	–	–	–	–
	P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A-> B
9	4	4	4	4	–	–	–	–	6	–

Flow curve diagram D3DL



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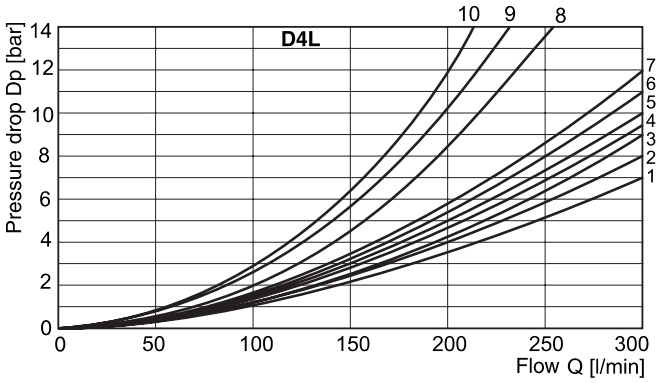
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

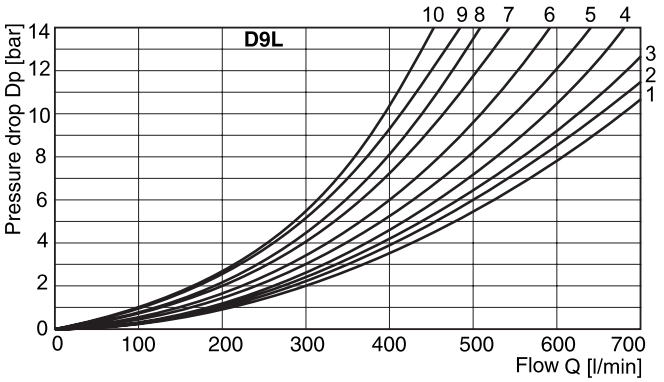
D4L

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
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	5	4
15	2	1	–	6	5
20	3	5	–	3	5
30	2	3	–	6	7



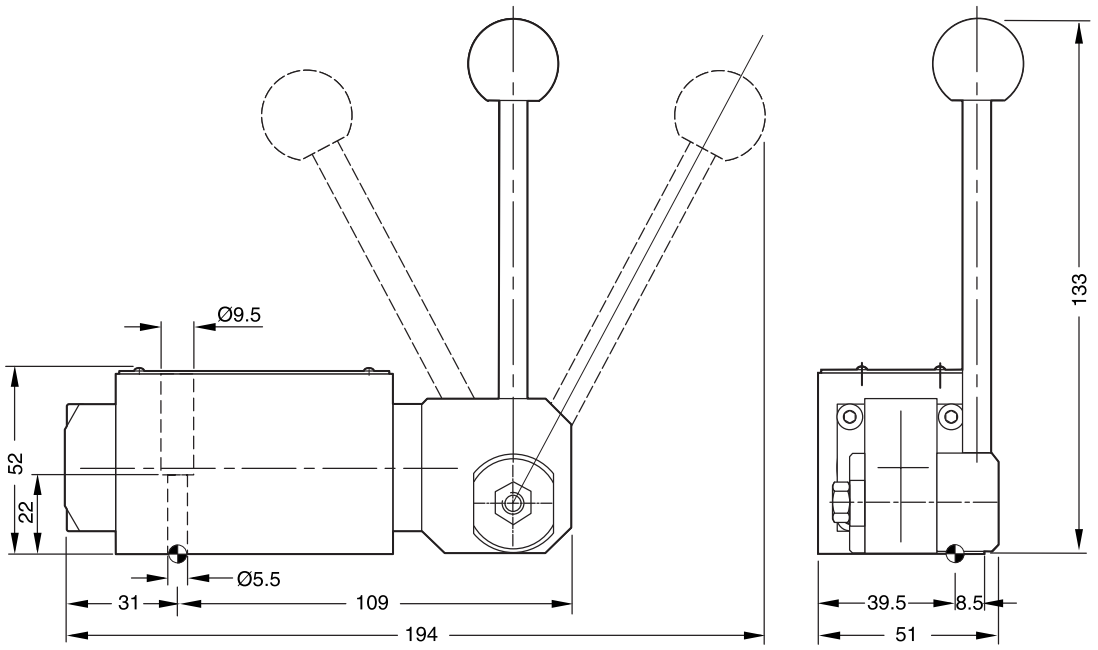
D9L

Spool Code	Curve number				
	P-A	P-B	P-T	A-T	B-T
1	3	2	-	3	5
2	2	1	1	3	5
3	4	2	-	3	6
4	4	3	-	3	5
7	3	1	7	3	5
9	4	8	9	4	10
14	1	3	7	5	3
15	2	4	-	5	3
20	6	5	-	6	8
30	3	2	-	3	5

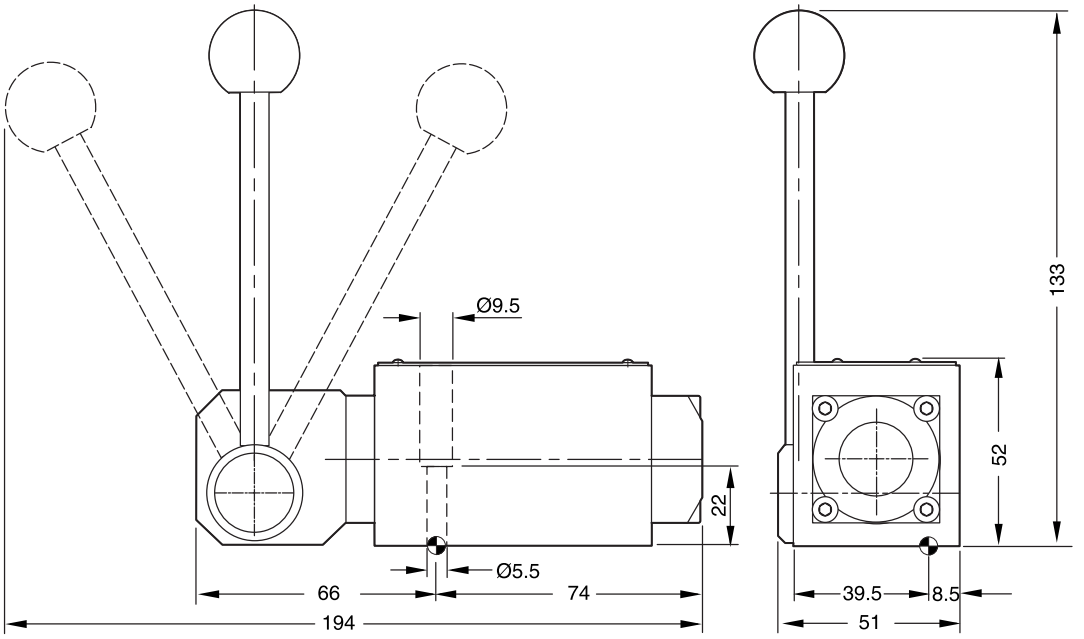


2

D1DL



D1DLB



Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	7.6 Nm ±15%	**NBR: SK-D1DL-77** FPM: SK-D1DL-V77

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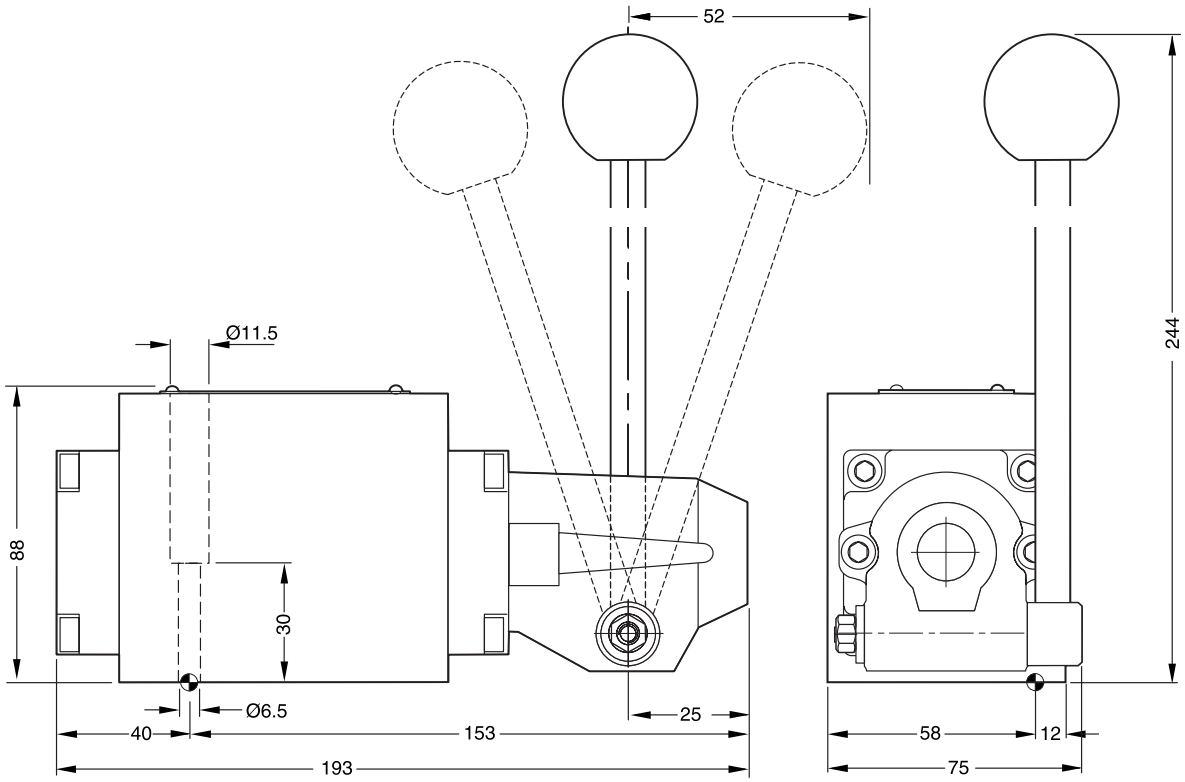
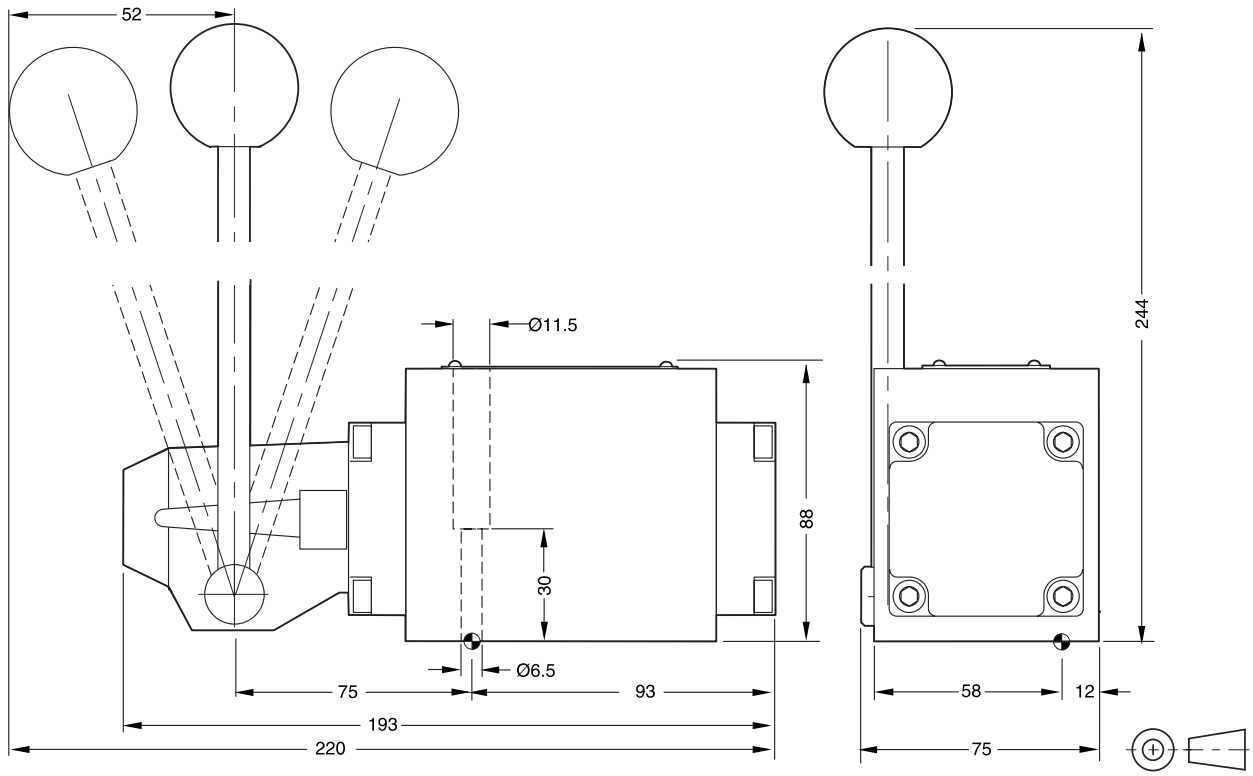
Kaarst, Germany

D3DL



D3DLB



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D3DL-35** FPM: SK-D3DL-V35

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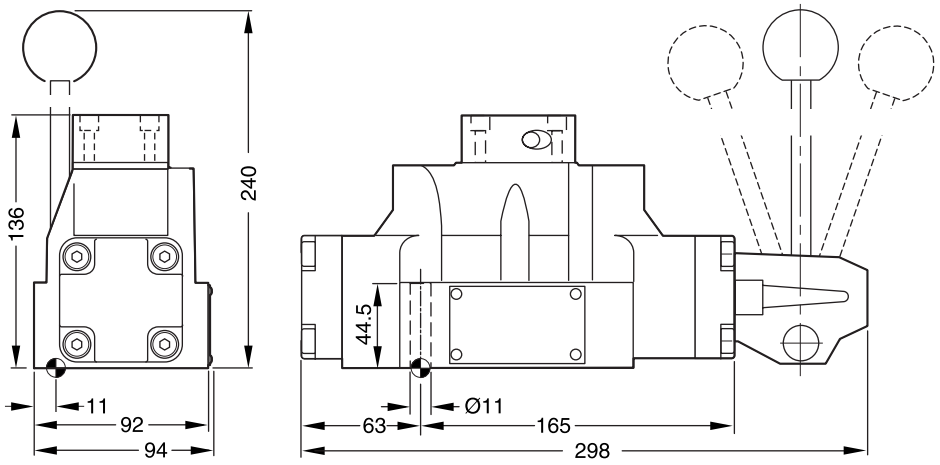
Kaarst, Germany

2

D4L



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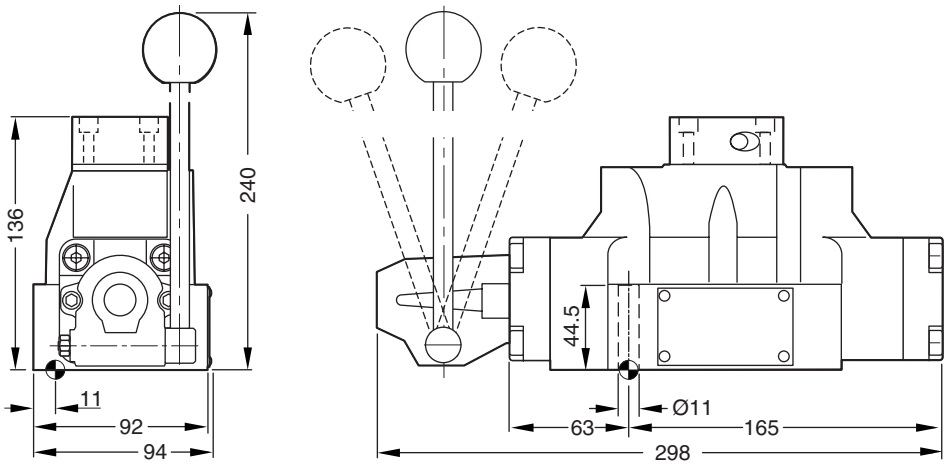
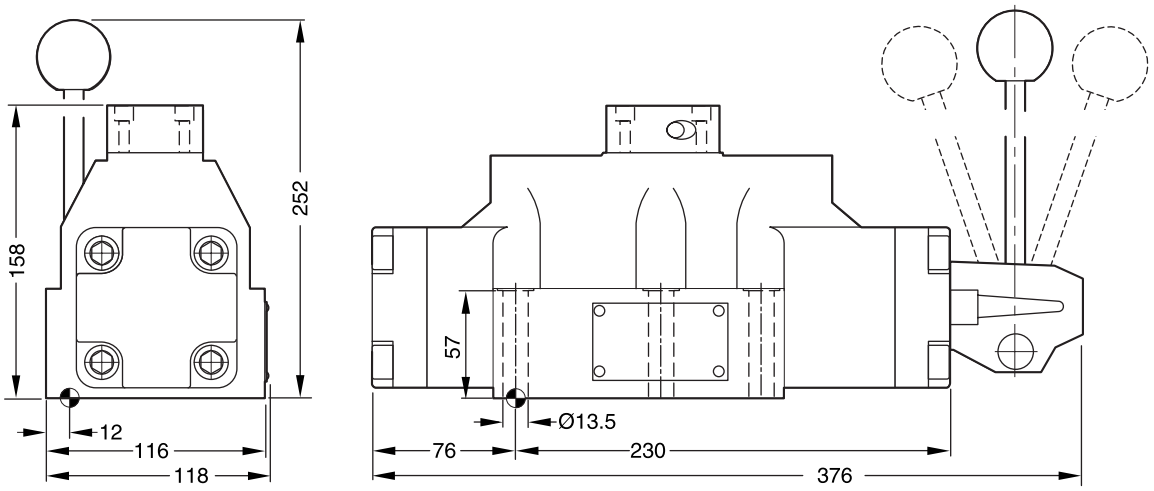
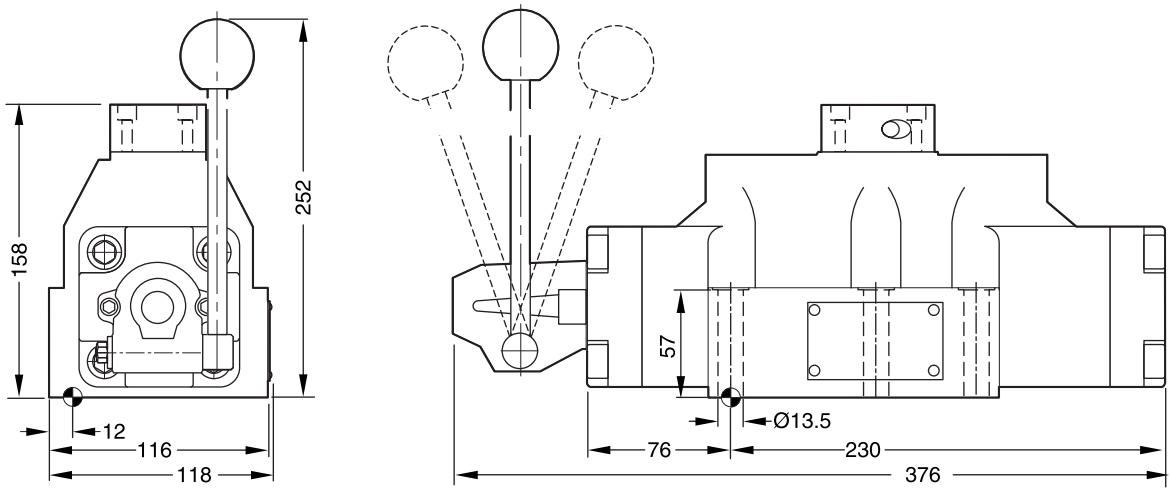


Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK320	4x M10x60 2x M6x55 DIN 912 12.9	63 Nm 13.2 Nm ±15%	**NBR: SK-D4L-60** FPM: SK-D4L-V60

D9L

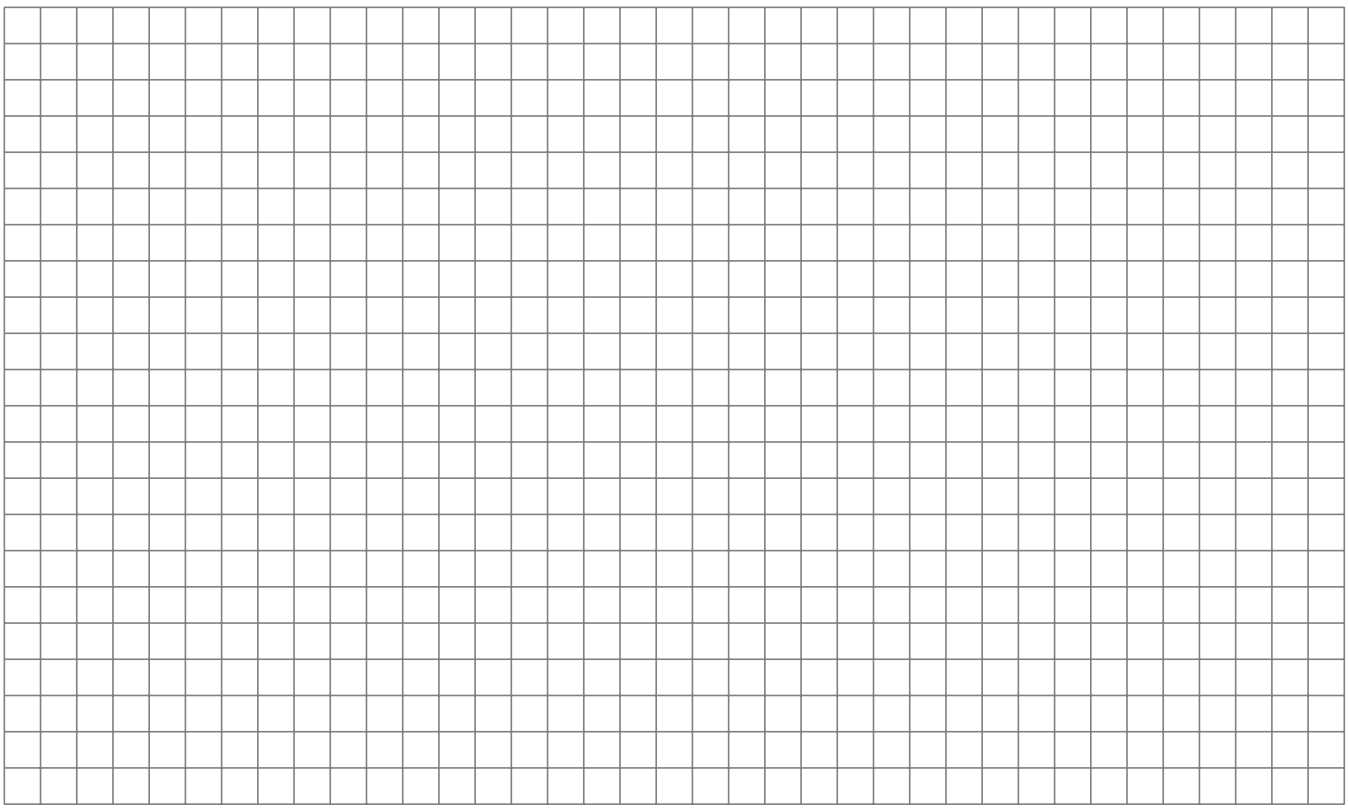


D9LB



Surface finish	Kit			Kit
$R_{max}6.3$ 0.01/100	BK360	6x M12x75 DIN 912 12.9	108 Nm ±15%	**NBR: SK-D9L-70** FPM: SK-D9L-V70

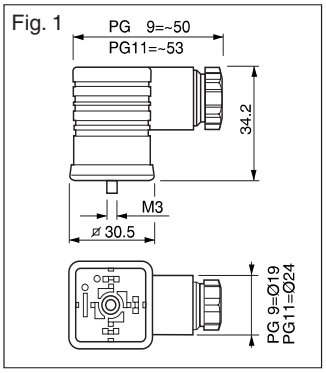
Notes

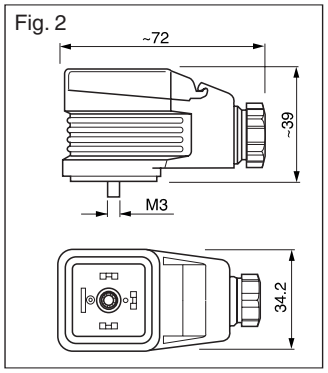


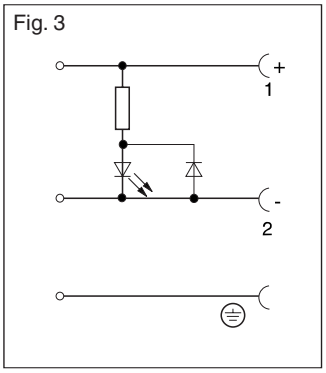
Description	Cable connection	Figure circuit	Order No. black (B)	Order No. grey (A)
Plug EN 175301-803 *, style AF Protection class IP 65 for voltages up to 250V	PG 9 PG 11	Fig. 1	5001710 5001716	5001711 5001717
Plug with LED 24V DC	PG 11	Fig. 1 and 3	5001571	5001572
Plug with lamp insert 120V AC Plug with lamp insert 230V AC		Fig. 1 and 4	5001573 5001575	5001574 5001576
Plug with LED 24 V DC and suppressing circuit	PG 11	Fig. 1 and 5	5001708	5001709
Plug with rectifier: Bridge-type rectifier with silicon diodes. Varistors are used to protect the diodes against power surges from the power supply up to 250V AC.		Fig. 1 and 6	5001737	5001738
Plug with cable strain relief and transparent cover		Fig. 2	5001723	5001724

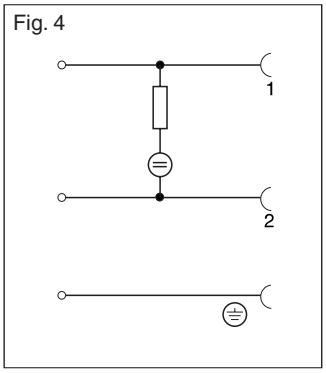
Inserts for plug 5001723 and 5001724	Cicuit	Order No.
Bridge-type rectifier up to 250V AC 7	7	5001727
Bridge-type rectifier with lamp 250V AC	8	5001734

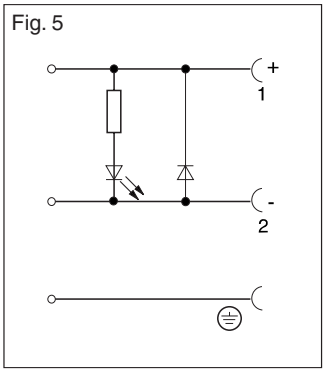
* (New) EN 175301-803 corresponds to (old) DIN 43650.

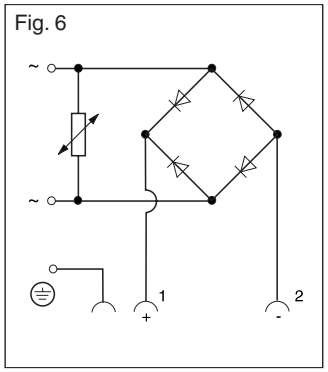


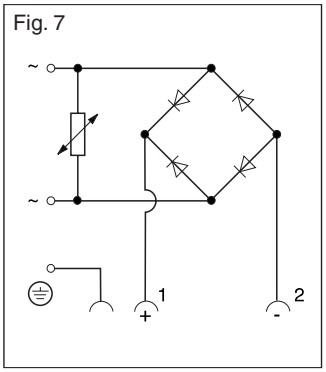


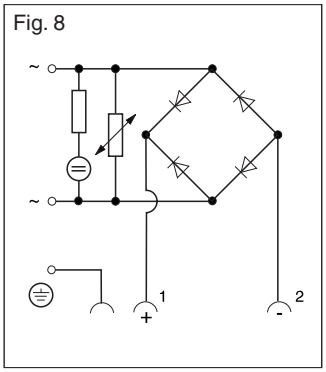




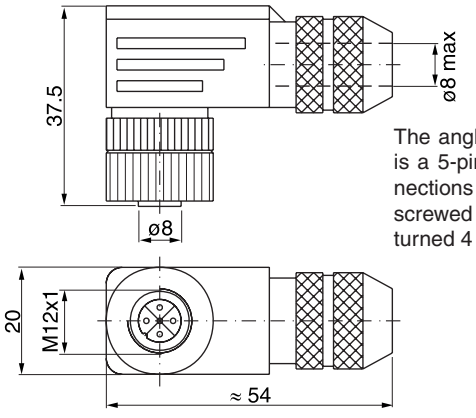




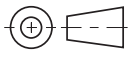




Plug M12x1, Order No.: 5004109



The angled plug for M12x1 is a 5-pin design. The connections in the plug can be screwed in. The plug can be turned 4 x 90°.

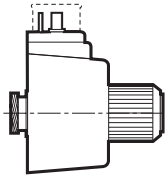


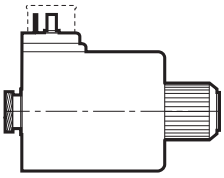
Plug kit 2-pin Junior Timer (AMP)

Order no.	Number of plugs in 1 kit
393 000 K822	1
393 000 K825	10
393 000 K826	50
393 000 K827	100

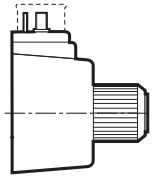
2

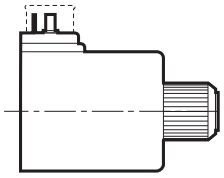
Solenoid kit (displayed: **EN plug**)
A solenoid kit contains tube, coil, retainer and seals for the solenoid.


AC


DC

Coil kit
A coil kit contains coil, retainer and seals for the coil.


AC


DC

For D1VW standard

Solenoid kits: **AK-D1VW-S-...** (Soft shift on request)			(Example: **AK-D1VW-S-JW-75**)	
Voltage Volt/Hertz	Voltage Code	EN plug D1VW	EN plug without manual override (Code „T“) D1VW	EN plug with 210bar tank pressure (Code „H“) D1VW
12V=	K	**KW-75**	KWT-75	KW-75
24V=	J	**JW-75**	JWT-75	JW-75
98V=	U	UW-75	UWT-75	UW-75
205V=	G	GW-75	GWT-75	GW-75
110V/50Hz / 120V/60Hz	Y	**YW-70**	–	YWH-70
230V/50Hz / 240V/60Hz	T	**TW-70**	–	TWH-70

Coil kits: **AK-D1VW-C-...**	(Example: **AK-D1VW-C-JW-75**)	
Voltage Volt/Hertz	Voltage Code	EN plug D1VW
12V=	K	**KW-75**
24V=	J	**JW-75**
98V=	U	UW-75
205V=	G	GW-75
110V/50Hz / 120V/60Hz	Y	**YW-70**
230V/50Hz / 240V/60Hz	T	**TW-70**

D1VW 8 Watt

Solenoid kits: **AK-D1VW-S-...**				Coil kits: **AK-D1VW-C-...**	
Voltage Volt/Hertz	Voltage Code	EN plug D1VW	M12x1 „DESINA“ (Code „DLJ5“) D1VW	EN plug D1VW	M12x1 „DESINA“ (Code „DLJ5“) D1VW
24V=	J	JWL-75	JDLJ5-75	**JWL-75**	JDLJ5-75

D3W

Solenoid kits: **AK-D3W-S-...** (Soft shift on request) (Example: **AK-D3W-S-JW-30**)					Coil kits: **AK-D3W-C-...**	
Voltage Volt/Hertz	Voltage Code	EN plug D3W	EN plug without manual override (Code „T“) D3W	EN plug with 210bar tank pressure (Code „H“) D3W	EN plug D3W	EN plug without manual override (Code „T“) D3W
12V=	K	KW-30	KWT-30	KW-30	KW-30	KWT-30
24V=	J	**JW-30**	JWT-30	JW-30	**JW-30**	JWT-30
98V=	U	UW-30	UWT-30	UW-30	UW-30	UWT-30
205V=	G	GW-30	GWT-30	GW-30	GW-30	GWT-30
110V/50Hz 120V/60Hz	Y	**YW-30**	–	YWH-30	**YW-30**	–
230V/50Hz 240V/60Hz	T	**TW-30**	–	TWH-30	**TW-30**	–

Other solenoids, coil kits and tube kits on request.

Bold letters =
Short-term availability

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Hydraulic Controls Division
Kaarst, Germany

O-rings to seal between valve and mounting surface

Valve size	Valve series	Ports	Dimensions inner Ø x section Ø	Quantity [1]
DIN NG 6	**D1**	P, A, B, T X, Y	9.25 x 1.78 4.47 x 1.78	4 2
DIN NG10	**D3**	P, A, B, T X, Y	12.42 x 1.78 10.82 x 1.78	5 2
DIN NG 16	**D4**	P, A, B, T X, Y	21.89 x 2.62 10.82 x 1.78	4 2
DIN NG 25	**D8**	P, A, B, T X, Y	29.82 x 2.62 20.29 x 2.62	4 2
DIN NG 25	**D9**	P, A, B, T X, Y	34.59 x 2.62 20.29 x 2.62	4 2
DIN NG 32	**D11**	P, A, B, T X, Y	53.57 x 3.53 14.00 x 1.78	4 2

[1] Number per set

Seal kits (connecting surface and inner seals)

Valve series	Material	Order code for valve size						
		D1	**D3**	**D31DW**	**D4**	**D8**	**D9**	**D11**
D**W Solenoid	NBR	SK-D1VW-70	SK-D3W-30	SK-D31DW-75	SK-D41VW-70	SK-D81VW-70	SK-D91VW-70	SK-D111VW-70
	FPM	SK-D1VW-V70	SK-D3W-V30	SK-D31DW-V75	SK-D41VW-V70	SK-D81VW-V70	SK-D91VW-V70	SK-D111VW-V70
D**P Hydr.	NBR	SK-D1VP-70	SK-D3DP-35	–	SK-D41VW-70	–	SK-D91VW-70	SK-D111VW-70
	FPM	SK-D1VP-V70	SK-D3DP-V35	–	SK-D41VW-V70	–	SK-D91VW-V70	SK-D111VW-V70
D*L/LB Hand lever	NBR	SK-D1DL-77	SK-D3DL-35	–	SK-D4L-60	–	SK-D9L-60	–
	FPM	SK-D1DL-V77	SK-D3DL-V35	–	SK-D4L-V60	–	SK-D9L-V60	–

2

Slip-in orifice for P, A, B port of directional control valves NG6 and NG10

DK — □ □

Orifice kit | Size | Orifice size

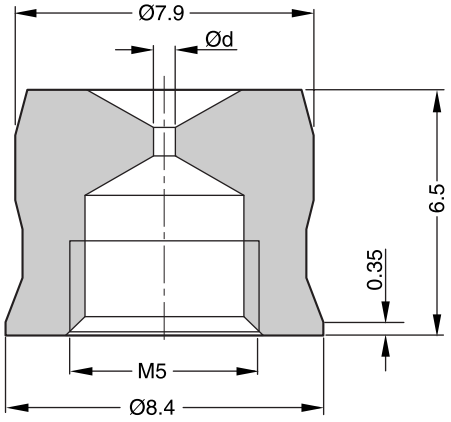
Code	Size
D1VW	NG6
D3W	NG10

Code	Orifice Ø	NG6	NG10
00	without orifice	x	x
06	0.6 mm	x	
08	0.8 mm	x	x
09	0.9 mm	x	
10	1.0 mm	x	x
11	1.1 mm	x	
12	1.2 mm	x	x
14	1.4 mm	x	x
15	1.5 mm	x	x
17	1.7 mm		x
18	1.8 mm	x	
20	2.0 mm	x	x
25	2.5 mm	x	x
30	3.0 mm		x
45	4.5 mm		x

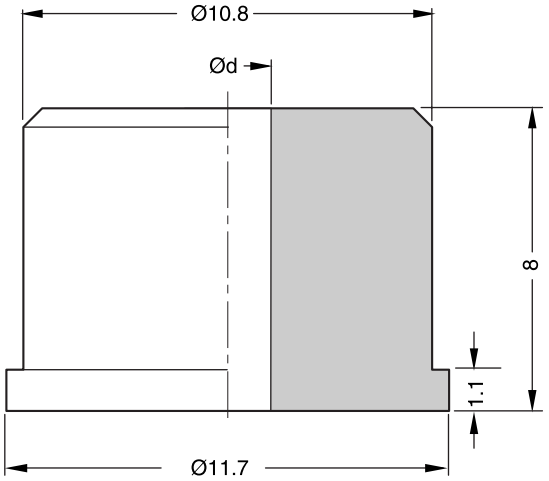
Package size: Each kit contains 10 orifice of the same size.

Dimensions

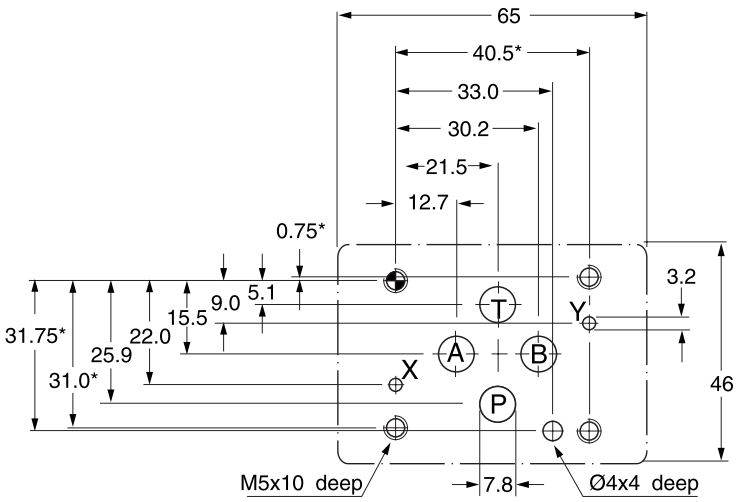
NG6



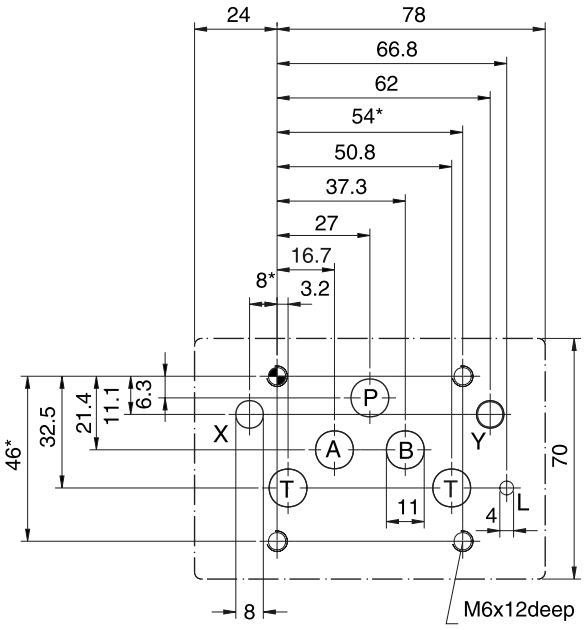
NG10



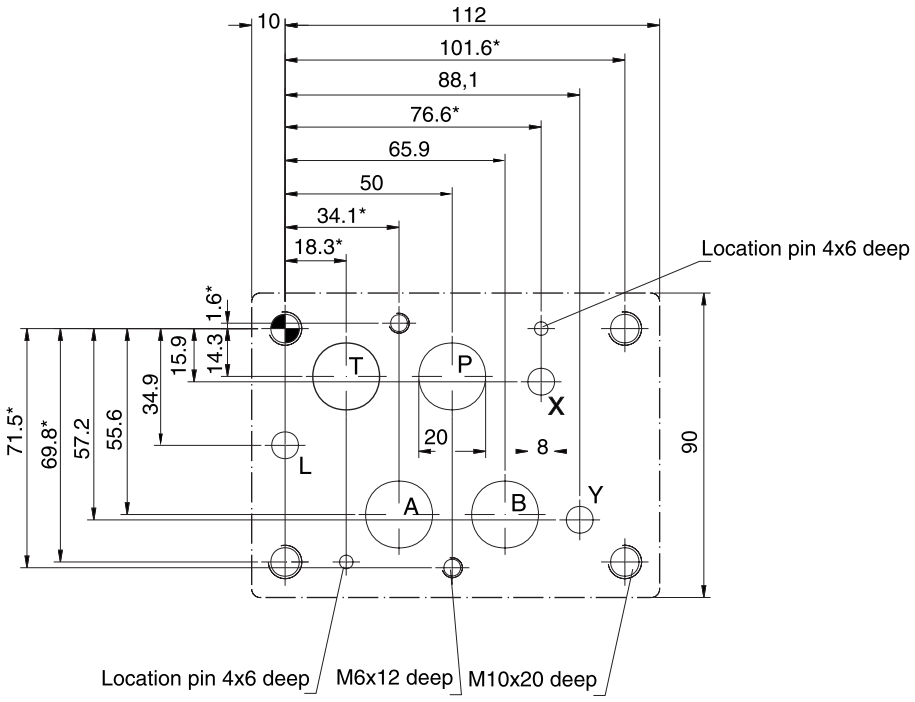
Size 6, mounting pattern to DIN 24340-A6



Size 10, mounting pattern to DIN 24340-A10



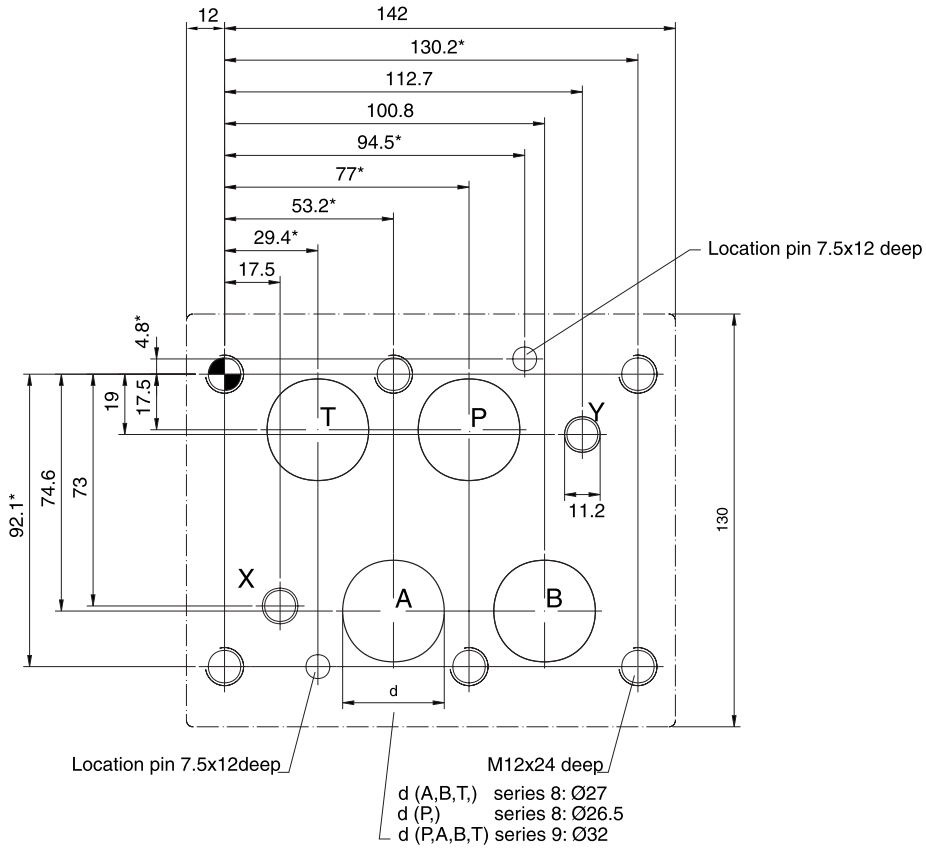
Size 16, mounting pattern to DIN 24340-A16



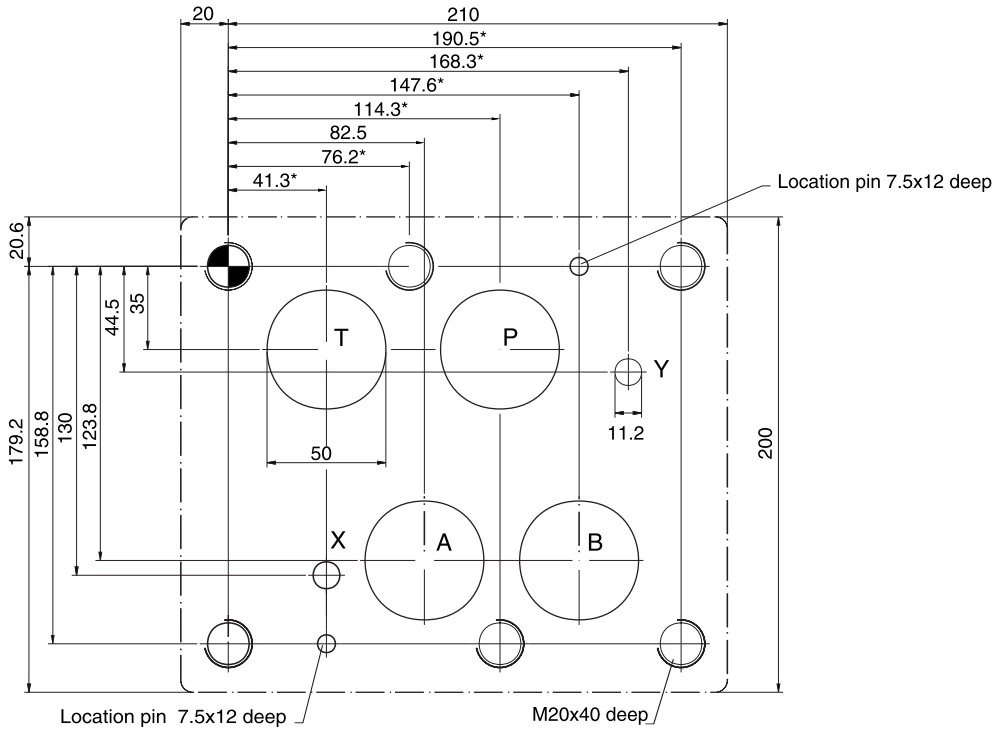
With * marked dimensions ± 0.1mm. All other dimensions ± 0.2mm.

Subplates and manifolds see accessories.

Size 25, mounting pattern to DIN 24340-A25



Size 32, mounting pattern to DIN 24340-A32



With * marked dimensions ± 0.1mm. All other dimensions ± 0.2mm.

Subplates and manifolds see accessories.

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